

IFS/Arpège Coordination Meeting Minutes

From: Claude Fischer (MF)

To: (ECMWF) HR, RD Division & Section Heads, Deborah Salmond, Anne Fouilloux

To: (Météo-France) Arpège diffusion list

To: (ALADIN) Filip Vaňa

To: (HIRLAM) Xiaohua Yang

File:

Subject: IFS/Arpège video-conference held on November 4th 2010: from CY37 to CY38.

Participants:

Météo-France: Alain Joly, Florence Rabier, Claude Fischer, Karim Yessad, Stéphane Martinez, Ryad El Khatib (at ECMWF)

ECMWF: Jean-Noël Thépaut, Anne Fouilloux, Deborah Salmond

ALADIN: none

HIRLAM: none

0. Adoption of the agenda

adopted

1. Approval of Minutes of last meeting and Action status

Minutes of last meeting (June): Claude will send the updated minutes from June 24th to all participants for a last check.

1. *ECMWF will write a short note about how to properly add new fields in the GOM arrays => can be done as a consequence of the cleaning in OBSHOR & GOM-arrays (to be finalized soon after CY37); action continued*
2. *GRIB_API performance issue on vector machines (NEC/SX): Enrico Fucile (ECMWF) shall liaise directly with NEC support and test on MF's NEC (note: this work of optimization will also be beneficial to other partners having vector machines). Another action is on ECMWF to provide a simple test program for assessing performances (read and write a GRIB file a number of times with low truncation data + one T1279 data set). => EC has sent MF a*

wrap-up program to test GRIB_API on the NEC. Version 1.9.4 contains vectorization aspects for NEC, but this version has poorer performances on the IBM/C1A than earlier versions. ECMWF will provide a more stabilized V1.9.6 (or 1.9.7) which should contain further code adaptations in order to keep the level of vectorization while improving the performances on the IBM. MF has noticed still several changes between recent versions in the GRIB reference tables (i.e., the link between GRIB numbers & identifiers on the one side, and field numbers on the other side). The reference version for GRIB_API should become stable with this respect => ECMWF will keep MF informed about the status in the new versions. Action continued.

3. *MF will prepare an updated version of the Fortran code coding guidelines (in preparation to OOPS) => action to be resumed in October. Olivier Rivière will then take over the coordination of the Fortran coding guidelines from Ryad. => discussions have started at MF (Olivier, Claude, Ryad, Karim), and should be finalized soon. MF will send the outcome of these discussions to ECMWF (contact at MF remains Olivier Rivière); action continued.*
4. *ECMWF will prepare C++ coding guidelines in preparation for OOPS => open action (not urgent)*
5. *Concerning a network-accessible SCR, ECMWF is considering GIT for some code (OOPS toy). MF has no plans so far to move from clearcase, but it shall investigate what would be feasible (action on MF). => discussions are ongoing both at MF and at ECMWF about their respective future SCR system. MF is considering GIT for its Vortex project (but not yet confirmed; an alternative could be Subversion); ECMWF is considering the pros and cons of GIT versus Perforce. This action is continued as a transversal one: MF and ECMWF to keep in touch about their plans on SCR tools and use of GIT.*
6. *action on ECMWF & MF: organize a prolongation of Eric Sevault's stay in Reading during the NEC User seminar beginning of November, for further introducing Vortex to ECMWF system staff => Eric indeed is at ECMWF for the HPC workshop; discussions about Vortex shall take place during this week. Action closed.*
7. *coordination for OOPS: The task analysis and GANTT charts should be reviewed during the summer (coordination by Claude and Jean-Noël). Complete list of actions:*
 - 1.1. *revise the task analysis and GANTT charts*
 - 1.2. *MF to find at least one contact for design questions and for following the toy model developments*
 - 1.3. *start the bottom-up work (1. classification of elements first, followed later by 2. re-arrangement of code then 3. modularization):*
 - a) *observation operators and GOM data structure => one contact person to be designated at MF*
 - b) *"Jb" including questions about geometry (spectral versus wavelets, global versus LAM) => one participating staff from the LAM community (to be checked with Aladin and Hirlam as well)*

=> this action is closed. The discussions shall be further arranged during the OOPS meetings or specific discussions between MF and ECMWF. See also **Item 3** below.

2. status of preparation of cycle 37:

status of activities & difficulties at MF:

- ongoing validation or known problems: TL798L70c2.4 with in-line FULL-POS for 5 domains (problems in B-level parallelization); Arpège 4D-VAR => in progress but still in the early stages of testing. A quite good validation could be performed on the side of model forecast configurations (Arpège, Alaro, Arome, Aladin), also thanks to the efficient support of the Aladin phasers (O. Spaniel, A. Bogatchev, M. Jidane)
- GRIB_API => MF has been having some difficulties or hesitations on the proper way of installing the GRIB_API libraries. The difficulties came from the still changing features from one version to another and from the handling of “templates”,
- code for predictors in the assimilation (emails between Deborah & Vincent) => completed discussion => the pre-CY37 contains the agreed code,
- coordination about the calls to OASIS coupler interfaces (link with MF's Climate group) => calls to OASIS coupler interfaces have been introduced on the side of ECMWF in pre-CY37, while MF is handling the equivalent code (alas, differing in the details ...) as a separate branch (climate group). Thus, new dummy routines need to be handled and some calls seem mandatory (at the level of MASTER), even for a purely atmospheric application. A minimum proposal would be to at least install all OASIS calls below the level of MASTER under a conditional call (MF will send ECMWF the list of calls as seen in pre-CY37). A more “pluggable” solution would be to arrange a pre-compilation macro which would allow to filter the code before compiling the IFS/Arpège libraries. Deborah and Ryad have been checking this post-meeting, and agreed on the pre-compilation macro solution to enter CY37.

ECMWF has started to validate a full IFS 4D-VAR, and corrected a few minor bugs. Some more validation needs to be done. ECMWF will send any useful bugfix for 4D-VAR to MF, in case this may help validation in Arpège.

late modsets from ECMWF which were planned to enter CY37 were discussed:

- obs error correlations => already present. No new developments planned,
- VarBC for GPS => ECMWF shall check whether the GPS/ZTD code which is in preparation only addresses pre-treatment aspects (OBSTAT) or actually concerns bias correction. MF would be interested to have this code in CY37 if it concerns VarBC, and only if ECMWF is in a position to include the modset in pre-CY37 before declaration. Otherwise, this contribution would remain for CY37R1 and enter the next common cycle (CY38) in 2011,
- ODB changes for continuous screening => not yet ready => CY37R1,
- more ODB cleaning => CY37R1,
- bugfixes from MF: “apl_arome.F90-modset” to avoid compiling with Arome-own modules => Stéphane will send the modset to Deborah, as this should enter CY37 (NB: Stéphane and Deborah will check that the corresponding email indeed is received at ECMWF, since a first send got lost)

The plan for finalizing CY37 is that ECMWF shall declare the cycle after reception of the last bugfixes by MF (at least, the Arome interface routines), and after a check and a decision-making about the GPS/ZTD contribution.

ECMWF indicates that they are not yet ready with CY36R5, so the plan is to produce a CY37R1 soon after CY37 is completed.

The decision is to declare CY37 on November 17th (Wednesday).

3. OOPS:

Debriefings have taken place at ECMWF within the three working groups (obs operators, interface physics/dynamics, scripts). Those have been shortly addressed at this coordination meeting, along with a few other aspects:

- coding standards (Fortran): see in Action list (**item 1, bullet number 3**)

- feedback from MF about the proposed re-organisation of the obs operators => this raises at MF the question about what to do with the vertical interpolations from model levels to RTTOV pressure levels :
 - a first, general view of the proposed re-organization of the obs operator code has been sent by ECMWF to MF (email by Deborah to Claude). This proposal seems fine for MF, but more investigations are needed and those probably should be organized as ECMWF progresses with the details of the specifications, and then the coding. Claude stresses that the overall re-structuring seems OK, but fears the (more or less) numerous differences in details between IFS and Arpège operators. A list of (to Claude's knowledge ...) only LAM-specific areas in the obs operators is provided here¹:
 - radar reflectivity related code in MKGLOBSTAB (for Arome): generic code to handle the distribution of vertical profiles of relative humidity retrievals is LAM-protected code (though, in principle, this code could be made more transversal). In Arome, 2D GOM arrays are used operationally to store fields of all prognostic model variables in order to produce model equivalents of observed reflectivity in the vicinity of the observed reflectivity. These profiles are then used in the 1D-inversion to retrieve a relative humidity profile at observation location.
 - in OBATABS: a test to check that all observation positions are inside the computational LAM grid (excluding the extension zone). This test uses Aladin geometry code which is in a F90-encapsulated coding structure. A code similar to the one in OBATABS has been introduced in MKGLOBSTAB in order to check that all positions of vertical profiles (used in the 1D-inversion of radar reflectivity) are inside the computational LAM grid.
 - In COBSLAG: horizontal wind components are rotated, since in a plane-geometry projection for LAM the X and Y directions do not correspond to geographical East/West and North/South, respectively.

¹Post-meeting: Claude has launched an email inquiry towards Harmonie partners in order to check and possibly complement the list of LAM specific code in the IFS obs operators. Some of the corresponding input (up to date) has been included in the list above.

- Within SLINT: LAM horizontal interpolations use the bi-linear option (NOBSHOR=201) while global IFS/Arpège uses bi-cubic (NOBSHOR=203). This difference therefore is not, per se, a LAM-geometry related difference, and NOBSHOR=201 actually also is in use for any global (incl. IFS) or LAM surface obs interpolations (info provided post-meeting by Françoise Taillefer).
- An option LAMSUBFULL is used by HIRLAM (concerns radiances and perhaps AMV winds ?)

ECMWF will send a more detailed, consolidated document to MF later on. MF so far only raises some concern about the way the vertical interpolations should be called for radiances: IFS uses the RTTOV plug-in code, while Arpège uses the vertical interpolation code called outside and before RTTOV (like for conventional observations). MF will check whether the RTTOV interpolations could be used, but the critical issue will be on the side of CPU performances on the NEC. ECMWF indicate that the plan is to continue to have vertical interpolations outside RTTOV available - but not called from HOP - i.e. moved to the time-stepping loop.

- physics/dynamics interfaces and scripts:

ECMWF has sent MF a short summary report about the phys/dyn interface WG (compiled by Tomas Wilhelmsson). Deborah stresses some of the cleaning actions which are under discussion: SC2RDG/SC2WRG, SLCOMM. MF will need some time to check this information internally before commenting it. Some aspects are not clear from ECMWF's summary text: calendar for the work, which part of the proposal is on the side of IFS cleaning and which part is on the side of brainstorming and testing in the toy model (MF indicates that it would have difficulties to start a comprehensive action on all the items listed by ECMWF's WG, shall these actions be planned for a firm inclusion in the IFS code).

For scripts: ECMWF is considering the needs for running 4D-VAR in one single run, the namelist versus XML issue & Python versus Shell scripts. MF is interested to get any further info also on these aspects, as they would have an impact on the existing Olive interfacing and on the specifications for Vortex.

MF insists on clarifying the managerial aspects and decisions, as MF remains very concerned about the detailed scheduling of actions. ECMWF confirms the goal to progress with obs operators and Jb, and build the 3D-VAR demonstrator by the summer 2011 (NB: MF and LAM partners will have to adapt a LAM version of the demonstrator). The more critical issue for MF is on the side of the expectations in the model code. Claude proposes that both sides should evaluate the need for some extra coordination discussions, focusing closely on managerial aspects. ECMWF indicates that they will anyhow send more detailed and clarified specification documents to MF, for all aspects under consideration at ECMWF (obs operator, Jb, model code, scripts).

4. any info at ECMWF about the possible plug-in of RTTOV version 10 ?

With the foreseen calendar for a CY38 after the summer 2011, ECMWF expects to plug RTTOV-10 into a CY37R2, and therefore, RTTOV-10 would be available in CY38.

5. Content and timing of CY38

CY38 remains scheduled for September/October 2011. Its content shall be further discussed, especially as concerns OOPS-oriented contributions (maybe obs operator code, maybe some of the Jb code if LAM compliance has been enough studied, ... ?).

6. AOB

- none

7. Date and Place of Next Meeting

Physical coordination meeting in Reading, in 2011.
Next phone calls: left open.

Next OOPS meeting: to be scheduled over December/January.

List of actions:

1. ECMWF will write a short note about how to properly add new fields in the GOM arrays => can be done as a consequence of the cleaning in OBSHOR & GOM-arrays (to be finalized soon after CY37);
2. GRIB_API: ECMWF will provide a more stabilized V1.9.6 (or 1.9.7) which should contain further code adaptations in order to keep the level of vectorization obtained for NEC while improving the performances on the IBM. MF has noticed still several changes between recent versions in the GRIB reference tables (i.e., the link between GRIB numbers & identifiers on the one side, and field numbers on the other side). The reference version for GRIB_API should become stable with this respect => ECMWF will keep MF informed about the status in the new versions;
3. MF will prepare an updated version of the Fortran code coding guidelines (in preparation to OOPS): discussions have started at MF (Olivier, Claude, Ryad, Karim), and should be finalized soon. MF will send the outcome of these discussions to ECMWF (contact at MF remains Olivier Rivière);
4. ECMWF will prepare C++ coding guidelines in preparation for OOPS => open action (not urgent);
5. towards a network-accessible SCR ?: discussions are ongoing both at MF and at ECMWF about their respective future SCR system. MF is considering GIT for its Vortex project (but not yet confirmed; an alternative could be Subversion); ECMWF is considering the pros and cons of GIT versus Perforce. MF and ECMWF will keep in touch about their plans on SCR tools and use of GIT.
6. OOPS-related actions:

- 6.1. ECMWF will send MF consolidated specification documents about the obs operator code and Jb, which are essential ingredients for the 3D-VAR demonstrator targeted for summer/autumn 2011. ECMWF and MF will continue to liaise on model and script aspects, as brainstorming proceeds (animated by ECMWF). The specification documents shall be used at MF for further checks about the technical aspects, but also for evaluating the managerial issues.
- 6.2. MF might come back to ECMWF in order to have specific discussions about management aspects (strategy, calendar, GANTT charts and the like ...)
- 6.3. further technical discussions shall be performed either by direct email exchanges between contacts (obs operator => Deborah Salmond and Patrick Moll; Jb => Mike Fisher and Thibaut Montmerle; model code => Tomas Wilhelmsson and Karim Yessad) or prepared by both sides for the next OOPS meeting. At MF: Claude remains the contact for the toy model code and C++ aspects.
- 6.4. Any more coordination to be planned about scripts and link with Olive / Vortex ?