Draft minutes of the tech' videoconf meeting of 6 Feb 2018

Participants: Deborah, Tomas, Olivier (EC), Claude, Stéphane, Alexandre, Ryad, Karim (MF) Roel, Roger, Daniel (Met.no/Hirlam), Daan (RMI/Aladin)

1. Start of merge CY46; details about build process

Merge started last week using CY45T1 and CY45R1+OOPS from MF and EC, resp. A number of early code issues have been addressed, before or during this meeting: compile issues fixed (Stéphane and Deborah), move code of the Augmented Control Vector (EC), passing dummy arrays with changing strategy (from automatic to allocatable and back which can become confusing) and old (wrong) dimensioning in CALL_SL probably as a result of merging scientific branches from before CY45 (problem found by Karim), use of LSLADREP, inconsistent definitions of new fields in SUAFN1/2/3.

About SUAFN1/2/3, and more specifically SUAFN1, Karim stressed that this was a usual trouble-making part of any new joint cycle. *A very typical and repeated bug was that new fields were created only under one condition, either LARPEGEF or .NOT.LARPEGEF, which can easily generate problems in the other conditional case. It is therefore warmly recommended to implement any code change in a symmetric manner for both conditions*. This is potentially an area for re-factoring in the mid-term, and Ryad noted that he was considering some object-oriented fashion to re-factor this part of the FP setup (in FORTRAN).

EC asked about reverting back some array allocation specs in FP in order to avoid overusing stack memory (agreed with Ryad); Deborah stressed the need for MF to carefully check the initialization of NOBSHOR in SUGOMS as its setting had been recently revisited and modified in the code for CY45R1 (it was not clear whether the new code was perfectly reproducing the test cases for Arpège and Arome as there are many IF TESTs to be evaluated in this piece of code).

Landmarks for the upcoming steps of the build have been agreed:

1. MF to continue initial checks of Arpège “mitraillette” tests and send early pre-cycle version to EC by Friday 16 Feb. EC will start their own technical testing asap, including early OOPS-IFS tests.
2. MF and EC to exchange about any fixes found here or there. For the next pre-cycle version, it will be important that EC send their fixes to MF.
3. MF to make an upgraded version of pre-CY46 in the first week of March, including Karim’s pruning of deep atmosphere code in the dynamics, Ryad’s progress for Full-POS in OOPS, some possible fixes from CY45T1 for specific forecast tests (broken for the time being in CY45T1, see Appendix for details), LAM phasing if ready.
4. MF and EC to resume testing.
5. Declaration of CY46 is expected for end of March or beginning of April.

For after CY46, EC informed they would start building a CY46R1 in the end of May. One important goal remains to complete the implementation of all OOPS objects needed to run IFS 4D-VAR with operational-like options (See §3 below).

MF will clarify their own plans about their next interim cycles asap (See §4 below). A complete overhaul of content and timing of the next cycles is planned for the physical coordination meeting on Mon 19 March in Toulouse.

2. OOPS-IFS status in CY46 (or, for now, CY45R1+OOPS)

- status of re-factoring (what will be ‘in’): SCATT obs, VarBC for AIREP, ability to use different time steps in OOPS-IFS models (Part I), TOVSCV (though not yet tested)
- status of validation (which objects and which confs work): EC explained they still need to fix a few bugs in OOPS-IFS (VarBC, all-sky radiances). Those are difficult to track down and slow down the OOPS-IFS validation now, although this is part of the expected technical work. Peter Lean has started to test OOPS-IFS 4D-VAR in the operational truncation and ran into technical problems (crash) to be investigated soon.

3. OOPS progress and problems (not directly linked with CY46)

- status of re-factoring aimed for after CY46: VarQC, constrained VarBC (aka C-VarBC), weak constraint term (stratosphere), time step and time information handling (Part II). EC informed that they would also work on a Restart facility which is being asked by their Operations. The Restart would consist of enabling to resume execution of the OOPS-IFS binary from the start of any outer-loop Trajectory. Note: as explained in previous meetings, the initial Traj (“Traj0” or Screening) and the final one will be run from different instances of the binary files. Peter Lean has started to evaluate running Traj0 with OOPS-IFS (if ready, necessary code adjustments would enter CY46R1). EC also informed that they intend to start working on the optimization of OOPS-IFS in CY46R1.
- MF questions : MF asked whether tests had been done for OOPS-IFS 4D-VAR with running the different minimizations with different binaries (thus handling the outer loops at scripting level as with classical IFS). EC explained they won’t try this, but it probably would be feasible after adapting the C++ codes a little.

4. Progress on assimilation testing at MF - CY43T2

MF have just been creating a new version of CY43T2, labelled “CY43T2_bf.04” in their GIT repository. MF are now running long assimilation experiments (Arpège 4D-VAR and Arome 3D-VAR) for further scientific and technical evaluation. For now, it is very likely that additional fixes to the code will be needed (suspicious values of obs-minus-guess for some radiances, significantly too large number of AIRS data kept after screening, fixes for using Surfex V8 in CY43T2 as in operations’ version V7.3 with CY42). For the time being, these tests are being run using OLIVE experiments based on CY42_op2, with specific changes here and there in order to point towards CY43T2 binaries and input files (namelists, PGD files etc.).

Claude explained that the content and timing of the next interim cycles in Toulouse shall be further addressed with MF management asap. One possible scenario could be to build a technical-only cycle (CY46T0) with a focus on validating assimilation configurations. This effort would already require to re-phase (after thorough code analysis) the re-coding and the fixes from CY43T2.

The possibility to build CY47 already in the autumn 2018 was discussed in the meeting. To be further assessed on 19 March.

5. AOB

- HIRLAM have started to install CY43T2 on the CRAY at EC in order to perform early technical evaluation. MF will try to provide information about log-files and namelists of their Arome tests.
- Note: a somewhat parallel request came from ALADIN partners (CHMI).
- A brainstorming discussion took place about the future place and handling of NCONF,

which is the configuration parameter whose role will soon become less clear as OOPS objects will take over in the IFS codes. Other high-level keys probably should be re-assessed as well (LIFSTRAJ, LIFSMIN, LOBSC1, etc.). EC explained they have started to consider removing SU0YOM[A-B] and replace them by specific calls to the Constructors of the OOPS-IFS interfaces. This could help keeping the FORTRAN code changes compatible with OOPS requirements, and ease the parallel maintenance of classical- and OOPS-IFS versions. No decision yet however. Claude suggested that this proposal should be further discussed in the 19 March meeting as the change would affect any/many configurations.

6. next meetings

next technical video-conference: tbd, 14h30 CET / 1.30pm UK

next physical IFS/Arpège coordination meeting on Monday 19 March 2018 in Toulouse

next video-conference IFS/Arpège coordination meeting: after 19 March meeting.

Appendix: status of validation of “mitraillette” tests for CY45T1_main.01 (MF GIT label)

most of the “mitraillette” configurations provide either reproducible norms with respect to CY45_main, or with accepted numerical differences. A small number of tests were not working at all in previous cycles, and thus still are not working yet …

specific (new) problems appeared, but time or resources were lacking to fix them before declaring the _main version:

- consistent definition of some surface fields around SU_SURF_FLDS (for instance neutral wind components required for SCATT obs operator for Arpège+Surfex). In the reference mitraillette tests, this causes crashes in some FP jobs, as well as in the so-called Aladin+Surfex test.
- Step 2 of Digital Filter Initialization (DFI) gives wrong norms for the LAM mean wind profile components (this is the step LINCR=.TRUE.).
- norms of the LAM Alaro configuration are suspicious, probably wrong. Investigations are ongoing (Bogdan in Krakow and Olda in Bratislava). It is very likely that this problem is not affecting other model configurations like Arpège, Aladin or Arome.
- Fix prepared for the encapsulation “à la OOPS” of the Coupling Update Frequency diagnostic field (aka CUF or MCUF) for Arpège/Aladin.