

## Evaluation of QPF during the HMT-West Winter Exercise: A DTC/HMT Collaboration with USWRP

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# HMT-DTC/USWRP Collaboration

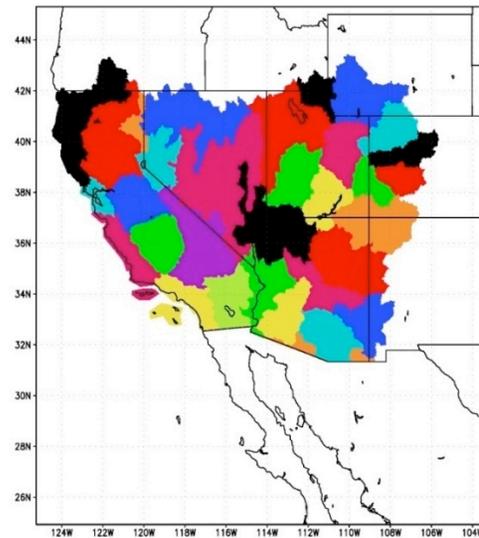
## Collaborating Agencies and Motivations

GSD: High-resolution ensemble NWP and verification

PSD, USWRP: Atmospheric Rivers and QPF; Severe events

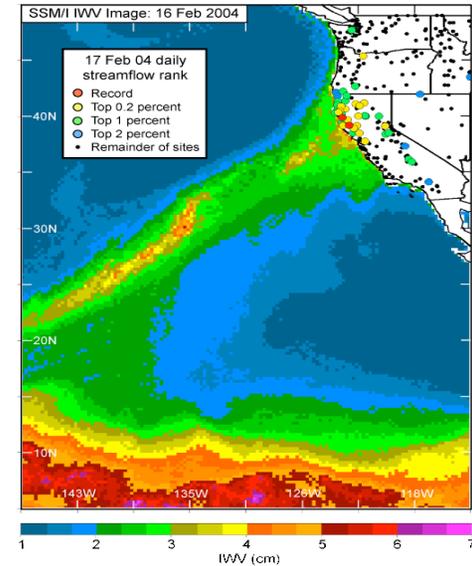
NCAR/RAL: MET-based real-time and object-based verification; HWT interactions

RFCs, WFOs, CA DWR: Operational reservoir management



GADS: COLA/IGES

2004-10-22-17:00



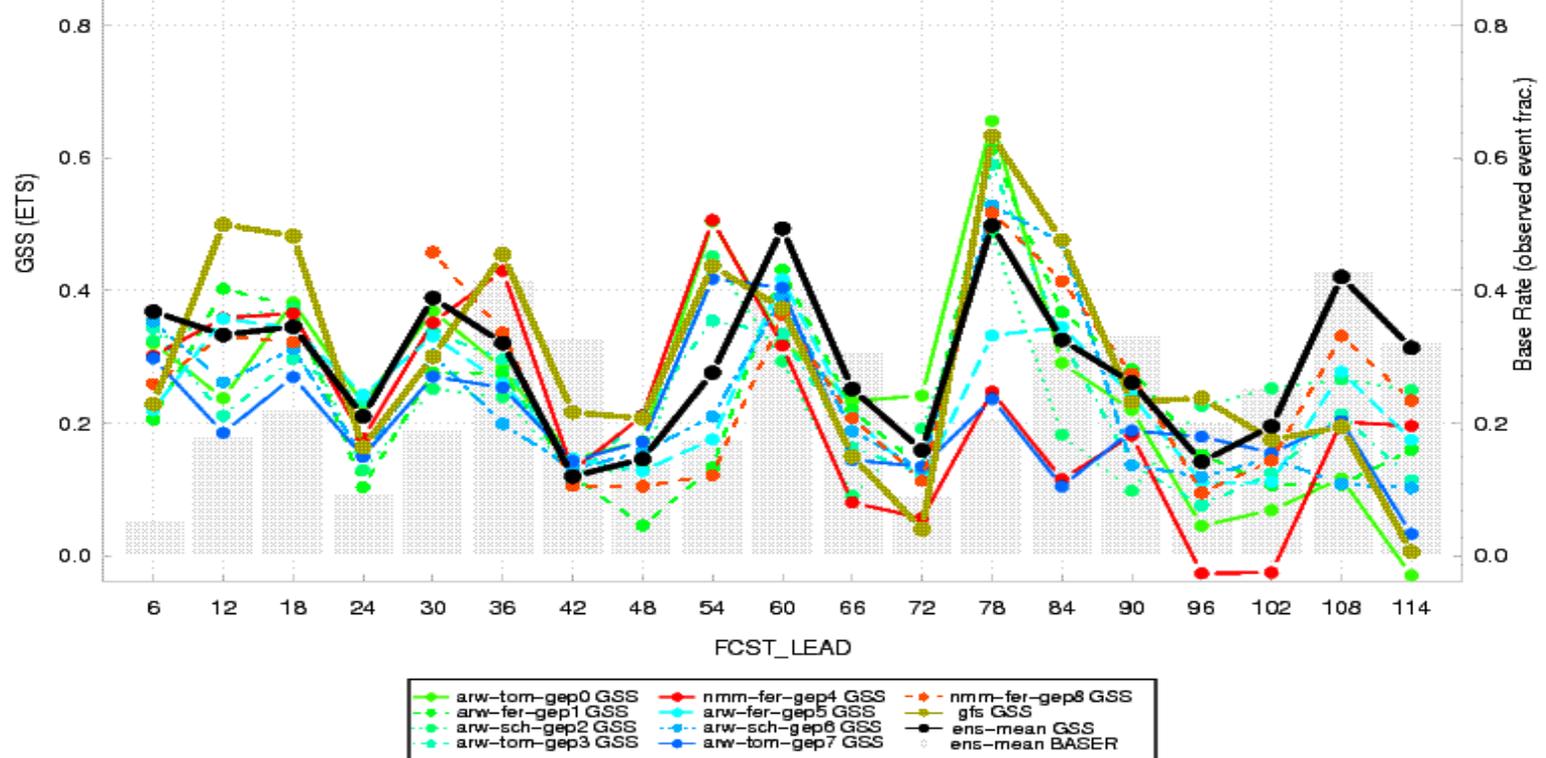
## Goals and Objectives

- Implementation and demonstration of new verification capabilities for high-resolution NWP
- Develop DTC capabilities for ensemble model probabilistic prediction and verification
- Data Impact Studies
- Impact studies of model physics and parameterizations relevant to HMT research



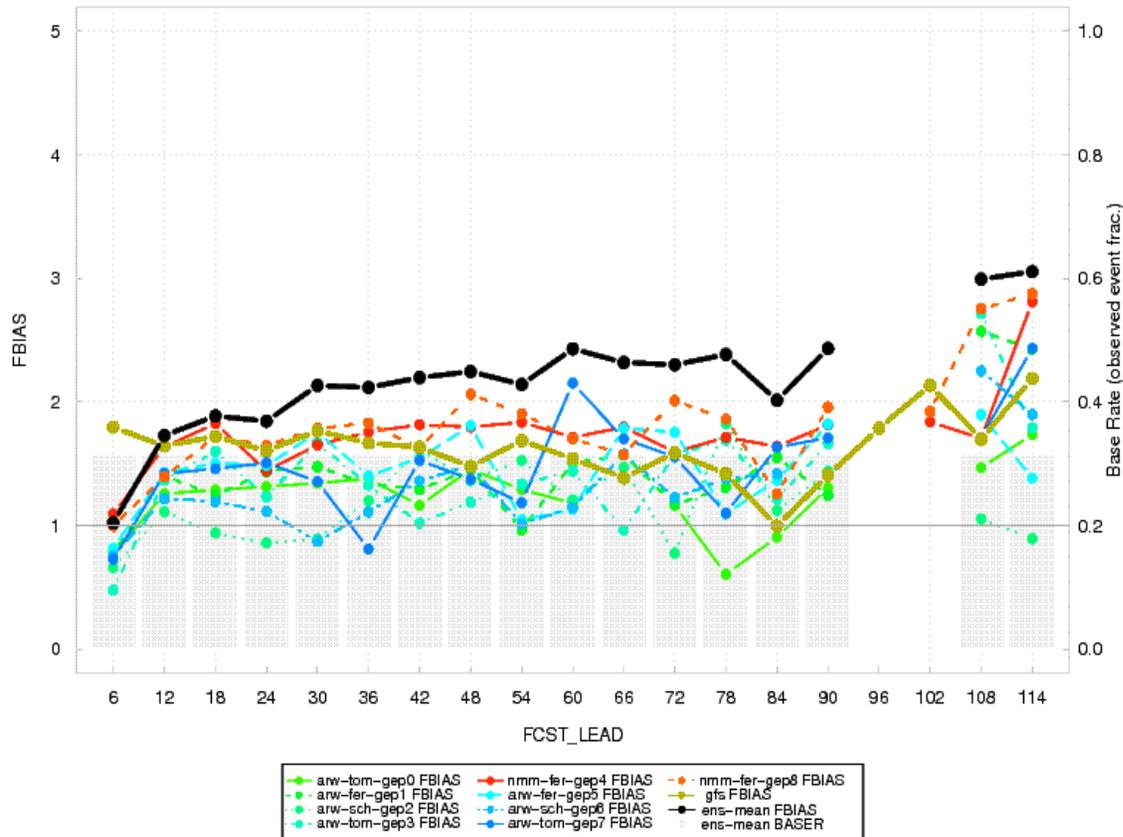
## Real-time QPF verification for HMT-West

- Initialized 12 UTC 1/17/2010, Verif. Stage IV, 0.1 in. threshold
- Good performance for ensemble mean (black ) and GFS (brown)
- Better performance overall for heavy rainfall periods
- <http://verif.rap.ucar.edu/eval/hmt/2010/graphics/>



## Real-time QPF verification for HMT-West

EVENT PERFORMANCE for APCP\_06  $\geq 0.010$ " FBIAS  
 CONSTANT VALID TIME 2010012012V – Region: FULL Obs: Stage IV

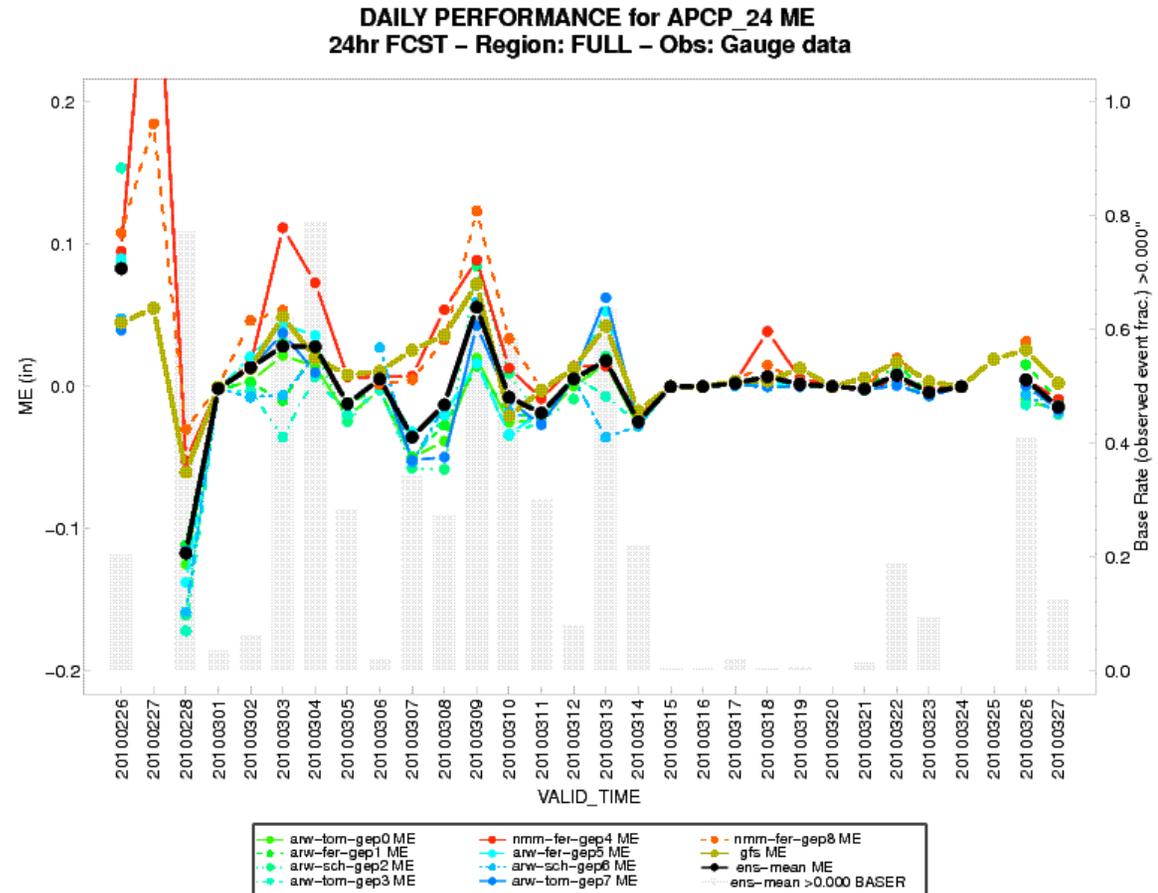


- Constant Valid Time: 1200 UTC 01/20/2010
- Spatial Frequency Bias, .01 inch threshold
- Full domain, .01 threshold
- Verified with 6h Stage IV
- Not large change with lead time except longest (4-5 day)
- Anomalously Large bias for ensemble mean



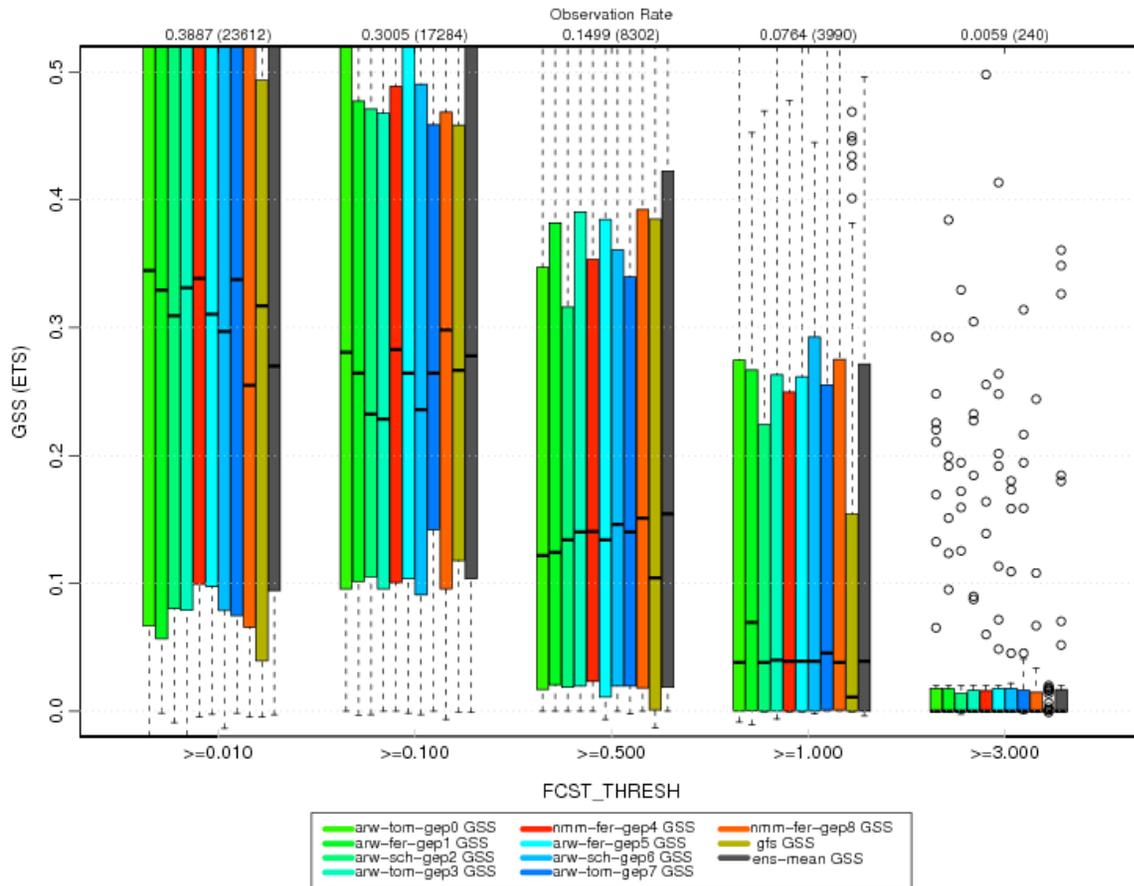
## Real-time QPF verification for HMT-West

- Daily time series, mean error (bias), 2/26-3/27
- 24h forecast, full domain
- Verified at gage sites
- Not surprisingly, largest bias during rainiest period
- High bias for NMM core



## Real-time QPF verification for HMT-West

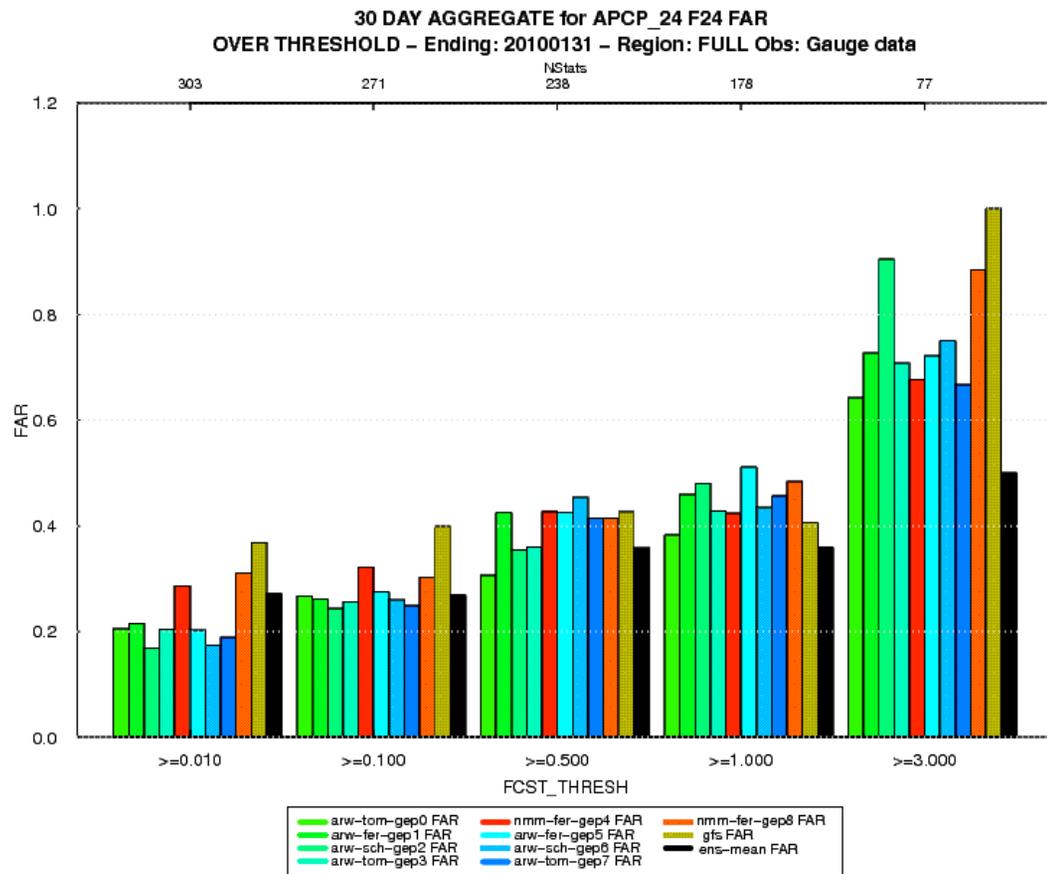
30 DAY AGGREGATE for APCP\_24 F24 GSS  
OVER THRESHOLD – Ending: 20100131 – Region: FULL Obs: Gauge data



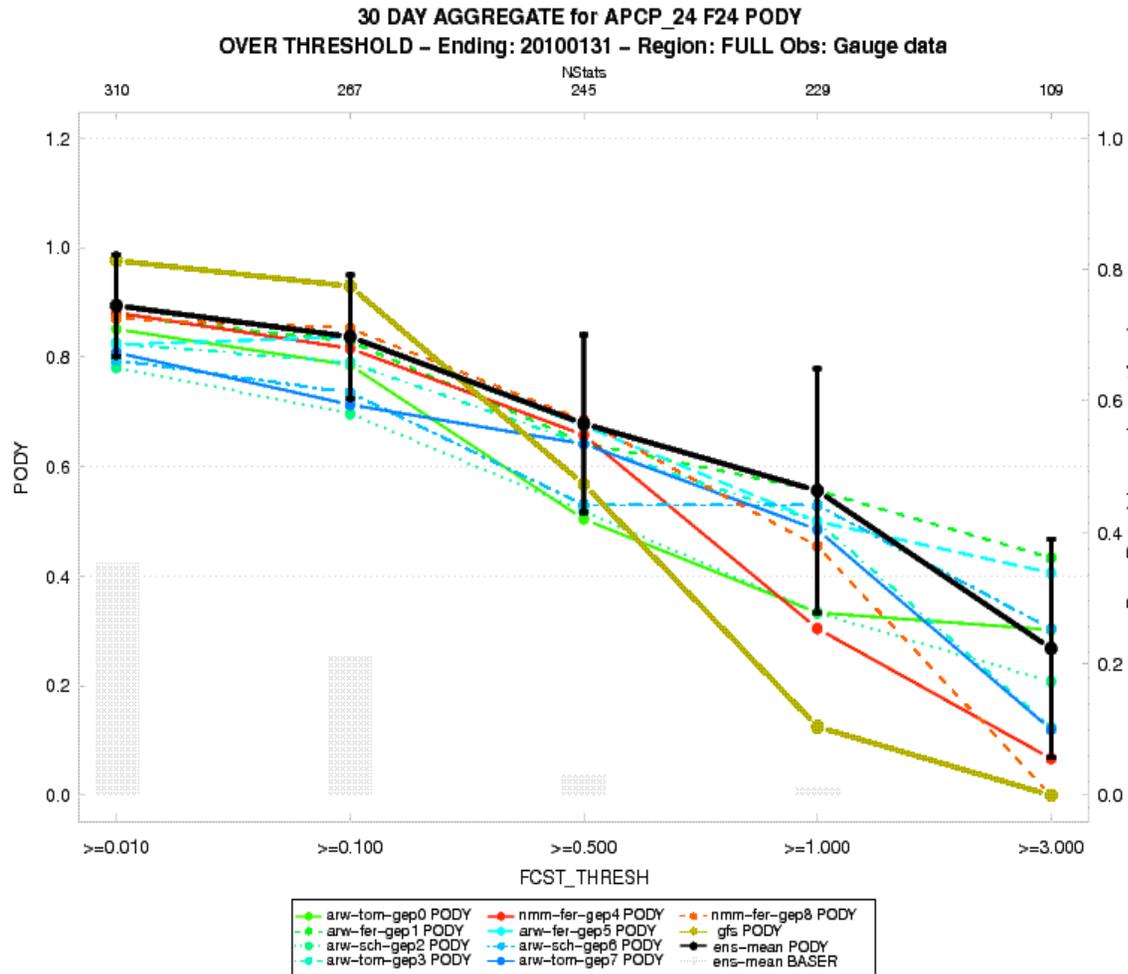
- January Summary, ETS
- 24h forecast, full domain
- Verified at 24h gage sites
- Segregated by threshold
- Dramatic performance hit at higher thresholds
- No real ensemble member advantages in statistics but large intger-quartile range

## Real-time QPF verification for HMT-West

- January Summary, FAR
- 24h forecast, full domain
- Verified at gage sites
- Segregated by threshold
- Good Performance by Ensemble Mean, poor for GFS



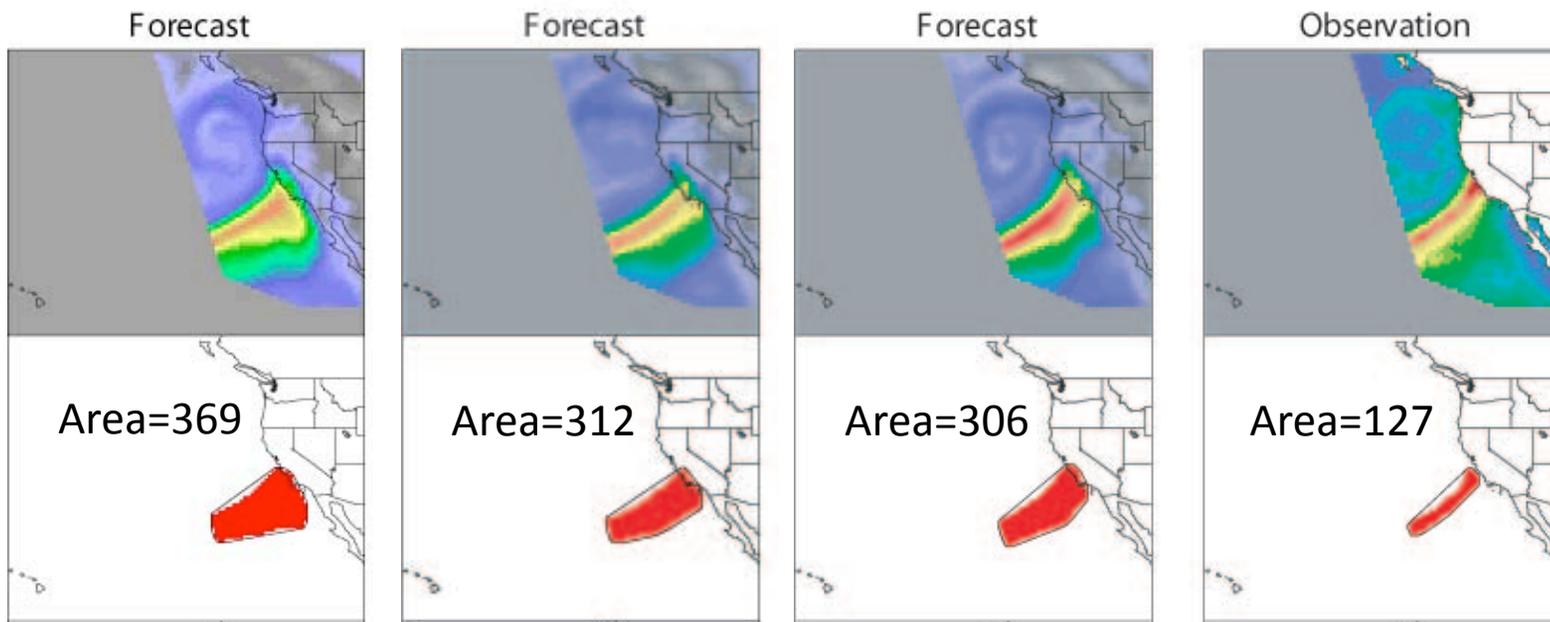
## Real-time QPF verification for HMT-West



- January Summary, PODY
- 24h forecast, full domain
- Verified at gage sites
- Segregated by threshold
- Best-to-worst for GFS as thresholds increas; resolution effect
- Best Performance by ensemble Mean

## Object-based Atmospheric River Verification of Integrated Water Vapor

MODE Object Comparison of  
GFS Forecasts with SSM/I Observation  
for 25 February, 2004 (Clear Cut Case)



<http://esrl.noaa.gov/gsd/fab>

Developmental Testbed Center

## Proposed Future Activities

- Expand and maintain real-time QPF verification demonstration system and analyze results (HMT-West and eventually HMT-East)
- Develop and assess prototype MODE-based spatial verification techniques to verify Eastern Pacific Atmospheric River events in near-real-time
- Addition of new ensemble-based probabilistic techniques to the MET, including spatial ensemble verification prototypes
- Investigate data impacts WRT verification data sets and initialization data

