

METplus Introduction

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July 30 – August 1, 2019

Tutorial

Monterey, CA



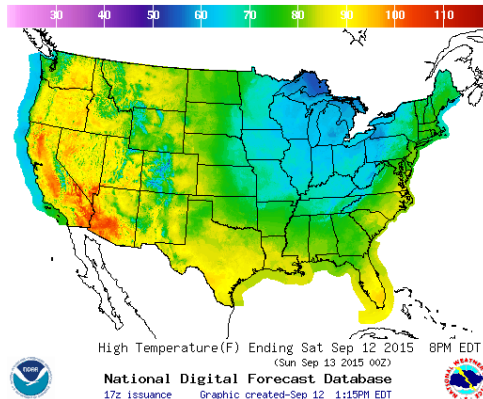
MET Package

- MET is community code supported by DTC that is free to download (registration required)
 - Approximately 3800+ registered users
 - 124 countries
 - Universities, Government, Private Companies, Non-Profits
- Free Download MET release and compile locally.
 - Register and download: www.dtcenter.org/met/users
- Language:
 - Primarily in C++ with calls to some Fortran libraries
- Supported Platforms and Compilers:
 - Linux with GNU compilers
 - Linux with Portland Group (PGI) compilers
 - Linux with Intel compilers
- On-line tutorial available
- In-person tutorials generally given yearly

- Being Adopted by NOAA, NRL, AF
- In operation in South Africa, Under Consideration by the Met Office, and ECMWF

Why Unification

Forecasters



Government Centers



University and National Lab Researchers



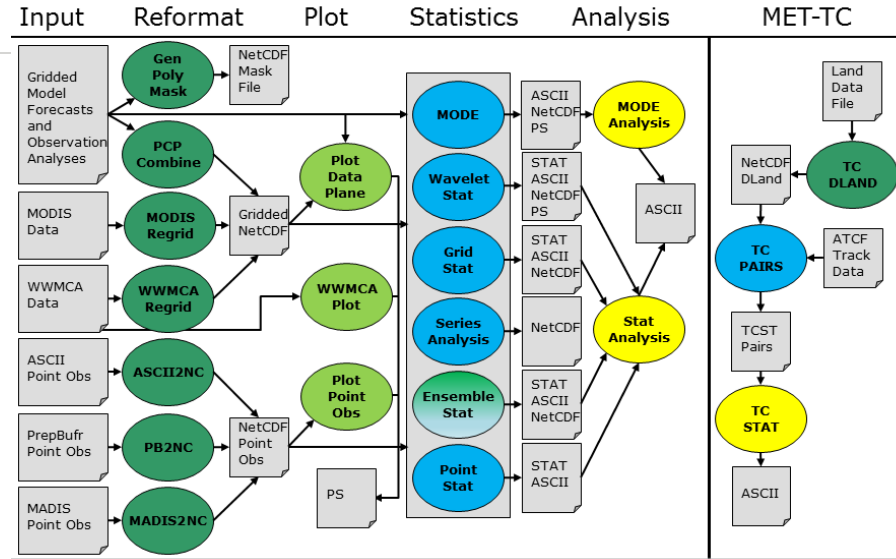
Comprehensive and unified verification tool - Make R20 more efficient - Provide a consistent set of metrics

Allows Researchers and Operational Scientists to speak a “common verification” language

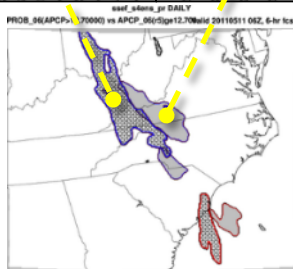
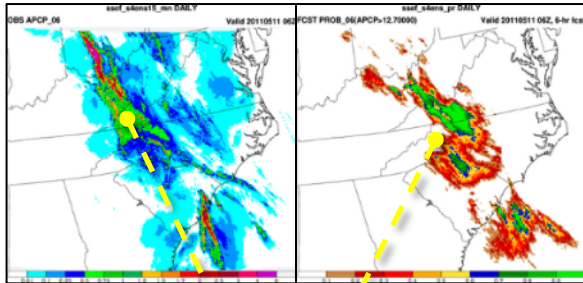


User Support of unified package provides greater opportunity to train all on verification best practices

- Originally developed to replicated the EMC mesoscale verification system
- Over 85 traditional statistics using both point and gridded datasets
- 15 interpolation methods
- Computation of confidence intervals
- Able to read in GRIB1, GRIB2 and CF-compliant NetCDF
- Applied to many spatial and temporal scales
- 3500+ users, both US & Int'l

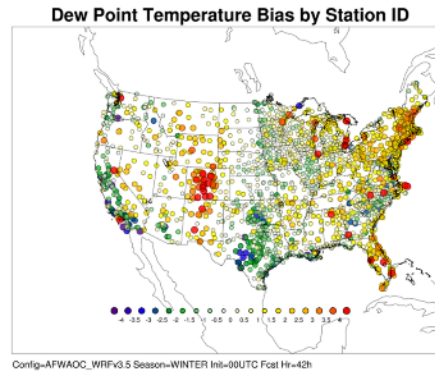


Object Based and Spatial Methods

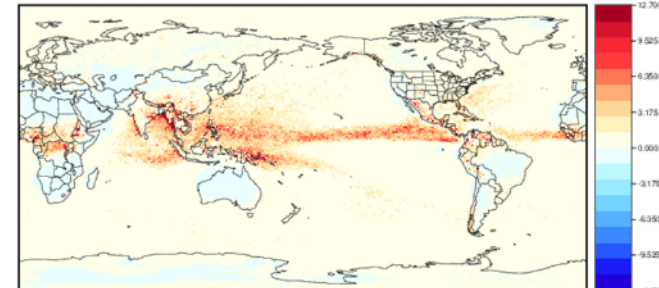


Bad forecast or Good forecast with displacement error?

Geographical Representation of Errors



90th Percentile of difference between two models

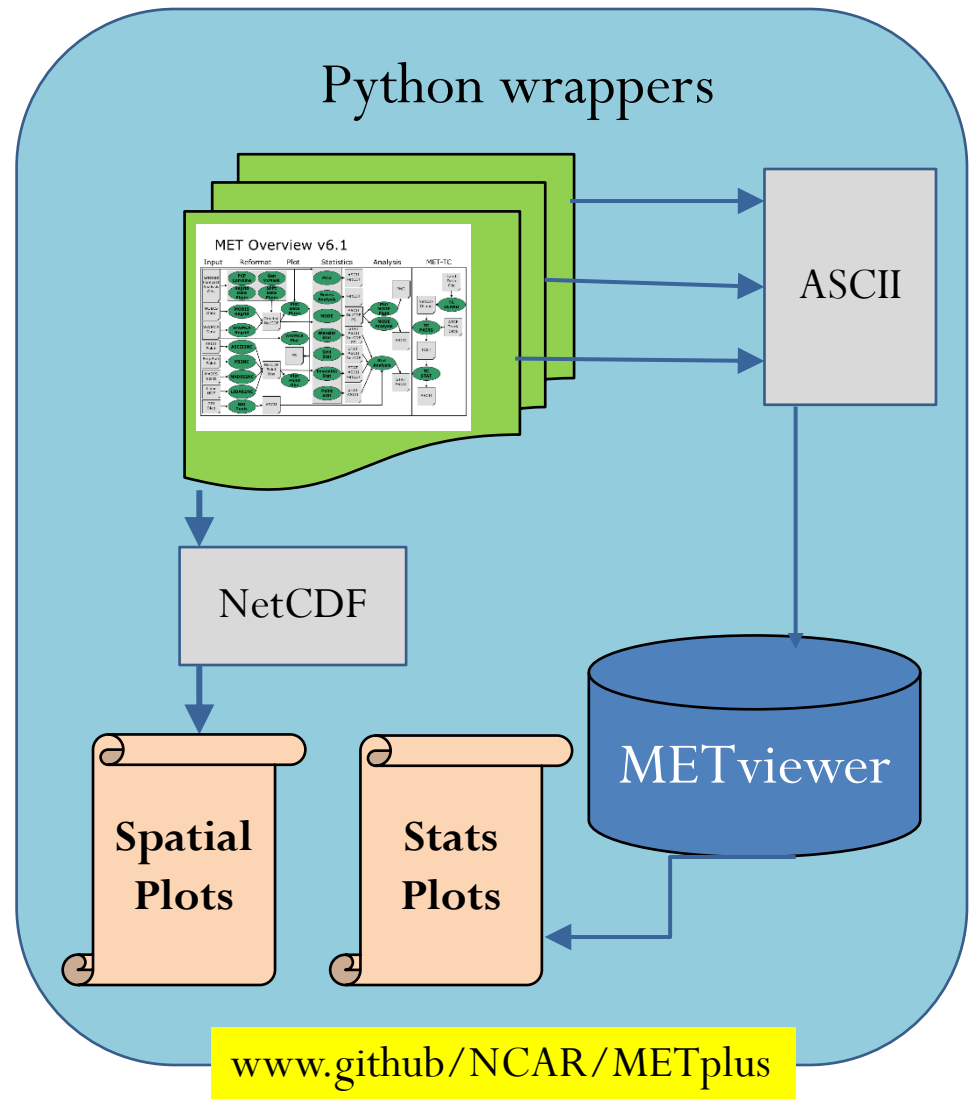


METplus Overview

General Concept of METplus

Python wrappers around:

- MET (core)
- METviewer (core)
- Plotting
 - METviewer User Interface
 - METviewer Batch Engine
 - Python plotting scripts
- Communication between MET & python algorithms



Near Term: After Global - CAM, Ensembles and Aerosols / Air Qual

Longer Term: Earth System "Components"

Components



NCAR / METplus

Code

Issues 55

Pull requests 0

Projects 0

Wiki

Insights

Python scripting infrastructure for MET tools.

1,527 commits

14 branches

15 releases

Branch: master

New pull request

Create

jimfrimel Updated notes in the logging conf file.

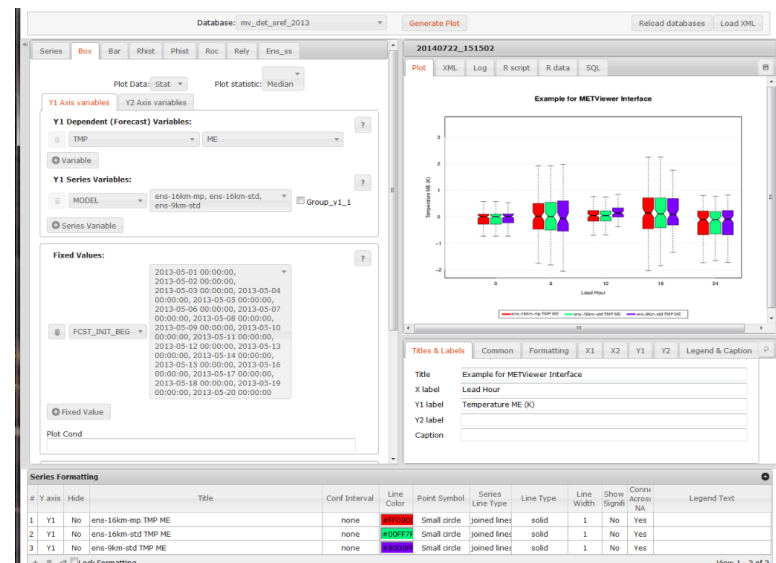
doc One more minor change to affiliation list

internal_tests Replaced all instances of INIT_INC with INIT_INCREMENT

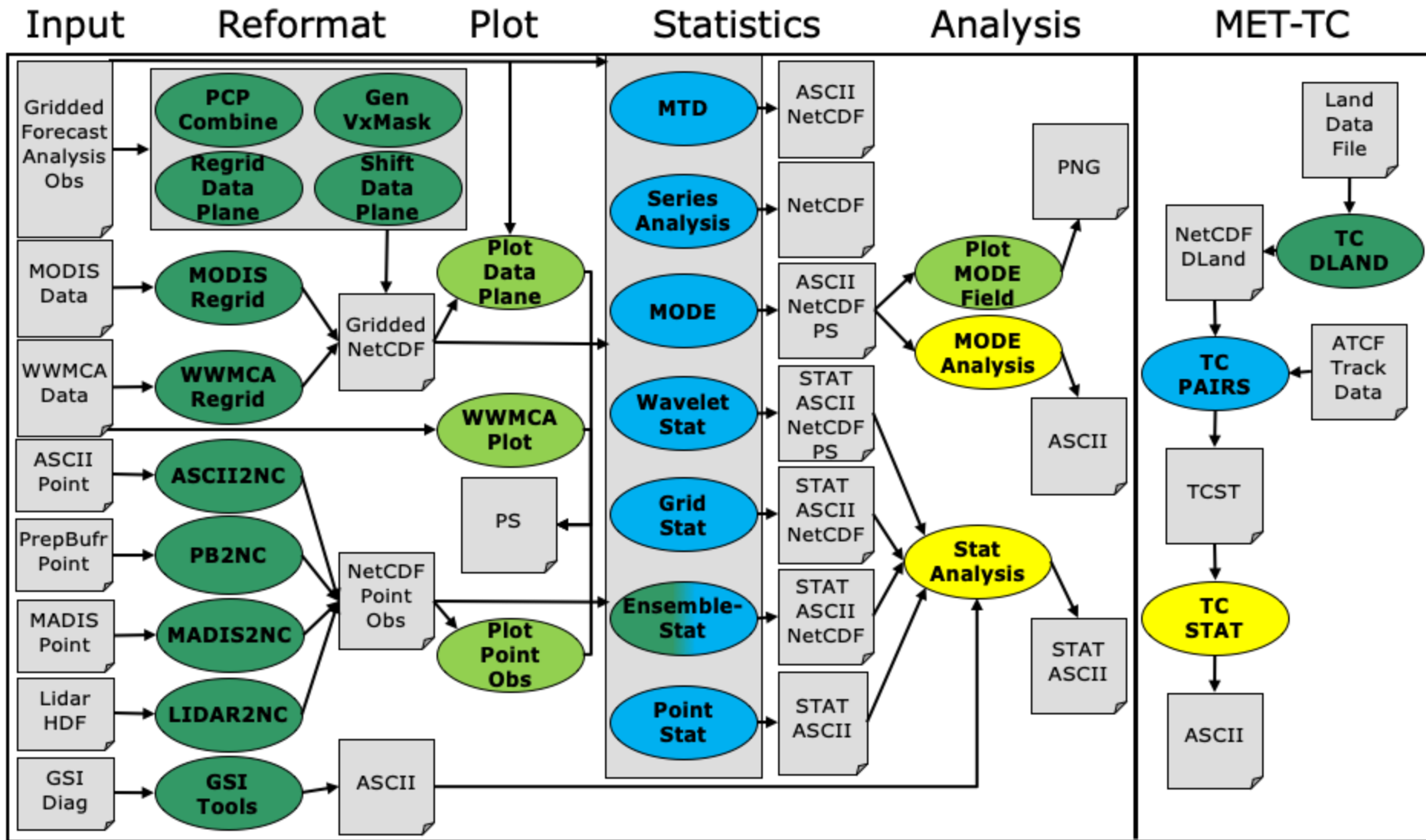
parm Updated notes in the logging conf file.

src Change name from Alpha-produtil to Beta-METplus.

ush Aligned the feature relative use case INIT_END time with the sample d...



MET Overview v8.1



Laundry List of Statistics

Type	Statistics
Continuous	Forecast and Observation mean, Standard deviation of the forecast and observations, Mean error (F-O), Standard deviation of the error, Anomaly Correlation, Pearson correlation coefficient, Spearman's rank correlation coefficient, Kendall's tau statistic, Multiplicative bias, Mean absolute error, Mean squared error, Bias-corrected mean squared error, Root mean squared error, 10th, 25th, 50th, 75th, and 90th percentiles of the error, Interquartile Range, Median Absolute Deviation, Square of the mean error, Mean squared error skill score, Root mean squared forecast anomaly, Root mean squared observation anomaly, Mean of absolute value of forecast and observed gradients, Mean of maximum of absolute values of forecast and observed gradients, Mean of absolute value of forecast minus observed gradients, S1 score, S1 score with respect to observed gradient, Ratio of forecast and observed gradients, Scalar Partial Sums, Vector Partial Sums, Anomaly Partial Sums
Categorical	Base rate, Forecast mean, Accuracy, Frequency Bias, Probability of detecting yes, Probability of detecting no, Probability of false detection, False alarm ratio, Critical Success Index, Gilbert Skill Score, Hanssen-Kuipers Discriminant, Heidke Skill Score, Odds Ratio, Logarithm of the Odds Ratio, Odds Ratio Skill Score, Extreme Dependency Score, Symmetric Extreme Dependency Score, Extreme Dependency Index, Symmetric Extremal Dependency Index, Bias Adjusted Gilbert Skill Score, Gerrity Score for multi-categorical statistics

Laundry List of Statistics

Type	Statistics
Probability	Base Rate, Reliability, Brier Score, Resolution, Uncertainty, Climatological Brier Score, Brier Skill Score, Receiver Operating Characteristic (ROC) Curve, Area under the ROC curve, Reliability Diagram points, Economic Cost/Loss Relative Value Diagram points), Calibration, Refinement, Likelihood
Ensemble	Continuous Ranked Probability Score and Skill Score, Ignorance Score, Rank Histogram, Probability Integral Transform, Relative Position, Spread, Skill, Spread and Skill of members perturbed to represent observation error, Spread+obs error
Skill by Spatial Scale	Fourier Decomposition of fields prior to computation of scores or use Wavelet_Stat tool which computes for each scale: Mean squared error, Intensity scale skill score, Forecast energy squared, Observed energy squared, Frequency Bias. Not scale dependent: Base rate
Neighborhood	Same as categorical statistics plus Fractions Brier Score, Fractions Skill Score, Asymptotic Fractions Skill Score, Uniform Fractions Skill Score, HiRA methods for neighborhoods around point observations
Tropical Cyclones	Mean, Standard deviation, Minimum Value, Percentiles, Maximum Value, Interquartile Range, Range, Sum, Independence time, Frequency of superior performance, contingency tables counts for Rapid Intensification and Rapid Weakening, contingency tables counts for Probability of Rapid Intensification and Rapid Weakening

Type	Statistics
2D Objects	<p>For each object: Location of the centroid in grid units, Location of the centroid in lat/lon degrees, Axis angle, Length of the enclosing rectangle, Width of the enclosing rectangle, Object area, Radius of curvature of the object defined in terms of third order moments, Center of curvature, Ratio of the difference between the area of an object and the area of its convex hull divided by the area of the complex hull, percentiles of intensity of the raw field within the object, Percentile of intensity chosen for use in the percentile intensity ratio, Sum of the intensities of the raw field within the object,</p> <p>For paired objects: Distance between two objects centroids, Minimum distance between the boundaries of two objects, Minimum distance between the convex hulls of two objects, Difference between the axis angles of two objects, Ratio of the areas of two objects, Intersection area of two objects, Union area of two objects, Symmetric difference of two objects, Ratio of intersection areas, Ratio of complexities, Ratio of the nth percentile of intensity, Total interest value computed for a pair of simple objects, NetCDF files with the objects and raw data for further processing</p>
Objects through time	<p>For 3D objects: x,y and t coordinates of centroid, Latitude and Longitude of centroid, x, y component of object velocity, Angle that the axis plane of an object makes with the grid x direction, Integer count of the number of 3D “cells” in an object, Object start time, Object end time, Total great circle distance travelled by the 2D spatial centroid over the lifetime of the 3D object, percentiles of intensity of the raw field within the object</p> <p>For 3D object pairs: Spatial distance between coordinates of object space-time centroid, Difference in index of object spacetime centroid, Difference in spatial axis plane angles, Difference in object speeds, Difference in object direction of movement, Ratio of object volumes, Difference in object start times, Difference in object end times, “Volume” of object intersection, Difference in the lifetimes of the two objects, Total interest for this object pair, NetCDF files with the objects and raw data for further processing</p>

METviewer Database and Display

Database: mv_det_sref_2013 Generate Plot Reload databases Load XML

Series: **Box** Bar Rhist Phist Roc Rely Ens_ss 20140722_151502

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

Temperature

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

- Allows users to thoroughly interrogate the data

METviewer Plot Templates

METviewer 2.2 Database: mv_aerocivil Generate Plot Reload databases Load XML

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 CSI

Y1 Series Variables:
MODEL GFS_27km_WRFv3.6.1, GFS_3km_WRFv3.6.1, GFS_9km_WRFv3.6.1 Group_y1_1

Fixed Values:
Fixed Value
Event Equalizer

Plot Cond

Independent Variable:
FCST_LEAD Select value Equalize

Statistics:

Series Formatting

#	Y axis	Hide	Title	Conf Interval	Color	Marker	LineStyle	Fill	Width	Height	Size
1	Y1	No	GFS_27km_WRFv3.6.1 APCP_03 CSI	none	Red	Small circle	joined lines	solid	1	No	Yes
2	Y1	No	GFS_3km_WRFv3.6.1 APCP_03 CSI	none	Blue	Small circle	joined lines	solid	1	No	Yes
3	Y1	No	GFS_9km_WRFv3.6.1 APCP_03 CSI	none	Green	Small circle	joined lines	solid	1	No	Yes

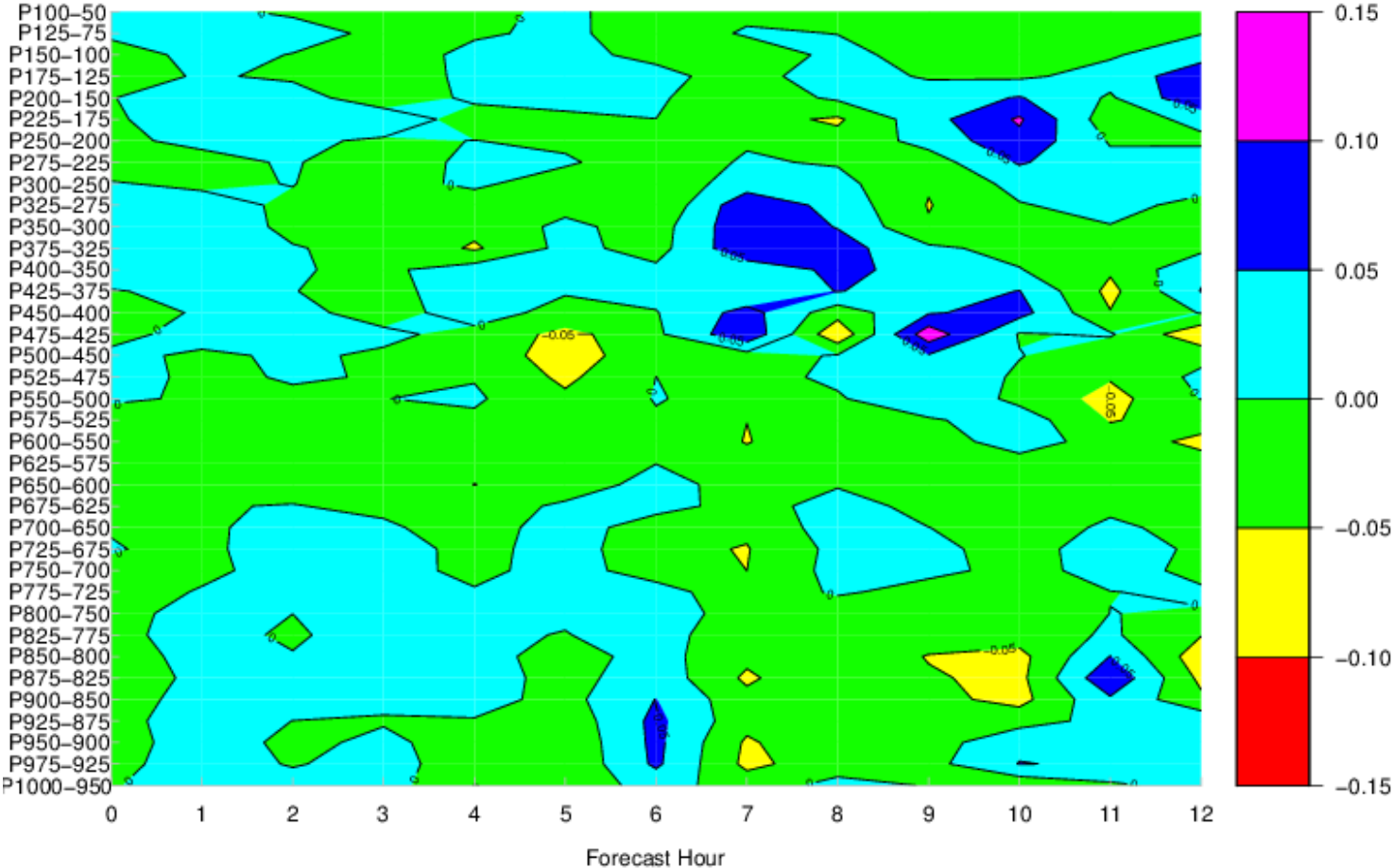
+ Add Derived Curve - Remove Derived Curve Apply defaults Lock Formatting

View 1 - 3 of 3

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

METviewer Contour Plots

Wind Speed RMSE (NoVAD-CTRL)



This Year:

Scorecarding using METviewer

Specify statistic

Specify aggregations

Specify regions

Specify field and level

Specify whether you have symbol, values or both

METViewer Scorecard
for PR4RN_1405 and GFS2016

2014-05-20 00:00:00 - 2014-07-30 00:00:00

		N.American					N.Hemisphere					S.Hemisphere					Tropics									
		Day 1	Day 3	Day 5	Day 6	Day 8	Day 10	Day 1	Day 3	Day 5	Day 6	Day 8	Day 10	Day 1	Day 3	Day 5	Day 6	Day 8	Day 10	Day 1	Day 3	Day 5	Day 6	Day 8	Day 10	
Anom Corr	Heights	P250	▲			▲	▲	▲				▲									▼	▲	▲			
		P500	▲																			▼		▲		
		P700																				▼		▲		
		P1000	▲																			▼		▲		
Anom Corr	Vector Wind	P250																			▼		▲			
		P500																			▼	▼				
		P850	▲																			▼	▼			
Anom Corr	Temp	P250					▲														▼		▲	▲	▲	
		P500																			▼		▲			
		P850			▲	▲	▲			▲	▲										▼	▼				
Anom Corr	MSLP	MSL	▲																	▼		▲	▲			
RMSE	Heights	P10	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
		P20	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▼	▲	▲	▲	▲	
		P50	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▼	▲	▲	▲	▲	
		P100	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▼	▲	▲	▲	▲	
		P200	▲																			▲	▲	▲	▲	
		P500	▲																			▼	▲	▲	▲	
		P700	▲																			▼	▲	▲		
		P850	▲																			▼		▲		
P1000	▲																			▼		▲				

Working Towards Easy Usability: METplus Use Case Example

Observed 1-min
AOD Data

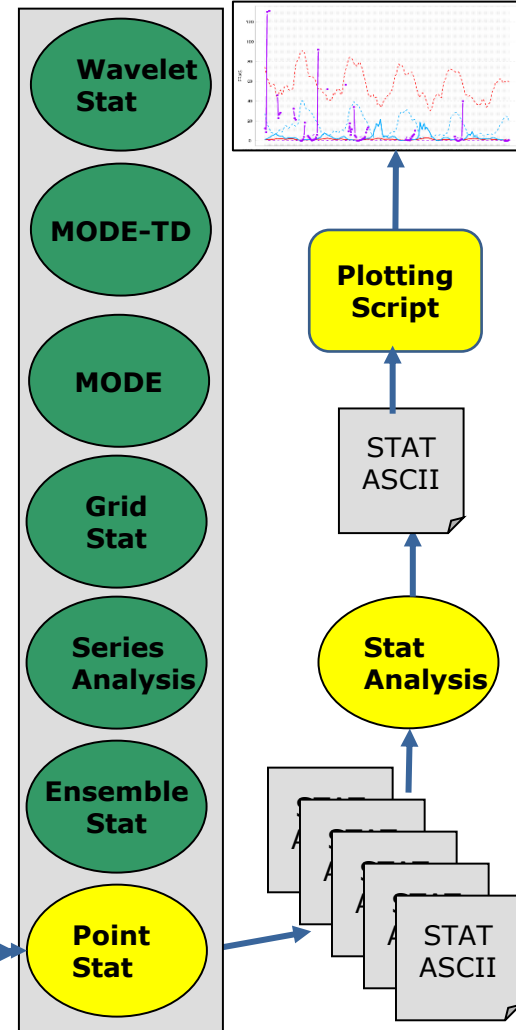
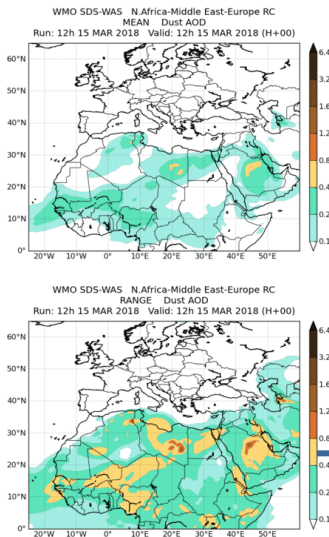
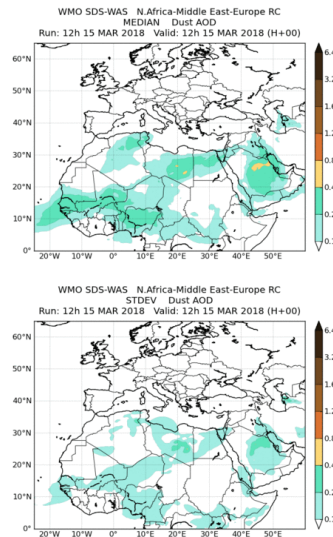


ASCII
2NC

Observed AOD
6-hr mean, max, stdev, range



Forecasted
Aerosol Optical
Depth (AOD):
6-hr mean, max
stdev, range



Working Towards Easy Usability: METplus Use Case Example

Observed 1-min
AOD Data

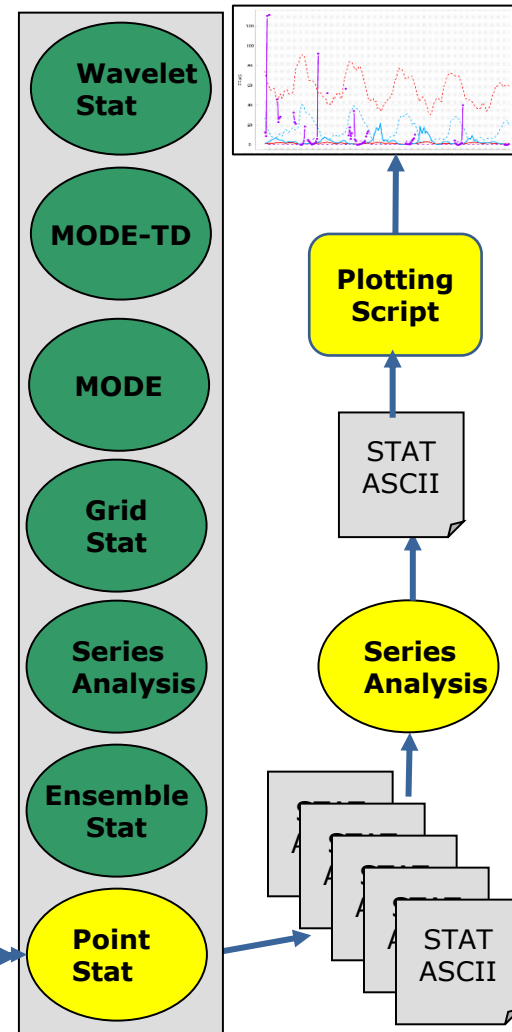
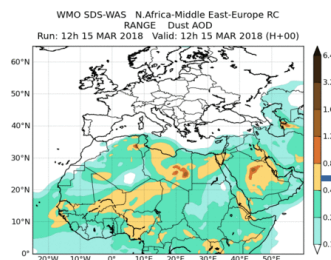
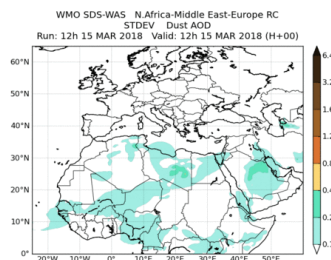
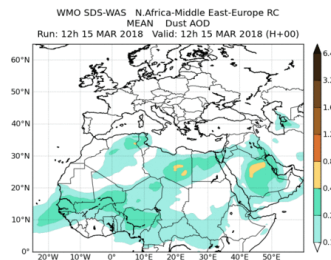
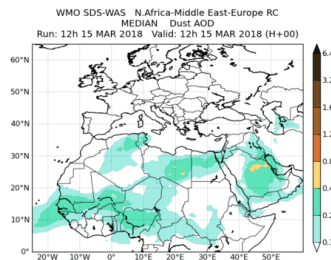


Observed AOD
6-hr mean, max, stdev, range



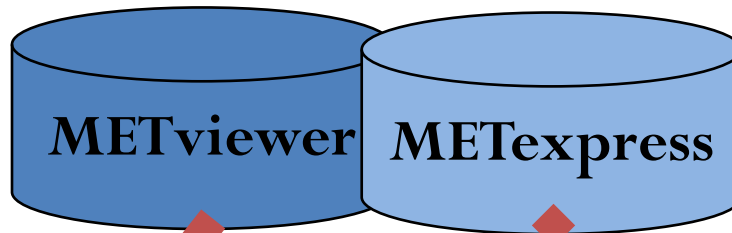
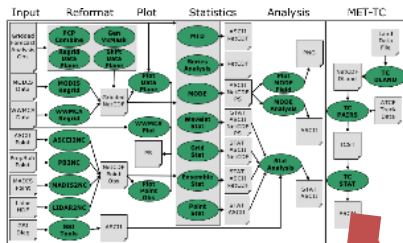
Use-case includes

- METplus .conf file
- MET config files
- Python scripts to:
 - Call Ascii2NC
 - Call Point-Stat
 - Call Stat-Analysis
 - Make statistics plot
 - Make plot of fields

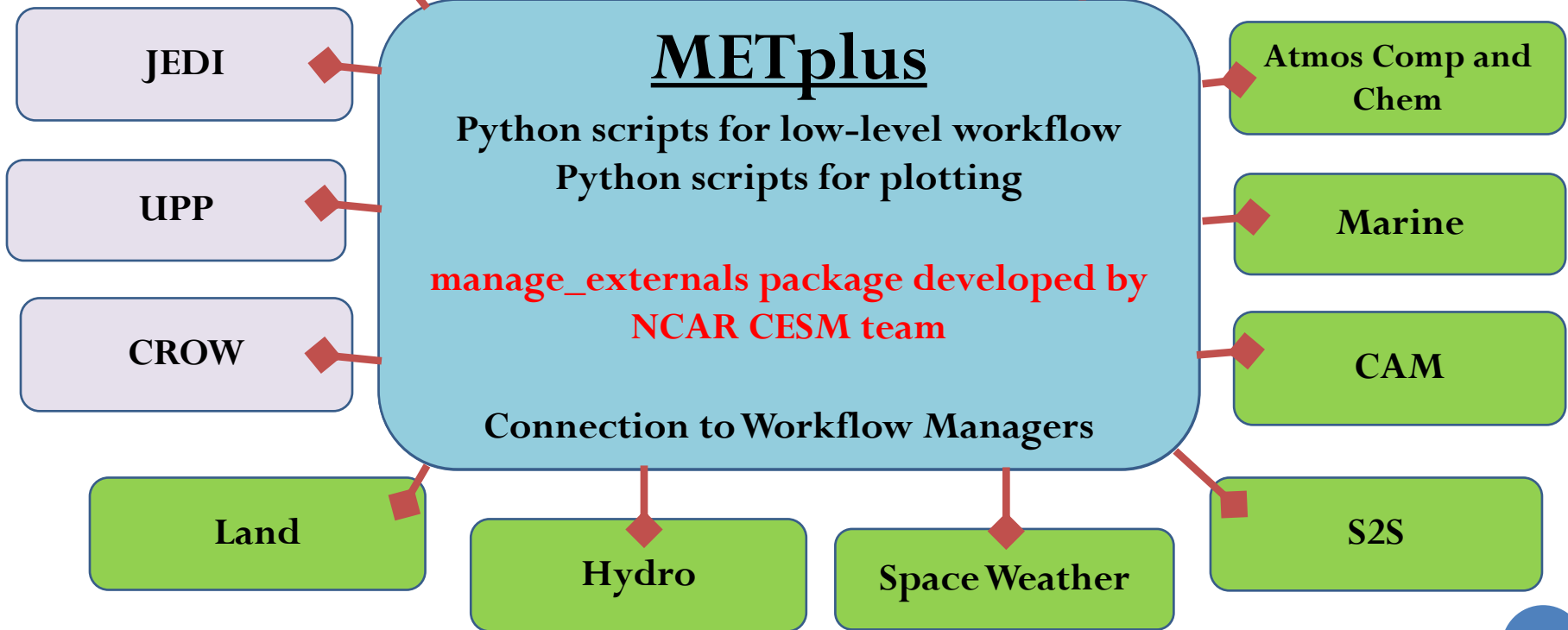


Developing a Strategy: METplus Authoritative Repository

MET



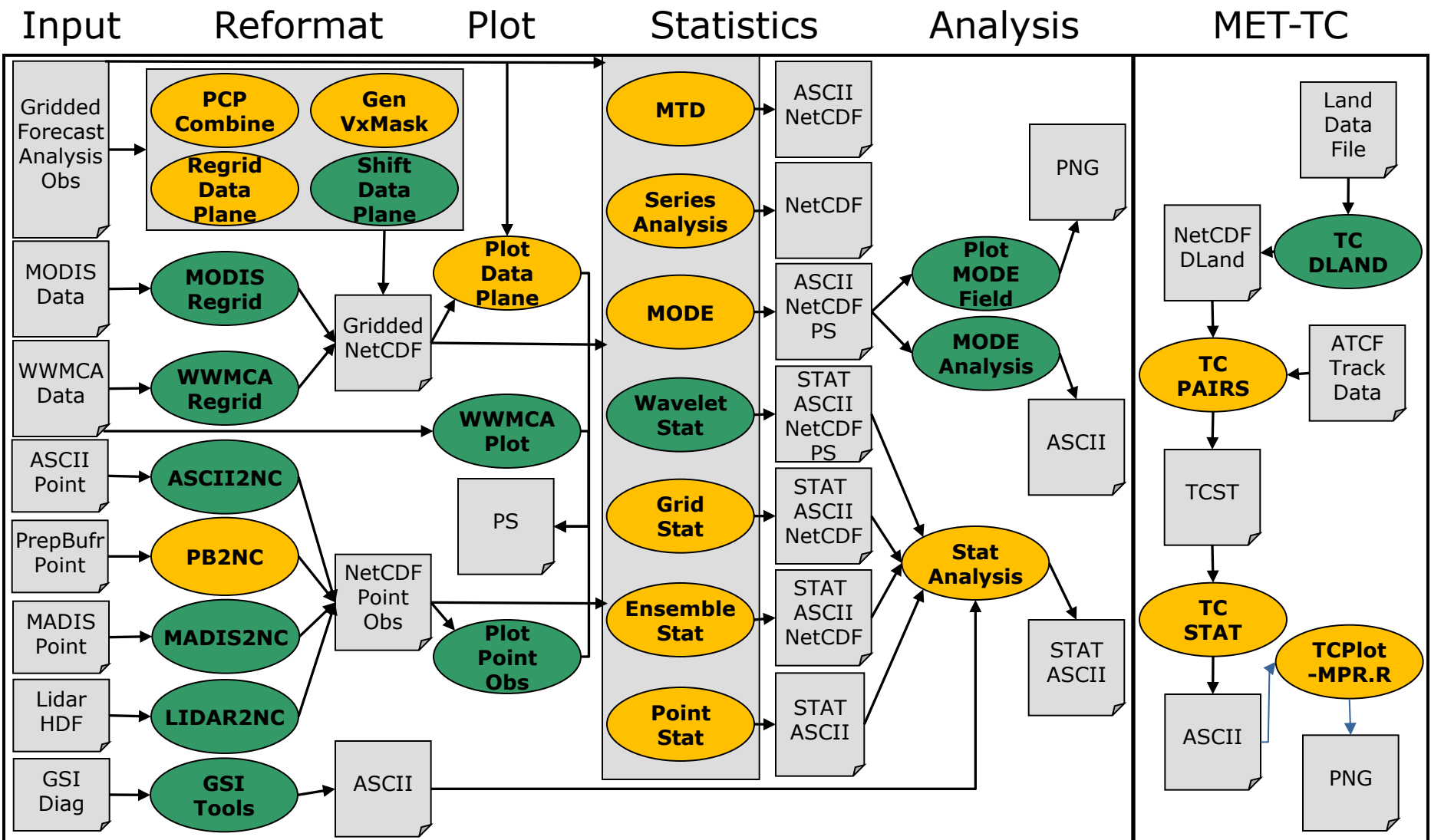
*In Development
through NGGPS*



What Does Wrapped by Python Mean?

What is Wrapped by Python Right Now

Python
Wrapped



What does wrapped by Python mean?

At <https://github.com/NCAR/METplus/>

NCAR / METplus Private

Unwatch 10 Star 2 Fork 4

Code Issues 32 Pull requests 0 Projects 0 Wiki Insights

Python scripting infrastructure for MET tools.

590 commits 4 branches 7 releases 6 contributors

Branch: master New pull request Create new file Upload files Find file Clone or download

Commit	Message	Time
bikegeek	Include TcStat in process list	Latest commit c8be465 17 minutes ago
doc	Replaced GFS_DIR with MODEL_DATA_DIR, now consistent with metplus_dat...	2 days ago
internal_tests	Merge branch 'master' into merge-qpf-sbu	7 days ago
parm	Include TcStat in process list	17 minutes ago
src	Initial Commit of Doxygen documentation suite.	4 months ago
ush	Fixed incorrect syntax for retrieving the MET_BUILD_BASE from the met...	25 minutes ago
.gitignore	Initial commit	a year ago
README.md	Updated top-level README .	3 months ago

README.md

Control
File and
Config

Python
Scripts

What does wrapped by Python mean?

METplus/parm/use_cases/grid_to_grid/examples/precip.conf

Grid to Grid Precipitation Example

[config]

time looping - options are INIT, VALID,
RETRO, and REALTIME
LOOP_BY = VALID

Format of VALID_BEG and VALID_END
VALID_TIME_FMT = %Y%m%d%H

Start time for METplus run
VALID_BEG = 2017061300

End time for METplus run
VALID_END = 2017061300

Increment between METplus runs

May be in seconds-hours

VALID_INCREMENT = 86400 or 24H

List of applications to run

PROCESS_LIST = PcpCombine, GridStat

run pcp_combine on forecast data

FCST_PCP_COMBINE_RUN = True

mode of pcp_combine to use (SUM, ADD,
SUBTRACT)

FCST_PCP_COMBINE_METHOD = SUM

list of variables to compare

FCST_VAR1_NAME = APCP

FCST_VAR1_LEVELS = A24

METplus Use-Cases

NCAR / METplus

Unwatch 20

Star 31

Fork 11

Code

Issues 107

Pull requests 0

Projects 11

Wiki

Security

Insights

Branch: master_v2.2














METplus / parm / use_cases /

Create new file

Upload files

Find file

History

 fisherhucar	Removed ^M characters and updated MET version number	Latest commit 05fb815 4 days ago
..		
 cyclone_plotter	fixed cyclone plotter use case	7 days ago
 ensemble	Updated exiting content to the following README files based on	14 days ago
 feature_relative	Cleaned up unnecessary entries to README for the feature relative use ...	12 days ago
 grid_to_grid	Fix reference to MODEL_NAME	6 days ago
 grid_to_obs	Fix reference to MODEL_NAME	6 days ago
 hmt	updated README to note which HMT use cases required Gempak support to...	5 days ago
 hwt	Removed ^M characters and updated MET version number	4 days ago
 mode	added missing config	6 days ago
 plotting	Bug fixes	3 months ago
 qpf	added missing config	6 days ago
 track_and_intensity	Forgot to include INPUT_BASE as something that needs to be set to run...	10 days ago
 wrappers	added README files for use cases that were missing	11 days ago

METplus Use-Cases

NCAR / METplus

Unwatch 20 Star 22 Fork 7

Code Issues 78 Pull requests 0 Projects 0 Wiki Insights

Branch: master METplus / parm / use_cases / track_and_intensity /

Create new file Upload files Find file History

James Frimel Aligned the feature relative use case INIT_END time with the sample d... Latest commit 74c0f65 on Sep 27, 2018

..

examples	Simplify use case by using the output base of the previous config file.	4 months ago
met_config	Aligned the feature relative	
tcmpr_customize.conf	Remove title, whitespaces in	
track_and_intensity.conf	Removed unused TRACK_D	

Branch: master METplus / parm / use_cases / track_and_intensity / examples /

bikegeek Simplify use case by using the output base of the previous config file.

..

tc_stat_filter.conf	Remove outdated comment.
tcmpr_mean_median.conf	Simplify use case by using the output base of the p
track_and_intensity_ATCF.conf	Config updates to cyclone_plotter, feature_relative,

Branch: master METplus / parm / use_cases / track_and_intensity / met_config /

James Frimel Aligned the feature relative use case INIT_END time with the sample d... ..

TCPairsETCConfig	Config updates to cyclone_plotter, feature_relative, and track_and
TCStatConfig	Aligned the feature relative use case INIT_END time with the sam

```
19 // Stratify by the AMODEL o 60 // Stratify by the INIT times.
20 //
21 //amodel = [];
22 //bmodel = [];
23 amodel = ${AMODEL};
24 bmodel = ${BMODEL};
25
26 //
27 // Stratify by the DESC col 61 // Model initialization time windows to include or exclude
28 //
29 //desc = [];
30 desc = ${DESC};
31
32 //
33 // Stratify by the STORM_ID 62 // May modify using the "-init_beg", "-init_end", "-init_inc",
34 //
35 //storm_id = [];
36 storm_id = ${STORM_ID};
37
38 //
39 // Stratify by the BASIN co 63 // and "-init_exc" job command options.
40 // May add using the "-basi 64 //
41 //
42 //basin = [];
43 basin = ${BASIN};
44
45 //
46 // Stratify by the INIT times. 65 //init_beg = "";
47 //
48 // Model initialization time windows to include or exclude 66 //init_end = "";
49 // May modify using the "-init_beg", "-init_end", "-init_inc", 67 //init_inc = [];
50 // and "-init_exc" job command options. 68 //init_exc = [];
51 //
52 //init_beg = "${INIT_BEG}";
53 //init_end = "${INIT_END}";
54 //init_inc = ${INIT_INCLUDE};
55 //init_exc = ${INIT_EXCLUDE};
56
57 //
58 // Stratify by the VALID times. 69
70 //
71 //valid_beg = "";
72 //valid_end = "";
73 //valid_inc = [];
74 //valid_exc = [];
75
76 //valid_beg = "${VALID_BEG}";
77 //valid_end = "${VALID_END}";
78 //valid_inc = ${VALID_INCLUDE};
79 //valid_exc = ${VALID_EXCLUDE};
```

master_metplus.py

METplus
config
parser

metplus_final.conf

```
63 MET_BUILD_BASE = /path/to
64 MET_BASE = {MET_BUILD_BASE}/share/met
65
66 ## Output directories
67 LOG_DIR = {OUTPUT_BASE}/logs
68
69 # DIRECTORIES
70 #
71 # [dir]
72 # EXECUTABLES
73 # [exe]
74 # NON-MET
75 # MGRIB2
76 # CUT_EXE
77 # TR_EXE
78 # RM_EXE
79 # NCAP2_EXE
80 # CONVERT
81 # NCUMPP_EXE
82 # EGREP_EXE
83
84 # [config]
85 # EXP=METplus ;; Experiment name, used for finding installation location
86 # Options are processes, times
87 # LOOP_METHOD = processes
88 # Processes to run in master script (master_met_plus.py)
89 # PROCESS_LIST = Usage
90 # NOTE: "TOTAL" is a REQUIRED cmt statistic used by the series analysis
91 # STAT_LIST = TOTAL, FBAR, OBAR, ME, MAE, RMSE, BCMSE, E50, ETQR, MAD
92
93 # Init time
94 # INIT_TIME_FMT = %Y%m%d
95 # INIT_BEG = 20141214
96 # INIT_END = 20141216
97 # INIT_INC = 23600
98 #23600 sec (hours) The increment in seconds in integer format
99
100 # LOGGING
101 LOG_LEVEL = DEBUG ;; Levels: DEBUG, INFO, WARNING, ERROR, CRITICAL
102 LOG_FILENAME = {LOG_DIR}/master_met_plus.log ;; NOTE: current YYYYMMDD
```

.conf files

Input

METplus
Wrapper 1

MET
Tool
1

Output
1

METplus
Wrapper 2

Output
2

METplus
Wrapper 3

MET
Tool
2

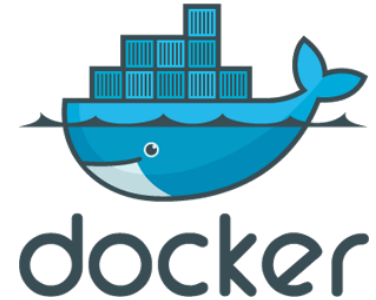
Output
3

From .conf
to running MET

Support

Repositories and Support

GitHub



NCAR / container-dtc-metviewer

Code Issues Pull requests Projects Wiki Insights

Branch: master container-dtc-metviewer / README.docker.txt

TatianaBurek remove building MySQL from the instructions, added alternative way to... 8a398cd on Nov 10, 2017

2 contributors

50 lines (41 sloc) | 2.06 KB

```

1 #
2 # Note: Not intended to be run on super computers or clusters where docker engine may not be running.
3 # These are tutorial steps for learning on a personal workstation or laptop where Docker engine has
4 # been installed and running.
5 #
6 # You can obtain Docker (current Mac and Windows)
7 # https://www.docker.com/products/overview
8 #
9 # Or Docker Tools (for older Mac and Windows)
10 # https://www.docker.com/products/docker-toolbox
11 #
12 # These are manual steps to build your personal workstation
13 #
14 git clone https://github.com/NCAR/container-dtc-metviewer
15
16 # From container-dtc-metviewer/METViewer, build the Docker image
17 cd ../METViewer
18 docker build -t metviewer .
    
```

Model Evaluation Tools Version 8.0 (METv8.0)

User's Guide

Developmental Testbed Center
Boulder, Colorado

John Halley Gotwoy, Kathryn Newman, Tara Jensen,

DTC Developmental Testbed Center

ABOUT TESTING + EVALUATION COMMUNITY CODE VISITOR PROGRAM NEWS EVENTS

MODEL EVALUATION TOOLS (MET)

Welcome

Welcome to the users page for the Model Evaluation Tools (MET) verification package. MET was developed by the National Center for Atmospheric Research (NCAR) Developmental Testbed Center (DTC) through the generous support of the U.S. Air Force Weather Agency (AFWA) and the National Oceanic and Atmospheric Administration (NOAA).

Description

MET is designed to be a highly-configurable, state-of-the-art suite of verification tools. It was developed using output from the Weather Research and Forecasting (WRF) modeling system but may be applied to the output of other modeling systems as well.

MET provides a variety of verification techniques, including:

- Standard verification scores comparing gridded model data to point-based observations
- Standard verification scores comparing gridded model data to gridded observations
- Partial verification methods comparing gridded model data to gridded observations using neighborhood, object-based, and intensity-scale decomposition approaches
- Ensemble and probabilistic verification methods comparing gridded model data to point-based or gridded observations
- Aggregating the output of these verification methods through time and space

MODEL EVALUATION TOOLS (MET)

- Home
- System Architecture
- Download +
- Documentation +
- User Support +

LATEST RELEASE

MET Version 8.1.1
Released: 2019-07-08

METplotpy

Search docs

CONTENTS:

- This is an installation guide for METplotpy
- This is the gallery of examples for METplotpy

Docs » Welcome to METplotpy's documentation!

Welcome to METplotpy's documentation!

Contents:

- This is an installation guide for METplotpy
- This is the gallery of examples for METplotpy
 - General Examples
 - Sample Example

Model Evaluation Tools (MET) Sponsors

National Center for Atmospheric Research (NCAR)
National Oceanic and Atmospheric Administration (NOAA)
United States Air Force (USAF)

Supporting the Community: Current Releases and Resources

METv8.1.1

- Downloadable Tarballs on DTC website
- Support for NCAR and NOAA HPC platforms
- In Container
 - *User's Guide available*
 - *Online Tutorial*
 - *Will move to GitHub by end of year*

METviewer 2.11

- On GitHub
 - *User Guide out soon*
- In Container
 - *Limited Online Tutorial*
- Support for NOAA network

METplus 2.2

- *User Guide now available*
- On GitHub
 - *Limited Online Tutorial*
- Support for NCAR and NOAA HPC platforms

The screenshot shows the 'MET USERS PAGE' website. The header includes the DTC logo and navigation links: ABOUT, TESTING & EVALUATION, COMMUNITY CODES, VISITOR PROGRAM, NEWS, and EVENTS. The main content area is divided into three columns. The left column is a navigation menu with links for Home, Terms of Use, Overview, Download, Documentation, User Support, and Related Links. The middle column, titled 'MODEL EVALUATION TOOLS', contains a 'Welcome' section with a description of the MET verification package and a 'Description' section listing various verification techniques. The right column contains three sections: 'EVENTS' (No Upcoming Events), 'ANNOUNCEMENTS' (MET version 8.0 Release 09.27.2018 and 2017 GSI Annual Release Version 3.6/EnKF Version 1.2 10.04.2017), 'MET NEWS' (Run MET in a Docker container), and 'MET SPONSORS' (National Center for Atmospheric Research (NCAR), National Oceanic and Atmospheric Administration (NOAA), and United States Air Force (USAF)).



NCAR



Developmental Testbed Center

All help requests go through MET Helpdesk: met_help@ucar.edu

MET Users Page: www.dtcenter.org/met/users/

METplus GitHub: github.com/NCAR/METplus

MET GitHub: github.com/NCAR/MET

METviewer GitHub: github.com/NCAR/METviewer

Container MET GitHub: github.com/NCAR/container-dtc-met

Container METviewer Github: github.com/NCAR/container-dtc-metviewer

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