



Sources and sinks of HONO in a heterogeneous forest landscape

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Nitrous acid (HONO) profiles were measured on a clearing and at the forest floor in a rural forest environment. For the forest floor deposition was found to be the predominant process. At the clearing net deposition was dominating during night whereas during day net emissions were observed. For selected days it was possible to estimate net fluxes of HONO from the measured profiles by the aerodynamic gradient method. The emission fluxes were in the range of 0.02 to $0.07 \text{ nmol m}^{-2} \text{ s}^{-1}$ thus in the lower range of previous results of flux measurements. These fluxes were compared to source strengths of postulated sources. By measuring different soils samples from both sites an upper limit for soil emissions fluxes of $0.025 \text{ nmol m}^{-2} \text{ s}^{-1}$ could be derived. HONO formation by light induced NO_2 conversion was calculated to be below $0.03 \text{ nmol m}^{-2} \text{ s}^{-1}$ for the respective days, thus being comparable to the potential soil fluxes. Due to light saturation at low irradiance this reaction pathway was found to be independent from light intensity most of the day (i.e. only dependent on ambient NO_2).

HONO formation from HNO_3 photolysis was calculated based on measured leaf nitrate loadings and by a) parameterization of HONO formation from photolysis of adsorbed HNO_3 and b) by directly calculating photolysis of surface adsorbed HNO_3 . Fluxes calculated by the empirical approach yielded values of the same order as the estimated fluxes, whereas the fluxes calculated based on kinetic values were much lower.