

Introduction

(scope, current status)

Piet Termonia



Scope (Friday)

- what is included into ALARO-1?
- the plan how to obtain ALARO-1 (short term)
- long term plan, LACE project
- validation of ALARO inside cycles
- ALARO with SURFEX
- continuation of 3MT-in-ARPEGE



Articulation of the scope of 3MT-in-ARPEGE (correct me if I am wrong)

- 3MT is based on the MT concept, which allows to close the scheme such that the detrainment is pure output (and this an attractive feature for the goal of a **M**ultiscale application, since the dynamics can take care of it and deposit it in another grid). This allows to make the scheme prognostic for the deep convective part (only) and, using the MT concept, the microphysics is used to close the deep convection. However this can only work if the resolved condensates are protected from evaporation/condensation, which has to be done statistically (Smith, Smith-Gerard, Xu-Randall)
- In PCMT one starts from the basic point of introducing 5 prognostic equations *including* from the resolved part. Once this is accepted, one has to call the microphysics twice, and one should not treat the protection statistically (since it can be in contradiction to the distribution over the different prognostic variables). Detrainment-entrainment are adjusted by a 2D NH model. **This makes PCMT by construction more super-parameterization-like than 3MT.**
- So the scientific issue is related to bulk vs. spectral. One could turn around the issue in a spectral vs. bulk issue:
 - MT plus bulk leads to 3MT
 - MT plus first-step superparameterization (2D NH) leads to, at least PCMT.
- At the technical core of the scientific set up is the (statistical) protection of the condensates and there should be no doubt on the set up before starting the tests: any (claimed) bugs should be fixed first, otherwise the experiment is useless.



Deep convection is at the core of ALARO, but

- **Where to go with deep convection?** Are we going to hectometric scales? A few ways to consider:
 - Testing basic scientific hypotheses, e.g.
 - Bulk vs. spectral;
 - Projection on the dynamics (back scatter);
 - How far does the gray zone reach?
 - Global models: ECMWF, ARPEGE.
 - Ensemble systems:
 - One might argue that one needs a parameterization of deep convection to “perturb” the deep convection. Also the problem is the stochastic nature of the triggering (cfr. Talks in Savona) and the best candidate for perturbing would thus be the triggering mechanism in a convection-permitting EPS.
 - Climate applications, where the problem of the backscatter is crucial to get the feedbacks (cloud-albedo, radiation) right.
- All of this points rather in the direction of a seamless system. **Does this seem a realistic idea?**



Cycling (one year outlook with focus on code stuff)

- CY39: September/October 2012**

- Contents of CY38R1-2 of IFS/ECMWF: new Fieldset Fortran code, some re-arranged Setup, horizontal SL interpolators made external from the IFS, Phase II of the overhaul of the code for observation operators, code adaptations to be able to run the OOPS 3D-VAR demonstrator on AMSUA-A radiances

- Some extras (Full-POS algorithm, externalization of coupling)

- Participation of at least 6 Aladin phasers expected + Hirlam**

- CY39T1: November/December or December/January 2012-2013**

- CY40: March/April and April/May (leaving some back-up window in June). Release of CY40 must be completed in June 2013 the latest. The exact timing will be decided at the June 28 IFS/Arpège coordination meeting.**

- Work on SL interpolators

- Obs-interpolation restructuring, leftovers

- Further break-up of setup routines (=> LAM)

- Cleaning of CDCONF

- Command line (part of it)

- GFL/GMV cleaning

- Enable more than one geometry

- Call only GPHPRE

- Optimization in the lateral coupling

Most of this is technical, especially in relation with OOPS.

Question: for ALARO-1, how much is already in cy38?

And for what is needed, we should consider phasing constraints.



PREP can change the geometry but it is inefficient
Fullpos could *inquire* Surfex data

ARPEGE
ALADIN
ALARO
With SURFEX

FA: upper air

FA/LFI: SURFEX

Original
geometry

(new) Interface Surfex-Fullpos

Full pos

PREP

Elements of PREP-SURFEX

Target
geometry

FA: upper air

FA/LFI: SURFEX

AROME
ALADIN
ALARO with
SURFEX

**CALL PREP science from Full pos
and write everything in FA files!**



Questions we might consider concerning code

- SC seen as turbulence vs. mass-flux? ACRANEB vs. FMR/RRTM? Different variation on the MT idea? **If we think in logical “stream” would this lead to blocks?**
- How much biodiversity is needed and how to organize the code? Some general remarks:
 - Codes developed by our community allow training of experts. Example: we do not have an influence on FMR nor on RRTM, so it is difficult to base a build a program on that that. But we need expertise on radiation!
- Everyone (that I spoke to) agrees we need to address the issue of APLPAR. This is related to the first bullet. We need an analysis, a plan and man power.... Question: reorganize it in blocks? Flexibility is good for clean scientific testing, but for some examples of distinct scientific streams the organization in blocks may be more useful (e.g. SC in turbulence vs. mass flux)?



TODO (in order of urgency which is not necessarily the same as priority)

- We need to test the physics-dynamics interface in AROME, see Daan's talk. **Who?**
- **Analysis of a rationalization of APLPAR/APL_AROME**
- Validation of the cycles. **Who? How to get organized, such that ALADIN and HIRLAM make use of each other better?**
- **Continuation of ICE3 in ALARO ... two-moments scheme**



TODO/open issues after ALW12

- Radiation:
 - ¼ e-type works. WHY? Could we consider climate sensitivity as a validation?
 - Validation (link with HIRLAM)
 - Comprehensive overview of Jan! Take care of it
 - Important message (for me): expertise. External expert Kristian Pagh Nielsen DMI, (RDT)
- TOUCANS
 - Tompkins for estimating SCC
 - Prognostic handling of L, kappa
 - **Link with SURFEX ... (what is needed in SURFEX?)**
- Precipitation (CSU is part ... modulo back up solutions)
 - Downdraft is an extension of the coded 3MT, under a switch.
 - CSU is consistent with the basic assumptions of 3MT? sigma_u relaxation, detrainment. Make list
 - Back up? Go back to ALARO-0 tuning? (non saturated downdraft is distinct).
 - Make “wish list” of needed variables for triggering
 - Rash Christjansson (Oct Nov person needed=
 - Work with PROC intermediate routine for adjustment
 - Transversal treatment of graup0el)AROME question mark
- SLHD is still part? (of course) but no update.



WP: packages

- Wrapping up ALARO-0 (calendar: this year)
 - See Radmila's talk 9km → 4km, increase of levels... Baseline. If Jan makes fast - progress, include it. In ALARO'1
 - Biases: setup coordinated "tuning" of Laszlo's work.
 - **Would someone coordinate this?**
- Integration of ALARO-1 (should enter the HIRLAM-ALADIN gliding plan + LACE plan! CSSI/HMG/Neva)
 - See science to be finished, see previous slide.
 - Two stages qm –toucans plus rad plus unsaturated downdraft, then rest (still this year). Question of the structuration.
 - Target resolution (linked to WK tests/EPS!) ↔ validation: 5km and 2 km. Lower? Forget about 10 km (this will be the standard ALARO-0 configuration0.



WP: packages

- Transversal
 - Test interface in AROME **who? (Mihalz)**
 - APLPAR/APL_AROME (we need to work out the **plan**, difficulty coordination with MF/HIRLAM) (CSSI/HMG?)
 - Radiation
 - SURFEX
 - CBR/TOUCANS
 - 3MT in ARPEGE (**help for Radmila**),
 - Stable PBLsee WP1, and present in HIRLAM meeting (3-5/12) Ivan
 - Validation (link with HIRLAM cfr. Work of Xiau + Laura!)
 - **Cycles validation!**
 - Cases: GABLES4, Sodankula, KNMI rtestbed (Cabuwaw=,
 -
 - RK scheme global aspects

