

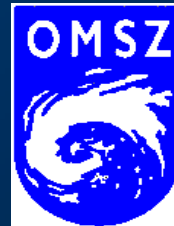
Estimation of satellite observations bias correction for limited area model

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Outline of the presentation

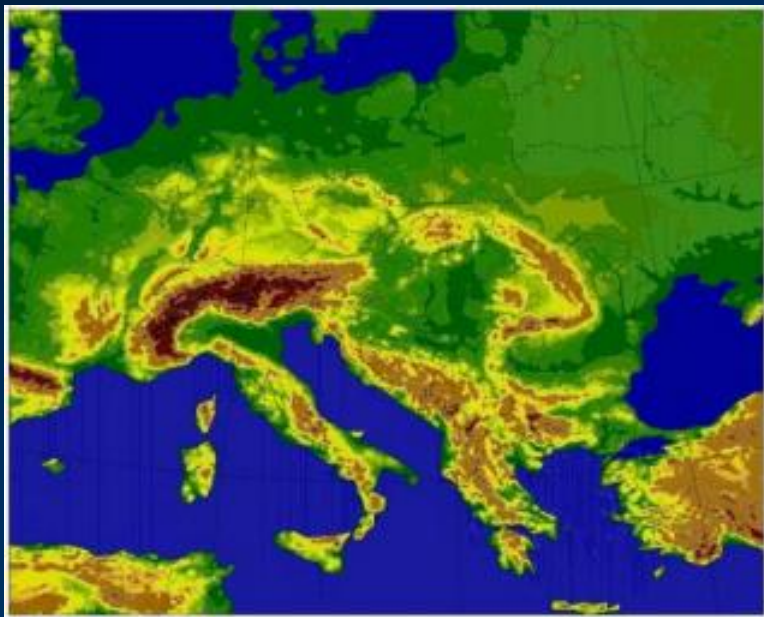
- ❑ The ALADIN/HU model and its experimental data assimilation system
- ❑ Investigation of different predictors in the estimation of the bias correction
- ❑ Investigation of different periods in the computation of the bias correction for LAM DAS
- ❑ Preliminary conclusions

→ ALADIN/HU model

Configuration of the model (CY28T3)

Main Characteristics

- 12 km horizontal resolution
- 37 vertical levels
- 3D-VAR for the upper air fields
- 6 hour cycle
- substitution of the surface fields with the ARPEGE ones
- B matrix: NMC method
- LBC: long cut-off ARPEGE analysis
- 3 hour coupling frequency
- 48 hour forecast twice a day



Satellite data

- full grid rad1C (1x1 FOV) AMSU-A (N15 & N16) and AMSU-B (N16 & N17) assimilation in 80 km resolution

→ Conclusion from the previous ITSC

... The air-mass bias correction must be included in the processing of satellite radiances in the limited area model ...

Harris and Kelly (2001)

Air-mass predictors for ARPEGE/ALADIN models:

(SBF8)

- model first guess thickness (1000-300 hPa)
- model first guess thickness (200-50 hPa)
- model first guess surface skin temperature
- model first guess total column water vapour

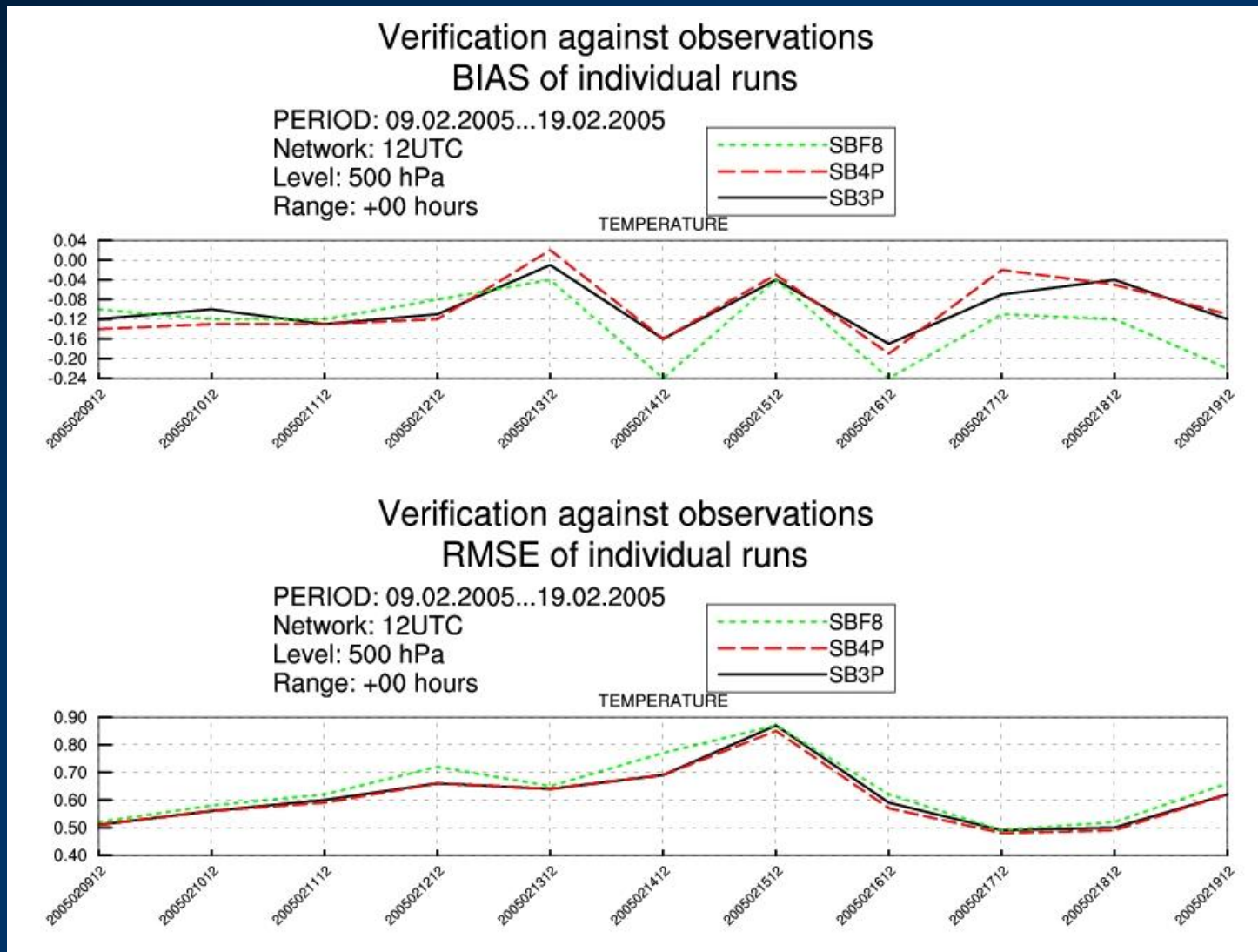
(SB4P – 4 predictors)

- model first guess thickness (850-300 hPa)
- model first guess thickness (200-50 hPa)
- model first guess surface skin temperature
- model first guess total column water vapour

(SB3P – 3 predictors)

- model first guess thickness (850-300 hPa)
- model first guess thickness (200-50 hPa)
- model first guess surface skin temperature
- ~~model first guess total column water vapour~~

→ Impact study during 2-week period



□ Investigation of different periods in the computation of the bias correction for LAM DAS

Importance:

→ We invest

- relative

In the estimation of the air-mass bias coefficients, with the global model we have almost all available meteorological conditions (cyclonic, anticyclonic, winter, summer etc ...) within a relatively short time

- short

WHILE

→ Te

With the LAM we have only those meteorological events passing through the model domain and for only one season

su

→ BC02 (one month)

winter December 2005

→ BC03 (long period)

→ BC04 (one month)

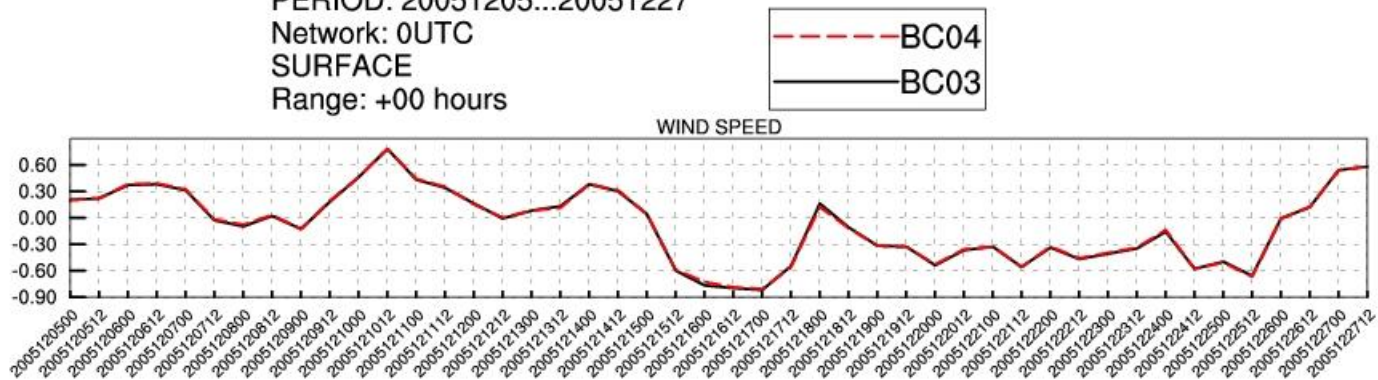
Verification against analyses BIAS of individual runs

PERIOD: 20051205...20051227

Network: 0UTC

SURFACE

Range: +00 hours



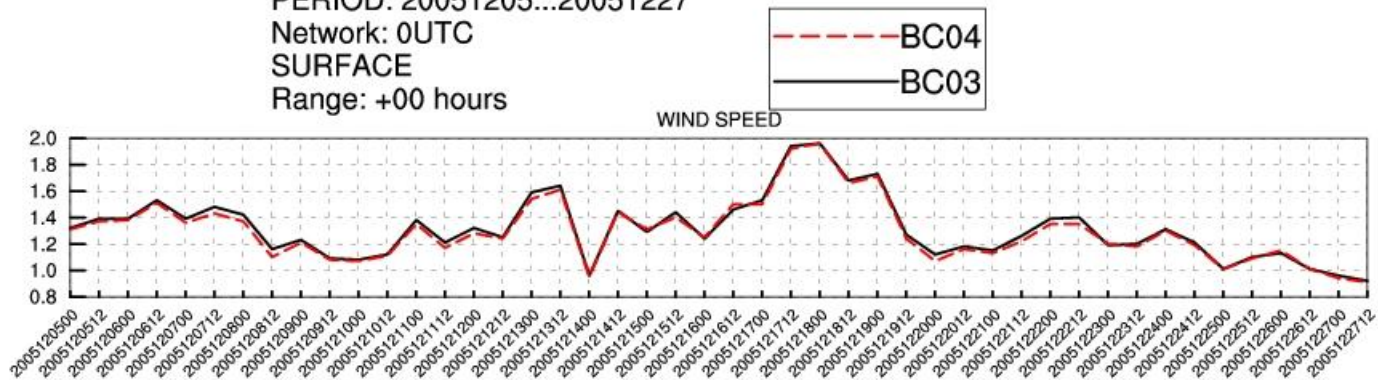
Verification against analyses RMSE of individual runs

PERIOD: 20051205...20051227

Network: 0UTC

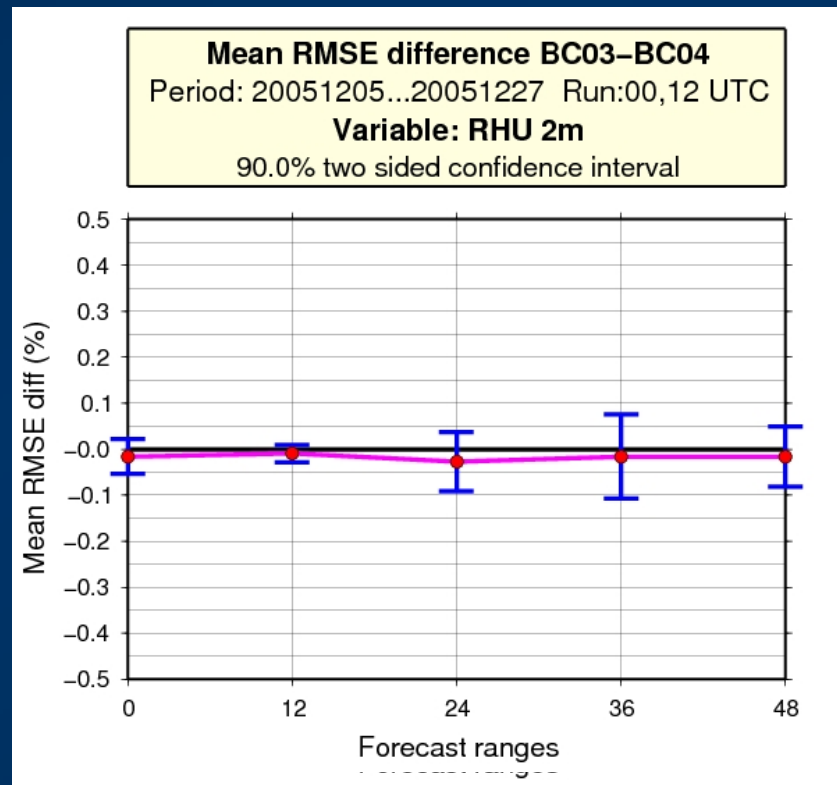
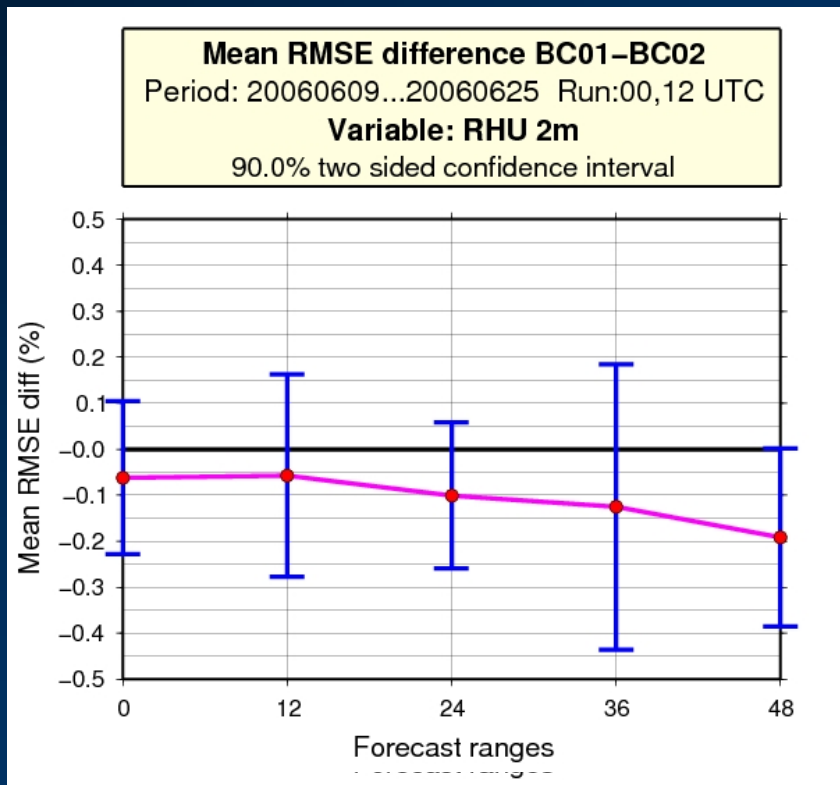
SURFACE

Range: +00 hours



Summer case

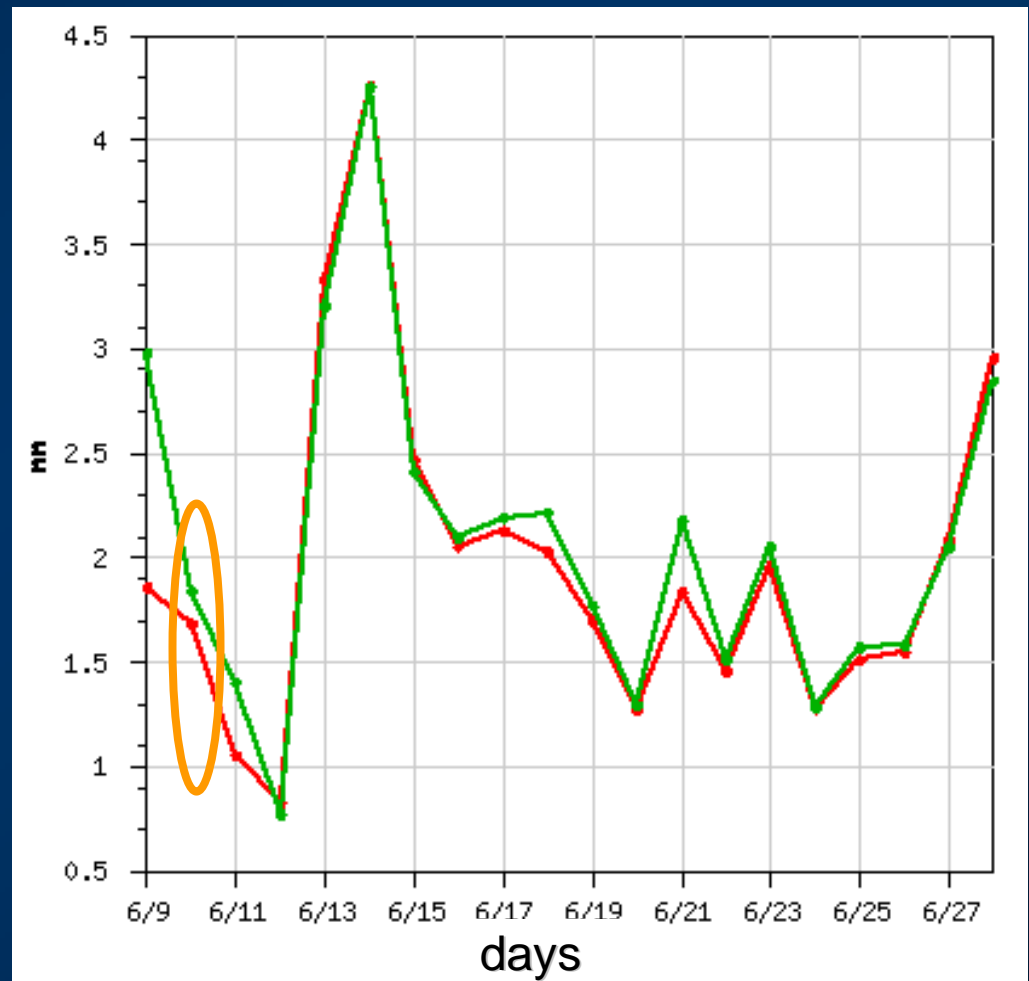
Winter case



Cumulated precipitation for the last 6-h of the 12-h forecast (mm/6h)

Period 09.06.2006 - 28.06.2006
Statistics for the whole ALADIN domain

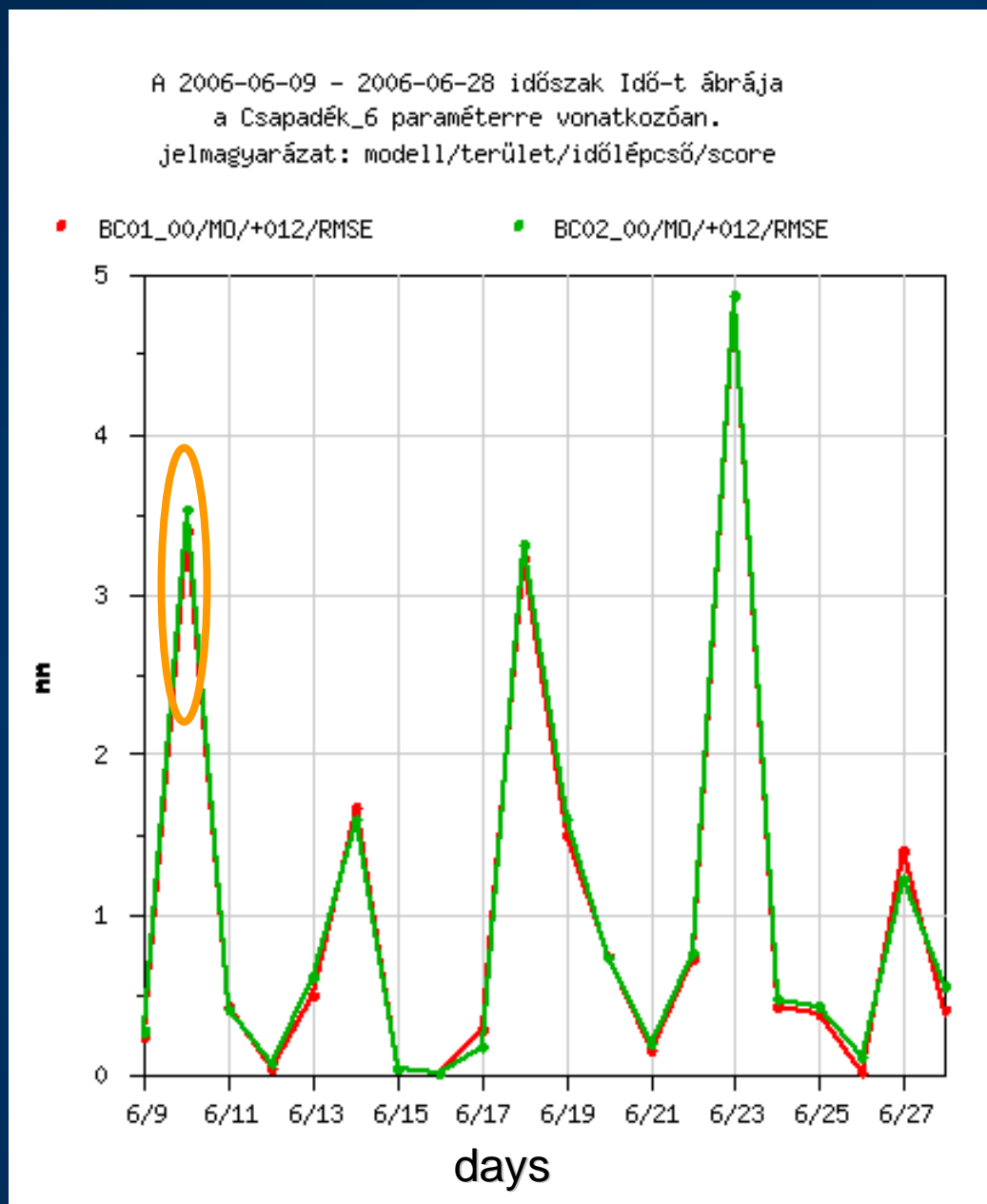
— short period (BC01)
— long period (BC02)



Cumulated precipitation for the last 6-h of the 12-h forecast (mm/6h)

Period 09.06.2006 - 28.06.2006
Statistics for Hungary

— short period (BC01)
— long period (BC02)



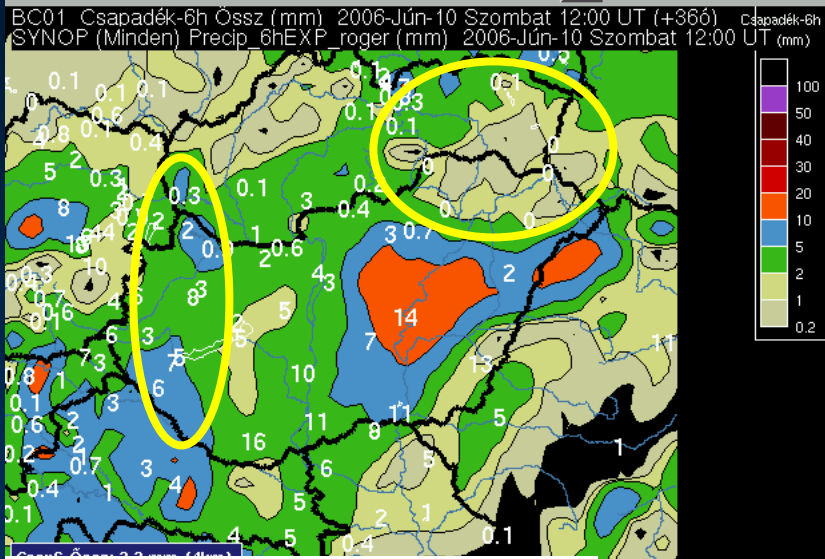
36-h forecast from 9.06.2006 00UTC

12-h forecast from 10.06.2006 00UTC

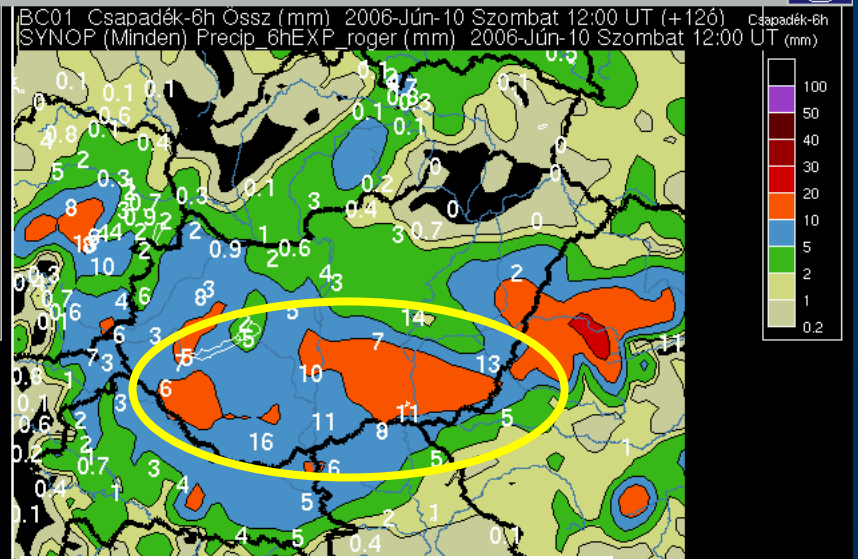
forecast for 12 UTC 10.06.2006: 6-h cumulated precipitation

File Térkép kivágat Hattértípus Program-opciók Makrók Adatok Műhold Radar SYNOP TEMP VAD Villám Meteogram Met. objektumok **HAWK 2.10.r8.** OMSZ

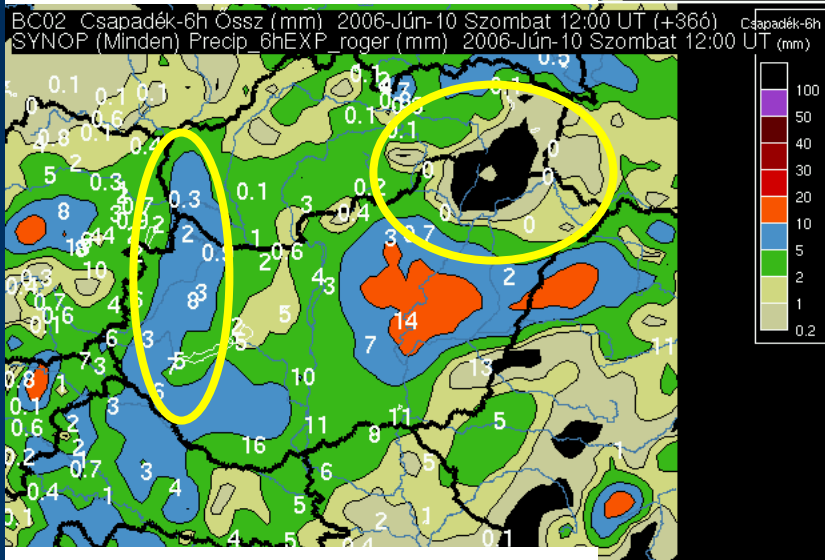
Háttér [Icons] Időpontok: Aktuális Megfigy.: Utolsó 6 időpont Felh.: alap 2006-Oct-01 10:57 UT



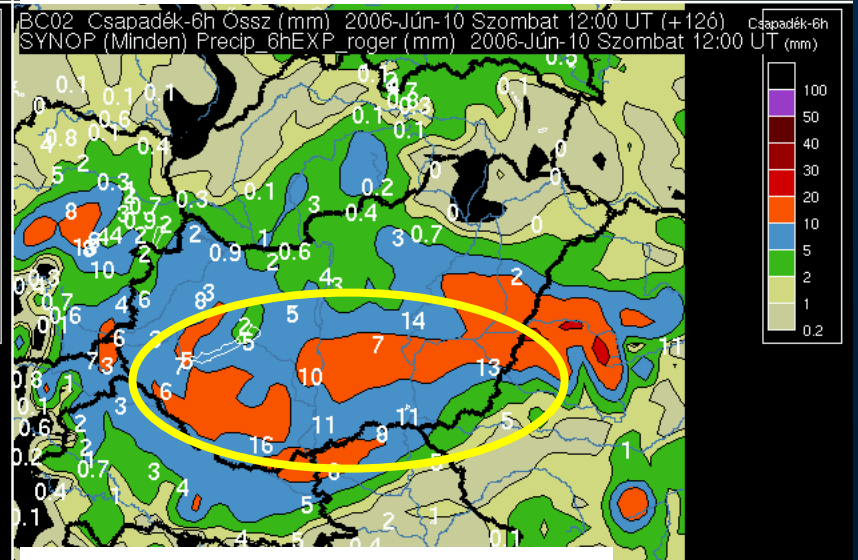
Long period (BC01) - 36h Forecast



Long period (BC01) - 12h Forecast



One month (BC02) - 36h Forecast

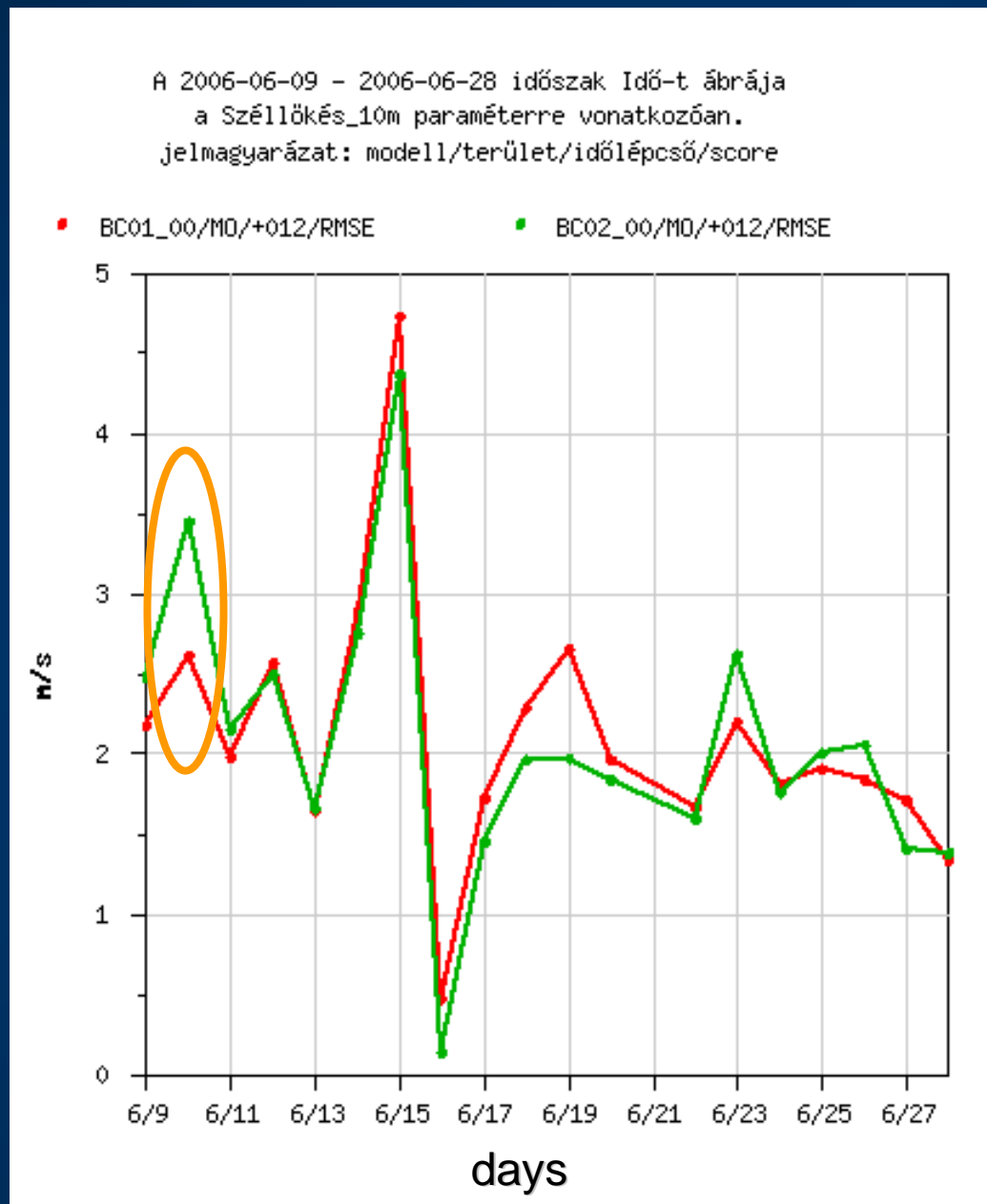


One month (BC02) - 12h Forecast

Wind gust during the last 6-h of the 12-h forecast (m/s)

Period 09.06.2006 - 28.06.2006
Statistics for the whole ALADIN domain

— short period (BC01)
— long period (BC02)

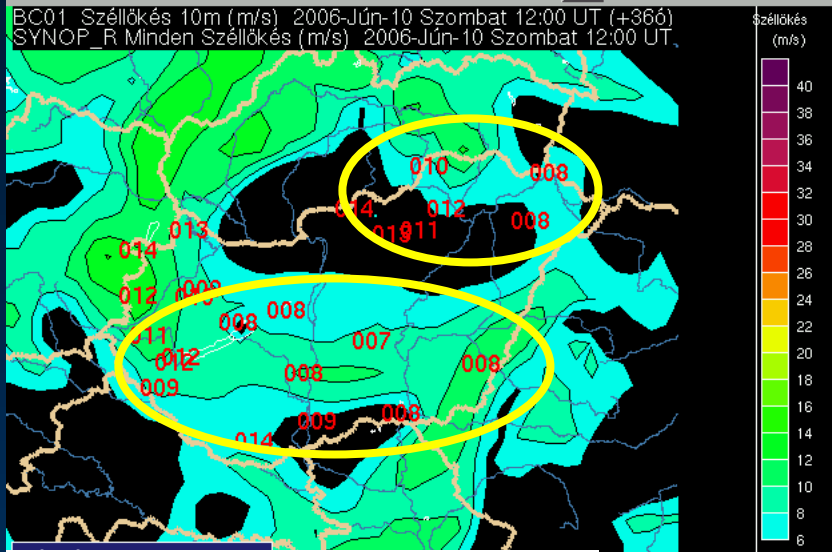


36-h forecast from 9.06.2006 00UTC 12-h forecast from 10.06.2006 00UTC

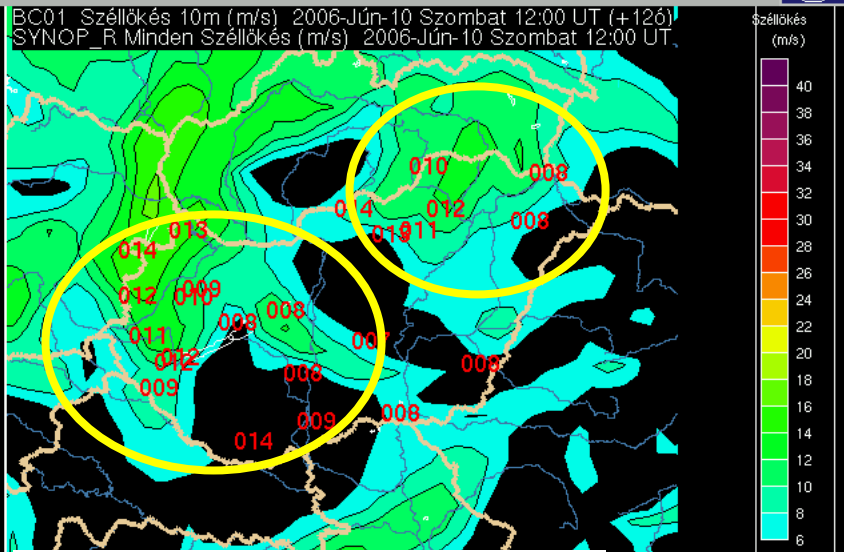
forecast for 12 UTC 10.06.2006: Wind gust

File Térképívágat Háttértípus Program-opciók Makrók Adatok Műhold Radar SYNOP TEMP VAD Villám Meteogram Met objektumok **HAWK 2.10.r8.** OMSZ

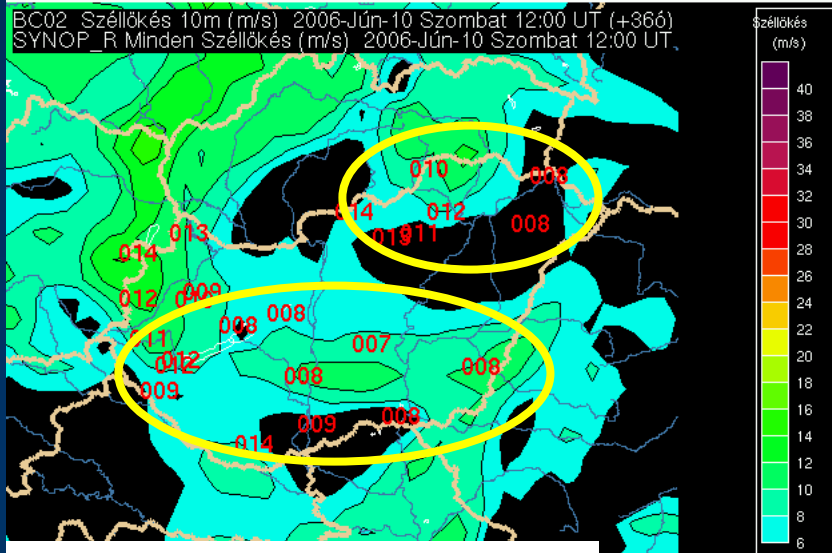
Háttér [Icons] Időpontok: Aktuális Megfigy.: Utolsó 6 időpont Felh.: alap 2006-Oct-01 11:11 UT



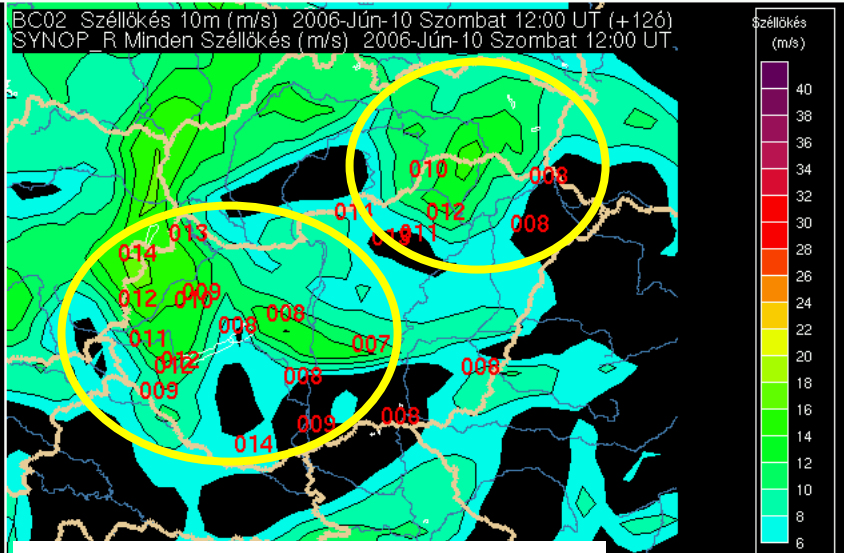
Long period (BC01) - 36h Forecast



Long period (BC01) - 12h Forecast



One month (BC02) - 36h Forecast



One month (BC02) - 12h Forecast

Preliminary conclusions

→ The presented results showed the importance of the air-mass bias correction in the assimilation of satellite radiances in LAM

→ Changing the predictors we got encouraging results ...

In addition to our results, excluding the model first guess surface skin temperature and total column water vapor among the predictors, Bjarne Amstrup improved the bias correction in DMI HIRLAM model (HIRLAM newsletter 51)

... to continue our investigation

→ We observed some differences in the results from summer and winter cases when investigating the impact of the period for the computation of bias coefficients.

→ We observed better forecast of wind using the monthly update, but better forecast of precipitation using long term computation of the bias correction

→ Is the difference between the summer and winter cases coming from the fact that there was one common month in the periods for the computation of bias correction coefficients for the winter cases ?

→ additional experiments are needed