

THE REGIONAL NWP SYSTEMS AT METEO-FRANCE

with contributions from the CNRM/GMAP staff

Météo-France

ALADIN-FRANCE : some general features

Spectral bi-Fourier space with elliptic truncation at wave number 149.

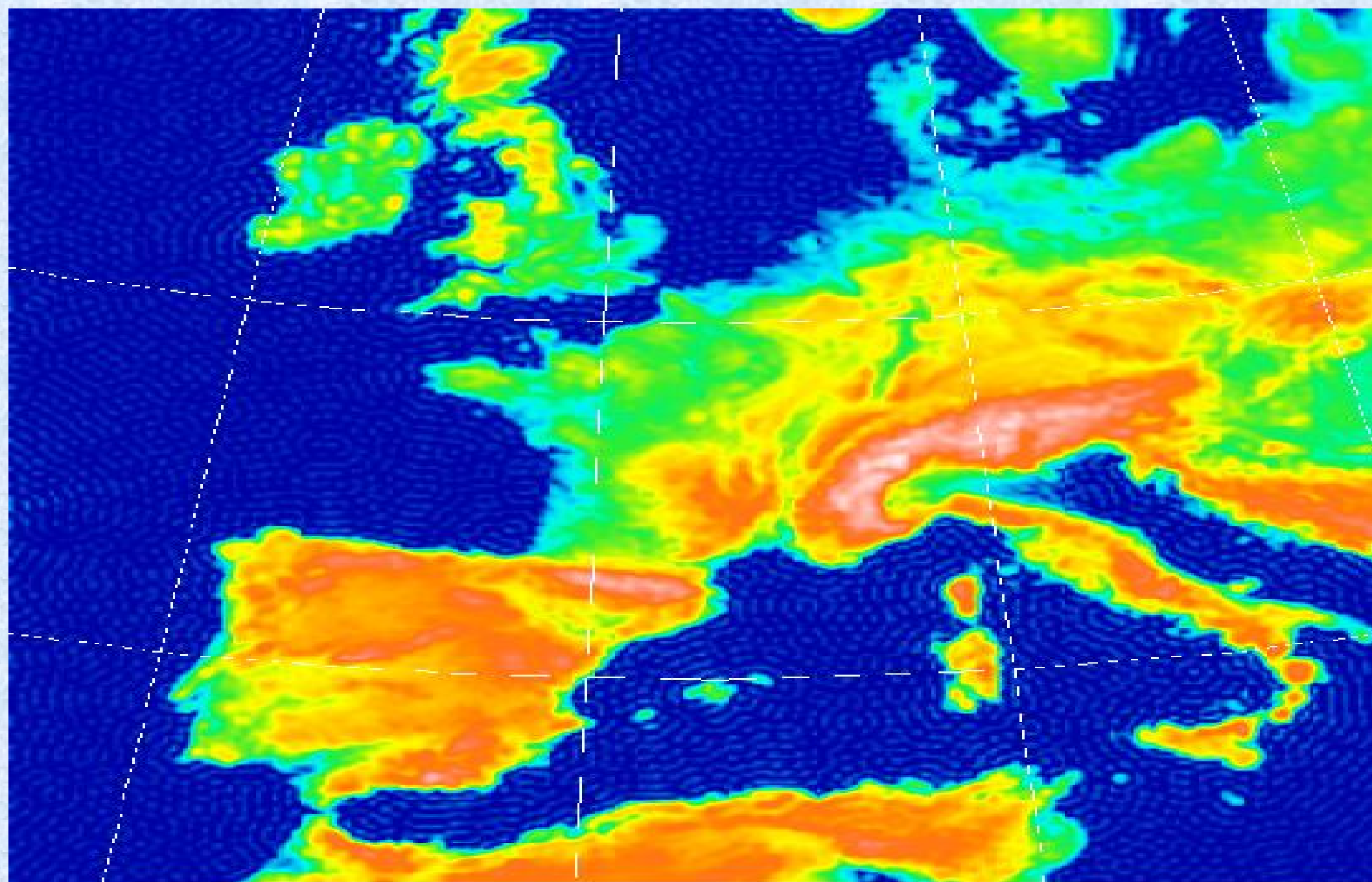
Equivalent grid : 9.51 km.

46 vertical levels

Coupled with ARPEGE every 3 hours.

The timestep is 415 s

4 runs per day. Up to 54H for the 00 UTC forecast



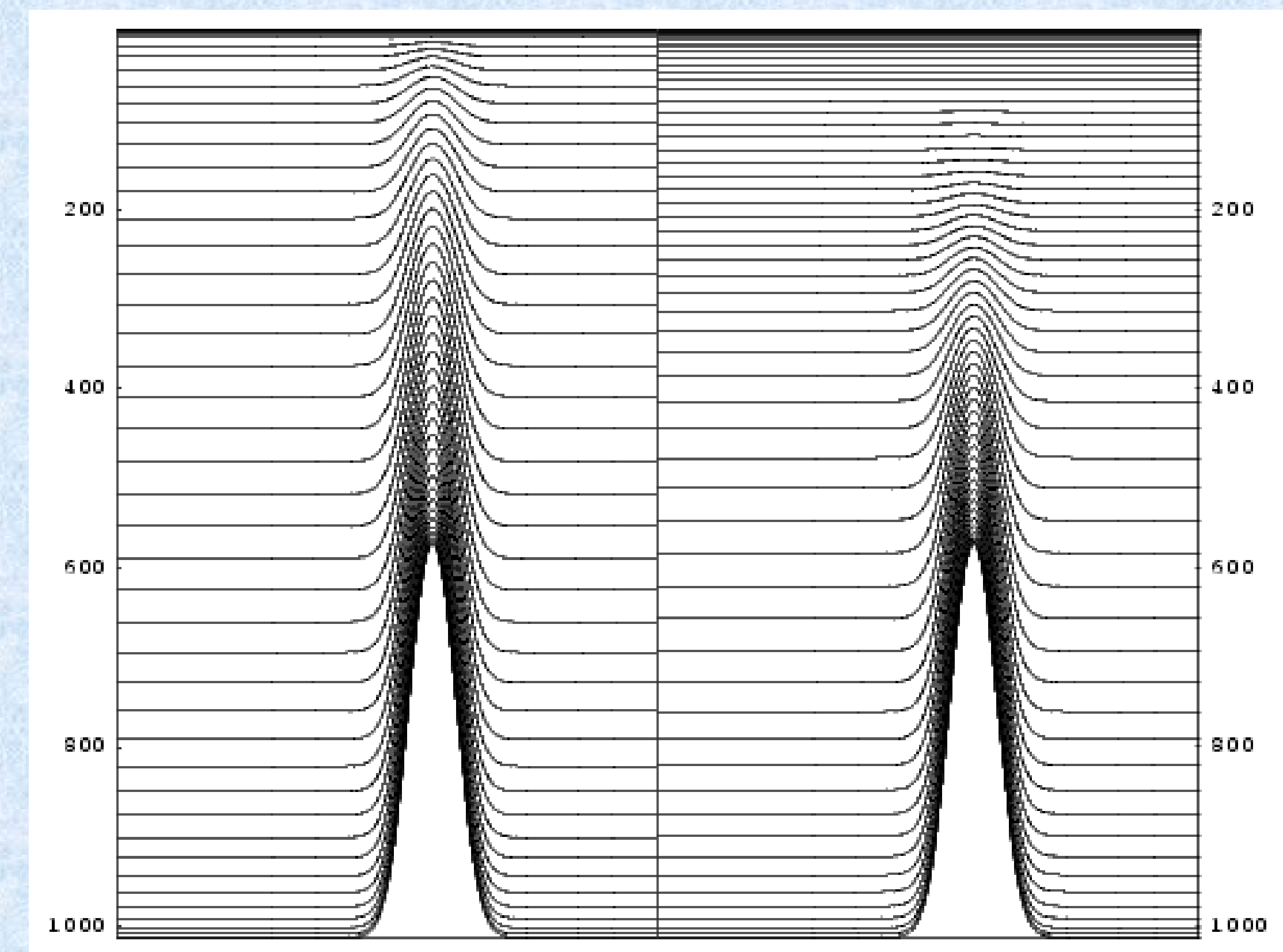
3D-Var assimilation scheme with 6 h. window.

- Assimilated observations are : Surface pressure and SHIP wind, 2m temperature and RH, 10m winds, Aircraft data, SATOB motion winds (AMV), Drifting buoys surface pressure, Soundings (TEMP, PILOT), European wind profilers, Satellite radiances: AMSU-A, AMSU-B, HIRS (NOAA and METOP), Meteosat-9 SEVIRI (5 channels), QuikSCAT winds, Ground-based GPS zenithal delays

The most likely next E-suite

The most remarkable items :

- Resolutions: global TL538L60C2.4, with 4D-VAR incremental TL107/TL224 (C1), 15 km resolution over France and refined vertical resolution at the tropopause and in the stratosphere (w/r to L46). ALADIN-FRANCE keeps its horizontal resolution unchanged and also switches to 60 levels.
- Observations: METOP/ASCAT, maybe Variational bias correction
- Assimilation methods: Ω and NL balance in the ALADIN Jb
- Physics: PDF-based sedimentation in the Advanced Prognostic Cloud Scheme, tunings for high resolution in turbulence (increased asymptotic mixing length parameter).
- Possibly: CANARI surface analysis, incremental DFI, retuned σ_b 's
- and most likely NOT (rather 2008) : SLHD, 6-band SW radiation, new tunings in the APCS for higher resolution, new gravity wave drag, envelope orography, sigma_b maps of the day (ARPEGE).



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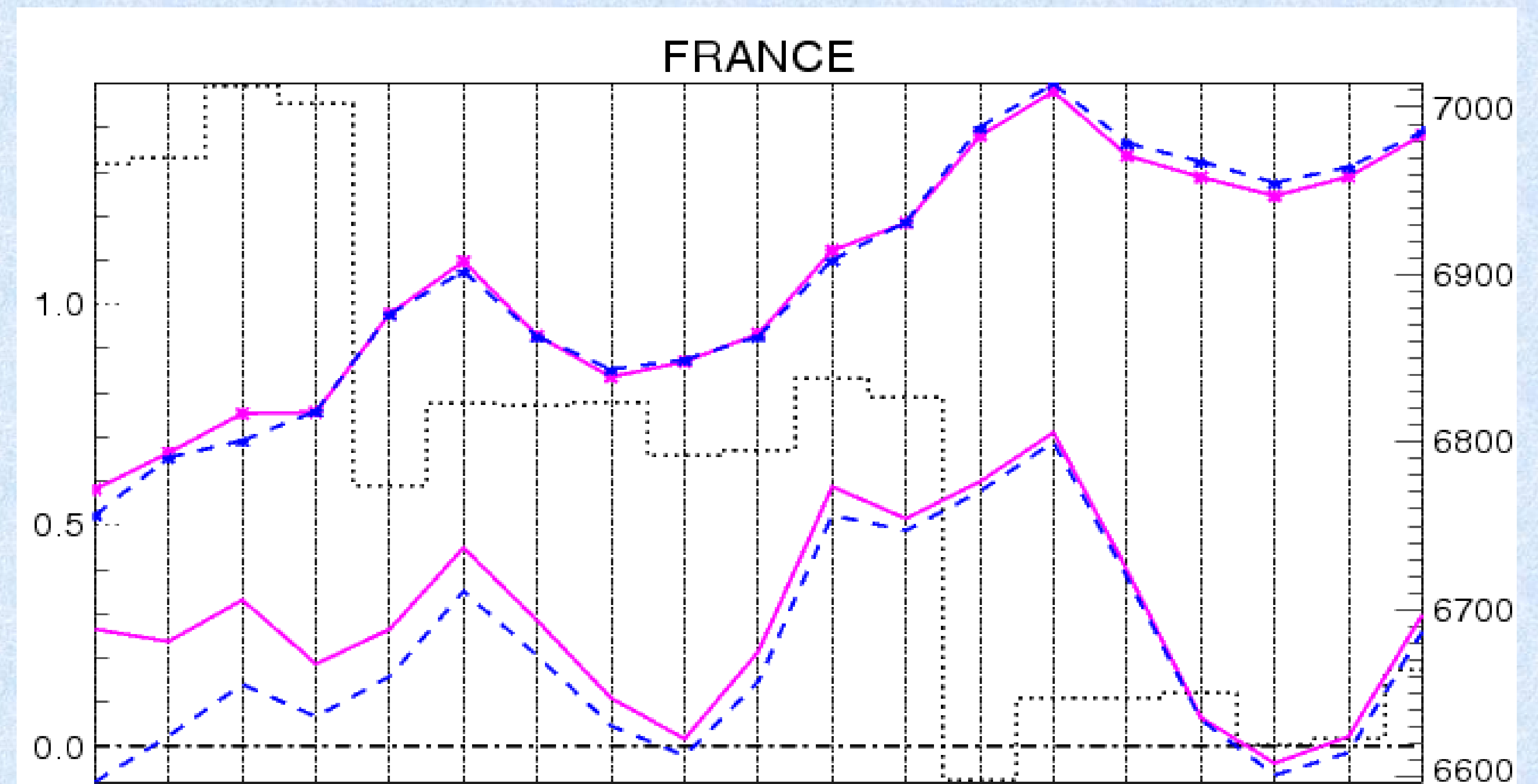
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Current developments

Impact of an incremental digital filtering within the 3D-VAR

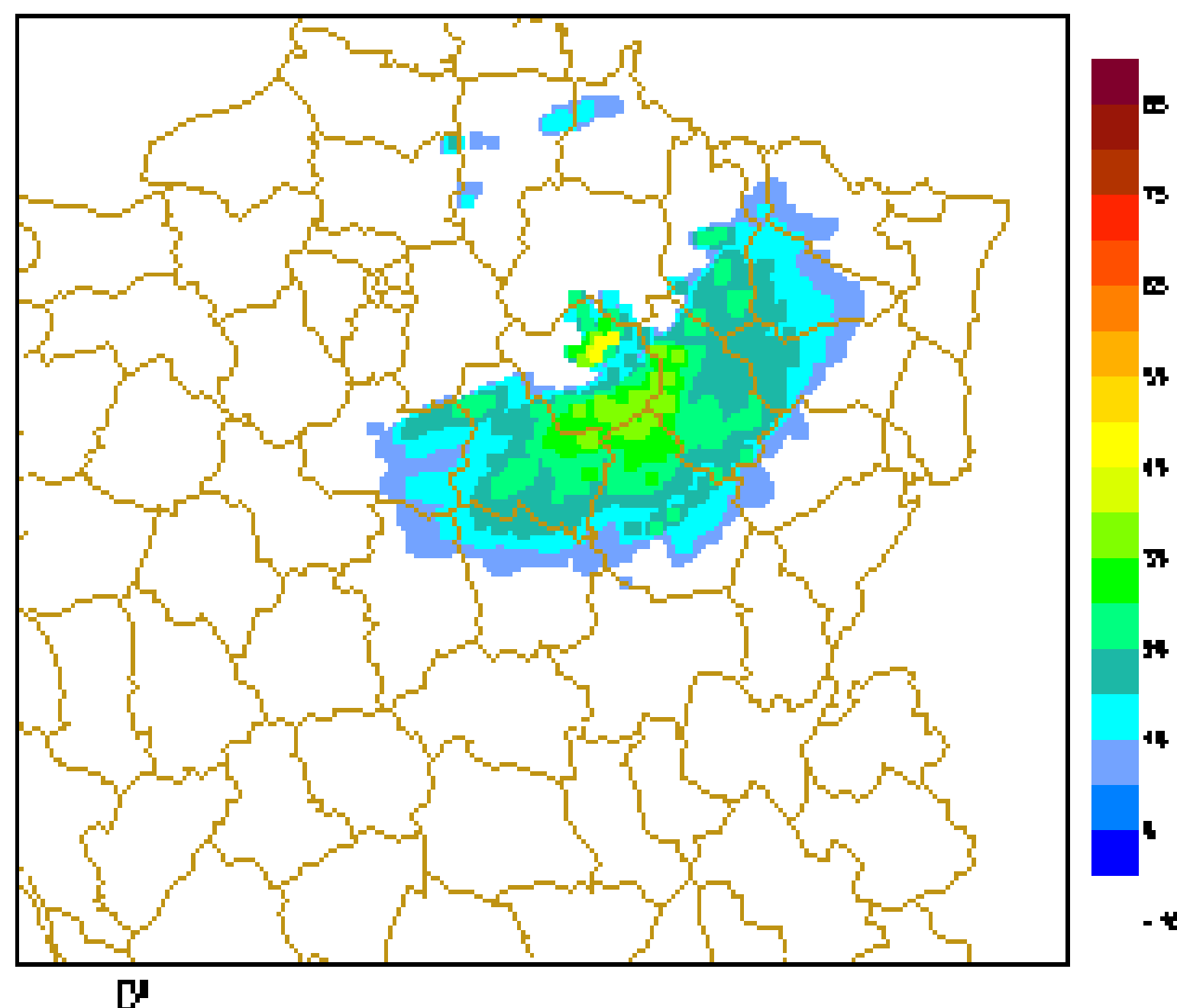
- “simple”: start forecast with $F(a)$
 - incremental: start forecast with $g+F(a)-F(g)$
- Spatially consistent LBC are used within IDFI.



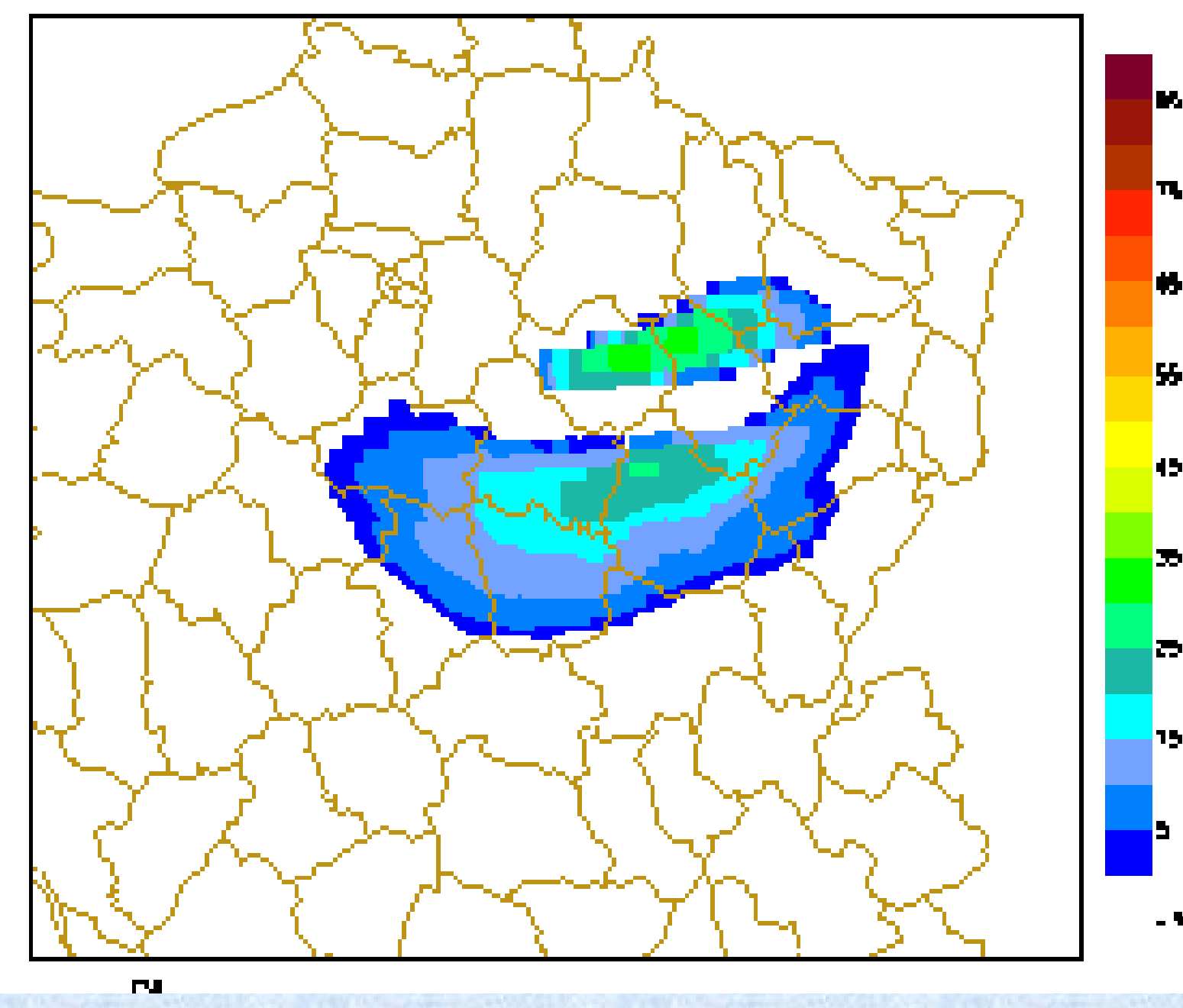
Radar reflectivity simulator

Most of the work within the ODB is completed. The quality control has been improved. Future work will focus on long time series of monitoring for computation of biases and standard deviations and inclusion of a beam blockagemodel within the simulator (orography). Developments coordinated with ALADIN and HIRLAM

RADAR DE TROYES : 12:00 01/03/2007



RADAR DE TROYES SIMULE PAR ALADIN 12:00 01/03/07



Comparison of observed (left) and simulated (right) reflectivities

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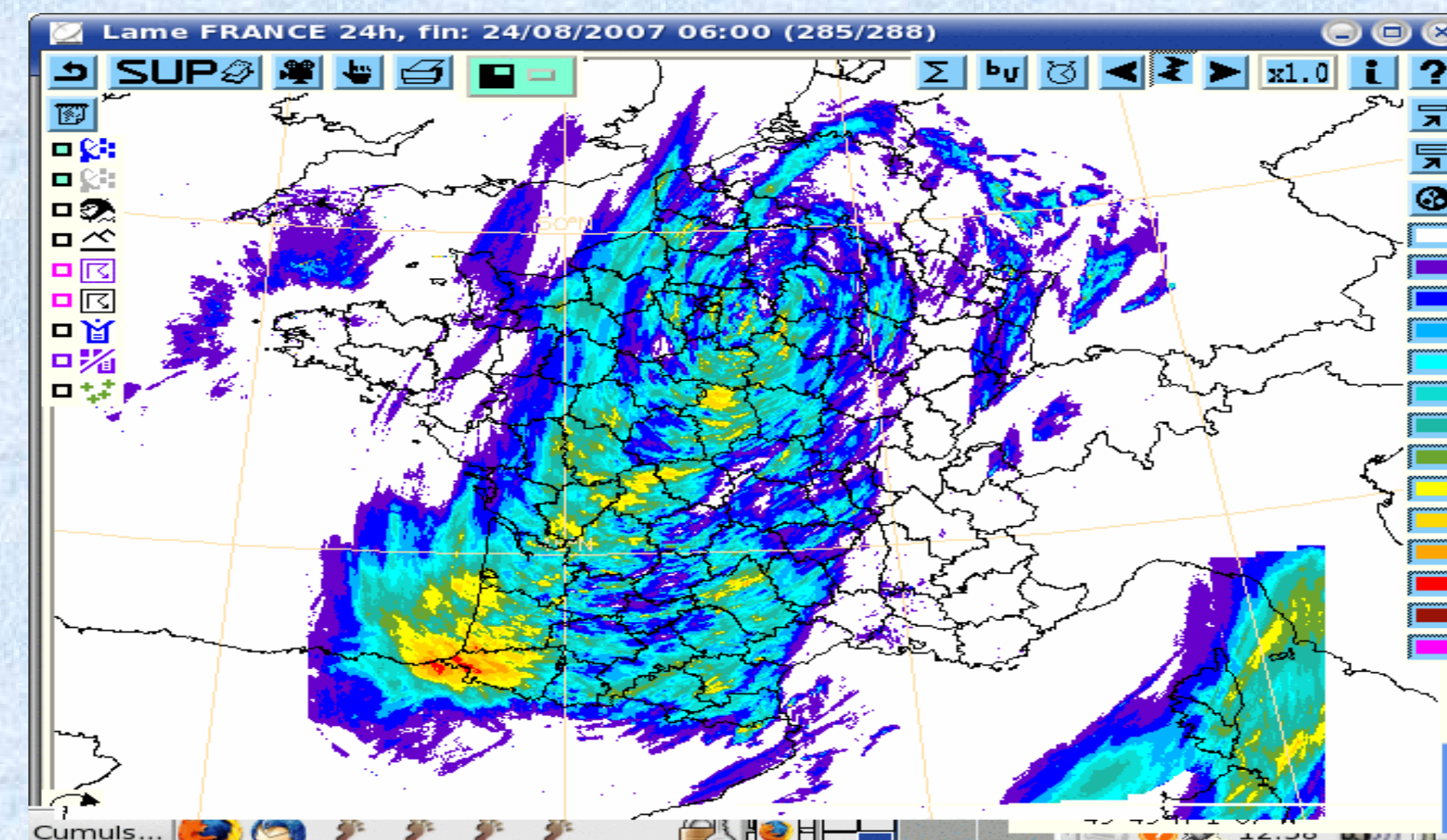
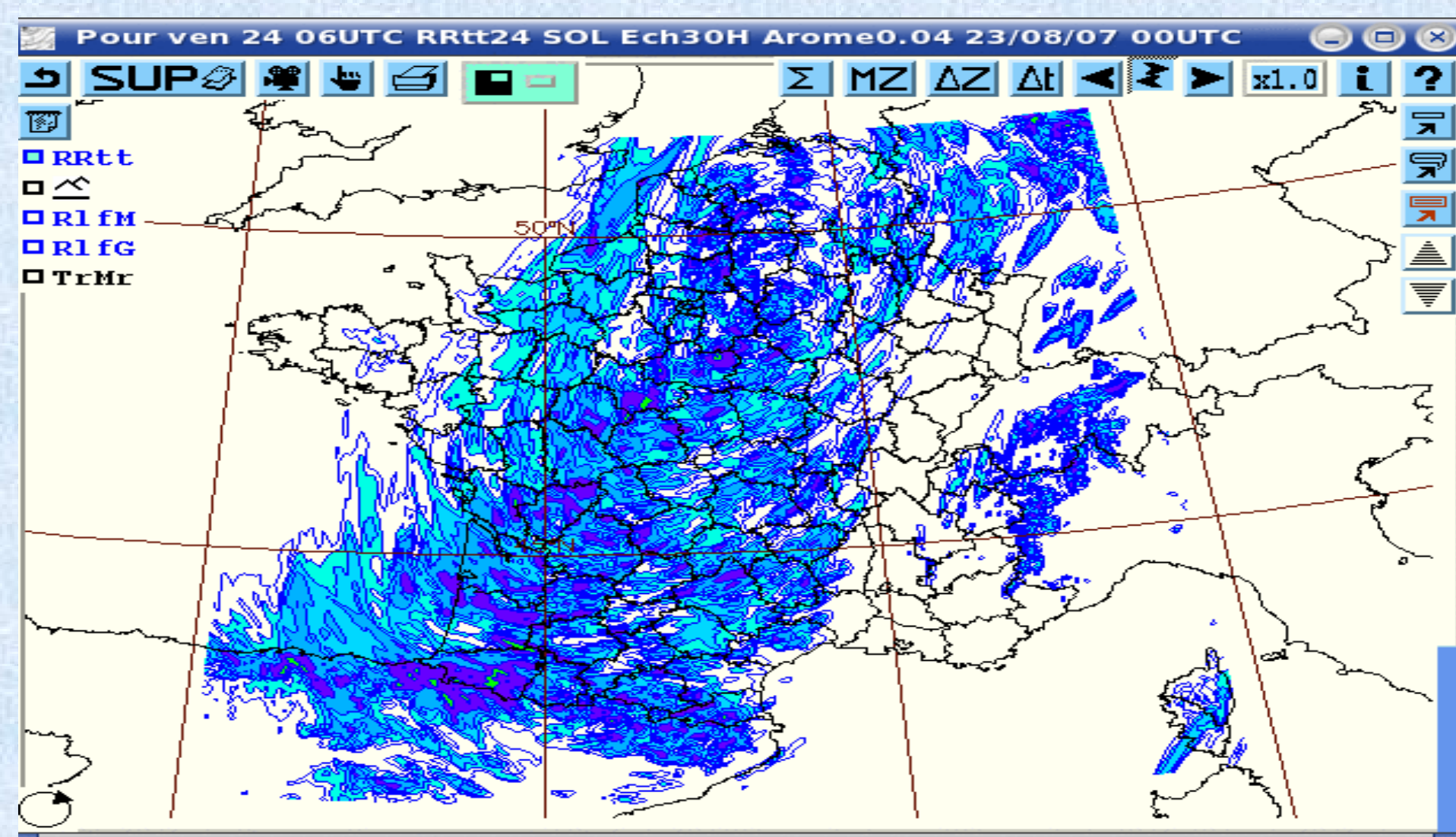
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AROME pre-operational settings

Forecast model: envisaged French domain and cost issues

AROME planned operational domain for October 2008 is 600x512 points, with 2.5km horizontal gridmesh. Time step of the model is 60s. On 64 processors of the NEC SX8R, 24 h forecasts can be produced in 20' elapse.

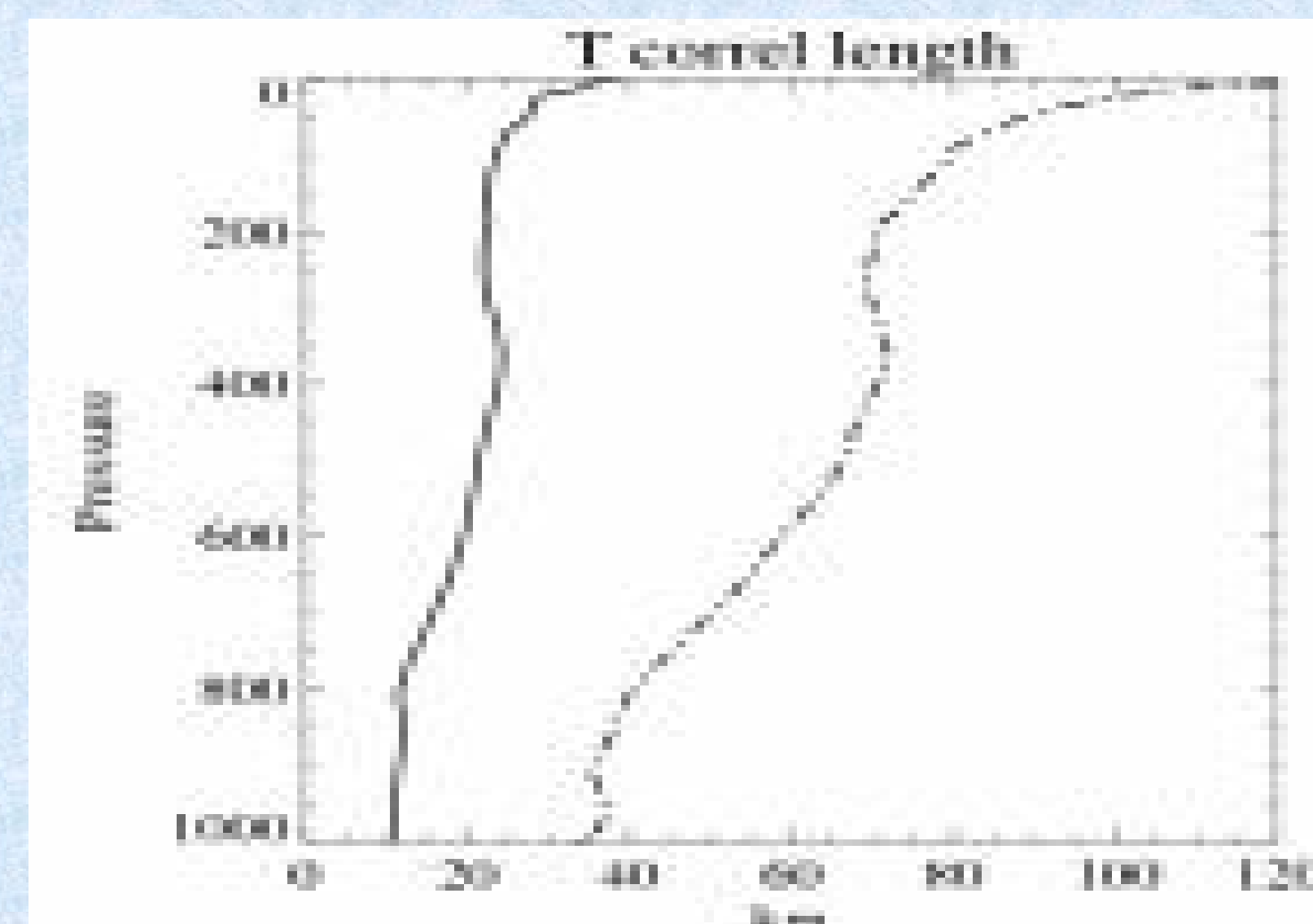
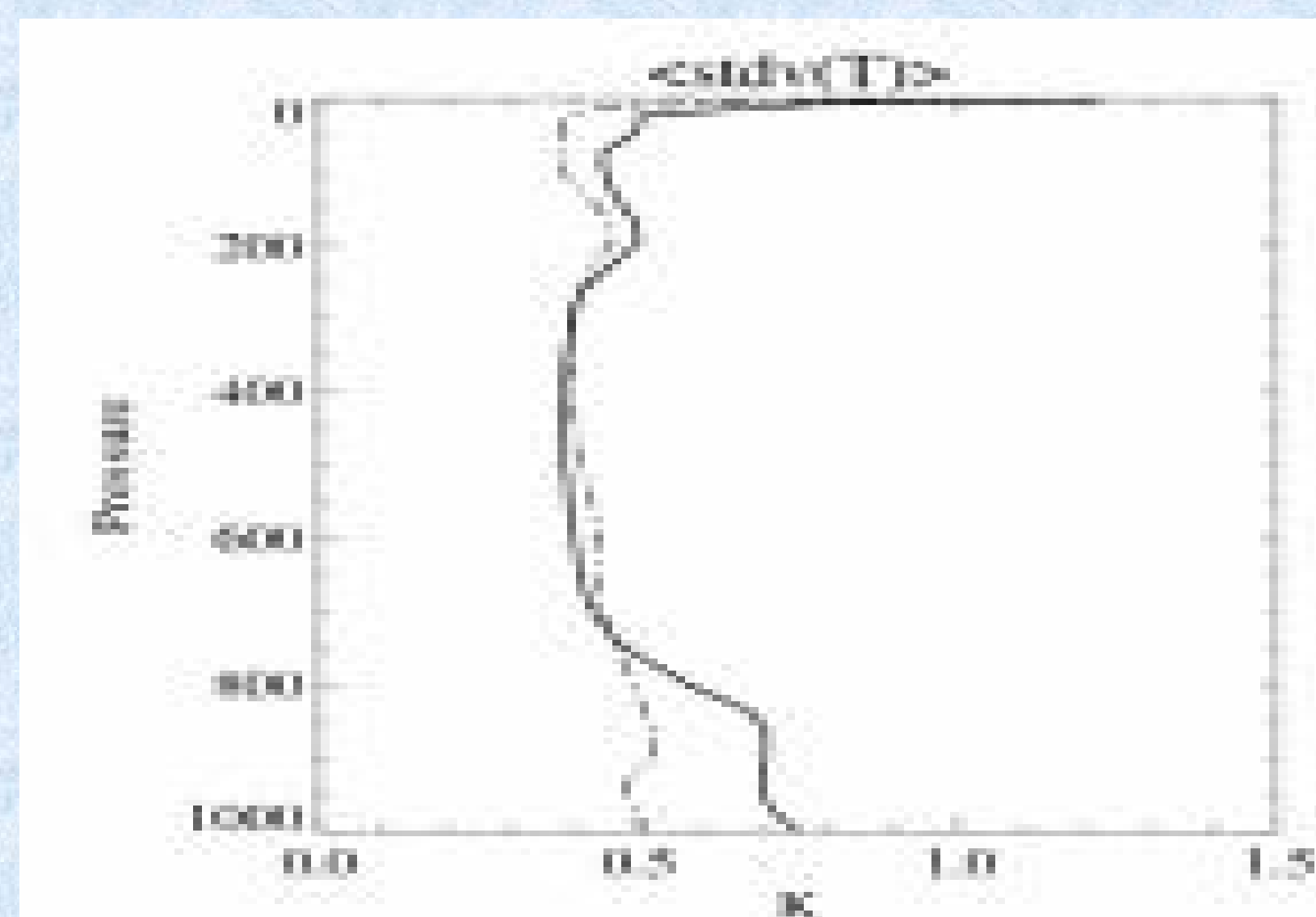


*F24h cumulated rainfalls,
Arome (left) and radar
composite (right)*

Rapid Update Cycle

The first operational AROME version should run on 4 daily production runs, for a 30 h range. Its assimilation should be with 3 hourly RUC including radar data. Further work will concern the spin-up and the initialization of forecasts.

Aladin
(dashed)
Versus
Arome
(continuous)



*Fig. 6: Background-error statistics
for AROME
sharing the same multivariate
formulation
as in ALADIN-FRANCE*