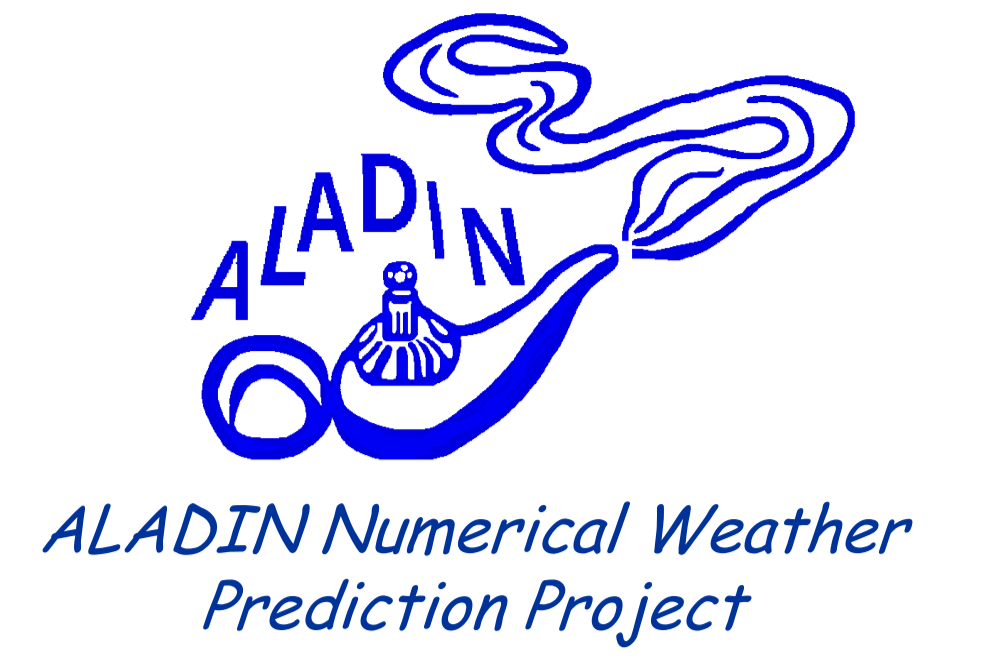


ALADIN related activities in ALGERIA: Operational forecasting system and ongoing activities.



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 LTM: Mohamed MOKHTARI



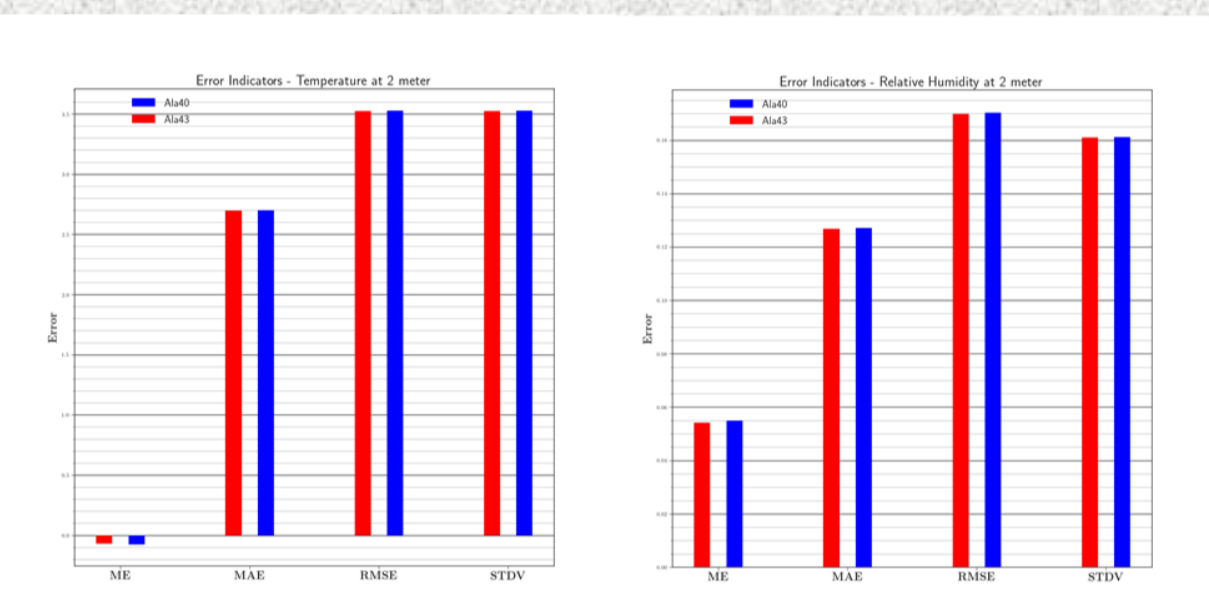
Department of Numerical Weather Prediction
 Office National de la Météorologie
 1 Avenue Med Khemisti Bp153 Dar El Beida , Algiers -ALGERIA

Operational HPC system

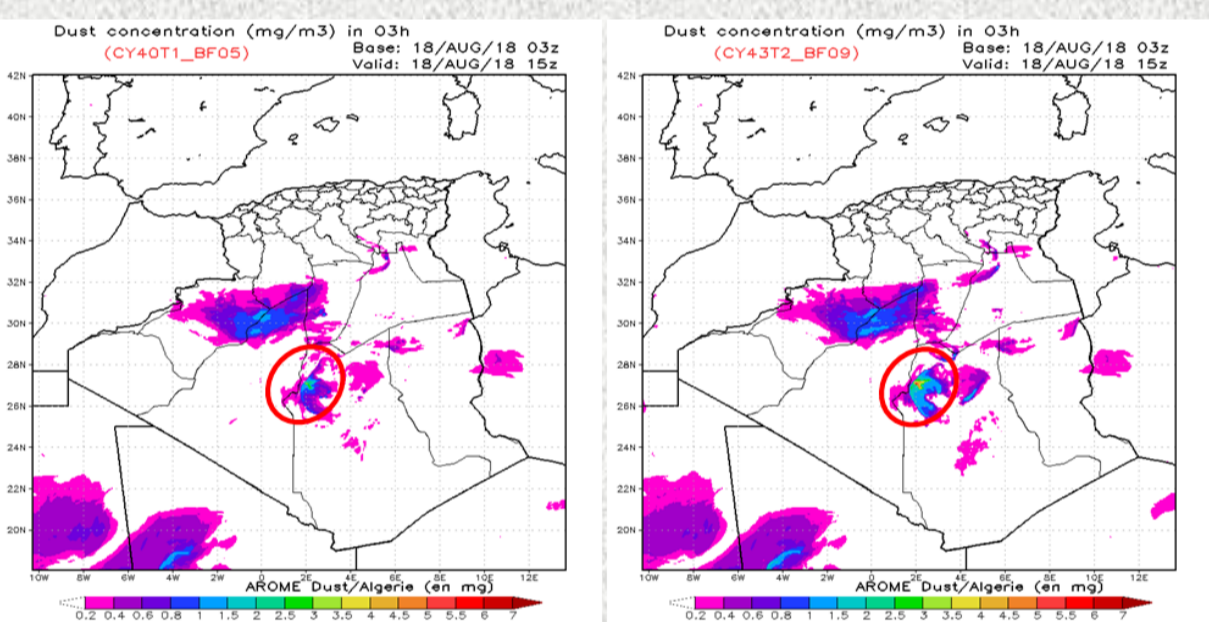
- Characteristics:**
- ✓ 416 processors
 - ✓ 26 Noeuds
 - ✓ Intel x 86 Processor architecture
 - ✓ Sandy Bridge
 - ✓ 520 TB of storage capacities
 - ✓ 10 Tf calculation power.



CY40T1_bf.05 / CY43T2_bf.09



Statistical comparison of 2 meters temperature and humidity between ALADIN CY40t1_bf.05 (bleu) and CY43T2_bf09 (red).

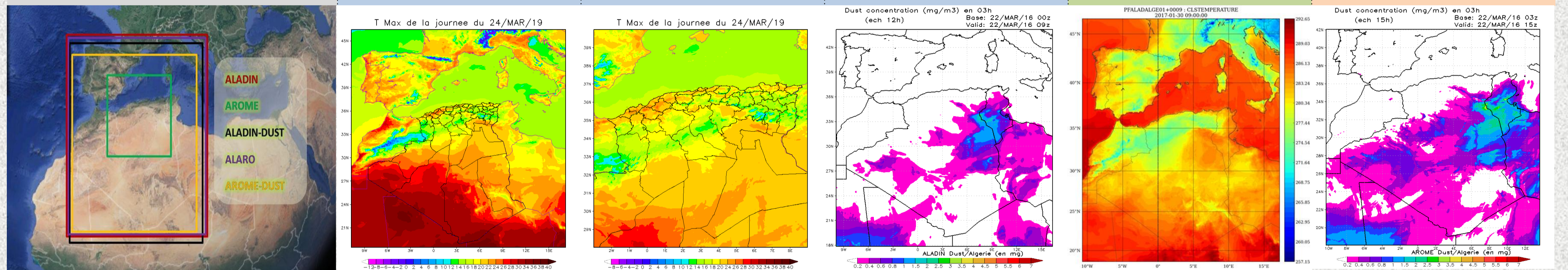


Comparison of Dust concentration output between AROME-DUST CY40t1_bf.05 (left) and CY43T2_bf09 (right).

Operational ALADIN / AROME configuration

ALADIN is used operationally at Météo Algérie since February 2014 to produce meteorological and dust forecasts. Few months later, AROME was implemented to be used also operationally and produce daily forecasts. The first implementation of ALADIN/AROME system was based on CY36T1, it was updated to CY38T1 in 2015, and to CY40T1 in 2016. New cycle was recently implemented (December, 2018) based on CY43T2.bf.09 Export version. ALARO model (V0) was installed in pre-operational status in first quarter of 2018.

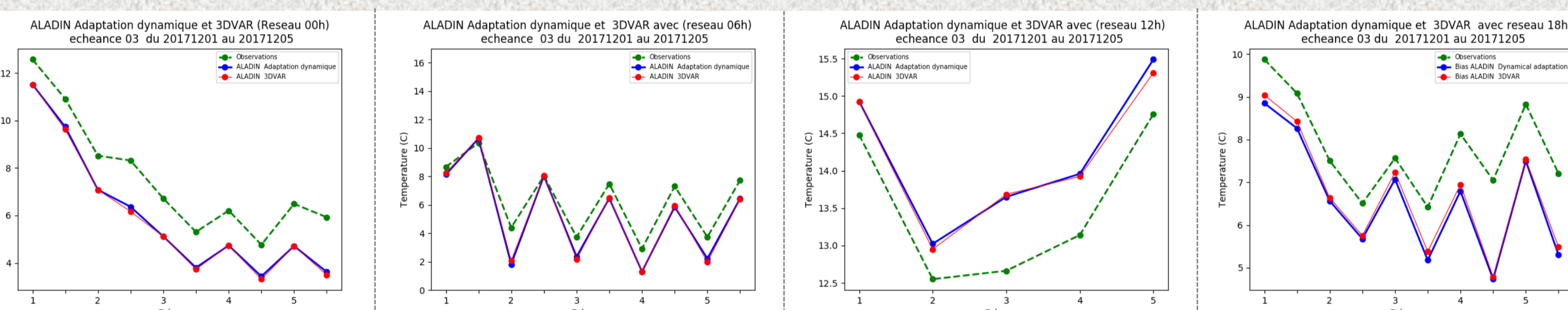
Status	Operational configurations			Pre-operational	Research purpose
Model	ALADIN	AROME	ALADIN_DUST	ALARO	AROME_DUST
Cycle	CY43T2.bf.09	CY43T2.bf.09	CY43T2.bf.09	CY43T2.bf.09	CY43T2.bf.09
Coupling model	ARPEGE	ALADIN	ARPEGE	ARPEGE	ALADIN
Coupling rang	3h	1h	3h	3h	1h
Horizontal resolution	8 km	3 km	14 km	6 km	3 km
Vertical levels	70	41	70	60	60
Time step	514 s	60 s	420 s	120 s	60 s
Grid	350 x 350	400 x 400	250 x 250	600 x 600	1024 x 972
Area	Lat	18.5°N – 46.5°N	28°N – 40°N	18.5°N – 46.5°N	19°N – 45.5°N
	Lon	11°W – 17°E	03°W – 09°E	11°W – 17°E	10.5°W – 16.5°E
Forecast runs	00h, 12h	00h, 12h	00h, 12h	00h	-
Forecast range	72h	48h	72h	48h	48h



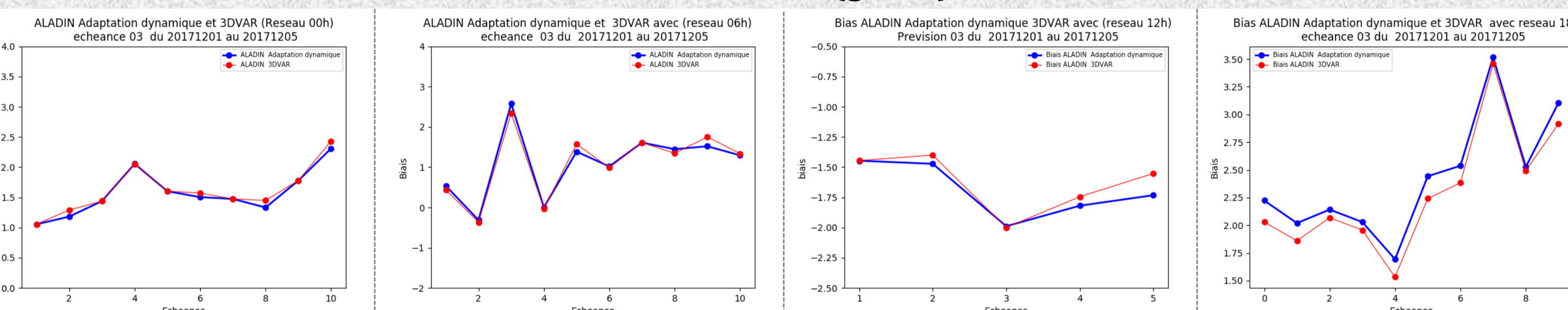
Overview of DA at Météo Algérie

Data assimilation at Météo Algérie started in 2016 with ALADIN configuration by implementing the CANARI configuration for the surface analysis. We realized a first pre-processing program of SYNOP and we've installed the binary BATOR for the generation of ODB "Observation Data Bases" (June, 2016), and then we've tested CANARI with SYNOP data for ALADIN model (October, 2016).

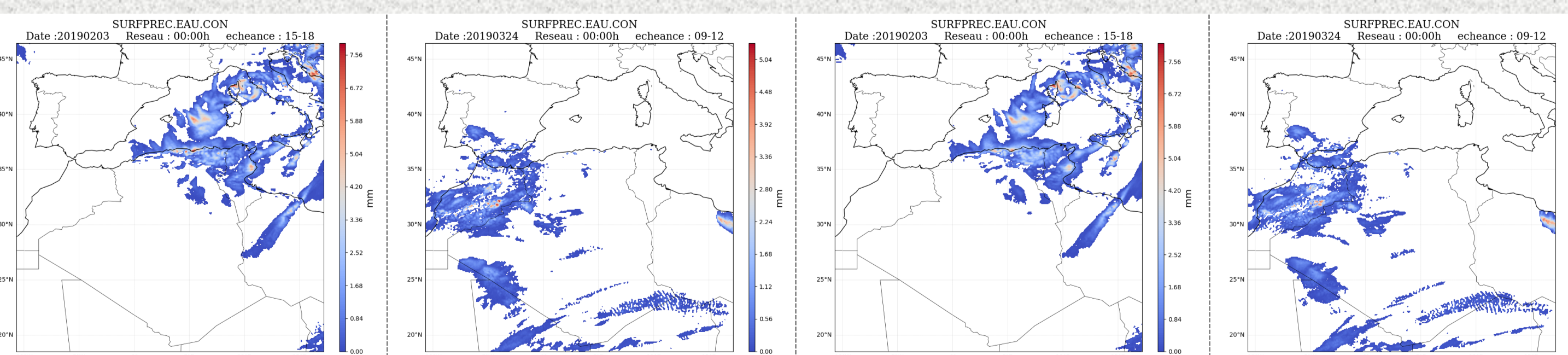
The next step was to calculate the B matrix for the ALADIN model using NMC methods (May, 2017), and then we've tested the 3 DVAR configuration with SYNOP observation for ALADIN model (August, 2017). After that, we've calculate the B matrix for AROME model and we've done assimilation of ASCAT wind at Météo France (October, 2017), and locally at Météo Algérie for ALADIN and AROME models based on cy40t1. Those two configurations had been put in pre-operational in February 2018. Later in April, we worked in pre-processing of AMDAR data. In July, we built a new scheme of 3DVAR assimilation chain with rapid update cycling. Currently, it's running in pre-operational.



Comparison between ALADIN without data assimilation (blue), ALADIN with 3 DVar (red) and observations (green).



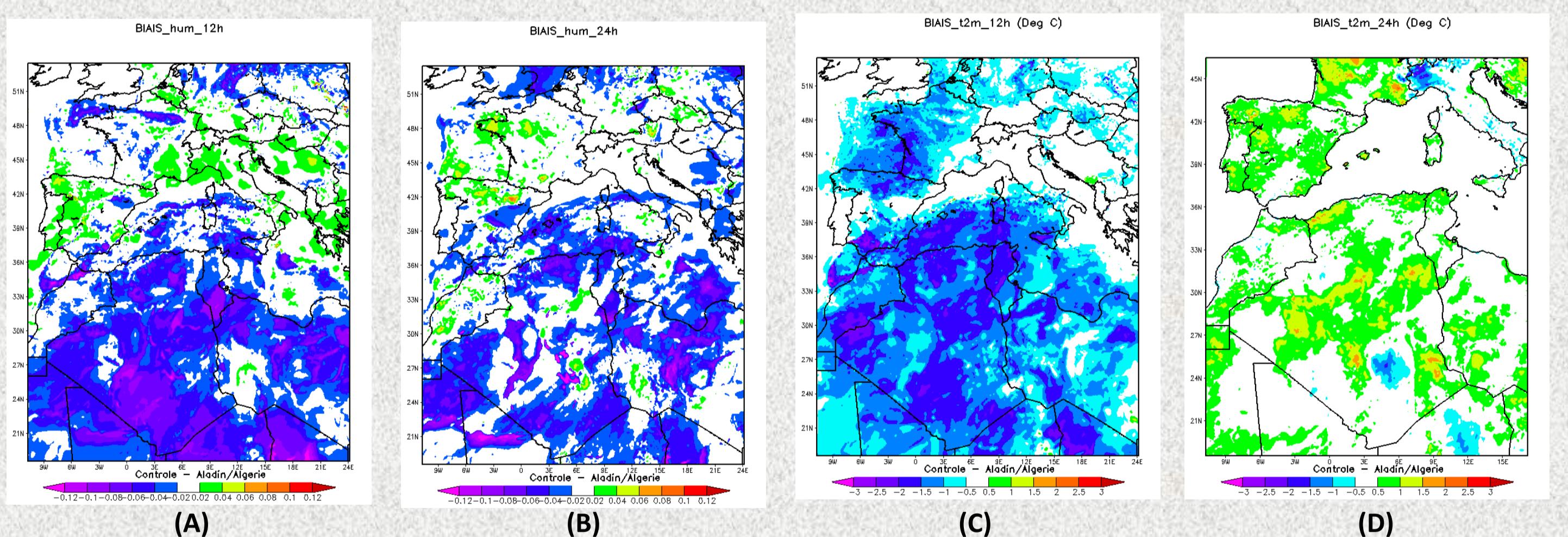
BIAS of ALADIN without data assimilation (blue) and BIAS of ALADIN with 3 DVar (red).



ALADIN without data assimilation : convectif precipitations outputs.

ALADIN with 3DVar : convectif precipitations outputs.

ALADIN verification report

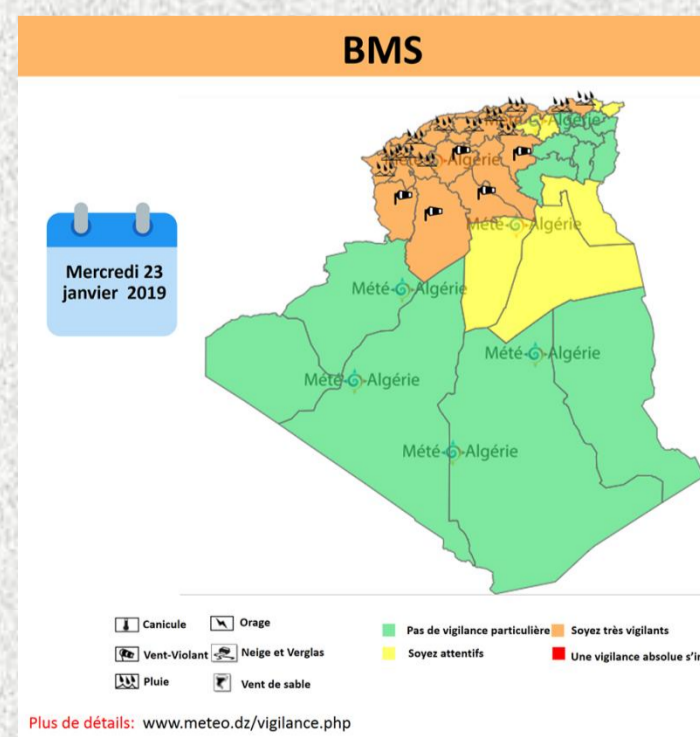


- * 2 meters monthly humidity means BIAS compared to the analysis after 12h (A) and 24h (B).
- * 2 meters monthly Temperature means BIAS compared to the analysis after 12h (C) and 24h (D).

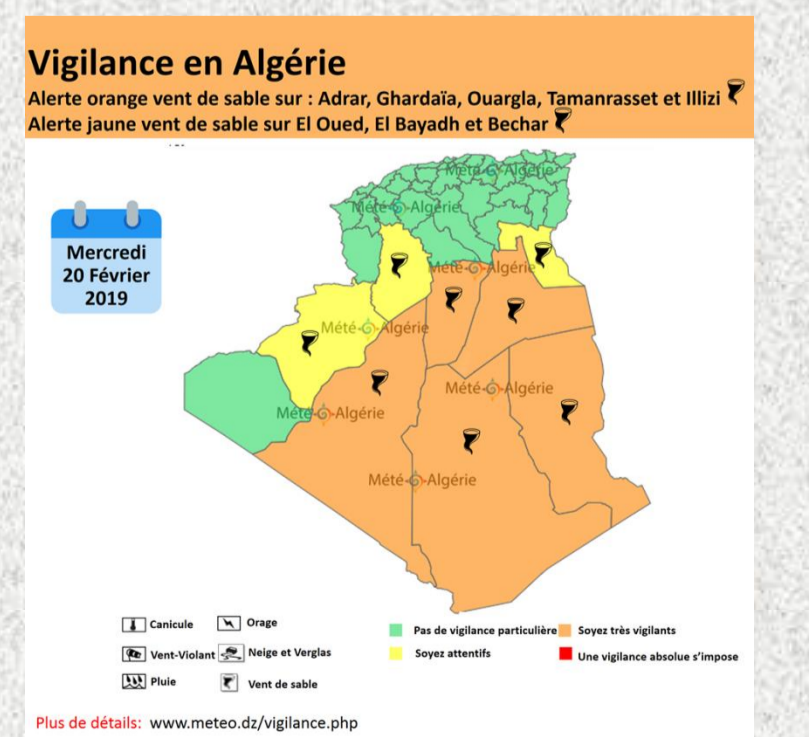
Applications based on ALADIN/ALADIN-DUST/AROME outputs

An important advantage of locally running several models is the possibility to run applications adapted to different users' needs. The weather vigilance system and the road vigilance system are the latest applications developed by the NWP team in Algeria.

The weather vigilance system:



The meteorological vigilance procedure is a weather warning system based on operational models running locally at Météo Algérie. Its main purpose is to better inform authorities and people in case of dangerous weather phenomena (heavy rain, sandstorms, etc.) and to improve the early warning system.



The road weather vigilance system:

The road weather vigilance system was developed on the same principle as the weather vigilance system, based on the outputs of the operational models at Météo Algérie. However, it still in pre-operational stage.

