Summary report of the 2018 DAsKIT WD, Bucarest, 19-21 September (from the joint discussion session).

See List of Participants and Agenda in attach.

A historical review was given by Piet Termonia, the ALADIN Programme Manager (PM). These days it is noticeable the difference between LACE and non-LACE countries on the local implementation of operational Data Assimilation (DA) systems. The coordinated efforts of LACE countries as well as the development of a centralised pre-processing system (OPLACE) bloomed the implementation of local DA systems in those countries.

For non-LACE countries (besides France) joining synergies in a coordinated way is the lesson to take from LACE experience. In this way, in 2017 a first joint effort was done in Lisbon during the 2017 DA Working Days: an exercise on pre-processing of conventional data, prepared by Alena Trojakova (AT), LACE Data Manager, was prepared and proposed; countries should be able to use the exercise as a reference in order to start implementation procedures in-doors. Meanwhile a new ALADIN core project - the Data Assimilation basic KIT (DAsKIT, for simplicity) project, was establish and its coordinator, Maria Monteiro (MM), was pointed out at the begining of 2018.

During the 1Q2018 a progress survey was done among DAsKIT countries, showing they managed to pre-process GTS BUFR SYNOP data in-doors (or were able to manipulate OPLACE pre-processed data files for this type of observations); it showed also there was a concern on local surface DA.

The 2018DAsKIT Working Days (WD) were planned with support of LACE (AT) and HIRLAM (Roger Randriamampianina, RR) DA experts trying to fulfill the needs and expectations shown in the survey. Rafiq Hamdi (RH) and Alex Deckmyn (AD) expertises, on surface and validation topics respectively, were also useful to support these WD and two video-conferences, one with Eoin Whelan on ECMWF pre-processing system SAPP and one with Météo-France (Claude Fischer and Camille Birman) have also taken place. In order to optimise efforts, the 2018DAsKIT WD was jointly organised with LACE DA Working Days (DAWD) and Romania team took charge of the local organization.

Data Assimilation systems implementation requires a change in mentality (when compared to downscaling initialisation) since a cycling dependency has to exist between different model runs. Tools have been prepared to allow DAsKIT countries to implement a cycling system in-doors. In particular, a set of scripts to solve the basic surface DA steps on a particular cycling network was prepared. The usage of tools for local data monitoring (standalone OBSMON and MANDALAY) and data validation (HARP) was demonstrated and the experience with its local installation was exchanged.

The final joint discussion session was split in two parts. For the DAsKIT part, a list of topics was prepared by PT and MM (see corresponding presentation). Main conclusions follow:

1. Some staffing issues were identified (TODO@PM). Nevertheless, it was reported that the reference version of the surface DA on Météo-France platforms will be a great help; it will be ported locally.

2. Surface DA has a crucial impact on the model performance. It was confirmed during the discussions that one can already gain a lot from surface DA before moving to 3Dvar. The cycling is important to keep the memory of surface conditions at the small scales in our models. In fact, deep soil moisture is the memory for convection and keeping this memory

in our models is crucial. Surface DA is a trackable tool, but the frequency of cycling as well as the density of surface observations (in addition to the information assimilated in the global model) are really important for the success of this tool.

3. to the question on which countries already have pre-operational/operational DA cycling, the countries replied:

Algeria - cycling for ALADIN in a pre-operational state.

Belgium - cycling (surface) in testing mode (should enter in pre-operationl up to the end of the year, first for AROME and later for ALARO) The developments were delayed last Summer due to problems with the queueing system on the RMI HPC.

Bulgaria - not cycling, but stepping in the proper direction after the working days by relying on the DasKIT reference installed on the Météo-France HPC machine (beaufix).

Morocco - pre-operational (e-suite) cycling 3D-Var for AROME, at 2.5km resolution; the problem with surface should be solved with the local implementation of the 2018DAsKIT exercise on surface DA

Portugal - cycling for AROME a 3-hour surface DA system

Poland - cycling in testing mode with CANARI

Turkey was not present but it is well known they already have DA systems in cycling mode (national posters at AH-WS-ASM, EWGLAM).

During discussion it was generally accepted the working days will help the countries to progress. Countries were tasked to cycle the 2018DAsKITWD surface DA exercise in order to share their problems. Moreover, participants were requested to ask their LTM's to put some man-power in the RWP2019 (TODO@participants).

4. Concerning SAPP, it was pointed out there are 3 countries which are not full or collaborating members of ECMWF and that may be an issue to solve in the near future (TODO@PM). Algeria was given as example: they asked access to SAPP and got a negative answer from ECMWF. For the time being those countries (as it is already the case of Poland and Tunisia) may get data already pre-processed from OPLACE; for the DA activities DAsKIT countries are doing locally, SAPP is not needed, so one should take time to discuss the price to pay to go to SAPP. If Algeria is interested in OPLACE, it must send request to LACE management; price is usually payed as man-power (one person month work in a LACE country at the expense of the non-LACE country that receives the OPLACE data) and LACE decision is taken case-by-case (latest LACE requirement is one month of work and access to national data). A proposal has been submitted to TAC about the use of SAPP by the LAM community. We will wait to see the outcome of this discussion and come back to this issue by the end of October.

For the DAWD discussion, a list of topics was presented by their DA Area Leader, Antonín Bučánek (AB). Main conclusions follow:

5. Several countries have been migrating operational suites to new computers: Cz, HU, At.

6. In LACE, all the countries have DA systems working, so they are more concentrated on new data sets like Mode-S, radar data and GNSS-ZTD. One concern when using Mode-S data is that the cost-function may not converge if the number of Mode-S observations is too large. For instance, in Austria they had to increase default number of iteration (50) to 100.

In context of Mode-S observation there was made a proposal to non LACE countries to explore local providers of Mode-S data (Air traffic control). Modern aircraft carry sensors to measure the Mach number (using pitotstatic probe) and the total air temperature (T). An air traffic surveillance radar interrogates all aircraft in sight in a selective mode (Mode-S), on which the aircraft replies with a message containing, for example, magnetic heading, airspeed and Mach number. From this information wind and temperature can be extracted. Mode-S observations are vertically dense and their assimilation gives positive impact on forecasts.

In case countries would be interested to use this data, KNMI can do the pre-processing/conversion and the price should be negotiated with KNMI. In principle, the requirements for the country will be the access to this data: KNMI gives back the pre-processed data in "real-time" to the local service or ATC. So far, there is already a good coverage of this type of data over the Eastern countries; over central Europe coverage is acceptable; but over the Iberian Peninsula and, in particular, over the south of Europe the coverage is rather poor. More details see:

https://sites.google.com/a/wmo.int/amdar-news-and-events/newsletters/volume-13-april-2017-compilation/emaddctowardsoperationalcollectionofmode-sehsobservationsineurope

7. Surface DA is a topic of research and development so they are still trying to improve it by testing EKF schemes.

8. The additional term in 3D-Var cost function Jk following the Météo-France implementation was tested in context of AROME EPS (submitted article to QJRMS).

9. For satellite observations variational bias correction (VarBC) is considered important. Patrik Benáček is proposing a new way of setup of VarBC with improved adaptavity of VarBC coefficients (an article close to submition).

10. Problems have been found with hourly updated cycle; 2-hour cycling have been tried with better results so the question relies on how to do it properly ?

11. problems have been found when assimilating screen-level parameters CANARI. The key LDIRCLSMOD=T allows to read T2m, RH2m, v10m directly from guess (input file) and not to rediagnose these parameters in CANARI. After rediagnostic there could be differences more than 4°C in some grids compared to temperature field in guess. So recommandation is to use LDIRCLSMOD=T in CANARI (small bug in wind reading on CY43; bugfix is on the way).

10. Recent OPLACE developments have been discussed.

11. radar DA was one of the main concerns this year and a pre-processing tool is being developed; BATOR is being examined.

As for next steps on DAsKIT countries it was decided:

i) in the follow up week, MM will prepare a google worksheet to monitor the finalization of the WD exercises;

ii) a question on the WD format will also asked;

iii) countries are expected to finalize the local installations of OBSMON

iv) to set a surface DA cycling in accordance with the tools provided during the WD;

v) Validate the surfDA cycling, either with local or HARP tool;

vi) a new video-conference will be done up to the end of the year.

ALADIN Data Assimilation basic kit Working Days
Preliminary Agenda (v2018.09.10)

Bucharest (Romania)
19/09/2018-21/09/2018

This year the DAsKIT WD will be special since LACE Data Assimilation Working Days (DAWD) will be partly joined this year. The program starts at 9am on Wednesday 19th with a joint session DAWD+DAsKIT, where participants of both meetings will give progress/status presentations. During the late Wednesday afternoon and Thursday we will have separate programs. On Friday we will have a short common discussion and then again separate sessions.

List of DAsKIT WD participants

Alex DECKMYN (Belgium)
Andrey BOGATCHEV (Bulgaria)
Fatima HDIDOU (Morocco)
Zahra SAHLAOUI (Morocco)
Haythem BELGHRISSI (Tunisia)
Idir DEHMOUS (Algeria)
Malgorzata SZCZECH-GAJEWSKA (Poland)
Maria MONTEIRO (Portugal)
Martina TUDOR (LACE PM)
Meral SEZER (Turkey)
Piet TERMONIA (ALADIN PM)
Rafiq HAMDI (Belgium)
Roger RANDRIAMAMPIANINA (HIRLAM DA Project Leader)
Simona TASCU (MeteoRom)
Raluca POMAGA (MeteoRom)
Alena Trojáková (CHMI)

ALADIN DAsKIT Agenda

Wednesday (19th September 2018), between 09:00-18:00

09:00 – 09:10	Welcome and Opening – Dr. Elena Mateescu, Director General, National Meteorological Administration
09:10 – 10:30	First common block of progress/status presentations, 15min/pres. Algeria, Belgium, Bulgaria, Poland, Portugal

Coffee-break 20 min (10:30 – 10:50)

10:50 – 12:30	Second common block of progress/status presentations, 15min/pres. Morocco, Tunisia, Turkey, Austria, Hungary, Croatia

Lunch break 90 min (12:30 – 14:00)

14:00 – 15:00	Third common block of progress/status presentations, 15 min/pres. Czech Rep., Slovakia, Romania, Slovenia
15:00 – 15:30	Discussion

Coffee break 30 min (15:30 – 16:00)

16:00 – 16:30	Review talk – surface DA: CANARI+OI_MAIN (Rafiq Hamdi)
16:30 – 17:00	Practical note – Surface DA: exercise data flow (Rafiq Hamdi)

17:30 – 18:00 Practical session – (init) Surface DA exercise (testbed in beaufix, Alex Deckmyn)

Thursday (20th September 2018), between 09:00-18:00

09:00 - 09:30 Review talk – DA monitoring: focus on surface aspects (Roger Randriamampianina)

09:30 – 09:50 Practical note – OBSMON/MANDALAY (Roger R., Alena Trojakova)

09:50 – 10:10 Practical session – OBSMON/MANDALAY

10:10 – 10:30 Practical session – OBSMON/MANDALAY

Coffee-break 20 min (10:30 – 10:50)

10:50 – 12:10 Practical session – (cont) Surface DA exercise

12:10 – 12:30 Video-conf on SAPP (Eoin Whelan)

Lunch break 90 min (12:30 – 14:00)

14:00 – 14:30 Review talk – DA validation (Roger Randriamampianina)

14:30 – 15:00 Practical note – HARP: focus on surfarce aspects (Alex Deckmyn)

15:00 – 15:30 Practical session – HARP exercise

Coffee break 30 min (15:30 – 16:00)

16:00 – 18:00

Official dinner – 19:30

Friday (21th September 2018), between 09:00-15:30

09:00 - 10:00 Common discussion DAWD and DasKIT

Coffee-break 20 min (10:0 – 10:20)

10:20 – 12:30 Practical session – (final) Surface DA exercise

Lunch break 90 min (12:30 – 14:00)

14:00 – 15:00 Video-conf with Météo-France (to be confirmed)

15:00 – 15:30 Conclusions, further planning & official closing