

## Summary report on DAsKIT video-conference, 25 March 2020

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The main topics of this video-conference were:

1. Status on the DAsKIT countries progress
2. Actual issues
3. Progress on actions: validation & diagnostics of surface DA; BATOR CY43T2 implementation/validation (up to end 1Q2020)
4. Planning of next actions & AOB

Short status per country:

### ALGERIA

- data acquisition:  
SYNOP (3-hour GTS; 1-hour GTS automatic stations), TEMP, AMDAR and ASCAT (MetopA, MetopB/1-hour) from GTS (BUFR).
- data pre-processing:  
BUFR SYNOP (duplications and amends are tackled); TEMP (filtered over ALADIN domain); AMDAR (filtered over ALADIN domain; selection of template 311010); ASCAT (filtered over ALADIN domain).  
Plans: pre-processing of GPS data.
- monitoring tools:  
OBSMON installation is on-going; MANDALAY (CY40T1) has been ported.
- verification tools:  
HARP not installed.
- surface DA:  
AROME OI\_MAIN (CY40T1\_bf07) is being cycled under test mode with GTS SYNOP data (first results available for a 20-day cycling period), but without blendsur.
- upper-air DA:  
BATOR (CY40T1\_bf07): SYNOP, TEMP, AMDAR;  
BATOR (CY43T2\_bf10): tested for SYNOP, TEMP, AMDAR;  
CY43T2\_bf10: compilation of screening and minimisation;  
B-matrix computed for ALADIN (6km);  
6-hour pre-operational 3D-Var for ALADIN at 00,06,12,18UTC (CY40T1\_bf07); for AROME (00,12UTC); B-matrix has been computed from AEARP downscaling and a 3D-Var cycling is being implemented for AROME at CY40T1\_bf07; B-matrix has been computed from AEARP downscaling and a 3D-Var cycling is being implemented for AROME with an hybrid cycle (CY40T1\_bf07 for BATOR and CT43T2\_bf10 for 001); on-going validation of ALADIN 3D-Var with multiple observations types (1 week forecasts in three regions (north, interior and south, using ALADIN at dynamical adaptation); ALADIN 3D-Var with single observation (SYNOP) and ALADIN 3D-Var with the three types of observations (one per type); results (favourable for multi-observation type) are available.  
Plans: compute a new B-matrix to ALADIN (6 km).
- combined surface+ upper-air DA:  
Plans: building a pre-operational version of 3D-Var cycle, combined with OI\_MAIN, for AROME at CY43T2.

- reported issues:
  - a segmentation fault in the forecast step with INIT\_SURF file when running blendsur routine (CY40T1\_bf07) was still reported;
  - issue with AMDAR and TEMP (CY43T2\_bf10);
  - a screening problem has been reported, most probably related to the specification of a namelist.

## BELGIUM

- data acquisition:  
SYNOP, TEMP, AMDAR from GTS (BUFR), ground-based GPS (E-GVAP samples from Royal Observatory of Brussels).
- data pre-processing:  
Python script that deals with duplications and amends; SAPP (ECMWF) server is installed;  
Plans: configuration of SAPP to local needs.
- monitoring tools:  
OBSMON is technically working but an issue found when reading CMA/ODB files coming from ALADIN system (see 'Recommendations & actions'); MANDALAY installation (CY43T2\_bf10).
- verification tools:  
HARP.
- surface DA:  
3-hour cycling of an ecflow suite for surface DA (OI\_MAIN) is running in pre-operational mode for CY43T2\_bf10 by switching off CANOPY; CANARY surface analysis in ALARO (4km).  
Plans: cycling with ALARO at 4.0 km;
- upper-air DA:  
computing B-matrix for ALARO 1.3, 4.0 and AROME 1.3 by the NMC method (period: 01.02.2019-01.08.2019);  
3D-Var setup for ALARO4.0 and AROME1.3;  
6-hour cycling 3D-Var (some experiments with AMDAR were already done) for ALARO4.0 and ALARO1.3.
- combined surface+ upper-air DA:  
BATOR (CY43T2\_bf10): tested for SYNOP, TEMP, AMDAR;
- 3-hour cycling of 3D-Var+OI\_MAIN (AROME1.3, CY43T2\_bf10); 3-hour cycling of 3D-Var+CANARI (ALARO4.0, CY43T2\_bf10).
- Plans: to use GPS data and other data sources like MODE-S and OPERA-ODIM radar.
- operational systems:  
CY43T2 by dynamical adaptation (coupling with ARPEGE);  
Plans: operational surfDA (CY43T2\_bf10).
- reported issues:  
the explained ALARO4.0 variances show a pic at the same altitude level (200hPa) for the three control parameters (Q, T and div); more investigations must be done to know what causes this variability (~60% of the error is caused by Temperature).

## BULGARIA

- data acquisition:  
SYNOP, TEMP from GTS (BUFR), local SYNOP (converted to BUFR).
- data pre-processing:  
new tools to split compressed BUFR file into single BUFR file have been developed in-doors using eccodes; duplications are then removed using the same tools.
- monitoring tools:  
OBSMON, MANDALAY ported locally.
- verification tools:  
HARP ported and some tests just started; local surface verification tool.

- surface DA:  
BATOR (CY43T2\_bf10): SYNOP (locally); AMDAR (tests in beaufix); OI\_MAIN (CY40T1\_bf07) for AROME-BG was ported from beaufix (Météo-France HPC platform) and cycle for 2 weeks with BUFR data and ODB validation; a newcomer has arrived and efforts are being put onto its training; on-going work to port surfDA for AROME-BG to CY43T2\_bf10.
- operational systems:  
CY43T2 by dynamical adaptation is running in operational suite since November 2019; ALADIN (105L/5km/72h) and AROME(60L/2.5km/36h); Plans: 2 daily runs at (00UTC and 12UTC; so far they had shifted model runs); new machine in 2020.
- reported issues:  
shuffle has presented a problem, which will be reported.

## MOROCCO

- data acquisition:  
SYNOP, TEMP and AMDAR from GTS (BUFR); local SYNOP; local GPS, ATOVS (BUFR).
- monitoring tools:  
OBSMON installation: on-going in the local machine.
- verification tools:  
HARP not yet.
- surface DA:  
BATOR (CY40T1) handling: SYNOP, TEMP and AMDAR from GTS (BUFR) in beaufix; local SYNOP; GPS (BUFR); surface DA runs to AROME-MOROCCO in beaufix; waiting the new local machine to port and cycle it.
- upper-air DA:  
3-hour cycling 3D-Var for AROME-MOROCCO has been cycled in beaufix (CY40T1\_bf07); B-matrix diagnostics have been done, comparing the downscaling with the ensemble method.
- combined surface+upper-air DA:  
Plans: acquisition of a new HPC is planned for 2019, where surface DA should be validated and the full AROME-MOROCCO settings is supposed to be ported.
- operational systems:  
a new HPC platform has been acquired to which porting of CY40T1\_bf07 (benchmark and upper-air DA) systems will be done together with those of CY41T1; compilation of CY43T1\_bf10 has started.

## POLAND

- data acquisition:  
OPLACE data is used;  
conversion of local SYNOP to BUFR.
- monitoring tools:  
OBSMON installed and tested with DAsKIT WD data (see reported issues).
- verification tools:  
HARP-v2 runs for DA cycle but not in use.
- surface DA:  
6-hour cycling of a surface DA based on CANARI (not SURFEX) for ALARO (CY40T1\_bf07 and CY43T2\_bf10) 4 km; 66-hour forecasts. RMSE scores for one week period (2019060400-2019061100) after a 3 week cycling was validated (more local data was introduced).
- operational systems:  
ALARO CY43T2\_bf10 (?L, 2.5km; 4x a day, up to 30h);  
AROME CY43T2\_bf10 (?L, 2.5km; 4x a day; up to 72h).

- reported issues:

OBSMON: problems when testing local data with graphical/shiny part of OBSMON; the implementation of the conversion tool (from the local experiment's output data to shiny recognised format) is missing.

## PORUGAL

- data acquisition:

SYNOP, TEMP, AMDAR from GTS (BUFR);

Plans: OIFS radar data.

- data pre-processing:

local handling of duplications and amends (FORTRAN): SYNOP and TEMP (missing validation); following local implementation of SAPP (SYNOP WMO BUFR data).

- monitoring tools:

home-made (metview plotting for SYNOP); local OBSMON\_V3.3.2 (shiny part) and MANDALAY (CY40T1\_bf07) implementation is on-going.

- verification tools:

local (home-made IPRODS-IVERIF) surface verification tool;

Plans: HARP implementation.

- surface DA:

3-hour cycling of a standalone surface DA scheme (OI\_MAIN, CY40T1\_bf07, AROME, 60L, 2.5km) ; on-going validation of 48-hour forecasts of AROME-PT2 (CY40T1\_bf07, 60L/46L) initialised by surface DA using as reference the same AROME-PT2 model configuration, initialised by dynamical adaptation for the two periods: WINTER: 10dez2018-10fev2019 (cold and rainy period); SUMMER: 01ago2018-09set2018 (extreme temperatures); preliminary validation revealed LNOTS and CANOPY scheme should be switch off for Mainland domain (AROME-PT2), but not for the Atlantic Islands (AROME\_MAD and AROME\_AZO); scores are available.

- combined surface+ upper-air DA:

BATOR (CY38, CY40T1\_bf07): SYNOP, TEMP; BATOR (CY43T2\_bf10, ported to ECMWF): SYNOP, TEMP, AMDAR;

B-matrix computed by AEARP downscaling and tested in beaufix for AROME-PT2 OI\_MAIN+3D-Var, with AROME DA VarBC (CY40T1); 20-day validation on beaufix platforms of combined AROME\_PT2 OI\_MAIN+3D-Var (CY42T2) has revealed a slightly improving using conventional + OIFS HDF5 volumetric data, in particular for larger amounts of 24-hour accumulated precipitation (Skill Scores and Probability of Detection), keeping the False Alarm Rates;

Plans: porting beaufix experiment to the ECMWF machines (at CY43T2\_bf10, with an adaptation of Slovenia (ARSO) scripts ported to ecgate).

- operational systems:

dynamical adaptation of AROME-PT2 (CY40T1\_bf07, 60L, 2.5km);

Plans: move to ECMWF computing platforms (CY43T2\_bf10).

- reported issues:

installing BATOR CY43T2\_bf\_09 installation in the local machine (IBM-p7) since the native compiler does not supports FORTRAN2008 features; installation in the local machine (IBM\_p7) with gcc since it was not possible to install gcc compiler with older software on the machine which does have maintenance support.

## TUNISIA

- data pre-processing:

OPLACE; local SYNOP; TEMP and WIND PROFILER.

- monitoring tools:

OBSMON and MANDALAY implemented on the local machine.

- verification tools:

HARP not installed.

- surface DA:  
BATOR has been locally implemented on CY40T1\_bf07 and should now be tested with OPLACE databases; surface DA (OI\_MAIN) has been implemented in beaufix but not yet on the local machine;  
Plan: move to CY43T2\_bf10.
- upper-air DA:  
6-hour DA cycling (ALADIN, AROME).
- combined surface+ upper-air DA:  
B-matrix has been computed by the ensemble method and tested in beaufix for AROME;  
Plans: to implement a combined surface + 3D-Var DA, with a Jk component on the new HPC platform by end of 2019; installing CY34T2 (AROME, BATOR).

## TURKEY

- data acquisition:  
SYNOP and AMDAR from GTS (BUFR), local SYNOP (conversion to BUFR); non-conventional observations are using AMSUA, AMSUB-MHS (NOAA18-19 & METOP1-2, SEVIRI (METEOSAT11) and AMV (METEOSAT).
- data pre-processing:  
using eccodes following DAsKIT examples;  
Plans: SAPP will be implemented during 2019 in pre-operational mode; test of new observations.
- monitoring tools:  
OBSMON has been installed and tested with provided observations; a python script has been created to visualize MANDALAY output.
- verification tools:  
Plan: HARP implementation.
- surface DA:  
BATOR (CY43T2\_bf10) has been installed; BATOR (CY43T2\_bf10) and CANARI tested successfully with local SYNOP (t2, rh2); diagnostics done for one SYNOP station; validation has been prepared for a 2-week period; scores are available;  
Plans: set-up of a surface DA (OI\_MAIN) cycling to AROME-Turkey.
- combined surface + upper-air DA:  
B-matrix has been calculated from AEARP at CY43T2 by the ensemble method;  
Plans: set-up of a joint surface (OI\_MAIN) + 3D-Var DA to AROME-Turkey.
- operational systems:  
CY43T2\_bf10 is operational since September 2019 for AROME (72L, 1.7km and 48-h lead time);  
CY40T1\_bf07 is operational for ALARO (60L, 4.5km and 72-h lead time);  
6-hour DA is being cycled for ALARO CY40T1 in test mode (at 00, 06, 12, 18UTC network times), at 4.5km, 60 levels and with LBC from ARPEGE; as conventional observations are using SYNOP GTS&local; TEMP local and AMDAR GTS; CANARI is used for surface DA and 3D-Var for the upper-air with 24-hour varBC. The model is integrated up to 48 hours.
- reported issues:  
screen-level parameters verification scores of AROME-Turkey when initialised by the surface data assimilation cycle are below the expected (for progress, see "Recommendations and actions" below).

Acknowledgments: to Alena Trojakova (CHMI, LACE) for bringing hints and solutions to DAsKIT problems; to Roger Randriamampianina for its support on OBSMON issues.

Main conclusions:

1. during first quarter of 2020, the main concern of DAsKIT countries was still the local implementation of CY43T2 and in sequence the porting of their DA systems to this cycle (Algeria, Bulgaria, Poland, Portugal, Tunisia, Turkey). Morocco has now new HPC

computing platforms. Bulgaria and Poland will keep a slow progress on DA due to lack of computing power on the actual local machine and plans the acquisition of a new HPC platform for 2020;

2. however, there is still a wide effort onto the implementation (including its validation) of the DAsKIT set for surface DA in almost all the countries (Algeria, Belgium, Bulgaria, Morocco, Portugal, Tunisia, Turkey, except Poland which runs a CANARI solution for ALARO);

3. countries continue to show and discuss the first diagnostics and forecast scores on the surface DA, namely: Algeria, Belgium, Poland, Portugal and Turkey;

4. and 1 out of 8 countries (Belgium) still plans to move the DAsKIT set into operations (with AROME physics).

5. The second main concern of DAsKIT countries is the handling of locally available data. Main observation types are: SYNOP, TEMP, AMDAR and WindProfilers (Tunisia) under BUFR format from GTS or local networks;

6. so far countries created pre-processing tools based on eccodes (ECMWF) to handle BUFR data, as it is the example of Belgium and Bulgaria. Pre-processing consists of removing duplicates from corrections and amends and filtering a certain type of BUFR template over a particular geographical area. Pre-processing is applied to SYNOP, TEMP and AMDAR, but removing duplicates on TEMP is a process missing to the most part of the DAsKIT countries.

7. BATOR at CY43T2 has been tested for SYNOP, TEMP and AMDAR by Algeria, Belgium and Portugal; for SYNOP, in Bulgaria, Tunisia and Turkey;

8. MANDALAY (CY40T1 or CY43T2) has been implemented and tested with demo data in almost all countries (still on-going for Portugal) and no issues have been reported so far. Turkey has their own scripts to do some data monitoring with MANDALAY;

9. OBSMON has been implemented and tested in almost all the countries with demo data (still on-going for Algeria and Portugal), but none has yet started to use it on a regular basis, though Belgium has tested it with locally produced data and faced some issues (see Recommendations & actions);

10. HARP has not been implemented in most of the countries;

11. Issues have been reported still in configuration 001 when blendsur (in CY43T2) is added to the workflow and this topic will still be the focus of priority actions during 2Q2020;

12. besides, it was discussed the possibility to analyse local CMA/ODB data with OBSMON and to ingest BUFR data produced by SAPP on BATOR export version. These two topics did not suffer a progress and should be investigated more deeply, so some action (with less priority) will still be kept alive also in order to support all the DAsKIT countries;

13. next DAsKIT video-conference will take place in June-July 2020 and a doodle to establish the appropriate dates will be set in advance.

Recommendations & actions:

1. all countries are invited to document their issues in the LACE forum, on the page dedicated to DAsKIT issues <http://www.rclace.eu/forum/viewtopic.php?f=21&t=580>;

2. main goal for 2Q020 is the porting of surfDA to CY43T2 in all countries; however,
3. countries which did not succeed to achieve the goal established for the 1Q2020 are invited to take advantage of the work already done by countries who did it.
4. besides, the issue with blendsur (the source code is called blendsur, however the task in some local applications of surface DA is frequently called “blendsea” to reference that blendsur is only applied to SST copy from the coupling model to LAM), reported by Algeria, joint with some new information on the way how ALARO is using blendsur was also shared. In fact, within the ALARO community there is no need to create a special input file to blendsur with a reduced number of fields; the input is directly the coupling file used on the model and with the full model state fields. Apparently the AROME model state is not accepted by blendsur and this should be carefully checked again. The DA coordinator will contact Belgium team to discuss the actual blendsur implementation at the surface DA settings and check if it is possible to optimise blendsur usage in the surface DA scheme.
5. concerning the bad scores obtained with the validation of surface DA, the following suggestions were done:
  - in case of doubts about the quality of local observations one should try to test CANARI quality control which can be activated (LAECHK=.true.);
  - to check which surface scheme is used within SURFEX, e.g. it has been found beneficial to switch off the CANOPY scheme over the Portuguese Mainland domain and over the Belgium domain also). However, in case the CANOPY scheme is switched off, the attention should be paid to the following details:  
LISBA\_CANOPY=.FALSE.; LSEA\_SBL=.FALSE; LWAT\_SBL=.FALSE. for the SURFEX initial file preparation; Furthermore N2M=2 (surface diagnostics after Geleyen 1988) should be activated during the model integration.
  - a possibility to tune surface analysis was mentioned following guidance from Météo-France, see <http://www.rclace.eu/forum/viewtopic.php?f=34&t=305>  
Please keep in mind that information is quite old & relevant for ARPEGE and ALARO using ISBA scheme (not for AROME using SURFEX). Therefore Météo-France colleagues were inquired for an update regarding AROME/SURFEX.
  - It might be also useful to check soil increments. There was an issue with the soil moisture increments encountered in LACE countries, for more details see
    - <http://www.rclace.eu/forum/viewtopic.php?f=34&t=362>
7. concerning the issue reported by Belgium on OBSMON (not possible to analyse locally produced CMA/ODB data with OBSMON), Roger Randriamampianina offered to interact with Belgium colleagues to find the solution and to inform the DA coordinator.
8. No action was set on the compatibility of SAPP (ECMWF) BUFR data with BATOR export version but it was mentioned that status in April 2018 was to keep ECMWF BUFR format reading in a different branch from the main. Therefore DAsKIT should still keep some attention on this.