

Zentralanstalt für Meteorologie und Geodynamik



Use of ECMWF products at the Austrian Meteorological Service

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Overview

- **Introduction**
- **ECMWF products used in the warning unit**
- **Medium range forecast products**
- **Seasonal forecast products**
- **Verification**
- **Conclusions**



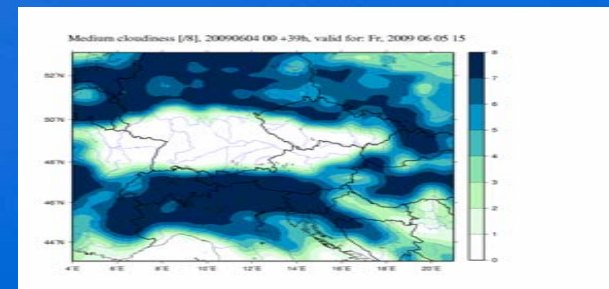
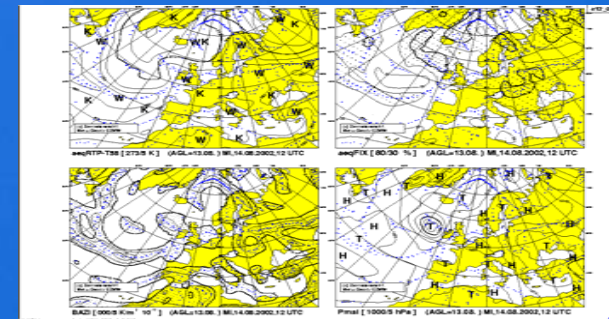
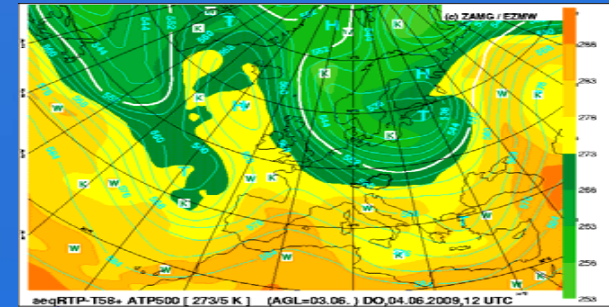
Operational Models

1) Global Models:

- ECMWF (10/15 days): 2 times a day
- UK Met Office (5 days): 2 times a day
- GME (7 days): 2 times a day
- NCEP (16 days): 4 times a day

2) Limited Area Models:

- Aladin (3 days): 4 times a day
- UK Met Office (2 days): 4 times a day
- LM (3 days): 2 times a day



Time Scale

- **short range forecasts: up to D+2**
- **medium range forecasts: D+3 to D+15**
- **monthly/seasonal forecasts**



End Products

- up to D+5: forecasts for political districts/federal countries
- D+6 and D+7: forecasts for the whole state
- D+8 to D+15: only tendency



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ECMWF products for the warning unit

Forecast Product Users Meeting, 10-12 June 2009

wind speed, heavy rain or snow, glaze, thunderstorms

Forecast departments

regional



INCA

(local features)

thunderstorms & hailstorms

ANT

Automatic Nowcasting Tool

Analysis

Extrapolation

www, SMS, email, FAX, telephone



ECMWF products for the warning unit

- **Severe weather warnings for the next 48 hrs mostly based on Aladin/PEPS and/or T799**

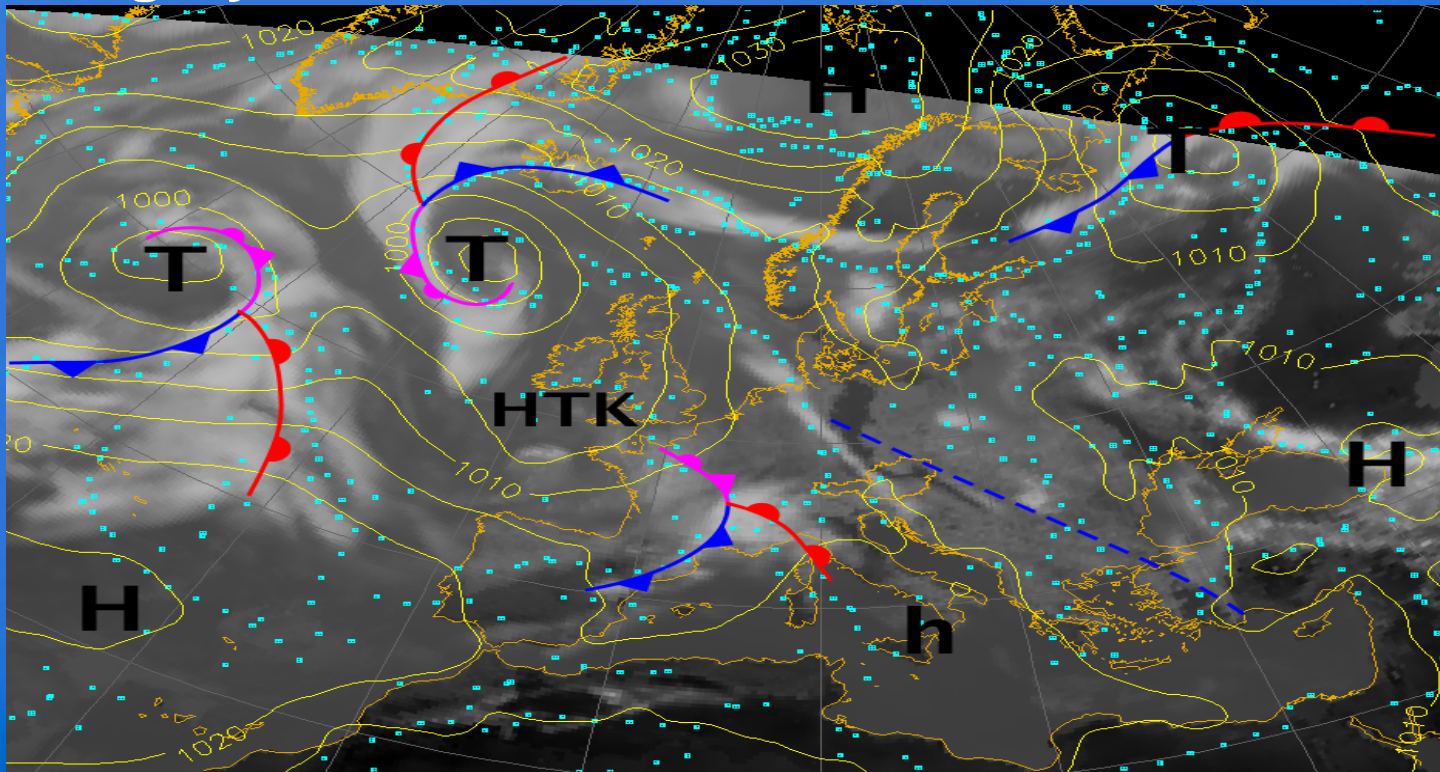
- **Severe weather warnings for D+3 and D+4 mainly based on ECMWF:**
 - * **T799**
 - * **EPSgrams (T399)**
 - * **EFI**



- **Often forecasted with LAM, partly with ECMWF or NCEP**
- **AROME (2,5km horizontal resolution, non hydrostatic) in pre-operational phase**



Popular product for the media: surface fronts superimposed with the simulated satellite imagery from ECMWF



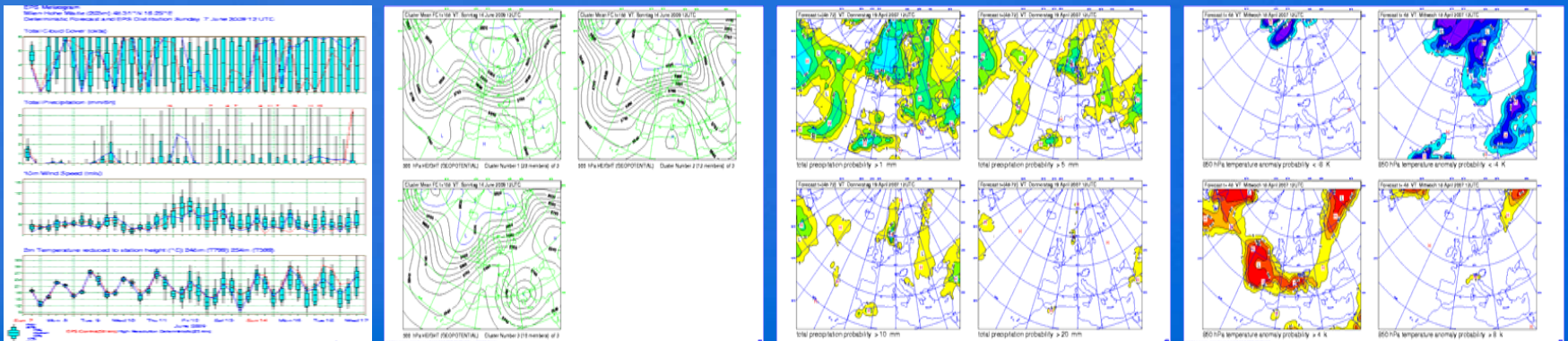
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Medium range forecasts

- Till D+4/D+5: mostly deterministic (ECMWF, NCEP, GME, UK Met Office)
- Afterwards more and more probabilistic information (EPSgrams, plumes, clusters, stamp maps, spaghetti diagrams, probabilities for e.g. certain rain amounts, poor man's ensemble, etc.)



End Products

Forecasting details related how certain the forecast is

- **Certain situation** \Rightarrow **more details (in time and space)**
- **Uncertain situation** \Rightarrow **less details (in time and space)**

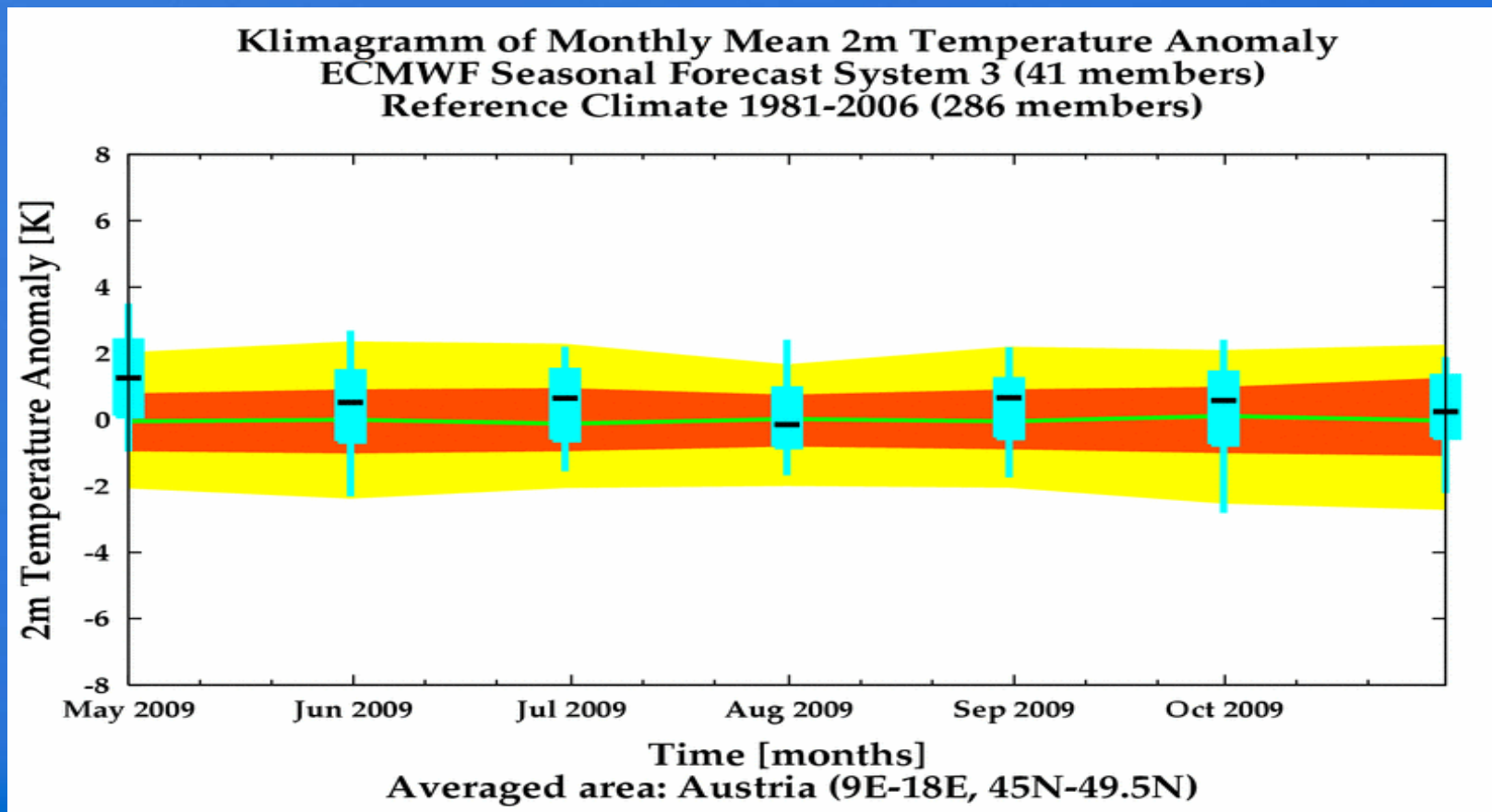


Overview

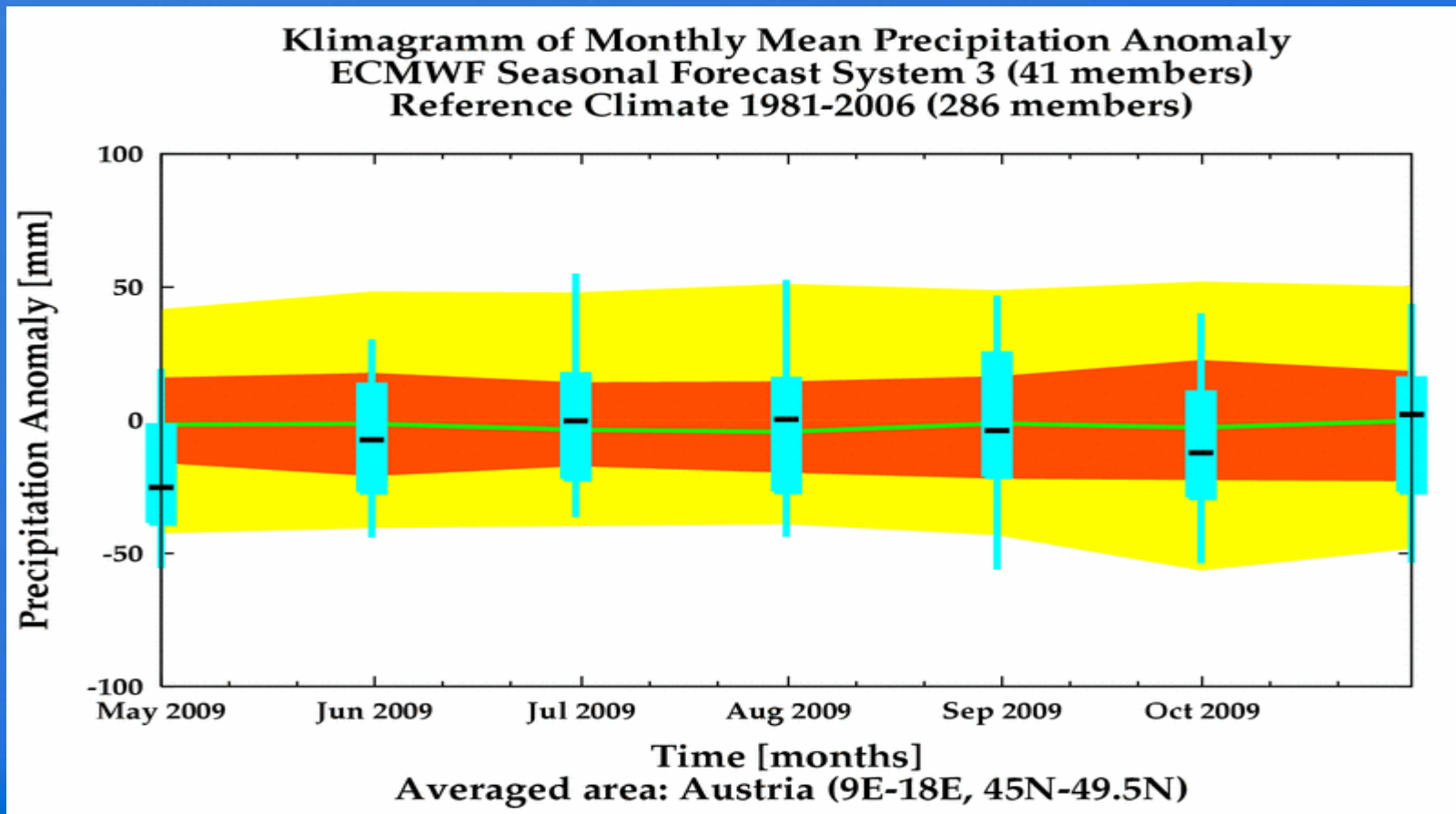
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Monthly mean 2m temperature anomaly over Austria



Monthly mean precipitation anomaly over Austria



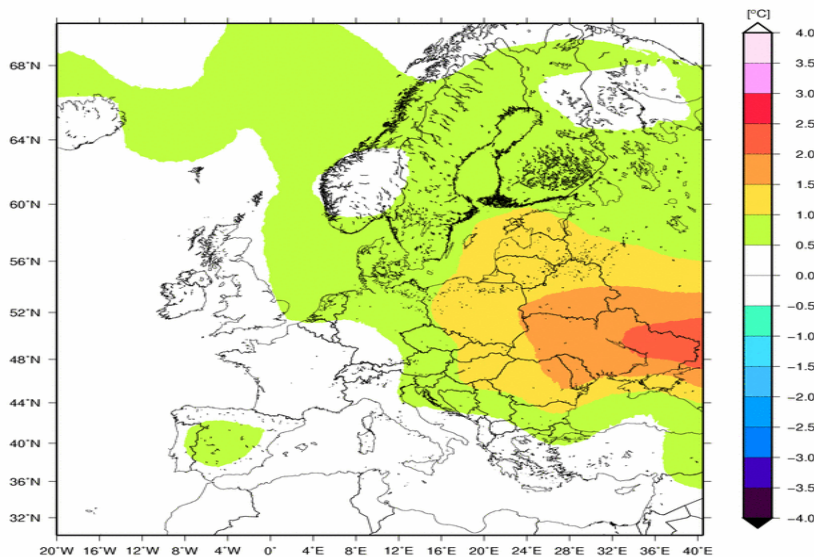
Monthly/Seasonal forecasts

Forecast Product Users Meeting, 10-12 June 2009

2m temperature anomaly and probabilities over Europe

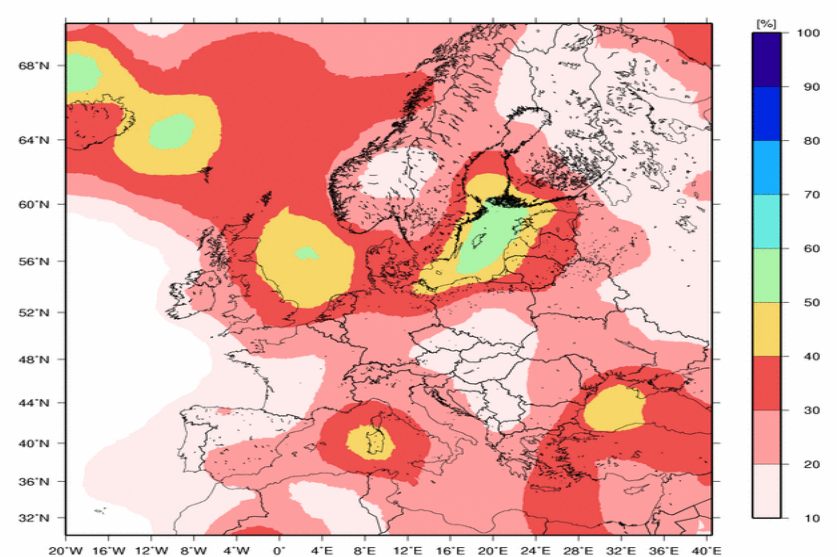
2m Temperature Anomaly [°C], Ensemble–Mean

Ini: May 2009; valid for: June 2009



2m Temperature Anomaly: Probability for: $0.5^{\circ}\text{C} < T2M_{\text{anomaly}} \leq 1.5^{\circ}\text{C}$

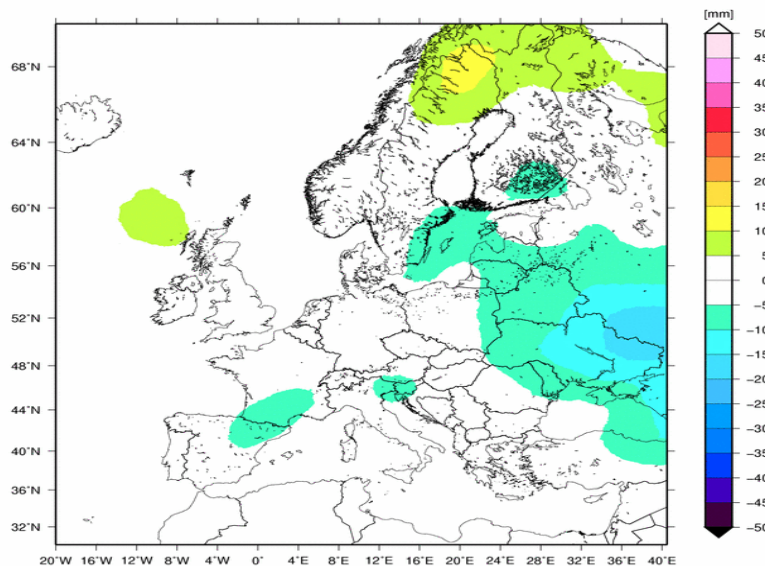
Ini: May 2009; valid for: June 2009



Precipitation anomaly and probabilities over Europe

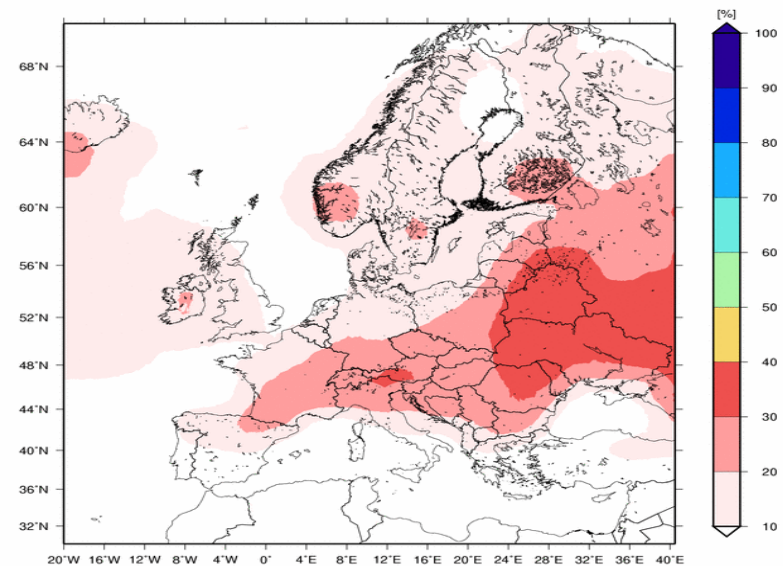
Precipitation Anomaly [mm], Ensemble–Mean

Ini: May 2009; valid for: June 2009



Precipitation Anomaly: Probability for: $-75\text{mm} < \text{RR}_{\text{anomaly}} \leq -25\text{mm}$

Ini: May 2009; valid for: June 2009



Important information for:

- **Energy suppliers**
- **Energy traders**
- **Industry (production planning and scheduling)**



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Aladin – ECMWF – MOS - Forecaster

- **Weekly verifications**
- **Monthly verifications**
- **Yearly verifications**

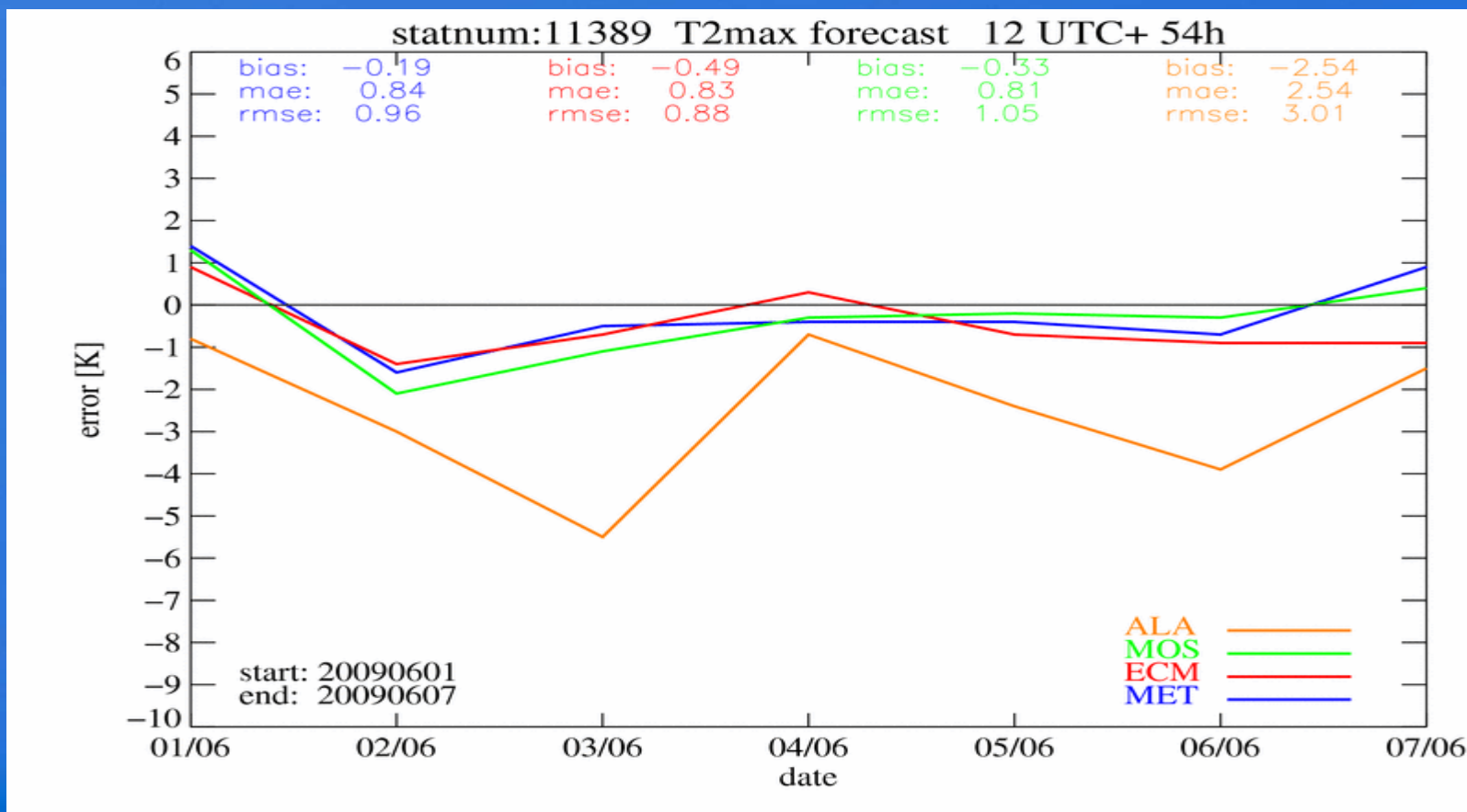


Verification

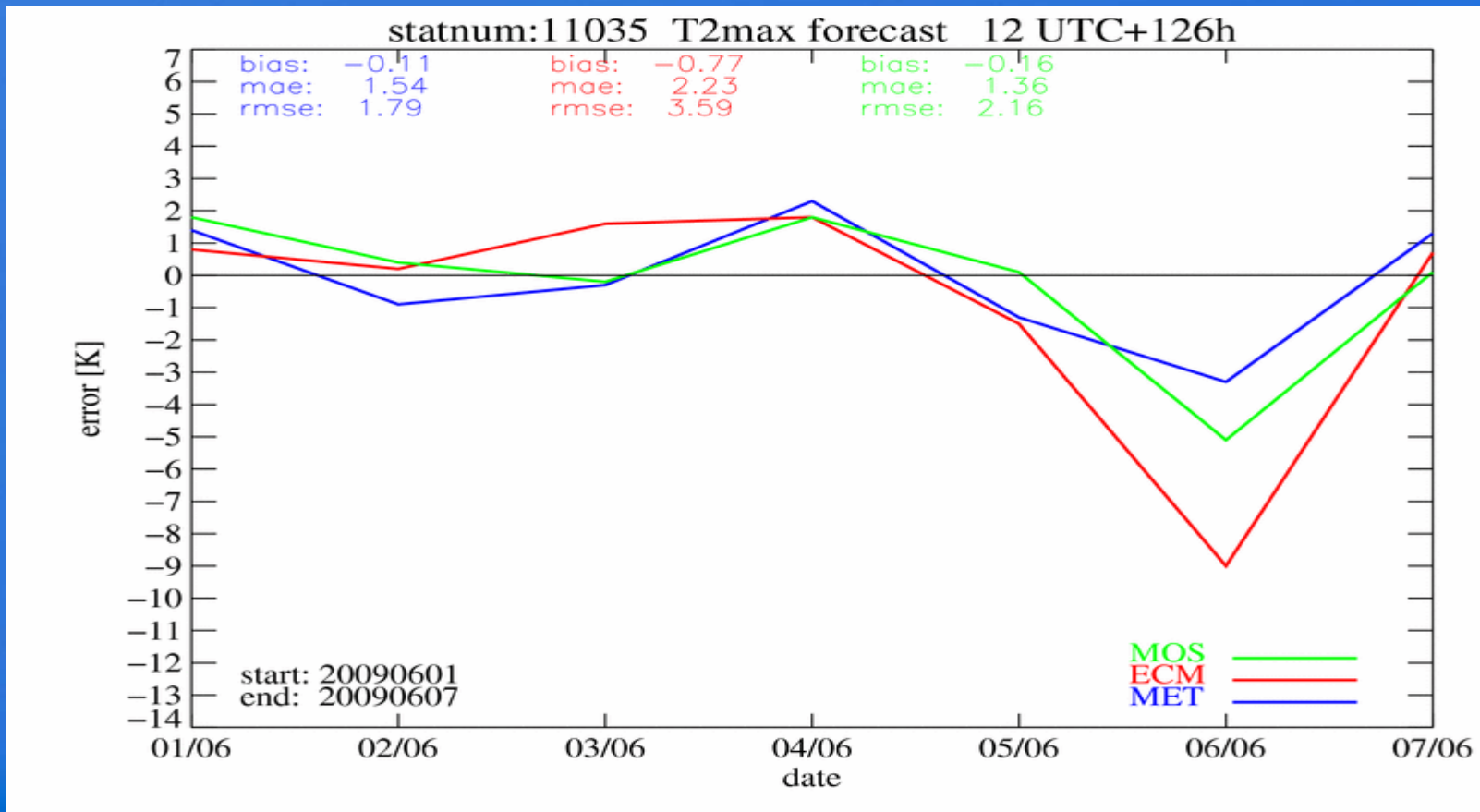
Forecast Product Users
Meeting, 10-12 June 2009



Weekly verification of 2m temperature of St.Pölten



Weekly verification of 2m temperature of Vienna

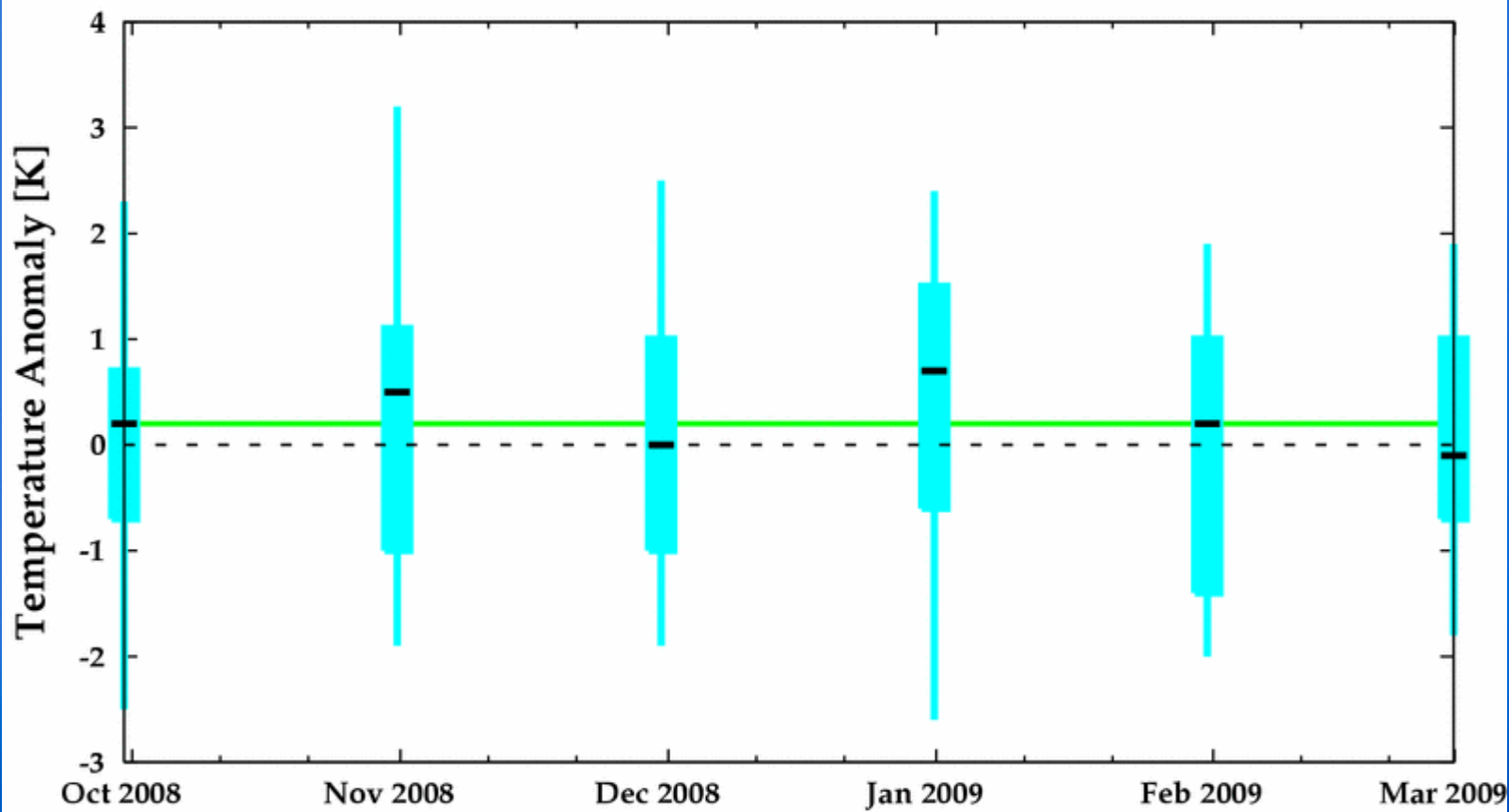


- **On the average quite stable and satisfying behaviour of ECMWF**
- **But: sometimes serious problems in forecasting the temperature (especially during winter time, if model is expecting snow coverage and clear sky conditions, but in reality no snow on the ground)**



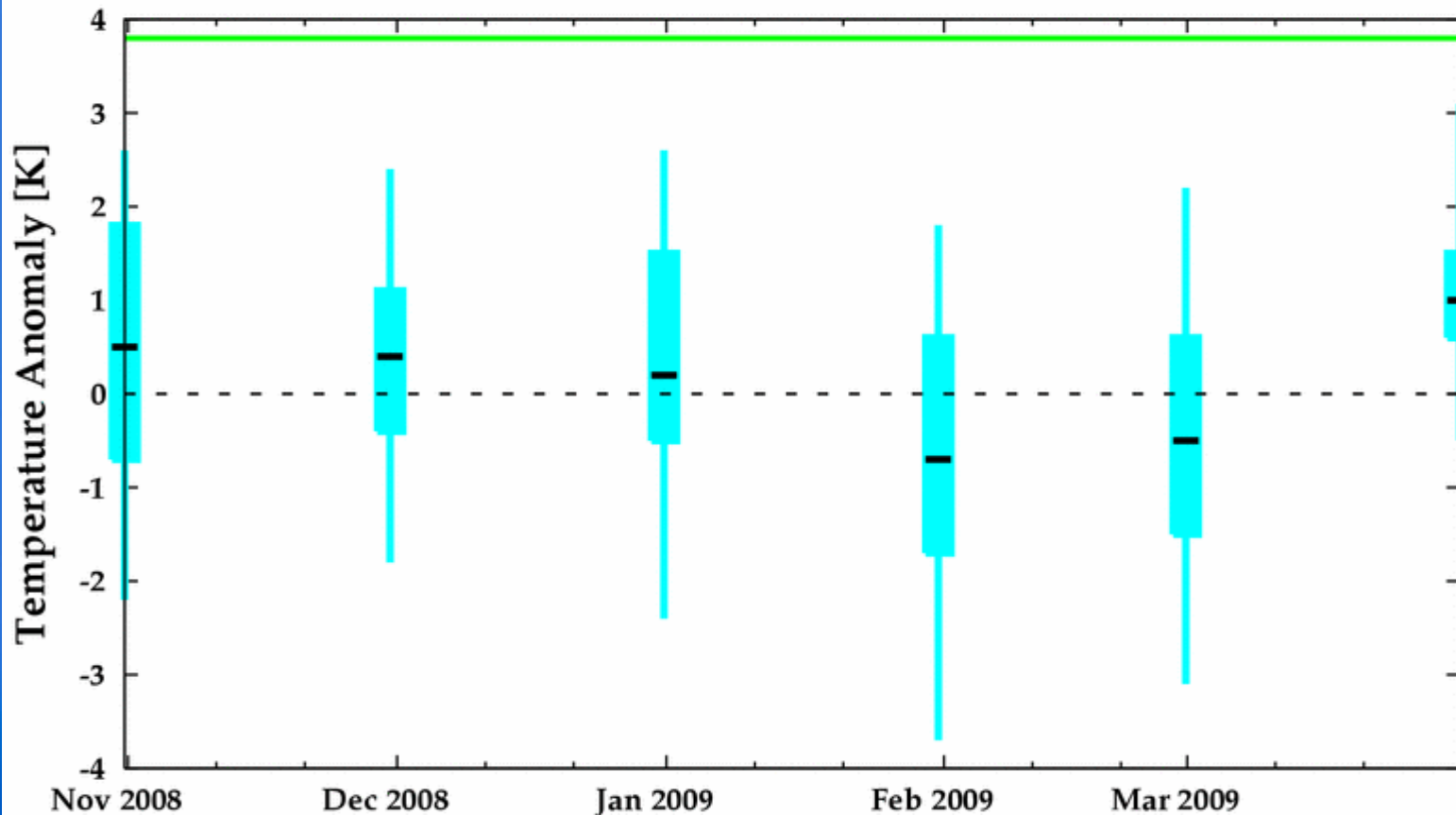
Seasonal Forecasts

Verification for 03/2009: Monthly Mean Temperature Anomalies Station 11035



Seasonal Forecasts

Verification for 04/2009: Monthly Mean Temperature Anomalies Station 11035



Seasonal Forecasts

- **Strong anomalies in reality (especially: T) can only be resolved rarely**
- **Negative anomalies in temperature are rarely forecasted**



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Suggestions – from the forecasters point of view

- **new clustering algorithm:**
 - * **too many cases with one cluster only**
 - * **sometimes different clusters do not differ very much over Central Europe**
- **EPS very strongly connected with deterministic run (EPS supports ‘jumpiness’ of T799, e.g. EPS 00 UTC and EPS 12UTC differ very much)**



- **EPSgrams: instead of total cloud coverage distinction between low – medium – high level clouds would be helpful**
- **Earlier dissemination of deterministic model (especially during summer time) and probabilistic information (always) highly appreciated**



Thank You very much for Your attention!

Any questions?

