Subproject: **Particle Modification and Formation from BVOC Emissions above Coniferous Forests in Germany**

Principal Investigator: Hartmut Herrmann
Institut für Troposphärenforschung Leipzig e.V., Abteilung Chemie, Leipzig

Kontakt: herrmann@tropos.de

The aim of this project was the investigation of airborne particles in and above the canopy of a spruce forest. Two measurement campaigns were carried out in summer 2001 and 2002 at the Waldstein site of BITÖK (University of Bayreuth). Size distributed particle sampling as well as PM 2.5 quartz filter sampling was performed inside (12m high) and above (24m high) the canopy in 2001. In the 2002 campaign a day/night rhythm for impactor sampling was introduced. The main focus in 2002 was to try aerosol mass closure, to find day/night differences and source apportionment by trajectory-analysis. 96-hours backward trajectories (HYSPLIT, NOAA) with start height 800m were used.

Mass closure requires the conversion of OC in OM (organic mass). The water content of the particles could be calculated. Considering all uncertainties a sufficient mass closure could be achieved. Existing day/night differences could be referred by trajectory analysis to different air masses. Trajectories crossing the Bohemian basin or the Silesian district showed higher values for carbon and sulfate, westerly air streams for nitrate and sodium, but on lower mass concentration level.

In 2002 DIGITEL-sampling in 12/24m height and by day/night was carried out in order to find organic species. For alkanes (C_20-C_33) no differences between day/night or 12/24m could be found. C_29 and C_31 alkanes of biogenic origin show clearly higher values due to abrasion effects of plant surfaces. No increased concentrations of C_24 and C_25 alkanes as marker for fossil fuel burning or of levoglucosan as tracer for biomass burning were found. Dicarboxylic acids didn't show a dependence of sampling height or daytime. Terpene oxidation products were found to have higher concentrations in 24m height hinting at photochemical formation. Organic compounds of biogenic origin include only a small proportion of the particle mass. Results of the determination of biogenic organic compounds in airborne particles have been published last year (Plewka et al. (2003), Chromatographia Suppl. 57, S 253-S 259).

In experiments in a reaction chamber with the a-pinene/ozone/seed aerosol-system the formation of SOA by a-pinene oxidation products could be shown measuring the changing size distribution and the increased carbon content of the seed aerosol. Findings on SOA composition in dependence of the seed particle acidity have been published recently (Iinuma et al. (2004), Atmospheric Environment 38, 761 - 773).

Prof. Dr. Hartmut Herrmann