Report on Operations

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Main changes introduced in MF's operations on September 20th, 2011

- Data assimilation (highlights):

  - Updated **coefficients in RTTOV for AIRS and IASI**

  - Assimilation of **ATOVS/RARS** « Regional ATOVS Retransmission Service »

  - Assimilation of **SSMI/S on board DMSP F-18**

- **Modifications in deep convection scheme** in order to prevent unrealistic deepening of shallow vortices, by increasing convective activity in some circumstances (strong vertical velocity but not over orography)

- Add a processus to take into account the **re-freezing of rain**

- **Arpège Ensemble DA and EPS** adapted to the changes in the deterministic model (plus some specific changes)

- **Move to SURFEX in Aladin-France and Aladin-Réunion**

- **Arome-France**: Add an additional contribution to turbulence in the adjustment process, representing sub-grid variability of clouds; Revised low level drag: limit the orographic roughness length to a maximal value; diagnostic hail; etc.

Plans:

- Data assimilation:

  - retuned σb's (AMSU-A, GPS-RO), inflation factor

  - increase volume of obs: IASI, GPS/EGVAP, ASCAT

  - more tolerant blacklisting for GSP ZTD

- **CY37T1: includes Surfex V6+**

- **Aladin-Réunion becomes the reference E-suite « Aladin model »**

- **Arome-France**: assimilation of radial winds from 2 more radars, monitoring of X-band radars, increased density of AMSU-A pixels, *use of higher resolution orography + Ecoclimap2 + HSWB (open issue)*

- mid-term (2012):

  - VarBC for GPS ZTD, wavelet basis function in global B-matrix, 1-hour timeslots in 4D-VAR ?

  - **Surfex V7.x in LAM models**

  - Vortex ; test new scenarios for production (esp. 0 UTC); 8 Arome runs per day

Most recent Alaro updates

CY37T1:

- new pseudo-conservative options in SL interpolators

- preparations for the 2D+1D turbulence approach

- updated version of TOUCANS

- switch of Cellular Automaton code, collaboration with ECMWF & SMHI

- fixes in convection/microphysics

Forthcoming novelties (in test):

- TOUCANS: **modeling of third-order moments for turbulence**; first steps towards entropy-based turbulence for shallow convection

- Radiation: improved method for computing gaseous transmission functions

Operations overview in partner centers:

Algeria	Austria	Belgium	Bulgaria	Croatia	Czech R
36T1	35T1 (Alaro) 36T1 (Arome)	35T1	32T3	32T3 36T1 installed	35T1
~ MF	Alaro-5km (IFS cpl & Surface OI); Arome (test)	Alaro-7km & 4km	35T1 in test (9km)	Alaro-8km + DA (3D-Var & Surf. OI); Alaro-2km	Alaro-4.7km + DA (blend. & Surf. OI); 3D-Var planned

France	Hungary	Morocco	Poland	Portugal	Romania
36T1	35T1	36T1	29T2 (13.5km)	36T1 (9km)	35T1
Arome ++; DA (3DVar & Surf. OI); IFS cpl (in Overseas 8km); Surfex	DA+IFS cpl (8km); Alaro physics in test; Arome-HU (DA in dev.)	Arome-NordMaroc ++; 18km & 10km (with DA)		Arome ++ (Pt, Ma, Az)	Alaro-6.5km;

Operations overview in partner centers:

Slovakia	Slovenia	Tunisia	Turkey
36T1	35T1	29T2	35T1
Alaro-9km + Blending; Surf. OI and Alaro-5km in test	Alaro-9.5km & 4.4km (with DA); IFS cpl + +	35T1 in test (12.5km)	Alaro-4.5km

- Alaro used in LAEF & LAMEPS/Hungary
- mid-term: Arome and Alaro-2km considered for high resolution EPS
(in those systems where a multi-model approach is considered);
Alaro-2km versions run experimentally in some Centers
- Arome-1.3km in development (for next HPC) and 500m for Nowcasting (MF)
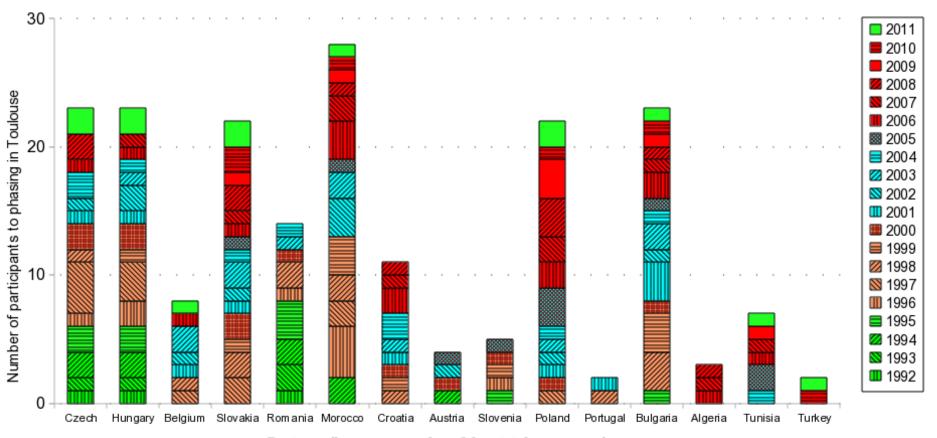
Report on maintenance activities

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Calendar of IFS and interim cycles

Maintenance = Phasing (centralized) + code cleaning and validation (somewhat split) + scientific developments (as decentralized as possible)
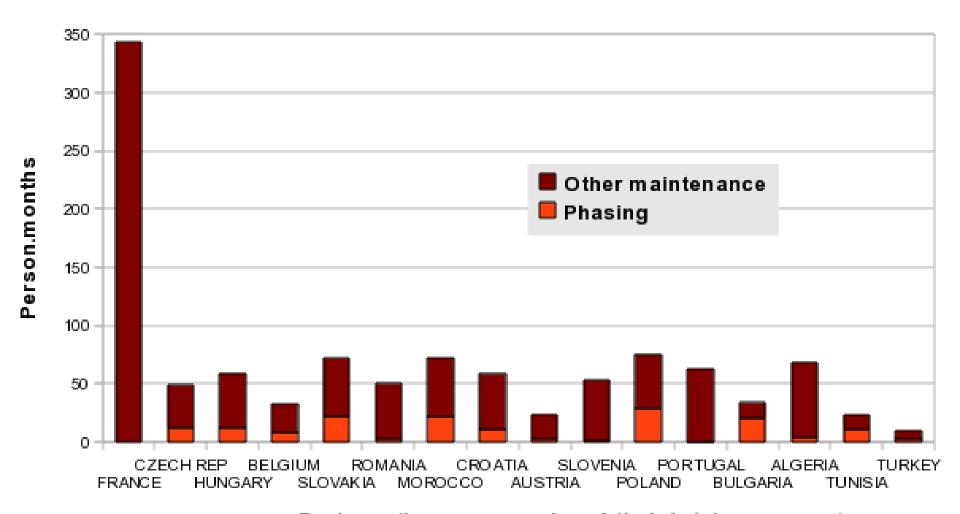
- CY37T1: declared in June'11; rather big and fairly complex phasing (number of contributors has increased); export before end of 2011
- CY37T2: cancelled
- CY38: common with IFS, declared early Nov'11; contains first code impacts from OOPS & IFS-cleaning

=> Two big phasing efforts this year (and probably the same next year)

Breakdown of the phasing effort by country

Maintenance effort by country since July 2001

Legend:
- Other maintenance
- Phasing

Y-axis: Person.months (0, 50, 100, 150, 200, 250, 300, 350)

X-axis: Partners (by reverse order of their total manpower)

Countries: FRANCE, CZECH REP, HUNGARY, BELGIUM, SLOVAKIA, ROMANIA, MOROCCO, CROATIA, AUSTRIA, SLOVENIA, POLAND, PORTUGAL, BULGARIA, ALGERIA, TUNISIA, TURKEY

Future …

- Phasing will continue, including invitations to Toulouse ! => 6 week stays for IFS/Arpège phasing; ***possibility to pair 2*3 weeks for interim cycles***

- Calendar:
    - CY38T1: early-March / end-April 2012
    - CY39: Sept / Oct 2012

- Enhance cooperation with HIRLAM on maintenance issues and phasing: upstream coordination, more decentralized validation

- Difficult phasings because of code overhaul (besides number of contributors):

    1. we need a stronger technical knowledge transfer *locally* for basics about the models: how to install & how to run them, what the code looks like

    2. a selected number of experts in various fields: hybrid parallelization, code design, C++, ODB, etc.

OOPS

- Planning but also specifications & coding started in 2011
- Present status:
  - Object oriented coding & C++: technical review of OOPS layer in June/July has *not* shown major coding weaknesses
  - Next steps:
    - 3D-VAR prototype in development at ECMWF, using bricks of IFS Fortran code
    - Scientific review this winter
    - Training of staff
  - Fortran source code modularization:
    - First changes entered CY38 => already big impact on existing code and phasing effort !
    - Next steps are under discussion: regular visio-confs MF/ECMWF; minutes are made available to all partners (Aladin website); otherwise, email exchanges (for the time being)
- OOPS Steering Committee with Aladin & Hirlam participation

OOPS/LAM impact

- CY38: Jb (3D-VAR) => T. Montmerle; namelist changes and code re-organization (including coupling) => K. Yessad & phasers of CY38

- CY39: LOOPS, Geometry object and Setup re-organization, take part in other code cleanings (eg. GFL setup) … and the next phasing !

- Training to C++ & identification of key staff within the Consortia as "pioneers" in the OOPS/LAM work

- participation to OOPS code review, start analysis of LAM declination of OO layer

COP(E)

- Deep re-organization of observation pre-treatment and throughput towards the assimilation system:
  - Perform continuous preparation of observations for their assimilation by taking the corr. steps out of the critical path of the DA sequence (comp. of departures, QC checks, ODB preparations)
  - Provide more flexible conversion tool for obs formats
- Technically speaking:
  - New BUFR2ODB
  - Split screening from IFS (incl. Y-H(X) and QC)
  - Recoding in C++ of several pieces of code
- Elements of COPE to enter CY39: ODB2, other …

SRNWP and Aladin involvement

- Coordination of SRNWP: A. Horanyi, now G. Boloni (HMS)
- SRNWP/Verification & Interoperability
- Roadmap redaction (Piet): Forecasting CP