

Use of existing and new observations in HIRLAM

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Observations in DA



Processing chain

Data reception

(Pre-)processing

Format conversion

Data screening

Active use
impact study

obs monitoring

Data reception

- ➔ Activity outside the Harmonie framework;
- ➔ Cooperation between our community and different agencies owning the measuring instruments/facilities is very important;
 - Example of Mode-S data reception and processing, collection of road observations, actively taking part in different observation-collection related programmes (ex. COST, OPERA, EUMETSAT, ...);
 - We need to continue and strengthen our pro-activity in this field.

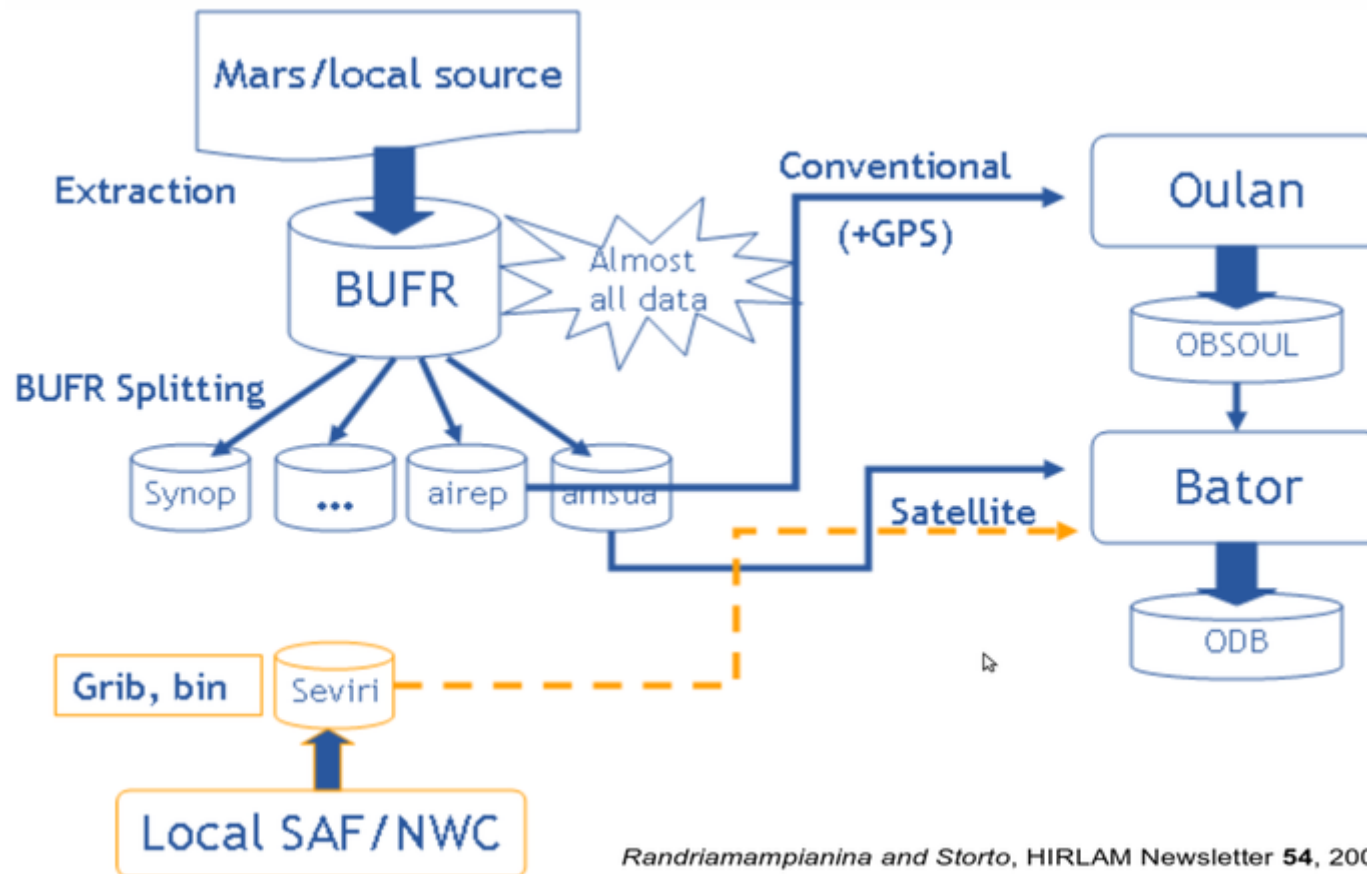
Data (Pre-)processing

- ➔ Used to be activity outside our framework, but we start to understand that the more we involve ourself in this process the better we can control/improve our system;
 - prep-opera tool, contribution of our colleagues in SAF programmes are good example;

Format conversion(1)

- Very important element of processing chain;
 - Today it is even crucial, since we face a data format change also for conventional data (WMO requirement);
- We (both consortia) use Oulan and Bator to create ODB database suitable for our DA system;
 - we try to use less Oulan and use more Bator when possible;
- One of the tasks of COPE is doing this conversion. **We can act now** to make it as flexible as possible using all good features of Bator (control reading of data through parameter file);
 - There is chance to have COPE as common <origin-format>2ODB tool for IFS-MF-Aladin-Hirlam;
- COPE is already implemented in the Harmonie DA system;
 - issues related to ODB2 ... (see Eoin presentation at 2016 ASM)

Format conversion(2)



Choice of observations and data thinning

→ What kind of observations?

- when looking to DFS estimates, humidity data seem to be important, also balance constraint in our background error statistics “impose” the existence of these data (see Randriamampianina, 2016 ASM)
radar reflectivity, GPS (ZTD and STD), ...;
- Tropospheric wind data are also important;
- when looking to forecast impact, radiance data provide impact at longer ranges;
- All observations with high spatial and temporal resolution are of great interest;
- (under) Cloud observations: radar data, cloudy radiances, AMV;

→ Important to take into account the properties (measurement strategy, applied retrieval technique) of the observations in observation operators;

- Good examples:
 - Superobing (averaging in observation space) of radar data;
 - Supermoding (averaging in model space) for ASCAT;
- Where relevant?
 - Supermoding technique applied to satellite radiances (accounting for footprint of the instruments);

Active use and impact studies

- We have a lot to do to make all “assimilable” observations in our system to be used in different centres.
- Agree in shared implementation procedure of missing or new observations. Ex: implementation of All-sky radiances – Hirlam will testing ECMWF solution and Météo France will implement the Bayesian technique, ...;
- About what with what observation to start or to choose?
Are we using the right parameters and in the best way?
 - Sharing of experience is very important;
 - Regular and active discussion through video meetings might help a lot (video meeting on radar data processing and radiance assimilation were exceptionally good example);

Diagnostic and monitoring tools

- ➔ It's important to use the same tool for comparison:
 - Same code for DFS (sensitivity of DA system to observations);
 - FSO or something similar – we have tool to evaluate the energy loss in the forecasting system due (to loss)/withdrawn observations from the assimilation system. Exactly, this tool is computing the moist total energy norm (MTEN) differences between different runs;
 - Use same verification tools;

- ➔ Observation usage monitoring:
 - LACE have a web-based system;
 - Hirlam have also one called “obsmon”;

Obsmon

