

Coupled dosimetry as a powerful tool for the study of the biological affectivity due to solar UV and atmospheric ozone variations

S.A. Chernouss¹, H. Lammer³, N.K. Belisheva², A. Bérces⁴, G. Kovács⁴, H. Biernat³

¹*Polar Geophysical Institute of the Kola Science Centre Russian Academy of Sciences, Apatity, Russia*

²*Polar-Alpine Botanical Garden – Institute of the Kola Science Centre, Russian Academy of Sciences, Apatity, Russia*

³*Space Research Institute, Austrian Academy of Sciences, Graz, Austria*

⁴*MTA-SE Research Group for Biophysics, Hungarian Academy of Sciences, Budapest, Hungary*

The problem of the impact on DNA-Damage and the human organism due to UV and variations of the atmospheric ozone column content is usually studied by the statistical methods under UV radiation measurements and the comparison with the obtained data to medical data. On the other hand the process of the UV radiation impact on the biological systems is investigated under the study of biophysical and genetic consequences of the UV irradiation. We plan to unite both approaches to find a connection between the UV radiation variation related to the total ozone content in the stratosphere and on the Earth's surface. Photosynthetically Active Radiation (PAR) and the state of bio-systems will be studied by coupled bio-dosimetry, performed in the same place with simultaneous registration of biological marker properties. These measurements will include the assessment of the Total Ozone Content (TOC), the Surface Ozone Concentration (SOC); UV-A, UV-B, PAR, and biological effects of the environmental radiation. We plan in our project the usage of biological dosimeters, which have been developed and used in Hungary by the MTA-SE Research Group for Biophysics in Budapest. These bio-dosimeters contain polycrystalline uracil or bacteriophage T7 and are suitable for monitoring the environmental radiation under different radiation conditions (from the polar to equatorial regions). For measuring the TOC and the SOC we will use a M-124 ozonometer and a Daisibi Monitor Laboratory device as well as a Differential Optical Spectroscopy equipment SANOVA. For measuring the UV-A, UV-B and PAR we shall use an ELDONET dosimeter. The experiment will be started in 2004 at the Apatity Observatory at the Kola Peninsula (Murmansk Region), Russia. Details of the experiment are under discussion.