

**Environmental Effects of Ozone Depletion: 1998 Assessment.** – United Nations Environmental Programme, Nairobi 1998. ISBN 92-807-1724-3. 192 pp.

The Vienna Convention for the Protection of the Ozone Layer (1985) and the Montreal Protocol on Substances that Deplete the Ozone Layer (1987) are two very successful documents that help to prevent a global environmental catastrophe. Regular meetings of specialists in this field from many countries all over the world analyse and summarise materials and publications that appeared in the previous period. Texts of the reviewed volume were prepared by 29 scientists (the USA 11, Germany and Sweden 3 each, China, India, Japan and the Netherlands 2 each, Italy, Kenya, New Zealand and Saudi Arabia 1 each) and reviewed by further 71 experts (the USA 25, Australia, Canada and the Netherlands 4 each, Argentina, Ethiopia and Sweden 3 each, France, New Zealand and Romania 2 each, Austria, Bénin, Chile, Czech Republic, India, Ghana, Greece, Malaysia, Russia, Saudi Arabia, South Africa, Syria, Uruguay, Zambia and Zimbabwe 1 each). These lists show that the evaluation has really an international basis.

The book starts with an Executive summary that shows how both above mentioned protocols help to mild the effects of ozone depletion. Chapter 1 (S. Madronich *et al.*) is on changes in biologically active ultraviolet radiation reaching the Earth's surface. The sensitivity of biologically active UV radiation ( $UV_{bio}$ ) to atmospheric ozone is summarised in a table of Radiation Amplification Factors (RAF) defined as the percentage in  $UV_{bio}$  that would result from a 1 % decrease in the column amount of atmospheric ozone. As concerns photosynthesis at 30°N, the RAF values are 0.2-0.1 for photosynthetic electron transport, 0.2-0.8 for inhibition of photosynthesis (the lowest values were found for the cyanobacterium *Nodularia spumigena* and the highest ones for an Antarctic plant community). The amount of UV radiation that reaches Earth's surface is related to ozone concentration, clouds, and aerosol. Results of model calculations are also given here. Chapter 2 (J. Longstreth *et al.*) is on human health risks connected with this problem, mainly with effects on the skin, hazards for domestic animals, factors modifying exposure and susceptibility, and risk assessment.

Effects connected with photosynthetic activities are shown in the following three chapters. Chapter 3 (M.M. Caldwell *et al.*) analyses the effects of increased solar UV radiation on terrestrial ecosystems, at various levels,

from cell to ecosystem. Plant growth responses, reproductive responses, protective responses, and carry-over effects in subsequent generations are shown as well as changes in plant susceptibility to pathogens and insects, timing of plant life phases, interaction of UV-B and other factors, *etc.* Finally, implications for agriculture, forests and other ecosystems at mid and high latitudes are given. The text is based on 123 references. Chapter 4 (D.-P. Häder *et al.*) deals with the effects on aquatic ecosystems. Photolytic degradation of dissolved organic matter is important in these ecosystems, and chlorophyll is probably the most often used indicator for remote detection of UV-induced modifications. Effects on bacterioplankton, picoplankton, cyanobacteria, phytoplankton, macroalgae, and seagrasses, as well as on zooplankton and secondary consumers are analysed in detail. Photosynthetic quantum yield is determined in these studies often by means of a PAM fluorimeter. Changes in freshwater, Antarctic, and Arctic ecosystems are given separately. 180 references supplement this chapter. Chapter 5 (R.G. Zepp *et al.*) deals with changes in biogeochemical cycles induced by enhanced UV-radiation, among others in carbon capture and storage in terrestrial and aquatic ecosystems. Important are the studies on interactions with other co-occurring environmental change variables. 117 references are supplemented to this chapter.

Chapter 6 (X. Tang *et al.*) explains changes in tropospheric composition and air quality (changes in  $O_3$ , HOx,  $CH_4$ , CO,  $H_2O_2$ , production and fate of trifluoroacetic acid, accumulation of these products and metabolites in animals and plants, and risks for living world). Last chapter is on the effects of UV-radiation on materials, such as plastics in building and agricultural applications, transportation, on natural biopolymers and synthetic polymers, *etc.* Photodegradation is wavelength sensitive.

Very interesting is the last part of the book entitled "Frequently asked questions (FAQ)" (J.F. Bornman and J.C. van der Leun). Twenty three questions are answered here in a comprehensive way. Let me mention three: Will penguins be affected by the ozone hole? Can plants protect themselves against increased UV-B? Will getting a suntan help prevent skin cancer? If you do not know how to answer these questions to your neighbour or student, look into this book.

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