

## Abstract

This dissertation concerns with ozone flux to vegetation which is an important component of surface ozone deposition in forest environment. Elevated ozone concentrations observed in High Tatras and other mountain regions pose the local vegetation at potential risk. The magnitude of this risk depends on actual meteorological conditions. The origin of elevated ozone concentrations depends on long-range transboundary transport of ozone precursors and the local biogenic emissions, intense photochemism and insufficient titration during night. Ozone is a reactive molecule and its interaction with plant tissues can lead to tissue damage caused by reactive oxygen species. The object of our research is the vegetation in the mountain area of High Tatras. Three conifer species were selected for investigation - Dwarf pine, Arolla pine and Norway spruce. The phytotoxic ozone doses are considered for these conifer species by  $POD_0$  and  $POD_1$  indices derived from ozone flux to vegetation. The impact of meteorological and climatological factors, such as air temperature, air humidity, wind, global radiation and rain gain to ozone flux to vegetation and phytotoxic ozone doses were examined. The results were compared with biological response of *Pinus mugo* Turra. The origin of episodes which contributed the most to  $POD$  increase were analysed by HYSPLIT transport model. The air temperature was considered as the most powerful meteorological modification factor was air temperature, due to its impact on stomatal conductance and the length of vegetation period. The biological response of dwarf pine to stress factors shows ozone to be less influential to the species than biological factors.

**Keywords:** ozone deposition, vegetation, stomatal conductance, ozone flux to vegetation, *Pinus mugo*, *Pinus cembra*, *Picea abies*, phytotoxic ozone dose