



The Champlain Thrust **News from the** **Department of Geology, UVM** ***2015-2016***



Greetings from the Chair:

Greetings from UVM Geology! I was fortunate enough to be able to spend Fall 2014 on sabbatical leave, while Char kept the Department running like a well-oiled machine. The combination of sabbatical and a relatively uneventful spring must explain why I accepted to serve as the Department Chair for an additional five years, starting this past summer. Of course the administrative pace changed as soon as the Fall semester started but it is now too late to change my mind. Oh well!

As always, it has been an engaging and successful year for the Department. As you will see in this newsletter, faculty and graduate students have been busily pursuing research and churning out an impressive number of publications. More information on the faculty's many exciting activities can be found on individual's websites. See [Faculty listing](#)

Some excellent news: Despite the general decrease in enrollments at UVM, our Department has actually been growing quite significantly. The number of geology majors has increased by 26% since Fall 2010, with a huge spike this year (14 incoming majors). We currently count 48 majors, 14 minors, and 14 graduate students. This is surely a very exciting time for our department!

Once again Jack has managed to collect all the information needed to put this newsletter together. As usual, not an easy feat! As always, we have Gabriela, Robin and Srebrenka to thank for keeping our small, but buzzing Department running smoothly. There is really never a chance for our support trio to get bored, and without them the place would fall apart pretty quickly!

On the financial side of Chairing, our budget was especially tight this year (what's new about that?). Every donation helps, so please consider making a donation to support the UVM Geology Department. Simply donate by choosing "Donate Online" and scroll down to select "Other" to write in "Geology Department" and donate directly to the department. If you would like your donation used for a specific purpose then please indicate. All of your funds go directly to students. This really IS a case of "every dollar helps." On behalf of everyone in the Department, "thank you" for all your support!

And now you can even visit the Perkins Museum of Geology on facebook:



Former Chair, Char Mehrtens (L), middle chair, and current Chair, Andrea Lini, discuss chair matters.



VT State geologic map on display in Perkins Geology Museum, Delehanty Hall

Department Faculty



Andrea Lini, Associate Professor (Stable isotopes, Limnology and Climate Change): Greetings from the Chair: Greetings from the world of stable isotopes, lake mud, tree rings, and dangerous predators!

I spent my Fall 2014 sabbatical leave visiting a few Stable Isotope facilities, performing some desperately needed maintenance on my own instruments, working on manuscripts, and helping my graduate student Ashliegh Belrose complete her MS thesis. It was a very busy fall and it almost felt good to be back at “work” in January! As I mentioned in last year’s newsletter, Ashliegh collected sediment cores from Missisquoi Bay and St. Albans Bay in Lake Champlain in order to study the history of these two shallow bays all the way back to the time when the Champlain Sea covered the area approximately 10,000 years ago. Her study focused on the Champlain Sea-Lake Champlain transition, which was accompanied by drastic changes in water level. She was able to document the existence of a freshwater wetland that occupied most of St. Albans Bay shortly after the “demise” of the Champlain Sea. This ancient wetland was preserved in the form of a thick peat layer. It is a very interesting story, and if you would like to learn more about it you can download her completed thesis [here](#). I now have a brand new graduate student (Matthew Kraft) who will focus specifically on the lateral and temporal extent of the St. Albans Bay peat layer. We are eagerly waiting for cold temperatures, so that the bay can freeze over and we can begin collecting several cores using the ice as a stable coring platform. Fingers crossed!



A Swiss (Andrea) and a Brazilian (Norton – Brrrr it's cold!) having winter fun on the lake.



Paul Bierman, Professor (Geomorphology, Geohydrology, Isotope Geology Applied to Landscape Change): Paul Bierman

It's been another great year. Instead of travelling this year, we stayed home and enjoyed Vermont and our rapidly growing kids, one of which is now taller than we are. My field forays this year included time in central Pennsylvania sampling enigmatic blockfields with Al Denn, a current MS student and revisiting the Potomac River to prepare for the GSA Kirk Bryan fieldtrip I am leading there for the 2015 national meeting. I've been serving on a high level NSF committee that advises the GEO directorate on policy and learning lots about how our government works. Highlight of our last meeting was a wonderful talk and QA session with John Holdren, Obama's science advisor. Been a busy year with many papers coming out (funny how much writing we can do when the lab is closed for an upgrade). One paper, by Ben Dejong an NR doctoral student with me, caught particular interest in the press. For fun, try Googling "Dejong, sea-level". He hit NPR, Scientific American, CNN, the weather channel and loads of talk radio shows. DC is truly sinking. See the UVM report at: <https://www.uvm.edu/~uvmpr/?Page=news&storyID=21210>. Three other papers qualify for the blast from the past award including two about New England including measurements we made back in the 1990s and Jane Duxbury's thesis work finally seeing the light of day in an extensive paper in AJS. Its been a good year!

Bierman, P. R., Davis, P. T., Corbett, L. B., Lifton, N. and Finkel, R. (2015) Cold-based, Laurentide ice covered New England's highest summits during the Last Glacial Maximum, *Geology*. doi:10.1130/G37225.1

Whitney, B. B., Clark, D., Hengesh, J. V. , Bierman, P. R. (2015) Paleoseismology of the Mt. Narryer fault zone, Western Australia: a multi-strand intraplate fault system. *Geological Society of America Bulletin* ., doi: 10.1130/B31313.1

Bierman, P., (2015) The incision history of the Great Falls of the Potomac River—The Kirk Bryan 2015 field trip, in Brezinski, D.K., Halka, J.P., and Ortt, R.A, Jr., eds., *Tripping from the Fall Line*. Geological Society of Field Guide 40, doi:10.1130/2015.0040(01). p.1-10.

DeJong, B. D., Bierman, P.R., Newell, W. L., Rittenour, T. M., Mahan, S.A., Balco, G., Rood, D. H. (in press, 6/15) State and fate of mid- Atlantic sea levels from the geologic perspective. *GSA Today*. ([download paper as PDF](#))

Pelletier, J. D. et al. (2015), Forecasting the response of Earth's surface to future climatic and land-use changes: A review of methods and research needs, *Earth's Future*, 3, 00–00, doi:10.1002/2014EF000290. ([download paper](#))

Dickerson, R. and Bierman, P. R., (2015) Alluvial fan surfaces and an age-related stability for cultural resource preservation: Nevada Test and Training Range, Nellis Air Force Base, Nevada, USA. *Journal of Archaeological Science*. doi:10.1016/j.jasrep.2015.05.002 ([download paper](#))

Davis, P. T., Bierman, P. R., Corbett, L. B., and Finkel, R. (2015) Cosmogenic exposure age evidence for rapid Laurentide deglaciation of the Katahdin area, west-central Maine, USA, 16 to 15 ka. *Quaternary Science Reviews*. ([download paper](#))

Pupim, F. do N., P. R. Bierman, M. L. Assine, D. H. Rood, A. Silva, E. R. Merino, (2015). Erosion rates and landscape evolution of the northern border of the Brazilian Pantanal basin from cosmogenic ^{10}Be , *Geomorphology*. v. 234.

Duxbury, J., Bierman, P., Larsen, J., Pavich, M.J., Southworth, S., Miguéns-Rodríguez, M., and Freeman, S. (2015). Erosion rates in and around Shenandoah National Park, VA, determined using analysis of cosmogenic ^{10}Be : *American Journal of Science*.v. 315, p46–76, DOI 10.2475/01.2015.02

Ouimet, W., Dethier, D., Bierman, P., Wyshnytsky, C., Shea, N. and Rood, D. (2015). Spatial and temporal variations in meteoric ^{10}Be inventories and long term deposition rates, Colorado Front Range: A cautionary tale. *Quaternary Science Reviews*. v.109, p.1-12, dx.doi.org/10.1016/j.quascirev.2014.11.003

Wyshnytzky, C., Ouimet, W.B., McCarthy, J. A., Dethier, D.P, Shroba, R.R., Bierman, P.R. (2015). Meteoric Be-10, clay, and extractable Fe depth profiles in the Colorado Front Range: Implications for soil mixing and slope stability. *Catena*. v. 127, p. 32–45.

Corbett, L., Bierman, P.R., Lasher, G.E., and Rood, D. (2015). Landscape chronology and glacial history in Thule, northwest Greenland. *Quaternary Science Reviews*, 57-67, 10.1016/j.quascirev.2014.11.019

Reusser, L., Bierman, P.R., and Rood, D. (2015) Quantifying human impacts on rates of erosion and sediment transport at a landscape scale. *Geology*. doi: 10.1130/G36272.1 ([download paper](#))

Portenga, E., Bierman, P.R., Duncan, C., Corbett, L., Kehrwald, N. M. Rood, D. (2015). Erosion rates of the Bhutanese Himalaya determined using in situ-produced ¹⁰Be. *Geomorphology*. <http://dx.doi.org/10.1016/j.geomorph.2014.09.027>

Paul

pbierman@uvm.edu
uvm.edu/geomorph
uvm.edu/landscape

UVM Geology Dept.
Delehanty Hall
180 Colchester Avenue
Burlington, VT 05405

uvm.edu/~pbierman

802-238-6826 (cell)

802-656-4411(v)

802-656-0045 (fax)



UVM alums (and current students) at Baltimore GSA after lunch at the "world famous" Lexington Market. November 2015.
L to R: Sophie Greene (current MS), Anders Noren, Paul Bierman, Lyman Persico, Christine Massey, Lee Corbett, Jenny Bower (current MS), Will Hackett, Al Denn (current MS), Luke Reusser, Josh Galster, Sarah (Brown) Lewis, Lydia Smith



John M. Hughes, Professor (Mineralogy, Crystallography, Crystal Chemistry): It has been a busy year. I finished my term as Past-President of the Mineralogical Society of America, which was rewarding and humbling. The term ended with the publication of my MSA Presidential Address, and it was interesting to write a summary of career-long work on the mineral apatite, work that involved many, many wonderful colleagues. It was also nice to see the apatite volume of *Elements* come out this year, summarizing a lot of past work on the mineral. I also serve as Associate Editor of *American Mineralogist*, on the special Apatite volume. Work currently continues on apatite crystal chemistry, and it is as much fun now as it was when I did my first experiments many years ago. Other mineralogical studies are also ongoing, and this spring I taught a course in Crystal Chemistry where the class participated in crystal structure solution and refinement using the fine facilities we have here. Susan and I again spent our summer in Charleston, SC, catching up on writing and enjoying family visits. Our granddaughter, now almost four, loves the beach and will fearlessly head into the waves. She was joined by a little brother, who appeared on Halloween. Gareth and Amy are super busy chasing two now, and Susan and I love to spoil them! Gareth is a producer with CBS Sports, and the work on the 2106 Super Bowl has been going on for a while now. Our daughter Rebecca, who lives in Oakland, is doing well and enjoying the earthquakes, including a big one last week.

Still enjoying teaching and research as much as ever...



Belle Halladay and Wylie
Celebrating his birthday and
Halloween (same day!)

Best to everyone,
John



Keith Klepeis, Professor, Structural Geology, Tectonics & Field Geology:
Greetings,

This year has been a wonderful one for me. During the winter months, and thanks to a sabbatical, I was able to catch up on some field work I've always wanted to do. In January, I took two UVM students (**John Gilbert** and **Hannah Blatchford**) to a remote part of Fiordland National Park in southwest New Zealand to do research. The site is located far up in the mountains and is only accessible via helicopter. John, Hannah and I, along with two New Zealand scientists (Rose Turnbull and Richard Jongens) set up three fly camps from which we completed traverses. As you can see from the photos it is pretty rugged. But we had unusually good weather (Fiordland is part of a temperate rain forest!). We finished making some great geological maps and cross sections, and collected a huge number of samples and measurements. John and Hannah presented their results at the annual meeting of the Geological Society of America in November.

I also had the pleasure of working with some great students both inside and outside the classroom. **Christina Strathearn** finished up a great Honors thesis with me looking at the evolution of some thrust duplex structures exposed below the Champlain thrust fault at Lone Rock Point in Burlington. Three other Geology Seniors (**Annie Gombosi**, **Max Langworthy**, **Ben Schachner**) and a Geology Junior (**Eleanor Johnson**) helped with the project and produced some fantastic results. They all joined forces and presented their findings at two local meetings (Vermont Geological Society and Vermont Student Research Conference) and one national meeting (Northeast section of the Geological Society of America). All finished up and graduated in 2015.

I've also heard from recent UVM graduates **Abigail Ruksznis** and **Douglas MacLeod**. Abi earned her Masters degree from Stanford University this year and Doug earn his Master's degree from Idaho State University where he worked on a high-grade gneiss terrain of British Columbia. **Laura Cuccio** also has entered into a very exciting graduate program at Utah State where she is working on sedimentary rock-basement interfaces and their relationship to wastewater injection and human-induced seismicity.

Students in our graduate program are doing equally well. **Kathryn Dianiska** and **Alice Newman** both earned their Master's degrees from UVM last year. Kathryn is working as a geologist for the Anadarko Petroleum Company in her home state of Texas. Alice is working as a visiting instructor at Carleton College where she is teaching and mentoring undergraduate students. All in all it has been a very rewarding year!

I hope all of you are doing well.

With best wishes,
Keith

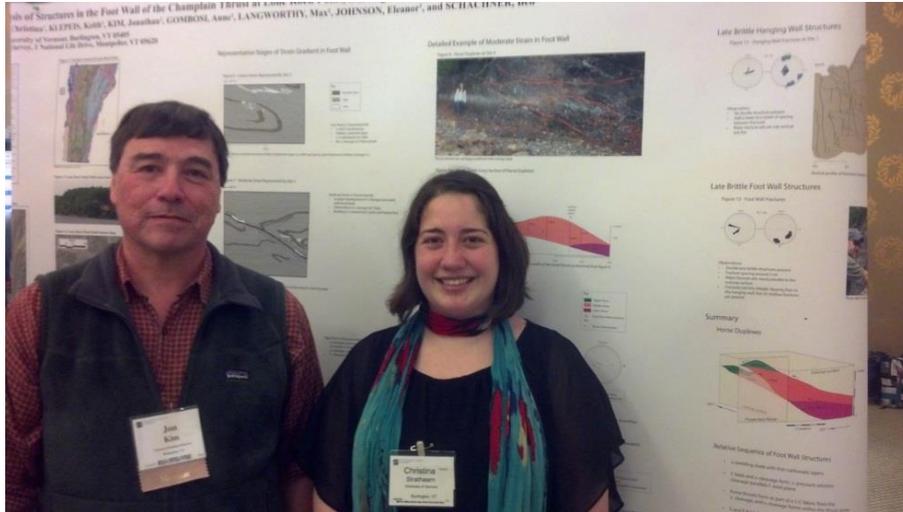
kklepeis@uvm.edu (802) 656-0247
<http://www.uvm.edu/~kklepeis>



Group photo with Coronation Peak in the background. Fiordland National Park. From left to right: Hannah Blatchford (UVM), Keith Klepeis, John Gilbert (UVM), Rose Turnbull (New Zealand), Richard Jongens (New Zealand).



John and Hannah organize gear for a fly camp.



Dr. Jon Kim (Vermont Geological Survey) and Christina Strathearn (UVM Senior) present the results of her research at a GSA meeting.

Selected Publications:

Webber, J.R., **Keith A. Klepeis**, Laura E. Webb, José Cembrano, Diego Morata, Gabriela Mora-Klepeis, Gloria Arancibia, (2015) Deformation and magma transport in a crystallizing plutonic complex, Coast Batholith, central Chile, *Geospheres*, submitted.

Betka, P. M., and **K.A. Klepeis**, 2013, Three-stage evolution of lower crustal gneiss domes at Breaksea Entrance, Fiordland, New Zealand, *Tectonics*, 32, doi:10.1002/tect.20068.

Kim J, Ryan P, **Klepeis K**, Gleeson T, North K, Bean J, Davis L, Filoon J (2014) Tectonic evolution of a Paleozoic thrust fault influences the hydrogeology of a fractured rock aquifer, northeastern Appalachian foreland. *Geofluids* 14: 266-290 DOI 10.1111/gfl.12076



Char Mehrtens, Professor (Stratigraphy, Sedimentation, Carbonate Petrology):

Annual greetings! It's been a busy year full of both work and play activities. Getting the work stuff out of the way first – last January saw the publication of the preliminary edition of my textbook “How the Earth Works.” I wrote this for the Earth Systems intro class I teach. It's a mixture of rocks, plate tectonics, water and climate. I taught with it last spring, caught many typos and sent it out to reviewers over the summer. I completed the revisions just before the semester started and the first edition should be out this spring.

Writing an introductory textbook was actually a lot more fun than I expected. I felt like I was downloading part of my brain.

In addition to writing the textbook I'm working with former grad students Ryan Brink and Steven Gohlke to get their M.S. theses into print. Ryan and I were co-authors/leaders on an NYSGA field trip to look at the Cambrian in northern New York. Bruce Selleck (Colgate) revised our "Crown Point" field trip for the Sunday NYSGA field trip. I'm still working on the Egypt project with Barb Tewksbury (Hamilton College) on the origin of a polygonal fault network in the Cretaceous and Paleogene stratigraphy there. Steven's burial history study in his thesis are key to unraveling that structural problem. A return trip to Egypt still looks out of the question, although our Egyptian colleagues were able to visit the States this fall.

Laura Webb and I are advising new grad student Henry McGuire on a project that will (I hope) finally move my years of work on the Monkton towards a conclusion. Henry will be trying to obtain detrital zircon ages for the Monkton as well as complete an outcrop-based gamma ray log for this unit, to better identify cycles. Both data should help us with correlations to the Cambrian sequence in New York.

This semester I'm teaching the intro "How the Earth Works" class and Strat/Sed (Geol 153). Many weeks of beautiful sunny warm days have given way to autumn weather unpredictability. Inevitably some of the weekend field trips will involve rain.

Now on to the fun things! To reward myself for a past summer of writing I gave myself a trip to the UK this May and June where I walked part of the Southwest Coastal Path in Cornwall and Dorset. The Brits are a walking culture and there are walking paths everywhere. One of the most beautiful is along the coast of Cornwall (if you watched the PBS Masterpiece Theater series "Poldark" you saw where I walked). I hired a company to schlep my bag and all I did every day was walk 6-14 miles from inn to inn. This was the best thing I've ever done and I highly recommend it, especially if your knees are telling you that days of carrying backpack are over :) Cornwall is an old mining region and did some geologizing while there (going underground into a tin mine!). I also pilgrimaged to Dorset to walk part of the "Jurassic Coast" famous for where Mary Anning found Ichthyosaurs and Plesiosaurs back in the late 1800's. All in all a spectacular trip.



Ammonite, The size of a dinner plate



Char at Lands End,
the place -Cornwall, England - NOT the
retail store.



Botalack Mine, Cornwall



Anacapa Island,
Channel Islands, California

More locally, Jack and Ruthie Drake continue to be good golf buddies. Occasionally, I torment Barry Doolan with my golf game. I play through the summer in the Adirondacks, where I have a small cabin. This year's big story was my acquisition of a slightly used 14' pontoon boat, aptly called "the party pontoon." I never saw myself owning one of these, but it kind of fell into my lap and is actually a LOT of fun.

Please keep sending news of your activities. It is ALWAYS great to hear from everyone.

Publications

Tewksbury, B. J., Hogan, J. P., Kattenhorn, S. A., Mehrtens, C. J., & Tarabees, E. A. ,2014, Polygonal faults in chalk; insights from extensive exposures of the Khoman Formation, western desert, Egypt. *Geology (Boulder)*, 42(6), 479-482.

B. J. Tewksbury, E. A. Tarabees, C. J. Mehrtens, J. A. Wolpert, L. L. DeGennaro, G. S. Dennison-Leonard, T.J McLean, 2014, Extensive syncline network in Eocene limestone of the western desert, Egypt: Regional folding? Collapsed paleokarst? Mobilization of underlying shale? *Geol. Soc. Am. Abstr with Progr.*

Tewksbury, B. J., Hogan, J. P., Mehrtens, C. J. ,2014, Using online video conferencing and file sharing to run multi-institutional seminars and to bring guest speakers to the classroom. *Geol Soc. Am. Abstr. with Progr.*



Laura Webb, Assistant Professor (Igneous petrology and Geochronology)

Hello alumni and friends of UVM Geology,

It's been another busy and exciting year. We've been enjoying the thrill of new $^{40}\text{Ar}/^{39}\text{Ar}$ geochronology data coming out of my new lab, which is providing great fodder for papers, theses, conference presentations, and new proposals and collaborations. I'm pleased to say the lab has just officially opened its doors as a facility to the international geoscience community. So please keep us in mind if you find yourself looking for a $^{40}\text{Ar}/^{39}\text{Ar}$ laboratory for current or future projects.

In AY2014-15 I was a UVM Faculty Fellow for Service Learning and I am a participant this fall in the Campuses for Environmental Stewardship grant funded by the Davis Educational Foundation. As part of this project, I have modified my Field Methods in Geophysics course and it is now a recognized service-learning course and meets the new UVM general education sustainability requirement. This semester the students are conducting geophysical experiments to locate archeological remains from the War of 1812 in the City of Burlington in partnership with the UVM Consulting Archaeology Program, and to investigate the bedrock structure and hydrogeology of the Rock Point property in Burlington in partnership with the Vermont Geological Survey. The latter project also has implications for the Episcopal Diocese of Vermont due to their interest in geothermal heating potential of sites on the property.

I've continued to be active in research projects related to the tectonic evolution of high and ultrahigh-pressure terranes (Papua New Guinea and new efforts in Vermont), and the role between deformation, partial melting/intrusion, and tectonic inheritance (central Chile, Vermont, Mongolia). I currently am advising three graduate students Sam Lagor, who is busy writing his thesis, and Cheyne Aiken and Evan Tam, who joined the department this fall.

Over the summer, Keith Klepeis and I co-lead a pre-meeting field trip for the EarthScope 2015 National Meeting that was held in Stowe, Vermont, in June. I also served on the organizing committee for that meeting and accepted a position on the EarthScope Steering Committee this fall.

Best regards,
Laura

Selected 2015 publications and conference presentations:

Webber, J.R., Klepeis, K.A., Webb, L.E., Cembrano, J., Morata, D., Mora-Klepeis, G., and Arancibia, G., 2015, Deformation and magma transport in a crystallizing plutonic complex, Coastal Batholith, central Chile, *Geosphere*, Vol. 11, p. 1401-1426.

Lagor, S. and Webb, L.E., 2015, Evidence for syntectonic intrusion of the Knox Mountain Pluton in the Connecticut Valley-Gaspé Trough, central Vermont, *Geological Society of America Abstracts with Programs*. Vol. 47, No. 3, p. 101.

Webb, L.E. and Klepeis, K.A., 2015, Punctuated Melt-Enhanced Deformation and Tectonic Reactivation above a Long-Lived Subduction Zone, Coastal Andes, Central Chile, *Geological Society of America Abstracts with Programs*. Vol. 47, No. 7, p. 495.

Webb, L.E., Baldwin, S.L. and Fitzgerald, P.G., *in press*, The Early–Middle Miocene subduction complex of the Louisiade Archipelago, southern margin of the Woodlark Rift. *Geophysics, Geochemistry, Geosystems*.

Heumann, M.J., Johnson, C.L., **Webb, L.E.**, Taylor, J.P., Jalbaa, U., and Minjin, C., 2014, Total and incremental left-lateral displacement across the East Gobi Fault Zone, southern Mongolia: implications for timing and modes of polyphase intracontinental deformation, *Earth and Planetary Science Letters*, v. 392, p. 1-15, doi: 10.1016/j.epsl.2014.01.016.



Laura Webb and her mom, Elaine Webb,
in St Jean Pied de Port, France, this past summer.



Keith Klepeis and Laura Webb, with the help of UVM Geology M.S. students, Sam Lagor and John Gilbert, led the EarthScope 2015 National Meeting field trip. The field trip visited classic and key sites in the Champlain Valley, such as Lone Rock Point and Mt. Philo (shown).



Geology B.S. major, Beth Pidgeon, and John Mark Brigham (UVM '13 Geology minor and rock-hounder extraordinaire) work at extracting an oriented sample of eclogite from Tillotson Peak.



Stephen Wright, Senior Lecturer (Glacial geology, Geomorphology, Environmental Geology):

One of my memories of growing up is seeing many of my friends sporting white plaster casts on arms and legs after falling from trees or bikes, getting legs caught while sledding fast down big hills, or failing to negotiate some ski slope obstacle. Those casts, of course, became steadily more embellished with signatures and drawings as the broken bones slowly healed. I finally had my turn this spring when I broke my leg bicycling during the first warm weekend of the year in mid-April. Thankfully I wasn't put in any kind of cast, but instead have a long titanium rod running almost the full length of my femur. I missed two weeks of school and John covered the Geo 1 class for me and Lee Corbett, one of Paul's PhD. students, picked up two weeks of the Glacial Geology class. With a lot of PT work I graduated from two crutches to one, from two walking poles to one, and finally none in the early part of the summer. I started biking again in mid-June and was grateful for the smoothness of the motion after so long limping. I'm pretty much fully recovered now.

I used some of the sitting still time early this summer to write a field trip guide for the New York State Geological Association (NYSGA) Meeting, which was, based out of Plattsburgh this last September. I also finally submitted a paper, which compiles all of the glacial striation measurements, I've made over the years and those made by other geologists in northern and central Vermont over the last 60 years. That paper was published on-line the last week of October and will appear in print in December (see reference below).

I did a little bit of field work late this summer with two students who both took the Glacial Geology class last spring. Some of that work was at a large landslide exposure in Honey Hollow (along Preston Brook), one of the stops on the NYSGA trip I led in September. While exploring upstream looking for other landslides, we came across an outcrop of deeply weathered rock (saprolite) in the brook (see below photo). Our exchange student from Cardiff University, Amy Lewis, is pursuing a research project aimed at understanding whether this is a relict of old, pre-Quaternary weathering or whether it has formed/is still forming in a weathering "hot spot."

Please stop by to say hello if you're in the area. Otherwise I'm sure I'll see some of you at the NE GSA meeting in Albany this coming March.

Wright, S.F., 2015, Late Wisconsinan ice sheet flow across northern and central Vermont, USA; Quaternary Science Reviews, 129: 216–228..

Email: Stephen.Wright@uvm.edu



Saprolite outcrop along Preston Brook



Julia Perdrial, Assistant Professor for Geochemistry This has been a fun and busy year: I had a great group of students in Earth Materials, Sustainability of Climate Change and Geochemistry of natural waters. Teaching Earth Materials for the first time was fun since I got to look at actual rocks for a whole semester! With my research in catchment carbon cycling I don't get to do this very often. Alyson, a MS student joined my biogeochemistry team last fall and made great progress in determining the influence of land use on floodplain C characteristics. She spent many hours last winter in the lab and more this summer in the field with many great undergraduate helpers (thanks to Lauren, Mae, Pat, David and Ingrid!).

Alyson and I both went to the Gordon Conference in Catchment Science in NH to present our results on dissolved organic matter dynamics and I was busy with workshops related to the Critical Zone (the zone spanning from the tops of the trees down to the actively cycled groundwater). I co-organized one of the workshops on CZ resilience (at the University of NH) and joined another one to foster collaboration between the US and Chinese CZ scientists in Guiyang and Yingtan in China. What a landscape!



Left: Students of the 2015 Earth Materials course use concept sketches to visualize sediment forming processes. Center: soil erosion experiment at the Red Soils Research Station in Yintang, China. Right: “stream” draining rice paddies at the Puding Karst station, China.

Recent publications:

J.N. Perdrial, Thompson AA, Chorover J (2015) Soil Geochemistry in the Critical Zone: Influence on Atmosphere, Surface- and Groundwater Composition. In: Giardino JR & Houser C (eds) Principles and Dynamics of the Critical Zone. Developments in Earth Surface Processes. Elsevier. p 173-201

Stielstra C, Brooks PD, Lohse KA, McIntosh JM, Chorover J, Barron-Gafford G, **J.N. Perdrial**, Barnard HR, Litvak M (2015) Climatic, Landscape, and Edaphic Controls on Soil Carbon Fluxes in Seasonally Snow Covered Forest Ecosystems. *Biogeochemistry* 123: 447-465

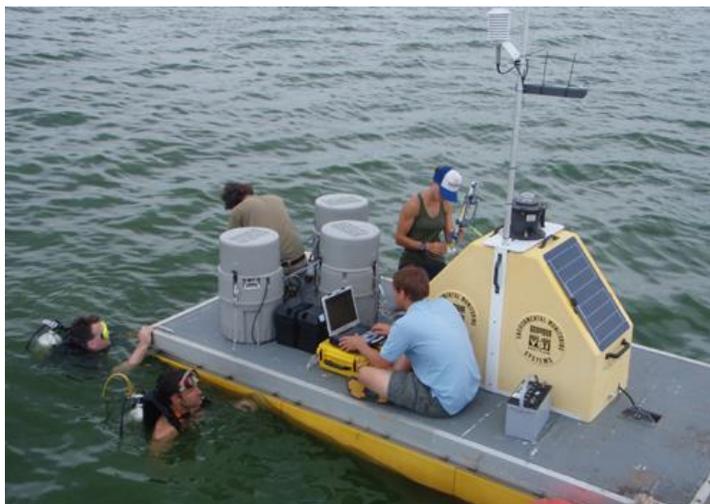
Vázquez-Ortega A, **J.N. Perdrial**, A. Harpold, X. Zapata, C. Rasmussen, J. McIntosh, M. Schaap, J. Pelletier, P. Brooks, M. K. Amistadi, Chorover J (2014) Rare earth elements as reactive tracers of biogeochemical weathering in forested rhyolitic terrain. *Chemical Geology* 391 19-3

J.N. Perdrial, Perdrial N, Vazquez-Ortega A, Porter CM, Leedy J, Chorover J (2014) Experimental assessment of fiberglass passive capillary wick sampler (PCap) suitability for sampling inorganic soil solution constituents. *Soil Sci Soc Am J* 78: 486-495.

Email: Julia.perdrial@uvm.edu



Andrew Schroth, Research Assistant Professor (Low Temperature Geochemistry, Limnology and Oceanography) Hello! I am a new Research Assistant Professor, and I am excited to be a part of UVM and the Department of Geology in particular. I come to the department after 5 years at U.S. Geological Survey in Woods Hole, MA, where I was a postdoctoral scholar and then a research geologist. Since I began working within the department, I have felt immediately at home due to the friendly faculty, staff and students here at UVM. My primary area of expertise is in low temperature geochemistry and environmental mineralogy, but I also have teaching and research interests in soil science, hydrology and hydrogeology. I am particularly interested in the transport, fate and speciation of metals in surface waters, soils and sediments. I have come to UVM to lead a team of Vermont-based scientists and students in an NSF EPSCoR-funded research effort that aims to better understand nutrient dynamics and algal blooms in Lake Champlain and its watershed, generally in the context of climate change and adaptive management. Our team has been extremely busy establishing an exciting network of sites for time series sample collection (water, sediment and biomass) and sensor deployment on Lake Champlain's Missisquoi Bay and at select sites within the Missisquoi and Winooski watersheds. Over the next few months, we will be conducting laboratory analyses of these samples as well as processing and interpreting data collected over the field season, while also establishing a winter sampling plan. We will continue to collect data from these sites over the next 4 years in an effort to better characterize and quantify inter and intra annual variability within the system and, more importantly, understand the environmental parameters that control nutrient/algal dynamics within the system. I also have active projects in Alaska studying trace metal speciation and cycling in watersheds, dusts and coastal marine waters that I hope to involve UVM undergraduate and graduate students as soon as possible. In the future, I look forward to developing new projects in the montane watersheds and soils of the nearby Green and Adirondack ranges, as these were the systems that I studied as a graduate and undergraduate student of geochemistry. I am also looking forward to teaching coursework in geochemistry and possibly other subjects through the Department of Geology. I am always keen to meet geologically-inclined alumni and current students! Please do not hesitate to shoot me an e-mail or stop by my office to chat!



Missisquoi Bay Microbiological Sampling Platform



Nico Perdrial: What a year! This felt more like the rooting year. Both professionally and personally it feels that the past year has been the start of me rooting into Vermont's Adams loamy sandy soil (developed on sandy glaciofluvial deposits). Clearly it is not difficult to understand why the Queen City and the state of Vermont are regularly cited in the most pleasant places to live in the US. We are enjoying all seasons whether we are going to the lake, the mountains or staying in the city. I continue working on the behavior of radionuclides in soils through my collaboration with the University of Arizona, university of California (Merced), Pacific Northwest Natl Laboratory and Lawrence Berkeley Natl Lab. I published three papers in 2015, including one authored by my former MS student from U of Arizona (Billy Linker). My current MS student Jenny Bower has been working with several undergraduate students (Sydney Lister, Chandler Noyes, Garrett Hazebrouck) to investigate the mobility and speciation of legacy lead in Burlington soils. They have and are still actively sampling private yards in Burlington (with the help of the Burlington Lead Project) to study the relationship between total Pb and bioavailable Pb. In addition, Jenny is moving forward on her research goal that is to understand the complex mechanism responsible for Pb mobility in soils and propose sustainable means of mitigation to the community. Stephen and I are also starting to work on some common project about preglacial saprolites in Vermont and are co-advising a senior BS student to that effect. Last spring I taught Environmental Geology (GEOL055) to 25 great students. I also built and taught the "Introduction to Environmental Science" lecture to 70+ students in the Rubenstein School. This fall I am re-teaching Geocomputing. This is such a fun class to teach, I love it and apparently the students too.

Email: Nicolas.Perdrial@uvm.edu

Website: <http://nicolasperdrial.weebly.com/>

Publications:

- Perdrial N.**, Thompson A. LaSharr K., Amistadi M.K. and Chorover J. (2015) - Quantifying particulate and colloidal release of radionuclides in waste-weathered Hanford sediments. *Journal of Environmental Quality*, 44, 945-952.
- Linker B., Khatiwada R., **Perdrial N.**, Abrell L., Sierra R., Field J. and Chorover J. (2015) - Adsorption of novel insensitive munitions compounds at clay mineral and metal oxide surfaces. *Environmental Chemistry*, 12, 74-84.
- Zaunbrecher L., Elliott W.C., Wampler J.M., **Perdrial N.**, Kaplan D.I. (2015) - Enrichment of cesium and rubidium in weathered micaceous materials at the savannah river site, South Carolina. *Environmental Science and Technology*, 49, 4226-4234.
- Bower J. and **Perdrial N.** (2015) – Impacts of competitive sorption processes on Pb bioaccessibility in urban soils. Joint Canadian/American Soil Science Society Meeting, Montreal, CA.



Nico and Niilo enjoying outdoor ice rinks



Environmental Geology student describing a soil pit and measuring infiltration rates during "Soil Hydraulics Lab (Geol 0055

Staff



Srebrenka Mrsic: Administrative Coordinator: I have worked in the Geology Department since May 16th, 2008 and been in the US since 1997. After these 7 full years at UVM I can tell that I am still very happy to be here especially in this department. It's a real pleasure to work with every single person in the Department, all the faculty, students and staff. I am so proud to share this year's Graduate Student Senate (GSS) award with my coworker and a really good friend Robin Hopps as the "Ida Russian Support Person of the Year 2014-2015." Also, I am so happy for my twin daughters that graduated this year at UVM so, I definitely feel good as a part of the UVM community.

Srebrenka

Email: Srebrenka.Mrsic@uvm.edu



Robin Hopps, Office Administrator: I enjoy my ten-month position in the office, as well as being out of the office from mid-June to mid-August for my landscaping business. This semester the Department has 10 graduate students, 2 PhD students through the Rubenstein School, 53 majors, 12 minors and 5 students with geology concentration. I am fortunate to work in this friendly academic department with such terrific faculty, fellow staff and students. I have four wonderful work-study student Museum Assistant employees making significant contributions to the Perkins Museum.

In July my partner and I had a wonderful lakefront camping trip in our pop-up at Maidstone, Vermont's most remote State Park. At home we had a good crop of berries and a huge harvest of stone fruits. Even though we had to remove a damaged peach tree, we have another smaller peach tree, plus plum, apricot, apple, pear, mulberry, and elderberry.

Visit the Department in Delehanty Building and see the Perkins Museum of Geology too. Please stay in touch by sending an email to geology@uvm.edu.

Robin

Email: robin.hopps@uvm.edu



Gabriela Mora-Klepeis, Senior Research Technician: The Geology Department has been in Delehanty Hall since the summer of 2004. We have a great facility that allows faculty and students do research on a great variety of topics. I was able to attend the Geological Society of America meeting last year in Vancouver where I took a short course in Detrital Mineral U-Pb Geochronology and Hf Isotope Geochemistry. I really appreciate the generosity of the Dean's office (College of Arts & Sciences) for their assistance that covered part of my expenses. GSA always is a great venue and despite the distance I was able to see and talk with former undergraduate and graduate students in between sessions. In addition to my general duties I still am the College of Arts & Sciences representative in Staff Council. On a personal note, I completed a biathlon and a triathlon in July. It was great to celebrate the completion of the triathlon with Jack and Ruth at their Grand Isle cabin. I finished the Summer doing my first 10K race! In early May I had the opportunity to go back and tour the Teotihuacan pyramids in Mexico City. Since my last trip there (25 years ago) they have made new discoveries that are now open to the public! In August I had the chance to spend a few days in Cape Cod and stopped by in Plymouth just briefly on my way back to Vermont. Hope to go back there again and spend more time. Even though it has been another busy year, I always have time to show you our building, so please stop by, I'll be happy to give you a tour.



Teotihuacan Pyramids



Gabriela & Keith at the Mayflower

Email: Gmora@uvm.edu



Dan Jones, Research Technician: It has been another great year in the Geochronology Lab! We have been producing exciting data from Italy, Mongolia, Chile, New Zealand and even right here from our Green Mountains! Outside of work, I spent some wonderful time paddling the Everglades, and am now looking forward to planning trips to Puerto Rico and Alaska.

Email: djones3@uvm.edu

Emeriti Faculty



Barry Doolan: Hello all former geology undergrads and grads.

Life is starting to get pretty routine for Sandy and me as we prepare for another (partial) winter in our home in Fletcher Vermont. We will chase Fall weather southward for a week next month and look forward to enjoying early Spring in South and North Carolina in March and April. Our time in Vermont still leaves plenty of winter to enjoy some warm fires, and cross country skiing .

Older daughter Kristan and husband George VanVlaanderen still are finding great success and enjoyment in their cheese and sausage making at Does' leap Farm in Bakersfield. We have enjoyed having 12 young does at our place this summer to keep our fields neatly trimmed and the neighbors entertained, as we have for the past five or so years. Grand daughter Zoe VanVlaanderen graduates from high school next year and has been looking at colleges this academic year. I have to admit it can't seem possible that she's off to college next year. For any of you who are teaching your sons or daughters to drive, I sympathize. Don't think it will be easier to have that job done by grandparents. We may appear to have the patience and the right attitude but there's a lot of gritting of teeth in the process! My grandson Peter VanVlaanderen is taking up golf and we have had a good summer sharing shots and lessons on the links. Good fun.

Daughter Katie and her husband Ian Schwartz have moved to Portland ME to be closer to the rest of the family. Three-year-old Madelyn is now close enough to visit on a regular basis and we are happy to be a bigger part of her life. Portland is great city to hang out in for a while. Katie works at home and is still involved with the AIDS research group with periodic trips to Africa to oversee projects.

I think of many of you at the oddest times but never with a bad memory. Don't hesitate to give a call or email if you're in the area. Always fun to catch up and see how you are doing.

Be well

Barry



Doolan Clan Gathering – summer 2015



Jack Drake: Greetings everybody!! Another year, another newsletter. But it is a task that I thoroughly enjoy – it lets me catch up on all of the department activities. Ruthie and I are still dodging VT winters by heading out to California near Santa Barbara – no complaints from us receive email photos of snow pile high on our street and have to admit that we don't miss it too much. This summer was a milestone for both Ruthie and me – we both hit the ¾ century mark and celebrated by taking a barge trip through Provence - great trip with abundant French history, food cheese and wine. I also managed to get in several golf games with Barry and Char – always great fun and (for me) mediocre golf. We are now in the process of organizing for our westward journey and I hope to get this newsletter “to press before we leave. If any of you come back for Alumni weekend please get in touch!!

Best to you all,

Jack Email: john.drake@uvm or jcdrakevt@gmail.com.



Jack & Ruthie
Carcassonne, Provence



David Bucke: Our year has been like replaying a basic plan with a few adjustments. The plan includes enjoying our Sleepy Hollow family and "homestead" for most of the year, a late winter escape to someplace warm and an extended fall RV trip. Considering our level of antiquity, we're enjoying amazingly good health [using a variety of Rx pills to prop us up :->].

An enjoyable but too-long winter was relieved over the February-March time slot when we spent about 10 days in St. Lucia totally relaxing in the Caribbean sunshine. Back home, refreshed, we were ready for a spring and summer of enjoyable gardening, mowing, and pond upkeep.

The September/October "field trip" did not include our usual "out west" travels. Instead we concentrated on Corps of Engineers campgrounds, mostly in the hills of West Virginia, Kentucky, and Tennessee. It was interesting to hear a very strong message from the locals about the benefits of strip coal mining -- making previously unusable land usable by creating flat areas for recreation and development on reclaimed mining sites. Always two sides to a story. We then headed down to SW Texas and North Padre Island where you can park right on the beach. From there on, for most of the rest of the trip, it was free camping (boondocking) along the Gulf Coast. (The picture is from a makeshift "campsite" at the marina in Pass Christian, Mississippi.) Our last Gulf Coast stop was at one of our favorite campgrounds, Ft. Pickens, on the National Seashore barrier island across from Pensacola, Florida. Then back to Vermont using "Camp Walmart" locations and Cabella's for overnights. A great trip!

Donna & I extend our warm best wishes to all of you.

Our email address is: ddbucke@gmail.com

I think my UVM mail still works & flips into the gmail box -- but maybe not.



Dave and Donna

Meet Current Graduate Students:

*[Read](#) their bios, and
[read](#) “ in-progress research ” titles, and completed theses.*

THIS YEAR’S OUTSTANDING GRADUATE TEACHING ASSISTANT WENT TO

Gina Accorsi



[Listing of all Graduate Students](#) and their thesis titles from 1960, includes links to most theses since 2001. Hard copies of all theses are housed in the Department.

RECENTLY COMPLETED M.S. THESES

Next . . .

RECENTLY COMPLETED M.S. THESES

2015: Ashliegh Belrose - The Champlain Sea/Lake Champlain Transition Recorded In The Northeast Arm Of Lake Champlain, USA-Canada [Read Ashliegh's Thesis](#)

2014: Ryan Brink- A petrological and provenance comparison of the late Lower Cambrian Monkton (Vermont) and the late Lower/early Middle Cambrian Altona Formations (Northern New York), along the Laurentian margin of Iapetus

Kathryn Dianiski - Structural evolution and deformation of the lower crust: Insights from microstructural analysis and geochronology of Vancouver Arm and Crooked Arm in Fiordland, New Zealand

Jacob Menken - Response of Tourmaline Atomic Arrangement to Thermal Treatments [Read Jacob's Thesis](#)

Alice Newman - Understanding lower crustal deformational processes: A structural and kinematic analysis of Vancouver Arm and Breaksea Sound in Fiordland, New Zealand

Lucas (Luke) Reusser PhD: Quantifying Human Impacts on Natural Rates of Erosion Along Continental Margins [Read Luke's Dissertation](#)

Ana Vang - The Geomorphic Effects of the Vermont Interstate System

2013: Patrick Dyess - Low-temperature TitanIQ thermobarometry of Taconian Cover-rocks of Rochester, VT [Read Patrick's Thesis](#) and/or [Appendices](#)

Angel A. García Jr. - Elemental Sulfur Nanoparticle Coarsening Kinetics and Changes in Raman and Voltammetric Signals [Read Angel's thesis](#)

Steven Gohlke- Insights into the origin of a zone of slipped deformation bands from the Seiyal Fault, Western Desert, Egypt

Alice Nelson - The Concentration of In Situ ¹⁰Be in Fluvial Sediments as a Tool for Deciphering 6 My of Greenland Ice Sheet History from a Marine Sediment Core

Megan Scott - The Tectonic Influence on the Depositional Environment of the Middle Ordovician Middlebury Formation [Read Megan's thesis](#)

HURRAY FOR THE LIBERAL ARTS!!



Christina Strathearn – winner of the Charles Doll Award for Outstanding Senior Geology Major

ADDITIONAL WINNERS of GEOLOGY DEPARTMENT HONORS AND AWARDS

COME SEE US AT THE FOLLOWING:

2016 NORTHEAST SECTIONAL GSA Meeting: 21 – 23 March, Albany, NY

2016 NATIONAL GSA Meeting: 25 – 28 Sept., Denver, CO, USA

NATIONAL AGU Meeting: Check the following website for up to date information:

NEIGC: Check for information, dates and location:

**2016 Alumni/Reunion Weekend at UVM!!!! (Note that this coming year it is in the fall!)
Make sure that you get in touch with us so we can show you around!!**

Visit our websites: [Geology Department](#) and [Perkins Museum of Geology](#)

See the following pages for photos from Regional geology!!

Regional Geology in “recent” years

Below are pictures from past trips so you can relive the experience. Due to recent lack of funding we are no longer offering the course, but we plan to find a way to revive it soon. We hope those of you who went on Regional found it to be a great educational experience.



**Regional Geology, 2012
on a “warm” summer day in Colorado**



Colorado Regional Geology class (2011) stymied by snow in the South Lottis Creek Valley. From left to right: Sam Hellman, Sam Kleh, Parker Richmond, Doug MacLeod, Abi Ruksznis, Ryan Stredny, Jo Palmer (TA), Hank Ainley, Sandra Cronauer, Abby O'Donnell, Emily Siegel, and Elizabeth (Ollie) Olliver.



Regional Geology, Iceland, 2010



Regional Geology, Colorado, 2009 geology students: Matt Bansak, Ben Henry, Greg Parrish, Will Hackett (TA), Maggie McMillan, Tyler Vendituoli, Holly Crimmins, Mary Snyder, Mike Ingram, and Shane Snyder at the base of a weathered Tertiary lava flow near Del Norte, Colorado.



Regional Geology, Italy, 2008



Regional Geology, Colorado, 2007: Pat Niggel, Gary Peters, Pat Tobin, Corey Coutu (TA, partially hidden behind Jessica), Jessica Schechter, and Kirsten Stokes studying the contact relationships between Paleozoic carbonate rocks and Laramide intrusive rocks near Cumberland Pass, Colorado



Regional Geology, Italy, 2006



**Regional Geology 2005
in front of the “Maroon Bells” near Aspen, Colorado**



**Regional Geology Iceland Crew August 2004
enjoyed the summer sun.**



Regional Geology 2003 enjoying the Maine coast

And . . . last but not least, a “blast from the past”



**Regional Geology from 1986! Can you identify these people??
If so, contact Jack John.Drake@uvm.edu with the names.**