Computationally Efficient Methods for Emulating ESM Output
Cross Working Group Session
Tuesday, 21 June 2016 – 3:30-5:00 PM
The Village – Aspen / Blue Spruce Room – Breckenridge, Colorado

The goal of this cross-WG meeting is to explore existing efforts and interest in the development of computationally cheap approaches that can approximate the output of complex ESMs. In addition we will explore interest and required next steps toward a common activity aimed at tailoring such approaches to the emulation of CESM specifically.

The primary motivation is to be able to produce relatively low cost projections of climate outcomes for arbitrary forcing scenarios (especially those that have not already been simulated) for use in impact or integrated assessment models. This ability would extend the usefulness of complex ESMs by making it much easier to carry out coupled human-earth system modeling studies and to more easily account for climate change uncertainty.

We consider a wide range of possible approaches to climate model emulation to be of interest, including:

- simple climate models (e.g., MAGICC, ISAM, Hector) tuned to ESMs or exploring a range of parameter settings;
- intermediate complexity models such as zonally resolved or coarse-resolution GCMs;
- statistical emulators including simple (e.g., pattern scaling) or complex (Gaussian processes) methods able to reproduce output at resolved spatial scales and for quantities beyond averages (e.g. extremes).

We will introduce the topic and its motivation with an overview talk, featuring slides contributed by researchers working on these types of approaches, and then open up the floor for discussion of new applications, approaches, collaborations and next steps.