Showcasing the hierarchical testing framework established by the Global Model Test Bed (GMTB)

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The Global Model Test Bed (GMTB) is a newly established group within the Developmental Testbed Center whose primary goal is to support research-to-operations for the US National Weather Service, the funding agency for the GMTB. The GMTB is actively developing a uniform “test harness” that will be made available to the research and operational communities to enable in-depth investigation of advanced physics suites that will facilitate a more efficient research-to-operations pipeline. With this hierarchical testing framework, a common infrastructure for evaluating physics that represents the logical testing progression, spanning from simple-to-more-complex, is made possible. Infrastructure for the test harness, including code, diagnostic tools, and data sets, is supported to the community.

The initial focus is on developing a Single Column Model (SCM) and the capacity to run NCEP’s Global Spectral Model (GSM) within a contained workflow. To showcase the GMTB’s capabilities for generating information that aides in making decisions about operational model implementations, a comprehensive test plan was created to compare the GSM’s operational convective scheme [Simplified Arakawa-Schubert (SAS)] to a configuration using a more advanced, scale-aware convective parameterization, Grell-Freitas (GF). This presentation will provide results from the SCM and full three-dimensional testing, which will highlight what is provided via the test harness.

Using a deep convective case from the Tropical Warm-Pool International Cloud Experiment, the SCM was used to ensure the GF scheme was properly connected to the GSM and facilitated further diagnostic investigation (e.g., temperature/moisture tendencies and convective/non-convective precipitation partitioning). Testing with the SCM naturally progressed to more complex testing. The GMTB established a workflow for the GSM, post-processing, comprehensive objective verification, and diagnostic output. To robustly assess the SAS and GF configurations, both were run over identical cases (JJA 2016). Verification was computed for surface and upper-air variables for a number of metrics. Examples of time-averaged diagnostics (e.g., seasonal precipitation) were also investigated.