EMS Annual Meeting Abstracts
Vol. 10, EMS2013-212, 2013
13th EMS / 11th ECAM


# The performance of the mesoscale models WRF and HARMONIE for two contrasting fog events at the Cabauw research facility

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Accurate forecasting of radiation fog is of key importance for many applications in transportation, in particular air- and road transportation, shipping, but also for human health. Despite previous research efforts, fog forecasting remains a challenging task for meteorologists. In particular the multiplicity of physical processes that govern the fog's life cycle makes the development of model parameterizations challenging. In this study we evaluate the widely used mesoscale models WRF and HARMONIE for two contrasting warm fog events at the Cabauw tower research facility in the Netherlands. The first case covers a typical radiation fog in calm conditions under a relatively large high pressure system. The second case is characterised by fog behind a cold front passage. From the WRF simulations we learn that the formulation of the boundary layer scheme is a key aspect for the fog onset. Relatively strong turbulent mixing in the YSU scheme delays the fog onset compared to the MYJ scheme. The fog dissipation appears to be mostly governed by the microphysics scheme. With a double moment microphysics scheme the fog dissipates starting at ground and lifts upward, while a single moment scheme inhibits the fog lifting and substantially delays the clearance in the morning.Furthermore, HARMONIE underestimates the diurnal cycle of the dew point depression for the first case, while it performs rather well for the fog behind the cold front passage, both in timing and thickness.