

East Carolina University

Geological Sciences Newsletter

Spring 2008

The 2007-2008 year in Geological Sciences

What a busy year! Just when you think things will settle down, new issues and opportunities arise. Thankfully, most of these have been and continue to be positive for the department. Dave Mallinson was awarded tenure. Congratulations, Dave! Last August we welcomed Siddhartha (Sid) Mitra. Sid is an organic geochemist who we enticed away from Binghamton. He has also worked at Tulane and the USGS and will bring additional expertise to our coastal geology team. You'll read more about Sid inside this newsletter. We have also just concluded a senior level hire for a joint position between our department and the UNC Coastal Studies Institute in Manteo. Rick Miller, an expert in remote sensing who has spent the last 20 years working for NASA at Stennis Space Center, will live at the coast and will be the first of three CSI program heads that will be joint positions with ECU. This arrangement opens up great opportunities for us as Rick will be heavily involved in the final planning of the \$34 million CSI facility that will be built on Roanoke Island.

We've increased the number of faculty and now we have increased the number of staff. As you know, John Woods joined us in September 2006 to work with Jim Watson. Michelle Stevens joined us in December, 2007. She is taking on the reception duties while Dare Merritt concentrates on managing the department's burgeoning external grant portfolio.

Continued on page 2

Water Resources Research in the Geological Sciences Department

Currently, the State of North Carolina is facing growing water demands from the mountains to the coast. It has become clear during the recent drought that the future economic well-being of North Carolina will hinge on our ability to sustainably manage our surface water and ground water systems (Figure 1). Past flooding events have shown that we also must be prepared to deal with too much water, particularly during tropical storms. Now and in the future an important balance will have to be met to provide sufficient quantities of clean water to sustain the standard of living of a growing population (the 6th fastest growing state in the nation) while ensuring that surface water and ground water withdrawals are sustainable and do not adversely impact the natural balance in watershed ecosystems. This is particularly challenging with the added uncertainty of the future effects of climate change on the hydrologic cycle. Recently, researchers in the Department of Geological Sciences have been shedding light on a variety of water resources problems. Our work has dealt with the quantity and quality of the surface water and ground water of North Carolina and the mid-Atlantic and Gulf Coasts, with a focus on eastern North Carolina. Recent work has focused on land-use effects on water quality and quantity, geologic controls on Coastal Plain hydrology, and ground water resources management.

Continued on page 3

2007-2008 *Continued from page 1*

We continue to improve our complement of instrumentation. A while ago I was asked to indicate what equipment we have that is obsolete. I listed our XRD and XRF and then promptly forgot about it. Early in the fall semester we had a very pleasant surprise when, out of the blue, we were notified that we had been allocated the funds for an XRD! As I write, a room is being readied for refurbishment for the arrival of the XRD. Fingers are crossed now for an XRF!

The addition of faculty and staff leads to pressure on space. Last summer, we managed to carve out two additional offices in the Graham building by redesigning and refurbishing the main office suite and the storage room of a teaching lab. This lab now has new furniture and is fully "smart". In May we will be refurbishing the graduate student space and furnishing it with new, computer-friendly and storage-friendly workspaces.

Scott Snyder retired at the end of December after a 35 year career at ECU. Scott had spent the last nine years as Senior Associate Dean but he still kept his hand in foraminifera via collaborations with several of us in the department. I intend to continue to pester him to work with us!

Finally, I must report to you that two more stalwarts of the faculty will be retiring at the end of the 2008-2009 academic year. Richard Mauger and Dave Lawrence have been at ECU for a combined 50 plus years. They taught many of you and, as a result of their vast knowledge and skill in imparting it, you have gone on to become successful geologists in your own right. Richard and Dave will be sorely missed but they, like the rest of us, are excited by the new challenges and opportunities that their retirements will afford the department. Together we will work diligently to search for their replacements. Of course, it's not really possible to replace the breadth of knowledge

of these two colleagues but we will do our best.

Please join us in wishing Richard, Dave and Scott long and happy retirements.

My very best regards,

Steve Culver

B.S. Graduates

Summer 2007

Jeremy D. Brandsen

John P. Deloatch

Henry A. Winn

Fall 2007

David M. Caldwell

M.S. Graduates

Fall 2007

John B. Elkins

Heather W. Hutchinson

Patrick K. Johnson

Katherine E. Ryan

Jason R. Soban

Benjamin W. Sumners



Figure 1. The Tar River at Falkland during drought conditions in September 2008. During this period the discharge (<math><100\text{ ft}^3/\text{s}</math>) was lower than ever recorded (records exist back to 1931). Photo courtesy of Chris Moore.

Land-Use Effects on Water Quantity and Quality

Dr. Mitra has been involved with research addressing the growing concern of the effects of trace organic chemicals in the environment. The active ingredients of hundreds of pharmaceutical and personal care products (PPCPs) commonly used by consumers are being found in natural waters throughout the world. There is an ever growing concern about these chemicals. In many cases, these chemicals are endocrine disrupting chemicals and may be toxic to aquatic organisms. In other cases, the toxicity of these chemicals to the ecosystem is not known. These PPCP compounds are largely released from waste water treatment plant discharge but the question remains as to whether they are also introduced into rivers and stream via septage and/or other sources, such as erosion from agricultural areas. To reduce the loading of these chemicals to the environment, consumers should practice the “two Rs: Reduce and Return!!”. First, use less medication, and if you can’t do that, please do not dispose of your unused medications by flushing them down the toilet! Give them back to your pharmacist (who will hopefully not flush them down her or his toilet).

Dr. Woods has been involved with research focused on the geochemical changes caused by reverse osmosis water treatment plant discharge (present and proposed) in coastal waters of northeastern Albemarle Sound. This work has focused on the ecological effects of releasing reverse osmosis water treatment plant discharge to an estuary. Detailed water and benthos sampling has shown the effects on estuarine water quality at discharge locations (Figure 2). Currently, the project is on hold while they are building the new plants. Then the “post-construction monitoring” will begin.

Dr. Corbett has recently completed a project in collaboration with NCSU focused on the spatial and temporal variability in ground water-based nitrogen input to a stream in an agricultural watershed in North Carolina. This work was focused on Bear Creek a tributary to the Neuse, and has provided insights into nitrogen loading to the estuary from tributaries draining these predominantly agricultural settings.

Dr. O’Driscoll has been involved with research documenting the effects of urban land-use on coastal plain and barrier island hydrology. The expansion of urban areas since the 1980s has increased the extent of impervious surfaces in the form of rooftops, roads, parking lots, etc. This has resulted in a reduction in ground water recharge and an increase in stormwater runoff that is often responsible for stream channel erosion and a lowering of riparian zone water tables. The net result is a change in floodplain moisture regime known as “riparian drought.” Many urban floodplains in the region have dried up compared to their undeveloped counterparts. Other work has been focused on the geologic controls on septic system effluent treatment in coastal areas. In general, sandy soils provide less removal of nutrients from septic wastewater when compared to loamy soils with greater percentages of silt and clay. Results suggest that high densities of septic systems in coastal areas threaten the shallow ground water quality.



Figure 2. Dr. Terri Woods and Brad Panneton sampling water quality in the Albemarle Sound.

Geologic Controls on Coastal Plain Hydrology

Drs. Mallinson and O’Driscoll were recently involved in a study characterizing the geologic controls on river-ground water interactions along the Tar River, N.C. The research used Ground Penetrating Radar to image the subsurface sediment properties underlying the Tar River. These and other data showed that the Tar drainage system is asymmetrical with broad floodplains and gentle slopes to the north and narrow floodplains and steeper slopes to the south. The presence of aeolian and fluvial deposits to the north of the river typically resulted in more permeable deposits than the marine sediment on the south side of the river and hence greater ground water influxes from the north side of the channel. Dr. Riggs has been working on the geologic framework of the Roanoke River and completed a report on the topic last year. His work highlighted the geologic asymmetry of the river system and will help with future management of the watershed.

Ground Water Resources Management

Dr. Spruill has been working on numerous ground water resources projects. He is currently involved in the pilot project for Greenville’s Aquifer Storage and Recovery system. This will be one of the first times that this technique has been used in North Carolina and will aim to collect surface water during relatively high discharge periods and inject this water into an aquifer for withdrawal at a later date. This innovative water resources management strategy is one approach that may help us weather future droughts in the region. In addition, Dr. Spruill has been working on ground water supply and saltwater intrusion problems at Hilton Head, SC and numerous other locations throughout the Coastal Plain.

These and other studies have helped to provide water managers with important data and insights that have helped to improve water resources management in the Coastal Plain of North Carolina. Population growth, land-use, and climate change will undoubtedly affect water quality, supply, and demand in the future. Water resources research is crucial to help guide sound water management practices in eastern North Carolina.

New Kid on the Block

Sid Mitra

It is indeed a pleasure to be writing this as the newest addition to the faculty in Geological Sciences here at ECU. My wife Paula, my 2 yr old son Sthir and our dog Angel, are all enjoying life here in North Carolina. We’re even more thankful to be in NC every time we see the weather channel covering the snow, sleet, cold weather, and rain in the Binghamton, NY area, our previous home. We are about to welcome a new addition to the family any

day now. So, stay tuned for news of baby #2's arrival.

On the professional front, I am an Organic Geochemist who focuses on the fate and transport of trace organic chemicals in the environment. Organic chemicals, natural or synthetic, can help answer many questions about anthropogenic or geologic processes. Below, I have highlighted my specific areas of research in organic geochemistry.

One major area of research, which I will be introducing here at ECU, deals with the geological cycling of black carbon and its effects on the global carbon cycle. Black carbon is the residue left after combustion processes such as biomass or fossil fuel burning. Investigations of historical black carbon deposition in sedimentary environments can offer evidence of paleofires and historical land use practices and are intimately linked to paleoclimate. Another area of research with which I am involved deals with the science of organic contaminant bioavailability. For example, why is it that an organic contaminant presents deleterious effects to a community of benthic organisms in one area but not to another community of the same organisms in another area? The answer may not lie so much in the organisms' biological response but more so in the natural organic matter composition of the sedimentary matrix to which the organisms are exposed. Finally, the third area of research with which I am involved, deals with tracking the fate and transport of the active ingredients in many pharmaceutical and personal care product chemicals, in the environment. Many of the drugs we ingest as humans are being detected in aquatic environments and may pose a significant threat to the ecosystem. Identifying the factors that affect the stability of these chemicals in the natural environment is tantamount to minimizing their potential environmental hazard.

Much of my research is comprised of fieldwork in coastal areas coupled with extensive laboratory analytical work. Field work for my current projects takes place in venues such as the Hudson River in NY and the Ganges-Brahmaputra River in Bangladesh. Depending on the scientific question at hand, fieldwork can entail sampling water, suspended sediments, and bed sediments. The corresponding laboratory work entails isolation of target organic chemicals from these samples.

I firmly believe that promoting scholarship at the university level requires not only a strong and cutting edge research program but also a sound educational program. In that context, I will initially be teaching Introduction to Oceanography (GEOL 1550), Environmental Geology (GEOL 1700) at the undergraduate level and Biogeochemistry (GEOL 7830) at the graduate level.

As an organic geochemist with a background in marine science and oceanography, I anticipate collaborations with several of the faculty here. I am very excited to be here and look forward to getting my research and education program up and running as soon as possible.

The Usual Suspects

Reide Corbett

We have had another productive year here in Geological Sciences. This year saw research-related trips to several areas in North Carolina, Malaysia, Puerto Rico, and back to the Gulf of Mexico. My work still focuses on sediment dynamics and the influence of storms. We have also continued our work evaluating shoreline change rates along the Inner Banks. I have tried to bring some of this to the classroom at the undergraduate (oceanography) and the

graduate level (new course in Isotope Geochemistry taught for the first time last spring). We have a great group of students in the department. We had several masters' students in our research group graduate over the last year with several finishing up this semester. It has been quite a whirlwind! We wish them the best in their new positions.

Hope you and yours are also doing well...look forward to hearing from you and hope to see you at this year's spring celebration!



Reide working!!!



JP and Reid, working???

Steve Culver

Over the last few years, I have been part of a team of many people on campus who have worked to design, plan and implement the Institute for Interdisciplinary Coastal Science and Policy (IICSP). The role of this umbrella organization is to promote interdisciplinary research, education and

outreach on coastal issues. It brings together the faculty from the former Institute for Coastal and Marine Resources (ICMR) and the Coastal Resources Management (CRM) PhD program. The search for a director of IICSP was not successful. Last August I took on the role of Interim Director while a new search was conducted. This has taken up much of my time during the past year. I would like to take this opportunity to thank Don Neal who cheerfully agreed to teach my courses during this academic year.

Part of the role of the Director is to increase external funding for interdisciplinary research. In December we heard that a Culver and Riggs-led UNC Research Competitiveness proposal was funded. We received \$288,000 that had to be spent by June 30th, 2008. This is not as hard as it seems because the project on Coastal Hazards in North Carolina involves 17 faculty members (six in ECU Geological Sciences) from several universities in the state. In addition to graduate student support, the department benefits from the new research equipment that will be purchased with this grant.

In a similar vein, I have been spear-heading, with Stan Riggs, the initial efforts to get a federally funded "Coastal Hazards in the Carolinas" proposal off the ground. Some 30 scientists from several east coast universities are involved, including seven from ECU's Geological Sciences. As you can imagine, this kind of proposal is more about organization than science. But once the money comes in, then the science can be done.

My six masters and two PhD students continue to undertake their research. Jenny Foley finished during the year and I expect three or four more students to finish by the end of summer 2008. Two more students, joint advised, with Dave Mallinson came on board in August and are looking forward to the week of fieldwork at the coast that will occur in May. We will be vibracoring and

running seismic in Pamlico Sound and coring in salt marshes near Cedar Island. These weeks are hard work but extremely enjoyable given the opportunity to relax in our group house at the end of a full day of fieldwork.

In summary, another busy year but one that will end with the most rewarding part of a professor's job, the graduation of his/her students.

Stephen B. Harper



For those of you have wondered why my title has remained "Visiting Assistant Professor" after being here for more than a decade at ECU, you need wonder no more! Due in part to some recent nomenclature changes by the ECU Faculty Senate and in part to a decision by the Department of Geological Sciences Personnel Committee, my title is now "Teaching Associate Professor."

On the teaching front, my typical teaching semester still includes sections of Dynamic Earth (Geology 1500) and one section of Environmental Geology (Geology 1700). As has been the case since I first arrived in the Geology Department in 1992, part of my teaching duties still include training and mentoring our Graduate Teaching Assistants to teach Geology 1501 labs. Our departmental curriculum still has me teaching Geomorphology (Geology 5000-5001) every 2 years. I will be teaching

an Honors course in the Fall Semester of 2008 entitled "The Geologic Environment and Resources of Southeast and East Asia."

I am still the Director of the North Carolina Summer Geology Field Course. I will be in the teaching rotation for the Geology Field Course in New Mexico and Colorado in May and June 2008 for the 10th straight year and will be teaching at the Abiquiu, San Ysidro, Cuba, and Taos-Sipapu, NM sites and then travel with the students up to Gunnison, CO where Dr. Diemer from UNC-C and myself will lead the Jack's Cabin Mapping Exercise. This year we will look like one big moving family as I will be renting a Penske truck in order to transport all the cooking and camp gear as well as student duffel bags out to New Mexico, around New Mexico, and back from Colorado. For the 2008 field course, our enrollment in the Geology Field Course is in the 22 to 25 student range. Currently, these students hail from ECU, App State, NCSU, JMU, UT-Chattanooga, Middle Tennessee State University, Elizabeth City State University, and Temple University. This will be the 44th year of the North Carolina Summer Geology Field Course.

After the Field Course concluded last year, I travelled to Southeast Asia and Hong Kong. My travel was supported by a \$4000 travel grant from the Asian Studies Program. The purpose of my trip was to gather information and photographs to incorporate into specific case studies on geo-hazards and geo-resource problems in Asian countries into my section of Environmental Geology Course in future semesters. My 25 days of travel took me to Bangkok, Krabi, and Phi Phi, Thailand, Singapore, and Hong Kong. In all I shot about 35 rolls of film with my Nikon FM3A's and about 400 photos with my cheap point-and-shoot Pentax Digital of Asian landscapes to show in my classes at ECU. This was my first trip ever to Phi Phi Island, which seems to be back to its normal tourista tropical beach resort mode after having more than 3000 people killed there by the December 26, 2004 Tsunami.

David Lawrence

Well, finally the article on the Gold Hill shear zone will be coming out in the journal South Carolina Geology this year. Never have I seen a review process take so long. Last May I did continue to look at shear zones in the region of Great Falls, and the dinky little town of Flint Hill. The Gayden's Creek fault is quite interesting; it has gneiss and schist in an anticline to the south of the fault, and low-grade Carolina terrane metavolcanics to the north. The fault itself is a north dipping ductile low-angle dextral normal fault, probably of Pennsylvanian age. The Great Falls area continues to surprise me with structures you just don't find in South Carolina much. After the SC field work, Sally and I drove out to Colorado so I could take part in the Gunnison segment of Field Camp. The region up Spring Creek beyond the reservoir is just as pretty as always, and I found a couple more outcrops in the overturned Paleozoic rocks, hiding amid some thick forest. The students found the elevation a bit of a challenge, but mostly enjoyed the area. After field camp I did find that I was having a bit of trouble climbing above 12,000 feet. Clearly I have been living near sea level too long. After field camp we continued west and north, up through Wyoming and Idaho, checked out some flood basalts, and went to Port Townsend, WA, where I studied some more cliffs of Pleistocene glacial deposits for evidence of recent faulting. We stayed around Puget Sound, then back east to Wallowa Lake; I took lots of photos of the end and lateral moraines. We now think that we have found our future retirement site: Moscow, Idaho. Right near a suture zone, old silver mines, and room to pasture a horse and raise garlic. Next summer we'll go back out and see if we can locate a little mini-ranch to buy. This year I taught Structural Geology, Field Methods, and Dynamic Earth. For those of you remember the Hot Springs field trip, you will not be surprised to learn that the list

of things students are banned from doing is getting ever longer. No joy-riding on freight trains, no swimming in the French Broad, no throwing fire-works in the campfire, and several other activities. I know, what a kill-joy.

Dave Mallinson

Another year has come and gone, and ECU Geology continues to grow in every way (reputation, facilities, equipment, people, collective weight, gray hairs, offspring, etc.). I was fortunate to have a big role in the recruitment of two new faculty members (having been given the great privilege of being search committee chair). We went through a long list of candidates and interviews, and selected two outstanding individuals for a position at ECU, and at the new UNC-Coastal Studies Institute in Manteo. They are Dr. Sid Mitra and Dr. Rick Miller, respectively. Sid already started, and Rick Miller will be here (or rather in Manteo) in August. You'll be hearing a lot about them, and from them, in the near future.

As far as what I've been up to, in addition to searches, I've been keeping busy as an Associate Editor for Sedimentology, and serving on other assorted university, state and national science panels. Then there's teaching (Marine Geology, Dynamic Earth), overseeing several excellent graduate students, writing proposals and manuscripts, and continuing and expanding research with lots of collaborators. I'm working closely with other faculty here in our continued studies of the Quaternary evolution of the coastal system, and responses to climate and sea-level change. And, I'm also working closely with researchers in Canada (McMaster U., U. of Toronto) in dating coastal deposits in NC and Florida, using luminescence techniques, to understand sea level and isostasy in the southeast U.S.

Enough about me. We want to hear about you! As you alumni now know, we're celebrating 40 years of Geology at ECU (40 Rocks!). So make sure you put May 3rd on

your calendar to visit and enjoy the festivities and grub and grog at the anniversary celebration! We guarantee a good time!

Don Neal

Last year I reported that I was working on another Oil and Gas report. Well, I am still working on the report but only have two sections left to complete. Hopefully I can finish this summer. In the meantime I pull small parts of the research out for presentation at GSA. This spring I will present some information on Devonian black shale stratigraphy and gas production at the meeting in Charlotte.

It has been more years than I care to remember since I took a paleontology course and this spring I am teaching it. I guess it is good to have a refresher now and again but I haven't seen some of this stuff in the last 35 years and don't much care if I see it again. In addition to paleo I am teaching stratigraphy: I pity those poor students who have to endure two senior level writing-intensive courses with me this spring. I am just trying to survive until the end of the semester.

I continue to advise undergraduate majors and a few students who came in thinking they want to major in geology. Some make it and others fall by the wayside. Some things never change. I am still editing The Compass of Sigma Gamma Epsilon and still looking for manuscripts. Also, I continue in my role as Secretary-Treasurer of the Southeastern Section of GSA.

Here is wishing each and every one of you the very best.

Mike O'Driscoll

Hi Everyone

Hope you are having a good year. This year has been good to us. Our twins are 18 months old now and started to attend ECU in the fall. They desperately want to be Pirates and attended their first football game this year. We taught them to scream "arrgh." Now they won't stop. We also took them to their first Geological Society of America Conference in Denver, CO. You can imagine they were very excited to attend and learn about the great career opportunities currently available to geologists.

I have been busy chasing around the twins and when they tire out I get back to work. This fall semester three of my students graduated with their M.S. degrees: Kolt Johnson, Heather Hutchinson, and Jason Soban. All worked on Coastal Plain hydrology problems. Kolt landed a nice job as a hydrologist in Hawkes Bay, New Zealand (we must develop a field trip to visit him). Heather and Jason are currently in Charlotte, NC and Ypsilanti, MI, respectively. Both are working for environmental consulting firms.

Currently my efforts are focused on teaching Environmental Geology and Drainage Basin Hydrology, advising students, and finishing up several research projects. In NC, our work is dealing with urban runoff effects on Coastal Plain and Barrier Island surface water and groundwater hydrology. The other area I am actively working in is the Appalachian Plateau and Valley and Ridge settings in central PA. I am finishing up two projects there that focus on surface water-groundwater interactions and their relationship to nutrient transport and wetland processes.

In the fall I visited Kazakhstan to develop collaborations with former Soviet Union scientists and to help work on some of their environmental problems. It was very interesting to see the effects that environmental contaminant releases during the Cold War have had on the water

resources of Kazakhstan. It was also very interesting to partake in the local cuisine; we ate horse for dinner almost every night. Our joke was that every night before dinner we would say “I’m so hungry I could eat a horse.” I hope to get a chance to return in the coming year.

Well, have a great year!

Stanley R. Riggs, Distinguished Research Professor

As I have gotten older, I have slowly evolved into the Department’s curmudgeon. In spite of a high degree of crankiness, my 41st year in the ECU Department of Geological Sciences has been great—I still look around and smile. I take great pleasure in still being a part of the best little program within the University. The Department is very healthy, has excellent leadership, awesome new young faculty, great students, and even an administration that is in tune with the Department and responsive and supportive of our program. All of you alumni can be extremely proud of your alma mater.

I am still actively involved in the ECU/USGS/NCGS North Carolina Coastal Geology Cooperative Program as we wind down our 8th year with this exciting research program. This program dealt with the origin and evolutionary development of the NE NC coastal system during the Quaternary glacial and interglacial episodes. Since this is the last year, our research crew has put in a lot of time this past year writing the new proposal for Phase II. Consequently, Steve Culver and I have taken many trips to Raleigh and Washington DC to lay the groundwork for funding this new program. The Phase II program is titled “Coastal Hazards in the Carolina’s: Economic Implications of Climate Change, Sea-Level Rise, and Storms” and includes researchers from the departments of Biology, Economics, Sociology, Coastal Resource Management, Center for Natural Hazard Research, and

Recreation and Leisure Studies, as well as several other universities. This research program continues to be very exciting and scientifically productive. Wish us some good luck during this month of March when we tangle with Congress.

The NC State Legislative Commission on Climate Change, of which I am a member, has been meeting for two years now. What an incredible change in people’s attitudes during this time period. The public has gone from a so what attitude to front burner. The Commission has been a real learning experience for me as we try to educate the legislators about our earth, its resources, and dynamic processes. NC might just get their act together and become a leader in the SE, if not nationally. Of course, all of our coastal research here at ECU is extremely relevant and makes ECU one of the main leaders in the state concerning global climate change, sea-level rise, and storm dynamics, and water resources. This is not only a case of being in the right place at the right time, but being there with the backup science that we have been developing for many decades now. And many of you, our former undergraduate and graduate students were extremely important parts in helping the Dept of Geology, ECU, and the State of NC to get where we are. Those of you who have done theses on our coastal system produced major pieces of the puzzle that we continue to build upon—each of you can feel good about your contributions. The Commission is now to the point where we will begin to develop critical legislation to help the State and its citizens 1) better manage the human activities that are apparently impacting global climate change; 2) deal with the potential consequences of global climate change on the citizens, natural resources, and economy of the State; and 3) take advantage of economic opportunities that may result from global climate change and the emerging carbon market.

My research associate, Dorothea Ames, and I now have produced the following series of

monographs as part of the USGS research project. Several others are in various stages of completion—hopefully they will be done by next years newsletter.

1. Riggs. 2001. Shoreline Erosion in North Carolina Estuaries. NC Sea Grant College Program, Raleigh, NC. Pub. No. UNC-SG-01-11, 69 p.
2. Riggs and Ames. 2003. Drowning the North Carolina Coast: Sea-Level Rise and Estuarine Dynamics. NC Sea Grant College Program, Raleigh, NC, Pub. No. UNC-SG-03-04, 152 p.
3. Riggs and Ames. 2007. Effect of Storms on Barrier Island Dynamics, 1960-2001, Core Banks, Cape Lookout National Seashore, North Carolina. U.S. Geological Survey Scientific Investigations Report 2006-5309, 73 p.
4. Riggs and Ames. In Press. Part I: Barrier island model utilized for the geomorphic mapping of the North Carolina Outer Banks. U.S. Geological Survey Scientific Investigations Report 2007-XXXX.
5. Ames and Riggs. In review. Part II: Geomorphic mapping of the North Carolina Outer Banks. U.S. Geological Survey Scientific Investigations Report 2007-XXXX.
6. Riggs and Ames. In review. Geologic Evolution of the Lower Roanoke River and Albemarle Sound Drainage System in Response to Climate Change and Sea-Level Rise. U.S. Geological Survey Scientific Investigations Report 2006-XXXX, 169 p.
7. Riggs, S.R., Ames, D.V., Culver, S.J., Mallinson, D.J., Corbett, D.R., and Walsh, J.P. In Review. In the eye of a human hurricane: Oregon Inlet, Pea Island, and the Northern Outer Banks, North Carolina. In Identifying America's Most Vulnerable Oceanfront Communities: A Geological Perspective", Eds. J.T. Kelley, R.S. Young, and O.H. Pilkey. Geological Society of America, Special Publication.

To keep up with the ECU-USGS-NCGS research program, visit both the ECU geology and the USGS websites—some of our progress reports are now on the ECU website

(www.ecu.edu/geology/coastal.html; <http://woodshole.er.usgs.gov/project-pages/northcarolina/>). We always look forward to hearing from each of you, or better yet, come out in the field with us—get your feet muddy and your gills wet before they permanently dry out!

Things are great and life is good! Cheers.

J.P. Walsh

It has been another fun and action-packed year. Some new opportunities have arisen

and others have completed or are coming to an end. This past Fall I taught Oceanography which was gratifying (and fun) because this was the class which got me hooked on geology. This spring I am teaching my seminar class, Land-Sea Interactions, which is also enjoyable as the students are engaged and enthusiastic. On the research front, I had a paper published in Geophysical Research Letters in late 2007; it presents evidence (see below) for a filling canyon during the present high stand in sea level which is interesting as canyons are often viewed as erosional features. I'm also working with a number of authors on papers covering topics such as classification of fine-grained deltaic systems, estuarine shoreline erosion, inlet-opening potential and tempestite characteristics. I slaved over two big grant proposals this year, but unfortunately neither was funded. I guess this is the harsh reality of grant funding. Fortunately, other projects continue, and some new funding sources have become available. Most of my fieldwork over the past year has been in coastal NC, including one freezing day aboard the R/V Beeliner in January 2008 (see photo).

This year I passed another big milestone as I graduated my first few MS students. Katie Ryan (Spring 2007), Ben Sumners (Fall) and Kat Marciniak (Fall) all graduated after producing impressive theses. Katie's thesis focused on sedimentation in a coral reef environment near La Parguera, Puerto Rico; you can read about her work in Marine Pollution Bulletin this spring. Ben examined outer-shelf and slope sediment accumulation and morphology seaward of the Waipaoa River in New Zealand. Part of his research will be a focus of a paper submitted in the next couple months. Kat (who I co-advised with Corbett) studied sedimentation in tributaries of the Neuse River. We hope to get her nice-looking data into a manuscript shortly; it's too good not to publish! Because I cannot review all the exciting activities we've got going on, I encourage you to check out the new web site

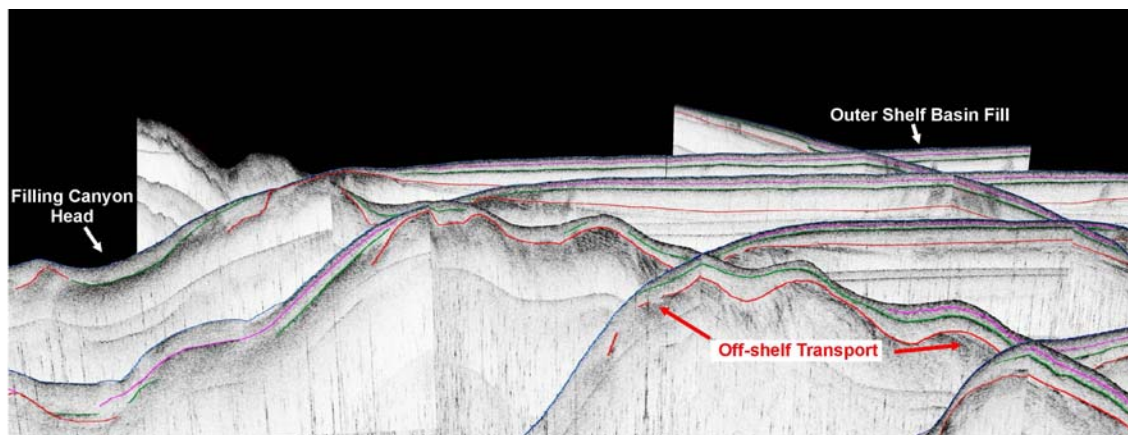
for our Sediment and Solute Transport on Rivers and Margins (SSTORM) research group: www.coastal.geology.ecu.edu. Great progress has been made on several projects as a result of hard work from talented, dedicated students, specifically Reanna Camp, Lisa Cowart, Sophie Dillard, David Lagomasino, Arianna Perkins, and Stephen Sanchagrin. Regarding new activities, David Lagomasino, the newest SSTORMer (see photo below), is examining marsh deposition in the Pamlico Sound. This work is in collaboration with Enrique Reyes (Biology) and is part of the state-funded Renaissance Computing Initiative; it also compliments the on-going studies of Cowart and Dillard. Support from a UNC Competitiveness grant, has enabled us to begin construction on a web site for the communication hazard risks to North Carolinians. The NC Coastal HAZards (NC COHAZ) site is under construction but already inlet-opening potential can be viewed with Google Maps. Check it out: www.coastal.geology.ecu.edu/NCCOHAZ! Of course, I am happy to see students moving onto new endeavors, but they will be sadly missed! I hope we can find some new people to fill their big shoes.

Outside of work, life is great. My wife, daughter and four-legged friend are all doing well. Most of our free time is spent

enjoying time at home, exploring NC or visiting family. I just wish there were more hours in a day so I could work and play more!



Fieldwork on the Pamlico River estuary in late January. Yes, it was *really* cold. Dave Lagomasino holds thin sheet of ice (left). J.P. Walsh attempts to stay warm (right).



A seismic-reflection fence diagram of chirp data which documents recent (Holocene) filling of a submarine canyon head.

Jim Watson

Greetings one and all. It's been an exciting year here at ECU Geological Sciences. John Woods and I have gotten involved in a couple of vibracoring expeditions in search of more Holocene record in Pamlico sound. We've also been busy with our new Geoprobe, helping students and faculty generate many feet of core....most notably Pete Parham, who is trying to unravel the upper Pleistocene. The Geoprobe is giving us the ability to collect cores previously unattainable. Couple this with the new optical luminescence dating techniques and a determined PhD candidate, and we're on the road to a much better understanding of this part of North Carolina's geologic history.

We've also had the opportunity to acquire an new x-ray diffractometer, which should be delivered in a few weeks. There's lots of excitement around the department about the potential of this instrument, which we were able to configure well beyond the basics.

And.....thanks to Pat Mallette (BS 1982, MS 1986) we now have an ECU Geology Alumni weblog set up to help us all keep in touch. I think it's a fantastic opportunity. We welcome contributions of all kinds...from insights from your corner of the geologic world to reports from your extracurricular activities. There are two ways to contribute: you can email your contribution to Pat or myself, or, better yet, you can request a password so that you can post directly. My email address is watsonj@ecu.edu.

Here's the link: <http://ecu-gas.blogspot.com/>

Also, don't forget to keep us updated as to your whereabouts and contact info via our alumni registry:
<http://www.ecu.edu/geology/alumni.html>

Terri Woods

I worked off and on during the summer to get two manuscripts to my co-authors. I succeeded in doing this by early September, but have still not heard back from them. The Reverse Osmosis project I worked on in 2005-2007 is on hold while they are building the new plants. Then we will go into the "post-construction monitoring". I have, therefore, spent most of my time on teaching and outreach in science education. As I did for my Oceanography class, I now have all my Physical Geology lectures in Powerpoint with lots of stuff on my website. Any of you need a quick refresher on a basic geology topic give it a try. Unfortunately, the publisher of the textbook I use came out with a new edition this year so I've had to go back and change all the figures and page numbers on my outlines and study questions. Other than rearranging things they make very few substantive changes so it's not worth it to the students to have to pay for a new book.

My big project has been developing an online course in Physical Geology-with a lab. The UNC-General Administration is making a big push to help improve science education by getting more basic courses on line. Physical geology is required for most of the science teaching degrees so I started working on it last fall. I refused to put the lab all online so we're working on the details of providing the students a kit with rocks, minerals, maps, etc. It's quite a challenge to turn a face-to-face course into an online course. If I didn't have nearly 20 years of lecture notes, study questions, outlines, and exercises already developed, I wouldn't have tried it. The biggest problem though has been the images. Think of the thousands of photographs, charts, diagrams, etc. used in an intro course. Most of mine are from the textbook but since this course cannot be tied to a particular book, I can't use those copyrighted images. I have spent hours on the web finding images that are

available. If any of you have good pictures of neat surface features, please send them along. I have been developing “reading assignments” for each topic that may make a text unnecessary except as a reference - especially considering that less than ~50% of students buy the textbooks.

The department was quite visible at Science Olympiad this year. Grad students ran four events and we had a big map of the world posted on which competitors plotted the locations of volcanoes and earthquakes. I’m hoping that all of you are involved in Science Olympiad in your communities. You would be invaluable to the local middle schools and high schools as coaches for the earth-science events!

The Departmental Spring Bash
and
40th Anniversary Celebration
will be held at the Spruill’s on
Saturday, May 3rd!

Contact the department for directions.
252-328-6360

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