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How much flavour can climate model data add to benchmarking a 200-year return period European winter storm event?

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Assessing losses induced by extreme but very rare winter storm events (e.g. 200-year return period losses) is very important for the (re)insurance industry, for example, with regards to regulatory capital requirements. However, there are hardly any benchmarks available beyond the 20-year return period level. Often this gap is attempted to be closed by century-long reanalysis (e.g. NOAA 20CR) paired with extreme value theory. In order not to rely on statistics purely, we employ CMIP5 ensembles of decadal hindcast experiments to assess loss levels and their uncertainties directly from physically realistic scenarios.

Winter storms in the CMIP5 models are identified using a wind tracking algorithm and quantified using a storm severity index (SSI). Exceedance probability curves (EPCs) for selected European countries and the entire of Europe are scaled with a 20-year loss event and compared with EPCs of Swiss Re's operational hazard set (∼60,000 artificial storm footprints). Furthermore the sensitivity of the SSI to the exponent (vulnerability component) is investigated.

Initial results show that the exponent of the SSI (found via manual calibration) has a large impact on resulting losses. Furthermore, the EPCs for different regions (e.g. UK vs. Scandinavia) look fairly different, especially with regards to the tail of the EPCs. This leaves the question how well suited are CMIP5 models really for investigating extreme winter storm events, in particular for regions which are outside of the prominent winter storm corridor (i.e. Scandinavian countries)?