

CAPS Storm-Scale Ensemble Forecast Experiment in Supporting 2016 NOAA HWT and HMT

Fanyou Kong¹, Ming Xue^{1,2}, Youngsun Jung¹, Keith Brewster¹, Nathan Snook¹, Kevin W Thomas¹, Gang Zhao¹

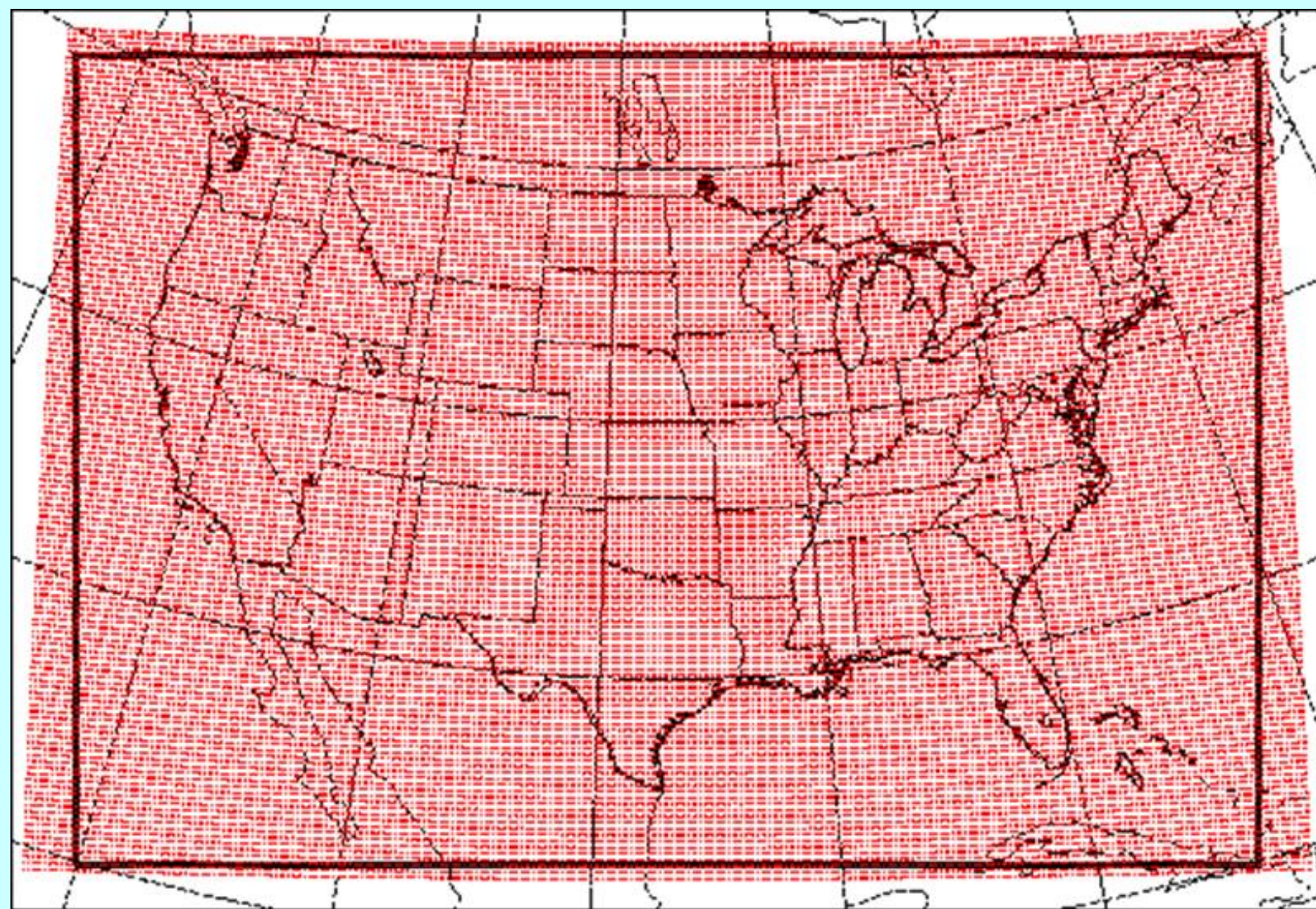
¹Center for Analysis and Prediction of Storms and ²School of Meteorology, the University of Oklahoma, Norman, OK 73072

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NOAA HWT Spring Forecasting Experiment: CAPS produced multi-model, storm-scale ensemble forecasts (SSEF) in realtime from 18 April through 3 June 2016 at 3-km grid spacing over contiguous US domain. 36 SSEF members were generated that consists of the multi-model, multi-physics, IC and LBC perturbation, and radar analysis members. Part of CLUE.

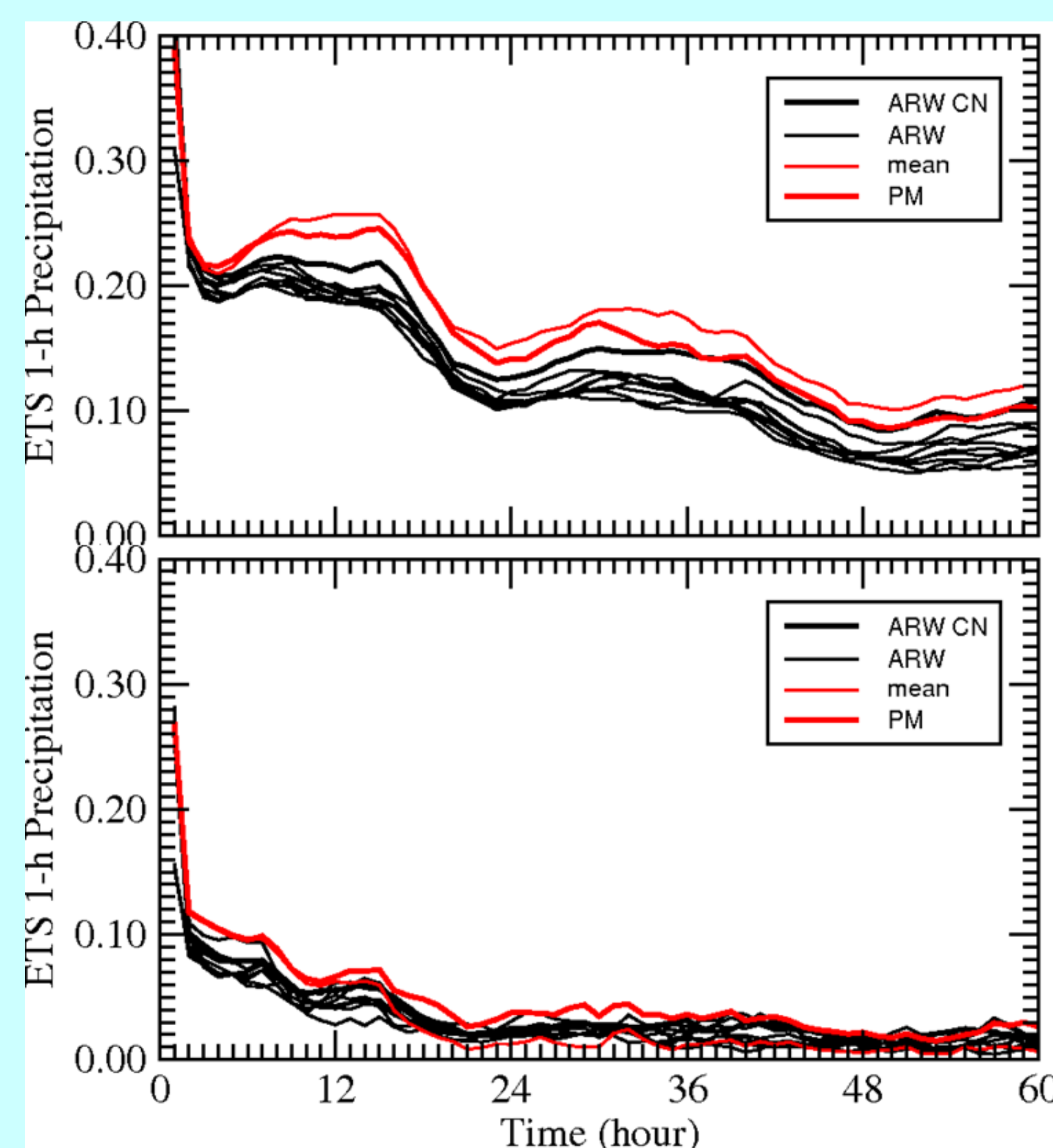
NOAA HMT FFaIR: CAPS produced a 15-member SSEF (13 ARW and 2 NMMB) from June 20 through July 22, with July 4th week off. Neighborhood exceedance probabilities of Flash Flood Guidance (FFG) and Reoccurrence Interval (RI) were produced.

CONUS domains



The computational domain for the 2016 Season. The red dot area is the NMMB domain (1568x1120); The inner domain is for ARW with both 3DVAR and EnKF forecasts (3-km grid spacing, 1680x1152 horizontal grid points); The outer domain (1860x1280) is used for providing IC/LBC for the NMMB

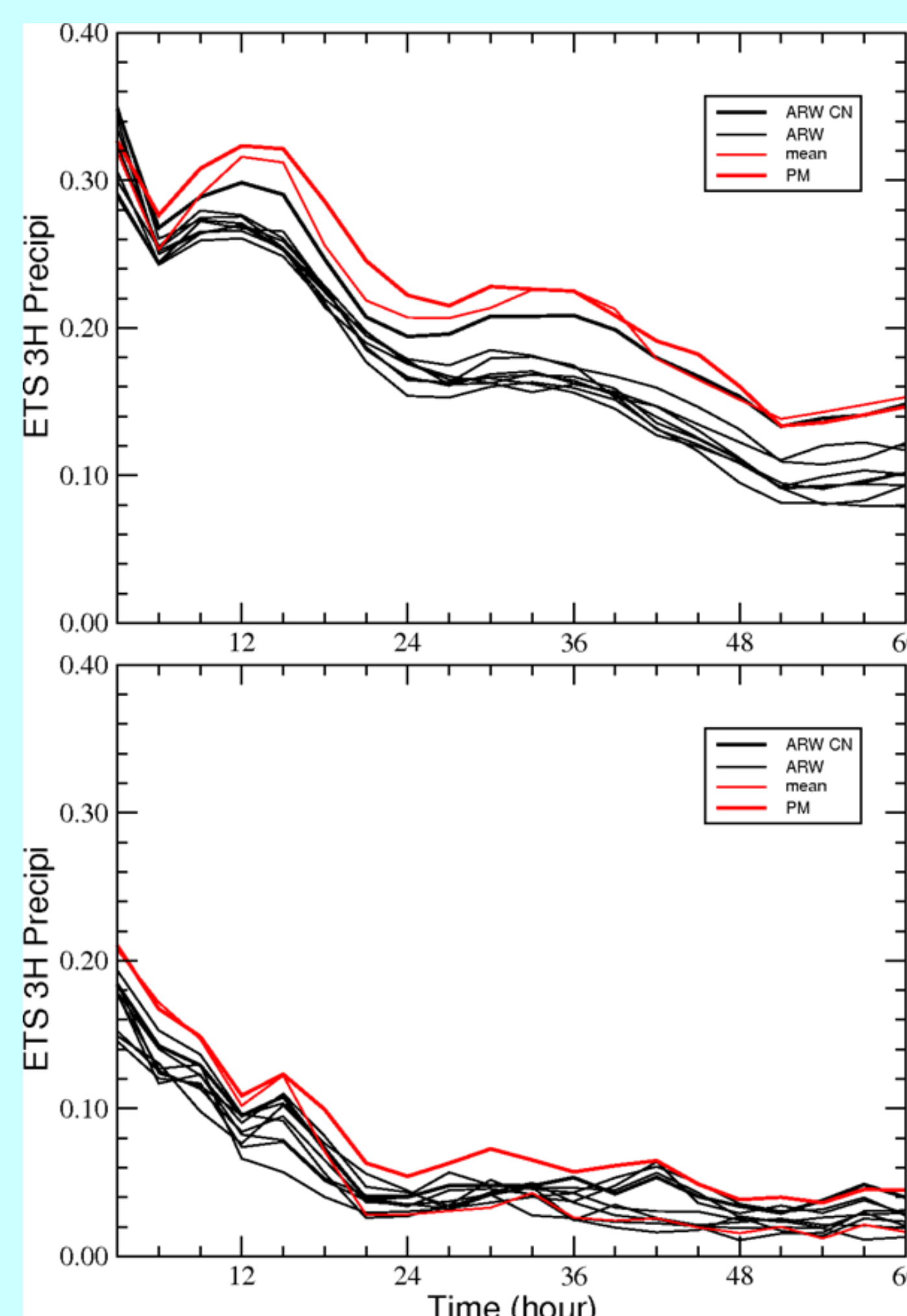
ETS of 1-hourly QPF



(top) ≥ 0.01 inch (bottom) ≥ 0.5 inch, averaged over all 2016 CAPS 3DVAR-based SSEF ARW forecasts initiated at 0000 UTC.

Highlight

- 24 3DVAR based members: 18 ARW, 6 NMMB
- 60 h forecast (some are 36h), initiated at 0000 UTC
- WRF-ARW V3.7.1
- Experimental GSI+EnKF DA and ensemble forecast system, with 40-member ensemble background, hourly GSI EnKF with RPF/HRRR data stream (except satellite data and Mesonet1 data), a one hour EnKF cycling with radar data at 15 min interval, and a 12-member ensemble forecast of 60-h starting 0000 UTC over the same CONUS domain as 3DVAR-based SSEF
- 3D/4D visualization experiment



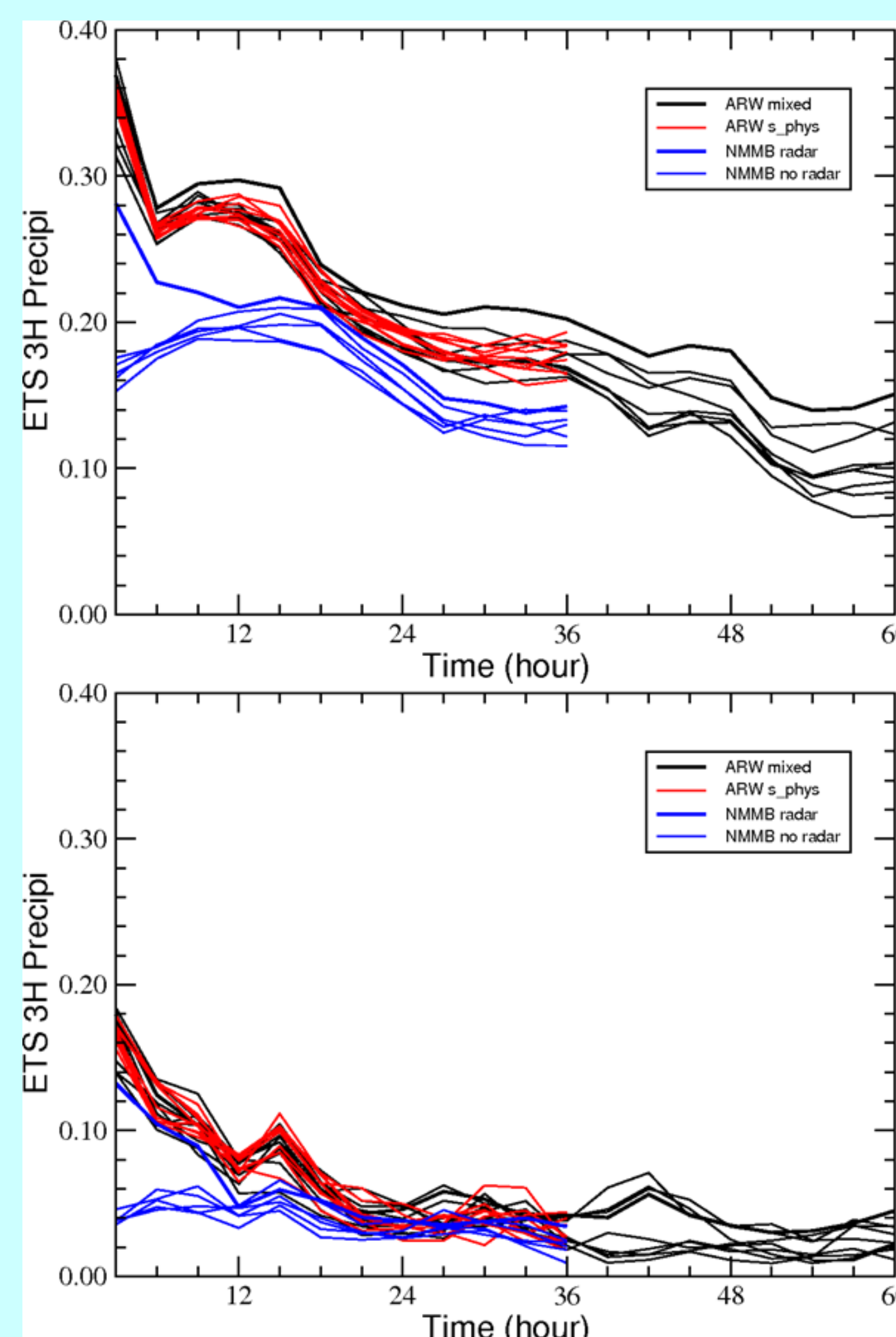
ETS of 3-h accumulated precipitation ≥ 0.01 inch (top) and 0.5 inch (bottom) from all ARW members, averaged over all 2016 CAPS SSEF forecasts initiated at 0000 UTC.

Sub-ensembles

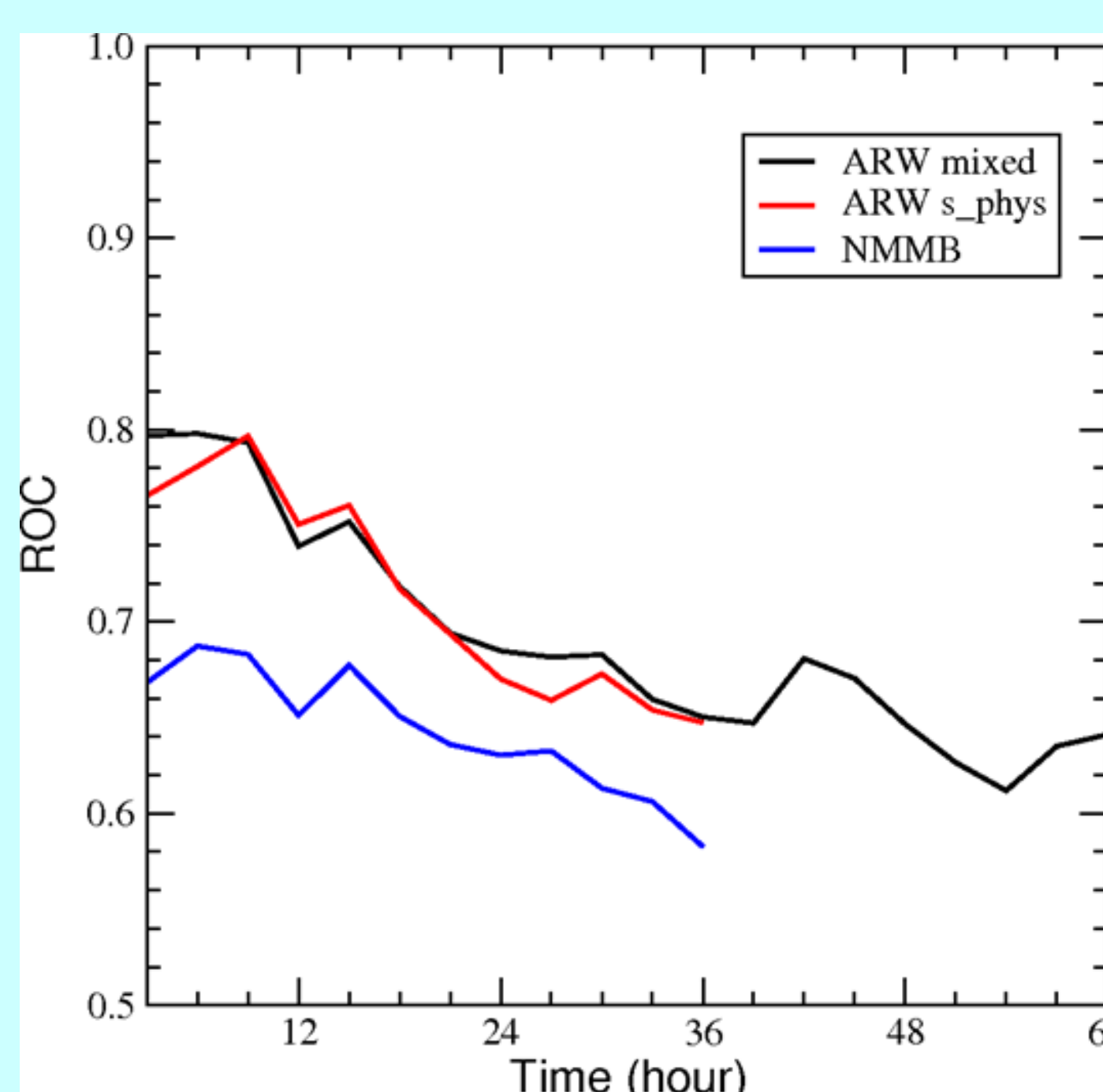
Sub-ensemble 1: ARW (9) mixed

Sub-ensemble 2: ARW (9) single physics

Sub-ensemble 3: NMMB (6) members



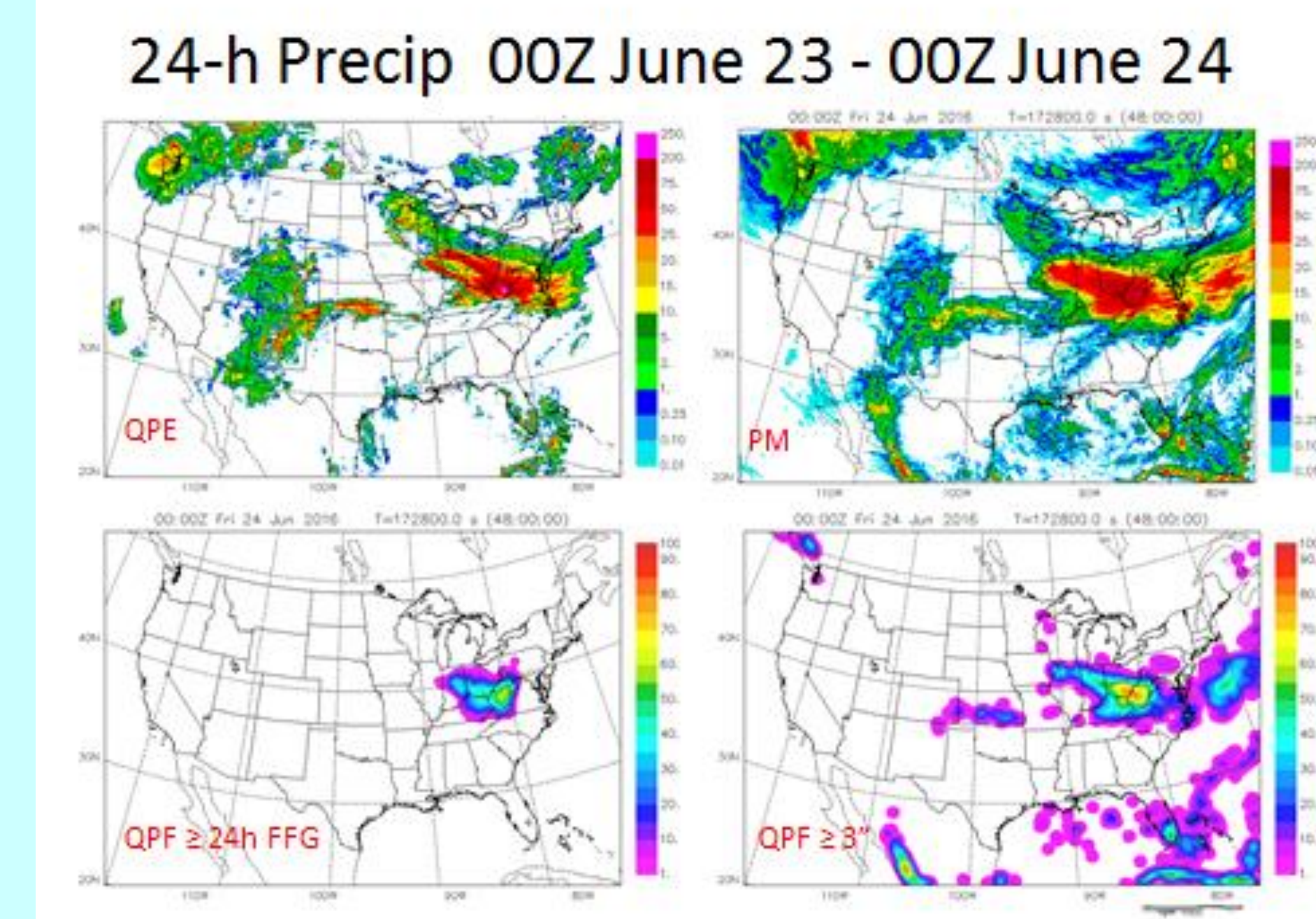
ETS of 3-h accumulated precipitation ≥ 0.01 inch (top) and 0.5 inch (bottom) from three sub-ensembles, averaged over all 2016 CAPS 3DVAR-based SSEF forecasts initiated at 0000 UTC.



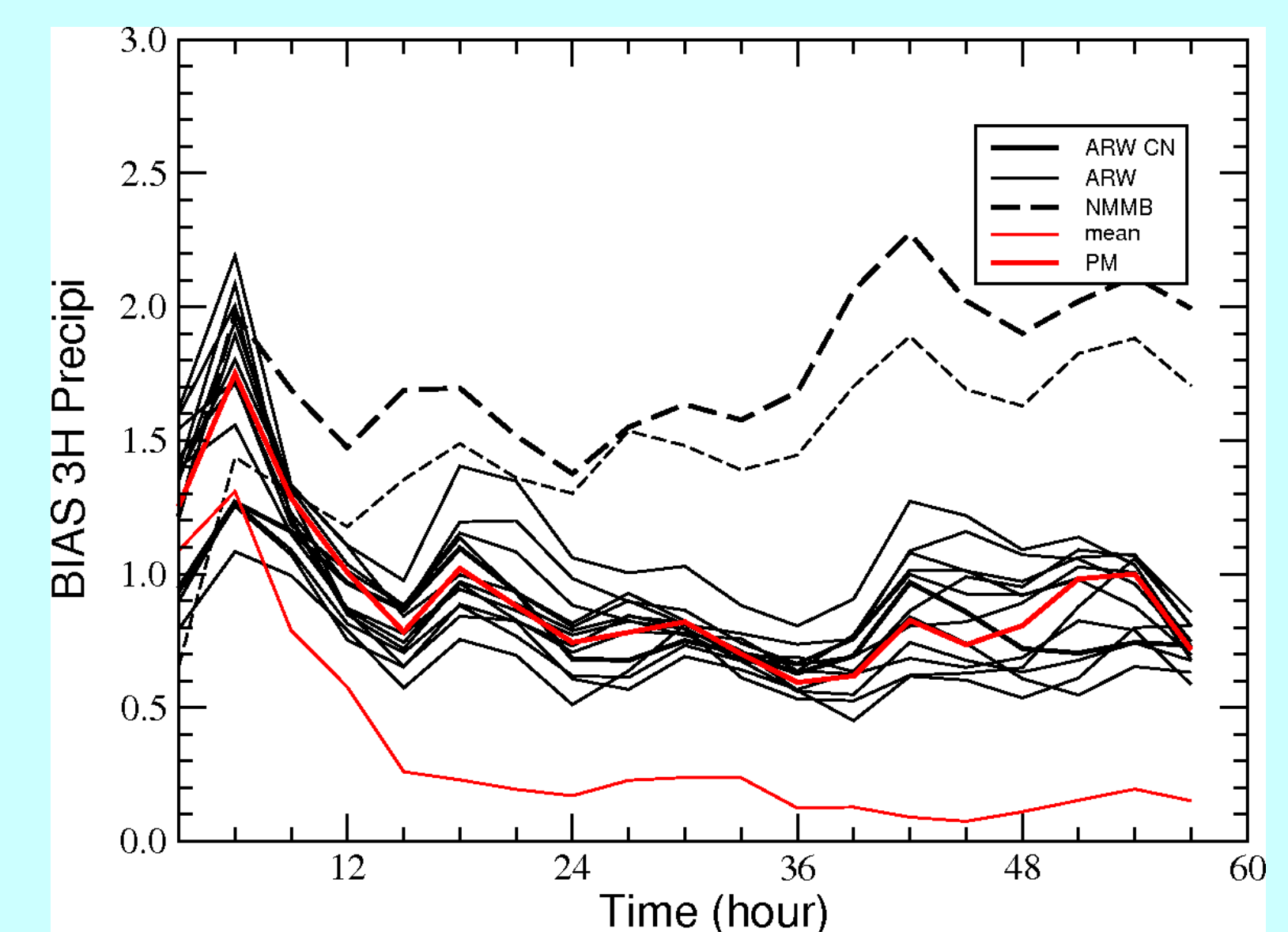
ROC areas for the 3-hourly accumulated precipitation ≥ 0.5 inch for the three sub-ensemble groups, over all 2016 CAPS 3DVAR-based SSEF forecasts

CAPS SSEF for HMT FFaIR 2016

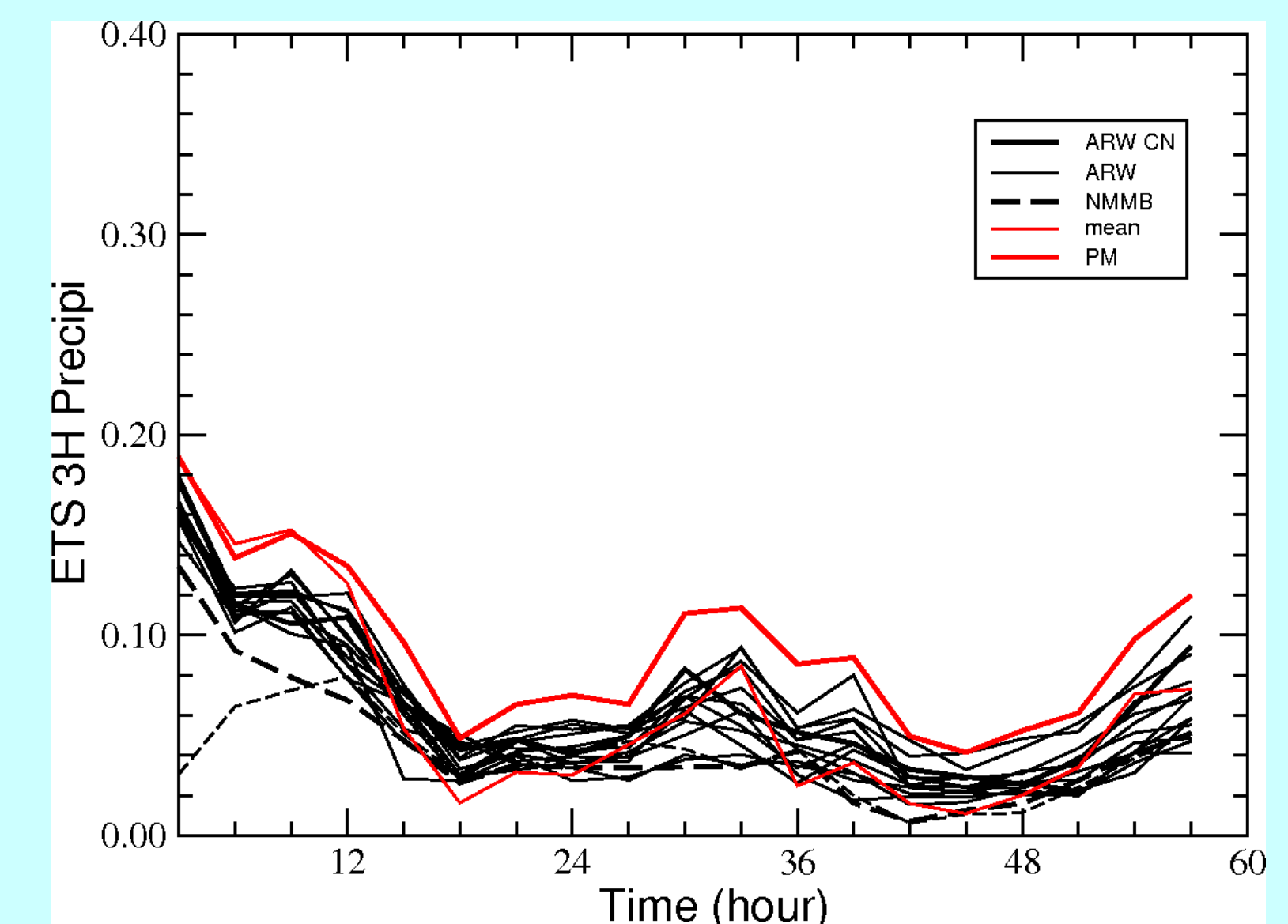
2016 West Virginia Flood Case



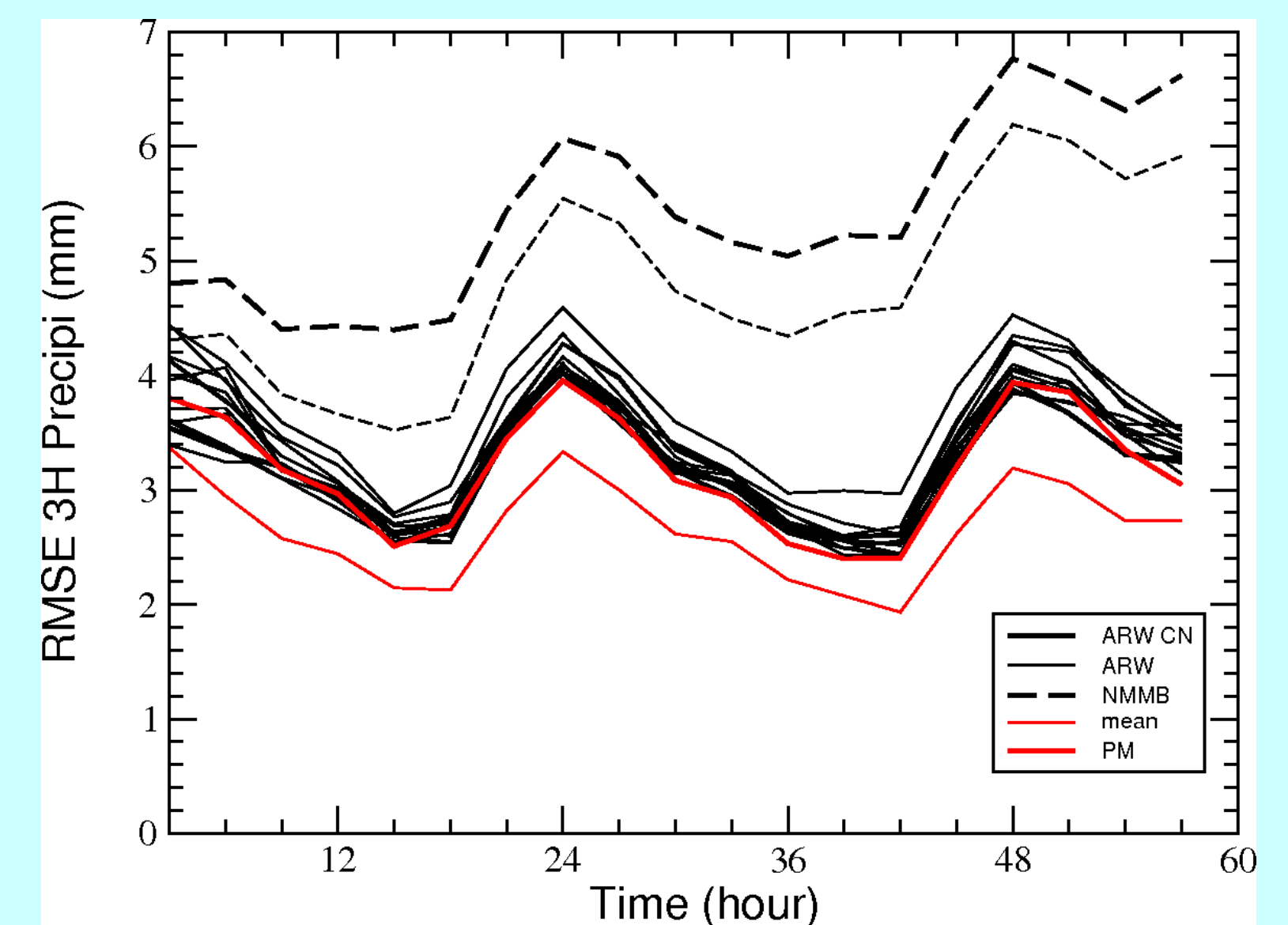
QPF Verification for HMT period



BIAS of 3-h accumulated precipitation ≥ 0.5 inches for the 15-member 3DVAR-based SSEF forecasts started at 0000 UTC



ETS of 3-h accumulated precipitation ≥ 0.5 inches for the 15-member 3DVAR-based SSEF forecasts started at 0000 UTC



RMSE of 3-h accumulated precipitation for the 15-member 3DVAR-based SSEF forecasts started at 0000 UTC

West Virginia Flash Floods

