Minutes from a meeting on the status and planning of the
HIRLAM Comprehensive Impact Studies (CIS)
Oslo, 7-8 May 2008

Participants: Nils Gustafsson, Jeanette Onvlee, Xiaohua Yang, Harald Schyberg, Carlos Geijo, Sigurdur Thorsteinsson, Eoin Whelan, Kirsti Salonen and Reima Eresmaa

Status of the Atlantic scale CIS:

4D-Var data assimilation runs with all the new types of observations ("all inclusive runs") have been carried out by Xiaohua for the winter period and by Carlos for the summer period. The new types of observations are:

- AMSU-A over sea, ice and land, AMSU-B over sea, both for NOAA-15, NOAA-16, NOAA-17 and NOAA-18 satellites.
- Seawinds scatterometer data
- AMV-GEO
- AMV-MODIS

Forecast verification scores have been produced by Xiaohua for both data periods. These scores show a clear positive impact of the new observation types, in particular for "dynamical" variables like surface pressure and tropospheric winds, for areas close to the North Atlantic (England and Ireland, for example) and for selected 2-3 day periods during the winter month. The forecast verification scores may be viewed at:

https://hirlam.org/portal/cis

Nils has started to track forecast differences back to analysis differences (and hopefully to impact of particular observations) for cases of strong positive impact of the new observation types (8 February 2007, for example). This exercise will continue.

Plan of actions for the continued validation of the "all inclusive runs"

- Carlos will check the bahavour of the minimization for all assimilation cycles of the "all inclusive runs" as well as the "all passive runs" for both data periods.

- Carlos will check that fractions of rejected data are reasonable in the "all inclusive runs" for both data periods. John is asked to do the same check for scattereometer wind data.

- Nils will check carefully all settings in the "all inclusive runs", for example backgroud error and observation error standard deviations.

- Xiaohua will carry out an a posteriori diagnosis of background and observation error standard deviations for the "all inclusive runs".

- Xiaohua will carry out field verification for the "all inclusive runs" as well as the "all passive runs" and for both data periods.

- Xiaohua will produce data usage maps for all observations except for scatterometer wind data, that John is asked to produce.

All these validation and monitoring actions should be finished and reported to Nils (and everybody) by 30 May 2008 !

Plan for data denial experiments

Data denial experiments will be carried out for both data periods as follows:

- John is asked to carry out the scatterometer wind experiment.
- Nils and Per Dahlgren will do the AMSU-A/B experiment as well as the conventional data only experiment.
- Eoin will do the AMV-GEO wind data experiment.
- Carlos will do the AMV-MODIS wind data experiment.

Based on the outcome of the validation and monitoring actions listed above, Nils will decide by 2 June on a "GO" for the data denial experiments.

The data denial experiments should ideally be finished by mid-June. A telephone conference on the status and results of the experiments will be arranged by Nils on 13 June.

The application of the OSI/SAF SST and SIC, NAR SST and ECMWF SIC data will await the final coordination of the development efforts by Mariken Homleid and John de Vries. A separate "all data" run including also these data will be carried out at a later stage.

On behalf of the "CIS workers", Carlos will make a presentation on the Atlantic scale CIS at the EMS meeting in September 2008.

The summer-time convection CIS

It was decided to go ahead with the summer time convection CIS. In addition to the new data types used during the Atlantic scale CIS, the aim is to include radar radial wind data, GPS Zenith delay data and SEVIRI cloud-free water vapour channel radiance data (and possibly also 2 meter relative humidity observations) in this impact study. The impact study will be carried out with 4D-Var and with 10 km horizontal resolution in the non-linear model. The integration domain will cover the European continental area. An impact study with a 5 km version of the HIRLAM system will be considered later.

The time period will be selected on the basis of radar data availability. Candidate data periods are (1) the Atlantic scale CIS summer period 24 July – 24 August 2006, (2) the COPS period summer 2007 with availability of radar data from Germany and surrounding areas and (3) the coming summer 2008. Kirsti will bring the question of radar data availability and data volumes up during a COST meeting this month. After consultation with Kirsti and other participants, Nils will decide on the data period for the summer time convection CIS (deadline 15 June 2008).

Some further plans and thoughts abouts the summer-time convection CIS:

- Reima will take care of the GPS Zenith delays data. The data will be collected from the EUMETNET E-GVAP data collection activity. Reima will investigate whether we should apply a white list for data selection or whether we should apply a station- and time-dependent bias correction (the SMHI approach). Preferrably data should be selected in accordance with the area of responsibility of each data producer.

- Kirsti will apply the radar super-observation pre-processor, developed by Gunther Haase and Daniel Michelson at SMHI, and including also a de-aliasing. No bias correction will be applied, rather data from some radars may be black-listed. Preferrably radars from the HIRLAM member countries, England, France, Germany and other European countries will be utilized.

- Martin Stengel will be asked to take care of the SEVIRI data and also check data availability for the periods mentioned above.

- Concerning the assimilation experiment, a CIS-RCR run will provide the lateral boundary conditions, and then a 10 km CIS baseline experiment without the 3 additional data types will be carried out. After that there will be the all inclusive (radar winds, GPS and SEVIRI, and possibly also 2 meter relative humidity observations) assimilation runs, followed by data denial experiments.

- A data collection plan and and an instruction for operational implementation need to be developed.

- Candidate researchers to contribute to the summer-time convection CIS are Martin Stengel, Reima, Kirsti, Eoin and Carlos. Nils will contact the respective heads of research for approval.

- All data archiving, also for raw radar data, (Kirsti will investigate the radar data needs) will be done at ECMWF.

- Nils will come with a integration domain proposal and with computer cost estimates valid for the proposed domain.

The Arctic CIS experiment

The questions behind the previously planned ARCTIC CIS will hopefully be answered by the Atlantic scale CIS. Within the EU-funded DAMOCLES project, an Arctic impact study will be carried out by SMHI and met.no. No further Arctic CIS experiments will be carried out within the framework of HIRLAM.

Contributions to EUCOS impact studies

HIRLAM has been approached by Stefan Klink from EUMETNET/EUCOS with a request for us to participate in some coming EUCOS data impact studies, mainly concerned with different scenarios for reduction of the upper air station network. Some limited funding from EUMETNET is available for this

purpose. We consider that it would be important for HIRLAM to contribute. It would be an advantage if these contributions could be linked to our CIS impact studies with regard model domains and data periods. Nils and Jeanette will provide an answer to the request from EUCOS.

At least met.no from the HIRLAM community is prepared to participate in the EUCOS impact studies, with the HARMONIE forecasting system (Roger). Nils will investigate the possibilities for other HIRLAM partners to participate. One possibility is to utilize the EUCOS impact study fro a comparison between HIRLAM and HARMONIE assimilations system (the activities of Magnus, Carlos, Sigurdur et al.).