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Extreme Winds: Improvement of RCM storm simulations using gust parameterizations and MOS

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Although observations of extreme wind speeds may be error prone due to both physical and technical reasons, their assessment is very important in construction planning, insurance issues and other economic fields. In order to fill gaps of observations in time and space, model simulations are highly desirable. In this study, more than 200 historical storms in the period 1960-2010, defined from potential loss estimation based on NCEP reanalyses, have been re-simulated in a two-step nesting approach using COSMO-CLM 4.8 in 0.165° and 0.0625° resolution with ERA-forcing. For gust estimation purposes, three different methods (Brasseur, drag velocity and TKE based) have been implemented in COSMO-CLM 4.8. The simulation results are compared to observations of wind speeds and wind gusts in entire Europe, mainly based on collected daily mean and maximum wind speeds. A method of a combined probabilistic downscaling and model output statistics is proposed for the enhancement of gust speed estimations.