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The role of the lateral boundary formulation for a spectral high-resolution model

1 R. Radu

National Meteorological Administration, Bucharest, ROMANIA (raluca.radu@meteo.inmh.ro)

A coupling method for joining the large-scale model (ARPEGE) with the limited area high-resolution model (ALADIN) in the terms of the lateral boundary conditions, method based on the bi-Fourier expansions representation of fields, has been developed and tested. This approach was focused on the investigation of the capability of the proposed spectral coupling method to provide the missing large-scale information to the high-resolution model in the case of extreme events. The performance of the limited area model using this scheme versus the traditional lateral boundary treatment was analysed. The effects of the hydrostatic/non-hydrostatic dynamics, the impact of the coupling schemes correlated with dynamics and the impact of different resolutions were studied. The results correlated with observations reveals an improved capacity of this method to simulate the extreme phenomena produced through scales interaction.