Patterns of Long Term Storm Evolution as Represented by Pressure Proxies:

Examples From Canada and Europe.

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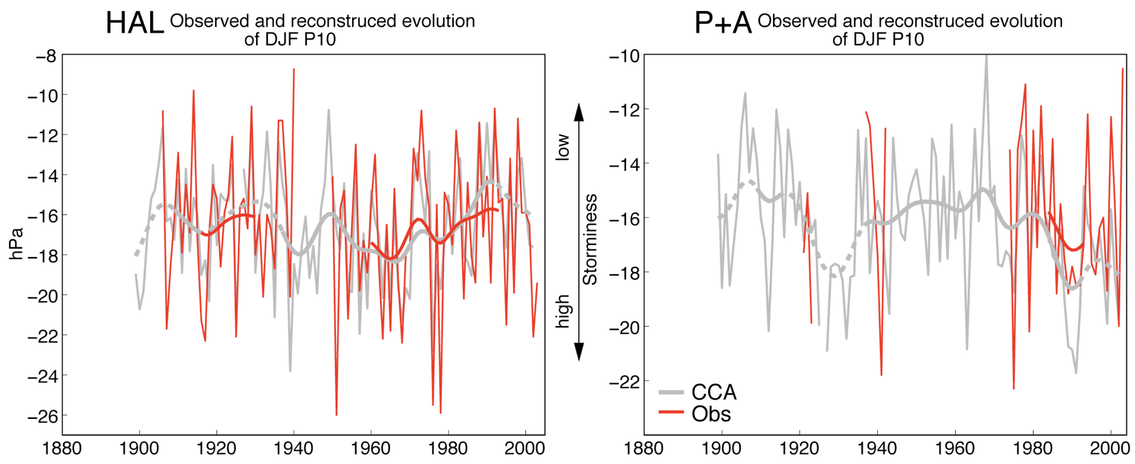
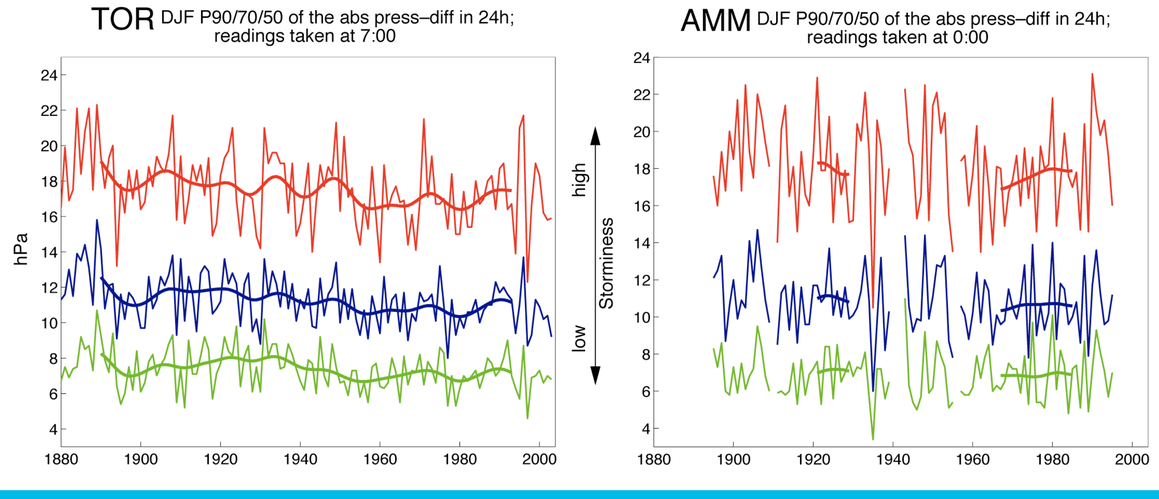
Storms are **a major threat at sea and on land** and make up the **largest insured losses** by far (see right Figure). So, **knowledge-gain regarding the evolution** of storminess is important.

Problem: **direct wind measurements** are fraught with **inhomogeneities.**
Solution: pressure based **storm proxies** may be used (WASA 1998).

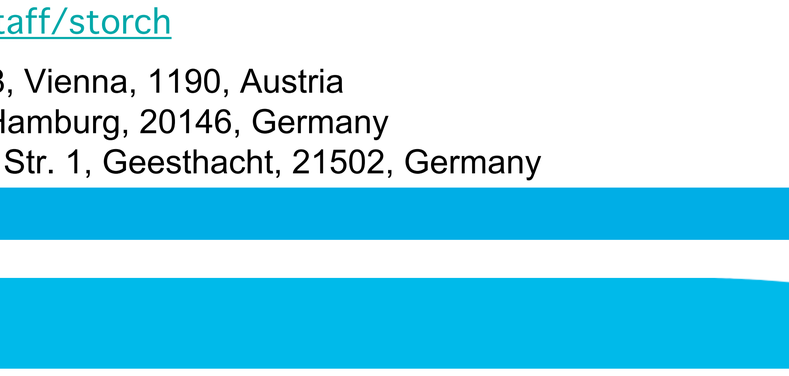


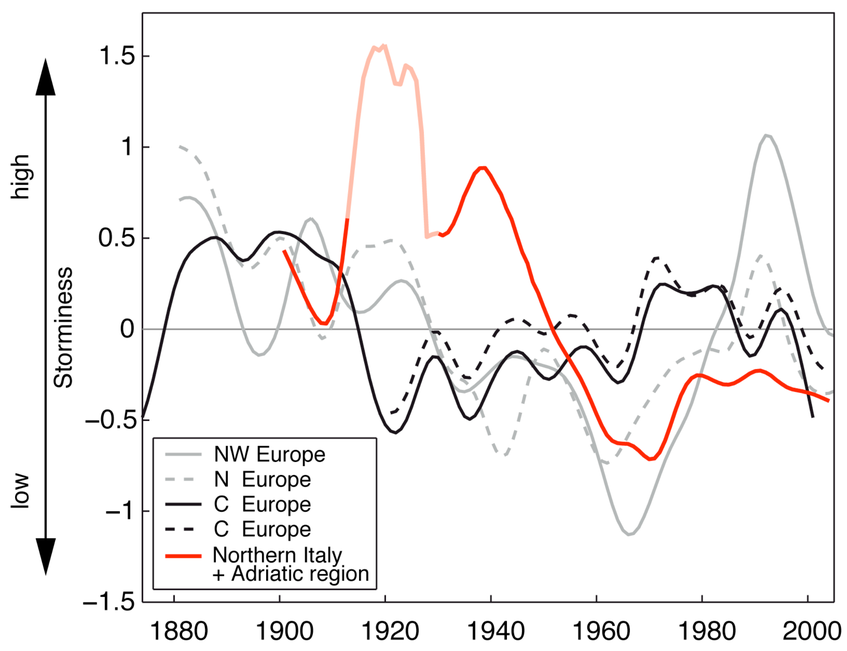
Reconstructions (see von Storch and Reichardt 1997) **of pressure percentiles** (above) in the **Arctic** (right panel): enhanced storminess having a peak in the 1920s; decreasing levels into the 1960s ; succeeded by another increase until the 1990s; most recent years are close to average conditions.
South of the Arctic: about the opposite behavior of the Arctic site.

Percentiles of absolute pressure differences within 24 hours (below): a general decrease is to be found in winter; other seasons feature little change at sites South of the Arctic and mostly increases at Arctic stations over the past decades.



Natural disasters 1980 - 2006 **Percentage distribution worldwide**





95th percentile of the geostrophic wind speed (Schmidt and von Storch 1993, Alexanderson et al. 1998, Matulla et al. 2008) for different areas across Europe. The **increase** from the **1960s** into the **1990s** raised **concerns in Northern Europe** and it was speculated about an **anthropogenic influence** on the storm climate. The peak in the 1920s/30s and the abrupt drop in the 1950s in the Adriatic region may be due to data inconsistencies and needs to be further investigated.

Alexandersson H, Schmith T, Iden K, Tuomenvirta H (1998) Longterm variations of the storm climate over NW Europe. *Glob Atmos Ocean Syst* **6**: 97–120
Matulla C, Schoener W, Alexandersson H, von Stroch H, and Wang XL (2008), European Storminess: Late nineteenth century to present. *Clim Dyn* **31**: 125-130.
Schmidt H, von Storch H (1993) German Bight storms analyzed. *Nature* **365**: 791
von Storch, H. and H. Reichardt 1997. A scenario of storm surge statistics for the German Bight at the expected time of doubled atmospheric carbon dioxide concentration *J. Climate* **10**: 2653-2662
WASA (1998) Changing waves and storms in the northeast Atlantic. *Bull Am Meteorol Soc* **79**: 741–760

we are grateful to B. Gardeike who prepared Figures and arranged the layout!

For the considered regions and on timescales of a century or so there is no evidence found that storminess evolves outside its natural variability.