Modeling of Sea Salt in a Regional Climate Model: Fluxes and Radiative Forcing

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Abstract

The RegCM (Regional Climate Model) is used as the modeling framework for regional-scale sea salt simulations. This is the first step towards the use of a regional climate model to study sea salt radiative effects on regional climate and it is the first published attempt to include radiatively active sea salt aerosols within a regional climate modeling framework. A sea salt generation module including both fine and coarse particle modes is coupled and assessed within the RegCM system in terms of its ability to simulate sea salt at the regional scale. The model is tested for three prominent sea salt producing areas, the Mediterranean Sea, the Arabian Sea, and the Northern Atlantic Ocean. In all these regions it shows a good performance in simulating sea salt fluxes and concentrations compared to available observations or other modeling systems. We also assess the simulation of sea salt radiative forcing by comparison with satellite observations of aerosol optical depth, showing that accumulation mode particles may have a dominant role in sea salt-radiation interactions.