



## **How well can we measure major compounds in aerosol?**

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Data on the chemical composition of aerosols are needed for all aspects of research on the impacts of aerosols, ranging from local impact on human health to assessment of radiative forcing by aerosols. Semi-volatile compounds like ammonium nitrate and semi-volatile organics present very serious problems. In on-line aerosol mass measurement methods like TEOM and beta-gauge monitors drying of aerosols at elevated temperatures leads to loss of ammonium nitrate and semi-volatile organics.

As ammonium nitrate is the most abundant compound in areas like Netherlands, North Germany, Belgium and Northern France, this leads to correction factors of 1.3 to even 1.9 for TEOM results to compensate. The same problems are observed for filter measurements: Customary 24 hours sampling can, depending on filter type, lead to extensive loss of semi-volatiles, but also lead to absorption of gaseous species like nitric acid on filter material. It is remarkable that at the present neither a truly reliable on-line aerosol mass method is available, nor standard artifact free methodology for measuring semi-volatile compounds.

In general, 24 hour sampling is another severe handicap in understanding aerosol processes, as these long sampling times not only lead to severe artifacts but smoothes out transients to the point that interpretation of e.g. daily cycles is not really possible. More or less artifact free methodologies like Steam Jet Aerosol Collector and PILS are available now that can circumvent these kinds of problems.