Evaluation of an air pressure based proxy for storm activity

Oliver Krueger** and Hans von Storch**

**Institute for Coastal Research, GKSS  *oliver.krueger@gkss.de  **hvonstorch@web.de

Motivation

» wind time series are often inhomogeneous and too short
» air pressure readings are usually homogeneous
Thus, the statistics of derived geostrophic wind speeds can be used as a proxy for past storm activity.

» It is commonly believed, however unproven, that the variation of the statistics of strong geostrophic wind speeds describes the variation of statistics of ground level wind speeds.

This study evaluates this approach by examining the correlation between quantiles of yearly and seasonal geostrophic wind speed and of atmospheric wind speed to determine whether the two distributions are linearly linked.

Are percentiles of geostrophic wind and atmospheric wind linearly related?

How do size and surface conditions influence the description of storm activity?

Dataset

» Diagnostic 10m wind and surface air pressure fields from the spectrally nudged and NCEP driven REMO (Weisse et al., 2009), known as coastDat, are made use of. The dataset covers Europe and the North Atlantic.

The period 1959-2005 is analysed.

How do size and surface conditions influence the description of storm activity?

Fig. A: Group means of correlations between 95th percentile wind speed time series for land and sea triangles, and small, medium and large sized triangles.

Fig B: Map of correlations between 95th percentiles of geostrophic and area maximum wind speeds.

Conclusion

» The variation of strong geostrophic wind speed statistics describes the variation of ground level wind speed statistics.

» Annual and seasonal quantiles of geostrophic wind speed and of atmospheric wind speed are linearly related.

» Geostrophic wind from sea triangles reflects storm activity better than geostrophic wind from land triangles.

References


