

Report on RC LACE Data Manager Activity

For the period of
1st April, 2006 - 19th February, 2007

Prepared by Sándor Kertész
19th February, 2007

Preface

In this report I summarize the work of the RC LACE Data Manager for the period of 1st April, 2006 - 19th February, 2007. Please note that the previous working plan of DM was valid only until 31st of December. It is also to be mentioned that a separate report was written about DM activity for the last LSC Meeting in held Zagreb between 28-29 September 2006. The work that has been performed since this previous report is represented in bold in the text below.

1. Investigation of the feasibility of the exchange and usage of more dense SYNOP data between the LACE Members. *The first task is to explore the volume and location of the additional SYNOP data. Then these data will be used in data assimilation experiments this autumn in Budapest (in the framework of the Data Assimilation WG). DM will provide the required data environment for the experiments: collect the necessary SYNOP data for the selected test periods from the RC LACE Members and put them into the DA observation database.*

	Plans (01.04.-31.12.)	Facts (up to now)
Realization	Budapest	Budapest
Estimated efforts	0.5 PM	1 PM
Contributors	S. Kertész	S. Kertész
Schedule	May + September	May - August, December - February

Based on the information provided by the LACE Members I have created a status document about the spatial distribution of non-GTS and GTS SYNOP reports available in the LACE countries. It turned out that there are a significant number of local SYNOP reports in Austria and in the Czech Republic, and to a less extent in Croatia and Slovakia. Therefore it seems that it is worth running DA experiments to see the impact of these additional SYNOP observations.

I agreed with the DA WG leader and selected a 10-day test period for which LACE Members were asked to provide the necessary local SYNOP observations. **By the end of November all the necessary data was received. These data were converted into ODB this February and are now prepared for the DA experiments.**

I agreed again with the DA WG leader that I would carry out the 3D-VAR experiments. For both the reference (GTS) and the extended observation (GTS+non-GTS) datasets two experiments will be performed:

- **in the first case only geopotential will be used from the SYNOP reports**

- in the second case beside geopotential the T2 and RHU2 observations will be also used from the SYNOP reports.

Thus altogether four experiments will be carried out. The reference experiments (with the reference GTS observations) have been already finished and the non-GTS SYNOP experiments are soon to start. The detailed evaluation of the results are expected to be available by the end of March.

2. ODB related activities

- *Help in the configuration and usage of ODB and ODB related applications at RC LACE members' site.*
- *Co-ordination in the use, visualization and de-coding of observations.*
- *Preparation and maintenance of a documentation about observation usage in the ALADIN data assimilation system based on CY30. The documentation will contain the description of data formats, data decoding techniques and the involved softwares. The first version of the document will be available by mid-autumn.*

	Plans (01.04.-31.12.)	Facts (up to now)
Realization	Budapest	Budapest, Prague
Estimated efforts	1.5 PM	0.5 PM
Contributors	S. Kertész	S. Kertész
Schedule	Continuous work	Continuous work

I took part in the organization of the ODB training held at Budapest in June and I helped Sami Saarinen (the author of ODB) to set up his ODB software environment to prepare demos. During this training I got in-depth knowledge of the standalone ODB software package that will serve as a basic ODB tool for each LACE member who intends to use observations.

As for the co-ordination, I set up an ODB mailing list for LACE members. There were interest from Austria, Czech Republic and Slovakia. I agreed with Sami Saarinen that I would act as an ODB contact point of LACE and he will inform me about the latest releases and developments and help to solve the emerging problems. **In the meantime there was only one new ODB release that I tested but it is still not working properly. This version is a very important one because it allows data retrieval without any compilation involved. If this version will be ready I plan to propose to install it at every centre intends to use ODB.** Beside these tests I visited Prague (it was a non-LACE financed journey) where I helped to install the recent version of the standalone ODB package. All things considered little activity was done on this particular subject.

I am at the very beginning of the preparation of observation usage documentation. Up to now only a brief overview of the ALADIN data assimilation system has been written.

3. Development and maintenance of an interactive web-based observation monitoring system for the ALADIN variational data assimilation systems (3D-VAR, 3D-FGAT). *The system will allow visualizing the location, status and departure statistics of the different observation types for a given analysis date or for a selected set of analysis dates. Continuous*

extension of the system to include more diagnostic tools and new observation types. First export package of the software will be available in September.

	Plans (01.04.-31.12.)	Facts (up to now)
Realization	Budapest	Budapest
Estimated efforts	1.5 PM	3 PM
Contributors	S. Kertész	S. Kertész
Schedule	Continuous work	Continuous work

I put heavy efforts into this development and a prototype has already been working at HMS. This prototype is based on a set of ASCII files that were created from ODB. I chose this solution because the direct use of ODB from my applications seemed too difficult at the beginning of the developments. As a result, only a limited number of data flags from ODB are available in the system. However, during the 3DVAR/ODB training in June in Budapest I got know the standalone ODB package and I realized the way I could implement a system fully based on ODB. Thus I started to design and develop an altered system that could use ODB directly and exploit the information content of various observation flags by implementing new visualization and statistics types.

The development of this system is still have not been finished and to my recent experiences it will requires a couple of months this year, as well. In the meantime the prototype version was installed at Prague by Alena Trojakova (with my help) and proved to be quite portable and easy to use. Thereafter I helped to tune and customize the system during my visit in Prague (it was a non-LACE financed journey) .

The structure of the new system can be seen on Figure 1. Some of its components are already working in the prototype version. This prototype version is able to handle given analysis dates or a series analyses dates. Statistics are computed for report and data status, and for observation-guess and observation-analysis departures. As for the graphical products, various types are available: maps (2D, 3D), profiles, time-series, time-height cross sections, observation usage charts. Batch mode runs and data browsing through a web interface are both possible. Figure 2 illustrates the graphical capabilities of the system.

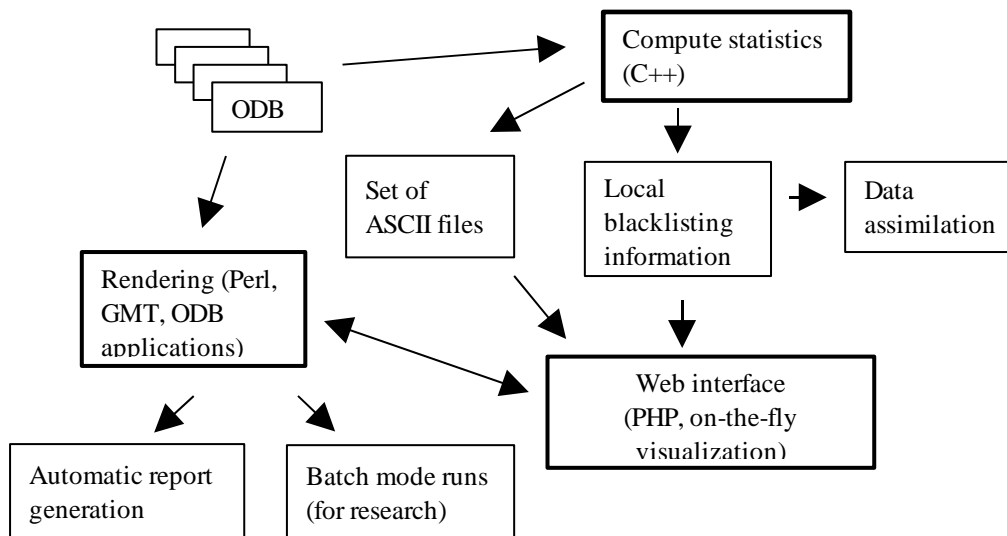


Figure 1. The structure of the observation monitoring system

The full system, apart from the direct ODB usage, will be completed with many new advanced features:

- new graphical (histograms, time distribution charts) and statistical (J_0 values, residuals) types
- automatic report generation based on user-specified criteria
- separate monitoring of each SYNOP and TEMP stations to perform local blacklisting that can be used in the local data assimilation runs
- capability for the easy comparison of data assimilation experiments.

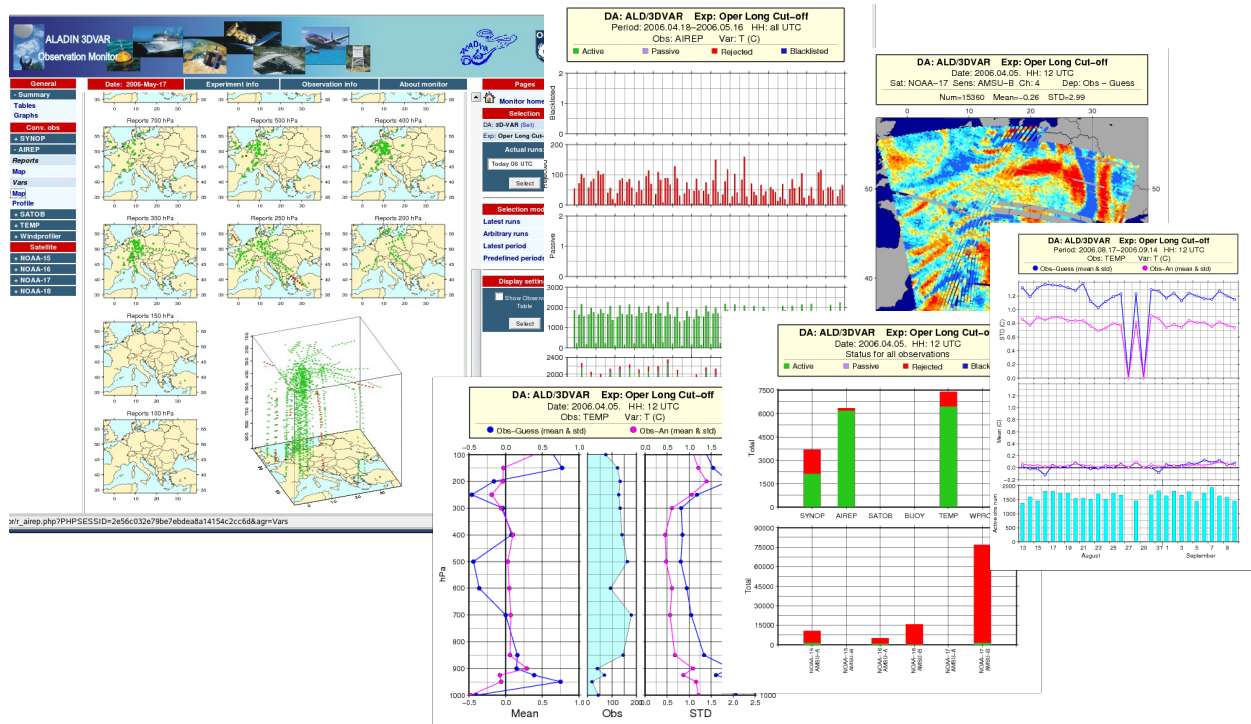


Figure 2. Snapshot of the web interface and some of the graphical products of the observation monitoring system

4. Acting as Technical Co-ordinator for the ECMWF Special Project for "Coupling of ALADIN and AROME models to boundary conditions from ECMWF and ERA model data". The aim of the project is the preparation of ECMWF LBC files for ALADIN and AROME at ECMWF's site. The main task of TC is to provide a suitable script environment and users guide for the preparation of the required LBCs at ECMWF's site. This activity is closely related to the work of the Data Assimilation and Predictability WGs

	Plans (01.04.-31.12.)	Facts (up to now)
Realization	Budapest	Budapest
Estimated efforts	1.5 PM	2.5 PM
Contributors	S. Kertész	S. Kertész
Schedule	Summer	Spring, Autumn-Winter

I have created a comprehensive users guide for beginners about how to work on the ECMWF HPCF system (including the hpcd supercomputer). I have also created demo scripts on HPCF to produce BCs for ALADIN using the T511, T799 deterministic IFS forecasts and ERA-40 re-

analyses. The structure and the usage of the scripts are explained in detail in a separate document.

This documentation was updated in November because all the applications on the hpcd had to be ported to the new hpce supercomputer. Beside the migration to hpce and documentation upgrade I created demo scripts also to the T399 EPS forecasts and complemented the documentation. The full documentation is available at the RC LACE web site (please see the section: Private->Local Manuals).

In the meantime some problems with the climate files used in the BC generation applications emerged. The actual problem now is that the global climate files produced at ECMWF HPCF are not as good as the ones created at Toulouse. The fixing of the problem is an ongoing work.

Besides, I started data assimilation experiments to test the possible use of T799 IFS BCs in the operational ALADIN 3D-VAR system. It turned out that due to the scheduling of the IFS runs at Reading the BCs for an operational ALADIN DA application are available only with a 6h shift. It means that e.g. for the 00 ALADIN analysis and forecast only the 18 UTC IFS analysis and forecast could be used. I designed and performed experiments to investigate this delayed mode BC usage, but due to the recently identified problems in the global climate files all the experiments should be re-run again.

Summary of the RC LACE Data Manager Activity

As a closure of the report the summary of the total work devoted to DM activities in the reporting period is specified.

	Plans (01.04.-31.12.)	Facts (up to now)
NON-GTS SYNOP data	0.5 PM	1 PM
ODB-related activities	1.5 PM	0.5 PM
Observation monitoring	1.5 PM	3 PM
ECMWF SP	1.5 PM	2.5 PM
Total	5 PM	7 PM