

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 updates were implemented in the operational environment. More ocean wind observations from Indian (OSCAT) and Chinese (HSCAT) Ku-band scatterometers were added to OPLACE on 11 March 2019 and an extension by E-GVAP data is ongoing. The main priority in 2019 has been the OPLACE redesign in order to speed up and improve system operations and to ease its supervision. All operational tasks were implemented in the new ecFlow suite and an extensive evaluation is ongoing to ensure a smooth transition to the new system.

The exchange of surface synoptic data within RC LACE performs well. The regular overview of exchanged data was prepared. The extension by more national data from Slovakia is close to the operational implementation. The provision of the high resolution aircraft observation from Slovenia and Netherlands works well. Furthermore, Mode-S MRAR data from the Czech Republic has been added to the exchange on 8 June 2019.

There has been no coordination on COPE. An ODB related support and help with configuration and usage of data assimilation (DA) applications was provided to the Members. The sample of simple scripts for surface analysis (ALARO) on cy43t2 was updated on beaufix. The DM also contributed to the ALADIN/HIRLAM/LACE Data Assimilation training held in Budapest, 11-15 February 2019 and to the ALADIN Data Assimilation starters kit (DASKIT) coordination.

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: 2.75 person months

Status: Several updates were implemented in OPLACE operational environment. Both technical and observation related aspects were tackled to improve OPLACE.

A duplications issue for ASCII and BUFR TEMP data due to different timeslots was fixed. There has been an upgrade of two local databases at OMSZ. In March 2019 the netCDF database of decoded SYNOP BUFR data (CSBS) was extended by

ship & buoy station names, therefore OPLACE was adapted to use those names as station identifications. In May the netCDF database of decoded TEMP BUFR data (CUGB) was upgraded, i.e. a new data converter uses ecCodes to decode TEMP BUFRs. Thanks to that new ship or mobile identifications are included and also more high resolution TEMP data get into the netCDF databases.

ASCAT coastal winds from Metop-A/B were successfully assimilated in Slovenia and OPLACE users expressed a wish to get more ocean wind observations. On March 2019 more ocean winds from Indian (OSCAT) and Chinese (HSCAT) Ku-band scatterometers with resolution of 25km were added to OPLACE. Unfortunately, HSCAT data over Europe are available with delay of 7 to 12 hours after the time of measurement which is unacceptable for operational data assimilation. The reason is that HSCAT data are currently only dumped at two Chinese reception stations. The Chinese data provider NSOAS in cooperation with the Finnish Meteorological Institute (FMI) and EUMETSAT are working on an improvement of the timeliness of Chinese data by establishing a data reception at Sodankylä, Finland.

The EUMETNET GNSS Water Vapour Programme (E-GVAP) was set up to provide GNSS signal delay and water vapour measurements for operational meteorology. Four RC LACE Members (HU, CR, SI, SK) expressed their interest to use E-GVAP data, therefore a possibility to access E-GVAP data was explored.

RC LACE members (as National Meteorological Services) can obtain and archive E-GVAP data for their usage without formalities. Also those RC LACE Members that are not E-GVAP-members. On the formal EUMETNET side the E-GVAP data are actually available to all EUMETNET members, independently of them being a member of E-GVAP or not. However, for E-GVAP itself it is important to demonstrate the products are used and useful. For that reason E-GVAP would like to be informed and obtain feedback, when new institutes start to use E-GVAP data. It would also help to RC LACE Members, as they would get on the list of institutes sharing information on how to best use GNSS delay data in NWP and nowcasting.

RC LACE got access to E-GVAP data and is allowed to share them via our central data sharing facility (OPLACE). Initially it will be Austria, Croatia, the Czech Republic, Hungary, Slovakia, Slovenia, and Romania. Potentially also Poland, which is one of the most active geodetic institution in Europe providing data and doing research in GNSS meteorology, and Tunisia.

The actual download will be done from the Hungarian Meteorological Institute (HMS), which already has an account on the E-GVAP download server. GNSS ZTD data tagged as operational are available via GTS in BUFR format. Unfortunately, GNSS ZTD data from Eastern Europe are not yet on the GTS and the data can be obtained via ftp download in E-GVAP COST 716 (ASCII) format. However, the format conversion from COST76 to a proprietary ALADIN data format (OBSOUL) is rather time consuming so we will probably implement the BUFR format conversion.

A redesign of the OPLACE scripts was initiated last year to improve the system operations and to easy it's monitoring and supervision. The ecFlow job scheduler is used in order to allow a parallel execution in a controlled state-of-the-art working

environment. All operational OPLACE tasks were implemented in the new ecFlow suite (oplace_ecf). The oplace_ecf suite is running in parallel to the operational version since December 2018. Further evaluations have been done this year to ensure stable and reliable operation. Documentation and guidelines for emergency handling should be still provided to Hungarian colleagues who supervise operational applications.

The migration from Traditional Alphanumeric Codes to BUFR (TAC2BUFR) progressed very slowly. A prototype of BUFR TEMP and wind profiler (WPRO) pre-processing was implemented but it requires further evaluation and development. Overall the BUFR data processing is rather time consuming and it is therefore postponed after the implementation of redesigned OPLACE script system to avoid delays in the OPLACE data provision.

Action: Data exchange

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

Efforts: 0.75 person month

Status: The exchange of the surface synoptic data within RC LACE is working well. The data (mostly not available in GTS) are provided by the RC LACE Members, only Slovakia provides also essential and additional data available in the GTS. An upgrade of Slovak data is under preparation. Hopefully soon there will be around 60 new stations from Slovakia.

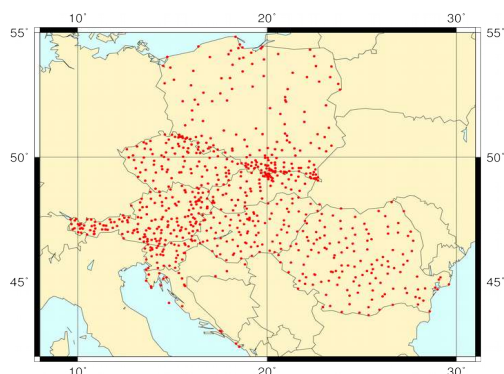


Figure 1: Geographical distribution of exchanged national synoptic data.

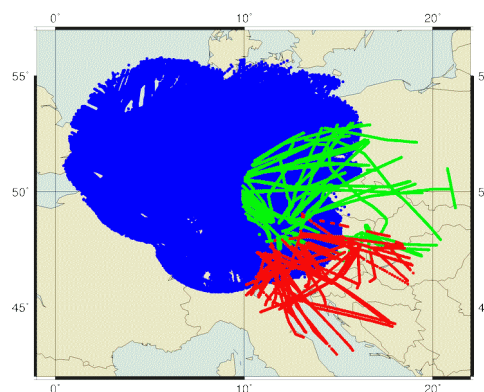
Number of national stations	Update WRT 2018	Number of national stations
Austria	171	-2/+4
Croatia	22	-1/+2
Czech Republic	89	-1/+30
Hungary	90	-4/+1
Romania	134	-0/+0
Slovakia	47	-0/+0
Slovenia	17	-0/+0
Poland	182	-4/+0
Total:	727	

Current coverage of the exchanged data is illustrated on Figure 1. The exchange is stable and reliable for an operational use. There were mostly minor updates of the number of available stations except for the Czech Republic. The Czech increase is explained by the correction of a local observation database issue. This issue was

fixed already last year on 11 September 2018. The regular review of the exchanged data was prepared for August 2019 and detailed statistics are available in a dedicated appendix.

The provision of the high resolution aircraft observations from modern air surveillance systems Mode-S MRAR (Meteorological Routine Air Report) from Slovenia and Mode-S EHS (Enhanced Surveillance) from KNMI has worked well in 2019. An illustration of the data geographical coverage is on Figure 2.

The preprocessing of Czech MRAR data is already done, i.e. good measurements were selected based on 3 months statistics (March-June 2019) with respect to ALADIN/CE NWP model separately for each aircraft following Strajnar (2012), more details can be found in Trojakova et al (2015). The Czech MRAR data can be simply merged and used for data assimilation. The data are encoded with the subtype=141 to be distinguishable from AMDAR data (subtype=144) or EHS data (subtype=145).



*Figure 2: Geographical distribution of exchanged **Mode-S EHS** from **KNMI**, **Slovenian MRAR** and **Czech MRAR**.*

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. The sample of simple ALARO scripts for surface analysis on cy43t2_bf09 was updated on beaufix. There was no coordination on COPE in 2019.

Considerable efforts (1PM) were devoted to the preparation and support of the common ALADIN/HIRLAM/LACE Data Assimilation training in Budapest, 11-15 February 2019. The training was attended by 44 participants from 18 countries. It covered main aspects of data assimilation (DA), i.e. observation pre-processing, quality control and a basic overview of DA algorithms. Presentations and training materials are available: <https://hirlam.org/trac/wiki/HarmonieSystemDocumentation/Training/HarmonieSystemTraining2019>.

List of actions, deliverables including status

Subject: ODB support

Deliverables: ODB support; ALARO simple script for surface analysis on cy43t2; DA training

Status: DONE

Subject: OPLACE

Deliverables: OPLACE maintenance and development;

Status: ONGOING

Subject: Data exchange

Deliverables: the national exchange was extended by Mode-S MRAR data from the Czech Republic and an extension by national synoptic data from Slovakia is ongoing; the regular overview of the exchanged data was prepared;

Status: ALMOST DONE

Activities of management, coordination and communication

- 1) 32nd LACE Steering Committee meeting, 13-15 March, Bratislava, Slovakia.
- 2) Joint 29th ALADIN Workshop & HIRLAM All Staff Meeting 2018, 1-5 April, Madrid, Spain.

Summary of resources

Subject	Resource		LACE	
	planned	realized	planned	realized
ODB support	1 PM	1.50 PM		
OPLACE	4 PM	2.75 PM	0.5 PM	0.0 PM
Data exchange	1 PM	0.75 PM		
Total:	6 PM	5 PM	0.5 PM	0.0 PM

Problems and opportunities

Maintenance and mainly development of the observation monitoring system to the new data types is pending due to lack of time. Also OPLACE developments, such as the redesign and TAC2BUFR migration, are progressing slowly. There starts to appear related issues, e.g. with availability of surface observations (the extreme temperatures, precipitation) for verification purposes.