SWI diagnostics for ALADIN/HU

14/12/2010
G. Bölöni

In this short report,

1) SWI diagnostics of ALADIN/HU are presented for the period of June 2010, which was the basis for LACE data assimilation inter-comparisons.
2) 2m (evol type) scores are plotted for comparison of dynamical adaptation and the assimilation run with Veral, to see how the SWI can be connected to 2m scores.

SWI diagnostics:

On the figures include, the time evolution of SWI is plotted for Budapest, Ljubljana, Prague, Vienna and Zagreb. The values are plotted for each analysis time (4 times a day) for the following 3 files:

- guess: SWI from the guess from the OI + 3DVAR cycle
- analysis: SWI from the analysis (using "guess" after applying OI and 3DVAR)
- lbc0: SWI from the ARPEGE analysis interpolated to the ALADIN/HU grid

The main findings visible on the SWI figures are as follows:

- SWI of the guess and the analysis are rather similar to each other for all points
- there is no bias seen caused by the analysis (on some dates the analysis moistens on some other dates it dries the soil)
- SWI of lbc0 is rather different from those of the guess and the analysis (this is the SWI that is used in case of dynamical adaptation)
- in some points (Ljubljana, Zagreb) lbc0 is drier than the assimilation cycling, while in some other points (Budapest, Prague, Vienna) it is wetter.

Scores:

1) The spatial average of 2m scores (bias & rmse) of all variables are plotted for 00 and 12 UTC forecast base for dynamical adaptation (DYNA) and assimilation (OPER) experiments. The day to day evolution of the scores is also plotted for the analysis (after DFI) i.e. for the +00h forecast range.
2) To be able to compare the SWI and 2m scores for a defined point, also the day to day evolution of RH2m analysis bias was plotted for Budapest (using the ALADIN verification project) for DYNA and OPER.

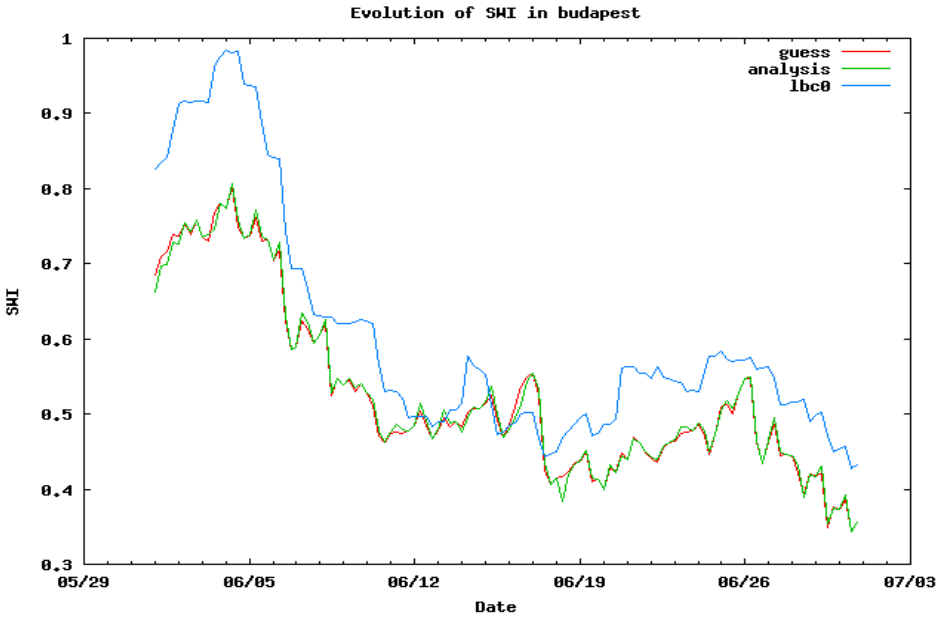
The main findings from the verification plots are as follows:

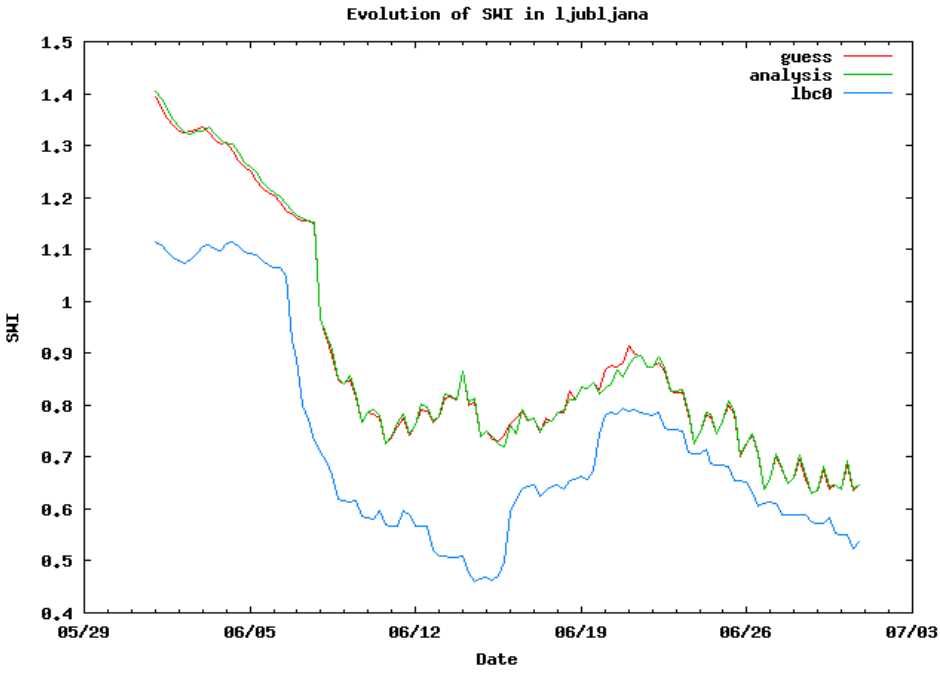
- all variables (but mostly T2m and RH2m) have smaller error at analysis time with assimilation (OPER)
- in the 12 UTC runs, the improvement by assimilation remains in the forecast up to almost 1-2 days (not so much in the 00 UTC runs)
- DYNA "analysis" is too wet both at 00 and 12 UTC
- DYNA "analysis" is too cold at 00 UTC
- At the location of Budapest, the positive bias in the RH2m "analysis" of DYNA might be connected to the very wet soil (high SWI compared to the assimilation cycling).

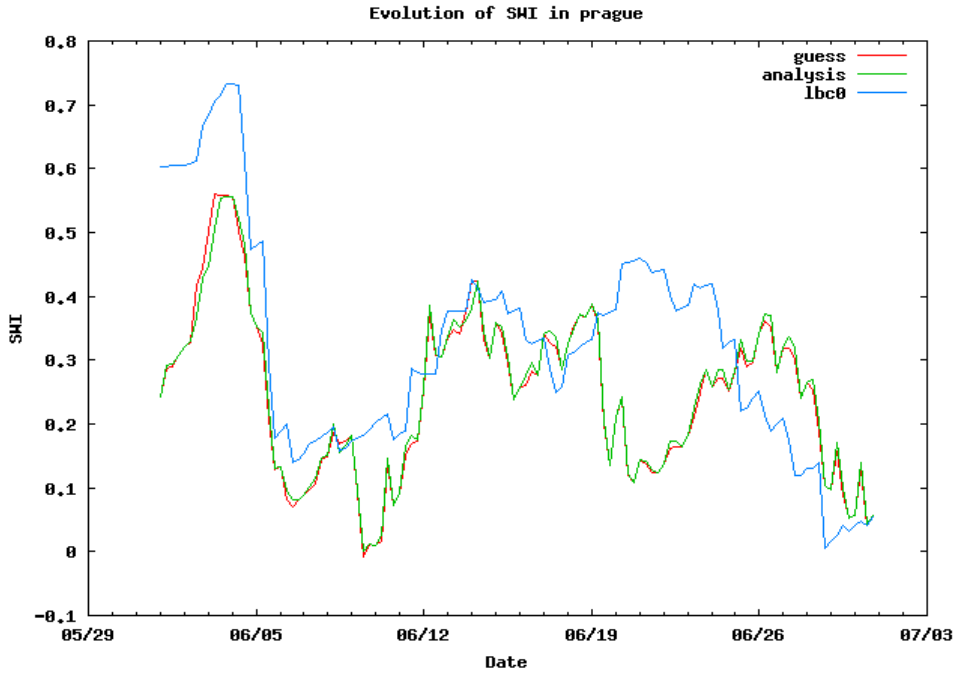
Conclusions:

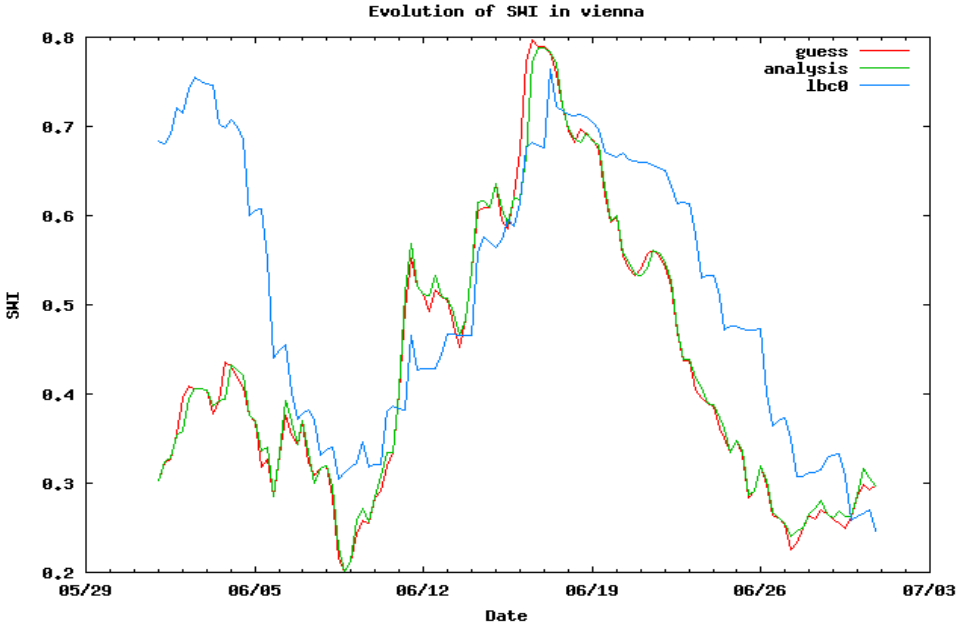
- SWI is very different in assimilation (OPER) and dynamical adaptation (DYNA)
- the RH2m (and T2m) scores seem to be strongly related to SWI
- for Budapest, the positive RH2m bias of DYNA is probably caused by the very wet soil compared to OPER (ALADIN verif. proj.)
- "analysis" scores are better for OPER than DYNA in a spatial average (Veral)

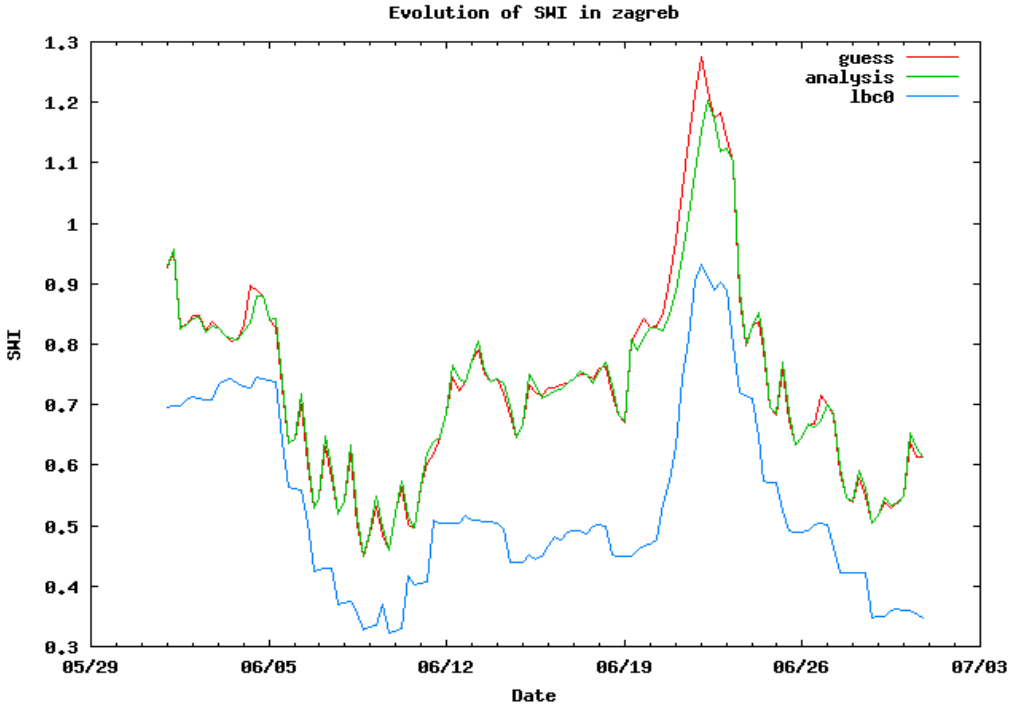
Figures (SWI):



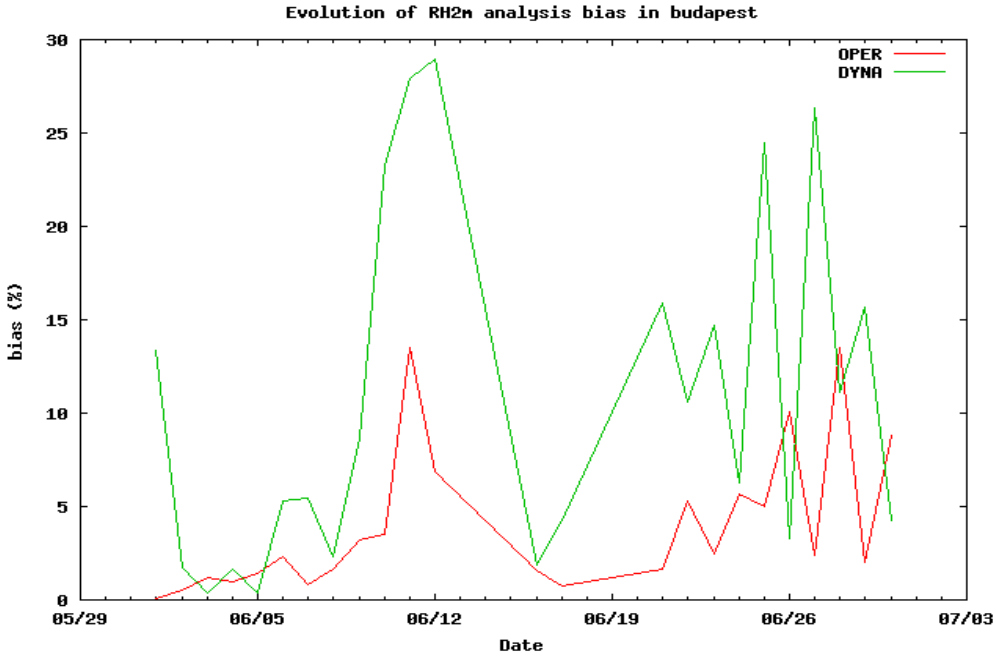



Evolution of SWI in prague
guess
analysis
lbc0
SWI
Date
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
-0.1
05/29
06/05
06/12
06/19
06/26
07/03


Evolution of SWI in vienna
guess
analysis
lbc0
SWI
Date
0.8
0.7
0.6
0.5
0.4
0.3
0.2
05/29
06/05
06/12
06/19
06/26
07/03

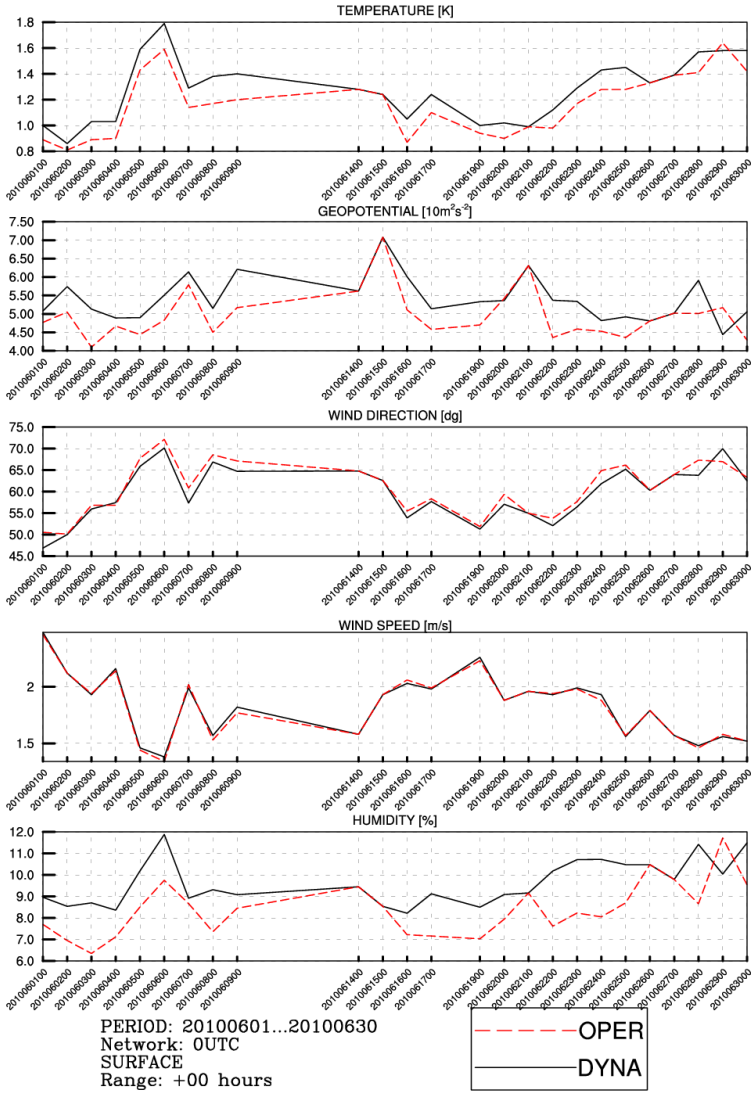

Evolution of SWI in zagreb
guess
analysis
lbc0
SWI
Date
1.3
1.2
1.1
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
05/29
06/05
06/12
06/19
06/26
07/03

Figures (scores):



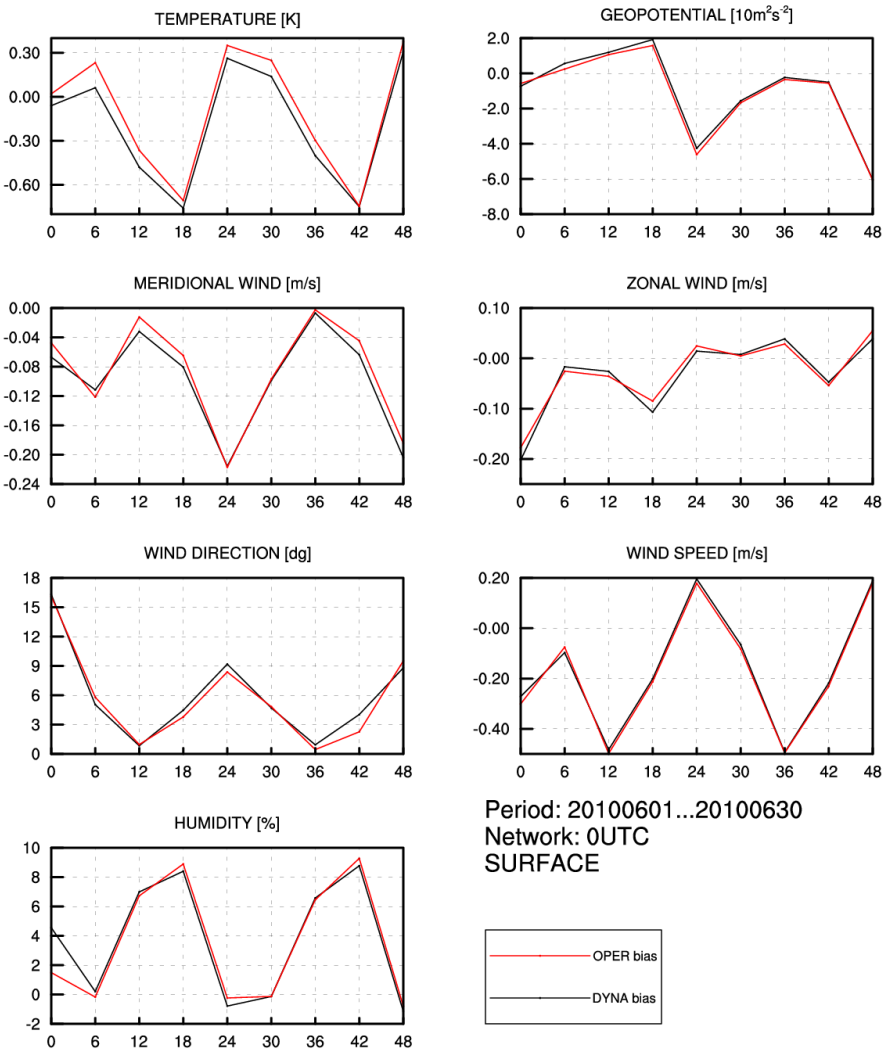
BIAS of individual runs

RMSE of individual runs

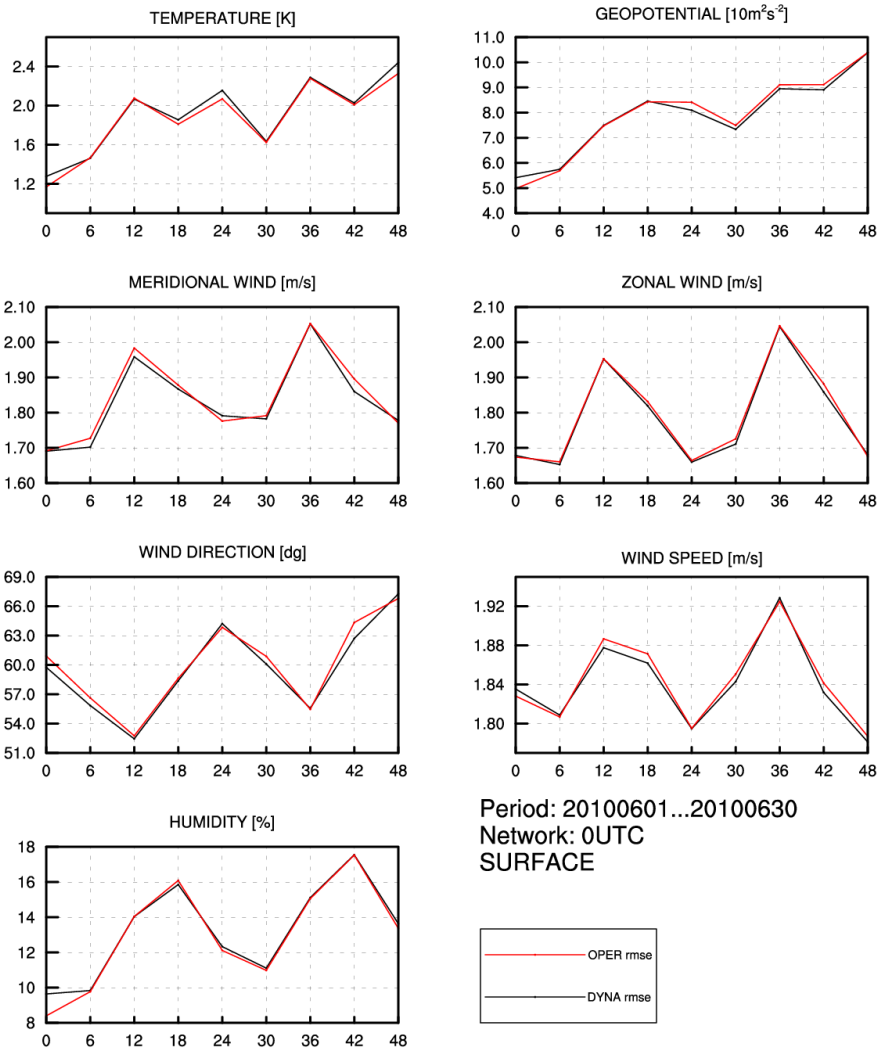


boloni@3700a Tue Dec 14 16:48:03 UTC 2010

Evolution of scores with forecast range

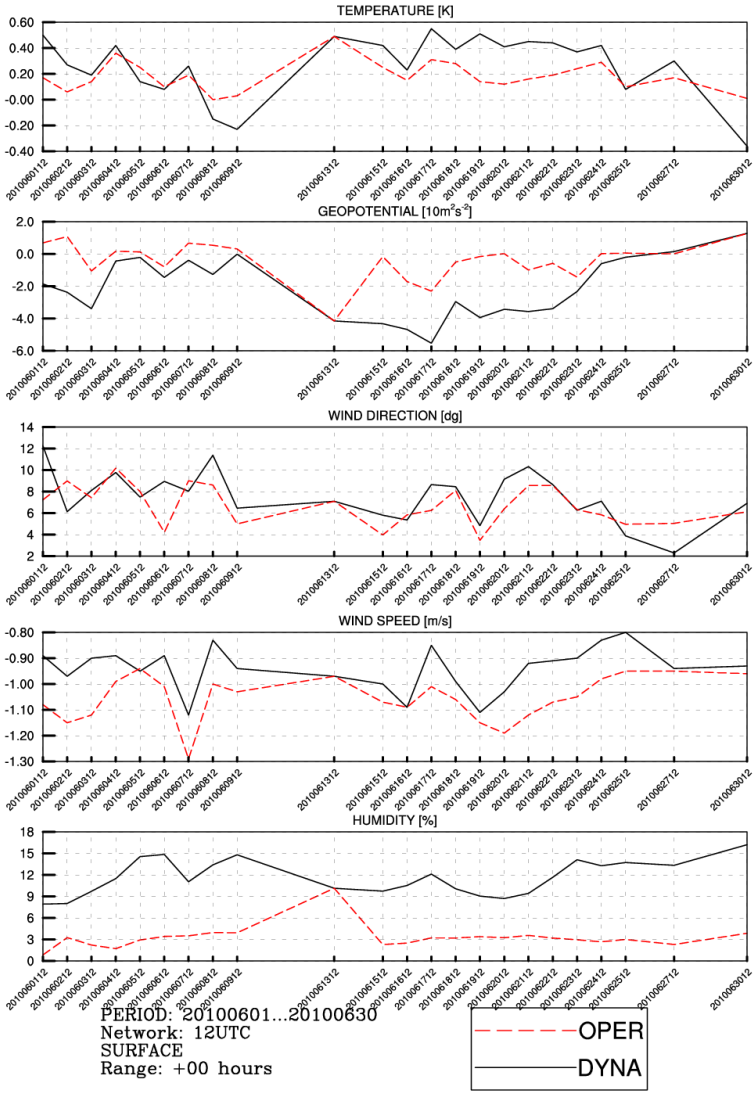


Evolution of scores with forecast range

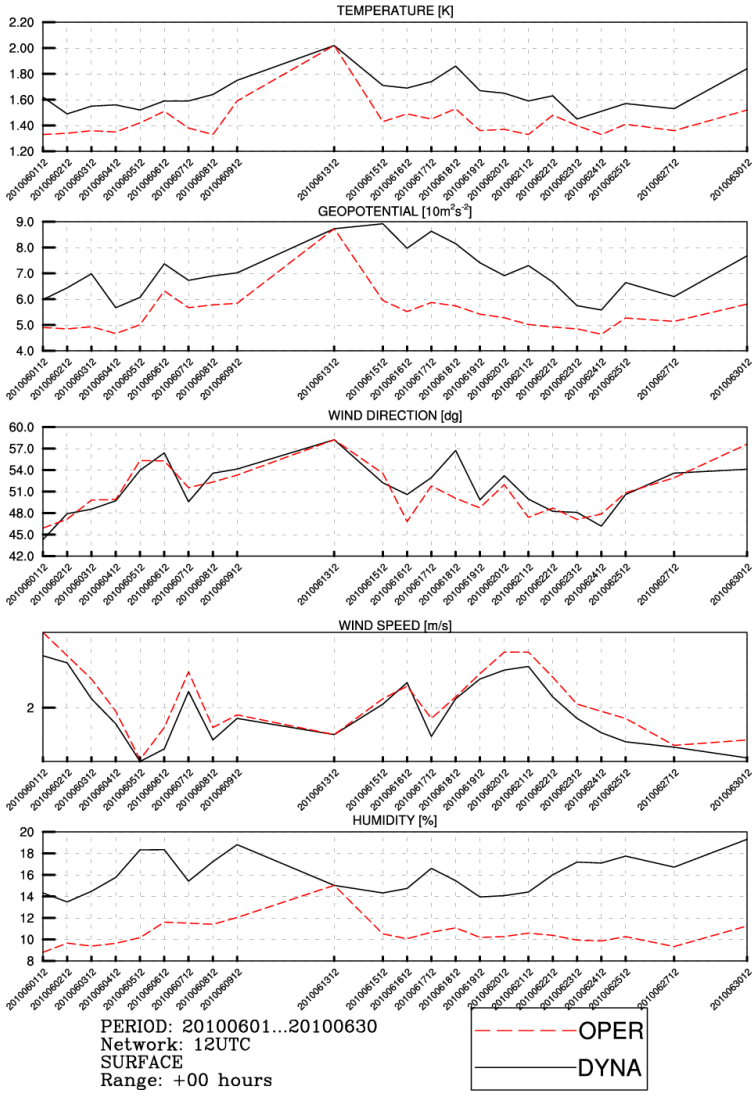


boloni@3700a Tue Dec 14 16:48:03 UTC 2010

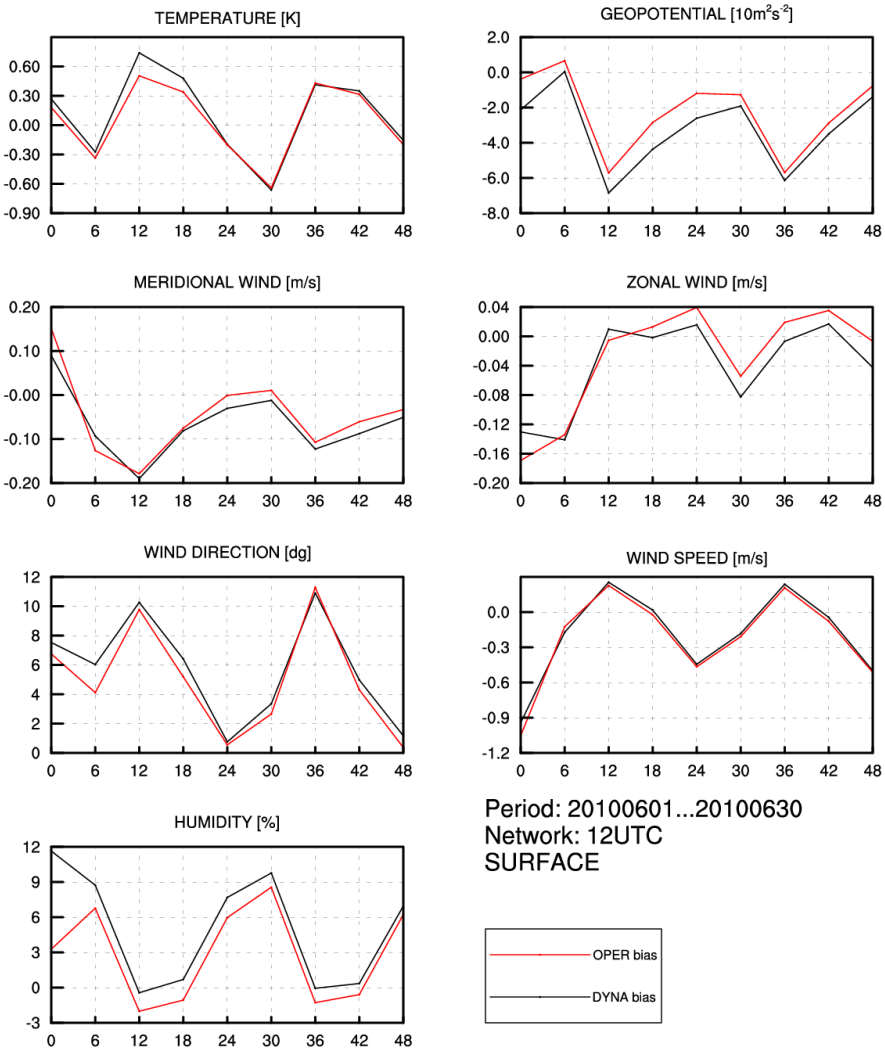
BIAS of individual runs



RMSE of individual runs



Evolution of scores with forecast range



Evolution of scores with forecast range