

Department of Geological Sciences

2012 Newsletter

“Budget Crunch Redux!”

The Department of Geological Sciences has survived the budget crunch that I reported on last year even though the cuts got worse. We now run the department on an operating budget which is just one-third of what it was three years ago! Even so, we are doing well. Our student numbers are rising. We now have over 60 majors and over 30 graduate students. As I write, I can report that we have more applications from students wishing to join our graduate program than we have ever had. Grants continue to come into the department to support our research and the annual list of publications continues to impress.

ECU is going through interesting times, because of the budget situation there is a huge effort on campus to determine if monies can be saved by reorganizing the university. Time will tell what the outcome is, but part of the process included an evaluation of the productivity, centrality and quality of all programs on campus. I am happy to report that our BS and MS programs, and the department in general, came out of this assessment very well.

Another exciting development is the nearing completion of the new Coastal Studies Institute building on Roanoke Island. This UNC system facility will provide huge educational, research and outreach opportunities for our faculty and students. Reide Corbett and J.P. Walsh are contributing to CSI's activities in their new roles as Co-Program Heads of the CSI Coastal Processes Program.

The development of the Coastal Water Resources Center within the Institute for Coastal Science and policy continues. Construction of a complex of four new laboratories in the Science and Technology Building is progressing. This will provide a great facility for interdisciplinary research related to all aspects of water resources.

So, another good year, albeit a fiscally challenging one, with many good things to reflect upon and by which we should be encouraged. I look forward to seeing you at the pig picking on the 29th of April!

My very best regards,

Steve Culver

B.S. Graduates 2011

Spring

Robert J. Broda

Wade B. Macdonald

Christopher R. Poythress

Summer

Kathleen M. Coyle

Scott W. Elkins

Emily R. Hylant

Samantha Kofroth

Fall

Sarah E. Hardison

John R. Hill

M.S. Graduates 2011

Spring

Megan E. Ganak

Fall

Annie M. Gerry

Nathan Z. Gwyn

Cynthia D. Muston

Nidhi Patel

Geological Sciences Foundation Accounts F/Y 2010-2011

Contributors to all foundation accounts (including matched contributions)

Christopher Stanton	James E. Gebbie
ExxonMobil	Henry G. Williams (for Mark Williams)
On The Fly Geological Services	Wells J. Barker
Ram Hospitality	Rick & Adrienne Koehler
James Franklin Coble	Michael Stoneman
Michael Wayne Sutton	Robert A. Millie
John David Simpson	Keil A. Schmid
Patricia C. Beaver	Lucy M. Mauger
David Vance	
Heidi Sydow McNeely	
Robert Ross Allen	

Expenditures F/Y 2010-2011 (from all foundation accounts)

ECU Printing & Graphics – newlstter	\$394.32
Sid Mitra-entertain seminar speaker	\$24.25
Ryan Mulligan-entertain seminar speaker	\$27.68
Megan Ganak-student presentation at AAPG	\$547.80
Wendy's Flowers-Mitra baby	\$58.00
Cindy Muston-student presentation to Annual Society Of Vertebrate Paleontology Meeting	\$325.00
Stephen Culver-partial funding to GSA for recruiting	\$273.00
Sigma Gamma Epsilon-Dept. Thanksgiving dinner	\$87.37
Stephen Culver-Dept. Welcome Back Luncheon	\$196.92
Richard Spruill-Dept. Alumni Pig Pickin'	\$139.10
Dare Merritt-Dept. luncheon for fall graduates/holiday	\$27.25
Sid Mitra-entertain seminar speaker	\$28.42

Faculty News

Steve Culver

2011-2012 has been a very full year of graduate student advising. I'm glad I share the load with other faculty members! Cindy Crane-Muston successfully defended her project on the microvertebrates from late Cretaceous strata from the Cape Fear River region. Drew Dietsche is near end of his project on the Holocene history of Core Sound. Kelli Moran, who is investigating the geological development of Currituck Sound during the late Holocene, is writing her thesis. Katrina Rabien is also in the writing phase; her thesis is on the foraminifera of recent hurricane deposits off the Mississippi delta. Ray Tichenor, who is working on slightly older delta sediments and their foraminifera, is progressing well and in the throes of foraminiferal identification. Alisha Ellis and Hanna Thornberg are processing their samples from the Setiu wetland in Malaysia; they are investigating the environmental effects of the local fish-farming industry.

I'm also involved in a new NSF project on the Holocene evolution of the sounds of northeastern North Carolina led by Dave Mallinson. I'll let him tell you about that. Just a week or so ago I heard that another NSF project has been funded; we intend to study Holocene variations in the southeast Asian monsoon. This project grew out of our Setiu wetland work with Malaysian colleagues at the Universiti Malaysia Terengganu. In July we will undertake a coring cruise on UMT's RV 'Discovery', a brand-new, custom build 37 m ship, in the South China Sea off the north coast of Borneo. A team of faculty members (Culver, Mallinson, Corbett, Leorri, Mitra, Walsh from Geological Sciences, with Scott Curtis from Geography) will be using a multiproxy approach to tease climatic signals from the sediments. If successful, this small project might grow into a much larger NSF-funded research program.

And, of course, I administer the department!

Looking forward to seeing you at the pig-picking!

Best regards,

Steve

Terri Woods

I spent way too much time this year working on Graduate Director "stuff". I'm sure Steve Culver will tell you the same thing about his year focusing on administrative matters. The first major time-killer was the Program Prioritization. This was university-wide and involved generating an extensive report on the department and its degree programs in order to justify our existence to ECU. The university is looking into the possibility of eliminating and consolidating departments and degree programs. They intend to use the results of this study to allocate financial and personnel resources in the near future. Immediately on the heels of this came preparation for our Department Program Review, which involves outside and inside reviewers. This evaluation is conducted about every 7 years for each department. It just happened that it was our turn this year. For my part the two reports required collection and description of all kinds of data going back ~10 years on numbers of students applying and admitted, GRE and GPA scores of applicants and active students, number of degrees granted, percent of grads getting geology jobs, grad assistant budgets, etc. Dr. Culver prepared the bulk of the report (137 pages), but needed a lot of supporting data to complete it. Also, this year we have the largest, and probably the best, applicant pool we have had since I've been Grad Director - ~ 38 applications completed or in the works. This large number of applicants, combined with some new funding sources for grad stipends, has made it a much more

complicated process than in past years. Obviously, this latter “problem” is a good one to have. Last fall I also spent more time than usual on teaching Aqueous Geochem (15 students) and Min/Pet I (30 students) because of large class size. This latter is also a good “problem” to have because it reflects the increasing number of students pursuing degrees in geology. With the rapidly expanding job market, we need to graduate as many competent geologists as we can, but we’re having to evaluate how we do things and make some changes to adapt to the increasing numbers. I did squeeze in a little bit of science advising a couple of students working on research projects. Also, I have finally started looking at clay minerals with the XRD, to learn what I need to start looking at sediment samples from a coastal marsh being studied by Dr. Leorri. Finally, last summer I enjoyed presenting a three-day workshop on rocks and minerals to elementary teachers and all year I’ve been working with a group of NC geologists to influence the new NC Standard Course of Study for earth-science instruction to ensure it is scientifically sound.

Eduardo Leorri

Well into the third year here at ECU, the time seems to be flying. On the one hand, it looks like I arrived here yesterday but on the other hand, I feel fully integrated, which is great. In last year’s newsletter I said that I wanted to start working in field areas close to ECU. Well, I am doing that. While the projects I have in Europe keep ongoing, I am involved in Dr. Mallinson’s NSF project. You can see the details in our web site <http://www.ecu.edu/geology/Change/index.html>. So, now I have to “unfortunately” do plenty of field work on our coastal area, really “unpleasant” (see the picture suffering on board of the RV Riggs). Through this project I do have the opportunity to work with two excellent Master’s students: Caitlin Lauback and Jeffrey Minnehan who are working on stable carbon and oxygen isotopes in calcareous foraminifera and the organic chemistry signal, respectively.

During last year, I was also fortunate enough to collaborate with the Department of Biology, and I started working on the Virginia Coastal Reserve. This research site is funded by the Long Term Ecological Research program at NSF. This site is also fairly close to home and the trips up there with the folks from Biology are always very enjoyable.



This new addition to my research is not incompatible with the continuation of the work in the Iberian peninsula. I learnt recently that another project has been funded to continue our research regarding sea-level changes in the Basque Country with Dr. Cearreta (my former PhD advisor). As result of this collaborations, we also had Ane Garcia-Artola (PhD student at the Universidad del País Vasco, Spain) visiting ECU last semester, and she will come back again this semester.

To compensate for the short commute we have now to the fieldwork areas, Dr. Culver's new NSF grant (in which I am also involved) will take us to core materials off shore Malaysia during this summer. As a last note regarding research from last year: I was nominated Scholar of the Center for Natural Hazard Research at ECU which allows me to focus on grant application this semester.

In the teaching area, I had the opportunity of teaching Marine Geology which I totally enjoyed (hopefully the students did too), and next semester I will be teaching Sedimentology. This is a great opportunity to work with our own undergraduates, something I wanted to do since I first arrived here.

In essence, this has been an awesome year, and I just hope next year is as good as this one.

Adriana Heimann

Greetings everybody! I hope you all had a great year 2011 and started an even better 2012. It was a very good and very busy year for me here at ECU. In the teaching aspect, in the Spring I prepared and taught a graduate-level Economic Geology course (lecture and lab) for the first time, which was a lot of work but also a good learning and rewarding experience. This course had not been taught for many years and I had eight students in the class, mostly graduate students and three advanced undergraduate students. The same semester I taught Mineralogy-Petrology II for the second time, this year again with the challenge of finding enough specimens and time to run from one to another in a large group of thirty students. This is what I experienced since I started in the Fall semester of 2009 and it is showing the fast increase in the number of Geology majors at ECU and worldwide. This is good news but also challenging. I again took all the Min-Pet II students, now along with the Economic Geology course, to the Gold Rock quarry where we can see granitoids, diabase dikes, coastal plain sediments, and spheroidal weathering all in the same place. In the Fall semester I taught Dynamic Earth again, only that this time I had two sections of 100 (well, 98!) students each.

In the research front, I have been working on the USGS-funded rare metal pegmatites project and collecting samples of garnet and gahnite in pegmatites from all over the world. This is the topic of Josh Bitner's Masters thesis and he has been finding some interesting results that we presented at the annual Geological Society of America meeting in Minneapolis in October of 2011. There it was nice to meet my old advisor, Paul Spry, and several other colleagues and friends. We will also present new results at the regional SE GSA in Asheville, NC, in April of 2012. We went on various trips related to the pegmatite project. In several occasions, we visited the Smithsonian Institution in Washington, D.C., to perform electron microprobe analysis in conjunction with a colleague there. In addition, we visited the University of Oklahoma to sample pegmatites from David London's extensive and impressive collection. Other electron microprobe sessions went on at Fayetteville State University. At the end of the Spring semester Scott Elkins, who graduated with a BS in Geology from ECU in the summer, finished his Honors thesis for which he worked on the mineral chemistry of garnet- and gahnite-rich rocks from near the giant Broken Hill deposit, Australia. In the Fall of 2011, Fernando Sardi, a collaborator from Argentina who also works on pegmatites arrived at ECU for six and a half months to research some pegmatites from Argentina together. Quite some time was also spent reviewing manuscripts for several journals in the field of Fe isotope

geochemistry, among others, participating in the ECU North Carolina Space Grant steering committee, and advising new undergraduate students who are conducting research with me in Early Earth's studies.

In the personal side, things are becoming a little bit less hectic for me now that Nicolas is 21 months old and does not cry when I leave him at day care, five buildings away from Graham. He is already speaking lots of Spanish and English words and phrases and is a lot of fun to hear him say English words without my accent. We visited family and friends in Uruguay in the summer and we all had a great time there. We also went to the beach for the first time (in the northern summer) with him and he loved it so much we could not get him out of the water, even when he was freezing cold. Last, but not least, he loves rocks already (or so far!) and happily says 'rocas, me encanta' when he sees them!

This is all for this year. I wish you all an excellent 2012, health, love, and prosperity.

Alex Manda

To frac or not to frac?

This past year, I have had multiple encounters with 'fracturing'. First, I fractured a bone in my right hand while playing soccer. Yes, you read that right, while playing soccer. I had to have surgery and was incapacitated for several months. And because I am right handed, this meant that my summer was essentially a wash; I could not do any fieldwork, and could barely type, therefore my research productivity had slowed down to a crawl. I am sure my tenure committee will not be too pleased with that. After undergoing several weeks of physical therapy, I am glad to say that I have retained a good range of motion in my hand and I am almost as good as new. Other than the 3 inch scar on the back of my hand, you would never know that I *fractured* my hand.

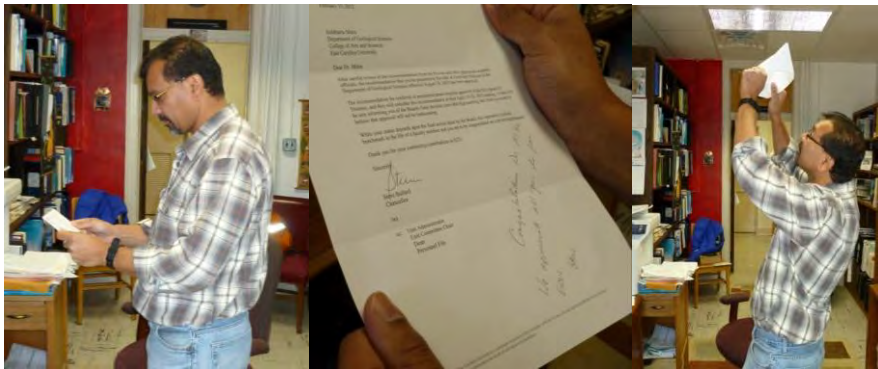
In my research, I am interested in studying fractures in rocks and how these fractures control the groundwater flow regimes in fractured rock aquifers. To understand how fractures control groundwater flow in the Piedmont and Blue Ridge physiographic provinces, I rounded up Jim Watson and several graduate students to assist with running downhole geophysical equipment and pumps. We found that although the distributions of fractures in the Piedmont and Blue Ridge physiographic provinces are significantly different, only 10% of fractures in the subsurface participate in groundwater flow. Furthermore, there is a bounding depth (~120 m below ground) below which fracture occurrence decreases dramatically. This bounding depth suggests that there may be few gains in drilling a well to depths greater than 120 m below ground in the Piedmont and Blue Ridge provinces. The decrease in *fracture* occurrence below the bounding depth is an interesting finding.

The advancement in horizontal drilling and hydraulic fracturing (aka fracking or fracing) techniques has made the development of previously uneconomic gas-rich rocks attractive sources for extraction of natural gas across the United States. In North Carolina, hydraulic fracturing (a technique that involves injecting large quantities of fluids at high pressures into tight rocks to create cracks that release previously trapped natural gas) and horizontal drilling have created an opportunity for the potential exploration and production of natural gas in the Triassic basins that are found in central parts of the state. Preliminary assessments of the geology by the State have revealed that these basins may contain sufficient quantities of natural gas that could be extracted economically. As the State of North Carolina considers studying the effects of potential development of shale gas on the environment, it is crucial to gain an understanding of groundwater resources in the counties that such development might impact. To this end, I have teamed with students and faculty in the Geography Department to

track any developments that will be related to hydraulic *fracturing* and whether these developments may impact groundwater resources in the State.

Sid Mitra

This story starts on a cold gray and snowy day in winter 2006/2007 at which time I was a tenure-track faculty in Geological Sciences at Binghamton University. I don't know if it was the 4 degree F temperature outside, or the 17th day in-a-row of overcast weather but I found myself wondering, 'Isn't there somewhere in the country with better weather and an equally great department where I can do my science??!' It so happened that around that time, I was emailing Reide Corbett about some Be-7 data. I remember asking Reide via email (half jokingly), "hey, are there any positions down there?" I also distinctly remember Reide's reply, "Actually, we have two positions advertised – you should apply". I mention all this because what started off as a half-joking enquiry about faculty positions at ECU has now culminated in tenure at ECU. You read it right – I got THE letter; that would be the letter from the Chancellor stating that I'm officially tenured (see photos below). Chapters of the rest of story continue to be added as exciting collaborations and research opportunities arise. Most importantly, sunny warm days are ahead. Be well.



Left-to-right: Getting the envelope with the Chancellor's letter, reading the Chancellor's letter, looking deep in the envelope for any sign of a raise....

Rick Miller

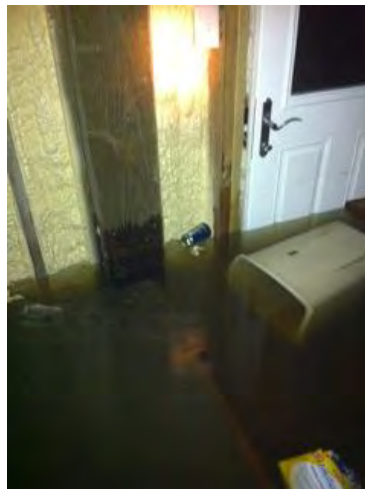
It's been a very busy and eventful year on all fronts. When I last wrote to you, I described how I thought that things were coming together nicely and that I was finally settling in. In large-part that seemed to be true until late in August Hurricane Irene made a visit to North Carolina. As you may recall, I live in Kill Devil Hills, with an apartment in Greenville. Well, following my GEOL1550 lecture on Wednesday I drove home to secure all the things outside, while my wife drove to Greenville to stay in the apartment. Having grown up in Miami and living in coastal Louisiana for 21 years I elected to ride out Irene on the coast. As I expected (hoped) Irene lessened in intensity as it approached North Carolina. But Irene was a very, very, large storm,

that moved oh so slowly and whose path essentially passed over my house. As a consequence, the Sounds near my house felt over 12 hours of winds from the east, thereby building up the water on the western shore, and as the center of the storm passed, the Sound waters felt winds from the west. The result? My house, my entire neighborhood and nearby neighborhoods were flooded by about 3 ft of water. Fortunately my house, and many houses on the Outer Banks, is up on pilings. However items on our ground levels were flooded – mostly ruined at best. But we are all fine and the items that we lost well, I just considered the loss as a type of urban renewal. Afterward the week long cleanup, I decided, being the dedicated educator that I am, to give my students in Introduction to Oceanography a real world timely lesson on hurricanes, seiching, and the dynamics of barrier islands. We would have covered these topics later in the semester but at that time I think that they were particularly interested and seemed to more easily grasp the concepts that we discussed, especially when I was able to show them action movies taken with my iPhone.

Speaking of students, my first MS student Matt Brown decided to take advantage of Hurricane Irene's passage and has conducted some very good work related to the mobilization and transport of terrestrial material through the Neuse River estuarine system resulting from rain events associated with Irene. I am also happy to note that Matt recently received a NASA NC Space Grant Graduate Fellowship in recognition of his proposed thesis research. This semester Chris Buonassissi, my former Research Associate, became a PhD student in the Coastal Resources Management Program here at ECU. I look forward to working with Chris from a different perspective now. I am also happy to tell you about Bradley Moore, a junior at ECU who is pursuing a double major in Biology and Chemistry. Brad joined our team to work on the use of remote sensing for examining the decadal flux of material through the Neuse River system resulting from major rain events. Teaching and interacting with these motivated and talented students is the reason I came to ECU and I'm really enjoying it.

As I mentioned above, I taught GEOL1550 again last fall and I think that I was far more effective in "reaching" more of the students – teaching a large introductory course to mainly non-majors is certainly a challenge, but I work hard to improve each semester. I think that it's paying off. This semester I'm teaching for the first time a graduate course on the remote sensing of coastal environments. It's a great opportunity to help students learn how to use remote sensing in their research. The course is currently listed as a seminar course but should be an official course next spring.

Regarding research activities, I spent a lot of time as many of my colleagues did writing proposals. One funded project was to participate this summer on a NASA-funded multidisciplinary field campaign in the Chesapeake Bay in support of NASA's future GEO-CAPE (Geostationary Coastal and Air Pollution Events) mission. I'll soon start on a local project funded by NC Sea Grant titled "Examining the Source and Transport of Land-derived Material Impacting North Carolina Coastal Waters: An Integrated Approach using Remote Sensing, Fluorescence Spectroscopy and Geochemical Analysis." This work is a collaborative project with UNC-CH with a major focus on continuing my efforts to develop innovative technologies for examining dynamic coastal environments. Four manuscripts were published in 2011 and are available from my personal web site: <http://core.ecu.edu/geology/millerri/home.html>. I spent a lot of time working on my web site this year and I encourage you to check it out. There you will find the



Collecting Sound water in a room on the ground floor of my house during Hurricane Irene.

details of my research, lab activities, course information and opportunities for students – I'm always looking for great students.

I hope that this finds you all well and that you have a healthy and prosperous year. Feel free to contact me – I like to hear from you or, maybe I'll see you the pig pickin'.

Rick

Steve Harper

On the teaching front, my typical teaching duties still include 3 sections of Physical Geology and Environmental Geology each semester and Geomorphology every other year. I also still coordinate the Graduate Students, who teach Geology 1501 labs. I plan to attend National GSA Meeting in Charlotte, NC later this year so hope to run into some of you, who will attend this meeting.

The only new development in my role in the Department is that I am now Director of Undergraduate Advising since January 01, 2012. We now have ~70 Geo majors as compared to ~25 less than 5 years ago. I directly advise 20-25 of our majors and get lots of help from Dr. Walsh, Corbett, Mallinson, and O'Driscoll with the remaining ~50.

I am still the Director of the North Carolina Summer Geology Field Course. I will be teaching the Geology Field Course in New Mexico and Colorado in May and June 2011 for the 14th straight year. For the 2012 field course, our enrollment in the Geology Field Course will be 41 students, the most in many years. Twenty-five of these students will be from our own program here at ECU, indicative of the recent growth in number of Geology Majors in our current program. Currently, the students from other universities hail from UNC- Chapel Hill, UNC-Charlotte, NCSU, Bloomsberg State University, PA, University of Pittsburgh, PA, Georgia Southern University GA, Virginia Tech University, VA, University of New Hampshire, NH, and Texas A&M University, TX. This year after ~2 weeks in Abiquiu and Cochiti-San Ysidro, NM, we will head north for 2 days to the Chaco Canyon National Historic Park and then camp in Durango or Silverton, Colorado. From there we have a 1-day field trip to look at the geology of the San Juan Volcanic Field and the Gold mining history of Silverton, CO. After the Durango-Silverton CO Trip, we will cross the Brazos Mountains on the way to Sipapu-Taos, where we stay for 25 days. After completing the Rio Grande Gorge Slope Stability Exercise and 2 mapping exercises in the Picuris Range, we will take a 2-day field trip to Great Sand Dunes National Park near Mosca, CO and then up to Creede, CO for the second day. After Creede, CO we will return to Sipapu-Taos, NM to complete a Hydro-geology exercise in the Rio Grande del Rancho Drainage Basin. Michael O'Driscoll from the ECU Department of Geological Sciences will be the lead instructor for this exercise.

I will stay with the students in NM and CO for the entire field course but will have Steve Campbell (GMA), Crystal Wilson (App State), Rick Wooten (NC Geologic Survey), John Diemer (UNC-C), and Evan Howell (Southwest Energy Company and formerly from App State) assisting me in addition to Michael O'Driscoll (ECU) and perhaps, Richard Spruill (ECU) too.

Mike O'Driscoll

Greetings from Greenville! I hope you are having a good year. We are doing well here. I was fortunate to be tenured and promoted this past August. I thought things might slow down a bit after tenure, but this past year at ECU has been my busiest yet. On the teaching front, I taught

a few courses on campus and during the summer headed out west to join Steve Harper to teach the hydro component of Field Camp in the Taos, New Mexico area. We were adventurous (or maybe just crazy) this year and took our 5-year old twins out to New Mexico for the field camp experience, they loved it and came back with some great stories for pre-school (they met a dog named peanut butter). In the fall I developed and taught a new undergraduate hydro course (Hydrogeology and the Environment). Thanks to Dr. Spruill we were fortunate to have the R.C. Heath Symposium on Aquifer Management in the Mid-Atlantic States in Greenville this past October. I presented, chaired a session, and brought my undergraduate class along to learn about some of the critical groundwater issues of the region. The students that attended the conference really enjoyed the experience. This spring the graduate students in my Environmental Science course are getting ready to attend the North Carolina Water Resources Research Institute Conference at the end of March, eight of our students will present at the conference. Aside from teaching (and raising twins), most of the past year was spent juggling advising duties (8 graduate and 10 undergraduate students), directing the Hydrogeology and Environmental Geology Certificate program (13 students), serving on the University Environment Committee, submitting proposals, and conducting water resources research.

Our current research efforts are funded by the Centers for Disease Control and Prevention; NC Department of Environment and Natural Resources; Office of the Attorney General for the State of North Carolina; and the North Carolina Water Resources Research Institute. This recent research has mainly focused on characterizing wastewater migration in the subsurface and the effects of urbanization on hydrology in eastern North Carolina. This year has been particularly interesting as the hydrological conditions have been extreme. Eastern North Carolina experienced severe drought conditions in August and then extreme flooding associated with Hurricane Irene. The water quality and groundwater flux data we collected this year have helped us better understand how extreme events affect onsite wastewater treatment and water quality in coastal areas. We hope to present this and some of our other work at the annual Geological Society of America Meeting this November in Charlotte, NC. Dr. Manda and I will chair a special session at the conference focused on advances in hydrology and sustainable water management in coastal environments. If you are interested the abstract submission period will open in April.

I hope your 2012 is off to a great start and that we will cross paths this year. Keep in touch,
M.O.

J.P. Walsh

Wow, what a year! Walt Disney World, the second-to-last Shuttle launch, my youngest daughter learned to walk and talk, and my eldest lost her first tooth. Oh, my research, teaching and service were exciting too, but really, I must admit that it is hard for work to compete with family fun and milestones! However, I'll focus on work here as most of you are probably acquainted with Mickey.

This last year, I continued to teach Oceanography and Coastal Geosciences (largely a CRM Ph.D. course), and am having fun with those classes, as you can see in Figure 1. On the research side, analysis of New Zealand samples continues, and Joey Kiker is currently working on two papers which will be part of his MS thesis. This past summer, we were fortunate to receive funding from NSF for a research expedition to investigate deposition from the 2011 flooding of the Mississippi River (Figure 2). I'll note here that a hearty crew of ECU students helped us collect a ton of samples (Figure 3)! David Young (MS) is now working hard on analysis of the many cores we collected. Also, the research along the NC coast continues. Our efforts to understand estuarine shoreline character and change are being spearheaded by Devon Eulie (CRM PhD), and Ian Conery is investigating storm sedimentary records in back-

barrier locations. This work is being funded by a variety of State sources. Additionally, Ian, Ryan Mulligan (our former faculty member now in Canada) and I investigated surge impacts and processes from Hurricane Irene (Figure 4). Many residents of NC (including myself and others in Greenville!) have a new appreciation for the potential strength of hurricanes. Service continues to be an important part of my job. Some notable activities of the year included: 1) I worked on an NSF Polar Program review panel, 2) I served as the Undergraduate Studies Director through Dec. 2010, 3) I have been the Assistant Chair of the City of Greenville's Bike and Pedestrian Commission, and 4) I poured countless draft beverages for Uptown's Piratefest and Freeboot Fridays.

This next year brings exciting changes as my wife has taken the Business Manager position at the NC Aquarium on Roanoke Island, so we will be relocating to the Outer Banks. I will continue to fulfill my Departmental obligations while also serving as a Program Head (along with Reide) for Coastal Processes, for the Coastal Studies Institute. This is a milestone year for CSI as its new waterfront campus near Manteo will be opened in September. Drop by for a visit!



Figure 1: Teaching on the Tar River. In the Fall of 2010, my Coastal Geoscience students (most CRM Ph.D.) and I paddled on the Tar River to discuss fluvial processes, river gauging and conduct some analyses.



Figure 2: A motley crew prepares for another oceanographic adventure. Shown are the PIs (Kevin Xu (Coastal Carolina Univ.), Sid Mitra, Reide Corbett and me) in front of the R/V Cape Hatteras before heading out on the Gulf of Mexico to study flood deposition from the 2011 Mississippi River flooding. This work was funded by an NSF RAPID grant.



Fig 3. An accomplished scientific crew on the R/V Hatteras. Coastal Carolina and ECU students and faculty stand proudly in front of multicore. ECU student participants included (left to right, mostly front row) Alisha Ellis (MS), Stephanie Balbuena (BS), Jessica Snyder (BS, Biology), Katrina Rabien (back row, MS), Devon Eulie (purple, PhD), David Young (MS), and Ray Tichenor (on end right, MS).

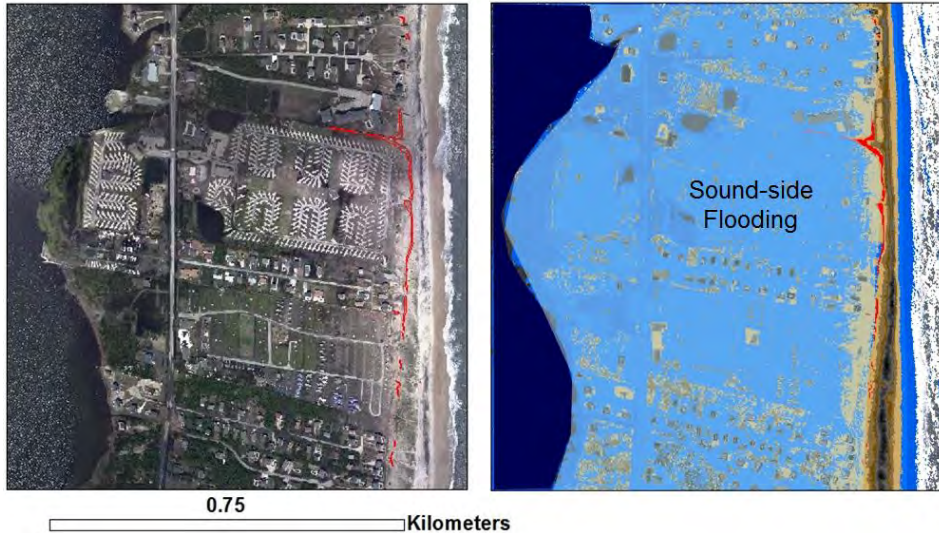


Figure 3: Outer Banks sound-side flooding during Hurricane Irene. Note, wrack line deposition (red area) highlights how most of the barrier island was flooded by surge along Pamlico and Albemarle sounds; only the dune stood above the sea level. These elevated waters caused several island breaches and opened a new inlet through Pea Island which remains open.

Don Neal

Life goes on much as it has since I got to ECU in 1979. Yes, it has been that long and I am that old, but, so are many of my former students!!! I am teaching Physical and Historical geology and Stratigraphy and this past fall I taught Sedimentary Petrology. I am still trying to get it right but I'm not there yet. Maybe next time.

Megan Ganak finished up her thesis on the Blue Monday Sandstone, a gas producer in West Virginia, and took a job with Schlumberger in Houston as a Seismic Data Engineer. Craig Simms is working on the stratigraphy of the Castle Hayne Limestone in the Onslow Quarry near Richlands. This is in an area where the Castle Hayne is thinning and interbedded with marls. Craig will defend this spring. Casey Smith is working on the Rhinestreet Shale, a shale gas reservoir in West Virginia. He will finish this summer come hell or high water as he has been accepted into the Ph.D. program at the University of Tennessee for the fall. My work is cut out for me.

I am still Secretary-Treasurer of the Southeastern Section of GSA which requires only periodic chunks of time lime with the section meeting and grant proposal review and travel proposal review and council meetings and...

So, with all of this going on, I try to keep my head above water. I wish all of you the same satisfaction of having a very full and productive life.

Stan Riggs

Based upon a solid scientific understanding of the origin and evolution of North Carolina's coastal system, a vision is evolving that lays the foundation for implementing a new paradigm framed around the "Land of Water Eco-Region". See Riggs, Ames, Culver, and Mallinson (UNC Press, 2011) for a general discussion of the evolutionary history, present crisis, and vision for the future of North Carolina's coastal system. The new paradigm, based upon dynamic change, is an interdisciplinary based educational program for living with the dynamics of our coastal system. We believe that this approach can lead to a truly sustainable tourism economy based upon the natural and human history and the dynamic coastal resources and processes of NE North Carolina. This first year of the Kenan Institute program has developed the framework for the vision, which will be fleshed out during the second and third years of the program.

The "Land of Water Eco-Region" is not a park, nor does it have boundaries. Rather, it is an over-arching umbrella that incorporates and builds upon all pre-existing programs, resources, and businesses and integrating them under the umbrella of the NE North Carolina coastal system. The common thread is water. This program will start as a grass-roots movement to establish a consortium with the primary goal of coordinating and educating stakeholder groups as to the potential benefits of the "Land of Water Eco-Region" concept. A key focus will be on the public, as well as the stakeholders that control major and pertinent land holdings in NE North Carolina, regional State and Federal politicians, and relevant business organizations.

The role of the "Land of Water Eco-Region" will be to develop a cohesive scientific and sociologic story for the origin and evolution of the NE North Carolina coastal system and its inhabitants in response to the multiple and ongoing forces of climate change. This will promote an understanding of sea-level fluctuations, storm dynamics, and the role of water, all of which control the rapid changes in coastal habitats, ecosystem evolution and migration, shoreline erosion, etc. With cohesive scientific and sociologic stories in place, the eco-region without boundaries will provide the framework for the local communities to supply global eco-tourists with a life-time experience within North Carolina's world class coastal system.

I AM SENDING OUT A PLEA TO OUR ALUMNI FOR ANY PHOTOGRAPHS AND/OR SLIDES FROM OUR MANY ECU GEOLOGY FIELD PROJECTS IN COASTAL SYSTEMS DURING THE 1960S, 1970S, AND 1980S. I PLAN TO PRODUCE A BOOK ABOUT THE EARLY YEARS OF COASTAL WORK AND NEED ADDITIONAL PHOTOS. IF YOU HAVE SOME TO SHARE, PLEASE SEND THEM ON. WE WILL SCAN THEM AND RETURN THE ORIGINALS TO YOU.

Thanks and come back for a visit to your dynamic and world-class northeastern NC "Land of Water"—it is no longer the way it was when you were a student here at ECU. Change is the only constant in our dynamic coastal system!

Dave Mallinson

It's been a year of travel, research and teaching new classes for me. Last February I was in Tokyo, just before the earthquake and tsunami. Everyone that I know there survived it, fortunately. The summer took me to Malaysia for some work in the Setiu wetland area (northeast coast of mainland Malaysia). I collected side-scan data to map the bottom of the estuary, while Dr. Culver and a graduate student, Alicia Ellis, collected many core samples to analyze the forams, sedimentology, and geochemical parameters. We recently received NSF funding to continue our work there, or more specifically on the Sunda Shelf off of Borneo, to look at monsoonal variation. A research cruise will be forthcoming this summer. Shortly after Malaysia, I went to Barcelona and Zaragoza Spain for a meeting of the International Association of Sedimentologists. I'm looking forward to returning to Spain this summer for another meeting there, as well as a meeting in Austria.

Other research work has included more seismic data collection on the Pamlico Sound and Currituck Sound, and the collection of some cores in Pamlico Sound, along with Dr. Leorri's Marine Geology class. Getting the students out in the field for hands-on work is the order of the day! Over the summer, we also received a substantial NSF grant to do more work in the Pamlico, to understand the evolution and hydrodynamic changes that occurred during the Holocene. So, that was good news, and will keep us busy for the next few years. That grant includes Drs. Culver, Leorri, Mitra, and Mulligan (who is back in Canada now), and graduate students Kelli Moran, Caitlin Lauback and Jeff Minnehan. We're planning a two-week field work session out there in May. You can check out the project on our new website (created by Dr. Leorri) <http://www.ecu.edu/geology/CHaNGE/index.html>

During the spring semester of last year I introduced a new course "Advanced Stratigraphic Analysis" which went well, and got graduate students in the field collecting and analyzing cores and seismic data. This semester had me teaching yet another new course, "Climate Change: A Geological Perspective". This course allows me to become more acquainted with many of the undergraduates in the department.

Everyone is doing well on the home front with Lisa still working as an RN at Lenoir Memorial Hospital; Katie (14) doing great things at D.H. Conley; Sophie (11) in her last year at Wintergreen Intermediate (also doing great!); and David (8) enjoying Wintergreen Primary.

I hope to see some of you at the pig pickin'!



Early morning preparations for surveying work on the Pamlico Sound aboard the R/V Riggs.



Bringing a vibracore aboard. R/V Riggs, Currituck Sound, NC

Reide Corbett

The last year was full of changes...that goes without saying. Through efforts of our own and certainly with the help of many friends and family, the Corbett's are doing well and have had a good year...personally and professionally. I hope we will have the opportunity at the pig pickn' to catch up a bit more.

This year has been filled with some new and exciting responsibilities. ECU saw some major changes in personnel in the Office of Dive and Water Safety. As part of the transition to a new Director and Dive Safety Officer, I took on an "advisory" role to the office to help keep things moving smoothly and help develop a plan for the future. I enjoyed interacting with that office and think the new staff are doing a great job. In January of this year, JP and I took on an additional role as Co-Program Heads for the Coastal Processes Program and the UNC Coastal Studies Institute (CSI) located on Roanoke Island (check it out here: <http://csi.northcarolina.edu/>). It is a great opportunity for us, our department, and ECU. It is our hope that CSI will become a hub for coastal research and education.

Even with these new responsibilities, I have continued to keep an active research group, in collaboration with many here in Geology. We completed our last research cruise in New Zealand, started some new research in the Gulf of Mexico related to the recent Mississippi flood, and continue research in the area of sea level rise and shoreline change in North Carolina. The next year will be as busy with continued work on the projects just listed, as well as some possible work in the far south! I am keeping my fingers crossed, but all arrows are current pointing toward the Antarctic continent in January, 2013...stay tuned!

Between the long days in the office, I have been spending as much time with my boys as possible. Ian, now 12 y, is growing up fast and getting big! He is playing lacrosse...a great way to get exercise AND check someone. I have been coaching Noah's (9 y) soccer team the last several seasons. That has been fun...mostly. I am too competitive for my own good. We spent some time getting out of Greenville this year as well...getting to the beach as often as possible (trying to get them interested in surfing), a short hiking/camping trip, FSU football game, Christmas in Maine, as well as some other day-long excursions. It keeps us busy...

Hope your year has been as exciting...looking forward to catching up soon!



Reide and JP

Eric Horsman

It has been another busy year.

My first M.S. student, Nate Gwyn, successfully defended his thesis during the Fall semester. Nate studied the construction of igneous intrusions in the shallow crust and focused on exposures in the beautiful and remote Henry Mountains of southern Utah. After his defense, Nate got straight to work looking for a job and was hired within a few weeks. He now works for Nomac Services, a part of Chesapeake Energy, and is based in western Oklahoma.

I have four other M.S. students working with me.

Emmett Keeler is working on rocks from the Adirondack Mountains of New York. Emmett is describing the architecture of a major mid-crustal shear zone using a variety of different techniques. His work will help us better understand how faults operate in the deep parts of the continental crust.

Ryan Poythress is studying a recently discovered Triassic basin buried beneath the North Carolina coastal plain about an hour north of Greenville. Ryan is characterizing the geometry of the covered basin using a detailed gravity survey of the region. He is also going to conduct detailed analyses of core samples held by the NC Geological Survey. By studying the geometry and history of this newly discovered basin, Ryan will advance our understanding of the Mesozoic history of eastern North America and, more generally, how continental extension is manifested in the rock record.

Finally, Robbie Broda and Mitch Ward are both working in the Henry Mountains of southern Utah, continuing and expanding Nate Gwyn's work. They are working on separate large laccoliths, each of which was constructed through injection of multiple pulses of magma. By combining many datasets they are deciphering the growth history of these shallow crustal bodies. Their results will provide insight into how magma systems operate under volcanoes, geothermal fields, etc.

I also have an undergraduate student, Erik Thornton, doing a senior research project with me. Erik is studying the Gupton pluton, an Alleghanian-age granitic body located NE of Raleigh. The primary goal of Erik's project is to study how the Gupton pluton was constructed and its association with regional ductile shear zones. He will present his results at the upcoming GSA Southeastern Section meeting in Asheville.

In teaching-related news, I have now gone through two or three iterations each of the long field trips for the Field Methods and Structural Geology courses. Each Fall, the Field Methods class heads up to Hot Springs, NC, for two and a half days of field work. In the Spring, the Structural Geology class heads up to Boone, NC, for two days of looking at nicely deformed rocks in the Blue Ridge and Valley & Ridge provinces of the Appalachians. Both of these field trips are evolving over time as I learn more about the areas.

In other teaching news, I have been working to improve spatial thinking skills for undergraduate students in the Field Methods and Structural Geology courses. In addition to providing students with frequent, focused practice using these skills, I have been developing and building 3-d visualization aids. One nice example of these aids is a set of 3-d stereonet bowls that allow students to more easily see the relationships between 3-d features and their 2-d representations. Students have started to use these visualization aids in the courses I teach and they seem to be helping. I am now starting to collect data to rigorously test the effectiveness of the 3-d aids.

Finally, I'll note that my wife, Beth Thompson, continues to work toward tenure in the Biology department here at ECU. Our son, Elias, is two and half years old now. While I still think of him as a little boy, he considers himself to be (depending on the day) a dragon, a race car, or a rocket drill.

Pig Pickin

The spring departmental pig pickin
will be held at the Spruill's on

Sunday, April 29

Contact the department if you need
directions.

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