Annex II

PROTECTION OF THE ATMOSPHERE

(Shinya Murase)

I. Introduction

1. The atmosphere (air mass), mostly existing in the troposphere and stratosphere, is the planet's largest single natural resource, and it is indispensable for the survival of humankind. Degradation of atmospheric conditions has long been a matter of serious concern to the international community.[1] While there have been a number of relevant conventions concluded for the protection of the transboundary and global atmosphere, these have nonetheless left substantial gaps in terms of geographical coverage, regulated activities, controlled substances and, most importantly, the applicable principles and rules. This piecemeal approach has had particular limitations for the atmosphere, which by its very nature warrants holistic treatment. There is no convention at present that covers the whole range of environmental problems of the atmosphere in a comprehensive and systematic manner. It is therefore believed that the Commission can make a significant contribution by codifying and progressively developing the relevant legal principles and rules on the basis of State practice and jurisprudence.

2. It is important to ensure that the International Law Commission be fully engaged with the international community's present-day needs. While the Commission's draft articles on international watercourses and on transboundary aquifers[2] contain some relevant provisions regarding the protection of the environment, the Commission has not dealt with any topic in the field of international environmental law since the conclusion of the topic on liability (in other words, the prevention of transboundary harm and allocation of loss),[3] which appears to be a significant omission at a time when the world is undergoing critical environmental degradation. It is therefore proposed that the Commission consider for its future work the topic "Protection of the atmosphere".

II. Rationale for the proposed topic

3. There is abundant State practice and literature on the subject. The frequently cited award of the *Trail Smelter* arbitration[4] (United States, Canada, 1938, 1941) has been the leading case on transboundary air pollution. In the 1950s, atmospheric nuclear testing manifested itself as one of the first environmental issues confronted by the international community.[5] The *Nuclear Tests* cases (*Australia* v. *France*; *New Zealand* v. *France*, 1973, 1974) before the International Court of Justice sparked heated discussions relating to possible atmospheric pollution.[6] The Court also referred, in its advisory opinion on the *Legality of the Threat or Use of Nuclear Weapons* in 1996, to the obligation of States to refrain from causing significant environmental damage from their transboundary pollution, including atmospheric pollution.[7] Accidents at nuclear facilities can have direct impacts on the environment of the atmosphere, as has been demonstrated by the accidents at Three Mile Island in 1979 and Chernobyl in 1986, as well as the damage to the Fukushima nuclear power plants caused by the huge earthquake and tsunami on 11 March 2011, which is currently a major concern for the international community. In the recent judgment of the *Pulp Mills on the River Uruguay (Argentina* v. *Uruguay)* case rendered on 20 April 2010, the Court

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[1] See, for example, A.-C. Kiss and D. Shelton, *International Environmental Law*, 3rd ed., Ardsley (New York), Transnational Publishers, 2004, pp. 555–592. See also Sands, *Principles of International Environmental Law* (footnote 483 above), pp. 317–390; Birnie, Boyle and Redgwell, *International Law and the Environment* (footnote 483 above), pp. 335–378; D. Hunter, J. Salzman and D. Zaelke, *International Environmental Law and Policy*, 3rd ed., New York, Foundation Press, 2007, pp. 538–733; and X. Hanqin, *Transboundary Damage in International Law*, Cambridge University Press, 2003, pp. 200–203.

[2] *Yearbook ... 1994*, vol. II (Part Two), para. 222; and *Yearbook ... 2008*, vol. II (Part Two), paras. 53–54.

[3] *Yearbook ... 2001*, vol. II (Part Two) and corrigendum, paras. 97–98; and *Yearbook ... 2006*, vol. II (Part Two), paras. 66–67.

[4] *Trail Smelter*, UNRIAA, vol. III (Sales No. 1949.V.2), pp. 1905 *et seq*. An often-quoted passage of the 1941 award reads as follows: "Under the principles of international law … no State has the right to use or permit the use of territory in such a manner as to cause injury by fumes in or to the territory of another or the properties or persons therein, when the case is of serious consequence and the injury is established by clear and convincing evidence" (*ibid.*, p. 1965).

[5] See, for example, the *Daigo Fukuryū Maru* (Lucky Dragon No. 5) incident (Japan, United States) in 1954; S. Oda, "The hydrogen bomb tests and international law", *Die Friedens-Warte*, vol. 53, No. 2 (1956), pp. 126–135; and L. F. E. Goldie, "A general view of international environmental law: a survey of capabilities, trends and limits", in A.-C. Kiss (ed.), *The Protection of the Environment and International Law*, Workshop 1973, The Hague Academy of International Law, Leiden, Sijthoff, 1975, pp. 25–143, at pp. 72−73.

[6] *Nuclear Tests (Australia* v. *France)*, *Interim Protection*, *Order of 22 June 1973*, *I.C.J. Reports 1973*, p. 99; *Judgment*, *I.C.J. Reports 1974*, p. 253; *(New Zealand* v. *France)*, *Interim Protection*, *Order of 22 June 1973*, *I.C.J. Reports 1973*, p. 135; and *Judgment*, *I.C.J. Reports 1974*, p. 457.

[7] *Legality of the Threat or Use of Nuclear Weapons* (see footnote 425 above), p. 241. The International Court of Justice stated thus in its opinion: "The existence of the general obligation of States to ensure that activities within their jurisdiction and control respect the environment of other States or of areas beyond national jurisdiction is now part of the corpus of international law relating to the environment" (pp. 241–242, para. 29).

referred in part to the issue of alleged air pollution (to the extent relevant to the river's aquatic environment).[8] Furthermore, the *Aerial Herbicide Spraying (Ecuador* v. *Colombia)* case currently pending before the International Court of Justice may also address the subject. The WTO case on the *United States—Standards for Reformulated and Conventional Gasoline* (1996) posed an important question of the compatibility of a country's domestic law (in this case, the United States Clean Air Act of 1990) with the trade provisions of the WTO/GATT.[9] Finally, relevant decisions of domestic courts may also be instructive.[10]

4. The relevant treaty and non-treaty practice includes the following:

• Convention on long-range transboundary air pollution (1979, entered into force 1983); Protocol to the 1979 Convention on long-range transboundary air pollution on long-term financing of the co-operative programme for monitoring and evaluation of the long-range transmission of air pollutants in Europe (EMEP) (1984); Protocol to the 1979 Convention on long-range transboundary air pollution on the reduction of sulphur emissions or their transboundary fluxes by at least 30 per cent (1985); Protocol to the 1979 Convention on long-range transboundary air pollution concerning the control of emissions of nitrogen oxides or their transboundary fluxes (1988); Protocol to the 1979 Convention on long-range transboundary air pollution concerning the control of emissions of volatile organic compounds or their transboundary fluxes (1991); Protocol to the 1979 Convention on Long-Range Transboundary Air Pollution on Further Reduction of Sulphur Emissions (1994); Protocol to the 1979 Convention on Long-Range Transboundary Air Pollution on Persistent Organic Pollutants (1998); Protocol to the 1979 Convention on Long-Range Transboundary Air Pollution on Heavy Metals (1998); and Protocol to the 1979 Convention on Long-Range Transboundary Air Pollution to Abate Acidification, Eutrophication and Ground-level Ozone (1999);

• Vienna Convention for the Protection of the Ozone Layer (1985);

• Montreal Protocol on Substances that Deplete the Ozone Layer (1987);

• Council Directive on the limitation of emissions of certain pollutants into the air from large combustion plants (1988/2001);[11]

• Agreement on air quality between Canada and the United States (1991);[12]

• United Nations Framework Convention on Climate Change (1992);

• The Kyoto Protocol to the United Nations Framework Convention on Climate Change (1997);

• The ASEAN Agreement on Transboundary Haze Pollution (2002);[13]

• Stockholm Declaration on the Human Environment (1972);[14]

• Institute of International Law resolution on transboundary air pollution (1987);[15]

• Rio Declaration on Environment and Development (1992);[16]

• Draft articles on prevention of transboundary harm from hazardous activities (2001);[17]

• Draft principles on the allocation of loss in the case of transboundary harm arising out of hazardous activities (2006).[18]

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[8] *Pulp Mills on the River Uruguay (Argentina* v. *Uruguay)*, *Judgment*, *I.C.J. Reports 2010*, p. 14, at pp. 100–101, paras. 263–264. The issue was raised during the oral proceedings (8 June 2006, CR 2006/47, paras. 22, 28 and 34; available from www.icj-cij.org).

[9] WTO, report of the Appellate Body, *United States—Standards for Reformulated and Conventional Gasoline*, WT/DS2/AB/R, 29 April 1996, pp. 16–17; and S. Murase, "Unilateral measures and the WTO Dispute Settlement", in S. S. C. Tay and D. C. Esty (eds.), *Asian Dragons and Green Trade: Environment, Economics and International Law*, Singapore, Times Academic Press, 1996, pp. 137–144.

[10] See, for example, *Massachusetts et al.* v. *Environmental Protection Agency et al.*, Decision of 2 April 2007, United States Supreme Court (549 U.S. 497; 127 S. Ct. 1438; 2007 U.S. LEXIS 3785), which was in part concerned with certain obligations of the Environmental Protection Agency to regulate emissions of greenhouse gases.

[11] Council Directive of 24 November 1988 on the limitation of emissions of certain pollutants into the air from large combustion plants, *Official Journal of the European Communities*, No. L 336, p. 1; and Directive 2001/80/EC of the European Parliament and of the Council of 23 October 2001 on the limitation of emissions of certain pollutants into the air from large combustion plants, *Official Journal of the European Communities*, No. L 309, p. 1.

[12] United Nations, *Treaty Series*, vol. 1852, No. 31532, p. 79.

[13] Entered into force on 25 November 2003.

[14] Declaration of the United Nations Conference on the Human Environment (Stockholm Declaration) (1972) (*Report of the United Nations Conference on the Human Environment, Stockholm, 5–16 June 1972* (United Nations publication, Sales No. E.73.II.A.14), Part One, chap. I). Principle 21 of the Stockholm Declaration provides as follows: "States have, in accordance with the Charter of the United Nations and the principles of international law … the responsibility to ensure that activities within their jurisdiction and control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction"; see also L. B. Sohn, "The Stockholm Declaration on the Human Environment", *Harvard International Law Journal*, vol. 14 (1973), p. 423.

[15] Article 2 provides as follows: "In the exercise of their sovereign right to exploit their resources pursuant to their own environmental policies, States shall be under a duty to take all appropriate and effective measures to ensure that their activities or those conducted within their jurisdiction or under their control cause no transboundary air pollution" (Institute of International Law, *Yearbook*, vol. 62, Part II, Session of Cairo (1987), p. 299; available from www.idi-iil.org, "Resolutions").

[16] *Report of the United Nations Conference on Environment and Development, Rio de Janeiro, 3–14 June 1992* (United Nations publication, Sales No. E.93.I.8 and corrigendum), vol. I: *Resolutions adopted by the Conference*, resolution 1, annex I.

[17] *Yearbook … 2001*, vol. II (Part Two) and corrigendum, paras. 97–98.

[18] *Yearbook … 2006*, vol. II (Part Two), paras. 66–67.

5. The rationale for the proposed project for codification and progressive development of international law is manifold: First and foremost, it is necessary to fill the gaps in the existing conventions relating to the atmosphere. The number of relevant conventions notwithstanding, they have remained a mere patchwork of instruments which cover only specific geographical areas and a limited range of regulated activities and controlled substances.[19] The incremental approach has its particular limitations for the protection of the atmosphere, which by its very nature warrants holistic treatment in the form of a framework convention by which the whole range of environmental problems of the atmosphere could be covered in a comprehensive and systematic manner. Thus, the present proposal envisages an instrument similar to Part XII of the United Nations Convention on the Law of the Sea on protection and preservation of the marine environment.

6. Second, the Commission will be expected to provide appropriate guidelines for harmonization and coordination with other treaty regimes outside international environmental law, which may come in conflict with the proposed convention during the compliance and implementation phases.[20] Third, it is also important that the proposed draft articles help provide the framework for harmonization of national laws and regulations with international rules, standards and recommended practices and procedures relating to the protection of the atmosphere. Fourth, it is hoped that the proposed project will establish guidelines on the mechanisms and procedures for cooperation among States in order to facilitate capacity-building in the field of transboundary and global protection of the atmosphere.

7. It is important to clearly distinguish between the notion of atmosphere and the notion of airspace. Article 1 of the 1944 Convention on International Civil Aviation reaffirms the rule of customary international law that "every State has complete and exclusive sovereignty over the airspace above its territory". Although the legal principles, rules and regulations envisaged in the proposed draft articles are perhaps most applicable to certain activities conducted *on the ground* within a State's territorial jurisdiction, there may be situations where the activities in question may be conducted in the airspace above.[21] In such a context, it will be appropriate for the draft articles to reaffirm a State's sovereignty over national airspace. It should be noted that the present project shall in no way be intended to affect the legal status of airspace as currently established in international law.

8. The present proposal does not duplicate the previous work of the Commission. The Commission adopted draft articles on prevention of transboundary harm from hazardous activities in 2001[22] and draft principles on the allocation of loss in the case of transboundary harm arising out of hazardous activities in 2006.[23] Both drafts contain important provisions potentially applicable to atmospheric damage. However, the scope of application of these drafts is, on the one hand, too broad (as they are intended to cover all types of environmental harm) and, on the other hand, too limited (as they focus on the questions related to prevention and allocation of loss caused by transboundary harm and hazardous activities). Since they do not adequately address the protection of atmospheric conditions as such, it is proposed that the Commission tackle the problem in a comprehensive and systematic manner, but, at the same time, with a specific focus on the atmosphere.

III. Physical characteristics of the atmosphere

9. In order to determine the definition, scope and objective of the exercise for codification and progressive development of international law on the protection of the atmosphere, as well as to characterize the legal status of the atmosphere, it is first necessary to understand the physical structure and characteristics of the atmosphere.

10. The "atmosphere" is "the envelope of gases surrounding the earth".[24] The main components (and proportion) of gases in the atmosphere are nitrogen (78.08 per cent), oxygen (20.95 per cent), argon (0.93 per cent) and carbon dioxide (0.03 per cent), with additional trace gases in tiny concentrations (0.01 per cent). The atmosphere exists in what is called the atmospheric cell. It is divided vertically into four atmospheric spheres (from the lower to upper layers: troposphere, stratosphere, mesosphere and thermosphere) on the basis of the temperature characteristics (see fig. 1).

[19] In recent years, there has been growing scientific evidence that so-called "tropospheric ozone" and "black carbon" are the two substances in the atmosphere directly threatening both the air quality and climate change. It is said that, for climate change, the so-called "greenhouse gases" identified in the United Nations Framework Convention on Climate Change are responsible for only 60 per cent, while these substances are responsible for some 40 per cent. This clearly demonstrates the *linkage* between the transboundary air pollution and climate change, and also the *gap* existing in the current treaty regime which needs to be filled by a comprehensive multilateral convention on the atmosphere. See the study by the United Nations Environment Programme (UNEP) and WMO on "Measures to limit near-term climate change and improve air quality: the UNEP/WMO integrated assessment of tropospheric ozone and black carbon" of 2011. It may also be noted that, for instance, Europe now struggles to meet standards for air quality as a result of the pollutants carried from other regions of the world. This is indicative of the fact that even regional air pollution problems cannot be solved without considering their causes and effects in the global framework.

[20] See S. Murase, "Perspectives from international economic law on transnational environmental issues", *Collected Courses of The Hague Academy of International Law, 1995*, vol. 253 (1995), pp. 283–431.

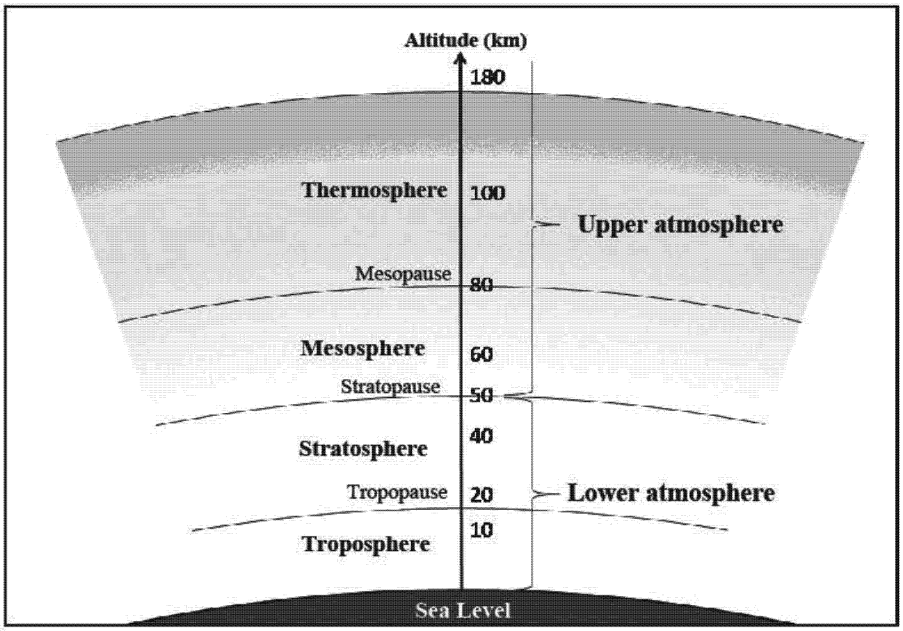
[21] Annex 16 to the 1944 Convention on International Civil Aviation is entitled "Environmental protection" (see ICAO, "Environmental protection: Annex 16 to the Convention on International Civil Aviation", vols. I (5th ed.) and II (3rd ed.) (2008)). The ICAO has established rules on the "Aircraft Engine Emissions Standards and Recommended Practices" since 1980, with a view to achieving "maximum compatibility between the safe and orderly development of civil aviation and the quality of the human environment" (ICAO Assembly resolution A18-11, para. (2) (Doc 8958 - A18-RES)). These Emissions Standards establish rules, *inter alia*, for vented fuel (Part II) and emissions certification (Part III), including emissions limits for smoke and certain chemical particles.

[22] See footnote 17 of the present annex above.

[23] See footnote 18 of the present annex above.

[24] *Concise Oxford English Dictionary*, 12th ed., Oxford University Press, 2011.

Figure 1. The zonation of the atmosphere

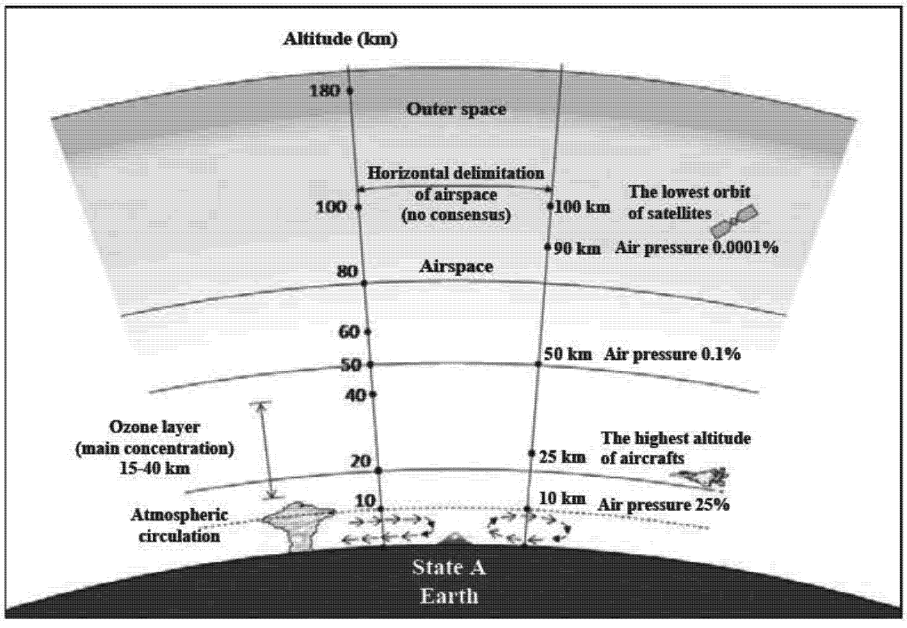


11. As the altitude increases, the gases in the atmosphere gradually dilute. Approximately 80 per cent of air mass exists in the troposphere and approximately 20 per cent in the stratosphere. In the troposphere and the stratosphere, the relative proportions of most gases are fairly stable; scientifically these spheres are grouped together as the *lower atmosphere*, which extends to an average altitude of 50 km, and are distinguished from the *upper atmosphere*. The atmosphere moves and circulates around the earth in a complicated manner, which is called "atmospheric circulation".[25] The gravitational influence of the sun and moon also affects its movements by creating "atmospheric tides".[26]

[25] G. Jones *et al.*, *Collins Dictionary of Environmental Science*, Glasgow, Harper Collins Publishers, 1990, p. 40.

[26] M. Allaby, *A Dictionary of the Environment*, 3rd ed., New York University Press, 1989, p. 34.

Figure 2. The delimitation of the atmosphere



12. Both human and natural environments can be adversely affected by certain changes in the condition of the atmosphere. There are three particularly important causes for the degradation of the atmosphere.[27] First, the introduction of harmful substances into the troposphere and lower stratosphere causes changes in atmospheric conditions (in other words, air pollution). The major contributing causes of air pollution are acids, nitrous oxides (NOx), sulphur oxides (SOx) and hydrocarbon emissions such as carbon dioxide (CO2). Strong horizontal winds, for example jet streams,[28] can quickly transport and spread these trace gases horizontally all over the globe, far from their original sources (although vertical transport is very slow). Second, chlorofluorocarbons (CFCs) and halons emitted into the upper troposphere and stratosphere cause ozone depletion. The ozone layer, as its name implies, contains significant amounts of ozone (O3), a form of oxygen. The main concentrations of ozone are at altitudes of 15 to 40 km (maximum concentrations are between 20 and 25 km). The ozone layer filters out ultraviolet radiation from the sun, which may cause skin cancer and other injuries to life. Third, changes in the composition of the troposphere and lower stratosphere cause climate change. The main cause of human-induced climate change is additional trace gases, such as carbon dioxide (CO2), nitrous oxide (N2O), methane (CH4), CFCs and tropospheric ozone (O3). These are called "greenhouse gases".[29] Conditions within the troposphere heavily affect the weather on the earth's surface, including cloud formation, haziness and precipitation. Most gases and aerosols are expunged by a natural "cleansing process" in the troposphere, but when emissions overwhelm this process, climate change begins to occur.

13. These three main international issues concerning the atmosphere—air pollution, ozone depletion and climate change—relate to the *troposphere* and the *stratosphere*,[30] although major contributing factors may be different in each case. The upper atmosphere—the mesosphere and thermosphere—which comprises approximately 0.0002 per cent of the atmosphere's total mass, is of little concern regarding the environmental problems under consideration, not to mention the vast regions of outer space where there is no air.

IV. Legal issues to be considered

14. The final outcome of this project is envisaged as a comprehensive set of draft articles for a framework convention on the protection of the atmosphere. Part XII of the United Nations Convention on the Law of the Sea, on the protection and preservation of the marine environment, may provide an example of the form that these draft articles could take. The legal issues to be considered, among others, will be as follows.

15. (**Definition**) Embarking on the formulation of relevant principles and rules on the protection of the atmosphere, the Commission will first need to define the atmosphere. The atmosphere—or air mass—is a mixture of gases that surrounds the earth, most of it existing in the troposphere and stratosphere. It may also be necessary to address not only the physical make-up of the atmosphere, but also its role as a medium for transporting pollutants. This definition will also clearly distinguish the notion of airspace and its distinct relevance from the definition of atmosphere.

16. (**Scope**) In clarifying the scope of the project, it should be made clear first that the proposed draft articles are addressed only to damage caused by human activities, and accordingly, their scope would not extend, for instance, to the damages caused by volcanic eruption and desert sand (unless these are exacerbated by human activity). Second, the draft articles should make clear the objects to be protected, natural and human environments, and the intrinsic relationship between the two. Third, it should be necessary to refer to the different modalities of the environmental damage in the atmosphere; one is the introduction of (deleterious) substances into the atmosphere and another, the alteration in the balance of composition of the atmosphere.

17. (**Objective**) Because of its dynamic and fluctuating character, the atmosphere needs to be treated as a *single global unit* for the purpose of environmental protection. While recognizing the difference of *modalities* in legal responses between transboundary air pollution and global atmospheric problems, both should be treated within the same legal framework based on the functional notion of the atmosphere for the purpose of codification and progressive development of international law on the subject. In other words, the atmosphere should be treated comprehensively for the purpose of its environmental protection.

18. (**Legal status of the atmosphere**) There are at least five concepts that may be considered relevant to the legal status of the atmosphere: airspace; shared or common natural resources; common property; common heritage; and common concern (common interest).[31] Each of these concepts should here be carefully considered as to whether and to what extent it is applicable to the protection of the atmosphere. For example, States may well wish to reaffirm their sovereignty over the atmosphere that exists within their airspace for the reasons stated above in paragraph 7.

19. (**Basic principles for the protection of the atmosphere**) Applicability of the well-known principles including the following will have to be considered: general obligations of States to protect the atmosphere; obligations of States *vis-à-vis* other States not to cause

[27] See R. Dolzer, "Atmosphere, protection", in R. Bernhardt (ed.), *Encyclopedia of Public International Law*, vol. 1, Amsterdam, North-Holland, 1992, p. 289.

[28] Jet streams are westerly winds (flowing from west to east) moving around the upper stratum of the troposphere. They move at a high speed of 240 to 720 km per hour.

[29] In recent years, however, scientists are finding that black carbon and troposphere ozone are also responsible for climate change. See footnote 19 of the present annex above.

[30] Kiss and Shelton, *International Environmental Law* (footnote 1 of the present annex above), pp. 556–562 (chap. 12, "Atmosphere, stratosphere and climate").

[31] See A. E. Boyle, "International law and the protection of the global atmosphere: concepts, categories and principles", in R. Churchill and D. Freestone (eds.), *International Law and Global Climate Change*, London, Graham and Trotman, 1991, pp. 7−19; see also J. Brunnée, "Common areas, common heritage, and common concern", in D. Bodansky, J. Brunnée and E. Hey (eds.), *The Oxford Handbook of International Environmental Law*, Oxford University Press, 2007, pp. 550–573.

significant harm to the atmosphere; the principle of *sic utere tuo ut alienum non laedas* to be applicable to the activities under the jurisdiction or control of a State; general obligations of States to cooperate; the principle of equity; the principle of sustainable development; and common but differentiated obligations.

20. (**Measures of prevention and precaution to protect the atmosphere**) One of the outstanding issues in this project will be the differentiation and relationship between the traditional "preventive" principle and the relatively new "precautionary" principle. Preventive measures should be taken where the probable damage is foreseeable with clear causal links and proofs, whereas, in contrast, precautionary measures ought to be taken even where the damage is scientifically uncertain. Environmental impact assessments will be crucial for certain situations.

21. (**Implementation of obligation**) Implementation of the prescribed obligations should be carried out through the domestic law of each State. Unilateral domestic measures and the effect of extraterritorial application have been sensitive issues in international environmental law. The role of relevant international organizations and the Conferences of the Parties should not be overlooked. Conflict and coordination with trade law will also be particularly important.

22. (**Mechanisms for cooperation**) Desirable procedures for cooperation, technical and other forms of cooperation, and pertinent measures for capacity-building should all be explored.

23. (**Procedural rules for compliance**) Notification, exchange of information, consultation, reporting systems, pledge and review, and promotional and enforcement procedures, among others, shall be considered.

24. (**Responsibility and liability**) Attribution of responsibility, due diligence, liability for high-risk activities and civil liability are no doubt critical issues to be considered in connection with the State's obligations under paragraphs 19 to 23 above.

25. (**Dispute settlement**) While recognizing the specific nature of each dispute settlement body, questions of general nature such as jurisdiction, admissibility and standing, and proof of scientific evidence should be considered.

V. Basic approaches

26. The Commission, charged with the work of codification and progressive development of international law, will not directly engage political issues. While the topic on climate change, for instance, often inspires impassioned political and policy debate, the Commission, composed as it is of legal experts, will deal only with the *legal* principles and rules pertaining to the protection of the atmosphere rather than the development of policy proposals. In so doing, the Commission's product will take the uncoordinated legal frameworks that have heretofore been set up to handle only discrete and specific atmospheric problems and rationalize them into a single, flexible code. This synthesis will hopefully lay the groundwork for a future convention covering substantive issues, and in the meantime help States, international organizations and civil society at large in clarifying the legal implications of their activities in this field.

27. It is important that the legal principles and rules on the subject be considered by the Commission within the framework of *general international law*. This implies that the work of the Commission should resist the tendency towards "fragmentation" caused by dominant "single-issue" approaches to international environmental law. In other words, the legal principles and rules on the atmosphere should, as far as possible, be considered in relation to doctrines and jurisprudence of general international law. It also implies that the work of the Commission should extend to applying the principles and rules of general international law to various aspects of the problem pertaining to the protection of the atmosphere.

VI. Cooperation with other bodies

28. Cooperation with other bodies is conceivable in various ways for conducting a study and elaborating draft articles on the protection of the atmosphere. The International Law Association, among others, has conducted a number of studies relating to the present subject. The author conducted preliminary informal consultations with the legal experts of UNEP in Nairobi in January 2011. He also held preliminary consultations in July 2011 at the International Environment House in Geneva with the experts of Geneva-based international environmental organizations and several secretariats of multilateral environmental agreements.

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PROTECTION OF THE ATMOSPHERE

[Agenda item 11]

DOCUMENT A/CN.4/667

First report on the protection of the atmosphere, by Mr. Shinya Murase, Special Rapporteur*

[*Original: English*]
[*14 February 2014*]

CONTENTS

* The Special Rapporteur wishes to thank Ms. Maya Inuzuka, Osgoode Hall Law School, York University, Canada, and Mr. Masayuki Hiromi, Research Associate, Institute of Comparative Law, Waseda University, Japan, for their valuable contribution in writing the present report, and Ms. Nadia Sanchez, PhD candidate at Leiden University, the Netherlands, for her assistance. He is also grateful to his interns from New York University School of Law for their assistance during the sessions of the Commission: Mr. Joseph Jerome in 2010; Mr. Joseph Rome in 2011; Ms. Annie Hillman in 2012; and Mr. Michael Lu in 2013.

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Introduction

A. Inclusion of the topic in the programme of work of the Commission

1. At its sixty-third session, held in 2011, the International Law Commission endorsed the inclusion of the topic "Protection of the atmosphere" in its long-term programme of work.[1] The syllabus, containing a brief outline of the topic and a selected bibliography, was annexed to the report of the Commission submitted to the General Assembly at its sixty-sixth session.[2]

2. At its sixty-sixth session, the General Assembly, in its resolution 66/98 of 9 December 2011 on the report of the Commission on the work of its sixty-third session, *inter alia*, took note of the inclusion by the Commission of the topic "Protection of the atmosphere" in its long-term programme of work (para. 7).

3. During the consideration by the Sixth Committee of the report of the Commission, a number of States welcomed the inclusion of the topic in the Commission's programme of work. These States expressed their keen interest in the subject.[3] Some also expressed a desire for the Commission to give priority to the topic.[4] The view was also expressed that the "topic of protection of the atmosphere addressed a growing global concern" and that an "effort by the Commission to take stock of rules under existing

[1] *Yearbook … 2011*, vol. II (Part Two), para. 32.

[2] *Ibid*., annex II.

[3] For example: Algeria, *Official Records of the General Assembly, Sixty-sixth Session, Sixth Committee*, 28th meeting (A/C.6/66/SR.28), para. 50; Denmark (on behalf of the Nordic countries), *ibid*., 18th meeting (A/C.6/66/SR.18), para. 30; Canada, *ibid*., 19th meeting (A/C.6/66/SR.19), para. 46; China, *ibid*., para. 15; Nigeria, *ibid*., 20th meeting (A/C.6/66/SR.20), para. 85; Poland, *ibid*., para. 64; Slovenia, *ibid*., para. 9; Spain, *ibid*., 27th meeting (A/C.6/66/SR.27), para. 37; and Sri Lanka, *ibid*., para. 29.

[4] Denmark (on behalf of the Nordic countries), *ibid*., 18th meeting (A/C.6/66/SR.18), para. 30, and Poland, *ibid*., 20th meeting (A/C.6/66/SR.20), para. 64.

conventions and to elaborate a new legal regime would be commendable".[5] Another delegation expressed a concurring view, going on further to state that the "deteriorating state of the atmosphere made its protection a pressing concern".[6] It was hoped that the Sixth Committee would give strong endorsement to the topic to be taken up by the Commission. Support was given in respect of the Commission's foray into new areas of international law, with one State stating that the Commission was now entering some areas of international law that it had never addressed before, such as the environment, humanitarian law and investment law and that the policy reflecting the current development of international law and the interests of the international community promised to bring very useful results.[7] It was noted that the protection of the atmosphere was "most deserving of consideration as [it] addressed fundamental aspects of environmental protection", a field in which there was no lack of international instruments or scholarly attention, but where there was "a need for further review and systematization in order to respond to the growing concerns of the international community".[8] Some States, however, expressed concerns as to the feasibility of the topic owing to its "highly technical issues".[9] With regard to codification and progressive development, it was hoped that the topic's "highly technical nature would not render the exercise futile".[10] The view was also expressed that since "the current structure of law in that area was treaty-based, focused and relatively effective, and in light of the ongoing negotiations designed to address evolving and complex circumstances, it would be preferable not to attempt to codify rules in that area at present".[11] The Special Rapporteur takes such criticisms very seriously and has tried to address the concerns in the present report. It is his sincere hope that the Member States will be convinced that the protection of the atmosphere is an important and appropriate topic for the Commission to address.

4. At its sixty-fifth session, held in 2013, the Commission decided to include the topic in its current programme of work and appointed Mr. Shinya Murase as Special Rapporteur for the topic.[12]

5. The Commission included the topic on the following understanding:

(*a*) Work on this topic will proceed in a manner so as not to interfere with relevant political negotiations, including those on climate change, ozone depletion, and long-range transboundary air pollution. The topic will not deal with, but is also without prejudice to, questions such as the liability of States and their nationals, the polluter-pays principle, the precautionary principle, common but differentiated responsibilities, and the transfer of funds and technology to developing countries, including intellectual property rights;

(*b*) the topic will also not deal with specific substances, such as black carbon, tropospheric ozone, and other dual-impact substances, which are the subject of negotiations among States. The project will not seek to "fill" the gaps in the treaty regimes;

(*c*) questions relating to outer space, including its delimitation, are not part of the topic;

(*d*) the outcome of the work on the topic will be a set of draft guidelines that do not seek to impose on current treaty regimes legal rules or legal principles not already contained therein.

The Special Rapporteur's reports would be based on such understanding.[13]

6. During the Sixth Committee's consideration of the Commission's report on the work of its sixty-fifth session, held in 2013, a number of delegates welcomed the inclusion of the topic,[14] while a few States expressed the same concerns as had been expressed in previous years.[15]

7. The Special Rapporteur has undertaken to establish contacts with representatives of interested intergovernmental and international organizations, including the United Nations Environment Programme (UNEP), the World Meteorological Organization (WMO) and the United Nations Economic Commission for Europe (ECE).[16]

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[5] Austria, *ibid*., 19th meeting (A/C.6/66/SR.19), para. 4.

[6] Japan, *ibid*., 18th meeting (A/C.6/66/SR.18), para. 63.

[7] Czech Republic.

[8] Italy, *Official Records of the General Assembly, Sixty-sixth Session, Sixth Committee*, 26th meeting (A/C.6/66/SR.26), para. 43. Slovenia also noted that the topic was of particular relevance (*ibid*., 20th meeting (A/C.6/66/SR.20), para. 9).

[9] It was noted that the topic appeared to be a highly technical topic, many aspects of which lay outside the areas of expertise of the Commission (France, *ibid*., 20th meeting (A/C.6/66/SR.20), para. 48). A similar concern was expressed by the Netherlands, which stated that the "question of protection of the atmosphere seemed more suited for discussion among specialists" (*ibid*., 28th meeting (A/C.6/66/SR.28), para. 64).

[10] Islamic Republic of Iran, *ibid*., 27th meeting (A/C.6/66/SR.27), para. 52.

[11] United States of America, *ibid*., 20th meeting (A/C.6/66/SR.20), para. 15. Similar remarks were made in 2012: China, *ibid*., *Sixty-seventh Session, Sixth Committee*, 19th meeting (A/C.6/67/SR.19), para. 52; France, *ibid*., para. 91; Netherlands, *ibid*., para. 31; Russian Federation, *ibid*., 22nd meeting (A/C.6/67/SR.22), para. 103; United Kingdom, *ibid*., 19th meeting (A/C.6/67/SR.19), para. 68; and United States, *ibid*., para. 118.

[12] *Yearbook … 2013*, vol. II (Part Two), p. 78, para. 168.

[13] *Ibid*. It may be noted that the understanding relates only to "relevant political negotiations" and "the subjects of negotiations"; therefore, such discussion is not prevented in relation to subjects that are not part of the agenda of any ongoing treaty negotiations, although the Special Rapporteur did not intend, from the beginning, to interfere with political processes or to deal with specific substances. That the project will not "deal with, but is also without prejudice to" certain questions mentioned above does not preclude the Special Rapporteur from referring to them in the present study. The project is not intended to fill the gaps in treaty regimes but it will certainly identify such gaps. Furthermore, it should be noted that the understanding indicates no restriction on discussing any matters of customary international law relating to the subject by taking treaty practice into consideration either as State practice or *opinio juris*.

[14] Austria, *Official Records of the General Assembly, Sixty-eighth Session, Sixth Committee*, 17th meeting (A/C.6/68/SR.17), para. 73; Czech Republic, *ibid*., 18th meeting (A/C.6/68/SR.18), para. 102; Indonesia, *ibid*., 19th meeting (A/C.6/68/SR.19), para. 69; Peru, *ibid*., 18th meeting (A/C.6/68/SR.18), para. 27; Portugal, *ibid*., 17th meeting (A/C.6/68/SR.17), para. 86; Romania, *ibid*., 18th meeting (A/C.6/68/SR.18), para. 116; Singapore, *ibid*., 17th meeting (A/C.6/68/SR.17), para. 78; and as well as Cuba (on behalf of the Community of Latin American and Caribbean States), India, Italy, Malaysia, Slovenia, Spain and Thailand. Austria suggested a redefinition of the understanding, stating that "some of the issues currently excluded from the mandate would also have to be taken up … such as liability and the precautionary principle" (*ibid*., 17th meeting (A/C.6/68/SR.17), para. 73). Japan stated that the "protection of atmospheric environment required coordinated action by the international community", expressing hope that "it looked forward to a fruitful outcome of the work on the topic" (*ibid*., para. 81).

[15] China, *Official Records of the General Assembly, Sixty-eighth Session, Sixth Committee*, 19th meeting (A/C.6/68/SR.19), para. 60; France, *ibid*., 17th meeting (A/C.6/68/SR.17), para. 106; Russian Federation, *ibid*., 19th meeting (A/C.6/68/SR.19), para. 55; United Kingdom, *ibid*., 18th meeting (A/C.6/68/SR.18), para. 21; and United States, *ibid*, 17th meeting (A/C.6/68/SR.17), para. 50. France pointed out that the limits imposed on the scope of the work seem to be "wise precautions" (A/C.6/68/SR.17, para. 106).

[16] A two-day workshop, organized by the Division of Environmental Law and Conventions of UNEP, was held for his benefit at UNEP

B. Purpose of the present report

8. The present report aims to address the general objective of the project in order to ascertain the rationale for work on the progressive development and codification of international law on the topic; and address the general scope of the topic in order to properly circumscribe it. The report is not, however, merely an exploratory study. It will attempt to identify the basic concepts, perspectives and approaches to be taken in connection with the subject. The purpose of the report is to outline the questions the Commission must consider from the outset with respect to the protection of the atmosphere and the corresponding legal problems to which they give rise, while simultaneously providing the basis for a common understanding of the basic concepts, objectives and scope of the project. It is hoped that the report will stimulate discussion within the Commission in order to provide the Special Rapporteur with the requisite guidance as to the approach to be followed and the goal to be achieved.

9. The present report first describes the rationale for the topic and basic approaches. It then traces the historical evolution of protection of the atmosphere in international law. It refers to the sources relevant to the progressive development and codification of the law on the topic and provides relevant information on the physical characteristics of the atmosphere, which will serve as a basis for defining the atmosphere in legal terms. It also provides a broad outline of the various elements comprising the general scope of the project, with a view to identifying the main legal questions to be covered. Lastly, the report discusses the question of the legal status of the atmosphere as a prerequisite for the Commission's consideration of the topic. The Special Rapporteur advances tentative conclusions on these preliminary questions in the form of draft guidelines.

C. Rationale for the topic and basic approaches

1. Rationale

10. While the draft articles of the Commission on the law of non-navigational uses of international watercourses[17] and the law of transboundary aquifers[18] contain some provisions relevant to the protection of the environment, the Commission had not dealt with any topic in the field of international environmental law since concluding its work on international liability for injurious consequences arising out of acts not prohibited by international law, namely, by adopting the draft articles on prevention of transboundary harm from hazardous activities[19] and the draft principles on the allocation of loss in the case of transboundary harm arising out of hazardous activities.[20] This appeared to be a significant oversight at a time when the world was undergoing serious environmental degradation.[21]

11. It may be recalled that the Commission had specified in 1997 and 1998 that, in selecting a new topic, it should be guided by the following criteria in particular: the topic should reflect the needs of States with respect to the progressive development and codification of international law; the topic should be at a sufficiently advanced stage in terms of State practice to permit progressive development and codification; and the topic should be settled and feasible enough for progressive development and codification.[22] It should be stressed that the Commission further agreed that it should not restrict itself to "traditional topics", and could also consider those that reflect "new developments in international law and pressing concerns of the international community as a whole".[23] The topic of protection of the atmosphere clearly satisfies those tests. First, the deteriorating state of the atmosphere has made its protection a pressing concern for today's international community. Second, there is abundant evidence of State practice including judicial precedents, treaties and other normative documents. Third, it is essentially a legal question rather than a political issue. For those reasons, the Commission and the Sixth Committee approved taking on the proposed topic.

12. As indicated in paragraphs 84 and 85 below, the atmosphere (air mass) is the planet's largest single natural

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headquarters in Nairobi on 17 and 18 January 2011 on the topic "Protection of the atmosphere". The Special Rapporteur wishes to express his deep appreciation to Mr. Masaharu Nagai, Acting Deputy Director of the Division, for organizing the workshop. A similar workshop was organized on the topic at the International Environment House in Geneva on 15 July 2011, and was attended by experts from Geneva-based international environmental organizations, such as the UNEP Regional Office for Europe, WMO and ECE. The Special Rapporteur wishes to thank the organizer of the workshop, Ms. Barbara Ruis of the UNEP Regional Office for Europe. Finally, a workshop on the topic was held in New York on 26 October 2011 at the Permanent Mission of Japan to the United Nations, jointly organized by UNEP and the Government of Japan. The Special Rapporteur wishes to express his deep gratitude to Mr. Tsuneo Nishida for hosting the workshop and to Mr. Chusei Yamada (former member of the Commission) for acting as moderator, as well as to the following for their contributions as speakers: Mr. Donald McRae (University of Ottawa School of Law and member of the Commission); Mr. Richard Stewart (New York University School of Law); and Mr. Masaharu Nagai (UNEP).

[17] See *Yearbook … 1994*, vol. II (Part Two), pp. 89 *et seq.*, para. 222. The draft articles resulted in the Convention on the Law of the Non-navigational Uses of International Watercourses.

[18] *Yearbook … 2008*, vol. II (Part Two), pp. 19 *et seq.*, para. 53.

[19] *Yearbook … 2001*, vol. II (Part Two), pp. 146 *et seq.*, para. 97.

[20] *Yearbook … 2006*, vol. II (Part Two), pp. 58 *et seq.*, para. 66.

[21] It was therefore welcomed that the Commission decided, in 2013, to adopt two environmental topics: "Protection of the atmosphere" and "Protection of the environment in relation to armed conflicts" (with Ms. Marie G. Jacobsson as the Special Rapporteur; see *Yearbook … 2013*, vol. II (Part Two), p. 78, para. 167).

[22] *Yearbook … 1997*, vol. II (Part Two), pp. 71–72, para. 238; and *Yearbook … 1998*, vol. II (Part Two), p. 110, para. 553. In the same vein, three criteria have been suggested for topic selection: practical concern, namely, whether there is any pressing need for the topic in the international community as a whole; technical feasibility, namely, whether the topic is "ripe" enough in the light of relevant State practice and literature; and political feasibility, namely, whether dealing with the proposed topic is likely to receive broad support from States. See Ramcharan, *The International Law Commission: Its Approach to the Codification and Progressive Development of International Law*, pp. 60–63; and Murase, *Kokusai Rippo: Kokusaiho no Hogenron* (*International Lawmaking: Sources of International Law*), pp. 217–221.

[23] *Yearbook … 1997*, vol. II (Part Two), pp. 71–72, para. 238. Mr. Amrith Rohan Perera, a member of the Commission during the 2006–2011 quinquennium, noted that "over time, the International Law of Co-existence evolved into an International Law of Co-operation, positive in character, to meet the needs and aspirations of the new global community and the accompanying challenges", and in "the final analysis, the ability of the Commission to effectively address these complex and challenging issues in formulating the new legal framework for contemporary international relations … will ensure the continuing relevance and the central role of the International Law Commission" (see Perera, "Role of international law in meeting challenges to contemporary international relations: contribution of the International Law Commission (ILC)", pp. 315 and 325, respectively).

resource; it is indispensable to the survival of humankind. Degradation of the conditions of the atmosphere has long been a matter of serious concern to the international community.[24] While a number of relevant conventions dealing with transnational and global atmospheric issues have been concluded, they remain a patchwork of instruments. Substantial gaps exist in terms of geographical coverage, regulated activities, regulated substances and, most importantly, applicable principles and rules. Such a piecemeal or incremental approach has created particular limitations for the protection of the atmosphere, which by its very nature warrants holistic treatment. There is no legal framework at present that covers the entire range of atmospheric environmental problems in a comprehensive and systematic manner. The Commission can therefore make a significant contribution by identifying the legal principles and rules applicable to the whole range of atmospheric problems on the basis of State practice and jurisprudence.

13. The goal to be achieved by the proposed project of progressive development and codification of international law is fourfold. First, the project aims to identify the status of customary international law, established or emerging, examining the gaps and overlaps, if any, in existing law relating to the atmosphere. Second, it aims to provide appropriate guidelines for harmonization and coordination among treaty regimes within and outside international environmental law. The issue of trade and the environment will prove to be a challenge in that area.[25] Third, the proposed draft guidelines will help to clarify a framework for the harmonization of national laws and regulations with international rules, standards and recommended practices and procedures relating to the protection of the atmosphere. Fourth, the project aims to establish guidelines on the mechanisms and procedures for cooperation among States in order to facilitate capacity-building in the field of transboundary and global protection of the atmosphere. It must be stressed that the purpose of this project is not to mould "shame and blame" matrices for potential polluters but that, on the contrary, it is primarily to explore possible mechanisms of international cooperation to solve the problems of common concern.

14. Last, as a word of reminder, it should be noted that the project does not duplicate the previous work of the Commission. The Commission adopted the draft articles on prevention of transboundary harm in 2001 and the draft principles on the allocation of loss in the case of transboundary harm arising out of hazardous activities in 2006. Both drafts contain important provisions potentially applicable to atmospheric damage. However, their scope of application is, on the one hand, too broad (as they are intended to cover all types of environmental harm) and, on the other hand, too limited (as they focus on questions related to the prevention and allocation of loss caused by transboundary harm and hazardous activities). As such, they do not adequately address the protection of the atmosphere. Therefore, it is proposed that the Commission tackle the problem in a comprehensive and systematic manner. The prior work of the Commission should be referred to as important guidelines, where appropriate.

2. Approaches

(a) *Adhering exclusively to a legal approach*

15. Needless to say, the Commission, charged with the work of the progressive development and codification of international law, will adhere exclusively to a legal approach in dealing with the topic. It will attempt to avoid the impassioned political and policy debate associated with certain environmental topics by addressing only the legal principles and rules pertaining to the protection of the atmosphere, as a Commission composed of legal experts. In the work of the Commission, it is critical to distinguish arguments based on *lex lata* (law as it is) from those based on *lex ferenda* (law as it ought to be). In the field of international environmental law, *lex ferenda* proposals and preferences are sometimes smuggled into the process of "interpretation" of *lex lata*, which should be avoided. Thus, the Commission will adopt a cautious approach to elaborating the draft guidelines on the protection of the atmosphere. First, it should seek to clarify the meaning and function of the existing legal principles in their interpretation and application de *lege lata*. Next, should existing law be found lacking, it could explore a reinterpretation of the existing legal concepts, principles and rules. Finally, it may, after careful analysis of the possibilities and boundaries of existing principles, add certain clarifications with regard to the progressive development of emergent rules of international law.

16. Naturally, all issues in international law, including the present topic, have both legal and political aspects. It is important, however, for the Commission to focus on the legal aspects of the issue. It is hoped that clarifying the key concepts from a legal perspective will enable a more disciplined analysis of their legal status, meanings, functions, implications, possibilities and limits within the existing legal regimes and set the stage for a more constructive elaboration and progressive development of international law in the future. The work of the Commission will take the various legal frameworks that have heretofore been set up to handle only discrete and specific atmospheric problems and rationalize them into a single, flexible set of guidelines. As agreed at the time of taking up the present topic, the work of the Commission will proceed in a manner so as not to interfere with relevant political negotiations (see para. 5 above).

(b) *Referring to general international law*

17. It is important for the Commission to consider the legal principles and rules on the subject within the framework of general international law. Obviously, the fundamental issues to be studied by the Commission involve such questions as the basic rights and obligations of States, the jurisdiction of States, the implementation of

[24] See, for example, Kiss and Shelton, *International Environmental Law*, pp. 555–592. See also Sands, *Principles of International Environmental Law*, pp. 317–390; Sands and Peel, *Principles of International Environmental Law*, pp. 238–298; Birnie, Boyle and Redgwell, *International Law and the Environment*, pp. 335–378; Hunter, Salzman and Zaelke, *International Environmental Law and Policy*, pp. 538–733; and Xue, *Transboundary Damage in International Law*, pp. 200–203.

[25] See Murase, "Perspectives from international economic law on transnational environmental issues"; from the same author, *International Law: An Integrative Perspective on Transboundary Issues*, pp. 1–127, and "Conflict of international regimes: trade and the environment".

international obligations through the domestic law of States, the responsibility of States and the settlement of disputes, as well as the sources of international law—classic issues for international lawyers in general and for the Commission in particular. In that regard, the Commission should resist the tendency towards "compartmentalization (or fragmentation)" caused by dominant "single-issue" approaches to international environmental law.[26] In other words, the legal principles and rules applicable to the atmosphere should, as far as possible, be considered in relation to the doctrine and jurisprudence of general international law.[27] It also implies that the work of the Commission should extend to applying the principles and rules of general international law to various aspects of the problem of atmospheric protection. The Commission must look to new topics in international law for progressive development and codification in specialized fields such as human rights, environmental protection, and trade and investment, since most of the significant "traditional" topics in international law have been exhausted. It is true to some extent that the development of those areas of law would be better carried out by specialized law-making bodies and experts with specialized knowledge. However, this would serve to further compartmentalize international law. It is absolutely necessary, therefore, to place each isolated compartment within the framework of general international law in order to establish coherent links among them. The "generalist" or "integrative" approach, which cuts across the boundaries of special regimes, is thus indispensable to today's law-making activities, and efforts to codify and progressively develop international law by the Commission are more important than ever before.

18. Given that the Commission is a body that primarily comprises experts in general international law, some may see it as ill-suited to accommodate new specialized subfields of international law. On the contrary, the Special Rapporteur sees new possibilities and new opportunities for the Commission in the twenty-first century. The enormous growth in the number of treaties in such specialized fields has led to "treaty congestion" or "treaty inflation".[28] The multitude of conventions notwithstanding, they are faced with significant gaps as well as overlaps because there has been little or no coordination or harmonization and, therefore, no coherence among them. The need to enhance synergies among the existing conventions has been emphasized repeatedly;[29] the Commission should seize upon this opportunity. In its exercise of progressive development and codification of international law, the Commission should deal with these proposed new topics in specialized fields from the perspective of general international law, with a view to ensuring coordination among the various subfields (compartments) of international law. The Commission is best placed to play that role.

(c) *Consulting scientific institutions and experts*

19. Taking on a subject such as the protection of the atmosphere requires the Commission to have a certain level of understanding of the scientific and technical aspects of the problem, such as the sources and effects of the damage in question. It is therefore necessary for the Commission to reach out to international environmental organizations and to the scientific community. Its statute authorizes, in article 16 (*e*), the Commission to "consult with scientific institutions and individual experts" for the progressive development of international law. There are also comparable precedents: Mr. Chusei Yamada, as Special Rapporteur for the law of transboundary aquifers, engaged UNESCO experts on the hydrology of aquifers for successful completion of the draft articles on the subject. As the author of the present report indicated above, steps have been taken to reach out to the

[26] Murase, *International Law*, p. 10. Mr. Martti Koskenniemi, a former member of the Commission, challenges the very *raison d'être* of the Commission by stating as follows: "Old law-making bodies such as the UN's International Law Commission find themselves increasingly jobless. Unable to identify stakeholder interests or regulatory objectives, 'generalist' law-making bodies will wither away to the extent that political commitment to that which is merely 'general' seems pointless. If human rights interests can best be advanced in human rights bodies, environmental interests in environmental bodies and trade interests in trade bodies, while transnational activities create *de facto* practices that are as good (or even better) than formal law in regulatory efficiency, why bother with 'the codification and progressive development of international law' (Statute of the International Law Commission, Article 1) beyond tinkering with diplomatic immunities or technical treaty law?" (Koskenniemi, "International law and hegemony: a reconfiguration", p. 212). See also Koskenniemi, *The Politics of International Law*, p. 237. It seems, however, that Koskenniemi's assertion contradicts the general conclusion of the Study Group on Fragmentation of International Law (A/CN/L.682 and Add.1 and Corr.1, available from the Commission's website, documents of the fifty-eighth session; the final text will appear as an addendum to *Yearbook … 2006*, vol. II (Part One)), which he chaired. (See also *The Work of the International Law Comission*, 8th ed., vols. I and II (United Nations publication, Sales No. E.12.V.2), pp. 231–234 and pp. 430–444.) Naturally, human rights bodies will be able to advance human rights interests more efficiently than other bodies; the situation is similar with environmental bodies and environmental interests, and trade bodies and trade interests. However, leaving law-making to specialist bodies results in a fragmentation of international law in an international society where there is neither a supreme legislature nor constitutional courts to ensure coordination among conflicting interests.

[27] For example, the use of the concept of "equity" in the context of climate change—often ambiguous and arbitrary—clearly demonstrates the need to refer to the jurisprudence of the International Court of Justice, including the 1985 Chamber judgment of the Court in the frontier dispute case between Burkina Faso and Mali (*Frontier Dispute, Judgment, I.C.J Reports 1986*, p. 554, at pp. 567–568, para. 28), in which the Court indicated that there were three categories of equity in international law: equity *infra legem* (within the law), equity *praeter legem* (outside, but close to, the law) and equity *contra legem* (contrary to law). The notion of equity *praeter legem* is particularly important for its function in filling gaps in existing law. See, in general, Weil, "L'équité dans la jurisprudence de la Cour Internationale de Justice: un mystère en voie de dissipation?"; Kokott, "Equity in international law", pp. 186–188; and Shelton, "Equity", pp. 653–658. See also the report of the National Committee on Climate Change of Japan, "Legal principles relating to climate change: preliminary issues on the methodology and scope of the work", *Japanese Yearbook of International Law*, vol. 52 (2009), pp. 500–537.

[28] See Brown Weiss, "International environmental law: contemporary issues and the emergence of a new world order", pp. 697–702; Murase and others, "Compliance with international standards: environmental case studies"; and Anton, "'Treaty congestion' in contemporary international environmental law".

[29] UNEP has been emphasizing the need for synergy among multilateral environmental agreements: see the appendix to decision SS.VII/1 of 15 February 2002 on international environmental governance of the seventh special session of the Governing Council entitled "Report of the Open-ended Intergovernmental Group of Ministers or Their Representatives on International Environmental Governance", sect. III.C entitled "Improved coordination among and effectiveness of multilateral environmental agreements", in particular paragraph 27 (see A/57/25, annex I). The UNEP Governing Council has adopted similar decisions almost every year. The latest is the Nusa Dua Declaration of 26 February 2010 (A/65/25, annex I, decision SS.XI/9, see paras. 10–12). See also Roch and Perrez, "International environmental governance: the strive towards a comprehensive, coherent, effective and efficient international environmental regime".

relevant international organizations as well as the scientific/technical community for their advice and expertise in helping the Commission to understand what has to be regulated. The situation is similar to the one faced by contemporary judges of international courts and tribunals, who, confronted with an increasing number of environmental disputes being filed in their dockets, require experts for proof of scientific evidence in those fact-intensive cases.[30]

[30] Most notably, see *Pulp Mills on the River Uruguay (Argentina v. Uruguay), Judgment, I.C.J. Reports 2010,* p. 14, at paras. 160–168 (on the burden of proof and expert evidence), and the joint dissenting opinion of Judges Al-Khasawneh and Simma (*ibid.,* pp. 108–111, paras. 1–6).

Chapter I

Background

A. Evolution of international law on the protection of the atmosphere

20. The gaseous content of the atmosphere (*aër* in Greek and Latin) has been categorized as one of the legal commons since Roman times—as proclaimed in the sixth century in a famous passage in the *Institutes* of Emperor Justinian: "Things can be: everybody's by the law of nature … the things which are naturally everybody's are: air, flowing water, the sea and the sea-shore."[31]

21. Sharia law, which was systematized in the early years of the Muslim era (the eighth and ninth centuries), places importance on "the air" as the element indispensable "for the perpetuation and preservation of life". An authoritative study states that "[t]his element is no less important than water" and "[s]ince the atmosphere performs all these biological and social functions, its conservation, pure and unpolluted, is an essential aspect of the conservation of life itself which is one of the fundamental objectives of Islamic law".[32]

22. For many centuries, oceans were at the centre of modern international law. Meanwhile, neither the atmosphere nor the air were considered objects to be regulated by international law until the twentieth century.[33] Lawyers first started looking to the sky in 1783 when a hot air balloon was launched by the Montgolfier brothers with the authorization of the French police. The authorization, containing clearly defined conditions to be observed, demonstrated the power of the State to regulate activities in what is now called airspace.[34] Development of the notion of airspace since then is well known.[35] However, most international lawyers did not attempt to look at the substances in the atmosphere or the role of the atmosphere in transporting pollutants even into the 1950s.[36] For a long time, the differentiation between airspace and atmosphere was not made clear among international lawyers, and it was generally considered that the highest altitude of an aircraft was the upper limit of airspace. For example, by interpreting the French text "*espace aérien*" in article 1 of the Convention on International Civil Aviation,[37] it was asserted that airspace reached as far as the atmosphere could be found. However, earlier in the twentieth century, a United States domestic court was faced with the air pollution case described below, which was later to have a significant impact on international law.

23. One of the earliest air-pollution cases to be considered in a domestic court was the United States Supreme Court case of the *State of Georgia v. Tennessee Copper Company*[38] in 1907 and 1915. The dispute concerned two copper mining companies located in the State of Tennessee that conducted mining and smelting operations near the border of the State of Georgia. The companies emitted large quantities of sulphur dioxide, which produced sulphuric acid in the atmosphere. Georgia brought an original action in the United States Supreme Court to restrain the two companies from discharging the noxious gas from their works. They alleged that the emissions, carried by the wind, resulted in a wholesale destruction of forests, orchards and crops in Georgia. The Supreme Court found that it was a fair and reasonable demand on the part of a sovereign entity that the air over its territory should not be polluted on a great scale. By 1914, Georgia and the Tennessee Copper Company had come to an agreement, whereby the latter undertook to contribute to

[31] *Justinian's Institutes*, Book Two, 1.1. The classification of things (*de rerum divisione*); see Sand, "Shared responsibility for transboundary air pollution".

[32] Bagader and others, *Environmental Protection in Islam,* p. 4. The Special Rapporteur wishes to express his gratitude to the author of the study, Wolfgang E. Burhenne.

[33] At the local level, legislative action in the face of atmospheric pollution dates back to at least 1273, when an ordinance aimed at the prohibition of coal burning in London was issued (see Rowlands, "Atmosphere and outer space", p. 317).

[34] In the period between 1870 and 1871 during the Franco-Prussian war, balloons were used on both sides, especially during the siege of Paris. Based on the experience of the war, the First Hague Peace Conference in 1899 adopted declaration (IV, 1) to prohibit for the term of five years the launching of projectiles and explosives from balloons, and other new methods of a similar nature (see Sand, Pratt and Lyon, *An Historical Survey of the Law of Flight*, p. 9; and Heere, "Problems of jurisdiction in air and outer space".

[35] At the turn of the twentieth century, Paul Fauchille was the leading advocate of freedom of the air. The gist of his arguments was that real property of the air was impossible because no one could appropriate it and that the same applied to the possibility of the State to "dominate" the air. The result was that airspace was a *res communis omnium,* and therefore free. For reasons of security, however, he proposed a safety zone for the first 1,500 metres above ground. Fauchille, "Le domaine aérien et le régime juridique des aérostats". The Convention relating to the regulation of Aerial Navigation recognized the complete and exclusive sovereignty over the airspace above a State territory (see Mateesco Matte, *Traité de droit aérien-aéronautique,* p. 95 *et seq.*).

[36] See, for example, Hogan, "Legal terminology for the upper regions of the atmosphere and for the space beyond the atmosphere".

[37] The Convention entered into force in 1947; see Cheng, "Air law", and *The Law of International Air Transport,* pp. 120–121.

[38] *State of Georgia v. Tennessee Copper Company and Ducktown Sulphur, Copper and Iron Company, Ltd,* United States Supreme Court, 13 May 1907, 10 May 1915, *United States Reports,* vol. 237, pp. 474 and 477; reproduced in Robb, *International Environmental Law Reports,* pp. 514–523.

a fund to compensate those injured by the fumes from its works, to allow inspections of its plant and to not operate more green ore furnaces than it found necessary. However, no agreement was reached with the Ducktown Company, and a second opinion of the Supreme Court was therefore rendered on 10 May 1915. The Court, while ultimately ruling in favour of Georgia's injunction request, found that it was impossible to ascertain the necessary reduction in sulphur content to Ducktown Company's emissions to prevent injury to the State. The Court imposed certain conditions on the Ducktown Company related to record-keeping, inspection and limiting emission levels.

24. The case was indeed a precursor to the famous *Trail Smelter* case[39] between the United States and Canada (then a Dominion of the United Kingdom) in the 1930s. The *Trail Smelter* case remains the leading case of transboundary air pollution in international law today, affirming the customary principle of "good neighbourliness" in bilateral arrangements between neighbouring countries. Its final judgment in 1941, which cited at length the decision in the *State of Georgia v. Tennessee Copper Company* case,[40] demonstrated that some of the most basic principles in international law are derived from domestic court decisions. The *Trail Smelter* case is representative of the traditional type of international environmental dispute in two ways: the causes and effects of the environmental damage are identifiable, and a territorial State is under an obligation to exercise due diligence over the activities of individuals and companies within its territory in order to ensure that the activities do not cause harm to other States and their nationals. That principle of prevention (or "preventive principle") was later confirmed as principle 21 of the Declaration of the United Nations Conference on the Human Environment (Stockholm Declaration) in 1972.[41] Transboundary air pollution caused by industrial accidents has become serious and large scale since the 1970s, as seen in the catastrophic accidents at Seveso, Italy (1976), and Bhopal, India (1984).[42] The Convention on the Transboundary Effects of Industrial Accidents[43] was designed to protect humans and the environment from the consequences of industrial accidents through preventive measures and, should accidents occur, to implement efforts to reduce their severity and mitigate their impacts.

25. The 1960s saw not only the repetition of traditional transboundary environmental problems but also the appearance of new challenges in international environmental law. The challenges came from two perspectives. One challenge was the broadening of environmental damage both in terms of its causes and effects, as in the case of acid rain, which made it difficult to identify distinct point-sources of pollution as well as specifically affected locations. The cumulative nature of the damage makes it particularly difficult to allocate blame. The Convention on Long-range Transboundary Air Pollution, of 1979, was concluded within a regional framework in response to such problems.[44] The other challenge was the rapid development of so-called "ultra-hazardous activities", such as the operation of oil tankers, aircraft, nuclear power plants and space objects. While those activities are generally beneficial for the welfare of people, they carry the potential for tremendous damage to human life in the event of accidents, and accidents have occurred. It was therefore necessary to establish a special regime of liability in the relevant conventions.[45]

26. Since the 1980s, the world has witnessed the rapid deterioration of the global environment in the form of ozone depletion and climate change. The initial response by the international legal community comprised the Vienna Convention for the Protection of the Ozone Layer[46] and the Montreal Protocol on Substances that Deplete the Ozone Layer.[47] The United Nations Framework Convention on Climate Change[48] and the Kyoto Protocol to the Convention[49] were later concluded to meet the challenge of climate change. In response to these global issues, international law has developed a number of new techniques to cope with the scientific uncertainty associated with environmental problems, including the adoption of precautionary approaches; a combination of framework conventions and protocols; and unique non-compliance procedures and flexible mechanisms.[50]

27. It may be noted that in the late 1980s there were certain significant movements promoting the idea of a "law of the atmosphere" aimed at the adoption of a comprehensive approach to combating atmospheric problems.[51]

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[39] *Trail Smelter*, UNRIAA, vol. III (United Nations publication, Sales No. 1949.V.2), pp. 1905–1982.

[40] *Ibid.*, p. 1965.

[41] See *Report of the United Nations Conference of the Human Environment, Stockholm 5–16 June 1971* (United Nations publication, Sales No. E.73.II.A.14), chap. I.

[42] Murase, *International Law: An Integrative Perspective on Transboundary Issues*, pp. 74–96.

[43] The Convention entered into force in 2000.

[44] The Convention entered into force in 1983; see Sand, "Regional approaches to transboundary air pollution".

[45] See, for example, Goldie, "Liability for damage and the progressive development of international law"; Jenks, "Liability for ultra-hazardous activities in international law", pp. 111–120; Dupuy, *La responsabilité internationale des États pour les dommages d'origine technologique et industrielle*.

[46] The Convention entered into force in 1988.

[47] The Protocol entered into force in 1989.

[48] The Convention entered into force in 1994.

[49] The Protocol entered into force in 2005.

[50] Murase, *International Law: An Integrative Perspective on Transboundary Issues*, pp. 24–30.

[51] For the 1988 and 1989 conferences organized by the Government of Canada, see, "International Conference on Atmosphere", *Environmental Policy and Law*, vol. 18, No. 5 (1988), p. 155 and "Protection of the atmosphere: statement of the International Meeting of Legal and Policy Experts, Ottawa, Ontario, Canada, February 22, 1989", *American University Journal of International Law and Policy*, vol. 5 (1989–1990), pp. 529–542; Bruce, "Law of the air: a conceptual outline"; Sand, "UNCED and the development of international environmental law"; and Soroos, *The Endangered Atmosphere: Preserving a Global Commons*. Mr. Donald McRae recalls that the topic of the protection of the atmosphere has had a link with the Commission since the late 1980s, remarking: "In June 1988 Canada hosted a conference in Toronto on the changing atmosphere, which engaged scientists and officials from Governments, the United Nations and other intergovernmental and non-governmental organizations. That conference called on Governments to work with urgency toward an action plan for the protection of the atmosphere, which would include an international framework convention. The next year in February 1989 a meeting of legal and policy experts was held in Ottawa. The meeting endorsed the idea of a framework convention on the protection of the atmosphere and set out the elements that would be needed in such a framework convention. Of course, events moved on, climate

(*Continued on next page.*)

Chapter 9 of Agenda 21 addressed the "Protection of the atmosphere",[52] and in ensuing years the Commission on Sustainable Development held substantive discussions on the subject in 2001[53] and 2007,[54] focusing on a cluster of thematic issues, including the atmosphere and air pollution. In 2002, the Johannesburg Declaration on Sustainable Development stated that the global environment continued to suffer and that air, water and marine pollution continued to rob millions of a decent life.[55] However, efforts to protect the atmosphere have not yet materialized into a hard-law instrument. Nonetheless, in recent years, there appears to be a revival of enthusiasm for a comprehensive multilateral convention on the atmosphere. For instance, the fifteenth World Clean Air Congress held in Vancouver, Canada, in September 2010 adopted its final declaration entitled "One atmosphere", which sought to encourage the integration of climate and pollution policies and called for a new "law of the atmosphere", which would parallel the United Nations Convention on the Law of the Sea.[56] It may be a little too ambitious to talk about the "law of the atmosphere" just yet. It appears more realistic to consider a "law on the protection of the atmosphere" with a relatively narrower focus. It is nonetheless encouraging to see that momentum appears to be mounting for a comprehensive consideration of the subject.

28. Finally, it may be worth pointing out that one of the outcomes of the workshop held in Gothenburg, Sweden, from 24 to 26 June 2013, on future international air pollution strategies, which was organized by the Swedish Environmental Protection Agency and the Swedish Environmental Research Institute, in close collaboration with the secretariat of the Convention on Long-range Transboundary Air Pollution and the European Commission, was a recommendation to call upon the expertise of the Commission in addressing atmospheric protection. Participants at the workshop stated that the Convention on Long-range Transboundary Air Pollution should invite the Commission "to continue exploring the scope for a *'Law of the Atmosphere'*, which would facilitate integrated action on climate change and tropospheric air pollution".[57] The high expectations of the international community in respect of the Commission should be duly noted.

B. Sources

29. Several sources relevant to the protection of the atmosphere can be cited. The relevant multilateral conventions can be roughly classified into those of, primarily, regional application and those of universal application. In contrast to the number of multilateral conventions, bilateral conventions are few, evincing the essentially regional and global character of the majority of the problems relating to the atmosphere. Principles and rules of customary international law must be ascertained in light of *opinio juris* and the general practice of States. The jurisprudence of international courts and tribunals is no doubt an important source for determining the customary law status of the rules and principles relating to the protection of the atmosphere. Non-treaty instruments, domestic legislation and the jurisprudence of domestic courts are also important sources for ascertaining existing or emergent rules of customary law—the basis for the exercise of codification and progressive development.

1. Treaty practice

30. The following is a non-exhaustive list of binding multilateral and bilateral agreements relevant to atmospheric problems:

(a) *Multilateral agreements relating to air pollution*

— The Convention on Long-range Transboundary Air Pollution and the protocols thereto, including on long-term financing of the co-operative programme for monitoring and evaluation of the long-range transmission of air pollutants in Europe; on the reduction of sulphur emissions or their transboundary fluxes by at least 30 per cent and on Further Reduction of Sulphur Emissions; concerning the control of emissions of nitrogen oxides or their transboundary fluxes; concerning

(*Footnote 51 continued.*)

change became a more major focus and while some of the ideas at that meeting of experts were incorporated into other conventions, no framework convention on the protection of the atmosphere was concluded. I mentioned that one could draw a link between the 1989 meeting and the [International Law Commission]. A leading participant in that meeting of legal and policy experts was Alan Beesley, the Canadian international lawyer and diplomat who had been a central figure in the [Law of the Sea] negotiations and played a role at Stockholm as well, and was at that time a member of the [Commission]. Beesley spoke at the opening of the meeting about the need for creative solutions to be adopted by lawyers and how lawyers had to take a lead in policy development in this field. And on the list of invitees were Julio Barboza, at that time a member of the [Commission], and Vaclav Mikulka, Hanqin Xue and myself, all later to become members of the [Commission]. So, in some sense, Professor Murase's proposal that the Commission take up the topic of the 'Protection of the Atmosphere reaches back to a challenge of twenty years ago. And, if it was ripe as a topic then, it is certainly ripe today." (Donald McRae, paper presented at the workshop on the Protection of the Atmosphere, held on 26 October 2011, at the Permanent Mission of Japan to the United Nations in New York. The workshop was organized jointly by the Government of Japan and UNEP.) See Murase, "Protection of the atmosphere and international law: rationale for codification and progressive development", p. 9, footnote 10.

[52] *Report of the United Nations Conference on Environment and Development, Rio de Janeiro, 3–14 June 1992,* vol. I, *Resolutions Adopted by the Conference* (A/CONF.151/26/Rev.1 (Vol 1)) (United Nations publication, Sales No. E.93.I.8), resolution 1, annex II.

[53] Commission on Sustainable Development, Report on the ninth session (5 May 2000 and 16–27 April 2001), *Official Records of the Economic and Social Council, 2001, Supplement No. 9* (E/2001/29).

[54] Commission on Sustainable Development, Report on the fifteenth session (12 May 2006 and 30 April–11 May 2007), *Official Records of the Economic and Social Council, 2007, Supplement No. 9* (E/2007/29).

[55] *Report of the World Summit on Sustainable Development, Johannesburg, South Africa, 26 August–4 September 2002* (A/CONF.199/20) (United Nations publication, Sales No. E.03.II.A.1), chap. I, para. 13.

[56] Available from www.iuappa.org/newsletters/VancouverDeclaration.pdf. The World Clean Air Congress is organized by the International Union of Air Pollution Prevention and Environmental Protection Associations, which comprises non-governmental organizations from 40 States.

[57] Grennfelt and others, *Saltjöbaden V—Taking International Air Pollution Policies into the Future, Gothenburg, 24–26 June 2013*, p. 14. At its 32nd session, held from 9 to 13 December 2013, the Executive Body for the Convention on Long-range Transboundary Air Pollution took note of the recommendations of the Saltjöbaden V workshop (see ECE/EB.AIR/122). The 16th World Clean Air Congress, held in Cape Town, South Africa, from 29 September to 4 October 2013, made a similar recommendation to the Commission.

the control of emissions of volatile organic compounds or their transboundary fluxes; on Heavy Metals; on Persistent Organic Pollutants; and the Protocol to Abate Acidification, Eutrophication and Ground-level Ozone (Gothenburg Protocol), as amended on 4 May 2012;[58]

— Agreement concerning the adoption of uniform conditions of approval and reciprocal recognition of approval for motor vehicle equipment and parts—later renamed Agreement concerning the adoption of uniform technical prescriptions for wheeled vehicles, equipment and parts which can be fitted and/or be used on wheeled vehicles and the conditions for reciprocal recognition of approvals granted on the basis of these prescriptions,[59] subsequently "globalized" by the Agreement concerning the Establishing of Global Technical Regulations for Wheeled Vehicles, Equipment and Parts, which can be fitted and/or used on Wheeled Vehicles;[60]

— Convention on environmental impact assessment in a transboundary context;[61]

— Convention on the Transboundary Effects of Industrial Accidents, with its Protocol on Civil Liability and Compensation for Damage Caused by Transboundary Effects of Industrial Accidents on Transboundary Waters to the 1992 Convention on the Protection and Use of Transboundary Watercourses and International Lakes and to the 1992 Convention on the Transboundary Effects of Industrial Accidents;[62]

— The directives of the European Union on air pollution,[63] including, in particular, Directive 2001/81/EC on national emission ceilings for certain atmospheric pollutants;[64] Directive 2007/46/EC establishing a framework for the approval of motor vehicles and their trailers, and of systems, components and separate technical units intended for such vehicles,[65] with related annexes and technical regulations implementing/adapting the corresponding ECE agreements for wheeled vehicles;[66] Directive 2008/50/EC on ambient air quality and cleaner air for Europe;[67] and Directive 2010/75/EU on industrial emissions (integrated pollution prevention and control);[68]

— International Standards and Recommended Practices of the International Civil Aviation Organization (ICAO) for aircraft engine emissions: annex 16 (Environmental Protection) of the Convention on International Civil Aviation;[69]

— Protocol of 1997 (new annex VI—Regulations for the prevention of air pollution from ships) to amend the International Convention for the prevention of pollution from ships, 1973, as modified by the Protocol of 1978 relating thereto;[70]

— Association of Southeast Asian Nations (ASEAN) Agreement on Transboundary Haze Pollution;

— Stockholm Convention on Persistent Organic Pollutants;[71]

— Framework Convention for the Protection of the Environment for Sustainable Development in Central Asia;[72]

— Minamata Convention on Mercury.

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[58] Executive Body for the Convention on Long-range Transboundary Air Pollution, decisions 2012/1 and 2012/2. See C.N.171.2013.TREATIES-XXVII.1.h and C.N.155.2013.TREATIES-XXVII.1.h.

[59] The Agreement entered into force in 1959. The title was amended in 1995 upon entry into force of amendments adopted by the Inland Transport Committee of the Economic Commission for Europe at its 103rd session on 18 August 1994 (see E/ECE/324/Rev.2-E/ECE/TRANS/505/Rev.2); it was implemented by a series of technical regulations dealing with pollutant emissions (especially Nos. 40, 41, 47, 49, 51 and 83).

[60] The Agreement entered into force in 2000 and was implemented by a series of technical regulations including the measurement of carbon dioxide and other exhaust gases.

[61] The Convention entered into force in 1997.

[62] The Protocol is not yet in force.

[63] For a current summary, see Jans and Vedder, *European Environmental Law: After Lisbon*, pp. 419–430.

[64] Directive 2001/81/EC of the European Parliament and of the Council of 23 October 2001 on national emission ceilings for certain atmospheric pollutants, *Official Journal of the European Communities*, L 309, 27 November 2001, p. 22, currently under review.

[65] Directive 2007/46/EC of the European Parliament and of the Council of 5 September 2007 establishing a framework for the approval of motor vehicles and their trailers, and of systems, components and separate technical units intended for such vehicles, *Official Journal of the European Union*, L 263, 9 October 2007.

[66] Especially through Regulation 715/2007 of the European Parliament and the Council of 20 June 2007 on type approval of motor vehicles with respect to emissions from light passenger and commercial vehicles (Euro 5 and Euro 6) and on access to vehicle repair and maintenance information (*ibid.*, L 171, 29 June 2007) (as amended by Regulation (EC) 595/2009 of the European Parliament and the Council of 18 June 2009 on type-approval of motor vehicles and engines with respect to emissions from heavy duty vehicles (Euro VI) and on access to vehicle repair and maintenance information and amending Regulation (EC) No. 715/2007 and Directive 2007/46/EC and repealing Directives 80/1269/EEC, 2005/55/EC and 2005/78/EC (*ibid.*, L 188, 18 July 2009); entered into force in 2013.

[67] Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe, *ibid.*, L 152, 11 June 2008, replacing (as from 11 June 2010) several earlier "substance-specific" directives on ambient air quality (for sulphur dioxide (1980); lead (1982); nitrogen dioxide (1985); ground-level ozone (1992); and volatile organic compounds (1999/2004)), and the related Council Directive 96/62/EC of 27 September 1996 on ambient air quality assessment and management (*Official Journal of the European Communities*, L 296, 21 November 1996).

[68] Directive 2010/75/EU on industrial emissions (integrated pollution prevention and control), *Official Journal of the European Union*, L 334, 17 December 2010. This directive will (as from 7 January 2016) replace Directive 2001/80/EC of the European Parliament and of the Council of 23 October 2001 on the limitation of emissions of certain pollutants into the air from large combustion plants (*Official Journal of the European Communities*, L 309, 27 November 2001, repealing an earlier 1988 directive), and Directive 2000/76/EC of the European Parliament and of the Council of 4 December 2000 on the incineration of waste (*Official Journal of the European Communities*, L 332, 28 December 2000).

[69] The first edition of annex 16, vol. II ("Aircraft engine emissions"), was adopted on 30 June 1981 and entered into force in 1982; it is periodically amended by the ICAO Council. See Sand, *Lessons Learned in Global Environmental Governance*, pp. 18–20.

[70] Annex VI entered into force in 2005 and has been periodically amended by the IMO Marine Environment Protection Committee.

[71] The Convention entered into force in 2004.

[72] The Convention is not yet in force. The following States have signed the Convention: Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan. Article 8 deals with "air protection".

(b) *Bilateral agreements on transboundary air pollution*

— Treaty between Czechoslovakia and Poland concerning protection of the atmosphere against pollution;[73]

— Memorandum of Intent between the United States of America and Canada concerning transboundary air pollution;[74]

— Agreement between the United Mexican States and the United States of America on cooperation for the protection and improvement of the environment in the border area,[75] together with two supplementary agreements;[76]

— Agreement between Canada and the United States of America on air quality;[77]

— Agreements between Germany and the Czech Republic of 1992, 1994, 2000 and 2004.[78]

(c) *Multilateral conventions on global atmospheric problems*

— Vienna Convention for the Protection of the Ozone Layer, with its Montreal Protocol on Substances that Deplete the Ozone Layer;

— United Nations Framework Convention on Climate Change and its Kyoto Protocol.

31. Some of the agreements are briefly highlighted below. They are no doubt important sources from which the Commission can draw inspiration when elaborating draft guidelines on the protection of the atmosphere.

32. **Convention on Long-range Transboundary Air Pollution.**[79] The Convention was formulated under the auspices of ECE in the form of a framework agreement to address the major concerns about acid rain and other dispersed pollutants. According to article 1 (*b*) of the Convention, the term "long-range transboundary air pollution" is defined as pollution having effects at such a distance that "it is not generally possible to distinguish the contribution of individual emission sources or groups of sources". While the Convention did not stipulate specific limits on emissions of industrial pollutants, it did establish a regime for continued consideration of the issue. It has been noted that "[d]espite its evident weaknesses, the Geneva Convention's real value is that it has provided a successful framework for cooperation and the development of further measures of pollution control".[80] A series of eight separate protocols have subsequently been negotiated and agreed upon.

33. **Protocols to the Convention on Long-range Transboundary Air Pollution.** The protocols reveal significant innovations in rule-making. The first Protocol, of 1985, on the reduction of sulphur emissions or their transboundary fluxes by at least 30 per cent, required parties to reduce such emissions or fluxes by at least 30 per cent by 1993, applying a single flat rate to all parties. In contrast, the second Protocol, of 1994, on Further Reduction of Sulphur Emissions, applied the "critical loads" concept to set differentiated emissions targets for each party. Targets ranged from an 80 per-cent reduction for Germany to a 49 per-cent increase for Greece, for an overall collective emissions reduction of 50.8 per cent. While the first Protocol's emissions reduction target of 30 per cent was arrived at essentially arbitrarily, the differentiated national targets of the second Protocol were reached using the critical loads approach, together with cost efficiency, reflecting a high degree of scientific and technical knowledge.[81] The resulting commitments are fairer to all parties, given that they are based on calculations of actual sources and effects. The Protocol of 1988 concerning the control of emissions of nitrogen oxides or their transboundary fluxes required parties to stabilize their nitrogen oxide emissions or their transboundary fluxes at 1987 levels by 1994. The Protocol covered major stationary sources (for example, power plants) and mobile sources (for example, vehicle emissions), and provided for the eventual negotiation of internationally accepted critical loads for nitrogen oxide pollution to take effect after 1996. The approach is considered better suited to regional environmental protection than flat-rate emission reductions.[82] Between 1991 and 1998, three protocols were adopted to regulate emissions from volatile organic compounds, persistent organic pollutants, lead, cadmium and mercury. Finally, in 1999, ECE adopted the Protocol to Abate Acidification, Eutrophication and Ground-level Ozone (Gothenburg Protocol) to abate the adverse effects of acidification, eutrophication and ground-level ozone on human health, natural ecosystems and crops resulting from transboundary air pollution. The Protocol recognizes the need for a precautionary approach and requires

[73] Signed at Warsaw on 24 September 1974 (United Nations, *Treaty Series*, vol. 971, No. 14068, p. 407) and entered into force in 1975. See Sommer, "Transboundary cooperation between Poland and its neighbouring States".

[74] Signed at Washington, D.C., on 5 August 1980 (United Nations, *Treaty Series*, vol. 1274, No. 21009, p. 235).

[75] Signed at La Paz (Baja California) on 14 August 1983 (*ibid.*, vol. 1352, No. 22805, p. 71).

[76] Agreement of cooperation between the United Mexican States and the United States of America regarding transboundary air pollution caused by copper smelters along their common border (annex IV), signed at Washington, D.C., on 29 January 1987 (*ibid.*, vol. 1465, No. 22805, p. 357) and the Agreement of cooperation between the United States of America and the United Mexican States regarding international transport of urban air pollution (annex V), signed at Washington, D.C., on 3 October 1989 (United States of America, TIAS 11269).

[77] Signed at Ottawa on 13 March 1991 (United Nations, *Treaty Series*, vol. 1852, No. 31532, p. 79).

[78] The 1994 Agreement provides for implementation of joint environmental pilot projects for flue gas cleaning in coal-fired power plants; the 2000 and 2004 Agreements provide for joint implementation of a "clean air fund" and other pilot projects in the Czech Republic, aimed at reducing the impact of transboundary air pollution in Germany; the 2004 Agreement specifically refers to "joint implementation" under the Kyoto Protocol of the United Nations Framework Convention on Climate Change.

[79] See Sliggers and Kakebeeke, eds., *Clearing the Air: 25 years of the Convention on Long-range Transboundary Air Pollution*; and Lidskog and Sundqvist, *Governing the Air: The Dynamics of Science, Policy, and Citizen Interaction*.

[80] Birnie, Boyle and Redgwell, *International Law and the Environment*, p. 345.

[81] *Ibid.*, p. 346. For this reason, it has been noted, the need to apply the precautionary principle was obviated in this case, although the Protocol's preamble acknowledges scientific uncertainty and the precautionary principle.

[82] *Ibid.*, p. 347.

that emissions not exceed the critical loads stipulated in the annexes. It should be noted that in May 2012, the parties to the Convention made a historic step by amending the Gothenburg Protocol with regard to certain substances to include black carbon—as a component of particulate matter—in the revision of the Gothenburg Protocol;[83] and black carbon, ozone and methane in the medium and long-term workplans of the Conventions as important air pollutants and short-lived climate forcers.[84]

34. **Convention on the Transboundary Effects of Industrial Accidents.** Like the Convention on Long-range Transboundary Air Pollution, the Convention on the Transboundary Effects of Industrial Accidents was negotiated by ECE as part of its legal framework to protect the environment. The Convention aims to protect both humans and the environment from the far-reaching transboundary effects of industrial accidents such as the mine tailings spill at Baia Mare (Romania). In article 3, paragraph 4, the Convention affirms the principle of State responsibility and obligates Parties to take legislative, regulatory, administrative and financial measures to prevent industrial accidents and improve preparedness and response measures. Parties are to identify hazardous operations within their borders (article 4, paragraph 1) and site new projects where risks for environmental harm are minimal (article 7). The Convention creates a framework for international cooperation that extends beyond assistance in the event of an accident. Parties are required to inform and consult other parties that could potentially suffer from the transboundary effects of hazardous operations and to draw up joint or compatible contingency plans. The Convention also promotes the exchange of information and safety technologies and cooperation in research and development. In order to help States to better respond to accidents, the Convention calls on parties to set up an industrial accident notification system to immediately inform affected parties. The Conference of the Parties, as the governing body, reviews the implementation of the Convention and defines priorities of work.

35. **ASEAN Agreement on Transboundary Haze Pollution.** The Agreement was drafted as a legally binding regional environmental agreement in collaboration with UNEP, in an attempt to remedy some of the compliance problems associated with previous efforts to tackle the problem of heavy haze in the area, such as the Regional Haze Action Plan. Recognizing the transboundary health and environmental effects of haze (largely originating from recurrent forest and land fires in Indonesia and Brunei Darussalam), the Agreement, in article 2, encourages regional and international cooperation to prevent and monitor transboundary air pollution. It adopts the preventive principle and requires States to identify and monitor fire-prone areas and to take the necessary preventative measures, but does not define the measures or provide specific standards. Consistent with the cooperative approach of ASEAN, the Agreement contains provisions for the exchange of information and technology, the development of a regional early warning system and mutual assistance. It establishes an ASEAN Coordinating Centre for Transboundary Haze Pollution Control to facilitate such cooperation and coordination in managing the impact of fires. However, in reflecting a traditional emphasis on sovereignty, the Agreement stipulates that a party must request or consent to such assistance, notwithstanding transboundary effects. Although the Agreement ultimately suffers from compliance problems, owing to a lack of provisions on monitoring and enforcement and to non-participation by the main target actor, it does attempt to overcome some of the barriers to implementation; for example, it establishes an ASEAN Transboundary Haze Pollution Control Fund to address the issue of financial capacity. It also creates an intergovernmental body, the Conference of the Parties, to evaluate implementation and adopt protocols or amendments, as necessary. Overall, it can be said that the Agreement represents a more concrete and law-oriented approach in dealing with the haze problem.[85]

36. **Stockholm Convention on Persistent Organic Pollutants.** The Convention seeks to protect human health and the environment from the risks posed by persistent organic pollutants, which are chemical substances that possess toxic properties, resist degradation and bio-accumulate through the food chain. UNEP initiated negotiations in response to calls for global action in the light of scientific evidence on the harmful effects of such pollutants and their ability to travel long distances through the air and water. The Convention is mindful of the precautionary approach and obligates parties to eliminate or reduce the production and use of 12 persistent organic chemicals (pesticides, industrial chemicals and unintentionally produced persistent organic chemicals). Other key elements include the requirement to prohibit or restrict the import and export of listed persistent organic chemicals, the development and use of safer substitutes, environmentally sound management of stockpiles and wastes, and the promotion of best alternative technologies and best environmental practices. The Convention recognizes that the ability of developing countries to implement their obligations will depend on the transfer of technology, financial resources and technical assistance from industrialized countries, and designates the Global Environment Facility as an interim financial mechanism for providing assistance. The institutions and procedures created by the Convention are of significance since they are the source of its flexibility and dynamism. The meetings of the Conference of the Parties, the governing body of the Convention, allow for regular review of implementation and the adoption of amendments. During the first meeting of the Conference of the Parties, the decision was made to create a Persistent Organic Pollutants Review Committee. The

[83] See Amendment of the text of and annexes II to IX to the Protocol and addition of new annexes X and XI (document C.N.155.2013. TREATIES-XXVII.1.h), annex, article 10, new para. 3.

[84] For a background study, see "Hemispheric transport of air pollution 2010" (ECE/EB.AIR/2010/10 and Corr.1–2). On the need to integrate the regulation of atmospheric pollutants and climate-forcing substances, see also the comprehensive new report *On Thin Ice: How Cutting Pollution Can Slow Warming and Save Lives* (joint report of the World Bank and International Cryosphere Climate Initiative, Washington, D.C., 2013). Available from http://documents.worldbank.org/curated/en/146561468180271158/Main-report.

[85] See Tan, "The ASEAN Agreement on Transboundary Haze Pollution: prospects for compliance and effectiveness in post-Suharto Indonesia"; and Rodziana Mohamed Razali, "The shortcomings of the ASEAN's legal mechanism to address transboundary haze pollution and proposals for improvement", paper submitted to the Third Biennial Conference of the Asian Society of International Law, Beijing, 27–28 August 2011.

scientific body, comprising 31 experts, reviews proposals for new additions to the list of regulated chemicals according to the procedure established by the Convention. First, the Committee applies the screening criteria of the Convention in respect of new persistent organic chemicals. Second, if all the criteria are met, it drafts a risk profile to evaluate whether a substance is likely, as a result of long-range environmental transport, to lead to significant adverse effects on human health or the environment, thereby warranting global action. Third, it develops a risk management evaluation, taking into account socioeconomic considerations, and makes a recommendation to the Conference of the Parties, which makes the final decision. To date, the Conference of the Parties has decided to include 10 new substances: 9 chemicals at the fourth meeting in 2009 and endosulfan at the most recent meeting in April 2011.

37. **Agreement between Canada and the United States of America on air quality.** The Agreement was signed on 13 March 1991 in order to address the issue of transboundary air pollution leading to acid rain. At the heart of the bilateral agreement are commitments by both parties to control transboundary air pollution. Annex 1 of the Agreement establishes specific objectives and deadlines for each country to limit sulphur dioxide and nitrogen oxide emissions, affecting the main chemicals contributing to acid rain. The Agreement reaffirms the decision in the *Trail Smelter* case and principle 21 of the Declaration of the United Nations Conference on the Human Environment (Stockholm Declaration) and creates a framework for addressing shared concerns. It "applies customary environmental law rules, such as the prior assessment of proposed actions, activities, and projects if they are likely to cause significant transboundary air pollution, the duty to notify the other State concerning such activities or projects as well as those that create the risk of significant transboundary harm, and to consult on request of the other party".[86] It is evident that a great deal of cooperation is envisaged by the system: it calls for scientific and technical cooperation in addition to emissions monitoring and consultation. In order to assist in implementing the Agreement and review progress, a permanent bilateral Air Quality Committee was established. The International Joint Commission, a body created under the 1909 Boundary Waters Treaty,[87] has oversight over the Air Quality Committee. The International Joint Commission has an important function with respect to enforcement: a party may refer a dispute to it. Furthermore, the International Joint Commission solicits/reports on views from the public and exposes the process to public scrutiny.[88] In December 2000, an annex on ozone was added to the Agreement in order to address the issue of transboundary air pollution leading to high levels of ground-level ozone. Pursuant to this annex, both countries commit to controlling and reducing their emissions of nitrogen oxides and volatile organic compounds (precursors to the formation of ground-level ozone), with a view to establishing ozone air quality standards in the long term.[89]

38. **Vienna Convention for the Protection of the Ozone Layer.** This Convention was the second multilateral treaty to address a global atmospheric issue.[90] Together with the Montreal Protocol on Substances that Deplete the Ozone Layer and its subsequent amendments, it comprises the legal regime for the protection of the stratospheric ozone layer. Treaty negotiations were initiated by UNEP in response to scientific evidence that widely used chemical substances, chlorofluorocarbons, were destroying the ozone layer. The resulting treaty, in the form of a framework convention, led to a general obligation on the part of States to take appropriate legislative or administrative measures, as stated in its preamble, "to protect human health and the environment against adverse effects resulting from modifications of the ozone layer". The Vienna Convention does not set specific targets, name particular substances to which the measures would relate (it merely lists in an annex the substances thought to have an effect on the ozone layer) or create a legal obligation to reduce emissions of ozone-depleting substances. The nature of the measures to be taken was left to the discretion of each State party. Instead, it emphasizes cooperation in the exchange of systemic observations, research, information and technology, as well as cooperation in formulating "agreed measures, procedures and standards for the implementation of this Convention" (article 2, paragraph 2 (*c*)). In recognizing the global nature of the problem, the drafters of the Convention tried to ensure participation by all countries. They considered some of the reservations that developing countries might have regarding the costs of implementing the treaty, both in terms of the cost of alternative technologies and in terms of the effect on development. As a result, in addition to a weak transfer of technology clause (article 4), a proviso was added that measures should be taken in accordance with "the means at their disposal and their capabilities" (article 2, paragraph 2). A bare-bones framework, the success of the Convention was in laying the foundation for future cooperation and creating the institutions, namely, the meeting of the parties, which would enable it to adapt in response to new scientific data through reviews of the implementation and adoption of new protocols or amendments. It also signified a more precautionary approach in environmental treaties, given that the effects of ozone depletion and the harmful effects of ultraviolet rays were still speculative.

39. **Montreal Protocol on Substances that Deplete the Ozone Layer.** The Montreal Protocol obligates States parties to limit the production and consumption of chlorofluorocarbons and halons, the key ozone-depleting substances. The Montreal Protocol was adopted in response to an international UNEP/WMO assessment prompted by

[86] Kiss and Shelton, *International Environmental Law*, p. 572.

[87] Signed at Washington, D.C., on 11 January 1909. See Bevans, *Treaties and other International Agreements of the United States of America 1776-1949*, vol. 12, p. 319.

[88] Buhi and Feng, "The International Joint Commission's role in the United States–Canada transboundary air pollution control regime: a century of experience to guide the future", p. 129.

[89] A further supplementary annex on particulate matter is currently under negotiation.

[90] The first multilateral instrument was the Treaty banning nuclear weapon tests in the atmosphere, in outer space and under water, which was prompted by the global risk of radioactive pollution fallout from the atmosphere. It is noteworthy to recall the historic speech by President of the United States John F. Kennedy (his commencement address at American University, Washington, D.C., on 10 June 1963), announcing his support for the Treaty, in which he said: "we all inhabit this planet. We all breathe the same air. We all cherish our children's futures" (*The Department of State Bulletin*, vol. XLIX, No. 1253, 1 July 1963, p. 4).

the discovery of a "hole" in the ozone layer above Antarctica. The assessment revealed that chlorofluorocarbon production levels would lead to dangerous ozone depletion, indicating a need for firm targets leading to reductions in the emissions of ozone-depleting substances.[91] The Montreal Protocol required industrialized countries to freeze production and consumption of chlorofluorocarbons at 1986 levels (the base year), to reduce them by half by 1999 and to freeze the consumption of halons at 1986 levels. The Montreal Protocol also established a meeting of the parties charged with making systematic observations of the ozone layer and responding to new scientific developments through the introduction, as necessary, of additional legal obligations upon States—a key component of its success. Amendments were made in 1989 (Helsinki), 1990 (London),[92] 1992 (Copenhagen),[93] 1997 (Montreal)[94] and 1999 (Beijing).[95] The amendments not only accelerated the phasing out of various substances and added new substances, they also addressed the important issues of participation by developing countries, non-compliance and non-parties. The London amendment was particularly significant in strengthening the principle of common but differentiated responsibilities. Paragraph 6 of the preamble was amended to include a reference to the need to take into account the "developmental needs of developing countries". Furthermore, old article 5, which contained the provision of a 10-year compliance period for countries whose consumption of chlorofluorocarbons was less than 0.3 kg per capita (basically developing countries), was replaced with a new article 5, which recognized that compliance by developing countries will depend on financial assistance and the transfer of technology.[96] Meanwhile, article 10 established a multilateral fund voluntarily financed by non-article 5 parties to assist developing countries in meeting the costs of compliance. In respect of non-compliance, the Montreal Protocol has relied on soft enforcement, placing emphasis on a facilitative and promotional approach. Parties in difficulty can be brought before an implementation committee either by self-referral, referral by another party or by the secretariat. It employs such measures as the provision of Global Environment Facility funding,[97] technical assistance or the issuing of cautions—mainly in an effort to ensure that parties comply with data reporting requirements. The Montreal Protocol has dealt with the problem of non-parties by taking an enforcement approach. It implements trade-restricting measures, namely, banning trade with non-parties in controlled substances or products containing such substances, and cutting illegal trade in chlorofluorocarbons through a system of export/import licences, which provide incentives to join and comply with the Montreal Protocol. The Montreal Protocol can be considered a success in that it has been widely adopted and implemented and in that global production of chlorofluorocarbons has decreased from the peak year of 1998. At the same time, it must be viewed within the greater scheme of atmospheric protection. Some chlorofluorocarbon substitutes are greenhouse gases, illustrating the need to coordinate efforts with the Kyoto Protocol to the United Nations Framework Convention on Climate Change.[98]

40. **United Nations Framework Convention on Climate Change.** The General Assembly began intensifying its efforts to address climate change in 1988, adopting a resolution stating that climate change was a common concern of mankind (see General Assembly resolution 43/53 of 6 December 1988). The following year, in recognition of the need to adopt measures to control anthropogenic emissions of greenhouse gases, it established the Intergovernmental Negotiating Committee to negotiate a treaty for the 1992 United Nations Conference on the Environment and Development. Much like the Vienna Convention for the Protection of the Ozone Layer, the United Nations Framework Convention on Climate Change does not establish quantitative commitments to limit greenhouse gases. As stated in article 2, its objective is framed in general terms: "stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system". There is no express commitment to return greenhouse emissions to 1990 levels by the year 2000, only a weakly worded recognition of a goal to that effect. The Convention establishes a number of key principles to guide any international response to climate change (many of the principles are also reflected in the Rio Declaration on Environment and Development[99] and Agenda 21), including the principle of equity and common but differentiated responsibilities, sustainable development, cost-effectiveness, and precautionary measures (article 3). The core of the commitments to be undertaken by parties can be found in article 4. Parties that are developed countries (annex I) are required to "adopt national policies and take corresponding measures on the mitigation of climate change, by limiting its anthropogenic emissions of greenhouse gases and protecting and enhancing its greenhouse gas sinks and reservoirs" (article 4, paragraph 2 (*a*)). In order to promote implementation, article 4 also requires each of those parties to "communicate, within six months of the entry into force of the Convention for it and periodically thereafter, and in accordance with article 12, detailed information on its policies and measures, … as well as on its resulting projected anthropogenic emissions by sources and removal by sinks of greenhouse gases not controlled by the Montreal Protocol" (article 4, paragraph 2 (*b*)). Taken as a whole, the Convention provides a sound framework for future consideration of the issue; it establishes a Conference of the Parties and provides it with

[91] Yoshida, *The International Legal Régime for the Protection of the Stratospheric Ozone Layer, International Law, International Régimes, and Sustainable Development*; and Sands, *Principles of International Environmental Law*, p. 575.

[92] Adjustments and Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer, adopted at the second meeting of the parties, London, 27–29 June 1990.

[93] Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer, adopted at the fourth meeting of the parties, Copenhagen, 23–25 November 1992.

[94] Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer, adopted at the ninth meeting of the parties, Montreal, 15–17 September 1997.

[95] Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer, adopted at the eleventh meeting of the parties, Beijing, 29 November–3 December 1999.

[96] See footnote 92 above.

[97] Sand, "Carrots without sticks? New financial mechanisms for global environmental agreements".

[98] See UNEP, *Environmental Effects of Ozone Depletion and its Interactions with Climate Change: 2010 Assessment* (Nairobi, 2010). Available from www.unenvironment.org/resources/report/environmental-effects-ozone-depletion-and-its-interactions-climate-change-2010.

[99] *Report of the United Nations Conference on Environment and Development, Rio de Janeiro, 3–14 June 1992* (see footnote 52 above), resolution 1, annex I.

a wide enough mandate—one that includes review of the implementation and the adoption of protocols—to elaborate specific obligations.

41. **Kyoto Protocol to the United Nations Framework Convention on Climate Change.** The Kyoto Protocol was negotiated after the first Conference of the Parties held in Berlin (the Berlin Mandate), which revealed the inadequacy of the commitments provided for in article 4 of the Convention. The Kyoto Protocol set quantified emission reduction targets and a specific timetable for their achievement. Its major achievement was a commitment by developed countries (annex I parties) to reduce their emissions of six greenhouse gases (carbon dioxide, methane, nitrous oxide, sulphur hexafluoride, hydrofluorocarbons and perfluorocarbons) by a specified amount, with a view to reducing collective emissions by at least 5 per cent below 1990 levels in the commitment period between 2003 and 2012 (article 3, paragraph 1). Parties could meet their commitments in any number of ways, including the enhancement of energy efficiency, the protection and enhancement of sinks and reservoirs of greenhouse gases and the promotion of sustainable forms of agriculture, to name only a few (article 2, paragraph 1 (*a*)). Significantly, developing countries were not assigned emission limitation and reduction commitments, in view of the concept of common but differentiated responsibilities. The principle was also reflected in provisions requiring the transfer of technology and financial assistance. Special consideration was given to countries most vulnerable to climate change, including small island developing States, countries with low-lying coastal areas, countries with areas prone to natural disasters and countries with areas liable to drought and desertification (article 4, paragraph 8, of the Convention itself). The Kyoto Protocol is particularly notable for several of the innovations it introduced. The agreement includes three "flexibility mechanisms", market mechanisms that aim primarily to achieve the cost-effective implementation of emission reduction commitments and secondarily to encourage widespread participation. Article 4 allows annex I parties to fulfil their emission limitation commitments jointly. The first two mechanisms, the joint implementation and the clean development mechanisms, are project-based. Joint implementation enables one developed country to earn emission reduction units by investing in an emission-reduction project in another developed country (article 6). The clean development mechanism, the only flexibility mechanism that engages developing countries, allows developed country parties to earn saleable emission reduction credits by investing in reduction or emission-limitation projects in developing countries with a view to stimulating sustainable development (article 12). The mechanism is overseen by an executive board, and emission reductions from projects must be certified by designated national authorities (article 12, paragraph 4)). The third mechanism concerns international emissions trading. Permits are allocated to each party in accordance with their emission limitation obligations; any unused emission permits can be traded to other parties on the "carbon market" (article 17).[100] Monitoring provisions are important in promoting compliance with the regime. Annex I parties must establish national systems to estimate anthropogenic emissions by source and removal by sinks (article 5), as well as annual inventories to incorporate the supplementary information necessary to demonstrate compliance with the commitments under the Protocol (article 7, paragraph 2). It was agreed at the seventh session of the Conference of the Parties of the Framework Convention, held in Marrakesh, Morocco, in 2001, that the promotional approach established under the Montreal Protocol could not be relied upon to ensure compliance by annex I parties. Consequently, it took an enforcement approach and established a non-compliance mechanism whereby an enforcement branch would examine non-compliance by annex I countries[101] and imposed a penalty equal to 1.3 times the respective non-complying portions of their commitments. The penalty was to be added to their commitments for the second commitment period.[102] Since the first commitment period came to an end in 2012, the seventeenth session of the conference of the parties (Durban Conference), in 2011, decided to work on the content of a second commitment period set to begin in 2013. However, Canada, Japan and the Russian Federation made clear that they had no intention of assuming any obligations in the second commitment period. Canada announced on 12 December 2011 that it would withdraw from the Kyoto Protocol entirely. The Durban Conference also decided to "launch a process to develop a protocol, another legal instrument or agreed outcome with legal force" that would be "applicable to all Parties",[103] and that would be adopted no later than 2015 and come into effect from 2020. The eighteenth conference of the parties (Doha Conference), in 2012, officially adopted an amendment to the Kyoto Protocol that contained the commitments of annex I parties during the second commitment period (2013–2020), but some developed countries decided that their commitments would not be prescribed in the amendment.[104] During the nineteenth session of the conference of the parties (Warsaw Conference), in 2013, parties discussed the elements of an agreement to be adopted at the twenty-first session of the conference of the parties, to be held in Paris in 2015. The Warsaw Conference decided to invite "all Parties" to elaborate their intended nationally determined "contributions" and to communicate them well in advance of the twenty-first session, without prejudice to the legal nature of the contributions.[105]

2. Jurisprudence of international courts and tribunals

42. There are several judicial decisions by international courts and tribunals that should be examined carefully in the course of the study addressed in the present report. The *Trail Smelter* case[106] laid the ground for the law on transboundary air pollution. Following the

[100] Rowlands argues that the introduction of these market-based instruments to environmental regimes is significant, "for it represents further commodification of the international environment" (Rowlands, "Atmosphere and outer space", p. 332).

[101] See FCCC/CP/2001/13/Add.3, decision 24/CP.7, annex. The decision was adopted by the first meeting of the parties to the Kyoto Protocol on 9 and 10 December 2005.

[102] Murase, *International Law: An Integrative Perspective on Transboundary Issues*, p. 174.

[103] See FCCC/CP/2011/9/Add.1, decision 1/CP.17, para. 2. It may be noted here that there is no longer any reference to the principle of "common but differentiated responsibilities".

[104] See FCCC/KP/CMP/2012/13/Add.1, decision 1/CMP.8.

[105] See FCCC/CP/2013/10/Add.1, decision 1/CP.19, para. 2 (*b*).

[106] See footnote 39 above.

arbitration of the case, the 1973/1974 *Nuclear Tests* cases (*Australia v. France* and *New Zealand v. France*)[107] brought before the International Court of Justice sparked heated discussions related to possible atmospheric pollution. The Court also referred to the obligation of States to refrain from causing significant environmental damage beyond their borders through transboundary pollution, including atmospheric pollution, in its advisory opinion on the *Legality of the Threat or Use of Nuclear Weapons*[108] in 1996. Although not directly related to pollution of the atmosphere, the 1997 *Gabčíkovo-Nagymaros Project (Hungary/Slovakia)* case[109] addressed the issue of environmental harm in a broader perspective. In the judgment of the *Pulp Mills on the River Uruguay (Argentina v. Uruguay)*[110] case rendered in April 2010, the Court referred in part to the issue of alleged air pollution (to the extent relevant to the river's aquatic environment). Furthermore, the *Aerial Herbicide Spraying (Ecuador v. Colombia)* case[111] brought to the Court in 2008, although subsequently settled and withdrawn, also concerned the subject. The 1996 World Trade Organization (WTO) case *United States—Standards for Reformulated and Conventional Gasoline*[112] posed the important question of the compatibility of a country's domestic law (in this case, the United States Clean Air Act of 1990) with the trade provisions of the General Agreement on Tariffs and Trade. Another decision of note is the judgment of the European Court of Justice in Luxembourg in December 2011, *Air Transport Association of America and Others v. Secretary of State for Energy and Climate Change*,[113] confirming the validity of the European Union directive to include aviation activities in the European Union emissions trading scheme.[114] The decision could be challenged by the United States (and possibly China) in WTO, illustrating the "trade versus environment" conflicts. A brief preliminary account of each of those cases may be appropriate in the present report to the extent that it is relevant to the topic of atmospheric protection.

43. ***Trail Smelter* case.** The case was concerned with cross-border damage in the State of Washington, United States, caused by smelting operations in Trail, British Columbia, Canada. At the smelting plant, zinc and lead-bearing ores were roasted to extract their metals. In the process, the ores, which also contained sulphur, discharged sulphur dioxide into the atmosphere. Owing to the physical and meteorological conditions prevalent in the area, the smelter's sulphur dioxide clouds moved southwards over the United States, causing extensive damage to crops, timber, pastures, livestock and buildings. The arbitral tribunal established pursuant to the Convention for settlement of difficulties arising from operation of smelter at Trail[115] was required, pursuant to article IV of the Convention, to apply "the law and practice followed in dealing with cognate questions in the United States of America as well as international law and practice, and [to] give consideration to the desire of the high contracting parties to reach a solution just to all parties concerned". A frequently quoted passage of the award reads as follows:

> under the principles of international law, as well as of the law of the United States, no State has the right to use or permit the use of its territory in such a manner as to cause injury by fumes in or to the territory of another or the properties or persons therein, when the case is of serious consequence and the injury is established by clear and convincing evidence.[116]

The *Trail Smelter* case was a traditional type of transboundary air pollution dispute—one in which the cause of the damage as well as its effect was sufficiently identifiable. The decision is frequently cited in support of the view that under international law, States have a duty to ensure that activities within their jurisdiction and control do not cause transboundary damage when the injury is foreseeable, supported by clear and convincing evidence.[117] The standard of proof is to be established on the basis of empirical probability. It is important to note that the tribunal affirmed the preventive principle based on scientific evidence, and that it adopted a corresponding regime to maintain a certain level of emissions. The precedential value of the award, however, cannot be upheld completely without qualification:[118] while the tribunal relied on the principles of United States law in accordance with the compromise, the principles referred to in the award, such as nuisance, trespass and strict liability, cannot easily be equated with what are considered the established principles of international law in all circumstances.[119] The significance in the arbitration lies in the tribunal's ability to achieve a proper balancing of interests between industry and agriculture[120] and, by analogy, between economic development and environmental protection, which is in line with the modern concept of sustainable development.

44. ***Nuclear Tests* cases.** In the *Nuclear Tests* cases, Australia asked the Court in its application "to adjudge and declare that the carrying out of atmospheric nuclear weapon tests in the South Pacific area is not consistent with obligations imposed on France by applicable rules of international law".[121] While the Court indicated provi-

[107] *Nuclear Tests (Australia v. France), Judgment, I.C.J. Reports 1974*, p. 253 and *Nuclear Tests (New Zealand v. France), Judgment, I.C.J. Reports 1974*, p. 457.

[108] *Legality of the Threat or Use of Nuclear Weapons, Advisory Opinion, I.C.J. Reports 1996*, p. 226.

[109] *Gabčíkovo-Nagymaros Project (Hungary/Slovakia), Judgment, I.C.J. Reports 1997*, p. 7.

[110] *Pulp Mills on the River Uruguay (Argentina v. Uruguay), Judgment, I.C.J. Reports 2010*, p. 14.

[111] *Aerial Herbicide Spraying (Ecuador v. Colombia),* Application by Ecuador (2008, General List No. 138), 31 March 2008, para. 37.

[112] WTO, Appellate Body, WT/DS2/AB/R, adopted 20 May 1996.

[113] Judgment of the Court (Grand Chamber), 21 December 2011, Case C-366/10, *European Court Reports 2011*.

[114] Directive 2008/101/EC of the European Parliament and the Council of 19 November 2008 amending Directive 2003/87/EC so as to include aviation activities in the scheme for greenhouse gas emission allowance trading within the Community (*Official Journal of the European Union*, L 8, 13 January 2009).

[115] Signed at Ottawa on 15 April 1935 (UNRIAA, vol. III (United Nations publication, Sales No. 1949.V.2), p. 1907).

[116] UNRIAA, vol. III, p. 1965; Kuhn, "The *Trail Smelter* arbitration, United States and Canada"; and Read, "The *Trail Smelter* dispute".

[117] UNRIAA, vol. III, p. 1965.

[118] Madders, "*Trail Smelter* arbitration", p. 903.

[119] Rubin, "Pollution by analogy: the *Trail Smelter* arbitration".

[120] Handl, "Balancing of interests and international liability for the pollution of international watercourses: customary principles of law revisited".

[121] Memorial on Jurisdiction and Admissibility submitted by the Government of Australia, *I.C.J. Pleadings, Oral Arguments, Documents: Nuclear Test Cases*, vol. I (*Australia v. France*), para. 430.

sional measures on 22 June 1973, it rendered a judgment on 20 December 1974. It held that the objective pursued by the applicants, namely, the cessation of the nuclear tests, had been achieved by French declarations not to continue atmospheric tests and that the Court was therefore not called upon to give a decision on the claims put forward by the applicants.[122] It may be noted that Australia filed the case on the grounds of protecting not only its own legal interests but also the interests of other States since it considered French nuclear tests a violation of the freedom of the high seas. Its memorial stated, *inter alia,* that:

> The sea is not static; its life systems are complex and closely interrelated. It is evident, therefore, that no one can say that pollution—especially pollution involving radioactivity—in one place cannot eventually have consequences in another. It would, indeed, be quite out of keeping with the function of the Court to protect by judicial means the interests of the international community, if it were to disregard considerations of this character.[123]

On that point, the joint dissenting opinion of Judges Onyeama, Dillard, Jiménez de Aréchaga and Waldock stated the following:

> With regard to the right to be free from atmospheric tests, said to be possessed by Australia in common with other States, the question of "legal interest" again appears to us to be part of the general legal merits of the case. If the materials adduced by Australia were to convince the Court of the existence of a general rule of international law, prohibiting atmospheric nuclear tests, the Court would at the same time have to determine what is the precise character and content of that rule and, in particular, whether it confers a right on every State individually to prosecute a claim to secure respect for the rule. In short, the question of "legal interest" cannot be separated from the substantive legal issue of the existence and scope of the alleged rule of customary international law. Although we recognize that the existence of a so-called *actio popularis* in international law is a matter of controversy, the observations of this Court in the *Barcelona Traction, Light and Power Company, Limited case* (*Second Phase, I.C.J. Reports 1970*, at p. 32) suffice to show that the question is one that may be considered as capable of rational legal argument and a proper subject of litigation before this Court.[124]

45. ***Legality of the Threat or Use of Nuclear Weapons.*** In its advisory opinion on the *Legality of the Threat or Use of Nuclear Weapons* case (as requested by the General Assembly in 1996), the International Court of Justice questioned whether the use of nuclear weapons would lead to damage to the environment, presumably including the atmospheric environment. The Court recognized that

> the environment is under daily threat and that the use of nuclear weapons could constitute a catastrophe for the environment [and] … that the environment is not an abstraction but represents the living space, the quality of life and the very health of human beings, including generations unborn. The existence of the general obligation of States to ensure that activities within their jurisdiction and control respect the environment of other States or of areas beyond national control is now part of the corpus of international law relating to the environment.[125]

However, it qualified its position by saying the following:

> The Court does not consider that the treaties in question could have intended to deprive a State of the exercise of its right of self-defence under international law because of its obligations to protect the environment. Nonetheless, States must take environmental considerations into account when assessing what is necessary and proportionate in the pursuit of legitimate military objectives. Respect for the environment is one of the elements that go to assessing whether an action is in conformity with the principles of necessity and proportionality.[126]

The Court noted furthermore that

> Articles 35, paragraph 3, and 55 of Additional Protocol I provide additional protection for the environment. Taken together, these provisions embody a general obligation to protect the natural environment against widespread, long-term and severe environmental damage; the prohibition of methods and means of warfare which are intended, or may be expected, to cause such damage; and the prohibition of attacks against the natural environment by way of reprisals. These are powerful constraints for all the States having subscribed to these provisions.[127]

In his dissenting opinion, Judge Weeramantry elaborated at length on the effects of nuclear weapons, especially damage to the environment and the ecosystems, and to future generations.[128]

46. ***Gabčíkovo-Nagymaros Project (Hungary/Slovakia).*** This case was essentially concerned with the use of an international watercourse and was not directly related to the atmosphere. Nonetheless, the International Court of Justice touched on several issues relevant to the topic, the findings of which could also be applicable to the protection of the atmosphere. While Hungary essentially relied on a "state of ecological necessity" to justify the suspension or abandonment of certain works necessary for building the planned dams, Slovakia argued that the alleged state of necessity had not existed, and that, regardless, it did not constitute a reason for the suspension of the party's treaty obligations. The Court supported the latter position. With regard to the measures taken by Slovakia to divert water, the Court concluded that they could not be considered a lawful countermeasure, and thus Slovakia was not entitled to put the diversion installations into operation.[129] During the proceedings, Hungary presented several arguments in support of the lawfulness of its action, including the impossibility of performance of the 1977 Agreement[130] (owing in part to ecological imperatives), a fundamental change of circumstances (owing in part to the progress of environmental knowledge) and the development of new norms and prescriptions in international environmental law. However, the Court, in rejecting the contention of Hungary, relied

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[122] *Nuclear Tests (Australia v. France), Interim Protection, Order of 22 June 1973, I.C.J. Reports 1973,* p. 99, and *Judgment, I.C.J. Reports 1974*, p. 253; *Nuclear Tests (New Zealand v. France), Interim Protection, Order of 22 June 1973, I.C.J. Reports 1973,* p. 135, and *Judgment, I.C.J. Reports 1974,* p. 457. See Thierry, "Les arrêts du 20 décembre 1974 et les relations de la France avec la Cour internationale de justice"; Franck, "Word made law: the decision of the ICJ in the nuclear test cases"; Lellouche, "The International Court of Justice—the *Nuclear Tests* cases: judicial silence v. atomic blasts"; McWhinney, "International law-making and the judicial process: the World Court and the French *Nuclear Tests* case"; Sur, "Les affaires des essais nucléaires"; and MacDonald and Hough, "The *Nuclear Tests* case revisited".

[123] Memorial on Jurisdiction and Admissibility submitted by the Government of Australia, *I.C.J. Pleadings, Oral Arguments, Documents: Nuclear Test Cases,* vol. I (Australia v. France), para. 459.

[124] *Nuclear Tests (Australia v. France), Judgment, I.C.J. Reports 1974,* p. 253, at pp. 369–370, para. 117.

[125] *I.C.J. Reports 1974,* pp. 241–242, para. 29.

[126] *Ibid.*, p. 242, para. 30.

[127] *Ibid*., para. 31.

[128] *Ibid*., pp. 433–555. See Brown Weiss, "Opening the door to the environment and to future generations"; and Momtaz, "The use of nuclear weapons and the protection of the environment: the contribution of the International Court of Justice".

[129] *Gabčíkovo-Nagymaros Project (Hungary/Slovakia), Judgment, I.C.J. Reports 1997*, p. 7, at pp. 55–57, paras. 82–87.

[130] Agreement between Czechoslovakia and Hungary concerning mutual assistance in the construction of the Gabčíkovo-Nagymaros system of locks, Budapest, 16 September 1977, United Nations, *Treaty Series*, vol. 1724, No. 30074, p. 120.

largely on the law of treaties embodied in the Vienna Convention on the Law of Treaties and the law of State responsibility reflected in the Commission's 2001 draft articles[131] rather than the principles and rules of international environmental law.[132] It may be noted that Judge Weeramantry discussed at length the concept of sustainable development in his separate opinion.[133]

47. ***Pulp Mills on the River Uruguay (Argentina v. Uruguay).*** In this case, which primarily concerned the river's water quality, the International Court of Justice referred in part to the issue of alleged air pollution to the extent relevant to the river's aquatic environment.[134] Argentina contended that emissions from the plant's stacks had deposited substances with harmful effects into the aquatic environment. The Court, however, found that "the record does not show any clear evidence that substances with harmful effects have been introduced into the aquatic environment of the river through the emissions of the … mill into the air".[135] What is striking about the judgment is the Court's dismissal of virtually every argument made by Argentina concerning Uruguay's alleged breach of the latter's substantive obligations, on the ground of lack of evidence, with little elaboration of the substantive issues. The judgment was met with criticism (in a joint dissenting opinion, a separate opinion, as well as a declaration) that the Court should have adopted inquisitorial methods (such as entrusting an enquiry to a commission) and should not have depended solely on evidence produced by the parties.[136] One of the distinctive features of environmental disputes, such as the case at hand, is that they are often fact-intensive. Accordingly, the gathering and evaluation of scientific evidence is crucial. The *Pulp Mills* case thus posed the further question of what role the Court should play in the assessment of technical scientific evidence when settling environmental disputes.

48. ***Aerial Herbicide Spraying (Ecuador v. Colombia).*** This case was squarely concerned with alleged transboundary air pollution. In March 2008, Ecuador instituted proceedings claiming "that by aerially spraying toxic herbicides at locations at, near and over its border with Ecuador, Colombia has violated Ecuador's rights under customary and conventional international law".[137] In its application, Ecuador stated that "[t]he spraying has already caused serious damage to people, to crops, to animals, and to the natural environment on the Ecuadorian side of the frontier, and poses a grave risk of further damage over time", and requested the Court to "adjudge and declare that: (A) Colombia has violated its obligations under international law by causing or allowing the deposit on the territory of Ecuador of toxic herbicides that have caused damage to human health, property and the environment; (B) Colombia shall indemnify Ecuador for any loss or damage caused by its internationally unlawful acts, namely the use of herbicides, including by aerial dispersion".[138] However, the case was removed from the Court's list on 13 September 2013 at the request of Ecuador since agreement had been reached between the parties regarding, *inter alia*, Colombia's discontinuance of aerial spraying and the creation of a joint commission.

49. ***United States—Standards for Reformulated and Conventional Gasoline.*** In this case before the WTO Appellate Body (1996) a number of important issues on the protection of the atmosphere were presented. It was the first ruling in which WTO dispute settlement procedures were employed.[139] In the case, Brazil and Venezuela (Bolivarian Republic of) requested that the Dispute Settlement Body examine the compatibility of the Clean Air Act and the "baseline establishment methods" of the "Gasoline Rule" promulgated by the United States Environmental Protection Agency with the relevant WTO provisions. The Clean Air Act and its regulations are intended to prevent and control air pollution in the United States by setting standards for gasoline quality and motor vehicle emissions. Under the 1990 amendment to the Act, new regulations on vehicular emissions of toxic air pollutants and ozone-forming volatile organic compounds were promulgated to improve air quality in the most polluted areas of the country. These new regulations applied to United States refiners, blenders and importers. In recognizing that clean air was a natural resource that could be depleted, the conclusion was reached that the baseline establishment methods were not consistent with article III, paragraph 4, of the General Agreement on Tariffs and Trade and could not be justified under article XX, paragraphs (*b*), (*d*) and (*g*). The Panel found that imported and domestic gasoline were "like products" and that imported gasoline was treated less favourably than domestic gasoline. The United States appealed to the Appellate Body, arguing that the Panel erred in ruling that the baseline did not constitute a measure relating to the conservation of clean air within the meaning of article XX, paragraph (*g*). The Appellate Body found that the United States Gasoline Rule was within the scope of the article XX, paragraph (*g*), exemption, but that the United States measure constituted "arbitrary" or "unjustifiable" discrimination or a "disguised restriction" on international trade and thus failed to meet the requirements of the chapeau of article XX. Hence, the case demonstrated a conflict between a domestic law for the protection of clean air and an international regime for free trade, on which the Appellate Body decided in favour of the latter.

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[131] Draft articles on responsibility of States for internationally wrongful acts, *Yearbook … 2001*, vol. II (Part Two), pp. 26 *et seq.*, para. 76.

[132] See "Symposium: the *Case concerning the Gabčíkovo-Nagymaros Project*", *Yearbook of International Environmental Law*, vol. 8 (1997), pp. 3–116; Fitzmaurice, "The *Gabčíkovo-Nagymaros* case: the law of treaties"; Lefeber, "The *Gabčíkovo-Nagymaros Project* and the law of State responsibility".

[133] *Gabčíkovo-Nagymaros Project (Hungary/Slovakia), Judgment, I.C.J. Reports 1997*, p. 7, at pp. 88–119.

[134] *Pulp Mills on the River Uruguay (Argentina v. Uruguay), Judgment, I.C.J. Reports 2010*, pp. 100–101, paras. 263–264. The issue was raised during the oral proceedings, see public sitting on 8 June 2006, CR 2006/47, paras. 22, 28 and 34.

[135] *Pulp Mills on the River Uruguay (Argentina v. Uruguay), Judgment, I.C.J. Reports 2010*, p. 101, para. 264.

[136] See the joint dissenting opinion of Judges Al-Khasawneh and Simma, *ibid.*, pp. 108–111, paras. 1–6; the separate opinion of Judge Cançado-Trindade, *ibid.*, p. 191, para. 151; and the declaration of Judge Yusuf, *ibid.*, pp. 216–220.

[137] Application by Ecuador (2008, General List No. 138), 31 March 2008, para. 37.

[138] *Ibid.*, paras. 2 and 38.

[139] See, in general, Murase, "Unilateral measures and the WTO dispute settlement".

50. ***Air Transport Association of America and Others v. Secretary of State for Energy and Climate Change.*** The judgment of the European Court of Justice in this case[140] affirmed the validity of including aviation activities in the European Union emissions trading scheme within Directive 2008/101/EC of the European Parliament and the Council of 19 November 2008 amending Directive 2003/87/EC so as to include aviation activities in the scheme for greenhouse gas emission allowance trading within the Community. The decision could potentially be challenged by non-European countries in other forums, illustrating the conflict between trade and environment.[141]

3. Customary international law

(a) Opinio juris *and general practice*

51. In addition to the multilateral and bilateral conventions described above, there is abundant State practice and literature on the subject. The frequently cited *Trail Smelter* arbitration continues to be the leading case on transboundary air pollution. The principle of *sic utere tuo ut alienum non laedas* (use your own property so as not to injure that of another) applied in the award is now generally recognized as part of customary international law, although with certain qualifications and conditions. The principle is recognized as customary international law as far as transboundary air pollution between adjacent countries is concerned, to the extent that cause and effect can be proved with clear and convincing evidence. Questions remain as to whether the same principle can be extended to the case of long-distance (transcontinental) air pollution, where the causal link is difficult to prove; and as to whether it can be extended to global atmospheric problems such as ozone depletion and climate change. Careful analysis is required in each case to determine whether and to what extent a principle or rule is considered "established" as customary international law in the light of *opinio juris sive necessitatis* and general State practice.[142] The assessment of evidence regarding the customary nature of a rule must be done on a case-by-case basis. It is generally understood that neither *opinio* unsupported by custom (usage) nor mere custom unsupported by *opinio* qualify as customary law.[143] There are also cases where customary law is in the making, rather than established, which is known as "emergent rules of customary law".[144]

52. It is expected that a great part of the Commission's work on the present project, like all other projects, will be devoted to the determination of the customary status of given principles and rules relating to the protection of the atmosphere. From an analytical perspective, the distinction between established and emergent rules becomes important if a parallel is drawn between the work of codification, which is conducted on the basis of established customary law, and that of progressive development, which is conducted on the basis of emergent rules of customary law.[145] However, the Commission does not seem very concerned about distinguishing the two types of work, suggesting that the difference between the two sources of rules may not be that significant in the actual context of codification and progressive development (unlike the context of judicial process in which the distinction could have a decisive impact on the determination of whether a particular provision of a convention is representative of a pre-existing customary law). Of greater importance is the distinction between emergent rules of customary law and rules that have not yet reached the necessary stage of maturity to be called emergent. Elaborating such rules would simply be an exercise in law-making, which, being outside the mandate of the Commission, should be avoided. The crucial task entrusted to the Commission is thus to clarify which elements are considered as constituting emergent rules of customary law suitable for progressive development. Again, this must be determined on a case-by-case basis. It is therefore necessary to look to the various materials that may be deemed relevant in determining what constitutes an emergent rule of customary international law. Accordingly, the material sources *praeter legem* (outside, but close to, the formal sources of law) should be examined.

(b) *Non-binding instruments*

53. Non-binding instruments are an important source for determining *opinio juris*. They include:

— Resolution of the Council of Europe Committee of Ministers on air pollution in frontier areas;[146]

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[140] See Faber and Brinke, *The Inclusion of Aviation in the EU Emissions Trading System: An Economic and Environmental Assessment*; Leggett, Elias and Shedd, *Aviation and the European Union's Emission Trading Scheme*; and Bartels, "The WTO legality of the application of the EU emissions trading system to aviation".

[141] With regard to potential disputes on the European Union emissions trading system before the ICAO Council, see Bae, "Review of the dispute settlement mechanism under the International Civil Aviation Organization: contradiction of political body adjudication". Regarding ICAO activities to combat climate change in the field of aviation, see the resolutions adopted at the thirty-eighth session of the ICAO Assembly, in 2013, entitled "Consolidated statement of continuing ICAO policies and practices related to environmental protection—general provisions, noise and local air quality" (resolution A38-17) and "Consolidated statement of continuing ICAO policies and practices related to environmental protection—climate change" (resolution A38-18) (*Assembly Resolutions in Force (as of 4 October 2013)*, Montreal, ICAO, 2014).

[142] *Colombian–Peruvian asylum case, Judgment of November 20th, 1950: I.C.J. Reports 1950*, p. 266, at pp. 276–277; *North Sea Continental Shelf, Judgment, I.C.J. Reports 1969*, p. 3, at p. 44, para. 77.

[143] It is not always easy to categorize material as evidence of *opinio juris* or State practice. Sometimes, the same source (such as domestic legislation) is double counted as evidence of both *opinio juris* and State practice.

[144] See *North Sea Continental Shelf, Judgment, I.C.J. Reports 1969*, p. 3, at p. 41, paras. 69–71. Denmark and the Netherlands asserted that, even if the provision in article 6 of the Convention on the Continental Shelf had not been considered as reflecting pre-existing customary law, that it, as a norm-creating provision, "constituted the foundation of, or has generated a rule which … has since passed into the general *corpus* of international law". The Court stated that "this process is a perfectly possible one and does occur from time to time: it constitutes indeed one of the recognized methods by which new rules of customary international law may be formed" (*ibid*., para. 71). Although the Court did not accept the contention by Denmark and the Netherlands on this particular provision of article 6, the Special Rapporteur considers there to be a strong basis for the progressive development of "emergent rule(s) of customary law", if supported by other material sources of law such as non-binding instruments, domestic law and domestic court decisions and other relevant incidents of State practice.

[145] For an enlightening analysis on the interrelationship of codification and progressive development, see McRae, "The interrelationship of codification and progressive development in the work of the International Law Commission".

[146] Resolution (71) 5, 26 March 1971.

— Declaration of the United Nations Conference on the Human Environment (Stockholm Declaration);

— OECD recommendation of the Council on principles concerning transfrontier pollution;[147]

— OECD recommendation of the Council for the implementation of a regime of equal right of access and non-discrimination in relation to transfrontier pollution;[148]

— Rio Declaration on Environment and Development;

— Malé Declaration on Control and Prevention of Air Pollution and its Likely Transboundary Effects for South Asia;[149]

— Acid Deposition Monitoring Network in East Asia;

— International Law Commission, draft articles on prevention of transboundary harm from hazardous activities;[150]

— International Law Commission, draft principles on the allocation of loss in the case of transboundary harm arising out of hazardous activities;[151]

— Eastern Africa Regional Framework Agreement on Air Pollution (Nairobi, 2008);[152]

—Southern African Development Community Regional Policy Framework on Air Pollution (Lusaka, 2008);[153]

— West and Central Africa Regional Framework Agreement on Air Pollution (Abidjan, 2009);[154]

— North African Framework Agreement on Air Pollution (2011).

54. Although not binding in form, some soft-law instruments are very important as they reflect material sources of international law; a brief account of some of those documents is therefore appropriate.

55. **Declaration of the United Nations Conference on the Human Environment (Stockholm Declaration).** The Stockholm Declaration laid the ground for international environmental law in the twentieth century. It contains a set of "common principles to inspire and guide the peoples of the world in the preservation and enhancement of the human environment",[155] although it does not specifically refer to the protection of the atmosphere.[156] The most important provision of the Declaration is principle 21, which asserts that States have the "responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction". While the word "responsibility" (to ensure) is somewhat ambiguous (the word "devoir" is used in the French text), the principle is now widely considered to have acquired the status of customary international law as far as transboundary air pollution is concerned, having been incorporated into several conventions.[157]

56. **Rio Declaration on Environment and Development.** The Rio Declaration was a product of the 1992 United Nations Conference on Environment and Development. While it is non-binding, it establishes general principles on sustainable development, thereby providing the foundation for future environmental protection regimes. In addition to general principles, the Declaration contains specific provisions on procedural elements, such as access to information and opportunities for public participation (principle 10); environmental impact assessments (principle 17); and notification, information exchange and consultation (principle 19). In that way, it can be seen as a framework for environmental law-making at the national and international levels and a benchmark against which future developments can be measured.[158] Significantly, the Declaration represents a paradigm shift from environmental law to the law of sustainable development. The shift is evident in the wording of principle 2, a slightly modified version of principle 21 of the Stockholm Declaration. It states that

> States have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental and developmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction.

The Declaration recognizes that in order to effect substantial change, environmental concerns must be integrated into the greater framework of economic development; its stated purpose is to elaborate strategies and measures to halt and reverse the effects of environmental degradation in the context of strengthened national and international efforts to promote sustainable and environmentally sound development in all countries. The Declaration can be viewed as a compromise between developed countries primarily concerned with environmental protection and developing countries primarily concerned with economic development. That balance is evident in its key provisions, namely principles 3 and 4, respectively. Principle 3 states that: "The right to development must be fulfilled as to equitably meet developmental and environmental needs of present and future generations." Principle 4, in

[147] OECD/LEGAL/0133, available from https://legalinstruments.oecd.org/en/instruments/OECD-LEGAL-0133.

[148] OECD/LEGAL/0152, available from https://legalinstruments.oecd.org/en/instruments/OECD-LEGAL-0152.

[149] Report of the Seventh Governing Council Meeting of the South Asia Cooperative Environment Programme, annex XVI, Malé, 22 April 1998.

[150] *Yearbook … 2001*, vol. II (Part Two), pp. 146 *et seq.*, para. 97.

[151] *Yearbook … 2006*, vol. II (Part Two), pp. 58 *et seq.*, para. 66.

[152] Available from www.york.ac.uk/media/sei/documents/publications/gapforum/Eastern_Africa_Air_Pollution_Agreement.pdf. See also Nordberg, *Air Pollution: Promoting Regional Cooperation*.

[153] Available from https://web.archive.org/web/20111226174616/www.unep.org/urban_environment/PDFs/SADC-LusakaAgreement.pdf.

[154] Available from https://www.york.ac.uk/media/sei/documents/publications/gapforum/West_and_Central_Africa_Air_Pollution_Agreement_English_final.pdf.

[155] Second preambular paragraph.

[156] Principle 6 provides that: "The discharge of toxic substances or of other substances and the release of heat, in such quantities or concentrations as to exceed the capacity of the environment to render them harmless, must be halted in order to ensure that serious or irreversible damage is not inflicted upon ecosystems."

[157] Murase, *International Law: An Integrative Perspective on Transboundary Issues*, p. 24.

[158] Sands, *Principles of International Environmental Law*, p. 54.

turn, states that: "In order to achieve sustainable development, environmental protection shall constitute an integral part of the development process and cannot be considered in isolation from it." Read together, the two principles form the core of sustainable development. The Declaration goes on to codify several important principles contained within the concept of sustainable development: the precautionary principle,[159] equity (both intragenerational and intergenerational),[160] and common but differentiated responsibilities.[161] The principles laid down in the Rio Declaration have significantly guided subsequent environmental treaties.

57. **Acid Deposition Monitoring Network in East Asia.** The Acid Deposition Monitoring Network in East Asia was developed as part of the initiative to establish a regional framework for the control of transboundary air pollution. Owing to rapid economic growth and industrialization, many countries in the East Asia subregion are facing a serious threat from air pollution, including acid deposition. Regional cooperation for countermeasures to prevent regional air pollution is urgently needed. Led by Japanese efforts, the Network aims to reduce the adverse impact of acid deposition on human health and the environment. As the institutional framework for the Network, the intergovernmental meeting is the decision-making body. In addition, a Scientific Advisory Committee, composed of scientific and technical experts, has been established under the intergovernmental meeting. The secretariat and the Network Centre are designed to support the Network. By 2010, 54 deposition monitoring sites had been set up in 10 participating States, and ecological surveys had been conducted at 44 sites (forests, lakes and rivers) in the subregion.[162]

58. **The Commission's draft articles on prevention of transboundary harm from hazardous activities.** The Commission, while addressing State responsibility for wrongful acts, also turned its attention to liability for lawful acts. Based on the recommendation of the Working Group (established to consider the topic), the Commission decided that the two aspects of the topic, namely, prevention and remedial measures, should be dealt with separately.[163] In 2001, the Commission adopted and submitted the final text of the draft articles on prevention of transboundary harm from hazardous activities to the General Assembly. The draft articles represent the Commission's attempt not only to codify but to progressively develop the law through its elaboration of the procedural and substantive content of the duty of prevention. Underpinning the draft articles is the principle of *sic utere tuo ut alienum non laedas* (as articulated in the *Trail Smelter* case and in principle 21 of the Stockholm Declaration). Draft article 3 states that the State of origin shall take all appropriate measures to prevent significant transboundary harm or at any event to minimize the risk thereof. The obligation to prevent transboundary harm is based on a standard of due diligence. Due diligence further involves the duty to assess the risk of activities likely to cause significant transboundary harm (draft article 7) and the duty to notify and provide relevant information to State(s) likely to be affected (draft article 8). Read with the duty of prior State authorization for risk-posing activities, the draft articles illustrate the interrelatedness of prevention and precaution, and endorse the precautionary principle with regard to environmental protection. In addition to elaborating the duty of due diligence, the draft articles codify several important overarching principles, some already well established in international law and some referred to with increasing frequency in international environmental treaties. The Commission refers to the duty to cooperate in good faith (draft article 4) in preventing significant transboundary harm and to seek solutions "based on an equitable balance of interests" (draft article 9).

59. **The Commission's draft principles on the allocation of loss in the case of transboundary harm arising out of hazardous activities.** The Commission resumed its work on the issue of liability with respect to transboundary harm in 2002, "bearing in mind the interrelationship between prevention and liability".[164] The scope of activities included in the draft principles remains the same as in the draft articles. The purpose of the draft principles is twofold: first, to "ensure prompt and adequate compensation to victims of transboundary damage"; and second, to "preserve and protect the environment in the event of transboundary damage, especially with respect to mitigation of damage to the environment and its restoration or reinstatement" (draft principle 3). It is significant that the principles recognize the intrinsic value of the environment and prioritize its protection/preservation. In conjunction with the draft articles, they reinforce the principles of equity and sustainable development. Compensation is based on the polluter pays principle. In requiring "prompt and adequate compensation" (principle 4) for transboundary environmental damage, the cost-benefit analysis of preventive measures is altered; environmental costs (for example, control and remedial measures) are internalized, giving operators a greater incentive to take preventive measures. The draft principles do not provide for State liability. Instead, they provide for operator liability on a strict liability basis. The role of the State is to put in place a system of victim compensation through the adoption of national laws or international agreements. The draft principles attempt to create a framework to guide States with its substantive and procedural provisions. At the substantive end is principle 4, the provision of prompt and adequate compensation for

[159] Principle 15 represents a comparatively weak version of the precautionary principle.

[160] Principle 3 refers to the needs of both present and future generations: "The right to development must be fulfilled as to equitably meet developmental and environmental needs of present and future generations."

[161] Principle 7 states that: "States shall cooperate in a spirit of global partnership to conserve, protect and restore the health and integrity of the Earth's ecosystem. In view of the different contributions to global environmental degradation, States have common but differentiated responsibilities. The developed countries acknowledge the responsibility that they bear in the international pursuit of sustainable development in view of the pressures their societies place on the global environment and of the technologies and financial resources they command."

[162] The Acid Deposition Monitoring Network in East Asia was adopted in Jakarta in March 2000; see Takahashi, "Formation of an East Asian regime for acid rain control: the perspective of comparative regionalism"; 13 countries, namely, Cambodia, China, Indonesia, Japan, Lao People's Democratic Republic, Malaysia, Mongolia, Myanmar, Philippines, Republic of Korea, Russian Federation, Thailand and Viet Nam have participated in the Network.

[163] *Yearbook … 1992*, vol. II (Part Two), paras. 344–349.

[164] In accordance with General Assembly resolution 56/82 of 12 December 2001, para. 3. See also *Yearbook … 2006*, vol. II (Part Two), p. 57, paras. 62–63; see also General Assembly resolution 61/36 of 4 December 2006, annex.

victims of transboundary damage[165] (comprising assignation of liability without proof of fault, specification of minimum conditions, and establishing insurance, bonds or other financial guarantees to cover liability). It should be noted that a threshold of "significant" transboundary harm must be met in order to trigger the application of the regime.[166] At the procedural end is principle 6: the provision of domestic and international procedures for claim settlements (comprising non-discriminatory access, availability of effective legal remedies and access to information). The provisions are neither couched in the language of rights or obligations, nor do they address the issue of non-operator State liability.

(c) *Domestic legislation*

60. Domestic legislation is important insofar as it addresses issues of transboundary harm to and global protection of the atmosphere. Inspiration may also be derived from laws of purely domestic concern that can be applied by analogy to the relevant international legal issues. Domestic law can be cited as evidence of State practice and, as such, constitute existing or emergent customary international law. It is also noteworthy that certain domestic legislation can have the norm-creating effect of opposability.[167] For instance, it can be said that in the *United States—Standards for Reformulated and Conventional Gasoline* case of the WTO Dispute Settlement Body (see paragraph 49 above), the central issue was whether the Clean Air Act of the United States was opposable *vis-à-vis* Brazil and Venezuela (Bolivarian Republic of).[168] In any event, the Special Rapporteur hopes to be supplied with relevant information on domestic legislation as well as the judicial decisions of the domestic courts referred to in paragraph 61 below.

(d) *Jurisprudence of domestic courts*

61. The decisions of domestic courts are also instructive to the extent that they are relevant to the protection of the atmosphere. As with domestic legislation, inspiration may be derived from domestic court decisions that can be applied to an international law context. Typically, the most relevant cases are those involving transboundary air pollution such as the 1957 *Walter Poro v. Houillères du Bassin de Lorraine* case along the French-German border.[169] However, there have also been pertinent cases involving global issues, notably, *Massachusetts v. Environmental Protection Agency*, which dealt with the question of whether the United States Environmental Protection Agency could decline to regulate carbon dioxide and other greenhouse gases.[170] Japanese courts have dealt with a number of cases related to air pollution[171] from which important analogies can be drawn to the protection of the atmosphere at the international level.

(e) *Other relevant incidents*

62. Incidents falling outside the categories listed above should also be taken into account and analysed to the extent to which they are considered relevant to State practice. For instance, atmospheric nuclear testing in the 1950s manifested itself as one of the first environmental issues to be confronted by the international community.[172] Accidents at nuclear facilities can have a direct impact on the atmosphere, as demonstrated by the accidents at Chernobyl in 1986 and Fukushima in 2011 (caused by the devastating earthquake and tsunami of 11 March 2011), and are currently a major concern, not only for Japan, but the international community in general.

4. Literature

63. A selected bibliography of the relevant international legal issues can be found in the syllabus on the topic, "Protection of the atmosphere".[173]

[165] Under principle 2(*a*), "'Damage' means significant damage caused to persons, property, or the environment". It includes, among other things, the costs of reasonable response measures and of reinstatement of the property, or environment including natural resources.

[166] Paragraph (2) of the commentary to principle 2 notes that: "The term 'significant' is understood to refer to something more than 'detectable' but need not be at the level of 'serious' or 'substantial'". See also *Yearbook … 2001*, vol. II (Part Two), p. 152, paras. (4) and (5), of the commentary to draft article 2 of the draft articles on prevention of transboundary harm from hazardous activities.

[167] It is well known that certain domestic measures based on domestic law have generated the creation of new international law, such as the regimes of conservation zones (see Moore, "Fur seal arbitration"); and preferential fishery zone (see *Fisheries Jurisdiction (United Kingdom v. Iceland), Merits, Judgment, I.C.J. Reports 1974*, p. 3). See, on the concept of opposability and its law-making function, Murase, *International Law: An Integrative Perspective on Transboundary Issues*, pp. 216–266.

[168] Murase, *International Law: An Integrative Perspective on Transboundary Issues*, pp. 273–274.

[169] *Walter Poro v. Houillères du Bassin de Lorraine*, Court of Appeals (*Oberlandesgericht*, 2nd Civil Chamber) of Saarbrücken, Germany, 22 October 1957 (Z U 45/57), upon appeal against a judgment of 12 February 1957 by the Saarbrücken District Court (*Landgericht*) as court of first instance; English summary in Sand, *Transnational Environmental Law: Lessons in Global Change*, pp. 89–90 and 121; see also Rest, "International environmental law in German courts"s, p. 412.

[170] See, for example, *Massachusetts v. Environmental Protection Agency*, U.S. Supreme Court decision of 2 April 2007 (549 U.S. 497), which was concerned in part with certain obligations of the Environmental Protection Agency to regulate emissions of greenhouse gases.

[171] See Osaka, "Re-evaluation of the role of the tort liability system in Japan", pp. 413–423.

[172] See, for example, the *Daigo Fukuryu Maru* (Lucky Dragon No. 5) incident (Japan–United States) in 1954 (Whiteman, *Digest of International Law*, vol. 4, pp. 565–566); Oda, "The hydrogen bomb tests and international law"; and Goldie, "A general view of international environmental law: a survey of capabilities, trends and limits", pp. 72–73.

[173] *Yearbook … 2011*, vol. II (Part Two), p. 189, annex II, .

Chapter II

Definition

A. Physical characteristics of the atmosphere

64. In order to determine the definition, scope and objective of the exercise of codification and progressive development of international law on the protection of the atmosphere and characterize its legal status, it is first necessary to understand the physical structure and characteristics of the atmosphere.

65. The "atmosphere" is "the envelope of gases surrounding the earth".[174] The average composition of the atmosphere up to an altitude of 25 km is as follows: nitrogen (78.08 per cent), oxygen (20.95 per cent), argon (0.93 per cent), carbon dioxide (0.03 per cent), trace gases (0.01 per cent) and water vapour[175] in highly variable amounts. The atmosphere exists in what is called the atmospheric shell.[176] Physically, it extends upwards from the earth's surface, the bottom boundary of the atmosphere. It is divided vertically into four atmospheric spheres on the basis of temperature characteristics, namely, from the lower to upper layers: troposphere, stratosphere, mesosphere and thermosphere (see figure I). The temperature of the atmosphere changes with altitude. In the troposphere (up to the tropopause, at a height of about 12 km), the temperature decreases as altitude increases because of the absorption and radiation of solar energy by the surface of the planet.[177] In contrast, in the stratosphere (up to the stratopause, at a height of nearly 50 km), temperatures gradually increase with height[178] because of the absorption of ultraviolet radiation by ozone. In the third layer, the mesosphere (up to the mesopause, at a height of 80 km), temperatures again decrease with altitude. In the fourth layer, the thermosphere, temperatures once more rise rapidly because of X-ray and ultraviolet radiation from the sun. The atmosphere extends above the mesopause and "has no well-defined upper limit".[179] Accordingly, there is no sharp scientific boundary between the atmosphere and outer space. Above 100 km, only 0.00003 per cent of the atmosphere remains. Beyond that altitude, traces of the atmosphere gradually merge with the emptiness of space.[180]

[174] *Concise Oxford English Dictionary*, 12th ed. (Oxford, Oxford University Press, 2011). A similar definition is found in the *Oxford English Dictionary* (Oxford, Oxford University Press, 2014); *The New Shorter Oxford English Dictionary* (Oxford, Clarendon Press, 1993); *Webster's Third New International Dictionary of the English Language Unabridged* (Springfield, Massachusetts, G. and C. Merriam, 1961); and *Le Grand Robert de la langue française*, vol. 1 (Paris, Dictionnaires Le Robert, 1985) ("*Enveloppe gazeuse qui entoure le globe terrestre*"). The American Meteorology Society physically defines the atmosphere as "a gaseous envelope gravitationally bound to a celestial body". See http://glossary.ametsoc.org/wiki/Atmosphere.

[175] Physically, water vapour, which accounts for roughly 0.25 per cent of the mass of the atmosphere, is a highly variable constituent. In atmospheric science, "[b]ecause of the large variability of water vapor concentrations in air, it is customary to list the percentages of the various constituents in relation to dry air". Ozone concentrations are also highly variable. Exposure to ozone concentrations [greater than] 0.1 [parts per million by volume] is considered hazardous to human health. See Wallace and Hobbs, *Atmospheric Science: An Introductory Survey*, p. 8.

[176] The American Meteorological Society defines the "atmospheric shell" (also called the "atmospheric layer" or "atmospheric region") as "[a]ny one of a number of strata or 'layers' of the earth's atmosphere" (http://glossary.ametsoc.org/wiki/Atmospheric_shell).

[177] The thickness of the troposphere is not the same everywhere; it varies with latitude and the season. The top of the troposphere lies at an altitude of about 17 km at the equator, although it is lower at the poles. On average, the height of the outer boundary of the troposphere is about 12 km. See Tarbuck, Lutgens and Tasa, *Earth Science*, p. 466; Thompson and Turk, *Earth Science and the Environment*, p. 438.

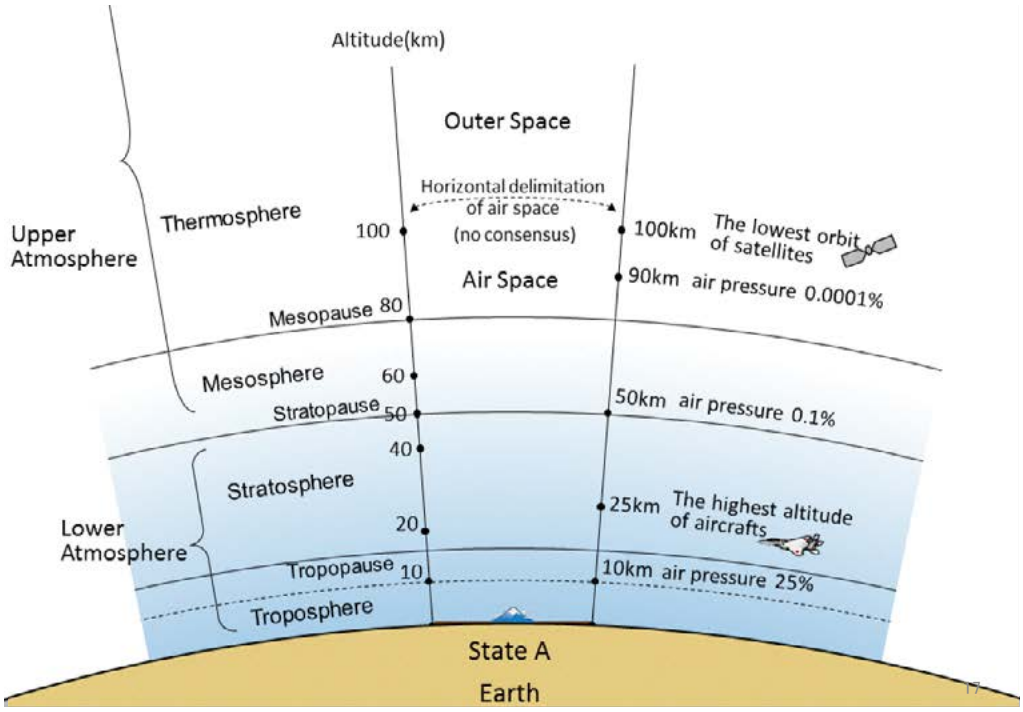
[178] Strictly, the temperature of the stratosphere remains constant to a height of about 20 to 35 km and then begins a gradual increase.

[179] Tarbuck, Lutgens and Tasa, *Earth Science*, p. 467.

[180] *Ibid.*, pp. 465–466.

FIGURE I

Spheres above the earth



Note: The diagram was drawn by the author with the assistance of Jun Okamoto, based on Ahrens, *Essentials of Meteorology: An Invitation to the Atmosphere*.

66. Because of gravity, the atmosphere exerts a downward force on the surface of the earth. Accordingly, as altitude increases, the gases in the atmosphere gradually become more dilute. Approximately 80 per cent of air mass exists in the troposphere and 20 per cent in the stratosphere. The thin, white hazy belt (with a thickness of less than 1 per cent of the radius of the globe) that one sees when looking at the earth from a distance is the atmosphere. In the troposphere and the stratosphere, the relative proportions of most gases are fairly stable. Scientifically, those spheres are grouped together as the lower atmosphere,[181] which extends to an average altitude of 50 km, and can be distinguished from the upper atmosphere.[182] The atmosphere moves and circulates around the earth in a complicated manner called atmospheric circulation.[183] The gravitational influence of the sun and moon also affect its movements by creating atmospheric tides.[184] Figure II shows where atmospheric problems, such as transboundary air pollution, depletion of the ozone layer and the accumulation of greenhouse gases, occur.

[181] The American Meteorological Society defines the "lower atmosphere" as "[g]enerally and quite loosely, that part of the atmosphere in which most weather phenomena occur (i.e., the troposphere and lower stratosphere); hence used in contrast to the common meaning for the upper atmosphere" (http://glossary.ametsoc.org/wiki/Lower_atmosphere).

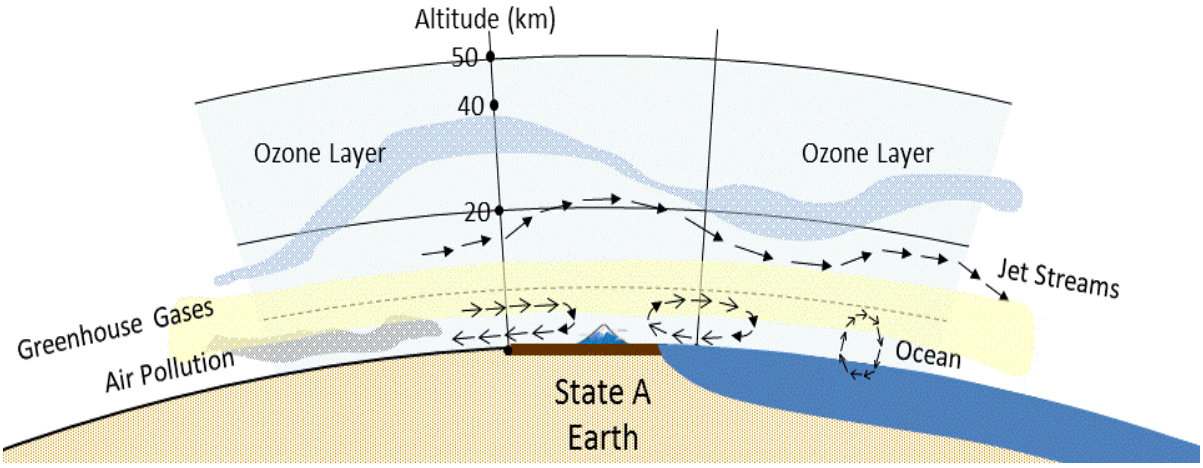
[182] In the same vein, the American Meteorological Society defines the "upper atmosphere" as residual, that is, "[t]he general term applied to the atmosphere above the troposphere" (http://glossary.ametsoc.org/wiki/Upper_atmosphere).

[183] Jones and others, *Collins Dictionary of Environmental Science*, p. 41.

[184] Allaby, *Dictionary of the Environment*, p. 34.

FIGURE II

Atmospheric circulation



Note: The diagram was drawn by the author, with the assistance of Jun Okamoto, based on C. Donald Ahrens, *Essentials of Meteorology: An Invitation to the Atmosphere*, 6th ed. (Belmont, California, Brooks/Cole, 2011), p. 210.

67. Both human and natural environments can be adversely affected by certain changes in the condition of the atmosphere. There are three particularly important causes for the degradation of the atmosphere.[185] First, the introduction of harmful substances (namely, air pollution) into the troposphere and lower stratosphere and associated chemical reactions[186] cause changes in atmospheric conditions. The major contributing sources of air pollution are acids (namely, nitrogen oxides and sulphur oxides), carbon monoxide, particulate matter and volatile organic compounds. Ozone and other photochemical oxidants are produced by a photochemical reaction of nitrogen oxides and volatile organic

[185] See Dolzer, "Atmosphere, protection", p. 290; and Kreuter-Kirchhof, "Atmosphere, international protection".

[186] Scientifically, pollutants are divided into two types: primary pollutants, substances that are emitted directly from identifiable sources; and secondary pollutants, substances that are not emitted directly into the air, but form in the atmosphere when reactions take place among primary pollutants. After the primary pollutant is emitted into the atmosphere, it combines with other substance(s) to produce other constituent pollutants through solar radiation or by photochemical reactions. See Tarbuck, Lutgens and Tasa, *Earth Science*, p. 464.

compounds under the sunlight in the troposphere; they produce harmful effects on humans and ecosystems.[187] Strong horizontal winds, for example, jet streams,[188] can quickly transport and spread such trace gases horizontally all over the globe far from their original sources (although vertical transport is mostly slow). It is important to recognize this functional aspect of the atmosphere as a medium for transporting pollutants. Some pollutants that are relatively innocuous while in the atmosphere can have significant deleterious effects when they accumulate in polar regions—both on fauna and flora and, through food chains, on humans, as in the cases of persistent organic pollutants and mercury. Second, chlorofluorocarbons, halons and other halocarbons emitted into the upper troposphere and stratosphere cause ozone depletion. The ozone layer, as its name implies, contains significant amounts of ozone. Ozone has the same chemical structure, whether it occurs miles above the earth or at ground level. It can be "good" or "bad", depending on its location in the atmosphere. The main concentrations of ozone ("good" ozone) are at altitudes of between 15 and 40 km (maximum concentrations occur between 20 and 25 km). The ozone layer filters out harmful ultraviolet radiation (known to cause skin cancer and other injury to life) from the sun. Third, changes in the composition of the troposphere and lower stratosphere cause climate change. The main source of anthropogenic climate change is the emission of gases (which already exist in trace amounts in the atmosphere), such as carbon dioxide, nitrous oxide, methane and hydrofluorocarbons. Such greenhouse gases are listed in annex A of the Kyoto Protocol (see paragraph 33 above).[189] Conditions within the troposphere heavily affect the weather on the earth's surface, including cloud formations, haze and precipitation. While some gases and aerosols are expunged through a natural cleansing process in the troposphere,[190] and a certain amount of carbon dioxide is absorbed by forests and oceans, emissions can overwhelm these processes, causing climate change to occur.

68. The three core international issues concerning the atmosphere—air pollution, ozone depletion and climate change—relate to the troposphere and the stratosphere,[191] although the major contributing factors may differ in each case. One such factor is residence time. While traditional air pollution constituents have a residence time of days to weeks, greenhouse gases, such as carbon dioxide and nitrous oxide, and compounds destroying the stratospheric ozone layer, have residence times that often exceed a century. The upper atmosphere (namely, the mesosphere and thermosphere), which comprises approximately 0.0002 per cent of the atmosphere's total mass, and outer space are of little concern as regards the environmental problems under consideration.

B. Definition of the atmosphere

69. Having briefly described the unique physical characteristics of the atmosphere, it is now necessary to formulate an appropriate legal definition that reasonably corresponds to the scientific definition. Most international treaties and documents do not define "atmosphere", even though it is the object of protection for the purpose of the application of those treaties. Alternatively, such instruments tend to define the causes and effects of damage to the object of protection.[192] It may nonetheless be noted that, in the contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, *Climate Change 2007—The Physical Science Basis*, atmosphere is defined as follows:

> The gaseous envelope surrounding the Earth. The dry atmosphere consists almost entirely of nitrogen (78.1% volume mixing ratio) and oxygen (20.9% volume mixing ratio), together with a number of trace gases, such as argon (0.93% volume mixing ratio), helium and radiatively active greenhouse gases such as carbon dioxide (0.035% volume mixing ratio) and ozone. In addition, the atmosphere contains the greenhouse gas water vapour, whose amounts are highly variable but typically around 1% volume mixing ratio. The atmosphere also contains clouds and aerosols.[193]

70. Once it undertakes the task of elaborating guidelines on the law relating to the atmosphere, the Commission will need to define the atmosphere. In so doing, it may need to address both the substantive aspect of the atmosphere as a layer of gases and the functional aspect of the atmosphere as a medium within which the

[187] See Royal Society, *Ground-level Ozone in the 21st Century: Future Trends, Impacts and Policy Implications* (London, 2008). Available from https://royalsociety.org/topics-policy/publications/2008/ground-level-ozone.

[188] Jet streams are narrow air currents, especially westerly winds (namely, those flowing from west to east) found in the upper stratum of the troposphere. They move at high speeds of between 240 and 720 km per hour.

[189] In recent years, however, experts have found that some of the substances in the troposphere are also responsible for climate change. On a scientific basis, chlorofluorocarbons also have greenhouse effects. Such contributions are defined as "a greenhouse warming potential (GWP)" (see Wallace and Hobbs, *Atmospheric Science: An Introductory Survey*, pp. 453–454).

[190] "Tropospheric … is continually being cleansed or scavenged of aerosols by cloud droplets and ice particles, some of which subsequently fall to the ground as rain or snow" (*ibid.*, p. 11).

[191] Kiss and Shelton, *International Environmental Law*, pp. 556–562.

[192] For instance, in the Convention on Long-range Transboundary Air Pollution, "air" is not defined, only a definition of "air pollution" is given. Article 1 (*a*) defines "air pollution" as "the introduction by man, directly or indirectly, of substances or energy into the air resulting in deleterious effects of such a nature as to endanger human health, harm living resources and ecosystems and material property and impair or interfere with amenities and other legitimate uses of the environment"; and article 1 (*b*) defines "long-range transboundary air pollution" as "air pollution whose physical origin is situated wholly or in part within the area under the national jurisdiction of one State and which has adverse effects in the area under the jurisdiction of another State at such a distance that it is not generally possible to distinguish the contribution of individual emission sources or groups of sources". The Convention also refers to "substances or energy" in its definition of air pollution (art. 1 (*a*)). Some of the protocols to the Convention, while referring to the "atmosphere" in their preambles, and in their object and purpose clauses, give no definition of the term. The definition of "emission" is given as "the release of a substance from a point or diffuse source into the atmosphere". The United Nations Framework Convention on Climate Change defines "climate change" as "a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere" (art. 1, para. 2). The same article defines "greenhouse gases" as "those gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and re-emit infrared radiation" (art. 1, para. 5). Such definitions refer to the effects and causes of the damage to the object the Convention aims to protect.

[193] Annex I (available from www.ipcc.ch/site/assets/uploads/2018/05/ar4_wg1_full_report-1.pdf), p. 941.

transport and dispersion of airborne pollutants occurs. The Special Rapporteur thus proposes the draft guideline set out below.

"*Draft guideline 1. Use of terms*

"For the purposes of the present draft guidelines,

"(*a*) 'Atmosphere' means the layer of gases surrounding the earth in the troposphere and the stratosphere, within which the transport and dispersion of airborne substances occurs."[194]

[194] Definitions of other terms will be proposed at later stages, as appropriate. Nonetheless, it may be helpful to give a tentative definition of "air pollution" (which will be discussed in some depth in the second report of the Special Rapporteur). Draft guideline 1 (*b*): "Air pollution" means the introduction by humans of chemicals, particulate matter, biological material or energy that degrade or alter, or form part of a process of degradation or alteration of, the atmosphere, and that have or are likely to have significant adverse effects on human life or health or the earth's natural environment.

Chapter III

Scope of the draft guidelines

A. Anthropogenic environmental degradation

71. In clarifying the scope of the project, it is necessary to address the main elements to be encompassed by the draft guidelines on the protection of the atmosphere, leaving no ambiguity as to its coverage. It may be useful to refer to the previous work of the Commission.[195] In general, the articles of multilateral environmental treaties relating to scope refer either to the effects of pollution (significant adverse effects) or to its causes (human activities). However, those two components are complementary to each other, with the "causes" of human activities resulting in certain effects,[196] and vice versa.[197]

72. The proposed draft guidelines only address damage caused by human activities. Accordingly, their scope would not extend to, for instance, damage caused by volcanic eruption or desert sands (unless exacerbated by human activities).[198] The term "human activities" includes not only activities conducted by States but also those conducted by natural and juridical persons.

73. The atmosphere has been used in several ways, most notably in the form of aerial navigation. Acoustic/noise pollution has raised transboundary problems for airports in border regions, which have been addressed by a number of bilateral treaties and a growing body of judicial cases.[199] Weather modification is another example for utilization of the atmosphere. Scientists have been suggesting various possible methods for active utilization of the atmosphere. Some of the proposed geoengineering technologies (such as solar radiation management and carbon dioxide removal) are relevant if they become realizable. Thus, modalities of the use (or utilization) of the atmosphere should certainly be considered in depth by the present study.

74. Obviously, most of the activities so far are those conducted without a clear or concrete intention to affect atmospheric conditions. There are, however, certain activities whose very purpose is to alter atmospheric conditions, namely, weather modification (weather control). While weather modification in warfare has been prohibited under the Convention on the prohibition of military or any other hostile use of environmental modification techniques,[200] weather control has been experimented with and practised widely since the 1940s to produce desirable changes in weather. The General Assembly addressed the issue in 1961.[201] The goals of weather con-

[195] See draft article 1 ("Scope") of the draft articles on the law of transboundary aquifers (*Yearbook … 2008*, vol. II (Part Two), p. 20, para. 53), as follows: "The present draft articles apply to: (*a*) utilization of transboundary aquifers or aquifer systems; (*b*) other activities that have or are likely to have an impact upon such aquifers or aquifer systems; and (*c*) measures for the protection, preservation and management of such aquifers or aquifer systems."

[196] For example, article 1 of the Convention on Long-range Transboundary Air Pollution provides that: "For the purpose of the present Convention: (*a*) 'Air pollution' means the introduction by man, directly or indirectly, of substances or energy into the air resulting in deleterious effects". Draft principle 1 ("Scope of application") of the draft principles on the allocation of loss in the case of transboundary harm arising out of hazardous activities (*Yearbook … 2006*, vol. II (Part Two), p. 58, para. 66) states that: "The present draft principles apply to transboundary damage caused by hazardous activities not prohibited by international law." Draft article 1 ("Scope") of the draft articles on prevention of transboundary harm from hazardous activities (*Yearbook … 2001*, vol. II (Part Two), p. 146, para. 97) states that: "The present articles apply to activities not prohibited by international law which involve a risk of causing significant transboundary harm through their physical consequences."

[197] For example, article 1, paragraph 2, of the United Nations Framework Convention on Climate Change provides that for the purpose of this Convention, "'climate change' means a change of climate which is attributed directly or indirectly to human activity".

[198] In the context of the Convention on Long-range Transboundary Air Pollution, Iceland even made a premonitory reservation upon signature of the Convention that it "does not take upon itself any responsibility for long-range transboundary air pollution caused by volcanic eruptions in Iceland" (see ECE/HLM.1/2/Add.1, vol. II, annex IV). Note, however, that some regional instruments also cover air pollution from natural causes; for example, article 1, paragraph 6, of the ASEAN Agreement on Transboundary Haze Pollution, and the African regional framework agreements.

[199] See, for example, the French–Swiss border, the judgment of the French Court of Appeal at Lyon in the *Cointrin airport* case (*Gazette du Palais*, vol. 74-II (1954), p. 205), followed by a bilateral boundary airport treaty in 1956; see Guinchard, "La collaboration franco–helvétique en matière d'aéroports (Bâle-Mulhouse et Genève)". Multilateral regimes relevant to aircraft noise damage include the Agreement between the Parties to the North Atlantic Treaty regarding the status of their forces; see, for example, Kiss and Lambrechts, "Les dommages causés au sol par les vols supersoniques", p. 771. Global technical standards for aircraft noise emissions have been laid down since 1971 by ICAO; see Davies and Goh, "Air transport and the environment: regulating aircraft noise".

[200] The Convention entered into force in 1978.

[201] In section C, paragraph 1 (*a*), of its resolution 1721 (XVI) of 20 December 1961 on international cooperation in the peaceful uses of outer space, the General Assembly advised Member States and other relevant organizations "to advance the state of atmospheric science and technology so as to provide greater knowledge of basic physical forces affecting climate and the possibility of large-scale weather modification."

trol range from preventing the occurrence of damaging meteorological events, such as hurricanes or tornadoes, to causing beneficial weather, such as artificial rainfall in an area experiencing drought; or, conversely, to stopping the rain in a designated area where an important event is scheduled to take place. Cloud seeding is a common technique to enhance precipitation; it entails spraying small particles such as dry ice and silver iodide into the sky in order to trigger cloud formation for eventual rainfall. Evidence of its safety is strong, but doubts remain as to its efficacy. The Governing Council of UNEP approved a set of recommendations for consideration by States and other weather modification operators in 1980.[202] If large-scale weather control were to become feasible in the future, there could be harmful consequences. Potential negative implications might include unintended side effects, damage to existing ecosystems and health risks to humans. Such effects, if transboundary in nature, could generate international concern for their injurious consequences.[203] It is suggested that progressive development of international law in this particular area should be pursued.[204]

B. Protection of natural and human environments

75. The draft guidelines should make clear the objects to be protected: natural and human environments. For the purpose of the present draft guidelines, the former is addressed as "the composition and quality of the atmosphere" and the latter as "human health or materials useful to mankind". Since the present draft guidelines are aimed at protecting the atmosphere, the primary concern is obviously the natural environment. However, given the intrinsic relationship between the natural environment and the human environment (which includes not only human health in a narrow sense but also natural vegetation and crops, materials and historical heritage), the draft guidelines should include both. It should also be added that any adverse effects on the environment should be "significant", warranting international regulation.

C. Causes of atmospheric degradation

76. While the present draft guidelines address various aspects of atmospheric degradation, both transboundary and global in nature, the causes of such environmental degradation are diverse. The causes generally fall into two categories, the first of which is the introduction of (deleterious) substances or energy into the atmosphere.[205] The major pollutants are acids (namely, nitrogen oxides), sulphur oxides, carbon monoxide, particulate matters and photochemical oxidants. Ozone depletion occurs as a result of the introduction of (deleterious) substances, such as chlorofluorocarbons and halons, into the atmosphere. In contrast, the main cause of climate change is the emission of greenhouse gases, such as carbon dioxide, nitrous oxide and methane. These gases are not always inherently deleterious to human health; rather, they have an indirect effect. They tend to cause climate change by altering the composition of the atmosphere.[206] Thus, the subject matter of the present draft guidelines, from a causal viewpoint, will include not only the introduction of certain substances but also of energy into the atmosphere, which would cover the problems of radioactive/nuclear pollution,[207] and will also include the cases of the

[202] Decision 8/7 A of the UNEP Governing Council on provisions for cooperation between States in weather modification, adopted at its eighth session, on 29 April 1980 (*Official Records of the General Assembly, Thirty-fifth Session, Supplement No. 25* (A/35/25), annex I). It may be noted that, as early as 1963, WMO made an important remark cautioning the need for a prudent approach to weather modification technologies, stating: "the complexity of the atmospheric processes is such that a change in the weather induced artificially in one part of the world will necessarily have repercussions elsewhere. This principle can be affirmed on the basis of present knowledge of the mechanism of the general circulation of the atmosphere. However, that knowledge is still far from sufficient to enable us to forecast with confidence the degree, nature or duration of the secondary effects to which change in weather or climate in one part of the earth may give elsewhere, nor even in fact to predict whether these effects will be beneficial or detrimental. Before undertaking an experiment on large-scale weather modification, the possible and desirable consequences must be carefully evaluated, and satisfactory international arrangements must be reached". Roslycky, "Weather modification operations with transboundary effects: the technology, the activities and the rules", p. 20.

[203] Sand, "Internationaler Umweltschutz und neue Rechtsfragen der Atmosphärennutzung"; see also Taubenfeld, "International environmental law: air and outer space", p. 195; and Brown Weiss, "International responses to weather modification", p. 813.

[204] It is suggested that the following points may be considered as regards weather modification: the duty to benefit the common good of humankind; the duty not to cause significant transboundary harm; the duty to perform environmental impact assessments; public participation; the duty to cooperate; exchange of information and notification; consultation; the duty to utilize international organizations; and State responsibility. See Roslycky, "Weather modification operations with transboundary effects: the technology, the activities and the rules", pp. 27–40. See also Davis, "Atmospheric water resources development and international law", pp. 17 *et seq.*

[205] For example, article 1 (*a*) of the Convention on Long-range Transboundary Air Pollution provides that: "'air pollution' means the introduction by man, directly or indirectly, of substances or energy into the air resulting in deleterious effects of such a nature as to endanger human health, harm living resources and ecosystems and material property and impair or interfere with amenities and other legitimate uses of the environment"; while article 1, paragraph 1, of the Agreement between Canada and the United States of America on air quality provides that "'air pollution' means the introduction by man, directly or indirectly, of substances into the air resulting in deleterious effects of such a nature as to endanger human health, harm living resources and ecosystems and material property and impair or interfere with amenities and other legitimate uses of the environment". It should be noted that article 1, paragraph 1 (4), of the United Nations Convention on the Law of the Sea defines "pollution of the marine environment" as "the introduction … of substances or energy into the marine environment".

[206] For example, article 1 of the United Nations Framework Convention on Climate Change provides that "'climate change' means a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods". See also article 1, paragraph 1, of resolution III of the Institute of International Law of 20 September 1987 on transboundary air pollution, which provides that: "For the purposes of this Resolution, 'transboundary air pollution' means any *physical, chemical or biological alteration in the composition or quality of the atmosphere** which results directly or indirectly from human acts or omissions, and produces injurious or deleterious effects in the environment of other States or of areas beyond the limits of national jurisdiction" (*Yearbook*, Session of Cairo 1987, vol. 62, Part II, Paris, Pedone, 1988).

[207] Questions on radioactive air pollution were debated in the context of the Convention on Long-range Transboundary Air Pollution. While, according to the explanatory memorandum to the Convention contained in a communication from the Government of Germany to Parliament ("Entwurf eines Gesetzes zu dem Übereinkommen vom 13, November 1979 über weiträumige grenzüberschreitende Luftverunreinigung", *Deutscher Bundestags-Drucksache* 9/1119, 2 December 1981, p. 14), radioactive substances are not covered (see also Rest, "Tschernobyl und die Internationale Haftung", pp. 612–613), the Government of Austria had expressed the contrary view, in a statement during the preparatory work of the Convention in January 1979 suggesting that the scope of the Convention should also include the study of possible negative effects resulting from the peaceful uses of nuclear energy on the environment of a State or States other than the State within which such activities are

alteration of the composition of the atmosphere. It bears repeating that the present draft guidelines will not attempt to deal with the specific substances causing such atmospheric degradation.

D. Linkages with other areas of international law

77. Obviously, the law of the atmosphere is intrinsically linked with other fields of international law such as the law of the sea[208] and biodiversity (forestry, desertification and wetlands),[209] as well as international trade law[210] and international human rights law.[211] The present draft guidelines will refer to those interrelationships, as appropriate. However, the linkages will be referred to as far as they are relevant to the other parts of the present draft guidelines.

78. On the basis of the foregoing considerations, the Special Rapporteur's proposal for draft guideline 2 would read as follows:

"Draft guideline 2. Scope of the guidelines

"(*a*) The present draft guidelines address human activities that directly or indirectly introduce deleterious substances or energy into the atmosphere or alter the composition of the atmosphere, and that have or are likely to have significant adverse effects on human life and health and the earth's natural environment;

"(*b*) The present draft guidelines refer to the basic principles relating to the protection of the atmosphere as well as to their interrelationship."

carried out; in this sense, see also Rauschning, "Interim report of the Committee: legal problems of continuous and instantaneous long-distance air pollution", p. 219; and Sands, *Chernobyl: Law and Communication—Transboundary Nuclear Air Pollution—The Legal Materials*, p. 163 (the definition in the Convention on Long-range Transboundary Air Pollution is "clearly wide enough to bring radioactive fallout within the scope of the Convention"). At the global level, the United Nations Scientific Committee on the Effects of Atomic Radiation, established by the General Assembly in its resolution 913 (X) of 3 December 1955 and now operating under the auspices of UNEP in Vienna, regularly monitors the levels and effects of ionizing radiation irrespective of its origin, including atmospheric emissions from underground tests not prohibited by the Treaty banning nuclear weapon tests in the atmosphere, in outer space and under water of 1963. These measurements thus reflect the cumulative impact of transnational radioactive air pollution from an aggregate of sources worldwide; see *Sources and Effects of Ionizing Radiation: United Nations Scientific Committee on the Effects of Atomic Radiation: UNSCEAR 2008 Report to the General Assembly with Scientific Annexes* (United Nations publication, Sales No. E.10.IX.3, 2010). On data-sharing by the Committee with the International Monitoring System under the Comprehensive Nuclear Test Ban Treaty (see General Assembly resolution 50/245 of 10 September 1996 and document A/50/1027), see Weiss, "The global dimensions of atmospheric radioactivity detection: experience and conclusions after the Fukushima Daiichi nuclear power plant accident".

[208] See United Nations Convention on the Law of the Sea, articles 212 ("Pollution from or through the atmosphere") and 195 ("Duty not to transfer damage or hazards or transform one type of pollution into another").

[209] The preamble of the United Nations Framework Convention on Climate Change refers to the negative impact of climate change on natural ecosystems, and article 4, paragraph 1, calls upon State parties to conserve "sinks and reservoirs of all greenhouse gases … including biomass, forests and oceans as well as other terrestrial, coastal and marine ecosystems". See also article 2, paragraph 1 (*a*) (ii), of the Kyoto Protocol and the Convention on Biological Diversity, United Nations Convention to combat desertification in those countries experiencing serious drought and/or desertification, particularly in Africa, and the Convention on wetlands of international importance especially as waterfowl habitat.

[210] See, in general, Murase, *International Law: An Integrative Perspective on Transboundary Issues*, pp. 130–166.

[211] See, in general, Schulze, Wang-Helmreich and Sterk, *Human Rights in a Changing Climate—Demands on German and International Climate Policy: The Human Rights to Food and to Water*; and Knox, "Climate change and human rights law".

Chapter IV

Legal status of the atmosphere

79. There are five concepts that may be considered applicable to the legal status of the atmosphere: airspace, shared or common natural resources, common property, common heritage and common concern (common interest).[212] Each of the concepts is briefly considered below as to whether and to what extent they are applicable to the protection of the atmosphere.

A. Differentiation between airspace and the atmosphere

80. The notion of "airspace" differs significantly from that of the "atmosphere". The two terms cannot be used interchangeably. Airspace is a concept used to signify the spatial dimension where States exercise their jurisdiction or control for aviation and defence.[213] Thus, article 1 of the Convention on International Civil Aviation provides that "every State has complete and exclusive sovereignty over the 'airspace' above its territory". Article 2 of the same Convention defines the territory of a State to be the land areas and adjacent territorial waters. The airspace beyond the boundaries of territorial waters is regarded as being outside the sovereignty of any State and is open for use by all States like the high seas (see also the reference to airspace in article 2 of the United Nations Convention on the Law of the Sea).[214]

[212] Boyle, "International law and the protection of the global atmosphere: concepts, categories and principles"; see also Brunnée, "Common areas, common heritage, and common concern".

[213] See Hobe, "Airspace", and Tomas, "Air law".

[214] Article 2 ("Legal status of the territorial sea, of the air space over the territorial sea and of its bed and subsoil") states:

"1. The sovereignty of a coastal State extends, beyond its land territory and internal waters and, in the case of an archipelagic State, its archipelagic waters, to an adjacent belt of sea, described as the territorial sea.

"2. This sovereignty extends to the air space over the territorial sea as well as to its bed and subsoil.

"3. The sovereignty over the territorial sea is exercised subject to this Convention and to other rules of international law."

81. Airspace refers to a domain,[215] an area-based approach; the atmosphere, in contrast, is a natural resource that flows through national boundaries. In respect of the legal status of the atmosphere, a functional, non-territorial, approach is more appropriate because it is a dynamic and fluctuating substance. Obviously, (vertical) delimitation is possible in the case of airspace by drawing lines vertically along territorial borders, but such artificial lines are not useful in the case of the atmosphere (air), which moves beyond borders in line with "atmospheric circulations" and "jet streams". Thus, the atmosphere is a fluid, single and non-partitionable unit, whereas airspace is a static—and separable—spatial domain.

82. Thus, the area-based approach adopted, for instance, by the United Nations Convention on the Law of the Sea (part XII, "Protection and preservation of the marine environment") cannot be followed for the protection of the atmosphere. The environmental regulations of the Convention are predominantly based on spatial (territorial) criteria (including the territorial sea, contiguous zones, exclusive economic zones and the high seas) for allocation of proper jurisdiction to control marine pollution, for example, flag-State jurisdiction, coastal-State jurisdiction and port-State jurisdiction.[216]

83. States may nonetheless feel it necessary to refer to the notion of airspace in the project since article 1 of the Convention on International Civil Aviation reaffirms the rule that "every State has complete and exclusive sovereignty over the airspace above its territory". Although the legal principles, rules and regulations envisaged in the proposed draft guidelines are perhaps most applicable to certain activities conducted on the ground within a State's territorial jurisdiction, there may be situations where the activities in question may be conducted in its airspace.[217] Therefore, the inclusion of a saving clause is proposed to the effect that nothing in the draft guidelines shall affect the legal status of airspace provided in other conventions.

B. Natural resources, shared or common

84. The atmosphere (air mass) is the earth's largest single natural resource, so listed—along with mineral, energy and water resources—by the Committee on Natural Resources,[218] as well as in the Stockholm Declaration[219] and in the World Charter for Nature.[220] It provides renewable "flow resources" essential for human, plant and animal survival on the planet; and, in addition to contributing basic economic production supplies (for example, oxygen and precipitation) as well as waste absorption services (for example, as a sink resource or dilution medium for combustion exhausts), it serves as a medium for transportation and communication ("spatial-extension resource").[221] It must be borne in mind that the atmosphere is a limited resource with limited assimilation capacity. The WTO Panel and Appellate Body recognized in the *Gasoline* case of 1996 that clean air was a natural resource that could be depleted. The atmosphere was long considered to be unlimited, non-exclusive and neutral (simply not worth fighting over) since it was assumed that everyone could benefit from it without depriving others.[222] That assumption is no longer valid. Although the atmosphere is not exploitable in the ordinary sense of the word (such as in the context of oil and gas resources), its proper maintenance is necessary for organisms to breathe and enjoy stable climatic conditions; thus, any polluting industry or polluting States in fact exploit the atmosphere by reducing its quality and

[215] The strict (horizontal) delimitation of airspace and outer space currently seems difficult, if not impossible (whereas the differentiation between the atmosphere and outer space is quite clear, because of the simple fact that there is no air in outer space). There is no agreement as to where airspace ends and outer space begins. Traditionally, two schools of thought existed. One school espoused the theory of the highest altitude of aircrafts while the other espoused the theory of the lowest orbit of satellites (see Matte, "Space law", p. 555). Bin Cheng for example, asserted that airspace reaches as far as the atmosphere can be found, by interpreting the French text "espace aérien" in article 1 of the Convention on International Civil Aviation. In this theory, the delimitation of airspace and outer space coincides with the differentiation between the atmosphere and outer space (van Bogaert, *Aspects of Space Law*, p. 12).

[216] Nordquist, Rosenne and Yankov, *United Nations Convention on the Law of the Sea 1982: A Commentary*, pp. 3–22. It may be noted, however, that the relevant part contains a provision based on the functional notion of the sea as a common good: article 216 ("Enforcement with respect to pollution by dumping") provides for so-called "loading State jurisdiction" in paragraph 1: "reduction and control of pollution of the marine environment by dumping shall be enforced" and in subparagraph (*c*) "by any State with regard to acts of loading of wastes or other matter occurring within its territory or at its off-shore terminals". It appears that loading State jurisdiction has the same theoretical foundation as State jurisdiction for the protection of the atmosphere under the present draft guidelines.

[217] Annex 16 of the 1944 Convention on International Civil Aviation is entitled "Environmental protection". The ICAO Council has established rules on aircraft engine emissions standards and recommended practices since 1981, with a view to achieving maximum compatibility between the safe and orderly development of civil aviation and the quality of the human environment. These emissions standards establish rules, *inter alia*, for vented fuel (Part II) and emission certification (part III), including emissions limits for smoke and certain chemical particles.

[218] The inclusion of "atmospheric resources" among "other natural resources" by the former Committee on Natural Resources was first mentioned in the Committee's report on its first session (New York, 22 February–10 March 1971), chap. II, sect.A.4 ("Other natural resources"), paragraph 94 (*d*) (*Official Records of the Economic and Social Council, Fiftieth Session, Supplement No. 6* (E/4969-E/C.7/13)). The work of the Committee on Natural Resources (later Committee on Energy and Natural Resources for Development) was transferred to the Commission on Sustainable Development.

[219] Principle 2: "The natural resources of the earth, including the air … must be safeguarded for the benefit of present and future generations through careful planning or management, as appropriate."

[220] "[A]tmospheric resources that are utilized by man … shall be managed to achieve and maintain optimum sustainable productivity" (General Assembly resolution 37/7 of 28 October 1982, annex, para. 4).

[221] See the terminology coined by von Ciriacy-Wantrup, *Resource Conservation: Economics and Policies*, pp. 40–42, and McDougal, Lasswell and Vlasic, *Law and Public Order in Space*, pp. 777–779.

[222] This appears quite similar to the classic 16th–17th century controversy between Hugo Grotius' *Mare Liberum* and John Selden's *Mare Clausum* over whether ocean resources were to be regarded as unlimited or limited. Grotius advocated the freedom of the ocean by asserting that, in light of its nature, the ocean could not be the object of occupation or possession. Therefore, according to the author, a State was not able to assert an exclusive right for fishing, which he thought had to presuppose *dominium* over the ocean. Moreover, in Grotius' view, there was no need to modify this historical construction, for he considered ocean resources unlimited. Accordingly, everyone could exploit fish stocks without infringing on the interests of others under the regime of the freedom of the seas. See Grotius, *The Freedom of the Seas or the Right which Belongs to the Dutch to Take Part in the East Indian Trade*, chap. 5. In contrast, Selden maintained that States possessed and could possess a part of the ocean as long as they actually exercised their power over that part of the ocean. In addition, Selden disputed Grotius' view by emphasizing that ocean resources were exhaustible and that there was a danger that the free use of the ocean would result in their depletion (see Selden, *Of the Dominion, Or, Ownership of the Sea*).

its capacity to assimilate the pollutants of other industries or States.[223] This rationale underlies, for example, "trade in emission rights". Accordingly, the concept of shared natural resources appears to be applicable in part to the problem of bilateral or regional transboundary air pollution, and common natural resources to global environmental issues relating to the atmosphere.

85. Assuming that the atmosphere is a natural resource, the term "protection" employed in this project may need to be clarified. In the context of the environment, the term is often used (consciously or unconsciously) in two ways: preservation and conservation. "Preservation" means the measures taken to maintain the original state of nature by requiring a total restriction on human activities in a designated off-limits area. "Conservation", on the other hand, means to maintain the state of the environment in a designated area through intentional human activities, for example, a conservation zone for fisheries resources on the high seas. As was indicated in paragraph 73 above, the utilization aspects of the atmosphere are becoming increasingly important and, accordingly, the draft guidelines to be elaborated on the protection of the atmosphere will refer not only to the preservation aspect (in the sense that the international community will strive as much as possible not to change the existing composition and balance of the atmosphere) but also to the conservation approach, which will aim at achieving sustainability in the utilization of the atmosphere.

C. Common concern of humankind

86. Common property, or *res communis*, refers to areas such as the high seas that are open for legitimate use by all States and that may not be appropriated to the sovereignty of any individual State. The airspace above the high seas is in this sense "common property". However, like sovereign airspace, common property is fundamentally a spatial dimension and is therefore insufficient when it comes to dealing with the atmosphere as a global unit,[224] as described in paragraphs 81 to 85 above.

87. The concept of common heritage was employed in the United Nations Convention on the Law of the Sea and in the Treaty on principles governing the activities of States in the exploration and use of outer space, including the moon and other celestial bodies. However, the attempt of Malta at the General Assembly in 1988 to have the global atmosphere declared part of the common heritage of humankind was unsuccessful. Since "common heritage" implies that a resource must be exploited and conserved for the benefit of mankind as a whole, such designation would usually require a far-reaching institutional apparatus to control the allocation of exploitation rights and benefits. If the atmosphere were treated as part of the common heritage of mankind, it would, in effect, place atmospheric problems under collective management—something widely considered premature.[225]

88. While the concepts of common property and common heritage may not be appropriate indicators of the legal status of the atmosphere, the notion of common concern is, and should be included in its legal status under international law. In 1988, the General Assembly declared, in its resolution 43/53 of 6 December 1988 on the protection of global climate for present and future generations of mankind, that climate change was a "common concern of mankind", somewhat mitigating the failure of the proposal by Malta. The same concept was incorporated into paragraph 1 of the preamble to the United Nations Framework Convention on Climate Change. In view of the growing recognition of the linkages between transboundary air pollution and global climate change, application of the concept of common concern to all atmospheric problems should be considered appropriate.[226]

89. The legal content of the concept of common concern is that States can no longer claim that atmospheric problems are within the reserved domain of domestic jurisdiction because the issues now legitimately fall under "matters of international concern". It will certainly lead to the creation of substantive legal obligations on the part of all States to protect the global atmosphere as enforceable *erga omnes*.[227] It may be too early at present to interpret the concept of common concern as giving "all States a legal interest, or standing, in the enforcement of rules concerning protection of the global atmosphere",[228] in view of the absence of appropriate procedural law to implement such an interpretation. It may also be premature to consider the concept of common concern as creating rights for individuals and future generations.

90. Yet, based on the foregoing analysis, it may be concluded that the atmosphere has the legal status of

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[223] Biermann, " 'Common concern of humankind': the emergence of a new concept of international environmental law", p. 428.

[224] Boyle, "International law and the protection of the global atmosphere: concepts, categories and principles", p. 9.

[225] *Ibid.*, pp. 9–10.

[226] The implications of the concept of common concern of humankind in relation to global environmental issues were examined at a meeting of the UNEP Group of Legal Experts held in Malta from 13 to 15 December 1990. It has been noted that the " 'common concern' concept has at least two important facets: spatial and temporal. Spatial aspect means that common concern implies cooperation of all States on matters being similarly important to all nations, to the whole international community. Temporal aspect arises from long-term implications of major environmental challenges which affect the rights and obligations not only of present but also of future generations" (see Attard, "The meeting of the Group of Legal Experts to examine the concept of the common concern of mankind in relation to global environmental issues", p. 37). This illustrates strong linkages with principles such as intergenerational equity contained in the Rio Declaration on Environment and Development and other international environmental instruments. One application of the concept of common concern has been explored from the viewpoint of an ecosystem, e.g., in the context of regional watershed management (see Brunnée and Toope, "Environmental security and freshwater resources: ecosystem regime building").

[227] As the International Court of Justice indicated in the *Barcelona Traction* case, such obligations are owed to the international community as a whole. Because of their importance, they are "the concern of all States" (*Barcelona Traction, Light and Power Company, Limited, Judgment, I.C.J. Reports 1970*, p. 3, at p. 30, para. 33). In this context, one may also recall the Commission's reference to "massive pollution of the atmosphere or of the seas" as an international crime in draft article 19, para. 3 (*d*), of the draft articles on State responsibility for internationally wrongful acts (*Yearbook … 1976*, vol. II (Part Two), p. 96) in its first reading, although the article disappeared in the final draft adopted on second reading (*Yearbook … 2001*, vol. II (Part Two), p. 26 *et seq.*, para. 76).

[228] Boyle, "International law and the protection of the global atmosphere: concepts, categories and principles", pp. 11–13.

an international resource, whether shared or common, indispensable for sustaining life on earth, human health and welfare, crops and the integrity of ecosystems; and that consequently its protection is a common concern of humankind. It may also be appropriate to add a caveat, so as to avoid any misunderstanding, to the effect that the present draft guidelines are not intended to prejudice in any way the status of airspace already established in international law. Thus, draft guideline 3 would read as follows:

"*Draft guideline 3. Legal status of the atmosphere*

"(*a*) The atmosphere is a natural resource essential for sustaining life on earth, human health and welfare, and aquatic and terrestrial ecosystems; hence, its protection is a common concern of humankind;

"(*b*) Nothing in the present draft guidelines is intended to affect the legal status of airspace under applicable international law."

Chapter V

Conclusion

91. In preparing the present report, the Special Rapporteur aimed to provide as thorough and exhaustive a background as possible on the topic, such as its historical development and the sources of law relevant to it, as well as to explain the rationale of the topic and the basic approaches, objectives and scope of the project. It has aptly been said that, "at its best, the [Commission's] real strength is the ability to take a systematic view of international law as a whole, to integrate new developments and different bodies of law and to articulate in its commentaries reasoned and fully researched conclusions".[229] Nonetheless, a number of problems had to be addressed here in a preliminary and general manner, leaving in-depth analysis of specific legal problems for a later stage. The Special Rapporteur hopes that he has been able to show that, with an appropriate approach, the protection of the atmosphere is both an important and proper topic for the codification and progressive development of international law—a topic through which the Commission can contribute significantly to the international community as a whole.

92. As a tentative plan of work to succeed the present first report, the Special Rapporteur hopes to consider, in the remaining two years (2015 and 2016) of the current quinquennium, questions relating to basic principles for the protection of the atmosphere. They will include the general obligations of States to protect the atmosphere, the principle of *sic utere tuo ut alienum non laedas* as applied to transboundary air pollution, as well as principles of equity, sustainable development and good faith. It is hoped that, during the next quinquennium (2017–2021), the Commission will complete its consideration of other related matters, such as international cooperation, compliance with international norms, dispute settlement and interrelationships.

[229] Boyle and Chinkin, *The Making of International Law*, p. 172.

United Nations A/CN.4/692

General Assembly

Distr.: General
25 February 2016

Original: English

International Law Commission
Sixty-eighth session
Geneva, 2 May-10 June and 4 July-12 August 2016

Third report on the protection of the atmosphere

by Shinya Murase, Special Rapporteur*

Contents

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I. Introduction

1. At its sixty-seventh session in 2015, the International Law Commission had before it the second report submitted by the Special Rapporteur on the topic of the protection of the atmosphere (A/CN.4/681 and Corr.1 (Chinese only)). The report contained proposals for five draft guidelines regarding the use of terms, scope of the guidelines, common concern of humankind, general obligation of States and international cooperation.

2. The second report was considered by the Commission during its 3244th to 3249th meetings, held on 4 to 8 and 12 May 2015. In addition, the Commission held an informal meeting in the form of a dialogue with scientists organized by the Special Rapporteur on 7 May 2015, which members of the Commission found useful and of which they were appreciative.[1]

3. The Commission decided to send to the Drafting Committee all the draft guidelines proposed by the Special Rapporteur, except draft guideline 4 on the general obligation of States to protect the atmosphere, which the Special Rapporteur did not ask to have considered by the Drafting Committee. When sending the draft guidelines to the Drafting Committee, the Commission also agreed that draft guideline 3 on the common concern of humankind be moved to the preambular section of the draft guidelines. The Drafting Committee recommended that the expression "common concern of humankind" should be changed to "pressing concern of the international community as a whole", and it was included in the preamble in that form. The Drafting Committee also recommended draft guideline 1 on the use of terms (namely, "atmosphere", "atmospheric pollution" and "atmospheric degradation"), draft guideline 2 on the scope, and draft guideline 5 on international cooperation for adoption by the Commission. The Commission provisionally adopted the preamble and the draft guidelines, with the commentaries thereto, at its sixty-seventh session.[2]

Debate held by the Sixth Committee of the General Assembly at its seventieth session

4. In November 2015, during the seventieth session of the General Assembly, the Sixth Committee considered the Special Rapporteur's second report and the work of the Commission on the topic. The delegations generally welcomed the work of the

[1] The dialogue with scientists on the protection of the atmosphere was chaired by the Special Rapporteur. Prof. Øystein Hov (President, Commission of Atmospheric Sciences, WMO) spoke on "Scientific aspects of the atmosphere: A General Overview", Prof. Peringe Grennfelt (Chair of the Working Group on Effects, CLRTAP, UNECE) on "Trans-continental transport of pollutants and their effects", Mr. Masa Nagai (Deputy Director, Division of Environmental Law and Conventions, UNEP) on "Pollutants affecting the global environment through the atmosphere", Mr. Christian Blondin (Director of Cabinet and External Relations Department, WMO) on "The role of the atmosphere in the global climate" and Ms. Jacqueline McGlade (Chief Scientist and Director, Division of Early Warning and Assessment, UNEP) on overall issues on atmospheric pollution and atmospheric degradation. Ms. Albena Karadjova (Secretary to CLRTAP, UNECE) also spoke on the economic implication of transboundary atmospheric pollution. For a summary of the meeting, see the UNEP document: Charles Wharton, "UN ILC's Dialogue with Scientists on the protection of the atmosphere", available at www.unep.org/delc/Events/montevideo-events/tabid/1060317/Default.aspx.

[2] *Official Records of the General Assembly, Seventieth session, Supplement No. 10 (A/70/10)*, chap. V, paras. 45-54.

Commission,[3] while a few delegates remained sceptical.[4] Most delegations expressed their endorsement of the collaboration of the Commission with atmospheric scientists in pursuing the work on the topic.[5]

5. With regard to the concept of "common concern of humankind" proposed by the Special Rapporteur, most delegations expressed agreement with changing the term to the "pressing concern of the international community as a whole" and placing it in the preamble,[6] while other delegations preferred to retain the original term.[7] One delegation stated that, instead of "pressing concern", "[a] more positive signal would be sent by referring to the concept of 'care' rather than using words that expressed anxiety."[8] Regarding draft guideline 1 (b), some delegations wondered whether the definition of "atmospheric pollution" should be restricted to activities having transboundary effects.[9] Some delegations also questioned whether it was appropriate to delete the word "energy" in the definition, in view of the fact that article 1 (1) (b) of the United Nations Convention on the Law of the Sea explicitly referred to "energy" as a cause of pollution.[10] One delegation favoured inclusion of a reference to the significant adverse effects to living resources in draft guideline 1 (c).[11] It was also suggested by another delegation that the word "global" be inserted before "atmospheric conditions" in the definition of "atmospheric degradation" in draft guideline 1 (c) in order to "make it clear that the atmospheric degradation referred to was the alteration of atmospheric conditions to such an extent that they produced worldwide deleterious effects."[12]

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[3] Finland (on behalf of the Nordic countries, *Official Records of the General Assembly, Seventieth session, Summary records, Sixth Committee*, A/C.6/70/SR.17, para. 36), Singapore (SR.17, para. 46), Italy (SR.17, para. 57), Belarus (SR.17, para. 68), Austria (SR.17, para. 81), Romania (SR.17, para. 102), Israel (SR.18, para. 4), Federated States of Micronesia (SR.18, para. 11), China (SR.18, para. 17), Japan (SR.18, para. 25), India (SR.18, para. 29), Islamic Republic of Iran (SR.18, para. 32), Sri Lanka (SR.18, para. 40), El Salvador (SR.18, para.47), Poland (SR.18, para. 63), Thailand (SR.18, para. 67), South Africa (SR.18, para. 73), Viet Nam (SR.18, para. 78), Republic of Korea (SR.18, para. 81), Malaysia (SR.19, para. 10), Germany (SR.19, para. 12), Philippines (SR.19, para. 15), Portugal (SR.19, para. 24), Algeria (SR.19, para. 34), Argentina (SR.19, para. 42), France (SR.20, para. 15), Hungary (SR.21, para. 81).

[4] Czech Republic (A/C.6/70/SR.17, para. 93), United Kingdom (SR.18, para. 10), Russian Federation (SR.19, para. 5), United States (SR.18, para. 18), Slovakia (SR.19, para. 31).

[5] Finland (on behalf of the Nordic countries, A/C.6/70/SR.17, para. 36), Singapore (SR.17, para. 46), Belarus (SR.17, para. 68). Austria, for instance, welcomed "the dialogue which the Commission had had with scientists, thereby promoting a better understanding of the complex physical phenomena involved" (SR.17, para. 81). One delegation however cautioned that "such dialogues might sometimes give rise to misleading conclusions, especially in the case of topics in which many important elements were defined by physics or other natural sciences, and not by the law" (Slovakia, SR.19, para. 31).

[6] Finland (on behalf of the Nordic countries, A/C.6/70/SR.17, para. 36), Singapore (SR.17, para. 46), Israel (SR.18, para.4), China (SR.18, para. 18), Japan (SR.18, para. 25), Sri Lanka (SR.18, para. 41), Poland (SR.18, para. 63), Republic of Korea (SR.18, para. 81), France (SR.20, para. 15).

[7] Federated States of Micronesia (A/C.6/70/SR.18, paras. 13-15), Germany (SR.19, para. 12), Portugal (SR.19, para. 24).

[8] Belarus (A/C.6/70/SR.17, para. 20).

[9] Finland (on behalf of the Nordic countries, A/C.6/70/SR.17, para. 37), Austria (SR.17, para. 81), Poland (SR.18, para. 64).

[10] Austria (A/C.6/70/SR.17, para. 82), Poland (SR.18, para. 64).

[11] Romania (A/C.6/70/SR.17. para. 102).

[12] China (A/C.6/70/SR.18, para. 18).

6. With regard to draft guideline 2, delegations generally welcomed the fact that the scope of the guidelines was clearly delineated by it.[13] However, one delegation suggested that a "'without prejudice clause' would be more helpful and appropriate than the exclusion of specific substances from the project's scope."[14] It was stated by one delegation that, in view of the fact that "most health problems were caused by particulate matter, including black carbon and tropospheric ozone, those pollutants should also be included in the scope of the draft guidelines", and that "thought might be given to enlarging its scope or even elaborating a new, global convention on air pollution."[15] In regard to the 2013 understanding,[16] one delegation expressed its belief that the reference to political negotiations was not necessary and should be removed from draft guideline 2 and from the general commentary.[17] Another delegation sought clarification of the logic behind the double-negative "do not deal with" followed by "but without prejudice to" in the understanding.[18]

7. Regarding draft guideline 5 on international cooperation, delegations generally supported it, together with the wording "as appropriate".[19] A few delegations noted, however, that the wording should be reconsidered.[20] Some States expressed the view that the scope of cooperation in guideline 5 was too limited[21] and should be expanded beyond scientific knowledge to "other areas, such as regulatory institutions and international emergency actions and communications" as well as to "promoting technical cooperation, such as the exchange of experiences and capacity building".[22] It was suggested that it might be possible to follow the provisions of the relevant draft articles of the Commission on the topic of prevention of transboundary harm.[23]

Information provided by Member States

8. In chapter III of its report on the work of its sixty-seventh session, the Commission indicated that it would welcome any information relevant to the topic.[24] Information on domestic legislation was received from Singapore on 30 January 2016.[25]

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[13] Italy (A/C.6/70/SR.17, para. 57), China (SR.18, para. 17), Poland (SR.18, para. 65), Republic of Korea (SR.18, para. 83).

[14] Islamic Republic of Iran (A/C.6/70/SR.18, para. 32).

[15] Hungary (A/C.6/70/SR.21, paras. 81-82).

[16] *Official Records of the General Assembly, Sixty-eighth session, Supplement No. 10* (A/68/10), chap. XII, para. 168.

[17] El Salvador (A/C.6/70/SR.18, para. 49).

[18] Philippines (A/C.6/70/SR.19, para. 15).

[19] Finland (on behalf of the Nordic countries, A/C.6/70/SR.17, para. 38), Sri Lanka (SR.18, para. 41). Singapore stressed also that the principle of "good faith" should be articulated in the commentary (SR.17, para. 48).

[20] E.g. Belarus (A/C.6/70/SR.17, para. 72).

[21] E.g. El Salvador (A/C.6/70/SR.18, para. 48).

[22] Singapore (A/C.6/70/SR.17, para. 50). Other States expressed a similar view: Islamic Republic of Iran (SR.18, para. 35), Malaysia (SR.19, para. 11), Algeria (SR.19, para. 34).

[23] Russian Federation (A/C.6/70/SR.19, para. 7).

[24] *Official Records of the General Assembly, Seventieth Session, Supplement No. 10* (A/70/10), para. 24.

[25] "Information on domestic legislation of Singapore: Transboundary Haze Pollution Act of 2014". This legislation is referred to in para. 32 and footnote 96 of the present report.

Recent developments

9. The United Nations summit for the adoption of the post-2015 development agenda was held from 25 to 27 September 2015 in New York and convened as a high-level plenary meeting of the General Assembly. It formally adopted the post-2015 development agenda, entitled "Transforming our world: the 2030 Agenda for Sustainable Development",[26] to guide the development of the international community over the next 15 years. As such, it called for action by all countries for all people in five areas of critical importance: people, planet, prosperity, peace and partnership. Throughout the summit, heads of State and government welcomed the 2030 Agenda for Sustainable Development and emphasized its transformative, universal and inclusive nature, its applicability to all countries and stakeholders and its motto of leaving no one behind.[27] The Agenda includes 17 Sustainable Development Goals with 169 associated targets,[28] covering a wide range of issues, including combating climate change, which are integrated and indivisible, to replace the Millennium Development Goals.[29]

10. At its twenty-first session, held in Paris from 30 November to 12 December 2015, the Conference of the Parties to the United Nations Framework Convention on Climate Change[30] adopted the Paris Agreement under the Convention with no objections from the 196 parties,[31] which is regarded as a new chapter for humankind in tackling climate change issues after 2020. In the Paris Agreement, the parties to the Convention, acknowledging that "climate change is a common concern of humankind",[32] dealt with, inter alia, mitigation, adaptation, loss and damage, finance, technology development and transfer, capacity-building, and transparency of action and support. The Paris Agreement aims to hold "the increase in the global average temperature to well below 2 degrees Celsius above pre-industrial levels and pursues efforts to limit the temperature increase to 1.5 degrees Celsius above pre-industrial levels" (article 2 (1) (a)).[33] It is significant that the Paris Agreement, pursuant to the Durban Platform for Enhanced Action, obliges "all parties" to undertake the commitments made thereunder (article 3).

Purpose of the present report

11. Building on the previous two reports, the Special Rapporteur wishes to consider, in the present (third) report, several key issues of the topic, namely, the obligations of States to prevent transboundary atmospheric pollution and mitigate global atmospheric degradation and the requirement of due diligence and environmental impact assessment (see section II below). He also explores the principle of sustainable and equitable utilization of the atmosphere and the legal

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[26] A/RES/70/1.

[27] See the overview in "Informal Summary on United Nations Summit on Sustainable Development 2015", at https://sustainabledevelopment.un.org/content/documents/8521Informal%20Summary%20-%20UN%20Summit%20on%20Sustainable%20Development%202015.pdf. See Birgit Lode et al., "Clean Air for All? Air Quality in the 2030 Agenda, and in International Law", *Review of European, Comparative and International Environmental Law*, vol. 25, No. 2 (forthcoming, 2016).

[28] General Assembly resolution 70/1, para. 59. See also paras. 12, 31, 49 and 73.

[29] General Assembly resolution 55/2.

[30] See http://unfccc.int/meetings/paris_nov_2015/session/9057.php.

[31] FCCC/CP/2015/L.9/Rev.1.

[32] Ibid., annex, preamble.

[33] Ibid., annex, article 2 (1) (a).

limits on certain activities aiming at intentional modification of the atmosphere (see section III below).

II. Obligations of States to protect the atmosphere

A. The duty to prevent transboundary atmospheric pollution

12. In his second report in 2015 (A/CN.4/681), the Special Rapporteur proposed draft guideline 4 on the "General obligation of States to protect the atmosphere", stipulating in a straightforward form that "States have the obligation to protect the atmosphere". That was modelled on article 192 of the United Nations Convention on the Law of the Sea, which provides that "States have the obligation to protect and preserve the marine environment".[34] The Special Rapporteur's characterization of this obligation as an "obligation *erga omnes*" was a point of debate in the Commission[35] and in the Sixth Committee,[36] which was not resolved. The proposed guideline was supported by some members of the Commission,[37] while others expressed objections on the grounds that it was "too open-ended and general".[38] To address the criticism of some members, the Special Rapporteur proposes in the present report to differentiate between two dimensions of the protection of the atmosphere, one on transboundary atmospheric pollution and the other on global atmospheric degradation. That division corresponds to the definitions provisionally adopted by the Commission in draft guideline 1, paragraphs (2) and (3), respectively.

13. The maxim *sic utere tuo ut alienum non laedas* (use your own property in such a manner as not to injure that of another) has been accepted in inter-State relations as the principle that the sovereign right of a State to use its territory is circumscribed by an obligation not to cause injury to, or within, the territory of another State.[39] That maxim has become the basis for the so-called "no harm rule", a prohibition of harmful transboundary impacts in the context of air pollution, most

[34] See A/CN.4/681, paras. 41-59.

[35] Critical views were expressed by Murphy (A/CN.4/SR.3246), Hassouna (SR.3247), Kittichaisaree (SR.3247) and McRae (SR.3248), while Maina Peter stated that he "could live with the Special Rapporteur's proposal, which was likely to garner more general support", noting that "once it had been agreed that the atmosphere was an area of common concern of mankind, there was an obligation on all States to protect it. Furthermore, the very nature of the atmosphere, which was in constant movement around the Earth, militated in favour of such an obligation" (SR.3247). Nolte was not convinced that "theoretical developments regarding the nature of obligations *erga omnes* were really helpful and even feared that they went too far" (SR.3246).

[36] Federated States of Micronesia supporting "a normative statement that imposed *erga omnes* obligations" (SR.18, para. 15). Islamic Republic of Iran drew attention to "the case law of the International Tribunal for the Law of the Sea that might be replicated for the purpose of the protection of the atmosphere", citing the advisory opinion of 1 February 2011 on responsibilities and obligations of States sponsoring persons and entities with respect to activities in the Area, which referred to the *erga omnes* character of the obligations under article 137 of UNCLOS (SR.18, para. 34).

[37] Nolte (A/CN.4/SR.3246), Hmoud (SR.3247), Comissario-Afonso (SR.3247), Peter (SR.3247), Candioti (SR.3248), Vasquez-Bermudez (SR.3248).

[38] Park (A/CN.4/SR.3244), Murphy (SR.3246), Wood (SR.3247), Hassona (SR.3247), Kittichasaree (SR.3247), Sturma (SR.3247), Petric (SR.3247), Jacobsson (SR.3248), Escobar-Hernandez (SR.3248), McRae (SR.3248).

[39] Jutta Brunnée, "*Sic utere tuo ut alienum non laedas*", in *Encyclopedia of Public International Law*, vol. IX (Oxford: Oxford University Press, 2012), p. 188.

notably in the famous 1938-41 *Trail Smelter Arbitration*, in which the tribunal confirmed the existence of the rule in international law, stating as follows:

> "... under the principles of international law, ... no State has the right to use or permit the use of its territory in such a manner as to cause injury by fumes in or to the territory of another or the properties or persons therein, when the case is of serious consequence and the injury is established by clear and convincing evidence."[40]

14. The *Trail Smelter* case was a traditional type of transboundary air pollution dispute — one in which the cause of the damage and its effects were sufficiently identifiable. That decision is frequently cited in support of the view that, under international law, States are obligated to ensure that activities within their jurisdiction or control do not cause transboundary damage when the injury is foreseeable, as supported "by clear and convincing evidence".[41] Thus, the *sic utere tuo ut alienum non laedas* principle has been recognized as customary international law as applied to the relationship with an "adjacent State" sharing a common territorial border. That rule was confirmed in principle 21 of the 1972 Declaration of the United Nations Conference on the Human Environment (Stockholm Declaration),[42] and reconfirmed, in a slightly modified form, in principle 2 of the 1992 Rio Declaration on Environment and Development.[43] In those Declarations, which provided for the duty of States "to ensure that activities within their jurisdiction or control do not cause damage to the environment of *other* States or of areas beyond the limits of national jurisdiction" (emphasis added), the scope of application of that principle has been broadened to the relationship with long-range transboundary causes and effects between the State of origin and the affected States. The same "no harm rule" has been endorsed in a large number of conventions relating to transboundary air pollution, such as the 1979 Convention on Long-range Transboundary Air Pollution.[44]

1. Prevention

15. As a corollary of the *sic utere tuo* principle, the principle of prevention (obligation of States to take preventive measures) is recognized as a rule of

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[40] United Nations, *Reports of International Arbitral Awards*, vol. III, pp. 1907 f. (Award of 1941), at 1965; See A/CN.4/667, para. 43. See also A. K. Kuhn, "The Trail Smelter Arbitration, United States and Canada", *American Journal of International Law*, vol. 32 (1938), pp. 785-788; ibid., vol. 35 (1941), pp. 665-666; J. Read, "The Trail Smelter Dispute", *Canadian Yearbook of International Law*, vol. 1 (1963), pp. 213-229.

[41] Award, ibid., p. 1965.

[42] Adopted at Stockholm on 16 June 1972, see *Report of the United Nations Conference on the Human Environment, Stockholm, 5-16 June 1972* (A/CONF.48/14/Rev.1), part one, chap. I. See Louis B. Sohn, "The Stockholm Declaration on the Human Environment", *Harvard International Law Journal*, vol. 14 (1973), pp. 485-493.

[43] Adopted at Rio de Janeiro on 14 June 1992, see *Report of the United Nations Conference on Environment and Development, Rio de Janeiro, 3-14 June 1992*, A/CONF.151/26/Rev.1 (vol. I), p. 3; See Leslie-Anne Duvic-Paoli and Jorge E. Vinuales, "Principle 2: Prevention", in Jorge E. Vinuales, ed., *The Rio Declaration on Environment and Development: A Commentary* (Oxford, Oxford University Press, 2015), pp. 107-138.

[44] *United Nations Treaties Series*, vol. 1302, p. 217.

customary international law in the context of transboundary atmospheric pollution.[45] That principle is regarded as consisting of two different obligations, one being the obligation to "prevent" before actual pollution or degradation occurs, and the other the duty to "eliminate", "mitigate" and "compensate" after they have already occurred. For example, article 7 of the 1997 Convention on the Law of Non-navigational Uses of International Watercourses, under the heading "Obligation not to cause significant harm", provides both for the obligation to prevent (paragraph 1) and the obligation to compensate if harm nevertheless occurred (paragraph 2).[46] In that context, more weight is given to the prevention of predictable future damage than to the reparation for damage which has already occurred. The Commission has recognized that in its previous work on the prevention of transboundary harm from hazardous activities "the emphasis upon the duty to prevent, as opposed to the obligation to repair, remedy or compensate, has several important aspects. Prevention should be a preferred policy because compensation in case of harm often cannot restore the situation prevailing prior to the event or accident. ... In any event, prevention as a policy is better than cure."[47] The International Court of Justice has emphasized prevention as well. In the *Gabčikovo-Nagymaros project* case, the Court stated that it "is mindful that, in the field of environmental protection, vigilance and prevention are required on account of the often irreversible character of damage to the environment and of the limitations inherent in the very mechanism of reparation of this type of damage".[48] In the *Iron Rhine Railway* case, the arbitral tribunal also stated that "Today, in international environmental law, a growing emphasis is being put on the duty of prevention".[49]

16. The Commission has dealt with the obligation of prevention in its 2001 articles on responsibility of States for internationally wrongful acts. Article 14, paragraph 3 provides that "The breach of an international obligation requiring a State to prevent a given event occurs when the event occurs and extends over the entire period during which the event continues ...". According to the commentary, "Obligations of prevention are usually construed as best efforts obligations, requiring States to take all reasonable or necessary measures to prevent a given event from occurring, but without warranting that the event will not occur".[50] The commentary illustrated "the obligation to prevent transboundary damage by air pollution, dealt with in the *Trail Smelter* arbitration" as one of the examples of the obligation of prevention.[51]

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[45] Gunther Handl, "Transboundary Impacts", in Daniel Bodansky, et al., eds., *Oxford Handbook of International Environmental Law* (Oxford: Oxford University Press, 2007), pp. 532, pp. 538-540; Nicolas de Sadeleer, "The principle of prevention and precaution in international law: two heads of the same coin?" in Malgosia Fitzmaurice, et al., eds., *Research Handbook on International Environmental Law* (Cheltenham: Edward Elgar, 2010), pp. 182-199.

[46] General Assembly resolution 51/229, annex.

[47] *Yearbook of the International Law Commission, 2001*, vol. II, Part Two, p. 148, para. (2).

[48] *Gabčikovo-Nagymaros Project (Hungary/Slovakia), Judgment, I.C.J. Reports 1997*, p. 78, para. 140.

[49] Award in the Arbitration regarding the Iron Rhine ("Ijzeren Rijn") Railway between the Kingdom of Belgium and the Kingdom of the Netherlands, decision of 24 May 2005, UNRIAA, vol. XXVII, p. 116, para. 222.

[50] *Yearbook ... 2001*, vol. II, Part Two, p. 62, para. 14.

[51] Ibid.

2. Due diligence

17. The principle of prevention in environmental law is based on the concept of due diligence. Significant adverse effects on the atmosphere are caused, in large part, by the activities of individuals and private industries, which are not normally attributable to a State. In that respect, due diligence requires States to ensure that such activities within their jurisdiction or control do not cause significant adverse effects. That does not mean, however, that due diligence applies solely to private activities. The activities of a State are also subject to the due diligence rule.[52]

18. Due diligence is an obligation to make best possible efforts in accordance with the capabilities of the State controlling the activities. Therefore, even where actual adverse effects materialize, that does not automatically constitute a failure of due diligence. Such failure is limited to the negligence of the State in meeting its obligation to take all appropriate measures to control, limit, reduce or prevent human activities where those activities have or are likely to have significant adverse effects. The obligation of States "to ensure" does not require the achievement of a certain result (obligation of result) but only requires the best available efforts not to cause adverse effects (obligation of conduct). In that sense, it does not guarantee that the harm would never occur.[53]

19. In its previous work analysing the due diligence standard, the Commission considered it to be "a diligence proportioned to the magnitude of the subject and to the dignity and strength of the power which is to exercise it"[54] or "to be appropriate and proportional to the degree of risk of transboundary harm in the particular instance".[55] Accordingly, "activities which may be considered ultra-hazardous require a much higher standard of care in designing policies", which is an absolute standard.[56] In the case of activities relating to the atmosphere, the required standard of care is set according to the scale and magnitude of a planned activity in the particular instance on the one hand, and the significance and irreparability of the adverse effects which that activity is expected to cause, or is likely to cause on the other hand.

3. Knowledge or foreseeability

20. A State may be deemed to have failed in its duty of due diligence only if it knew or ought to have known that the particular activities would cause significant

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[52] Ibid., p. 154, para. 7 ("The obligation of the State of origin to take preventive … measures is one of due diligence"); *Pulp Mills on the River Uruguay (Argentina* v. *Uruguay), Judgment, I.C.J. Reports 2010*, p. 55, para. 101 ("the principle of prevention, as a customary rule, has its origins in the due diligence"). See generally on due diligence, Duncan French (Chair) and Tim Stephens (Rapporteur) of the International Law Association Study Group on Due Diligence, "First report on due diligence in international law", pp. 1-33 (2014), available from http://www.ila-hq.org/en/study-groups/index.cfm/cid/1045.

[53] Although the principle to prevent is referred to as "no harm rule", that term is somewhat misleading, Patricia Birnie, Alan Boyle and Catherine Redgwell, *International Law and the Environment*, 3rd ed. (Oxford: Oxford University Press, 2009), p. 137. In relation to obligations of result and obligations of conduct, see generally Pierre-Marie Dupuy, "Reviewing the Difficulties of Codification: On Ago's Classification of Obligations of Means and Obligations of Result in Relation to State Responsibility", *European Journal of International Law*, vol. 10 (1999), 371-385. See also S. Murase, *International Law: An Integrative Perspective on Transboundary Issues* (Tokyo: Sophia University Press, 2011), pp. 113-115.

[54] Yearbook …, 1994, vol. II, Part Two, p. 103, para. (4).

[55] Ibid., ... *2001*, vol. II, Part Two, p. 154, para. 11.

[56] Ibid.

harm to other States.[57] As observed by the International Court of Justice in the *Corfu Channel* case, it is "every State's obligation not to allow *knowingly* its territory to be used for acts contrary to the rights of other States" (emphasis added).[58] The use of the word "knowingly" in this case clarifies a key subjective condition of due diligence. The Court then associated the condition of knowledge with the concept of control and stated that:

> "It is true, as international practice shows, that a State on whose territory or in whose waters an act contrary to international law has occurred, may be called upon to give an explanation. ... But it cannot be concluded from the mere fact of the control exercised by a State over its territory and waters that that State necessarily knew, or ought to have known, of any unlawful act perpetrated therein ..."[59]

21. In the area of international environmental law, the knowledge required of a State is intimately connected with the obligation to carry out an environmental impact assessment. An environmental impact assessment is "one of the central mechanisms used by states to acquire knowledge respecting the environmental consequences of their actions",[60] and "addresses foreseeability by requiring project proponents to comprehensively analyse the likely impacts of proposed activities, including trans-boundary impacts".[61] As the International Court of Justice pointed out in the *Pulp Mills* case, "due diligence, and the duty of vigilance and prevention which it implies, would not be considered to have been exercised, if a party ... did not undertake an environmental impact assessment on the potential effects of such works".[62] The Court, in the recent cases of *Certain Activities carried out by Nicaragua in the Border Area* and *Construction of a Road in Costa Rica along the San Juan River*, also stated that "to fulfil its obligation to exercise due diligence in preventing significant transboundary environmental harm, a State must, before embarking on an activity having the potential adversely to affect the environment of another State, ascertain if there is a risk of significant transboundary harm, which would trigger the requirement to carry out an environmental impact assessment".[63] The Court continued that "to conduct a preliminary assessment of the risk posed by an activity is one of the ways in which a State can ascertain whether the proposed activity carries a risk of significant transboundary harm".[64] Since the Court concluded in the *Pulp Mills* case that "it may now be considered a requirement under general international law to undertake an environmental impact assessment where there is a risk that the proposed industrial activity may have a significant

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[57] Ibid., *1994*, vol. II, Part Two, p. 104, para. 8.

[58] *Corfu Channel Case, Judgment of April 9th, 1949, I.C.J. Reports 1949*, p. 22. Karine Bannelier, "Foundational Judgment or Constructive Myth? The Court's Decision as a Precursor to International Environmental Law", in Karine Bannelier, Theodore Christakis and Sarah Heathcote, eds., *The International Court of Justice and the Evolution of International Law: The Enduring Impact of the Corfu Channel Case* (New York: Routledge, 2012), pp. 246-247.

[59] *Corfu Channel Case, Judgment*, p. 18.

[60] Neil Craik, *The International Law of Environmental Impact Assessment* (Cambridge: Cambridge University Press, 2008), p. 64.

[61] Ibid.

[62] *Pulp Mills on the River Uruguay*, *Judgment*, p. 83, para. 204.

[63] *Certain Activities carried out by Nicaragua in the Border Area (Costa Rica* v. *Nicaragua)* and *Construction of a Road in Costa Rica along the San Juan River (Nicaragua* v. *Costa Rica)*, *Judgment*, *I.C.J. Reports 2015*, paras. 104, 153.

[64] Ibid., para. 154.

adverse impact in a transboundary context, in particular, on a shared resource",[65] it can be concluded from the fact of an environmental impact assessment carried out by a State that the State necessarily knew, or ought to have known, of a risk of significant transboundary harm.

4. Degree of care

22. Since due diligence requires States to "act" so as not to cause significant transboundary harm, it is necessary to clarify the degree of care required of a State, that is, the extent to which the behaviour of a State in a set of given circumstances discharges the due diligence obligation.[66] While the condition of knowledge is a subjective element of due diligence, the degree of care constitutes an objective element. Those are cumulative conditions. In the theory and practice of international environmental law, two categories of degree of care exist: "generally accepted international standards" on the one hand and "best practicable means" on the other hand.[67]

23. The former criteria, generally accepted international standards, are "internationally agreed minimum standards set out in treaties or in the resolutions and decisions of international bodies".[68] For example, articles 207, 208, 210-212 of the United Nations Convention on the Law of the Sea provide for "*generally accepted* rules and *standards* established through the competent international organization or general diplomatic conference" (emphasis added). Those provisions can incorporate recommendations and resolutions of international organizations, such as the International Maritime Organization (IMO), into the obligations of the treaty by reference.[69] Quite apart from their incorporation by treaty, such criteria may require to be recognized as having the force of customary international law by virtue of the obligation of due diligence if international support is sufficiently widespread and representative.[70]

24. The latter criteria require States to employ the best practicable means available to them at their disposal and in accordance with their capabilities, so as to prevent transboundary harm so far as possible.[71] A typical example is article 194, paragraph 1, of the United Nations Convention on the Law of the Sea which provides that "States shall take ... all measures ... that are necessary to prevent, reduce and control pollution of the marine environment from any source, using for this purpose *the best practicable means at their disposal and in accordance with their capabilities* ..." (emphasis added). In the application of that criterion, the regulatory capacity and technology of the State concerned are taken into account, so that a differentiated degree of care for different States is allowed.[72] The Commission confirmed such

[65] *I.C.J. Reports 2010*, p. 83, para. 204. See also para. 55 below.
[66] Pierre-Marie Dupuy, "Due diligence in the international law of liability", in *Legal Aspects of Transfrontier Pollution* (Paris: OECD, 1977), pp. 369-379.
[67] Birnie, Boyle and Redgwell, *International Law and the Environment*, op. cit., pp. 148-150; Ilias Plakokefalos, "Prevention obligations in international environmental law", *Yearbook of International Environmental Law*, vol. 23 (2012), pp. 3-43, at 32-36.
[68] Ibid. (Birnie, Boyle and Redgwell), p. 149.
[69] Alan Boyle and Christine Chinkin, *The Making of International Law* (Oxford: Oxford University Press, 2007), p. 219.
[70] Birnie, Boyle and Redgwell, op. cit., p. 150.
[71] Ibid., p. 149.
[72] Ibid. See also Ilias Plakokefalos, "Prevention Obligations in International Environmental Law", *Yearbook of International Environmental Law*, vol. 23 (2012), at 32-36.

consideration in its work on the Prevention of Transboundary Harm from Hazardous Activities, stating that:

> "the degree of care in question is that expected of a good Government. It should possess a legal system and sufficient resources to maintain an adequate administrative apparatus to control and monitor the activities. It is, however, understood that the degree of care expected of a State with a well-developed economy and human and material resources and with highly evolved systems and structures of governance is different from States which are not so well placed. Even in the latter case, vigilance, employment of infrastructure and monitoring of hazardous activities in the territory of the State, which is a natural attribute of any Government, are expected."

Therefore, to fulfil the duty of due diligence under general international law, States are required to use the best practicable means at their disposal and in accordance with their capabilities.

25. As regards the temporal scope of application, the Commission has affirmed in its previous work that "The duty of prevention based on the concept of due diligence is not a one-time effort but requires continuous effort. This means that due diligence is not terminated after granting authorization for the activity and undertaking the activity; it continues ... as long as the activity continues."[73] In that regard, the content of "due diligence" is not static, and the degree of care may change over time. The Commission stated that "What would be considered a reasonable standard of care or due diligence may change with time; what might be considered an appropriate and reasonable procedure, standard or rule at one point in time may not be considered as such at some point in the future. Hence, due diligence in ensuring safety requires a State to keep abreast of technological changes and scientific developments."[74] The Seabed Disputes Chamber of the International Tribunal for the Law of the Sea also held, as a matter of general international law, that "due diligence is a variable concept", and that "It may change over time as measures considered sufficiently diligent at a certain moment may become not diligent enough in light, for instance, of new scientific or technological knowledge".[75]

5. Burden of proof and standard of proof

26. In the *Trail Smelter* case, the tribunal applied the *sic utere tuo* principle only under the condition when "the injury is established by clear and convincing evidence".[76] In general, there are two main standards of proof: the higher "beyond reasonable doubt" standard in a criminal case and the lower standard of proof of a

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[73] Ibid., p. 165, para. (2). Although the context is slightly different, the International Court of Justice stated in the *Pulp Mills* case that "the obligation … to prevent pollution is an obligation to act with due diligence in respect of all activities which take place under the jurisdiction and control of each party. It is an obligation which entails not only the adoption of appropriate rules and measures, but also a certain level of vigilance in their enforcement and the exercise of administrative control applicable to public and private operators, such as the monitoring of activities under taken by such operators …" *Pulp Mills on the River Uruguay*, *Judgment*, p. 79, para. 197.

[74] Ibid., p. 154, para. (11).

[75] International Tribunal for the Law of the Sea, Seabed Disputes Chamber, *Responsibilities and Obligations of States Sponsoring Persons and Entities with respect to Activities in the Area*, Advisory Opinion, ITLOS, Case No. 17, para. 117.

[76] *Trail Smelter* case (United States, Canada), 11 March 1941, *UNRIAA*, vol. III, p. 1965.

"balance of probabilities" in a civil case.[77] The tribunal in the *Trail Smelter* case appears to have set a higher standard of proof for transboundary air pollution,[78] and the special context and circumstances of that case should not be overlooked. First, both parties referred the case to the tribunal by special agreement. Therefore, the attitudes of both parties were relatively cooperative for the resolution of the dispute, and consequently they were able to entrust the International Joint Commission established pursuant to the Boundary Waters Treaty of 1909, with the scientific investigation.[79] Secondly, as a result of the scientific examination, it was considered that the direction of the wind that carried pollution across the boundary was unidirectional by reason of the geographical features and resulting meteorological conditions prevailing in the Columbia River valley.[80] Those factors enabled the tribunal to set a higher standard of proof in the case.

27. One can observe somewhat similar developments in the *Lac Lanoux* case.[81] The tribunal was established by *compromis* between the States. As for the fact-finding, the tribunal stated that "It has not been *clearly affirmed* that the proposed works [i.e. the diversion of the waters of the international river] would entail an abnormal risk in neighbourly relations or in the utilization of the waters" (emphasis added).[82] Therefore, the tribunal set a higher standard of proof. However, in that case, the river flow was unidirectional so that the chain of causation was relatively easy to establish as well.

28. By contrast, when one of the parties refers a dispute to an international court or tribunal on the basis of an optional clause, compromissory clause or treaty, or *forum prorogatum*, there tend to be different claims on the facts and allocation of the burden of proof. In that case, in accordance with the well-established principle of *onus probandi incumbit actori*, it is for the party alleging a fact to establish its existence.[83] However, it will be difficult for the (potentially) affected States to establish the alleged facts by clear and convincing evidence, because "the necessary information may largely be in the hands of the party causing or threatening the damage".[84] That is the main reason why a (potentially) affected State may claim a shift or reversal of the burden of proof based on the alleged precautionary principle. However, it may be noted that the International Court of Justice pointed out in the *Pulp Mills* case that the precautionary approach does not necessarily operate "as a reversal of the burden of proof".[85]

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[77] Anna Riddell and Brendan Plant, *Evidence before the International Court of Justice* (London, BIICL, 2009), p. 124; Eduardo Valencia-Ospina, "Evidence before the International Court of Justice", *International Law Forum du Droit international*, vol. 1 (1999), p. 203.

[78] Stephen C. McCaffrey, "Of paradoxes, precedents, and progeny: the *Trail Smelter* arbitration 65 years later", in Rebecca M. Bratspies and Russell A. Miller (eds.), *Transboundary Harm in International Law: Lessons from the Trail Smelter Arbitration* (New York, Cambridge University Press, 2006), p. 39.

[79] *Trail Smelter case*, p. 1918.

[80] Ibid., pp. 1943, 1969-1974. *See also*, John E. Read, "The *Trail Smelter* dispute [abridged]", in Bratspies and Miller (eds.), *Transboundary Harm in International Law* (New York: Cambridge University Press, 2006), p. 27.

[81] *Affaire du Lac Lanoux* (*Spain* v. *France*), 16 November 1957, *UNRIAA*, vol. XII, p. 281.

[82] Ibid.

[83] In the civil procedure of municipal courts, the result is the rule of *ei incumbit probatie qui dicit, non qui negat* (the burden of proof lies with who declares, not who denies).

[84] Dissenting Opinion of Judge Weeramantry, *I.C.J. Reports 1995*, p. 342.

[85] *Pulp Mills on the River Uruguay, Judgment*, *I.C.J. Reports 2010*, p. 71, para. 164.

29. In that case, the majority opinion preferred to resolve the burden-shifting problem by requiring the other party to cooperate "in the provision of such evidence as may be in its possession that could assist the Court in resolving the dispute submitted to it".[86] In the recent case of the *Application of the Genocide Convention (Croatia v. Serbia)*, although the applicant claimed that "the respondent is best placed ... to provide explanations of acts which are claimed to have taken place in a territory over which [the respondent] exercised exclusive control", the Court primarily allocated the burden of proof to the party alleging a fact, while it relied on the other party's "duty to co-operate" in good faith in matters of evidence.[87] However, the duty to cooperate in matters of evidence is a procedural duty, non-compliance with which does not give rise to State responsibility.[88]

30. In contrast, Judge Greenwood suggested, in his separate opinion in the *Pulp Mills* case, a lessening of the standard of proof in the circumstances of that case. Referring to the statement of the Court in the *Application of the Genocide Convention* case (*Bosnia and Herzegovina v. Serbia and Montenegro*) that charges of conduct as grave as genocide require "proof at a high level of certainty appropriate to the seriousness of the allegation",[89] he indicated that "in that statement ... a lower standard of proof is acceptable than in the case of other, less grave, allegations".[90] He concluded that "the nature of environmental disputes is such that the application of the higher standard of proof would have the effect of making it all but impossible for a State to discharge the burden of proof", and accordingly the (potentially) affected State is required to establish the facts on the balance of probabilities.[91]

31. Indeed, the International Court of Justice had already implied a "lessening of the standard of proof" in the 1949 *Corfu Channel* case,[92] stating:

> "It is true, as international practice shows, that a State on whose territory or in whose waters an act contrary to international law has occurred, may be called upon to give an explanation. ... But it cannot be concluded from the mere fact of the control exercised by a State over its territory and waters that that State

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[86] Ibid., p. 71, para. 163.

[87] *Application of the Convention on the Prevention and Punishment of the Crime of Genocide (Croatia* v. *Serbia), Judgment*, paras. 170, 173.

[88] Durward V. Sandifer, *Evidence before International Tribunals* (Charlottesville: University Press of Virginia, 1975), pp. 112, 117; Mariko Fukasaka, "Burdens of proof before international litigation: burden of proof and producing evidence (1)", *Sophia Law Review*, vol. 52 No. 4 (2009), pp. 183-184 [in Japanese].

[89] *Application of the Convention on the Prevention and Punishment of the Crime of Genocide (Bosnia and Herzegovina* v. *Serbia and Montenegro), Judgment, I.C.J. Reports 2007*, p. 130, para. 210. The standard of proof, i.e., what a party must do in order to discharge the burden of proof when that burden rests upon it, is essentially a common law tradition. In the civil law tradition, "if the judge considers himself to have been persuaded by the argument on a certain matter, then the standard of proof has been met". Whereas the International Court of Justice, being composed of the judges of "the principal legal systems of the world" (article 9 of the Statute), had long not referred to the standard of proof, in the case of the *Application of the Genocide Convention (Croatia* v. *Serbia)*, it addressed that concept for the first time.

[90] Separate Opinion of Judge Greenwood, *I.C.J. Reports 2007*, p. 230, para. 25.

[91] Ibid., p. 230, para. 26.

[92] Katherine Del Mar, "The International Court of Justice and Standards of Proof", in Bannelier, Christakis and Heathcote (eds.), *The International Court of Justice and the Evolution of International Law* (London: Routledge, 2013), pp. 98-123.

necessarily knew, or ought to have known, of any unlawful act perpetrated therein ... On the other hand, the fact of this exclusive territorial control exercised by a State within its frontiers has a bearing upon the methods of proof available to establish the knowledge of that State as to such events. By reason of this exclusive control, the other State, the victim of a breach of international law, is often unable to furnish direct proof of facts giving rise to responsibility. Such a State should be allowed a more liberal recourse to inferences of fact and circumstantial evidence. This indirect evidence is admitted in all systems of law, and its use is recognized by international decisions. It must be regarded as of special weight when it is based on a series of facts linked together and leading logically to a single conclusion."[93]

6. Jurisdiction and control

32. As stated in Max Huber's dictum in the *Island of Palmas* case, the dominant criterion for identifying the State that owes the obligation of protection is territorial jurisdiction.[94] Territory is a primary basis of jurisdiction. Consequently, when an activity occurs within the territory of a State, the duty to protect falls firstly on that State. The territoriality principle is not without exceptions,[95] and there may be a situation where extraterritorial application of a domestic law is envisaged in the context of transboundary atmospheric pollution.[96] On the other hand, in common

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[93] *Corfu Channel Case, Judgment*, p. 18.

[94] "Perspectives from international economic law on transnational environmental issues", in Shinya Murase, *International Law: an Integrative Perspective on Transboundary Issues* (Tokyo, Sophia University Press, 2011), p. 92.

[95] Ibid., pp. 54-57, 295-304; American Law Institute, *Foreign Relations of the United States, Restatement Third* (Philadelphia/PA: ALI, 1987), section 402, pp. 230-234. F. A. Mann, "The doctrine of jurisdiction in international law", in *Studies in International Law*, Oxford: Oxford University Press, 1973, pp. 39-41; F. A. Mann, "The doctrine of international jurisdiction revisited after twenty years", *Further Studies in International Law* (Oxford: Clarendon Press, 1990), pp. 5-10; Werner Meng, "Extraterritorial effects of administrative, judicial and legislative acts", in Bernhardt, ed., *Encyclopedia of Public International Law*, vol. II, 1992, p. 340; Menno T. Kamminga, "Extraterritoriality", in Rüdiger Wolfrum, ed., *Encyclopedia of Public International Law*, vol. III, 2012, p. 1071.

[96] Section 4 of Singapore's Transboundary Haze Pollution Act 2014 (No. 24 of 2014) stipulates for extraterritorial application that "[t]his Act shall extend to and in relation to any conduct or thing outside Singapore which causes or contributes to any haze pollution in Singapore." It was explained by Singapore's Minister for the Environment and Water Resources (D. Vivian Balakrishanan) before Parliament that "[b]ecause we are addressing transboundary haze pollution, an extraterritorial approach is necessary for the law to be effective. This exercise of extraterritorial jurisdiction under the Bill is in line with international law, specially the objective territorial principle" (Parliament of Singapore, Official Reports, No. 12, Session 2, 4 August 2014). It may be noted, however, that the ASEAN Haze Convention is now effective (ASEAN Agreement on Transboundary Haze Pollution, entered into force on 25 November 2003, http://haze.asean.org/status-of-ratification/. To date, all the ASEAN member States are parties, since Indonesia, the last tenth ASEAN Member State, ratified the Agreement on 14 October 2014), it may not be necessary to resort to extraterritorial application of a domestic law, since the same objective can be achieved by application of the Convention, the method which is normally more desirable. However, if the measures contemplated under the Act extend beyond the scope of the Agreement, that part of the measures may be considered either as opposable or non-opposable in view of the legitimacy and effectiveness of the measures in question. See "Unilateral measures and the concept of opposability in international law", in Shinya Murase, *International Law: An Integrative Perspective on Transboundary Issues* (Tokyo: Sophia University Press, 2011), pp. 214-266.

areas, such as the high seas and the airspace above the high seas, there is no territorial link between a State and the activity because of the location of the activity. In such situations, if the activity leads to significant adverse effects on the atmosphere, the State exercising jurisdiction over the area in question should comply with the duty to prevent. An example is the introduction of substances or energy into the atmosphere by vessels or aircraft flying its flag in the area of other States or in areas beyond national jurisdiction, such as the high seas and the airspace above the high seas.

33. It may be noted that there has been a shift of emphasis from "jurisdiction" to "control" in exercising the State obligation of prevention. As both principle 21 of the 1972 Stockholm Declaration and principle 2 of the 1992 Rio Declaration use the disjunctive conjunction "or", the term "control" is distinct from the term "jurisdiction",[97] The two concepts have acquired a special meaning, to the effect that "activities within their ... control" are treated on a separate and independent basis.[98] In its previous work, the Commission considered that "[t]he function of the concept of 'control' in international law is to attach certain legal consequences to a State whose jurisdiction over certain activities or events is not recognized by international law; it covers situations in which a State is exercising de facto jurisdiction, even though it lacks jurisdiction de jure ..."[99] Therefore, jurisdiction refers to "legal" ties, whereas "control" refers to the factual capacity of effective control over activities outside the jurisdiction of a State. As for the concept of "control", the International Court of Justice stated in the *Namibia* case that "[t]he fact that South Africa no longer has any title to administer the Territory [of Namibia] does not release it from its obligations and responsibilities under international law towards other States in respect of the exercise of its powers in relation to this Territory. *Physical control of a territory, and not sovereignty or legitimacy of title, is the basis of State liability for acts affecting other States*" (emphasis added).[100]

34. In line with the jurisprudence of international courts and tribunals, the Special Rapporteur concludes that, in the context of transboundary atmospheric pollution, the principle *sic utere tuo ut alienum non laedas* has now been confirmed as a principle of general international law.[101]

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[97] However, there is a difference between the wording of the Stockholm Declaration, principle 21, and the observation of the advisory opinion in the *Nuclear Weapons Case*. While principle 21 provides for "activities within their jurisdiction or control", the International Court of Justice used the coordinate conjunction, stating "activities within their jurisdiction and control". One observer considers that "[i]t constrains the application of the principle by limiting extraterritorial application." Edith Brown Weiss, "Opening the door to the environment and to future generations", in Laurence Boisson de Chazournes and Philippe Sands, eds., *International Law, the International Court of Justice and Nuclear Weapons* (Cambridge: Cambridge University Press, 1999), p. 340.

[98] Louis B. Sohn, "The Stockholm Declaration on the Human Environment", *Harvard International Law Journal*, vol. 14 (1973), p. 493; Shinya Murase, *Kokusai Rippo* (International Lawmaking), Tokyo: Toshindo, 2002, pp. 421-422 (in Japanese), Chinese translation (Beijing: Chinese People's University of Public Safety Press, 2012), pp. 210-212.

[99] *Yearbook ... 2001*, vol. II, Part Two, p. 151, para. (12).

[100] *Legal Consequences for States of the Continued Presence of South Africa in Namibia (South West Africa) Notwithstanding Security Council Resolution 276 (1970), Advisory Opinion, I.C.J. Reports 1971*, p. 54, para. 118.

[101] See A/CN.4/681, para. 58.

B. The duty to mitigate the risk of global atmospheric degradation

1. The *sic utere tuo* principle in the global context

35. As discussed above (para. 12), in the present draft guidelines, the *sic utere tuo* principle has two distinct dimensions, one in a transboundary context and the other in the global context. That differentiation should be viewed in line with the judgment in the *Pulp Mills* case by the International Court of Justice, which distinguished two different forms of obligations flowing from the principle.[102] One is the *sic utere tuo* principle in the narrow sense, as formulated in the *Trail Smelter* award, the other being the broader interpretation extending beyond the transboundary perspective. In one way, the Court in *Pulp Mills* limited the scope of application of the principle to damage to the environment of another State, stating that "A State is ... obliged to use all the means at its disposal in order to avoid activities which take place in its territory, or in any area under its jurisdiction, causing significant damage to the environment of *another State*" (emphasis added),[103] a formula which, according to the Court, is derived from the judgment in the *Corfu Channel* case.[104] In another way, the Court interpreted the *sic utere tuo* principle in the broader sense, affirming that the principle has since been expanded in scope to encompass a broader geographical context, by referring to the *Nuclear Weapons* advisory opinion that "the general obligation of States to ensure that activities within their jurisdiction and control respect the environment of other States or of *areas beyond national control*" (emphasis added).[105]

36. In his second report, the Special Rapporteur stated that the *sic utere tuo ut alienum non laedas* principle, whose application was initially limited to the relationship with an "adjacent State" sharing a common territorial border, has subsequently been widened to include global atmospheric issues.[106] While the traditional principle dealt only with transboundary harm to other States in a narrow sense, it has evolved to extend the territorial scope so as to address the global commons per se.[107] In principle 21 of the Stockholm Declaration, the principle was reformulated, providing that "States have ... the responsibility [devoir] to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States *or of areas beyond the limits of national jurisdiction*." That part of the principle was reiterated in principle 2 of the Rio Declaration. The areas beyond the jurisdiction and sovereignty of any State, generally referred to as "global commons", are understood to include the high seas, outer space and the global atmosphere.[108] Although the atmosphere, which is not an area-based notion, does not conform to the notion of "areas beyond the limits of national jurisdiction",

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[102] Karine Bannelier, "Foundational Judgment or constructive myth? The Court's decision as a precursor to international environmental law", in Karine Bannelier, Theodore Christakis and Sarah Heathcote, eds., *The International Court of Justice and the Evolution of International Law: The Enduring Impact of the Corfu Channel Case* (New York: Routledge, 2012), p. 251.

[103] *I.C.J. Reports 2010*, p. 56, para. 101.

[104] Ibid., p. 55, para. 101. The Court affirmed in the Corfu Channel case "every State's obligation not to allow knowingly its territory to be used for acts contrary to the rights of other States". *I.C.J. Reports 1949*, p. 22.

[105] Ibid., p. 78, para. 193.

[106] See A/CN.4/681, paras. 52-57.

[107] Xue Hanqin, *Transboundary Damage in International Law* (Cambridge: Cambridge University Press, 2003), p. 191.

[108] Ibid., pp. 191-193; Alan E. Boyle, "State responsibility for breach of obligations to protect the global environment", in W. E. Butler, ed., *Control over Compliance with International Law* (Dordrecht: Nijhoff, 1991), p. 69.

it is nonetheless clear that the atmosphere existing above those areas is now covered by principle 21 of the Stockholm Declaration.[109]

37. It is notable that the *sic utere tuo* principle encounters certain evidentiary difficulties when it is applied to global issues, such as long-distance, transcontinental air pollution, ozone depletion and climate change. In such cases, the chain of causation, i.e. the physical link between cause (activity) and effect (harm), is difficult to prove, because of the widespread, long-term and cumulative character of their effects. The adverse effects, because of their complex and synergistic nature, result from multiple sources and any single activity is not sufficiently attributable to such adverse effects. In the global setting, virtually all States are likely to be responsible States as well as injured States. Consequently, even where actual harm has occurred, it is difficult, if not impossible, to identify a single responsible State of origin.[110] The difficulty of establishing the causal link between the wrongful act and the harm suffered has already been acknowledged by the Convention on Long-range Transboundary Air Pollution (1979). Article 1 of that convention characterizes long-range transboundary air pollution as pollution "at such a distance ... that it is not generally possible to distinguish the contribution of individual emission sources or groups of sources". Notwithstanding that definition, the Convention enshrines principle 21 of the Stockholm Declaration in the preambular paragraph as a "common conviction". The Vienna Convention for the Protection of the Ozone Layer and the United Nations Framework Convention on Climate Change recognize the above difficulties as well. However, they also expressly incorporate principle 21 of the Stockholm Declaration into their preambles and therefore can lead it to be considered an integral component of international law.[111]

38. In fact, it was confirmed in the International Court of Justice advisory opinion on *Nuclear Weapons* that the terms of principles 21 of the Stockholm Declaration and principle 2 of the Rio Declaration are "now part of the corpus of international law relating to the environment".[112] In the *Gabčikovo-Nagymaros Project* case, the Court reaffirmed this view, recognizing further that "it has recently had occasion to stress ...

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[109] Birnie, Boyle and Redgwell, *International Law and the Environment*, op. cit., p. 145, citing the preambles of the United Nations Framework Convention on Climate Change and other global conventions.

[110] In contrast, an "injured State" for the purpose of the law of state responsibility may be identified even in that case. According to article 42(b)(i) of the Articles on the responsibility of States for internationally wrongful acts, where the obligation breached is owed to the international community as a whole, a specially affected State is considered to be an injured State. According to the Commentary, "[e]ven in cases where the legal effects of an internationally wrongful act extend by implication … to the international community as a whole, the wrongful act may have particular adverse effects on one State or on a small number of States". *Yearbook ... 2001*, vol. II, Part Two, article 43, para. (12). An example given in the Commentary is the pollution of the high seas, which constitutes a breach of the customary rule, where such pollution has a particular impact on the territorial sea of a particular State. In that case, "the breach exists in respect of all other States, but among these the coastal State which is particularly affected by the pollution is to be considered as 'specially' affected." Giorgio Gaja, "The concept of an injured State", in James Crawford, Alain Pellet and Simon Olleson, eds., *The Law of International Responsibility* (Oxford: Oxford University Press, 2010), p. 947. The same can be applied, for example, to acid rain damage resulting from transboundary air pollution or damage caused by the ozone hole.

[111] Yoshida Osamu, *The International Legal Régime for the Protection of the Stratospheric Ozone Layer* (The Hague: Kluwer Law International, 2001), pp. 62-67; Malgosia Fitzmaurice, "Responsibility and climate change", *German Yearbook of International Law*, vol. 53 (2010), pp. 117-118.

[112] *Legality of the Threat or Use of Nuclear Weapons, Advisory Opinion, I.C.J. Reports 1996*, pp. 241-242, para. 29.

the great significance that it attaches to respect for the environment, not only for States *but also for the whole of mankind*" (emphasis added).[113] The Court also cited the same paragraph in the *Pulp Mills* case.[114] In addition, in the *Iron Rhine Railway* case, the tribunal stated that "Environmental law ... require[s] that where development may cause significant harm to the environment there is a duty to prevent, or at least mitigate, such harm ... This duty ... has now become a principle of general international law."[115] Those cases have confirmed the principle of not causing significant harm to the atmospheric environment of other States, not limited exclusively to adjacent States, as an established principle of customary international law.

2. Precaution

39. In the context of the protection of the atmosphere from global atmospheric degradation, substantive obligations incorporated in the relevant conventions are those of precautionary measures. Unlike the "preventive measures" that are based on scientific knowledge, precaution is addressed where there exists no sufficient scientific certainty. Thus, in dealing with the protection of the atmosphere, consideration of precaution is inevitable. Precaution is distinguished into two types: one is "precautionary measures" (precautionary approach) and the other the "precautionary principle". While the former implies administrative measures implementing the rules of precaution, the latter is a legal principle to be applicable before a court of law, the main function of which is to shift the burden of proof from the party alleging the existence of damage to the defendant party, who is required to prove non-existence of the damage.[116] While there are a few conventions providing for a precautionary principle,[117] international courts and tribunals have thus far

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[113] *Gabčikovo-Nagymaros Project (Hungary vs. Slovakia), Judgment, I.C.J. Reports 1997*, p. 41, para. 53.

[114] *Pulp Mills on the River Uruguay, Judgment*, p. 78, para. 193.

[115] Award in the Arbitration regarding the *Iron Rhine* ("Ijzeren Rijn") Railway between the Kingdom of Belgium and the Kingdom of the Netherlands, decision of 24 May 2005, *UNRIAA*, vol. XXVII, pp. 66-67, para. 59. It may have been premature to say that Principle 21 was only a starting point and that the principle had not yet entered into customary international law at the time of the adoption of the Stockholm Declaration in 1972. However, subsequent developments of jurisprudence, such as the 1995 *Nuclear Tests II* case, the 1996 *Nuclear Weapons* case, the 1997 *Gabčikovo-Nagymaros Project* case and the 2010 *Pulp Mills* case, confirm the customary status of the principle, consolidated by State practice and *opinio juris* as well; see Birnie, Boyle and Redgwell, *International Law and the Environment*, op. cit., p. 143; Paolo Galizzi, "Air, Atmosphere and Climate Change", in Shawkat Alam, et al., eds., *Routledge Handbook of International Environmental Law* (London: Routledge, 2014), pp. 333-347.

[116] In adopting the 2000 Cartagena Protocol on Biosafety, States opted for "precautionary approach" rather than "precautionary principle" as reflected in its preamble (Nicolas de Sadeleer, "The principle of prevention and precaution in international law: two heads of the same coin?" in Malgosia Fitzmaurice, et al., eds., *Research Handbook*, op. cit., pp. 191-192). On this continuing discourse, see Jonathan B. Wiener, "The rhetoric of precaution", in Jonathan B. Wiener et al., eds., *The Reality of Precaution: Comparing Risk Regulation in the United States and Europe* (Washington/DC and London: Earthscan, 2011), pp. 3-35.

[117] For example, 1996 Protocol to the London Dumping Convention and the 2001 Stockholm POPs Convention. Sadeleer, op. cit., pp. 186-187. Arie Trouwborst, *Evolution and Status of the Precautionary Principle in International Law* (The Hague: Kluwer Law International, 2002), p. 15; Jonathan B. Wiener, "Precaution", in Daniel Bodansky et al., eds., *Oxford Handbook*, op. cit., p. 601. See Antonio A. Cançado Trindade, "Principle 15: precaution", in Duvic-Paoli and Vinuales, *The Rio Declaration on Environment and Development*, op, cit., pp. 417-421.

never recognized the precautionary principle as customary international law, although it has been invoked several times by claimants.[118] It should thus be considered inappropriate to refer to a precautionary principle in the present guidelines.[119] As mentioned above, the law relating to degradation of the atmosphere is based on the idea of precaution and the relevant conventions incorporate the precautionary approaches/measures, either explicitly or implicitly, as essential elements for the obligation of States to minimize the risk of atmospheric degradation.

40. On the basis of the foregoing, the following draft guideline is proposed:

Draft guideline 3: Obligation of States to protect the atmosphere

States have the obligation to protect the atmosphere from transboundary atmospheric pollution and global atmospheric degradation.

(a) **Appropriate measures of due diligence shall be taken to prevent atmospheric pollution under international law.**

(b) **Appropriate measures shall be taken to minimize the risk of atmospheric degradation in accordance with relevant conventions.**

C. The duty to assess environmental impacts

41. One of the important obligations of States in protecting the atmosphere by preventing atmospheric pollution and minimizing the risk of atmospheric degradation is to conduct an appropriate environmental impact assessment. In the recent case of the International Court of Justice on the *Construction of a Road in Costa Rica along the San Juan River (Nicaragua v. Costa Rica)*, the Court affirmed that "a State's obligation to exercise due diligence in preventing significant transboundary harm requires that State to ascertain whether there is a risk of significant transboundary harm prior to undertaking an activity having the potential adversely to affect the environment of another State. If that is the case, the State concerned must conduct an environmental impact assessment",[120] and concluded that the State in question had "not complied with its obligation under general

[118] The ITLOS order on the provisional measures of 27 August 1999 in the cases of *Southern Blue Fin Tuna (New Zeeland* v. *Japan; Australia* v. *Japan)* held that the parties should "act with *prudence and caution* to ensure that effective conservation measures are taken to prevent serious harm to the stock of southern blue fin tuna" (emphasis added), but the Tribunal avoided referring to the "precautionary principle" that had been invoked by the applicants. (para. 77 of the Order. This Order was nullified by the subsequent award by the Arbitral Tribunal of 4 August 2000.) In the *Mox Plant (Ireland* v. *United Kingdom)* case, the Tribunal again referred to "prudence and caution" rather than the "precautionary principle" (Order of 3 December 2001, para. 84). The phrase was repeated by the Tribunal in the *Case concerning Land Reclamation by Singapore in and around the Strait of Johor (Malaysia* v. *Singapore)* (Order of 8 October 2003, para. 99). See Sadeleer, op. cit., pp. 189, 208.

[119] In elaborating the 2013 understanding, this difference was stressed by the Special Rapporteur and it was agreed that "precautionary approach/measures" could be dealt with in the draft guidelines, if not the "precautionary principle" (noting however the phrase "but without prejudice to" in the said understanding). The present guidelines proposed by the Special Rapporteur do not refer to either of the two concepts. The concept of precautionary approach/ measures is naturally implicit in draft guideline 3 (a) below.

[120] *Construction of a Road in Costa Rica along the San Juan River, Judgment*, para. 153.

international law to perform an environmental impact assessment prior to the construction of the road".[121] It may be noted that "an environmental impact assessment plays an important and even crucial role in ensuring that the State in question is acting with due diligence under general international environmental law".[122]

1. Evolution of environmental impact assessment in international law

42. Environmental impact assessment, a process which identifies and analyses the environmental impact of a certain project, plan or programme,[123] was first introduced in the 1969 National Environmental Policy Act of the United States of America. Today, more than 130 States around the world have followed or adapted the model of environmental impact assessment in their national legislation.[124] At the international level, environmental impact assessment is said to have emerged after the United Nations Conference on the Human Environment, held in Stockholm in 1972. Even though the Stockholm Declaration did not expressly refer to environmental impact assessment, its principles 14 and 15 have been interpreted as implying the rationale underlying environmental impact assessment.[125] Furthermore, Principle 17

[121] Ibid., para. 168.

[122] Judge Hisashi Owada's separate opinion, para. 18.

[123] Astrid Epiney, "Environmental impact assessment", in *Encyclopedia of Public International Law*, vol. III (Oxford: Oxford University Press, 2012), pp. 580-592; Philippe Sands and Jacqueline Peel, *Principles of International Environmental Law* (Cambridge: Cambridge University Press), 3rd ed., 2012, pp. 601-623; Olufemi Elias, "Environmental impact assessment", in Malgosia Fitzmaurice et al., eds. *Research Handbook on International Environmental Law*, op. cit., pp. 227-242; John Glasson, Riki Therivel and Andrew Chadwick, *Introduction To Environmental Impact Assessment* (Oxford: Routledge, 2013); David B. Hunter, "International environmental law: sources, principles and innovations" in Paul G. Harris, *Routledge Handbook of Global Environmental Politics* (Oxford: Routledge, 2013); Donald K. Anton, "Case concerning pulp mills on the River Uruguay (*Argentina v Uruguay*) (Judgment) [2010] I.C.J. Reports (10 April 2010)", available from http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1705810; Deng Hua, "The evolution and implementation of environmental impact assessment in international law", *Sun Yat-Sen University Law Review*, vol. 13, No. 3 (2015), pp.129-148 (in Chinese). See also Nicholas A. Robinson, "International trends in environmental assessment", *Boston College Environmental Affairs Law Review*, vol. 19 (1992), pp. 591-622; Kevin R. Gray, "international environmental impact assessment-potential for a multilateral environmental agreement", *Colorado Journal of International Environmental Law and Policy*, vol.11 (2000), pp. 83-128; John H. Knox, "The myth and reality of transboundary environmental impact assessment", *AJIL*, vol.96 (2002), pp. 291-319; John H. Knox, "Assessing the candidates for a global treaty on transboundary environmental impact assessment", *New York University Environmental Law Journal*, vol.12 (2003), pp. 153-168; Charles M. Kersten, "Rethinking transboundary environmental impact assessment", *Yale Journal of International Law*, vol. 34 (2009), pp.173-206; Vanessa Edwards, "Review of the Court of Justice's case law in relation to waste and environmental impact assessment", *Journal of Environmental Law*, vol. 25 (2013), pp. 515-530; Mary Sabina Peters, "Minimize risk of carbon sequestration through environmental impact assessment and strategic environmental assessment", *European Energy and Environmental Law Review*, vol. 24 (2015), pp. 12-16.

[124] Kersten, ibid., p.176; James Rasband et al., *Natural Resources Law and Policy* (New York: Foundation Press, 2nd ed., 2009), p. 253.

[125] Principles 14 and 15 of the Stockholm Declaration provide as follows. Principle 14: "Rational planning constitutes an essential tool for reconciling any conflict between the needs of development and the need to protect and improve the environment." Principle 15: "Planning must be applied to human settlements and urbanization with a view to avoiding adverse effects on the environment and obtaining maximum social, economic and environmental benefits for all. In this respect projects which are designed for colonialist and racist domination must be abandoned." A/CONF.48/14/Rev.1.

of the 1992 Rio Declaration provides in a mandatory form (although the Declaration itself is a non-binding instrument): "Environmental impact assessment, as a national instrument, shall be undertaken for proposed activities that are likely to have a significant adverse impact on the environment and are subject to decision of a competent national authority."[126]

43. Today, environmental impact assessment has been widely adopted in international legal systems and included in numerous international conventions.[127] It is defined as "a national procedure for evaluating the likely impact of a proposed activity on the environment" (Convention on Environmental Impact Assessment in a Transboundary Context, Espoo Convention, article 1 (vi)).[128] A number of international judicial precedents have confirmed the requirements of environmental impact assessment.[129] Generally, it is used as a legal technique for rendering possible integration of environmental considerations into the decision-making process, proposing possible measures to mitigate adverse environmental effects and describing alternatives that are less harmful to the environment, helping the decision maker to evaluate a project and then make a decision as to whether to implement the project or not, and enabling possible affected persons to participate in the decision-making process, etc.[130] Furthermore, it is regarded as necessary to understand the environmental impacts of a project as early as possible, in order to prevent, reduce or control environmental harm.[131] Moreover, in the context of the principle of sustainable development, it is also a legal technique for reconciling socioeconomic development and environmental protection, with a view to striking a proper balance for sustainable development.[132] Environmental impact assessment itself is a procedure and neither compels by itself a particular result, nor imposes substantive environmental standards.[133]

2. Treaties

44. There is so far no comprehensive global convention governing transboundary environmental impact assessment; instead, States have addressed the subject mainly through a series of regional or sectoral treaties. As a result, environmental impact assessment regimes vary from region to region and from resource to resource.[134] A large number of conventions include provisions requiring an environmental impact assessment, of which the field of marine environmental protection is of special importance for the development of the process.[135] The following conventions refer

[126] Rio Declaration on Environment and Development, A/CONF.151/26/Rev.1, vol. I.
[127] See paras. 44-50 below.
[128] Convention on Environmental Impact Assessment in a Transboundary Context, 25 February 1991, United Nations Treaties Series, vol. 1989, p. 310 (entered into force 10 September 1997) (hereinafter Espoo Convention).
[129] See paras. 52-58 below.
[130] Epiney, "Environmental impact assessment", p. 581.
[131] Ibid., p. 580.
[132] Gerry Bates, *Environmental Law in Australia*, 7th ed. (Chastwood, N.S.W: Lexis Nexis Butterworths, 2010), p. 307.
[133] Elias, "Environmental Impact Assessment", op. cit., p. 227.
[134] For a discussion as to why a global treaty on environmental impact assessment remains elusive, see Knox, "Assessing the candidates for a global treaty on transboundary environmental impact assessment", op. cit., pp. 153-168; see also Kersten, "Rethinking transboundary environmental impact assessment", op. cit., p. 178.
[135] Epiney, "Environmental impact assessment", op. cit., p. 582.

in different ways to the obligation to conduct an environmental impact assessment: (a) Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (London Convention 1972 and its 1996 Protocol) (articles 4 and 5, annexes II and III);[136] (b) United Nations Convention on the Law of the Sea 1982 (article 206);[137] (c) Kuwait Regional Convention for Co-operation on the Protection of the Marine Environment from Pollution 1978 (article 11);[138] (d) Convention for Co-operation in the Protection and Development of the Marine and Coastal Environment of the West and Central African Region 1981 (article 13);[139] (e) Convention for the Protection of the Marine Environment and Coastal Area of the South-East Pacific 1981 (article 8);[140] (f) Regional Convention for the Conservation of the Red Sea and Gulf of Aden Environment 1982 (article 11);[141] (g) Cartagena Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region 1983 (article 12);[142] (h) Convention for the Protection, Management and Development of the Marine and Coastal Environment of the Western Indian Ocean 1985/2010 (article 14);[143] (i) Convention for the Protection of the Natural Resources and Environment of the South Pacific Region 1986 (Noumea Convention) (article 16);[144] (j) Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean 1976/1995 (article 4);[145] and its Protocols for the Protection of the Mediterranean Sea against Pollution Resulting from Exploration and Exploitation of the Continental Shelf and the Seabed and its Subsoil (1994, article 5) and on Integrated Coastal Zone Management in the Mediterranean (2008, article 19); (k) Framework Convention for the Protection of the Marine Environment of the Caspian Sea 2003 (article 17)[146] and its Protocol on Pollution from Land-based Sources and Activities (2012, article 12; a further protocol on environmental impact assessment in a transboundary context is scheduled to be adopted in 2016).

45. Conventions in other fields of international environmental law also provide for an environmental impact assessment: (a) Convention on the Protection of the Environment between Denmark, Finland, Norway, and Sweden 1974 (article 6);[147] (b) Association of Southeast Asian Nations (ASEAN) Agreement on the Conservation of Nature and Natural Resources 1985 (article 14 (1));[148] (c) Canada-USA Agreement on Air Quality 1991 (article 5)[149]; (d) United Nations Framework

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[136] *United Nations Treaty Series*, vol. 1046, p. 138.
[137] *United Nations Treaty Series*, vol. 1833, p. 396.
[138] *United Nations Treaty Series*, vol. 1140, p. 155.
[139] Available from http://abidjanconvention.org/media/documents/publications/Abidjan%20Convention%20English.pdf.
[140] Available at: http://sedac.ciesin.org/entri/texts/marine.environment.coastal.south.east.pacific.1981.html.
[141] *Environmental Policy and Law*, vol. 9, p. 56, available at http://sedac.ciesin.org/entri/texts/red.sea.gulf.of.aden.1982.html.
[142] *United Nations Treaty Series*, vol. 1506, p. 157.
[143] Available at http://www.unep.org/NairobiConvention/docs/Final_Act_Nairobi_Amended_Convention&Text_Amended_Nairobi_Convention.pdf.
[144] Available at http://sedac.ciesin.org/entri/texts/natural.resources.south.pacific.1986.html.
[145] *United Nations Treaty Series*, vol. 1102, p. 27.
[146] Available at: http://www.tehranconvention.org/IMG/pdf/Tehran_Convention_text_final_pdf.pdf.
[147] Available at http://sedac.ciesin.org/entri/texts/acrc/Nordic.txt.html.
[148] Available at http://environment.asean.org/agreement-on-the-conservation-of-nature-and-natural-resources/.
[149] Available at www.ijc.org/rel/agree/air.html.

Convention on Climate Change 1992 (article 4 (1) (f));[150] (e) Convention on Biological Diversity 1992 (article 14 (1));[151] (f) Protocol on Environmental Protection to the Antarctic Treaty 1991 (article 8);[152] (g) Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal 1989 (article 4 (2) (f));[153] (h) Convention on the Protection and Use of Transboundary Watercourses and International Lakes 1992 (articles 3 (1) (h) and 9 (2) (j)).[154]

46. It is noteworthy that several multilateral financial institutions insist that the borrower States conduct an environmental impact assessment as a condition of their lending activities. The pertinent instruments of the International Bank for Reconstruction and Development (World Bank) provide for its own assessment procedures, which are laid down in the World Bank environmental assessment operational policy 4.01 (January 1999, revised in April 2013, currently under further review), according to which the World Bank requires an environmental impact assessment of projects proposed for financing. In the course of the assessment, an array of factors are to be taken into consideration, including the natural environment, human health and safety, social aspects and transboundary and global environmental implications, and public participation has to be guaranteed. The World Bank is free to refuse financing of a project that may have harmful consequences for the environment. The purpose of imposing this obligation is to help ensure that the projects are environmentally sound and sustainable with a view to improving its decision-making.[155] It may be noted that the newly established Asian Infrastructure Investment Bank has also proposed certain environmental assessment provisions.[156]

47. The leading multilateral instrument in the field of environmental impact assessment is the Espoo Convention,[157] which is particularly important in the development of the environmental impact assessment regime in international law. The Convention sets out the obligations of parties to assess the environmental impact of certain activities at an early stage of planning and it also lays down the general obligation of States to notify and consult each other on all major projects under consideration that are likely to have a significant adverse environmental impact across boundaries.[158] Since it was adopted under the auspices of the Economic Commission

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[150] *United Nations Treaty Series*, vol. 1771, p. 107.

[151] Ibid., vol. 1760, p. 79.

[152] *International Legal Materials*, vol. 30, p. 1455 (1991), and available at http://www.polarlaw.org/1991protocol.htm.

[153] *United Nations Treaty Series*, vol. 1673, p. 57.

[154] Ibid., vol. 1936, p. 269.

[155] Epiney, "Environmental impact assessment", op. cit., pp. 582-583; see also Philippe Sands, *Principles of International Environmental Law*, 2nd ed. (Manchester: Manchester University Press, 2003), pp. 821-822. For similar environmental assessment guidelines adopted by the African Development Bank, the Asian Development Bank and the Inter-American Development Bank, see Günther Handl, *Multilateral Development Banking: Environmental Principles and Concepts Reflecting General International Law and Public Policy* (London: Kluwer Law International, 2001). See also the International Seabed Authority, "Recommendations for the guidance of contractors for the assessment of the possible environmental impacts arising from exploration for marine minerals in the Area", ISBA/19/LTC/8.

[156] See www.aiib.org/uploadfile/2015/0907/20150907061253489.pdf.

[157] Convention on Environmental Impact Assessment in a Transboundary Context, Feb 25, 1991, *United Nations Treaties Series*, vol. 1989, p. 310 (entered into force 10 September 1997) (Espoo Convention).

[158] See http://www.unece.org/env/eia/eia.html.

for Europe (ECE), the geographical scope of the Espoo Convention was at first limited to the ECE region (45 parties, including the European Union). However, following the entry into force of its first amendment on 26 August 2014, the Convention is now open to all States Members of the United Nations, which it is expected will play an important role in international law, further advancing environmental impact assessment as an important tool for sustainable development.[159]

48. According to its article 2 (1), the general purpose of the Espoo Convention is the commitment of parties to take all appropriate and effective measures to prevent, reduce and control significant adverse transboundary environmental impact from proposed activities. Therefore, according to article 2 (2), the parties are required to establish an environmental impact assessment procedure for certain activities within their jurisdiction that are likely to have a "significant adverse transboundary impact"; moreover, the parties have the obligation to notify and consult with potentially affected States regarding the expected transboundary effects of the activity. According to article 1 on definitions, "proposed activities" means any activity or any major change to an activity subject to a decision of a competent authority in accordance with an applicable national procedure; "environmental impact assessment" means a national procedure for evaluating the likely impact of a proposed activity on the environment; "impact" means any effect caused by a proposed activity on the environment including human health and safety, flora, fauna, soil, air, water, climate, landscape and historical monuments or other physical structures or the interaction among these factors, and also includes effects on cultural heritage or socioeconomic conditions resulting from alterations to those factors; "transboundary impact" means any impact, not exclusively of a global nature, within an area under the jurisdiction of a Party caused by a proposed activity the physical origin of which is situated wholly or in part within the area under the jurisdiction of another Party.[160] More detailed procedural obligations are laid down in the other provisions of the Convention. The significance of the Convention lies in the fact that it provides for rather detailed and precise standards as regards the manner of carrying out an environmental impact assessment.[161] The Espoo Convention has been applied with significant frequency, which reflects the increase in the number of parties, but also indicates that States consider transboundary environmental impact assessment as a valuable procedure for informing and consulting the authorities and the public of neighbouring countries. In 2003, the Convention was supplemented by the Protocol on Strategic Environmental Assessment (entered into force in 2011). The Protocol lays the groundwork for sustainable development: it ensures that parties integrate environmental, including health, considerations and public concerns into their plans and programmes and, to the extent possible, also into policies and legislation, at the earliest stages. As of January 2016, there were 26 parties to the Protocol, including the European Union.[162]

[159] UNECE press releases, "UNECE Espoo Convention on Environmental Impact Assessment Becomes a Global Instrument" (27 August 2014), available at http://www.unece.org/info/media/presscurrent-press-h/environment/2014/unece-espoo-convention-on-environmental-impact-assessment-becomes-a-global-instrument/unece-espoo-convention-on-environmental-impact-assessment-becomes-a-global-instrument.html.

[160] See article 1 of the Convention (Definitions) http://www.unece.org/fileadmin/DAM/env/eia/documents/legaltexts/Espoo_Convention_authentic_ENG.pdf.

[161] Epiney, "Environmental impact assessment", op cit., p.584.

[162] https://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-4-b&chapter=27&lang=en.

49. Transboundary environmental impact assessment has also been adopted by the European Union, which has issued directives that require a member State to assess the impact of a project on the environment of other member States. The original environmental impact assessment directive (85/337/EEC) has been in force since 1985 and applies to a wide range of public and private projects, as defined in annexes I and II.[163] The directive has been amended three times, in 1997, 2003 and 2009 respectively. Directive 97/11/EC brought its content into line with the Espoo Convention, widening its scope of regulation by increasing the types of projects covered and the number of projects requiring mandatory environmental impact assessment (at annex I). It also provided for new screening arrangements, including new screening criteria (at annex III) for annex II projects and established minimum information requirements. Directive 2003/35/EC was aimed at aligning the provisions on public participation with the 1998 Convention on Public Participation in Decision-making and Access to Justice in Environmental Matters. Directive 2009/31/EC amended annexes I and II of directive 85/337/EEC by adding projects related to the transport, capture and storage of carbon dioxide. Directive 85/337/EEC and its three amendments were codified by directive 2011/92/EU of 13 December 2011. Directive 2011/92/EU was amended in 2014 by directive 2014/52/EU, which entered into force on 15 May 2014 to simplify the rules for assessing the potential effects of projects on the environment.[164] It is in line with the drive for smarter regulation in order to reduce administrative burdens. It also improves the level of environmental protection, with a view to making business decisions on public and private investments more sound, predictable and sustainable in the longer term. The new approach pays greater attention to threats and challenges that have emerged since the original rules came into force over 30 years ago. That means that more attention is paid to areas such as resource efficiency, climate change and disaster prevention, which are now better reflected in the assessment process.[165] In comparison with a large number of international instruments, the environmental impact assessment directive contains rather detailed provisions that have also been specified by many rulings of the European Court of

[163] Kersten, “Rethinking trans-boundary environmental impact assessment”, op. cit., p. 180.

[164] See http://ec.europa.eu/environment/eia/eia-legalcontext.htm.

[165] The main amendments of EIA Directive 2014/52/EU are as follows: (1) Member States now have a mandate to simplify their different environmental assessment procedures. (2) Time frames are introduced for the different stages of environmental assessments: screening decisions should be taken within 90 days (although extensions are possible) and public consultations should last at least 30 days. Member States also need to ensure that final decisions are taken within a “reasonable period of time”. (3) The screening procedure, determining whether an EIA is required, is simplified. Decisions must be duly motivated in the light of the updated screening criteria. (4) EIA reports are to be made more understandable for the public, especially as regards assessments of the current state of the environment and alternatives to the proposal in question. (5) The quality and the content of the reports will be improved. Competent authorities will also need to prove their objectivity to avoid conflicts of interest. (6) The grounds for development consent decisions must be clear and more transparent for the public. Member States may also set time frames for the validity of any reasoned conclusions or opinions issued as part of the EIA procedure. (7) If projects do entail significant adverse effects on the environment, developers will be obliged to do the necessary to avoid, prevent or reduce such effects. These projects will need to be monitored using procedures determined by the member States. Existing monitoring arrangements may be used to avoid duplication of monitoring and unnecessary costs. See for details: http://ec.europa.eu/environment/eia/review.htm.

Justice.[166] The Court has thus contributed in a decisive way to the effectiveness of the directive, while its formulations still leave notable discretion to member States.[167]

50. The 1991 Protocol on Environmental Protection to the Antarctic Treaty incorporates a more progressive form of environmental impact assessment. Article 8 (1) provides that proposed activities shall be subject to the procedures set out in annex I to the Protocol for prior assessment of the impacts of those activities on the Antarctic environment. If a proposed activity is found to cause "less than a minor or transitory impact", that activity may proceed. If it is not so found, an initial environmental evaluation will be prepared, and if it is found that there is "minor or transitory impact", the activity may proceed under appropriate procedures of monitoring, assessment and verification of the impact of the activity. If it is found that there is "more than a minor or transitory impact", a comprehensive evaluation will be circulated to all parties and made publicly available, and considered by the Consultative Meeting. That represents an advanced version of how the requirement for an environmental impact assessment operates and is more likely to be acceptable within defined contexts such as Antarctica.[168]

3. Non-binding instruments

51. With regard to non-binding instruments on the subject of environmental impact assessment, the following instruments are noteworthy: (a) United Nations Environment Programme (UNEP), draft principles of conduct in the field of the environment for the guidance of states in the conservation and harmonious utilization of natural resources shared by two or more States (principle 5),[169] endorsed by the General Assembly in resolution 34/186; (b) UNEP, conclusions of the study of legal aspects concerning the environment related to offshore mining and drilling within the limits of national jurisdiction (UNEP/GC.9/5/Add.5, annex III),[170] endorsed by the General Assembly in resolution 37/217; (c) World Charter for Nature (paras. 11 (b) and (c)) endorsed by the General Assembly in resolution 37/7 (1982);[171] (d) UNEP, Goals and Principles of Environmental Impact Assessment of 1987 (UNEP/GC.14/17, annex III) endorsed by the General Assembly in resolution 42/184;[172] (e) United Nations Conference on Environment and Development, Rio Declaration on Environment and Development (principle 17) (1992);[173] and finally, (f) the draft articles on prevention of transboundary harm from hazardous activities

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[166] For example: Case C-301/95 *Commission of the European Communities* v. *Federal Republic of Germany* (1998) ECR I-6135; Case C-392/96 *Commission of the European Communities* v. *Ireland* (1999) ECR I-5901; Case C-87/02 *Commission* v. *Italy* (2004) ECR I-5975; Case C-508/03 *Commission of the European Communities* v. *United Kingdom of Great Britain and Northern Ireland* (2006) ECR I-3969; Case C-290/03 *Barker* v. *London Borough of Bromley* (2006) ECR I-3949; Case C-435/97 *World Wildlife Fund* v. *Autonome Provinz Bozen* (1999) ECR I-5613; Case C-287/98 *State of the Grand Duchy of Luxembourg* v. *Linster* (2000) ECR I-6917; etc.

[167] Epiney, "Environmental impact assessment", op. cit., p. 586.

[168] Elias, "Environmental impact assessment", op. cit., p. 234.

[169] UNEP/GC.6/17.

[170] UNEP/GC.9/5/Add.5, annex III.

[171] *Official Records of the General Assembly, Thirty-seventh Session, Supplement No. 51* (A/37/51), p. 17, UN Doc. A/Res/37/7 (1982).

[172] UNEP/GC.14/17, annex III, endorsed by A/Res/42/184.

[173] See para. 14, supra above, footnote 42.

of 2001.[174] It should be noted that draft article 7 provides as follows: "Any decision in respect of the authorization of an activity within the scope of the present articles shall, in particular, be based on an assessment of the possible transboundary harm caused by that activity, including any environmental impact assessment." According to its commentary, draft article 7 does not oblige the State of origin to require risk assessment for any activity being undertaken within its territory or otherwise under its jurisdiction or control. However, draft article 7 is fully consonant with principle 17 of the Rio Declaration, which provides also for assessment of the risk of activities that are likely to have a significant adverse impact on the environment. A State of origin should thus ensure that an assessment is undertaken of the risk of the activity causing significant transboundary harm and that the assessment enables the State to determine the extent and the nature of the risk involved in an activity and consequently the type of preventive measures it should take. Although draft article 7 does not specify what the content of the risk assessment should be, such an assessment should contain an evaluation of the possible transboundary harmful impact of the activity and include the effects of the activity not only on persons and property, but also on the environment of other States.[175]

4. Judicial decisions

52. It may be appropriate here to review briefly how international courts and tribunals have regarded the obligation of carrying out an environmental impact assessment in their jurisprudence. In the second *Nuclear Tests* case before the International Court of Justice in 1995,[176] New Zealand sought to prevent France resuming underground nuclear testing in the Pacific, citing among other reasons that France had not conducted an environmental impact assessment, as required under the Noumea Convention, 1986,[177] and also under customary international law.[178] It may be noted that France does not seem to have denied the existence of those obligations under the Noumea Convention and under customary international law. Instead, its argument was that an environmental impact assessment should be understood as leaving some latitude to States in conducting the assessment. While the majority of the members of the Court did not consider those points for lack of jurisdiction, Judge Weeramantry stated that in his opinion the obligation to carry out the transboundary environmental impact assessment had become sufficiently developed for the Court to "take notice" of it,[179] and Judge ad hoc Sir Geoffrey Palmer also considered that customary international law might require such an assessment in respect of activities that could have significant environmental effects.[180]

53. In the 1997 *Gabčikovo-Nagymaros Project* case, the concept of environmental impact assessment was first referred to by Hungary, claiming that "a joint

[174] See *Yearbook ... 2001*, vol. II, Part Two, para. 97.
[175] Ibid., para. 98.
[176] *Request for an Examination of the Situation in Accordance with Paragraph 63 of the Court's Judgement of 20 December 1974 in the Nuclear Tests, I.C.J. Reports 1995*, pp. 288f.
[177] Convention for the Protection of Natural Resources and Environment of the South Pacific Region, 24 November 1986 (entered into force 22 August 1990, see para. 44 supra) available at: http://sedac.ciesin.org/entri/texts/natural.resources.south.pacific.1986.html.
[178] New Zealand's pleadings, 1995: CR/95/20, paras. 10-25.
[179] Dissenting Opinion of Judge Weeramantry, *Request for an Examination of the Situation in Accordance with Paragraph 63 of the Court's Judgement of 20 December 1974 in the Nuclear Tests, I.C.J Reports 1995*, p. 344.
[180] Ibid., p. 412; See Elias, "Environmental impact assessment", op. cit., pp. 234-235.

environmental impact assessment of the region and of the future of Variant C structures in the context of the sustainable development of the region should be carried out".[181] In its judgment, the International Court of Justice seems to admit that there is an obligation to proceed to an environmental impact assessment before realizing a project with potentially harmful effects on the environment of another State, the Court doing so by interpreting the relevant treaty in an evolving way[182] and holding that: "It is clear that the Project's impact upon, and its implications for, the environment are of necessity a key issue. The numerous scientific reports which have been presented to the Court by the Parties ... provide abundant evidence that this impact and these implications are considerable. In order to evaluate the environmental risks, current standards must be taken into consideration. This is not only allowed by the wording of articles 15 and 19 of the Treaty on the Construction and Operation of the Gabčikovo-Nagymaros Barrage System signed in Budapest on 16 September 1977, but even prescribed, to the extent that these articles impose a continuing — and thus necessarily evolving — obligation on the parties to maintain the quality of the water of the Danube and to protect nature. The Court is mindful that, in the field of environmental protection, vigilance and prevention are required on account of the often irreversible character of damage to the environment and of the limitations inherent in the very mechanism of reparation of this type of damage."[183] The Court stressed that newly developed environmental standards had to be taken into account "not only when States contemplate new activities but also when continuing with activities begun in the past",[184] thus noting the close relationship between prior impact assessment and subsequent monitoring of the implementation of treaties to take account of environmental effects.[185]

54. The 2005 award of the *Iron Rhine* arbitration provided support as to the general requirement of an environmental impact assessment under international law. The tribunal stated that both international law and European Community law require "the integration of appropriate environmental measures in the design and implementation of economic development activities" and that "emerging principles now integrate environmental protection into the development process", thus endorsing the views expressed by the International Court of Justice in the *Gabčikovo-Nagymaros Project* judgment.[186]

55. In the 2010 *Pulp Mills* case judgment, the International Court of Justice noted the practice of environmental impact assessment, "which in recent years has gained so much acceptance among States that *it may now be considered a requirement under general international law to undertake an environmental impact assessment* where there is a risk that the proposed industrial activity may have a significant adverse impact in a transboundary context, in particular, on a shared resource" (emphasis added).[187] Although the 1975 Statute of the River Uruguay between

[181] *Gabcikovo-Nagymaros Project*, *Judgment*, p. 73, para. 125.
[182] Epiney, "Environmental impact assessment", op. cit., p. 588.
[183] *Gabcikovo-Nagymaros Project*, *Judgment*, pp. 77-78, para. 140.
[184] Ibid., Judge Wearamantry referred in his opinion to the "principle of continuing environmental impact assessment", stating that the incorporation of environmental considerations into the treaty meant that EIA with a duty of monitoring was also built into the treaty. Ibid., pp. 111-112.
[185] Elias, "Environmental impact assessment", op. cit., p. 235.
[186] UNRIAA, vol. XXVII, para. 59.
[187] In the *Pulp Mills* case, the Court held that "an environmental impact assessment must be conducted prior to the implementation of a project". *Pulp Mills on the River Uruguay*, Judgment, p. 83, para. 204.

Argentina and Uruguay did not require an environmental impact assessment, Uruguay had prepared one. While both parties agreed that international law required such an assessment, Argentina argued that the scope of the Uruguayan assessment did not satisfy international standards, particularly with regard to the evaluation of siting alternatives and public consultation. The Court found that the assessment was adequate in both respects.[188] One of the most significant outcomes of the *Pulp Mills* case is the recognition by the Court that environmental impact assessment is a practice that has become an obligation of general international law in situations where a proposed industrial activity may have a significant adverse impact on another State or a shared natural resource. The comments of the Court should be seen as reflecting standard practice in defining some of the issues that States should consider when implementing the obligation to carry out an assessment through their own domestic legislation or project authorization procedures. For example, the indication by the Court that an environmental impact assessment must be conducted "prior to the implementation of a project"[189] would seem to imply that such an assessment can influence the decision and the overall design of a project.[190] The statement by the Court that an environmental impact assessment must be followed, when necessary, by continuous monitoring of the effects of the project on the environment throughout the life of the project is reflective of best practice and logically flows from the acknowledgement by the Court of "due diligence, and the duty of vigilance and prevention which it implies".[191] Thus, while in the *Gabčikovo-Nagymaros Project* case the Court stopped short of recognizing the non-conventional status of the requirement of an environmental impact assessment, it seems that the Court positively endorsed such a status in the *Pulp Mills* case. It may be concluded that environmental impact assessment is now recognized as an essential tool for integrating environmental concerns into the development process and therefore that a general requirement of environmental impact assessment is now part of positive international law.[192]

56. In 2011, the Seabed Disputes Chamber of the International Tribunal for the Law of the Sea rendered its Advisory Opinion on the responsibilities and obligations of States sponsoring persons and entities with respect to activities in the Area.[193] In its opinion, the Chamber dealt with environmental impact assessment by referring to the *Pulp Mills* judgment. In answering the question submitted by the Council of the International Seabed Authority as to "what are the legal ... obligations of States Parties to the Convention [on the Law of the Sea] with respect to the sponsorship of activities in the Area ...", the Chamber singled out the obligation to conduct environmental impact assessments as one of the direct obligations incumbent on sponsoring States.[194] As the Chamber noted, under article 206 of the Convention and related instruments, such as regulation 31, paragraph 6, of the Regulations on

[188] Ibid., pp. 85, 87, paras. 210, 211, 219.

[189] Ibid., p. 83, para. 205.

[190] See the dissenting opinion of Judge ad hoc Vinuesa (at para. 65): "all of the consultations … took place after environmental authorizations had been granted, and therefore all are meaningless".

[191] *Pulp Mills on the River Uruguay*, pp. 82-83, para. 204. Also see Cymie R. Payne, "Pulp Mills on the River Uruguay", *AJIL*, vol. 105 (2011), pp. 99-100.

[192] Elias, "Environmental impact assessment", op. cit., p. 236.

[193] The International Tribunal for the Law of the Sea, *Seabed Disputes Chamber, Responsibilities and Obligations of States Sponsoring Persons and Entities with respect to Activities in the Area*, Advisory Opinion, ITLOS, Case No. 17, para. 141f.

[194] Ibid., p. 44, para. 122.

Prospecting and Exploration for Polymetallic Nodules in the Area and regulation 33, paragraph 6, of the Regulations on Prospecting and Exploration for Polymetallic Sulphides in the Area adopted by the International Seabed Authority, sponsoring States have the obligation to conduct an environmental impact assessment.[195] However, the Chamber did not stop there and it stated that: "It should be stressed that the obligation to conduct an environmental impact assessment is a direct obligation under the Convention *and a general obligation under customary international law*" (emphasis added).[196] The Chamber deduced this statement from the *Pulp Mills* judgment,[197] and broadened the scope of the obligation to cover activities in the Area. According to the Chamber: "Although aimed at the specific situation under discussion by the Court [in the *Pulp Mills* case], the language used [by the International Court of Justice] seems broad enough to cover activities in the Area even beyond the scope of the Regulations. *The Court's reasoning [in the Pulp Mills case] in a transboundary context may also apply to activities with an impact on the environment in an area beyond the limits of national jurisdiction; and the Court's references to 'shared resources' may also apply to resources that are the common heritage of mankind*" (emphasis added).[198] Bearing the opinion in mind, it may be concluded that the obligation to conduct an environmental impact assessment under general international law also applies in the context of activities in an area beyond the limits of national jurisdiction.

57. The 2013 partial award of the *Indus Waters Kishenganga Arbitration (Pakistan v. India)* confirmed the obligation of the State under customary international law to undertake an environmental impact assessment in light of the judgments of the International Court of Justice in the *Gabčikovo-Nagymaros Project*, *Pulp Mills* and *Iron Rhine* cases.[199]

58. In the recent case of *Certain Activities carried out by Nicaragua in the Border Area* and *Construction of a Road in Costa Rica along the San Juan River*, the International Court of Justice reiterated its statement in the *Pulp Mills* case that "it may now be considered a requirement under general international law to undertake an environmental impact assessment".[200] The Court in the present case developed the content of the obligation held in the *Pulp Mills* case in three ways. First, although the statement by the Court in the *Pulp Mills* case refers to industrial activities undertaken by private companies, it concluded in the present case that the obligation of environmental impact assessment "applies generally to proposed activities which may have a significant adverse impact in a transboundary context",[201] and therefore applies to projects conducted by a State itself as well. Secondly, although the Court held in the *Pulp Mills* case that the obligation to carry out environmental impact assessments is a continuous one, the Court in that case put an emphasis on the obligation to conduct the assessment prior to undertaking an activity, stating that "the obligation to conduct an environmental impact assessment

[195] Ibid., p. 49, para. 142 and p. 50, para. 146.
[196] Ibid., p. 50, para. 145.
[197] Ibid., p. 51, para. 147.
[198] Ibid., p. 51, para. 148.
[199] PCA, *Indus Waters Kishenganga Arbitration*, Partial Award of 18 February 2013, paras. 450, 451 and 452. This was confirmed by the Final Award of 20 December 2013, para. 112.
[200] *Certain Activities carried out by Nicaragua in the Border Area, Judgment, I.C.J. Reports, 2015*, para. 104.
[201] Ibid.

requires an ex ante evaluation of the risk of significant transboundary harm".[202] Thirdly, the Court observed that the "reference to domestic law does not relate to the question of whether an environmental impact assessment should be undertaken".[203]

5. Customary international law

59. Based on the aforementioned international practice, there has been considerable support for the view that an environmental impact assessment is required as customary international law with regard to the activities or projects that may cause considerable transboundary environmental effects. Since the early 1980s, an environmental impact assessment is regularly required in a broad range of international instruments in case of potentially harmful activities: in addition, more than 130 countries have incorporated requirements for environmental impact assessments in their national legislation, so a rather uniform and continuous State practice exists. States also recognize that obligation as legally binding, at least as far as projects with potential transboundary effects are concerned. Therefore, at least the principle of requiring prior environmental assessment of projects, which may cause significant transboundary environmental harm, can be considered as international customary law. In other words, States have the obligation to conduct an environmental impact assessment if the following conditions are fulfilled: first, the project must be likely to have an impact on the environment; second, transboundary effects must be likely; third, the impact must be significant. Meanwhile, according to international practice, some indications with regard to the procedure of an environmental impact assessment have to be observed: first, the assessment should be carried out prior to the decision on the project; second, it must be carried out in such a manner that all relevant environmental impacts can be analysed and evaluated; third, public participation should be guaranteed in some way; fourth, in practice, the assessment is generally conducted by State authorities; and fifth, the result of an assessment must be taken into consideration when the competent authority decides on the realization of the project.[204] Concerning the conditions or indications mentioned above, some are still vague and lack details in many international instruments, even though some supranational instruments, such as directive 85/337/EEC,[205] contain more precise elements as to the procedure. However, those elements can hardly be said to reflect a real continuous practice, so that it is not possible at the present stage to formulate more precise conclusions as to the manner how to conduct an environmental impact assessment under customary international law.

60. While those observations primarily address the requirement of environmental impact assessment in transboundary contexts, it is uncertain, mainly for the lack of relevant precedents, whether the same applies to environmental impact assessment for projects intended to have significant effects on the global atmosphere, such as geo-engineering activities. It is submitted, however, that those activities are likely to carry a more extensive risk of "widespread, long-term and severe" damage than even those of transboundary harm and therefore that the same rules should a fortiori be applied to those activities potentially causing global atmospheric degradation.

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[202] Ibid., para. 161. It must be borne in mind, however, even in the *Pulp Mills* case the Court held that "an environmental impact assessment must be conducted prior to the implementation of a project". *Pulp Mills on the River Uruguay*, p. 83, para. 205.

[203] Ibid., para. 157.

[204] Epiney, "Environmental impact assessment", op. cit., pp. 588-590.

[205] See para. 42 above *supra*.

61. In view of the above, the following draft guideline is proposed:

Draft guideline 4: Environmental impact assessment

States have the obligation to take all necessary measures to ensure an appropriate environmental impact assessment, in order to prevent, mitigate and control the causes and impacts of atmospheric pollution and atmospheric degradation from proposed activities. The environmental impact assessment should be conducted in a transparent manner, with broad public participation.

III. Obligations of sustainable and equitable utilization of the atmosphere

A. Sustainable utilization of the atmosphere

1. The notion of sustainability in international law

62. The atmosphere was long considered to be non-exhaustible and non-exclusive, since it was assumed that everyone could benefit from it without depriving others.[206] That view is no longer held.[207] It must be borne in mind that the atmosphere is a limited resource with limited assimilation capacity. Even though the atmosphere is not exploitable in the traditional sense of the word (such as in the context of mineral or oil and gas resources), any polluter in fact exploits the atmosphere by reducing its quality and its capacity to assimilate pollutants, thus necessitating its proper maintenance for organisms to breathe and enjoy stable climatic conditions. If the atmosphere is a limited natural resource, it must be used in a sustainable manner. That is easy to say, but difficult to implement, since the normative character of sustainable development has not always been clear in international law. Sustainable development is a concept that seems to be widely supported in theory, but at the same time, there have been certain disagreements with regard to its actual application.[208]

63. The evolution of the notion of sustainable development is well summarized, for example, by the work of Nico Schrijver on the subject[209] and it will not be repeated in the present report. It may, however, be noted that the 1893 *Bering Sea*

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[206] As mentioned in A.CN.4/667, para. 84, footnotes 235 and 236, this appears quite similar to the classic 16th-17th century controversy between Hugo Grotius' *Mare Liberum* and John Selden's *Mare Clausum* over whether ocean resources were to be regarded as unlimited or limited.

[207] See the commentary to the preamble para. (2), *Official Records of the General Assembly, Seventieth Session, Supplement No. 10* (A/70/10), p. 25. The WTO Panel and Appellate Body recognized in the *Gasoline* case of 1996 that clean air was an "exhaustible natural resource" that could be "depleted". *United States — Standards for Reformulated and Conventional Gasoline* (1996), Report of the Appellate Body: WT/DS2/AB/R (1996).

[208] Duncan French, "Sustainable development", in Malgosia Fitzmaurice, et al., eds., *Research Handbook of International Environmental Law*, op. cit., pp. 51-68; Daniel Barstow Magraw and Lisa D. Hawke, et al., "Sustainable development", in Daniel Bodansky and David Freestone, eds., *Oxford Handbook of International Environmental Law* (Oxford: Oxford University Press, 2007), pp. 613638. See also Winfried Lang, ed., *Sustainable Development and International Law*, London: Graham & Trotman (1995), pp. 3-290; Konrad Ginther, et al., eds., *Sustainable Development and Good Governance* (Dordrecht: Martinus Nijhoff, 1995), pp. 1-22; Alan Boyle, et al., eds., *International Law and Sustainable Development*, op. cit., pp. 1-364.

[209] See Nico Schrijver, "The Evolution of sustainable development in international law: inception, meaning and status", *Recueil des cours*, vol. 329 (2007), pp. 217-412. See also, Dire Tladi, *Sustainable Development in International Law: An Analysis of Key Enviro-Economic Instruments* (Pretoria: Pretoria University Law Press, 2007), pp. 11-38.

Fur Seals arbitration was a precursor of the present-day notion of sustainable development.[210] The notion of sustainability in international law first appeared in the high sea fisheries agreements in the form of "maximum sustainable yield" in the 1950s.[211] The maximum sustainable yield was determined in principle by scientific evidence regarding the level of sustainable existence of a species, so that the total allowable catch of the species should not exceed that level. It is important to note that the notion of sustainability was based, in principle, on scientific data. In article 2 of the 1958 Convention on Fishing and Conservation of the Living Resources of the High Seas,[212] defined in article 2 the meaning of "conservation of the living resources of the high seas" is defined as "the aggregate of the measures rendering possible the *optimum sustainable yield* from those resources so as to secure a maximum supply of food and other marine products" (emphasis added). In the context of fisheries law the standard of maximum sustainable yield has subsequently been qualified with a view to limiting the total allowable catch. For example, the Convention on the Law of the Sea provides in article 61 (3) that the measures for conservation "shall also be designed to maintain or restore populations of harvested species at levels which can produce the *maximum sustainable yield, as qualified by relevant environmental and economic factors*, including the economic needs of coastal fishing communities and the special requirements of developing States" (emphasis added).[213] The qualifier is said to reflect the concern of the international community that the standard of maximum sustainable yield itself would not effectively ensure appropriate limits to prevent over-catching.[214] Thus, it can be said that the notion of sustainability, at least in high sea fisheries, is based on scientific knowledge but also on certain (non-scientific) policy considerations.

2. Treaties and other instruments

64. The first visible use of the term "sustainable development" in an international document appears to be the 1980 World Conservation Strategy prepared by the International Union for Conservation of Nature and Natural Resources, which

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[210] The arbitral tribunal adopted the "Regulations" for the sustainable conservation of the fur seal resources. *Moore's International Arbitral Awards*, vol. 1, p. 755. See, "Unilateral measures and the concept of opposability in international law", in Shinya Murase, *International Law: An Integrative Perspective on Transboundary Issues* (Tokyo: Sophia University Press, 2011), pp. 227-228.

[211] Para. 10 (a) of the Schedule to the 1946 International Convention on the Regulation of Whaling; article IV, paragraph 1 (b) (i) of the 1952 International Convention for the High Seas Fisheries of the North Pacific Ocean (*United Nations Treaty Series*, vol. 205, p. 2770); article 2, para. 1 (a) of the 1957 Interim Convention between the United States of America, Canada, Japan and the Union of Soviet Socialist Republics on Conservation of North Pacific Fur Seals (ibid., vol. 314, p. 4546).

[212] *United Nations Treaty Series*, vol. 559, p. 285. Done at Geneva on 29 April 1958, entered into force on 20 March 1966.

[213] Similar provisions can be found in article 119 (1) (a) of the UNCLOS; in article 5 (b) of the 1995 UN Agreement for Implementation of the Provisions of the UNCLOS relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks; in Section 7.2.1 of the 1995 FAO Code of Conduct on Responsible Fisheries; and in the 1992 UNCED, Agenda 21, chapter 17, para. 17 46 (b) concerning sustainable use and conservation of marine living resources of the high seas.

[214] J. F. Caddy and K. L. Cochrane, "A review of fisheries management past and present and some future perspectives for the third millennium", *Ocean and Coastal Management*, vol. 44 (2001), pp. 653-682; Chusei Yamada, et al., "Regarding the southern bluefin tuna case", *Jurist*, No. 1197 (2001), p. 66 (in Japanese).

defined sustainable development as "the integration of conservation and development to ensure that modifications to the planet do indeed secure the survival and wellbeing of all people".[215] The report by the World Commission on Environment and Development (Brundtland Commission), entitled *Our Common Future*, gave international prominence to the term "sustainable development".[216] Those two publications led to a significant "paradigm shift" in international environmental law.[217] The United Nations Conference on Environment and Development, held in Rio de Janeiro, Brazil, in 1992, was the first occasion on which Governments officially adopted sustainable development as a global policy, which was confirmed in the Rio Declaration[218] and in Agenda 21.[219] The two important conventions adopted in Rio, namely, the United Nations Framework Convention on Climate Change[220] and the Convention on Biological Diversity (Biodiversity Convention),[221] provide for sustainable development. Article 3 of the Convention on Climate Change provides as a "principle" that: "The Parties have a right to, and should, promote sustainable development". Article 1 of the Biological Biodiversity Convention states that: "The objectives of this Convention ... are ... the conservation of biological diversity [and] the sustainable use of its components". In the Non-legally Binding Authoritative Statement of Principles for a Global Consensus on the Management, Conservation and Sustainable Development of All Types of Forests,[222] also adopted in Rio, the global consensus on the management, conservation, and "sustainable development" of the world's forests is expressed. In 1994, sustainable development was recognized as an objective of the World Trade Organization (WTO) in the first preambular paragraph to the Marrakesh Agreement Establishing the WTO.[223] The fact that sustainable development is provided only as an "objective" or a "principle" in those instruments may imply that the term offers no more than a policy statement or guidance, rather than an operational code to determine rights and obligations among States.

3. Judicial decisions

65. In its decision on the case concerning the *Gabčíkovo-Nagymaros Project (Hungary v. Slovakia)* in 1997, the International Court of Justice referred to the "need to reconcile environmental protection and economic development",[224] which is, in its opinion, "aptly expressed in the concept of sustainable development", although the Court never went further to analyse the normative character and status of the concept. On that point, Judge Weeramantry in his separate opinion considered sustainable development "to be more than a mere concept, but as a principle with

[215] IUCN, *World Conservation Strategy: Living Resources Conservation for Sustainable Development* (Gland: IUCN, 1980).
[216] World Commission on Environment and Development, *Our Common Future* (Oxford: Oxford University Press (1987), pp. 43-46.
[217] Tladi, *Sustainable Development in International Law*, op. cit., pp. 34-38.
[218] Rio Declaration, para. 14.
[219] Agenda 21, report of the UNCED, 1 (1992) A/CONF.151/26/Rev.1 (vol. I), p. 9.
[220] *United Nations Treaty Series*, vol. 1771, p. 107.
[221] *United Nations Treaty Series*, vol. 1760, p. 79.
[222] A/CONF.151/26/Rev.1 (vol. I), p. 480.
[223] *United Nations Treaty Series*, vol. 1867, p. 154.
[224] *I.C.J. Report 1997*, para. 140.

normative value which is crucial to the determination of this case",[225] a view shared by some with certain qualifications.[226] In the 2006 order of the *Pulp Mills Case (Argentina v. Uruguay)*, the International Court of Justice highlighted "the importance of the need to ensure environmental protection of shared natural resources while allowing for sustainable economic development", noting that "account must be taken of the need to safeguard the continued conservation of the river environment and the rights of economic development of the riparian States".[227] The judgment of 2010 on the same case reiterated the reference to sustainable development in the 2006 order cited above[228] and also that of the *Gabčíkovo-Nagymaros Project* judgment.[229]

66. The WTO Appellate Body decision of 1998 on *United States — Import Prohibition of Certain Shrimp and Shrimp Products* stated that, "recalling the explicit recognition by WTO Members of the objective of sustainable development in the preamble of the WTO Agreement, we believe it is too late in the day to suppose that article XX(g) of the GATT 1994 may be read as referring only to the conservation of exhaustible mineral or other non-living resources", and that: "As this preambular language reflects the intentions of negotiators of the WTO Agreement, we believe that it must add colour, texture and shading to our interpretation of the agreements annexed to the WTO Agreement, in this case, the GATT 1994".[230]

67. In the arbitral case of 2005 on the *Iron Rhine Railway (Belgium v. The Netherlands)*, the tribunal held as follows: "There is considerable debate as to what, within the field of environmental law, constitutes 'rules' or 'principles': what is 'soft law; and which environmental treaty law or principles have contributed to the development of customary international law ... The emerging principles, whatever their current status, make reference to ... sustainable development ... Importantly, these emerging principles now integrate environmental protection into the development process. Environmental law and the law on development stand not as alternatives but as mutually reinforcing, integral concepts, which require that where development may cause significant harm to the environment there is a duty to prevent, or at least mitigate such harm ... This duty, in the opinion of the Tribunal, has now become a principle of general international law."[231] In the 2013 partial award of the *Indus Waters Kishenganga Arbitration (Pakistan v. India)* the Court of Arbitration stated as follows: "There is no doubt that States are required under

[225] Separate Opinion of Judge Weeramantry, para. 104. He also stated that "the law necessarily contains within itself the principle of reconciliation. That principle is the principle of sustainable development", further noting that it is "a part of modern international law by reason not only of its inescapable logical necessity, but also by reason of its wide and general acceptance by the global community" (ibid.).

[226] See, Vaughn Lowe, "Sustainable development and unsustainable arguments", in Boyle, et al., eds., *International Law and Sustainable Development*, op. cit., pp. 19 et seq, in which sustainable development is characterized as a "meta-principle". See also, Dire Tladi, *Sustainable Development in International Law*, op. cit., pp. 94-109.

[227] *Pulp Mills on the River Uruguay, Indication of Provisional Order, I.C.J. Reports 2006*, p. 133, para. 80.

[228] Ibid., para. 75.

[229] Ibid., para. 76.

[230] Report of the WTO Appellate Body, AB-1998-4, WT/DS58/AB/R (12 October 1998), paras. 129, 131 and 153.

[231] PCA, *Iron Rhine Arbitration*, 2005, paras. 58-60.

contemporary customary international law to take environmental protection into consideration when planning and developing projects that may cause injury to a bordering State. Since the time of *Trail Smelter*, a series of international ... arbitral decisions have addressed the need to manage natural resources in a sustainable manner. In particular, the International Court of Justice expounded upon the principle of 'sustainable development' in *Gabčíkovo-Nagymaros*, referring to the 'need to reconcile economic development with protection of the environment.'"[232]

68. Thus, with regard to the question of whether the "concept" of sustainable development has evolved as a "principle", the trend seems definitely to be leading to its recognition of its legal character as an "emerging principle" under customary international law. However, in view of a certain ambiguity remaining as to its legal status, the Commission may wish to opt for the term "should" in referring to sustainable utilization of the atmosphere, as follows:

Draft guideline 5: Sustainable utilization of the atmosphere

1. **Given the finite nature of the atmosphere, its utilization should be undertaken in a sustainable manner.**

2. **For sustainable utilization of the atmosphere, it is required under international law to ensure a proper balance between economic development and environmental protection.**

B. Equitable utilization of the atmosphere

1. The notion of equity in international law

69. Equity and sustainable development are two notions frequently employed as inherently interrelated concepts in international environmental law, and in the law of the atmosphere in particular, since equitable use of the atmosphere is a corollary of its sustainable use.[233] While equity addresses distributive justice in allocating resources on the one hand, it also refers to distributive justice in allocating burdens on the other hand,[234] and therefore, the relationship between the two within the concept of equity should also be taken into account.

70. Equity has been a long-standing concern in general international law, within which diverse meanings of the concept have been discussed.[235] While it is difficult

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[232] PCA, *Indus Waters Kishenganga Arbitration*, Partial Award of 18 February 2013, para. 449. This was confirmed by the Final Award of 20 December 2013, para. 111.

[233] For example, the Copenhagen Accord of the UNFCCC COP-15 in 2009 stated that those who associate with the Accord agree "on the basis of equity and in the context of sustainable development" to enhance long-term cooperative action to combat climate change (Decision 2/CP. 15, Copenhagen Accord, in FCCC/CP/2009/11/Add.1, 30 March 2010). The Paris Agreement adopted by the UNFCCC COP-21 on 12 December 2015 emphasized the "intrinsic relationship" of "equitable access to sustainable development" in its 8th preambular paragraph (FCCC/CP/2015/L.9).

[234] Dinah Shelton, "Equity" in Daniel Bodansky, et al., *Oxford Handbook of International Environmental Law* (Oxford: Oxford University Press, 2007), pp. 639-662.

[235] Michael Akehust, "Equity and general principles of law", *ICLQ*, vol. 25 (1976), pp. 801-825; Francesco Francioni, "Equity in international law", in Rüdiger Wolfrum, ed., *Encyclopedia of Public International Law*, vol. III (Oxford, Oxford University Press, 2012), pp. 632-642; M. W. Janis, "Equity in international law", in ibid., vol. II (Amsterdam: North-Holland, 1995), p. 109.

to define, equity in international law has been equated by the International Court of Justice to "a direct emanation of the idea of justice".[236] The notion conveys "considerations of fairness and reasonableness often necessary for the application of settled rules of law".[237] The International Court of Justice referred to the concept in its Chamber judgment of 1985 in the *Frontier Dispute* (*Burkina Faso v. Mali*) case,[238] in which the Court recalled that there were three categories of equity in international law: (a) equity *infra legem* (within the law), (b) equity *praeter legem* (outside, but close to, the law) and (c) equity *contra legem* (contrary to law). Equity *infra legem*, according to the judgment, is "that form of equity which constitutes a method of interpretation of the law in force, and is one of its attributes".[239] The notion of equity *praeter legem* is particularly important for its function of filling gaps in existing law.[240] Equity *contra legem* (contrary to the law) is similar to settlement *ex aequo et bono* (see article 38, paragraph 2 of the Statute of the International Court of Justice), which may, upon agreement of the parties concerned, serve as a mechanism to correct existing legal rules that might otherwise lead to an unreasonable or unjust consequence, but it should be distinguished from the interpretation and application of existing law.

71. In the context of international environmental law, equity has a dual dimension.[241] On the one hand, it postulates an equitable global "North-South" balance, reflected in the concept of "common but differentiated responsibilities" (formulated in principle 7 of the Rio Declaration and in several multilateral environmental agreements). On the other hand, it calls for an intergenerational equitable balance between the present generation and future generations of humankind, highlighted by the seminal definition report of the World Commission on Environment and Development: "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs".[242]

2. Treaties and other instruments

72. Provisions concerning equity and equitable principles are crucial in many global multilateral treaties. According to its preamble, the Montreal Protocol on

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[236] *Continental Shelf (Tunisia* v. *Libyan Arab Jamahiriya), Judgment, I.C.J. Reports 1982*, p. 46, para. 71.

[237] James R. Crawford, SC, FBA, *Brownlie's Principles of Public International Law, 8th edition* (Oxford: Oxford University Press, 2012), p. 44. See also Thomas Franck, *Fairness in International Law and Institutions* (Oxford: Clarendon Press, 1995).

[238] *Frontier Dispute (Burkina Faso* v. *Mali), Judgment, I.C.J. Reports 1986*, p. 554.

[239] Ibid.

[240] See in general Prosper Weil, "L'équité dans la jurisprudence de la Cour Internationale de Justice: Un mystère en voie de dissipation?", in Vaughan Lowe and Malgosia Fitzmaurice, eds., *Fifty Years of the International Court of Justice: Essays in Honour of Sir Robert Jennings* (Cambridge: Cambridge University Press, 1996), pp. 121-144; Juliane Kokott, "Equity in international law", in Ferenc L. Toth, ed., *Fair Weather? Equity Concerns in Climate Change* (London: Earthscan, 1999), pp. 186-188; Dinah Shelton, "Equity", in Daniel Bodansky, et al., eds., *Oxford Handbook of International Environmental Law*, op. cit., pp. 639-662, at 642.

[241] Shelton, ibid., at pp. 640-645.

[242] *Our Common Future* (Oxford: Oxford University Press, 1987), at p. 43. See also Edith Brown Weiss, *In Fairness to Future Generations: International Law, Common Patrimony, and Intergenerational Equity* (Tokyo: United Nations University Press, 1989); and Claire Molinari, "Principle 3: From a Right to Development to Intergenerational Equity", in Duvic-Paoli and Vinuales, *The Rio Declaration on Environment and Development*, op. cit., pp. 139-156.

Substances that Deplete the Ozone Layer to the Vienna Convention on the Protection of the Ozone Layer of 1985, purports to "control equitably total global emissions". The United Nations Framework Convention on Climate Change[243] recognizes in article 3 (1) that: "The Parties should protect the climate system for the benefit of present and future generations of humankind", and "on the basis of equity and in accordance with their common but differentiated responsibilities and respective capabilities". Article 4 (2) (a) of the Convention provides that: "Each of these [Annex I] Parties shall adopt national policies and take corresponding measures on the mitigation of climate change, by limiting its anthropogenic emissions of greenhouse gases and protecting and enhancing its greenhouse gas sinks and reservoirs ... taking into account ... the need for equitable and appropriate contributions by each of these Parties to the global effort regarding that objective", and most recently, the Paris Agreement, adopted by the parties to the Convention on 12 December 2015, stipulates in article 2 (2) that it "will be implemented to reflect equity and the principle of common but differentiated responsibilities and respective capabilities, in the light of different national circumstances". The 1992 Convention on Biological Diversity sets forth, among its objectives in article 1, "the fair and equitable sharing of the benefits arising out of the utilization of genetic resources".[244] Similarly, the 1994 Convention to Combat Desertification in Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa (1994)[245] repeatedly emphasizes benefit sharing "on an equitable basis and on mutually agreed terms" (see article 16 (g), article 17 (1) (c) and article 18 (2) (b)).

73. Explicit reference to equity is contained in the United Nations Convention on the Law of the Sea: (a) the preamble affirms among the goals of the Convention "the equitable and efficient utilization" of the ocean's resources, "Bearing in mind that the achievement of these goals will contribute to the realization of a just and equitable international economic order which takes into account the interests and needs of mankind as a whole and, in particular, the special interests and needs of developing countries, whether coastal or land-locked"; (b) articles 74 (1) and 83 (1) provide for an "equitable solution" of disputes; (c) articles 69 (1) and 70 (1) provide for participation "on an equitable basis"; (d) 82 (4), 140 (2) provide for "equitable sharing" in the exploitation of resources; and (e) 155 (2) provides for "equitable exploitation of the resources of the Area for the benefit of all countries".

74. Similar provisions also exist in regional treaties and instruments. The ECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes of 1992 provides that the parties "shall take all appropriate measures ... to ensure that transboundary waters are used in a reasonable and equitable way" (article 2 (2) (c)). The Danube River Protection Convention of 1994 sets forth the goals of "sustainable and equitable water management" in article 2 (1), and provides that the contracting parties "shall take appropriate measures aiming at the prevention or reduction of transboundary impacts and at a sustainable and equitable use of water resources as well as at the conservation of ecological resources" (article 6 (a)).[246] The Agreement on the Cooperation for the

[243] *United Nations Treaty Series*, vol. 1771, p. 107.
[244] Ibid., vol. 1760, p. 79.
[245] Ibid., vol. 1954, p. 3.
[246] Article 6 (a) Convention on Cooperation for the Protection and Sustainable use of the Danube River, done at Sofia on the 29th day of June 1994. See http://www.icpdr.org/main/icpdr/danube-river-protection-convention.

Sustainable Development of the Mekong River Basin of 1995[247] provides for "reasonable and equitable utilization" of the waters of the Mekong River system (article 5). The Revised Protocol on Shared Watercourses in the Southern African Development Community of 2000[248] highlights the equitable utilization of shared watercourse systems in the region (preamble, articles 2 (a), 3 (7) and 3 (8)). Similar provisions can also be found in the Framework Convention on the Protection and Sustainable Development of the Carpathians of 2003, which aims to take measures for "sustainable, balanced and equitable water use" (article 6 (b)).[249]

3. Previous work of the Commission

75. The previous work of the Commission in relation to equity should be noted. Article 5 ("Equitable and reasonable utilization and participation") of the Articles on the Law of the Non-navigational Uses of International Watercourses of 1994[250] (adopted as a convention in 1997), provides that watercourse States "shall in their respective territories utilize an international watercourse in an *equitable and reasonable manner*" and "shall participate in the use, development and protection of an international watercourse in an *equitable and reasonable manner*"[251] (emphasis added). The International Law Commission articles on the law of transboundary aquifers (2008) have similar provisions in article 4 ("Equitable and reasonable utilization") to the effect that: "Aquifer States shall utilize transboundary aquifers or aquifer systems according to the principle of equitable and reasonable utilization".[252]

76. The articles on prevention of transboundary harm from hazardous activities of 2001 provide that: "The States concerned shall seek solutions based on an equitable balance of interests in the light of article 10" (draft article 9 (2)). Article 10 ("Factors involved in an equitable balance of interests") provides as follows: "In order to achieve an equitable balance of interests as referred to in paragraph 2 of article 9, the States concerned shall take into account all relevant factors and circumstances, including: (a) the degree of risk of significant transboundary harm and of the availability of means of preventing such harm, or minimizing the risk thereof or repairing the harm; (b) the importance of the activity, taking into account its overall advantages of a social, economic and technical character for the State of origin in relation to the potential harm for the State likely to be affected; (c) the risk of significant harm to the environment and the availability of means of preventing such harm, or minimizing the risk thereof or restoring the environment; (d) the degree to which the State of origin and, as appropriate, the State likely to be affected are prepared to contribute to the costs of prevention; (e) the economic viability of the activity in relation to the costs of prevention and to the possibility of carrying out the activity elsewhere or by other means or replacing it with an

[247] The parties are: Cambodia, Laos and Thailand. See http://www.mrcmekong.org/assets/Publications/policies/agreement-Apr95.pdf.

[248] http://www.sadc.int/files/3413/6698/6218/Revised_Protocol_on_Shared_Watercourses_-_2000_-_English.pdf.

[249] Article 6 (b) Framework Convention on the Protection and Sustainable Development of the Carpathians, see http://www.carpathianconvention.org/tl_files/carpathiancon/Downloads/01%20The%20Convention/1.1.1.1_CarpathianConvention.pdf.

[250] *Yearbook* … 1994, vol. II (Part Two), p. 117.

[251] See also article 6 for "factors relevant to equitable and reasonable utilization", and the commentaries thereto. Ibid., paras. 218 and 222.

[252] *Official Records of the General Assembly, Sixty-third Session, Supplement No. 10* (A/63/10), paras. 53 and 54.

alternative activity; (f) the standards of prevention which the State likely to be affected applies to the same or comparable activities and the standards applied in comparable regional or international practice."

4. Judicial decisions

77. The International Court of Justice has also invoked the rules of equity, particularly in the context of maritime disputes. In considering Germany's concave coastline, the Court, in the 1969 judgment of the *North Sea Continental Shelf* cases, resorted to equity as a principle for the delimitation of continental shelves, rather than supporting the application of the equidistance rule which would, in its opinion, lead to a substantively unjust result. The Court stated that: "Whatever the legal reasoning of a court of justice, its decisions must by definition be just, and therefore in that sense equitable"; and that it "was not applying equity simply as a matter of abstract justice, but applying a rule of law which itself requires the application of equitable principles".[253] That judgment of the *North Sea Continental Shelf* cases was followed by subsequent maritime delimitation or resource allocation cases. They include: the *Fisheries Jurisdiction* cases (*United Kingdom of Great Britain and Northern Ireland* v. *Iceland and Federal Republic of Germany* v. *Iceland*) of 1974,[254] the arbitration on the delimitation of the continental shelf between the United Kingdom and France of 1977 and 1978,[255] the Tunisia-Libyan Arab Jamahiriya continental shelf case of 1982;[256] the Gulf of Maine Area case of 1984;[257] the Libyan Arab Jamahiriya-Malta continental shelf case of 1985;[258] the

[253] *North Sea Continental Shelf Cases (Federal Republic of Germany* v. *Denmark); (Federal Republic of Germany* v. *Netherlands), Judgment, I.C.J. Reports 1969*, paras. 85 and 88.

[254] *Fisheries Jurisdiction Cases (United Kingdom* v. *Iceland; Federal Republic of Germany* v. *Iceland)*, *Judgment, I.C.J. Reports 1974*, pp. 3f. The Court stressed that "[n]either right is an absolute one" and that both parties should take into account the rights of other states and the needs of conserving the fish stocks (paras. 63, 71). "[B]oth Parties have the obligation to keep under review the fishery resources in the disputed waters and to examine together, in the light of scientific and other available information, the measures required for the conservation and development, and equitable exploitation, of those resources ..." (paras. 64, 71), the Court emphasized, restating its similar standpoint expressed in the *North Sea Continental Shelf* cases, that "[i]t is not a matter of finding simply an equitable solution, but an equitable solution derived from the applicable law" (paras. 69, 78).

[255] *UNRIAA*, vol. 18 (2006), p. 57, para. 99.

[256] *Tunisia-Libya Continental Shelf Case*, *I.C.J. Reports*, *1982*. The Court called for not only the application of equitable principles, but an equitable result derived from the application of equitable principles. "The equitableness of a principle must be assessed in the light of its usefulness for the purpose of arriving at an equitable result. It is not every such principle which is in itself equitable; it may acquire this quality by reference to the equitableness of the solution. The principles to be indicated by the Court have to be selected according to their appropriateness for reaching an equitable result" (para. 70). Furthermore, the Court took into account relevant circumstances to "meet the requirements of the test of proportionality as an aspect of equity" (para. 131).

[257] *Delimitation of the Maritime Boundary in the Gulf of Maine Area (Canada* v. *United States of America)*, *Judgment, I.C.J. Reports 1984*. After a detailed discussion, the Chamber drew the conclusion that "the delimitation effected in compliance with the governing principles and rules of law, applying equitable criteria and appropriate methods accordingly, has produced an equitable overall result" (para. 241).

[258] In the 1985 *Continental Shelf Case (Libyan Arab Jamahiriya* v. *Malta)*, the Court affirmed the importance of "[t]he normative character of equitable principles applied as a part of general international law", the reason being that "these principles govern not only delimitation by adjudication or arbitration, but also, and indeed primarily, the duty of Parties to seek first a delimitation by agreement, which is also to seek an equitable result", *Judgment, I.C.J. Reports 1985*, para. 46.

Maritime Delimitation and Territorial Questions between Qatar and Bahrain case of 2001.[259] In an environmental context, the concept of intergenerational equity has been elaborated, in particular, in the opinions of Judge Cançado-Trindade.[260]

78. On the basis of the foregoing, the following draft guideline is proposed:

Draft guideline 6: Equitable utilization of the atmosphere

States should utilize the atmosphere on the basis of the principle of equity and for the benefit of present and future generations of humankind.

5. Relation of equity with the need for special consideration for developing countries

79. Equity does not mean equality and usually the truth is that "relevant dissimilarities warrant adjustment or special treatment"[261] for the sake of a result-oriented equity. The concept of common but differentiated responsibilities might have been such an attempt, by adopting an equitable approach, to foster substantive equality in international environmental law. It entails that "while pursuing a *common goal*, States take on *different obligations*, depending on their socioeconomic situation and their historical contribution to the environmental problem at stake" (emphasis added).[262] That phenomenon is not new in international law. The first such attempt was probably the Washington Conference of the International Labour Organization in 1919, at which delegations from Asia and Africa succeeded in ensuring the adoption of differential labour standards.[263]

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[259] In the 2001 case between Qatar and Bahrain, the Court, after weighing "whether there are special circumstances which make it necessary to adjust the equidistance line as provisionally drawn in order to obtain an equitable result", applied the equidistance rule in view of the special geographical circumstances as the equitable solution. *Maritime Delimitation and Territorial Questions between Qatar and Bahrain (Qatar* v. *Bahrain)*, *Judgment, I.C.J. Reports 2001*, para. 217.

[260] See his separate opinions in the cases of *Pulp Mills on the River Uruguay* (Judgment), pp. 177-184, paras. 114-131, and *Whaling in the Antarctic*, *I.C.J. Reports 2014*, pp. 362-367, paras. 41-47.

[261] Shelton, "Equity" in Daniel Bodansky, et al., *Oxford Handbook of International Environmental Law* (2007), op. cit., p. 647.

[262] Ellen Hey, "Common but differentiated responsibilities", in *Encyclopedia of Public International Law*, vol. II (Oxford: Oxford University Press, 2012), pp. 444-448.

[263] See Iwao Ayusawa, *International Labor Legislation* (Studies in History, Economics and Public Law, vol. XCI, No. 2) (New York: Columbia University, 1920), pp. 149f. He wrote that the third point of the President Wilson's Fourteen Points, "[t]he removal of all economic barriers and the establishment of an equality of trade conditions among all nations" was "an empty phrase", and stressed that varied economic conditions require differential treatment in labor legislation (chapter VI, pp. 149 *et seq*), which was recognized in the Washington Conference of 1919 concerning the working conditions of workers in Asian and African countries including his own country Japan (Chapter VII, pp. 173f.). Long before the advent of the CBDR concept, this was in fact the first attempt in international law-making for asserting differentiated treatment, on the basis of article 405(3) of the 1919 Versailles Peace Treaty, which became article 19(3) of the ILO Constitution (labour conventions "shall have due regard" to the special circumstances of countries where local industrial conditions are "substantially different"). The same principle also appeared in some of the Conventions approved by ILO in 1919 and in several Conventions adopted after Dr. Ayusawa's article. While Ayusawa did not originate the idea of differential treatment, he was one of the first scholars to take note of the principle as a normative dictate and to link it more generally to substantive equality of treatment in international economic law. In his later years in the 1960s, Dr. Ayusawa served as professor at International Christian University in

Another example is the Generalized System of Preferences elaborated under the United Nations Conference on Trade and Development in the 1970s.[264]

80. The need for special consideration for developing countries in the context of environmental protection has been endorsed by a number of international instruments, such as the Stockholm and Rio Declarations. Principle 12 of the Stockholm Declaration attaches importance to "taking into account the circumstances and particular requirements of developing countries". Principle 6 of the Rio Declaration highlights the special needs of developing countries and particularly the least developed and those most environmentally vulnerable, while Principle 7 provides that: "In view of the different contributions to global environmental degradation, States have common but differentiated responsibilities".

81. The concept of common but differentiated responsibilities is reflected in the provisions of several multilateral environmental agreements, starting with the United Nations Framework Convention on Climate Change.[265] Article 3 (1) provides that: "The Parties should protect the climate system ... on the basis of equity and in accordance with their common but differentiated responsibilities and respective capabilities."[266] In the Kyoto Protocol of 1997, the parties adopted a strict dictate of the concept of common but differentiated responsibilities, imposing obligations to mitigate or stabilize greenhouse gas emissions only on the developed, industrialized States (Annex 1 parties), leaving the developing countries without new legally binding obligations. However, at the seventeenth session of the Conference of the Parties in 2011, it was decided to launch a process to develop a legal instrument which would be applicable to all parties. It is noteworthy that there is no longer any reference here to the concept of common but differentiated responsibilities. Indeed, the Paris Agreement of 2015 obliges all parties to undertake the commitments made thereunder (article 3). It should be noted, however, that, the parties are still to be guided by "equity and common but differentiated responsibilities and respective capabilities, in the light of different national circumstances" (third preambular paragraph, article 2 (2) and article 4 (3)).

82. Since there are various situations affecting the allocation of shared or common resources and the burden of environmental protection, as mentioned before, equal treatment "may yield extreme outcomes when pre-existing economic or other

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Tokyo where he gave courses on international labour law as well as international relations. The present writer, then a freshman student, had the privilege to attend one of his courses in which he lectured with passion and enthusiasm North-South problems, which he considered a top-priority agenda for the post-war world. (The Special Rapporteur is deeply grateful to Professor Steve Charnovitz of George Washington University School of Law for drawing his attention to the contribution made by Dr. Ayusawa.)

[264] See article 23 (The most-favoured-nation clause in relation to treatment under a generalized system of preferences) and article 30 (New rules of international law in favour of developing countries) of the 1978 ILC draft Articles on the most-favoured-nation clauses, *Yearbook ...* 1978, vol. II, Part Two, paras. 47-72. Shinya Murase, *Economic Basis of International Law*, Tokyo: Yuhikaku (2001), pp. 109-179 (in Japanese). Tuula Honkonen, *The Common But Differentiated Responsibilities Principle in Multilateral Environmental Agreements: Regulatory and Policy Aspects* (Alphen: Kluwer Law International, 2009), at pp. 49-66. And see the earlier exceptions for developing countries specified in article XVIII of the 1947 General Agreement on Tariffs and Trade (GATT), *United Nations Treaty Series*, vol. 55, p. 194.

[265] See Christopher D. Stone, "Common but differentiated responsibilities in international law", *AJIL*, vol. 98 (2004), pp. 276-301, at p. 279.

[266] *United Nations Treaty Series*, vol. 1771, p. 107.

inequalities exist in society".[267] Equality of rights "does not necessarily bring about equality of outcomes", and therefore, international environmental law has moved considerably away from "formal equality towards grouping states" to "allocate burdens and benefits based on responsibility for harm and financial or technological capacity to respond".[268] That is the background against which the concept of common but differentiated responsibilities was considered necessary. It may be noted however that the concept leaves an inherent ambiguity as to the basis of the proposed differentiation.[269] Furthermore, in the context of climate change, there has been a certain regression in the application of the concept, as exemplified by the Durban Platform for Enhanced Action of 2011 that ultimately led to the adoption of the Paris Agreement in 2015, recognizing the obligations thereunder as being applicable to all States (article 3).

83. It may be recalled that, in adopting the present topic in 2013, the Commission stated its understanding that "the topic will not deal with, *but is also without prejudice to*, questions such as ... common but differentiated responsibilities ..." (emphasis added). While the exact meaning of this "double negative" expression remains uncertain,[270] it may be noted that the words "but is also without prejudice to" were inserted with the agreed intention that the concept of common but differentiated responsibilities should be included in the draft guidelines. However, given that respect for the needs of developing countries remains significant in international law but not necessarily in the form of common but differentiated responsibilities, the Special Rapporteur proposes a guiding principle in the preamble, modelled after the ninth paragraph of the preamble of the draft articles on the law of transboundary aquifers of 2008, as follows:

Draft preambular paragraph 4

"Emphasizing the need to take into account the special situation of developing countries"

C. Legal limits on intentional modification of the atmosphere

84. The atmosphere has been used in several ways, most notably in the form of aerial navigation. Obviously, most of the activities so far are those conducted

[267] Shelton, "Equity" in Daniel Bodansky, et al., eds., *Oxford Handbook of International Environmental Law* (2007), op. cit., p. 655.

[268] Ibid.

[269] There are a variety of views as to the grounds and criteria for differentiated treatment such as the "contribution theory" (industrialized countries generating the largest share of historical and current global emissions of greenhouse gases are responsible for the global environmental degradation and hence should bear the costs of clean up), "entitlement theory" (developing countries are entitled to fewer and less stringent commitments and financial/technical assistances, in the light of the history of colonialism and exploitation as well as necessity of development), "capacities theory" (developed countries having resources and capacities to take responsive measures should lead to the environmental protection) and "promotion theory" (differentiation tailoring commitments for different situations of each country is necessary to promote a large participation in international treaties). See, Lavanya Rajamani, *Differential Treatment under International Environmental Law* (Oxford: Oxford University Press, 2006), pp. 2, 118-125. See also, Philippe Cullet, "Common but differentiated responsibilities", in Malgosia Fitzmaurice, et al., eds., *Research Handbook on International Environmental Law*, op. cit., pp. 161-181.

[270] See para. 6 and footnote 18 above.

without a clear or concrete intention to affect atmospheric conditions. There are, however, certain activities whose very purpose is to alter atmospheric conditions, for example, weather modification (weather control). Weather modification is an example of utilization of the atmosphere that has already been practised domestically. Additionally, ocean fertilization for CO_2 absorption has been conducted on a limited experimental basis. Scientists have suggested various possible methods for active utilization of the atmosphere. Some of the proposed geo-engineering technologies (such as carbon dioxide removal and solar radiation management) are relevant if they become realizable. Thus, it is considered that the modalities of the use (or utilization) of the atmosphere and their legal implications should be carefully studied in the present report.

85. Weather modification "in warfare" has been prohibited under the Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques of 1976 (Environmental Modification Convention, ENMOD).[271] The Convention does not deal with the question of whether or not a given use of environmental modification techniques for peaceful purposes is in accordance with generally recognized principles and applicable rules of international law. Nonetheless, as the only international instrument to directly regulate deliberate manipulation of natural processes, which have "widespread, long-lasting or severe effects" (article 1) of a transboundary nature, the Convention is considered to offer one possible route towards the prohibition of large-scale geo-engineering practices. Weather control has been experimented with and practised widely in domestic settings since the 1940s to produce desirable changes in weather. The General Assembly first addressed the issue in 1961.[272] The goals of weather control range from preventing the occurrence of harmful meteorological events, such as hurricanes or tornadoes, to causing beneficial weather, such as artificial rainfall in an area experiencing drought; or, conversely, for temporary avoidance of rainfall in a designated area where an important event is scheduled to take place. Cloud seeding is a common technique to enhance precipitation; it entails spraying small particles such as dry ice and silver iodide into the sky in order to trigger cloud formation for eventual rainfall. Evidence of safety is widely believed to be strong, but doubts remain as to its efficacy. The Governing Council of UNEP approved a set of recommendations for consideration by States and other weather modification operators in 1980.[273] If

[271] Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques, adopted at New York on 10 December 1976, *United Nations Treaty Series*, vol. 1108, p. 151, entered into force on October 1978.

[272] The General Assembly, in resolution 1721 (XVI) on "International co-operation in the peaceful uses of outer space" (1961), para. C 1 (a), advised Member States and other relevant organizations: "To advance the state of atmospheric science and technology so as to provide greater knowledge of basic physical forces affecting climate and the possibility of large-scale weather modification".

[273] Decision 8/7/A of the UNEP Governing Council, Provisions for Co-operation between States in Weather Modification, 6th session, 29 April 1980. It may be noted that, as early as 1963, the World Meteorological Organization (WMO) had called for a prudent approach to weather modification technologies, stating as follows: "The complexity of the atmospheric processes is such that a change in the weather induced artificially in one part of the world will necessarily have repercussions elsewhere. This principle can be affirmed on the basis of present knowledge of the mechanism of the general circulation of the atmosphere. However, that knowledge is still far from sufficient to enable us to forecast with confidence the degree, nature or duration of the secondary effects to which change in weather or climate in one part of the Earth may give rise elsewhere, nor even in fact to predict whether these effects will be beneficial or detrimental. Before undertaking an experiment on large-scale weather modification, the possible and desirable consequences must be carefully evaluated, and satisfactory international arrangements

large-scale weather control were to become feasible in the future, there could be some harmful consequences. Potential negative implications may include unintended side effects, damage to existing ecosystems and health risks to humans. Those effects, if transboundary in nature, could generate international concern for their injurious consequences.[274] It is suggested that progressive development of international law in that particular area should be pursued.[275]

86. Geo-engineering is commonly understood as the "intentional large-scale manipulation of the global environment".[276] In the context of climate change, geo-engineering refers to "a broad set of methods and technologies that aim to deliberately alter the climate system in order to alleviate the impacts of climate change".[277] To combat global warming, reducing the emission of greenhouse gases is the primary solution.[278] However, in view of the fact that reducing greenhouse gas emission has not been fully achieved,[279] extracting existing greenhouse gases, especially carbon dioxide, is considered to be an alternative solution.[280] Afforestation is a traditional measure to reduce carbon dioxide and has been incorporated in the

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must be reached." WMO, *Second Report on the Advancement of Atmospheric Sciences and Their Application in the Light of Developments in Outer Space* (Geneva: WMO Secretariat, 1963). See Rita F. and Howard J. Taubenfeld, "Some international implications of weather modification activities", *International Organization*, vol. 23, No. 4 (1969), pp. 808-833, at 811.

[274] Lada L. Roslycky, "Weather modification operations with transboundary effects: the technology, the activities and the rules", *Hague Yearbook of International Law*, vol. 16 (2003), pp. 3-40; Peter H. Sand, "Internationaler Umweltschutz und neue Rechtsfragen der Atmosphärennutzung", *Zeitschrift für Luft-und Weltraumrecht* (German Air and Space Law Journal), vol. 20, No. 2 (1971), pp. 109-133. See also, H. J. Taubenfeld, "International environmental law: air and outer space", in L. A. Teclaff and A. E. Utton, eds., *International Environmental Law* (New York: Praeger, 1974), p. 195; Edith Brown Weiss, "International responses to weather modification", International Organization, vol. 29 (1975), pp. 805-826, at p. 813.

[275] It has been suggested that the following points should be considered in the regulation of weather modification: the duty to benefit the common good of mankind; the duty not to cause significant transboundary harm; the duty to perform environmental impact assessments; public participation; the duty to co-operate; exchange of information and notification; consultation; the duty to utilize international organizations; and State responsibility; Roslycky, op. cit., at 27-40. See also Ray J. Davis, "The international law of the hydroscopic cycle: atmospheric water resources development and international law", *Natural Resources Journal* vol. 31 (1991), pp. 11-44, at 17.

[276] David W. Keith, "Geoengineering", in Andrew S. Goudie et al., eds., *Encyclopedia of Global Change: Environmental Change and Human Society* (Oxford: Oxford University Press, 2001), p. 495.

[277] Intergovernmental Panel on Climate Change, report on the IPCC Expert Meeting on Geoengineering, June 2011. See also generally the Oxford Geo-engineering Programme, www.geoengineering.ox.ac.uk/what-is-geoengineering/what-is-geoengineering/; Parson, Edward A, "Climate Engineering: Challenges to International Law and Potential Responses", www.questia.com/library/journal/1G1-326981407/climate-engineering-challenges-to-international-law; Jesse Reynolds, "The International Legal Framework for Climate Engineering", http://geoengineeringourclimate.com/2015/03/26/the-international-legal-framework-for-climate-engineering-working-paper/; Clive Hamilton, *Earthmasters: The Dawn of the Age of Climate Engineering* (New Haven, Yale University Press, 2013).

[278] www.epa.gov/climatechange/ghgemissions/; John Shepherd et al., "Geoengineering the Climate: Science, Governance and Uncertainty" (London: Royal Society, 2009), available at https://royalsociety.org/~/media/Royal_Society_Content/policy/publications/2009/8693.pdf.

[279] John Shepherd et al., "Geoengineering the Climate: Science, Governance and Uncertainty" (London: Royal Society, 2009) at p. 1, available at https://royalsociety.org/~/media/Royal_Society_Content/policy/publications/2009/8693.pdf.

[280] Johannes Urpelainen, "Geoengineering and global warming: a strategic perspective", *International Environmental Agreements: Politics, Law and Economics*, vol. 12, issue 4 (2012), pp. 375-389.

Kyoto Protocol regime as a valuable climate change mitigation measure.[281] That measure has been recognized in the decisions adopted at various sessions of the Conference of the Parties to the United Nations Framework Convention on Climate Change: in Copenhagen in 2009[282] and Cancun, Mexico, in 2010[283] and in article 5 (2) of the Paris Agreement. New incentives were created to reduce emissions from deforestation and forest degradation in developing countries.[284]

87. Generally, global warming reduction-oriented geo-engineering can be divided into two categories: carbon dioxide removal and solar radiation management.[285] The carbon dioxide removal techniques are designed to remove carbon dioxide from the atmosphere, directly countering the increased greenhouse effect and ocean acidification.[286] Those techniques would probably need to be implemented on a global scale to have a significant impact on carbon dioxide levels in the atmosphere. The proposed techniques include: (a) "soil-carbon sequestration", also known as "biochar", which is to char biomass and bury it so that its carbon is locked up in the soil,[287] which, however, was not endorsed in the Kyoto Protocol;[288] and (b) "carbon capture and storage", referring to a set of technologies to capture carbon dioxide (CO_2) emissions from large-point sources, such as coal-fired power plants,[289] with the captured CO_2 to be stored in geological reservoirs or in the oceans.[290] (The long-term advantage of carbon capture and storage is that the sequestration costs can be partially offset by revenues from oil and gas production,[291] while its disadvantage is also recognized — since the CO_2 stored underground may escape, it could cause explosions.)[292] Under some international legal instruments, measures have recently been adopted for regulating carbon capture and storage. For example, the 1996 Protocol to the 1972 London Convention now includes an amended provision and annex, as well as new guidelines for controlling the dumping of wastes and other matter. Those amendments created a legal basis in international environmental law for regulating carbon capture

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[281] Josep G. Canadell & Michael R. Raupach, "Managing forests for climate change mitigation", Science vol. 320 (2008), pp. 1456, 1456-57; Leonard Ornstein et al., "Irrigated afforestation of the Sahara and Australian outback to end global warming", *Climatic Change*, vol. 97 (2009), pp. 409, 410; Kenneth R. Richards and Carrie Stokes, "A review of forest carbon sequestration cost strategies: a dozen years of research", *Climatic Change*, vol. 63 (2004), pp. 24, 25.

[282] *Report of the Conference of the Parties on its fifteenth session, Addendum. Part Two: Action taken by the Conference of the Parties at its fifteenth session*, FCCC/CP/2009/11/Add.1 (30 March 2010), pp. 11f.

[283] *Report of the Conference of the Parties on its sixteenth session, Addendum Part Two: Action taken by the Conference of the Parties at its sixteenth session*, FCCC/CP/2010/7/Add.1 (15 March 2011).

[284] Ibid.

[285] Brian P. Flannery et al., "Geoengineering climate", in Robert G. Watts, ed., *Engineering Response to Global Climate Change: Planning a Research and Development Agenda* (Boca Raton/Florida: CRC Press, 1997), p. 381; Jason Blackwell and Jane C. S. Long, "The politics of geoengineering", Science, vol. 327 (29 January 2010), p. 527.

[286] www.geoengineering.ox.ac.uk/what-is-geoengineering/what-is-geoengineering/.

[287] Ibid.

[288] Karen N. Scott, "International law in the anthropocene: responding to the geoengineering challenge", *Michigan Journal of International Law*, vol. 34, No. 2 (2013), p. 322.

[289] Jennie C. Stephens, "Carbon capture and storage", http://www.eoearth.org/view/article/150922/.

[290] Ibid.

[291] Ibid.

[292] Intergovernmental Panel on Climate Change, "IPCC Special Report on Carbon Dioxide Capture and Storage", Working Group III. December 2005, p. 259. (For example the explosions in 2001 in Hutchinson, Kansas (USA), when compressed natural gas escaped from salt cavern storage facilities.) Available at www.ipcc.ch/pdf/special-reports/srccs/srccs_wholereport.pdf.

and storage in sub-seabed geological formations for permanent isolation.[293] In accordance with those regulations, CO_2 sequestration and export to other States is conditionally allowed for the purposes of sub-seabed storage.[294]

88. Marine geo-engineering, as "a deliberate intervention in the marine environment to manipulate natural processes", may be a useful technology for absorption of CO_2, but may also result in deleterious effects.[295] There are several types of marine geo-engineering.[296] The following two types of activities, namely "ocean iron fertilization" and "ocean alkalinity enhancement" are related to ocean dumping, and therefore to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972 London Convention and the 1996 Protocol thereto (London Protocol). In 2008, the parties adopted a resolution stating that ocean fertilization activities, apart from legitimate scientific research, should not be allowed and urging States to use the "utmost caution and the best available guidance" even for scientific research.[297] Furthermore, in 2008, the Conference of the Parties to the Biodiversity Convention urged States to ensure that ocean fertilization activities would not take place until there was an adequate scientific basis on which to justify such activities and a "global transparent and effective control and regulatory mechanism is in place for these activities".[298] Another form of marine geo-engineering is "ocean alkalinity enhancement", which involves grinding up, dispersing, and dissolving rocks such as limestone, silicates, or calcium hydroxide in the ocean to increase its ability to store carbon and directly ameliorate ocean acidification.[299] The objective is to sequester CO_2 from the atmosphere by increasing the alkalinity (and the pH) of the oceans.[300] It

[293] www.imo.org/en/OurWork/Environment/LCLP/EmergingIssues/CCS/Pages/default.aspx. These regulations include: 2012 Specific Guidelines for the Assessment of Carbon Dioxide for Disposal into Sub-seabed Geological Formations, adopted 2 November 2012 (LC 34/15, annex 8), available at www.imo.org/en/OurWork/Environment/LCLP/EmergingIssues/CCS/Documents/2012%20SPECIFIC%20GUIDELINES%20FOR%20THE%20ASSESSMENT%20OF%20CARBON%20DIOXIDE.pdf; Risk Assessment and Management Framework for CO2 Sequestration in Sub-Seabed Geological Structures (CS-SSGS) (Source LC/SG-CO2 1/7, annex 3), available at www.imo.org/en/OurWork/Environment/LCLP/EmergingIssues/CCS/Documents/CO2SEQUESTRATIONRAMF2006.doc; Resolution LP 3(4) on the Amendment to article 6 of the London Protocol (adopted on 30 October 2009), available at www.imo.org/en/OurWork/Environment/LCLP/EmergingIssues/CCS/Documents/Resolution%20LP-3(4).doc; Resolution on the amendment to include CO2 sequestration in sub-seabed geological formations in Annex 1 to the London Protocol, available at www.imo.org/en/OurWork/Environment/LCLP/EmergingIssues/CCS/Documents/LP1_1%20CO2.doc.

[294] Article 6, Annex 1, "Specific Guidelines for the Assessment of Carbon Dioxide Streams for Disposal into Sub-seabed Geological Formations", in Annex 4 of IMO, "Report of the twenty-ninth consultative meeting and the second meeting of Contracting Parties", 14 December 2007, LC 29/17.

[295] Amendment to article 1 of the London Protocol, new para. 5 bis (LC 35/15, annex 4).

[296] C. M. G. Vivian, "Brief summary of marine geo-engineering techniques", available at www.cefas.defra.gov.uk/publications/files/20120213-Brief-Summary-Marine-Geoeng-Techs.pdf.

[297] Resolution LC-LP (2008) on the regulation of ocean fertilization, available from www.whoi.edu/fileserver.do?id=56339&pt=10&p=39373.

[298] Decision IX/16 on biodiversity and climate change, available from www.cbd.int/decision/cop/?id=11659. An exception was made for small-scale research activities within "coastal waters" for scientific purposes, without generation or selling carbon offsets or for any other commercial purposes. Naoya Okuwaki, "The London Dumping Convention and Ocean Fertilization Experiments: Conflict of Treaties surrounding Technological Development for CO_2 Mitigation", *Jurist*, No. 1409 (2010), pp. 38-46 (in Japanese).

[299] www.geoengineering.ox.ac.uk/what-is-geoengineering/what-is-geoengineering/.

[300] Haroon S. Kheshgi, "Sequestering atmospheric carbon dioxide by increasing ocean alkalinity", *Energy*, vol. 20, issue 9 (1995), pp. 915-922.

is geo-chemically equivalent to the natural weathering of rocks, which helps to buffer the ocean against decreasing pH and is thereby considered to help to counter ocean acidification.[301] That may pose legal problems similar to those of ocean fertilization, but has not yet been addressed by competent international bodies.

89. Solar radiation management is another form of geo-engineering. Its techniques are designed to mitigate the negative impacts of climate change by lowering earth surface temperatures through increasing the albedo of the planet or by deflecting solar radiation.[302] It has been estimated that a deflection of approximately 1.8 per cent of solar radiation would offset the global mean temperature effects of a doubling of atmospheric concentrations of CO_2.[303] There are several proposals in this area, such as "albedo enhancement" and "stratospheric aerosols". The former is a method for increasing the reflectiveness of clouds or the land surface, so that more of the heat of the sun is reflected back into space. That measure is thought by many to be risk-free, because it does not change the composition of the atmosphere. It only involves the utilization of white or reflective materials in urban environments to reflect greater amounts of solar radiation and therefore to cool global temperatures.[304] However, its effectiveness as a mitigation measure is not thought to be entirely satisfactory.[305] The stratospheric aerosols method is to introduce small, reflective particles into the upper atmosphere to reflect some sunlight before it reaches the surface of the Earth. However, there are some concerns over the injection of sulphate aerosols into the stratosphere. First, it is likely to increase the depletion of the ozone layer.[306] Second, it also has the potential to affect rainfall and monsoon patterns, with consequences for food and water supplies, especially in Africa and Asia.[307] Third, the option is not considered to be cost-effective as a climate change mitigation measure.[308]

90. Thus, while geo-engineering is a potential response to climate change, it has also been criticized as a rather deceptively alluring reaction to global warming issues, because it will reduce the incentive to cut greenhouse gas emissions.[309] It is in part a consequence of the perceived challenges of the climate change regime and the current

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[301] Ibid.

[302] Scott, "International law in the anthropocene: responding to the geo-engineering challenge", *Michigan Journal of International Law*, vol. 34, No. 2 (2013), p. 326.

[303] Ken Caldeira and Lowell Wood, "Global and Arctic climate engineering: numerical model studies", *Philosophical Transactions of the Royal Society* (Series A), vol. 366 (2008), pp. 4039, 4040.

[304] Hashem Akbari et al., "Global cooling: increasing world-wide urban albedos to offset CO_2", 94 *Climatic Change* (2009), pp. 275, 277; Robert M. Hamwey, "Active amplification of the terrestrial albedo to mitigate climate change: an exploratory study", *Mitigation and Adaptation Strategies for Global Change*, vol. 12 (2007), pp. 419-421.

[305] The Royal Society, "Geoengineering the Climate: Science, Governance and Uncertainty", at 34 (London, 2009), available at https://royalsociety.org/~/media/Royal_Society_Content/policy/publications/2009/8693.pdf.

[306] Simone Tilmes, et al., "The sensitivity of polar ozone depletion to proposed geoengineering schemes", *Science*, vol. 320 (2008), pp. 1201, 1204; Paul J. Crutzen, "Albedo enhancement by stratospheric sulfur injections: a contribution to resolve a policy dilemma?", *Climatic Change*, vol. 77, issues 3-4 (2006), pp. 211-220.

[307] Alan Robock et al., "Regional climate responses to geoengineering with tropical and Arctic SO2 injections", *J. Geophysical Res.* (16 August 16 2008), at 1.

[308] Marlos Goes, Nancy Tuana and Klaus Keller, "The economics (or lack thereof) of aerosol geoengineering", *Climate Change*, vol. 109 (2011), pp. 719, 720.

[309] Richard Black, "UK Climate Fix Balloon Grounded" (16 May 2012), http://www.bbc.com/news/science-environment-18086852; Johannes Urpelainen, "Geoengineering and global warming: a strategic perspective", *International Environmental Agreements: Politics, Law and Economics*, vol. 12, issue 4 (2012), pp. 375-389.

policies of focusing on emissions reductions that has led to geo-engineering becoming more attractive.[310] Given the imperfect knowledge of both the technologies and the climatic system, there are concerns about unintended environmental and ecosystem side effects. Some experts argue that while geo-engineering should remain on the table, it is important to begin developing international norms and legal rules to govern its usage in the future.[311] It has also been argued that there should be a thorough scientific review of geo-engineering by a competent organ, such as the Intergovernmental Panel on Climate Change, which may lead to the formation of a new international agreement to govern geo-engineering.[312] As a new law-making exercise, that is certainly beyond the task of the International Law Commission. However, among the examples of geo-engineering cited above, afforestation is well established within the Kyoto Protocol and weather modification is partially regulated by international law (the Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques), and supplemented by the relevant General Assembly resolutions and UNEP guidelines. Ocean fertilization, as a form of marine geo-engineering, is in part under the control of the London Convention and Protocol, and is permitted only for scientific research. In 2010, the parties to the Biodiversity Convention also addressed all geo-engineering activities. It was decided, in line with the above-mentioned decision on ocean fertilization, that "no climate-related geo-engineering activities that may affect biodiversity take place, until there is an adequate scientific basis on which to justify such activities and appropriate consideration of the associated risks for the environment and biodiversity and associated social, economic and cultural impacts, with the exception of small scale scientific research studies that would be conducted in a controlled setting ... and only if they are justified by the need to gather specific scientific data and are subject to a thorough prior assessment of the potential impacts on the environment."[313] In addition, there are several notable non-binding guidelines proposed in the field: the recommendations of the Asilomar Conference on Climate Intervention Technologies convened by the United States Climate Institute in 2010;[314] the voluntary standards formulated in 2011 by the United States Bipartisan Policy Center's Task Force on Climate Remediation Research[315] and the Oxford Principles on Climate Geo-engineering Governance, elaborated by British academics in 2013.[316] Thus, it is clear

[310] Karen N. Scott, "International law in the anthropocene: responding to the geoengineering challenge", op. cit., p. 320.

[311] Johannes Urpelainen, "Geoengineering and global warming: a strategic perspective", op. cit., p. 378.

[312] Ibid. See also Scott Barrett, "The incredible economics of geoengineering", *Environmental and Resource Economics*, vol. 39 (2008), p. 53.

[313] Decision X/33 (2010), available from www.cbd.int/decisions/cop/?m=cop-10.

[314] The Asilomar Conference recommendations are: 1. Promoting collective benefit; 2. Establishing responsibility and liability; 3. Open and cooperative research; 4. Iterative evaluation and assessment; 5. Public investment and consent. www.climate.org/resources/climate-archives/conferences/asilomar/report.html.

[315] 2011-The Bipartisan Policy Center's Task Force on Climate Remediation Research elaborated the following principles: Principle 1: Purpose of climate remediation research; Principle 2: Testing and deploying climate remediation technologies; Principle 3: Oversight issues for research programs; Principle 4: Importance of transparency; Principle 5: International coordination; Principle 6: Adaptive management. http://bipartisanpolicy.org/library/task-force-climate-remediation-research/.

[316] The principles are as follows: 1. Geo-engineering to be regulated as a public good; 2. Public participation in geo-engineering decision-making; 3. Disclosure of geo-engineering research and open publication of results; 4. Independent assessment of impacts; 5. Governance before deployment (the five principles have equal status; numbering does not imply priority). See, Steve Rayner, et al., "The Oxford principles", Climate Geoengineering Governance working paper series No. 1 (University of Oxford, 2013), available from www.geoengineering-

that conducting geo-engineering will require "prudence and caution" (to use the words of the orders of the International Tribunal for the Law of the Sea),[317] even where such an activity is permitted, and that, in any event, prior assessment of geo-engineering activities should be made on a case-by-case basis in respect of each individual project. It is clearly a requirement of international law that environmental impact assessments are required for such activities as discussed at length earlier in the present report (paras. 41-60 above).

91. In view of the above, the following draft guideline is proposed:

Draft Guideline 7: Geo-engineering

Geo-engineering activities intended to modify atmospheric conditions should be conducted with prudence and caution in a fully disclosed, transparent manner and in accordance with existing international law. Environmental impact assessments are required for such activities.

IV. Conclusion

92. Having covered core substantive guidelines on the subject (namely, the obligations of States to protect the atmosphere and sustainable and equitable utilization of the atmosphere) in his third report in 2016, the Special Rapporteur wishes to suggest that the Commission deal in 2017 with the question of the interrelationship of the law of the atmosphere with other fields of international law (such as the law of the sea, international trade and investment law and international human rights law), and in 2018 with the issues of implementation, compliance and dispute settlement relevant to the protection of the atmosphere, by which time hopefully the first reading of the topic could be concluded that year, and the second reading in 2019.

governance-research.org/perch/resources/workingpaper1rayneretaltheoxfordprinciples.pdf. See also, Chiara Armani, "Global experimental governance: international law and climate change technologies", ICLQ, vol. 64, No. 4 (2015), pp. 875-904.

[317] See the ITLOS orders on the provisional measures in the 1999 case *of Southern Blue Fin Tuna (New Zealand* v. *Japan; Australia* v. *Japan)* (para. 77), in the 2001 case of the *Mox Plant (Ireland* v. *United Kingdom)* (para. 84) and in the 2003 *Case concerning Land Reclamation by Singapore in and around the Strait of Johor (Malaysia* v. *Singapore)* (para. 99).

Annex

Draft guidelines proposed by the Special Rapporteur

Preamble

...

"Emphasizing the need to take into account the special situations of developing countries",

[Some other paragraphs may be added, and the order of paragraphs may be coordinated, at a later stage.]

Guideline 3: Obligation of States to protect the atmosphere

States have the obligation to protect the atmosphere from atmospheric pollution and atmospheric degradation.

(a) Appropriate measures of due diligence shall be taken to prevent atmospheric pollution in accordance with the relevant rules of international law.

(b) Appropriate measures shall be taken to minimize the risk of atmospheric degradation in accordance with relevant conventions.

Guideline 4: Environmental impact assessment

States have the obligation to take all such measures that are necessary to ensure an appropriate environmental impact assessment, in order to prevent, reduce and control the causes and impacts of atmospheric pollution and atmospheric degradation from proposed activities. Environmental impact assessment should be conducted in a transparent manner, with broad public participation.

Guideline 5: Sustainable utilization of the atmosphere

1. Given the finite nature of the atmosphere, its utilization should be undertaken in a sustainable manner.

2. For sustainable utilization of the atmosphere, it is required under international law to ensure a proper balance between economic development and environmental protection.

Guideline 6: Equitable utilization of the atmosphere

States should utilize the atmosphere on the basis of the principle of equity and for the benefit of present and future generations of humankind.

Guideline 7: Geo-engineering

Geo-engineering activities should be conducted with caution and prudence in a fully disclosed, transparent manner and in accordance with existing international law. Environmental impact assessments are required for such activities.

Guideline 8 [5]: International cooperation

Draft guideline 8 would be draft guideline 5, as provisionally adopted by the Commission in 2015.

United Nations A/CN.4/705

General Assembly

Distr.: General
31 January 2017

Original: English

International Law Commission
Sixty-ninth session
Geneva, 1 May-2 June and 3 July-4 August 2017

Fourth report on the protection of the atmosphere

by Shinya Murase, Special Rapporteur*

Contents

* The Special Rapporteur wishes to acknowledge the valuable assistance given to him by the following professors and researchers: Charles Wharton, formerly Assistant Professor, Renmin University of China Law School; Yuka Fukunaga, Waseda University; Yubing Shi, Xiamen University; Masayuki Hiromi, Post-doctoral Fellow, Faculty of Law, Sophia University; Deng Hua, doctoral candidate, Renmin University of China Law School; Zhang Maoli, graduate student, China Youth University of Political Studies; and Zhou You, Juris Master, Peking University. Other graduate students at China Youth University of Political Studies, including Qi Quanmei, Li Yubo, Zhang Yixi, Wang Jing, Wang Kun, Liu Yue and Chen Yue, as well as Wang Leifan, doctoral candidate, Renmin University of China Law School, were also very helpful. The Special Rapporteur is deeply grateful to Lin Wei, Vice-President; Wu Yong, Dean; Wang Lijun, Vice-Dean; and Qin Yihe and Chen Xiaohua, Professors, who helped make his research at China Youth University of Political Studies so fruitful, and also to Zhu Wenqi, Professor, Renmin University of China Law School, for his constant support and encouragement during this project.

III. Interrelationship with the law of the sea

A. Linkages between the sea and the atmosphere

46. In physical terms, the sea (oceans) and the atmosphere are closely linked in specific processes that determine the character of ocean-atmosphere interaction.[126] These include the role of ambient water vapour and clouds, the selective absorption of radiation by the ocean and the distribution of total heating in the ocean-atmosphere system.[127] Energy, momentum and matter (water, carbon, nitrogen, etc.) are exchanged between the ocean and the atmosphere.[128] A significant proportion of pollution of the marine environment from or through the atmosphere generally originates from land-based sources, that is, from anthropogenic activities on land. The atmosphere is a significant pathway for the transport of many natural and pollutant materials from the continents to the oceans.[129] Pollution emanates from either direct discharges or diffuse sources, including those released into the atmosphere by fossil-fuel and waste combustion. According to scientific findings, "[a]lthough chemical contaminants — released as a result of human activities — can now be found throughout the world's oceans, most demonstrable effects on living resources occur in coastal waters and are the result of pollution from land".[130] Human activities are also responsible for global warming, which causes the temperature of the oceans to rise, which in turn results in extreme atmospheric conditions of flood and drought[131] as well as mega typhoons (hurricanes/

[126] R.A. Duce, J.N. Galloway and P.S. Liss, "The impacts of atmospheric deposition to the ocean on marine ecosystems and climate", *World Meteorological Organization Bulletin*, vol. 58, No. 1 (2009), pp. 61-66; E.H.G. Brévière and others, "Surface ocean-lower atmosphere study: scientific synthesis and contribution to Earth system science", *Anthropocene*, vol. 12 (2015), pp. 54-68; Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection, *The Atmospheric Input of Chemicals to the Ocean*, Reports and Studies No. 84, GAW Report No. 203 (2012), available from www.wmo.int/pages/prog/arep/wwrp/new/documents/Final_GAW_203_WEB.pdf (accessed 20 February 2017). The Special Rapporteur is grateful to Ms. Oksana Tarasova, Chief, and Ms. Silvina Carou, Scientific Officer, Atmospheric Environment Research Division, WMO, for the supply of the relevant scientific information.

[127] P.J. Webster, "The role of hydrological processes in ocean-atmosphere interactions", *Reviews of Geophysics*, vol. 32, No. 4 (1994), pp. 427-476; See also E.B. Kraus and J.A. Businger, *Atmosphere-Ocean Interaction,* 2nd ed. (Oxford, Oxford University Press, 1994); and W.K.M. Lau and D.E. Waliser, *Intraseasonal variability in the atmosphere-ocean climate system* (Berlin-Heidelberg, Springer, 2012). The Special Rapporteur is grateful to Ms. Zhou You, Juris Master, Peking University (graduate of its Science Department), for supplying the relevant scientific information on the linkages between the sea and the atmosphere.

[128] See T. Stocker, *Introduction to Climate Modelling* (Berlin-Heidelberg, Springer, 2011), pp. 137-150, stating that "[m]ost of the movements in the ocean, particularly the large-scale flow, are caused by these exchange fluxes" (ibid., p. 137).

[129] R.A. Duce and others, "The atmospheric input of trace species to the world ocean", *Global Biogeochemical Cycles*, vol. 5, No. 3 (1991), pp. 193-259; T. Jickells and C.M. Moore, "The importance of atmospheric deposition for ocean productivity", *Annual Review of Ecology, Evolution, and Systematics*, vol. 46 (2015), pp. 481-501.

[130] D.F. Boesch and others, *Marine pollution in the United States* (Arlington, Pew Oceans Commission, 2001); J.M. Prospero, "The atmospheric transport of particles to the ocean", *Particle Flux in the Ocean*, V. Ittekkot and others, eds., SCOPE Report, vol. 57 (San Francisco, John Wiley and Sons, 1996), pp. 19-52; S. Cornell, A. Randell and T. Jickells, "Atmospheric inputs of dissolved organic nitrogen to the oceans", *Nature*, vol. 376 (1995), pp. 24-246; R.A. Duce and others, "Impacts of atmospheric anthropogenic nitrogen on the open ocean", *Science*, vol. 320 (2008), pp. 893-897.

[131] According to a scientific study, "human-induced increases in greenhouse gases have contributed to the observed intensification of heavy precipitation events found over approximately two-thirds of data-covered parts of Northern Hemisphere land areas" (S.K. Min, and others, "Human contribution to more-intense precipitation extremes", *Nature*, vol. 470 (2011), pp. 378-381). Many scientific analyses suggest there is a risk of drought in the twenty-first century and severe

cyclones).[132] El Niño phenomena, resulting from unstable interactions between the tropical Pacific Ocean and the atmosphere,[133] are among the prominent features of climate variability with a global climatic impact. It has been suggested that: "Such a massive reorganization of atmospheric convection … [has] severely disrupted global weather patterns, affecting ecosystems, agriculture, tropical cyclones, drought, bushfires, floods and other extreme weather events worldwide."[134]

47. Of various human activities, greenhouse gas emissions from ships have been increasing in recent years at a high rate, and have contributed to global warming and climate change. The 2000 study by the International Maritime Organization (IMO) on greenhouse gas emissions classified such emissions from ships into four categories, namely: emissions of exhaust gases; emissions of refrigerants; cargo emissions; and other emissions from fire-fighting and other equipment.[135] Not only carbon dioxide (CO_2) emissions but also sulphur oxides (SO_x) and nitrogen oxides (NO_x) from shipping are noted.[136] Research indicates that excessive greenhouse gas emissions from ships change the composition of the atmosphere and climate, and cause a negative impact on the marine environment and human health.[137]

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and widespread droughts during the next 30 to 90 years over many land areas, resulting from either decreased precipitation and/or increased evaporation (see A. Dai, "Increasing drought under global warming in observations and models", *Nature Climate Change*, vol. 3 (2013), pp. 52-58; and J. Sheffield, E.F. Wood, and M.L. Roderick, "Little change in global drought over the past 60 years", *Nature*, vol. 491 (2012), pp. 435-438).

[132] "A large increase was seen in the number and proportion of hurricanes reaching categories 4 and 5. The largest increase occurred in the North Pacific, Indian, and Southwest Pacific Oceans, and the smallest percentage increase occurred in the North Atlantic Ocean. These increases have taken place while the number of cyclones and cyclone days has decreased in all basins except the North Atlantic during the past decade" (see P.J. Webster and others, "Changes in tropical cyclone number, duration, and intensity in a warming environment", *Science*, vol. 309, No. 5742 (2005), pp. 1844-1846). "[F]or some types of extreme — notably heatwaves, but also precipitation extremes — there is now strong evidence linking specific events or an increase in their numbers to the human influence on climate. For other types of extreme, such as storms, the available evidence is less conclusive, but based on observed trends and basic physical concepts it is nevertheless plausible to expect an increase" (see D. Coumou and S. Rahmstorf, "A decade of weather extremes", *Nature Climate Change*, vol. 2, No. 7 (2012), pp. 491-496).

[133] A.V. Fedorov and S.G. Philander, "Is El Niño changing?", *Science*, vol. 288 (5473) (2000), pp. 1997-2002.

[134] W. Cai and others, "Increasing frequency of extreme El Niño events due to greenhouse warming", *Nature Climate Change*, vol. 4 (2014), pp. 111-116.

[135] Ø. Buhaug and others, *Second IMO GHG Study 2009* (London, IMO, 2009), p. 23. See also T.W.P. Smith and others, *Third IMO GHG Study 2014* (London, IMO, 2014), table 1.

[136] M. Righi, J. Hendricks and R. Sausen, "The global impact of the transport sectors on atmospheric aerosol in 2030 — Part 1: land transport and shipping", *Atmospheric Chemistry and Physics*, vol. 15 (2015), pp. 633-651.

[137] Most of the greenhouse gas emissions from ships are emitted in or transported to the marine boundary layer where they affect atmospheric composition. See, e.g., V. Eyring and others, "Transport impacts on atmosphere and climate: shipping", *Atmospheric Environment*, vol. 44, No. 37 (2010), pp. 4735, 4744-4745 and 4752-4753. Greenhouse gas emissions from ships have a negative impact on the marine environment. The Fifth Assessment Report of the Intergovernmental Panel on Climate Change asserted that greenhouse gas emissions have led to global ocean warming, the rise of ocean temperatures and ocean acidification. Intergovernmental Panel on Climate Change, "Climate change 2014 synthesis report: summary for policymakers", available from www.ipcc.ch/pdf/assessment-report/ar5/syr/AR5_SYR_FINAL_SPM.pdf (accessed 20 February 2017); D.E.J. Currie and K. Wowk, "Climate change and CO_2 in the oceans and global oceans governance", *Carbon and Climate Law Review*, vol. 3, No. 4 (2009), pp. 387 and 389; C. Schofield, "Shifting limits? Sea level rise and options to secure maritime jurisdictional claims", *Carbon and Climate Law Review*, vol. 3, No. 4 (2009), p. 12; S.R. Cooley and J.T. Mathis, "Addressing ocean acidification as part of sustainable ocean development", *Ocean Yearbook*, vol. 27, No. 1 (2013), pp. 29-47.

48. One of the most profound impacts of atmospheric degradation on the sea is the rise in sea level caused by global warming. The Fifth Assessment Report of the Intergovernmental Panel on Climate Change estimates that the global mean sea-level rise is likely to be between 26 cm and 98 cm by the year 2100.[138] While exact absolute figures and rates of change still remain uncertain, the report states that it is virtually certain that the sea level will continue to rise during the 21st century, and for centuries beyond — even if the concentrations of greenhouse gas emissions are stabilized. Moreover, the rise in sea level is likely to exhibit "a strong regional pattern, with some places experiencing significant deviations of local and regional sea level change from the global mean change".[139] That degree of change in sea level may pose a potentially serious, maybe even disastrous, threat to many coastal States, especially those with large, heavily populated and low-lying coastal areas, as well as to small, low-lying island States, which will be discussed later in the present report.

49. The General Assembly has continued to emphasize the urgency of addressing the effects of atmospheric degradation, such as increases in global temperatures, sea-level rise, ocean acidification and the impact of other climate changes that are seriously affecting coastal areas and low-lying coastal countries, including many least developed countries and small island developing States, and threatening the survival of many societies.[140] In 2015, the first Global Integrated Marine Assessment (first World Ocean Assessment) was completed as a comprehensive, in-depth study of the substances polluting the oceans from land-based sources through the atmosphere.[141] The summary of the report was approved by the General Assembly in its resolution 70/235 of 23 December 2015. General Assembly resolution 71/257 of 23 December 2016 has confirmed the effect of climate change on oceans.[142]

B. Legal relationship between the law of the sea and the law on the protection of the atmosphere***

1. United Nations Convention on the Law of the Sea and other instruments

50. When the United Nations Convention on the Law of the Sea was adopted in 1982, it aimed to address all issues relating to the law of the sea, including the protection of the marine environment from atmospheric pollution and atmospheric degradation. To that end, the Convention defines the "pollution of the marine environment" in article 1, paragraph 1 (4), and regulates all airborne sources of marine pollution, including atmospheric pollution from land-based sources and vessels, through articles 192, 194, 207, 211 and 212 of Part XII of the Convention. Although climate change was not on the international environmental agenda when

*** The Special Rapporteur is particularly grateful to Yubing Shi, Professor, Xiamen University, for drafting the relevant parts of the present report concerning the law of the sea and related judicial decisions.

[138] Intergovernmental Panel on Climate Change, *Climate Change 2013: The Physical Science Basis. Working Group I Contribution of to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge, United Kingdom, Cambridge University Press, 2013), p. 1180.

[139] Ibid., p. 1140.

[140] See "Oceans and the law of the sea: report of the Secretary-General" (A/71/74/Add.1), chap. VIII ("Oceans and climate change and ocean acidification"), paras. 115-122.

[141] United Nations Division for Ocean Affairs and the Law of the Sea, "First Global Integrated Marine Assessment (first World Ocean Assessment)", available from www.un.org/depts/los/global_reporting/WOA_RegProcess.htm (accessed 20 February 2017) (see, in particular, chap. 20 on "Coastal, riverine and atmospheric inputs from land").

[142] See paras. 185-196.

the Convention was negotiated,[143] the relevant obligations of States can be inferred from it, and these obligations interact with the international climate change regime and the IMO regime in a mutually supportive manner.

51. Article 1, paragraph 1 (4), of the Convention provides that: "'pollution of the marine environment' means the introduction by man, directly or indirectly, of substances or energy into the marine environment, including estuaries, which results or is likely to result in such deleterious effects as harm to living resources and marine life, hazards to human health, hindrance to marine activities, including fishing and other legitimate uses of the sea, impairment of quality for use of sea water and reduction of amenities." Based on this definition, the release of toxic, harmful or noxious substances (including atmospheric pollutants) from land-based sources cause marine pollution and harm the marine environment, and this has been confirmed by articles 194, paragraph 3, and 207 of the Convention. Similarly, atmospheric pollution from vessels also harms the marine environment, and this has been regulated by articles 194, paragraph 3, 211 and 212 of the Convention. While SO_x and NO_x have been generally accepted as air pollutants,[144] there are debates and differences in national legislation on whether greenhouse gas emissions from ships, in particular CO_2 emissions from ships, are a type of pollution.[145] Nonetheless, it is well known that greenhouse gas emissions from ships, as a main factor contributing to climate change, cause marine pollution and harm the marine environment. The definition provided in article 1, paragraph 1 (4), of the Convention is significant in that it provides the criteria for judging whether a type of "substance or energy" is marine pollution and this may trigger the application of many pollution-related treaties under the auspices of the IMO and other international fora to the issue of that particular "substance or energy".[146]

52. Part XII of the Convention covers atmospheric pollution from land-based sources. While article 192 provides a general obligation for States to protect and preserve the marine environment, articles 194, paragraph 3 (*a*), and 207 specify requirements on pollution of land-based sources. Article 194, paragraph 3 (*a*), reads that:

> The measures taken pursuant to this Part shall deal with all sources of pollution of the marine environment. These measures shall include, *inter alia*, those designed to minimize to the fullest possible extent:
>
> (a) the release of toxic, harmful or noxious substances, especially those which are persistent, from land-based sources, from or through the atmosphere or by dumping.

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[143] A. Boyle, "Law of the sea perspectives on climate change", in *The 1982 Law of the Sea Convention at 30: Successes, Challenges and New Agendas,* D. Freestone, ed. (Leiden, Martinus Nijhoff, 2013), pp. 157-164; See, in general, R.S. Abate, ed., *Climate Change Impacts on Ocean and Coastal Law: U.S. and International Perspectives* (Oxford, Oxford University Press, 2015).

[144] For example, at the fifty-eighth session of the Marine Environment Protection Committee in 2008, IMO adopted annex VI, as amended, to the International Convention for the prevention of pollution from ships, which regulates, inter alia, emissions of SO_x and NO_x. The Convention now has six annexes, namely, annex I on regulations for the prevention of pollution by oil (entry into force on 2 October 1983); annex II on regulations for the control of pollution by noxious liquid substances in bulk (entry into force on 6 April 1987); annex III on regulations for the prevention of pollution by harmful substances carried by sea in packaged form (entry into force on 1 July 1992); annex IV on regulations for the prevention of pollution by sewage from ships (entry into force on 27 September 2003); annex V on regulations for the prevention of pollution by garbage from ships (entry into force 31 December 1988); and annex VI on regulations for the prevention of air pollution from ships (entry into force 19 May 2005).

[145] Y. Shi, "Are greenhouse gas emissions from international shipping a type of marine pollution?", *Marine Pollution Bulletin*, vol. 113, Nos. 1-2 (2016), pp. 187-192.

[146] Ibid., p. 187.

Through the above provisions, the Convention requires States to take all necessary measures to prevent, reduce and control land-based atmospheric pollution. The source of this atmospheric pollution also covers greenhouse gas emissions due to their deleterious effects on the marine environment.[147] In this way, the Convention imposes an obligation of due diligence on States,[148] and serves as a framework treaty for States to reduce land-based atmospheric pollution and greenhouse gas emissions. This regulation underpins the subsequent global and regional regulatory initiatives including the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities,[149] the United Nations Framework Convention on Climate Change and its Kyoto Protocol[150] and the Paris Agreement.[151]

53. Article 207, paragraph 4, of the United Nations Convention on the Law of the Sea highlights that global and regional rules, standards and recommended practices and procedures to prevent, reduce and control pollution from land-based sources should be established through competent organizations or diplomatic conference. The plural term "competent international organizations" in this provision indicates that IMO is not the sole organization exclusively dealing with land-based sources of marine pollution.[152] In this way, relevant treaties adopted under the auspices of IMO and other international forums have thus been incorporated into the Convention by reference. Meanwhile, this provision underscores that the establishment of global and regional rules, standards and recommended practices and procedures should take into account characteristic regional features, the economic capacity of developing States and their need for economic development. This provision reflects article 194, paragraph 1, that requires States to take measures "in accordance with their capabilities",[153] and underpins the eventual formation of the "common but differentiated responsibilities and respective capabilities principle" in 1992.

54. The regulation on atmospheric pollution from vessels under the Convention incorporates "mutual supportiveness" for dealing with the interrelationship between the Convention and IMO. This has been achieved by two approaches, namely the so-called rules of reference, and general obligations being supplemented by IMO instruments.

55. Regarding the rules of reference, parties to the Convention are required to comply with rules and standards that are stipulated in other international

[147] Boyle, "Law of the sea perspectives on climate change" (see footnote 143 above), p. 158; See also Intergovernmental Panel on Climate Change, *Climate Change 2013 ...* (footnote 138 above), pp. 4-5; D.E.J. Currie and K. Wowk, "Climate change and CO_2 in the oceans and global oceans governance", *Carbon and Climate Law Review*, vol. 3, No. 4 (2009), pp. 387 and 389.

[148] Boyle, "Law of the sea perspectives on climate change" (see footnote 143 above), p. 159.

[149] The Global Programme of Action is administered by a Coordinating Unit hosted by the United Nations Environment Programme. The Global Programme of Action was designed around the relevant provisions of chaps. 17, 33 and 34 of Agenda 21, the Rio Declaration on Environment and Development, and the Montreal Guidelines for the Protection of the Marine Environment against Pollution from Land-based Sources. The Global Programme of Action recommends actions at the international, regional and national levels to address the issue of marine pollution from land-based activities.

[150] Kyoto Protocol to the United Nations Framework Convention on Climate Change (Kyoto, 11 December 1997).

[151] Paris Agreement under the United Nations Framework Convention on Climate Change (Paris, 12 December 2015), document FCCC/CP/2015/L.9/Rev.1, annex.

[152] M.H. Nordquist and others, eds., *United Nations Convention on the Law of the Sea 1982: A Commentary* (Dordrecht, Martinus Nijhoff, 1991), vol. IV, p. 133, para. 207.7(*d*).

[153] The origin of this expression can be traced back to principle 7 of the Declaration of the United Nations Conference on the Human Environment (Stockholm Declaration), which incorporated the words "all possible steps". See Nordquist and others, *United Nations Convention on the Law of the Sea ...* (footnote above), p. 64, para. 194.10(*b*).

instruments adopted under the auspices of IMO, even when these parties to the Convention are not parties to the IMO instruments.[154] Two rules of reference under the Convention may be relevant for the regulations on atmospheric pollution from vessels. Article 211 ("Pollution from vessels"), paragraph 2, of the Convention reads: "States shall adopt laws and regulations for the prevention, reduction and control of pollution of the marine environment from vessels flying their flag or of their registry. Such laws and regulations shall at least have the same effect as that of generally accepted international rules and standards established through the competent international organization or general diplomatic conference." The "competent international organization" in this provision refers to IMO. Indeed, this provision imposes an obligation on all flag States that their national laws and regulations for the prevention, reduction and control of vessel-sourced atmospheric pollution should be consistent with or stricter than generally accepted international rules and standards established by IMO.[155] In this way, this provision is linked to relevant IMO instruments on vessel-sourced atmospheric pollution in which relevant rules and standards are qualified as "generally accepted" for the purpose of article 211, paragraph 2.[156] An example of such an instrument is annex VI ("Regulations for the prevention of air pollution from ships") to the International Convention for the prevention of pollution from ships. Article 212, paragraph 1, of the United Nations Convention on the Law of the Sea ("Pollution from or through the atmosphere") provides that: "States shall adopt laws and regulations to prevent, reduce and control pollution of the marine environment from or through the atmosphere, applicable to the air space under their sovereignty and to vessels flying their flag or vessels or aircraft of their registry, taking into account internationally agreed rules, standards and recommended practices and procedures and the safety of air navigation." This provision encourages flag States to enforce internationally agreed IMO rules, standards and recommended practices and procedures so as to satisfy their obligations under the Convention. Compared with the expression "generally accepted", "generally agreed" is a weaker term. However, the United Nations Division for Ocean Affairs and the Law of the Sea has treated annex VI of the International Convention for the prevention of pollution from ships as a complementary instrument that needs to be implemented by States to fulfil their obligations under article 212.[157]

56. Some general obligations of States on vessel-sourced atmospheric pollution provided by the United Nations Convention on the Law of the Sea are supplemented by concrete regulations under the auspices of IMO. For instance, article 194, paragraph 3 (*b*), of the Convention mentions atmospheric pollution from vessels in a general manner. It reads as follows:

> The measures taken pursuant to this Part shall deal with all sources of pollution of the marine environment. These measures shall include, *inter alia*, those designed to minimize to the fullest possible extent:

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[154] See, e.g., J. Harrison, "Recent developments and continuing challenges in the regulation of greenhouse gas emissions from international shipping", University of Edinburgh School of Law, Research Paper Series No. 2012/12, available from: https://ssrn.com/abstract=2037038 (accessed 20 February), p. 20.

[155] Nordquist and others, *United Nations Convention on the Law of the Sea ...* (see footnote 152), p. 203, para. 211.15(*f*).

[156] See, e.g., A.E. Boyle, "Marine pollution under the law of the sea convention", *American Journal of International Law*, vol. 79 (1985), p. 357; and R. Van Reenan, "Rules of references in the new Convention on the Law of the Sea, in particular in connection with the pollution of the sea by oil from tankers", *Netherlands Yearbook of International Law*, vol. 12 (1981), p. 3.

[157] Division for Ocean Affairs and the Law of the Sea, *The Law of the Sea: Obligations of States Parties under the United Nations Convention on the Law of the Sea and Complementary Instruments* (United Nations publication, Sales No. E.04.V.5), p. 52.

…

(b) pollution from vessels, in particular measures for preventing accidents and dealing with emergencies, ensuring the safety of operations at sea, preventing intentional and unintentional discharges, and regulating the design, construction, equipment, operation and manning of vessels.

The standard of conduct set out in this provision is very general. It covers various sources of air pollution from vessels, including those resulting from the normal operation of vessels and also from marine casualties following collisions and groundings. The concrete obligations can be found in relevant IMO instruments such as the International Convention for the prevention of pollution from ships, the Convention on the international regulations for preventing collisions at sea, and the International Convention for the Safety of Life at Sea. Similarly, for the purpose of preventing, reducing and controlling vessel-sourced marine pollution, article 211, paragraph 6, allows coastal States to establish special areas in their exclusive economic zone after appropriate consultations through the competent international organization. To facilitate the enforcement of this provision, in 2005 IMO adopted resolution A.982(24) on revised guidelines for the identification and designation of particularly sensitive sea areas, which provide guidelines on designating such areas.

57. A commentary to article 194 is illuminating in describing the (limited) interrelationship between the law of the sea and the law relating to the atmosphere:

> The word "atmosphere" appears for the first time in this Convention in paragraph 3 (a), and the question arises of the extent to which the atmosphere can be considered as part of the marine environment. Several provisions of the Convention refer to the atmosphere in terms of the superjacent airspace or some cognate expression … This is sufficient to indicate that the atmosphere itself can be regarded as a component of the marine environment, at least to the extent that there is a direct link between the atmosphere in superjacent airspace and the natural qualities of the subjacent ocean space. Article 194, paragraph 3 (a), together with articles 212 and 222, thus also constitutes a link with between the law relating to the marine environment and the law relating to the atmosphere as such, whether or not over the oceans. At the same time, the provisions of this Convention, and especially those found in Part XII, do not themselves prejudge the question whether any part of the atmosphere is itself part of the marine environment.[158]

The scope of application of article 212 is the territorial airspace "under the sovereignty" of a given State, and it does not relate to airspace above an exclusive economic zone, not to mention common airspace above the high seas. Article 212 does not address directly the problem of pollution of the atmosphere itself, or any form of pollution other than that defined in article 1, paragraph 4, namely pollution of the marine environment.[159] Article 222 ("Enforcement with respect to pollution from or through the atmosphere") is the enforcement counterpart of article 212, the standard-setting article for the prevention, reduction and control of pollution of the marine environment from or through the atmosphere. Article 222 may to some extent overlap article 223 on enforcement with regard to the pollution of the marine environment from land-based sources, since in fact most of the pollution in the atmosphere derives from sources on land.[160]

[158] Nordquist and others, *United Nations Convention on the Law of the Sea …* (see footnote 152), p. 67, para. 194.10(*k*).
[159] Ibid., pp. 212-213, para. 212.9(*d*).
[160] Ibid., pp. 315-319.

58. Other relevant instruments include the Convention for the protection of the marine environment of the North-East Atlantic (art. 1 (*e*)), the Convention on the protection of the marine environment of the Baltic Sea Area (art. 2, para. 2), the Protocol for the protection of the Mediterranean Sea against pollution from land-based sources (art. 4, para. 1 (*b*)),[161] the Protocol for the protection of South-East Pacific against pollution from land-based sources (art. II (*c*)) and the Protocol to the Kuwait Regional Convention for the Protection of the Marine Environment Against Pollution from Land-Based Sources (art. III), dealing with pollution through the atmosphere as a land-based source. The revised Protocol on the Protection of the Marine Environment of the Black Sea from Land-based Sources and Activities[162] regulates pollution transported through the atmosphere in its annex III. In 1991, the parties to the Protocol for the protection of the Mediterranean Sea against pollution from land-based sources adopted a new annex (IV) to the Protocol on land-based sources of pollution transported through the atmosphere.[163] Prior to the United Nations Convention on the Law of the Sea, the only international instrument of significance was the Treaty banning nuclear weapon tests in the atmosphere, in outer space and under water.

59. Through the rules of reference under the United Nations Convention on the Law of the Sea, annex VI of the International Convention for the prevention of pollution from ships can be treated as the "internationally agreed rules [and] standards" for the purpose of reducing vessel-sourced air pollution such as SO_x and NO_x.[164] Regarding greenhouse gas emissions from ships, the interaction between IMO and the United Nations Convention on the Law of the Sea becomes more complicated due to their interrelationship with the international climate change regime. It seems that the interrelationship among IMO, the United Nations Convention on the Law of the Sea and the United Nations Framework Convention on Climate Change is somehow conflicted due to the controversial application of the principle of common but differentiated responsibilities and respective capabilities to the IMO regulation of greenhouse gas emissions from international shipping. However, in essence this relationship is still "mutually supportive", as the so-called conflict can be addressed through interpretation in good faith.

60. The entire negotiation process regarding greenhouse gas emissions reduction within IMO has been shaped and bedevilled by tension between developed and developing States. The conflict centres on the question of whether the principle of common but differentiated responsibilities and respective capabilities or the principle of no more favourable treatment should be applied to the regulation of greenhouse gas emissions from international shipping.[165] While the former principle

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[161] The original Protocol was modified by amendments adopted on 7 March 1996 by the Conference of Plenipotentiaries on the Protocol for the Protection of the Mediterranean Sea against Pollution from Land-based Sources, held in Syracuse on 6 and 7 March 1996 (UNEP(OCA)/MED IG.7/4). The amended Protocol, recorded as "Protocol for the Protection of the Mediterranean Sea against Pollution from Land-Based Sources and Activities", entered into force on 11 May 2008.

[162] The Protocol is not yet in force.

[163] D. Bodansky and others, "Oceans", in *Yearbook of International Environmental Law*, vol. 1, G. Handl, ed. (London, Graham and Trotman, 1991), pp. 111-137.

[164] United Nations Convention on the Law of the Sea, art. 212, para. 1. Based on the current literature on the criteria of "generally accepted", it is less likely, however, that annex VI can be regarded as constituting generally accepted international rules and standards as stipulated in art. 211, para. 2, of the Convention. See, e.g., Harrison, "Recent developments and continuing challenges …" (footnote 154 above), pp. 21-22.

[165] The principle of common but differentiated responsibilities and respective capabilities requires developed and developing States to address environmental issues but underscores that the former should take primary responsibility. The premise for this arrangement is the different levels of responsibility developing and developed States have for the causation of environmental problems. The no more favourable treatment principle refers to "port States enforcing applicable

runs through the United Nations Framework Convention on Climate Change, its Kyoto Protocol and the Paris Agreement, the latter principle is incorporated into all IMO regulations, including the International Convention for the prevention of pollution from ships. Thus, there are strongly held different views regarding which principle should be applied to the regulatory regime to reduce greenhouse gas emissions from international shipping. Nonetheless, it is possible that this tension can be addressed provided that an interpretation based on the Vienna Convention is made in a mutually supportive manner. Generally speaking, the mandate of IMO as regards greenhouse gas emissions comes from both the United Nations Convention on the Law of the Sea and the International Convention for the prevention of pollution from ships as well as the Kyoto Protocol to the United Nations Framework Convention on Climate Change,[166] which indicates that both principles mentioned above can be applied to the issue under discussion and their incorporation into the regulation can be achieved through a broader and flexible interpretation of the principle of common but differentiated responsibilities and respective capabilities.[167] To some extent, this approach has been reflected in the adoption of the 2011 amendments to annex VI of the International Convention for the prevention of pollution from ships and the ongoing discussion on market-based measures within IMO.[168]

61. As a package deal, the United Nations Convention on the Law of the Sea does not provide definitions on various types of marine pollution, and the absence of certain types of marine pollution has been supplemented by other regional treaties. For instance, the United Nations Convention on the Law of the Sea regulates pollution from land-based sources, and a definition of "land-based sources" was later provided by the Convention for the protection of the marine environment of the North-East Atlantic. Article 1 (*e*) of that Convention provides that:

> "Land-based sources" means point and diffuse sources on land from which substances or energy reach the maritime area by water, through the air, or

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standards in a uniform manner to all ships in their ports, regardless of flag"; see Y. Shi, "The challenge of reducing greenhouse gas emissions from international shipping: assessing the International Maritime Organization's regulatory response", *Yearbook of International Environmental Law*, vol. 23, No. 1 (2012), pp. 136-137.

[166] Art. 2, para. 2, of the Kyoto Protocol authorizes IMO to regulate greenhouse gas emissions from international shipping. Meanwhile, IMO receives its competence on greenhouse gas emissions from arts. 1 (*a*) and 64 of the Convention on the International Maritime Organization and arts. 211, para. 1, and 212, para. 3, of the United Nations Convention on the Law of the Sea. Y. Shi, "Greenhouse gas emissions from international shipping: the response from China's shipping industry to the regulatory initiatives of the International Maritime Organization", *International Journal of Marine and Coastal Law*, vol. 29 (2014), pp. 77-115, at pp. 82-84.

[167] Ibid., pp. 86-89.

[168] The amendments adopted in 2011 to annex VI of the International Convention for the prevention of pollution from ships (see IMO resolution MEPC.203(62) of 15 July 2011, document MEPC 62/24/Add.1, annex 19) introduced a mandatory energy efficiency design index for new ships and a ship energy efficiency management plan for all ships. Furthermore, market-based measures, as a third type of measure in addition to the technical and operational measures, had also been discussed and negotiated from 2000 to 2013 within IMO. See IMO, "Main events in IMO's work on limitation and reduction of greenhouse gas emissions from international shipping" (2011), para. 18, available from www.imo.org; Y. Shi, "Reducing greenhouse gas emissions from international shipping: is it time to consider market-based measures?", *Marine Policy*, vol. 64 (2016), pp. 123-134, at p. 125; and H. Zhang, "Towards global green shipping: the development of international regulations on reduction of GHG emissions from ships", *International Environmental Agreements: Politics, Law and Economics*, vol. 16, No. 4 (2016), pp. 561-577. At its seventieth session from 24 to 28 October 2016, the IMO Marine Environment Protection Committee agreed to cut SO_x emissions from ships, starting in 2020 (with an implementation scheme to be discussed in 2017), but postponed a decision on greenhouse gas emissions until after a further review in 2017.

directly from the coast. It includes sources associated with any deliberate disposal under the sea-bed made accessible from land by tunnel, pipeline or other means and sources associated with man-made structures placed, in the maritime area under the jurisdiction of a Contracting Party, other than for the purpose of offshore activities.

62. Thus, the relevant provisions of the United Nations Convention on the Law of the Sea and other related instruments address the atmosphere as long as it is within territorial airspace, and as long as it affects the marine environment. They do not address the atmosphere itself, nor situations where the oceans may affect the atmosphere. The interrelationship between the sea and the atmosphere covered by the United Nations Convention on the Law of the Sea is limited and unilateral (one way from the atmosphere to the oceans, but not the other way around), requiring further efforts by the international community to overcome such negative conflicts within the relevant international law. As recalled, the preamble of the Paris Agreement notes the importance of ensuring the integrity of all ecosystems, including oceans. It is therefore considered important that the law of the sea and the law relating to the atmosphere are interpreted and applied in a mutually supportive manner.

2 Judicial decisions

63. As was referred to in the second report by the Special Rapporteur,[169] Australia had asked the International Court of Justice, in its application in the *Nuclear Tests* case, "to adjudge and declare that the carrying out of atmospheric nuclear weapon tests in the South Pacific area is not consistent with obligations imposed on France by applicable rules of international law".[170] While the Court had previously indicated provisional measures on 22 June 1973, it rendered a final judgment on 20 December 1974, holding that the objective pursued by the applicants, namely the cessation of the nuclear tests, had been achieved by French declarations not to continue atmospheric tests, and therefore that the Court was not called upon to give a decision on the claims put forward by the applicants.[171] It may be noted that Australia filed this case on the grounds of protecting, not only its own legal interests, but also the interests of other States, since it considered French nuclear tests a violation of the freedom of the high seas. Its memorial stated, inter alia, that:

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[169] A/CN.4/681, para. 44.

[170] *Memorial on Jurisdiction and Admissibility submitted by the Government of Australia, I.C.J. Pleadings 1973*, para. 430.

[171] *Nuclear Tests (Australia v. France), Interim Protection, Order of 22 June 1973, I.C.J. Reports 1973,* p. 99; *Nuclear Tests (Australia v. France)*, *Judgment, I.C.J. Reports 1974*, p. 253; *Nuclear Tests (New Zealand v. France)*, *Interim Protection*, *Order of 22 June 1973*, *I.C.J. Reports 1973*, p. 135; *Nuclear Tests (New Zealand v. France)*, *Judgment, I.C.J. Reports 1974*, p. 457. See, H. Thierry, "Les arrêts du 20 décembre 1974 et les relations de la France avec la Cour internationale de justice", *Annuaire français de droit international*, vol. 20 (1974), pp. 286-298; T.M. Franck, "Word made law: the decision of the ICJ in the Nuclear Test cases", *American Journal of International Law*, vol. 69 (1975), pp. 612-620; P. Lellouche, "The International Court of Justice: the nuclear tests cases: judicial silence v. atomic blasts", *Harvard International Law Journal*, vol. 16 (1975), pp. 614-637; E. McWhinney, "International law-making and the judicial process, the world court and the French Nuclear Tests case", *Syracuse Journal of International law and Commerce*, vol. 3 (1975), pp. 9-46; S. Sur, "Les affaires des essais nucléaires (Australie c. France; Nouvelle-Zélande c. France: C.I.J. — arrêts du 20 décembre 1974)", *Revue générale de droit international public*, vol. 79 (1975), pp. 972-1027; R.S.J. MacDonald and B. Hough, "The Nuclear Tests case revisited", *German Yearbook of International Law*, vol. 20 (1977), pp. 337-357. The Court stated that "the unilateral statements of the French authorities were made outside the Court, publicly and *erga omnes*", implying that France became bound towards all States (*Nuclear Tests (Australia v. France)*, *Judgment, I.C.J. Reports 1974*, p. 253, at p. 269, para. 50).

"The sea is not static; its life systems are complex and closely interrelated. It is evident, therefore, that no one can say that pollution — especially pollution involving radioactivity — in one place cannot eventually have consequences in another. It would, indeed, be quite out of keeping with the function of the Court to protect by judicial means the interests of the international community, if it were to disregard considerations of this character."[172]

64. The 2001 decision by the International Tribunal for the Law of the Sea in the *MOX Plant case*[173] exemplifies the interrelationship between the United Nations Convention on the Law of the Sea and the relevant international law regime regarding the prevention, reduction and control of land-based atmospheric pollution. Mutual supportiveness between the Convention and the atmospheric pollution regime was one of the factors being considered by the Tribunal. In this case, Ireland requested that an arbitral tribunal be constituted under annex VII to adjudge and declare that the United Kingdom, through its MOX plant, had breached its obligations under articles 192, 193 and/or article 194 and/or article 207 and/or articles 211 and 213 of the Convention. Ireland asserted that the United Kingdom failed to take the necessary measures to prevent, reduce and control marine pollution in the Irish Sea by means of the intended discharge and/or accidental release of radioactive materials or wastes from the MOX plant.[174] The reasoning behind the submission of Ireland was that compliance with agreed standards of pollution control under relevant international law was not enough to satisfy the more general duty of due diligence, which was established under the Convention.[175] Based on this consideration, Ireland requested the Tribunal to impose certain provisional measures, such as the United Kingdom immediately suspending its authorization to the MOX plant. The Tribunal decided not to impose provisional measures as requested by Ireland but requested that the two parties cooperate forthwith. This case can also be seen as a balancing exercise by the Tribunal between continued economic development and environmental protection.[176]

65. The *Pulp Mills* case[177] before the International Court of Justice was another example addressing the interrelationship between the duty of due diligence provided under the Convention and the duty to protect the environment stipulated in other agreements. Mutual supportiveness between the Convention and other instruments was again one of the factors being considered by the Court. In this case, Argentina alleged that Uruguay had breached its obligations under the Statute of the River Uruguay[178] by authorizing one pulp mill and constructing another on the River Uruguay. Argentina asserted that Uruguay had breached international law, including the obligation to prevent pollution, a duty of diligence established under the Convention. To that end, Argentina submitted a request for provisional measures. However, that request was rejected by the Court. The Court held that Uruguay had only breached a procedural obligation rather than substantive obligations under the

[172] *Memorial on Jurisdiction and Admissibility submitted by the Government of Australia, I.C.J. Pleadings 1973*, para. 459.

[173] *The MOX Plant case (Ireland v. United Kingdom)*, provisional measures, order of 3 December, International Tribunal for the Law of the Sea, Case No. 10.

[174] *Request for provisional measures and statement of case submitted on behalf of Ireland*, 9 November 2001, available from www.itlos.org/fileadmin/itlos/documents/cases/case_no_10/request_ireland_e.pdf (accessed 20 February 2017). In its request for provisional measures, Ireland stated that "the consequences for human health and environment of an accidental atmospheric release of the high-level radioactive waste tanks at Sellafield would be far greater than the Chernobyl accident in April 1986" (para. 11).

[175] Boyle, "Law of the sea perspectives on climate change" (see footnote 143 above), p. 162.

[176] Ibid.

[177] *Pulp Mills on the River Uruguay (Argentina v. Uruguay), Judgment, I.C.J. Reports 2010*, p. 14.

[178] Statute of the River Uruguay, United Nations, *Treaty Series*, vol. 1295, p. 340.

Statute, for the protection of the environment.[179] In this way, the interrelationship of mutual supportiveness between the duty of due diligence under the Convention and substantial obligations provided in other agreements has been identified by the Court.

C. Sea-level rise and its impact

66. As described in paragraph 48 above, sea-level rise as a result of global warming was predicted by the Intergovernmental Panel on Climate Change as the most likely scenario. One of the well-known consequences of sea-level rise is the significant global regression of coastlines, leading to changes of baselines to measure territorial waters and other maritime zones including archipelagic lines, as the baselines are intended to be "ambulatory".[180] As sea levels rise, the low water line along the coast, which marks the "normal baseline" for the purposes of article 5 of the Convention, will usually move inland and some key geographical features used as base points may be inundated and lost. Some authors, however, hold the view that "a substantial rise in sea level, whatever the cause, should not entail the loss of States' ocean space and their rights over maritime resources, already recognized by the 1982 Convention".[181] The International Law Association Committee on Baselines under the International Law of the Sea has suggested that there may be two options: first, a new rule freezing the existing baselines in their current positions, using the "large-scale charts officially recognised by the coastal State"; or, second, a new rule freezing the existing defined outer limits of maritime zones measured from the baselines established in accordance with the Convention.[182] These options do appear to be contrary to the established rule of international law, since the fundamental change of circumstances cannot be applied to boundaries.[183] Nonetheless, there is a strong need for the international community to consider the problem *de lege ferenda* to overcome the difficulty facing the States concerned with baseline issues.[184]

67. Another set of problems caused by sea-level rise, which is of direct relevance to the protection of the atmosphere, relates to the issues of forced migration and human rights. Sea-level rise is threatening partial or complete inundation of State territory, or depopulation thereof, in particular of small island and low-lying States,

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[179] The Court held that there was "no conclusive evidence in the record to show that Uruguay has not acted with the requisite degree of due diligence or that the discharges of effluent from the Orion (Botnia) mill have had deleterious effects or caused harm to living resources or to the quality of the water or the ecological balance of the river since it started its operations in November 2007" (*Pulp Mills on the River Uruguay (Argentina v. Uruguay), Judgment, I.C.J. Reports 2010*, p. 14, at p. 101, para. 265).

[180] A.H.A. Soons, "The effects of a rising sea level on maritime limits and boundaries", *Netherlands International Law Review*, vol. 37, No. 2 (1990) pp. 207-232; M. Hayashi, "Sea level rise and the law of the sea: future options", in *The World Ocean in Globalisation: Climate Change, Sustainable Fisheries, Biodiversity, Shipping, Regional Issues*, D. Vidas and P.J. Schei, eds. (Leiden, Martinus Nijhoff, 2011), p. 188 et seq. The VCLT provides in article 62 (2) that: "A fundamental change of circumstances may not be invoked as a ground for terminating or withdrawing from a treaty: (a) if the treaty establishes a boundary."

[181] J.L. Jesus, "Rocks, new-born islands, sea level rise and maritime space", in *Negotiating For Peace* — Liber Amicorum *Tono Eitel*, J. Frowein and others, eds. (Berlin/Heidelberg, Springer, 2003), pp. 599 and 602.

[182] See International Law Association, *Report of the Seventy-Fifth Conference held in Sofia, August 2012* (London, 2012), pp. 385-428.

[183] The International Court of Justice also confirmed this exclusion of a boundary from the application of fundamental change of circumstances in *Aegean Sea Continental, Judgment, I.C.J. Reports 1978*, p. 3, at pp. 35-36, para. 85.

[184] International Law Association, *Johannesburg Conference (2016): International Law and Sea Level Rise* (interim report), pp. 13-18.

and the relevant implications under international law are enormous, requiring serious, in-depth study of the issues. The combined and cumulative impacts of relative sea-level rise and other effects of climate change present a range of direct and indirect negative consequences for human lives and living conditions in coastal and low-lying areas.[185] These questions of human rights and migration should, however, be better considered in the context of human rights law rather than the law of the sea, and will therefore be discussed in section IV.

68. In view of the above, the following draft guideline is proposed:

Draft guideline 11: Interrelationship of law on the protection of the atmosphere with the law of the sea

1. States should take appropriate measures in the field of the law of the sea, taking into account the relevant provisions of the United Nations Convention on the Law of the Sea and related international instruments, to protect the atmosphere from atmospheric pollution and atmospheric degradation and to deal with questions of maritime pollution from or through the atmosphere. In order to avoid any conflict, States should ensure that development, interpretation and application of relevant rules of international law conform to the principle of mutual supportiveness.

2. States and competent international organizations should consider the situations of small island States and low-lying States with regard to the baselines for the delimitation of their maritime zones under the law of the sea.

IV. Interrelationship with international human rights law

69. International law related to the protection of the atmosphere can only coordinate appropriately with international human rights law to the extent that elements of the law of protection of the atmosphere are considered "anthropocentric" (human-centric) rather than eco-centric in character,[186] that is, that environmental protection is primarily considered as a means of protecting humans rather than an end in itself.[187] Thus, for instance, the European Court of Human Rights, in a case concerning the protection of marshland, stated that: "Neither article 8 nor any of the other Articles of the Convention are specifically designed to provide general protection of the environment as such; other international instruments … are more pertinent in dealing with this particular aspect."[188]

In order for human rights instruments to contribute to the protection of the environment in general and to the protection of the atmosphere in particular, the

[185] Ibid., pp. 18-28. See also Intergovernmental Panel on Climate Change, "Climate change 2014 synthesis report …" (footnote 137 above).

[186] See C.D. Stone, "Ethics and international environmental law", in *The Oxford Handbook of International Environmental Law*, D. Bodansky, J. Brunée and E. Hey, eds. (Oxford, Oxford University Press, 2007), pp. 291-301. The Special Rapporteur is particularly grateful to Masayuki Hiromi, Sophia University, for supplying relevant material and drafting parts of the present report on human rights law.

[187] Boyle, "Relationship between international environmental law …" (see footnote 36 above), p. 141.

[188] *Kyrtatos v. Greece*, no. 41666/98, ECHR 2003-VI, para. 52. The Court went on to say that "even assuming that the environment has been severely damaged by the urban development of the area, the applicants have not brought forward any convincing arguments showing that the alleged damage to the birds and other protected species living in the swamp was of such a nature as to directly affect their own rights under Article 8 § 1 of the Convention" (ibid., para. 53).

direct link between atmospheric pollution or degradation and an impairment of a protected human right must be established.[189] In this sense, international human rights law can be pertinent only in the context of atmospheric pollution and atmospheric degradation affecting the human and natural environments, since they are protected ultimately for humans. Thus, international human rights law does not necessarily overlap with international environmental law, but may do so to some extent.[190]

A. Treaties and other instruments

70. With regard to human rights references in environmental texts, the Declaration of the United Nations Conference on the Human Environment (Stockholm Declaration)[191] recognized for the first time the interrelationship between international environmental law and international human rights law: its principle 1 focused on the rights granted to individuals rather than the obligations imposed on States, providing that: "Man has the fundamental right to freedom, equality and adequate conditions of life in an environment of a quality that permits a life of dignity and well-being."[192] The Rio Declaration on Environment and Development[193] of 1992 also outlined in its principle 1 that "[h]uman beings are at the centre of concerns for sustainable development", and that "[t]hey are entitled to a healthy and productive life in harmony with nature". Although the second clause did not refer specifically to the term "human right",[194] principle 1 has helped the development of international human rights law to incorporate concerns for sustainability and environmental protection. While these declarations are not legally binding instruments, they provided the basis for subsequent development of a human right to a healthy environment.[195]

71. It is important to note that international law relating to the protection of the atmosphere does significantly reflect an anthropocentric approach so that human rights law does have a great potential to contribute to this field, since, after all, clean air is indispensable for human survival. In the context of atmospheric pollution, the Convention on Long-range Transboundary Air Pollution recognizes that air pollution has "deleterious effects of such a nature as to endanger human health" (article 1) and obliges the parties "to protect man and his environment against air pollution" (article 2). Likewise, for atmospheric degradation, the Vienna Convention for the Protection of the Ozone Layer contains a provision whereby the parties are required to take appropriate measures "to protect human health" (article 2), and the United Nations Framework Convention on Climate Change deals

[189] P.-M. Dupuy and J.E. Viñuales, *International Environmental Law* (Cambridge, United Kingdom, Cambridge University Press, 2015), pp. 308-309 and 319.

[190] Certain environmental norms, such as conventions concerning the protection of biodiversity, "reflect a greater environmental consciousness and suggest that the protection of the environment is often recognised on its own terms, and not simply a means of protecting humans" (Sands and Peel, *Principles of International Environmental Law* (see footnote 106 above), p. 776). In such an area, there is no room for international human rights norms to be taken into consideration.

[191] See *Report of the United Nations Conference of the Human Environment, Stockholm 5-16 June 1971* (United Nations publication, Sales No. E.73.II.A.14), chap. I.

[192] L.B. Sohn, "The Stockholm Declaration on the Human Environment", *Harvard International Law Journal*, vol. 14 (1973), pp. 423-515, at pp. 451-452.

[193] *Report of the United Nations Conference on Environment and Development* … (see footnote 41 above), resolution 1, annex I.

[194] D. Shelton, "What happened in Rio to human rights?", *Yearbook of International Environmental Law*, vol. 3 (1992), pp. 75-93, at p. 75.

[195] F. Francioni, "Principle 1: human beings and the environment", in *The Rio Declaration on Environment and Development: A Commentary*, J.E. Viñuales, ed. (Oxford, Oxford University Press, 2015), pp. 93-106, at pp. 97-98.

with the adverse effects of climate change including significant deleterious effects "on human health and welfare" (article 1). As noted in a recent analytical study on the relationship between human rights and the environment undertaken by the Office of the High Commissioner for Human Rights,[196] environmental degradation including air pollution, climate change and ozone layer depletion "has the potential to affect the realization of human rights".[197]

72. As regards environmental considerations in human rights instruments, it is after the 1972 United Nations Conference on the Human Environment that human rights treaties have included the specific right to the environment. So far, there are two instruments that expressly provide such a right: the African Charter on Human and Peoples' Rights of 1981, which provides in its article 24 that "[a]ll peoples shall have the right to a general satisfactory environment favourable to their development" and the Additional Protocol to the American Convention on Human Rights in the area of economic, social and cultural rights, which stipulates in its article 11, paragraph 1, that "[e]veryone shall have the right to live in a healthy environment". In contrast, treaties and other instruments concluded before the Stockholm Conference in 1972 did not explicitly refer to any specific right to the environment, among these the Universal Declaration of Human Rights, the Convention for the Protection of Human Rights and Fundamental Freedoms (hereinafter, "European Convention on Human Rights"), the International Covenants on Civil and Political Rights and on Economic, Social and Cultural Rights and the American Convention on Human Rights. However, human rights courts and bodies established under those conventions have subsequently incorporated environmental considerations into the existing provisions on certain general rights through an evolutionary interpretation of respective treaties in order to afford human protection from environmental pollution or degradation.[198] Thus, the European Court of Human Rights, for instance, stated that: "There is no explicit right in the Convention to a clean and quiet environment, but where an individual is directly and seriously affected by noise or other pollution, an issue may arise under Article 8."[199] The Inter-American Commission on Human Rights also expressly recognized the link between the protection of the environment and the enjoyment of human rights guaranteed under the American Convention on Human Rights, stating that:

> although neither the American Declaration of the Rights and Duties of Man nor the American Convention on Human Rights includes any express reference to the protection of the environment, it is clear that several fundamental rights enshrined therein require, as a precondition for their proper exercise, a minimal environmental quality, and suffer a profound detrimental impact from the degradation of the natural resource base. The IACHR [Inter-American Commission on Human Rights] has emphasized in this regard that there is a direct relationship between the physical environment in which persons live and the rights of life, security, and physical integrity. These rights are directly

[196] Human Rights Council resolution 19/10 of 19 April 2012 on human rights and the environment (A/HRC/RES/19/10).

[197] "Analytical study on the relationship between human rights and the environment: report of the United Nations High Commissioner for Human Rights" (A/HRC/19/34), paras. 15-16 (this report was undertaken by an independent expert, John Knox, for the Office of the High Commissioner for Human Rights).

[198] R. Desgagné, "Integrating environmental values into the European Convention on Human Rights", *American Journal of International Law*, vol. 89 (1995), pp. 263-294. See draft conclusion 8 adopted by the Commission on first reading on the topic "Subsequent agreements and subsequent practice in relation to the interpretation of treaties" (*Official Records of the General Assembly, Seventy-first Session, Supplement No. 10* (A/71/10), pp. 180-188).

[199] *Hatton and Others v. the United Kingdom* [GC], no. 36022/97, ECHR, 2003-VIII, para. 96.

affected when there are episodes or situations of deforestation, contamination of the water, pollution, or other types of environmental harm.[200]

B. Jurisprudence of international courts and treaty bodies

73. There may be a difficulty, however, in analysing the protection of the atmosphere through application of human rights norms within the framework of general international law, because the specific circumstances and priorities in respective societies lead regional courts and human rights treaty bodies to interpret such norms differently.[201] Indeed, their focus and interpretation of the rights relating to environmental protection are slightly different. Generally speaking, the environmental jurisprudence of the European Court of Human Rights has been mainly concerned with individual rights relating to human health and private and family life, while it appears that the Inter-American Court of Human Rights and the African Commission on Human and Peoples' Rights have focused more on the collective rights of indigenous or tribal peoples,[202] though admittedly, based on the commonality of environmental jurisprudence, the relevant treaty provisions may in the long run come to be interpreted and applied in a harmonious manner.[203]

Human Rights Committee

74. At the global level, it was after 1990 that certain complaints relevant to environmental concerns were communicated to the Human Rights Committee, though such complaints had limited success on the merits.[204] In the context of the protection of the atmosphere, the *Bordes and Temeharo v. France*[205] case is of particular relevance, although the Committee found the case inadmissible. The case concerned underground nuclear tests in the South Pacific carried out by France in 1995 and 1996, which led New Zealand to bring the *Nuclear Tests II* case to the International Court of Justice.[206] In the *Bordes and Temeharo* case, French citizens residing in the islands of the South Pacific contended that the French tests violated their rights to life (article 6) and to privacy and family life (article 17) guaranteed under the International Covenant on Civil and Political Rights. According to them, the nuclear tests fractured the geological structure of the atolls, and radioactive particles that leaked from fissures contaminated the atmosphere and exposed the population surrounding the testing area to an increased risk of radiation. The Committee stated that "for a person to claim to be a victim of a violation of a right protected by the Covenant, he or she must show either that an act or omission of a

[200] *Kuna Indigenous People of Madungandí and Emberá Indigenous People of Bayano and Their Members v. Panama*, merits of 13 November 2012, Report No. 125/12, Case 12.354, para. 233.

[201] R. Higgins, "Human rights: some questions of integrity", *Modern Law Review*, vol. 52 (1989), pp. 1-21; and B. Simma, "International human rights and general international law: a comparative analysis", *Collected Courses of the Academy of European Law*, vol. IV-2 (The Hague, Martinus Nijhoff, 1995), pp. 153-236.

[202] Dupuy and Viñuales, *International Environmental Law* (see footnote 189 above), pp. 307-311.

[203] That does not mean the jurisprudence of the European Court of Human Rights on the matter has to be followed by other courts and bodies of human rights. See Higgins, "Human rights: some questions of integrity" (footnote 201 above), p. 7. Cf. L. Lixinski, "Treaty interpretation by the Inter-American Court of Human Rights: expansionism at the service of the unity of international law", *European Journal of International Law*, vol. 21, No. 3 (2010), pp. 585-604, at pp. 594-596.

[204] Dupuy and Viñuales, *International Environmental Law* (see footnote 189 above), p. 306.

[205] *Bordes and Temeharo v. France*, Communication No. 645/1995, Decision adopted on 22 July 1996*, Official Records of the General Assembly, Fifty-first Session, Supplement No. 40* (A/51/40), vol. II, annex IX, sect. G.

[206] *Request for an Examination of the Situation in Accordance with Paragraph 63 of the Court's Judgment of 20 December 1974 in the* Nuclear Tests (New Zealand v. France) *Case*, *I.C.J. Reports 1995*, p. 288.

State party has already adversely affected his or her enjoyment of such right, or that there is a real threat of such result",[207] finding that the applicants did not qualify as "victims" of violation due to the remoteness of the harm, and that the case was inadmissible. It should be noted, however, that the Committee did not deny the possibility that atmospheric pollution by a State infringes the right to life and the right to family life guaranteed under the Covenant, if the direct link between such pollution and the impairment of their rights is established.

European Court of Human Rights

75. It was in the 1994 *López Ostra v. Spain* case that the European Court of Human Rights for the first time clearly recognized environmental issues within the European Convention on Human Rights, even in the absence of an explicit environmental right.[208] In this case, the applicant, a Spanish national and resident of the city of Lorca, in Spain, claimed that fumes from a waste treatment plant, which was built by a private company in the vicinity of the applicant's residence, polluted the atmosphere in that city and caused health problems and nuisance to the applicant and her family, which resulted in a violation of article 8 ("Right to private and family life") of the Convention. The Court endorsed the preceding Commission's findings that "there could be a causal link between … emissions and the applicant's daughter's ailments".[209] The Court went on to say that "[a]dmittedly, the Spanish authorities, and in particular the Lorca municipality, were theoretically not directly responsible for the emissions in question",[210] because the plant concerned was owned, controlled and operated by a private company. According to the Court, however, the Spanish authorities incurred "a positive duty … to take reasonable and appropriate measures to secure the applicant's rights" guaranteed under the Convention,[211] because the town allowed the plant to be built on its land and subsidized the plant's construction.[212] The Court finally concluded that Spain was responsible for violating article 8 due to its failure to take steps to that end.

76. The subject matter of the 1995 case *Noel Narvii Tauira and 18 others v. France*[213] before the then European Commission on Human Rights was the same as that of the *Bordes and Temeharo v. France* case before the Human Rights Committee above (see paragraph 74 above). In that case, the applicants claimed that the decision of France to resume nuclear tests in the South Pacific would result in a violation of, among other rights, articles 2 ("Right to life") and 8 ("Right to respect for private and family life") of the European Convention on Human Rights and article 1 ("Protection of property") of its Protocol No. 1. As the Committee concluded, the Commission stated that: "[i]n order for an applicant to claim to be a victim of a violation of the Convention, there must be a sufficiently direct link between the applicant and the loss which he considers he has suffered as a result of the alleged violation",[214] and that "[m]erely invoking risks inherent in the use of nuclear power … is insufficient to enable the applicants to claim to be victims of a violation of the Convention, as many human activities generate risks".[215] Eventually, the Commission reached the same conclusion as the Committee, namely that the

[207] *Bordes and Temehero v. France*, Communication No. 645/1995, para. 5.4.
[208] M. Fitzmaurice, *Contemporary Issues in International Environmental Law* (Cheltenham, Edward Elgar, 2009), p. 186. *López Ostra v. Spain*, 9 December 1994, Series A no. 303-C.
[209] Ibid., para. 49.
[210] Ibid., para. 52.
[211] Ibid., para. 51.
[212] Ibid., para. 52.
[213] *Noel Narvii Tauira and 18 others v. France*, no. 28204/95, Commission decision of 4 December 1995, Decisions and Reports No. 83-B, p. 112.
[214] Ibid., p. 130.
[215] Ibid., p. 131.

application was inadmissible due to the applicants' failure to substantiate their allegations. But, unlike the Committee, the Commission clearly recognized the admissibility of the application against the risk of a future violation, stating that "[i]t is only in highly exceptional circumstances that an applicant may nevertheless claim to be a victim of a violation of the Convention owing to the risk of a future violation", since the applicants alleged the potential risk to their lives, health and family lives of a leakage of radioactivity from ruptured atolls.[216] The Commission went on to say that: "In order for an applicant to claim to be a victim in such a situation, he must ... produce reasonable and *convincing evidence* of the likelihood that a violation affecting him personally will occur; mere suspicion or conjecture is insufficient in this respect."[217]

77. The jurisprudence of the European Court of Human Rights relevant to the protection of atmosphere developed further in the case of *Fadeyeva v. Russia*[218] in 2005. This case concerned intra-boundary air pollution from the Severstal steel plant in the town of Cherepovets in the Russian Federation, privatized in 1993, which was argued by the applicants who lived in a flat near the plant to have infringed their right to health and well-being, as guaranteed under article 8 of the European Convention on Human Rights. The Court pointed out that, for the applicant to raise an issue under article 8 ("Right to respect for private and family life"), he or she has to establish (a) the causal link between environmental pollution or degradation and an impairment of a protected human right and (b) a certain minimum level of the adverse effect sufficient to bring it within the scope of article 8 of the Convention.[219] After the Court found that those two requirements were fulfilled, it noted that in the instant case the Severstal steel plant was not owned, controlled or operated by the Russian Federation at the material time.[220] The Court pointed out, however, that "the State's responsibility in environmental cases may arise from a failure to regulate private industry" and considered whether the State incurred a positive duty to take reasonable and appropriate measures to secure the applicant's right under article 8, paragraph 1, of the Convention.[221] The Court finally concluded that there exists "a sufficient nexus between the pollutant emissions and the State", because the authorities were in a position to evaluate the pollution hazards and to take adequate measures to prevent or reduce them,[222] thus affirming that there had been a violation of article 8 of the Convention by the Russian Federation.

African Commission on Human and Peoples' Rights

78. The 2001 *Ogoni* case[223] concerned environmental degradation and health problems among the Ogoni people in Nigeria resulting from the contamination of

[216] Ibid., p. 130.
[217] Ibid., p. 131 (emphasis added).
[218] *Fadeyeva v. Russia*, no. 55723/00, ECHR 2005-IV.
[219] Ibid., paras. 68-69.
[220] Ibid., para. 89. Although the plant had released toxic substances into the air of the town before its privatization in 1993, the Court took into consideration only the period after 5 May 1998 when the European Convention on Human Rights came into force with respect to the Russian Federation.
[221] Ibid., para. 89.
[222] Ibid., para. 92.
[223] *Social and Economic Rights Action Center (SERAC) and Center for Economic and Social Rights (CESR)/Nigeria*, decision of 27 October 2001, African Commission on Human and Peoples' Rights, Communication No. 155/96. The case was also concerned with the direct conduct of the Nigerian military and security forces against the Ogoni people, such as attacks, and burning and destruction of several Ogoni villages and homes. The present report, however, focuses only on environmental questions. See, F. Coomans, "The *Ogoni* case before the African Commission on Human and Peoples' Rights", *International and Comparative Law Quarterly*, vol. 52 (2003), pp. 749-760.

water, soil and air from resource exploitation by an oil consortium in which the Government of Nigeria was involved. The complainants invoked, among other rights, articles 4 ("Right to life"), 16 ("Right to health"), and 24 ("Right to a general satisfactory environment") of the African Charter on Human and Peoples' Rights as substantial rights infringed by the acts and omissions of Nigeria. In that case, the African Commission on Human and Peoples' Rights first of all mentioned the necessary condition for the complaint to be admissible, that is, the link between environmental pollution or degradation and the infringement of human rights, stating that: "These rights recognise the importance of a clean and safe environment … in so far as the environment affects the quality of life and safety of the individual."[224] Then, the Commission suggested that violation of the human rights that the applicant had invoked entailed both negative and positive obligations.[225] In concluding its opinion, the Commission referred to certain precedents of the European Court of Human Rights and the Inter-American Court of Human Rights,[226] and emphasized that: "As a human rights instrument, the African Charter is not alien to these concepts".[227] According to the Commission, the right to health (article 16) imposes on States a negative obligation "to desist from directly threatening the health and environment of their citizens"[228] and the right to a general satisfactory environment (article 24) imposes on States a positive obligation "to take reasonable and other measures to prevent pollution and ecological degradation, to promote conservation, and to secure an ecologically sustainable development and use of natural resources",[229] including environmental impact assessments, appropriate monitoring and provision of information. Finally, the African Commission, after examining the conduct of the Government of Nigeria, found a violation of articles 16 and 24 of the Charter. As for the right to life, the Commission found a violation of article 4, since "[t]he pollution and environmental degradation to a level humanly unacceptable has made living in the Ogoni land a nightmare".[230]

Inter-American Commission on Human Rights

79. The *Community of La Oroya v. Peru* petition concerned air, soil and water pollution from the metallurgical complex operated by the United States firm Doe Run in the community of La Oroya, Peru.[231] The petitioners alleged that Peru had been liable by act and omission, especially in its failure to control the complex, its lack of supervision, and its failure to adopt measures to mitigate ill effects. In its preliminary remarks, the Inter-American Commission found that: "the alleged deaths and/or health problems of alleged victims resulting from actions and omissions by the State in the face of environmental pollution generated by the metallurgical complex operating at La Oroya, if proven, could represent violations of the rights enshrined in Articles 4 ["Right to life"] and 5 ["Right to humane treatment"] of the American Convention [on Human Rights]".[232]

Since the environmental contamination was caused by a complex operated by a private enterprise, the Commission asserted the positive obligation of a State to take measures to avert risks to life and health by third parties.

[224] African Commission on Human and Peoples' Rights, Communication No. 155/96, para. 51.
[225] Ibid., para. 44.
[226] Ibid., para. 57.
[227] Ibid., para. 44.
[228] Ibid., para. 52.
[229] Ibid.
[230] Ibid., para. 67.
[231] *Community of Law Oroya v. Peru*, decision on admissibility of 5 August 2009, Report No. 76/09, Petition 1473-06. The complex was nationalized in 1974 and then purchased by the United States firm in 1997.
[232] Ibid., para. 74.

80. Climate change has specific identifiable effects on polar regions and populations living in the area. Two indigenous groups independently presented petitions to the Inter-American Commission on issues related to such climate change.[233] In 2005, a Chair of the Inuit Circumpolar Conference, on behalf of the Inuit of the Arctic regions of the United States and Canada, filed a petition against the United States with the Commission, alleging that the impact of climate change in the Arctic, caused by the greenhouse gas emissions of the United States, violated the Inuit's fundamental human rights protected by the American Declaration of the Rights and Duties of Man and other international instruments.[234] These included their rights to the benefits of culture, to property, to the preservation of health, life, physical integrity, security, and a means of subsistence, and to residence, movement, and inviolability of the home. In 2006, the Commission, however, dismissed the petition, concluding that the petitioners failed to establish "whether the alleged facts would tend to characterize a violation of rights protected by the American Declaration".[235] In 2013, the Arctic Athabaskan Council, on behalf of all the Athabaskan Peoples of the Arctic regions of Canada and the United States, in turn, filed a petition against Canada with the Commission, claiming that Arctic warming, caused by Canada's inaction and a lack of effective regulations for black carbon emissions, violated the human rights of Arctic Athabaskan peoples, including the right to the benefits of their culture, the right to property and the right to health enshrined in the American Declaration of the Rights and Duties of Man.[236] A review of the admissibility of the Athabaskan petition is still pending.

C. Substantive rights

81. A comparative analysis of environmental jurisprudence and the decisions of human rights courts and bodies suggests that the most commonly used "general" substantive rights in environmental claims are "the right to life" (article 6 of the International Covenant on Civil and Political Rights; article 6 of the Convention on the Rights of the Child; article 10 of the Convention on the Rights of Persons with Disabilities; article 2 of the European Convention on Human Rights; article 4 of the American Convention on Human Rights; and article 4 of the African Charter on Human and Peoples' Rights), "the right to private and family life" (article 17 of the Covenant; article 8 of the European Convention on Human Rights; and article 11, paragraph 2, of the American Convention on Human Rights), and "the right to property" (article 1 of Protocol No. 1 to the European Convention on Human Rights; article 21 of the American Convention on Human Rights; and article 14 of the African Charter on Human and Peoples' Rights).[237] Where a "specific" right to

[233] V. de la Rosa Jaimes, "Climate change and human rights litigation in Europe and the Americas", *Seattle Journal of Environmental Law*, vol. 5, No. 1 (2015), pp. 165-196, at pp. 191-195.

[234] Inuit Circumpolar Conference, *Petition to the Inter-American Commission on Human Rights Seeking Relief from Violations resulting from Global Warming caused by Acts and Omissions of the United States*, 7 December 2005, available from www.inuitcircumpolar.com/uploads/3/0/5/4/30542564/finalpetitionicc.pdf (accessed 20 February 2017).

[235] See letter from Ariel E. Dulitzky, Assistance Executive Secretary, Organization of American States, to Paul Crowley, ref. Sheila Watt-Cloutier, et al., Petition No. P-1413-05, United States, 16 November 2006, available from http://graphics8.nytimes.com/packages/pdf/science/16commissionletter.pdf (accessed 20 February 2017).

[236] Arctic Athabaskan Council, *Petition to the Inter-American Commission on Human Rights Seeking Relief from Violations of the Rights of Arctic Athabaskan Peoples resulting from Rapid Arctic Warming and Melting Caused by Emissions of Black Carbon by Canada*, 23 April 2013, available from http://earthjustice.org/sites/default/files/AAC_PETITION_13-04-23a.pdf (accessed 20 February 2017).

[237] D. Shelton, "Human rights and the environment: substantive rights", in *Research Handbook on International Environmental Law*, M. Fitzmaurice, D.M. Ong and P. Merkouris, eds. (Cheltenham, Edward Elgar, 2010), pp. 267-283, at pp. 267 and 269-278.

environment is not explicitly provided for under human rights instruments, human rights courts and treaty bodies interpret those general rights to cover the content of the right to environment and the right to health.[238] In addition, even where there exist specific rights to environment in human rights conventions such as the African Charter on Human and Peoples' Rights, relevant courts and treaty bodies apply general rights, such as the right to life, as well as the specific right to environment and the right to health, as indicated in the *Ogoni* and the *Inuit* cases above. Those general rights are common to all human rights instruments, whether global or regional, and thus may be universally applicable, if jurisprudence continues in such a direction in this field.

82. In order for international human rights law to contribute to the protection of the atmosphere, however, certain core requirements must be fulfilled.[239] First, international human rights law remains "a personal-injury-based legal system"[240] and, as a result, the direct link between atmospheric pollution or degradation and an impairment of a protected right must be established. Second, the adverse effects of atmospheric pollution or degradation must attain a certain minimum level if they are to fall within the scope of international human rights law. The assessment of that minimum standard is relative and depends on the content of the right to be invoked and all the relevant circumstances of the case, such as the intensity and duration of the nuisance, and its physical or mental effects. Third, and most importantly, it is necessary to establish a causal link between the action or omission of a State, on the one hand, and atmospheric pollution or degradation, on the other hand.

83. The obligations of States engendered from relevant rights are of two dimensions. In principle, States incur the negative obligation — or obligation to respect — to refrain from any interference directly or indirectly with the enjoyment of fundamental rights. However, as the above jurisprudence and decisions of human rights courts and bodies have suggested, this duty of abstention is accompanied by the positive obligation — or obligation to protect — to take all appropriate measures to protect human rights.[241] It requires States to take positive measures to protect one's rights against any interference by third parties, such as individuals or private industries. The latter obligation includes, inter alia, adopting the necessary and effective legislative and other measures to prevent third parties from infringing upon guaranteed rights. As the Human Rights Committee rightly stated, the obligations under international human rights law "do not … have direct horizontal effect as a matter of international law", but there may be circumstances in which State responsibility arises as a result of States' "permitting or failing to take appropriate measures or to exercise due diligence to prevent … the harm caused by such acts by private persons or entities".[242]

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[238] R.R. Churchill, "Environmental rights in existing human rights treaties", in *Human Rights Approaches to Environmental Protection*, A.E. Boyle and M.R. Anderson, eds. (Oxford, Clarendon Press, 1996), pp. 89-108, at pp. 89-98.

[239] Dupuy and Viñuales, *International Environmental Law* (see footnote 189 above), pp. 320-329.

[240] Ibid., pp. 308-309.

[241] A.A. Cançado Trindade, "The contribution of international human rights law to environmental protection, with special reference to global environmental change", in *Environmental Change and International Law: New Challenges and Dimensions*, E. Brown Weiss, ed. (Tokyo, United Nations University Press, 1992), pp. 244-314, at pp. 272 and 280.

[242] Report of the Human Rights Committee, *Official Records of the General Assembly, Fifty-ninth Session, Supplement No. 40* (A/59/40), vol. I, annex III, general comment No. 31 (2004) on the nature of the general legal obligation imposed on States parties to the Covenant, para. 8.

D. Vulnerable people

84. Certain groups of people deserve special attention under international law because of their vulnerability to the impact of atmospheric pollution and degradation. These include indigenous people, those living in small island and low-lying developing countries, women, children and the elderly as well as persons with disabilities. According to the most recent data published by the World Health Organization (WHO) in September 2016, an estimated 6.5 million deaths annually (11.6 per cent of all global deaths) are attributable to air pollution, with the highest increases recorded in urban areas of low-income countries.[243] In response therefore, the Sustainable Development Goals adopted by the General Assembly in its 2030 Agenda for Sustainable Development address atmospheric pollution in Goals 3.9 and 11.6, calling, in particular, for a substantial reduction of the number of deaths and illnesses from air pollution, and for special attention to ambient air quality in cities.[244]

85. WHO has also noted that: "All populations will be affected by a changing climate, but the initial health risks vary greatly, depending on where and how people live. People living in small island developing states and other coastal regions, megacities, and mountainous and polar regions are all particularly vulnerable in different ways. Health effects are expected to be more severe for elderly people and people with infirmities or pre-existing medical conditions." Persons with disabilities should also be included here. WHO further noted that: "The groups who are likely to bear most of significant cost of the resulting disease burden are children and the poor, especially women.[245] The major diseases that are most sensitive to climate change — diarrhoea, vector-borne diseases like malaria, and infections associated with undernutrition — are most serious in children living in poverty."[246]

Thus, for instance, the World Bank Group has in recent years focused on policy development to support the people most vulnerable to climate change. According to its Climate Change Action Plan, extremely vulnerable groups include the very poor — those without access to basic infrastructure services and social protection — children, women and the elderly, persons with disabilities, indigenous populations, refugees and migrants, and people living in extremely vulnerable areas such as small islands and deltas.[247]

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[243] WHO, *Ambient Air Pollution: A Global Assessment of Exposure and Burden of Disease* (Geneva, 2016). See also WHO, "Burden of disease from the joint effects of household and ambient air pollution for 2012" (Geneva, 2014); United Nations Environment Assembly resolution 1/7 (2014) on strengthening the role of the United Nations Environment Programme in promoting air quality, UNEP/EA.1/10, annex I; World Health Assembly resolution WHA68.8 of 26 May 2015 on health and the environment: addressing the health impact of air pollution; and J. Lelieveld and others, "The contribution of outdoor air pollution sources to premature mortality on a global scale", *Nature*, vol. 525, No. 765 (2015), pp. 367-371.

[244] General Assembly resolution 70/1 of 25 September 2015; see B. Lode, P. Schönberger and P. Toussaint, "Clean air for all by 2030? Air quality in the 2030 Agenda and in international law", *Review of European, Community and International Environmental Law*, vol. 25, No. 1 (2016), pp. 27-38. See also the indicators for these targets specified in 2016 (3.9.1: mortality rate attributed to household and ambient air pollution; and 11.6.2: annual mean levels of fine particulate matter in cities).

[245] Footnote added. The Committee on the Elimination of Discrimination against Women has an agenda on "gender-related dimensions of disaster risk reduction and climate change"; see www.ohchr.org/EN/HRBodies/CEDAW/Pages/ClimateChange.aspx (accessed 20 February 2017).

[246] WHO, *Protecting Health from Climate Change: Connecting Science, Policy and People* (Geneva, 2009), p. 2.

[247] World Bank Group Climate Change Action Plan, 7 April 2016, para. 104, available from http://pubdocs.worldbank.org/en/677331460056382875/WBG-Climate-Change-Action-Plan-public-version.pdf (accessed 20 February 2017).

86. Apart from limited treaty practice and soft-law instruments, the legal status of indigenous people is not yet sufficiently settled in international law.[248] Nonetheless, as was declared in the Report of the Indigenous Peoples' Global Summit on Climate Change, "[i]ndigenous people are the most vulnerable to the impacts of climate change because they live in the areas most affected by climate change and are usually the most socio-economically disadvantaged",[249] and therefore they should certainly be included in those categories of people to be especially protected against the effects of atmospheric degradation.

E. Future generations

87. As previously emphasized in draft guideline 6 provisionally adopted in 2016, and in the Special Rapporteur's third report,[250] equitable and reasonable utilization of the atmosphere should also take into account the interests of future generations of humankind. It is considered necessary to emphasize the interests of future generations in the context of human rights protection. This intergenerational obligation was already expressed in principle 1 of the Stockholm Declaration ("solemn responsibility to protect and improve the environment for present and future generations"), and in the very concept of sustainable development as formulated in the 1987 Brundtland Report ("development that meets the needs of the present without compromising the ability of future generations")[251] as well as in the Preamble to the 2030 Agenda for Sustainable Development ("to support the needs of present and future generations"). It is also reflected in article 4 of the Convention for the protection of the world cultural and natural heritage (recognizing the "duty of ensuring the identification, protection, conservation, presentation and transmission to future generations" of cultural and natural heritage); in article 3, paragraph 1, of the United Nations Framework Convention on Climate Change ("Parties should protect the climate system for the benefit of present and future generations of humankind"), in the Preamble to the Convention on biological diversity, and in other subsequent treaties, such as article 4 (vi) of the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management (parties shall "strive to avoid actions that impose reasonably predictable impacts on future generations greater than those permitted for the current generation"). The International Court of Justice, in its 1996 advisory opinion on *Nuclear Weapons*, noted that "it is imperative … to take account of the unique characteristics of nuclear weapons, and in particular their … ability to cause

[248] General Assembly resolution 61/295 of 13 September 2007 entitled "United Nations Declaration on the Rights of Indigenous Peoples" does not define "indigenous people", leaving the matter to future development. The group's self-identification is considered as an essential element in determining its status and scope. See R.L. Barsh, "Indigenous peoples", in *The Oxford Handbook of International Environmental Law*, D. Bodansky, J. Brunée and E. Hey, eds. (Oxford, Oxford University Press, 2007), pp. 829-852; B. Kingsbury, "Indigenous peoples", in *The Max Planck Encyclopedia of Public International Law*, R. Wolfrum, ed. (Oxford, Oxford University Press, 2012), vol. V, pp. 116-133; H.A. Strydom, "Environment and indigenous peoples", in *The Max Planck Encyclopedia of Public International Law*, R. Wolfrum, ed. (Oxford, Oxford University Press, 2012), vol. III, pp. 455-461.

[249] Report of the Indigenous Peoples' Global Summit on Climate Change, 20-24 April 2009, Anchorage, Alaska, p. 12, available from www.un.org/ga/president/63/letters/globalsummitoncc.pdf#search=%27 (accessed 20 February 2017).

[250] A/CN.4/692, paras. 69-78. See also the suggestion by Malaysia, during the debate on the topic in the Sixth Committee in October 2016, for further examination of factors to be assessed in balancing the interests of current and future generations (*Official Records of the General Assembly, Seventy-first Session, Sixth Committee*, 26th meeting (A/C.6/71/SR.26), para. 67).

[251] "Report of the World Commission on Environment and Development: note by the Secretary-General" (A/42/427), annex, chap. 2, para. 1.

damage to generations to come";[252] and Judge Weeramantry, in his dissenting opinion, considered that "the rights of future generations have passed the stage when they are merely an embryonic right struggling for recognition. They have woven themselves into international law".[253]

88. While there are no rights-holders present with legal standing to invoke the obligations so incurred, it has been suggested in the literature that the rights involved could be enforced by a "guardian" or representative of future generations.[254] Regarding protection of the atmosphere in particular, there have indeed been recent domestic court decisions in a number of countries upholding the human rights of minors, represented by guardians, to challenge governmental action (or inaction) in this field.[255] Standing to sue in some of those proceedings was granted on the basis of what is referred to as the "public trust doctrine",[256] holding Governments accountable as trustees for the management of common environmental resources.[257] Given, however, that there are as yet no decisions by international tribunals conferring customary intergenerational rights of this kind,[258] the Drafting Committee, at the sixty-eighth session of the Commission, opted for the term "interests" rather than "benefit" in draft guideline 6.[259] Accordingly, paragraph 4 of the proposed new draft guideline 12 below uses similar language.

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[252] *Legality of the Threat or Use of Nuclear Weapons, Advisory Opinion, I.C.J. Reports 1996*, p. 226, at p. 244, para. 36.

[253] Ibid., at p. 455.

[254] E. Brown Weiss, *In Fairness to Future Generations: International Law, Common Patrimony, and Intergenerational Equity* (Tokyo, United Nations University Press, 1989), p. 96; M. Bruce, "Institutional aspects of a charter of the rights of future generations", in *Our Responsibilities Towards Future Generations*, S. Busuttil and others, eds. (Malta, UNESCO and Foundation for International Studies, University of Malta, 1990), pp. 127-131; T. Allen, "The Philippine children's case: recognizing legal standing for future generations", *Georgetown International Environmental Law Review*, vol. 6 (1994), pp. 713-741, referring to the judgment of the Philippine Supreme Court in *Minors Oposa et al. v. Factoran* (30 July 1993), *International Legal Materials*, vol. 33 (1994), pp. 173-206.

[255] On the "children's atmospheric trust" cases decided or currently pending in several United States state and federal courts, see M.C. Wood and C.W. Woodward, IV, "Atmospheric trust litigation and the constitutional right to a healthy climate system: judicial recognition at last", *Washington Journal of Environmental Law and Policy*, vol. 6 (2016), pp. 634-684. For a similar case now pending in the Pakistan Supreme Court, see *Rabab Ali v. Federation of Pakistan*, summary available from http://www.ourchildrenstrust.org/pakistan (accessed 20 February 2017).

[256] See C. Redgwell, *Intergenerational Trusts and Environmental Protection* (Manchester, Manchester University Press, 1999); K. Coghill, C. Sampford and T. Smith, eds., *Fiduciary Duty and the Atmospheric Trust* (London, Routledge, 2012); M.C. Blumm and M.C. Wood, *The Public Trust Doctrine in Environmental and Natural Resources Law*, 2nd ed. (Durham, North Carolina, Carolina Academic Press, 2015); K. Bosselmann, *Earth Governance: Trusteeship of the Global Commons* (Cheltenham, Edward Elgar Publishing, 2015).

[257] In a landmark judgment on 13 December 1996, the Indian Supreme Court declared the public trust doctrine "the law of the land"; *M.C. Mehta v. Kamal Nath and others*, (1997) 1 Supreme Court Cases 388, reprinted in C.O. Okidi, ed., *Compendium of Judicial Decisions in Matters Related to Environment: National Decisions*, vol. I (Nairobi, United Nations Environment Programme/United Nations Development Programme, 1998), p. 259. See J. Razzaque, "Application of public trust doctrine in Indian environmental cases", *Journal of Environmental Law*, vol. 13, No. 2 (2001), pp. 221-234.

[258] C. Redgwell, "Intra- and inter-generational equity", in *The Oxford Handbook of International Climate Change Law*, C.P. Carlarne, K.R. Gray and R.G. Tarasofsky, eds. (Oxford, Oxford University Press, 2016), pp. 185-201, at p. 198.

[259] *Official Records of the General Assembly, Seventy-first Session, Supplement No. 10* (A/71/10), p. 293, commentary on draft guideline 6, para. (3).

**** The term "extra-jurisdictional" application of a treaty is employed here in order to differentiate it from "extra-territorial" application of a domestic law.

F. Procedural problems: extra-jurisdictional application****

89. The most intriguing problem in the interrelationship between the law relating to the atmosphere and human rights law is the disconnect in their application. While the law on the atmosphere is to be applied not only to the States of victims but also to the States of origin of the harm, the scope of application of human rights treaties is limited to the persons subject to a State's jurisdiction (article 2 of the International Covenant on Civil and Political Rights; article 1 of the European Convention on Human Rights; and article 1 of the American Convention on Human Rights).[260] Since most jurisprudence and decisions examined above concerned intra-boundary air pollution cases in which applicants lodged their complaints against their own States, there was no problem of recognizing the States' positive obligations to deal with atmospheric pollution and atmospheric degradation in the context of the relevant human rights treaties. However, where an environmentally harmful activity in one State infringes a right of persons in another State, the case becomes a matter of extra-jurisdictional application, and thus a situation that human rights treaties cannot normally cope with. In other words, human rights treaties cannot be applied extra-jurisdictionally to the State of origin of the alleged environmental harm. This is the most fundamental difficulty in dealing with environmental problems via human rights treaties.

90. How would it be possible to overcome this difficulty? One way may be to resort to the object and purpose of human rights treaties. It should be noted that the International Court of Justice in its advisory opinion on the *Legal Consequences of the Construction of a Wall in the Occupied Palestinian Territory* pronounced: "while the jurisdiction of States is primarily territorial, it may sometimes be exercised outside the national territory. Considering the object and purpose of the International Covenant on Civil and Political Rights, it would seem natural that, even when such is the case, State parties to the Covenant should be bound to comply with its provisions".[261] If the fundamental object and purpose of human rights treaties is to protect human rights on the basis of the principle of non-discrimination, it is unreasonable to conclude that international human rights law has no application to transboundary atmospheric pollution or global degradation and that the law can extend protection only to the victims of intra-boundary pollution. The non-discrimination principle requires the responsible State to treat such pollution or degradation no differently from domestic pollution.[262] In the same vein, another possible way to address the challenge would be to resort to the test of "necessary and foreseeable consequence". The Human Rights Committee considered the jurisdictional scope of application of respective human rights instruments in cases concerning extradition by one State to another jurisdiction where a fugitive faced the death penalty (*Joseph Kindler v. Canada* case). The Human Rights Committee stated, however, that: "if a State party takes a decision relating to a person within its jurisdiction, and the necessary and foreseeable consequence is that that person's rights under the Covenant will be violated in another jurisdiction, the State party itself may be in violation of the Covenant".[263]

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[260] A. Boyle, "Human rights and the environment: where next?", *European Journal of International Law*, vol. 23, No. 3 (2012), pp. 613-642, at pp. 633-641.

[261] *Legal Consequences of the Construction of a Wall in the Occupied Palestinian Territory, Advisory Opinion, I.C.J. Reports 2004*, p. 136, at p. 179, para. 109.

[262] Boyle, "Human rights and the environment …" (see footnote 260 above), pp. 639-640.

[263] *Kindler v. Canada*, Communication No. 470/1991, Views adopted on 30 July 1993, *Official Records of the General Assembly, Forty-eighth Session, Supplement No. 40* (A/48/40), annex XII, sect. U, para. 6.2. The author was a fugitive who was convicted of murder and kidnapping and sentenced to the death penalty in the United States in 1983. He escaped to Canada in 1984. Canada arrested and detained him in 1985 and extradited him to the United States, by which he

This could be conceived of as a form of non-discrimination in human rights law. The same principle has been confirmed by the European Court of Human Rights in an effort to overcome the difficulty of the extra-jurisdictional application of human rights treaties.[264]

91. Another avenue to overcome the jurisdictional difficulty of human rights treaties may be to recognize that those substantive human rights norms relevant to the protection of the atmosphere, such as the rights to life and to property, are now crystallized as customary international law. Since customary international law can be applied without jurisdictional limitation, the relevant human rights norms can be equally applied to any State, including the author and victim States. Indeed, many human rights norms are today recognized as established or emergent rules of customary international law.[265] If the relevant human rights norms are recognized as such, they will be considered as overlapping with environmental norms, such as due diligence (draft guideline 3), environmental impact assessment (draft guideline 4), sustainable utilization (draft guideline 5) and equitable and reasonable utilization (draft guideline 6), among others, which would enable interpretation and application of both norms in a harmonious manner.

92. Based on the foregoing considerations, draft guideline 12 is proposed as follows:

Draft guideline 12: Interrelationship of law on the protection of the atmosphere with human rights law

1. States should make best efforts to develop, interpret and apply international human rights norms in a mutually supportive manner with rules of international law relating to the protection of the atmosphere, with a view to effectively protecting the atmosphere from atmospheric pollution and atmospheric degradation.

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alleged a violation by Canada of certain rights guaranteed under the Covenant. Canada contented that the author could not be considered a victim within the jurisdiction of Canada, since he had already been extradited to the United States, falling therefore outside the former's jurisdiction. The tests of "necessary and foreseeable" or "real risk" or "reasonably anticipate" have been employed in turns by the Human Rights Committee when extra-jurisdictionally applying the Covenant facing extradition: *Kindler v. Canada*, ibid., paras. 6.2 and 13.2; *Chitat Ng v. Canada*, Communication No. 469/1991, Views adopted on 5 November 1993, ibid., *Forty-ninth Session* (A/49/40), annex IX, sect. CC, para. 7; *Cox v. Canada*, Communication No. 539/1993, Views adopted on 31 October 1994, ibid., *Fiftieth Session*, annex X, sect. M, para. 16.1; *A.R.J. v. Australia*, Communication No. 692/1996, Views adopted on 28 July 1997, ibid., *Fifty-second Session* (A/52/40), annex VI, sect. T, para. 4.1; *Judge v. Canada*, Communication No. 829/1998, Views adopted on 5 August 2003, ibid., *Fifty-eighth Session* (A/58/40), annex V, sect. G, para. 10.4; *Esposito v. Spain*, Communication No. 1359/2005, Decision adopted on 20 March 2007, ibid., *Sixty-second Session* (A/62/40), annex VIII, sect. P, para. 7.5; *Munaf v. Romania*, Communication No. 1539/2006, Views adopted on 30 July 2009, ibid., *Sixty-fourth Session* (A/64/40), annex VII, sect. LL, para. 4.14.

[264] The test of "real risk" is used by the European Court of Human Rights in its extra-jurisdictional application of the Convention facing extradition. See *Soering v. the United Kingdom*, 7 July 1989, Series A no. 161, para. 4; *Chahal v. the United Kingdom*, 15 November 1996, *Reports of Judgments and Decisions* 1996-V, para. 68; *Saadi v. Italy* [GC], no. 37201/06, ECHR 2008.

[265] B. Simma and P. Alston, "Sources of human rights law: custom, jus cogens and general principles", *Australian Year Book of International Law*, vol. 12 (1988), pp. 82-108; V. Dimitrijevic, "Customary law as an instrument for the protection of human rights", Working Paper, No. 7 (Milan, Istituto per gli Studi di Politica Internazionale (ISPI), 2006); B. Simma, "Human rights in the International Court of Justice: Are we witnessing a sea change?", in *Unity and Diversity of International Law: Essays in Honour of Professor Pierre-Marie Dupuy*, D. Alland and others, eds. (Leiden, Martinus Nijhoff, 2014), pp. 711-737; H. Thirlway, "International law and practice. Human rights in customary law: an attempt to define some of the issues", *Leiden Journal of International Law*, vol. 28 (2015), pp. 495-506.

2. States should make best efforts to comply with international human rights norms in developing, interpreting and applying the rules and recommendations relevant to the protection of the atmosphere from atmospheric pollution and atmospheric degradation, particularly with regard to the human rights of vulnerable groups of people, including indigenous people, people of the least developed developing countries, and women, children and the elderly as well as persons with disabilities.

3. States should consider, in developing and interpreting and applying the relevant rules of international law, the impact of sea-level rise on small island and low-lying States, particularly in matters relating to human rights and migration.

4. States should also take into account the interests of future generations of humankind in the long-term conservation of the quality of the atmosphere.

V. Conclusion

93. The present report has attempted to demonstrate that the law relating to the protection of the atmosphere exists and functions in the interrelationship with other relevant fields of international law, most notably, international trade and investment law, the law of the sea and human rights law. These are the fields that have intrinsic links with the law on the atmosphere and, as such, it is clear that they need to be treated in an integrated manner within the scope of the present topic.

94. The next report, in 2018, will deal with: (a) implementation (on the level of domestic law); (b) compliance (on the level of international law); and (c) specific features of dispute settlement relating to the law on the protection of the atmosphere, which will hopefully conclude the first reading of the topic.

United Nations A/CN.4/705/Corr.1

General Assembly

Distr.: General
10 May 2017

Original: English

International Law Commission
Sixty-ninth session
Geneva, 1 May-2 June and 3 July-4 August 2017

Fourth report on the protection of the atmosphere

by Shinya Murase, Special Rapporteur

Corrigendum

1. Paragraph 28

For As mentioned earlier (paragraph 20 above) *read* As mentioned earlier (paragraph 18 above)

2. Paragraph 65

Delete the paragraph

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Chapter IV
Protection of the atmosphere

A. Introduction

29. At its sixty-fifth session (2013), the Commission decided to include the topic "Protection of the atmosphere" in its programme of work, subject to an understanding, and appointed Mr. Shinya Murase as Special Rapporteur.[6]

30. The Commission considered the first report of the Special Rapporteur at its sixty-sixth session (2014); the second report at its sixty-seventh session (2015); the third report at its sixty-eighth session (2016); the fourth report at its sixty-ninth session (2017) and the fifth report at its seventieth session (2018).[7] At its seventieth session, on the basis of the draft guidelines proposed by the Special Rapporteur in the second, third, fourth and fifth reports, the Commission provisionally adopted 12 draft guidelines and a preamble, together with commentaries thereto, on first reading.[8]

B. Consideration of the topic at the present session

31. At the present session, the Commission had before it the sixth report of the Special Rapporteur (A/CN.4/736), as well as comments and observations received from Governments and international organizations (A/CN.4/735). The Special Rapporteur, in his report, examined the comments and observations received from governments and international organizations on the draft preamble and guidelines, as adopted on first reading. He considered proposals for consideration on second reading, in the light of the comments and observations, and proposed a recommendation to the General Assembly.

32. The Commission considered the sixth report of the Special Rapporteur at its 3508th to 3510th and 3512th to 3515th meetings, from 26 to 28 April, and on 30 April and 3 and 4 May 2021.

33. Following its debate on the report, the Commission, at its 3515th meeting, held on 4 May 2021, decided to refer draft guidelines 1 to 12, together with the preamble, as contained in the Special Rapporteur's sixth report, to the Drafting Committee, taking into account the debate in the Commission.

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[6] At its 3197th meeting, on 9 August 2013 (*Yearbook … 2013*, vol. II (Part Two), para. 168). The Commission included the topic in its programme of work on the understanding that: "(a) work on the topic will proceed in a manner so as not to interfere with relevant political negotiations, including on climate change, ozone depletion, and long-range transboundary air pollution. The topic will not deal with, but is also without prejudice to, questions such as: liability of States and their nationals, the polluter-pays principle, the precautionary principle, common but differentiated responsibilities, and the transfer of funds and technology to developing countries, including intellectual property rights; (b) the topic will also not deal with specific substances, such as black carbon, tropospheric ozone, and other dual-impact substances, which are the subject of negotiations among States. The project will not seek to 'fill' gaps in the treaty regimes; (c) questions relating to outer space, including its delimitation, are not part of the topic; (d) the outcome of the work on the topic will be draft guidelines that do not seek to impose on current treaty regimes legal rules or legal principles not already contained therein. The Special Rapporteur's reports would be based on such understanding." The General Assembly, in paragraph 6 of its resolution 68/112 of 16 December 2013, took note of the decision of the Commission to include the topic in its programme of work. The topic had been included in the long-term programme of work of the Commission during its sixty-third session (*Yearbook … 2011*, vol. II (Part Two), para. 365), on the basis of the proposal contained in annex II to the report of the Commission on its work at that session (*ibid*., p. 189).

[7] A/CN.4/667, A/CN.4/681 and Corr.1 (Chinese only), A/CN.4/692, and A/CN.4/705 and Corr.1, A/CN.4/711, respectively.

[8] *Official Records of the General Assembly, Seventieth Session, Supplement No. 10* (A/70/10), paras. 53–54; *ibid., Seventy-first Session, Supplement No. 10* (A/71/10), paras. 95–96; *ibid., Seventy-second Session, Supplement No. 10* (A/72/10), paras. 66–67; and *ibid., Seventy-third Session, Supplement No. 10* (A/73/10), paras. 77–78.

34. At its 3529th meeting, held on 27 May 2021, the Commission considered the report of the Drafting Committee (A/CN.4/L.951), and adopted the draft guidelines, together with a preamble, on the protection of the atmosphere on second reading (see sect. E.1 below).

35. At its 3549th to 3554th meetings, held from 26 to 29 July 2021, the Commission adopted the commentaries to the draft guidelines and the preamble (see sect. E.2 below).

36. In accordance with its statute, the Commission submits the draft guidelines, together with the preamble, to the General Assembly, with the recommendation set out below (see sect. C below).

C. Recommendation of the Commission

37. At its 3554th meeting, held on 29 July 2021, the Commission decided, in accordance with article 23 of its statute, to recommend that the General Assembly:

(a) take note in a resolution of the draft preamble and guidelines on the protection of the atmosphere, annex the draft guidelines to the resolution, and ensure their widest possible dissemination;

(b) commend the draft preamble and guidelines, together with the commentaries thereto, to the attention of States, international organizations and all who may be called upon to deal with the subject.

D. Tribute to the Special Rapporteur

38. At its 3554th meeting, held on 29 July 2021, the Commission, after adopting the draft guidelines on the protection of the atmosphere, adopted the following resolution by acclamation:

"*The International Law Commission*,

Having adopted the draft guidelines on the protection of the atmosphere,

Expresses to the Special Rapporteur, Mr. Shinya Murase, its deep appreciation and warm congratulations for the outstanding contribution he has made to the preparation of the draft guidelines through his tireless efforts and devoted work, and for the results achieved in the elaboration of the draft guidelines on the protection of the atmosphere."

E. Text of the draft guidelines on the protection of the atmosphere

1. Text of the draft guidelines

39. The text of the draft guidelines, adopted by the Commission on second reading, at the seventy-second session is reproduced below.

Protection of the atmosphere

Preamble

Acknowledging that the atmosphere is a natural resource, with a limited assimilation capacity, essential for sustaining life on Earth, human health and welfare, and aquatic and terrestrial ecosystems,

Bearing in mind that the transport and dispersion of polluting and degrading substances occur within the atmosphere,

Considering that atmospheric pollution and atmospheric degradation are a common concern of humankind,

Aware of the special situation and needs of developing countries,

Noting the close interaction between the atmosphere and the oceans,

Noting in particular the special situation of low-lying coastal areas and small island developing States due to sea-level rise,

Recognizing that the interests of future generations of humankind in the long-term conservation of the quality of the atmosphere should be fully taken into account,

Recalling that the present draft guidelines were elaborated on the understanding that they were not intended to interfere with relevant political negotiations or to impose on current treaty regimes rules or principles not already contained therein,

Guideline 1
Use of terms

For the purposes of the present draft guidelines:

(*a*) "atmosphere" means the envelope of gases surrounding the Earth;

(*b*) "atmospheric pollution" means the introduction or release by humans, directly or indirectly, into the atmosphere of substances or energy contributing to significant deleterious effects extending beyond the State of origin of such a nature as to endanger human life and health and the Earth's natural environment;

(*c*) "atmospheric degradation" means the alteration by humans, directly or indirectly, of atmospheric conditions having significant deleterious effects of such a nature as to endanger human life and health and the Earth's natural environment.

Guideline 2
Scope

1. The present draft guidelines concern the protection of the atmosphere from atmospheric pollution and atmospheric degradation.

2. The present draft guidelines do not deal with and are without prejudice to questions concerning the polluter-pays principle, the precautionary principle and the common but differentiated responsibilities principle.

3. Nothing in the present draft guidelines affects the status of airspace under international law nor questions related to outer space, including its delimitation.

Guideline 3
Obligation to protect the atmosphere

States have the obligation to protect the atmosphere by exercising due diligence in taking appropriate measures, in accordance with applicable rules of international law, to prevent, reduce or control atmospheric pollution and atmospheric degradation.

Guideline 4
Environmental impact assessment

States have the obligation to ensure that an environmental impact assessment is undertaken of proposed activities under their jurisdiction or control which are likely to cause significant adverse impact on the atmosphere in terms of atmospheric pollution or atmospheric degradation.

Guideline 5
Sustainable utilization of the atmosphere

1. Given that the atmosphere is a natural resource with a limited assimilation capacity, its utilization should be undertaken in a sustainable manner.

2. Sustainable utilization of the atmosphere includes the need to reconcile economic development with the protection of the atmosphere.

Guideline 6
Equitable and reasonable utilization of the atmosphere

The atmosphere should be utilized in an equitable and reasonable manner, taking fully into account the interests of present and future generations.

Guideline 7
Intentional large-scale modification of the atmosphere

Activities aimed at intentional large-scale modification of the atmosphere should only be conducted with prudence and caution, and subject to any applicable rules of international law, including those relating to environmental impact assessment.

Guideline 8
International cooperation

1. States have the obligation to cooperate, as appropriate, with each other and with relevant international organizations for the protection of the atmosphere from atmospheric pollution and atmospheric degradation.

2. States should cooperate in further enhancing scientific and technical knowledge relating to the causes and impacts of atmospheric pollution and atmospheric degradation. Cooperation could include exchange of information and joint monitoring.

Guideline 9
Interrelationship among relevant rules

1. The rules of international law relating to the protection of the atmosphere and other relevant rules of international law, including, *inter alia*, the rules of international trade and investment law, of the law of the sea and of international human rights law, should, to the extent possible, be identified, interpreted and applied in order to give rise to a single set of compatible obligations, in line with the principles of harmonization and systemic integration, and with a view to avoiding conflicts. This should be done in accordance with the relevant rules set forth in the Vienna Convention on the Law of Treaties, including articles 30 and 31, paragraph 3 (*c*), and the principles and rules of customary international law.

2. States should, to the extent possible, when developing new rules of international law relating to the protection of the atmosphere and other relevant rules of international law, endeavour to do so in a harmonious manner.

3. When applying paragraphs 1 and 2, special consideration should be given to persons and groups particularly vulnerable to atmospheric pollution and atmospheric degradation. Such groups may include, *inter alia*, indigenous peoples, people of the least developed countries and people of low-lying coastal areas and small island developing States affected by sea-level rise.

Guideline 10
Implementation

1. National implementation of obligations under international law relating to the protection of the atmosphere from atmospheric pollution and atmospheric degradation, including those referred to in the present draft guidelines, may take the form of legislative, administrative, judicial and other actions.

2. States should endeavour to give effect to the recommendations contained in the present draft guidelines.

Guideline 11
Compliance

1. States are required to abide by their obligations under international law relating to the protection of the atmosphere from atmospheric pollution and atmospheric degradation in good faith, including through compliance with the rules and procedures in the relevant agreements to which they are parties.

2. To achieve compliance, facilitative or enforcement procedures may be used as appropriate, in accordance with the relevant agreements:

(*a*) facilitative procedures may include providing assistance to States, in cases of non-compliance, in a transparent, non-adversarial and non-punitive manner to ensure that the States concerned comply with their obligations under international law, taking into account their capabilities and special conditions;

(*b*) enforcement procedures may include issuing a caution of non-compliance, termination of rights and privileges under the relevant agreements, and other forms of enforcement measures.

Guideline 12
Dispute settlement

1. Disputes between States relating to the protection of the atmosphere from atmospheric pollution and atmospheric degradation are to be settled by peaceful means.

2. Since such disputes may be of a fact-intensive and science-dependent character, due consideration should be given to the use of scientific and technical experts.

2. Text of the draft guidelines and commentaries thereto

40. The text of the draft guidelines and commentaries thereto, adopted by the Commission on second reading, is reproduced below.

Protection of the atmosphere

General commentary

(1) As is always the case with the Commission's output, the draft guidelines are to be read together with the commentaries.

(2) The Commission recognizes the importance of being fully engaged with the international community's present-day needs. It is acknowledged that both the human and natural environments can be adversely affected by certain changes in the condition of the atmosphere mainly caused by the introduction of harmful substances or energy, causing transboundary air pollution, ozone depletion, as well as changes in the atmospheric conditions leading to climate change. The Commission seeks, through the progressive development of international law and its codification, to provide guidelines that may assist the international community as it addresses critical questions relating to transboundary and global protection of the atmosphere. In doing so, the Commission, based on the 2013 understanding,[9] does not desire to interfere with relevant political negotiations or to impose on current treaty regimes rules or principles not already contained therein.

Preamble

Acknowledging that the atmosphere is a natural resource, with a limited assimilation capacity, essential for sustaining life on Earth, human health and welfare, and aquatic and terrestrial ecosystems,

Bearing in mind that the transport and dispersion of polluting and degrading substances occur within the atmosphere,

Considering that atmospheric pollution and atmospheric degradation are a common concern of humankind,

Aware of the special situation and needs of developing countries,

Noting the close interaction between the atmosphere and the oceans,

Noting in particular the special situation of low-lying coastal areas and small island developing States due to sea-level rise,

Recognizing that the interests of future generations of humankind in the long-term conservation of the quality of the atmosphere should be fully taken into account,

Recalling that the present draft guidelines were elaborated on the understanding that they were not intended to interfere with relevant political negotiations or to impose on current treaty regimes rules or principles not already contained therein,

[9] See footnote 6 above.

Commentary

(1) The preamble seeks to provide a contextual framework for the draft guidelines. The first preambular paragraph is overarching in acknowledging the essential importance of the atmosphere for sustaining life on Earth, human health and welfare, and aquatic and terrestrial ecosystems. The atmosphere is the Earth's largest single natural resource and one of its most important. It was listed as a natural resource – along with mineral, energy and water resources – by the former Committee on Natural Resources of the Economic and Social Council,[10] as well as in the 1972 Declaration of the United Nations Conference on the Human Environment (hereinafter, "Stockholm Declaration")[11] and in the 1982 World Charter for Nature.[12] The World Charter recognizes that humankind is part of nature and life depends on the uninterrupted functioning of natural systems which ensure the supply of energy and nutrients.[13] The atmosphere provides renewable "flow resources" essential for human, plant and animal survival on the planet, and it serves as a medium for transportation and communication. As a natural resource, the atmosphere was long considered to be non-exhaustible and non-exclusive. That view is no longer held.[14] It must be borne in mind that the atmosphere is a natural resource with a limited assimilation capacity, also referred to in draft guideline 5.

(2) The second preambular paragraph addresses the functional aspect of the atmosphere as a medium through which transport and dispersion of polluting and degrading substances occurs, involving the large-scale movement of air. The atmospheric movement has a dynamic and fluctuating feature. Long-range transboundary movement of polluting and degrading substances is recognized as one of the major problems of the present-day atmospheric

[10] The inclusion of "atmospheric resources" among "other natural resources" by the former Committee on Natural Resources was first mentioned in the Committee's report on its first session, *Official Records of the Economic and Social Council, Fiftieth Session, Supplement No. 6* (E/4969-E/C.7/13), section 4 ("other natural resources"), para. 94 (d). The work of the Committee (later the Committee on Energy and Natural Resources for Development) was subsequently transferred to the Commission on Sustainable Development.

[11] "The natural resources of the earth including the air … must be safeguarded for the benefit of present and future generations through careful planning or management, as appropriate" (adopted at Stockholm on 16 June 1972, see *Report of the United Nations Conference on the Human Environment, Stockholm, 5–16 June 1972* (United Nations publication, Sales No. E.73.II.A.14 (A/CONF.48/14/Rev.1 and Corr.1), part one, chap. I, principle 2).

[12] "[A]tmospheric resources that are utilized by [humankind], shall be managed to achieve and maintain optimum sustainable productivity" (World Charter for Nature, General Assembly resolution 37/7 of 28 October 1982, annex, general principles, para. 4).

[13] *Ibid*., second preambular paragraph, subpara. (a).

[14] See, for example, the World Trade Organization (WTO) Panel and Appellate Body, which recognized in the *Gasoline* case of 1996 that clean air was an "exhaustible natural resource" that could be "depleted". Report of the Appellate Body, *United States-Standards for Reformulated and Conventional Gasoline* (1996), WT/DS2/AB/R.

environment,[15] with the Arctic region being identified as one of the areas seriously affected by the worldwide spread of deleterious pollutants.[16]

(3) The third preambular paragraph states that atmospheric pollution and atmospheric degradation are a "common concern of humankind". This expression first appeared in General Assembly resolution 43/53 of 6 December 1988 on the protection of global climate for present and future generations of mankind, recognizing that climate change was a "common concern of [human]kind", since the climate was an essential condition sustaining life on Earth. The first paragraph of the preamble to the 1992 United Nations Framework Convention on Climate Change[17] acknowledges that "change in the Earth's climate and its adverse effects are a *common concern of humankind*" (emphasis added),[18] which was reiterated in the preamble of the 2015 Paris Agreement on climate change.[19] Likewise, other conventions use this expression or similar language.[20] The phrase as used in this preambular paragraph reflects a concern of the entire international community that all may be affected by atmospheric pollution and atmospheric degradation, as defined in the draft guidelines. It is recalled that the expression has commonly been used in the field of environmental law, even though doctrine is divided on its scope, content and consequences.[21] It is understood

[15] See the 2001 Stockholm Convention on Persistent Organic Pollutants, United Nations, *Treaty Series*, vol. 2256, No. 40214, p. 119 (noting in the preamble that "persistent organic pollutants, … are transported, through air … across international boundaries and deposited far from their place of release, where they accumulate in terrestrial and aquatic ecosystems"). The 2012 amendment to the Gothenburg Protocol to the 1979 Convention on Long-Range Transboundary Air Pollution to Abate Acidification, Eutrophication and Ground-level Ozone (Gothenburg, 30 November 1999, United Nations, *Treaty Series*, vol. 2319, p. 81) indicates in the third preambular paragraph: "Concerned … that emitted [chemical substances] are transported in the atmosphere over long distance and may have adverse transboundary effects". The 2013 Minamata Convention on Mercury (Kumamoto, Japan, 10 October 2013, *ibid.*, vol. 3013, No. 54669 (volume number has yet to be determined), available from https://treaties.un.org) recognizes mercury as "a chemical of global concern owing to its long-range atmospheric transport" (first preambular para.); see, J.S. Fuglesvedt *et al.*, "Transport impacts on atmosphere and climate: metrics", *Atmospheric Environment*, vol. 44 (2010), pp. 4648–4677; D.J. Wuebbles, H. Lei and J.-T Lin, "Inter-continental transport of aerosols and photochemical oxidants from Asia and its consequences", *Environmental Pollution*, vol. 150 (2007), pp. 65–84; J.-T Lin, X.-Z Liang and D.J. Wuebbles, "Effects of inter-continental transport on surface ozone over the United States: Present and future assessment with a global model", *Geophysical Research Letters*, vol. 35 (2008).

[16] See T. Koivurova, P. Kankaanpää and A. Stepien, "Innovative environmental protection: lessons from the Arctic," *Journal of Environmental Law*, vol. 27 (2015), pp. 285–311, at p. 297.

[17] New York, 9 May 1992, United Nations, *Treaty Series*, vol. 1771, No. 30822, p. 107.

[18] United Nations Framework Convention on Climate Change, first preambular para.

[19] Paris Agreement (Paris, 12 December 2015), United Nations, *Treaty Series*, No. 54113 (volume number has yet to be determined), available from https://treaties.un.org, eleventh preambular para.

[20] Convention on Biological Diversity (Rio de Janeiro, 5 June 1992, United Nations, *Treaty Series*, vol. 1790, No. 30619, p. 79: the third preambular paragraph: "common concern of humankind"); Convention to Combat Desertification in Those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa (Paris, 14 October 1994, *ibid.*, vol. 1954, No. 33480, p. 3: the first preambular paragraph: "centre of concerns"; second preambular paragraph: "urgent concern of the international community"; fourth preambular paragraph: "problems of global dimension"); Minamata Convention on Mercury (the first preambular paragraph: mercury as "a chemical of global concern").

[21] M. Bowman, "Environmental protection and the concept of common concern of mankind," in M. Fitzmaurice, D.M. Ong and P. Merkouris, eds., *Research Handbook on International Environmental Law* (Cheltenham, Edward Elgar, 2010), pp. 493–518, at p. 501; D. French, "Common concern, common heritage and other global(-ising) concepts: rhetorical devices, legal principles or a fundamental challenge?" in M.J. Bowman, P.G.G. Davies and E.J. Goodwin, eds., *Research Handbook on Biodiversity and Law* (Cheltenham, Edward Elgar, 2016), pp. 334–360, at pp. 349 *ff.*; J. Brunnée, "Common areas, common heritage, and common concern," in D. Bodansky, J. Brunnée and E. Hey, eds., *The Oxford Handbook of International Environmental Law* (Oxford, Oxford University Press, 2007), pp. 550–573, at p. 565; A. Boyle and C. Redgwell, *International Law and the Environment*, 4th ed. (Oxford, Oxford University Press, 2009), pp. 143–145; D. Shelton, "Common concern of humanity," *Environmental Policy and Law*, vol. 39 (2009), pp. 83–96; D. Shelton, "Equitable utilization of the atmosphere: rights-based approach to climate change?", in S.

that the expression identifies a problem that requires cooperation from the entire international community, while at the same time that its inclusion does not create, as such, rights and obligations, and, in particular, that it does not entail *erga omnes* obligations in the context of the draft guidelines.

(4) The fourth preambular paragraph, having regard to considerations of equity, concerns the special situation and needs of developing countries.[22] The need for special consideration for developing countries in the context of environmental protection has been endorsed by a number of international instruments, such as the 1972 Stockholm Declaration,[23] the 1992 Rio Declaration on Environment and Development (hereinafter, "Rio Declaration"),[24] and the 2002 Johannesburg Declaration on Sustainable Development.[25] Principle 12 of the Stockholm Declaration attaches importance to "taking into account the circumstances and particular requirements of developing countries". Principle 6 of the Rio Declaration highlights "the special situation and needs of developing countries, particularly the least developed and those most environmentally vulnerable". The Johannesburg Declaration expresses resolve to pay attention to "the developmental needs of small island developing States and least developed countries".[26] The principle is similarly reflected in article 3 of the United Nations Framework Convention on Climate Change and article 2 of the Paris Agreement under the United Nations Framework Convention on Climate Change. The formulation of the preambular paragraph is based on the seventh paragraph of the preamble

Humphreys, ed., *Human Rights and Climate Change* (Cambridge, Cambridge University Press, 2010), pp. 91–125; S. Stec, "Humanitarian limits to sovereignty: common concern and common heritage approaches to natural resources and environment," *International Community Law Review*, vol. 12 (2010), pp. 361–389; T. Cottier, ed., *The Prospects of the Common Concern of Humankind in International Law* (Cambridge, Cambridge University Press, 2021).

[22] One of the first attempts to incorporate such a principle was the Washington Conference of the International Labour Organization in 1919, at which delegations from Asia and Africa succeeded in ensuring the adoption of differential labour standards, on the basis of article 405, paragraph 3, of the 1919 Treaty of Versailles (Treaty of Peace between the Allied and Associated Powers and Germany, 28 June 1919, *British and Foreign State Papers*, 1919, vol. CXII, London, HM Stationery Office, 1922, p. 1), which became article 19, paragraph 3, of the International Labour Organization Constitution (9 October 1946, United Nations, *Treaty Series*, vol. 15, No. 229, p. 35) (labour conventions "shall have due regard" to the special circumstances of countries where local industrial conditions are "substantially different"). The same principle also appeared in some of the conventions approved by the Organization in 1919 and in several conventions adopted afterwards. See I.F. Ayusawa, *International Labor Legislation* (New York, Columbia University, 1920), chap. VI, pp. 149 *et seq.* Another example is the Generalized System of Preferences elaborated under the United Nations Conference on Trade and Development in the 1970s, as reflected in draft article 23 of the Commission's 1978 draft articles on most-favoured-nation clauses. See article 23 (The most-favoured-nation clause in relation to treatment under a generalized system of preferences) and article 30 (New rules of international law in favour of developing countries) of the draft articles on the most-favoured-nation clauses adopted by the Commission at its thirtieth session in 1978, *Yearbook … 1978*, vol. II (Part Two), para. 74, see also paras. 47–72. See S. Murase, *Economic Basis of International Law* (Tokyo, Yuhikaku, 2001), pp. 109–179 (in Japanese). And see the earlier exceptions for developing countries specified in art. XVIII of the 1947 General Agreement on Tariffs and Trade (Geneva, 30 October 1947), United Nations, *Treaty Series*, vol. 55, No. 814, p. 194.

[23] *Report of the United Nations Conference on the Human Environment, Stockholm, 5-16 June 1972* (A/CONF.48/14/Rev.1), Part One, chap. 1. See L.B. Sohn, "The Stockholm Declaration on the Human Environment", *Harvard International Law Journal*, vol. 14 (1973), pp. 423–515, at pp. 485–493.

[24] Adopted at Rio de Janeiro on 14 June 1992, see *Report of the United Nations Conference on Environment and Development, Rio de Janeiro, 3-14 June 1992* (A/CONF.151/26/Rev.1 (vol. I) and Corr.1), resolution I, p. 3.

[25] *Report of the World Summit on Sustainable Development, Johannesburg, South Africa, 26 August–4 September 2002* (A/CONF.199/20; United Nations publication, Sales No. E.03.II.A.1 and corrigendum), chap. I, resolution 1, annex.

[26] Johannesburg Declaration, para. 24. See also Outcome document of the United Nations Conference on Sustainable Development, "The future we want", contained in General Assembly resolution 66/288 of 27 July 2012, annex.

of the 1997 Convention on the Law of the Non-navigational Uses of International Watercourses.[27]

(5) The fifth preambular paragraph acknowledges the "close interaction" that arises, as a factual matter, from the physical relationship between the atmosphere and the oceans. According to scientists, a significant proportion of the pollution of the marine environment from or through the atmosphere originates from land-based sources, including from anthropogenic activities on land.[28] Scientific research shows that human activities are also responsible for global warming, which causes a rise in temperature of the oceans and in turn results in extreme atmospheric conditions that can lead to flood and drought.[29] The General Assembly has confirmed the effect of climate change on oceans and stressed the importance of increasing the scientific understanding of the oceans-atmosphere interface.[30] Although not mentioned in the preambular paragraph, there are also close interactions between the atmosphere and other biospheres, as well as forests, lakes and rivers.[31]

(6) The First Global Integrated Marine Assessment (first World Ocean Assessment), as a comprehensive, in-depth study on the state of the marine environment, refers to substances polluting the oceans from land-based sources through the atmosphere, which bear on sea-surface temperature, sea-level rise, ocean acidification, salinity, stratification, ocean circulation, storms and other extreme weather events, and ultraviolet radiation and the ozone layer.[32] The General Assembly has continued to emphasize the urgency of addressing the effects of atmospheric degradation, such as increases in global temperatures, sea-level rise, ocean acidification and the impact of other climate changes that are seriously affecting coastal areas and low-lying coastal countries, including many least developed countries and small island developing States, and threatening the survival of many societies.[33] Among other human activities that have an impact on the oceans, are greenhouse gas emissions from ships

[27] Convention on the Law of the Non-Navigational Uses of International Watercourses (New York, 21 May 1997), *Official Records of the General Assembly, Fifty-first session, Supplement No. 49* (A/51/49), vol. III, resolution 51/229, annex. The Convention entered into force on 17 August 2014.

[28] R.A. Duce *et al.*, "The atmospheric input of trace species to the world ocean", *Global Biogeochemical Cycles*, vol. 5 (1991), pp. 193–259; T. Jickells and C.M. Moore, "The importance of atmospheric deposition for ocean productivity", *Annual Review of Ecology, Evolution, and Systematics*, vol. 46 (2015), pp. 481–501.

[29] See Intergovernmental Panel on Climate Change (IPCC), "Climate change 2014 synthesis report: summary for policymakers", p. 4. Because of the rise in ocean temperatures, many scientific analyses suggest risk of severe and widespread drought in the twenty-first century over many land areas. See Ø. Hov, "Overview: oceans and the atmosphere" and T. Jickells, "Linkages between the oceans and the atmosphere", in "Summary of the informal meeting of the International Law Commission: dialogue with atmospheric scientists (third session), 4 May 2017", paras. 4–12 and 21–30, respectively. Available from http://legal.un.org/docs/?path=../ilc/sessions/69/pdfs/english/informal_dialogue_4may2017.pdf&lang=E.

[30] General Assembly resolution 75/239 of 31 December 2020 on oceans and the law of the sea, parts IX and XI. See also General Assembly resolutions 71/257 of 23 December 2016; 72/73 of 5 December 2017; 73/124 of 11 December 2018; 74/19 of 10 December 2019.

[31] IPCC, *Climate Change and Land: An IPCC Special Report on Climate Change, Desertification, Land Degradation, Sustainable Land Management, Food Security, and Greenhouse Gas Fluxes in Terrestrial Ecosystems* (2019). Available at www.ipcc.ch/srccl/.

[32] United Nations Division for Ocean Affairs and the Law of the Sea, "First Global Integrated Marine Assessment (first World Ocean Assessment)". Available from www.un.org/depts/los/global_reporting/WOA_RegProcess.htm (see, in particular, chap. 20 on "Coastal, riverine and atmospheric inputs from land"). The summary of the report was approved by the General Assembly at its seventieth session: see General Assembly resolution 70/235 of 23 December 2015 on oceans and the law of the sea.

[33] General Assembly resolution 70/1 of 25 September 2015, Transforming our world: the 2030 Agenda for Sustainable Development, para. 14. See also "Oceans and the law of the sea: report of the Secretary-General" (A/71/74/Add.1), chap. VIII ("Oceans and climate change and ocean acidification"), paras. 115–122.

that contribute to global warming and climate change, including exhaust gases, cargo emissions, emissions of refrigerants and other emissions.[34]

(7) The sixth preambular paragraph addresses one of the most profound impacts of atmospheric degradation for all States, that is the sea-level rise caused by global warming. It draws particular attention to the special situation of low-lying coastal areas and small island developing States due to sea-level rise. The Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) estimates that the global mean sea-level rise is likely to be between 26 cm and 98 cm by the year 2100.[35] While exact figures and rates of change still remain uncertain, the report states that it is "virtually certain" that sea levels will continue to rise during the twenty-first century, and for centuries beyond – even if the concentrations of greenhouse gas emissions are stabilized. Moreover, sea-level rise is likely to exhibit "a strong regional pattern, with some places experiencing significant deviations of local and regional sea level change from the global mean change".[36] Such degree of change in sea levels may pose a potentially serious, maybe even disastrous, threat to many coastal areas, especially those with large, heavily populated and low-lying coastal areas, as well as to small island developing States.[37]

(8) The sixth preambular paragraph is linked to the interrelationship between the rules of international law relating to the protection of the atmosphere and the rules of the law of the sea addressed in paragraph 1 of draft guideline 9.[38] Special consideration to be given to persons and groups in vulnerable situations are referred to in paragraph 3 of draft guideline 9.[39] The words "in particular" are intended to acknowledge specific areas without necessarily limiting the list of potentially affected areas.

(9) The seventh preambular paragraph emphasizes the interests of future generations, including with a view to human rights protection, as well as intergenerational equity. The goal is to ensure that the planet remains habitable for future generations. In taking measures to protect the atmosphere today, it is important to fully take into account the long-term conservation of the quality of the atmosphere. The Paris Agreement, in its preamble, after acknowledging that climate change is a common concern of humankind, provides that parties should, when taking action to address climate change, respect, promote and consider, among other things, their respective obligations on human rights, as well as intergenerational equity. The importance of "intergenerational" considerations was already expressed in principle 1 of the 1972 Stockholm Declaration.[40] It also underpins the concept of sustainable development,

[34] The 2009 study by the International Maritime Organization (IMO) on greenhouse gas emissions, Ø. Buhaug *et al.*, *Second IMO GHG Study 2009* (London, IMO, 2009), p. 23. See also T.W.P. Smith *et al.*, *Third IMO GHG Study* (London, IMO, 2014), executive summary, table 1. M. Righi, J. Hendricks and R. Sausen, "The global impact of the transport sectors on atmospheric aerosol in 2030 – Part 1: land transport and shipping", *Atmospheric Chemistry and Physics*, vol. 15 (2015), pp. 633–651.

[35] IPCC, *Climate Change 2013: The Physical Science Basis. Working Group I Contribution to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge, Cambridge University Press, 2013), p. 1180. See also chapter IX on sea-level rise in relation to international law.

[36] *Ibid*., p. 1140. See also IPCC, *IPCC Special Report on the Ocean and Cryosphere in a Changing Climate* (2019). Available at www.ipcc.ch/srocc/.

[37] See A.H.A. Soons, "The effects of a rising sea level on maritime limits and boundaries", *Netherlands International Law Review*, vol. 37 (1990), pp. 207–232; M. Hayashi, "Sea-level rise and the law of the sea: future options", in D. Vidas and P.J. Schei, eds., *The World Ocean in Globalisation: Climate Change, Sustainable Fisheries, Biodiversity, Shipping, Regional Issues* (Leiden, Brill/Martinus Nijhoff, 2011), pp. 187 *et seq*. See also, International Law Association, *Report of the Seventy-fifth Conference held in Sofia, August 2012* (London, 2012), pp. 385–428, and International Law Association, *Johannesburg Conference* (2016): *International Law and Sea Level Rise* (interim report), pp. 13–18. See also International Law Association, *Sydney Conference* (2018): *International Law and Sea Level Rise* (report), Part II, p. 866.

[38] See para. (9) of the commentary to draft guideline 9 below.

[39] See paras. (16) to (18) of the commentary to draft guideline 9 below.

[40] Principle 1 of the Declaration refers to the "solemn responsibility to protect and improve the environment for present and future generations".

as formulated in the 1987 Brundtland Report, *Our Common Future*,[41] and informs the 2030 Agenda for Sustainable Development.[42] It is also reflected in the preamble of the 1992 Convention on Biological Diversity,[43] and in other treaties.[44] Article 3, paragraph 1, of the United Nations Framework Convention on Climate Change, for example, provides that: "Parties should protect the climate system for the benefit of present and future generations of humankind". The International Court of Justice has noted, in its 1996 Advisory Opinion in the *Nuclear Weapons* case with respect to such weapons, the imperative to take into account "in particular their … ability to cause damage to generations to come".[45] The term "interests" is employed rather than "benefit" in the paragraph. A similar formulation is used in draft guideline 6, which refers to the interests of future generations in the context of "equitable and reasonable utilization of the atmosphere".[46]

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[41] Report of the World Commission on Environment and Development, *Our Common Future* (Oxford, Oxford University Press, 1987). It emphasized the importance of "development that meets the needs of the present without compromising the ability of future generations" (p. 43).

[42] General Assembly resolution 70/1 of 25 September 2015, which emphasizes the need to protect the planet from degradation so that it can "support the needs of present and future generations".

[43] The preamble of the Convention provides for the "benefit of present and future generations" in conservation and sustainable use of biological diversity.

[44] Article 4 (vi) of the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management (Vienna, 5 September 1997, United Nations, *Treaty Series*, vol. 2153, No. 37605, p. 303) provides that parties shall "strive to avoid actions that impose reasonably predictable impacts on future generations greater than those permitted for the current generation".

[45] *Legality of the Threat or Use of Nuclear Weapons, Advisory Opinion, I.C.J. Reports 1996*, p. 226, at p. 244, para. 36.

[46] There have been national court decisions that recognize intergenerational equity, see Australia, *Gray v. Minister for Planning*, [2006] NSWLEC 720; India, *Vellore Citizens' Welfare Forum and State of Tamil Nadu (joining) v. Union of India and others*, original public interest writ petition, 1996 5 SCR 241, ILDC 443 (IN 1996); Kenya, *Waweru, Mwangi (joining) and others (joining) v. Kenya*, miscellaneous civil application, Case No. 118 of 2004, Application No. 118/04, ILDC 880 (KE 2006); South Africa, *Fuel Retailers Association of South Africa v. Director-General, Environmental Management, Department of Agriculture, Conservation and Environment, Mpumalanga Province, and others*, [2007] ZACC 13, 10 BCLR 1059; Pakistan, *Rabab Ali v. Federation of Pakistan*, petition filed 6 April 2016 (summary available at www.ourchildrenstrust.org/pakistan). For commentary, see C. Redgwell, "Intra- and inter-generational equity", in C.P. Carlarne, K.R. Gray and R.G. Tarasofsky, eds., *The Oxford Handbook of International Climate Change Law* (Oxford, Oxford University Press, 2016), pp. 185–201, at p. 198. See also, E. Brown Weiss, *In Fairness to Future Generations: International Law, Common Patrimony, and Intergenerational Equity* (Tokyo, United Nations University Press, 1989), p. 96; M. Bruce, "Institutional aspects of a charter of the rights of future generations", in S. Busuttil *et al.*, eds., *Our Responsibilities Towards Future Generations* (Valetta, UNESCO and Foundation for International Studies, University of Malta, 1990), pp. 127–131; T. Allen, "The Philippine children's case: recognizing legal standing for future generations", *Georgetown International Environmental Law Review*, vol. 6 (1994), pp. 713–741 (referring to the judgment of the Philippine Supreme Court in *Minors Oposa et al. v. Factoran* (30 July 1993), *International Legal Materials*, vol. 33 (1994), p. 168). Standing to sue in some proceedings was granted on the basis of the "public trust doctrine", which holds governments accountable as trustees for the management of common environmental resources. See M.C. Wood and C.W. Woodward IV, "Atmospheric trust litigation and the constitutional right to a healthy climate system: judicial recognition at last", *Washington Journal of Environmental Law and Policy*, vol. 6 (2016), pp. 634–684; C. Redgwell, *Intergenerational Trusts and Environmental Protection* (Manchester, Manchester University Press, 1999); K. Coghill, C. Sampford and T. Smith, eds., *Fiduciary Duty and the Atmospheric Trust* (London, Routledge, 2012); M.C. Blumm and M.C. Wood, *The Public Trust Doctrine in Environmental and Natural Resources Law*, 2nd ed. (Durham, North Carolina, Carolina Academic Press, 2015); and K. Bosselmann, *Earth Governance: Trusteeship of the Global Commons* (Cheltenham, Edward Elgar Publishing, 2015). In a judgment on 13 December 1996, the Indian Supreme Court declared the public trust doctrine "the law of the land"; *M.C. Mehta v. Kamal Nath and Others*, (1997) 1 Supreme Court Cases 388, reprinted in C.O. Okidi, ed., *Compendium of Judicial Decisions in Matters Related to the Environment: National Decisions*, vol. I (Nairobi, United Nations Environment Programme/United Nations Development Programme, 1998), p. 259. See J. Razzaque, "Application of public trust doctrine in Indian environmental cases", *Journal of Environmental Law*, vol. 13 (2001), pp. 221–234.

(10) The eighth preambular paragraph is based on the 2013 understanding of the Commission according to which the topic was included in the programme of work at its sixty-fifth session.[47] This preambular paragraph was considered important to reflect certain elements of the 2013 understanding, as the latter resulted in a significant limitation on both the scope of the topic and the outcome of the work of the Commission. This preambular paragraph should be read in conjunction with paragraph 2 of draft guideline 2 on scope.

Guideline 1
Use of terms

For the purposes of the present draft guidelines:

(*a*) "atmosphere" means the envelope of gases surrounding the Earth;

(*b*) "atmospheric pollution" means the introduction or release by humans, directly or indirectly, into the atmosphere of substances or energy contributing to significant deleterious effects extending beyond the State of origin of such a nature as to endanger human life and health and the Earth's natural environment;

(*c*) "atmospheric degradation" means the alteration by humans, directly or indirectly, of atmospheric conditions having significant deleterious effects of such a nature as to endanger human life and health and the Earth's natural environment.

Commentary

(1) The present draft guideline on the "Use of terms" seeks to provide a common understanding of what is covered by the present draft guidelines. The terms used are provided only "for the purposes of the present draft guidelines", and are not intended in any way to affect any existing or future definitions of any such terms in international law.

(2) No definition has been given of the term "atmosphere" in the relevant international instruments. A working definition for the present draft guidelines is provided in subparagraph (*a*). It is inspired by the definition given by IPCC.[48]

(3) The definition provided is consistent with the approach of scientists. According to scientists, the atmosphere exists in what is called the atmospheric shell.[49] Physically, it extends upwards from the Earth's surface, which is the bottom boundary of the dry atmosphere. The average composition of the atmosphere up to an altitude of 25 km is as follows: nitrogen (78.08%), oxygen (20.95%), together with trace gases, such as argon (0.93%), helium and radiatively active greenhouse gases, such as carbon dioxide (0.035%) and ozone, as well as greenhouse water vapour in highly variable amounts.[50] The atmosphere also contains clouds and aerosols.[51] The atmosphere is divided vertically into five spheres on the basis of temperature characteristics. From the lower to upper layers, the spheres are: troposphere, stratosphere, mesosphere, thermosphere, and the exosphere. Approximately 80 per cent of air mass exists in the troposphere and 20 per cent in the stratosphere. The thin, white, hazy belt (with a thickness of less than 1 per cent of the radius of the globe) that one sees when looking at the earth from a distance is the atmosphere. Scientifically these spheres

[47] *Yearbook … 2013*, vol. II (Part Two), para. 168.

[48] Fifth Assessment Report, Working Group III, annex I. IPCC, *Climate Change 2014: Mitigation of Climate Change*, O. Edenhofer *et al*., eds. (Cambridge, Cambridge University Press, 2014), p. 1252, available at www.ipcc.ch/report/ar5/wg3/.

[49] The American Meteorology Society defines the "atmospheric shell" (also called atmospheric layer or atmospheric region) as "any one of a number of strata or 'layers' of the earth's atmosphere" (available at http://glossary.ametsoc.org/wiki/Atmospheric_shell).

[50] Physically, water vapour, which accounts for roughly 0.25 per cent of the mass of the atmosphere, is a highly variable constituent. In atmospheric science, "because of the large variability of water vapor concentrations in air, it is customary to list the percentages of the various constituents in relation to dry air". Ozone concentrations are also highly variable. Over 0.1 ppmv (parts per million by volume) of ozone concentration in the atmosphere is considered hazardous to human beings. See J.M. Wallace and P.V. Hobbs, *Atmospheric Science: An Introductory Survey*, 2nd ed. (Boston, Elsevier Academic Press, 2006), p. 8.

[51] *Ibid.*

are grouped together as the "*lower atmosphere*", which extends to an average altitude of 50 km, and can be distinguished from the "*upper atmosphere*".[52] The temperature of the atmosphere changes with altitude. In the troposphere (up to the tropopause, at a height of about 12 km), the temperature decreases as altitude increases because of the absorption and radiation of solar energy by the surface of the planet.[53] In contrast, in the stratosphere (up to the stratopause, at a height of nearly 50 km), temperature gradually increases with height[54] because of the absorption of ultraviolet radiation by ozone. In the mesosphere (up to the mesopause, at a height of above 80 km), temperatures again decrease with altitude. In the thermosphere, temperatures once more rise rapidly because of X-ray and ultraviolet radiation from the sun. The atmosphere "has no well-defined upper limit".[55]

(4) Aside from its physical characteristics, it is important to recognize the function of the atmosphere as a medium within which there is constant movement as it is within that context that the "transport and dispersion" of polluting and degrading substances occurs (see the second preambular paragraph). Indeed, the long-range transboundary movement of polluting substances is one of the major problems for the atmospheric environment. In addition to transboundary pollution, other concerns relate to the depletion of the ozone layer and to climate change.

(5) Subparagraph (*b*) defines "atmospheric pollution" and addresses transboundary air pollution, whereas subparagraph (*c*) defines "atmospheric degradation" and refers to global atmospheric problems. By stating "by humans", both subparagraphs (*b*) and (*c*) make it clear that the draft guidelines concern "anthropogenic" atmospheric pollution and atmospheric degradation. The focus on human activity, whether direct or indirect, is a deliberate one, as the present draft guidelines seek to provide guidance to States and the international community.

(6) The term "atmospheric pollution" (or, air pollution) is sometimes used broadly to include global deterioration of atmospheric conditions such as ozone depletion and climate change,[56] but the term is used in the present draft guidelines in a narrow sense, in line with existing treaty practice. It thus excludes the global issues from the definition of atmospheric pollution.

(7) In defining "atmospheric pollution", subparagraph (*b*) uses the language that is essentially based on article 1 (a) of the 1979 Convention on Long-Range Transboundary Air Pollution,[57] which provides that:

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[52] The American Meteorological Society defines the "lower atmosphere" as "generally and quite loosely, that part of the atmosphere in which most weather phenomena occur (i.e., the troposphere and lower stratosphere); hence used in contrast to the common meaning for the upper atmosphere" (available at http://glossary.ametsoc.org/wiki/Lower_atmosphere). The "upper atmosphere" is defined as residual, that is "the general term applied to the atmosphere above the troposphere" (available at http://glossary.ametsoc.org/wiki/Upper_atmosphere).

[53] The thickness of the troposphere is not the same everywhere; it depends on the latitude and the season. The top of the troposphere lies at an altitude of about 17 km at the equator, although it is lower at the poles. On average, the height of the outer boundary of the troposphere is about 12 km. See E.J. Tarbuck, F.K. Lutgens and D. Tasa, *Earth Science*, 13th ed. (New Jersey, Pearson, 2011), p. 466.

[54] Strictly, the temperature of the stratosphere remains constant to a height of about 20–35 km and then begins a gradual increase.

[55] See Tarbuck, Lutgens and Tasa, *Earth Science* (footnote 53 above), p. 467.

[56] For instance, art. 1, para. 1, of the Cairo resolution (1987) of the Institute of International Law (Institut de droit international) on "Transboundary Air Pollution" provides that: "[f]or the purposes of this Resolution, 'transboundary air pollution' means any physical, chemical or biological *alteration in the composition* or quality of the atmosphere which results directly or indirectly from human acts or omissions and produces injurious or deleterious effects in the environment of other States or of areas beyond the limits of national jurisdiction." (emphasis added). Available from www.idi-iil.org, *Resolutions*.

[57] Convention on Long-Range Transboundary Air Pollution (Geneva, 13 November 1979), United Nations, *Treaty Series*, vol. 1302, No. 21623, p. 217. The formulation of art. 1 (a) of the Convention on Long-Range Transboundary Air Pollution goes back to the definition of pollution by the

> "[a]ir pollution" means "the introduction by man, directly or indirectly, of substances or energy into the air resulting in deleterious effects of such a nature as to endanger human health, harm living resources and ecosystems and material property and impair or interfere with amenities and other legitimate uses of the environment, and 'air pollutants' shall be construed accordingly."

(8) However, in departing from the language of the 1979 Convention, the words "contributing to" were used instead of "resulting in" in order to safeguard the overall balance in ensuring international cooperation. The change was made for this particular "use of terms" and "for the purpose of the present draft guidelines", which are not intended to give a "definition" for international law in general, as noted in paragraph (1) of the present commentary.

(9) Another departure from the 1979 Convention is the addition the word "significant" before "deleterious". This is intended, for the purposes of consistency, to align the wording of subparagraphs (*b*) and (*c*). The term "significant deleterious effects" is intended to qualify the range of human activities to be covered by the draft guidelines. The Commission has further employed the term "significant" in its previous work.[58] In doing so, the Commission has stated that "*significant is something more than 'detectable' but need not be at the level of 'serious' or 'substantial'*. The harm must lead to a real detrimental effect [and]… such detrimental effects must be susceptible of being measured by factual and objective standards".[59] Moreover, the term "significant", while determined by factual and objective standards, also involves a value determination that depends on the circumstances of a particular case and the period in which such determination is made. For instance, a particular deprivation at a particular time might not be considered "significant" because, at that time, scientific knowledge or human appreciation did not assign much value to the resource. The question of what constitutes "significant" is more of a factual assessment.[60] The deleterious effects arising from an introduction or release have to be of such a nature as to endanger human life and health and the Earth's natural environment, including by contributing to endangering them.

Council of the Organization for Economic Cooperation and Development (OECD) in its Recommendation C(74)224 on "Principles concerning Transfrontier Pollution", of 14 November 1974 (*International Legal Materials*, vol. 14 (1975), p. 243), which reads as follows: "For the purpose of these principles, pollution means the introduction by man, directly or indirectly, of substances or energy into the environment resulting in deleterious effects of such a nature as to endanger human health, harm living resources and ecosystems, and impair or interfere with amenities and other legitimate uses of the environment". See H. van Edig, ed., *Legal Aspects of Transfrontier Pollution* (Paris, OECD, 1977), p. 13; see also Boyle and Redgwell, *International Law and the Environment*, (see footnote 21 above) pp. 364–371; A. Kiss and D. Shelton, *International Environmental Law*, 3rd ed. (New York, Transnational Publishers, 2004), p. 99 (definition of pollution: "also forms of energy such as noise, vibrations, heat, and radiation are included").

[58] See, for example, art. 7 of the Convention on the Law of the Non-navigational Uses of International Watercourses (General Assembly resolution 51/229 of 21 May 1997, annex); art. 1 of the articles on prevention of transboundary harm from hazardous activities (2001) (General Assembly resolution 62/68 of 6 December 2007, annex); principle 2 of the principles on the allocation of loss in the case of transboundary harm arising out of hazardous activities (2006) (General Assembly resolution 61/36 of 4 December 2006, annex); art. 6 of the articles on the law of transboundary aquifers (2008) (General Assembly resolution 63/124 of 11 December 2008, annex). It was also underlined that the term "significant" has been used in the jurisprudence of the International Court of Justice, including in its 2015 judgment in *Certain Activities Carried Out by Nicaragua in the Border Area (Costa Rica v. Nicaragua*) and *Construction of a Road in Costa Rica along the San Juan River (Nicaragua v. Costa Rica)* (*Judgment, I.C.J. Reports 2015*, p. 665, at paras. 104–105 and 108; see also paras. 153, 155, 156, 159, 161, 168, 173, 196 and 217).

[59] Para. (4) of the commentary to article 2 of the articles on prevention of transboundary harm from hazardous activities, 2001, *Yearbook … 2001*, Vol. II (Part Two) and corrigendum, p. 152, at para. 98.

[60] See, for example, the commentary to the articles on prevention of transboundary harm from hazardous activities (paras. (4) and (7) of the commentary to article 2), *ibid*. See also the commentary to the principles on the allocation of loss in the case of transboundary harm arising out of hazardous activities (paras. (1) to (3) of the commentary to principle 2), *Yearbook … 2006*, vol. II (Part Two), para. 67.

(10) Article 1 (a) of the Convention on Long-Range Transboundary Air Pollution and article 1, paragraph 1 (4), of the United Nations Convention on the Law of the Sea provide for "introduction of energy" (as well as substances) as part of the "pollution".[61] The reference to "energy" in the present subparagraph (*b*) is understood to include heat, light, noise and radioactivity introduced and released into the atmosphere through human activities.[62] The reference to radioactivity as energy is without prejudice to peaceful uses of nuclear energy in relation to climate change in particular.[63]

(11) The expression "effects extending beyond the State of origin" in subparagraph (*b*) clarifies that the draft guidelines address the transboundary effects, excluding as a matter of general orientation regarding scope, domestic or local pollution, and the expression is understood in the sense provided in article 1 (b) of the Convention on Long-Range Transboundary Air Pollution that:

> "[l]ong-range transboundary air pollution" means air pollution whose physical origin is situated wholly or in part within the area under the national jurisdiction of one State and which has adverse effects in the area under the jurisdiction of another State at such a distance that it is not generally possible to distinguish the contribution of individual emission sources or groups of sources."

(12) As is evident from draft guideline 2 below, on scope, the present draft guidelines are concerned with the protection of the atmosphere from both atmospheric pollution and atmospheric degradation. Since subparagraph (*b*) covers "atmospheric pollution" only, it is necessary, for the purposes of the draft guidelines, to address issues other than atmospheric pollution by means of a different definition. For this purpose, subparagraph (*c*) provides a definition of "atmospheric degradation". This definition is intended to include problems of ozone depletion and climate change. It covers the alteration of the global atmospheric conditions caused by humans, whether directly or indirectly. These may be changes to the physical environment or biota or alterations to the composition of the global atmosphere.

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[61] See also the Protocol concerning Pollution from Land-Based Sources and Activities to the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (Oranjestad, 6 October 1999), *Treaties and Other International Acts Series*, 10-813, art. 1 (c).

[62] With regard to heat, see World Meteorological Organization/International Global Atmospheric Chemistry, Project Report, "Impacts of megacities on air pollution and climate", Global Atmosphere Watch Report No. 205 (Geneva, World Meteorological Organization, 2012); D. Simon and H. Leck, "Urban adaptation to climate/environmental change: governance, policy and planning", Special Issue, *Urban Climate*, vol. 7 (2014) pp. 1–134; J.A. Arnfield, "Two decades of urban climate research: a review of turbulence, exchanges of energy and water, and the urban heat island", *International Journal of Climatology*, vol. 23 (2003), pp. 1–26; L. Gartland, *Heat Islands: Understanding and Mitigating Heat in Urban Areas* (London, Earthscan, 2008); see, in general, B. Stone Jr., *The City and the Coming Climate: Climate Change in the Places We Live* (Cambridge, Massachusetts, Cambridge University Press, 2012). Regarding light pollution, see C. Rich and T. Longcore, eds., *Ecological Consequences of Artificial Night Lighting*, (Washington, D.C., Island Press, 2006); P. Cinzano and F. Falchi, "The propagation of light pollution in the atmosphere", *Monthly Notices of the Royal Astronomic Society*, vol. 427 (2012), pp. 3337–3357; F. Bashiri and C. Rosmani Che Hassan, "Light pollution and its effects on the environment", *International Journal of Fundamental Physical Sciences*, vol. 4 (2014), pp. 8–12. Regarding acoustic/noise pollution, see e.g. annex 16 of the 1944 Convention on International Civil Aviation (Chicago, 7 December 1944, United Nations, *Treaty Series*, vol. 15, No. 295 p. 295), vol. I: *Aircraft Noise*, 5th ed. 2008; see P. Davies and J. Goh, "Air transport and the environment: regulating aircraft noise", *Air and Space Law*, vol. 18 (1993), pp. 123–135. Concerning radioactive emissions, see D. Rauschning, "Legal problems of continuous and instantaneous long-distance air pollution: interim report", *Report of the Sixty-Second Conference of the International Law Association* (Seoul, 1986), pp. 198–223, at p. 219; and International Atomic Energy Agency, *Environmental Consequences of the Chernobyl Accident and their Remediation: Twenty Years of Experience – Report of the Chernobyl Forum Expert Group 'Environment'*, Radiological Assessment Report Series (2006), STI/PUB/1239. See also United Nations Scientific Committee on the Effects of Atomic Radiation, 2013 Report to the General Assembly, *Scientific Annex A: Levels and effects of radiation exposure due to the nuclear accident after the 2011 great east-Japan earthquake and tsunami* (United Nations publication, Sales No. E.14.IX.1), available at www.unscear.org/docs/reports/2013/13-85418_Report_2013_Annex_A.pdf.

[63] International Atomic Energy Agency, *Climate Change and Nuclear Power 2014* (Vienna, 2014), p. 7.

(13) The 1985 Vienna Convention for the Protection of the Ozone Layer[64] provides the definition of "adverse effects" in article 1, paragraph 2, as meaning "changes in the physical environment or biota, including changes in climate, which have significant deleterious effects on human health or on the composition, resilience and productivity of natural and managed ecosystems, or on materials useful to mankind." Article 1, paragraph 2, of the United Nations Framework Convention on Climate Change defines "climate change" as "a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods".

Guideline 2
Scope

1. The present draft guidelines concern the protection of the atmosphere from atmospheric pollution and atmospheric degradation.

2. The present draft guidelines do not deal with and are without prejudice to questions concerning the polluter-pays principle, the precautionary principle and the common but differentiated responsibilities principle.

3. Nothing in the present draft guidelines affects the status of airspace under international law nor questions related to outer space, including its delimitation.

Commentary

(1) Draft guideline 2 sets out the scope of the draft guidelines on the protection of the atmosphere. Under paragraph 1, the draft guidelines deal with the protection of the atmosphere from atmospheric pollution and atmospheric degradation. Paragraphs 2 and 3 contain saving clauses.

(2) Paragraph 1 deals with the protection of the atmosphere in two areas, atmospheric pollution and atmospheric degradation. The draft guidelines are concerned only with anthropogenic causes and not with those of natural origins such as volcanic eruptions and meteorite collisions. The focus on transboundary pollution and global atmospheric degradation caused by human activity reflects current realities.[65]

(3) In Agenda 21, it was recognized that transboundary air pollution has adverse health impacts on humans and other detrimental environmental impacts, such as tree and forest loss and the acidification of water bodies.[66] Moreover, according to IPCC, the science indicates with 95 per cent certainty that human activity is the dominant cause of observed warming since the mid-twentieth century. The Panel has noted that human influence on the climate system is clear. Such influence has been detected in warming of the atmosphere and the ocean, in changes in the global water cycle, in reductions in snow and ice, in global mean sea-level rise, and in changes in some climate extremes.[67] The Panel has further noted that it is extremely likely that more than half of the observed increase in global average surface temperature from 1951 to 2010 was caused by the anthropogenic increase in greenhouse gas concentrations and other anthropogenic "forcings" together.[68]

(4) The guidelines do not deal with domestic or local pollution as such. It may be noted however that whatever happens locally may sometimes have a bearing on the transboundary and global context in so far as the protection of the atmosphere is concerned. Ameliorative

[64] Vienna Convention for the Protection of the Ozone Layer (Vienna, 22 March 1985), United Nations, *Treaty Series*, vol. 1513, No. 26164, p. 293.

[65] See, generally, IPCC, *Climate Change 2013: The Physical Science Basis, Summary for Policy makers*, available at www.ipcc.ch/pdf/assessment-report/ar5/wg1/WG1AR5_SPM_FINAL.pdf.

[66] *Report of the United Nations Conference on Environment and Development, Rio de Janeiro, 3–14 June 1992*, vol. I, *Resolutions Adopted by the Conference* (A/CONF.151/26/Rev.1(Vol. I); United Nations publication, Sales No. E.93.I.8 and corrigendum), resolution 1, annex II, para. 9.25.

[67] IPCC, *Climate Change 2013: The Physical Science Basis, Summary for Policy makers*.

[68] *Ibid.* IPCC, *Global Warming of 1.5 ºC. An IPCC Special Report, Summary for Policymakers* (2018), pp. 4–5. Available at www.ipcc.ch/sr15/chapter/spm/.

human action, taken individually or collectively, may need to take into account the totality of the atmosphere, hydrosphere, biosphere and geosphere and their interactions.

(5) Sulphur dioxide and nitrogen oxides are the main sources of transboundary atmospheric pollution,[69] while climate change and depletion of the ozone layer are the two principal concerns leading to atmospheric degradation.[70] Certain ozone depleting substances also contribute to global warming.[71]

(6) Paragraph 2 reflects what is not covered by the present draft guidelines. It is based on the 2013 understanding of the Commission. It should be read in conjunction with the eighth preambular paragraph. In order to provide greater clarity to the formula of the understanding which stated "do not deal with, but without prejudice to", the paragraph has been reformulated to combine the two phrases with "and" instead of "but". Paragraph 2 further explains that questions concerning the polluter-pays principle, the precautionary principle and the common but differentiated responsibilities principle are excluded from the present draft guidelines. It should be noted that, in not dealing with these three specified principles, this paragraph does not in any way imply the legal irrelevance of those principles. Also excluded in the 2013 understanding from the scope of this topic were questions concerning liability of States and their nationals, and the transfer of funds and technology to developing countries, including intellectual property rights.

(7) The 2013 understanding also had a clause stating that "[t]he present draft guidelines would not deal with specific substances, such as black carbon, tropospheric ozone and other dual-impact substances, which are the subject of negotiations among States". This has also not been reflected in the text of the draft guideline.

(8) Paragraph 3 is a saving clause that the draft guidelines do not affect the status of airspace under international law. The atmosphere and airspace are two different concepts, which should be distinguished. The regimes covering the atmosphere and outer space are also separate. Accordingly, the draft guidelines do not affect the legal status of airspace nor address questions related to outer space.

(9) The atmosphere, as an envelope of gases surrounding the Earth, is dynamic and fluctuating, with gases that constantly move without regard to territorial boundaries.[72] The atmosphere is invisible, intangible and non-separable. Airspace, on the other hand, is a static and spatial-based institution over which the State, within its territory, has "complete and exclusive sovereignty". For instance, article 1 of the Convention on International Civil Aviation provides that "every State has complete and exclusive sovereignty over the 'airspace' above its territory".[73] In turn, article 2 of the same Convention deems the territory of a State to be the land areas and territorial waters adjacent thereto under the sovereignty, suzerainty, protection or mandate of such State. The airspace beyond the boundaries of territorial sea is not under the sovereignty of any State and is open for use by all States, like the high seas.

(10) The atmosphere is spatially divided into spheres on the basis of temperature characteristics. There is no sharp scientific boundary between the atmosphere and outer space. Beyond 100 km, traces of the atmosphere gradually merge with the emptiness of space.[74] The Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, is silent on the definition of "outer

[69] Boyle and Redgwell, *International Law and the Environment* (see footnote 21 above), pp. 378–379.

[70] *Ibid.*, p. 379. The linkages between climate change and ozone depletion are addressed in the preamble as well as in article 4 of the United Nations Framework Convention on Climate Change. The linkage between transboundary atmospheric pollution and climate change is addressed in the preamble and article 2, paragraph 1, of the 2012 amendment of the Gothenburg Protocol.

[71] *Ibid.*

[72] See generally Boyle and Redgwell, *International Law and the Environment* (footnote 21 above), pp. 359–361.

[73] Convention on International Civil Aviation (Chicago, 7 December 1944), United Nations, *Treaty Series*, vol. 15, No. 102, p. 295. See also article 2, paragraph 2, of the United Nations Convention on the Law of the Sea, which provides that "sovereignty extends to the air space over the territorial sea as well as to its bed and subsoil".

[74] Tarbuck, Lutgens and Tasa, *Earth Science* (see footnote 53 above), pp. 465 and 466.

space".[75] The matter has been under discussion within the context of the Legal Sub-Committee of the Committee on the Peaceful Uses of Outer Space since 1959, which has looked at both spatial and functional approaches to the questions of delimitation.[76]

Guideline 3
Obligation to protect the atmosphere

States have the obligation to protect the atmosphere by exercising due diligence in taking appropriate measures, in accordance with applicable rules of international law, to prevent, reduce or control atmospheric pollution and atmospheric degradation.

Commentary

(1) Draft guideline 3 restates the obligation to protect the atmosphere. It is central to the present draft guidelines. In particular, draft guidelines 4, 5 and 6, below, which seek to apply various principles of international environmental law to the specific situation of the protection of the atmosphere, flow from the present guideline.

(2) The draft guideline concerns both the transboundary and global contexts. It will be recalled that draft guideline 1 contains a "transboundary" element in defining "atmospheric pollution" (as the introduction or release by humans, directly or indirectly, into the atmosphere of substances or energy contributing to significant deleterious effects "extending beyond the State of origin", of such a nature as to endanger human life and health and the Earth's natural environment), and a "global" dimension in defining "atmospheric degradation" (as the alteration by humans, directly or indirectly, of atmospheric conditions having significant deleterious effects of such a nature as to endanger human life and health and the Earth's natural environment).

(3) The present draft guideline delimits the obligation to protect the atmosphere to preventing, reducing or controlling atmospheric pollution and atmospheric degradation. The formulation of the present draft guideline finds its genesis in principle 21 of the 1972 Stockholm Declaration, which reflected the finding in the *Trail Smelter* arbitration.[77] According to principle 21, "States have the sovereign right to exploit their own resources pursuant to their own environmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction". This principle is further reflected in principle 2 of the 1992 Rio Declaration.

(4) The reference to "States" for the purposes of the draft guideline denotes both the possibility of States acting individually and jointly, as appropriate.

(5) As presently formulated, the draft guideline is without prejudice to whether or not the obligation to protect the atmosphere is an *erga omnes* obligation in the sense of article 48 of the articles on responsibility of States for internationally wrongful acts,[78] a matter on which there are different views.

[75] Moscow, London and Washington, D.C., 27 January 1967, United Nations, *Treaty Series*, vol. 610, No. 8843, p. 205.

[76] See, generally, B. Jasani, ed., *Peaceful and Non-Peaceful uses of Space: Problems of Definition for the Prevention of an Arms Race*, United Nations Institute for Disarmament Research (New York, Taylor and Francis, 1991), especially chaps. 2–3.

[77] See UNRIAA, vol. III (Sales No. 1949.V.2), pp. 1905–1982 (Award of 11 March 1941), 1907, at p. 1965 *et seq.* ("under the principles of international law … no State has the right to use or permit the use of territory in such a manner as to cause injury by fumes in or to the territory of another or the properties or persons therein, when the case is of serious consequence and the injury is established by clear and convincing evidence") and the first report of the Special Rapporteur (A/CN.4/667), para. 43. See also A.K. Kuhn, "The Trail Smelter Arbitration, United States and Canada", *American Journal of International Law*, vol. 32 (1938), pp. 785–788, and *ibid*., vol. 35 (1941), pp. 665–666; and J.E. Read, "The Trail Smelter Dispute", *Canadian Yearbook of International Law*, vol. 1 (1963), pp. 213–229.

[78] Article 48 (Invocation of responsibility by a State other than an injured State) provides that: "1. Any State other than an injured State is entitled to invoke the responsibility of another State in accordance

(6) Significant adverse effects on the atmosphere are caused, in large part, by the activities of individuals and private industries, which are not normally attributable to a State. In this respect, due diligence requires States to "ensure" that such activities within their jurisdiction or control do not cause significant adverse effects. This does not mean, however, that due diligence applies solely to private activities since a State's own activities are also subject to the due diligence rule.[79] It is an obligation which entails not only the adoption of appropriate rules and measures, but also a certain level of vigilance in their enforcement and the exercise of administrative control applicable to public and private operators, such as the monitoring of activities undertaken by such operators, to safeguard the rights of the other party. It also requires taking into account the context and evolving standards of both regulation and technology. Therefore, even where significant adverse effects materialize, that does not necessarily constitute a failure of due diligence. Such failure is limited to the State's negligence to meet its obligation to take all appropriate measures to prevent, reduce or control human activities where these activities have or are likely to have significant adverse effects. The States' obligation "to ensure" does not require the achievement of a certain result (obligation of result) but only requires the best available good faith efforts so as not to cause significant adverse effects (obligation of conduct).

(7) The obligation to "prevent, reduce or control" denotes a variety of measures to be taken by States, whether individually or jointly, in accordance with applicable rules relevant to atmospheric pollution on the one hand and atmospheric degradation on the other. The phrase "prevent, reduce or control" draws upon formulations contained in article 194, paragraph 1, of the United Nations Convention on the Law of the Sea, which uses "and"[80] and article 3, paragraph 3, of the United Nations Framework Convention on Climate Change, which uses "or".[81] Important in the consideration of the draft guideline is the obligation to ensure that "appropriate measures" are taken. In this context, it should be noted that the Paris Agreement, "acknowledging" in the preamble that "climate change is a common concern of humankind", states "the importance of ensuring the integrity of all ecosystems, including oceans, and the protection of biodiversity".[82]

(8) Even though the appropriate measures to "prevent, reduce or control" apply to both atmospheric pollution and atmospheric degradation, the reference to "applicable rules of

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with paragraph 2 if … (*b*) the obligation breached is owed to the international community as a whole" (General Assembly resolution 56/83 of 12 December 2001. For the articles adopted by the Commission and the commentaries thereto, see *Yearbook … 2001*, vol. II (Part Two) and corrigendum, chap. IV, sect. E).

[79] *Pulp Mills on the River Uruguay (Argentina v. Uruguay), Judgment, I.C.J. Reports 2010*, p. 14, at pp. 55 and 179, paras. 101 and 197; *Certain Activities Carried Out by Nicaragua in the Border area (Costa Rica v. Nicaragua)* and *Construction of a Road in Costa Rica along the San Juan River (Nicaragua v. Costa Rica)* (see footnote 58 above), paras. 104, 153, 168 and 228; International Tribunal for the Law of the Sea, *Responsibilities and Obligations of States with Respect to Activities in the Area (Request for Advisory Opinion submitted to the Seabed Dispute Chamber)*, Advisory Opinion, 1 February 2011, *ITLOS Reports 2011*, p. 10, at para. 131; draft articles on prevention of transboundary harm from hazardous activities, *Yearbook … 2001*, vol. II (Part Two) and corrigendum, para. 97 (reproduced in General Assembly resolution 62/68, annex, of 6 December 2007), paras. 7–18; first and second reports of the International Law Association Study Group on due diligence in international law, 7 March 2014 and July 2016, respectively; J. Kulesza, *Due Diligence in International Law* (Leiden, Brill, 2016); Société française pour le droit international, *Le standard de* due diligence *et la responsabilité internationale*, Paris, Pedone, 2018; S. Besson, "La *due diligence* en droit international", *Collected Courses of the Hague Academy of International Law*, vol. 409 (2020), pp. 153–398.

[80] M.H. Nordquist *et al.*, eds., *United Nations Convention on the Law of the Sea 1982: A Commentary*, vol. IV (Dordrecht, Martinus Nijhoff, 1991), p. 50.

[81] Article 3, paragraph 3, states that "[t]he Parties should take precautionary measures to anticipate, prevent or minimize the causes of climate change and mitigate its adverse effect". See, for example, United Nations Convention on the Law of the Sea (Montego Bay), United Nations, *Treaty Series*, vol. 1833, No. 31363, p. 3, art. 212; Vienna Convention for the Protection of the Ozone Layer, art. 2, para. 2 (b); United Nations Framework Convention on Climate Change, art. 4; Stockholm Convention on Persistent Organic Pollutants, first preambular paragraph and art. 3; and Minamata Convention on Mercury, arts. 2 and 8–9.

[82] Eleventh and thirteenth preambular paragraphs.

international law" signals a distinction between measures taken, bearing in mind the transboundary nature of atmospheric pollution and global nature of atmospheric degradation and the different rules that are applicable in relation thereto. In the context of transboundary atmospheric pollution, the obligation of States to prevent significant adverse effects is firmly established as customary international law, as confirmed, for example, in the Commission's articles on prevention of transboundary harm from hazardous activities[83] and by the jurisprudence of international courts and tribunals.[84] However, the existence of this obligation in customary international law is still somewhat unsettled for global atmospheric degradation.

(9) The International Court of Justice has stated that "the existence of the general obligation of States to ensure that activities within their jurisdiction and control respect the environment … of areas beyond national control is now part of the corpus of international law",[85] and has attached great significance to respect for the environment "not only for States but also for the whole of mankind".[86] The Tribunal in the *Iron Rhine Railway* case stated that the "duty to prevent, or at least mitigate [significant harm to the environment] … has now become a principle of general international law".[87] These pronouncements are instructive and relevant to the protection of the atmosphere.

Guideline 4
Environmental impact assessment

States have the obligation to ensure that an environmental impact assessment is undertaken of proposed activities under their jurisdiction or control which are likely to cause significant adverse impact on the atmosphere in terms of atmospheric pollution or atmospheric degradation.

Commentary

(1) Draft guideline 4 deals with environmental impact assessment. This is the first of three draft guidelines that flow from the overarching draft guideline 3. The draft guideline is formulated in the passive in order to signal that this is an obligation of conduct and because, given the variety of economic actors, the obligation does not necessarily require the State

[83] *Yearbook … 2001*, vol. II (Part Two) and corrigendum, chap. V, sect. E, art. 3 (Prevention): "The State of origin shall take all appropriate measures to prevent significant transboundary harm or at any event to minimize the risk thereof". The Commission has also dealt with the obligation of prevention in its articles on responsibility of States for internationally wrongful acts. Article 14, paragraph 3, provides that "The breach of an international obligation requiring a State to prevent a given event occurs when the event occurs and extends over the entire period during which the event continues" (*ibid*., chap. IV, sect. E). According to the commentary: "Obligations of prevention are usually construed as best efforts obligations, requiring States to take all reasonable or necessary measures to prevent a given event from occurring, but without warranting that the event will not occur" (*ibid*., para. (14) of the commentary to art. 14, para. 3). The commentary illustrated "the obligation to prevent transboundary damage by air pollution, dealt with in the *Trail Smelter* arbitration" as one of the examples of the obligation of prevention (*ibid*.).

[84] The International Court of Justice has emphasized prevention as well. In the *Gabčíkovo-Nagymaros Project* case, the Court stated that it "is mindful that, in the field of environmental protection, vigilance and prevention are required on account of the often irreversible character of damage to the environment and of the limitations inherent in the very mechanism of reparation of this type of damage" (*Gabčíkovo-Nagymaros Project (Hungary/Slovakia), Judgment, I.C.J. Reports 1997*, p. 7, at p. 78, para. 140). See also *Certain Activities Carried Out by Nicaragua in the Border Area (Costa Rica v. Nicaragua)* and *Construction of a Road along the San Juan River (Nicaragua v. Costa Rica)* (see footnote 58 above), para. 104. In the *Iron Rhine Railway* case, the Arbitral Tribunal also stated that "[t]oday, in international environmental law, a growing emphasis is being put on the duty of prevention" (*Award in the Arbitration regarding the Iron Rhine ("Ijzeren Rijn") Railway between the Kingdom of Belgium and the Kingdom of the Netherlands*, decision of 24 May 2005, UNRIAA, vol. XXVII, pp. 35–125, at p. 116, para. 222).

[85] *Legality of the Threat or Use of Nuclear Weapons, Advisory Opinion, I.C.J. Reports 1996*, p. 226, at pp. 241–242, para. 29.

[86] *Gabčíkovo-Nagymaros Project* (see footnote 84 above), p. 41, para. 53; the Court cited the same paragraph in *Pulp Mills on the River Uruguay* (see footnote 79 above), p. 78, para. 193.

[87] *Iron Rhine Railway* (see footnote 84 above), pp. 66–67, para. 59.

itself to perform the assessment. What is required is that the State put in place the necessary legislative, regulatory and other measures for an environmental impact assessment to be conducted with respect to proposed activities. Procedural safeguards such as notification and consultations are also key to such an assessment. It may be noted that the Kiev Protocol on Strategic Environmental Assessment to the Convention on the Environmental Impact in the Transboundary Context encourages "strategic environmental assessment" of the likely environmental, including health, effects, which means any effect on the environment, including human health, flora, fauna, biodiversity, soil, climate, air, water, landscape, natural sites, material assets, cultural heritage and the interaction among other factors.[88]

(2) The International Court of Justice in the *Gabčíkovo-Nagymaros Project* case alluded to the importance of environmental impact assessment.[89] In *Certain Activities Carried Out by Nicaragua in the Border area (Costa Rica v. Nicaragua)* and *Construction of a Road along the San Juan River (Nicaragua v. Costa Rica)* in the context of due diligence obligations, the Court affirmed that "a State's obligation to exercise due diligence in preventing significant transboundary harm requires that State to ascertain whether there is a risk of significant transboundary harm prior to undertaking an activity having the potential adversely to affect the environment of another State. If that is the case, the State concerned must conduct an environmental impact assessment".[90] The Court concluded that the State in question "ha[d] not complied with its obligation under general international law to perform an environmental impact assessment prior to the construction of the road".[91] In a separate opinion, Judge Hisashi Owada noted that "an environmental impact assessment plays an important and even crucial role in ensuring that the State in question is acting with due diligence under general international environmental law".[92] In the earlier *Pulp Mills* case, the Court stated that "the obligation to protect and preserve, under Article 41 (a) of the Statute, has to be interpreted in accordance with a practice which in recent years has gained so much acceptance among States that it may now be considered *a requirement under general international law to undertake an environmental impact assessment*".[93] Moreover, the Seabed Disputes Chamber of the International Tribunal for the Law of the Sea in its Advisory Opinion on the *Responsibilities and obligations of States regarding activities in the Area* held that the duty to conduct an environmental impact assessment arises not only under the United Nations Convention on the Law of the Sea, but is also a "general obligation under customary international law".[94]

(3) The phrase "of proposed activities under their jurisdiction or control" is intended to indicate that the obligation of States to ensure an environment impact assessment is in respect of activities under their jurisdiction or control. Since environmental threats have no respect for borders, it is not precluded that States, as part of their global environmental responsibility, take decisions jointly regarding environmental impact assessments.

(4) The phrase "which are likely to cause significant adverse impact" establishes a threshold considered necessary to trigger an environmental impact assessment. It is drawn from the language of principle 17 of the Rio Declaration. Moreover, there are other instruments, such as the 1991 Espoo Convention on Environmental Impact Assessment in a Transboundary Context,[95] that use a similar threshold. In the 2010 *Pulp Mills* case, the Court indicated that an environmental impact assessment had to be undertaken where there was a

[88] Protocol on Strategic Environmental Assessment to the Convention on the Environmental Impact in the Transboundary Context (Kiev, 21 May 2003), United Nations, *Treaty Series*, vol. 2685, No. 34028, p. 140, art. 2, paras. 6–7.

[89] *Gabčíkovo-Nagymaros Project* (see footnote 84 above), para. 140.

[90] *I.C.J. Reports 2015* (see footnote 58 above), para. 153.

[91] *Ibid*., para. 168.

[92] *Ibid*., Separate Opinion of Judge Hisashi Owada, para. 18.

[93] *Pulp Mills on the River Uruguay* (see footnote 79 above), para. 204.

[94] International Tribunal for the Law of the Sea, *Responsibilities and Obligations of States with Respect to Activities in the Area (Request for Advisory Opinion submitted to the Seabed Dispute Chamber)*, Advisory Opinion, 1 February 2011, *ITLOS Reports 2011*, p. 10, at para. 145.

[95] Convention on Environmental Impact Assessment in a Transboundary Context (Espoo, 25 February 1991), United Nations, *Treaty Series*, vol. 1989, No. 34028, p. 309.

risk that the proposed industrial activity may have a "significant adverse impact in a transboundary context, in particular, on a shared resource".[96]

(5) By having a threshold of "likely to cause significant adverse impact", the draft guideline excludes an environmental impact assessment for an activity whose impact is likely to be minor. The impact of the potential harm must be "significant" for both "atmospheric pollution" and "atmospheric degradation". The phrase "significant deleterious effects" has been used both in subparagraphs (*b*) and (*c*) of draft guideline 1 and, as mentioned in the commentary thereto, what constitutes "significant" requires a factual rather than a legal, determination.[97]

(6) The phrase "in terms of atmospheric pollution or atmospheric degradation" relates the draft guideline once more to the two main issues of concern to the protection of the atmosphere under the present draft guidelines, namely transboundary atmospheric pollution and atmospheric degradation. While the relevant precedents for the requirement of an environmental impact assessment primarily address transboundary contexts, it is considered that there is a similar requirement for projects that are likely to have significant adverse effects on the global atmosphere, such as those activities involving intentional large-scale modification of the atmosphere.[98] In the context of atmospheric degradation, such activities may carry a more extensive risk of severe damage than even those causing transboundary harm, and therefore the same considerations should apply *a fortiori* to those activities potentially causing global atmospheric degradation.

(7) Even though procedural aspects are not dealt with in text of the draft guideline, transparency and public participation are important components in ensuring access to information and representation in undertaking an environmental impact assessment. Principle 10 of the 1992 Rio Declaration provides that environmental issues are best handled with the participation of all concerned citizens, at the relevant level. Participation includes access to information, the opportunity to participate in decision-making processes, and effective access to judicial and administrative proceedings. The Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters[99] also addresses these issues. The above-mentioned Kiev Protocol on Strategic Environmental Assessment encourages the carrying out of public participation and consultations, and the taking into account of the results of the public participation and consultations in a plan or programme.[100]

Guideline 5
Sustainable utilization of the atmosphere

1. Given that the atmosphere is a natural resource with a limited assimilation capacity, its utilization should be undertaken in a sustainable manner.

2. Sustainable utilization of the atmosphere includes the need to reconcile economic development with the protection of the atmosphere.

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[96] *Pulp Mills on the River Uruguay* (see footnote 79 above), para. 204.

[97] The Commission has frequently employed the term "significant" in its work, including in the articles on the prevention of transboundary harm from hazardous activities (2001). In that case, the Commission chose not to define the term, recognizing that the question of "significance" requires a factual determination rather than a legal one (see the general commentary, para. (4), *Yearbook … 2001*, vol. II (Part Two) and corrigendum, chap. V, sect. E). See, for example, paras. (4) and (7) of the commentary to art. 2 of the articles on the prevention of transboundary harm from hazardous activities (*ibid*.). See also the commentary to the principles on the allocation of loss in the case of transboundary harm arising out of hazardous activities (commentary to principle 2, paras. (1)–(3), *Yearbook … 2006*, vol. II (Part Two), chap. V, sect. E).

[98] See draft guideline 7 below.

[99] Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (Aarhus, 28 June 1998), United Nations, *Treaty Series*, vol. 2161, No. 37770, p. 447.

[100] Art. 2, paras. 6–7.

Commentary

(1) The atmosphere is a natural resource with limited assimilation capacity. It is often not conceived of as exploitable in the same sense as, for example, mineral or oil and gas resources are explored and exploited. In truth, however, the atmosphere, in its physical and functional components, is exploitable and exploited. The polluter exploits the atmosphere by reducing its quality and its capacity to assimilate pollutants. The draft guideline draws analogies from the concept of "shared resource", while also recognizing that the unity of the global atmosphere requires recognition of the commonality of interests. Accordingly, this draft guideline proceeds on the premise that the atmosphere is a natural resource with limited assimilation capacity, the ability of which to sustain life on Earth is impacted by anthropogenic activities. In order to secure its protection, it is important to see the atmosphere as a natural resource subject to the principles of conservation and sustainable use.

(2) Paragraph 1 acknowledges that the atmosphere is a "natural resource with a limited assimilation capacity". The second part of paragraph 1 seeks to integrate conservation and development so as to ensure that modifications to the planet continue to enable the survival and wellbeing of organisms on Earth. It does so by reference to the proposition that the utilization of the atmosphere should be undertaken in a sustainable manner. This is inspired by the Commission's formulations as reflected in the Convention on the Law of the Non-navigational Uses of International Watercourses, [101] and the articles on the law of transboundary aquifers.[102]

(3) The term "utilization" is used broadly and in general terms evoking notions beyond actual exploitation. The atmosphere has been utilized in several ways. Likely, most of these activities that have been carried out so far are those conducted without a clear or concrete intention to affect atmospheric conditions. However, there have been certain activities the very purpose of which is to alter atmospheric conditions, such as weather modification. Some of the proposed technologies for intentional, large-scale modification of the atmosphere[103] are examples of the utilization of the atmosphere.

(4) The phrase "its utilization should be undertaken in a sustainable manner" in paragraph 1 is intended to be simple and reflects a paradigmatic shift towards viewing the atmosphere as a natural resource that ought to be utilized in a sustainable manner.

(5) Paragraph 2 builds upon the language of the International Court of Justice in its judgment in the *Gabčíkovo-Nagymaros Project* case, in which it referred to the "need to reconcile environmental protection and economic development".[104] There are other relevant cases.[105] The reference to "protection of the atmosphere" as opposed to "environmental

[101] Arts. 5–6. For the articles and commentaries thereto adopted by the Commission, see *Yearbook … 1994*, vol. II (Part Two), chap. III, sect. E.

[102] General Assembly resolution 63/124 of 11 December 2008, annex, arts. 4–5. For the articles and commentaries thereto adopted by the Commission, see *Yearbook … 2008*, vol. II (Part Two), chap. IV, sect. E.

[103] See draft guideline 7 below.

[104] *Gabčíkovo-Nagymaros Project* (see footnote 84 above), p. 78, para. 140.

[105] In the 2006 order of the *Pulp Mills* case, the International Court of Justice highlighted "the importance of the need to ensure environmental protection of shared natural resources while allowing for sustainable economic development" (*Pulp Mills on the River Uruguay (Argentina v. Uruguay)*, Provisional Measures, Order of 13 July 2006, *I.C.J. Reports 2006*, p. 113, at p. 133, para. 80); the 1998 WTO Appellate Body decision on *United States – Import Prohibition of Certain Shrimp and Shrimp Products* stated that, "recalling the explicit recognition by WTO Members of the objective of sustainable development in the preamble of the *WTO Agreement*, we believe it is too late in the day to suppose that article XX(g) of the [General Agreement on Tariffs and Trade] may be read as referring only to the conservation of exhaustible mineral or other non-living resources" (Appellate Body Report, *United States – Import Prohibition of Certain Shrimp and Shrimp Products*, WT/DS58/AB/R, adopted 6 November 1998, para. 131, see also paras. 129 and 153); in the 2005 arbitral case of the *Iron Rhine Railway*, the Tribunal held as follows: "[t]here is considerable debate as to what, within the field of environmental law, constitutes 'rules' or 'principles': what is 'soft' law; and which environmental treaty law or principles have contributed to the development of customary international law. … The emerging principles, whatever their current status, make reference to … sustainable

protection" seeks to focus the paragraph on the subject matter of the present topic, which is the protection of the atmosphere.

Guideline 6
Equitable and reasonable utilization of the atmosphere

The atmosphere should be utilized in an equitable and reasonable manner, taking fully into account the interests of present and future generations.

Commentary

(1) Although equitable and reasonable utilization of the atmosphere is an important element of sustainability, as reflected in draft guideline 5, it is considered important to state it as an autonomous principle. Like draft guideline 5, the present draft guideline is formulated at a broad level of abstraction and generality.

(2) The draft guideline is stated in general terms so as to apply the principle of equity[106] to the protection of the atmosphere as a natural resource that is to be shared by all. The first part of the sentence deals with "equitable and reasonable" utilization. The formulation that the "atmosphere should be utilized in an equitable and reasonable manner" draws, in part, upon article 5 of the Convention on the Law of the Non-navigational Uses of International Watercourses, and article 4 of the articles on the law of transboundary aquifers. It indicates a balancing of interests and consideration of all relevant factors that may be unique to either atmospheric pollution or atmospheric degradation.

(3) The second part of the draft guideline addresses aspects of intra- and intergenerational equity.[107] In order to draw out the link between these two aspects, the phrase "taking fully into account the interests of" has been preferred to "for the benefit of" present and future generations of humankind. The words "the interests of", and not "the benefit of", have been

development. … Importantly, these emerging principles now integrate environmental protection into the development process. Environmental law and the law on development stand not as alternatives but as mutually reinforcing, integral concepts, which require that where development may cause signify harm to the environment there is a duty to prevent, or at least mitigate such harm. … This duty, in the opinion of the Tribunal, has now become a principle of general international law", *Iron Rhine Railway* (see footnote 84 above), paras. 58–59; the 2013 Partial Award of the *Indus Waters Kishenganga Arbitration (Pakistan v. India)* states: "[t]here is no doubt that States are required under contemporary customary international law to take environmental protection into consideration when planning and developing projects that may cause injury to a bordering State. Since the time of *Trail Smelter*, a series of international … arbitral decisions have addressed the need to manage natural resources in a sustainable manner. In particular, the International Court of Justice expounded upon the principle of 'sustainable development' in *Gabčíkovo-Nagymaros*, referring to the 'need to reconcile economic development with protection of the environment": Permanent Court of Arbitration Award Series, *Indus Waters Kishenganga Arbitration (Pakistan v. India): Record of Proceedings 2010–2013*, Partial Award of 18 February 2013, para. 449. This was confirmed by the Final Award of 20 December 2013, para. 111.

[106] See *Continental Shelf (Tunisia/Libyan Arab Jamahiriya), Judgment, I.C.J. Reports 1982*, p. 18, at para. 71. On equity and its use in international law generally, see *Frontier Dispute (Burkina Faso v. Mali), Judgment, I.C.J. Reports 1986*, p. 554, at paras. 27–28 and 149; *North Sea Continental Shelf, Judgment, I.C.J. Reports 1969*, p. 3, at para. 85; J. Kokott, "Equity in international law", in F.L. Toth, ed., *Fair Weather? Equity Concerns in Climate Change* (Abingdon and New York, Routledge, 2014), pp. 173–192; P. Weil, "L'équité dans la jurisprudence de la Cour internationale de Justice: Un mystère en voie de dissipation?", in V. Lowe and M. Fitzmaurice, eds., *Fifty Years of the International Court of Justice: Essays in Honour of Sir Robert Jennings*, (Cambridge, Cambridge University Press, 1996), pp. 121–144; F. Francioni, "Equity in international law," in R. Wolfrum, ed., *Max Plank Encyclopedia of Public International Law*, vol. III (Oxford, Oxford University Press, 2013), pp. 632–642.

[107] C. Redgwell, "Principles and emerging norms in international law: intra- and inter-generational equity", in C.P. Carlarne *et al.*, eds., *The Oxford Handbook on International Climate Change Law*, (Oxford, Oxford University Press, 2016), pp. 185–201; D. Shelton, "Equity" in Bodansky *et al.*, eds. *Oxford Handbook of International Environmental Law* (footnote 21 above), pp. 639–662; and E. Brown Weiss, "Intergenerational equity" in *Max Planck Encyclopaedias of Public International Law* (updated 2021), available at https://opil.ouplaw.com/view/10.1093/law:epil/9780199231690/law-9780199231690-e1421.

used to signal the integrated nature of the atmosphere, the "exploitation" of which needs to take into account a balancing of interests to ensure sustenance for the Earth's living organisms. The word "fully" seeks to demonstrate the importance of taking various factors and considerations into account, and it should be read with the seventh preambular paragraph, which recognizes that the interests of future generations of humankind in the long-term conservation of the quality of the atmosphere should be fully taken into account.

Guideline 7
Intentional large-scale modification of the atmosphere

Activities aimed at intentional large-scale modification of the atmosphere should only be conducted with prudence and caution, and subject to any applicable rules of international law, including those relating to environmental impact assessment.

Commentary

(1) Draft guideline 7 deals with activities the purpose of which is to alter atmospheric conditions. As the title of the draft guideline signals, it addresses only intentional modification on a large scale.

(2) The term "activities aimed at intentional large-scale modification of the atmosphere" is taken in part from the definition of "environmental modification techniques" in the Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques,[108] which refers to techniques for changing – through the deliberate manipulation of natural processes – the dynamics, composition or structure of the Earth, including its biota, lithosphere, hydrosphere and atmosphere, or of outer space.

(3) These activities include what is commonly understood as "geo-engineering", the methods and technologies of which encompass carbon dioxide removal and solar radiation management.[109] Activities related to carbon dioxide removal involve the ocean, land and technical systems and seek to remove carbon dioxide from the atmosphere through natural sinks or through chemical engineering. Proposed techniques for carbon dioxide removal include: soil carbon sequestration; carbon capture and sequestration; ambient air capture; ocean fertilization; ocean alkalinity enhancement; and enhanced weathering.

(4) According to scientific experts, solar radiation management is designed to mitigate the negative impacts of climate change by intentionally lowering the surface temperatures of the Earth. Proposed activities here include: "albedo enhancement", a method that involves increasing the reflectiveness of clouds or the surface of the Earth, so that more of the heat of the sun is reflected back into space; stratospheric aerosols, a technique that involves the introduction of small, reflective particles into the upper atmosphere to reflect sunlight before it reaches the surface of the Earth; and space reflectors, which entail blocking a small proportion of sunlight before it reaches the Earth.

(5) The term "activities" is broadly understood. However, there are certain other activities that are prohibited by international law, which are not covered by the present draft guideline, such as those prohibited by the Convention on the Prohibition of Military or Any Other

[108] Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques (New York, 10 December 1976), United Nations, *Treaty Series*, vol. 1108, No. 17119, p. 151.

[109] IPCC, IPCC Expert Meeting on Geoengineering, Lima, Peru, 20–22 June 2011, Meeting Report. See, generally, the Oxford Geo-engineering Programme, "What is geoengineering?", available at www.geoengineering.ox.ac.uk/what-is-geoengineering/what-is-geoengineering/; K.N. Scott, "International law in the anthropocene: responding to the geoengineering challenge", *Michigan Journal of International Law*, vol. 34, No. 2 (2013), pp. 309–358, at p. 322; Steve Rayner, *et al*., "The Oxford principles", Climate Geoengineering Governance Working Paper No. 1 (University of Oxford, 2013), available from www.geoengineering-governance-research.org/perch/resources/workingpaper1rayneretaltheoxfordprinciples.pdf. See also, C. Armani, "Global experimental governance, international law and climate change technologies", *International and Comparative Law Quarterly*, vol. 64, No. 4 (2015), pp. 875–904.

Hostile Use of Environmental Modification Techniques[110] and Protocol I to the Geneva Conventions of 1949.[111] Accordingly, the present draft guideline applies only to "non-military" activities. Military activities involving deliberate modifications of the atmosphere are outside the scope of the present draft guideline.

(6) Likewise, other activities are governed by various regimes. For example, afforestation has been incorporated in the Kyoto Protocol to the United Nations Framework Convention on Climate Change[112] regime and in the Paris Agreement (art. 5, para. 2). Under some international legal instruments, measures have been adopted for regulating carbon capture and storage. The 1996 Protocol (London Protocol)[113] to the 1972 Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter[114] now includes an amended provision and annex, as well as new guidelines for controlling the dumping of wastes and other matter. To the extent that "ocean iron fertilization" and "ocean alkalinity enhancement" relate to questions of ocean dumping, the 1972 Convention and the London Protocol thereto are relevant.

(7) Activities aimed at intentional large-scale modification of the atmosphere have a significant potential for preventing, diverting, moderating or ameliorating the adverse effects of disasters and hazards, including drought, hurricanes, tornadoes, and enhancing crop production and the availability of water. At the same time, it is also recognized that they may have long-range and unexpected effects on existing climatic patterns that are not confined by national boundaries. As noted by the World Meteorological Organization with respect to weather modification: "The complexity of the atmospheric processes is such that a change in the weather induced artificially in one part of the world will necessarily have repercussions elsewhere … . Before undertaking an experiment on large-scale weather modification, the possible and desirable consequences must be carefully evaluated, and satisfactory international arrangements must be reached."[115]

(8) It is not the intention of the present draft guideline to stifle innovation and scientific advancement. Principles 7 and 9 of the Rio Declaration acknowledge the importance of new and innovative technologies and cooperation in these areas. At the same time, this does not mean that those activities always have positive effects.

(9) Accordingly, the draft guideline does not seek either to authorize or to prohibit such activities unless there is agreement among States to take such a course of action. It simply sets out the principle that such activities, if undertaken, should only be conducted with prudence and caution. The word "only" is intended to further enhance the prudent and cautious manner in which activities aimed at intentional large-scale modification may be undertaken, while the latter part of the draft guideline makes it clear that such activities are conducted subject to any applicable rules of international law.

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[110] See art. 1.

[111] Protocol Additional to the Geneva Conventions of 12 August 1949, and relating to the Protection of Victims of International Armed Conflicts (Protocol I), 1977, United Nations, *Treaty Series*, vol. 1125, No. 17512, p. 3, arts. 35, para. 3, and 55; see also Rome Statute of the International Criminal Court (Rome, 17 July 1998), United Nations, *Treaty Series*, vol. 2187, No. 38544, p. 3, art. 8, para. 2 (b) (iv).

[112] Kyoto Protocol to the United Nations Framework Convention on Climate Change (Kyoto, 11 December 1997), United Nations, *Treaty Series*, vol. 2303, No. 30822, p. 162.

[113] 1996 Protocol to the 1972 Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (London, 7 November 1996), *International Legal Materials*, vol. 36 (1997), p. 7.

[114] Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (London, Mexico City, Moscow and Washington, D.C., 29 December 1972), United Nations, *Treaty Series*, vol. 1046, No. 15749, p. 138.

[115] See *Second Report on the Advancement of Atmospheric Science and Their Application in the Light of the Developments in Outer Space* (Geneva, World Meteorological Organization, 1963); see also Decision 8/7 (Earthwatch: assessment of outer limits) of the Governing Council of the United Nations Environment Programme, Part A (Provisions for co-operation between States in weather modification) of 29 April 1980.

(10) The reference to "prudence and caution" is inspired by the language of the International Tribunal for the Law of the Sea in the *Southern Blue Fin Tuna Case*,[116] the *MOX Plant Case*,[117] and the *Case concerning Land Reclamation by Singapore in and around the Straits of Johor*.[118] The Tribunal stated in the *Land Reclamation* case: "*Considering* that, given the possible implications of land reclamation on the marine environment, prudence and caution require that Malaysia and Singapore establish mechanisms for exchanging information and assessing the risks or effects of land reclamation works and devising ways to deal with them in the areas concerned." The draft guideline is cast in hortatory language, aimed at encouraging the development of rules to govern such activities, within the regimes competent in the various fields relevant to atmospheric pollution and atmospheric degradation.

(11) The phrase "including those relating to environmental impact assessment" at the end of the draft guideline adds emphasis, to acknowledge the importance of an environmental impact assessment, as reflected in draft guideline 4. Activities aimed at intentional large-scale modification of the atmosphere should be conducted with full disclosure and in a transparent manner, and an environmental impact assessment provided for in draft guideline 4 may be required for that purpose. It is considered that a project involving intentional large-scale modification of the atmosphere may cause significant adverse impact, in which case an assessment is necessary for such an activity.

Guideline 8
International cooperation

1. States have the obligation to cooperate, as appropriate, with each other and with relevant international organizations for the protection of the atmosphere from atmospheric pollution and atmospheric degradation.

2. States should cooperate in further enhancing scientific and technical knowledge relating to the causes and impacts of atmospheric pollution and atmospheric degradation. Cooperation could include exchange of information and joint monitoring.

Commentary

(1) International cooperation is at the core of the whole set of the present draft guidelines. The concept of international cooperation has undergone a significant change in international law,[119] and today is to a large extent built on the notion of common interests of the international community as a whole.[120] In this connection, it is recalled that the third

[116] *Southern Blue Fin Tuna Cases (New Zealand v. Japan; Australia v. Japan)*, Provisional Measures, Order of 27 August 1999, *ITLOS Reports 1999*, p. 280, at para. 77. The Tribunal stated that "*[c]onsidering* that, in the view of the Tribunal, the parties should in the circumstances act with prudence and caution to ensure that effective conservation measures are taken to prevent serious harm to the stock of southern bluefin tuna".

[117] *MOX Plant (Ireland v. United Kingdom)*, Provisional Measures, Order of 3 December 2001, *ITLOS Reports 2001*, p. 95, at para. 84 ("*[c]onsidering* that, in the view of the Tribunal, prudence and caution require that Ireland and the United Kingdom cooperate in exchanging information concerning risks or effects of the operation of the MOX plant and in devising ways to deal with them, as appropriate").

[118] *Case concerning Land Reclamation by Singapore in and around the Straits of Johor (Malaysia v. Singapore)*, Provisional Measures, Order of 8 October 2003, *ITLOS Reports 2003*, p. 10, at para. 99.

[119] W. Friedmann, *The Changing Structure of International Law* (London, Stevens & Sons, 1964), pp. 60–71; C. Leben, "The changing structure of international law revisited by way of introduction", *European Journal of International Law*, vol. 3 (1997), pp. 399–408. See also, J. Delbrück, "The international obligation to cooperate – an empty shell or a hard law principle of international law? – a critical look at a much debated paradigm of modern international law", H.P. Hestermeyer *et al.*, eds., *Coexistence, Cooperation and Solidarity* (Liber Amicorum Rüdiger Wolfrum), vol. 1 (Leiden, Martinus Njihoff, 2012), pp. 3–16.

[120] B. Simma, "From bilateralism to community interests in international law", *Collected Courses of The Hague Academy of International Law, 1994-VI*, vol. 250, pp. 217–384; Naoya Okuwaki, "On compliance with the obligation to cooperate: new developments of 'international law for

preambular paragraph of the present draft guidelines considers that atmospheric pollution and atmospheric degradation are a common concern of humankind.

(2) Paragraph 1 of the present draft guideline provides the obligation of States to cooperate, as appropriate. In concrete terms, such cooperation is with other States and with relevant international organizations. The phrase "as appropriate" denotes a certain flexibility for States in carrying out the obligation to cooperate depending on the nature and subject matter required for cooperation, and on the applicable rules of international law. The forms in which such cooperation may occur may also vary depending on the situation and allow for the exercise of a certain margin of appreciation of States in accordance with the applicable rules of international law. It may be at the bilateral, regional or multilateral levels. States may also individually take appropriate action.

(3) In the *Pulp Mills* case, the International Court of Justice emphasized linkages attendant to the obligation to cooperate between the parties and the obligation of prevention. The Court noted that, "it is by cooperating that the States concerned can jointly manage the risks of damage to the environment … so as to prevent the damage in question".[121]

(4) International cooperation is found in several multilateral instruments relevant to the protection of the environment. Both the Stockholm Declaration and the Rio Declaration, in principle 24 and principle 27, respectively, stress the importance of cooperation, entailing good faith and a spirit of partnership.[122] In addition, among some of the existing treaties, the Vienna Convention for the Protection of the Ozone Layer provides, in its preamble, that the Parties to this Convention are "[*a*]*ware* that measures to protect the ozone layer from modifications due to human activities require international co-operation and action". Furthermore, the preamble of the United Nations Framework Convention on Climate Change acknowledges that "the global nature of climate change calls for the widest possible cooperation by all countries and their participation in an effective and appropriate international response …", while reaffirming "the principle of sovereignty of States in international cooperation to address climate change".[123] Under article 7 of the Paris Agreement, parties "recognize the importance and support and international cooperation on adaptation efforts and the importance of taking into account the needs of developing country Parties, especially those that are particularly vulnerable to the adverse effects of climate

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cooperation'", in J. Eto, ed., *Aspects of International Law Studies* (Festschrift for Shinya Murase), (Tokyo, Shinzansha, 2015), pp. 5–46, at pp. 16–17 (in Japanese).

[121] *Pulp Mills on the River Uruguay* (see footnote 79 above), p. 49, para. 77.

[122] Principle 24 of the Stockholm Declaration states:

> "International matters concerning the protection and improvement of the environment should be handled in a cooperative spirit by all countries, big or small, on an equal footing. Cooperation through multilateral or bilateral arrangements or other appropriate means is essential to effectively control, prevent, reduce and eliminate adverse environmental effects resulting from activities conducted in all spheres, in such a way that due account is taken of the sovereignty and interests of all States."

Report of the United Nations Conference on the Human Environment, Stockholm, 5–16 June 1972 (see footnote 11 above).

Principle 27 of the Rio Declaration states:

> "States and people shall cooperate in good faith and in a spirit of partnership in the fulfilment of the principles embodied in this Declaration and in the further development of international law in the field of sustainable development."

Report of the United Nations Conference on the Human Environment, Rio de Janeiro, 3–14 June 1992, vol. I: *Resolutions adopted by the Conference* (United Nations publication, Sales No. E.93.I.8 and corrigenda), resolution 1, annex I, chap. I.

[123] See also section 2 of Part XII of the United Nations Convention on the Law of the Sea, which provides for "Global and Regional Cooperation", setting out "Cooperation on a global or regional basis" (art. 197), "Notification of imminent or actual damage" (art. 198), "Contingency plans against pollution" (art. 199), "Studies, research programmes and exchange of information and data" (art. 200) and "Scientific criteria for regulations" (art. 201). Section 2 of Part XIII on Marine Scientific Research of the United Nations Convention on the Law of the Sea provides for "International Cooperation", setting out "Promotion of international cooperation" (art. 242), "Creation of favourable conditions" (art. 243) and "Publication and dissemination of information and knowledge" (art. 244).

change".[124] The preamble of the Paris Agreement in turn affirms the importance of education, training, public awareness, public participation, public access to information and cooperation at all levels on the matters addressed in the Agreement.[125]

(5) In its work, the Commission has also recognized the importance of cooperation.[126] Cooperation could take a variety of forms. Paragraph 2 of the draft guideline stresses, in particular, the importance of cooperation in enhancing scientific and technical knowledge relating to the causes and impacts of atmospheric pollution and atmospheric degradation. Paragraph 2 also highlights the exchange of information and joint monitoring.

(6) The Vienna Convention for the Protection of the Ozone Layer provides, in its preamble, that international cooperation and action should be "based on relevant scientific and technical considerations", and in article 4, paragraph 1, on cooperation in the legal, scientific and technical fields, there is provision that:

> The Parties shall facilitate and encourage the exchange of scientific, technical, socio-economic, commercial and legal information relevant to this Convention as further elaborated in annex II. Such information shall be supplied to bodies agreed upon by the Parties.

Annex II to the Convention gives a detailed set of items for information exchange. Article 4, paragraph 2, provides for cooperation in the technical fields, taking into account the needs of developing countries.

(7) Article 4, paragraph 1, of the United Nations Framework Convention on Climate Change, regarding commitments, provides that:

> All Parties … shall (e) cooperate in preparing for adaptation to the impacts of climate change; … (g) promote and cooperate in scientific, technological, technical, socio-economic and other research, systematic observation and development of data archives related to the climate system and intended to further the understanding and to reduce or eliminate the remaining uncertainties regarding the causes, effects, magnitude and timing of climate change and the economic and social consequences of various response strategies; (h) promote and cooperate in the full, open and prompt exchange of relevant scientific, technological, technical, socio-economic and legal information related to the climate system and climate change, and to the economic and social consequences of various response strategies; (i) promote and cooperate in

[124] See art. 7, para. 6. See also arts. 6, para. 1, 7, para. 7, 8, para. 4, and 14, para. 3.

[125] Preamble, fourteenth para. See also paragraph 1 of article 8 of the Convention on the Law of the Non-navigational Uses of International Watercourses, on the general obligation to cooperate, which provides that:

> "[W]atercourse States shall cooperate on the basis of sovereign equality, territorial integrity and mutual benefit in order to attain optimal utilization and adequate protection of an international watercourse."

[126] The articles on prevention of transboundary harm from hazardous activities (2001) provide in article 4, on cooperation, that:

> "States concerned shall cooperate in good faith and, as necessary, seek the assistance of one or more competent international organizations in preventing significant transboundary harm or at any event in minimizing the risk thereof."

Further, the articles on the law of transboundary aquifers (2008) provide in article 7, entitled "General obligation to cooperate", that:

> "1. Aquifer States shall cooperate on the basis of sovereign equality, territorial integrity, sustainable development, mutual benefit and good faith in order to attain equitable and reasonable utilization and appropriate protection of their transboundary aquifers or aquifer systems.
>
> 2. For the purpose of paragraph 1, aquifer States should establish joint mechanisms of cooperation."

Moreover, the draft articles on the protection of persons in the event of disasters (2016) provide, in draft article 7, a duty to cooperate. Draft article 7 provides that:

> "In the application of the present draft articles, States shall, as appropriate, cooperate among themselves, with the United Nations, with the components of the Red Cross and Red Crescent Movement, and with other assisting actors."

education, training and public awareness related to climate change and encourage the widest participation in this process, including that of non-governmental organizations.

(8) In this context, the obligation to cooperate includes, *inter alia* and as appropriate, exchange of information. In this respect, it may also be noted that article 9 of the Convention on the Law of the Non-navigational Uses of International Watercourses has a detailed set of provisions on exchange of data and information. Moreover, the Convention on Long-Range Transboundary Air Pollution provides in article 4 that the Contracting Parties "shall exchange information on and review their policies, scientific activities and technical measures aimed at combating, as far as possible, the discharge of air pollutants which may have adverse effects, thereby contributing to the reduction of air pollution including long-range transboundary air pollution". The Convention also has detailed provisions on cooperation in the fields of research and development (art. 7); exchange of information (art. 8); and implementation and further development of the cooperative programme for the monitoring and evaluation of the long-range transmission of air pollutants in Europe (art. 9). Similarly, at the regional level, the Eastern Africa Regional Framework Agreement on Air Pollution (Nairobi Agreement, 2008)[127] and the West and Central Africa Regional Framework Agreement on Air Pollution (Abidjan Agreement, 2009)[128] have identical provisions on international cooperation. The parties agree to:

1.2 Consider the synergies and co-benefits of taking joint measures against the emission of air pollutants and greenhouse gases;

…

1.4 Promote the exchange of educational and research information on air quality management;

1.5 Promote regional cooperation to strengthen the regulatory institutions.

(9) In its work, the Commission has also recognized the importance of scientific and technical knowledge.[129] In the context of protecting the atmosphere, enhancing scientific and technical knowledge relating to the causes and impacts of atmospheric pollution and atmospheric degradation is key. For addressing the adverse effects of climate change, the Paris Agreement recognizes the importance of averting, minimizing and addressing loss and damage associated with the adverse effects of climate change and envisages cooperation in such areas as (*a*) early warning systems; (*b*) emergency preparedness; (*c*) slow onset events; (*d*) events that may involve irreversible and permanent loss and damage; (*e*) comprehensive risk assessment and management; (*f*) risk insurance facilities, climate risk pooling and other insurance solutions; (*g*) non-economic losses; and (*h*) resilience of communities, livelihoods and ecosystems.[130]

[127] Available at https://web.archive.org/web/20111226174901/http:/www.unep.org/urban_environment/PDFs/EABAQ2008-AirPollutionAgreement.pdf.

[128] Available at https://web.archive.org/web/20111224143143/http://www.unep.org/urban_environment/PDFs/BAQ09_AgreementEn.Pdf.

[129] The second sentence of article 17, paragraph 4, of the articles on the law of transboundary aquifers provides that: "Cooperation may include coordination of international emergency actions and communications, making available emergency response personnel, emergency response equipment and supplies, scientific and technical expertise and humanitarian assistance". In turn, the draft articles on the protection of persons in the event of disaster, provides in draft article 9, that "[f]or the purposes of the present draft articles, cooperation includes humanitarian assistance, coordination of international relief actions and communications, and making available relief personnel, equipment and goods, and scientific, medical and technical resources". Further, draft article 10 (Cooperation for risk reduction) provides that "[c]ooperation shall extend to the taking of measures intended to reduce the risk of disasters".

[130] Art. 8.

Guideline 9
Interrelationship among relevant rules

1. The rules of international law relating to the protection of the atmosphere and other relevant rules of international law, including, *inter alia*, the rules of international trade and investment law, of the law of the sea and of international human rights law, should, to the extent possible, be identified, interpreted and applied in order to give rise to a single set of compatible obligations, in line with the principles of harmonization and systemic integration, and with a view to avoiding conflicts. This should be done in accordance with the relevant rules set forth in the Vienna Convention on the Law of Treaties, including articles 30 and 31, paragraph 3 (*c*), and the principles and rules of customary international law.

2. States should, to the extent possible, when developing new rules of international law relating to the protection of the atmosphere and other relevant rules of international law, endeavour to do so in a harmonious manner.

3. When applying paragraphs 1 and 2, special consideration should be given to persons and groups particularly vulnerable to atmospheric pollution and atmospheric degradation. Such groups may include, *inter alia*, indigenous peoples, people of the least developed countries and people of low-lying coastal areas and small island developing States affected by sea-level rise.

Commentary

(1) Draft guideline 9 addresses "interrelationship among relevant rules"[131] and seeks to reflect the relationship between rules of international law relating to the protection of the atmosphere and other relevant rules of international law. Paragraphs 1 and 2 are general in nature, while paragraph 3 places emphasis on the protection of groups that are particularly vulnerable to atmospheric pollution and atmospheric degradation. Atmospheric pollution and atmospheric degradation are defined in draft guideline 1 on the use of terms. Those terms focus on pollution and degradation caused "by humans". That necessarily means that human activities governed by other fields of law have a bearing on the atmosphere and its protection. It is therefore important that conflicts and tensions between rules relating to the protection of the atmosphere and rules relating to other fields of international law are to the extent possible avoided. Accordingly, draft guideline 9 highlights the various techniques in international law for addressing tensions between legal rules and principles, whether they relate to a matter of interpretation or a matter of conflict. The formulation of draft guideline 9 draws upon the conclusions reached by the Commission's Study Group on fragmentation of international law: difficulties arising from the diversification and expansion of international law.[132]

(2) Paragraph 1 addresses three kinds of legal processes, namely the identification of the relevant rules, their interpretation and their application. The phrase "and with a view to avoiding conflicts" at the end of the first sentence of the paragraph signals that "avoiding conflicts" is one of the principal purposes of the paragraph. It is, however, not the exclusive purpose of the draft guideline. The paragraph is formulated in the passive form, in recognition of the fact that the process of identification, interpretation and application involves not only States but also others including international organizations, as appropriate.

(3) The phrase "should, to the extent possible, be identified, interpreted and applied in order to give rise to a single set of compatible obligations" draws upon the Commission's Study Group conclusions on fragmentation. The term "identified" is particularly relevant in

[131] See draft article 10 (on interrelationship) of resolution 2/2014 on the declaration of legal principles relating to climate change of the International Law Association, *Report of the Seventy-sixth Conference held in Washington D.C., August 2014*, p. 26; S. Murase (Chair) and L. Rajamani (Rapporteur), Report of the Committee on the Legal Principles Relating to Climate Change, *ibid.*, pp. 330–378, at pp. 368–377.

[132] *Yearbook … 2006*, vol. II (Part Two), para. 251. See conclusion (2) on "relationships of interpretation" and "relationships of conflict". See, for the analytical study, "Fragmentation of international law: difficulties arising from the diversification and expansion of international law", report of the Study Group of the International Law Commission finalized by Martti Koskenniemi (A/CN.4/L.682 and Corr.1 and Add.1).

relation to rules arising from treaty obligations and other sources of international law. In coordinating rules, certain preliminary steps need to be taken that pertain to identification, for example, a determination of whether two rules address "the same subject matter", and which rule should be considered *lex generalis* or *lex specialis* and *lex anterior* or *lex posterior*, and whether the *pacta tertiis* rule applies.

(4) The first sentence makes specific reference to the principles of "harmonization and systemic integration", which were accorded particular attention in the conclusions of the work of the Study Group on fragmentation. As noted in conclusion (4) on harmonization, when several norms bear on a single issue they should, to the extent possible, be interpreted so as to give rise to "a single set of compatible obligations". Moreover, under conclusion (17), systemic integration denotes that "whatever their subject matter, treaties are a creation of the international legal system". They should thus be interpreted taking into account other international rules and principles.

(5) The second sentence of paragraph 1 seeks to locate the paragraph within the relevant rules set forth in the 1969 Vienna Convention on the Law of Treaties,[133] including articles 30 and 31, paragraph 3 (*c*), and the principles and rules of customary international law. Article 31, paragraph 3 (*c*), of the 1969 Convention, is intended to guarantee a "systemic interpretation", requiring "any relevant rules of international law applicable in the relations between the parties" to be taken into account.[134] In other words, article 31, paragraph 3 (*c*), emphasizes both the "unity of international law" and "the sense in which rules should not be considered in isolation of general international law".[135] Article 30 of the 1969 Convention provides rules to resolve a conflict, if the above principle of systemic integration does not work effectively in a given circumstance. Article 30 provides for conflict rules of *lex specialis* (para. 2), of *lex posterior* (para. 3) and of *pacta tertiis* (para. 4).[136] The phrase "principles and rules of customary international law" in the second sentence of paragraph 1 covers such principles and rules of customary international law as are relevant to the identification, interpretation and application of relevant rules.[137] While the last sentence of paragraph 1 refers to "principles" as well as "rules" of customary international law, it is without prejudice to the relevance that "general principles of law" might have in relation to the draft guidelines.

(6) The reference to "including, *inter alia*, the rules of international trade and investment law, of the law of the sea and of international human rights law" highlights the practical importance of these three areas in their relation to the protection of the atmosphere. The specified areas have close connection with the rules of international law relating to the protection of the atmosphere in terms of treaty practice, jurisprudence and doctrine.[138] Other fields of law, which might be equally relevant, have not been overlooked and the list of relevant fields of law is not intended to be exhaustive. Furthermore, nothing in draft guideline

[133] United Nations, *Treaty Series*, vol. 1155, No. 18232, p. 331.

[134] See, e.g., WTO, Appellate Body report, *United States – Import Prohibition of Certain Shrimp and Shrimp Products*, WT/DS58/AB/R, 6 November 1998, para. 158. See also *Al-Adsani v. the United Kingdom*, Application No. 35763/97, ECHR 2001-XI, para. 55.

[135] P. Sands, "Treaty, custom and the cross-fertilization of international law", *Yale Human Rights and Development Law Journal*, vol. 1 (1998), p. 95, para. 25; C. McLachlan, "The principle of systemic integration and article 31 (3) (c) of the Vienna Convention", *International and Comparative Law Quarterly*, vol. 54 (2005), p. 279; O. Corten and P. Klein, eds., *The Vienna Conventions on the Law of Treaties: A Commentary*, vol. 1 (Oxford, Oxford University Press, 2011), pp. 828–829.

[136] *Ibid*., pp. 791–798.

[137] It may be noted that the WTO Understanding on Rules and Procedures Governing the Settlement of Disputes (Marrakesh Agreement establishing the World Trade Organization, United Nations, *Treaty Series*, vol. 1869, No. 31874, p. 3, annex 2, p. 401) provides in article 3, paragraph 2, that "[t]he dispute settlement system of the WTO … serves … to clarify the existing provisions of those [covered] agreements in accordance with *customary* rules of interpretation of public international law" (emphasis added).

[138] See International Law Association, resolution 2/2014 on the declaration of legal principles relating to climate change, draft article 10 (on interrelationship) (footnote 131 above); A. Boyle, "Relationship between international environmental law and other branches of international law", in Bodansky *et al*., *The Oxford Handbook of International Environmental Law* (footnote 21 above), pp. 126–146.

9 should be interpreted as subordinating rules of international law in the listed fields to rules relating to the protection of the atmosphere or vice versa.

(7) With respect to international trade law, the concept of mutual supportiveness has emerged to help reconcile that law and international environmental law, which relates in part to the protection of the atmosphere. The 1994 Marrakesh Agreement establishing the World Trade Organization[139] provides, in its preamble, that its aim is to reconcile trade and development goals with environmental needs "in accordance with the objective of sustainable development".[140] The WTO Committee on Trade and Environment began pursuing its activities "with the aim of making international trade and environmental policies mutually supportive",[141] and in its 1996 report to the Singapore Ministerial Conference, the Committee reiterated its position that the WTO system and environmental protection are "two areas of policy-making [that] are both important and … should be mutually supportive in order to promote sustainable development".[142] As the concept of "mutual supportiveness" has become gradually regarded as "a legal standard *internal* to the WTO",[143] the 2001 Doha Ministerial Declaration expresses the conviction of States that "acting for the protection of the environment and the promotion of sustainable development can and must be mutually supportive".[144] Mutual supportiveness is considered in international trade law as part of the principle of harmonization in interpreting conflicting rules of different treaties. Among a number of relevant WTO dispute settlement cases, the *United States – Standards for Reformulated and Conventional Gasoline* case in 1996 is most notable in that the Appellate Body refused to separate the rules of the General Agreement on Tariffs and Trade from other rules of interpretation in public international law, by stating that "the *General Agreement* is not to be read *in clinical isolation from public international law*" (emphasis added).[145]

(8) Similar trends and approaches appear in international investment law. Free trade agreements, which contain a number of investment clauses,[146] and numerous bilateral investment treaties[147] also contain standards relating to the environment, which have been

[139] United Nations, *Treaty Series*, vols. 1867–1869, No. 31874.

[140] *Ibid*., vol. 1867, No. 31874, p. 154.

[141] Trade Negotiations Committee, decision of 14 April 1994, MTN.TNC/45(MIN), annex II, p. 17.

[142] WTO, Committee on Trade and Environment, Report (1996), WT/CTE/1 (12 November 1996), para. 167.

[143] J. Pauwelyn, *Conflict of Norms in Public International Law: How WTO Law Relates to Other Rules of International Law* (Cambridge, Cambridge University Press, 2003); R. Pavoni, "Mutual supportiveness as a principle of interpretation and law-making: a watershed for the 'WTO-and-competing regimes' debate?", *European Journal of International Law*, vol. 21 (2010), pp. 651–652. See also S. Murase, "Perspectives from international economic law on transnational environmental issues", *Collected Courses of The Hague Academy of International Law*, vol. 253 (Leiden, Martinus Nijhoff, 1996), pp. 283–431, reproduced in S. Murase, *International Law: An Integrative Perspective on Transboundary Issues* (Tokyo, Sophia University Press, 2011), pp. 1–127; and S. Murase, "Conflict of international regimes: trade and the environment", *ibid*., pp. 130–166.

[144] Adopted on 14 November 2001 at the fourth session of the WTO Ministerial Conference in Doha, WT/MIN(01)/DEC/1, para. 6. The Hong Kong Ministerial Declaration of 2005 reaffirmed that "the mandate in paragraph 31 of the Doha Ministerial Declaration aimed at enhancing the mutual supportiveness of trade and environment" (adopted on 18 December 2005 at the sixth session of the Ministerial Conference in Hong Kong, China, WT/MIN(05)/DEC, para. 31).

[145] WTO, Appellate Body report, *Standards for Reformulated and Conventional Gasoline*, WT/DS2/AB/R, 29 April 1996, p. 17. See also S. Murase, "Unilateral measures and the WTO dispute settlement" (discussing the *Gasoline* case), in S.C. Tay and D.C. Esty, eds., *Asian Dragons and Green Trade: Environment, Economics and International Law* (Singapore, Times Academic Press, 1996), pp. 137–144.

[146] See, for example, Agreement Between Canada, the United Mexican States, and the United States of America, 1 July 2020, art. 1.3 and chap. 14 ("Investment"), available from the website of the Office of the United States Trade Representative, https://ustr.gov/trade-agreements/free-trade-agreements/united-states-mexico-canada-agreement/agreement-between.

[147] There are various model bilateral investment treaties (BITs), such as: Canada Model BIT of 2004, available from www.italaw.com; Colombia Model BIT of 2007, available from www.italaw.com; United States Model BIT of 2012, available from www.italaw.com; Model International Agreement on Investment for Sustainable Development of the International Institute for Sustainable Development (IISD) of 2005, in H. Mann *et al.*, *IISD Model International Agreement on Investment*

confirmed by the jurisprudence of the relevant dispute settlement bodies. Some investment tribunals have emphasized that investment treaties "cannot be read and interpreted in isolation from public international law".[148]

(9) The same is the case with the law of the sea. The protection of the atmosphere is intrinsically linked to the oceans and the law of the sea owing to the close physical interaction between the atmosphere and the oceans. The Paris Agreement notes in its preamble "the importance of ensuring the integrity of all ecosystems, including oceans". This link is also borne out by the United Nations Convention on the Law of the Sea,[149] which defines the "pollution of the marine environment", in article 1, paragraph 1 (4), in such a way as to include all sources of marine pollution, including atmospheric pollution from land-based sources and vessels.[150] It offers detailed provisions on the protection and preservation of the marine environment through Part XII, in particular articles 192, 194, 207, 211 and 212. There are a number of regional conventions regulating marine pollution from land-based sources.[151] IMO has sought to regulate vessel-source pollution in its efforts to supplement the provisions of the Convention[152] and to combat climate change.[153] The effective implementation of the applicable rules of the law of the sea could help to protect the atmosphere. Similarly, the

for Sustainable Development, 2nd ed. (Winnipeg, 2005), art. 34. See also United Nations Conference on Trade and Development, *Investment Policy Framework for Sustainable Development* (2015), pp. 91–121, available at http://unctad.org/en/PublicationsLibrary/diaepcb2015d5_en.pdf; P. Muchlinski, "Negotiating new generation international investment agreements: new sustainable development-oriented initiatives", in S. Hindelang and M. Krajewski, eds., *Shifting Paradigms in International Investment Law: More Balanced, Less Isolated, Increasingly Diversified*, (Oxford, Oxford University Press, 2016), pp. 41–64.

148 *Phoenix Action Ltd. v. the Czech Republic*, ICSID Case No. ARB/06/5, award, 15 April 2009, para. 78.

149 Prior to the Convention, the only international instrument of significance was the 1963 Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and Under Water (Moscow, 5 August 1963, United Nations, *Treaty Series*, vol. 480, No. 6964, p. 43).

150 M.H. Nordquist *et al.*, eds., *United Nations Convention on the Law of the Sea 1982: A Commentary*, vol. II (Dordrecht, Martinus Nijhoff, 1991), pp. 41–42.

151 For example, the Convention for the Protection of the Marine Environment of the North-East Atlantic (United Nations, *Treaty Series*, vol. 2354, No. 42279, p. 67, at p. 71, art. 1 (e)); the Convention on the Protection of the Marine Environment of the Baltic Sea Area (Helsinki, 9 April 1992, *ibid*., vol. 1507, No. 25986, p. 166, at p. 169, art. 2, para. 2); the Protocol for the Protection of the Mediterranean Sea against Pollution from Land-based Sources (*ibid*., vol. 1328, No. 22281, p. 105, at p. 121, art. 4, para. 1 (b)); the Protocol for the Protection of the South-East Pacific against Pollution from Land-based Sources (Quito, 22 July 1983, *ibid*., vol. 1648, No. 28327, p. 73, at p. 90, art. II (c)); and the Protocol for the Protection of the Marine Environment against Pollution from Land-based Sources to the Kuwait Regional Convention for Co-operation on the Protection of the Marine Environment from Pollution (Kuwait, 21 February 1990, *ibid*., vol. 2399, No. 17898, p. 3, at p. 40, art. III).

152 For example, at the fifty-eighth session of the Marine Environment Protection Committee in 2008, IMO adopted annex VI, as amended, to the International Convention for the Prevention of Pollution from Ships (*ibid*., vol. 1340, No. 22484, p. 61), which regulates, *inter alia*, emissions of SO_x and NO_x. The Convention now has six annexes, namely, annex I on regulations for the prevention of pollution by oil (entry into force on 2 October 1983); annex II on regulations for the control of pollution by noxious liquid substances in bulk (entry into force on 6 April 1987); annex III on regulations for the prevention of pollution by harmful substances carried by sea in packaged form (entry into force on 1 July 1992); annex IV on regulations for the prevention of pollution by sewage from ships (entry into force on 27 September 2003); annex V on regulations for the prevention of pollution by garbage from ships (entry into force on 31 December 1988); and annex VI on regulations for the prevention of air pollution from ships (entry into force on 19 May 2005).

153 S. Karim, *Prevention of Pollution of the Marine Environment from Vessels: The Potential and Limits of the International Maritime Organization* (Dordrecht, Springer, 2015), pp. 107–126; S. Karim and S. Alam, "Climate change and reduction of emissions of greenhouse gases from ships: an appraisal", *Asian Journal of International Law*, vol. 1 (2011), pp. 131–148; Y. Shi, "Are greenhouse gas emissions from international shipping a type of marine pollution?" *Marine Pollution Bulletin*, vol. 113 (2016), pp. 187–192; J. Harrison, "Recent developments and continuing challenges in the regulation of greenhouse gas emissions from international shipping" (2012), Edinburgh School of Law Research Paper No. 2012/12, p. 20. Available from https://ssrn.com/abstract=2037038.

effective implementation of the rules on the protection of the environment could protect the oceans.

(10) As for international human rights law, environmental degradation, including air pollution, climate change and ozone layer depletion, "has the potential to affect the realization of human rights".[154] The link between human rights and the environment, including the atmosphere, is acknowledged in practice. The Stockholm Declaration recognizes, in its principle 1, that everyone "has the fundamental right to freedom, equality and adequate conditions of life in an environment of a quality that permits a life of dignity and well-being".[155] The Rio Declaration of 1992 outlines, in its principle 1, that "[h]uman beings are at the centre of concerns for sustainable development", and that "[t]hey are entitled to a healthy and productive life in harmony with nature".[156] In the context of atmospheric pollution, the Convention on Long-Range Transboundary Air Pollution recognizes that air pollution has "deleterious effects of such a nature as to endanger human health" and provides that the parties are determined "to protect man and his environment against air pollution" of a certain magnitude.[157] Likewise, for atmospheric degradation, the Vienna Convention for the Protection of the Ozone Layer contains a provision whereby the parties are required to take appropriate measures "to protect human health" in accordance with the Convention and Protocols to which they are a party.[158] Similarly, the United Nations Framework Convention on Climate Change deals with the adverse effects of climate change, including significant deleterious effects "on human health and welfare".[159]

(11) In this regard, relevant human rights include "the right to life",[160] "the right to private and family life"[161] and "the right to property",[162] as well as the other rights listed in the eleventh preambular paragraph of the Paris Agreement:

> [C]limate change is a common concern of humankind, Parties should, when taking action to address climate change, respect, promote and consider their respective obligations on human rights, the right to health, the rights of indigenous peoples, local communities, migrants, children, persons with disabilities and people in vulnerable situations and the right to development, as well as gender equality, empowerment of women and intergenerational equity.

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[154] Analytical study on the relationship between human rights and the environment: report of the United Nations High Commissioner for Human Rights (A/HRC/19/34), para. 15. See also Human Rights Council resolution 19/10 of 19 April 2012 on human rights and the environment.

[155] See L.B. Sohn, "The Stockholm Declaration on the Human Environment" (footnote 23 above), pp. 451–455.

[156] F. Francioni, "Principle 1: human beings and the environment", in J.E. Viñuales, ed., *The Rio Declaration on Environment and Development: A Commentary* (Oxford, Oxford University Press, 2015), pp. 93–106, at pp. 97–98.

[157] United Nations, *Treaty Series*, vol. 1302, No. 21623, p. 217, at p. 219, arts. 1 and 2.

[158] *Ibid*., vol. 1513, No. 26164, p. 293, at p. 326, art. 2.

[159] Art. 1.

[160] Art. 6 of the International Covenant on Civil and Political Rights of 1966 (New York, 16 December 1966, United Nations, *Treaty Series*, vol. 999, No. 14668, p. 171); art. 6 of the Convention on the Rights of the Child of 1989 (New York, 20 December 1989, *ibid*., vol. 1577, No. 27531, p. 3); art. 10 of the Convention on the Rights of Persons with Disabilities of 2006 (New York, 20 December 2006, *ibid*., vol. 2515, No. 44910, p. 3); art. 2 of the Convention for the Protection of Human Rights and Fundamental Freedoms of 1950 (Rome, 4 November 1950, *ibid*., vol. 213, No. 2889, p. 221, hereinafter, "European Convention on Human Rights"); art. 4 of the American Convention on Human Rights of 1969 (San José, 22 November 1969, *ibid*., vol. 1144, No. 14668, p. 171); and art. 4 of the African Charter on Human and Peoples' Rights of 1981 (Nairobi, 27 June 1981, *ibid*., vol. 1520, No. 26363, p. 217).

[161] Art. 17 of the International Covenant on Civil and Political Rights; art. 8 of the European Convention on Human Rights; and art. 11, para. 2, of the American Convention on Human Rights.

[162] Art. 1 of Protocol No. 1 to the European Convention on Human Rights (*ibid*., vol. 213, No. 2889, p. 221); art. 21 of the American Convention on Human Rights; and art. 14 of the African Charter on Human and Peoples' Rights. See D. Shelton, "Human rights and the environment: substantive rights" in Fitzmaurice, Ong and Merkouris, eds., *Research Handbook on International Environmental Law*, (footnote 21 above), pp. 265–283, at pp. 265, 269–278.

(12) Where a specific right to environment exists in human rights conventions, the relevant courts and treaty bodies apply them, including the right to health. In order for international human rights law to contribute to the protection of the atmosphere, however, certain core requirements must be fulfilled.[163] First, as international human rights law remains "a personal-injury-based legal system",[164] a direct link between atmospheric pollution or degradation that impairs the protected right and an impairment of a protected right must be established. Second, the adverse effects of atmospheric pollution or degradation must attain a certain threshold if they are to fall within the scope of international human rights law. The assessment of such minimum standards is relative and depends on the content of the right to be invoked and all the relevant circumstances of the case, such as the intensity and duration of the nuisance and its physical or mental effects. Third, and most importantly, it is necessary to establish the causal link between an action or omission of a State, on the one hand, and atmospheric pollution or degradation, on the other hand.

(13) One of the difficulties in the relationship between the rules of international law relating to the atmosphere and human rights law is the "disconnect" in their application *ratione personae*. While the rules of international law relating to the atmosphere apply not only to the States of victims but also to the States of origin of the harm, the scope of application of human rights treaties is limited to the persons subject to a State's jurisdiction.[165] Thus, where an environmentally harmful activity in one State affects persons in another State, the question of the interpretation of "jurisdiction" in the context of human rights obligations arises. In interpreting and applying the notion, regard may be had to the object and purpose of human rights treaties. In its Advisory Opinion on the *Legal Consequences of the Construction of a Wall in the Occupied Palestinian Territory*, the International Court of Justice said, when addressing the issue of extraterritorial jurisdiction, "while the jurisdiction of States is primarily territorial, it may sometimes be exercised outside the national territory. Considering the object and purpose of the International Covenant on Civil and Political Rights, it would seem natural that, even when such is the case, State parties to the Covenant should be bound to comply with its provisions".[166]

(14) One possible consideration is the relevance of the principle of non-discrimination. Some authors maintain that it may be considered unreasonable that international human rights law would have no application to atmospheric pollution or global degradation and that the law can extend protection only to the victims of intra-boundary pollution. They maintain that the non-discrimination principle requires the responsible State to treat transboundary atmospheric pollution or global atmospheric degradation no differently from domestic pollution.[167] Furthermore, if and insofar as the relevant human rights norms have extraterritorial effect,[168] they may be considered as overlapping with environmental norms for the protection of the atmosphere, such as due diligence (draft guideline 3), environmental impact assessment (draft guideline 4), sustainable utilization (draft guideline 5), equitable and reasonable utilization (draft guideline 6) and international cooperation (draft guideline

[163] P.-M. Dupuy and J.E. Viñuales, *International Environmental Law* (Cambridge, Cambridge University Press, 2015), pp. 320–329.

[164] *Ibid*., pp. 308–309.

[165] Art. 2 of the International Covenant on Civil and Political Rights; art. 1 of the European Convention on Human Rights; and art. 1 of the American Convention on Human Rights. See A. Boyle, "Human rights and the environment: where next?", *European Journal of International Law*, vol. 23 (2012), pp. 613–642, at pp. 633–641.

[166] *Legal Consequences of the Construction of a Wall in the Occupied Palestinian Territory, Advisory Opinion, I.C.J. Reports 2004*, p. 136, at p. 179, para. 109.

[167] Boyle, "Human rights and the environment" (see footnote 165 above), pp. 639–640.

[168] B. Simma and P. Alston, "Sources of human rights law: custom, *jus cogens* and general principles", *Australian Year Book of International Law*, vol. 12 (1988), pp. 82–108; V. Dimitrijevic, "Customary law as an instrument for the protection of human rights", Working Paper, No. 7 (Milan, Istituto Per Gli Studi Di Politica Internazionale (ISPI), 2006), pp. 3–30; B. Simma, "Human rights in the International Court of Justice: are we witnessing a sea change?", in D. Alland *et al.*, eds., *Unity and Diversity of International Law: Essays in Honour of Professor Pierre-Marie Dupuy* (Leiden, Martinus Nijhoff, 2014), pp. 711–737; and H. Thirlway, "International law and practice: human rights in customary law: an attempt to define some of the issues," *Leiden Journal of International Law*, vol. 28 (2015), pp. 495–506.

8), among others, which would enable interpretation and application of both norms in a harmonious manner.

(15) In contrast to paragraph 1, which addresses identification, interpretation and application, paragraph 2 deals with the situation in which States wish to develop new rules. The paragraph signals a general desire to encourage States, when engaged in negotiations involving the creation of new rules, to take into account the systemic relationships that exist between rules of international law relating to the atmosphere and rules in other legal fields.

(16) Paragraph 3 highlights the plight of those in vulnerable situations because of atmospheric pollution and atmospheric degradation. It has been formulated to make a direct reference to atmospheric pollution and atmospheric degradation. The reference to paragraphs 1 and 2 captures both the aspects of "identification, interpretation and application", on the one hand, and "development", on the other hand. The phrase "special consideration should be given to persons and groups particularly vulnerable to atmospheric pollution and atmospheric degradation" underlines the broad scope of the consideration to be given to the situation of vulnerable persons and groups, covering both aspects of the present topic, namely "atmospheric pollution" and "atmospheric degradation". It was not considered useful to refer in the text to "human rights", or even to "rights" or "legally protected interests".

(17) The second sentence of paragraph 3 gives examples of groups that may be found in vulnerable situations in the context of atmospheric pollution and atmospheric degradation. The World Health Organization has noted that: "[a]ll populations will be affected by a changing climate, but the initial health risks vary greatly, depending on where and how people live. People living in small island developing States and other coastal regions, megacities, and mountainous and polar regions are all particularly vulnerable in different ways."[169] In the Sustainable Development Goals adopted by the General Assembly in its 2030 Agenda for Sustainable Development, atmospheric pollution is addressed in Goals 3.9 and 11.6, which call, in particular, for a substantial reduction in the number of deaths and illnesses from air pollution, and for special attention to ambient air quality in cities.[170]

(18) The phrase in the second sentence of paragraph 3 "may include, *inter alia*" denotes that the examples given are not necessarily exhaustive. Indigenous peoples are, as was declared in the Report of the Indigenous Peoples' Global Summit on Climate Change, "the most vulnerable to the impacts of climate change because they live in the areas most affected by climate change and are usually the most socio-economically disadvantaged".[171] People of the least developed countries are also placed in a particularly vulnerable situation as they often live in extreme poverty, without access to basic infrastructure services and to adequate medical and social protection.[172] People of low-lying areas and small-island developing States affected by sea-level rise are subject to the potential loss of land, leading to displacement and, in some cases, forced migration. Inspired by the preamble of the Paris Agreement, in addition to the groups specifically indicated in paragraph 3 of draft guideline 9, other groups of potentially particularly vulnerable people include local communities,

[169] World Health Organization, *Protecting Health from Climate Change: Connecting Science, Policy and People* (Geneva, 2009), p. 2.

[170] See B. Lode, P. Schönberger and P. Toussaint, "Clean air for all by 2030? Air quality in the 2030 Agenda and in international law", *Review of European, Comparative and International Environmental Law*, vol. 25 (2016), pp. 27–38. See also the indicators for these targets specified in 2016 (3.9.1: mortality rate attributed to household and ambient air pollution; and 11.6.2: annual mean levels of fine particulate matter in cities).

[171] "Report of the Indigenous Peoples' Global Summit on Climate Change, 20–24 April 2009, Anchorage, Alaska", p. 12. See R.L. Barsh, "Indigenous peoples", in Bodansky *et al.*, *The Oxford Handbook of International Environmental Law*, (footnote 21 above), pp. 829–852; B. Kingsbury, "Indigenous peoples", in R. Wolfrum, ed., *The Max Planck Encyclopedia of Public International Law* (Oxford, Oxford University Press, 2012), vol. V, pp. 116–133; and H.A. Strydom, "Environment and indigenous peoples", in *ibid.*, vol. III, pp. 455–461.

[172] World Bank Group Climate Change Action Plan, 7 April 2016, para. 104, available from http://pubdocs.worldbank.org/en/677331460056382875/WBG-Climate-Change-Action-Plan-public-version.pdf.

migrants, women, children, persons with disabilities and also the elderly, who are often seriously affected by atmospheric pollution and atmospheric degradation.[173]

Guideline 10
Implementation

1. National implementation of obligations under international law relating to the protection of the atmosphere from atmospheric pollution and atmospheric degradation, including those referred to in the present draft guidelines, may take the form of legislative, administrative, judicial and other actions.

2. States should endeavour to give effect to the recommendations contained in the present draft guidelines.

Commentary

(1) Draft guideline 10 deals with national implementation of obligations under international law relating to the protection of the atmosphere from atmospheric pollution and atmospheric degradation. Compliance at the international level is the subject of draft guideline 11. These two draft guidelines are interrelated. The term "implementation" is used in the present draft guideline to refer to measures that States may take to make treaty provisions effective at the national level, including implementation in their national laws.[174]

(2) The two paragraphs of the draft guideline address, on one hand, existing obligations under international law and, on the other hand, recommendations contained in the draft guidelines.

(3) The term "[n]ational implementation" denotes the measures that parties may take to make international obligations operative at the national level, pursuant to the national constitution and legal system of each State.[175] National implementation may take many forms, including "legislative, administrative, judicial and other actions". The word "may" reflects the discretionary nature of the provision. The reference to "administrative" actions is used, rather than "executive" actions, as it is more encompassing. It covers possible implementation at lower levels of governmental administration. The term "other actions" is a residual category covering all other forms of national implementation. The term "national implementation" also applies to obligations of regional organizations such as the European Union.[176]

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[173] The Committee on the Elimination of Discrimination against Women has a general recommendation on "gender-related dimensions of disaster risk reduction and climate change"; see http://www.ohchr.org/EN/HRBodies/CEDAW/Pages/ClimateChange.aspx. Along with women and children, the elderly and persons with disabilities are usually mentioned as vulnerable people. See World Health Organization, *Protecting Health from Climate Change …* (footnote 169 above) and the World Bank Group Climate Change Action Plan (footnote 172 above). The Inter-American Convention on Protecting the Human Rights of Older Persons of 2015 (*General Assembly of the Organization of American States, Forty-fifth Regular Session, Proceedings*, vol. I (OEA/Ser.P/XLV-O.2), pp. 11–38) provides, in article 25 (right to a healthy environment), that: "Older persons have the right to live in a healthy environment with access to basic public services. To that end, States Parties shall adopt appropriate measures to safeguard and promote the exercise of this right, inter alia: a. To foster the development of older persons to their full potential in harmony with nature; b. To ensure access for older persons, on an equal with others, to basic public drinking water and sanitation services, among others."

[174] See generally, P. Sands and J. Peel, with A. Fabra and R. MacKenzie, *Principles of International Environmental Law*, 4th ed. (Cambridge, Cambridge University Press, 2018), pp. 144–196; E. Brown Weiss and H.K. Jacobson, eds., *Engaging Countries: Strengthening Compliance with International Environmental Accords*, (Cambridge, Massachusetts, MIT Press, 1998), see "A framework for analysis", pp. 1–18, at p. 4.

[175] C. Redgwell, "National implementation", in Bodansky *et al.*, *The Oxford Handbook of International Environmental Law* (footnote 21 above), pp. 923–947.

[176] See L. Krämer, "Regional economic integration organizations: the European Union as an example", in Bodansky *et al.*, *The Oxford Handbook of International Environmental Law* (footnote 21 above), pp. 854–877 (on implementation, pp. 868–870).

(4) The use of the term "obligations" in paragraph 1 does not refer to new obligations for States, but rather refers to existing obligations that States already have under international law. Thus, the phrase "including those [obligations] referred to in the present draft guidelines" was chosen, and the expression "referred to" highlights the fact that the draft guidelines do not as such create new obligations and are not dealing comprehensively with the various issues related to the topic.

(5) The draft guidelines refer to obligations of States under international law relating to the protection of the atmosphere from atmospheric pollution and atmospheric degradation, namely, the obligation to protect the atmosphere (draft guideline 3), the obligation to ensure that an environmental impact assessment is carried out (draft guideline 4) and the obligation to cooperate (draft guideline 8).[177] Given that States have these obligations, it is clear that they need to be faithfully implemented.

(6) The reference to "the recommendations contained in the present draft guidelines" in paragraph 2 is intended to distinguish such recommendations from "obligations" as referred to in paragraph 1. The expression "recommendations" was considered appropriate as it would be consistent with the draft guidelines, which use the term "should".[178] This is without prejudice to any normative content that the draft guidelines have under international law. Paragraph 2 provides that States should endeavour to give effect to the recommended practices contained in the draft guidelines.

(7) Moreover, even though States sometimes resort to extraterritorial application of national law to the extent permissible under international law,[179] it was not considered necessary to address the matter for the purposes of the present draft guidelines.[180] It was considered that the matter of extraterritorial application of national law by a State raised a host of complex questions with far-reaching implications for other States and for their relations with each other.

Guideline 11
Compliance

1. States are required to abide by their obligations under international law relating to the protection of the atmosphere from atmospheric pollution and atmospheric degradation in good faith, including through compliance with the rules and procedures in the relevant agreements to which they are parties.

2. To achieve compliance, facilitative or enforcement procedures may be used as appropriate, in accordance with the relevant agreements:

[177] Even the obligation to cooperate sometimes requires national implementation. According to draft guideline 8, paragraph 2, "[c]ooperation could include exchange of information and joint monitoring", which normally require national implementing legislation.

[178] See, for example, draft guidelines 5, 6, 7, 9, and 12, para. 2.

[179] The relevant precedents of extraterritorial application of national law include: (a) *Tuna-Dolphin* cases under the General Agreement on Tariffs and Trade (The "extra-jurisdictional application" of the United States Marine Mammal Protection Act not being consistent with article XX of the General Agreement, Panel report, *United States – Restrictions on Imports of Tuna*, DS21/R-39S/155, 3 September 1991 (Tuna-Dolphin-I, not adopted), paras. 5.27–5.29; General Agreement on Tariffs and Trade, Panel report, *United States – Restrictions on Imports of Tuna*, DS29/R, 16 June 1994 (Tuna Dolphin II, not adopted), para. 5.32); (b) WTO *Gasoline* case (On the extraterritorial application of the United States Clean Air Act, WTO, Appellate Body report, *United States – Standards of Reformulated and Conventional Gasoline*, WT/DS2/AB/R, 22 April 1996); (c) European Court of Justice judgment, *Air Transport Association of America and Others v. Secretary of State for Energy and Climate*, 21 December 2011 (On the extraterritorial application of the European Union Aviation Directive 2008/101/EC); and (d) Singapore Transboundary Haze Pollution Act of 2014, providing for extraterritorial jurisdiction based on the "objective territorial principle" (Parliament of Singapore, *Official Reports*, No. 12, Session 2, 4 August 2014, paras. 5–6). See Murase, "Perspectives from international economic law on transnational environmental issues" (footnote 143 above), pp. 349–372.

[180] See the Special Rapporteur's fifth report (A/CN.4/711), para. 31.

(*a*) facilitative procedures may include providing assistance to States, in cases of non-compliance, in a transparent, non-adversarial and non-punitive manner to ensure that the States concerned comply with their obligations under international law, taking into account their capabilities and special conditions;

(*b*) enforcement procedures may include issuing a caution of non-compliance, termination of rights and privileges under the relevant agreements, and other forms of enforcement measures.

Commentary

(1) Draft guideline 11, which complements draft guideline 10 on national implementation, refers to compliance at the international level. The use of the term "compliance" is not necessarily uniform in agreements, or in the literature. The term "compliance" is used in the present draft guideline to refer to mechanisms or procedures at the international level that verify whether States in fact adhere to the obligations of an agreement or other rules of international law.

(2) Paragraph 1 reflects, in particular, the principle *pacta sunt servanda*. The purpose of the formulation "obligations under international law" relating to the protection of the atmosphere is to harmonize the language used, in paragraph 1, with the language used throughout the draft guidelines. The broad nature of the formulation "obligations under international law" was considered to also better account for the fact that treaty rules constituting obligations may, in some cases, be binding only on the parties to the relevant agreements, while others may codify or lead to the crystallization of rules of international law, or give rise to a general practice that is accepted as law,[181] thus generating a new rule of customary international law, with consequent legal effects for non-parties. The phrase "relevant agreements" to which the States are parties has been used to avoid narrowing the scope of the provision only to multilateral environmental agreements, when such obligations can exist in other agreements.[182] The general character of paragraph 1 also appropriately serves as an introduction to paragraph 2.

(3) Paragraph 2 deals with the facilitative or enforcement procedures that may be used by compliance mechanisms.[183] The wording of the opening phrase of the chapeau "[t]o achieve compliance" is aligned with formulations in existing agreements addressing compliance mechanisms. The phrase "may be used as appropriate" emphasizes the differing circumstances and contexts in which facilitative or enforcement procedures could be

[181] See conclusion 11 of the conclusions on the identification of customary international law and commentary thereto, *Official Records of the General Assembly, Seventy-third Session, Supplement No. 10* (A/73/10), chap. V, pp. 143–146.

[182] This reflection of State practice would include multilateral or regional or other trade agreements, for example, that may also contemplate environmental protection provisions including exceptions such as those under article XX of the General Agreement on Tariffs and Trade or even so-called environmental "side agreements", such as the North American Agreement on Environmental Cooperation.

[183] Non-compliance procedures have been widely adopted in multilateral environmental agreements relating to the protection of the atmosphere, including the following: (a) Convention on Long-Range Transboundary Air Pollution and its subsequent Protocols: see E. Milano, "Procedures and mechanisms for review of compliance under the 1979 Long-Range Transboundary Air Pollution Convention and its Protocols", in T. Treves *et al.*, eds., *Non-Compliance Procedures and Mechanisms and the Effectiveness of International Environmental Agreements* (The Hague, T.M.C. Asser Press, 2009), pp. 169–180; (b) the Montreal Protocol on the Substances that Deplete the Ozone Layer (United Nations, *Treaty Series*, vol. 1522, No. 26369, p. 3, and UNEP/OzL.Pro.4/15); F. Lesniewska, "Filling the holes: the Montreal Protocol's non-compliance mechanisms", in Fitzmaurice, Ong and Merkouris, eds., *Research Handbook on International Environmental Law* (footnote 21 above), pp. 471–489; (c) Convention on Environmental Impact Assessment in a Transboundary Context; (d) Kyoto Protocol to the United Nations Framework Convention on Climate Change, and decision 24/CP.7 (FCCC/CP/2001/13/Add.3); J. Brunnée, "Climate change and compliance and enforcement processes", in R. Rayfuse and S.V. Scott, eds., *International Law in the Era of Climate Change* (Cheltenham: Edward Elgar, 2012), pp. 290–320; (e) the Paris Agreement; D. Bodansky, "The Paris Climate Change Agreement: a new hope?", *American Journal of International Law*, vol. 110 (2016), pp. 288–319.

deployed to help foster compliance. The disjunctive word "or" indicates that facilitative or enforcement procedures may be considered as alternatives by the competent organ established under the agreement concerned. The phrase "in accordance with the relevant agreements" is used at the end of the chapeau, so as to emphasize that facilitative or enforcement procedures are those provided for under agreements to which States are parties, and that these procedures will operate in accordance with such agreements.

(4) Besides the chapeau, paragraph 2 comprises two subparagraphs, (*a*) and (*b*). In both subparagraphs, the word "may" has been used before "include" to provide States and the competent organ established under the agreement concerned with flexibility to use existing facilitative or enforcement procedures.

(5) Subparagraph (*a*) employs the phrase "in cases of non-compliance"[184] and refers to "the States concerned", avoiding the expression "non-complying States". Facilitative procedures may include providing "assistance" to States, since some States may be willing to comply but unable to do so for lack of capacity. Thus, facilitative measures are provided in a transparent, non-adversarial and non-punitive manner to ensure that the States concerned are assisted to comply with their obligations under international law.[185] The last part of that sentence, which references "taking into account their capabilities and special conditions", was considered necessary, in recognition of the specific challenges that developing and least developed countries often face in the discharge of obligations relating to environmental protection. This is due to, most notably, a general lack of capacity, which can sometimes be mitigated through the receipt of external support enabling capacity-building to facilitate compliance with their obligations under international law.

(6) Subparagraph (*b*) speaks of enforcement procedures, which may include issuing a caution of non-compliance, termination of rights and privileges under the relevant agreements, and other forms of enforcement measures.[186] Enforcement procedures, in contrast to facilitative procedures, aim to achieve compliance by imposing a penalty on the State concerned in case of non-compliance. At the end of the sentence, the term "enforcement measures" was employed rather than the term "sanctions" in order to avoid any confusion with the possible negative connotation associated with the term "sanctions". The enforcement procedures referred to in subparagraph (*b*) should be distinguished from any invocation of international responsibility of States, hence these procedures should be adopted only for the purpose of leading the States concerned to return to compliance in accordance with the relevant agreements to which they are party as referred to in the chapeau.[187]

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[184] This is based on the Montreal Protocol on Substances that Deplete the Ozone Layer, which in art. 8 uses the phrase "Parties found to be in non-compliance" (United Nations, *Treaty Series*, vol. 1522, No. 26369, p. 40).

[185] M. Koskenniemi, "Breach of treaty or non-compliance? Reflections on the enforcement of the Montreal Protocol", *Yearbook of International Environmental Law*, vol. 3 (1992), pp. 123–162; D.G. Victor, "The operation and effectiveness of the Montreal Protocol's non-compliance procedure", in Victor, K. Raustiala and E. B. Skolnikoff, eds., *The Implementation and Effectiveness of International Environmental Commitments: Theory and Practice* (Cambridge, Massachusetts, MIT Press, 1998), pp. 137–176; O. Yoshida, *The International Legal Régime for the Protection of the Stratospheric Ozone Layer* (The Hague, Kluwer Law International, 2001), pp. 178–179; Dupuy and Viñuales, *International Environmental Law* (footnote 163 above), p. 285 *et seq.*

[186] G. Ulfstein and J. Werksman, "The Kyoto compliance system: towards hard enforcement", in O. Schram Stokke, J. Hovi and G. Ulfstein, eds., *Implementing the Climate Change Regime: International Compliance* (London, Earthscan, 2005), pp. 39–62; S. Urbinati, "Procedures and mechanisms relating to compliance under the 1997 Kyoto Protocol to the 1992 United Nations Framework Convention on Climate Change", in Treves *et al*., *Non-Compliance Procedures and Mechanisms and the Effectiveness of International Environmental Agreements* (footnote 183 above), pp. 63–84; S. Murase, "International lawmaking for the future framework on climate change: a WTO/GATT Model", in Murase, *International Law: An Integrative Perspective on Transboundary Issues* (footnote 143 above), pp. 173–174.

[187] G. Loibl, "Compliance procedures and mechanisms", in Fitzmaurice, Ong and Merkouris, eds., *Research Handbook on International Environmental Law* (footnote 21 above), pp. 426–449, at pp. 437–439.

Guideline 12
Dispute settlement

1. Disputes between States relating to the protection of the atmosphere from atmospheric pollution and atmospheric degradation are to be settled by peaceful means.

2. Since such disputes may be of a fact-intensive and science-dependent character, due consideration should be given to the use of scientific and technical experts.

Commentary

(1) Draft guideline 12 concerns dispute settlement. Paragraph 1 describes the general obligation of States to settle their disputes by peaceful means. The expression "between States" clarifies that the disputes being referred to in the paragraph are inter-State in nature. The paragraph does not refer to Article 33, paragraph 1, of the Charter of the United Nations, but the intent is not to downplay the significance of the various pacific means of settlement mentioned in that provision, such as negotiation, enquiry, mediation, conciliation, arbitration, judicial settlement, resort to other peaceful means that may be preferred by the States concerned, nor the principle of choice of means.[188] Paragraph 1 is not intended to interfere with or displace existing dispute settlement provisions in treaty regimes, which will continue to operate in their own terms. The main purpose of the present paragraph is to reaffirm the principle of peaceful settlement of disputes[189] and to serve as a basis for paragraph 2.

(2) The first part of paragraph 2 recognizes that disputes relating to the protection of the atmosphere from atmospheric pollution and atmospheric degradation would be "fact-intensive" and "science-dependent". As scientific input has been emphasized in the process of progressive development of international law relating to the protection of the atmosphere,[190] likewise, more complicated scientific and technical issues have been raised in the process of international dispute settlement in recent years. Thus, the cases brought before international courts and tribunals have increasingly focused on highly technical and scientific evidence.[191] Thus, those elements, evident from the experience with inter-State environment disputes, typically require specialized expertise to contextualize or fully grasp the issues in dispute.

[188] C. Tomuschat, "Article 33", in B. Simma *et al.*, eds., *The Charter of the United Nations: A Commentary*, 3rd ed., vol. 1 (Oxford, Oxford University Press, 2012), pp. 1069–1085; H. Ascensio, "Article 33", in J.-P. Cot, A. Pellet, M. Forteau, eds., *La Charte des Nations Unies*, 3rd ed. (Economica, 2005), pp. 1047–1060.

[189] N. Klein, "Settlement of international environmental law disputes", in Fitzmaurice, Ong and Merkouris, eds., *Research Handbook on International Environmental Law* (footnote 21 above), pp. 379–400; C.P.R. Romano, "International dispute settlement", in Bodansky *et al*., *The Oxford Handbook of International Environmental Law* (footnote 21 above), pp. 1037–1056.

[190] See S. Murase, "Scientific knowledge and the progressive development of international law: with reference to the ILC topic on the protection of the atmosphere", in J. Crawford *et al.*, eds., *The International Legal Order: Current Needs and Possible Responses: Essays in Honour of Djamchid Momtaz* (Leiden, Brill Nijhoff, 2017), pp. 41–52.

[191] See the speech of the President of the International Court of Justice, Judge Abraham, before the Sixth Committee on 28 October 2016 (on international environmental law cases before the International Court of Justice) (available from www.icj-cij.org/en/statements-by-the-president); and President Peter Tomka, "The ICJ in the service of peace and justice – words of welcome by President Tomka", 27 September 2013 (available from https://www.icj-cij.org/en/statements-by-the-president). See also E. Valencia-Ospina, "Evidence before the International Court of Justice", *International Law Forum du droit international*, vol. 1 (1999), pp. 202–207; A. Riddell, "Scientific evidence in the International Court of Justice – problems and possibilities", *Finnish Yearbook of International Law*, vol. 20 (2009), pp. 229–258; B. Simma, "The International Court of Justice and scientific expertise", *American Society of International Law Proceedings*, vol. 106 (2012), pp. 230–233; A. Riddell and B. Plant, *Evidence Before the International Court of Justice* (London, British Institute of International and Comparative Law, 2009), chap. 9; G. Niyungeko, *La preuve devant les juridictions internationales* (Brussels, Bruylant, 2005).

(3) Recent cases before the International Court of Justice involving the science-dependent issues of international environmental law[192] illustrate, directly or indirectly, specific features of the settlement of disputes relating to the protection of the atmosphere. For this reason, it is necessary that, as underlined in paragraph 2, "due consideration" be given to the use of technical and scientific experts.[193] The essential aspect in this paragraph is to emphasize the use of technical and scientific experts in the settlement of inter-State disputes whether by judicial or other means.[194]

(4) The Commission decided to maintain a simple formulation for this draft guideline and not to address other issues that may be relevant, such as *jura novit curia* (the court knows the law) and *non ultra petita* (not beyond the parties' request).[195]

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[192] In the 1997 *Gabčíkovo-Nagymaros Project* (see footnote 84 above) and the 2010 *Pulp Mills* (see footnote 79 above) cases, the parties followed the traditional method of presenting the evidence, that is, by expert-counsel, though they were scientists and not lawyers. Their scientific findings were treated as the parties' assertions, but this met some criticisms by some of the individual judges of the Court (*Pulp Mills on the River Uruguay*, Judgment, separate opinion of Judge Greenwood, paras. 27–28, and joint dissenting opinion of Judges Al-Khasawneh and Simma, para. 6), as well as by commentators. In the *Aerial Herbicide Spraying* (withdrawn in 2013) (*Aerial Herbicide Spraying (Ecuador v. Colombia), Order of 13 September 2013, I.C.J. Reports 2013*, p. 278), in the 2014 *Whaling in the Antarctica* (*Whaling in the Antarctica (Australia v. Japan: New Zealand intervening), Judgment, I.C.J. Reports 2014*, p. 226) and in the 2015 *Construction of a Road* (see footnote 58 above) cases, the parties appointed independent experts, who were, in the latter two cases, cross-examined and were treated with more weight than the statements of expert-counsel. In all of these cases, the Court did not appoint its own experts in accordance with Article 50 of its Statute, but it did so in the *Maritime Delimitation* case, although the latter was not *per se* an environmental law dispute (*Maritime Delimitation in the Caribbean Sea and the Pacific Ocean (Costa Rica v. Nicaragua)* and *Land Boundary in the Northern Part of Isla Portillos (Costa Rica v. Nicaragua), Judgment, I.C.J. Reports 2018*, p. 139). With regard to the issue of the standard of proof, the International Court of Justice tends to avoid extensive elaboration on the question, though the Court occasionally refers to it in abstract terms, leaving the matter for the discretion of the Court. In case of fact-intensive/technical cases such as environmental disputes, the Court might be viewed as lowering the standard of proof if needed, and simply weigh the respective evidence submitted by the parties in order to reach a conclusion. See, for example, Judge Greenwood's separate opinion in the *Pulp Mills on the River Uruguay* case judgment (para. 26), concluding that, in such cases, the party that bears the burden of proof needs to establish the facts only "on the balance of probabilities (or, the balance of the evidence)". See also K. Del Mar, "The International Court of Justice and standards of proof", in K. Bannelier, T. Christakis and S. Heathcote, eds., *The ICJ and the Evolution of International Law: the enduring impact of the* Corfu Channel *case* (Abingdon, Routledge, 2012), pp. 98–123, at pp. 99–100; A. Rajput, "Standard of proof" in *Max Planck Encylopedia of Public International Law* (updated in 2021).

[193] See D. Peat, "The use of court-appointed experts by the International Court of Justice", *British Yearbook of International Law*, vol. 84 (2014), pp. 271–303; J.G. Devaney, *Fact-finding before the International Court of Justice* (Cambridge, Cambridge University Press, 2016); C.E. Foster, *Science and the Precautionary Principle in International Courts and Tribunals: Expert Evidence, Burden of Proof and Finality* (Cambridge, Cambridge University Press, 2011), pp. 77–135; Special edition on courts and tribunals and the treatment of scientific issues, *Journal of International Dispute Settlement*, vol. 3 (2012); C. Tams, "Article 50" and "Article 51", in A. Zimmermann *et al.*, eds., *The Statute of the International Court of Justice: A Commentary* (Oxford, Oxford University Press, 2012), pp. 1287–1311; C.E. Foster, "New clothes for the emperor? Consultation of experts by the International Court of Justice", *Journal of International Dispute Settlement*, vol. 5 (2014), pp. 139–173; J.E. Viñuales, "Legal techniques for dealing with scientific uncertainty in environmental law", *Vanderbilt Journal of Transnational Law*, vol. 43 (2010), pp. 437–504, at pp. 476–480; G. Gaja, "Assessing expert evidence in the ICJ", *The Law and Practice of International Courts and Tribunals*, vol. 15 (2016), pp. 409–418.

[194] It should be recalled that there are close interactions between non-judicial and judicial means of settling disputes. In the context of disputes relating to the environment and to the protection of the atmosphere, in particular, even at the stage of initial negotiations, States are often required to be well equipped with scientific evidence on which their claims are based, and accordingly the distance between negotiation and judicial settlement may not be very distant.

[195] Based on *jura novit curia*, the Court can in principle apply any applicable law to any fact. In addition, it can evaluate evidence and draw conclusions as it sees appropriate (as long as it complies with the

United Nations A/RES/76/112

General Assembly

Distr.: General
17 December 2021

Seventy-sixth session
Agenda item 82
Report of the International Law Commission on the work of its seventy-second session

Resolution adopted by the General Assembly on 9 December 2021

[*on the report of the Sixth Committee (A/76/473, para. 12)*]

76/112. Protection of the atmosphere

The General Assembly,

Having considered chapter IV of the report of the International Law Commission on the work of its seventy-second session,[1] which contains the draft preamble and guidelines on the protection of the atmosphere,

Taking note of the recommendation of the International Law Commission contained in paragraph 37 of its report,

Emphasizing the continuing importance of the codification and progressive development of international law, as referred to in Article 13, paragraph 1 (a), of the Charter of the United Nations,

Noting that the subject of protection of the atmosphere is of major importance in international relations,

1. *Welcomes* the conclusion of the work of the International Law Commission on the protection of the atmosphere and its adoption of the draft preamble and guidelines on the protection of the atmosphere and commentaries thereto;[2]

2. *Expresses its appreciation* to the International Law Commission for its continuing contribution to the codification and progressive development of international law;

3. *Takes note* of the views and comments expressed in the debates of the Sixth Committee on the subject, including those made at the seventy-sixth session of the

[1] *Official Records of the General Assembly, Seventy-sixth Session, Supplement No. 10* (A/76/10).
[2] Ibid., paras. 39 and 40.

General Assembly,[3] after the International Law Commission had completed its consideration of this topic in accordance with its statute;

4. *Also takes note* of the preamble and guidelines on the protection of the atmosphere, the text of which is annexed to the present resolution, with the commentaries thereto, brings them to the attention of States, international organizations and all who may be called upon to deal with the subject, and encourages their widest possible dissemination.

49th plenary meeting
9 December 2021

Annex

Guidelines on the protection of the atmosphere

Preamble

Acknowledging that the atmosphere is a natural resource, with a limited assimilation capacity, essential for sustaining life on Earth, human health and welfare, and aquatic and terrestrial ecosystems,

Bearing in mind that the transport and dispersion of polluting and degrading substances occur within the atmosphere,

Considering that atmospheric pollution and atmospheric degradation are a common concern of humankind,

Aware of the special situation and needs of developing countries,

Noting the close interaction between the atmosphere and the oceans,

Noting in particular the special situation of low-lying coastal areas and small island developing States due to sea-level rise,

Recognizing that the interests of future generations of humankind in the long-term conservation of the quality of the atmosphere should be fully taken into account,

Recalling that the present guidelines were elaborated on the understanding that they were not intended to interfere with relevant political negotiations or to impose on current treaty regimes rules or principles not already contained therein,

Guideline 1
Use of terms

For the purposes of the present guidelines:

(a) “atmosphere” means the envelope of gases surrounding the Earth;

(b) “atmospheric pollution” means the introduction or release by humans, directly or indirectly, into the atmosphere of substances or energy contributing to significant deleterious effects extending beyond the State of origin of such a nature as to endanger human life and health and the Earth’s natural environment;

[3] See A/C.6/76/SR.16, A/C.6/76/SR.17, A/C.6/76/SR.18, A/C.6/76/SR.19, A/C.6/76/SR.20, A/C.6/76/SR.21, A/C.6/76/SR.22, A/C.6/76/SR.23, A/C.6/76/SR.24, A/C.6/76/SR.25 and A/C.6/76/SR.29. The statements made in the Sixth Committee are available in full (in the original languages) on the website of the Sixth Committee, at www.un.org/en/ga/sixth/.

(c) “atmospheric degradation” means the alteration by humans, directly or indirectly, of atmospheric conditions having significant deleterious effects of such a nature as to endanger human life and health and the Earth’s natural environment.

Guideline 2
Scope

1. The present guidelines concern the protection of the atmosphere from atmospheric pollution and atmospheric degradation.

2. The present guidelines do not deal with and are without prejudice to questions concerning the polluter-pays principle, the precautionary principle and the common but differentiated responsibilities principle.

3. Nothing in the present guidelines affects the status of airspace under international law nor questions related to outer space, including its delimitation.

Guideline 3
Obligation to protect the atmosphere

States have the obligation to protect the atmosphere by exercising due diligence in taking appropriate measures, in accordance with applicable rules of international law, to prevent, reduce or control atmospheric pollution and atmospheric degradation.

Guideline 4
Environmental impact assessment

States have the obligation to ensure that an environmental impact assessment is undertaken of proposed activities under their jurisdiction or control which are likely to cause significant adverse impact on the atmosphere in terms of atmospheric pollution or atmospheric degradation.

Guideline 5
Sustainable utilization of the atmosphere

1. Given that the atmosphere is a natural resource with a limited assimilation capacity, its utilization should be undertaken in a sustainable manner.

2. Sustainable utilization of the atmosphere includes the need to reconcile economic development with the protection of the atmosphere.

Guideline 6
Equitable and reasonable utilization of the atmosphere

The atmosphere should be utilized in an equitable and reasonable manner, taking fully into account the interests of present and future generations.

Guideline 7
Intentional large-scale modification of the atmosphere

Activities aimed at intentional large-scale modification of the atmosphere should only be conducted with prudence and caution, and subject to any applicable rules of international law, including those relating to environmental impact assessment.

Guideline 8
International cooperation

1. States have the obligation to cooperate, as appropriate, with each other and with relevant international organizations for the protection of the atmosphere from atmospheric pollution and atmospheric degradation.

2. States should cooperate in further enhancing scientific and technical knowledge relating to the causes and impacts of atmospheric pollution and atmospheric degradation. Cooperation could include exchange of information and joint monitoring.

Guideline 9
Interrelationship among relevant rules

1. The rules of international law relating to the protection of the atmosphere and other relevant rules of international law, including, inter alia, the rules of international trade and investment law, of the law of the sea and of international human rights law, should, to the extent possible, be identified, interpreted and applied in order to give rise to a single set of compatible obligations, in line with the principles of harmonization and systemic integration, and with a view to avoiding conflicts. This should be done in accordance with the relevant rules set forth in the Vienna Convention on the Law of Treaties, including articles 30 and 31, paragraph 3 (c), and the principles and rules of customary international law.

2. States should, to the extent possible, when developing new rules of international law relating to the protection of the atmosphere and other relevant rules of international law, endeavour to do so in a harmonious manner.

3. When applying paragraphs 1 and 2, special consideration should be given to persons and groups particularly vulnerable to atmospheric pollution and atmospheric degradation. Such groups may include, inter alia, indigenous peoples, people of the least developed countries and people of low-lying coastal areas and small island developing States affected by sea-level rise.

Guideline 10
Implementation

1. National implementation of obligations under international law relating to the protection of the atmosphere from atmospheric pollution and atmospheric degradation, including those referred to in the present guidelines, may take the form of legislative, administrative, judicial and other actions.

2. States should endeavour to give effect to the recommendations contained in the present guidelines.

Guideline 11
Compliance

1. States are required to abide by their obligations under international law relating to the protection of the atmosphere from atmospheric pollution and atmospheric degradation in good faith, including through compliance with the rules and procedures in the relevant agreements to which they are parties.

2. To achieve compliance, facilitative or enforcement procedures may be used as appropriate, in accordance with the relevant agreements:

(a) facilitative procedures may include providing assistance to States, in cases of non-compliance, in a transparent, non-adversarial and non-punitive manner to

ensure that the States concerned comply with their obligations under international law, taking into account their capabilities and special conditions;

(b) enforcement procedures may include issuing a caution of non-compliance, termination of rights and privileges under the relevant agreements, and other forms of enforcement measures.

Guideline 12
Dispute settlement

1. Disputes between States relating to the protection of the atmosphere from atmospheric pollution and atmospheric degradation are to be settled by peaceful means.

2. Since such disputes may be of a fact-intensive and science-dependent character, due consideration should be given to the use of scientific and technical experts.