



## **Potential Seasonal Predictability for Winter Storms over Europe**

Simon Wild, Daniel J Befort, and Gregor C Leckebusch

University of Birmingham, School of Geography, Earth and Environmental Sciences, Birmingham, United Kingdom  
(sbw206@bham.ac.uk)

Reliable seasonal forecasts of strong extra-tropical cyclones and windstorms would have great social and economical benefits, as these events are the most costly natural hazards over Europe. In a previous study we have shown good agreement of spatial climatological distributions of extra-tropical cyclones and wind storms in state-of-the-art multi-member seasonal prediction systems with reanalysis. We also found significant seasonal prediction skill of extra-tropical cyclones and windstorms affecting numerous European countries.

We continue this research by investigating the mechanisms and precursor conditions (primarily over the North Atlantic) on a seasonal time scale leading to enhanced extra-tropical cyclone activity and winter storm frequency over Europe. Our results regarding mechanisms show that an increased surface temperature gradient at the western edge of the North Atlantic can be related to enhanced winter storm frequency further downstream causing for example a greater number of storms over the British Isles, as observed in winter 2013-14. The so-called "Horseshoe Index", a SST tripole anomaly pattern over the North Atlantic in the summer months can also cause a higher number of winter storms over Europe in the subsequent winter. We will show results of AMIP-type sensitivity experiments using an AGCM (ECHAM5), supporting this hypothesis.

Finally we will analyse whether existing seasonal forecast systems are able to capture these identified mechanisms and precursor conditions affecting the models' seasonal prediction skill.