EMS Annual Meeting Abstracts
Vol. 11, EMS2014-375, 2014
14th EMS / 10th ECAC
© Author(s) 2014

Radiation fogs: WRF and LES numerical experiments

Carlos Román-Cascón (1), Gert-Jan Steeneveld (2), Carlos Yagüe (1), Mariano Sastre (1), and Gregorio Maqueda (3)

(1) Universidad Complutense de Madrid, Departamento Geofísica y Meteorología, Madrid, Spain, (2) Meteorology and Air Quality Section, Wageningen University, The Netherlands, (3) Universidad Complutense de Madrid, Departamento Astrofísica y Ciencias de la Atmósfera, Madrid, Spain

Fogs are common and hazardous phenomena difficult to correctly forecast by the Numerical Weather Prediction (NWP) models, especially regarding the issues of thickness, times of onset/dissipation, transformation in low clouds, etc. Radiation fogs which persist during daytime are even more difficult to forecast, since the models almost always dissipate or transform them into low clouds some hours after sunrise. This type of fogs considerably affects many daily life activities occurring during daytime. After a careful statistical analysis performed over a 6-year dataset at the Cabauw Experimental Site for Atmospheric Research (CESAR), a long-lasting fog episode has been selected. This fog persisted for more than 48 hours over some regions of The Netherlands and the observational analysis shows a progressive increase in thickness, sometimes associated with increases in turbulence in the Planetary Boundary Layer (PBL). On the other hand, the fog caused the cancellation of several flights in Schiphol airport (Amsterdam). For these reasons, this period has been simulated with the mesoscale model WRF-ARW and compared to observations taken from several instruments installed at CESAR site, in order to study the ability of the model simulating the fog. Several PBL parameterizations have also been compared with the objective of studying the effect of turbulence over the development of the fog. Finally, Large Eddy Simulation (LES) experiments have been performed to analyse in more detail the evolution of the fog.