



NWS Hydrology Forecast

Verification Team:

16th Meeting

05/26/2009 –2 pm EDT



Outline

- Final team report: consensus on recommendations?
- Sensitivity analysis: how to analyze
 - Impact of QPF horizon?
 - Impact of run-time mods made on the fly?



Final team report

- Sets of verification metrics, products and analyses to be used at all RFCs
 - Need consensus among all team members
- Timeline
 - May 28: report sent to Geoff B. and Pedro R. for review
 - Early July: report sent to Gary Carter and Tom Graziano for review
 - Mid-September: finalized report due



Final team report: Metrics

- 4 different levels of information

Information level	Attributes	Single-valued forecasts	Probabilistic forecasts
1) Data information	Forecast and observed values	Scatter plots for each lead time Time series plots for set of forecasts	Scatter plots with box and whiskers for each lead time Time series plots with box and whiskers for set of forecasts
2) Summary information	Error Bias Skill	MAE Relative Bias MAE-SS _{ref}	Mean CRPS Relative Bias in ensemble means CRPSS _{ref}
3) More detailed information	Error Skill Reliability Resolution Discrimination Correlation Sample size	MSE MSE-SS _{ref} Reliability _{MSE} Resolution _{MSE} ROC Score for set of events Correlation coefficient Number of forecast-observed pairs	BS for set of events BSS _{ref} for set of events Reliability _{CRPS} Resolution _{CRPS} ROC Score for set of events Correlation coefficient for ensemble means Number of forecast-observed pairs
4) Sophisticated information	Reliability Discrimination Forecast value	FAR for set of events ROC curves for set of events Relative value	Cumulative Talagrand Diagram, Reliability Diagram for set of events ROC curves for set of events Relative value



Final team report: Analyses

- Use different temporal aggregations
 - 6-hr instantaneous flow vs. weekly minimum flow
- Avoid data pooling across different lead times
 - Quality strongly depends on lead time
 - Plot verification statistic as function of lead time
- Perform spatial aggregation carefully
 - Aggregate verification results across basins with similar hydrologic processes
 - Analyze results for each individual basin and analyze results plotted on verification maps



Final team report: Analyses

- Analyze forecast performance
 - w/ time conditioning: by month, by season
 - w/ atmospheric/hydrologic conditioning:
 - low/high probability threshold
 - absolute thresholds (e.g., PoP, Flood Stage)
 - Plot also sample size (in future confidence intervals)
- Analyze sources of uncertainty and error
 - Verify forcing input forecasts and output forecasts
 - For extreme events, verify both stage and flow
 - Sensitivity analysis to be set up at all RFCs: 1) impact of QPF horizon; 2) impact of run-time mods made on the fly



Sensitivity analysis: QPF horizon

- Goal: what is the optimized QPF horizon for hydrologic forecasts?
- QPF horizon to test:
 - From 6-hr up to 5, 7 or 10 days?
- Model states to use:
 - Which carryover?
 - Which mods to include?
- What forecast to verify
 - 6-hr stage forecasts
 - Aggregated forecasts: daily mean? weekly mean?
weekly min? weekly max?



Sensitivity analysis: run-time MODs

- Goal: do run-time mods made on the fly improve forecasts?
 - Run-time MODs: 2 scenarios
 - A priori MODs (known before producing forecast)
 - A priori MODs + MODs made on the fly
- } ***List of MODs?***
- Model states:
 - Carryover from 5 days ago (w/ past mods) + a priori mods
 - Forcing inputs: 2 sets for each scenario
 - Best available observed inputs, no forecast inputs
 - Best available observed and forecast inputs



Next meeting

- 17th meeting: late June or early July
 - Update on comments for team report
 - Discussion on sensitivity analyses





Thank you!

Questions?

