

Data Assimilation progress and plans in Tunisia

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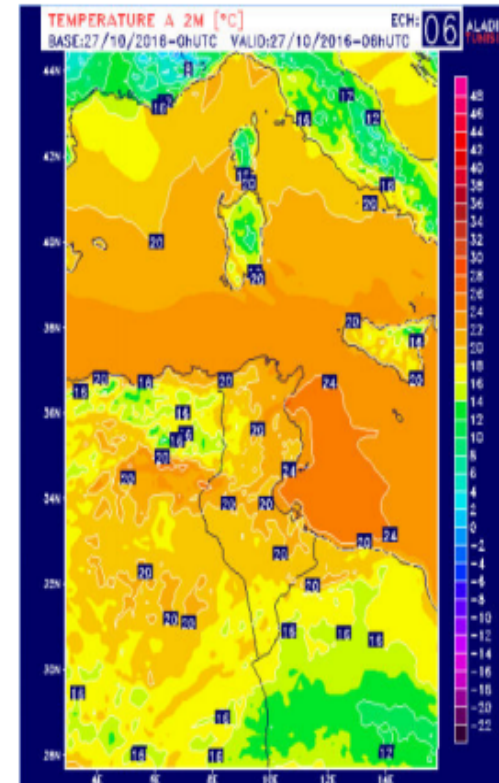
Models Installed on the HP Server

Operational & Parallel Suites

- Models implemented on Ashtarte Server

	<u>ALADIN</u> <u>operational</u>	<u>AROME</u>	<u>HARMONIE</u>
Model version	CYCLE 40	CYCLE 40	CYCLE 40
Spatial Resolution	7.5 km	2.5 km	2.5 km
Vertical Levels	70	60	65
Boundaries	ARPEGE 10km	ARPEGE 10km	ALADIN 7.5km
Time step	450 s	60 s	60 s

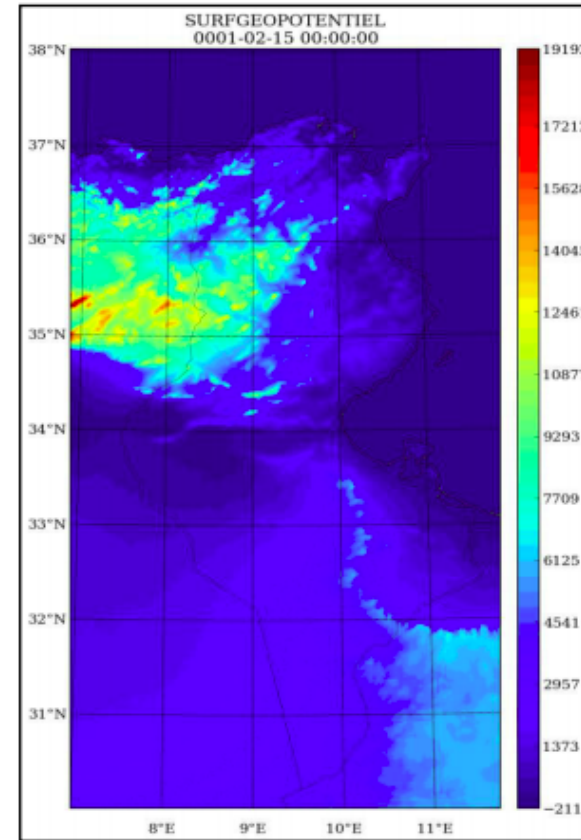
- Configuration of **AROME-Tunisia 1.3 km**
(CY42, Coupled to ARPEGE 10Km, Time step 45s,90 vertical levels)



Model used in the Benchmark

AROME-TUNISIE Configuration

	AROME-TUNISIE 1.3 km
Version	CYCLE 42
Resolution	1.3 km
Number of Points N _{LONG} *N _{LAT}	384 X 720
Vertical Level	90
Coupling Model	ARPEGE 10km
Time step	45 s



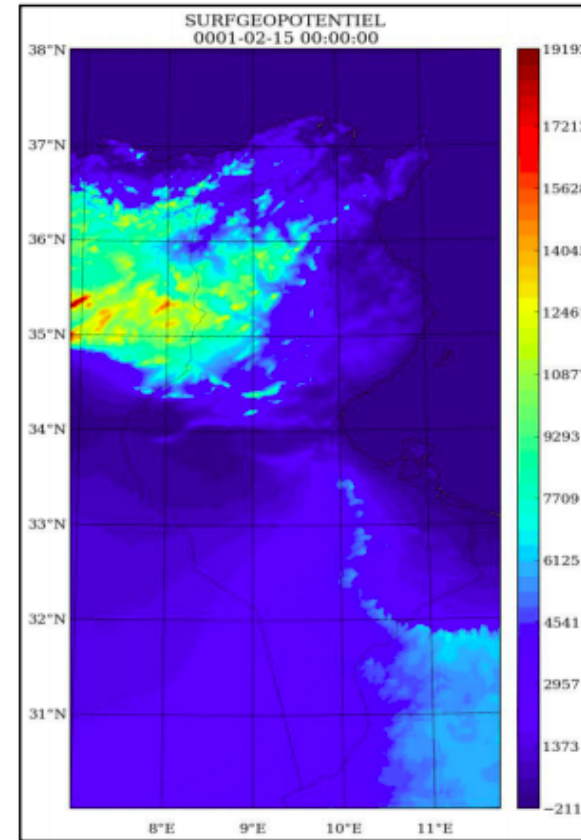
AROME-Tunisie Domain

- HPC Project: Enhancement of the computing capacity:

Model used in the Benchmark

AROME-TUNISIE Configuration

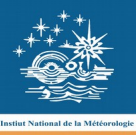
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AROME-Tunisie Domain

- HPC Project: Enhancement of the computing capacity:

Observation and monitoring



Observation : 26 SYNOP, 2 TEMP and 1 wind profiler
- Use of OPLACE

Monitoring

Installing and using MANDALAY and OBSMON

HARP not yet tied

Canari and Minimisation chain



Obsprep - odb – canari

Obsprep – odb – screening – minimisation

Obsprep : prepares all needed observations for 3DVAR Atmospheric analysis.

Odb : Builds ODB (program BATOR) by subbases and merges the sub-bases at the end to one common ECMA database. The database is dumped at the end with MANADALAY.

Screening : Performs observational SCREENING and take first guess from CANARI analysis.

Minimisation : Performs 3DVAR analysis and take first guess from CANARI analysis.

B matrice used

- B matrices are the average of 3 B matrices calculated over 3 periods: winter (rainy season) , summer (Hot & humid) and Fall (convective systems) → take on consideration all the Regimes that influence Tunisian Weather
- In order to have a positive definite B matrix , we must have the number N of differences equal to or greater than the number of vertical levels of the model (60 for Arome 2.5 km et 90 for Arome 1.3 km) :

Winter-Time 07-16 February:

6 members ensemble * 10 days at 00H → 60

Fall-Time "Off season" 25September – 04October 2015:

6 members ensemble * 10 days at 00H → 60

Summer-Time 16-20 August 2016:

6 members ensemble * 5 days * 2 runs 00H & 12H (to integrate convective phenomena) → 60

- Same periods for B matrix - EDA and B matrix Spin-up → compare the matrices

1st B

Ensemble
Spin - Up

N LBC
Ensemble
from
PEARP

N forecast
Ensemble from
AROME
Spin - up

N Forecast
Differences
With
AROME

B Matrix

2^{sd} B

Ensemble
Data
Assimilation

N LBC
Ensemble
from PEARP
+
Perturbed
Surface Observations
& SST

N forecast
Ensemble
from
AROME - 3Dvar
EDA _

N Forecast
Differences
With
AROME-3Dvar

B Matrix

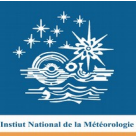
Perturbed Surface Observations & SST

Perturbed SST: (following Y. Michel's works)

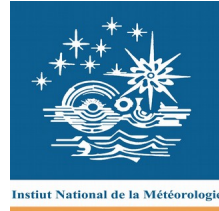
- OSTIA files
- As the Sea ~ 1/6 of Tunisian domain -> fixed perturbation

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HPC project



- **Benchmark** : Cy 42
- **Machine** : Dell machine with Redhat HPC.
- **Run time** : Run to Arôme 1,3 model in 40 minutes.
- **Next steps** :
 - Installing Cycle 43
 - Try to run data assimilation cycle locally.
 - do all the exercices locally,



Thank you