NWS Hydrology Forecast Verification Team
Teleconference Notes
06/29/2009

Agenda

- Demonstrations of verification prototype displays in CHPS by Julie Demargne
- Presentation of the verification activities for the CHPS Verification Service and of the recommendations from the final team report by Julie Demargne

Questions, Comments and Actions

CHPS demos

The first demo was relative to the display of forecast analog information for a given flood forecast issued on 03/06/2006 for the Russian River at the Guerneville Bridge in CNRFC. The forecast from 03/06/2006 was considered as the current forecast being produced. Forecast analogs were selected (outside CHPS) from other dates by considering the following conditions: the forecast value at lead hour 6 was within an interval [current 6-hr forecast value ± 20%] and the forecast peak occurred within the next 48 hours. With these conditions, 6 forecast analogs were selected to be meaningful analogs for the current forecast. The forecast and observed values for these 6 events were then imported in CHPS using the HistoricalEvents.xml file in the Config\RegionConfigFiles directory. Using the FEWS Time Series Display, the user can plot the current forecast along with past observations and then display any of the 6 analogs (forecast and corresponding observed time series) using the Historical Events functionality of FEWS. In this case, 5 out of 6 forecast analogs were overforecasting; therefore the analogs tend to indicate that the current forecast might also have a positive bias. Based on this information, the forecaster may revise the forecast and issue a warning forecast, instead of a flood forecast. For the RFCs who want to start using this CHPS-FEWS analog display tool, they need to get the forecast and observed analog data in the correct format in the HistoricalEvents.xml file in the Config\RegionConfigFiles directory.
In the future, the goal is to build a functionality to dynamically query the archived forecast and observed datasets in order to select forecast analogs using a wide range of conditions. The analog tool could also include predefined analog events for specific conditions (e.g., hurricane events) (similarly to what was demonstrated in CHPS) for which the analog data could be stored in the operational database.

The second demo was relative to displaying verification statistics for multiple locations on a spatial map. Monthly statistics relative to operational stage forecasts for 20 locations in CNRFC were extracted from the Stats-on-demand archive using 6 years of forecast data. The verification statistic used for the demo was the relative RMSE (defined as RMSE / average observation for each month and computed outside CHPS) in order to use a normalized statistic for multiple locations. The monthly relative RMSE values for the 20 locations and for lead days 1 to 3 were imported in CHPS by defining module instance files under the Config\ModuleConfigFiles\ directory and by running a workflow to import

the statistics into the FEWS database. The user can plot the monthly statistic values in the FEWS Time Series Display for each location and for all the 3 lead days. Using the FEWS Spatial Display, the user can display on a map the values of the monthly statistics for a given lead day using a given number of user-defined categories; these maps could also be animated to display monthly statistic values on a loop. For the RFCs who want to start using this CHPS-FEWS spatial display tool, they need to get the verification statistics in the correct format in the module instance files and to define configuration files for the import workflow and for the spatial display.
In the future, a functionality will be developed to import the verification statistics into the operational database in order to plot them on time series plots and spatial maps.

Julie's presentation

Slide #8: the functionality for analog query will need to be flexible to include conditions on various forecast and/or observed attributes for forcing input and hydrologic output variables (e.g., past flow forecasts for which the precipitation forecast at 6-hr lead time is above 1 inches and the last observed precipitation observation is above 0.5 inches). NWRFC mentioned the need to select flow analogs for upstream locations, which could be useful to analyze the potential magnitude and timing errors at the downstream location. CBRFC mentioned the need to display flow analogs as well as corresponding forcing input data (e.g., precipitation and temperature forecasts and corresponding observations) to better analyze the flow forecast analog information.

Slide #13: the next step is to develop the user requirements for the CHPS Verification Service, including the analog functionality and the spatial display functionality, by getting feedback from all the RFCs. The Hydrologic Ensemble Prediction (HEP) group will also develop additional prototype displays to be reviewed by all the RFCs. These prototype displays should also be used by the Service Coordination Hydrologists to get feedback from external end users. For the analog functionality, the HEP group plans to send a list of questions to the RFCs about the conditions when analogs could be useful for forecasters and/or end users, the list of attributes to be used for the analog query, the type of analog displays for forecasters and/or end users. For the spatial verification displays, the questions will be relative to the conditions when verification maps could be useful, the type of verification statistics to be displayed (e.g., monthly statistics, statistics for a range of thresholds from low flow to high flow), and the type of spatial displays that would be the most meaningful to forecasters and end users.
Action: Julie D. will send to all the RFCs the list of questions about the requirements for the analog functionality and the spatial display functionality.

Slide #15: at the HIC meeting Julie D. and Mary Mullusky will present the final team report, including the recommendations on verification metrics, verification products, and sensitivity analyses, as well as the new team charter. This will give an opportunity to all the HICs to give feedback on the future team activities described in the new team charter and the resources needed at each RFC to work on verification. Any team member should let the team know if there is any disagreement or comment on the proposed new team charter or any other recommendations in the final team report.

Slide #16: for the QPF horizon study, all the RFCs should use the best available QPF values for up to 4 lead days; the QPF sources need to be defined at each RFC. This study will include 10 different scenarios using various QPF horizons (0, 6-hr, 12-hr, 18-hr, 24-hr, 30-hr, 36-hr, 48-hr, 72-hr, and 96-hr); additional scenarios may be defined at each RFC. The 6-hr stage forecasts should be verified for each individual lead time and for a 7-day window; the window may need to be extended for slow responding basins. Julie Meyer has been working on a similar QPF case study with CR and NCRFC; she will share with the team the scripts developed to perform quality control of the forecast data exported to the archive database. OHRFC will also share with the team how they currently run and store the datasets for similar forecast scenarios.

Slide #17: for the run-time mods study, all the RFCs should define 3 additional forecast scenarios to be compared with the operational forecasts. The 6-hr stage forecasts should be verified for each individual lead time and for the same window as the one used for operational stage forecasts.

Slide #18: for the next team meeting, some RFCs may want to share their experiences in setting up the different forecasting scenarios for the verification analysis.

The next team meeting will be scheduled for early September in order to finalize the team report by mid-September.