Operational implementation

Tricks, problems, solutions

Preparation of the e-suite (1/3)

- All bricks pre-validated;
- Need to consider the cycle
  - In case of data assimilation or blending it is necessary;
  - In case of dynamical adaptation the spin-up is very likely enhanced; initial QV is not quite well in equilibrium with other moist variables and all new processes;
- New 3D variables (5 of them without 3MT and 11 when everything) increase considerably the size of history files.

Preparation of the e-suite (2/3)

➢ Fortunately there are possibilities of the GFL fields for the I/O options and also other options. It is an important technical issue:

- Reading: either GFLs (like TKE, QL, …) are present in the INITIAL file; one can read them. If not, one can set their initial value (zero or other) and not to read them from the file.

- Writing out: again the choice by namelist. Perhaps useless for the production forecast (provided we do not wish to blow up the archiving device).

- Lateral coupling: no coupling of TKE, QI, QL, QR, QS. QV is coupled, of course. The condensates even cannot be coupled due to technical reason: these are not present in the production ARPEGE forecast files (and it was shown it does not matter).

- Post-processing in line if needed. Some problems were reported on CY29T2 but it needs to be clarified further and also on CY32T1. In Prague we have first demand for TKE at low flight levels.

Preparation of the e-suite (3/3)

- ➢ When we have a cycle (3DVAR, blending)
  - New fields are initialized by their own guess.
  - Special treatment for the cold-start.
  - Cold-start should be done only when absolutely necessary (there is also a problem of soil not to be spoiled by coupling files)
  - There are small tools to add the GFL files to avoid the cold start for soil.
- ➢ When we do not cycle
  - We start from zero values. But the spin-up is unavoidable.
  - One idea: in case of 4 runs per day, use the previous 6h production forecast (just for TKE and Qx except QV). It surely can do better than to start from zero.

E-suite is running

- ➢ Scores and maps: detection of problems
  - QV excess in the altitude (validation lecture)
  - Warm T bias in the altitude (400hPa) : we think we have not an equilibrium with ACCVIMP.
  - Temporary fix: retuning the "vertical depth" of entrainement GCVNU=2.5E-05
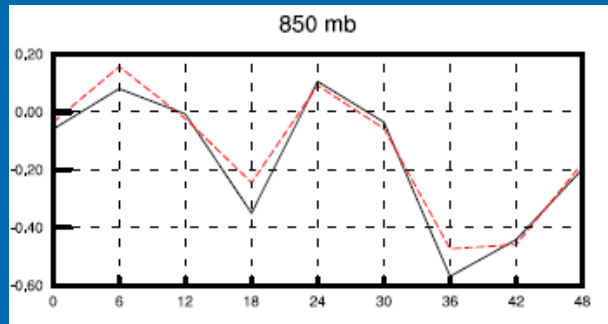 - There is no point to do more; final tuning will be done for 3MT

Some scores

Geopotential RMSE diff

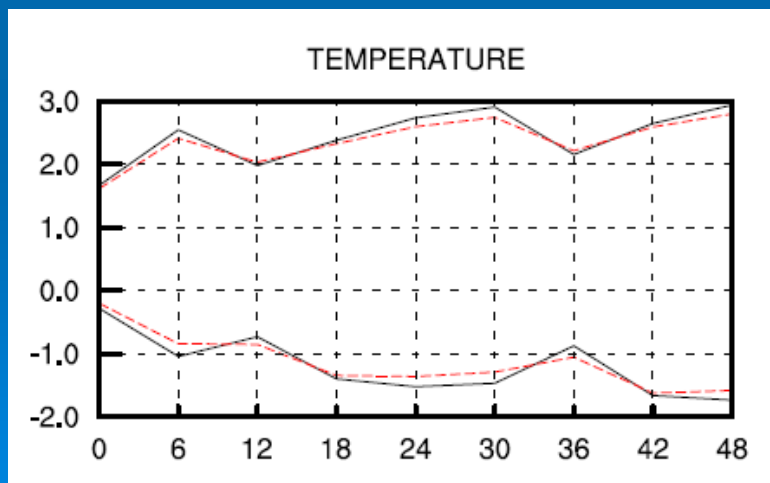Difference Daga - ALAD

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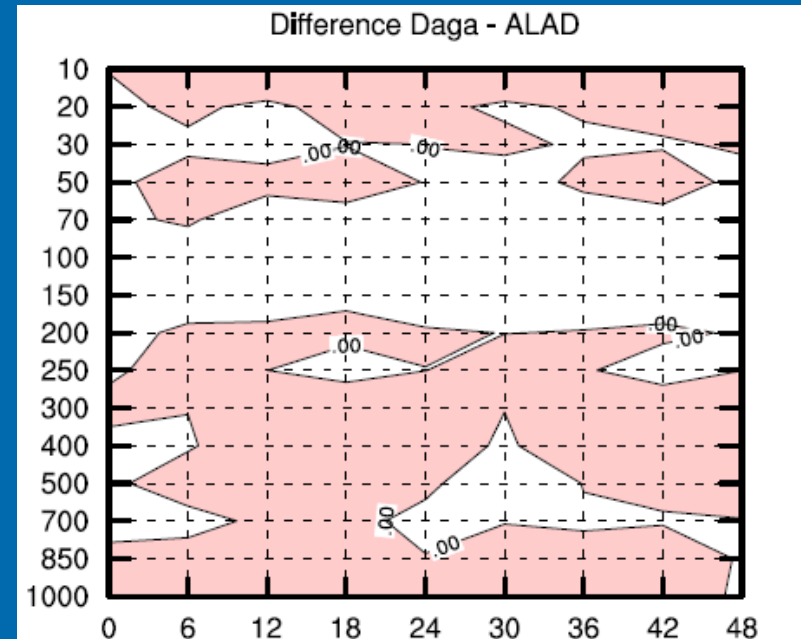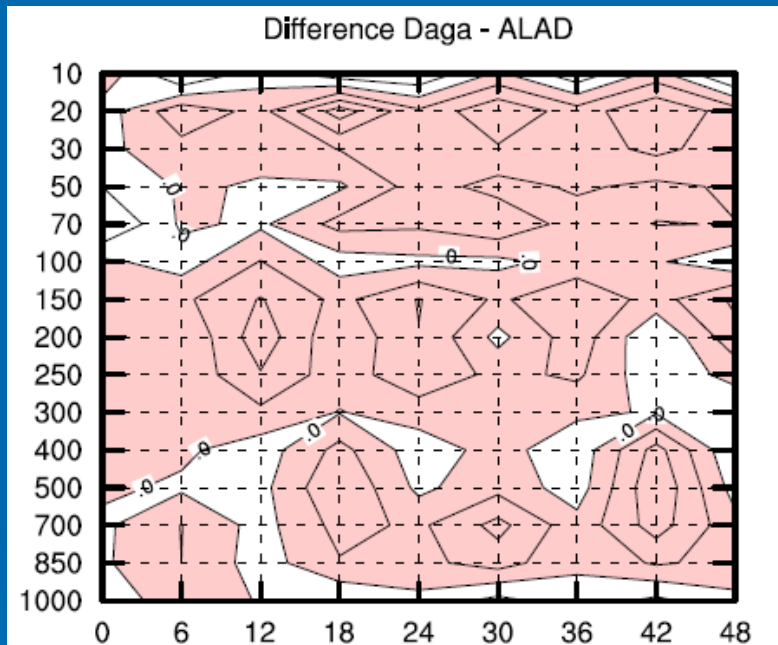
Temperature RMSE and BIAS diff;
Bias diff reaches 0.1 K
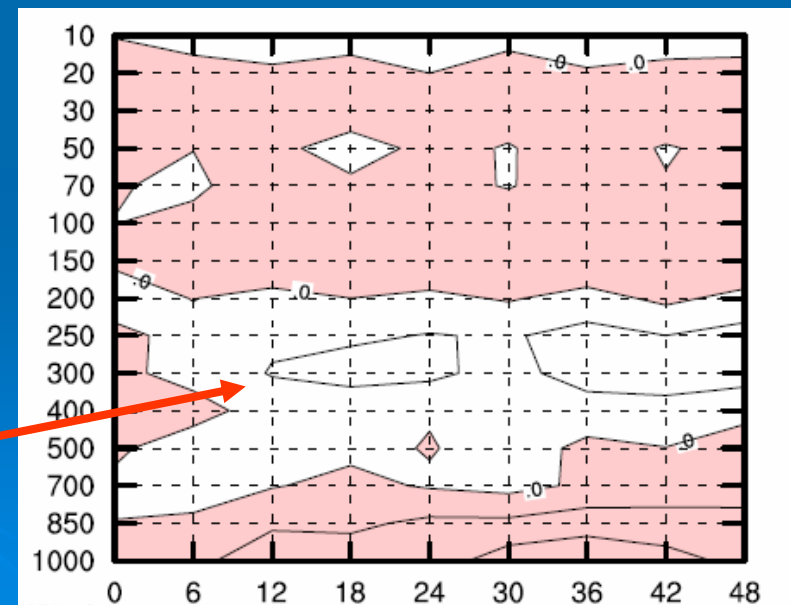
Some scores


Wind: diurnal cycle improved bias

Score of T2m improved a bit but one sees the general cold bias problem in winter

Operational switch

➢ Most scores are OK; there are some problems (warm T bias nearby tropopause) but acceptable.

➢ Precipitation scores (contingency tables over Czech Republic) show a tiny improvement

➢ Forecasters appreciate better precipitation structure

➢ New products are not yet generated (full-pos problems)

Problem of cold T2m bias in winter

➢ Nothing to do with ALARO-0; it is a long lasting problem
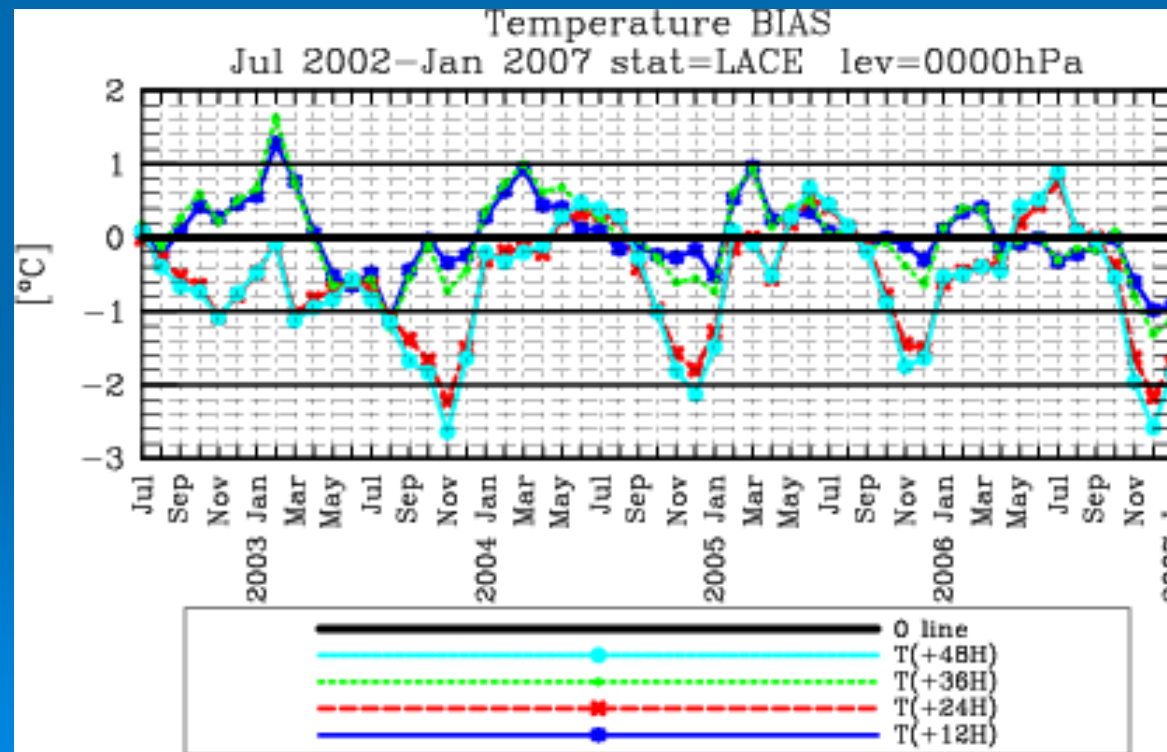
Preliminary diagnostics

parameter	ref	test	ALADIN/FR
T2m +30h	269.291	269.532	269.198
T2m +36h	272.003	272.293	271.946
Solar S+42h	0.912 E+07	0.940 E+07	0.945 E+07
Thermal S	-0.939 E+07	-0.954 E+07	-0.892 E+07
Sensible H	-	0.370 E+07	0.165 E +07
Latent Ev H	-	-0.633 E+07	-0.478 E+07
Latent S H	-	-0.004 E+07	-0.002 E+07

Some summary

- Surface analysis brings T2m to a right value (almost)
- There is a temperature drop in the first hours of forecast (at +6 we have problem)
- Reasons?
    - Soil: Ts drops quite a lot (not enough heating from lower soil layer?)
    - Atmosphere: rather mixing than radiation/cloud problem