Stat Analysis Tool

- Filtering
- Summarizing
- Aggregating

of Grid-Stat, Point-Stat,
   & Wavelet-Stat output

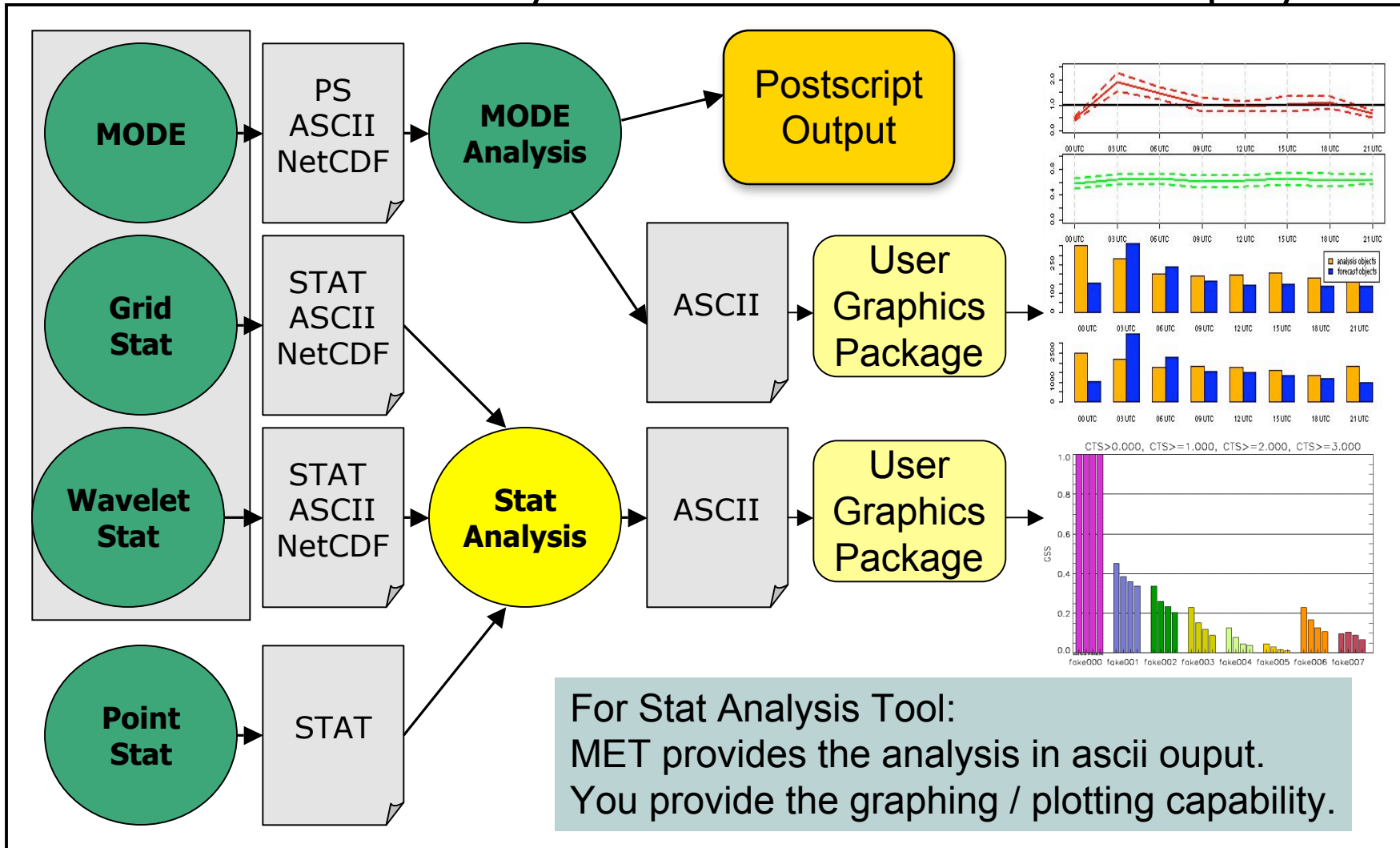Presenter: Tara Jensen

What can Stat Analysis do for you?

✓ **Q:** If I wanted the overall statistics for all the gridded observations compared to the forecasts for hours 0 through 24 together, can MET do this?
A: Yes – using Stat Analysis Tool on Grid-Stat output

✓ **Q:** Can I compute long-term statistics at individual sites (eg, mean absolute error or RMS error for daily forecasts for a month).?
A: Yes – using Stat Analysis Tool on Point-Stat output

✓ **Q:** Can I aggregate my contingency table statistics over multiple runs?
A: Yes – using Stat Analysis Tool on any output

✓ **Q:** Can I aggregate statistics for a large number (N) of individual stations in one simultaneous run?
A: Yes – but it would be cumbersome, you would have to configure Stat Analysis Tool to run (N) number of jobs.

Stat Analysis Tool

Statistics   Analysis   User Defined Display

For Stat Analysis Tool:
MET provides the analysis in ascii ouput.
You provide the graphing / plotting capability.

Stat Analysis Jobs

- **Filtering**
  - **stat_job_filter -** filters out lines from one or more stat files based on user-specified filtering options.
- **Summarizing**
  - **stat_job_summary -** produces summary information from a single column of data including:

    mean, standard deviation, min, max, and the 10th, 25th, 50th, 75th, and 90th percentiles.
- **Customized tool for AFWA**
  - **stat_job_go_index -** computes the GO Index, a performance Statric used primarily by the United States Air Force.

Stat Analysis Jobs

- **Aggregation**
  - **stat_job_aggr -** aggregates stat data across multiple time steps or masking regions; sums contingency table data or partial sums across multiple lines of data.

  - **stat_job_aggr_cts -** aggregates contingency table to produce aggregated contingency table statistics.

  - **stat_job_aggr_cnt -** computes as many continuous statistics from aggregated partial sums as possible.

  - **stat_job_aggr_mpr -** aggregates the matched pair output of Point-Stat and recomputes the requested stat line type.

Stat Analysis Tool: Usage

Usage: stat_analysis

-lookin path

[-out filename]

[-v level]

-config config_file

or –job command line

options with associated

arguments

[stat_job_filter]

[stat_job_summary]

[stat_job_aggr]

[stat_job_cts]

[stat_job_aggr_cnt]

[stat_job_aggr_mpr]

[stat_job_go_index]

-lookin	Path to *.stat files – this can be a directory or a single file name (Use one or more times)
-out	Output name for ASCII file
-v	Level of logging
-config	StatAnalysisConfig file
stat_job_filter	See previous 2 slides
stat_job_summary	See previous 2 slides
stat_job_aggr	See previous 2 slides
stat_job_cts	See previous 2 slides
stat_job_aggr_cnt	See previous 2 slides
stat_job_aggr_mpr	See previous 2 slides
stat_job_go_index	See previous 2 slides

Stat Analysis Tool: Configuration

- 22 configurable parameters – only set a few:
  - Apply NAM G212 mask
    - **vx_mask[ ] = [“G212”];**
  - Using only the Temperature variable
    - **var[ ] = [“TMP”];**
  - Filter on CTC lines that have been threshholded var[ ]>278
    - **line_type[ ] = [“CTC"];**
    - **fcst_thresh[ ] = [“>278”];**
  - Dump the filtered stat data to a file
    AND sum contingency table count (CTC) lines of data
    for pressure levels between 850 and 750
    - **joblist[ ] = ["-job stat_job_filter -dump_row \
      out/filter_job.stat", \
      "-job stat_job_aggr -dump_row out/aggr_ctc_job.stat \
      -level P850-750"];**

Stat Analysis Tool: Run stat_job_aggr

"-job stat_job_aggr -dump_row out/aggr_ctc_job.stat -level P850-750"

Point Stat Output *(i.e. point_stat_out.stat)*

```
V2.0    WRF   … ADPUPA G212 … TMP
   P850-750 … >278.00 CTC
   401      192     11     24      174
   UW_MEAN 1
```

	OBS		
F C S T		**Y**	**N**	
	Y	**192**	**11**	*203*
	N	**24**	**174**	*198*
		216	*185*	**401**

```
V2.0    WRF   … ADPSFC G212 … TMP
   P850-750 … >278.00 CTC
   167      25      23     0       119
   UW_MEAN  1
```

(NOTE: header modified to show only pertinent info)

	OBS		
F C S T		**Y**	**N**	
	Y	**25**	**23**	*48*
	N	**0**	**119**	*119*
		25	*142*	**167**

Stat Analysis Tool: Run stat_job_aggr

Stat Analysis Output *(i.e. stat_analysis.out)*

```
FILTER:  -job stat_job_filter
   -vx_mask G212 -line_type CTC
   -fcst_thresh >278.000 -var TMP
   -dump_row out/filter_job.stat


JOB_LIST: -job stat_job_aggr
-vx_mask G212 -line_type CTC
   -fcst_thresh >278.000 -var TMP
   -level P850-750 -dump_row
   out/aggr_ctc_job.stat
COL_NAME:       TOTAL
   FY_OY            FY_ON
   FN_OY           FN_ON
   INTERP_MTHD       INTERP_PNTS
CTC:            568              217
   34              24          293

   -9999                    -9999
```

		OBS		
F		**Y**	**N**	
C	**Y**	**217**	**34**	*251*
S				
T	**N**	**24**	**293**	*317*
		241	*327*	**568**

Stat Analysis Tool: Run stat_job_summary

*"-job stat_job_summary –line_type CNT –alpha 0.050 -var TMP \
–dump_row ../out/job_summary_RMSE.stat –column RMSE"*

(stat_analysis.out cont.)
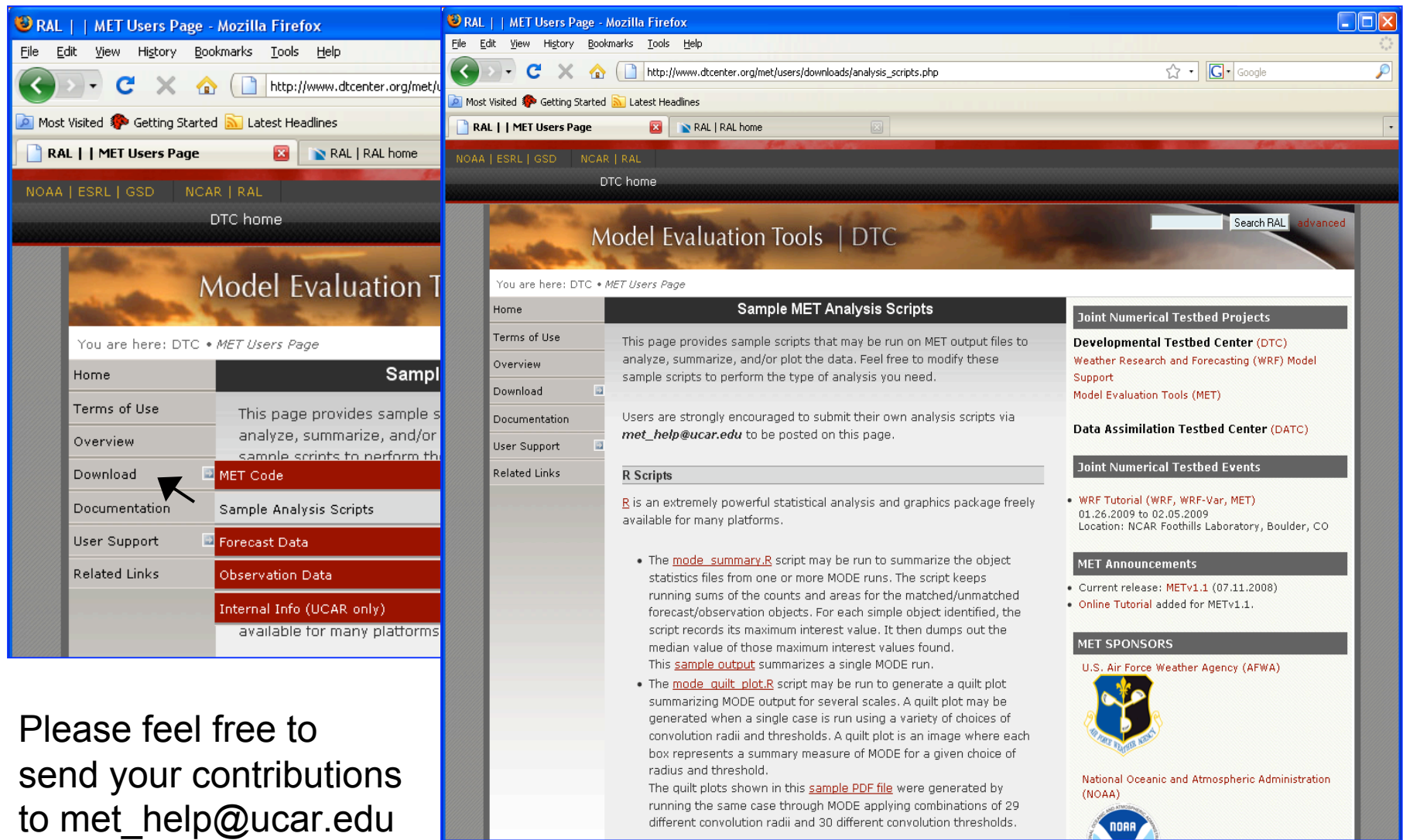
Column Number	Description
1	Summary (job type)
2	Total
3-7	Mean* *Includes normal and bootstrap upper and lower confidence limits*
8-10	Standard deviation** *Includes bootstrap upper and lower confidence limits*
11	Minimum value
12	10th percentile
13	25th percentile
14	Median (50th percentile)
15	75th percentile
16	90th percentile
17	Maximum value

```
JOB_LIST: -job
stat_job_summary -line_type
CNT ….
COL_NAME: TOTAL MEAN
MEAN_NCL MEAN_NCU MEAN_BCL
MEAN_BCU STDEV STDEV_BCL
STDEV_BCU MIN  P10
P25 P50 P75
P90 MAX
SUMMARY: 4  1.98438
1.33219 2.63656  1.58837
2.29289 0.40986 0.04574
0.55950 1.41291 1.59671
1.87241 2.07130 2.18328
2.18328 2.30251
```

Use your favorite plotting software

MET provides the analysis in ascii ouput.
You provide the graphing / plotting capability.
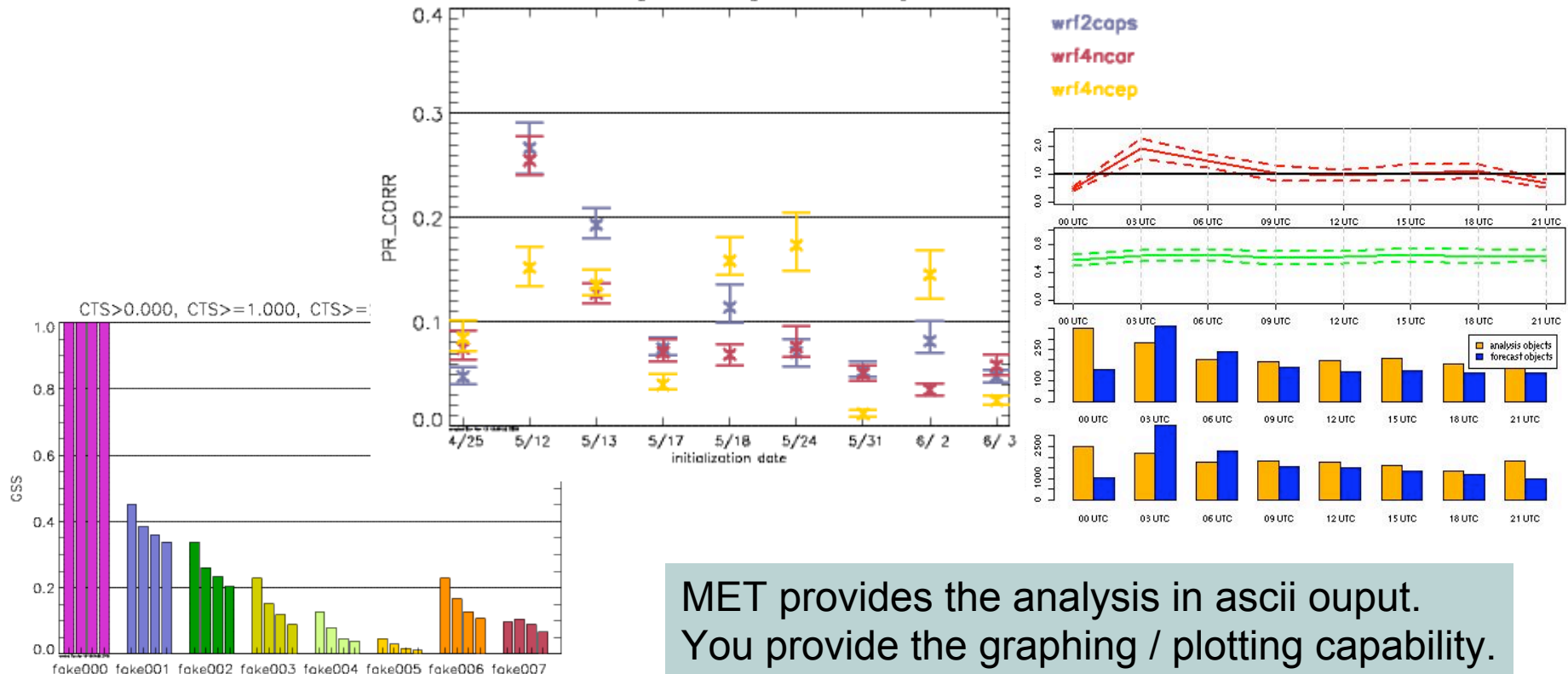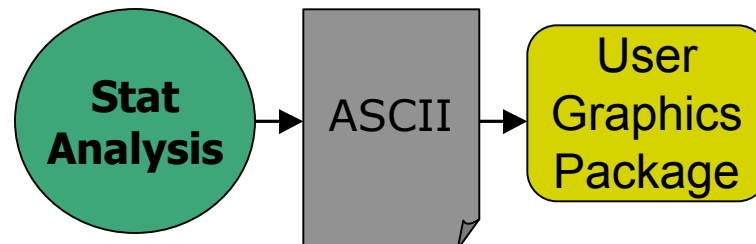
User Contributed Plotting Scripts

Please feel free to
send your contributions
to met_help@ucar.edu

Thanks - Any Questions?

Now you know how to:
Filter it.
Aggregate it.
and
Plot it...

Next up is:
Analyzing it.
and
Customizing it.