



Aerosol Formation and Aging: Insights from the Combination of Chemical Transport Models and Measurements

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The field measurements that have taken place in the PEGASOS and other European projects (ACTRIS, EUCAARI) offer a unique opportunity to test our understanding of a series of processes related to the formation and atmospheric evolution of atmospheric particulate matter. We combine the predictions of the Chemical Transport Model PMCAMx focusing on particle mass composition distribution and its sister model PMCAMx-UF focusing on particle number with these measurements over Europe. We first quantify our ability to reproduce the observed levels of the major PM components and their precursors in a variety of environments and meteorological conditions. In the second step we test the models further examining the diurnal profiles of the various PM components, the oxygen content (a measure of the chemical aging) of organic aerosol, and the vertical distribution. We focus especially on the various processes responsible for the chemical evolution of the OA in the atmosphere and test a number of hypotheses regarding their rates and specifics. The interactions between these organic aerosol processes and the growth of ultrafine particles formed in the atmosphere are investigated.