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Simulating gas and aerosol concentrations in the Paris area using different land surface models

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Regional air quality forecasting depends on the performance of weather forecast models used to drive chemistry-transport models. The widely used Weather Research and Forecasting (WRF) model provides a few land surface schemes (LSMs) to compute heat and moisture fluxes over land surface. The LSMs differ in complexity and approaches used. We performed WRF simulations for 15 and 5 km resolution nested domains over the North of France and Paris, respectively, for summer 2008. We used the four LSMs provided with WRF: 6-layer Rapid Update Cycle (RUC), 5-layer thermal diffusion, 2-layer Pleim-Xiu scheme (together with the Pleim-Xiu surface layer and the ACM boundary layer models), and 4-layer Noah scheme. The SIRTA atmospheric observatory located in Paris area provides in situ data of measurements for a number of meteorological parameters, as well as vertical profiles measured by a lidar. The simulation results were compared to the SIRTA measurement data. In order to quantify possible impacts of the LSMs to simulated gas and aerosol concentrations in the Paris region, we use a chemistry-transport model CHIMERE forced by the corresponding WRF meteorological fields. Implications for the regional air quality forecasting will be discussed.