TEN YEARS OF MONITORING TROPOSPHERIC OZONE BY PLANTS IN SLOVENIA AND SOME COMPARISON WITH GREECE AND HUNGARY

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Monitoring of tropospheric ozone effects in plants, coordinated by UNECE ICP Vegetation programme is well established in some, and is developing and spreading in other countries of Eastern Europe. Three permanent experimental sites differently polluted by ozone have been operating since 1998 in Slovenia and three more in Greece. In Hungary the measurements of ozone concentration are performed at two sites, at which the basic ICP-Vegetation ozone monitoring proocol should be implemented in the following years.

White clover clones (*Trifolium repens* 'Regal' NC-R, NC-S), distributed by the coordinator of ICP-Vegetation, Bangor, UK, are ozone resistant and ozone sensitive bioindicators used in the basic program, which includes assessments of leaf injuries and biomass determination according to protocol of ICP-Vegetation.

Threshhold AOT40 values for crop plants (3 ppm h in 3 months), horticultural plants (6 ppm h in 3,5 months), semi-natural vegetation, grasslands (3 ppm h in 3 months) and forests (5 ppm h in vegetation season), were exceeded in all years of experiment at all sites in Slovenia. In Greece they were exceeded at all sites in 2003 and 2005. Measurements of ozone and assessments of ozone caused injuries showed that air pollution by ozone is persistent environmental issue in Eastern Europe. Fluctuations of accumulated ozone (AOT40) and its impact on indicator plants among the years were considerable. They were influenced by local air pollution type, but we found the major impact by weather fluctuation. Data showed that the evaluation of troposphere ozone impact at certain area is only possible if based on several years of monitoring.

Air pollution by photo-oxidants, nitrogen compounds and heavy metals remains serious environmental problem concerning human health, food and fodder quality and at least minimal monitoring system should be set up within the European environmental programme, taking monitored ozone effects, compiled by ICP-Vegetation as a pressure driven indicator.