ALARO-0 Training Course

Wrapping-up and preparing KIT work

introduction for discusion

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- What we have learned in this week?
- List of needed improvements/developments
- Discussion

Aim of training

- Learn about new schemes
- Learn better scientific maintenance
- Networking

Lectures
Exercises
Working groups

ALARO concept

- Cost-efficient algorithmic solutions
- Use of existing well-proven method
- Multi-scale solution

A good methodology is needed

- Governing equations
- Coding rules
- Modularity

ALARO-0

Schemes following ALARO concept
- Governing equations
- SLHD
- Radiation
- Pseudo-prognostic TKE scheme
- Microphysical processes
- 3MT

Cascading approach, negative values correction
New prognostic variables cloud water and ice, rain, snow, TKE, *up-/down-draft velocity and mesh fraction, updraft entrainment rate, convective cloudiness*

Scientific maintenance

- Understanding scientific description/background/idea of the scheme
- Understanding code
- Diagnose correctly the problem
- Propose solution

- Documentation

Future work

in the short, long term

Governing Equations

- For the compressible case (NH)
  - projection of heat source in equation for temperature and pressure changes
  - full kinetic energy budget

Pseudo-prognostic TKE scheme

- new mixing length formulation
- generalization of relation between TKE, mixing length and turbulent exchange coefficient to be stability dependent
- further stabilization
- study impact of current shallow convection (Geleyn 1987)

- extend vertical diffusion ql/i

Radiation

- Modularisation of the code
- Improvement of gaseous transmission functions
- Work in the direction of ‘new’ intermittency
- Better aerosol model
- Intermediate price for the Voigt extension
- Improving the ‘multi-cloud’ aspect of the ‘cloud-band-model’

Cloudiness

- Unifying the cloudiness computation is a goal
- Remain pragmatic

Microphysics

- Comparison with other process parametrizations (ARPEGE one)
- Further validation

3MT (internal) validation

- Assembling bugs
- Diurnal cycle
- Sensitivity to mid-tropospheric humidity
- Cold air showers
- Drizzle

Topics for discussion

- Priority list
- Validation
- Networking
- Exercises
- Working groups sessions leftover
- Documentation
- Others

Priority list

- 3MT
- Link SURFEX – turbulent diffusion
- Cloudiness
- Radiation

focus point:
2m temperature in winter anticyclonic situation

Validation

- Well documented cases
  - Input files
- Initial conditions for operational implementation
  - Cycling (3Dvar, blending, first guess from previous run)
  - Initialization with value 0.
- Comparison with INCA precipitation analysis
  - Recent time period

Networking

- Toulouse is centre for IFS/ARPEGE/ALADIN/ALARO/AROME code maintenance
- Prague is centre for scientific, technical maintenance of ALARO code
- 9 ALADIN partners for scientific maintenance
  - 3 working group (continuity,flexibility)
- Interested people

to build up a flexible structure for supervision, reporting, ...

Exercises - discussion

Types:

- Algorithmic recognition (3+1)
- Bug search (6+1)
- Algorithm stability (3+1)
- Results interpretation (3)
- Modularity (3)

To put on web site?

WG session - discussion

- Documentation presentation (congratulations for a “homework”)
- ALARO-0 experience at services
- Other topics: time-step organization, shallow convection, calculating humidity convergence with finite differences

Documentation - discussion

Shape of documentation - harmonization

- Content depends on topic
  - Scientific background
  - Implementation in the code
  - Float chart
  - input/output variables
  - Tuning parameters
- One document ?
- LaTex format
- Available on web page
- Regular update

Topics for discussion

- Priority list
- Validation
- Networking
- Exercises
- Working groups sessions leftover
- Documentation
- SURFEX
- Time stepping