

This thesis focuses on physical and chemical characteristics of atmospheric aerosol measured with high time resolution. Size distribution, chemical composition, and volatility of submicron particles were studied in relation to meteorological conditions and other factors. To reach higher variability in ambient conditions, we considered atmospheric aerosol during two seasons of the year (summer and winter) and at two different locations (suburban site Prague Suchdol and rural site Košetice). Measurement during two different seasons enabled us to better distinguish the influence of seasonal sources such as domestic heating in winter and increased biogenic emissions in summer. Also, seasonal differences in meteorological conditions mainly in case of temperature, humidity, and solar radiation were shown to play a role in aerosol characteristics. A comparison of aerosol properties at two different measurement sites, namely a rural and suburban, enabled us to better characterize the role of background aerosol and the influence of the city. Furthermore, a transformation of aerosol particles entering indoors from outdoors was also studied within this thesis. The influence of indoor/outdoor temperature and humidity gradient as well as presence of new particle formation events on the indoor/outdoor ratio was described. The high time resolution measurement of chemical composition and size distribution enabled us to reveal mechanisms of aerosol dynamics that remained hidden for previous studies with lower time resolution at the same locations.