

## Public Executive Summary

**Title:** Effect of Global Warming on Hurricane Activity

**Name of Offeror:** National Center for Atmospheric Research (NCAR)

**Project Manager:** Don Richardson

**Principal Investigator:** Greg Holland

**Additional participants:** Georgia Institute of Technology (GA Tech)

**Solicitation Number:** RFP2007DW1801 (07121-1801)

**Project Start Date:** February 23, 2009

**Project End Date:** April 1, 2011

**Total Estimated Cost:** \$ 684,085.00

**RPSEA Maximum Share:** \$ 544,085.00

**NCAR Cost Share:** \$ 140,000.00

### Goal

The goal of this project is to evaluate the impacts of global warming on North Atlantic hurricane activity, through a nested climate modeling approach that combines existing global climate simulations with more detailed regional simulations of individual storms and hurricanes and advanced statistical techniques. Project results will be used to assess likely changes in hurricane activity under a global warming scenario and to project likely changes in hurricane intensity and frequency in the Gulf of Mexico over the next fifty years.

### Background

Since the disastrous 2004 and 2005 hurricane seasons, there has been considerable debate on whether global warming is affecting the frequency and intensity of hurricanes in the Gulf of Mexico. This project aims to provide some realistic climate simulation results that may help to resolve this debate.

Climate simulations will be carried out for the North Atlantic, with a focus on the Gulf of Mexico. The large-scale climate component will be provided by existing global climate simulations from the NCAR Community Climate System Model (CCSM) archive of simulations. This is one of the leading global climate models in existence today and has undergone careful review and testing by the scientific community. In addition, it has been extensively documented and provides one of the best available future projections of ocean and atmosphere changes in the North Atlantic under greenhouse warming scenarios. These global-scale simulations are too coarse in their spatial resolution to model hurricane activity, so the research team will nest its Nested Regional Climate Model (NRCM) into the CCSM model for a closer look at the North Atlantic and, more specifically, the Gulf of Mexico. By nesting the regional

model into the global model, the project team will be able to conduct a series of downscaling simulations for current and future climate and hurricane activity in the Gulf of Mexico. All results will be archived by the NCAR for use by other researchers.

The project will be led by NCAR's Mesoscale and Microscale Meteorology Division in partnership with their Climate and Global Dynamics Division and the Georgia Institute of Technology. NCAR is a Federally-Funded Research and Development Center administered by the National Science Foundation. NCAR's new Blue Fire supercomputer will be used for the simulations.

Deliverables for this project will include a final report detailing results and analyses for each technical task, as well as an archive of all project data and simulations, to be made available to the research community through an NCAR database. These simulations are likely to serve as the basis for more sophisticated modeling in the future, as the global and regional climate knowledge base grows and supercomputing capabilities become more advanced.

**Potential Impacts**

This project will result in a combined global climate and regional weather model that will allow global climate projections as well as detailed snapshots of potential hurricane activity in the Gulf of Mexico. This should result in a better understanding of the potential impacts of greenhouse warming on hurricane activity in the North Atlantic and the Gulf of Mexico. To the degree that these projections can document any expected change in hurricane frequency and/or intensity with a greater degree of accuracy than is currently possible, the data may inform decision-making by energy companies active in the Gulf of Mexico.

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