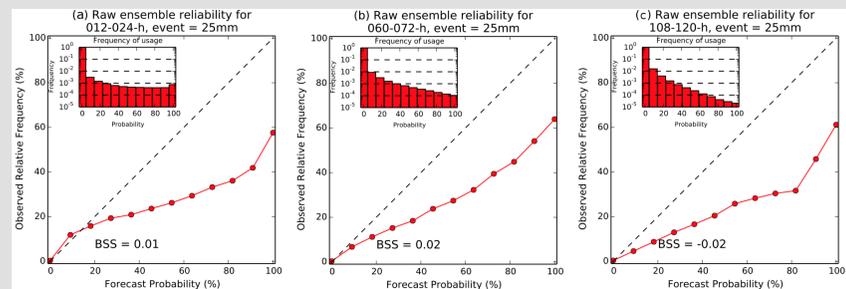


Development of Calibrated Probabilistic Forecast Products for Extreme Rainfall

Michael Scheuerer, Tom Hamill, and Gary Bates

Why Postprocessing?

Probability forecasts derived from ensembles directly are often biased and underdispersive. This can result in poor forecast skill:



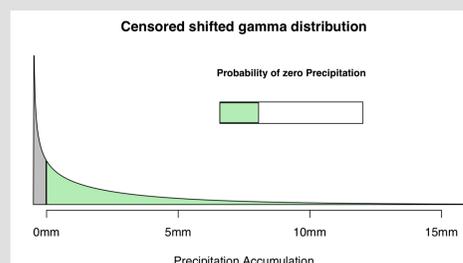
- Identify such short-comings based on past forecasts and observations
- Adjust future forecasts accordingly

Regression Type Approach

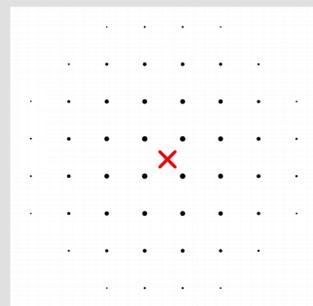
Goal: Transform the ensemble forecasts into calibrated predictive probability distributions.

Conditional distribution model

Conditional distributions of precipitation amounts are modeled via censored, shifted gamma distributions (CSGDs).



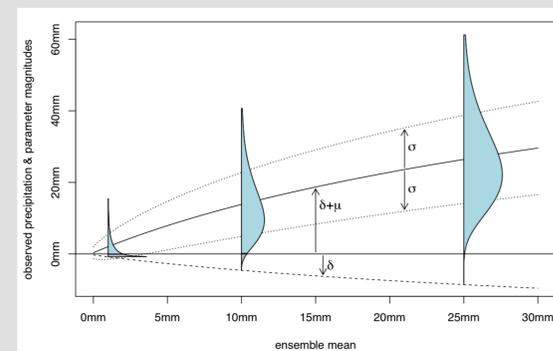
Ensemble statistics



- Consider all forecasts in the vicinity of the location of interest
- Use them to calculate informative statistics about mean, spread, etc.

Heteroscedastic Regression

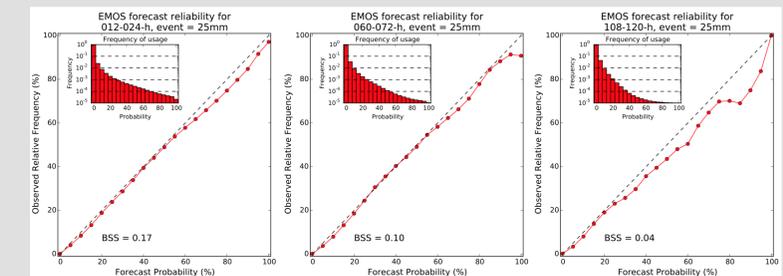
- Link CSGD parameters to ensemble statistics
- Plug new forecasts into regression equations to obtain predictive CSGD distributions



Forecast Verification

- Prediction: GEFS ensemble forecasts (1/2 deg. grid)
- Verification: Climatology corrected precipitation analyses (1/8 deg. grid)
- Training: Cross-Validation with reforecasts (12 years) (for each year, fit model with data from other years)

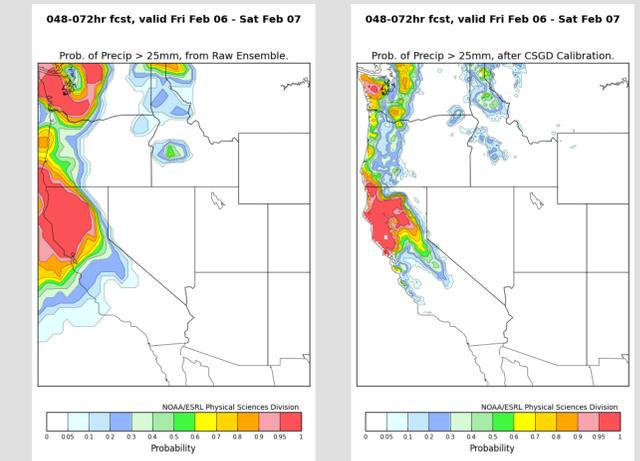
Reliability for 25mm threshold



Forecast products

<http://www.esrl.noaa.gov/psd/forecasts/reforecast2/>

High resolution precipitation forecasts based on NCEP GEFS reforecasts and CCPA.



Future plans

- Transition to NOAA/MDL ("Blender project")
- Application in reservoir management: calculate *non-exceedance probabilities* of n-year recurrence levels