

Comparative Study about Aerosol Sampling at the Research Station Melpitz in Saxony

A contribution to AEROSOL

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Starting with the SANA project the research station Melpitz was developed to characterize the changing air quality nearby the most polluted region of the former GDR around Leipzig-Halle-Bitterfeld. Beside the gaseous components from 1992 the PM 10 aerosol was analysed. During the European project LIFE the aerosol collection was directed to the differences between day and night time for the PM 2.5 and PM 10 since 1995.

The comparison of the results of the daily taken high volume samples from SIERRA-ANDERSEN PM-10 sampler and the weekly taken low volume samples from the PARTISOL 2000 system from RUPPRECHT & PATASHNICK shows excellent agreement on all parameters over a three year period.

A general trend was observed for the anthropogenic aerosol constituents. Nitrogen containing ions (NH_4^+ and NO_3^-) increase significantly, whereas sulphate and calcium from heating and power plants decrease. During the inversion periods in late autumns and winters the maximum concentrations of all constituents were decreasing. During the extreme winters 1995/96 and 1996/97 an increase for mass and soot because the heating behaviour during continuing frost periods and the meteorological effects was observed. The reconstruction of industry, the brown coal fired power plants, and the beginning modernisation of individual heating systems are mean causes for this development. The increasing traffic density was in part compensated by the catalyst technology.

Typical yearly variations were observed for mass, soot, nitrate and sulphate with winter maxima. Meteorological aspects (lower mixing height, low temperatures, easterly winds and dry air masses) influence these observations enormously. The advantages and different possibilities of both sampling units were discussed and weighed.