Tests of CANARI/Surface in ALADIN/CE

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Outline of the talk

- Setting of ALADIN/CE

- Implementation of CANARI surface analysis

- Impact studies
  - Test ADX
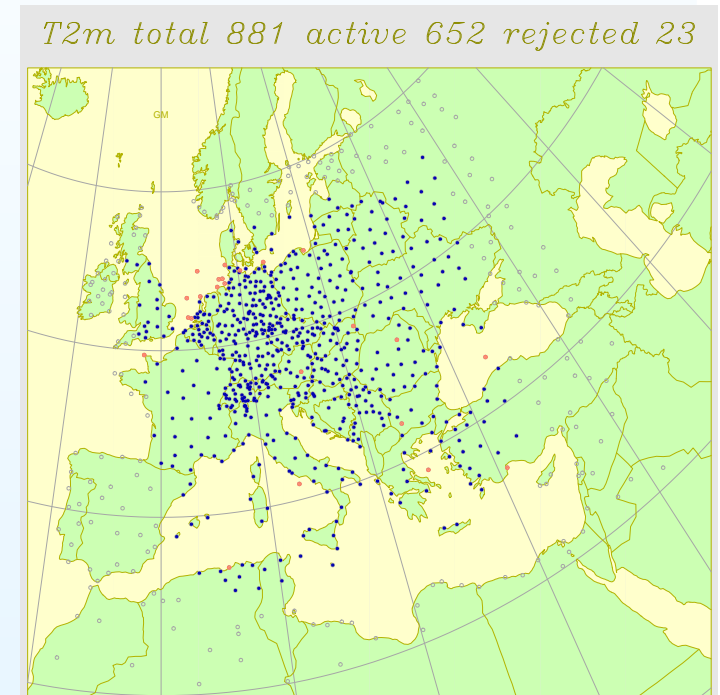 - Test AEV
  - Test AEU

- Conclusion

Setting of ALADIN/CE

- ARPEGE/ALADIN cycle 29T2
- LACE domain (309x277 grid points, linear truncation E159x143, $\triangle$x=9km)
- 43 vertical levels, mean orography
- time step 360 s
- digital filter spectral blending, long cut-off 6h cycle (filtering at truncation E47x42, no DFI in the next +6h guess integration)
- digital filter spectral blending + incremental DFI initialization of short cut-off production analysis
- 3h coupling interval
- OpenMP parallel execution
- 00 and 12 UTC forecast to +54h
- 06 and 18 UTC forecast to +24h
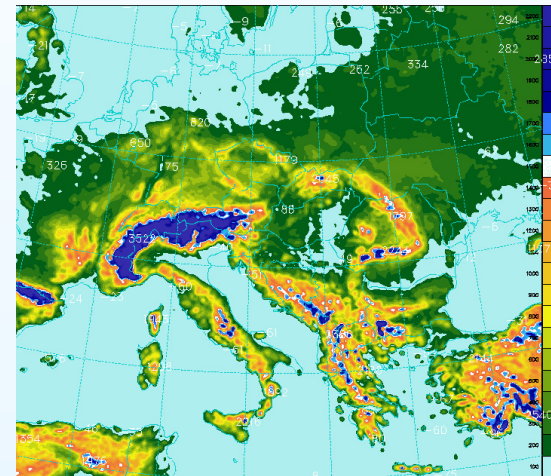
Implementation of CANARI surface analysis

- OI method on ALADIN guess before upper-air spectral blending
- surface analysis of T2m and RH2m, from which the increments of soil variables are computed
- we use spatial quality control of the observations
- we don't analyze SST, this one is taken from ARPEGE.
- any other land soil variables which are not analyzed (like snow) are initialized from the ALADIN guess with the relaxation to the climatology as implemented within the CANARI configuration
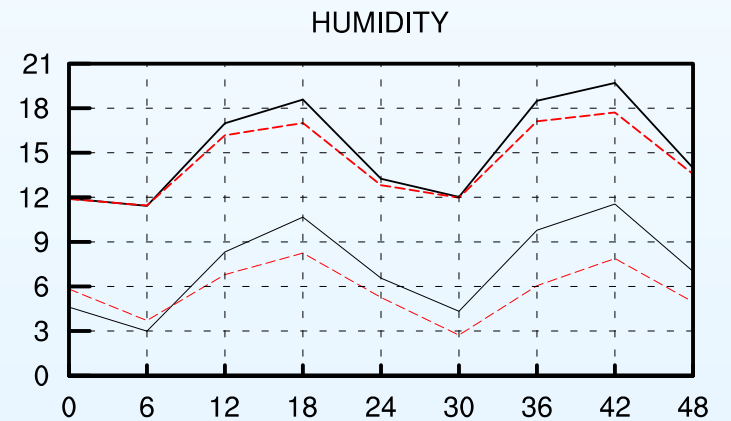

T2m total 881 active 652 rejected 23

Test ADX from June till November 2005

TEMPERATURE
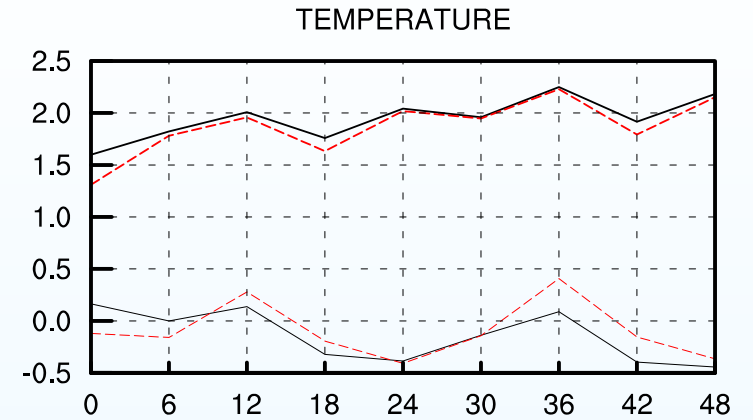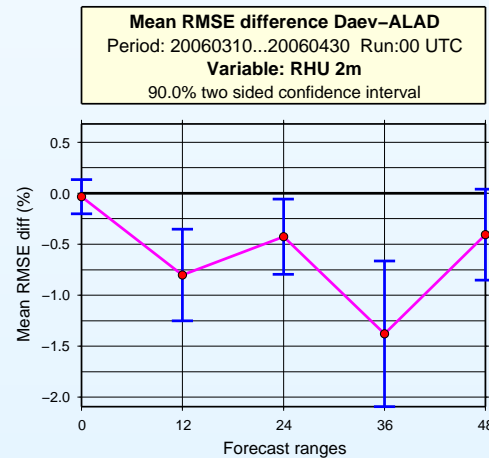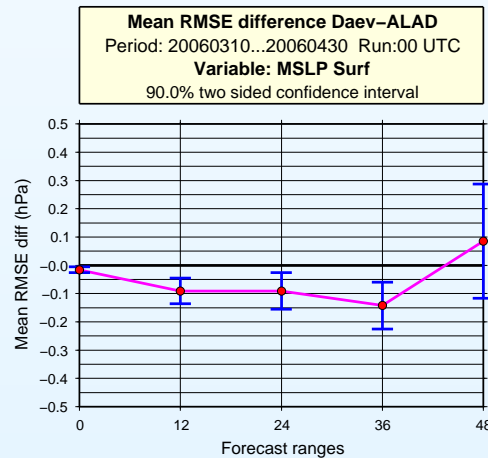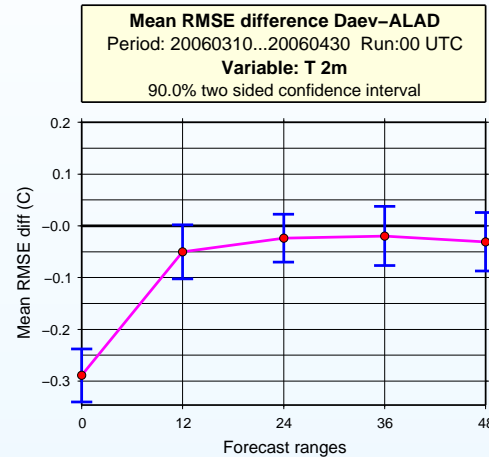
HUMIDITY

TEMPERATURE

HUMIDITY
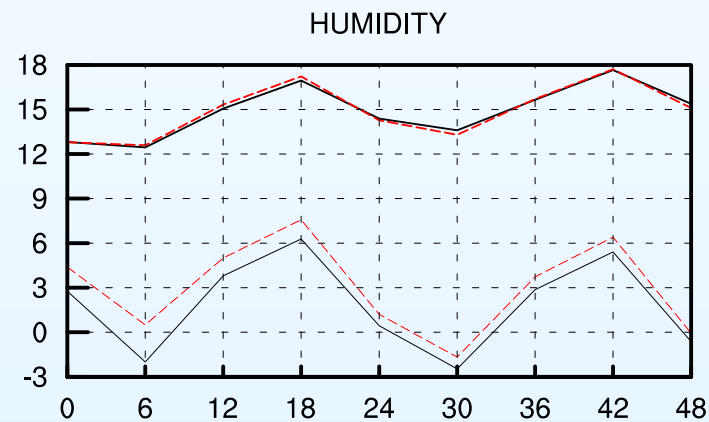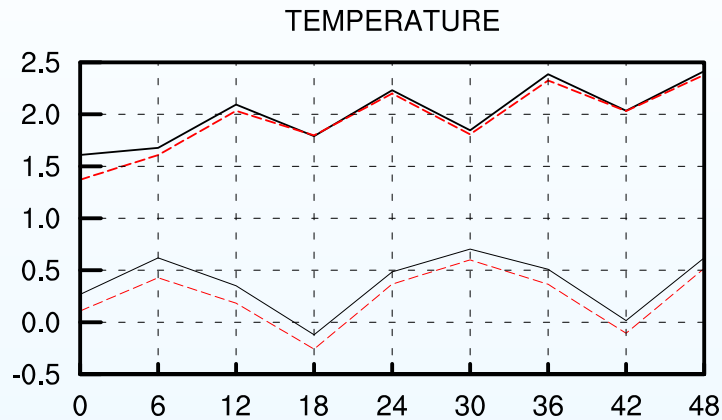
T2m and RH2m RMSE (thick)
and BIAS (thin) for June 2005
ADX (red) and reference (black)
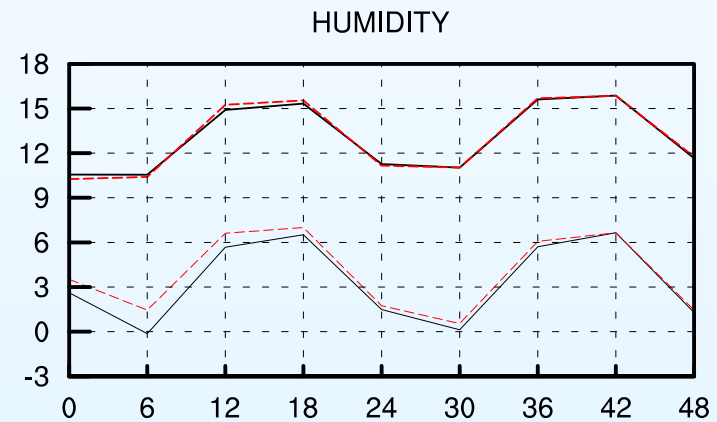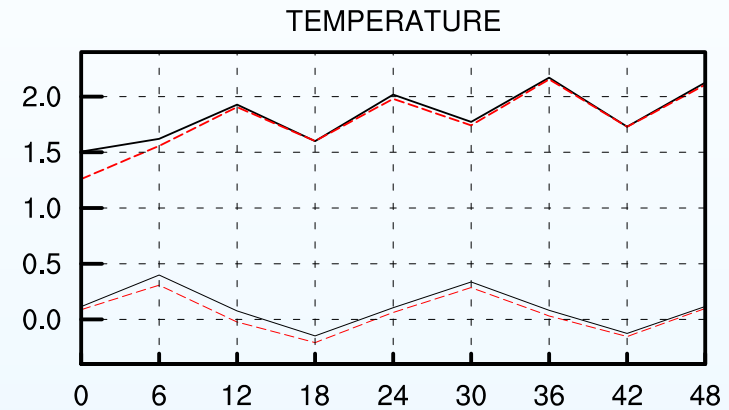
T2m and RH2m RMSE (thick)
and BIAS (thin) for August 2005
ADX (red) and reference (black)
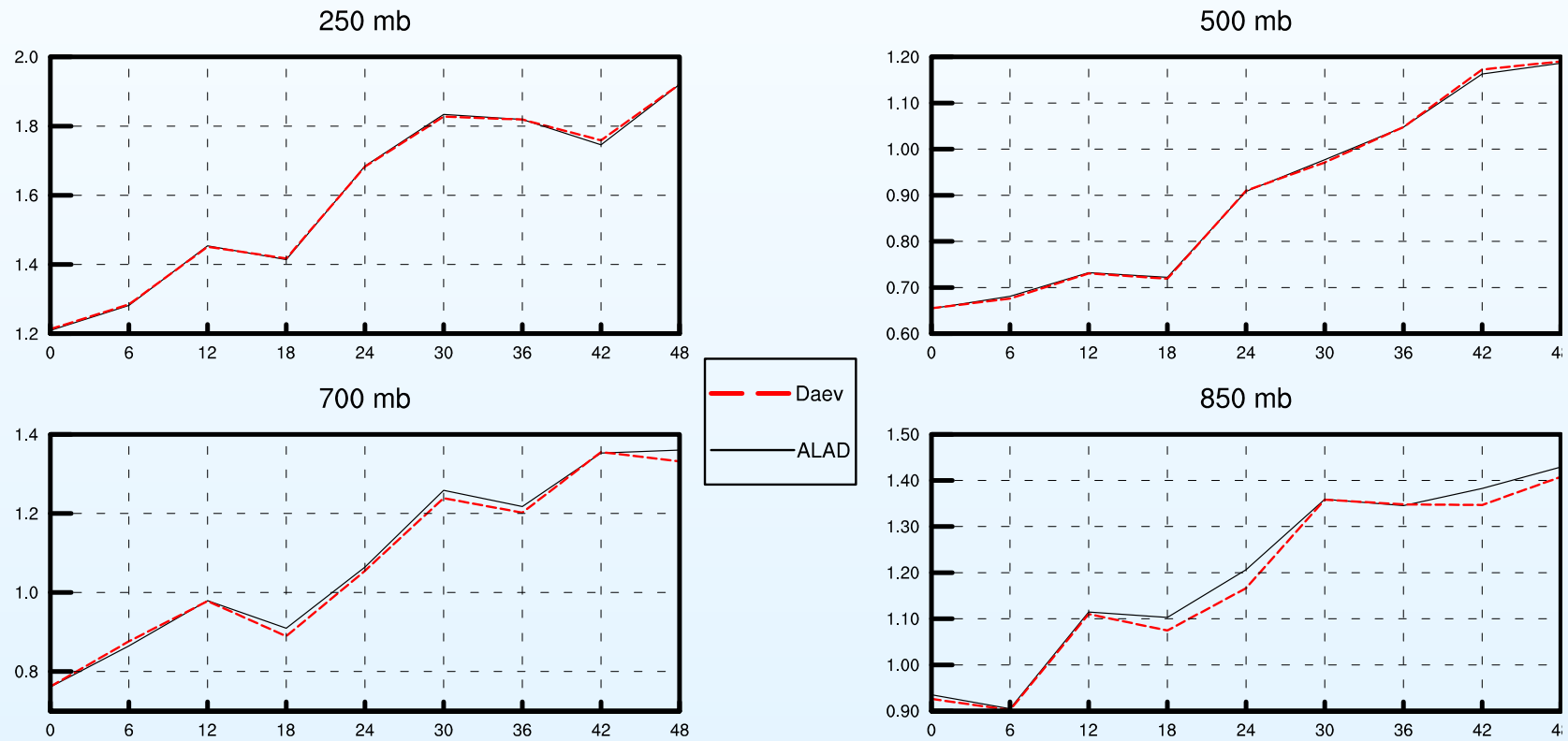
Test AEV from March till August 2006

- ISBA polynomes version 02

- SMU0=0

Mean RMSE difference Daev−ALAD
Period: 20060310...20060430 Run:00 UTC
Variable: T 2m
90.0% two sided confidence interval

Mean RMSE diff (C) / Forecast ranges

Mean RMSE difference Daev−ALAD
Period: 20060310...20060430 Run:00 UTC
Variable: MSLP Surf
90.0% two sided confidence interval

Mean RMSE diff (hPa) / Forecast ranges

Mean RMSE difference Daev−ALAD
Period: 20060310...20060430 Run:00 UTC
Variable: RHU 2m
90.0% two sided confidence interval

Mean RMSE diff (%) / Forecast ranges

TEMPERATURE

HUMIDITY

T2m and RH2m RMSE (thick)
and BIAS (thin) for March-April 2006
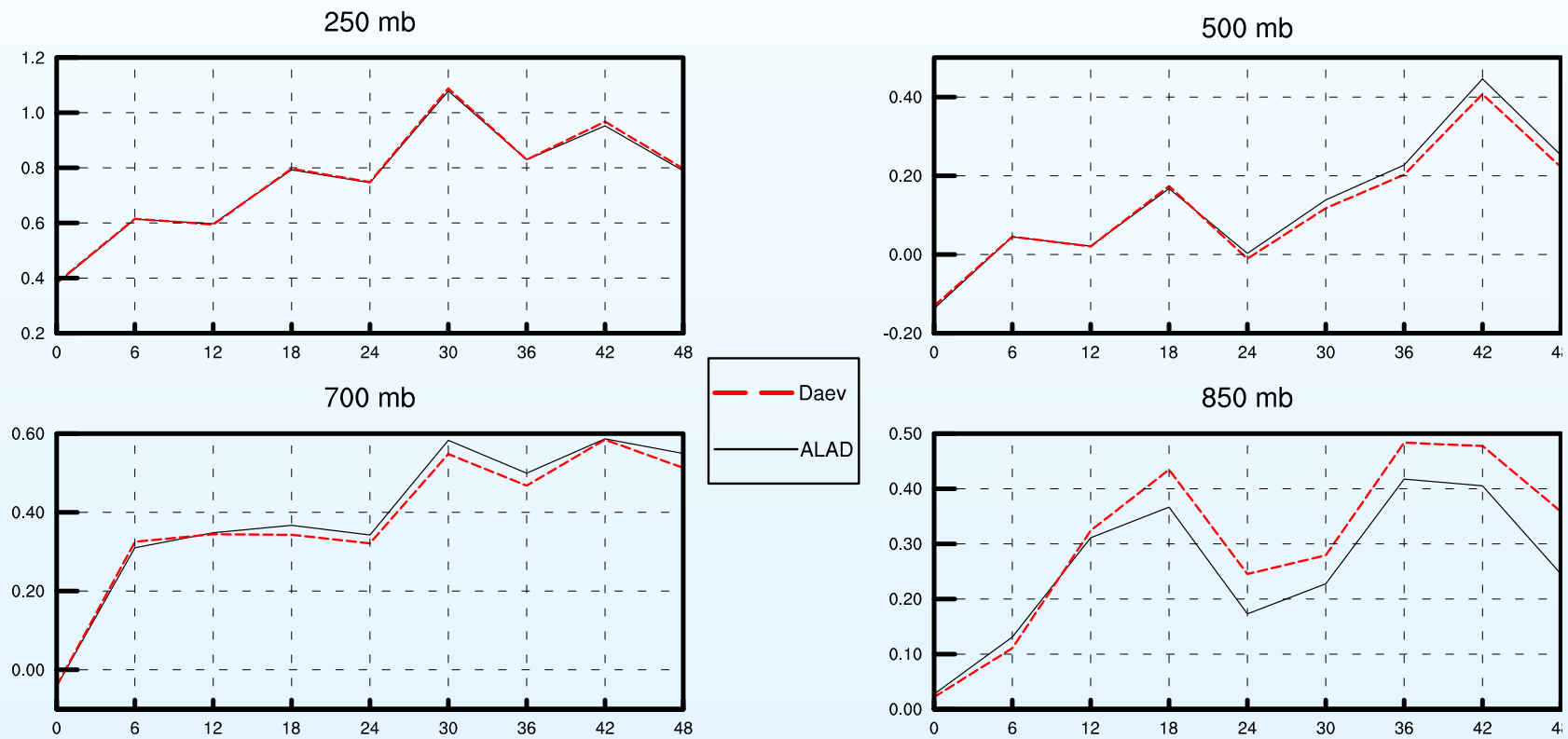AEV (red) and reference (black)
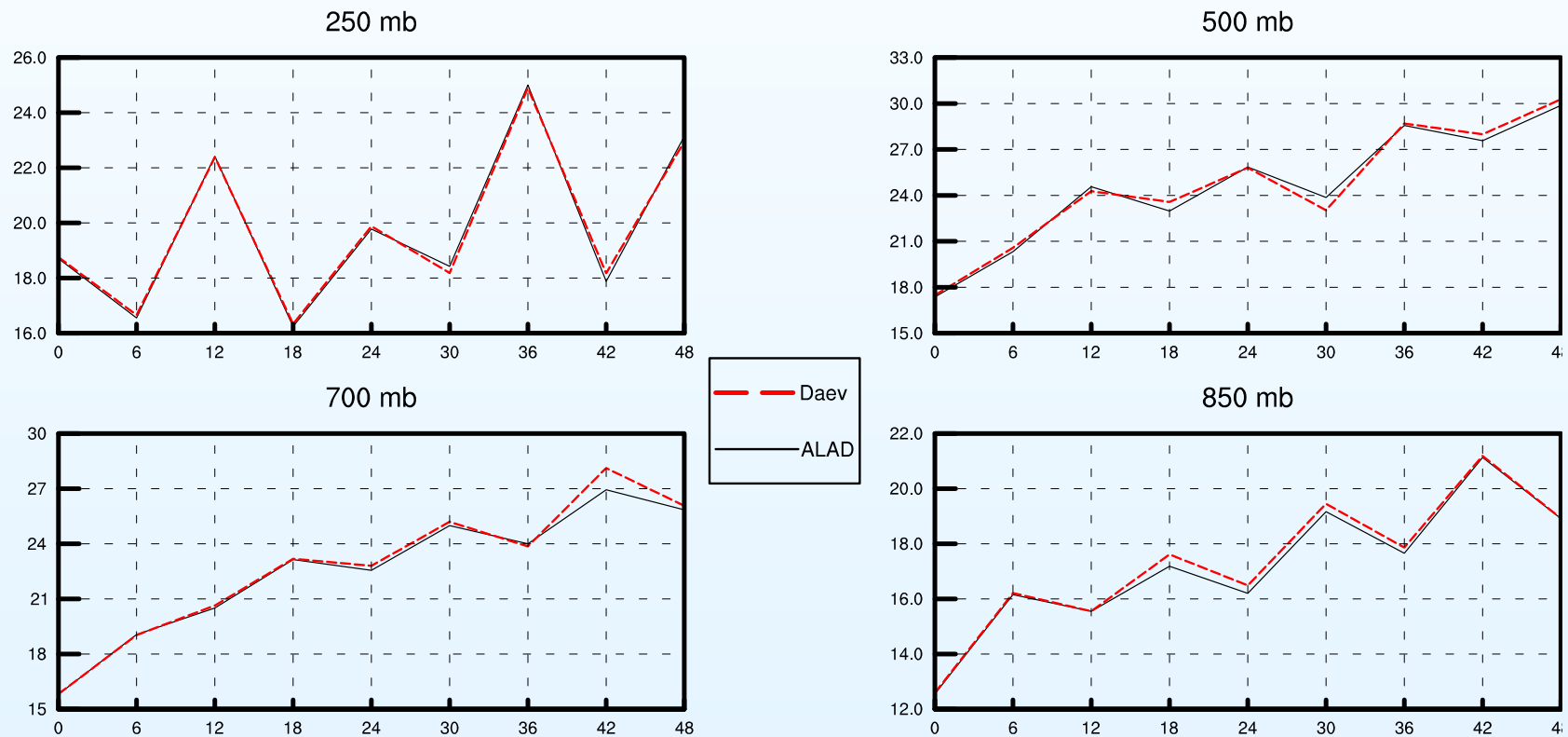
Test AEV from March till August 2006

RMSE temperature

Test AEV from March till August 2006
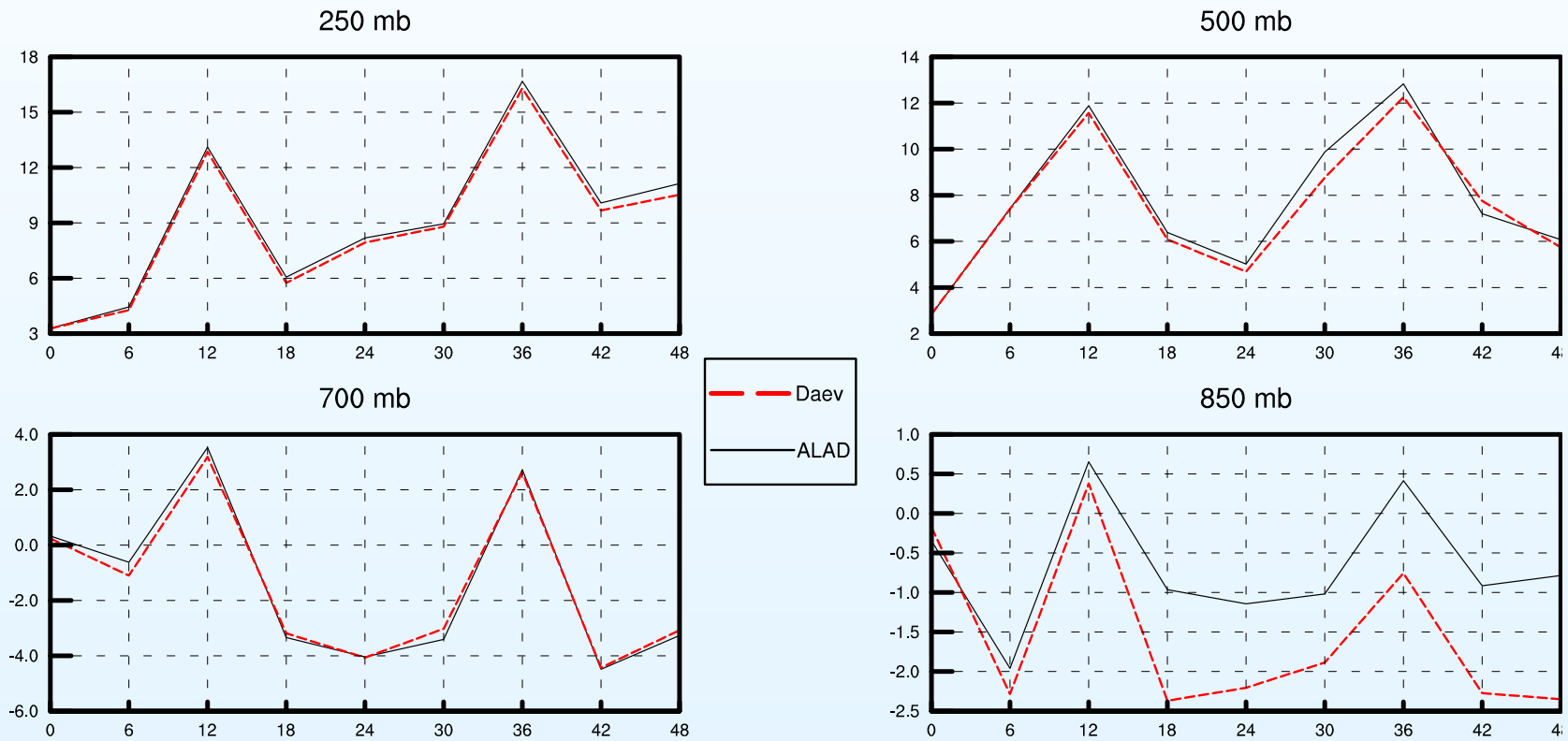
BIAS temperature

Test AEV from March till August 2006
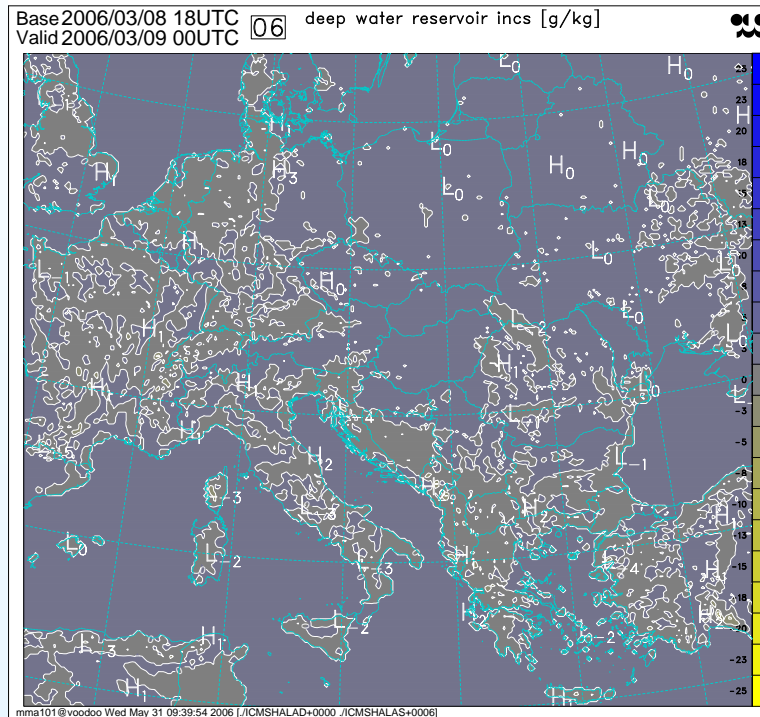
RMSE relative humidity

Test AEV from March till August 2006

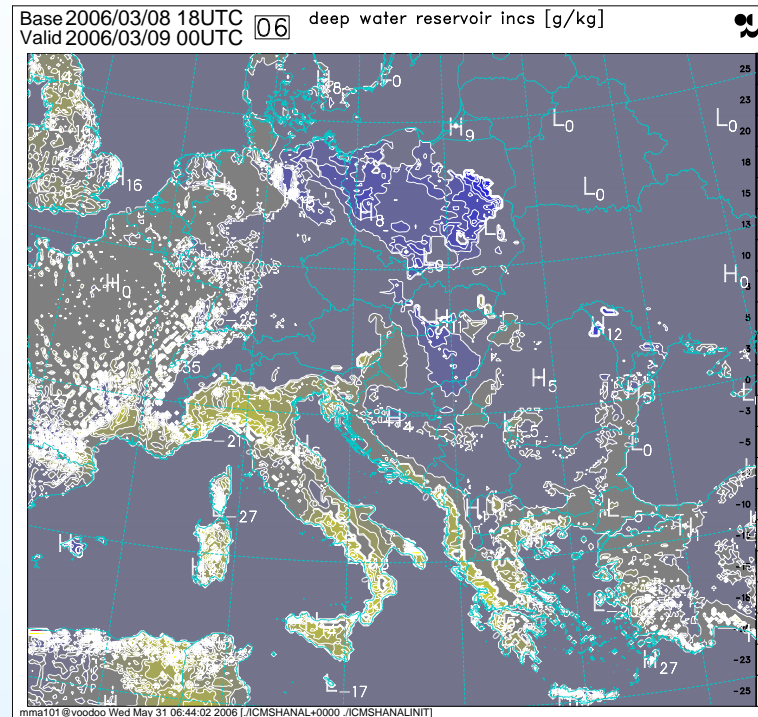## BIAS relative humidity

Impact of CANARI surface analysis

Increments of the deep water reservoir field for March 9th 2006
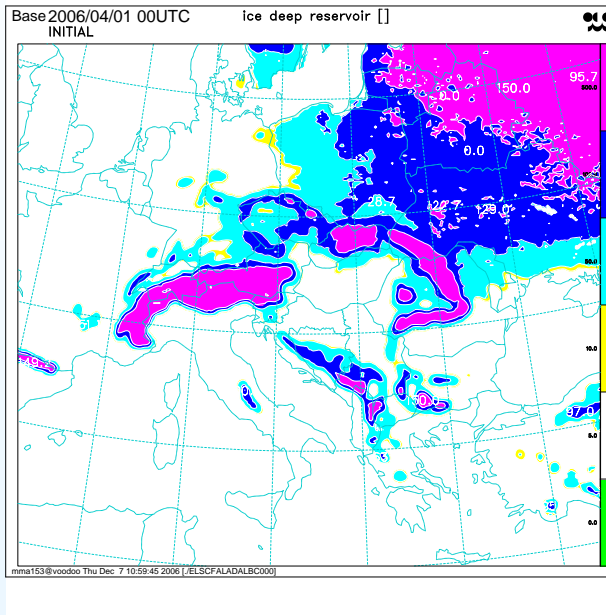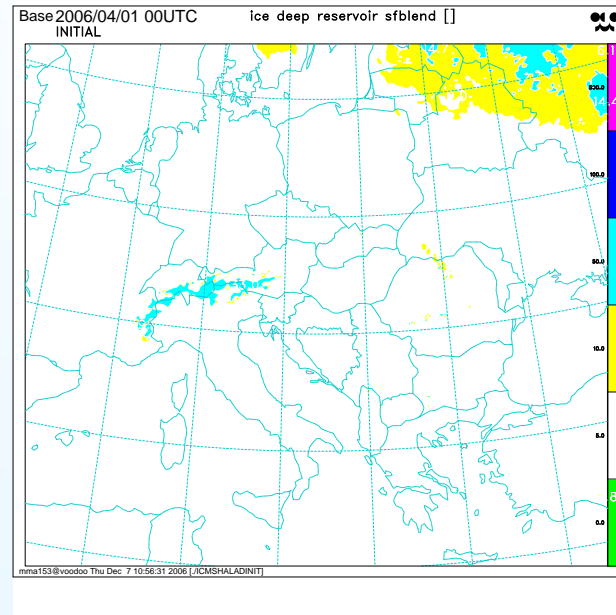

spectral blending

CANARI surface analysis

Impact of CANARI surface analysis

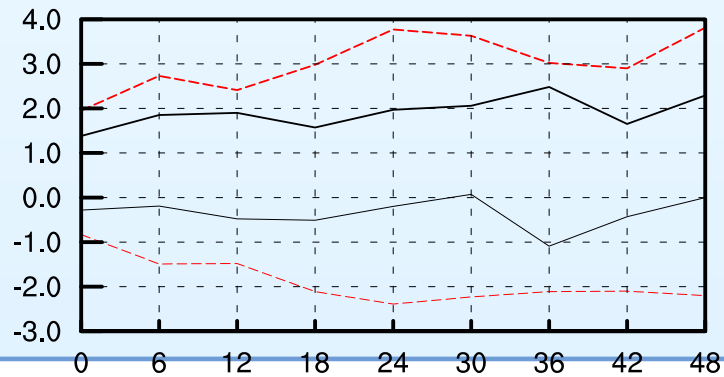## Content of the ice deep reservoir field for April 1st 2006
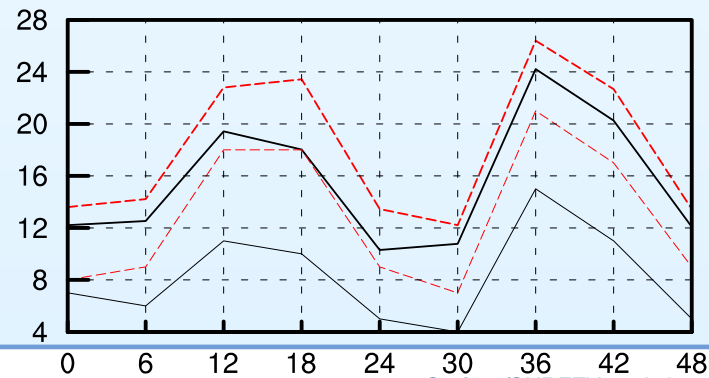

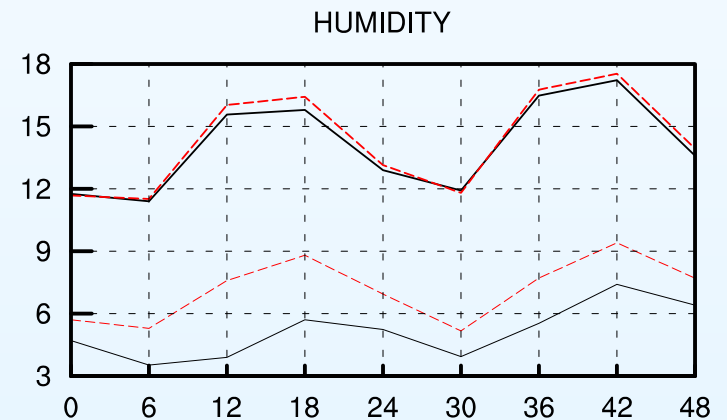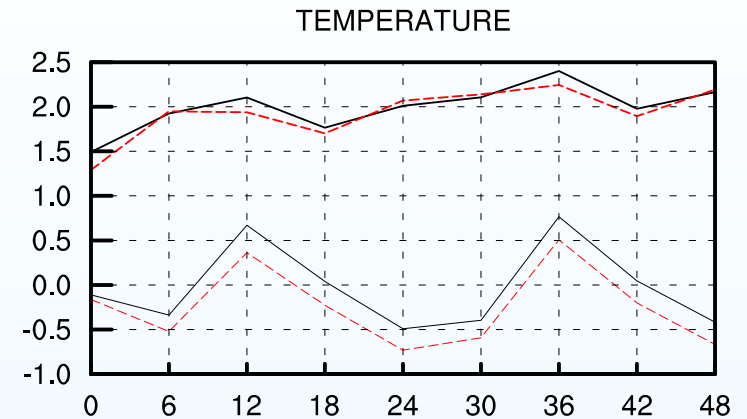an interpolated ARPEGE   CANARI surface analysis

TEMPERATURE

HUMIDITY

Test AEU March 2006

TEMPERATURE

- Incremental mode (LAEINC) updating of guess upper-air fields by their analysis (from spectral blending) inside CANARI

- source code modifications needed to run it for ALADIN

- scores worse than AEV

HUMIDITY

T2m and RH2m RMSE (thick)

and BIAS (thin) for March 2006

AEU (red) and reference (black)

Conclusion

- Performed tests showed significant impact of the surface analysis

- CANARI surface analysis (version AEV) was switched to operational August 3rd 2006

Thank you for your attention.