

ISOTOPIC COMPOSITION OF CARBONACEOUS AEROSOLS FOR SEASONAL OBSERVATION

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An aerosol is an ensemble of solid, liquid, or mixed-phase particles suspended in air. Carbonaceous aerosols mainly contain carbon compounds. The isotopic composition can provide unique information about source emissions as well as physical and chemical processes in the atmosphere. The seasonal variation of carbon isotopic composition will be presented in two distinct environments urban and coastal sites. Year-round samples were collected from 1 January 2014 to 30 December 2014 every single day. There were 72 filter samples from urban background site (Vilnius) and 103 aerosol samples from the coastal site (Preila). The findings of this study reveal seasonal variations in PM1 total carbon (TC) concentrations at both the urban and coastal sites. These observations align with studies conducted in different regions, stressing the influence of primary regional sources on TC levels. The monthly averaged $\delta^{13}C_{TC}$ values of aerosol particles from both sites demonstrated a prominent seasonal cycle, reflecting variations in the isotopic composition of carbon in these particles. The monthly averages exhibited a wide range, from -28.4 ± 0.8 ‰ to -25.3 ± 0.1 ‰ at both sites, with standard deviations varying from 0.1 ‰ to 0.9 ‰. Notably, distinct seasonal variations in $\delta^{13}C_{TC}$ were observed, with enrichment in winter and depletion in spring at the urban site, indicating shifts among emission sources. In contrast, the coastal site exhibited relatively stable isotopic composition throughout most of the year, with minimal variations between the monthly averaged values. The highest values occurred during the winter months, while the remaining months displayed nearly constant isotopic composition. These findings provide insights into sources and seasonal dynamics of aerosol particles' isotopic composition at these sites. Overall, these findings contribute to our understanding of air quality dynamics in the studied areas and provide valuable insights for future environmental monitoring and policy decisions.