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Trends and characteristics of winter storms in CMIP6

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Windstorms are considered the most devastating natural peril in many regions around the globe. For insurance associations in Europe for example, the damages generated by windstorms make up to about 90% of the claims in the category of natural hazards. The interannual variability of windstorms can be quite strong and thus research has recently focused on this topic.

However, storm risk and its changes under anthropogenically induced climate change are so far rather little discussed in literature. Thus, there are still large uncertainties about how climate change will affect the extratropical circulation. CMIP5 models showed at times opposing signals regarding number and strength of windstorm generating cyclones and storm tracks. In more detail, the latest IPCC AR5 states that substantial uncertainty and low confidence remains in projecting changes in NH storm tracks, especially for the North Atlantic basin.

With the lately released CMIP6 simulations, providing model output of increased spatial and temporal resolution, there is potential for new insights and enhanced confidence regarding future trends of storminess.

In our study, we assess characteristics and trends of windstorm diagnostics in an ensemble of the latest CMIP6 climate scenario simulations, with a focus to the North Atlantic basin and winterstorms affecting Europe.

In the CMIP6 model ensemble the trends of winter windstorm frequencies appear to be overall weaker in an anthropogenically changed climate than in the preceding CMIP5 scenarios; yet, first results indicate that they are somewhat more consistent amongst models. All CMIP6 models exhibit a windstorm frequency increase locally confined over the Arctic, while in the mid and high latitudes a wide-ranging decrease of windstorm activity is simulated. In our study we will also assess what this entails for characteristics like life time, intensity and size.