

Minutes of the 12 January 2017 technical video-conference

Participants:

EC: Deborah, Tomas, Olivier

MF: Claude, Etienne, Karim, Alexandre, Stéphane

Hirlam: Daniel (left later), Roel, Roger

Aladin: Olda (in Toulouse), Daan

Note: a few specific suggested actions have been **highlighted** for reminder until next meeting.

1. Status of pre-CY44 code and testing

- at ECMWF: Tomas had sent an updated version of pre-CY44 to MF on 30 Dec. This version does not yet contain the OOPS items, but it has been installed at MF for local testing. Now EC continue validating IFS 4D-VAR, which is for the time being crashing in the first trajectory calculation in the OpenMP loop in screening - most likely related to the fact that this loop contains MPI calls – as the problem goes away if LOPENMP_SCREEN is set to false. EC also have a few extra changes coming from the finalization of CY43R3, and the OOPS items (GMV/GFL/FIELDS for Increments, new trajectory code) are ready to enter as well.

- at MF (including CY43): MF are busy with validating the surface OI code CANARI on CY43 (screening and minimization seem OK after fixing a number of problems, for both ARPEGE and AROME). MF also have fixed the IO_server code for the ARPEGE/AROME version and validation of pre-CY44 will be resumed including this fix.

It was suggested that, for R&D purposes, specific MF and EC developers could get an access to the GIT repository of the partner centre. This would help at MF for frequently following the code updates in both the OOPS and the IFS GIT repositories, while EC could check at any time specific MF branches. Etienne is interested at MF; Tomas at EC. **Both EC and MF to check whether these accesses can be technically implemented (easily).**

2. Status of OOPS-related recoding to enter CY44 (New-fields, Trajectory, Varbc)

New-fields and trajectory codes for OOPS/IFS are ready to enter CY44. Roel is going to EC on 16 January, for about 6 months (until August), and he is going to re-factor the VarBC code as first priority (this work includes splitting the VarBC structure types into several smaller pieces, which will help simplify various areas in the IFS code, like the singular vector one).

EC are now running a simple (single-resolution, quasi-adiabatic, no LTOVSCV) IFS 4D-VAR from OOPS. A thorough scientific validation is now starting, probably with a focus on the quality of the humidity analysis increment (Sébastien Massart).

MF have prepared a set of interface Fortran-from-C++ routines, in order to enable the construction of PostProcessor objects from OOPS, using the Full-POS codes (basically those of CY43). These interface routines can be handed over to EC at any appropriate time for testing, or added later in CY45. **EC will check when they would like to start testing the PP-object and liaise with MF.**

MF furthermore have been running an updated code version of the ARPEGE OOPS 3D-VAR prototype with CY43+OOPS+fixes, but the results cannot thoroughly be compared to the Fortran-only result (too many differences in the libraries between this specific code version and CY43_main).

3. Next steps in the CY44 build, content and timing

A detailed timing has been agreed in the meeting :

- MF to send EC the code fixes for the ARPEGE/AROME IO_server implementation. For further information, contact is Philippe Marguinaud. Note : Olda and Anis Satouri (from Tunisia) have been building a merged code version with Tomas' send + Philippe's fix. *In week of 16 Jan.*
- EC to add their last changes from CY43R3, the OOPS items needed to run 'OOPS-IFS simple 4D-Var', the fixes for IFS 4D-VAR (hopefully ready soon), the IO_server fix (possibly with any necessary adaptation for IFS) into pre-CY44.
- EC would send this new pre-cycle version to MF *by about 30 Jan. or 31 Jan.*
- MF to finalize the LAM code phasing, resume ARPEGE and LAM testing (model, Full-POS) based on 'mitraillette'. MF to send the pre-cycle code back to EC *by about 22-23 Feb.* Note : in February, there will be 3 Aladin phasers available in Toulouse to help for this work (Olda, Bogdan, Boryana).
- CY44 testing and debugging work to continue in February
- EC and MF to officially *declare CY44 by end of Feb.*

Note : MF would probably not add the fixes for running the ARPEGE and AROME assimilations from CY43/CY43T2 in CY44. Perhaps not even CY45. This could simplify the code exchanges and the timing in the coming weeks, while MF would have to manage a parallel code branch for their assimilation perhaps until CY45T1 (autumn 2017).

4. Outlook towards CY45 (SPAMMING)

It is likely that the VarBC re-factoring will mostly enter this cycle CY45.

But the major change will consist of SPAMMING the MODEL code. For reminder, this change means that a large number of USE MODULE shall be replaced by passing-by-arguments of data derived type structures. Olivier is now finalizing the Python script that should do much of this job. He is soon going to apply his script to IFS, a necessary step for evaluating how much extra manual intervention will be required. The data derived type structures have been organized within two layers, a top layer for defining the MODEL as a whole, and an intermediate layer where several « big » components appear encapsulated separately (dynamics, physics, diagnostics etc.).

Olivier had sent Claude, before this meeting, a list of ARPEGE/LAM routines called from HOP, and which use specific model MODULEs (mostly from physics). Those USEs should eventually be taken out since otherwise the routines would not compile anymore as module access will be removed. However, the Tomas trick method could be left in here until the re-factoring of this part was done - hopefully in CY45 or soon after. Indeed, the OOPS specs forbid that MODEL variables are being directly addressed inside the obs. Operator codes. At EC, there will be some further discussion between Olivier and Alan Geer, in order to decide of an appropriate recoding for the IFS case. **Code examples will then be sent to MF for evaluation, followed probably by an exchange of questions/comments at the upcoming technical meeting.**

Olivier expects to have an applicable SPAMM script in February or early March. **He will make an IFS/ARPEGE SPAMMed code version available to all participants, so that they can have a look into this code and make comments (Karim, Yves, Alexandre, Daan etc.).**

It was left open whether the script would have to be applied, separately, to the LAM codes.

5. AOB

Claude would be interested to get a suggestion for a bibliographical reference of the IFS parallelization strategy, ideally including MPI/OpenMP aspects as well as the NPROMA paradigm. Deborah will check with Mats.

Next meeting: technical video-conference planned for Thursday 16 March 2017, 14h30 CET / 1.30pm UK.

Provisional agenda: feedback about SPAMMING the code; exchange about the MODEL/HOP passing of information (how to concretely avoid the dependency of the obs operator w/r to the model object); preparation of CY45 (steps and timing); feedback about OOPS tests at EC.

Claude.