Overview of data assimilation developments in LACE

Gergely Bölöni, Edit Adamcsek, Máté Mile, András Horányi, Mihály Szűcs, Alena Trojáková, Antonin Bucanek, Patrik Benacek, Xin Yan, Florian Meier, Tomislav Kovacic, Antonio Stanesic, Jure Cedilnik, Benedikt Strajnar, Mirela Niculae, Michal Nestiak, Maria Monteiro, Loïk Berre

LACE
nwp central europe

EWGLAM/SRNWP, Exeter, 4 - 7 Oct 2010

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- Diagnosis of Downscaled Global Ensemble DA and LAM Ensemble DA systems for sampling the B matrix
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- Observation, background and model error diagnosis in AROME
- Local surface perturbations in the LAMEPS system of Hungary

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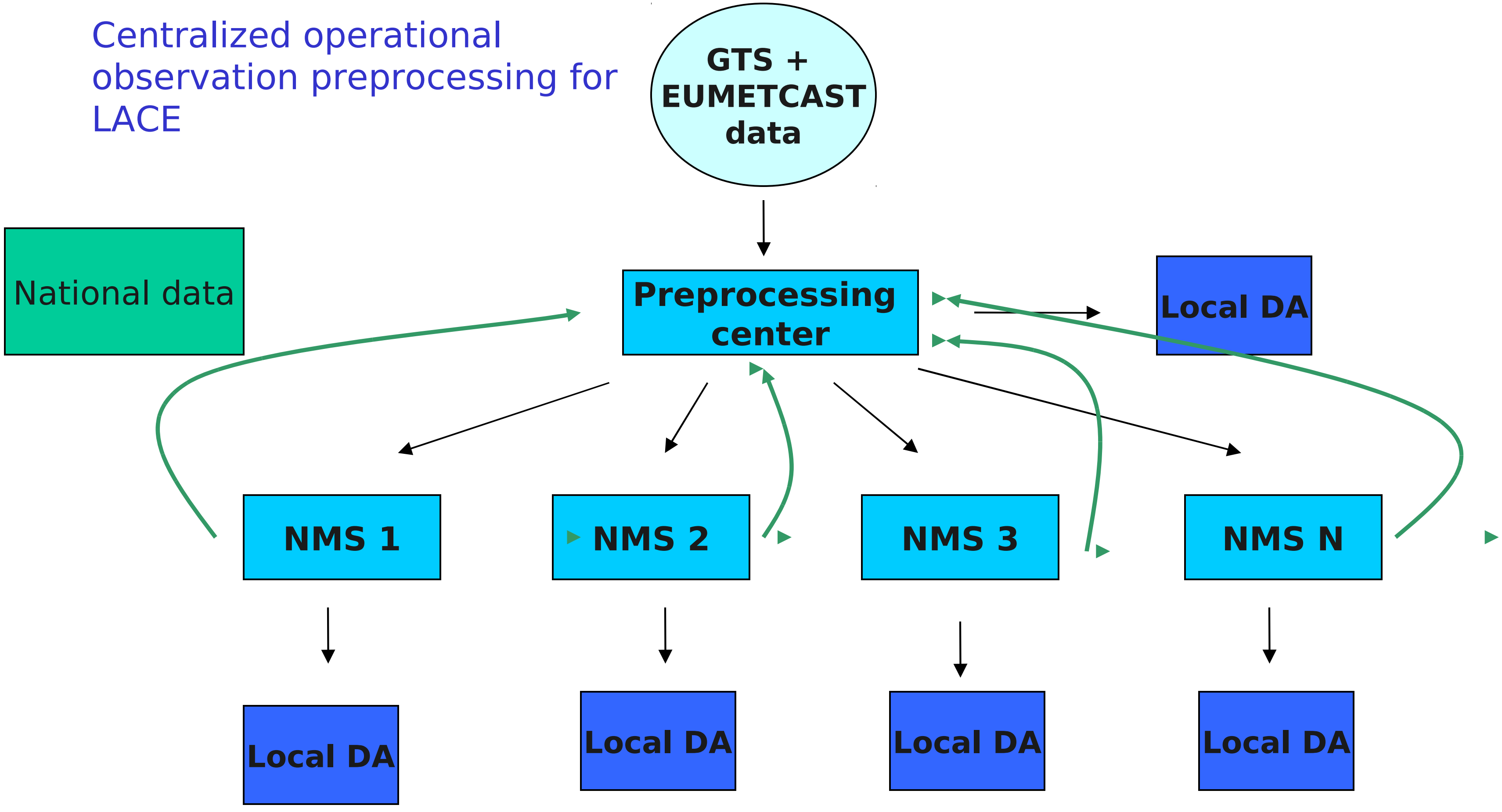
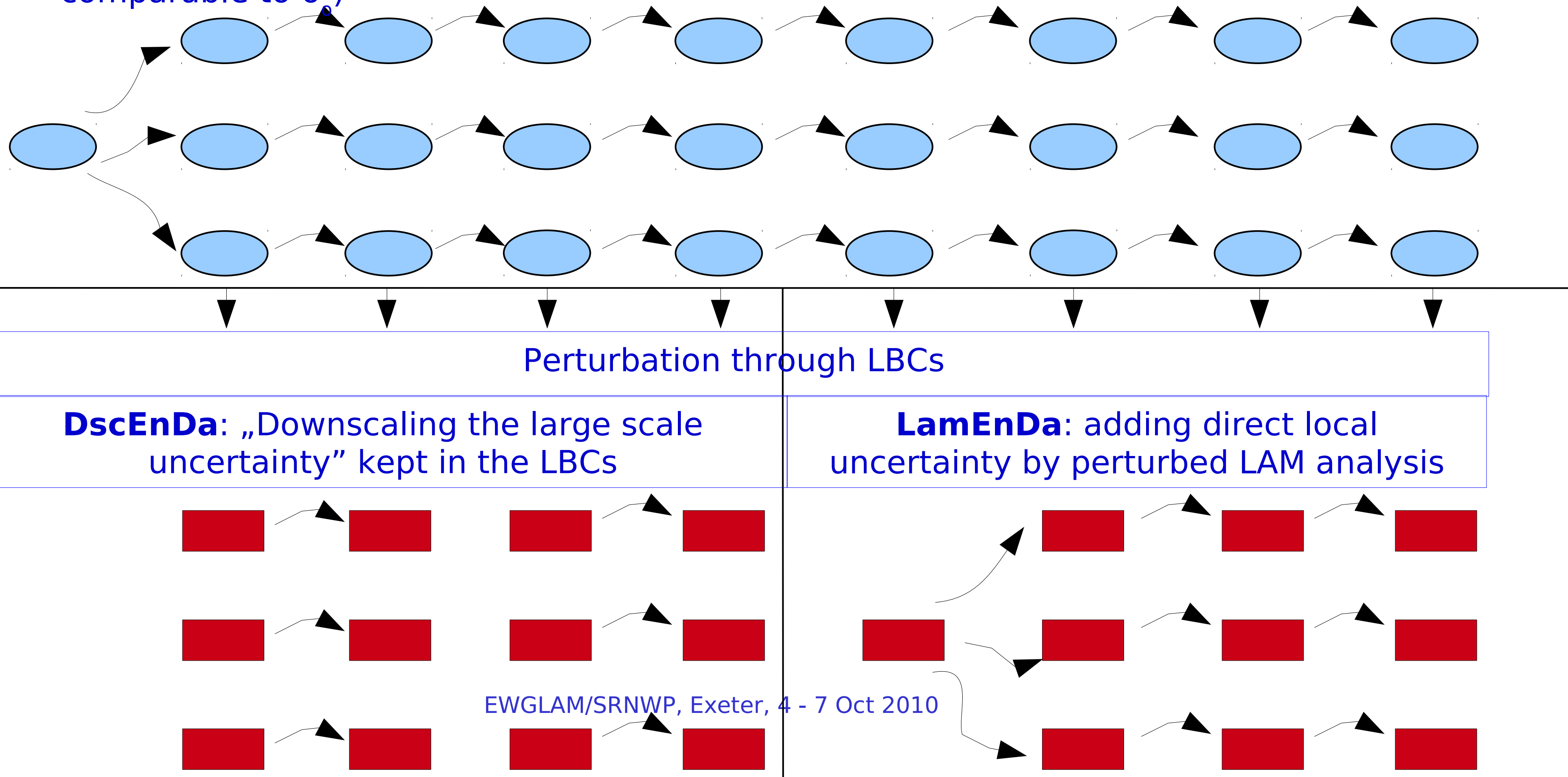


Downscaled Global Ensemble DA versus LAM Ensemble DA

Global Ensemble Data Assimilation system (perturbed analyses through randomly perturbed observations with Gaussian distribution and rescaled amplitude comparable to σ_o)



Diagnosis of DscEnDa vs. LamEnDa for sampling the B matrix

What is the information we gain with LamEnDa vs. DscEnDa?

Diagnosis with PECA: Perturbation versus Error Correlation analysis
(Wei and Toth, MWR, 2003)

$$PECA = (\epsilon_b, \epsilon_{ref})$$

$$\epsilon_b = x_b^{pert} - x_b^{ct}$$
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In what extent our ensemble differences explain the B error variance?

PECA defined in the ALADIN spectral space (after B cov computation by Berre, 2000):

$$PECA(k^*, z) = \frac{1}{2\pi}\int_0^{2\pi} \overline{\epsilon_b^{m,n,z}\,\epsilon_{ref}^{m,n,z}}\, d\theta$$

$$\theta = \tan^{-1}\frac{n/nyl}{m/nxl}$$

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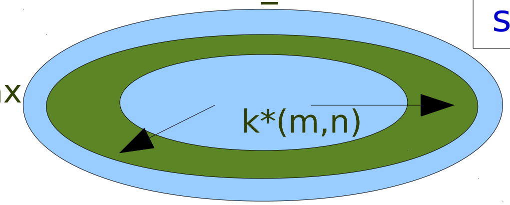

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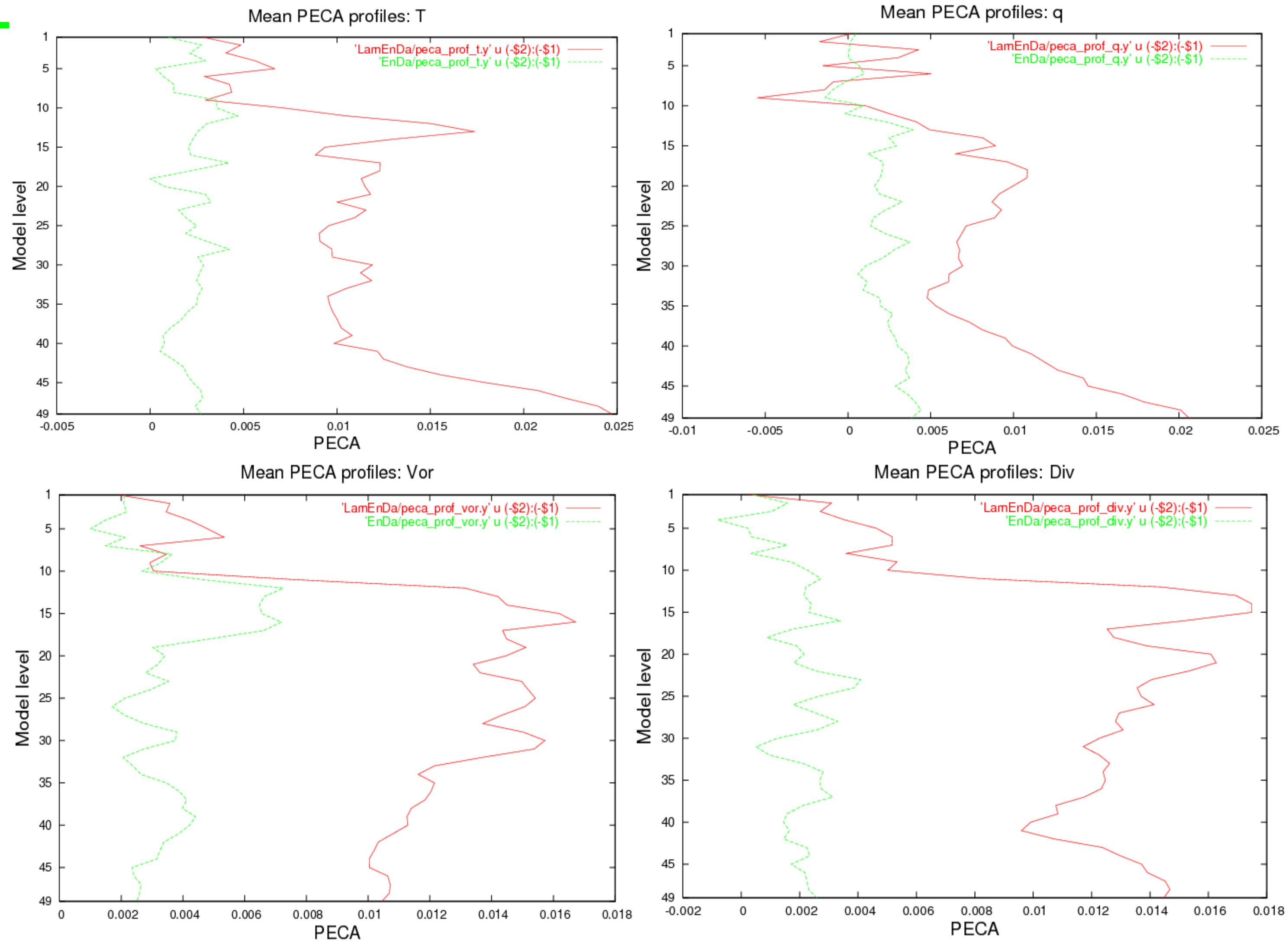

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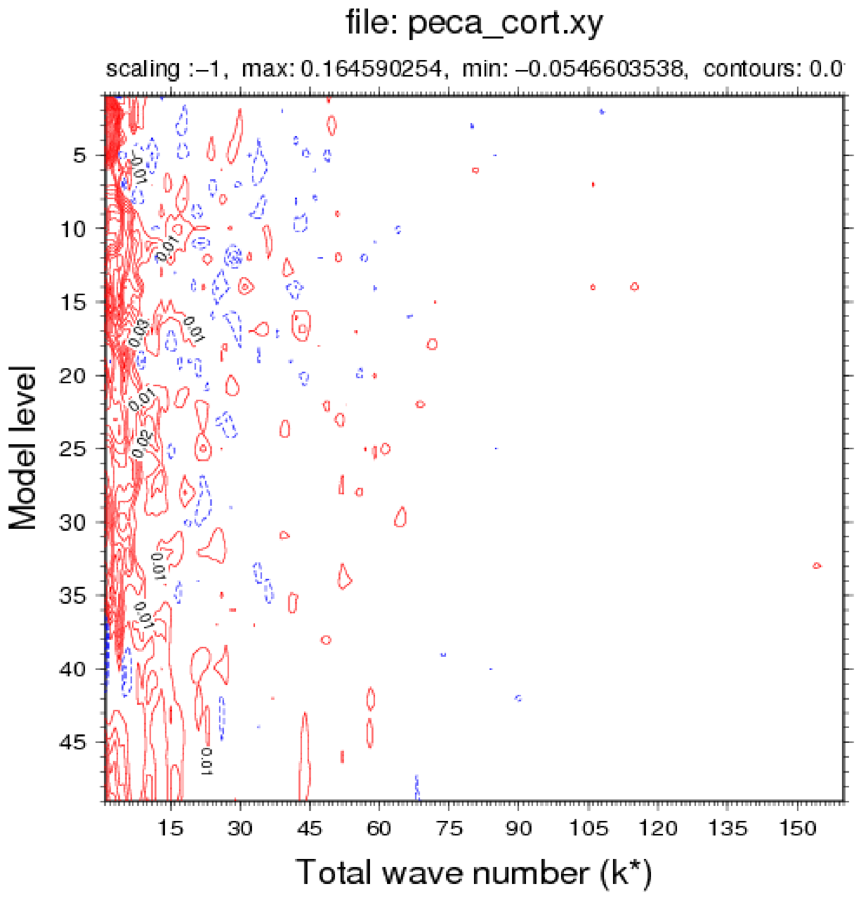

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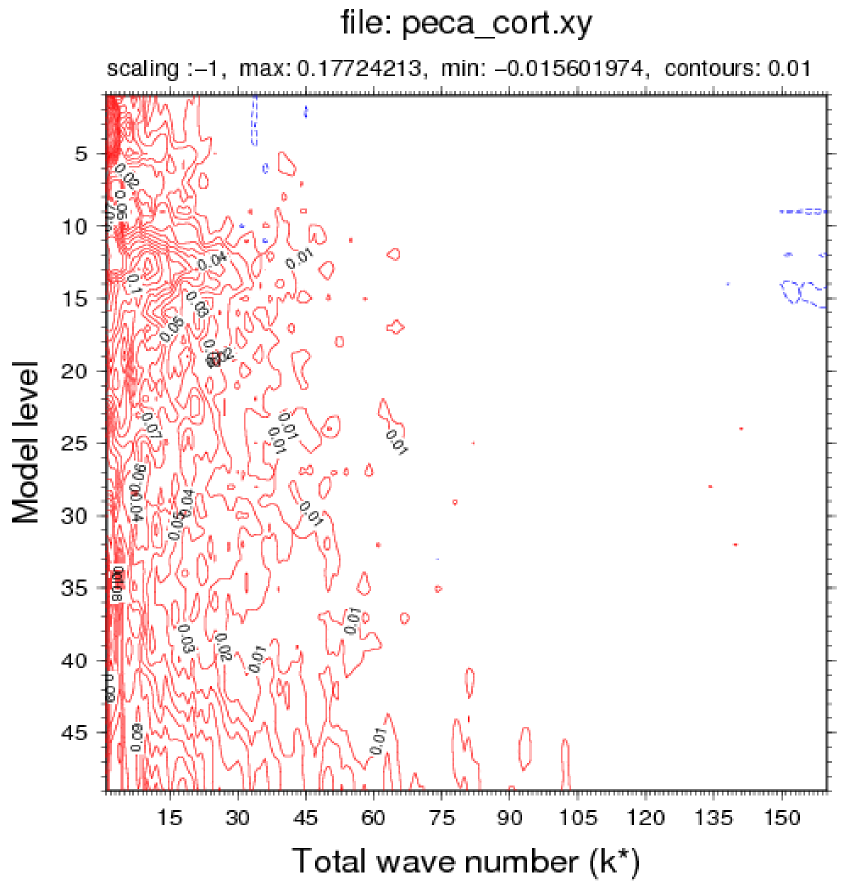

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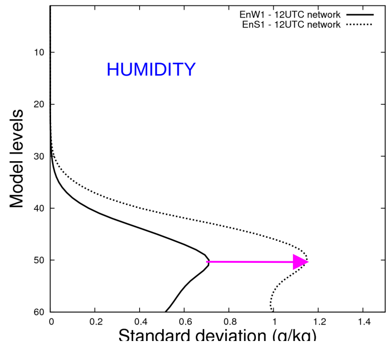

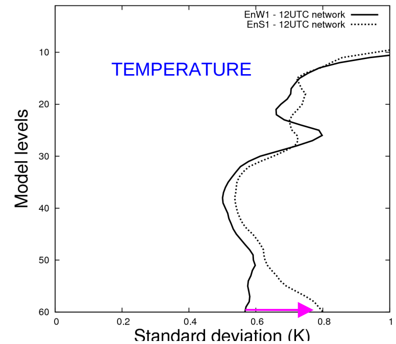

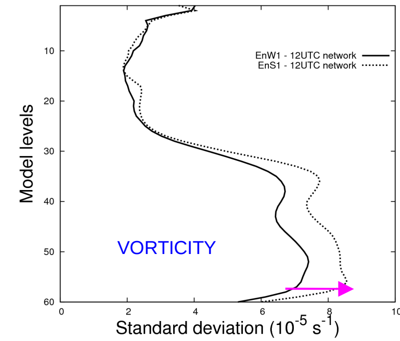

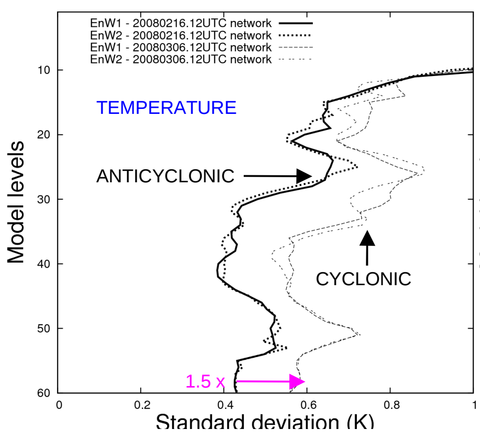

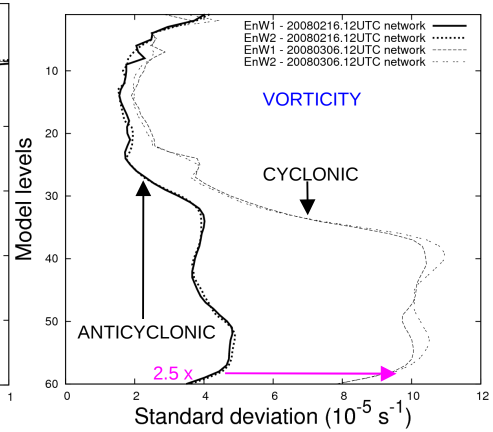

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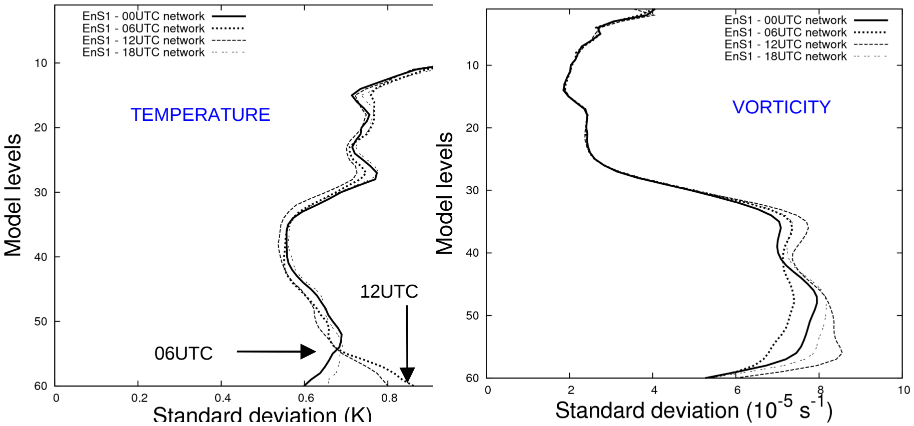

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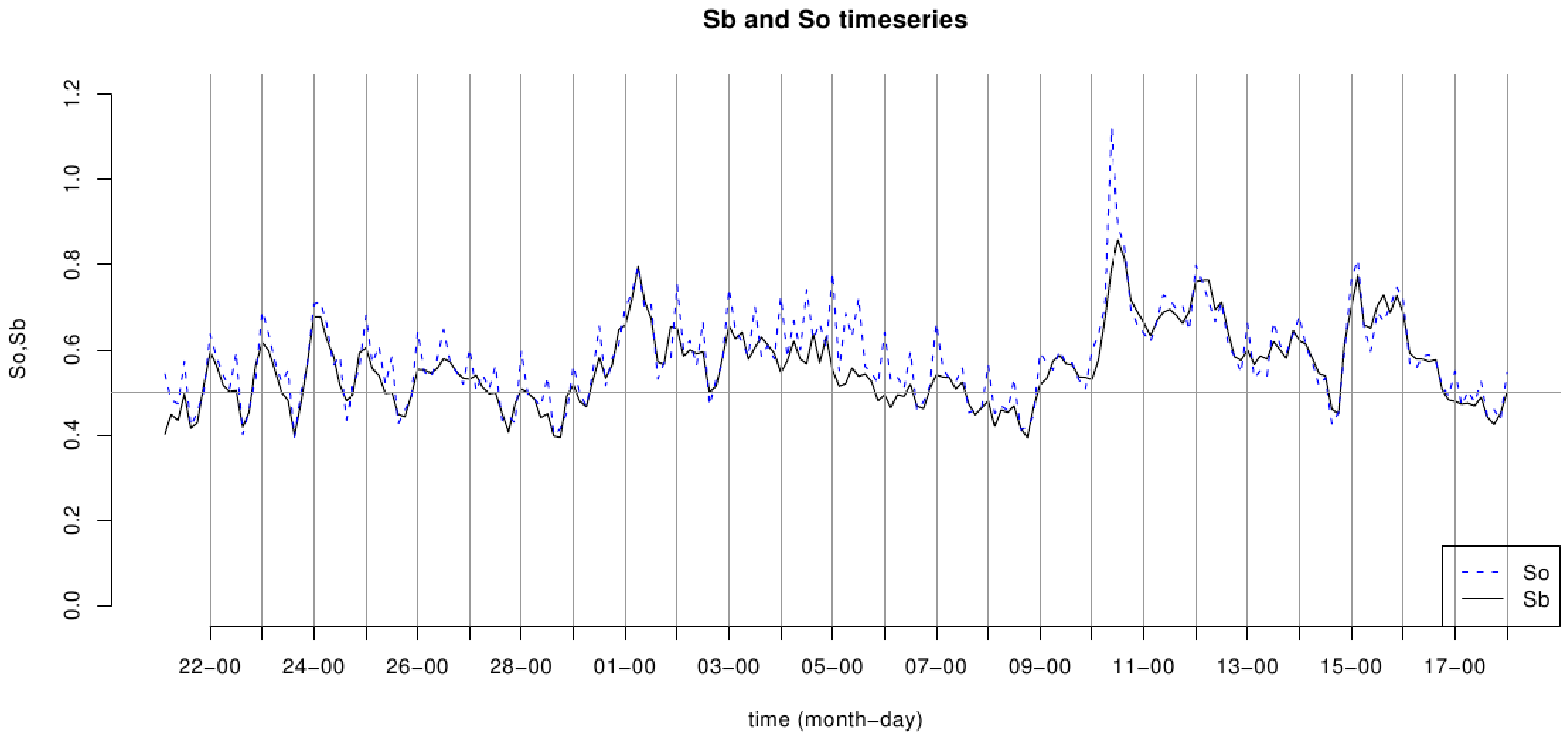
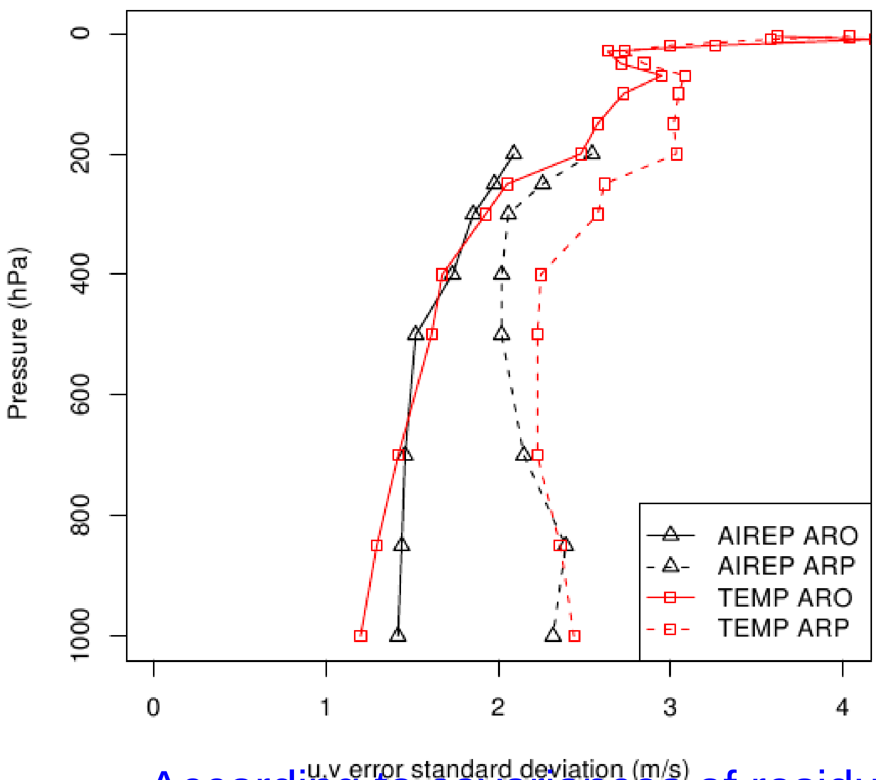


Observation, background and model error diagnosis in AROME

Resolution impact on σ_o and σ_b

Profile of diagnosed observational error STD



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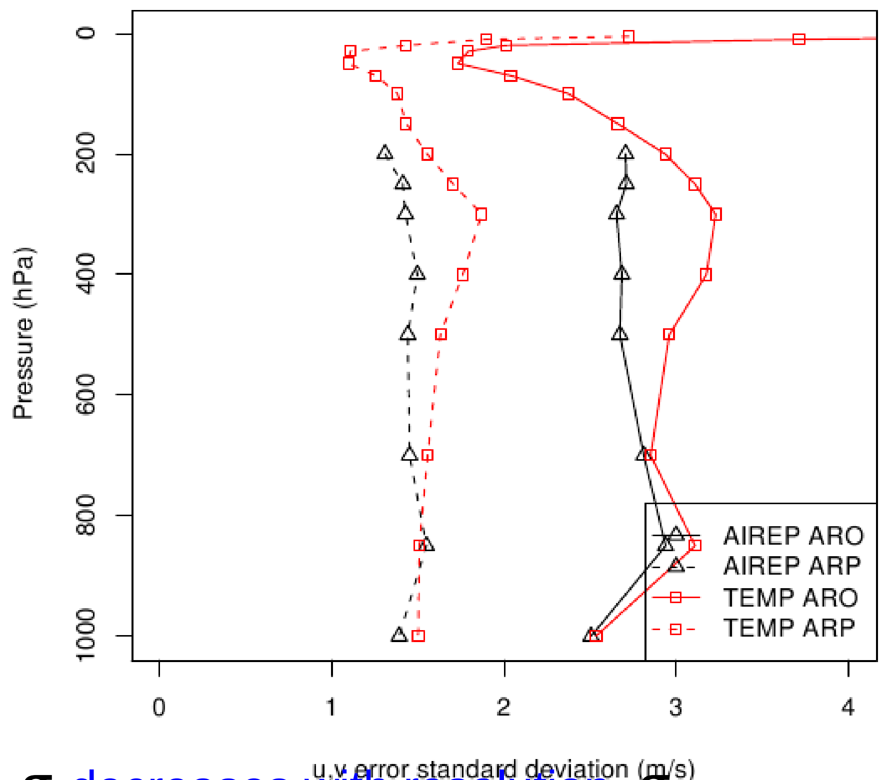

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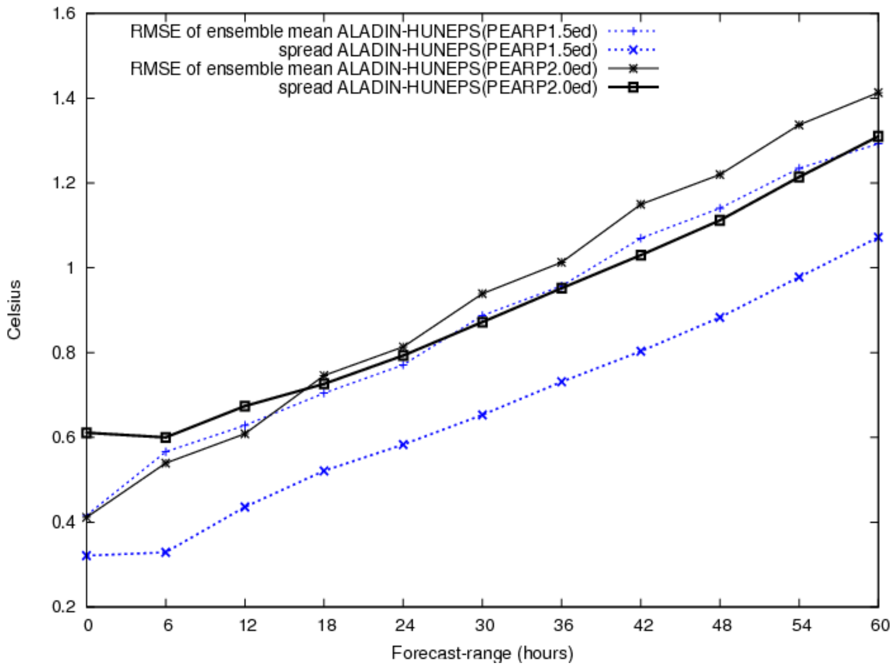
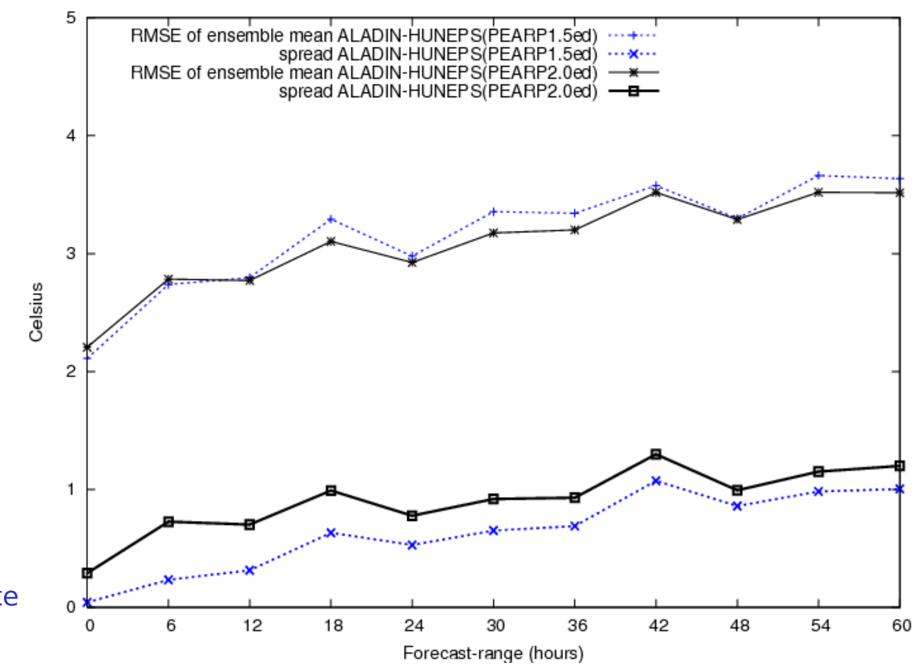


T 2m



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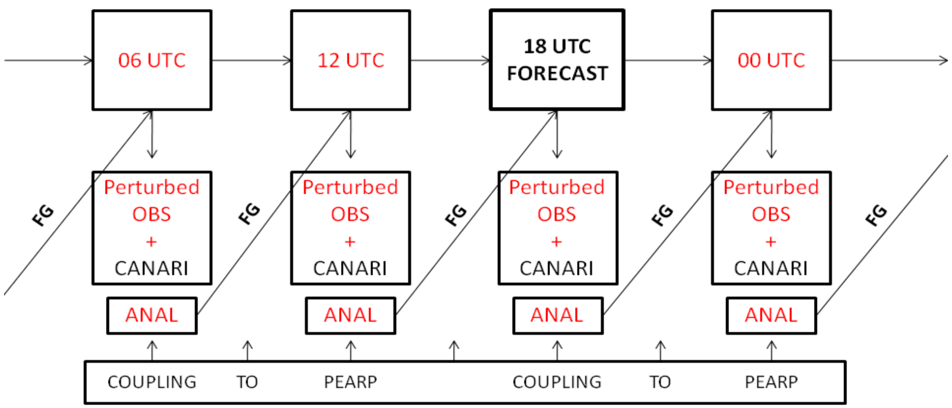

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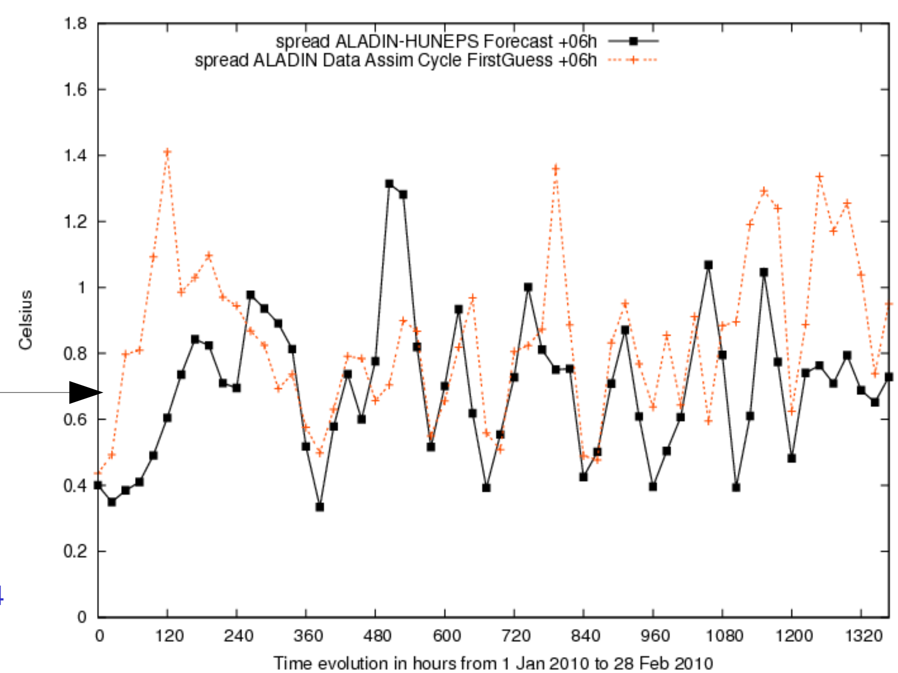

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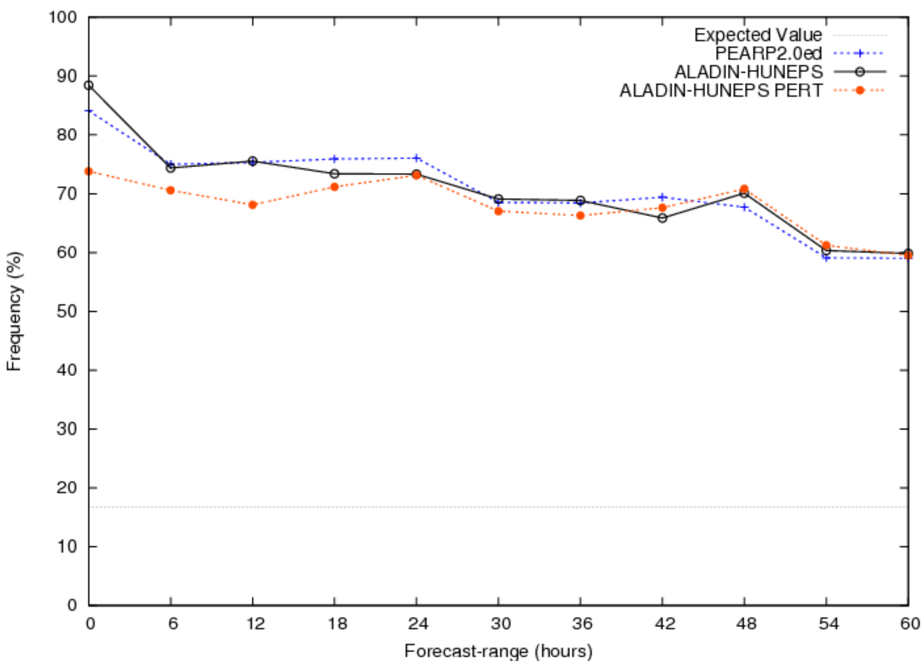

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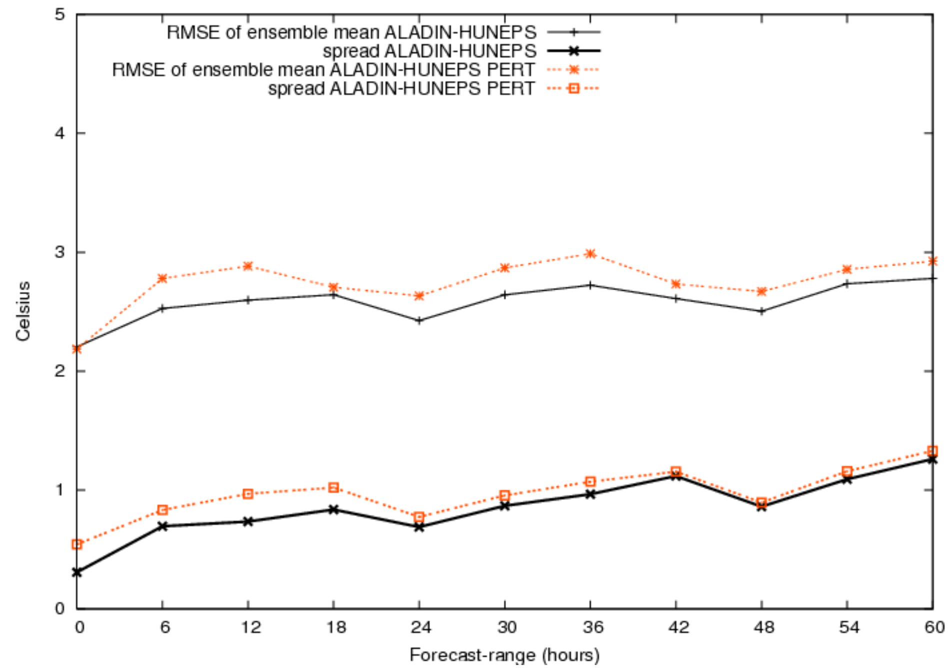

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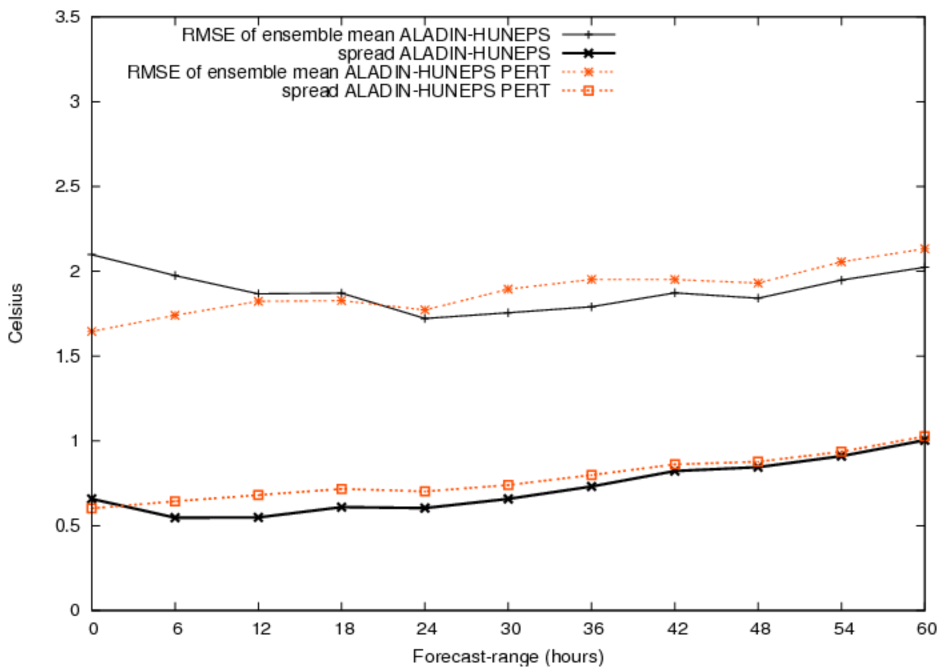


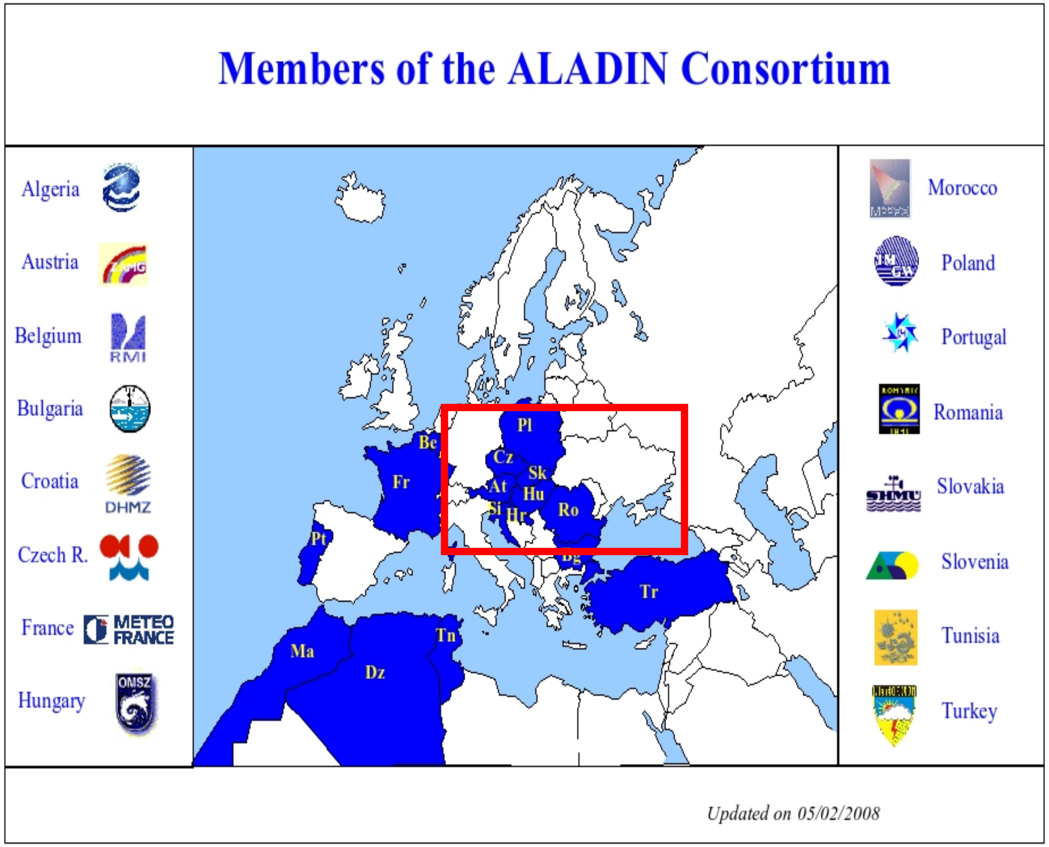
Some improvement in the spread-skill at 1000 hPa

- 7 Oct 2010

Thank you for your attention

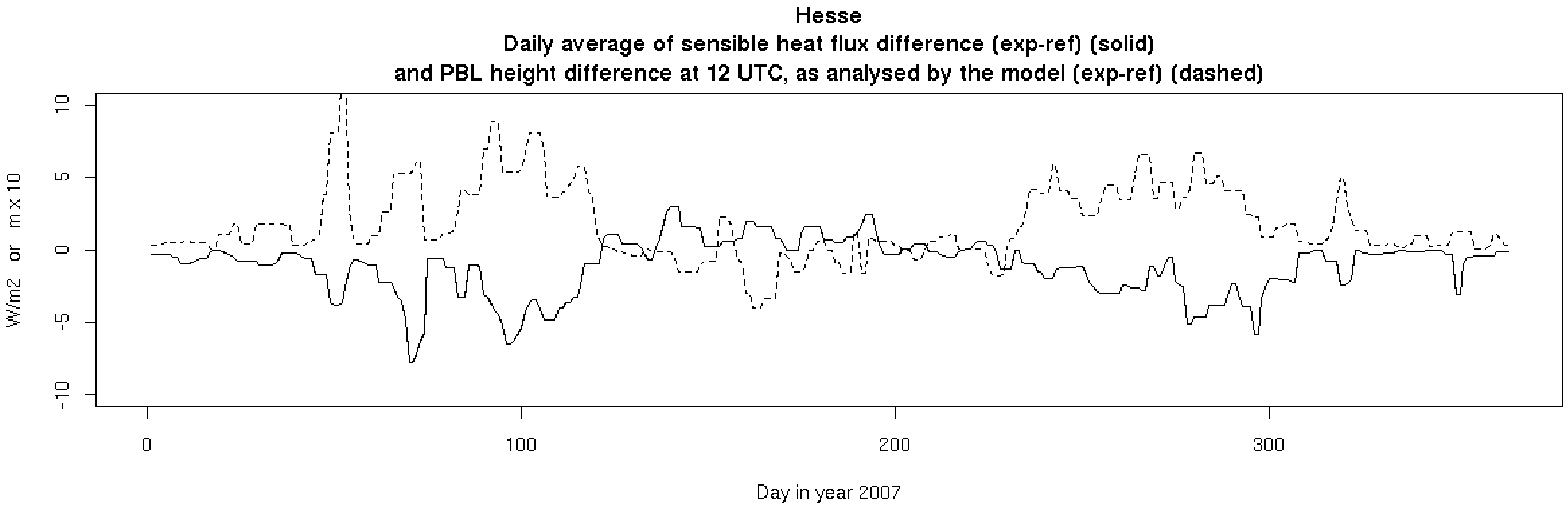
LACE

- Austria
- Croatia
- Czech Republi
- Hungary
- Romania
- Slovakia
- Slovenia



Initialisation with LandSAF albedo

- Technical developments: use FA instead of previous binary formats (oper use is easier technically)
- 1 Year test: albedo assimilation acts as systematic bias correction of 2m fields
- LSAF albedo assim has an important effect on the PBL height



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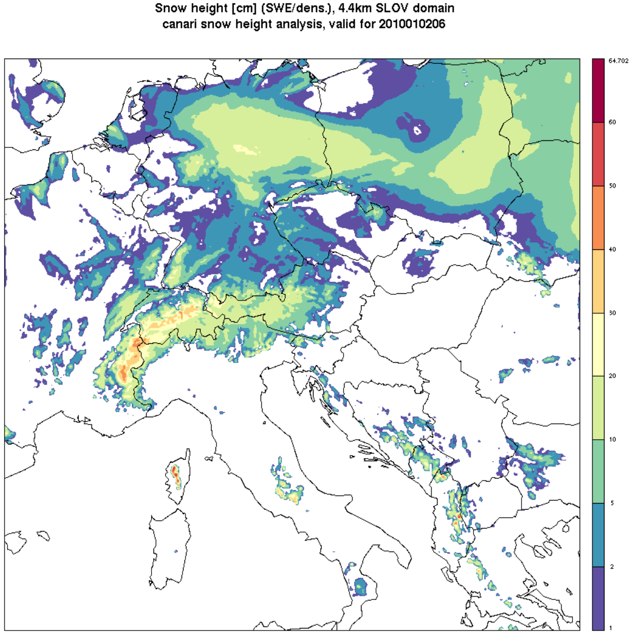
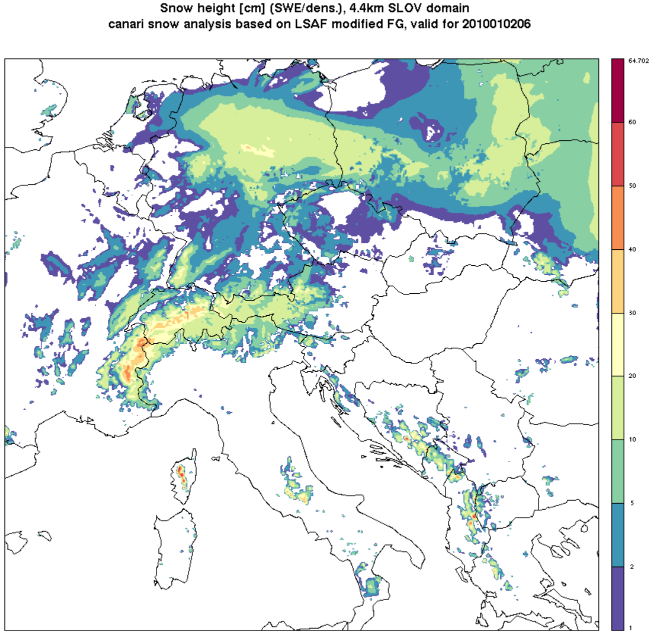
- Combine CANARI snow assimilation and LSAF product
- LSAF/MF-albedo-snow cover products gives an improved guess for CANARI snow analysis
- Use of snow height instead of snow water equivalent in CANARI
- Try to define evolving B errors for snow analysis (previous analysis error + increase where precipitation was falling)





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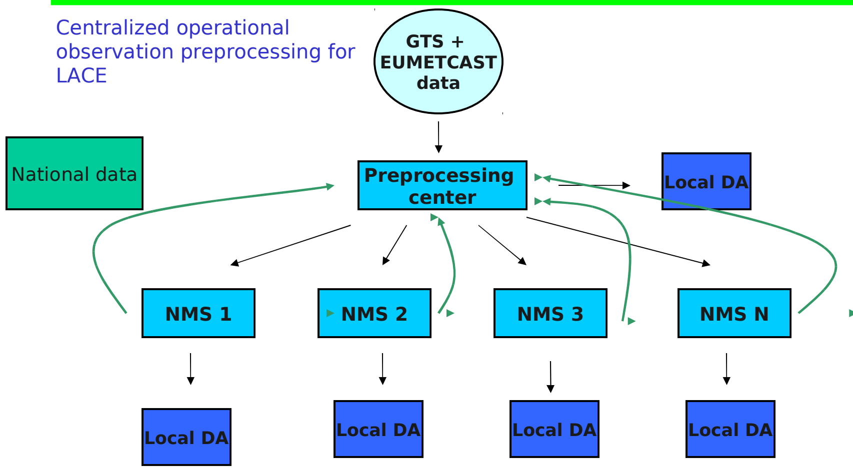

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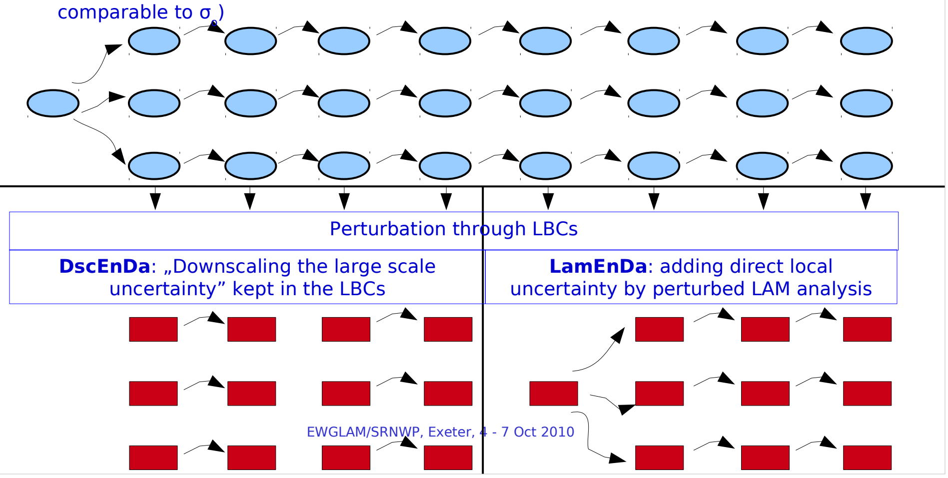

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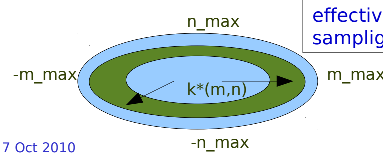

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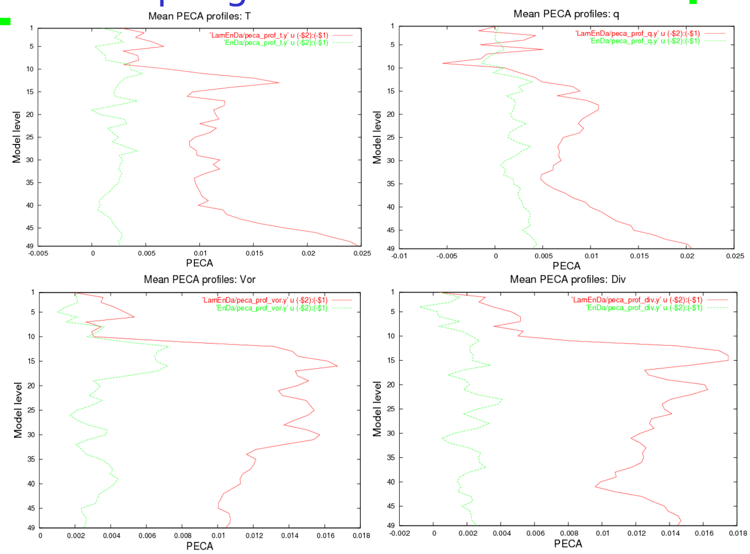

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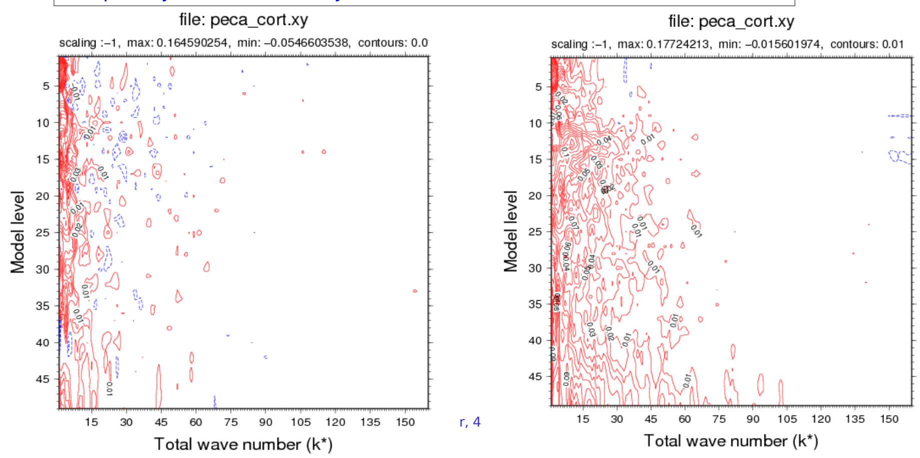

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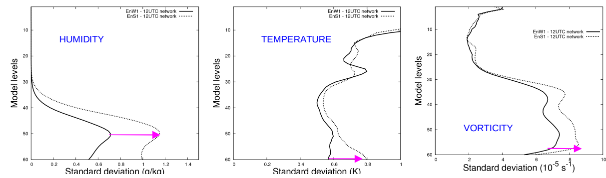

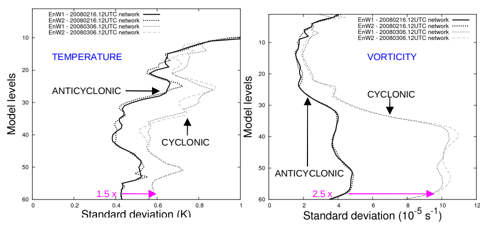

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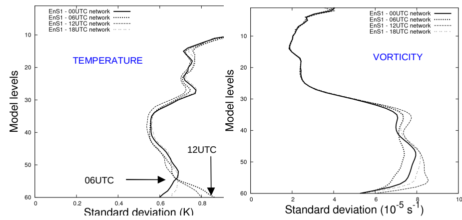

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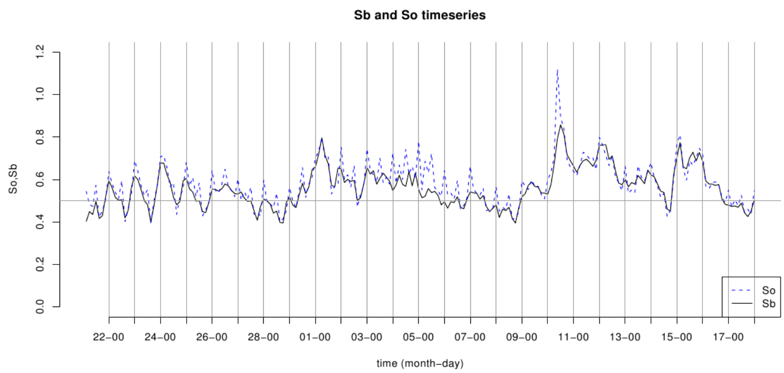

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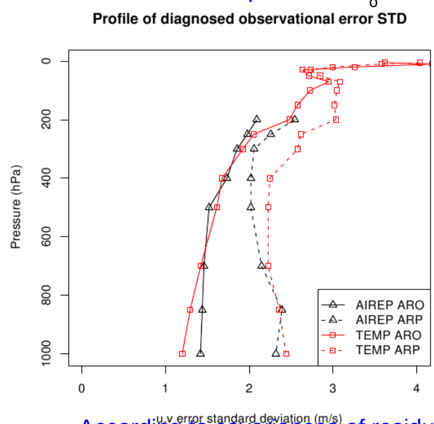

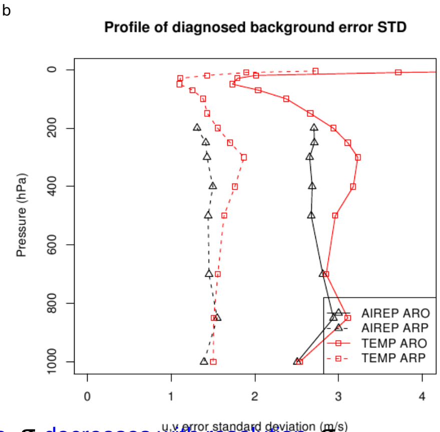

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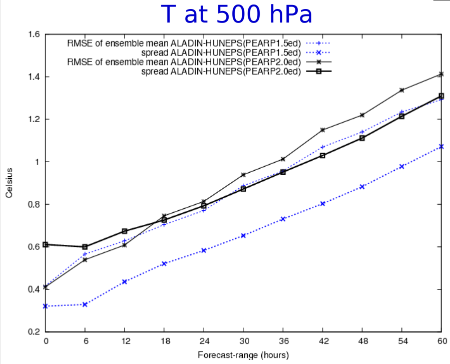

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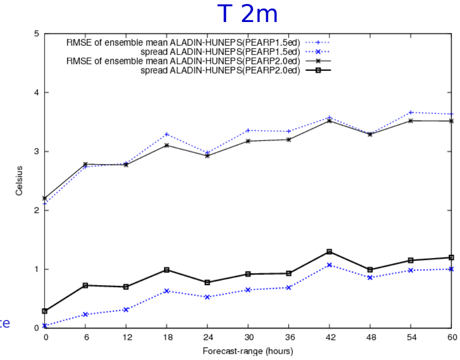

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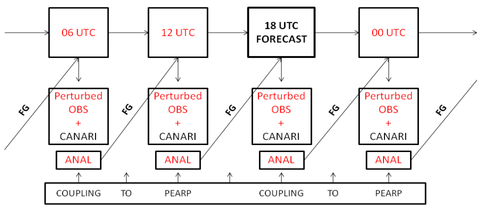

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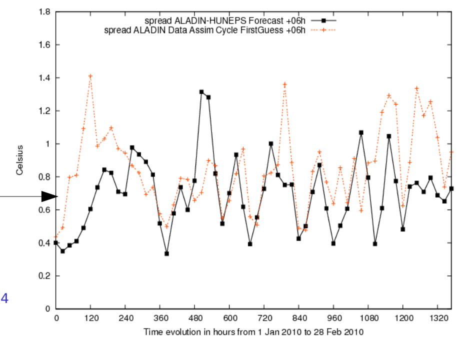

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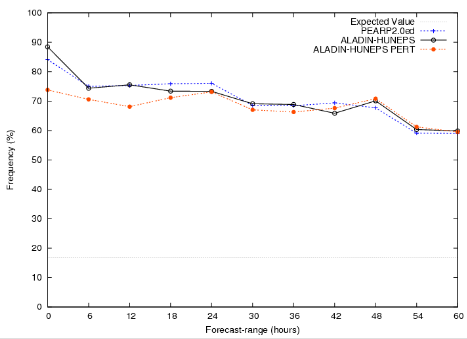
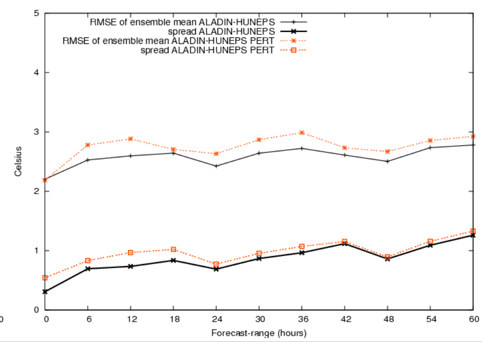
Spread-skill: spread increased but RMSE as well

T 2m



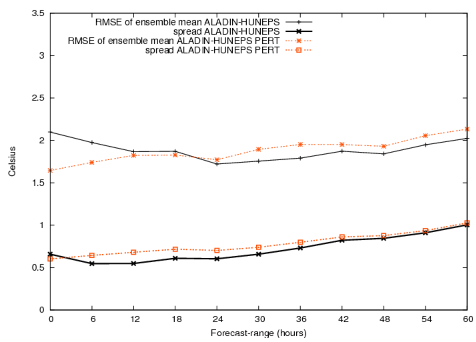
T 2m



Local surface perturbation in ALADIN-HUNEPS

PEARP2.0 downscaling + surface ensemble DA:

1000 hPa



Some improvement in the spread-skill at 1000 hPa

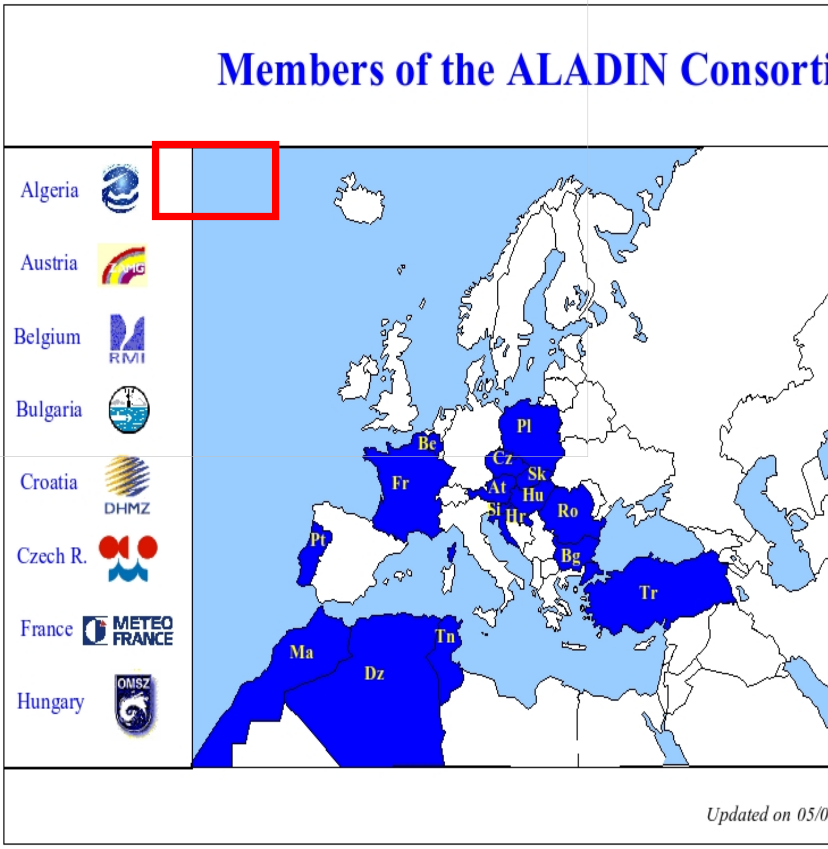
- 7 Oct 2010

Thank you for your attention

LACE

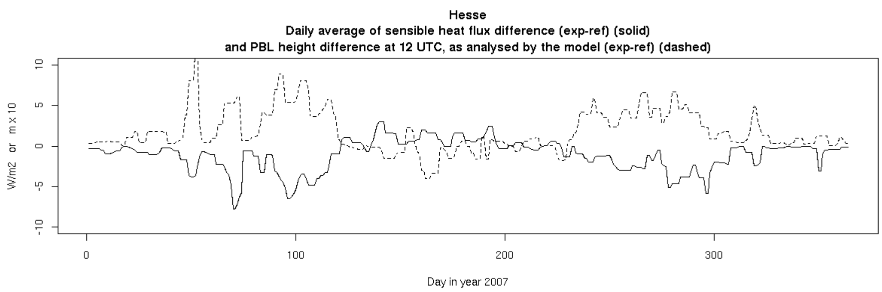
- Austria
- Croatia
- Czech Republic
- Hungary
- Romania
- Slovakia
- Slovenia

EWG



Initialisation with LandSAF albedo

- Technical developments: use FA instead of previous binary formats (oper use is easier technically)
- 1 Year test: albedo assimilation acts as systematic bias correction of 2m fields
- LSAF albedo assim has an important effect on the PBL height



Initialisation with LandSAF albedo

- Combine CANARI snow assimilation and LSAF product
- LSAF/MF-albedo-snow cover products gives an improved guess for CANARI snow analysis
- Use of snow height instead of snow water equivalent in CANARI
- Try to define evolving B errors for snow analysis (previous analysis error + increase where precipitation was falling)