Convergence on Microphysics between ALARO, ARPEGE and AROME

Conclusions of the workshop of September 24-25, 2008 concerning Microphysics

Preamble : The notations of the Microphysical modules are:
- ALARO model : APLMPHYS module
- ARPEGE/ALADIN model: ACPLUIZ module
- AROME/MESO-NH model : ICE3 module

For each task cited below, the manpower is estimated with the team(s) in charge of the development.

A. Convergence between ACPLUIZ and APLMPHYS : The tasks are :

1. To switch off the subgrid treatment in APLMPHYS (2 weeks, ALARO)
2. To change the order of processes in ACPLUIZ (1 week, ARPEGE)
3. To approximate Δz_{eff} (formulation proposed by ALARO) and then to run 1D and 3D tests in ACPLUIZ (1 month , ARPEGE)
4. To compute the precipitation fluxes in ACPLUIZ (1 week, ARPEGE)
5. Tests of reproducibility (2 weeks, ALARO + ARPEGE)

Estimation of total manpower = **2.5 months**

B. Convergence between APLMPHYS and ICE3 :The tasks are :

1. To split the bulk ICE3 routine into individual routines and to include them in 1 monitor , including DDH calls (4 weeks, ALARO)
2. To push reshaping functions of ICE3 upward, leading to single level subroutines. The sedimentation process presents a higher difficulty to reshape as it is only a "fall" process that redistributes vertically the species (4 weeks, ALARO)
3. To test the reproducibility between both schemes ICE3_old and ICE3_new in AROME 1D (2 weeks, ALARO+AROME)
4. To add processes relative to graupel in APLMPHYS[1] and the inherent modification of data flow (8 weeks, ALARO)
5. To test the comparison between ICE3_new and APLMPHYS_new (2 weeks at least, ALARO+AROME). This suppose the possibility to switch off the subgrid treatment in APLMPHYS (Task A.1).

Estimation of total manpower = **5 months at least**

Options :

1. P3 could be included in AROME 1D on all collection processes (suppose an AROME contribution, Y.Bouteloup + Y.Seity)
2. Tests of sensitivity on the time step could be leaded on ICE3_new and APLMPHYS_new in a future work .

The final implementation of ICE3_new in AROME/Méso-NH supposes beforehand :

- The reproducibility of the results on multiple test cases
- The equivalence of the computational efficiency

[1] Necessary to a comparison between ICE3_new and APLMPHYS_new as graupel is an obligatory hydrometeor in ICE3 and ICE2 is not straightforward