

## **Inorganic nitrogen deposition to forest ecosystems in Europe - spatial patterns and temporal changes in the past 15 years**

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Economic transformation and emission reduction efforts result in ongoing changes in inorganic nitrogen deposition loads to forest ecosystems. Atmospheric deposition to forests across Europe is continuously measured at the intensive forest monitoring (Level II) plots of the International Co-operative Programme on Assessment and Monitoring of Air Pollution Effects on Forests (ICP Forests). The sampling design allows the analysis of both, throughfall (under the canopy) and open field deposition. Evaluations of measurements on 101 plots showed that mean throughfall deposition rates of ammonium and nitrate decreased by 9% and 13%, respectively, between the two periods 2000-2004 and 2007-2011. Deposition rates in open field precipitation decreased by 11% and 13% for the same substances between the same periods. This temporal development of deposition rates of inorganic nitrogen compounds is put into context with patterns of the national emission inventories and estimations from spatial transport and deposition models (EMEP). A potential shift toward an increasing relative importance of reduced forms of deposited nitrogen emphasizes the importance of understanding not only the effects of the total amount but also of the form (reduced vs. oxidized) of nitrogen input to forest ecosystems. We will present and discuss the magnitude and spatial pattern of such changes in the deposition of different nitrogen compounds, based on the long-term nitrogen deposition measurements of the ICP Forests Level II network across Europe.