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Online oxidant chemistry in the aerosol module of CAM4-Oslo

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We show results from the impact of using online calculated oxidant fields in a life cycle model for aerosols.
The model which is used is the Community Climate System Model version 4.0 (CCSM4), coupled with an aerosol module developed at the University of Oslo and the Norwegian Meteorological Institute. This aerosol module describes the evolution of DMS and SO2 gases, and of sea salt, dust, black carbon (BC), organic carbon, and sulfate aerosols. It also describes the interaction of the aerosols with radiation and clouds.
In the standard version of the aerosol module, the oxidation rates for the conversion of DMS into SO2 and of SO2 into sulfate are calculated using prescribed monthly fields for the oxidants OH, O3, H2O2 and NO3.
In the new model setup, we use oxidant fields calculated online by the tropospheric chemistry model MOZART which is part of CCSM4.
Results obtained using online OH, O3 and H2O2 show slightly higher DMS and SO2 concentrations, and lower BC and sulfate concentrations. We find a moderate reduction of both direct and indirect aerosol radiative effect (40-60 mW/m2) with locally changes up to 1 W/m2. When in addition online NO3 fields are used, we find mainly a further reduction of the indirect aerosol radiative effect (120 mW/m2).