METViewer

What is METViewer

The METViewer

- A highly-configurable software package designed to help MET users visualize MET output easily.
- Runs on the web on apache tomcat and relies on a database for data and the R language for plots
- Available to anyone online:

  http://www.dtcenter.org/met/metviewer/metviewer.jsp ***DTC***

  *Note: The link is a public test version and hence is limited to a single database

  http://lark.fsl.noaa.gov:8080/metviewer/metviewer.jsp ***GSD***

  (Restricted to fsl.noaa.gov users)

METViewer

- Fully customizable and very powerful but has a learning curve
- Can produce fully customizable:
  - -Series plots with confidence intervals
  - -Box plots
  - -X-Y scatter plots
  - -Histograms

METViewer Usage

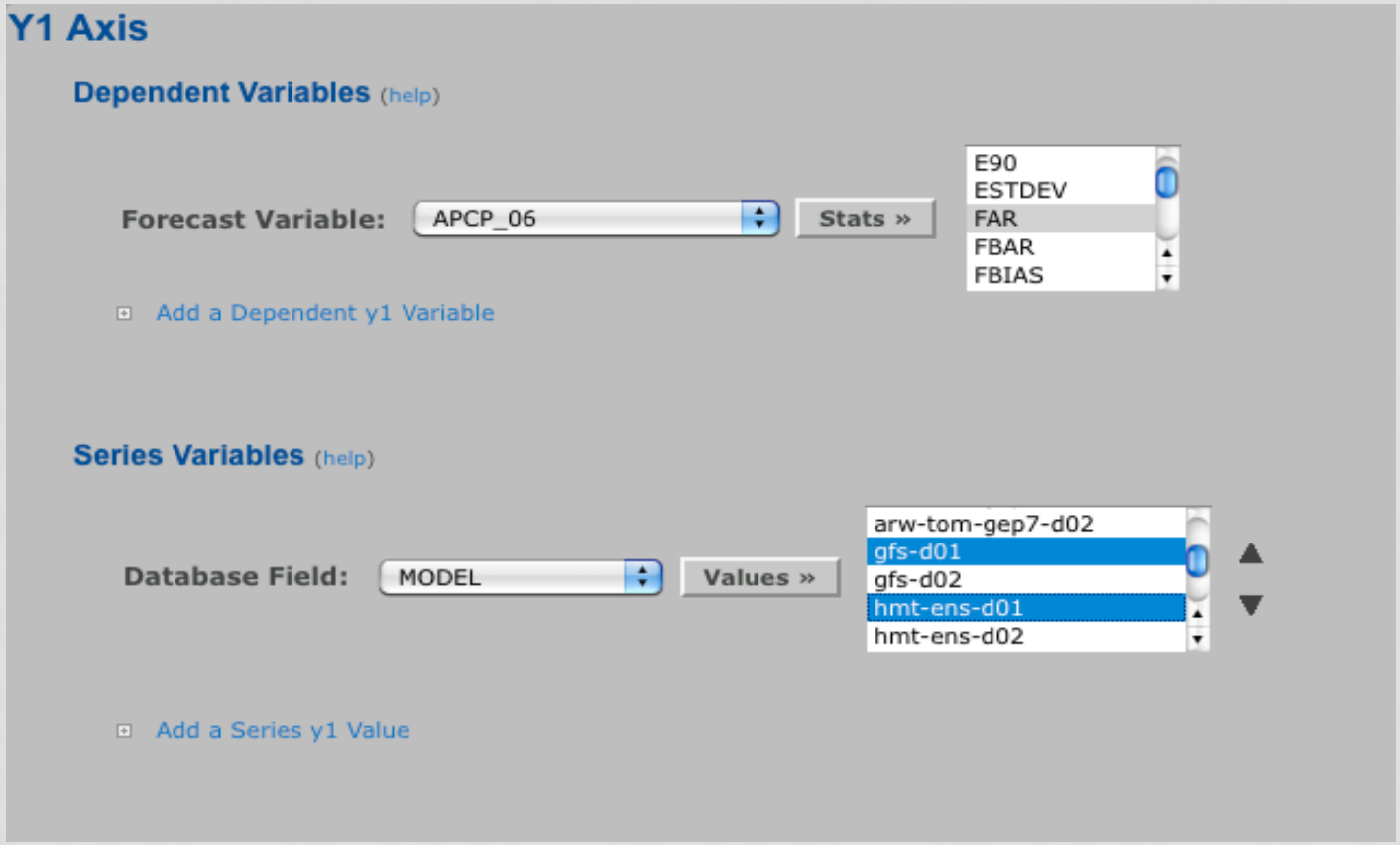
METViewer Usage

MET Viewer is designed to be configured in a downward direction. This means that the user should set the desired settings in order, gradually moving downward

- The top three settings (shown above) allow the user to select a database and type for the plot.

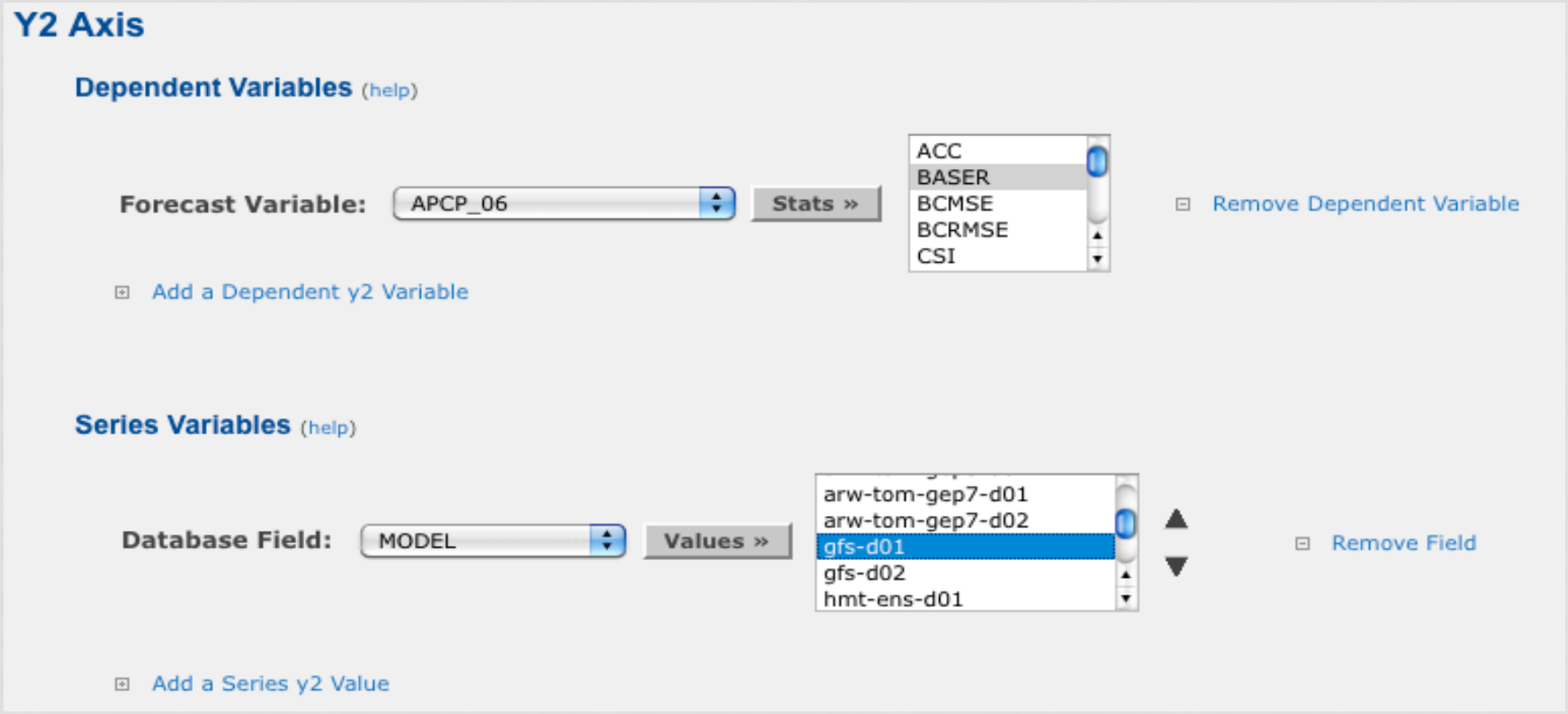
METViewer Usage

- The next section is where the variable, statistic of interest, and models of interest are selected



METViewer Usage

- The Y2 axis can be used to plot a Base Rate.

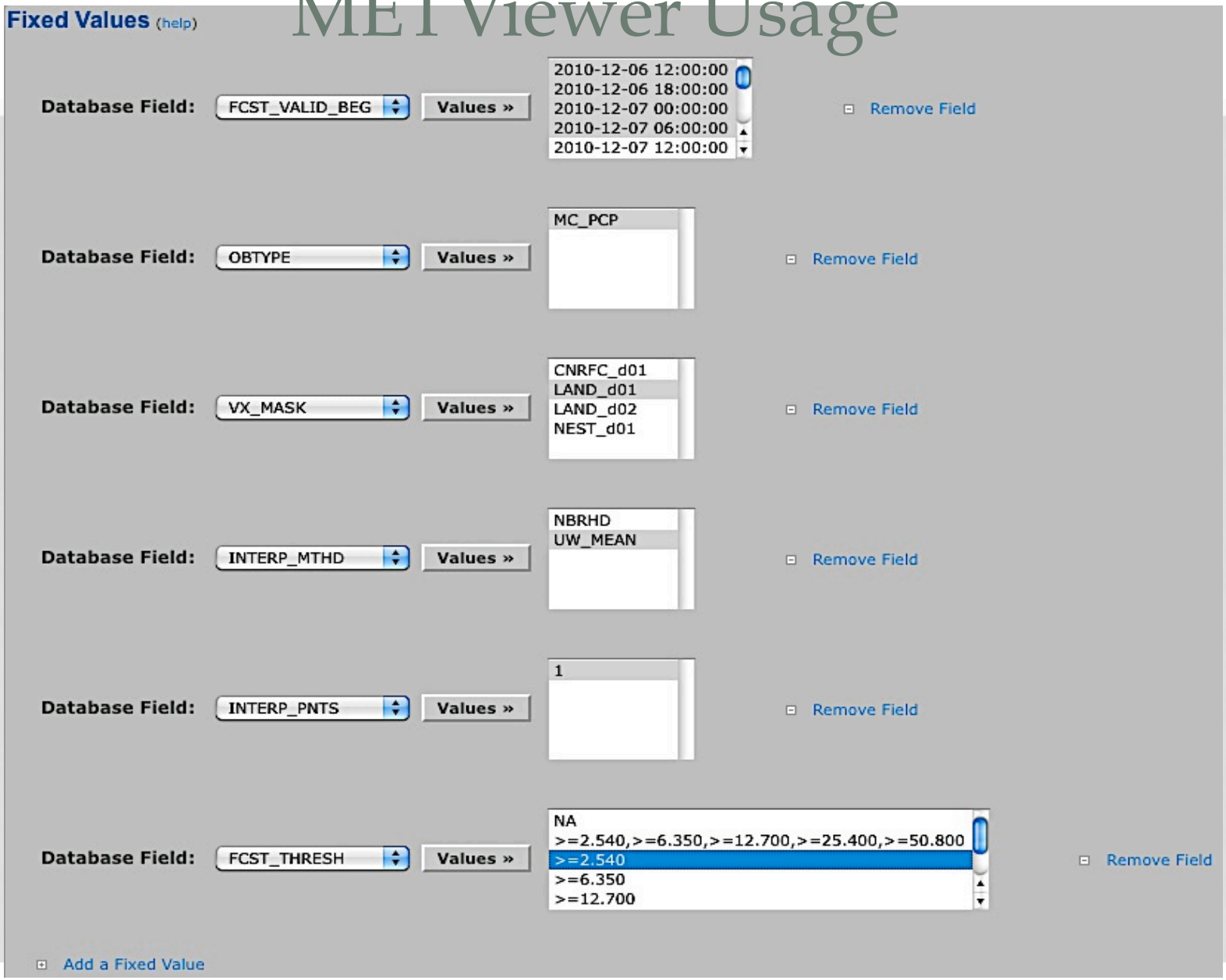


METViewer Usage

- The fixed variables section is what usually confuses new users and can take quite some time to master
- It controls the constraints for the plot (what period of data is used, what thresholds to include, interpolation method, as well as domains)
- The screenshot on the next slide shows a typical Fixed Variables setting

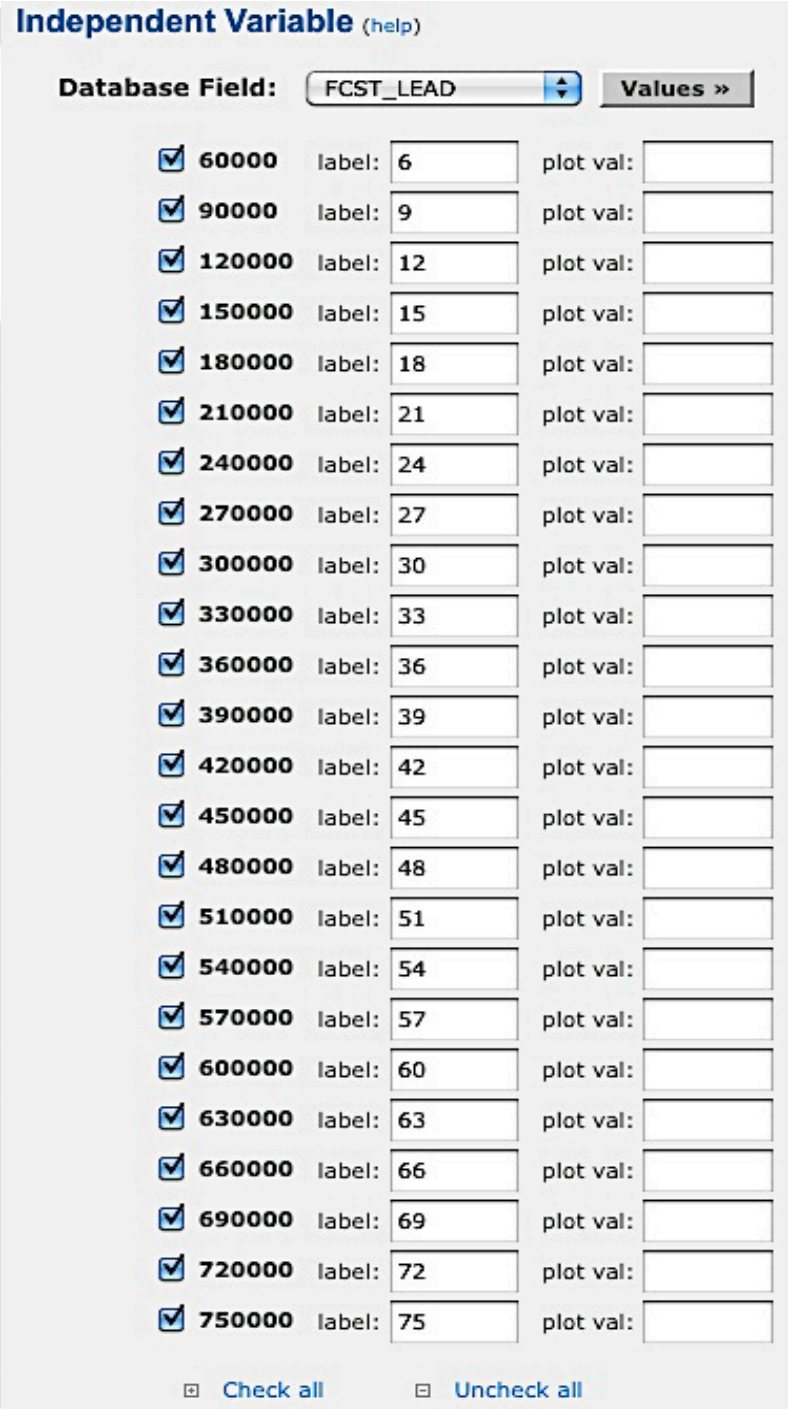
Note: The order of fixed variables is NOT important.

METViewer Usage



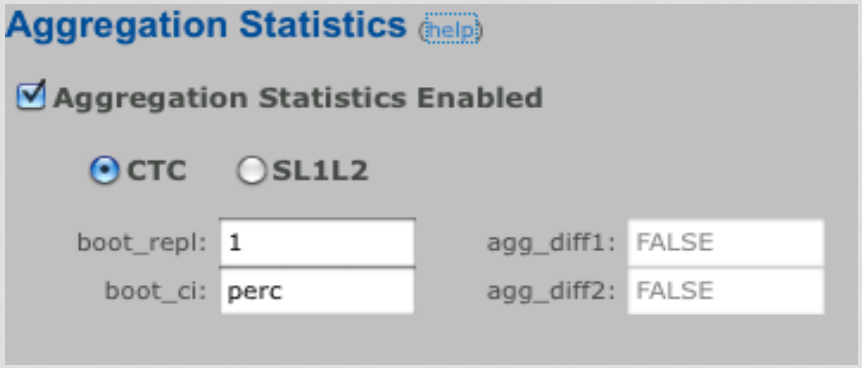
METViewer Usage

- This is where the x-axis is configured
- In the example, we are using forecast lead hours as our x-axis



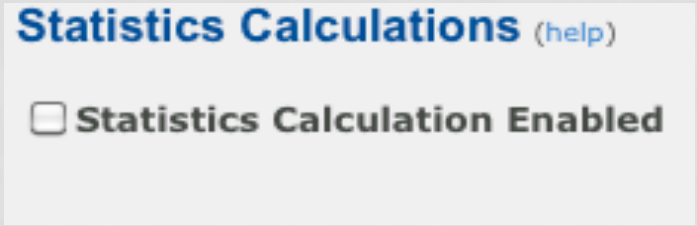
METViewer Usage

- The options in this section, named Aggregate Statistics depend on the type of graph and statistic
- It is essential this section is configured correctly or the graph will either error or produce results which baffle the user. *Click the "help" button on the section if confused about any setting*



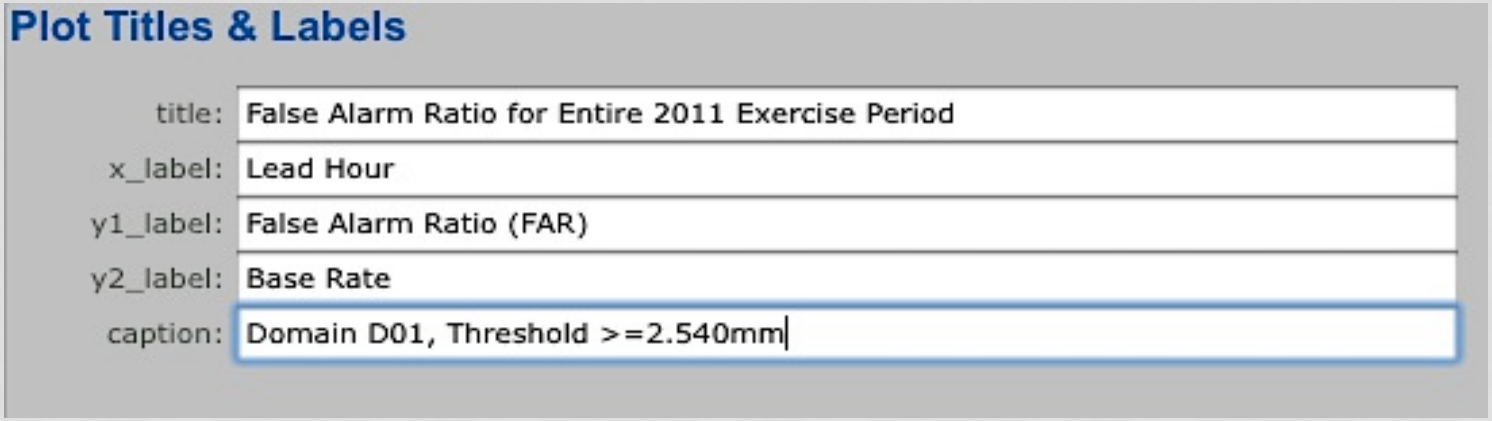
METViewer Usage

- This setting does exactly what it says. It calculates the plot statistics from CTCs or partial sums.
- Commonly, it is left disabled as in our example.



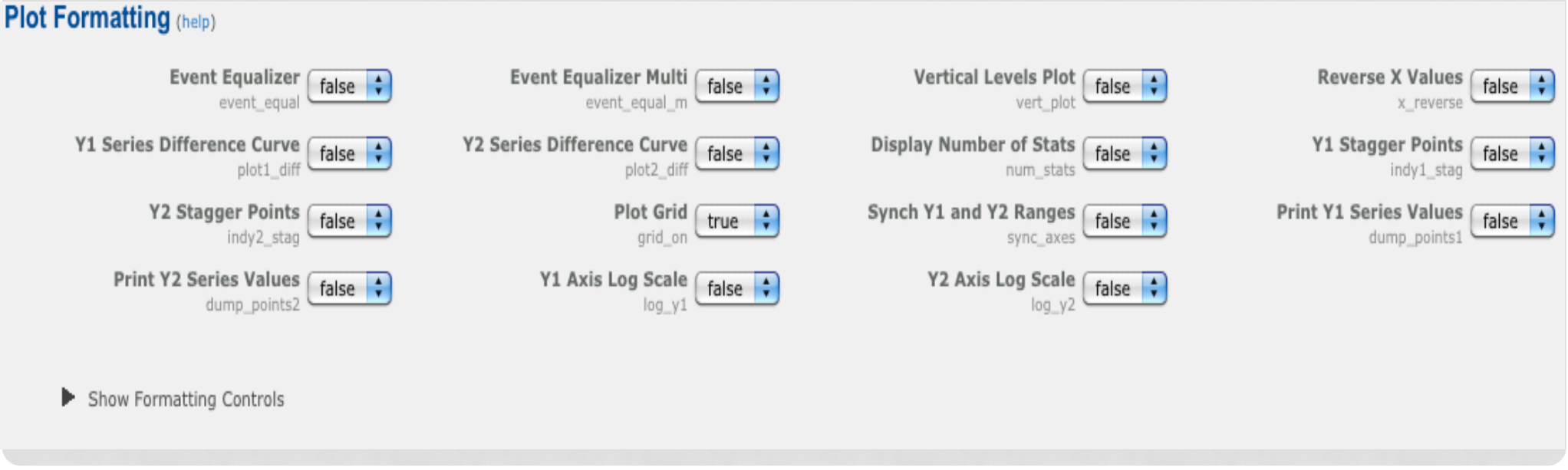
METViewer Usage

- This is where the main plot labels are entered



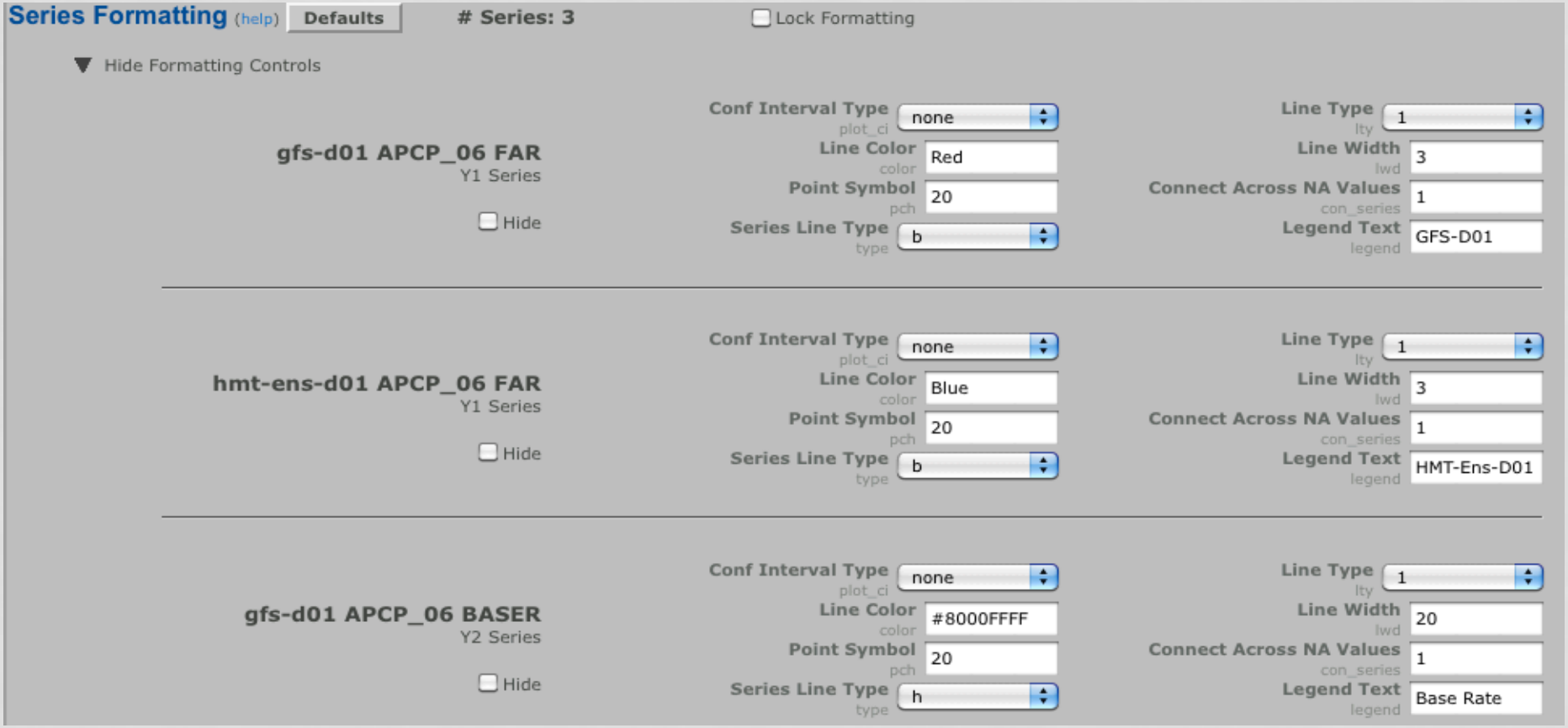
METViewer Usage

- This is where a whole lot of stylistic changes can be applied to the graph.
- Two important settings here are the "Event Equalizer" and the "Box Plot Show Notches". (hidden by default)



METViewer Usage

- This section is reserved for line labels and formatting.



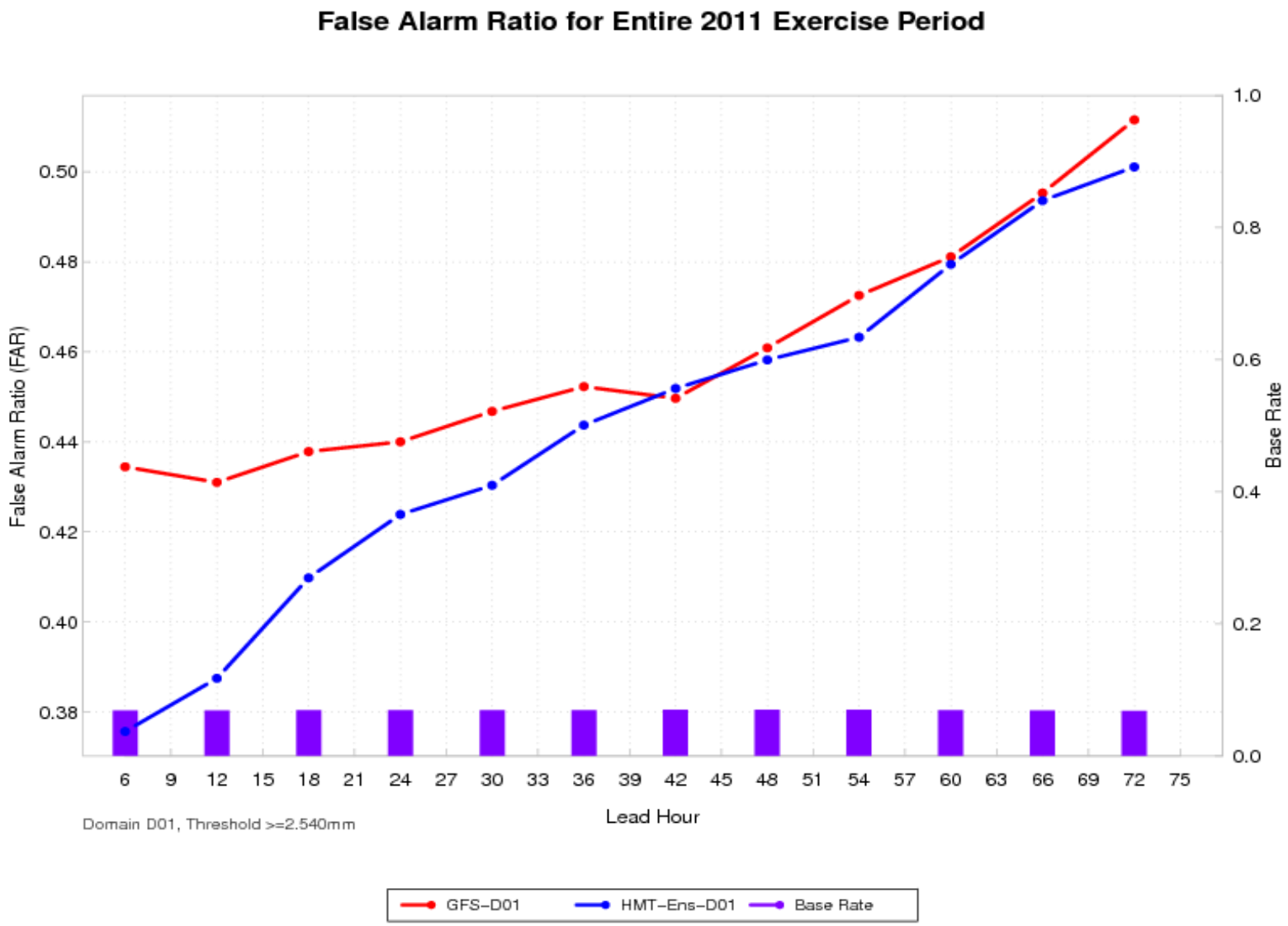
Note: If names are changed on one line, all lines require a name to be put defined in "Legend Text".

METViewer Usage

- This last section allows users to specify a custom scale
- Scales must be in R language format:

  For example, if a scale of 0 to 2 is desired, the expression put into y1_lim: would be "c(0,2)". You cannot change the x-scale as you have already defined that further up in the graph settings (see the Independent Variable section)

Result


False Alarm Ratio for Entire 2011 Exercise Period
False Alarm Ratio (FAR)
0.50
0.48
0.46
0.44
0.42
0.40
0.38
Base Rate
1.0
0.8
0.6
0.4
0.2
0.0
6 9 12 15 18 21 24 27 30 33 36 39 42 45 48 51 54 57 60 63 66 69 72 75
Lead Hour
Domain D01, Threshold >=2.540mm
GFS-D01
HMT-Ens-D01
Base Rate

Importing Data To METViewer

What is METViewer

The METViewer tool

- Reads MET verification statistics output from a database
- Creates plots using the R statistical package
- Includes a web application that can be accessed from a web browser to create a single plot
  - Specification for each plot is built using a series of controls and then serialized into XML
  - For each plot, METViewer generates a SQL query, an R script to create the plot, a flat file containing the data that will be plotted and the plot itself

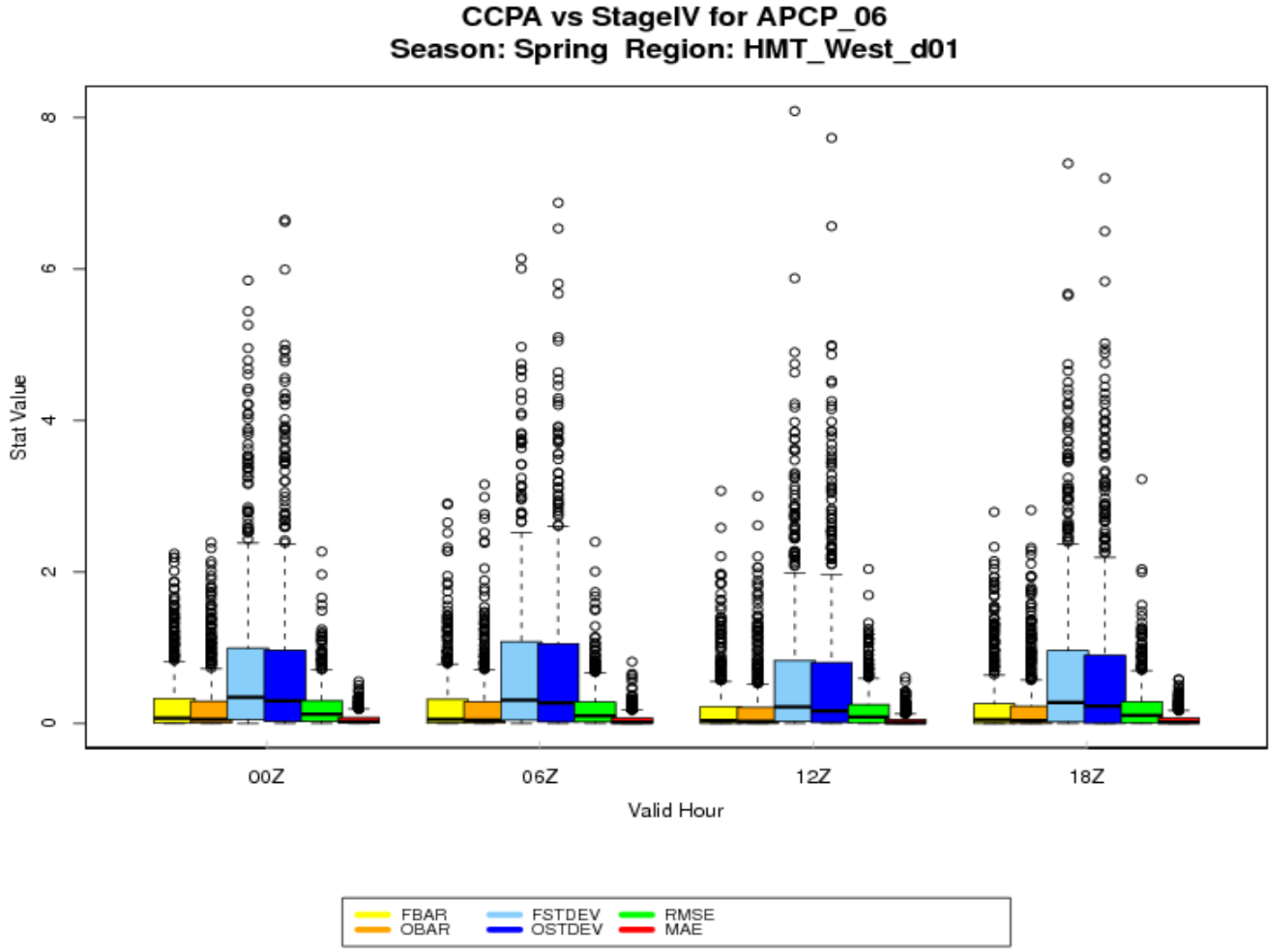
Available to anyone online:

http://www.dtcenter.org/met/metviewer/metviewer.jsp?db=hmt_2010 ***DTC***

- Note: the link is a public test version and hence is limited to a single database

OR http://lark.fsl.noaa.gov:8080/metviewer/metviewer.jsp ***GSD***

Result



Aggregated by diurnal cycle valid times; Comparison of one gridded dataset with another gridded dataset (StageIV and 'improved' StageIV)

MET Viewer Importing Data

How do you import data into the MET Viewer?

- Create verification statistics (.stat files) using MET
- Organize verif stat data files in a tree-like dir structure which emulates a database structure, where
  - Top level directories reference domains, ensemble membs
  - Mid level directories reference dates
  - Low level directories reference hourly content
  - E.g.

dwr_domains/ewp2_d01/2011051116V_01h/grid_stat/grid_stat_d01_F000_01h__000000L_20110511_160000V.stat
dwr_domains/ewp2_d01/2011051116V_01h/grid_stat/grid_stat_d01_F001_01h__010000L_20110511_170000V.stat
dwr_domains/ewp2_d01/2011051116V_01h/grid_stat/grid_stat_d01_F002_01h__020000L_20110511_180000V.stat
dwr_domains/ewp2_d01/2011051116V_01h/grid_stat/grid_stat_d01_F003_01h__030000L_20110511_190000V.stat
dwr_domains/ewp2_d01/2011051116V_01h/grid_stat/grid_stat_d01_F004_01h__040000L_20110511_200000V.stat

MET Viewer Importing Data

How do you import data into the MET Viewer?

- Create an XML script with instructions that closely match the dirs containing the data files
- Load the data files into mySQL using ***myload***, a MET Viewer script, which reads the XML file

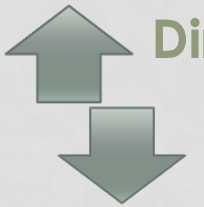
- E.g.

```
<connection>
        <host>lark</host>
        <database>mv_hmt_ed_2011</database>
<folder_tmpl>/exchange/tmp/HMT/West/2011/dwr_domains/{model}/{fcst_valid}/{output_type}/</folder_tmpl>
    <date_list name="folder_dates_01h">
        <start>2011051116V_01h</start>
        <format>yyyyMMddHH'V_01h'</format>
    </date_list>
<field name="model">
            <val>ewp2_d01</val>
            <val>ewp3_d01</val>
```

MET Viewer Importing Data

Directory structure, content and Xml (again)

dwr_domains/ewp2_d01/2011051116V_01h/grid_stat/grid_stat_d01_F000_01h__000000L_20110511_160000V.stat
dwr_domains/ewp2_d01/2011051116V_01h/grid_stat/grid_stat_d01_F001_01h__010000L_20110511_170000V.stat
dwr_domains/ewp2_d01/2011051116V_01h/grid_stat/grid_stat_d01_F002_01h__020000L_20110511_180000V.stat
dwr_domains/ewp2_d01/2011051116V_01h/grid_stat/grid_stat_d01_F003_01h__030000L_20110511_190000V.stat
dwr_domains/ewp2_d01/2011051116V_01h/grid_stat/grid_stat_d01_F004_01h__040000L_20110511_200000V.stat



Directory & content

Xml

```
<connection>
        <host>lark</host>
        <database>mv_hmt_ed_2011</database>
<folder_tmpl>/exchange/tmp/HMT/West/2011/dwr_domains/{model}/{fcst_valid}/{output_type}/</folder_tmpl>
    <date_list name="folder_dates_01h">
        <start>2011051116V_01h</start>
        <format>yyyyMMddHH'V_01h'</format>
    </date_list>
<field name="model">
            <val>ewp2_d01</val>
            <val>ewp3_d01</val>
```

MET Viewer System

The process of populating the MET Viewer (CON'T)

- VM (virtual machine) called 'lark' created, has all the software tools needed
  - apache – to host metviewer on as website as server
  - mySQL – database
  - R – plotting software
  - metviewer – suite of tools (scripts) to populate a database and extract data according to requests, etc
- No need to log onto lark ***unless*** importing data for MET Viewer

MET Viewer Importing Data

The process of populating the MET Viewer (CON'T)

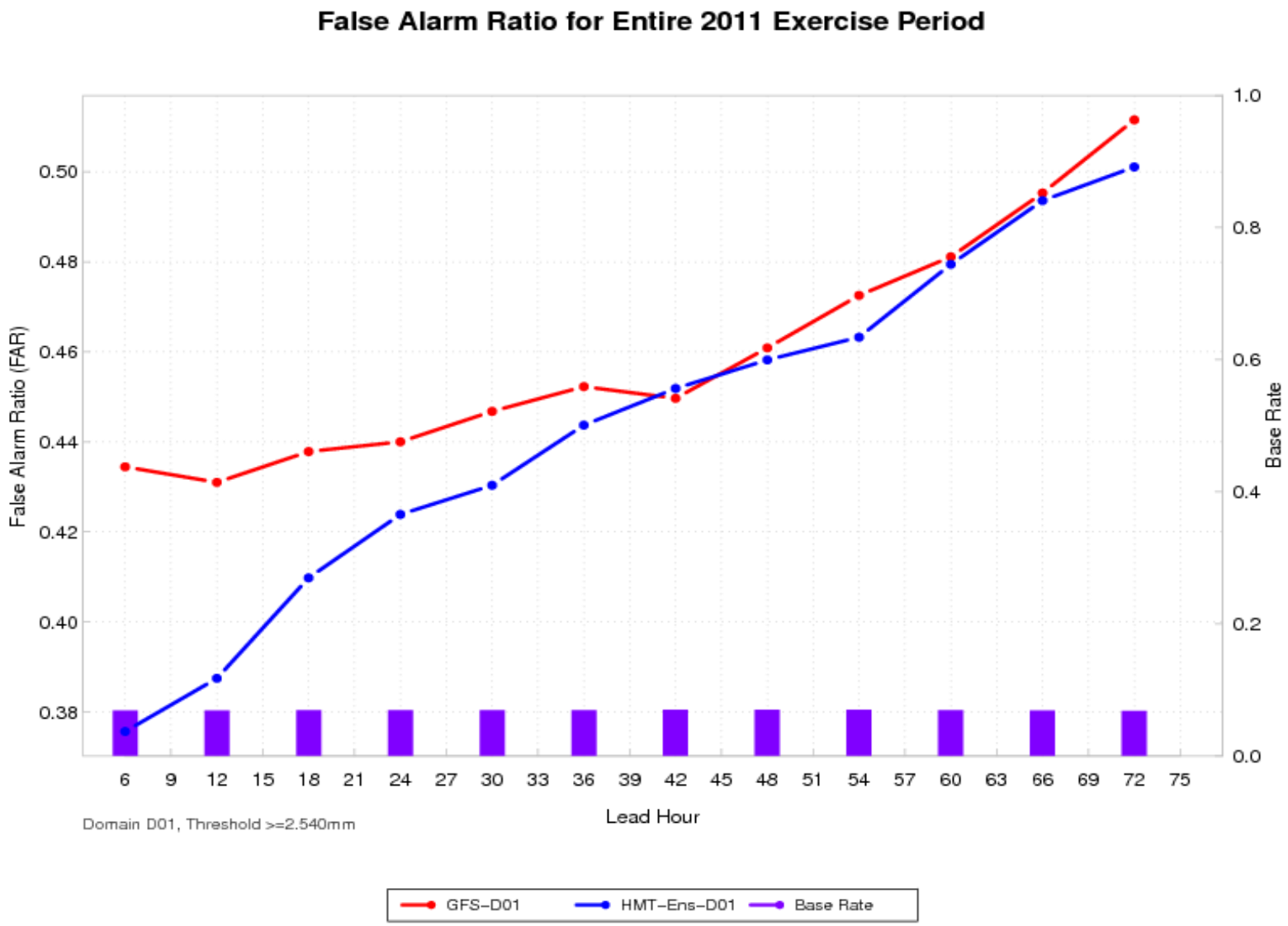
- With verification task, e.g. '***HMT_2012***':
  1. Create mysql database '***mv_hmt_2012***' (where mv= metviewer)
  2. Grant all permissions on '***mv_hmt_2012***' via mysql
  3. Load db tables

     mysql –u [user] mv_hmt_2012 < mv_mysql.sql
  4. Load verification data into db

     bin/mv_load.sh [load_hmt_2012.xml] >& log/load_[date].log
  5. Edit java servlet file to include '***mv_hmt_2012***'

     /usr/local/metviewer/webapp/metviewer/WEB-INF/classes/mvservlet.properties
  6. Rebuild web application – ant
  7. Re-deploy application to webserver
  8. Change permissions for global execute and write access, as R will be run by the end-user (need to write and execute scripts)

Result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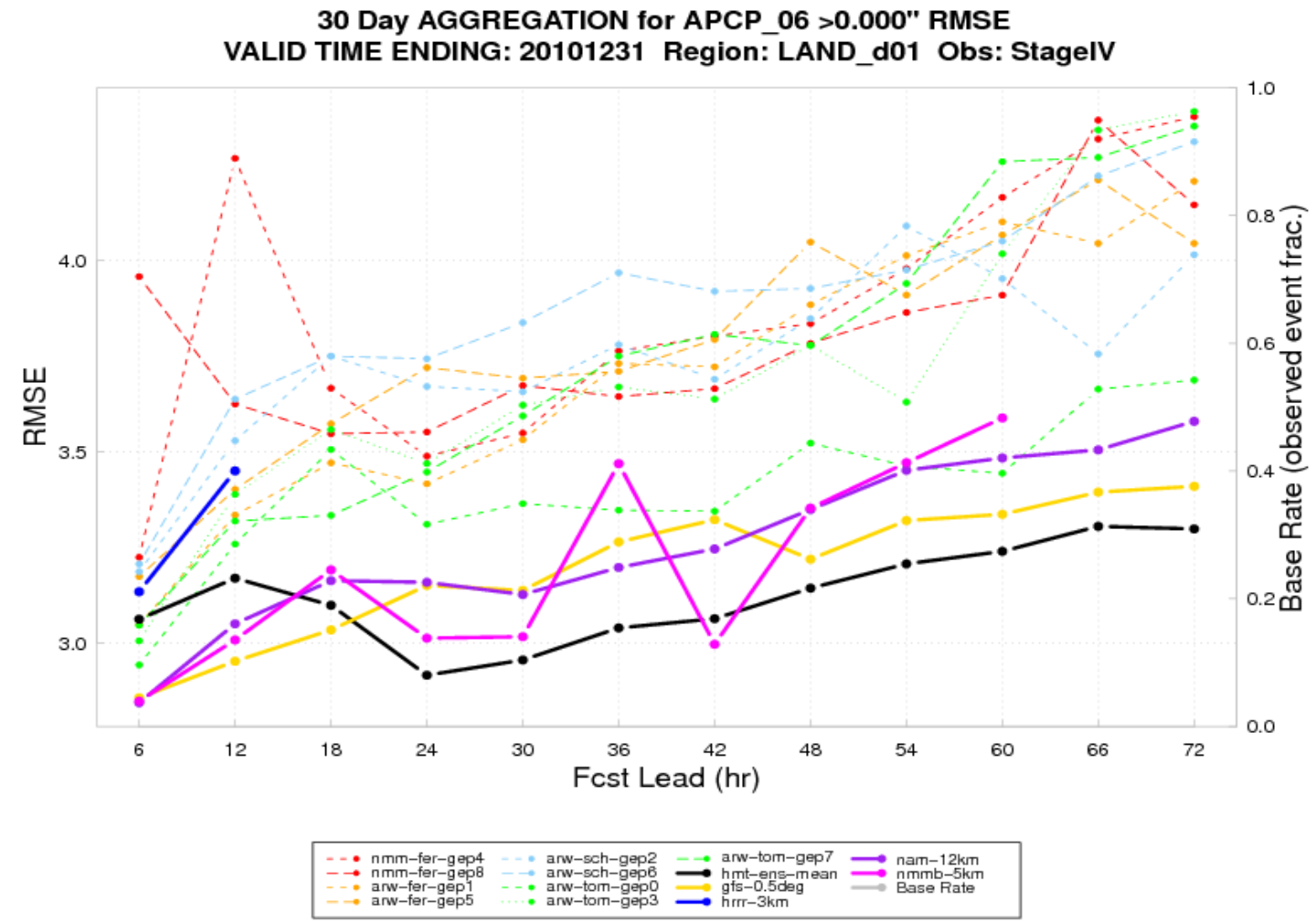
6 9 12 15 18 21 24 27 30 33 36 39 42 45 48 51 54 57 60 63 66 69 72 75
Lead Hour
Domain D01, Threshold >=2.540mm
GFS-D01
HMT-Ens-D01
Base Rate

Result



30-day aggregations, with multiple models and ensemble members, plotted over lead times