

Simulating a severe windstorm in complex terrain

H. Ágústsson (1,2), H. Ólafsson (1,2,3)

(1) Institute for Meteorological Research, Iceland (2) University of Iceland (3) Icelandic Meteorological Office

The severe windstorm that hit Iceland on 1 February 2002 is analyzed using high-resolution numerical simulations, conventional observations at the ground and satellite images. The windstorm and the great mesoscale variability in the observed wind are reproduced by the numerical simulations, with increasing accuracy as the horizontal resolution is increased, stepwise from 9 km to 333 m. The strongest surface winds are found in localized downslope windstorms below steep and amplified gravity waves which presumably break in a reverse vertical wind shear at middle tropospheric levels. Surface winds are in general slightly overestimated and the model performs worst at locations where subgrid topography is expected to be of importance. The overestimating of the simulated surface wind speed is greatest immediately downstream and upstream of steep mountains. The surface winds are only moderately affected by the parameterization of surface friction and the magnitude of the downslope windstorms shows some sensitivity to the distance to the next downstream mountain.