Northeast Atlantic Storminess

Geostrophic wind speeds calculated from mean sea level pressure readings are used to derive time series of northeast Atlantic storminess following Alexandersson, et al. (1998, 2000). The technique of geostrophic wind speed triangles provides relatively homogeneous long-term storm activity data and is thus suited for statistical analyses. This study makes use of the time series of upper annual percentiles representative for northeast Atlantic storminess from 1875 until 2016 including uncertainty estimates.

Uncertainty

Uncertainty is considered through a bootstrapping approach, for which a yearly data availability of at least 80% is assumed, thereby creating an ensemble of 100,000 yearly time series.

Sources of uncertainty include digitization errors, sampling errors, conversion errors, errors due to measurement routines. We use metadata of the Twentieth Century Reanalysis dataset 20CR to identify erroneous air pressure readings.

Connection to the North Atlantic Oscillation

We make use of the annual and seasonal station-based NAO-indices and of annual and seasonal NE Atlantic storminess time series to gauge the link between the North Atlantic Oscillation and storminess over the northeast Atlantic.

The time series share common characteristics, such as the increase from the 1960s to the 1990s, or the interdecadal variability.

However, the link between the NAO and storm activity is not constant, likely indicating shifted centers of the NAO dipole or the presence of other modes of variability.

<table>
<thead>
<tr>
<th>correlation</th>
<th>MAM</th>
<th>JUL</th>
<th>OCT</th>
<th>DJF</th>
<th>annual</th>
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<tbody>
<tr>
<td>95th percentiles</td>
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<td>99th percentiles</td>
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<td>0.2046</td>
<td>0.0548</td>
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<td>0.4388</td>
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</tbody>
</table>

Simultaneous correlation between the NAO index and northeast Atlantic storm activity time series for annual and seasonal scales for the period 1875-2016.

References