Mesoscale Model Evaluation Testbed (MMET): Helping Connect the Research and Operational Communities

Michelle Harrold*, Jamie Wolff, and Tracy Hertneky

National Center for Atmospheric Research/Research Applications Laboratory

*harrold@ucar.edu

What is MMET?

- Testing Protocol Motivation
  - ✓ Wide range of NWP science innovations under development in the research community
  - ✓ Testing protocol imperative to advance new innovations through the research to operations (R2O) process *efficiently* and *effectively*
  - ✓ Three stage process:
    1) Proving ground for research community
    2) Comprehensive T&E performed by the DTC or community
    3) Pre-Implementation testing at Operational Centers

- MMET was established to assist researchers with initial stage of testing by *providing an environment of active development* that *fosters open communication of results* among the participating partners of the R2O transition process:

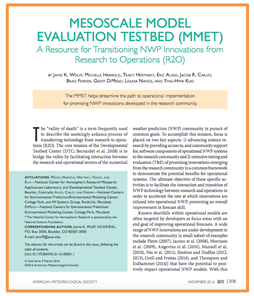
  Why: Assist the research community in efficiently demonstrating the merits of a new development

  What: Datasets of opportunity
  - Model input and observation datasets to use for testing and evaluation
  - Common framework for testing; allow for direct comparisons
  - DTC-established baseline results for select operational models
  - Community contributed results

  Where: Hosted by the DTC; served through **R**epository for **A**rchiving, **M**anaging and **A**ccessing **D**iverse **DA**ta (RAMADDA)

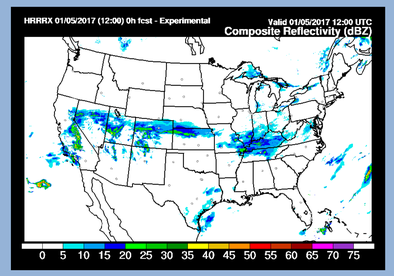
http://www.dtcenter.org/eval/meso_mod/mmet/index.php

For more information on MMET, including community use examples, see Wolff et al. 2016

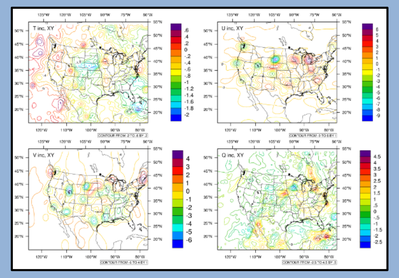

MESOSCALE MODEL EVALUATION TESTBED (MMET)

A Resource for Transitioning NWP Innovations from Research to Operations (R2O)

Initialization Data



Data Assimilation

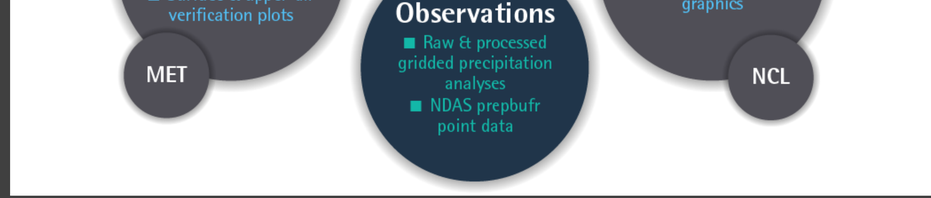


Future Activities

- WRF, UPP, and MET have recently been implemented in *Docker "containers"* to assist the user community in alleviating one of the biggest hurdles when running a new software system – setting up and compiling the individual software components of an end-to-end system. The *containers package everything that is needed to run the model, including operating system, code, and data.*
- To better coordinate synergistic efforts within the DTC, and to support NOAA's goal of model unification across scales, *MMET will transition to include global modeling.*

Operational Model Physics Suites

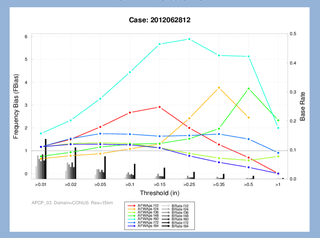
Physics Suite	WRF-ARW RAP/HRRR OC	WRF-ARW Air Force OC	NEMS-NMMB NAM OC
Microphysics	Thompson	WRF Single-Moment 5	Ferrier-Hires
Radiation (LW/SW)	RRTMG/RRTMG	RRTM/Dudhia	GFDL/GFDL
Surface Layer	MYNN	Monin-Obukhov similarity theory	Mellor-Yamada-Janjic
LSM	RUC	Noah	Noah
PBL	MYNN 2.5	Yonsei University	Mellor-Yamada-Janjic
Convection	Grell-Freitas (RAP)	Kain-Fritsch	Betts-Miller-Janjic



MMET Case Inventory

Date(s)	Meteorological Scenario
20160623-24	*Flooding* in W.Virginia and surrounding states
20160509-10	*Severe weather* over Central Plains
20160122-24	Major *snow storm* that impacted Mid-Atlantic region
20150322	Narrow and intense band of *heavy snowfall* from northeast SD through southern MN
20150125-27	Redeveloped low that intensified into strong *Nor'Easter*, bringing heavy snow and winds
20150105	Clipper system over Midwest with broad band of snow but with *intense snowfall rates*
20140912/15	*Hurricane Edouard* in Atlantic Ocean
20140105	*Arctic air outbreak* impacting much of the United States east of the Rockies
20130908-14	Historic Colorado *flooding* associated w/ long duration and warm rain processes
20130729	*Mesoscale convective system* (MCS) over SE Kansas
20120628	*Derecho* event that began in Iowa and traveled eastward through the Mid-Atlantic states

Verification



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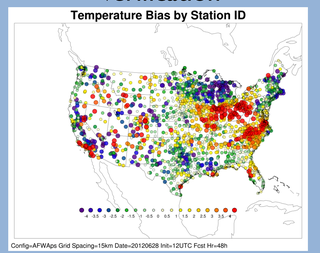
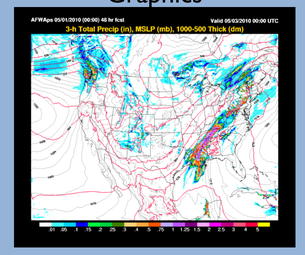


Graphics



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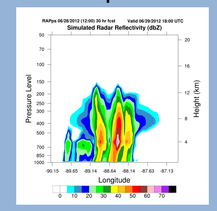
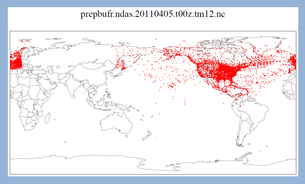


Observations



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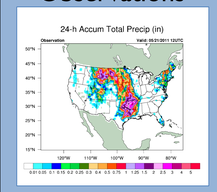

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