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NEW YORK GLACIOGRAM

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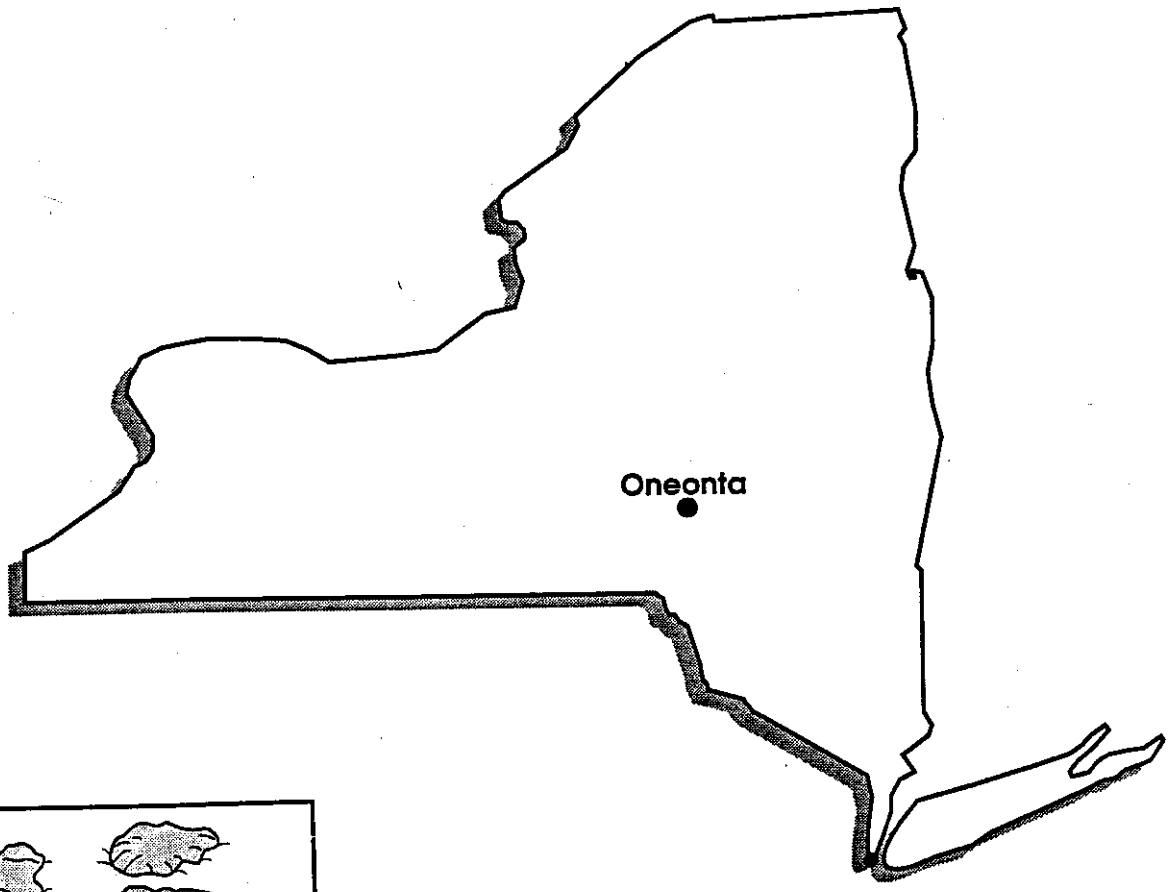

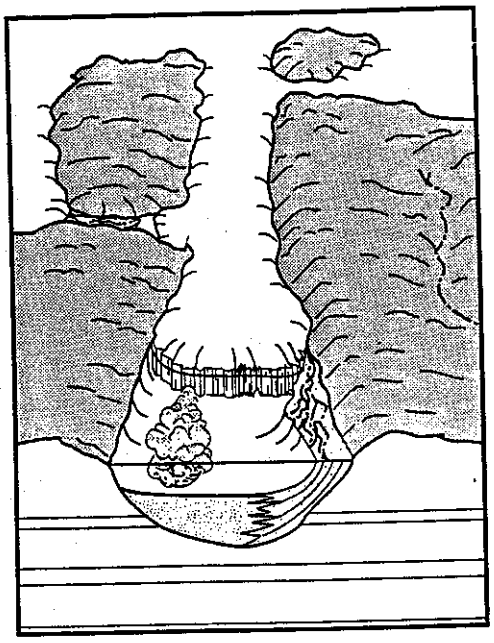

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EDITORIAL POLICY

The **GLACIOGRAM** is intended to be a 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.

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Note from the editor

For many years, Parker E. Calkin, Department of Geology, SUNY-Buffalo assumed the responsibilites as editor of the **NEW YORK GLACIOGRAM**, which he inherited from Don Coates (SUNY-Binghamton), the originator and first editor. We are all indebted to Don's foresight and to Parker for carrying the message. Now, I am pleased to say, the Glaciogram will be assembled at SUNY-Oneonta, where I hope to continue in the example set by Parker. I am sure you will join me in thanking him for his dedicated service and for a job well done. I am pleased to pass along two unsolicited comments received from current Glaciogram contributors who expressed similar appreciation for Parker's efforts.

• Yes indeed I do join you in thanks to Parker Calkin for his longstanding commitment to the Glaciogram. It's one of the most interesting things to come in the mail.

- Paul Karrow

• I was glad to learn that you will be taking over from Parker, who deserves one large pat on the back for keeping the ball rolling for so long. I wish you an equal amount of success in your work.

- With best wishes, Norton Miller

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I would like to suggest that in the future, the Glaciogram include a contributor-generated list of recently published articles pertaining to the Quaternary geology of New York State and adjacent regions.

Please forward to me at anytime during the year, formal and informal references that you discover and/or use that include information about the Quaternary geology of New York State. The purpose is to keep readers of the Glaciogram informed of relatively new material. To get the ball rolling, I have listed a few examples from the recently-published Field Trip Guide for the 69th Annual Meeting of the New York State Geological Association, Hamilton College, Clinton, NY edited by Todd W. Rayne, David G. Bailey, and Barbara J. Tewksbury.

Jay

Pinet, Paul R. and McClennan, Charles E., 1997, Drumlin-Bluff and Baymouth-Barrier Erosion Along the Southeastern Shore of Lake Ontario, New York, p. 17-36.

Halfman, John D. and Donald L. Woodrow, 1997, Stratigraphy, Sedimentology, and Geochemistry of Seneca Lake, New York, p. 51-64.

Mullins, Henry T., Seltzer, Geoffrey O., Paterson, William P., Domack, Eugene W., and Leventer, Amy R., 1997, Holocene Paleoenvironmental Records from the Western Hemisphere: A Workshop, p. 117-126.

Hilfinger IV, Martin F. and Mullins, Henry T., 1997, Geology, Limnology, and Paleoclimatology of Green Lakes State Park, New York, p. 127-158.

Pair, Donald L., 1997, Glacial Lithostratigraphy of the Tully Valley, Onondaga County, New York, p. 167-174.

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CONTRIBUTORS

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Several days on Manitoulin Island in early May completed planned shoreline surveys (Algonquin-Nipissing, etc.). With the late spring there were widespread patches of snow in the bush and ice on the bays but we weren't hindered. We checked out one site surveyed in 1996 that yielded anomalously low maximum beach elevations in front of a Niagara Escarpment headland and, as surmised, found higher gravel bars back in an embayment, so it makes sense after all. The work on Manitoulin was begun in 1988, suspended in 1992 and 1993, and involved a couple of weeks surveying each spring before leaves and bugs were out. However, a move to Iron Bridge north of Lake Huron was thwarted by the second deer collision with the same car, which became "a total write-off" and we returned home in a rental car.

Most of my time since has been divided between editing, manuscript writing or rewriting, and identification of molluscs from Victoria, B.C. The editing, with Owen White, is a Geological Association of Canada Special Paper on Urban geology of Canadian cities, containing papers on 23 cities across the country, with publication expected about the end of the year. We are nearly half way through page proofs now. Cities near New York include Niagara, Hamilton, Toronto, Oshawa, and Montreal. Paper writing includes the Woodbridge site (more than 3/4 together), Woodstock quarry stratigraphy, and molluscs from two marl sites near Waterloo. Meanwhile, the Mill Creek (MI) site paper has just appeared in Palaeo3, this with Barry Miller, June Mirecki, and Kevin Seymour.

After a long rest, samples from Fernbank (near Ithaca) New York, again got attention and most have been wet sieved for fossil recovery. A few samples remain to be washed and all to be picked for everything identifiable on the # 10,35, and 60 sieves. Alan Morgan is contributing sections on insects and permafrost. Barry Miller is doing the molluscs and is visiting Cornell to examine Maury's original fossil collection, courtesy of Art Bloom. Jock McAndrews (Univ. Toronto) is carrying on with plant remains, and Kevin Seymour is examining the fish bones. It will be interesting to compare with the 500 taxa known from the Toronto interglacial, with which Fernbank has long been correlated.

Graduate students Astride Silis, Andy Stuart, Roger Paulen, and John Johnston are all endeavoring to finish M.Sc. theses in the next few months, and Remi Farvacque will defend in October. His M.Sc. deals with geoarcheology in Pukaskwa National Park. New student Steve Douglas is embarking on an M. Sc. on the Fort Erie area related to present archeological excavations for the twinning of the Peace Bridge to Buffalo. His B. Sc. thesis at Brock University was the palynology of a bog near Fort Erie. New Ph.D. student Abigail Burt will work on glacial geology of an area northeast of Winnipeg, Manitoba. I visited her field area in July.

The Quaternary Sciences Institute has had a turnover of executive as Owen White is replaced by Alan Morgan as Director and Ian McKenzie by Jim Warren as Secretary-Treasurer.

Near-future activities include a summary paper on the urban geology volume to be given at GSA in Salt Lake City. In June, Owen White gave a related paper in Athens, Greece at the IAEG meeting. Efforts will continue this fall to advance laboratory fossil work on B.C. and Fernbank samples and push papers to completion.

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We had a successful field trip to Bare Mountain, south of Syracuse, on September 28, 1997, as part of the annual meeting of the New York State Geological Association. Twenty-five geologists viewed and discussed the strange formations that I believe form an unusual rock-block landslide. A new idea is that the delicately preserved structures could have remained intact, if the blocks were let down gradually above a collapsing salt cavity. We are now looking into doing pollen analysis of the silted sags behind the main ridge. Seismic studies will not be permitted by the land owners. I'm thinking about giving this new idea some exposure at the Spring NE Section GSA Meeting.

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It is a shame, but I can't even remember the last time I dug Quaternary dirt in New York State. Instead, I keep looking at cores taken at the sea floor and elsewhere. However what we recently found with few of my colleagues is of general interest to the Quaternarists everywhere and thus has an indirect relation to the New York State as well.

We observed a very close correlation of the pollen record in Grande Pile, France, with the North Atlantic core V 29-191. In particular, the cold water invasion at the C24 level of the deep sea core appears to correlate with the band of the eolian dust Melisey I in Grande Pile, which, at least in France, marks the end of the last interglacial (Lure = Eemian).

The consequences are multiple:

(1) The Eemian correlates with MIS 5e and a good part of MIS 5d.

(2) It was not 11 millennia long, but twice as much. This is now independently confirmed by the chronological studies on North Atlantic cores which are currently either in print or prepared for publication.

(3) The second half of the Eemian witnessed gradual growth of polar ice and a cooling and probably ocean circulation shifts in the Northern North Atlantic. This happened at a time of the relatively warm ocean in the middle latitudes.

(4) The interglacial, as defined in European pollen records, terminated very probably with a major ice surge into the Atlantic and with a continental-size dust storm on the continent.

(5) Only the first half of the Eemian can be justly compared to the elapsed segment of the Holocene, assuming that the present interglacial follows the same Milankovitch blueprint as the Eemian. If so, then we are just about entering the second half of the interglacial, whose end is still many millennia ahead.

More information on this issue can be found in Quaternary Science Reviews,Vol. 16., pp 605-612 (1997) and in my paper in the NATO ASI Series, Vol I 49, entitled Third Millennium BC Climate Change (eds: Dalfes, Kukla, Weiss), pp 699-710, Springer Verlag, Heidelberg 1997.

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ERNEST H. MULLER, 204 Heroy Geology Laboratory, Syracuse University, Syracuse, NY, 13244-1070; ehmuller@mailbox.syr.edu

A couple of weeks ago [early October], I enjoyed a day in the valley of Sixmile Creek, (Ithaca's water supply) with Vic Schmidt and companions. Vic had studied the varve sequences in this valley long ago and had reported on them at NEGSA in Buffalo a couple of years ago.

Almost at the time of the Buffalo meetings, a spring flood opened a new exposure revealing more detail in the stratigraphic section below the first (oldest) of the varve units he had described.

Along with Whitney Autin, Art Bloom, Parker Calkin, Norton Miller and George Smith, we pretty much concurred with Vic's interpretations and are hoping that he will soon have a report ready for publication.

The NYSGA meetings, hosted by Hamilton College, Sept. 27-28 included glacial geology field trips in the Syracuse area that made one wish to be in two places at once. The climate change field trip that focussed on Green Lake State Park, led by Hank Mullins and Martin Hilfinger, included a small seminar with papers by Geof Seltzer and Gene Domack as a kind of perspective on the Holocene history of Green and Round Lakes.

Perhaps there will be an official note elsewhere in this issue of Glaciogram, but in any case for those who are wondering, Les Sirkin has agreed to host the meeting of the Friends of the Pleistocene in the eastern Long Island next May. Persons who attended a meeting of the Friends in the last year or two may expect a first notice with further information by March. Other persons interest need only to get in touch with Les at Adelphi University.

Although my own New York glacial geology work has languished during the past year, I have learned much from a return to the Bering Glacier area with Jay Fleisher, Dorothy Peteet and others BERG associates; also from Tidewater Glacier Workshop in Ohio, Beringia Paleoenvironmental Workshop in Colorado Springs, and hopefully in the next couple of weeks from a first encounter with the Northwest Glaciologists in Tacoma.

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Les Sirkin, Adelphi University

The 1998 field meeting of the Eastern Friends of the Pleistocene will be held on eastern Long Island, May 15-17, 1998, with headquarters in Montauk, NY. The meeting will include a Friday evening program and reunion and Saturday and Sunday field trips. Trips will highlight the nature of the terminal moraine and recessional moraines, evidence of two glaciations, and the late glacial erosion of the terminal moraine south of the Montauk Peninsula by the rising sea. A boat trip to Block Island is planned (depending on the weather) to compare the drift sheets and the moraines. Host for the meeting will be Les Sirkin, Earth Sciences, Adelphi University, Garden City, NY 11530.

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Continued funding through the USGS Statemap program has focused my attention on the surficial deposits of the Otisco Valley, Tully, Jamesville, and Marcellus quadrangles. These efforts have trained a number of undergraduates in mapping and resulted in senior theses and student-authored presentations at GSA meetings. Recent graduate Fran Gomes (now at U. Mass) ably presented the conclusions of his B.S. Thesis research in the Tully Valley to participants on this Fall's NYSGA Fieldtrip to the Tully Valley. Fran used geotech. studies of lake clays exposed on the flank of the Tully Moraine to invoke a readvance of ice in the Tully Valley. Mapping will continue this coming summer on these quads and I would welcome any observations and/or subsurface records that readers of the Glaciogram might know of from this long-studied region of New York.

In other news, a contribution to the subglacial meltwater debate - based on evidence in northern New York - appeared in a special issue of Sedimentary Geology on subglacial environments (v. 111, p. 199-215) and work continues on glacial pavements along Lake Ontario and moraine segments in the Adirondacks. Informal field trips into any of these areas (Tully Valley, eastern Lake Ontario Lowland, Adirondacks) are always a possibility - I can be reached by phone or email.

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Aleksis Dreimanis, Dept. of Earth Sciences, University of Western Ontario, London, Ontario, Canada, N6A 5B7; c/o mary.rice@uwoadmin.uwo.ca

Together with John Delgaty who is doing his M.Sc. thesis on Lake Ontario lobe drumlins, we re-visited several sections along the Lake Ontario north shore bluffs this Fall. Orientation of glaciotectonic deformations, till fabric and heavy minerals suggest that both the Lake Simcoe-Kawartha Lakes lobe and the Ontario lobe participated in the formation of these drumlins."

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Richard A. Young, Department of Geological Sciences, SUNY at Geneseo, Geneseo, NY 14454; phone 716-245-5296; fax 716-245-5288; young@uno.cc.geneseo.edu

I have been investigating a potential tectonic/ice-thrust(?) feature within the Clarendon-Lindon fault zone near Linden, NY. Glacial till and bedrock are involved in a west-directed, shallow "thrust-like" structure on the west side of the Dale Valley. The structure is within the N-S corridor of small surface bedrock deformation features and faults compiled on NYSGS open-file structure maps by VanTyne. A trench, 20 feet deep and 100 feet long, exposed a large slab of deformed shale "thrust" westward and separated from undisturbed bedrock by a thin bed of glacial till. Small folds and striated surfaces clearly indicate a westward transport direction. A N-S linear ridge crossing Chaddock Road marked the original topography at the site (borrow pit). The structure appears to be either a feature formed by basal ice transport, or a potential indicator of westward compressional deformation within the Clarendon-Lindon fault zone under an active ice load. The east-to-west motion indicators are difficult to reconcile with a pure glacial origin, but are consistent with the recognized sense of compressional displacement within the fault zone. The Clarendon-Lindon fault/monocline structure has an estimated dip of 35 degrees (eastward) at depth and could conceivably shallow and splay into unrecognized bedding-parallel displacements nearer the surface. Numerous small bedrock faults and folds, whose orientations are consistent with the implied Alleghenian stress field, are exposed throughout the local region, but the potential interactions between the modern stress field and such older structures has not been adequately studied to date.

Dr. Robert Jacobi from SUNY Buffalo, who is actively studying the southern extension of the Clarendon-Linden zone, cooperated in the initial trench surveys and field reconnaissance. Further excavations of other shallow bedrock deformation structures is planned. The area is located close to the active salt solution mining operations that were assumed to be the cause of local earthquake activity within the Clarendon-Linden fault zone in the 1970's.

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Eugene Domack, Department of Geology, Hamilton College, Clinton, NY 13323; phone 315-859-4711; edomack@hamilton.edu

We are continuing our work on Holocene paleoenvironmental reconstructions in Antarctica. We have a cruise aboard the new RVIB Gould in February and March and have two sites to be drilled by the JOIDES Resolution at the same time. On the local front one student is completing a senior thesis on glacial lake varves in the Oriskany Creek Valley and we are beginning a new project on alluvial peat stratigraphy in the Sconondoa and Oriskany Creek Valleys. This we hope to tie into the Holocene records from the finger lakes and green lakes being produced at Syracuse University by H. Mullins and his students.

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More on the Sixmile Creek Pleistocene Beds, Tompkins County, New York.

In June, with a group of students from North Dakota State University led by Allan Ashworth, Vic Schmidt and I resampled the "middle" Wisconsinan organic bed that outcrops along Sixmile Creek southeast of Ithaca. Allan and his students recovered a large assemblage of arctic/subarctic beetle fossils from these samples, which also contain fossils of various contemporary arctic and subarctic plant species. A preliminary report about the new faunal discoveries -- and their botanical counterparts -- was presented by Allan at the October 1997 Annual Meeting of the Geological Society of America (see Abstracts with Programs 29(7): A-37). The fossil assemblages from the Sixmile Creek organic bed, particularly beetles, indicate much colder conditions than those inferred on the basis of biological evidence from temporally equivalent deposits in the midcontinent region of the United States. In an effort to understand this preliminary conclusion better, our research during the winter will focus on obtaining additional AMS radiocarbon ages for single plant and other fossils of paleoenvironmental significance in the Sixmile organic bed. While the insect and botanical evidence is not in conflict (both indicate open, tundra-like conditions), the two available AMS ages, one 27,000 yr BP for a plant of the arctic Dryas integrifolia, the other 33,940 yr BP for a small piece of wood, leave the age of the bed in dispute.

Vic Schmidt assembled a group of Quaternary specialists, including Ernie Muller, Parker Calkin, Art Bloom, Whitney Autin, George Smith, and Norton Miller, in October, to view and discuss his interpretation of deposits exposed along Sixmile Creek, and in particular deposits exposed in a large cutbank. Interest was focused on a probable buried soil, the varve set that occurs above the plant bed (and its correlation with the varve set seen in other nearby exposures in the Sixmile Creek valley), and in the interpretation of various diamictons. We anticipate that more results from these studies will be forthcoming soon.

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John D. Halfman, Damian Herrick*, Nancy Ciszkowski**, and Melissa Potter
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*now at Duke University; **now at University of California, Irvine

Potential paleoclimatic proxies gleaned from Seneca Lake

Over the past few years, my students and I have been investigating the environmental/ paleoclimatic history preserved in the sediments of Seneca Lake. We are primarily pursuing two types of data: (1) high-resolution seismic reflection profiles, and (3) elemental geochemistry of the postglacial sediments. Over 200 km of high-resolution (2-12 kHz) seismic-reflection profiles were collected from Seneca Lake, the largest Finger Lake in Upstate New York, over the past 2 years. The profiles image as much as 30 m below the lake floor. Four acoustic packages were identified based on acoustic character and correlation, when possible, to short (1-3 m) piston cores and surface grab samples. The units are, from oldest to youngest: (1) glacial drift, (2) proglacial rythmites (varves?), (3) previously unidentified slump deposits of the proglacial·materials, and (4) postglacial muds. The slumping probably occurred during or just after deglaciation of the area. Another, but less extensive, acoustic package is typically restricted to water depths shallower than 20 meters and is interpreted as nearshore, early Holocene marls. Subbottom reflectors within the marl are typically obscured by gas. The seismic profiles reveal truncation of reflectors at the lake floor and other evidence for sediment re-working and erosion down to water depths of 50 to 60 meters. An erosional scarp, truncating proglacial and early Holocene units, is also detected at a water depth of 20 meters through out the basin. It suggests that lake levels were 20 meters lower in the past than the present day, low enough to close the basin sometime after the early Holocene. Clearly, more research is required to substantiate the closed basin hypothesis.

Analysis of surface and downcore sediment samples from Seneca Lake (ICP-AES) for selected major and minor elements (calcium, aluminum, iron, magnesium, sodium, potassium, manganese, strontium, barium, and zinc). These were supplemented with bulk carbonate, total organic carbon, water content, heavy mineral and x-ray diffraction analyses. The objective was to discern the primary sediment source to the basin for the upper glacial and postglacial sediments, and the suitability of bulk sediment geochemistry as a paleoenvironmental tool. Two primary geochemical end-members were identified in the sediments: an Al, Fe-rich allochthonous component (clays and iron oxides), and a Ca-rich autochthonous component (carbonates and organic matter). The largest downcore variation in the silicate component is at the glacial / postglacial transition, and is interpreted to reflect a change in source rocks from igneous/metamorphic bedrock to the north and east of Lake Ontario to shales within the drainage basin of Seneca Lake from glacial to modern times. Smaller but significant variability is also observed in the elemental concentration profiles of the sediment core and suggests that sediments have preserved a high-resolution paleoclimatic record. Analysis of more cores is needed to determine the significance of the high-resolution changes.

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Our deep seismic reflection studies on the Finger Lakes are now mostly complete and we have changed our focus to the understanding of Holocene climate change in the northeastern United States. The Finger Lakes region is ideal for this objective because of widespread marl deposits (up to 90% $CaCO_3$) with rapid accumulation (>/m/100 years) rates. In addition, sediments on the bottom of Cayuga and Seneca Lakes are nicely laminated (varved?), and Green lake has long been known to contain varved sediments. Thus, we have the potential to evaluate climate change over the past 10,000+ years on a year-by-year basis!

I currently have four graduate students working with me; two that are quite close to finishing and two new ones. Martin Hilfinger is now completing his M. S. thesis on short (<1m) cores recovered from the deep basin of Green Lake as well as longer (up to 11m) cores from the lake's adjacent wetland. The short cores have provided a valuable calibration of stable isotope results with historical climatic data which we can now use in longer core studies; whereas the wetland cores have defined a number of significant lake level fluctuations at Green lake throughout the Holocene which also define climate change.

Kathy Guiles is approaching the end of her M. S. thesis on high-resolution (2 cm sample interval) stable isotope stratigraphy of deep lake sediments (past 13,000 years) from Seneca Lake. This is a follow-up study to previous work in Seneca by Bill Anderson (Anderson et al., 1997, GEOLOGY) who discovered a major cold paleoclimate following the Younger Dryas.

Matt Kirby is a new Ph.D. student who will be working on Holocene paleoclimates based on a 30.5m long drillcore recently recovered from Green Lakes State Park as part of a NYSGA fieldtrip. This long core extends from the time of glacial Lake Iroquois up to the latest Holocene. Much of the core is beautifully laminated and carbonate-rich which will give Matt an opportunity to develop a truly high-resolution record.

And, finally, new M. S. student Chris Lajewski will be working on short (<1m) cores recovered from all eleven Finger Lakes. He will be looking at calcite concentrations and their stable isotope signature in order to further calibrate our geologic proxy data with historical climate records and to evaluate whether or not global change within the past 200 years has had any effect on the ecosystem of the Finger Lakes.

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The New York State-based research team (BERG) fielded a group for the tenth consecutive year at Bering Glacier in May/June. Projects and people involved are:

1. Don Cadwell, with assistance from colleagues Gary Nottis and Bill Kelly, applied portable seismic techniques, similar to those used for New York State on seismic risk assessment, in an attempt to identify subsurface stratigraphic units beneath a segment of the eastern foreplain. They are planning to report results at NEGSA.

2. Terrane altered by the 1993-95 surge is being mapped by Brian Tormey and Don Cadwell as part of general effort to apply GPS technology as a field mapping technique.

3. P. Jay Fleisher and two undergraduates, Peter Lissitschenko and Jason Dell, continued a multi-year effort to document sedimentation in two ice-contact, proglacial lakes. The project compares rates of sedimentation derived from multi-year bathymetric surveys with amounts of sediments collected in cylinder-style sedimentation traps. The next step will be to apply these rates to thick late-Pleistocene lacustrine sediments in the Susquehanna system to better understand ice-contact lake sedimentation during the retreat of the Laurentide Ice Sheet.

4. Ernie Muller, Jay, and Brian collected from newly-exposed organic horizons in the outwash of the eastern Bering foreplain with hopes of developing a more complete chronology than is currently known.

5. With support from the National Geographic Society, Dorothy Peteet, Ernie and Jay had use of a helicopter on uplands of the western and southern Bering/Steller foreplain in the vicinity of Katalla. In addition to retrieving several promising bog cores, a beach location near the Suckling Hills was found to contain large exotic boulders which will help with the historic problem of interpreting the extent of Bering Glacier. In addition, striated boulders prove through-flow across a col separating the Martin River and Katalla drainages, which is also new information. Neal O'Brien (SUNY-Potsdam) has agreed to look at bog-bottom clays for potential clues to weathering history.

Plans to continue much of this work in 1998, and eventually find application in New York State, are now being made.

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Here is a short note for the Glaciogram. I know this doesn't sound much like surficial, but surficial is integral.

This is the fourth year I, and the Geological Survey, have been working with the New York State Emergency Management Office and the New York State Disaster Preparedness Commission on a multi-year earthquake preparedness project. The emphasis of the SEMO Program is to develop the ability to conduct earthquake loss estimates for scenario events. Specifically, we want to determine expected damages, casualties, shelter needs, and secondary effects, as, fire and toxic releases, and then utilize this information on mitigation and response planning. Major earthquake damage occurs from attenuation of S-waves (shear-waves) as they travel from bedrock into the surficial glacial sediments. As the shear-wave velocity decreases in the unconsolidated sediments (together with a shortened wavelength), there is a corresponding increase in wave amplitude. The increased amplitude produces greater ground shaking and, consequently, increased damage. We are accumulating a wealth of shear-wave data for surficial materials. This data collection is expanding the database for the projection statewide of seismic hazards and obtaining detailed information about the varied surficial materials across New York State.

The NYSGS began with studies from Columbia, Dutchess, Rensselaer, Greene and St. Lawrence counties, New York. A preliminary seismic hazard map for the entire State has been produced, based on the results of these County studies. Onondaga County was selected for study in 1997 because of the ~300,000 people in the greater Syracuse region that live on the Glacial Lake Oneida lake plain. The lacustrine sands and silts are vulnerable to liquefaction. The 1998 study area may be near the downstate populace of NYC!

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