EMS Annual Meeting Abstracts
Vol. 14, EMS2017-258, 2017

Variable resolution modelling in the grey-zone with the Model for Prediction Across Scales (MPAS)

Matthijs Kramer (1), Dominikus Heinzeller (3,4), Hugo Hartmann (2), Wim van den Berg (2), and Gert-Jan Steeneveld (1)

(1) Wageningen University, Meteorology and Air Quality chair group, (2) MeteoGroup, Weather Modelling Team, (3) Karlsruhe Institute of Technology, Institute of Meteorology and Climate Research, (4) Augsburg University, Institute of Geography, Regional Climate and Hydrology chair group

In the past years, there have been interesting developments in the field weather modelling in order to overcome limitations in the global and regional weather models of today. We study the meteorological potential and computational requirements of the novel global Model for Prediction Across Scales (MPAS) for critical weather situations in Europe. MPAS runs on an unstructured Voronoi grid, which scales very well on parallel computers and it allows for a smooth grid refinement in the region of interest. In this way, problems like anisotropic grid cells near the poles and grid nesting refinement with flow distortions at nest boundaries are avoided. In this study, we assessed MPAS for three meso-scale weather events being a synoptic gale over the North Sea, a föhn wind in Switzerland, and organised convection with hail over the Netherlands. To our knowledge, this is the first study where MPAS has been assessed over Europe. We will highlight the meteorological quality produced by MPAS for these three cases in comparison with surface observations and WRF results produced by MeteoGroup's operational WRF configuration as a reference. In addition, we present the computational requirements of MPAS in comparison with that of WRF. The results provided by the MPAS runs on different flexible and constant grid configurations were encouraging. The MPAS runs with a constant grid resolution of 3km were in line with observations and the WRF results, which indicates that the physical core of the model works fine. Moreover, the MPAS runs with a flexible grid resolution of 60 to 3 km performed well for two out of three cases. Further research is ongoing for the MPAS runs that showed peculiar results which were less in agreement with observations.