

EXTENDING SIZE-DEPENDENT COMPOSITION TO THE
MODAL APPROACH: A CASE STUDY WITH SEA SALT
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The modal approach used in models such as the CMAQ and the MAQSIP for the aerosol size distribution dynamics has been extended to represent the variability of the aerosol composition in each mode. The method adapts the existing modal algorithm for the condensational growth of aerosol to the condensation/evaporation process. In this initial study, the bulk equilibrium composition has been determined using the ISORROPIA thermodynamic model. Any mass transferred to the aerosol from the gas phase for each aerosol species is partitioned between the modes according to the particle surface area. The interaction of sea salt particles with anthropogenic inorganic species provides a test case to evaluate the algorithm. The study examines the compositional variations between the fine and the coarse modes, and the sink provided by the coarse mode for volatile species such as nitrate that can now partition between sodium and ammonium. Comparisons have been made between two model simulations using the MAQSIP for a 1996 summertime episode with and without the presence of sea salt emissions to investigate these effects. Observational data from the IMPROVE and CASTNet networks have also been compared with modeled aerosol concentrations to evaluate the new mass transfer scheme.