

METplus Global Grid-to-Grid Use Case Overview

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Background

- Grid-to-grid use case goals (these are split into different parts):
 1. Compute anomalous or regular partial sums (**part 1**)
 2. Create plots for various statistics (**part 2**)
- 3 types of grid-to-grid use cases:
 1. **Anom** – various variables at various pressure levels (uses climatology data)
 2. **Pres** – various variables at various pressure levels
 3. **Sfc** – various variables at a single level

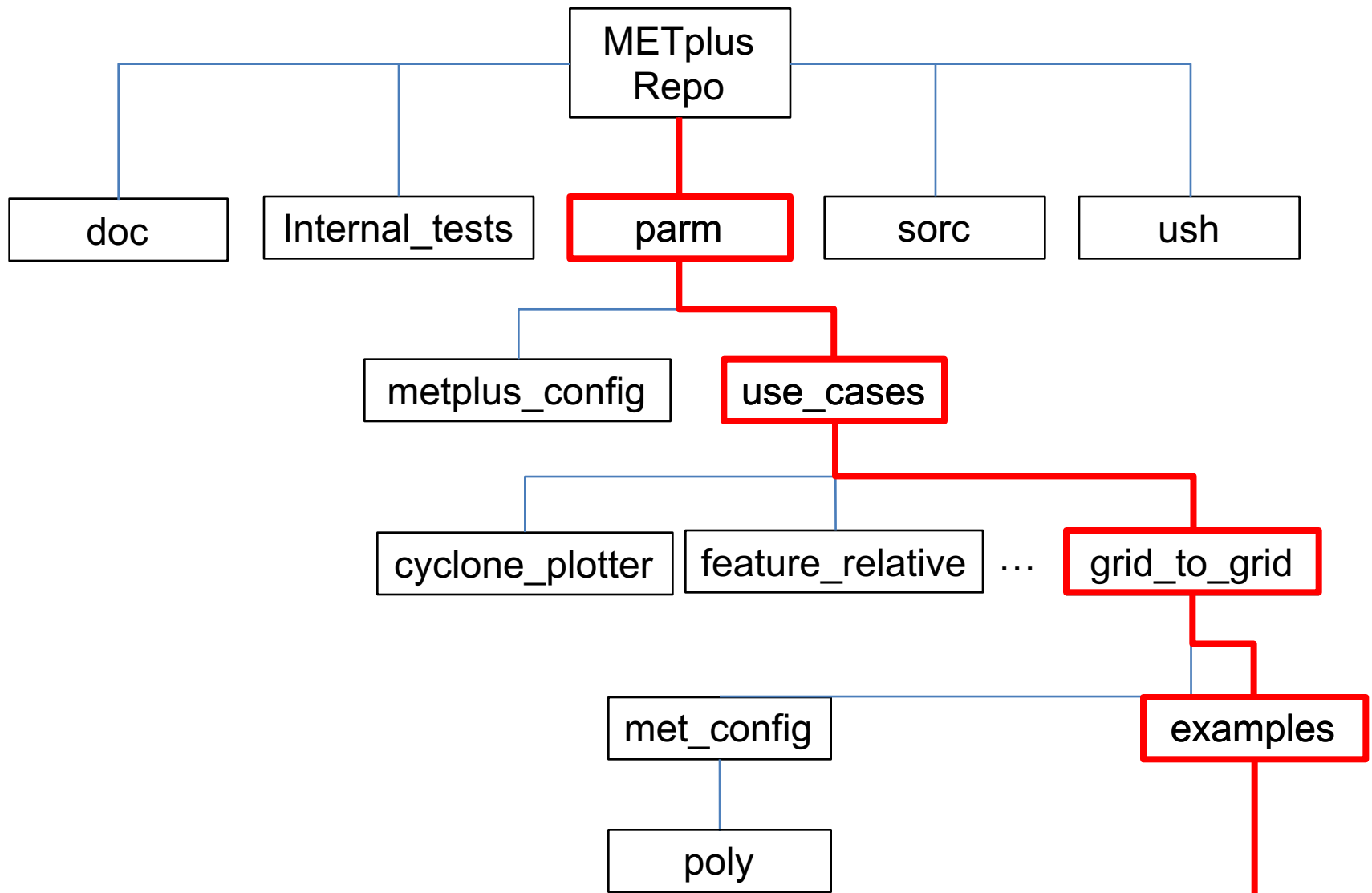
Background

- Both observation and forecast files must be gridded files!
- Data used for this example of the use case:
 1. Operational GFS analysis and forecast files
 - a. “pres” and “anom” use the analysis files as “observations”
 - b. “sfc” uses the forecast hour 0 files as “observations”
 2. 30-year (1959-1988) climatology of the NCEP/NCAR reanalysis files
 3. Verification masking region files

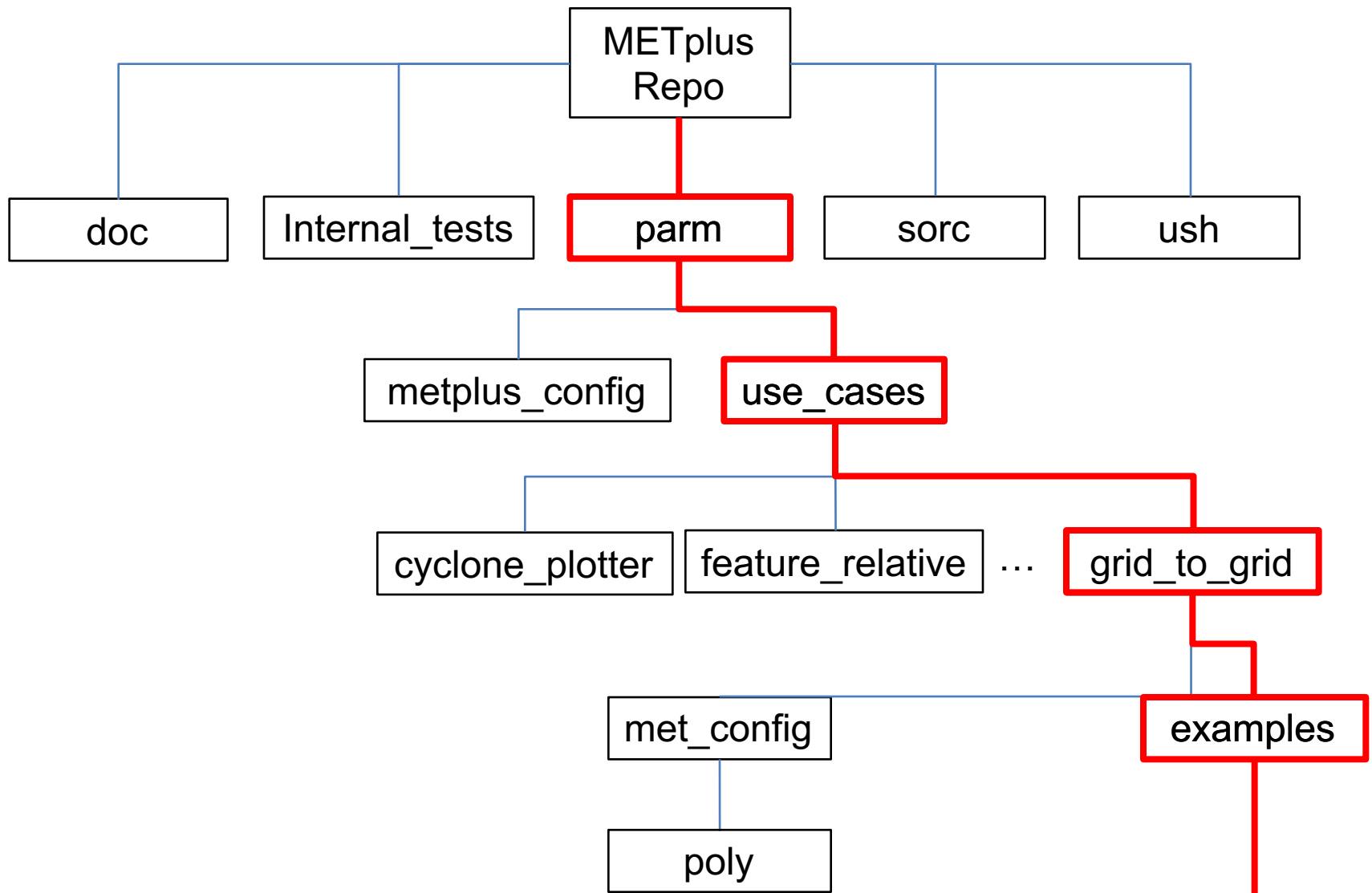
Tools

- Tools run from MET in this use case:
 1. Grid_stat – provides verification statistics (in this case, partial sums) for matched forecast and observation grid

Note: grid_stat will regrid forecast and observation files (climo files, if being used) if not on the same grid.
 2. Stat_analysis – gathers together the output from running grid_stat
- Python scripts is used to create plots.
- If running full part 1, GridStat wrapper is run first, then StatAnalysis wrapper.
- If running full part 2, StatAnalysis is run first, then the MakePlots wrapper.
- The full grid-to-grid use case for the 3 types are fully run by first running part 1 successfully followed by part 2.



anom.conf	anom_part1b.conf	precip.conf	pres_part1.conf	sfc_part1.conf
anom_height.conf	anom_part1c.conf	precip_continuous.conf	pres_part2.conf	sfc_part2.conf
anom_part1a.conf	anom_part2.conf	pres.conf	sfc.conf	



anom.conf anom_part1b.conf precip.conf pres_part1.conf sfc_part1.conf
 anom_height.conf anom_part1c.conf precip_continuous.conf pres_part2.conf sfc_part2.conf
 anom_part1a.conf anom_part2.conf pres.conf sfc.conf

Configuring METplus for Use Case

- The following example of running the METplus grid-to-grid use case will be reflect for running the use case on Theia.
(/scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial)
- METplus can be run on other NOAA research and EMC WCOSS machines (just be sure to set paths accordingly).
- There is no wrong way to set up your METplus .conf files (as long as everything is there). METplus is flexible!
- This example for the grid-to-grid use case has been set up to use 3 METplus .conf files:
 1. General machine file
 2. User machine file
 3. User customized use case file

Configuring METplus for Use Case – General machine file

- **WHAT** -> This contains machine specific paths to non-METplus executables, and the MET and METplus source code.
- **WHY** -> The paths in this file are used consistently across all METplus use cases. This creates an easy way for all users to be pointing to the same executables and source codes, and avoids repeatedly typing out the same paths in users' .conf files.
- **WHO** -> This is used by all METplus users on the corresponding machine.
- **WHERE** -> A starting point for this file can be copied from *METplus/parm/metplus_config/metplus_system.conf*; there is an example for Theia at */scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/machine_theia.conf* (needs to be moved to more common area?; shown on next slide).
- **WHEN** should this be change?
 - New releases of executables
 - New release of METplus and MET

Configuring METplus for Use Case – General machine file

```
#  
# DIRECTORIES  
#  
[dir]  
## Commonly used base METplus variables  
  
# Location of METplus code  
METPLUS_BASE = /contrib/METplus/METplus-2.0  
  
# Location of METplus parm directory  
PARM_BASE = {METPLUS_BASE}/parm  
  
## Commonly used base MET variables  
  
## Met install location  
MET_INSTALL_DIR = /contrib/met/8.0  
MET_BASE = {MET_INSTALL_DIR}/share/met  
#  
# EXECUTABLES  
#  
[exe]  
# NON-MET executables  
WGRIB2 = /apps/wgrib2/0.1.9.5.1/bin/wgrib2  
RM_EXE = /usr/bin/rm  
CUT_EXE = /usr/bin/cut  
TR_EXE = /usr/bin/tr  
NCAP2_EXE = /apps/nco/4.4.5-intel/bin/ncap2  
CONVERT_EXE = /usr/bin/convert  
NCDUMP_EXE = /apps/netcdf/4.3.0-intel/bin/ncdump  
EGREP_EXE = /usr/bin/grep
```

Configuring METplus for Use Case – User machine file

- **WHAT** -> This contains machine and user specific paths to various directories used by METplus.
- **WHY** -> The paths in this file are used consistently across the METplus grid-to-grid use case. This avoid repeatedly typing out the same paths in the user customized use case .conf files.
- **WHO** -> This is used by the user running METplus on corresponding machine.
- **WHERE** -> There is an example for Theia at */scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/machine_theia_Mallory.Row.conf* (shown on next slide).
- **WHEN** should this be change?
 - Using input from new location
 - Save output to new location

Configuring METplus for Use Case – User machine file

```
#  
[dir]  
#  
# Location of input for METplus  
PROJ_DIR = /scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_sample_data/grid_to_grid  
# Location of METplus output  
OUTPUT_BASE = /scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/output_METplus  
  
## Other directories  
LOG_DIR = {OUTPUT_BASE}/logs  
TMP_DIR = /tmp
```

Configuring METplus for Use Case – User customized use case file

- **WHAT** -> This file contains user customized settings for the use case they want to run.
- **WHY** -> The settings in this file are used to customize the use case for the user's preference.
- **WHO** -> This is used by the user running METplus.
- **WHERE** -> A starting point for this file can be copied from the examples in *METplus/parm/use_cases/grid_to_grid/examples*; there are examples on Theia at */scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/my_parm/use_cases/grid_to_grid/examples*
- **WHEN** should this be change?
 - Change variables or level(s) being verified
 - Change verifying dates or forecast hours
 - Change model being verified

Configuring METplus for Use Case – User customized use case file – part 1

```
# grid-to-grid - pres configurations
#
[dir]
#
CONFIG_DIR = {PARM_BASE}/use_cases/grid_to_grid/met_config
#dirs for GridStat
FCST_GRID_STAT_INPUT_DIR = {PROJ_DIR}/gfs
OBS_GRID_STAT_INPUT_DIR = {PROJ_DIR}/gfs
GRID_STAT_OUT_DIR = {OUTPUT_BASE}/{VERIF_CASE}/make_met_data/{VERIF_TYPE}/{MODEL_TYPE}
#dirs for StatAnalysis
STAT_ANALYSIS_LOOKIN_DIR = {GRID_STAT_OUT_DIR}
STAT_ANALYSIS_OUT_DIR = {OUTPUT_BASE}/{VERIF_CASE}/VSDB_format/{VERIF_TYPE}
```

CONFIG_DIR – path to where config file are for MET

FCST(OBS) GRID_STAT_INPUT_DIR - path to where the forecast
(observation) files are

GRID_STAT_OUT_DIR – path to where the output from running MET's
grid_stat should go

STAT_ANALYSIS_LOOKIN_DIR – path to where MET's *stat_analysis* should
look for files

STAT_ANALYSIS_OUT_DIR - path to where output from running MET's
stat_analysis should go

Configuring METplus for Use Case – User customized use case file – part 1

```
#  
[config]  
#  
LOG_METPLUS = {LOG_DIR}/master_metplus.log.g2g{VERIF_TYPE}_part1.runon{LOG_TIMESTAMP_TEMPLATE}  
METPLUS_CONF = {OUTPUT_BASE}/confs/metplus_final_g2g{VERIF_TYPE}_part1.conf
```

- *Not required* (set in METplus default .conf files), but useful for keep tracking of output and final METplus .conf for various parts and types of verification that encompasses the full grid-to-grid use case

LOG_METPLUS – name of log file

METPLUS_CONF – the name of the final METplus .conf file, used to run METplus

Configuring METplus for Use Case – User customized use case file – part 1

```
#  
LOOP_BY_INIT = false  
#Format of VALID_BEG and VALID_END  
VALID_TIME_FMT = %Y%m%d%H  
# Start time for MET+ run  
VALID_BEG = 2018060100  
# End time for MET+ run  
VALID_END = 2018060200  
# Increment between MET+ runs in seconds. Must be > 60  
VALID_INCREMENT = 86400
```

LOOP_BY_INIT - if to verify over model initialization (true) or valid time (false)

VALID(INIT) TIME_FMT - format of loop dates

VALID(INIT) BEG(END) - date to start (end) verification in format of VALID(INIT)_TIME_FMT

VALID(INIT) INCREMENT - increment to increase date by, in seconds

Configuring METplus for Use Case – User customized use case file – part 1

```
# TODO: Add -- see Minna's description in another file
LOOP_METHOD = times
# List of applications to run
PROCESS_LIST = GridStat, StatAnalysis
```

LOOP_METHOD – set to *times*, so METplus loops over dates

PROCESS_LIST - list of METplus wrappers to run

Configuring METplus for Use Case – User customized use case file – part 1

```
MODEL_TYPE = gfs
OB_TYPE = gfs_anl

#GridStat
#FCST
FCST_NATIVE_DATA_TYPE = GRIB

#OB
OBS_NATIVE_DATA_TYPE = GRIB
```

MODEL_TYPE - name to refer to model forecasts as
OB_TYPE - name to refer to observations as
FCST(OBS)_NATIVE_DATA_TYPE - data format of forecasts (observation) files, either GRIB or NETCDF

Configuring METplus for Use Case – User customized use case file – part 1

```
#info on forecast leads and init to process  
LEAD_SEQ = 0, 24, 48  
FCST_MAX_FORECAST = 48  
FCST_INIT_INTERVAL = 24
```

LEAD_SEQ - comma separated list of forecast hours to verify

FCST_MAX_FORECAST - max forecast hour, i.e. last hour in LEAD_SEQ

FCST_INIT_INTERVAL - interval/increment of model initialization forecast hours to verify

Configuring METplus for Use Case – User customized use case file – part 1

```
#list of variables to compare
FCST_IS_PROB = false

FCST_VAR1_NAME = HGT
FCST_VAR1_LEVELS = P1000, P850

FCST_VAR2_NAME = TMP
FCST_VAR2_LEVELS = P1000, P850

FCST_VAR3_NAME = UGRD
FCST_VAR3_LEVELS = P1000, P850

FCST_VAR4_NAME = VGRD
FCST_VAR4_LEVELS = P1000, P850

FCST_VAR5_NAME = 03MR
FCST_VAR5_LEVELS = P100, P70

GRID_STAT_CONFIG = {CONFIG_DIR}/GridStatConfig_pres
```

Configuring METplus for Use Case – User customized use case file – part 1

FCST_IS_PROB - if the variables to verify are probabilistic (true) or not (false)

FCST_VAR'N' NAME - name of variable to verify

FCST_VAR'N' LEVELS - comma separated list of levels to verify for

FCST_VAR'N' NAME

FCST_VAR'N' OPTIONS - “extra” information to describe the variable

* ‘N’ is actually a number starting at 1, numerous variables can be listed in one METplus conf file

* if variables are named the same in the observation file, there is no need to relist them; however, if they are different OBS_VAR'N' NAME and OBS_VAR'N' LEVELS

GRID_STAT_CONFIG - path to the MET config file to use for *grid_stat*

Configuring METplus for Use Case – User customized use case file – part 1

```
#StatAnalysis
VERIF_CASE = grid2grid
VERIF_TYPE = pres
STAT_ANALYSIS_CONFIG = {CONFIG_DIR}/STATAnalysisConfig_VSDBformat
```

VERIF_CASE - set to “grid2grid” for grid-to-grid use case

VERIF_TYPE - for “grid2grid” can be: anom, pres, or sfc

STAT_ANALYSIS_CONFIG - path to the MET config file to use for *stat_analysis*

```
#
[filename_templates]
#
FCST_GRID_STAT_INPUT_TEMPLATE = pgbf{lead?fmt=%HH}.gfs.{init?fmt=%Y%m%d%H}
OBS_GRID_STAT_INPUT_TEMPLATE = pgbanl.gfs.{valid?fmt=%Y%m%d%H}
```

FCST(OBS)_GRID_STAT_INPUT_TEMPLATE - file template of what the forecast (observation) files look like

Running the use case with METplus – part 1

- Be sure correct modules are loaded and environment is set up correctly for the machine the use case is being run on!
- Commands can be used in job card to submit jobs to batch queues.
- Example for part 1 for grid-to-grid pres:

```
master_metplus.py -c
/scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/machine_theia.conf -c
/scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/machine_theia_Mallory.Row.conf -c
/scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/my_parm/use_cases/grid_to_grid/examples/pres_step1.conf
```

Post-run overview: logging – part 1

Information METplus is using to create command using MET's *grid_stat*

```
10/01 12:33:24.279 metplus.StatAnalysis (master_metplus.py:142) INFO: *****
10/01 12:33:24.280 metplus.StatAnalysis (master_metplus.py:143) INFO: * RUNNING MET+
10/01 12:33:24.280 metplus.StatAnalysis (master_metplus.py:147) INFO: * at valid time: 201806010000
10/01 12:33:24.280 metplus.StatAnalysis (master_metplus.py:148) INFO: *****
10/01 12:33:24.307 metplus.GridStat (compare_gridded_wrapper.py:344) DEBUG:
10/01 12:33:24.307 metplus.GridStat (compare_gridded_wrapper.py:345) DEBUG: ENVIRONMENT FOR NEXT COMMAND:
10/01 12:33:24.307 metplus.GridStat (command_builder.py:146) DEBUG: MODEL=gfs
10/01 12:33:24.307 metplus.GridStat (command_builder.py:146) DEBUG: FCST_VAR=HGT
10/01 12:33:24.307 metplus.GridStat (command_builder.py:146) DEBUG: OBS_VAR=HGT
10/01 12:33:24.307 metplus.GridStat (command_builder.py:146) DEBUG: LEVEL=P1000
10/01 12:33:24.307 metplus.GridStat (command_builder.py:146) DEBUG: OBTYPE=gfs_anl
10/01 12:33:24.307 metplus.GridStat (command_builder.py:146) DEBUG: CONFIG_DIR=/contrib/METplus/METplus-2.0/parm/use_cases/grid_to_grid/met_config
10/01 12:33:24.307 metplus.GridStat (command_builder.py:146) DEBUG: FCST_FIELD={ name="HGT"; level="[P1000]"; }
10/01 12:33:24.307 metplus.GridStat (command_builder.py:146) DEBUG: OBS_FIELD={ name="HGT"; level="[P1000]"; }
10/01 12:33:24.307 metplus.GridStat (command_builder.py:146) DEBUG: INPUT_BASE=/scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_sample_data/grid_to_grid
10/01 12:33:24.307 metplus.GridStat (command_builder.py:146) DEBUG: MET_VALID_HHMM=0601
10/01 12:33:24.308 metplus.GridStat (compare_gridded_wrapper.py:356) DEBUG:
10/01 12:33:24.308 metplus.GridStat (compare_gridded_wrapper.py:357) DEBUG: COPYABLE ENVIRONMENT FOR NEXT COMMAND:
10/01 12:33:24.308 metplus.GridStat (command_builder.py:141) DEBUG: export MODEL=gfs; export FCST_VAR=HGT; export OBS_VAR=HGT;
export LEVEL=P1000; export OBTYPE=gfs_anl; export CONFIG_DIR=/contrib/METplus/METplus-2.0/parm/use_cases/grid_to_grid/met_config; export FCST_FIELD="{ name=\"HGT\"; level=\"[P1000]\"; }"; export OBS_FIELD="{ name=\"HGT\"; level=\"[P1000]\"; }"; export
INPUT_BASE=/scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_sample_data/grid_to_grid; export MET_VALID_HHMM=0601;
10/01 12:33:24.308 metplus.GridStat (compare_gridded_wrapper.py:363) DEBUG:
10/01 12:33:24.308 metplus.GridStat (compare_gridded_wrapper.py:369) INFO:
10/01 12:33:24.308 metplus.GridStat (command_runner.py:220) DEBUG: LOG_MET_OUTPUT_TO_METPLUS log file is True
10/01 12:33:24.309 metplus.GridStat (command_runner.py:119) INFO: app_name is: grid_stat, output sent to: /scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/output_METplus/logs/master_metplus.log.g2gpres_part1.runon20181001
10/01 12:33:24.362 metplus.GridStat (command_runner.py:155) INFO: RUNNING: /contrib/met/8.0/bin/grid_stat /scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_sample_data/grid_to_grid/gfs/pgbf00.gfs.2018060100 /scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_sample_data/grid_to_grid/gfs/pgbanl.gfs.2018060100 /contrib/METplus/METplus-2.0/parm/use_cases/grid_to_grid/met_config/GridStatConfig_pres -outdir /scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/output_METplus/grid2grid/make_met_data/pres/gfs/201806010000/grid_stat >> /scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/output_METplus/logs/master_metplus.log.g2gpres_part1.runon20181001 2>&1
```

Post-run overview: logging – part 1

The command METplus generated and runs for MET's *grid_stat*

```
10/01 12:33:24.279 metplus.StatAnalysis (master_metplus.py:142) INFO: *****
10/01 12:33:24.280 metplus.StatAnalysis (master_metplus.py:143) INFO: * RUNNING MET+
10/01 12:33:24.280 metplus.StatAnalysis (master_metplus.py:147) INFO: * at valid time: 201806010000
10/01 12:33:24.280 metplus.StatAnalysis (master_metplus.py:148) INFO: *****
10/01 12:33:24.307 metplus.GridStat (compare_gridded_wrapper.py:344) DEBUG:
10/01 12:33:24.307 metplus.GridStat (compare_gridded_wrapper.py:345) DEBUG: ENVIRONMENT FOR NEXT COMMAND:
10/01 12:33:24.307 metplus.GridStat (command_builder.py:146) DEBUG: MODEL=gfs
10/01 12:33:24.307 metplus.GridStat (command_builder.py:146) DEBUG: FCST_VAR=HGT
10/01 12:33:24.307 metplus.GridStat (command_builder.py:146) DEBUG: OBS_VAR=HGT
10/01 12:33:24.307 metplus.GridStat (command_builder.py:146) DEBUG: LEVEL=P1000
10/01 12:33:24.307 metplus.GridStat (command_builder.py:146) DEBUG: OBTYPE=gfs_anl
10/01 12:33:24.307 metplus.GridStat (command_builder.py:146) DEBUG: CONFIG_DIR=/contrib/METplus/METplus-2.0/parm/use_cases/grid_to_grid/met_config
10/01 12:33:24.307 metplus.GridStat (command_builder.py:146) DEBUG: FCST_FIELD={ name="HGT"; level="[P1000]"; }
10/01 12:33:24.307 metplus.GridStat (command_builder.py:146) DEBUG: OBS_FIELD={ name="HGT"; level="[P1000]"; }
10/01 12:33:24.307 metplus.GridStat (command_builder.py:146) DEBUG: INPUT_BASE=/scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_sample_data/grid_to_grid
10/01 12:33:24.307 metplus.GridStat (command_builder.py:146) DEBUG: MET_VALID_HHMM=0601
10/01 12:33:24.308 metplus.GridStat (compare_gridded_wrapper.py:356) DEBUG:
10/01 12:33:24.308 metplus.GridStat (compare_gridded_wrapper.py:357) DEBUG: COPYABLE ENVIRONMENT FOR NEXT COMMAND:
10/01 12:33:24.308 metplus.GridStat (command_builder.py:141) DEBUG: export MODEL=gfs; export FCST_VAR=HGT; export OBS_VAR=HGT;
export LEVEL=P1000; export OBTYPE=gfs_anl; export CONFIG_DIR=/contrib/METplus/METplus-2.0/parm/use_cases/grid_to_grid/met_config; export FCST_FIELD="{ name=\"HGT\"; level=\"[P1000]\"; }"; export OBS_FIELD="{ name=\"HGT\"; level=\"[P1000]\"; }"; export
INPUT_BASE=/scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_sample_data/grid_to_grid; export MET_VALID_HHMM=0601;
10/01 12:33:24.308 metplus.GridStat (compare_gridded_wrapper.py:363) DEBUG:
10/01 12:33:24.308 metplus.GridStat (compare_gridded_wrapper.py:369) INFO:
10/01 12:33:24.308 metplus.GridStat (command_runner.py:220) DEBUG: LOG_MET_OUTPUT_TO_METPLUS log file is True
10/01 12:33:24.309 metplus.GridStat (command_runner.py:119) INFO: app_name is: grid_stat, output sent to: /scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/output_METplus/logs/master_metplus.log.g2gpres_part1.runon20181001
10/01 12:33:24.362 metplus.GridStat (command_runner.py:155) INFO: RUNNING: /contrib/met/8.0/bin/grid_stat /scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_sample_data/grid_to_grid/gfs/pgbf00.gfs.2018060100 /scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_sample_data/grid_to_grid/gfs/pgbanl.gfs.2018060100 /contrib/METplus/METplus-2.0/parm/use_cases/grid_to_grid/met_config/GridStatConfig_pres -outdir /scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/output_METplus/grid2grid/make_met_data/pres/gfs/201806010000/grid_stat >> /scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/output_METplus/logs/master_metplus.log.g2gpres_part1.runon20181001 2>&1
```


Post-run overview: logging – part 1

Logging output from MET's *grid_stat*

```
10/01 12:33:24.362 metplus.GridStat (command_runner.py:156) DEBUG: RUNNING exe('/contrib/met/8.0/bin/grid_stat')['/scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_sample_data/grid_to_grid/gfs/pgbf00.gfs.2018060100', '/scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_sample_data/grid_to_grid/gfs/pgbanl.gfs.2018060100', '/contrib/METplus/METplus-2.0/parm/use_cases/grid_to_grid/met_config/GridStatConfig_pres', '-outdir', '/scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/output_METplus/grid2grid/make_met_data/pres/gfs/201806010000/grid_stat'].out('/scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/output_METplus/logs/master_metplus.log.q2qpres_part1.runon20181001', append=True).err2out()
DEBUG 1: Default Config File: /contrib/met/8.0/share/met/config/GridStatConfig_default
DEBUG 1: User Config File: /contrib/METplus/METplus-2.0/parm/use_cases/grid_to_grid/met_config/GridStatConfig_pres
GSL_RNG_TYPE=mt19937
GSL_RNG_SEED=336900699
DEBUG 1: Forecast File: /scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_sample_data/grid_to_grid/gfs/pgbf00.gfs.2018060100
DEBUG 1: Observation File: /scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_sample_data/grid_to_grid/gfs/pgbanl.gfs.2018060100
DEBUG 1: Regridding field HGT/P1000 to the verification grid.
DEBUG 1: Regridding field HGT/P1000 to the verification grid.
DEBUG 2: Processing masking regions.
DEBUG 2:
DEBUG 2: -----
DEBUG 2:
DEBUG 2: Processing HGT/P1000 versus HGT/P1000, for smoothing method NEAREST(1), over region FULL, using 10512 pairs.
DEBUG 2: Computing Scalar Partial Sums.
DEBUG 2: Processing HGT/P1000 versus HGT/P1000, for smoothing method NEAREST(1), over region NHX, using 3600 pairs.
DEBUG 2: Computing Scalar Partial Sums.
DEBUG 2: Processing HGT/P1000 versus HGT/P1000, for smoothing method NEAREST(1), over region SHX, using 3600 pairs.
DEBUG 2: Computing Scalar Partial Sums.
DEBUG 2: Processing HGT/P1000 versus HGT/P1000, for smoothing method NEAREST(1), over region TR0, using 2448 pairs.
DEBUG 2: Computing Scalar Partial Sums.
DEBUG 2: Processing HGT/P1000 versus HGT/P1000, for smoothing method NEAREST(1), over region PNA, using 1311 pairs.
DEBUG 2: Computing Scalar Partial Sums.
DEBUG 2:
DEBUG 2: -----
DEBUG 2:
DEBUG 1: Output file: /scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/output_METplus/grid2grid/make_met_data/pres/gfs/201806010000/grid_stat/grid_stat_gfs_HGT_vs_gfs_anl_HGT_P1000_000000L_20180601_000000V.stat
```

Post-run overview: logging – part 1

Information METplus is using to create command using MET's *stat_analysis*

```
10/01 12:34:16.690 metplus.StatAnalysis (stat_analysis_wrapper.py:778) INFO: RUNNING STAT_ANALYSIS FOR VSDB FORMAT
10/01 12:34:16.691 metplus.StatAnalysis (stat_analysis_wrapper.py:62) INFO: Formatting in VSDB style for grid2grid
10/01 12:34:16.691 metplus.StatAnalysis (stat_analysis_wrapper.py:72) INFO: Valid on: 201806020000
10/01 12:34:16.691 metplus.StatAnalysis (stat_analysis_wrapper.py:107) DEBUG:
10/01 12:34:16.691 metplus.StatAnalysis (stat_analysis_wrapper.py:108) DEBUG: ENVIRONMENT FOR NEXT COMMAND:
10/01 12:34:16.691 metplus.StatAnalysis (stat_analysis_wrapper.py:109) DEBUG:
10/01 12:34:16.692 metplus.StatAnalysis (stat_analysis_wrapper.py:110) DEBUG: COPYABLE ENVIRONMENT FOR NEXT COMMAND:
10/01 12:34:16.692 metplus.StatAnalysis (stat_analysis_wrapper.py:111) DEBUG:
10/01 12:34:16.692 metplus.StatAnalysis (stat_analysis_wrapper.py:117) INFO:
10/01 12:34:16.692 metplus.StatAnalysis (command_runner.py:220) DEBUG: LOG_MET_OUTPUT_TO_METPLUS log file is True
10/01 12:34:16.693 metplus.StatAnalysis (command_runner.py:119) INFO: app_name is: stat_analysis, output sent to: /scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/output_METplus/logs/master_metplus.log.g2gpres_part1.runon20181001
10/01 12:34:16.693 metplus.StatAnalysis (command_runner.py:155) INFO: RUNNING: /contrib/met/8.0/bin/stat_analysis -lookin /scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/output_METplus/grid2grid/make_met_data/pres/gfs/201806020000/grid_stat at -config /contrib/METplus/METplus-2.0/parm/use_cases/grid_to_grid/met_config/STATAnalysisConfig_VSDBformat >> /scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/output_METplus/logs/master_metplus.log.g2gpres_part1.runon20181001 2>&1
10/01 12:34:16.693 metplus.StatAnalysis (command_runner.py:156) DEBUG: RUNNING exe('/contrib/met/8.0/bin/stat_analysis')['-lookin', '/scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/output_METplus/grid2grid/make_met_data/pres/gfs/201806020000/grid_stat', '-config', '/contrib/METplus/METplus-2.0/parm/use_cases/grid_to_grid/met_config/STATAnalysisConfig_VSDBformat'].out('/scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/output_METplus/logs/master_metplus.log.g2gpres_part1.runon20181001', append=True).err2out()
DEBUG 1: Default Config File: /contrib/met/8.0/share/met/config/STATAnalysisConfig_default
DEBUG 1: User Config File: /contrib/METplus/METplus-2.0/parm/use_cases/grid_to_grid/met_config/STATAnalysisConfig_VSDBformat
DEBUG 2: Processing 30 STAT files.
DEBUG 2: STAT Lines read      = 150
DEBUG 2: STAT Lines retained = 150
DEBUG 2:
DEBUG 2: Processing Job 1: -job filter -model gfs -fcst_valid_beg 20180602_000000 -fcst_valid_end 20180602_000000 -fcst_valid_hour 000000 -obtype gfs_anl -dump_row /scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/output_METplus/grid2grid/VSDB_format/pres/00Z/gfs/gfs_20180602.stat
DEBUG 1: Creating dump row output file "/scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/output_METplus/grid2grid/VSDB_format/pres/00Z/gfs/gfs_20180602.stat"
FILTER:      -job filter -model gfs -fcst_valid_beg 20180602_000000 -fcst_valid_end 20180602_000000 -fcst_valid_hour 000000 -obtype gfs_anl -dump_row /scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/output_METplus/grid2grid/VSDB_format/pres/00Z/gfs/gfs_20180602.stat
DEBUG 2: Job 1 used 150 out of 150 STAT lines.
```

Post-run overview: logging – part 1

The command METplus generated and runs for MET's *stat_analysis*

```
10/01 12:34:16.690 metplus.StatAnalysis (stat_analysis_wrapper.py:778) INFO: RUNNING STAT_ANALYSIS FOR VSDB FORMAT
10/01 12:34:16.691 metplus.StatAnalysis (stat_analysis_wrapper.py:62) INFO: Formatting in VSDB style for grid2grid
10/01 12:34:16.691 metplus.StatAnalysis (stat_analysis_wrapper.py:72) INFO: Valid on: 201806020000
10/01 12:34:16.691 metplus.StatAnalysis (stat_analysis_wrapper.py:107) DEBUG:
10/01 12:34:16.691 metplus.StatAnalysis (stat_analysis_wrapper.py:108) DEBUG: ENVIRONMENT FOR NEXT COMMAND:
10/01 12:34:16.691 metplus.StatAnalysis (stat_analysis_wrapper.py:109) DEBUG:
10/01 12:34:16.692 metplus.StatAnalysis (stat_analysis_wrapper.py:110) DEBUG: COPYABLE ENVIRONMENT FOR NEXT COMMAND:
10/01 12:34:16.692 metplus.StatAnalysis (stat_analysis_wrapper.py:111) DEBUG:
10/01 12:34:16.692 metplus.StatAnalysis (stat_analysis_wrapper.py:117) INFO:
10/01 12:34:16.692 metplus.StatAnalysis (command_runner.py:220) DEBUG: LOG_MET_OUTPUT_TO_METPLUS log file is True
10/01 12:34:16.693 metplus.StatAnalysis (command_runner.py:119) INFO: app_name is: stat_analysis, output sent to: /scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/output_METplus/logs/master_metplus.log.g2gpres_part1.runon20181001
10/01 12:34:16.693 metplus.StatAnalysis (command_runner.py:155) INFO: RUNNING: /contrib/met/8.0/bin/stat_analysis -lookin /scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/output_METplus/grid2grid/make_met_data/pres/gfs/201806020000/grid_stat -config /contrib/METplus/METplus-2.0/parm/use_cases/grid_to_grid/met_config/STATAnalysisConfig_VSDBformat >> /scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/output_METplus/logs/master_metplus.log.g2gpres_part1.runon20181001 2>&1
10/01 12:34:16.693 metplus.StatAnalysis (command_runner.py:156) DEBUG: RUNNING exec ('/contrib/met/8.0/bin/stat_analysis' ['-lookin', '/scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/output_METplus/grid2grid/make_met_data/pres/gfs/201806020000/grid_stat', '-config', '/contrib/METplus/METplus-2.0/parm/use_cases/grid_to_grid/met_config/STATAnalysisConfig_VSDBformat']).out('/scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/output_METplus/logs/master_metplus.log.g2gpres_part1.runon20181001', append=True).err2out()
DEBUG 1: Default Config File: /contrib/met/8.0/share/met/config/STATAnalysisConfig_default
DEBUG 1: User Config File: /contrib/METplus/METplus-2.0/parm/use_cases/grid_to_grid/met_config/STATAnalysisConfig_VSDBformat
DEBUG 2: Processing 30 STAT files.
DEBUG 2: STAT Lines read      = 150
DEBUG 2: STAT Lines retained = 150
DEBUG 2:
DEBUG 2: Processing Job 1: -job filter -model gfs -fcst_valid_beg 20180602_000000 -fcst_valid_end 20180602_000000 -fcst_valid_hour 000000 -obtype gfs_anl -dump_row /scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/output_METplus/grid2grid/VSDb_format/pres/00Z/gfs/gfs_20180602.stat
DEBUG 1: Creating dump row output file "/scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/output_METplus/grid2grid/VSDb_format/pres/00Z/gfs/gfs_20180602.stat"
FILTER:      -job filter -model gfs -fcst_valid_beg 20180602_000000 -fcst_valid_end 20180602_000000 -fcst_valid_hour 000000 -obtype gfs_anl -dump_row /scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/output_METplus/grid2grid/VSDb_format/pres/00Z/gfs/gfs_20180602.stat
DEBUG 2: Job 1 used 150 out of 150 STAT lines.
```

Post-run overview: logging – part 1

Logging output from MET's *stat_analysis*

```
10/01 12:34:16.690 metplus.StatAnalysis (stat_analysis_wrapper.py:778) INFO: RUNNING STAT_ANALYSIS FOR VSDB FORMAT
10/01 12:34:16.691 metplus.StatAnalysis (stat_analysis_wrapper.py:62) INFO: Formatting in VSDB style for grid2grid
10/01 12:34:16.691 metplus.StatAnalysis (stat_analysis_wrapper.py:72) INFO: Valid on: 201806020000
10/01 12:34:16.691 metplus.StatAnalysis (stat_analysis_wrapper.py:107) DEBUG:
10/01 12:34:16.691 metplus.StatAnalysis (stat_analysis_wrapper.py:108) DEBUG: ENVIRONMENT FOR NEXT COMMAND:
10/01 12:34:16.691 metplus.StatAnalysis (stat_analysis_wrapper.py:109) DEBUG:
10/01 12:34:16.692 metplus.StatAnalysis (stat_analysis_wrapper.py:110) DEBUG: COPYABLE ENVIRONMENT FOR NEXT COMMAND:
10/01 12:34:16.692 metplus.StatAnalysis (stat_analysis_wrapper.py:111) DEBUG:
10/01 12:34:16.692 metplus.StatAnalysis (stat_analysis_wrapper.py:117) INFO:
10/01 12:34:16.692 metplus.StatAnalysis (command_runner.py:220) DEBUG: LOG_MET_OUTPUT_TO_METPLUS log file is True
10/01 12:34:16.693 metplus.StatAnalysis (command_runner.py:119) INFO: app_name is: stat_analysis, output sent to: /scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/output_METplus/logs/master_metplus.log.g2gpres_part1.runon20181001
10/01 12:34:16.693 metplus.StatAnalysis (command_runner.py:155) INFO: RUNNING: /contrib/met/8.0/bin/stat_analysis -lookin /scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/output_METplus/grid2grid/make_met_data/pres/gfs/201806020000/grid_stat -config /contrib/METplus/METplus-2.0/parm/use_cases/grid_to_grid/met_config/STATAnalysisConfig_VSDBformat >> /scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/output_METplus/logs/master_metplus.log.g2gpres_part1.runon20181001 2>&1
10/01 12:34:16.693 metplus.StatAnalysis (command_runner.py:156) DEBUG: RUNNING exe('/contrib/met/8.0/bin/stat_analysis')['-lookin', '/scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/output_METplus/grid2grid/make_met_data/pres/gfs/201806020000/grid_stat', '-config', '/contrib/METplus/METplus-2.0/parm/use_cases/grid_to_grid/met_config/STATAnalysisConfig_VSDBformat'].out('/scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/output_METplus/logs/master_metplus.log.g2gpres_part1.runon20181001'.append=True).err2out()
DEBUG 1: Default Config File: /contrib/met/8.0/share/met/config/STATAnalysisConfig_default
DEBUG 1: User Config File: /contrib/METplus/METplus-2.0/parm/use_cases/grid_to_grid/met_config/STATAnalysisConfig_VSDBformat
DEBUG 2: Processing 30 STAT files.
DEBUG 2: STAT Lines read      = 150
DEBUG 2: STAT Lines retained = 150
DEBUG 2:
DEBUG 2: Processing Job 1: -job filter -model gfs -fcst_valid_beg 20180602_000000 -fcst_valid_end 20180602_000000 -fcst_valid_hour 000000 -obtype gfs_anl -dump_row /scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/output_METplus/grid2grid/VSDB_format/pres/00Z/gfs/gfs_20180602.stat
DEBUG 1: Creating dump row output file "/scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/output_METplus/grid2grid/VSDB_format/pres/00Z/gfs/gfs_20180602.stat"
FILTER:      -job filter -model gfs -fcst_valid_beg 20180602_000000 -fcst_valid_end 20180602_000000 -fcst_valid_hour 000000 -obtype gfs_anl -dump_row /scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/output_METplus/grid2grid/VSDB_format/pres/00Z/gfs/gfs_20180602.stat
DEBUG 2: Job 1 used 150 out of 150 STAT lines.
```

Post-run overview: output – part 1

- GRID_STAT_OUT_DIR -
/scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/oupu

```
[Mallory.Row@tfe07 gfs]$ ls
201806010000 201806020000
[Mallory.Row@tfe07 gfs]$ ls 201806020000/grid_stat/*
201806020000/grid_stat/grid_stat_gfs_HGT_vs_gfs_anl_HGT_P1000_000000L_20180602_000000V.stat
201806020000/grid_stat/grid_stat_gfs_HGT_vs_gfs_anl_HGT_P1000_240000L_20180602_000000V.stat
201806020000/grid_stat/grid_stat_gfs_HGT_vs_gfs_anl_HGT_P1000_480000L_20180602_000000V.stat
201806020000/grid_stat/grid_stat_gfs_HGT_vs_gfs_anl_HGT_P850_000000L_20180602_000000V.stat
201806020000/grid_stat/grid_stat_gfs_HGT_vs_gfs_anl_HGT_P850_240000L_20180602_000000V.stat
201806020000/grid_stat/grid_stat_gfs_HGT_vs_gfs_anl_HGT_P850_480000L_20180602_000000V.stat
201806020000/grid_stat/grid_stat_gfs_O3MR_vs_gfs_anl_O3MR_P100_000000L_20180602_000000V.stat
201806020000/grid_stat/grid_stat_gfs_O3MR_vs_gfs_anl_O3MR_P100_240000L_20180602_000000V.stat
201806020000/grid_stat/grid_stat_gfs_O3MR_vs_gfs_anl_O3MR_P100_480000L_20180602_000000V.stat
201806020000/grid_stat/grid_stat_gfs_O3MR_vs_gfs_anl_O3MR_P70_000000L_20180602_000000V.stat
201806020000/grid_stat/grid_stat_gfs_O3MR_vs_gfs_anl_O3MR_P70_240000L_20180602_000000V.stat
201806020000/grid_stat/grid_stat_gfs_O3MR_vs_gfs_anl_O3MR_P70_480000L_20180602_000000V.stat
201806020000/grid_stat/grid_stat_gfs_TMP_vs_gfs_anl_TMP_P1000_000000L_20180602_000000V.stat
201806020000/grid_stat/grid_stat_gfs_TMP_vs_gfs_anl_TMP_P1000_240000L_20180602_000000V.stat
201806020000/grid_stat/grid_stat_gfs_TMP_vs_gfs_anl_TMP_P1000_480000L_20180602_000000V.stat
201806020000/grid_stat/grid_stat_gfs_TMP_vs_gfs_anl_TMP_P850_000000L_20180602_000000V.stat
201806020000/grid_stat/grid_stat_gfs_TMP_vs_gfs_anl_TMP_P850_240000L_20180602_000000V.stat
201806020000/grid_stat/grid_stat_gfs_TMP_vs_gfs_anl_TMP_P850_480000L_20180602_000000V.stat
201806020000/grid_stat/grid_stat_gfs_UGRD_vs_gfs_anl_UGRD_P1000_000000L_20180602_000000V.stat
201806020000/grid_stat/grid_stat_gfs_UGRD_vs_gfs_anl_UGRD_P1000_240000L_20180602_000000V.stat
201806020000/grid_stat/grid_stat_gfs_UGRD_vs_gfs_anl_UGRD_P1000_480000L_20180602_000000V.stat
201806020000/grid_stat/grid_stat_gfs_UGRD_vs_gfs_anl_UGRD_P850_000000L_20180602_000000V.stat
201806020000/grid_stat/grid_stat_gfs_UGRD_vs_gfs_anl_UGRD_P850_240000L_20180602_000000V.stat
201806020000/grid_stat/grid_stat_gfs_UGRD_vs_gfs_anl_UGRD_P850_480000L_20180602_000000V.stat
201806020000/grid_stat/grid_stat_gfs_VGRD_vs_gfs_anl_VGRD_P1000_000000L_20180602_000000V.stat
201806020000/grid_stat/grid_stat_gfs_VGRD_vs_gfs_anl_VGRD_P1000_240000L_20180602_000000V.stat
201806020000/grid_stat/grid_stat_gfs_VGRD_vs_gfs_anl_VGRD_P1000_480000L_20180602_000000V.stat
201806020000/grid_stat/grid_stat_gfs_VGRD_vs_gfs_anl_VGRD_P850_000000L_20180602_000000V.stat
201806020000/grid_stat/grid_stat_gfs_VGRD_vs_gfs_anl_VGRD_P850_240000L_20180602_000000V.stat
201806020000/grid_stat/grid_stat_gfs_VGRD_vs_gfs_anl_VGRD_P850_480000L_20180602_000000V.stat
```


Configuring METplus for Use Case – User customized use case file – part 2

```
#
[dir]
#
CONFIG_DIR = {PARAM_BASE}/use_cases/grid_to_grid/met_config
#dirs for StatAnalysis
STAT_ANALYSIS_LOOKIN_DIR = {OUTPUT_BASE}/{VERIF_CASE}/VSDB_format/{VERIF_TYPE}
STAT_ANALYSIS_OUT_DIR = {OUTPUT_BASE}/{VERIF_CASE}/plot_format_data/{VERIF_TYPE}
#dirs for MakePlots
PLOTING_SCRIPTS_DIR = {METPLUS_BASE}/ush/plotting_scripts
STAT_FILES_INPUT_DIR = {STAT_ANALYSIS_OUT_DIR}
PLOTING_OUT_DIR = {OUTPUT_BASE}/{VERIF_CASE}/make_plots/{VERIF_TYPE}
#
[config]
#
LOG_METPLUS = {LOG_DIR}/master_metplus.log.g2g{VERIF_TYPE}_part2.runon{LOG_TIMESTAMP_TEMPLATE}
METPLUS_CONF = {OUTPUT_BASE}/confs/metplus_final_g2g{VERIF_TYPE}_part2.conf
#
VERIF_CASE = grid2grid
VERIF_TYPE = pres
#
LOOP_BY_INIT = false
#Format of VALID_BEG and VALID_END
VALID_TIME_FMT = %Y%m%d
# Start time for MET+ run
VALID_BEG = 20180601
# End time for MET+ run
VALID_END = 20180602
#valid hours to verify
VALID_BEG_HOUR = 00
VALID_END_HOUR = 00
VALID_INCREMENT = 6
```

PLOTING_SCRIPTS_DIR – path to where the plotting scripts are

STAT_FILES_INPUT_DIR – path to where the STAT files to use for plotting are

PLOTING_OUT_DIR – path to where to save images to

Configuring METplus for Use Case – User customized use case file – part 2

```
# TODO: Add -- see Minna's description in another file
# plot method: processes, VSDB format: times
LOOP_METHOD = processes
# List of applications to run
PROCESS_LIST = StatAnalysis, MakePlots
#info for looping
#models
MODEL_LIST = gfs
```

LOOP_METHOD – set to *processes*, so METplus loops various tasks over the given date span

PROCESS_LIST - list of METplus wrappers to run

MODEL_LIST – list of models to plot statistics for

Configuring METplus for Use Case – User customized use case file – part 2

```
#variables and levels
FCST_VAR1_NAME = HGT
FCST_VAR1_LEVELS = P1000, P850

FCST_VAR2_NAME = TMP
FCST_VAR2_LEVELS = P1000, P850

FCST_VAR3_NAME = UGRD
FCST_VAR3_LEVELS = P1000, P850

FCST_VAR4_NAME = VGRD
FCST_VAR4_LEVELS = P1000, P850

#regions
REGION_LIST = FULL, NHX

#leads
LEAD_LIST = 0, 24, 48

#StatAnalysis
STAT_ANALYSIS_CONFIG = {CONFIG_DIR}/STATAnalysisConfig_plotformat

#MakePlots
#stats to plot, options:bias rms mress rsd rmse_md rmse_pv pcor
PLOT_STATS_LIST = bias, rmse, mress, rsd, rmse_md, rmse_pv, pcor
```

REGION_LIST – list of regions to plot statistics for

LEAD_LIST – list of forecast hours to plot

STAT_ANALYSIS_CONFIG – path to the MET config file to use for *stat_analysis*

PLOT_STATS_LIST – list of statistics to plot

Running the use case with METplus – part 2

- Be sure environment is set up correctly for the machine the use case is being run on!
- Commands can be used in job card to submit jobs to batch queues.

- Example for part 2 for grid-to-grid pres:

```
master_metplus.py -c
/scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplu
s_tutorial/machine_theia.conf -c
/scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplu
s_tutorial/machine_theia_Mallory.Row.conf -c
/scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplu
s_tutorial/my_parm/use_cases/grid_to_grid/examples/pres_s
tep2.conf
```

Post-run overview: logging – part 2

Information METplus is using to create command using MET's *stat_analysis*

```
10/01 12:37:46.994 metplus.StatAnalysis (stat_analysis_wrapper.py:750) INFO: RUNNING STAT_ANALYSIS FOR PLOTTING FORMAT
10/01 12:37:46.994 metplus.StatAnalysis (stat_analysis_wrapper.py:196) INFO: Formatting for plotting for grid2grid-pres
10/01 12:37:47.014 metplus.StatAnalysis (stat_analysis_wrapper.py:287) DEBUG:
10/01 12:37:47.014 metplus.StatAnalysis (stat_analysis_wrapper.py:289) DEBUG: ENVIRONMENT FOR NEXT COMMAND:
10/01 12:37:47.014 metplus.StatAnalysis (stat_analysis_wrapper.py:290) DEBUG:
10/01 12:37:47.014 metplus.StatAnalysis (stat_analysis_wrapper.py:291) DEBUG: COPYABLE ENVIRONMENT FOR NEXT COMMAND:
10/01 12:37:47.014 metplus.StatAnalysis (stat_analysis_wrapper.py:292) DEBUG:
10/01 12:37:47.014 metplus.StatAnalysis (stat_analysis_wrapper.py:298) INFO:
10/01 12:37:47.014 metplus.StatAnalysis (command_runner.py:220) DEBUG: LOG_MET_OUTPUT_TO_METPLUS log file is True
10/01 12:37:47.015 metplus.StatAnalysis (command_runner.py:119) INFO: app_name is: stat_analysis, output sent to: /scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/output_METplus/logs/master_metplus.log.g2gpres_part2.runon20181001
10/01 12:37:47.072 metplus.StatAnalysis (command_runner.py:155) INFO: RUNNING: /contrib/met/8.0/bin/stat_analysis -lookin /scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/output_METplus/grid2grid/VSDb_format/pres/00Z/gfs -config /contrib/METplus/METplus-2.0/parm/use_cases/grid_to_grid/met_config/STATAnalysisConfig_plotformat >> /scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/output_METplus/logs/master_metplus.log.g2gpres_part2.runon20181001 2>&1
10/01 12:37:47.073 metplus.StatAnalysis (command_runner.py:156) DEBUG: RUNNING exe('/contrib/met/8.0/bin/stat_analysis')['-lookin', '/scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/output_METplus/grid2grid/VSDb_format/pres/00Z/gfs', '-config', '/contrib/METplus/METplus-2.0/parm/use_cases/grid_to_grid/met_config/STATAnalysisConfig_plotformat'].out('/scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/output_METplus/logs/master_metplus.log.g2gpres_part2.runon20181001', append=True).err2out()
DEBUG 1: Default Config File: /contrib/met/8.0/share/met/config/STATAnalysisConfig_default
DEBUG 1: User Config File: /contrib/METplus/METplus-2.0/parm/use_cases/grid_to_grid/met_config/STATAnalysisConfig_plotformat
DEBUG 2: Processing 2 STAT files.
DEBUG 2: STAT Lines read = 300
DEBUG 2: STAT Lines retained = 2
DEBUG 2:
DEBUG 2: Processing Job 1: -job filter -model gfs -fcst_lead 000000 -fcst_valid_beg 20180601_000000 -fcst_valid_end 20180602_000000 -fcst_valid_hour 000000 -fcst_var HGT -obs_var HGT -fcst_lev P1000 -obs_lev P1000 -vx_mask FULL -interp_mthd NEAREST -dump_row /scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/output_METplus/grid2grid/plot_format_data/pres/00Z/gfs/FULL/gfs_f00_fcstHGTP1000_obsHGTP1000.stat
DEBUG 1: Creating dump row output file "/scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/output_METplus/grid2grid/plot_format_data/pres/00Z/gfs/FULL/gfs_f00_fcstHGTP1000_obsHGTP1000.stat"
FILTER: -job filter -model gfs -fcst_lead 000000 -fcst_valid_beg 20180601_000000 -fcst_valid_end 20180602_000000 -fcst_valid_hour 000000 -fcst_var HGT -obs_var HGT -fcst_lev P1000 -obs_lev P1000 -vx_mask FULL -interp_mthd NEAREST -dump_row /scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/output_METplus/grid2grid/plot_format_data/pres/00Z/gfs/FULL/gfs_f00_fcstHGTP1000_obsHGTP1000.stat
DEBUG 2: Job 1 used 2 out of 2 STAT lines.
```

Post-run overview: logging – part 2

The command METplus generated and runs for MET's *stat_analysis*

```
10/01 12:37:46.994 metplus.StatAnalysis (stat_analysis_wrapper.py:750) INFO: RUNNING STAT_ANALYSIS FOR PLOTTING FORMAT
10/01 12:37:46.994 metplus.StatAnalysis (stat_analysis_wrapper.py:196) INFO: Formatting for plotting for grid2grid-pres
10/01 12:37:47.014 metplus.StatAnalysis (stat_analysis_wrapper.py:288) DEBUG:
10/01 12:37:47.014 metplus.StatAnalysis (stat_analysis_wrapper.py:289) DEBUG: ENVIRONMENT FOR NEXT COMMAND:
10/01 12:37:47.014 metplus.StatAnalysis (stat_analysis_wrapper.py:290) DEBUG:
10/01 12:37:47.014 metplus.StatAnalysis (stat_analysis_wrapper.py:291) DEBUG: COPYABLE ENVIRONMENT FOR NEXT COMMAND:
10/01 12:37:47.014 metplus.StatAnalysis (stat_analysis_wrapper.py:292) DEBUG:
10/01 12:37:47.014 metplus.StatAnalysis (stat_analysis_wrapper.py:298) INFO:
10/01 12:37:47.014 metplus.StatAnalysis (command_runner.py:220) DEBUG: LOG_MET_OUTPUT_TO_METPLUS log file is True
10/01 12:37:47.015 metplus.StatAnalysis (command_runner.py:119) INFO: app_name is: stat_analysis, output sent to: /scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/output_METplus/logs/master_metplus.log.g2gpres_part2.runon20181001
10/01 12:37:47.072 metplus.StatAnalysis (command_runner.py:155) INFO: RUNNING: /contrib/met/8.0/bin/stat_analysis -lookin /scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/output_METplus/grid2grid/VSDb_format/pres/00Z/gfs -config /contrib/METplus/METplus-2.0/parm/use_cases/grid_to_grid/met_config/STATAnalysisConfig_plotformat >> /scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/output_METplus/logs/master_metplus.log.g2gpres_part2.runon20181001 2>&1
10/01 12:37:47.072 metplus.StatAnalysis (command_runner.py:156) DEBUG: RUNNING exec(/contrib/met/8.0/bin/stat_analysis) ['lookin', '/scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/output_METplus/grid2grid/VSDb_format/pres/00Z/gfs', '-config', '/contrib/METplus/METplus-2.0/parm/use_cases/grid_to_grid/met_config/STATAnalysisConfig_plotformat'].out('/scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/output_METplus/logs/master_metplus.log.g2gpres_part2.runon20181001', append=True).err2out()
DEBUG 1: Default Config File: /contrib/met/8.0/share/met/config/STATAnalysisConfig_default
DEBUG 1: User Config File: /contrib/METplus/METplus-2.0/parm/use_cases/grid_to_grid/met_config/STATAnalysisConfig_plotformat
DEBUG 2: Processing 2 STAT files.
DEBUG 2: STAT Lines read = 300
DEBUG 2: STAT Lines retained = 2
DEBUG 2:
DEBUG 2: Processing Job 1: -job filter -model gfs -fcst_lead 000000 -fcst_valid_beg 20180601_000000 -fcst_valid_end 20180602_000000 -fcst_valid_hour 000000 -fcst_var HGT -obs_var HGT -fcst_lev P1000 -obs_lev P1000 -vx_mask FULL -interp_mthd NEAREST -dump_row /scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/output_METplus/grid2grid/plot_format_data/pres/00Z/gfs/FULL/gfs_f00_fcstHGTP1000_obsHGTP1000.stat
DEBUG 1: Creating dump row output file "/scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/output_METplus/grid2grid/plot_format_data/pres/00Z/gfs/FULL/gfs_f00_fcstHGTP1000_obsHGTP1000.stat"
FILTER: -job filter -model gfs -fcst_lead 000000 -fcst_valid_beg 20180601_000000 -fcst_valid_end 20180602_000000 -fcst_valid_hour 000000 -fcst_var HGT -obs_var HGT -fcst_lev P1000 -obs_lev P1000 -vx_mask FULL -interp_mthd NEAREST -dump_row /scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/output_METplus/grid2grid/plot_format_data/pres/00Z/gfs/FULL/gfs_f00_fcstHGTP1000_obsHGTP1000.stat
DEBUG 2: Job 1 used 2 out of 2 STAT lines.
```

Post-run overview: logging – part 2

Logging output from MET's *stat_analysis*

```
10/01 12:37:46.994 metplus.StatAnalysis (stat_analysis_wrapper.py:750) INFO: RUNNING STAT_ANALYSIS FOR PLOTTING FORMAT
10/01 12:37:46.994 metplus.StatAnalysis (stat_analysis_wrapper.py:196) INFO: Formatting for plotting for grid2grid-pres
10/01 12:37:47.014 metplus.StatAnalysis (stat_analysis_wrapper.py:288) DEBUG:
10/01 12:37:47.014 metplus.StatAnalysis (stat_analysis_wrapper.py:289) DEBUG: ENVIRONMENT FOR NEXT COMMAND:
10/01 12:37:47.014 metplus.StatAnalysis (stat_analysis_wrapper.py:290) DEBUG:
10/01 12:37:47.014 metplus.StatAnalysis (stat_analysis_wrapper.py:291) DEBUG: COPYABLE ENVIRONMENT FOR NEXT COMMAND:
10/01 12:37:47.014 metplus.StatAnalysis (stat_analysis_wrapper.py:292) DEBUG:
10/01 12:37:47.014 metplus.StatAnalysis (stat_analysis_wrapper.py:298) INFO:
10/01 12:37:47.014 metplus.StatAnalysis (command_runner.py:220) DEBUG: LOG_MET_OUTPUT_TO_METPLUS log file is True
10/01 12:37:47.015 metplus.StatAnalysis (command_runner.py:119) INFO: app_name is: stat_analysis, output sent to: /scratch4/NCE
PDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/output_METplus/logs/master_metplus.log.g2gpres_part2.runon20181001
10/01 12:37:47.072 metplus.StatAnalysis (command_runner.py:155) INFO: RUNNING: /contrib/met/8.0/bin/stat_analysis -lookin /scra
tch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/output_METplus/grid2grid/VSDb_format/pres/00Z/gfs -config /contrib/M
ETplus/METplus-2.0/parm/use_cases/grid_to_grid/met_config/STATAnalysisConfig_plotformat >> /scratch4/NCEPDEV/global/save/Mallor
y.Row/VRFY/METplus_tutorial/output_METplus/logs/master_metplus.log.g2gpres_part2.runon20181001 2>&1
10/01 12:37:47.073 metplus.StatAnalysis (command_runner.py:156) DEBUG: RUNNING exe('/contrib/met/8.0/bin/stat_analysis')['-look
in', '/scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/output_METplus/grid2grid/VSDb_format/pres/00Z/gfs', '-confi
g', '/contrib/METplus/METplus-2.0/parm/use_cases/grid_to_grid/met_config/STATAnalysisConfig_plotformat'].out('/scratch4/NCEPDEV/
global/save/Mallory.Row/VRFY/METplus_tutorial/output_METplus/logs/master_metplus.log.g2gpres_part2.runon20181001', append=True).
out()
DEBUG 1: Default Config File: /contrib/met/8.0/share/met/config/STATAnalysisConfig_default
DEBUG 1: User Config File: /contrib/METplus/METplus-2.0/parm/use_cases/grid_to_grid/met_config/STATAnalysisConfig_plotformat
DEBUG 2: Processing 2 STAT files.
DEBUG 2: STAT Lines read = 300
DEBUG 2: STAT Lines retained = 2
DEBUG 2:
DEBUG 2: Processing Job 1: -job filter -model gfs -fcst_lead 000000 -fcst_valid_beg 20180601_000000 -fcst_valid_end 20180602_00
0000 -fcst_valid_hour 000000 -fcst_var HGT -obs_var HGT -fcst_lev P1000 -obs_lev P1000 -vx_mask FULL -interp_mthd NEAREST -dump
_row /scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/output_METplus/grid2grid/plot_format_data/pres/00Z/gfs/FUL
L/gfs_f00_fcstHGTP1000_obsHGTP1000.stat
DEBUG 1: Creating dump row output file "/scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/output_METplus/grid2gri
d/plot_format_data/pres/00Z/gfs/FULL/gfs_f00_fcstHGTP1000_obsHGTP1000.stat"
FILTER: -job filter -model gfs -fcst_lead 000000 -fcst_valid_beg 20180601_000000 -fcst_valid_end 20180602_000000 -fcst_v
alid_hour 000000 -fcst_var HGT -obs_var HGT -fcst_lev P1000 -obs_lev P1000 -vx_mask FULL -interp_mthd NEAREST -dump_row /scrat
h4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/output_METplus/grid2grid/plot_format_data/pres/00Z/gfs/FULL/gfs_f00_fc
stHGTP1000_obsHGTP1000.stat
DEBUG 2: Job 1 used 2 out of 2 STAT lines.
```

Post-run overview: logging – part 2

Logging output from plotting

```
10/01 12:37:57.213 metplus.MakePlots (make_plots_wrapper.py:632) INFO: RUNNING SCRIPTS FOR PLOTTING
10/01 12:37:57.213 metplus.MakePlots (make_plots_wrapper.py:36) INFO: Making plots for grid2grid-pres
10/01 12:38:15.424 (plot_grid2grid_pres_ts.py:87) INFO: -----> Running /contrib/METplus/METplus-2.0/ush/plotting_scripts/plot_
grid2grid_pres_ts.py
10/01 12:38:15.424 (plot_grid2grid_pres_ts.py:88) DEBUG: ----- with Valid start date:20180601 Valid end date:20180602 cycle:00Z
lead:00 region:FULL fcst var:HGT_P1000 obs var:HGT_P1000
10/01 12:38:15.424 (plot_grid2grid_pres_ts.py:95) DEBUG: ---- bias
10/01 12:38:15.424 (plot_grid2grid_pres_ts.py:99) DEBUG: 1 gfs
10/01 12:38:15.424 (plot_grid2grid_pres_ts.py:107) DEBUG: Found /scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial
/output_METplus/grid2grid/plot_format_data/pres/00Z/gfs/FULL/gfs_f00_fcstHGT_P1000_obsHGT_P1000.stat
10/01 12:38:15.449 (plot_grid2grid_pres_ts.py:218) DEBUG: Writing gfs f00 mean to /scratch4/NCEPDEV/global/save/Mallory.Row/VRF
Y/METplus_tutorial/output_METplus/grid2grid/make_plots/pres/data/00Z/gfs/bias_mean_FULL_fcstHGT_P1000_obsHGT_P1000.txt
10/01 12:38:15.514 (plot_grid2grid_pres_ts.py:248) DEBUG: Plotting bias time series for gfs
10/01 12:38:15.521 (plot_grid2grid_pres_ts.py:270) DEBUG: ---- Saving image as /scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/M
ETplus_tutorial/output_METplus/grid2grid/make_plots/pres/imgs/00Z/bias_f00_fcstHGT_P1000_obsHGT_P1000_G2FULL.png
```

Post-run overview: output – part 2

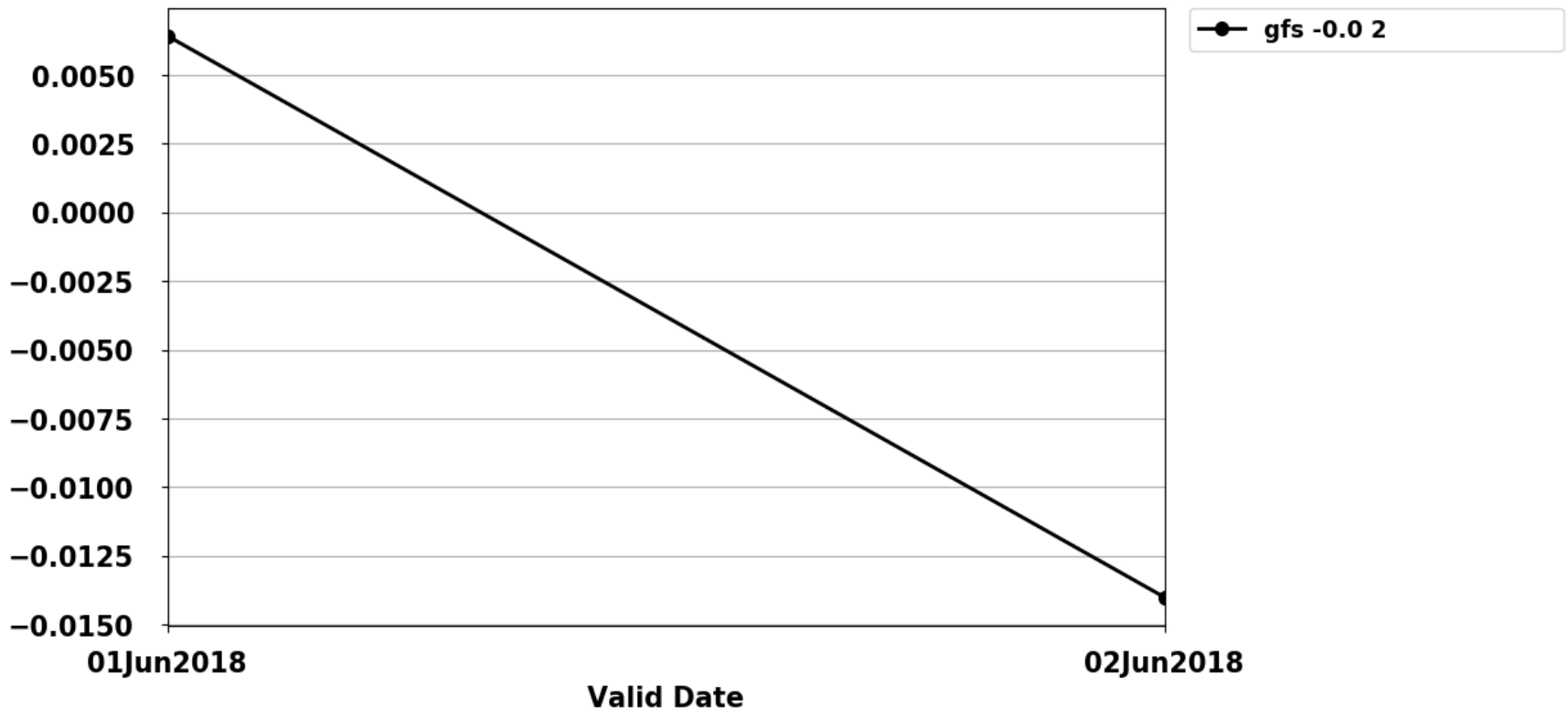
- STAT_ANALYSIS_OUT_DIR -
/scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/output_METplus/grid2grid/plot_format_data/pres
- Example:
/scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/output_METplus/grid2grid/plot_format_data/pres/00Z/gfs/NHX/gfs_f00_fcstHGT1000_obsHGT1000_stat

VERSION	MODEL	DESC	FCST_LEAD	FCST_VALID_BEG	FCST_VALID_END	OBS_LEAD	OBS_VALID_BEG	OBS_VALID_END	FCST_VAR	FCST_LEV	OBS_VAR
V8.0	gfs	NA	000000	20180601_000000	20180601_000000	000000	20180601_000000	20180601_000000	HGT	P1000	HGT
V8.0	gfs	NA	000000	20180602_000000	20180602_000000	000000	20180602_000000	20180602_000000	HGT	P1000	HGT

Post-run overview: output – part 2

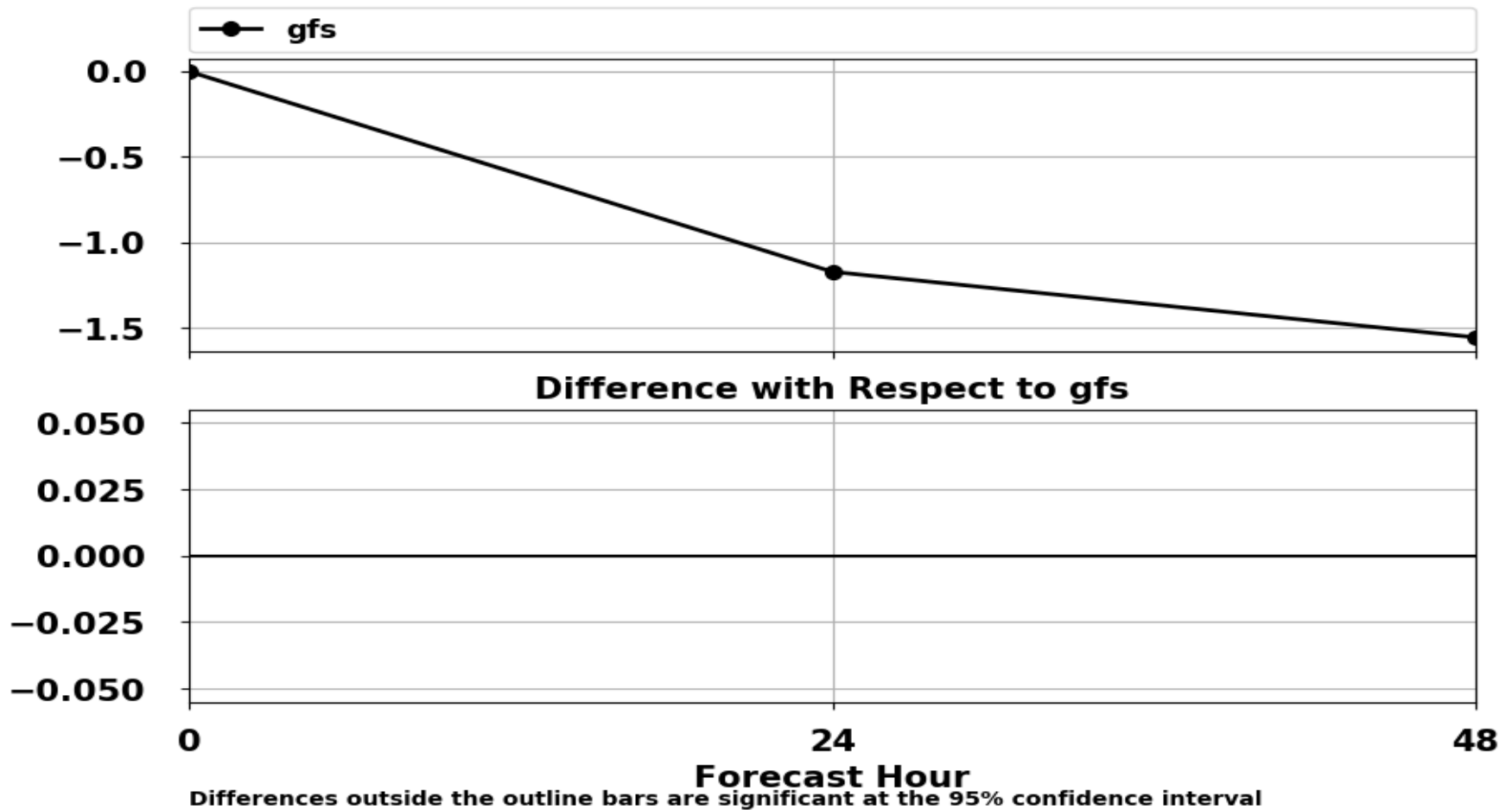
- PLOTTING_OUT_DIR -
/scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/outu

Fcst: HGT_P1000 Obs: HGT_P1000 bias
G2-NHX Valid 00Z 1Jun2018-2Jun2018 f00



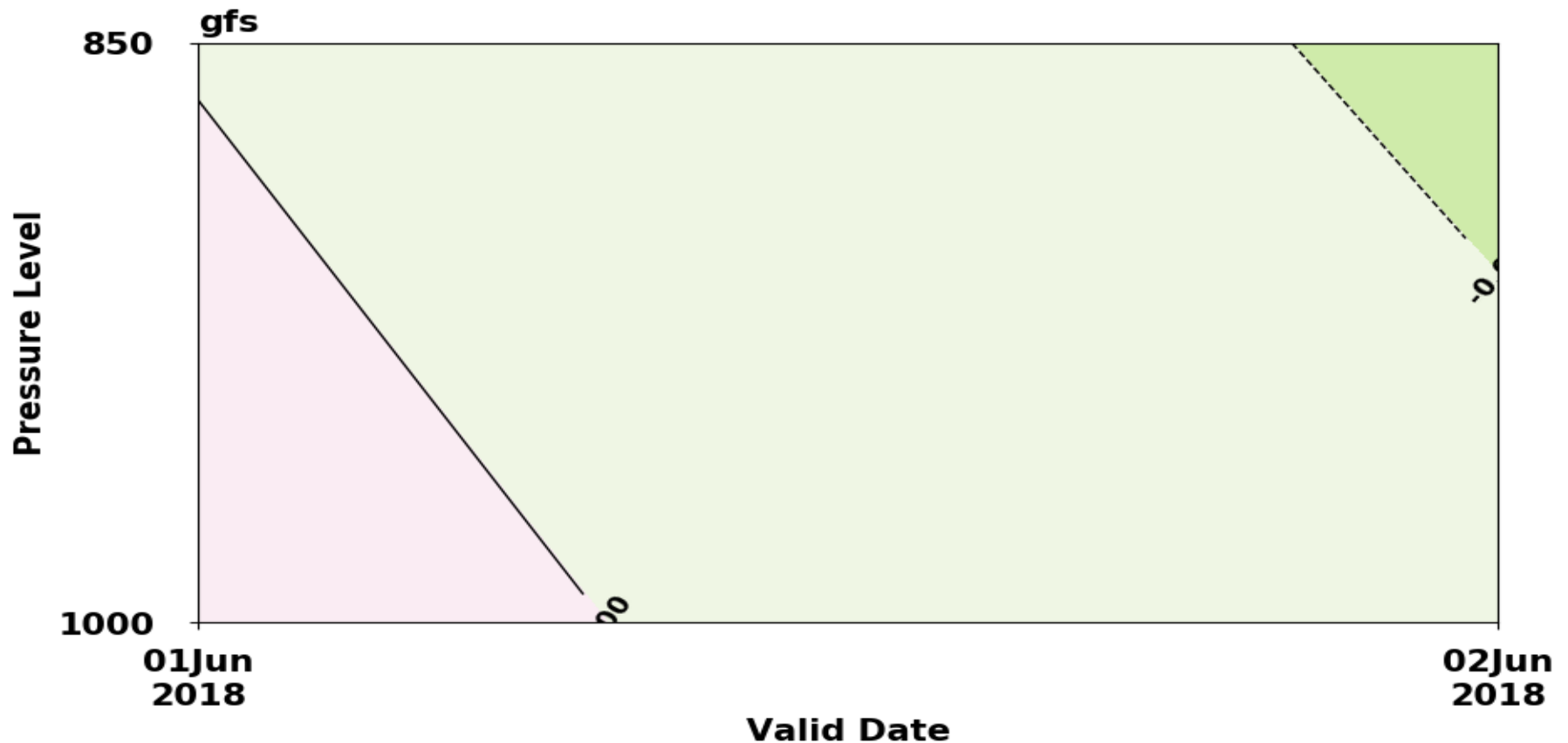
Post-run overview: output – part 2

Fcst: HGT_P1000 Obs: HGT_P1000 bias
G2-NHX Valid 00Z 1Jun2018-2Jun2018 Means



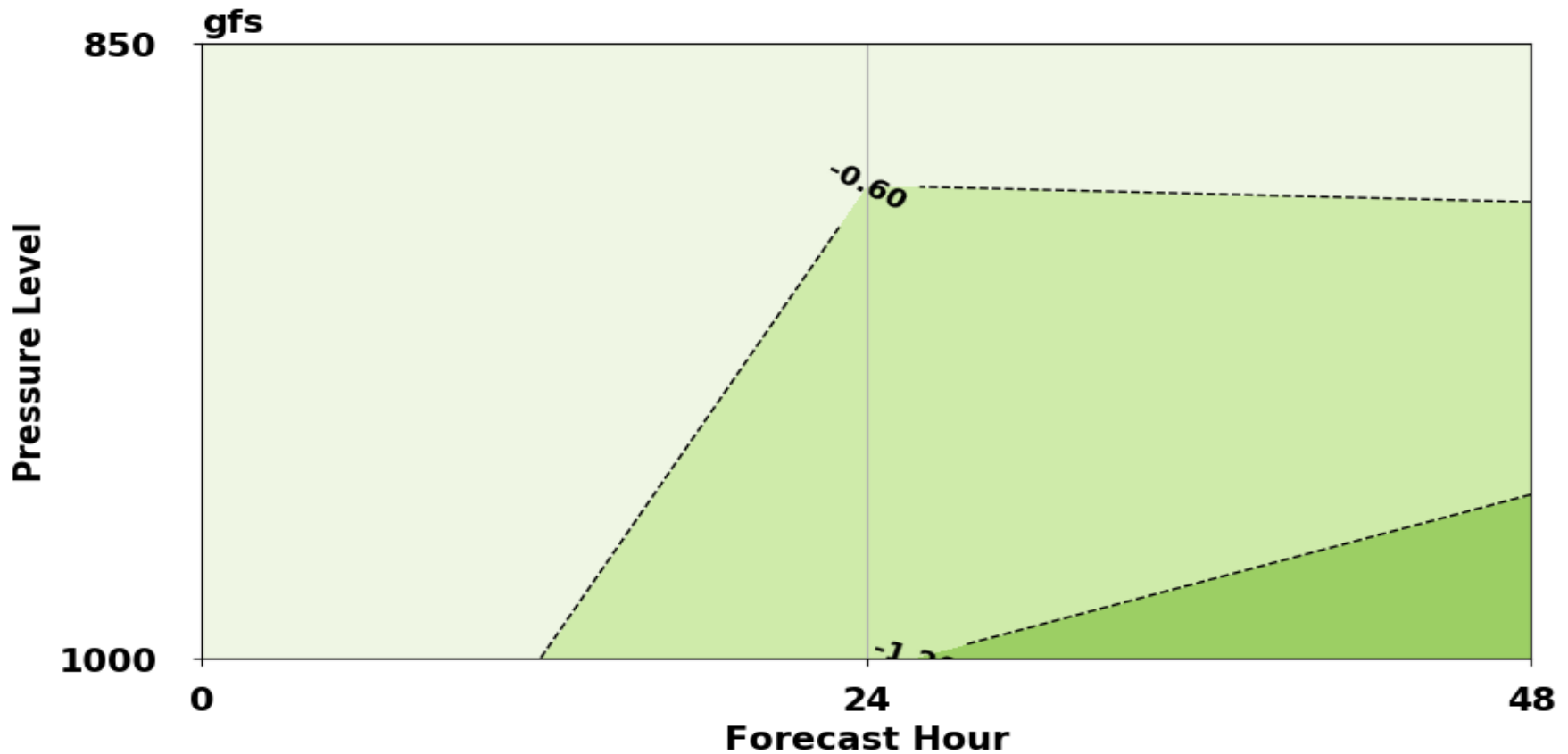
Post-run overview: output – part 2

Fcst: HGT Obs: HGT bias
G2-NHX Valid 00Z 1Jun2018-2Jun2018 f00



Post-run overview: output – part 2

Fcst: HGT Obs: HGT bias
G2-NHX Valid 00Z 1Jun2018-2Jun2018 Mean



Running the use case with METplus – part 1

- Commands for running the other types of grid-to-grid verifications....

- Example for part 1a for grid-to-grid anom:

```
master_metplus.py -c
/scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/machine_theia.conf -c
/scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/machine_theia_Mallory.Row.conf -c
/scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/my_parm/use_cases/grid_to_grid/examples/anom_step1a.conf
(grid_stat - no Fourier decompositon)
```

Running the use case with METplus – part 1

- Commands for running the other types of grid-to-grid verifications....

- Example for part 1b for grid-to-grid anom:

```
master_metplus.py -c
/scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/machine_theia.conf -c
/scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/machine_theia_Mallory.Row.conf -c
/scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/my_parm/use_cases/grid_to_grid/examples/anom_step1b.conf
```

(grid_stat - Fourier decompositon)

Running the use case with METplus – part 1

- Commands for running the other types of grid-to-grid verifications....

- Example for part 1c for grid-to-grid anom:

```
master_metplus.py -c
/scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/machine_theia.conf -c
/scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/machine_theia_Mallory.Row.conf -c
/scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/my_parm/use_cases/grid_to_grid/examples/anom_step1c.conf
(stat_analysis)
```

Running the use case with METplus – part 2

- Commands for running the other types of grid-to-grid verifications....

- Example for part 2 for grid-to-grid anom:

```
master_metplus.py -c
/scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/machine_theia.conf -c
/scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/machine_theia_Mallory.Row.conf -c
/scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/my_parm/use_cases/grid_to_grid/examples/anom_step2.conf
```

Running the use case with METplus – part 1

- Commands for running the other types of grid-to-grid verifications....
- Example for part 1 for grid-to-grid sfc:

```
master_metplus.py -c
/scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/machine_theia.conf -c
/scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/machine_theia_Mallory.Row.conf -c
/scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/my_parm/use_cases/grid_to_grid/examples/sfc_step1.conf
```


Running the use case with METplus – part 2

- Commands for running the other types of grid-to-grid verifications....

- Example for part 2 for grid-to-grid sfc:

```
master_metplus.py -c
/scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/machine_theia.conf -c
/scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/machine_theia_Mallory.Row.conf -c
/scratch4/NCEPDEV/global/save/Mallory.Row/VRFY/METplus_tutorial/my_parm/use_cases/grid_to_grid/examples/sfc_step2.conf
```

Summary and Questions

- The whole grid-to-grid use case is comprised of two parts...
 1. Compute anomalous or regular partial sums
 2. Create plots for various statistics
- ... with 3 different types of grid-to-grid verifications
 1. Anom – various variables at various pressure levels (uses climatology data)
 2. Pres – various variables at various pressure levels
 3. Sfc – various variables at a single level

QUESTIONS?