



Earth & Environmental Systems Modeling

Metrics, Benchmarks and Credibility of Model Output and Data for Science and End Users

Forrest Hoffman, Paul Ullrich, and Dave Bader (Time Keeper)



U.S. DEPARTMENT OF
ENERGY

Office of
Science

2024 EESM PI Meeting
August 6–9, 2024



Grand Challenges, Gaps, and Opportunities

- Gap: Evaluation and benchmarking packages often require CMORization of model output, which can be a barrier for some modeling teams
- Opportunity: Build a tool that knows synonymous variable names and dictionaries. Cannot solely depend upon the standard_name attribute
- Gap: Need more metrics tailored to regional scales and process evaluation
- Opportunity: More observations at regional scales to support more use-inspired science
- Gap: More metrics for determining which GCMs/ESMs to use for downscaling. Can community agree on what these metrics are?
- Opportunity: Regional downscaling community workshop
- Opportunity: Event-based reanalysis
- Gap: AI-ready climate data (maybe CF-standard model data is ready, but observational data are not



Grand Challenges, Gaps, and Opportunities

- Opportunity: Co-locating computing with the data
- Gap: QA/QC of data
- Gap: Better ocean model evaluation is a need
- Gap: Can we eliminate all regridding in an intelligent (and mass/flux conservative) manner?