EGU21-155
https://doi.org/10.5194/egusphere-egu21-155
EGU General Assembly 2021

Fog forecasting for Schiphol airport at sub-kilometre scale.

Gert-Jan Steeneveld and Roosmarijn Knol
Wageningen University, Meteorology and Air Quality Section, Wageningen, Netherlands (gert-jan.steeneveld@wur.nl)

Fog is a critical weather phenomenon for safety and operations in aviation. Unfortunately, the forecasting of radiation fog remains challenging due to the numerous physical processes that play a role and their complex interactions, in addition to the vertical and horizontal resolution of the numerical models. In this study we evaluate the performance of the Weather Research and Forecasting (WRF) model for a radiation fog event at Schiphol Amsterdam Airport (The Netherlands) and further develop the model towards a 100 m grid spacing. Hence we introduce high resolution land use and land elevation data. In addition we study the role of gravitational droplet settling, advection of TKE, top-down diffusion caused by strong radiative cooling at the fog top. Finally the impact of heat released by the terminal areas on the fog formation is studied. The model outcomes are evaluated against 1-min weather observations near multiple runways at the airport.

Overall we find the WRF model shows an reasonable timing of the fog onset and is well able to reproduce the visibility and meteorological conditions as observed during the case study. The model appears to be relatively insensitive to the activation of the individual physical processes. An increased spatial resolution to 100 m generally results in a better timing of the fog onset differences up to three hours, though not for all runways. The effect of the refined landuse dominates over the effect of refined elevation data. The modelled fog dissipation systematically occurs 3-4 h hours too early, regardless of physical processes or spatial resolution. Finally, the introduction of heat from terminal buildings delays the fog onset with a maximum of two hours, an overestimated visibility of 100-200 m and a decrease of the LWC with 0.10-0.15 g/kg compared to the reference.