December 14, 2007

Global Warming: Exploring Uncertainties

Jay Grymes LSU Climatologist & WAFB Chief Meteorologist

The Earth is warming and humans are the primary agents of this global temperature change -- this is the conclusion drawn by the Intergovernmental Panel on Climate Change (IPCC). National and international surveys indicate that "global warming" ranks among the top issues of environmental concern. Near-daily reports can be found in the popular press regarding "global warming," and the topic is now one of such import that it has taken a significant place in the political landscapes across Europe and America. But a question arises: "Do the headlines and politics of 'global warming' interfere with a scientific dialog about the IPCC's conclusions?" The objective of this forum is not to argue against well-documented IPCC findings, but to show that important scientific questions remain to be explored regarding the roles of natural and human-induced climate variability and change.

Biography: Jay arrived at Louisiana State University in 1985 and became the Assistant State Climatologist for Louisiana the following year. In 1991 he was appointed the Louisiana State Climatologist, a position he held through May 2003. He currently holds a 50% faculty appointment in the LSU system, divided between the Dept. of Geography & Anthropology, where he teaches "Earth Atmosphere", and the LSU AgCenter/Dept. of Biological & Agricultural Engineering, where he serves as an Cooperative Extension weather specialist and program managerof the AgCenter's automated weather network. In 1996, Jay joined WAFB-TV (CBS affiliate, Baton Rouge) as a part-time weathercaster and in May 2003 he moved to a full-time role at "Channel 9" and was named the station's Chief Meteorologist. Jay served as the editor/publisher of the Louisiana Monthly Climate Review for roughly 15 years and has more than a dozen professional and academic publications dealing with aspects of Gulf Coast weather and climate. Over the years he has given more than 60 presentations at national and regional professional and academic conferences. His most prized professional honors include election as the President of the American Association of State Climatologists (2001-2002) and recipient of the Louisiana Association of Broadcaster's "Weathercast of the Year" Award (2004). Among Jay's professional public service activities are: weather consultant for the Louisiana State Police, the East Baton Rouge Office of Homeland Security & Emergency Preparedness, and the Louisiana Department of Justice.

November 9th, 2007

Geology of the Gulf of Mexico with Emphasis on the Paleogene Wilcox Foldbelt Trend

John Dribus

A management overview of the geology of the deep water Gulf of Mexico. The origin of the GOM begins with the breakup of Pangea at the end of the Permian, and follows with deposition of the Louann Salt, Cretaceous source rocks, and clastic sedimentary rocks of the Lower Tertiary through modern times. During these deltaic and deepwater sedimentary processes, extensional and compressional faulting and associated salt mobilization has resulted in setting up a perfect petroleum system in the Gulf: 1. A thick salt base to mobilize for trap creation, 2. Deposition of abundant organic rich source rocks, 3 &4. Lower Tertiary clastic reservoir rocks inter bedded with impermeable shales, and 5. Abundant faults and welds for migration pathways and juxtapostion for trapping hydrocarbons..

Biography: John Dribus is the Gulf Coast Operations Manager and Principal Geologist for Schlumberger's Data and Consulting Services team. He has worked in oil and gas exploration and production in the Gulf of Mexico Basin for over 30 years including 25 years for a major O&G company and seven years for Schlumberger. His expertise includes deepwater geology, petroleum systems analysis, geologic risk assessment, and prospect evaluation.

October 12th, 2007

The Geology of the Katrina Disaster in New Orleans

Stephen A. Nelson, Department of Earth and Environmental Sciences, Tulane University

Abstract: A combination of historical and geological factors combined with inadequate design of levees and floodwalls resulted in a series of levee overtopping and levee failures in the New Orleans area during the passage of Hurricane Katrina on August 29, 2005. Early in the morning of August 29, levees along the Mississippi River - Gulf Outlet and Intracoastal Waterway were overtopped by the storm surge generated by Katrina resulting in the flooding of eastern New Orleans and St. Bernard Parish. Later in the morning storm surge entering New Orleans' Inner Harbor Navigational Canal overtopped levees and floodwalls on both sides of the canal, eventually resulting in the catastrophic failure of the floodwalls and the destruction of the Lower 9th Ward. Three drainage canals in New Orleans, originally constructed in the mid-1800s to drain rainwater from the city into Lake Pontchartrain to north, then became subject to storm surge entering from the Lake. The excess pressure of the surge combined with the weak geological material underlying the levees and floodwalls resulted in two levee breaches on the London Avenue Canal and one on the 17th St. Canal by mid-morning on August 29. These breaches resulted in flooding of 75 to 80% of the city of New Orleans. The failures of levees on these drainage canals did not result from overtopping the floodwall system, but apparently from weaknesses in the design of the system that failed to adequately account for the underlying geologic conditions.

Biography: Stephen A. Nelson, associate professor and Chair of the Department of Earth and Environmental Sciences at Tulane University, received his B.A. in 1973, M.A. in 1975, and Ph.D. in 1979, all in Geology and all from the University of California, Berkeley. He has been at Tulane since 1979 where he teaches courses in physical geology, mineralogy, petrology, igneous petrology, natural disasters, and earth physics. Dr. Nelson is author or coauthor on 25 scientific publications and has presented the results of his work at over 36 scientific conferences. His research has involved the geology and petrology of Mexican volcanoes, thermodynamics of silicate liquids, volcanic hazards, and, more recently, levee breaches during Hurricane Katrina.

September 14th, 2007

The Tri-State Water War in Alabama, Florida and Georgia: Past and Present

Daniel L. Thomas, PhD, PE

Abstract: T he tri-state water war began in the early 1990's when the state of Georgia requested the Corp of Engineers to allocate additional water from the Chattahoochee River system to meet growth and demands in the Atlanta metropolitan area. Florida filed suit to halt action on the request. Alabama immediately followed with a lawsuit of their own. The current lawsuit has been extended for over 15 years to provide a period of time to study actual water use, since information was unavailable about how much water was actually being used (beyond any municipal permits), and how much water was actually needed to meet the different demands. The Governor's of all three states continued to negotiate the water use issue, with changing leadership, designated federal representation, and additional information coming on board each year. Unfortunately, the issue is still not settled, although changes in water use, permitting, etc. continue to evolve within each of the three states.

Although my talk may include a somewhat biased representation of the issues and problems from each of the three states (since I was in Georgia between 1990 and 2003), the hope is to present some of the more interesting intrinsic issues surrounding the overall problem of allocation equality between states, western water expert help with the problem, and who actually owns the water. One issue that may be of direct interest is the University of Georgia's direct involvement in a study to determine agricultural irrigation withdrawals in the Flint River Basin (a sub-basin within the Chattahoochee River basin). The Karst geologic formation within the Flint River Basin creates direct connections between surface and ground water, and patterns of recharge that are difficult to quantify and model. The extensive agricultural irrigation acerbates the issues, especially during drought years (2007, and especially from 1998 to 2003). I am an engineer, not a geologist, so information will be presented from an engineer's perspective!

Biography: Dr. Daniel L. Thomas is Professor and current head of the Biological and Agricultural Engineering Department at Louisiana State University and the LSU Agricultural Center in Baton Rouge. Prior to this he was a faculty member at the University Georgia, Bio & Ag Engineering Department, College of Agricultural and Environmental Sciences Tifton Campus. He holds a B.S. (1978) and M.E. (1980) degrees in Agricultural Engineering from Louisiana State University and a Ph.D. from Purdue University (1984). He has been involved in research and extension activities associated with irrigation, drainage, water quality, and precision agricultural systems. With over 70 refereed/reviewed publications, over 110 presentations to professional groups, over 70 formal extension presentations, and about 30 other publications, his research and extension efforts are well-known. He has been a member of ASAE, ASCE/EWRI, and SWCS for many years and has served in leadership positions in each organization. He has taught portions of college level courses on irrigation, professionalism/ethics, drainage, design of small dams, engineering graphics, and surveying. He has been recognized by Sigma Xi (Research Honorary), Alpha Epsilon (Agricultural Engineering Honorary), and Gamma Sigma Delta (Agricultural Honorary). He was the Panel Manager for the NRI Watershed Processes and Water Resources Program in 2004-2005. In 2005, Dr. Thomas was inducted into the first class of Diplomates for the American Academy of Water Resources Engineers. In 2006 he became a Fellow of the American Society of Civil Engineers. In 2006 he also served as the Panel Leader for the review of USDA-ARS five-year projects associated with drainage and irrigation.

May 11th, 2007

Structure of the Plio-Miocene Aquifers in Rapides Parish

Dale J. Nyman, Nyman and Associates.

Abstract: Reports regarding the Plio-Miocene aquifer systems of central Louisiana have been summaries of aquifer characteristics, water quality, and updated maps of structure contours and water levels. Such reports are helpful, but summaries of aquifer tests for these wells may be somewhat misleading in that they imply that the aquifers fit the underlying assumptions of most groundwater equations—that the aquifers are infinite in areal extent, and have a reasonably uniform thickness and permeability. These assumptions work well for the Chicot aquifer of southwestern Louisiana, for example, which generally has over 500 feet of sand and gravel stretching for over a hundred miles along the Gulf Coast, but these assumptions are less applicable to the Plio-Miocene aquifers of central Louisiana where the aquifers are buried river channels perhaps a few miles wide and a few tens of miles in length. An example of the problem regarding drawdown calculations is provided. The Plio-Miocene sand deposits underlying Rapides Parish are not isolated bodies that are randomly distributed. Each sand body is a product of streams that originated in highland areas to the north and flowed southward toward the Gulf. The north shore of the Gulf of Mexico was in southern Rapides Parish during Plio-Miocene time so the local

streams didn't have far to go. An attempt has been made to map the major channel sands that were deposited and examples are provided for the Evangeline, Williamson Creek, and Carnahan Bayou aquifers of southern Rapides Parish. The mapping is largely conceptual because geologic information is limited and it is difficult to predict the location of a buried, meandering stream channel. A detailed description of the geology of the Plio-Miocene sand bodies will be published by the Water Resources Section of the Louisiana Department of Transportation and Development.

Biographical Sketch: Dale J. Nyman, has a BSc. and M.S. degree in geology from Iowa State University, Ames, Iowa. He retired after 31 years with the Water Resources Division of the U.S. Geological Survey. Since his retirement he has worked for the Louisiana Department of Environmental Quality, Arcadis Geraghty & Miller, Professional Services Inc., and others. He is a Certified Groundwater Profession (Association of Groundwater Scientists and Engineers, NWWA), a Professional Geologist (AIPG), and a Registered Professional Geologist (State of Mississippi)..

April 13th, 2007

Living in Southeastern Louisiana Atop a Passive Continental Margin Slump

Dr. Sherwood Gagliano, Coastal Environments Inc.

Abstract:

Biographical Sketch:

March 9th, 2007

Subsidence of south Louisiana: Measurement, Causes, and Human Implications

Dr. Roy K. Dokka, LSU

Abstract: It is well known that the modern Mississippi River delta has formed over last ~8,000 yrs. The landscape is due to the interplay between subsidence, accretion, and global sea level rise. Flooding builds land by sediment deposition and stimulates wetland biologic processes. The delta is composed of lobes that formed as the river shifted position with time. As a lobe was abandoned, accretion ceased yet continued to subside. Over time, the lobe is slowly eroded and inundated by the Gulf. Although deltas generally do not grow much above sea level, the surface of the MRD has accreted sufficiently over the past several thousand years to maintain its position with respect to a slowly sea level. Thus, periodic river flooding of the delta region is an essential component in maintaining this landscape. Enter large numbers of Homo sapiens beginning in the 1600s. Because such a landscape is not favorable for human habitation, river levees were built. Current levees were built by order of Congress to benefit the entire USA. Levees prevent flooding, but have the unintended consequence of stopping accretion. Today, subsidence and slow eustatic rise continue. It is, therefore critical that subsidence be correctly measured and its origins be understood. Highly precise and accurate geodetic measurements demonstrate that land areas and coastal wetlands of the northern Gulf of Mexico basin are sinking at rates unanticipated by conventional geological methods that can only record change averaged over 100s to 1000s of years. Modern subsidence of south Louisiana is due to the integrated effect of multiple natural and anthropomorphic processes. The processes include flexure of the crust and regional mantle outflow produced by loads of the MRD, Mississippi alluvial valley, and water loads from rising sea levels since the late Pleistocene, faulting, compaction, oil, gas, and groundwater extraction, oxidation and drying of organic soils due to levee and drainage projects, and probably the motions of subsurface salt. Although heralded by some as a primary cause of subsidence, data do not support oil and gas extraction as a substantial contributor, even at type areas. What about the near future of coastal Louisiana? Because subsidence and eustatic rise will continue, much of the coast will eventually be inundated. Because of their low elevation, the wetlands will be first to be lost, followed in time by the coastal land where people live and work. Long before the latter happens, however, the increasing vulnerability to hurricane flooding will cause people and businesses to abandon the coast for safer ground. Official mitigation plans to save Louisiana's coast will unfortunately fall short of their goals due to the lack of due consideration of the realities of subsidence and its dynamic and unrelenting impact on coast.

Biographical Sketch: Roy K. Dokka, Executive Director, Center for GeoInformatics, Director, Louisiana Spatial Reference Center, and Fruehan Endowed Professor of Engineering, Louisiana State University, Baton Rouge, LA. 70803. Dr. Dokka is a Fellow of the Geological Society of America (elected 1994). He was awarded a lifetime honorary membership in Alpha Lambda Delta, the National Freshman Honor Society for his record of outstanding teaching. Since 1989, Dr. Dokka has been awarded 10 University, College, and Departmental teaching awards at LSU. This includes the 1990 LSU Alumni Association Distinguished Faculty Award. He received a Presidential Citation in 2003 for "outstanding service to the surveying profession in Louisiana" from the Louisiana Society of Professional Surveyors. In 2006, he received the "Distinguished Service Award for the Advancement of Spatial Activities in Louisiana", at the 22nd annual Louisiana Remote Sensing and GIS Worksop. He is the author of over 65 publications in refereed professional journals. In 2003-2004, he served as President of the South-Central Section of the Geological Society of America. He has proudly served as the major professor for 23 outstanding men and women who have completed their masters and doctoral degrees at LSU. In 1992-93, Dr. Dokka served as a Program Director at the National Science Foundation. He has testified before the United States Congress on coastal vulnerabilities and flooding and has been a member of several national policy committees for NSF and NASA dealing with Geology, Geographical Information Systems, and Geodesy. He initiated and continues to head the Louisiana Spatial Reference Center, a partnership with the National Geodetic Survey-NOAA focused on creating a state-of-the-art positional infrastructure for the state. His current research interests center on the application of the Global Positioning System (GPS) and geodetic leveling to study the massive subsidence that is affecting Louisiana's coast and mid-continent, and on understanding the role that tectonism and climate play in creating landscapes.

February 9th, 2007

The Comite River Diversion Canal

Dietmar Rietschier

Abstract: The Comite River Diversion Canal is a federal, state and local sponsored project designed to provide flood protection to the Comite River Basin. The project will reduce flooding in the Baton Rouge Metropolitan area, including portions of East Baton Rouge, Ascension and Livingston Parishes. The project provides for the construction of a 12-mile long diversion channel located between the Comite River and the Mississippi River. The project includes a diversion structure at the Comite River, a control structure at Lilly Bayou, four drop structures and three continuous flow stations. Estimated cost of the project is 174 million dollars.

Biographical Sketch: Dietmar Rietschier is the Executive Director for the Amite River Basin Drainage and Water Conservation District. He has been with ARBC since 1994. Prior to his work with the Commission he worked in the private sector with various engineering consulting firms, the Capital Region Planning Commission on Transportation Planning for the Baton Rouge Urban Area, the City of Denham Springs as Director of the Office of Planning and Public Works. Mr. Rietschier is a graduate of LSU with a Bachelors Degree in Architecture and a Masters Degree in Civil Engineering.

January 12th, 2007

Dispelling the Myths: Exploration and Development of Natural Gas Hydrate

Art Johnson

Abstract: As gas supplies tighten around the world, natural gas hydrate is being considered as a new gas play with potentially enormous natural gas resources by a growing number of energy companies and national governments. Results from scientific drilling consortia, such as the Ocean Drilling Program (ODP) and more recently the Integrated Ocean Drilling Program (IODP), have yielded considerable data about the occurrence of gas hydrate in sediments. This knowledge is critical for the successful commercial development of gas hydrate resources as disparate models for the accumulation of potential commercial natural gas deposits can be tested and exploration models developed. Many older and erroneous concepts concerning natural gas hydrate are deeply entrenched within the E&P community. These can be dispelled. These "myths" about gas hydrate include (amongst others) the belief that 1) commercial gas hydrate deposits are always associated with a seismic "Bottom Simulating Reflector" (BSR), 2) that the best gas hydrate deposits are in remote areas, 3) that development is 20 or 30 years away and will require entirely new methods of production, and 4) that hydrate resources in the Gulf of Mexico have no net present value so they can be ignored in lease sales. Successful development of natural gas hydrate will require an accurate understanding of the nature of gas hydrate formation and the geological controls on their occurrences. The relationship between natural gas hydrate and their host sediments and the application of a petroleum systems approach can yield the same play development that has resulted in successful exploration methods for conventional gas deposits. Through the integration of information gained during the past five years, production of natural gas from hydrate should be viable in the near term – within the life of existing deepwater leases.

Biographical Sketch: Art Johnson is President and Chief of Exploration for Hydrate Energy International and is engaged in exploration efforts throughout the world. Prior to forming HEI in 2002, Art was with Chevron for 25 years. Among his positions were Division Geologist and New Trends Team Leader. Art is currently President-Elect of the New Orleans Geological Society, co-chair of the AAPG/EMD Gas Hydrate Committee and chaired the Methane Hydrate Advisory Committee for the U.S. Secretary of Energy from 2001 to 2006. He has advised Congress and the White House on energy issues since 1997. Art is also an Adjunct Research Professor at Tulane University, an AAPG Visiting Geoscientist, and Vice President of Technology for Gulf States BioFuels. Among his recent publications are two books, "Economic Geology of Natural Gas Hydrates" published by Springer, and "Alternative Energy and Fuels Technology", published by the Catalyst Group.