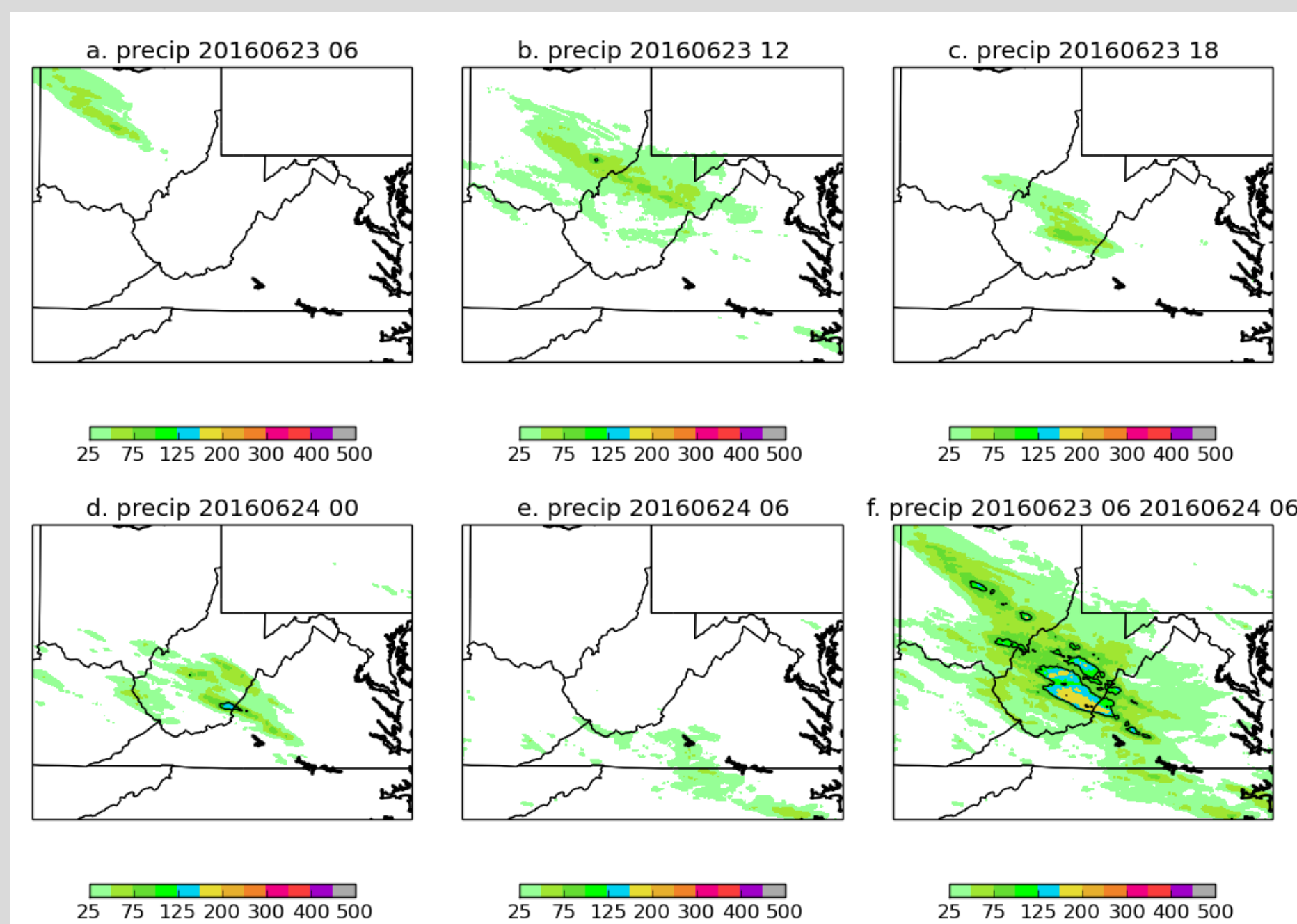


Overview

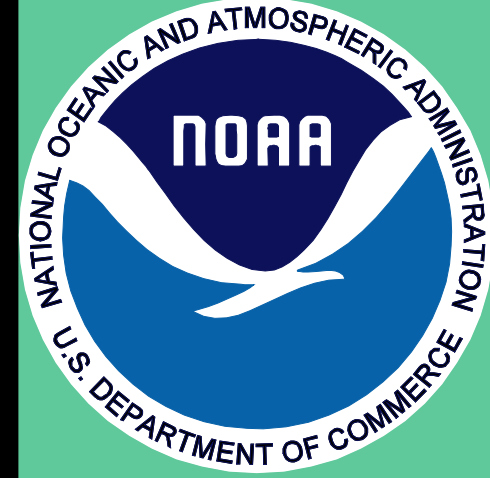
- Historic Flooding in West Virginia 23 June 2016. Focus of extreme rainfall over West Virginia
- Classic Maddox Frontal rainfall event and this pattern was well predicted by the larger scale models and ensemble forecast systems
- Large scale models had the pattern so they contained a useful QPF signal
- Convective allowing models (CAMs) had more refined forecasts and these forecasts had higher QPF amounts than the larger scale forecast systems
- CAMs showed good signals for the general area for heavy convective rainfall and thus the potential for flooding. Not perfect but useful guidance

Methods

- Large scale pattern from CFSRV2
- Rainfall pattern and return periods
 - Stage-IV QPE
 - NOAA Atlas 40 ARI data
- Software for plotting:
 - GrADS
 - Python/Matplotlib
- Rainfall Plot (Python)
- GEFS and GEFS with M-Climate QPF
- CAMs → NCAR/HRRR/HREF



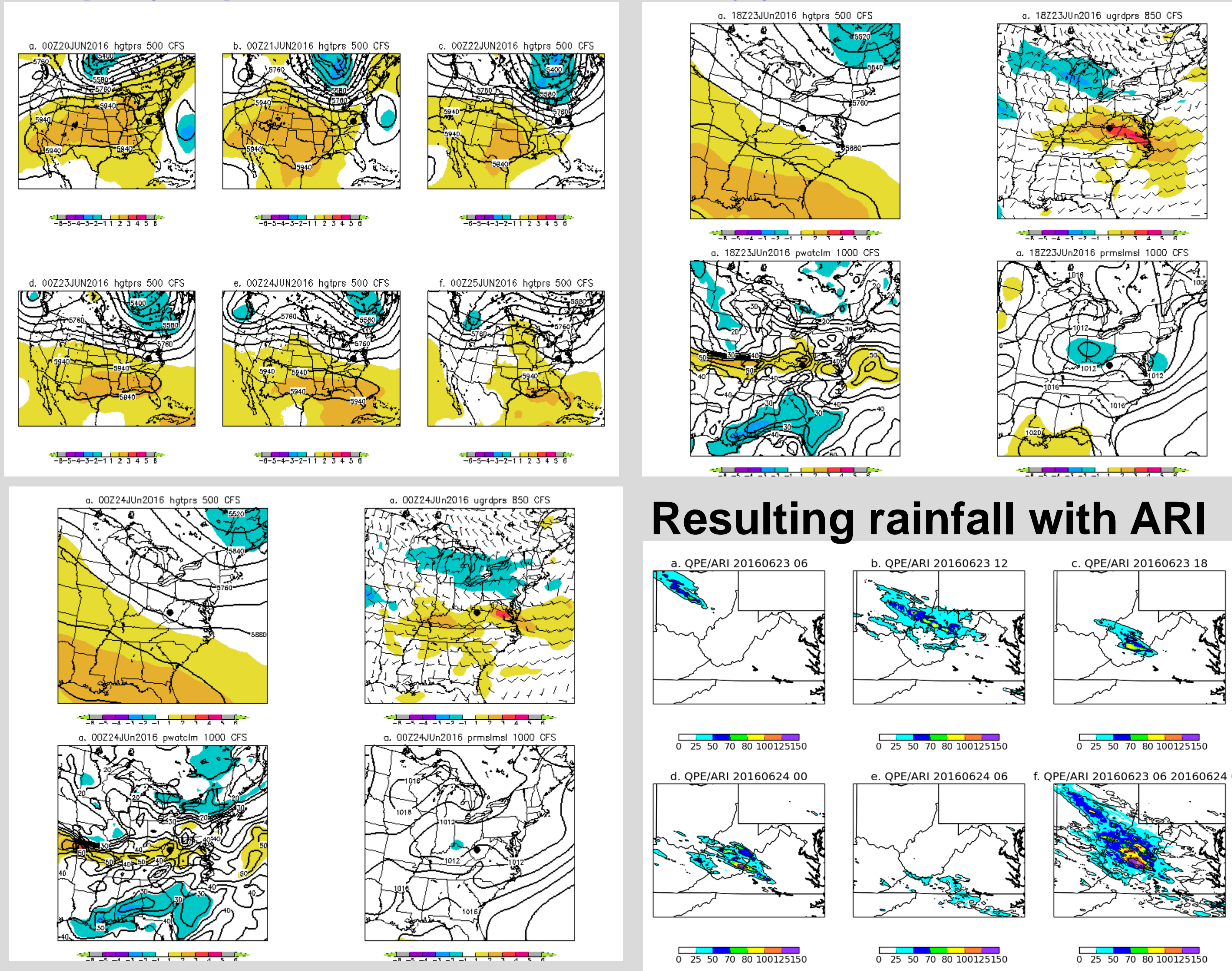
P916: Model Review of the Historic and Devastating floods West Virginia of June 2016



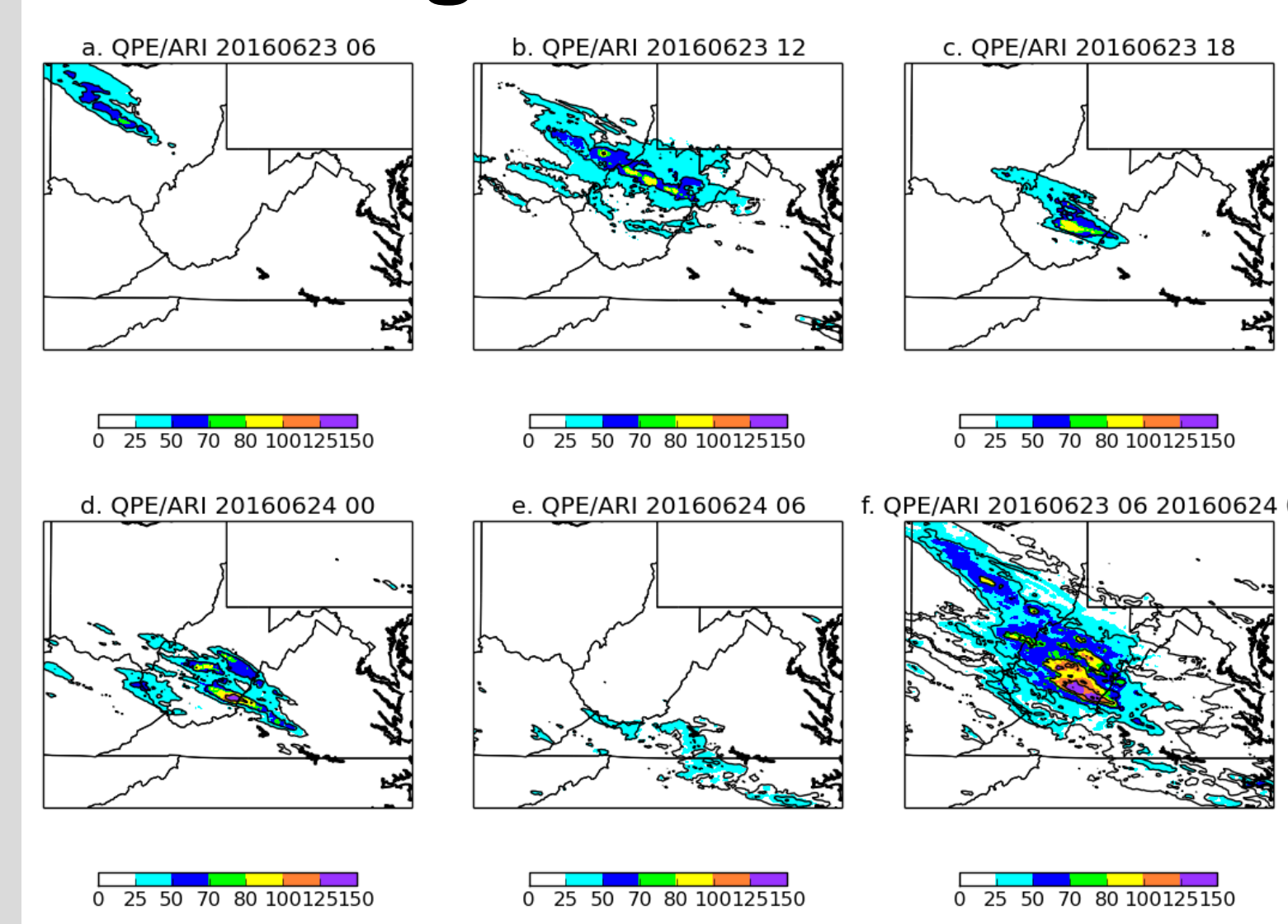
By
Richard H. Grumm
NOAA/National Weather Service, State College, PA 16803



The large Scale Pattern Strong flow over subtropical ridge with a surge of high PW air and southwesterly flow.

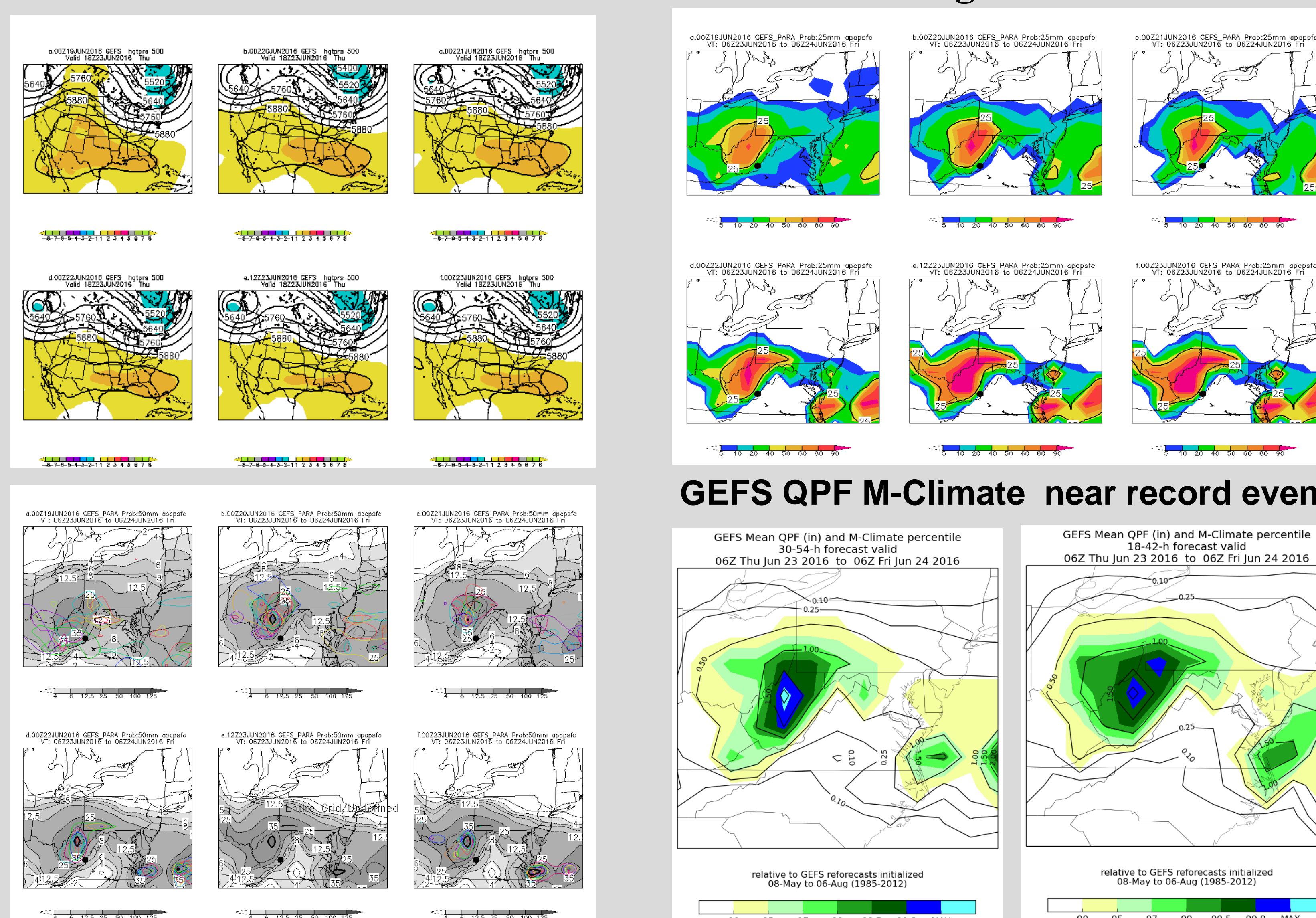


Resulting rainfall with ARI



GEFS had pattern and area of heavy rainfall

Missed the exact location and amounts but useful signal



Convective Allowing Models Showed good signal

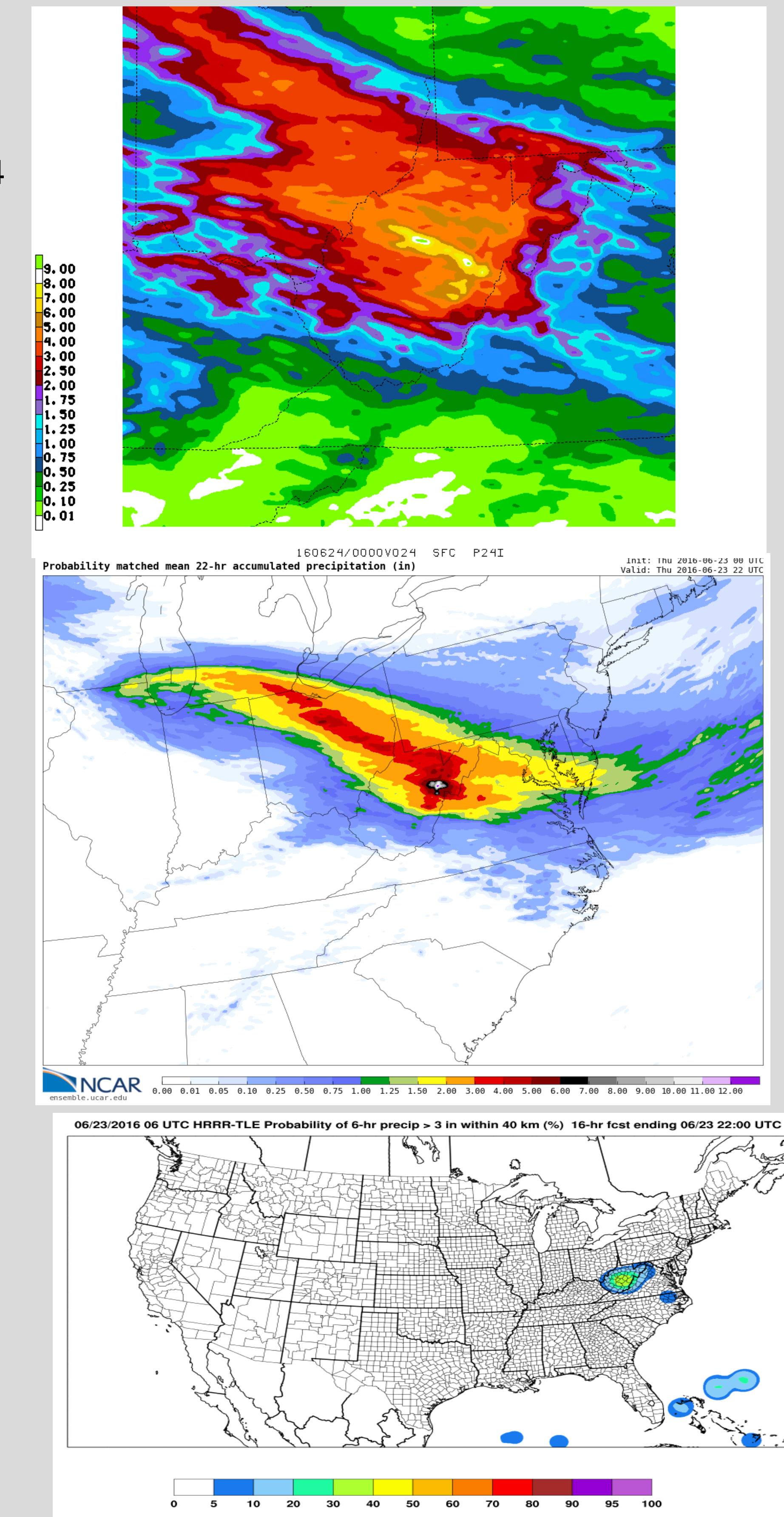
NCEP HREF forecast initialized at 1200 UTC 23 June 2016 showing 24 hour QPF for the 24 hour period ending at 1200 UTC 24 June 2016 showing the matched mean QPF

Many other products produced but limited examples on an AMS poster

NCAR 3km EFS Probability Matched mean QPF in inches

HRRR-TLE Example of 6 or more inches of QPF within 40 km of a point

HRRR has advantage of rapid updates



Summary

- Heavy rain fell in well defined and predictable pattern
- NCEP models forecast heavy rainfall in correct region. GEFS had near record event in model.
- CAMs had refined forecasts with improved location and higher amounts. Showed limited products
- HRRR-TLE shows some promise for evolving rapidly updating CAM based ensemble forecast system.

Takeaways:

- Models can show good signals for record events
- CAMs and CAM ensembles can add value and will only get better
- HRRR-TLE and NCAR show great promise for improved forecasts of stronger forced convective based flood events.

