Climate-to-humans: A study of urbanized coastal environments, their economics and vulnerability to climate change.

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Abstract

The fundamental aim of this project is to develop a framework for investigating the interactions between human activity and the climate system, using state-of-the-art multi-scale climate and economic models. We chose to study the highly industrialized and urbanized coastal region of the northeast US with an emphasis on New Jersey. The framework is developed around the NCAR Community Earth System Model (CESM). The CESM model capabilities are augmented with enhanced resolution of the land surface model in our region of interest, a more sophisticated ground water capability, downscaled coastal ocean and a high-resolution global atmosphere capable of generating storms. We are coupling the physical model with human activity models for the utility sector, a 300-equation econometric model with sectorial details of an input-output model for the New Jersey economy, an agent-based model for land use changes and finally a social network model used to study the decision making process affecting climate and its relation to economic activity. Figure 1 on the right highlights the linkages we are exploring between climate change and economic and social activity. The feedback between the various systems is designed to be dynamically evolving.