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Effect of aerosol-radiation feedback on regional air quality – A sensitivity study with WRF/chem.

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Fully coupled "online" meteorology-chemistry models provide the possibility to account for feedback mechanisms between simulated aerosol concentrations and meteorological variables, which cannot be accounted for in traditional off-line coupled air quality models. The simplest and probably most important short term effect is the impact of atmospheric aerosol particles on radiation and its feedback on the meteorological conditions. The simulations of two groups using the fully coupled meteorology-chemistry model WRF/chem within the Air Quality Model Evaluation International Initiative (AQMEII) run with identical boundary conditions emissions, as well as physics parameterizations are compared. The only difference between the model runs is the inclusion of radiation-aerosol feedback (direct effect). By making this one change between the year-long simulations it offers the ability to investigate the impact of the direct effect on the meteorology and photochemistry over Europe.