



Regional effects of atmospheric aerosols on temperature: an evaluation of an ensemble of on-line coupled models

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The climate effect of atmospheric aerosols is associated to their influence on the radiative budget of the Earth due to direct aerosol-radiation interactions (ARI) and indirect effects, resulting from aerosol-cloud interactions (ACI). On-line coupled meteorology-chemistry models permit the description of these effects on the basis of simulated atmospheric aerosol concentrations, although there is still some uncertainty associated to the use of these models. In this sense, the objective of this work is to assess whether the inclusion of atmospheric aerosol radiative feedbacks of an ensemble of on-line coupled models improves the simulation results for maximum, mean and minimum temperature over Europe. The evaluated model outputs originate from EuMetChem COST Action ES1004 simulations for Europe, differing in the inclusion (or omission) of ARI and ACI in the various models. The case studies cover two important atmospheric aerosol episodes over Europe in the year 2010, a heat wave and forest fires episode (July-August 2010) and a more humid episode including a Saharan desert dust outbreak in October 2010. The simulation results are evaluated against observational data from E-OBS gridded database. The results indicate that, although there is only a slight improvement in the bias of the simulation results when including the radiative feedbacks, the spatio-temporal variability and correlation coefficients are improved for the cases under study when atmospheric aerosol radiative effects are included, especially for those areas closest to emissions sources of atmospheric aerosols.