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Processing of carbonaceous material by fogs

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Over the last years our understanding of carbonaceous material in aerosols, fogs and clouds has substantially improved. Comprehensive analytical approaches coupling chromatographic separations to bulk carbon measurements (total/dissolved organic carbon, TOC/DOC) and functional group characterization techniques (FT-IR, NMR), developed in water and soil chemistry, have been applied to atmospheric samples.

We will present novel insights on the composition of carbonaceous materials in fogs using size exclusion chromatography coupled to inline TOC detection (SEC-DOC) and spectroscopic approaches like fluorescence excitation emission matrices or H-NMR spectroscopy. SEC-DOC revealed similarities of fog water organic matter to the water soluble fraction of ambient aerosols (WSOC). However some notable differences have also been observed that will be discussed. Time resolved fog sampling allowed the observation of intra-event variability of organic matter concentrations and composition including changes in molecular size. The latter being particularly interesting as it might provide observational evidence of SOA generation or oligomerization type reactions.

Observations of carbonaceous particulate matter during foggy periods including pre-, interstitial and post-fog aerosol, allowed to gain insights on the impact of fog processing on carbonaceous matter and on the scavenging of carbonaceous matter by fogs. Observations made during a recent field campaign in Fresno (CA) will be discussed in detail.