Development of local DA system at DHMZ

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Content

Development from last DAWD

Future plans

Development from last DAWD

DAWD, Ljubljana

- use VARBC - ☺
- clean up “the” AMSU channels - ☺
- look into CANARI and physics (ISBA) interaction: ratio of evaporation and heating by radiation - ☺☹
- Jb/Jo tuning - ☹
- Use ensemble B for the June period - ☹
- IDFI - ☹

Domain & DA system

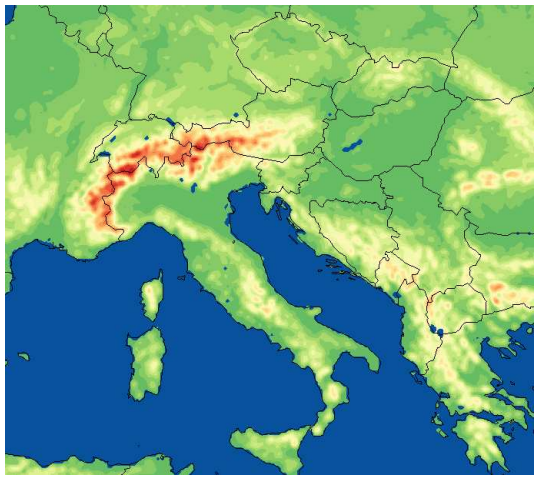


Figure 1: Domain of ALADIN Croatia.

- DA runs in parallel quasi-operational mode; 72h production for 00 and 12 UTC
- CYCLE:
  - CANARI - cy35t1
  - BATOR, SCREENING, MINIMIZATION - cy35t1
  - e001 - cy32t1

BUFR

- BUFR files - from mid of November 2010 switch to BUFR files for obs types 3 and 7
- Files were tested with cy35t1 - number of data is a bit bigger when using BUFR files compared to OBSOUL

VarBC

- VARBC was implemented at the end of December 2010
- worm up period: 20101124-20101220
- VARBC started from VARBC.merge file
  - first day 6 h cycling of VARBC.cycle file
  - afterward 24 h cycling of VARBC.cycle file
- no verification done for production from varbc cycle vs. production of “static bias correction” cycle

NOAA 16 - AMSUA

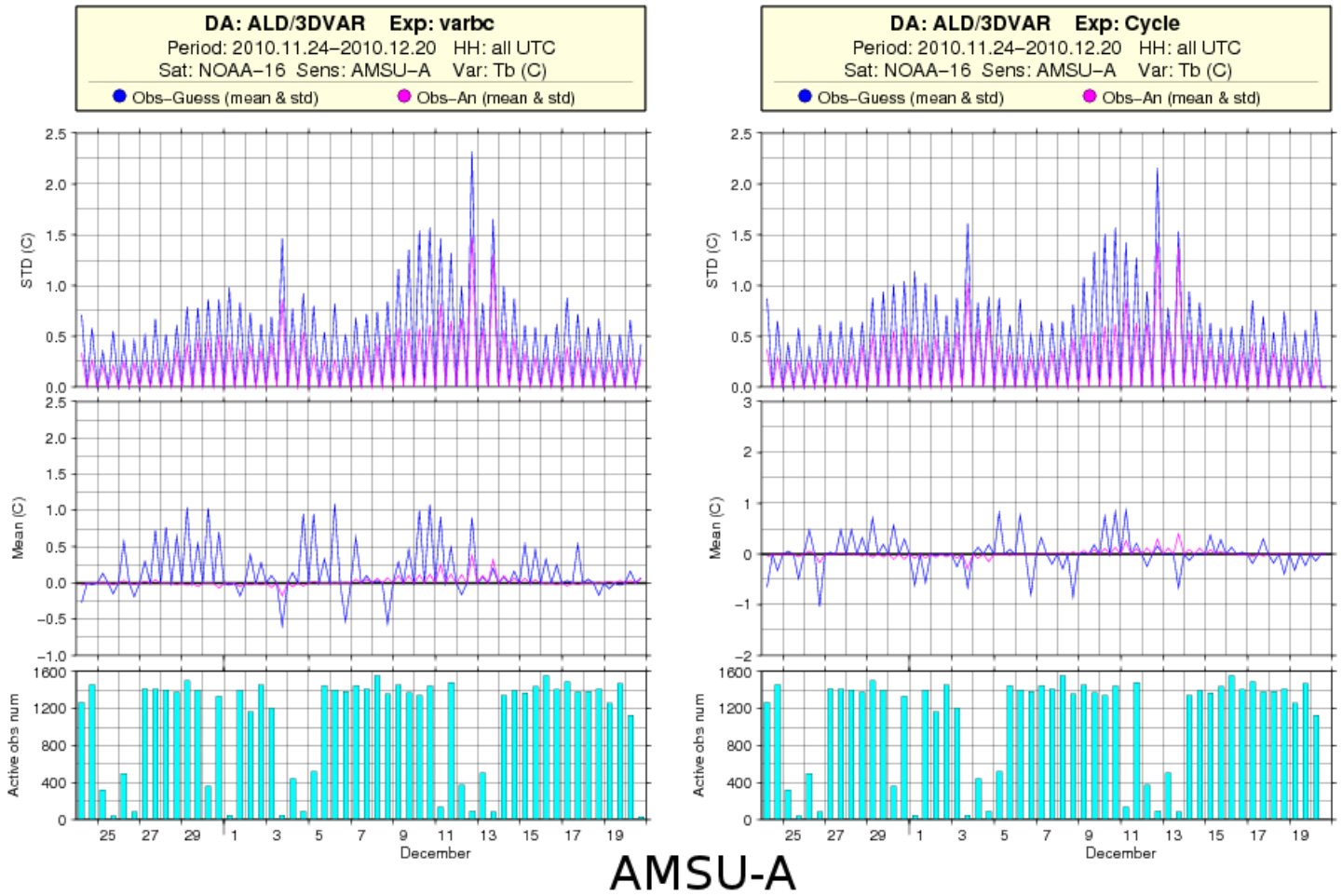


Figure 2: NOAA16-AMSUA; Left: monitoring statistics from VarBC cycle. Right: monitoring statistics from “static BC” cycle.

NOAA 16 - AMSUB

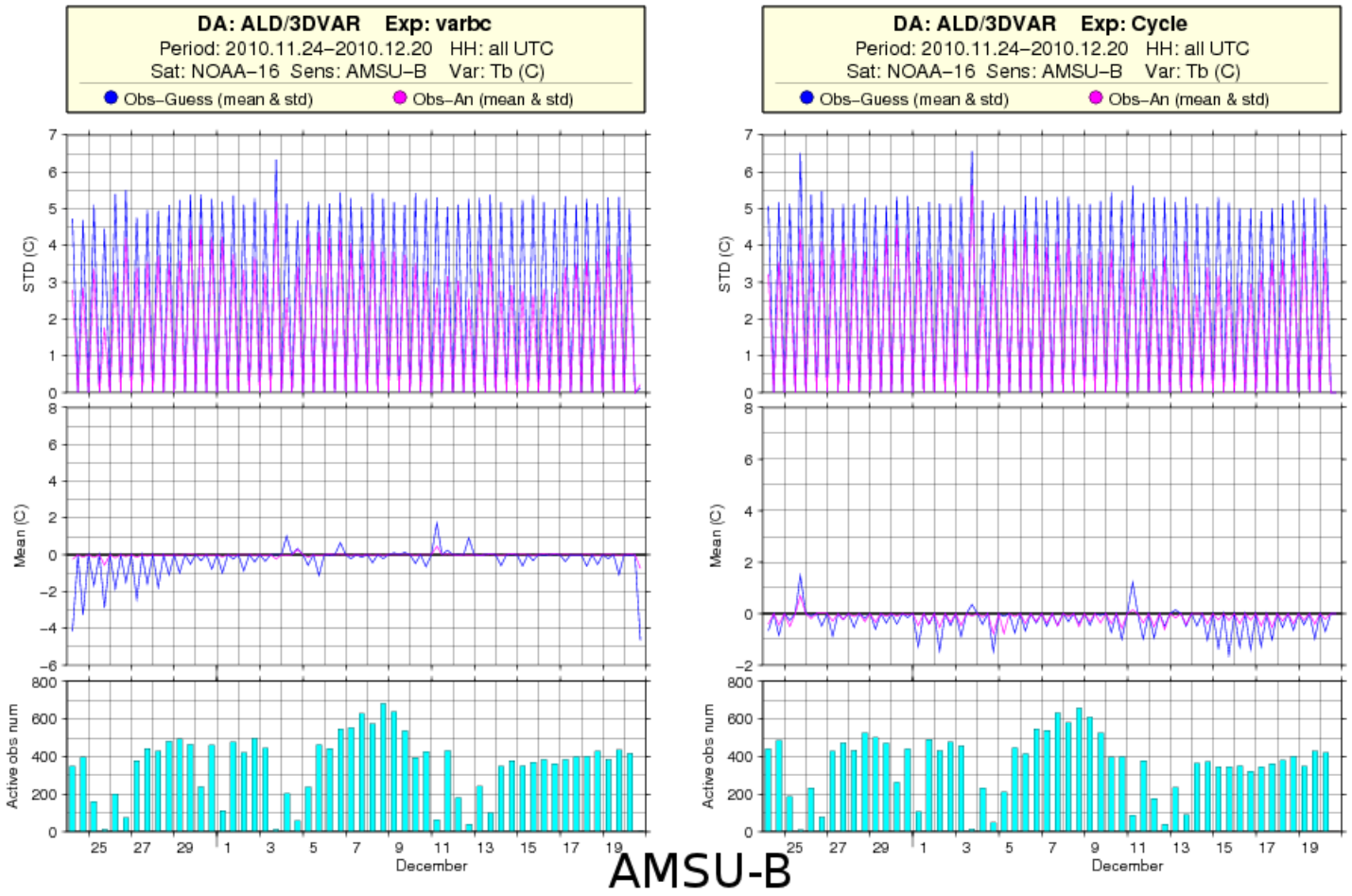


Figure 3: NOAA16-AMSUB; Left: monitoring statistics from VarBC cycle. Right: monitoring statistics from “static BC” cycle.

NOAA 18 - AMSUA

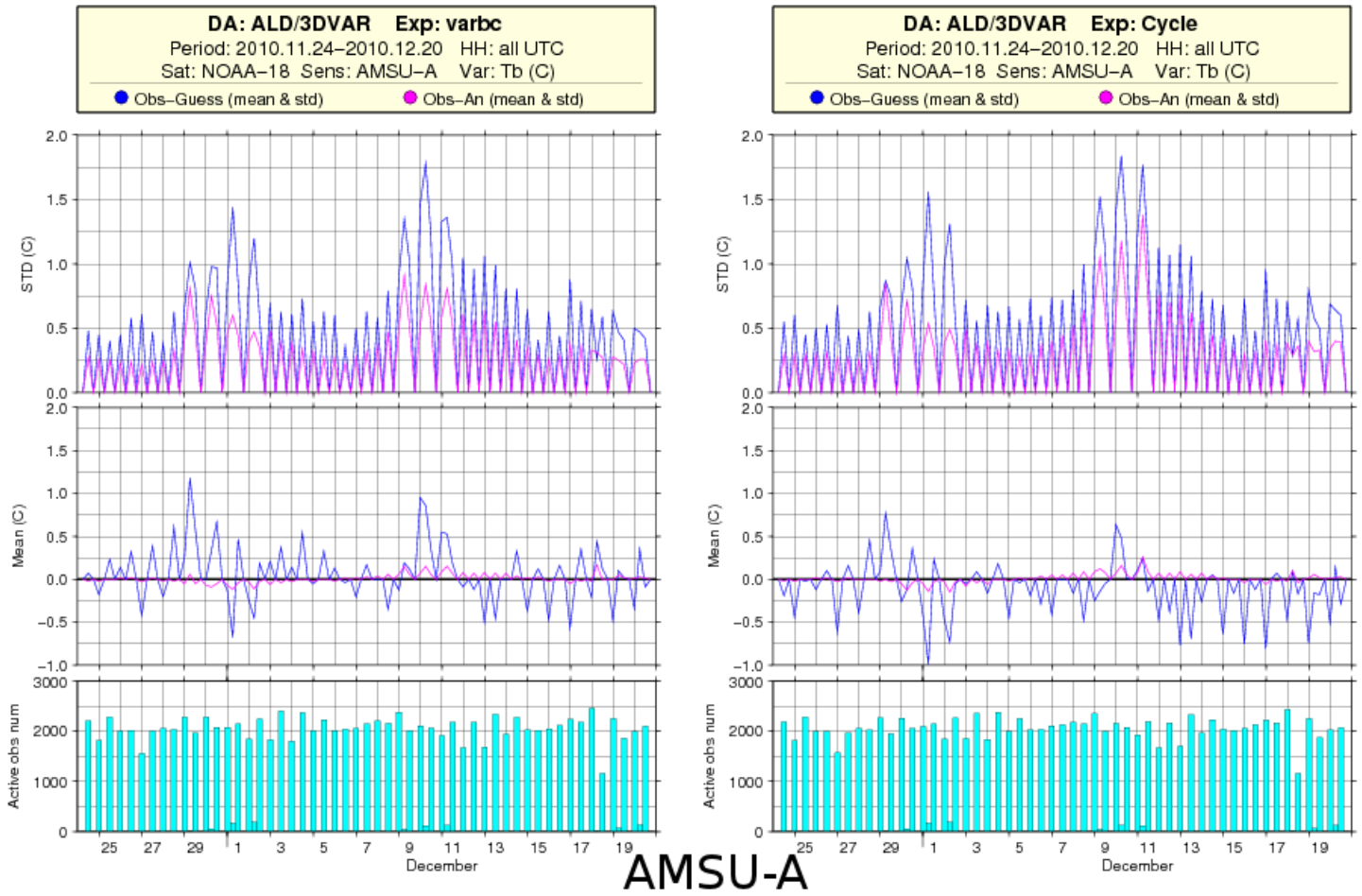


Figure 4: NOAA16-AMSUB; Left: monitoring statistics from VarBC cycle. Right: monitoring statistics from "static BC" cycle.

NOAA 18 - AMSUB

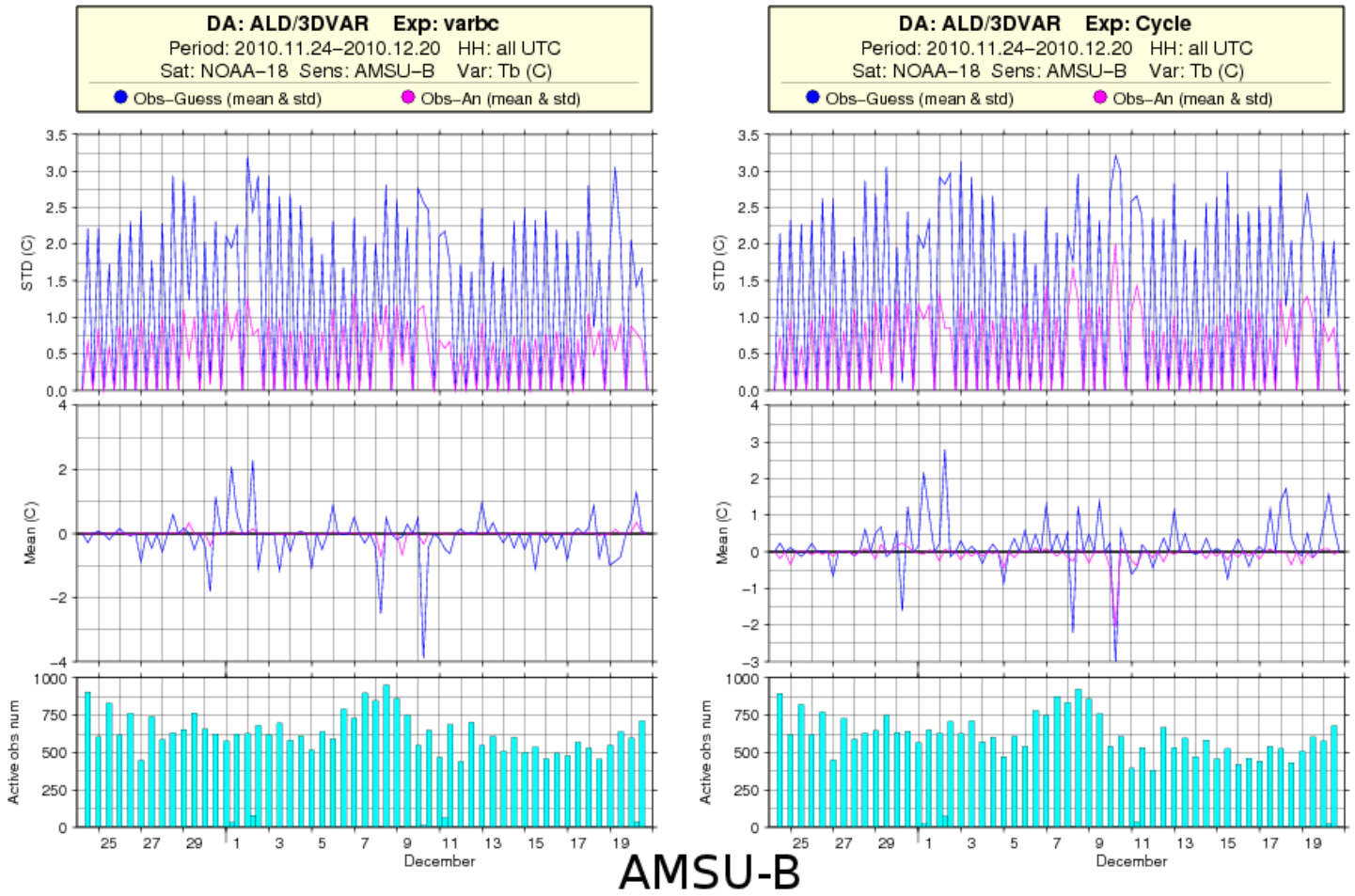


Figure 5: NOAA16-AMSUB; Left: monitoring statistics from VarBC cycle. Right: monitoring statistics from “static BC” cycle.

MSG2 - SEVIRI

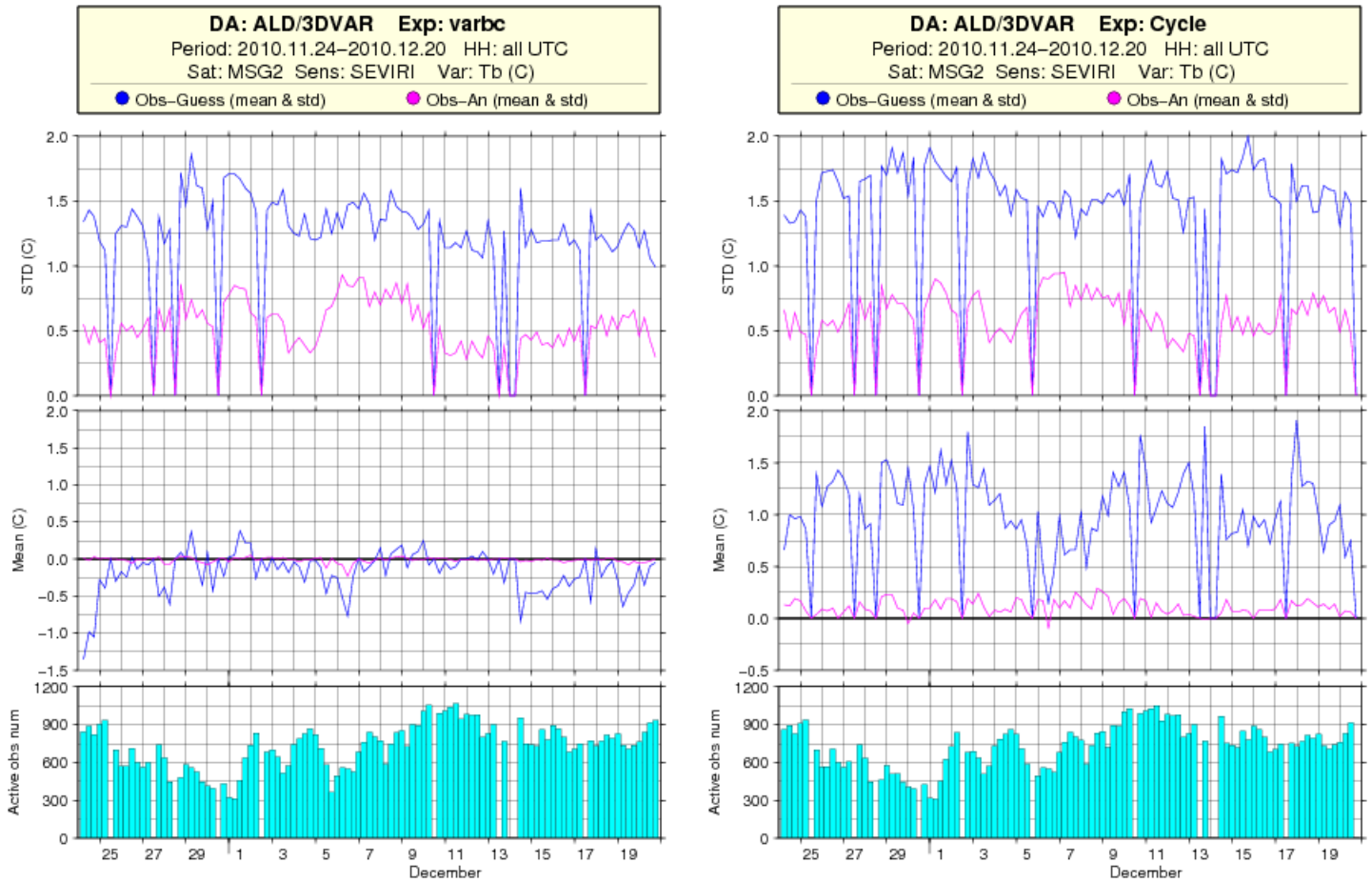


Figure 6: MSG 2 - SEVIRI; Left: monitoring statistics from VarBC cycle. Right: monitoring statistics from "static BC" cycle.

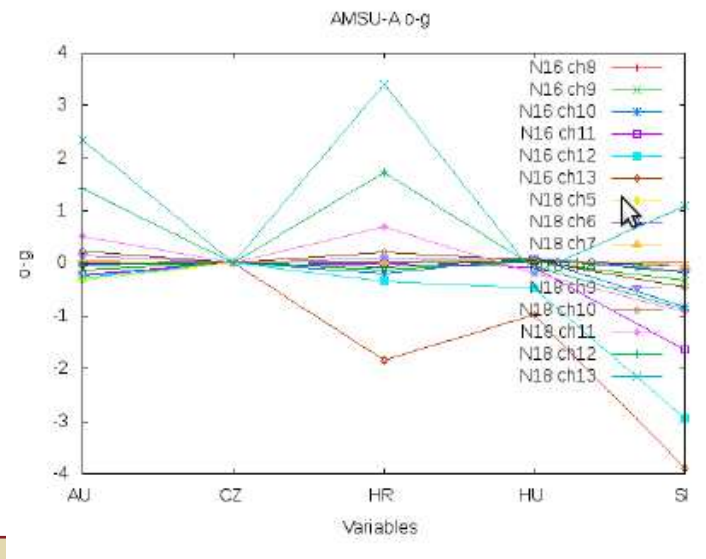
Monitoring

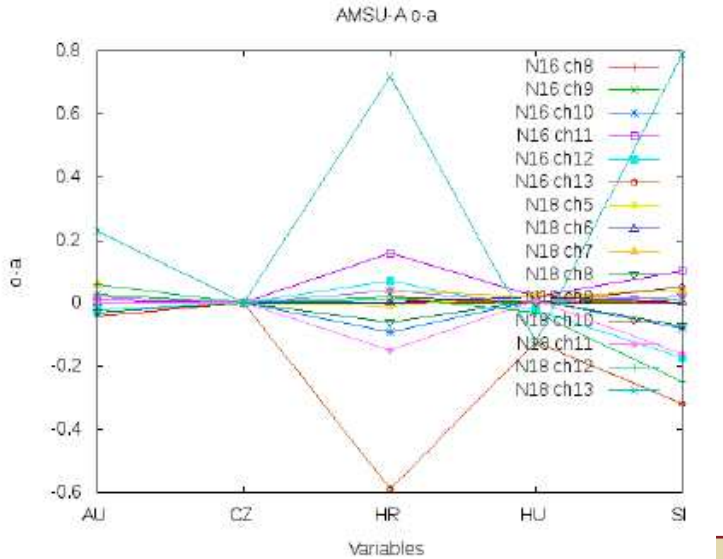
NOAA-16 AMSU-A

Channel	Total	Active	Pass	Reject	Black	O-G Mean	O-A Mean	O-G STD	O-A STD
1	50290	0	0	20	50290	0.00	0.00	0.00	0.00
2	50290	0	0	26	50290	0.00	0.00	0.00	0.00
3	50242	0	0	0	50242	0.00	0.00	0.00	0.00
4	0	0	0	0	0	0.00	0.00	0.00	0.00
5	50242	0	0	5169	50242	0.00	0.00	0.00	0.00
6	50242	0	0	5169	50242	0.00	0.00	0.00	0.00
7	50242	0	0	0	50242	0.00	0.00	0.00	0.00
8	50242	0	0	0	50242	0.00	0.00	0.00	0.00
9	50200	17947	0	23836	8417	-0.04	-0.01	0.19	0.15
10	50242	17966	0	23855	8421	0.06	0.01	0.26	0.17
11	50242	17966	0	23855	8421	0.19	-0.02	0.52	0.22
12	50242	17966	0	23855	8421	0.43	0.05	0.75	0.34
13	50242	0	0	4	50242	0.00	0.00	0.00	0.00
14	50242	0	0	16863	50242	0.00	0.00	0.00	0.00
15	50242	0	0	0	50242	0.00	0.00	0.00	0.00

NOAA-18 AMSU-A

Channel	Total	Active	Pass	Reject	Black	O-G Mean	O-A Mean	O-G STD	O-A STD
1	42406	0	0	25	42406	0.00	0.00	0.00	0.00
2	42406	0	0	30	42406	0.00	0.00	0.00	0.00
3	42405	0	0	0	42405	0.00	0.00	0.00	0.00
4	42405	0	0	0	42405	0.00	0.00	0.00	0.00
5	42405	6150	0	11904	28958	-0.04	-0.00	0.26	0.18
6	42405	7043	0	12495	27233	-0.08	-0.01	0.16	0.14
7	42405	7524	0	7709	27172	-0.08	-0.01	0.19	0.16
8	42405	14352	0	21069	6984	-0.07	0.01	0.25	0.19
9	42405	14352	0	21069	6984	-0.05	0.00	0.21	0.14
10	42405	14352	0	21069	6984	-0.06	0.00	0.29	0.18
11	42405	14352	0	21069	6984	-0.00	-0.07	0.49	0.23
12	42405	14352	0	21069	6984	0.42	0.13	0.73	0.36
13	42401	0	0	25	42401	0.00	0.00	0.00	0.00
14	42405	0	0	14595	42405	0.00	0.00	0.00	0.00
15	42405	0	0	0	42405	0.00	0.00	0.00	0.00





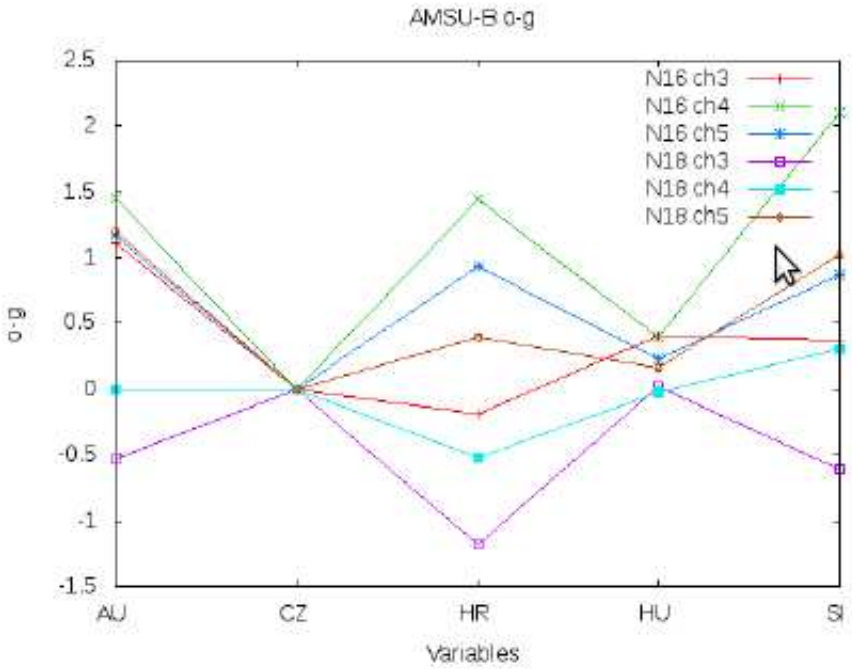
Monitoring

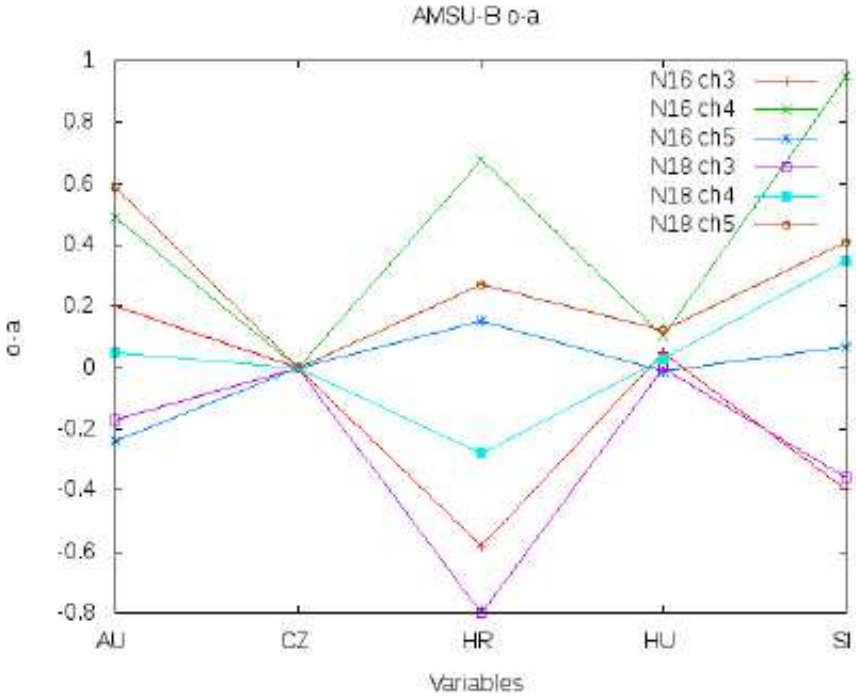
NOAA-16 AMSU-B

Channel	Total	Active	Pass	Reject	Black	O-G Mean	O-A Mean	O-G STD	O-A STD
1	456282	0	0	92	456282	0.00	0.00	0.00	0.00
2	456281	0	0	1340	456281	0.00	0.00	0.00	0.00
3	456275	19241	0	344057	201187	-0.32	0.00	5.85	4.04
4	14562	654	0	10073	5643	0.72	0.17	5.23	3.57
5	456263	4771	0	304389	348104	0.12	0.01	5.11	3.33

NOAA-18 AMSU-B

Channel	Total	Active	Pass	Reject	Black	O-G Mean	O-A Mean	O-G STD	O-A STD
1	391212	0	0	146	391212	0.00	0.00	0.00	0.00
2	391215	0	0	646	391215	0.00	0.00	0.00	0.00
3	391194	19417	0	250584	122124	-0.15	0.00	2.42	1.11
4	391210	18679	0	245095	130208	-0.09	0.00	2.20	0.91
5	391171	6953	0	125073	268820	-0.00	0.00	2.04	0.79





SWI diagnostic

- Motivation: bad “summer” verification scores for T2m and RH2

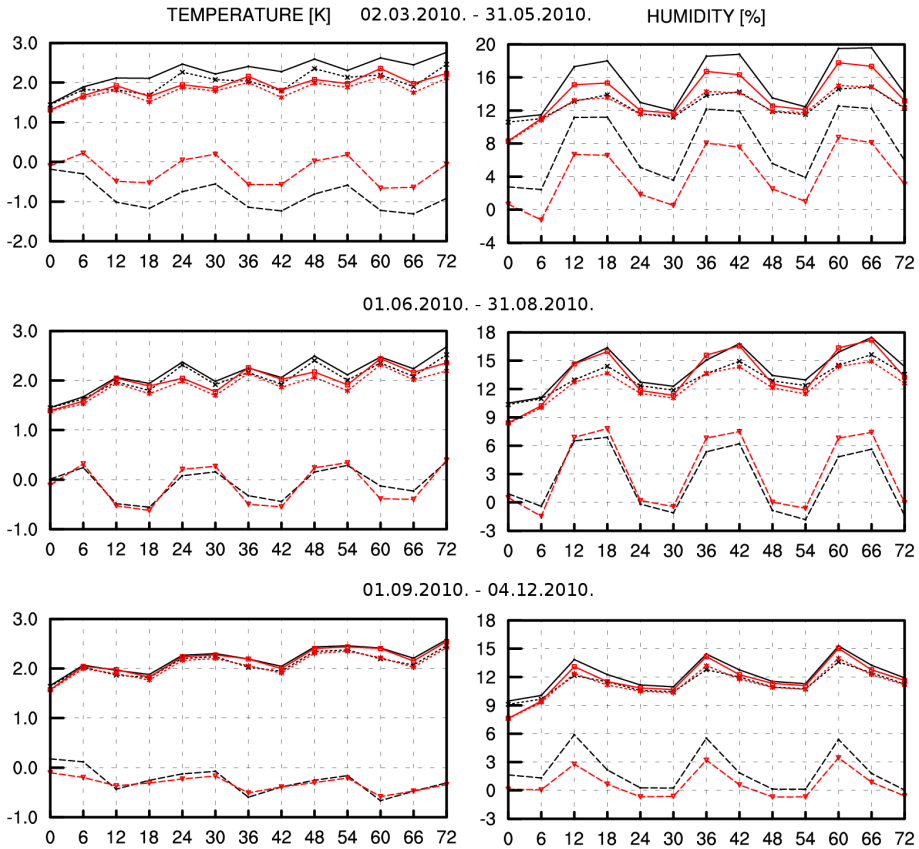


Figure 7: Seasonal verification scores for T2m and RH2m.

SWI diagnostic

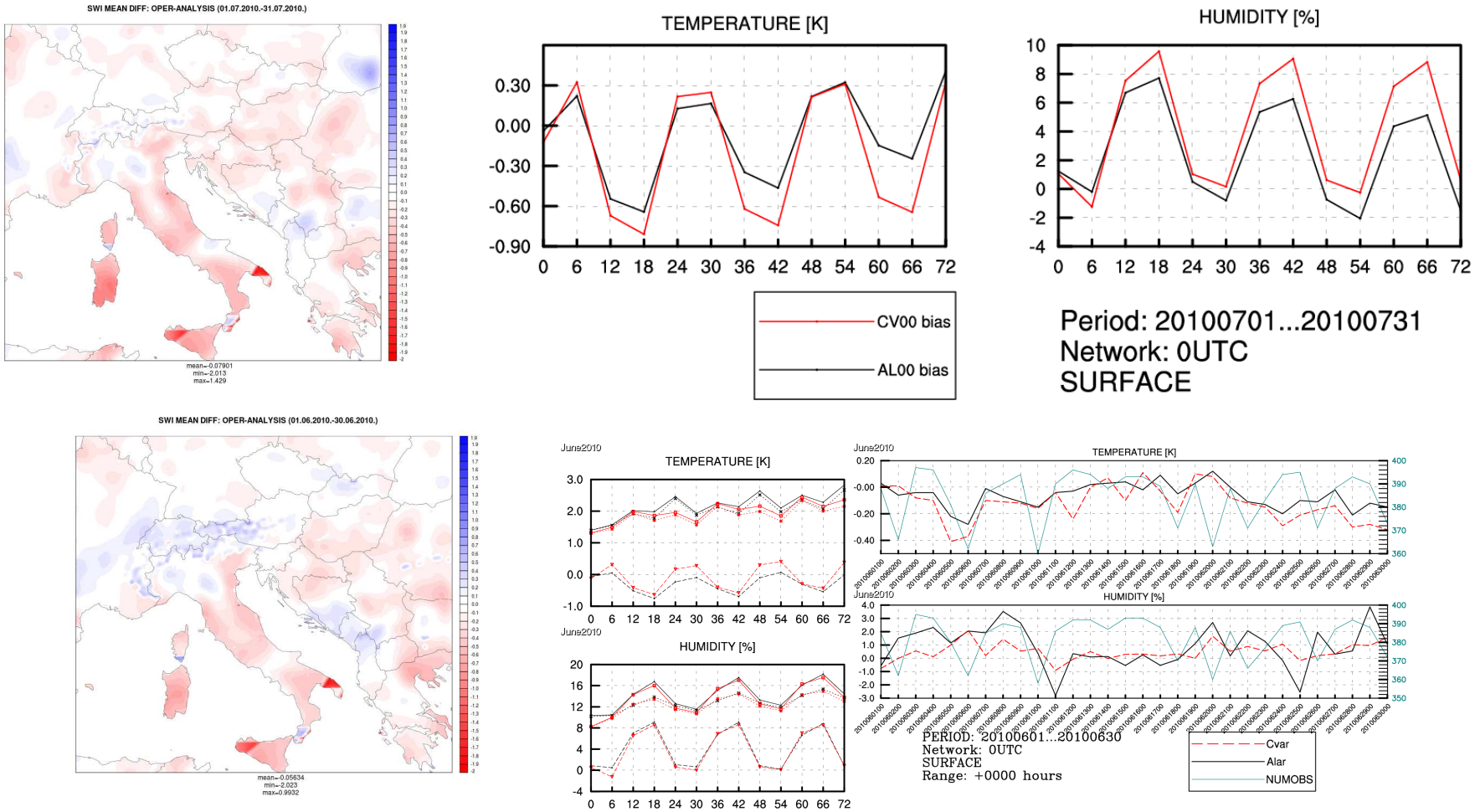


Figure 8: First row: mean SWI difference oper-assim July (left). BIAS of T2m and RH2m for July (right). Second row:mean SWI difference oper-assim June (left). Verification scores June (right).

SWI diagnostic

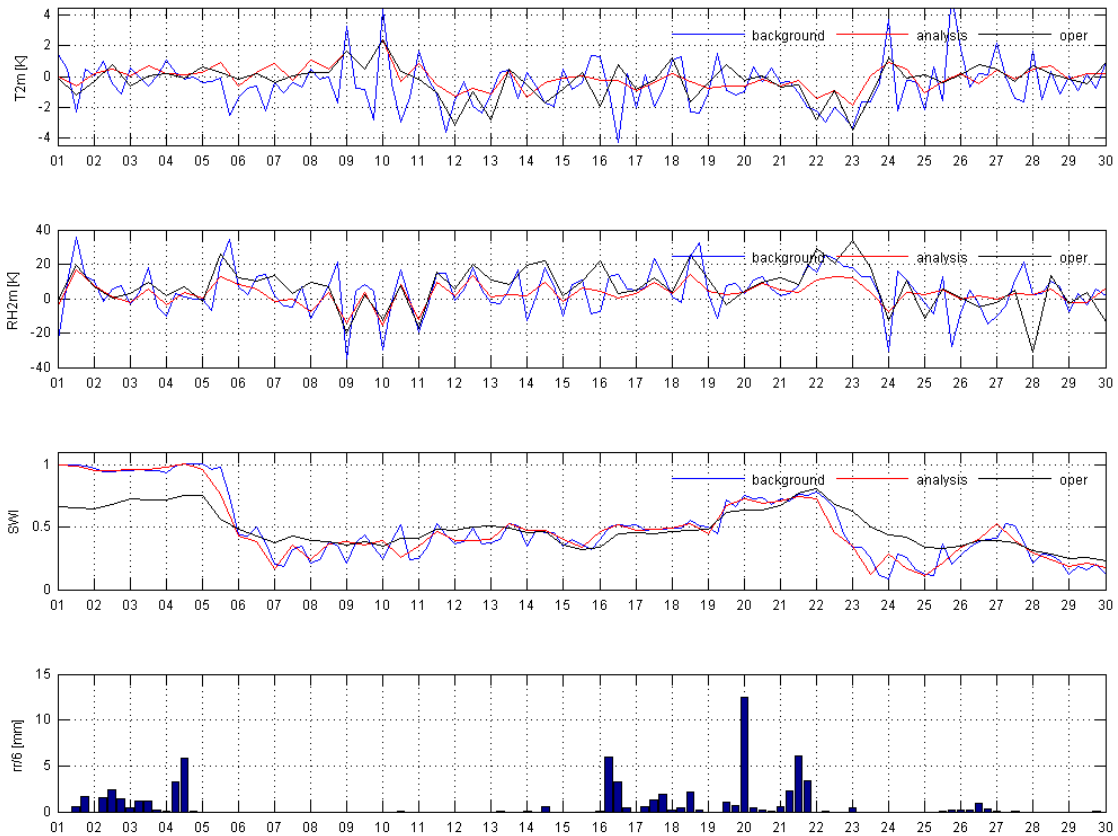
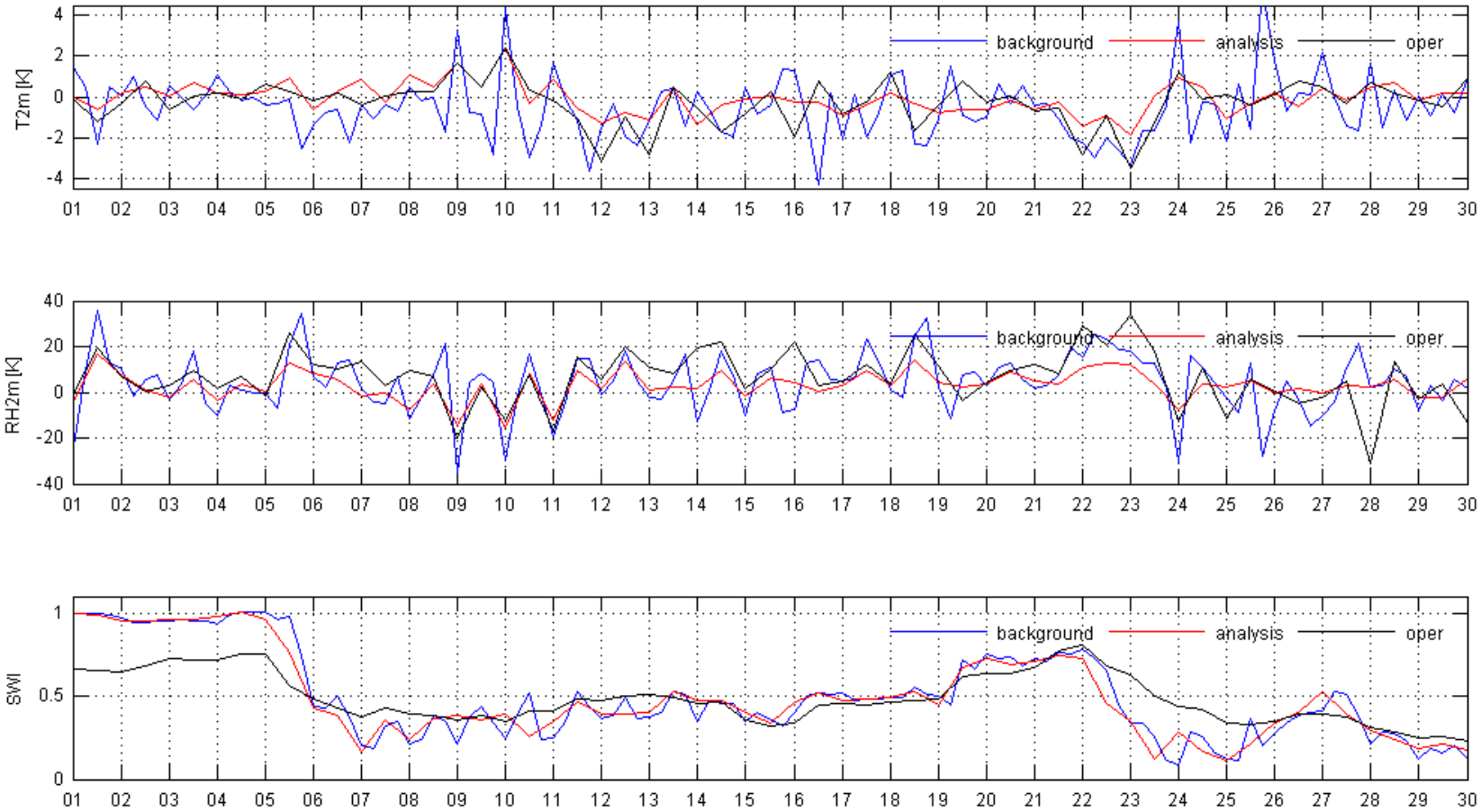


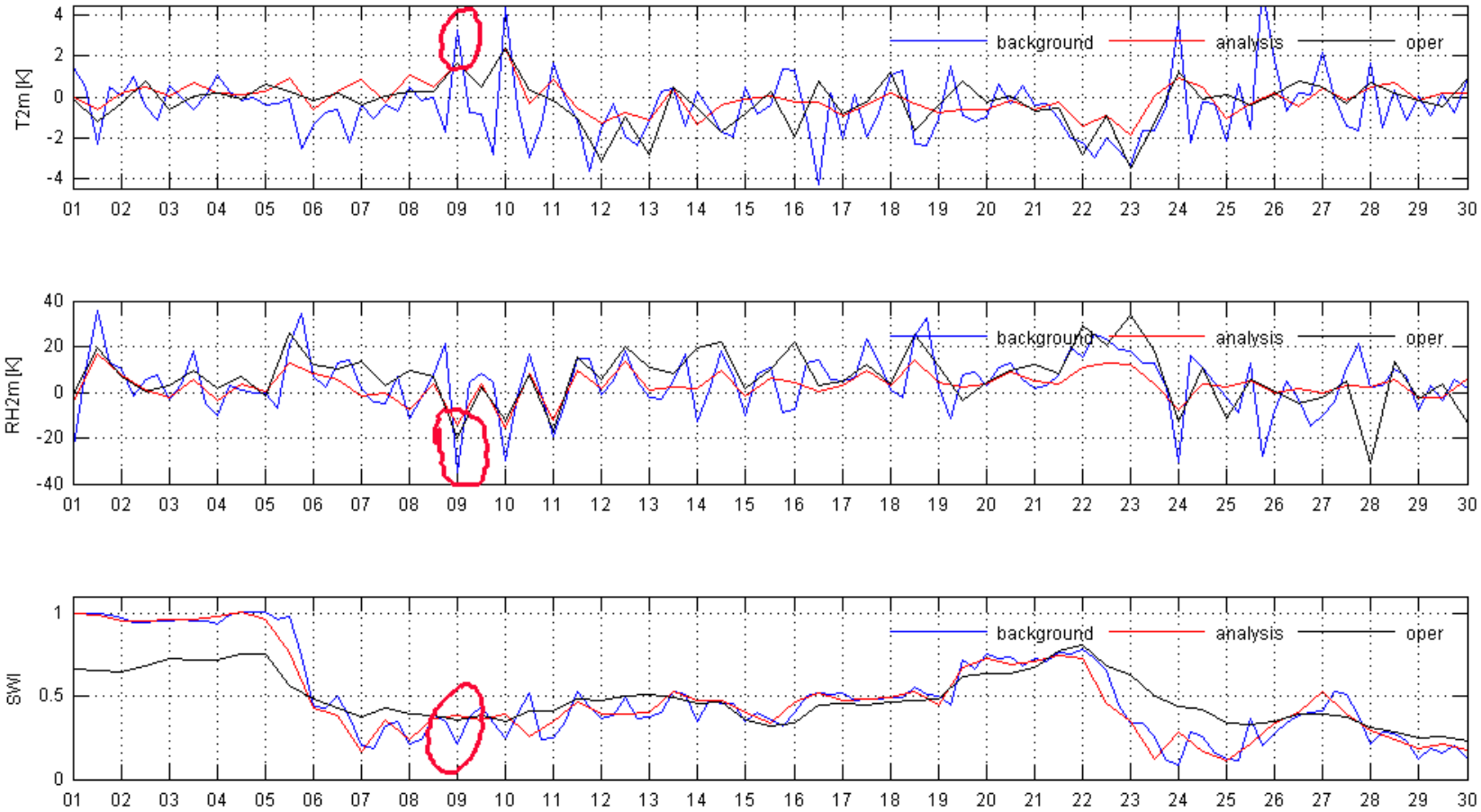
Figure 9: Bias of 2 m temperature (first row), 2 m relative humidity bias (second row) and SWI (third row) in June 2010 for 6 h forecast from assimilation cycle (blue)- every 6 h, analysis (red)-every 12 h, initial conditions for operational integration (black)-every 12 h. Last row: 6 h accumulated rain from 6 h forecast in assimilation cycle.

SWI diagnostic



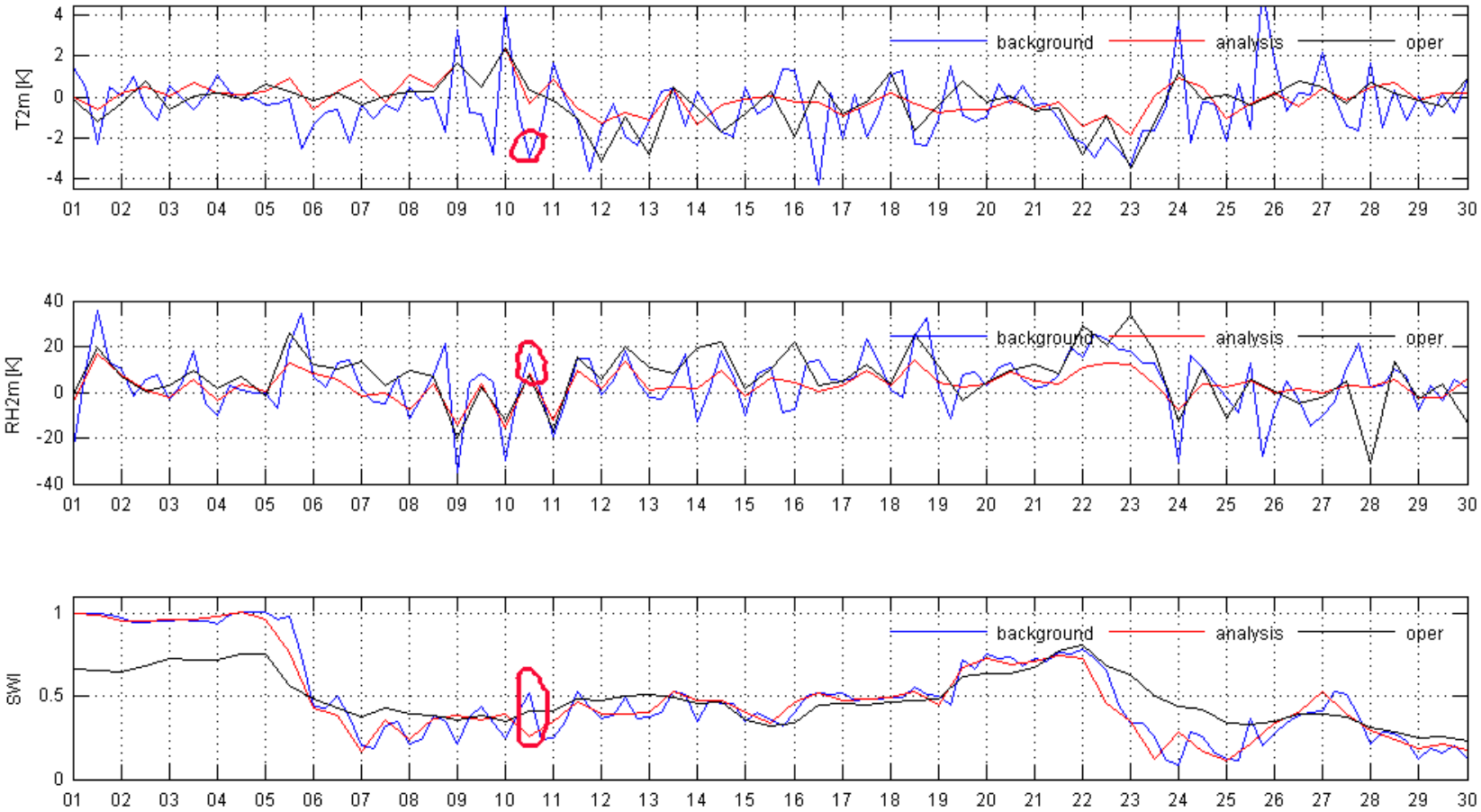
- occasionally sharp changes between SWI at 00 and 12 UTC

SWI diagnostic



- RH2m BIAS <0; T2m BIAS>0 => SWI increases after analysis

SWI diagnostic



- RH2m BIAS >0; T2m BIAS<0 => SWI decreases after analysis

SWI diagnostic

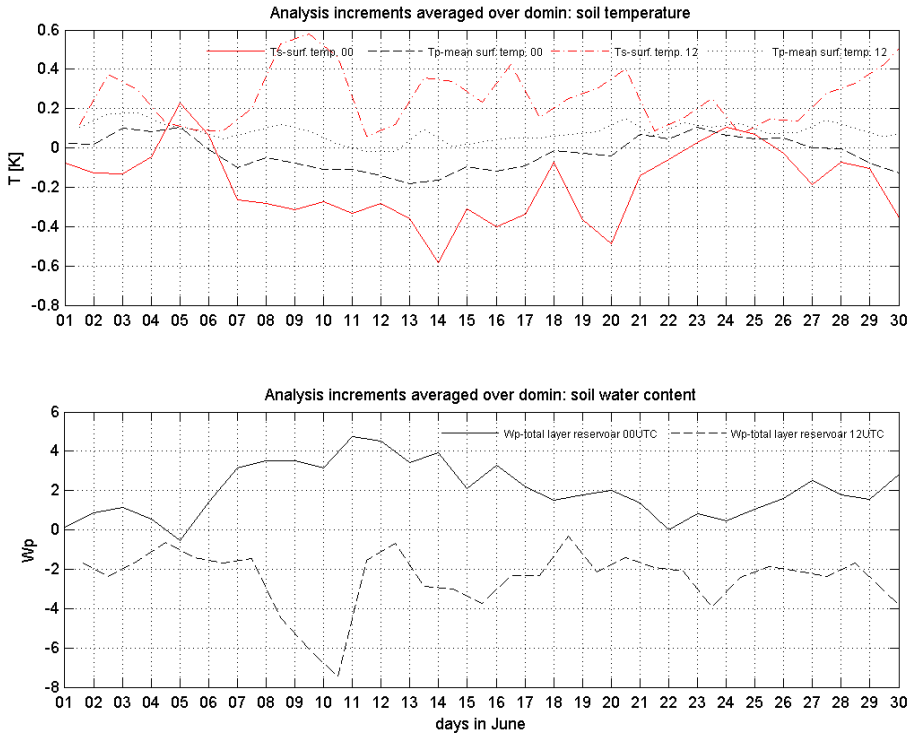


Figure 10: Analysis increments averaged over the domain for land surface variables for June 2010. First row: surface temperatures at 00 (full red line), at 12 UTC (dashed red line), mean surface temperature at 00 (dashed black line) and at 12 UTC (dotted black line). Second row: soil water content at 00 (full black line) and at 12 UTC (dashed black line).

SWI diagnostic

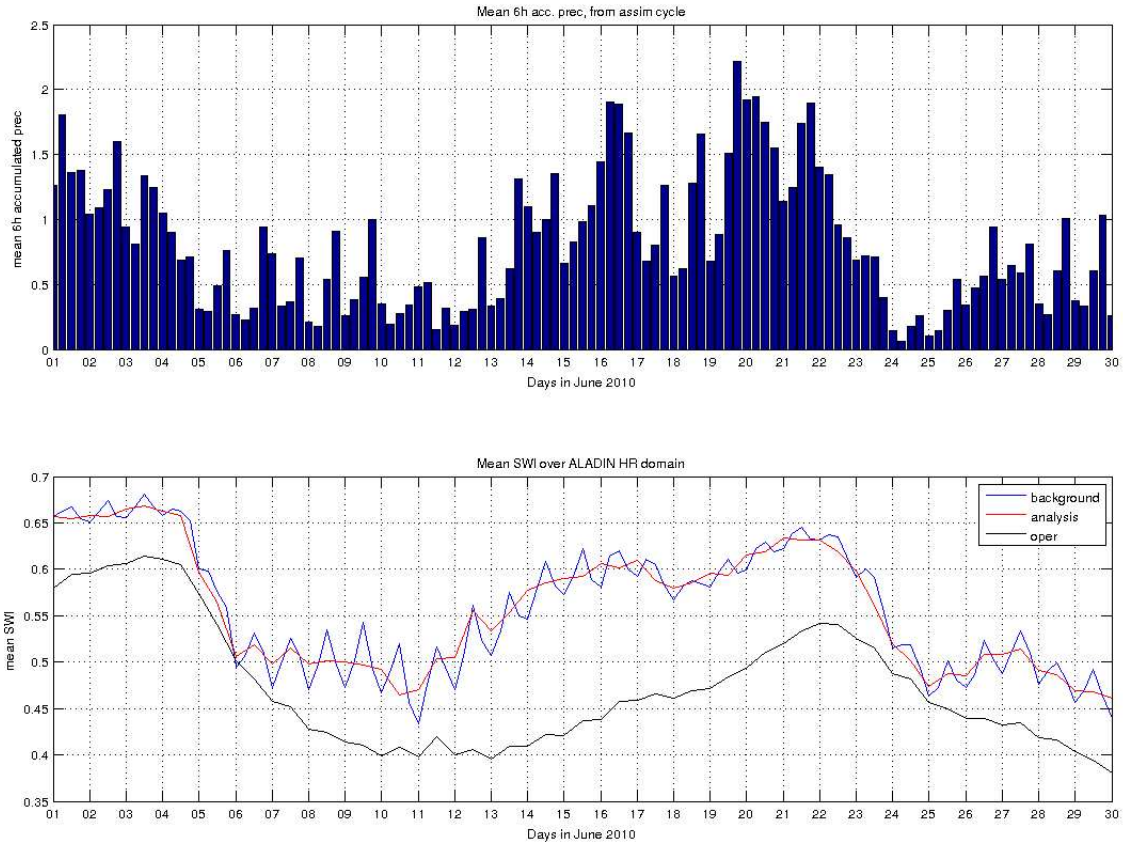
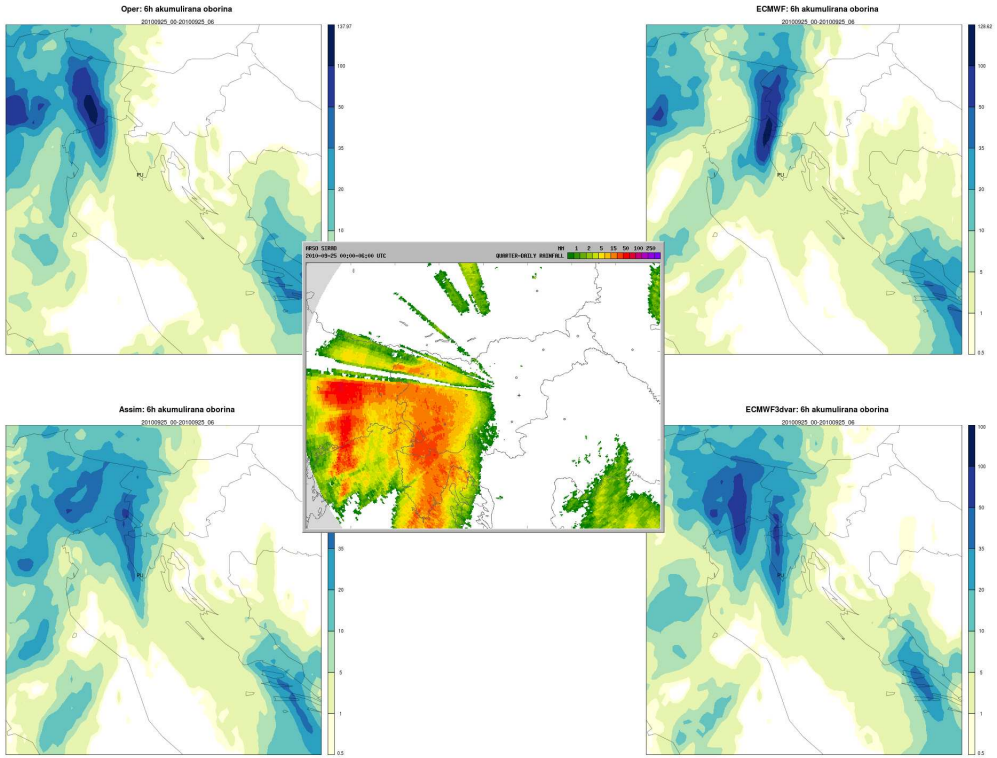


Figure 11: First row: mean domain 6h accumulated precipitation from assimilation cycle. Second row: Mean SWI for 6 h forecast from assimilation cycle (blue), analysis (red), initial conditions for operational integration (black).

Coupling with ECMWF

- coupling with ECMWF was tried for two case studies



New verification results

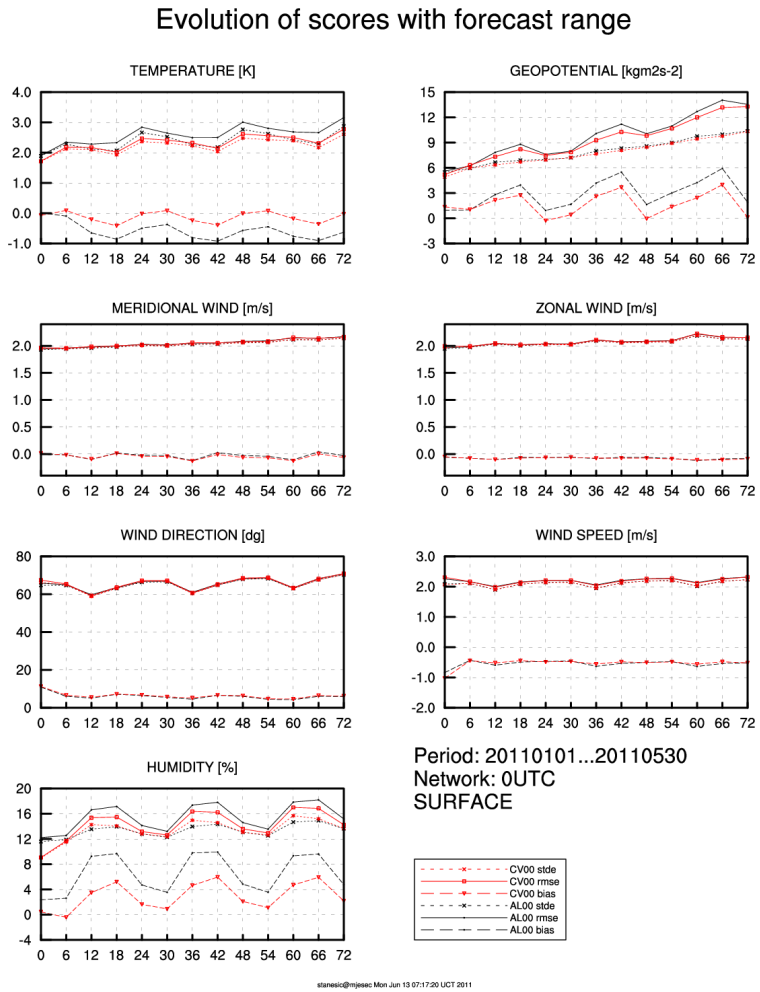


Figure 12: Verification for period of first 5 month of 2011.

New verification results

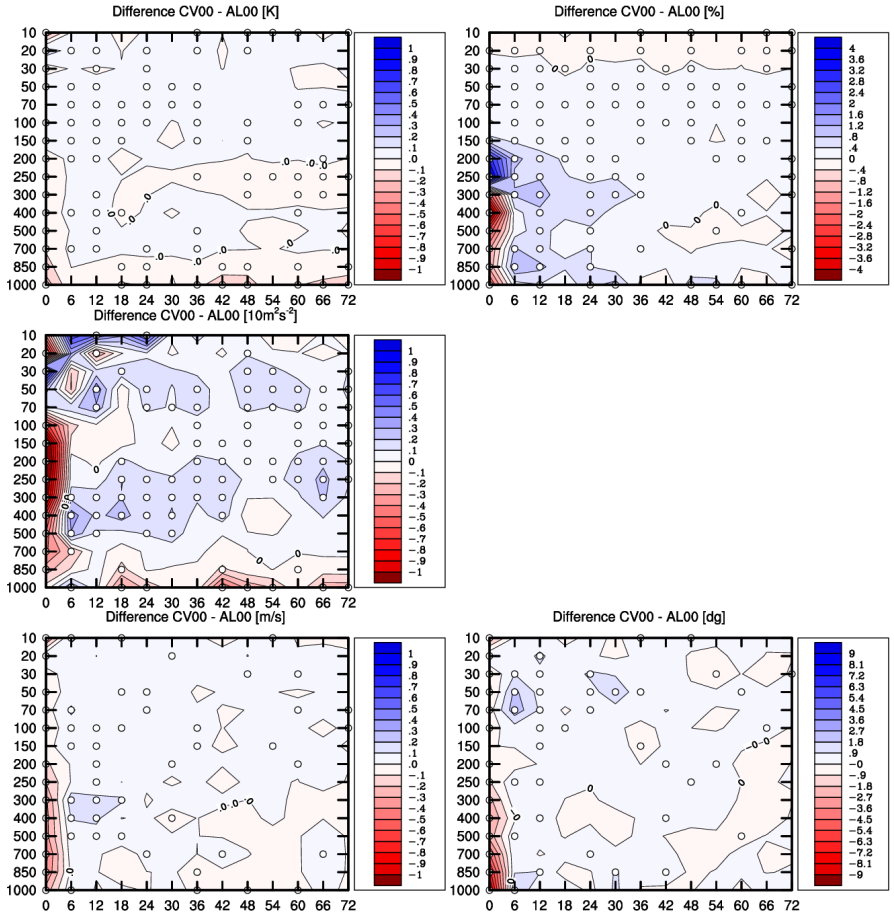


Figure 13: Verification for period of first 5 month of 2011.

Future plans

Short term plans

- put assimilation in operational configuration
- go to cy36
- look into CANARI and physics (ISBA) interaction: ratio of evaporation and heating by radiation
- Jb/Jo tuning
- consider coupling with ECMWF
- include new observations