



Further case studies using the 3D-Var scheme for the ALADIN/Hungary model

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Background error
covariance matrix:
NMC method

Background
information:
6h forecast

The cost function is the sum of:

$$J(x) = \frac{1}{2} (x - x^b)^T B^{-1} (x - x^b) +$$

background term $\rightarrow J^b$

$$+ \frac{1}{2} (Hx - y^o)^T R^{-1} (Hx - y^o)$$

observation term

Observations
available:
SYNOP + TEMP

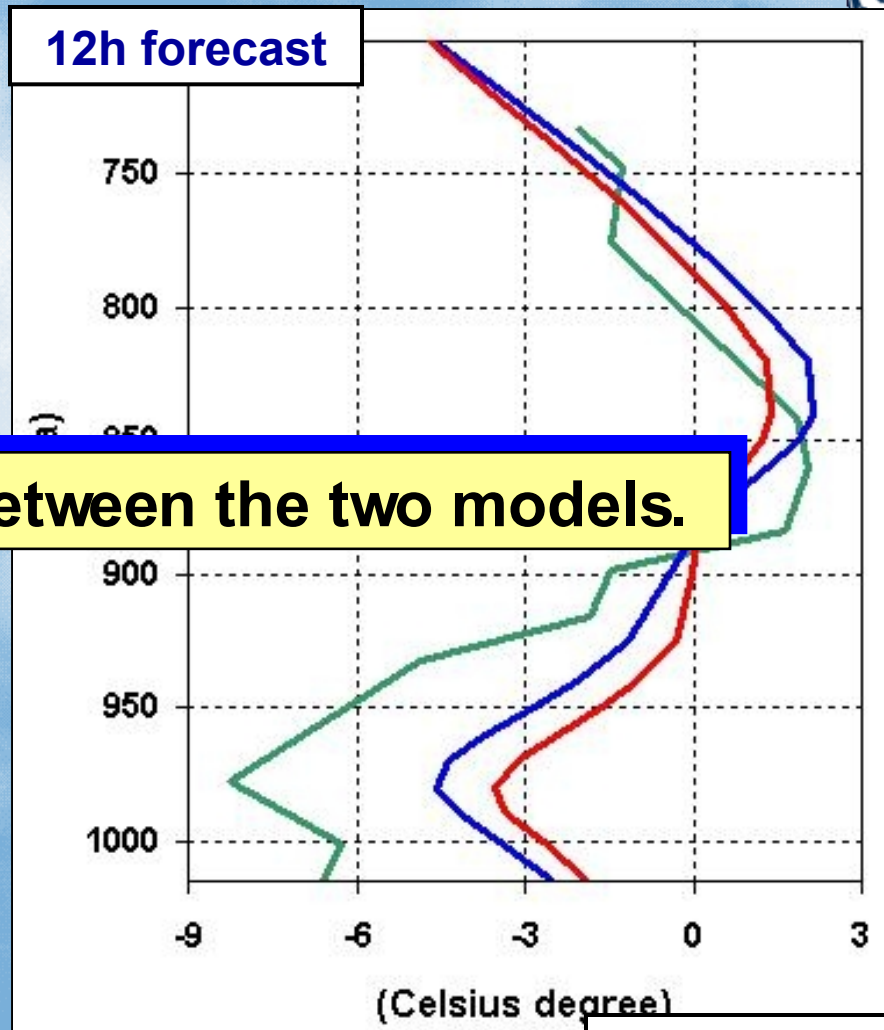
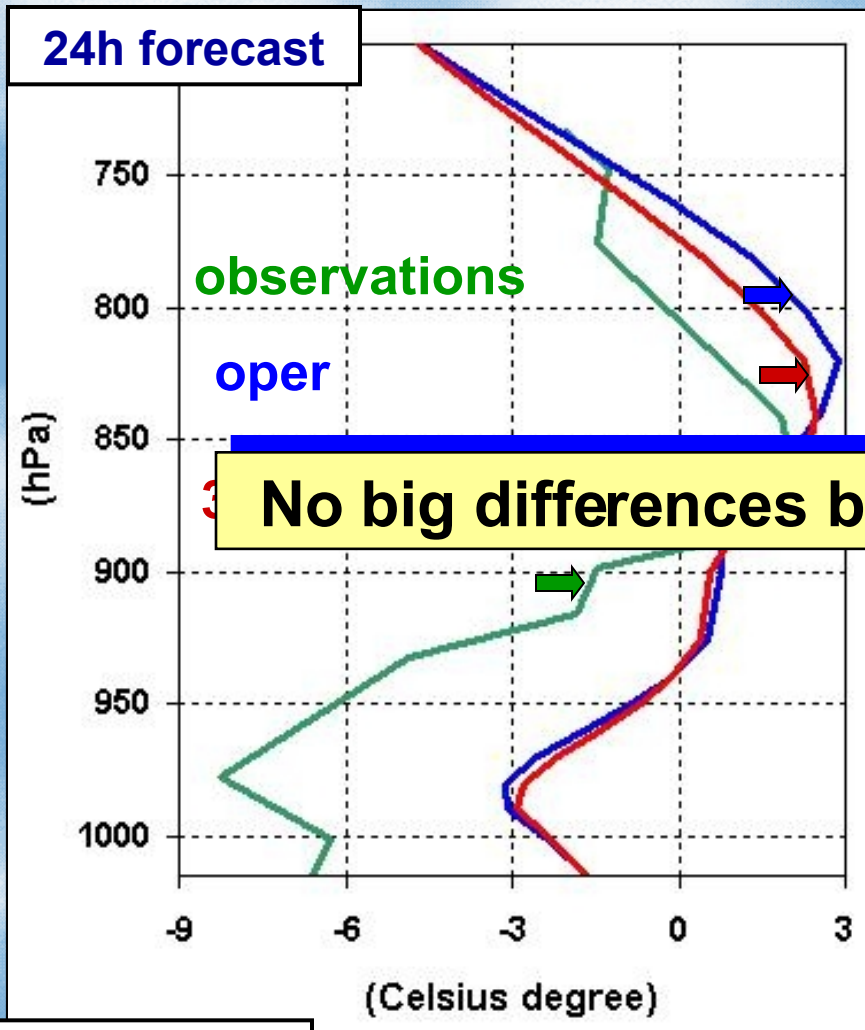


Case studies

- ✓ The “inversion” case (December 27, 2002)
- ✓ The “snow” case (January 7, 2003)



The "inversion" case (December 27, 2002)



No big differences between the two models.

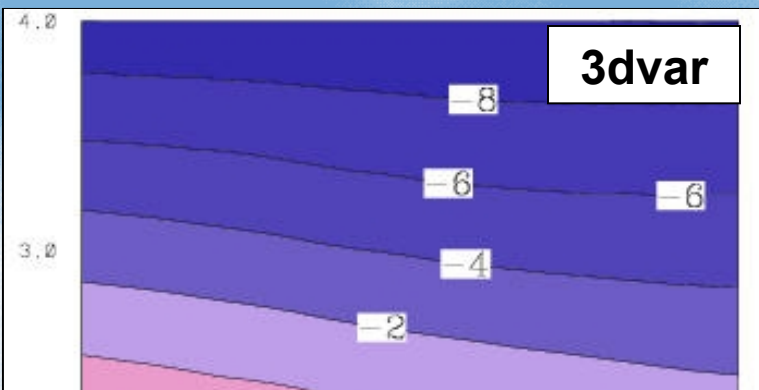
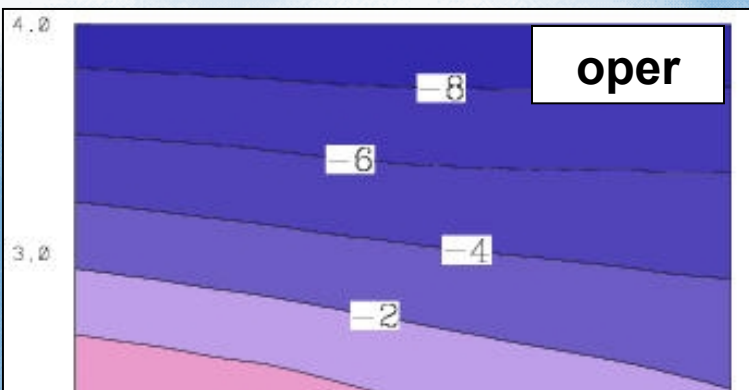
**26.12 12 UTC
run**

**27.12 00 UTC
run**



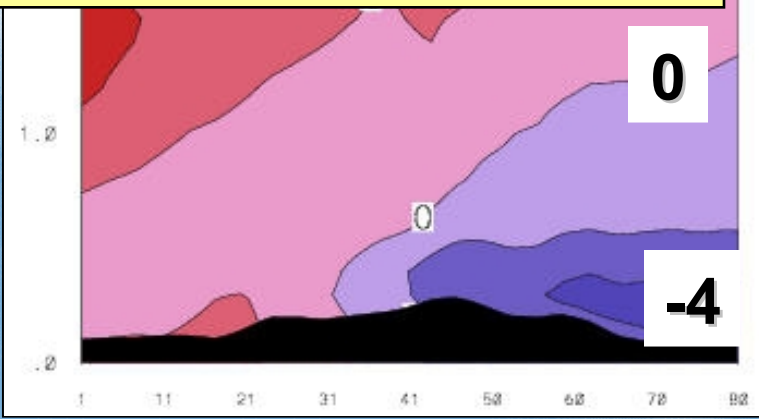
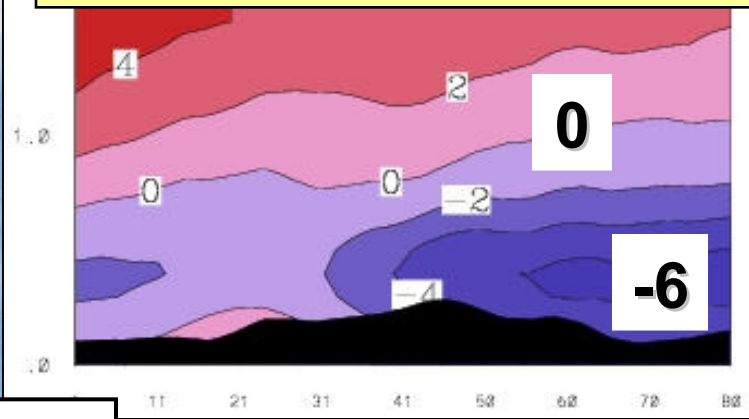
The "inversion" case (December 27, 2002)

analysis



The operational analysis showed a strong inversion, closer to reality.

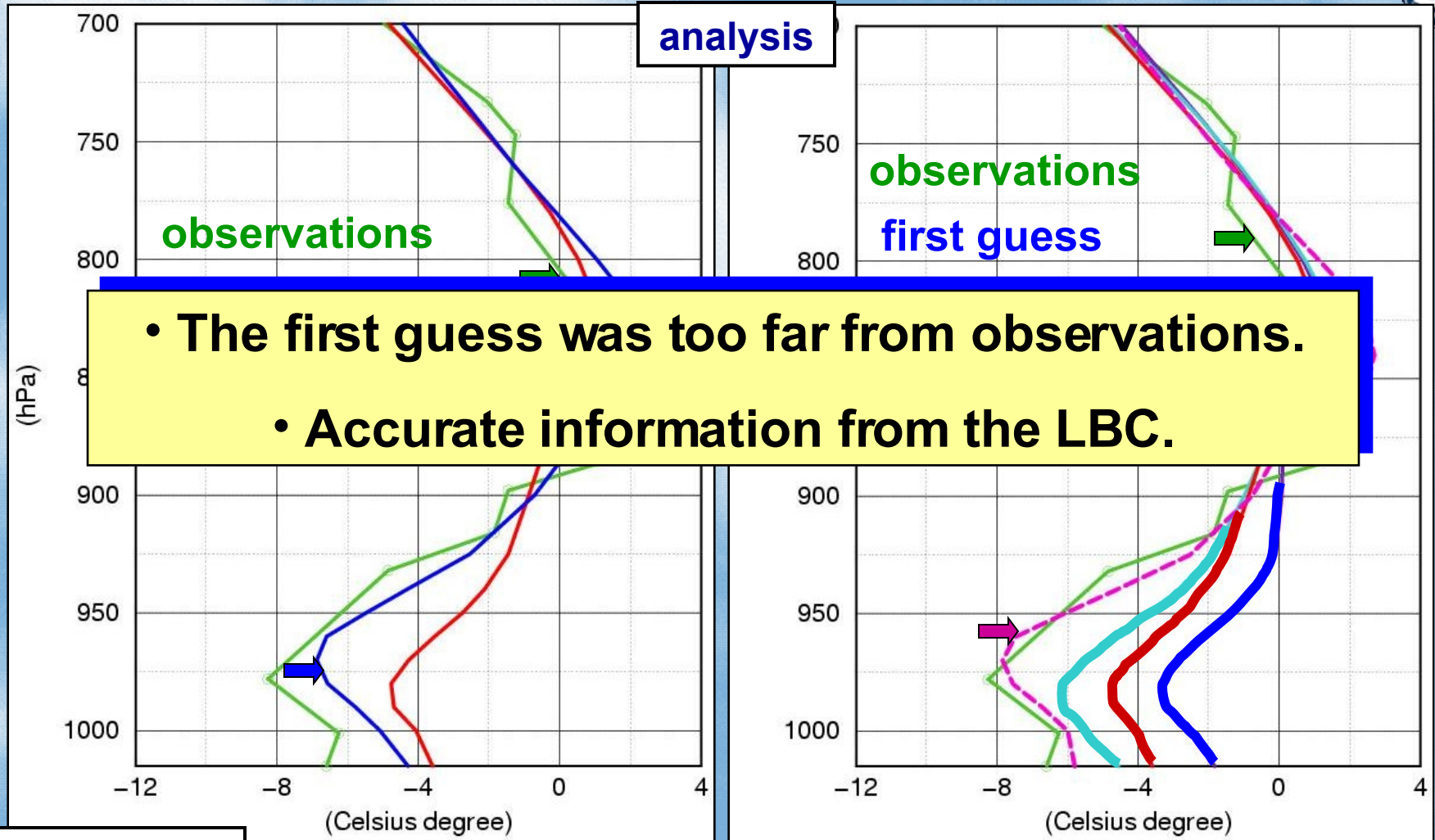
height (km)



27.12 12 UTC run



The "inversion" case (December 27, 2002)



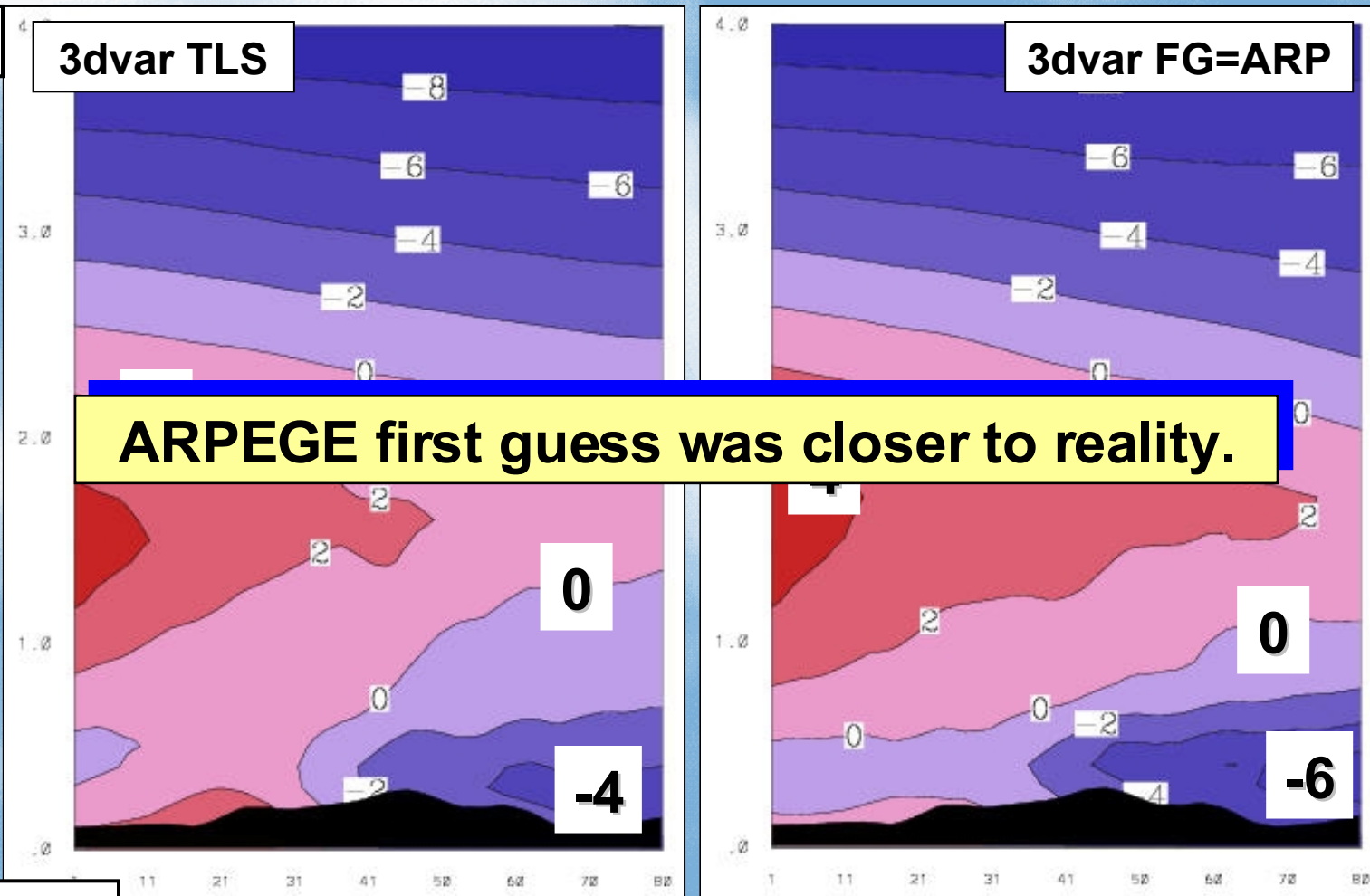
27.12 12 UTC
run



The "inversion" case (December 27, 2002)

analysis

height
(km)



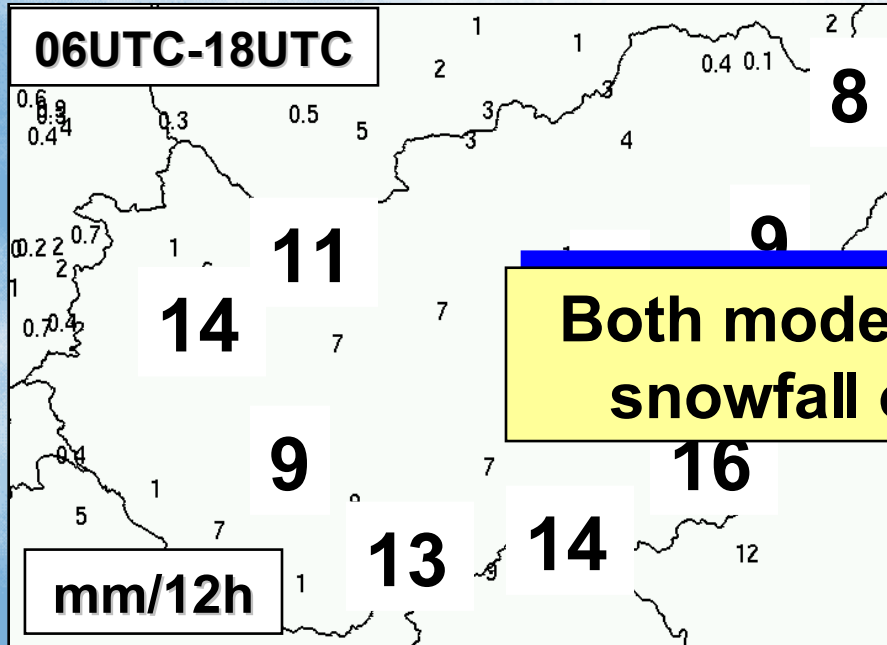
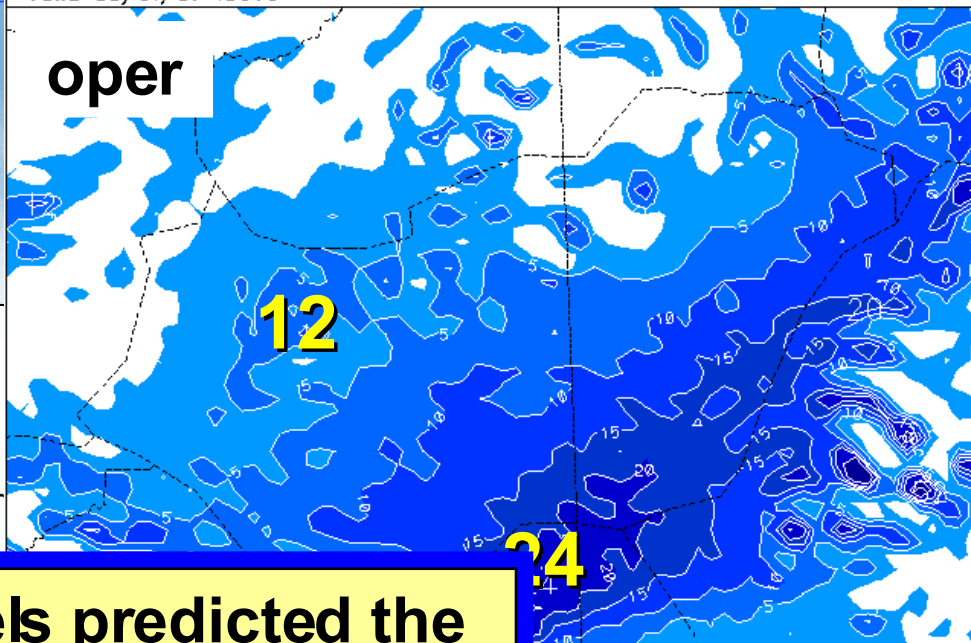
27.12 12 UTC
run



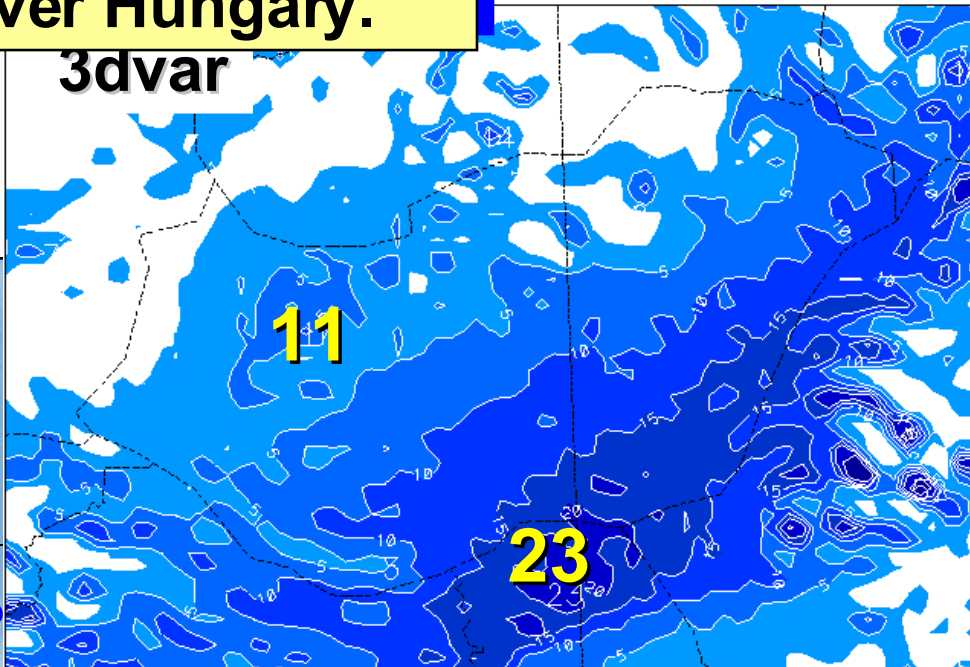
Further case studies using the

Base 03/01/06 00UTC
Valid 03/01/07 18UTC

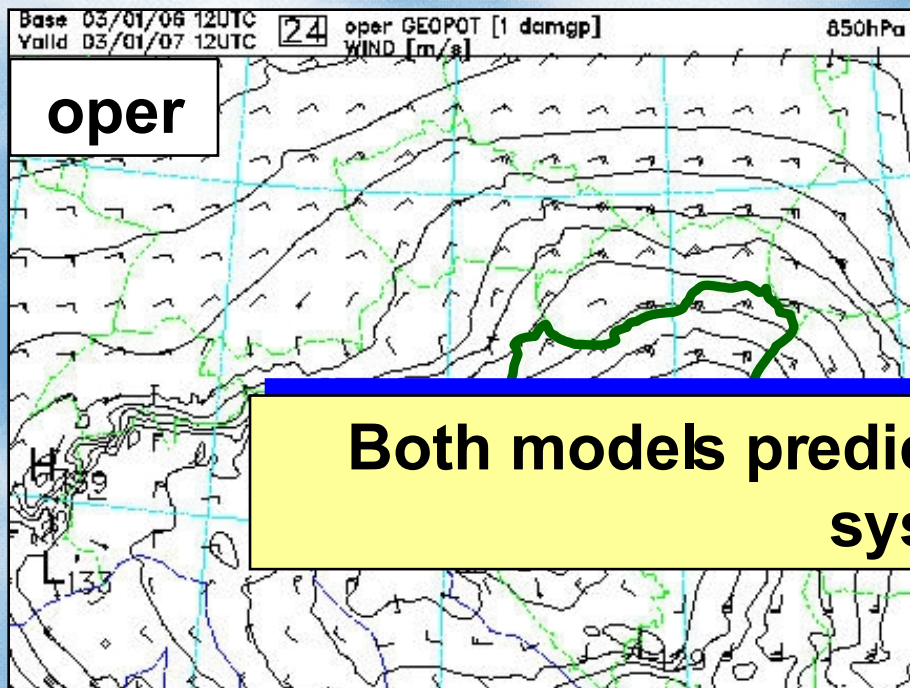
oper PREC [1,5,10,15,20,30 mm/12h]



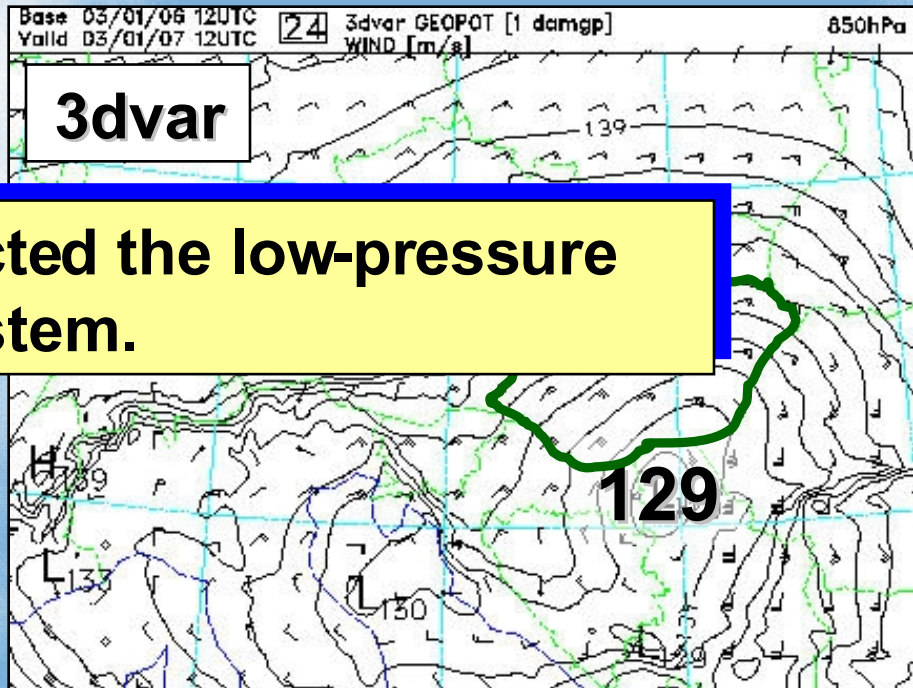
Both models predicted the snowfall over Hungary.



The "snow" case
(January 7, 2003)



850 hPa



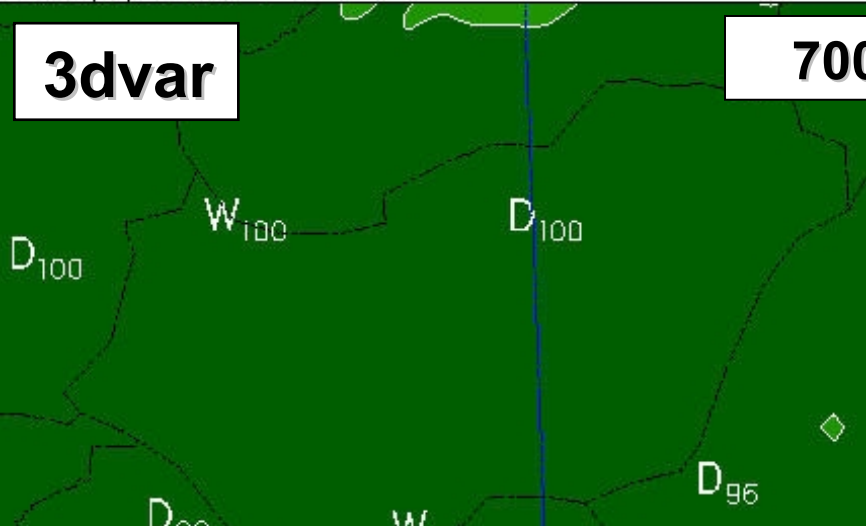
Both models predicted the low-pressure system.

24h forecast

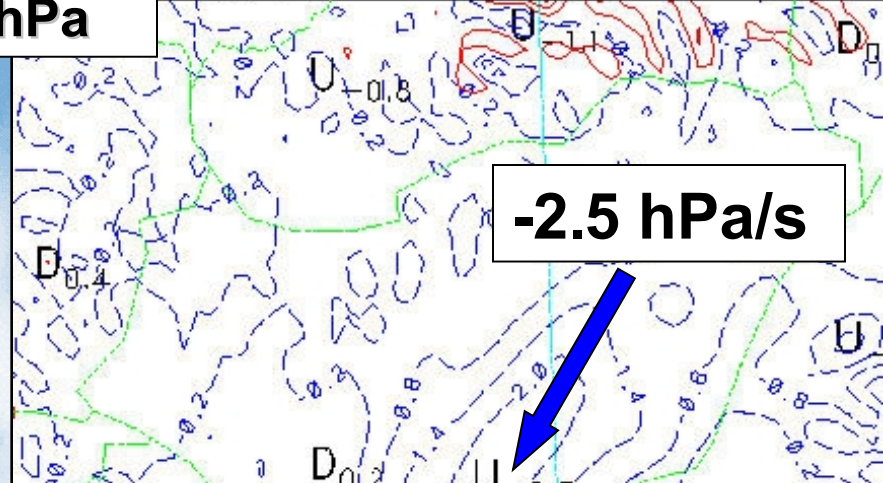
The "snow" case (January 7, 2003)



3dvar

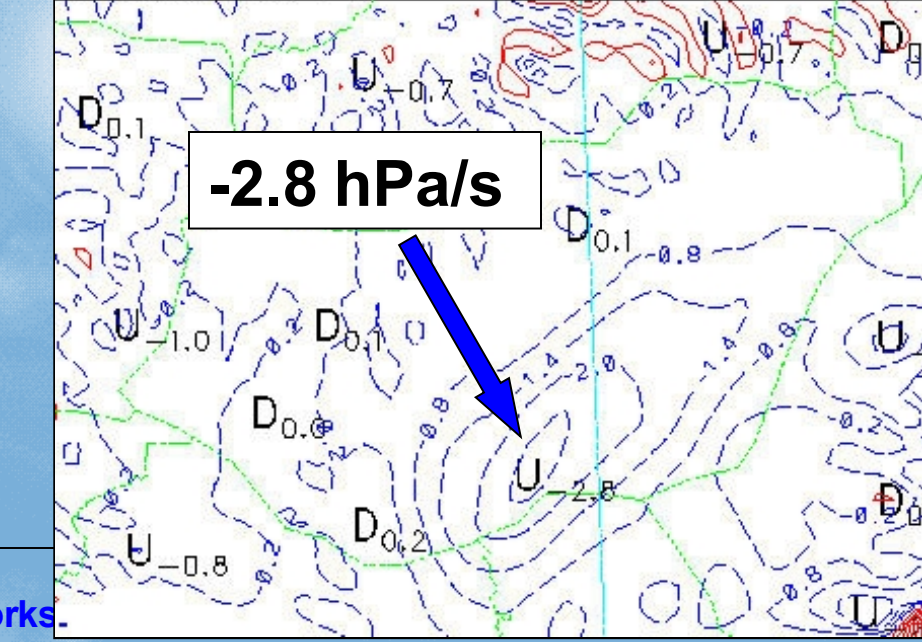
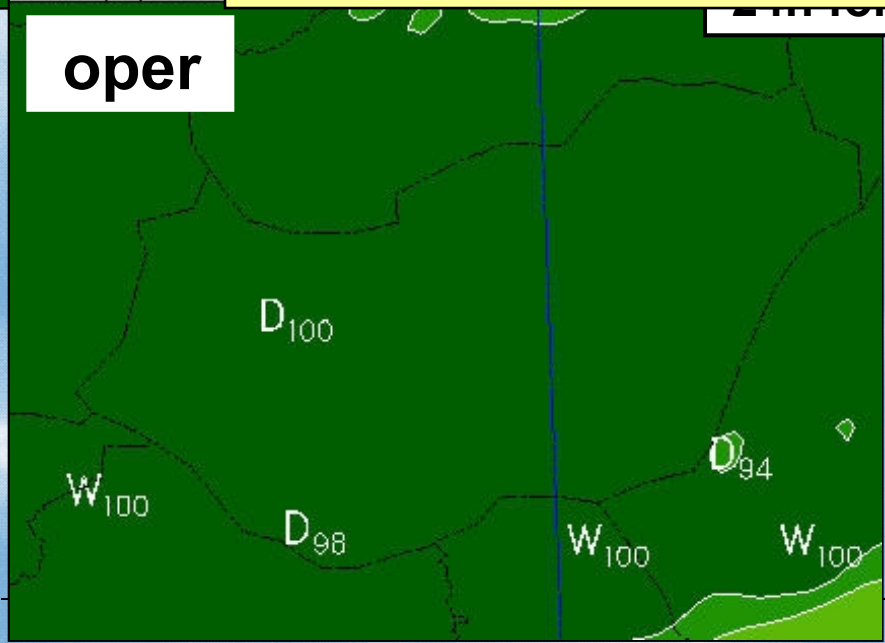


700 hPa



Similar forecasts for other fields too.

oper





Conclusions

- *The 3D-Var procedure works properly.*
- *But with some limitations.*
- *The improvements introduced in the analysis were lost after 6h.*
- *It is important to have accurate lateral boundary conditions.*





**THANK YOU FOR YOUR
ATTENTION!**

