Chapter V

PROTECTION OF THE ATMOSPHERE

A. Introduction

45. At its sixty-fifth session (2013), the Commission decided to include the topic "Protection of the atmosphere", together with an understanding, in its programme of work and appointed Mr. Shinya Murase as Special Rapporteur.[15]

46. The Commission received and considered the first report of the Special Rapporteur at its sixty-sixth session (2014).[16]

B. Consideration of the topic at the present session

47. At the present session, the Commission had before it the second report of the Special Rapporteur (A/CN.4/681). Building upon the first report, in the light of comments made in the Commission and the Sixth Committee of the General Assembly, the Special Rapporteur, in his second report, provided a further analysis of the draft guidelines submitted in the first report, offering a set of revised guidelines relating to use of terms, including a definition of the atmosphere, the scope of the draft guidelines, and the common concern of humankind. Moreover, the Special Rapporteur offered an analysis of the general obligation of States to protect the atmosphere and of international cooperation for the protection of the atmosphere. Draft guidelines were presented on the general obligation of States to protect the atmosphere and on international cooperation.[17] He suggested that common concern of humankind, the general obligation of States to protect the atmosphere and international cooperation were established in State practice and fundamentally interconnected, thereby forming a trinity for the protection of the atmosphere. The Special Rapporteur also presented a detailed future plan of work, in the light of comments made in the Commission in 2014 requesting such a plan. He estimated, on a tentative basis, that work on the topic could be completed in 2020, following consideration of such issues as the principle of *sic utere tuo ut alienum non laedas*, the principle of sustainable development (utilization of the atmosphere and environmental impact assessment), the principle of equity, and special circumstances and vulnerability in 2016; prevention, due diligence and precaution in 2017; principles guiding interrelationships with

---

[15] At its 3197th meeting, on 9 August 2013 (see *Yearbook … 2013,* vol. II (Part Two), p. 78, para. 168: "The Commission included the topic in its programme 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 an 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), p. 175, para. 365), on the basis of the proposal contained in annex II to the report of the Commission on its work during that session (*ibid.*, pp. 189–197).

[16] *Yearbook … 2014*, vol. II (Part One), document A/CN.4/667.

[17] The text of the draft guidelines, as proposed by the Special Rapporteur in his report, read as follows (see section C.2, below, for the text of the draft guidelines and preambular paragraphs, as well as commentaries thereto, provisionally adopted by the Commission at the present session):

"*Draft guideline 1. Use of terms*

"For the purposes of the present draft guidelines,

"(*a*) 'Atmosphere' means the envelope of gases surrounding the Earth, within which the transport and dispersion of degrading substances occurs.

"(*b*) 'Air pollution' means the introduction by human activities, directly or indirectly, of substances or energy into the atmosphere resulting in deleterious effects on human life and health and the Earth's natural environment.

"(*c*) 'Atmospheric degradation' includes air pollution, stratospheric ozone depletion, climate change and any other alterations of atmospheric conditions resulting in significant adverse effects to human life and health and the Earth's natural environment.

"[Definition of other terms will be proposed at later stages.]

"*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 with other relevant fields of international law.

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

"*Part II. General principles*

"*Draft guideline 3. Common concern of humankind*

"The atmosphere is a natural resource essential for sustaining life on Earth, human health and welfare, and aquatic and terrestrial ecosystems, and hence the degradation of atmospheric conditions is a common concern of humankind.

"*Draft guideline 4. General obligation of States to protect the atmosphere*

"States have the obligation to protect the atmosphere.

"*Draft guideline 5. International cooperation*

"(*a*) States have the obligation to cooperate with each other and with relevant international organizations in good faith for the protection of the atmosphere.

"(*b*) States are encouraged to cooperate in further enhancing scientific knowledge relating to the causes and impacts of atmospheric degradation. Cooperation could include exchange of information and joint monitoring."

other fields of international law in 2018; and compliance, implementation and dispute settlement in 2019.

48. The Commission considered the report at its 3244th to 3249th meetings, on 4, 5, 6, 7, 8 and 12 May 2015.

49. In addition to the Commission's debate, there was a dialogue with scientists organized by the Special Rapporteur on 7 May 2015.[18] Members of the Commission found the dialogue useful and expressed appreciation to the presenters for the contributions made.

50. Following its debate on the report, the Commission, at its 3249th meeting, on 12 May 2015, decided to refer draft guidelines 1, 2, 3 and 5, as contained in the Special Rapporteur's second report, to the Drafting Committee, on the understanding that draft guideline 3 be considered in the context of a possible preamble. Moreover, the Special Rapporteur proposed that the Commission's referral of draft guideline 4, on the general obligation of States to protect the atmosphere,[19] to the Drafting Committee be deferred pending further analysis in 2016.

51. At its 3260th meeting, on 2 June 2015, the Commission received the report of the Drafting Committee and provisionally adopted draft guidelines 1, 2 and 5 and four preambular paragraphs (see section C.1 below).

52. At its 3287th and 3288th meetings, on 5 and 6 August 2015, the Commission adopted commentaries to the draft guidelines provisionally adopted at the present session (see section C.2 below).

C. Text of the draft guidelines on the protection of the atmosphere, together with preambular paragraphs, provisionally adopted so far by the Commission

1. Text of the draft guidelines, together with preambular paragraphs

53. The text of the draft guidelines on the protection of the atmosphere, together with preambular paragraphs, provisionally adopted so far by the Commission, is reproduced below.

Preamble

…

Acknowledging **that the atmosphere is 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,**

Recognizing therefore **that the protection of the atmosphere from atmospheric pollution and atmospheric degradation is a pressing concern of the international community as a whole,**

Recalling **that these draft guidelines are not to interfere with relevant political negotiations, including those on climate change, ozone depletion, and long-range transboundary air pollution, and that they also neither seek to "fill" gaps in treaty regimes nor impose on current treaty regimes legal rules or legal principles not already contained therein,**[20]

[Some other paragraphs may be added, and the order of paragraphs may be coordinated, at a later stage.]

…

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 contributing to 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 of the guidelines

1. The present draft guidelines [contain guiding principles relating to] [deal with][21] the protection of the atmosphere from atmospheric pollution and atmospheric degradation.

2. The present draft guidelines do not deal with, but are without prejudice to, questions concerning the polluter-pays principle, the precautionary principle, common but differentiated responsibilities, the liability of States and their nationals, and the transfer of funds and technology to developing countries, including intellectual property rights.

3. The present draft guidelines do not deal with specific substances, such as black carbon, tropospheric ozone, and other dual-impact substances, which are the subject of negotiations among States.

4. Nothing in the present draft guidelines affects the status of airspace under international law nor questions related to outer space, including its delimitation.

Guideline 5. 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 knowledge relating to the causes and impacts of atmospheric pollution and atmospheric degradation. Cooperation could include exchange of information and joint monitoring.

---

[18] The dialogue with scientists on the protection of the atmosphere was chaired by Mr. Shinya Murase, Special Rapporteur. Professor Øystein Hov (President, Commission for Atmospheric Sciences, World Meteorological Organization (WMO)), Professor Peringe Grennfelt (Chair of the Working Group on Effects, Convention on Long-Range Transboundary Air Pollution), Mr. Masa Nagai (Deputy Director, Division of Environmental Law and Conventions, United Nations Environment Programme (UNEP)), Mr. Christian Blondin (Director, Cabinet and External Relations Department, WMO), Ms. Albena Karadjova (Secretary, Convention on Long-Range Transboundary Air Pollution) and Ms. Jacqueline McGlade (Chief Scientist and Director, Division of Early Warning and Assessment, UNEP) gave presentations. These were followed by a question and answer session.

[19] See footnote 17 above for the text of draft guideline 4, as proposed by the Special Rapporteur.

[20] The terminology and location of this paragraph, which derives from paragraph 168 of the report of the International Law Commission on the work of its sixty-fifth session (*Yearbook … 2013*, vol. II (Part Two)), will be revisited at a later stage in the Commission's work on this topic.

[21] The alternative formulations in brackets will be subject to further consideration.

2. Text of the draft guidelines, together with preambular paragraphs, and commentaries thereto provisionally adopted by the Commission at its sixty-seventh session

54. The text of the draft guidelines, together with preambular paragraphs, and commentaries thereto, provisionally adopted by the Commission at its sixty-seventh session, is reproduced below.

General commentary

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, 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 does not desire to interfere with relevant political negotiations, including those on long-range transboundary air pollution, ozone depletion and climate change, to seek to "fill" gaps in treaty regimes, or to impose on current treaty regimes legal rules or legal principles not already contained therein.

Preamble

…

Acknowledging **that the atmosphere is 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,**

Recognizing therefore **that the protection of the atmosphere from atmospheric pollution and atmospheric degradation is a pressing concern of the international community as a whole,**

Recalling **that these draft guidelines are not to interfere with relevant political negotiations, including those on climate change, ozone depletion, and long-range transboundary air pollution, and that they also neither seek to "fill" gaps in treaty regimes nor impose on current treaty regimes legal rules or legal principles not already contained therein,**[22]

[Some other paragraphs may be added, and the order of paragraphs may be coordinated, at a later stage.]

…

[22] The terminology and location of this paragraph, which derives from paragraph 168 of the report of the International Law Commission on the work of its sixty-fifth session (*Yearbook … 2013*, vol. II (Part Two)), will be revisited at a later stage in the Commission's work on this topic.

Commentary

(1) On previous occasions, preambles have been prepared once the Commission has concluded work on a particular topic.[23] In the present case, the Commission referred draft guideline 3 (on the common concern of humankind), as contained in the Special Rapporteur's second report, to the Drafting Committee, for consideration in the context of a possible preamble. Accordingly, a preamble was prepared reflecting the current stage of consideration, it being understood that there may be additional preambular paragraphs as the work progresses.

(2) 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, and one of the most important, natural resources. It was listed as a natural resource—along with mineral, energy and water resources—by the former United Nations Committee on Natural Resources,[24] as well as in the 1972 Declaration of the United Nations Conference on the Human Environment (Stockholm Declaration)[25] and in the 1982 World Charter for Nature.[26] The atmosphere provides renewable "flow resources" essential for human,

[23] In the past, the Commission has generally presented the General Assembly with the outcome of its work without a draft preamble, leaving the elaboration thereof to States. However, there have also been instances in which the Commission has prepared such preambles. This was the case, for example, with respect to the 1954 draft convention on the elimination of future statelessness (*Yearbook … 1954*, vol. II, document A/2693, para. 25); the 1954 draft convention on the reduction of future statelessness (*ibid.*); the 1958 model rules on arbitral procedures (*Yearbook … 1958*, vol. II, document A/3859, para. 22), the preamble to which reflected fundamental rules for an undertaking to arbitrate; the 1999 draft articles on the nationality of natural persons in relation to the succession of States (*Yearbook … 1999*, vol. II (Part Two), para. 47 (reproduced in General Assembly resolution 55/153, annex, of 12 December 2000)); the 2001 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)); the 2006 guiding principles applicable to unilateral declarations of States capable of creating legal obligations (*Yearbook … 2006*, vol. II (Part Two), para. 176); the 2006 draft principles on the allocation of loss in the case of transboundary harm arising out of hazardous activities (*ibid.*, para. 66 (reproduced in General Assembly resolution 61/36, annex, of 4 December 2006)); and the 2008 draft articles on the law of transboundary aquifers (*Yearbook … 2008*, vol. II (Part Two), para. 53 (reproduced in General Assembly resolution 63/124, annex, of 11 December 2008)).

[24] The inclusion of "atmospheric resources" among "other natural resources" by the former United Nations Committee on Natural Resources was first mentioned in the Committee's report on its first session (New York, 22 February to 10 March 1971), section 4 ("Other natural resources"), para. 94 (*d*) (*Official Records of the Economic and Social Council, 1971, Supplement No. 6* (E/4969)). The work of the Committee (later United Nations Committee on Energy and Natural Resources for Development) was subsequently transferred to the Commission on Sustainable Development.

[25] "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" (*Report of the United Nations Conference on the Human Environment, Stockholm, 5 to 16 June* 1972 (United Nations publication, Sales No. E.73.II.A.14), part one, chap. I, p. 3, principle 2).

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

plant and animal survival on the planet, and it serves as a medium for transportation and communication. 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. That view is no longer held.[27] It must be borne in mind that the atmosphere is a limited resource with limited assimilation capacity.

(3) The second preambular paragraph addresses the functional aspect of the atmosphere as a medium through which transport and dispersion of polluting and degrading substances occur. The Commission considered it appropriate to refer to this functional aspect in the preamble. This decision reflects a concern that the inclusion of the functional aspect as part of the definition may suggest that this transport and dispersion is desirable, which is not the intention of the Commission. Long-range transboundary movement of polluting and degrading substances is recognized as one of the major problems of the present-day atmospheric environment,[28] with the Arctic region being identified as one of the areas most seriously affected by the worldwide spread of deleterious pollutants.[29]

(4) The third preambular paragraph pronounces, bearing in mind the aforementioned importance of the problems relating to the atmosphere, that the protection of the atmosphere from atmospheric pollution and atmospheric degradation is a "pressing concern of the international community as a whole". While a number of treaties and the literature demonstrate some support for the concept of "common concern of humankind",[30] the Commission decided not to adopt this language for the characterization of the problem, as the legal consequences of the concept of common concern of humankind remain unclear at the present stage of development of international law relating to the atmosphere. It was considered appropriate to express the concern of the international community as a matter of a factual statement, and not as a normative statement, as such, of the gravity of the atmospheric problems. In this context, therefore, the expression "a pressing concern of the international community as a whole" has been employed. This is an expression that the Commission has frequently employed as one of the criteria for the selection of new topics for inclusion in its long-term programme of work.[31]

(5) The fourth preambular paragraph is a reproduction of the 2013 understanding of the Commission on the inclusion of the topic in its programme of work at its sixty-fifth session in 2013. It was agreed that the terminology and location of this paragraph would be revisited at a later stage in the Commission's work on this topic.[32]

(6) Some other preambular paragraphs may be added, and the order of paragraphs may be coordinated, at a later stage.

---

[27] In the 1996 *Gasoline* case, the World Trade Organization (WTO) Panel and Appellate Body recognized that clean air was an "exhaustible natural resource" that could be "depleted" (WTO Appellate Body Report, *United States—Standards for Reformulated and Conventional Gasoline*, WT/DS2/AB/R, adopted 20 May 1996).

[28] See the 2001 Stockholm Convention on Persistent Organic Pollutants, the preamble to which notes 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 fourth preambular paragraph of the 1999 Protocol to Abate Acidification, Eutrophication and Ground-level Ozone (Gothenburg Protocol) to the Convention on Long-range Transboundary Air Pollution, as amended in 2012, states the following: "*Concerned* … that emitted [chemical substances] are transported in the atmosphere over long distances and may have adverse transboundary effects". The 2013 Minamata Convention on Mercury (adopted on 10 October 2013 at Kumamoto, Japan, on the occasion of the Conference of Plenipotentiaries on the Minamata Convention on Mercury, held on 10 and 11 October 2013) recognizes mercury as "a chemical of global concern owing to its long-range atmospheric transport" (preamble, para. 1). See J. S. Fuglestvedt and others, "Transport impacts on atmosphere and climate: Metrics", *Atmospheric Environment*, vol. 44, No. 37 (December 2010), pp. 4648–4677; D.J. Wuebbles, H. Lei and J.-T. Lin, "Intercontinental transport of aerosols and photochemical oxidants from Asia and its consequences", *Environmental Pollution*, vol. 150, No. 1 (November 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), L02805.

[29] Several of these pollution threats to the Arctic environment have been identified, such as persistent organic pollutants and mercury, which originate mainly from sources outside the region. These pollutants end up in the Arctic from southern industrial regions of Europe and other continents via prevailing northerly winds and ocean circulation. See T. Koivurova, P. Kankaanpää and A. Stępień, "Innovative environmental protection: lessons from the Arctic," *Journal of Environmental Law*, vol. 27, No. 2 (July 2015), pp. 285–311, at p. 297, available from https://academic.oup.com/jel.

[30] Paragraph 1 of the preamble to the 1992 United Nations Framework Convention on Climate Change acknowledges that "change in the Earth's climate and its adverse effects are a common concern of humankind". Likewise, the preamble to the 1992 Convention on Biological Diversity shows parties to be "[c]onscious … of the importance of biological diversity for evolution and for maintaining life sustaining systems of the biosphere" (para. 2) and affirms that "the conservation of biological diversity is a common concern of humankind" (para. 3). The 1994 Convention to combat desertification in those countries experiencing serious drought and/or desertification, particularly in Africa, adopted phrases similar to "common concern" in its preamble, including "the centre of concerns", "the urgent concern of the international community" and "problems of global dimension", for combatting desertification and drought. Other instruments, such as the Minamata Convention on Mercury, the Stockholm Convention on Persistent Organic Pollutants and the Gothenburg Protocol to the Convention on Long-range Transboundary Air Pollution, employ similar concepts to that of common concern. 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 & Trotman; Norwell, Massachusetts, Kluwer Academic Publishers Group, 1991), pp. 7–19, at pp. 11–12; D. French, "Common concern, common heritage and other global(-ising) concepts: rhetorical devices, legal principles or a fundamental challenge?", *in* M. Bowman, P. Davies and E. Goodwin (eds.), *Research Handbook on Biodiversity and Law* (Cheltenham, Edward Elgar Publishing, 2016), pp. 334–358, at p. 347; A. Kiss, "The common concern of mankind", *Environmental Policy and Law*, vol. 27, No. 4 (1997), pp. 244–247, at p. 246; A.A. Cançado Trindade and D.J. Attard, "The implications of the 'common concern of mankind': concept on global environmental issues", *in* T. Iwama (ed.), *Policies and Laws on Global Warming: International and Comparative Analysis* (Tokyo, Environmental Research Center, 1991), pp. 7–13; 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 pp. 565–566. See also C. Kreuter-Kirchhoff, "Atmosphere, international protection", *in* R. Wolfrum (ed.), *The Max Planck Encyclopedia of Public International Law* (Oxford, Oxford University Press, 2012), vol. I, pp. 737–744, at p. 739, paras. 8–9 (the atmosphere as a "common concern of mankind").

[31] *Yearbook … 1997*, vol. II (Part Two), pp. 71–72, para. 238; *Yearbook … 1998*, vol. II (Part Two), p. 110, para. 553. See also *Yearbook … 2014*, vol. II (Part Two), p. 164, para. 269. The Commission has agreed that it should not restrict itself to traditional topics, but could also consider those that reflect new developments in international law and pressing concerns of the international community as a whole.

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

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 contributing to 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 Commission has considered it desirable, as a matter of practical necessity, to provide a draft guideline on the "Use of terms" in order to have a common understanding of what is to be 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 to the term "atmosphere" in the relevant international instruments. The Commission, however, considered it necessary to provide a working definition for the present draft guidelines, and the definition given in paragraph (*a*) is inspired by the definition given by a working group of the Intergovernmental Panel on Climate Change (IPCC).[33]

(3) The Commission considered it necessary that its legal definition be consistent with the approach of scientists. According to scientists, the atmosphere exists in what is called the atmospheric shell.[34] 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 per cent), oxygen (20.95 per cent), together with trace gases, such as argon (0.93 per cent), helium and radiatively active greenhouse gases, such as carbon dioxide (0.035 per cent) and ozone, as well as greenhouse water vapour in highly variable amounts.[35] The atmosphere also contains clouds and aerosols.[36] The atmosphere is divided vertically into five spheres on the basis of temperature characteristics. From the lower to upper layers, these spheres are: troposphere, stratosphere, mesosphere, thermosphere and 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 are grouped together as the "*lower atmosphere*", which extends to an average altitude of 50 km and can be distinguished from the "*upper atmosphere*".[37] 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.[38] In contrast, in the stratosphere (up to the stratopause, at a height of nearly 50 km), temperature gradually increases with height[39] 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".[40]

(4) The definition, in paragraph (*a*), of the "atmosphere" as the envelope of gases surrounding the Earth represents a "physical" description of the atmosphere. There is also a "functional" aspect, which involves the large-scale movement of air. Atmospheric movement has a dynamic and fluctuating feature. The air moves and circulates around the earth in a complicated formation called "atmospheric circulation". The Commission has decided, as noted earlier in the commentary to the preamble, to refer to this functional aspect of the atmosphere in the second paragraph of the preamble.[41]

(5) It is particularly 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

[33] Fifth Assessment Report, Working Group III, Annex I (IPCC, *Climate Change 2014: Mitigation of Climate Change—Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, O. Edenhofer and others (eds.) (Cambridge, Cambridge University Press, 2014), p. 1252). Available from www.ipcc.ch/site/assets/uploads/2018/02/ipcc_wg3_ar5_annex-i.pdf.

[34] The American Meteorological 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 from http://glossary.ametsoc.org/wiki/Atmospheric_shell).

[35] 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. (Amsterdam, Elsevier Academic Press, 2006), p. 8.

[36] *Ibid.*

[37] 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 from 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 from http://glossary.ametsoc.org/wiki/Upper_atmosphere).

[38] 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 (E.J. Tarbuck, F.K. Lutgens and D. Tasa, *Earth Science*, 13th ed. (Upper Saddle River (New Jersey), Pearson Prentice Hall, 2011), p. 466).

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

[40] Tarbuck, Lutgens and Tasa (see footnote 38 above), p. 467.

[41] See para. (3) of the commentary to the preamble, above.

"transport and dispersion" of polluting and degrading substances occurs. 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.

(6) Paragraph (*b*) defines "atmospheric pollution" and addresses transboundary air pollution, whereas paragraph (*c*) defines "atmospheric degradation" and refers to global atmospheric problems. By stating "by humans", both paragraphs (*b*) and (*c*) make it clear that the draft guidelines address "anthropogenic" atmospheric pollution and atmospheric degradation. The Commission is aware that the focus on human activity, whether direct or indirect, is a deliberate one, as the present guidelines seek to provide guidance to States and the international community.

(7) 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,[42] but the term is used in the present draft guidelines in a narrow sense, in line with existing treaty practice. It thus excludes global issues from the definition of atmospheric pollution.

(8) In defining "atmospheric pollution", paragraph (*b*) uses language that is essentially based on article 1 (*a*) of the 1979 Convention on Long-Range Transboundary Air Pollution,[43] which provides that

> "[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".

It may also be noted that article 1, paragraph 1 (4), of the United Nations Convention on the Law of the Sea defines the term "pollution" as meaning "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 …"[44] 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.

(9) While 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) into the atmosphere as part of the "pollution", the Commission has decided not to include the term "energy" in the text of paragraph (*b*) of the draft guideline. It is the understanding of the Commission that, for the purposes of the draft guidelines, the word "substances" includes "energy". "Energy" is understood to include heat, light, noise and radioactivity introduced and released into the atmosphere through human activities.[45]

(10) The expression "effects extending beyond the State of origin" in paragraph (*b*) clarifies that the draft

---

[42] For instance, article 1, paragraph 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 action or omissions and produces injurious or deleterious effects in the environment of other States or of areas beyond the limits of national jurisdiction" (*Yearbook of the Institute of International Law*, vol. 62, Part II (Session of Cairo, 1987), pp. 296 and 298; available from www.idi-iil.org, *Resolutions*).

[43] The formulation of article 1 (*a*) of the Convention on Long-range Transboundary Air Pollution goes back to the definition of pollution by the 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, 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" (*International Legal Materials*, vol. 14 (1975), p. 242, at p. 243, or OECD, *Legal Aspects of Transfrontier Pollution* (Paris, 1977), p. 13; see also P. Birnie, A. Boyle and C. Redgwell, *International Law and the Environment*, 3rd ed. (Oxford, Oxford University Press, 2009), pp. 188–189, and A. Kiss and D. Shelton, *International Environmental Law* (Ardsley-on-Hudson (New York), Transnational Publishers; London, Graham & Trotman, 1991), p. 117 (definition of pollution: "also forms of energy such as noise, vibrations, heat, radiation are included")).

[44] Article 212 of the United Nations Convention on the Law of the Sea provides for an obligation to prevent airborne pollution of the sea, and to that extent, the definition of "pollution" in this Convention is relevant to atmospheric pollution.

[45] With regard to heat, see WMO, *WMO/IGAC: Impacts of Megacities on Air Pollution and Climate*, Global Atmosphere Watch Report No. 205 (Geneva, September 2012); D. Simon and H. Leck, "Urban adaptation to climate/environmental change: governance, policy and planning", Special Issue, *Urban Climate*, vol. 7 (March 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, 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, No. 4 (December 2012), pp. 3337–3357; F. Bashiri and C.R. Che Hassan, "Light pollution and its effect on the environment", *International Journal of Fundamental Physical Sciences*, vol. 4, No. 1 (March 2014), pp. 8–12. Regarding acoustic/noise pollution, see e.g. annex 16 (Environmental Protection: Aircraft Noise) to the 1944 Convention on International Civil Aviation; P. Davies and J. Goh, "Air transport and the environment: regulating aircraft noise", *Air and Space Law*, vol. 18, No. 3 (1993), pp. 123–135. Concerning radioactive emissions, see D. Rauschning, "Interim report of the Committee: legal problems of continuous and instantaneous long-distance air pollution", International Law Association, *Report of the Sixty-Second Conference held at Seoul, August 24th to August 30th, 1986* (London, 1986), pp. 198–223, at p. 219; and International Atomic Energy Agency (IAEA), *Environmental Consequences of the Chernobyl Accident and their Remediation: Twenty Years of Experience*, Report of the Chernobyl Forum Expert Group "Environment" (Radiological Assessment Reports Series) (Vienna, April 2006), STI/PUB/1239. See also 2013 Report of the United Nations Scientific Committee on the Effects of Atomic Radiation 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 from www.unscear.org/docs/publications/2013/UNSCEAR_2013_Annex-A-CORR.pdf. This is without prejudice to the peaceful uses of nuclear energy in relation to climate change in particular (see IAEA, *Climate Change and Nuclear Power 2014*, (Vienna, 2014), p. 7).

guidelines address transboundary effects in the sense provided for in article 1 (*b*) of the Convention on Long-range Transboundary Air Pollution, i.e. 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."

(11) Since "atmospheric pollution" is defined narrowly in paragraph (*b*), 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, paragraph (*c*) provides the 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. The 1985 Vienna Convention on the Protection of Ozone Layer provides a 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 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".

(12) The term "significant deleterious effects" is intended to qualify the range of human activities to be covered by the draft guidelines. The Commission has frequently employed the term "significant" in its previous work.[46] 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] … [s]uch detrimental effects must be susceptible of being measured by factual and objective standards."[47] Moreover, the term "significant", while determined by factual and objective criteria, 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.[48]

(13) While with respect to "atmospheric pollution" the introduction or release of substances has to contribute only to "deleterious" effects, in the case of "atmospheric degradation" the alteration of atmospheric conditions must have "significant deleterious effects". As is evident from draft guideline 2, on the scope of the guidelines, the present guidelines are concerned with the protection of the atmosphere from both atmospheric pollution and atmospheric degradation. As noted in paragraph (11) above, "adverse effects" in the Vienna Convention on the Protection of Ozone Layer (art. 1, para. 2) refers to changes that have significant deleterious effects. The word "deleterious" refers to something harmful, often in a subtle or unexpected way.

Guideline 2. Scope of the guidelines

1. The present draft guidelines [contain guiding principles relating to] [deal with] the protection of the atmosphere from atmospheric pollution and atmospheric degradation.

2. The present draft guidelines do not deal with, but are without prejudice to, questions concerning the polluter-pays principle, the precautionary principle, common but differentiated responsibilities, the liability of States and their nationals, and the transfer of funds and technologies to developing countries, including intellectual property rights.

3. The present draft guidelines do not deal with specific substances, such as black carbon, tropospheric ozone, and other dual-impact substances, which are the subject of negotiations among States.

4. 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 in relation to the protection of the atmosphere. Paragraph 1 describes the scope in a positive manner, indicating what is dealt with by the guidelines, while paragraphs 2 and 3 are formulated in a negative way, specifying what is not covered by the present draft guidelines. Paragraph 4 contains a saving clause on airspace and outer space.

[46] See, for example, article 7 of the 1997 Convention on the Law of the Non-navigational Uses of International Watercourses (General Assembly resolution 51/229 of 21 May 1997, annex; the text of the draft articles adopted by the Commission at its forty-sixth session is contained in the *Yearbook ... 1994*, vol. II (Part Two), pp. 89 *et seq.*, para. 222); draft article 1 of the 2001 draft articles on prevention of transboundary harm from hazardous activities (*Yearbook … 2001*, vol. II (Part Two) and corrigendum, p. 146; the text of the draft articles is reproduced in General Assembly resolution 62/68, annex); draft principle 2 of the 2006 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; the text of the draft principles is reproduced in General Assembly resolution 61/36, annex); and draft article 6 of the 2008 draft articles on the law of transboundary aquifers (*Yearbook … 2008*, vol. II (Part Two), p. 20; the text of the draft articles is reproduced in General Assembly resolution 63/124, annex).

[47] Para. (4) of the commentary to draft article 2 of the 2001 draft articles on prevention of transboundary harm from hazardous activities (*Yearbook … 2001*, vol. II (Part Two) and corrigendum, p. 152).

[48] See the commentary to the draft articles on prevention of transboundary harm from hazardous activities (paras. (4) and (7) of commentary to article 2: *ibid.*, pp. 152–153). See also the commentary to the draft principles on the allocation of loss in the case of transboundary harm arising out of hazardous activities (paras. (1) to (3) of commentary to draft principle 2: *Yearbook … 2006*, vol. II (Part Two), pp. 64–65).

(2) Paragraph 1 defines the scope of the draft guidelines on the basis of the definitions contained in paragraphs (*b*) and (*c*) of draft guideline 1. It deals with questions of 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 the current realities, which are supported by the science.[49] According to the 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 IPCC 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.[50] The IPCC 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.[51]

(3) The guidelines will also not deal with domestic or local pollution. It may be noted, however, that whatever happens locally may sometimes have a bearing on the transboundary and global context insofar as the protection of the atmosphere is concerned. Ameliorative human action, taken individually or collectively, may need to take into account the totality of the atmosphere, hydrosphere, biosphere and geosphere and their interactions.

(4) Sulfur dioxide and nitrogen oxides are the main sources of transboundary atmospheric pollution,[52] while climate change and depletion of the ozone layer are the two principal concerns leading to atmospheric degradation.[53] Certain ozone depleting substances also contribute to global warming.[54]

(5) Whether the draft guidelines "contain guiding principles relating to" or "deal with" the protection of the atmosphere from atmospheric pollution and atmospheric degradation is a matter that will have to be given further consideration as the work progresses.

(6) Paragraphs 2 and 3, as well as the fourth preambular paragraph, reflect the understanding of the Commission when the topic was included in the programme of work of the Commission at its sixty-fifth session in 2013.[55]

(7) Paragraph 4 is a saving clause, establishing that the draft guidelines do not affect the status of airspace under international law. The atmosphere and airspace are two entirely different concepts, which should be distinguished. Airspace 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".[56] 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 waters is regarded as being outside the sovereignty of any State and is open for use by all States, like the high seas. On the other hand, the atmosphere, as an envelope of gases surrounding the Earth, is dynamic and fluctuating, with gases that constantly move without regard to territorial boundaries.[57] The atmosphere is invisible, intangible and non-separable.

(8) Moreover, while 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.[58] 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 space". The matter has been under discussion within the Legal Subcommittee of the United Nations Committee on the Peaceful Uses of Outer Space since 1959; it has looked at both spatial and functional approaches to questions of delimitation.[59]

(9) Accordingly, the Commission elected, in paragraph 4, to indicate that the draft guidelines neither affect the legal status of airspace nor address questions related to outer space. Moreover, the reference to outer space reflects the 2013 understanding of the Commission.

Guideline 5. 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.

---

[49] See, generally, IPCC, *Climate Change 2013: The Physical Science Basis. Summary for Policymakers. Working Group I Contribution to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, T. F. Stocker and others (eds.) (2013). Available from www.ipcc.ch/site/assets/uploads/2018/02/WG1AR5_all_final.pdf.

[50] *Ibid*.

[51] *Ibid*.

[52] Birnie, Boyle and Redgwell (footnote 43 above), p. 342.

[53] *Ibid*., p. 336. 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 (1) of the 1999 Protocol to Abate Acidification, Eutrophication and Ground-level Ozone (Gothenburg Protocol) to the 1979 Convention on Long-range Transboundary Air Pollution, as amended in 2012.

[54] Birnie, Boyle and Redgwell (see footnote 43 above), p. 336.

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

[56] See 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.".

[57] See, generally, Birnie, Boyle and Redgwell (footnote 43 above), chap. 6.

[58] Tarbuck, Lutgens and Tasa (see footnote 38 above), pp. 465–466.

[59] 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 & Francis, 1991), especially chaps. 2 and 3.

2. States should cooperate in further enhancing scientific 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 draft guidelines on the protection of the atmosphere. The concept of international cooperation has undergone a significant change in international law[60] and today is to a large extent built on the notion of common interests of the international community as a whole.[61] The third paragraph of the preamble to the present draft guidelines recognizes this in stating that the protection of the atmosphere from atmospheric pollution and degradation is "a pressing concern of the international community as a whole".

(2) In this context, draft guideline 5, paragraph 1, provides for 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 and latitude for States in carrying out the obligation to cooperate, depending on the nature and subject matter of the cooperation required. The forms in which such cooperation may occur may also vary depending on the situation and the exercise of a certain margin of appreciation by States. It may be at the bilateral, regional or multilateral levels. States may also individually take appropriate action.

(3) International cooperation is found in several multilateral instruments relevant to the protection of the environment. Both the Declaration of the United Nations Conference on the Human Environment (Stockholm Declaration) and the Rio Declaration on Environment and Development (Rio Declaration), in principle 24 and principle 27, respectively, stress the importance of cooperation.[62] In addition, in the *Pulp Mills on the River Uruguay* case, the International Court of Justice emphasized linkages attendant upon the obligation to inform, cooperation 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."[63]

(4) Among some of the existing treaties, the Vienna Convention for the Protection of the Ozone Layer (1985) 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 to the United Nations Framework Convention on Climate Change (1992) 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".[64]

(5) Article 8, paragraph 1, of the Convention on the Law of the Non-navigational Uses of International Watercourses, on the general obligation to cooperate, provides that:

> Watercourse States shall cooperate on the basis of sovereign equality, territorial integrity, mutual benefit and good faith in order to attain optimal utilization and adequate protection of an international watercourse.

(6) In its work, the Commission has also recognized the importance of the obligation to cooperate. The draft articles on prevention of transboundary harm from hazardous activities provide, in draft 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.[65]

Further, the draft articles on the law of transboundary aquifers provide, in draft article 7 on the 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.

---

[60] W. Friedmann, *The Changing Structure of International Law* (London, Stevens & Sons, 1964), pp. 60–71; C. Leben, "By way of introduction" (Symposium: The changing structure of international law revisited), *European Journal of International Law*, vol. 8, No. 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", *in* H. P. Hestermeyer and others (eds.), *Coexistence, Cooperation and Solidarity: Liber Amicorum Rüdiger Wolfrum*, vol. I (Leiden, Martinus Nijhoff, 2012), pp. 3–16.

[61] B. Simma, "From bilateralism to community interest in international law", *Collected Courses of the Hague Academy of International Law 1994-VI*, vol. 250, pp. 217–384; N. Okuwaki, "On compliance with the obligation to cooperate: new developments of 'international law for cooperation'", *in* J. Eto (ed.), *Aspects of International Law Studies: Achievements and Prospects (Festschrift for Shinya Murase)* (Tokyo, Shinzansha, 2015), pp. 5–46, at pp. 16–17 (in Japanese).

[62] 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 … (see footnote 25 above), pp. 5–6.

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 Environment and Development, Rio de Janeiro, 3–14 June 1992, vol. I, *Resolutions Adopted by the Conference* (United Nations publication, Sales No. E.93.I.8 and corrigendum), resolution 1, annex I, p. 6.

[63] *Pulp Mills on the River Uruguay (Argentina v. Uruguay)*, Judgment, *I.C.J. Reports 2010*, pp. 14 *et seq.*, at p. 49, para. 77.

[64] See also part XII, section 2, of the United Nations Convention on the Law of the Sea, on global and regional co-operation, which covers "Co-operation 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 ("Marine scientific research") of the Convention, on international co-operation, covers "Promotion of international co-operation" (art. 242), "Creation of favourable conditions" (art. 243) and "Publication and dissemination of information and knowledge" (art. 244).

[65] *Yearbook … 2001*, vol. II (Part Two) and corrigendum, p. 146.

2. For the purpose of paragraph 1, aquifer States should establish joint mechanisms of cooperation.[66]

(7) Finally, the draft articles on the protection of persons in the event of disasters, provisionally adopted by the Commission on first reading in 2014, provide, in draft article 8, for a duty to cooperate.[67]

(8) Cooperation could take a variety of forms. Paragraph (*b*) of the draft guidelines stresses, in particular, the importance of cooperation in enhancing scientific knowledge relating to the causes and impacts of atmospheric pollution and atmospheric degradation. Paragraph (*b*) also highlights the exchange of information and joint monitoring.

(9) 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", while article 4, paragraph 1, on cooperation in the legal, scientific and technical fields, makes provision that

> [t]he 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 technical fields, taking into account the needs of developing countries.

(10) Article 4, paragraph 1, of the United Nations Framework Convention on Climate Change, regarding commitments, provides that

> [a]ll 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 education, training and public awareness related to climate change and encourage the widest participation in this process, including that of non-governmental organizations …

(11) The obligation to cooperate includes, *inter alia*, the 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, the Eastern Africa Regional Framework Agreement on Air Pollution (Nairobi Agreement, 2008)[68] and the West and Central Africa Regional Framework Agreement on Air Pollution (Abidjan Agreement, 2009)[69] 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 …

(12) The second sentence of draft article 17, paragraph 4, of the draft 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."[70] In turn, the draft articles on the protection of persons in the event of disaster, provisionally adopted by the Commission on first reading in 2014, provide, in draft article 9 (Forms of cooperation), 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 disaster risk reduction) provides that "[c]ooperation shall extend to the taking of measures intended to reduce the risk of disasters."[71]

(13) In the context of protecting the atmosphere, enhancing scientific knowledge relating to the causes and impacts of atmospheric pollution and atmospheric degradation is considered key by the Commission.

---

[66] *Yearbook … 2008*, vol. II (Part Two), p. 20.

[67] Draft article 8 provides that "[i]n accordance with the present draft articles, States shall, as appropriate, cooperate among themselves, and with the United Nations and other competent intergovernmental organizations, the International Federation of Red Cross and Red Crescent Societies and the International Committee of the Red Cross, and with relevant non-governmental organizations" (*Yearbook … 2014*, vol. II (Part Two), p. 61).

[68] Eleven countries—Burundi, the Democratic Republic of the Congo, Djibouti, Eritrea, Ethiopia, Kenya, Rwanda, Somalia, the Sudan, the United Republic of Tanzania and Uganda—subscribed to this framework agreement.

[69] Twenty-one countries—Angola, Benin, Burkina Faso, Cameroon, Cape Verde, Chad, the Republic of the Congo, Côte d'Ivoire, the Democratic Republic of the Congo, Equatorial Guinea, Gambia, Ghana, Guinea, Guinea Bissau, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone and Togo—subscribed to this agreement.

[70] *Yearbook … 2008*, vol. II (Part Two), p. 22.

[71] *Yearbook … 2014*, vol. II (Part Two), p. 62.