http://www2.newpaltz.edu/glaciogram

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Vol. 42 (2)

Editorial Policy

The *New York Glaciogram* is intended to be an annually compiled collection of informal notes concentrating on Quaternary work that relates to New York State either directly or indirectly. The Glaciogram is not a formal publication and is not circulated to libraries, nor to individuals not engaged or interested in Quaternary research. The information included is often of a preliminary and tentative nature, and as such, should not be quoted without direct communication with the appropriate authors. It is suggested that reference to information in the Glaciogram be identified merely as informal communication. Please contact individual contributors for permission to reprint any information published here.

Invitation From The Editor

As the title implies, past issues of the *New York Glaciogram* have contained entries weighted toward Glacial Geology. My predecessor believed, as do I, that we should expand the coverage to also include topics that may be closely related to glacial geology, such as limnology, palynology, soil science, ground water geology, environmental geology, etc. Also, please check out the new *Help Wanted* section at the end of this year's volume. I will be collecting contributions for the next edition in the Fall of 2011. Deadline for next year's contributions will be Monday, December 5th, 2011. If you have any meetings, fieldtrips, or other announcements that you would like put on the Glaciogram website, please contact me.

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Vol. 42 (3)

CONTENTS

ANNOUNCEMENTS:

SURVEY NEWS:

CONTRIBUTORS:

HELP WANTED:

Vol. 42 (4)

(The Original FOP!)

June 3, 4, & 5, 2011 the Northeastern FOP will be hosted by Duane Braun and will meet in Wellsboro, PA to examine the glacial deposits, landforms, and drainage diversions in Deep Valleys Section of the Appalachian Plateau. The FOP last visited this area, the "Grand Canyon of PA" country of north central PA, in 1958 on a trip led by Charlie Denny and Walter Lyford. Since then Sevon and Braun did recon mapping of the region in the 1980's at 1:24,000 scale that was eventually published as two open file maps at 1:100,000 scale (W. D. Sevon and D. D. Braun, 1997, Surficial geology of the Wellsboro and Towanda 30 x 60-minute quadrangles, Pennsylvania, 25 p., 2 maps, OF 97-02 & OF 97-03) . Starting in 2009, Braun has been doing more detailed mapping at 1:24,000 scale using Lidar imagery and that is becoming available as digital files at the PAGS website: http://www.dcnr.state.pa.us/topogeo/openfile/jacksonsummit.aspx . The trip will focus on several themes:

1. The southward diversion of portions of the preglacial northeastward drainage system.
2. The large-deep proglacial lakes that had multiple outlets and levels as ice receded.
3. Constraining ice margin postions through glacial lake sluiceway locations.
4. Large scale slope failures in varves deposited on steep mountain sides.
5. Marcellus black shale gas drilling activity in glaciated terrain.

I am also trying yet again to get the Genesee Valley glacial mapping I did in the early 1980's (first day of FOP 1988) published by the NYS Geological survey. Hopefully with Andy Kozlowski's help the maps will see the light of day. It is the most detailed mapping I've ever done thanks to the density outcrops in the Genesee Valley south of Letchworth State Park. We were able to trace the stratigraphy for several miles along each side of the valley from the Valley Heads moraine to south of the Angelica moraine.

website: http://www.geology.um.maine.edu/friends/

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New England Intercollegiate Geological Conference

http://w3.salemstate.edu/~lhanson/NEIGC/

The 103nd NEIGC will be hosted by Middlebury College, the weekend of September 30 to October 2. Dave West has agreed to take the lead on organizing the meeting and we look forward to a weekend of field trips in the west-central Vermont area. .

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New York State Geological Association
http://www.nysga.net/

The 83nd meeting of the NYSGA is still being negotiated. Stay tuned to the NYSGA or Glaciogram websites. Future meetings: 2012 - Hamilton College, 2013 – SUNY Fredonia

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Vol. 42 (6)

Geological Association of Canada
http://www.gac.ca/

The 2011 Geological association of Canada annual meeting is in Ottawa, Ontario from May 25-27, 2011. A number of Quaternary orientated sessions and fieldtrips are planned. Below are extracts form the GAC/MAC 2011 website

http://www.gacmacottawa2011.ca/technicalprogram.php

1- Regional and basin-scale groundwater flow systems
Ian Clark, Richard Jackson, Tom Al
This session invites contributions highlighting recent research on groundwater recharge and movement on the regional scale, from groundwater resources in shallow Quaternary aquifers to brines in deep crustal systems.

4- Integration of process-based understanding of glacial systems in mineral exploration studies
Hazen Russell, Dave Sharpe, Don Cummings
There is a long history of application of geochemical, indicator mineral and boulder tracing methods for mineral exploration in glaciated landscapes of Canada and Scandinavia. Several media record simple to complex transport directions as well as mechanisms of dispersion from eroded mineral deposits. Existing exploration models lack a robust process understanding for the interpretation of pathfinder dispersion. Recent advances have improved understanding of glacial hydrologic systems, glacial dynamics and sub-glacial processes, for example the inferred role of deformable beds. This session provides a forum to discuss improved process knowledge related to the analysis of geochemical and indicator mineral signatures for mineral exploration in glaciated terrain. It should be relevant to mineral exploration, regional baseline geological surveys, and to understanding glaciated landscapes.

5- Arctic landscape evolution: large scale geomorphic response to regional climatic, oceanographic, and geodynamic processes
Duane Froese, John Gosse
The Arctic and Subarctic landscape has evolved with strong periglacial influence over the last few million years, but much of the northern geomorphic form reflects the influence of climatic and geodynamic processes over even longer timescales. This special session invites contributions that seek to constrain the role of these or other processes operating over long (> millenial) timescales through sedimentary reconstructions, thermal or isotopic analyses, or numerical or analogue modeling.

6- Living in a naturally hazardous place
Greg Brooks, Réjean Couture
Our society is vulnerable to a variety of natural hazards that threaten lives and/or property, and the sustainability of communities of all sizes. The geoscience community is an important contributor to understanding and mitigating/managing hazard phenomena. This special session is a multidisciplinary forum for oral and poster presentations on hazard topics such as landslides, earthquakes and flooding, addressing the subjects of, but not restricted to, hazard assessments, risk assessments, and applications towards mitigating/managing risk.

Fieldtrips
The significance of buried valleys to groundwater systems in the Oak Ridges Moraine region, Ontario (2 days)
Dave Sharpe, Hazen Russell
Deglacial history of the Champlain Sea basin and implications for urbanization (2 days)
Hazen Russell, Greg Brooks, Don Cummings
Subglacial hydrology: implication of the Cantley meltwater site (1 day)
DaveSharpe
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GeoHydro2011
http://geohydro2011.ca/

Water and Earth: The junction of Quaternary Geoscience and Hydrogeology
August 28-31, 2011 in Quebec City

The Canadian Quaternary Association (CANQUA) and the Canadian Chapter of the International Association of Hydrogeologists (IAH-CNC) invite you to attend their first joint meeting, organized by the Geological Survey of Canada and the Institut national de la recherche scientifique – Eau, Terre et Environnement (INRS-ETE). The conference will be held August 28-31, 2011 at hotel Château Laurier, in historic Quebec City.

Under the theme “Water and Earth: The junction of Quaternary geoscience and hydrogeology”, the organizing committee wishes to promote valuable exchanges between

hydrogeologists and Quaternary scientists of all persuasions. The conference will consist of broad-scoped thematic sessions led by keynote speakers of international stature as well as a series of more specialized thematic sessions. In addition to the conference program, the meeting will include short courses as well as pre- and post-meeting field trips.

The committee has planned 17 thematic sessions (listed below), of which four are special sessions of interest to both organizations, and seven general sessions. Presentations may be given orally or as posters.

Abstract submission deadline: December 15th, 2010.

Special common sessions
Climate change : landscape and groundwater impacts in Canada
From 3D geomodelling to groundwater modelling : Current challenges and successes
Quaternary stratigraphic architecture and hydrostratigraphic models : From geomorphology and sedimentology to geophysical techniques
Peatland ecohydrology

Thematic sessions
Climate conditions of the last millennium revealed by natural archive systems
Contaminated sites and remediation technology
Glacier and ice sheet hydrology: past and present (CGRG sponsored session)
Groundwater / surface water interactions
Groundwater quality and aquifer vulnerability
Hydrocarbons and groundwater resources
Hydrogeophysics : Expanding our view about the subsurface
Ice sheet dynamics and regional glacial patterns
Long continental and marine sedimentary sequences as Quaternary paleoclimatic records
Protecting and managing groundwater resources: methods, data and perspectives
Remote sensing applications to Quaternary geosciences and hydrogeology
Regional aquifer characterization: A Canadian perspective
Sustainable development indicators and groundwater resources

General sessions
General hydrogeology and case studies
Groundwater characterization methods
Contaminant hydrogeology
Quaternary geology
Quaternary Paleoenvironments
Geomorphology
Permafrost and Arctic studies

Vol. 42 (9)

New York State Geological Survey
http://www.nysm.nysed.gov/nysgs/

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2010 has been a busy and productive year for glacial research activities for the New York Survey and State Museum. We have several current projects that include collaboration with the New York City Department of Environmental Protection (NYCDEP), USGS Water Resources, U.S. Fish & Wildlife, and NYDEC. Despite the economic downturn, shortage of State funds and recent layoffs our external funding remains consistent and we remain optimistic that programs and projects will continue, and we will weather these difficult times.

In September of this year we hired a new staff member, Quaternary Research Scientist Colby Smith to assist with our STATEMAP Program. Colby, has a strong background in glacial geology, and a broad range of experience that includes work in Antarctica, New Zealand and South America. Most recently Colby, was a visiting professor at St. Lawrence University. Colby has been focusing on our drilling, mapping and stratigraphic analysis in the Catskills as part of our collaborative project with Dan Davis of the NYC DEP to provide three-dimensional geologic mapping to protect water resources.
In Central New York (CNY), we continue on two projects, one long term project investigating the groundwater and aggregate resources and chronology the cross-state meltwater channels in western and central upstate New York. Our second and more pressing project focuses on developing a more detailed understanding of the geologic framework of the Montezuma Wetlands Complex. This wetland complex represents one of the largest wetland systems in the northeast and is home to wide and diverse ecological community. Despite its size and importance relatively little work has been done to characterize the stratigraphic framework, understand the glacial chronology of this locality and delineate the glacial aquifers present that control the “plumbing” of the fascinating glacial landscape. This project is in close collaboration with Don Pair at the University of Dayton, Tom Lowell at University of Cincinnati, and William Kappel at the USGS WRD office in Ithaca.

In southeastern New York we are continuing our work on the Tunkamoose Creek Mastodon. Originally discovered in 2008, the complete tusks were recovered from an eroding stream bank. Radiocarbon ages of both the tusks and abundant organic material are providing a rich context to evaluate early deglaciation in this portion of the State. This interdisciplinary project involves Robert Feranec (Vertebrate Paleontologist NYSM), Jonathon Lothrop (Paleo Indian specialist NYSM) and Norton Miller NYSM. Collectively we constitute a relatively new research group known as the Quaternary Research Group here at the NYSM. In the future we hope to continue work collaboratively on many sites within the Empire State. Please don't hesitate to contact us at the Survey or Museum we are a resource and would love to hear from others in the community.

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Vermont Geological Survey

http://www.anr.state.vt.us/DEC/GEO/vgs.htm

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Mapping

Recent maps posted at the Vermont Geological Survey (VGS) Web Site:
http://www.anr.state.vt.us/dec/geo/mapsonlineinx.htm

Surficial Geologic Map of the Town of Charlotte, Vermont by George Springston and Stephen Wright

Surficial Geologic Map of the Town of Craftsbury, Vermont by George Springston and Donald Maynard

Surficial Geologic Map of the Town of Randolph, Vermont by Stephen Wright, Fred Larsen, and George Springston

Surficial Geologic Map of Rutland, Vermont by John Van Hoesen

Applied Products based on Framework Surficial Geologic Maps

Further exploration at our web site will lead to the groundwater page:
http://www.anr.state.vt.us/dec/geo/grndwaterinx.htm

Maps for Craftsbury, Charlotte, Dorset, Woodstock and Williston, Rutland, the Southern Worcester Mountains watershed, and the Wallingford, St. Johnsbury, Montpelier, and Barre West quadrangles are the base for further analysis. Derivative maps produced include aquifer recharge potential, overburden thickness, flow lines, and buried aquifers. One source of data integrated in the surficial maps is the subsurface data from the VT Water Supply Division's water well driller's reports. Geologists enhance the dataset during surficial and bedrock mapping projects by obtaining accurate locations for some wells and integrating the information in cross-sections and isopach maps.

Thanks to Marjorie Gale of the VGS for water well database work and for combining and web posting the framework and derivative maps.

Other Projects using Map Data

The VGS received a National FEMA Pre-disaster Mitigation Competitive Grant to write a landslide mapping protocol to be part of the State Hazard Mitigation Plan. George Springston of Norwich University and Anne Clift (a consultant) are using surficial geologic maps, lidar and a 3D computer view of airphotos with ERDAS software (obtained for this project) as the core of the analysis toward developing the protocol. Through FEMA's Earthquake Hazard Reduction State Assistance Program, the VGS is developing earthquake site class, amplification and liquefaction maps for the Burlington and Colchester VT 7 ½ minute quadrangles. A University of Vermont Engineering Professor Mandar Dewoolkar, his graduate student John Lens and George Springston of Norwich University are incorporating Stephen Wright's surficial geologic data for the analysis. Borings from engineered projects and seismic surveys by George Springston will be used to predict shear wave velocities. The goal is to identify critical facilities that are in higher risk areas.

The Vermont State Geologist is chairing a group of northeastern state geologists that provide information and support to the Northeast States Emergency Consortium, a Board of Directors of Emergency Management Agencies from eight northeastern states (NESEC). Our cooperative project funded with a USGS grant is: Utilizing the Surficial Geology of the Northeast United States to Improve Site Effect Classifications in HAZUS-MH. A step in this analysis just conducted is to take surficial materials maps from states and code materials for Site Class following guidance that Don Cadwell developed in 2003 when he was at the New York State Geologic Survey. The goal is to substitute improved information into the FEMA computer program HAZUS-MH to better project potential earthquake damage in the northeastern states.

Vol. 42 (12)

New Hampshire Geological Survey
http://des.nh.gov/organization/commissioner/gsu/index.htm

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Check out the recently published Madison (NH) Boulder Brochure at:

http://des.nh.gov/organization/commissioner/pip/publications/geologic/documents/madison-boulder-brochure.pdf

NH State Parks recently entered into an agreement with the Madison Conservation Commission, the Geological Society of NH and the NH Geological Survey to help upgrade and maintain the Madison Boulder Natural Area. This is a unique partnership arrangement, helping NH State Parks upkeep, maintain and expand the educational experience of some of the State's smaller parks.

You are probably also aware that the International Commission on Stratigraphy has recently revised the Geologic Time Chart...placing the beginning of the Pleistocene at 2.588 mya.
The reasoning for that is explained at: http://www.stratigraphy.org/

The new Chart is at:

http://www.stratigraphy.org/upload/ISChart2009.pdf

As simplified version of the Revised Geologic Time Chart is at:

http://des.nh.gov/organization/commissioner/gsu/documents/geologic_time.pdf

Vol. 42 (13)

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This was to have been the year I got back to The Friends meeting but snow days in Kentucky, of all places, moved my granddaughter's high school graduation back to the Friends weekend, once again. Then I planned on NEIGC and a last minute SNAFU in Buffalo caused me to miss that meeting also. So I'll look forward to "reunioning" in 2011.

Field work in the Buffalo NE and NW Quads is essentially complete and I have moved southward to the Buffalo SE Quad and eastward to the Clarence and Orchard Park Quads. Aside from detailed quadrangle maps, the three major accomplishments thus far are distinguishing the Lake Ontario Lobe events from those of the Lake Erie Lobe, mapping the OLGLM as a depositional unit, and tying depositional events to specific ancestral lake levels.

The preponderance of lithologic evidence suggests that the Lake Ontario Lobe was not an equal partner with the Lake Erie Lobe. Rather, it was very late in arriving in western New York after the Erie Lobe had retreated. The conglomeration of features that long have been lumped together as the "Hamburg Moraine" represent retreat and piecemeal disintegration Lake Erie Lobe sublobes, not a distinct end moraine. Glacial Lakes Whittlesy (910 ft), Warren I (840 FT), II (830 FT), and III (815 FT) accompanied the demise of the Erie Lobe. Like Parker Calkin before me, I can find no evidence of lower level Lake Wayne (790 ft) between Warren II and III. The Ontario Lobe did not advance into Glacial Lake Warren III until shortly after the Erie Lobe was out of the way.

The Ontario Lobe deposited three distinct end moraines in the Buffalo vicinity. The initial advance into western New York resulted in a moraine that can be traced for at least 13 miles east of the Lake Erie shoreline. However narrow gaps, where the moraine has been washed away by Cazanovia, Buffalo, and little Buffalo Creeks, results in four prominent moraine segments between Lake Erie and the vicinity of Alden NY. The easternmost segment almost certainly corresponds to part of Calkin's "Alden Moraine," but actually is part of the Ontario Lobe terminal moraine.

The Ontario Lobe advanced south into the water of Lake Warren III (815 ft), which was 210 feet deep at the present Lake Erie shoreline and more than 100 feet deep at the eastern end. So the moraine segments, with 40 to 50 feet of relief, were emplaced underwater, at the base of the Allegheny Escarpment. They are designated as the Ontario Lobe Grounding Line Moraine (OLGLM). There is very convincing evidence that the Ontario Lobe ice floated free as it receded from the OLGLM. And after the ice margin retreated northward the lake level dropped to Lake Grassmere (775 ft). There are hanging Grassmere deltas north of the OLGLM, but none to the south.

The Buffalo Moraine has been recognized for more than 100 years. It is about 8 miles north of the OLGLM. It is an imposing ridge formed at the edge of the retreating glacier during a stillstand of the ice margin. The moraine is about 70 feet high and extends 7 miles across the city of Buffalo, from the Niagara River to the village of Walden on east. The maximum elevation of the crest is ±675 feet. Because it was deposited on the gentle dip slope of the Onondaga Escarpment it stands only 30 feet above the till plain to the north. This prominent wooded ridge marked the northern edge of the early city. As Buffalo expanded northward, many of its most prominent cultural institutions were constructed on the Buffalo Moraine.

The emplacement of the Buffalo Moraine took place fronting Lake Grassmere (775 ft). In modern exposures there is no indication of ice shove or readvance. Thus, it is inferred that the Buffalo Moraine was deposited in 100 ft of water during an equilibrium stillstand at the front of a deteriorating glacier. There is no trace of lacustrine sedimentation behind the Buffalo Moraine so subsequent Lakes Lundy (760 ft) and Algonquin (715 ft) must have drained westward before the ice began to disintegrate.

It is not unlikely that the Buffalo Moraine also represents a grounding line, even though it is on a gentle southerly slope. I posit that when the water level began dropping below the level of Lake Grassmere it began to change the ice/water ratio in favor of the glacier. As a result, the glacier was no longer buoyant and displaced the lake waters as it settled onto the dip slope of the Onondaga Formation.

There are scarplets and slope breaks at 640 feet in the densely populated urban landscape that may document the presence of Glacial Lake Dana on the distal side of the moraine, though not on the proximal side.

The Cleveland Hill moraine lies 2 miles north of the Buffalo Moraine and is much less impressive. It is only about 20 feet high and less than a half mile wide. It stretches just 3.2 miles from Winspear Avenue, south of the UB campus, to the Buffalo International Airport where it was truncated by construction. Although Buffalo's highest point is at the crest of this moraine, there are no great cultural monuments to mark its presence. It merely passes without notice beneath most suburban streets. The Cleveland Hill moraine is the result of a readvance by the Ontario Lobe that just barely climbed the Onondaga Escarpment. An equivalent ridge can be traced for several miles east of the airport along the Escarpment.

Ultimately the ice margin retreated north of the Onondaga Escarpment and then the Lockport Escarpment. A large mass of stagnant ice was left in the Salina Sag between the two escarpments. As it melted it created Glacial Lake Tonawanda which drained into the Niagara River, via lower Tonawanda Creek.

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John Rayburn (SUNY New Paltz) and I are still working in the Seneca Lake (one of the NY Finger Lakes) watershed. This past September, the USGS drill team from Reston, VA collected a 25-m long core from the wetlands south of the lake. We hope that this core penetrated much of the Late Holocene record. One undergraduate student will work with John to investigate the micropaleontology of the core and another undergraduate will work with me on the sedimentology during the spring 2011 semester.

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First, here's the down side of 2010. The economic situation has impacted the geoarchaeology business and there were definitely fewer projects this year versus the previous 2 years. However, some interesting data came to light in this work. Wood recovered from just above the water table in a stream terrace in Randolph, VT, will hopefully yield a C14 date that reinforces the current interpretation of the stratigraphy. Finding a spoked wheel and tire ca. the 1920s and a ladies shoe on the same buried 'A' horizon was delightful and the wood came from a much deeper buried 'A' horizon.

The other down side was a lack of new mapping this past field season. Apparently, both the NY and VT Geological Surveys have better use of their limited funds in these tight financial times. Hopefully, this will improve for 2011. Another factor is something that many of us "old timer" surficial mappers would rather not become a trend. It seems that at least one state survey has a preference for using only mappers who can also create the digital map layer(s) for them. I've talked to a few fellow mappers who expressed alarm at this trend. It suggests the quality of the mapping is less important than most of us would desire. It also does not seem to be in the spirit of the STATEMAP program.

Happily, RPI had me teaching full time for the Fall term. In addition to my usual Field Methods responsibility, I've been teaching our introductory geology class to nearly 60 students. It's been a pleasure to be in the classroom again on a regular basis. It's always rewarding to see how we can sometimes influence the direction of students and ignite a love of geology in their minds. I'd missed that in these years of only teaching part time. Our Department remains short-handed for the Spring term and I anticipate –

funding permitting – teaching both Environmental Geology and Geomorphology. Interestingly, this will be the first time RPI has offered Geomorphology since my mentor, Bob LaFleur, retired many years ago.

Lastly, I really enjoyed the small contribution I was able to make to John Rayburn's REU program during the summer. It was great to see one student develop an interest in stream terrace mapping, identifying flood channels, and thinking about channel migration. It will be great to pursue this again during 2011.

As I write this, it is Black Friday and I was out doing some Xmas shopping. I noticed a wonderful 1:100,000 topo map, courtesy of Delorme, that covered a wall in my local LLBean store. I inquired about getting a print of the map but it's not available. While having this in digital form would be great, getting it printed – it was about 6' x 6' – might be a problem!

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Late Glacial through Holocene Landforms and Stratigraphy, Western Mohawk Valley and Eastern Oneida Lake Basin, Central New York

In the last year the four of us excavated a number of key stratigraphic intervals in the landscape system of Central New York, in the eastern basin of Oneida Lake, and the western end of the Mohawk Valley. Newly acquired Lidar maps for western Oneida County have allowed us to begin to construct a new surface geology map of the region. We have also sampled eolian (dune) and near shore (beach) ridge sediments as well as esker fan deposits for OSL age determinations (to be done at Univ. Cincinnati). These will be compared to shell radiocarbon dates, we have been collecting for the past several years, in order to elucidate the relative timing of recession of the Ontario Lobe, subsequent inundation by Glacial Lake Iroquois, and the evolution of Oneida Lake and its varying shoreline. This template of terrestrial stratigraphic information will be compared to Oneida Lake bathymetric and seismic reflection features which are being mapped in unprecedented detail by Hamilton's research boat the "RV Continental Drifter".

Early results from the lake system indicate an early Mid Holocene dry lake episode followed by renewed high lake levels in the Late Holocene. We expect the first results of our work to be ready for public presentation by the fall of 2011.

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We (student Matt Gentoso and Ed Evenson, Richard Alley, Neal Iverson, Andy Kozlowski and Claudio Berti) just finished a fabric study in the Weedsport drumlin and flute field of New York.

The abstract for a BOREAS paper we are preparing and a figure from the manuscript will give you a feeling for the excellent data we recovered:

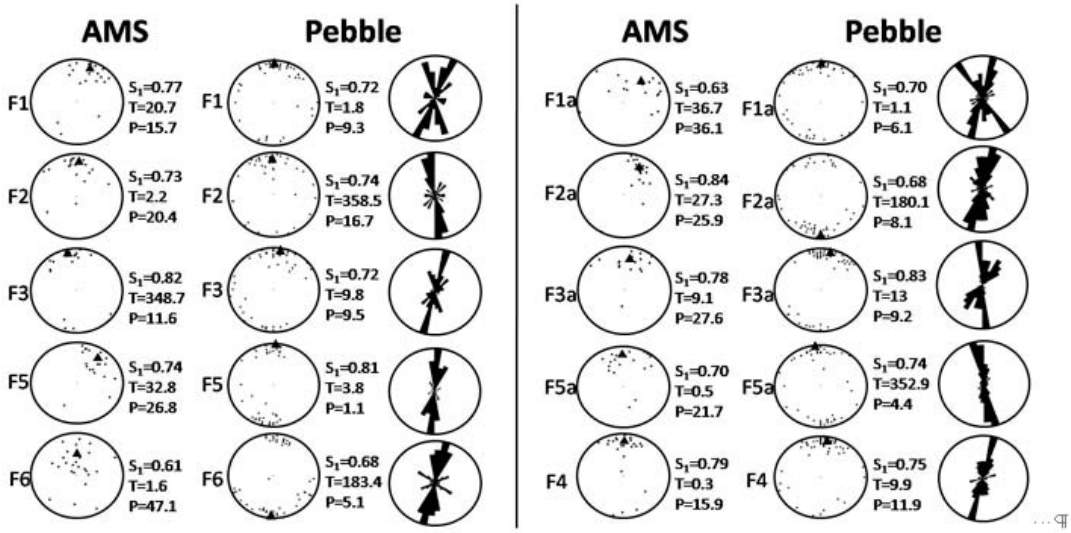

Figure 6 - AMS and pebble stereonets and pebble rose diagrams for flutes. The 20 dots in lower hemisphere AMS stereo plots are k_1 orientations, and the black triangles are the mean orientations. The 50 dots in lower hemisphere pebble stereo plots are orientations of individual pebbles and the black triangles are the mean orientations. S_1 values, trend (T) and plunge (P) of the average k_1 principal axes accompany each plot.

ABSTRACT:

The thick, relatively homogeneous basal tills exposed in the drumlins and flutes of the Weedsport Drumlin field in New York State exhibit strong fabrics that are consistently oriented parallel to the streamlined bedforms. The pebble fabrics and the

anisotropy of magnetic susceptibility (AMS) fabrics agree extremely well. Six drumlins and five flutes were sampled. Thermally-induced, incremental reduction of isothermal remanent magnetization indicates that AMS is caused by primarily elongate maghemite grains. The orientations of principal axes of maximum susceptibility (k1) are generally parallel to pebble long-axis orientations, and tend to plunge mildly up-glacier. Fabric directions are generally parallel to drumlin long-axis orientations, but deviate 12-23º from flute directions. Fabrics of the flutes are stronger and more unidirectional than those of the drumlins. These results support the use of AMS as a fast and objective method for characterizing fabrics in tills, and suggest hypotheses about basal processes linked to glacially streamlined landforms.

I am looking for a M.S. or Ph.D. student to continue this project.

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Professional information for colleagues and friends. As the interim Director of the Juneau Icefield Research Program (JIRP), Juneau, Alaska I find myself doing more administration and less science then at Bering Glacier. But, I am willing because it's a long-standing, worthy program that is involved in equal parts of research and education, with a strong expeditionary fabric. We have 15-20 research faculty from North America (mainly) and Europe, usually an equal number of undergraduates (only 9 in 2010), and a few graduate students working on theses. The icefield facilities are phenomenal. There are six actively occupied camps and several others for special needs distributed across the icefield. Camps have grown over the years and now consist of 5-6 buildings perched on arêtes and the flanks of nunataks above outlet glaciers. Not just a bunkhouse, kitchen and outhouse, but library, generator shack, garages for oversnow vehicles, computer labs, etc. It's a going operation that is capable of hosting large groups. At present camps are underutilized. When Mal Miller ran JIRP he discouraged "outsiders". In contrast, I'd like to attract visiting scientists, Faculty willing to run an REU, graduate students, undergrads, and educational groups. Opportunities exist for those interested in a broad variety of research topics involving alpine glacial geology and glaciology. Currently, we have groups working on long-term investigation of mass balance (climate change), high-precision GPS velocity and elevation surveys, meltwater stream migration near the snowline, rates of downwasting by ice ablation, micrometeorology, air quality, and many others. There are two web sites that depict the program: crevassezone.org and juneauicefield.com. Check it out. I am available to discuss how one gets affiliated with JIRP. Please let your students know about JIRP and encourage them to contact me regarding academic credit.

Vol. 42 (19)

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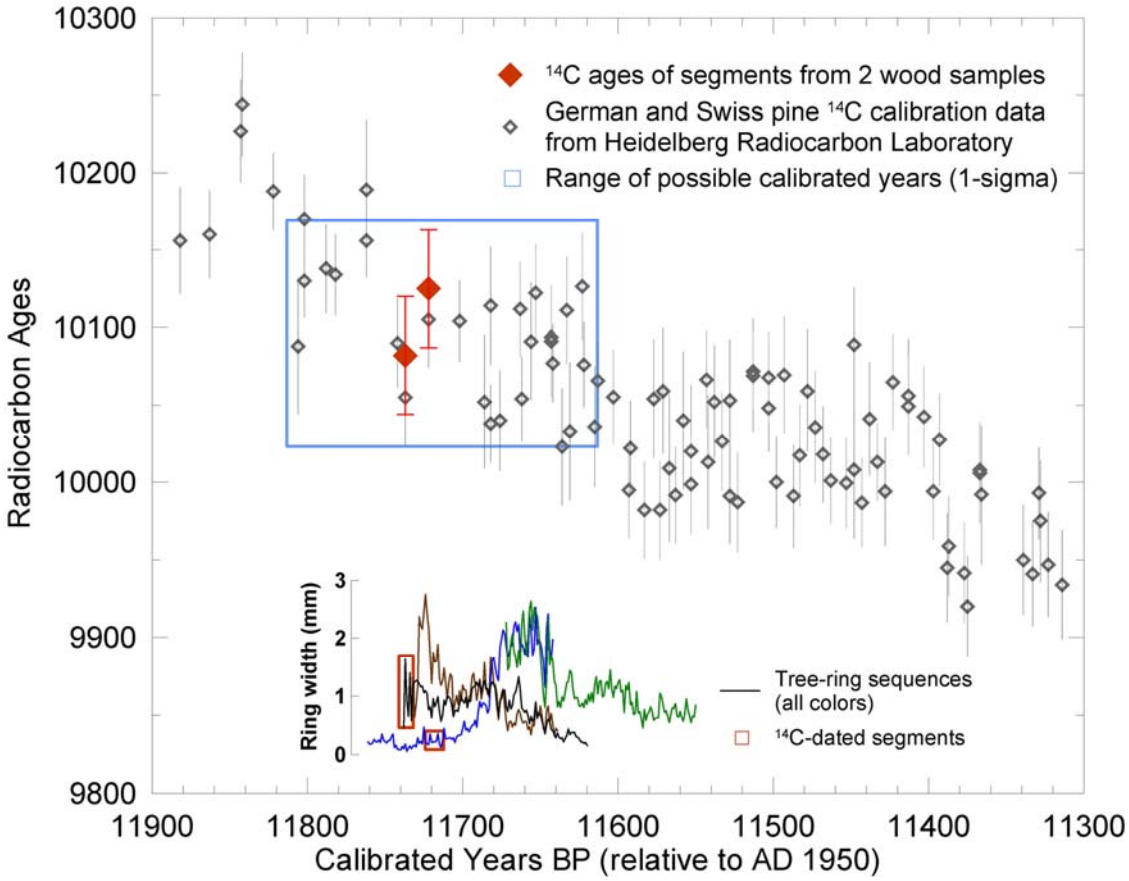
I'm now taking a look at the annual record of the Younger Dryas – Holocene transition with tree-rings plus their stable isotope content. Several chronologies have been built from logs found at the bottom of Bell Creek, near Fulton, NY (43.30°N 76.34°W). The earliest chronology, part of which is shown in the figure below, radiocarbon-dates to the transition of the late Younger Dryas into the early Holocene (10,125 and 10,008 14C BP). A biennial 13C and 18O analysis of the samples is underway, to help determine 1) if the transition was an abrupt event in this area; and 2) to look for evidence of the post-transition cooling trend indicated by sediments in the Finger Lakes (Anderson et al. 1997, Ellis et al. 2004, Kirby et al. 2002), and provide the higher-resolution data sets that are available with tree-rings.



Vol. 42 (20)

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Greetings from Oneonta! Many thanks to John Rayburn for keeping this news letter going. It has been a busy year. Last year at this time I was pondering the significance of buried bars and channels in the floodplain archaeological site at Pine Lake near Davenport, NY. This past year I began some new but related projects: Emily Carroll (a SUNY Oneonta geology undergraduate) and I floated 100 plus km of the local trunk streams in Otsego County, mapping gravel deltas at tributary junctions. I had a real Lyellian moment when I realized the cutbanks exposed the record of processes occurring in the modern channels. It's somewhat embarrassing as a fluvial geomorphologist to have this sort of revelation, but I had not spent that much time on the water before this year. In reaches with active gravel bars, we find gravel bars exposed in the cutbanks. In deep calm reaches, we find tall muddy banks. We also found buried woody debris everywhere. In many places, the stratigraphy looks remarkably like the "legacy sediment" type section, with gravel at the base, overlain by gray organic-rich mud, overlain by a thick massive silty-sand. There are obvious signs of ongoing burial of organic debris behind obstructions and inner bends of the modern channel, indeed, there are mud bars with dipping foresets. All of this has thrown me into the Holocene record of alluvial activity. I am now working on getting some dates on basal woody debris, and wrestling with a conceptual model for alluvial stratigraphy in Otsego County. Key unanswered questions include the extent of historic sediment accumulation on floodplains, the role of deglacial environment in setting trunk stream gradient, the apparent incompetence of trunk streams to move gravel, and whether the current apparent high activity of local erosion and deposition is representative of the entire Holocene. There appears to be two common reach types, and this has spawned a model of "reaches with bars and reaches without", or to push this closer to Suess, "the bar-bellied reaches had floodplains with bars, while the plain belly reaches had none upon thars". It would be great to have a session at an upcoming GSA meeting to document alluvial stratigraphy in the Northeast, and discuss various models. Any takers?

For the coming year I hope to continue mapping channel types, conduct more geophysical surveys of local floodplains, and get some dates on basal woody debris from alluvial stratigraphy. If I can get a student interested, I would dearly love to map rock basins in the uplands, and begin the work of sorting out what the glaciers have done to the upland drainage basins in Otsego County. The LiDAR data we have for the upper Susquehanna certainly begs for new detailed geomorphic mapping (both fluvial and glacial!), and maybe I can get a student interested in this as well. Please see my website for additional details on what I've been up to:

http://employees.oneonta.edu/hasbarle/

Vol. 42 (21)

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Since reporting to the Glaciogram a year ago, the urban geology paper, coauthored with John Clague, was accepted by Geoscience Canada in January. Although scheduled for the June issue, it has not yet arrived.

Several projects continue to occupy our attention in the UW laboratory, chiefly involving fossil recovery from sub-till organic sites to reconstruct paleoenvironments. Wet-sieving of a set of 143 samples of the interglacial Don Fm. collected in 2003 at the Don Valley Brickyard in Toronto has approached the half-way mark. Fossil picking has focused on microvertebrates (all fish). This is a joint project with Royal Ontario Museum vertebrate curator Kevin Seymore, where I am a Research Associate. Also on the Toronto interglacial is a study with Jock McAndrews, in part based on macrofossils recovered by Leslie Kerr-Lawson in her M.Sc. thesis (1985) and Jim Eckenwalder (UofT), including archived material at the ROM.

Field work and UW lab work have been completed on a mid-Wisconsin (14C ca. 47 ka = Port Talbot) quarry site at Zorra (near Woodstock, ON) led by Andy Bajc and Peter Barnett of the Ontario Geological Survey. Identification and interpretation of the ostracodes (B.B.Curry) and molluscs (J.Nnekola and G. Mackie) are completed while those for plants and insects are awaited. No diatoms were recovered from samples by R. Hall. While stratigraphic work at this quarry was carried out earlier by J. Westgate and A. Dremanis (1967) and D. Krzyskowski and me (2001), the recent exposures were discovered by A. Bajc during an OGS 3D mapping projects of the Woodstock-Brantford area and sampled 2006-2009.

Work on the Innerkip site, also near Woodstock, was recently reactivated. Discovered by Dick Cowan in 1970 and later studied by Alan Morgan and students in the 1980s, drill cores were made available in 2010 from holes drilled to bedrock (2-3 m below creek level) by Cowan and Morgan in the 1970s and 1980s at the base of the peat bed that underlies three tills. Cores provide the stratigraphy below the peat and have yielded ostracodes, molluscs, plants, microvertebrates, and insects. The age of the deposits has long been uncertain (interstadial/interglacial) and additional dating attempts are planned. Ostracode and mollusc data from silts above the peat have been reported by Curry and Nekola/Mackie respectively, while pollen and plant macrofossil reports are awaited. Processing of sub-peat silt samples is partly completed and various components of the fossil assemblages will be dispersed to specialists.

The campus or Waterloo site is another project underway. Borings in 1999 and 2004 (OGS) have yielded plants, molluscs, and a few insects and microvertebrates from an inter-drift buried valley (Karrow and Warner 1984) with an uncertain age (MOIS 3 or

5). Sample processing at UW is nearly complete, with possibly enough wood for an AMS date. Plant macrofossils have been reported by Catherine Yansa.

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Our work in surficial geology at Binghamton has moved more toward fluvial geomorphology than glacial geology over the last few years. However, I maintain my collaboration with John Rayburn, Dave Franzi, and Tom Cronin in the Lake Champlain region, and Amanda Buboltz is completing her Master's thesis on late-glacial geology of the Tioughnioga River valley in central New York. Meanwhile, two undergraduate students (Devin Mannix, currently in the graduate program at Southern Illinois, and senior Ethan Blatt) have been working with me on studies of paleoflood hydrology of the upper Susquehanna River basin. Although this work remains in its early stages, we have identified and begun working at sites that record flood stratigraphy within the Susquehanna and Chenango River floodplains, seeking to develop a record of flood frequency for the last few thousand years. More to come in the future.

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As senior geologist with Mueser Rutledge Consulting Engineers, based in New York City, I've spent over 25 years looking at the soil and rock in the NYC area. While there's been fairly recent mapping of the glacial soils in NJ and CT, there appears to be little new information published about the glacial deposits in NYC. Since 2004 I've been using subsurface information obtained from boring investigations and construction excavations to get a better understanding of NYC's glacial soils.

Across the city, valleys (often over 100 feet deep) are filled with multiple interlayers of till, outwash and glacial lake sediments. The engineering properties of the soil from each glacial advance are different from those of the next glaciation. Consequently, it’s often important to understand the glacial history of a site. Since 2005 I've been presenting information from some of our projects at the annual conference of

Long Island Geologists (extended abstracts available online at http://www.geo.sunysb.edu/lig/) with the hope of getting feedback.

There's been a lot of confusion and debate about the number, nature and age of the glacial advances in the NYC area. I'm currently trying to piece together information from these sites (and others in our files) to try to resolve some of the questions. In 2009 I was able to get a carbon date of 49,500 Ka on wood found at the World Trade Center site. This date will help put some of the pieces into context, but I'm trying to track down any other dates that may be out there for the NYC area. Sirkin published some dates for Long Island, but I'm not aware of any from NYC. If anybody can recommend other sources of data please let me know. I'm not aware of any other research being conducted on NYC glacial geology and would appreciate any suggestions.

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Boulder Beds of Upper Flat Brook, New Jersey

As part of a semester project in my Geomorphology seminar (and field work the previous summer), I undertook a study of an interesting armored boulder bed near Big Flat Brook, in Northern New Jersey just west of Sunrise Mountain. The bed is probably subglacial till, possibly sorted and winnowed by subglacial or proglacial meltwater. However, proglacial flood deposit and periglacial boulder field are alternate explanations. There is also some post-depositional slope movement, evident in fabric analysis. The study is now published as a paper in The Middle States Geographer, (Pope, Gregory A., Temples, Andrew J., McLearie, Sean I., and Kornoelje, Joanne C., 2009. The nature of boulder-rich deposits in the Upper Big Flat Brook drainage, Sussex County, New Jersey. The Middle States Geographer, v. 42, p. 43-53) and linked (free) here: http://geographyplanning.buffalostate.edu/2009MSG.html

Sediment core at Lake Wapalanne

We obtained a bucket auger core of sediments of Lake Wapalanne, a small pond on the New Jersey School of Conservation in Sussex County. The core goes down over 2 meters, below lake sediments (the lake was constructed in the 1930s), where we found an interesting blue clay of unknown age. Preliminary work on the sediment size and carbon content of the core was presented at the Association of American Geographers Annual Meeting in Washington, DC, last April. (Pope, Gregory A., Mary Egan, Michael J. Kruge, and Sandra Passchier. Environmental change evident by sediment core, Lake Wapalanne, northwest New Jersey. Association of American Geographers Annual Meeting, Washington, DC, April 13-18, 2010.) Depending on dating, we think we see the

onset of historical deforestation and reforestation in the area. Future work will focus on bracketing ages and pollen analysis.

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Hi Glaciogram readers. As always I'm the last to submit something. (Editor's prerogative!) I have had a busy year at New Paltz with teaching and research. I have continued working with David Barclay (SUNY Cortland) on Dendro projects in the Adirondacks, Tara Curtin (Hobart & William Smith) on Seneca Lake post-glacial history, Tom Cronin (USGS), David Franzi (SUNY Plattsburgh), Peter Knuepfer (Binghamton University) on post-glacial history of the Champlain Valley, and many students. My former student Kira Baca - now working with Tim Fisher (University of Toledo) on her Master's Degree - won a GSA award for best undergraduate student poster at the NE/SE GSA meeting in Baltimore. Her poster (co-authored by David Barclay and myself) was titled "Climate signals in a 195-year Red Oak tree ring record from the Champlain Valley, New York". Too many other student involved projects to mention here, but see the publication list at:
http://www2.newpaltz.edu/~rayburnj/Jpubs.html

Also this year we kicked off the SUNY New Paltz REU program. We had 12 amazing students working in the Catskills. We are gearing up for our second session this summer. See the *Help Wanted* add at the end of the Glaciogram and let your students know! Hope to see many of you at the joint NE/NC GSA meeting in March.

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Jake Benner (also at Tufts) and I have completed a major update of the North American Glacial Varve Project web site. The main addition is a complete revamping of Ernst Antevs' (1922, 1928) New England Varve Chronology. The new chronology, called the North American Varve Chronology (NAVC) includes minor corrections, consolidation of independently numbered sequences, and an extension of Antev's original chronology. On the web site all data files connected to the NAVC are available for download as well as many not connected. There is also a full explanation of how the original Antevs sequence was modified as well as conversion tables. There is information

about varve deposition and also deglaciation in the northeastern U.S. along with an explanation of techniques used to collect and process varve samples for turning them into varve records. There is a new listing of all radiocarbon ages in varves in the northeastern U.S. as well as an updated calibration of the NAVC that determines the best fit of the NAVC radiocarbon ages to the IntCal09 data set. The web site can be reached at:

http://geology.tufts.edu/varves/default.asp

We would appreciate comments on the site or any additions you think should be included.

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I have been continuing my secondary career as a geology columnist. Currently, I publish about 70 columns per year in the Woodstock Times, the four newspapers of the Register-Star Chain and Kaatskill Life magazine. About a third of these are about Ice Age topics. These describe glacial features and Ice Age history of the Catskills and Hudson Valley. My wife Johanna and I are currently finishing a book about the Hudson Valley during the Ice Age which will be aimed at the general public.

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I spent part of last summer mapping a reach of the Second Branch of the White River in central Vermont. This mapping was combined with mapping completed several years ago by Fred Larsen in the Third Branch and Ayers Branch of the White River to complete a surficial geologic map for the town of Randolph (published by the Vermont Geological Survey). I was able to trace an esker system down the valley (the same esker I had previously mapped to the north in the Steven's Branch valley of the Winooski River) until it became completely buried beneath younger glaciolacustrine sediments (see photo below). The White River valley was an arm (albeit narrow arm) of Glacial Lake Hitchcock. High-elevation river terraces indicate that the valley became almost fully filled with lake sediments before Glacial Lake Hitchcock drained. Several good sections of varved lake sediments were discovered, but will not be measured until this coming summer. The compiled geologic map, an isopach map of surficial materials,

cross-sections, and implications for groundwater resources and flow in the area will be presented during the NE GSA meeting in Pittsburgh this coming spring. I may also lead a NEIGC field trip to the area this coming fall as part of the field conference hosted by Middlebury College next fall.

Top of esker buried by fine lacustrine sand, East Randolph, Vermont.

UVM Geomorphology Masters Projects – 2011 recruiting

We are actively recruiting two students for projects that will lead to Masters Degrees in Geology at the University of Vermont. These projects are funded by Federal grants and will include full support for research and project-related travel as well as at least one semester of a Research Assistantship and full summer support. We are a moderate-sized department with about a dozen MS students in Burlington, Vermont, a great location. Our MS students present their work at professional meetings and publish their research in peer-reviewed journals. To learn more about UVM Geology, please visit the department web site at **http://uvm.edu/geology**. To learn more about Geomorphology at UVM, please visit: **http://uvm.edu/geomorph** and **http://uvm.edu/cosmolab**.

Interpreting the Interstates

With support from the National Endowment for the Humanities, we are working to understand the impact that building nearly 400 miles of Interstate Highway had on the rural Vermont landscape. The project is based on a unique collection of 36,000 images (**http://www.uvm.edu/landscape/learn/interstate.html**) taken over the 20 year construction period. Two graduate students (one in History, the other in Geology) will work together to document physical and cultural changes occasioned by the coming of these massive roads using a combination of historical imagery and field mapping. There will be on-going interaction with the public including interviews and collection of oral histories. We will conduct an extensive public outreach effort creating interpretive materials for display at rest areas, town libraries, and county fairs and by writing an illustrated book. You will be traveling to these outreach venues and interacting with the public, explaining our work. The best applicants will be outgoing and personable, be comfortable working in the field, have at least basic design and lay-out skills, and enjoy working with historical maps and images. For this project, demonstrated ability to write clearly and accessibly is key. GIS skills are a plus. This project is real, hands-on Environmental Science. The goal is to determine in what ways the coming of a massive road system altered the trajectory of landscape change in a profoundly rural area. This project is part of an on-going effort to document landscape change in Vermont. See: **http://uvm.edu/landscape**

Cut and fill construction of Interstate 89 moves massive amounts of rock and clears forested slopes. A single rail line runs along the right side of the image. Montpelier, Vermont, July, 1959. LS8769.

Deciphering 6 My of the Greenland Ice Sheet History Using In Situ 10-Be

With support from the National Science Foundation, we are working to understand the erosive behavior of the Greenland Ice Sheet over the past several million years. We will do this by measuring the concentration of cosmogenic ^{10}Be in quartz carried from Greenland buy icebergs and then collected in marine cores. But first, we will refine dating of the cores using stable isotope analysis of forams.

The project has both field and laboratory components. In order to document modern conditions and the flux of cosmogenic ^{10}Be leaving Greenland today, we will travel to Greenland and collect sediment from active outwash streams and from streams draining deglaciated terrains. To go back in time, we will sample previously collected ODP cores in order to generate a cosmogenic ^{10}Be stratigraphy over the past several million years. The goal of this project is to understand when the Greenland ice sheet first expanded far enough to strip weathered rock and soil from the island and then to track over time how efficiently a large ice sheet erodes its bed.

The best applicants will have superior attention to detail as you will be working with irreplaceable cores in a state-of-the-art, hazardous materials clean lab. You will also need to be comfortable travelling to Greenland with a small group of people and doing fieldwork in remote and rugged locations both using helicopters and working on foot. Applicants must have some Chemistry coursework and we prefer students with laboratory experience processing samples for chemical or physical analysis. Prior field and lab research experience is a plus.

UVM campsite with a view of the Greenland Ice Sheet during fieldwork in summer 2008.

If one of these projects appeals to you, please contact Paul Bierman directly stating your interest and background (pbierman@uvm.edu) and then apply to UVM as soon as possible (**http://www.uvm.edu/~gradcoll/).**

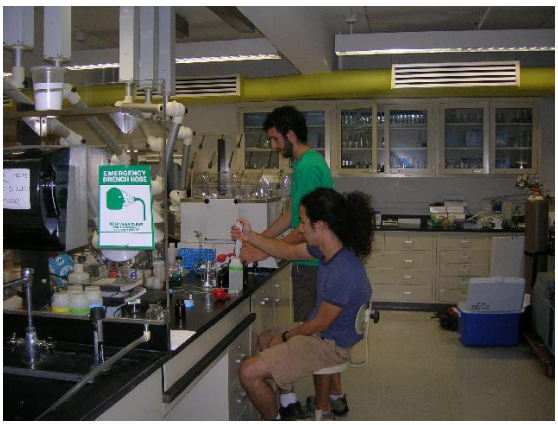
Research Experience for Undergraduates

Research in Watershed Characterization

June 1 – July 31, 2011

State University of New York at New Paltz (SUNY NP) will offer its REU program for the second year in 2011 for 12 students. This REU program is funded by the National Science Foundation which provides a challenging eight-week summer experience conducting research in a comprehensive Watershed Characterization approach at SUNY-NP in collaboration with the New York State Department of Environmental Protection (DEP). Please see http://www.newpaltz.edu/geology/nsf-reu/ for more information.

Application Deadline: February 7, 2011



Projects for 2011:

- Surficial mapping of the upper Esopus drainage network using GIS
- Monumenting and surveying stream banks to monitor stability
- Watershed characterization by conducting wetland and aquatic inventories
- Study of Didymo geminata (rock snot) in Esopus Creek
- Impact of Stony Clove Creek Watershed on Disinfection Byproduct Formation
- Evaluation of different methods for estimating evapotranspiration (ET)
- Establishing a relationship between turbidity and total suspended solids (TSS)
- Evaluation of turbidity vs flow relationships in Esopus Creek
- Groundwater-surface water interaction Identifying factors controlling water quality
- Role of groundwater on stream bank erosion

Financial Support:

REU participants receive a stipend of $3,600 for eight weeks of research. Food, lodging and internal travel expenses for field data collection is covered by the grant.

For additional information, please contact:

Dr. Shafiul H Chowdhury, REU Program Principal Investigator
at (845) 257-2618 or email *chowdhus@newpaltz.edu*