Geophysical Research Abstracts
Vol. 18, EGU2016-18383-2, 2016
EGU General Assembly 2016

Monitoring air pollution in the Bialowieza Forest

Elżbieta Malzahn, Izabela Sondej, and Rafał Paluch
Department of Natural Forests, Forest Research Institute,Białowieża, Poland

Air pollution, as sulfur dioxide(SO_2) and nitrous oxides (NO_x), affects forest health negatively and can initiate forest dieback. Long-term monitoring (since 1986) and analyses are conducted in the Bialowieza Forest due to the threat by abiotic, biotic and anthropogenic factors. This forest has a special and unique natural value, as confirmed by the various forms of protection of national and international rank. The main aim of monitoring is to determine the level and trends of deposition of air pollutants and their effects on selected forest stands and forest communities in the Bialowieza Forest. Concentration measurements of gaseous pollutants and the chemical composition of the precipitation are performed at seven points within the forest area (62 219 ha). Measurement gauges are measuring gaseous pollutants (SO_2 and NO_x) by the passive method and collecting precipitation at each point at a height of three meters. The period of measuring by the instruments is 30 days. All analyses are conducted according to the methodology of the European forest monitoring program in the certified Laboratory of Natural Environment Chemistry of the Polish Forest Research Institute (IBL). The concentration of pollutant gases (dry deposition) in the years 2002–2015 accounted for only 6-13% of the limit in Poland, as defined by the Polish Ministry of Environment, and are of no threat to the forest environment. Wet deposition of pollutants, which dependents directly from the amount of precipitation and its concentration of pollutants, varied strongly between different months and years. Total deposition (dry and wet) of sulfur (S) and nitrogen (N) was calculated for seasonal and annual periods. On an annual basis, wet deposition represented approximately 80% of the total deposition of S and N. Total deposition of S did not exceed the average deposition values for forests in north-eastern Europe (5–10 kg ha^{-1} $year^{-1}$) at any of the seven measuring points. Total deposition of N did not exceed the limit value for managed forests, but it was higher than the limit value for natural forests (2–5 kg $ha^{-1}year^{-1}$). The spatial distribution of S and N deposition indicated an increased deposition in the Bialowieza Glade (central part) and Narewka Glade (northern part of Bialowieza Forest). A statistically significant decreasing linear trend in total deposition of air pollutants of S and N compounds over the period 2002–2015 suggests a continuing decreasing trend in the deposition also in the coming years.