

# First tests with AROME 1.3 km: technical note and scale effect on the short term rainfall forecast.

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## Résumé

AROME is a convective-scale numerical weather prediction system developed by Meteo France in close collaboration with national and international institutes so as to benefit from the latest research in atmospheric modeling. Today, this system is used by some fifteen countries already, for both operational and research purpose. This short paper aims to (i) define some technical notes about the AROME system and its operational use at Météo Algérie in Algeria, (ii) explain the scientific and the technical approach of reducing the horizontal resolution from 3.0 km to 1.3 km, (iii) show the first results obtained by the new configuration AROME 1.3 km on a small domain (North-center) and compare it to the operational configuration AROME 3.0 km .

Keywords : AROME — Convective Event — High-Resolution Model

## 1. Introduction

The AROME forecasting system (Seity et al. (2011) ) is a blend of the best components from the Méso-NH model, the ALADIN model, and the IFS/Arpège data assimilation software (Bouttier and Roulet (2008)). AROME is a convective-scale numerical weather prediction system developed by Meteo France, its physical parameterizations comes mostly from the research Meso-NH model whereas the dynamic core is the Non-Hydrostatic ALADIN one.

AROME has been running operationally at Météo Algérie since February 2014, one year after the acquisition of a new HPC system. The current configuration of AROME Algeria covers only the Northern part of the country with an horizontal resolution of 3.0 km . This area restriction is caused by the high computational costs needed to run the model over the full domain. This did not prevent us to prepare a configuration covering the whole country (Ambar and Mokhtari (2016)) in the soon perspective to acquire a new HPC system with more resources (the procedure of purchase is in progress). The results obtained by fine mesh model AROME are quite encouraging; it has improve notably the very localized phenomena forecasts, especially in convective situations, for forecasts ranging from 3 hours to 48 hours, compared to ones of the ALADIN model with 8.0 km horizontal resolution. Thereby, improving the resolution of the AROME model from 3.0 km et 1.3 km is one

of the priorities for the NWP service at the Meteo Algérie. The main objective is to allow forecasters to progress in the anticipation and localization of severe weather phenomena. The challenges are multiple : the safety of people and property when it comes to alerting the public authorities and the population on the arrival of a major weather risk, the economic prevention when a company needs very fine meteorological information to organize its activities.

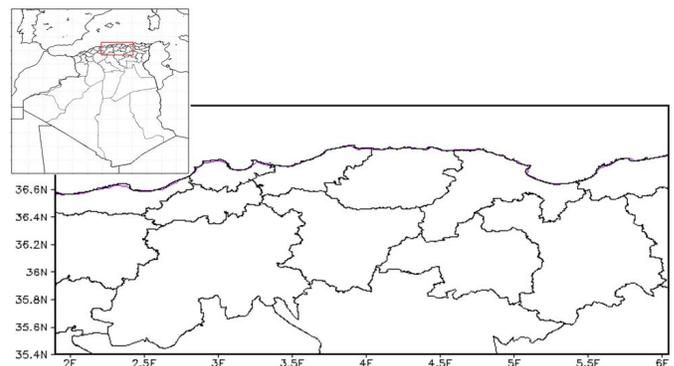


FIGURE 1. New configuration AROME-1.3 km domain.

## 2. Scientific and technical approach

It uses a non-hydrostatic dynamical core that was developed by Bénard et al. (2010). Physical parameterizations