

DESCRIPTION

A total of $\approx 19,000$ ACSM data points (with a temporal resolution of 10 minutes) were collected from May to October 2024, covering 74% of the period. The columns show the values relating to sulphates (SO_4^{2-}), nitrates (NO_3^-), ammonium (NH_4^+), chlorides (Cl^-) and organic species (OA) present in the aerosols. Missing days in the time series correspond to maintenance operations or instrument failures. A “NaN” value in the time series corresponds to "Not a Number." “NaN values” are not reported in the monthly series. The concentration values reported in the table are hourly averages, and the time reported corresponds to the beginning of the time interval considered. Concentrations are expressed in $\mu\text{g}/\text{m}^3$.

INSTRUMENT

The ToF-ACSM allows the determination of both the organic fraction of the aerosol (OA) and inorganic components such as ammonium ion (NH_4^+), nitrate ion (NO_3^-), sulfate ion (SO_4^{2-}), and chloride ion (Cl^-). The operating principle of the ACSM is based on the same principle previously used by Aerodyne for the aerosol mass spectrometer (AMS). Briefly, aerosols are sampled through an aerodynamic lens, where they are focused into a narrow beam and accelerated to a velocity inversely related to their aerodynamic size. The instrument has a PM1 lens, which provides the size cut. A PM2.5 cyclone upstream of the ACSM operating at 3 L min^{-1} is used to remove large particles, as they can cause inlet clogging. The particles are transmitted into a high-vacuum detection chamber ($\sim 10^{-5}$ Torr), where the NR-PM1 components impact a resistively heated surface (600°C) and flash vaporize. The resulting gas molecules are ionized by electron impact (EI, $\sim 70 \text{ eV}$) and analyzed by time-of-flight mass spectrometry. Finally, the electrical signal is converted into a digital signal by the detector. A Nafion dryer installed upstream of the instrument eliminates the complicating inlet effects due to particle-composition-dependent water uptake.