



Measuring of urban ultrafine aerosol as a part of regular air pollution monitoring activities

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Number size distribution of UFP has been measured since June 2012 to present time (end of 2014) at a background urban site in Northern Bohemia in the frame of UltraSchwarz Project. The project sustainability guarantees at least five years further measuring thus this highly specific activity already becomes part of existing air pollution monitoring system of Czech Hydrometeorological Institute.

Number concentrations of UFP were measured by SMPS in a diameter range of 10 to 800 nm in 7 channels with time resolution of 10 minutes. For the purposes of this study the data were re-arranged into series of one-hour means in three size categories: nucleation mode (10-30 nm), Aitken mode (30-100 nm) and accumulation mode (100-800 nm). At the same measuring site 7 other air pollutants (PM_{1-BC} , NO, NO_X , NO_2 , O_3 , PM_{10} and SO_2) were measured with identical time resolution.

The successive daily courses of submicron particles in three size modes as well as of seven other ambient air pollutants were drawn in the form of 3D surface diagrams expressing different behavior of specific substances in the course of 26 months of continuous measuring campaign, allowing for analysis of both diurnal and seasonal changes. The three modes of UFP manifest diverse pictures, the nucleation mode is apparent mainly during warm seasons, the particles in Aitken mode behave rather indifferently to the period of the year and the accumulation mode has close relationship to coarse particles.

Month by month correlation analysis indicate that nucleation mode nanoparticles are positively correlated especially with increasing O_3 and SO_2 concentration and that there exists connection between Aitken and accumulation modes and nitrogen oxides. In order to better understand fine time patterns we plan to calculate moving correlation indices over shorter time periods. Good idea would also be to make use of large database of data from nearby stations of CHMI to analyze the role of meteorological conditions.