ALADIN

Piet Termonia

EWGLAM

Rome, 3/10/2016

http://www.cnrm-game-meteo.fr/aladin/

Happy birthday ALADIN!

MINISTERE DE L'EQUIPEMENT, DU LOGEMENT,
DES TRANSPORTS ET DE LA MER

DIRECTION DE LA METEOROLOGIE NATIONALE

COPIE

27 NOV. 1990

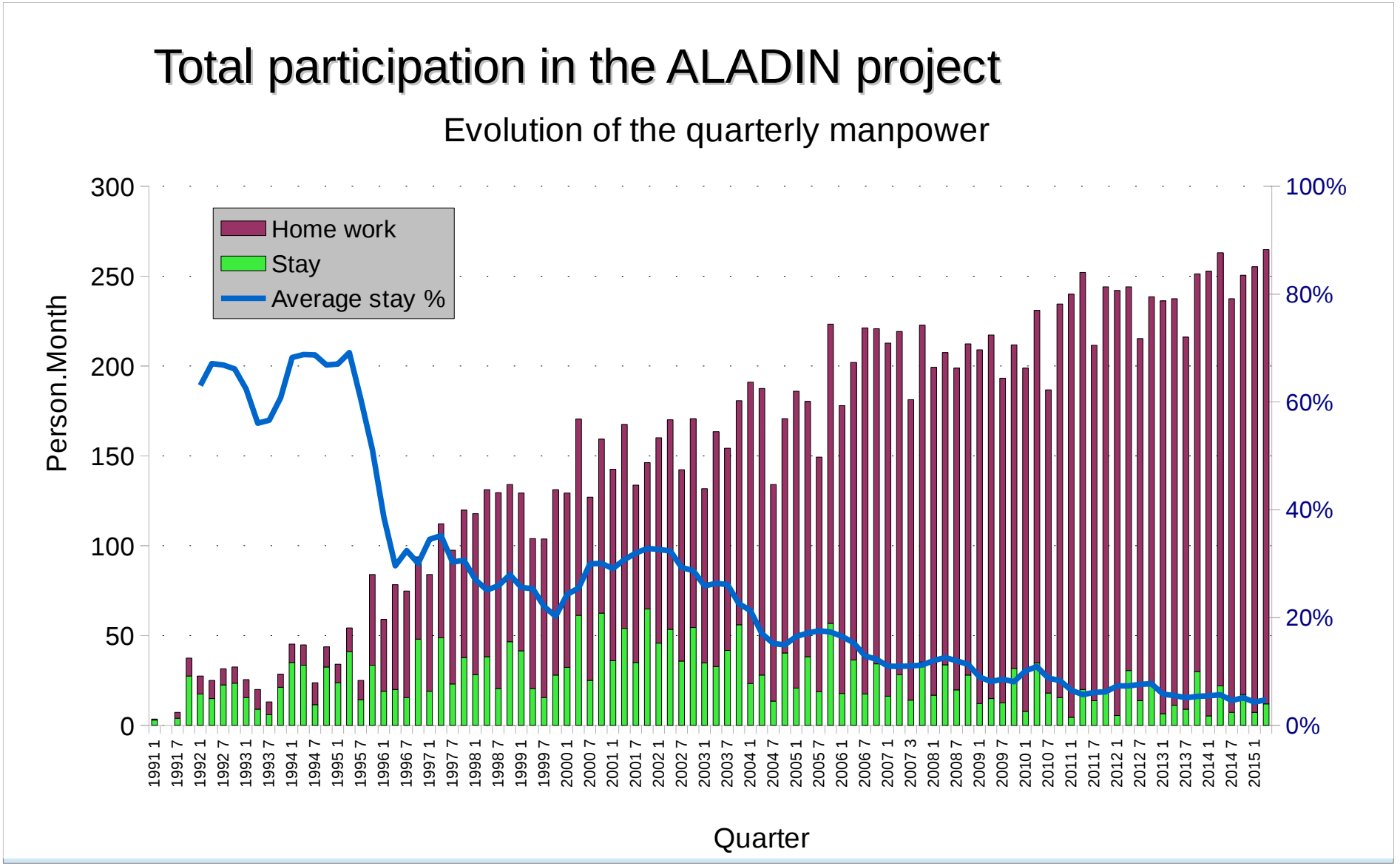
ETABLISSEMENT D'ETUDES ET DE RECHERCHES METEOROLOGIQUES
908542 | 27 NOV. 90
ARRIVEE

Référence à rappeler : MN/RIy 045466

Monsieur le Directeur et cher Collègue,

Par cette lettre, la Direction de la Météorologie Nationale souhaite proposer aux services météorologiques des Pays d'Europe Centrale une collaboration dans le domaine de la Prévision Numérique du temps (P.N.). Cette proposition s'inscrit dans une perspective à moyen terme et vise à valoriser et à accroître l'expertise déjà existante dans votre Service ou votre Pays, tout en générant des retombées positives pour nos propres actions. Elle est complémentaire de la distribution RETIM des produits du système français de P.N. EMERAUDE/PERIDOT (bientôt remplacé par le système ARPEGE).

Total participation in the ALADIN project

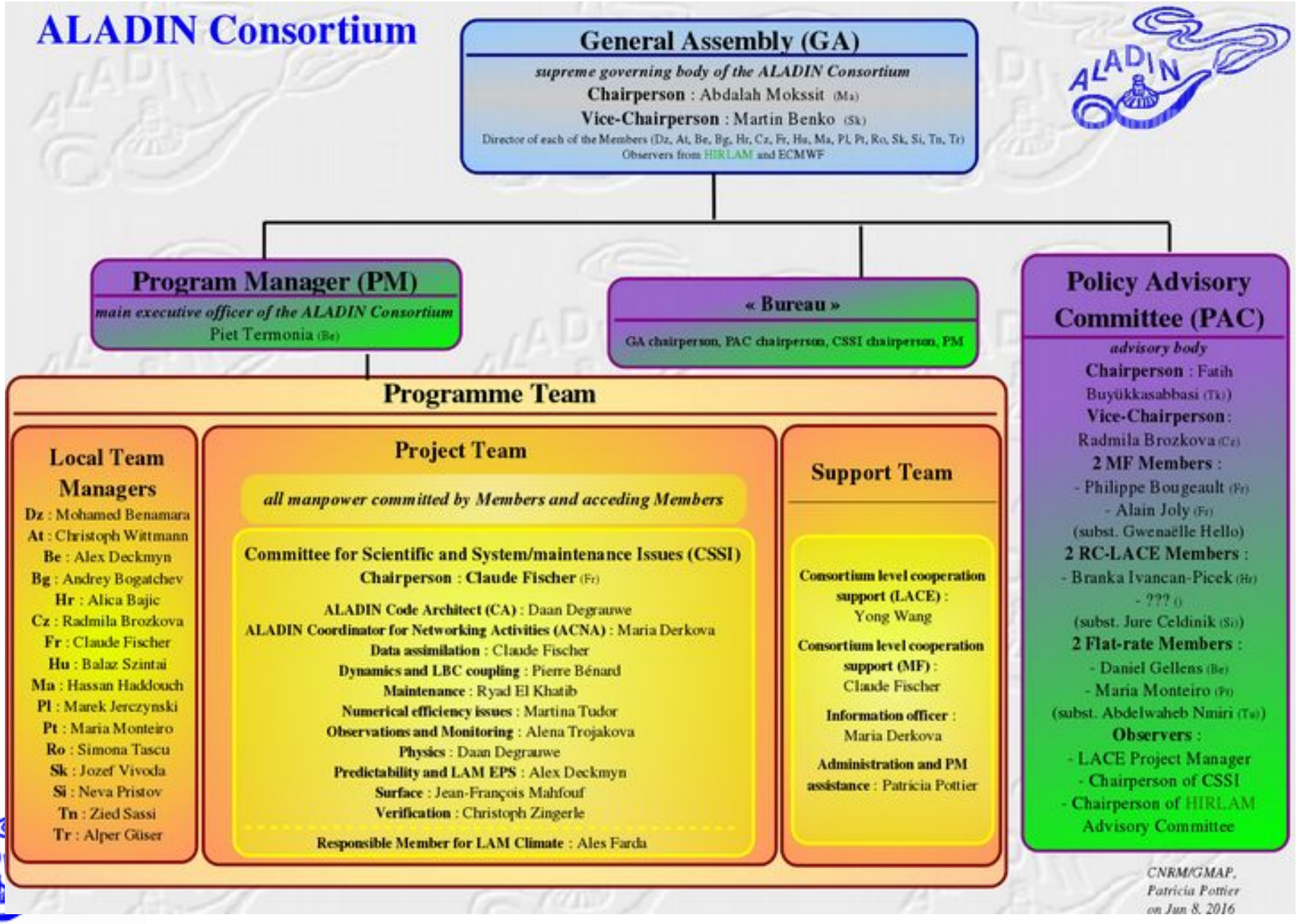


Courtesy Patricia Pottier

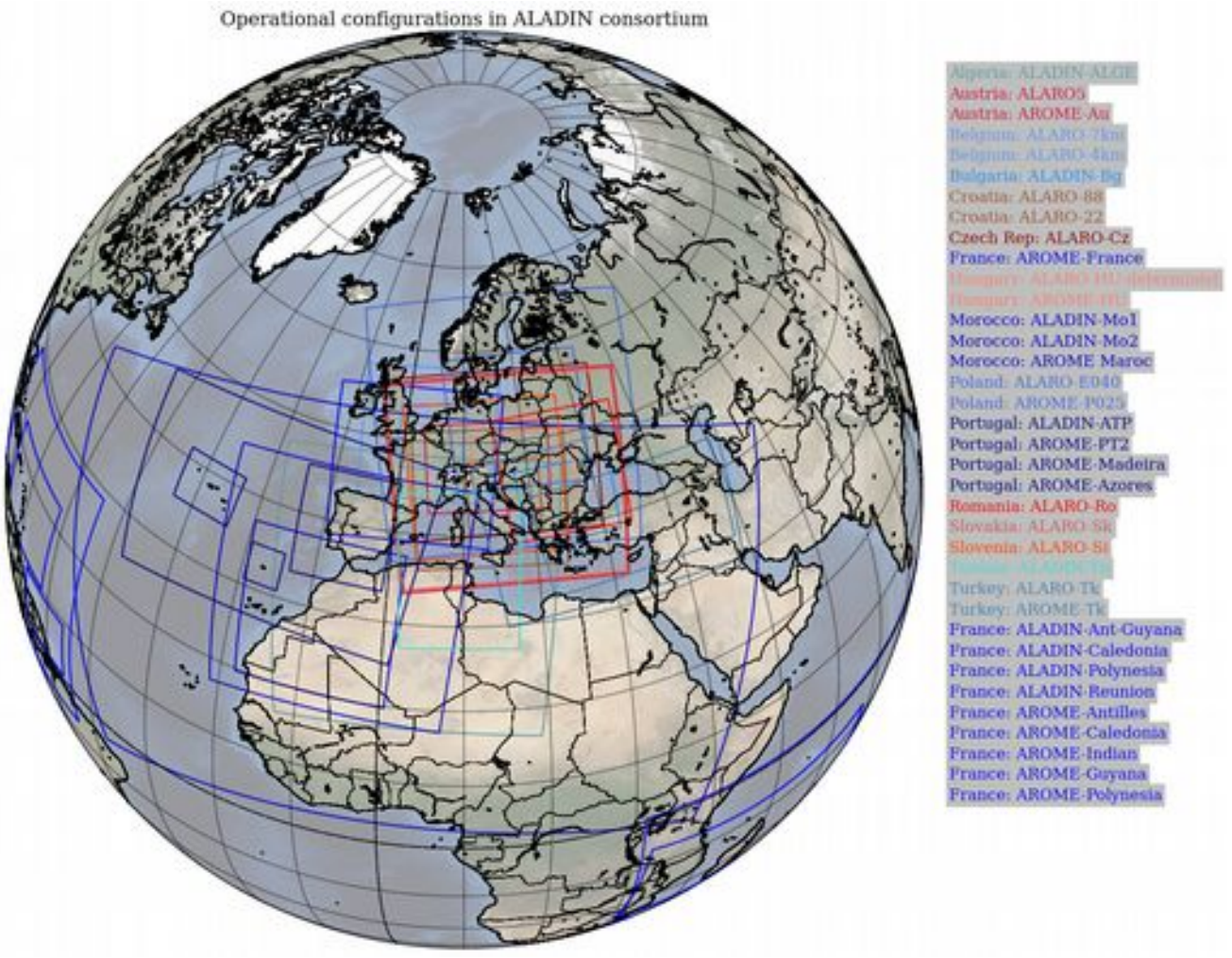
The past year, a few highlights

- **The New ALADIN MoU was signed!**
- ACNA activities:
  - Release of the cy40t1 export version.
  - Work on
    - improving the mechanism for bugfixes and repositories.Good discussions with the HIRLAM colleagues in the Bratislava meeting.
    - Implementation of the use of SURFEX (Arpege)
    - Thanks to Mariska for organizing it!
- Two Newsletters, thanks to the efforts of Patricia!
- The second ALADIN Forecasters meeting was organized by ipma (see my talk this week). Thanks to Maria and colleague
- The annual ALADIN workshop/ HIRLAM All Staff Meeting

Governance


ALADIN Consortium
General Assembly (GA)
supreme governing body of the ALADIN Consortium
Chairperson : Abdalah Mokssit (Ma)
Vice-Chairperson : Martin Benko (Sk)
Director of each of the Members (Dz, At, Be, Bg, Hr, Cz, Fr, Hu, Ma, Pl, Pt, Ro, Sk, Si, Tn, Tr)
Observers from HIRLAM and ECMWF
Program Manager (PM)
main executive officer of the ALADIN Consortium
Piet Termonia (Be)
« Bureau »
GA chairperson, PAC chairperson, CSSI chairperson, PM
Policy Advisory Committee (PAC)
advisory body
Chairperson : Fatih Buyükkasabbasi (Tk)
Vice-Chairperson : Radmila Brozkova (Cz)
2 MF Members :
- Philippe Bougeault (Fr)
- Alain Joly (Fr)
(subst. Gwenaëlle Hello)
2 RC-LACE Members :
- Branka Ivancan-Picek (Hr)
- ??? ()
(subst. Jure Celdinik (Si))
2 Flat-rate Members :
- Daniel Gellens (Be)
- Maria Monteiro (Pt)
(subst. Abdelwaheb Nmiri (Tn))
Observers :
- LACE Project Manager
- Chairperson of CSSI
- Chairperson of HIRLAM Advisory Committee
Programme Team
Local Team Managers
Dz : Mohamed Benamara
At : Christoph Wittmann
Be : Alex Deckmyn
Bg : Andrey Bogatchev
Hr : Alica Bajic
Cz : Radmila Brozkova
Fr : Claude Fischer
Hu : Balaz Szintai
Ma : Hassan Haddouch
Pl : Marek Jerczynski
Pt : Maria Monteiro
Ro : Simona Tascu
Sk : Jozef Vivoda
Si : Neva Pristov
Tn : Zied Sassi
Tr : Alper Güser
Project Team
all manpower committed by Members and acceding Members
Committee for Scientific and System/maintenance Issues (CSSI)
Chairperson : Claude Fischer (Fr)
ALADIN Code Architect (CA) : Daan Degrauwe
ALADIN Coordinator for Networking Activities (ACNA) : Maria Derkova
Data assimilation : Claude Fischer
Dynamics and LBC coupling : Pierre Bénard
Maintenance : Ryad El Khatib
Numerical efficiency issues : Martina Tudor
Observations and Monitoring : Alena Trojakova
Physics : Daan Degrauwe
Predictability and LAM EPS : Alex Deckmyn
Surface : Jean-François Mahfouf
Verification : Christoph Zingerle
Responsible Member for LAM Climate : Ales Farda
Support Team
Consortium level cooperation support (LACE) : Yong Wang
Consortium level cooperation support (MF) : Claude Fischer
Information officer : Maria Derkova
Administration and PM assistance : Patricia Pottier
CNRM/GMAP, Patricia Pottier on Jun 8, 2016

The applications

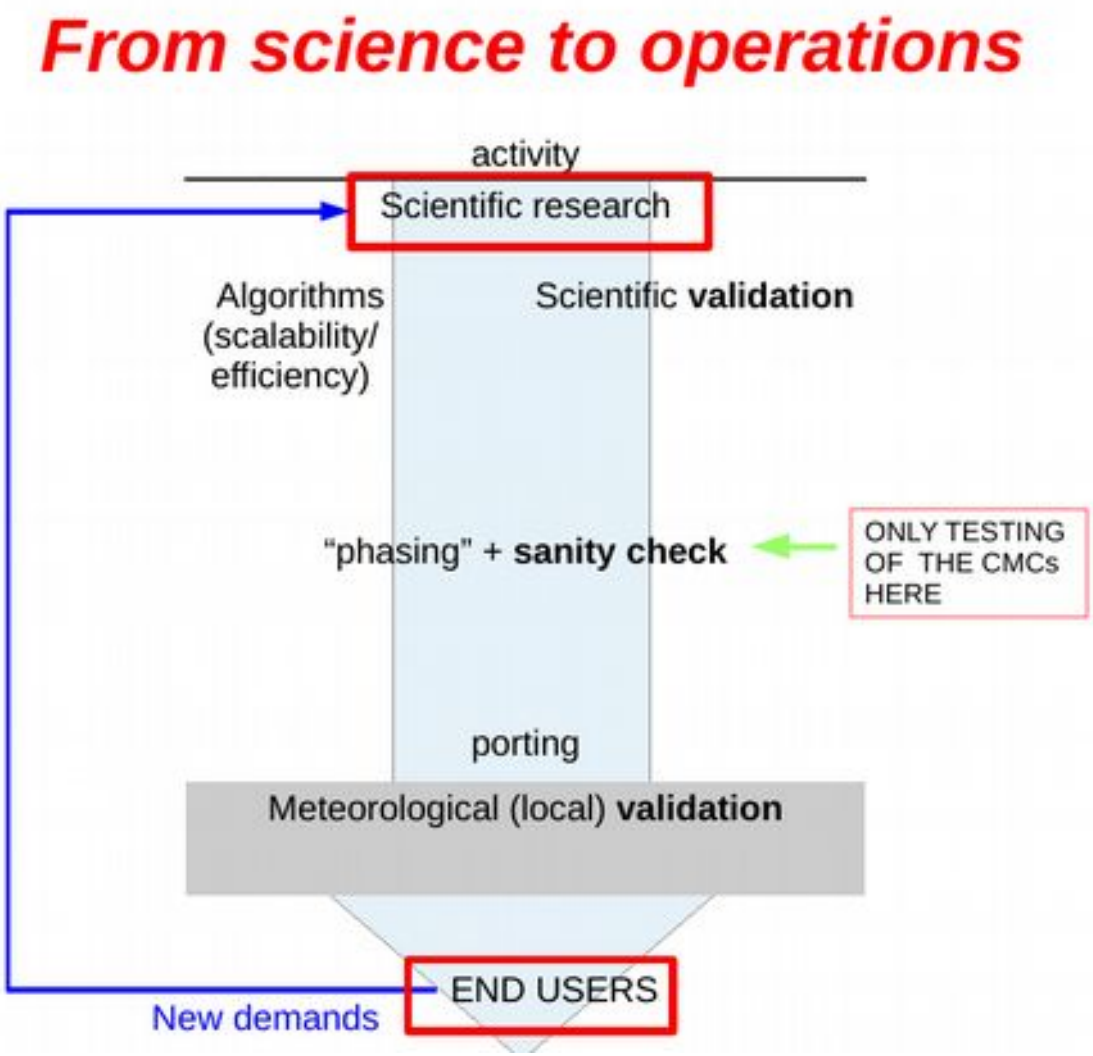


http://www.cnrm-game-meteo.fr/aladin/

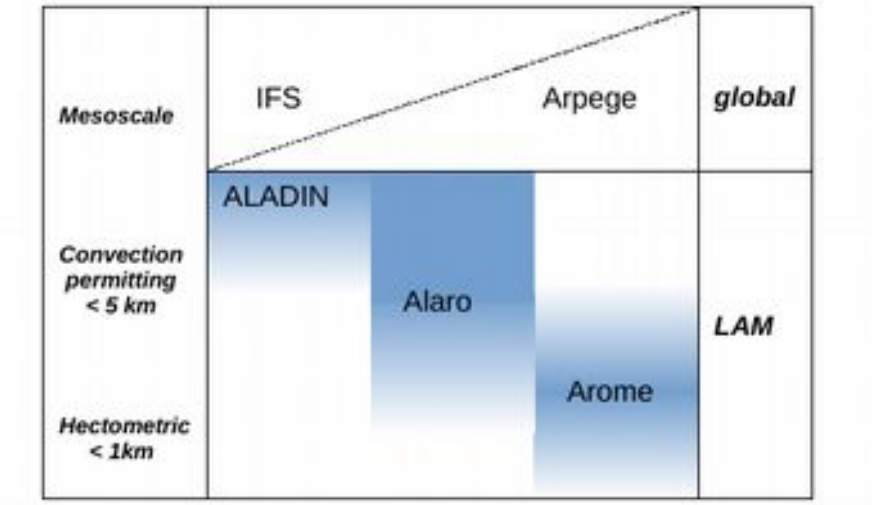
Courtesy Patricia Pottier

Main innovations in the ALADIN MoU5

- Better articulation of the steps in the “From science to operations” diagram.
- Filling a lack of dedicated and recognised expertise corresponding to the Algorithms part in the process and to promote focused code design work (see slide 5) by a new position of a Code Architect (CA).
- The Introduction of “priviledged” model configurations: the so-called Canonical Model Configurations (CMCs)



The scientific articulation of the ALADIN System w.r.t. to the global models (IFS/Arpege)



numerical task	declination options LAM/global
1. computation of the horizontal derivative (vorticity, divergence)	
2. inverse spectral transform: spectral to gridpoint	bi-FFT^{-1} / Legendre, FFT
3. compute physics contributions (in the arrival points)	AROME physics / ALARO physics
4. update the tendencies	INTFLEX
5. semi-Lagrangian computations	SLHD
6. compute the explicit part of the dynamics	IFS/ARPEGE/ALADIN hydrostatic / ALADIN-NH
7. add all tendencies	
8. lateral boundary coupling	bi-periodic LBC conditions
9. direct spectral transforms	bi-FFT / Legendre, FFT
10. solve the Helmholtz equation	IFS/ARPEGE/ALADIN Hydrostatic / ALADIN NH

- Differentiation in three Code Architecture aspects:
  - Bi-FFT instead of FFT/Legendre
  - The LBC mechanism
  - Adapted physics packages for the convection-permitting scales with 2 CMCS: AROME, ALARO

The ALADIN System is basically the system that allows to make LAM configurations in the above "code univerise". Only a few canonical configuration are, the so-called CMCs.

Example: the cy40t1 ALARO CMC

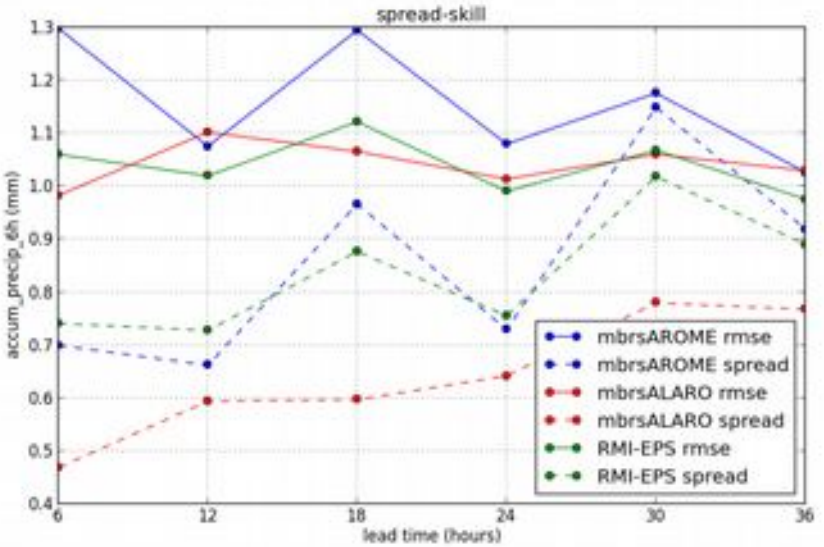
Table 2. The CMC-ALARO configuration

Physics parameterization	scheme	references
Dynamics for dx > 4km	hydrostatic ARPEGE/ALADIN	Temperton et al. (2001), Radnóti et al. (1995)
Dynamics for dx < 4km	non-hydrostatic ALADIN	Bénard et al. (2010)
radiation	ACRANEB2	Mašek et al. (2015), Geleyn et al. (1996)
turbulence	TOUCANS	Ďurán et al. (2014), Marquet and Geleyn (2013)
deep convection	3MT	Gerard et al. (2009)
sedimentation scheme		Geleyn et al. (2008)
physics-dynamics coupling	INTFLEX	Catry et al. (2007), Degrauwe et al. (2016)
LBC scheme	SAST	Davies (1976) Radnóti (1995)
		Termonia et al. (2012), Degrauwe et al. (2012)

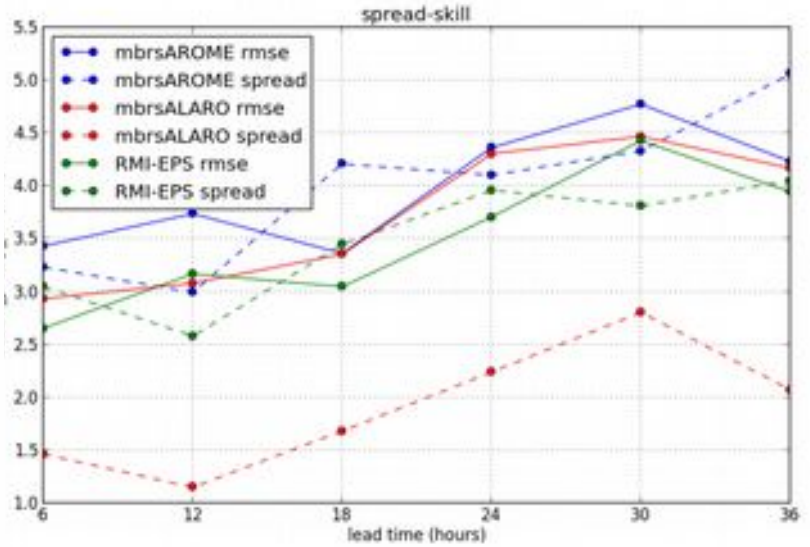
You are free to run your own configuration at home,
but if you want to get support choose the CMC

RMI-EPS: 2.5-km Convection-permitting multi-physics approach (AROME and ALARO) is beneficial

February-march 2016



August 2016



- *ALARO has better rmse*
- *AROME adds spread*
- *The negative features of the subensembles do not "deteriorate" the total ensemble.*

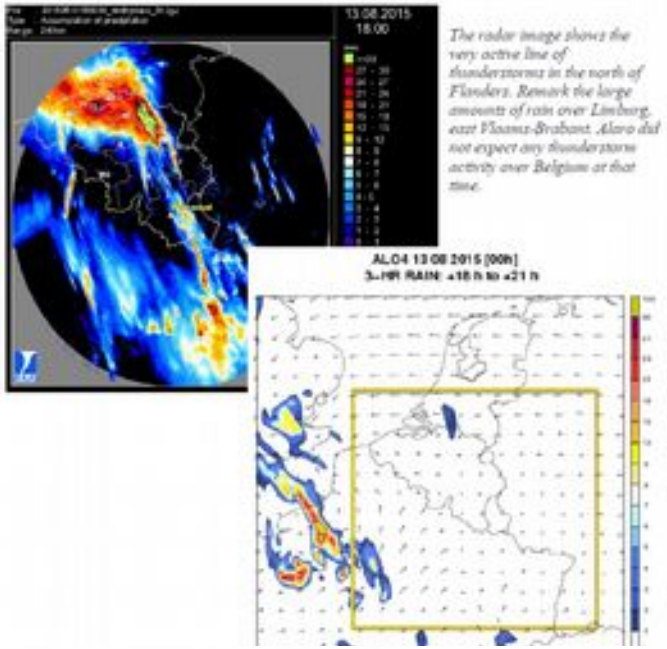
Courtesy Geert Smet

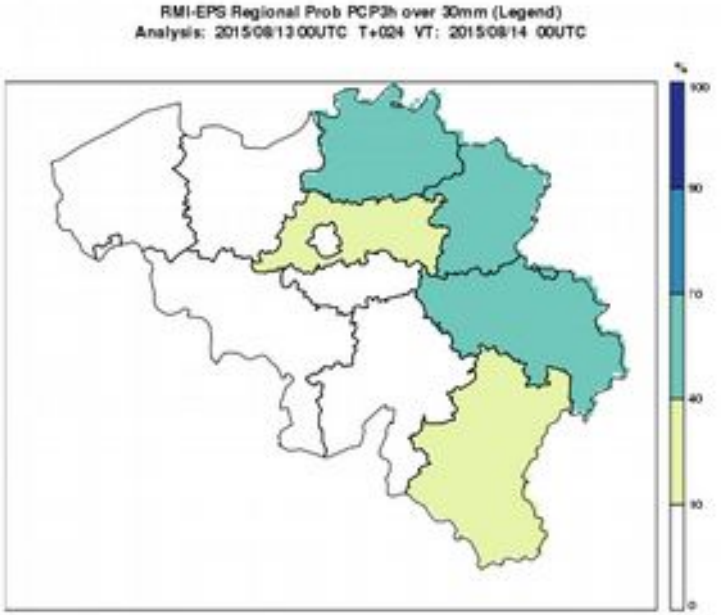
Forecasters meeting Lisbon 21-23/9/2015

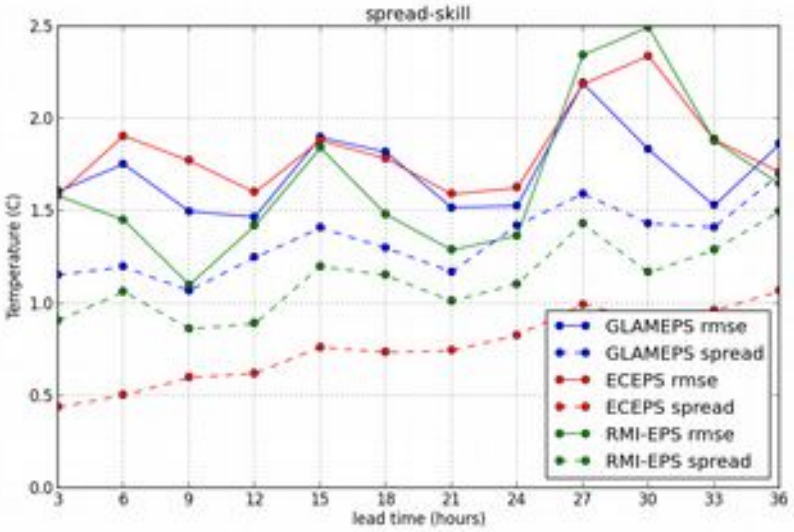
- 20 participants
- Same format but we included and exercise on the use of probabilistic model output
- Conclusion: forecasters have a traditional top-down way of thinking, starting from the global model output. This thinking is based on classical synoptic-scale: parameters: Mslp, wind shear, theta_E, geopotential at standard level, even quasi-geostrophic Q vector analysis, mean omega, laspe rates, humidity, ...
- Also, forecasters have difficulties to smoothen out probailities on maps, particualrly at the high resolutions

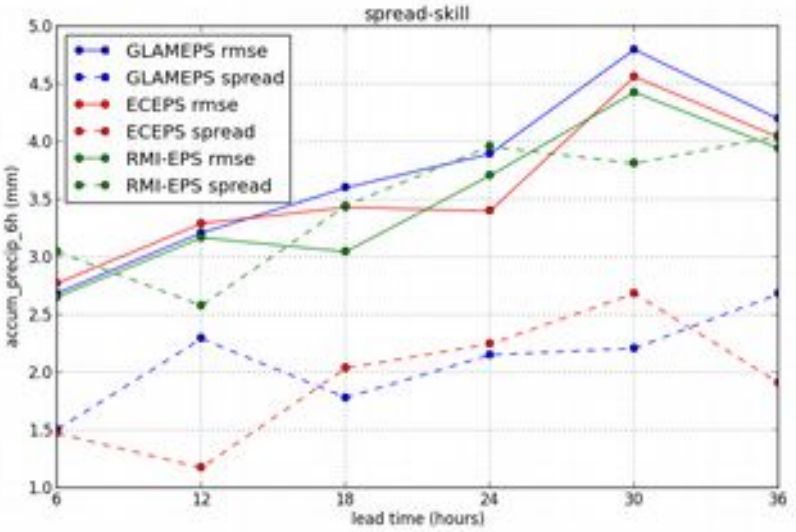
What do we add w.r.t to the global models?

Convection-permitting EPS (see also Belgian poster)









Convection-permitting EPS a vehicle to make EPS more reliable for precipitation?

Courtesy Geert Smet

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doi:10.5194/gmd-9-1143-2016

Geoscientific Model Development
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Validation of the ALARO-0 model within the EURO-CORDEX framework

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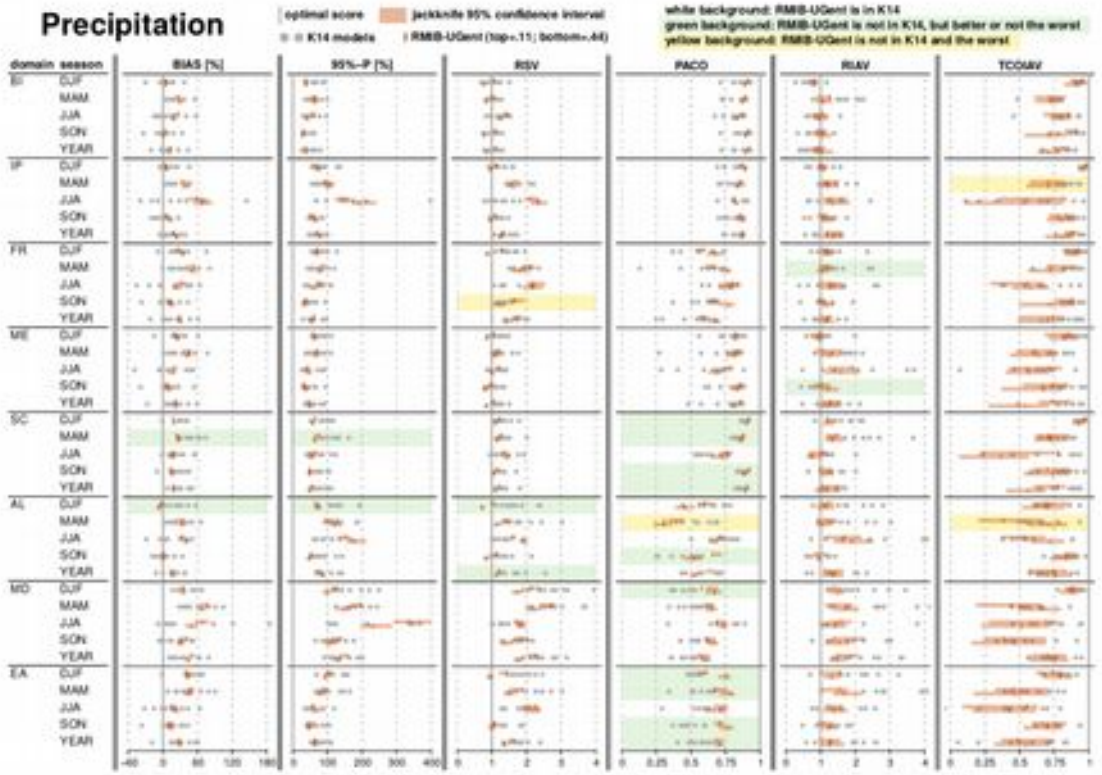
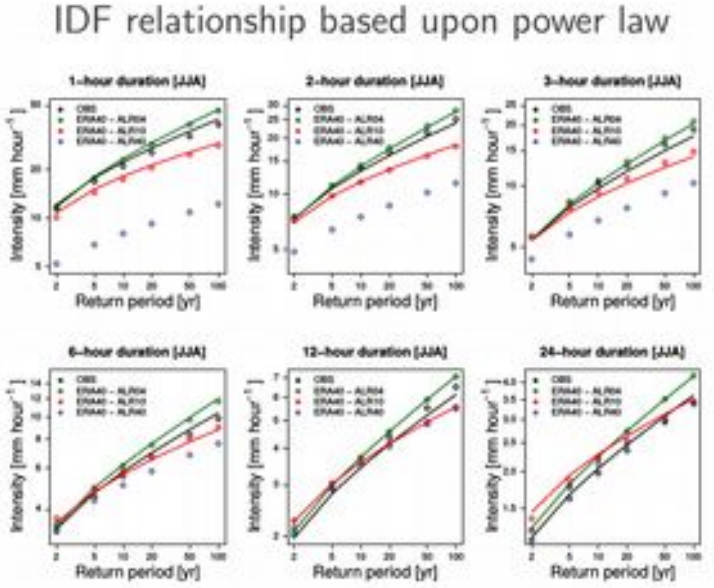


Figure 5. Scores for precipitation for all domains (first column), seasons (second column) and metrics.



Courtesy R. De Troch

Conclusion: ALARO has been validated for CORDEX runs compared to "established models, but

- ***Is doing better for (extreme) precipitation than the CORDEX ensemble***
- ***and adds value in the subdaily temporal scale (1h)***

In fact you can see this as NWP "long-run" validation, but it takes time

Summary

A New ALADIN MoU5 for the next 5 years.

- Better articulation of model configurations in relation to (growing) maintenance load: the canonical model configurations.
- Discussion about our “vision” or identity as LAM community: we target convection-permitting scales. Work has to be done to
  - develop convection-permitting EPS
  - to help forecasters to think probabilistically
- Position our NWP models w.r.t. climate. Proven validation and added value in the convection-permitting scales.