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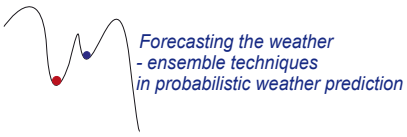

Idealized Simulations of Mesoscale Convective Systems on a Small Planet with the IFS model

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Global non-hydrostatic simulations of mesoscale phenomena are possible with low computational using the “small planet” test bed available in the IFS system at ECMWF. The dry non-hydrostatic dynamical core of ALADIN (Bubnova et al, 1995, Bénard et al. 2009) has been adapted to the IFS and a series of non-hydrostatic phenomena have been explored on a reduced-size sphere (Wedi and Smolarkiewicz, 2009). However, an integral part of the validations of the non-hydrostatic version of IFS is to assess the diabatic generalization of the Euler equations in mass-coordinate (Laprise, 1992) as implemented in IFS and their interaction with physical parameterizations. The feedback between the NH dynamics and the prognostic micro-physics recently implemented in the IFS is tested in the small planet configuration for simulations of idealized mesoscale convective systems.Simulations are also performed with the hydrostatic version of the model. The importance of the non-hydrostatic dynamics for the organization of convection during the development of splitting thunderstorms, supercells and squall lines is carefully analysed. Results are also compared with simulations performed at Meteo-France using the limited area mesoscale models Arome and Meso-NH on a Cartesian geometry.