



The Maine Geologist

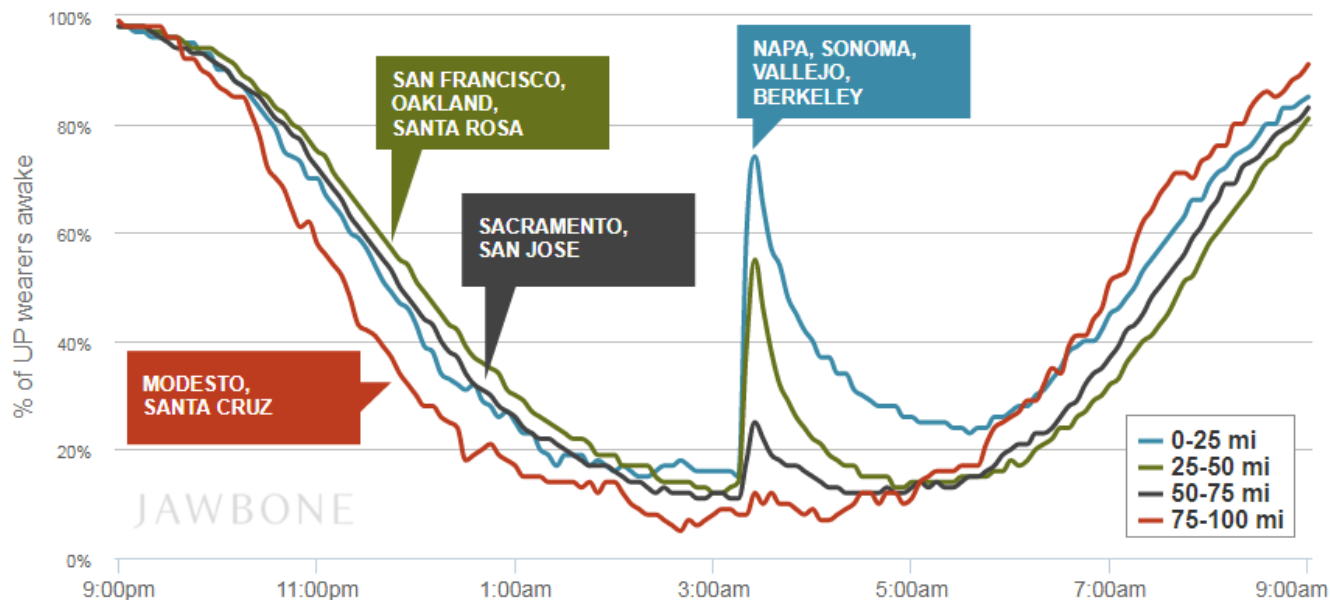
NEWSLETTER OF THE GEOLOGICAL SOCIETY OF MAINE

February 2018

Volume 44

Number 1

PRESIDENT'S MESSAGE



jawbone.com/blog/napa-earthquake-effect-on-sleep/

Geologic information can come from unexpected sources. Here's a 21st Century example from the magnitude 6.0 earthquake in Napa, California on August 24, 2014. Many people in the area were wearing a fitness tracker that records when they are sleeping. The graph above shows that when the earthquake struck at 3:20 am most people within 25 miles of the epicenter were awakened, and stayed awake for a while, whereas people 75 miles away hardly noticed it. They had become human seismometers! This is not the reason they were wearing the trackers, but it showed up in the data anyway.

Another example of an unexpected result is from the tide gauge in Portland, which was originally installed for navigation so ships would know when and how high the tides would be. Yet after a hundred years of accumulated data, the record showed a long-term trend of sea-level change. This is not the reason

the data was collected in the first place. There are many other examples of unexpected results being drawn from data collected for one purpose and showing another result. This is part of what makes geology interesting.

A related creative activity, one that is becoming more common as digital data becomes more accessible and computing tools become more powerful, is the repurposing of geologic information to produce derivative maps or specialized map products. In some cases this can go well, especially in cross-discipline uses. For example, an aquifer map can be derived from a surficial geologic map by knowing the hydrologic character of the various surficial units. A botanist may be interested in a map showing bedrock of mafic and ultramafic composition because of the unusual nutrient chemistry. But I have seen cases where derivative maps have gone badly. A consulting report on

potential frac sand resources in the United States included a map that showed Aroostook County as having a "high potential" for a frac sand mine. This is ridiculous. The sandstones in Maine don't have the right composition, grain shape, or cementation. I contacted the authors of the report who had done a GIS intersection with a map that did not show appropriate geologic units. They could not justify the content of their map.

So my message for today is about metadata. In reading maps, please check the sources of information. And by that, I mean who was the scientist who made the observations, why was the data collected, by what methods or techniques, and with what resolution. Keep this in mind as we gather at the GSM Spring Meeting in Unity on April 6 and talk with the students about their projects. I am excited to see the breadth and depth of new knowledge about Maine geology that the students have gained this year. And big thanks are in order to Kevin Spigel for hosting the meeting at the Unity College Center for the Performing Arts, which will be a perfect facility for us to spend a full afternoon together.

Henry Berry, GSM President
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COOL MAINE GEOLOGY DATA SITES

New England seismograms in real time
(Maine stations:
WVL, EMMW, ORNO, PKME, PQI)
http://aki.bc.edu/cgi-bin/NESN/24hr_heli

Groundwater level monitoring network
<https://cida.usgs.gov/ngwmn>

New map of sea floor bathymetry
http://ccom.unh.edu/gis/maps/WGOM_4m

THE EDITOR'S MESSAGE

The newsletter is distributed through email in pdf format. Anyone with special needs please contact the Editor. Please send items of interest and photographs of GSM activities to:

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GSM WEBSITE: www.gsmmaine.org
FACEBOOK: facebook.com/GSMMaine

NEWS FROM THE STATE GEOLOGIST

What's out there?

A revision of a column written in 2008

What goes around comes around. I first wrote about offshore oil and gas potential in 2008 when national security drove a reevaluation of the nation's energy policy, including the long-standing moratorium on drilling in the North Atlantic. Here's the first paragraph of that column, edited to reflect the current times:

"On ~~July 14th~~ January 4, President ~~Bush~~ Trump revoked most provisions of an executive order supporting moratoria on leasing of many areas of the outer continental shelf (OCS) for oil and gas production, as one part of a strategy to reduce our nation's reliance on foreign oil. This was followed shortly by declarations from our Congressional Delegation ~~and Governor~~ supporting a continuation of the moratorium on drilling in Maine's OCS."

In 2009, as part of the then Ocean Energy Task Force's review of offshore energy potential, I compiled a summary report of Maine's potential for oil and gas resources, both onshore and offshore. (Report at Digital Maine: http://digitalmaine.com/mgs_publications/534/) We geologists know that four ingredients are required for the generation of significant hydrocarbon accumulations: sufficient organic carbon in sediments, a specific thermal history applied to those

sediments, rocks that can act as reservoirs, and suitable traps that allow migrating hydrocarbons to accumulate in the reservoir.

Looking at the second criterion first, almost all onshore Maine can be eliminated from hydrocarbon potential by thermal history. Based on metamorphic mineral assemblages, we know that most of the rocks now exposed experienced temperatures above 200°C, beyond the optimum temperature range (100-200°) for the development of hydrocarbons from naturally occurring organic material. Above about 225°C, organic carbon is converted to graphite, a common mineral in many metamorphosed sedimentary rocks of Maine. Only extreme northern Maine has escaped the extreme heat, and the turbidite rocks there are unlikely to have sufficient organic carbon.

Moving to the offshore: Well-exposed rocks on Maine's coast have attracted geologists for centuries. Their collective work demonstrates that the immediate coastal areas and coastal islands, to the 3-nautical-mile limit of state jurisdiction, have experienced a similar geologic history as the remainder of Maine. High-grade metamorphic rocks and igneous intrusions abound to the outermost islands, leaving no opportunity for preservation of hydrocarbons.

Less is known of the geology in federal waters beyond 3 miles, but sufficient work has been done to provide a framework for assessing hydrocarbon potential. One of the very first applications of seismic refraction techniques in the Gulf of Maine was by Katz and others (1953). Their work investigated the nature of the crust along a traverse that extended from about 25 miles seaward of Yarmouth to about 35 miles seaward of Mount Desert Island. The compressional wave velocities they determined with this experiment are consistent with granite as the dominant rock in the shallow crust.

The work of Hutchinson and others (1988) summarizes much of what is known about the geology of the Gulf of Maine. Based on seismic reflection profiles and aeromagnetic surveys, they delineated several Triassic rift basins related to the Fundy rift system. Due to a series of sidestepping faults, the rift basins are located progressively farther offshore as one moves from the Bay of Fundy to the

southwest. Based on aeromagnetic signatures similar in strength and pattern to those of the subaerial igneous and metamorphic terranes, on seismic refraction velocities, and interpreted seismic reflection profiles, Hutchinson and others (1988) concluded that most of the Gulf of Maine inboard of the Triassic basins is underlain with the extension of the terranes of igneous and metamorphic rocks that geologists have mapped throughout New England. The short answer is that the Gulf of Maine to the northern boundary of the Georges Bank has no potential for hydrocarbon accumulations.

The Georges Bank is another story. Eight exploration holes were drilled there during the 1970s and 80s, among them two Continental Offshore Stratigraphic Test (COST) wells. Walter Anderson visited one of these drill sites when it was active. These wells showed favorable Mesozoic stratigraphy, similar to that of the productive area offshore Nova Scotia at Sable Island, but they were short on organics. Furthermore, the units had been insufficiently heated to generate hydrocarbons, had there been enough organic carbon.

Despite long odds, assessments of undiscovered and technically recoverable hydrocarbon reserves have been made by the Bureau of Ocean Energy Management (Department of Interior) for the North Atlantic Planning Area, a region extending from southern New Jersey to The Hague Line. The [2016 assessment](#) estimates reserves of 1.8 billion barrels of oil (BBO) and gas reserves of 11.8 trillion cubic feet (Tcf) in the entire Area. This assessment takes into account plays that are productive at Sable Island and shows oil and gas in holes off New Jersey. For comparison, undiscovered reserves in the Gulf of Mexico are set at 48 BBO and 142 Tcf gas.

So the question for the near-term is will there be oil and gas exploration leases anywhere within the Gulf of Maine or on the Georges Bank? We'll see.

Robert G. Marvinney, State Geologist
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Hutchinson, D. R., Klitgord, K. D., Lee, M. W., and Trehu, A. M., 1988, U. S. Geological Survey deep seismic reflection profile across the Gulf of Maine, Geological Society of America, Bulletin, v. 100, no. 2, p. 172-184.

Katz, S., Edwards, R.S., and Press, F., 1953, Seismic refraction profiles across the Gulf of Maine, Geological Society of America, Bulletin, v. 64, no. 2, p. 249-251.

2017 FALL MEETING REPORT

Opportunities and challenges facing Maine's mineral resource industries

An enthusiastic audience of about 80 geologists and interested persons congregated at the Augusta Civic Center on November 17 for presentations on mineral resources in Maine. The focus of this meeting was very timely, following by just weeks the final adoption of Maine's Metallic Mineral Mining Rules, and following by just a day Wolfden Resources' purchase of the Pickett Mountain (formerly Mount Chase) VMS deposit. As GSM members know, the finalization of the mining rules come after years of lengthy and often acrimonious debate.

Fred Beck (F.M. Beck, Inc.), perhaps Maine's most experienced exploration geologist, led off with an overview of past exploration programs and exploration methods. Highlighted in his presentation were the efforts of the late John Cummings to develop and successfully apply advanced exploration techniques in northern Maine.

John Slack (USGS), an economic geologist with more than 40 years of experience, presented (by proxy) an overview of Maine's undiscovered mineral potential, focusing on how new genetic models for ore bodies have led to discoveries in other jurisdictions. Application of new models and shifting mineral commodity demands open many opportunities for exploration work in Maine.

Gary Freeman (owner, Mount Mica and Plumbago Mountain), who for many years has mined spectacular mineral specimens in western Maine, discussed his discovery of enormous spodumene crystals in pegmatite at Plumbago Mountain. Should reserves prove out, the increasing demand for lithium may make this pegmatite extremely valuable.

Bob Marvinney (MGS) discussed several digital data management projects by the Survey and the

emphasis on improving discoverability and accessibility of the data. He also reviewed progress on a National Geological and Geophysical Data Preservation grant to retrieve and curate drill cores that were critical to the discovery and definition of the Pickett Mountain (Mount Chase) VMS deposit.

Chip Laite (Aggregate Manager, Sargent Corp.) discussed the challenges of multi-layered local, state, and federal regulations imposed on the aggregate industry and difficulties finding supplies that meet all environmental regulations. Maine's ageing workforce is also a concern for the industry, leading his company and others to implement training programs to encourage the next generation to pursue careers in the industry.

Don Hoy (President and CEO, Wolfden Resources) introduced his company and discussed why they see great potential for undiscovered mineral resources in Maine. He reviewed the geology of the Pickett Mountain Zn-Pb-Cu-Ag VMS and described it as among the highest-grade deposits of its kind in North America. Wolfden's plans over the next year include a drilling program to confirm and extend the deposit (underway), and several local and regional geophysical surveys.

Andrew Morgan (Master's graduate, UMaine) presented his thesis work on assessing public perceptions about the risks of metallic mineral mining. Andrew first reviewed and developed statistics for testimony given by hundreds of individuals during legislative debate of the rules over several years, identifying impact on clean water as an overriding concern. Over the years, the number of supporters declined while the number of opponents rose. His team used a random survey of Maine residents to test risk perception. Risk perception does not equal risk reality but rather is driven by many factors, chief among them socio-cultural influences.

John Hopeck (Hydrogeologist, Maine DEP) presented highlights of the recently adopted Chapter 200 Metallic Mineral Mining Rules. He emphasized the many provisions in the rules intended to protect groundwater quality. These include a very stringent definition of "Mining Area," provisions for baseline monitoring, and extensive monitoring requirements during and after mining.

Following these presentations, GSM was very fortunate to convene for a Q&A session a distinguished panel of individuals who had intensive involvement with the legislative debate on mining. Senator Tom Saviello (District 17) and co-chair of the Joint Standing Committee on Environment and Natural Resources, a veteran of the full 5-year legislative process, discussed the great extent his committee went through to hear from the public and fully debate every aspect of the statutes and rules. Committee co-chair Representative Ralph Tucker (District 50) discussed how the Committee sought out advice and knowledge from numerous experts in various aspects of mining and environmental protection, which he described as enormously beneficial to their process. Nick Bennett (Senior Staff Scientist, Natural Resources Council of Maine) reviewed his organization's efforts on improving the provisions in statute and rule that provide financial assurances and protect the environment. John Hopeck and Don Hoy rounded out the panel. In response to questions about specific provisions of the rules, the legislative and environmental panelists indicated that there would be little desire to revisit the metallic mineral mining debate anytime soon.

Robert G. Marvinney, State Geologist
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2018 SPRING MEETING ANNOUNCEMENT

**April 6, 2018
Unity College**

Mark your calendars! The 2018 GSM Spring Meeting is scheduled for Friday, April 6. This year the conference is being hosted by the Earth and Environmental Science program at Unity College. The primary emphasis of the spring meeting is to showcase the latest undergraduate research during a poster session and a round of oral presentations. The keynote speaker will be Dr. Alicia "Cici" Cruz-Uribe, Assistant Professor at the University of Maine at Orono. She will discuss her work on deep subduction zone processes. See the flyer at the end of

the newsletter for more information on how to submit an abstract (**deadline is March 21, midnight**), preliminary schedule, and more. Please contact Dr. Kevin M. Spigel with any questions.

Kevin Spigel
kspigel@unity.edu

2018 SUMMER FIELD TRIP ANNOUNCEMENT: PART II

**July 28-29, 2018
North Maine Woods**

The 2018 GSM Summer Trip goes deep into the North Maine Woods, in the areas around Round Mountain, Jack Mountain, Chandler Mountain, Mule Brook Mountain, and Horseshoe Pond. It will provide a great opportunity to explore the Woods, its wilderness, its beautiful lakes and forests, its rich indigenous history, and of course its intriguing rocks, glacial features, and archaeology.

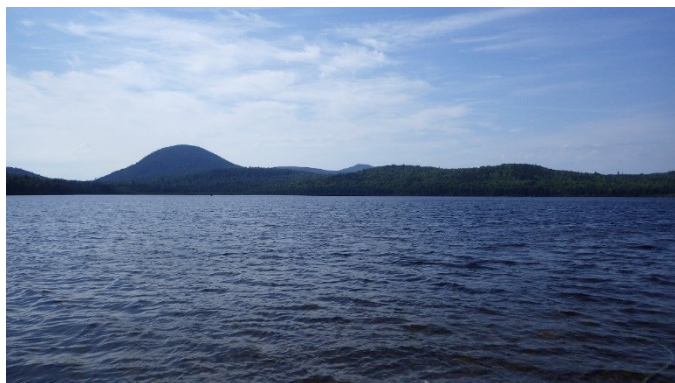
The North Maine Woods have become a new geological frontier in Maine. As indicated in the previous Newsletter, this summer trip will highlight some new and exciting geological and archaeological discoveries in the central "Munsungun Anticlinorium" region. Trip leaders include Chunzeng Wang and David Putnam of UMPI and Stephen Pollock of USM.

The trip will be held the weekend of July 28-29 when mosquitoes and black flies begin to disappear (we hope). The gathering and camping place is at a private lakefront camp on Rowe Lake, T11R8, Aroostook County. The camp has a new log cabin, a kitchen, and an outhouse, plus several boats, kayaks, and canoes and of course a huge swimming pool – the quiet lake with a spectacular view of Round Mountain. The log cabin can only sleep several people and it is reserved for several elders.

The trip runs all day on Saturday (July 28) and most of the day on Sunday (July 29). Therefore, trip attendants must arrive on Friday (July 27). Due to limited parking space around the camp and also the very limited room at the outcrops and sites we plan

to visit, we plan to use only several large vans to limit the size of our caravan. Depending on the number of people who will take the trip, participants will meet at Ashland High School parking lot on Friday (July 27) afternoon (arrive no later than 6:00 pm) before being picked up by vans to drive into the camp. Limited exceptions may include people with extraordinary circumstances. Please contact trip organizer Chunzeng Wang if you plan to drive a 12-passenger van. All trip participants must bring sleeping bags, tents, and personal gear (tents are not necessary for the elders who are confirmed to use the lodge). There is plenty space for tenting by the lake (or in the woods if you prefer). The camp is off-grid and there is no generator, so please bring a flashlight. About food and meals: the kitchen at the camp can be used to cook meals. The group can decide whether to share food. Anyone with special dietary requirements should inform the trip organizer and/or bring their own food. GSM will take care of the Saturday night cookout as usual.

Registration information will be distributed by email and posted on the GSM web site. Contact chunzeng.wang@maine.edu for any questions about the trip.



View of Rowe Lake and Round Mountain from the camp.

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David Putnam
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Steve Pollock
stephen.pollock@maine.edu

OBITUARY

John S. Cummings
1930 - 2017

John Cummings, a Maine geologist with a long history of base metal discoveries in Maine, died on November 26, 2017 in Grand Prairie, Texas. He was without question the most productive mineral exploration geologist in Maine during the busy exploration years from 1965 to 1990. He is credited with the discovery of several massive sulfide deposits including the Bald Mountain deposit in Aroostook County. John was a native of Auburn, Maine, graduated from Middlebury College in 1953 and got his Master's degree in Geology from Columbia in 1955. He retired with his wife Joan to Texas to be close to his daughter and grandchild. John was a maverick in many ways. He feuded with many established organizations, particularly the USGS, about exploration methods and interpretations. He was a strong believer in accurate lithologic maps showing outcrop locations and discounted the value of maps with only Formations shown without outcrop lithology. He had a good sense of humor and will be missed by many of his former friends and associates in Maine.

Fred Beck, GSM Historian
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NOTE OF INTEREST

Arthur Hussey files now in Bowdoin Archives

A large volume of Art Hussey's files is now organized and archived at Bowdoin College. A detailed index is available for those interested. If you want a copy of the scanned index, contact:

Fred Beck, GSM Historian
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2018 GRAND CANYON RAFTING TRIP

August 6-13, 2018

There are still a few spaces available for the Grand Canyon rafting trip which will be from August 6 through the 13th, an 8-day trip with incredible geology and companionship. If interested, contact Fred Beck at fmbeck@fmbeck.net for further details.

and Student Volunteer Organizers are still needed, among many other positions. Contact as soon as possible:

Steve Pollock
stephen.pollock@maine.edu

VOLUNTEERS NEEDED FOR 2019 NE GSA

The 54th Annual Meeting of the Northeastern Section of the Geological Society of America will take place at the Holiday Inn by the Bay in Portland March 17 to 19, 2019. This will be the fourth time NE GSA has met in Portland. The last three meetings (1988, 1998, 2009) were rousing successes. These successes happened because the geological community in Maine rose to the occasion of putting on highly memorable events. **Volunteers are needed** to once again organize a meeting that will be memorable for years afterwards. The heart and soul of these meetings is the technical program. NE GSA has a significant reputation of highlighting student research, but the technical program also involves cutting edge science and topics of interest to all professionals from applied as well as students. Because of this, there is an immediate need to begin building the technical program for 2019. The technical program needs to have theme sessions and symposia which are broad based, current and forward looking. The technical program needs to be fleshed out by June 2018 for the preliminary announcement in September. There is an immediate need for individuals willing to co-chair and/or serve on the technical program committee. As the meeting date approaches there will be a need for others to chair or co-chair committees on student help and sponsorship among others. This is an opportunity to expand your horizons, work with the excellent GSA staff in Boulder and have an overall rewarding experience.

If you are interested in volunteering for the NE GSA Technical Program Committee, please respond by March 30th. Sponsorship Committee Members

NEWS FROM THE CAMPUSES

Bates College

Genevieve Robert is back from pre-tenure leave. She is teaching mineralogy, igneous and metamorphic petrology, and overseeing the department's senior thesis seminar this semester. She is compiling viscosity data collected during her leave and planning for summer research with students, involving more viscosity experiments at Bates and the University of Missouri - Columbia. Genevieve is excited to report that Megan Lubetkin ('16) recently published her senior thesis work in Deep-Sea Research Part II on "Nontronite-bearing tubular hydrothermal deposits from a Galapagos seamount".

Dyk Eusden is chairing the department this year and is teaching the Mapping and GIS course this semester. He finished up the Jefferson, NH bedrock geologic map and is working on the Mt Crescent, NH quad for the New Hampshire Geological Survey and the USGS StateMap Program. Across the border, he is in the final stages of map editing with folks at the Maine Geological Survey on the bedrock geologic map of the Gilead, ME quad. Many Bates students served as co-authors and contributors to these projects.

Alice Doughty is a visiting assistant professor and is now assisting Mike Retelle with the introductory course on surface processes. She co-hosted a successful Dr. MLK Jr Day event called "Achieving success in STEM as a student of color," where a panel of 8 current Bates science majors shared their experiences, advice, and love of science. She is currently modeling past glacier extents in Uganda in collaboration with professors at Dartmouth College and Brown University, and is mentoring a University of Maine graduate student in modeling glaciers in Mongolia.

Mike Retelle is currently teaching introductory geology and will run his Limnology and Paleolimnology course during Bates Short Term in late April through May. He and students are continuing research on marine paleoclimate and sea level in Finnmark, northernmost coastal Norway, in collaboration with Al Wanamaker from Iowa State (UMaine PhD). Mike also is continuing his long-term glacier watershed monitoring and paleoclimate work in Svalbard where he and colleagues have developed an international summer field program for undergraduates with the University Centre in Svalbard.

Phil Dostie is currently assisting Bev Johnson's Environmental Geochemistry Lab as well as assisting in the workup and data interpretation of $\delta^{15}\text{N}$ from various amino acids of the ocean quahog *Arctica islandica*. He is also starting a project that is developing low cost, reliable field ready dataloggers/sensors. These sensors are being built with the intent on monitoring sensitive environmental sites along the coast of Maine and elsewhere.

Raj Saha is joint Geology-Physics Lecturer. He studies climate dynamics and teaches courses in Climate Modeling, Mathematical Modeling, and Polar environments. His current research focus is on understanding critical transitions in the Arctic permafrost in response to anthropogenic warming.

Bev Johnson is teaching Environmental Geochemistry this semester; students are measuring road salt contamination in a local watershed and the history of lead deposition in the area, among other things. Her thesis students are doing great work studying the geologic history of Scarborough Marsh, the impact of urbanization on water quality and sediment dynamics in the Hart Brook watershed, and blue carbon stocks in Maine salt marshes and eelgrass beds.

Many of us will be at NEGSA in Burlington this March and hope to see you there. Eight of our seniors will be presenting posters, so stop by to encourage them along.

Dyk Eusden, Chair

Bowdoin College

Emily Peterman was just promoted to Associate Professor with tenure. You can read more about Peterman and her cohort here:

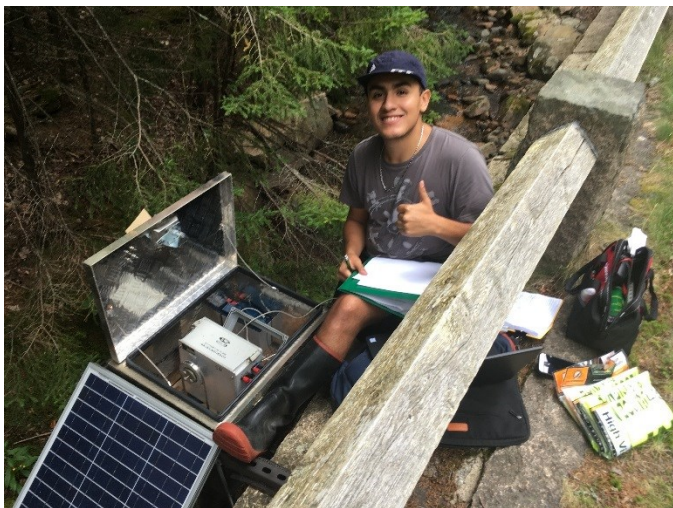
<http://community.bowdoin.edu/news/2018/02/elevate-faculty-members-promoted-with-tenure/>

College of the Atlantic

Sarah Hall traveled to southern Peru with two COA students, Gemma Venuti and Alba Mar Rodriguez Padilla, during December 2017 to conduct field work associated with Alba's senior project which she has continued to work on with collaborators at University of Maine (Sam Roy, Scott Johnson). Together with Peruvian colleagues, the team mapped active faults for geohazards assessments and collected samples to build a climate record for a region periodically affected by large El Niño events. Gemma Venuti was awarded student research funds to pursue her senior project: establishing a paleoclimate and paleoecological record of Great Duck Island from sediment cores in conjunction with collaborators (Andrea Nurse, Jacquelyn Gill) at the UMaine Climate Change Institute. Various COA students continue to work with regional collaborators (UMaine, Acadia National Park, Friends of Acadia, MDI Biological Laboratory) on local watershed projects in and around Acadia National Park. During winter 2018, faculty members Sarah Hall (Geoscientist) and Netta van Vliet (Anthropologist) have been exploring the challenges and opportunities arising through co-teaching a multidisciplinary course, "The Anthropocene." During Summer 2018, Hall and COA students will join undergraduates from two California colleges, University of San Francisco and Mt. San Antonio College, for a 3-week Environmental Geoscience Field Methods and Professional Development course for Environmental-STEM students in the amazing Long Valley and Central Sierra Nevada region.



Sarah, Alba, and Gemma in Peru.



Pato, stream work, Acadia National Park.

Sarah Hall

Unity College

There is a flurry (yes, winter pun intended) of activity in the Geoscience Lab at Unity College this semester – with approximately 18 students working on various projects. Most of the activity involves students in GL 3524 – Lake Sedimentation and Environmental Change conducting their class research project on a 6.7m core collected from Lake Winnecook (Unity Pond) on January 27. Students recently completed splitting the cores and performing initial core descriptions and future work involves loss-on-ignition, charcoal, and pollen. They will interpret their findings in the context of other

studies from Maine and the rest of the New England to reconstruct post-glacial environmental conditions in central Maine since approximately (13,500 cal yr BP, basal date). We'll try and get some preliminary findings together for the spring GSM meeting. Another team of freshmen just started to learn some of the same lake sediment procedures with the intention of leading them up to collecting their own sediment core to form the foundation of a few senior thesis projects. Upperclassmen are busy mentoring the latest cohort of students while continuing their own work on topics ranging from an evaluation of the health status/quality of soils across campus, reconstructing a groundwater model, studying water quality of snowmelt runoff on campus, to preparing a pollen record from a lake in northern Wisconsin. Several students are eager for the spring thaw in order to get back in the water and continue ongoing projects in several nearby streams. Until then, lots to do.



Students in GL 3524 and field assistants pose for a post-coring photo on Lake Winnecook on 1/27/18. The temperature was -14°C, perfect for working with metal coring instruments and water! All went well and we recovered 6.7 m total in seven drives.

Kevin Spigel

NEWS FROM THE PRIVATE SECTOR

CES, Inc.

In 2014, Northern New England Passenger Rail Authority submitted applications to the MDEP to expand the Amtrak Downeaster to Brunswick. The eight-acre site had been historically used for railroad activities from the 1850s to the 1980s. During the application process, the project gained a significant amount of public scrutiny as there were concerns about the possible effects on groundwater during the construction of a facility necessary for service expansion. CES, Inc. Vice President Michael (Mike) Deyling, CG, assisted NNEPRA with a variety of actions including investigations, community outreach, expert testimony, Soil Management Plans and Dewatering Plans to minimize the environmental impacts during the new facility's construction. "Based on our understanding of the site from the original Phase I and Phase II assessments and our own monitoring of the site, we were able to provide reassurance to the regulators, public and client that allowed for facility construction," Deyling said. "Ultimately, now passengers are taking advantage this additional service in Brunswick, and NNEPRA is in the process of expanding even further up the coast to Rockland." For more information about the project specifics visit CES' website here: Link: <http://www.ces-maine.com/projects/amtrak-downeaster-brunswick-layover-facility/>.

NEWS FROM THE PRIVATE SECTOR is a new section in the GSM newsletter. Thank you, CES, Inc., for contributing the first item!

SECRETARY'S REPORT

Fall 2017 Business Meeting Minutes

1. GSM President Henry Berry called the meeting to order and began with some announcements: Acting Treasurer Steve Kelley is collecting annual dues and taking orders for GSM t-shirts, which will be available for pick-up at the spring meeting. Copies of Arthur Hussey's A Guide

to the Geology of Southwestern Maine are also available for purchase.

2. Henry offered thanks to outgoing Director Keith Taylor for his service to GSM from 2010 to 2017, as Vice President, President, and Director.

3. Sarah Hall, Vice President and representative of the Nominating Committee, presented nominees Mike Deyling for Director (three-year term) and Fred Beck for Historian (one-year term to fill the remainder of Art Hussey's term). Nominees were approved by the membership, with thanks for their willingness to serve GSM.

4. Acting Treasurer Steve Kelley provided the Treasurer's Report. As of today, GSM has approximately \$1,100 in savings \$2,600 in the checking account. The Walter Anderson Fund account has approximately \$22,000 in CDs and about \$500 in savings. The annual Treasurer's report was provided in the October 2017 newsletter.

5. The Executive Council approved an award from the Walter Anderson Education Fund. Gemma Venuti from the College of the Atlantic will be awarded \$750 to support an undergraduate research project on the paleoecology and paleoclimatology of Great Duck Island.

6. Anderson Fund discussion – In 2008 a team reviewed the status and use of the Anderson Fund. At the time, the fund had about \$7,500. It is now at about \$22,000. The fund has been a great success and we want to do more with it, and also ensure that the fund can continue to support and foster geology projects in the state of Maine, and study/work by Maine students and geologists. To that end, Henry Berry and Bruce Hunter will convene a task force to look at policies, procedures, and the possibility of a fundraising campaign. Interested parties are invited to join. Carol White, Cliff Lippitt, Walter Anderson, and Steve Pinette volunteered to join the task force, which will meet in early 2018.

7. Upcoming events:
- a. The next Walter Anderson Education Fund application deadline is March 1, 2018
 - b. The GSM Spring Meeting will be held at Unity College on April 6
 - c. The 2018 Summer Field trip in northern Maine will be July 28-29
 - d. Fred Beck and Alison Jones will lead a rafting trip through the Grand Canyon, August 6-13, 2018
 - e. Looking ahead: Geological Society of America, NE Section annual meeting will be held in Portland, March 19-21, 2019

Henry adjourned the business meeting at 1:25pm.

Respectfully submitted,

Lisa Jacob, GSM Secretary
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TREASURER'S REPORT

I have returned to Maine after a six-month family assignment in the suburbs of San Francisco taking care of my granddaughter while her parents transitioned back to work. She was nine months old when we returned from California. Many thanks to Steve Kelley who served as interim treasurer. Steve did an excellent job and left the records well organized. It's good to be back in Maine. You may once again send your dues to me at:

Bruce Hunter
44 Old Fairgrounds Rd.
Readfield, ME 04355

In the small amount of free time I had I studied the geology of the Franciscan Formation, using the "Geology of the San Francisco Bay Region" by Doris Sloan as a guide. The rocks were formed during the Cretaceous subduction of the oceanic Farralon plate which was thrust under the now North American plate to the east. Radiolarian chert deposited on pillow basalts on the marine plate were overlain by

shale and immature sands sourced from the continental plate. These sediments were deposited in the oceanic trench and were mixed during subduction. The sandstone, a typical graywacke, was composed more of rock fragments and feldspar grains than quartz grains found typically in a sandstone. Hence, it is referred to as the graywacke member of the Franciscan formation. That is the rock I saw most frequently in Marin County where I was living. It has been difficult for Californian geologists to piece together the stratigraphic relationships of the members of the Franciscan Formation because the originally layered deposits were squeezed and faulted during subduction into a complex mixture, a *mélange*. One can see shear zones in the photo of the shale as evidence of the thrusting. Shearing no doubt occurred in the graywacke member also but it is not readily apparent.



Sheared shale, penny for scale.

I also spent an afternoon hiking along the San Andreas Fault zone which separates the Franciscan Formation from the rocks of the Point Reyes Peninsula that were transported from Southern California. This included a visit to the location of the fence that was offset during the 1906 earthquake and is featured in many text books. A replica of the fence stands there now.

Respectfully submitted,

Bruce E. Hunter, GSM Treasurer

UPCOMING EVENTS

<u>Date</u>	<u>Event</u>	<u>Location</u>	<u>Organizer</u>
March 18-20	2018 Geological Society of America Northeastern Section 52 nd Annual Meeting	Burlington, Vermont	University of Vermont
March 29	2018 Maine Sustainability and Water Conference	Augusta Civic Center	Senator George J. Mitchell Center for Sustainability Solutions
April 6	2018 GSM Spring Meeting	Unity College Center for the Performing Arts	Kevin Spigel
April 14-15	35 th Annual Gem, Mineral, and Jewelry Show	Saint Joseph's College, Standish	Maine Mineralogical and Geological Society
May 11-13	6 th Annual New England Mineral Conference	Sunday River, Newry	New England Mineral Association
June 1-3	81 st Annual Reunion of the Friends of the Pleistocene	Bar Harbor	Duane Braun, P. Thompson Davis, Joe Kelley, and Jeremy D. Shakun
July 28-29	2018 GSM Summer Field Trip	Northern Maine, west of Ashland	Chunzeng Wang
August 6-13	2018 Grand Canyon Rafting Trip	Lee's Ferry, Arizona	Fred Beck and Alison Jones
September 10-13	69 th Annual Highway Geology Symposium	Portland, Maine	Highway Geology Symposium
October 12-14	110 th New England Intercollegiate Geological Conference – joint meeting – 90 th Annual New York State Geological Association Field Conference	Lake George, New York	Colgate and Castleton Universities (William Peck and Timothy Grover)
March 17-19, 2019	2019 Geological Society of America Northeastern Section 53 rd Annual Meeting	Portland, Maine	Steve Pollock

MEMBERSHIP DUES STATEMENT

The GEOLOGICAL SOCIETY OF MAINE, INC. (often referred to as **GSM**) is a non-profit corporation established as an educational Society to advance the professional improvement of its members; to inform its members and others of current and planned geological programs in Maine; to encourage continuing social contact and dialog among geologists working in Maine; and to further public awareness and understanding of the geology of the State of Maine; and of the modern geological processes which affect the Maine landscape and the human environment.

The Society holds three meetings each year, in the late fall (Annual Meeting), early spring, and mid-summer (usually a field trip). A newsletter, ***The Maine Geologist***, is published for all members three times a year. The Society year runs from Aug. 1 to Jul. 31. Annual dues and gift or fund contributions to the Society are tax deductible. There are four classes of membership:

2018 FEE SCHEDULE

\$ 20.00	REGULAR MEMBER	Graduate geologists, or equivalent, with one year of practice in geology, or with an advanced degree.
\$ 20.00	INSTITUTIONAL MEMBER	Libraries, societies, agencies, businesses with interests in or practicing geology and related disciplines.
\$ 10.00	ASSOCIATE MEMBER	Any person or organization desirous of association with the Society.
\$ 5.00	STUDENT MEMBER	Persons currently enrolled as college or university students.

THE GEOLOGICAL SOCIETY OF MAINE ANNUAL RENEWAL / APPLICATION FOR MEMBERSHIP

Regular Member	\$ 20.00	\$ _____	Name _____	Make checks payable to: Geological Society of Maine Bruce Hunter, GSM Treasurer 44 Old Fairgrounds Rd Readfield, ME 04355
Institutional Members	\$ 20.00	\$ _____		
Associate Member	\$ 10.00	\$ _____	Address _____	
Student Member	\$ 5.00	\$ _____		
Contributions to GSM (please write gift or fund on check)		\$ _____		
TOTAL ENCLOSED		\$ _____		

Email Address _____

(GSM funds include the Walter Anderson Fund _____, and discretionary gifts as noted by contributor)

THE MAINE GEOLOGIST is the Newsletter of the Geological Society of Maine, published three times a year, in mid-winter, summer, and early fall, for members and associates.

Items for inclusion in the **Newsletter** may be directed to:

THE GEOLOGICAL SOCIETY OF MAINE

c/o Amber Whittaker, Newsletter Editor
Maine Geological Survey
93 State House Station
Augusta, ME 04333-0093
amber.h.whittaker@maine.gov

2018/2019 SOCIETY YEAR BEGAN August 1
PLEASE SEND DUES TO TREASURER.

THE GEOLOGICAL SOCIETY OF MAINE

c/o Bruce Hunter, GSM Treasurer
44 Old Fairgrounds Rd
Readfield, ME 04355

PLEASE PAY YOUR DUES!

THE GEOLOGICAL SOCIETY OF MAINE EXECUTIVE COUNCIL

President	Henry Berry	(2018)	Maine Geological Survey, henry.n.berry@maine.edu
Vice President	Sarah Hall	(2018)	College of the Atlantic, shall@coa.edu
Secretary	Lisa Jacob	(2018)	Sevee & Maher Engineers Inc., lj@smemaine.com
Treasurer	Bruce Hunter	(2018)	Maine DEP, bruce.e.hunter@gmail.com
Newsletter Editor	Amber Whittaker	(2018)	Maine Geological Survey, amber.h.whittaker@maine.gov
Directors	Steve Kelley	(2018)	Haley & Aldrich, skelley@haleyaldrich.com
	Martin Yates	(2019)	University of Maine, yates@maine.edu
	Mike Deyling	(2020)	CES, Inc., mdeyling@ces-maine.com
Historian	Fred Beck	(2018)	F.M. Beck, Inc., fmbeck@fmbeck.net

The Geological Society of Maine

2018 Spring Meeting



Featuring

Student Research Presentations

Friday, April 6, 2018, 1:00pm

Hosted by the Earth and Environmental Science Program at Unity College
Unity College Center for the Performing Arts
Unity, ME

This is an opportunity for students to present current geologic research in a formal yet collegial atmosphere. Students from Maine schools, or students enrolled elsewhere and working in Maine are invited to present their work in oral or poster format. Members of the Society are eager to learn what students are doing. Interested students must submit an abstract by **March 21, 2018 (midnight)**.

To Submit an Abstract:

Follow the URL: <https://goo.gl/forms/MzoxBvQYUboZniPS2>

- Complete each required section in the form. Ensure accuracy and proofread all content as no changes will be permitted after the deadline (March 21, 2018, midnight).
- Posters cannot exceed 48" in length or width and should be formatted in landscape view
- Oral presentations should not exceed 15 minutes
- For questions, please contact Dr. Kevin M. Spigel (kspigel@unity.edu)

Preliminary Schedule

- 1:00 Opening Remarks
- 1:15 GSM Business Meeting, open to all members
- 1:30 Student Poster Presentations
- 3:00 Keynote Address
- 3:45 Student Oral Presentations
- 5:00 Student Presentation Awards (Undergraduate Poster, Oral Presentation, High School Student)
- 5:15 Social Hour (cash bar)

Other Information

- The Unity College Center for the Performing Arts (UCCPA) is located at 42 Depot St. in Unity, ME.
- Several local options exist in Unity for lunch prior to the meeting or for dinner after the meeting (Spanky's Pizza, Mammie's Country Kitchen, Unity House of Pizza, Subway, Dunkin Donuts)
- Please be a good neighbor by parking in designated areas (see map), otherwise towing may occur.

Parking Areas for UCCPA

Please park only in these areas to avoid being towed:

- * Behind the UCCPA
- * Church parking lot (across street)
- * Along Depot St. (north side)

