Introduction to ALARO-1 Working days

From ALARO-0 to ALARO-1

Neva Pristov

LACE area leader for physics

- **Short overview of ALARO**
- **Organisation of the Working Days**

ALARO concept

- **continuous transition from ARPEGE/ALADIN to AROME (continuity + improvements)**
- **to treat 'grey-zone' 3-7 km mesh size**
- **economical computation, numerical efficiency**
- **algorithmic flexibility → good basis for further developments**

ALARO-0 (mid 2005 - mid 2008)

- **Dynamics**
  - **SHLD, *NH***
- **Physics**
  - **New interface (governing equations)**
  - **Radiation: NER scheme, cloud optical properties**
  - **Turbulence: pseudo-prognostic TKE**
  - **Mountains: new GWD and lift scheme**
  - **Moist processes:**
    - **Full prognostic microphysics**
    - **3MT cascade**
    - **Prognostic convection**

Operational applications of ALARO-0

- Benefits exist for resolutions at the upper limit and in the middle of the grey zone
- Be (4km) is already at the initial targetting resolution
- Tests at many scales are ongoing, mostly with encouraging results, but with still too much divergence between the two versions at very high resolution

	ALARO-0 minus-3MT	Full ALARO-0
Cz	30/1/07	**4/6/08**
At	13/9/07	**7/4/09**
Sk	19/2/08	**19/8/08**
Hr	25/2/08	test
Si	X	**16/6/08**
Be	X	**15/1/09**
Ro	X	?/1/10

LACE project

Name: **Operational ALARO configuration at scales around 5km mesh-size (ALARO 5km)**

Responsible person: Neva Pristov

Responsible center: CHMI

Project duration: 2008-2010

50 person months

10 LACE scientists

ALARO-0 (mid 2008 - mid 2009)

- Deficiencies
  - Overestimation of cooling rates in lower troposphere
  - Diurnal convection cycle
  - Diagnosed cloud cover (overcast very rare)

  - Compensating errors between radiative forcing and moist physics
  - Formulation of the PBL representation too simple
  - Deficiencies in 3MT's behaviour at the finer border of the grey zone
  - The absence of a unifying concept for the cloud representation

ALARO-1
2009 – 201?

Moist PBL

3MT to higher resolutions

ALARO-1
2009 – 201?

Moist PBL

3MT to higher resolutions

- Radiative cloud properties and radiative fluxes computation
- Moist turbulence and diffusive transport
- Condensation/evaporation associated processes (including deep convection)

Short history

Working plan ALARO-0, Jun 2005, Bratislava

ALARO-0-without-3MT (oper Jan 2007)

Training Course ALARO-0 Radostovice, Mar 2007

Working plan ALARO-0 update, Mar-Jul 2007, Oslo

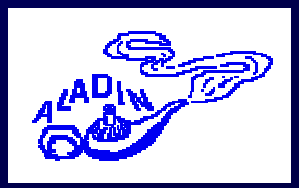
ALARO-0-3MT (oper Jun 2008)

Working plan ALARO-1, Jun-Oct 2009, Norrkoping

ALARO-1 Working Days, Feb 2010, Budapest

ALARO-1 Working Days

Overview of the programme



ALARO-1 Working Days

Transversal talks

- **generic equations and phys-dyn interfacing**
- **physics time step organisation**
- **3D turbulence**
- **DDH**
- **Object-Oriented Prediction System (OOPS)** restructuring the IFS

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Scientific talks

- Radiation
- Turbulence and diffusion (TOUCANS)
- Convection
  - evolution for closure
  - improving convergence of 3MT to CRM
- Phase changes
  - ICE3 equations
  - Rasch-Kristjansson large scale condensation in ALARO-0

ALARO-1 Working Days

ALARO-0 Experience

- Austria
- Belgium
- Croatia
- Czech Republic
- Romania
- Slovenia
- Sweden
- Turkey

(Slovakia, Portugal, France)

ALARO-1 Working Days

Exercises

- Microphysics code (APLMPHYS) by
  Jean-François Geleyn
- turbulence code by
  Ivan Bašták Duran

ALARO-1 Working Days

- **25 Participants**
- **13 countries**
- **ALADIN, LACE, HIRLAM, Russia**

- Newcomer from Turkey,
- *regional climate modelling*,

ALARO-1 Working Days

- **No time limitation for scientific presentations**
- **Time for questions (on the fly) and discussion**

- **Coffee (app. 30 min) and lunch breaks (90 min)**

ALARO-1 Working Days

Acknowledgements

- **HMS for hosting**
- **LACE for financial support**