Institut National de la Météorologie

Joint LACE DATA Assimilation Working Days

& ACCORD Data Assimilation basic kit Working Days

Tunisia Status of Progress

Wafa KHALFAOUI, Haythem BELGHRISSI

NWP , INM

1. Operational and E-suites

2. Data Assimilation at INM : Scheme & observations

3. Status and Progress

4. Jk Blending

5. Summary & Outlook

Implementation on HPC

	ALADIN Tunisia 7.5 km	AROME-TUNISIE 1.3 km	AROME-TUNISIE 1.3 km
Cycle Version	CYCLE 38	CYCLE 42op2	CYCLE 43t2
Resolution	7.5 km	1.3 km	1.3 km
N° of points	205 x 259	687*352	687*352
Vertical levels	70	90	90
LBC	ARPEGE 10km	ARPEGE 10km	ARPEGE 10km
Time step	450 s	45 s	45 s
Forecast	54h	48h	48h

Data Assimilation Scheme
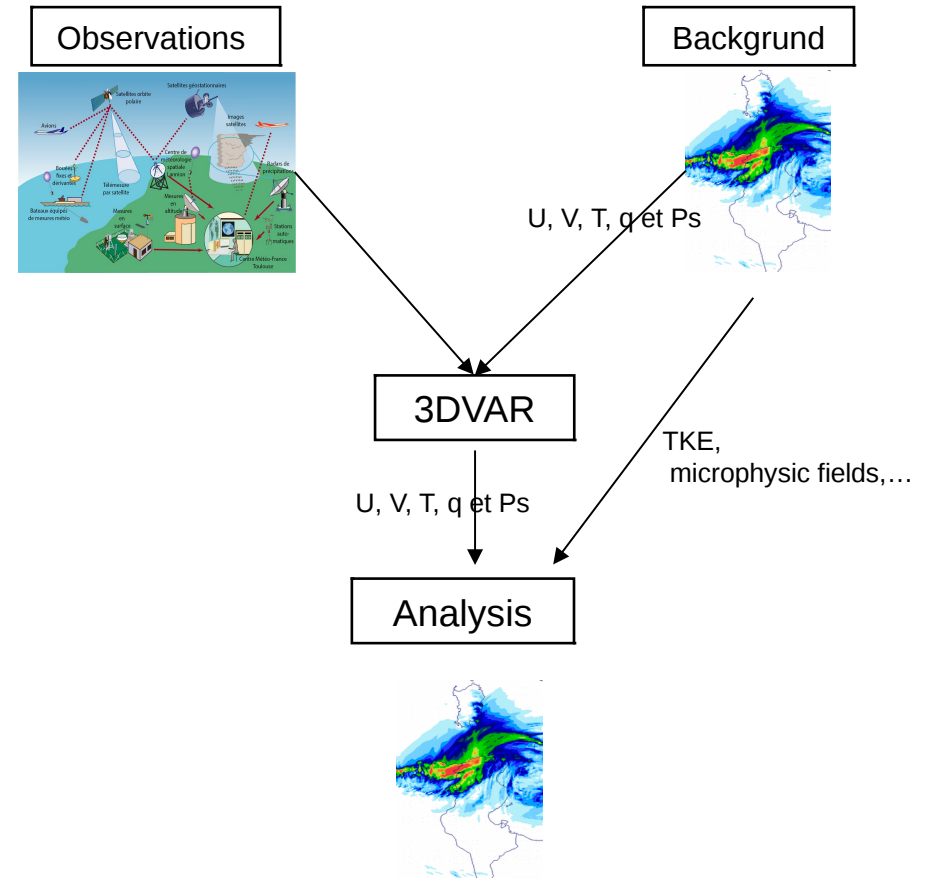
ALADIN-Tunisie DA Configuration

- 3DVAR scheme: spin up Ensemble B matrix

- 6H cycling

- Local: Synop, Temp

AROME-Tunisie DA Configuration

Tested on Meteo-France

- 3DVAR scheme : DA ensemble B matrix

- 3H cycling

- Synop, Temp, Amdar, Buoy

- Satellite: Seviri, AMSU-A, AMSU-B, IASI

Observations

Backgrund

U, V, T, q et Ps

3DVAR

TKE, microphysic fields,…

U, V, T, q et Ps

Analysis

Implementation on HPC

Implementation of cycle 43t2.
Bator Cy43 Tested for SYNOP

Surface analysis

CANARI   GTS+local SYNOP

Upper Air Analysis : 3dvar scheme

- Ensemble B-Matrix
- Work on progress to use Jk blending with Arome 3dvar

Observation Pre-processing

- Pre-processing : local SYNOP , Temp
- we don't use SAAP
- We use Alex Deckmyn python tool « Pop-rmi » to process local conventional data

Monitoring

- Test of Mandalay Ok
- Test of Obsmon OK (shiny part)
- HARP on going implementation

- Motivation :

Small domain + low observations density

- V matrix computation and diagnostics :

Ensemble method

Same setup and periods of the Ensemble Data Assimilation Bmatrix

Seasonal variability:(winter, summer, convective situations)

- Namelist tuning

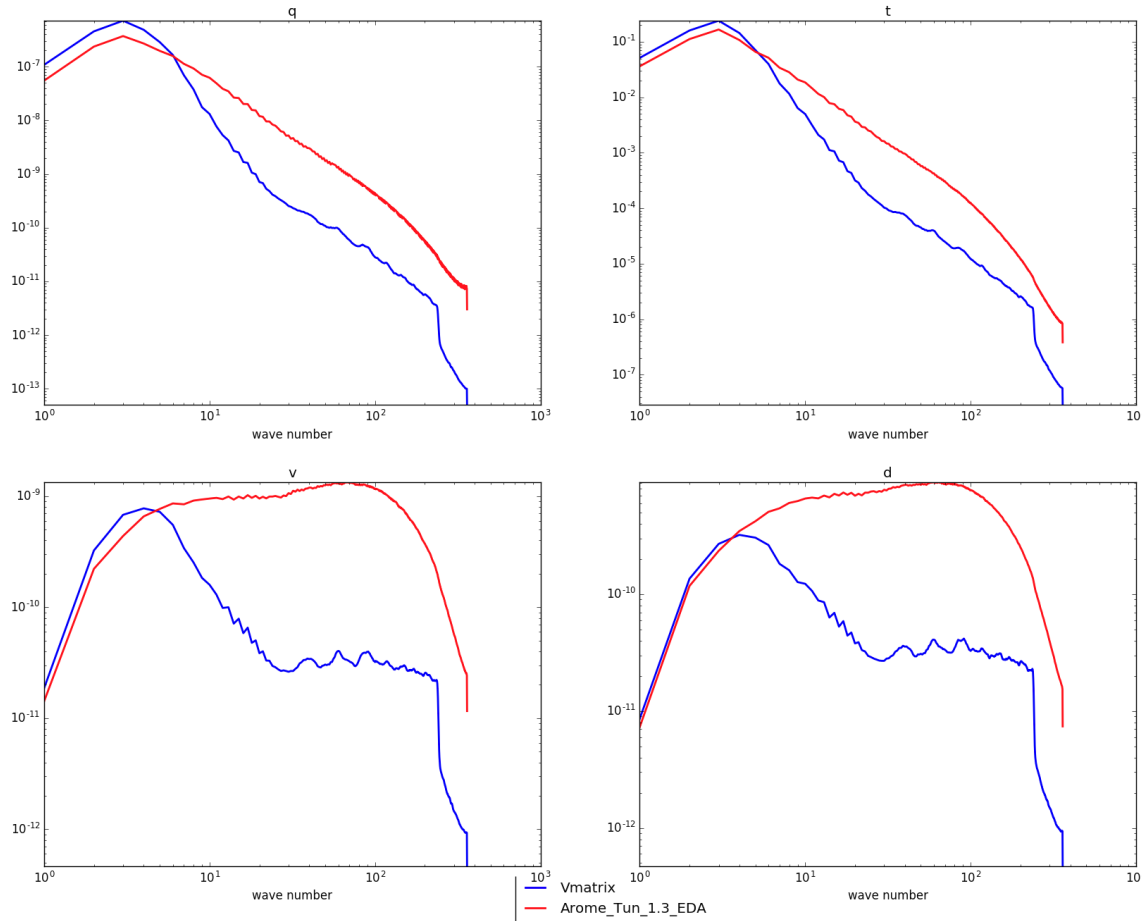**- Code modifications**

Adapting Jk ALADIN existing routines for AROME

Changing Grid point Humidity in AROME to Spectral within the code

- Experiments

crush in minimization at some dates => computation profile / out of bound arrays issue that needs to be fixed !

**Horizontal variance spectra at 800 hPa**

Results :

- Horizontal variances of the EDA Bmatrix are bigger than the Vmatrix for the small scales.

- Horizontal variances of the V matrix are bigger than the EDA Bmatrix for the large scales.

Horizontal variance spectra at 800 hPa of specific humidity (q) temperature (t), vorticity

(v) and divergence (d) forJk (blue) and 3dvar (red)

Vertical profile of background error standard deviation

Increase in standard deviation of vorticity and divergence of EDA B matrix compared to V matrix
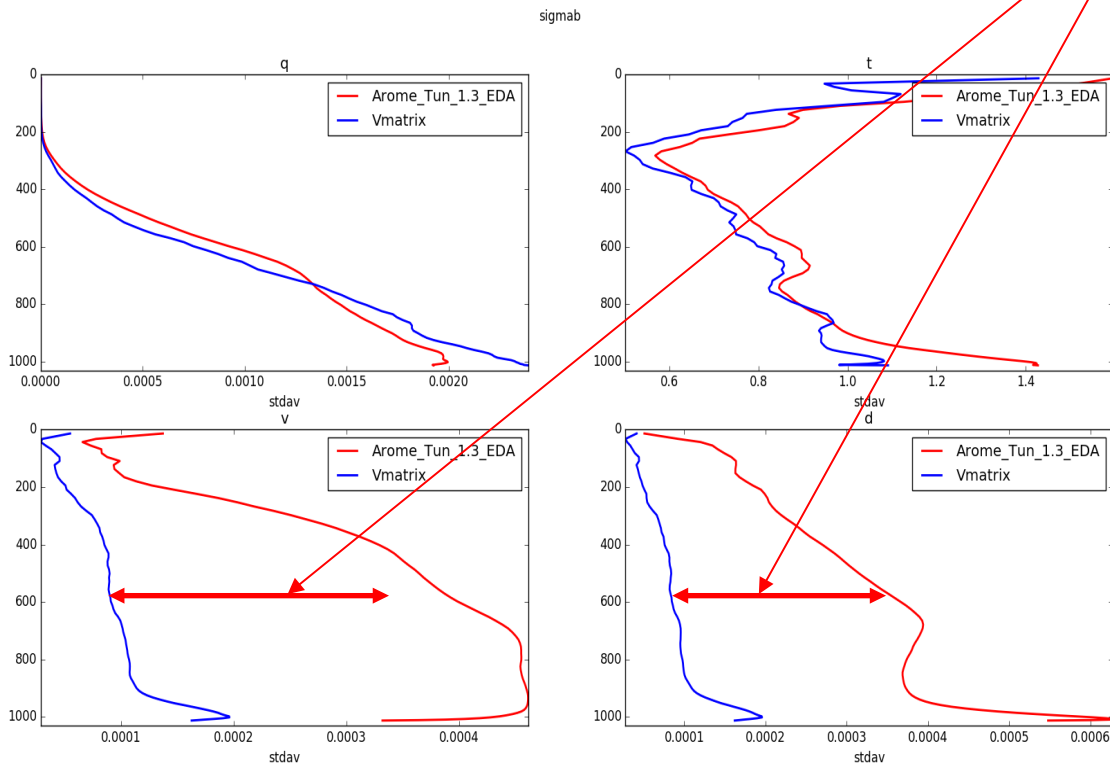
Vertical profile of the standard deviation of specific humidity (q), temperature (t), vorticity (v) and divergence (d) for AROME-TUNISIE during winter (blue line), inter-season (cyan line) and summer (red line) periods; B matrix (mean of the 3 periods) (red line) and V matrix (blue line)

- Observation:

    - Work on our Local Data Base Observation

    - Use of more observations: AMDAR, local GNSS

- Cycling of AROME 3dvar locally

- Jk blending further investigations

Thank you ☺

Question ?

wafa.khalfaoui@meteo.fr

wafakhalfaoui@gmail.com

Numerical Weather Prediction Service
Research and development Department

National Institute of Meteorology