

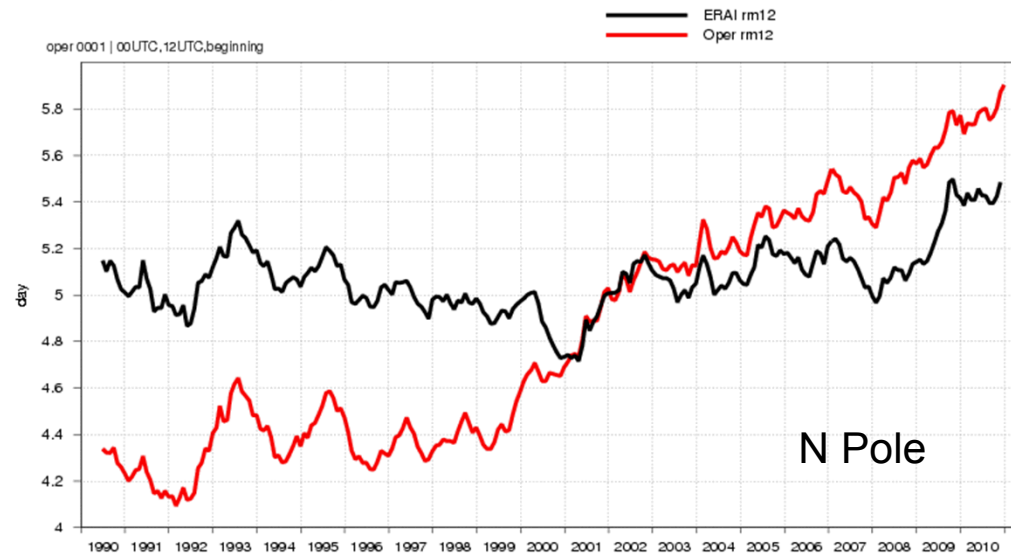
Verification for polar regions

- **Scores computed for polewards of 65°**
 - NB proposed for CBS is polewards of 60°
- **Verification at ECMWF using available fields from other centres**
- **Done for Z500 only**
- **All verification against analysis (each centre against own analysis)**
- **ERA-Interim scores shown as reference (ERA is fixed model and assimilation system)**

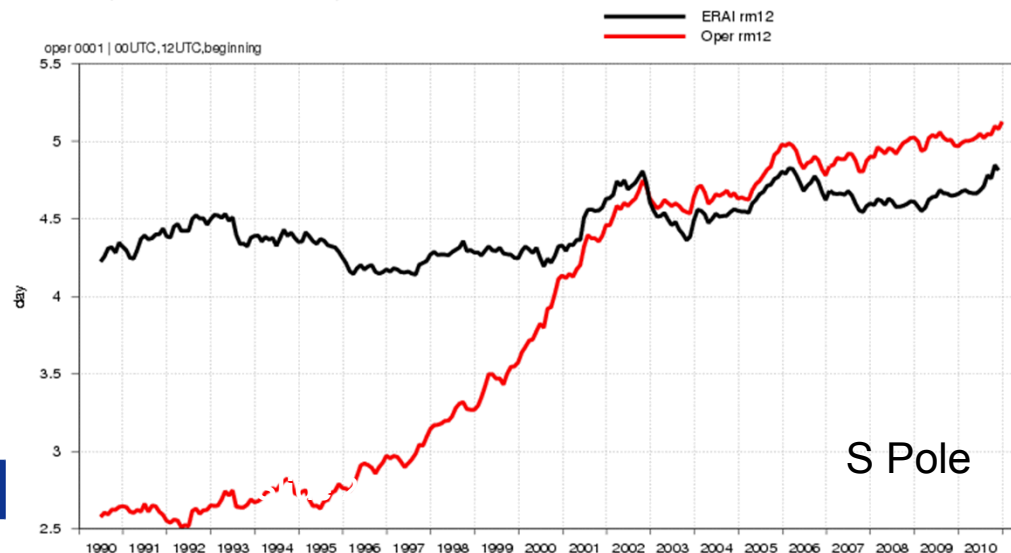
ECMWF operational and ERA-Interim (1990-2011)

- **Z500 ACC=80%, 12-month moving average**
- **N Pole: 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**
- **S Pole: clear sustained improvement in 1990s; still positive trend**
- **ERA changes: either atmospheric variability or changes to observing system**

500hPa geopotential
Correlation coefficient of forecast anomaly
N Pole (lat 65.0 to 90.0, lon -180.0 to 180.0)

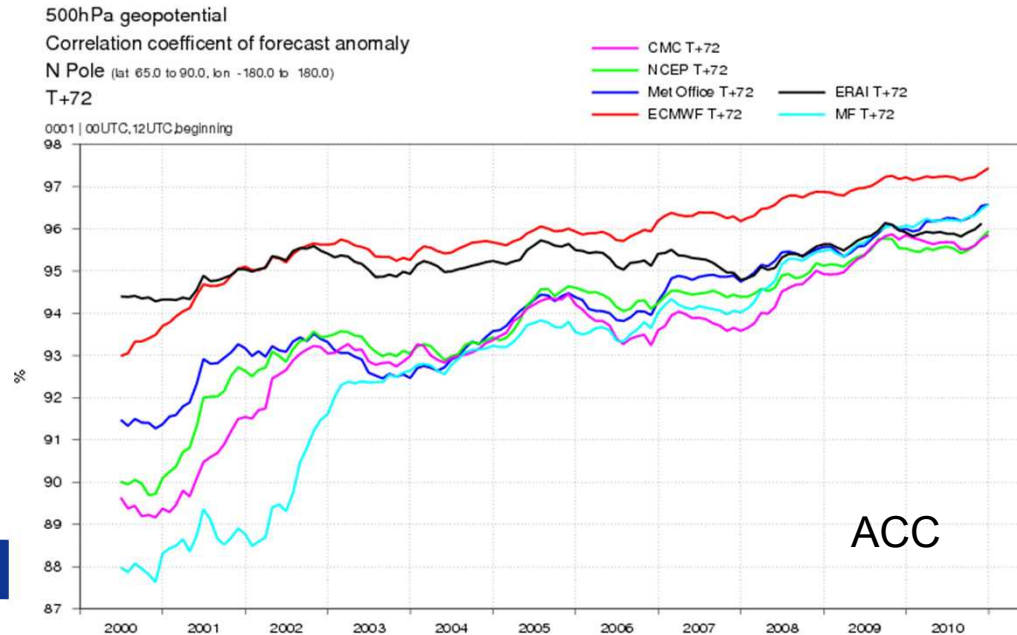
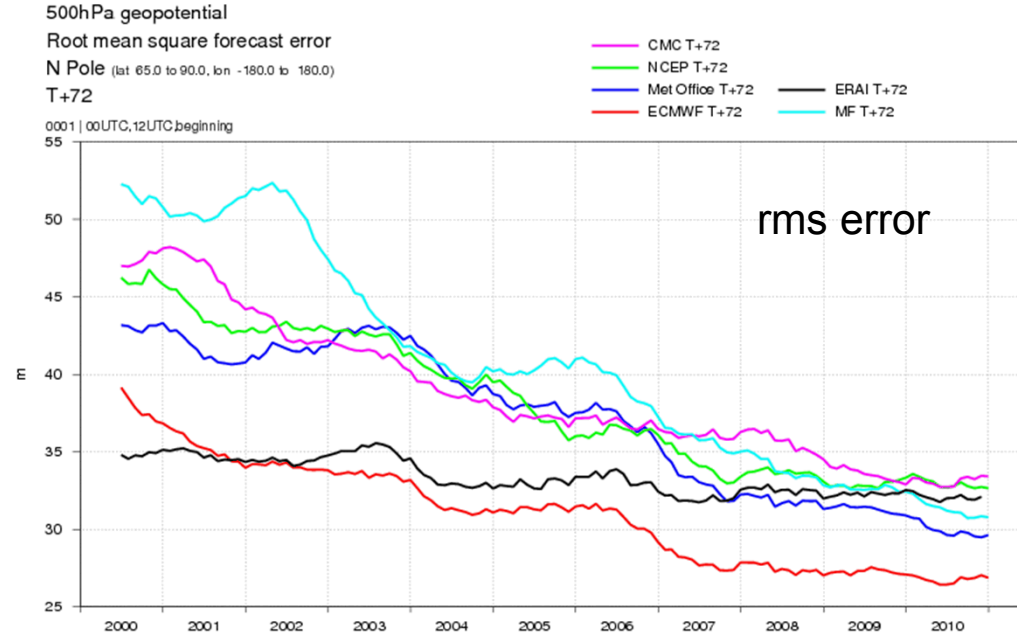


500hPa geopotential
Correlation coefficient of forecast anomaly
S Pole (lat -90.0 to -65.0, lon -180.0 to 180.0)



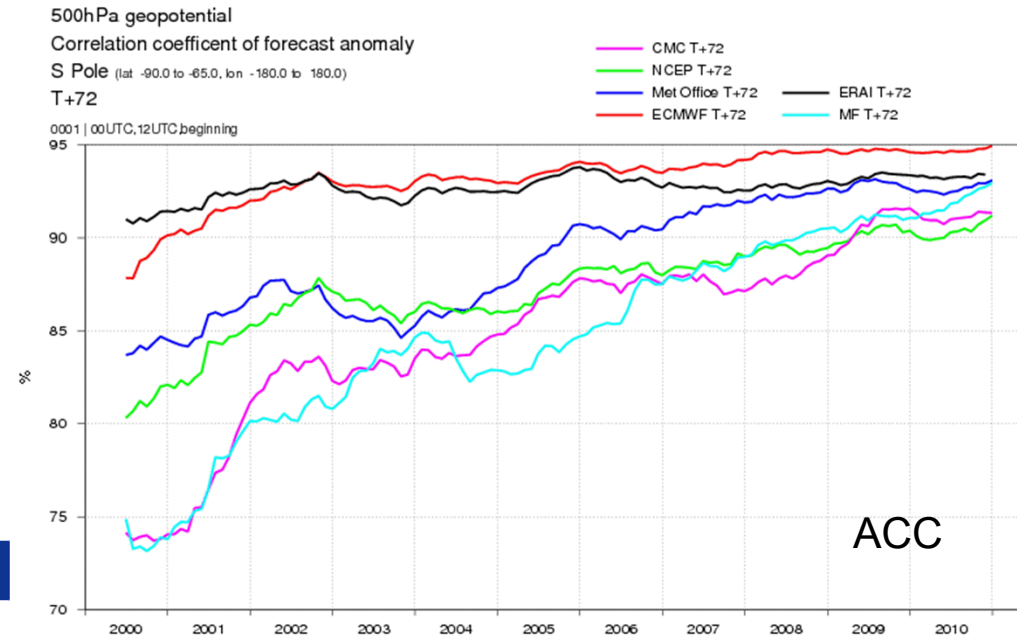
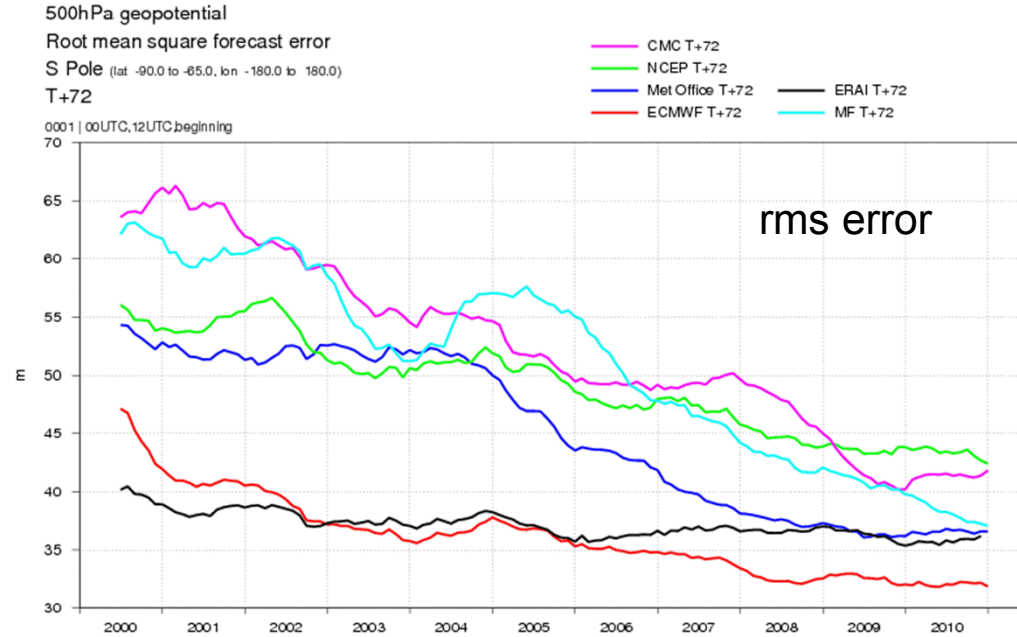
Comparison with other centres (2000-2011) N pole

- Day 3 forecasts (T+72)
- Z500, 12-month moving average
- Each centre verified against own analysis
- ERA-I shown for reference



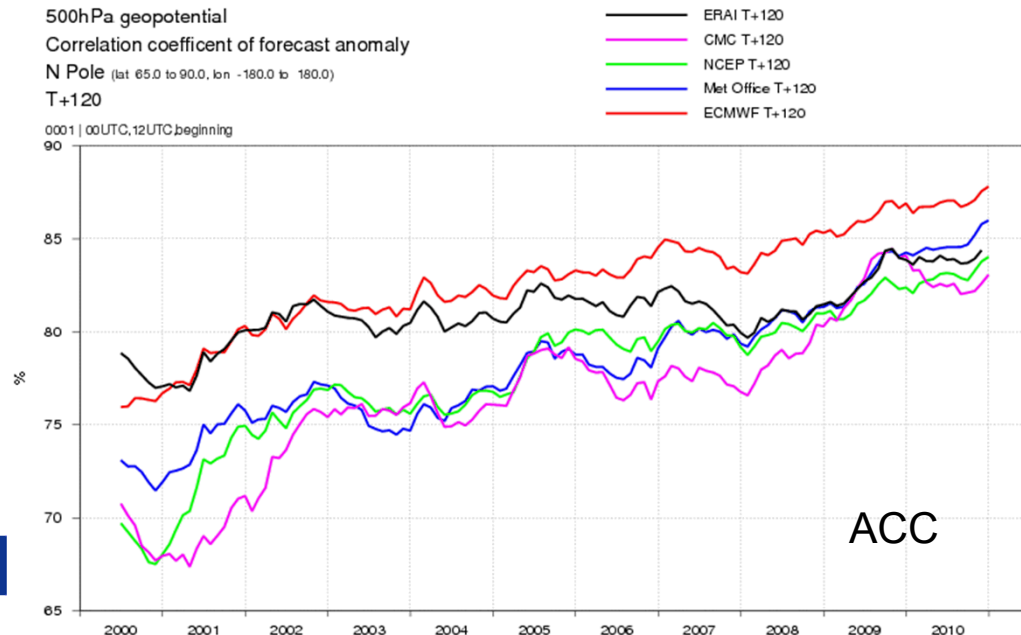
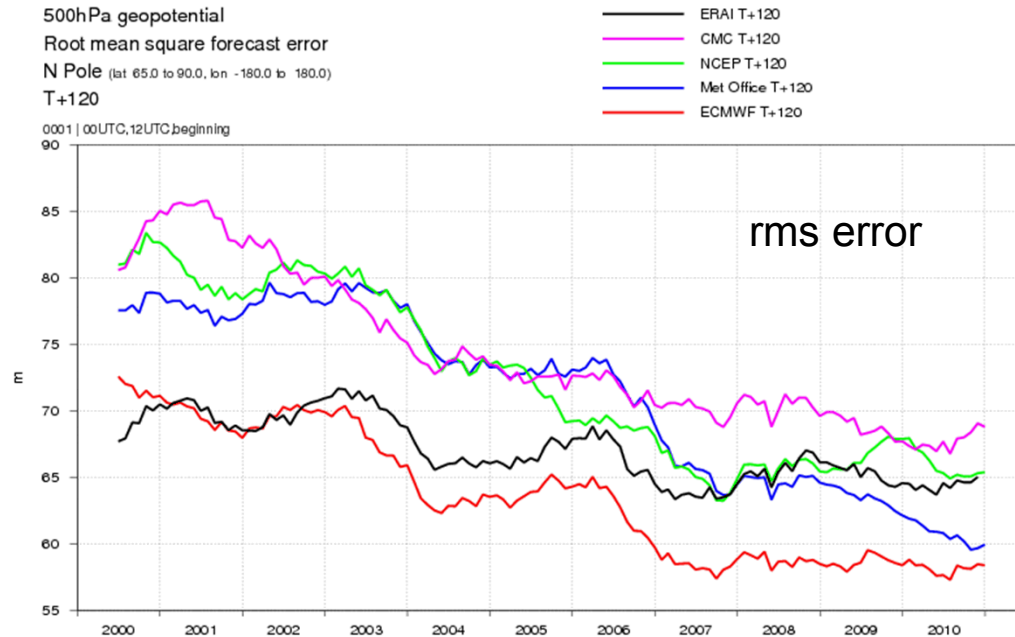
Comparison with other centres (2000-2011) S pole

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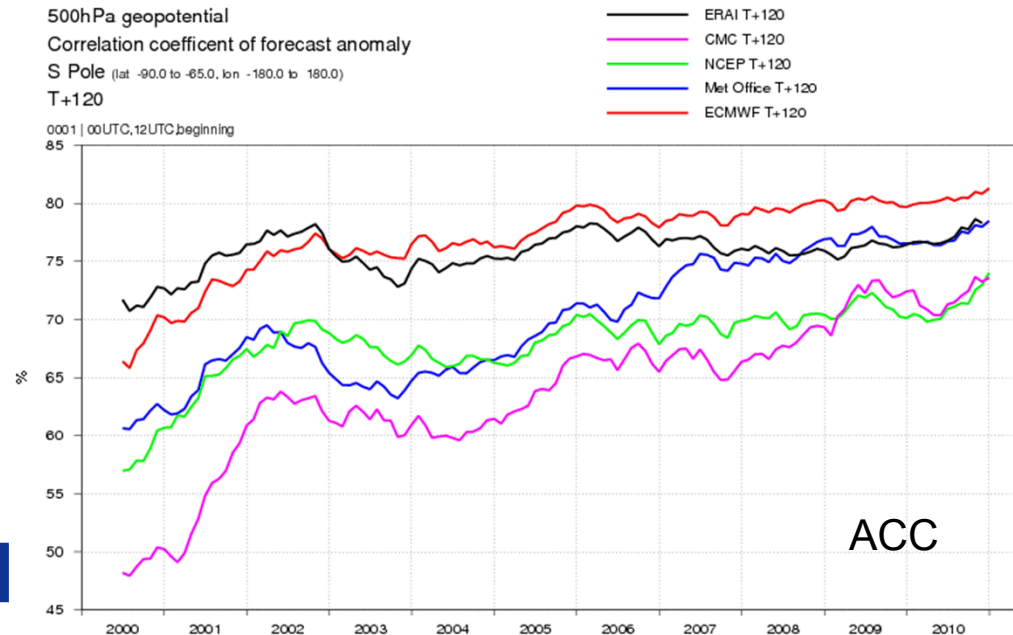
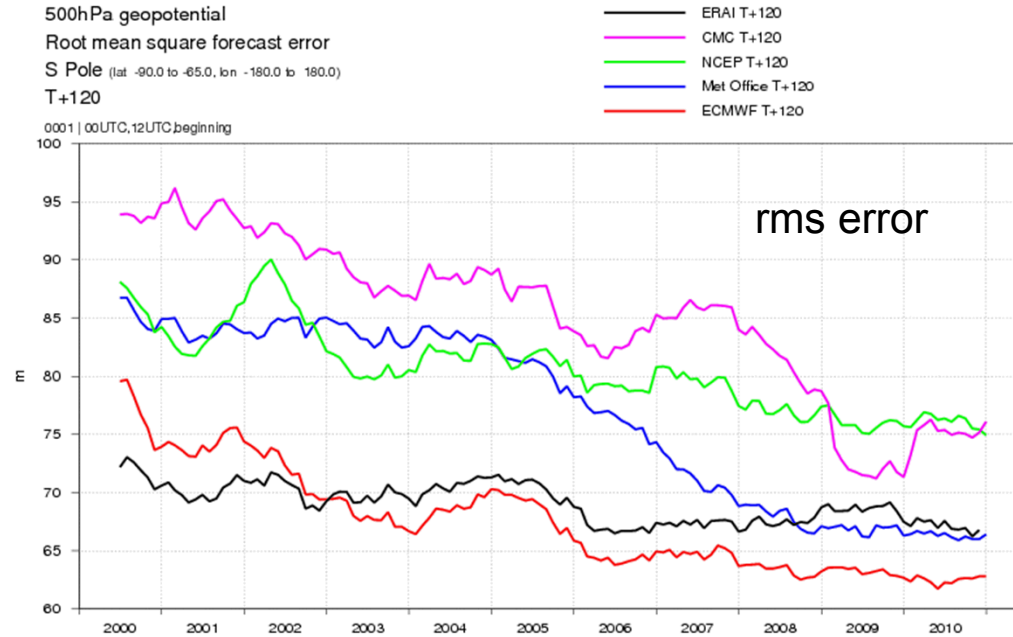
Comparison with other centres (2000-2011) N pole

- Day 5 forecasts (T+120)
- Z500, 12-month moving average
- Each centre verified against own analysis
- ERA-I shown for reference



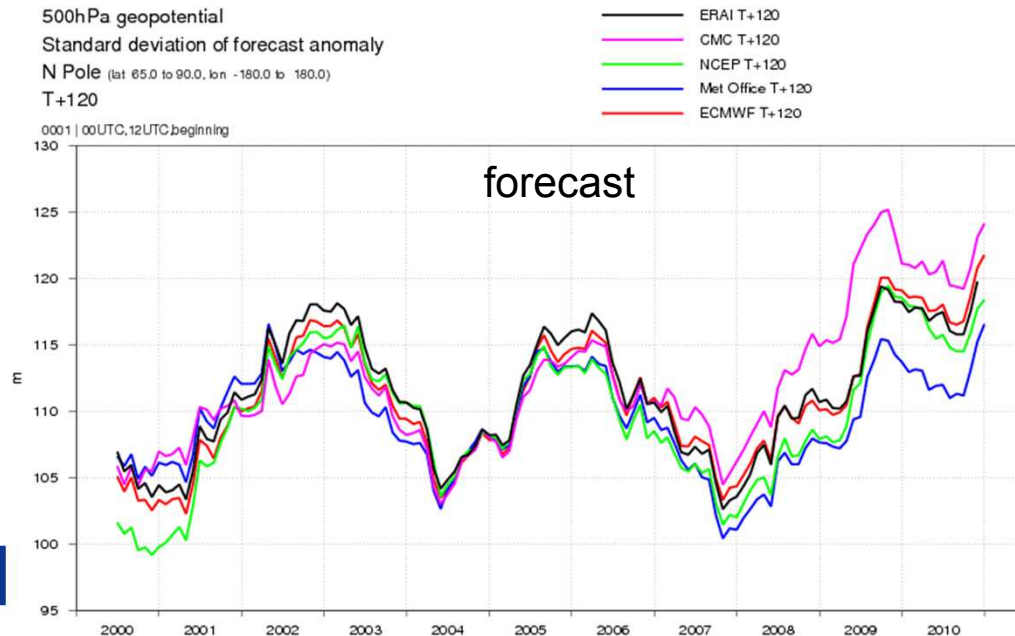
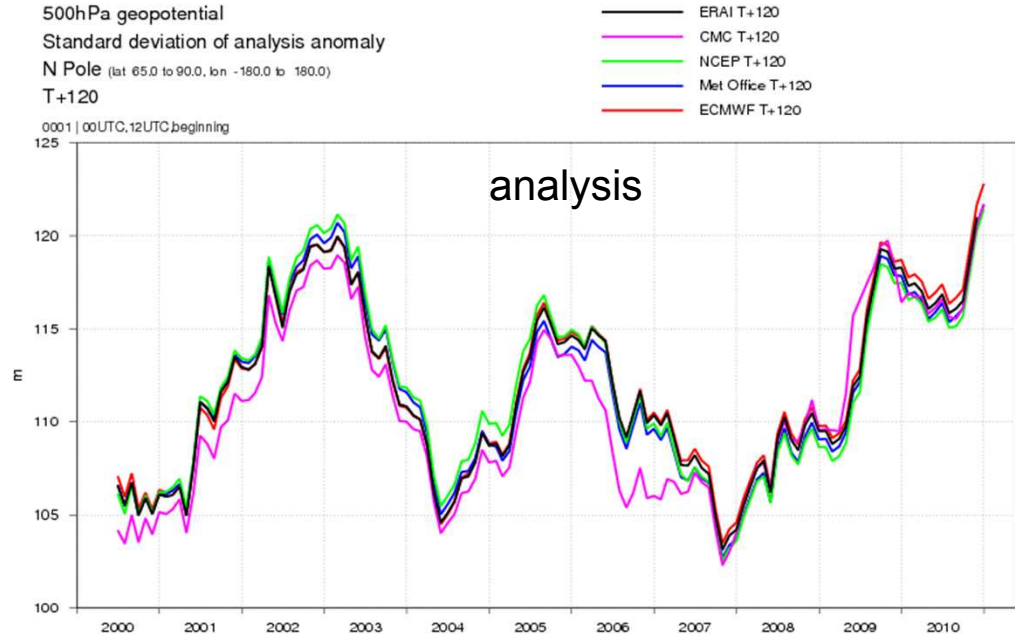
Comparison with other centres (2000-2011) S pole

- Day 5 forecasts (T+120)
- Z500, 12-month moving average
- Each centre verified against own analysis
- ERA-I shown for reference
- NB some dates missing for CMC in 2009 – affects these scores for 2009 (other years OK)



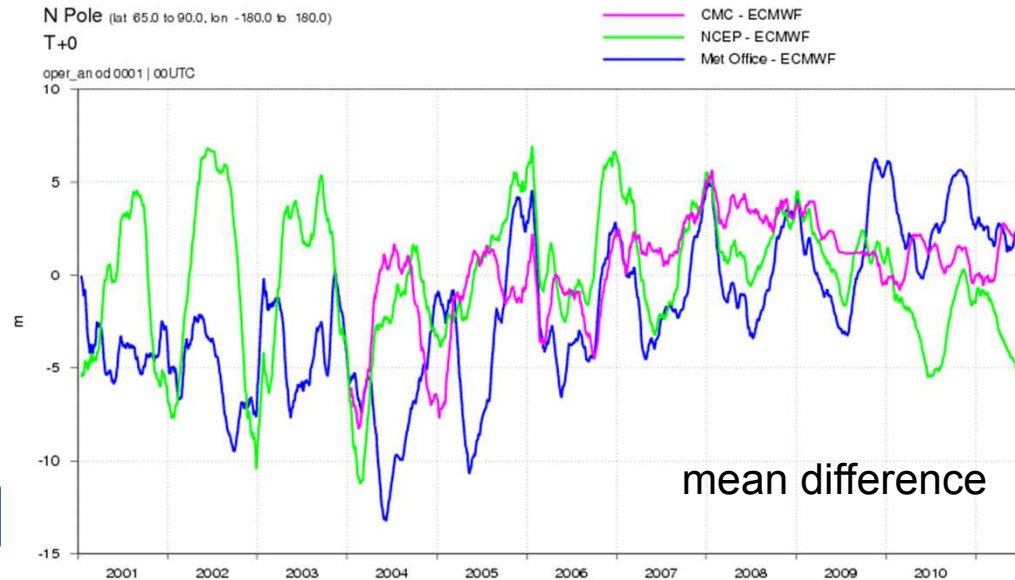
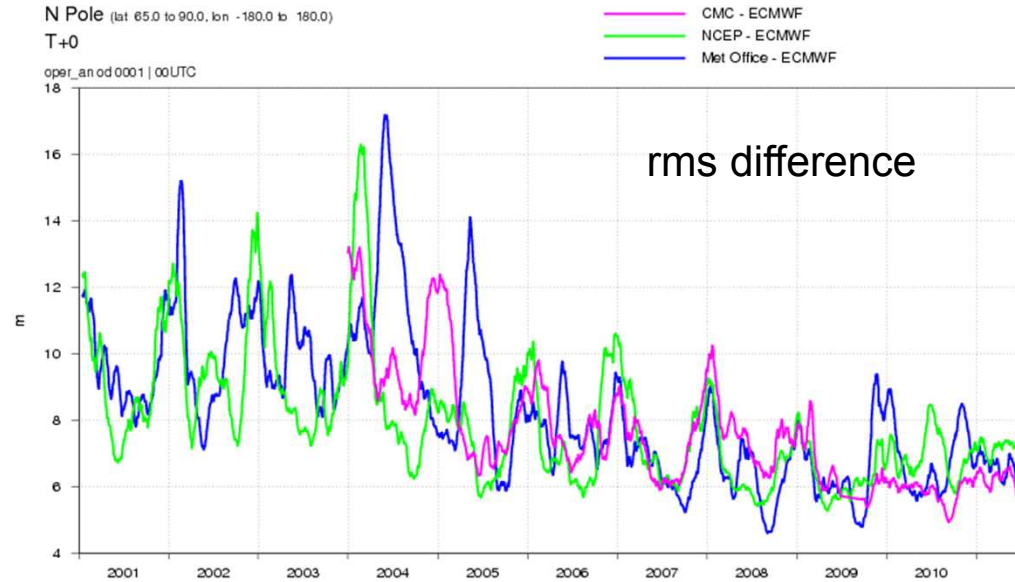
Comparison with other centres (2000-2011) N pole

- **Variability (activity) of forecast and analysis fields: standard deviation of anomalies**
- **Day 5 forecasts (T+120)**
- **Z500, 12-month moving average**
- **ERA-I shown for reference**
- **Compared to the analysis, Met Office forecast now rather underactive; CMC overactive (this can affect the rms errors)**
- **NB some dates missing for CMC in 2009 – affects these scores for 2009 (other years**



Comparison between analyses (N Pole)

- Differences between the analyses of different centres
- Z500 30 day moving average
- Decrease over last decade in the difference between the analyses of different centres



Comparison between analyses (S Pole)

- Differences between the analyses of different centres
- Z500 30 day moving average
- Decrease over last decade in the difference between the analyses of different centres

