

Department of Geological Sciences

2013 Newsletter

Leaner but bigger!

Our small operating budget may still mean we're lean but our number of majors, now in the mid 70s, illustrates the continuing growth of the Geological Sciences student body. The number of graduate students has also grown over the last few years, but at a more manageable pace. So we are very healthy and, if nothing important breaks, we will continue to get our students in the field and to conferences.

The big discussion on campus this year is how coastal research at ECU should be reconfigured to reap the full benefits of the collaborative, interdisciplinary research and education that we strongly support. We shall hear the details soon, but it is clear that the Institute for Coastal Science and Policy, where Reide Corbett, Alex Manda, Rick Miller and J.P. Walsh hold joint appointments, will no longer be in the Division of Research and Graduate Studies.

"Hard rock" geology has been undergoing a resurgence over the last few years. Several new graduate students joined Adriana Heimann and Eric Horsman last year and many of the many applicants to our Master's program this spring have indicated that interest is continuing. Mineralogy and structural geology are clearly in good hands after the retirement of Richard Mauger and Dave Lawrence.

Sid Mitra deserves our congratulations for his promotion to Associate Professor last year and Dave Mallinson for his promotion to Professor effective July 2013. Mike O'Driscoll has succeeded Richard Spruill as the Director of the Coastal Water Resources Center and Catherine Rigsby continues her excellent service as the Chair of the Faculty Assembly for the entire University of North Carolina system.

Finishing on another high note, I am happy to announce the Department's first graduate student scholarship thanks to a generous donation by Nancy and John Bray, long-time supporters of science education in the Greenville region. Equally as important is the move by several alumni of our graduate program to donate monthly to the Department's Foundation accounts through credit card automatic debit. This is a very encouraging development and one that is sincerely appreciated as it will help us to continue our commitment to fieldwork for undergraduate students and scientific conference attendance by our graduate students. Just call me (252 328 6010) or email me (culvers@ecu.edu) if you want to learn more about automatic donations. No donation is too small and, of course, no donation is too big!

See you at the pig-picking on April 28th!

My very best regards,

Steve Culver

BS Graduates

Spring 2012

Caitlin Casar—Magna Cum
Laude
Nicholas DeSimone
Dustin Deloatch
Christopher Ellmann
Cameron Griffin
Megan Javonovich
Sahra Rahili
Katie Tabor

Summer 2012

Emily Ayscue
Michael Barbour
Beau Benfield
Erik Thornton

Fall 2012

Cory Buie
Jared Crenshaw
Matthew Mellis
James Pitt

MS Graduates

Spring 2012

Alex Culpepper
Quantitative comparison of 2D porosity and pore
geometry between the upper Castle Hayne aquifer,
North Carolina, and the Biscayne aquifer, Florida,
using image and geospatial analysis Advised by Alex
Manda

Summer 2012

Joseph Kiker
Spatial and Temporal Variability in Surficial Seabed
Character, Waipaoa River Margin, New Zealand
Advised by Reide Corbett and JP Walsh

Fall 2012

Keaton Henry
Occurrence of Escherichia coli (E coli) and
Enterococcus in shallow groundwater adjacent to
onsite wastewater treatment systems in Washington,
North Carolina
Advised by Mike O'Driscoll

Cassandra Horton
Soil color as an indicator of urban riparian drought
Advised by Mike O'Driscoll

Kelli Moran
Late Holocene evolution of Currituck sound, North
Carolina, USA: Environmental change driven by sea-
level rise, storms and barrier island morphology
Advised by Dave Mallinson and Steve Culver

Katrina Rabien
The foraminiferal signature of recent Gulf of Mexico
hurricanes Advised by Steve Culver

Craig Simms
Geology of the Castle Hayne Limestone in the Onslow
Quarry, Richlands, NC
Advised by Don Neal

Casey Smith
The Devonian West Falls Formation, implications of
sedimentation controlled by preexisting structures,
West Virginia
Advised by Don Neal

Pig Pickin'

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

Sunday, April 28

Contact the department if you need
directions.

POST-HURRICANE SANDY AUTOPSY

Stanley R. Riggs

Climate change, sea-level rise, and storm dynamics are fundamental and critical issues that our various scientific professions and societies must deal with now. The status quo of unlimited growth and development without a solid scientific basis doesn't work anymore for America's valuable and vulnerable coastal system.

Coastal systems breathe and evolve much like living organisms. The coast is an incredibly high energy, inter-dependent, and complex geomorphic system that changes on time-scales ranging from hours to decades and centuries, unlike most geologic landscapes. Change is the only constant in this dynamic zone where the ocean and atmosphere intersect the land; this zone cannot and should not be engineered to withstand the long-term forces of change.

This past fall, the northeast Atlantic coast was slammed by Hurricane Sandy with a monstrous human and economic impact to the region. Society must begin to live with this dynamic system of change if we hope to maintain a viable coastal economy and preserve a healthy resource base, upon which that economy is based. However, in order to accomplish a sustainable coastal system, we need to develop an entirely new vision with viable alternatives from what we have done in the past—Hurricane Sandy sent a tragic, but clear message.

The scientific professions must now stand up and be heard. We must speak about the science of climate change, sea-level rise, and coastal dynamics, as well as other crucial resources (e.g., energy, water, minerals, etc.) and hazards (e.g., storms, earthquakes, floods, droughts, etc.). Earth scientists have an important obligation to help make our scientific understanding more relevant to politicians and more available to the public. We need a well educated population in order to prevent political actions that attempt to outlaw sea-level rise. Furthermore, we need to encourage development of new coastal paradigms that allow us to live with the dynamics of coastal change resulting from future storms like Hurricane Sandy.

Stephen J. Culver

As noted in my introductory remarks, the number of Geology majors has increased considerably over the past few years. I'm currently teaching my largest ever Introduction to Paleontology class. The increased numbers mean there are logistical issues with enough specimens to go around, but it is a good problem to have. Master's students are keeping me busy also. Two of them, Katrina Rabien and Kelli Moran (jointly advised by Dave Mallinson), graduated at the end of the fall semester. Katrina is working for an oil company in Texas and Kelli has joined the Coastal Resources Management PhD program at ECU. During the current semester I expect three more students to finish. Alisha Ellis, Hanna Thornberg and Ray Tichenor will all be looking for employment, so please let me know if you are looking for some good people to hire.

All of these departing graduate students will leave me with just one (Anna Lee Woodson) to advise, although there may be a new student joining me in the fall. Anna Lee and I visited Ipoh, Malaysia, in early January to sample some cores taken from the South China Sea off the coast of Sarawak. These samples will be the source of micropaleontological, sedimentological and geochemical data that will allow us (hopefully) to reconstruct variations in strength of the SE Asian monsoon over the last several thousand years. This NSF funded project is part of collaboration between several ECU faculty members in Geological Sciences and Geography with colleagues at Universiti Malaysia Terengganu and the Minerals and Geoscience Department of Malaysia. Our visit to Malaysia was very enjoyable – lots of excellent food and beautiful tower karst scenery. Our trip home, however, was nightmarishly long – 60 hours – in large part because Anna Lee became ill on route from Kuala Lumpur to Hong Kong. Her overnight stay in a Hong Kong hospital will provide her with a good story for years to come! Dave Mallinson, Anna Lee and I hope to return to Universiti Malaysia Terengganu again in June to work with colleagues there, including our former ECU student, Pete Parham, who now works for the Institute of Oceanography at UMT as a geologist. It's a small world – even if it takes 60 hours to get home!

Eduardo Leorri

And again, another year is gone! This last year, Ane Garcia-Artola came to visit for a second time. During her visit, she did some work but she also visited the Outerbanks thanks to Dr Culver's field trip that included some top researchers (that is the cue to say that I was not there). Now she is in the process of writing her PhD dissertation. Let's wish her the best of luck and patience. But Ane was not the only one coming to visit. My friend (and also colleague) Dr. Irabien, Professor at the University of the Basque Country (Spain), also visited us for just two weeks. We worked on a new paper that hopefully will be well accepted (fingers crossed). We also explored some of the NC cuisine. She actually came here to pay back a visit I made to the Basque Country during last summer, when I told her about the nice things we have around here. During my trip to Spain I discussed the ongoing research with my colleagues but also did some fieldwork. This was a very exciting time. The weather was great, the scenery (see picture below) was awesome and plenty of food.

We also had some news regarding students. Kelli Moran will stay for a little bit longer after getting her Master's degree. Kelli decided to sign up for a PhD in the CRM program. Those are great news. Nick Zarembo joined our CHAnGE project. Joao Moreno, a friend and colleague decided also to get his PhD in Portugal, at the University of Lisbon and I will be working with him as well. He got a national fellowship that will fund his salary over the next few years. So you will be hearing about them in the near future.

Regarding my teaching, I have been teaching GEOL 1500, which is nice, but last semester I had a great time teaching Sedimentology to Geology majors for the first time here at ECU. I hope they do not hate me still. I think it was a great class and I really enjoyed teaching it. Slightly too much work, they might say. I have to agree with them.

Some additional news, I got an Award from the Geological Society of America which was pretty nice, mostly because there were plenty of people from ECU (including students) at the reception when I got it. I was overshadowed by the brighter recognition that Dr. Culver received and the open bar, but still very nice. In the research area, well, for that you can visit my website. There you can find all the fancy stuff we are doing. Really interesting stuff is happening in collaboration with many of the colleagues here at ECU.



View of Oyambre, with the beach and snow in the nearby hills. North of Spain.

Dave Mallinson

It's been a busy year for me with travels to Spain, Austria, and Malaysia for various scientific panel meetings and research (tough work, but someone has to do it!), and continued work in the Pamlico Sound with NSF funding. Our NSF project (CHaNGE – Coastal Hydrodynamics and Natural Geological Evolution; with Drs. Culver, Leorri, Mitra and Mulligan) is making great progress in understanding the evolution of the Holocene system in the sound, with the great help of top-notch graduate students. Jeff Minnehan is rapidly progressing with defining the organic geochemical changes within the sediments, and relating them to regional climate patterns and processes. Caitlin Lauback is working up the carbon and oxygen isotopic signatures of forams to understanding changes in water characteristics, also related to climate and processes within the sound and changes to the Outer Banks. Nick Zaremba just began last semester, but is making good progress in working up the overall seismic, litho- and chrono-stratigraphic framework to develop paleobathymetric models with which we can model past circulation changes. Kelli Moran defended her thesis last semester (doing a geologic/paleoenvironmental/modeling study of Currituck Sound), and is continuing on in the Coastal Resources Management program to get her PhD. Finally, one of our undergraduate assistants, Caroline Smith, has decided to take

us up on an offer to do research with us, so she'll be joining the project as a graduate student in the fall. Another project I'm involved in is a collaboration with some Canadian researchers to understand the age and geology, and sea level, tectonic and isostatic implications of paleoshorelines in Georgia. I'm also continuing to work on a project in Malaysia with NSF funds (with Drs. Culver and Corbett and collaborators at the Universiti Malaysia – Terengganu), to look at the Holocene record of the monsoon in the South China Sea, the development of the coastal system in northeast Malaysia, and the impact of fish-farms on lagoons. Alisha Ellis is about to defend her thesis related to this project, and Hanna Thornberg and Anna Lee Woodson are hard at work on this as well. One more project we have going (with Drs. O'Driscoll and Humphries) is using ground-penetrating radar and resistivity to map water discharge from septic systems. This could be a very important technique for groundwater contaminant monitoring in the future. Matt Smith is finishing up his thesis on this, and Sarah Hardison is nearly there as well. On the home front, everyone remains healthy and in good spirits. Lisa continues to work as an RN at Lenoir Memorial Hospital in Kinston. Katie, Sophie, and David are 15, 12 and 9, respectively, and are all excelling in school and doing the standard kid stuff (swim team, volleyball, girl scouts, drivers ed, etc.) that keeps us running constantly. I'm looking forward to some down-time (hopefully) this summer to catch my breath.

Steve Harper

On the teaching front, my typical teaching duties still include 2 sections of Geology 1500, Physical Geology/Dynamic Earth and 1 section of Geology 1700, Environmental Geology, each semester and Geology 3250/51, Introduction to Geomorphology every other year. I also still coordinate the Graduate Students, who teach Geology 1501 labs. I plan to attend National GSA Meeting in Denver, CO, later this year so hope to run into some of you who will attend this meeting.

I am now in my second year as Director of Undergraduate Studies/Advising since January 01, 2012. We now have ~75-80 Geo majors as compared to ~25 less than 5 years ago. I directly advise ~45 of our majors and get some help from Drs. Walsh, Corbett, and O'Driscoll with the remaining ~35.

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 2013 for the 15th straight year. This is the 49th edition of this course going back to 1965. Hence, next year we plan to have a 50th Anniversary Geology Field Course Reunion in NM/CO. For the 2013 field course, our enrollment in the Geology Field Course will be 44 students, the most in many years. Nineteen 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, App State, Guilford College, Bloomsberg State University, PA, University of Pittsburgh, PA, Temple University, PA, James Madison University, VA, Virginia Tech, VA, Grand Valley State University, MI, Middle Tennessee University, TN, Mississippi State University, MS, Eastern New Mexico University, NM, and Washington State University, WA. This year after ~2 weeks in Abiquiu and Cochiti-San Ysidro, NM, we will head north to Sipapu-Taos, where we stay for 13 days. After completing the Hydro-geology exercise in the Rio Grande del Rancho Drainage Basin, we will do the long enduring Copper Hill/Rattlesnake Gulch mapping exercise. 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 and a Silver Mine Tour. From Creede, CO, we will head over to Durango, CO, for the last 12 days of the 2013 Geology Field Course. In the Durango area, we will be doing two mapping exercises in the high country in Proterozoic and Lower Paleozoic rocks as well as a side trip to Silverton, CO, for one day.

Dr. Eric Horsman and Dr. Michael O'Driscoll from the ECU Department of Geological Sciences will be helping out with the GFC instruction this year as well as faculty from UNC-C (John Diemer), Grand Valley State University (Ginny Peterson), GMA (Steve Campbell), Noble Energy (Evan Howell), and University of Nevada-Reno (Sabina Kraushaar).

Richard Miller

We all say it – “wow, has it really been another year already?” To me, that’s how I feel now as I write my contribution to the newsletter. I’ve tried to recall all the events of the last year and it’s hard to remember what I actually did. I guess time truly does fly when you’re having fun or you become dazed and confused when you’re

busy – or perhaps it’s a combination of the two. That said, here’s my best recollection...

This year I made a conscious decision to focus most of my time and resources to becoming a better educator. After all, that was the primary reason as to why I came to ECU. To that end, I concentrated on improving the content, particularly the slides and demonstration materials, of my GEOL1550 Introduction to Oceanography lectures and GEOL6950 Data Analysis. These changes were based on my review of what was effective teaching these courses, and what was not effective, over the past few years. Again, this is hard work and extremely time consuming, but I hope that in the long run will be worth the effort. In addition to teaching my “regular” courses, I taught “Remote Sensing of Coastal Environments” for the first time during Spring 2012. Taught as a seminar course this time, I’m happy to report that the university has approved the course as a formally listed course in Geological Sciences. Beyond teaching, I have also targeted a lot of time to mentoring students and recruiting new students (shameless plug here: please direct good students to our department). Matt Brown is working feverously to finish his thesis and defend this semester. He’s done some great work and I expect that you’ll hear about him in the future. Matt is my first student at ECU and it’ll be both rewarding and sad to see him move on.

Things have also been busy regarding research. I continue to try to develop a program of research in North Carolina as well as nationally and internationally. In North Carolina, we completed our first year of a project sponsored 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.” In this project, we’re sampling nine stations along the Tar and Neuse Rivers and making bio-optical and chemical measurements – stay tuned on this. Another local project is an expansion of my collaboration with Dr. Robert Reed of the North Carolina State University’s Center for Applied Aquatic Ecology. For this project we’ve teamed with a colleague Dr. Cheng-Chien Liu in Taiwan to obtain high-resolution multi-spectra images of the Falls Lake reservoir near Raleigh, NC. The focus of this project is to develop a processing workflow for the use of Formosat-2 RSI (Remote Sensing Instrument) data that would provide an effective monitoring strategy

for the quantity and quality of freshwater of the Falls Lake reservoir. This project is a marriage of exciting science, technology development and applications. Of course research also denotes writing proposals and I've been busy in that endeavor too. Fortunately, I was recently selected to receive funding from NASA for two projects: one project deals with an analysis on in-water data collected in 2012 as part of NASA's Chesapeake Bay cruises to support the future GEO-CAPE geostationary satellite for coastal applications and the other project is a 3-year effort to examine dissolved carbon transport from major river systems. This project involves two years of sampling off the Mississippi River plume. And then there is a major 5-year NSF proposal recently submitted. This project involves a multidisciplinary team from ECU, UNC, Duke, Boston College and VIMS to examine floodplain processes on the Tar and Roanoke Rivers---Roanoke Rivers - Please keep your fingers crossed.

Well, until next year.

I wish you all peace and prosperity.

Sid Mitra



That about sums it up! I could go on-and-on about all that has, or more appropriately hasn't been accomplished over the last year. However, I will take this time to highlight a new and unique course I've developed and I'm presently teaching to our majors entitled *Environmental Forensics*. Several of our students (perhaps some of you reading this) are employed as environmental consultants. There are also those of you that are employed in the petroleum field. Both disciplines require some knowledge of the

behavior of organic substances in the environment, whether we are talking about oil or hydrocarbon pollution.....at some point, you just can't keep calling natural and synthetic organic materials "stuff"!

The students in *Environmental Forensics* are developing basic skills about organic molecules and how they behave in the environment. What is particularly interesting about the class is that the students are learning the skills associated with "fingerprinting" environmental pollution. On a practical level, they'll put that skill to use by trying to fingerprint the remains of the old Town Commons spill. By the way, you can still get a whiff of that little bit of history by crossing First Street going northbound to get over towards the boat ramp on the Tar. The students, who are an extremely engaging bunch, are making a vital local connection and learning that there is more to downtown Greenville than just eating and drinking. We even have guest speakers from NC DENR, the City of Greenville, and an environmental lawyer.

The grad students (shown below) are getting ready to fly the coop. Kim Scalise, having worked on air quality associated with the R/V *Deepwater Horizon* oil spill going on 3y now, promises me she will defend this semester. Recently married Katie Supler, (now Katie DelRosario) who is investigating pharmaceutical and personal care products in shallow septic systems, has started writing and is not far behind in finishing up. She'll be looking for a job in the triangle area. Also finishing soon, if he survives the grueling lab work dealing with hydrofluoric acid, is Jeff Minnehan. Jeff is investigating the historical patterns of climate and black carbon burial in Pamlico Sound. Lastly, I've been sucked into a new project investigating the highly contentious field of potential meteorite impacts associated with the Younger Dryas Stadial. My new student Abigail Maiorana-Boutilier, is feverishly trying to juggle that project, along with the joys of first time motherhood, life as an undergraduate chemistry major, and part time work as a hostess at Starlite Cafe. Busy days indeed.....



Terri Woods

This year I started turning some of the Graduate Program Director duties over to other people. I won't be around forever so other faculty need to learn the "ins and outs" of the job. Also, we recognized that it is too big a job for just one person. Therefore, faculty have begun advising their own students instead of the GPD advising them all each semester. Dr. Mallinson has taken over some of the duties related to continuing students. Dr. Mitra has taken over assessment activities. With Michele's help I still work on recruiting and bringing in new graduate students as well as helping everyone else with their parts of the job. I've had some time to do a little research with Dr. Leorri on one of his cores from Spain. I ran X-ray diffraction of samples from various depths looking for changes in mineralogy that might relate to changes in other parameters and sea level. We're stalled in that work right now because the XRD tube went bad and needs to be replaced. Also, we will have to do much more extensive sample preparation if we want to extract quantitative information on mineral abundances. For the first time in years I am teaching a new course. Our required course GEOL 2000 - Quantitative Methods in the Geological Sciences - went on line this semester. I am the first one to teach it so I've been spending lots of time generating reading assignments, powerpoints, homeworks, tests etc. on a wide variety of topics including: significant figures, powers of ten, logs/exponents, unit conversions, math of mineral chemistry, math of maps, using EXCEL, using algebra to analyze geological processes, etc. I am still preparing units on advanced

graphing, statistics, trigonometry, etc. It's been quite a challenge thinking like a math instructor rather than a geology instructor.

Alex Manda

Montana: The land of the shining mountains and other insidious things

Last summer I was fortunate enough to participate in a National Science Foundation sponsored "Teaching Environmental Geology" workshop that was held at Montana State University in Bozeman, Montana. Before leaving for Bozeman, I went online to look up interesting things about Montana. So, I did what I tell my students not to do; I went to Wikipedia to find out as much information as I could about the state I was about to visit.

Among other things, I found that Montana has several slogans, "Land of the Shining Mountains", "Big Sky Country", "The Treasure State", and "The Last Best Place".

"Wow!" I thought, "I cannot wait to go there!"

The workshop in Bozeman was geared towards assisting instructors of Environmental Geology explore various techniques of teaching the course to undergraduate students. So, when I and 30 other participants got to Bozeman, one of the things we did was to go on several field trips to get ideas about how we could use local environmental problems to improve the effectiveness of delivering the content in our courses. The views of the mountains around Bozeman were simply breathtaking. From the campus of Montana State University, it seemed as though Bozeman was surrounded by peaks in whichever direction you looked. So, tranquil, soothing, and peaceful. Unbeknownst to us, was that in the midst of such beauty lay an insidious cocktail of cancer causing chemicals lurking beneath the ground. A Superfund Site! In fact, there are two superfund sites in the city of Bozeman. Our discussion that day centered on how we could effectively teach about "invisible poisons". Another day, we drove to the city of Butte which has relied on the mineral treasures of the earth for economic growth and development. Copper and Molybdenum are currently being extracted using the open pit method from the Continental Pit. Adjacent to the Continental pit is the Berkeley Pit. The Berkeley pit, which is part of one of the largest contaminated sites in the US, is a former copper mine that is now filling with toxic water and dangerous chemicals. Another Superfund Site! Water seeping into the pit will be allowed to fill

the pit to a critical threshold level. After this level is reached, water will perpetually be pumped out of the pit to prevent the toxic chemicals in the pit from contaminating the groundwater surrounding the pit. I guess the slogan "Last Best Place" is all about perspective. These experiences highlighted the importance of teaching Environmental Geology to undergraduate students, particularly those students that may not necessarily consider careers in Geology. My hope is that as I apply the tools that I learned at the workshop, students will not only have enriching experiences in my course, but that they would also be well equipped to appreciate the consequences of human actions on the natural environment.



Standing in front of the Palisades Falls near Bozeman, Montana. The Falls drop 80 feet over a basaltic rock unit that displays spectacular columnar jointing.



Photo of Continental open pit where active copper mining is occurring, the Berkeley Pit which is filling with a billion gallons of contaminated water, and the city of Butte which derives its water from an aquifer that is threatened by contaminated water from Berkeley pit.

Mike O'Driscoll

Greetings from Greenville! I hope you are having a good year. First, I must congratulate Keaton Henry and Cassandra Horton for graduating this year! This past year has been an eventful one at ECU; we have been juggling several large groundwater research projects. We had big showings at the national GSA meeting in Charlotte, the NC Onsite Water Protection Conference in Hickory and the NC WRRRI conference in Raleigh. I have been keeping busy with the Coastal Water Resources Center and moving in to its new lab in the Science and Technology Building. In May I'll be off to New Mexico for field camp. Enough about me. I hope your 2013 is off to a great start and that we will cross paths this year. Take care,

JP Walsh

January of 2012, I took on a new role as the Interim Co-Program Head for Coastal Processes at the UNC Coastal Studies Institute (CSI), and after teaching Oceanography in last spring, my family and I moved to the Outer Banks. Moving was awful, but we found some time to enjoy life near the beach during the summer. Last fall and this spring have been overwhelming, with much research, teaching and service activity

along with a lot of new additional work with CSI. The new CSI campus opened this January (Fig. 1). Come visit! Thankfully, several great students are helping our lab group with many different research projects. Ian Conery and David Young are 2nd year Geology MS students working on sedimentation projection in coastal North Carolina and the Mississippi shelf, respectively.



Figure 1. The new UNC Coastal Studies Institute campus on Roanoke Island. Upper photo is an aerial view looking northeast. Research and Education Building situated on Croatan Sound is shown in the lower photo. The campus officially opened in January 2013.

Devon Eulie, CRM PhD student, continues her research on estuarine shoreline and sedimentation processes in the Albemarle-Pamlico estuarine system, and she recently got her first paper accepted! David Hawkins and Jared Crenshaw, who both just started in their Geology MS, recently returned from Antarctica; David will examine coastal morphological characteristics and changes in North Carolina while Jared is working on Reide's NSF project measuring submarine groundwater discharge from Antarctica. Finally, we recently hired a post-doc, Brad Pickens, who has a PhD in

Biology and is helping us analyze properties of the NC coast for a couple projects.

Personally, life is great. My wife, two children and dog are healthy and happy. Denise and I celebrated our 10th anniversary and our children are now 6 and 3. Although we miss seeing many folks regularly in Greenville, we are finding time to explore and enjoy the Outer Banks which has been a lot of fun! Some highlights of my year include traveling to Antarctica and backpacking in Patagonia for Christmas (Figs. 2 and 3). But nothing beats having spending time with the fam! (Fig. 4)



Figure 2: Research voyage to Antarctica. In December, I was fortunate to assist Dr. Corbett on an NSF-funded research trip to the West Antarctic Peninsula. (above) Photo of the team of scientists. (below) ME taking a refreshing dip in the Southern Ocean.



Figure 3: Backpacking Christmas Day 2012 in Torres Del Paine National Park, Chile.



Figure 4: Emma (6) and Dad enjoy some kite flying on Jockey's Ridge.

Adrianna Heimann

Greetings everybody! I hope this newsletter finds you all well.

This year has been very busy in all fronts. In terms of teaching I taught Dynamic Earth in the Fall while in the Spring I am teaching Mineralogy and Petrology II with 26 students plus Dynamic Earth with 100 students. Grading is a challenge for Min-Pet III! In addition to this, I have 4 new graduate students who started working with me in the Fall, one undergraduate student doing his honors thesis, and a new undergraduate student who started working with me by writing research proposals. Two of my graduate students, Jason Yonts and Leatha Moretz, are working on my project about rare metal mineralization in pegmatites and the mineral chemistry of garnet and gahnite in those rocks. The other two graduate students, Erica Serna and Heather Lancaster, and two undergraduate students, John Gemperline and Kristopher Ashton, are working on early Earth studies and the origin of banded iron formations and metamorphosed chemical precipitates associated with minor massive sulfide mineralization from Australia and Uruguay. In the Fall of 2012 we presented our results at the GSA meeting in Charlotte and we visited the Smithsonian Institution in Washington, DC, to perform electron microprobe analysis in collaboration with colleague Mike Wise. Last Fall, it was a pleasure to have my Masters and PhD advisor, Paul Spry, come as a visiting lecturer for the Society of Economic Geologists (SEG).

This Spring I had my four graduate students writing research proposals for SEG at the same time. In addition, in February Kristopher and Erica wrote and submitted research proposals for the North Carolina Space Grant, and Leatha and Jason wrote and submitted abstracts for the International Symposium on Granitic Pegmatites to be held in Maine in the summer. Last Fall John submitted a proposal and received an ECU undergraduate research and creative activity award. Getting all those proposals and abstracts ready for submission implied some crazy long weeks of work. Trying to obtain research funds had me writing NSF and North Carolina Space Grant proposals and I also started writing proposals for mining companies hoping to get some funding that way. I have also been busy writing my own papers and reviewing papers for Geology, Earth and Planetary Science Letters, Geochimica et Cosmochimica Acta, and Mineralogy and Petrology, among others.

Of course I have been very busy in the personal side with Nicolas turning three in May of 2013. We visited Uruguay during the winter break and we had a great time there. Nicolas learned lots of Spanish and got the Uruguayan accent, even though I didn't realize it until Manuel told us upon our return. Being close to grandparents is a rarity for him and he and my parents truly enjoyed the time together. This is all for this year. I hope you will have a fantastic year!

Reide Corbett

This has been one of the more exciting years I have had in quite some time. The year started with a new role as the Interim Co-Program Head for Coastal Processes at the UNC Coastal Studies Institute (CSI). JP Walsh and I share that position and we are actively creating new education and research programs at the new facility located on Roanoke Island. This new position was the impetus for a much needed relocation of the Corbett Clan. The boys and I packed our gear and moved to the Outer Banks in June, 2012. I think this move has been good for all of us...sort of a new start.

During this same time, I was informed that one of my NSF proposals would be funded. Pretty exciting considering it was to do work in the Western Antarctic Peninsula. The study is focused on quantifying freshwater discharging into the coastal ocean...particularly evaluating the difference between direct glacial melt and

groundwater discharge. This project consumed much of my time over the last six months...including the 10 weeks I spent in the Antarctic or traveling there and back (December 6, 2012 – February 10, 2013). It was hard being away so long, but the trip was incredible...professionally and personally. I encourage you to have a look at our Blog if you are interested in hearing more about it (<http://ecusstorm.blogspot.com/>)...or feel free to ask me! We also made a point to include several middle and high school classes from the area. In fact, I did a live broadcast from the Palmer Station with help from two of our Outreach Specialist at CSI. You can have a look at that broadcast if you would like as well... <http://www.ustream.tv/channel/unc-coastal-studies-institute>.

This project and several others focused on sediment and shoreline dynamics, as well as sea level rise, have kept me and our group quite busy. Walsh and I are lucky to have a great team of masters (Ian Conery, Jared Crenshaw, David Hawkins, David Young) and PhD (Devon Eulie) students and two post-docs (Kim Null, Brad Pickens) that are keeping us straight and moving the research forward. This successful year is certainly due to our collective team effort! I look forward to talking with each of you about the adventures we have had...I have include a few photos below from the most recent Antarctic adventure.

At home, the boys and I are doing well. They are getting big...Ian turned 13 and is almost as tall as I am. Noah just turned 10, not letting me forget that I was in the Antarctic on his big day. They enjoy their new home and the Outer Banks, but we all also enjoy coming back to Greenville to see old friends! Hope to see you soon.



Figure 1. This picture represents about 10 weeks of my life this year...the ship in the foreground is the Laurence M Gould (LMG). We spent a total of about two weeks on the ship, going to/from the Antarctic as well as ~6 science days working on the continental shelf of the Western Antarctic Peninsula. Behind the LMG is Palmer Station, one of three permanent US research station in eth Antarctic. Our research team stayed and worked out of Palmer Station for ~7 weeks. Not all of our days were as clear as what is pictures...



Figure 2. David Hawkins (ECU), Leigha Peterson (CCU), and myself sampling a freshwater stream draining from the glacier prior to discharge to the coastal ocean.



Figure 3. Swimming across Hero Inlet at Palmer Station. The water was about 3.5°C and we swam (with a safety boat) from the ice edge in the background to the Palmer dock. Wow, was it cold! There were only 6 of us out of the ~55 on station willing (or stupid enough?) to do it. And yes, if you have to know, I am the one in the lead...

Don Neal

Another year, another newsletter. This will be wrapping up year 34 in the Emerald City. Seems like it was yesterday....last week....that I came to ECU fresh out of grad school. I am not so fresh these days but I keep kicking. It is better than the alternative. I teach my fair share of Dynamic Earth and Earth and Life Through Time and of course, Stratigraphy. I have a pretty good group of students this year; at least I will think so until I grade the midterm exam they just took. I will be teaching the graduate sed pet course this fall. If anyone has any hand sample sized sed rocks I would appreciate the donation.

Craig Simms and Casey Smith finished up their MS degrees last fall. Craig continues to work as a computer jockey for Pierson publishers and Casey took a position with Arch Coal. I currently have one student, Katie Cummings, working on the stratigraphy of the Alexander Siltstone...a gas pay in the Devonian of northern West Virginia.

I am still the Secretary-Treasurer of the Southeastern Section of GSA and as I write this

am looking forward to a good section meeting in San Juan, Puerto Rico. It will be a small meeting but interesting. Next year we are in Blacksburg, VA, so if you are around, join us. All the best.

Eric Horsman

It's a bit hard to believe, but I've been at ECU for a three full years now.

I have a small army of students working with me on a variety of research projects in Utah, North Carolina, New York, and elsewhere. Many of these students will be traveling with me to Denver in October 2013 to present their research at the annual meeting of the Geological Society of America.

I was ecstatic to learn last summer that the National Science Foundation decided to fund my proposal to study processes of magma emplacement in the shallow crust. So for the next several years I will be bringing students out to southern Utah's Henry Mountains to study how sills, dikes, laccoliths, and other intrusions are constructed. By combining many datasets we are deciphering the growth history of these shallow crustal intrusions. Our results will provide insight into how magma systems operate under volcanoes, geothermal fields, etc.

Three M.S. students, Robbie Broda, Mitch Ward, and Erik Thornton spent about six weeks in the Henry Mountains last summer. They were ably assisted by Nick DeSimone (B.S. 2012), who also spent considerable time in Utah in the summer of 2011.

I've included some photos from last summer's adventures. While they certainly don't tell the whole story, these photos provide a fair summary of how things went for the students. It was a summer of flat tires, often more than one at a time, and usually right before massive thunderstorms (upper left); wheels falling off the van while on the highway (upper right), and lengthy vehicle extraction projects (lower left). The students' mental health was severely impacted, as is clear from the ridiculous image at the lower right, taken late in the field season.

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 three and half years old now. He loves making things fly: model rockets, paper airplanes, boomerangs, and of course himself whenever there is something convenient to jump off.



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