

Abstract

The knowledge of the emission history and deposition trends of the main pollutants is key to understanding changes occurring in ecosystems. High levels of sulphur (S) and nitrogen (N) deposition, which peaked in the Czech Republic in the 1970s and 1980s, have caused significant acidification and damage to forest ecosystems. Due to the political and economic changes in the 1990s, there was a significant reduction in emissions and an improvement in the conditions of forest soil. Future ecosystems development and recovery are affected primarily by climate change and still excessive nitrogen loads. To model the future development of ecosystems affected by acidification and nutrient degradation in the Czech Republic the dynamic model VSD+ Studio in combination with the vegetation model PROPS was used in this work. Two forest catchments of the GEOMON network (Liz and Uhlířská) were selected as model sites. The catchment areas significantly differed in the historical sulphur and nitrogen deposition loads.

The results indicate that excessive depositions of S and N between 1970 – 1990 caused significant soil acidification and reduced the level of base saturation in both monitored locations. There is also a decrease in the C:N ratio and organic carbon content in the mineral soil. The vegetation model PROPS predicts a significant decline in the suitability of the sites for species of the natural vegetation, which is the acidophilous beech forest in the future, reducing the likelihood of their occurrence. Both sites (Liz and Uhlířská) show an overall dominance of acidophilous plant species with Norway spruce (*Picea abies*) being the predominant species (around 50 %) along with blueberry (*Vaccinium myrtillus*).

Keywords: atmospheric deposition, critical loads, vegetation modelling, VSD+ Studio, GEOMON catchments