Date: THURSDAY, May 12

Time: 3:30-4:45 PM

Place: Buchanan 1930

Speaker: Alex Hall; Professor, Department of Atmospheric and Oceanic Sciences at University of California, Los Angeles

Title: "Developing a Physical Understanding of Regional Climate Change"

Abstract:
To produce regional climate change projections, global climate model (GCM) projections, with typical resolutions of about 100 km, are routinely downscaled to resolutions as high as hundreds of meters. Downscaling techniques include "dynamical downscaling," in which GCM data are fed directly to regional dynamical models, and "statistical downscaling," in which empirical relationships are established between the GCM grid scale and finer scales of interest using a training data set corresponding to the current climate. The relationships are then used to derive finer-scale fields given future GCM data. Dynamical downscaling is limited because of its computational expense. This prevents downscaling of the full ensemble of GCM projections, and makes it difficult to provide credible likelihood and uncertainty estimates for future climate change at the regional scale. Statistical downscaling, on the other hand, is computationally cheap. However, it is subject to possibly incorrect assumptions about the stationarity of relationships between fine and large scales as climate changes. Here we propose a new hybrid approach to downscaling, where the physical robustness of dynamical downscaling is married to the economy of statistical downscaling. In this hybrid statistical-dynamical technique, statistical models are constructed to reproduce the behavior of the dynamical models. These statistical models are then be used to downscale the entire GCM ensemble for a particular region of interest, providing the necessary likelihood and uncertainty estimates for regional climate change. We apply this technique to the Los Angeles region, and highlight key aspects of climate change in one of the world's largest urban areas.