



METviewer Training

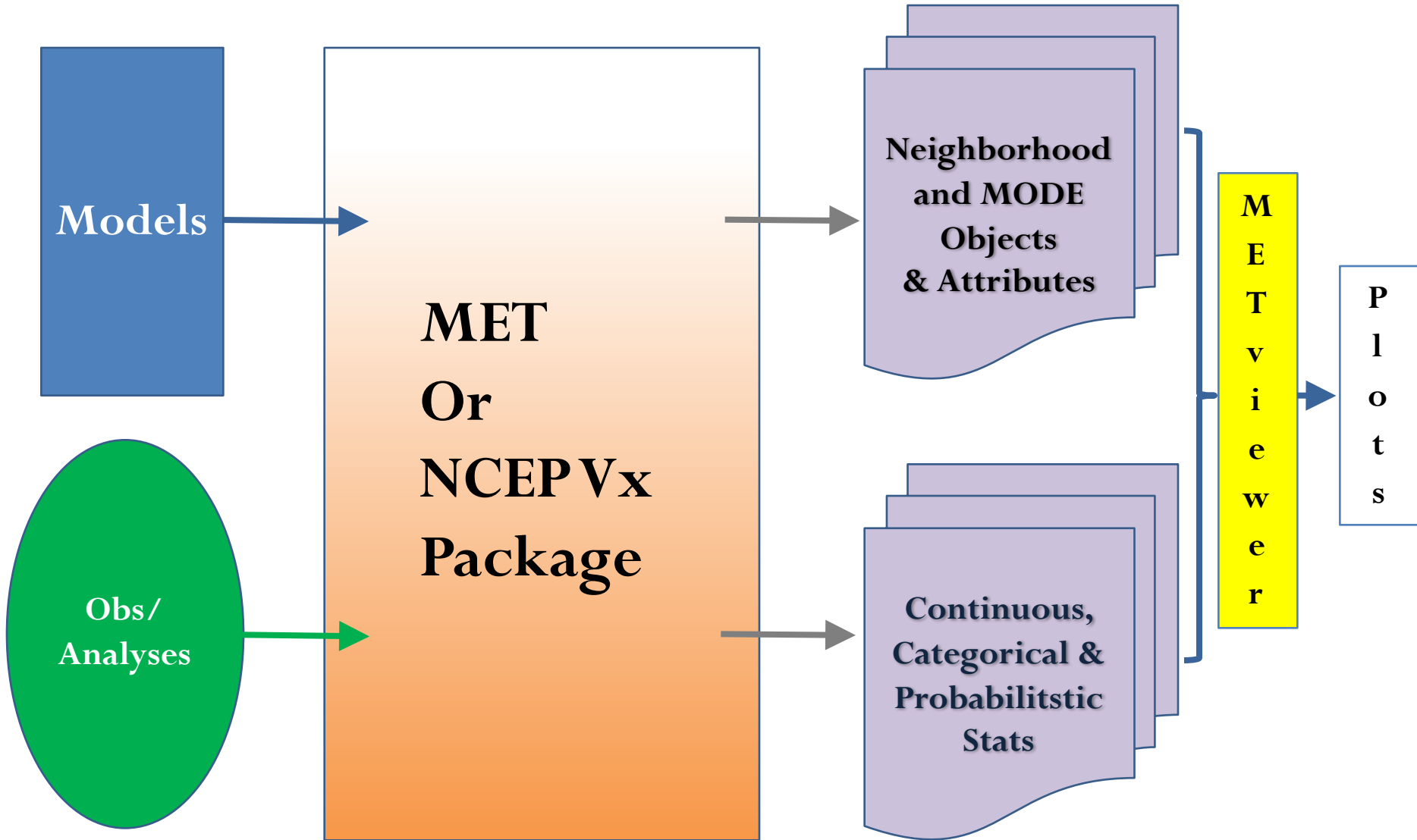


Developmental Testbed Center



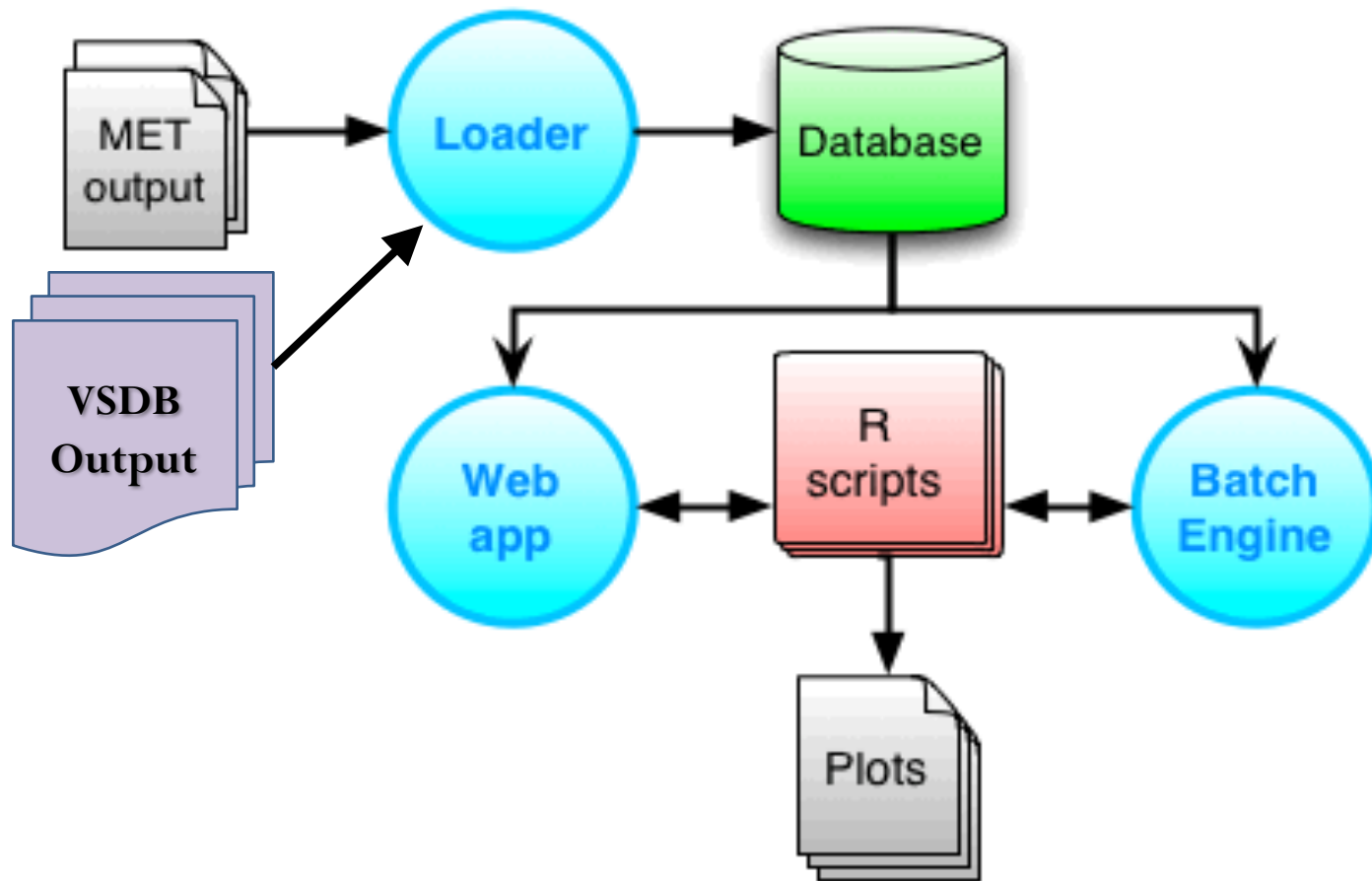
NCAR

Verification Dataflow



METviewer components

Packages: Java, Apache/Tomcat, MySQL, R statistics



What can be loaded into METviewer?

- STAT files (*.stat) files from MET packages
 - Grid-Stat
 - Point-Stat
 - Ensemble-Stat
 - MODE (.obj and ctc.stat)
 - MODE-TD (.obj and ctc.stat)
- VSDB files from NCEP verification packages
 - Grid-to-Obs
 - Grid-to-Obs_e*
 - Grid-to-Grid
 - Grid-to-Grid_e*

** Some variables in ensemble VSDB currently not available for loading but will be soon*

Interface Basics

General Layout

Focus on initial settings

Database: mv_det_sref_2013 Generate Plot Reload databases Load XML

Series **Box** Bar Rhist Phist Roc Rely Ens_ss

Plot Data: Stat Plot statistic: Median

Y1 Axis variables Y2 Axis variables

Y1 Dependent (Forecast) Variables:

TMP ME

Variable

Y1 Series Variables:

MODEL ens-16km-mp, ens-16km-std, ens-9km-std Group_y1_1

Series Variable

Fixed Values:

2013-05-01 00:00:00, 2013-05-02 00:00:00, 2013-05-03 00:00:00, 2013-05-04 00:00:00, 2013-05-05 00:00:00, 2013-05-06 00:00:00, 2013-05-07 00:00:00, 2013-05-08 00:00:00, 2013-05-09 00:00:00, 2013-05-10 00:00:00, 2013-05-11 00:00:00, 2013-05-12 00:00:00, 2013-05-13 00:00:00, 2013-05-14 00:00:00, 2013-05-15 00:00:00, 2013-05-16 00:00:00, 2013-05-17 00:00:00, 2013-05-18 00:00:00, 2013-05-19 00:00:00, 2013-05-20 00:00:00

FCST_INIT_BEG

Fixed Value

Plot Cond

20140722_151502

Plot XML Log R script R data SQL

Example for METViewer Interface

Temperature ME (K)

Load Hour

ens-16km-mp TMP ME ens-16km-std TMP ME ens-9km-std TMP ME

Titles & Labels Common Formatting X1 X2 Y1 Y2 Legend & Caption

Title: Example for METViewer Interface

X label: Load Hour

Y1 label: Temperature ME (K)

Y2 label:

Caption:

Series Formatting

#	Y axis	Hide	Title	Conf Interval	Line Color	Point Symbol	Series Line Type	Line Type	Line Width	Show Signifi	Connec Across	Legend Text
1	Y1	No	ens-16km-mp TMP ME	none	#FF0000	Small circle	joined lines	solid	1	No	Yes	
2	Y1	No	ens-16km-std TMP ME	none	#00FF7F	Small circle	joined lines	solid	1	No	Yes	
3	Y1	No	ens-9km-std TMP ME	none	#8000FF	Small circle	joined lines	solid	1	No	Yes	

View 1 - 3 of 3

METviewer

Click on down arrow to pick one or more databases

The screenshot shows the METviewer 2.8 web interface. At the top left, the version 'METviewer 2.8' is displayed with an information icon. A red oval highlights the 'Select databases' button, which includes a trash icon and a right-pointing arrow. To the right of this button is a 'Generate Plot' button. Below the navigation bar, there are tabs for different plot types: Series, Box, Bar, Roc, Rely, Ens_ss, Perf, Taylor, Hist, Eclv, and Contour. The 'Series' tab is active. The main content area is titled 'Plot Data: MODE' and contains several configuration sections: 'Y1 Axis variables' and 'Y2 Axis variables' tabs; 'Y1 Dependent (Forecast) Variables:' section with a trash icon, 'Select options' dropdown, 'Select ratio stat' dropdown, and a '+ Variable' button; 'Y1 Series Variables:' section with a trash icon, 'MODEL' dropdown, 'Select value' dropdown, and a 'Group_y1_1' checkbox; 'Fixed Values:' section with a '+ Fixed Value' button and an 'Event Equalizer' checkbox; a 'Plot Cond' text input field; 'Independent Variable:' section with 'FCST_LEAD' dropdown, 'Select value' dropdown, and an 'Equalize' checkbox; and finally, a 'Statistics:' section. On the right side, there is a vertical sidebar with a 'Plot' button and a list of options including 'N/A', 'Titles &', 'Title', 'X label', 'Y1 label', 'Y2 label', and 'Caption'.


METviewer

Click on down arrow to pick one or more databases

The screenshot shows the METviewer 2.8 interface. At the top, the title bar reads "METviewer 2.8" and a status bar indicates "2 selected". A red circle highlights the "2 selected" text. Below the title bar, there are tabs for "Series", "Box", "Bar", "Roc", "Rely", "Ens_ss", "Perf", and "Taylor". The "Series" tab is active. The main panel is divided into several sections: "Y1 Axis variables" and "Y2 Axis variables" (both currently empty), "Y1 Dependent (Forecast) Variables:" (containing "BCAPE" and "Select attribute stat"), "Y1 Series Variables:" (containing "MODEL" and "Select value"), "Fixed Values:" (containing "Fixed Value" and "Event Equalizer"), "Plot Cond" (empty), "Independent Variable:" (containing "FCST_LEAD" and "Select value"), and "Statistics:" (empty). A dropdown menu is open, listing various data sources: "Data Assimilation", "Hurricanes", "NOAA ESRL", "NOAA NCEP", "RAL Projects", "Regional Ensemble", "Verification", and "NO GROUP". The "NOAA NCEP" section is expanded, showing a list of variables with checkboxes: "mv_met_bblake_prob", "mv_namp_vsdb", "mv_ncep_ens", "mv_ncep_gfs_mode", "mv_ncep_gfs_mode_ee", "mv_ncep_gfs_mode_extra", "mv_ncep_gfs_mode_extra_ee", "mv_ncep_gfsx_2017", "mv_ncep_meso" (checked), "mv_ncep_meso_fho", and "mv_ncep_meso_sl1l2" (checked). On the right side, there are buttons for "Plot", "XML", "Log", and "R script". Below these, there is a "Titles & Labels" section with a table:

Titles & Labels	
Title	test title
X label	test x_label
Y1 label	test y_label
Y2 label	
Caption	

METviewer

METviewer 2.8  > 2 Click on tab to pick plot type

Series Box Bar Roc Rely Ens_ss Perf Taylor Hist Eclv Contour

Plot Data: MODE

Y1 Axis variables Y2 Axis variables

Y1 Dependent (Forecast) Variables:

Y1 Series Variables:

Group

Fixed Values:

Event Equalizer

Plot Cond

Independent Variable:

Statistics:

Series
Box
Bar
ROC
Reliability
Ensemble Spread-Skill
Performance Diagram
Taylor Diagram
Hist (Rhist, Phist, RELP)
ECLV
Contour


METviewer

If there is more than one type of data in a database, click to select statistic type Stat, MODE or MODE-TD

The screenshot displays the METviewer 2.8 interface. At the top, there is a header bar with the text "METviewer 2.8" and a "Select databases" button. Below this is a navigation bar with tabs for "Series", "Box", "Bar", "Roc", "Rely", "Ens_ss", "Perf", "Taylor", and "Hist". The "Series" tab is active. A red circle highlights the "Plot Data: Stat" dropdown menu, with a red number "3" next to it. Below the navigation bar, there are several configuration panels: "Y1 Axis variables" and "Y2 Axis variables" tabs; "Y1 Dependent (Forecast) Variables:" panel with "Select options" and "Select attribute stat" dropdowns; "Y1 Series Variables:" panel with "MODEL" and "Select value" dropdowns, and a "Group_y1_1" checkbox; "Fixed Values:" panel with a "Fixed Value" button and an "Event Equalizer" checkbox; "Independent Variable:" panel with "FCST_LEAD" and "Select value" dropdowns, and an "Equalize" checkbox; and "Statistics:" panel. On the right side, there is a "Plot" panel with a list of options: "Titles &", "Title", "X label", "Y1 label", "Y2 label", and "Caption".

METviewer

METviewer 2.8 

 Select databases >

Generate Plot

Series | Box | Bar | Roc | Rely | Ens_ss | Perf | Taylor | Hist | Eclv | Contour

N/A
Plot

4 Click on down arrow to pick variable then pick the statistic(s)



Y1 A: _____

Y1 Dependent (Forecast) Variables: 

 Select options  Select attribute stat

+ Variable

Y1 Series Variables: 

 MODEL  Select value Group_y1_1

+ Series Variable


Fixed Values: 

+ Fixed Value

Event Equalizer

Plot Cond

Independent Variable: 

FCST_LEAD  Select value Equalize

Statistics: 

< _____
Titles &
Title
X label
Y1 label
Y2 label
Caption

METviewer

METviewer 2.8 ? Select databases > Generate Plot

Series | Box | Bar | Roc | Rely | Ens_ss | Perf | Taylor | Hist | Eclv | Contour | N/A

Plot Data: Stat

Y1 Axis variables | Y2 Axis variables

Y1 Dependent (Forecast) Variables: ?

Select options Select attribute stat

MODEL Select value Group_y1_1

+ Series Variable

Plot Cond

Independent Variable: ?

FCST_LEAD Select value Equalize

Statistics: ?

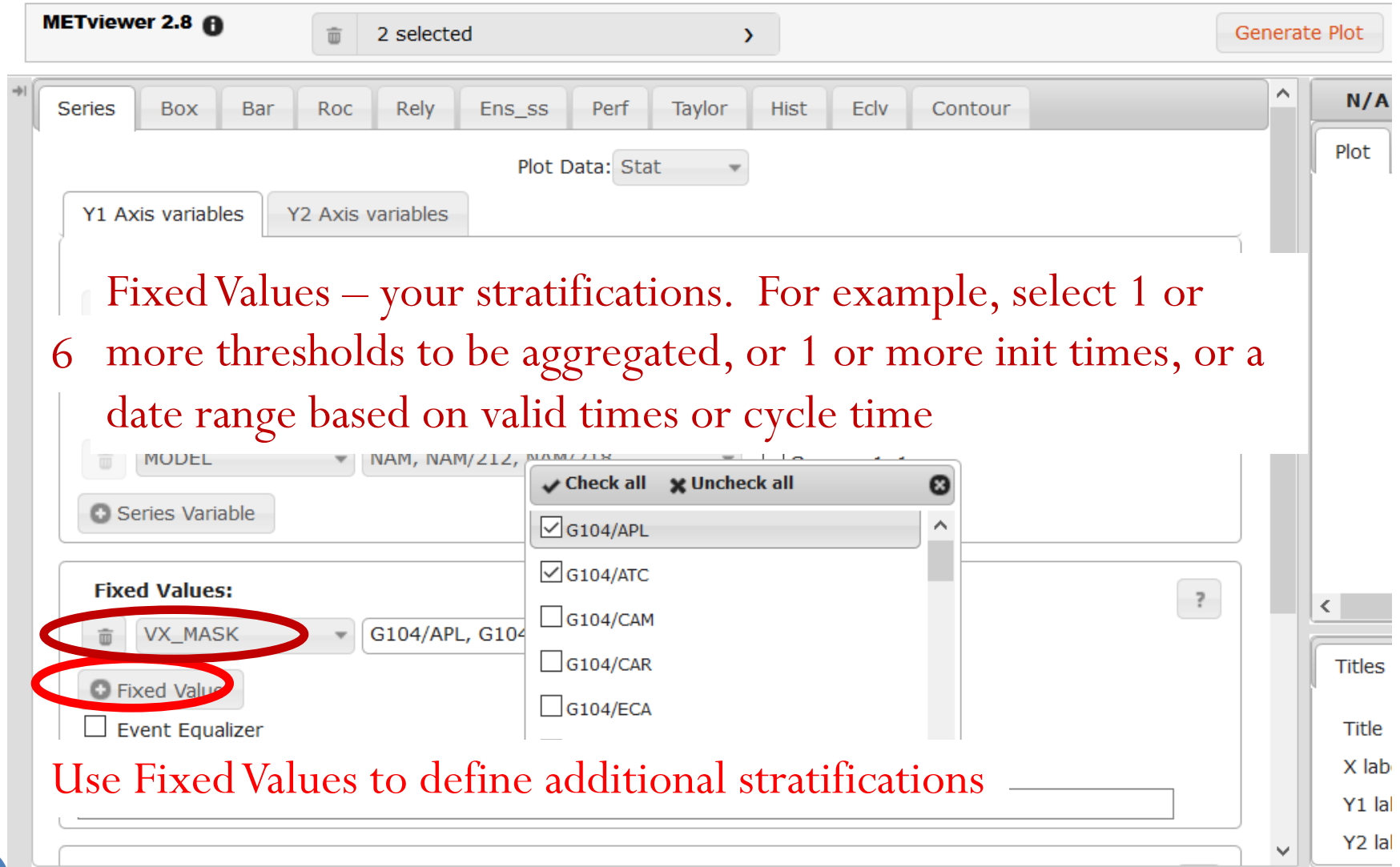
Titles & Labels: Titles &, Title, X label, Y1 label, Y2 label, Captions

5. Click on down arrow to what lines/boxes you want to include on Y-axis

Use Series Variable to define additional series

Click on Group if you want selections grouped into 1 series (e.g. leads 0+12 in group 1 and 24+36hr in group 2, etc...)

Stratifications



METviewer 2.8 2 selected Generate Plot

Series Box Bar Roc Rely Ens_ss Perf Taylor Hist Eclv Contour

Plot Data: Stat

Y1 Axis variables Y2 Axis variables

Fixed Values: VX_MASK G104/APL, G104/ATC

Series Variable

Event Equalizer

Check all Uncheck all

- G104/APL
- G104/ATC
- G104/CAM
- G104/CAR
- G104/ECA

Titles

Title

X lab

Y1 lab

Y2 lab

Use Fixed Values to define additional stratifications

METviewer

METviewer 2.8 2 selected Generate Plot

Y1 Series Variables:
MODEL NAM, NAM/212, NAM/218 Group_y1_1

Fixed Values:
 Fvent

Independent variable:
FCST_LEAD Select value Equalize

Statistics:
 Summary Aggregation statistics Revision statistics
None Plot statistic: Median

Series Formatting

#	Y axis	Hide	Title	Conf Interval	Line Color
1	Y1	No	NAM T BCRMSE	none	#ff0000
2	Y1	No	NAM/212 T BCRMSE	none	#8000ff
3	Y1	No	NAM/218 T BCRMSE	none	#00ff7f

<http://www.ral.ucar.edu/hurricanes/realtime/current/curve> Apply defaults Lock Formatting

7 Select dropdown arrow to choose what you want to plot against on the X-axis (Independent Variable)

METviewer

METviewer 2.8 ?



2 selected



Generate Plot

+ Variable

Y1 Series Variables:



MODEL

NAM, NAM/212, NAM/218

Group_y1_1

+ Series Variable

Fixed Values:

+ Fixed Value

Event Equalizer

Plot Cond

Independent Variable:

FCST_LEAD

0*, 3*, 6*

Statistics:

Summary Aggregation statis

None

Check all Uncheck all

- 0* Label: 0 Plot val:
- 1 Label: 1 Plot val:
- 2 Label: 2 Plot val:
- 3* Label: 3 Plot val:
- 4 Label: 4 Plot val:
- 5 Label: 5 Plot val:
- 6* Label: 6 Plot val:
- 7 Label: 7 Plot val:
- 8 Label: 8 Plot val:
- 9* Label: 9 Plot val:
- 10 Label: 10 Plot val:
- 11 Label: 11 Plot val:
- 12* Label: 12 Plot val:

N/A

Plot

Titles

Title
X lab
Y1 lab
Y2 lab

Series Formatting

#	Y axis	Hide	Title	Conf Interval	Line Color
1	Y1	No	NAM T BCRMSE	none	#ff0000
2	Y1	No	NAM/212 T BCRMSE	none	#8000ff
3	Y1	No	NAM/218 T BCRMSE	none	#00FF7F

+ Add Derived Curve



Remove Derived Curve



Apply defaults



Lock Formatting

How to compute statistics

METviewer 2.8

Variable

Y1 Series Vari

MODEL

8 Varia

Fixed Values:

Fixed Value

Event Equal

Plot Cond

Independent

FCST_LEAD Select value Equalize

Statistics

Summary Aggregation statistics Revision statistics

None Plot statistic: Median

Series Formatting

#	Y axis	Hide	Title	Conf Interval	Line Color
1	Y1	No	NAM T BCRMSE	none	#ff0000
2	Y1	No	NAM/212 T BCRMSE	none	#8000ff
3	Y1	No	NAM/218 T BCRMSE	none	#00ff7f

Apply defaults Lock Formatting

Summary – scores computed per each combination of fixed values and independent variable then mean or median taken

Aggregate statistics – accumulates SL1L2 lines or CTC counts prior to calculating the statistic

Revision statistics – basically looks at $dProg/dT$ for a given valid time

Summary vs. Aggregation

Summary for example

Computes RMSE for each day, fcst lead combination

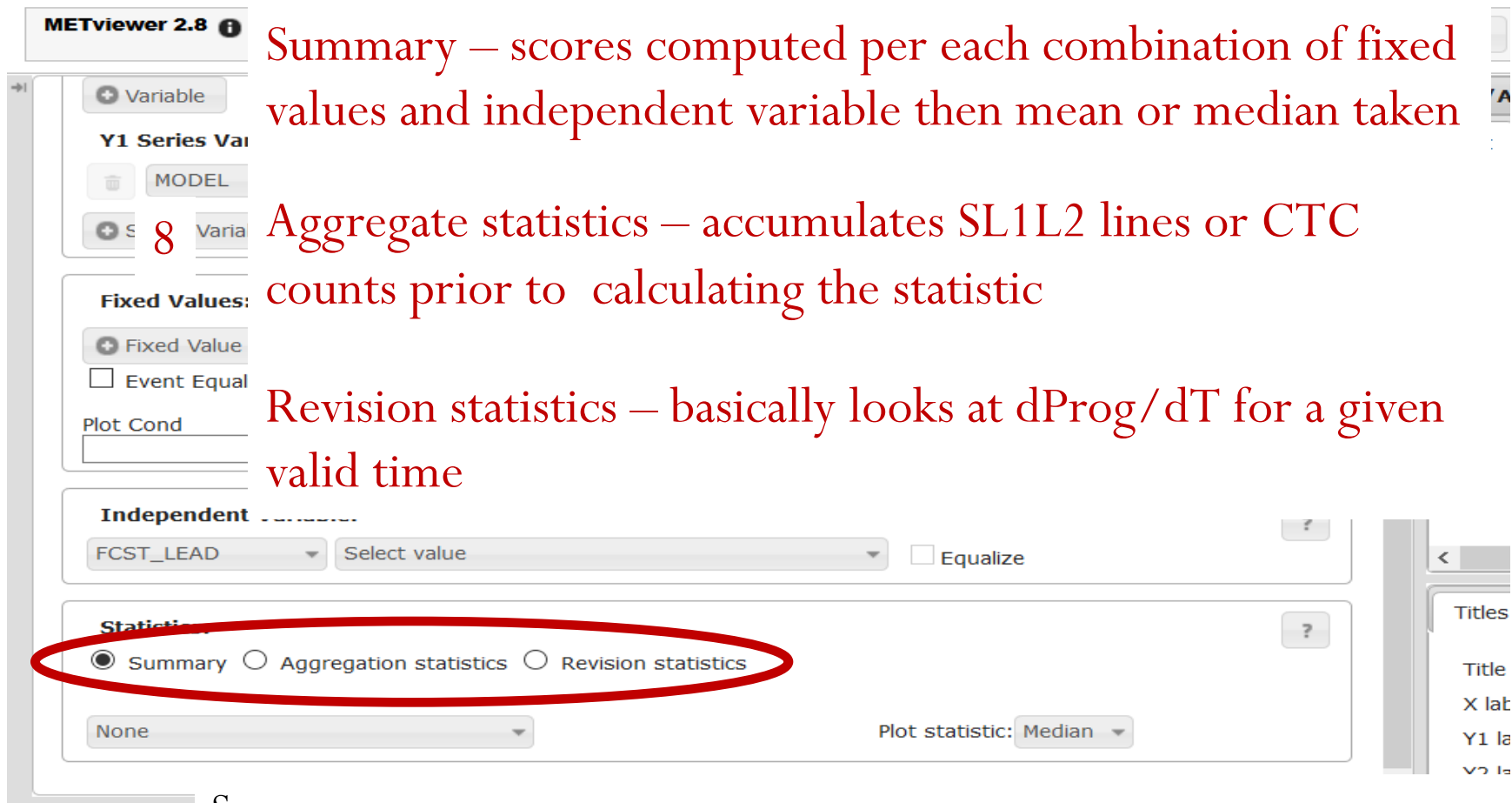
Aggregation
from partial sums

model	fcst_init_beg	lead	fcst_var	stat_name	stat_value	Mean	Median	Agg
GFS/212	8/5/2014 0:00	0	T	RMSE	0.917	0.876	0.883	0.878
GFS/212	8/6/2014 0:00	0	T	RMSE	0.815			
GFS/212	8/7/2014 0:00	0	T	RMSE	0.883			
GFS/212	8/8/2014 0:00	0	T	RMSE	0.823			
GFS/212	8/9/2014 0:00	0	T	RMSE	0.942			
GFS/212	8/4/2014 0:00	24	T	RMSE	1.211	1.180	1.127	1.182
GFS/212	8/5/2014 0:00	24	T	RMSE	1.125			
GFS/212	8/6/2014 0:00	24	T	RMSE	1.127			
GFS/212	8/7/2014 0:00	24	T	RMSE	1.308			
GFS/212	8/8/2014 0:00	24	T	RMSE	1.127			
GFS/212	8/3/2014 0:00	48	T	RMSE	1.919	1.533	1.561	1.547
GFS/212	8/4/2014 0:00	48	T	RMSE	1.390			
GFS/212	8/5/2014 0:00	48	T	RMSE	1.570			
GFS/212	8/6/2014 0:00	48	T	RMSE	1.226			
GFS/212	8/7/2014 0:00	48	T	RMSE	1.561			

Example:

Y1 Variable: RMSE **Y1 Series:** GFS/212 **Fixed:** 5 days, 0 UTC **X-axis:** 3 lead times

How to compute statistics



The screenshot shows the METviewer 2.8 interface. The 'Statistics' section is highlighted with a red oval, showing three radio button options: 'Summary' (selected), 'Aggregation statistics', and 'Revision statistics'. Below this, there is a dropdown menu set to 'None' and a 'Plot statistic' dropdown set to 'Median'. The 'Independent' section shows 'FCST_LEAD' selected in a dropdown menu, with a 'Select value' dropdown and an 'Equalize' checkbox. The 'Fixed Values' section has a 'Fixed Value' button and an 'Event Equal' checkbox. The 'Y1 Series Variable' section has a 'MODEL' button and a 'Variable' dropdown menu.

Summary – scores computed per each combination of fixed values and independent variable then mean or median taken

Aggregate statistics – accumulates SL1L2 lines or CTC counts prior to calculating the statistic

Revision statistics – basically looks at $dProg/dT$ for a given valid time

Summary:

None is if using MET output and statistics are already computed

Pick SL1L2 if plotting continuous statistics (RMSE, MAE etc...)

Pick CTC (aka FHO) if plotting categorical statistics (ETS, TSS, Freq. Bias etc...)

SAL1L2, VL1L2, VAL1L2, and Grad for S1 statistics

Series Form		
#	Y axis	H
1	Y1	
2	Y1	
3	Y1	

Aggregation and Bootstrapping

METviewer 2.8 2 selected Generate Plot

MODEL NAM, NAM/

Series Variable

Fixed Values:

Fixed Value

Event Equalizer

Plot Cond

Independent Variable:

FCST_LEAD 0*, 3*, 6* Equalize

Statistics:

Summary **Aggregation statistics** Revision statistics

None

1000 Bootstrapping replications

Bootstrapping seed

perc Confidence Interval method

Cache aggregation statistics

Series Formatting

#	Y axis	Hide	Title	Conf Interval	Line Color	Po
1	Y1	No	NAM T BCRMSE	none	#ff0000	S
2	Y1	No	NAM/212 T BCRMSE	none	#8000ff	S
3	Y1	No	NAM/218 T BCRMSE	none	#00ff7f	S

+ Add Derived Curve Remove Derived Curve Apply defaults Lock Formatting

Bootstrapping for confidence intervals, including setting confidence () available on the Aggregation Statistics Page – NOTE: you must also set CIs to true on the series you want them on

Revision Series

METviewer 2.8

2 selected

Generate Plot

Variable

Y1 Series Variables:

MODEL

NAM, NAM/2

Series Variable

Fixed Values:

Fixed Value

Event Equalizer

Plot Cond

Independent Variable:

FCST_VALID_BEG

0*, 3*, 6*

Equalize

Statistics:

Summary Aggregation statistics **Revision statistics**

None

Add Auto-Correlation

Add Wald-Wolfowitz Runs Test

Revision statistics – basically looks at $dProg/dT$ for a given valid time

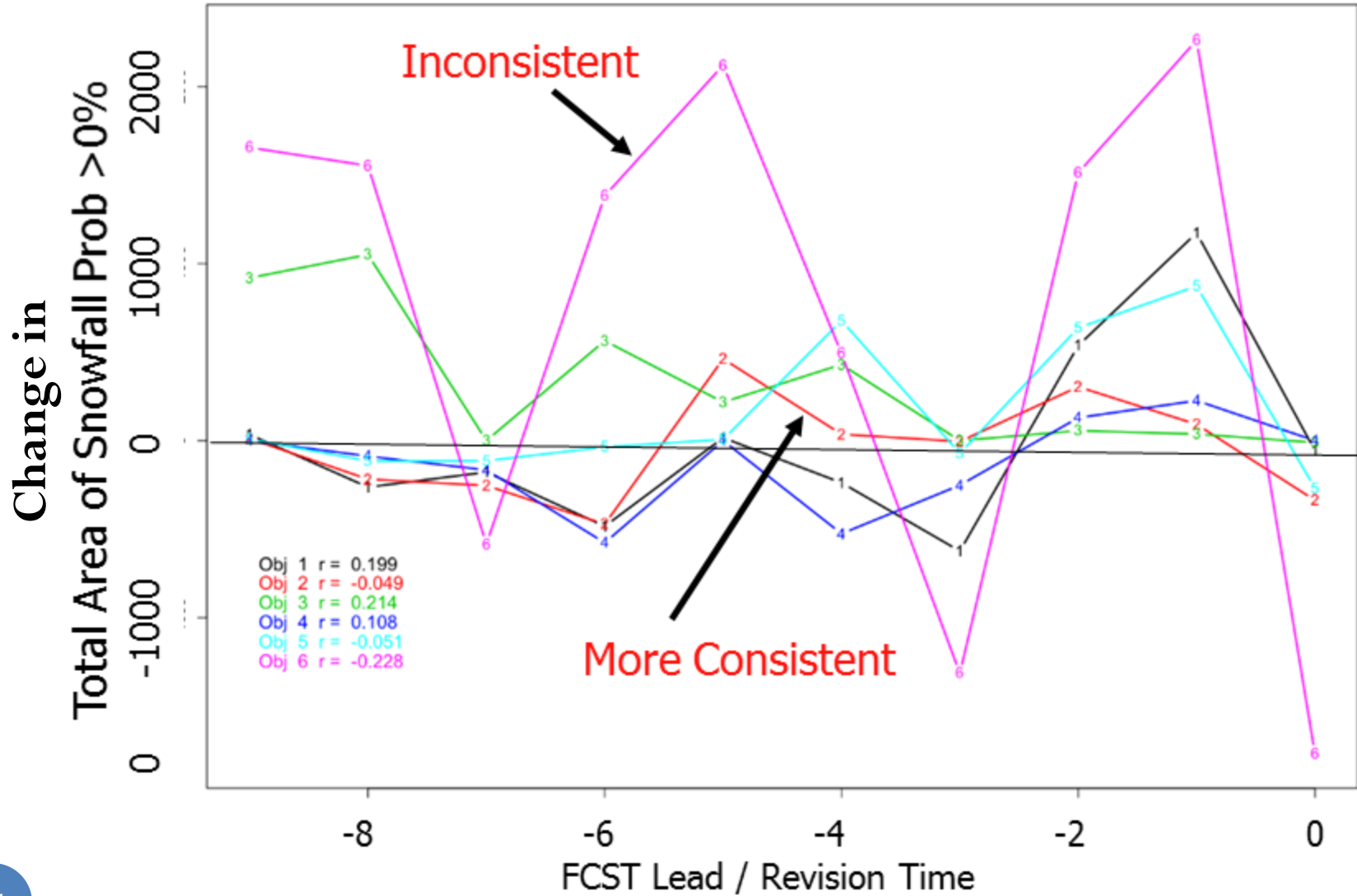
Can add a test to see how many

Series Formatting

#	Y axis	Hide	Title	Conf Interval	Line Color	P
1	Y1	No	NAM T BCRMSE	none	#ff0000	
2	Y1	No	NAM/212 T BCRMSE	none	#8000ff	
	Y1	No	NAM/218 T BCRMSE	none	#00FF7F	

Revision Series

January 22, 2016 Forecasts Valid at 18Z



Formatting Series

Series

Plot Data: Stat Plot statistic: Median

Y1 Axis variables Y2 Axis variables

Y1 Dependent (Forecast) Variables:

TMP ME

Variable

Y1 Series Variables:

MODEL ens-16km-mp, ens-16km-std, ens-9km-std Group_y1_1

Series Variable

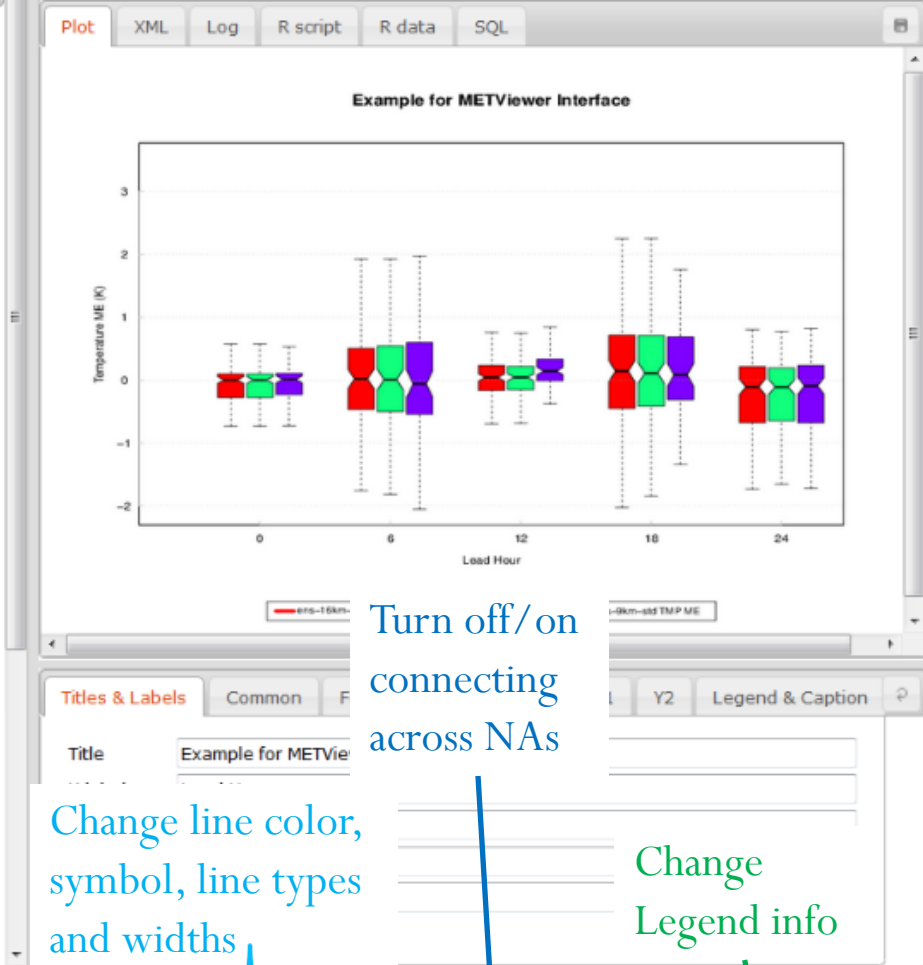
Fixed Values:

2013-05-01 00:00:00, 2013-05-02 00:00:00, 2013-05-03 00:00:00, 2013-05-04 00:00:00, 2013-05-05 00:00:00, 2013-05-06 00:00:00, 2013-05-07 00:00:00, 2013-05-08 00:00:00, 2013-05-09 00:00:00, 2013-05-10 00:00:00, 2013-05-11 00:00:00, 2013-05-12 00:00:00, 2013-05-13 00:00:00, 2013-05-14 00:00:00, 2013-05-15 00:00:00, 2013-05-16 00:00:00, 2013-05-17 00:00:00, 2013-05-18 00:00:00, 2013-05-19 00:00:00, 2013-05-20 00:00:00

FCST_INIT_BEG

Fixed Value

Plot Cond



Turn on Conf Intvls

Turn off/on connecting across NAs

Change line color, symbol, line types and widths

Change Legend info

Format Series

9

#	Y axis	Hide		Conf Interval	Line Color	Point Symbol	Series Line Type	Line Type	Line Width	Show Signifi	Conne Across NA	Legend Text
1	Y1	No	ens-16km-mp TMP ME	none	#FF0000	Small circle	joined lines	solid	1	No	Yes	
2	Y1	No	ens-16km-std TMP ME	none	#00FF7F	Small circle	joined lines	solid	1	No	Yes	
3	Y1	No	ens-9km-std TMP ME	none	#8000FF	Small circle	joined lines	solid	1	No	Yes	

Lock Formatting

Difference Curves and StatSignificance

Database: mv_ncep_meso_sl12 Generate Plot Reload databases Load XML

Series Box Bar Rhist Phist Roc Rely Ens_ss Perf

Plot Data: Stat

Y1 Axis variables Y2 Axis variables

Y1 Dependent (Forecast) Variables:

RH RMSE

Variable

Y1 Series Variables:

MODEL GFS/212, NAM/212 Group_y1_1

Series Variable

Fixed Values:

INIT_HOUR 00

VX_MASK G236

OBTYPE ONLYSF

20160506_031343

Plot XML Log R script R data SQL Y1 Points Y2 Points

Titles & Labels Common Formatting

Turn on Show Signif to have Statistically Significant differences highlighted

Add difference curve... Next to it is remove difference curve...

You might want to also turn on confidence intervals

Series Formatting

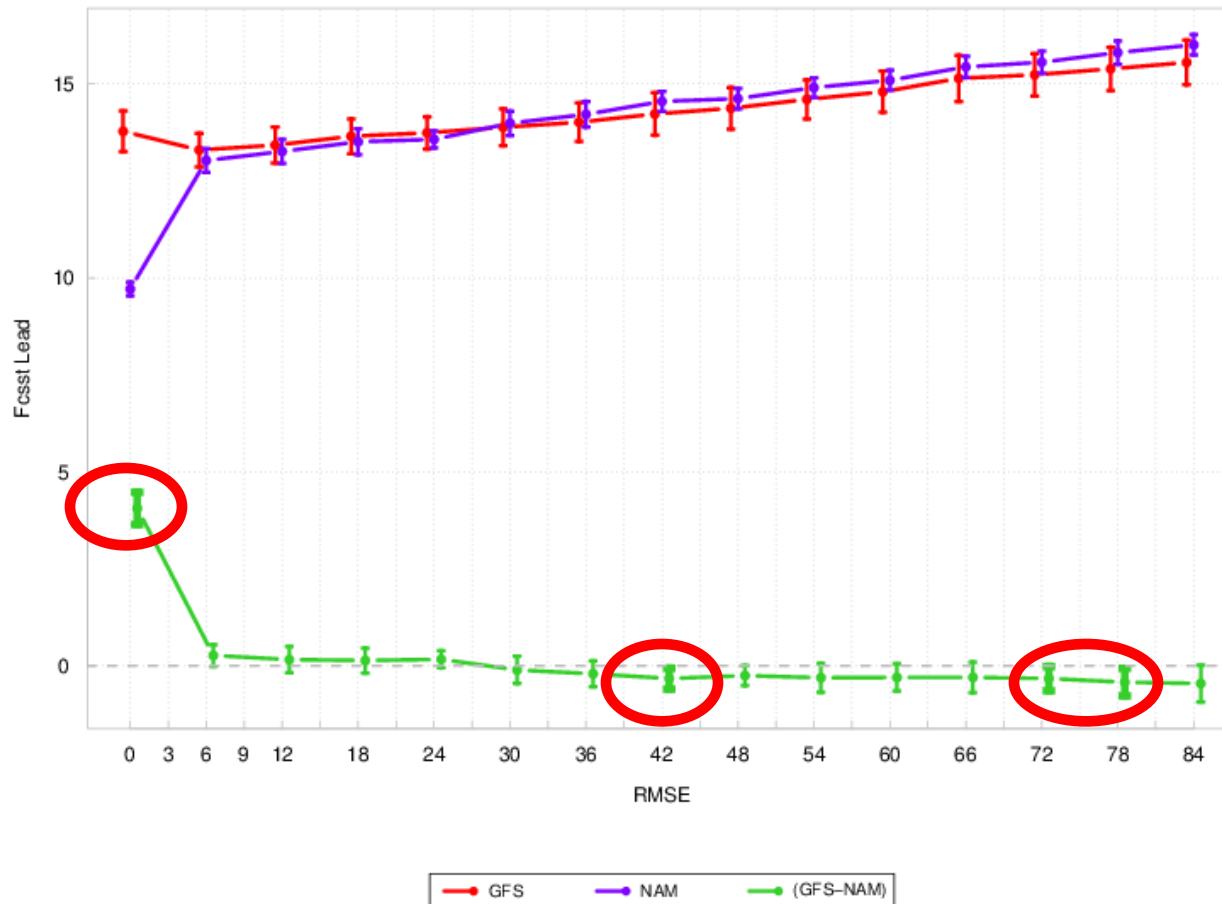
#	Y axis	Hide	Title	Conf Interval	Line Color	Point Symbol	Series Line Type	Line Type	Line Width	Show Significant	Connect Across NA	Legend Text
1	Y1	No	GFS/212 RH RMSE	std	#ff0000	Small circle	joined lines	solid	1	No	Yes	GFS
2	Y1	No	NAM/212 RH RMSE	std	#8000ff	Small circle	joined lines	solid	1	No	Yes	NAM
3	Y1	No	DIFF ("GFS/212 RH RMSE"- "NAM/212 RH RMSE")	std	32cd32	Small circle	joined lines	solid	1	Yes	Yes	(GFS-NAM)

+ Add Difference Curve Remove Difference Curve Apply default Lock Formatting

View 1 - 3 of 3

Statistically Significant Plot

GFS vs. NAM



Formatting the Plot

Database: mv_det_sref_2013 Generate Plot Reload databases Load XML

Series: Box Bar Rhist Phist Roc Rely Ens_ss

Plot Data: Stat Plot statistic: Median

Y1 Axis variables Y2 Axis variables

Y1 Dependent (Forecast) Variables:
 TMP ME

Y1 Series Variables:
 MODEL ens-16km-mp, ens-16km-std, ens-9km-std Group_y1_1

Fixed Values:
 FCST_INIT_BEG

2013-05-01 00:00:00, 2013-05-02 00:00:00, 2013-05-03 00:00:00, 2013-05-06 00:00:00, 2013-05-09 00:00:00, 2013-05-12 00:00:00, 2013-05-14 00:00:00, 2013-05-15 00:00:00, 2013-05-16 00:00:00, 2013-05-17 00:00:00, 2013-05-18 00:00:00, 2013-05-20 00:00:00

Titles, Axes, Legends, etc... 10

Common
 Staggering Points,
 Turn on removing Lag1 autocorrelation,
 Display number of stats

X1, X2, Y1, Y2 – set axis, font size, label orientation

Legend & Caption
 Set font size, location, text color

Formatting
 Plot size, image type, font size for titles, additional lines

Example for METViewer Interface

Titles & Labels Common Formatting X1 X2 Y1 Y2 Legend & Caption

Title Example for METViewer Interface
 X label
 Y1 label
 Y2 label
 Caption

Series Formatting

#	Y axis	Hide	Title	Conf Interval	Line Color	Point Sym
1	Y1	No	ens-16km-mp TMP ME	none	#FF0000	Small circle
2	Y1	No	ens-16km-std TMP ME	none	#00FF7F	Small circle
3	Y1	No	ens-9km-std TMP ME	none	#8000FF	Small circle

View 1 - 3 of 3

Series Box Bar Rhist Phist Roc Rely Ens_ss
 Plot Data: Stat Plot statistic: Median

Y1 Axis variables Y2 Axis variables

Y1 Dependent (Forecast) Variables:
 BCAPE BCRMSE

Y1 Series Variables:
 MODEL AKARW, AKNEST, AKNESTX Group_y1_1

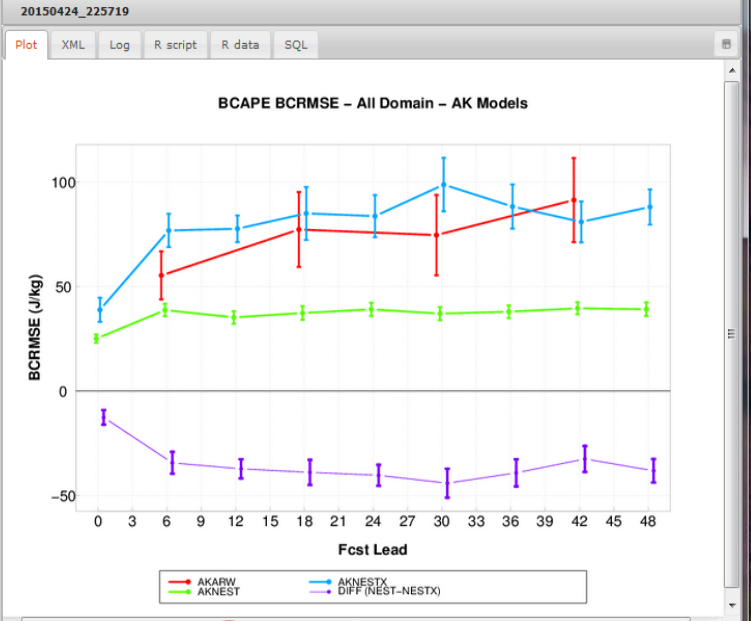
Fixed Values:
 Fixed Value

Plot Cond

Independent Variables:
 FCST_LEAD 0, 3, 6, 9, 12, 15, 18, 21, 24, 27, 30, 33, 36, 39, 42, 45, 48

Statistics:
 None Aggregation statistics Statistics Calculations

Contingency table count (CTC)
 Scalar partial sums (SL1L2)



Titles & Labels Comments **Formatting** X1 X2 Y1 Y2 Legend & Caption

Image Type png16m Width 8.5 Width 11
 Units in Text Magnification 1 Resolution 72
 Margins c(8, 4, 5, 4) Axis Margin Line c(1, 1, 0)

Title Formatting
 Horizontal align 0.5 Perpendicular offset -2
 Text Size 1.4 Text Weight bold

Grid Line Formatting
 Line Type dotted Line Width 1
 Line Color ccccc X positions listX

Plot Script Commands
 abline(h=0)

Under Formatting

abline(h=0) is what tells it to put a horizontal line at 0
 abline(h=1) would be horizontal at 1
 abline(v=0) would be vertical at 0 etc...



Series Formatting

#	Y axis	Hide	Title	Conf Interval	Line Color	Point Symbol	Series Line Type	Line Type	Line Width	Show Significant	Connect Across I/A	Legend Text
1	Y1	No	AKARW BCAPE BCRMSE	std	#f0000	Small circle	joined lines	solid	3	No	Yes	AKARW
2	Y1	No	AKNEST BCAPE BCRMSE	std	#55ff00	Small circle	joined lines	solid	3	No	Yes	AKNEST
3	Y1	No	AKNESTX BCAPE BCRMSE	std	#00aaff	Small circle	joined lines	solid	3	No	Yes	AKNESTX
4	Y1	No	DIFF ("AKNEST BCAPE BCRMSE"- "AKNESTX BCAPE BCRMSE")	std	#8000ff	Small circle	joined lines	solid	1	Yes	Yes	DIFF (NEST-NESTX)

Add Difference Remove Difference Apply Lock

View 1 - 4 of 4

METviewer History

Database: mv_det_sref_2013 Generate Plot Reload databases Load XML

Series **Box** Bar Rhist Phist Roc Rely Ens_ss

20140722_151502

Plot XML Log R script R data SQL

Example for METViewer Interface

Temperature ME (K)

10 24

Y1 Axis variable

Y1 Dependent

2013-05-03 00:00:00, 2013-05-04 00:00:00, 2013-05-05 00:00:00, 2013-05-06 00:00:00, 2013-05-07 00:00:00, 2013-05-08 00:00:00, 2013-05-09 00:00:00, 2013-05-10 00:00:00, 2013-05-11 00:00:00, 2013-05-12 00:00:00, 2013-05-13 00:00:00, 2013-05-14 00:00:00, 2013-05-15 00:00:00, 2013-05-16 00:00:00, 2013-05-17 00:00:00, 2013-05-18 00:00:00, 2013-05-19 00:00:00, 2013-05-20 00:00:00

FCST_INIT_BEG

Fixed Value

Plot Cond

History

All Success

20160413_203117

20160413_203030

20160413_202905

20160413_202603

Series Box

Ens_ss Perf

Y1 Y2 Legend & Caption

Y1 Axis variable

Y1 Dependent

Series Formatting

#	Y axis	Hide	Title	Conf Interval	Line Color	Point Symbol	Series Line Type	Line Type	Line Width	Show Signif	Conn Across NA	Legend Text
1	Y1	No	ens-16km-mp TMP ME	none	#FF0000	Small circle	joined lines	solid	1	No	Yes	
2	Y1	No	ens-16km-std TMP ME	none	#00FF7F	Small circle	joined lines	solid	1	No	Yes	
3	Y1	No	ens-9km-std TMP ME	none	#8000FF	Small circle	joined lines	solid	1	No	Yes	

Lock Formatting

View 1 - 3 of 3

METviewer History

The screenshot displays the METviewer web interface. At the top, the database is identified as 'mv_det_sref_2013'. A red circle highlights the 'Series' tab in the top navigation bar. The main plot area shows a line graph titled 'test title' with 'test_x_label' on the x-axis and 'test_y_label' on the y-axis. The plot contains several data series represented by different colored lines and markers. A red arrow points from the plot area to the 'Series' tab in the configuration window below. Another red arrow points from the 'Series' tab in the configuration window to the 'Series Formatting' table at the bottom.

The configuration window, titled '20160413_203117', displays an XML configuration for the plot. The XML content is as follows:

```
<?xml version="1.0" encoding="UTF-8" standalone="no"?>
<plot_spec>
  <connection>
    <host>mandan.rap.ucar.edu:3306</host>
    <database>mv_namp_vsdb</database>
    <user>*****</user>
    <password>*****</password>
  </connection>
  <rscrip>/usr/local/bin/Rscript</rscrip>
  <folders>
    <r_tmpl>/opt/vx/www/tomcat/webapps/metviewer/R_tmpl</r_tmpl>
    <r_work>/opt/vx/www/tomcat/webapps/metviewer/R_work</r_work>
    <plots>/d2/www/dtcenter/met/metviewer_output/plots</plots>
    <data>/d2/www/dtcenter/met/metviewer_output/data</data>
    <scrips>/d2/www/dtcenter/met/metviewer_output/scrips</scrips>
  </folders>
  <plot>
    <template>series_plot.R_tmpl</template>
    <dep>
      <dep1>
        <fcst var name="VIS">

```

Below the plot, there is a legend for the series:

- NAM 1000
- NAM 3000
- NAM 5000
- NAM 1000
- NAM 3000
- NAM 5000

The 'Series Formatting' table at the bottom provides details for each series:

#	Y axis	Hide	Title	Conf Interval	Line Color	Point Symbol	Series Line Type	Line Type	Line Width	Show Signif	Conne Across NA	Legend Text
1	Y1	No	ens-16km-mp TMP ME	none	#FF0000	Small circle	joined lines	solid	1	No	Yes	
2	Y1	No	ens-16km-std TMP ME	none	#00FF7F	Small circle	joined lines	solid	1	No	Yes	
3	Y1	No	ens-9km-std TMP ME	none	#8000FF	Small circle	joined lines	solid	1	No	Yes	

METviewer

Save Plots, XML,
Data, Rscripts, etc

**Based on which tab is selected

Database: mv_det_sref_2013 Generate Plot Reload databases Load XML

Series **Box** Bar Rhist Phist Roc Rely Ens_ss

Plot Data: Stat Plot statistic: Median

Y1 Axis variables Y2 Axis variables

Y1 Dependent (Forecast) Variables:

TMP ME

Variable

Y1 Series Variables:

MODEL ens-16km-mp, ens-16km-std, ens-9km-std Group_y1_1

Series Variable

Fixed Values:

2013-05-01 00:00:00, 2013-05-02 00:00:00, 2013-05-03 00:00:00, 2013-05-04 00:00:00, 2013-05-05 00:00:00, 2013-05-06 00:00:00, 2013-05-07 00:00:00, 2013-05-08 00:00:00, 2013-05-09 00:00:00, 2013-05-10 00:00:00, 2013-05-11 00:00:00, 2013-05-12 00:00:00, 2013-05-13 00:00:00, 2013-05-14 00:00:00, 2013-05-15 00:00:00, 2013-05-16 00:00:00, 2013-05-17 00:00:00, 2013-05-18 00:00:00, 2013-05-19 00:00:00, 2013-05-20 00:00:00

FCST_INIT_BEG

Fixed Value

Plot Cond

20140722_151502

Plot XML Log R script R data SQL

Example for METViewer Interface

Temperature ME (K)

Lead Hour

ens-16km-mp TMP ME ens-16km-std TMP ME ens-9km-std TMP ME

Titles & Labels Common Formatting X1 X2 Y1 Y2 Legend & Caption

Title: Example for METViewer Interface

X label: Lead Hour

Y1 label: Temperature ME (K)

Y2 label:

Caption:

Series Formatting

#	Y axis	Hide	Title	Conf Interval	Line Color	Point Symbol	Series Line Type	Line Type	Line Width	Show Signifi	Connec ACROSS	Legend Text
1	Y1	No	ens-16km-mp TMP ME	none	#FF0000	Small circle	joined lines	solid	1	No	Yes	
2	Y1	No	ens-16km-std TMP ME	none	#00FF7F	Small circle	joined lines	solid	1	No	Yes	
3	Y1	No	ens-9km-std TMP ME	none	#8000FF	Small circle	joined lines	solid	1	No	Yes	

View 1 - 3 of 3

METviewer

Upload XML scripts
from your system

Database: mv_det_sref_2013 Generate Plot Reload databases Load XML

Series: Box Bar Rhist Phist Roc Rely Ens_ss

Plot Data: Stat Plot statistic: Median

Y1 Axis variables Y2 Axis variables

Y1 Dependent (Forecast) Variables: TMP ME

Y1 Series Variables: MODEL ens-16km-mp, ens-16km-std, ens-9km-std Group_y1_1

Fixed Values: 2013-05-01 00:00:00, 2013-05-02 00:00:00, 2013-05-03 00:00:00, 2013-05-04 00:00:00, 2013-05-05 00:00:00, 2013-05-06 00:00:00, 2013-05-07 00:00:00, 2013-05-08 00:00:00, 2013-05-09 00:00:00, 2013-05-10 00:00:00, 2013-05-11 00:00:00, 2013-05-12 00:00:00, 2013-05-13 00:00:00, 2013-05-14 00:00:00, 2013-05-15 00:00:00, 2013-05-16 00:00:00, 2013-05-17 00:00:00, 2013-05-18 00:00:00, 2013-05-19 00:00:00, 2013-05-20 00:00:00

FCST_INIT_BEG

Plot Cond

20140722_151502

Plot XML Log R script R data SQL

Example for METViewer Interface

Temperature ME (K)

Lead Hour

ens-16km-mp TMP ME ens-16km-std TMP ME ens-9km-std TMP ME

Titles & Labels Common Formatting X1 X2 Y1 Y2 Legend & Caption

Title: Example for METViewer Interface

X label: Lead Hour

Y1 label: Temperature ME (K)

Y2 label:

Caption:

Series Formatting

#	Y axis	Hide	Title	Conf Interval	Line Color	Point Symbol	Series Line Type	Line Type	Line Width	Show Signifi	Connec Across	Legend Text
1	Y1	No	ens-16km-mp TMP ME	none	#FF0000	Small circle	joined lines	solid	1	No	Yes	
2	Y1	No	ens-16km-std TMP ME	none	#00FF7F	Small circle	joined lines	solid	1	No	Yes	
3	Y1	No	ens-9km-std TMP ME	none	#8000FF	Small circle	joined lines	solid	1	No	Yes	

View 1 - 3 of 3

METviewer

Database: mv_det_sref_2013 Generate Plot Reload databases Load XML

Series: Box Bar Hist Phist Roc

Plot Data: Stat

Y1 Axis variables Y2 Axis variables

Y1 Dependent (Forecast) Variables: TMP ME

Y1 Series Variables: MODEL ens-16km-mp, ens-16km-std, ens-9km-std Group_y1_1

Fixed Values: 2013-05-01 00:00:00, 2013-05-02 00:00:00, 2013-05-03 00:00:00, 2013-05-04 00:00:00, 2013-05-05 00:00:00, 2013-05-06 00:00:00, 2013-05-07 00:00:00, 2013-05-08 00:00:00, 2013-05-09 00:00:00, 2013-05-10 00:00:00, 2013-05-11 00:00:00, 2013-05-12 00:00:00, 2013-05-13 00:00:00, 2013-05-14 00:00:00, 2013-05-15 00:00:00, 2013-05-16 00:00:00, 2013-05-17 00:00:00, 2013-05-18 00:00:00, 2013-05-19 00:00:00, 2013-05-20 00:00:00

Plot Cond

Plot Data: Choose between Stat and MODE

for METViewer Interface

Titles & Labels: Common Formatting X1 X2 Y1 Y2 Legend & Caption

Title: Example for METViewer Interface

X label: Lead Hour

Y1 label: Temperature ME (K)

Y2 label:

Caption:

Series Formatting

#	Y axis	Hide	Title	Conf Interval	Line Color	Point Symbol	Series Line Type	Line Type	Line Width	Show Signifi	Connec Across	Legend Text
1	Y1	No	ens-16km-mp TMP ME	none	#FF0000	Small circle	joined lines	solid	1	No	Yes	
2	Y1	No	ens-16km-std TMP ME	none	#00FF7F	Small circle	joined lines	solid	1	No	Yes	
3	Y1	No	ens-9km-std TMP ME	none	#8000FF	Small circle	joined lines	solid	1	No	Yes	

View 1 - 3 of 3

MODE Interface

Database: mv_ncep_gfs_mode_extra Generate Plot Reload databases Load XML

History: All Success

Series: Box Bar Rhist Phist Roc Rely Ens_ss Perf

Plot Data: MODE

Y1 Axis variables Y2 Axis variables

Y1 Dependent (Forecast) Variables:

APCP_24 Select ratio stat Fcst Simple Matched
 CNTSUM Diff Obs Cluster Unmatched

Variable

Y1 Series Variables:

MODEL ECMG4, GFS_T1534 Group_y1_1

Series Variable

Fixed Values:

FCST_THR >=20.000

Fixed Value

Plot Cond

Independent Variables:

FCST_LEAD 360000, 600000, 840000, 1080000, 1320000, 1560000, 1800000

Statistics

20160506_042455

Plot XML Log R script R data SQL Y1 Points Y2 Points

MODE Total Objects

Forecast Lead	ECMG4 APCP_24 CNTSUM_AAA	GFS_T1534 APCP_24 CNTSUM_AAA
36	960	960
60	960	950
84	950	940
108	920	950
132	890	940
156	890	850
180	820	860

Titles & Labels: Common Formatting X1 X2 Y1 Y2 Legend & Caption

Title: MODE Total Objects

X label: Forecast Lead

Y1 label: Total Count

Y2 label:

Caption:

Series Formatting

#	Y axis	Hide	Title	Conf Interval	Line Color	Point Symbol	Series Line Type	Line Type	Line Width	Show Significant	Connect Across NA	Legend Text
1	Y1	No	ECMG4 APCP_24 CNTSUM_AAA	none	#FF0000	Small circle	joined lines	solid	1	No	Yes	
2	Y1	No	GFS_T1534 APCP_24 CNTSUM_AAA	none	#8000FF	Small circle	joined lines	solid	1	No	Yes	

+ Add Difference Curve Remove Difference Curve Apply defaults Lock Formatting

View 1 - 2 of 2

METviewer

- **NCAR Instance (public):**
 - <http://www.dtcenter.org/met/metviewer/metviewer1.jsp>
- **NCEP Instance (inside firewall):**
 - <http://metviewerdev.ncep.noaa.gov/metviewer1.jsp>

Databases

Each person can maintain their own (or several) databases within METviewer

For example:

mv_MMB_f2o (could have sl1l2 and fho in same database)

or

mv_MMB_sl1l2_f2o

mv_MMB_fho_f2o

mv_SREF_g2oe (could have data for rank histograms, reliability curves, roc diagrams, spread vs. skill diagrams and ensemble mean statistics all in the same database)

mv_GMB_g2o

mv_GMB_mode

Databases must have “mv_” at the beginning of name
to be recognized by the user interface

Databases

Currently data must be in same database to be plotted together

Partitioning of individual databases to speed up performance is possible – send request to met_help@ucar.edu.

To gain permission to load data into your own database, send a request to NCO helpdesk and ask for access to METviewer

Databases must have “mv_” at the beginning of name
to be recognized by the user interface

GUI Help

The screenshot shows the METViewer v1.10 web application interface. The browser address bar shows the URL <http://www.dtccenter.org/met/metviewer/metviewer1.jsp>. The application title is "METViewer 1.10" and the database is set to "mv_aerocivil".

Annotations highlight key features:

- Release Info:** A callout box pointing to the application version information.
- Access to other help:** A callout box pointing to question mark icons next to various configuration sections.
- Mouse over statistic to get tooltip about what the acronym means:** A callout box pointing to the "CSI" variable in the Y1 Axis variables list, with a tooltip that reads "Critical Success Index, aka Threat Score".

The interface includes several configuration panels:

- Y1 Axis variables:** A list of variables including ACC, BAGSS, BASER, CSI (checked), EDI, EDS, and MODEL. A "Check all" button is present.
- Fixed Values:** A section for setting fixed values and an "Event Equalizer" checkbox.
- Independent Variables:** A section for selecting independent variables and an "Equalize" checkbox.
- Statistics:** A section for selecting statistics, with "Summary" selected and "Aggregation statistics" as an option.
- Plot Data:** A dropdown menu set to "Stat".
- Plot statistic:** A dropdown menu set to "Median".

The right side of the interface shows a plot area labeled "N/A" and a "Titles & Labels" panel with fields for Title, X label, Y1 label, Y2 label, and Caption.

The bottom of the interface features a "Series Formatting" table with columns for #, Y axis, Hide, Title, Conf Interval, Line Color, Point Symbol, Series Line Type, Line Type, Line Width, Show Significan, Connect Across NA, and Legend Text. Below the table are buttons for "+ Add Derived Curve", "Remove Derived Curve", "Apply defaults", and "Lock Formatting".

METviewer Documentation

- <http://www.dtcenter.org/met/metviewer/doc/index.html>

The screenshot shows the METviewer 2.2 software interface. The top bar includes the title 'METviewer 2.2', a database dropdown set to 'mv_aerocivil', a 'Generate Plot' button, and 'Reload databases' and 'Load X' buttons. The main workspace is divided into several sections: 'Series' (with tabs for Box, Bar, Roc, Rely, Ens_ss, Perf, Taylor, Hist, Eclv), 'Y1 Axis variables' and 'Y2 Axis variables' (with a 'Plot Data: Stat' dropdown), 'Y1 Dependent (Forecast) Variables' (containing 'APCP_03' and 'Select attribute stat'), 'Y1 Series Variables' (containing 'MODEL' and 'Select value'), and 'Fixed Values' (containing 'Fixed Value' and 'Event Equalizer'). A 'Plot Cond' field is also present. A 'Series Formatting' table is visible at the bottom. A 'Help' window is open on the right, displaying documentation for various parameters: <agg_s1112>, <agg_pct>, <boot_repl>, <boot_ci>, <eveq_dis>, and <cache_agg_stat>. A red box highlights a question mark icon in the 'Y1 Dependent (Forecast) Variables' section, and a larger red oval highlights the 'Help' window.

Database: mv_aerocivil Generate Plot Reload databases Load X

Series Box Bar Roc Rely Ens_ss Perf Taylor Hist Eclv

Plot Data: Stat

Y1 Axis variables Y2 Axis variables

Y1 Dependent (Forecast) Variables: ?

APCP_03 Select attribute stat

Variable

Y1 Series Variables: ?

MODEL Select value Group_y1_1

Series Variable

Fixed Values: ?

Fixed Value

Event Equalizer

Plot Cond

Series Formatting

Y axis Hide Title Conf Interval Line Color Point Symbol Series Line Type Line type Line width Show Significa Across NA Legend text

Help

CTCs

<agg_s1112>: TRUE or FALSE, indicating whether or not to aggregate SL1L2s

<agg_pct>: TRUE or FALSE, indicating whether or not to aggregate PCTs

<boot_repl>: number of bootstrapping replications, use 1 for no bootstrapping

<boot_ci>: type of confidence interval to calculate, passed to boot.ci() R function (e.g. bca)

<eveq_dis>: TRUE or FALSE, disables the automatic event equalization that occurs when bootstrap confidence intervals are requested

<cache_agg_stat>: true or false, turns on/off the prevention the reuse of existing bootstrapping output data

When using <agg_stat>, the following constraints and conditions apply:

Open in new window Cancel

What's available

- <http://www.dtcenter.org/met/metviewer/doc/index.html>

Location: Home

METViewer Documentation

This site contains documentation for the METViewer plotting system:

[Release page](#)

[Installing METViewer](#)

[Database Loading Module - mv_load](#)

[Batch Plotting Module - mv_batch](#)

[Database Scrubbing Module - mv_prune](#)

[Scorecard Module - mv_scorecard](#)

[Common XML Structures](#)

[Web Service XML API](#)

[Testing Module - mv_test](#)

The [JIRA site](#) for METViewer contains information about open and fixed bugs

What can be loaded into METviewer?

- STAT files (*.stat) files from MET packages
 - Grid-Stat
 - Point-Stat
 - Ensemble-Stat
 - MODE
- VSDB files from NCEP verification packages
 - Grid-to-Obs
 - Grid-to-Obs_e*
 - Grid-to-Grid
 - Grid-to-Grid_e*
 - Precip

** Some variables in ensemble VSDB currently not available for loading but will be soon*

NCEP's METviewer Instance

<http://vm-lnx-metviewdev-app1.ncep.noaa.gov:8080/met/metviewer.jsp>

You can also play with some sample data at:

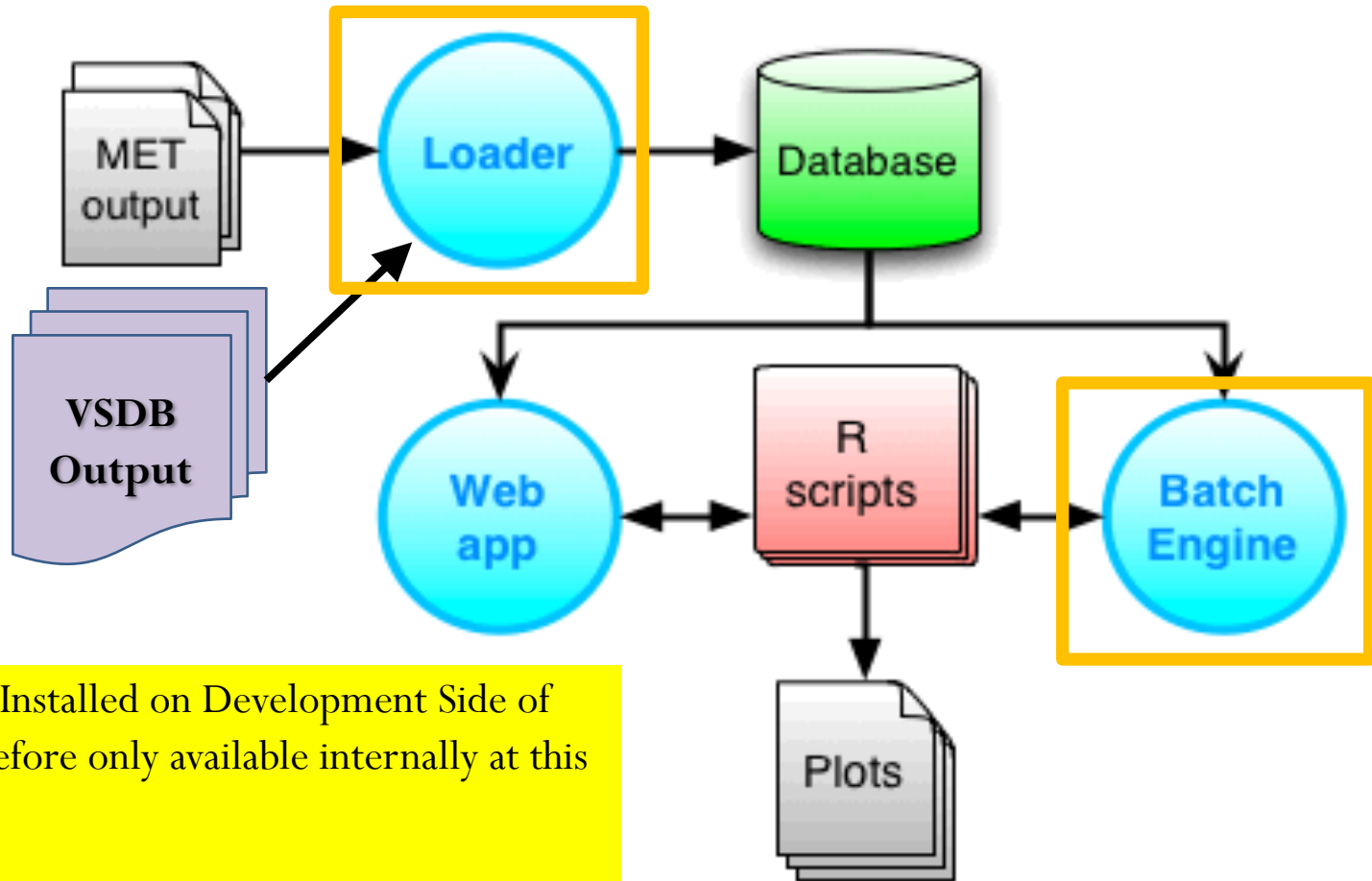
<http://www.dtcenter.org/met/metviewer.jsp>

Always Set in Load or Batch XML:

1. Server
2. Database

METviewer components

Packages: Java, Apache/Tomcat, MySQL, R statistics



At NCEP: Installed on Development Side of IDP – therefore only available internally at this time

Local initial adopters: Perry, Jacob, Tracey, Binbin, Ying

Loading

- To be able to load your own data – send a helpdesk ticket to NCO requesting access to METviewer
- They will get approval from your supervisor
- They will then give you an account on the staging and computing areas and give you instructions on how to use the metviewer account to load data
- *Storage in staging area is limited so please clean up after yourself when loading*

Loading

Loading XML script examples may be found in: /usr1/metviewer

```
/usr1/metviewer/load_test.xml_fulldata
```

Entries you need to change are:

```
<database>mv_{your-favorite-name} </database>
```

```
<folder_tmpl> /metviewer/staging/ {path-to-model} / {model}
```

#note {model} is either the last directory before you get to your .vsdb or .stat files or could be part of a filename. It can also be called whatever is meaningful to you (e.g. var, region, etc...). The example below assumes you have .vsdb or .stat files in 3 different directories for the operational model, a parallel version 1 and a parallel version 2.

```
<field name="model">
```

```
    <val>model</val>
```

```
    <val>model-parallel1</val>
```

```
    <val>model-parallel2</val>
```

```
</field>
```

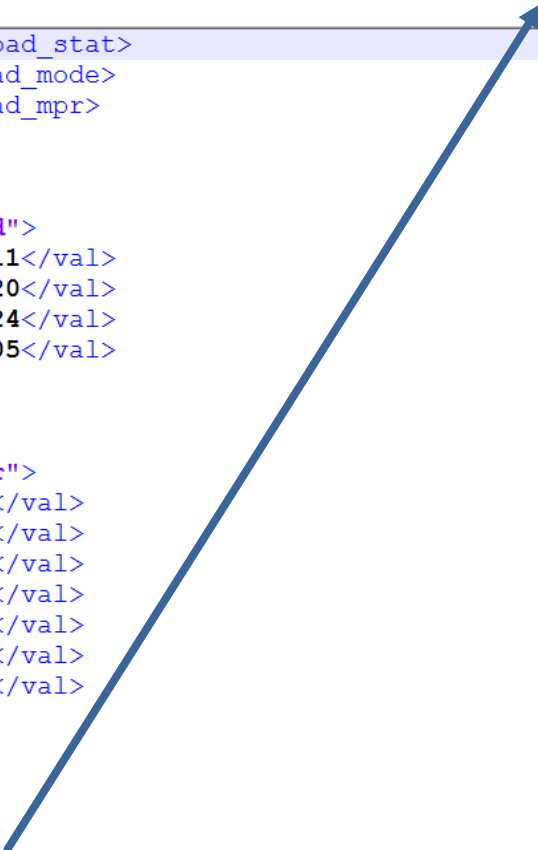
Loading

```
1 <load_spec>
2   <connection>
3     <host>mandan</host>
4     <database>mv_af_mode_a16</database>
5     <user>mvuser</user>
6     <password>mvuser</password>
7   </connection>
8
9     <folder_tmp>/d3/personal/jensen/AF/met_out_{thr}/{ymd}/{combo}</folder_
10
11     <met_version>V5.1</met_version>
12
13     <verbose>true</verbose>
14     <insert_size>1</insert_size>
15     <stat_header_db_check>false</stat_header_db_check>
16     <mode_header_db_check>true</mode_header_db_check>
17     <drop_indexes>false</drop_indexes>
18     <apply_indexes>true</apply_indexes>
19     <load_stat>false</load_stat>
20     <load_mode>true</load_mode>
21     <load_mpr>false</load_mpr>
22
23
24   <load_val>
25     <field name="ymd">
26       <val>20151111</val>
27       <val>20160120</val>
28       <val>20160424</val>
29       <val>20160805</val>
30     </field>
31   </load_val>
32   <load_val>
33     <field name="thr">
34       <val>r25t20</val>
35       <val>r25t80</val>
36     </field>
37   </load_val>
38 </load_spec>
```

In mv 2.7
<group>Verification</group>

Loading

```
19 <load_stat>false</load_stat>
20 <load_mode>true</load_mode>
21 <load_mpr>false</load_mpr>
22
23
24 <load_val>
25   <field name="ymd">
26     <val>20151111</val>
27     <val>20160120</val>
28     <val>20160424</val>
29     <val>20160805</val>
30   </field>
31 </load_val>
32 <load_val>
33   <field name="thr">
34     <val>r25t20</val>
35     <val>r25t80</val>
36     <val>r25t85</val>
37     <val>r30t15</val>
38     <val>r30t20</val>
39     <val>r30t80</val>
40     <val>r30t85</val>
41   </field>
42 </load_val>
43
44
45 <load_val>
46   <field name="combo">
47     <val>UMDCF_REANAL</val>
48   </field>
49 </load_val>
50
51 <load_xml>true</load_xml>
52 </load_spec>
53
```



Loading

```
1 <load_spec>
2   <connection>
3     <host>mandan</host>
4     <database>mv_af_mode_a16</database>
5     <user>mvuser</user>
6     <password>mvuser</password>
7   </connection>
8
9     <folder_tmpl>/d3/personal/jensen/AF/met_out_{thr}/{ymd}/{combo}</folder_
10
11   <met_version>V5.1</met_version>
12
13   <verbose>true</verbose>
14   <insert_size>1</insert_size>
15   <stat_header_db_check>false</stat_header_db_check>
16   <mode_header_db_check>true</mode_header_db_check>
17   <drop_indexes>false</drop_indexes>
18   <apply_indexes>true</apply_indexes>
19   <load_stat>false</load_stat>
20   <load_mode>true</load_mode>
21   <load_mpr>false</load_mpr>
22
23
24   <load_val>
25     <field name="ymd">
26       <val>20151111</val>
27       <val>20160120</val>
28       <val>20160424</val>
29       <val>20160805</val>
30     </field>
31   </load_val>
32   <load_val>
33     <field name="thr">
34       <val>r25t20</val>
35       <val>r25t80</val>
```

See demo for way to specify a date range including init start, end, by seconds

Basic Load Script

```
#!/bin/sh
```

```
dbname="mv__[your-favorite-name] "
```

```
host="[NCEP hostname]"
```

```
metv="[Path 2 metviewer on NCEP]"
```

```
path2data="[Path2data in staging area]"
```

```
mvuser="mvuser"
```

```
mypass="mvuser"
```

```
Loadxml="[your load xml name]"
```

```
# Drop the database
```

```
mysql -h$ {host} -u$ {mvuser} -p$ {mypass} -e"drop database $ {dbname};"#
```

```
#Create the database
```

```
mysql -h$ {host} -u$ {mvuser} -p$ {mypass} -e"create database $ {dbname};"
```

```
# Apply the METviewer schema
```

```
mysql -h$ {host} -u$ {mvuser} -p$ {mypass} $ {dbname} < $ {metv} /sql/mv_mysql.sql
```

```
# Load data
```

```
$ {metv} /bin/mv_load.sh $ {path2data} / $ {loadxml}
```



Scorecard and Batch

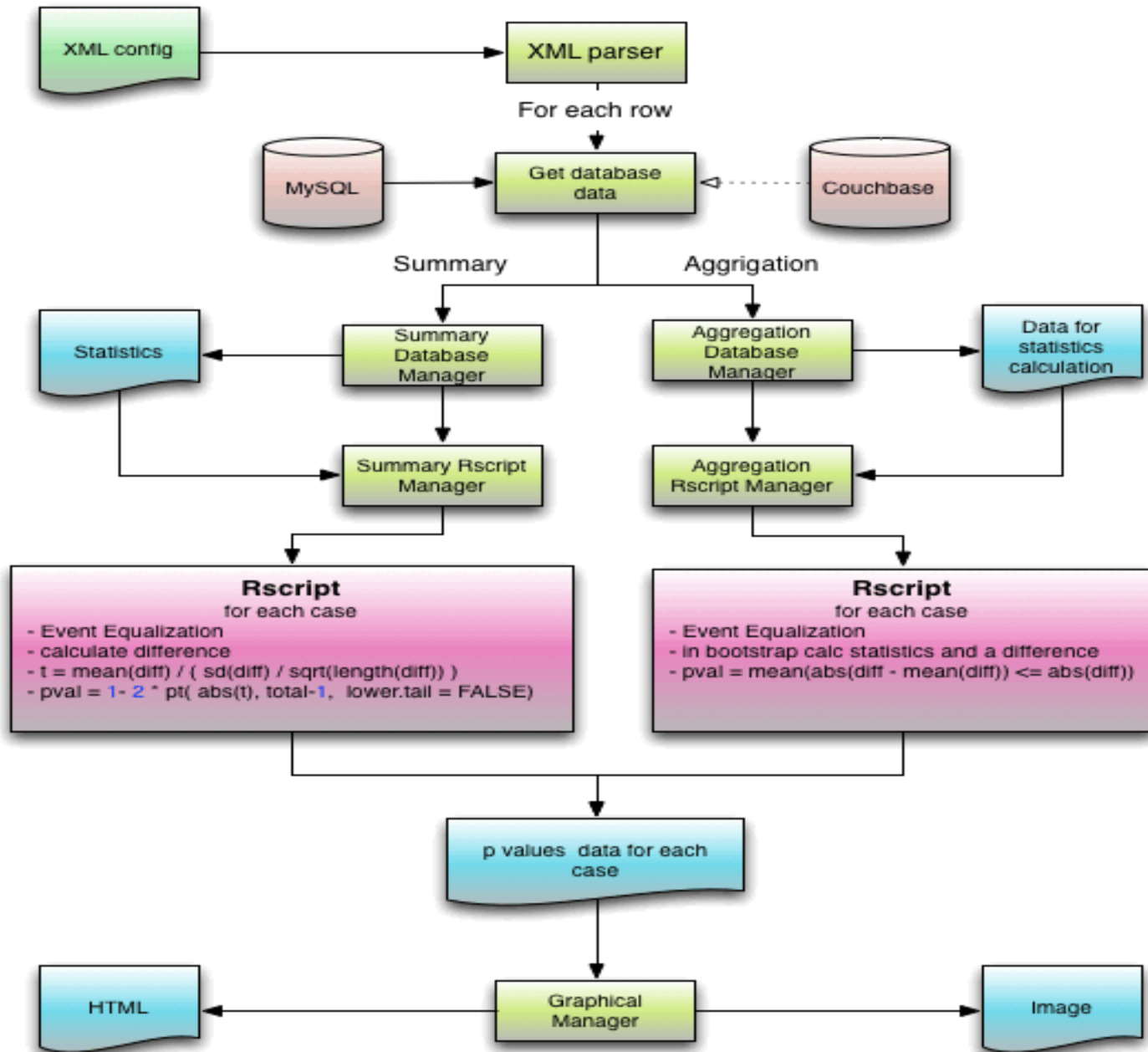


Developmental Testbed Center



NCAR

Data Flow



Setting up the scorecard

Change the database name
to point to yours

True if you want it on image
False if you don't

1st Model is parallel
2nd Model is reference

Specify the date range
and fix init hour

```
<connection>
  <host>dakota.rap.ucar.edu:3306</host>
  <database>mv_scorecard_vsdb</database>
  ...
</connection>
...
<plot>
  <view_value>>false</view_value>
  <view_symbol>>true</view_symbol>
  <view_legend>>false</view_legend>

  <stat_flag>NCAR</stat_flag>
  <!--stat_flag>EMC</stat_flag-->

<!-- This scorecard mimics EMS scorecard except for ME WIND. -->
<!-- We don't have VL1L2_ME to calculate it -->

<template>scorecard.R_tmpl</template>

<plot_fix>
  <field name="model">
    <val name="PR4RN_1405" />
    <val name="GFS2016" />
  </field>
  <field name="fcst_init_beg">
    <val name="2014-05-20 00:00:00" />
    <val name="2014-07-30 00:00:00" />
  </field>
  <field name="init_hour">
    <val name="00" />
    <!--val name="12" /-->
  </field>
</plot_fix>
```

Setting up scorecard

```
<rows>
  <field name="stat">
    <val name="ANOM_CORR" />
    <field name="fcst_var">
      <val name="HGT" />
      <field name="fcst_lev">
        <val name="P250" label="250hPa" />
        <val name="P500" />
        <val name="P700" />
        <val name="P1000" />
      </field>
    </field>
  </field>
```

		N.A.			
		Day 1	Day 3	Day 5	
ANOM_CORR	HGT	P250	▲		
		P500	▲		
		P700	▲		
		P1000	▲	▲	
	T	P250			▲
		P500	▼		
		P850			▲
PMSL	MSL	▲	▲		

Set-up a “super-row”:

This sets up the first, second and third columns of a super-row

Repeat to specify next super-row (e.g. for RMSE)

Setting up scorecard

If you wish, specify multiple fcst_leads to be aggregated or averaged together

```

<columns>
  <field name="vx_mask">
    <val name="G2/PNA" label="N.American" />
    <field name="fcst_lead">
      <val name="6,12,18, 24" label="Day 1" />
      <!--val name="30,36,42,48" label="Day 2" /-->
      <val name="54, 60, 66,72" label="Day 3" />
      <!--val name="78, 84, 90,96" label="Day 4" /-->
      <val name="102, 108, 114,120" label="Day 5" />
      <val name="126, 132, 138,144" label="Day 6" />
      <!--val name="150, 156, 162,168" label="Day 7" /-->
      <val name="174, 180, 186,192" label="Day 8" />
      <!--val name="198, 204, 210,216" label="Day 9" /-->
      <val name="222, 228, 234,240" label="Day 10" />
    </field>
  </field>

  <field name="vx_mask">
    <val name="G2/NHX" label="N.Hemisphere" />
    <field name="fcst_lead">
      <val name="6,12,18, 24" label="Day 1" />

```

Change the label that shows up on the image.

Set-up a “super-column”:

This sets up the first, second row of the super-column

Repeat to specify next super-column (e.g. N.Hemisphere)

or

2014-05-20 00:00:00

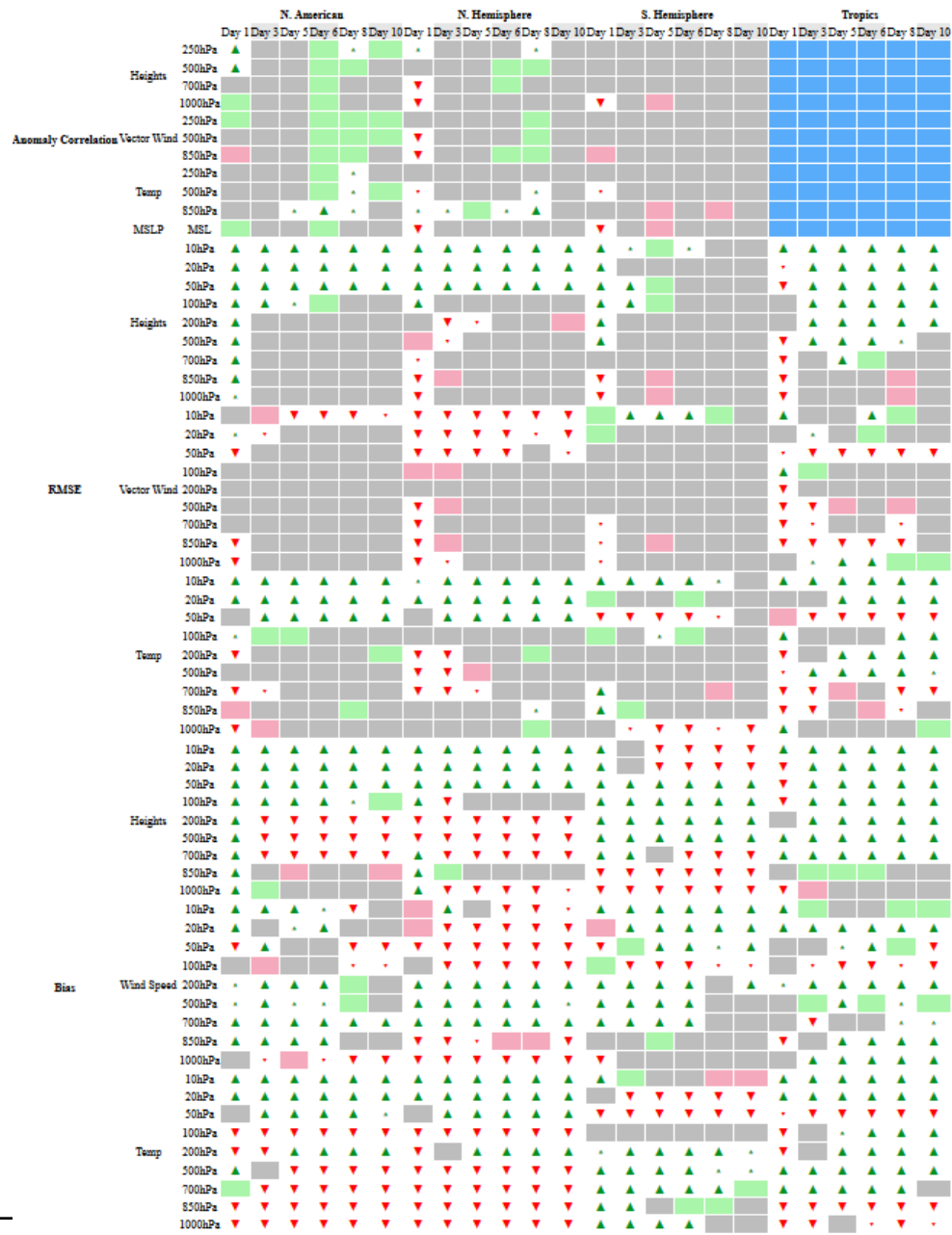
			N.American					N.Hemisphere				
			Day 1	Day 3	Day 5	Day 6	Day 8	Day 10	Day 1	Day 3	Day 5	Day 6
			▲			▲			▲	-		

Setting up scorecard

```
</columns>  
  
<agg_stat>false</agg_stat>  
<boot_repl>1000</boot_repl>  
<boot_random_seed>1</boot_random_seed>  
  
<tmpl>  
  <data_file>scorecard_sum.data</data_file>  
  <plot_file>scorecard_sum.png</plot_file>  
  <title>Scorecard</title>  
</tmpl>  
  
</plot>  
</plot_spec>
```

False = student-T/normal
True = bootstrapping

Give it unique filenames
and title



Mixing Statistics

METViewer CAM Scorecard

for multip_ens_mean_hwt and singlp_ens_mean_hwt

2016-05-04 00:00:00 - 2016-06-04 00:00:00

			Continental US						East						West					
			6 hr	12 hr	18 hr	24 hr	30 hr	36 hr	6 hr	12 hr	18 hr	24 hr	30 hr	36 hr	6 hr	12 hr	18 hr	24 hr	30 hr	36 hr
CSI	1 hr Accumulated Precip	surface																		
CSI	3 hr Accumulated Precip	surface																		
CSI	Reflectivity	L0	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
RMSE	Temp	2 m	▲	▲			▲	▲	▲	▲			▲		▲	▲	▲		▲	▲
RMSE	Dew Point	2 m	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
RMSE	Wind	10 m	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Bias	Temp	2 m	■	▼	▲	▲	▲	▼	▼	■		▲	▲	▼	▼	▼	▲	■	▲	▼
Bias	Dew Point	2 m	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Bias	Wind	10 m	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲

Iterating on CAM Scorecard

Number of Stats with Range
for GFDL FV3 and HRRR

2018-04-30 00:00:00 - 2018-05-10 00:00:00

			Daily Domain												
			12 hr	14 hr	16 hr	18 hr	20 hr	22 hr	24 hr	26 hr	28 hr	30 hr	32 hr	34 hr	36 hr
CSI	Composite Reflectivity	>=25.0													
		>=30.0													
		>=35.0													
		>=40.0													
		>=45.0													
		>=50.0													

▲	GFDL FV3 is better than HRRR at the 99.9% significance level
▲	GFDL FV3 is better than HRRR at the 99% significance level
■	GFDL FV3 is better than HRRR at the 95% significance level
■	No statistically significant difference between GFDL FV3 and HRRR
■	GFDL FV3 is worse than HRRR at the 95% significance level
▼	GFDL FV3 is worse than HRRR at the 99% significance level
▼	GFDL FV3 is worse than HRRR at the 99.9% significance level
■	Not statistically relevant

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Research. All rights reserved.

Iterating on CAM Scorecard

Number of Stats with 2 Ranges 1 symbol 1 color
for GFDLFV3 and HRRR

2018-04-30 00:00:00 - 2018-05-10 00:00:00

		Daily Domain													
			12 hr	14 hr	16 hr	18 hr	20 hr	22 hr	24 hr	26 hr	28 hr	30 hr	32 hr	34 hr	36 hr
CSI	Composite Reflectivity	>=25.0													
		>=30.0													
		>=35.0		B											
		>=40.0													
		>=45.0	B		B										
		>=50.0	B	B	A										

A	GFDLFV3 is better than HRRR at the 99.9% significance level
	GFDLFV3 is better than HRRR at the 95% significance level
	No statistically significant difference between GFDLFV3 and HRRR
	GFDLFV3 is worse than HRRR at the 95% significance level
B	GFDLFV3 is worse than HRRR at the 99.9% significance level
	Not statistically relevant

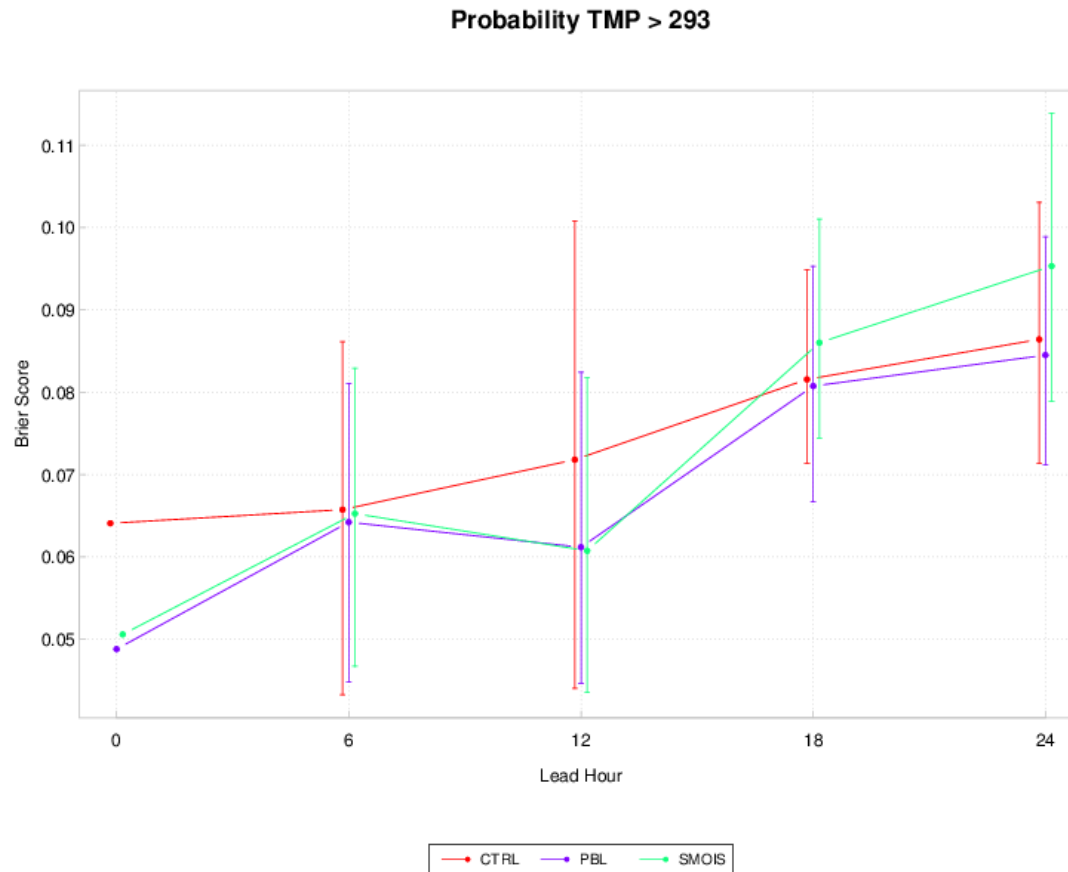
Need Help with MET or METviewer

- Contact met_help@ucar.edu – MET staff will answer as quickly as possible – this includes:
 - Help with running MET on Theia, WCOSS, Jet or Cheyenne
 - Help with understanding output or error messages
 - Help with METviewer GUI
 - Help with loading METviewer
 - Help with setting up and running a Scorecard in METviewer batch

Extra Slides

PCT

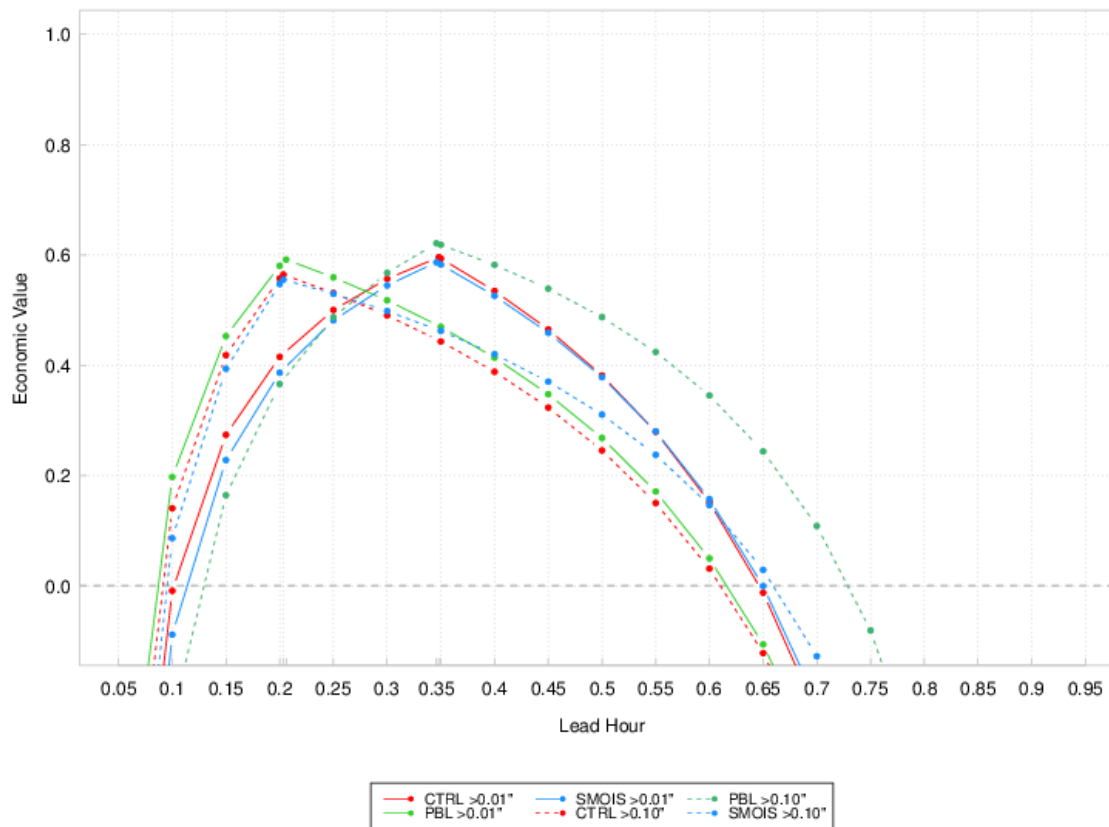
- Bootstrapping and CI are available for PCT line type statistics.
- PCT line type statistics can be used in the scorecard.



Economic Value

- MET ECLV, VSDB ECON, and RELP line types are available for loading and plotting.

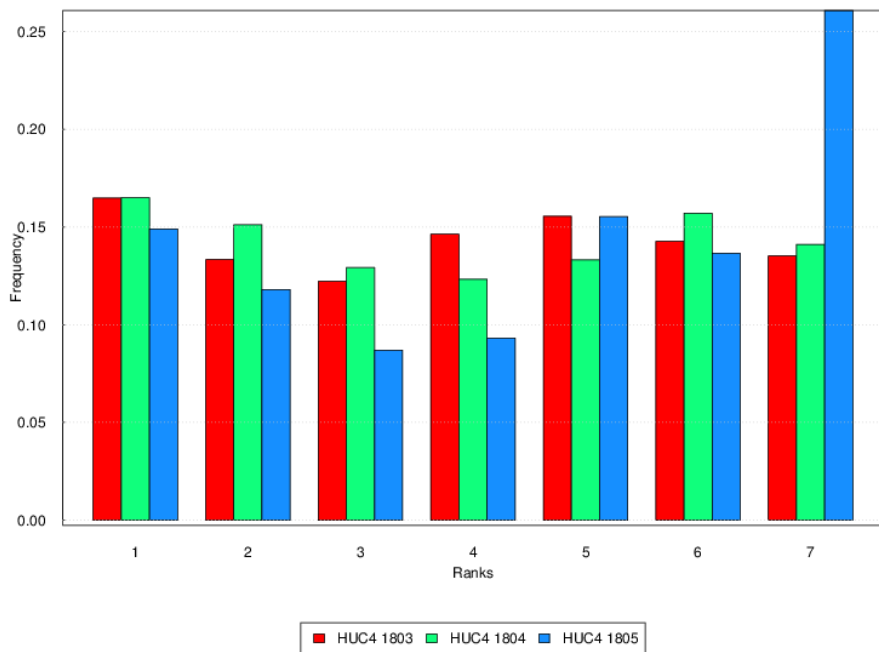
Economic Value for 24-hour APCP



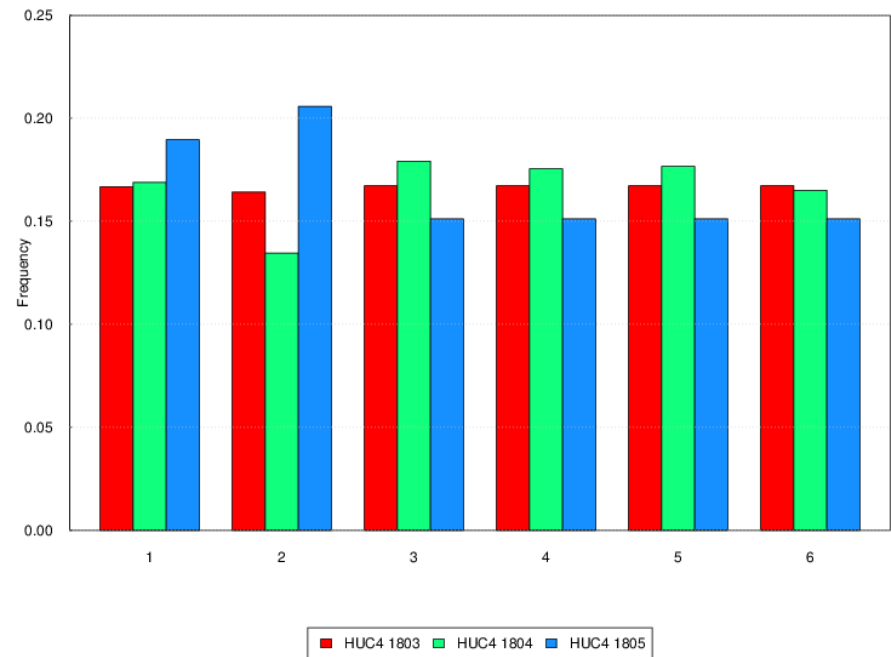
HIST Tab

- RHIST/PHIST tabs combined into single HIST tab.
- Add support for loading and plotting RELP.
- User interface: allow empty strings in "X label" and "Y1 label" fields.
- 6 member ensemble: 7 RHIST bars and RELP bars.

RHIST for APCP 24



RELP for APCP 24



METviewer Automated Testing

- NOAA GSD is developing infrastructure for automated METviewer GUI testing (Randy Pierce and Molly Smith).
- Define test **scenarios** to exercise specific METviewer features.
- Each scenario executes a series of human-readable steps to interact with a website (Chrome browser well supported).
- Scenario *.feature* files live in the repository with the METviewer code.
- These automated tests are useful in two ways:
 - Regression testing: Run all scenarios for two versions of METviewer and make sure the output is identical.
 - Training: Record the execution of each scenario as a movie to illustrate available METviewer features.
- Currently have 4 *.feature* files in **test/user_interface/features** directory:
 - metv_plot_boxplot_APCP_06_GSS.feature
 - metv_plot_boxplot_TMP_2m_RMSE.feature
 - metv_plot_series_APCP_06_AGG_GSS.feature
 - metv_plot_series_TMP_2m_AGG_RMSE.feature

METviewer Automated Testing

- View feature file: **timeSeries/basic/
metv_plot_series_APCP_06_AGG_GSS.feature**
- Run **mvTest.sh -p 20**
- Future development:
 - Add many, many more automated feature tests.
 - Add tests for tracking performance and exceptions.
 - Save output files and set up logic for diffing results.
 - Capture test execution as individual animations.
 - Organize and post automated plotting examples to METviewer website.