

**OOPS technical video-conference of February 20, 2014**  
**meeting number 6 towards CY41**

Participants (MF) : Claude Fischer, Karim Yessad, Alexandre Mary

Participants (EC) : Deborah Salmond

Participants (LAM): Daan De Grauwe (RMI), Jelena Bojarova & Ole Vignes (Met.no)

*Tomas Wilhelmsson was missing as he's just become the happy father of a baby-girl. The participants warmly congratulate and wish all the best to the young Wilhelmsson staff !*

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

1. Deborah and Stéphane shall liaise during the phasing process of CY41 in order to perform the rename/move changes of Appendix E in the most optimal way. The Aladin “ald” routines will be changed in MF during the same phasing. OPEN
2. Geometry/Setup/OOPS-IFS forecast/STEPO\_OOPS code changes, and work at MF on an OOPS-Arpège prototype forecast. MF will give feedback about the Arpège prototype porting to EC at the next video-conf. CLOSED
3. 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) OPEN
4. encapsulation of Model-related global variables (automatic script and ASSOCIATE statement):
  - 4.1. Tomas to write Python script for encapsulation and association of variables => REFORMULATED: Tomas and Etienne to liaise and agree on a finalized form of the Python script
  - 4.2. all: test script and check resulting code => OPEN
  - 4.3. resume technical discussion at next video-conference => CLOSED
  - 4.4. if this implementation is accepted, agree on which modules (list) should be refactored this way => OPEN
  - 4.5. address the cycling and calendar aspects at the IFS/Arpège coordination meetings => CLOSED
  - 4.6. NEW: resume discussion and possibly agree on what's to be done, at the March 18 coordination meeting
5. cleaning in SUVAR and SUDYNA:
  - 5.1. Karim will send a minimal list of Setup cleaning proposals for after CY41 to EC => right after this meeting, Karim resent a technical note describing his suggested extra Setup reorganizations/cleaning. Karim shall send a specific e-mail to EC listing all Setup cleaning he suggest for EC to do in CY40R2. Others would be done by him during the merge of CY41.
  - 5.2. Tomas will write down recommendations for general Setup 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). OPEN
  - 5.3. NEW: Karim raised the issue of where exactly TSTEP/NSTOP and related parameters should be set. Perhaps somewhere between the set-up for a Geometry object

and a Model object. This shall be further discussed, and later implemented, after CY41 is completed.

6. evolution of the VarBC code:

- 6.1. Ulf to send e-mail to EC and MF about which issues Hirlam found
- 6.2. MF informed the partners that they will study how to have more flexibility in the choice of the VarBC predictors in Arome (with respect to Arpège). This may lead to proposals for implementing some flexibility. MF will inform EC and Hirlam when ready. Contacts in MF would be Louis-François and Vincent Guidard. At EC, Alan Geer. Note: Jelena mentioned that Magnus Lindskog should be kept in the loop of discussions about the recent code phasing between MF and Hirlam, in coordination with EC. Claude confirmed there had been e-mail exchanges between Roger Randriamampiana, Paul Poli and Patrick Moll. Jelena will check with Roger; Claude will pass message in GMAP.

## **2. Status of the work on OOPS/Arpège prototypes at MF:**

Before the meeting, MF sent a short technical note describing the code changes that were necessary for implementing an Arpège 3D-Var run from the OOPS layer with CY40 (this was the work by Etienne Arbogast). EC expressed their satisfaction to see that an Arpège version of the OOPS 3D-Var prototype was indeed made possible, and asked what amount of work this action required. MF evaluated this particular effort to about a half time occupation over four months (~ 2 man.month). The question whether the corresponding code changes should enter CY41 was raised, and kept open.

Action: MF to prepare a set of routines with the code changes required for the Arpège 3D-Var prototype, based on CY40\_main, and send those to EC (Etienne/Claude => Deborah). EC to check the changes and give some advice before a decision is taken of what can enter CY41. Furthermore, check whether the changes enter via CY40R2 (deadline mid-March) or while phasing CY41 (in Toulouse).

MF has started work for implementing an Arpège forecast from the OOPS layer (based on an older version of CY40+TJK branch). Alexandre Mary is being working on this. He was able to run a test Arpège forecast with bit-reproducible norms with CY40R1, CY40R1+TJK/L\_OOPS=.FALSE. and CY40R1+TJK/L\_OOPS=.TRUE. (all run from Fortran).

Several specific Fortran code changes had to be made however. At present, work goes towards running the test forecast from the OOPS/C++ layer. Various diagnostic output facilities had to be switched off for this purpose (CFU, XFU fluxes, ISP model-to-satellite images). Write-out of Arpège historical files was enabled in STEPO\_OOPS (but is this OK with respect to OO design?). DDH computations were kept switched on, and seemed to work technically. The validation of the C++-driven prototype is in its very first stages. As the time step of the OOPS-Arpège forecast had to be adapted to an integer value (see below), a rerun of the Fortran-Arpège reference is necessary (based on TJKv8). This forecast however crashed at first trial. Note that the OOPS forecast ran technically. Investigations are ongoing.

Among the aspects of concern: the time step value is repeated in the XML config file (in addition to the Fortran namelist). In the XML config file, only integer values are possible for the time being. For the validation of the C++-driven forecast, a careful check of the spectral and gridpoint norms in

the output listing should be enough (we expect bit-reproducibility with respect to the Fortran-driven version).

Action: keep everybody informed about progress, and discuss which code changes could enter CY41 (Alexandre, Claude, Deborah, others).

### **3. Status of CY40T1, CY40R2 and preparations for CY41**

MF informed about the progress of the construction of CY40T1 (joined cycle with Aladin and Hirlam). A version 4 of the pre-cycle 40T1 had just been built (Feb 19) and it is expected that all major model configurations are now validated (Arpège, Aladin, Arome, Alaro; models with or without SURFEX). Specific investigations had taken place in order to well understand the numerical impacts of the new SURFEX V7.3+ in Arome results, and the side effects of the future physics/dynamics interface code. Furthermore, Full-POS and change of geometry configurations ((e)e)927 should be fine as well. CANARI/OI had also been well fixed (though there might remain some details to be checked). MF expects that validation of the variational assimilation with 4D-Var Arpège and with 3D-Var Arome can start in March, however probably too late before declaration of the main cycle (which is expected at the latest on the 2nd week of March).

Deborah gave an overview of the content of the next interim cycle at EC, CY40R2:

- changes for 40R1 operational suite at EC
- the OOPS branch “TJK” version 8 (last send by Karim) (incl ASSOCIATE from python script for YOMDIM, YOMDIMV, YOMGEM, YOMMP)
- porting changes for CRAY
- RTTOV-11
- some additional changes for satellite obs: (1) in coordination between N. Bormann and LF Meunier; (2) by A. Geer
- increased flexibility for SL/dynamics options suggested by Karim after discussing with Sylvie (LSETTLS & LPC\_NESC)
- cleaned interfaces inside the MPL library
- additional GPHPRE calls from Karim's V9b
- F. Vana's OOPS trajectory branch

EC will send CY40R2 for scrutiny to MF in mid-March.

CY40R1 is operational on IBM. The start of acceptance test of the CRAY had to be slightly delayed, which may cause a prolongation of the operational period of the IBM machine by about 3 months.

### **4. AOB and next meetings**

Deborah explained that EC will try in future to regularly test compilation and execution of the IFS code with the Intel and gfortran compilers, both available on their new CRAY. Claude indicated that MF and Aladin had made efforts towards portability of CY40T1 on IBM (Olda Spaniel and Ryad El Khatib, resp. SHMU/Slovakia and MF).

The next IFS/Arpège coordination meeting is by video-conference on March 18.

A technical video-conference is planned for May 13 (1.30 UK, 14h30 CET), for an update on progress with phasing of CY41.

The next physical IFS/Arpège coordination meeting will be held in Toulouse on June 2, 2014. This meeting is back-to-back with the OOPS Steering Committee (June 3).

### **List of Actions:**

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2. 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)
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  - 3.4. resume discussion and possibly agree on what's to be done, at the March 18 coordination meeting
4. extra cleaning in set-up for CY41 or just after:
  - 4.1. Karim shall send a specific e-mail to EC listing all Set-up cleaning he suggests for EC to do in CY40R2. Other items would be done by him during the merge of CY41.
  - 4.2. 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). OPEN
  - 4.3. Karim raised the issue of where exactly TSTEP/NSTOP and related parameters should be set. Perhaps somewhere between the set-up for a Geometry object and a Model object. This shall be further discussed, and later implemented, after CY41 is completed.
5. About the Arpège 3D-Var prototype: MF to prepare a set of routines with the code changes required for the Arpège 3D-Var prototype, based on CY40\_main, and send those to EC (Etienne/Claude => Deborah). EC to check the changes and give some advice before a decision is taken for what can enter CY41. Furthermore, check whether the changes enter via CY40R2 (deadline mid-March) or while phasing CY41 (in Toulouse).
6. About the Arpège forecast prototype: MF to keep everybody informed about progress, and discuss with EC about which code changes could enter CY41 (Alexandre, Claude, Deborah, others).
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.