thereby contributing to the reduction of air pollution including long-range transboundary air pollution.

Article 5

Consultations shall be held, upon request, at an early stage between, on the one hand, Contracting Parties which are actually affected by or exposed to a significant risk of long-range transboundary air pollution and, on the other hand, Contracting Parties within which and subject to whose jurisdiction a significant contribution to long-range transboundary air pollution originates, in connection with activities carried on or contemplated therein.

Air quality management

Article 6

Taking into account Articles 2–5, the ongoing research, exchange of information and monitoring and the results therefor, the cost and effectiveness of local and other remedies and, in order to combat air pollution, in particular that originating from new or rebuilt installations, each Contracting Party undertakes to develop the best policies and strategies including air quality management systems and, as part of them, control measures compatible with balanced development, in particular by using the best available technology which is economically feasible and low- and non-waste technology.

Research and development

Article 7

The Contracting Parties, as appropriate to their needs, shall initiate and co-operate in the conduct of research into and/or development of:

(a) existing and proposed technologies for reducing emissions of sulphur compounds and other major air pollutants, including technical and economic feasibility, and environmental consequences;

(b) instrumentation and other techniques for monitoring and measuring emission rates and ambient concentrations of air pollutants;

(c) improved models for a better understanding of the transmission of long-range transboundary air pollutants;

(d) the effects of sulphur compounds and other major air pollutants on human health and the environment, including agriculture, forestry, materials, aquatic and other natural ecosystems and visibility, with a view to establishing a scientific basis for dose/effect relationships designed to protect the environment;

(e) the economic, social and environmental assessment of alternative measures for attaining environmental objectives including the reduction of long-range transboundary air pollution;

(f) education and training programmes related to the environmental aspects of pollution by sulphur compounds and other major air pollutants.

Exchange of information[31]

Article 8

The Contracting Parties, within the framework of the Executive Body referred to in Article 10 and bilaterally, shall, in their common interests, exchange available information on:

31 Provisions relating to exchange of information and publicity are increasingly common in treaties concerned with environmental issues. Adverse publicity and informed lobbying by the general public are seen as major sanctions against pollution.

(a) data on emissions at periods of time to be agreed upon, of agreed air pollutants, starting with sulphur dioxide, coming from grid-units of agreed size; or on the fluxes of agreed air pollutants, starting with sulphur dioxide, across national borders, at distances and at periods of time to be agreed upon;

(b) major changes in national policies and in general industrial development, and their potential impact, which would be likely to cause significant changes in long-range transboundary air pollution;

(c) control technologies for reducing air pollution relevant to long-range transboundary air pollution;

(d) the projected cost of the emission control of sulphur compounds and other major air pollutants on a national scale;

(e) meteorological and physico-chemical data relating to the processes during emission;

(f) physico-chemical and biological data relating to the effects of long-range transboundary air pollution and the extent of damage which these data indicate can be attributed to long-range transboundary air pollution;

(g) national, subregional and regional policies and strategies for the control of sulphur compounds and other major air pollutants.

Implementation and further development of the co-operative programme for the monitoring and evaluation of the long-range transmission of air pollutants in Europe

Article 9

The Contracting Parties stress the need for the implementation of the existing 'Co-operative programme for the monitoring and evaluation of the long-range transmission of air pollutants in Europe' (hereinafter referred to as EMEP) and, with regard to the further development of this programme, agree to emphasise:

(a) the desirability of Contracting Parties joining in and fully implementing EMEP which, as a first step, is based on the monitoring of sulphur dioxide and related substances;

(b) the need to use comparable or standardised procedures for monitoring whenever possible;

(c) the desirability of basing the monitoring programme on the framework of both national and international programmes. The establishment of monitoring stations and the collection of data shall be carried out under the national jurisdiction of the country in which the monitoring stations are located;

(d) the desirability of establishing a framework for a co-operative environmental monitoring programme, based on and taking into account present and future national, subregional, regional and other international programmes;

(e) the need to exchange data on emissions at periods of time to be agreed upon, of agreed air pollutants, starting with sulphur dioxide coming from grid-units of agreed size; or on the fluxes of agreed air pollutants, starting with sulphur dioxide, across national borders, at distances and at periods of time to be agreed upon. The method, including the model, used to determine the fluxes, as well as the method, including the model, used to determine the transmission of air pollutants based on the emissions per grid-unit, shall be made available and periodically reviewed, in order to improve the methods and the models;

(f) their willingness to continue the exchange and periodic updating of national data on total emissions of agreed air pollutants, starting with sulphur dioxide;

(g) the need to provide meteorological and physico-chemical data relating to processes during transmission;

(h) the need to monitor chemical components in other media such as water, soil and vegetation, as well as a similar monitoring programme to record effects on health and environment;

(i) the desirability of extending the national EMEP networks to make them operational for control and surveillance purposes.

Executive body

Article 10

1 The representatives of the Contracting Parties shall, within the framework of the Senior Advisors to ECE Governments on Environmental Problems, constitute the Executive Body of the present Convention, and shall meet at least annually in that capacity.

2 The Executive Body shall:

(a) review the implementation of the present Convention;

(b) establish, as appropriate, working groups to consider matters related to the implementation and development of the present Convention and to this end to prepare appropriate studies and other documentation and to submit recommendations to be considered by the Executive Body;

(c) fulfil such other functions as may be appropriate under the provisions of the present Convention.

3 The Executive Body shall utilise the Steering Body for the EMEP to play an integral part in the operation of the present Convention, in particular with regard to data collection and scientific co-operation.

4 The Executive Body, in discharging its functions, shall, when it deems appropriate, also make use of information from other relevant international organisations.

Secretariat

Article 11

The Executive Secretary of the Economic Commission for Europe shall carry out, for the Executive Body, the following secretariat functions:

(a) to convene and prepare the meetings of the Executive Body;

(b) to transmit to the Contracting Parties reports and other information received in accordance with the provisions of the present Convention;

(c) to discharge the functions assigned by the Executive Body.

Amendments to the Convention

Article 12

1 Any Contracting Party may propose amendments to the present Convention.

The text of proposed amendments shall be submitted in writing to the Executive Secretary of the Economic Commission for Europe, who shall communicate them to all Contracting Parties. The Executive Body shall discuss proposed amendments at its next annual meeting provided that such proposals have been circulated by the Executive Secretary of the Economic Commission for Europe to the Contracting Parties at least 90 days in advance.

3 An amendment to the present Convention shall be adopted by consensus of the representatives of the Contracting Parties, and shall enter into force for the Contracting Parties which have accepted it on the 90th day after the date on which two-thirds of the Contracting Parties have deposited their instruments of acceptance with the depositary. Thereafter, the amendment shall enter into force for any other Contracting Party on the 90th day after the date on which that Contracting Party deposits its instrument of acceptance of the amendment.

Settlement of disputes

Article 13

If a dispute arises between two or more Contracting Parties to the present Convention as to the interpretation or application of the Convention, they shall seek a solution by negotiation or by any other method of dispute settlement acceptable to the parties to the dispute.

Another major treaty dealing with atmospheric matters is the Vienna Convention for the Protection of the Ozone Layer 1985[32] which was largely the work of UNEP. The convention is supplemented by the Montreal Protocol on Substances that Deplete the Ozone Layer 1987[33] which sets targets for the gradual elimination of CFCs and other substances that have a deleterious effect on the ozone layer.[34]

VIENNA CONVENTION FOR THE PROTECTION OF THE OZONE LAYER[35]

Article 1 Definitions

For the purposes of this Convention:

1 'The ozone layer' means the layer of atmospheric ozone above the planetary boundary layer.

2 'Adverse effects' means changes in the physical environment or biota, including changes in the 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.

3 'Alternative technologies or equipment' means technologies or equipment the use of which makes it possible to reduce or effectively eliminate emissions of substances which have or are likely to have adverse effects on the ozone layer.

4 'Alternative substances' means substances which reduce, eliminate or avoid adverse effects on the ozone layer.

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32 Done at Vienna, 22 March 1985. Entered into force, 22 September 1988 – reprinted in (1987) 26 ILM 1529.

33 Done at Montreal, 16 September 1987. Entered into force 1 January 1989. Reproduced in (1987) 26 ILM 1550.

34 The international law relating to protection of the ozone layer provides a useful illustration of an increasingly popular form of law making and development. The original Convention is drafted in broad terms and essentially exists to provide a framework which can be filled in subsequently as and when more detailed agreement becomes possible.

35 Done at Vienna, 22 March 1985. Entered into force, 22 September 1988 – reprinted in (1987) 26 ILM 1529.

5 'Parties' means, unless the text otherwise indicates, parties to this Convention.

6 'Regional economic integration organisation' means an organisation constituted by sovereign states of a given region which has competence in respect of matters governed by this Convention or its Protocols and has been duly authorised, in accordance with its internal procedures, to sign, ratify, accept, approve or accede to the instruments concerned.

7 'Protocols' means Protocols to this Convention.

Article 2 General Obligations

1 The parties shall take appropriate measures in accordance with the provisions of this Convention and of those Protocols in force to which they are party to protect human health and the environment against adverse effects resulting or likely to result from human activities which modify or are likely to modify the ozone layer.

2 To this end the parties shall, in accordance with the means at their disposal and their capabilities:

(a) Co-operate by means of systematic observations, research and information exchange in order to better understand and assess the effects of human activities on the ozone layer and the effects on human health and the environment from modification of the ozone layer.

(b) Adopt appropriate legislative or administrative measures and co-operate in harmonising appropriate policies to control, limit, reduce or prevent human activities under their jurisdiction or control should it be found that these activities have or are likely to have adverse effects resulting from modification or likely modification of the ozone layer.

(c) Co-operate in the formulation of agreed measures, procedures and standards for the implementation of this Convention, with a view to the adoption of Protocols and annexes.

(d) Co-operate with competent international bodies to implement effectively this Convention and Protocols to which they are a party.

3 The provisions of this Convention shall in no way affect the right of parties to adopt, in accordance with international law, domestic measures additional to those referred to in paras 1 and 2 above, nor shall they affect additional domestic measures already taken by a party, provided that those measures are not incompatible with their obligations under this Convention.

4 The application of this article shall be based on relevant scientific and technical considerations.

In some ways linked to the question of depletion of the ozone layer is the issue of climatic change and in particular, global warming and the so-called greenhouse effect. Partly because of the limitations of universally accepted scientific knowledge in the area and also because of the strong economic interests that are connected with practices which are alleged to affect the climate adversely, it has proved difficult to obtain agreement on rules relating to climatic change. However, at the Rio Conference in 1992 the Convention on Global Climate Change 1992 was adopted. The Convention, which entered into force in March 1994, has been criticised for not going far enough to protect the global climate but it is at least a start from which further refinements may follow.

UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE[36]

Article 1

For the purposes of this Convention:

1 'Adverse effects of climate change' means changes in the physical environment or biota resulting from climate change which have significant deleterious effects on the composition, resilience or productivity of natural and managed ecosystems or on the operation of socio-economic systems or on human health and welfare.

2 '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 considerable time periods.

3 'Climate system' means the totality of the atmosphere, hydrosphere, biosphere and geosphere and their interactions.

4 'Emissions' means the release of greenhouse gases and/or their precursors into the atmosphere over a specified area and period of time.

5 'Greenhouse gases' means those gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and re-emit infra-red radiation.

6 'Regional economic integration organisation' means an organisation constituted by sovereign states of a given region which has competence in respect of matters governed by this Convention or its Protocols and has been duly authorised, in accordance with its internal procedures, to sign, ratify, accept, approve or accede to the instruments concerned.

7 'Reservoir' means a component or components of the climate system where a greenhouse gas or a precursor of a greenhouse gas is stored.

8 'Sink' means any process, activity or mechanism which removes a greenhouse gas, an aerosol or a precursor of a greenhouse gas from the atmosphere.

9 'Source' means any process or activity which releases a greenhouse gas, an aerosol or a precursor of a greenhouse gas into the atmosphere.

Article 2

The ultimate objective of this Convention and any related legal instruments that the Conference of the Parties may adopt is to achieve, in accordance with the relevant provisions of the Convention, stabilisation of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within a time-frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner.

Article 3

In their actions to achieve the objective of the Convention and to implement its provisions, the parties shall be guided, *inter alia*, by the following:

36 Adopted by the UN Conference on Environment and Development, Rio de Janeiro, 14 June 1992.

1 The parties should protect the climate system for the benefit of present and future generations of humankind, on the basis of equity and in accordance with their common but differentiated responsibilities and respective capabilities. Accordingly, the developed country Parties should take the lead in combating climate change and the adverse effects thereof.

2 The specific needs and special circumstances of developing country parties, especially those that are particularly vulnerable to the adverse effects of climate change, and of those parties, especially developing country parties, that would have to bear a disproportionate or abnormal burden under the Convention, should be given full consideration.

3 The parties should take precautionary measures to anticipate, prevent or minimise the causes of climate change and mitigate its adverse effects. Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing such measures, taking into account that policies and measures to deal with climate change should be cost-effective so as to ensure global benefits at the lowest possible cost. To achieve this, such policies and measures should take into account different socio-economic contexts, be comprehensive, cover all relevant sources, sinks and reservoirs of greenhouse gases and adaptation, and comprise all economic sectors. Efforts to address climate change may be carried out co-operatively by interested Parties.

4 The parties have a right to, and should, promote sustainable development. Policies and measures to protect the climate system against human-induced change should be appropriate for the specific conditions of each party and should be integrated with national development programmes, taking into account that economic development is essential for adopting measures to address climate change.

5 The parties should co-operate to promote a supportive and open international economic system that would lead to sustainable economic growth and development in all parties, particularly developing country parties, thus enabling them better to address the problems of climate change. Measures taken to combat climate change, including unilateral ones, should not constitute a means of arbitrary or unjustifiable discrimination or a disguised restriction on international trade.

18.7.2 Marine pollution

Marine pollution has long been an area of concern and as early as 1926 attempts were made to draw up an international convention to control pollution from ships.[37] However, the attempts were unsuccessful and for the next 40 years little was done to regulate the situation. For example, there was little discussion of marine pollution at either UNCLOS I or UNCLOS II apart from the expression of a general obligation on states to prevent pollution of the high seas by oil and by radioactive waste.[38] It was not until the late 1960s that it became clear that action needed to be taken to preserve the marine environment and reduce the level of pollution. This realisation of the need for action coincided with a rapid increase in the number of high tonnage oil tankers which posed the

37 See Boyle and Birnie, *International Law and the Environment* 1992, Oxford: Oxford University Press at p 251.

38 Articles 24 and 25 of the Convention on the High Seas, done at Geneva, 29 April 1958.

risk of massive environmental damage. In April 1967, the Liberian registered tanker, the *Torrey Canyon*, broke up off the coast of the UK spilling about 100,000 tons of crude oil into the sea. The environmental damage resulting from the spill and the high level publicity it received increased the pressure for new controls to be introduced. At the same time, it was discovered that mercury emissions from a Japanese factory were poisoning fish and it became clear that the threat to the marine environment came not just from ships. In fact, it is generally accepted that there are four main sources of marine pollution:

- shipping;
- dumping;
- sea bed activities;
- land-based pollution.

The *Torrey Canyon* disaster had an immediate effect on the law relating to liability for the effects of pollution. The International Convention on Civil Liability for Oil Pollution Damage 1969 (the Civil Liability Convention) and the International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage 1971 (the Fund Convention) impose obligations on the shipowner to pay for pollution damage and the cost of any preventive measures taken. The Fund Convention establishes an International Oil Pollution Compensation Fund which will compensate victims in the event that the shipowner is not liable. The Fund is financed by a levy on oil imports. In addition to these measures two private schemes were adopted: the Tanker Owners' Voluntary Agreement concerning Liability for Oil Pollution (TOVALOP) and the Contract regarding an Interim Supplement to Tanker Liability for Oil Pollution (CRISTAL). These private schemes mirror the provisions of the conventions and still are of relevance to those states that are not parties to the conventions.

Aside from the question of compensation arrangements it was recognised that there was a need also for stricter controls on pollution. This was recognised at the Stockholm Conference and it was resolved that new controls would be introduced. In the same year as the conference the Convention on the Prevention of Marine Pollution by Dumping of Wastes and other Matters 1972 (the London Dumping Convention) was signed. Dumping is defined as the deliberate disposal of waste and the Convention prohibits the dumping of specific categories of waste. The Convention for the Prevention of Marine Pollution by Dumping from Ships and Aircraft 1972 (the Oslo Dumping Convention) imposes stricter rules in respect of the north-east Atlantic and the North Sea. There have since been a number of other similar regional conventions. The year after the adoption of the London and Oslo Conventions the International Convention for the Prevention of Pollution by Ships 1973 (MARPOL) was signed. Marine pollution was a major concern at UNCLOS III and the Law of the Sea Convention 1982 (LOSC) has a number of significant provisions relating to marine pollution. Most importantly LOSC gives the coastal state rights to make and enforce regulations protecting its territorial sea and the EEZ and continental shelf. More recently such regulations have been co-ordinated by regional agreements between neighbouring states and this can be

particularly effective where the continental shelf and EEZs cover the major shipping lanes.

UNITED NATIONS CONVENTION ON THE LAW OF THE SEA 1982[39]

PART XII – PROTECTION AND PRESERVATION OF THE MARINE ENVIRONMENT

Section 1 General Provisions

Article 192 General Obligation

States have the obligation to protect and preserve the marine environment.

Article 193 Sovereign rights of states to exploit their natural resources

States have the sovereign right to exploit their natural resources pursuant to their environmental policies and in accordance with their duty to protect and preserve the marine environment.

Article 194 Measures to prevent, reduce and control pollution of the marine environment

1 States shall take, individually or jointly as appropriate, all measures consistent with this Convention 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, and they shall endeavour to harmonise their policies in this connection.

2 States shall take all measures necessary to ensure that activities under their jurisdiction or control are so conducted as not to cause damage by pollution to other states and their environment, and that pollution arising from incidents or activities under their jurisdiction or control does not spread beyond the areas where they exercise sovereign rights in accordance with this Convention.

3 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 minimise 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 by dumping;

(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;

(c) pollution from installations and devices used in exploration or exploitation of the natural resources of the sea bed and subsoil in particular measures for preventing accidents and dealing with emergencies, ensuring the safety of operations at sea, and regulating the design, construction, equipment, operation and manning of such installations or devices;

(d) pollution from other installations and devices operating in the marine environment, in particular measures for preventing accidents and dealing

39 Adopted at Montego Bay, 10 December 1982. Entered into force 16 November 1994. Reproduced in (1982) 21 *ILM* at 1261.

with emergencies, ensuring the safety of operations at sea, and regulating the design, construction, equipment, operation and manning of such installations or devices.

4 In taking such measures to prevent, reduce or control pollution of the marine environment, States shall refrain from unjustifiable interference with activities carried out by other states in the exercise of their rights and in pursuance of their duties in conformity with this Convention.

5 The measures taken in accordance with this Part shall include those necessary to protect and preserve rare and fragile ecosystems as well as the habitat of depleted, threatened or endangered species and other forms of marine life.

Section 2 Global and regional co-operation

Article 197 Co-operation on a global or regional basis

States shall co-operate on a global basis and, as appropriate, on a regional basis, directly or through competent international organisations, in formulating and elaborating international rules, standards and recommended practices and procedures consistent with this Convention, for the protection and preservation of the marine environment, taking into account characteristic regional features.

Article 198 Notification of imminent or actual damage

When a state becomes aware of cases in which the marine environment is in imminent danger of being damaged or has been damaged by pollution, it shall immediately notify other states it deems likely to be affected by such damage, as well as the competent international organisations.

Article 199 Contingency plans against pollution

In the cases referred to in Article 198, states in the area affected, in accordance with their capabilities, and the competent international organisations shall co-operate, to the extent possible, in eliminating the effects of pollution and preventing or minimising the damage. To this end, states shall jointly develop and promote contingency plans for responding to pollution incidents in the maritime environment.

Section 5 International rules and national legislation to prevent, reduce and control pollution of the marine environment

Article 207 Pollution from land-based sources

1 States shall adopt laws and regulations to prevent, reduce and control pollution of the marine environment from land-based sources, including rivers, estuaries, pipelines and outfall structures, taking into account internationally agreed rules, standards and recommended practices and procedures.

2 States shall take other measures as may be necessary to prevent, reduce and control such pollution.

3 States shall endeavour to harmonise their policies in this connection at the appropriate regional level.

4 States, acting especially through competent international organisations or diplomatic conference, shall endeavour to establish global and regional rules, standards and recommended practices and procedures to prevent, reduce and control pollution of the marine environment from land-based sources, taking into account characteristic regional features, the economic capacity of developing states and their need for economic development. Such rules, standards and recommended practices and procedures shall be re-examined from time to time as necessary.

5 Laws, regulations, measures, rules, standards and recommended practices and procedures referred to in paras 1, 2 and 4 shall include those designed to minimise, to the fullest extent possible, the release of toxic, harmful or noxious substances, especially those which are persistent, into the marine environment.

Article 208 Pollution from sea bed activities subject to national jurisdiction

1 Coastal states shall adopt laws and regulations to prevent, reduce and control pollution of the marine environment arising from or in connection with sea bed activities subject to their jurisdiction and from artificial islands, installations and structures under their jurisdiction, pursuant to Articles 60 and 80.

2 States shall take other measures as may be necessary to prevent, reduce and control such pollution.

3 Such laws, regulations and measures shall be no less effective than international rules, standards and recommended practices and procedures.

4 States shall endeavour to harmonise their policies in this connection at the appropriate regional level.

5 States, acting especially through competent international organisations or diplomatic conference, shall endeavour to establish global and regional rules, standards and recommended practices and procedures to prevent, reduce and control pollution of the marine environment referred to in para 1. Such rules, standards and recommended practices and procedures shall be re-examined from time to time as necessary.

Article 209 Pollution from activities in the Area[40]

Article 210 Pollution by dumping

1 States shall adopt laws and regulations to prevent, reduce and control pollution of the maritime environment by dumping.

2 States shall take other measures as may be necessary to prevent, reduce and control such pollution.

3 Such laws, regulations and measures shall ensure that dumping is not carried out without the permission of the competent authorities of states.

4 States, acting especially through competent international organisations or diplomatic conference, shall endeavour to establish global and regional rules, standards and recommended practices and procedures to prevent, reduce and control such pollution. Such rules, standards and recommended practices and procedures shall be re-examined from time to time as necessary.

5 Dumping within the territorial sea and the exclusive economic zone or onto the continental shelf shall not be carried out without the express prior approval of the coastal state, which has the right to permit, regulate and control such dumping after due consideration of the matter with other states which by reason of their geographical situation may be adversely affected thereby.

6 National laws, regulations and measures shall be no less effective in preventing, reducing and controlling such pollution than the global rules and standards.

Article 211 Pollution from vessels

1 States, acting through the competent international organisations or general diplomatic conference, shall establish international rules and standards to prevent, reduce and control pollution of the marine environment from vessels

40 See Chapter 11.