

Ensemble Forcing Postprocessing at the National Water Center



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NWC Forecast and Forcing Engine

- **NWC Forecast**
 - Gridded WRF-Hydro (1-km, national scale)
- **Present Forcing Engine**
 - Short-range (18 hours): HRRR/RAP (downscaled)
 - Medium-range (10 days): GFS (downscaled)
 - Long-range water resource (30 days): CFS (16 ensemble members downscaled/bias-corrected)

NWC Forcing Engine Under Development

- **Aims to enhance forecast accuracy and represent uncertainties**
 - help both WRF-Hydro forecast and hydraulic forecast
- **A central element:**
 - Postprocessing and downscaling of ensemble forecast:
- **Prototype ready by 2017**

Current Undertakings

- **Adaptation/enhancement of existing postprocessing paradigms for medium term forecast**
- **Evaluation/comparison of paradigms through hindcast experiments**
- **Development of mechanisms for postprocessing**
 - climate forecast (CFS and NMME)
 - short and medium-range wind forecast

Planned Activities

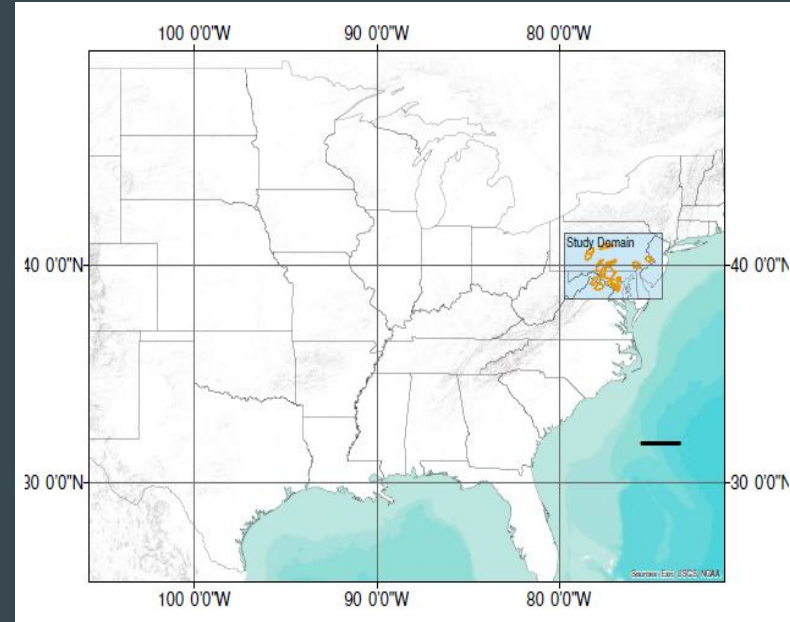
- **Enhancement of radar-based nowcaster (AdStat)**
 - Ensemble nowcaster
- **Postprocessing of HRRR**
 - Bias correction and representing uncertainties

Postprocessing of Medium-range Forecast

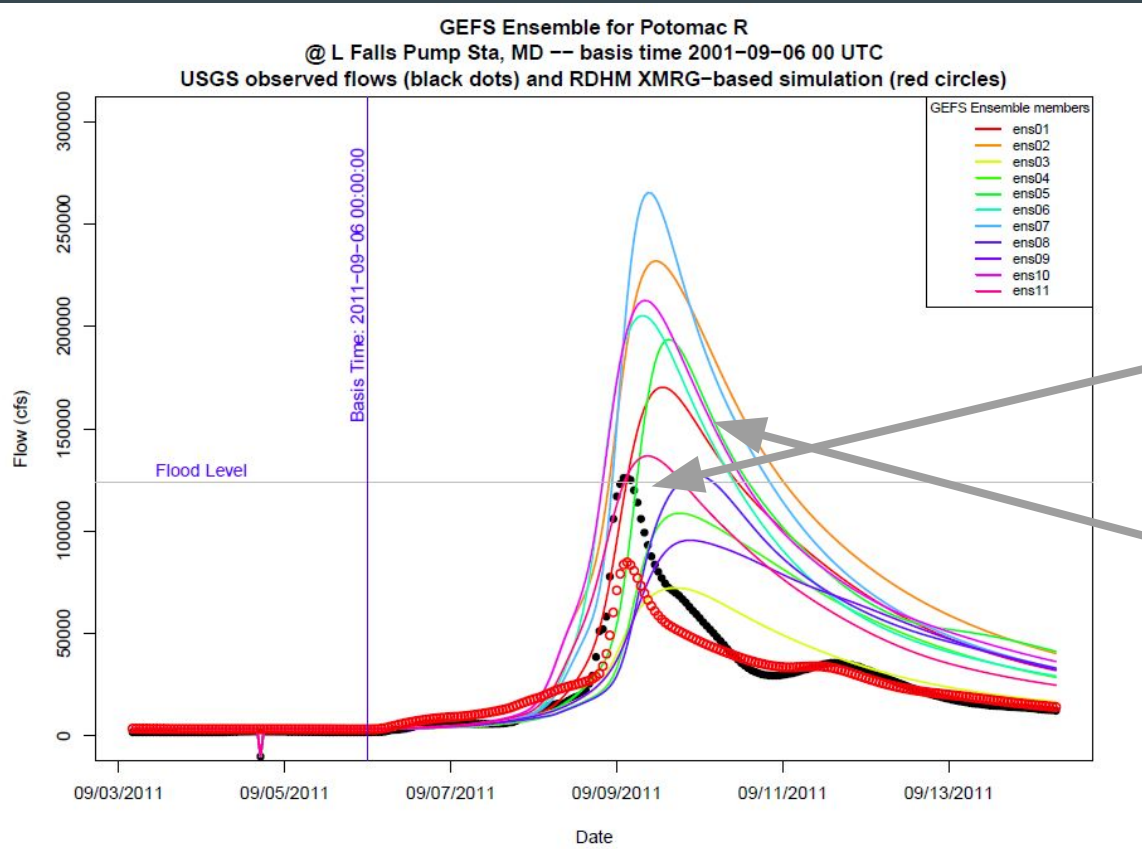
- **Adaptation of Meteorological Ensemble Forecast Postprocessor (MEFP)**
- **Testing of Alternative Mechanisms**
 - Analog
 - Bayesian Postprocessor of Ensemble (BPE)
 - Censored Shifted Gamma Distribution (CSGD)

Hindcast Experiment

- **Current:**
 - 20 watersheds in MARFC
 - Use HL-RDHM as hydrologic model
- **Near future**
 - Including additional basins in MARFC
 - Western test domain in CNRFC
 - Use WRF-Hydro



Hindcast Experiment



Observation crosses
flood stage:

Majority of Traces
point to flooding

Challenges and Collaborations

- **Determine and harness the complementary strengths of various processing mechanism**
 - MEFP/Analog/BPE/CSGD
- **Mitigate conditional bias in forecast**
- **Developing downscaling paradigms**
- **Collaboration among NOAA line offices and NCAR**
 - Joint efforts (downscaling wind forecast, CFS postprocessing)
 - Roles of testbeds (HMT, Climate Testbed)?