The main outcomes and decisions from the final discussions on the ALARO-0 Training Course 26-30 March 2007, Radostovice, Czech Republic

notes taken by Doina Banciu

The last session, on March 30, 2007, "Wrapping up and prepare the KIT work" was chaired by Neva Pristov who made a short overview of the training course underlining its aims (to learn about the new schemes, to improve the basis of the scientific maintenance and networking) which have been followed in corresponding modules of the course: lectures, exercises and working groups.

The ALARO concept is oriented towards the cost-efficient algorithmic solutions and the use of existing well-proven method, offering a multi-scale solution, with a priority targeting on the so-called grey-zone. All this involves a coherent set of governing equations, specific coding rules and a high level of modularity-flexibility.

The components of the ALARO-0 version concern the governing equations set, the horizontal diffusion (SLHD), turbulent diffusion (a pseudo-prognostic TKE scheme), radiation, the microphysical processes (more sophisticated and efficient parameterisation including new prognostic variables - cloud liquid and solid water, rain, snow – all treated through the use of the PDF-based sedimentation method) a unified and coherent solution for the treatment of moist processes under the 3MT approach (cascading call of different parameterisations, prognostic convective updrafts and downdrafts, convective and resolved processes treated in a spirit of common handling of the water vapour resource, with downdrafts having their closure separated from the one of the updrafts).

The necessary further developments of the components were synthesized based on the lectures as following:

- **Governing equations**: extension to the compressible case (NH)
  - optional projection of heat source on 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 for their stability dependency
  - further stabilization of the scheme
  - study impact of current shallow convection (Geleyn, 1987); extend vertical diffusion to q_l/q_i within the LDIFCONS option
- **Radiation**
  - modularisation of the code
  - improvement of gaseous transmission functions
  - work in the direction of 'new' intermittency
  - better aerosol model
  - better intermediate price solution for the Voigt extension
  - improving the 'multi-cloud' aspect of the so-called 'cloud-band-model'
- **Cloudiness**: going towards unification of the different computation, while remaining pragmatic
- **Microphysics**

    - comparison with other microphysics packages (ARPEGE)
    - further validation
- **3MT**: validation and tuning of the corresponding L3MT-switch part (in the same manner as for the already done validation of ALARO-0 minus 3MT)
    - internal validation
        - find assembling bugs
        - diurnal cycle
        - sensitivity to mid-troposphere humidity
        - cold air showers
        - drizzle
    - extension to dry and to shallow convection in the longer term

The ensuing discussions mainly followed the above list proposed by Neva Pristov and amended 'on the spot' for some details:

1. Priority list for further developments

A general consensus was reached concerning the most important topics: 3MT and the problem of too cold 2m temperature forecast during winter.

3MT

It seems that the 3MT part of ALARO-0 is still containing a bug despite the recent bug-fixes; for a chosen date for tests, a convective area behind a cold front is missing in the ALARO-0 simulation when including 3MT. Similarly Luc Gerard does not find back all the precipitations he used to have on his basic 'Belgian thunderstorms' case.

2 m temperature

It turned out that it is a general problem not only of ALARO and it was encountered by all partners with the operational ALADIN integration.

Radmila Brozkova (see her presentation about implementation in WG session) carried out a test using the set up of ALADIN Meteo-France and checking the radiation budgets as well. Even with a more positive downward radiation budget for the ALADIN-France set up, the 2m temperatures are similarly too low. She also showed the evolution of 2m temperature verification scores during the last years; the analysis is very closed to the observed values but the forecast show a negative bias almost every winter. During the last 2 years this bias was more evident and during the last winter even 6h forecast encountered this problem. This 'earlier' behaviour could be linked to the change of climatic files in January 2006 and the whole problem could be more pronounced for a continental climate.

Probably some improvements could be brought by tuning the stability dependency parameters. "ZUSURIC/D" related values are promising candidates but the bug recently discovered in ACCOEFK has to be corrected first (see exercise E5/2), apart for testing changes in the sole value of USURIC.

Another problem concerns the externalised surface parameterisation. Jean-Francois Geleyn underlined the fact that in the beginning the use of SURFEX will be a black box and everyone have to accept the risk to get worse results on some aspects as price for a better average behaviour. Rafik Hamdi will work on this topic (stays in Toulouse and in

Prague are already planed), Luksa Kraljevic may be also available for a 1 month correlated effort.

A short list of ongoing work and what should be done in this year will be prepared by Neva Pristov and Jean-Francois Geleyn.

2. Validation

Two periods for interesting cases were agreed: March 2007 and June-July 2006. A comparison with INCA over Alps was proposed (especially for "banana-shape precipitation cases"). Austrian colleagues will provide the INCA analysis and Christoph Wittmann will contact Eric Bazile to perform the comparison (he kindly offered himself as volunteer some time ago).

Regarding the ALARO-0 operational implementation steps, reports should be send to Particia Pottier by local teams, as usual (the model is still ALADIN, ALARO-0 naming only the development concept and the R&D achievements).

3. Networking

The main feature of the structure for the future common work has to be the flexibility.

Since there are 9 declared Partners for the scientific validation of ALARO-0 and 3 established working groups for the ALARO-0 training course it seems reasonable to keep these 3 working group as the base for the cooperative work.

People charged with the preparation of the documentation for the training course will follow up the documentation and will be responsible for the reporting within the initial working group. Otherwise everybody is free to express his/her interest about a specific working group (A, B or C) by sending a message to Luc Gerard (A), Filip Vana (B) and Neva Pristov (C). The last three mentioned persons will coordinate the effort within the working groups; they will receive the information concerning the progress made by the partners belonging to their workgroup. A second person in each working group will filter the received information and distribute the relevant news: it could be done through messages to the ALADIN mailing list, contributions to the ALADIN Newsletter or by posting on a site. Volunteers are welcome for this second WG positions.

4. Exercises

The exercises were well appreciated by all the participants despite the fact that sometimes they were found too difficult or too complicated for the time reserved for their solving. In fact they constitute a training for the near future work. It has to be noted that they were more oriented to the skill of people working on physics.

Since the exercises were found very useful they will be put on the web in order to made them available for those who did not attend the course. Jean-Francois Geleyn and Martin Janousek will revise and clean them to this effect, most probably during May.

5. Documentation

The home work on documentation was successful although the contents was not prescribed in advance. Structure is depending on scheme characteristics and is let to author how to present it. A continuous update is necessary and this will be done inside the working groups (see item 3, networking). Documents will stay separated, an introduction and list of contents will be prepared by Neva Pristov and Jean-Francois Geleyn.

For the time being it was decided that the documentation about ALARO-0 will be hosted on the LACE web site. It was also agreed to ask Patricia to prepare a page containing information about the ALARO-0 training course (generalities, financing issues, outcomes) with link to the ALARO page at the LACE web site.