THE MAINE GEOLOGIST

NEWSLETTER OF THE GEOLOGICAL SOCIETY OF MAINE

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THE PRESIDENT'S MESSAGE

The annual Spring Meeting of the Geological Society of Maine was hosted for the first time by the University of Maine at Presque Isle on April 7 – 8, 2006. The meeting, a rousing success, was ably coordinated by Kevin McCartney. With a pre-registration figure of nearly 70 people, it was clear that attendance was not going to be a problem. Traditionally, the afternoon began with student posters and a new twist; professional displays by consulting geologists and other scientists. Oral presentations were heard during the late afternoon. Congratulations are deserved to the Anderson Award winners, Malissa Washburn (University of Maine) and Jesse Powers (University of Maine at Farmington). During the break between sessions, yours truly was interviewed by the local TV station asking why we were there; clearly a horde of geologists descending on Presque Isle is real news.

Following the brief business meeting and social hour, the participants were treated to a full course banquet prepared by the dining staff of the capable campus food service, and it was outstanding. This was a tough act to follow, but evening speaker University of Cincinnati Professor Tom Lowell did so with tree-felling authority; as he approached the podium, the Lincoln woodsman accidentally got wrapped up in a potted evergreen, bringing it and the house down! Tom presented an overview of his work on climate change from remote parts of the world, the Lake District of Chile, Southern Alps of New Zealand, and Greenland, comparing the glacial chronological and paleoclimate records from the northern and southern hemispheres. After that spectacular photo-filled global whirlwind tour, the group was serenaded by the Borderline Bluegrass Band, finishing up with "If You Got the Money, Honey, I Got the Time" putting the now rowdy crowd in the mood to go a-honky-tonkin'.

With just one more twist to the spring meeting, Saturday morning began with another fabulous meal, a hearty breakfast buffet in preparation for a field trip led by Maine DEP geologist John Hopeck to examine the stratigraphy of the Aroostook - Matapedia Belt and its contacts with the Central Maine Belt. Five stops for those returning home were visited to compare lithologies and deformation within the units. A non-traditional GSM spring meeting, for sure Kevin; thanks for providing a great time for all and a professionally run event.

It is with pleasure I announce that Martha Mixon, Senior Geologist with Acadia Environmental Technology, has agreed to serve as Secretary to the Society. The nominating committee has accepted her offer and she will be on the ballot for election at the fall meeting. Also, Charlotte Lehman (Bates College) has agreed to serve as the Newsletter Editor pro tem while Dan Belknap is on sabbatical next year.

In closing, I send out a pitch for this year's annual GSM summer field trip. Chris Gerbi (Bowdoin College) has agreed to lead a trip for us on the weekend of July 28-30, as a dry run for the 2006 NEIGC, which in turn will be hosted by the University of Maine at Farmington this year. Details for both of these meetings can be found elsewhere in this newsletter.

Tom Weddle, President (2004-2006)
<Thomas.K.Weddle@maine.gov>

THE EDITOR'S MESSAGE:

Please send any items from individuals, schools or organizations for inclusion in the Newsletter to my e-mail address. Remember that **the date on your mailing address refers to when your current dues run out**. Please help the Society by paying up to date or beyond, and most especially, making good on any arrears. I will be on sabbatical from July 1, 2006 for one year. I thank Charlotte Lehmann for taking on the editorship during my sabbatical (or longer if she likes it!)

Thanks.

Dan Belknap, Newsletter Editor (1998 - present)
<belknap@maine.edu> (207) 581-2159, FAX: -2202

GSM WEBSITE: www.gsmmaine.org

The GSM website contains copies of present and archived Newsletters, a calendar of events, and other items of interest to the Society, including the updated Bylaws. There are many important links to geology items in Maine and elsewhere. There is a page on Maine geology and the Photo of the Month. Let us know what you think.

Webmaster, Mike Lerley mike@rentageekme.com

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Geological Society of Maine Summer Field Trip

"History and Context of the Boundary Mountains" **Eustis, Maine**

This year's GSM summer field trip will be held on the weekend of July 28-30. Chris Gerbi (Bowdoin College) has agreed to lead a trip for us, as a dry run for the 2006 NEIGC, which in turn will be hosted by the University of Maine at Farmington this year.

Orogenesis in the northern Appalachians began in the Ordovician with well-documented arc collision in western New England and Atlantic Canada. On this trip we will examine rocks between Eustis and Chain of Ponds that constitute the Maine segment of that Taconian arc and its adjacent environments. On the bedrock portion of the trip we will discuss two topics. (1) Tectonics: Gary Boone and Gene Boudette recognized the Boundary Mountains as a terrane decades ago, and recently we have been able to more tightly constrain its origin and development. We will consider the geologic history of the region on its own as well as the relationship between Maine's Boundary Mountains and other parts of the northern Appalachians. (2) Metamorphic processes: the Chain Lakes massif appears to be an example of low-pressure anatexis (in-situ melting), with the massif's renowned peculiar textures developing as a result of the melting. Ridge subduction may have been the source of the shallow heat.

Stops on Saturday will be in the Chain Lakes massif, Boil Mountain Complex, and Jim Pond Formation. On Sunday, as we head south, we will stop in the late Ordovician-Silurian sequence that overlies the Boundary Mountains and view some of the nearby glacial features.

Camping is at Cathedral Pines Campground in Eustis on Friday and Saturday nights (Map 29 Delorme Atlas) http://www.eustismaine.com/Pines/

Saturday night is the GSM banquet/cookout; all other meals are on your own

Contact Tom Weddle for more information and if you plan to attend. thomas.k.weddle@maine.gov

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THE STATE GEOLOGIST'S MESSAGE

Landslide Mapping Initiative

Last year at this time I reminded readers that Maine is not without geologic hazards. The very wet months of April and May in 2005 produced a number of small landslides, one of which led to the abandonment of a home in Wells. It seems we have played that tape over again during May and June of this year. Many of us in central and northern Maine enjoyed a very pleasant Mother's Day this year, perhaps unaware the southern Maine was being deluged. Portland received 2.77 inches of rain on May 13, the greatest 24-hour total since 1893! The rainy May was partly responsible for minor landslides in Cumberland, Skowhegan and elsewhere that did little property damage, but that rattled the confidence of some property owners in the stability of our rock-solid earth.

Fortunately, this year I can tell people we are doing something about it, at least in terms of identifying the hazard. Last year's landslides led the Maine Emergency Management Agency (MEMA) to reconsider and fund an earlier proposal by MGS to conduct a pilot study of inland landslide hazards in Maine using modern digital methods. This effort will build on the excellent work done by Irwin Novak (1987, 1990) and subsequently by his students on an inventory of landslides in portions of southern Maine.

Over the next year, Mike Foley and Marc Loiselle, along with other MGS staff, will develop a digital methodology for identifying potentially hazardous areas, focusing primarily on the distribution of the Presumpscot Formation in areas with steep slopes. This effort will build on our digital library of 1:24,000-scale surficial geology maps, and digital elevation models (DEMs) with 10-meter data spacing available from the Maine Office of GIS (MEGIS). In an attempt to identify previous landslides, we will review these areas using digital imagery, also available from MEGIS. Following this effort, we will select four towns, two in southern Maine and two in the Penobscot River drainage, for ground-truthing the potential hazard maps. This effort has generated interest in the Cumberland and York County Emergency Management Agencies, whom we will meet with before the end of June.

On another front, we continue to work toward completion of our coastal bluff hazard and landslide hazard series, with mapping in eastern Maine during 2006 funded by MEMA. This effort has produced excellent results with the Maine DEP giving these maps serious consideration when reviewing coastal development, and many coastal towns adopting them in their local ordinances. Just today (June 12) I received a request from the Town of York to complete the map series in their town because these maps "provide important information for responsible natural resource management and the protection of public health and safety." Fortunately, the York maps are in final review and will be available shortly. Congratulations to Joe Kelley and Steve Dickson for driving this effort, and to the small army of U Maine graduate students who have done the bulk of the fieldwork through the years!

With the soaring value of coastal and shorefront real estate, the entire map series would be worth their

cost by leading to the avoidance of **one** poorly placed multi-million dollar home!

Novak, I.D., 1987, Inventory and bibliography of Maine landslides: Maine Geological Survey Open-File Report 87-3, 1:500,000-scale.

Novak, I.D., 1990, Air photo reconnaissance of slope failures in the Presumpscot Formation, Cumberland County, Maine: Maine Geological Survey Open-File Report 90-22, 1:50,000-scale.

Robert G. Marvinney, Maine State Geologist:
<Robert.G.Marvinney@state.me.us>

GSM MEMBER NEWS

GSM members **Roger Hooke, Alice Kelley, Hal Borns** and location leaders George Jacobson, Brian Robinson and Dave Sanger led the 69'th Annual Friends of the Pleistocene field conference in the Penobscot Valley north of Orono, June 2-4. The rain was sufficient to dampen the black flies, but the mosquitoes and participants remained very active.

Please send member news to:

Carolyn Lepage, Member News Correspondent
(1996-present) <clepagegeo@aol.com> or
PO Box 1195, Auburn, ME 04211-1195 or
Fax: (207)-777-1370; Phone: (207)-777-1049

NEIGC 2006

The **New England Intercollegiate Geological Conference** (**NEIGC**) will be hosted by the University of Maine at Farmington, September 29th to October 1st, 2006. We will be based at the lodge at the Saddleback ski resort just outside Rangeley. The meeting will follow the usual format with field trips on each of the three days, reception on the Friday evening and banquet Saturday night. This will be a very special NEIGC as we will be honoring **Professor Charlie Guidotti** and his work in western Maine.

If you are interested in organizing a field trip please contact one of us at UMF as soon as possible. Information updates will be posted on the NEIGC website <http://neigc.org/NEIGC>.

David Gibson (dgibson@maine.edu),
Julia Daly (dalyj@maine.edu),
Doug Reusch (resusch@maine.edu),
Tom Eastler (eastler@maine.edu)

GSM SECRETARY'S REPORT

Geological Society of Maine
Spring Meeting, April 7, 2006
University of Maine at Presque Isle

The business meeting was called to order by President Tom Weddle at 5:15 PM in Folsom Hall on the UMPI campus. Geological Society of Maine (GSM) officers met before the poster session. Annual awards for best poster and talk was discussed by GSM officers.

Tom thanked the host, Kevin MacCartney, and the UMPI geology students and staff for the fine meeting at the college.

At the fall meeting Dan Belknap requested a new GSM newsletter editor to take his place during his sabbatical (fall 2006 - summer 2007). Charlotte Lehman (Bates) volunteered to take over the GSM newsletter during that time.

GSM is looking for a Secretary. Sean Doherty (DEP) has resigned so the society does not have a secretary at present. The GSM nominating committee is working on a replacement. [Ed. Note that Martha Mixon has graciously volunteered]

Bob Johnston asked GSM for a monetary donation to the Waterville High School Science Olympaid team that is going to Indiana University in May to compete in the Sci-O National Championships. Society members voted to approve $100 to the Waterville Sci-O team.

Tom Weddle mentioned that GSM donated money to Salem State College to help run the 2004 NEIGC meeting. Tom asked GSM to assist (financially) the U. Maine Farmington Geology Department who are hosting the 2006 NEIGC.

Dave Gibson (UMF) announced that the 2006 NEIGC meeting will be held at Saddleback Ski Area in Rangeley on September 29, 30 and October 1st. The meeting is being organized in honor of Charlie Guidotti. Check the NEIGC web site for updates: <http://neigc.org/NEIGC//>

A summer field trip for 2006 is being planned for the last weekend in July (July 29 and 30). Christopher Gerbi (Bowdoin) has offered to lead a bedrock trip. Tom Weddle promised to come up with a few Quaternary field trip stops.

Bob Marvinney (Maine State Geologist) spoke on the "State of the Survey." Existing programs are going well. Ambitious program is planned for the field season in 2006; including bedrock and surficial quadrangle mapping, bluff mapping (in cooperation with UMO), and landslide hazard mapping in southern Maine. The value of Maine's groundwater resources was stressed. The Maine Geological Survey (MGS) will move to the Williams Pavilion in November of 2006 (nearby on the AMHI grounds).

MGS now has its published map collection available as downloads (PDF's) on its web site http://www.maine.gov/doc/nrimc/mgs/pubs/index.htm

Rob Peale, GSM treasurer, announced that he would accept dues payments at the meeting. He has an updated list of members' dues status.

A member asked if a list of GSM members and their professions is available. Rob Peale has a master list of names and addresses. In recent years the Board of Directors and Officers have discussed releasing the list to anyone interested. There is some concern about this by members (privacy issues). Matter will be discussed in the future.

Motion to adjourn to the social hour was made and seconded at 5:35. Vote was in favor to adjourn.

Respectfully submitted: Robert Johnston, meeting secretary. *robert.a.johnston@maine.gov*

GSM TREASURER'S REPORT

The Society currently has 320 members, distributed as follows:

Students:	53	Associates:	31
Regular:	231	Institutional:	5
TOTAL:	320		

Total Paid Up: 207 (64.7 %)

Previous Balance: Funds as of January 31, 2006

Anderson Fund Savings	$ 535.68
Anderson Fund CD	$ 5,187.48
Education Fund Savings	$ 901.80
General Fund Savings	$ 9,415.80
General Fund Checking	$ 0.00
Total Funds	**$ 16,040.76**

Receipts 02/01/06-05/31/06

Dues	$ 825.00
Interest	$ 123.51
Anderson Fund Donations	$ 31.00
Other Donations	$ 385.50
Publication Sales	$ 27.50
Receipts Subtotal	$ 1,365.51

Expenses 02/01/06-05/31/06

Newsletters	$ 0.00
Honoraria	$ 150.00
Anderson Awards	$ 260.50
Meeting Expenses	$ 1,523.58
Donations	$ 100.00
Refunds	$ 0.00
Expenses Subtotal	$ 2,034.08

Funds as of May 31, 2006

Anderson Fund Savings	$ 418.31
Anderson Fund CD	$ 5,253.71
Education Fund Savings	$ 804.63
General Fund Savings	$ 3,466.46
General Fund CD	$ 5,028.08
General Fund Checking	$ 401.00
Total Funds	**$ 15,372.19**
Net gain or loss:	($ 668.57)

Respectfully submitted, Rob N. Peale, Treasurer (2004 -) Rob.N.Peale@maine.gov

GSM SPRING MEETING STUDENT ABSTRACTS

NUMERICAL AND ANALOG STUDY OF THE ST. ELIAS OROGENY

BARKER, Adam, Department of Earth Sciences, University of Maine, Orono, ME 04469-5790. <Adam_Barker@umit.maine.edu>

Convergence of the Yakutat terrane into southern Alaska is a unique example of active terrane accretion. In this region, the Yakutat terrane accretes in a transition area from transform faulting along the west coast of North America to subduction under southern Alaska. In this transition area, the terrane has accreted into and partially subducted under Alaska. To better understand the dynamics of terrane accretion in this setting, we use both 3-D numerical modeling techniques and analog models. Numerical modeling allows multiple hypotheses to be tested and compared with field and analog observations. Analog sand modeling simulates horizontal and lateral accretion as a sand terrane collides into an L-shaped backstop of the same material composition. Surficial displace-ment of chalk particles has been tracked and analyzed to characterize horizontal strain rates at different points during accretion. Shear strain along the lateral accretion front is strongly by simple shear with some contraction. Rotation along this front is clockwise. The frontal accretion zone is dominated by material contraction near the active thrust faults. We compare the analog results with numerical patterns in 3-D and with the natural analog. The lateral accretion zone is analogous to the Fairweather-Queen Charlotte transform fault along western Canada. The frontal accretion zone is analogous to the Chugach-St. Elias fault along southern Alaska.

EVIDENCE FOR GULF OF MAINE TEMPERATURE AND SALINITY DECLINE 2001-2005 FROM GULF OF MAINE OCEAN OBSERVING SYSTEM (GOMOOS) BUOYS.

HOERING, Elizabeth, Geology Department, Bowdoin College, Brunswick, ME 04011. <ehoering@bowdoin.edu>

Data collected by the 11 Gulf of Maine Ocean Observing System (GoMOOS) buoys show an average Gulf-wide decline in temperature (1.6°C) and salinity (0.7 psu) between June, 2001 and May, 2005. The most rapid rate of cooling (1.6°C/yr), which occurred at 200 m in Jordan Basin, suggests an influx of relatively cold and low salinity Labrador Subarctic Slope Water (LSSW) indicative of a negative North Atlantic

Oscillation (NAO) phase. The 4.6°C decline in surface water temperature and 0.3 psu decrease in salinity indicate an upward mixing of the slope water. The moorings located in bays (Penobscot and Casco) showed a slower rate of surface cooling and faster rate of freshening than other onshore sites.

IMPORTANT MODIFICATIONS OF AN ALUMINUM SPECIATION TECHNIQUE FOR SURFACE WATERS

LINDSEY, Edward, Old Town High School, Old Town, Maine, 04468, Edward.Lindsey@umit.maine.edu,
WILSON, Tiffany, Ecology and Environmental Sciences, University of Maine, 5764 Sawyer Environmental Research Center, Orono, Maine, 04469, Tiffany.Wilson@umit.maine.edu

Defining species of aluminum (Al) is an important topic in stream geochemistry. Aqueous Al may be toxic, though its toxicity is reduced if Al complexes with organic matter (Al_{org}) or becomes bound to particulates (Al_{part}). Solubility of Al is controlled by pH and the presence of certain ligands. Cationic forms of inorganic Al predominate at pH<6.3. These positively-charged Al species (Al_r) can be biologically-reactive and toxic to fish at concentrations ≥50 ug/L. Decisions regarding restoration of declining Atlantic salmon (*Salmo salar*) populations require reliable quantification of Al_r.

Cation exchange techniques separate Al_r from other Al species (mainly Al_{org}) in aqueous samples. Al_r is calculated as the difference between dissolved Al (Al_{diss}, from a filtered and acidified sample) and Al_{org} (from a separate, unfiltered sample that is passed through a column of exchange resin and acidified). Many studies of Al have used this technique; however, the speciation performed on unfiltered samples erroneously considers Al_{part}. We modified the method by attaching a 0.45 um pre-filter to the exchange column, allowing only the dissolved fraction of Al (Al_{diss}) to be speciated. We compared Al_r results from two contrasting streams in Maine and found that the Al_r was significantly lower in unfiltered stream water than in filtered water. This suggests that Al_{part} passed through the exchange column and was measured as Al_{org}, thereby decreasing the apparent Al_r values in the unfiltered samples.

Quality assurance tests for efficiency, capacity and repeatability of the exchange columns using this modified Al exchange technique suggest that the ion exchange resin is efficient at removing Al_r at push rates ranging from 10 to 60 mL/minute. The exchange capacity of each column is ≥ 600 µg Al_r. There were insignificant differences between the Al exchange performances of two different columns, suggesting good repeatability among columns.

SPECTRAL TRANSMISSION OF SHORTWAVE RADIATION THROUGH FIRST YEAR ARCTIC SEA ICE

MCGRATH, Daniel, Geology Department, Bowdoin College, 522 SU, Brunswick, ME 04011 <dmcgrath@bowdoin.edu>

Shortwave radiation transmission in sea ice fundamentally influences the energy balance and climate of polar regions, in addition to primary productivity within surface waters. Field research was conducted in Barrow, Alaska during March, May and June, 2005. Measurements were conducted with a dual channel spectrophotometer consisting of a downward looking optical sensor that was lowered down a core hole and an upward looking optical detector measuring changes in the incident light levels. During the spring-summer melt season, Arctic sea ice undergoes tremendous changes in response to increased amounts of solar radiation. Evolving from a homogenous, snow-covered surface to an amalgamation of snow patches, melt ponds and bare ice, the optical properties of the sea ice develop high spatial and temporal variability. Changes in transmission due to the draining of brine pockets, melting of snow, formation of melt ponds and the formation and evolution of a surface scattering layer were the focus of this study. Normalized upwelling irradiance and spectral extinction coefficients are reported. Normalized upwelling irradiance plot the ratio of incident to upwelling light values versus depth, thus creating a profile of light transmission through the ice thickness. Spectral extinction coefficients measure the attenuation of light due to scattering and absorption within the medium. The values reported in this study are comparable to previous work, with variability due to real spatio-temporal variations of physical structure and inclusions of biological and suspended particulate material.

SILICOFLAGELLATES RECOVERED FROM OCEAN DRILLING PROGRAM LEG 207, SITES 1257 AND 1258 EQUATORIAL ATLANTIC OCEAN

POWER, Christopher and McCARTNEY Kevin , Micropaleontology Undergraduate Research Laboratory, University of Maine at Presque Isle <cpower35@hotmail.com>

The Ocean Drilling Program Leg 207 explored the western Equatorial Atlantic Ocean. During Leg 207, samples from 5 sites were selected from the Demerara Rise. These samples were used for a number of paleooceanographic studies. Samples from sites 1257 and 1258 were selected for silicoflagellate study.

The Demerara Rise is located off the coast of Suriname and French Guyana. This plateau stretches from 380 km along the coast and is 220 km wide. Most of the plateau lies in shallow water, and is covered with 2m to 3m of sediments. The plateau was one of the last places in contact with West Africa during the opening of the Atlantic Ocean. Site 1257 is located on the northwestern side of the Demerara Rise. Site 1258 is located on the western slope.

Silicoflagellate research was conducted on two sites: 1257 and 1258. In the research that was conducted, slides were prepared and silicoflagellates were identified. Once identified these silicoflagellates were used in biostratigraphic work. Counts were also made of the silicoflagellates to gain information about the paleooceanic history of the area.

Results showed that silicoflagellates were limited in many of the samples observed. Eocene samples showed low numbers of silicoflagellates. Many of these slides showed an abundance of radiolarians, limiting the amount of silicoflagellates. More than twenty taxa of silicoflagellates were identified. Of interest in the taxa identified were two unusual species *Dictyocha bachmanni* and *Naviculopsis lata oblique.*

PETROGRAPHY AND GEOCHEMISTRY OF THE ZONED ONAWA PLUTON, CENTRAL MAINE

POWERS, Jesse J. and GIBSON, David, Dept. Natural Sciences, University of Maine at Farmington, Preble Hall, 173 High Street, Farmington, ME 04938, jesse.powers@maine.edu

The Onawa pluton is an elliptically shaped intrusion ~ 60km^2 in size, located in southern Piscataquis County, central Maine. It is one of several post-tectonic, Devonian-aged plutons associated with the Acadian orogeny. It was intruded into the Carrabassett Formation and produced a textbook contact aureole. Many earlier maps of central Maine show the Onawa as concentrically zoned, with an outer margin of gabbro surrounding a central granodiorite. Age dates on these two rock types are 400.1±3.7 Ma and 405± 2.9 Ma respectively (Bradley et al., 2000). However, recent field and petrographic investigations have revealed more complex and variable field relations within the pluton identifying three distinct phases. The most mafic rocks of the Onawa pluton, gabbro-diorites, are observed only along the southwest margin. They have a high color index and are variable in grain size. The central area of the pluton is composed mainly of coarse-grained biotite ± hornblende granodiorite and granite. Titanite and zircon are the dominant accessory phases. Aplite dikes cut the felsic rocks of this central zone. The latter also contains abundant microgranular mafic enclaves (MMEs). They are elliptical in shape and up to 10 cm in long dimension. In the northeast portion of the pluton, a fine-grained equigranular leuco-granite crops out. This is petrographically similar to the aplites that cross-cut the granodiorite outcrops in the northeast. In general, color index and plagioclase abundance decrease toward the center of the pluton with a concomitant increase in quartz. Therefore at the present level of erosion the field relations suggest the Onawa is asymmetrically zoned. Although the presence of MMEs, especially in the northeast of the intrusion, does not preclude the presence of more mafic rocks at depth. Contacts between the three phases are unclear. There are three possible models that could explain the field relations and petrographic variations observed within the Onawa pluton: 1) The three phases represent a single comagmatic suite that has crystallized largely in situ, 2) they represent magmatic pulses from a zoned magma chamber, or 3) they are separate intrusive events. Detailed geochemistry will be used to critically assess the comagmatic nature of the three phases and elucidate the crystallization history of the Onawa pluton.

GENESIS AND PRESERVATION OF ROCK GLACIERS IN NORTHERN MAINE

PUTNAM, David E. [1], PUTNAM, Aaron E. [2], HELSTROM, Jonathan [1], and BELKNAP, Daniel F. [2] 1 University of Maine at Presque Isle, 2 Climate Change Institute, University of Maine. <putnamd@polaris.umpi.maine.edu>

Four rock glaciers were identified in talus slopes in the Deboullie Lakes Reserve in northern Maine during the summer of 2004. Subsequent investigation indicates that these features preserve interstitial ice throughout the summer months and may contain solid ice cores. We suggest a late glacial origin of the features. Rapid exfoliation of sheet-jointed bedrock cliffs deposited talus on the surface of wasting glacial ice that persisted in the topographically shadowed valley margin. The process resulted in a solid core of glacial ice capped with talus. Topographic long profiles exhibit over-steepened slopes of ice cemented boulders, thermokarst features, and prominent frontal bulges, indicating that the rock glaciers have actively advanced down-slope since their formation.

Interstitial ice near the surface is unaffected by summer air temperature and ablates only as a direct result of heat transported downward by heavy rain from tropical storm remnants and thunderstorms during the summer.

The region that encompasses northern Maine and the Gaspé Peninsula supports extant rock glaciers, corresponds with USDA plant hardiness zone 3 and the boundaries of an ice cap isolated south of the St. Lawrence River that persisted through the Younger Dryas chronozone. This correlation suggests that patterns of the northern jet stream and the polar front position play an integral role not only in preservation of low elevation rock glaciers but may be also related to the configuration and behavior of ice sheet growth and ablation in eastern North America.

UTILITY OF RADON AS A RADIOCHEMICAL TRACER FOR SUBMARINE GROUNDWATER DISCHARGE INTO THE COASTAL OCEAN

SUPCHAROEN, Ratsirin, Department of Geology, Bowdoin College, 778 Smith Union, Brunswick, Maine 04011, <rsupchar@bowdoin.edu>

Submarine groundwater discharge (SGD) acts as a source of nutrients and chemical input into the coastal ocean, and thus it has a significant influence on chemistry and biology of the estuary. Here ^{222}Rn is employed as a radiochemical tracer to study SGD at two sites: Waquoit Bay, Massachusetts and Quahog Bay, Maine. In sandy intertidal beach sediments at the head of Waquoit Bay, groundwater ^{222}Rn activity is low (80 ñ 394 dpm/l) in both fresh (< 5 psu) and saline (> 25 psu) groundwater zones, but there is a zone of very high ^{222}Rn activity (537 - 3,782 dpm/l) in brackish groundwater (10 - 25 psu) along the freshwater-salt water interface. The high ^{222}Rn activity along the salinity gradient zone might be explained by two hypotheses: 1) sediments along the salinity gradient area have high ^{226}Ra concentrations, and 2) the sediments in this zone have high concentrations of adsorbed ^{226}Ra, and thus high ^{222}Rn production. High adsorbed ^{226}Ra could reflect factors such as grain size (surface area), or sediment composition (manganese oxide coatings). In Quahog Bay the average water column ^{222}Rn activity is higher than can be explained by tidal inputs and ^{222}Rn production from dissolved ^{226}Ra, suggesting one or more additional ^{222}Rn sources to the Bay. High tide and low tide pairs of surface water ^{222}Rn activity measurements in four sub-bays show low ^{222}Rn activity at high tide (1.8 dpm/l) and high ^{222}Rn activity at low tide (3.6 dpm/l), reflecting a net low tide ^{222}Rn input to these small bays. Measurements of ^{222}Rn in bay water, streams and springs, and surface sediments were used to constrain a simple box model of the Quahog Bay ^{222}Rn budget, as an essential first step to use ^{222}Rn to estimate SGD rates in this setting.

RELATIONSHIPS BETWEEN MIGMATITES OF THE SILURIAN RANGELEY FORMATION AND THE WILDCAT GRANITE: NEW HAMPSHIRE, USA.

WASHBURN, Malissa, GROOME, Wesley G., KOONS, Peter O., JOHNSON, Scott E., WALKER, Richard J., LUX, Dan R., Dept. Earth Sciences, University of Maine, Orono, ME 04469-5790.
<Malissa_Washburn@umit.maine.edu>

A gradational contact between stromatic migmatites of the Silurian Rangeley Formation and the 401 Ma Wildcat Granite in the White Mountains, New Hampshire, provides an opportunity to examine a classic problem: is localization of deformation the cause or the result of melt accumulation? The transition from migmatite to diatexite, to granite is accompanied by a gradient in deformation style. The nature of this transition is of interest due to an apparent increase in leucosome fraction in the migmatites, and corresponding increase in disaggregation of compositional layering. If a genetic relationship between the migmatites and the granite can be proven, this area would be ideal to study the rheological effects of variably distributed partial melts, the effects of heterogeneity on melt migration mechanisms, and the processes of granite genesis.

A Sm-Nd isotope geochemistry study was undertaken in an attempt to correlate the Rangeley Formation with the Wildcat Granite. Samples of unmigmatized schists of the Rangeley Formation, Rangeley migmatites, diatexites, and samples of the Wildcat Granite were taken from a variety of locations within approximately 25 km^2. All of the samples have e_{Nd} (at 401 Ma) ranging from –7.7 to –9.2 with T_{DM} model ages ranging from 1.62 to 1.96 Ga. The limited range in initial Nd isotopic compositions provides permissive evidence that the Rangeley schist may have been the dominant source material for the Wildcat Granite. The model ages suggest that the crustal precursors of all these rocks were generated during the Early Proterozoic.

3D mechanical models show that melt migration in a rheologically heterogeneous medium is driven by pore-pressure gradients which arise from strain rate localization, resulting in feedback between melt localization and strain rate localization at a variety of scales. Together with the results of 1D thermal modeling, the mechanical models support the idea that melt was mobile within the Rangeley Formation, and that its distribution at the outcrop-scale was likely influenced by deformation. Small-scale processes that lead to melt accumulation may feed into larger-scale melt redistribution and localization, which in turn influence the rheological evolution of an orogen.

NEWS FROM THE COLLEGES AND UNIVERSITIES

UNIVERSITY OF MAINE :

Daniel R. Lux, Ph.D., Professor of Earth Science
On the occasion of his 25'th Anniversary at UM

Professor Dan Lux joined the University of Maine in 1981, brought in to the then Geology Department (now Earth Sciences) under UM's first NSF EPSCOR grant. That project expanded research and teaching capabilities in Appalachian geology and Gulf of Maine studies. Dr. Lux is a "bedrock geologist" who studies the nature of igneous rocks and techniques for dating the earth's ancient crust. His first few years of work centered around Argon-Argon dating, a relatively new technique at the time, useful in obtaining absolute ages for individual rocks, as well as the timing of cooling from peak metamorphic conditions. This is a critical tool for understanding the formation and evolution of mountain belts. Dr. Lux's present research is more centered on granite and other igneous rocks. There are fascinating examples in Maine rocks of magma mixing, which were created by mixing of dark and light rocks resembling marble cake or puddings. These rocks reveal fundamental aspects of temperature, viscosity, cooling rates, and sources of the very disparate magmas. Dr. Lux collaborates with colleagues in England, Ireland and Maine to study examples of these "hot" rocks.

Dan's personality is upbeat and warm, leading to an excellent rapport with undergraduate and graduate students, as well as colleagues. He is always ready with a joke, and is known to torment colleagues and family with practical jokes and stories. We refer to his wife as "Saint Susie" for putting up with him. Dan also has a low golfing handicap, which is hard to equate with his successful career. Balance and swing in golf may relate to finding a balance in life. Dan has advised numerous graduate students, chairing 1 Ph.D. and 6 MS committees. He also advises the undergraduate Geology Club, indicative of his concern for undergraduates. Another example was his recent 4:00 AM visit to the Bangor International Airport to see one of our seniors off to Iraq for a 9-month deployment as a Marine. Most of his former students stay in touch with him (and now return the "attitude" mercilessly). Dan is the author or co-author of 66 refereed journal articles, all but three written since his arrival at UM, as well as 94 published abstracts. Many of his co-authors are his students. He supports his research through grants from the National Science Foundation and other sources, totaling over $1.3 million. In addition, he is a keystone in the undergraduate and graduate curriculum, teaching a wide variety of introductory and advanced courses. Dan Lux is part of the bedrock foundation of the Department of Earth Sciences, a lithophile with no major faults, stable in his isotopic composition. If he were extrusive, we'd call him pahoehoe, but he is deep-seated, crystalline and equilibrated.

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 modem 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 field trips). A newsletter, ***The Maine Geologist***, is published for all members three times a year. The Society year runs from August 1 to July 31. Annual dues and gift or fund contributions to the Society are tax deductible. There are three classes of memberships:

$12.00	REGULAR MEMBER	Graduate geologists, or equivalent, with one year of practice in geology, or with an advanced degree.	***PLEASE NOTE NEW FEE SCHEDULE AS OF August 1, 2003***
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2005/2006 SOCIETY YEAR BEGINS AUGUST 1 - PLEASE SEND DUES TO TREASURER.
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Return Service Requested

Correspondence about **membership** in the Society, **publications** and **dues** should be mailed to:
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