



The effect of using real-time versus climatological aerosols in the HARMONIE-AROME NWP model

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The HARMONIE-AROME Numerical Weather Prediction (NWP) model is a configuration of the ALADIN-HIRLAM system (Bengtsson et al., 2017). It is used operationally by several European countries. Currently, both the radiation scheme and the microphysics scheme in the model use climatological concentrations of land/sea aerosols and cloud condensation nuclei (CCN) concentrations. The effect of replacing the climatological aerosols with near real-time CAMS data provided by the European center for medium range weather forecasts (ECMWF) is presented here.

The climatological CCN concentrations in the model are 100/cm³ over sea and 300/cm³ over land, except over urban areas, 500/cm³. With CAMS near real-time data, three sea-salt types, sulfate, hydrophilic black carbon and organic matter are used for determination of the CCN concentration. The CCN concentration is used for auto-conversion and accretion of rain and for sedimentation of water droplets.

For radiation calculations, the climatological TEGEN dataset (Tegen et al., 1997) is also replaced by the CAMS data from ECMWF.

The aerosols affect radiation in several ways, such as the optical thickness of the cloud-free atmosphere and liquid clouds by altering the CCN concentration.

Sensitivity tests for both southern and northern Europe will be presented in this study.

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