DYNAMICS

Session 2 summary:

- P. Bénard – Status of the dynamics in ARPEGE/ALADIN
- M. Hortal – HIRLAM dynamics development
- P. Thermonia – Scale-selective digital filtering initialization
- Discussion

Research areas

- VFE for NH
  - Extending the current NH code (P, d4)
    - Integral and derivative operators
    - C1 constraint not fulfilled => iterative SI solver
  - Exploring new proposal (Φ, w)
    - Derivative operators only
    - Less algebraic constraints
    - No more just extension of hydrostatic dynamics
    - No FD counterpart
- Semi-elastic model as alternative NH core

Research areas

- SL advection
  - Conservative interpolators
    - Generalized (two parametric) interpolator
    - E. Kaas (Tellus, 2008)
  - SLHD
    - Specific case of generalized interpolator
    - Δ (GP, explicit) to mimic K-type 3D turbulent behavior
    - Triggering
      - Purely horizontal
      - Based on combination of deformation and divergence
- Scale selective DFI

Research areas

- LBC coupling
  - Transparent LBCs
    - About to finish 2D with vertical shear
    - Adapt to gridpoint model
    - Extrinsic or iterative treatment for spectral model

      $\Rightarrow$Long term research
  - Boyd (MWR, 2005)
  - Enlarging C-zone width
  - Relaxation of orography in C-zone
  - Frequent update of BC
  - Interpolation producing well balanced fields

Research areas

- Dynamics sources in DDH
- Non constant linearized map factor for large areas
- Physics-dynamics interface
  - Allow different resolution for physics and dynamics
  - Second order time coupling

Discussion

- Finite differences as an option for horizontal discretization
  - No real problem of spectral representation observed
  - For high resolution differences between spectral and GP model becomes smaller (no spectral diffusion, no derivatives,…)
  - LBC can't be used as an argument (SL also problem, extrinsic coupling)
  - In the worst case better to switch to FE (no staggering, remains galerkin → solver, energy and enstrophy conservation)

Discussion

- Q compressibility and mass conservation
  - Why the phys-dyn interface of Arome must be the one of unelastic Méso-NH?
  - Limitation to various phys-dyn interaction study
  - MAPFI could be a way to explore cheaply the issues