

7.1 Discussion common meeting

P. Termonia

FROM SCIENCE TO OPERATIONS



“MANDATE” GA 2013 (minutes)

The GA agreed on going toward a common governance, but not for the next MoUs.

The GA agreed on common meetings (HAC/PAC as in May 2013, next Council/GA).

The GA asked the Task Force (the ALADIN, HIRLAM and LACE PMs, the chairpersons of HAC, PAC and CSSI) to set clear directives for the renewal of MoUs, considering still two separate MoUs. The Task Force should identify which points should be addressed in the common parts (to be presented and discussed at the next joint HAC/PAC meeting) and reported at the next GA/Council).



Merge: historical review since last GA

- Last year GA:
 - not go for a merge at the next MoUs, but make preparations
 - Input from LACE!
- Meeting in Brussels (14/2/2014) by the Task Force
- Analysis of LACE included, new document presented to PAC, see appendix preparatory document.
- Synthesized in a “blueprint” diagram: accepted by PAC
- Presented to the HIRLAM Council this summer
- Presented to HIRLAM Advisory Committee in November
- Several actions were taken to test the feasibility of the proposals (physics-dynamics action, HARMONIE WW, Forecasters meeting).



Questions

- Where do we want to get: **a European CODE COLLABORATION?**
- How?
- How shall we organize ourselves?

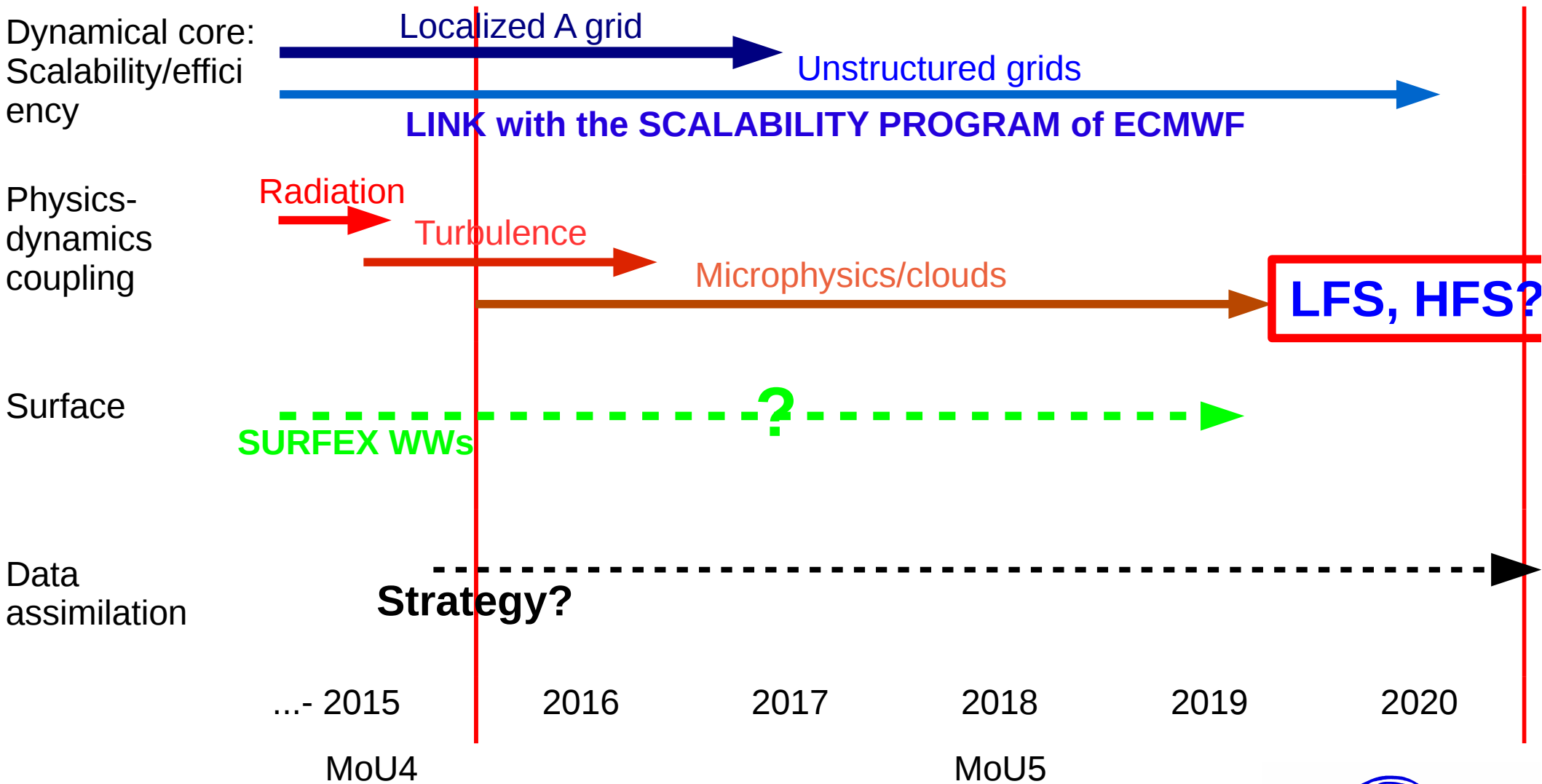
Three diagrams



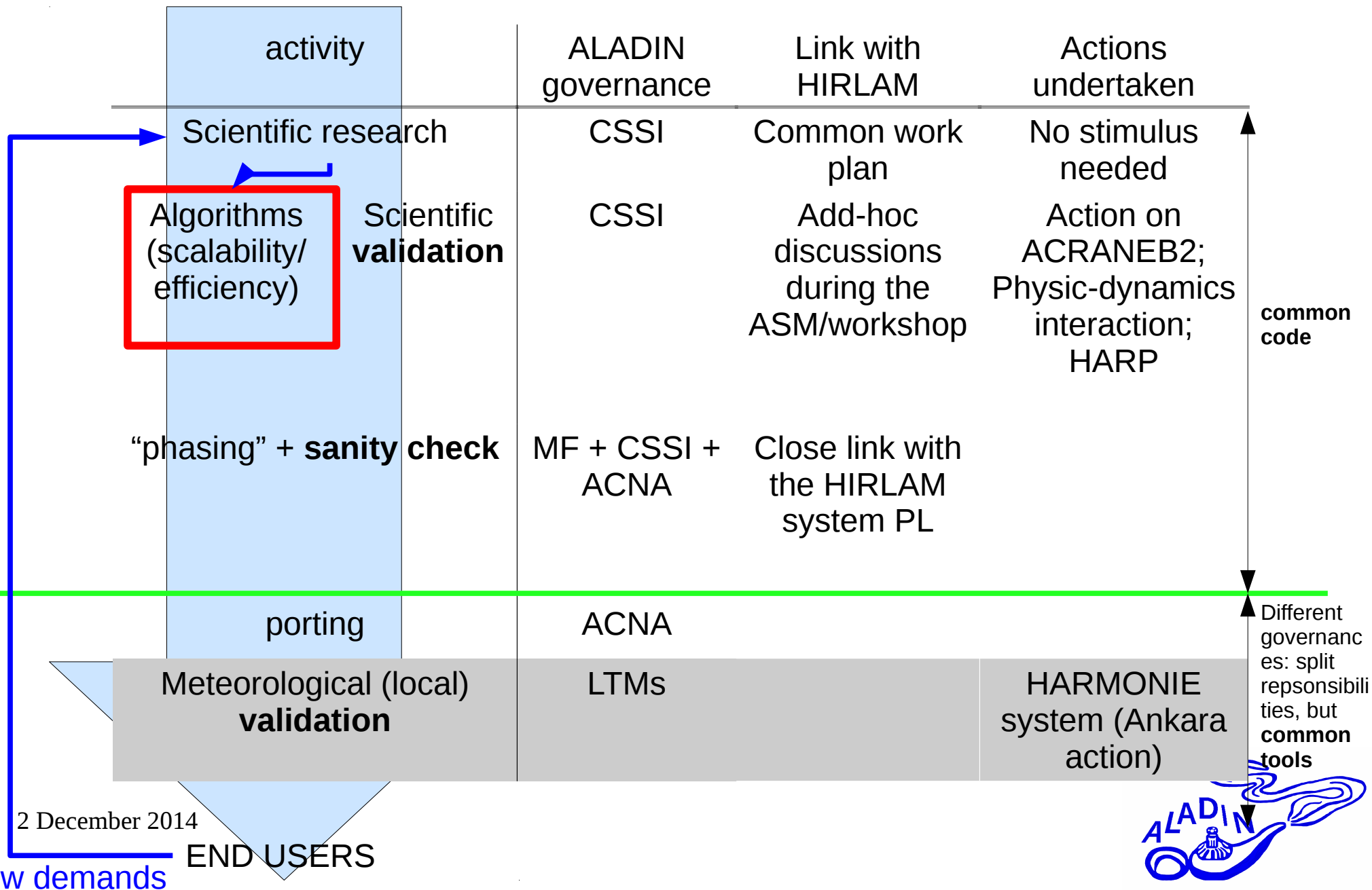
Do we have a “seamless” system?

	Reanalysis	Numerical Weather Prediction		Climate
<i>Global</i>	ERA-40 ERA-Int, ...	IFS	ARPEGE	ARPEGE-clim, CNRM CMIP runs
<i>Meso scale</i>	Downscaling		ALADIN	ALADIN-climate ENSEMBLES, CORDEX, ...
<i>Convection permitting</i>			HFS, LFS?	ALARO
			AROME	AROME-climate

ALADIN PAC: roadmap needed for the code development to be concretized at the next ALADIN GA(/HIRLAM Council)



From science to operations summarized on 1 sheet



Current MoU

2 December 2014



Definitions on code

4. *The following definitions are used in this MoU:*

i. *The ALADIN System is defined as the set of pre-processing, data assimilation, model and postprocessing/verification software codes, tools and data shared by all Members and available to each Member and acceding Member for producing and using the best possible operational mesoscale forecasts based on a configuration compatible with its available resources.*

ii. *The ALADIN System is composed of shared software codes of three different types:*

- *the ALADIN Common Codes, defined as the codes jointly developed and maintained by the Members and the ALADIN acceding Members referred to in Article 3;*
- *the ALADIN Co-owned Codes defined as the codes jointly developed and maintained with other consortia or partners and co-owned by the Members and these consortia or partners (e.g. the Common ALADIN-HIRLAM Code);*
- *the ALADIN Shared Third-Party Codes contributed and owned by partners, other consortia or third parties who have granted appropriate rights to the Members for the use of such codes for the implementation of this MoU.*

iii. *A Version of the ALADIN System is any release of the ALADIN System present in the ALADIN code repository for research and development including operational purposes, or any subset of code anticipated to become part of the Common Codes.*

iv. *A **Configuration of the ALADIN System** is a subset of ALADIN Codes used by a Member or acceding Member for its own implementation.*

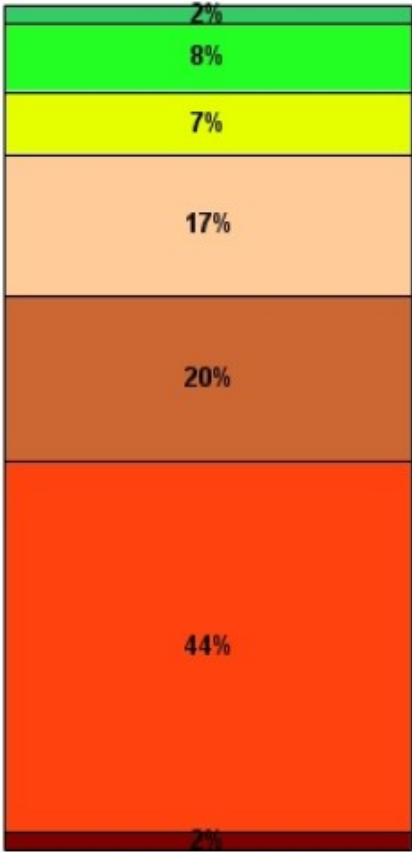


Role of the ALADIN PM

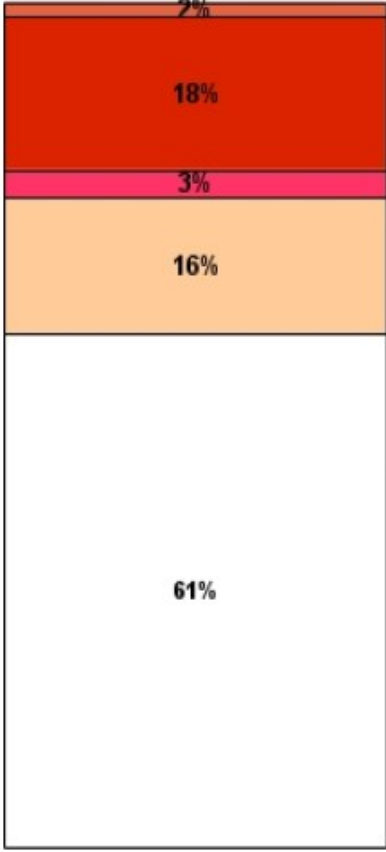
52. *The Programme Manager shall supervise the definition and the evolution of the ALADIN System, with respect to the agreed plans and the collaboration activities (IFS/ARPEGE, HIRLAM, any further collaboration possibly undertaken by the Programme).*



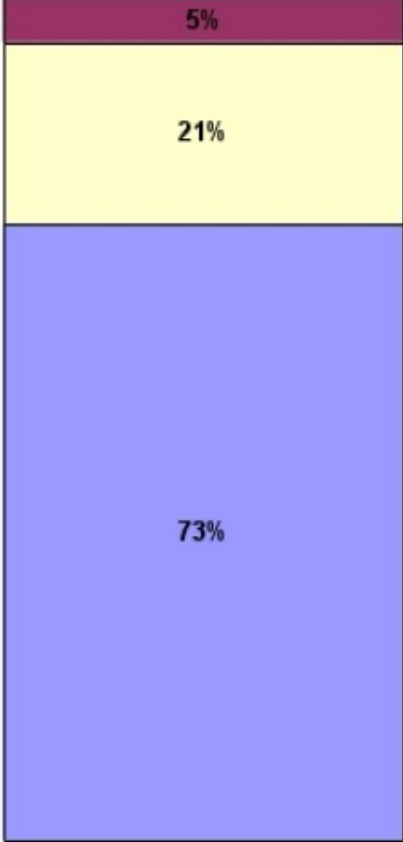
Type of work realised (manpower between January 2012 and June 2014)



- Tution
- Networking
- Operational
- Maintenance
- Validation
- Development
- Training



- Parallelization optimization
- Code development
- Code design
- Code maintenance
- None



- Other
- Local appl.
- Direct work



Ownership and rights

72. *The ALADIN Common Codes, along with all related intellectual property rights, shall be owned by the Members and acceding Members in proportion to their respective cumulative manpower contributions, as recorded by the GA, without prejudice to the intellectual property rights for those parts for which a single originator can be identified.*

75. *Any Member contributing code or software to the ALADIN System, without being the formal owner or right-owner of that code or software shall guarantee that the rights to use such code and software for the implementation of this MoU are granted to the Members, and inform the GA in advance of any restriction affecting the possible use of that code or software by the Members.*

78. *Each Member and acceding Member shall have:*

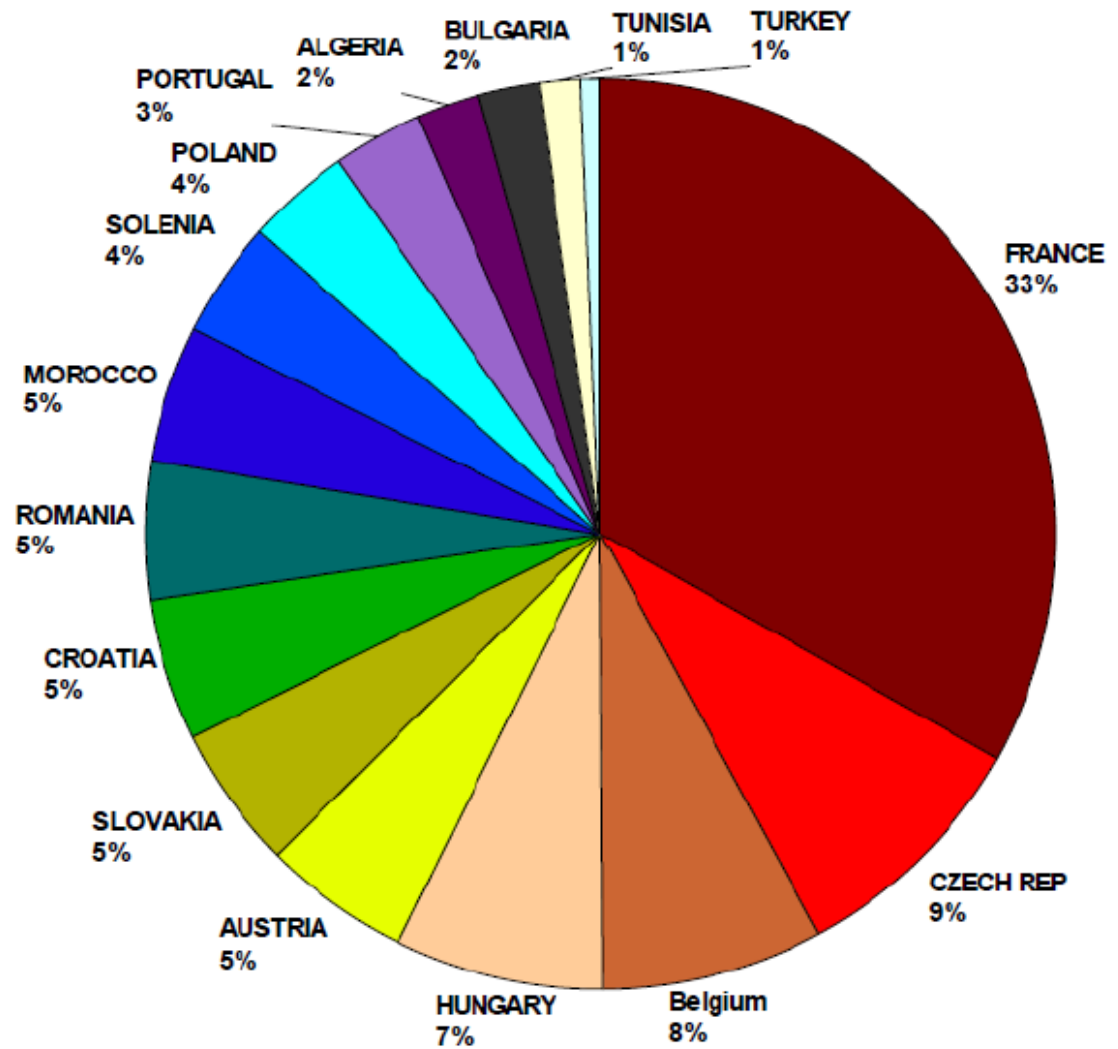
- i. full access rights to the ALADIN System source code, including rights to modify codes for the implementation of its own Configuration;*
- ii. full responsibility for and control of the Configuration(s) of the ALADIN System implemented for its research and/or operational requirements and any use authorised by this MoU, provided that such implementation is compliant with agreements signed by the Members or one of them for the execution of this MoU. In particular, compliance is required to the terms and conditions of the ECMWF/Météo-France agreement for ARPEGE/IFS software protection agreement (see Annex II).*



Total participation in the ALADIN project

Breakdown
of the
person.months
by
country

52 (Full Time Equivalent)
persons in average since 1991
(>80 FTE in the last years)



A few points from the ALADIN and LACE MoUs

- ALADIN:
 - The **ALADIN System** is defined as the set of pre-processing, data assimilation, model and postprocessing/verification software codes, tools and data shared by all Members and available to each Member and acceding Member for producing and using the best possible operational mesoscale forecasts based on a configuration compatible with its available resources.
 - The Programme Manager shall supervise the definition and the evolution of the ALADIN System, with respect to the agreed plans and the collaboration activities (IFS/ARPEGE, HIRLAM, any further collaboration possibly undertaken by the Programme).
- LACE:
 - AL is responsible for the applicability of the R & D results in ALADIN. In coordination with ALADIN-LACE System Coordinator the AL will be responsible for implementation of the relevant developments to the ALADIN library.
 - The ALADIN-LACE System Coordinator ASC is responsible to collect the validated code developments done by the scientists under organization of RC LACE and verify that the coding standards of IFS/ARPEGE/ALADIN are respected.



Agreement with HIRLAM

The shared ALADIN-HIRLAM System shall mean the complete code that is necessary for executing all configurations that are part of the agreed collaboration according to this Agreement. The ALADIN-HIRLAM System is composed of shared codes of four different types:

- the ALADIN Common Codes, defined as the codes jointly developed, maintained and owned by the ALADIN Consortium;*
- the HIRLAM Common Codes, defined as the codes jointly developed, maintained and owned by the HIRLAM Consortium;*
- the ALADIN-HIRLAM Common Codes defined as the codes jointly developed and maintained by both consortia;*
- Other ALADIN-HIRLAM codes that are either co-owned or owned by third parties and shared under relevant provisions of agreements concluded by either consortium or by Member(s) thereof with such third parties extending rights to both consortia.*



HIRLAM MoU

The Harmonie system is the non-hydrostatic mesoscale model code and system ensuing from the collaboration with ALADIN within the IFS framework.



Code Agreement: one sentence to be discussed

7.1 ALADIN and HIRLAM will co-operate in a number of areas. The co-operation, initially organised around the shared ALADIN- HIRLAM System defined above, will evolve towards a full ALADIN-HIRLAM Common System based on common codes. At a precise stage during the term of this Agreement and after successful collaboration, all of the respective ALADIN and HIRLAM Common Codes will be regarded as ALADIN - HIRLAM Common Codes upon a joint decision by the ALADIN Assembly and HIRLAM Council, including appropriate arrangements for co-ownership. Both Consortia will seek arrangements with third parties to convert other shared codes into ALADIN -HIRLAM Common Codes.



ToR Code Architect

Option 1: 0.5 FTE, stream two

1. The ALADIN/HIRLAM Code Architect shall technically assist the ALADIN PM in supervising the definition of the ALADIN System, see, Art. 52.¹
2. This includes the following tasks; the Code Architect (CA)
 - will finalize the physics-dynamics action;
 - will document the scientific consistency between different physics packages and the dynamics;
 - propose technical solutions to implement new pieces of code in the model code, consistent with the common numerical frame (including the physics-dynamics interface and the constraints from the time step organization);
 - will execute a 5-y engineering program to define a Limited-Area Forecast System (“brand” to be decided), according to the road map put forth in Fig 2;
 - will monitor the definition of the two *canonical model configurations* ALARO and AROME
3. The CA will de facto be part of CSSI and will work in close collaboration with ACNA.

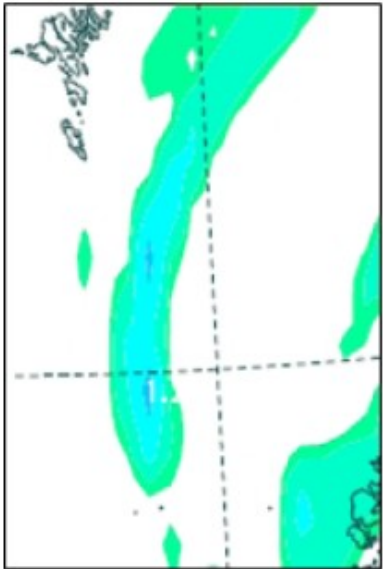


Do we have a “seamless” system?

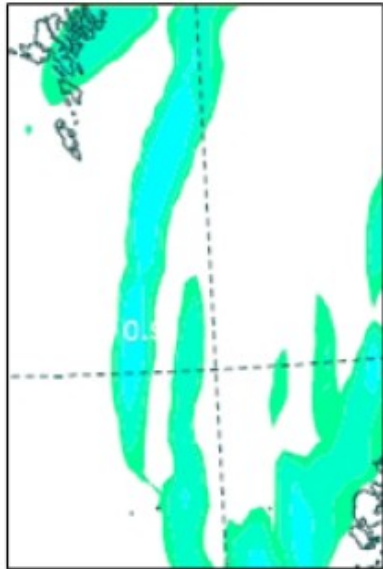
	Reanalysis	Numerical Weather Prediction		Climate
<i>Global</i>	ERA-40 ERA-Int, ...	IFS	ARPEGE	ARPEGE-clim, CNRM CMIP runs
<i>Meso scale</i>	Downscaling		ALADIN	ALADIN-climate ENSEMBLES, CORDEX, ...
<i>Convection permitting</i>			HFS, LFS?	ALARO
			AROME	AROME-climate

Seamless in the in a “multiscale” sense

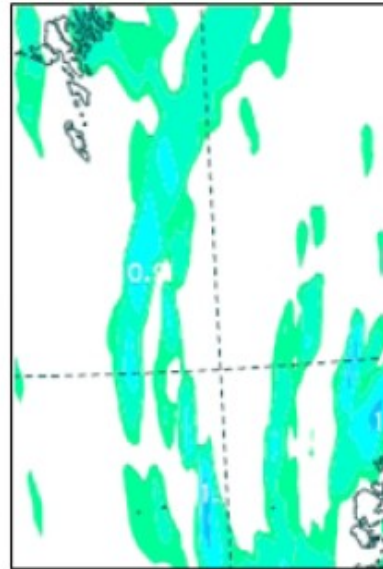
$\delta x=16\text{km}$



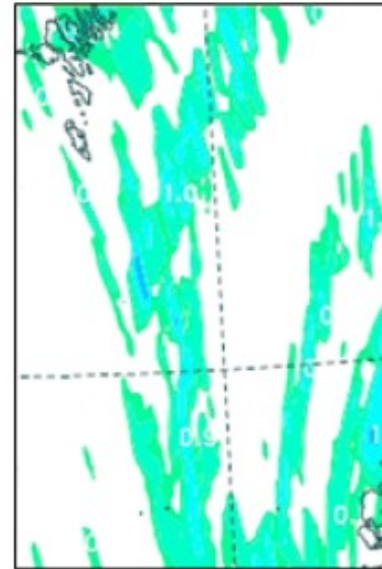
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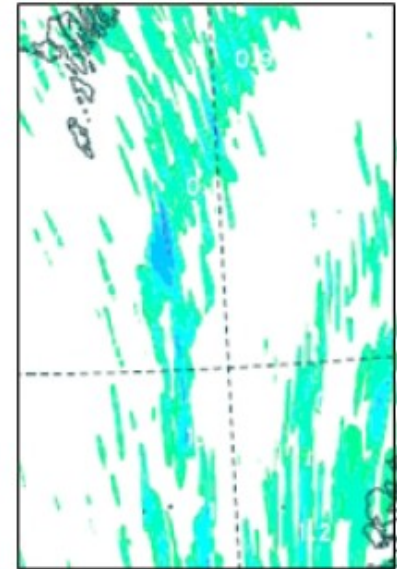
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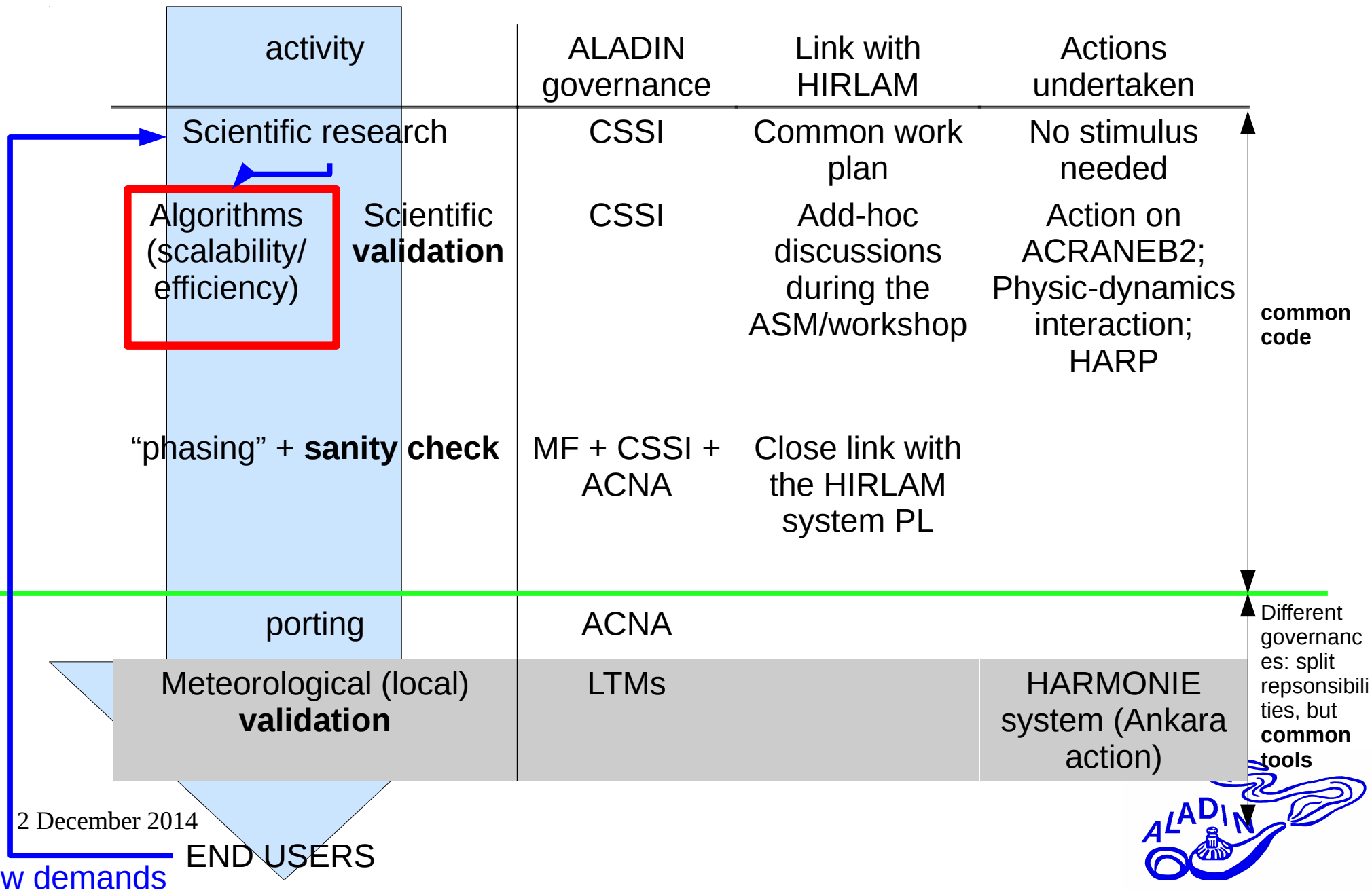
$\delta x=2\text{km}$



$\delta x=1\text{km}$



From science to operations summarized on 1 sheet

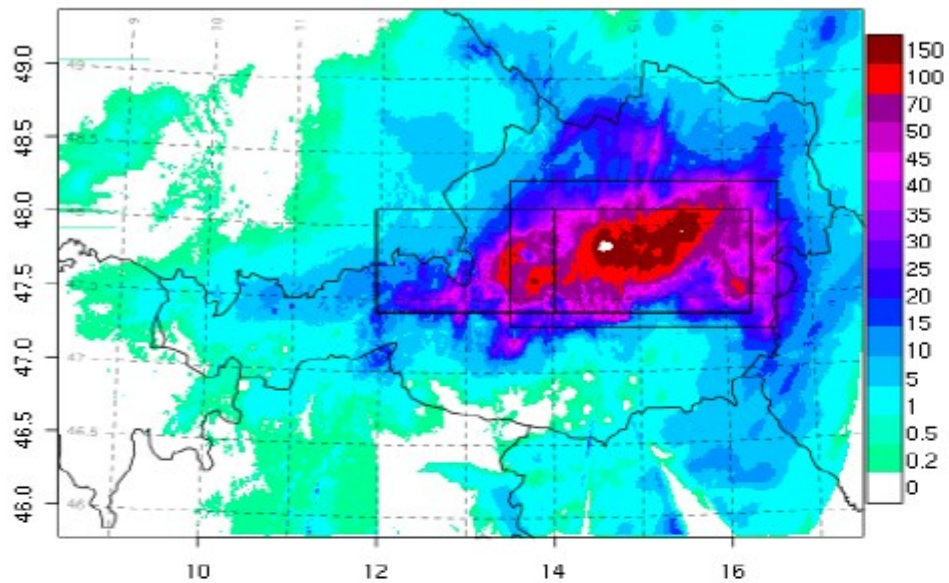


Tools (for quality control): APMT, HARP, HARMONIE system tools

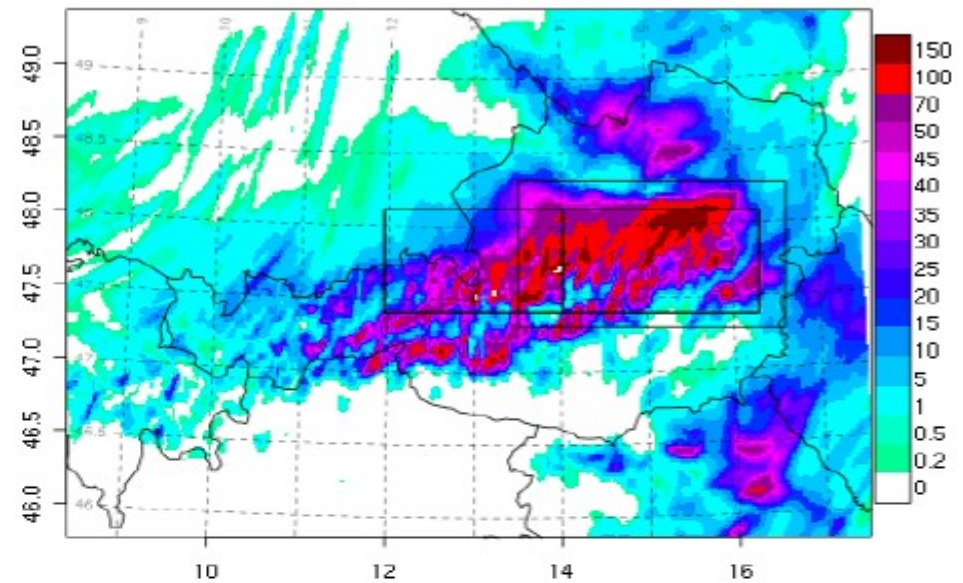
	Compute scores on the fly	Monitoring of the applications in the countries	Validation of new cycles	Science verification	Verify fields or pointwise
ALADIN Performance Monitoring Tool in Ljubljana (APMT)	yes	yes	no	no	pointwise (station data)
HARP	yes	yes (through APMT)	no	yes	both
HIRLAM verification tool: The HARMONIE system	no	no	yes	yes	pointwise

Forecasters meeting 2014:

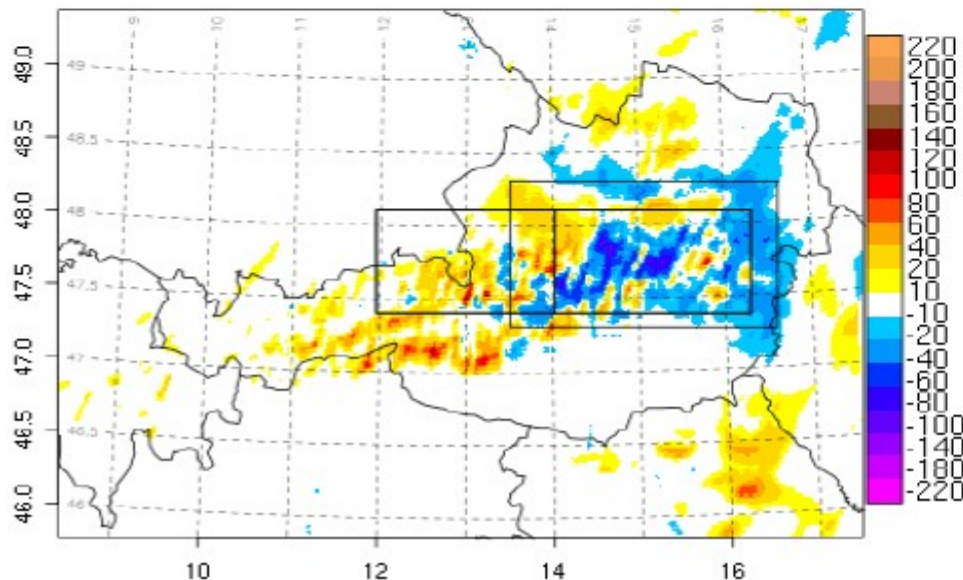
24h precip. INCA 2014051700



24h precip. AROME 2014051600+24



24h precip.diff. AROME 2014051600+24 minus INCA



SAL für Region NORDSTAU_NOE_OOE:

Structure:	-0.11	Mean Sum Forecast [mm]:	40.14
Amplitude:	-0.00	Mean Sum INCA [mm]:	52.37
Location:	0.05		

Contingency Table %: Threshold=50mm

Hits:	0.34
False Alarms:	0.14
Missed:	0.11
Corr. Negatives:	0.42

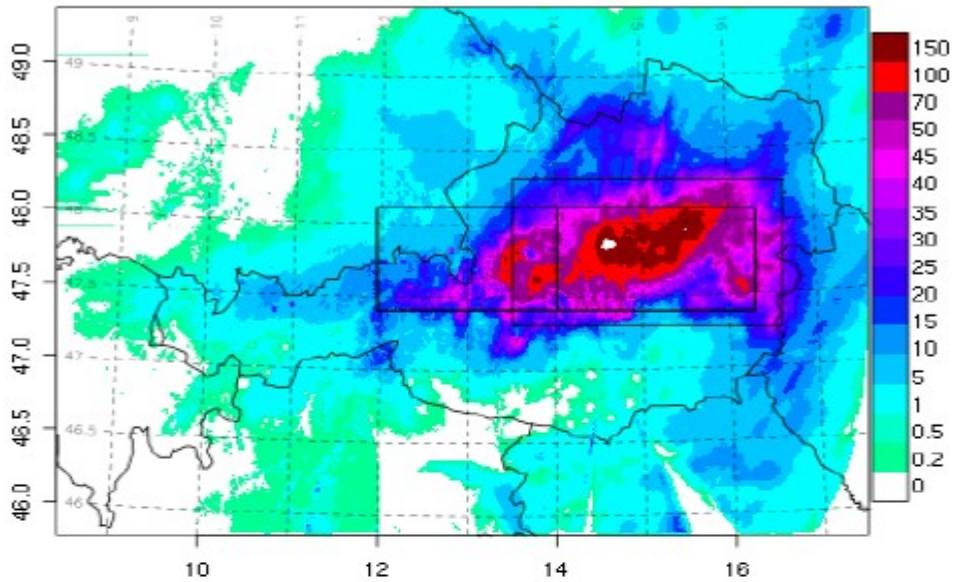
RR-class: 4 - Convective Large-Scale

Courtesy C. Zingerle

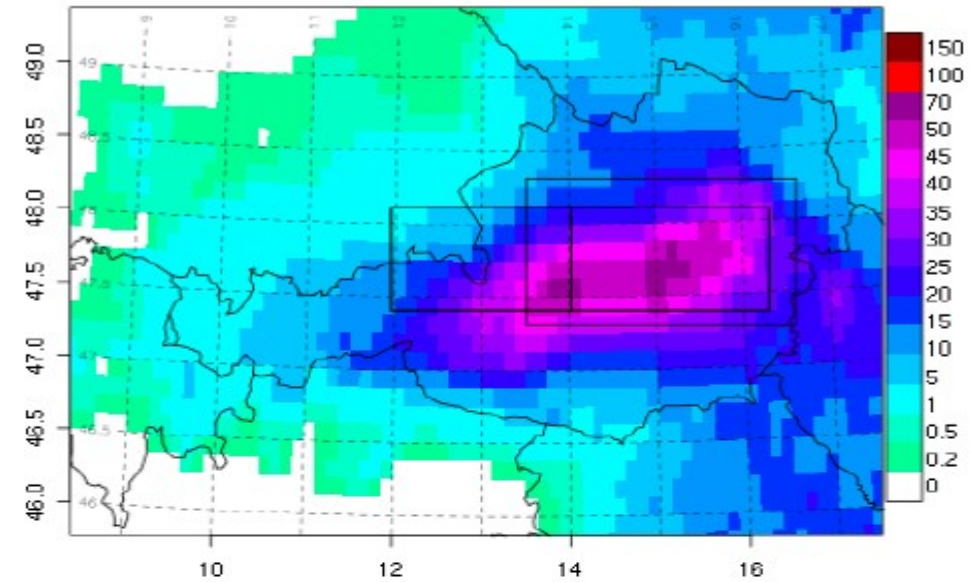


Forecasters meeting 2014

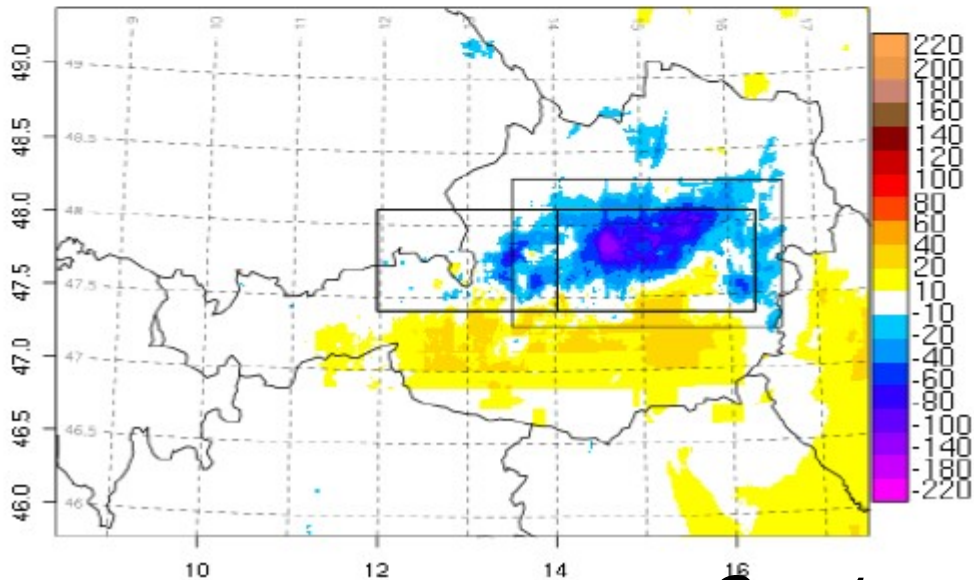
24h precip. INCA 2014051700



24h precip. ECMWF 2014051600+24



24h precip.diff. ECMWF 2014051600+24 minus INCA



SAL für Region NORDSTAU_NOE_OOE:

Structure:	0.74	Mean Sum Forecast [mm]:	36.89
Amplitude:	-0.35	Mean Sum INCA [mm]:	52.37
Location:	0.05		

Contingency Table %: Threshold=50mm

Hits:	0.04
False Alarms:	0.01
Missed:	0.4
Corr. Negatives:	0.54

RR-class: 4 - Convective Large-Scale

Courtesy C. Zingerle



Forecasters meeting: conclusion

- The meeting was too short. We will organize one next year!
- General improvements in the high resolution w.r.t. the global model
 - Precipitation: build a portfolio of cases
 - Wind
- Bad cases will be reported back to the workshop
- Blocking point: the human is not capable of smoothing out spatial probability, in other words forecasters are not capable of interpreting high-resolution model output in a probabilistic sense.
- Topic for next year: high-resolution EPS systems. (cfr. endorsement of the SRNWP EPS program).



ACNA business: porting the model to the countries, an example

list of countries	response	type of tests	results
Algeria	-		operational model runs in Toulouse
Austria	-		coupling with ecmwf
Belgium		only clim files	intensive testing of bull clim files
Bulgaria			parallel suite run regularly, no technical problem, nothing special on the forecast. LBCs are not zipped.
Croatia			results with new LBC files compared with operational forecast and no meteorologically significant difference found
Czech R.		5days assim + 7days assim+prod	deterioration, bad scores namely for G and wind, getting worse with forecast range after +24h.
France	-		
Hungary			tests performed and differences in the forecast and also in the input lbc files reported (T fields), bigger than in original off-line test. similar for PEARP
Morocco			Scores (bias, rmse : T2m, H2m and WIND 10m) calculated for 18 days show no significant changes in operational ALADIN model using NEC vs BULL-mirror LBC
Poland			test carrying down but no results provided yet due some local problems
Portugal	no response		
Romania			5days period (25.-29.11.) tested, differences in meteorological fields reported (mslp, prec, G500hpa), mostly pronounced on 25.-26.11.
Slovakia		5days assim + 12days assim+prod	significant worsening of scores, namely upper air and longer forecast range. complementary test with lbc from nec but using bull clim in e927 rather ok =>bull clim not guilty
Slovenia		technically	technically working, plans for 2weeks suite delayed
Tunisia			decrease in wind scores, no impact on precip and temperature parameters
Turkey	no response		



New “demands”: examples

- ACRANEB2 (done) [ACRANEB is the radiation scheme used in ALADIN and still used in ALARO, it has been further developed mostly by J. Mašek into a new version, ACRANEB2]
- RACMO input [KNMI developments on turbulence]
- aerosols; cfr. workshop in Toulouse last year.
- new options for LBC v/s code overhaul of the existing LBC solution (eg. for OOPS)
- New microphysics from HIRLAM for fog (works for Finland but not for Hungary and vice versa)



An unofficial strongly needed activity: *code architecture*

- Last year in Reykjavik there was a question: *what model are we running?* AROME, ALARO ...
- This led to a dedicated action.
- First “deliverable”: ACRANEB2 is phased to the AROME configuration (as requested by HMG last year in Reykjavik) by Jan Masek. The exercise for radiation is relatively easy compared to the “moist” part, BUT the “methodology” (stepwise approach, follow-up meetings with webconfs, meeting in Toulouse, care of cycles) works so far. Next step: turbulence
- Evolve towards a “WRF-ish” **HARMONIE Forecast System (HFS)?**
- This is also a **scientific testbed!**

Synthetic time table:

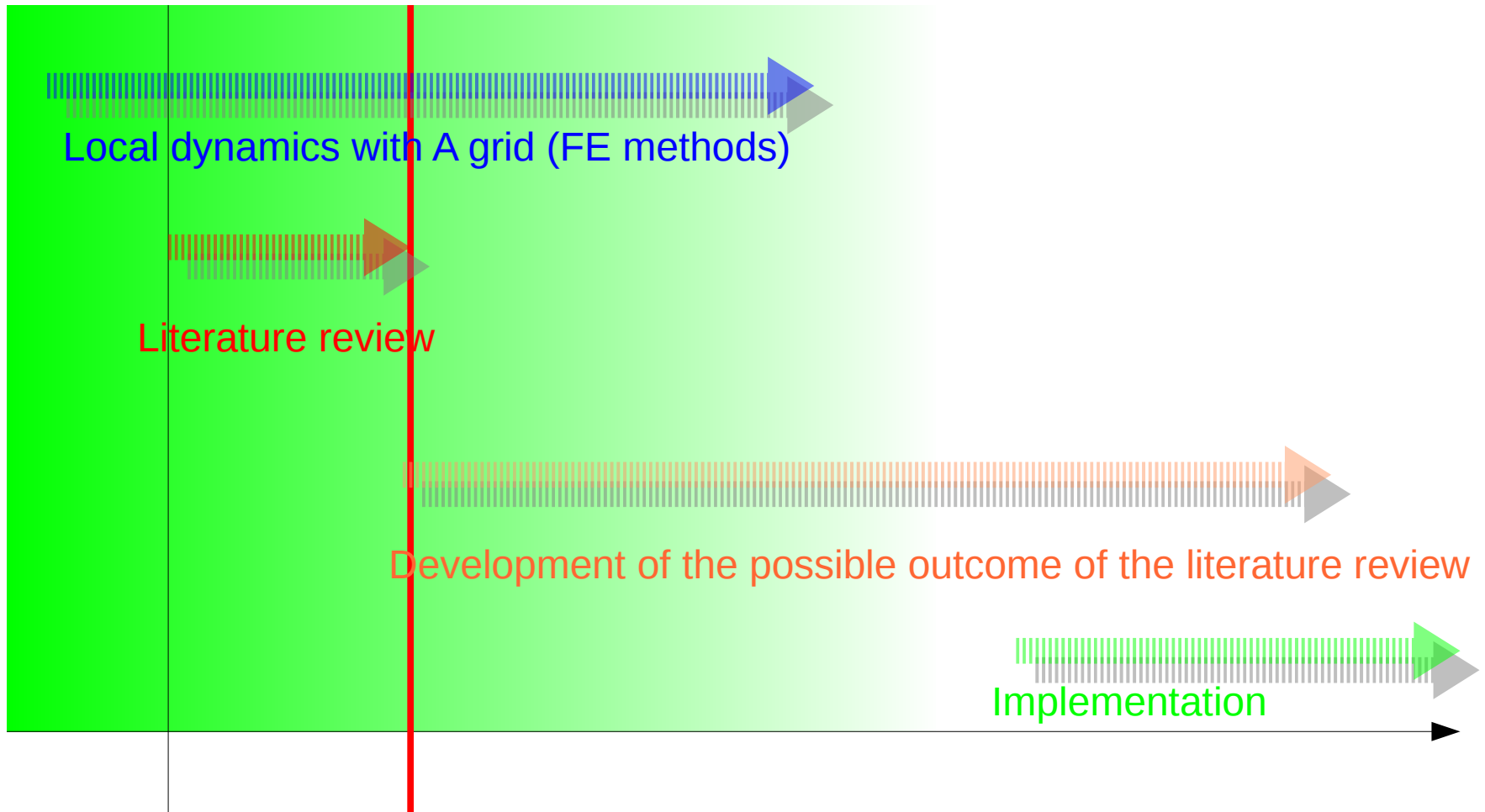
	Calendar (months/meetings)											
	2013						2014					
	5-6	WW Brussels (24-28/6)	7-9	CSSI/HMG (video)meeting	10-11	General Assembly (14-15/11)	12	1-4	ALADIN workshop/ASM	4-5	PAC/HAC	
Action 1: CPTEND_FLEX	█	█										
Action 2: r vs. q, T vs. theta	█	█	█									
Discuss analysis of action 2				█								
Action 3: Cleaning of APLPAR	█	█	█	█	█	█	█					
Action 4: Redesign of APL_AROME, APLPAR								█	█	█		
Report progress to GA about action 1 to 3.						█						
ALADIN WS/HIRLAM ASM : present analysis of action 4								█	█			
PAC/HAC : provide advice on the scenario's of action 4											█	



Dynamics: road map

Eliminating the A grid means we have to overhaul the whole system.

We stay with the current system at least for the term of the current strategy plan (green area).



2012
2 December 2014

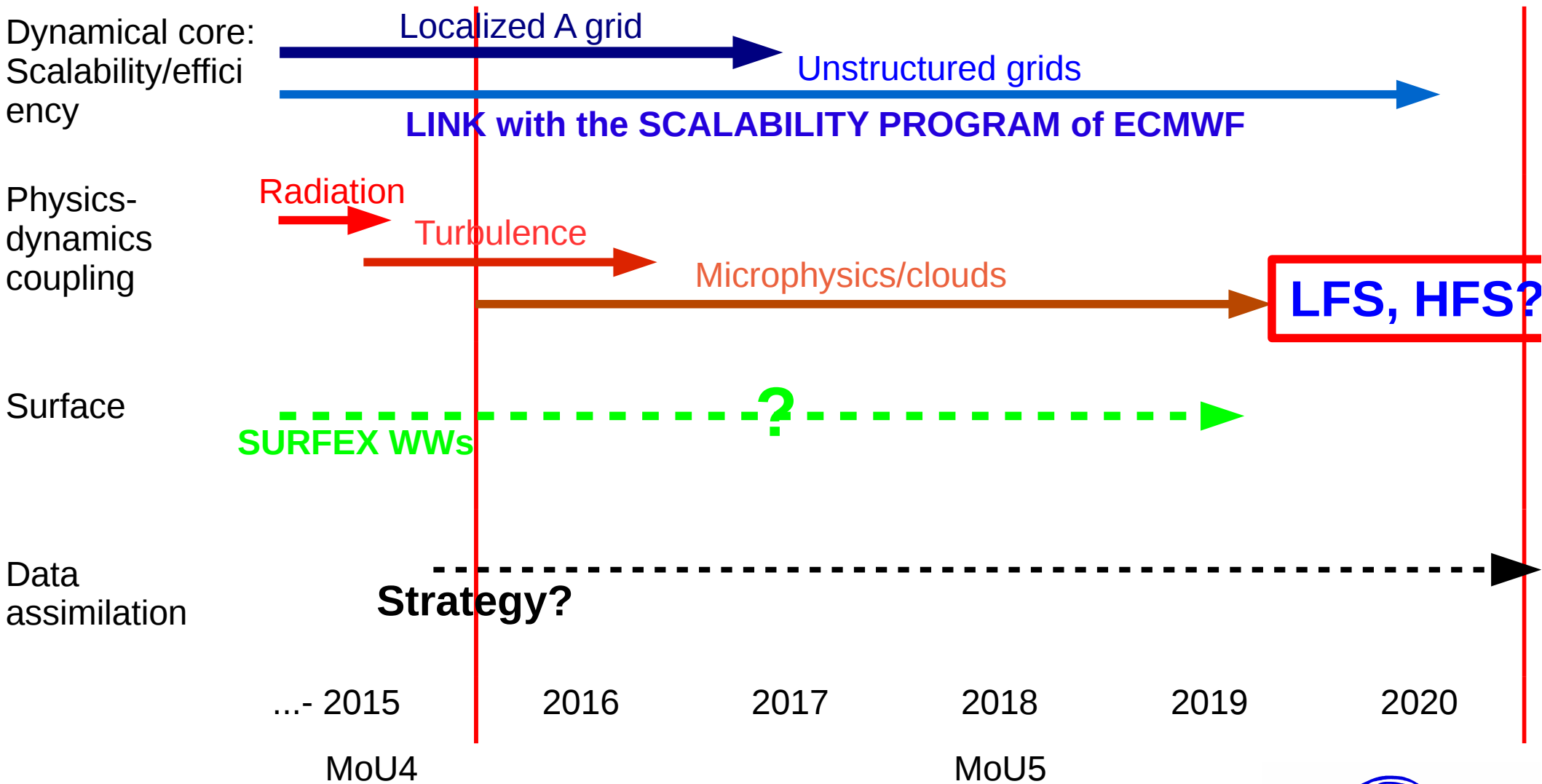
2014

2017-2020

2025



ALADIN PAC: roadmap needed for the code development to be concretized at the next ALADIN GA(/HIRLAM Council)



Data handing, outside of the diagram on slide 3

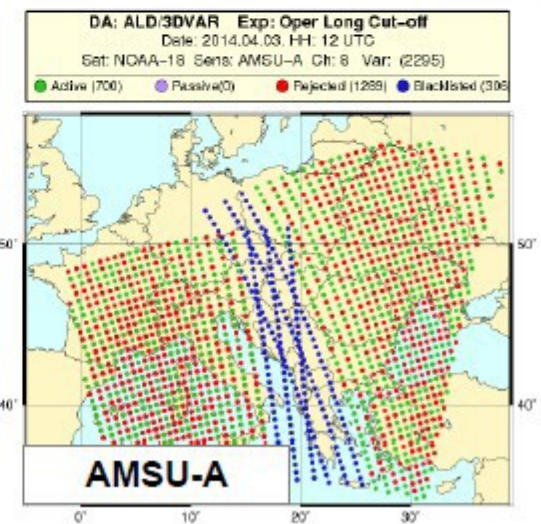
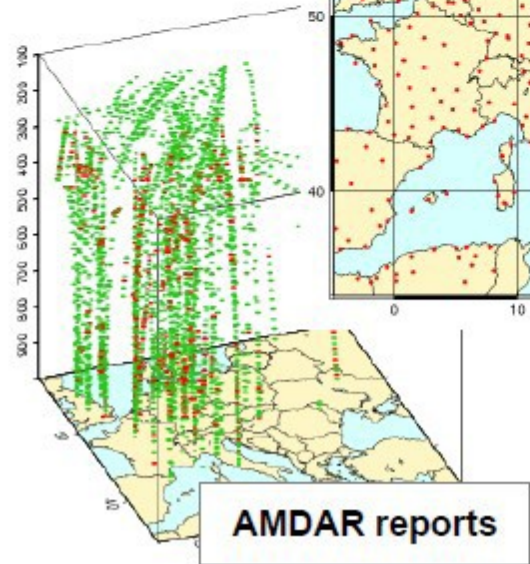
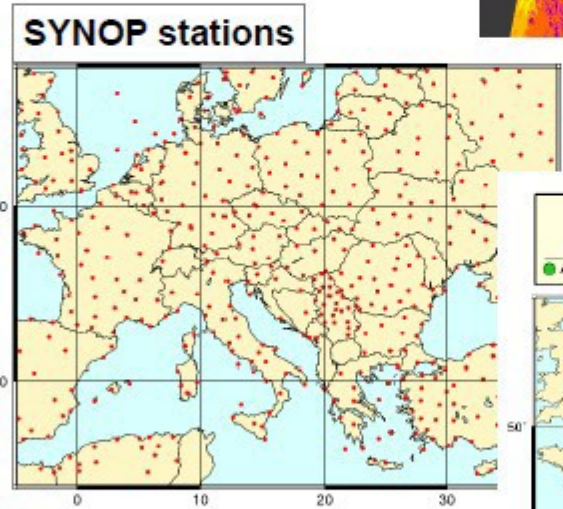
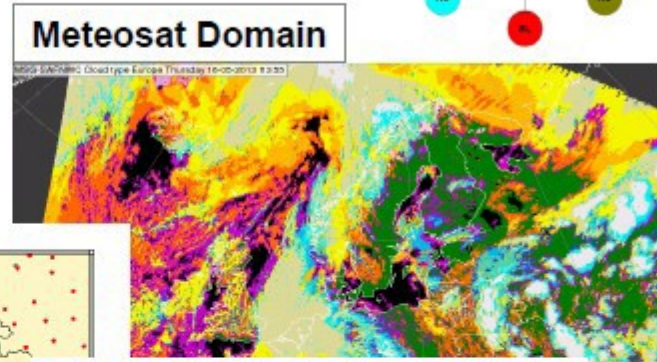
- Data policy (should be handled transversally across the two/three consortia)
- Exchange of “local” data, e.g. radar data
 - Could be treated by subgroups.
 - An example is the OPLACE system developed by LACE, see presentation of Yong.
- Note that data assimilation is closely linked to data exchange.



OPLACE



- Samples:



Code Architect option 2

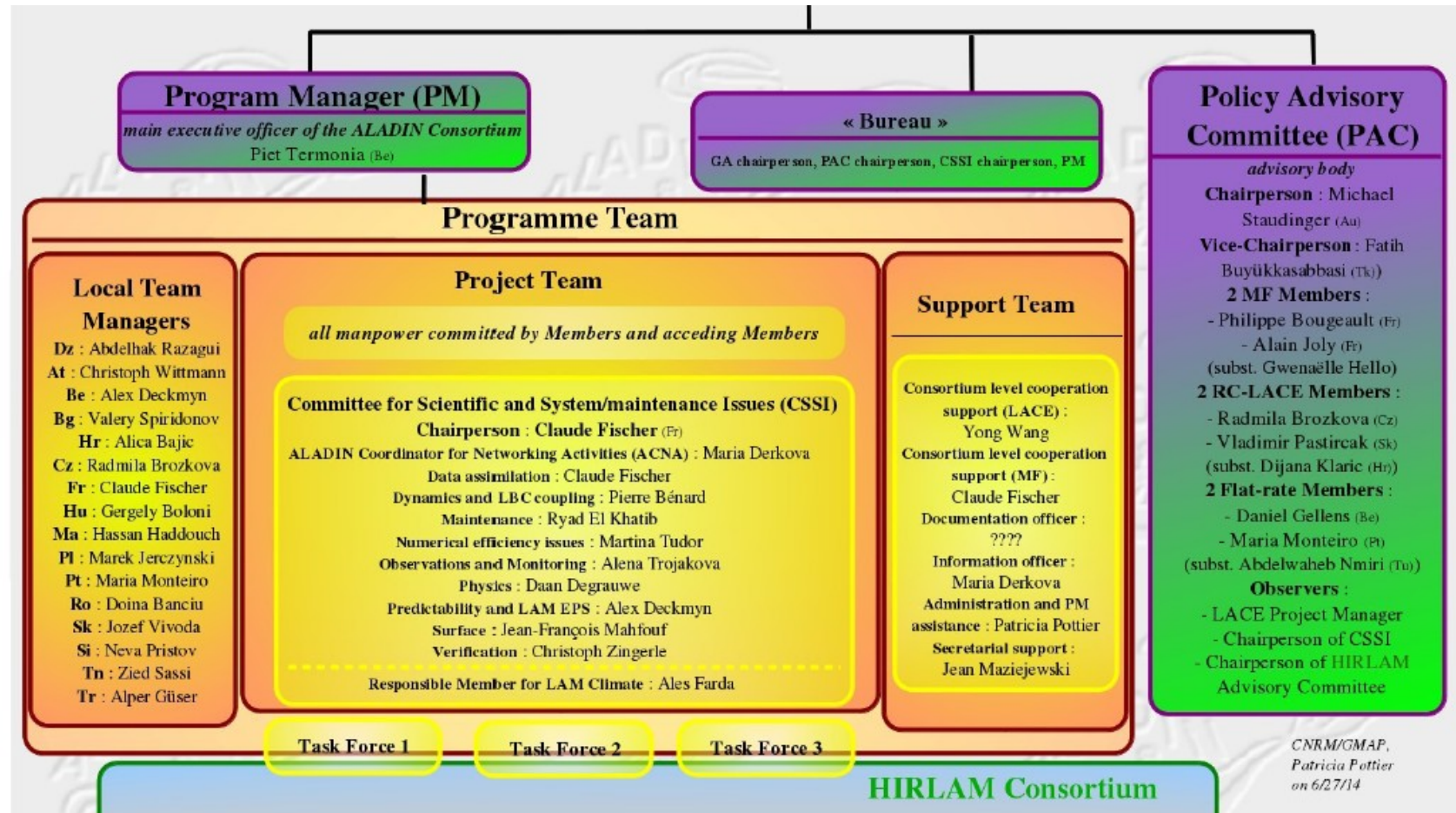
Option 2: 1 FTE, stream one and stream two

For this option. ToRs are extended:

1. The ToRs of option 1, and
2. the follow up of the technical LAM aspects of the ECMWF scalability program (OOPS code work, COPE, Polymitos, HERMES).



Current ALADIN Governance



CNRM/GMAP,
Patricia Pottier
on 6/27/14



From science to operations summarized on 1 sheet

CA

activity	ALADIN governance	Link with HIRLAM	Actions undertaken
Scientific research	CSSI	Common work plan	No stimulus needed
<div style="border: 2px solid red; padding: 5px; display: inline-block;"> Algorithms (scalability/efficiency) </div> Scientific validation	CSSI	Add-hoc discussions during the ASM/workshop	Action on ACRANEB2; Physic-dynamics interaction; HARP
"phasing" + sanity check Canonical model configs	MF + CSSI + ACNA	Close link with the HIRLAM system PL	
porting	ACNA		
Meteorological (local) validation	LTMs		HARMONIE system (Ankara action)

common code

Different governances: split responsibilities, but common tools

2 December 2014

END USERS

New demands



Next steps

- The present ALADIN MoU is very well written: no major overhaul needed
- Agree on the three diagrams (should define the coordination modus between the two consortia)?
- Scrutinize the current MoU.
- Include CA and revisit the role of CSSI.
- Changes to the Agreement with HIRLAM can only be possible given further merger. Remove the sentence on the common ALADIN-HIRLAM code.
- First draft somewhere around in March.
- Consult the LTMs during the workshop (13-16 April) if needed [they were already informed about during the EWGLAM meeting in September]
- First version to PAC (May 21-22)

