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Possible Contents of Annexes and/or Protocols to the Draft Convention for the Protection of the Ozone Layer

Research and Monitoring

Draft Text submitted by Norway

ANNEX I: Research and monitoring

1. Recognizing the importance of research and monitoring to the protection of the ozone layer, and of international scientific assessments to the development of international scientific consensus, the Contracting Parties agree to support, individually and collectively, research, monitoring and scientific assessments appropriate to their expertise, geography, and available resources.

2. The Contracting Parties shall co-operate in:

(a) Conducting research and publishing in peer-reviewed literature information developed on understanding the physics and chemistry of the earth's upper atmosphere and of its susceptibility to change, in particular on the state of the ozone layer and on environmental and climatic effects which would result from changes in either the total column content or the vertical distribution of ozone;

(b) The assessment of research results and the development of recommendations for future research;

(c) The sharing of information on planned and ongoing research, both government and private, to facilitate the co-ordination of research programmes so as to make the most effective use of available national and international resources;

(d) The development and implementation of multi-national satellite and ground-based global measurement systems.

3. Areas of research and monitoring that the Contracting Parties recognize as important include:

(a) <u>Research in the physics and chemistry of the atmosphere</u>

(i) Further development of multidimensional models which consider the interaction between radiative, chemical and dynamical processes, studies of simultaneous effects of various man made species upon atmospheric ozone.

Studies of the radiative effects of ozone and other minor species and their potential impact on climate. Evaluation of trends and development of methods for attributing changes in ozone data to specific causes.

(ii) Laboratory studies of rate coefficients, absorption cross-sections, quantum yield and reaction mechanisms relevant for tropospheric and stratospheric photochemical processes.

(iii) Field measurements. Simultaneous measurements of photochemical related species. Emphasis should be placed on obtaining 3-D fields of key trace species in the stratosphere and troposphere.

(iv) Instrument development. Including reliable operational satellite sensors, and improved ground-based, balloon- and rocketborne sensors, and furthermore, development of in situ or remote sensors for key constituents for which instrumentation currently does not exist.

(b) Research in human health and biological effects

(i) The relationship between human exposure to UV-B radiation and non-melanoma skin cancer, the possible relation between sunlight and melanoma skin cancer, as well as the effects on the immune system of enhanced UV-B radiation.

(ii) Total biological effects of existing and enhanced UV-B radiation on terrestrial species, communities and ecosystems, especially on crop plants.

(iii) Total biological effects of existing and enhanced UV-B radiation on aquatic food web, as well as on total food productivity and economic important species.

(iv) The biological mechanism by which UV-B radiation acts on biological species and ecosystems, including photorepair mechanism, adaption, dose-response, and protection.

(v) The effect of increased UV-B radiation on photodegradation on agricultural and other kinds of chemicals.

(c) Monitoring

(i) Significant improvements in the quality and quantity of vertical distribution measurements of ozone by making the Global Ozone Observing System fully operational.

(ii) Extended observations of sources gases for the HO_x, NO_x and ClO families in the troposphere and stratosphere.

(iii) The temperature from the ground to the mesosphere, utilizing both ground-based and satellite systems;

(iv) Wavelength-resolved solar flux entering the earth's atmosphere utilizing satellite measurements;

(v) Wavelength-resolved solar flux reaching the earth's surface in the ultra-violet range with biological effects (UV-B), in conjunction with total ozone measurements;

(vi) Aerosol concentrations from the ground to the mesosphere, utilizing both ground-based and satellite systems;

(vii) Improved methods for analysing global monitoring data on trace species, temperatures, solar flux, and aerosols.