Title:

An ensemble-based consistency test for the Community Earth System Model

Abstract:

Climate simulations codes are especially complex and continually evolving. Their on-going state of development requires frequent software verification in the form of quality assurance to both preserve the quality of the code and instill model confidence. To formalize and simplify this aspect of the verification process, we have developed a new tool for evaluating climate consistency for the Community Earth System Model (CESM) that uses an ensemble approach. In particular, we obtain a statistical distribution from an ensemble of CESM runs that can be used to determine whether a new climate run is statistically distinguishable from the original ensemble. The CESM Ensemble Consistency Test, referred to as CESM-ECT, is objective in nature and accessible to CESM developers and users. The tool has proven its utility in detecting errors in software and hardware environments and providing rapid feedback to model developers.

Bio:

Allison Baker is a project scientist in the Application Scalability and Performance group at NCAR. Dr. Baker works primarily with the Community Earth System Model (CESM). Her research interests include high-performance computing, software for scientific computing, performance analysis, iterative linear solvers, and, more recently, data compression and verification techniques. Before joining NCAR in 2012, she worked at the Center for Applied Scientific Computing (CASC) at Livermore National Laboratory, where she focused on parallel algebraic multigrid methods and exascale computing. She earned her Ph.D. in Applied Mathematics from the University of Colorado at Boulder in 2003.