OHRFC Verification Case Study

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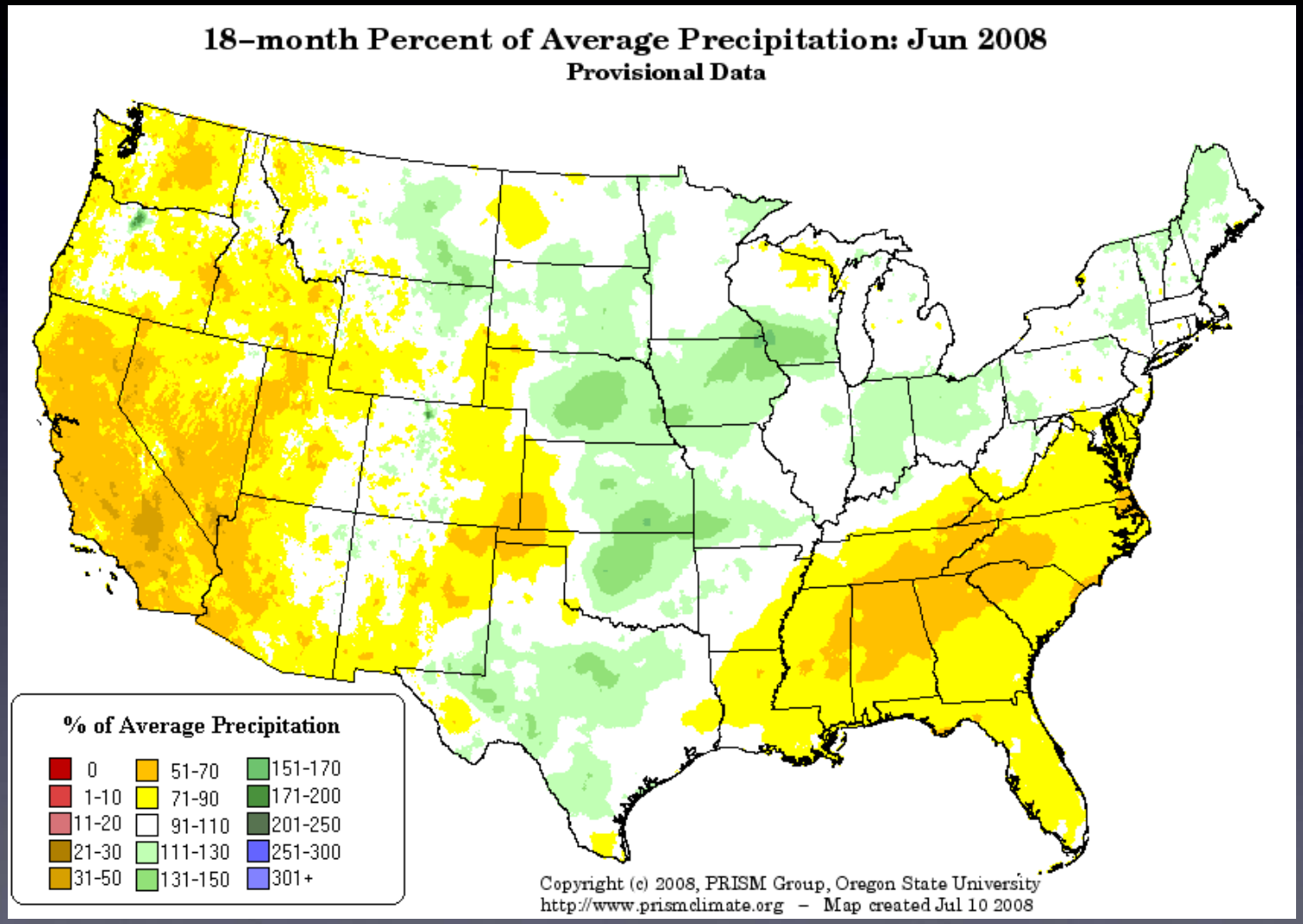
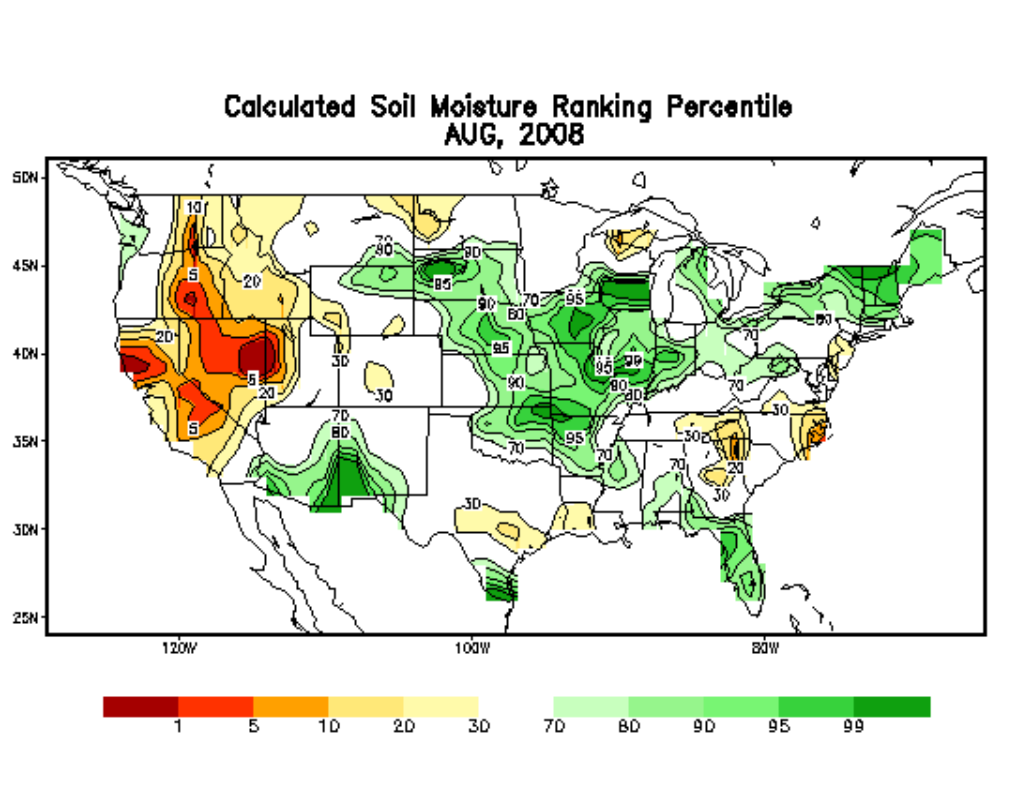
What's covered?

- What's the value of QPF?
- What's the value of run-time MODs?
- Who's QPF is better: HAS or HPC?
- Verification differences across forecast points.

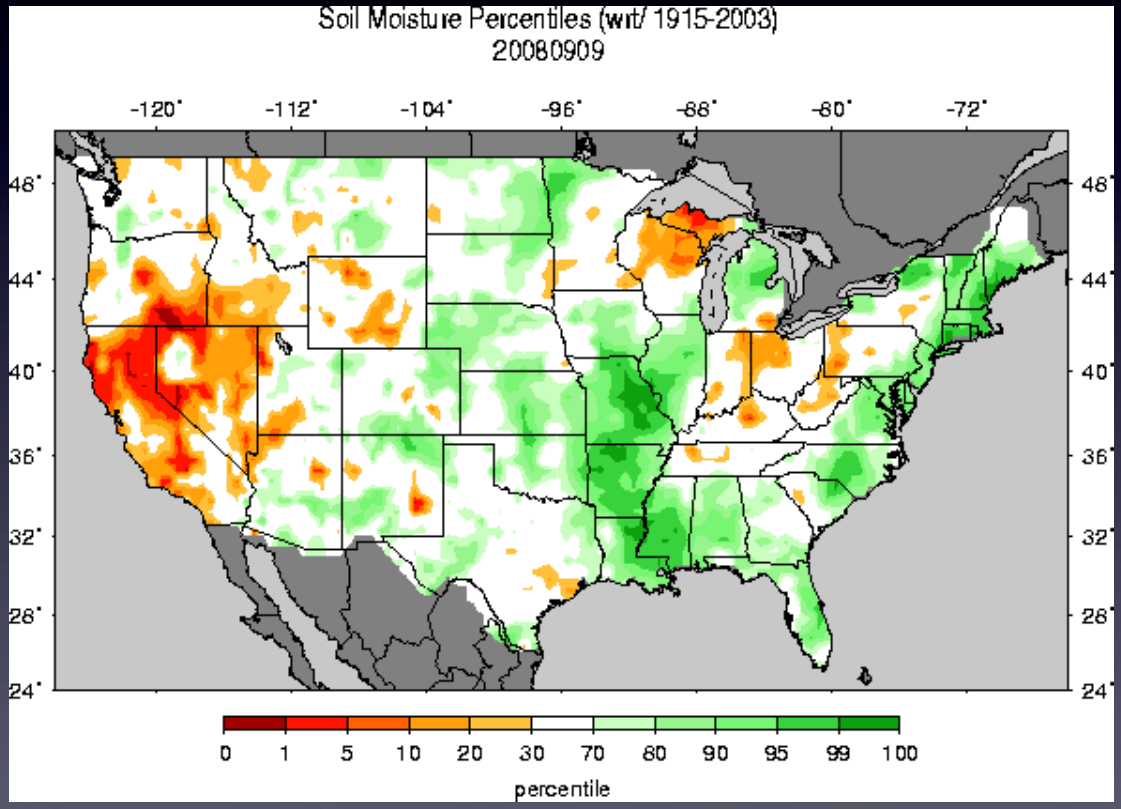
Precipitation Anomalies



CPC Soil Moisture Percentile



University of Washington
VIC-CPC soil moisture percentiles



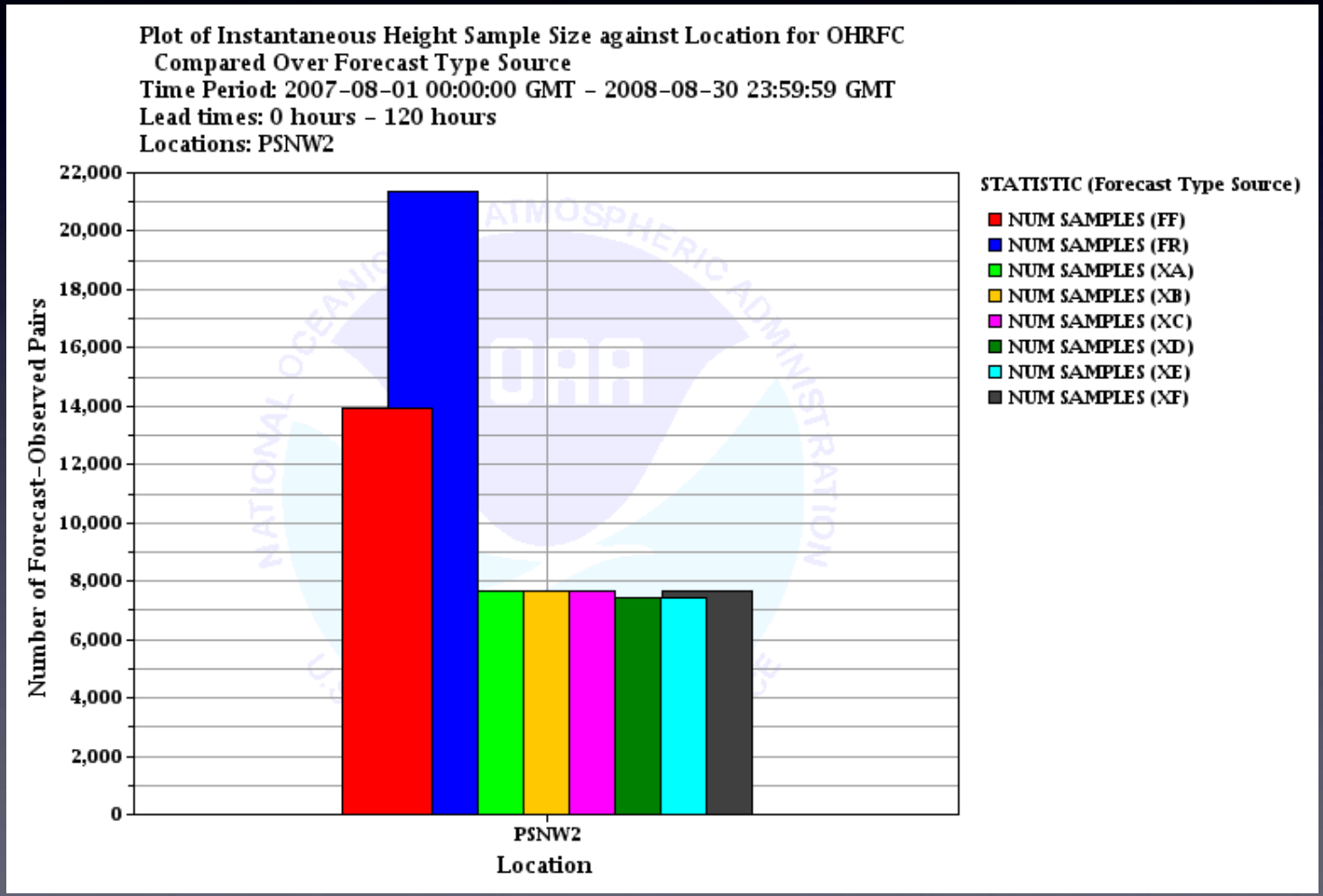
Methodology

- 6 parallel, non-operational batch OFS model runs; once daily on Dell-5
  - No MODs, no QPF
  - No MODs, with HPC QPF
  - No MODs, with HAS QPF
  - With MODs, no QPF
  - With MODS, with HPC QPF
  - With MODS, with HAS QPF
  - Operational Forecast runs with MODs & HAS QPF (directly archived)
- Run PRDUTIL TSDATA command to dump time series data
- Use custom Perl scripts to reformat TS data for Archive Database ingest
- Use IVP for analysis & generate graphics

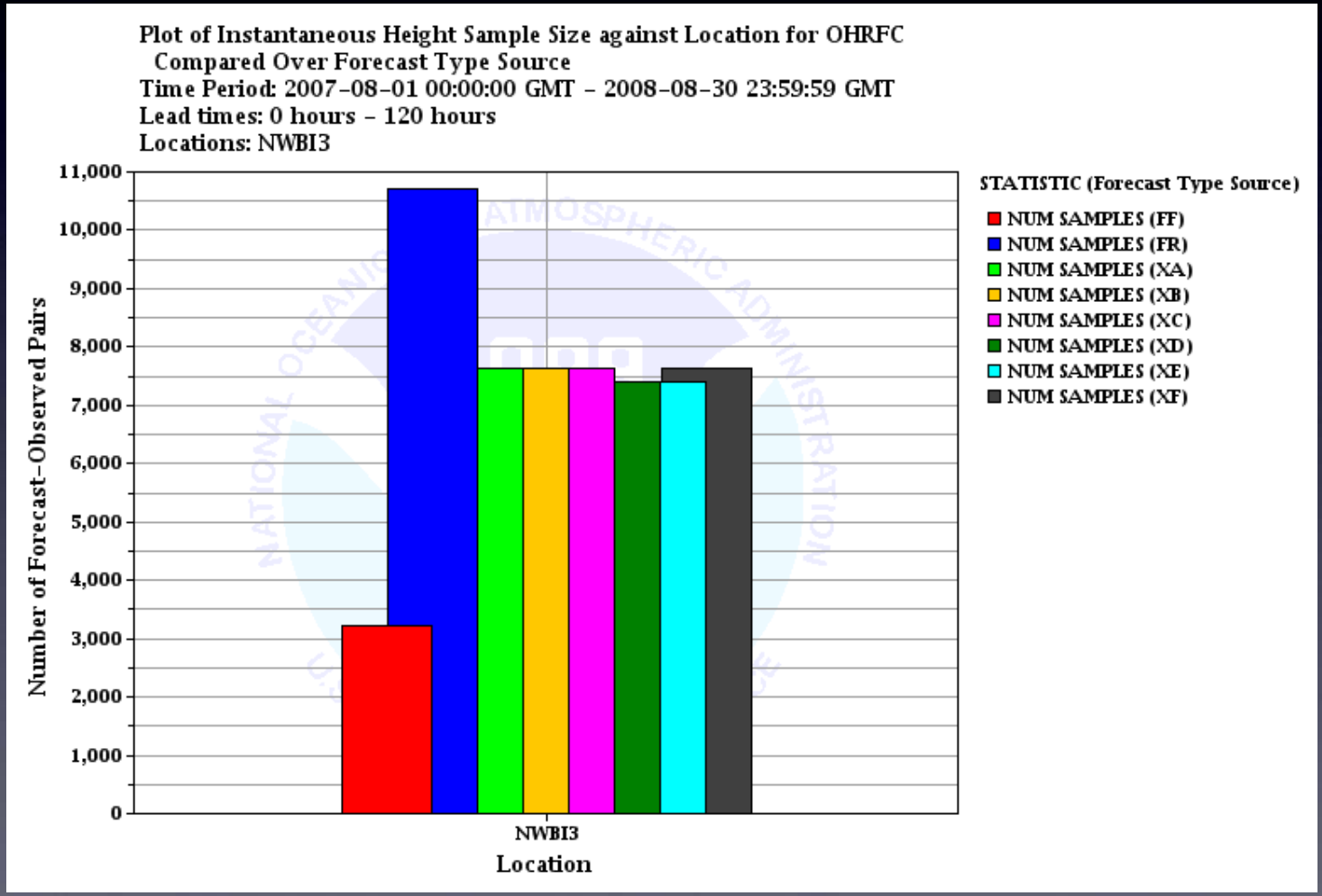
Preliminary comments…

- Limited to 7 basins — range in location, basin size, & basin response characteristics
- Analysis restricted to ~1-year period of concurrent archived OFS forecasts using HPC QPF
- 2 basins (MILO1 & NWBI3) are non-daily forecast points; implies sample size issues
- Some thought exists that OHRFC HAS QPF is not up-to-snuff *wrt* HPC QPF
- Operational Forecast Sample Size ≠ Batch OFS Model Runs with-MODs & with-HAS QPF
- Pittsburgh basins (PTTP1 & PSNW2) run twice daily — more verification pairs

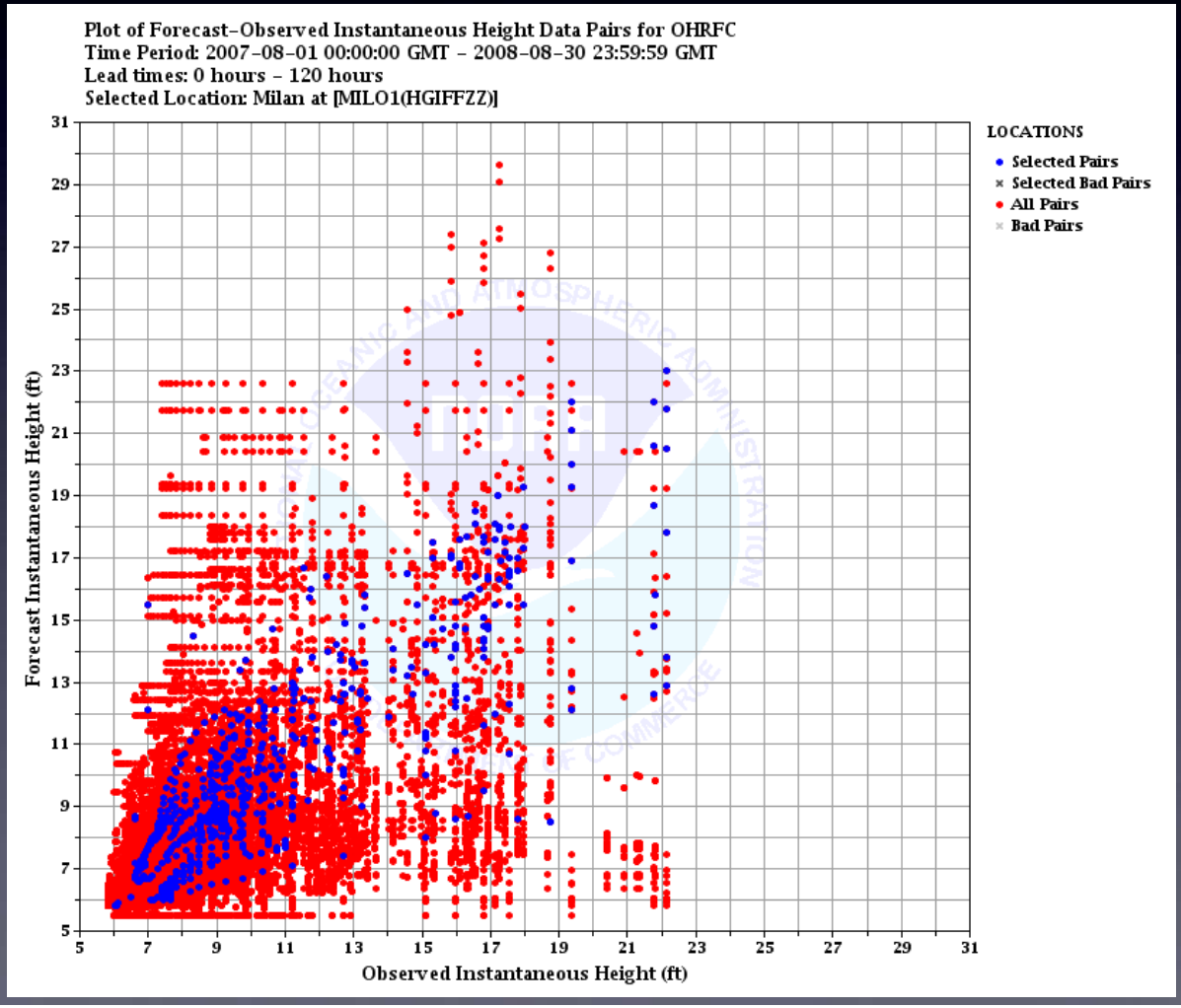
Forecast — Observtion pairs PSNW2



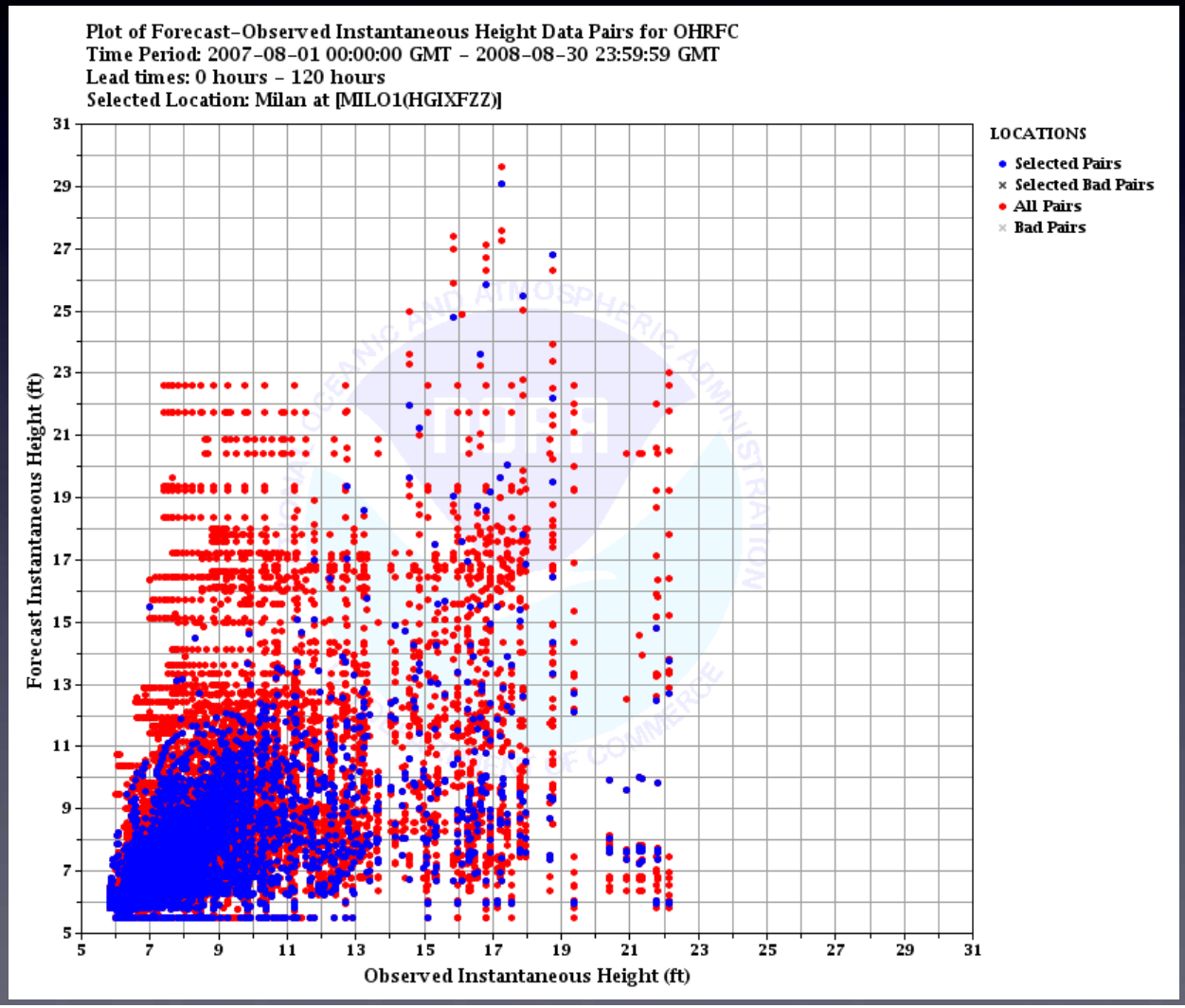
Sample Size
NWBI3 (non-daily)



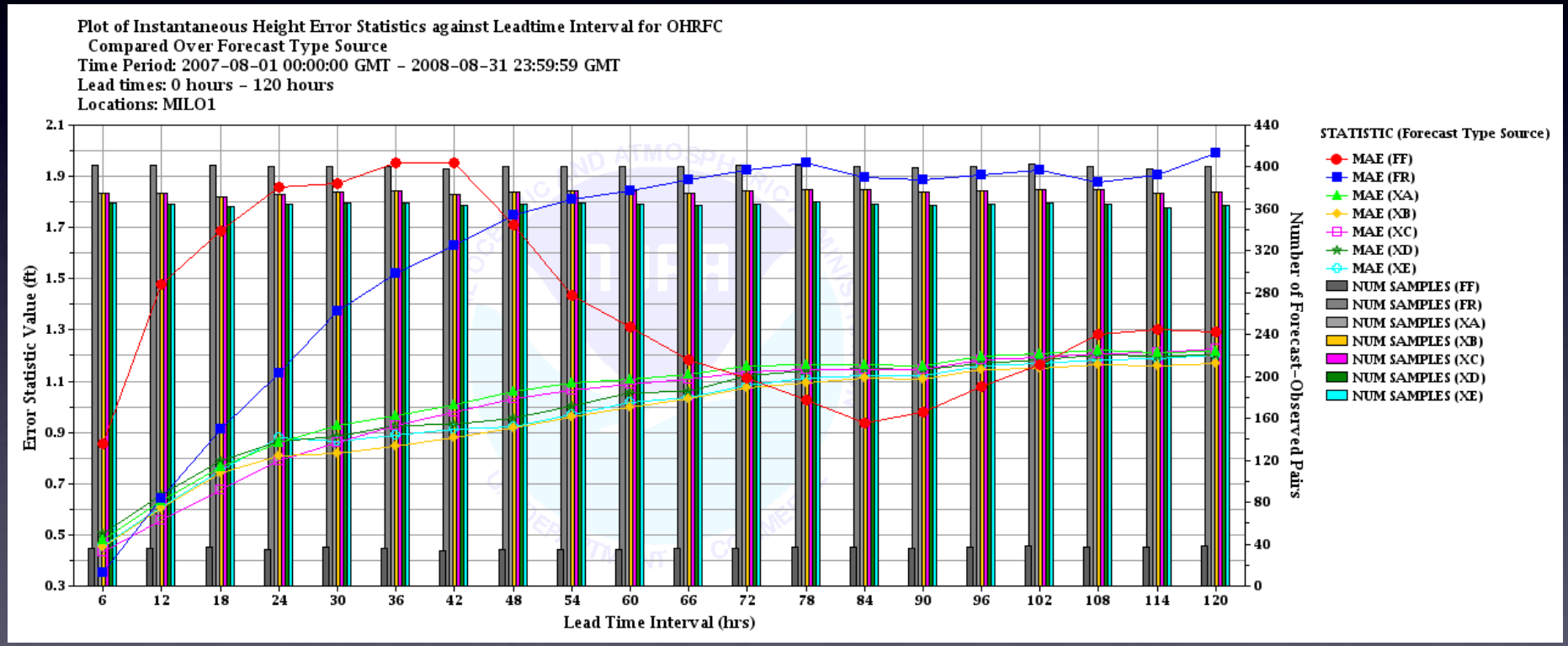
Scatterplot
MILO1 (FF)



Scatterplot MILO1 (XF)

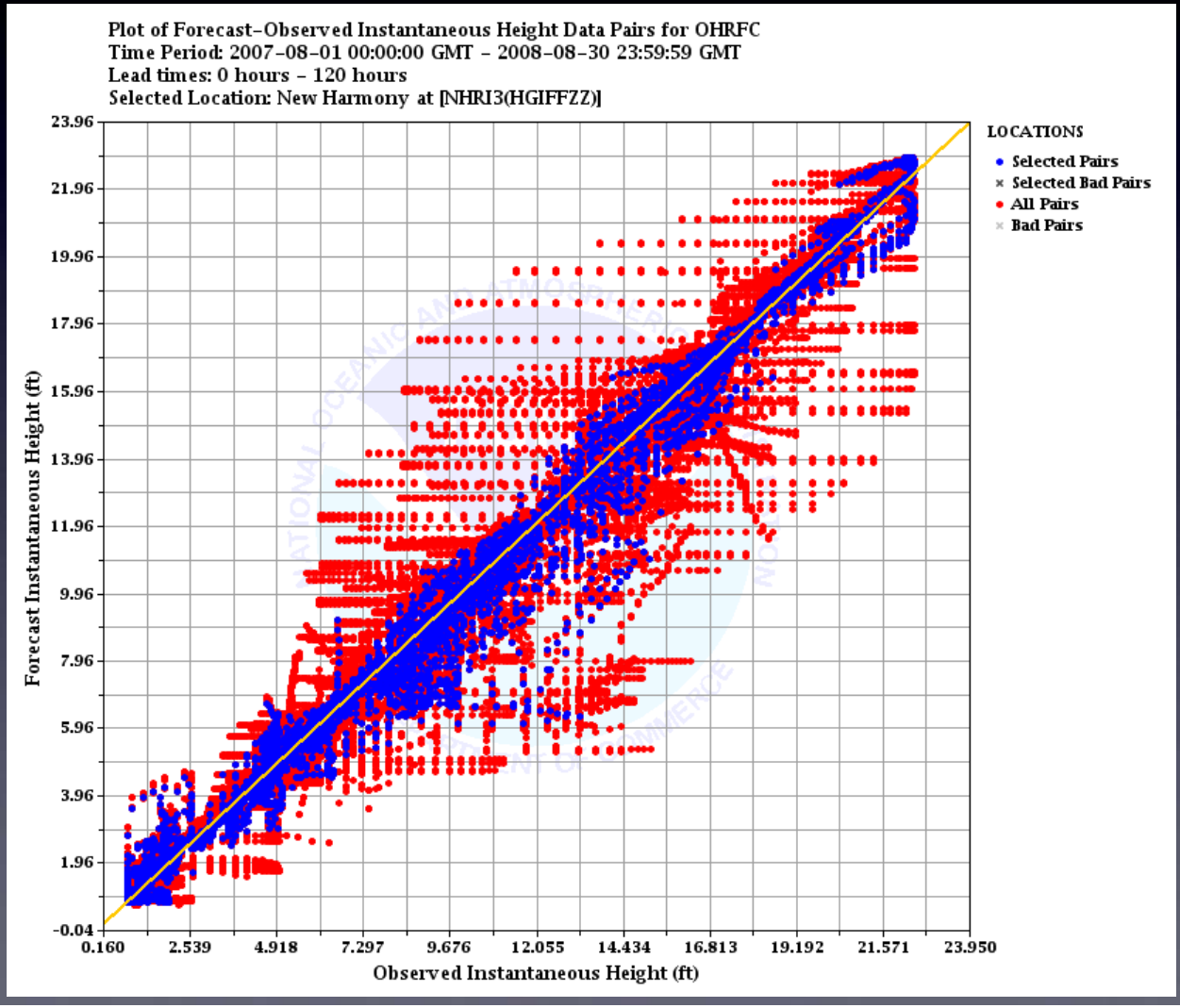


Sample Size
MILO1(non-daily)

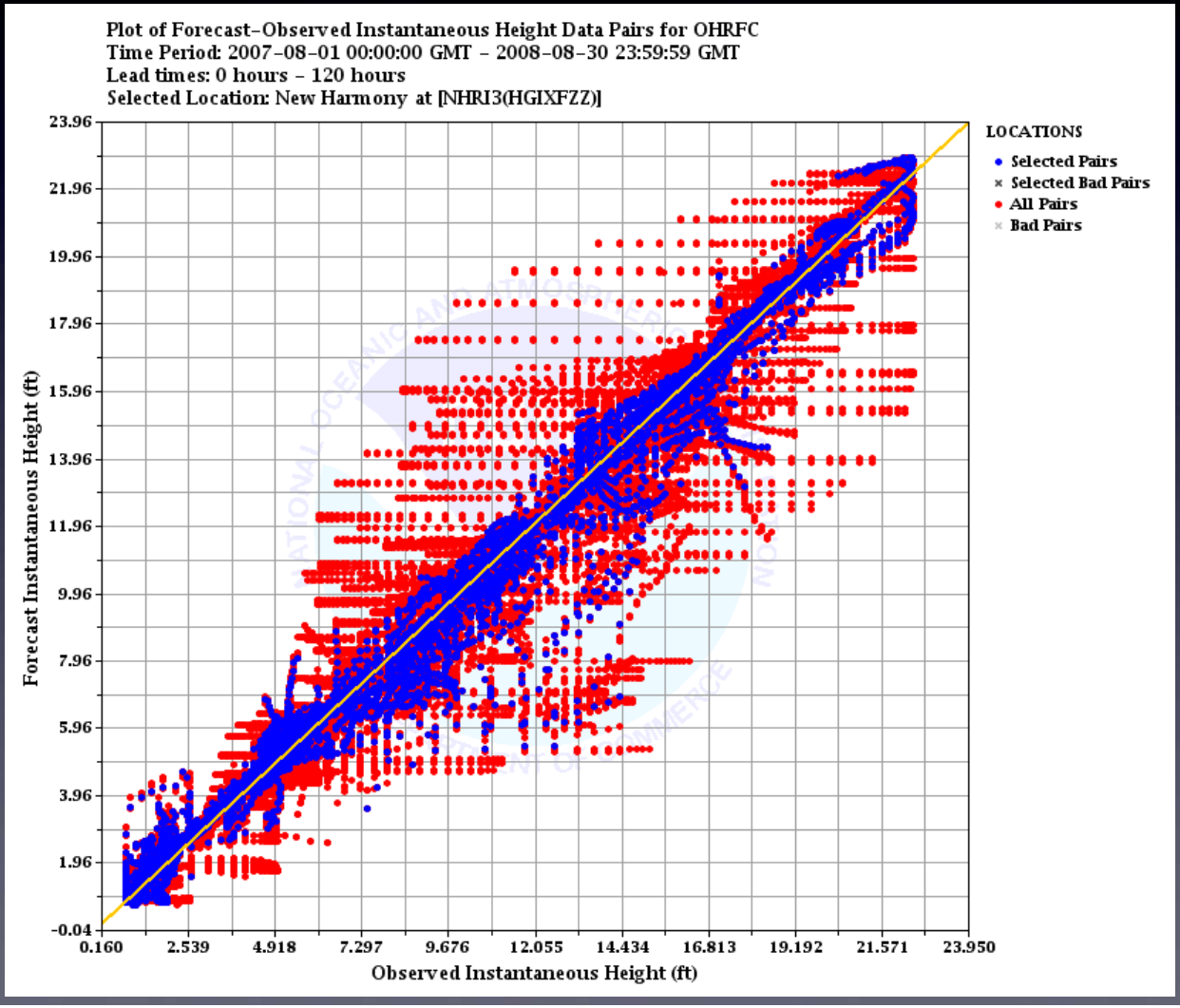


Size matters…

Scatterplot NHRI3 (FF)



Scatterplot
NHRI3 (XF)

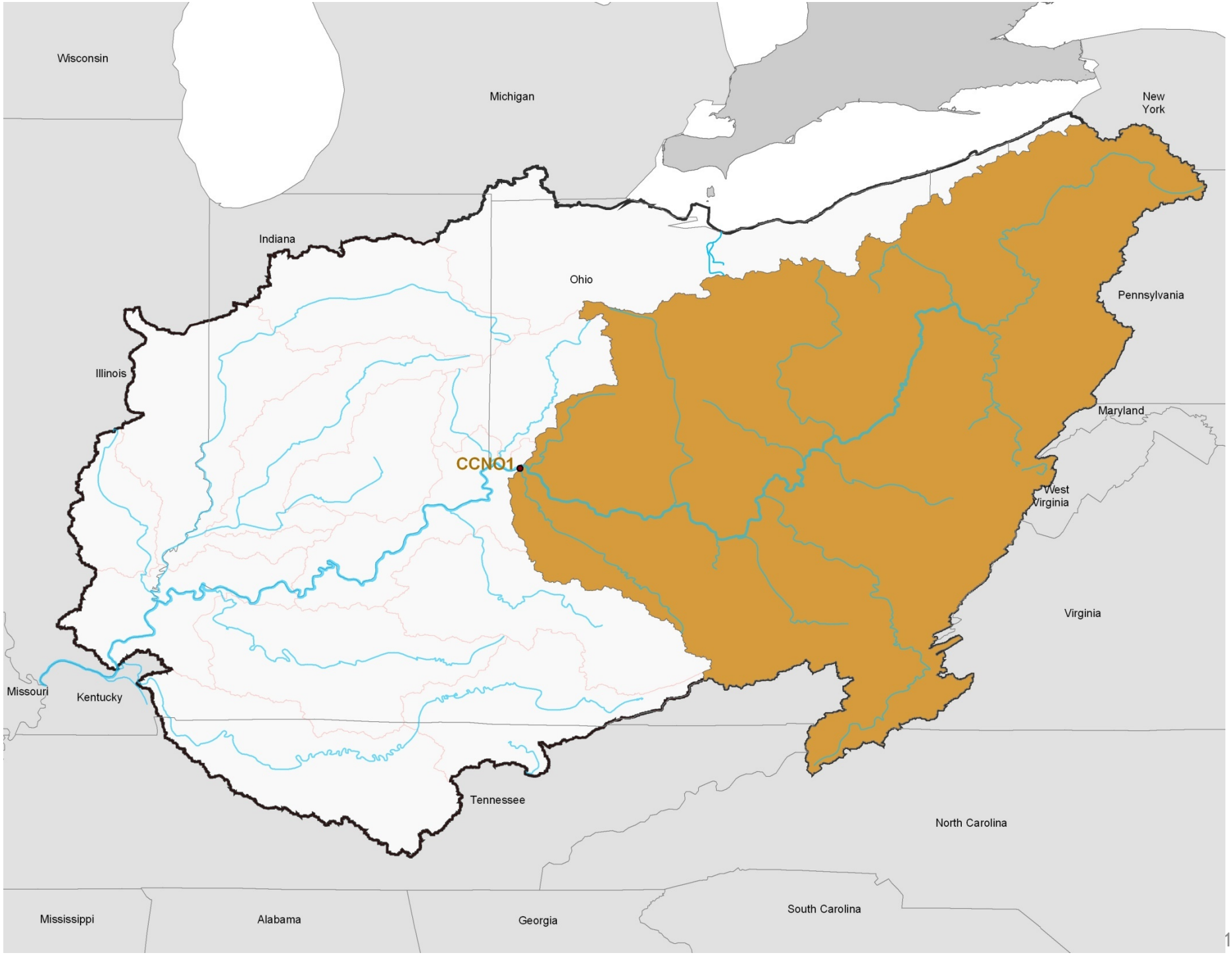


Basins Studied

ID	Forecast Group	Response	Basin Area (mi^2)
MILO1	GTL	fast	371
PSNW2	MNU	fast	722
NWBI3	WHT	medium	4688
LAFI3	WBU	medium	7267
PTTP1	OHW	medium	19101
NHRI3	WBL	slow	29234
CCNO1	OHC	slow	76580


Wisconsin
Michigan
New York
Indiana
Pennsylvania
Illinois
Ohio
Maryland
PSNW2
West Virginia
Virginia
Missouri
Kentucky
Tennessee
North Carolina
Mississippi
Alabama
Georgia
South Carolina


Wisconsin
Michigan
New York
Indiana
Pennsylvania
PTTP1
Illinois
Ohio
Maryland
West Virginia
Virginia
Missouri
Kentucky
Tennessee
North Carolina
Mississippi
Alabama
Georgia
South Carolina


Wisconsin
Michigan
New York
Indiana
Ohio
Pennsylvania
Illinois
Maryland
CCNO1
West Virginia
Virginia
Missouri
Kentucky
Tennessee
North Carolina
Mississippi
Alabama
Georgia
South Carolina

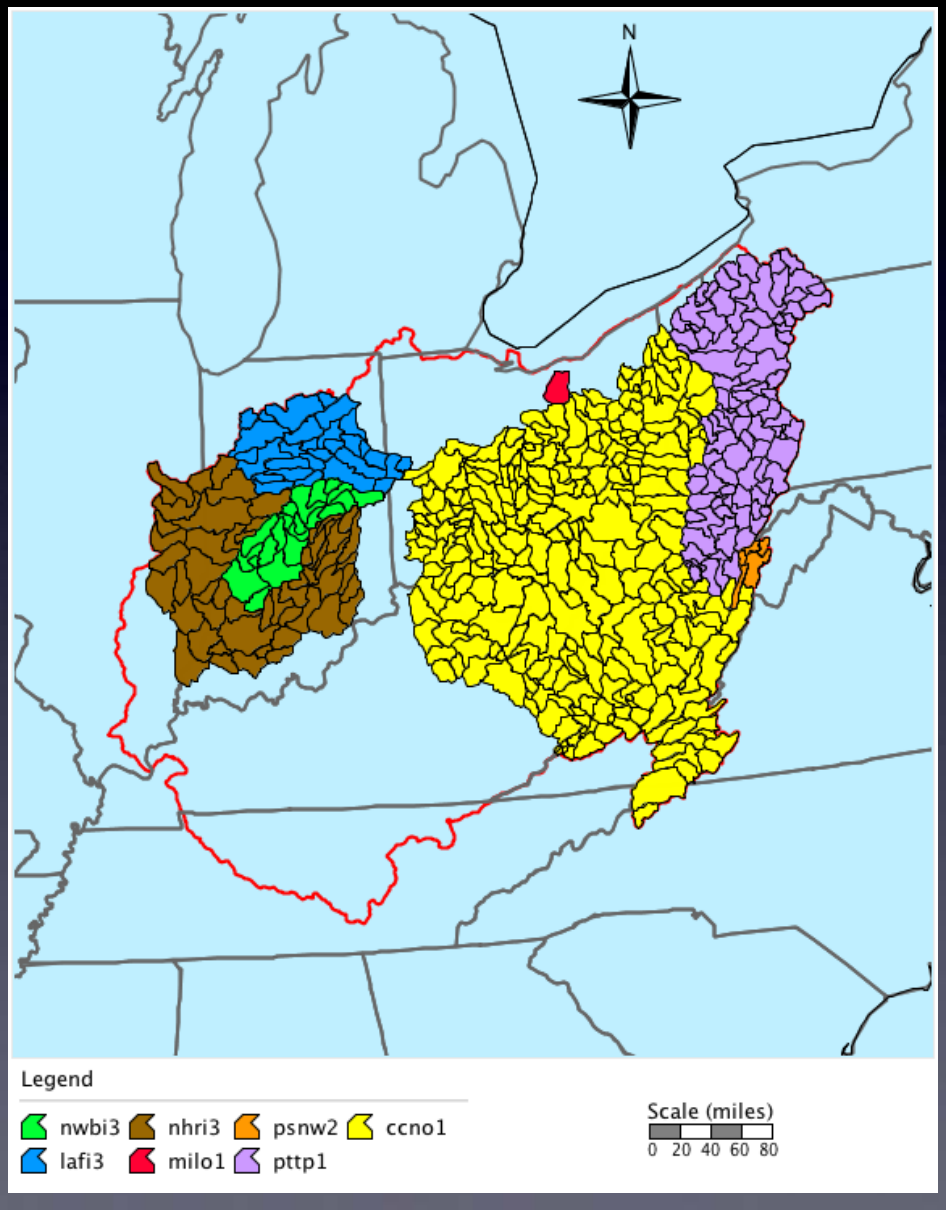

Wisconsin
Michigan
New York
Indiana
MILO1
Pennsylvania
Illinois
Ohio
Maryland
West Virginia
Virginia
Missouri
Kentucky
Tennessee
North Carolina
Mississippi
Alabama
Georgia
South Carolina


Wisconsin
Michigan
New York
Indiana
LAFI3
Pennsylvania
Illinois
Ohio
Maryland
West Virginia
Virginia
Missouri
Kentucky
Tennessee
North Carolina
Mississippi
Alabama
Georgia
South Carolina

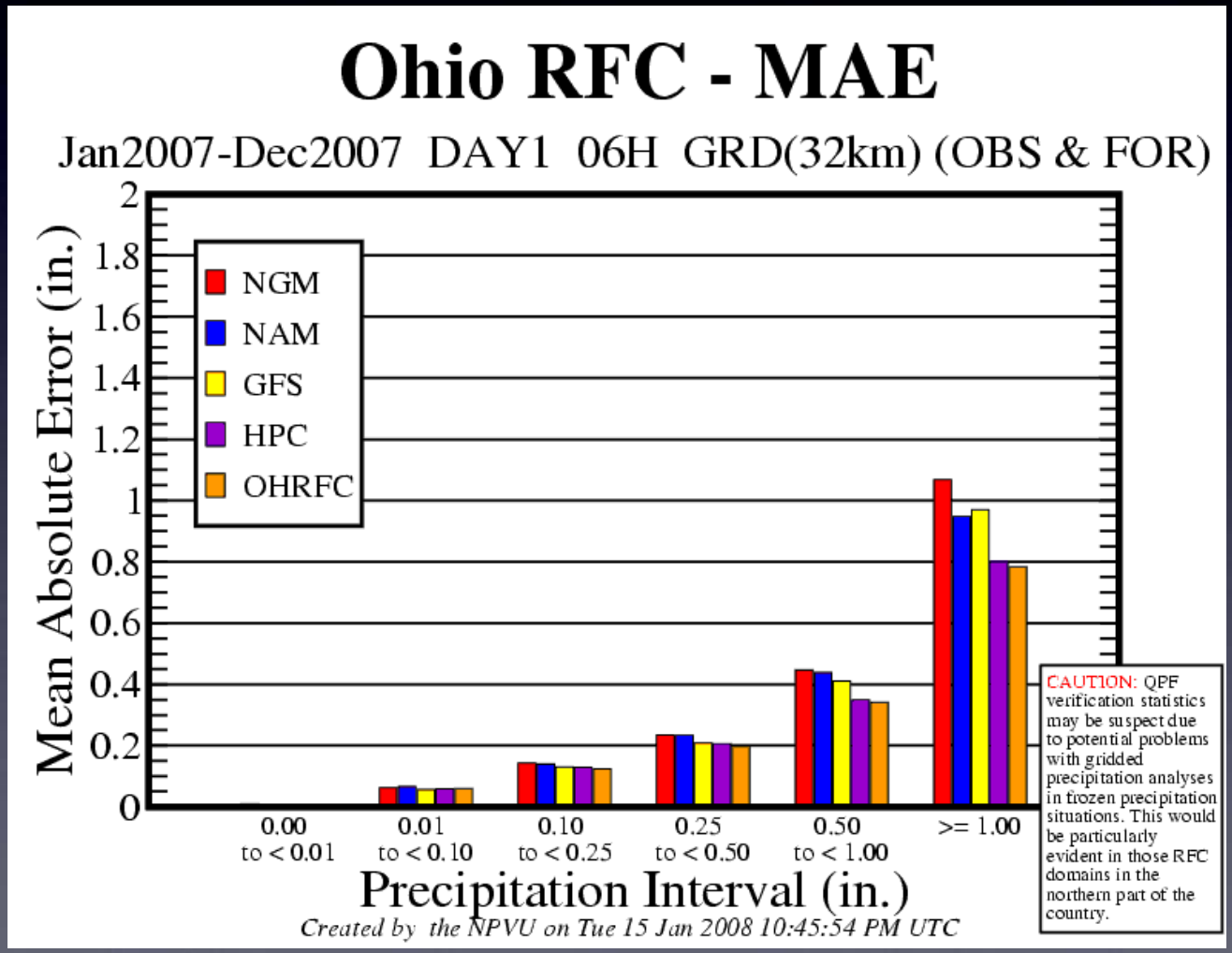

Wisconsin
Michigan
New York
Indiana
Pennsylvania
Illinois
Ohio
Maryland
NWBI3
West Virginia
Virginia
Missouri
Kentucky
Tennessee
North Carolina
Mississippi
Alabama
Georgia
South Carolina


Wisconsin
Michigan
New York
Indiana
Pennsylvania
Illinois
Ohio
Maryland
West Virginia
NHRI3
Virginia
Missouri
Kentucky
Tennessee
North Carolina
Mississippi
Alabama
Georgia
South Carolina

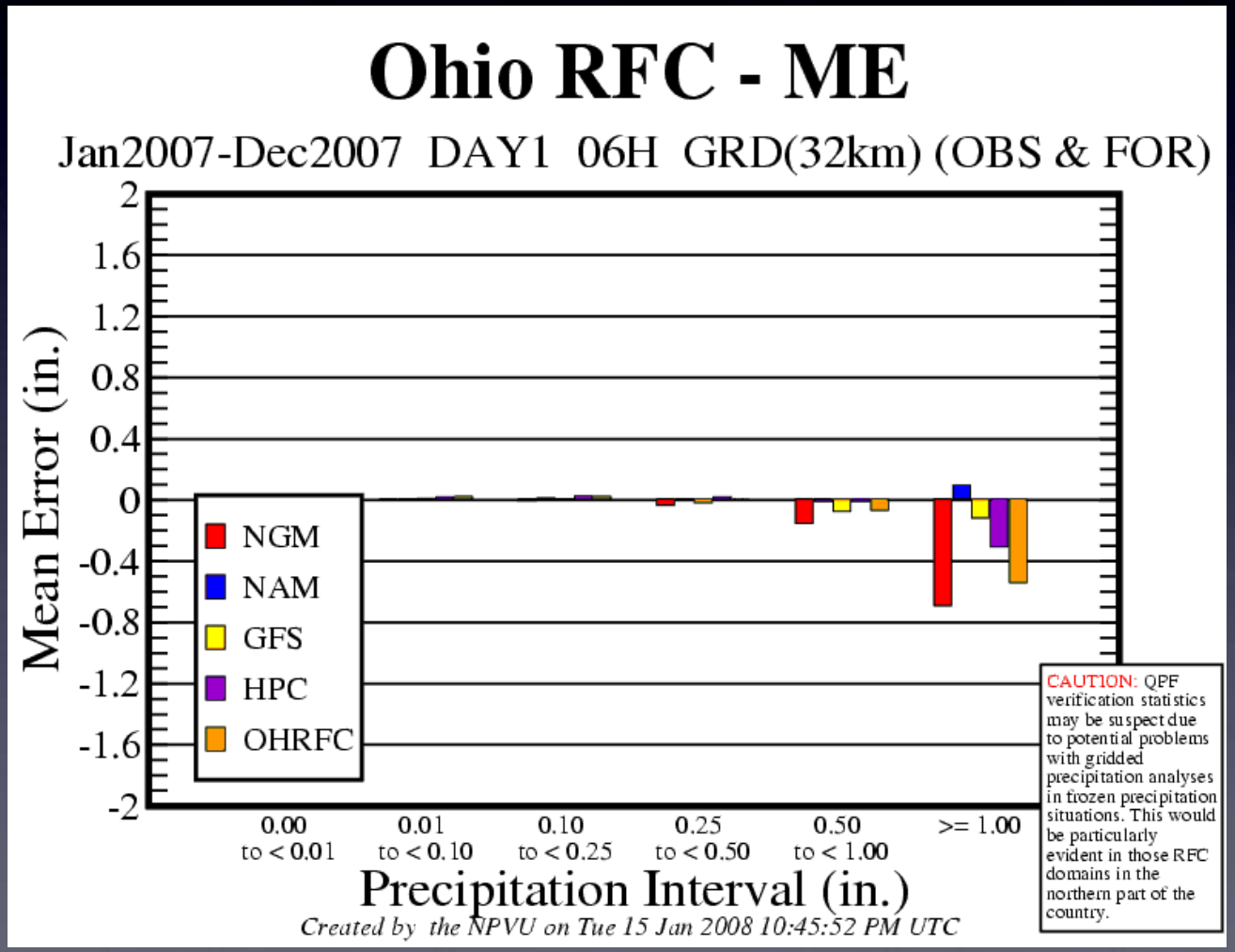
Basin Locations



NPVU Statistics 2007



NPVU Statistics 2007



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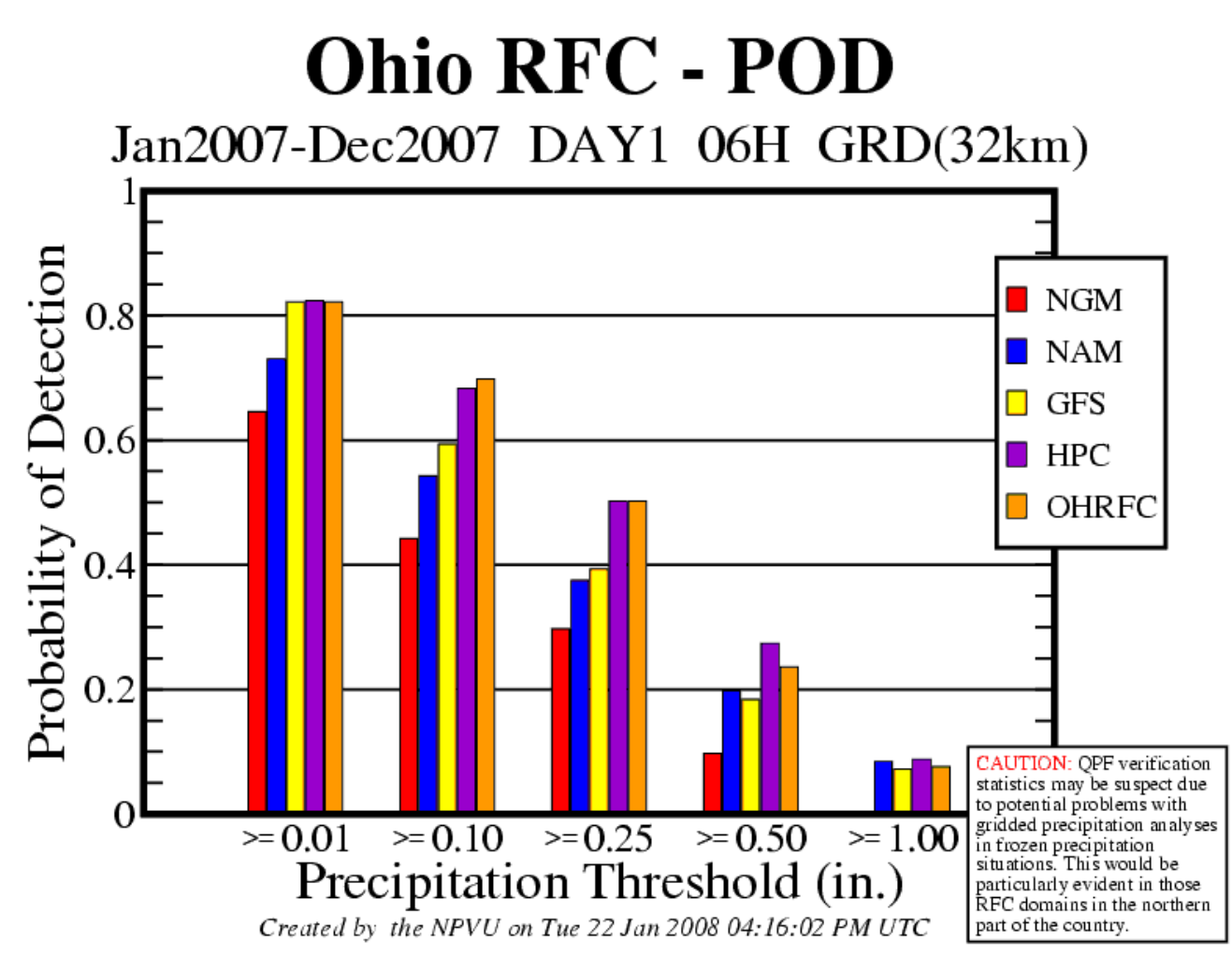

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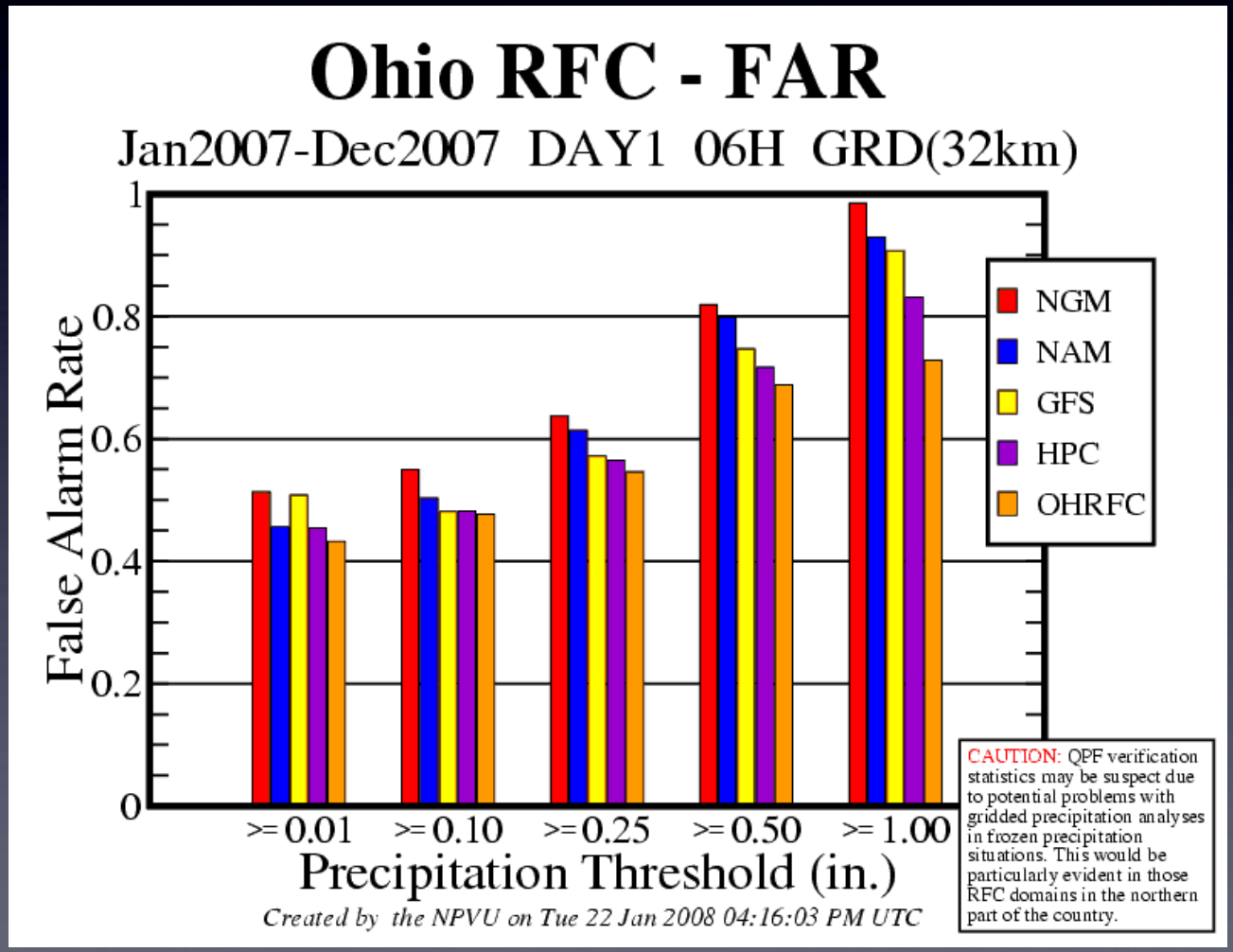
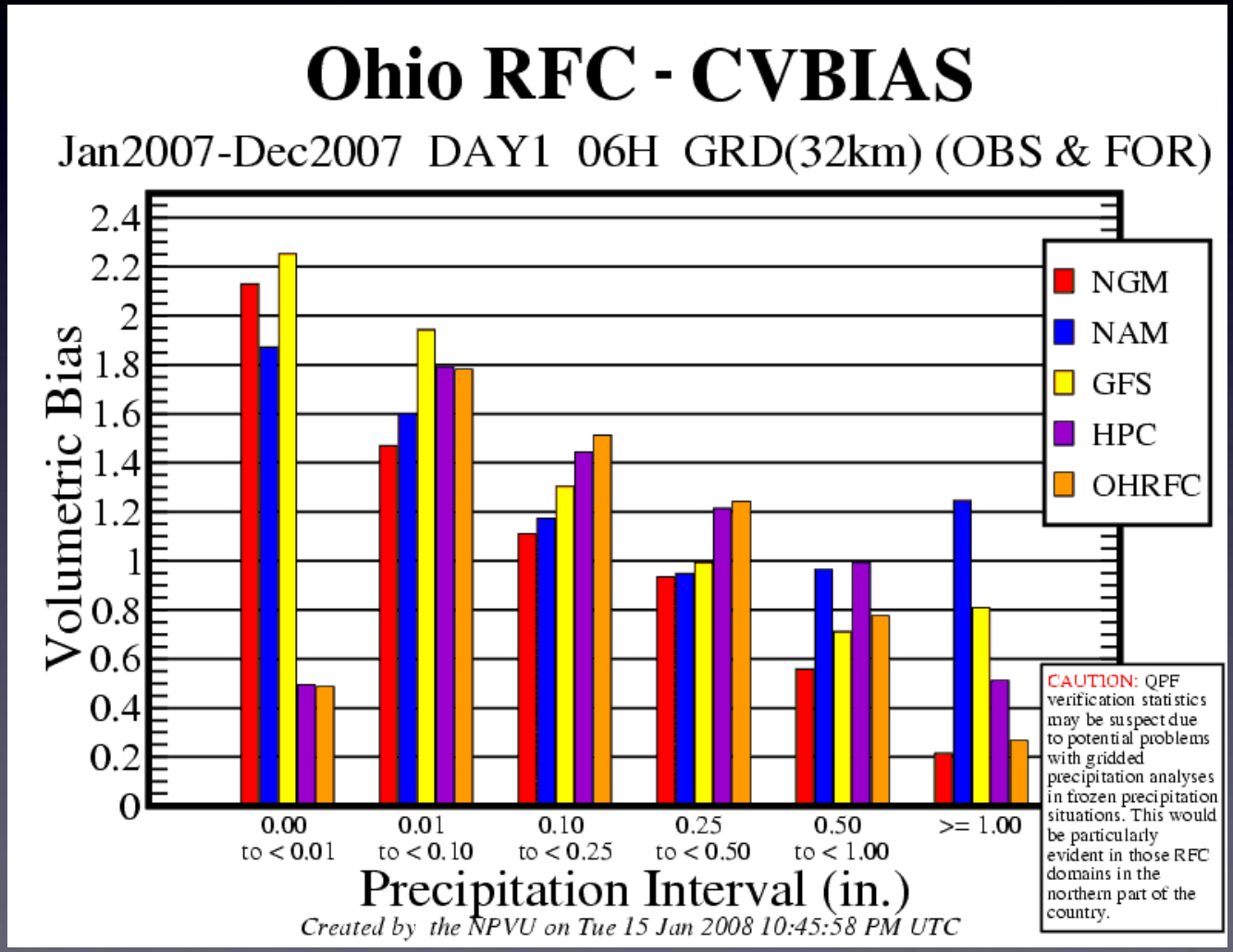


NPVU Statistics 2007



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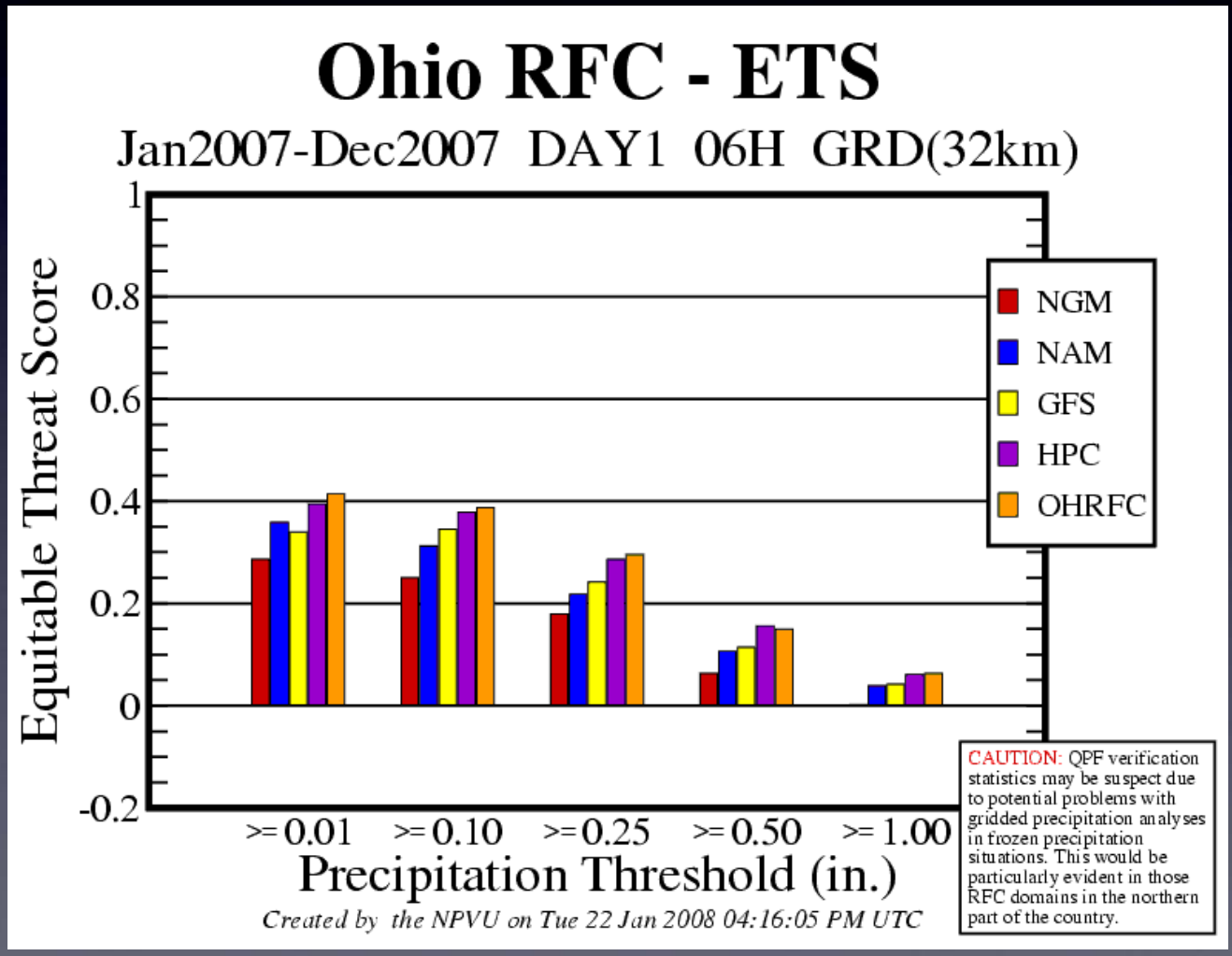
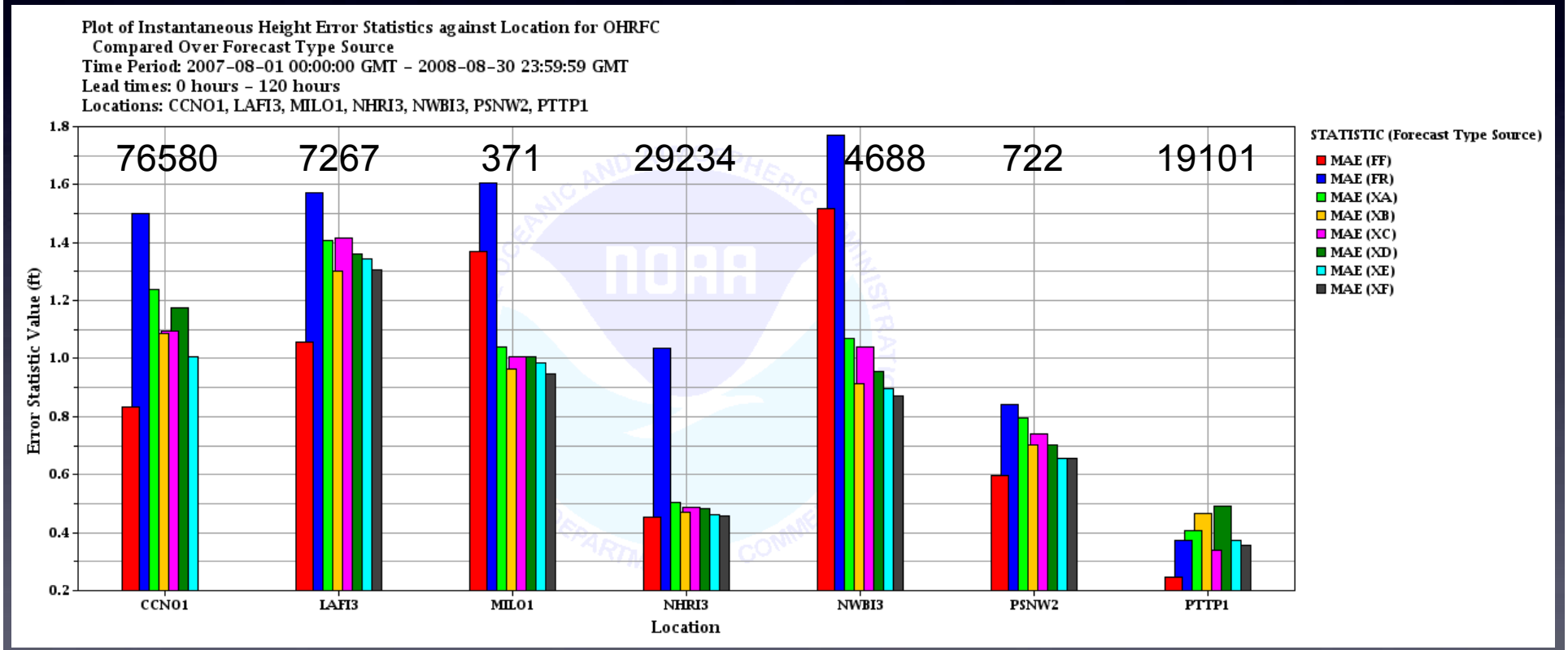


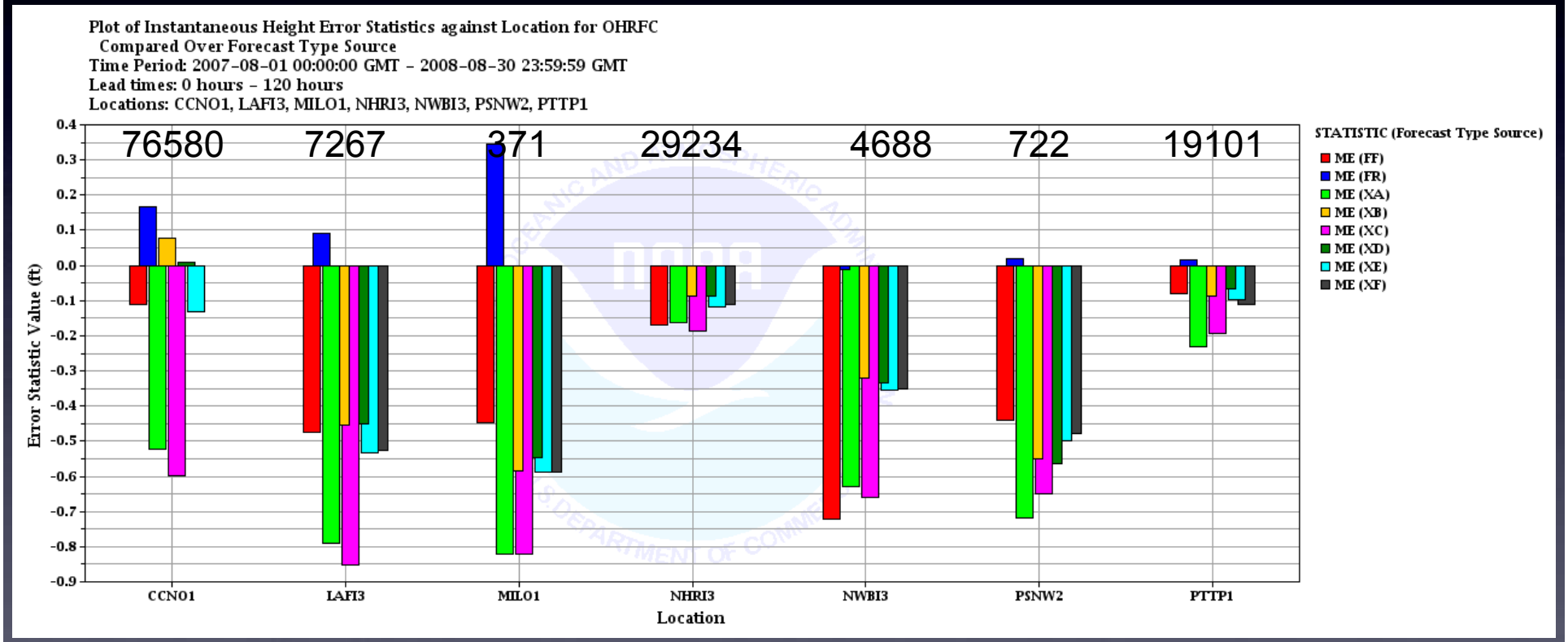
Key

Code	Meaning
XA	No MODs, No QPF
XB	No MODs, with QPF
XC	with MODs, No QPF
XD	No MODs, with HPC
XE	with MODs, with HPC
XF	with MODs, with QPF
FF	Operational Forecast
FR	Persistence

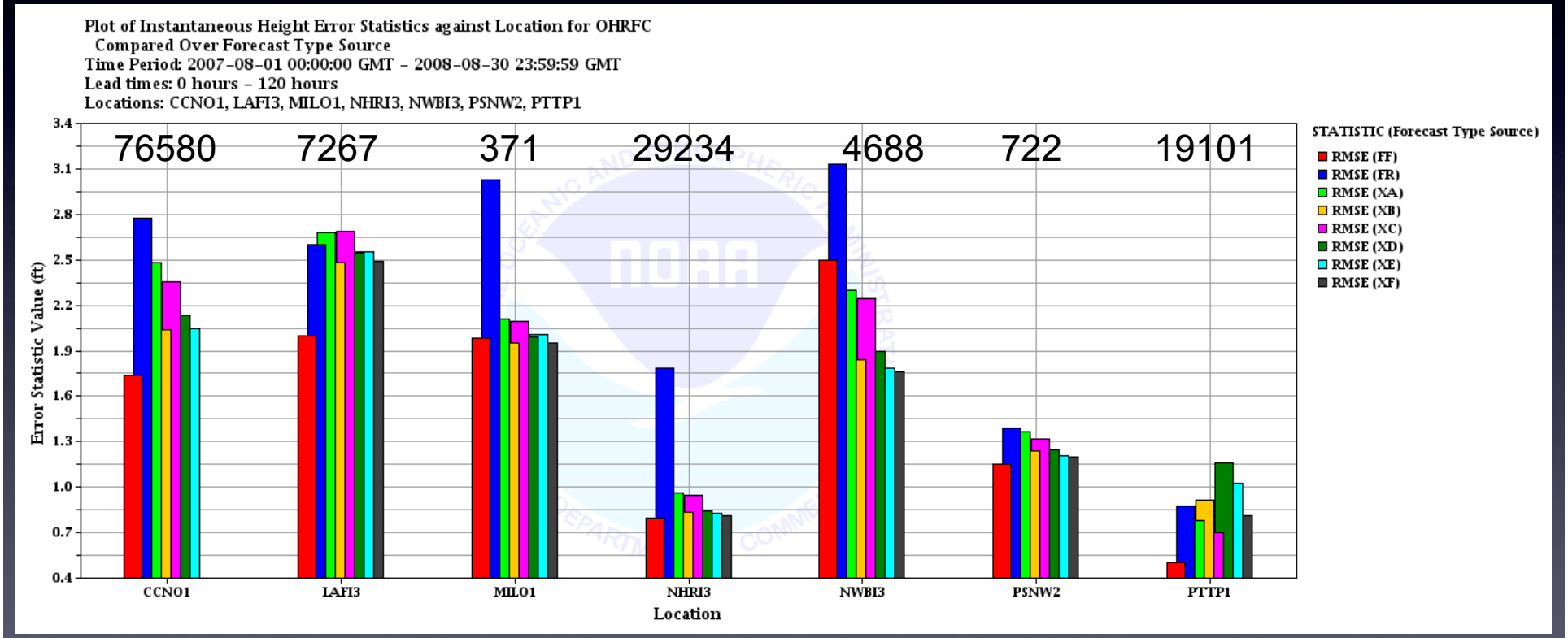
IVP Summary Graphics
MAE



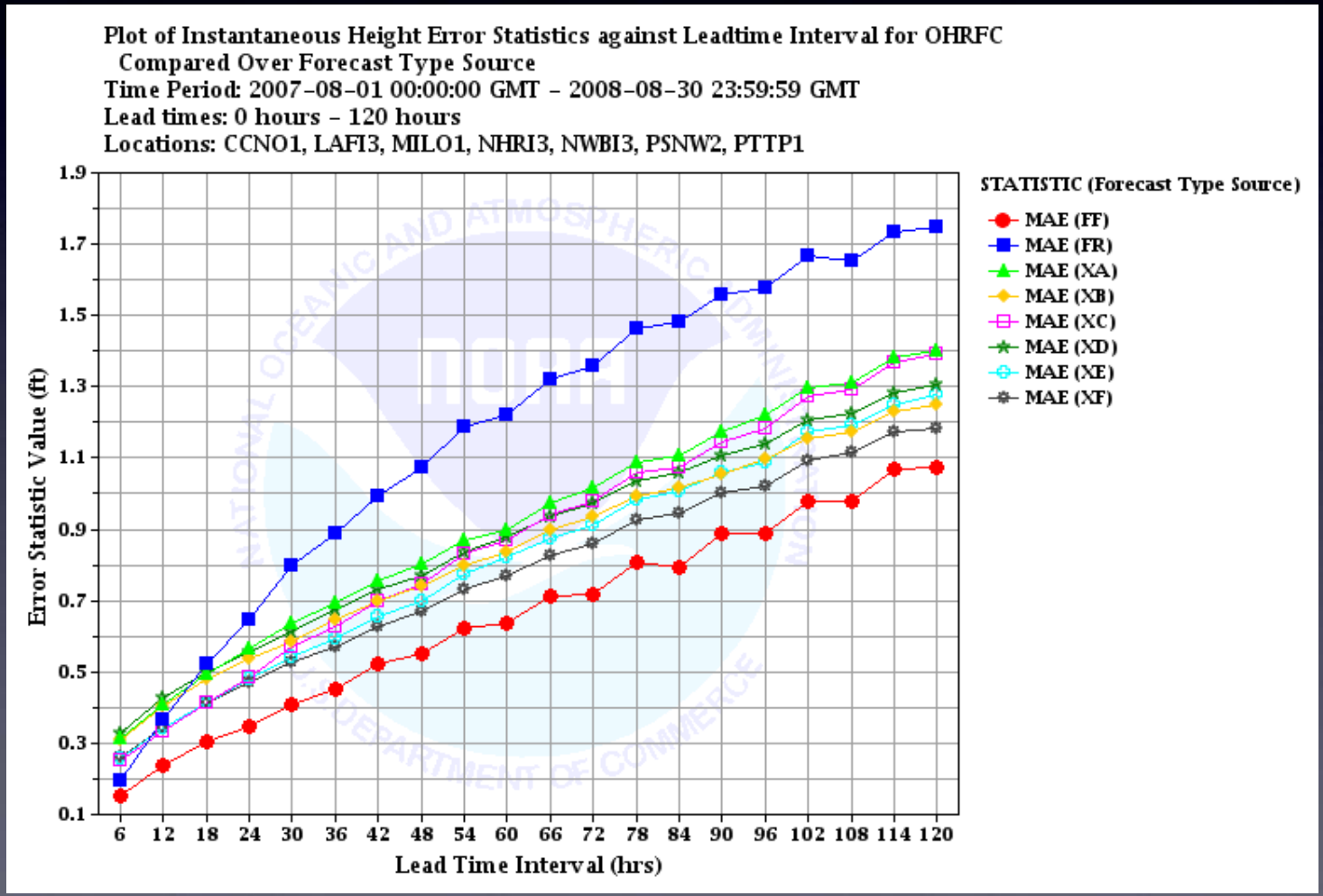
IVP Summary Graphics
ME



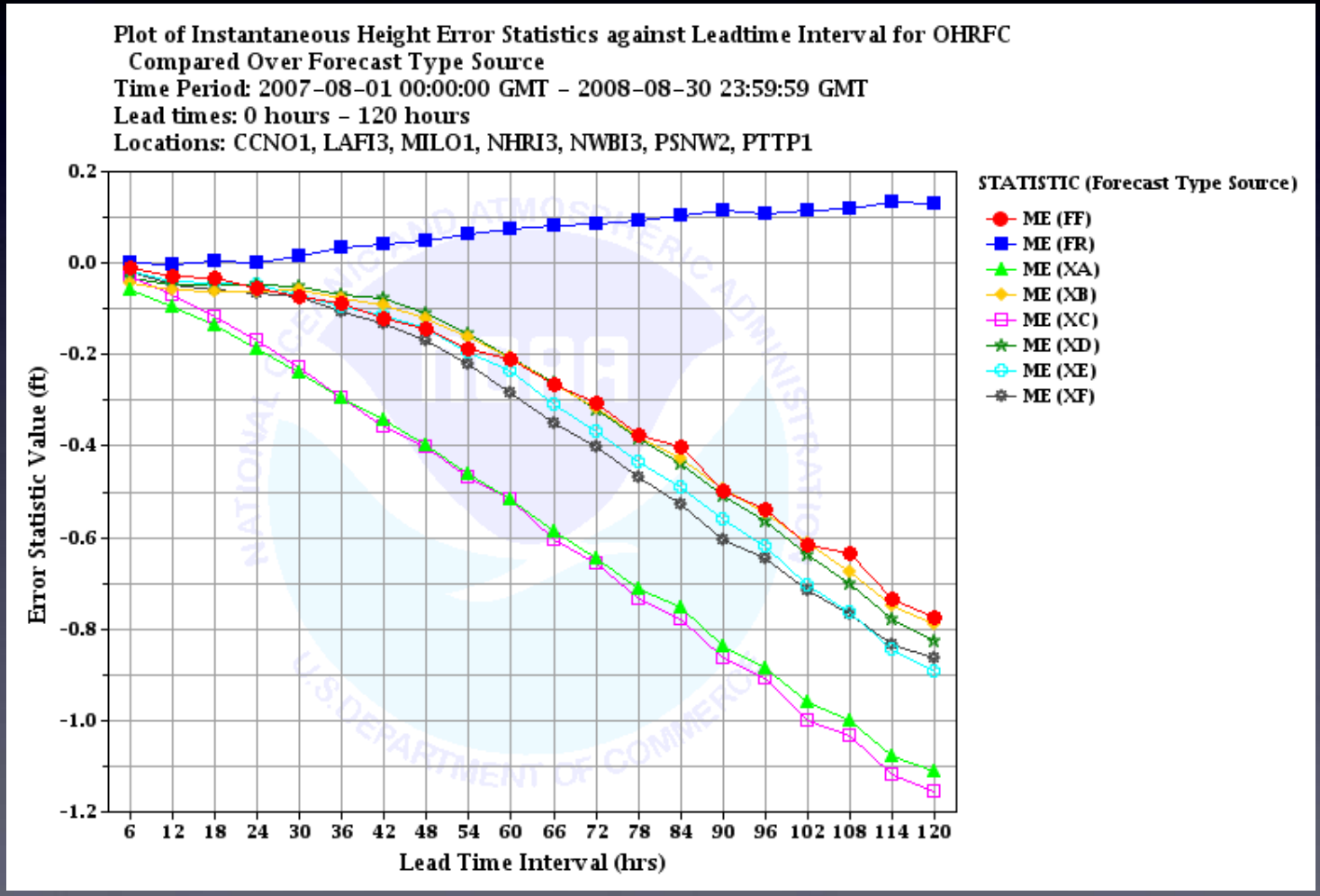
IVP Summary Graphics
RMSE



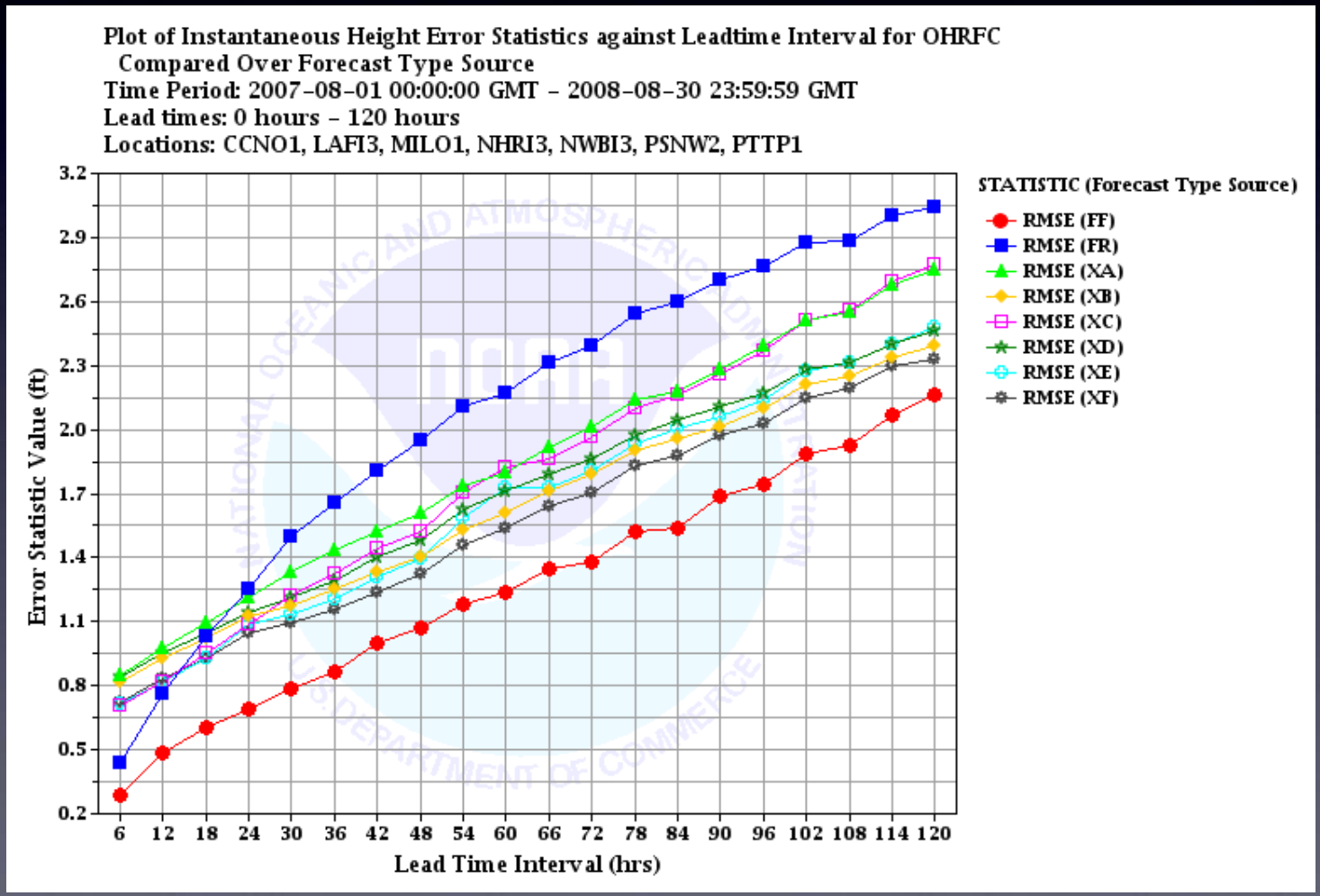
IVP Summary Graphics
MAE by Leadtime



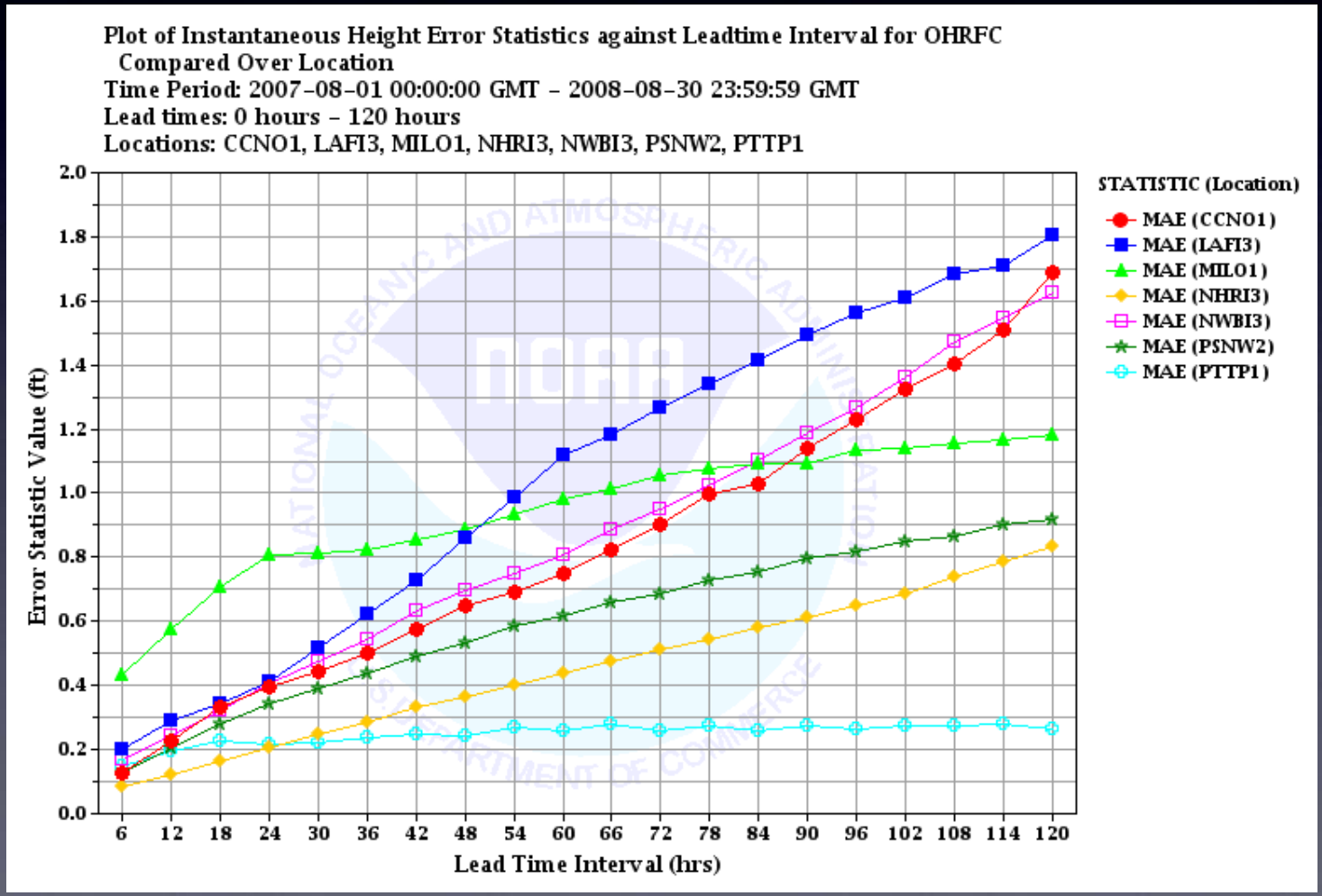
IVP Summary Graphics
ME by Leadtime



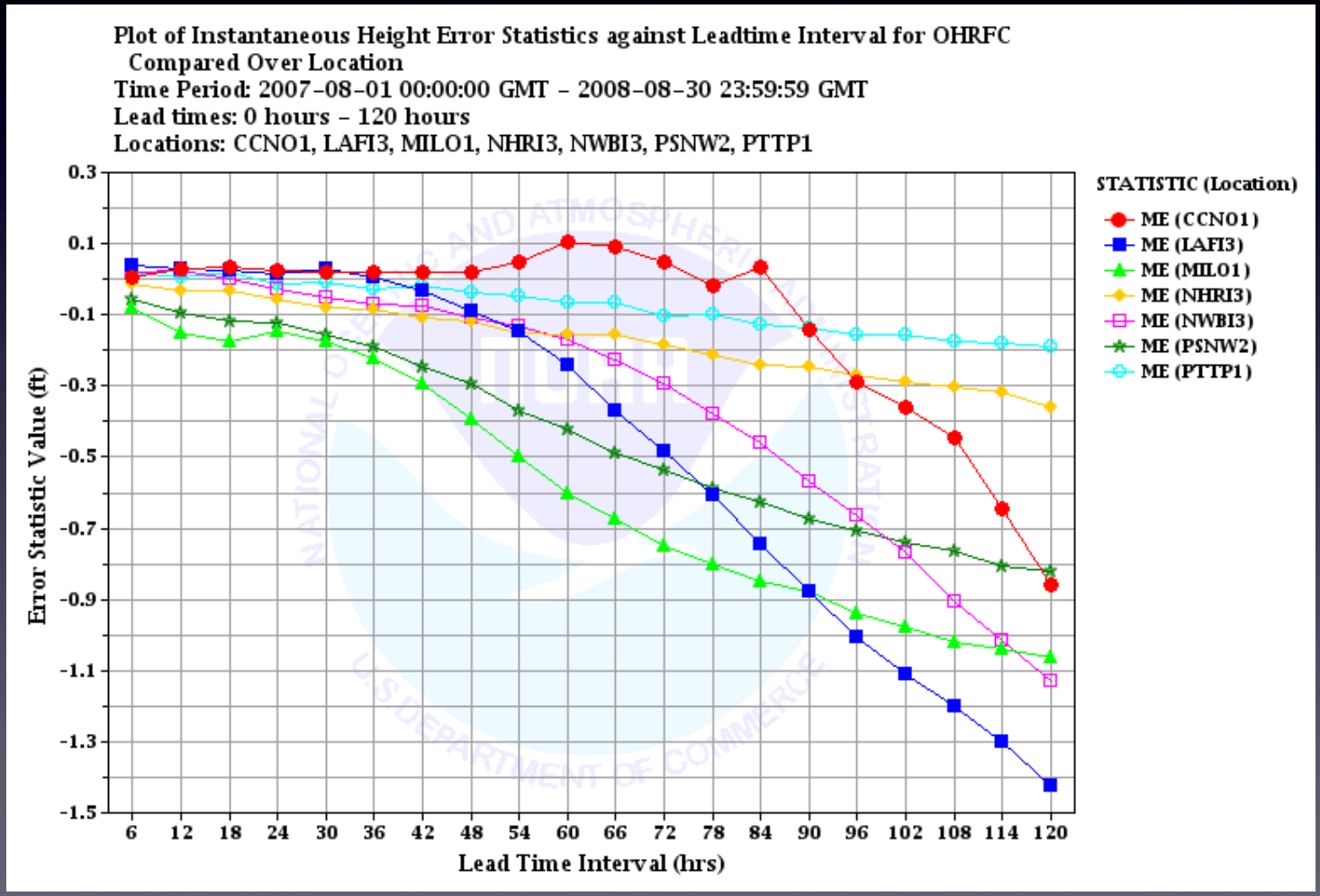
IVP Summary Graphics
RMSE by Leadtime



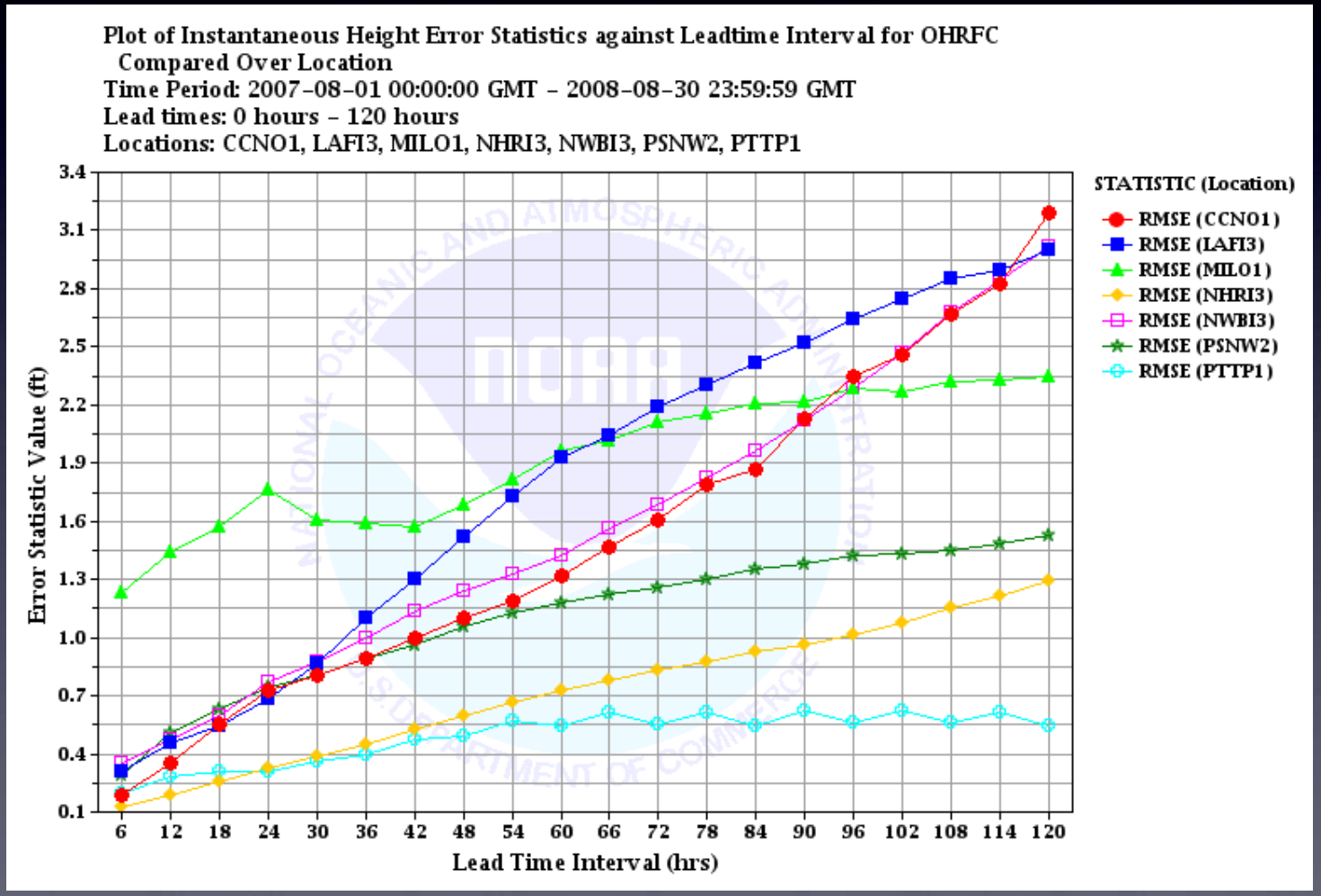
IVP Summary Graphics
MAE by Location



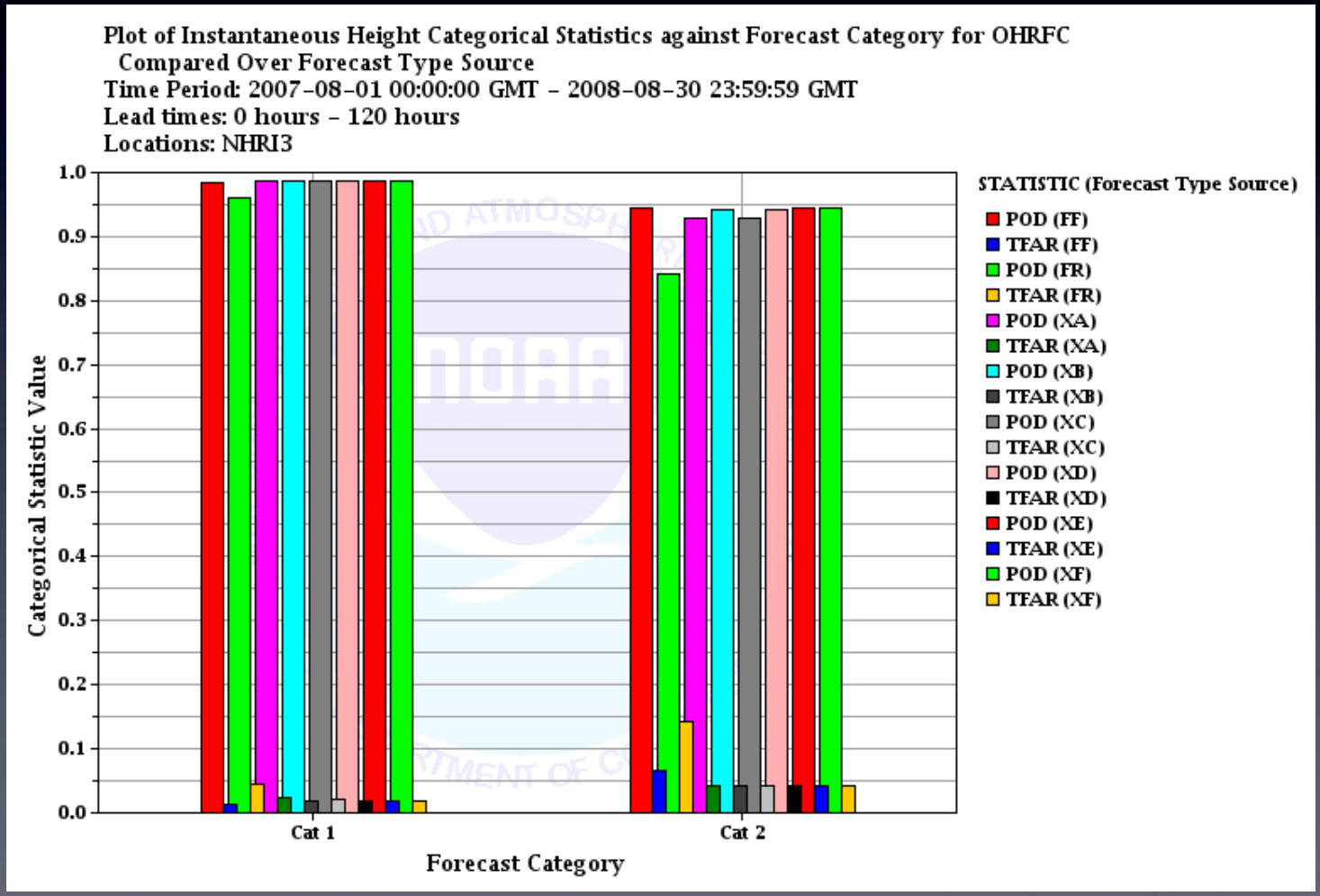
IVP Summary Graphics
ME by Location



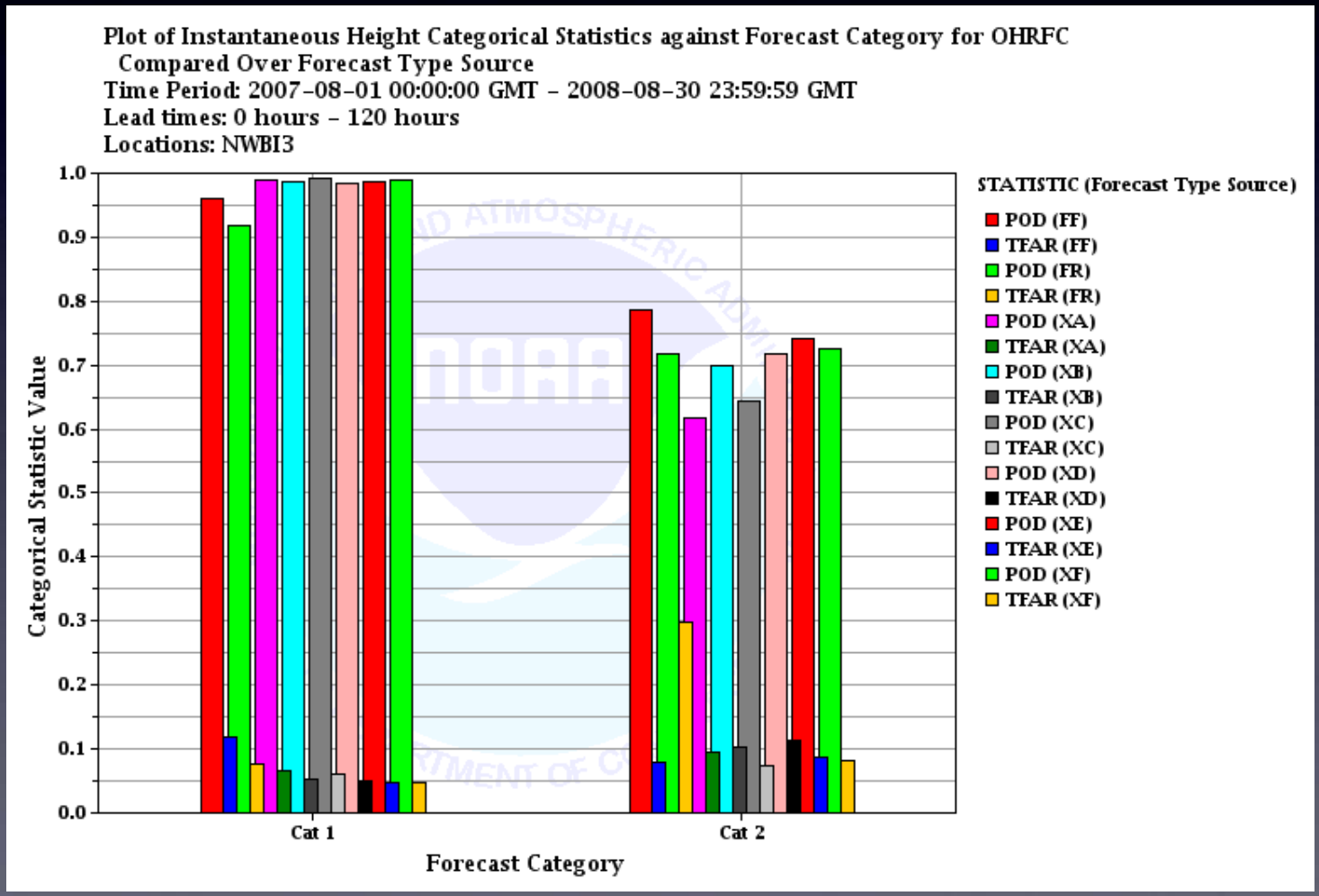
IVP Summary Graphics
RMSE by Location



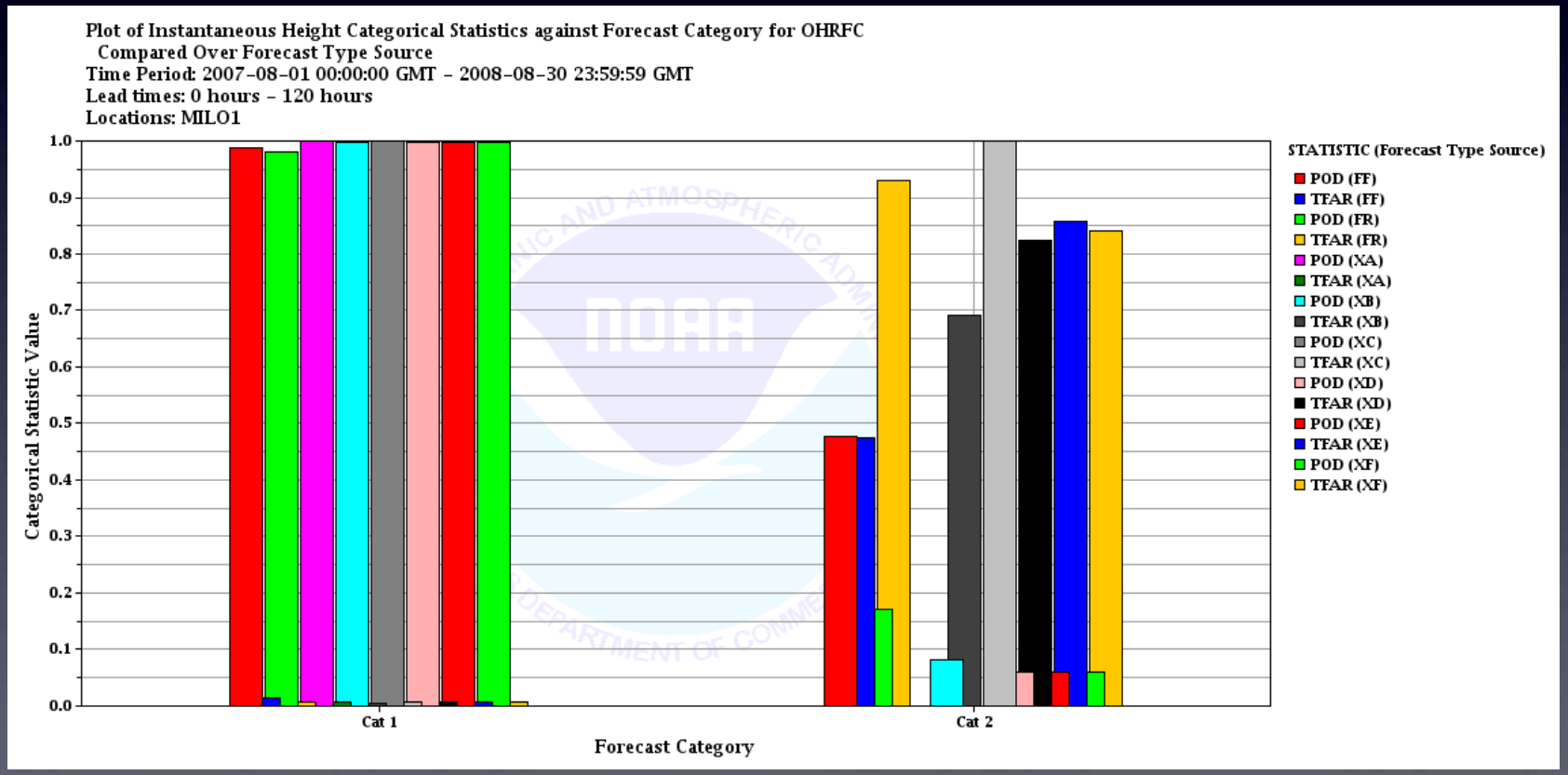
POD & FAR
NHRI3



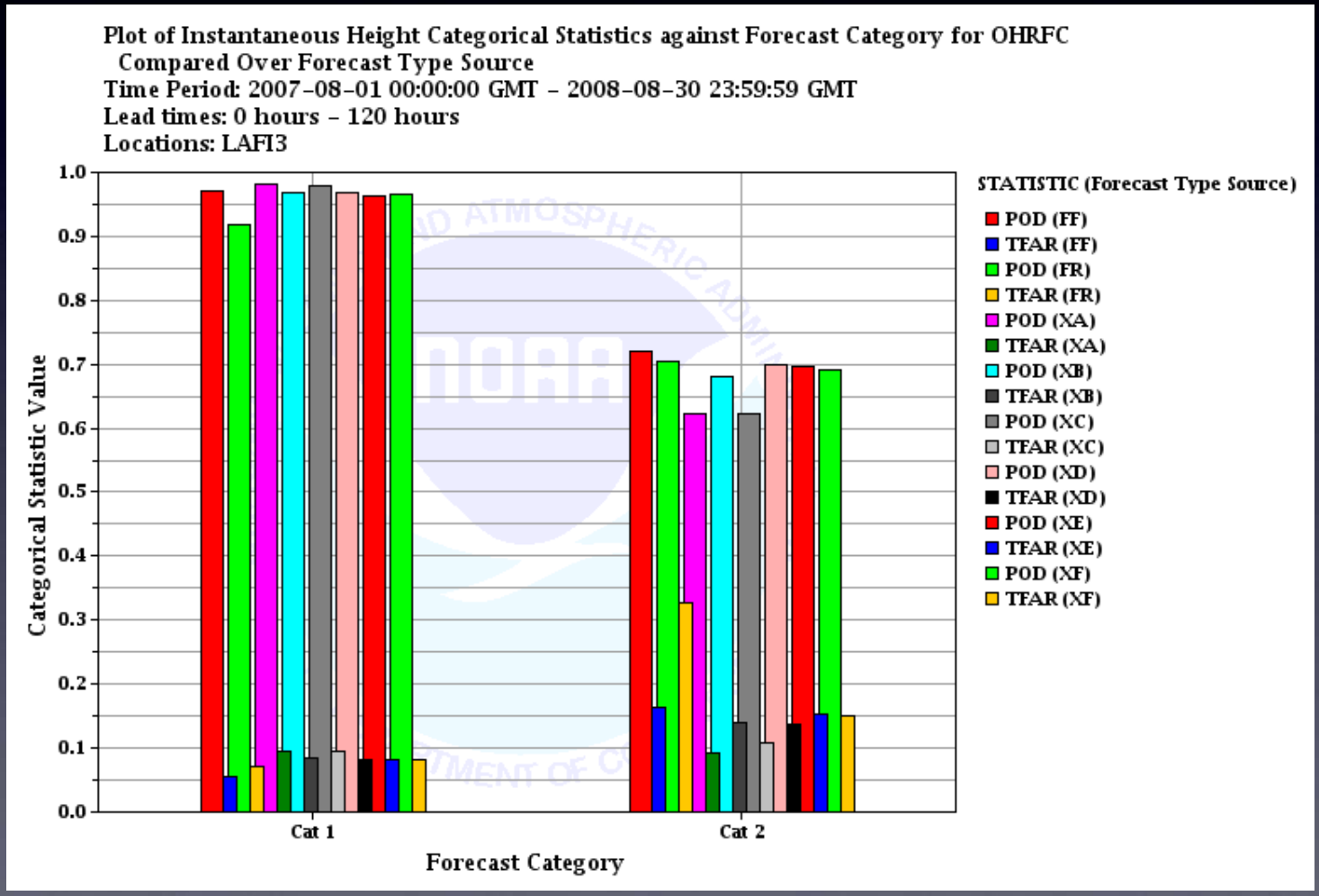
POD & FAR
NWBI3



POD & FAR
MILO1



POD & FAR
LAFI3



Summary

- Use of QPF improves forecasts…
  - more apparent for larger basins
- MODs *generally* improve forecasts
- Forecasts better with OHRFC HAS QPF than with HPC QPF
- Must carefully scrutinize statistics when drawing conclusions
- Statistics worse for flood-only points
- Sample size!

Future Study

- Analyze all modeled points (including non-daily)
- Look at >0 QPF forecasts vs zero-QPF forecasts
- Study 6-, 12-, 24-, 48-, 72-hour HPC forecasts