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Long-Term Measurements of Size-Resolved Particle Chemistry and its Dependence on Air Mass Origin in the German Lowlands. GERALD SPINDLER, Erika

Brueggemann, Thomas Gnauk, Achim Gruener, Konrad Mueller, Birgit Wehner, Alfred Wiedensohler, Hartmut Herrmann, Leibniz-Institute for Tropospheric Research, Leipzig, Germany; Thomas M. Tuch, UFZ Centre for Environmental Research, Leipzig, Germany; Markus Wallasch, Umweltbundesamt, Dessau, Germany.

A joint investigation (supported by the Umweltbundesamt, project 351 01 022) for a size-segregated physical-chemical characterization of tropospheric aerosol has started in spring 2004 at the research station of the Leibniz-Institute for Tropospheric Research (IFT) in Melpitz in the river Elbe valley (12 degrees 56' E, 51 degrees 32' N, 86 m asl.). This spot is integrated in EMEP activities and a supersite in the EUSAAR network. 24 hour samples for PM₁₀, PM_{2.5} (every day) and PM₁ (at least every six days) were collected using high volume samplers.

Particle mass concentration was determined gravimetrically and water-soluble ions were detected by ion chromatography. Organic and elemental carbon were quantified by a thermographic method. The particle number size distribution was measured between 3 and 800 nm. During selected days with a distinct air mass origin particles with diameters between 0.05 μm and 10 μm were size-fractionated using a five stage BERNER-type low pressure impactor and analyzed for mass, water soluble ions, carbon and selected organic species.

The mean source regions for wintertime anthropogenically influenced air masses are inside and outside of the European Union. The mean concentrations in the Melpitz area for PM₁₀, PM_{2.5} and PM₁ were 19.9, 15.2 and 12.7 micro-g/m³ in 2004 and 22.4, 17.6 and 12.9 micro-g/m³ in 2005, respectively. Therefore, particles were physically and chemically characterized for two years after size-segregated sampling. The main results of the project are the differences in the mean particle mass concentration, the chemical distribution and the physical properties of particles distinguished for air masses transported from West or East in summer and winter by classification of the daily results. These differences show the possible influence of long-range transports from the east, mostly in wintertime, to the region of Saxony near the Polish border in Germany.