Minutes from CHPS Forcing Team Call
Wednesday February 04, 2009
Mark Glaudemans, OHD

Participants:
ABRFC – Mike Boehmke, Mike Pierce, Eric Jones
CNRFC – Art Henkel
NERFC –
NWRFC – Don Laurine, Joe Intermill
OHD – Mark Glaudemans, Paul Tilles, Jingtao Deng, David Miller, David Kitzmiller
OCWWS – Mary Mullusky

Next Call:
<mark>Wednesday 02/11/2009</mark> 12:00 Eastern [no call planned for 02/18]
number: 866-614-2988; participant passcode: 7565560

1) Forcings Grid Form:

In short, it has been decided to use GRIB1 format for sending data to FEWS during BOC-1. This is noted more prominently in the latest, updated matrix showing the methods and grids forms per RFC, per forcing.

Serious consideration was given to netCDF for sending data to GRIB. However, the netCDF used by the NWS in MPE and GFE/NDFD operations is not "standard" netCDF. The recommended standard for netCDF data structures is the "CF" (climate-forecast) convention (see http://www.unidata.ucar.edu/software/netcdf/ for netCDF info…). Deltares import software can handle netCDF forms using the CF convention. However, as pointed out in a wiki page noted by Peter Gijsbers, there are FEWS-restrictions on the CF conventions, which may or may not affect us one day (see details at http://public.deltares.nl/display/FEWSDOC/DELFT-FEWS+netcdf+convention).   They are willing to adapt their import module – something we will keep in mind for the future. Other factors in the decision to use GRIB are that OHD and some RFCs have already invested a significant amount of software and knowledge in GRIB1, for better or worse. The looming migration of NWS AWIPS, including GFE, into AWIPS-II and its possible impact on netCDF usage complicates the choice for all forcings format scenarios, but probably impacts netCDF more than GRIB.

Given the short time frame we have to implement an end-to-end solution, the safer route to an acceptable approach is to use GRIB1. We sincerely expect to re-consider this choice of GRIB1 after BOC-1 or sooner if time permits.

Before closing this matter, some other points…Tish Soulliard at the NPVU has stated that they are only able to use GRIB1 currently, not GRIB2. They are still planning to implement GFE over the summer. As discussed below, plans for a netCDF-to-GRIB translator will allow GFE to be used at the RFCs without requiring NPVU to implement GFE. Other news…comparisons of the file sizes generated for HRAP QPE by MPE, which uses standard file generation APIs, show that netCDF files are about 2x as large as netCDF files (netCDF files are about the same size as xmrg). These sizes are for raw files without compression by independent compression utilities such as gzip.

2) **Longer-Term Vision for Forcings:**

During the CAT Preparation workshop on 1/27-29, there was some discussion of the longer-term vision. This covers the period after BOC-1 when the other (9) RFCs implement CHPS, and also the period beyond that BOC-2 period.   Mark presented thoughts about expanded use of GFE and to even have MPE move into GFE someday and in general to continue to push for use of and changes to GFE to support the forcings needs. The NWS has enormous focus on GFE for all sorts of needs. It seems logical to leverage these existing capabilities, and add what is still needed, in order to effectively meet the

needs of the collective RFCs. Changing to different grid formats (e.g. netCDF, HDF5) can be reviewed as BOC-1 evolves and BOC-2 is active.

3) OHD Grid Activities:

At the CHPS workshop last week, there was discussion about methods to encode the QPF data into GRIB1, an important requirement for the NPVU. Using GFE is planned for use at AB, NE, and NW RFCs to generate forcings so methods are needed to support not just NPVU but the grid transformation from GFE to FEWS. As noted, GRIB1 will be used for FEWS ingest. To support these requirements, OHD will develop software to transform GFE output into GRIB1 form for ingest by FEWS and NPVU. Dave Miller is working to either extend the OHD "gribit" application to ingest netCDF and to generate 10-km GRIB1 or to write a new application to meet the requirements.

Tom Lefebvre, OHRFC, and OST/MDL are providing helpful guidance on this activity. We have since obtained sample netCDF grids from TomL and NWRFC. There are differences between these grids which we currently dissecting in detail; some of the differences are due to the role played by the ifpnetCDF utility, which remaps a "cluster" of grids into individual grids.

At the meeting, there was speculation that GDAL (http://www.gdal.org/) software could provide support. After research by multiple folks (thanks all!) it was determined that GDAL libraries do not support writing of GRIB data.

4) OHD MPE Support Activities:

As noted before, OHD will work with NE and NW RFCs to provide support and complete modifications as necessary for these offices to MPE/DQC for QPE, QTE, FLE and QPE, respectively. OHD is communicating with NWRFC to work on the hydrologic day and after the meeting exchanged correspondence. OHD is standing by for comments from NERFC. Paul Tilles and Jingtao Deng are working on this activity to support MPE/DQC.

5) OHD Temperature (QTE/QTF) Activities

This issue continues to be most challenging for the team. At the workshop, NWRFC encouraged a solution which included one-hour temperature grids. These could be then used within FEWS to generate the 6-hour means for model use.

At the call, Mark discussed reading observed temperature from the hydro database, applying some QC checks on the data, then rendering the station to a grid using the DQC methods. The max/min data values could be incorporated into the QC checks, but unlike the RFC MAT preprocessor, they would not be used to estimate values. A problem with this approach would mean that a full interactive tool (ala DQC) would not be available to QC the data, although such a "full" approach would certainly be a goal for the future. Also, it is not clear if there would be any forecast blending with observed values. Lastly, this approach would be a real variance from the current operations which have been calibrated to use 3/6-hour data and max/min data. The benefits of this approach are that it would use the actual 1-hour data and would be relatively easy to implement. Subsequent phone calls with NW and CN RFC discussed these tradeoffs. Mark will be talking with other RFCs.

As noted by Art, the one-hour method may be something for post-BOC-1. Methods comparable to the current methods in the MAT preprocessor are planned by CNRFC for their use by applying pre and-or post-processing to DQC operations. OHD and CNRFC will continue to coordinate this solution in addition. It is possible that both the MAT-comparable solution and one-hour instantaneous solutions will be implemented.

6) RFC Status

NWRFC is waiting on the OHD grid converter to make use of GFE for operations. They are also waiting on OHD changes for MPE/DQC to allow use of it operationally and will support OHD coordination for this effort. The forecast forcings will make use of GFE methods already developed.

ABRFC noted that they are still working on GFE PET generation. MikeB discussed his tools for QTE generation and subsequently sent his GFE tool and procedure to OHD. This will be helpful to understand the xmrg file creation methods it uses, in addition to noting the method for QTE averaging.

CNRFC is able to produce QPE, QPF grids and working on FLE/FLF grid generation. As discussed, for temperature, they plan on modifying approach to have pre- or post- processing wrt MM/DQC.

NERFC reported via email that they… can produce a 6 hourly QTE in GFE...a 6 hourly QPF in GFE and I am not sure about a 6 hourly QTF but we are working towards that. For QPE...we will be using MPE and/or MPE Daily QC to produce our grids but we are not trained as of yet.

Other Notes:

1) RFC Tracking: CAT RFCs are asked to verbally report on their progress towards generating their grids.   This is part of the need for RFCs to create actual grids using their planned methods. RFCs can initially display these grids within FEWS, and then, FEWS must extract data from these grids for use in model operations.

2）ESP Forcings: This needs later investigation and discussion.