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2011-2012 winter radiation fogs at CIBA (Spain): Observations compared to WRF simulations using different PBL parameterizations.

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The correct understanding of the different physical processes (turbulence among them) affecting the formation, development and dissipation of fogs is very important to obtain an appropriate forecast of fogs from Numerical Weather Prediction (NWP) models. These processes are not always well parameterized by the NWP models because they are not well understood physically. The effect of the turbulence over the development and dissipation of fogs is one of these processes of special importance. While some authors state that turbulence acts favouring the formation of fogs, others think the contrary, i.e. turbulence favours its dissipation.

Different days with fogs have been observationally analysed and simulated with WRF-ARW model and several options of the model have been compared in order to evaluate the ability of the different options simulating these events, specially focusing in the use of distinct planetary boundary layer (PBL) parameterizations.

The data used for this study was obtained from different instruments (standard instrumentation measuring temperature, relative humidity and wind, sonic anemometers, microbarometers and particle concentrations measurements) placed at the Research Centre for the Lower Atmosphere (CIBA in Spanish). This place is situated at the Northern Spanish Plateau, 25km north-west of Valladolid city (Spain), on a region known as Montes Torozos, which forms a high plain of nearly 200 km2 elevated above the main plateau, being a prosperous place for the development of radiation fogs in autumn-winter. In particular, the 2011-2012 winter was a very interesting season to study, since the long persistence of anticyclones over the Iberian Peninsula produced many days of fogs over this region, with interesting differences between the analysed days.