



# ALADIN 2005

Main achievements

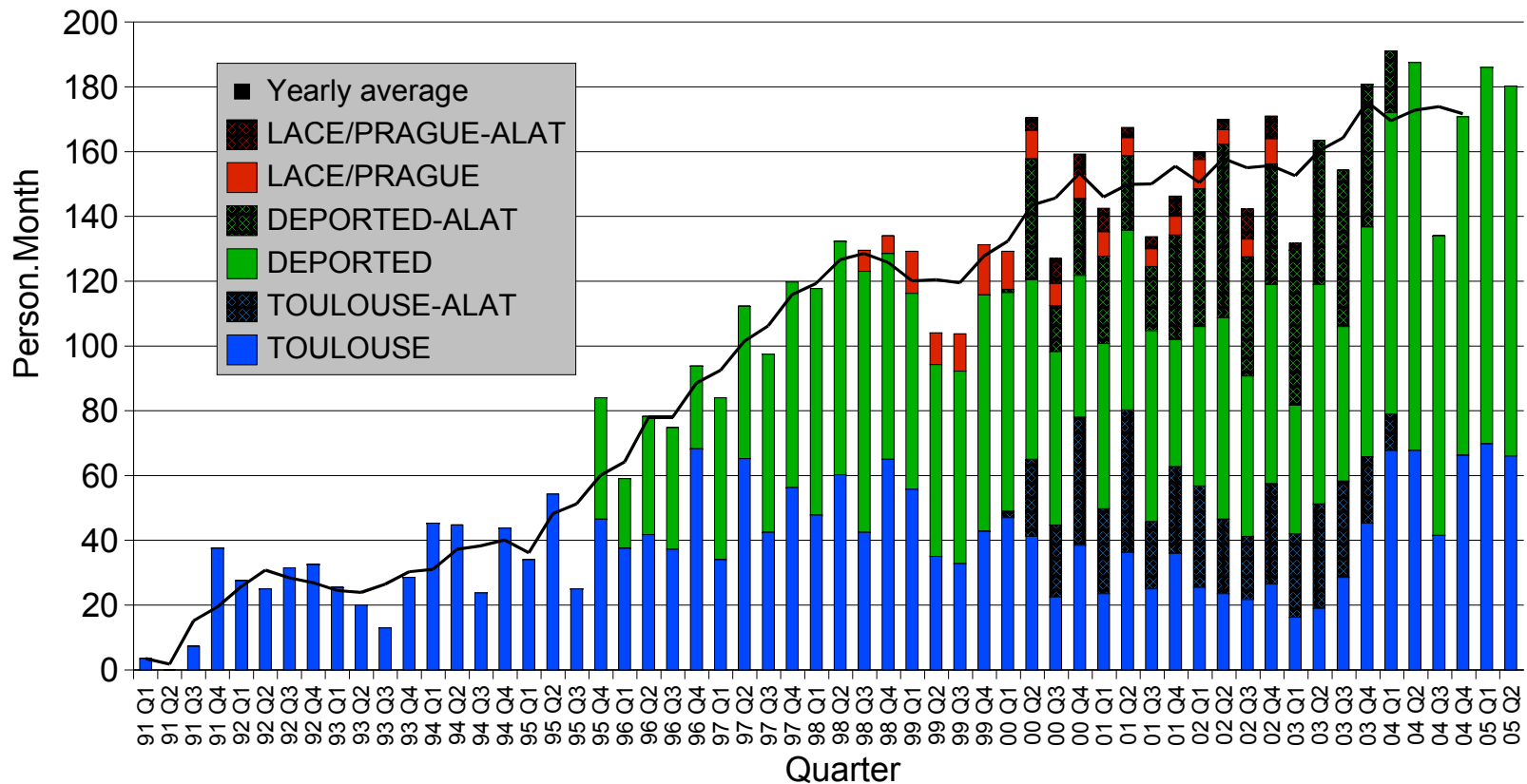
# Introduction

- R & D effort in numbers
- R & D results in areas:
  - Data Assimilation: 2 new operational 3DVAR
  - NH Dynamics: still faster and better
  - Physics: bridging towards AROME started
- What we expect to do in 2006

# Some stats ....

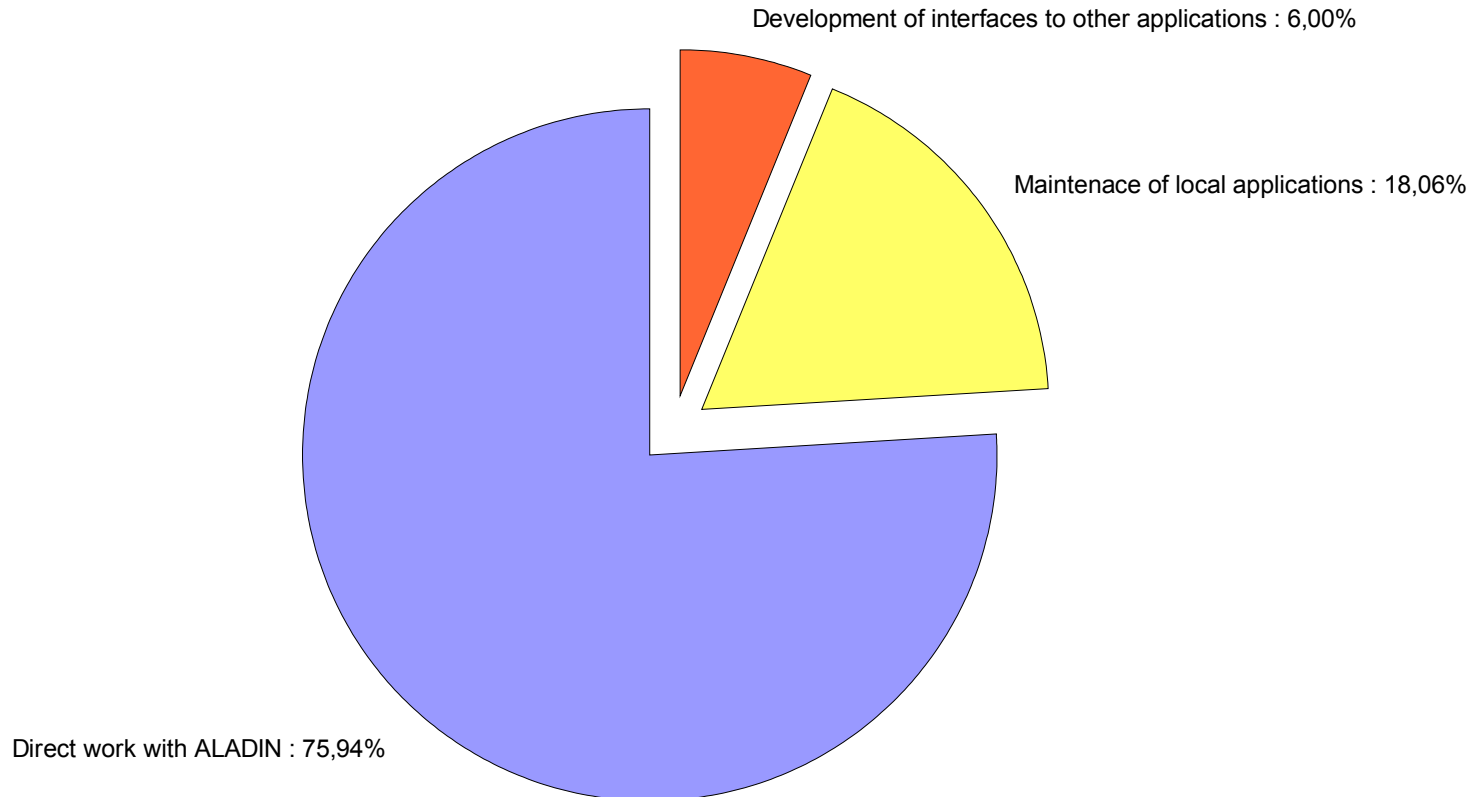
## Total participation in the ALADIN project

Evolution of the quarterly manpower



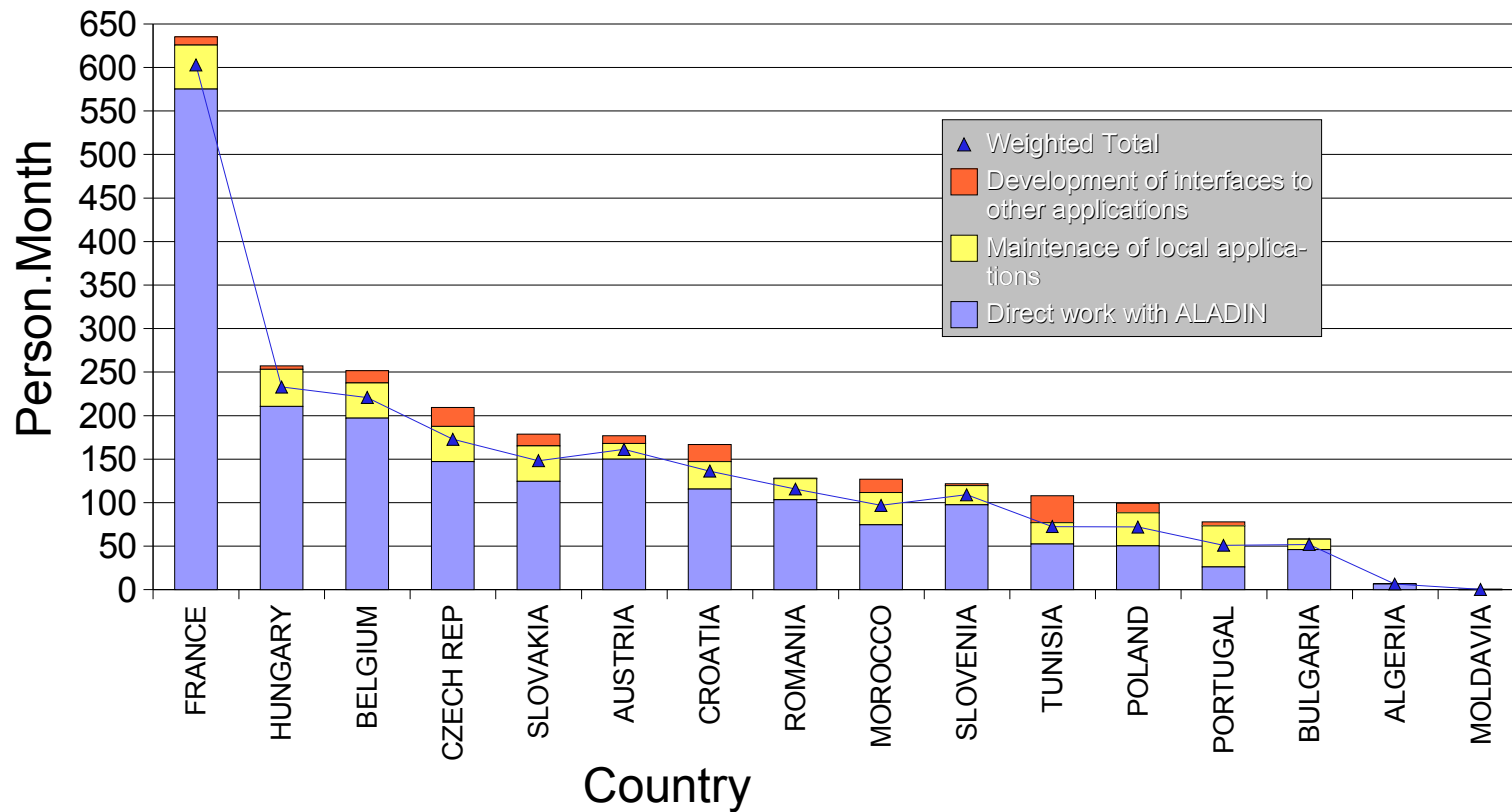
# Breakdown of the ALADIN effort by activity

since the 3rd quarter of 2001



Updated on 20050701

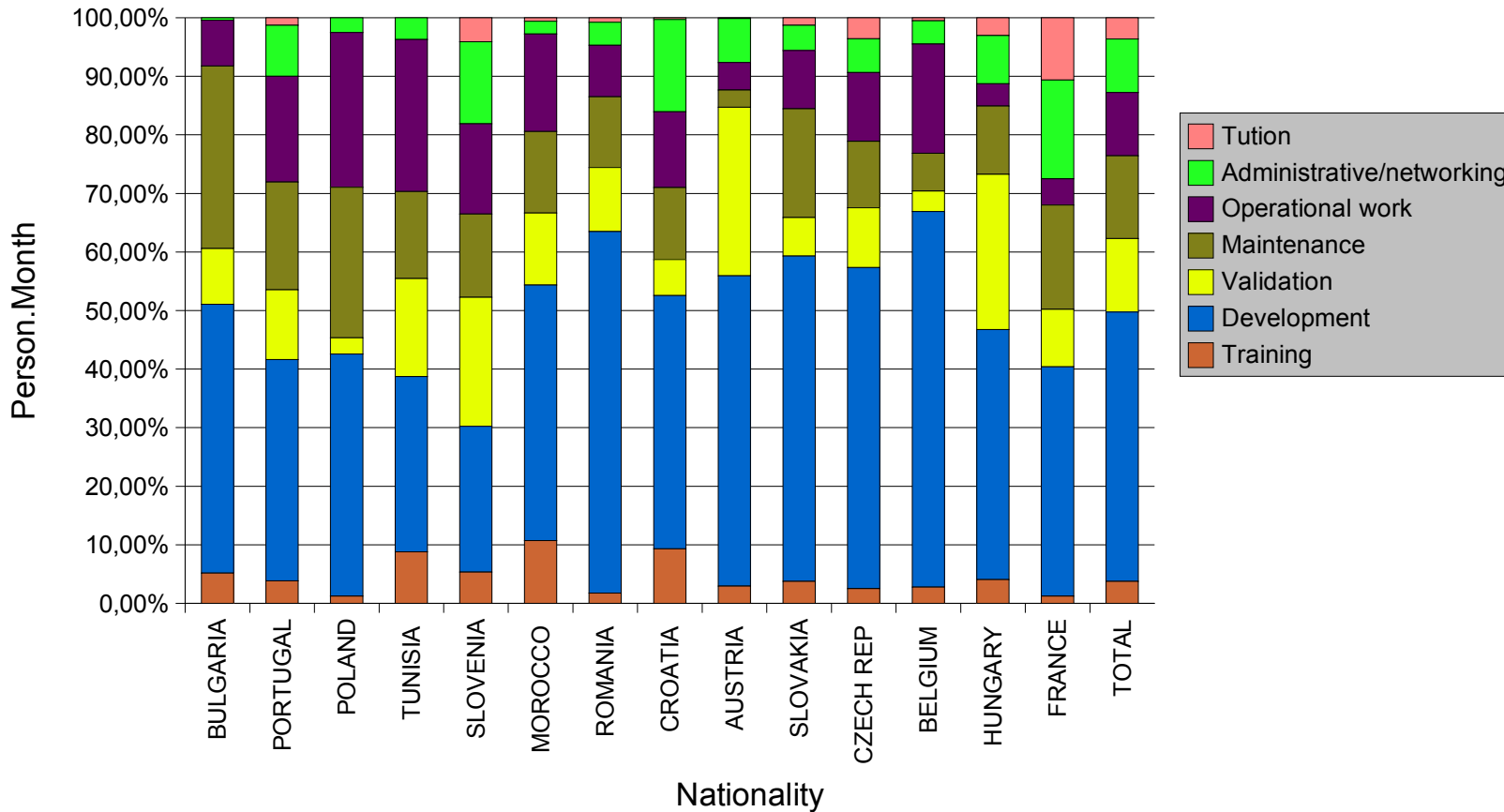
## Breakdown of the ALADIN effort by activity since the 3rd quarter of 2001



Updated on 20050701

# Breakdown of the ALADIN effort by type and nationality

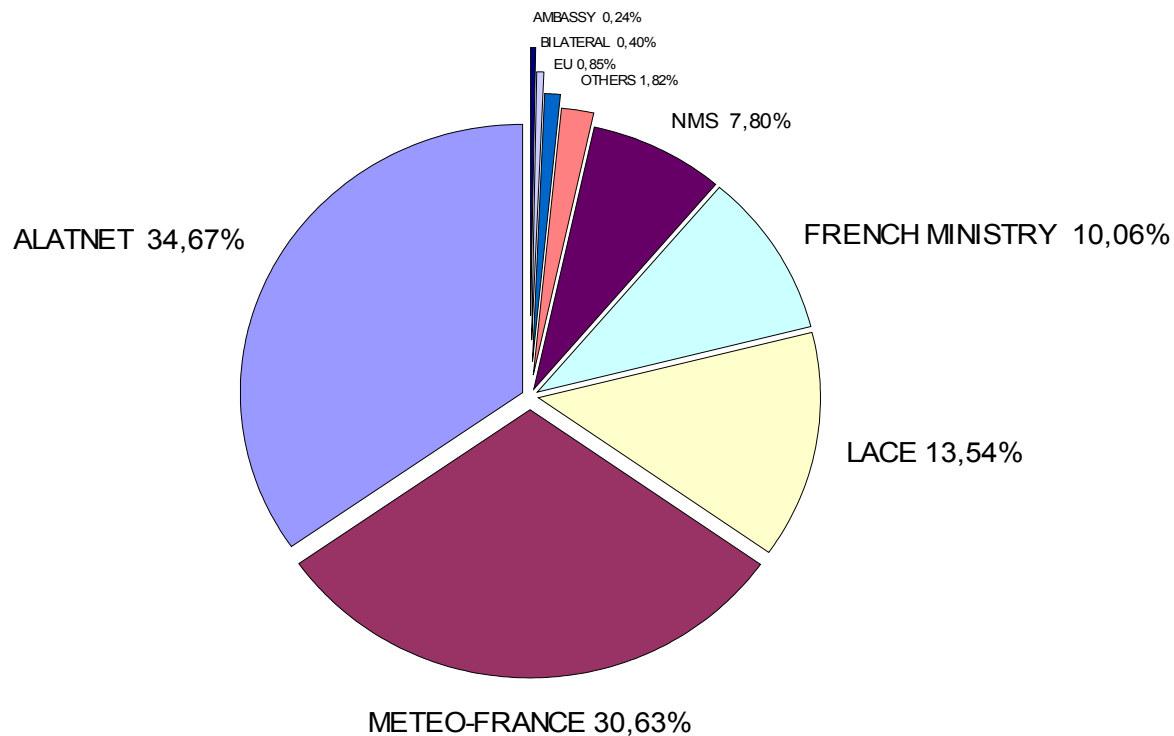
since July 2001



Updated on 20050701

# STAYS in the ALADIN project

Breakdown of the person.months by money funding



*From 20010701*

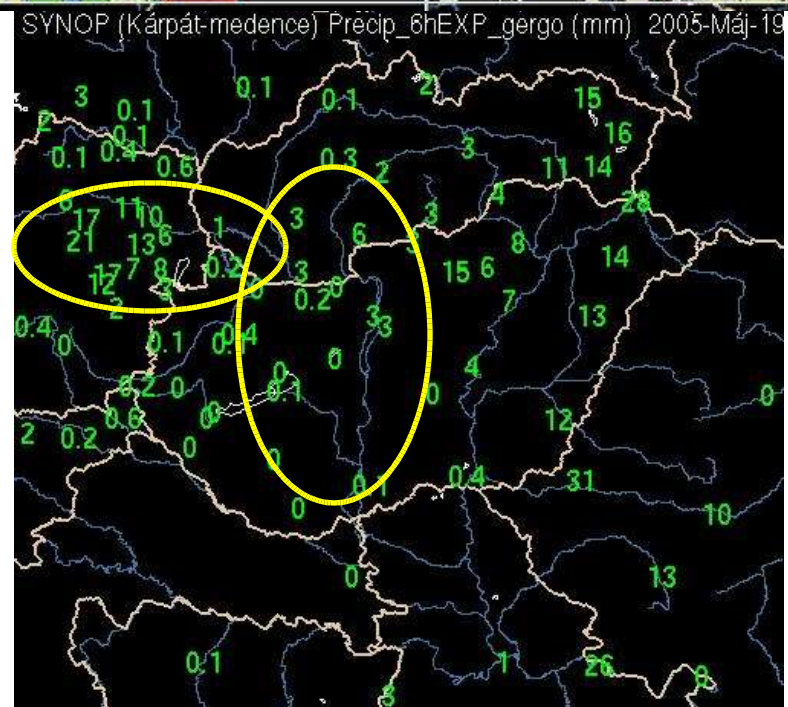
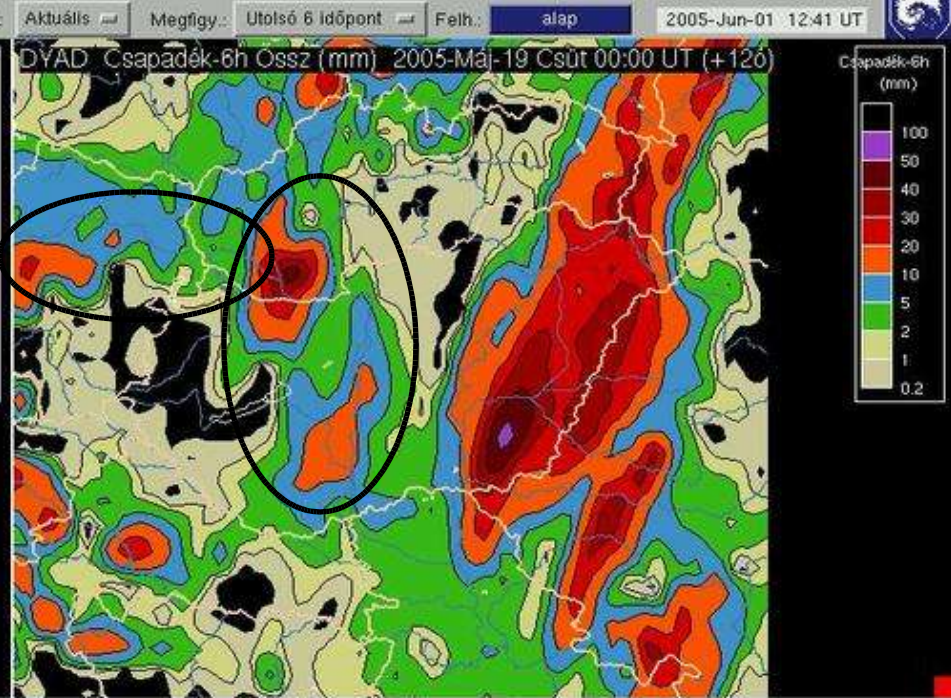
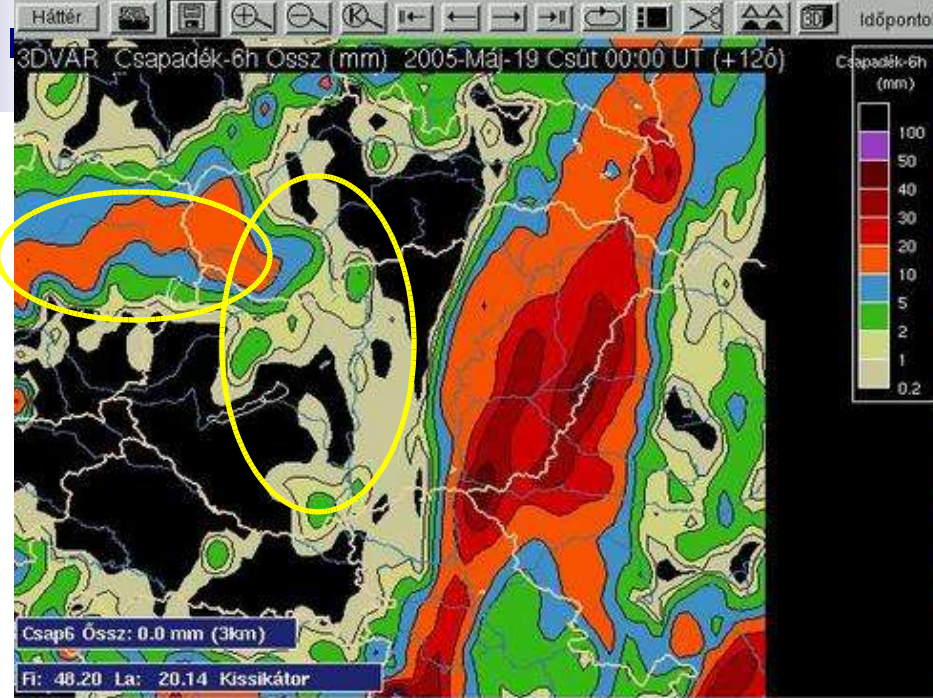
*Updated on 20050701*

# 2005: Year of 3DVAR

## ALADIN/HU & ALADIN/FR

- Forecasts of ALADIN get improved even if the same set of observations is used as for ARPEGE
- Further improvement is achieved when meso-scale observations are used (MSG-SEVIRI radiances, ...)
- Predictability improvement is mainly in the first 12h but it is still noticeable up to 24h (then lateral forcing is the more dominating factor).



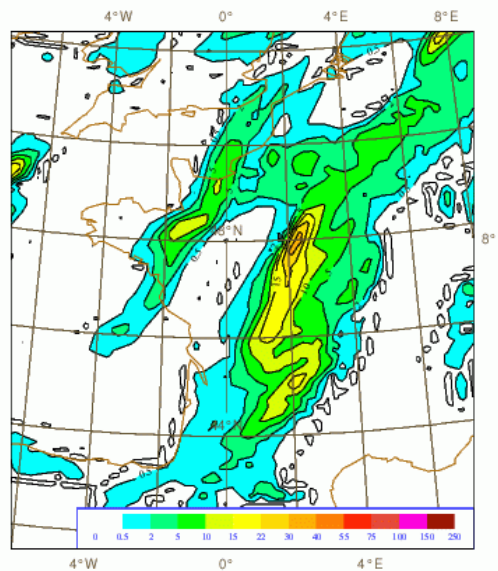


19/05/05 00 UTC  
mm/6h

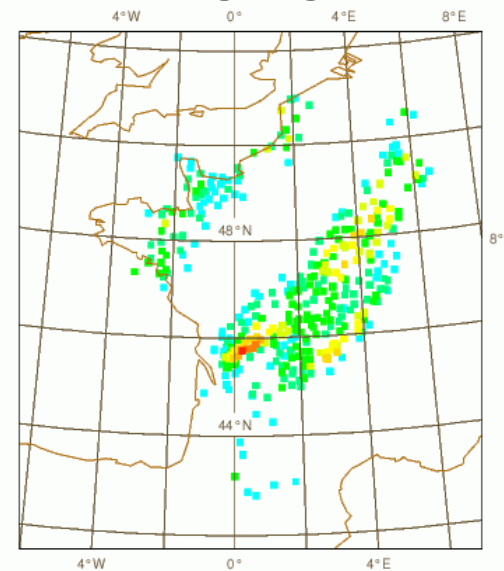
# Impact study : Precipitation forecast

2004/07/18 12UTC  
RR P12 – P6

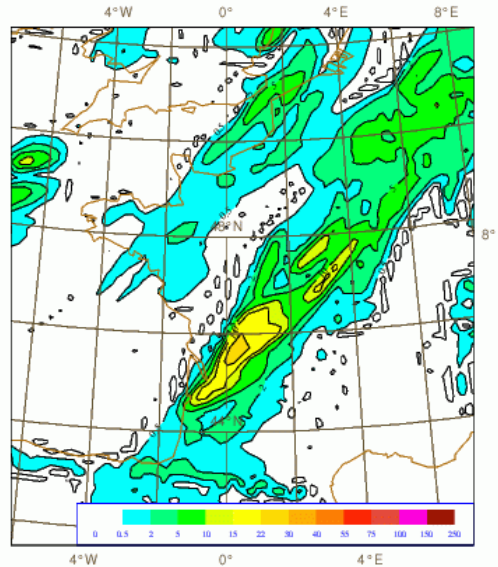
### Dyn. Adapt.



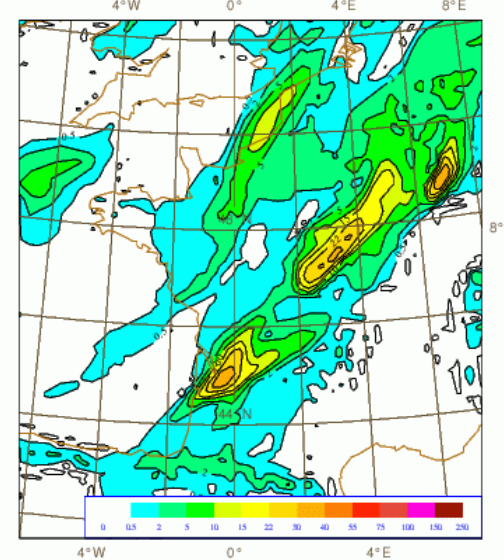
### Raingauges



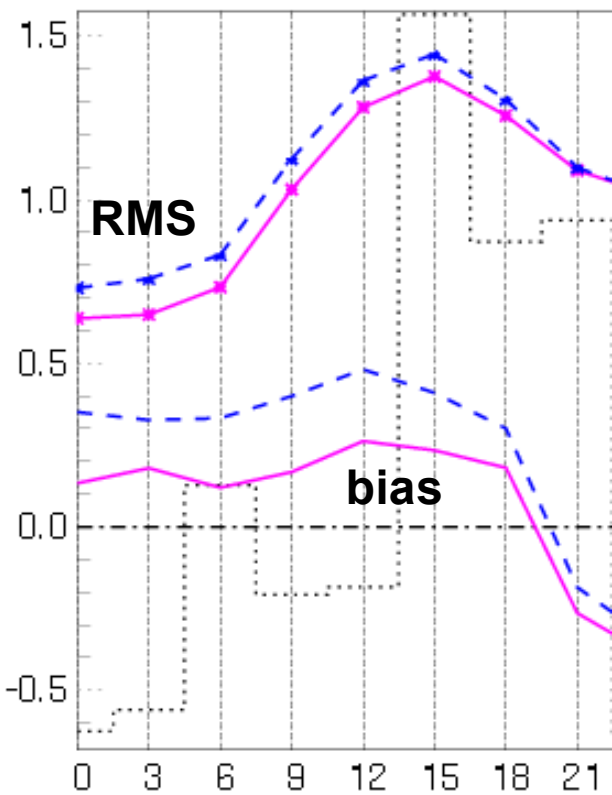
### 3DVar



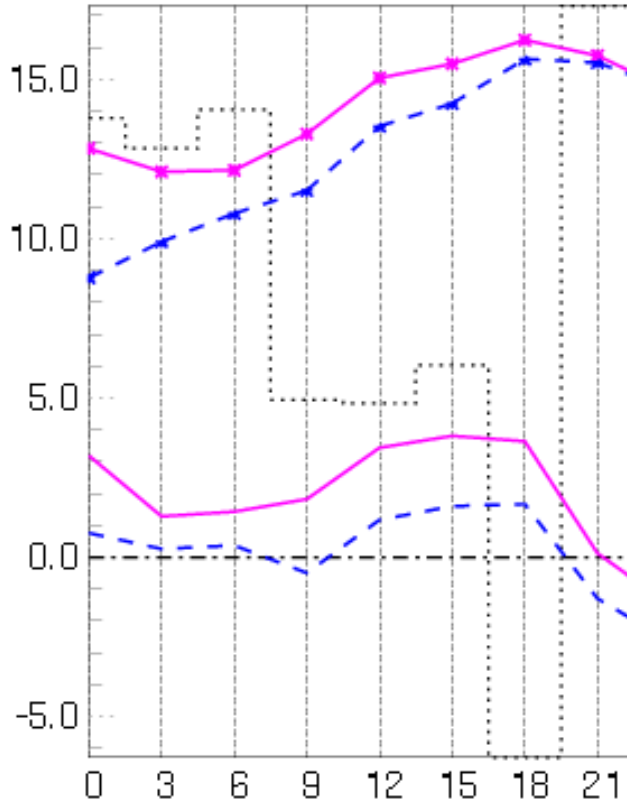
### 3DVar with SEVIRI



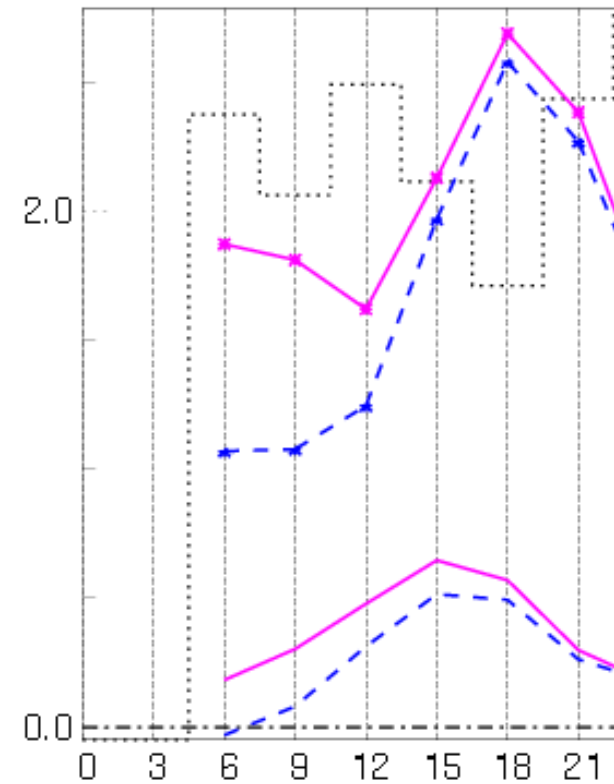
# Scores: 3D-VAR versus Dyn. Adapt.



Mean sea level pressure



2m relative humidity



3 hour cumulated precipitations

# ALADIN NH: where we are now

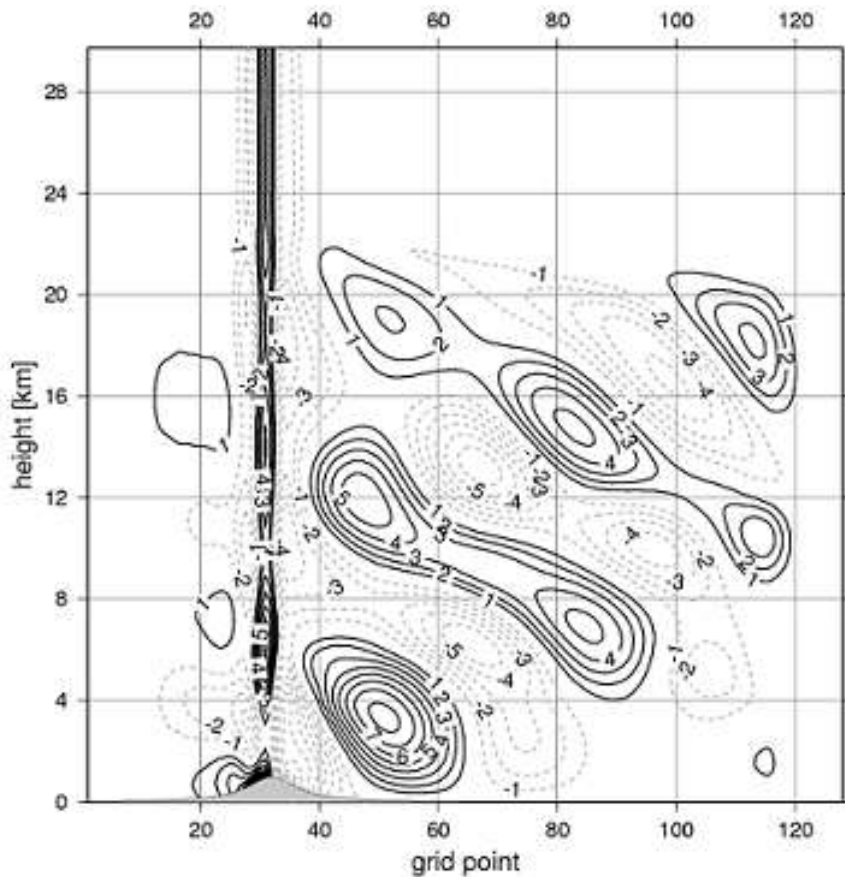
Discretization issues: VFE-like scheme of IFS,  
SL advection of d4 (bubbles), high aspect ratio

d4 variable  
Acoustic T\*  
Full P/C

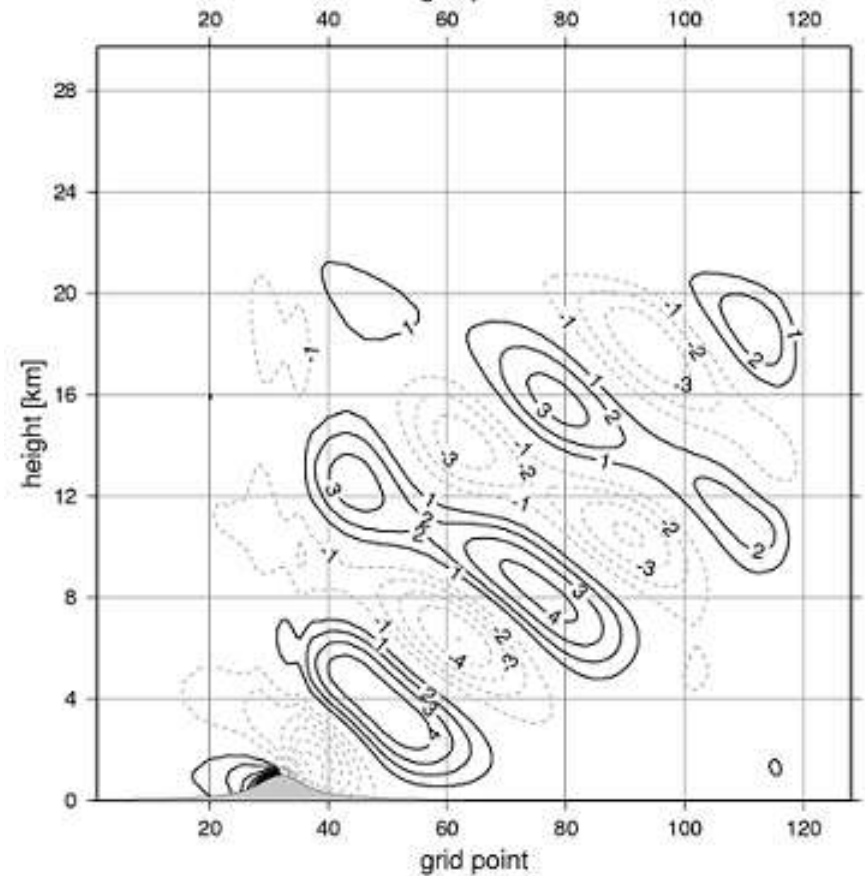
Code optimisation  
and cleaning  
Bottom boundary condition

NH equations  
discretization  
Partial P/C scheme

Solving remaining issues  
(each time somebody says  
it is unsolvable .....):  
Example of “chimney syndrom”  
we got the cure just now



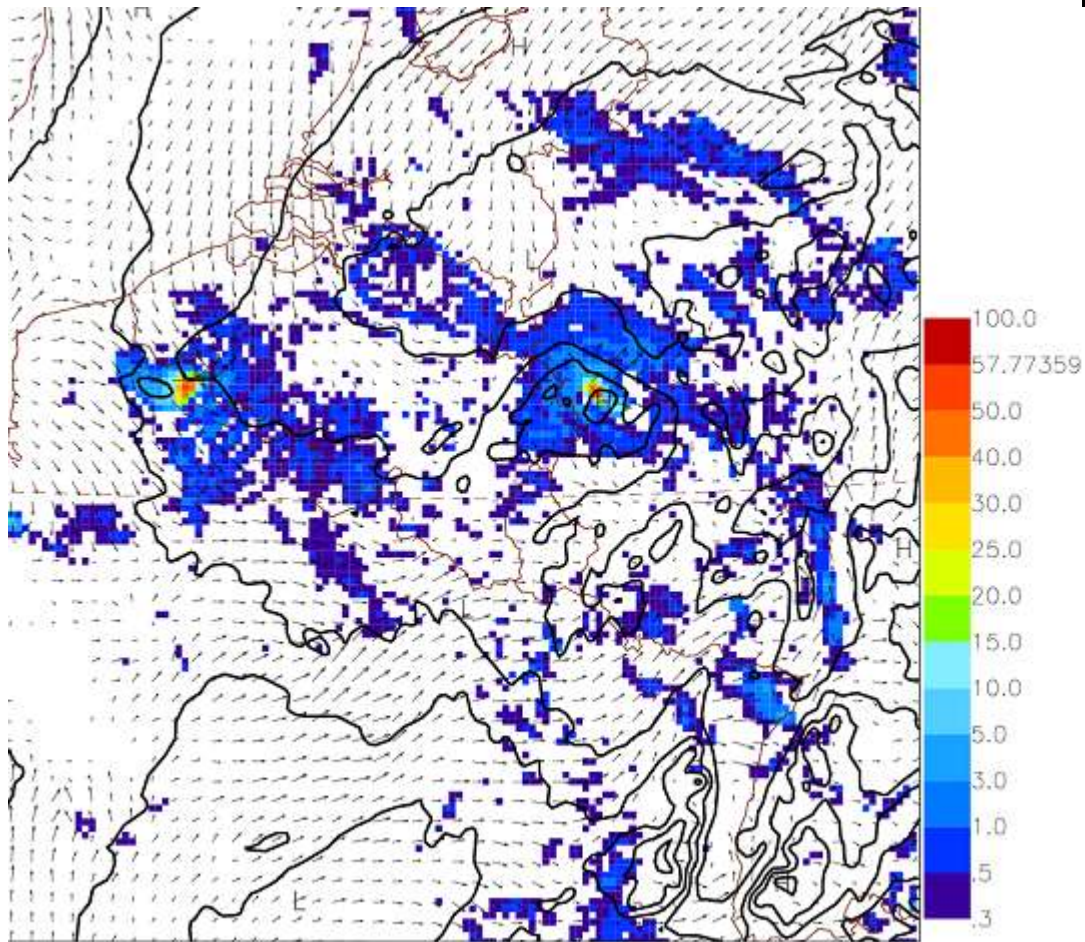
Flow over bell-shape mountain & horizontal diffusion: incompatibility with the bottom boundary condition creates a chimney.



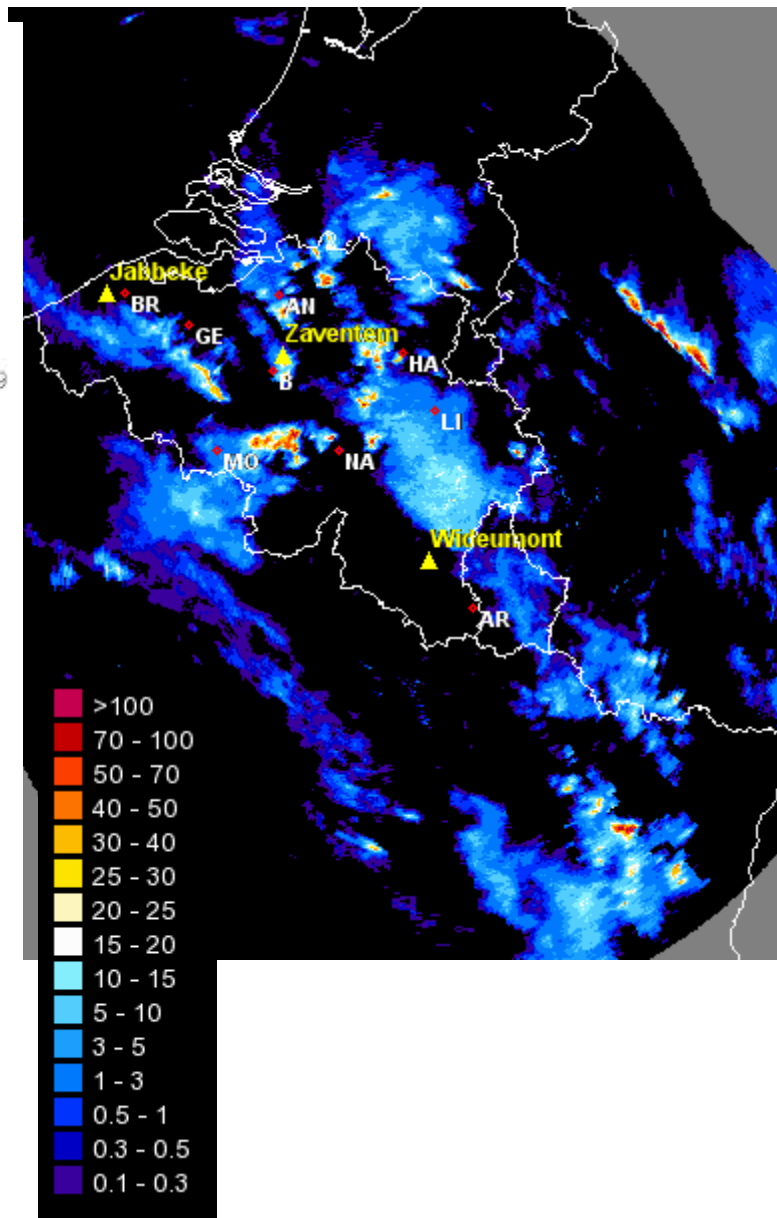
Horizontal diffusion ensured by the semi-Lagrangian method (SLHD)

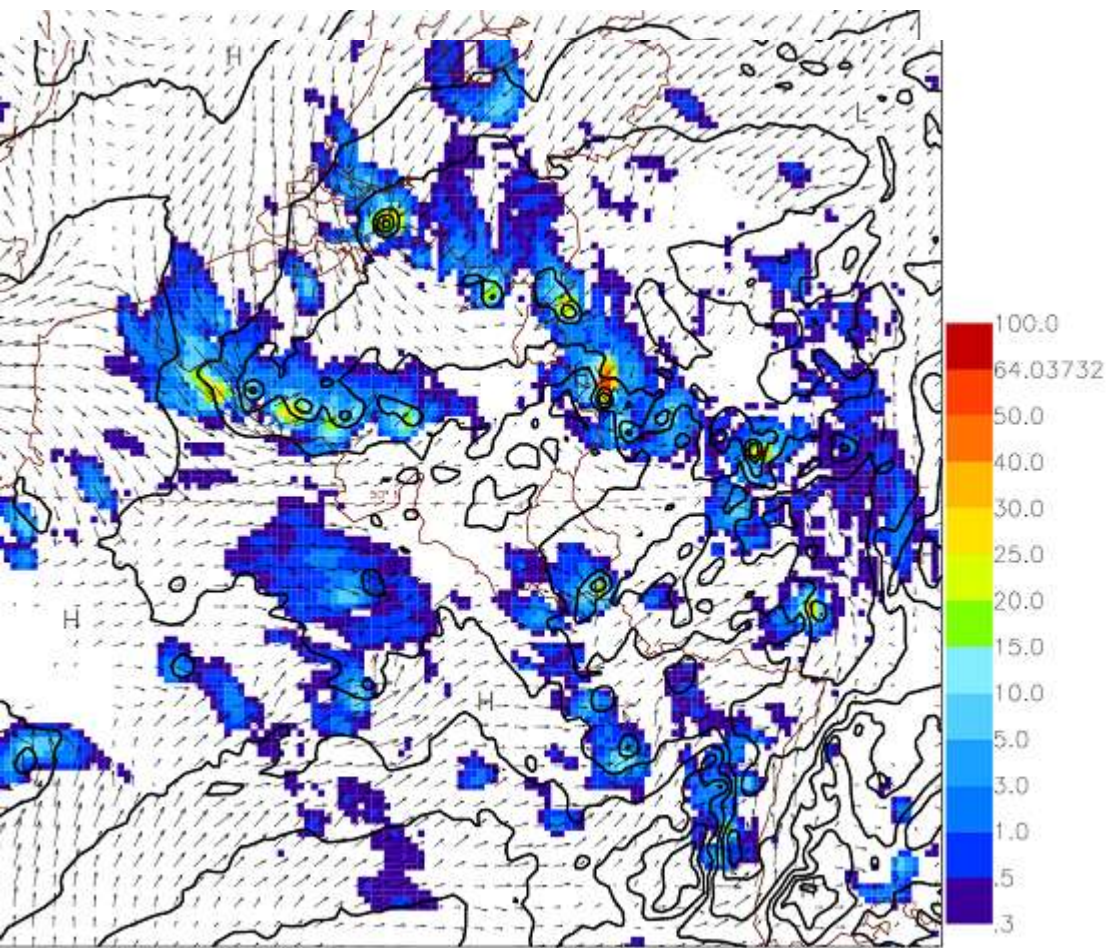
# ALARO Concept for Physics (bridge over troubled water ...) (1/2)

- Principles: operational continuity & potential convergence with AROME
- Core: moist processes
  - Merge work of L. Gérard on prognostic auto-extinguishing convection and thesis of J.-M. Piriou on convective transport and microphysics: key to grey zone. The skeleton is done (Luc).
  - Add under the same philosophy the entrainment and closure parts of the thesis (work currently in progress)



Operational  $dx = 4\text{km}$

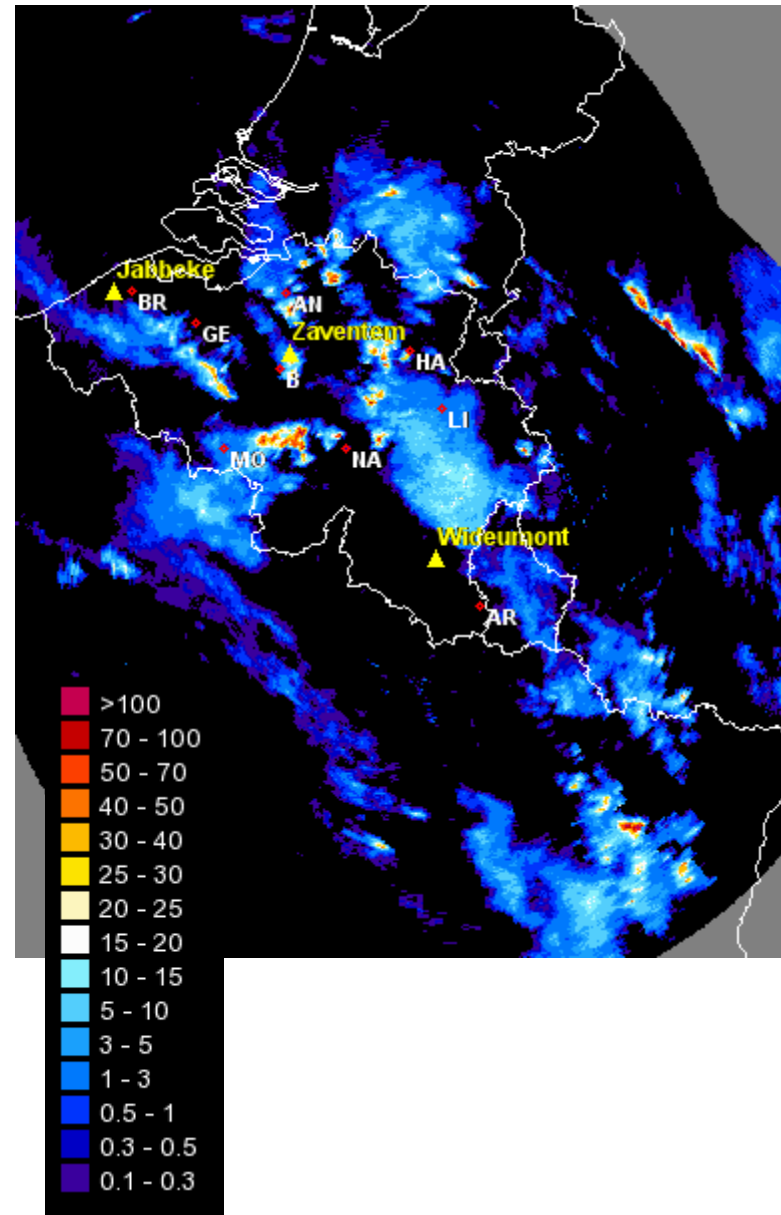




ALARO-0 skeleton

dx = 4km

Does the grey zone trauma exist  
only due to a lack of imagination?





# ALARO Concept (bridge over troubled water ..... ) (2/2)

- In progress and/or still to be done:
  - Start with simpler but stable microphysics (extension of the ALADIN code through the concept of statistical sedimentation); prepare move to more complex schemes;
  - Start with pseudo-prognostic TKE based on operational tunings and stable numerics (extending Redelsperger et al. & Bringkop-Roeckner ideas); move later closer to full-TKE;
  - Link the “skeleton” with current shallow convection and diagnostic cloudiness parametrisations;
  - Ongoing work on radiation (complex but computationally efficient) & mountain drag.
- Release expected mid-February after Brussels gathering for assembling and validation.

# Selective Outlook for 2006

- Extend the idea of convective transport and microphysics to moist turbulence: key to the non-precipitating (so-called “shallow”) convection. To be done in parallel with an integrated use of the prognostic-type cloudiness for radiation
- Vertical Finite Element (VFE) like discretisation extension to NH dynamics (harmonisation of options with IFS)
- Variational code harmonisation with HIRLAM