

THE ALADIN COLLABORATION

WWW.CNRM.METEO.FR/ALADIN

ALADIN is a successful collaboration on numerical weather prediction involving 16 National Meteorological Services in Europe and Northern Africa. It started after an initiative taken by Météo France in 1990 and has been growing to a large-size international collaboration of about 90 full time equivalents. Since its start, the program has brought its members to the forefront of the developments in high-resolution short-range Numerical Weather Prediction.



OBJECTIVES

→ Code development

The main activity is the conceptualization, definition, development, operation, and the maintenance of a shared, state-of-the-art, high-resolution Numerical Weather Prediction system called **the ALADIN System**¹. This system is used to configure the Numerical Weather Prediction applications in the participating member states. The code is shared with the global ARPEGE model of Météo France and the Integrated Forecast System (IFS) of the European Centre for Medium Range Weather Forecasts (ECMWF). The applications of the ALADIN System can run on limited geographical areas at about ten times higher resolutions than the ones of the global applications, allowing to compute weather forecast maps in high detail.

→ From science to operations

Significant scientific achievements are published in leading international journals. The ALADIN program coordinates scientific research and implements the scientific results into the new versions of the ALADIN System. These versions are regularly exported and installed on the High-Performance Computers in the Institutes of the ALADIN members.

They are implemented in the operational applications. The members then run the numerical weather prediction model on limited areas covering their national territories. Feedback from the weather forecasters of the Institutes is used to steer future Research and Development (R&D).

→ Expertise building

ALADIN provides a specialized background for training and recruitment of experts. This background is tightly linked to the national applications and is, as such, unique compared to purely academic research. This allows the members to create small to medium size teams to carry out R&D at a state-of-the-art international level.

→ Pooling of Resources

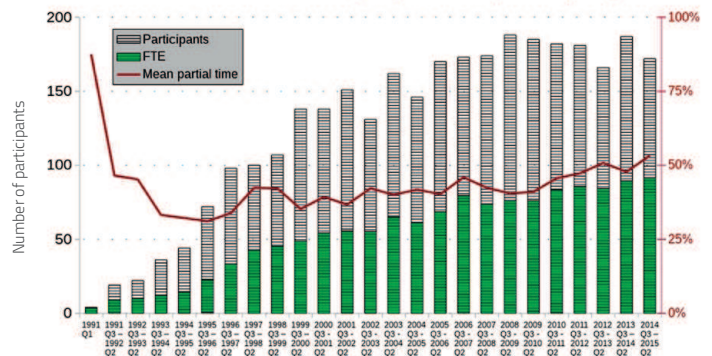
The activities of the consortium are supported by collective commitments of human resources to the operational and maintenance efforts, and to the management activities. The program has been used as a background to draw extra resources from external funding, both at national and international levels.



Country	Year	Participants	FTE	Mean partial time
Algeria	1991	1	0.1	0.1
Austria	1991	1	0.1	0.1
Belgium	1991	1	0.1	0.1
Bulgaria	1991	1	0.1	0.1
Croatia	1991	1	0.1	0.1
Czech Republic	1991	1	0.1	0.1
France	1991	1	0.1	0.1
Hungary	1991	1	0.1	0.1
Morocco	1991	1	0.1	0.1
Poland	1991	1	0.1	0.1
Portugal	1991	1	0.1	0.1
Romania	1991	1	0.1	0.1
Slovakia	1991	1	0.1	0.1
Slovenia	1991	1	0.1	0.1
Tunisia	1991	1	0.1	0.1
Turkey	1991	1	0.1	0.1

OPERATIONAL CONFIGURATIONS IN ALADIN CONSORTIUM

TOTAL PARTICIPATION IN THE ALADIN PROJECT
Evolution in the yearly Full Time Equivalent (green)

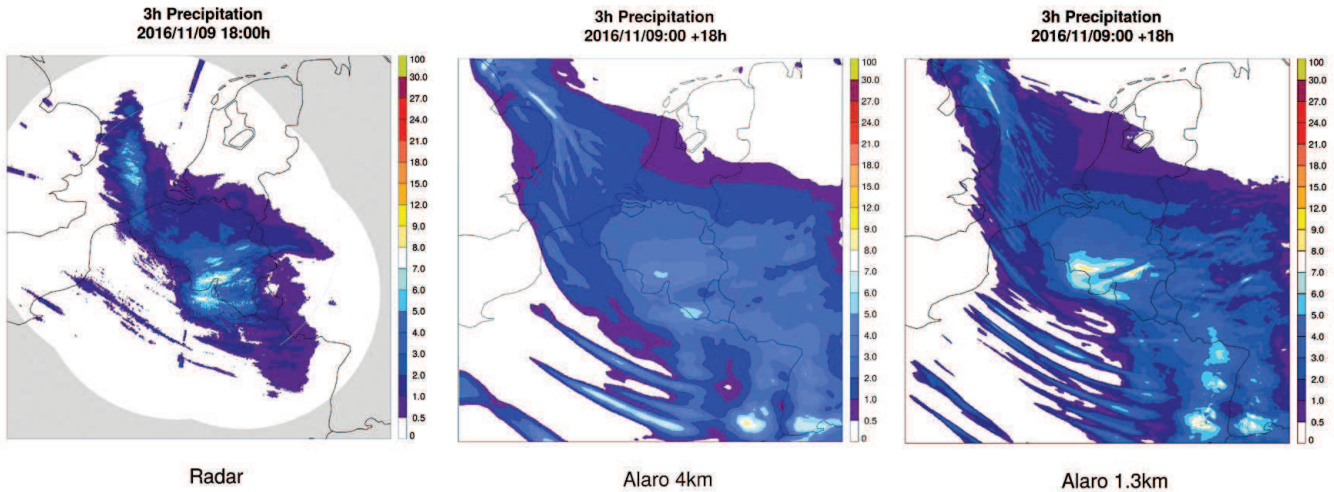


1. The acronym is derived from the French expression Aire Limitée Adaptation dynamique Développement InterNational.

HIGH-RESOLUTION NUMERICAL WEATHER PREDICTION WITH THE ALADIN SYSTEM AT THE ROYAL METEOROLOGICAL INSTITUTE OF BELGIUM

One of the major challenges in Numerical Weather Prediction (NWP) is to improve the forecast for high-impact weather such as thunderstorms. Two important research topics are *increasing the spatial resolution* of the models and the development of *probabilistic forecasts*.

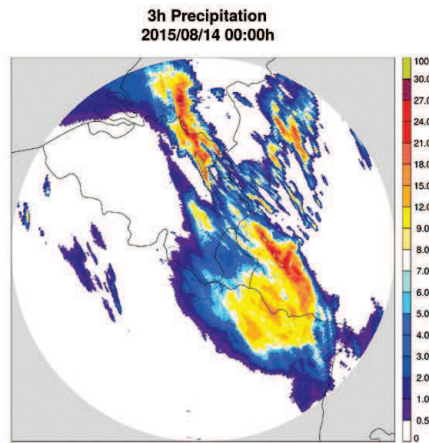
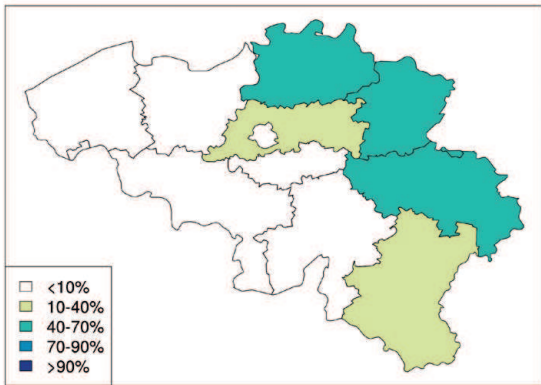
The ALARO physics package, which incorporates significant contributions from the Belgian RMI team, was developed to allow for a continuous increase of vertical resolution to scales that allow the formation of e.g. thunderstorms. At RMI we are testing a model version with a resolution of 1.3km. At that scale, the forecasts for rainfall look much more realistic, even if the exact location of thunderstorms remains unpredictable.



Probabilistic forecasts have proven to lead to better weather related decision making by the end users of weather forecasts. They are usually made using an ensemble of forecasts. All these forecasts have slightly different starting conditions and/or slight differences in the

model configurations. This allows us to make probabilistic forecasts, which may also include (small) probabilities for extreme events. At RMI we are developing RMI-EPS, an ensemble running at a high resolution (2.5 km) over Belgium.

RMI-EPS Regional Prob PCP3h over 30mm (Legend)
Analysis: 2015/08/13 00UTC T+024 VT: 2015/08/14 00UTC



Radar

RISK MAP FOR EXTREME PRECIPITATION BASED ON RMI-EPS (LEFT) AND THE RADAR OUTPUT (RIGHT).