

THE GREEN MOUNTAIN GEOLOGIST



QUARTERLY NEWSLETTER OF THE VERMONT GEOLOGICAL SOCIETY

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*The Vermont Geological Society's
Summer Field Trip*

*Integration of Bedrock and Surficial Geology
in the Town of Williston, Vermont
August 9, 2008*

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SUMMER FIELD TRIP DESCRIPTION

Saturday, August 9, 2008

TITLE: Integration of Bedrock and Surficial Geology in the Town of Williston, Vermont

LEADERS: Jonathan Kim*, David DeSimone*, George Springston**, Marjorie Gale*, and Laurence Becker* (*Vermont Geological Survey, 103 South Main Street, Logue Cottage, Waterbury, VT 05671; **Dept. of Geology and Environmental Science, Norwich University, 158 Harmon Drive, Northfield, VT 05663)

TIME: 9:15 AM – 3:30 PM (approx.)

MEETING PLACE AND DIRECTIONS: Meet at the Williston Central School at 9:15 AM. The directions to the school are: Take Exit 12 (Williston) off of Interstate 89. Proceed north on Vermont Route 2A to Tafts Corner. Turn right onto US Route 2. Travel east for 1.9 miles to Williston Town Center. Turn left (north) onto Library Lane. Proceed approximately 100 yards to the School and into the parking lot on the right.

QUESTIONS?: Contact Jon Kim by telephone at (802) 241-3469 or by e-mail at jon.kim@state.vt.us

FIELD TRIP STOPS AND DESCRIPTION:

Stop 1 Top of Ledgewood Road hill: Panoramic view of topography and surficial and bedrock geology. Introduction to LIDAR slope map (bedrock lineaments, “bathtub rings”, crag and tail till structures) and Cheshire Quartzite.

Stop 2 Pine Ridge School: Surficial deposits (fine sands and clays) from Ft. Ann Stage of Lake Vermont; incised ravines; bedrock control on deposits.

Stop 3 Oak Knoll Road: Discussion of variations in depth to Hinesburg Thrust and bedrock control on Old Creamery basin. Discuss surficial geology of Old Creamery basin.

Stop 4 5-Tree Hill Area: Fairfield Pond Formation; F3 folds and S3-related lineaments; thin till on ridges. Lunch.

Stop 5 Sucker Brook: Thick surficial deposits and bedrock control; Sucker Brook avulsion and erosion issue.

Stop 6 South Brownell Road quarry: Bascom Limestone; black shale slivers; fractures; lamprophyres; deformed till.

[Editor’s note: The following abstract was originally intended to be published in the Spring 2008 *GMG* but was not received before the publication deadline. It is reproduced here to complement the Summer Field Trip.]

ABSTRACT**THREE DIMENSIONAL MODELING OF AN ANCIENT THRUST FAULT SURFACE IN THE TOWN OF WILLISTON, NORTHWEST VERMONT**

Karen M. Derman*, Jon Kim**, and Keith Klepeis* (*Geology Department, University of Vermont, Burlington, VT 05405, **Vermont Geological Survey, 103 South Main Street, Logue Cottage, Waterbury, VT 05671)

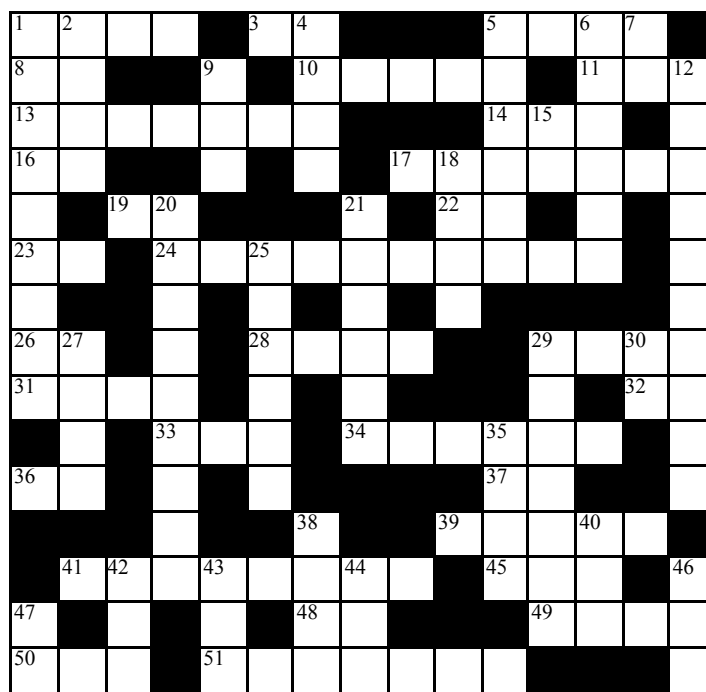
The Vermont Geological Survey mapped the bedrock geology of the Town of Williston during 2007 at 1:24,000 scale as a framework to help understand water quantity and quality issues associated with domestic wells. The bedrock in Williston is composed of metamorphosed rift clastic rocks of the Green Mountain geologic province on the east side and carbonate and clastic continental margin rocks of the Champlain Valley geologic province on the west side; these provinces were juxtaposed by the Ordovician Hinesburg Thrust Fault (HTF). The rocks in Williston were affected by four fold generations and at least two brittle events. Recent logs for domestic wells demonstrate that this thrust can be penetrated at depths ranging from ~100-1000' depending on where the well is drilled relative to the thrust front. The logs also indicate that these wells have significantly higher yields (avg=~50 gpm). Because of the polydeformational history of the HBT, it is very difficult to predict the depth that this fault is encountered. The goal of this study is to construct a 3-dimensional model of the HTF surface that can be used to enhance current groundwater planning efforts.

This study integrates data from the following sources: 1) depth and lithologic data from accurately located domestic wells, 2) topographic data of the area acquired via LIDAR, and 3) the Williston bedrock geologic map and associated structural data. Using GIS, TINs were created of the ground surface and underlying HTF surface and then overlaid. Preliminary analysis of the HTF TIN indicates that the fault has an irregular surface that is consistent with multiple deformational events. Ongoing research will attempt to associate specific ductile and brittle structures with irregularities in the HTF surface and to directly compare the topographic and thrust fault TINs. We anticipate that these methods that pair bedrock mapping with GIS computer modeling be exportable to other areas of Vermont and make drilling high-yield wells more predictable.

PRESIDENT'S LETTER

I thought that a crossword puzzle might be a fun way to get members thinking about the vast range of subjects that we geologists deal with. The theme of the puzzle below is largely that of geology and geography, especially having to do with Vermont. However, some terms from archaeology and chemistry and other places crept in as well. Give it a try and let me know what you think. The answers will be posted on the Society's website.

Respectfully submitted,
George Springston, President

**Across**

1. The Couching Lion or The _____
3. Element in pyrolusite
5. Appalachian and Middlebury _____
8. Anomalous element at K-T boundary
10. Passumpsic valley _____
11. Edge of a crater
13. Happened before the Acadian Orogeny
14. Flows in a riviere
16. Element below fluorine in Periodic Table
17. _____ Dome in southeast Vermont
19. Element in dolomite
22. Francoise would say "en"
23. Element in calcite
24. Mapped what became known as the RMC
26. Metal found with ultramafics
28. The _____ Age
29. Archaeologists search for this
31. City on the Dnieper River
32. Element after lead in Periodic Table
33. A clay min.
34. Melting ice leaves this type of hole
36. Abundant element in the Crust
37. Found in placers
39. Diatoms, kelp, Spirogyra
41. Foothills
45. A promontory to Jacque
48. Element in spodumene
49. Strike-_____ fault
50. Base of a slope
51. The Standing Pond Volcanics have them

Down

1. He has a late Pleistocene lake named after him
2. Mountains in Russia
4. A volcanic plug
5. Big mountains in Vermont
6. Black Mountain _____ or Averill _____
7. Granites have a lot of this element
9. Class of silicate including pyroxene
12. Sediments can become this metamorphic rock
15. Realgar contains this element
18. Stone tools were used to work on this
20. A Precambrian crunch
21. _____ Thompson, found Charlotte Whale
25. Diabase margins get this way
27. With erosion, this becomes a gully
29. They swam in the Champlain Sea
30. Symbol for Niobium
35. A powdery ultramafic
38. Editor of 1961 Bedrock map of Vermont
40. Short for a light-colored, fine-grained granitoid
42. Melts at 0°C.
43. _____-slip fault
44. Chance of finding a live Mammoth in Vermont
46. _____ center of a quake
47. Plutach's "and"

SPRING MEETING MINUTES

Saturday, April 26, 2008, Middlebury, Vermont

The meeting of the Executive Committee followed twelve student presentations associated with the Spring Meeting held at Middlebury College. President George Springston called the meeting to order with seven people in attendance. Treasurer Steve Howe indicated that the financial condition of the Society is sound (see the Treasurer's Report in this newsletter for details). Steve, in his role as Chair of the Advancement of Science Committee, indicated that no research grant applications were received prior to the latest grant application deadline (April 1st). Recognizing the increased costs associated with geological research, the Executive Committee engaged in a discussion on increasing the maximum award amount for individual student research grants and then voted unanimously to increase the maximum award amount to \$700 effective at the next application deadline (October 1st). The Executive Committee also unanimously agreed to make the Spring Meeting Student Judging Forms available to presenters prior to next year's Spring Meeting. This form will be posted on the VGS website.

It was confirmed that Jon Kim, along with other colleagues at the Vermont Geological Survey, would be leading the VGS Summer Field Trip to the Williston area on August 9th. The Committee briefly discussed the Fall Field Trip and while a leader was not identified, the date of the trip was tentatively set for either October 18th or 25th to avoid conflicts with the NEIGC and GSA meetings.

It was brought to the attention of the Committee that the National Speleological Society (NSS) would be holding its 2010 annual convention in Essex Junction, Vermont (July 12-17, 2010). A field trip to local geological sites is expected to be run during this meeting and the NSS is interested in identifying geologists interested in organizing and leading this trip. Additional details, including whom to contact to volunteer, will be provided as they become available.

The Committee also discussed at length the possibility of changing the format and location of the Winter and Fall Meetings but deferred a decision pending further discussion at a future Executive Committee meeting.

Finally, members of the Executive Committee who were present at the meeting volunteered to stand for reelection to their current positions for the next year, with the exception of Steve Howe who will step down as Chair of the Advancement of Science Committee (he will continue in his role as Treasurer). The meeting was adjourned.

Respectfully submitted,
David West, Secretary

TREASURER'S REPORT

The financial condition of the Society continues to be very strong. As of July 15, 2008, the Society's checking account balance was \$6,844.66. To my knowledge, there are no outstanding bills.

The following member has been approved for membership in the Society since the last report:
Patrick Niggel, Williston, Vermont.

Respectfully submitted,
Stephen S. Howe, Treasurer

ADVANCEMENT OF SCIENCE COMMITTEE REPORT

The Society's Spring Meeting was a showcase for the excellent research carried out by 13 undergraduate and graduate students from Middlebury College, Norwich University, the University of Vermont, and Harvard University. The following students received awards for their presentations:

1st Place Award and Doll Award (\$100): Emily Dawson, Middlebury College

2nd Place Award (\$75): Evan Ellenberger, Middlebury College

3rd Place Award (\$50): Ethan Lake, Middlebury College

The Charles G. Doll Award, given for the top undergraduate student presentation, is a plaque with the student's name and school engraved on it that is kept at the student's school until the following year's Spring Meeting. The University of Vermont will be the host of the Spring 2009 Meeting.

The Committee will recommend several dates in early March 2009 for the Society's next Winter Meeting. Members are encouraged to contact me with any suggestions they may have for a theme for the meeting.

No applications to the Society's Research Grant Program were received by the Committee by the deadline of April 1, 2008. Applications for the second round are due October 1, 2008. Please see the Society's website for details.

Finally, I will be stepping down as Chair of the Advancement of Science Committee at the conclusion of the Society's Annual Meeting this fall. It has been a pleasure to serve the Society as Chair for the past eight years.

Respectfully submitted,
Stephen S. Howe, Chair

VERMONT STATE GEOLOGIST'S REPORT

Association of American State Geologists Meeting

From June 29 to July 2, 2008, the Vermont State Geologist attended the 100th Anniversary Meeting of the Association of American State Geologists (AASG) in Shepardstown, West Virginia as one of the State Geologists of the 50 United States and Puerto Rico. Founded in 1908, the AASG seeks to advance the science and practical application of geology and related earth sciences in the United States and its territories, commonwealths, and possessions.

As Vermont was one of 23 states at the first meeting, the 100th anniversary history volume includes a biography of its representative at that meeting, George H. Perkins, Vermont State Geologist from 1898-1933, compiled by the present State Geologist. The 2008 Annual Meeting was an opportunity to celebrate our common past and to visualize the future role of geological survey agencies in our society, with an emphasis on the responsibilities and challenges of the coordinated Federal/State Geological Survey Agency network that will be needed by the Nation.

The meeting was also a retreat for the State Geologists and the USGS to discuss cooperation for the big issues that will come before the next administration. The Director of the USGS, Dr. Mark Myers, and his associates for geology, water, mapping, and biology were in attendance throughout the entire meeting. There were keynote presentations on Energy, Water, Minerals, Hazards, and Climate Change. Other areas included: data preservation, information products for the public, LIDAR topographic mapping, and carbon sequestration. The Vermont State Geologist represents the AASG on the American Geologic Institute (AGI) Government Affairs Advisory Committee. For the earth science community, AGI will be an important representative in bringing these issues forward to the next administration and the incoming Congress.

Northeast State Emergency Consortium (NESEC) Meeting

The Vermont State Geologist chaired a meeting of Northeast State Geologists on May 21, 2008 in Portland, Maine. The group discussed a complete list of natural hazards to focus our interests that apply to emergency management needs. The State Geologists can help through education and bringing a view grounded in science while forecasting problem areas for mitigation and recovery with a multi-hazard approach and GIS expertise. The focused list includes: seismic, landslides, fluvial geomorphology, coastal erosion, HAZUS [Editor's note: a GIS-based natural hazard loss estimation software package developed and freely distributed by FEMA], and groundwater as a hedge against drought and terrorism. The Vermont and Maine State Geologists presented landslide/slope instability maps to the NESEC Board on May 22nd. The NESEC Executive Director will now search for funds to make this an annual event. The hope of the State Geologists is to build relationships with the Directors of Emergency Management Agencies through which we can work on specifics of our list and search for funds to bring needed geologic information for mitigation and recovery.

Hartford Slope Instability

Vermont Emergency Management (VEMA), through partnership with the Vermont Geological Survey, requested a field visit to a site west of White River Junction off of Route 14. Cracks are developing next to a house at the top of a slope with failure evidence and piping discharge at the base of a slope above Route 14. It appears that the most recent movement is associated with spring runoff. The State Geologist and George Springston, Research Associate at Norwich University, visited the site and will be reporting on findings and recommendations to VEMA.

Smugglers Notch – Rockfall

George Springston and the State Geologist met with the Commissioner of Forests, Parks, and Recreation (FP&R), the Director of Operations for the Agency of Transportation (AOT), and Notch recreational planners to present draft results of George's rockfall study in the Notch. Both FP&R and AOT supported the study conducted by Norwich University in cooperation with the Vermont Geological Survey. Follow-up management issues were discussed at the meeting.

Respectfully submitted,
Laurence R. Becker, State Geologist

ANNOUNCEMENTS**VERMONT GEOLOGICAL SOCIETY LECTURER PROGRAM**

The goal of the Vermont Geological Society Lecturer Program is to offer local colleges, universities, and high schools the opportunity to invite a member of the VGS to speak at their institution on timely topics within the broad realm of earth and environmental sciences. The program is primarily intended to reach those departments which either do not hold a regularly scheduled seminar series or whose finances do not permit them to invite external speakers to present talks on a regular basis. Any costs associated with the Lecturer's travel, lodging, and meals are borne entirely by the Vermont Geological Society.

Jon Kim, Ph.D., Geologist/Environmental Scientist, at the Vermont Geological Survey in Waterbury, Vermont, is our 2008 Lecturer. Jon is offering the following two lecture topics: "Nitrate Contamination of a Bedrock Aquifer in Central Vermont" and "Application of Tectonics to Groundwater Problems in Vermont." For scheduling information, see the Society's website at www.uvm.org/vtgeologicalsociety/lecturer_program.html. Stephen Wright, Ph.D., Department of Geology, University of Vermont, will be our 2009 Lecturer.

STUDENT RESEARCH GRANT APPLICATIONS

Students and secondary school teachers are encouraged to apply to the VGS Research Grant Program by October 1, 2008. Downloadable Research Grant Program applications are available from the Society's website at www.uvm.org/vtgeologicalsociety/grantpolicy.html. For those without Internet access, forms may be obtained by writing to Stephen S. Howe at the Dept. of Earth and Atmospheric Sciences, University at Albany, ES-351, 1400 Washington Avenue, Albany, NY 12222-0001. Tel: (518) 442-5053; e-mail: showe@albany.edu

WATER WORKSHOP

Water Workshop: Water Dynamics, November 9-12, 2008, at the Sheraton Hotel and Conference Center in Burlington, Vermont. For more information, see the website at www.uvm.edu/EPSCoR/Water_Conference

Water is a topic that should be of high priority in this century. Fundamental studies of water are important to all the NSF EPSCoR jurisdictions, and, indeed, are sponsored across many of the directorates at NSF. We ask you to save the date for an important workshop on research on water dynamics to be hosted by Vermont EPSCoR and featuring research on water across the NSF EPSCoR jurisdictions. The goals of the workshop will include sharing of information, exploration of collaborations, and learning about the opportunities for research on water through the NSF.

"Although the movement of water links natural systems and human social systems, there are many gaps in our basic scientific understanding of water dynamics. We still know very little about the effects of climate change and resulting changes in human interventions and land use on the availability and quality of fresh water.

One of the greatest environmental and economic challenges we face this century is to ensure an adequate, high-quality water supply for human use while maintaining the integrity of ecosystems. While humans can survive without petroleum, they can't survive without water." – Dr. Arden L. Bement, Jr., Director, NSF

VERMONT GEOLOGICAL SOCIETY CALENDAR

- 8/9/08 VGS Summer Field Trip, Integration of Bedrock and Surficial Geology in the Town of Williston, Vermont
- 9/26-28/08 NYSGA Annual Meeting, Lake George, New York
- 10/1/08 Student Research Grant Program Applications due
- 10/5-9/08 GSA Annual Meeting and Exposition, Houston, Texas
- 10/10-12/08 NEIGC 100th Annual Meeting, Westfield, Massachusetts
- 10/12-18/08 Earth Science Week
- 11/9-12/08 Water Workshop: Water Dynamics

The **Vermont Geological Society** is a non-profit educational corporation. The **Executive Committee** of the Society is comprised of the Officers, the Board of Directors, and the Chairs of the Permanent Committees.

Officers

President	George Springston	(802) 485-2734	gsprings@norwich.edu
Vice President	John Van Hoesen	(802) 287-8387	vanhoesenj@greenmtn.edu
Secretary	David West	(802) 443-3476	dwest@middlebury.edu
Treasurer	Stephen Howe	(518) 442-5053	showe@albany.edu

Board of Directors

Richard Dunn	(802) 485-2304	rdunn@norwich.edu
Les Kanat	(802) 635-1327	les.kanat@jsc.edu
Jon Kim	(802) 241-3469	jon.kim@state.vt.us

Chairs of the Permanent Committees

Advancement of Science	Stephen Howe
Geological Education	Christine Massey
Membership	Stephen Howe
Public Issues	Laurence Becker
Publishing	Stephen Howe

Vermont Geological Society
P.O. Box 1224
Saint Albans, VT 05478-1224

ADDRESS CHANGE?

Please send it to the Treasurer at the above address

Vermont Geological Society
Summer Field Trip
August 9, 2008, 9:15 AM
Williston Central School, Williston, Vermont

Directions to the Williston Central School: Take Exit 12 (Williston) off of Interstate 89. Proceed north on Vermont Route 2A to Tafts Corner. Turn right onto US Route 2. Travel east for 1.9 miles to Williston Town Center. Turn left (north) onto Library Lane. Proceed approximately 100 yards to the School and into the parking lot on the right.