

Data Manager Activity
Progress Report

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Progress summary

The core of RC LACE Data Manager (DM) activity has been the maintenance and development of the common Observation Pre-processing system for LACE (OPLACE). Several upgrades were implemented in OPLACE operational environment. In particular, aircraft data processing was improved and extended in by non-European programs providing aircraft measurements over the Europe. The migration from Traditional Alphanumeric Codes to BUFR (TAC2BUFR) has progressed and although the first prototype of BUFR SYNOP, TEMP and AMDAR data processing was implemented in the OPLACE test suite, further validation is needed before an operational implementation.

The exchange of surface synoptic data within RC LACE performs well and the regular overview was prepared. An extension of this change by new data from Poland has been almost finalized and it will be implemented in early 2018. Although the provision of the high resolution aircraft observation from Slovenia and Netherlands works quite well, the quality issues were reported. The correction of the Mode-S EHS data processing was implemented on 20 May 2017.

There was no considerable coordination on COPE in 2017. An ODB related support and help with configuration and usage of data assimilation (DA) applications was provided to the Members. The DM also contributed to the ALADIN DA kick-off meeting. RC LACE collaboration and tools were promoted. It was concluded that a special attention is needed for the local observation handling and a good coordination. A considerable manpower is being gathered to contribute to the DA activities in the ALADIN consortium. It is a good opportunity for RC LACE to support the ALADIN DA partners in order to enhance the common development in area of data assimilation.

Scientific and technical main activities and achievements, major events

Action: OPLACE

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

Efforts: 3.5 person months

Status: Several upgrades were implemented in OPLACE operational environment. The first update in February contained corrections for aircraft data handling (suppressed undefined winds, added data for flight level=0) and main adaptation for the phase of flight according to the new BUFR template 311010. The phase of the flight from BUFR data is correctly passed into ODB (retrtype@hdr) and it can be later used for blacklisting of AMDAR data with detailed phase of flight = 2 (unsteady UNS \Leftrightarrow rolling angle $>5^\circ$) which are of possibly minor quality. The blacklisting will not be done on the level of the OPLACE system, but it is user's responsibility to apply the blacklisting.

During the maintenance stay in April 2017 the new local SYNOP databases were implemented and BUFR TEMP data (not available in TAC format any more) were added to the OPLACE processing to avoid a decrease of TEMP observations. Furthermore, the first prototype of BUFR SYNOP, AMDAR and TEMP data and new ocean wind data (ASCAT) processing was added in the OPLACE testing suite, but further evaluation is still needed before an operational implementation.

Aircraft data processing was extended in June 2017 by non-European programs - mainly from USA and Hong Kong/China - providing aircraft measurements over the Europe. New aircraft data provide significant increase of aircraft data during night hours, e.g. the amount of the data for ALARO/CHMI has doubled for 00UTC analyses.

The migration from Traditional Alphanumeric Codes to BUFR (TAC2BUFR) has progressed. Detailed evaluation of BUFR SYNOP processing continues, several issues were fixed and comprehensive validations are ongoing. Processing of aircraft BUFR data progressed considerably thanks to the flat-rate stay of Maria Monteiro at CHMI. The extension for decoding of the WMO AMDAR template 311010 v7 used by OPLACE AMDAR data was prepared and tested. An evaluation of BUFR TEMP data also progressed in 2017 as a result of the "OPLACE stay" of Anis Satouri at CHMI. Two type of BUFR TEMP data are exchanged globally: BUFR reports generated directly from the radiosonde data (often of a high resolution) and BUFR reports generated through the conversion of ASCII TEMP reports (without exact time and displacement information). A processing of BUFR TEMP data by BATOR CY41T1 and CY43T1 were evaluated. The back-phased BATOR (to CY38T1 available at CHMI) was able to read the BUFR messages and to process them properly. The new version of BATOR introduces 2 major functionalities for the handling of radiosonde observations: the possibility to choose one of 3 profiles (single profile, splitted profiles and full trajectory profile) and the thinning of observations. Both functionalities need further examination to ensure a successful migration and an effective use of the extra information available in BUFR TEMP observations.

Action: Data exchange

Description and objectives: The substantial number of local 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: 1.00 person month

Status: The exchange of the surface synoptic data within RC LACE is working well and there are Members, which use the data already operationally. The data (mostly not available in GTS) are provided by the Members to OPLACE-national, only Slovakia provides also essential and additional data available in the GTS.

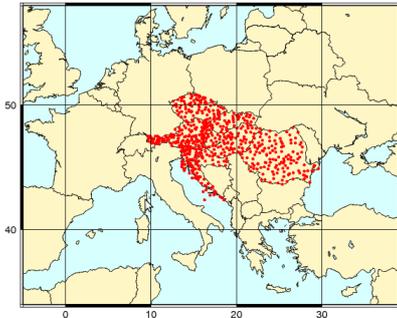


Fig 1: Geographical distribution of exchanged national synoptic data

Number of national stations	
Austria	169
Croatia	21
Czech Republic	90
Hungary	92
Romania	134
Slovakia	46
Slovenia	17
Total:	569

Coverage of the exchanged data is illustrated on Figure 1. The exchange is stable and reliable for an operational use. The overall number of exchanged data is stable and a decrease of Croatian and Slovenian stations was caused by a removal of duplicated GTS data. Regular review of the exchanged data was prepared for August 2017 and detailed statistics are available in a dedicated appendix. The extension for surface synoptic data from Poland has been almost finalized and it will be implemented in early 2018.

Although the provision of the high resolution aircraft observation Mode-S MRAR (Meteorological Routine Air Report) from Slovenia and Mode-S EHS (Enhanced Surveillance) from KNMI has worked well. Quality issue of Mode-S EHS data was reported in May 2017.

An offset to make the magnetic correction relative to Schiphol airport was applied when creating the correction files but was not applied when the actual correction was performed. The Mode-S EHS data acquired and disseminated by OPLACE till 20 May 2017 were affected by this error.

Mode-S EHS data set from 2013 onward has been reprocessed and can be made available on request. Figure 2 illustrates slow increase of standard deviation caused by the preprocessing error.

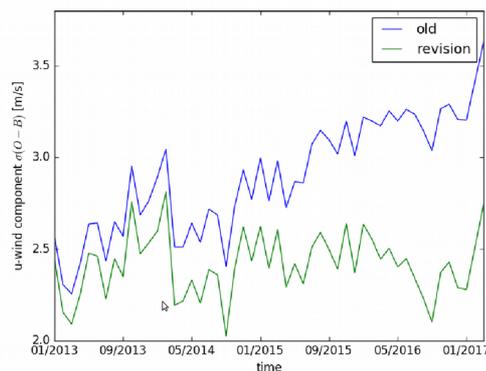


Fig 2: Mode-S EHS observation minus model statistics for the old and revised data set.

Action: ODB support

Description and objectives: The main objective is to provide observation database (ODB) related support and to help with configuration and usage of ODB and related applications at RC LACE members' site. The DM also acts as a contact point for the Continuous Observation Processing Environment (COPE) project initiated by ECMWF, which is expected to provide a new frame-work for a quasi-continuous, more scalable and timely observation processing including conversion to ODB.

Efforts: 1.5 person months

Status: An ODB related support was provided upon request. There was no considerable coordination on COPE in 2017. ECMWF continues developments for their operations and HIRLAM colleagues have started work on HDF5 extension for radar data handling.

A kick-off meeting for ALADIN Members who do not run an operational data assimilation : Al, Be, Bu, Mo, Po, Pt, Ro, Tu and Tk was organized by ALADIN Program Manager. RC LACE has been very successful in installing operational data assimilation, therefore Area Leader for DA and Data Manager were invited to present LACE experiences. Part of the LACE success is the use of OPLACE to commonly handle observations. Another important aspect is a good coordination to avoid unnecessary duplication of work and miscellaneous support when needed.

The OPLACE was of great interest for ALADIN Members, but the OPLACE access requirements are difficult to achieve. The Scalable Acquisition and Pre-Processing (SAPP) system of ECMWF has been promoted as an alternative. The function of SAPP is to acquire observation from many sources, decode the various formats, apply initial QC and convert data to a consolidated format delivering data to the data assimilation processing. SAPP Virtual Machine can be provided by ECMWF for testing/evaluation, but ECMWF do not have the staff resources for user's support.

RC LACE observation monitoring was promoted and use of the Forum was suggested for exchange of information. Importance of the scripting system was mentioned. It was concluded that there is a need for an inquiry as to what the scripting system should provide as features and how it should be coded or recoded. Furthermore, special attention is needed to the local handling of the observational data. The participating ALADIN countries were invited to coordinate this action. Almost all attending countries have activities on data assimilation and a considerable manpower (~10 FTE) is being gathered to contribute to the DA activities in the ALADIN consortium. It is of interest of RC LACE to support the ALADIN DA pioneers/starters to gain in the future the permanently missing manpower for research and development in area of data assimilation.

List of actions, deliverables including status

Subject: ODB support

Deliverables: ODB support;

Status: DONE

Subject: OPLACE

Deliverables: OPLACE maintenance and development;

Status: DONE

Subject: Data exchange

Deliverables: data overview was prepared and extension of the national exchange by data from Poland is almost completed;

Status: ONGOING

Activities of management, coordination and communication

- 1) 28th LACE Steering Committee meeting, 13-14 March, Payerbach, Austria.
- 2) OPLACE maintenance stay, 10-25 April, Budapest, Hungary.
- 3) RC LACE Management meeting, 19 June, Devin, Slovakia.
- 4) The second 2-weeks OPLACE stay was postponed to 2018.

Summary of resources

Subject	Resource		LACE	
	planned	realized	planned	realized
ODB support	2 PM	1.5 PM		
OPLACE	3 PM	3.5 PM	1.0 PM	0.5 PM
Data exchange	1 PM	1.0 PM		
Total:	6 PM	4 PM	1.0 PM	0.5 PM

Problems and opportunities

Development and extensions of the observation monitoring system to the new data types is delayed due to lack of time. Also OPLACE adaptations to the TAC2BUFR migration are progressing slowly. There start to appear related issues, e.g. with availability of surface observations (the extreme temperatures, precipitation) for verification purposes.

More effective collaboration with non-LACE partners is a challenge. RC LACE can consider more support of ALADIN activities to enhance overall DA related developments, e.g. more open policy for OPLACE access can significantly trigger progress in this area.