

BUDGET BLUES BUT THE FUTURE IS BRIGHT

Dear Alumni,

In recent years I have talked about the cuts in our department's operating funds. You will also have received a letter recently from Stan Riggs about giving to support the department. It is clear that Geological Sciences at ECU will be more dependent upon donations in the future than it has ever been before. Our operating budget may never return to previous levels. It is in this context that I asked one of our alumni, Mike Hale ('08), an exploration geologist with American Energy Partners in Oklahoma City, to contribute to my message this year.

"Why I donate. I began donating on a monthly basis to the ECU Geology Alumni Fund in January of 2013, after hearing from Dr. Culver about recent misfortunes regarding budget cuts to the ECU Geological Sciences Department. It was explained to me that any dollar would help, that anything I could contribute would help to give current grad students admission to geological conferences, or help fund critical sample analyses as part of their thesis work. It was hard for me to imagine those funds not being available, because when I was working on my thesis, money was always available for what I needed. Clearly, I took these things for granted. I now find myself in a rather enviable position. I have a great job, which I thoroughly enjoy, and it would be foolish of me to not give credit where credit is truly due. Without the quality of education and mentorship that I was given at ECU, I know that I would, more than likely, not be so fortunate. I do feel it is my duty to give back to those that guided me to where I am now, and hopefully I can create a few chances for others who are now in the position I was once in. Mike Hale, January, 2014"

Thank you to Mike for these thoughts. We will not thrive on one large donation but on the gifts from many alumni like Mike and, indeed, like you. There are many ways to give. A donation to match the gifts of benefactors such as Stan and Ann Riggs (the Riggs Fund) and former department Chair, C.Q. Brown (the Brown Scholarship fund), is one way. A donation to the department's general Foundation account or Century account (e.g., funding for students who give papers at conferences) is another. You can donate with a check or you can donate monthly by credit card, as practiced by Mike Hale and several other recent alumni. No matter how you give, no matter how small or how large the amount, as an active contributor to your Department (and I hope that's how you think of it), you can take pride in the achievements of our current and future students. All you need to do is contact me at culvers@ecu.edu and we will build the future of our department together.

Wish all best wishes.

Steve Culver, Chair of Geological Sciences

50th Anniversary for the North Carolina Summer Geology Field Course

If you are in New Mexico or Colorado during May-June 2014, please drop by to visit us at the 50th Edition of the North Carolina Summer Geology Field Course. Perhaps the most convenient times to visit us are whilst we are in the Taos, NM area from May 28-June 08 or in the Durango, CO area from June 12-20. For more specific details on the 2014 Geology Field Course schedule, please contact Stephen Harper at harpers@ecu.edu or 252-328-6773. Because those of you receiving the Department Newsletter span many years, I have included a brief history of the 50 years of the Summer Geology Field Course.

The North Carolina Geology Field Course has been operating since 1965 and was first operated out of UNC-Chapel Hill Department of Geology. The Summer Geology Field Course was created by David Dunn of the UNC-CH Department of Geology and was taught primarily out of the Taos, NM area in its early years. In the 1970's the North Carolina Geology Field Course was directed and taught by David Dunn and Robert Butler from the UNC-CH Department of Geology. From 1980-1984 the Geology Field Course was co-administered by the Geology Departments of UNC-Chapel Hill and East Carolina University and directed by Geoff Feiss and Richard Spruill respectively.

In 1985-86 the North Carolina Geology Field Course became the UNC System-wide Summer Geology Field Course with participation (both faculty and students) and funding from UNC-CH, ECU, NCSU, and UNC-W. In addition, UNC System universities, which did not have funding to contribute to the UNC System-wide Geology Field Course, contributed students and faculty. These universities included Western Carolina University, UNC-Charlotte, Elizabeth City State University, and Appalachian State University. When space was available, students from non-UNC System Universities were also enrolled in the UNC System-wide Geology Field Course.

In 1990-91 Richard Mauger of East Carolina University took over the director role of the UNC System-wide Geology Field Course. From the 2001 to 2005, the original consortium of 4 UNC System-wide (UNC-CH, ECU, UNC-W, and NCSU) began to falter due to changes in funding sources in the Geology Departments at the 4 universities. Since 2005, the Summer Geology Field Course has been directed by Stephen Harper from the Department of Geological Sciences at East Carolina University. The Summer Field Course is now officially referred to as the North Carolina Geology Field Course and the funding for the course since 2010 has been entirely student-based. For the past 3 years, 2012-2014, students enrolled in the NCGF have come from ECU, UNC-CH, UNC-C, NCSU, App State, and from at least 8 other universities from around the country each year. Enrollments have been very robust at around 40-43 students per year.

A NEW PARADIGM FOR MAINTAINING A SUSTAINABLE COASTAL SYSTEM WITH ONGOING SEA-LEVEL RISE & STORM DYNAMICS IN NORTH CAROLINA'S LAND OF WATER (NC LOW)

Stan Riggs

Based on almost five decades of coastal research by the many geology students and faculty within ECU's Department of Geological Sciences we have pieced together much of the complex history of NC's vast coastal system and developed a basic understanding of the dynamics that drive the environmental changes through time. In 2011, a team of ECU geologists (Stan Riggs, Dorothea Ames, Steve Culver, and Dave Mallinson) published a book titled "*The Battle for North Carolina's Coast: Evolutionary History, Present Crisis, and Vision for the Future*". This book stresses that there always has been a North Carolina coastal system with ocean and estuarine shorelines in the past and will be into the future; that the coast is a dynamic and moving system; and that society must adapt to and live with the processes of ongoing change. Trying to maintain the status quo through engineering fixed structures and ignoring the natural limits to growth will ultimately cause the collapse of both the coastal economy and the natural resources on which it is based. The twenty-first century is an exciting time with tremendous opportunity for determining new ways of living in concert with NC's dynamic and changing coastal system of shifting sand, high-energy storms, and rising sea-level; this is a challenge that we must embrace.

Within this book we developed the framework for a new vision that we called the North Carolina Land of Water (NC LOW). The NC LOW initiative is both a geographic region and a concept for economic development. The geographic region consists of vast water-dominated and low-land ecosystems of northeastern NC's Outer Banks and Inner Banks that are subject to large-scale changes resulting from the ongoing processes of sea-level rise, high energy storms, and severe human modification. NC LOW is also a new economic paradigm being developed for northeastern NC that recognizes the fundamentally important role of the natural water resources in the coastal region. NC LOW is based on a diversified, enhanced, and sustainable coastal economy that respects the natural dynamics essential for maintaining and preserving the coastal resources upon which that economy is dependent. The energetic processes of change that molded North Carolina's human history and continue to severely impact the present culture, will have a heavy imprint on the nature of our future coastal economy.

The primary goal of NC LOW is to define and initiate an "umbrella" organization whose role is to facilitate an integrated approach to sustainable development with new business opportunities adapted to the NC LOW coastal system. NC LOW is dependent upon successfully integrating the human culture and history, societal needs and conflicts, and the geological and biological processes and resulting ecosystems. To succeed, there must be a critical outreach component to promote an educated public (both adults and K-16) as well as strong support from the many stakeholder groups, private industry, and all levels of leadership both within and outside the coastal system. This is particularly critical in today's world where science is sometimes vilified and natural coastal change is often prohibited through legislative means and engineering efforts. The consequence of the present status quo attitude towards change leads to the "perfect conflict" between human development and quality of the natural resource base upon which the coastal economy is based.

YOU WILL BE HEARING MORE ABOUT NC LOW IN THE NEXT FEW YEARS—STAY TUNED!

Steve Culver

The past year was all change for my graduate students. Ray Tichenor, Alisha Ellis and Hanna Thornberg all graduated and became employed, Hanna and Ray in the petroleum industry and Alisha at USGS. Devon Reed and Jessica Kegel took their place. Devon is working on a project in Malaysia and Jess is funded by my new NSF grant to extend the sea level record in North Carolina back to ca. 4000 years.

My field work in Malaysia last summer was very enjoyable. Dave Mallinson and Devon Reed accompanied me and we met up with former ECU student, Pete Parham, who is now on the faculty at Universiti Malaysia Terengganu. My boss (recently departed to University of South Carolina) represented ECU administration but did yeoman service as photographer. We undertook a coring program off the coast of Kuala Terengganu and did this work with a flotilla of three boats. As you can see from the picture, the calm, warm tropical setting was just stunning.



Efforts to get colleagues to call me Admiral Culver failed miserably. The coring, however, was a great success and Devon's C-14 results indicate we have a 4000 year record of paleoclimate. I hope to return to Malaysia in summer 2014 and attempt to collect cores that will extend that record further back in time. My work in Malaysia continues to expand. I have been asked to go there as a Visiting Professor and also to undertake some foraminiferal work in Brunei Bay

off the coast of Borneo. Apparently, water quality in that bay has decreased recently, threatening the sea-grass beds and hence the dugongs that graze there. Because many foraminifera live on sea grasses the idea is to use them as indicators of environmental quality. I'm hoping to take a couple of new graduate students with me to take on this exciting new work.

Mike O'Driscoll

Greetings from Greenville! I hope you are having a good year. Overall, this past year has been a rewarding one for me at ECU. Last April I started my two-year term as the Director of the Coastal Water Resources Center (CWRC) and in September, I was honored (and surprised) to receive the Great Blue Heron Award from the Pamlico-Tar River Foundation for contributions to the protection of environmental quality in the watershed. It was also nice this year to see a couple of graduate students complete their degrees. I would like to congratulate Matt Smith and Guy Iverson for graduating this year! Matt spent part of the fall semester working as a hydrological intern at USGS Menlo Park in California. After that great experience, he is heading west to look for a hydro position. Guy graduated this past summer and moved on to the Coastal Resources Management PhD program here at ECU.

During the past summer I ranged from Quebec to New Mexico with a variety of undertakings including teaching the field camp hydro exercise, learning electromagnetic profiling, grading AP Environmental Science exams, and conducting research. In July, we completed two research projects funded by the NC Department of Environment and Natural Resources and the NC Water Resources Research Institute focused on septic system nutrient exports to coastal plain streams, and geophysical detection of subsurface wastewater plumes, respectively. These studies have helped lay the foundations for a couple of newly funded coastal wastewater projects and conference presentations.

This fall we started a Water Resources Seminar Series through the CWRC. If you are interested in learning more about the Center and some of the water issues we are working on, check out our webpage at: <http://www.ecu.edu/cs-acad/rgs/cwrc/>. With recent state and federal budget cuts, the funds available for water resources research and monitoring programs have been dwindling, it is more important than ever that we work together to help solve some of the region's water issues. We were fortunate to recently get funding from the state on a collaborative project to help improve stormwater management on ECU campus. We will be seeking volunteers this spring to help plant trees in bioretention areas to enhance groundwater recharge and reduce stormwater runoff. Additionally, this spring we have a grant to improve our hydro-educational opportunities on campus. We will install real-time monitoring stations on Greens Mill Run (urban stream) and Otter Creek (rural stream, photo below) that will provide students with data that can quantify how urbanization influences hydrology and water quality. The grant will also finance a groundwater monitoring station and geophysical test pit on campus to provide opportunities for students to hone their hydro and geophysical surveying skills. It will be exciting to have these resources on campus to enhance field learning opportunities and expand our hydro-literacy infrastructure.

I hope your 2014 is off to a great start. Take care,



GEOL 5150 students studying the hydrology of Otter Creek, Falkland, NC (Fall 2013).

Eduardo Llorri

I am writing this piece while looking at this surprisingly white scenery I cannot believe that another year went by. I cannot believe either that we had plenty of snow this year. But let's go with some details. Good run this year. We finished several projects that I started before coming to ECU. This means that we have to put together all the information gathered over the last 4 years and start writing papers like crazy. Also means that a new cycle starts and so we applied for several new projects that go from high energy deposits in the SW of the Iberian Peninsula to sea-level studies in the N. of Spain. A new and exciting collaboration has started with some colleagues from Argentina and I should be visiting them very soon. This project funded by the Argentinian Ministerio de Ciencia, Tecnologia e Innovacion Productiva will take me to travel all around their beautiful coast next summer (winter here). I am looking forward to that. In the last newsletter we mentioned that Ane Garcia-Artola was writing her PhD thesis dissertation, well, now she holds a PhD and she is teaching at the University of the Basque Country. Great news for her! This last fall I taught again Sedimentology, but I think this was the last time. It has been pretty intense but nice. Now I started teaching COAS 4025. This is part of the Coastal Studies minor that we have at the College. This is an interdisciplinary course that I just started and I am very excited about it too. Oh! I almost forgot, I have been elected as a delegate of the UNC Faculty Assembly. Since I have not been to any meeting yet, I do not have much to say, but I am pretty sure it will be a fantastic experience. A new cycle starts now and I am really curious about what the next few years will bring, I just hope is as good as the last past five years.

J.P. Walsh

It's been a fun but challenging year, including a brush with death (see photo). As part of my joint-appointment, I continue to serve as the Interim Co-Program Head of Coastal Processes for the UNC Coastal Studies Institute. This involves building a research, education and outreach program on the Outer Banks and continuing lab, teaching and service activities in Greenville. After a year of working in the new UNC CSI facility, there is much activity, and we have become more engaged and familiar with the surrounding coast. Also, new experiences have opened new ideas and opportunities, and the future has great potential. Drop in for a visit!

J.P.'s near death experience. I'm attacked by a tiger after giving a seminar at Princeton.



In 2013, we initiated the Summester at the Coast, which is a month-long summer program for undergraduates interested in coastal science. Last year was a great success; nine students from different institutions relished the chance to live and learn on the OBX. We hope for another energetic group of students in 2014.

Several research projects in various stages are keeping our lab group busy. I have enjoyed working with Reide Corbett, Brad Pickens (short-term post-doc), Trip Taylor (technician) and several students, including Ian Conery, Jared Crenshaw, David

Hawkins, Jessi Strand and David Young (Geology MS) and Devon Eulie (CRM PhD). Devon, in fact, is nearly finished and is currently working as a faculty at UNCW. I continue to teach Coastal Geosciences in the fall (see photo) and Oceanography in the spring and help with departmental, University and other service.



Marsh madness at the UNC Coastal Studies Institute. Summester at the Coast students explore marsh sedimentation and learn about sea-level rise and shoreline erosion. These marshes and nearby areas are also the focus for several ongoing research projects. We hope to find donor or other funding for a marsh boardwalk to help educate and examine estuarine and wetland changes.

I have invested a lot of time in coordinating a special issue on source-to-sink sedimentation for Earth Science Reviews, and I have taken on a new job as an Associate Editor for *Sedimentology*.

I am happy to report that my family is healthy and happy, and life near the sea provides much enjoyment and inspiration. One of the highlights of last year was a field trip to study Jurassic mudstones (see photo) following the 30th Annual IAS meeting in Manchester. I hope to get more time to examine ancient strata in 2014 and beyond.



Lunch on the Lias. During a field trip to examine shales of the Cleveland Ironstone Formation, our group from the IAS meeting enjoys some sun while sitting on ammonite-rich strata of the Yorkshire Coast, England.



Coastal Geosciences (GEOL 7002) students on the Tar River. This graduate class designed for Coastal Resource Management PhD students has field trips to study fluvial, estuarine and ocean processes.

Terri Woods

This year I began to “reconstruct” my research program and phase out my duties as Graduate Program Director. I am reading lots of recent articles on hydroxy-copper minerals (sulfates, chlorides, carbonates, etc.) in preparation for reviewing Eunice’s thesis. We have discovered that since I did my original work with Bob Garrels in 1988, other scientists have recognized that a major mineral (paratacamite) identified by Bob and me had actually been incorrectly named for years. In fact, there are several newly recognized species of Cu-hydroxy-chlorides. Now we just have to figure out which ones show up in Eunice’s samples as their XRD patterns are extremely similar. I also have a new student (Mark Akland - from our own BS program), who started last fall. He will be working on the source, fate, and cycling of iron in the Castle Hayne Aquifer. He’ll be doing lots of XRD, XRF, petrology, and water chemistry to sort this out. Also, along with Dr. O’Driscoll, I will be co-advising a new student (Adam Trevisan) as he pursues his investigation of a new geophysical technique for analyzing the distribution and movement of shallow groundwater around septic fields. Lastly, I am working with Dr. Heimann and an undergraduate (Erik Anderson) to put together data on the chemistry of ilmenite in various rock types. Dr. Heimann provided lots of articles containing ilmenite data and I found quite a few more. Erik put all the data into a spreadsheet and we will begin plotting those compositions on triangular diagrams soon. These diagrams will hopefully reveal patterns that will allow Dr. Heimann to distinguish different rocks based on their ilmenite chemistry. As always I continue with Science Outreach efforts including Science Olympiad and High-school STEM Day. Finally, last summer I began development of a new DE version of our oceanography course. I will probably be teaching that for the first time this summer.

Eric Horsman

It has been another busy year.

As usual, I led two big field trips for undergraduate students. In the Spring 2013 semester, students in Structural Geology braved winter weather while camping in Boone, NC. The spectacular rocks we saw made it all worthwhile. In the Fall 2013 term, students in Introduction to Field Methods enjoyed nearly perfect camping and field work weather in Hot Springs, NC, as the group photo below shows.



During the Summer of 2013, I spent about two weeks in the Henry Mountains of southern Utah, helping graduate students Robbie Broda, Erik Thornton, and Mitch Ward work on their thesis projects. They're all studying how igneous intrusions grow and evolve in the shallow crust. We met up with collaborators from Central Michigan University and SUNY – Geneseo. As the photo below shows, for a few days all the groups overlapped and we had 14 geologists climbing around on the rocks.



In October, four graduate students and I traveled to the annual G.S.A. meeting in Denver. Robbie, Erik, and Mitch all presented their work on the shallow intrusions of the Henry Mountains. Ryan Poythress presented his work on a newly discovered Triassic basin buried beneath about 1000 feet of coastal plain strata in Bertie County, just an hour north of Greenville.

Two new graduate students started working with me in Fall 2013. Liz Maurer is studying the construction of the Copper Ridge laccolith in the Henry Mountains. Rich Burns is studying Alleghanian-age igneous intrusions in eastern North Carolina and their spatial and temporal relationships with the Eastern Piedmont fault system.

My wife, Beth Thompson, continues to study maize genetics as part of the ECU Biology Department. Our son, Elias, is four and half years old and growing at a terrifying pace.

Adriana Heimann

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

This year has been the busiest of all in all fronts. In terms of teaching, in the fall of 2013 I taught graduate level Economic Geology Lecture and Lab while for the spring of 2014 I have been teaching Dynamic Earth. Grading in Min-Pet II is always very time consuming because I do it all. In addition to this, I have been directing four graduate student theses, and directing the research and proposal writing of two undergraduate students. My students are working on smaller portions of two big endeavors that I focus on: the mineral chemistry of minerals as indicators of magma evolution and rare metal mineralization in granitic pegmatites; and the geochemistry of Archean-Proterozoic banded iron formations (BIFs) as reflection of the biochemical evolution of the ancient oceans in the early Earth. In the first project we are

investigating pegmatites from worldwide localities, and for the second one we are currently working on the unstudied ~2.5 Ga Valentines Iron Formation from Uruguay and ~1.7 Ga BIFs spatially associated with the giant Pb-Zn-Ag Broken Hill deposit in Australia. The pegmatite project was funded by the USGS and the Australia BIF project was recently funded by a NASA North Carolina Space Grant New Investigator Award. For these projects I am the sole PI but I count with collaboration of excellent colleagues from Argentina, Brazil, and the US. This allows my students to meet many top scientists and work in their labs, for example, at the Smithsonian Institution in DC to do electron microprobe analysis, the USGS laser ablation ICP-MS lab in Denver, the pegmatite collection at the University of Oklahoma, and the Fe isotope geochemistry lab at the University of Wisconsin-Madison.

As always, I encourage my students to submit research proposals to various opportunities. I find this very important as it improves their writing skills, and very rewarding, even though it requires lots of dedication. As a result, three of my four graduate students received Sigma Xi research awards, two of them Society of Economic Geologists research awards, two undergraduate students received ECU undergraduate research and creative activity awards, and one of them received a NASA North Carolina Space Grant undergraduate research award. Some of these awards are only for research expenses or a combination of research expenses and stipends, while the NC Space Grant funds are for the students. One of my graduate students and one undergraduate student submitted NASA NC Space Grant research proposals. In January of 2014 two of my students and I submitted abstracts for the regional GSA meeting in Virginia. Again, getting all those proposals and abstracts ready for submission implied some crazy long hours of work week and weekend days. Trying to obtain research funds had me writing an NSF proposal during the winter “break”, which is now pending and hope to get funded. I have also been busy writing revisions of a review paper on BIFs as well as a couple of other papers, and reviewing lots of papers for *Geology*, the *Journal of Geochemical Exploration*, *Earth and Planetary Science Letters*, *Geochimica et Cosmochimica Acta*, and *Mineralogy and Petrology*, among others.

Regarding trips, in the summer of 2013 two of my graduate students and I attended the International Symposium on Granitic Pegmatites in New Hampshire where we presented our results. In July we went to the USGS in Denver to do LA-ICP-MS analyses, where my students stayed for almost two weeks and were also able to see the city. In the summer and fall of 2013 my students and I visited the Smithsonian Institution and Fayetteville State University probe labs in several opportunities. As usual, I also took my Mineralogy and Petrology II students and my graduate students to the Gold Rock quarry field trip to observe igneous as well as sedimentary rocks.

Also as always I have been extremely busy in the personal side with Nicolas, who is 3 years and 9 months old. This year during the winter “break”, due to my crazy fall semester and proposals and grant reports, as well as my PAD for reappointment, due in December and January, my parents and oldest brother came all the way from Uruguay to help out and spend some time together while Manuel traveled to Colombia to see his parents. Nicolas was able to enjoy time with his grandparents and uncle, something we all greatly enjoyed (even though I wish I had had more time to be with them). So, this is the life of a tenure-track assistant professor and mom: exciting but very busy.

This is all for this year. I hope you will all have a splendid year and enjoy life! Best wishes!



David Young and Ian Conery preparing to board the LMG on a 5 week research cruise to the Antarctic (February 2014).

Reide Corbett

Hope you have had a good year since last we wrote! I am writing this from my desk on the R/V Laurence M Gould in the middle of the Drake Passage...it is February 15th. We are in 20-25 ft waves, 60 mph winds, and the ship is rocking from rail to rail...pretty exciting. It seemed like the perfect time to write an update on our

group...it sort of exemplifies the exciting and challenging year we have had!

As I mentioned last year, we have an exciting project focused on quantifying melt water and groundwater discharging to the coastal ocean in the Western Antarctic Peninsula. We are headed back now for our second and last field season. I will only be gone for about 6 weeks this season, but several members of our group have been at Palmer Station since the beginning of the year. The data being collected are very interesting, suggesting that groundwater contributes around 3-5% of the water balance in the nearshore...this may seem low, but the concentrations of nutrients and iron are orders of magnitude higher than other water sources, potentially influencing primary production. So, we are really excited about the project and the experience.

When we aren't venturing down to the Antarctic, we are still quite busy back in NC. Walsh and I have been working hard to grow the coastal processes programing...from new research endeavors to new and innovative courses. We started the Summer at the Coast last summer...a month-long classroom/field experience for students on the Outer Banks. We had a great group of students from all over the eastern seaboard. It was a great experience for the students and us ...we hope to offer it again this summer.

The next several weeks will be very busy for our group...we will start by completing our Antarctic fieldwork, then the fun really begins. We have several students completing their work. David Young will defend his research focused on the sediment dynamics of the 2011 Mississippi flood, Ian Conery will defend his work on the geomorphic evolution of Ocracoke Island, and Devon Eulie will defend her PhD focused on shoreline and sea bed dynamics in the APES. As these students finish up and move on to bigger and better things, we have two new students starting...David Hawkins and Jessi Strand are starting to get into their research focused on the relationship between shoreline change and nearshore/marsh sediment processes. So, we continue to work hard...hope you will visit us at CSI and see some of our ongoing efforts. If you can't visit personally, check out our blog (ecusstorm.blogspot.com), we try to keep it up to date with ongoing work!



Abandon ship drill on the LMG...hope we don't have to get in this thing anytime soon!!! My face says... "Seriously, we could be in this thing for a month?"



We were lucky enough to vacation in Costa Rica this year...here I am at my new favorite past time!!

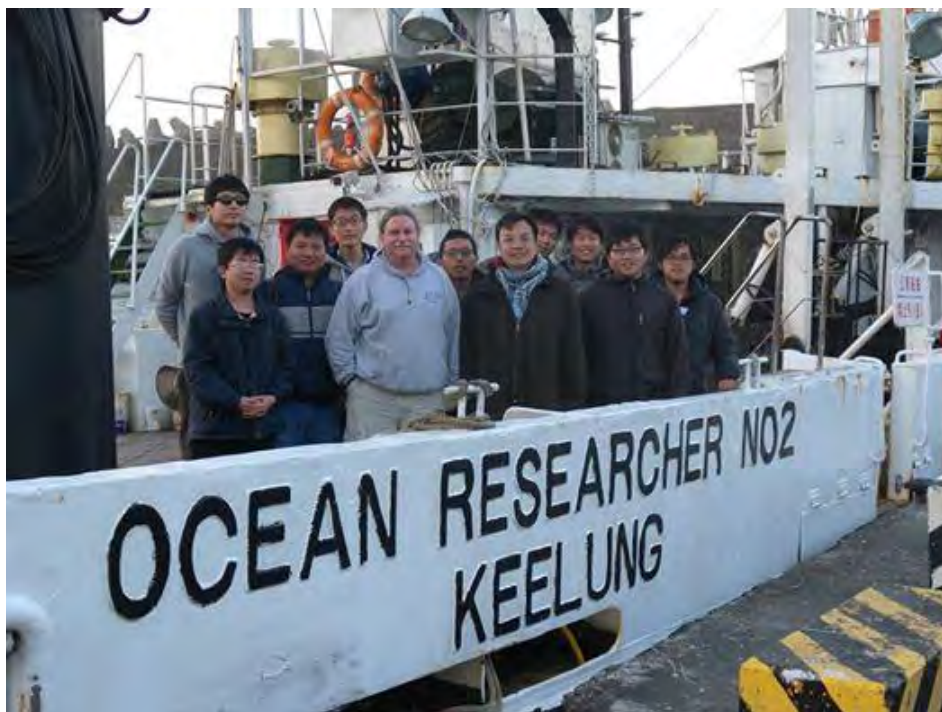
Richard Miller

Greetings from snowy North Carolina! I hope that everyone is somewhere safe and warm.

It's been another personally challenging but yet, I think, a professionally productive year. My first graduate student in the department, Matt Brown graduated last semester. Matt did a truly excellent job during his stay here at ECU and as a result he quickly got a job working as a Geologist back home in Pittsburgh. Matt wrote his thesis as two manuscripts. One paper,

“Modeling the transport of freshwater and dissolved organic carbon in the Neuse River Estuary, NC, USA following Hurricane Irene (2011)” is currently in press in the journal *Estuarine, Coastal and Shelf Science*. Check it out. A new student Jeremy Robbins from Radford University joined my lab in Fall 2013 and is interested in examining the transport of terrestrially derived material to the coast resulting from landscape processes. Stay tuned for more from Jeremy. My research program continues to grow. I received funding from NASA for two projects: “On the export of dissolved organic carbon by large rivers: assessing the effect of climate variability” and “A workshop on the laboratory measurement of the spectral absorption of color dissolved organic matter.” The “rivers” project will soon involve cruises to the Mississippi River Bight and hopefully a cruise to the Arctic. A great benefit of this project is that Dr. Ramon Lopez joined us here at ECU as a member of ICSP. Ramon was last at the Applied Physics Laboratory at Johns Hopkins University and has considerable experience in both field programs and remote sensing. Ramon brings a lot of knowledge and expertise to the group and I’m excited that he’s here. The workshop project is a particularly exciting project in that our group is involved in developing recommended NASA protocols for CDOM absorption measurements and will contribute to a NASA Technical Memorandum.

I continue to teach Introduction to Oceanography (GEOL1550) every Fall semester to about 100 undergraduates; in the spring I alternate teaching Data Analysis (GEOL6950) and Remote Sensing of Coastal Environments (GEOL7600). I’m now teaching the remote sensing course and have some highly motivated students. I do enjoy teaching and invest a lot of my time to continue to improve. Hopefully, this investment is paying off for the students.



I was able to get away from the region for a while as well. I presented an invited keynote talk in early December at the Asian Workshop on Ocean Color (AWOC) 2013 in Tainan, Taiwan. The AWOC is an annual workshop for investigators and students in Ocean Color from China, Japan,



Korea, and Taiwan. A highlight of the visit was when I gave a tutorial on field protocols to students during a two-day research cruise in the northeast coastal waters off Taiwan to support algorithm development for the Korean geostationary instrument GOCI. The students were fun to be around and it also impresses me how students are very similar everywhere. Well that's a

thumbnail sketch of the past year. So, until next year I wish you all peace and prosperity.

Alex Manda

A grand circle tour out west

The past year was very eventful. In addition to the grant writing, paper submissions, teaching and conferences, I had the opportunity to go out west to view some of the most spectacular geology and scenery on offer. My wife Khatundi had never been to the west, so I decided to take her camping for a week to show her what captivates geologists. The itinerary involved flying into Las Vegas before making our way to some of the best national parks in the west, if not the country. We spent at least one day exploring each of the following: Zion National Park, Capitol Reef National Park, Arches National Park, Monument Valley and Grand Canyon National Park. We then made a complete loop by returning to Las Vegas.

Zion had its majestic cliffs, whereas Arches had impressive arches. The Grand Canyon was definitely grand, and Monument Valley had its monuments. However, in my opinion, Capitol Reef is definitely the hidden gem among these parks. There were fewer people at Capitol Reef than at any of the other parks, and to boot, the geology was simply breathtaking. If you are ever at Capitol Reef, make your way to the Temple of the Sun and the Temple of the Moon monoliths. These sandstone



Manda exploring the Temple of the Sun monolith in Capitol Reef National Park, Utah.

features are well worth a long a secluded drive where you will be hard pressed to see another person for tens of miles.

The days spent camping by the banks of the Colorado, sleeping under the stars, hiking spectacular canyons, and enjoying stunning views made me remember why I love what I do. I look forward to exploring other wonders like this in other parts of the country.



Manda at Arches National Park, Utah.

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. In the Fall 2013 semester, my Geomorphology class had 28 students, most ever, and we took 2 full weekend field trips, a cave-karst trip to the Shenandoah Valley of VA and a coastal trip to the northern Outer Banks of NC. I also still coordinate the Graduate Students, who teach Geology 1501 labs. I attended National GSA Meeting in Denver, CO in November 2013 and met up with a few of you there.

I am now in my third year as Director of Undergraduate Studies/Advising since January 01, 2012. We now have ~60 Geo majors as compared to ~25 less than 5-6 years ago. I directly advise ~40-45 of our majors and get some help from Dr. Walsh, Corbett, and Neal with the remaining ~15-20.

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 2014 for the 16th straight year. This is the 50th edition of this course going back to 1965. Hence, this year we may have a 50th Anniversary Geology Field Course Reunion in Durango, CO. For the 2014 field course, our enrollment in the Geology Field Course will be 41 students. Fourteen of these students will be from our own program here at ECU, indicative of the recent growth in number

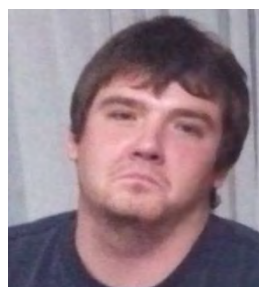
of Geology Majors in our current program. Currently, the students from other universities hail from UNC- Chapel Hill (4), UNC-Charlotte (2), App State, James Madison University (7), VA, Middle Tennessee University, (4) TN, Virginia Tech University, (2) VA, University of Pittsburgh, (2) PA, Temple University, PA, Grand Valley State University, MI, Eastern Kentucky University, KY, University of Maryland, MD, Missouri State University, MO, and California State University-East Bay, CA. 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 1-day field trip to Great Sand Dunes National Park near Mosca, CO and then up to Creede, CO for the 2-3 days for a Silver Mine Tour and some Oligocene-Miocene Volcanics. From Creede, CO, we will head over to Durango, CO for the last 10-12 days of the 2014 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 side trips to Mesa Verde ruins and to Silverton, and perhaps Ouray, CO for one day each.

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 GMA-ECU (Steve Campbell and Jay Holley), UNC-C (John Diemer), Noble Energy (Evan Howell), University of Nevada-Reno (Sabina Kraushaar), and perhaps Crystal Wilson from App State.

Sid Mitra

Cycles

Greetings everyone! As we all know, many things in life go in cycles. As many of you know, academic life also follows cycles. We have cycles of research interests, teaching, mentoring... With respect to mentoring, I'm happy to report that after doing some grueling analytical research for their thesis topics, Kim Scalise and Katie Supler (shown below), have graduated with their master's degrees,.... and they are still smiling – go figure! Both of them have moved on. Katie has gotten a job as Environmental Health Specialist with Durham County, NC. Kim is somewhere in New England, which by my last check of the weather, is a regional block of ice! My two current students, Jeff Minnehan and Abigail Boutilier are doing well. Abigail, an undergraduate, is a new mom, trying to juggle parenthood and research while obtaining an undergraduate degree in chemistry. Jeff is a master's student who these days, cycles between the "I'm gonna cry" look (see below) and the "I wanna be done or I will kill people" look (too scary to display in a public forum). Fortunately, he has been intensely writing and will defend soon. Since last year, we have also had Sophie Carman join us from Anthropology. I am coadvising Sophie and was recently informed by her co-advisor that Sophie is a kick boxer. Hmm....what could possibly go wrong with that scenario?! So the mentoring cycle continues, fueled by the hard work conducted by these great students!



Recently, a friend of mine asked me the following question, “What’s your 5 year professional



plan?” Interesting question! I can plan a 5 year menu for a family of 5 – no problem. I can tell you how any form of carbon can be sequestered in a coastal system over 5 years. I can even extrapolate how many beers I will have over the next five years (don’t ask – I’ve done it)!

However, the 5 year professional plan??! I admit, I was stumped! In fact, when I posed that question to other colleagues, even the chatterboxes were stumped. Not sure what to do, I did what a famous songwriter said to do, “pay attention to the open sky, you never know what will be coming down” and that’s when it hit me – rain! Over the last few years, I’d

dabbled in the general subject area of atmospheric chemistry. But in thinking some more, I realized the that there is an unparalleled wealth of expertise that exists here at ECU across various departments. I would argue that collectively, our university has more experts on the evolution AND impact of coastal storms than any other school in the state. Now, add the fact that we also have a great new Coastal Studies Institute (CSI) out in Manteo [heck, the CSI building practically out on the water and its roof is an empty pallette, just waiting to house atmospheric sampling equipment (see pic above)]. Also, add the fact that we just inherited thousands of dollars worth of atmospheric and rain sampling equipment from the Virginia Institute of Marine Science, and what do you get????!! Answer: A 5 y plan to bring together some talented individuals and delve deeply into coastal storms at an unprecedented comprehensive level. Stay tuned as we merge into this next cycle of research!

Dave Mallinson

Another busy year has come and gone. Highlights related to my work included travels to California (twice), Denver (GSA), Malaysia, and Bremen Germany. The Malaysia trip was with Steve Culver and Devon Reed (a new graduate student who was previously an undergrad in our program), and we were joined there by Pete Parham who is now working as a research associate professor at the University of Malaysia, Terengganu. We were collecting gravity cores on the Sunda Shelf to understand variations in monsoon intensity in the South China Sea. Devon (advised by Dr. Culver) will be working up those data for her M.S. The trips to California and Germany are related to my participation with the International Ocean Discovery Program (IODP).

My graduate students, working on various grants, continue to make progress and some are wrapping up their theses. Matt Smith graduated with his M.S., and did an excellent job of showing how subsurface mapping using ground-penetrating radar and resistivity can be used to understand water discharge from septic systems. He was co-advised by Mike O’Driscoll and me. Nick Zaremba (co-advised by Edu Leorri and me) is making good progress in working up the overall seismic, litho- and chrono-stratigraphic framework of Pamlico Sound to develop paleobathymetric models with which we can model past circulation changes. He will likely defend this semester. Caitlin Lauback (also co-advised by Dr. Leorri and me) is working up the

carbon and oxygen isotopic signatures of forams from the Pamlico Sound to understanding changes in water characteristics during the Holocene. Caroline Smith will be doing a project on the Ocracoke Inlet flood tide delta area. Jeff Minnehan (not technically my student, but working on my NSF project and advised by Sid Mitra) is finishing up his thesis looking at the organic geochemistry in the Holocene section of Pamlico Sound, and its relation to climate change.

I'm also involved in a few other projects. I'm collaborating with some Canadian researchers to understand the age and geology, and sea level, tectonic and isostatic implications of paleoshorelines in the southeast U.S. (from GA through NC). I'm currently working on funding for this, with the help of Eric Horsman and Regina Dewitt (who operates an OSL lab in Physics). I'm working with Alex Manda in trying to understand the potential for ground-water flooding in coastal areas, in response to sea-level rise and storm impacts. I'm working with J.P. Walsh and Reide Corbett on a project to assess sand resources for beach nourishment along our coast. So, in a nutshell, life is very busy.

Everything is fine on the home front. Lisa changed her job and is now a dialysis nurse for a big international company (Fresenius), which provides some nice benefits. We celebrated our 20th anniversary this last year. Katie, Sophie, and David are 16, 13 and 10, respectively, and are all excelling in school and doing the standard kid stuff (swim team, volleyball, girl scouts, etc.). Katie is driving and looking at colleges.

You'd think as a geologist, I'd have some understanding of time, but I have no idea where it goes....

Dare Merritt

Hello! I am the proud grandmother of a precious baby girl, Lena, born January 28, 2014! My son and DIL still live in Las Vegas so Lena will receive intensive periods of spoiling as frequently as I can get out there.

I was thrilled to welcome Kim West to the department as an Administrative Assistant in August after Michele Taing left us for a promotion at UNC-Charlotte in June. It was a busy summer and I had to relearn some things I hadn't done in a long time. The refresher may have been good for me but I am very happily delegating them again into capable hands.

Richard Spruill

Hello Fellow Geologists and Friends. It has been a busy year for the Spruill group! My two adult/kids are still living at home – the empty nest eludes me. Anna, 23, and Alex, 25, are doing well and they don't want to leave the farm. Lisa is involved in lots of activities, and we are traveling a great deal as I continue my activities with the National Association of State Boards for Licensing of Geologists (ASBOG). I completed my 5-year commitment on the Executive Committee, and I have now moved on as Chairman of the International Relations Committee of ASBOG. This committee is working on issues of mutual recognition, examinations, etc., between US licensure States (there are 30 of them), and the Canadian Provinces. I have been to Canada so often that I regularly end my sentences with "eh". Canada is fascinating to me – wonderful scenery, spectacular geology, and the Geologists there are the same as everywhere! I remain committed to studies of the aquifer systems of the Atlantic Coastal Plain. Much of my recent work has been on Hilton Head Island – I know what you are thinking. The Island relies

on groundwater as the major source of drinking water and irrigation supply, and they have been experiencing major issues with saltwater intrusion caused by regional over-pumping of the Floridan Aquifer System (we call it the Castle Hayne in NC). We are developing the salty portions of the deeper aquifers and working with engineers who are designing and building reverse osmosis plants on the Island. Perhaps my most interesting project this past year involved making repairs on a 4200 foot deep well screened in the Cretaceous Aquifers on the southern end of Hilton Head. The well has an artesian head of 140 feet above land surface, the saline groundwater is warm (about 118 deg F), and the well will free flow at 1900 gpm.

We are planning a big celebration at ECU for the 50th Anniversary of the Geology Department. Please plan to attend the annual end of year party (details provided in this newsletter) and help us plan the celebration for next year. Hope to see you this Spring at the 'Spruill Farm' for the annual pig pick'n.

Jim Watson and John Woods

The tech support side of the department continues to enjoy the very strong and diverse talents and dedication of John Woods. It has been very gratifying and helpful to be able to work directly with the guy I always used to call for advice. John puts his amazing IT skills to work every day to solve a wide range of problems, and has resurrected an astonishing number of comatose hard drives. John also brings a great depth of boating experience and knowledge to the department. The Department of Interior was so impressed with John's knowledge and teaching skills that they rented him from ECU at one point to go to Florida to train instructors of their small boating course, which we have also adopted at ECU. My focus has therefore shifted somewhat away from boating, and more toward things like support of research and teaching instrumentation. Our new x-ray analytical lab continues to see good use.

We are enjoying working with Dr. Culver and Dr. Horsman in designing the new teaching lab on the first floor of the Graham Building. The architects have agreed to incorporate geologically meaningful stone products wherever possible, so we are looking forward to choosing a very interesting suite of polished slabs for all the countertops, as well as choosing some meaningful tiles for strategic placement on the walls.

Our alumni website continues to be quite functional, thanks to the hard work of Rob Howard, who revamped the site while still a grad student, and who has now been drafted by ECU into a full time position to develop the Coastal Atlas. Please take a moment to register on our department website, and drop me an email if you have any questions, or if you need me to delete an older entry. Note that most of the information asked for on the form doesn't appear on the website, but it is available to us on our database, and is helpful as we try to keep track of your developing careers. Also, you will note that Rob has cleverly designed the site to keep the bots away from the information that is viewable. Do stay in touch. Hope to see you at the pig pickin.

Catherine Rigsby

When not engulfed in the politics of the UNC system (my position as Chair of the Faculty Assembly ends on June 30th of this year!), I continue to teach and do field-based research relating sedimentology to paleoclimatology, landscape, and land-use change. Excitedly, an interdisciplinary team of colleagues (geologists, climatologists, and biologists) and I were recently awarded a \$4.4 million grant from NSF's Frontiers in Earth System Dynamics (FESD) Program to study *The Dynamics of Mountains, Landscapes and Climate in the Distribution and Generation of Biodiversity of the Amazon/Andean Forest*. The team will take advantage of recent advances in their respective disciplines to develop an integrated understanding of how climate and geology interact to shape the distribution and generation of biodiversity in the Amazon/Andean forests through time. Field work will begin this summer with expeditions to the upper and middle Amazon basin.



But, there's more! Last year, I received a Special Visiting Researcher Award from the Brazilian National Science Foundation (CNPq). The work on this 3-year "Ciencia sem Fronteiras" grant is to study the *Seismic Stratigraphy and the Geologic History of the Amazon Basin* in collaboration with researchers in the department of Ocean and Earth Dynamics at Universidade Federal Fluminense (UFF) in Niteroi, Rio de Janeiro, Brazil. During the project's July 2014 field season students and faculty from UFF and ECU will begin the first ever high-resolution, deep seismic survey of the full length of the Amazon River valley.

Before either of this summer's field expeditions, however, co-workers and I will convene an International Ocean Drilling Program (IODP) workshop in Buzios, Brazil, to discuss potential IODP drilling to continuously sample late-Cenozoic through modern sediment in the "Foz do Amazonas" basin on the equatorial Atlantic continental margin of Brazil. They hope to leave the March gathering with a near-complete full proposal for *Deep Drilling of the Amazon Continental Margin: Cenozoic Climate and Biodiversity; Gravity Tectonics; Microbes, Diagenesis, Gas Hydrates and Fluid*.

My contribution to all of these projects will expand the work I and my former students (you know who you are!) started in tropical South America almost 17 years ago -- first on the Bolivian Altiplano, then in the highlands of Peru, and most recently in the southwestern Amazon Basin (wow, how the time flies!). As with those previous studies, these new projects will inform both my teaching and my research with future students. I'll be back in the classroom, lab, and field with undergraduate and graduate sedimentology students in Fall 2014 (after a 2-year hiatus to do all that political service for the system's faculty) and am looking forward to it more than you can possibly imagine!

Don Neal

Another year, another newsletter. I have lost count as to the number of newsletters I have compiled. Some are better than others but the content is more important than the design. You would think that after 35 years I would figure out how to teach these courses but I am still trying to work the kinks out. Last fall I taught the graduate sed pet course and although it wasn't perfect I think the students learned a little. I am still teaching 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 think I said this last year as well. We do have some very bright students and I know they will do well in their careers after leaving ECU.

Katie Cummings, working on the stratigraphy of the Alexander Siltstone... a gas pay in the Devonian of northern West Virginia, is trying to wrap her thesis up but will probably have to delay until the end of the summer as she has an internship with EQT Corporation this summer in Pittsburgh. I have two new graduate students working with me, both from the University of Kansas. Mallory Stevenson is looking at the gas production of the Marcellus Shale in southern West Virginia near the erosional limit of the formation and Brian Klipp is working on the diagenesis of the Oriskany Sandstone, also a gas producer, with special emphasis on the relationship of diagenesis to thermal maturation. So, lots of interesting geology is taking place on the third floor of Graham Building.

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 Blacksburg, VA. Expectations are for a large meeting in spite of the eclectic mix of technical sessions. Next year we are in Chattanooga, TN, and the year after that in Columbia, SC. I always look forward to meeting with alumni young and not so young.
All the best.

Spring Pig Pickin'

Sunday, April 27

Spruill Ranch

44232

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