



Minutes



CSSI-HMG meeting 2019

5 April 2019, 9:00 – 16:00
Madrid, Spain

List of participants :

Daan Degrauwe, Maria Derkova, Claude Fischer, Ryad El-Khatib, Inger-Lise Frogner, Bent Hansen Sass, Frank Lantsheer, Jeanette Onvlee, Patricia Pottier, Roger Randriamampianina., Daniel Santos, Roel Stappers, Piet Termonia, Sander Tijm, Alena Trojakova, Martina Tudor, Clemens Wastl, Christoph Zingerle

Remote participants: *Patrick Samuelsson, Ludovic Auger*

Excused : *Jean-François Mahfouf, Maria Monteiro*

1 Opening and adoption of the agenda

Claude opens the meeting and welcomes the participants in the AEMET and the remote participants, Ludovic and Patrick. The agenda is adopted without modifications.

2 Debriefing and status of the RWP2018 (with special attention with respect to code deliverables)

Prior to the meeting, the HMG/CSSI members have filled the status of each task in the Work Packages sheets of the RWP2018. A summary table was prepared and is assessed during the meeting. Patricia shows some manpower statistics.

The summary report on the status of the RWP2018 is given in Annex 1 (and is available on the page dedicated to the RWP on the aladin website).

3 Expected /planned evolution of cycles

The description of the evolution of the cycles (timing and content) was detailed during the system plenary session of the Workshop (see Claude's presentation) or the usual "Progress and plans" document produced for the LTM meeting.

The HMG/CSSI participants have no comment.

4 Preparations for the RWP2020

The priorities for RWP2020 are agreed on and a list of actions is defined. The time-line to assess the RWP2019 and to prepare the RWP2020 is also adopted.

Patricia will make the RWP2020 google environment ready by the end of April 2019 and distribute instructions to lead authors.

ROLLING WORK RWP2020
Actions and priorities defined during the HMG/CSSI meeting, on April 5, 2019

	WP NAME	MAIN EDITOR(S)	Priorities	TODO list (in green, when done)
ROLLING WORK PLAN 2019 : CHAPTER 1				
MGMT1	Management and ALADIN support activities	Piet Termonia and Patricia Pottier		
MGMT3	Management HIRLAM	Jeanette Onvlee		
MGMT2	Management LACE	Martina Tudor		
COM1.1	ALADIN Code architect coordination activities	Piet Termonia and Daan Degrauwe		
COM1.2	HIRLAM Code analyst activities	Jeanette Onvlee & Roel Stappers		
COM2	Code generation and maintenance	Claude Fischer	code contribution to surfex mechanism	
COM3.1	Support for maintenance and Partners' implementations of ALADIN system	Maria Derkova		
COM3.2	Support for maintenance and Partners' implementations of HIRLAM system	Daniel Santos		
COM3.3	Training (preparation, lectures, attendance)	Jeanette Onvlee, Piet Termonia, Martina Tudor, Claude Fischer		New WP => add in reporting tool for 2019
ROLLING WORK PLAN 2019 : CHAPTER 2 : CORE PROGRAMS				
CDPY1	Quasi-Elastic (QE) system	Ludovic Auger, Sander Tijm	Prioritization during DDay on 28 May	
CDPY2	Development of methods for solving the implicit equation in gridpoint space.	Ludovic Auger, Sander Tijm		New : add grid point solvers of Daan
CDPY3	Horizontally Explicit Vertically Implicit (HEVI) methods with ALADIN-NH core	Ludovic Auger, Sander Tijm		
CDPY4	Physics-dynamics interface	Daan Degrauwe, Sander Tijm		
CDPY5	Development of LAM components in Atlas	Daan Degrauwe, Sander Tijm		Daan to present Atlas status during DDay
CPDA1	Core programme Basic data assimilation setup	Piet Termonia, Alena Trojakova	Prioritizing started by Maria, then discussed in June (web meeting)	

ROLLING WORK PLAN 2019 : CHAPTER 3 : OTHER R&D ACTIVITIES

DA1	Further development of 3D-Var (alg. Settings)	Roger Randriamampianina, Benedikt Strajnar, Claude Fischer		Martina : check with Benedikt if he is OK to replace Antonin
DA2	Development of flow-dependent algorithms	Roger Randriamampianina and Claude Fischer	Further develop EnVAR	
DA3	Use of existing observations	Roger Randriamampianina, Jean-François Mahfouf	Homogeneization (code implementation and tools) of MODE-S data and radar data;	
DA4	Use of new observations types	Jean-François Mahfouf and Roger Randriamampianina		
DA5	Development of assimilation setups suited for nowcasting	Xiaohua Yang, Pierre Brousseau, Florian Meier	RUC	Action: more communication (share of expertise) => specific e-mails or teleconf
DA6	Participation in OOPS	Claude Fischer, Roel Stappers, Daan Degrauwe	Phase up pieces for 4DVAR	New: Roel start to work on LAM oops prototype; New: GNSS gradient in OOPS
DA7	Observation pre-processing and diagnostic tools	Eoin Whelan, Alena Trojaková	SAPP	Roger to send SAPP docs to Aladin; Web conf on bator modeS and radar (try to agree on specs by CY47T1)
DY1	Boundary conditions and nesting	Sander Tijm		
DY2	Time-stepping algorithm	Petra Smolíková		
DY3	Vertical discretization	Petra Smolíková		Action: add Fabrice's idea for treatment of vertical velocity (so-called new W-term)
DY4	Semi-Lagrangian advection	Petra Smolíková		
PH1	Developments of AROME-France (and ARPEGE) physics	Claude Fischer and Yves Bouteloup		ECRAD : MF to provide figures of performance to HIRLAM
PH2	Developments of HARMONIE-AROME physics	Sander Tijm		
PH3	Developments of ALARO physics	Neva Pristov		
PH4	Common 1D MUSC framework for parametrization validation	Sander Tijm, Wim de Rooij and Eric Bazile	MUSC	

PH5	Model output diagnostics	Maria Derkova		Mariska to propose a redaction for the WP (more concrete steps)
SU1	Algorithms for surface assimilation	Rafiq Hamdi and Patrick Samuelsson		Sent LACE report on EKF jacobian to Patrick S; Patrick : how to strengthen the coordination on EKF activities and add in the WP
SU2	Use of observations in surface assimilation	Stefan Schneider and Patrick Samuelsson		
SU3	SURFEX: validation of existing options for NWP	Patrick Samuelsson and Samuel Viana		add ALADIN editor
SU4	SURFEX: development of model components	Patrick Samuelsson		add ALADIN editor
SU5	Assess/improve quality of surface characterization	Ekaterina Kurzeneva and Patrick Samuelsson		Patrick and Balasz to prepare a proposal for EWGLAM : physiographic databases; For subgrid orography parameters: extension of e923 (ALARO) and the evaluation of improvement of PGD for ARPEGE; Add ALADIN editor (Martina)
SU6	Coupling with sea surface/ocean	Neva Pristov and Patrick Samuelsson		
E1	Arome-France EPS (PEARO)	Claude Fischer		
E2.1	Development of convection-permitting ensembles: HarmonEPS - Physics perturbations	Inger-Lise Frogner		
E2.2	Development of convection-permitting ensembles: HarmonEPS - Initial conditions perturbations	Inger-Lise Frogner		
E2.3	Development of convection-permitting ensembles: HarmonEPS - Surface perturbations	Inger-Lise Frogner		
E2.4	Development of convection-permitting ensembles: HarmonEPS - Lateral boundary perturbations	Inger-Lise Frogner		
E2.5	Development of convection-permitting ensembles: HarmonEPS - HarmonEPS system	Inger-Lise Frogner	Update to CY43 (in 2019)	
E3	Development, maintenance	Clemens Wastl		Replace Martin by Clemens

	and operation of convection-permitting ensembles for LACE			Adapt the title of the WP (it's developed for some NMS but should be adapted)
E4	Development, maintenance and operation of LAEF	Clemens Wastl		
E5	Production and maintenance of GLAMEPS	Inger-Lise Frogner		to be REMOVED in RWP2020
E6	Ensemble calibration	Inger-Lise Frogner		
QA1	Development of HARP	Christoph Zingerle	More people start to use HARP	organise HARP training (com3.3)
QA2	Development of new verification methods	Bent Hansen Sass, Christoph Zingerle, Joël Stein, Claude Fischer		Add LACE and MF new developments ; redesign the WP, main authors => the new QA2 would be devoted to new methods and development of tools (presumably this is transversal to any CMC)
QA3	Quality assessment of new cycles and alleviation of model weaknesses	Bent Hansen Sass, Joël Stein, Claude Fischer, ??	add in the same WP the equivalent for MF/LACE/FR => remove HARMONIE-AROME from the WP title and merge the list of editors	redesign the WP and redefine authors => the new QA3 would be devoted to scientific validation efforts ahead of any e-suite or RCR, per CMC
QA4	Verification and quality control at MF : development of new methods or products	Joël Stein, Claude Fischer		MF efforts for developing new validation methods and their tools to be moved to QA2
SY1	Code optimization	Daniel Santos, Ryad El Khatib		New: add LAM spectral transforms (GPU); Action: report of BSC activities on code profiling on EC Cray
SY2	Maintenance and development of the Harmonie Reference System	Daniel Santos		
SY3	Revision of the Harmonie scripting system	Daniel Santos		MF to send information about Vortex (Alena, Daniel, Maria M, Piet)
HR1	(Sub)-km configurations and turbulence R&D activity	Sander Tijm & Martina Tudor & Claude Fischer		organise HR meeting in 2019; Sandor will collect information on current situation

Timeline for the redaction of the 2020 RWP (backwards) as adopted on April 5, 2019

15 March 2020	Summary of execution of RWP2019 by PMs ready
January 2020	Execution of the RWP2019 : HMG/CSSI fill the additional columns (final status) in the augmented RWP2019: 1 February
25 November 2019	Submission of RWP2020 to HC/GA (16-17/12/2019)
15 October 2019	Submission of RWP2020 to HAC/PAC (4-5/11/2019)
10 October 2019	Move of the unstaffed tasks to the "needed unstaffed tasks table", preparation of a clean pdf version
7 October 2019	Finalization of commitments by ALADIN LTMs
7 October 2019	Finalization of commitments by Hirlam HoR
15 September 2019	Plan text ready, not yet with finalized pm numbers
until end of August	2nd redaction and check of the draft RWP by PMs
17 June 2019	Invitation for the HIRLAM staff and ALADIN LTM (roles, responsibilities, timeline) to check if there is nothing missing that is in their local scientific plans
until mid-June 2019	1st redaction : from 29 April to mid-June
29 April 2019	Make RWP2020 google environment ready and distribute instructions to lead authors:
15-19 April 2019	Appointment of lead authors
12 April 2019	Request for commitment to lead authors
12 April 2019	HMG-CSSI: finalization list of 2020 WP's, lead authors for RWP2020

5 A.O.B.

None.

6 Closing and next year meeting

The next meeting will take place in Ljubljana on Thursday 2 afternoon and Friday 3 morning April, 2020.

In order to give room for discussions during the HMG/CSSI meeting and to make sure that the meeting will last one full day (or two half-days), it was decided to have the first part of the HMG/CSSI meeting on Thursday afternoon, just after the closing session, and the second part on Friday morning (according to the current plane schedule, there are planes from Ljubljana to most hubs, departing between 15:00 and 18:00 on Friday afternoons, thus everybody should be able to attend the HMG/CSSI until at least 13:00 in the afternoon).

Annex 1 : Summary status of the RWP2018 [date: as of 12 April 2019]

ROLLING WORK PLAN 2018 : STATUS in April 2019

	WP NAME	MAIN EDITOR(S)	STATUS	comment	2018 Reported manpower	2018 Committed manpower
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ROLLING WORK PLAN 2018 : CHAPTER 1 : Common code design, generation and maintenance

Management	MGMT1	Management and ALADIN support activities	Piet Termonia and Patricia Pottier	On track		41.25	45
	MGMT2	Management LACE	Yong Wang and Andrea Ehrlich	On track		21.75	22
	MGMT3	Management HIRLAM	Jeanette Onvlee	On track		13.5	
Common	COM1.1	ALADIN Code architect coordination activities	Piet Termonia and Daan Degrauwe	On track		0.75	1
	COM1.2	HIRLAM Code analyst activities	Jeanette Onvlee & Roel Stappers		Worked on OOPS global VarBC and LAM DA (script) system analysis and documentation in 2018. Work on DA block testing and development of LAM OOPS awaiting availability of Cy46T1	5.5	
	COM2	Code generation and maintenance	Claude Fischer	On track		111.25	97.5
	COM3.1	Support for maintenance and Partners' implementations of ALADIN system	Maria Derkova	On track		154	6.5
	COM3.2	Support for maintenance and implementation of Harmonie system on local machines	Daniel Santos		Added in 2019 RWP		

ROLLING WORK PLAN 2018 : CHAPTER 2 : CORE PROGRAMS

Dynamics and scalability	CDPY1	Quasi-Elastic (QE) system	Ludovic Auger	Completed	Results from simulations show no stability improvement.	8.00	6.00
	CDPY2	Development of methods for solving the implicit equation in gridpoint space.	Ludovic Auger	On track	Implementation in a 3D model has been partially achieved, treatment of orography is on tracks. Work with 2D vertical plane model and gridpoint discretization in a shallow-water is completed.	36.00	34.00
	CDPY3	Horizontally Explicit Vertically Implicit (HEVI) methods with ALADIN-NH core	Ludovic Auger	On track	The HEVI formulation has been improved, partially taking into account orography. The development of a new 3D code allowing HEVI or SI is not finished yet.	10.50	8.50
	CDPY4	Physics-dynamics interface	Daan Degrauwe	Not started	This has been discussed during the ALARO WDs. But no decision on an action has been taken. So there is no activity for the time being.	1.00	5.00
	CDPY5	Development of LAM components in Atlas	Daan Degrauwe	On track	The LAM part of Atlas have been developed. The impact of the projection on the operators is not done yet for discrete operators. Whether this should be prioritized will depend on the decisions taken during the dynamics days later this year.	0.25	3.00
Basic data assimilation setup	CPDA1	Core programme Basic data assimilation setup	Piet Termonia, Alena Trojakova	On track	Steady progress in the DAsKIT countries on (i) data preprocessing, (ii) use of BATOR, (iii) observation monitoring (OBSMON), and (iv) cycling. Bug and compilation issues have been reported. Further action on AMDAR data is being planned.	39.50	28.00

ROLLING WORK PLAN 2018 : CHAPTER 3 : OTHER R&D ACTIVITIES

Data Assimilation	DA1	Further development of 3D-Var (alg. Settings)	Roger Randriamampianina, Máté Mile, Claude Fischer	On track	Cycling strategy of a RUC was elaborated at DMI. Jk was activated in Austria, while in Hirlam its tuning has started. In MF, preparation and porting of the Arome DA in CY43T2 and coupled with the Arpège T1798C2.2 e-suite version.	41.00	29.75
	DA2	Development of flow-dependent algorithms	Roger Randriamampianina and Claude Fischer	On track	Good achievement in both Meteo France and Hirlam. Papers accepted recently: Caron et al. (MWR, 2019); Mercier et al. (QJ, 2019)	64.75	56.75
	DA3	Use of existing observations	Roger Randriamampianina, Jean-François Mahfouf	On track	Old types of observation were explored for reanalysis purpose in Hirlam. Significant progress on the use of ModeS and European radars in AROME-France	114.00	128.50
	DA4	Use of new observations types	Jean-François Mahfouf and Roger Randriamampianina	On track	More testing with assimilation of GNSS slant delay was done. Implementation of assimilation of Aeolus L2 HLOS wind started at Meteo France and MET Norway. Humidity aircraft data was tested in Hirlam and monitored in Arome-France.	84.25	84.50
	DA5	Development of assimilation setups suited for nowcasting	Roger Randriamampianina, Xiaohua Yang, Pierre Brousseau, Florian Meier	On track	Intensive testing of cloud initialization method took place at FMI. MET Norway tested double nesting and 1 h RUC setup. Overlapping windows with connected assimilation cycles was tested at DMI. Nudging technique was tested at ZAMG.	28.00	25.75
	DA6	Participation in OOPS	Claude Fischer, Roel Stappers, Daan Degrauwe, Roger Randriamampianina	On track	Worth to notice that OOPS-IFS is becoming little by little a technical reality at ECMWF. We have been told that a OOPS-IFS 4D-VAR minimization now is part of the regular technical validation of new IFS cycles. In MF, the very first achievements from OOPS could be (1) to use the "oopsified" conf 903 for the production of IFS coupling files for Arome and (2) to start using DA component tests with OOPS binaries (prototyped first time for CY46T1).	19.00	26.50
	DA7	Observation pre-processing and diagnostic tools	Eoin Whelan, Alena Trojaková, Jean-Francois Mahfouf, Roger Randriamampianina	On track	Bator was updated to treat all observations, including new BUFR formatted observations from GTS. HOOF radar pre-processing tool was developed in LACE. New version of the visualisation part of the Obsmon was developed with improved installation facility.	18.25	22.00
Dynamics	DY1	Boundary conditions and nesting	Sander Tijm	On track	work on weak constraint LBC was completed, will not lead to application. In tests of gl vs fullpos, the impact of adapting vertical interpolation in gl to something closer to fullpos was minimal.	5.25	3.75
	DY2	Time-stepping algorithm	Petra Smolíková	On track	The code of the "on demand" corrector step is prepared. Staff to take over?	1.50	6.75
	DY3	Vertical discretization	Petra Smolíková	Completed	Work on VFE has been finalized, published and phased.	5.50	3.00
	DY4	Semi-Lagrangian advection	Petra Smolíková	Delayed or issues	Study of use of the algorithm "on demand" which calculates the trajectory but stops in case the process seems to be divergent for a given grid point. Even if there is some portion of grid points for which the process diverges according to our criteria, we were not able to detect the benefit of the algorithm "on demand".	1.25	3.00

Physics parametrizations	PH1	Developments of AROME-France (and ARPEGE) physics	Claude Fischer and Yves Bouteloup	On track	Arpège physics tunings for the T1798C2.2 e-suite (CY43T2_op1). Tests with ECRAD and the Tiedtke convection schemes are ongoing in GMAP. For Arome, tuning of the Arome schemes for the CY43T2 e-suite. Note that a significant effort for the Arpège and Arome CY43T2 e-suites was directed into implementing new model output diagnostics like visibility or surface precipitation types. The finalization of these developments actually lasted into 2019 (including the present time, where I write these lines !). In R&D, tests of ICE3_new and LIMA are continued; 3D turbulence research development.	43.25	88.00
	PH2	Developments of HARMONIE-AROME physics	Sander Tijm	Delayed or issues	Work on turbulence, cloud and convection schemes led to improvements but does not yet solve the problems seen with low clouds and deep convection adequately, so this work has continued into 2019. Good results with inclusion of CAMS aerosol so far, but this needs further adjustments and longer validation. Stable PBL tasks were delayed due to focus on low clouds and convection.	31.00	29.75
	PH3	Developments of ALARO physics	Neva Pristov	On track	ACRANEB2 is consolidated. An extensive literature study was done on 3D effects. TOUCANS: unification of QSSC is done, a new proposal is made for a two energies scheme (paper by Ivan). The homogenization of the cloud treatment is planned (a fix is proposed for operations). Unsaturated downdrafts runs in Be. Prognostic graupel is being implemented. Coupling of SURFEX with ALARO progresses, some fibrillations are found and will be studies with the implicit model of the Best et al interface.	41.25	45.00
	PH4	Common 1D MUSC framework for parametrization validation	Sander Tijm, Wim de Rooij and Eric Bazile	Delayed or issues	MUSC is presently based on Cy38. A more portable version of MUSC based on Cy43 has been made to facilitate research experimentation on e.g. the radiation scheme, but this does not yet contain the idealized cases.	11.00	6.00
	PH5	Model Output PostProcessing Parameters	Maria Derkova	On track	Coordination will start in the RWP2019. A few diagnostics were already added for ALARO, AROME and ARPEGE.	9.00	

Surface analysis and modelling	SU1	Assimilation algorithms for surface assimilation	Rafiq Hamdi	Delayed or issues	The work on EKF is ongoing. The work on DIF progresses. STAEKF exists in cy40h, but will not be used to treat LAI. Hybrid approaches (relying on CANARI) are used in HIRLAM and MF for snow analysis. The development of sea ice with EKF is on track.	31.50	31.50
	SU2	Use of observations in surface assimilation	Stefan Schneider	Delayed or issues	Some documentation on satellite snow-extent products is written. Analysis for ASCAT is progressing slowly. Some progress is made on SIMBA buoys for sea ice. Progress is reported in the PhD work of Zied.	15.25	11.00
	SU3	SURFEX: validation of existing options for NWP	Patrick Samuelsson and Samuel Viana	Delayed or issues	Climate runs with a combination of new Surfex modules were delayed due to technical problems with Cy43h, but have now been completed and are being analyzed. This has led to delays in several tasks relying on the outcome of the climate runs.	44.75	38.50
	SU4	SURFEX: development of model components	Patrick Samuelsson	On track	Mostly on track. Glacier model developments were delayed/reprioritized due to decision within CARRA to use D95 rather than Extended Snow scheme.	16.00	17.25
	SU5	Assess/improve quality of surface characterization	Ekaterina Kurzeneva	On track	Mostly on track. Evaluation of ECOCLIMAP-SG has started, assessment within Harmonie-Arome is ongoing.	13.25	8.00
	SU6	Coupling with sea surface/ocean	Jure Cedilnik	On track	- A lot of work reported on the implementation of NEMO in MF, Slovenia and Sweden. - A coupling of Harmonie-Arome with the Wavewatch wave model has been realized by SMHI. Due to staff departure this work has stalled, however, with new staff at MetEireann this may be picked up again in 2019.	28.00	11.75

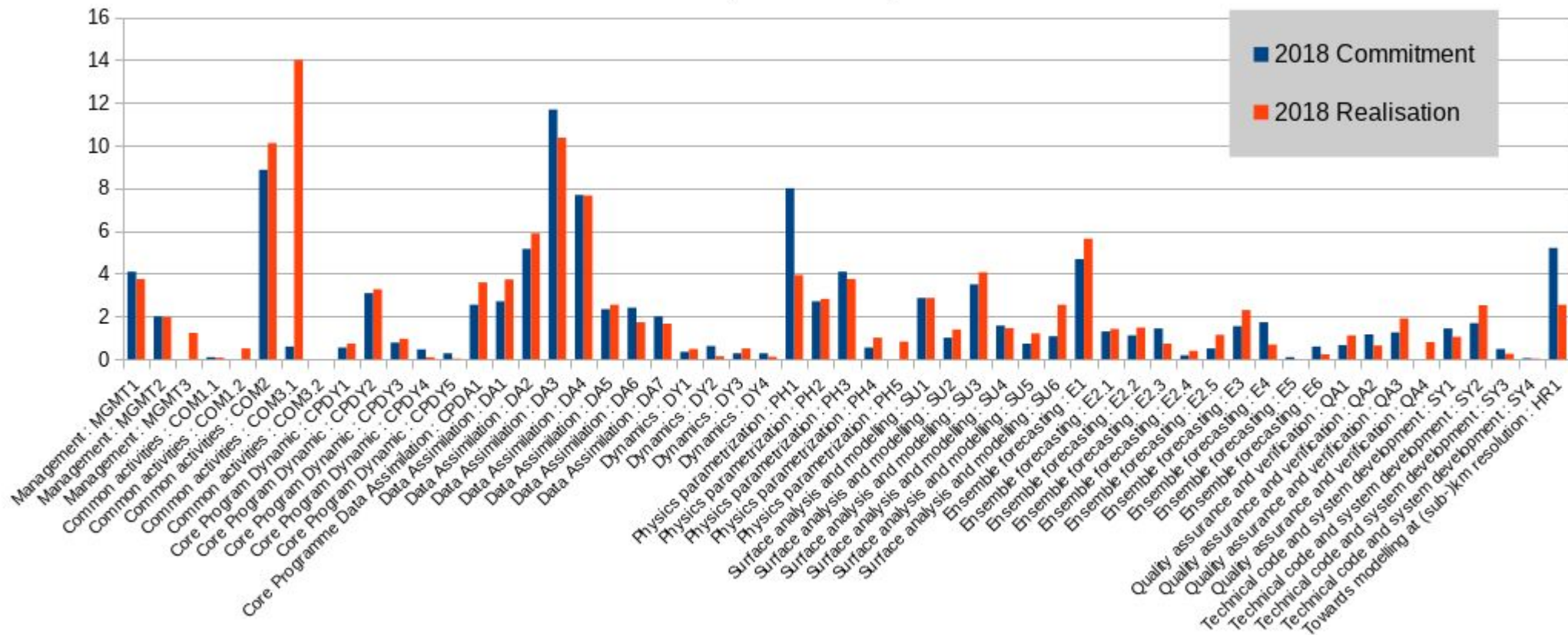
Ensemble forecasting and predictability	E1	Arome-France EPS (PEARO)	Claude Fischer	On track	The most noticeable aspect is the operational version of AEARO, and its use for initializing the ICs of the PEARO system. Preparation and porting of the CY43T2 PEARO version for the e-suite.	62.00	51.50
	E2.1	Development of convection-permitting ensembles: HarmonEPS - Physics perturbations	Inger-Lise Frogner	Delayed or issues	SPPT testing has been delayed but now has good momentum. SPP work is proceeding well. EPPES developments were stopped due to staff departure.	15.50	14.25
	E2.2	Development of convection-permitting ensembles: HarmonEPS - Initial conditions perturbations	Inger-Lise Frogner	On track	EDA work was completed. LETKF and Brand work is on track and will continue in 2019. Work on the intercomparison of these IC perturbation types is ongoing.	16.25	12.25
	E2.3	Development of convection-permitting ensembles: HarmonEPS - Surface perturbations	Inger-Lise Frogner	Delayed or issues	Work on surface field perturbations for SST and snow is on track. Work on surface physics parametrizations has waited for the new Surfex physics to become available in Cy43h2, and will start later this year.	8.00	15.75
	E2.4	Development of convection-permitting ensembles: HarmonEPS - Lateral boundary perturbations	Inger-Lise Frogner	On track	Research on options to improve ensemble spread with ENS LBC perturbations has continued into 2019. Activities on clustering have been completed.	4.25	2.00
	E2.5	Development of convection-permitting ensembles: HarmonEPS - HarmonEPS system	Inger-Lise Frogner	On track	HarmonEPS paper submitted to WAF with some delay. EPPES work stopped due to staff departure. Other activities have been completed or are on track.	12.50	5.50
	E3	Development of convection-permitting ensembles: LACE	Martin Belluš	On track	Work is ongoing in Hungary and Austria. Pre-operational suite for C-LAEF (convection permitting LAEF) in Austria expected in 2019	25.25	17.00
	E4	Development, maintenance and operation of LAEF	Martin Belluš	On track	ALADIN-LAEF 5km version in progress - ecFlow suite for pre-operational version soon available	7.50	19.00
	E5	Production and maintenance of GLAMEPS	Inger-Lise Frogner	On track	GLAMEPS production will stop after 1 July 2019.		1.00
	E6	Ensemble calibration	Inger-Lise Frogner	Delayed or issues	Preparations have been made for calibration in inhomogeneous terrain, but this has not yet been well tested. Site calibration for visibility has been developed for MEPS. Work to extend calibration to other parameters has been limited, partly due to the potential lack of consistent observations.	2.50	6.50

Quality assurance and verification	QA1	Development of HARP	Christoph Zingerle	Delayed or issues	Emphasis was put on new strategy (from R-scripts to R-packages) and reorganizing/rewriting package. Alpha version is available, work ongoing. QA1.2 was delayed due to people involved in QA1.1. Implementation of QA1.2 is foreseen also in 2019 and expected to be less demanding within the new framework.	12.25	7.25
	QA2	Development of new verification methods	Christoph Zingerle	Delayed or issues	Documentation of available Data and Methods delays as focus was on QA1. New person entered the task and decided to be shifted to 2019. Developments of new methods is ongoing.	7.00	12.75
	QA3	Quality assessment of new HARMONIE-AROME cycles and alleviation of model weaknesses	Bent Hansen Sass	On track	Quarterly validation reports are produced routinely. Pre-release validation and verification for Cy43h2.1 will start soon. A Harmonie User Workshop has been held to foster interaction with forecasters, and it has been agreed that this will be continued on a yearly basis.	21.00	13.75
	QA4	Verification and quality control at MF : development of new methods or products	Joël Stein, Claude Fischer	On track	- development of a new control library to assess Météo-France products (in replacement of our old codes that have upgradability/performance issues) - publication of a scientific paper on how to account for neighborhoods in contingency tables : "Neighborhood-based contingency tables including errors compensation", by Stein and Stoop. - research activity on track on how to include neighborhoods in probabilistic scores.	8.75	

Technical code and system development	SY1	Code optimization	Daniel Santos	On track	Note that single precision has been technically tested in Arpège and Arome forecasts in CY43T2. Such efforts will have to be repeated in future cycles.	11.50	15.75
	SY2	Maintenance and development of the Harmonie Reference System	Daniel Santos	Delayed or issues	Most tasks have been completed or are on track. The preparations for the introduction and testing of new components in Cy43h2 have been delayed due to technical issues with Cy43h, but this has now begun.	27.75	18.50
	SY3	Revision of the Harmonie scripting system	Daniel Santos	Delayed or issues	Some actions on this have started but on others ideas still need to be developed more. Will be continued in 2019.	2.75	5.25
	SY4	Hirlam maintenance and support	Daniel Santos	Completed	This work package has been deleted in the 2019 RWP.	0.25	0.50
Towards modelling at (sub-)km resolution	HR1	(Sub)-km configurations and turbulence R&D activity	Sander Tijm & Martina Tudor & Petra Smolikova & Claude Fischer	On track	J: Tasks related to km- and hectometric-scale experimentation with Harmonie-Arome are mostly on track. Coupling of Harmonie-Arome with LES has been delayed. Stochastic physics has not been worked on (no staff available).	28.00	57.25

Manpower (in F.T.E.) in 2018 RWP Work Packages

Committed in RWP2018, Reported in manpower DataBase in 2018



2018 reported manpower by Work Packages

