HIGH-RESOLUTION RE-ANALYSIS OF EXTREME WEATHER EVENTS - PART A: THE HAZARD MODEL

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Extreme weather events like winter storms over Europe are of special interest for the insurance as well as reinsurance industries. Risk assessment for insurance and reinsurance portfolios requires precise knowledge of the maximum gust wind speeds over a regular grid. As a globally active reinsurer, PartnerRe assigned MeteoSwiss with the reanalysis of 100 historical storms over Europe from 1957 onward. In Part A the details and results of the used hazard model is presented.

The re-analysis is carried out at the Swiss Center for Scientific Computing (CSCS) with the 'Alpine Model' (aLMo), the operational mesoscale weather forecast model at MeteoSwiss, developed in the frame of COSMO (collaboration of five European national weather services). Data from the ECMWF ERA-40 project provides the initial- and boundary fields. A two-step processing cascade leads from the original 120km ERA-40 resolution to the final 7km grid-mesh. Each simulation runs in assimilation-mode where historical weather observations and measurements are exploited to achieve the best possible quality.

Preliminary results illustrating the near-surface maximum wind speed at each location during the active period of a storm will be presented based on two different parametrisations. As in most operational forecast models, gusts as a function of the friction velocity and the wind at the lowest model layer are calculated. In addition, an alternative approach by Brasseur (2001) using the height of the balance between turbulent kinetic energy and the buoyancy force has been incorporated.

Brasseur O., 2001: Mon. Wea. Rev. 129, 5–25