WRF/Chem model analyses of the BEACHON-ROMBAS 2011 filed study

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The scientific understanding of the formation and aging of organic aerosols in forest environments is still limited especially in presence of anthropogenic pollutants. The Bio-hydro-atmosphere interactions of Energy, Aerosols, Carbon, H_2O, Organics and Nitrogen (BEACHON) project was initiated by NCAR in 2008 to provide a detailed characterization of biosphere-hydrosphere-atmosphere interactions through combination of long-term field measurements, laboratory studies and multi-scale modeling. The BEACHON-ROMBAS intensive aerosol study took place from 25 July to 25 August 2011 at the Manitou Observatory Forest in Colorado with the specific objective of characterizing the formation and growth of biogenic particles in the forest canopy, and quantifying the perturbations that occur in presence of anthropogenic emissions. Here we will present the first results of the high-resolution simulations (4km) that were performed over the Colorado mountains using the Weather Research and Forecasting model with chemistry (WRF/Chem) during summer 2011 and used to interpret and analyze the meteorological and chemical data collected during the campaign. The meteorological and passive tracer analyses were used to identify the main meteorological regimes, and characterize the periods of a strong anthropogenic influence. Of particular interest were the periods featuring the transport of the front-range urban pollution or the four corners power plant plume over the forest site. For each of these periods the WRF/Chem model predictions of main organic aerosol components were assessed and compared with the AMS data. In addition, the sensitivity of the model results to changes and inaccuracies in the landuse is discussed.