Geophysical Research Abstracts
Vol. 14, EGU2012-735-2, 2012
EGU General Assembly 2012

Evaluating ammonia deposition rates for deciduous forest using measurements and modelling

K. Hansen (1), C. Geels (2), O. Hertel (1), C. A. Skjøth (2), B. Jensen (2), L. L. Soerensen (2), and E. Boegh (1)

(1) Department of Environmental, Social and Spatial Change, Roskilde University, P.O. Box 260, Universitetsvej 1, 4000 Roskilde, Denmark, krih@ruc.dk, (2) Department of Environmental Science, Aarhus University, P.O. Box 358, Frederiksborgvej 399, 4000 Roskilde, Denmark

Atmospheric ammonia (NH3) is a major contributor to soil acidification and eutrophication of natural terrestrial ecosystem leading to e.g. reduced biodiversity (Erisman et al. 2007, Environmental Pollution, Stevens et al. 2004, Science, Sutton et al. 2009, Biogeoscience). In order to assess these impacts, quantifying the magnitude of the NH3 flux in the biosphere atmosphere system is essential. Model simulations using the Danish Ammonia Modelling System (DAMOS) have recently indicated that particular forest ecosystems are exposed to critical load exceedances of N (Geels et al., not yet submitted). However, there are relatively few datasets of atmospheric NH3 fluxes available for forests which can contribute verifying model results.

The atmospheric dry deposition of NH3 for the beech (Fagus sylvatica) forest, Lille Bøgeskov, in Sorø, Denmark, is investigated using the high resolution micrometeorological measuring technique, Relaxed Eddy Accumulation (REA), for 26 October – 11 November 2010. Measurements of atmospheric NH3 concentrations and fluxes are compared to local-scale model simulations using the Danish Ammonia Modelling System (DAMOS). It was found that long-term measured and modelled atmospheric mean concentrations of NH3 agreed well within the range of 0.56-0.68 μg NH3-N m-3, however, observed emission fluxes of up to app. 0.8 μg NH3-N m-2 s-1 after leaf fall were not represented by DAMOS because the model system does not consider vegetative and soil NH3 emissions from non-agricultural areas (Skjøth et al. 2011, ACPD). New atmospheric NH3 flux measurements for Lille Bøgeskov have been conducted throughout 2011 and these data are presented and discussed in relation to the 2010 data of atmospheric NH3. Future studies aim to improve the description of dry deposition of NH3 for vegetative surfaces in local-scale models whereby the NH3 vegetative emission and its contribution to the atmospheric NH3 concentration and flux is considered.