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Impacts of severe cyclones on property losses: estimations based on global and regional ENSEMBLE modelling.

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The recently occurred storm “Kyrill” (18.01.2007) newly demonstrated the destructive potential of atmospheric hazards on an Europe wide scale with about US-$7-8 bn estimated insured claims. The storm series in early 1990 and late 1999 led also to enormous economic damages (US-$14.2 bn and $18.5 bn, respectively) and insured claims (US-$9.8 bn and $10.75 bn, respectively). Thus, wind storms are by far the most important factor for property losses caused by natural hazards over Europe.

Although significant trends in North Atlantic / European storm activity have not been identified for the last decades, this study investigates future trends of storminess over Europe by an analysis of global and regional models taking part in the ENSEMBLE project. Evidence is found that under anthropogenic climate change the number of extreme storms could increase, whereas the total number of cyclones may be slightly reduced. The results from an ensemble of global climate models are well recognized in wind speed analyses from regional climate models. For parts of western Central Europe an increase in frequency and intensity of extreme wind speeds are identified. In this context, the analysis of climate models from the ENSEMBLES initiative offers the unique opportunity to investigate model to model variability for GCM and RCM simulations in more horizontal detail, leading thus to measures of uncertainty also in terms of the representation of cyclones in different models.

Additionally, loss potentials derived from an ensemble of global and regional climate models using a simple storm damage regression model under climate change conditions are presented. In order to gain more regional information, RCMs have been

forced with ECMWF-ERA40 for validation, and with several GCMs under IPCC SRES scenarios for future conditions. With respect to climate change, the RCM simulations follow the trend of the forcing global model for the occurrence of extreme losses on regional scales. By application of the damage model to RCMs even extreme events (with respect to occurred damages) are partly better resolved than by the GCM. Thus, leading to even higher interannual variability as deduced from GCMs.