Data assimilation status Croatia

DA setup

- IN OPERATION – ALADIN-HR8
  - Surface: CANARI OI (cy35t1)
  - Upper air: 3DVAR (cy35t1)
  - 6h cycle (cy38t1)
  - LBC from ECMWF

- IN TEST MODE - ALADIN-HR4
  - Surface: CANARI OI (cy38t1)
  - Upper air: 3dvar (cy38t1)
  - 3h cycle (cy38t1)
  - LBC from ECMWF

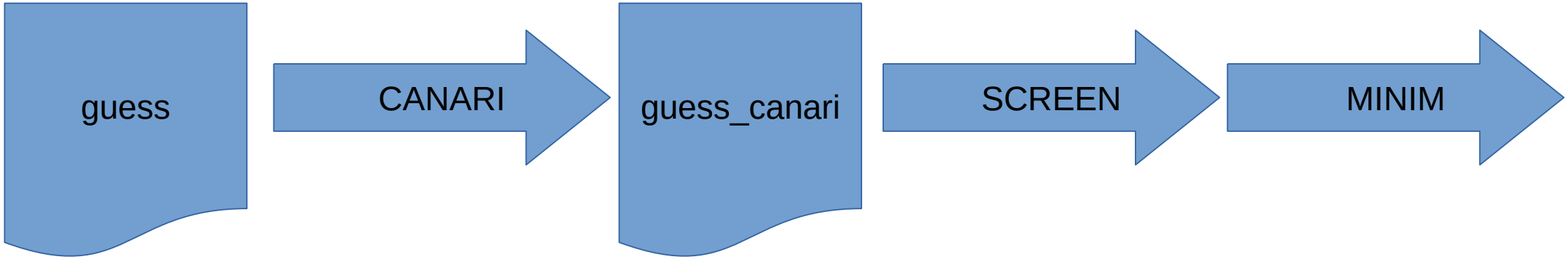
DA setup ALADIN-HR4

- Observations used:

  - SYNOP (T2m,RH2m,p)
  - AIREP(u,v; AMDAR, MODE-S)
  - GEOWIND
  - TEMP
  - SEVIRI (ch 2,3,4,6)

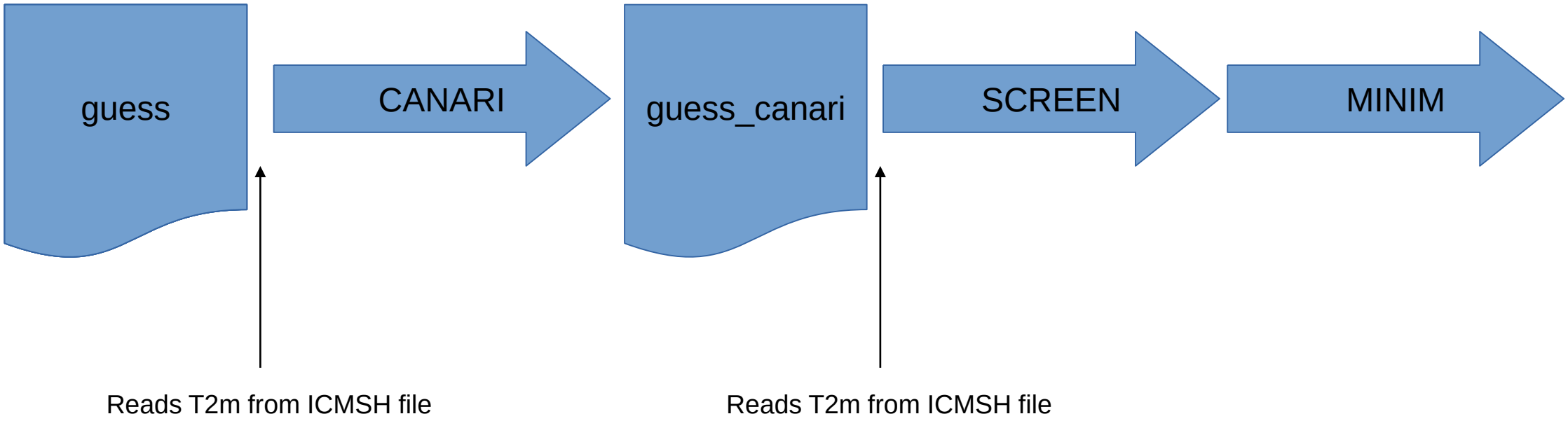
CANARI

- CANARI configuration



CANARI

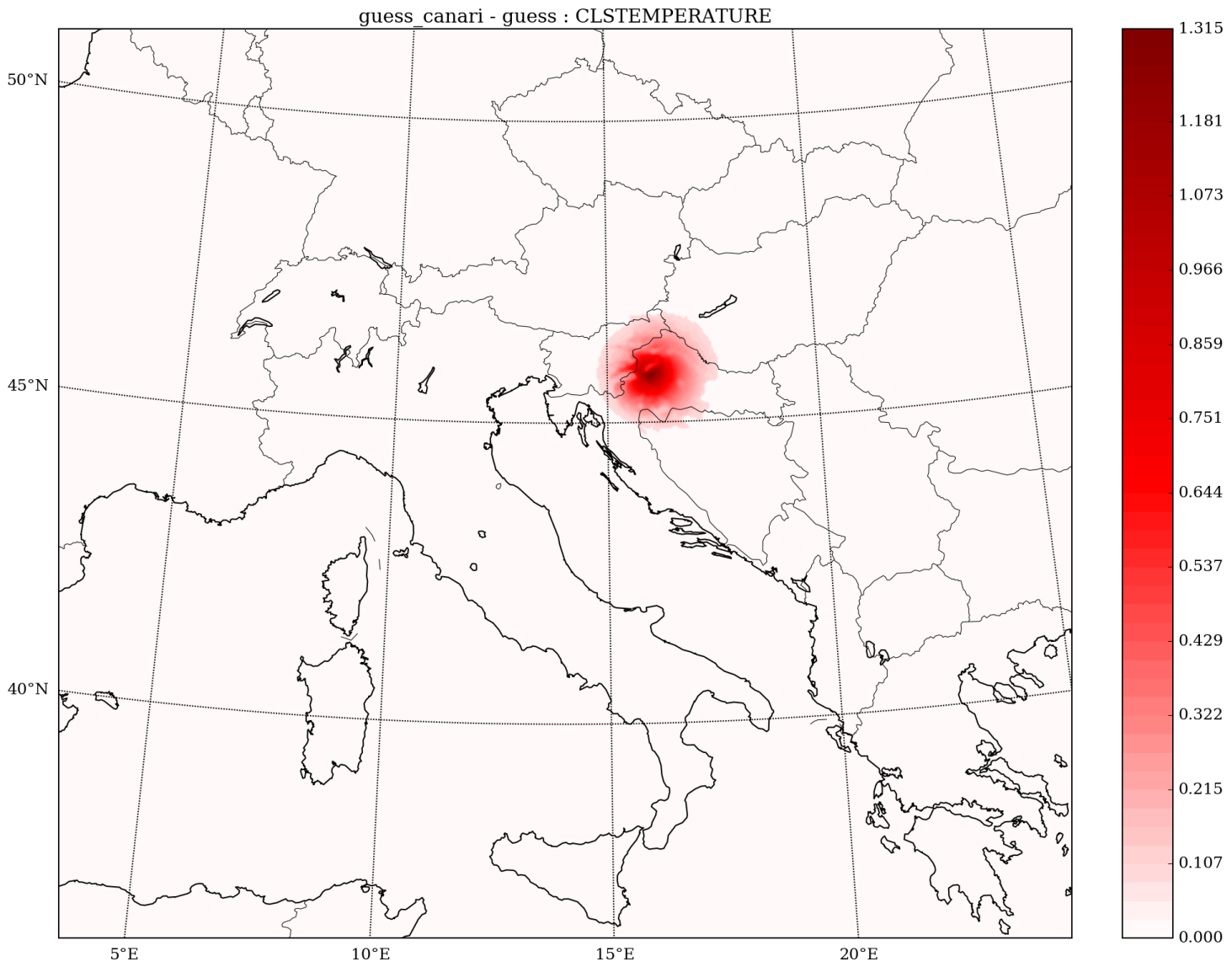
- LDIRCLSMOD=.T.



CANARI

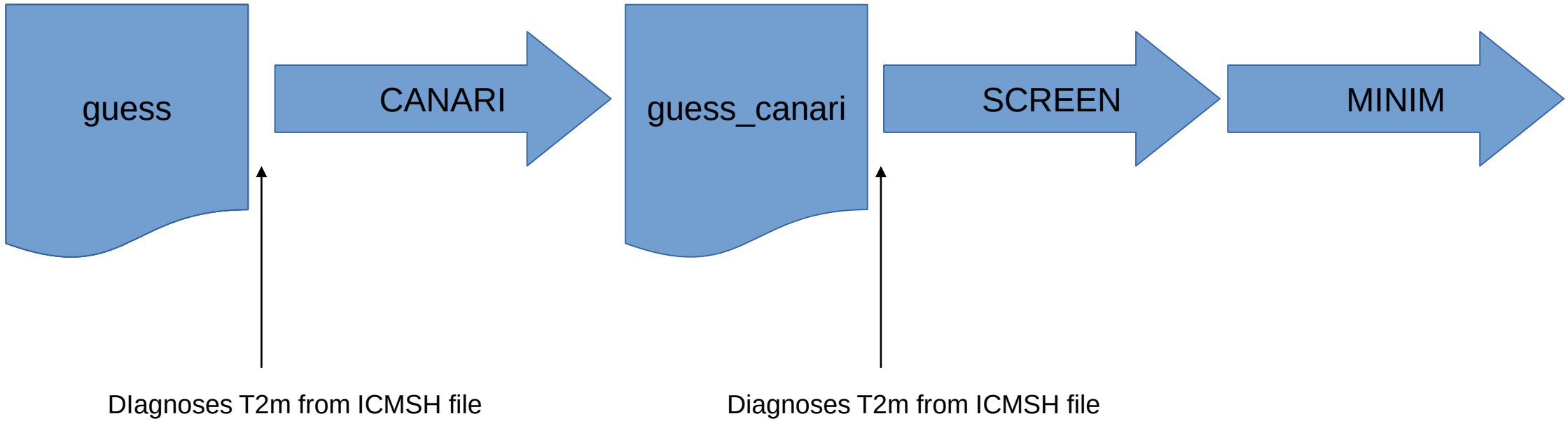
- LDIRCLSMOD=.T.
- single obs

T2m: guess_canari-guess



CANARI

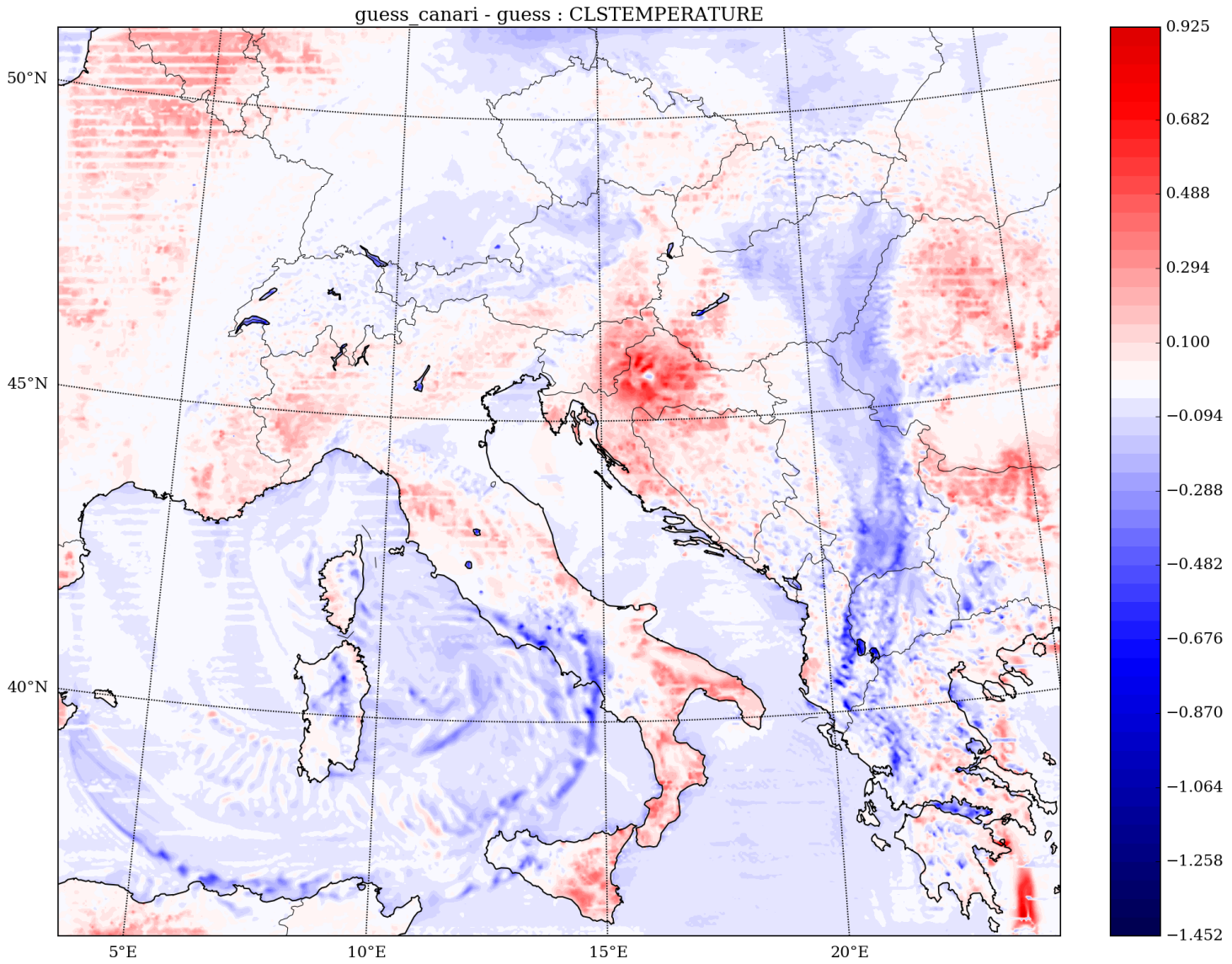
- LDIRCLSMOD=.F.



CANARI

- LDIRCLSMOD=.F.
- single obs

T2m: guess_canari-guess

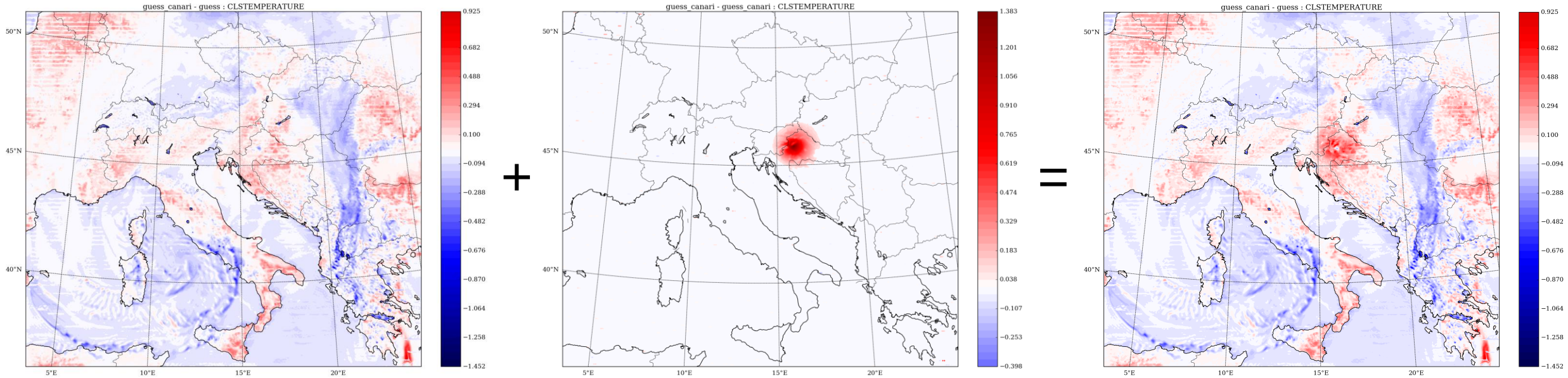


CANARI

- LAECDS: calculates 2m fields from surface fields
- LAEICS: calculates surface fields
- LAEICS:F + LAECDS=T => guess_canari – diagnosed T2m in guess
- LAEICS:T + LAECDS=T => guess_canari – T2m after analysis

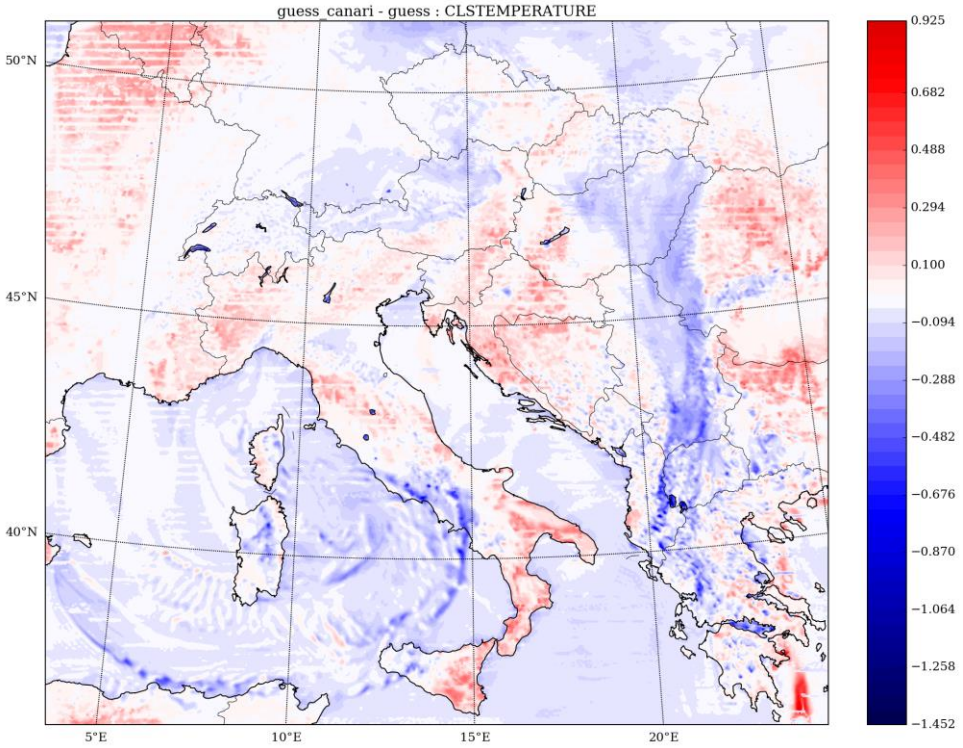
CANARI

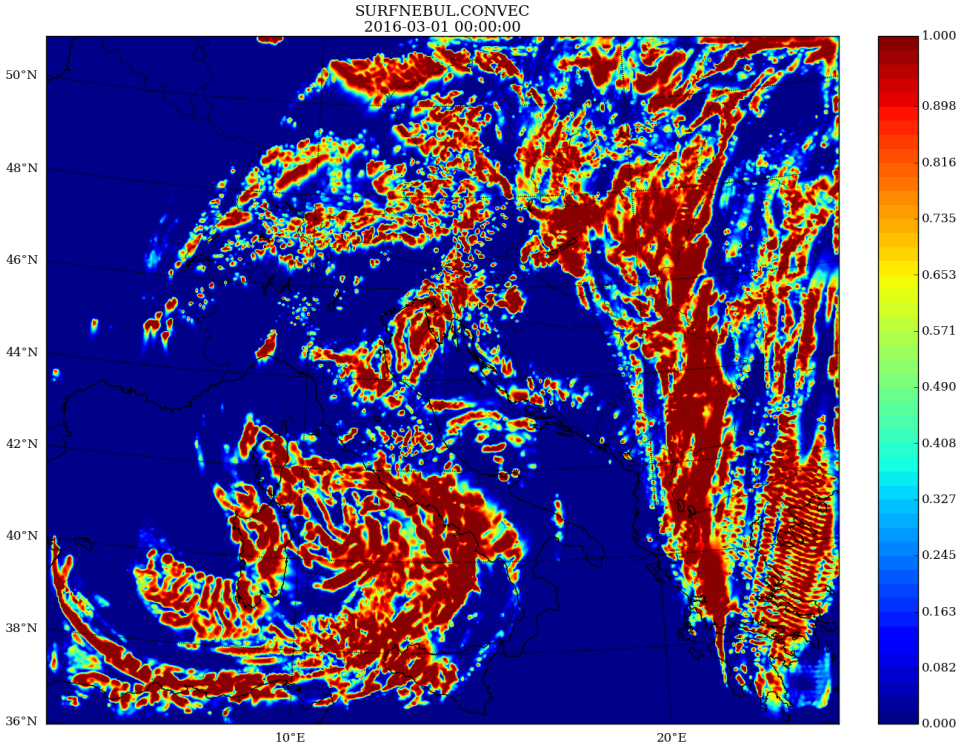
LDIRCLSMOD=.F.



CANARI

LDIRCLSMOD=.F.





CANARI

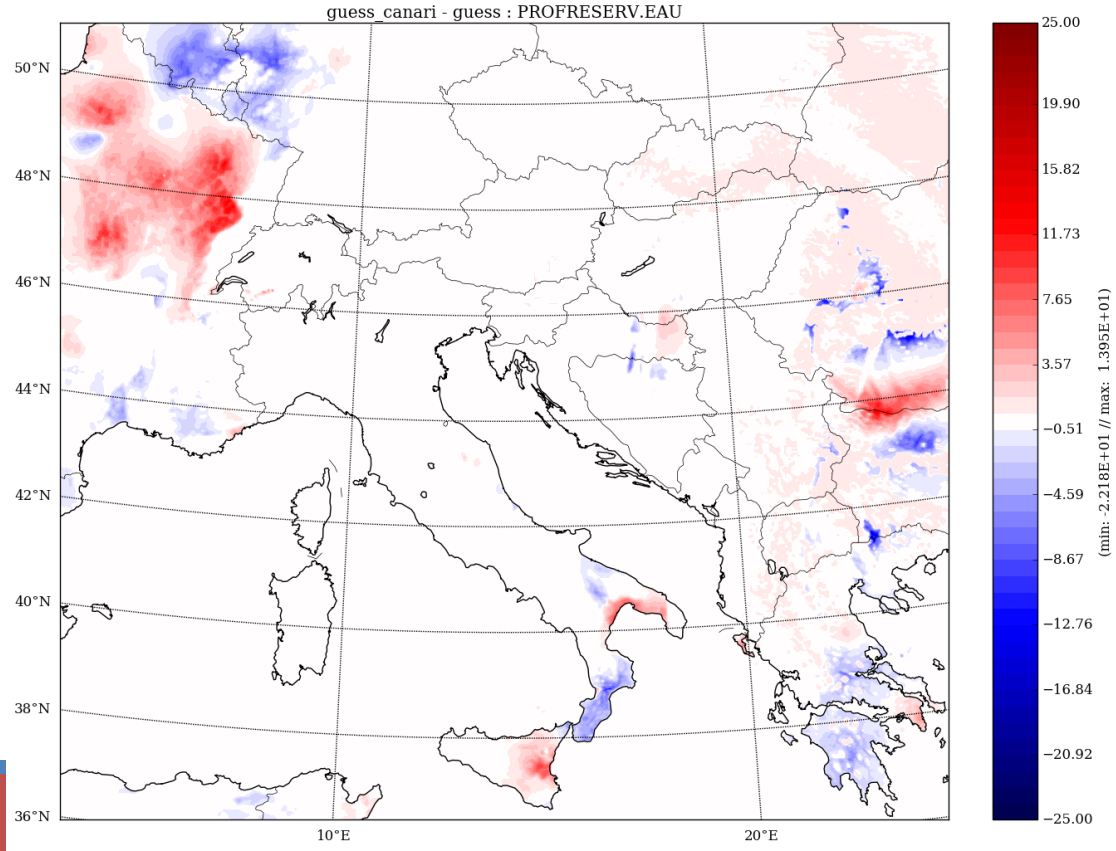
- LDIRCLSMOD=.F. vs LDIRCLSMOD=.T.
  - different SURF/PROF increments (different fg_depar) => different surface analysis
  - different CLS values written at ICMSH file => different values for screening and minimisation (if 2m params used and LDIRCLSMOD=.T.)

  - => LDIRCLSMOD=.T. - used both for Canari and Screening

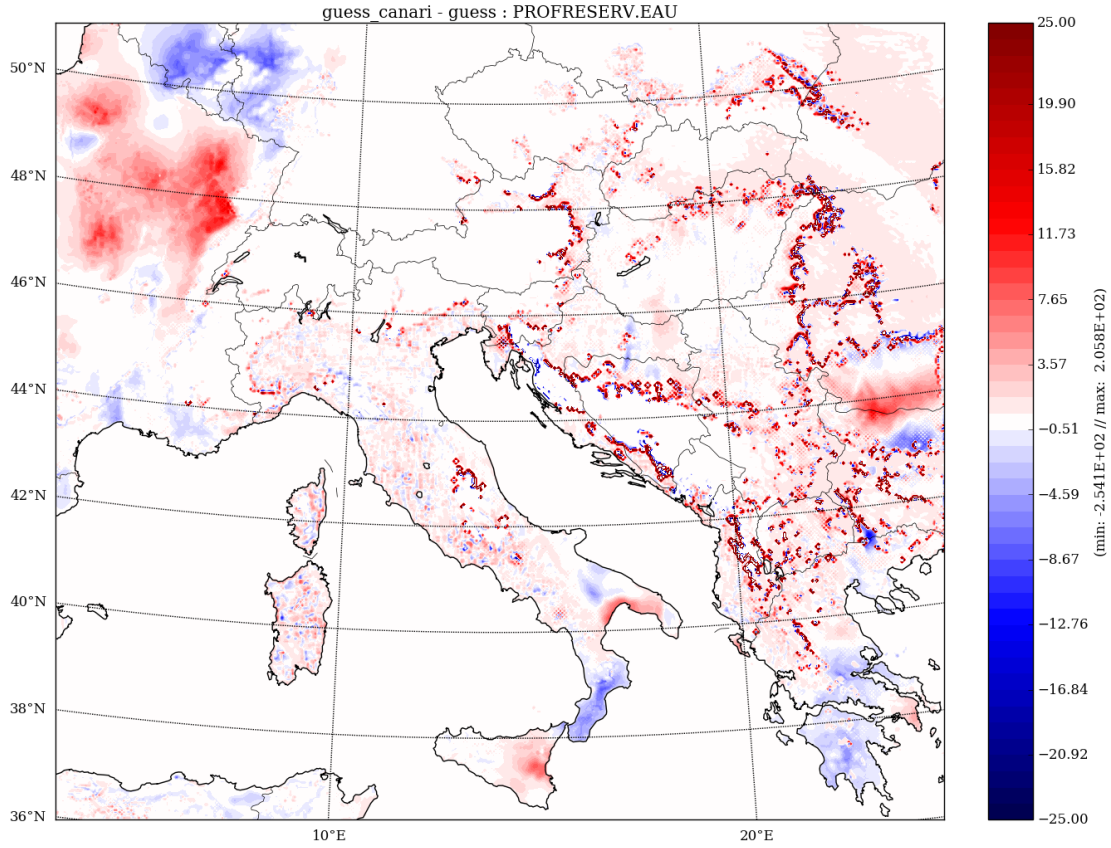
CANARI

- SMOOTHING - OFF

SMOOTHING OFF

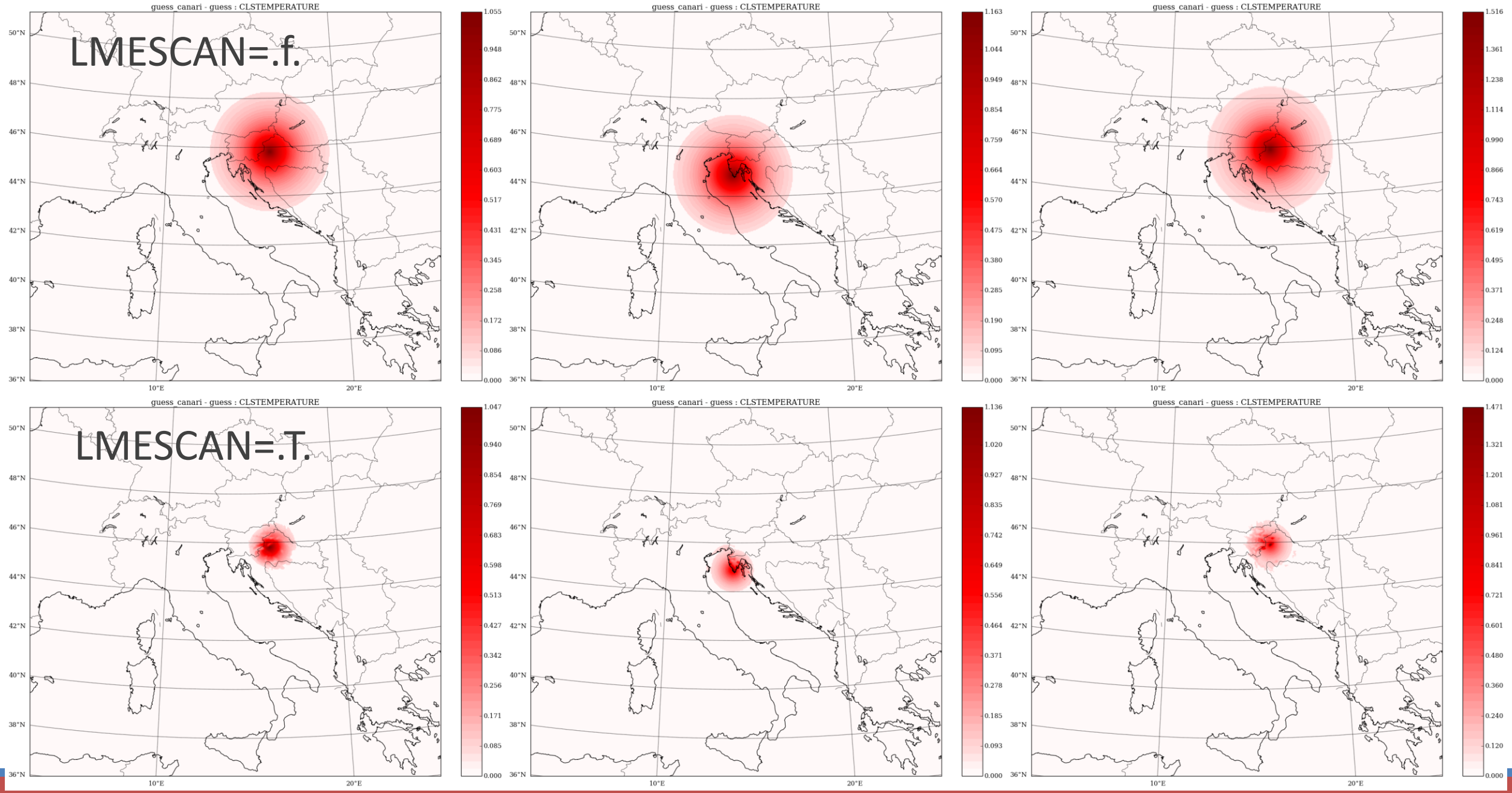


SMOOTHING ON

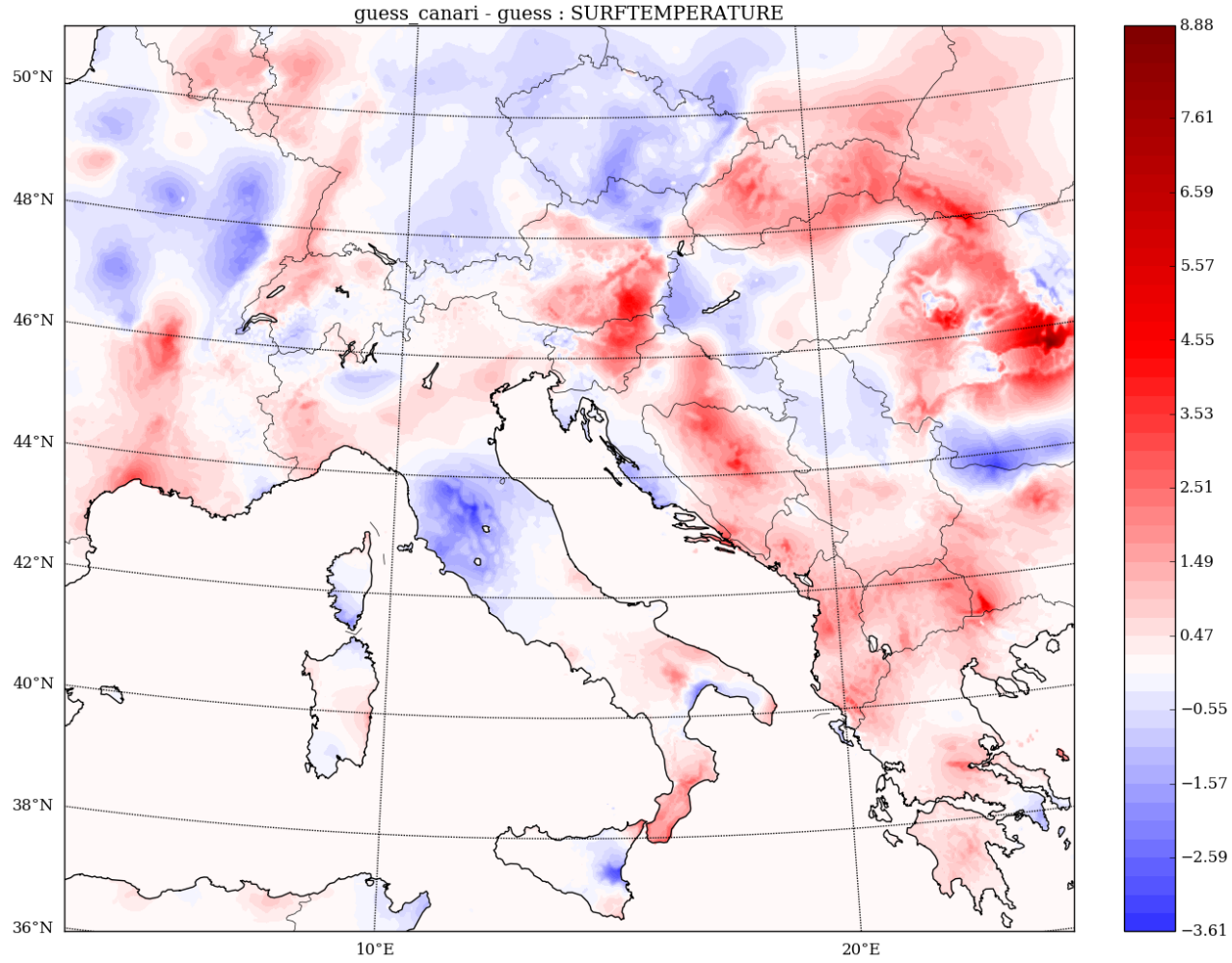


CANARI

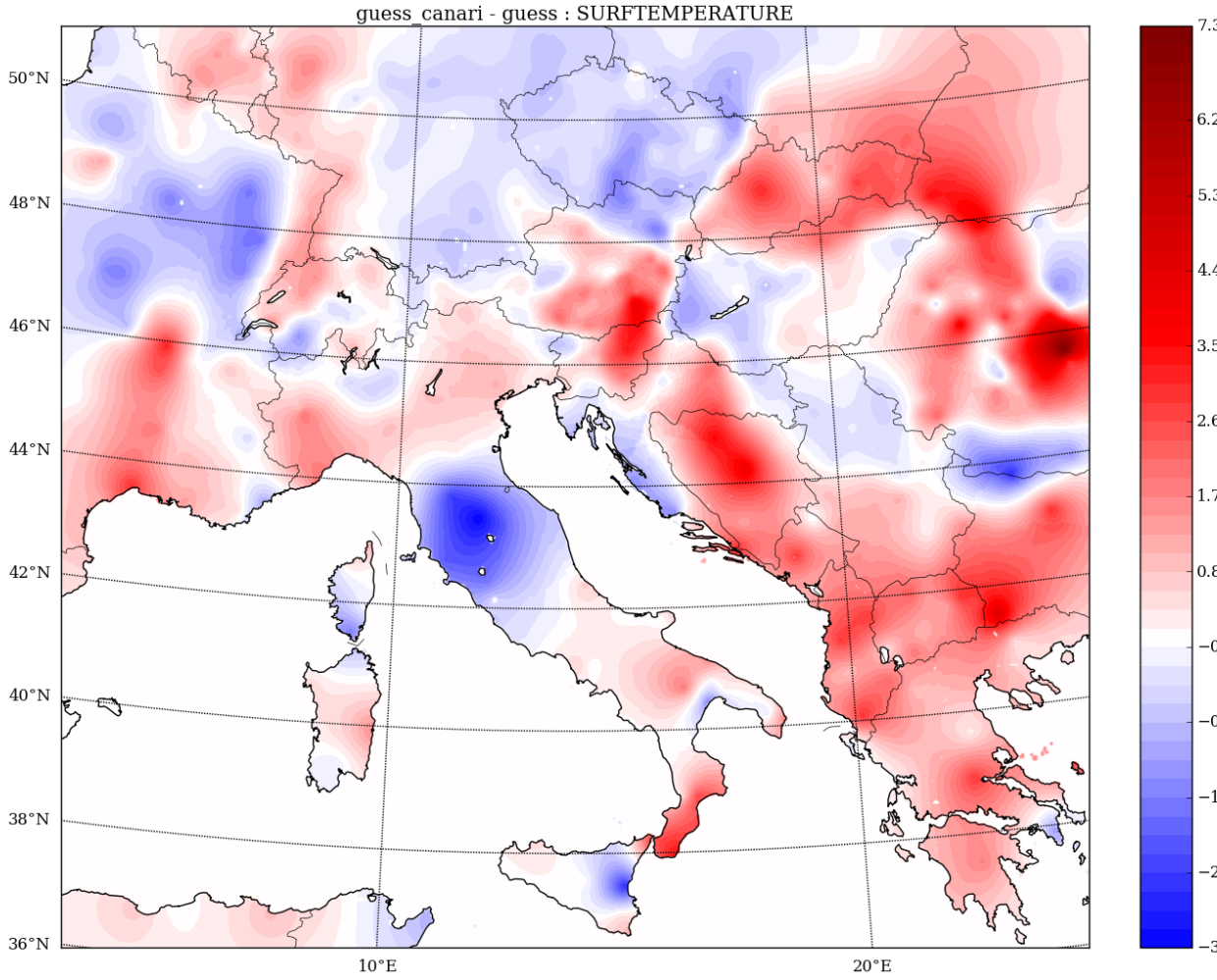
- LMESCAN=.T.
- Background error correlation function for T2m and RH2m dependand on difference in height and land-sea between two locations


LMESCAN=.f.
LMESCAN=.T.
guess_canari - guess : CLSTEMPERATURE
INLAND
NEAR SEA
HILL

LMESCAN=.T.



LMESCAN=.F.



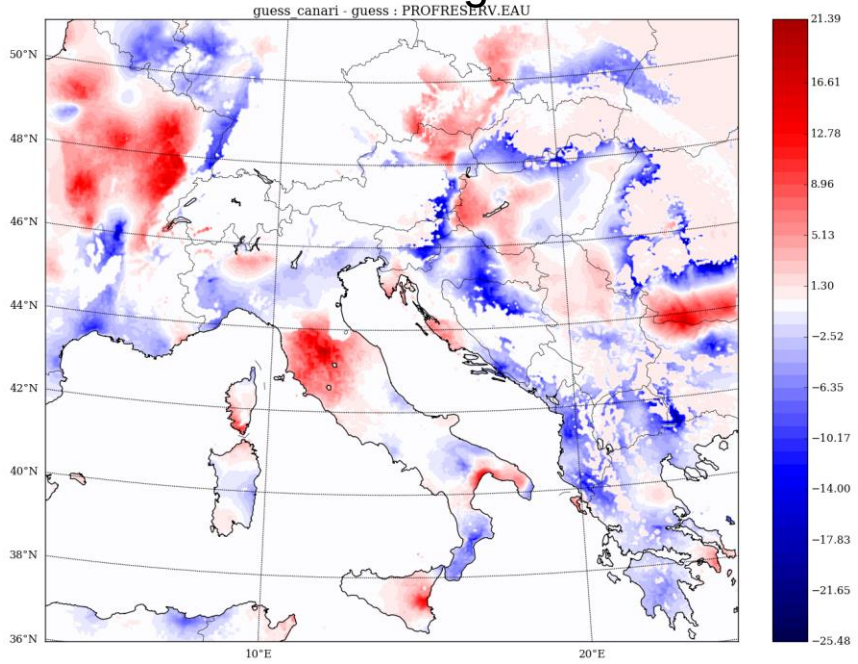
CANARI

- MASKING
- No masking:

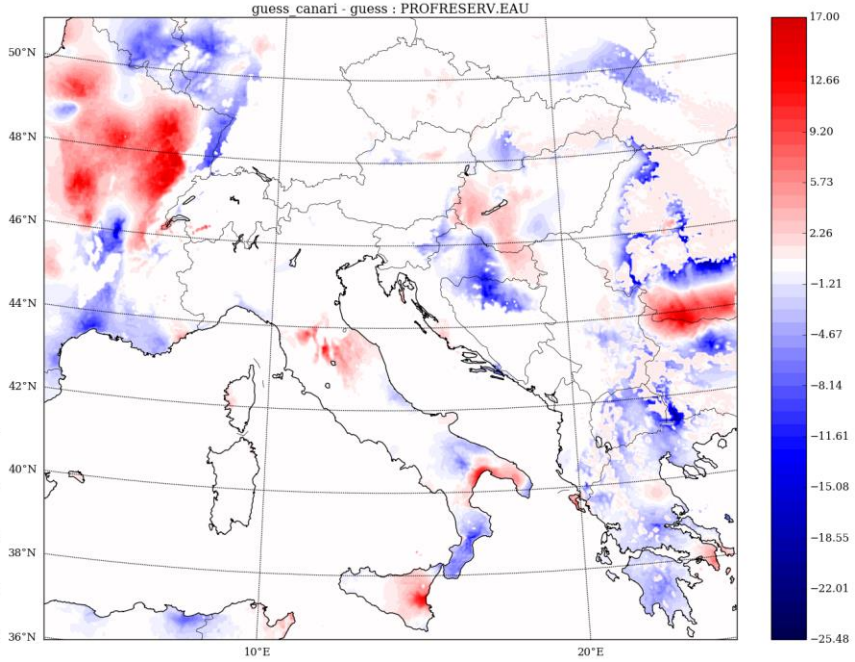
ANEBUL=0., ! cloudiness
SMU0=0., ! solar zenit angle (no Wp increments during night)
SPRECIP=1000 ! precipitation
V10MX=10000 ! wind

CANARI

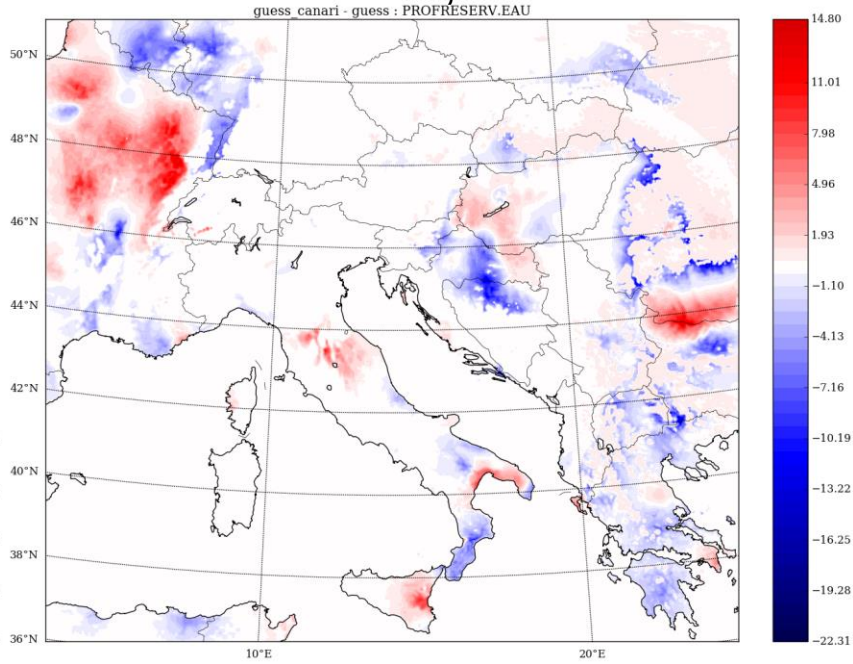
NO masking



SPRECIP=10



SPRECIP=10; VMAX=10

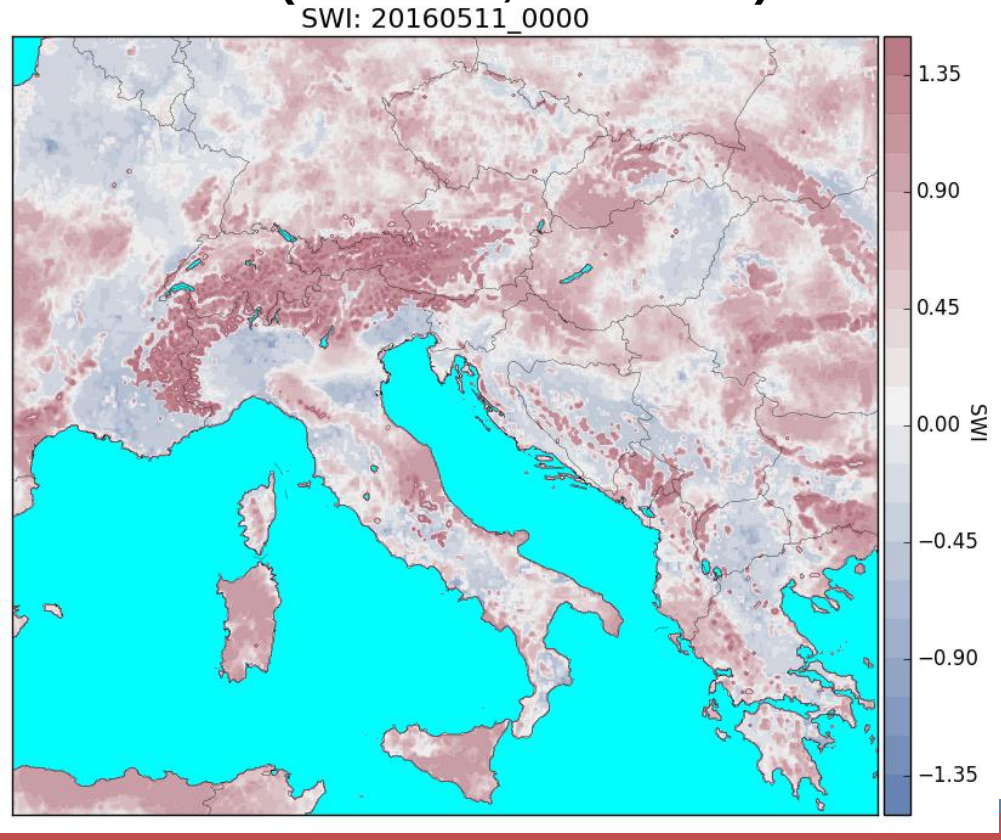


ANEBUL=0.4, SMU0=0., SPRECIP=10, V10MX=10.

CANARI

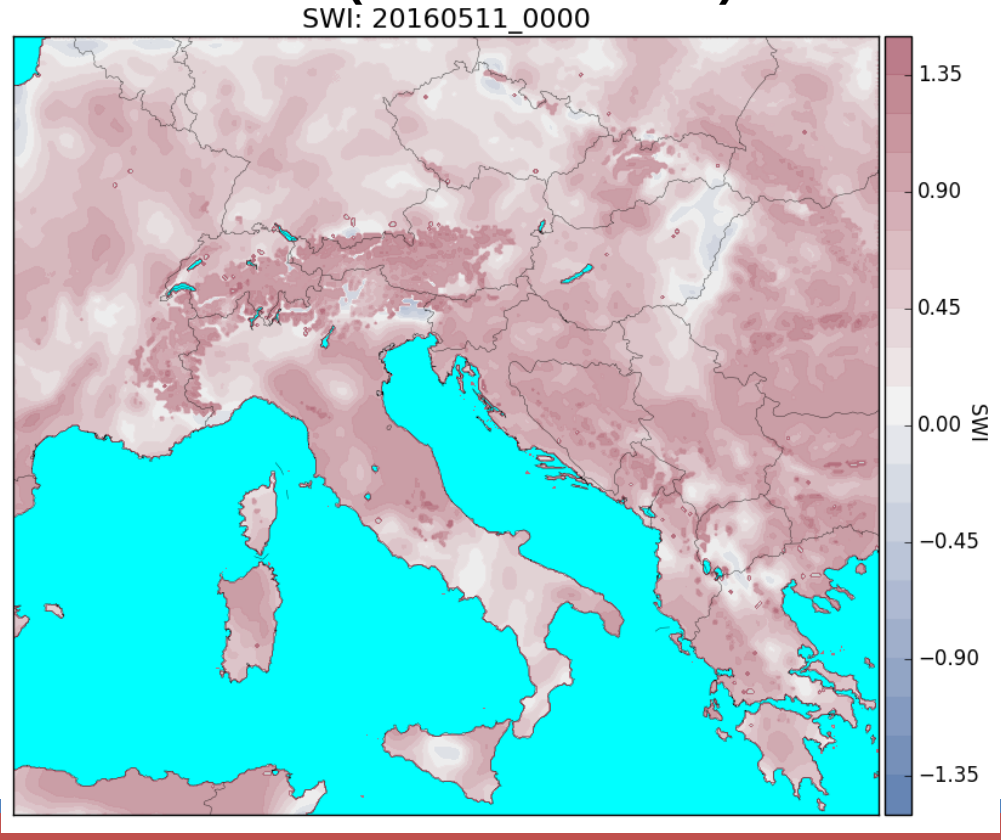
ANEBUL=0.4, SMU0=0., SPRECIP=10, V10MX=10.

NEW (MESCAN, MASKING)



~1.5m cycle

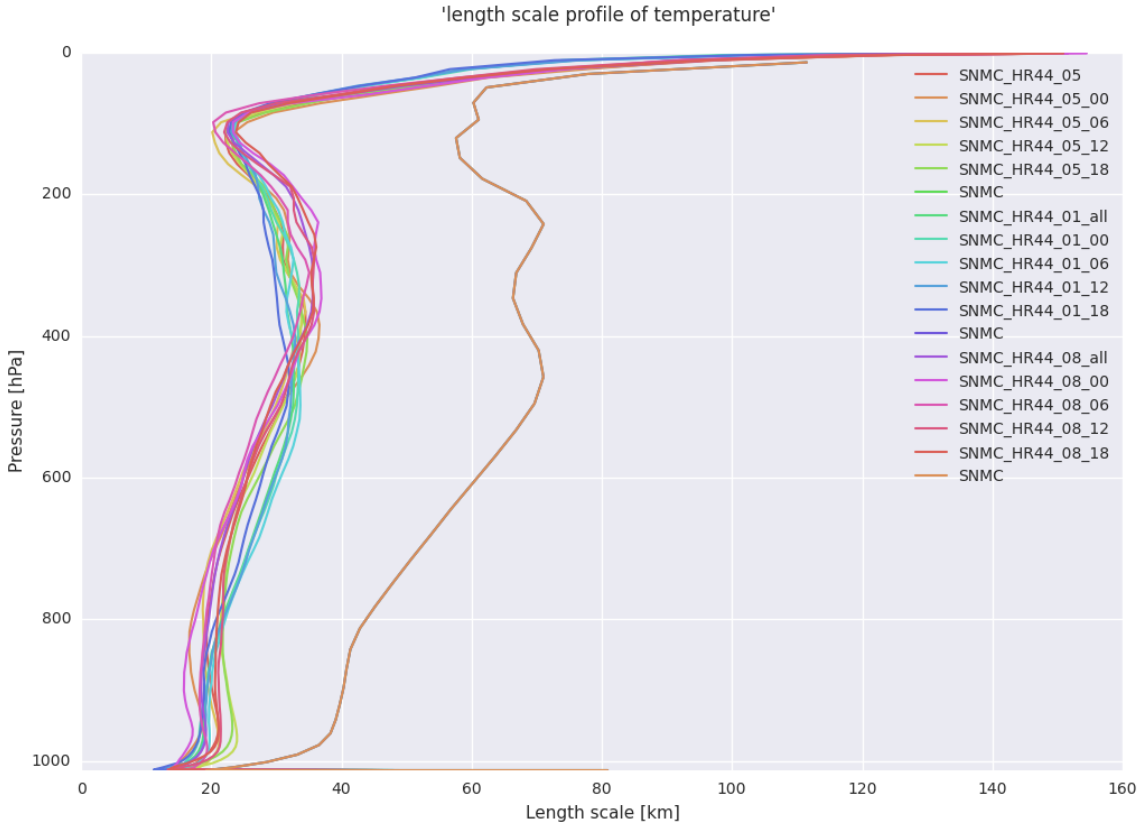
OLD (CANARI default)

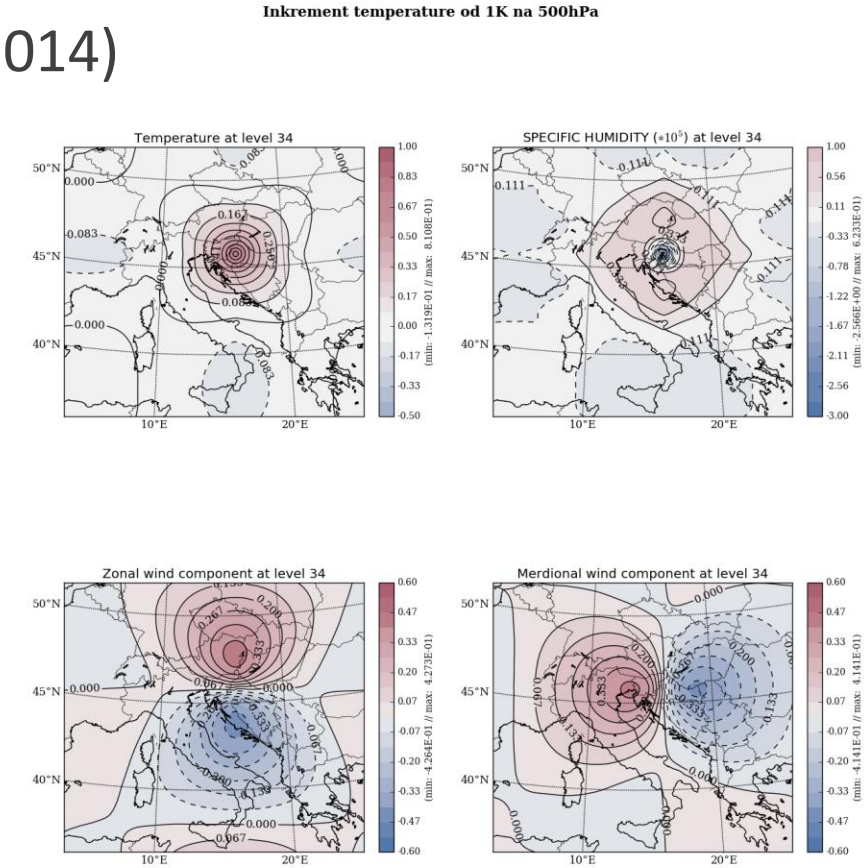


3DVAR

- B matrix:

SNMC method: 3 month (January, May, August 2014)





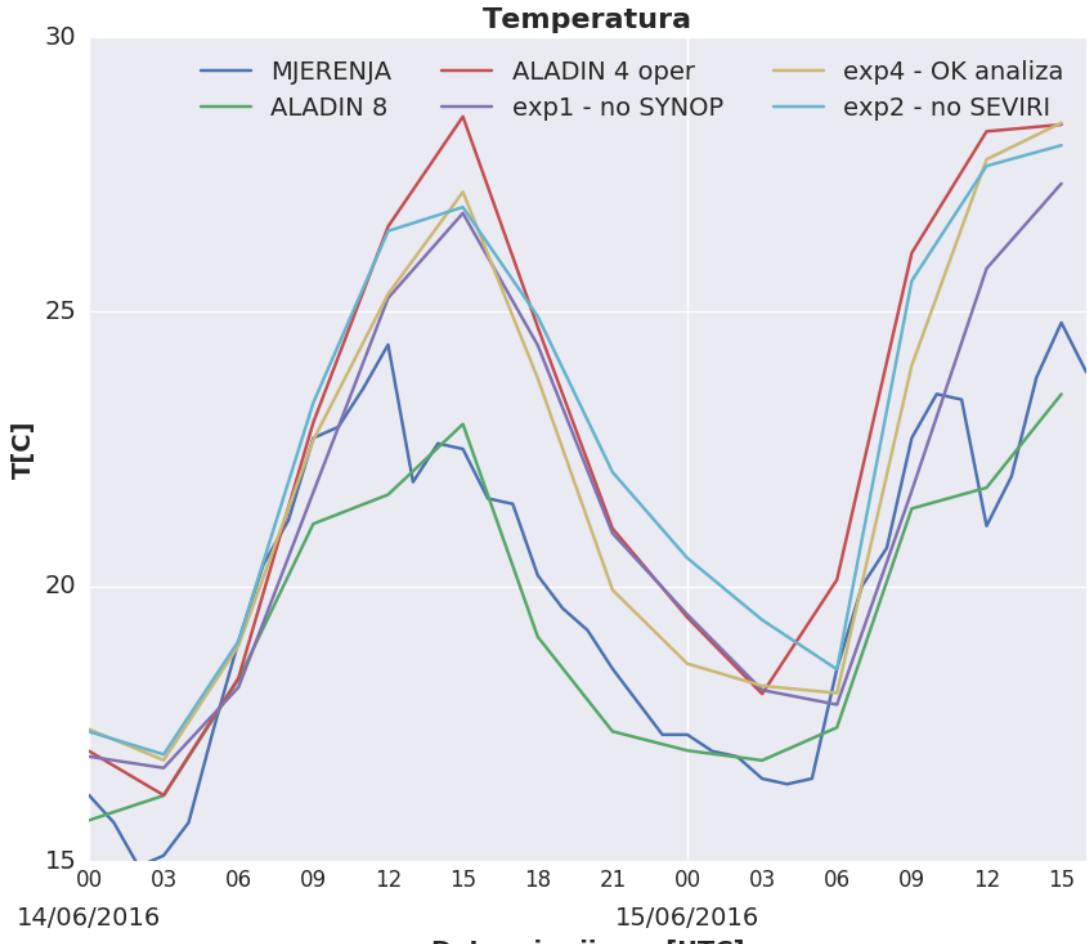
SNMC_HR44_01-05-08_00

3DVAR

- DA 3h cycle started 2016.03.01.
- B matrix tuning [Desroziers et al. (2005)] on period 2016-04-01-2016-05-15
  - REDNMC (1.4), REDNMC_Q (1), sigma o (0.6)
- Other changes compared to ALADIN-HR8:
  - GEOWIND → HRWIND
  - AMDAR→ AMDAR+MODE-S
  - SEVIRI THINING 70km →30km
  - SEVIRI CH 2,3 → 2,3,4,6
  - VARBC cycling 24h → 3h
- production started 2016.05.18. (00 run; +72hrs)

3DVAR

- Problems due to too high temperature (14.06.2016.)



3DVAR

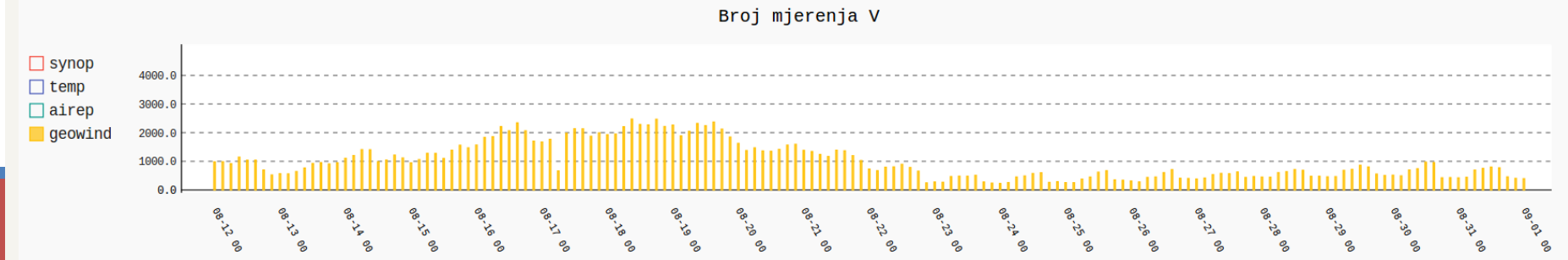
NaN in minimsation:

- *PS: NaN*
- *SPECTRAL NORMS - LOG(PREHYDS) NaN*
- *GREPGRAD - LSIMPLE,ITER,SIM,GRAD,J 0 0 NaN 0.6096772572228781E+04*

- => NO analysis performed

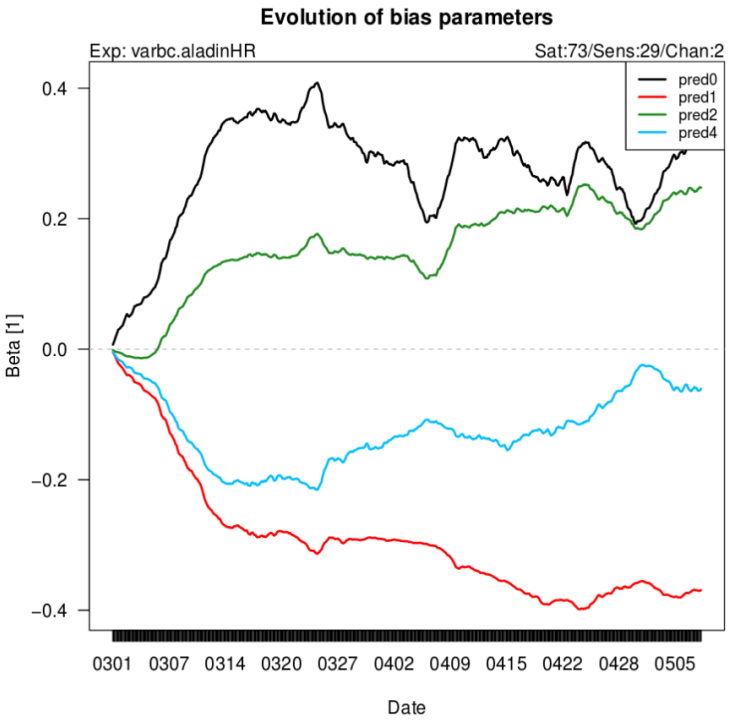
3DVAR

- NaN in minimisation (~3-4% of cases):
  - synop+hrwind+seviri+amdar (84 proc) → NaN
  - synop+hrwind+seviri+amdar (96 proc)→ works
  - synop+hrwind+seviri+amdar (72 proc)→ works
  - synop+seviri+amdar (84 proc) → works
  - synop+hrwind+amdar (84 proc) → works
  - synop+hrwind+seviri (84 proc) → NaN
  - => connected with nb of proc and nb od data most probably HRWIND
  - => from 20.08.2016. GEOWIND instead HRWIND – no NaN

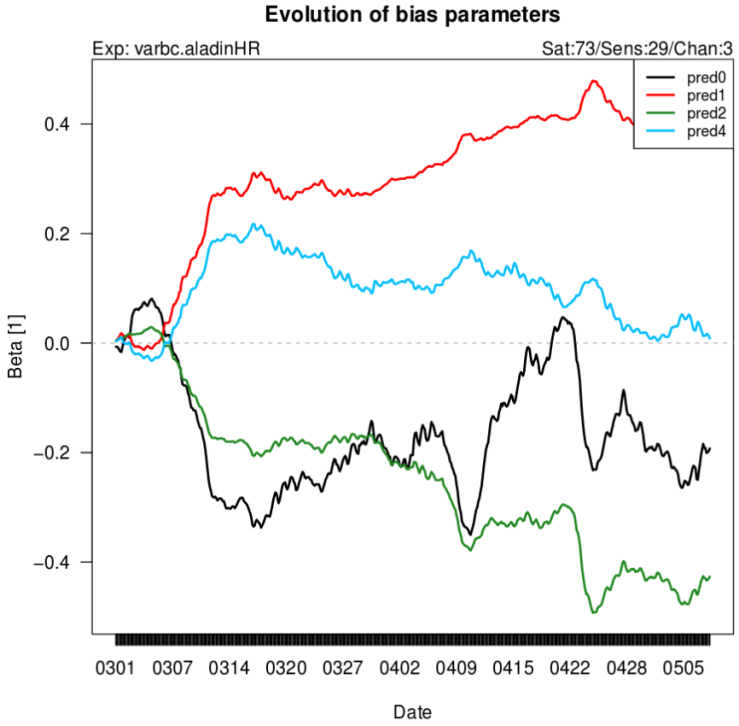


3DVAR-varbc

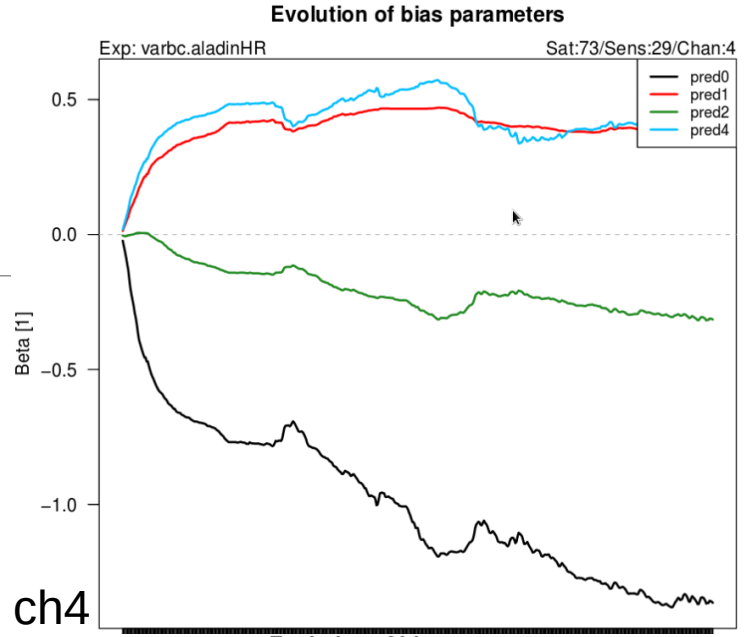
01.03.-05.05.



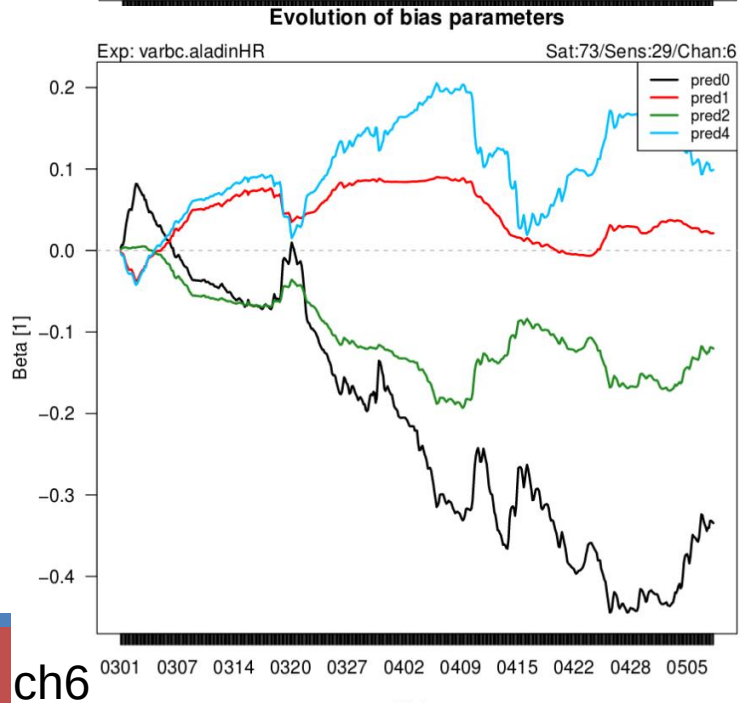
ch2



ch3



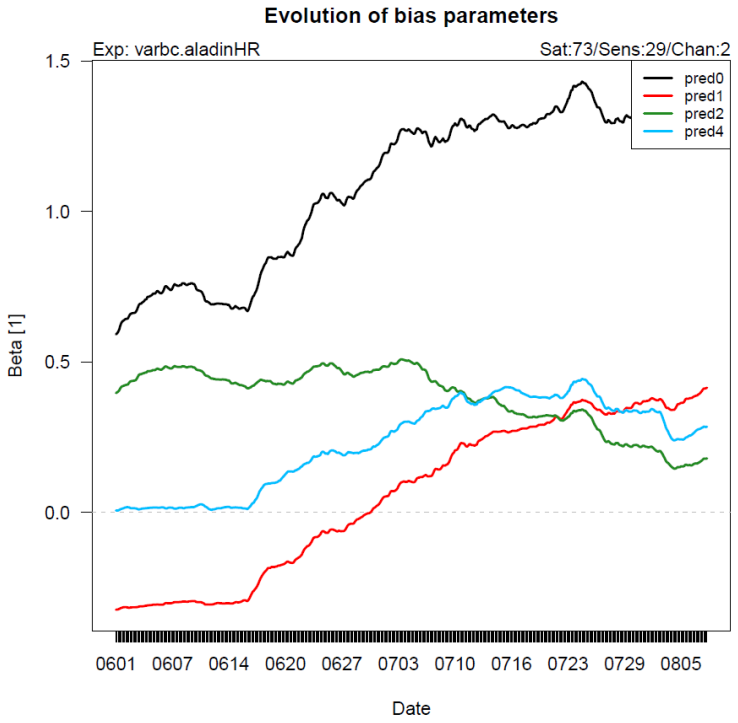
ch4



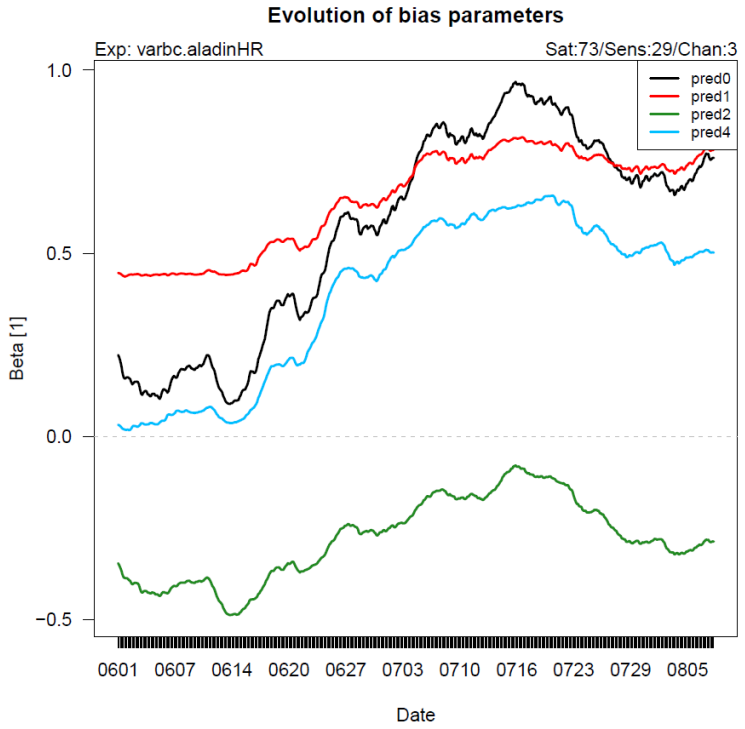
ch6

3DVAR-varbc

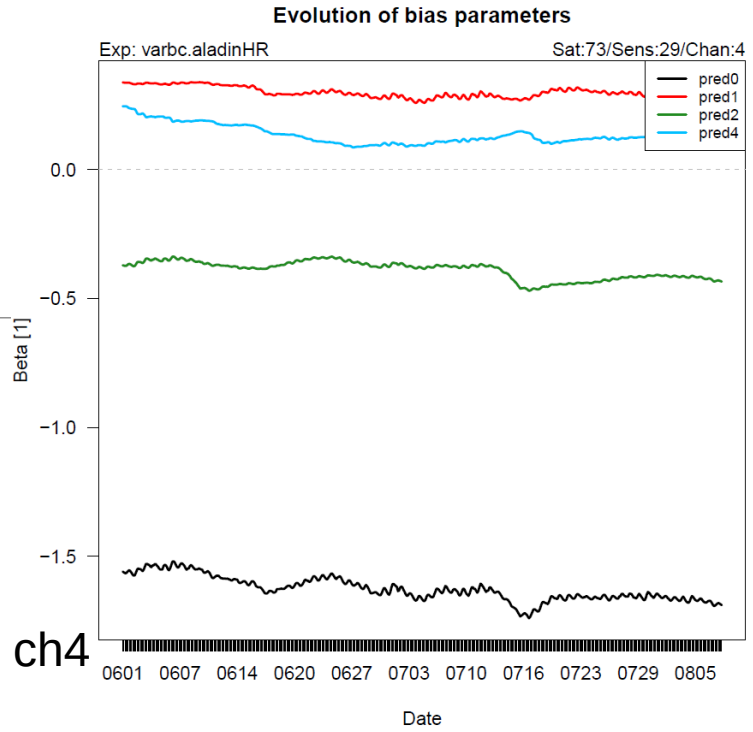
01.06.-05.08.



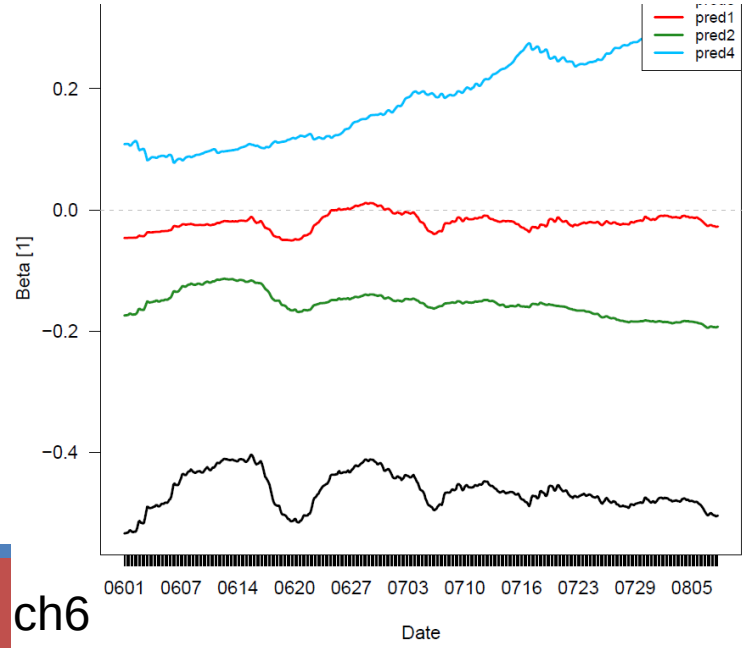
ch2



ch3



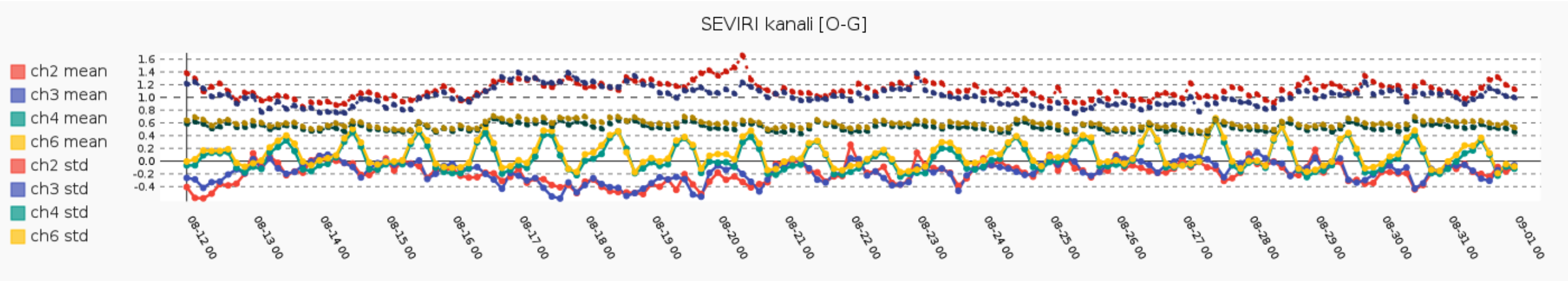
ch4



ch6

3DVAR

- VARBC problem?
  -

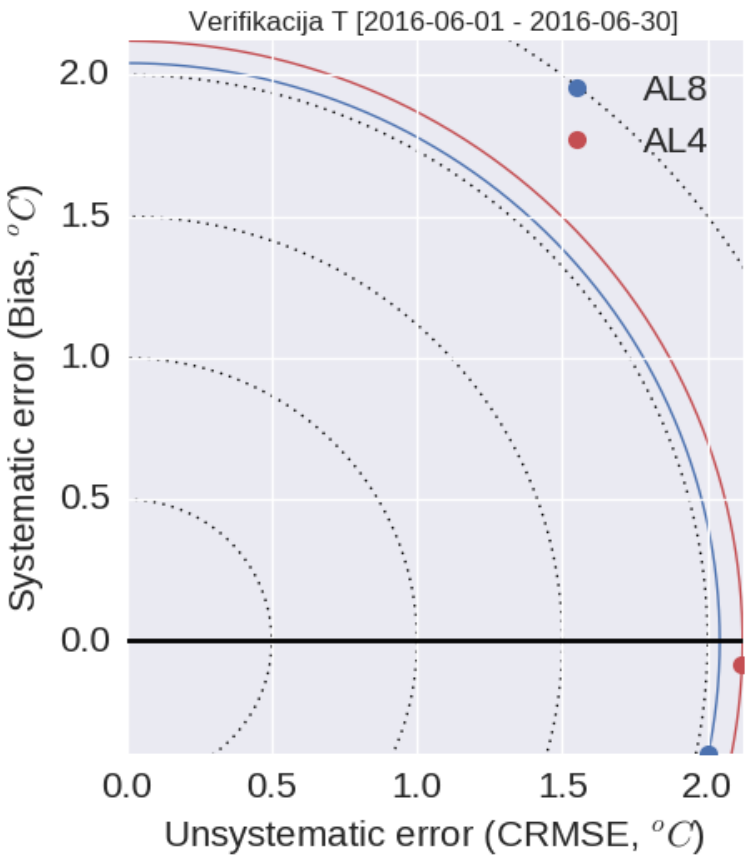


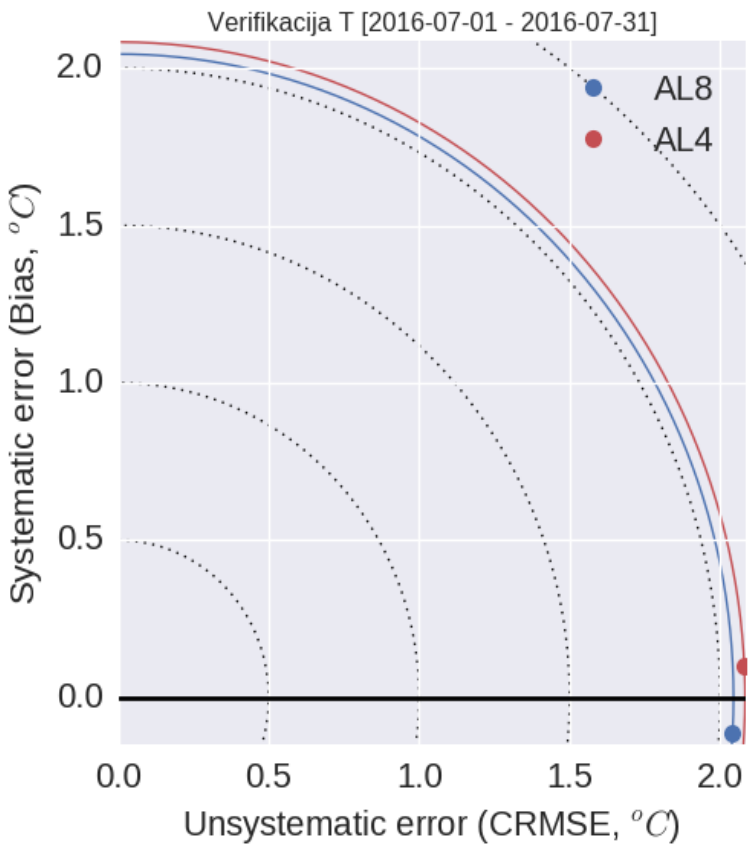
VERIF T2M

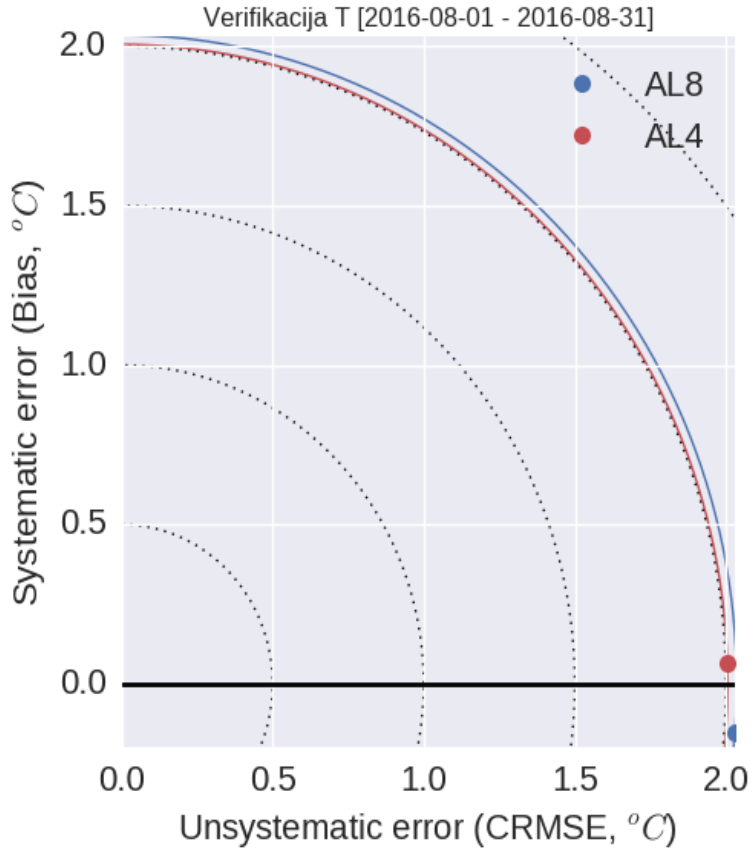
June

July

August



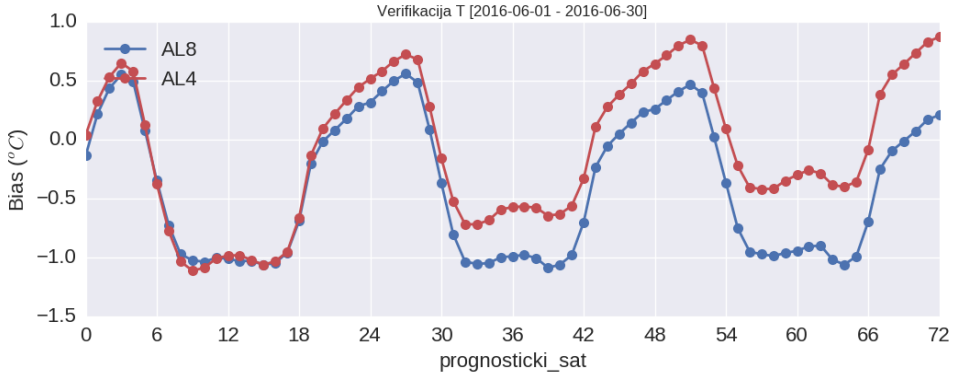




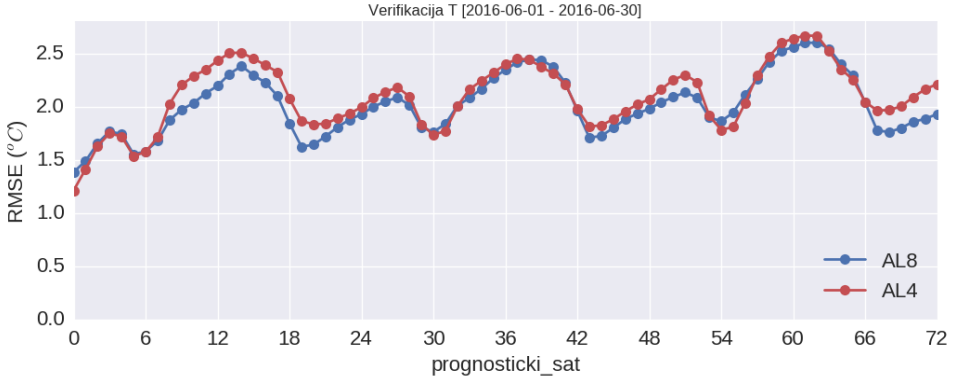
BIAS

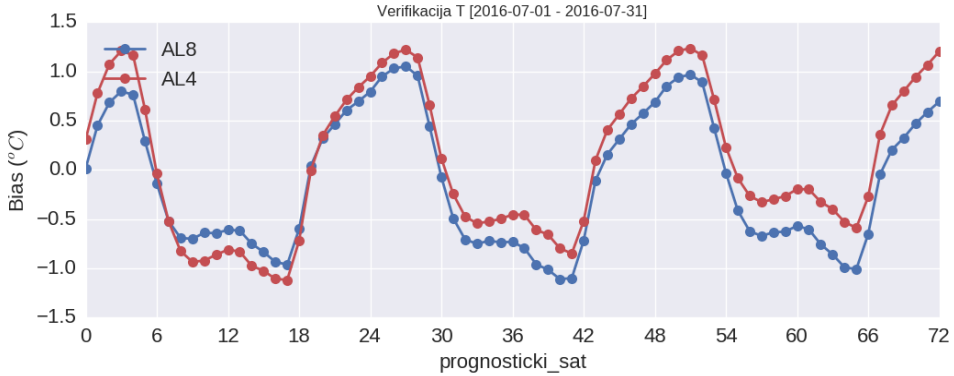
RMSE

VERIF T2M

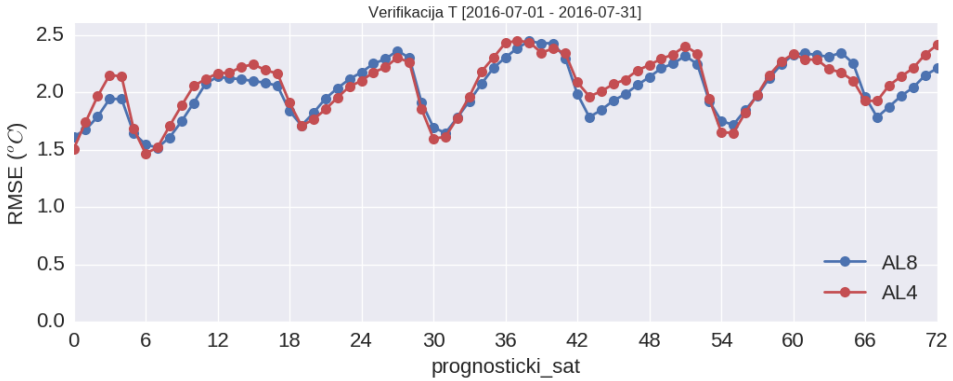


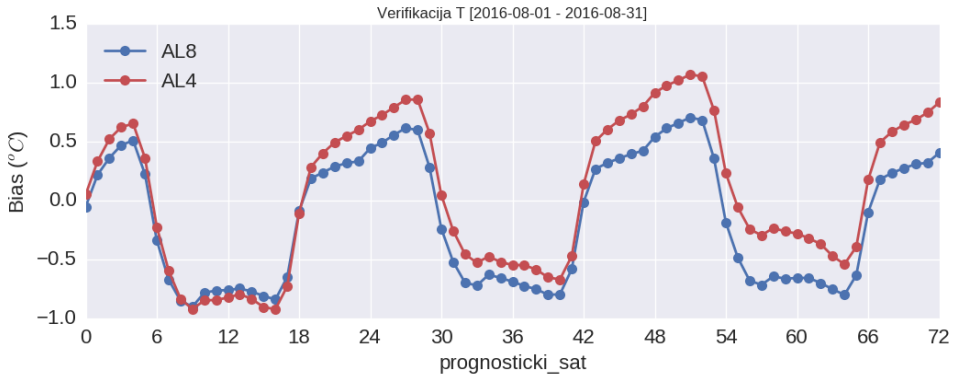
June



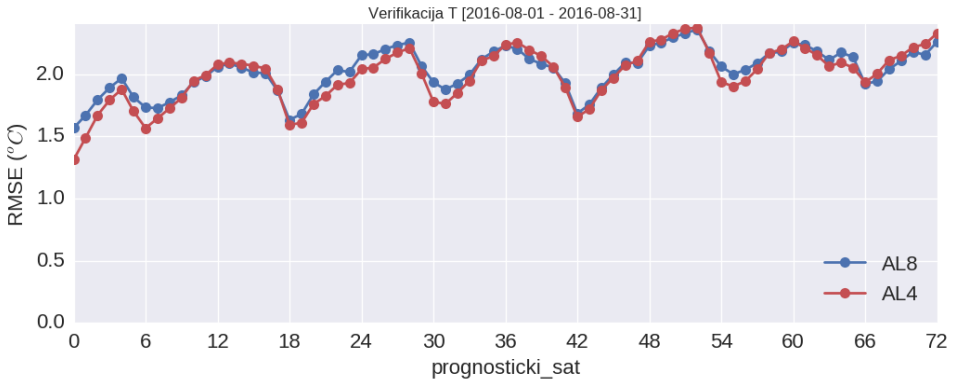


July





August



BIAS

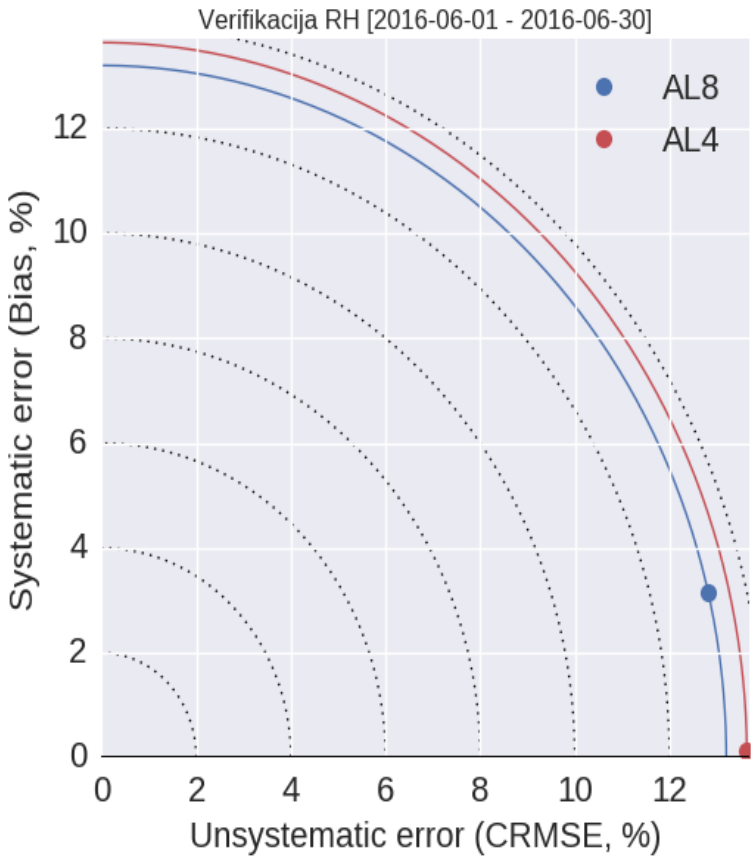
RMSE

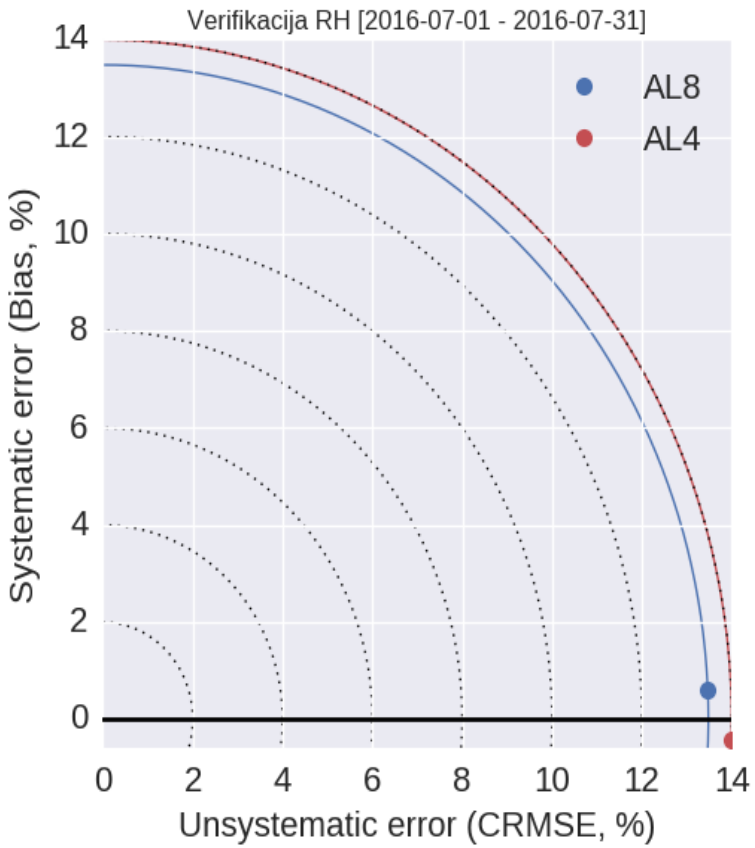
VERIF RH2M

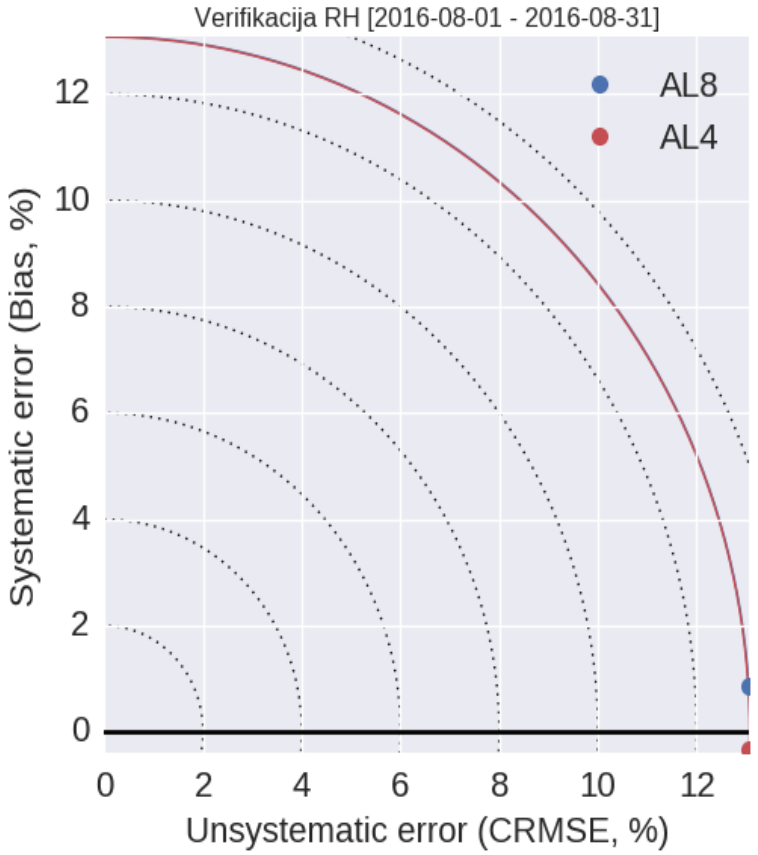
June

July

August



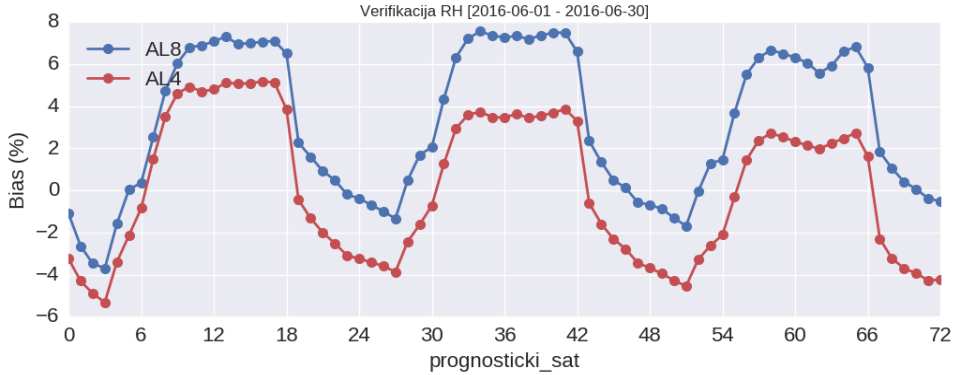




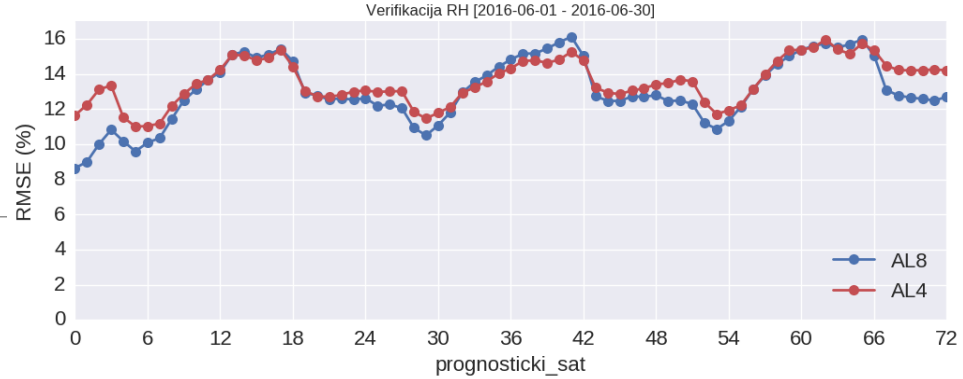
BIAS

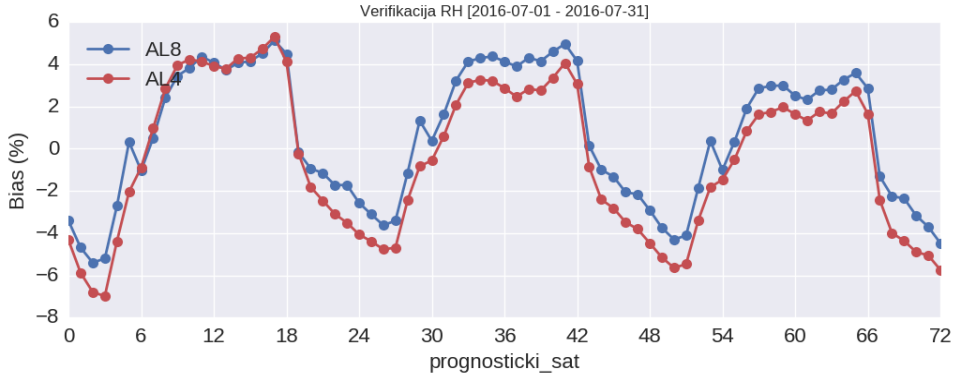
RMSE

VERIF RH2M

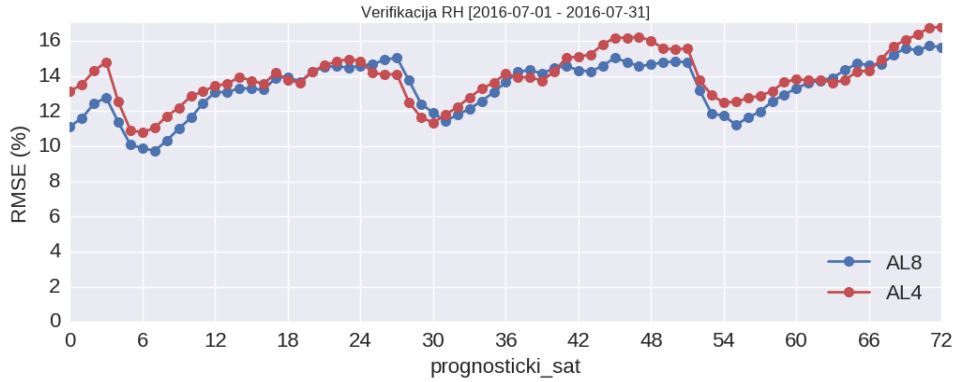


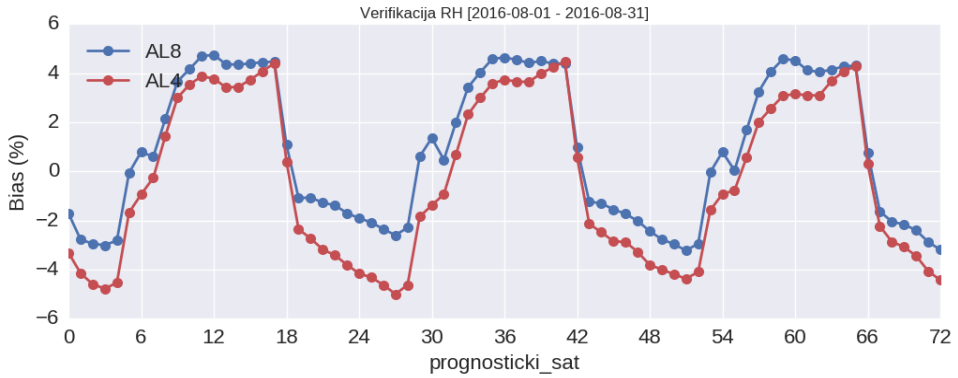
June



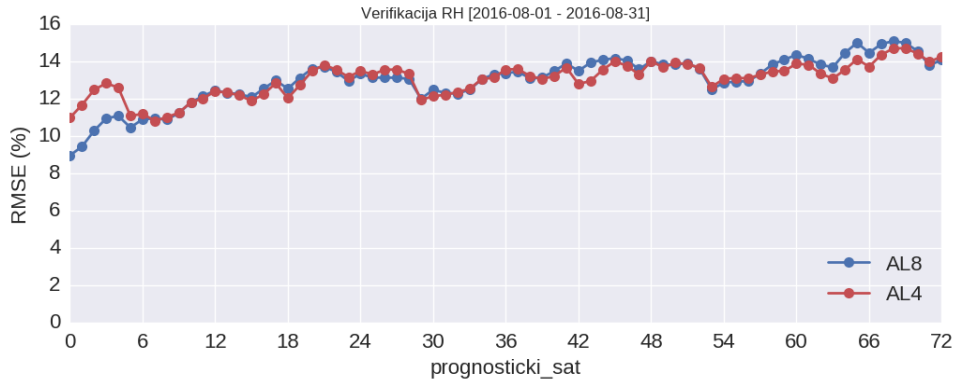


July





August



BIAS

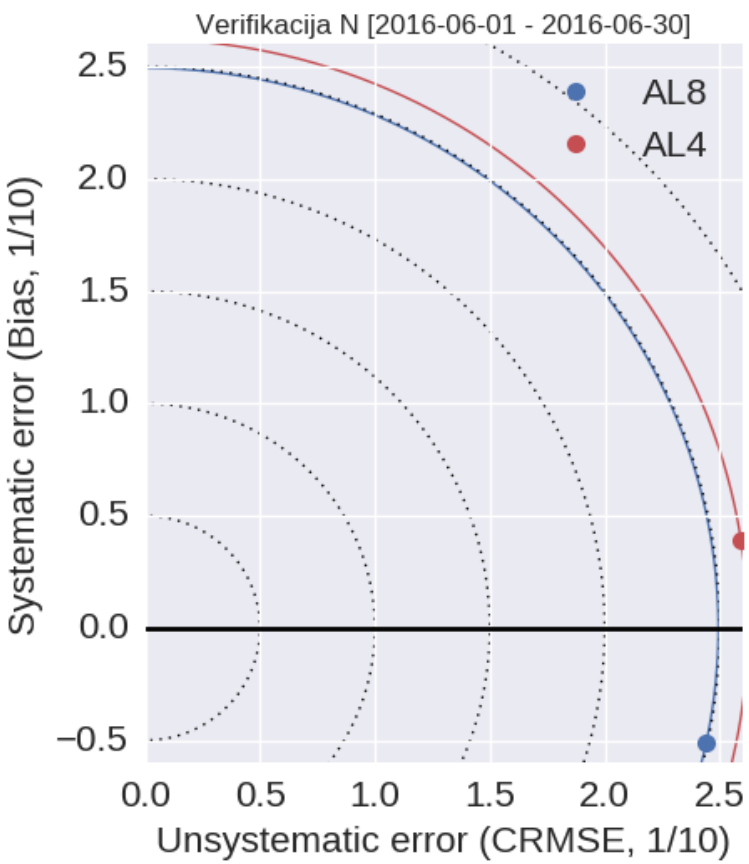
RMSE

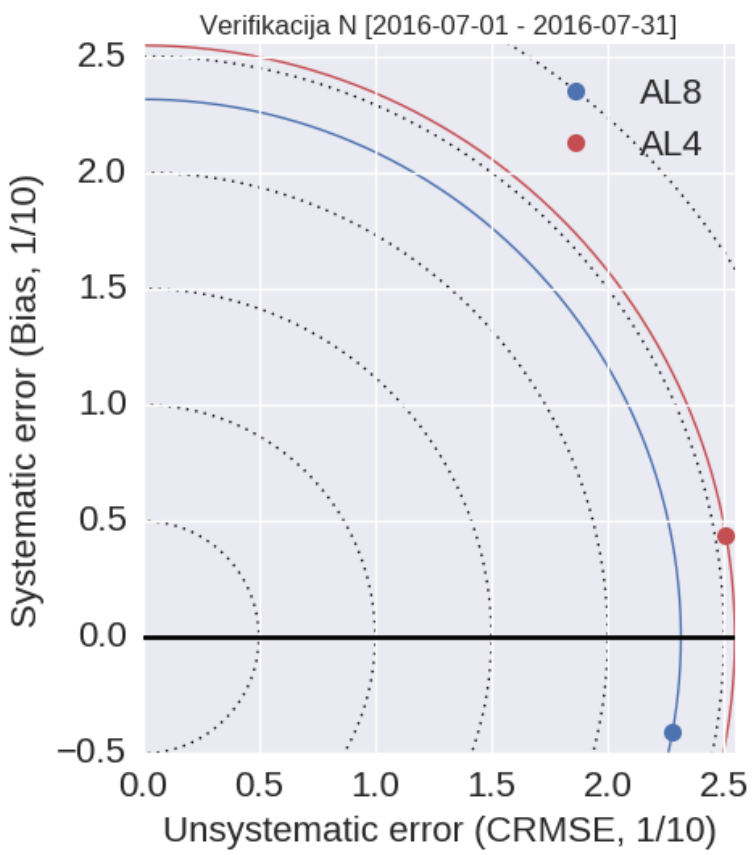
VERIF CLOUDINESS

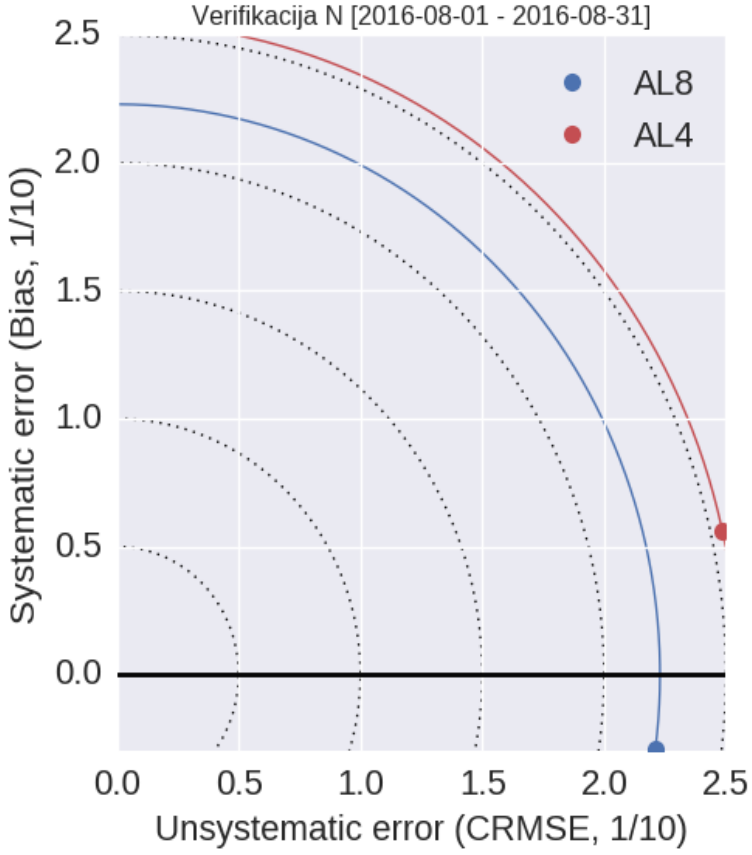
June

July

August



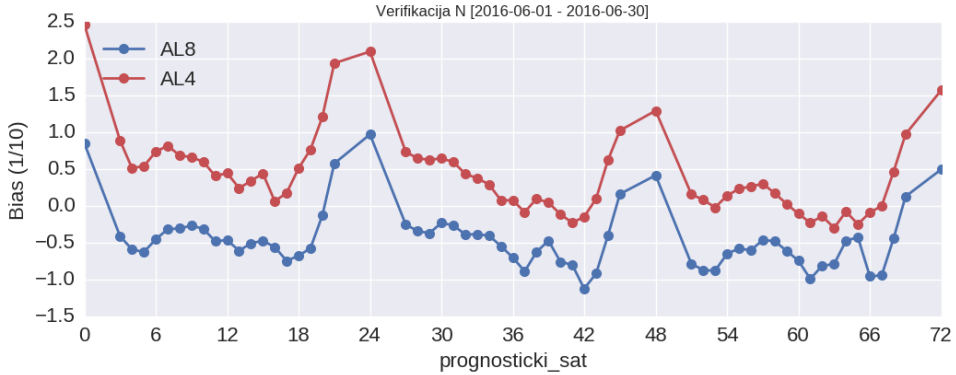




BIAS

RMSE

VERIF CLOUDINESS



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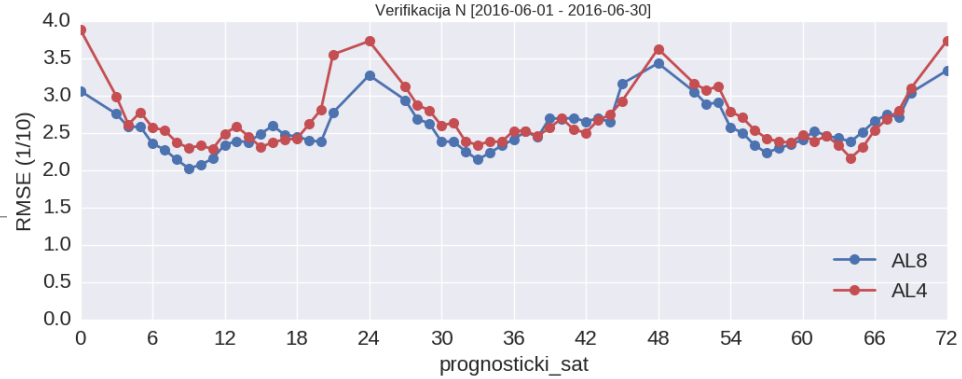

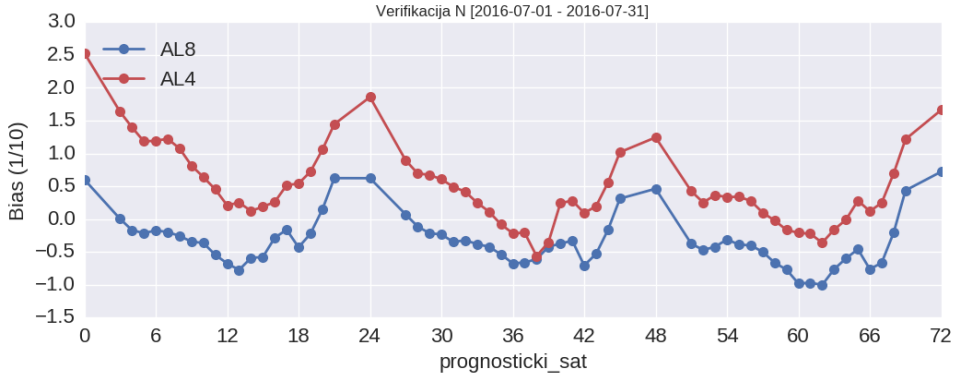

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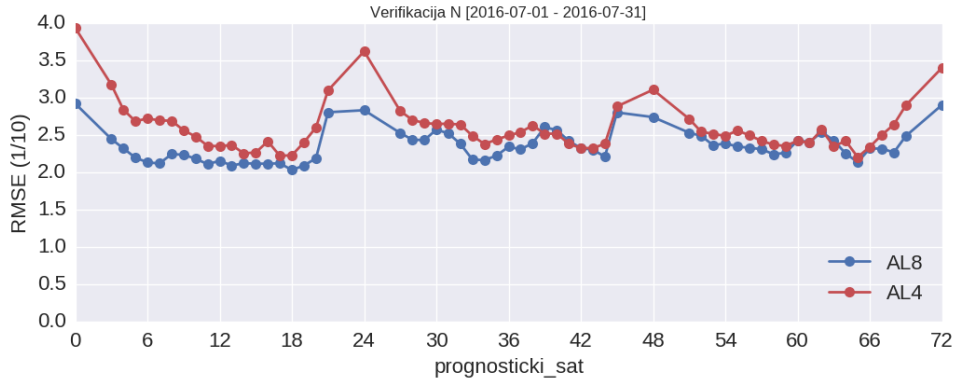

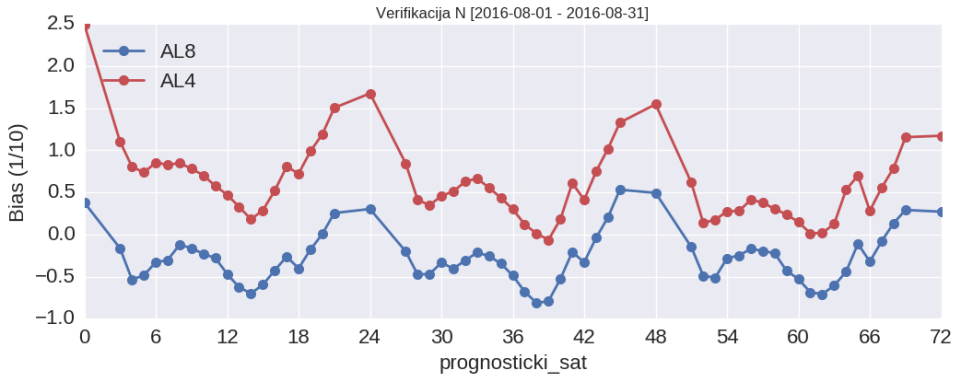

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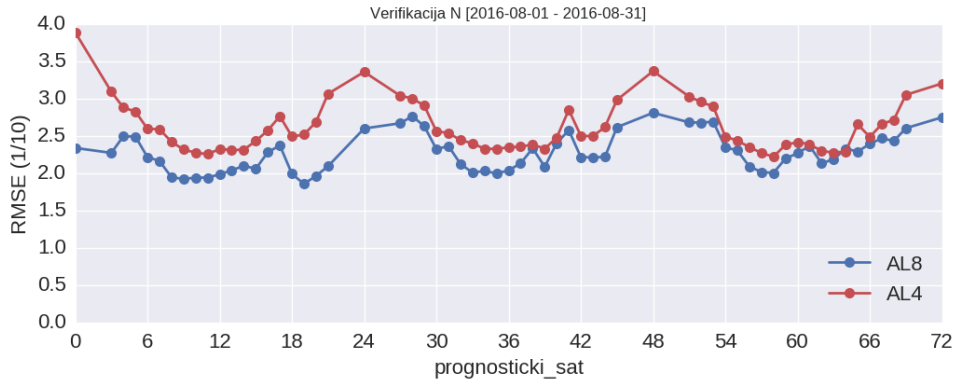

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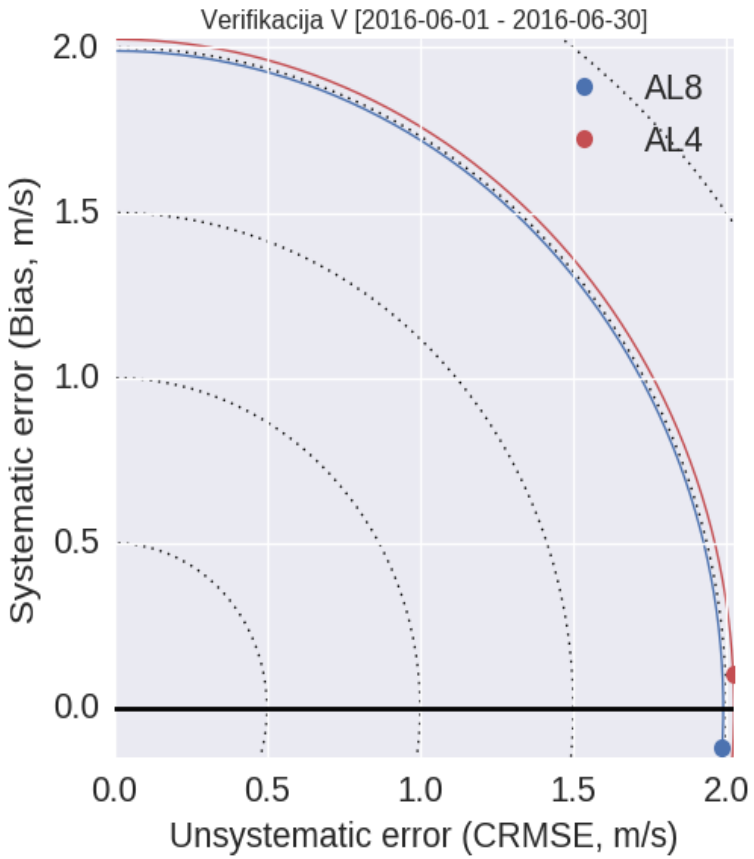
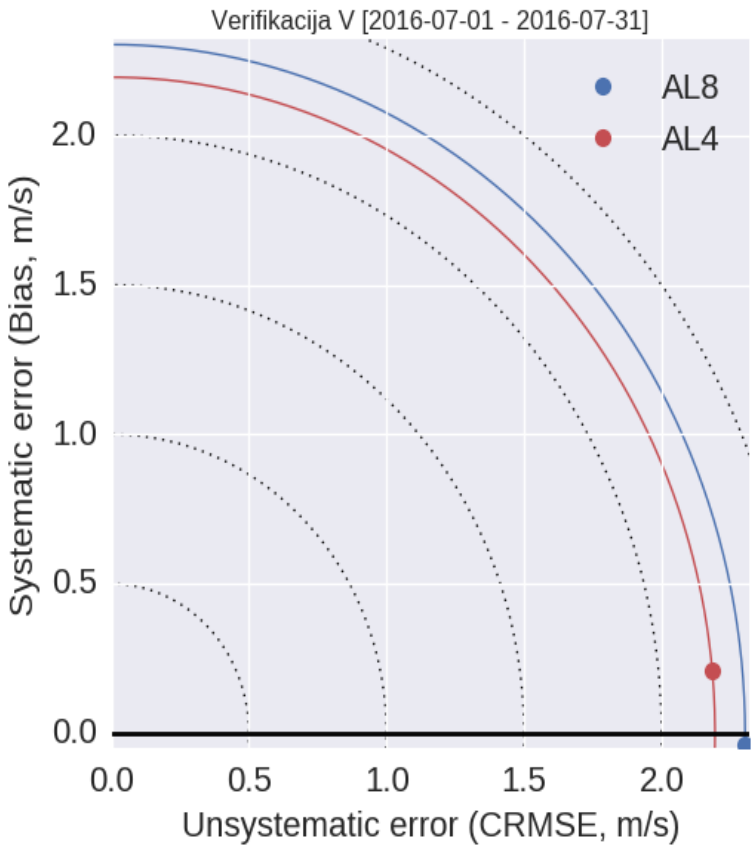
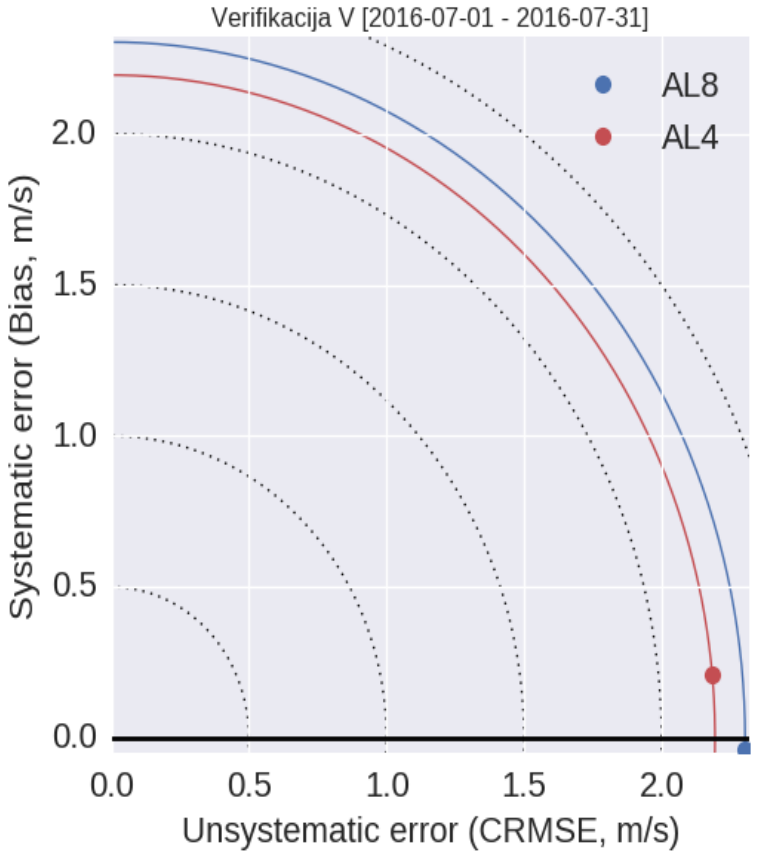
June

July

August







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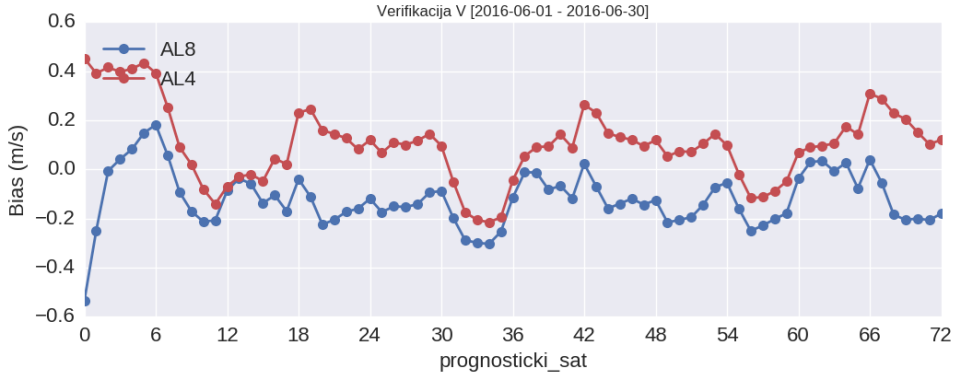
VERIF WIND



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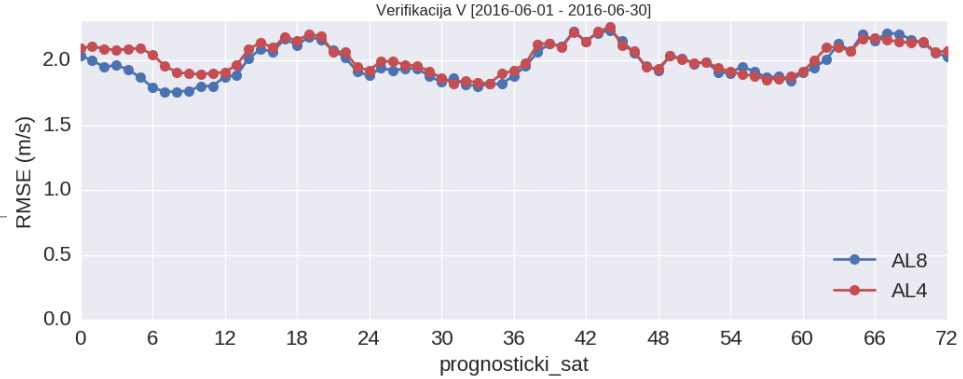

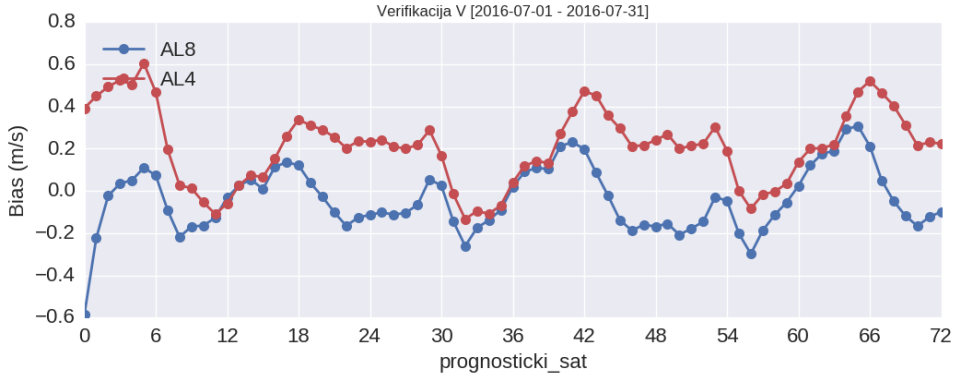

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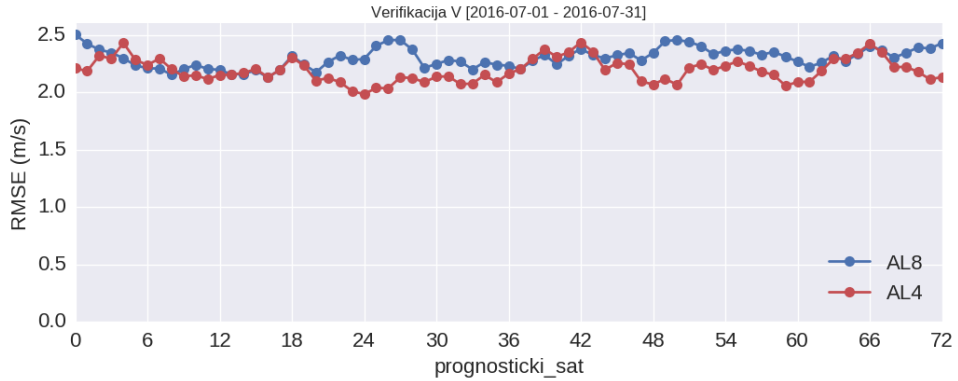

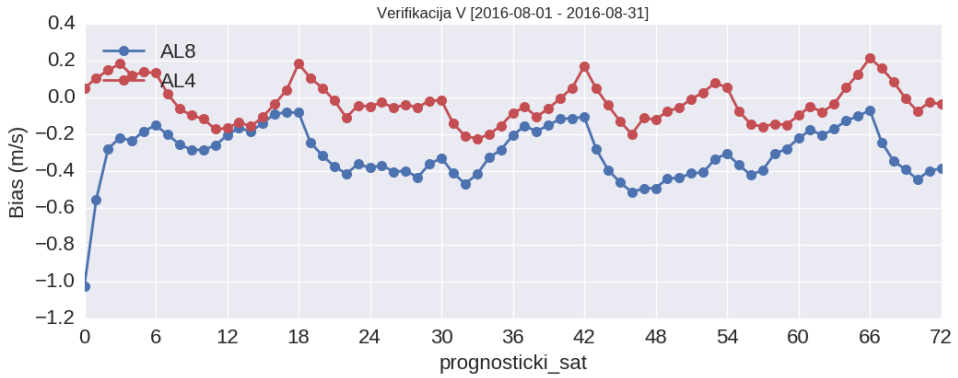

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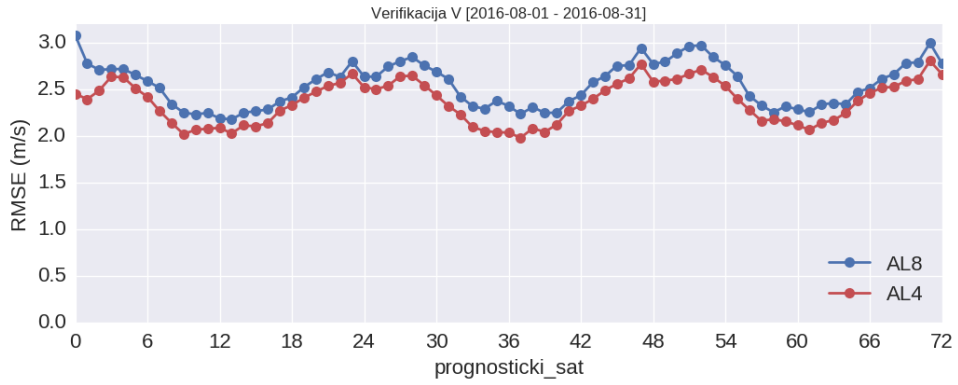

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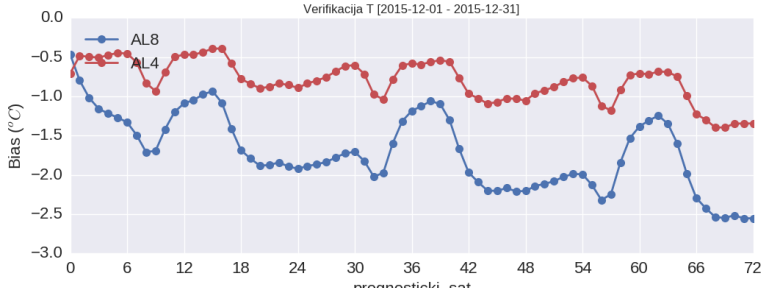

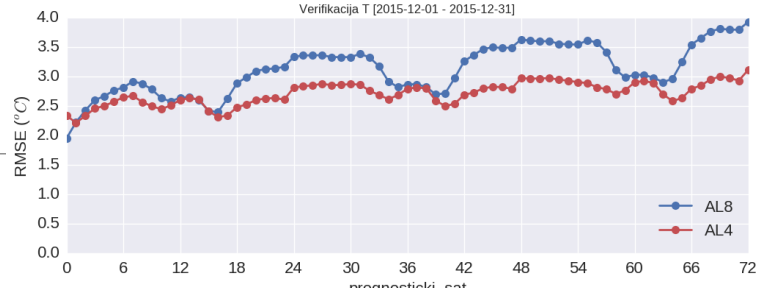

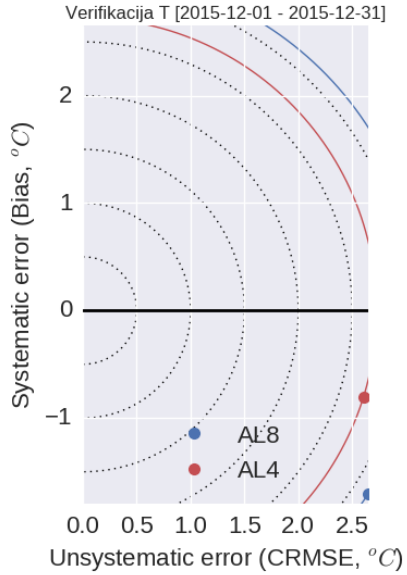

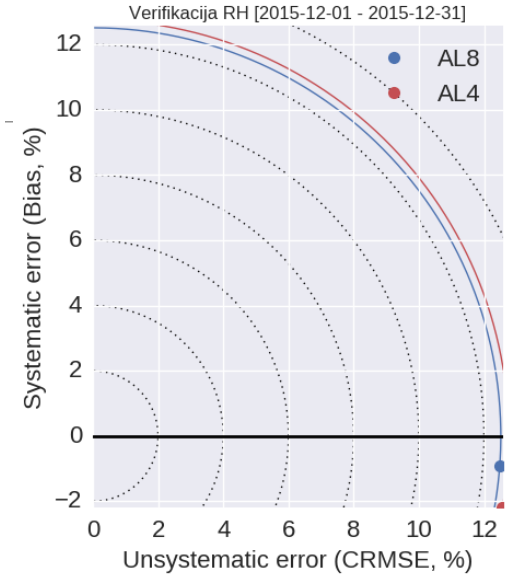

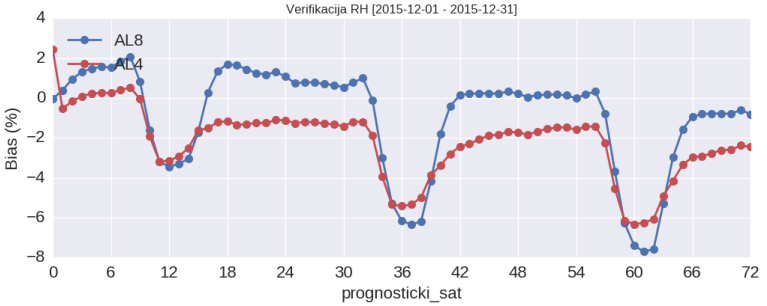

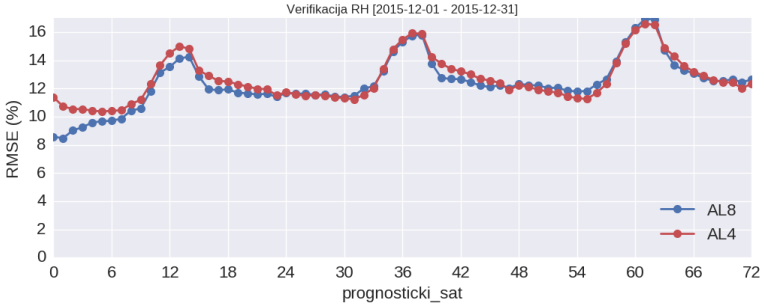

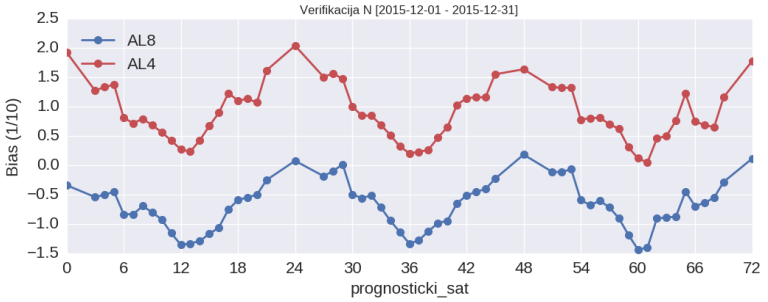

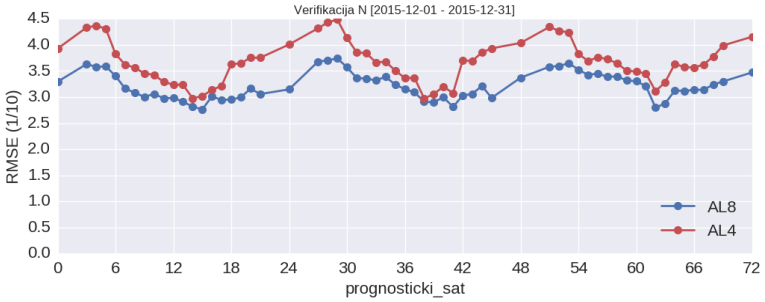

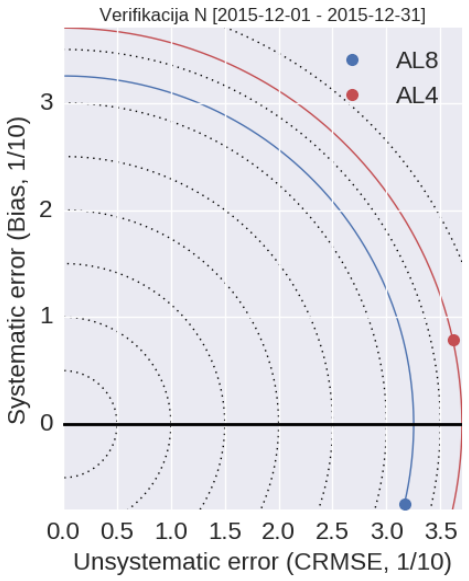

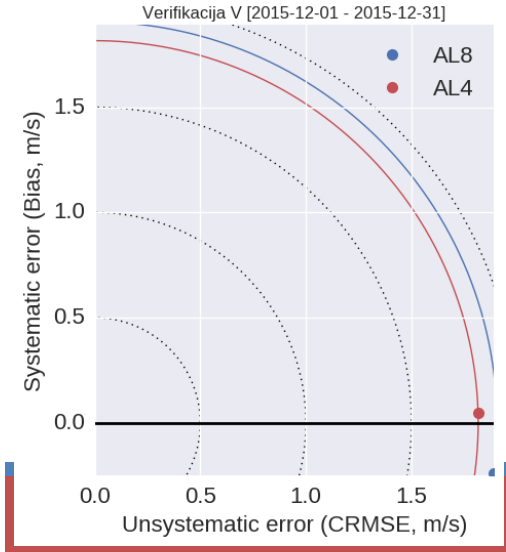

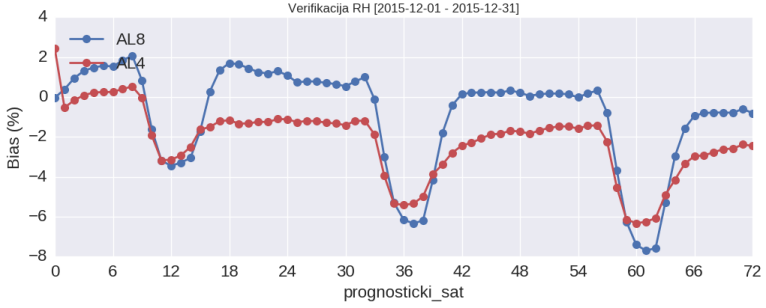

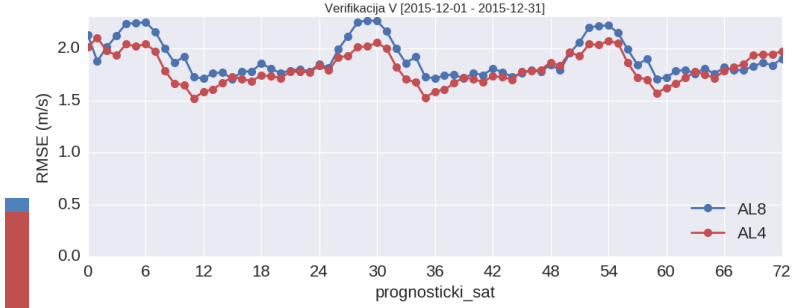

ALADIN-HR4 VERIFICATION

- ALADIN-HR4 compared to ALADIN-HR8:
  - More clouds in ALADIN4; bigger RMSE
  - T2m better bias during day, too warm during night; comparable RMSE – gets better
  - RH2m better bias during day, too dry during night;
  - Wind speed – bigger (positive) bias; smaller RMSE

  => days with broken analysis NOT filtered
  - Better results for T2m and wind speed during winter
  - Better results if we look whole domain (HARMONIE verif)

PLANS

- continue validation of ALADIN-HR4
- continue work on radar data assimilation
- implement new observation types: GPS
- B matrix diagnostics and impact tests