

Information Science and Technology Seminar Speaker Series



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Model Interdependency in the CMIP5 Multi-Model Ensemble: A Framework for Integrated Projections

Wednesday, November 7, 2012

3:00 - 4:00 PM

TA-3, Bldg. 1690, Room 102 (CNLS Conference Room)

Abstract: Multi-model ensembles remain the primary tool used by the Intergovernmental Panel on Climate Change to assess uncertainty in model projections of future climate change. In this talk, we examine some of the intrinsic problems which we face when attempting to combine multiple model simulations into an integrated and objective statement about future climate and how a number of new methodologies might address some of these issues. Starting with the simplest approach of simply averaging a large number of models, we examine why the multi-model mean performs so well in replicating present-day climate but why it cannot itself be considered to be a plausible climate state, especially for fields with small-scale variability such as precipitation. We combine observationally-derived patterns of precipitation variability together with model-derived projections to produce an 'optimal' mean precipitation change estimate, which can reproduce more faithfully the distribution of precipitation change seen in the individual models. Finally, we address the issue of model interdependency: in an ensemble where models share components and parameterizations in an uncoordinated fashion, "model democracy" samples the components in a demonstrably biased fashion. We use present day simulations to define an observable space, in which the multi-model ensemble can be resampled to overcome some of these biases.

Biography: Sanderson graduated from Oxford in 2007, studying under Myles Allen for his DPhil where he analyzed feedback mechanisms and constraints on climate sensitivity arising from the climateprediction.net experiment. Sanderson moved to Boulder in early 2008 and has worked on a range of projects: perturbed physics experiments using the Community Atmosphere Model, Cloud feedback analysis using output from cloud simulators, methodologies for integrating projections from multiple models. He has also worked with the Integrated Assessment Group at NCAR to further understanding of scenario uncertainty and emulation of complex model output. His spare time is largely spent riding bicycles up mountains.