



Measurements of nitrous acid in a boreal forest ecosystem (Hyytiälä, Finland)

Robert Oswald (1), Christian Breitenberger (2), Franziska Köllner (2), Magdalena Bertelmann (2), Huug Ouwersloot (2,3), Rainer Königstedt (2), Zeinab Hosaynali Beygi (2), and Ivonne Trebs (1)

(1) Max Planck Institute for Chemistry, Biogeochemistry Department, P. O. Box 3060, 55020 Mainz, Germany , (2) Max Planck Institute for Chemistry, Atmospheric Chemistry Department, P. O. Box 3060, 55020 Mainz, Germany , (3) Meteorology and Air Quality, Wageningen Institute for Environment and Climate Research, Wageningen University, Netherlands

We measured atmospheric mixing ratios of nitrous acid (HONO) in the European boreal zone using two LOPAP (Long Path Absorption Photometer) instruments simultaneously within and above the forest canopy. Measurements were made within the framework of the HUMPPA (Hyytiälä United Measurements of Photochemistry and Particles in Air) campaign and took place at the SMEAR II station in Hyytiälä (61°N, 24°E, 180 m above sea level), south-western Finland. HONO measurements were performed from 12 July to 8 August 2010 simultaneously on a tower ($z = 19$ m, above canopy) and in the trunk space ($z = 1$ m).

Rapid HONO photolysis can lead to an integrated OH yield of up to 40 % during daytime. Current observations suggest a large unknown daytime HONO source. Our measurements in the remote area of Hyytiälä reveal extremely low HONO mixing ratios with maximal values during daytime (30 - 40 ppt) and minimal values during nighttime (< 10 ppt). This finding is different to the typically observed diel cycle of HONO with maximal values occurring during nighttime. We anticipate that this could be the result of a not well developed nocturnal boundary layer, which only has a few hours to form in Finnish summers. Lowest mixing ratios were observed when the wind blew from the (north-west) clean sector, while winds from the opposite direction (south-east) lead to higher mixing ratios (up to 55 ppt). We will present an analysis of the measured HONO mixing ratios and their relationship to meteorological conditions (T, RH) and surface wetness within and above the canopy.