Spatio-temporal climate variations and trends over the Baltic Sea since 1850

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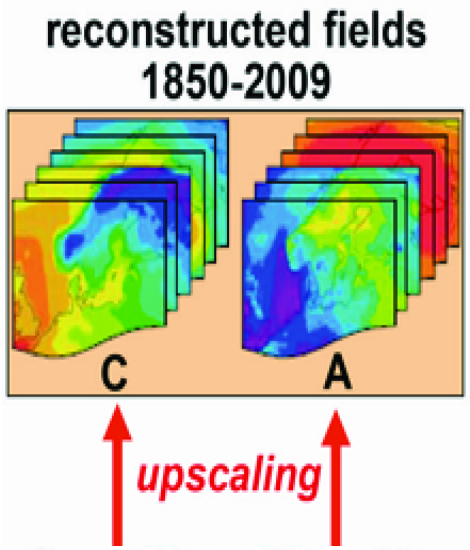
Helmholtz-Zentrum Geesthacht, Germany

and

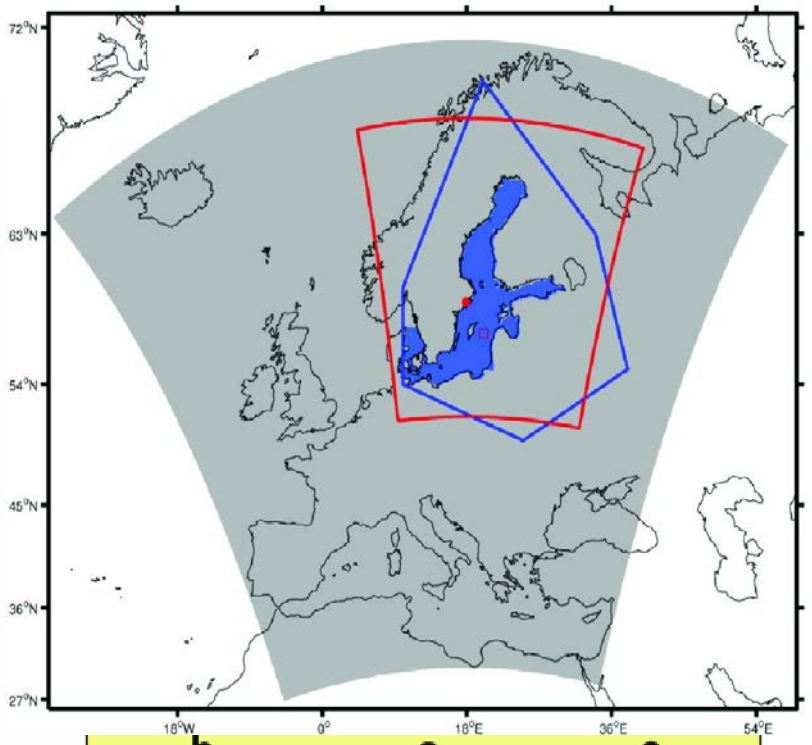
Ecosupport project

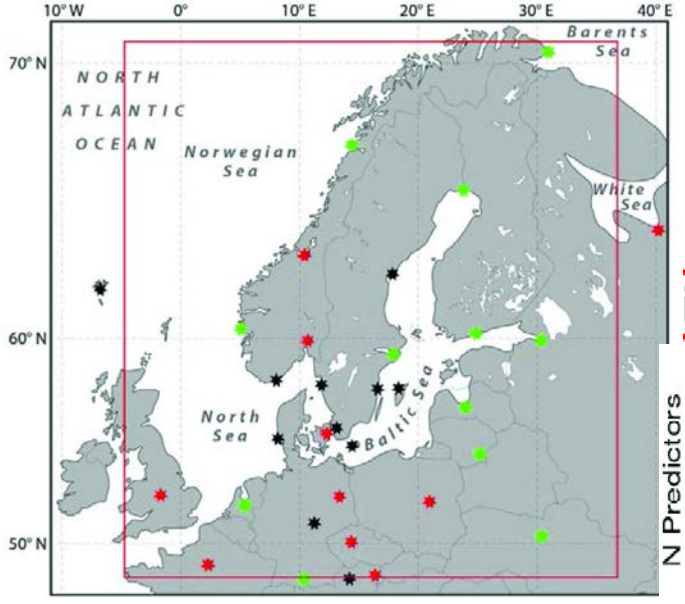
The analog method to reconstruct gridded fields from sparse station data

Schenk and Zorita, Climate of the Past (2012)



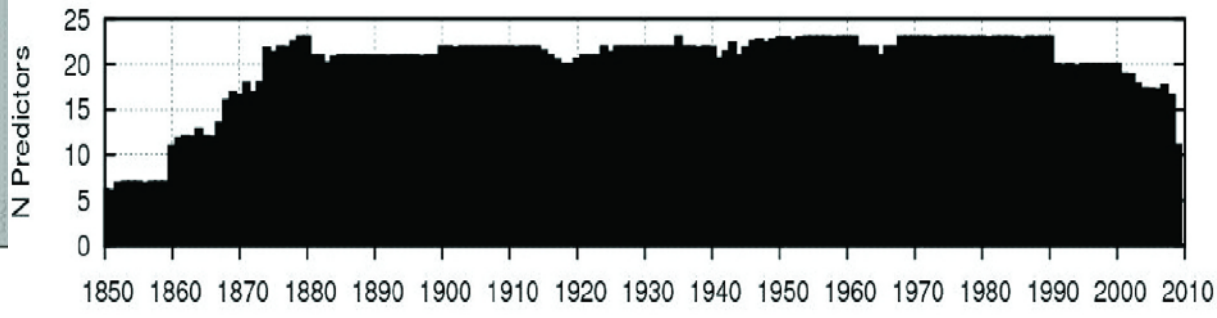
Fields from a regional climate simulation





station data or proxy

in $\| P(u) - P(t) \|$



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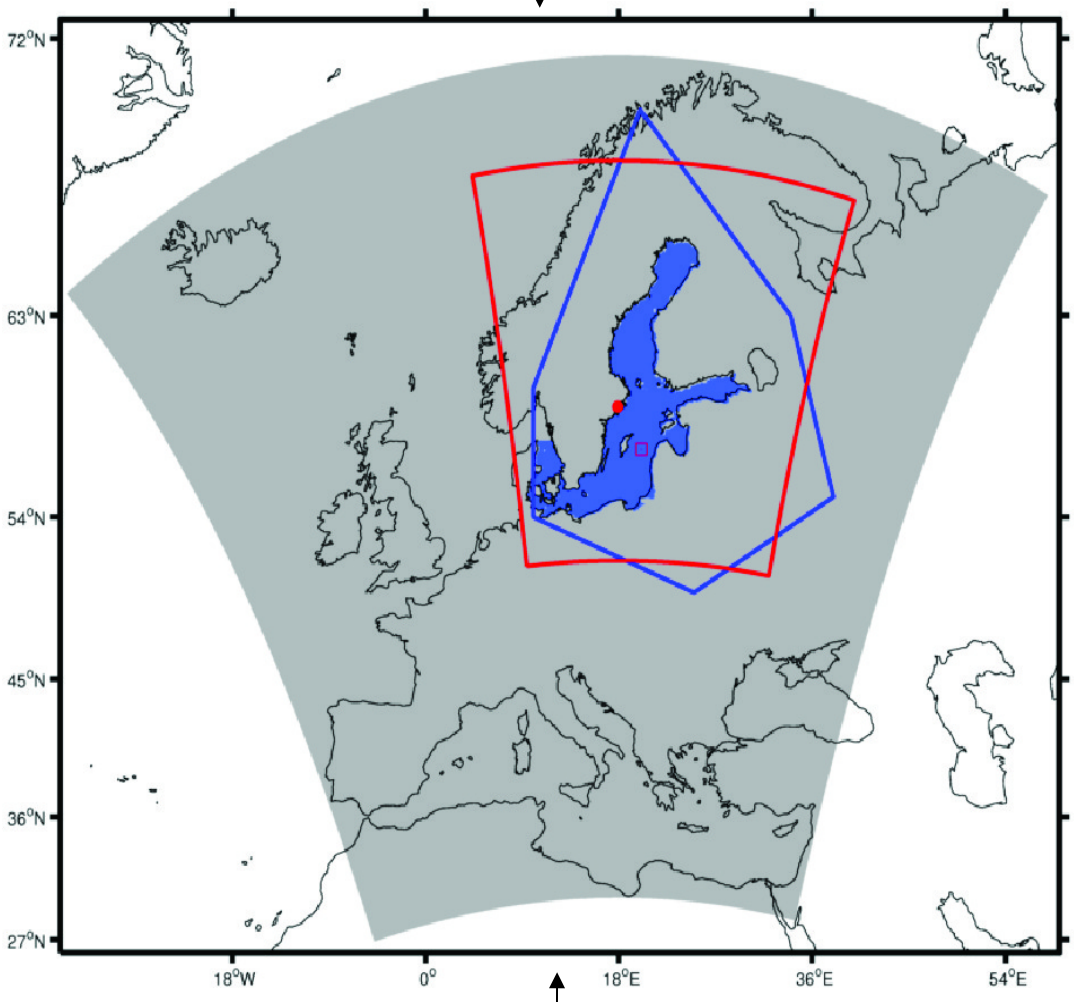
Model RCA(O)

1958-2007

~ 25 km x 25 km

Daily means T,SLP,PP,u,v,etc.

ERA 40 Reanalysis



ERA 40 Reanalysis

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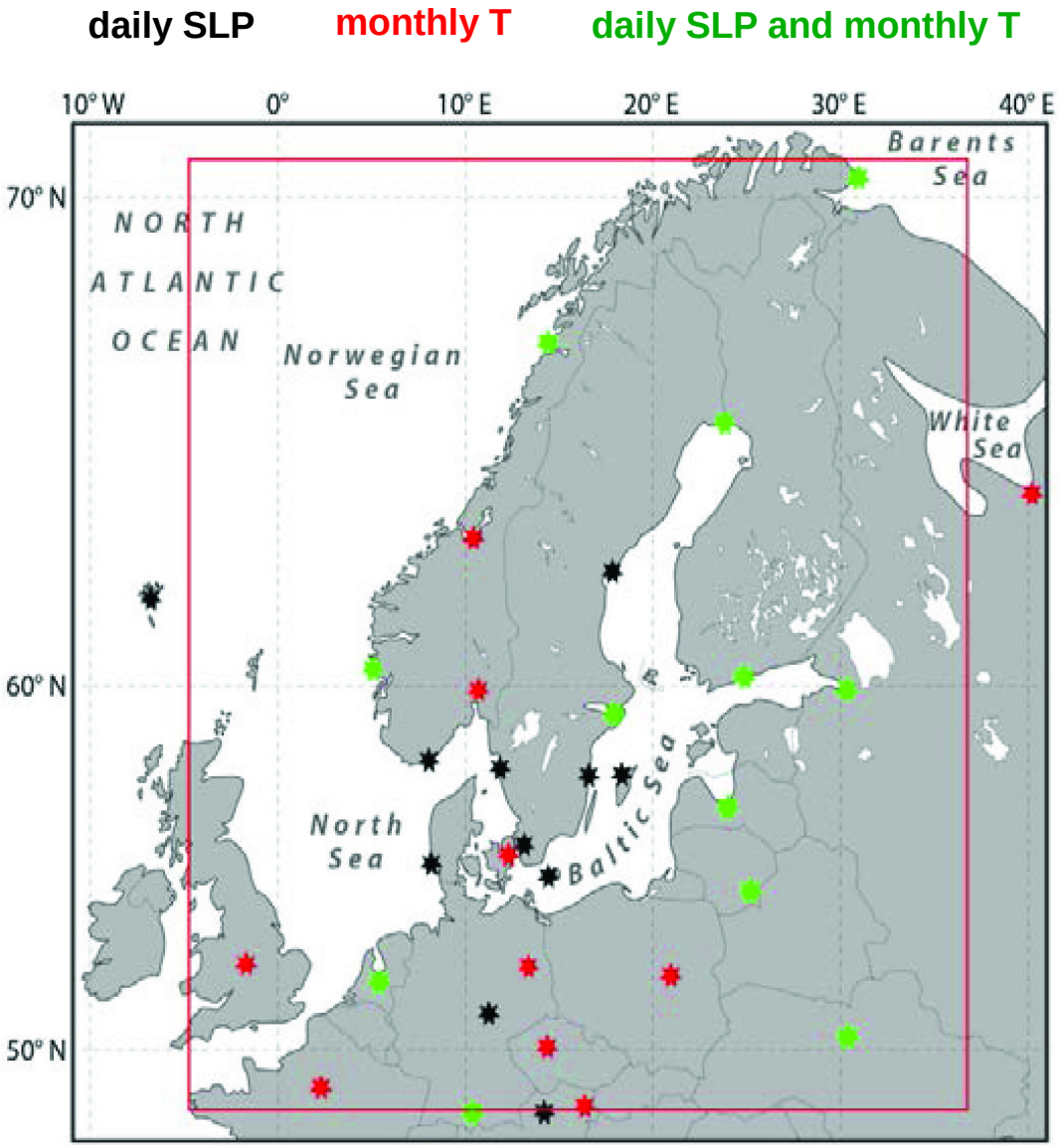
Predictors

- Daily sea-level pressure (SLP) observations 1850-present, with some updates collected from the ADVICE project

- Long monthly means temperature records from CRU

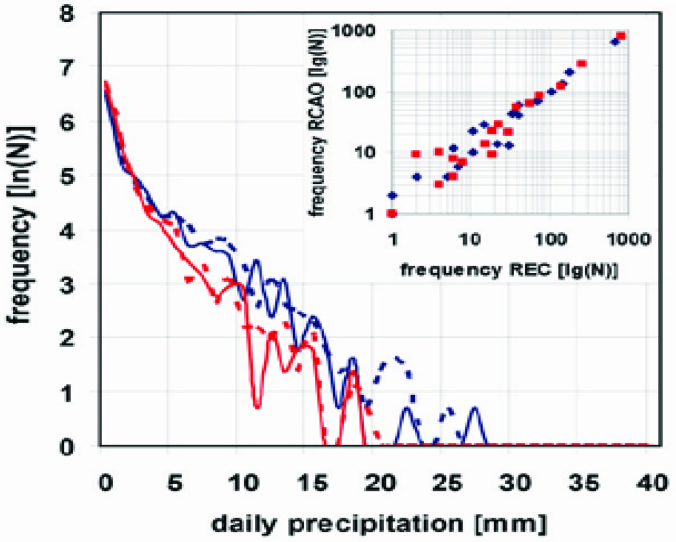


Distributions of reconstruction versus reference: HiresAFF ——— Reference (RCAO) ·····

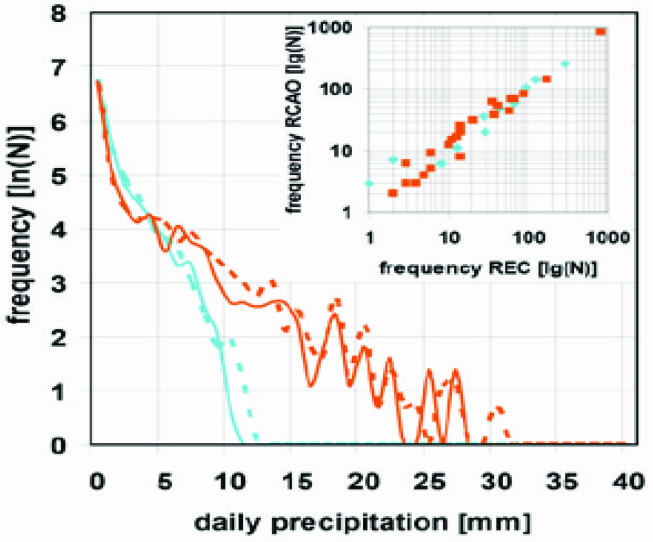
Summer

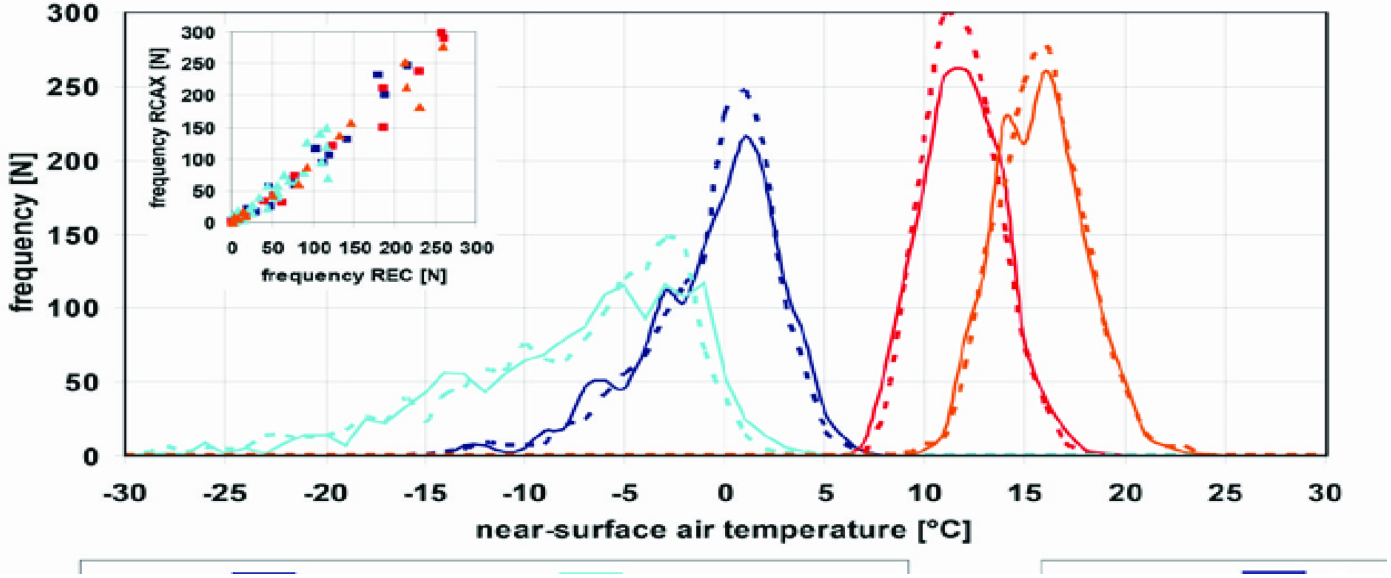
Winter

Bergen



St. Petersburg





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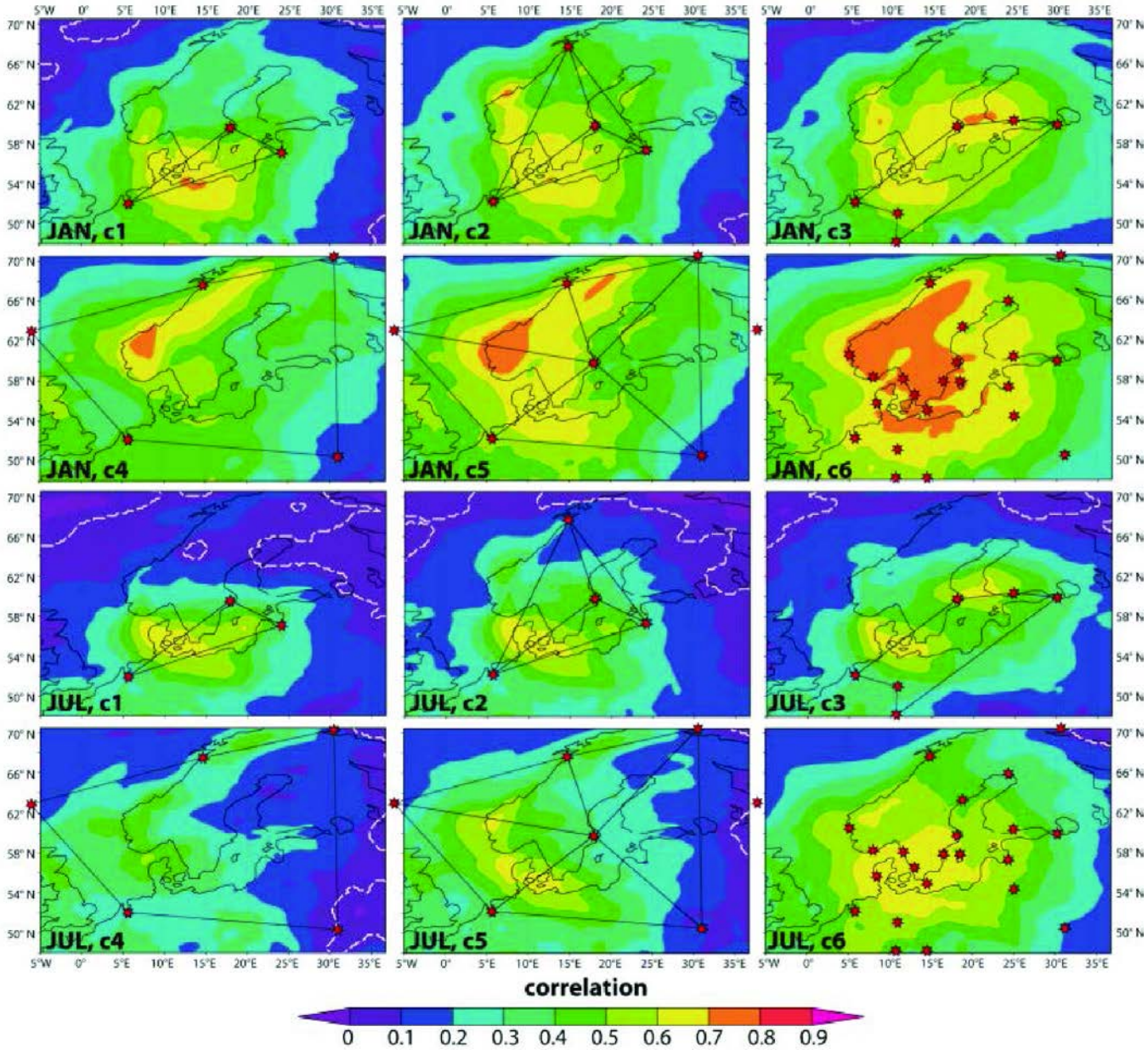
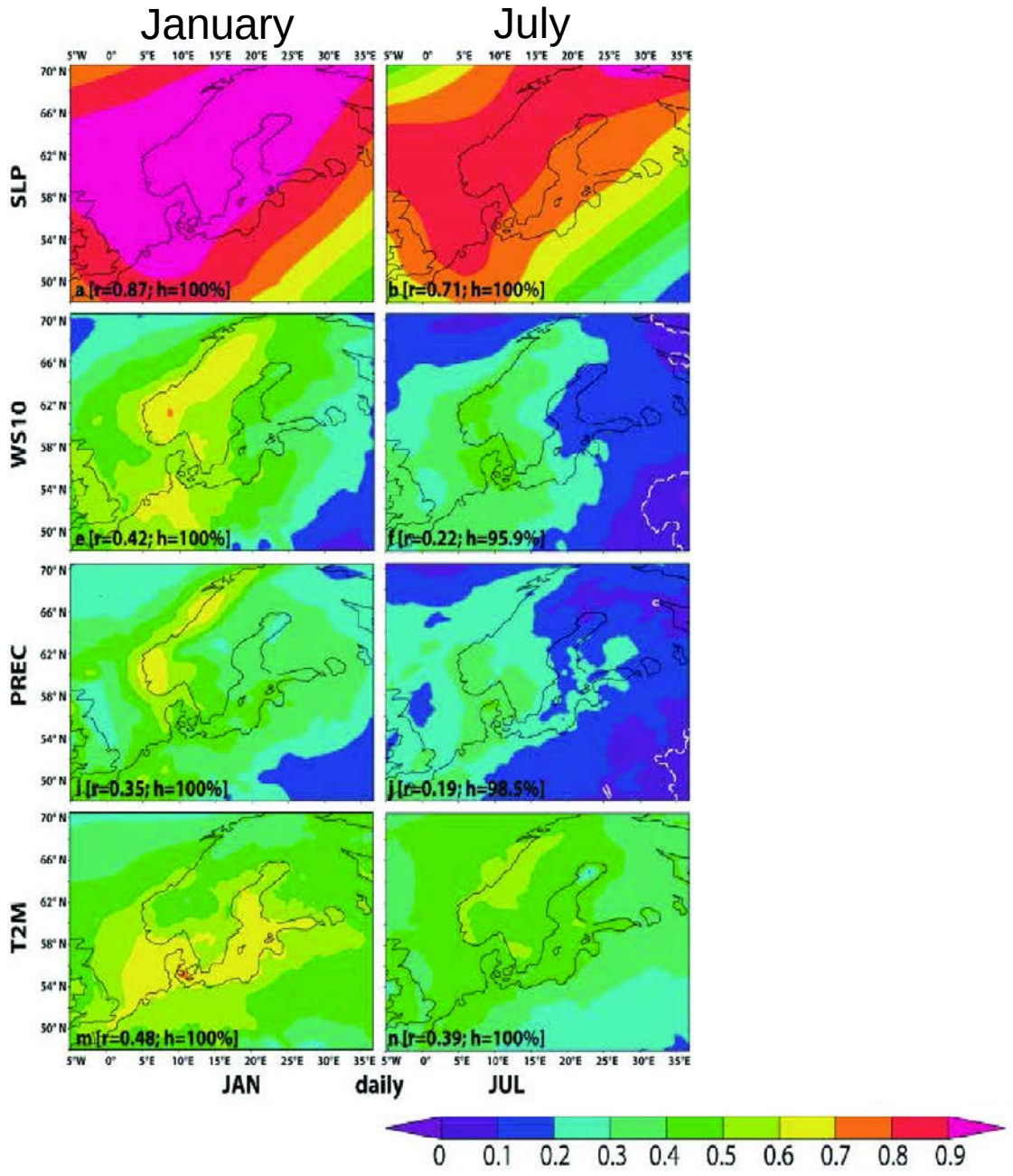
The quality of the reconstructions depends on the number and location of the predictors



Correlation between reconstruction (HresAFF) and reference (model RCAO)

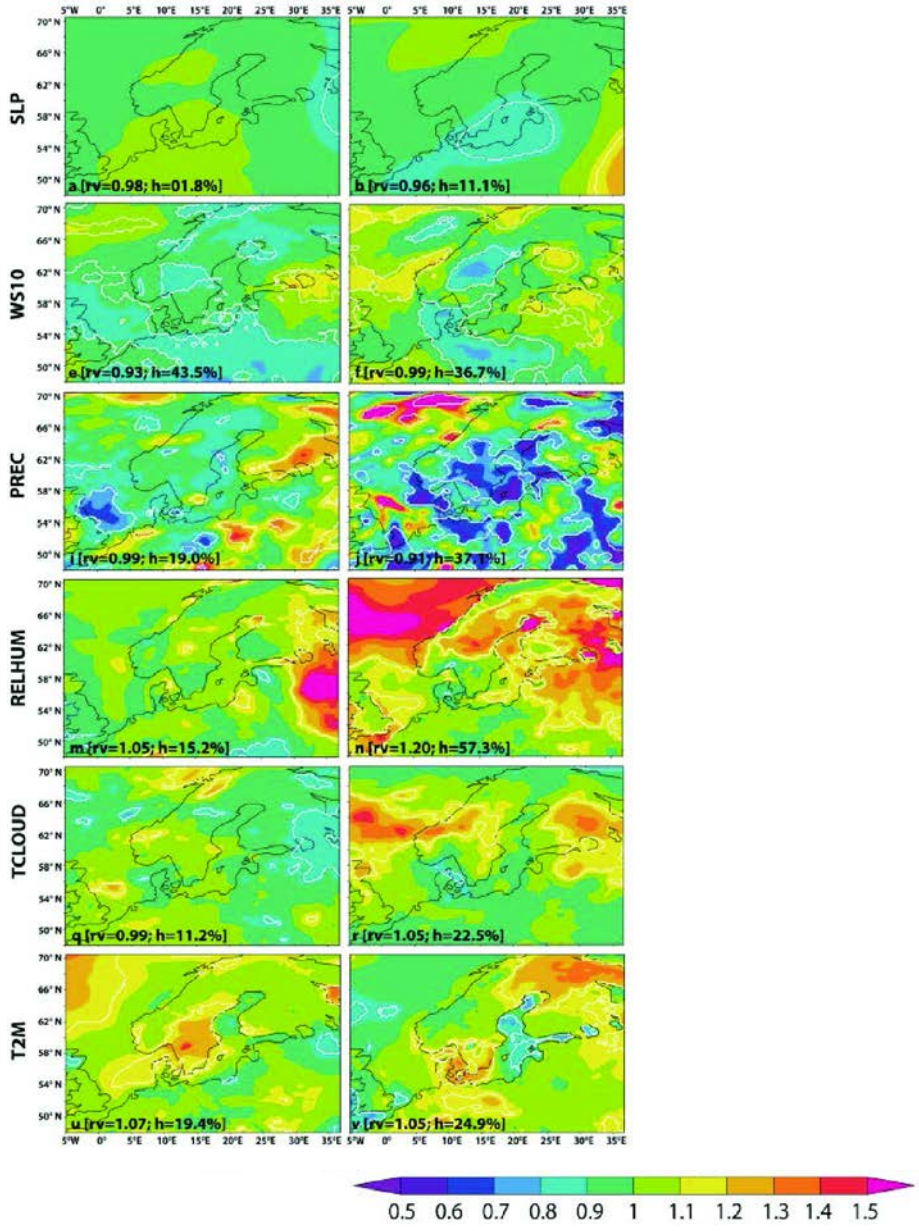
Correlations between reconstructions (HiresAFF) and reference

Daily timescale

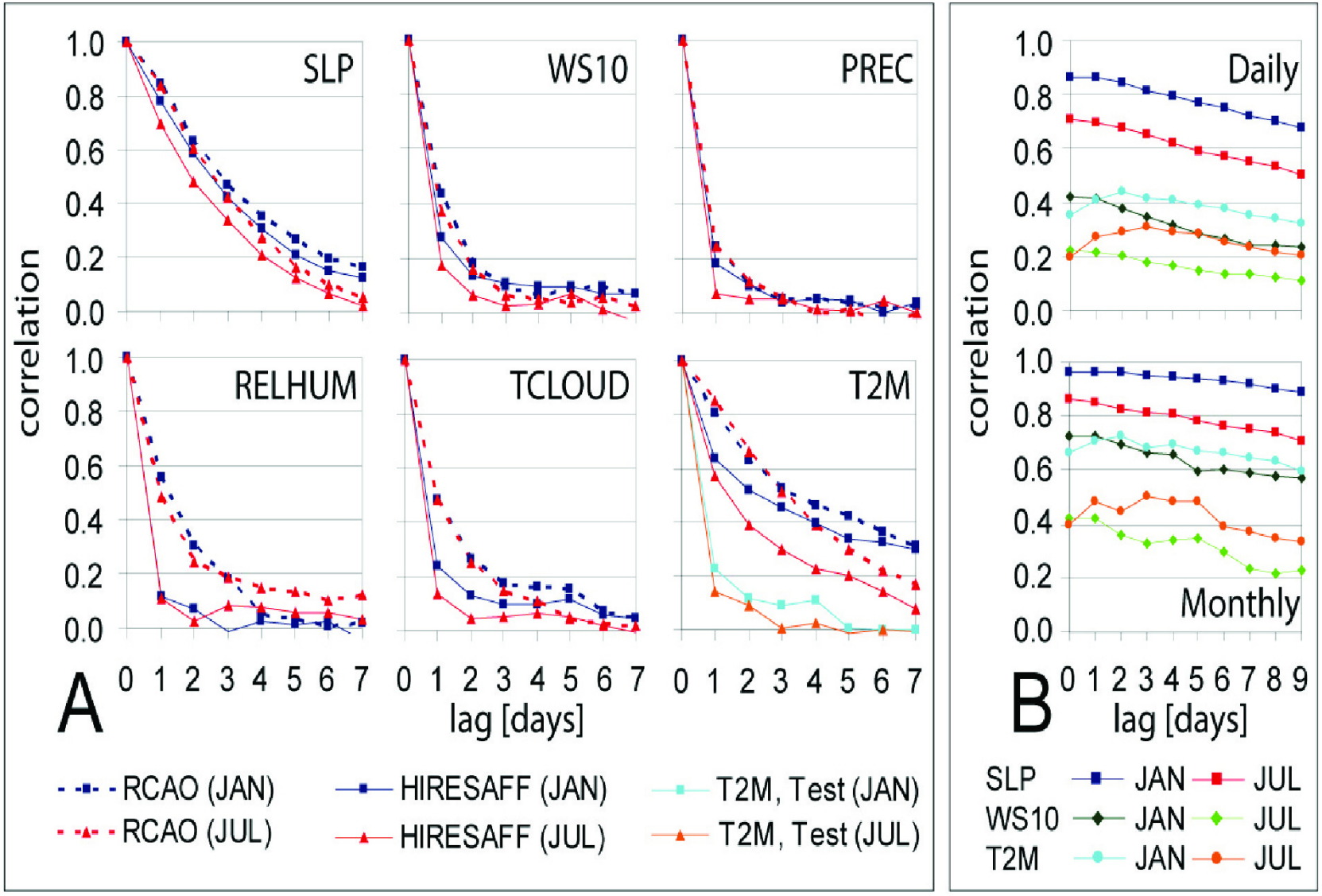


Ratio of variances between reconstructions (HiresAFF) and reference

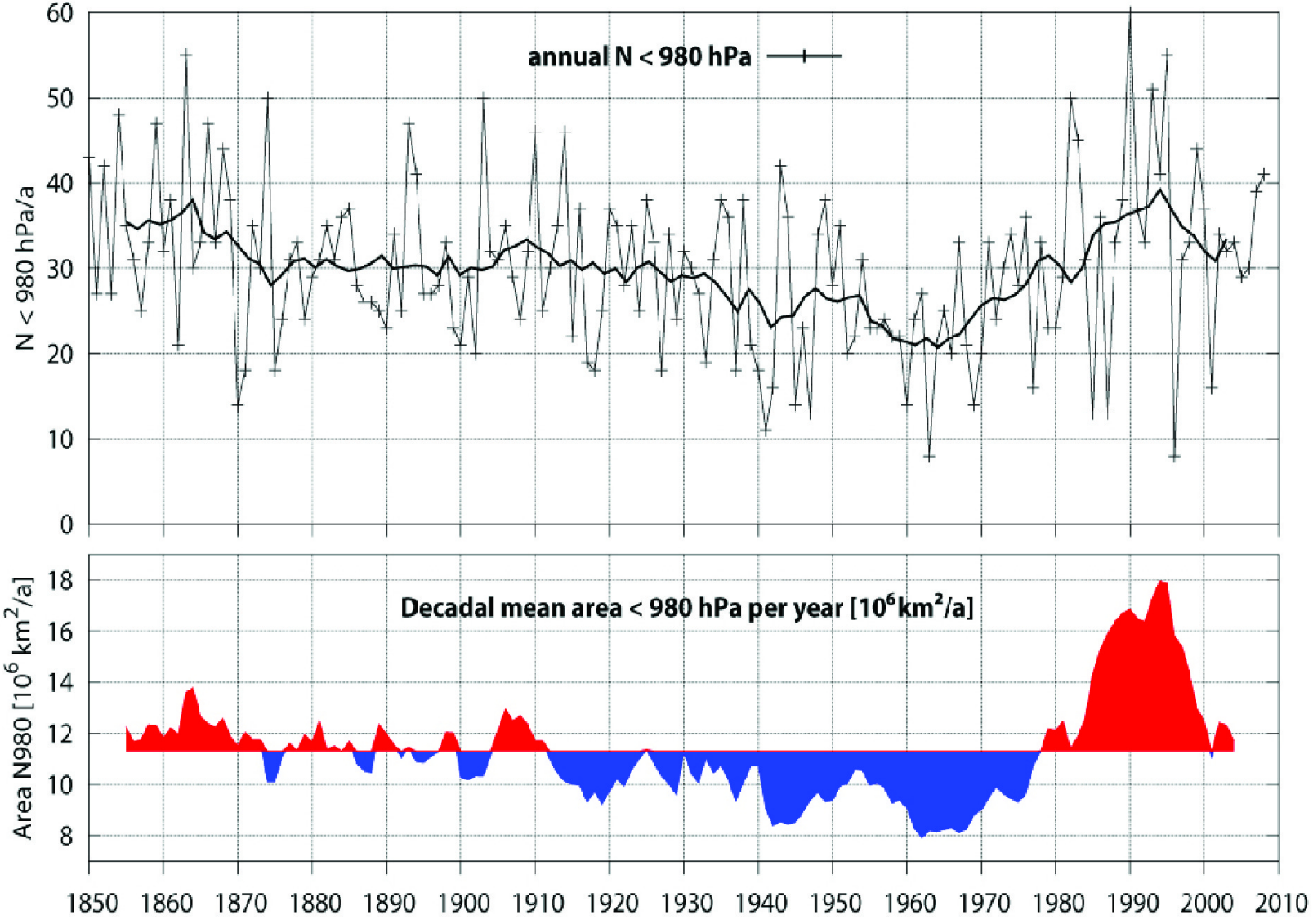
Daily timescale



Daily autocorrelation

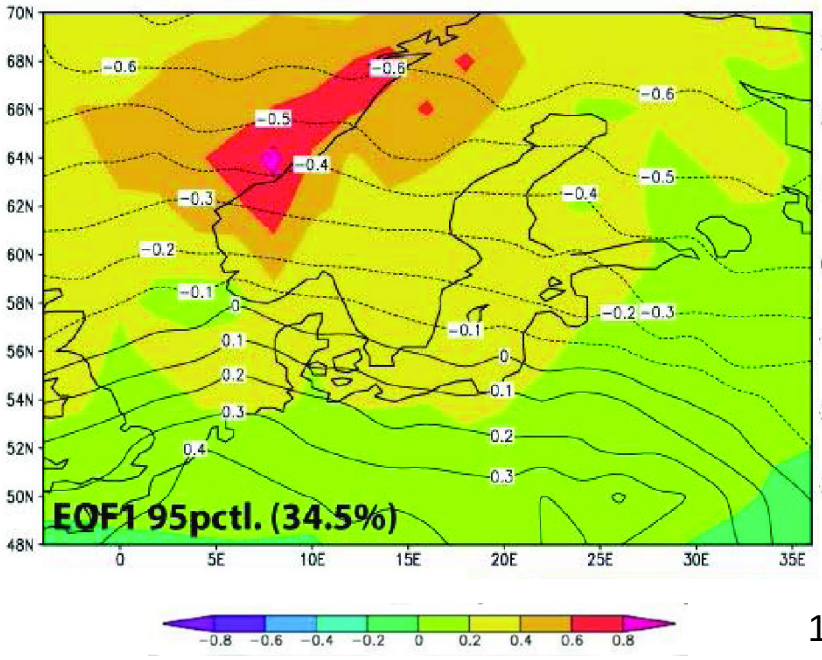


Long-term evolution of the number of cyclones

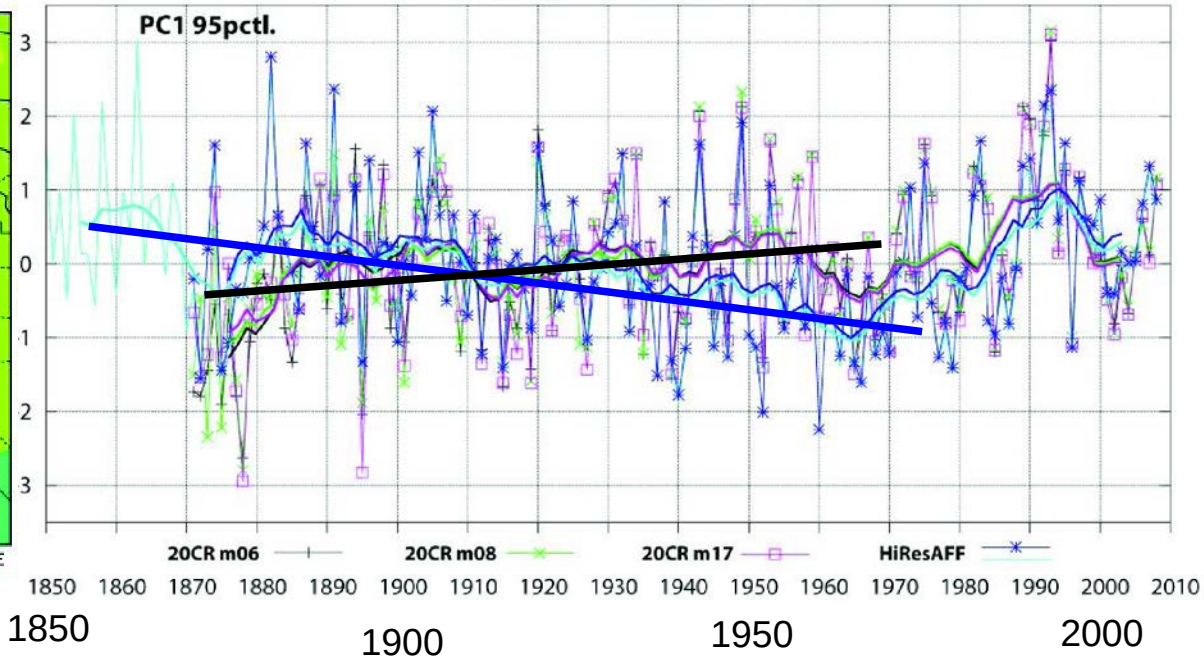


Storminess (wind speed), time evolution, comparison with long-term reanalysis

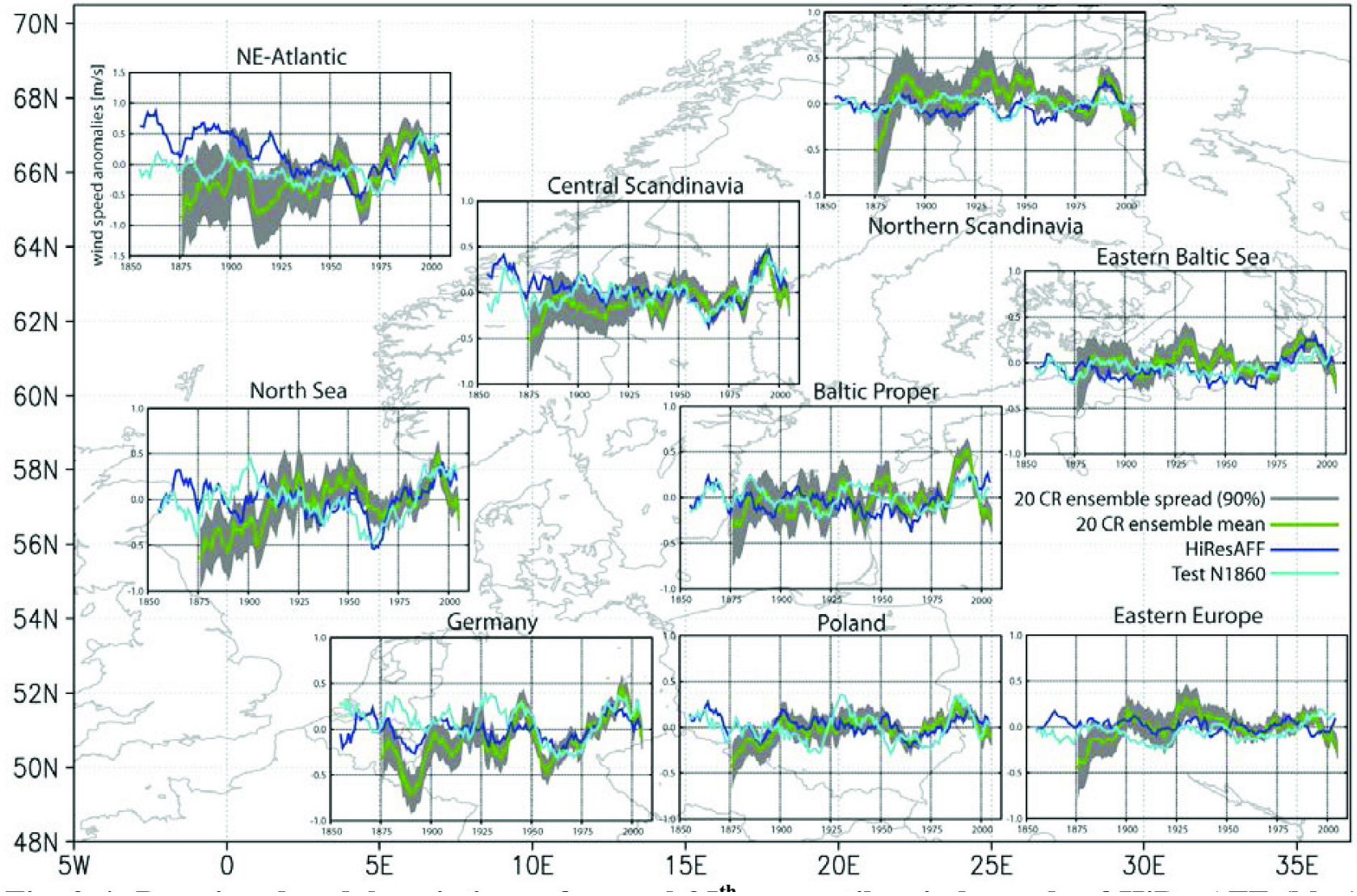
Colour shading: PC1 of 95% daily wind percentile contours, associated SLP pattern



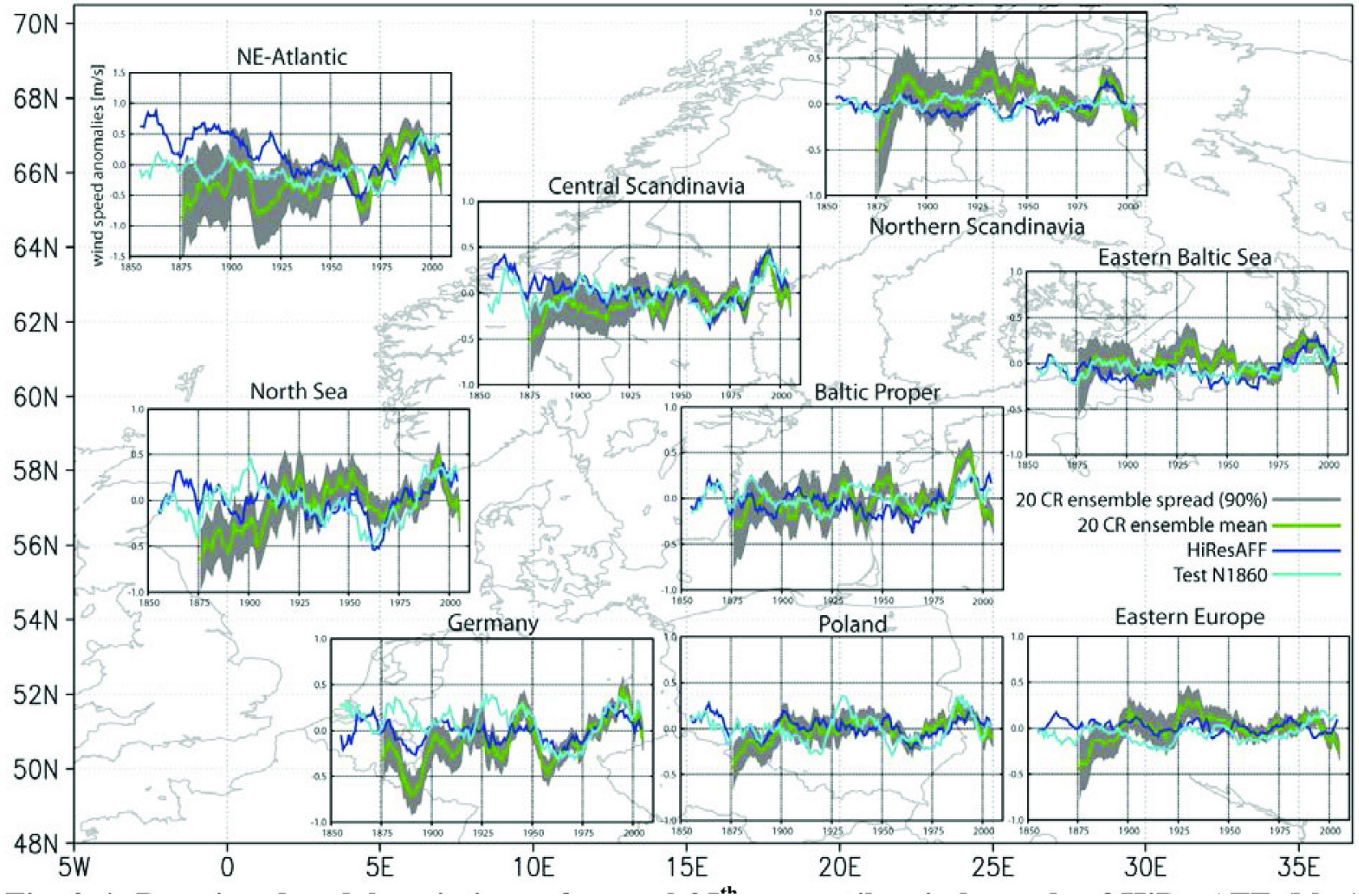
HiresAFF versus 20CR reanalyis



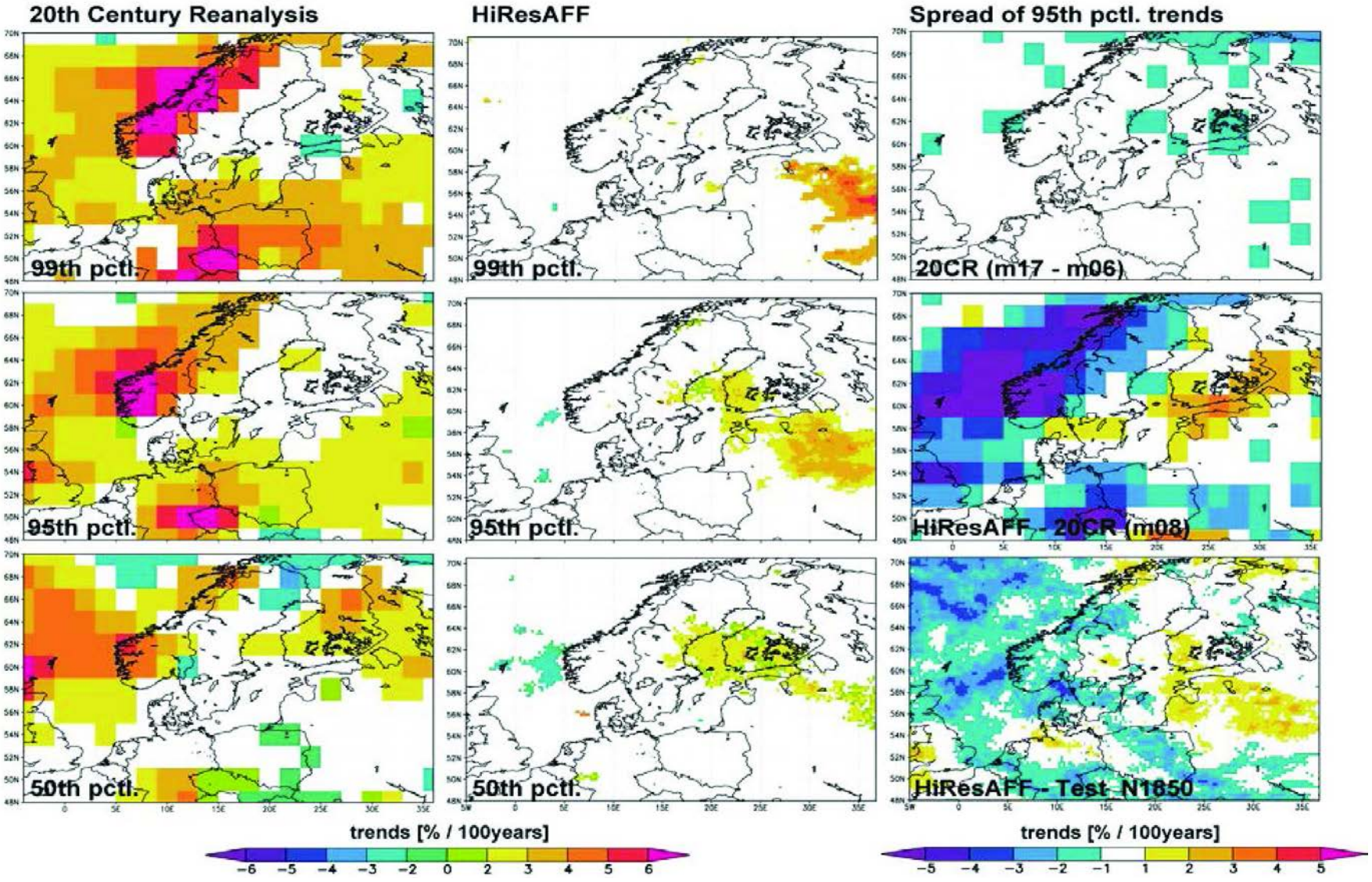
Regional comparison with long-term meteorological reanalysis 20 CR



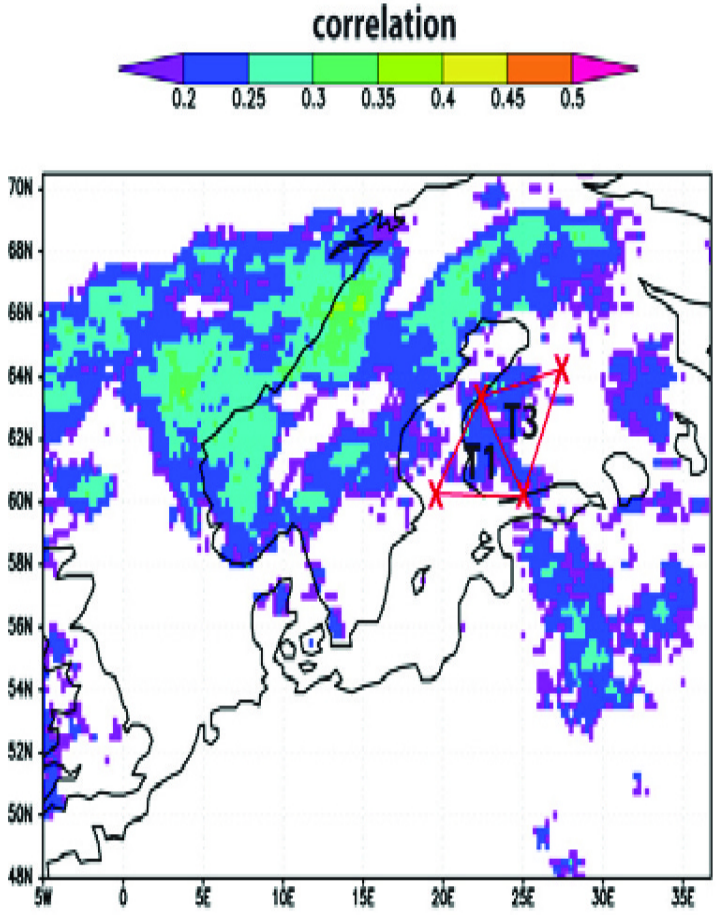
Comparison with long-term meteorological reanalysis 20 CR

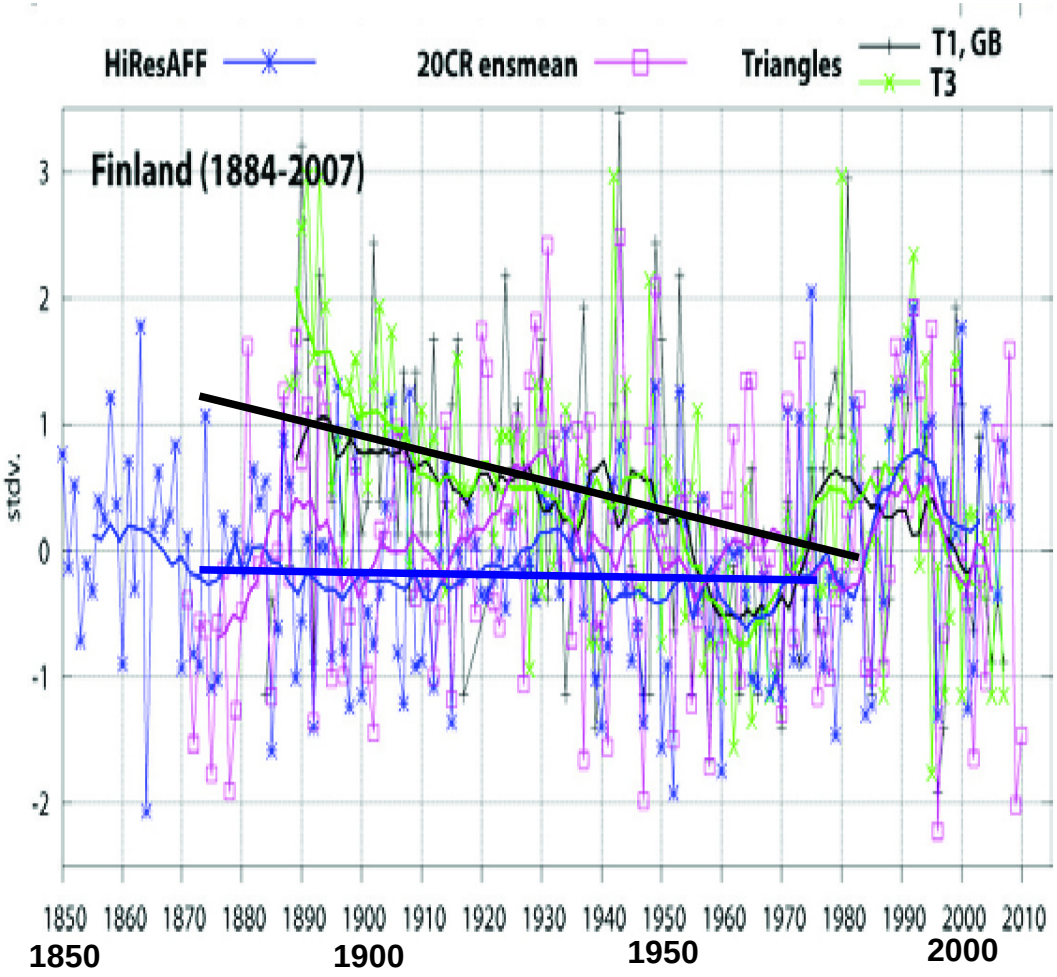


Trend in storminess 1980-2000: Hiresaff versus 20CR reanalysis



Storminess: comparison with geostrophic triangulation indices. Finland





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Thank you !