United Nations Environment Programme

Distr.
GENERAL

UNEP/WG.78/12
5 April 1983

ORIGINAL: ENGLISH

Ad Hoc Working Group of Legal and Technical Experts for the Elaboration of a Global Framework Convention for the Protection of the Ozone Layer

Second part of the second session
Geneva, 11-15 April 1983

EXECUTIVE SUMMARY OF THE RECOMMENDATIONS OF THE CO-ORDINATING COMMITTEE ON THE OZONE LAYER

CCOL EXECUTIVE SUMMARY OF THE ASSESSMENT OF OZONE LAYER DEPLETION AND ITS IMPACTS - APRIL 1983

1. The ozone layer may be affected by several trace substances a number of which are produced by Man's activities, none of which acts independently but are strongly coupled in a complex manner.

2. If one considers only CFC 11 and CFC 12 releases at their present rates, current calculations estimate an eventual reduction in the total ozone column of somewhere between 3 and 5 per cent depending on the model chosen, compared to about 5 - 10 per cent estimated in the previous CCOL report. The change from the 1981 figure is due to new data on certain chemical reaction rates. If present releases of other chlorocarbons are continued at present rates, then they could increase the eventual ozone depletion due to CFC 11 and 12 alone by about a third.

3. The predicted depletion of the ozone layer in the upper stratosphere due to chlorofluorocarbon releases is still about the same as earlier estimated (~40%)

4. Calculations for several other individual perturbations have been performed e.g. a doubling of CO_2 shows an increase in total ozone similar in magnitude to the decrease calculated for CFC's.

5. However, it should be recognized that the range of predicted ozone reductions does not adequately represent the true uncertainty in our knowledge, which is substantially greater.

6. In recognition of the simultaneous and complex impacts of human activities on atmospheric ozone, more realistic scenarios have been developed to study the coupled nature of potential ozone changes. The changes in the trace gas concentrat of CO_2, N_2O, NO_x, CH_4 and halocarbons may all have affected past ozone amounts. The estimate of total column ozone changes in recent times is below the present detection limit.

7. Recent multiple perturbation calculations estimate little change in the total ozone column over the next decades, but do predict substantial redistribution in the vertical profile of ozone.

8. Continued improvement of the data base on atmospheric trace species has contributed to the resolution of some past problems in interpretation and pointed out new areas of possible concern.

9. The generally recognized concern about the quality of stratospheric measurement data has led to vigorous efforts in a series of international intercomparison campaigns.

10. No evidence of changes in total ozone has been observed, not withstanding the significant continuing progress made in statistical analysis of the ozone record. The relatively large natural variability of the atmospheric ozone, and the possibility from model calculations of a cancellation of effects at different altitudes, creates difficulties when trying to detect changes in the total column ozone by observation. However, it should be possible to detect distortions of the vertical ozone profile.

11. Observational data indicate an ozone increase in the northern hemisphere troposphere over the last 15 years which is qualitatively consistent with the model-predicted impact from past subsonic aircraft operations and other NO_x emissions. Observations in the upper stratosphere are not yet fully adequate for deriving statistically significant trends. Further combined ground based and satellite data analyses are expected to produce statistically significant results within the coming few years.

12. With respect to possible climatic consequences, multiple-scenario models suggest that the distortion of the vertical ozone profile might become more important than changes in the total amount. Calculations indicate that early next century the combined radiative effects of ozone and other trace gases on the surface temperature would be of the same order as that calculated for CO_2 at that time.

13. Estimated world production of CFCs 11 and 12 (including an upwards revision of the assumed growth rate for producers not reporting to the Chemical Manufacturers Association (CMA)) have fallen by 18% between 1976 and 1980. Most of the decrease occurred in the years 1974 to 1977; since then the decrease has levelled off and the revised estimates show an increase of 2 per cent between 1980 and 1981. The validity of this increase, and its implication for estimates of future production levels, depends on the validity of the assumption made about the growth rates of non CMA producers.

14. The Committee emphasized that it was important for Member countries and international organizations such as WMO, with the support of UNEP, to continue to collaborate in studies on the ozone layer, and to provide data on production, use, and release of chemicals related to this question.

15. If atmospheric ozone decreases, more solar ultraviolet radiation, in the UV-B range, will penetrate to the earth's surface and into surface waters. Computer calculations of solar UV-B radiation reaching the earth's surface have been determined for a variety of UV-B radiation wavelengths, latitude, season and time of the day combinations for normal and depleted total ozone amounts. Health and biological effects can be expected to occur from such an increase of ultraviolet radiation. Most of the known effects of UV-B are damaging effects, so that there is concern for the consequences, especially with regard to agricultural production, fisheries and human health.

16. Recent research results indicate that many terrestrial plants and aquatic organisms may undergo damage by increased UV-B; this applies to important crops such as wheat and rice, and to aquatic organisms such as plankton, fish eggs and larvae. The damaging effects of UV-sensitive terrestrial plants of enhanced UV-B radiation in combination with other stresses, such as water or mineral deficiency, are greater than the sum of the effects produced by either stress independently.

17. With regard to human health, it is well-established that an increase in solar UV-B would lead to an increased incidence of non-melanoma skin cancer, especially in light-skinned people. There are several indications that sunlight may be one of the causative factors of malignant melanoma, which affects people of all skin types. It is presently not proved whether UV-B is involved.

18. Recent research indicates that UV radiation alters several responses of the immunological system.

19. The Committee emphasized the importance for member nations and organizations to study the biological effects and to make quantitative assessments of these effects, especially with regard to the productivity of agriculture and fisheries, and to human health.