

From ALADIN to AROME : the ALADIN-2 project

Dominique Giard . Météo-France/CNRM/GMAP

Introduction

With the launching of the quite ambitious AROME project at Météo-France and the choice of the ALADIN model as the main basis for AROME (architecture, dynamics, data assimilation, post-processing at least), the ALADIN partnership had to find a suitable organization in order to better face the divergence of means hence of time-schedules to reach the target horizontal scales for AROME (2-3 km) and the necessity to maintain a regular improvement of the operational skill everywhere in the meantime. The problem (if any) of the so-called "grey zone" for physical parameterizations, in which Météo-France didn't want to be involved, was also to be considered.

The chosen strategy is described here.

A smooth operational transition

- There will be 2 main steps (eventually merged in a single one for Météo-France) for operational changes, and a continuous improvement in-between.
- First step :
 - ☞ move to a new library, including all new options and the state of the art for prototypes (*ALARO*)
 - ☞ move to a new file structure (required at least by the externalization of the surface scheme)
 - ☞ a small increase in cost
 - ☞ change imposed to all partners simultaneously (for a simpler management of coupling)
- Second step :
 - ☞ jump to the AROME nominal resolution (2-3 km)
 - ☞ jump to the suitable (expensive) physics
 - ☞ a significant increase in cost
 - ☞ move based on individual choices (i.e. when partners are ready)
- Improvements are allowed in-between : increased resolution, NH dynamics, improved physics, refinements in data assimilation, ...

5 sub-projects

○ INTERFACES

This is in some way the core of the project, with the following objectives :

- ☞ to allow a flexible use of ALARO via the "toolbox" approach,
- ☞ to easy exchanges between groups and models,
- ☞ to allow testing and using various physical packages, with the design of a very general physics-dynamics interface,
- ☞ to ensure cost efficiency and portability.

○ AROME

This is the short name for the modelling aspects at very high resolution, dynamics and physics mainly. The axes of research are :

- ☞ improvement of (ALADIN) non-hydrostatic dynamics,
- ☞ adaptation and refinement of (Meso-NH) physics,
- ☞ cleaning of the present (raw) physics-dynamics interface, investigation of stability problems .

○ **ALARO - 5 km**

This sub-project is dedicated to specific "grey zone" issues :

- ☞ specific problems in physical parameterizations (convection, orography),
- ☞ improvement or development of a cheaper physical package than the AROME one,
- ☞ some coupling problems (NH versus H dynamics),

○ **ALARO – 10 km**

This may also be called *UPSCALING*, a new approach since downscaling was rather the rule up to now.

This is also a key work, its goal is to ensure that developments (in physics) designed for small scales will improve forecast skill at the present operational ones (i.e. around 10 km) at a reasonable cost (which implies also long time-steps). Operational suites at such resolutions will always be required.

○ **ALAROPAC**

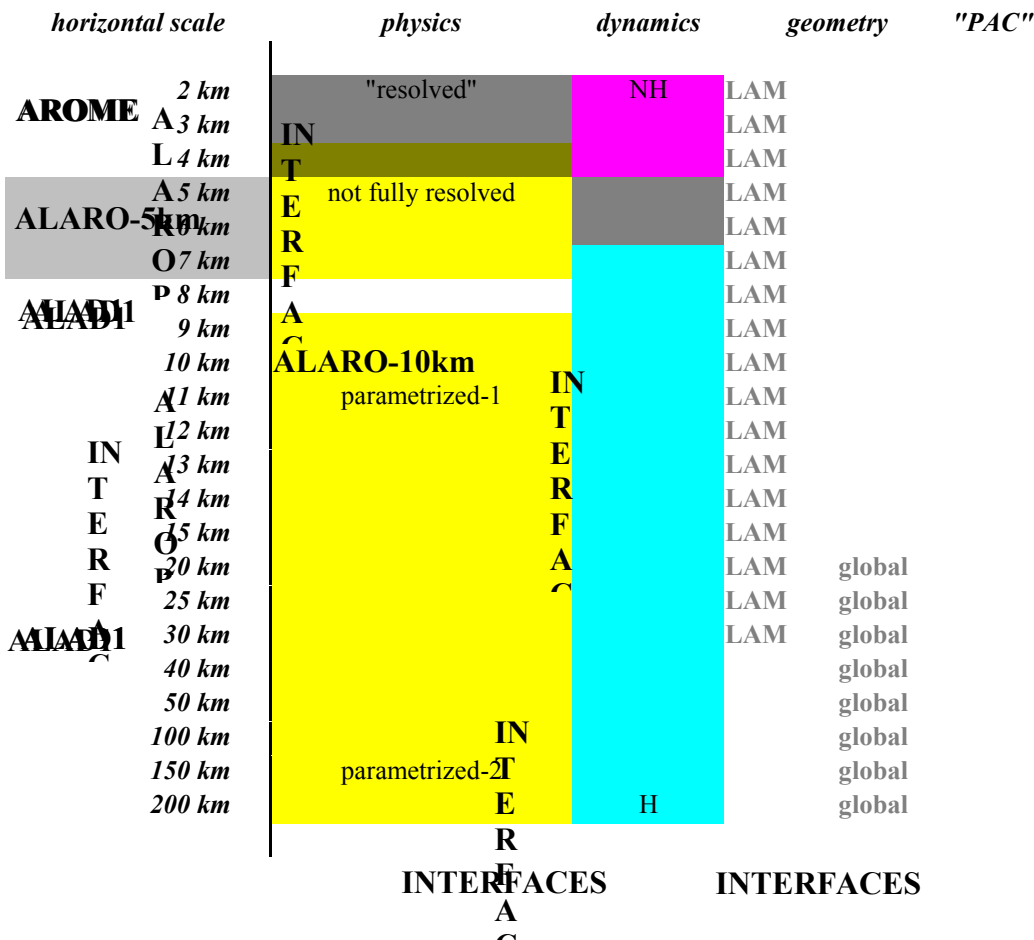
This name covers most Predictability and Assimilation issues, and Coupling problems for forecast and assimilation. There is no identified "grey zone" for such topics, so that all LAM-relevant scales are concerned. Downscaling will be preferred to upscaling here.

○ **ALADI**

This sub-project covers all the tasks related to operations :

- ☞ update / improvement of operational suites,
- ☞ maintenance of the source code,
- ☞ verification, case studies, ...

Horizontal scales in NWP and relative positions of the sub-projects



More details ? : <http://www.cnrm.meteo.fr/aladin/> , and soon : <http://www.cnrm.meteo.fr/arome/>