Monday, October 12, 2009

Westchase Hilton • 9999 Westheimer
Social Hour 5:30–6:30 p.m.
Dinner 6:30–7:30 p.m.

Cost: $28 Preregistered members; $35 non-members & walk-ups

To guarantee a seat, you must pre-register on the HGS website and pre-pay with a credit card.
Pre-registration without payment will not be accepted.
You may still walk up and pay at the door, if extra seats are available.

John Anderson
Maurice Ewing Professor of Oceanography
Rice University

Past, Present, and Future Sea Level and Subsidence Record for Texas: Predicting the Future of Our Coast

A newly constructed sea-level curve for the northern Gulf of Mexico is used to examine past coastal response to different rates of rise. This information is in turn used to help predict the future of the Texas coast.

The rate of eustatic rise for the past 4,000 years has been 0.4 to 0.6 millimeters per year. The average rate was 1.4 mm/yr between 4,000 and 7,000 years ago and was 4.2 mm/yr between 7,000 and 10,000 years ago. Comparison of the geological record of sea-level rise to satellite altimetry and tide gauge records indicates that the rate of rise has nearly doubled this century and there is growing consensus within the scientific community that the rate of eustatic rise will reach 5.0 mm/yr by the end of this century. The current rate of relative rise varies widely along the coast due to variable subsidence. This is largely due to changes in the depth of the Pleistocene surface and the thickness

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of overlying sediments, which control subsidence due to compaction. A comparison of a new composite curve to Caribbean sea-level curves (areas where subsidence is minimal) suggests that coastal subsidence in Texas over the past several thousand years has also been minimal.

A new approach is to study the evolution of the Texas coast and bays at times when the rate of sea-level rise was at or near that predicted for this century (3.0 to 5.0 mm/yr). The result of this analysis indicates that in coming decades the coast will experience more dramatic change than is occurring today. Texas bays will be most severely impacted. Diminished sediment supply and human intervention will only exacerbate the problem. However, predictions are limited by the lack of a detailed sediment budget for the Texas coast and by uncertainties about the frequency and magnitude of tropical storm activity. Ongoing research is also aimed at establishing a detailed sediment budget and a record of past storm frequency and impact for the Texas coast. When it comes to facing the challenge of coastal sustainability this century, Texas is a "State of Denial", having done little to prepare for the changes that will occur along our coasts. ■

Biographical Sketch

John Anderson is the Maurice Ewing Professor of Oceanography at Rice University. He has participated in 24 scientific expeditions to Antarctica. Currently his two main research interests are in the recent retreat history of the West Antarctic Ice Sheet and the regulating factors thereof; and the evolution of the US Gulf Coast and response of coastal environments to global change. He has authored and co-authored over 185 refereed publications, edited four volumes, and published two books, *Antarctic Marine Geology* (Cambridge University Press) and *Formation and Destiny of the Upper Texas Coast* (Texas A&M Press). John has received numerous awards, including the 2007 Shepard Medal of the Society for Sedimentary Research.