TRENDS OF MAIN AEROSOL COMPONENTS IN SAXONY (GERMANY) - A COMPARATIVE STUDY

A contribution to topic Particulate matter

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The research station Melpitz was developed to characterize the changing air quality nearby the most polluted urbanisation of the former GDR around Leipzig-Halle-Bitterfeld and the power plants near the Polish border (mean wind directions). Besides the gaseous components the PM 10 aerosol was analysed in the national project SANA from 1992 on. During the EU-project LIFE the aerosol collection was directed to the differences between PM 2.5 and PM 10 since 1995, additionally.

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 filter sampling system from RUPPRECHT & PATASHNICK shows excellent agreement on all parameters over a four year period.

The results of mass determination were compared to historical data since 1983. A statistical significant decrease begun with the German unification in 1990.

The maximum concentrations of main constituents (mass, soot, sulphate, calcium) were detected during inversions in late autumn and winter. 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 the PM 2.5/PM 10 ratio with winter maximum. The trend and the variations were expressed in harmonic analyses.