



Semi-volatile inorganic species: importance for atmospheric chemical composition on diurnal and seasonal timescales

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Nitrate aerosol has become an important driver of reduced European air quality and climate forcing, following reductions in sulphate precursor emissions since the 1980s, and is expected to be more influential in future decades. Measurements from the European Integrated Project on Aerosol and Cloud Climate Air Quality Interactions (EU-CAARI) field campaign have shown that semi-volatile aerosol species such as ammonium nitrate can comprise a major component of the sub-micron particulate matter, particularly in high pollution episodes. This presentation will assess the contribution of semi-volatile inorganic aerosol to diurnal and seasonal cycles in atmospheric chemical composition over Europe. We use the UM-UKCA composition-climate model, including the GLOMAP interactive aerosol microphysics module and a recently developed 'hybrid' dissolution solver (HyDis) to accurately represent size-resolved partitioning of ammonia and nitric acid to the particle phase.

In particular, we evaluate simulated size-resolved composition variations over Europe through the diurnal cycle, comparing hourly model output to Aerosol Mass Spectrometer observations at several sites during 2008. We will present the results of this composition analysis, in addition to model evaluation from comparisons with European Monitoring for Environmental Protection (EMEP) network and EUCAARI field campaign observations.