Verification scores including polar verification

Jean-Noël Thépaut - ECMWF

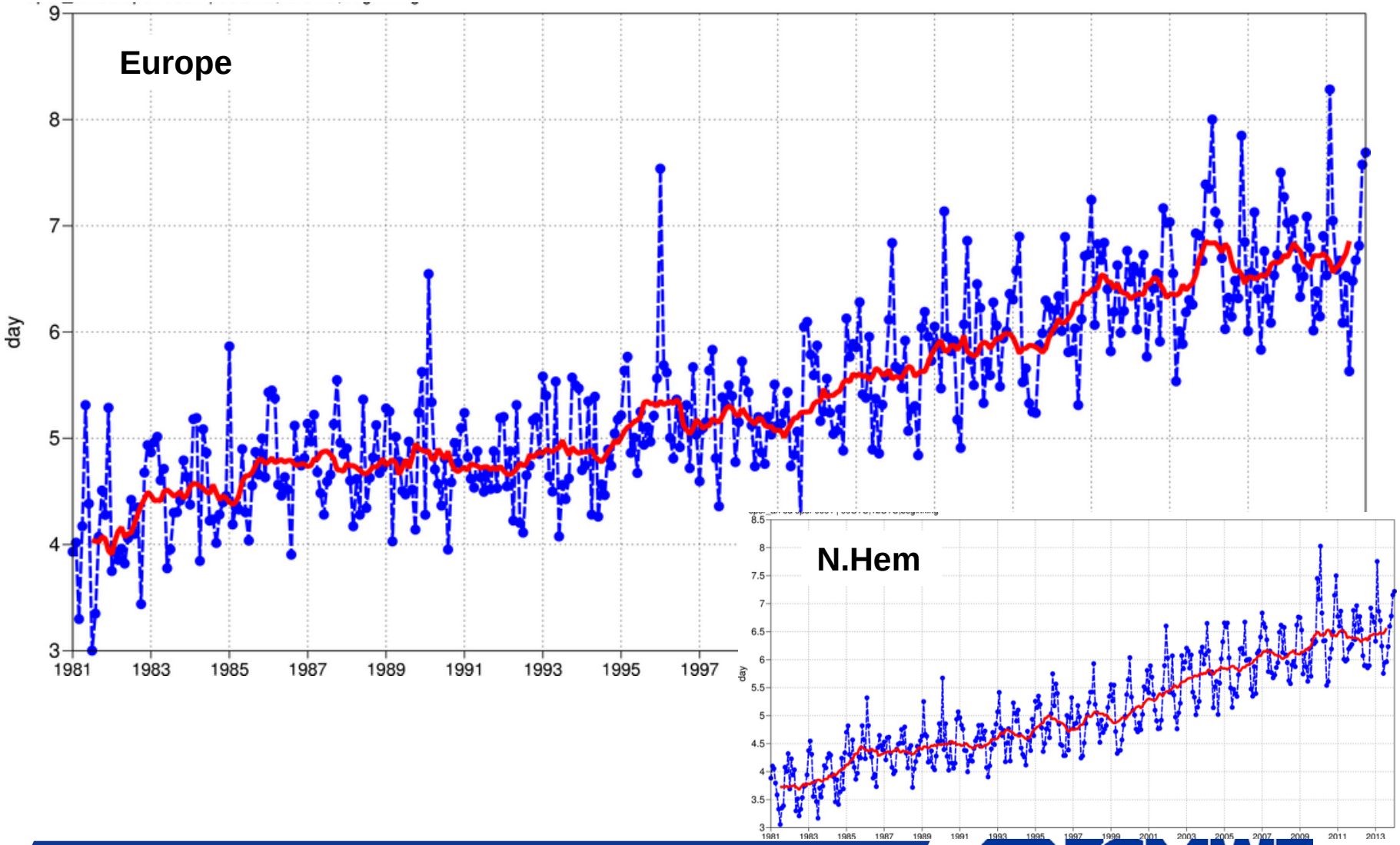
- **Scores evolution between 2000 and 2013**
- **Update on ECMWF: WMO Lead Centre for Deterministic Forecast Verification**
- **Polar verification**

Acknowledgements: Martin Janousek, David Richardson

ECMWF

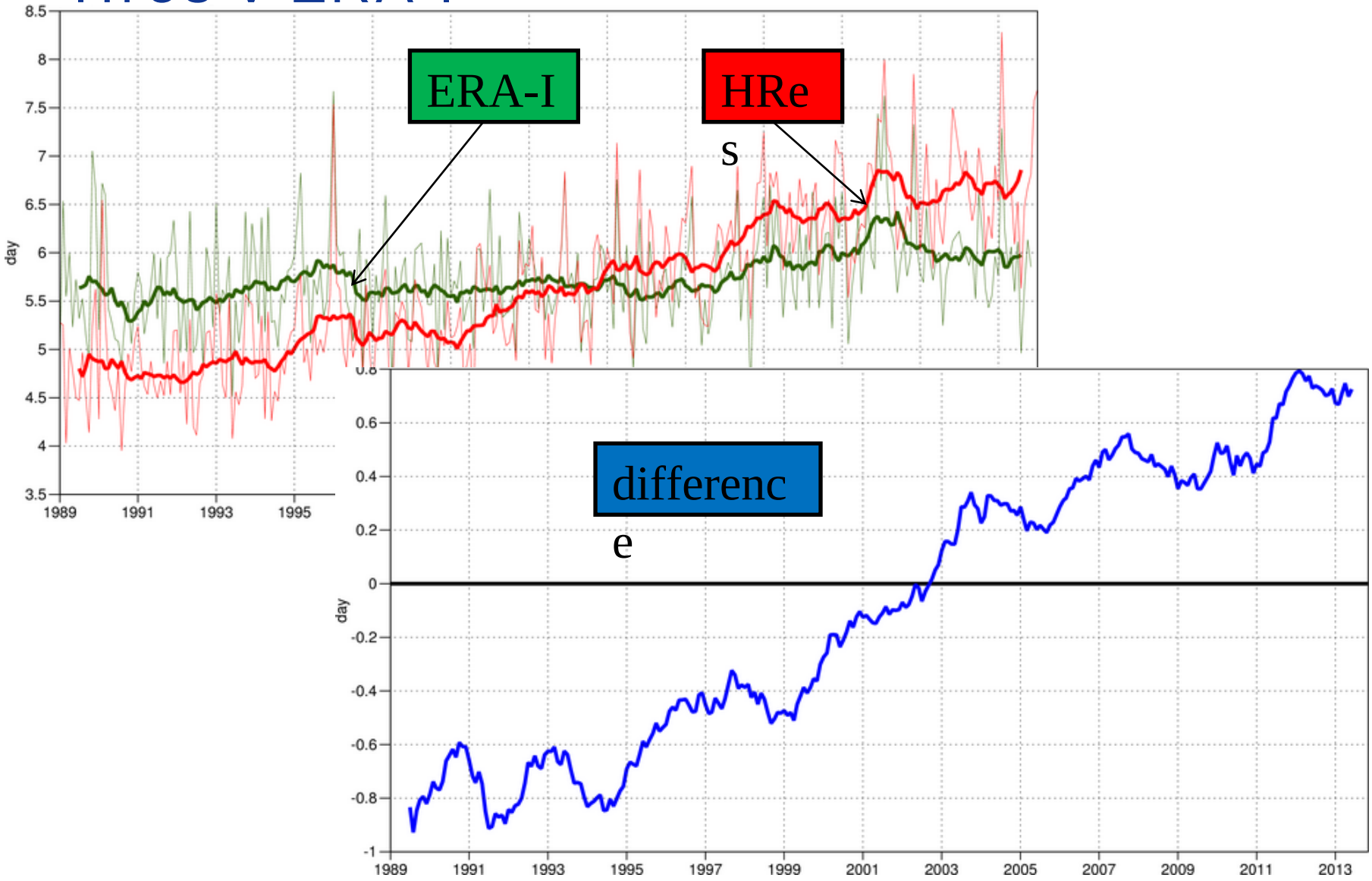
Primary Headline Score

Z500, Time series of ACC=0.8 Europe



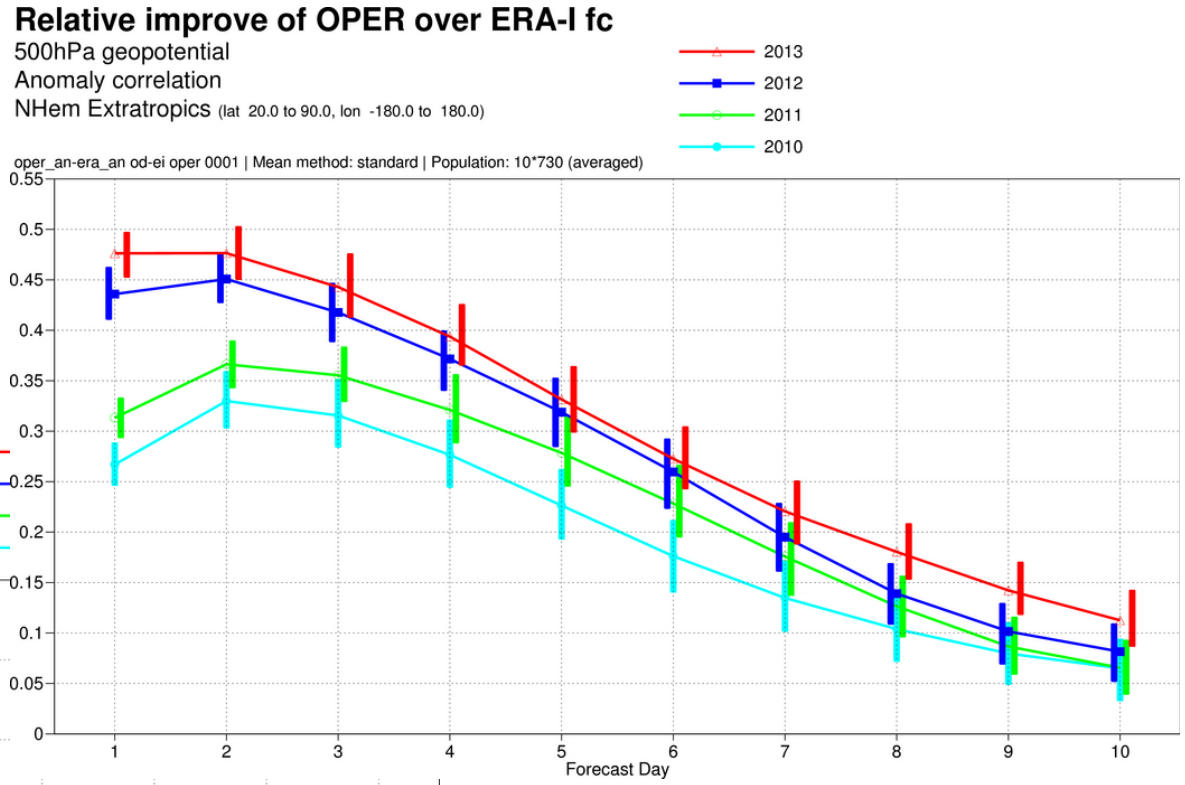
ECMWF

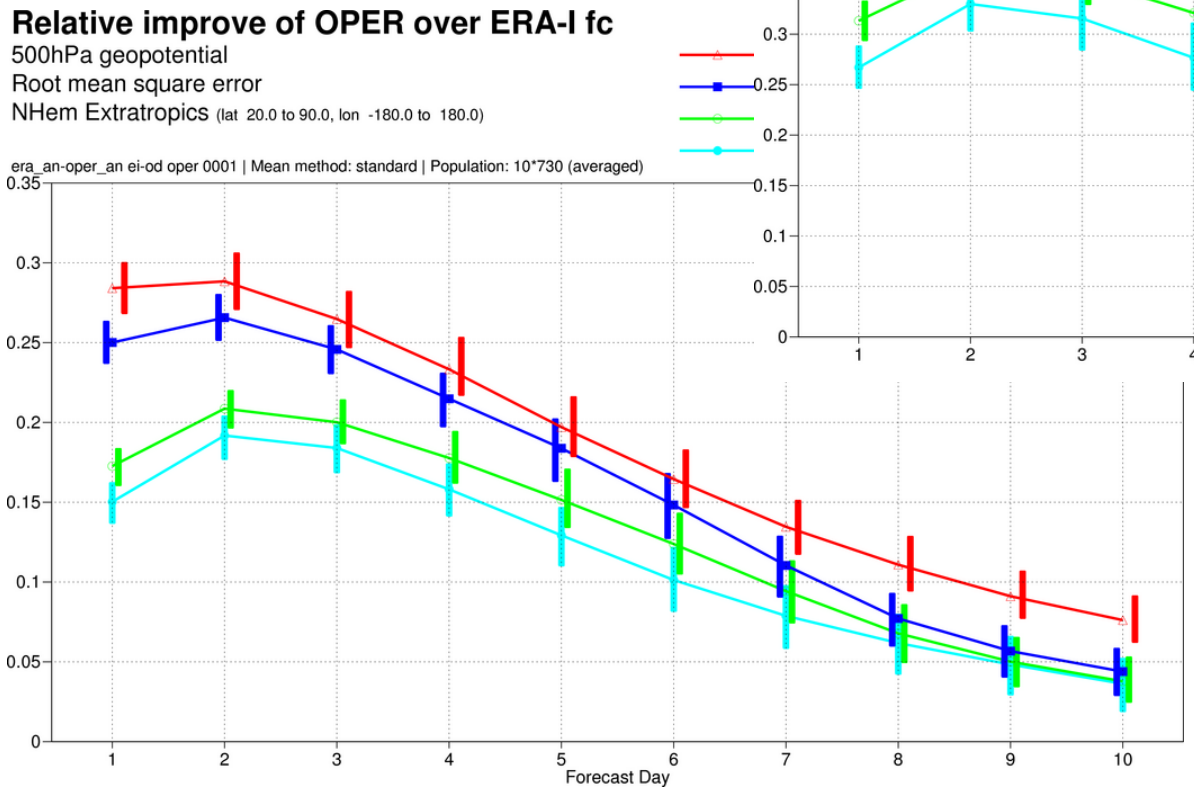
Z500, Time series of ACC=0.8 Europe Hres v ERA-I



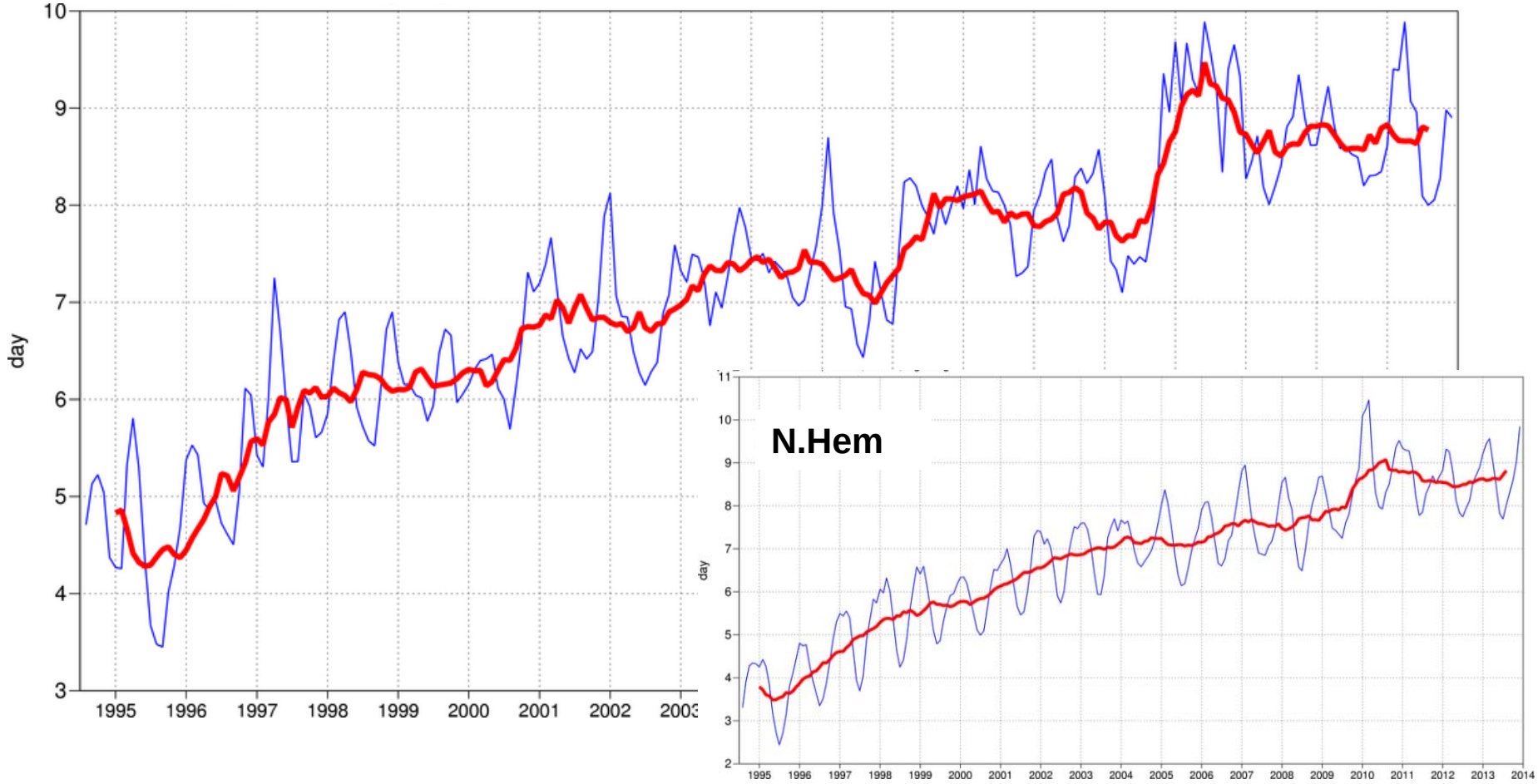
ECMWF

High-res v ERA-I N hem





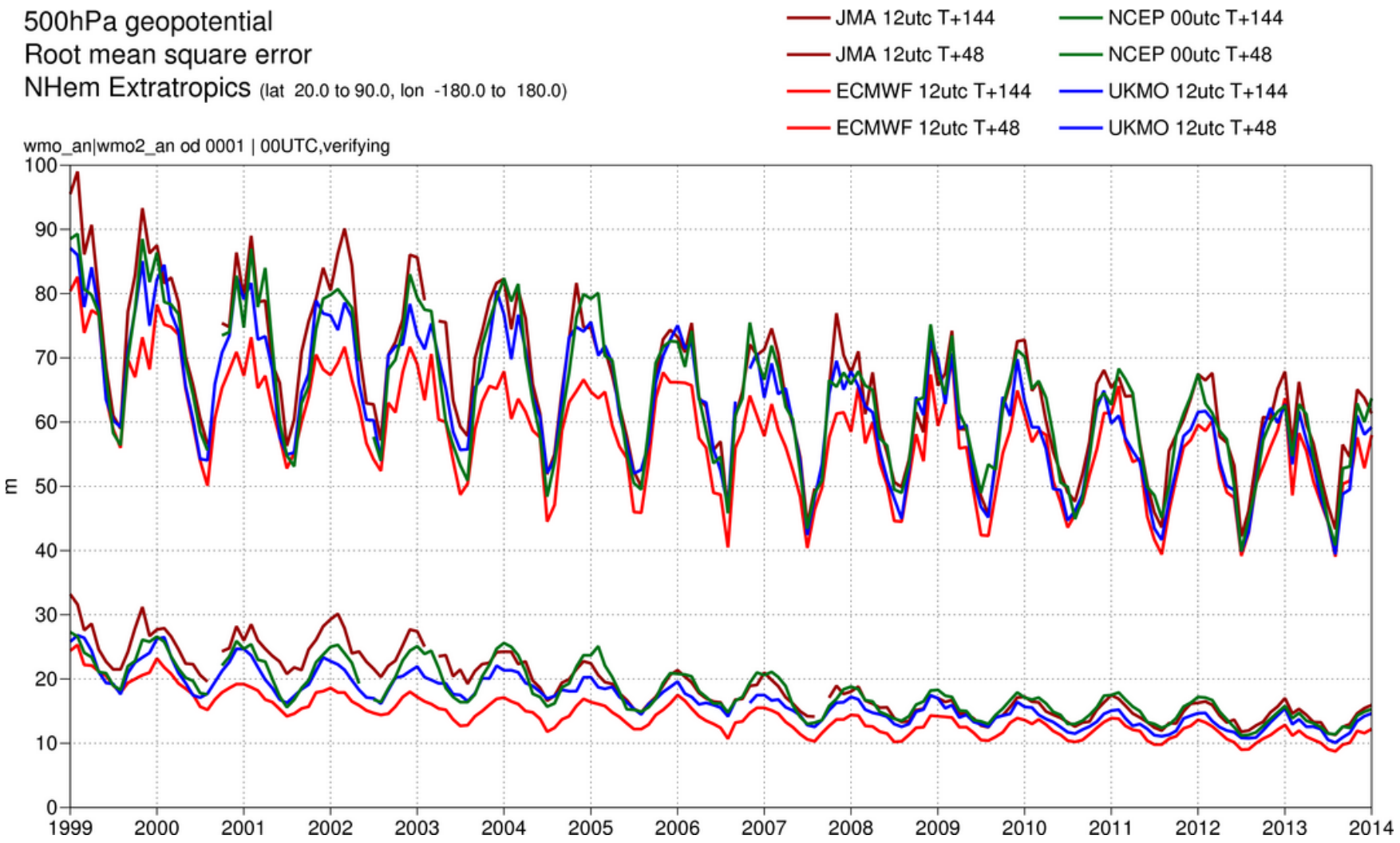
Primary Headline Probabilistic Score
CRPSS, T850 Europe



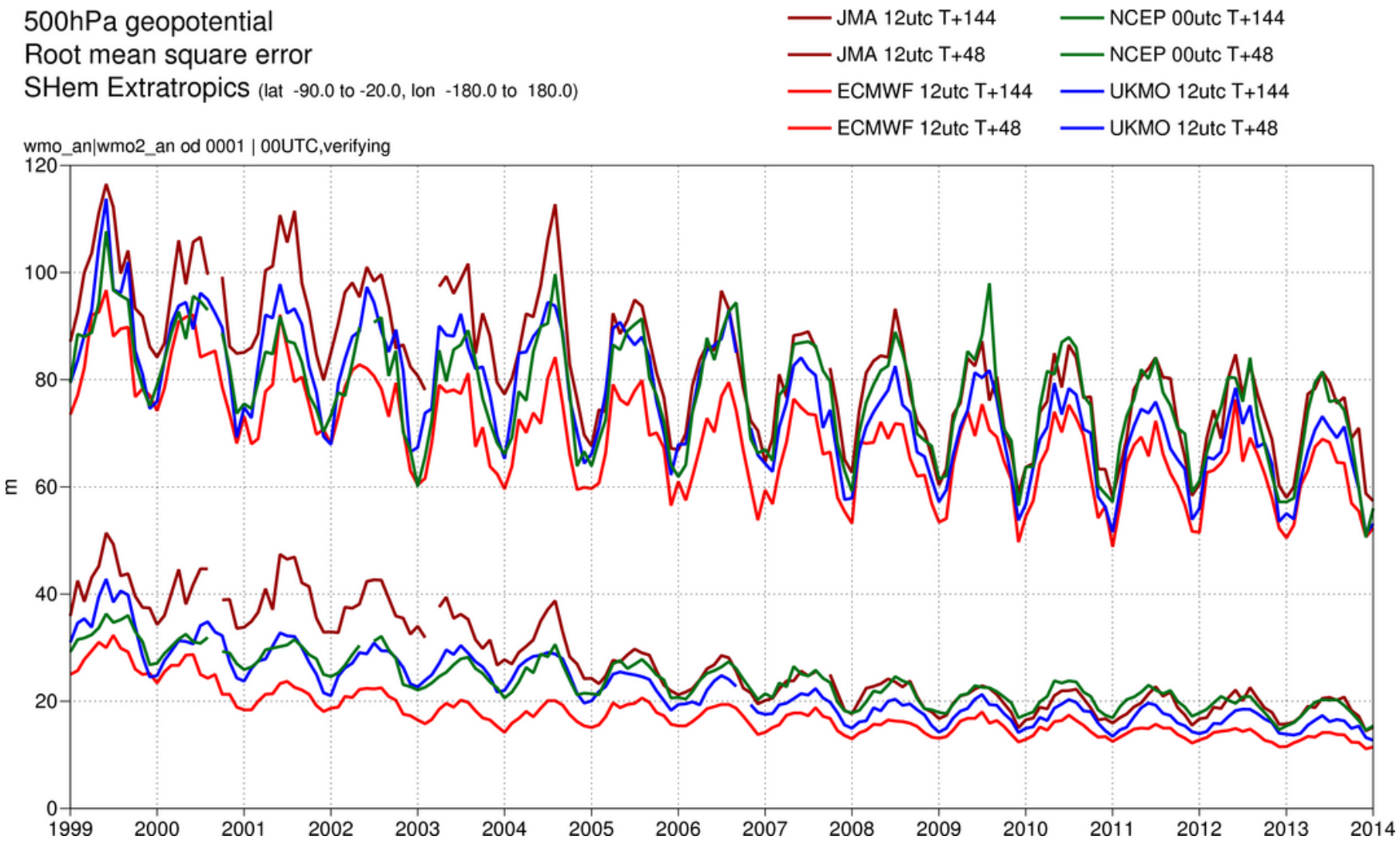
Monthly score (blue), and 12-month running mean (red) of Continuous Ranked Probability Skill Score for EPS forecasts of T850 hPa for Europe. Day at which score reaches 25%.

ECMWF

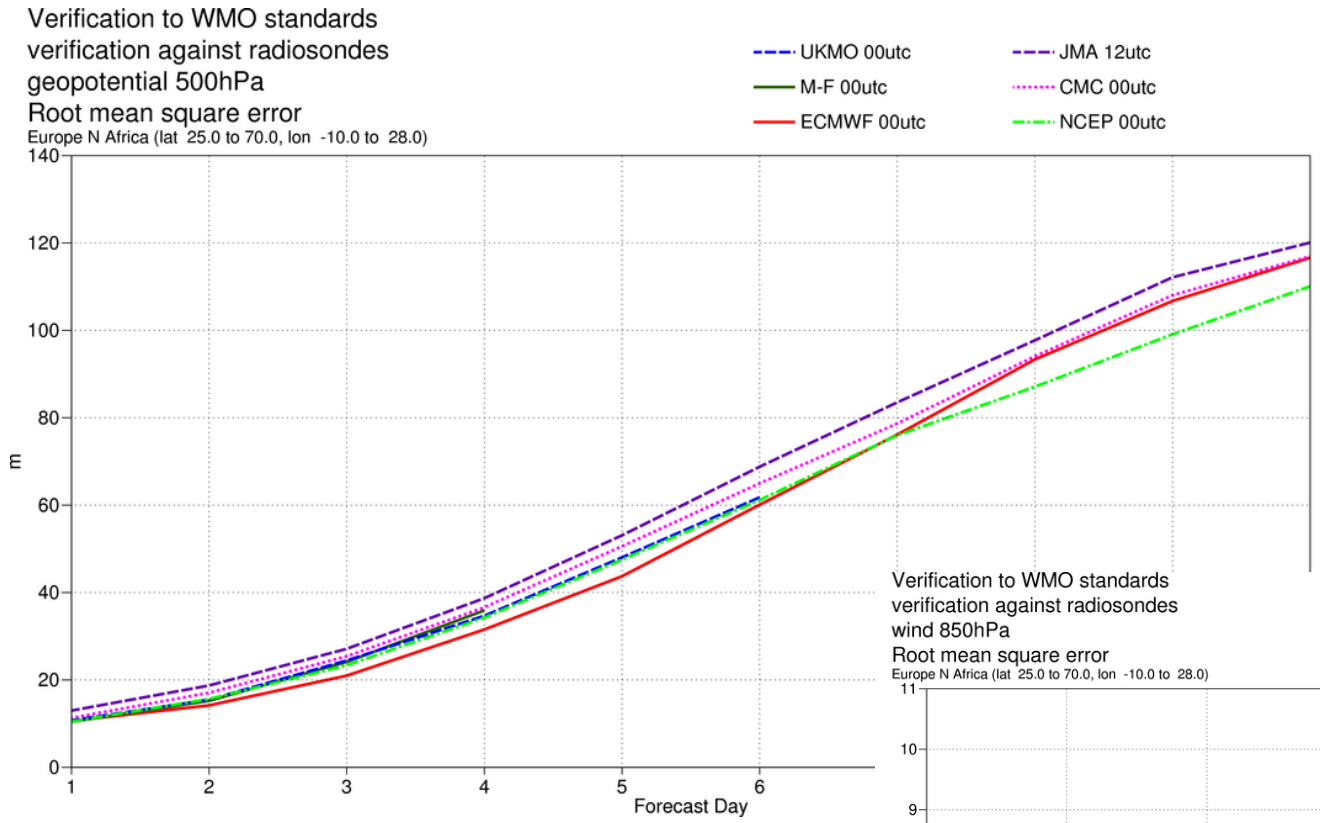
WMO scores Z500 N.Hem

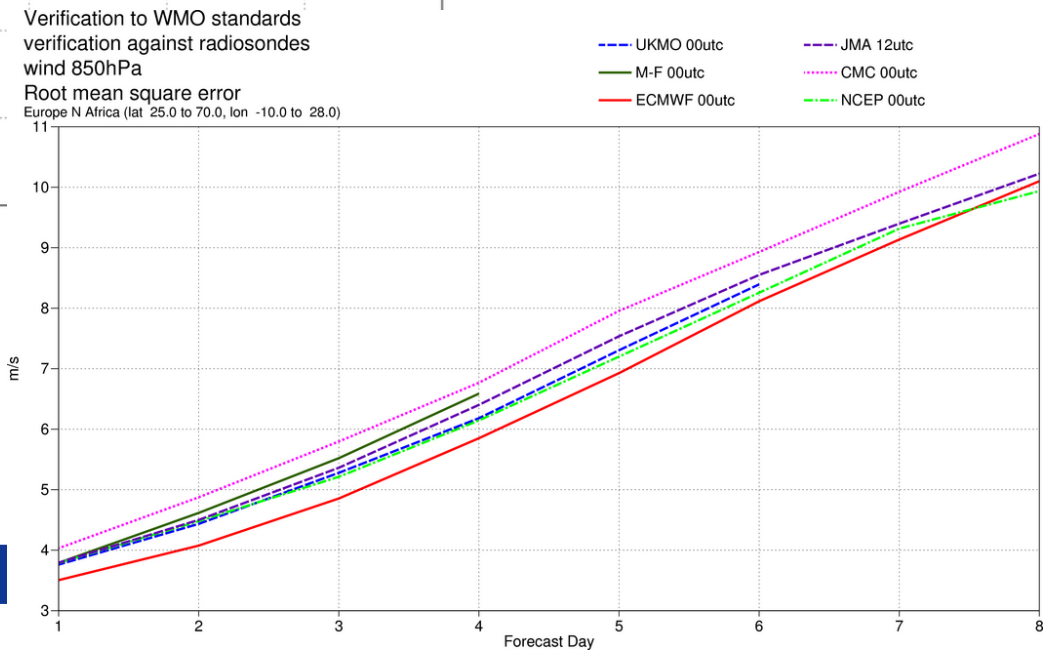


WMO scores Z500 S.Hem

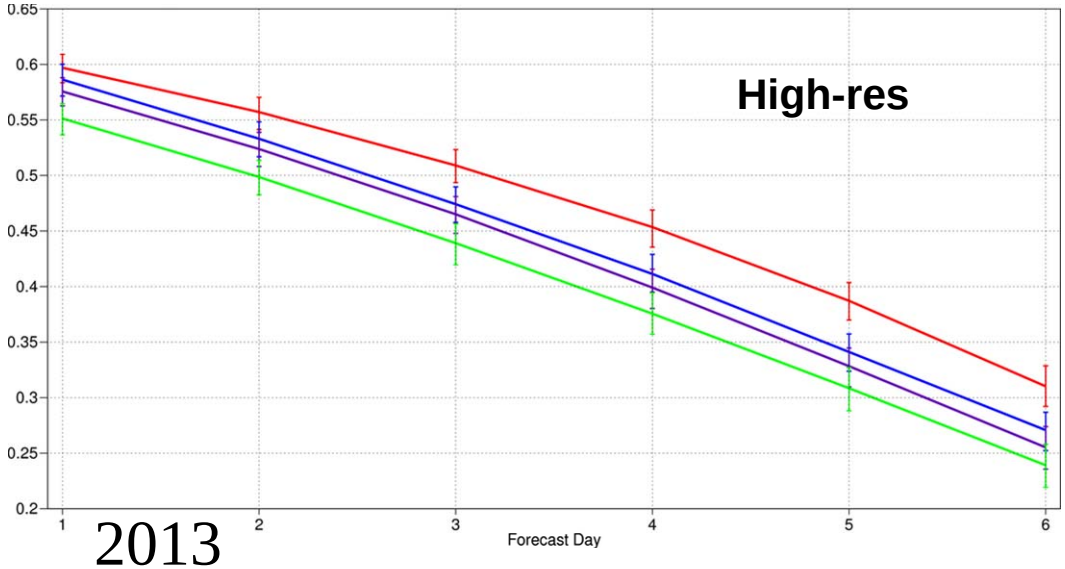


WMO scores using radiosondes
Z500 and wind850 over Europe, 2013

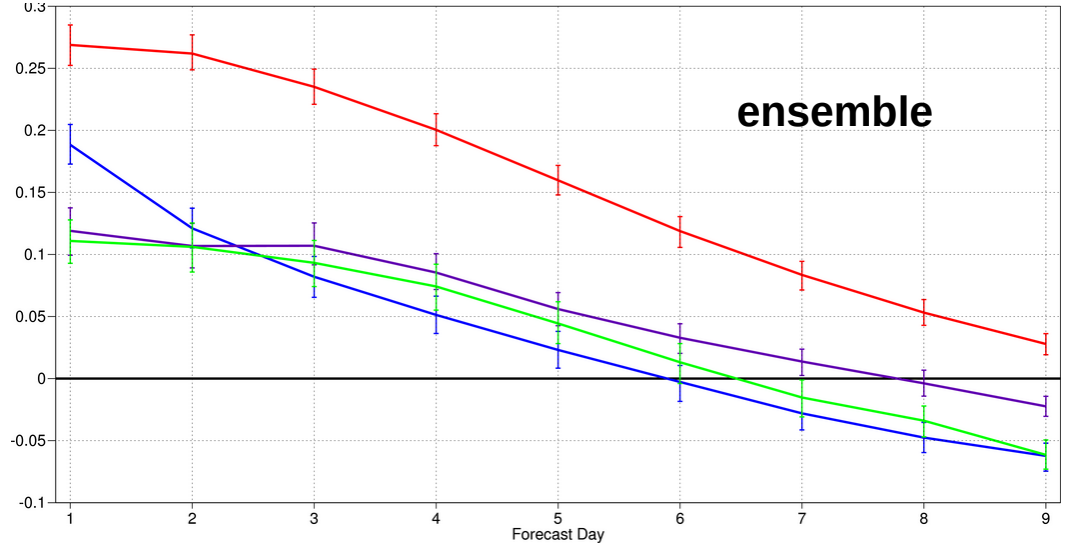


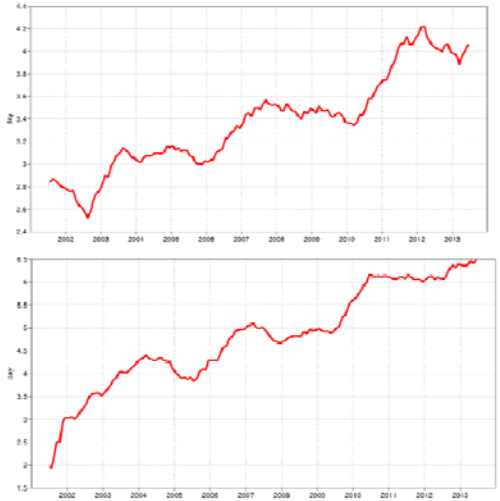


Precipitation skill extra-tropics



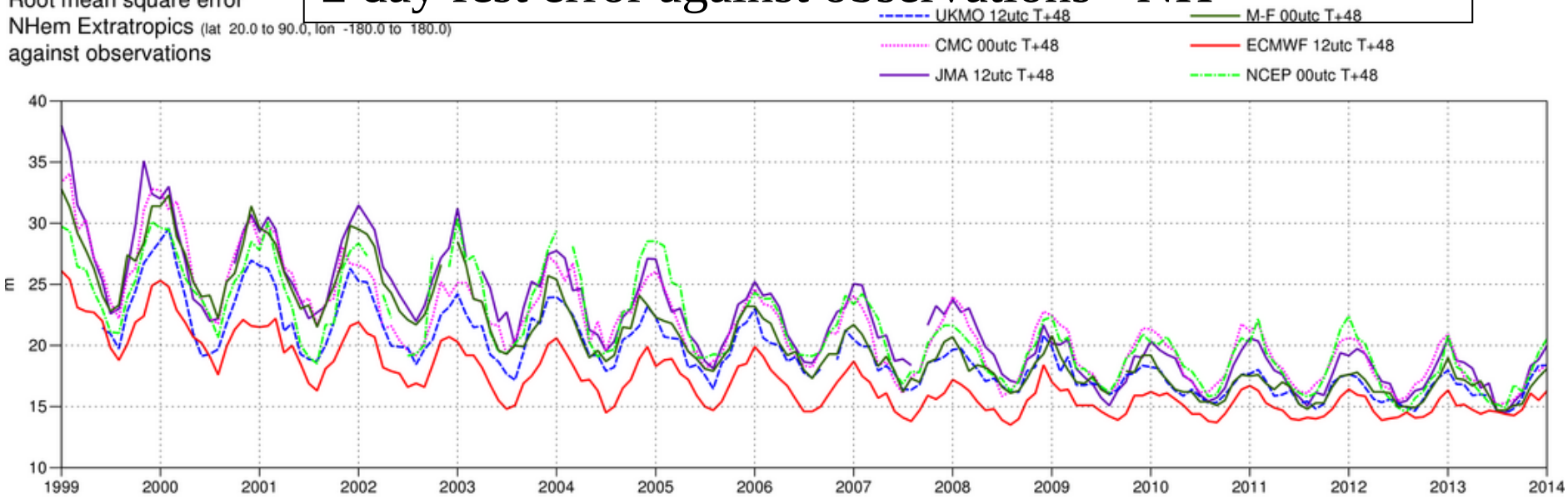
2013



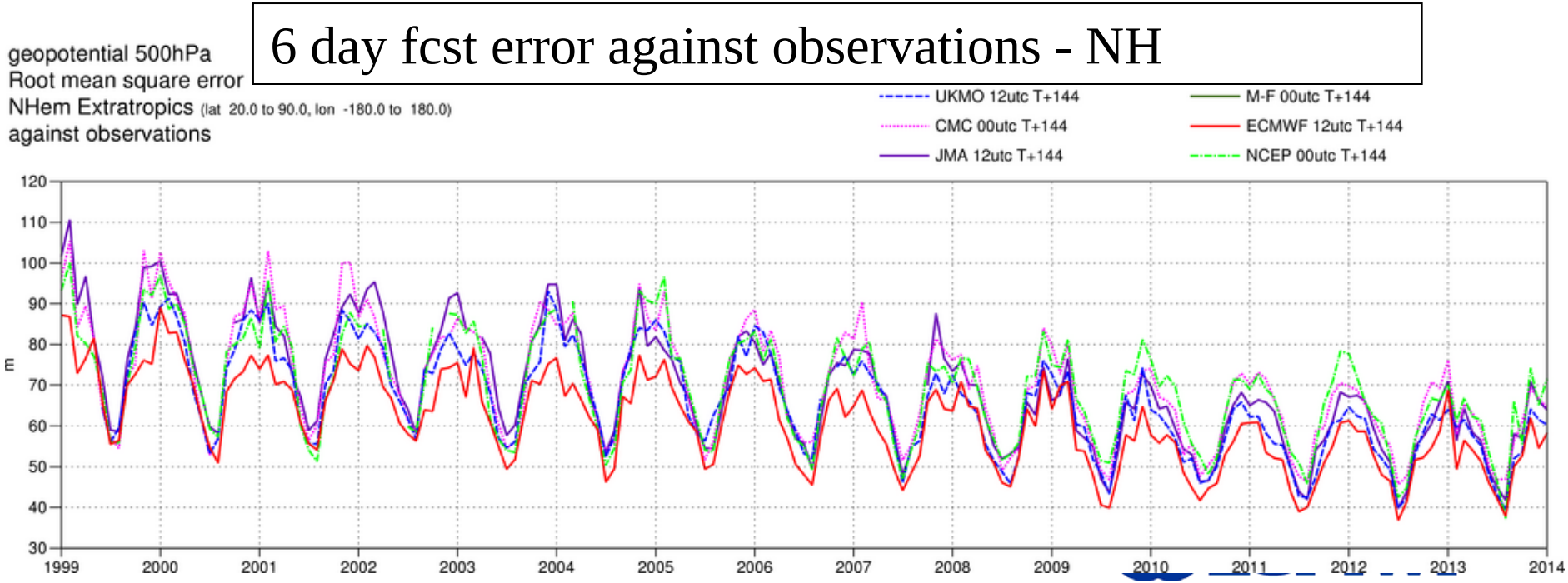


ECMWF (red), Met Office (blue), JMA (magenta), NCEP (green)

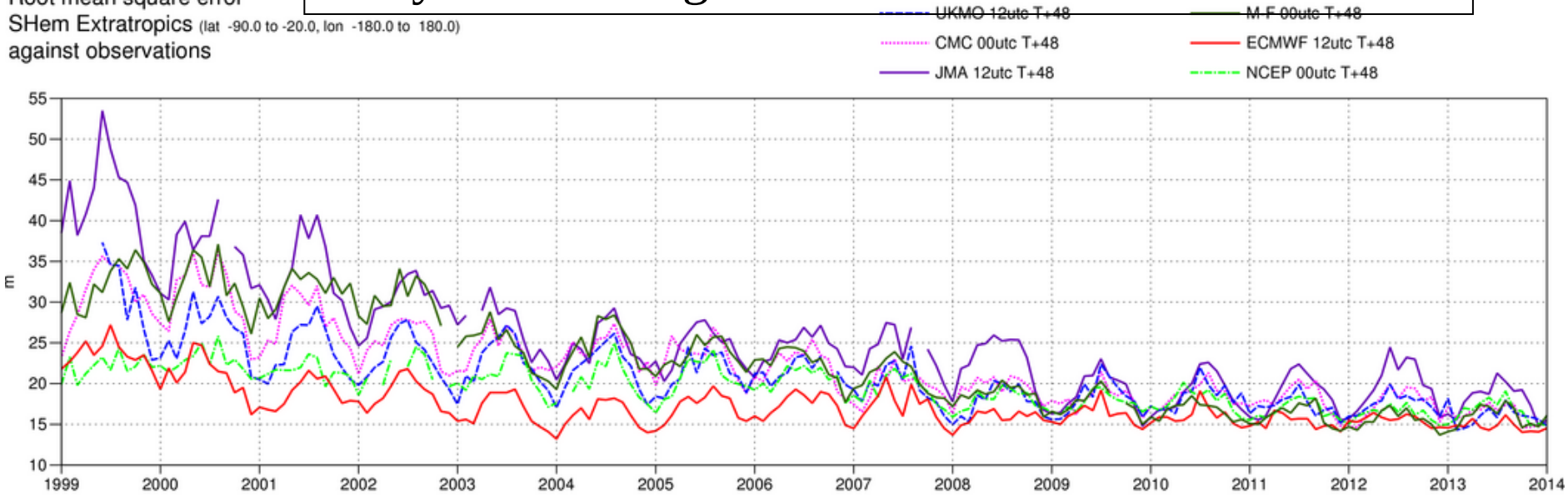
2 day fcst error against observations - NH



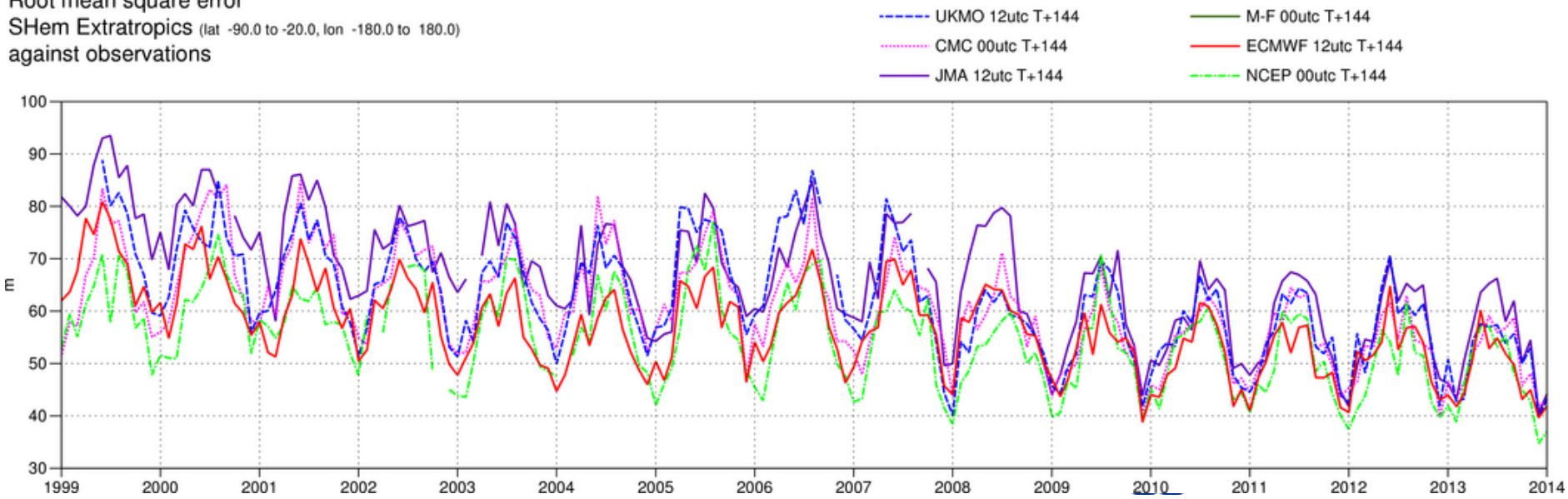
6 day fcst error against observations - NH

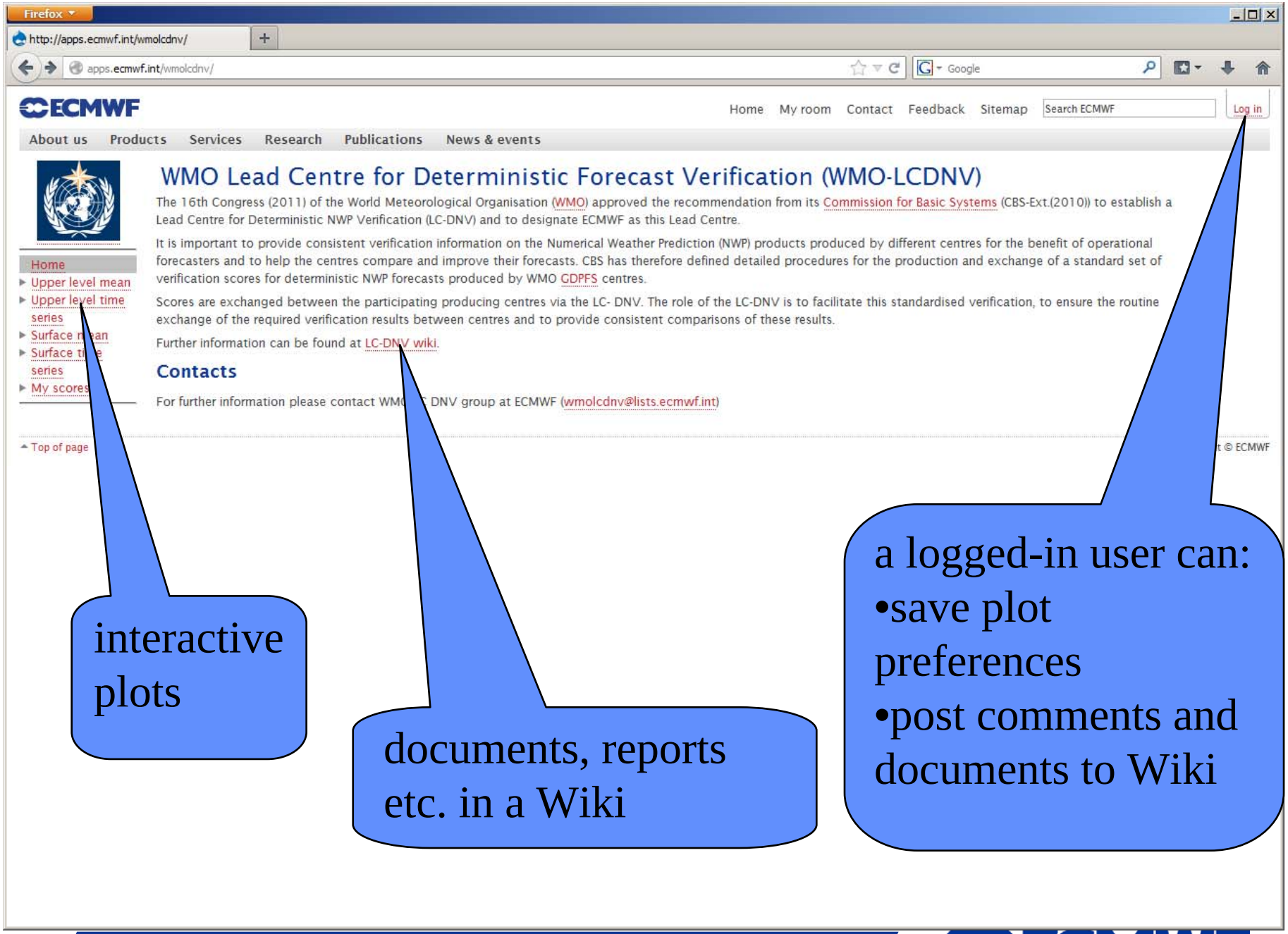


2 day fcst error against observations - SH



6 day fcst error against observations - SH

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WMO Lead Centre for Deterministic Forecast Verification (WMO-LCDNV)
The 16th Congress (2011) of the World Meteorological Organisation (WMO) approved the recommendation from its Commission for Basic Systems (CBS-Ext.(2010)) to establish a Lead Centre for Deterministic NWP Verification (LC-DNV) and to designate ECMWF as this Lead Centre.
It is important to provide consistent verification information on the Numerical Weather Prediction (NWP) products produced by different centres for the benefit of operational forecasters and to help the centres compare and improve their forecasts. CBS has therefore defined detailed procedures for the production and exchange of a standard set of verification scores for deterministic NWP forecasts produced by WMO GDPFS centres.
Scores are exchanged between the participating producing centres via the LC- DNV. The role of the LC-DNV is to facilitate this standardised verification, to ensure the routine exchange of the required verification results between centres and to provide consistent comparisons of these results.
Further information can be found at LC-DNV wiki.
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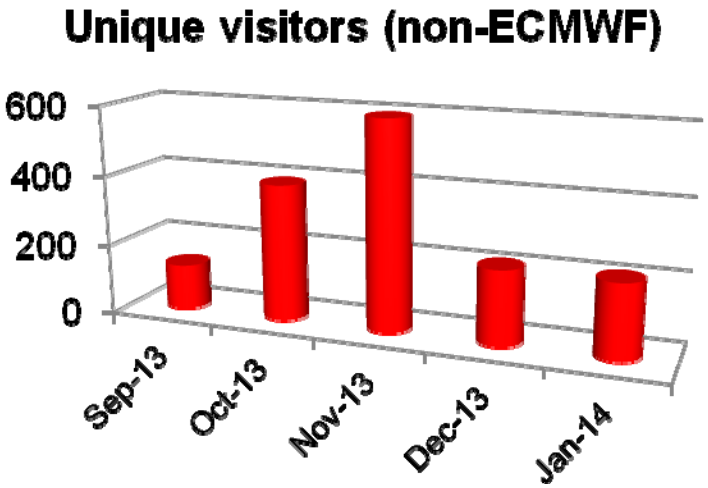
Lead Centre Web site access (Sept 2013 – January 2014)



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  - **MSL pressure**
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  - **T850**

- **Statistics excludes ECMWF**

- **Top referers:**
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  - **5% Google search**

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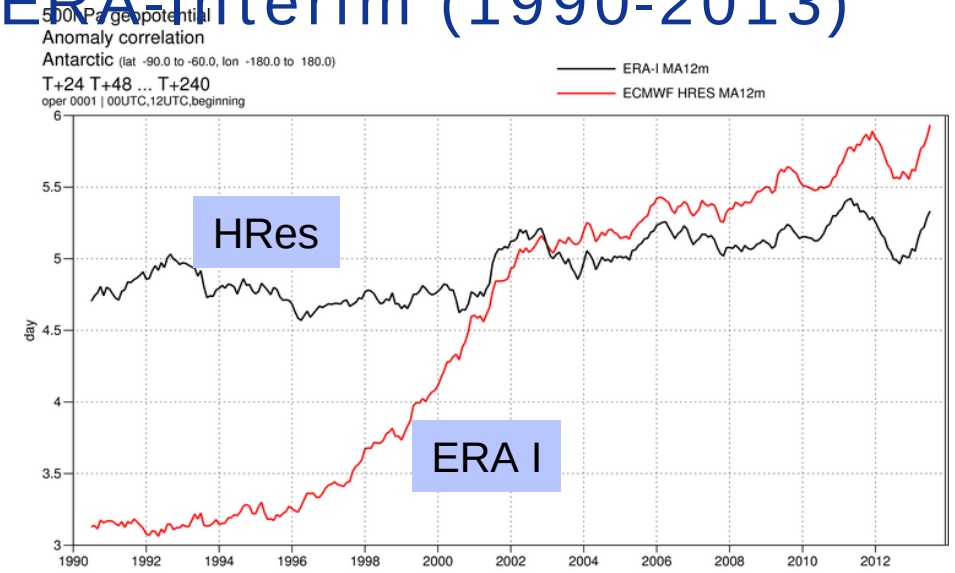
http://apps.ecmwf.int/wmolcdnv/

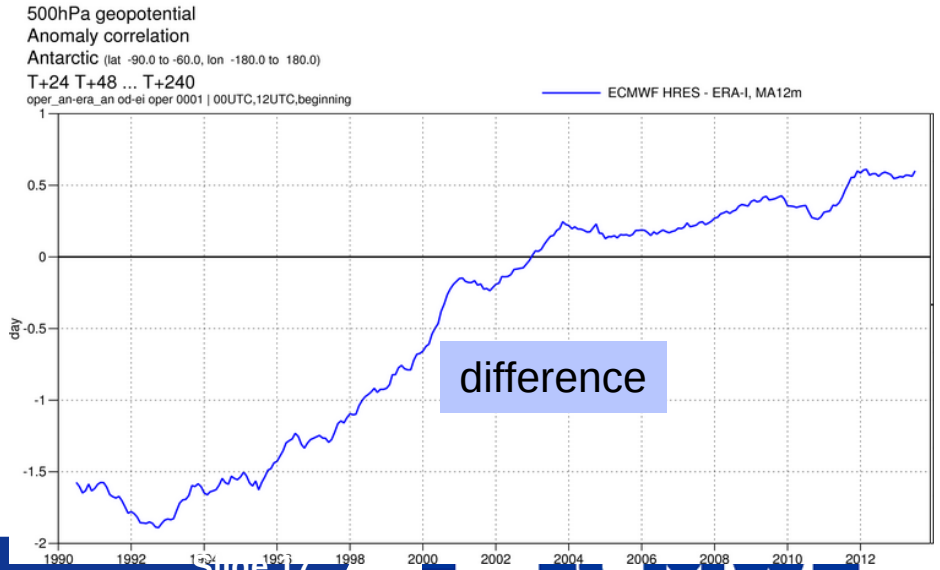
Verification for polar regions (M. Janousek, D. Richardson)

- **Scores computed for polewards of 60°**
- **Verification at ECMWF using available fields from other centres**
- **Done for Z500 and T850**
- **All verification against analysis (each centre against own analysis) or radiosonde observations**
- **ERA-Interim scores shown as reference (ERA is fixed model and assimilation system)**

ECMWF operational and ERA-Interim (1990-2013)

- **Z500 ACC=80%, 12-month moving average**
- **Arctic: clear improvement in system around 2000, and consistently better than ERA beyond 2002. But the apparent change 2001-2002 and 2008-09 are matched in ERA. Drop in skill and predictability in 2012 recovered in 2013.**
- **Antarctic: clear sustained improvement in 1990s; still positive trend**
- **ERA changes: either atmospheric variability or changes to observing system**





Comparison with other centres (2000-2013) Arctic

- **Day 3 forecasts (T+72)**
- **Z500, 12-month moving average**
- **Each centre verified against own analysis**
- **ERA-I shown for reference**
- **JMA score only since 2012 (due to limited availability of fields at ECMWF)**