

OOPS technical video-conference of 16 October, 2014
meeting number 2 towards CY42

Participants (MF) : Claude Fischer, Karim Yessad, Ryad El Khatib, Alexandre Mary, Philippe Marguinaud

Participants (EC) : Deborah Salmond, Tomas Wilhelmsson, Mats Hamrud, Willem Deconinck

Participants (LAM): none

Stéphane Martinez, Etienne Arbogast and Yves Bouteloup (MF), Ulf Andrae, Jelena Bojarova and Daan Degrauwe were excused.

1. Wrap-up of actions from last video-conference:

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. **Open.**
2. EC will write a script to reorder the ASSOCIATE and the CALL DR_HOOK statements, and liaise with MF. The script will be applied while building CY42. **Open.**
3. Karim and Deborah shall liaise for the implementation of Karim's dynamics reorganisation in CY41R1. *Code was re-factored by Karim this summer, and sent to Deborah. It has been implemented in CY41R1 giving bit-reproducible results.* **Action closed.**
4. Tomas and Yves shall liaise about the encapsulation of model physics variables:
 - 4.1. Tomas and Yves to agree on the set of Arpège define MODULES, to be done at MF. **Open.**
 - 4.2. Tomas to send regular updates of the code in progress to MF (Yves, with Karim and Claude in copy). **Ongoing.**
 - 4.3. MF to perform the Arpège encapsulation work: Yves, Yann (link with some Arome code), Cécile (linear physics), Karim (link with dynamics), Etienne (use of scripts and some tests). The ideal goal would be to have this task done for CY41T1, by end of November. **Open.** *See below the specific discussion about progress and plans for the encapsulation work.*
5. 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). *This development is planned to enter CY41R2, and it is presently being tested in a long assimilation experiment to assess neutral meteorological results. The new code with only one single call to COBSALL is not bit-reproducible. Alan will provide a description of the change and of its numerical impact when providing the code branch for CY41R2, and the information will be sent to MF contacts.* **Open.**
6. Actions for ensuring that the IFS Fortran code will remain OOPS-compliant from cycle to cycle:
 - 6.1. Tomas will write down recommendations for general Set-up ordering, especially in order not to break specific Object-oriented rules (like a Geometry should be fully initialized without a Model dependency, so a Model can be defined from it). *This effort will be done once most of the Fortran re-factoring would be completed.* **Open.**
 - 6.2. New Unitary tests should be coded at C++ level for testing IFS objects (Geometry, Model, ...). *It was agreed that specific IFS-Arpège-LAM models oriented*

test programs that could be of interest were test programs where multiple MODEL objects are instantiated (at least 2). These test codes would be simpler to handle than if testing multiple MODEL objects within the 4D-Var algorithm. Open.

- 6.3. develop a piece of Python script able to scan the code and check that no USE MODULE statement is present / was recently implement, where it shouldn't be used (use passing by argument instead). **Open.**
- 6.4. *A new proposal was to write a document describing at a general level what the main object of OOPS-IFS were, and why they existed: GEOMETRY, MODEL, etc.*
7. 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. **Open.**

2. Status about model variables encapsulation:

Tomas has well progressed with the encapsulation of IFS model variables, and most of this work will enter CY41R2 (deadline in December). The work is now easier because many of the more difficult MODULE's had already been re-factored before, for CY41. Tomas has made some adaptations to the Python script, and he will send his latest version to MF (Etienne). Tomas explained that he has not done any logical re-organisation in the content of the MODULE's, everything is being encapsulated as is. He has rather systematically included the ASSOCIATE statement, so that the computational code remains quite unchanged, but local manual re-coding can be envisaged where scientists believe that the "Y%Z" naming references do not overload the code, and the ASSOCIATE's could be avoided.

The timing for then removing the MODULE/POINTER USE's, and replacing them by passing lists of derived types by arguments, was discussed. Tomas explained that this change would start progressively (not all in one go), and after CY42 only. Tests with the model forecasts from the OOPS layer could already start as soon as the variables encapsulation is completed, with its present form.

An open issue was which not yet encapsulated MODULE's MF should address, with a focus on Arpège variables. Since Karim had updated a list of done / not yet done MODULE's after CY41, it is agreed that Tomas, Yves and Karim shall liaise in order to (1) avoid duplicated work and (2) list the Arpège specific MODULE's that MF shall re-factor. If feasible in time, MF's target cycle would be CY41T1 (end of November), otherwise the changes would enter directly CY42.

Actions: Tomas, Yves and Karim to agree on list of MODULE's to be encapsulated at MF, and Tomas to send the latest version of the Python script to Etienne. Claude will circulate Karim's status note about encapsulation in CY41.

ECMWF indicated that there would most likely not be any CY41R3, as the schedule for CY41R2 had been shifted by about a month (Dec-Jan now), and the build of CY42 was to start in March 2015. MF asked that EC's contribution could be sent as early as possible in March, since for instance Karim likes to have enough time for early checks and potential pre-phasing. *GCO also might like to test compilation of CY41R2 on BULL.*

3. Discuss further possible code cleaning actions from Karim's document

Karim has updated version v11a of the cleaning document (sent to participants before the meeting). The issue was to discuss whether some cleaning could be taken on board in any interim cycle on the way to CY42.

The following items have been agreed, work will be done at ECMWF:

- appendix C1a (to be rechecked at the time of building CY42 as this item is about moving around routines / the precise list of IFS radiation routines should be provided)
- remove YOMSC2 and transfer the remaining variables to PTRSLB1/2 (appendix D, D4 first bullet)
- it was agreed that appendix A1 was useless and could be dismissed, as the code of concern would be recoded within the COPE project

4. Introduction to the Atlas library

Willem Deconinck introduced the development of the ATLAS library at ECMWF.

ATLAS will provide a flexible code for implementing structured or unstructured grids, by providing descriptive objects for metadata and data. In addition, MPI, I/O facilities, simple interpolation functions and a number of object-oriented facilities (for grouping of actions or objects, for instance) have been developed. The core code is in C++, with some specific F2003 interface and class definitions for binding ATLAS with an upper-level Fortran code. ATLAS is now being used within the Fortran code of PantaRhei.

ECMWF wish to install ATLAS as a passive library within the IFS in CY42. Exploratory work will start in order to assess the benefit of ATLAS for new IFS developments involving grid changes or specific data sets (possibly later, GFL). Exploratory codes will be further sent and discussed with MF when ready.

Claude will disseminate the slides by Willem within MF staff and to LAM contacts. Remarks and questions shall be addressed at a forthcoming meeting, when required (coordination meeting ?).

5. AOB

Jelena asked for a reviewing of her code for LETKF re-sampling in the OOPS framework, and implementation in the toy models.

Action: Yannick to liaise with Jelena.

6. Date of next technical video-conference

next technical video-conference: Thursday 22 January 2015 , 14h30 MET / 1.30pm UK

[IFS/Arpège coordination meeting (video-conf): 13 November, 1.30 UK time]

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 - 5.2. Test programs should be coded at C++ level for checking the multiple instantiation of MODEL objects of IFS-Arpège-LAM versions.
 - 5.3. develop a piece of Python script able to scan the code and check that no USE MODULE statement is present / was recently implement, where it shouldn't be used (use passing by argument instead).
 - 5.4. A new proposal was to write a document describing at a general level what the main object of OOPS-IFS were, and why they existed: GEOMETRY, MODEL, etc.
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7. Introduction to ATLAS: Claude will disseminate the slides by Willem within MF staff and to LAM contacts. Remarks and questions shall be addressed at a forthcoming meeting, when required (coordination meeting ?).
8. LETKF re-sampling in OOPS: Yannick and Jelena should liaise for a review of the code.