

The embedded Arpège/Aladin/Arome/(Alaro)/(IFS)/(Hirlam) 1D platform

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One more 1D model ?

The off-line Arpege/Aladin 1D model

See E.Bazile presentation

It was used for the first Arome prototype (2003, first test of Méso-NH physics plugged in an Arpege environment), but the current physics of the 3D Arome prototype was not phased with the current off-line Arpege/Aladin 1D model.

One more 1D model ?

The Méso-NH 1D model

- An option of the 3D code (pseudo-1D=3 identical columns on a C-grid)
- Works on linux PC in the Méso-NH environment :
 - ideal case preparation (initial profile and forcings in namelist)
 - lfi file format
 - Méso-NH set of diagnostics (very usefull to compare to LES)
 - Méso-NH graphic package (diaprog)

What's the embedded 1D model

Just a switch ...

A 1D option of the operational 3D code Arpege/Aladin/IFS (but also sooner or later Alaro, Arome, Hirlam).

From the existing 2D version of the 3D operational system

A 2D vertical plane version was already developed for ideal case studies (for a meridional vertical plane (O, y, z)).

A pseudo-1D

- A 2D model with 4 identical columns, 1 meridional wave number ($NSMAX = 1$)
 - stationary solution if no physics and no forcing
 - still go to spectral space but horizontal derivatives are zero
- Cyclic geometry (no coupling, no bi-periodicisation)

Why an embedded 1D model for Arpège/Aladin/Arome/(Alaro)/(IFS)/(Hirlam)

- A common «official» tool to work on all the physics sets of the community
- A code evolving automatically with the Arpège/IFS cycles
- A code validated as the 3D and 2D options before each new cycle («mitraille» tests)
- A code automatically distributed to the 3D users of Arpège/Aladin/Arome/(Alaro)/(IFS)/(Hirlam)
- A code benefiting immediately from the improvements of the 3D (data flux modification (GFL), new physics interfaces, new diagnostics interfaces)

Drawbacks and current limitations of an embedded 1D model for Arpège-Aladin-Arome

- Loose most of the development which have been made for the «off line» Arpège 1D model (presentation of Eric Bazile)
- Loose a bit of portability
- Loose the flexibility of a non operationnal code
- Loose the facilities of Méso-NH 1D for an ideal case preparation
- Loose the large set of output/diagnostics of Méso-NH 1D (easy comparisons to LES references)

Preparation of a case

The I/O of the 3D/2D/1D are FA files (Standart Arpege/Aladin format)

Initial condition and forcings

- create an ascii file with the 1D atmospheric profiles and forcings (+ surface fields for Arpege surface scheme)
 - A and B (functions to define the vertical η coordinate) may coorespond to a pressure coordinate ($B = 1$, $A = 0$ at bottom and $B = 0$, $A = p_{lev}/p_{00}$ above)
 - with the current solution, put all the atmospheric forcings (for each time) in the initial file
- for SURFEX, create an idealized PGD file (physigrapy) on a cartesian geometry with 4 identical points (cover "SEA" or "ISBA")
- run the (adapted) acsii2FA tool

Running the embedded 1D model

You need :

- the initial FA file
- an arpege/aladin namelist
- a standart script

You get :

output FA files (+ output from SURFEX)

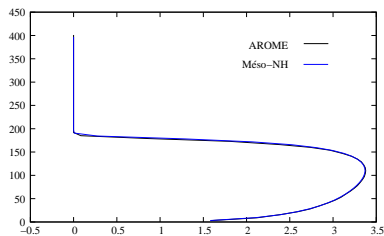
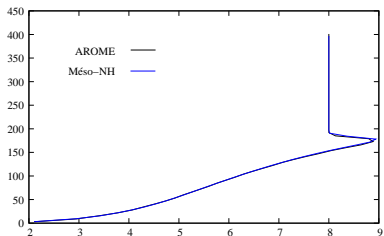
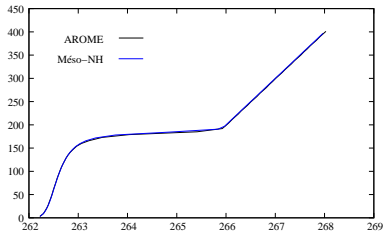
Treatment of outputs and diagnostics

- The 2D users developed a basic FA2ascii tool which was easily adapted for the supplementary prognostic variables of Arome but it does not compute (yet) sophisticated diagnostics (only θ from T or r from q for example)
- Most of the Arpege/Aladin budget diagnostics (DDH) should work (not tested yet, anyway they do not work yet for Arome)

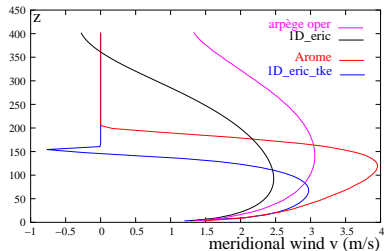
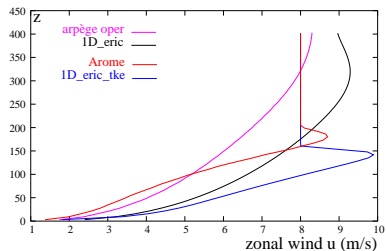
Test cases

- Bomex
- Eurocs/Arm/shallow Cu
- Gabls
- Gabls2

Gabls : Comparison Arome/Méso-NH



Gabls : little inter-comparison



Where we are, and what's next ...

Where we are

- An embedded prototype with a set of modifications proposed for the next-next cycle of ARPEGE/IFS (CY31T1, spring 2006)
- Some basic tools for cases preparation
- Some basic tools for output treatment

Where we are, and what's next ...

What may be next ...

- finish the development of the PC package
- find a way to make outputs and diagnostics easier
- maybe implement a «mechanics» for reading forcing files as coupling files
- improve the tools for cases preparation
- prepare new cases
- improve the initial set of modification (more forcings, better treatment of surface forcings ...)