



Predictability, return period and potential loss of European winter storms in seasonal forecast data

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Accurate assessment of the return level and return period of wind storms is of fundamental importance for many safety, engineering and financial applications. The accuracy of extreme wind climatologies is limited by the length and quality of observation based datasets. We investigate integrations from dynamical seasonal ensemble prediction models (s2d), firstly to investigate the potential predictability of European winter storms on seasonal time scales and secondly to help improve estimates of the return period of wind storms and the corresponding losses using a reinsurance loss model. Previous investigations of the predictability of (e.g.) the NAO, show rather limited predictability using s2d models. Our results confirm that the potential and actual predictability of winter storms in s2d data is limited to the first forecast month. Based on the skill assessment, it can be assumed that the ensemble members are independent of each other after a few weeks of integration and hence each member represents a separate realisation of the climate of western Europe. Using various s2d datasets we have between 300 and 800 pseudo winter seasons on which to apply statistics to identify storms. Within these huge data sets pseudo wind storms are objectively identified. An intercomparison of results based on s2d data and reanalyses based data show that there is improved accuracy of return periods of winter storms using s2d data. In a second step, the pseudo wind storms are used as input for a reinsurance wind damage loss model. For the coupling to the loss model, the wind values are calibrated to remove systematic biases of the model. Several methods of calibration are evaluated and compared against each other. Preliminary estimates of losses based on these hypothetical events are similar to current operational i.e. market estimates. The study gives an estimate, to what extent the European winter wind storm risk might be biased or uncertain

due to the limitation of only 50 years of actual recorded events.