

Tackling the Simulation and Analysis Frontiers of Atmospheric and Earth System Science

Wednesday, 26 September 2018 09:00 (1 hour)

Title: Tackling the Simulation and Analysis Frontiers of Atmospheric and Earth System Science

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Atmospheric and Earth system models (ESMs) are complex multiscale, multi-physics software systems developed over decades through the collaboration of many institutions. With low floating point intensity, large code bases, and the need for high throughput rates, ESMs are problematic for current post-Dennard-scaling computer architectures. ESMs are also especially data intensive, making it difficult to extract scientific knowledge from a sea of model output. NCAR's efforts to tackle these challenges will be reviewed, including an update of the on-going port of the MPAS atmospheric model to many-core architectures, the introduction of machine learning techniques to both modeling and post analysis, and our plans develop flexible and parallel in-situ and cloud based analysis systems. Data-centric system design concepts that leverage emerging computational and data storage technologies to support a new approach to simulation and prediction, will also be presented.

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Track Classification: 18th Workshop on high performance computing in meteorology