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# The general problem of moist processes in ALADIN-2

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## A few obvious (?) statements

- ✦ At least for our latitudes, the current ARPEGE-like moist physics (ACCVIMP(D), ACPLUIE, LCVPP, ACNEBN) doesn't work so bad at the  $\sim 10$  km scale (since DIFCORA + COCONUT).
- ✦ There is a huge paradox in the choice of a strategy oriented around the existence of the 'grey-zone', together with the affirmation that the same physics can be the best solution on each side!
- ✦ There is a true consensus around the choices for AROME.
- ✦ It would be stupid to redevelop the parts that really differ between AROME and ALADIN-1 (microphysics, turbulence).
- ✦ For other aspects relevant to ALARO, science should progress from 'doubt' and 'confrontation of ideas'. Else we are doomed to revive the 'dynamical kernel' syndrome.

# The constraints

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- ✦ Owing to what was just said, the scientific degrees of freedom are restricted to ALARO, but they are conditioned to a large extent by choices in AROME and even in ARPEGE => **unstable situation (cf. WG discussion of 1/6).**
  - ✦ For ALARO, efficiency (i.e. mostly the length of the physics time-steps) ought to be paramount => it is not sufficient to think of it in absolute terms (e.g. '60 s'), one must count in relative terms => **contradiction with AROME?**
  - ✦ Keeping the possibility to solve the 'grey-zone' problem is a key part of the challenge, but it should not lead to additional contradictions => **convergence of constraints at the most delicate point!**

# Basic proposals

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✦ The organisation of the phys-dyn time-step must be thought in terms of SI-SL spectral schemes, and be studied alike.

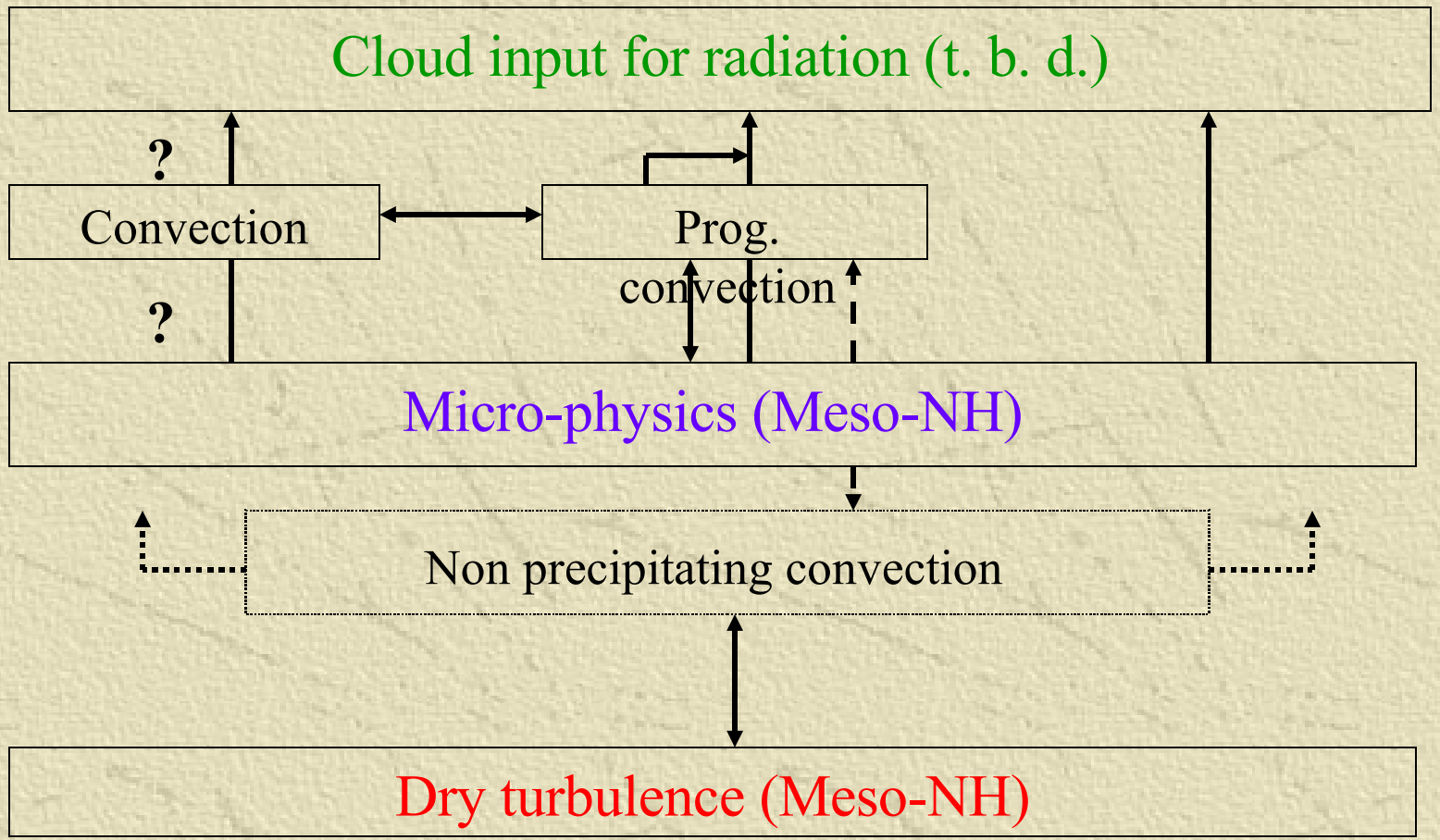
✦ For the way to combine effects of various parameterisation schemes one should work from the general to the special:

- ◆ The set of general equations (the full-barycentric choice is a good offspring of the need to find compromises);
- ◆ Its consequences on getting and combining tendencies (**interface**);
- ◆ The latter's consequences on individual routines for full consistency.

✦ For (**may-be**) doing better for the grey zone problem, 3 ideas:

- ◆ Prognostic convection;
- ◆ One single approach to phase changes (adapt. AROME micro-phys.);
- ◆ Mixed input for downdraft (resolved + updraft).

# All this starts to resemble to a complex road-map, with constraints and opportunities.



# Priorities

- ✦ To find a **consensus** on the equations and on their AROME-ALARO-(ARPEGE?) basic declination.
- ✦ To start looking at the problem of the **micro-physics time-step-length** (algorithmically, not scientifically).
- ✦ To prepare testing of deep-convective ideas in a very wide sense (if one wants compatibility between ALARO-10 and ALARO-5 in methods and between AROME and ALARO-5 for micro-physics, **cross-fertilisation** will be necessary).
- ✦ To consider **ab-initio** the non-precipitating convection problem in the same spirit, but across even more scales! Hopefully the transition with dry-turbulence will be more crucial than the one with deep convection. **Otherwise => big hurdle!!**

# Conclusions

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- ✦ Obeying the list of constraints may look like an impossible challenge.
  - ✦ This may fortunately not be so, if one accepts a few basic principle for development and if the initial priorities are the right ones.
  - ✦ But this requires a wide consensus that obviously does not (yet?) exist, on either side (M-F/Partners).
  - ✦ This point may a-priori look academic, but in fact it is central to the question of the adequation of ALARO to ALADIN Partners' real needs.