The small planet : a test-bed for High-Resolution Cloud Modeling with the non-hydrostatic IFS

Global non-hydrostatic simulations of mesoscale phenomena are possible with low computational cost with the “small planet” test bed available in the IFS 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 generalisation of the Euler equations in mass-coordinate (Laprise, 1992) as implemented in IFS and their interaction with physical parameterizations. The feedback between the dynamics and the physics is tested in the small planet configuration with different physical packages for simulations of idealized convective storms. The results are compared with simulations performed by the Cloud Resolving Models Meso-NH (Lafore et al., 1998) and EULAG (Prusa, 2008).