

**Session I – Climate Change and Challenges to Ecological and Economic Sustainability**  
**11:40 AM**

**Northern Gulf of Mexico Landscape Change and Natural Hazards**

John Brock

U.S. Geological Survey, Coastal and Marine Geology Program, Reston, Virginia, USA,  
Email: [jbrock@usgs.gov](mailto:jbrock@usgs.gov)

**Abstract**

Following the devastation wrought by Hurricanes Katrina and Rita in August–September 2005, a better understanding of the northern Gulf of Mexico (NGOM) coastal system is a basic requirement for sustainable restoration, redevelopment, and sound natural resource management strategies. Further impetus for investigations of the geomorphological structure, ecological function, and hazard vulnerability of the northern Gulf Coast stems from global climate projections that suggest more intense Atlantic hurricanes over the next several decades. Moreover, dramatic landscape change in the NGOM region during the last century has reduced the level of hurricane protection afforded to NGOM human populations by coastal wetlands and barrier islands.

The USGS Northern Gulf Coast Ecosystem Change and Hazard Susceptibility Project is undertaking interdisciplinary research to (1) reconstruct Holocene geologic stratigraphy, paleoenvironments, climate, and sea-level histories, (2) examine the historical period evolution of the NGOM landscape, (3) forecast change in this landscape, and (4) predict the susceptibility of NGOM ecosystems and human communities to severe storms throughout the coming century. Recent results to be presented include (1) a regional synthesis of the late Holocene geomorphic evolution of the shallow northern Gulf of Mexico continental shelf, (2) processes of changes in the position, areal extent, and rate of change of the Mississippi – Alabama barrier islands just east of the Mississippi River Delta (MRD), and (3) an analysis of deltaic wetland loss in the MRD due to episodic hurricane impacts over the last several decades.