METViewer: MET Data Visualization
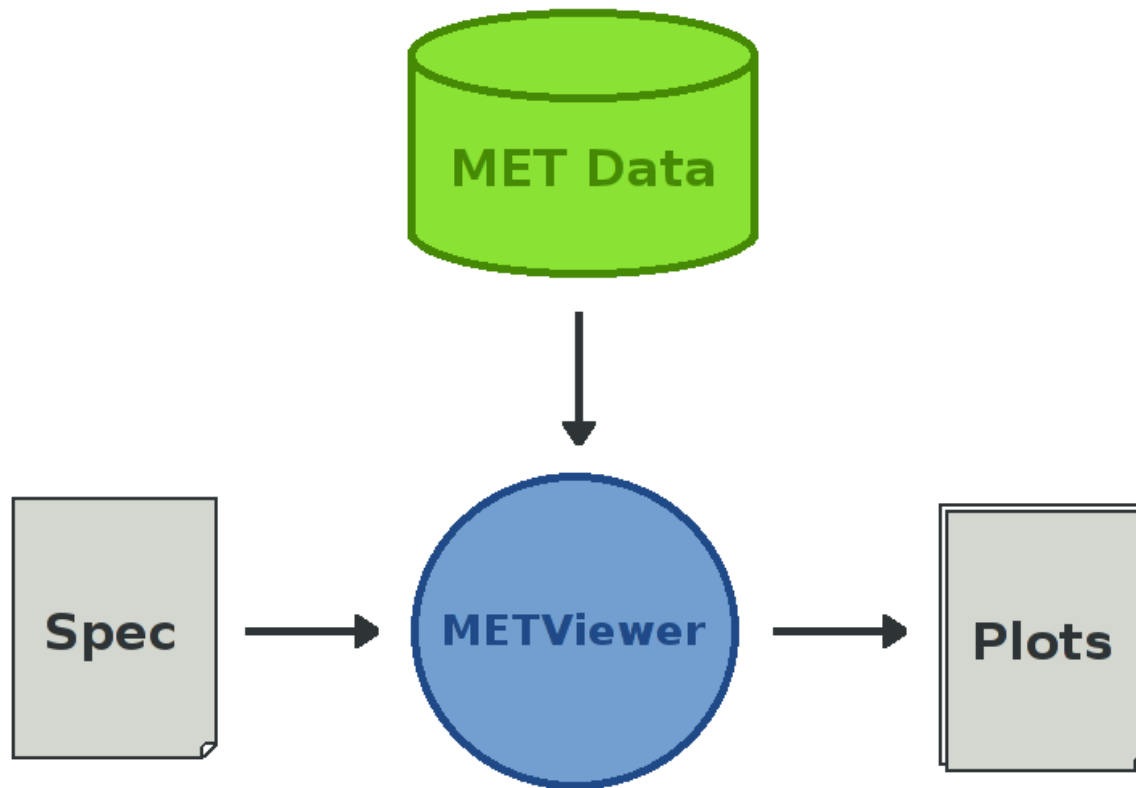
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What is METViewer?

METViewer is a data visualization (plotting) system
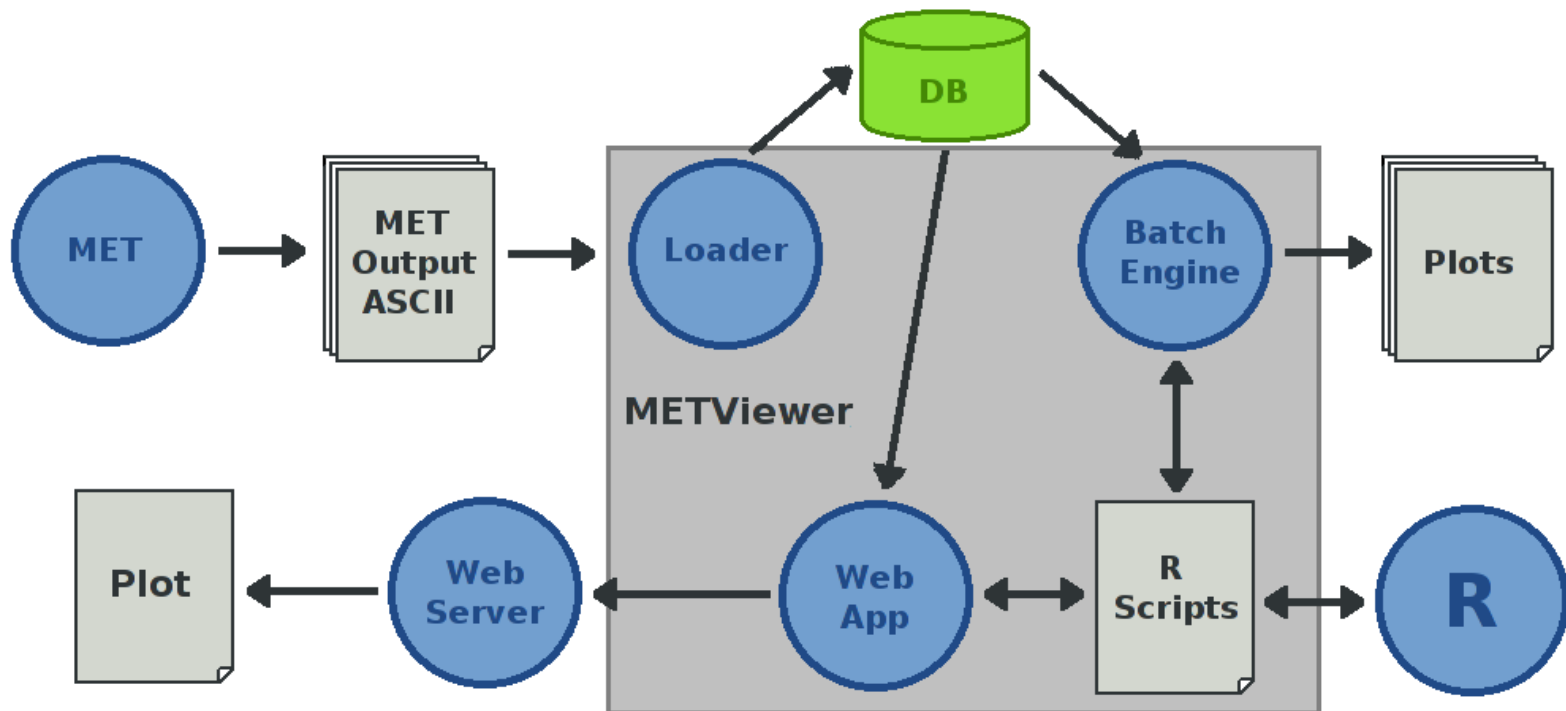
Demand Arises…

- MET outputs statistics in data tables
- Users frequently request a system for visualizing MET output data
- Scientists want plots showing statistics for variables, cases and relationships
- Often, many plots are reviewed to find a small number of illustrative cases

Design Principles

- **Relational database:** for searching, sorting and grouping MET output data - MySQL
- **Plotting system:** for consistent and robust graphics – R
- **Web application:** for accessibility, portability and ease of use – java & apache tomcat
- **Batch processing:** for generating many plots with only a few simple commands - java
- **Distributable**

METViewer Design

METViewer consists of three components which implement the solution ideas

Plot Specification

- ## Data type:
  - Traditional Statistics
  - MODE Statistics

- ## Plot type / Template:
  - Series plot
  - Box plot
  - Bar plot

- ## Independent variable and values:
  - Lead time (FCST_LEAD)
  - Valid / Initialization time (FCST_VALID_BEG)
  - Threshold (FCST_THRESH)
  - Vertical Level (FCST_LEV)

Plot Specification Cont'd

- **Dependent variable(s)**
  - Forecast Variable (e.g. APCP_o6, TMP, WIND)
  - Statistic (e.g. CSI, RMSE, BRIER, AREA, ANGLE_DIFF)

- **Series variables and values: lines on plot**
- **Fixed variables and values: case information**
- **Aggregation – CTCs or SL1L2**
- **Plot formatting**
- **Series formatting & confidence intervals:**
  - Normal
  - Bootstrap
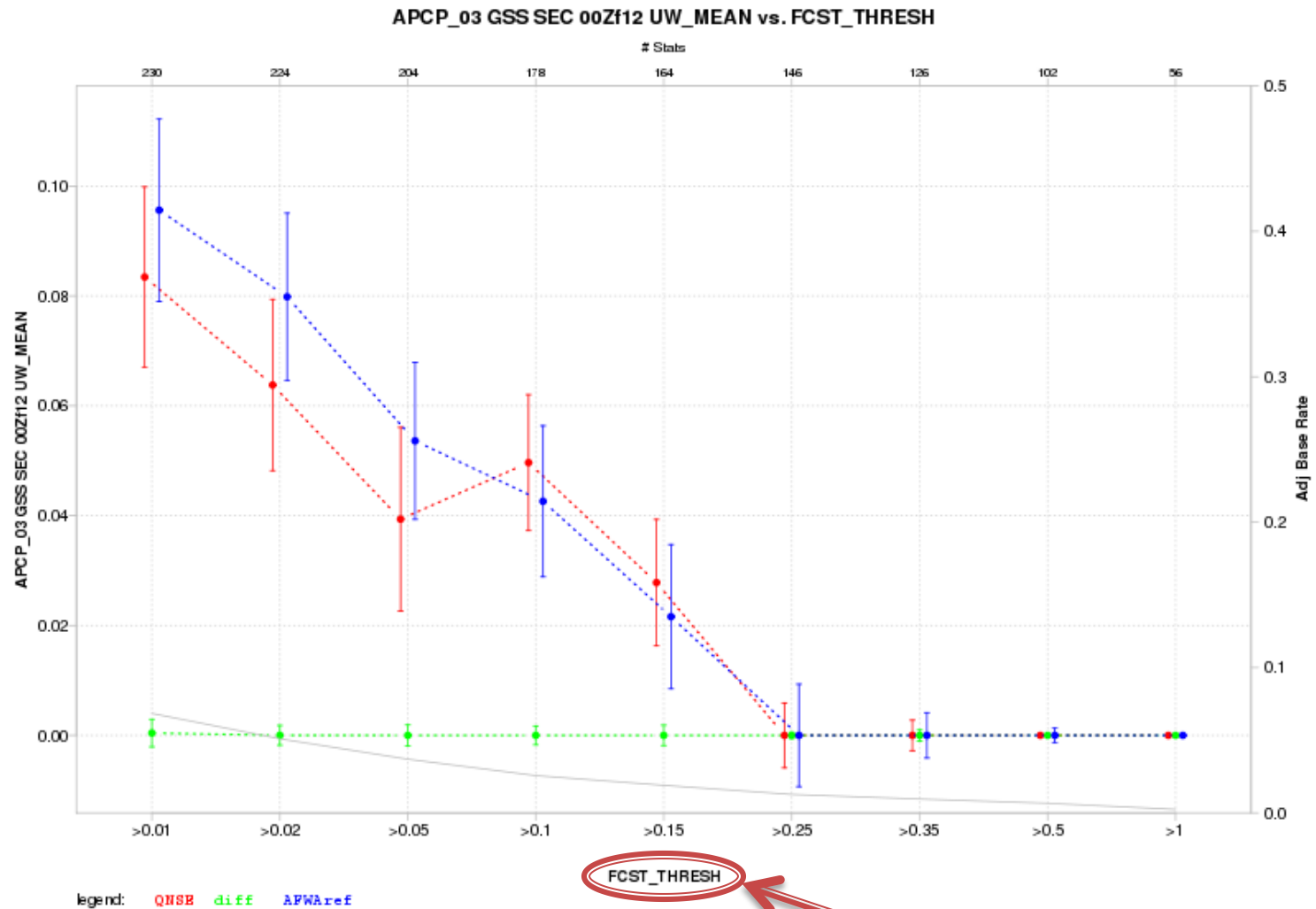 - Standard error (median or mean) – configurable α

Plot Types

Currently Implemented:

- Time series
- Threshold series
- Vertical levels (independent variable on vertical axis)
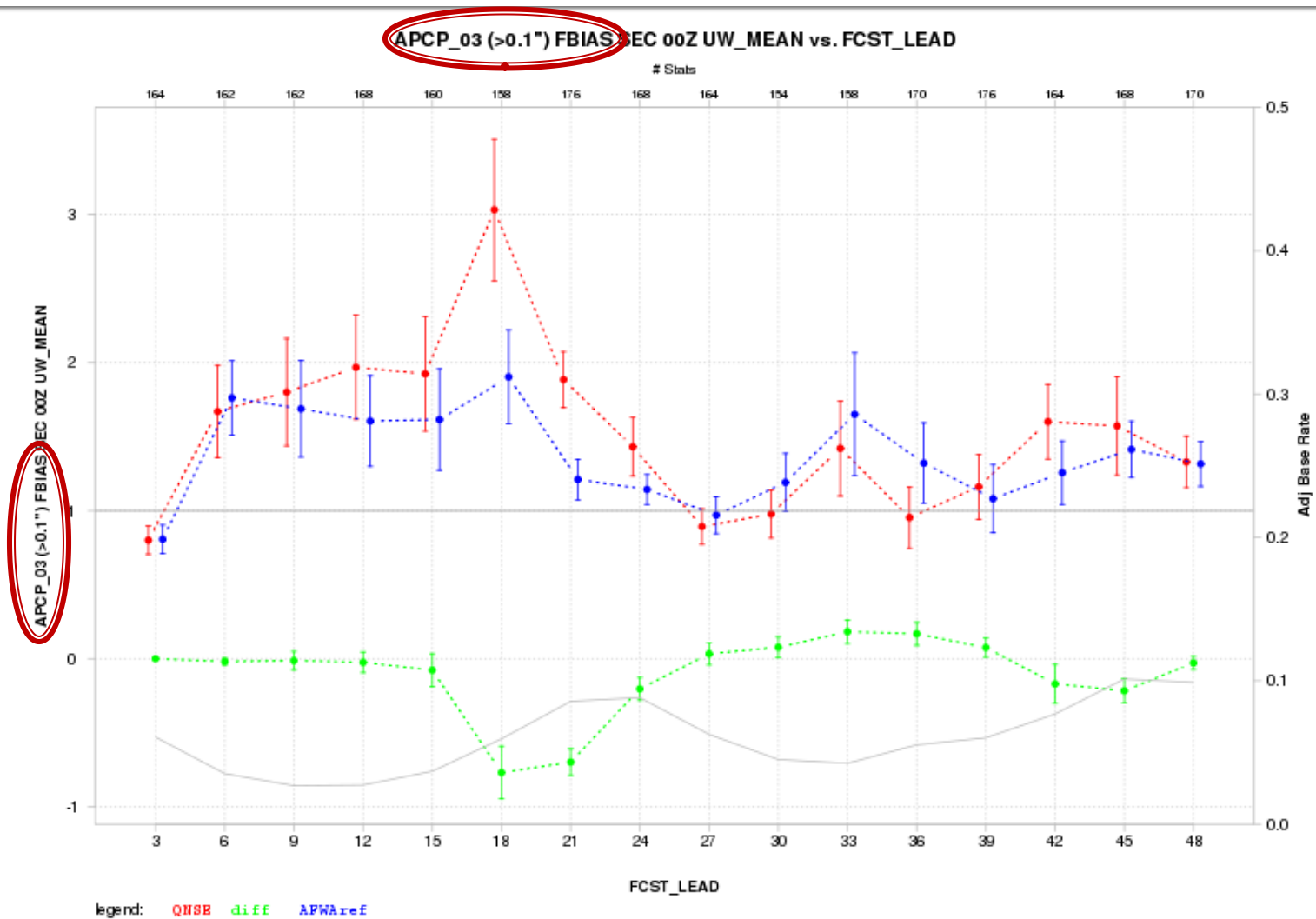- Box plot / Points Distribution plot
- Bar plot

Forthcoming:

- Scatter plot (statistic 1 vs. statistic 2)
- Frequency Histogram
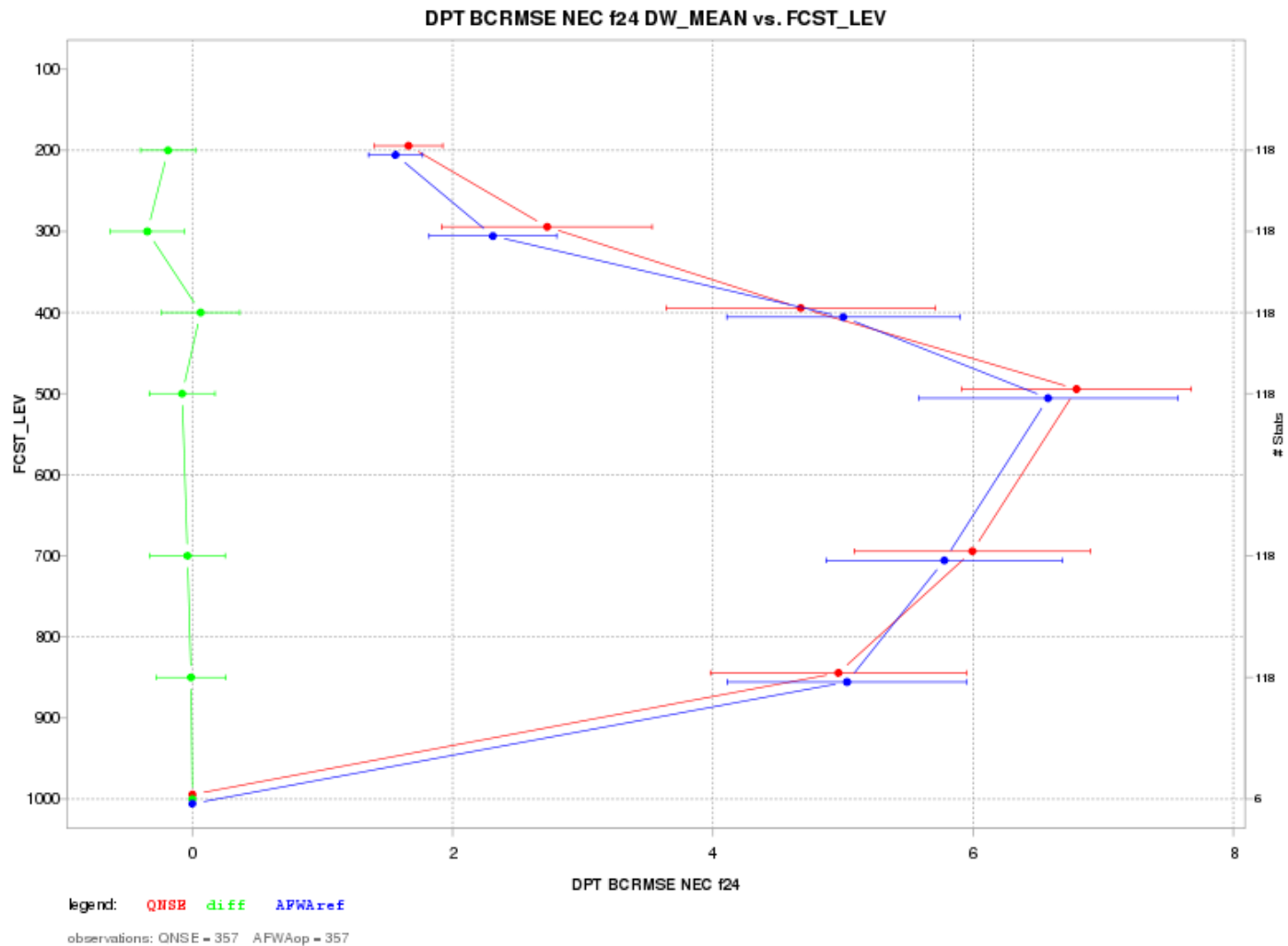- Rank Histogram
- ROC

Independent Variable

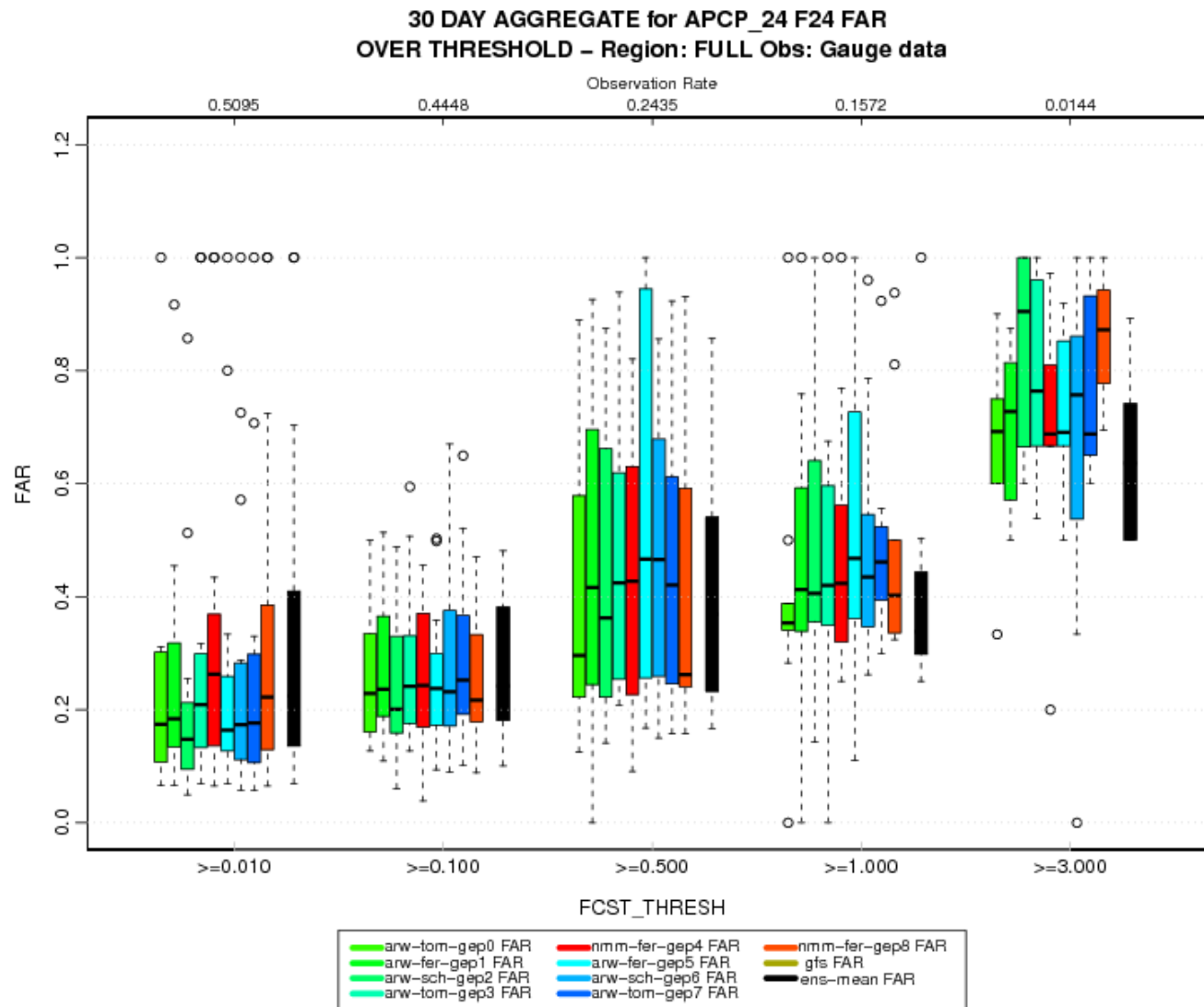APCP_03 GSS SEC 00Zf12 UW_MEAN vs. FCST_THRESH

Independent Variable

Dependent Variable

APCP_03 (>0.1") FBIAS SEC 00Z UW_MEAN vs. FCST_LEAD

legend: QNSE diff APWAref

Vertical Levels

DPT BCRMSE NEC f24 DW_MEAN vs. FCST_LEV

legend: QNSE   diff   AFWAref

observations: QNSE = 357   AFWAop = 357

Box Plot

30 DAY AGGREGATE for APCP_24 F24 FAR
OVER THRESHOLD – Region: FULL Obs: Gauge data

Web App Demo

… and questions

http://www.dtcenter.org/met/metviewer/db/qnse