

**OOPS technical video-conference of 23 April 2015**  
**meeting number 5 towards CY42**

Participants (MF) : C. Fischer, K. Yessad, R. El Khatib, A. Mary, S. Martinez

Participants (EC) : D. Salmond, T. Wilhelmsson, O. Marsden, Y. Trémolet

Participants (LAM): U. Andrae, B. Bochenek

excused: P. Termonia, D. Degrauwe

## **1. Wrap-up of list of actions from last meetings**

1. Deborah and Stéphane shall liaise during the phasing process of CY42 in order to perform the move changes of Appendix C, sub-item C1a. => *the remaining moves will be implemented in v03 of the pre-cycle, at MF. Action closed.*
  - 1.1. Deborah to provide the exact list of routines to move
  - 1.2. Stéphane to do the moves during build of pre-CY42 in Toulouse
2. passing-by-arguments-list with Python script: => *see item 4 below. This action closed.*
  - 2.1. Olivier to send the passing-by-argument Python script to MF (Alexandre Mary will be the main contact person)
  - 2.2. both EC and MF to apply the script on the FIELDSET object, check the codes (code scrutiny and bit-reproducibility)
  - 2.3. resume discussion at 23 April video-conference (or by e-mail before) and take decision about implementation in CY42
3. LETKF re-sampling code in OOPS: Jelena to send out her slides or a technical note to EC (YT, DS) and MF (EA, CF). Exchange by e-mail or video-conference or later visit (MF).  
=> *See item 5 below. This action closed.*

video-conference about re-factoring of the observation operators: => *these items are taken over by the obs operator re-factoring task, or will be part of any further discussion in this context. These actions are closed as far as the IFS technical video-conferences are concerned.*

- Alan Geer would send an e-mail to MF, about the work towards a single call to COBSALL and the results of validation (contacts: Eric Wattrelot, Jean-François Mahfouf, Claude Fischer)
- evolution of the VarBC code: EC, MF and Hirlam agree to recheck in future video-conferences the requirements for making the VarBC code scientifically more flexible. Contacts at EC (A. Geer), MF (LF Meunier, V. Guidard), Hirlam (Ulf). Plus other scientists involved in VarBC aspects for input

## **2. Progress with CY42 at Meteo-France**

ECMWF sent CY41R2 end of March to MF, and the merge started in the very beginning of April. Stéphane reported that specific technical problems in the merge appeared due to the merge of the ASSOCIATE lines. On the whole, the full merge until first compilation succeeded required about two weeks, which is about twice the usual duration for this first phase.

Nevertheless, good progress had been achieved for the validation, especially using the LAM configurations as technical test-bed at MF. Bogdan Bochenek (Aladin phaser) was extremely active in this respect. As of today, MF had built a v02 of the pre-cycle and validated all adiabatic LAM forecasts (bit-identical with CY41T1) and Full-POS jobs. Forecasts with physics however display numerical differences which are not yet understood. Ryad reported he managed to port the pre-cycle on PC (gfortran) after extra debugging. One important change in CY42 (coming from CY41R1) is the use of new input files for the IFS radiation code (input parameters for optical properties and climatologies of atmospheric components like CO2 and O3). Deborah sent the new set of input files to MF, and those files are now being used in the technical validation.

For the near future, MF with the help of Aladin staff, will focus validation on the forecasts with physics (Arpège, Aladin, Arome, Alaro) and problems with the IO\_server.

Karim had listed 3 issues about the code design inpre-CY42:

- some array allocation for the surface fields should be made conditional => EC will implement this change (action Deborah to check with the surface team at EC)
- weights for the SLHD option had been duplicated, so that now both memory allocation and compute time are expected to grow in LASCAN and ELASCAN (option LSLHDHEAT). Ryad mentioned that this might be annoying for a future build of a RAPS configuration at MF, based on CY42. EC agreed to evaluate an alternative code proposal by Karim, and implement it either before or after CY42 (action Deborah with the support of Filip and Karim)
- many norm violations had been found by the norm checker. MF will clean those that are of high priority. Action Ryad with possibly the help of an Aladin phaser.

Given the good progress, it was agreed that MF will send the pre-cycle code to EC next week. So the short term steps are:

1. MF to build a v03 of pre-CY42 including a fix for the IO\_server, a fix for FP (filtering of fields in stretched geometry), cleaning of some norm violations, possibly any “update6” if provided by Deborah. Deadline for this build: Thursday 30 April, morning.
2. MF to send v03 to EC on 30 April or 4 May
3. EC will start testing IFS 4D-VAR and the recoding of the SLHD\_heat option
4. MF will continue to evaluate the forecast models with physics and the IO\_server

In this period, the master library for pre-CY42 would stay at MF/GIT. EC would send updates for code changes to MF when required.

### **3. Release of CY41R2 at ECMWF**

CY41R2 was released a few days ago. This cycle contains about all changes required for the cubic octahedral grid in the IFS.

CY41R1 should become operational around 12 May. The next high resolution IFS E-suite should be based on CY42R1.

At MF, the Arpège and Arome high resolution suites switched to operations on 13 April, and a new E-suite is being prepared for testing over June-December 2015, based on CY41T1 (plus extra changes: CY41T1\_op1).

#### **4. Script for passing derived types for CY42**

Olivier introduced his new Python-based script for passing by arguments variables and derived types in IFS. The script still requires some tidying-up and some adaptations to recently found problems. Olivier will send next week a cleaned version of the script to MF (Alexandre). The number of manual interventions in the code, after application of the script, had remained very reduced (in Olivier's tests: for 2 out of about 450 modified routines).

Alexandre tested a preliminary version of the script and one specific, remaining issue is to test and validate the script on LAM source code. Alexandre and Olivier will liaise on this issue next week.

Pending a final validation of the script at both EC and MF (ex for LAM codes), it was agreed that we could go ahead and confirm the application of the script for CY42 on the 5 modules that define the STATE object: YOMGMV, YOMGFL, YOMGMV5, YOMGFL5, SURFACE\_FIELDS\_MIX.

In addition, Tomas reported about his latest tests for running two IFS forecasts in parallel from OOPS. The two forecasts run but do not provide identical norms. Tomas suspects problems with the code of vertical diffusion. So far, he had to implement a few fixes, and those changes also could make their way into CY42 before declaration.

Eventually, it was agreed to hold another wrap-up video-conference about the status of technical actions for CY42, scheduled for Thursday 28 May (14h30 MET, 1.30pm UK). On the agenda:

- feedback of validation at MF (models with physics, IO\_server, norm violations)
- feedback of validation at EC: IFS 4D-VAR
- feedback of further code actions: Python scripting (incl LAM codes), surface buffers allocation, SLHD\_heat, 2 model in parallel testing

#### **5. OOPS related preparations of IFS**

##### ***5.1. status of Alan's note about cleaning in the obs operator codes***

Deborah had sent a preliminary version of the note by Alan Geer about cleaning the obs operator codes. This work should come as a first step for the re-factoring of the obs operators for OOPS. Yannick explained that Alan will finalize the note next week, and send out this version. MF and partners should have about 2 or 3 weeks then to read the proposal, for discussion at the next obs operator video-conference. Yannick will e-mail to all relevant contacts for setting a date for this meeting (MF: JF Mahfouf and Claude; Hirlam; Ulf and Jelena; Aladin: ?).

##### ***5.2. evaluate possible dates and venues for the next OOPS meetings***

On 11 March, a specific working week was suggested for preparing the obs operator re-factoring work. MF suggested to hold this WW in Toulouse on 1-2-3 July. Yannick agreed with this proposal, and indicated that the EC participants would be himself, Alan Geer and possibly Peter Lean. MF participants will be JF Mahfouf, E Arbogast and the staff from the OBS team involved in this

action. Hirlam participants will be Jelena and possibly one other staff. Aladin participants would probably be from RMI.

It was further suggested that we could try to append a one or half-day discussion about OOPS design aspects for the needs of Hirlam. This discussion would then focus on the design of OOPS objects and the implementation of new features in the C++ layer (LETKF, large scale constraint).

*Post-meeting note; one week ago in Elsinore, it was also agreed that Jelena will prepare a technical note explaining the formulations she wished to implement, and the technical analysis and problems she had faced.*

## **6. AOBs**

Deborah informed that EC had started considerations for long term scientific goals and recoding of the radiation codes for IFS. Robin Hogan (successor of JJ Morcrette for the radiation code development) is going to prepare an internal talk at EC about this topic. Deborah will send MF documentation about this discussion. MF shall evaluate whether this topic should be addressed already at the next IFS/Arpège coordination meeting (15 June). Contacts on this topic at MF should be Yves Bouteloup and François Bouyssel (besides Claude).

It was noticed that Filip Vana had sent earlier in the week an e-mail about this initiative, but this announcement and the content of the mail were fairly premature (asking for concrete options and possibly return listings or/and namelists for MF configurations). Such aspects may however become relevant in some mid-term future.

We had a short discussion about the use of the FTTW package in the IFS. This code is “free” software under GNU GPL license. For the people in the discussion (Claude, Deborah, Ryad), it however was not clear what precisely were the implications of using this code (commercial use for IFS products and others ?), neither for any inclusion in packages of codes that would be distributed to the partners. For the time being, the FTTW code is NOT part of the IFS/Arpège library and has to be downloaded specifically by anybody who wants to use it. Only the calls to FTTW are in the IFS, and have been put under a conditional macro `#ifdef`.

## **7. Next meetings**

next technical video-conferences:

For observation operator re-factoring: Yannick to check by e-mail with relevant participants

For update about CY42 and other business: Thursday 28 May, 14h30 MET / 1.30pm UK

*[IFS/Arpège coordination meeting (physical): 15 June 2015 (Reading/ECMWF) ]*

### **List of actions updated:**

***Next IFS technical video-conference.:***

1. build of CY42:
  - 1.1. MF to build v03 by Thu 30/04 and send this v03 to EC
  - 1.2. MF to clean some of the norm violations; further testing (physics, IO\_server)
  - 1.3. EC to test IFS 4D-VAR, implement conditional allocation of new surface buffers, new design of SLHD\_heat
  - 1.4. EC (Olivier) and MF (Alexandre) to liaise about the SPAM scripting (esp for LAM codes aspects)
  - 1.5. EC for any further testing of running two models in parallel with CY41R2 (Tomas)
  - 1.6. all, to wrap-up about status of actions and steps for finalizing CY42 in June: next meeting on 28 May
2. pre-OOPS obs operator coordination:
  - 2.1. Alan Geer to send out the final version of his note for cleaning the code
  - 2.2. Yannick to e-mail all participants and check for a suitable date for the next obs operator video-conference.
  - 2.3. continue arrangements for the obs operator WW in Toulouse (Yannick and Claude at this stage)
3. AOBs:
  - 3.1. Deborah to send information about EC's scientific and technical long term goals for the radiation codes in the IFS; MF to decide whether to have this item on the agenda of the forthcoming IFS/Arpège coordination meeting (15 June)
  - 3.2. Deborah and Claude to check about the implications of using/distributing the FFTW code (L-GPL licensed)