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Data Manager Activity

Progress Report

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Progress summary

The core of RC LACE Data Manager (DM) activity has been maintenance and development of the common Observation Pre-processing system for LACE (OPLACE). The OPLACE was extended by TEMP observation measuring at 03 UTC, processing of radio-sounding and aircraft data was upgraded to ensure the migration from the Traditional Alphanumeric Codes to BUFR format and the new product of the High Resolution Wind was added. By the end of the year RC LACE Council approved access to OPLACE to Turkey, the first non-LACE country. Several issues with the OPLACE data provision were reported in November and December and it reopened discussions on backup of the OPLACE system. Work on improving reliability of the OPLACE has started immediately and will have the highest priority in the future.

The DM took a part in discussions on status of the Continuous Observation Processing Environment (COPE) project and areas of possible collaborations between ECMWF, Météo France, ALADIN, RC LACE and HIRLAM. The RC LACE Steering Committee and the Management Group are kindly invited to discuss the proposal for the contribution to the COPE project.

The exchange of surface synoptic data within RC LACE progressed substantially in 2014, all Members are providing data ready for an operational use, while the work on HARMONIE have not advanced as expected.

Scientific and technical main activities and achievements, major events

Action: ODB support

Description and objectives: The main objective is to provide observation database (ODB) related support. This includes help in configuration and usage of ODB and ODB related applications at RC LACE members' site. The DM acts as ODB contact point, helps to solve emerging problems and further spread information inside the community. The DM also updates and maintains RC LACE Forum regarding observation usage in ALADIN data assimilation system.

Efforts: 1.5 person months

Contributors: DM

Documentation: www.rclace.eu/forum, Trojáková (2014)

Status: The ODB related support was provided upon request and the regular update of the blacklist files from Météo France was maintained. Main efforts were dedicated to the Continuous Observation Processing Environment (COPE) project. The DM has been involved in discussions and a kick-off meeting on status of the COPE and areas of possible collaboration between ECMWF, Météo France, ALADIN, RC LACE and HIRLAM.

The ECMWF initiated the COPE project to support the more timely delivery and better monitoring and control of meteorological observations for ECMWF's operational assimilation system. The main goals are to perform a substantial part of the observation processing earlier, so that it takes place before the cut-off time instead of after, to perform most of observation processing tasks using the ODB rather than BUFR format and to enhance early detection and handling of observation anomalies that could cause failures in the operational suite.

The COPE project is ongoing, but the full design is not yet set. In 2014 the project will focus on building infrastructure components, and create a proof-of-concept prototype for two observation types (one conventional and one satellite data type) from the incoming telecom message up to the use in the assimilation and archiving. It will not produce an operational system, nor will it renew all the existing decoders, filters and ODB loading software.

The project will require a long term development. More advanced components that rely on background information would only be tackled in the coming year(s). In this time frame it is expected that COPE will become part of ECMWFs scalability programme. To explore more options of software development the COPE is planned as "a community project", using Apache-2 as software license. The ECMWF is ready to facilitate the development, but the project will not necessarily be mainly driven by ECMWF staff, and contribution by other partners is more than welcome. Several areas of collaboration were identified during discussions on possible collaboration between partners, e.g. decoders (telecom message to BUFR), obs2ODB (bufr2ODB) and filters, facilitating pre-obs treatment and quality control. Météo France showed an interest to collaborate with two persons. The HIRLAM and ALADIN/LACE also expressed their interest in collaboration, but at this time it is not clear which synergies can be found, and what resources can be brought to the main project. In any case these LAM consortia could provide valuable feedback on the ease of use of the COPE framework by extending its use to LAM specific observation sets.

The DM and the Area Leader for data assimilation discussed the COPE project and its consistency with the OPLACE and here follows the summary and a proposal for RC LACE contribution to the project:

- currently and most probably also in a short term (1-2 years) there is no consistency issue between the COPE and the OPLACE;
- the COPE is expected to provide a new frame-work for observation processing and conversion to ODB, but the project is in an early stage of development and there are still open questions regarding design and ODB;
- collaboration on the COPE project is of an interest for RC LACE;
- RC LACE heavily relies on Météo France regarding the development of observation processing and conversion to ODB (BATOR) and it would be good to take the COPE project as an opportunity to get more involved;
- the main area for possible collaboration was identified as work on identification and externalization of the filters included in ALADIN/LACE observation processing components (OULAN, BATOR, screening);
- the coordination of the project is essential to avoid duplication of work;
- there is a need to find candidate(s) and allocate a corresponding budget for coordination meetings and short stays in 2015. Some programming experience with C++ and/or Python would be an advantage;
- only limited resources were identified within RC LACE at the moment. The collaboration on COPE will be advertised during the Data Assimilation Working Days in September 2014 and so-far the DM have contributed to the of a testing environment for an identification of filters from ALADIN/LACE observation processing chain (OULAN, BATOR) with 0.75PM.

Action: Data exchange

Description and objectives: The substantial number of local surface observations is available in LACE countries. The main objective is to ensure an exchange of data, which have a potential for data assimilation and verification.

Efforts: 0.75 person month

Contributors: DM

Documentation: no

Status: The exchange of surface synoptic data within RC LACE progressed substantially last year. An overview of the exchanged data was prepared for August 2014. The geographical distribution of the exchanged data is shown on Fig 1 and an hourly statistic is on Fig 2. There were some drop-outs in the data provision, but the system is ready for an operational use.

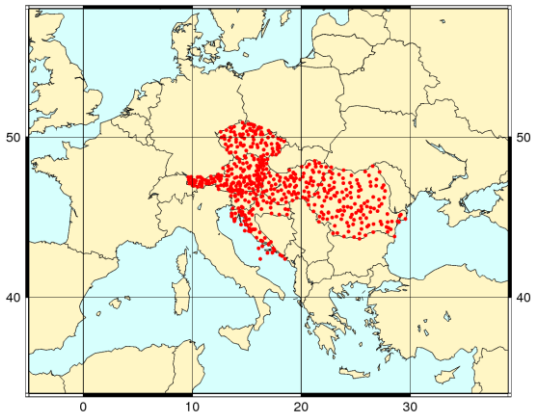

Fig 1: The geographical distribution

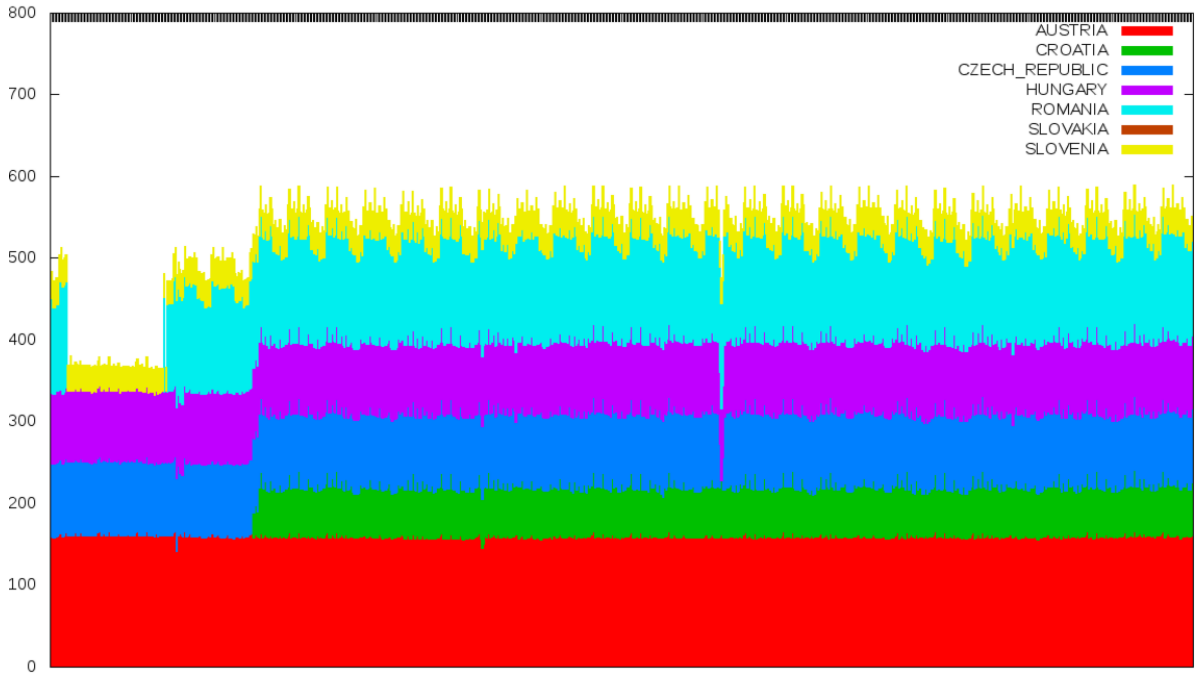

Fig 2: Hourly number of stations exchanged during August 2014

The Members are kindly invited to use all (essential and additional) surface synoptic data from OPLACE-national to avoid the reduction of the data due to plan to open access to non-LACE countries to the OPLACE, which will provide only essential data thereafter.

Action: OPLACE

Description and objectives: Meteorological observations are a key aspect of data assimilation and verification. The OPLACE was built with aim of providing available observations in an appropriate format for data assimilation to RC LACE Members. Regular maintenance is required in order to provide stable and reliable bases for the operational purposes and further extension by the new data is essential for a general progress in area of data assimilation.

Observation monitoring is also very important for any data assimilation system. The LACE observation monitoring has been installed in almost all Members. The maintenance and extension of the monitoring system for new observation and diagnostics is another objective.

Efforts: 3.25 person months

Contributors: DM

Documentation: Trojáková (2014b), Trojáková (2014c)

Status: Continuous local work and maintenance stays at Hungarian Meteorological Service (HMS) have provided several extensions of the OPLACE in 2014:

- TEMP observation measuring at 03 UTC were added in April;
- the migration of TEMP from the Traditional Alphanumeric Codes (TAC) to the Table Driven Code Forms (TDCF) such as BUFR was planned for November 2014, but through EUMETNET (EUCOS) we have got information that generally the BUFR encoded data are of lower quality than those encoded in TAC due to encoding mistakes at NMSs. This conclusion was mainly based on global center's and ECMWF experience. The ECMWF asked at least 3 months of TAC continuation after November 2014 to keep validating the quality of BUFR and TAC in parallel.

  The extraction of TEMP data from BUFR bulletins was prepared within OPLACE and although we are already providing BUFR TEMP data, we propose to wait with their use until the quality of the data stabilizes;
- the migration from TAC to TDCF concerned also AMDAR data. During a transition period (between 3 November and 15 December 2014) airlines migrated to the WIGOS AMDAR BUFR Template TM311010 v7.

  There were issues with OPLACE AMDAR decoder update by the end of 2014, which resulted in a short gap in AMDAR data provision.
- Another OPLACE upgrade comprised High Resolution Wind (HRW) product, developed by AEMET in the framework of the EUMETSAT Satellite Application Facility on support to Nowcasting and Very short range forecasting. The HRW aims to provide detailed sets of

Atmospheric Motion Vectors (AMVs) from Meteosat Second Generation satellite without the use of the wind guess in the definition of the tracking area, so reducing the dependence of the AMVs from the NWP model data and updated quality control process. An adaptation of BATOR was prepared to allow technical reading of the HRW data, but more detailed scientific validation is needed before an operational use. More technical details can be found on RC LACE Forum http://www.rclace.eu/forum/viewtopic.phpf=30&t=423&p=1594&hilit=HRW#p1594.

During the last Data Assimilation Working Days in Zagreb, September 2014, a need of a backup of the OPLACE system was briefly discussed. Considering that we are running LAM applications and a complete backup of the OPLACE system is rather demanding, it was concluded that we may accept an occasional disturbance the OPLACE and there is no need for the backup. Unfortunately several issues with the OPLACE data provision were reported in November and December 2014 and reopened discussions on reliability of the OPLACE system. Following options were identified:

- no backup - but improve reliability of the OPLACE system;
- a poor man's backup - to provide at least SYNOP and TEMP observation from other (backup) center, e.g. Prague, Wien, ... to RC LACE ftp server;
- a complete backup - to build an independent OPLACE system at other (backup) LACE Member. This is the most demanding solution (on IT infrastructure, manpower and maintenance).

The proposal is to proceed step by step, to focus on improvements first and on backup solutions only if it fails. Most of the recent issues were related to IT infrastructure at HMS. From this point of view, possibilities for more reliable solution are being discussed with the IT department of HMS.

By the end of the year RC LACE Council approved access to OPLACE to Turkey, the first non-LACE country. Necessary data policy restriction to OPLACE (all additional data will be moved to the OPLACE national) have to be finalized as soon as possible.

The observation monitoring is an important component of any data assimilation systems. Within the LACE data assimilation project it was proposed that as a temporary solution the monthly observation monitoring reports of HMS will be distributed via e-mail to the RC LACE Members. The aim of these reports was to provide information about the observation usage of ALADIN 3DVAR based on OPLACE. Currently most of the Members installed the observation monitoring software locally and took over the survey of their local data assimilation systems.

Monthly observation monitoring was extended for passively assimilated channels from NOAA 19 and METOP-A/B satellites and in order to share information about an operational use of observation within RC LACE it is proposed to provide the monthly observation monitoring reports of all Members on web RC LACE Observation Monitoring, see http://www.rclace.eu/dynamic/view monitor.php?

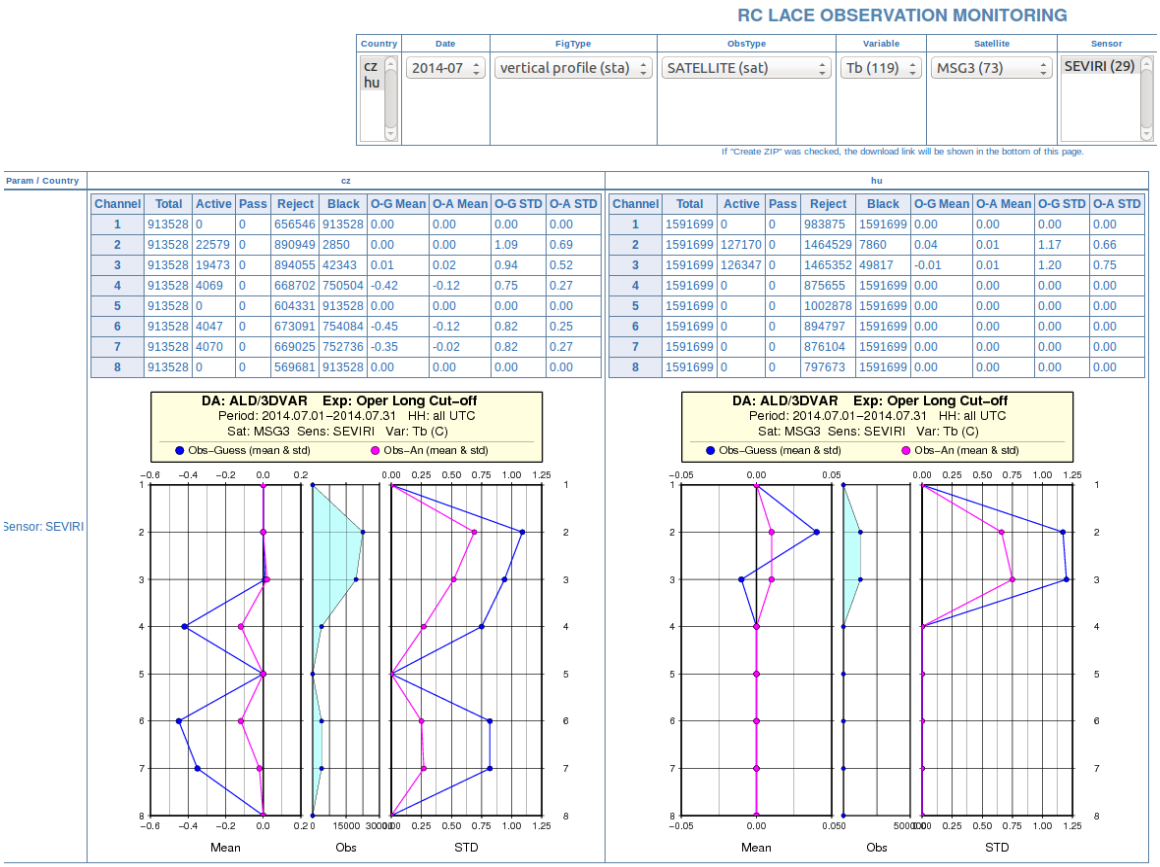

Fig 3: RC LACE Observation monitoring of SEVIRI radiances assimilated in Hungary and the Czech Republic.

Action: HARMONIE

Description and objectives: Data assimilation suite is rather complex and thus quite demanding for installation and maintenance. To give support to LACE Members the unification of the scripting system was examined, but has not spread much within RC LACE. The new impulse was provided by proposal of ALADIN-LACE System Coordinator (ASC) to

focus on two rather standalone components: HARMONIE Verification package and Namelist maker.

Efforts: 0.50 person months

Contributors: DM, ASC

Documentation: no

Status: The HARMONIE verification package was examined and the model data extraction part was installed locally. A support was provided with the common HARMONIE verification for LACE and also during HARMONIE working week in Bratislava. Validation of the local installation and cross-comparison with respect to the local verification package VERAL is in progress. The work on the main issue of the observation handling, i.e. use of OPLACE observation instead default ECMWF database, has just started.

List of actions, deliverables including status

Subject: ODB support

Deliverables: regular update of blacklist files; the proposal for cooperation on the COPE project

Status: DONE

Subject: OPLACE

Deliverables: OPLACE maintenance and development;

Status: ONGOING

Subject: Data exchange

Deliverables: implementation is finished and overview of available data was prepared;

Status: ONGOING

Subject: HARMONIE

Deliverables: no

Status: ONGOING

Documents and publications

Trojáková, A. 2014. Report on the COPE technical meeting held at ECMWF, Reading 9-12 June 2014, *internal report*

Trojáková, A. 2014b. Internal report on the OPLACE maintenance*, internal report*

Trojáková, A. 2014c. Internal report on the OPLACE maintenance*, internal report*

Activities of management, coordination and communication

1) 22nd LACE Steering Committee meeting, 3-4 March 2014, Brdo pri Kranju, Slovenia
2) Joint 24th ALADIN Workshop & HIRLAM All Staff Meeting 2014, 7-11 April 2014, Bucharest, Romania.
3) COPE technical meeting, 9-12 June, 2014, Reading, United Kingdom.
4) Management meeting RC LACE, 17 Jun 2014, Balatonföldvár, Hungary
5) OPLACE maintenance stay, 18-24 June 2014, Budapest, Hungary
6) 23rd LACE Steering Committee meeting, 22-23 September 2014, Zagreb, Croatia.
7) HARMONIE working week, 13-17 October 2014, Bratislava, Slovakia
8) OPLACE maintenance stay, 1-5 December 2014, Budapest, Hungary

Summary of resources/means

Subject	Resource		LACE	
	Planned	realized	Planned	realized
ODB support	**1.0 PM**	**1.50 PM**		
OPLACE	**3.0 PM**	**3.25 PM**	**0.5 PM**	**0.5 PM**
Data exchange	**1.0 PM**	**0.75 PM**		
HARMONIE	**1.0 PM**	**0.50 PM**		
Total:	**6.0 PM**	**6.00 PM**	**0.5 PM**	**0.5 PM**

Problems and opportunities

The RC LACE Steering Committee and the Management Group are kindly invited to consider a contribution to the COPE project and keep in mind that corresponding human resources and a budget line for coordination meetings and/or short working stays have to be allocated.

The non-LACE countries showed an interest to access OPLACE. Necessary data policy restriction to OPLACE (all additional data will be moved to the OPLACE national) have to be finalized as the RC LACE Council agreed to provide the access to Turkey by the end of 2014.

Recent issues with the OPLACE data provision showed deficiencies in the system and work on improving reliability of the OPLACE will have the highest priority in 2015.