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Implementation and impacts of WRF meteorology in the LOTOS-EUROS chemistry transport model

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The chemistry-transport model LOTOS-EUROS has a long record in air pollution modelling. As an operational model it provides the Dutch smog forecast, it is part of the MACC/Copernicus ensemble and specific services, it provides air quality forecast over China as part of the Marco Polo project and is part of the SDS-WAS dust forecast. In off-line applications it has an even longer history with process studies, air quality assessment studies and with emission and climate scenarios studies. By default, ECMWF forecasts are used as input meteorology. Recently an interface to WRF meteorology was developed. The first motivation to use WRF meteorology is the availability of meteorology at higher resolution than provided by ECMWF, thus enabling a better spatial resolution of LOTOS-EUROS simulations. The second motivation is the recent release of an open source version of the LOTOS-EUROS model. Many potential users do not have access to ECWMF meteorology but can use WRF meteorology.

We will briefly indicate the steps that were needed to use WRF output in LOTOS-EUROS. Then we present the impact of WRF meteorology on concentrations of ozone, NO_2 and particulate matter concentrations over Europe for a 2014 episode, as compared to ECMWF meteorology at comparable resolution. Meteorological variables and concentrations will be compared to ground observations of wind, temperature and rain and to concentrations of NO_2, PM10 and ozone, with a focus on The Netherlands and Germany. Differences between the simulations with WRF and ECMWF will be related to differences in meteorological variables.