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Near surface profiles of HONO: The vegetated surface as source and sink

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The photolysis of HONO is an important primary OH radical source. The OH radical is the most important oxidizing agent, the so called "detergent" of the atmosphere. HONO formation pathways are still unclear (e.g. Sörgel et al., 2011). Nevertheless, the main pathways are believed to be heterogeneous. Thus, the surface is proposed to be a major source. Furthermore, soil emissions of HONO due to microbiological activity in soil (Su et al., 2011) have been proposed. Therefore, we measured gradients of HONO, NO, NO_2 and O_3 close to the surface (0.1 to 1.6 m above ground).

We used an automated, programmable moving inlet to measure at 3 or 5 heights between 0.1 m and 1.6 m above the ground. HONO, O_3, NO and NO_2 were measured simultaneously. HONO was measured with a long path absorption photometer (LOPAP), O_3 by UV absorption and NO and NO_2 by chemiluminescence with photolytic conversion of NO_2. The time resolution of an individual LOPAP measurement was 3 min, and a full profile was measured within 30 min. Additionally, profiles of temperature and relative humidity as well as leaf wetness and $j(NO_2)$ were measured. Measurements were conducted above a clearing at the Waldstein field site of the University of Bayreuth in the Fichtelgebirge Mountains in south-east Germany.

Preliminary results are presented. For example, during the day the highest values were often measured close to the ground, indicating emission of HONO at the surface. This also indicates that the daytime formation of HONO is heterogeneous or the emissions are due to microbiological activity (Su et al., 2011). During the night, the lowest values were often measured at the surface indicating deposition. Thus, HONO emissions as well as HONO deposition have been observed. The profile data will be analyzed with respect to light intensity, NO_2 availability, atmospheric stability and surface wetness in order to elucidate the driving forces behind emission and deposition, respectively.

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