Review Talk on Dynamics

- Ongoing activities / SRNWP-NT Workshop
- Cooperation HIRLAM / ALADIN / ECMWF
- SL scheme at mesoscale and A-Grid
- Strategy for implicit solver at mesoscale

Ongoing activities/SRNWP-NT workshop

- Problems linked to kilometric scales in NWP

  "unsmooth" convective motions resolved

  more chaotic motions endanger numerical schemes
- Lateral Boudary and coupling for LAMs

  Well-posed, Variable mesh, Boyd
- Strategy for implicit solver at mesoscale

  Map factor, departure to reference state

SRNWP-NT mini-workshop

- Held 23-24 March 2009 at Reading Univ.
- Mostly :

- LBC coupling issues

- SL issues

- and other issues (VFE, NH)

Cooperation
ALADIN / ECMWF / HIRLAM

- Focused on NH dynamics aspects

LAM and small-planet idealised tests (E+A)

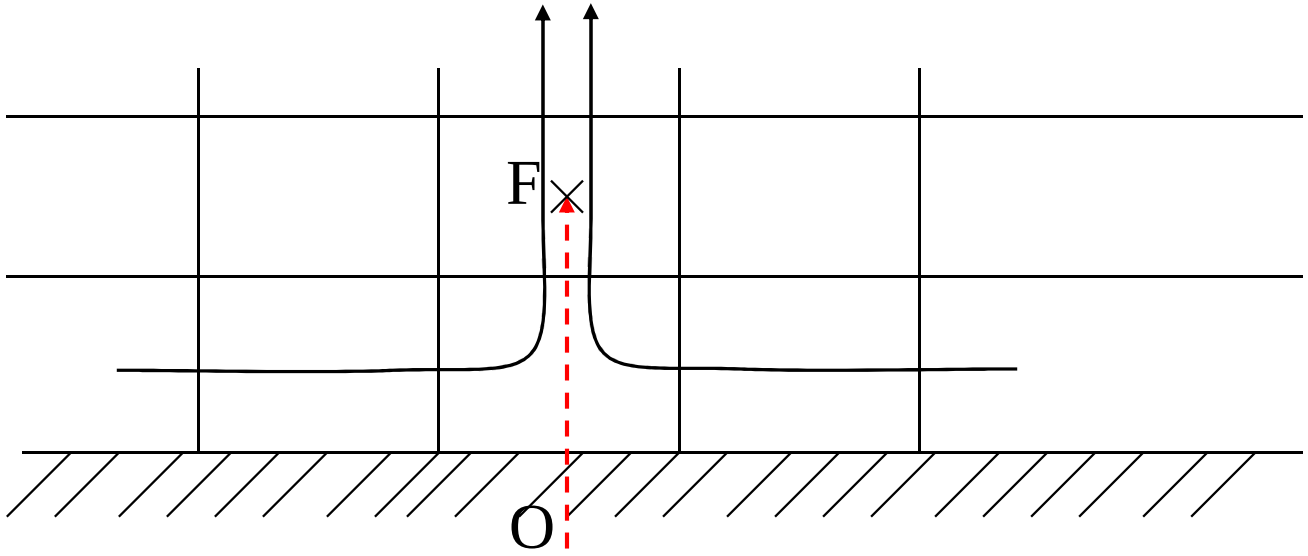
map-factor in SI scheme (H+A)

SL scheme at mesoscale (E+A)

convective structures (H+A)

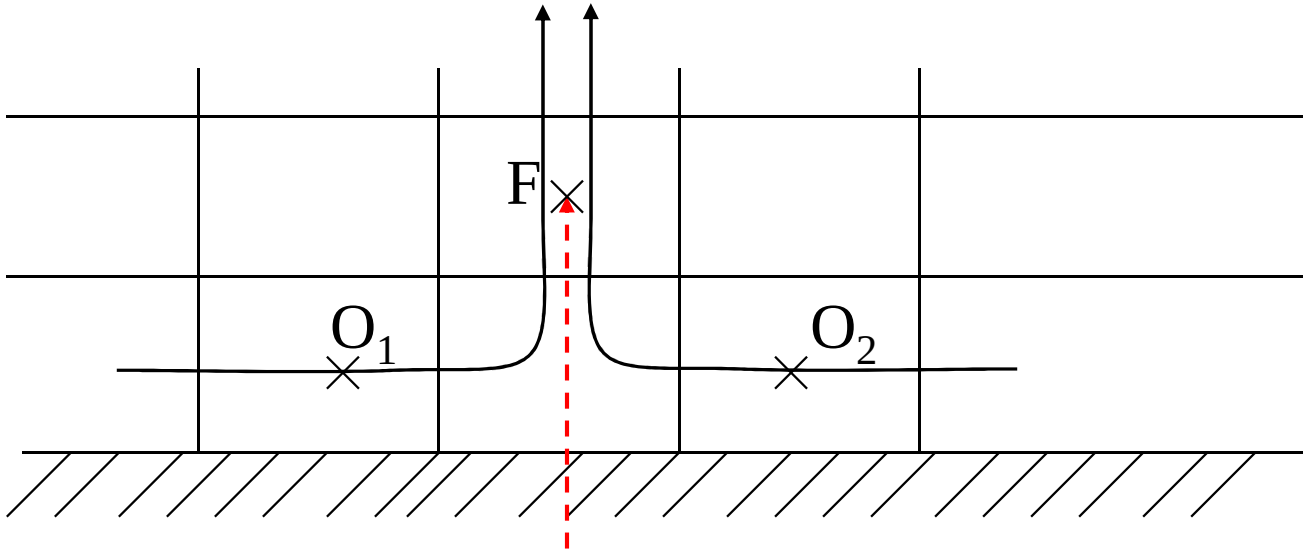
SL scheme on A-Grid at mesoscale

- Problem of origin point determination in grid-scale convergence areas



SL scheme on A-Grid at mesoscale

- Happens at mesoscale in convective areas



SL scheme on A-Grid at mesoscale

- Spurious/overestimated source of moisture
- Overestimated convective feeding/lifetime
- Might happens (in a lesser extent) inside the atmosphere (areas of strong convergence shear)

SL scheme on A-Grid at mesoscale

- Possible tracks

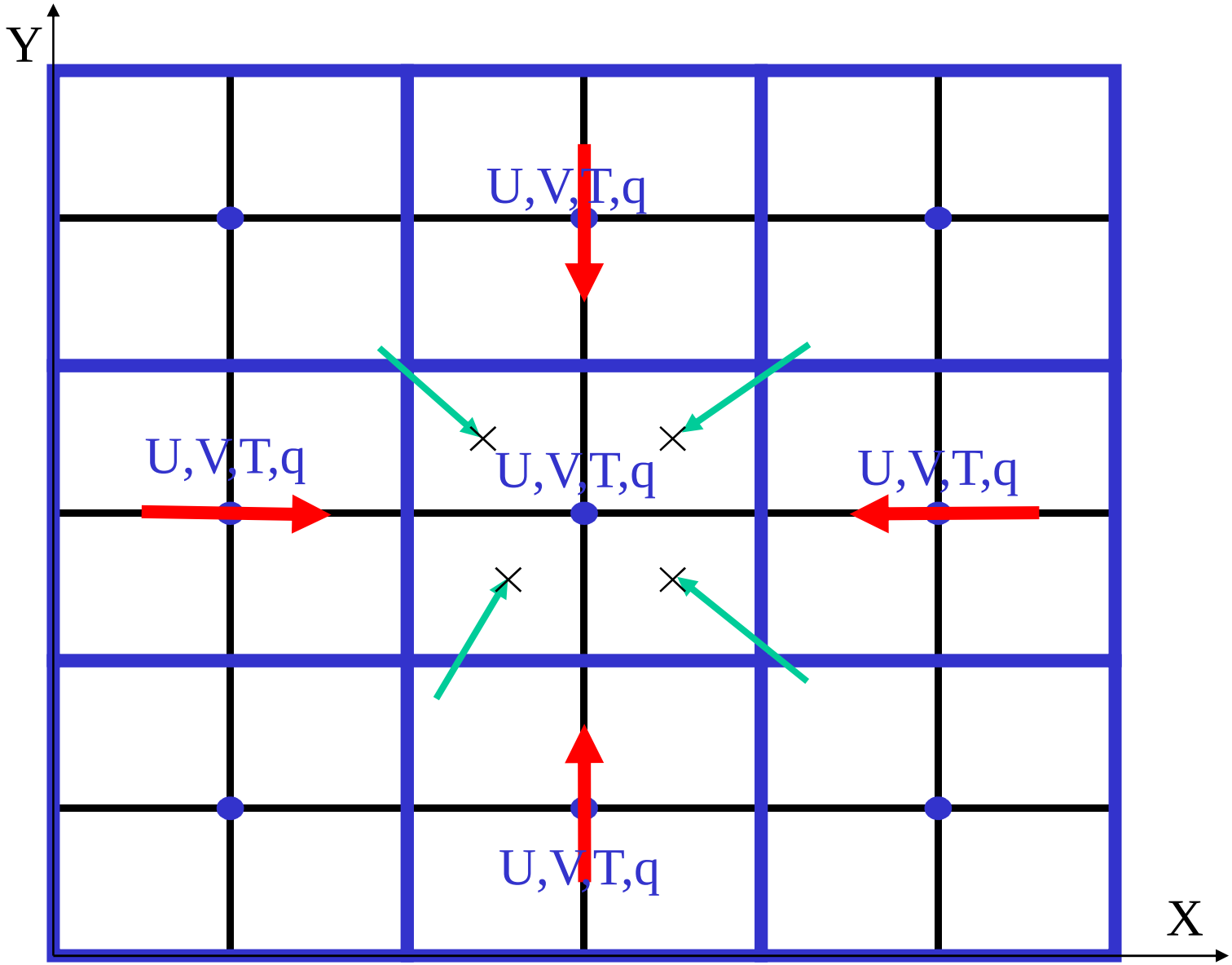
  - Refined C-grid scheme

  - mesh-box budget approach

  - use SLHD frame to mimics spreading of origin points

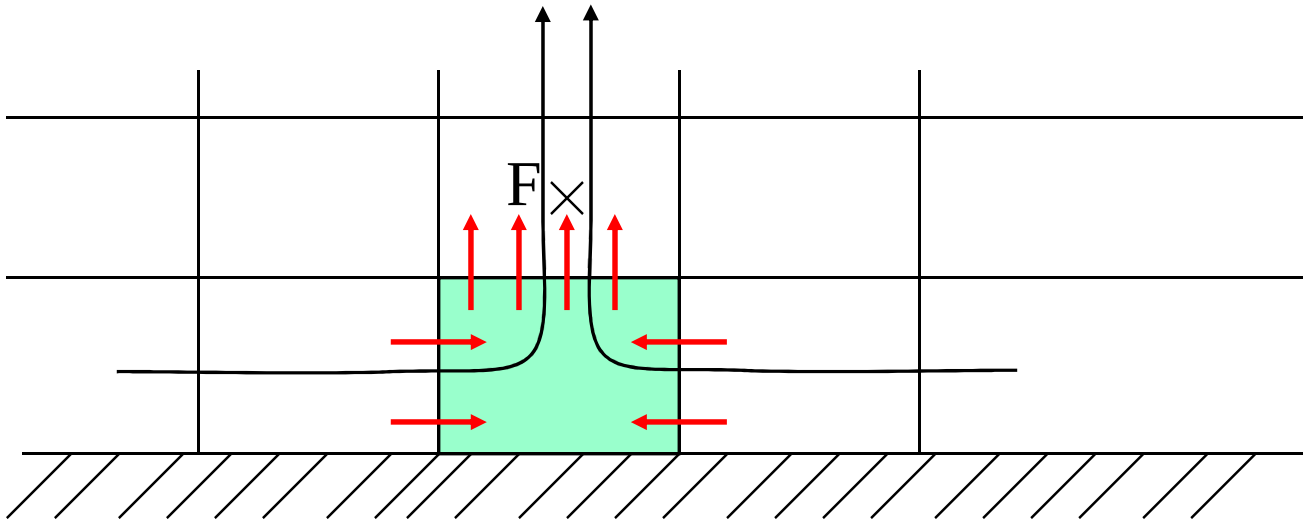
- All schemes used whenever needed (criterion)

Refined-grid scheme whenever needed (4 traj)



Mesh-box budget approach

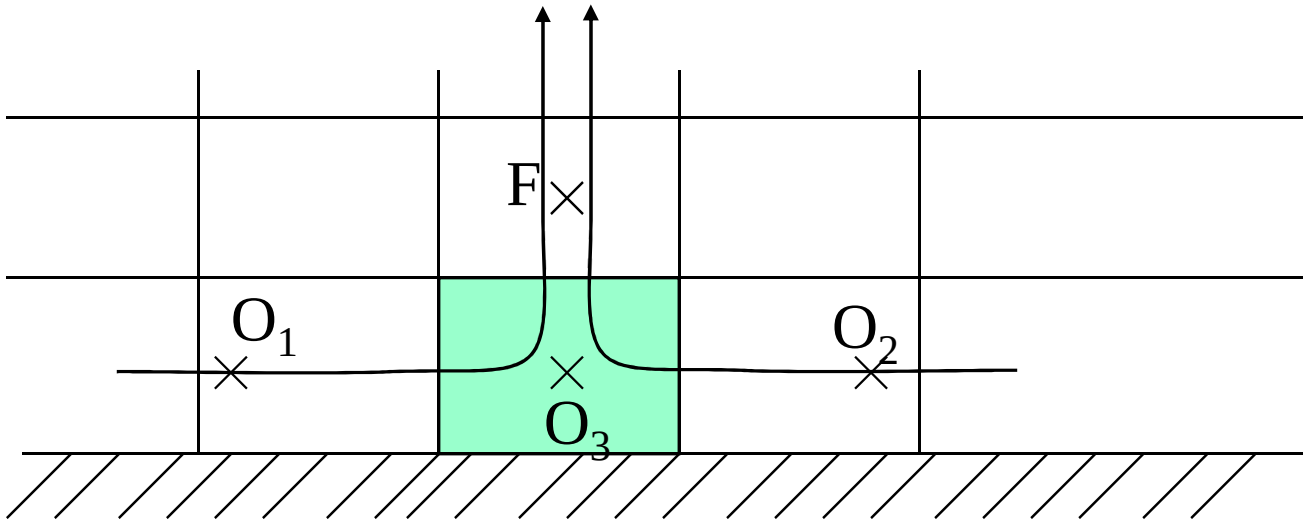
" all what enters the underneath cell must go out «



Seems mainly applicable to massic quantities

SL Diffusive approach

" The spreading of origin points means a grid-scale diffusion "



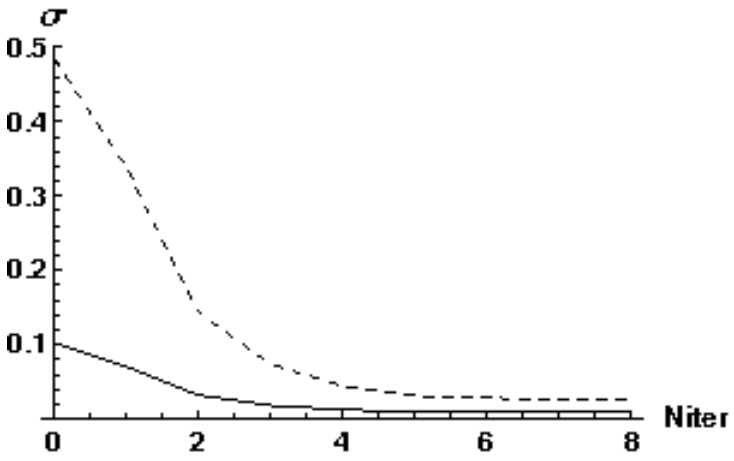
applicable to all transported quantities

Strategy for implicit system

- At mesoscale, tending to replace non-iterative SI scheme, by "more-implicit" iterative schemes.
- Côté et al. (canada), Bénard et al. (Aladin) , Wood et al. (UK), …
- "At convergence" → nice schemes (optimal stability, no dependence over ref state,…)
- But convergence not formally proved/provable

Strategy for implicit system

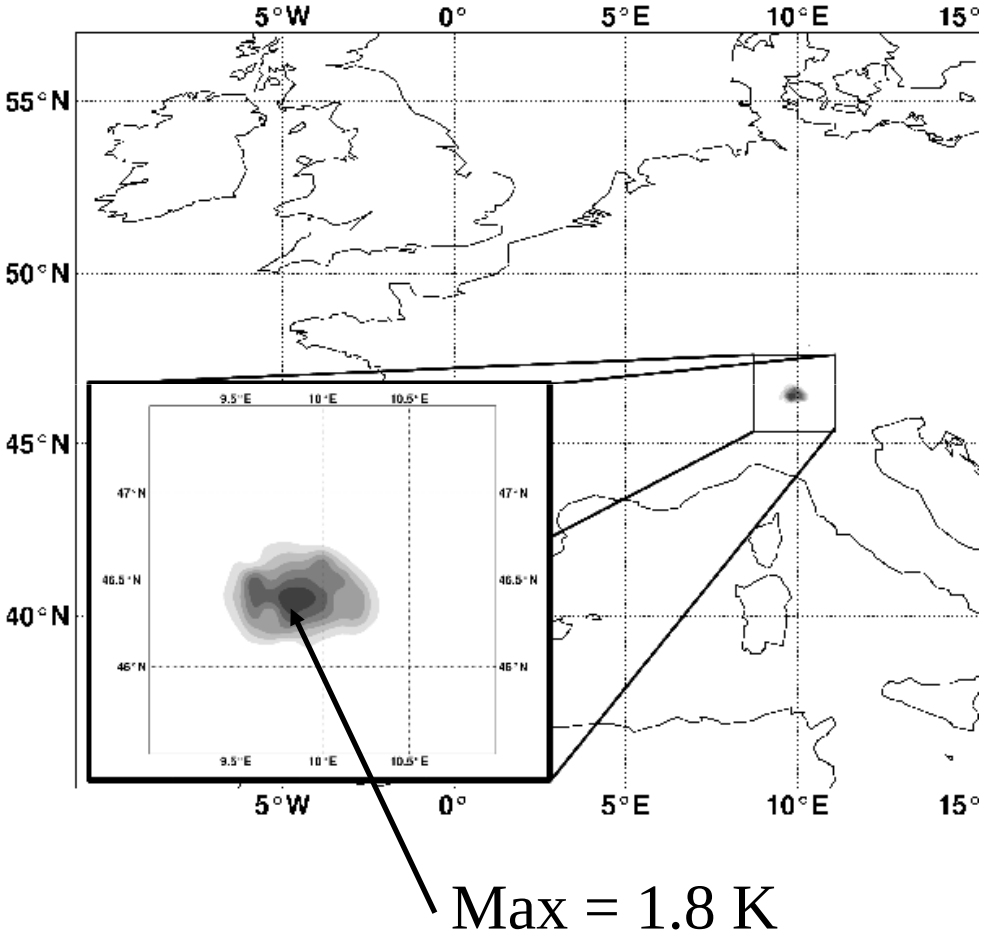
- lack of convergence of ICI (SI) scheme when physics is activated (H or NH).



30 experiments Dx=10km

σ = RMS between Niter and 10 SI-iterations

Strategy for implicit system

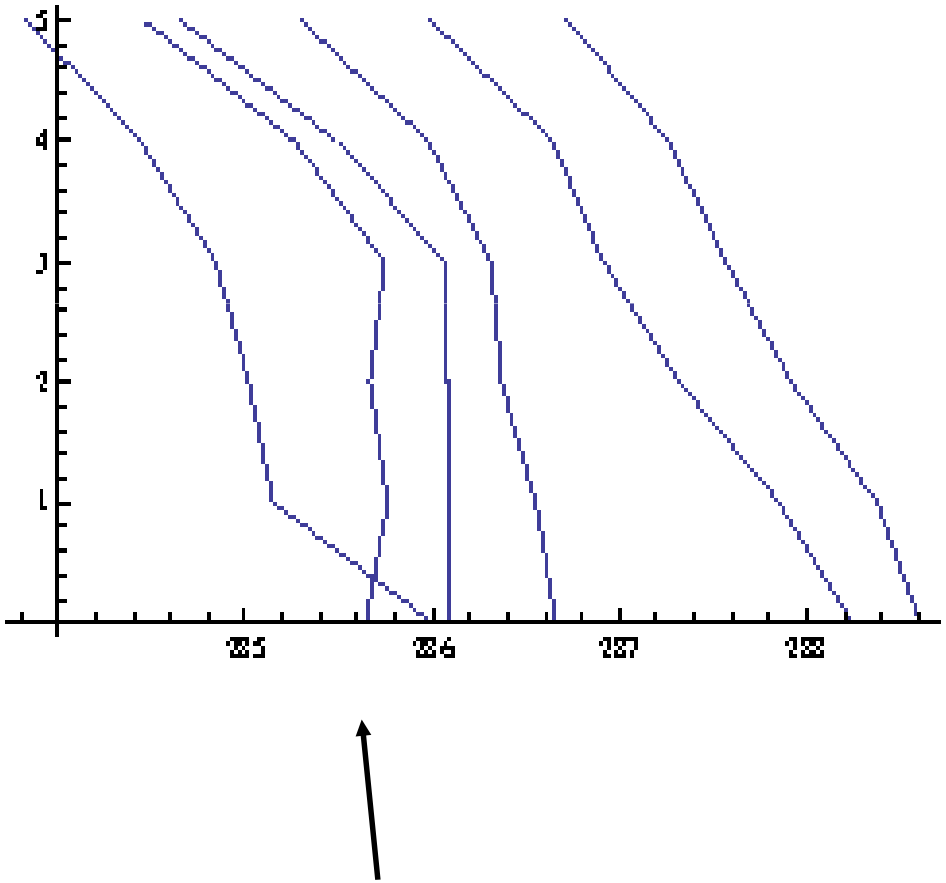


Usual local max diff = 0.3 K

Here:

experiments with largest σ

Strategy for implicit system



Stable Surface-Layer during daytime over high orography ???

Strategy for implicit system

- Suspected links with thermal profiles built by physical processes (e.g. large stability profiles)
- Reminiscent of ECMWF feature (fixer still in use ?)
- Reminiscent of analysed limitation in SI solution strategy.
- Deleterious impact not clear (hardly seen on maps)
- Warning for future use in special areas (Greenland?)