

Energy, Climate & Infrastructure Security

> The Climate Security program area works to understand and prepare the nation for the national security implications of climate change.

Goal: Assess U.S. prosperity and security impact risks by modeling climate and human response at the regional level with quantified uncertainty

Climate instability could create geopolitical disruptions over the next 40 years, changing the global balance of power. Potential socio-economic changes driven by changes in climate must be understood in order to mitigate climate-change impacts on the nation, transformative approaches and, in fact, in the international arena.

infrastructure problems. Every year we wait to address climate instability/ security issues increases the potential severity of the disruptions and decreases our ability to act

effectively. On the other hand, acting imprudently or without the proper scientific foundation could exacerbate climate instability or cause socio-economic suffering without significantly mitigating the situation.

Global warming models in the UN's **IPCC 2007 Assessment Report are** skewed toward larger temperature changes. These skewed probability distributions illustrate future climatic condition uncertainty despite advances in climate science and the computational modeling of climate dynamics. We must understand these issues now in order to implement the least disruptive mitigation policies possible—through reducing humanity's global carbon footprint and/or through adapting to climatic changes that cannot be



stopped.

This ECIS program-area activity seeks to assess the risks to U.S. prosperity and security by modeling climate and human response at the regional level

Vision

To enhance the nation's

security and prosperity

to our most challenging energy, climate, and

through sustainable,

UN-IPCC 2007 Assessment Report global warming model probability distributions are skewed toward larger temperature changes than the "best estimate" values commonly discussed.

Climate | Modeling & Analysis



macroeconomic analysis to develop a state-level risk assessment of climate change impacts through the year 2050. The most uncertain impact of the predicted climate change characteristic, precipitation, was used to assess economic impacts associated with water availability. In addition to the risk assessment and level of detail, this dynamic

with guantified uncertainty. To accomplish this, modeling and simulation activities must

- develop regional U.S. climate models with quantified uncertainty;
- develop selected regional alobal climate models with uncertainty quantified;
- quantify the impact vectors regionally-precipitation, disease, extreme events, etc.;
- evaluate the impacts on humans and their societies, including economic impacts; and
- analyze policy alternatives to mitigate and adapt to changing climate.

The mitigation and adaptation plans that could be created through understanding and characterizing these domestic

and global impacts could greatly increase the nation's ability to successfully deal with the human impacts of climate change. It could also provide the U.S. with a global, proactive leadership position in preparing for climate change.

Understanding climate-change risk will assist policy makers in

choosing actions that could avoid the realization of those risks. Sandia researchers generated the first truly integrated assessment of climate risk among the contiguous 48 states. Multiple departments combined their expertise in uncertainty guantification, risk assessment, climate science, hydrology, infrastructure impacts, and

Risk: the combination of potential consequences and the probability of those consequences occurring.

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interaction among the states is a critical element that is missing from previously published studies.

For more information please contact:

John Mitchiner E-mail: jlmitch@sandia.gov Phone: (505) 844-7825 Website: www.energy.sandia.gov