HMOS Verification Exercise
2nd RFC Verification Workshop
Salt Lake City, UT
11/19/2008

Goal: compare the IVP and EVS capabilities and interpret the forecast verification results for an HMOS case study using the single-valued flow forecasts (used as input in HMOS), the HMOS ensemble mean flow forecasts, and the HMOS ensemble flow forecasts.

1. Display data

IVP Time Series Plot (slide #4)

Notice the periods with missing values.
Get an estimate of the number of events above flood level.
What variable is plotted on the Y axis?

EVS Box Plots with time (slides #5-12)

What variable is plotted on the Y axis?
Comparing the boxes on slides #5-8, what can you say about the spread of the HMOS ensembles?
From slides #9-12, what can you say about the error in the HMOS ensemble means?

IVP Time Series Plot (slides #13-15)

What can you say about the performance of the HMOS ensemble means vs. the single-valued forecasts for the 3 different lead times?

EVS Box Plots with observed value (slides #16-23)

What is the difference between the graphics on slide #16 vs. slide #5?
By comparing slides #16-19, what can you say about the conditional bias of the ensembles?
From slides #20-23, what can you say about the conditional bias of the ensemble means?

2. Error verification metrics

IVP Correlation Plot (slide #24)

What can you say about the correlation coefficients for the 3 sets of forecasts (ensemble mean, single-valued and persistence)?

EVS Correlation Plot (slide #25)

The HMOS ensemble mean forecasts were verified for 2 subsets based on 2 different thresholds: 5297 cfs, which corresponds to the 90^{th} percentile of the observations, and 32100 cfs, which corresponds to flood level.
What can you say about the correlation coefficients for these 2 forecast subsets?

EVS Mean Continuous Rank Probability Score (MCRPS) Plots (slides #26-27)

The MCRPS corresponds to the Mean Absolute Error (MAE) for single-valued forecasts. How do the MCRPS values compare against each other for the HMOS ensembles and the HMOS ensemble means and for the 2 forecast subsets?

EVS Mean Error (ME) Plot (Slide #28)

What can you say about the ME values for the 2 subsets of forecasts?

IVP Error Plots (Slide #29)

What can you say about the ME and RMSE values for the 3 sets of forecasts?
What can you say when comparing the ME values with slide #28?

3. Conditional verification metrics

EVS ROC Plots (Slide #30-37)

For both HMOS ensemble means and ensemble forecasts, ROC was computed for 2 events: flow > 5297 cfs and flow > 32210 cfs.
What can you say about the variations of ROC with lead time for the 2 events?
How does ROC for HMOS ensembles compare to ROC for HMOS ensemble means?

EVS Cumulative Talagrand Plots (Slide #38-41)

The cumulative diagrams were produced for 2 subsets of forecasts: observed flow > 5297 cfs and observed flow > 32210 cfs.
What can you say about the variations of the Talagrand curves with lead time for the 2 forecast subsets?