



Can we forecast fog using meso-scale models?

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Despite its high importance for many human operations, most notably take-off and landing of aircraft, the proper forecasting of the occurrence of radiation fog is still one of the unresolved topics in meteorology. The reason is that the onset and further development of radiation fog depends on many processes that all critically interact on relatively short time scales. Goal of this study is the evaluate the performance of two state-of-the-art meso-scale atmospheric models in predicting the onset and development for three typical episodes of radiation fog in the Netherlands. The models involved are the Weather Research Forecasting (WRF) model and the Harmonie model. THE WRF model is widely used in meso-scale atmospheric and air pollution, while the HARMONIE model is considered as the meso-scale alternative for the operational limited area model HIRLAM . The model is evaluated using detailed measurements at the Cabauw tower in central Netherlands. The data include profiles of temperature, dewpoint temperature and wind speed to a height of 200 m, and detailed measurements of the different component of the surface energy budget. It appears that for all fog episodes considered , both models have serious problems predicting both the onset and the further development of the layer of radiation fog. Causes are the poor vertical resolution of these models close to the surface and a poor representation of the vertical mixing process and the representation of radiative transfer close to the surface.