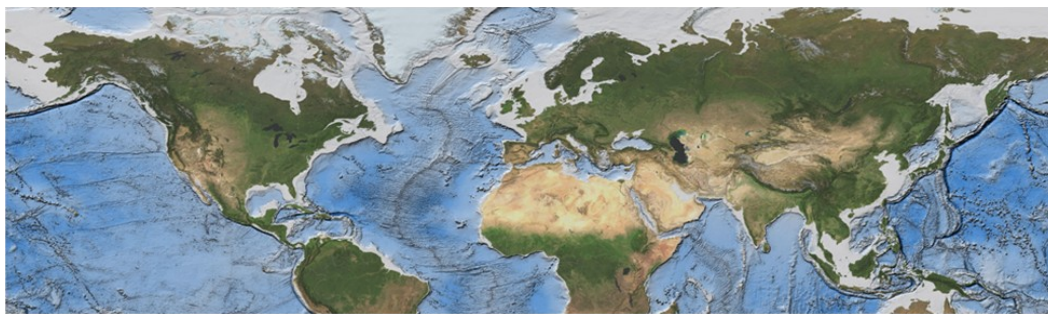


Fall 2011

UMD

Geological
Sciences

Geological Sciences Newsletter for Alumni & Friends



News from the Department Head - Ron Morton



Greetings to all:

First I have the pleasure to tell you that the alumni reunion, held in October at the Hilton hotel in Minneapolis in conjunction with the GSA conference, was a HUGH success. More than 125 (it was hard to keep track as people were coming and going all night long) alums, faculty, and current students attended, many of whom I had not seen in quite a long time. It was a pleasure to catch up on all the changes, additions, and adventures in your lives. Thank you for making this an enjoyable and fun event. Continuing on that same theme, it is also really nice when you stop by the department on your trips to or through Duluth. After all, in many large and small ways, this is still your department and you are always welcome here.

Our outstanding alumnus for the year is Dr. Randy Koski, a 1966 graduate. Randy, recently retired, spent his professional career with the USGS, and for many years was a leader of their seafloor exploration program (black and white smokers and trips to the sea floor in a small submersible called the Alvin). This was also a great year in the department in terms of funds that we were able to give out to our students, all thanks to your generous donations and gifts. We gave out just over \$35,000 for the year to support undergraduate and graduate students to go on field trips, attend regional and national conferences, attend short courses, carry out summer field work, and do lab analysis. Most, however, was given to support students going to one of our two field camps. The department does try very hard to pay the tuition for each of our students going to either the Wasatch or Precambrian field camp. In addition, we were able to provide funds that allowed our top seven graduate applicants to come to Duluth and visit the department and talk with potential faculty advisors. It was also very thoughtful and nice that our current graduate students hosted the potential newcomers. So once again, thank you for your continued generosity and support of the department.

There has also been a significant change in the department. Starting in January, 2011, the environmental science program became part of the Department of Geological Sciences. The program is four years old, has about 80 majors, and is quite rigorous, with students taking physics, chemistry, biology, and geology courses along with five designated environmental science courses. Christina Gallup and I are the co-directors of the program (although Christina does most of the advising and work). So we are a much larger (major-wise) but smaller (space-wise) place!

In respect to all the environmental science students, it is nice to report that they have an active student club which joins the geology club in the department. Also, as of this spring, we have a Society of Economic Geology student chapter up and running (only eight in the U.S. but 130 worldwide). There are currently eighteen members and they are busy planning a spring field trip to the southwest in conjunction with students from New Mexico Tech.

On a personal note, my new book, "Ancient Earth and the First Ancestors: A Cultural and Geological Journey", written with Carl Gawboy, has just been published. It is a sequel to "Talking Rocks," the other book Carl and I wrote together. Finally, and best of all, I am a grandfather as of three months ago. Our son, Chris, and his wife, Tracy, are the proud parents of Vyla Jane Morton. So I once again get the fun of reading Dr. Seuss. Lastly Tillie, our Brittany Spaniel, and I are still doing agility training, and we are actually getting better. So much so that in August Tillie received two first places at an agility meet – to say the least our instructor just about fainted dead away!

So as you can see by this brief update, the department, in terms of students and student support, is doing quite well, and we are doing so in large part thanks to all of you, not only by means of your financial donations, but also due to your being enthusiastic and passionate boosters for the department. On that appreciative note, I wish all of you a healthy, peaceful, and prosperous year.

Fall 2011 UMD Geological Sciences

To Our Donors: *We thank the following alumni and friends who have supported our students and programs with a charitable gift in the past year. Listed below are the names of individuals and organizations who donated to the funds of the Department of Geological Sciences, and includes those donations that the University has posted to our department accounts at press time.*

Anderson, Curtis A.	Frantes, Thomas J.	Kallestad, June A.	Mudrey, Michael G., Jr.	Simonet, James F.
Anderson, Roger A.	Gallup, Christina D.	Kesler, Stephen	Munter, James & Elizabeth	Skelly, Michael F.
Backstrom, Pamela S.	Gardner, Thomas A.	Kessler, Adam S.	Murray, George C.	Straight, Muriel E.
Beaudet, Nancy J.	Gasser, Michael M.	Koski, Randolph A. & Nancy E.	Murray, William	Swor, Terrence E.
Beck, John W.	Gearns, James M.	Krahulec, Kenneth A.	Newell, Roger A.	Syversen, Kent & Lila
Bellamy, Kathleen & William	Geerts, Stephen D. & Patricia Monson Geerts	Kraus, Keith K.	Norris, Robert H.	Tieberg, James E.
Brenner, Sharon A.	Gietzen, Darren M. & Latisha R.	Kyllonen, David P.	Ojakangas, Dennis	Wahlstrom, Robert J.
Buell, Douglass A. & Karen R.	Graham, Richard C.	Lauerson, Floyd E.	Ojakangas, Richard & Beatrice	Wergin, Colleen
Cartwright, Alyson M.	Grant, James A. & Christabel	Lentsch, Diane E. & Powell, William A.	Olson, Jean M.	Wonson-Liukkonen, Barbara
Christensen, Odin & Lucas, Phyllis	Green, John C. & Janet	Levar, Thomas & LaVonnie	Olson, Karen R.	Zins, David J. & Sharon
Clement, Caroline	Hauck, Steven & Barbara	Marsden, Ellen P.	Oreskovich, Julie A. & Roger F.	
Connolly, Marc R.	Hjerpe Family Fund	Matsch, Charles L.	Patelke, Marsha M.	3M Foundation, Inc.
Crain, William & Jean	Hudak, George & Pastoor, Rachel	Mattson, Peter S.	Peterson, Dean & Rausch, Deborah	Chevron Texaco
DeVaney, Stephen & Deborah	Hudelson, Warren F.	McCabe, Brian P.	Pieper, Rodney J.	Cleveland Cliffs Foundation
Dincau, Anthony R.	Hughes, David W. & Brenda L.	McLimans, Roger K.	Poulsen, K. Howard	El Paso Corporation Foundation
Draves, David L. & Deanna	Hunter, Stephanie	McManus, Jeffrey L.	Rapp, George R.	ExxonMobil Foundation
Everett, Karl D.	Johnson, Adam D.	Miller, James D., Jr.	Ripley, Edward & Kathleen	Franklin Geosciences, Ltd.
Fashbaugh, Earl F.	Jones, Jeffrey T.	Miller, Marlene A.	Risdal, Scott N. & Zandra A.	
Fitz, Thomas J., III	Jongewaard, Peter K. & Roggenkamp, Sandra L.	Miller, Marsha J.	Ruhanen, Richard W., Jr. & Jean A.	Global Minerals Engineering, LLC
Flammang, Julie A.		Mooers, Howard D.	Sher, Laura B.	Minnesota Section S.M.E.
		Moore, Niall		
		Morton, Penelope		

Student Scholarships, Awards and other Notable Mentions for 2010-2011

Ralph & Ellen Marsden and Randy Seeling Outstanding Graduate Student Award: Steven Hoaglund

Outstanding Graduate Teaching Assistant Award: Amy Radakovich

Ralph & Ellen Marsden and Minnesota Section SME Outstanding Senior Award: Adam Salzer

Hugh Roberts Scholarship Outstanding Junior Award: Cullen Phillips

Minnesota Section SME Tools-Of-The-Trade Award: Michael Buschette, Matthew Manor, Cullen Phillips, Allison Severson

Harry & Margaret Walker Research Fund Award: Jonathan Dyess, Christopher Goscinak

Estwing Geology Field Methods Award: Cullen Phillips

Roderick Syck Outstanding Field Camp Performance Award: Gavin Wagoner

Differt Scholarship: Julia Halbur, Angela Hawkins, Matthew Manor

Jill & Terry Swor Scholarship: Kaitlin Johnson

AIPG 2011 Student Grant Winner: Matthew Manor

FIELD CAMP SCHOLARSHIPS:

Robert L. Heller Field Camp Scholarship: Taylor Balogh, Vance Smith

“Rip” Rapp Field Camp Scholarship: Chris Novak

Charlie Matsch Field Camp Scholarship: Angela Hawkins, Gavin Wagoner

Ralph & Ellen Marsden Scholarship: Daniel Sletten

Lempi M. & John Pagnucco Scholarship: Bradford Folta, Kyle Richardson

Millennium Fund Scholarship: Drew Faherty

Undergraduate Student Presenters & Contributors

Spring 2011 UMD UROP Showcase University of Minnesota Duluth

Manor, M., "Late Pleistocene climate in sediments of Lake Chalco Basin of Mexico"

McGinn, M., "Pressure Measurements in a Heterogeneous Porous Medium"

National Conference on Undergraduate Research 2011 Ithaca, New York

McGinn, M., "Pressure Measurements in a Heterogeneous Porous Medium"

Upper Midwest Association for Campus Sustainability 2011 University of Minnesota Morris

Pexa, K., "Establishing Roots for Community Gardening"

International Association for Great Lakes Research Conference 2011 Duluth, Minnesota

Moore, Z., "Tracing a Ballast Water Release in the Duluth Superior Harbor Using Fluorescent Dye"

McNair Scholars Presentation 2011 University of Wisconsin Superior

Leach, C., "Influences of Temperature and Precipitation on Wood Frog (*Rana sylvatica*) Breeding Phenology with Predictions of Climate Change Impacts"

The Institute on Lake Superior Geology 2011 Ashland, Wisconsin

Birkemeier, R., "Geologic Mapping of Neoproterozoic Rocks near Ogishkemuncie Lake, by students of the Precambrian Research Center's 2010 Field Camp"

Graduate Student Presenters & Contributors

Geological Society of America 2011 Minneapolis, Minnesota

Abbott, A., Curtin, T., "Historic Mercury Deposition in Two New York Finger Lakes"

Cervin, D., "Characterization of Precious Metal Mineral Occurrences in the NorthMet Deposit of the Partridge River Intrusion, Duluth Complex, Minnesota, USA"

Chorn, B., Johnson, T., Lane, C., "Geochemical Characterization of some Lake Malawi Tephra Layers"

Foley, D., Miller, J., "Petrology and Cu-Ni-PGE Mineralization of the Bovine Igneous Complex, Baraga County, Northern Michigan"

Goldner, B., Miller, J., "Emplacement and Crystallization History of the Tamarack Intrusion, Minnesota"

Graupner, M., Hansen, V., "Geologic and Structural Mapping of Southern Tellus Regio, Venus: Implications for Crustal Plateau Evolution"

Gustafson, D., Wattrus, N., "Lake Agassiz's Role in the Formation of Lake Superior's Lake Floor Rings"

Halbur, J., Birkemeier R., Swenson, J., "Spatial Distribution of Avulsions on Modern Deltas"

Rubesch, M., Werne, J., "A 45,000 Year Geochemical Record of Temperature and Aridity from Lake Chalco, Mexico"

Theriault, S., Miller J., "The Mineralogy, Spatial Distribution, and Isotope Geochemistry of Sulfide Minerals in the Biwabik Iron Formation"

AWARDS

Cabin Ross was recipient of the best poster award at the Geological Association of Canada meeting in Ottawa and at ILSG. Dan Cervin received the best oral presentation award at ILSG. Congratulations!

The Institute on Lake Superior Geology 2011 Ashland, Wisconsin

Cervin, D., Morton, P., Miller, J., and Patelle R., "Characterization of Precious Metal Mineral Occurrences in the NorthMet Deposit of the Partridge River Intrusion, Duluth Complex, Minnesota, USA"

Dayton, R., Miller, J., and Vervoort, J., "The Geochemical Evolution of the Sonju Lake Intrusion: an Assimilation-Fractional Crystallization Model"

Foley, D., Miller, J., "Petrology and Cu-Ni-PGE Mineralization of the Bovine Igneous Complex, Baraga County, Northern Michigan"

Goldner, B., Miller, J., "Petrology of the Ni-Cu-PGE-Mineralized Tamarack Intrusion, Aitkin and Carlton Counties, Minnesota"

Radakovich, A., Parent, C., Partridge, M., Ritts, A., Rubesch, M., Hudak, G., "Reconnaissance Bedrock Geological Map of the Northern Part of Sudan Underground Mine State Park and the Northwestern Part of Lake Vermillion State Park, St. Louis County, Minnesota"

Ross, C., Hudak, G., Morton, R., Quigley, T., and Mahin, B., "Preliminary Stratigraphy and Physical Volcanology Associated with the Paleoproterozoic Backforty VMS Deposit, Menominee County, Michigan"

Theriault, S., Miller, J., Berndt, M., Ripley, E., "The Mineralogy, Spatial Distribution, and Isotope Geochemistry of Sulfide Minerals in the Biwabik Iron Formation"

Totenhagen, M., Morton, P., Larson, P., "Characterization of Gangue Minerals in Lower Cherty Ores of the Biwabik Iron Formation at United Taconite, LLC"

Wartman, J., Morton R., Hudak, G., and Hercun, C., "Physical Volcanology and Hydrothermal Alteration of the Rainy River Gold Project, Northwestern Ontario"

Current Faculty News

Erik Brown

The big change this year is my appointment as Acting Director at LLO. Steve Colman is on sabbatical so I am working to keep things ticking in his absence. I encourage you all to drop by the Research Lab Building (UMD's last piece of the "Old Campus") for a visit to see what we're up to.

I have been working on projects examining the climate history of southwestern North America (very relevant for water resource usage in this country). I am now in the process of organizing a workshop in Mexico City to make plans for a drilling program to recover long climate records preserved in lake sediments. I spent three months in Tasmania this spring, developing a study of climate history in a region dominated by the Southern Ocean and starting a project to look at chemical weathering processes under cool humid conditions.

Barbara and the kids (Andrew, 15; Lianna, 13; and Matthew, 9) came along to Tasmania. Barbara homeschooled the kids during the trip; the curriculum included Australian history, Tasmanian wildlife, and Tasmanian geology and climate history (okay, I helped with the last topics).

This has been a busy year with graduate students. Xiuju Liu (co-advised with Steve Colman) completed her doctorate in Geology and moved on to a post-doctoral position at University of Toledo. I was on committees of six MS and four PhD defenses this year; it is rewarding to see the great work that our students are accomplishing!

Steve Colman

I am enjoying being on sabbatical this year, although "catching" up has not been as easy as I thought it would be. With the administration of LLO in Erik Brown's capable hands, the Woods Hole Oceanographic Institution is a stimulating place to spend the year. My two major NSF projects (Lake Agassiz-Superior and Lake Qinghai, China, with Nigel Watrus and Erik Brown, respectively) have ended, and various graduate students have completed their degrees, or nearly so. What remains is writing and thinking about new projects. My work with National Geographic and IGBP-PAGES continues, and grandparenthood provides diversion.

Christina Gallup

The addition of the Environmental Science program to our department has meant a big change for me. I am now co-director of the program with Ron. I am really enjoying this new role and the new program. The students are smart and motivated and a great addition to our department. One of the things that has been a challenge for me in this new role is trying to get a concrete idea of where environmental scientists can find employment. If you work somewhere that employs environmental scientists, I would love to hear from you!

I am also co-chairing a UMD task force on "First Year Foundations for Student Success." We are looking at how we can improve the first year experience from when a student first looks at UMD as a prospective student all the way to the end of their second semester. If you have any suggestions from your personal experience of your first year that would have improved your experience at UMD, I would really appreciate hearing about it.

John Goodge

The year began with a return from Antarctica just a few days before spring semester classes, and it's kept up at a steady pace since then. My group had a great field season in Antarctica between November and January of last year. Our goals in the field were to collect clasts of igneous and metamorphic rocks from glacial moraines and tills scattered along the Transantarctic Mountains, which provide proxy samples of the ice-covered craton buried beneath the polar ice cap. It was very successful given all the possible interruptions that arise from bad weather, aircraft scheduling, and logistics problems -- fortunately, we had no major issues and got to all of our target sites and more. The field group included Jeff Vervoort (MS from UMD and now a geology professor at Washington State University). For those interested in the field activities, Jeff and I wrote a series of blogs for The New York Times on the Scientist at Work page (<http://scientistatwork.blogs.nytimes.com/>) which describes many of

(Goode, continued from previous page)

our experiences. After spring semester, a group of students worked with me to curate and cut over 300 samples, and as I'm writing this I am working with Jeff in his lab to do a round of reconnaissance U-Pb dating of zircon. Summer was equally busy with lab work, writing, meetings and overseas travel, including trips to the UK and Chile. I also began a four-year term this year as co-editor of the journal *Lithosphere*, published by the Geological Society of America.

Karen Gran

I made it back to the Philippines this year, with a trip in June to collect terrestrial lidar data on the Pasig-Potrero River at Mount Pinatubo. We were hoping to measure channel change through repeat scans, and in the end we got more channel change than we could have hoped for as we were hit by two tropical storms. This fall we purchased a lidar scanner here at UMD, which is exciting and opens up new avenues for research locally. The Le Sueur River sediment budget project I've been working on for four years wrapped up this summer, and we're now expanding our work into the Greater Blue Earth River Basin and working with stakeholders to develop a decision analysis model to help reduce fine sediment loading in the basin. I have several projects on-going on North Shore Rivers, too, primarily focusing on assessment of stream rehabilitation techniques. I currently have six graduate students, although I finally graduated my first MS student - congrats to Emily Dunn! Back at home, my husband Rik just got tenure in the physics department, and the boys (Alex, 8 and Peter, 4) keep us as busy as ever.

Vicki Hansen

2010-2011 has been a great year, beginning with the Google Earth Geological Society of America Penrose Conference at GOOGLE Headquarters. One thing to emerge is a long-term project assembling a pseudo GOOGLE-Venus through collaboration with Professor Declan DePaor and PhD student Mladen Dordevic at Old Dominion University in Virginia. 2011 also saw publication of Emily Bjonnes' Monte Carlo modeling of Venus impact craters (Congratulations, Emily!). And a personal high point—experiencing the Moine Thrust, a goal for 30 years! I didn't plan to visit the Moine during a family UK trip, respecting non-geologist family members. But one foggy morning we found ourselves in the gorgeous coastal village of Ullapool. Knowing the Moine was close, John jokingly visited the visitor center looking for a Moine map; incredibly he returned with a Moine 'Geopark' map. We all touched the Moine, then the family left me to hike the Moine alone to reflect on past structural debates centered there in the magical Scottish Highlands. Later I beamed as I climbed into the shower — I made it to the Moine(!!) — and with no inkling of reaching my goal when I awoke that day. What an incredible treat! This year's other amazing treat has been seeing so many past students at the GSA in Minneapolis and elsewhere and hearing of how your lives are unfolding and your fantastic successes.

Tom Johnson

This has been a great year! Melissa Berke defended her PhD dissertation based on paleotemperature reconstructions from organic geochemical signals in sediment cores from Lakes Turkana, Victoria and Albert in East Africa. Several surprises arose from these studies, and these will soon be coming out in publications. Melissa has now moved on to a nice post-doctoral position at the University of Utah. During her stay with us, Melissa participated in coring expeditions to Lake Malawi and to some northern Minnesota lakes (VERY different experiences!), and she was instrumental in advancing the analytical capabilities of the organic geochemistry lab in LLO. She also ventured overseas to undertake geochemical analyses in the Netherlands Royal Institute for Sea Research (NIOZ) on the island of Texel, and also to a laboratory at Curtin University in Perth, Australia. April Abbott completed her MS thesis on what is now the longest, continuous high resolution record of temperature from anywhere on the continents—a 1.2 million year long record from the Lake Malawi drill core in tropical East Africa. After doing a great job at UMD, April has moved on to Oregon State University where she is pursuing a PhD in oceanography. I spent last spring semester on the St. Paul campus as a Resident Fellow in the University's Institute on the Environment. This has led to planning new research initiatives on water sustainability in the Great Lakes region of East Africa, where allocation of water for new irrigation initiatives seriously threatens the future of these magnificent lakes.

(continued on next page)

Fall 2011 UMD Geological Sciences

(Johnson, continued from previous page)

I have attended a number of interesting professional meetings and workshops over the past year. The highlight was a workshop on Lake Turkana geology hosted by Richard and Meave Leakey at their new Turkana Basin Institute in Kenya. Around twenty of us geologists from many countries who have worked in the Turkana basin over the past few decades were invited in to review accomplishments and contemplate future research initiatives in the basin, mainly on land but also in the lake. No Powerpoint presentations were allowed! The only visual aid technology available was a 2' by 4' white board. This resulted in our "cutting to the chase" in our presentations, offering ample opportunity for long and stimulating discussion of whatever topic was being considered.

This has been a great year for the family as well. Son Ryan returned from a year's tour of duty in Iraq with the California National Guard unscathed, thank goodness, and is now back at his job in southern California. Daughter Heidi and her family are living nearby in St. Paul, entering their second year in Minnesota after spending four years in Shanghai. Both Heidi and Neil are teaching, and maintaining a bilingual environment in their home for their two kids. Kate opened a new art studio this past month in the DeWitt Seitz building in Canal Park, providing greater exposure to the wonderful paintings that she continues to turn out. I have entered phased retirement! The phase will last four years. It's an interesting period of adjustment.

Jim Miller

Now in my fourth year as a faculty member in the department, I am finally falling into a routine of teaching, graduate advising, and directing the Precambrian Research Center. I fulfilled my half-time teaching obligations by teaching Advanced Earth Science for Teachers (GEOL 4100) for the sixth time and a graduate seminar class on Layered Mafic Intrusions (GEOL 5100) for the third time, both in the spring semester.

Graduate students continue to keep me busy and vicariously engaged in research. I was pleased (and relieved) that five of my graduate students successfully defended their MS theses this past year - Brian Goldner, Ryan Dayton, Stephanie Theriault, Dan Foley, and Dan Cervin. I am currently advising two second-year graduate students, Ben Brooker (mapping and petrology study of the Sawbill Lake intrusion, NE MN) and Matt Chaffee (petrology of the Ni-Cu-PGE-mineralized Current Lake intrusion near Thunder Bay, Ontario), and a first-year student, Aubrey Lee (petrology of an Fe-Ti oxide-rich, Archean layered intrusion near Mine Centre, Ontario).

Programs of the Precambrian Research Center, for which I serve as administrative director, were very successful this year, as reported elsewhere in the newsletter.

I filled in my "free-time" in 2011 by serving as field trip chairman for the national Geological Society of America meeting held in October in Minneapolis. I also served as principal organizer for the 14th Annual Minnesota Minerals Education Workshop, which was held over three days in June at the Mesabi Range Community College in Eveleth. The MMEW was attended by 76 K-12 earth science teachers from across the state.

All the best for a happy and productive 2012.

Howard Mooers

Happy holidays everyone. Still here and still keeping busy with the UMD Honors Program, the Planetarium, and my teaching in geology and astronomy. For the first time in seven years I DID NOT go to England. However, with the defense of Avery Cota in August (MS thesis) we finished up a big part of my monument corrosion/acid rain study. We are now working on a publication and planning for additional work. Hmmmm, I think I may need to go to England again next summer, around the time of the Olympics maybe. The other big task that I have been involved in over the past year was a renovation at the Planetarium. Over the summer we added full-dome video capabilities, surround sound, programmable digital LED lighting, and best of all, new theater seats. We now boast the only full-dome theater in the region and we have expanded our programming to Saturday matinee and evening shows. Although we have the capability of displaying the stars, constellations, and artwork with the full-dome system, we still rely on our old star machine that was installed in 1967. It's hard to beat that old technology. Stop in and see us if you can.

Penny Morton

Greetings from the Dean's office. This is the only year I will be able to say that. I am serving as Interim Dean of SCSE—quite different than any previous job I have had at the university. I am not teaching mineralogy, and I do miss that. Last summer, I did manage to spend three weeks at field camp, however, and experience the field trip to the Swell with Tim Demko. It was a lot of fun, even if we had to put up with gnats (and those would be GNATS!!!). The beauty of Utah never loses its magnificence: I just love it out there. Jim Miller and I co-advised a student working on the PGE mineralogy of Northmet deposit and he finished early last summer. I also have another student finishing a project on Thunderbird Mine, and a new student who will be working on the Bald Eagle Intrusion. So, I am trying to keep my hand in.

On a personal level, Ron and I became grandparents for the first time. We have a new granddaughter. Her name is Vyla—and for you old-timers out there who were around in the 80's, I think the parent is Galena or maybe Sphalerite (I never knew which name applied to which of our children).

John Swenson

From my perspective, a single adjective to describe the previous year might be copacetic: The highs were relatively low and the lows were relatively high; all was generally agreeable in the world, if somewhat mundane, and, as such, I cannot complain. Sarah and I edged further into middle life, sans any significant crises, our surviving parents held their own collectively, and the poodle-doodle combination enjoyed another year of long, introspective walks on our favorite Duluth trails. In classic Duluth fashion, after a frigid month of June, July and August brought spectacular sunshine and warmth and allowed me to mature a nice crop of vegetables and small fruit in my lakefront garden. My young orchard came through the winter with flying colors and then doubled in tree count with spring planting. Sarah survived her first year at the helm of the summer tennis program at Duluth's Longview courts; currently, she is teaching a full load of classes at Lake Superior College and dreaming of escaping to Mexico over the holiday break! Life is good for us—I hope the same is true for all of you.

Nigel Wattrus

The past year has been a busy one, as usual! Earlier this year I participated in two field expeditions to collect seismic data for International Continental Scientific Drilling Program (ICDP) drilling proposals. In January, I spent two weeks in Mexico City with Erik Brown and some of our graduate and undergraduate students collecting seismic reflection data in the Chalco sub-basin. This is part of the ancient lake bed upon which much of the city is built. It was an interesting and exhausting exercise working in the confines of Mexico City. I don't recommend driving south of the border! In May I travelled to Peru with my graduate student, Dan Gustafson, to collect airgun seismic data on Lake Junin. We spent more than a week in Lima at sea level, waiting for gear to clear customs. This made life interesting when we had to race up to the lake at 4000+ m to start the survey! Not a good idea!

Most of my summer was spent on Lake Huron, working on the second year of my project with the U.S. Geological Survey (USGS) Fisheries to map lake trout spawning grounds off Drummond Island. Although some of this work was conducted off our research boat, R/V Blue Heron, most of it was collected on a small USGS pontoon boat, a less than perfect platform to work on the Great Lakes!

The fall semester has been a busy one. I am once again teaching "Nonrenewable Resources" for the Environmental Science program. I am also teaching a new introductory geophysics course, "Principles of Geophysics", which is now part of our core curriculum for our geology undergraduates. So far it's going well, and I am trying to get the students into the field as much as possible to actually use the geophysical methods we've been talking about in class. Looks like we'll be collecting ground penetrating radar (GPR) data in the snow in the near future. Brrrrrr!!!

2011 Graduates

BS

Geological Sciences

Alexandria Beadell
Ryan Birkemeier
Bridgette Eischens
Julia Halbur
Todd Marks
Christopher Novak
Kyle Richardson

BA

Geological Sciences

Adam Johnson
Hannah McIntyre-Talbott
Charles Parent

MS

Geological Sciences

April Abbott
Daniel Cervin
Ryan Dayton
Emily Dunn
Daniel Foley
Brian Goldner
Stephanie Theriault
Jakob Wartman

PhD

Geological Sciences

Melissa Berke
Xiuju Liu

BS

Environmental Science

Julien Babel
Aisha Beaty
Lukas Dahlin
Benjamin Duscher
Derrick Erie
Kristin Hanson
Bradley Johnson
Andrew Just
Paul Kimpling
Travis Tolaas

PhD

Water Resources Science

Martin Woltering

EMERITUS FACULTY

Jim Grant

On our annual trip to Park City, Christabel and I had some excitement in having to be roped down by the excellent ski patrol from a disabled ski lift, onto a precipitous wooded slope with six feet of new snow. In spring we visited Sabra and Dennis Anderson in Tucson and Don and Mary Davidson in Tubac – all doing well.

I reviewed several papers involving isocons this year, and discovered on-line that my original isocon paper has been and still is at the top of Economic Geology's monthly list of most quoted papers! In the fall, we went to Ireland and the UK, and included a couple of days in the Assynt region, now a UNESCO Geopark. Right in the middle of the Geopark is the place where I first thought, how did that rock form? I was looking at an outcrop of Torridonian conglomerate, and got it half right. This is not the reason for the Geopark, which covers the classic area of the Moine Thrust.

The family is all well, still doing their respective things, looking forward to next year in Park City.

Wishing you all a Happy Christmas and a prosperous and healthy New Year!

John Green

My year has been another good one, with most of my professional activities focused on the Annual Meeting of the Geological Society of America in Minneapolis in October. I spent a lot of time planning the budget and itinerary and writing the guidebook for my three-day post-meeting field trip to the North Shore Volcanic Group, only to have it scrubbed at the end for lack of enough registrants. Oh well – the guidebook is there in the GSA Guidebook volume for all to see (and use). I did present a review paper on the NSVG in the Midcontinent Rift special session (co-authored by Terry Boerboom, UMD MS 1987, Tom Fitz, UMD MS 1988, and Susanne Schmidt) and co-lead a two-day field trip (with Mark Jirsa, UMD MS 1980) to “Classic Precambrian geology of northeastern Minnesota”, which attracted a good group with many from overseas.

May brought, as usual, the Institute on Lake Superior Geology, this year at Ashland, Wisconsin, and hosted by Tom Fitz of Northland College. The field trip I went on was a great walking tour of the Midcontinent Rift rocks in Copper Falls State Park.

Travels with Jan during the year started with a week in the Fort Myers, Florida, area in January, and a week in Maine during mud season visiting our daughter Martha and family. This included their home maple sugar operation which was interrupted by a 12” snowfall, which fortunately melted quickly. Our usual summer family trip (late July-early August) was spent mostly at daughter Sarah’s in Vermont, where the group climbed Mt. Hunger in the nearby Green Mountains, all made of nice garnet-muscovite schist with great glacial grooves on top.

I continue serving on the Superior Hiking Trail Board and scouting for new trail. We might actually complete the last segment linking up Duluth to the rest of the trail to the NE next year! And I’m still the main Department go-to-guy for the many folks who have “meteorites” they’ve found. (Most turn out to be iron-formation glacial boulders, including one I checked out this morning.)

Charlie Matsch

It is mid-November and there is snow on the ground, time to check in with you. I'm doing fine in retirement. I share an office at UMD with John Green, so I keep in touch with the Department. I continue to enjoy the wonders of the North Shore and sharing them with others. In June I led a field trip for a group of undergraduate Geointerns from the Twin Cities as part of their visit to the Large Lakes Observatory. Besides a land look along the shore of Lake Superior, they took a cruise on the research vessel Blue Heron. In October the LLO research staff hosted a group of Geological Society of America members who had come to Minneapolis to participate in activities related to the annual meeting. I gave them a land tour and they got a cruise on the Blue Heron. In April I made a getaway from the northland to Tucson, Arizona, to thaw out from the long Minnesota winter. I had a great time hiking in the foothills of the Santa Catalina Mountains and basking in the ever-present sunshine. Back home in Duluth I enjoyed a great summer, with many visitors, and lots of time spent outdoors enjoying the trails and spying on the activities of the newly returned bird population. In October I had a wonderful time at the reunion of alumni in Minneapolis. I love "happy hours" and this one was the best. Thanks for coming. Have a great holiday season.

Dick Ojakangas

I spent February in India, starting with an International Symposium on Precambrian Accretionary Orogens in Delhi. I presented “Proterozoic Sedimentology, Great Lakes Region, Southern Canadian Shield”. Then I was off to the Dharwar Craton of Southern India for fieldwork on what we think are Archean glacial deposits.

I taught an eight-week (two hours per week) course to UMD’s University for Seniors entitled “Geology of Antarctica and Points North”.

At the Institute on Lake Superior Geology (ILSG) in Ashland in May, I co-led, with Tom Fitz and Drew Kramer, a field trip entitled “Geology of the Bayfield Peninsula: Keweenaw Bayfield Group and Pleistocene Deposits”. Dean Rossell, UMD 1979, was awarded the S.S. Goldich Medal.

I lectured at the Minnesota Minerals Education Workshop for Earth Science Teachers on Roadside Geology of Minnesota. At the GSA Annual Meeting in Minneapolis in October, I presented “Sedimentation in the Mesoproterozoic Midcontinent Rift,

(continued on next page)

(Ojakangas, continued from previous page)

Lake Superior Region” in a session on the MRS. I also co-led a field trip with Mark Severson and Peter Jongewaard, “Geology and Sedimentology of the Paleoproterozoic Animikie Group: The Pokegama Formation, the Biwabik Iron Formation, and Virginia Formation of the Eastern Mesabi Range, and the Thomson Formation near Duluth, NE Minnesota”.

Peach and I took a summer riverboat cruise from Budapest to Amsterdam on the Danube, Main, and Upper Rhine rivers—67 locks and hundreds of low bridges. I visited Seattle for three days (different trip) and I also visited Los Cabos, Mexico, on the tip of the Baja Peninsula.

Kids—Cathy is a neuroscientist at the University of Chicago; Greg is still teaching Physics at Drury University in Springfield, Missouri, and contracting with NASA on orbital debris; and Susanna, in the Twin Cities, just finished her licensure for teaching middle school earth science and high school general science. I have been eating a lot of soup and breads, testing for Peaches’ next cookbook. Getting older is FUN—39 radiations for prostate cancer and also cataract surgery. Another busy and exciting year!

Rip Rapp

Retirement is a great opportunity for academics to publish articles and books that were not completed when encumbered by the myriad of things required of faculty in a university. After eight years in retirement, the articles and books still seem to materialize. Perhaps for some that scenario does not indicate 'retirement', but for a scholar it is truly a welcome opportunity. I also took a trip to England and France, which I suppose sounds more like retirement to most people. The other aspect of retirement from the University of Minnesota that I particularly enjoy is living in southern Arizona, where I can bike nearly every day of the year. I cannot always count on biking when I return to Duluth for the month of June.

Update on the Precambrian Research Center at UMD

The Precambrian Research Center, now in its sixth year, had a very successful 2012. The centerpiece program of the PRC, the Precambrian field camp, was again near capacity with 22 students from 18 different schools. As in past years, the camp was filled with a diverse and enthusiastic group of students from schools from all across the US. This year, four UMD students attended the PRC camp. We are already fielding inquiries about next summer’s field camp.

Because of record fundraising from member corporations and individuals in 2011, the PRC has been able to provide graduate research assistantships to three students (Ben Brooker, Matt Chaffee, and Chris Goscinak), and research grants (\$1000 each) to five UMD graduate students (Ben Brooker, Matt Chaffee, John Dyess, Chris Goscinak, and Amy Radakovich).

The other major program of the PRC, a professional workshop series, was not run this year because of commitments by the PRC directors to serve as field trip chairs for the national Geological Society of America meeting, which was held this past October in Minneapolis. We are planning to resume our workshop series in October, 2012, on the topic of Cu-Ni-PGE deposits of the Lake Superior region.

One new endeavor for the PRC this past year was its serving as principal organizer for the 14th Annual Minnesota Minerals Education Workshop held last June at the Mesabi Range Community College in Eveleth. The MMEW is a popular three-day workshop for K-12 earth science teachers that included a day of short courses and two days of field trips. The goal of the workshop is to provide current information to teachers on the geology and mineral resources of the state.

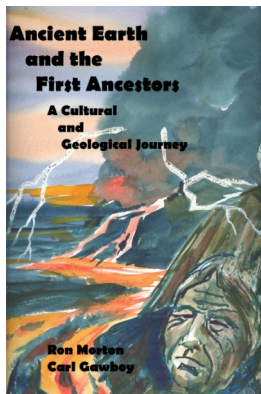
A new venture planned for 2012 is a field camp for professional geologists on specific types of Precambrian geology and associated ore deposits. The first camp will be held next May on the topic of mapping in Archean greenstone belts and shear zones with potential for lode gold deposits. For more information on these and other programs and on how to become a supporting member, please visit the PRC website: <http://www.d.umn.edu/prc>.



"The rocks are the final court of appeal" Francis Pettijohn

Dr. Tom Johnson—UMD Fellow of the American Geophysical Union 2011

Regents Professor Tom Johnson, a world leader in the field of geological limnology, has been awarded the **first ever** UMD Fellow of the American Geophysical Union. Tom has served on two National Academy of Sciences National Research Council Committees; was a Fulbright Senior Fellow to France in 1993-1994; an Overseas Visiting Fellow at St. John's College University of Cambridge in 2005; and a Gledden Fellow at the University of Western Australia in 2006. In 2003 he was awarded the W. H. Bradley Medal by the International Association of Limnogeology for his service to the lake community as well as his impressive research accomplishments. In 2009 he was honored with a Regents Professorship (one of only thirty in the University of Minnesota system) and selected as a Residential Fellow in the University of Minnesota Institute on the Environment for 2010 – 2013. Way to go, Tom!



Congratulations to Ron Morton and his co-author, Carl Gawboy, on their sequel to "Talking Rocks", "**Ancient Earth and the First Ancestors: A Cultural and Geological Journey**", published by Rockflower Press (info@rockflowerpress.com). Continuing where "Talking Rocks" left off, this work follows an earth scientist and Ojibwa elder as they travel through three billion years of geological time exploring the ancient rocks that make up a large part of the state of Minnesota.

With a donation to the department of \$75 or more, we would like to say "thank you" by sending you a copy of Professor Ron Morton's and Carl Gawboy's book "Ancient Earth and the First Ancestors: A Cultural and Geological Journey. (We will also include those of you who have recently donated to the department.)



Dr. Randolph Koski named Outstanding Alumnus

Dr. Koski graduated from the University of Minnesota Duluth with a Bachelor of Science degree in Geology. He continued his education at Stanford where he completed his M.S. and Ph.D. degrees. Dr. Koski is a Scientist Emeritus at the U.S. Geological Survey. His research interests include hydrothermal systems and mineral deposits on oceanic ridges and their analogs in ophiolites, as well as environmental impact of sulfide oxidation in coastal zones.

Alumni News

Burnell, Jim, MS 76, is a Senior Minerals Geologist with the Colorado Geological Survey. He interacts with the mining industry interfacing between the mining industry, the government and the citizens of Colorado. Jim states that he is having the most fun he's had in 30 years!

Cervin, Daniel, MS 11, is a hydrogeologist with MSA Professional Services, Inc. in Duluth, Minnesota.

Costello, Daniel, MS 10, is an Associate Geologist for Chesapeake Energy in Oklahoma City, Oklahoma.

Dayton, Ryan, MS 11, is an Associate Geologist for Chesapeake Energy in Oklahoma City, Oklahoma.

DeLong, Steve, BS 97, is an Assistant Research Professor for the University of Arizona. Some of his current projects are Lead Scientist, Biosphere 2 Landscape Evolution Observatory, project management for a \$7M project funded by the Philecology Foundation, monitoring and evaluation of arroyo restoration measures, San Bernardino Ranch, Sonora Mexico, and Fault zone evolution along the San Andreas Fault at Mustang Ridge, Monterey County, and event scale landscape change in a flash flood-dominated discontinuous ephemeral stream.

Goldner, Brian, MS 11, is a Project Geologist for Rio Tinto / Kennecott Exploration in Tamarack, Minnesota.

Hoaglund, Steven, MS 10, is an Associate Geologist for Chesapeake Energy Corporation in Oklahoma City, Oklahoma.

Kessler, Ken, BS 99, is entering his twelfth year as a consulting hydrogeologist for HDR Engineering, Inc. in Minneapolis. Ken became a licensed Professional Geologist in Minnesota in 2009.

McGown, Hillary, BS 09, is an Environmental Scientist for Carlson Professional Services in Duluth, Minnesota.

Norton, Kevin, MS 02, has accepted a position as a geomorphologist in the School of Geography, Environmental and Earth Sciences at Victoria University in Wellington, New Zealand. Kevin received his PhD from the University of Hannover in Germany in 2008.

Theriault, Stephanie, MS 11, is a geochemist for Barr Engineering Company in Minneapolis, Minnesota.

Vervoort, Jeff, MS 87, was recently elected a Fellow of the Geological Society of America. Jeff is an associate professor at Washington State University, Pullman.

(Alumni, continued from previous page)

Voytek, Emily, MS 10, is a hydrologist for United States Geological Society, Office of Ground Water Branch of Geophysics.

Wagner, Duane, BS 78, works for EnerVest, Ltd., as a consulting geologist.

Wahlstrom, Robert, BS 79, was recently promoted to Principal Environmental Engineer at American Engineering Testing, Inc. Congratulations, Robert !

Wartman, Jakob, MS 11, is an Associate Geologist for Chesapeake Energy, Oklahoma City, Oklahoma.

White, Christopher, MS 10, works in Ely, Minnesota as a consulting geologist.

Wonson-Liukkonen, Barbara, MS 87, plans to retire at the end of 2011, and in 2012, move with her family back to ten acres on the Stewart River just north of Two Harbors.



John Goodge looks for clues about Antarctica's past in the two percent of the continent that is *not* covered in ice! The University of Minnesota Duluth professor has been visiting Antarctica since 1985, finding and studying rocks that help tell the story of how this desolate continent has formed and changed over time.



In late 2010 and early 2011, Dr. Goodge, with other scientists, spent several weeks in the field visiting a dozen sites along 1,200 miles of mountains.

"What we're doing is finding places along the Transantarctic Mountains and we are sampling those to pick up pieces of rock that can, hopefully, give us some examples of what's further under the ice sheet," he says.

Dr. Goodge and his colleagues are supported by the U.S. Antarctic Program, which is managed by the National Science Foundation.

Field Mountaineer Dylan Taylor; Professor John Goodge, University of Minnesota Duluth; Associate Professor Jeff Vervoort (UMD MS) Washington State University; UMD graduate student Tanya Dreyer; Geologist Mark Fannin, Australian National University.

Precambrian Field Camp 2011



2011 Precambrian field camp students at Soudan Underground Mine State Park

I was very excited to attend the PRC field camp last summer because I learned about the Duluth Complex in classes and I was then able to see these rocks in the field. The principal instructors for field camp were Jim Miller, George Hudak, and Dean Peterson. They provided a very open learning environment as we worked on various projects. These mapping projects were located in different areas throughout northern Minnesota. Although difficult, the most difficult projects allowed me to learn the most.

The first two weeks of field camp were spent in the Duluth area mapping in familiar places like Thomson Dam, Spirit Mountain, and the North Shore. For one exercise, we collected geophysical data near Esko, Minnesota with Professor Nigel Wattrus from UMD. After two weeks the field camp packed up and moved to Vermilion Community College in Ely, where we mapped more geologically diverse areas including the Biwabik Iron Formation, the copper mineralized Duluth Complex, and greenstone belt rocks in Soudan State Park. We viewed this geology both in the field and in drill core, as we made several trips to the Minnesota DNR core library in Hibbing. After our stay in Ely, students dispersed into four different capstone project groups.

The capstone project during week five was the best educational experience I had during this field camp. I was able to apply everything I had learned about mapping in the field camp up to that point to this poorly mapped area. My capstone area was located just south of the Canadian border in the Archean Quetico Subprovince. Our capstone group was composed of six students, one TA (Amy Radakovich) and one instructor (Dean Peterson). We “camped” in an old fishing lodge along the Vermilion River called Gold Mine Camp and headed out to the field every day in fishing boats. Although the area had abundant outcrop, it had never been mapped in detail. Because the area was structurally and geologically complex, each outcrop that we came across could be a different rock type than the previous one. Therefore, it was very important to note any changes we would observe among key metamorphic minerals, like biotite and garnet, and whether the outcrop was dominated by granite (leucosome) or mafic minerals (paleosome). The areas I mapped were dominated by schist-rich migmatites and granitic-rich migmatites that are indicative of high grade metamorphism with some outcrops showing partial melting of the surrounding parent rock.

Back at UMD in week six, we compiled all of the capstone field data into ArcGIS and created a geologic map using Adobe Illustrator. This map and a powerpoint about our capstone was then presented at the NRRI in front of a group of professional geologists. These geologists were looking to hire students from this field camp right away because there is currently a high demand for field geologists. It was nice to know that the skills they were looking for were exactly the things we had learned at this field camp.

Taylor Balogh

Wasatch-Uinta Field Camp 2011

The 2011 Wasatch-Uinta Field Camp in Park City, Utah, found itself smaller than last year with only eight UMD students making the trip plus one University of Minnesota Morris student. The 2011 participants were: Drew Flaherty, Gavin Wagoner, Chris Novak, Bradford Folta, Vanessa Baratta (U of M Morris), Angela Hawkins, Vince Buhr, Jeff Klenner, and Kyle Richardson.

Nine of us journeyed across the western USA at different times. One van led by a week and traveled as far as the Grand Canyon and enjoyed activities such as hiking and whitewater rafting. The other group picked up the student from Morris and had an adventure staying in national parks and eating fajitas around a campfire. A side note, did you know there are about 300 signs across South Dakota for Wall Drug? We counted! After a few mishaps with the first van, we recovered some students that had fallen behind due to illness. This only added to the adventure!

Arriving in the beautiful Park City, I was awestruck to find such a great place in the middle of the mountains. After dumping our gear at the Chateau, we dispersed into the city to find dinner. I have to say the best burritos, by far, are at Taquerilla in the old part of town. Next we explored the bazaar that happens every Sunday. The following day we started with tours of the area and sites we would map the first few weeks. The terrain looked rugged and I could only imagine what obstacles would be in our way. However, each mapping area became my favorite in one way while hated in another. The focus the first few weeks was mainly sedimentary with one small volcanic unit (Keetley). As we moved further into Utah near the Moab area, we found it to be

very hot, especially for most Minnesotans. The geology was astounding as it was right there in your face and you could follow beds for miles.

I found that camp flies by when you start thinking of the number of days in a project rather than the days of the week. Field trips provided somewhat of a break, and the trip to the Grand Teton was amazing! We did nothing but hike and have fun! All in all, field camp was a success. In the beginning you feel overwhelmed, but as you progress you begin to apply geology 1000 to geology 4000 and put all the complex nature of rocks together. When that happens, maps get easier, the work lessens, and as you walk around, you begin to take in the surrounding environment and see more than a person typically sees.

Bradford Folta, Jr.



Field camp students at the Black Pine gold mine in Idaho

In Memory of Richard L. Patelke



Richard L. Patelke, 54, passed away August 29th, 2011 in his home. Richard was a passionate geologist who was enthusiastic about discussing the rocks of Northeast Minnesota, and loved to spend time in the field. Richard graduated with his MS from the UMD Geology Department in 1996. His thesis work was on the Colvin Creek Body near Hoyt Lakes, Minnesota. This body is a rather large, rotated inclusion of a cross-bedded sandstone (roughly 1,000 feet thick) and associated magnetite-rich basaltic flows within the Duluth Complex. What makes the inclusion unique is that the sandstone is extremely fine-grained and is composed of granular plagioclase, diopside, orthopyroxene, and oxides but no quartz - essentially a micro-gabbro. Richard determined that the sandstone was derived from a provenance dominated by the North Shore Volcanic Group and deposited in an eolian environment.

His professional career included his current work as Chief Geologist at PolyMet Mining. He also worked as Project Geologist at Minnesota Iron and Steel, at the Natural Resources Research Institute (UMD), and on other regional geologic projects.

Richard was a regular participant in the Institute on Lake Superior Geology (ILSG), Mesabi Range Geologic Society (MRGS), and Minnesota Minerals Education Workshop (MMEW). He loved field trips. "Whoever sees the most rocks wins!"

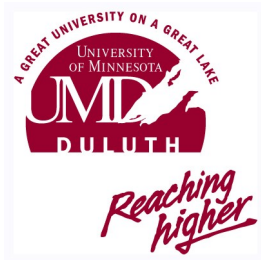
To honor Richard's skill, devotion, and enthusiasm for Precambrian Geology, a memorial scholarship fund has been established in his name. To date, \$8750 has been donated to the Richard Patelke scholarship fund (fund #8680). Proceeds from this fund will be used to offset field camp expenses for UMD students attending the Precambrian Research Center's summer field program (<http://www.d.umn.edu/prc/>). In the future, funds may also be used to contribute to master's thesis projects completed in NE Minnesota. Contact Susan Mack, Director of Development at 218-726-6984 or srmack@d.umn.edu for more information on making a contribution.

Fall 2011 UMD Geological Sciences

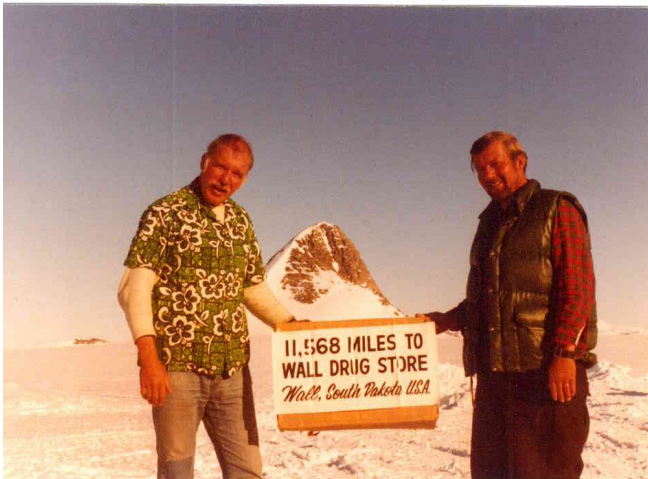
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Should Dick tell Charlie it's not Hawaii, it's Antarctica??

What's New ?

Please contact us at geol@d.umn.edu with your update to be included in a future issue of our newsletter. We'd love to share your good news. Did you change your job, get married, receive special recognition from a professional organization? Let us know by sending:

Name

Contact information

Degree earned and graduation year

A short paragraph with your news

