

# **Common activities : codes and system collaboration**

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# Outline

- Cycles : updates of the common codes (IFS/ARPEGE/LAM, MF/ALADIN/HIRLAM)
- Specific examples of recent code developments
- Code architect activities
- ACNA system coordination

# IFS/ARPEGE/LAM and MF/ALADIN/HIRLAM cycles

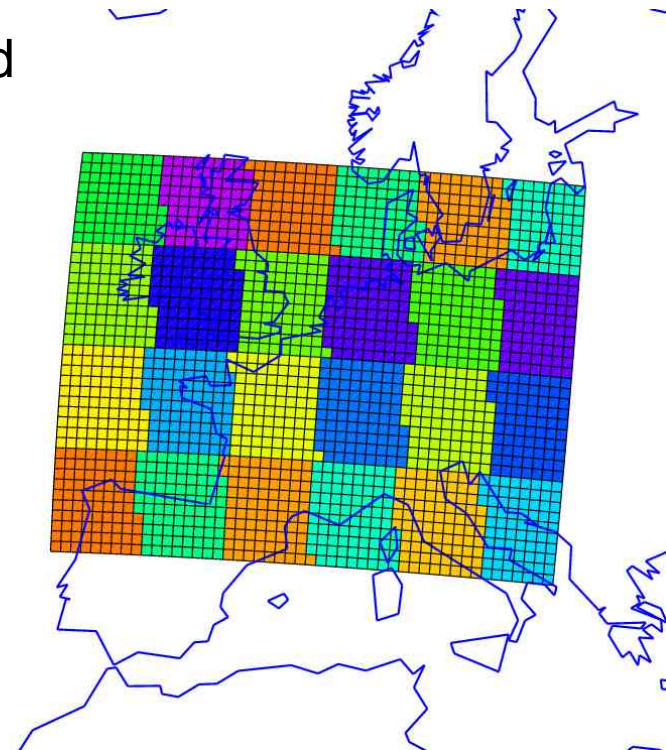
- CY43 : 25 February 2016 ; 3300 files touched ; 315000 code changes
- CY43T1 : 30 June 2016 ; 2600 files touched ; 630000 code changes
- CY43T2 : 14 November 2016
- CY44 : 15 March 2017
- CY45 : 28 June 2017 ; 2500 files touched ; 70000 lines modified
- CY45T1 : October – December 2017 ; 780 files touched ; 320000 lines modified
- CY46 : January – March 2017
- Collaboration :
  - We share the same sanity check tools between MF/ALADIN and HIRLAM,
  - We work hard for making the necessary efforts of upstream code coordination when building the common cycles (eg. Structure of RWP),
  - Coordination meetings :
    - HMG/CSSI for MF/ALADIN/HIRLAM,
    - ALADIN and HIRLAM participants at the IFS/ARPEGE coordination meetings
  - Code contributions by HIRLAM to the shared system are increasing over the last cycles

# Code developments : a few highlights from CY45T1 (*not exhaustive*)

- Non-hydrostatic dynamics :
  - « Quasi-Elastic » solution (K. Yessad and F. Voitus, MF),
  - Vertical model discretization for VFE (P. Smolikova, J. Vivoda, CHMI & SHMU)
- AROME microphysics :
  - Modified ICE3 scheme (Y. Seity, S. Riette, MF)
  - First version of new microphysics scheme LIMA (Y. Seity, S. Riette, B. Vié, MF)
- ALARO :
  - Coupling with SURFEX (D. Degrauwe, RMI)
  - ALARO-1 fixes and improvements (J. Masek, B. Bochenek and coll.)
- HIRLAM :
  - observation pre-treatment codes (eg. Bator/HDF5),
  - microphysics and dynamics options for Harmonie-Arome,
  - options in data assimilation code, portability (CRAY, others)
- Optimization :
  - Computation of background error statistics (R. El Khatib, MF)
- OOPS re-factoring of the « old » IFS codes :
  - Full-POS (R. El Khatib, MF)
  - Participation to VarBC re-factoring (R. Stappers, Met.no)
  - Participation to MODEL object definition (K. Yessad, A. Mary, MF)

# ALADIN Code Architect work: LAM features in Atlas

- Atlas is a framework for parallel data structures, under development at ECMWF.
- Given the relation between the codes in the ALADIN-HIRLAM system and the global IFS/ARPEGE codes, it is necessary to introduce support for LAM grids in Atlas.
- LAM-specific features that have been added to Atlas so far:
  - geographic projections (Lambert, Mercator, Schmidt)
  - Regional grids
  - Bi-Fourier spectral transforms and bi-periodic grids



# ALADIN Code Architect work: Surface fields « coherent » conversion from SURFEX to ISBA

- SURFEX is to replace ISBA as the surface scheme of MF's global NWP model. It is currently running in the ARPEGE e-suite, and should become operational soon.
- Many ALADIN partners are still running ALARO with the ISBA scheme.
- SURFEX and ISBA may adapt some surface fields using different physical assumptions (albeit internally consistent within each scheme). These differences can create significant errors when surface fields from SURFEX are being handed over to an ISBA-using LAM. *This is an issue for LBC coupling data for ALADIN partners.*
- Actions taken:
  - Initialize ISBA fields from SURFEX data (from ARPEGE): identification of a problem in deep soil frozen water conversion + proposal of solution.
  - Later extended to snow cover (MF/F. Bouyssel)
  - Enable ALARO to run with SURFEX: (technical) solution phased in cy45t1. Scientific validation and possible re-tuning remain to be done.

# ACNA coordination activities (since last GA)

- 1) Preparation and chairmanship of the LTM meetings
  - a) April 2017: Helsinki (AHW)
  - b) October 2017: Reading (EWGLAM)
- 2) Supervision of the cycle 40t1 installation at the Partners' NMS
- 3) CY40t1bf07\_export preparation
  - a) Collection and documentation of reported bugs and bugfixes (ALADIN, HIRLAM, MF)
  - b) GIT branch preparation (later extended with ALARO-1vB by J. Masek, CHMI)
  - c) Mitraillette sanity check (by LACE ASC)
  - d) Data assimilation run check based on AROME (by MF)
  - e) Release of CY40t1bf07 in April 2017 (by MF)
- 4) Supervision of the impact on the LBC files from ARPEGE with SURFEX
  - a) Evaluation of online and offline ARPEGE e-suites LBC data
  - b) Coordination of the tests by Partners
  - c) Reporting to relevant bodies (LTM, MF)
- 5) Co-organisation of the DA basic kit Working Days, Lisbon 2017
- 6) Contribution to ALADIN system paper
- 7) Contribution to task definition and planning of the RWP for 2018

# Overview of the porting of the export version in ALADIN countries (Nov 2017)

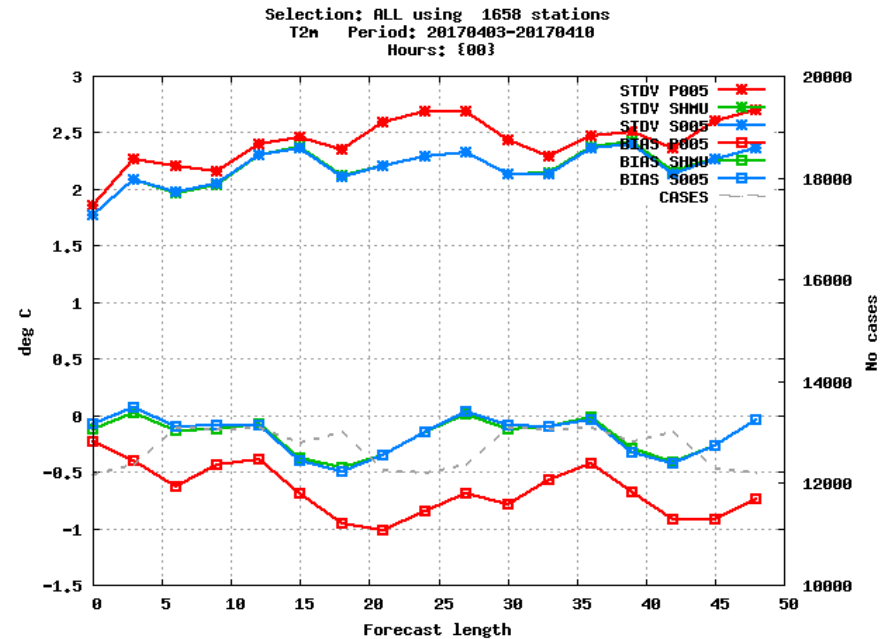
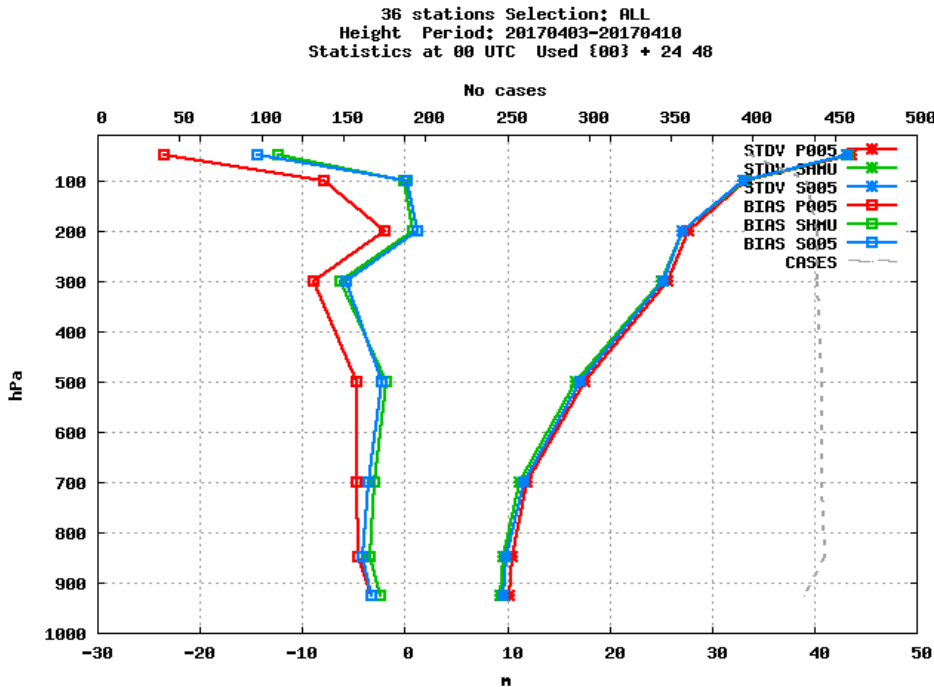
countries		Oct2015	Apr2016	Oct2016	Nov2017
Algeria	ALADIN AROME	no	ported	ported	operational
Austria	ALARO AROME	ported	e-suite	operational	operational
Belgium		ported	ported	e-suite	operational
Bulgaria	ALARO ALADIN AROME	ported	ported	e-suite CY41	operational 41t1
Croatia	ALARO	no (but CY41)			ported
Czech R.	ALARO	not planned (HPC upgrade 2017)			HPC upgraded, CY43T2_export expected
France	AROME	operational	operational	operational	operational 41t1
Hungary	ALARO AROME	no	ported	ported	e-suite
Morocco	ALADIN AROME	ported	ported	ported	operational 41t1
Poland	ALARO AROME	operational	operational	operational	operational
Portugal	ALADIN AROME	not planned (HPC upgrade 2017)			
Romania	ALARO	ported	operational	operational	operational
Slovakia	ALARO	ported	ported	operational	operational
Slovenia	ALARO	no	no	ported	operational
Tunisia		no	ported	ported	ported
Turkey	ALADIN ALARO AROME	ported	ported	operational	operational
		not planned (HPC upgrade 2017)			HPC upgraded => Jan2018
	ported/operational	10/2	13/3	14/6(2)	14/11(2)



# Supervision of the impact on the LBC files from ARPEGE with SURFEX

Issue of SURFEX -> ISBA conversion addressed => various tests and e-suites made, by ACNA and in coordination with Météo-France and other ALADIN countries (since April 2016). A problem with soil frozen water and snow cover identified and solved (D. Degrauwe, F. Bouyssel)

Fig. : Geop and T2m scores: SHMU\_oper, P005 old setup, S005 adapted solution



**Dziękuję za uwagę !**