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Title

Title:
High-impact Tropical Weather Prediction with the NASA Coupled Advanced Multi-scale Modeling and Concurrent Visualization Systems (CAMVis)

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Requested Areas

Requested Areas: Algorithms
Applications

Keywords

Algorithms:

scalability
data structures for parallel and distributed systems

Applications:

scientific applications
applications using multicore and/or GPUs

Abstract

Abstract (Maximum 150 words):

Accurate prediction of tropical activity at sub-seasonal scales is crucial for extending numerical weather prediction beyond two weeks. Among the challenges of this goal is accurate forecasting of a Madden-Julian Oscillation (MJO), involving accurate representations of multiple physical processes and multiscale interactions. With a 45- to 60-day time scale, MJOs have one of the most prominent large-scale features of the tropical general circulation, and could modulate tropical cyclone (TC) activity. Therefore, the lead time of TC genesis prediction can be extended by improving MJO simulations.

In this study, we integrate NASA multi-scale model and concurrent visualization systems on NASA advanced supercomputers and 128-panel Hyperwall-2, such that we could concurrently visualize massive volumes of model outputs without the need for intermediate storage. Then, we demonstrate how the system can help examine model's performance at a very high-temporal resolution, aimed at improving the model's ability to simulate sub-seasonal and seasonal weather systems.

Electronic Posters

Electronic Posters (Maximum 200 words):

Accurate prediction of tropical activity at sub-seasonal scales is crucial for extending numerical weather prediction beyond two weeks. Among the challenges of this goal is accurate forecasting of a Madden-Julian Oscillation (MJO), involving accurate representations of multiple physical processes and multiscale interactions. With a 45- to 60-day time scale, MJOs have one of the most prominent large-scale features of the tropical general circulation, and could modulate tropical cyclone (TC) activity. Therefore, the lead time of TC genesis prediction can be extended by improving MJO simulations.

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Supplementary File

Supplementary File:

Acknowledgement

Acknowledgement: yes