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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 2012. Deadline for next year's contributions will be Monday, December 3rd, 2012. 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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(The Original FOP!)

PRELIMINARY ANNOUNCEMENT

**75th Annual Reunion
Northeastern Friends of The Pleistocene**

June 1 - 3, 2012

Pinkham Notch, New Hampshire

**The Alpine Zone & Glacial Cirques of
Mt. Washington & the Northern Presidential
Range, New Hampshire**

Leaders

Brian K. Fowler, Mount Washington Observatory

P. Thompson Davis, Bentley University

Woodrow B. Thompson, Maine Geological Survey

J. Dykstra Eusden, Bates College

Ian Dulin, Bates College

The field trips of this Reunion will update The Friends on glacial, geomorphological, geochronological, and paleoenvironmental research within and below the alpine zone of Mt. Washington and the northern Presidential Range. This is the first return of The Friends to this area since the 33rd Reunion in 1970.

The Reunion will be hosted by the Mt. Washington Auto Road and the Mt. Washington Observatory. The Auto Road's Base Lodge will serve as Reunion and social event headquarters, while the Observatory will be our field headquarters in the alpine zone. Further information will be posted on the Friends website early next year:

<http://geology.um.maine.edu/friends/img/News.jpg>.

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

The 84th meeting of the NYSGA will be hosted by Hamilton College. Stay tuned to the NYSGA or Glaciogram websites. Future meeting: 2013 – SUNY Fredonia

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

The 2012 Geological association of Canada annual meeting is in St. John's, Newfoundland from May 27-29, 2012.

<http://stjohns2012.ca/>



New York State Geological Survey

Dear Colleagues,

As curators and research scientists at the New York State Museum and New York State Geological Survey, we mourn the passing of **Dr. Norton G. Miller**, emeritus curator of bryology and quaternary paleobotany. A native of Western NY, Norton was born in Buffalo and graduated with high honors in 1963 from the State University of New York at Buffalo (BA, Biology). In 1969, Norton received his Ph.D. in botany from Michigan State University, where he also received graduate training in geology. Reflecting his personal roots, Norton's Ph.D. dissertation focused on late glacial and postglacial vegetation change in southwestern New York which ultimately became a NY State Museum Bulletin (NYSM Bulletin 420, 1973). Norton spent his early career at the University of North Carolina at Chapel Hill and Harvard University. In 1982, he was hired and spent the rest of his career at the NY State Museum. Norton had an amazingly productive professional career spanning more than 45 years. He conducted field research across the contiguous US, Alaska, British Columbia, the Canadian Arctic, and northern regions of Europe and Asia. He was author, or editor of eight books and well over 100 research articles published in peer-reviewed journals and edited volumes right up to his death / the present. For those of us working in the Northeast, he made enduring contributions to our understanding of late glacial and postglacial paleoenvironments and landscapes. Norton saw great value in interdisciplinary collaboration to productively address and update quaternary research questions, as exemplified by his editorship with Richard Laub and David Steadman of the first Smith Symposium Proceedings (Late Pleistocene and Early Holocene Paleoeology and Archaeology of the Eastern Great Lakes Region. Bulletin, Buffalo Society of Natural Sciences, 33, 1988). He served as editor and as editorial board member of a dozen professional journals, and mentored many graduate students in botany and biology. He was a regular participant in annual field meetings of Friends of the Pleistocene (northeastern section). Norton was a man of great energy, good humor, and tremendous intellect -- for many of us, the world is a poorer place without him.

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<http://www.nysm.nysed.gov/>
<http://www.nysm.nysed.gov/nysgs>

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Vermont Geological Survey

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

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Floods Reach Vermont Geological Survey (VGS) Building

Like many in Vermont, the VGS building (the Logue Cottage in the Waterbury State Office Complex) received flood waters. Up to a foot of water reached the first floor with the basement completely inundated (we are now in temporary quarters in Winooski, VT).

Luckily, the core geologic archives and maps were out of the office to be scanned. In fact, the scanning project is complete and we already have PDF files on a hard drive with plans to make VGS reports and maps available on the web. The core of a state survey is its geologic reports and maps and thankfully we now have a solid amount of information in digital form.

Searchable PDF's

For example, an interest in hummocky ground in Vermont came to mind. With an internal query for "hummocky" through a Windows Explorer search enabled for PDF's that have received optical character recognition over five references were identified. To further illustrate the rapid power of this archival approach, a 1972, NEIGC Fred Larson field trip location came up for a stop in Northfield, VT.

Recent Surficial Geology Maps

Springston, G, 2011, Surficial Geologic Map of the Plainfield, Vermont Quadrangle: Vermont Geological Survey Open File Report VG2011-3, scale 1:24,000 (in progress).

Van Hoesen, J., 2011, Surficial Geologic Map of the Town of Dover, Vermont: Vermont Geological Survey Open File Report VG11-1, 1 color plate, scale 1:24,000.

Van Hoesen, J., 2011, Surficial Geology and Hydrogeology of the Town of Dover, Vermont: Vermont Geological Survey Open File Report VG11-1b, 8 color plates and Report, scale 1:24,000.

<http://www.anr.state.vt.us/dec/geo/grndwaterDover.htm>

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Wright, S., Larsen, F., Springston, G., and Gale, M., 2011, Surficial Geology and Hydrogeology of the Town of Randolph, Vermont, 6 color plates and report, scale 1:24,000

<http://www.anr.state.vt.us/dec/geo/grndwaterRandolph.htm>



New Hampshire Geological Survey

<http://des.nh.gov/organization/commissioner/gsu/index.htm>

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New Surficial Geology maps of NH

The NH Geological Survey recently completed its 2011 field mapping season. Four 24 K NH quadrangles were mapped for their surficial geology.

1. The NH Portion of the Windsor Quadrangle (along the NH - VT border).
2. The Claremont North Quadrangle.
3. The Henniker Quadrangle

Also of glacial interest, is the recent publication of the Surficial Geology of Mount Washington and the Presidential Range, NH, 2010. This new map of the geology of the presidential range has just been published by well-known New Hampshire geologist and Mount Washington Valley resident, Brian Fowler.

The November 28, 2011 Conway Daily Sun says that Brian's map, "The Surficial Geology of Mt. Washington & The Presidential Range," answers the commonly-asked questions, "Why do the high peaks of the Presidential Range look like 'rock piles'"

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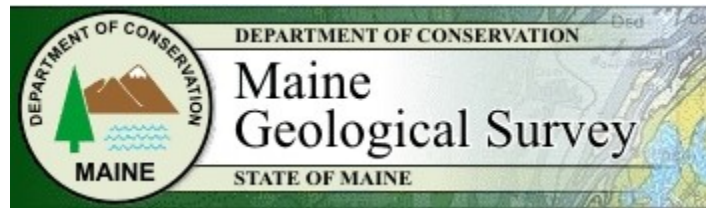
instead of open, cliffy summits?” and “What changes have occurred to the climate here since the end of the last ice age?”

The map also presents evidence that a large cirque glacier existed in the Great Gulf after the continental ice sheet departed and that a postglacial lake was created at The Glen by this glacier’s terminal moraine when it temporarily dammed the Peabody River. The map is the first of its kind for the Presidential Range and is the result of 45 years of work by its author, lately in cooperation with both the New Hampshire Geological Survey and the USGS.

All NH Geological Survey Publications can be viewed at:

<http://des.nh.gov/organization/commissioner/pip/publications/geologic/index.htm>

They can be obtained by contacting the NH Department of Environmental Services, Public Information Center, PO Box 95, Concord, NH 03302-0095; (603) 271-2975; or FAX (603) 271-8013. pip@des.nh.gov



Maine Geological Survey

<http://www.maine.gov/doc/nrimc/mgs/mgs.htm>

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Maine Geological Survey

Maine Geological Survey 2011 Surficial Geology Mapping Program

The Maine Geological Survey (MGS) carried out surficial quadrangle mapping in three areas of southern Maine during the 2011 field season. The work is part of our ongoing participation in the STATEMAP program funded by the State of Maine and U. S. Geological Survey.

This year’s projects included mapping by Carol Hildreth in the Sullivan quad (eastern coastal Maine); Alice Kelley in the Otter Chain Ponds quad near Bangor; Woody Thompson in the Jefferson and Union quads (mid-coastal Maine); and Tom Weddle in

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the Newbury Neck and Salsbury Cove quads (northern Mt. Desert Island and adjacent mainland).

In addition to the mapping of Quaternary deposits in these areas, we are looking for evidence that will help document the pattern and chronology of glacial retreat from Maine's coastal lowland. The current and previous mapping shows evidence of changing ice-flow directions, especially during deglaciation, as calving bays and convergent ice flow developed in valleys during the late-glacial marine submergence.

Tom Weddle's mapping has documented an unusual late eastward ice flow in the Ellsworth area, as demonstrated during the 2010 NEIGC field conference. There are also places where late southward ice flow overprinted the regional SE flow attributed to the Laurentide glacial maximum. However, Hildreth and Thompson have found a few sites in the Sullivan and Tunk Lake quads (just east of Ellsworth) where E and S-SSW flow also occurred prior to the SE regional flow. More work is needed to determine the extent and timing of flow events and the ice dynamics responsible for them.

Lidar imagery became available to us for the first time this fall. Maine presently has Lidar coverage for just the coastal towns, but the imagery shows glacial and bedrock features in amazing detail! It reveals extensive swarms of closely spaced (annual?) moraines, many of which would have otherwise been overlooked due to forest cover, subtle topographic expression, and limited access. Glacially streamlined topography and marine raised beaches are also readily apparent, often in areas where the topographic map contours fail to show them. It is clear that Lidar data – where available – will be indispensable to our future geologic mapping efforts, as well as countless other applications by Maine citizens. We will present one or more poster sessions related to surficial mapping applications of Lidar in coastal Maine at the Hartford NE GSA meeting in March.

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This fall we examined some remarkable stratigraphy at Styles Brook in the eastern High Peaks area of the Adirondacks. Flooding during Hurricane Irene had scoured the stream channel and moved a tremendous amount of sediment, thereby dramatically freshening the stream-cut bluffs and removing decades of accumulated streambed deposits.

Glacial sediments exposed in the lower valley are interbedded diamictons and glacialustrine deposits that represent southwestwards progradation of an ice-proximal delta or subaqueous fan into Glacial Lake Chapel. Slickensides, ball and pillow

structures, folds, and faults all indicate considerable syndepositional movement of the deposits. The main sediment source appears to have been an ice margin to the northeast at Clements Mountain; this small massif forms a slight constriction in Keene Valley and so is a plausible pinning point against which the Laurentide Ice Sheet margin may have briefly stabilized while withdrawing from the area. An erosion-resistant yellow diamicton was found at stream level through much of the study reach, but this appears to have gained its intriguing color and consolidation from post-depositional precipitation of interstitial iron oxides.

Previous work in the 1970s by Craft had led to interpretation of some of these deposits at Styles Brook as lodgement till from a local valley glacier. This valley glacier would have had to been at least 9 km long to have reached this site and was proposed to have moved from the east into Keene Valley following retreat of the Laurentide Ice Sheet. However, we found no evidence to support this interpretation. The situation at Styles Brook is similar to other sites in the eastern Adirondack High Peaks where purported local glacier deposits can be satisfactorily explained as the product of the Laurentide Ice Sheet and/or proglacial lakes. We have yet to find a site that provides unequivocal evidence for kilometers-long valley glaciers in the Adirondack High Peaks following retreat of the Laurentide Ice Sheet.

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Thanks to the Marcellus black shale gas drilling and fracturing frenzy in northern Pennsylvania, some streams have actually been going dry from the withdrawal of water for well “frac-ing”. Such is the case in the east draining Sugar Creek valley, the first major right bank tributary of the North Branch Susquehanna River south of the New York State line. The Sugar Creek channel has been going dry several miles downstream of the frac water withdrawal site but not immediately below the withdrawal site. There are about 100 feet of glacial sediments under the floor of the valley, a complex of ice-contact stratified drift, varve, and till deposits. The Sugar Creek valley contained a proglacial lake with four successively lower outlets as the glacier retreated northeasterly from the area.

The PA Geologic Survey, the Susquehanna River Basin Commission, and myself have submitted a STATEMAP proposal to do detailed mapping and borehole work in the area to delineate the aquifer system in the downstream two-thirds of the Sugar Creek basin covered by the East Troy, Ulster, and Towanda 7.5’ quadrangles. It is expected that the Sugar Creek valley is underlain by basal aquifers confined by varves between ice margin still stand positions and near surface unconfined aquifers that connect to the basal

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aquifers in places. The primary objective of the project is to better delineate the connections between the various aquifers and explain the why the channel is going dry where it does.

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As I indicated last year, detailed mapping is essentially complete in Buffalo NW and Buffalo NE 7½' Quadrangles. The northern half of Buffalo SE is complete and I have been working southeastward into the Orchard Park and East Aurora quads. The western half of OP is almost complete. This may be a lot of wasted work for maps that will never be published.

The Lake Warren I, II, and III beach ridges form a series of prominent ridges that extend 12 miles northeastward, from the village of Orchard Park to Cayuga Creek. Rare exposures reveal a shale-chip sand or gravel. The ridges crest at ±840, ±830, and ±810 ft, respectively. Less prominent features at ±890 to ±910 ft extend at least 8 miles along the base of the Allegheny Escarpment, from Orchard Park to at least Buffalo Creek. These document earlier Glacial Lake Whittlesey.

But the most interesting feature is the ±910 to ± 900 ft delta surface upon which the village of East Aurora was established. Main Street in East Aurora was reconstructed over the past two summers and exposure was almost continuous. This Lake Whittlesey delta is about five miles SE of the Allegheny scarp, at the junction of the East and West Branches of Cazenovia Creek. During the existence of Lake Whittlesey, the five mile trench of Cazenovia Creek, or at least the southeastern two miles, was a fjord up which the Whittlesey waters extended. I hereby christen this the Cazenovia Creek Fjord of Glacial Lake Whittlesey. How's that for blowing things up way out of proportion? Anyway, the later Lake Warren I delta is at the other end of the fjord right, at the escarpment.

A similar situation may have developed another 5 miles eastward in the Buffalo Creek trench near the village of Wales Center. But I am not there yet and the situation looks to be much more complex than that at Cazenovia 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 year, three undergraduate students, Ben Spencer (HWS), Alison Platsky (SUNY New Paltz), and Ashliegh Kollmer (SUNY New Paltz) worked with us to analyze the sedimentology and micropaleontology of a ~12 m of a core collected from the wetland at the southern end of the lake. Dr. Carol Griggs (Cornell University) identified two pieces of wood collected from ~11.6 and ~12.9 m depth in the core as fir and tamarack respectively. We recently learned that the lowermost wood sample is of Younger Dryas age (~12,500 calendar years BP) and the uppermost is earliest Holocene (~9,300 calendar years BP). The sediment record in the wetland documents a transgression during the mid-Holocene followed by eutrophication during the mid- to Late Holocene.

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Happily, RPI asked me to teach Geomorphology during the spring 2011 term. I limited the class to one van full and taught it as an upper level to grad level course, very experiential and little in the way of lectures. It's amazing how the students got turned on by the topics, including surficial mapping, my old favorite when I took the same course from Bob LaFleur as an RPI undergrad during the early Holocene! John Rayburn and I joined our classes for a field trip that took in some of the sites from the FOP 2008 trip. My students finally had a chance to hear someone other than me talk...good it was John, too. They came away with many good comments. Sadly, though, the university pulled the funding away and the course won't be available this spring...after we had it all planned and there were many students hoping to see it on the schedule.

This past summer had me assisting John Rayburn with his REU program again in the Catskills. We had 2 fantastic students who really toiled away in the field finding numerous exposures that really helped clarify things in and around the Phoenicia quadrangle. One of the students was lead author for a GSA poster in Minneapolis and the other is lead author on a second poster for the Hartford GSA. I hope you'll check that poster out in March. I think there's an exciting story emerging that turns the old Rich interpretation on its head. It's a sound hypothesis with a lot of stratigraphic data to

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support it. I hope to join John again in 2012 and see if the next pair of students can advance the story or change it according to whatever new information is gathered.

The geoarchaeology business finally picked up in the latter half of 2011. Maybe this means the economic downturn truly is easing up as construction projects seem to be moving forward. I enjoyed one project in VT just the week before Irene flooded the same terraces we were trenching into. Another project took me back along the Hudson's floodplain and we were heartily surprised by trenching into a buried peat bog. C14 dates on 2 samples of the peat confirmed suspicions it was old, early Holocene – can't say the specifics as the project isn't finished and I'm not cleared to talk about it. Additional projects took me to the NW 'Dacks and into the Catskills.

Guarded optimism that maybe 2012 will bring some quadrangle mapping in NY or elsewhere. I'm pleased there is progress on publishing my map of the Thiells quadrangle and hope that brings some needed attention to NY's mapping program. I think it's time to report on this mapping at Hartford. See you there.

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Hello from the Director of Juneau Icefield Research Program (JIRP).

Thanks for your interest in our program, which has enjoyed a long history of involving undergraduate and graduate students in various aspects of icefield science, while training them for an alpine expedition. I would refer you the JIRP Facebook that has some great photos taken by students last summer. Crevassezone.org is another good source of information. There you will find illustrated reference to the nature of the science we do and more very cool images.

Should you be interested in joining JIRP on the Juneau Icefield for our 8-week program, you will find application information that can be downloaded from our website (juneauicefield.com). We are in the process of updating the website, so take note that the dates for next summer are the same as last summer, June 23 to August 18, 2012. The application deadline is March 15, 2012. However, early acceptance will secure your position on our roster, which will be limited to 25 students.

Let me know should you have questions related to JIRP and/or the application procedure.

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NEW MAP OF MT. WASHINGTON & THE PRESIDENTIAL RANGE

A new map entitled “Surficial Geology of Mt. Washington & The Presidential Range, 2010” has just been published by B. K. Fowler. Among many other interesting things, the map provides new field evidence that the Late Wisconsinan Ice Sheet was likely not as thick in the region as its predecessors and thus did not completely remove post-Illinoian regolith from the highest peaks. It also describes evidence that a large reactivated ice mass may have existed in the Great Gulf cirque after the Late Wisconsinan ice sheet departed the area and that morainal material related to it dammed the Peabody River creating an ephemeral lake at The Glen in Pinkham Notch. The map is the first of its kind for the Presidential Range and is the result of 45 years of work by its author, lately in cooperation with both the N.H. and U.S. Geological Surveys.

The map can be ordered on-line from the publisher, Durand Press (www.durandpress.com), from the NH Geological Survey via its website, or it can be purchased from local book and map sellers in the White Mountain Region.

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Pleistocene to Present NE North American Dendrochronology Project

Field work was minimal this year, but did co-author a report about a previously-unrecognized level of the North Atlantic 14C reservoir, at least for 13.7 to 13.5k yrs BP, which will clear up some of the temporal problems in connecting late glacial events along the North Atlantic coast with those in inland New England / maritime Canada (Thompson, Griggs, Miller, Nelson, Weddle, and Kilian in *Quat Res* 75 (2011): 552-565). In addition, Norton Miller and I are finishing an accepted paper on the YD macrofossils found at the Pump House site in Cohoes, NY. Finally, I am writing up the results of the isotope analyses of wood from the Fulton site (see last year’s *Glaciogram*) to be submitted in early 2012. Aside from writing... I’ve helped John (Rayburn) with wood identification of samples from river sediments within the Lake Champlain basin, and am similarly helping Peter Barnett with early to mid Holocene samples found at the Meldrum Bay site, Manitoulin Island. That’s why I haven’t been out in the field much this year, but am looking forward to next year!

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Greetings from Oneonta! Many thanks to John Rayburn for keeping this news letter alive and circulating. It has been another busy year. Where to begin...

I obtained some funds to establish a few 14C dates for material imbedded in the river banks in Otsego County. The main purpose was to get a better handle on ages of alluvial stratigraphy. Of course, not all the cutbanks are Holocene, strictly speaking. I pulled some leaf and twig material out of some laminated clays in a cutbank along the Susquehanna River by Otego, NY. I suspected it was part of a glacial lake, perhaps at the distal end of a delta at the mouth of a small nearby tributary. The dates that came back place the deposit at ~13,300 BP. This date might have some significance for glacial retreat in our area, as there are very few dates in our neck of the woods. I think there are quite likely a series of other such deposits along the Unadilla and upper Susquehanna which could also place more constraints on retreat rates, but focusing on that problem will have to wait until I have a little more time.

As for the ages of Holocene alluvial stratigraphy in Otsego County, we have found a broad scatter in ages, ranging from 13,000 year BP to yesterday (or maybe in September when Lee was rampaging through the area). My hope had been to get a clearer idea of the amount of bank material that accumulated during forest clearing and mill construction during European settlement. But I must say that the picture is far from clear. Distinctive horizons in the cutbanks that could mark the arrival of Europeans (such as buried soil horizons) are very challenging to identify. The stratigraphy includes gravel bars, draped with mud and woody debris, and massive buff-colored silty sand. At the base of the floodplains near modern low water in the channels we commonly find what look like hydric soils, gray or gray mottled rich with woody debris, and in fact peat layers in some locations. The correspondence between low water (i.e., the water table), and anoxic conditions (the hydric soil) makes me think that it's not necessarily an old buried marsh. Modern channels show numerous cases of recent burial of wood around the bars and in eddies. Anoxic conditions lead to preservation of the wood, and the evolution toward a gley soil. This casts some doubt on interpreting the hydric soil as an extensive surface which represents the floodplain prior to the arrival of Europeans. Our work on this issue will continue, as stream assessment is sweeping into the upper Susquehanna, and interpreting the hydric soil as some kind of initial condition (target condition) for stream restoration is the ruling model for the mid-Atlantic. I have enlisted the aid of a student (Lauren Dolginko) to map known dams and mill ponds across the county, and we'll focus our efforts more around those structures to see if there really was a pulse of sedimentation on local floodplains caused by European land use methods.

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I have also advised students on ground penetrating radar, electromagnetic induction profiling, and differential GPS surveying on a couple of different projects this past year. I don't know quite how I got into shallow subsurface geophysics, but it's a going affair. One student (Frankie Alvino) is probing an archaeological site/floodplain, and the project has informed my thinking on floodplain stratigraphy quite a bit. Plus, we have helped target some areas for excavation by the archaeologists. Another student (Chris Aucoin) has used differential GPS and a total station to georeference handheld photos of dinosaur trackways. Stephanie Kromhout, another student, has been working of sediment cores from deltas in local reservoirs and trying to correlate grain size in the cores to flood records. I think our lake records are way under-utilized, and Steph has made some good progress. Ellyse Powers and Anna Downie, two Earth Science Education majors, have started working on a way of creating virtual field trips within the Google product world. They floated the Unadilla River this past summer, and georeferenced digital photos, and then created a virtual lab for high school level students. The tools to create a virtual trip (with maps, aerial imagery, topography, etc) are quite accessible in the Google world, and the real challenge is really bringing the field to the computer screen.

Finally, my students Leandra Baker and Fiona Lowry, colleague Devin Castendyk and I have been sampling drinking water wells in Otsego County to provide a baseline of water quality prior to horizontal drilling and hydraulic fracturing for natural gas begins in the area. This project is still in its infancy, in terms of grappling with the water-rock reactions, and in characterizing the various aquifers. It has certainly made me think more about glacial and bedrock aquifers, subsurface flow paths, and how one might get a better picture of depth to bedrock, perhaps with gravity.

Well, not a lot of glacial material in this update, but somewhere in here, a glacier flows through it.

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Our work in the Quaternary geology lab wet sieves field samples for recovery of fossils by picking under the microscope. At the present, such work is concentrated on samples of the interglacial Don Formation from the Don Brickyard in central Toronto. This work recovers plants and molluscs but is concentrating on microvertebrates (mainly fish). However, over the past year, with student help, samples from several other sub-till organic sites and one postglacial project have been completed as described below. Recovered fossils are dispersed to specialist experts for identification and interpretation. Delays in reporting are ongoing causes of slow progress.

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Two sites with intradrift buried valleys at Zorra quarry and the University of Waterloo campus site were described last year. AMS 14C dates at the campus site have increased the age from the previous 41,000 BP to > 48,000 years BP. Plant macrofossils, ostracodes, and molluscs have been reported from these sites, while pollen and insect results are awaited.

The complexities of the apparently simple stratigraphy at the Innerkip site await further unraveling as we expect various reports. The chief advance of the past year has been lab processing of three cores provided by Alan Morgan extending the stratigraphy below the visible peat bed to bedrock 2-3 m below. Sufficient molluscs have now been recovered from above and below the peat to enable AAR analysis for dating purposes. As well, plant macrofossils, pollen, ostracodes, insects, and microvertebrates were recovered.

A manuscript has been resubmitted after review by Phil Kor, Daryl Cowell, Rik Kristjansson and me on Lake Algonquin shorelines at Cabot Head in the northern Bruce Peninsula. The Niagara Escarpment, in the northeastern edge of the Michigan Basin, projects sufficiently far and higher to have been attacked by Lake Algonquin waves, forming wave-cut notches and stacks in the bedrock. A related paper of mine is well advanced, reporting Algonquin to Nipissing shoreline surveys in northern Bruce and Grey counties undertaken in 2003 and 2004, and other field and lab studies of associated faunas of Nipissing age. The Nipissing transgression severed the northern Bruce Peninsula from the mainland about 5000 BP and they were later rejoined through outlet downcutting at Sarnia and isostatic uplift. Molluscs are under study by Gerry Mackie, University of Guelph, and ostracodes by Brandon Curry of the Illinois State Geological Survey.

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All of my current work is on Pleistocene glacial records in the western U.S. I am working with Jeff Munroe (Middlebury College) on reconstructing the extent and timing of mountain glacier and pluvial-lake changes during the last glaciation in the northern Great Basin, Utah and Nevada. The project involves field mapping; lake-sediment coring in high alpine basins; cosmogenic surface-exposure dating of glacial features; radiocarbon dating of shoreline deposits of Pluvial Lakes Clover and Franklin; and numerical modeling of glaciers and lakes. I am also working with Eric Leonard (Colorado College), Mitch Plummer (Idaho National Lab) and Joe Licciardi (University of New Hampshire)

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on a similar project in the Rocky Mountains. This research involves cosmogenic-exposure dating of glacial features and numerical modeling of latest Pleistocene glaciers to limit temperature and precipitation of the Pinedale Glaciation along the continental divide (northern New Mexico to northwestern Montana).

A significant outcome of this research that may be of interest to the glacial community in New York is the development of a cosmogenic-nuclide preparation lab at SUNY Geneseo. The lab is designed for processing of rock and sediment samples for cosmogenic aluminum and beryllium in preparation for AMS analysis. Although my research focuses primarily on glacial/paleoclimate history in the western U.S., I am interested in exploring collaborative research opportunities elsewhere, especially in New York State.

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Hello again Glaciogram'ers!

I am a past contributor to Glaciogram, Vol. 36 No. 1, as a graduate student in the Department of Earth and Environmental Sciences at Columbia University. After five years of teaching in the Department of Biological Sciences at Eastern Kentucky University, I returned to the Tree Ring Laboratory at Lamont-Doherty Earth Observatory in June 2010 as an assistant research professor. For my dissertation I intended to focus on the climate response of northern and southern range margin species in eastern NYS. I published on the southern temperate species (Pederson et al., 2004, *Dendrochonrologia*) and then quickly became distracted by other features of my data, like the evidence of elevated growth rates of old trees across the eastern US. Since that time my research expanded more to the south and then back to Mongolia where I had cut my teeth in my first two years at Lamont as a research technician. We are wrapping up a study on climate, fire and forest history in eastern and central Mongolia and are going back this in summer 2012 in an attempt to reconstruct 2000 years of drought history in central Mongolia (cross fingers). However, I am primarily a forest ecologist interested in studying disturbance and climate.

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Of particular interest to NYS researchers might be the manuscript I just submitted to the Journal of Climate on 500 years of drought history for the NYC watershed. Did 2011 feel particularly wet to you? How about the last 3-8 years? Did it seem unusually damp? Our analysis of instrumental precipitation data and a tree-ring based reconstruction of drought back to 1531 CE indicates that the region has been in an unusually wet era since the end of the severe 1960's drought and that the last eight years are at the upper end hydroclimatic variability since the beginning of our record. We also find the 16th century megadrought, more commonly described in the southeast and southwestern US, peaking its head into the NYC watershed primarily as a 23 year drought. And, we also see only 4 positive departures from the mean, wet years, between 1543 and 1577. The 17th century, primarily described as a significant drought via geologic proxies in the upper Midwest as well as central and eastern Canada, was particularly dry here. We find six significant droughts between 1633 and 1701. I am most fascinated by the current pluvial. If someone is studying landslide activity in eastern NYS, I would like to talk to you about what you have learned. Please contact me at: adk@ldeo.columbia.edu, <http://www.ldeo.columbia.edu/~adk/>.

Finally, for those teaching field-based classes, you might be interested in my 2010 Natural Areas Journal publication, "External Characteristics of Old Trees in the Eastern Deciduous Forest". It was intended for general audiences and might be a way to engage students into the forest. It is available on my web page. If you do download it, please drop me a short note hello, especially if you will use it as a teaching tool.

Glad to see this is still up and running. I hope to bump into you at conferences or, better, in the field.

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Radionuclides as Tracers for Sediment Chronology Study in Lake Wapallane, New Jersey

Kiara Jones (Saint Augustine's College)

Elena Noonan (William Paterson University)

Huan Feng, Greg Pope, Josh Galster (Montclair State University)

Lake Wapallane, a small lake in northwest New Jersey, was constructed in 1933, which allows for the study of sediment records post and prior to the lake's formation. In this study, sediment characteristics were compared to environmental changes. Major

characteristics that were looked at analyzed were color, carbon content, and particle size. A sediment core was collected out of Lake Wapallane using the PVC pipe method, and sectioned every 2 cm. These samples went through a muffle furnace for loss on ignition to determine carbon content, and the Malvern Mastersizer 2000 for particle sizing. The color was assessed using the Munsell Soil-Color Charts. The top sediment of the corer was a dark black color, and then became lighter turning into a gley color at the bottom. The percent carbon content in the sediment decreased with depth. Finer particles were found at the top of the sediment, while coarser particles were in the deeper sediment depths. The very bottom of the core decreased in particle size, showing fine particles again. According to the results, the sediment core included lake, stream, and wetland sediment. Relationships between color, carbon content, and particle size were used to come to this conclusion.

Future plans include analyzing the sediment for naturally occurring radionuclides (e.g., Be-7 and Pb-210) and anthropogenic radionuclides (e.g., Cs-137), which are useful tracers for sediment chronology and mixing study (Fig. 1). Coupling with the sediment quality assessment, these radionuclides can be used to understand the contamination history since the industrial revolution began. This information is important for Lake Wapallane environmental protection and assessment.

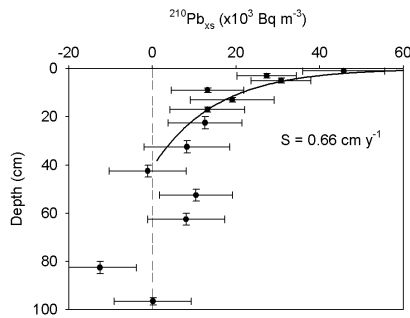


Fig. 1 Excess ^{210}Pb profile shows a steady-state sedimentation (Feng et al., 2010)

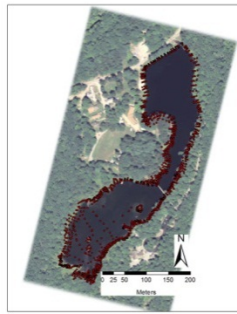


Fig. 2 Air photo of Lake Wapallane in the Stokes State Forest, Sussex County, New Jersey.



Fig. 3 Canberra BE2020 Germanium Detector housed at MSU for radionuclide measurement.

Reference

Feng H., Zhang W., Jia L., Weinstein M. P., Zhang Q., Yuan D., Tao J., Yu L. (2010) Short- and long-term sediment dynamics in western Bohai Bay and coastal areas. *Chinese Journal of Oceanology and Limnology*, 28(3), 583-592.

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Hi everybody! Wow! What a year!!! I don't know where to begin. There is the ongoing research in Champlain Valley dendrochronology with David Barclay (SUNY Cortland). We (and our students) have been working up living chronologies in red pine, red oak, and white oak. Also historical chronologies in the same by taking samples from barns and very old houses. Some preliminary results in conference abstracts. Much more on that in the year to come. There is also the ongoing research with Tara Curtin (and our students) on lake level fluctuations in Seneca Lake. (See Tara's Glaciogram entry for an update).

This summer SUNY New Paltz hosted our second REU on the *Comprehensive Approach to Watershed Characterization Focusing on the Source of New York City Water*. David De Simone and I worked with two outstanding students (Mike Sandstrom from Vassar and Karen Kiser from Macalester) on the surficial mapping and glacial history. (See David's Glaciogram entry for an update). We will run the REU again this summer. We are looking for more outstanding students. Please see the advertisement at the end of the Glaciogram.

And of course, there is the ongoing work on the deglacial history of the Champlain Valley with my many talented co-investigators. This was the year for manuscripts!

Cronin, T.M., Rayburn, J.A., Guilbault, J-P., Thunell, R., Franzi, D.A., *In Press*. Stable isotope evidence for glacial lake drainage through the Saint Lawrence Estuary, eastern Canada, ~13.1-12.9 ka. *Quaternary International*.

Katz, B.G., Najjar, R.G., Cronin, T.M., Rayburn, J.A., Mann, M.E., 2011. Constraints on Lake Agassiz discharge through the late-glacial Champlain Sea (St. Lawrence Lowlands, Canada) using salinity proxies and an estuarine circulation model. *Quaternary Science Reviews* 30, 3248-3257.

Rayburn, J.A., Cronin, T.M., Franzi, D.A., Knuepfer, P.L.K., Willard, D.A., 2011. Timing and duration of North American glacial lake discharges and the Younger Dryas climate reversal. *Quaternary Research* 75, 541-551.

I would also like to give a special mention to:

Manley, P.L., Manly, T.O., Hayo, K., Cronin, T.M., *In Press*. Small-scale lacustrine drifts in Lake Champlain, Vermont, *J. Great Lakes Res.*

I will hopefully see most of you at NE-GSA in March. If you did not yet get your limited edition New York Glaciogram sticker please be sure get one from me then.

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Robert Titus

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This year, Robert Titus of Hartwick College, completed his 20th year of writing popular columns about New York state geology for regional newspapers and magazines. Currently he writes quarterly for Kaatskill Life magazine, monthly for the Woodstock Times, and weekly for the four newspapers of the Register Star newspaper chain. Increasingly, he has been joined as co-author, by his wife Johanna Titus of Dutchess College. The two of them expect to have a book out late next year about the Ice Age history of the Hudson Valley.

About 30% of their columns have been about Ice Age topics. This has been the year of the late Ice Age alluvial fan. A number of the columns have described the alluvial fans which form the foundations of villages such as Delhi, Prattsville, Palenville and Margaretville. A feature article for Kaatskill Life described the glacial history of Delhi. The role that these fans played in the Hurricane Irene flooding of Prattsville has been explored in several columns. Robert has been working with the mountaintop Historical Society to lead hikes to Ice Age localities. These have included Ice Age meltwater spillways at North Lake State Park and at Diamond Notch in the Catskills Park. He also did a spillway walk for the Woodstock Land Conservancy at their property Sloan Gorge. Robert did a similar walk to Glacial Lake Albany for the Columbia Conservancy at their Greenport Preserve. He described the history of the Greenport mastodon for the Columbia County Historical Society. In short, through their columns and public presentations Robert and Johanna are helping make the general public more aware of our region's Ice Age heritage.

Robert presented a paper on his experiences as a writer at the annual meeting of the Geological Society of America at Minneapolis. He is working with the society to promote author potential authors of columns similar to his He encourages others to join him in this pursuit. If you are interested you should contact him at titusr@hartwick.edu

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Maine Geological Survey

Last spring marked the publication of a paper in Quaternary Research, describing the late-glacial fossil wood occurrence in Portland, Maine. Coauthors include Carol Griggs (Cornell University) and Norton Miller (New York State Museum), along with Bob Nelson and his student Taylor Killian (Colby College), and Tom Weddle from here at Maine Geological Survey. The title is: "Associated terrestrial and marine fossils in the

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late-glacial Presumpscot Formation, southern Maine, USA, and the marine reservoir effect on radiocarbon ages” (vol. 75, p. 552-565).

Our study extracted a lot of information from this rare occurrence of very well-preserved spruce logs and other plant remains in the marine clay of the Presumpscot Formation. Carol’s dendrochronology work showed that the trees all died in the same season of the same year, while the site stratigraphy indicates they were swept into the sea by a large landslide from adjacent Bramhall Hill in what is now downtown Portland. Radiocarbon age calibration dates the landslide to 13,520 +95/–20 cal yr BP. We were fortunate to find marine shells next to the wood, and thus obtained a local marine reservoir value of ~ 1000 yr. This is several hundred years greater than previous Maine estimates and helps resolve discrepancies between the varve chronology of deglaciation elsewhere in New England and the older marine ages from shells in the Presumpscot Formation.

I’ve also been continuing investigations of glacial deposits in the northern White Mountains of New Hampshire. This work includes the compilation of a new map showing glacial lakes, the White Mountain Moraine System (of Older Dryas age), and other deglaciation features in the area covered by the Mt. Washington 1:100 k sheet. The map will be presented at the March, 2013, Northeast GSA meeting in the Bretton Woods/Mt. Washington Hotel resort complex. The 2013 NE GSA is also the target date for completion of a layperson’s guidebook to the geology of the White Mountains, on which I’ve been working with coauthors Dyk Eusden, Brian Fowler, and Thom Davis. The book combines information that we’ve been gathering over many years of field work and hopefully will present the region’s geology in a manner that’s both informative and entertaining.



Carol Griggs' students sawing off a section of white spruce log for dendro work. (2007)



Woody holding a big log segment that he and Norton Miller had just excavated from the Mercy Hospital construction site. (2007)

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I am on sabbatical leave for 2011-2012 academic year for purpose of writing about past research, including updates of literature citations, checking field locations, attending local and regional meetings, and generally "mining the files". The writing involves NY water resources, glacial geology, and fluvial processes for the most part. A second purpose is to build momentum in my new role as a NY Commissioner to ORSANCO (Ohio River Valley Water Sanitation Commission).

Research Experience for Undergraduates

Research in Watershed Characterization

June 4 – July 28, 2012

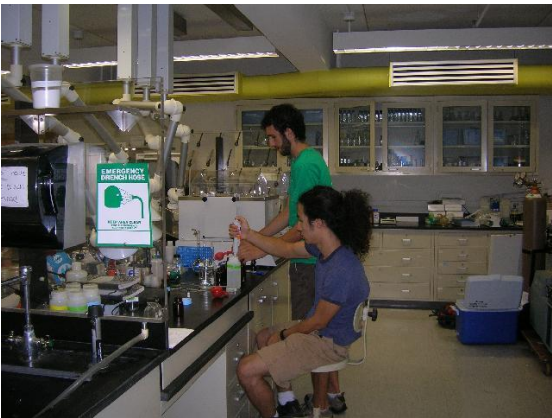


State University of New York at New Paltz (SUNY NP) will offer its REU program for the third year in 2012 for 12 students. This REU program is funded by the National Science Foundation which provides a challenging eight-week summer experience conducting research in a comprehensive Watershed Characterization 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 10, 2012

Projects for 2012:

- ✚ 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
- ✚ 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

