



Implementation and Evaluation of Wind Gust Estimate methods in COSMO-CLM

Kai Born, Patrick Ludwig, and Joaquim G. Pinto

Institute for Geophysics and Meteorology, University of Cologne, Germany (kai.born@uni-koeln.de)

The overall aim of our recent work is the investigation of historical storms like Kyrill, Emma and others. The COSMO-CLM regional climate model allows for a detailed analysis of dynamic and energetic features, which lead to more or less intense development of storms and affect the potential damage.

Windstorms are characterised by strong time and space variability of wind gusts. In order to simulate the local characteristics of wind gusts, it is desirable to use physically based parameterisations to estimate wind gusts instead of empirical constant gust factors. In addition to the semi-empirical, combined TKE/convective downdraft scheme implemented, we apply the Wind Gust Estimate method (Brasseur 2001) in the COSMO-CLM model. The method assumes that gusts occurring at the surface are induced by turbulent eddies in the planetary boundary layer, deflecting air parcels from higher levels with higher momentum down to the surface under suitable conditions. The scheme is run at every time step; it is not recommendable to use such scheme in post-processing mode because it uses actual TKE values. The maximum wind gust during the last 30 min is kept for latter evaluation and validation against observational data derived from the German Weather Service. Results indicate that the model is able to reproduce large-scale wind gust patterns.