

East Carolina University
Department of Geology

Newsletter

From the Chair

Dear Alumni,

It hardly seems like twelve months since I last wrote to you. The year has probably flown by because we seem to be so busy. The big news of the year is three-fold. First, the move of the Geology laboratories to a refurbished Flanagan Building (I mentioned this last year) is still on schedule. This amazes me because there have been the usual funding problems but the campus planners are dealing with this by mothballing one entire wing of the building. So Geology should have new labs, workshops and storage facilities two to three years from now. In addition, we will have a 115-seat lecture theater that will enhance our student numbers by replacing our current 80-seater in Graham.

The second major item is that we are searching for a new, additional faculty member. The new appointment will be set up in a similar fashion to Reide Corbett's, shared with the Coastal Resources Management Program, and with a research emphasis. The position is in coastal physical oceanography and will help strengthen coastal activities (teaching, research and service) at ECU. So if you know of anyone with a geological background who has an oceanographic bent, please let us know!

The third item of interest is the establishment of a Geology Advancement Council (GAC). The purpose of the GAC is to provide an opportunity for friends and alumni to use their influence and affluence to further the Department's goals, and to participate in ensuring its future success. The GAC provides advocacy, consultation, and support for the Department and the continuing development of its undergraduate and graduate programs. The founding members include: **C.Q. Brown, Scott Snyder, Ron Crowson, Mike Amsbaugh, Pat Mallette, Jerry Dominey and Scott Hartness.** If you are interested in joining the GAC or nominating someone for membership, please contact me at culvers@mail.ecu.edu. We have yet to meet or discuss initiatives but I hope to be able to report positively a year from now. Until then, best wishes to all!

Stephen J. Culver

Faculty News

Reide Corbett

The years seem to pass quicker and quicker...maybe that means I am settling in or getting older!? This year has been exciting, both personally and professionally. Lisa and I welcomed our second child into the family. Noah Steele was born on February 5 and has kept us fairly busy ever since. Ian (now 3) is excited to be a BIG brother and is actually a lot of help, as long as it doesn't involve changing diapers.

Life around the department has been equally exhilarating. My research group has grown to include 2 PhD's, 3 masters, and 1 undergraduate student. Together we have initiated several new projects

over the last year. We received funding from the National Science Foundation to evaluate groundwater/surface water interactions in southern Louisiana, adjacent to the Mississippi River delta. This project has six research cruises scheduled for the next year on the Louisiana's continental shelf beginning in the fall. Our first field excursion to collect groundwater samples was very successful. We brought back plenty of water and even more bug bites...the gnats for large blood sucking clouds! This study will provide insight into the influence groundwater has on the geochemical budgets and represents the first time this type of work will be done in a river-dominated coastal system.

We have also begun a study to further our understanding of barrier island hydrology and the effects people have on groundwater flow (magnitude and/or direction) and nutrient concentrations. We will begin installing short (5 meter) wells in the next couple months in several locations. We hope to find suitable sites to compare on Cape Lookout (natural) and Bogue Banks ("impacted").

Our work in North Carolina's estuaries has not slowed. We are still actively involved in several studies evaluating the sediment dynamics of these systems. In particular, we are interested in the potential importance of natural (waves, wind, etc.) and anthropogenic (trawling) disturbances in nutrient cycling. Recent work has demonstrated the intense energy of the system, efficiently reworking sediments several times before the ultimate deposition. Our trawling work has shown the similarity between the disturbance associated with trawl nets and natural wind events. To date, our trawling research has been a fairly isolated study in South Creek. However, we are currently trying to secure funds to broaden this research to include areas actively trawled (Pamlico Sound).

If you ever have any questions regarding our research group, current activities, or anything else for that matter, please don't hesitate to call. Have a great year!

Steve Culver

After three years of organizing ECU conferences on flooding, I thought I would have an opportunity to spend a little more time on my research this year. But of course, other administrative duties got in the way. I did manage to spend a very enjoyable two weeks in the field last summer in the company of some 15 to 20 other faculty, staff and students including visitors from Beloit, Wisconsin and Durham, England. We stayed at a house in Frisco and I had an enjoyable time sampling Pamlico Sound's muddy bottom with Reide Corbett, vibracoring Pea Island and Hatteras Island with Jim Watson, and slogging through mosquito-infested marshes with Stan Riggs (some things never change!) Many of the samples collected are now being worked up by several students (Dave Vance, Chris Smith, Irene Abbene and, some of you may know him, Pete Parham). As usual, the fieldwork was the fun part. The sample processing will be a long and tough process, but the results will all be worthwhile. I'm certainly looking forward to my first student at ECU, Dave Vance, to graduate in Spring Semester 2003.

Talking of results, this year saw the publication of papers on predation on and by foraminifera, the trophic role of marine microorganisms through time, the response of benthic foraminifera to bolide impact at the K-T boundary, and species diversity patterns through the Cenozoic. One of the most enjoyable outputs this year, however, was coauthoring an abstract for the San Francisco AGU meeting with several students and faculty, including your former Chairperson, Scott Snyder. If you read this, Scott, let's collaborate some more!

Although this section of the Newsletter focuses on research, I believe that activity is closely connected to teaching. So let me report that I had fun teaching Earth and Life Through Time (Historical Geology) and Paleontology. I even managed to recruit some students from the former into the latter. Although exam results are sometimes disappointing, I always get a big kick when a student's "light bulb" suddenly turns on when a difficult concept is grasped. Teaching is most certainly fun and every time I stand in front of a class it reminds me why I left my job at the Natural History Museum in London to come to ECU. That was, undoubtedly, the best move of my career!

Steve Harper

On the teaching front, my typical teaching semester still includes 2 sections of Dynamic Earth (Geology 1500) and 1 section of Environmental Geology (Geology 1700). As has been the case since I first arrived in the Geology Department in 1992, part of my teaching duties still include training and mentoring our Graduate Teaching Assistants to teach Geology 1501 labs. I recently received an ECU Teaching Grant from the Vice Chancellor's Office to develop a WEB site utilizing my personal geo photo library as a virtual field trip to study landforms for Geology 1500 and 1501. This is the third teaching grant I have received in the past four years. Our departmental curriculum also has me teaching Geomorphology (Geology 5000-5001) every other spring semester, which includes the spring semester of 2003. In my Geomorphology course we have just completed a coastal field trip to the northern Outer Banks and next weekend will be heading to the Blue Ridge of Virginia to look at debris flows and caves in the Shenandoah Valley. Also, I will be in the teaching rotation for the UNC System-wide Geology Field School in New Mexico and Colorado in May 2003 for the fifth straight year and will be teaching at the Abiquiu and Taos, NM sites. For the 2003 field course, we look to have ~40 students enrolled in the summer geology field course from 6 universities in North Carolina (ECU, UNC-CH, NCSU, UNC-W, WCU, and ECSU) and 2 universities in Virginia (JMU and JMU). This will be the 39th year of the UNC System-wide Summer Geology Field Course from its original beginnings as strictly a UNC-CH endeavor in 1965 located out of Fort Burgwin Research Center at Rancho de Taos, NM. In honor of approaching our 40th anniversary, Dr. David Dunn, who founded the course and taught me in its 4th year in 1968, will spend 3 days with us at Sipapu Lodge in Vadito, NM. There is a lot of history in the 39 years with important contributions from Dr. Spruill and Dr. Mauger here at ECU!

My primary research interest now is evaluating the role of mass wasting in the evolution of tower karst in coastal areas of Krabi and Phang Nga Provinces along the southwest coast of Thailand. I am also looking for approaches to date high sea level stands along the western coast of Thailand indicated by notches 3-5 meters higher than modern notches. My focus on the high notches is on the "exterior" tufa stalactites that have grown down from the visor of the high notches. All of this is what I consider summer vacation, self-funded research! Also, I made a minor push into coastal tower karst terrains at Ha Long Bay and Bai Tu Long Bay, Vietnam last summer. Lastly, I presented a tower karst abstract at national GSA meeting at Denver in November 2002 and tower karst seminars at James Madison University and UNC-Wilmington during the 2002-2003 academic year.

As for my summer travels for the summer of 2003, I plan to fly Bangkok with a stopover in Singapore around June 20. I will stay in SE Asia until the end of July. My current travel plan includes 10-14 days in northwestern Laos including a slow boat trip down the Mekong River from Ban Huai Xai to Luang Prabang, where I will explore some surface karst and caves. Then a road trip from Luang Prabang to Vientiane with a stopover at Vang Vieng, which also has karst! Will also be checking out some of the ethnic minorities while in Laos and may even pan for gold near Huai Xai! From Vientiane, Laos will return to Bangkok to catch a flight to Hanoi, Vietnam. From Hanoi will then travel overland to Ha Long Bay and Haiphong. I have many karst areas that I want to explore in the Ha Long Bay area and hope for sunnier skies than last August during my first trip there. From Ha Long and Haiphong, I will bus or train down the Viet coast first to Dong Hoi (coastal dunes and a big cave with underground stream, then Hue (the spiritual capital of Vietnam), then Danang, and then Hoi An before heading back to Hanoi for a return flight to Bangkok. Then will head to south Thailand to my beloved coastal karst areas at Krabi and Phang Nga and plan to push 100 km south along the coast to Trang to check even more coastal tower karst. If time allows, will travel to Penang, Malaysia for 2-3 days before returning to Singapore and USA. Lastly, I have a second two week trip planned from mid to late August to Hong Kong and Yunnan Province of China. More karst (pinnacle karst/stone forest) and hill tribe/ethnic minorities of highland areas of Asia along the Laotian-Burmese border! All of these plans are made assuming SARS has run its course in southern China and SE Asia by mid June!?

David Lawrence

Well, the most fun I had during the year was looking at outcrops on the Via dell' Amore on the west coast of Italy in the summer. It is indeed hard to beat eating Italian ice cream, while hiking between little Italian fishing villages that are attached in unlikely ways to the coastal cliffs. Even better, you know that if you get tired, you can get on the train at the next village, go through a few tunnels, and get off and drink wine at your hotel. The outcrops? Classic turbidites, with full Bouma sequences, folds, thrusts, worm burrows, and soft sediment folds. I highly recommend the town of Vernazza and the Cinque Terre wines.

Otherwise, I made progress on collecting gravity data along the Cross Anchor thrust in South Carolina, did some mapping along the thrust, and constructed gravity models of the thrust sheet. I also spent a lot of time merging my gravity data with other data sets, and producing an edited version of a gravity map of the entire South Carolina Piedmont. There were lots of bad points, so it took quite a while removing them point by point. You know, some people just do not know where they are, even when collecting gravity values.

I doubt they were standing in the middle of a swamp, which is where some of the latitudes and longitudes would lead you to believe.

Oh, and Field Methods is back in the curriculum after its short hiatus, so it is off to the grand city of Hot Springs this April for the annual field trip.

Dave Mallinson

Presently, my work with the North Carolina Coastal Geology Cooperative (NCCGC) is occupying most of my research time. For those of who don't know, this is the USGS-funded research program to define the Quaternary evolution of the North Carolina coastal system. Drs. Stan Riggs, Steve Culver, and Reide Corbett at ECU are also working on this project; and we have numerous graduate students involved, as well as other investigators at other universities and agencies. The objectives include mapping the Quaternary geology of the N.C. coastal system, determining the record of Quaternary sea-level events, and determining the extent of geologic controls on barrier island migration and coastal erosion, among other things. My part of this is the estuarine seismic data interpretation, and ground-penetrating radar work on the barrier islands and mainland. The best part is, we spend several weeks each summer out on the Outer Banks.

My other research is progressing as well. I have an Integrated Ocean Drilling Program proposal working its way through the maze of reviews. This proposal calls for shallow-water drilling of relict reefs and paleoshorelines in south Florida. So far, the reviews are looking positive. I'm also continuing my connections to warm waters with seafloor mapping work (side-scan sonar and multibeam bathymetry) and diving on the Florida Middle Ground in the eastern Gulf of Mexico this summer.

On the home front, my life gets seemingly busier by the day. With a 5-year old (in Kindergarten), a 2-year old (climbing everything in site), and one on the way (due July 19th), there's never a dull moment (nor a moment to rest).

Richard Mauger

This past academic year, I've taught Oceanography, introductory geology, now called Dynamic Earth, Manuscripts, a writing course, and the Geologic Component of Environmental Science, an advanced course in environmental geology. Last summer I taught the Gunnison, CO, area projects in the UNC System-Wide Geology Field Course and as Field Course Director, I've continued to take on much of the financial and administrative work and planning that goes with the course. A total enrollment of about 40 looks certain for the coming summer. Enrollment has been augmented by 3 students

from James Madison Univ. and 4 from George Mason Univ. I've done some reviews of introductory geology and oceanography texts, completed geologic maps of parts of two quadrangles in Colorado and of the Los Sauces Quadrangle in Chihuahua, Mexico. A brief manuscript describing a Zr-rich, silica-poor, ferric iron garnet and a possible ferric iron-bearing thomsonite (a zeolite) from Chihuahua, Mexico has survived a review by a USGS zeolite expert. I walk one of our Siberian huskies for a mile or more every day and do some reading. My recommended reading list for this year follows.

Fire in America: A Cultural History of Wildland and Rural Fire
Stephen J. Pyne, Foreword by William Cronon, 1997

The Silent War: The Cold War Battle Beneath the Sea
John Pina Craven, 2002

Hurricane Watch
Bob Sheets and Jack Williams, 2001

Don Neal

I see there is a little space left in the newsletter so I guess I will do my part in filling in the white. This has been a hectic year with a fair amount of travel and a lot going on outside. Last fall I had the distinct privilege of presiding over the biennial convention of Sigma Gamma Epsilon held at Southern Utah University. I must have done an okay job as they elected me to a second term as National President. This means I get another two years of trying to keep *The Compass* appearing regularly and nurturing existing chapters and starting new chapters of the honor society. While in Utah we had a great trip to Zion National Park. I highly recommend you take the time to visit the area if you get a chance.

This was followed closely by the GSA meeting in Denver which is always a blast, especially if your expenses are paid (one of the perks of being Secretary-Treasurer of the Southeastern Section of GSA - no state money involved!). If this sounds sexy then consider the schedule of mini-meetings that I have for GSA in addition to judging the best poster contest of SGE. On the last day of the meeting I get to see some science. Unfortunately, there isn't always a session dealing with my research interests.

Speaking of research interests, I am still working with carbonates. I have two graduate students working on Mississippian carbonates in southwestern Virginia and another working on Ordovician chert and carbonate also in southwestern Virginia. This spring I presented a paper at the SE-SC GSA meeting in Memphis, TN, on some reworked data from Alan Hartsook's thesis on a Cretaceous oolite shoal in northern Louisiana. Don't be surprised if others find bits and pieces of their theses resurrected, restudied and repackaged.

On the home front, my sister the pastry chef moved back from the mountains of western North Carolina and I have helped her open up a coffeeshop/bakeshop/gourmet food retail store in a little strip mall on the south side of town. I can now make a variety of espresso drinks even though I don't drink the stuff. All of the baked goods are made from scratch and business is getting better. So, if you are ever in town, please stop by.

I guess enough white space has been filled-up for this year. Here's wishing you all the best.

Live long and prosper.

Stan Riggs

It has been three years now since I have taught an undergraduate class, but I don't feel like I have ever left teaching. I have been the co-PI on two large teacher workshop grants for the past three years. One is a National Science Foundation funded program called Earthview. This weekend we have our final workshop to come full circle back to the coast and wrap things up at Nags Head with the 40 earth science high school teachers that have been with us now for 3 years—year 1 was an extended field workshop on coastal systems; year 2 was in the Appalachian Mts; and year 3 was in the Piedmont-Coastal Plain systems. This hands on teacher training program led into our Sea Grant funded project entitled Seaview. Here we took the 10 best teachers from Earthview and their 10 best students back to the coast to develop a curriculum that would take the coast to the inland schools. This program will finish up this summer. I still have a passel of graduate students that I work closely with on their thesis research as part of the ECU/USGS/NCGS coop project. In addition, I have been giving an untold number (I don't have to keep count any more!) of public lectures, workshops, and programs for government agencies, professional organizations, and public groups—this is all pretty much fun because these people really do want to learn something.

Last fall I had an opportunity to travel to China with a group for which I gave a couple of lectures as we floated through the massive Three Gorges of the Yangtze River and the spectacular karst of the Li River. This was an incredible journey through many of the same rock sequences that we worked on in 1981 with the IGCP 156 program. China has become as capitalistic as the US! I believe that this century will see China's rise to world prominence—what an absolutely mind-boggling change has taken place in the 20 years since my first trip.

My research program on the riverine systems of coastal NC has slowed down and sort of fallen on hard times—most have forgotten about floods and the others have lost interest in the geology. I guess rivers are not glamorous enough anymore. On the other hand, the coast is becoming ever more glamorous as our Coastal Geology Cooperative Program for NE NC (ECU-USGS-NCGS) is thriving and coming up with awesome geologic results. We survived the FY 2003 budget woes and finally received our 3rd years funding. To give you an idea of how hot this project is, we gave a special symposium on the coastal geology of the Carolinas at the fall American Geophysical Union in San Francisco—ECU faculty and students presented 10 papers to a full house with a great reception. The goal of this research program is to dissect the Pleistocene and Holocene section of the NC coastal system and determine the evolutionary history, including development of detailed climatic and sea level curves for coastal NC. See last year's newsletter for a summary of the project. Last summers field program took us through northern Pamlico Sound and down the barrier islands from Oregon Inlet to Hatteras Inlet. Last March we drilled 8 deep core holes in the Kitty Hawk to Nags Head area. Next week we start drilling the next set of 8 to 10 core holes between Nags Head and Buxton. These cores are being drilled on sites defined in the seismic and ground-penetrating radar data. This summer's field program will take place in southern Pamlico Sound, the Hatteras Flats, and the barriers islands down to Ocracoke Inlet. In addition, we have another major project working on North and South Core Banks. This should keep our crew of 17 faculty, technicians, and graduate students—this includes 7 of our graduate students, a senior researcher and student from England, and one honors high school student.

Be sure to visit both our ECU geology and the USGS websites to keep up with this research program—our second year progress report is now on the ECU website (www.ecu.edu/geology/coastal.html; <http://woodshole.er.usgs.gov/project-pages/northcarolina/>). We always look forward to hearing from each of you, or better yet, come out in the field with us—get your feet muddy and wet your gills before they permanently dry out!

Cheers

Catherine Rigsby

It has been a very busy year. So busy, in fact, that I have to keep this brief so I can get to my next task! Here are some the highlights:

- Two of my M.S. students (Renee Farabaugh and Amy Caulder) presented posters at GSA in the fall. It was fun. And, the feedback we received on the Ramis work (Renee) and on Amy's work on cores from the island of Grenada (did I mention I spent week there last year coring tropical island lakes?!) was very useful.
- Michelle Warren and Renee Farabaugh completed their thesis research this year. Michelle finished in the fall. Her work on 5 cores from the central Rio Desaguadero valley finished up a seven-year long NSF-funded paleoclimate project that included surface studies (done by Pattie Baucom – the first ECU student to work with me in South America, way back in '96-'99) and other core evaluation studies (done by Stephanie McNabb – M.S. '00 – and several undergraduate researchers) in that valley. Renee defended in April. Her thesis extended our paleoclimate research to the Peruvian watersheds of Lake Titicaca. We are now preparing her excellent study of the Rio Ramis Valley for publication.
- David Foster started an undergraduate honors thesis this semester. He is doing some detailed grain-size and inorganic- and organic-carbon analysis on the cores studied by Michelle and Stephanie. That work will continue through the Fall of 2003.
- I've been working hard on faculty governance issues: helping to redefine faculty scholarship at ECU as we transition into a research-extensive university, reexamining the undergraduate general education program, looking carefully at instructional technology issues on campus, slugging through the ever-present parking problems (somebody has to do it . . .), etc., etc..
- The "Sediment Deposition and Transport" class had a great trip to Cape Lookout in the Fall (check out some of the trip photos on-line at <http://core.ecu.edu/geology/rigsbyc/Images/CapeLookout2002/index.html>) and the Sedimentology class had their usual fun in the Tar River and on Shackleford Banks.

I'm heading for Peru in May and (assuming the WHO gives the all-clear) to China and Tibet in July. Both projects are extensions of my fluvial sedimentology/paleoclimatology research in high-elevation basins and both, luckily, are NSF-funded.

I love hearing from my ex-students out there, so keep writing to let me know how everything is going in your career and your life. As most of you know. Even though it often takes awhile, I usually do respond to your e-mails. If you don't hear from me immediately, just assume I'm out doing fieldwork in some great place! Also, I try to update the research pages of my website – <http://core.ecu.edu/geology/rigsbyc/rigsby/home.html> – a couple of times a year (adding new pictures and info about current and past students). Check it out every now and then. You never know what might turn up!

Scott Snyder

Scott Snyder continues as Associate Dean of the College of Arts and Sciences. Although his time is consumed largely by administrative duties, he does keep a hand in things geological, remaining active in the Cushman Foundation for Foraminiferal Research, directing or serving as a committee member on several theses, and occasionally contributing enough to ongoing departmental research projects to merit a co-authorship on an abstract. The only paper he presented during the past year (at a Phi Kappa Phi sponsored conference at Austin Peay State University) was anything but geological. It addressed the liberal arts and how they could adapt to demands for learning outcomes assessment without abandoning high academic ideals. Running, although much more slowly than in years past, is still an important part of his daily regimen.

Richard Spruill

After a depressing start (Remember 9-11!), this year has been quite eventful for the Spruill family. Lisa and the kids are doing well – Alex is fourteen and six feet tall, Anna graduates from elementary school, and Lisa and I are master chauffeurs!

I am teaching the same courses – Physical Geology, Petrology, and two Groundwater Hydrology courses. I am committed to teaching a smaller number of topics better, and I hope that it will pay dividends for the students down the road?

I taught a couple of short courses in Hydrology with my mentor Ralph Heath last summer in Raleigh. Teaching with the “Master” was intimidating, but I survived it, and I am sure that I learned more than most of the students in the class. Ralph and I published a paper in the *Journal of Hydrology* on our assessment of the recharge rates of the Cretaceous Aquifers in the Coastal Plain of North Carolina. Look for it in Spring/Summer of 2003.

Much of my focus for the last fifteen years has been to bring to the attention to the regulatory agencies and the consuming public the plight of our overstressed aquifers. I am happy to report that as of August 1, 2002, we have in place the Central Coastal Plain Capacity Use Area Rule. The Rule will effectively reduce withdrawals from the most severely affected aquifers by up to 75% over the next sixteen years! Our great challenge now is to find alternate sources of water to meet our future demands, and this is now the focus of most of my efforts. For example, I am working closely with Greenville Utilities Commission to develop the first Aquifer Storage and Recovery well in NC. We plan to begin cycle testing of the system late in 2003.

That is about it for me. I continue to be proud of all of you out there who trusted us to provide you with geologic information during your “time” at ECU, and I continue to hear great things about your contributions to the State and the region.

Terri Woods

On the research front this year, I have spent time analyzing data from the Wilmington, NC project and trying to write up some results. I am learning Principal Components Analysis (a multivariate statistical technique) and seeing what it reveals about my data and compiling the Sr, O, and H isotope numbers. A paper is coming out in *Limnology and Oceanography*, based mainly on analysis by the group at Wood's Hole, summarizing the results of the carbon-isotope data. Don Neal and I have written up the work of one of our former students, Delynda Tolen-Mehlhop, and just need to find time to format the references and submit it. Thanks to the efforts of a couple of students, my groundwater database for eastern NC has been cleaned-up and organized. It includes values for thousands of elemental analyses for most coastal plain aquifers – although the Castle Hayne is most frequently represented. I can essentially summarize all the work I've done at ECU over the past 15 years on a piece of paper measuring 3' X 7'. That's how much space the database takes up when printed out on our plotter. I currently have two students working on stream chemistry projects in small watersheds here in Pitt County. Both should finish up sometime this year.

I didn't make any major changes to my teaching this past year, but Richard Spruill and I have decided to change textbooks for Mineralogy and Petrology. We're going to try a single book “Earth's Materials: Minerals and Rocks” for both courses. It should save the students some money and most claim they never read much in either the Klein and Hurlburt mineralogy text or the petrology text Richard Spruill's been using. Finally, I have taken on a new type of project for the summer. I'm going to be writing the “Hydrosphere” chapter for the new North Carolina, high-school, earth-science textbook. The idea of the book is to use as many examples from North Carolina as possible, so I would welcome any good examples or exercises you can think of that elucidate the nature of the rivers, groundwater, and coasts in North Carolina.