Stat Analysis Tool

- Filtering
- Summarizing
- Aggregating

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

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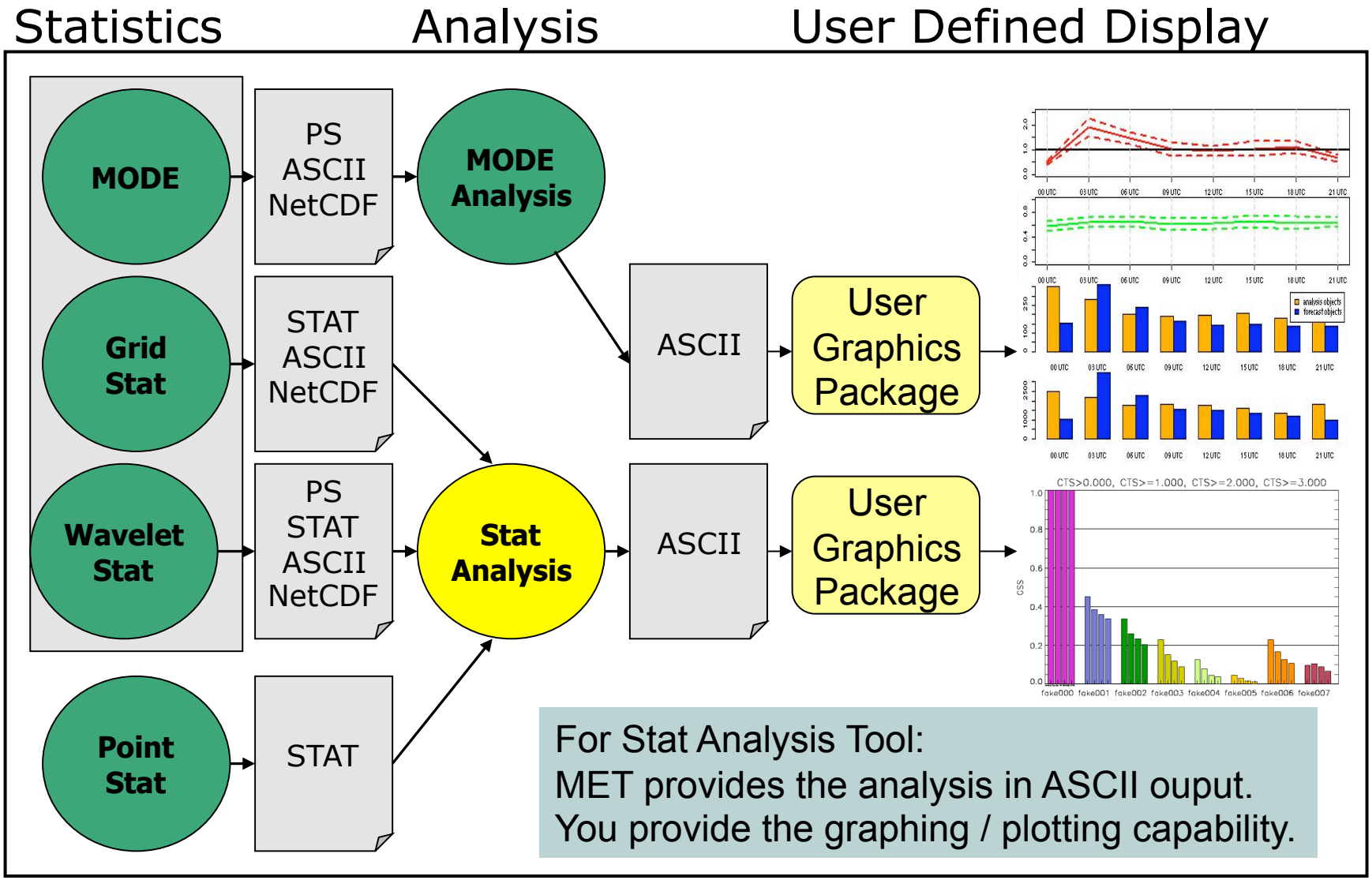
What can Stat Analysis do for you?

Can I get…

- ✓ **Q:** Overall statistics for all gridded observations compared to the forecasts for hours 0 through 24 together?
  A: Yes - using Stat Analysis Tool on Grid-Stat output
- ✓ **Q:** Long-term statistics at individual sites (e.g., mean absolute error or RMS error for daily forecasts for a month).?
  A: Yes - using Stat Analysis Tool on Point-Stat output
- ✓ **Q:** My contingency table statistics aggregated over multiple runs?
  A: Yes – using Stat Analysis Tool on any output
- ✓ **Q:** Statistics aggregated 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



Stat Analysis Jobs

- **Filtering**
  - **filter -** filters out lines from one or more stat files based on user-specified filtering options.
- **Summarizing**
  - **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**
  - **go_index -** computes the GO Index, a performance statistic used primarily by the United States Air Force.

Stat Analysis Jobs

- **Aggregation**
  - **aggregate -** aggregates stat data across multiple time steps or masking regions. Output line type is the same as input line type.
  - **aggregate_stat –** aggregates across multiple times/ regions then calculates statistics. Output line is typically different from input line types.

Valid line type combinations include:

-line_type FHO, CTC,	-out_line_type CTS
-line_type SL1L2, SAL1L2,	-out_line_type CNT
-line_type VL1L2, VAL1L2,	-out_line_type WDIR (wind direction)
-line_type PCT,	-out_line_type PSTD, PJC, PRC
-line_type NBRCTC,	-out_line_type NBRCTS
-line_type MPR,	-out_line_type FHO, CTC, CTS, CNT SL1L2, SAL1L2,PCT, PSTD, PJC, PRC

Stat Analysis Tool: Usage

Usage: stat_analysis

-lookin path

[-out filename]

[-v level]

-config config_file

or –job at command line options with associated arguments

[filter]

[summary]

[aggregate]

[aggregate_stat]

[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
filter	See previous 2 slides
summary	See previous 2 slides
aggregate	See previous 2 slides
aggregate_stat	See previous 2 slides
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
    - **fcst_var[ ] = [“TMP”];**
      obs_var[ ] = [];
  - Filter on CTC lines in which fcst_var[ ] > 278 K
    - **line_type[ ] = [“CTC"];**
    - **fcst_thresh[ ] = [“>278”];**
      obs_thresh[ ] = [];
  - Dump the filtered stat data to a file
    AND sum contingency table count (CTC) lines of data
    for pressure levels between 850 and 750
    - **jobs[ ] = *["-job filter -dump_row out/filter_job.stat", ***
      ***"-job aggregate –line_type CTC ***
      ***-dump_row out/aggr_ctc_job.stat –fcst_lev P850-750"*];**

Stat Analysis Tool: Run –job aggr

"-job aggregate –line_type CTC -dump_row out/aggr_ctc_job.stat \ -fcst_lev P850-750"

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

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

```
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		
FCST		Y	N	
	Y	192	11	203
	N	24	174	198
		216	185	401

		OBS		
FCST		Y	N	
	Y	25	23	48
	N	0	119	119
		25	142	167

Stat Analysis Tool: Run –job aggr

Stat Analysis Output *(i.e. aggr_ctc_job.stat)*

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

JOB_LIST: -job aggregate
-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		
FCST		Y	N	
	Y	**217**	**34**	*251*
	N	**24**	**293**	*317*
		241	*327*	**568**

Stat Analysis Tool: Run –job summary

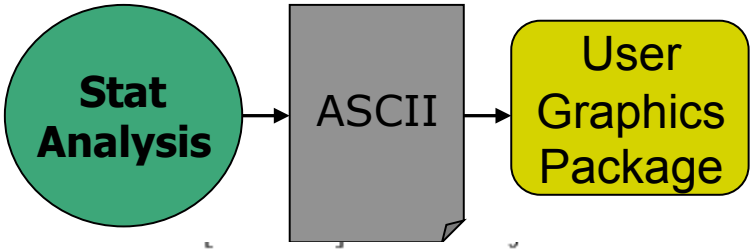
"-job summary –line_type CNT -fcst_var TMP \ –dump_row out/job_summary_RMSE.stat –column RMSE"

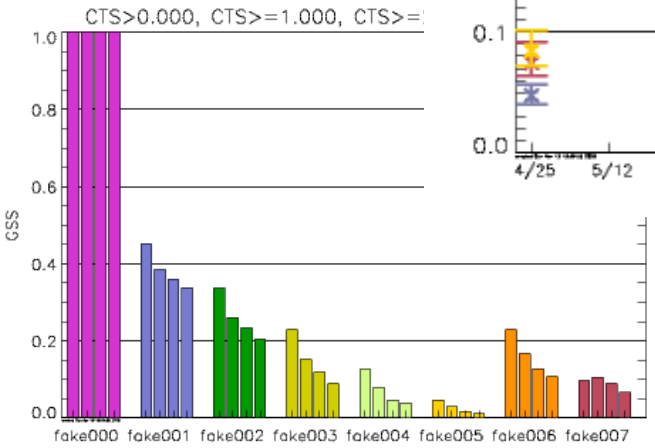
Column Number	Description
1	Summary (job type)
2	Total
3-7	Mean* *Includes normal and bootstrap upper and lower confidence limits*
8-10	Standard deviation** *Includes bootstrap upper and lower confidence limits*
11	Minimum value
12	10th percentile
13	25th percentile
14	Median (50th percentile)
15	75th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

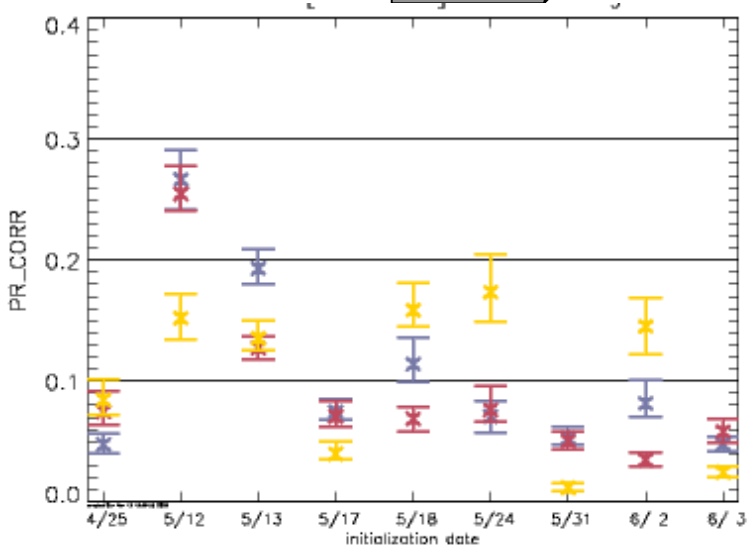
(stat_analysis.out cont.)

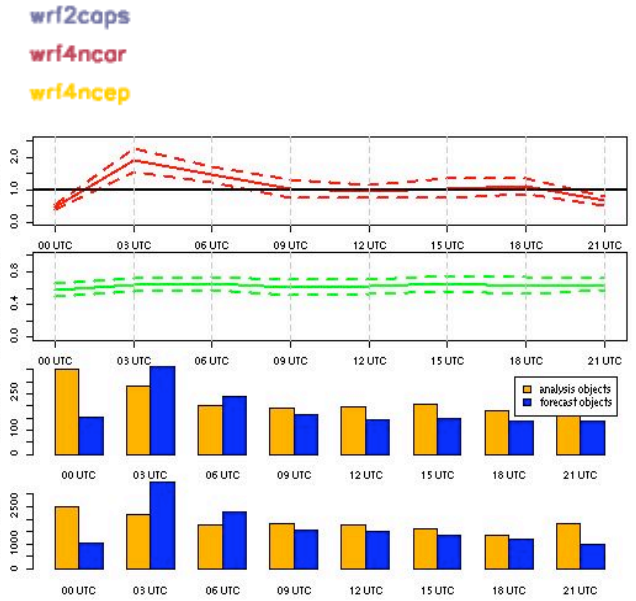
```
JOB_LIST: -job summary -
line_type CNT ….
COL_NAME: TOTAL MEAN
MEAN_NCL MEAN_NCU MEAN_BCL
MEAN_BCU STDEV STDEV_BCL
STDEV_BCU MIN  P10
P25 P50 P75
P90 MAX
SUMMARY: 4  1.98438
1.33219 2.63656  1.58837
2.29289 0.40986 0.04574
0.55950 1.41291 1.59671
1.87241 2.07130 2.18328
2.18328 2.30251
```

Use your favorite plotting software



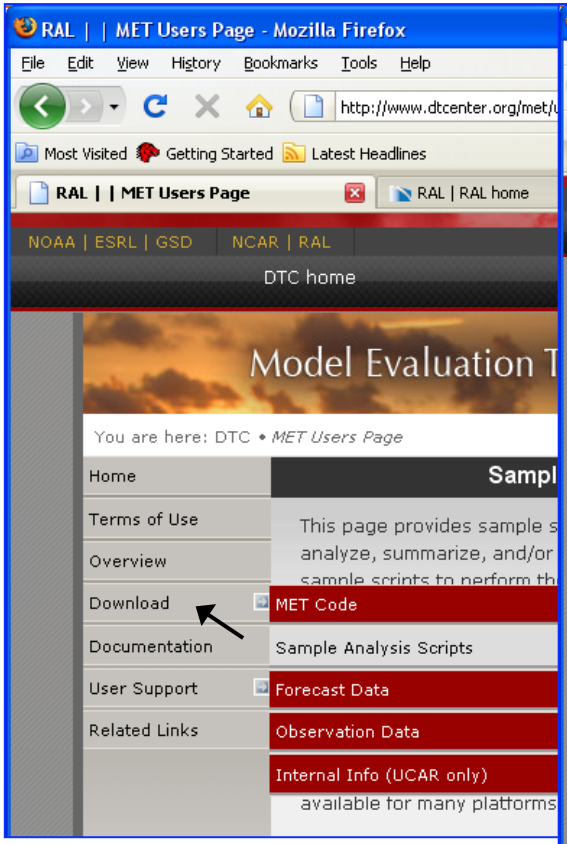


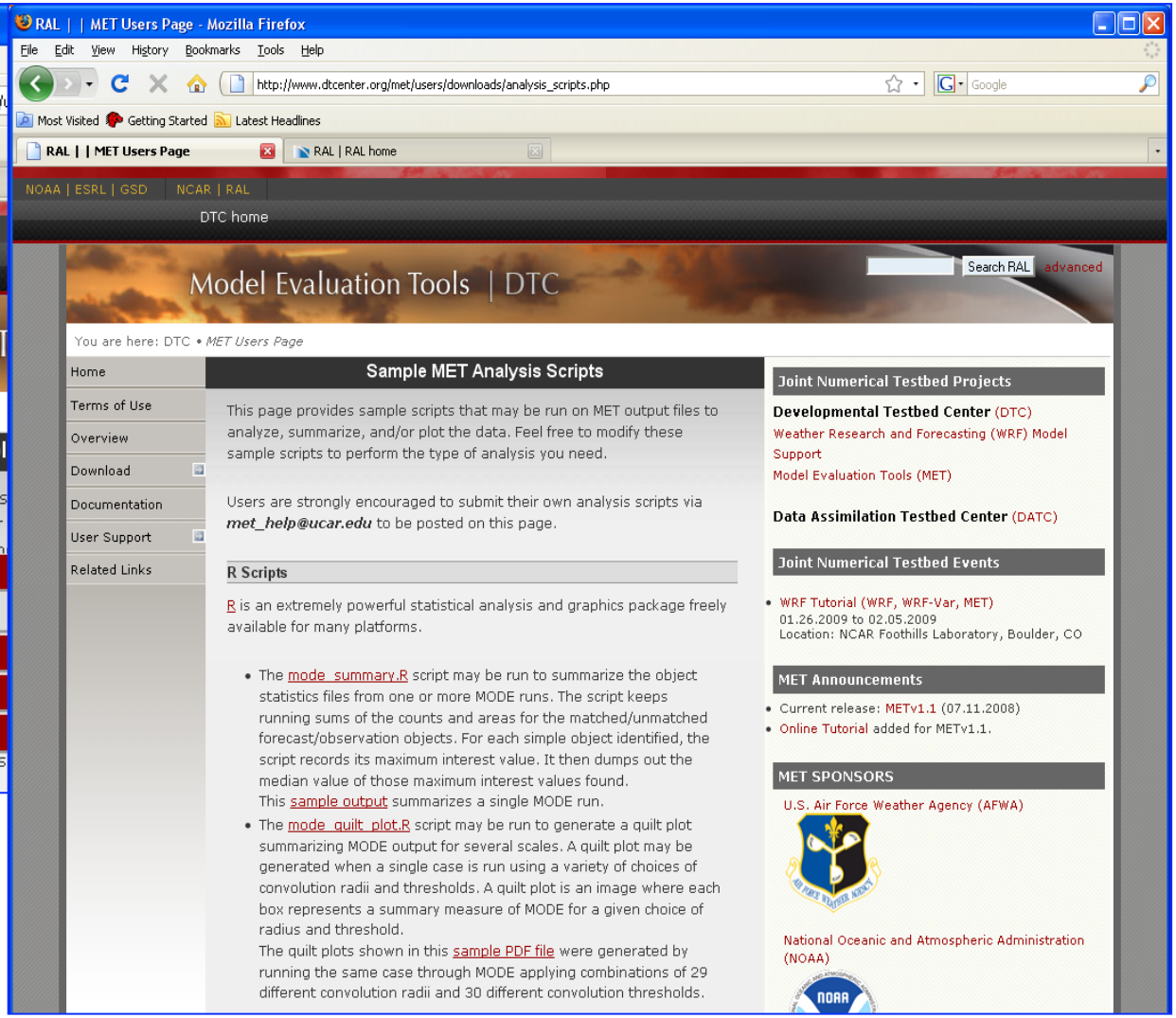




MET provides the analysis in ascii ouput.
You provide the graphing / plotting capability.

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.