ALADIN status and plans

Piet Termonia

Outline of this talk

- 4 actions, which I have personally been preoccupied with, originating from the GA:

  - Use **SURFEX** in all operational applications: ***Less is more***.

  - **Arbitration vs. collaboration. *More is more***

  - **Dynamics**: efficiency and scalability vs. scientific issues. ***How much (more) academic work can we tolerate***?

  - **LAM EPS**: how to get organized? ***More is better.***

- **SYSTEM and MAINTENANCE <-> *Less is more*!**

- Data assimilation.

- I will illustrate this with some highlights from material I "stole" from some of you (thanks for that ...).

SURFEX short term action, COSP

- Goal: investigate whether we can use SURFEX in all application in the ALADIN countries that are not doing that already

- The goal is **reproducibility** or improvement.

- We will not address code optimization, code ergonomy, use of TEB CANOPY and data assimilation issues. **That will be for later!**

- There will be SURFEX working week in Brussels 18/4-22/4.

- At PAC we will discuss and install a Governance for SURFEX (initiative of Ph. Bougeault)
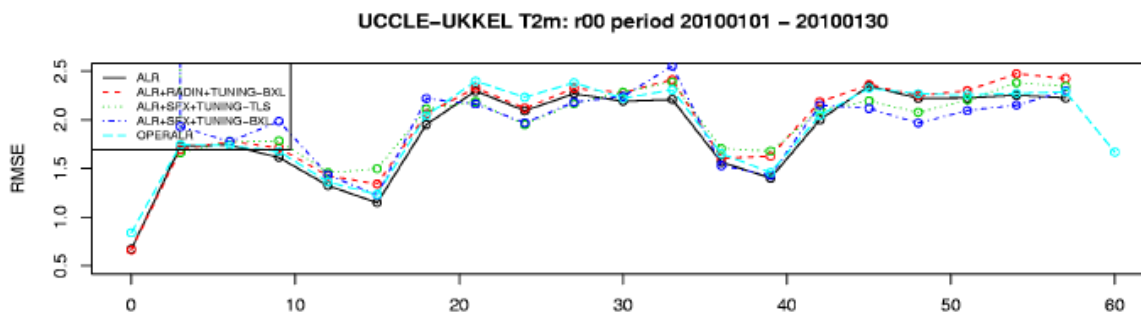
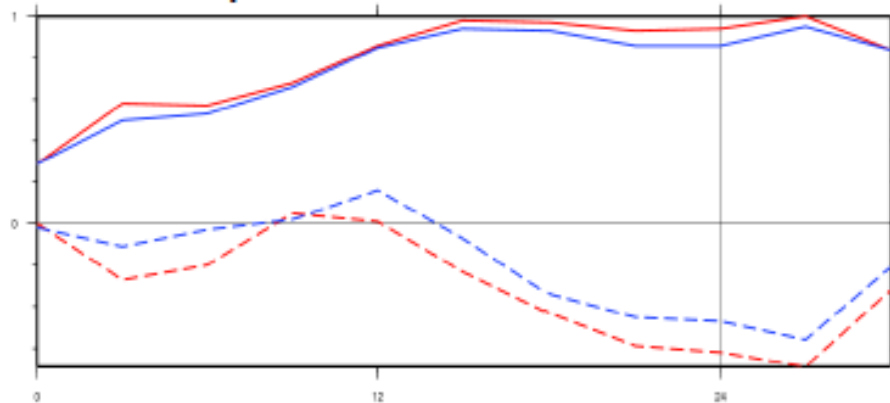*Work of Rafiq Hamdi.*
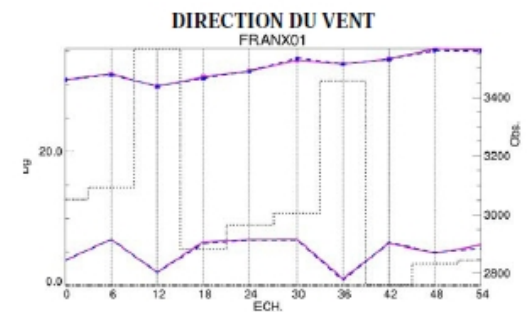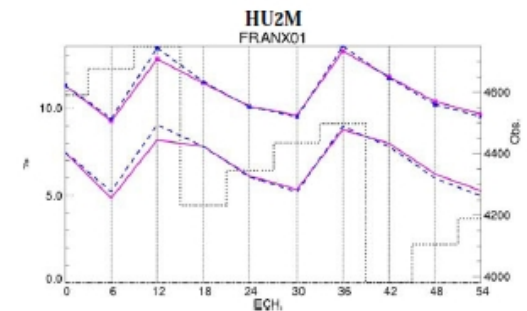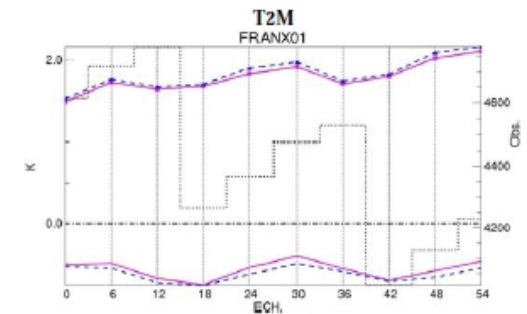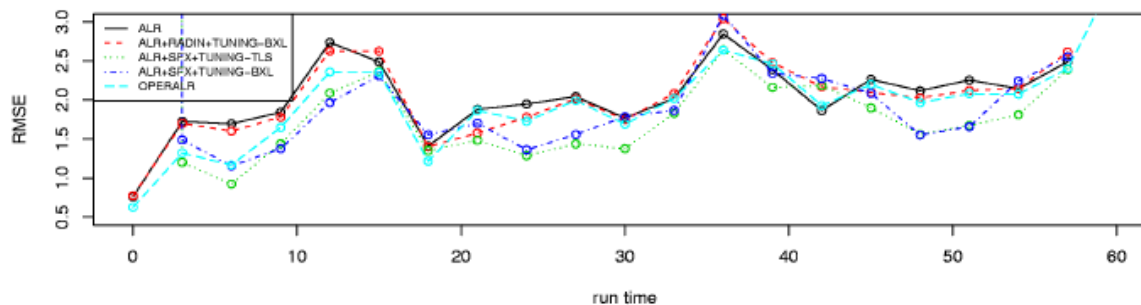
Work of Mohamed Jidane

Models: progress

AROME-France scores
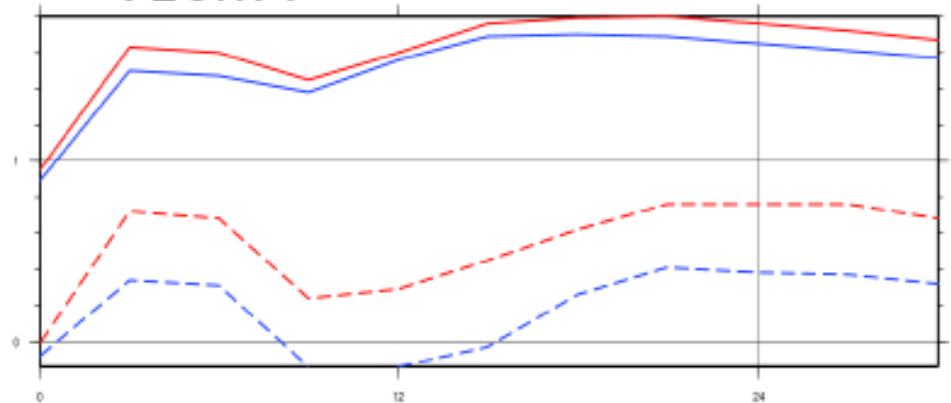
Surface scores (from 20 August to 13 September 2010) : AROME_35t2_op1, AROME_36t1_op1

—— RMSE   – – Bias

Surface pressure :

V10m :

T2m :
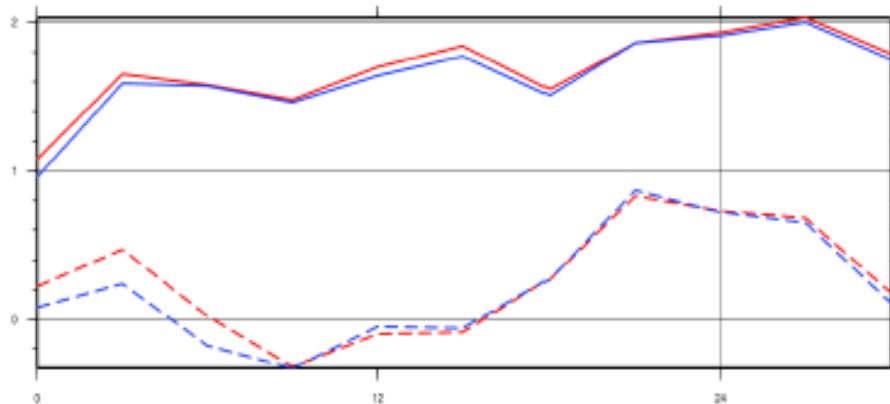
Forecast time

Hu2m :
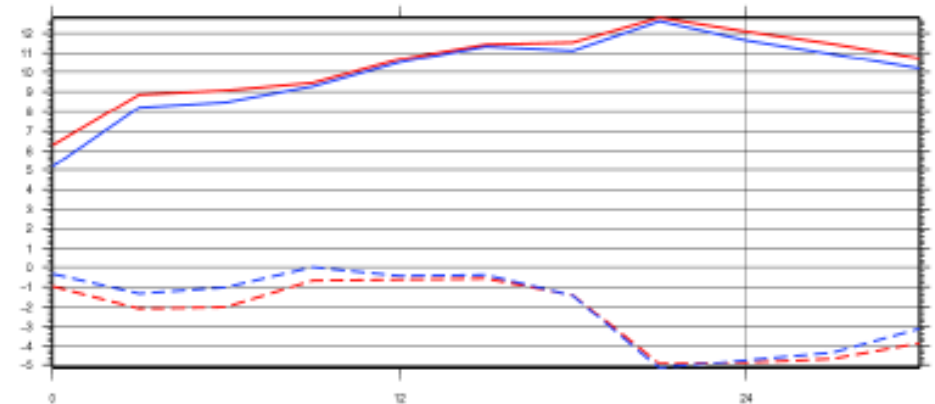
Forecast time

Perspectives

Current E-suite in CY36T1_op2
- - Hail diagnostic
  - - Improvements of low clouds forecasts
(cf Yann's talk)
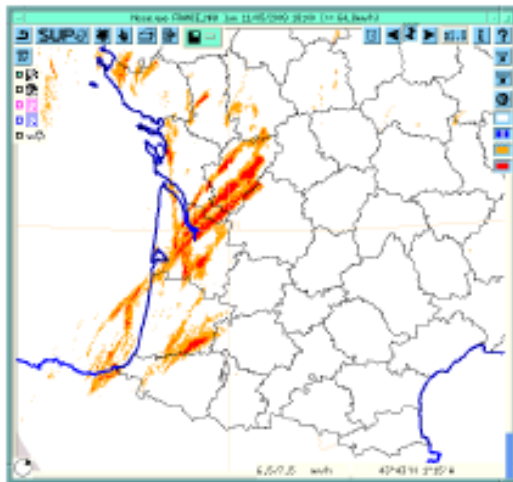
Hail from radar observation
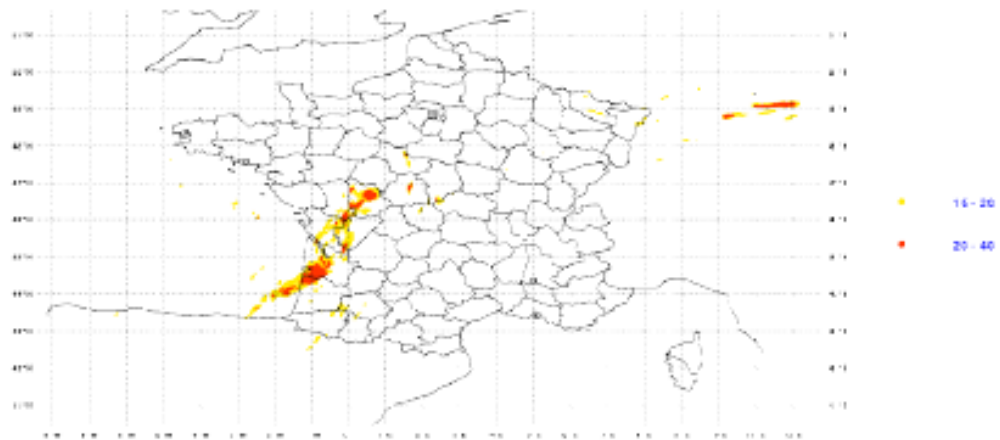
Hail from AROME diagnostic

"Operational ALARO configuration at scales around 5km mesh-size"

Implementation and results

improves in terms of cloud cover, precipitation, radiative fluxes and temperature and humidity structure of the atmosphere

ALARO 5km

Cz – (25 October 2010)
4.7km/ 89 levels - **operative**

Ro – 6.5 km/ 69 levels - **operative**

Au -4.9 km –parallel runs

Si -4.4 km –parallel runs
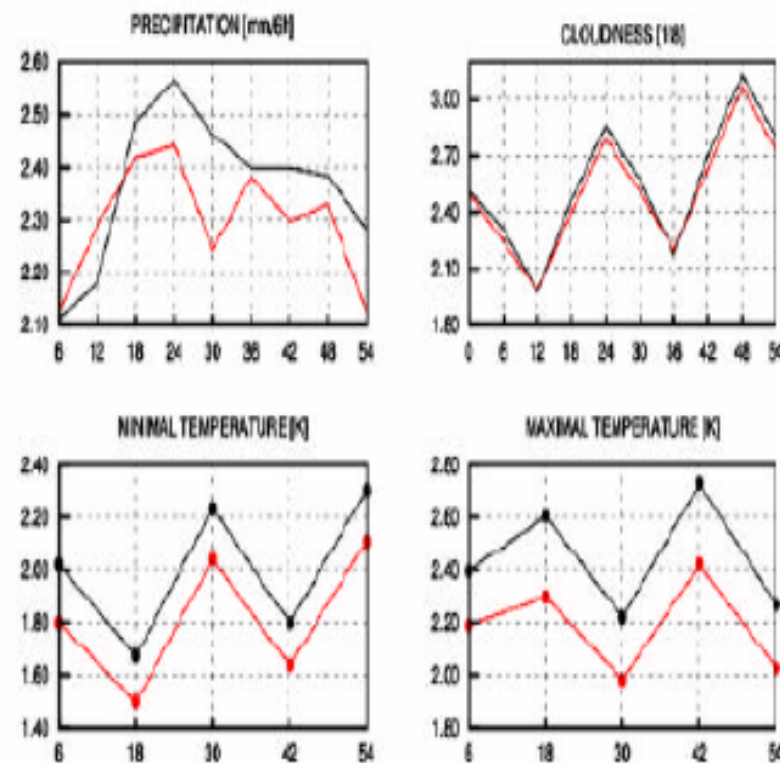
Figure 2: Verification scores (standard deviation) from the CHMI esuite, comparison of forecasts at 9.6 km (black) and 4.7 km (red) for period between 26 August and 20 September 2010.

Example: CZ flood case of 7th August2010
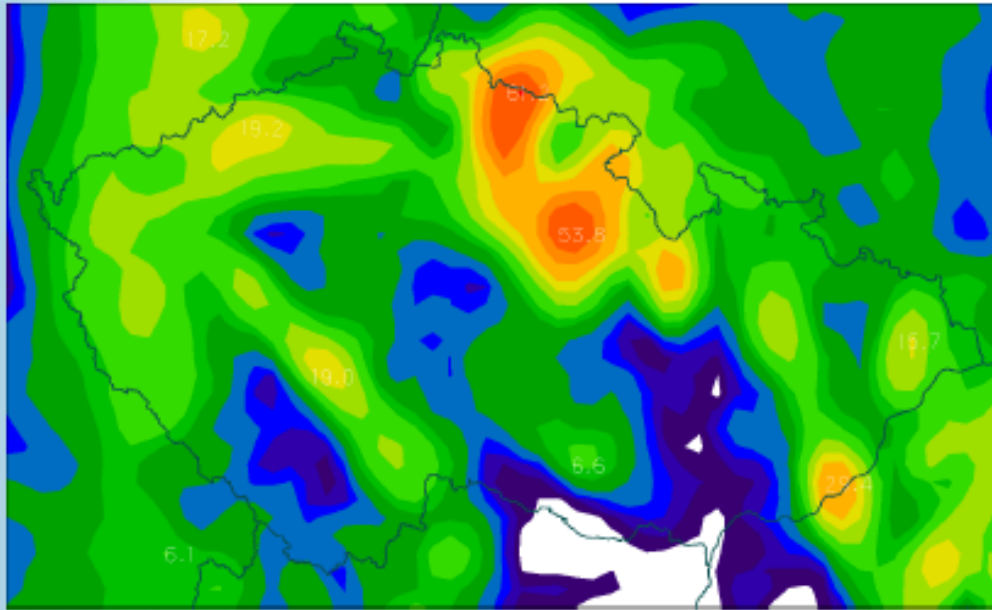
9km, 43L, 24h forecast
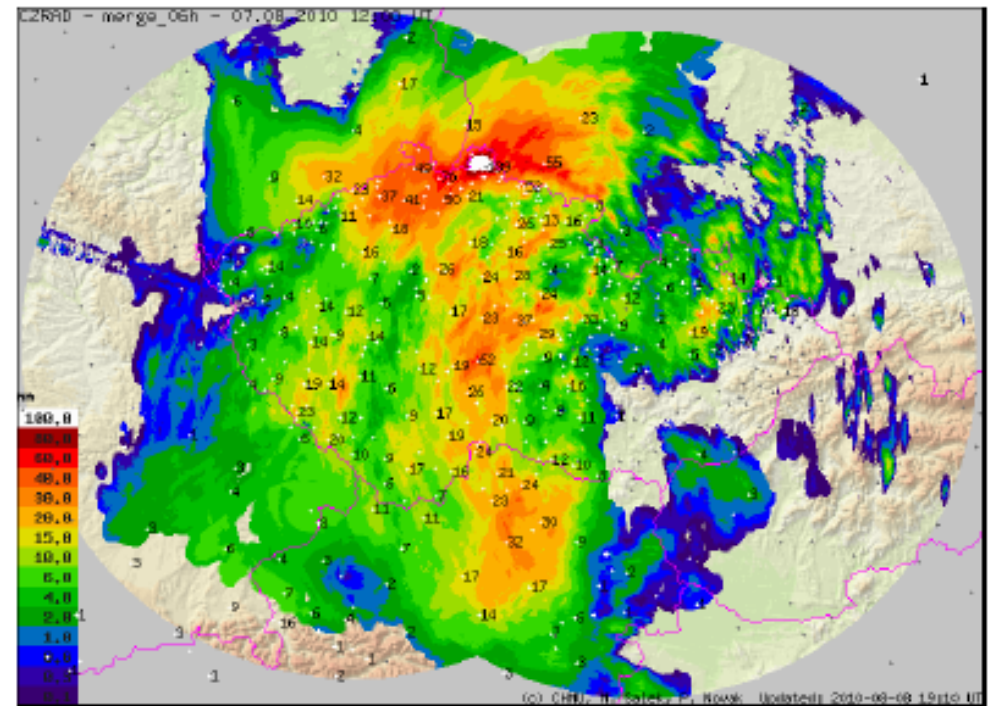
observations: radar & gauges
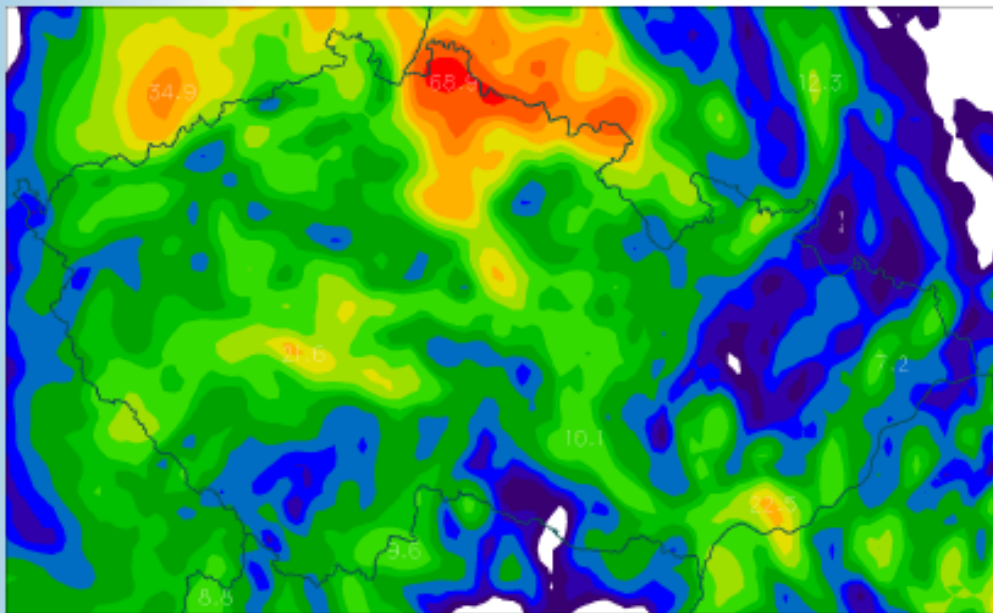
4,7km, 87L, 24h forecast => better location

Example of phys-dyn interaction
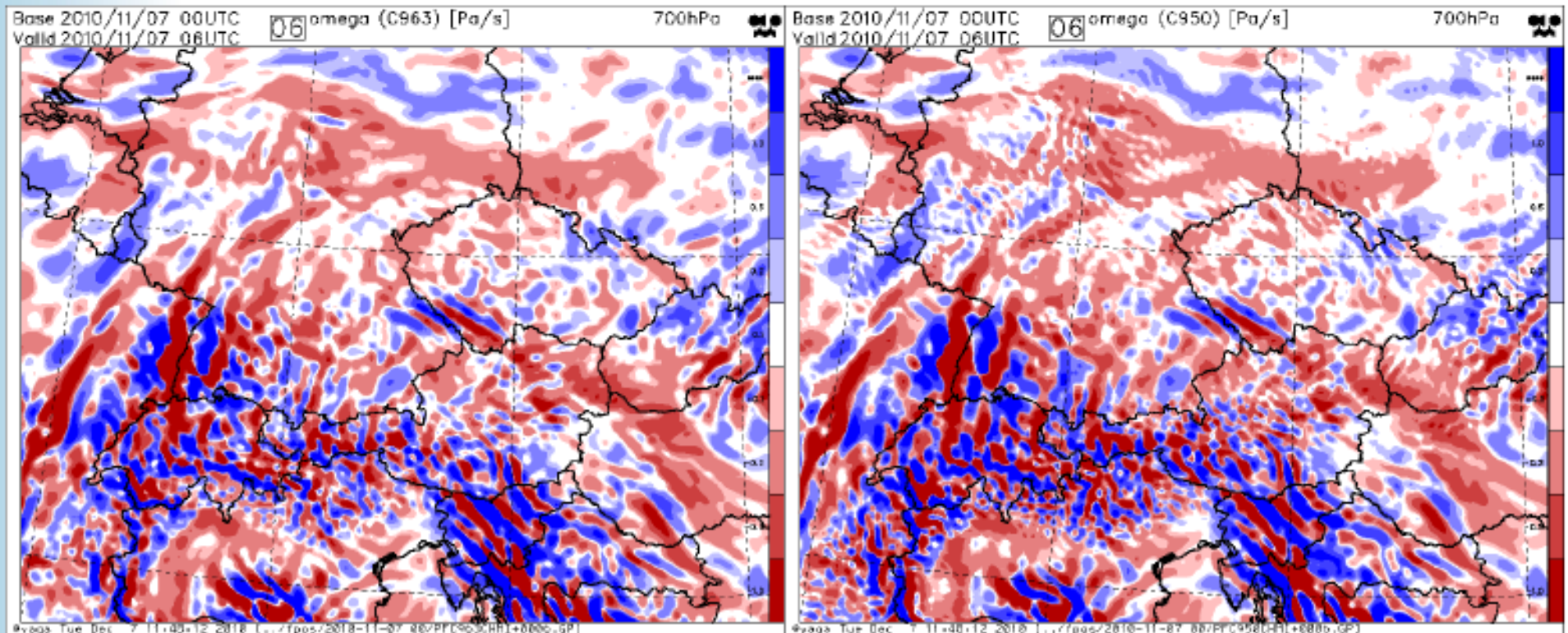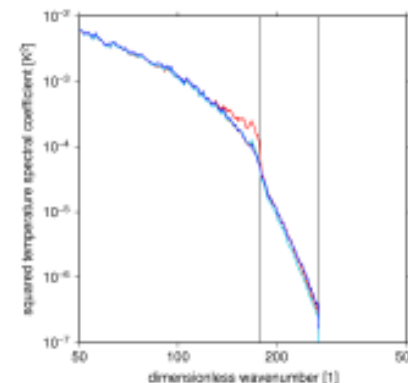
Vertical velocity as measure
of noise: effect of diffusion and
stationary forcing

spectral linear diffusion reduced by factor 10 for T,q and VOR and by factor 50 for DIV (left)

vertical velocities from adiabatic run obtained with the original diffusion tuning (right)
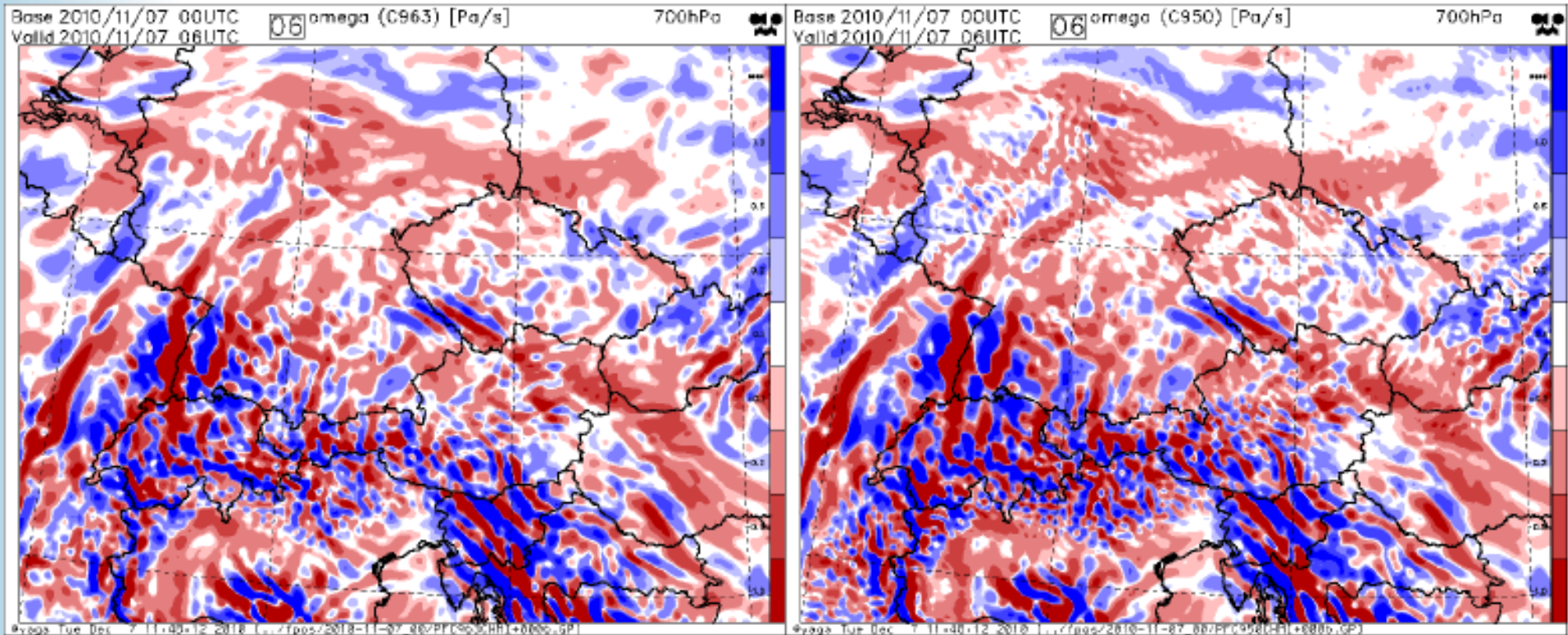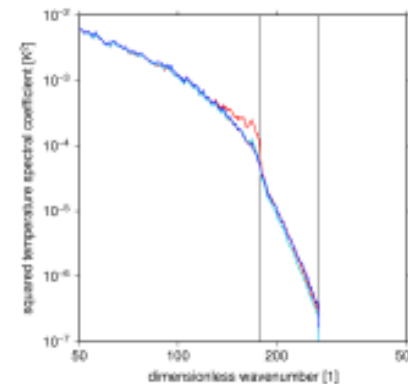
Vertical velocity as measure of noise: effect of diffusion and stationary forcing

We should not Be too dogmatic About "spectral" resolution!

spectral linear diffusion reduced by factor 10 for T,q and VOR and by factor 50 for DIV (left)

vertical velocities from adiabatic run obtained with the original diffusion tuning (right)
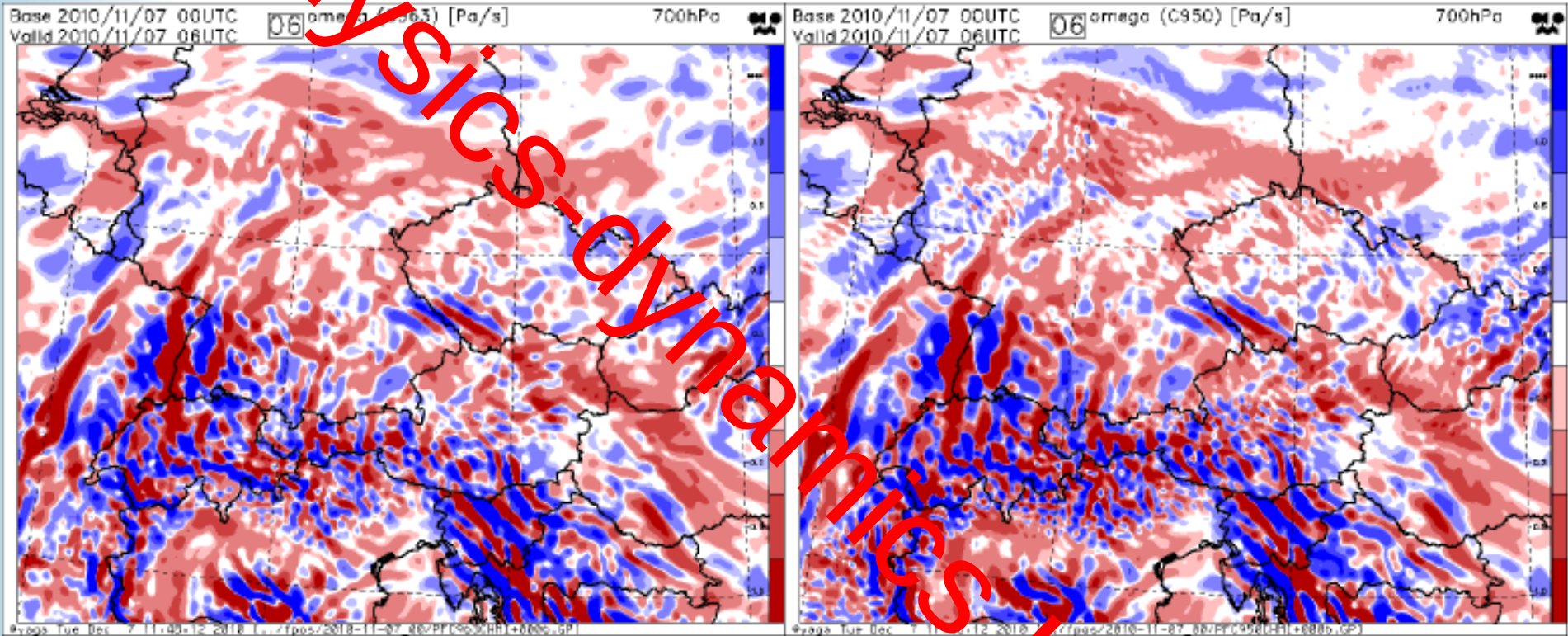
Vertical velocity as measure of noise: effect of diffusion and stationary forcing
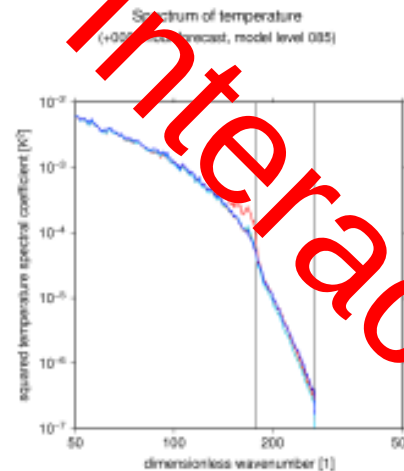
We should not Be too dogmatic about "spectral" resolution!

Physics-dynamics Interaction

Conclusion

- Everyone has his/her environment in which he/she feel comfortable, and is able to solve his/her problems

- Biodiversity is a positive aspect of the collaboration!

- What is even better is that we solve problems by using each other's solutions! Example: SLHD

- How far can we push a renewed convergence action?

Arbitration vs. collaboration?

Convergence action: plan for the near future:

- Convergence action:
  - Determine what it means: 3MT in ARPEGE
  - Agree on a validation
  - Validation: this is meant as an exchange of ideas and solutions, not a beauty contest.
- (related to my previous slide), solutions/understandings developed in the context of ALARO might, one day, be useful to solve problems in ARPEGE, or AROME solutions in ALARO, etc ...

Dynamics

- **Brac-HR dilemma** ...

- Personally I believe we are fine with Spectral SI SL for the next 5 years

- But that is not an excuse for not making scientific progress on our understanding scalability and efficiency:

  - We should stop try to kill the kind of selective argumentation we witnessed in Brac and make an effort to attack it scientifically

  - Along the way there are many questions to be addressed. e.g. the problem of the steep slopes and whether a solver with constant coefficients is able to handle this at very high resolution

- Of course that should not compromise our operationally oriented research! Most gains are currently expected in the vertical (e.g. VFE, mastering the pressure gradient term, ...).

- But (a) this seems excellent for academic work (link with universities, PhDs, ...), and (b) we need a **plan**!

- This is currently being discussed by the extended group of 4.

There will be a discussion today during the dynamics WG

LAMEPS: more is better?

Figure: Relative economic value with respect to (sample) climatology for 10-meter wind speed (run = 12h, lead time = 30h). For the period 01/03/2010-31/12/2010 and averaged over 10 stations.

See talk of Geert Smet, later this week!

There are many arguments against multimodel EPS systems. But it seems we may have to accept the existing of a number of different LAM EPS systems. In that case, more seems to be better.

System and Maintenance!!!

- More is better: except if we have to maintain it, then it may backfire.

- On top of that we have to face:

  - OOPS

  - Scalability

  - Increased demand on phasings

    which is all putting stress on system work!

- SURFEX is an example, from my experience. Where, clearly: **_Less is more!_**

- Later this year we have to address this for other maintenance issues

- It is important that:

  as a scientist you SHOULD also think about the code and its impact on maintenance!!!
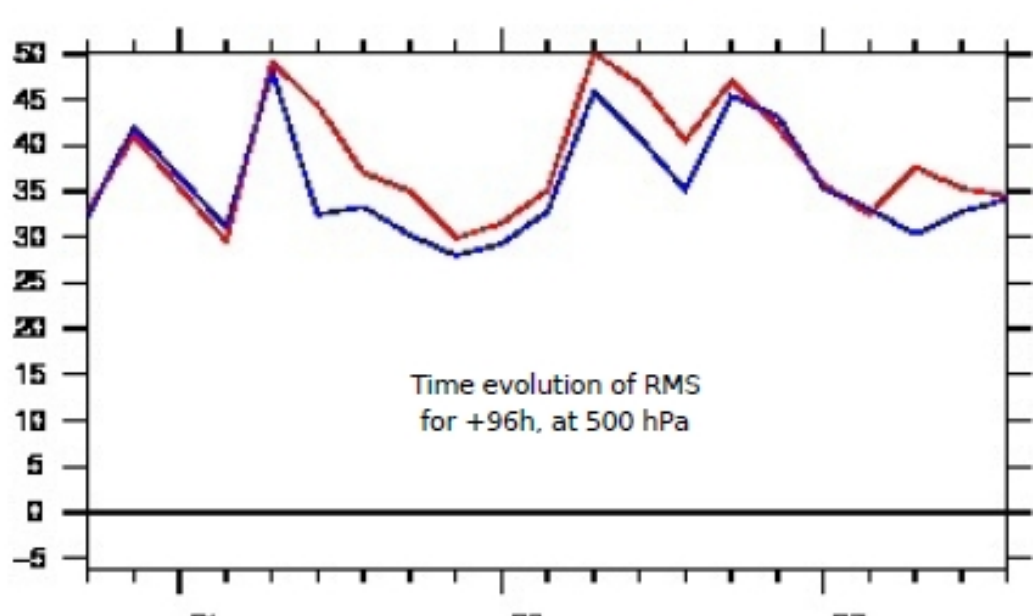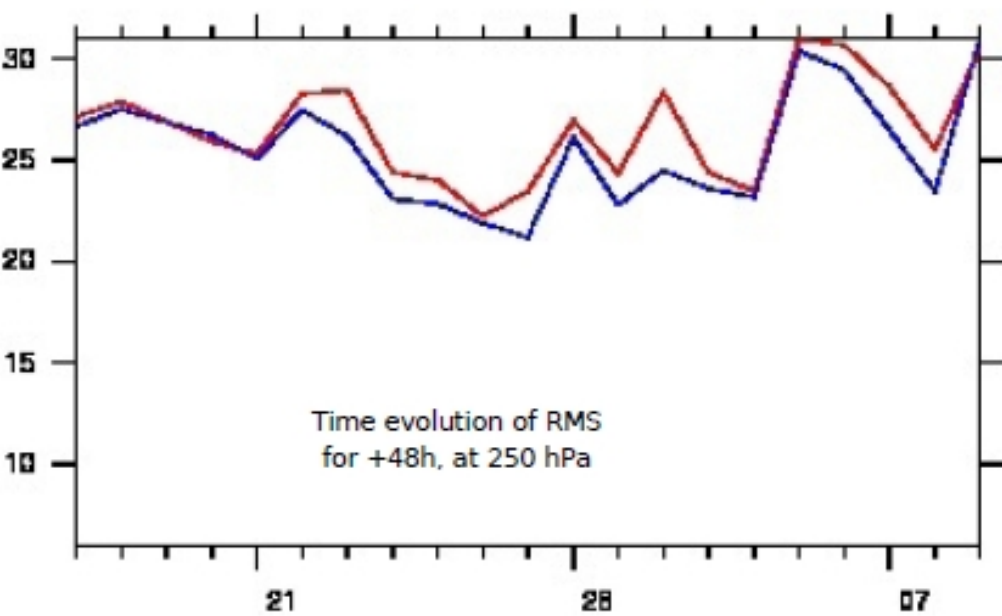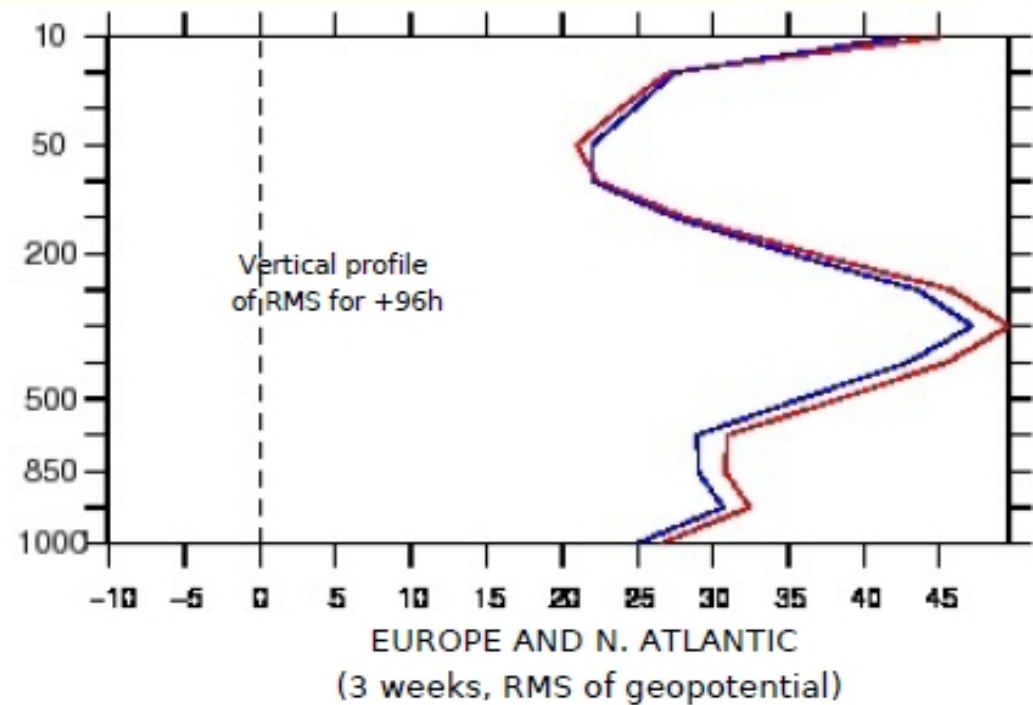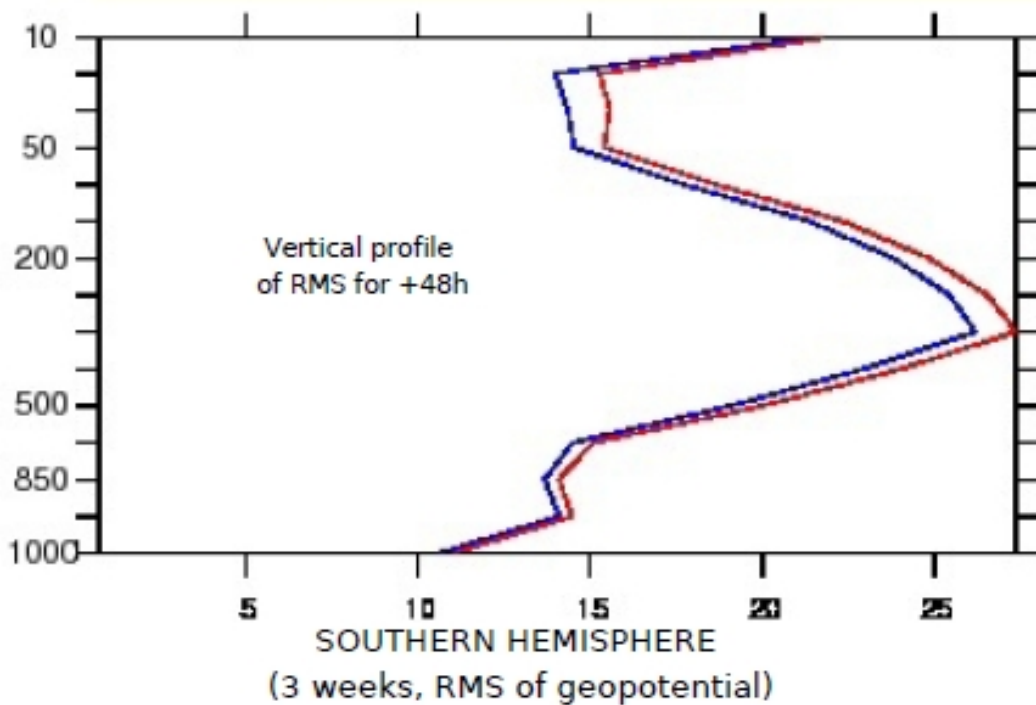
For a future change ?: flow-dependent background error correlations
using EnDA and wavelets
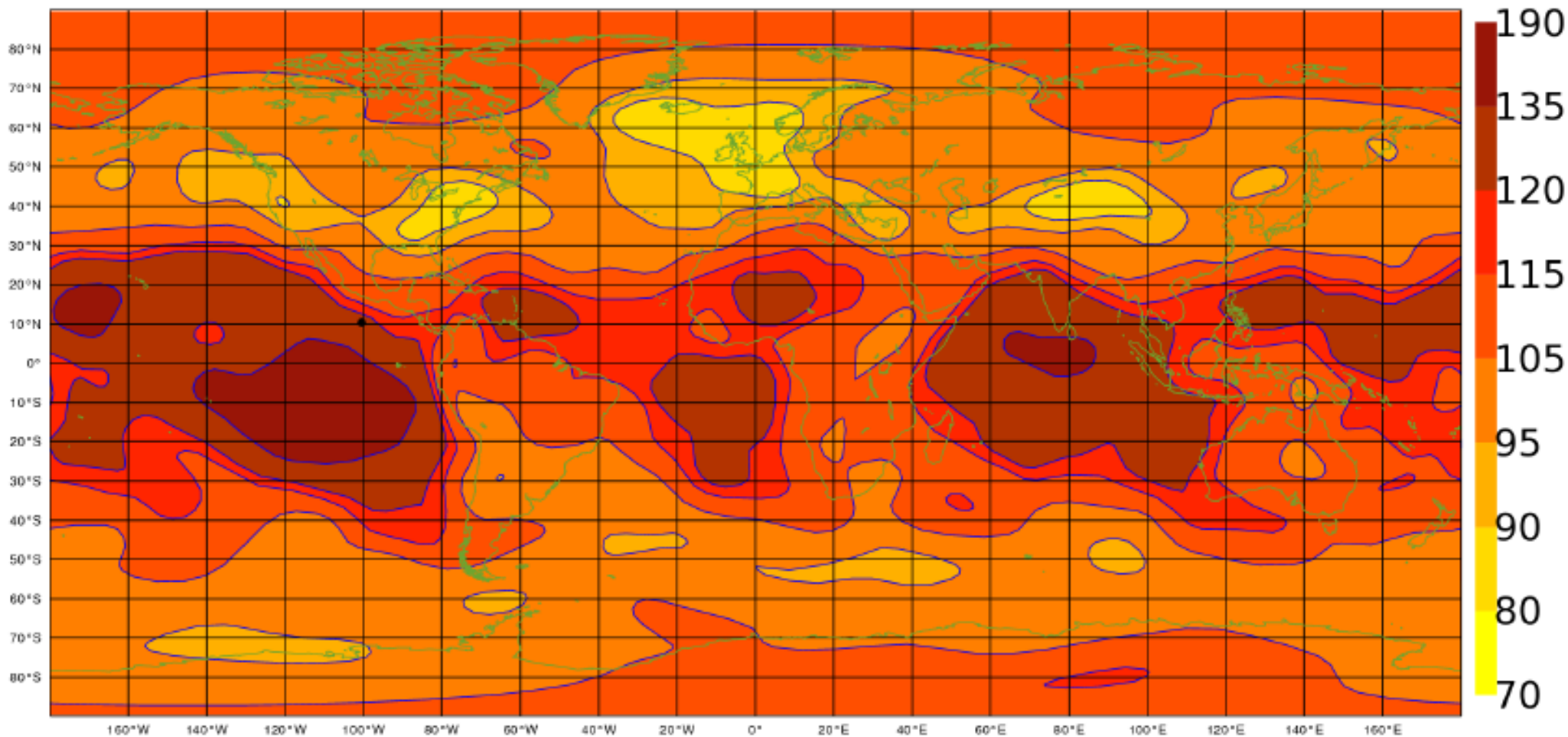
Wavelet-implied horizontal length-scales (in km),
for wind near 500 hPa, averaged over a 4-day period.

(Varella et al 2011b, following « static applications » in Fisher 2003,
Deckmyn and Berre 2005, Pannekoucke et al 2007)

Impact of wavelet flow-dependent correlations against spectral static correlations (Varella et al 2011b)

Vertical profile of RMS for +48h

SOUTHERN HEMISPHERE
(3 weeks, RMS of geopotential)

Vertical profile of RMS for +96h

EUROPE AND N. ATLANTIC
(3 weeks, RMS of geopotential)

Time evolution of RMS for +48h, at 250 hPa

Time evolution of RMS for +96h, at 500 hPa

"Development of an operational data assimilation system for LACE"

Country	3DVAR (atmospheric analysis)	Optimum Interpolation (soil analysis)	Data	Blending
AU	Experimental (2009)	Experimental (2008)	OPLACE + local SYNOP + GPS	No
CRO	Experimental (2009)	Experimental (2008)	OPLACE + local SYNOP	No
CZ	Experimental (2008)	Operational (2006)	OPLACE + local SYNOP	Operational (2001)
HU	Operational (2005)	Operational (2008)	OPLACE (including local SYNOP of HU)	No
RO	Experimental (2010)	Experimental (2010)	OPLACE	No
SI	Experimental (2009)	Experimental (2008)	OPLACE + local SYNOP	No
SK	No	Experimental (2010)	OPLACE + local SYNOP	Operational (2007)

LACE
nwp central europe

Projects 2012 ->

LACE toward cloud permitting models

Plans for the new projects:

-
- *Verification and validation tool development*
- *ALARO 1 toward 1km scale*
- *DA methods for High Resolution*
- *ALADIN –LAEF: operations+ development toward cloud permitting system*

Summary

- 4 actions: SURFEX, Dynamics, Physics, LAM EPS.

- Some stuff about data assimilation

- The importance of system and maintenance can not be underestimated!!!