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NEW YORK GLACIOGRAM

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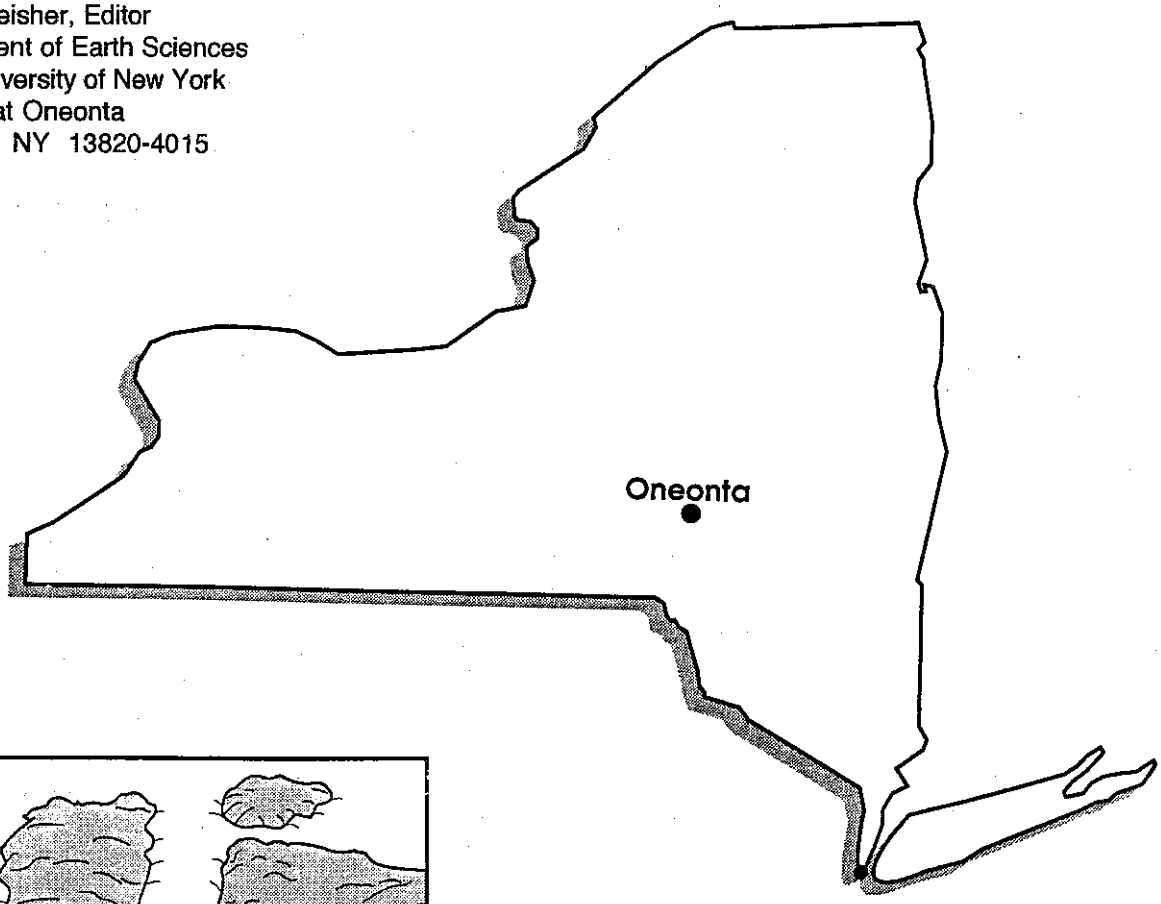

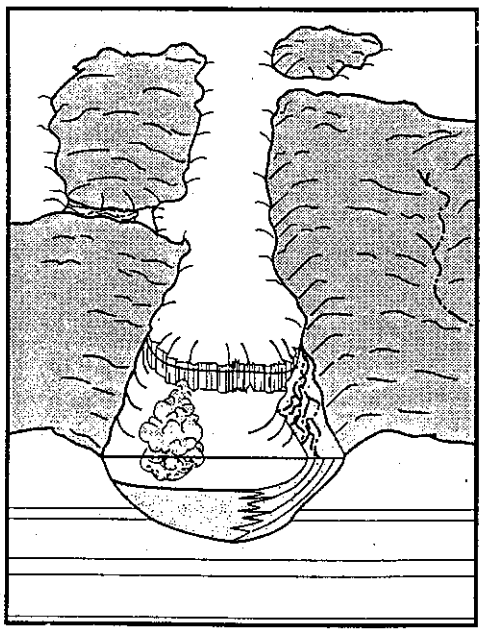

DEPARTMENT OF
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EDITORIAL POLICY

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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INVITATION FROM THE EDITOR

As you may know, the **Glaciogram** contains volunteered notes and project summaries. As the title implies, past issues have contained entries weighted toward Glacial Geology. Perhaps it's time to 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., but to date have not yet been included. Should your area of interest fall within this broader realm, please consider having your work included in the spring edition by forwarding a brief (300-500 words or less) summary at your convenience. Easily duplicated, simple, line diagrams and map figures (sorry, no photos) may also be submitted. Please pass this invitation on to friends and colleagues who may wish to share their work or be placed on the mailing list.

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During the past year the Department of Geology at the University of Akron established an informal Office for Terrestrial Records of Environmental Change based on the overlapping research interests of over half the current faculty. John Peck, our sedimentologist, has received a NSF equipment grant to set up an environmental magnetism lab. This past summer we excavated and sampled all but 1.4 m of the section at Garfield Hts for extensive magnetic analysis. Preliminary work during the spring established that there were major differences among the units. We have also purchased a walk-in refrigerator for storage of his cores from Mongolia and Africa. Lisa Park's students are still evaluating the recovery of Mentor Marsh from brine spillage in the 1960s, and she continues her work on ostracodes in the African lakes. Andy Brayman, one of Ira Sasowsky's students, is performing a detailed examination to determine the age and origin of the sediment in Ohio Caverns in the Bellefontaine Outlier in west-central Ohio. David Steer, in cooperation with the Department of Biology, was awarded an EPA 319 grant to evaluate the effectiveness of constructed wetlands for sewage treatment. Ira Sasowsky received a grant from the same agency to evaluate the hydrogeologic interaction of glacial sediments and the buried karst in northwestern Ohio.

I participated in a local PBS video on the geologic foundations of Tower City in Cleveland. Segments showed coring of fractured tills, methods of laboratory analysis, explanations of the glacial history of northern Ohio, and examination of the glacial grooves on Kelleys Island. It is amazing how 10 hours of tape turn into a 1/2-hour show entitled, "Dirty Little Secrets". The stratigraphic correlations from units beneath Cleveland are established. Illinoian units that correlate with the established stratigraphy farther south near Akron overlie the Ohio shale about 40 m beneath the surface. Late Wisconsinan sediments associated with the Kent advance may be missing and may have been eroded away by the post-Erie Interstade ice advances. These later advances may have been into proglacial lakes trapped between the ice and the Allegheny Escarpment. The whole project has been frustrating in dealing with what engineers considered representative samples from over 75 years ago. They often mention organics in their descriptions but some how failed to sample that part of the sediment containing the organics. DEM files from the Ohio Geologic Survey really demonstrate how complex the paleodrainage system is in northern Ohio. Again, it is evident that there are several different systems that operated at different times.

I. Peter Martini, Dept. of Land Resource Science, University of Guelph, Guelph, Ont. N1G 2W1, Canada, Phone 519-824-4120 Ext. 2488, Fax 519-824-5730, <pmartini@uoguelph.ca> Web http://www.uoguelph.ca/~pmartini/martini.htm

Peter Martini writes: Ongoing is a review of the large unconfined peatlands of the Hudson Bay Lowland and those of central Siberia in collaboration with Russian colleagues. I would be pleased to get in touch with other colleagues who may have up to date information on similar peatland basins of Alaska.

THE CALEDON-GUELPH OUTWASH, ONTARIO, CANADA: ITS ORIGIN, DEPOSITS, AND ECONOMICS, Lesley A. Hymers and I. Peter Martini
(M.Sc. Thesis of senior author)

The Late Pleistocene Caledon_Guelph outwash has developed in front of the Paris Moraine from Caledon to Guelph and to Paris in southwestern Ontario. Its sediments were transported and deposited by braided meltwater streams that flowed quasi-parallel to the front of the Ontario lobe of the Laurentide Ice Sheet. These streams received input of sediment and water from various points along their path, and never developed a graded profile. They were also affected by strongly variable discharge related to variation in thaw in different seasons and from day and night. Occasional bursts of ice-dammed supra- and/or sub-glacial lakes may have triggered short-lived but powerful mega-floods. These events led to a complex distribution of variable deposits of sand and gravel. As a result, these deposits maintain the record of events and processes active in these glacial marginal environments. These sand and gravel deposits were studied in four representative pits: Caledon, Erin, Martini (within the outwash), and the Leslie pit (within an ice-contact zone). Stagnant water conditions are revealed by few local occurrences of silt and fine sand layers. Braided stream conditions, with continuous cutting and filling of channels, is revealed by the alternation of massive sandy gravels and cross-bedded deposits. Evidence of extremely large magnitude floods is recorded by the presence of imbricated coarse boulders, large foresetted deposits, and large channel fills, particularly in the Caledon region. These outwash deposits have been and continue to be a valuable resource (aggregates) for the large nearby markets of Toronto, Hamilton and other minor towns in the region.

LATE WISCONSINAN GLACIOLACUSTRINE SEDIMENTS ALONG THE NORTH SHORE OF LAKE ERIE, Melanie Oakes and I. Pete Martini

The primary aim of this study is to understand the glaciolacustrine processes that were active during the Late Pleistocene at the glacial termini submerged in Lake Erie. The secondary aim concentrates on stratigraphic variations and subsequent soil formation leading to assessing the relationship between human interference on cliff stability in the last 300-400 years and how results have contributed to the development of aeolian dunes in the last two centuries.

The study area is along the north shore of Lake Erie at Sand Hills Park just east of Long Point in Haldimand-Norfolk County. Nine superbly exposed successions of diamicton, sand and silt deposits were studied at this locality to determine if any evidence could be used to establish: 1) whether sediments were transported to this site by seasonal meltwater floods normally occurring at glacial margins, or by a megaflood(s) that was (were) triggered by a catastrophic event such as the sudden break of a glacier dammed lake; 2) whether glaciofluvial/glaciolacustrine sediments were deposited in (a) proximity of a submerged terminus of an active glacier, or (b) whether they were formed in a river cut valley after the retreat of the glacier, and later drowned by rising lake waters as the precursor of Lake Erie was dammed again farther east by the ice sheet.

To establish the most likely genesis for this sedimentary succession, facies assemblages were identified in the field by mapping both lateral and vertical variability (architecture) noting bedding, grain size variations, sedimentary structures and soil variations. Particle size analysis on selected layers help establish paleohydrology and depositing flows. The overall geometry of the deposits between the sandier units and diamicton were correlated in the field and may potentially be explored utilizing ground penetrating radar (GPR) (future state of the research).

PRINCIPLES OF GLACIAL GEOMORPHOLOGY AND GEOLOGY by I. Peter Martini, Michael E. Brookfield, and Steven Sadura, Prentice Hall

PREFACE

We live in an interglacial period when glacier ice covers 11% of the continents. A further 11% of the ground is permanently frozen, 12% of the surface water is frozen, and ice surrounds us in the atmosphere. This sphere of ice (cryosphere) influences all our activities. Changes in average global temperatures by just a few degrees Celsius or changes in insolation at mid-latitudes can either move us into a warmer interglacial time, or conversely plunge us back into a full glacial period. In either case tremendous efforts will be required for mankind to adjust to changing climatic conditions; including dryer conditions in some places, wetter conditions in others, and changes in sea level. All this is nothing new; it has gone on for the last 2.5 million years of recent geological time, and has occurred several times before during the 5 billion years of Earth's history. The so-called "ice ages" occur when the average temperature on Earth is so low (approximately what we have today); during ice ages, small (a few degrees Celsius) temperature changes may force alternating periods of glacial advance (glacial periods) and retreat (interglacial periods). We are now living in the last interglacial period, called the Holocene: a time of rapid change in the last 10,000 years.

Changes bring difficulties, but also opportunities if we are prepared for them. This book aims to help the reader to understand the processes and history of glaciation: how glaciers form and move, what effect they have, when and where they have affected the Earth, and the consequences of ice ages. The approach is to analyze the workings of present glaciers and learn how to "read" the sediments and

landforms left by previous glaciers. To do this we first need to understand how glaciers form and act: this is a field of Glaciology. Then we need to analyze how glaciers and the meltwater derived from them interact with the substrate: how they erode it, how and where they deposit sediments, and what landscapes they develop; this is the field of Glacial Geomorphology. Finally, we need to establish what kind of sediment and rock, past glaciers have left behind, and the history of glaciation they record; this is the field of Geology. These three approaches constitute what we call here the "Principles of Glacial Geomorphology". The reason we use the term "Principles" is because the fundamental processes and their effects are the major focus of the book, rather than detailed analysis of any particular region or environment.

This book is designed for science and non-science students alike who have an interest in natural sciences and in understanding how nature and humanity have been tremendously impacted by glacial events. It is designed for anyone who has completed a first year University geology or geomorphology, and/or some high school science courses. For this reason, the subject matter is approached in a scientific manner, but using a minimum amount of mathematics.

See also http://www.uoguelph.ca/~geology/glacial/glacial.htm

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Our studies on the hanging deltas of the Finger Lakes continue. Cindy Pettit has been working on her M.A. thesis re-examining the delta sequence in the Seneca Lake area. Here an apparently stable outlet at Horseheads, NY, maintained a possible constant-elevation lake as ice retreated rapidly from the Valley Heads Moraines position towards the north. A broad delta complex developed associated with this lake level; subsequent lake-level drops to the Holocene level left a more subtle record of lower deltas. Cindy has completed most of her field work, but analysis is continuing; tune in to a future Glaciogram for a more complete report.

Norton G. Miller, Biological Survey, New York State Museum, Albany, NY 12230;
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In preparing for the second Smith Symposium [Buffalo Museum of Science, 13-15 October 2001], collaborator Richard P. Futyma (The LA Group, P.C., Saratoga Springs, NY 12866) and I polished a manuscript that describes results of our paleoecological studies at the Byron-Bergen Swamp. This environmentally significant wetland, long celebrated for its unique concentration of plant and animal rarities, is a few miles northeast of the Hiscock Paleontological-Archeological Site in Bryon, Genesee County, New York, and about which much new information was presented at the Symposium. Parts of the Bryon-Bergen Swamp are a peculiar mixture of sparsely vegetated marl fens and dense eastern white cedar swamps, the temporal and spatial relationships of which prompted our investigations. We took sediment cores from a fen and a nearby swamp and found the sediment records reversed – marl beneath peat at the swamp site and marl above peat under the fen. Additional sediment sampling along a transect between the two principal study sites showed that the sediment types we recognized thinned laterally and disappeared or appeared and enlarged along the transect. Both cores bottomed out in silts of Lake Tcakowageh. Radiocarbon ages and pollen profiles established relationships between various contemporary vegetation types registered in surface pollen samples and equivalent pollen assemblages from Holocene sediments of different age. One area where marl occurs at the surface has been a marl fen for some 3000 years, on the basis of radiocarbon ages of peat in the sediment cores. Our work establishes that the Swamp did not develop as a lake filled with sediment centripetally, but rather as the result of sediment accumulation along impermanent spring-discharge drainage tracks that flow generally northeastward toward Black Creek near the northern edge of the Swamp. While the sedimentary record of the Byron-Bergen Swamp does not appear to contain at any one place an uninterrupted Holocene sequence, the record supplements that at the Hiscock Site where a long Holocene depositional hiatus has been documented.

We are also integrating and interpreting two of our other unpublished paleobotanical studies of sites near Hiscock – Divers Lake, Town of Pembroke, Genesee County, New York, and the Lamb Archeological Site [R. M. Gramly, The Lamb Site: A Pioneering Clovis Encampment. 108 pp. Persimmon Press. 1999] – with the Byron-Bergen and Hiscock records. A detailed pollen diagram and 12 conventional and AMS radiocarbon age determinations are available for Divers Lake, where a complete late-Pleistocene to Holocene record of vegetation change was recovered. Late-glacial, inorganic sediment at the Lamb Site contains a large suite of plant macrofossils (seeds and fruits of vascular plants; mosses) and is dominated by the pollen of spruce and sedge. There is also a good late-glacial record of pollen and associated plant macrofossils in the basal inorganic sediments of Divers Lake.

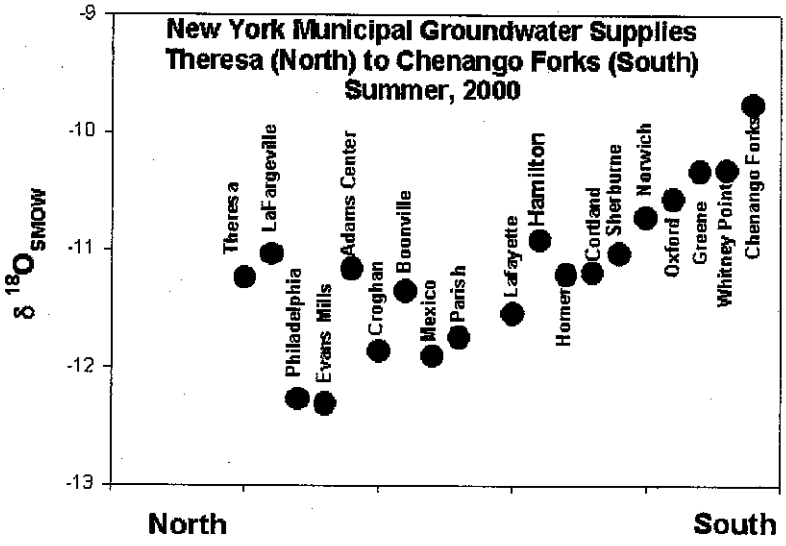
Together these three new data sets augment greatly the previously published results of paleobotanical studies at Hiscock.

A published proceedings volume is planned for the second Smith Symposium.

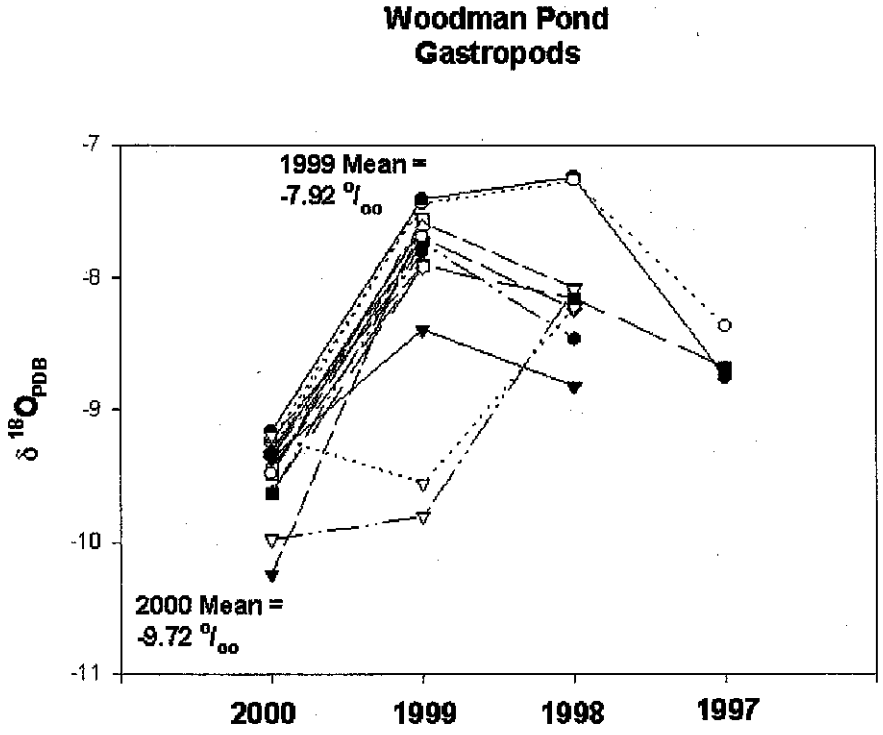
Bruce Selleck, Department of Geology, Colgate University, Hamilton, NY;
bselleck@mail.colgate.edu

Efforts to characterize variations in the stable isotope (D and 18O) composition of central New York waters continue, along with study of year-to-year variations in the isotopic composition of lake water and mollusk shells from Woodman Pond, located near Hamilton, New York.

During the summer of 2000 Colgate undergraduate Ami Parekh collected a suite of municipal groundwater samples along a north-south transect from the St. Lawrence River to the Pennsylvania border. The D and 18O data show depletion in heavy isotopes in areas most influenced by lake effect precipitation (see below). Joe Janick, another Colgate student, has re-sampled a number of the same wells this summer, and has added additional wells to the sampling suite. The goal of this study is to determine if stable isotope character of groundwater recharge varies systematically with regard to lake effect and other inputs, and if other water quality variables (pH, dissolved metals like Hg) also are influenced by lake effect input. We plan to analyze a set of snow samples from the Tug Hill and western Adirondacks this winter to understand the temporal and spatial patterns in snowfall in that part of the study area.



Colgate students Dan Grady and Caroline Olson have completed a study of water and mollusk (clam and snail) shell stable isotopes in Woodman Pond that provides a baseline for continuing annual study of these systems. Dan and Caroline's work, plus data from another study completed in 1999 (hot, dry summer), show that the pond surface water underwent evaporative enrichment in heavy isotopes in both water isotope data and gastropod shell carbonate precipitated that summer. In contrast, 2000 (cool, wet summer) water and gastropod carbonate are, on average, lighter in terms of 18O by nearly 2.5 per mil. Data from unionid bivalves are similar, but annual differences are subdued, perhaps because of the benthic habit of the clams. Carbon isotope data from bivalves suggest changes in either water depth or dietary prefences as the clams grow. The results of this study suggest that stable isotope data from gastropods may be a more sensitive indicator of climate change than bivalve data.



Duane Braun, Geosciences, Bloomsburg University, dbraun@husky.bloomu.edu

In the summer of 2001, we mapped nine 7.5' quads. between Carbondale and Tunkhannock, PA on the Appalachian Plateau and the northern end of the northern Anthracite coal basin. Last year, as noted in a previous glaciogram, we mapped in the Great Bend area just south of the New York State line. This summer we also did some preliminary varve counting in the Great Bend area. There are at least 150 varve couplets (years) exposed at one site and correlation between several sites suggests as much as 300 years of deposition in glacial lake Great Bend before ice readvanced across the lake.

I will be helping host the Field Conference of PA geologists meeting in the Tunkhannock to Great Bend area on October 3-5, 2002. Several stops will be made in the New Milford glacial meltwater sluiceway and within glacial lake Great Bend to discuss the glacial deposits and history of the area. Also evidence negating Shaw's catastrophic floods from the Finger Lakes will be examined in the incised meander reach of the Susquehanna River around Tunkhannock. A pre-meeting Oct. 2 glacial geology trip may be run if 15 to 30 people are interested in hiking up some of the tributary valleys to look at slump exposures showing the lake sediments and over-riding glacial deposits.

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Genesee Valley mid Wisconsin Studies

We have received the results of the 14C analysis on well preserved wood fragments from 85-88 foot depth between the Niagara and Alden moraines as described in the Spring 2001 Glaciogram. The age of 43,300 + 1800 years BP obtained obviously cannot be tied to the surficial topography with any confidence, given the limited well log stratigraphy. However, the similarity of this age to the cluster of like ages of wood from reworked organics in the tills at the mid Wisconsin Elam Site, nine miles to the northeast, suggests that reworking of interstadial materials by younger advances is not limited to a single, rare occurrence. The results at both sites also suggest that the glacial stratigraphy of central NY may have many more complications and much more interesting data to be revealed than the existing literature might suggest.

As NSF funding for a much more ambitious (costly) study does not seem to be a reasonable prospect, I anticipate writing up the results of the work to date on the mid Wisconsin stratigraphy as it currently stands during the next calendar year. The Elam pit has been inactive for most of the last year and access to additional samples seems unlikely in the near future.

David J. De Simone, P.O. Box 272, 957 Babcock Lake Road, Grafton, NY 12082-0272

Recent work in the Vermont Valley has raised a few questions in my mind. Mapping the surficial deposits of the Arlington,VT, quad and VT portion of the Salem,NY, quad was completed early this year under grant from the Vermont Geological Survey. The character of the massive kame moraine unit on the Valley floor, admittedly observered in only limited exposures, exhibited no till. The deposits were entirely stratified sand and gravel with a variable cap of unstratified gravel, sand and cobbles that I attribute to either ablation and/or mass wasting processes. Esker segments and kame terrace fragments form part of this massive unit first mapped by Behling in 1966. This says something about the state of the ice at the time these deposits were made and is consistent with my past mapping further south in the Vermont Valley to Bennington and Pownal and North Pownal. More interestingly, the existence of Glacial Lake Batten in the Valley in the northern portion of the mapped Arlington area has come into question. I could find no fine grained lacustrine sediments - silt and clay - to represent the former existence of an open body of water and I observed no strandline features to suggest a former stable lake level. Final judgment on this question awaits further field mapping which is anticipated to begin in 2002 on the Manchester, Sunderland and West Rupert quadrangles, again under contract to the State of Vermont. The technical discussion of my results is currently available as an open file report with the Vermont Geological Survey.

Like some of you out there I am now in the consulting business full time. My little operation has over the years typically catered to the client with a smaller budget who could not afford one of the established consulting firms. I have been able to handle ground water and landfill cases involving small scales from developers and homeowner associations down to individual homeowners and farmers. That is still true but I am also currently available to handle work for government agencies and subcontracting for larger corporations. So, to conclude this wee bit of advertising, please contact me to serve your needs for consulting work in the geosciences anywhere in New York, New England and Alaska.

In the latter state, I recently concluded my first season of guiding for an adventure travel company, Alaska Discovery, in Juneau. This gave me an opportunity to educate a new audience of clients on the glacial geology, natural history and climatic changes of Southeast Alaska. I greatly look forward to another season of guiding next summer and suggest that if any of your friends or relatives are seeking out an Alaskan adventure they contact me or the above company directly - but be sure to mention my name!

Donald H. Cadwell, New York State Museum, Albany, NY 12230;
dcadwell@mail.nysed.gov

The following is a summary of my current projects:

1. Bering Glacier project:

Jim Albanese (SUNY Oneonta) and I are compiling GPS data to illustrate systematic glacial retreat of Bering Glacier, and the 1993 - 1995 surge. The data is plotted on rectified aerial photo images, and illustrate landform changes to Weeping Peat Island before, during and after the surge.

2. Surficial Geologic Mapping:

I am continuing to compile and digitize (in ArcView) the surficial geology of 7.5 minute quadrangles in the Catskill Mountains. In addition, I am compiling the surficial data obtained during the SEMO Seismic Program, for Westchester, Dutchess, Columbia and Onondaga Counties. This digital surficial geologic information will eventually be available through the Museum website http://www.nysm.nysed.gov

1. Microtextural analysis:

Gordon Connally and I have obtained cores of late glacial lacustrine sediments from the Schoharie Valley near Prattsville (16 ft), the Champlain Valley near Crown Point (51 ft) and near Bridport (15 ft) on the eastern side of Lake Champlain. We will work with Jack Ridge to see how these samples fit his model.

2. The New York State Museum is planning to sponsor the Second Earth Science Workshop, July 8-12, 2002. The workshop will focus on science teachers assigned to teach Earth Science/Physical Setting during the 2002/2003 school year. This workshop is designed to help Earth Science teachers improve Regents Examination scores by becoming more familiar with the geologic environment and geologic history of New York State.

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Robert Titus, Hartwick College, Oneonta, NY 13820

Robert Titus continues to write articles about Catskill geology, especially ice age geology, for Kaatskill Life magazine and the Greenville Press. Titus has been doing most of his recent glacial work at North/South Lakes State Park. The first edition of his book "The Catskills in the Ice Age" has sold out and a second edition will be published by Purple Mountain Press in 2002. He is participating in the preparation of a documentary on the Natural History of the Southern Tier for WSKG-TV in Binghamton, and part of that program will be about the glacial geology of the Catskills.

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QUATERNARY GEOLOGIC MAP OF THE HOLLEY, NEW YORK 7.5-MINUTE QUADRANGLE

The Holley, NY 7.5-minute quadrangle has been the study area for the Geologic Mapping Team of the State University of New York, College at Brockport. This area is covered with mostly Quaternary deposits, including moraine and drumlin features interfingered with wetland areas. Numerous ice stagnation areas are interspersed across the map, and a prominent kame delta occurs on the eastern fringe of proglacial Lake Tonawanda.

The Holley area is crossed by the east to west trending Silurian Lockport escarpment The Clarendon-Linden fault zone traverses the area from north to south, and produces a composite fault scarp. Each of these bedrock features probably affected patterns of glacial erosion and deposition. Drumlins east of the fault scarp are partially buried by recessional glacial deposits and are better exposed west of the fault scarp. Moraines are cross cut by stratified deposits of the kame delta which formed as channels discharged meltwater to Lake Tonawanda.

Quaternary geologic maps are compiled using integrated geomorphic and stratigraphic techniques. Correlations between topography, surficial sediments, and soils are the primary criteria for Quaternary map unit identification and delineation. Landforms are initially delineated using satellite images, topographic maps, and Soil Survey data. In the field, lithofacies are correlated to mappable landform areas by describing profiles from exposures and hand augered borings. Mapping data are integrated into ARCVIEW-GIS for distribution of both paper maps and a CD of the project data and report.

This project helps undergraduate geology and water resources majors learn collaborative map compilation and production. Undergraduate researchers were able to investigate the dynamics of glacial processes, the evolution of post-glacial flood plains, and mechanisms of active tectonics in the region.

The results of this project provides impetus for continuing research in two areas. First, Heidi Natel is expanding the analysis of ancestral Lake Tonawanda into her Master's thesis project at SUNY Oneonta. Second, the Geologic Mapping Team of SUNY College at Brockport is applying for another project to map the Brockport quadrangle.

Leah Joseph and John Halfman, Environmental Studies, Hobart and William Smith Colleges, (315) 781-3954, Ljoseph@hws.edu

Mid-Holocene climate transition

Micah Nicolo, a recent Hobart graduate, is getting ready to present the results of his year-long Honors study of Seneca Lake sediment at GSA in Boston (his first national conference!). This project involves the analysis of high-resolution seismic profiles and Holocene sediment from piston cores obtained by the *H-WS Explorer* in Seneca Lake. The seismic profiles were used to determine the overall thickness of Holocene sediment and to potentially delineate the early and late Holocene sediment packages, information that aided us in coring site selection. Once cored, described, and analyzed, stratigraphic correlation of magnetic susceptibility, carbonate, water content, and total organic carbon analyses of six piston cores, investigated the relative thickness of early and late Holocene strata to compare to the seismic sections.
Results indicate that early Holocene sedimentary sections are truncated predominantly more than late Holocene sedimentary sections. Such selective truncation of early Holocene sediment suggests that atmospheric circulation, as well as the greater environmental system, became more dynamic in the Finger Lakes region of the northeastern United States at the mid-Holocene, possibly in relation to cooler surface air temperatures and an associated southward shift in the jet stream. Stratigraphic correlation of calcite profiles to three established and dated intervals of the early Holocene (Anderson et al., Geology, 1997), suggests that climate abruptly changed after or near the mid-Holocene hypsithermal and effectively created a gap in the sedimentary column representing ~7-8.5 ky in the shallowest cores.

John A. Rayburn, Dept. of Geological Sciences, Binghamton University (SUNY), Binghamton, NY 13902, jrayburn@binghamton.edu, http://amadeus.geol.binghamton.edu/~rayburn/

I continued my field work in the Lake Champlain Valley during this past summer. A new and interesting discovery occurred when Dave Franzi (SUNY Plattsburgh), Pete Knuepfer (SUNY Binghamton) and I took a pair of short (~ 1 m) cores from a recent landslide exposure along the Salmon River (just south of Plattsburgh, NY). The stratigraphy of the exposure represents, we suspect, the lacustrine-marine transition (Glacial Lake Vermont - Champlain Sea). The section contained small (~1mm) laminated clay layers (varves?), and shell fragments were visible in the uppermost laminae. What was truly interesting was the discovery of one thin red layer that appeared roughly in the middle of both cores. A careful re-examination later in the summer of a better exposure - a bluff along the shore of Lake Champlain at the old Plattsburgh Airforce Base about 5.5 km northeast of the Salmon River site - revealed that there was a laterally continuous red layer there too, at approximately the same stratigraphic position. I am currently trying to see how well the stratigraphy from these two sites correlate, and what they may tell us about the lacustrine-marine transition. Last year I recovered fossil birch seeds from the Airefore Base site at a stratigraphic position about half a meter below the transition. I will continue looking for plant macro fossils in both of these section, and Catherine Yansa (University of Wisconsin - Madison), will take sub-samples for pollen analysis.

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After a summer of teaching for a month in Australia and working on an Ohio Keck Project with Greg Wiles and Tom Lowell, I now hope to get back to my New York research this summer. STATEMAP efforts have continued with the completion of the Spafford quadrangle. B.S. thesis student Julie Engel (now a GIS person for Rensselaer County, NY) is a coauthor on the map and used ArcInfo for the maps and interpretations. She presented her results at last year's NE-GSA in Burlington, VT. This summer will hopefully extend the completed 7.5' mapping in Onondaga County eastward to the Oran and DeRuyter quads. In addition, I hope to use all the surficial and bedrock quad data now being GIS'd to try to quantify possible relationships between bedrock lithology and glacial sediments/landforms. In other news, the volume with the Tully Valley paper (with Bill Kappel) from the "Geomorphology in the Public Eye" geomorphology symposium seems to be moving through the final stages of publication.

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I finally turned in the last chapter of my dissertation about the North Branch of the Susquehanna River, running 303 pages minus bibliography. There are a total of 139 radiocarbon dates for samples from the alluvial deposits. Three dates from purely geological contexts mark the Pleistocene-Holocene boundary while as yet the only late Pleistocene outwash date is the one on mastodon bone from the Chemung River reported in 1971 by Donald Coates (GSAB, v. 82, p. 2005-2010). Most of us have been writing off the earliest alluvial contexts as continually reworked by high-energy braided channels but I am beginning to reconsider. We might at least develop alternative theoretical models of river response to abrupt warming episodes such as the Allerød. Isolated paleochannel remnants or slackwater deposits may show up. We have only begun to touch most of the tributary valleys, alluvial fans, or colluvium in terms of either chronology or archaeological potential.

I have reported some relatively well-developed buried soils formed in stratified alluvium and characterized alot of these with thin-sections and other laboratory results. I do not have a "chronosequence," however, because of wide variation in both grain size and the length of time material was exposed at the land surface. I measured magnetic susceptibility for a total of 54 samples of rock, soil, or sediment. Once again, there was a poor match with either age or depth below surface. Recent floodplain silt and very young soils had higher susceptibility than any of the rock samples and most of the samples from buried soils. The highest susceptibility measured was for a sample from a soil formed in pre-Illinoian till, however. I collected this during the FOP trip Ben Marsh ran out of Bucknell in 1999. This suggests magnetic susceptibility may be very useful for studying the true paleosols of the Pleistocene. I hope to pursue this in the future and apply some more sophisticated magnetic mineralogy techniques to Holocene problems.

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Two ongoing projects involving glacial geological research have held my interest and attention in recent months.

With Jay Fleisher, Matt Lachniet and other BERGers (Bering Glacier Research Group), I returned to Alaska in July to monitor Bering Glaciers rapid recession since the surge of 1993-95. By study of till microstructure in surfaces recently exposed we seek better understanding of dynamics of till lodgement and recognition of subsequent till deformation.

With Parker Calkin and Keith Tinkler, I summarized geomorphic history of western New York as an opening paper in Smith Symposium II at the Buffalo Museum of Science. A score of papers followed, treating many aspects of 15 years research related to the Hiscock Mastodon Site near Byron (Genesee County). As was the case after the first Smith Symposium in 1996, publication of these papers may be expected in due course. Coupled with recovery of mastodon and mammoth skeletal remains near Hyde Park (recently featured on the Discovery Channel) and north of Horsehead (see displays at Paleontological Research Institute in Ithaca) proglacial paleontology has been unusually productive in the past few years.

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We completed the second year of our Research Experiences for Undergraduates program which is sponsored by the National Science Foundation, William H. Miner Agricultural Research Institute and Plattsburgh State University. The program involved an interdisciplinary investigation of ecosystem-level processes in the sandstone-pavement jack pine barrens in northeastern New York. This year's program featured six integrated research components; surface and ground water hydrogeology, forest biogeochemistry, and forest, wetlands and aquatic invertebrate ecology. We had a very successful summer field season and are looking forward to presenting our work at appropriate regional or national meetings. I hope that my glacial and environmental geology colleagues will look for our REU posters at the Northeastern GSA meeting next spring. More information about the Plattsburgh REU program can be found at our website: http://faculty.plattsburgh.edu/david.franzi/PSURP/PSURPindex.htm

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Lake Ontario. I continue work on seismic profiles from Lake Ontario which document the architecture of Quaternary sediments and the bedrock surface. In areas of thin sediment cover over shale formations, the profiles reveal bedrock structures in the upper 10-20 m. Bedrock faults and pop-ups in one area south of Toronto are being analysed currently in collaboration with Bob Jacobi, University at Buffalo, and Derek Armstrong, Ontario Geological Survey.

Canadian Geophysical Union meeting, May 14-17, 2001, Ottawa. With Thane Anderson, Canadian Museum of Nature, and Bob Mott, Geological Survey of Canada, we re-dated the onset of organic sedimentation to 9.5 ka in Turtle Lake near North Bay, Ontario, using AMS C-14 dating of terrestrial plant seeds from basal gyttja sediments. This result invalidates previous bulk sediment dates of 11.5 ka and 11.3 ka, which were cited as constraints in some previous ice sheet retreat models. The younger age favors the younger chronological model formulated by Paul Karrow and associates for the 10.5-10 ka drainage of glacial Lake Algonquin; it also suggests the Younger Dryas ice margin was close to North Bay, Ontario.

I presented an empirical quantitative model of relative differential glacio-isostatic rebound throughout the Great Lakes region based on the present deformed configurations of the Iroquois, Whittlesey, Algonquin, Nipissing, Minong, Washburn, and Wisconsin paleo-lake shorelines. This model facilitates the digital backtilting of the present topography and bathymetry in geographic information systems for reconstruction of lakes and terrain for any postglacial age.

Were the Great Lakes once hydrologically closed, impacted by an early-middle Holocene dry- climate? This question is posed by colleague Steve Blasco and myself based on new findings of submerged tree stumps and former beaches on the sill between Georgian Bay and Lake Huron, and new interpretation of beach sediments deep in the eastern Lake Erie basin. A reconstruction of the original elevations of water level evidence for 7.6 ka using the above model for removing glacio-isostatic uplift indicates that lake levels were several metres to 10s of metres below possible overflow sills. Closed-lake status of the Great Lakes is consistent with the recent discovery that southern Lake Winnipeg to the west had dried up between 8 ka and 4 ka (see August 2001 issue of *Geology*). Thus we hypothesize that, at times, dry airflow from the west has blocked moist Gulf air from the south, desiccated Lake Winnipeg, and continued eastward to impact the Great Lakes, possibly forcing them into a hydrologically closed state. We suspect other evidence, both pro and con, exists bearing on this idea. We would welcome hearing about it. We are thinking a workshop should be held to explore all lines of evidence, and whether a project to corroborate the hypothesis is worthwhile. Such a study would illustrate the sensitivity of the Great Lakes water balance to climate change; its societal value is in the context of global warming in which temperatures of the Great Lakes region are projected to rise and water levels to fall relative to present conditions.

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I'm glad to finally be able to announce that USGS Professional Paper 1415B, entitled "Hydrogeologic framework of stratified-drift aquifers in the glaciated Northeastern United States", has been printed. I haven't actually seen a copy yet, but I'm told that copies should be available any day now. This paper explains several concepts that are widely applicable in interpreting aquifer geometry in the glaciated northeast, divides the study area into several "hydrophysiographic regions", and describes distinctive features of each. It is one of the major products of the Regional Aquifer Systems Analysis (RASA) project that has occupied much of my time since 1983. Hydrogeologists new to the glaciated northeast may find it helpful in getting up to speed. It may also have applications in academic courses that cover regional hydrology.

I'd like to take this opportunity to also call your attention to another RASA product, the latest and most sophisticated in a series of reports (beginning with the 1966 article by Mendall Thomas in USGS Prof Paper 550B) which demonstrate that the extent of surficial coarse-grained stratified drift and alluvium in a watershed, relative to surficial till, lake clay, and bedrock, is the principal factor controlling the magnitude of streamflow under dry or drought conditions. USGS Water-Resources Investigations Report 93-4092, by S.W.Wandle and A.D.Randall, entitled "Effects of surfical geology, lakes and swamps, and annual water availability on low flows of streams in central New England, and their use in low-flow estimation", was published in 1994. Like all USGS publications, it should be available from USGS Information Services, Box 25286, Denver Federal Center, Denver, Colo. 80225-0286. I still have a few copies left. If you order this one, be sure you also get the 3-page errata sheet dated July 1997, which calls attention to 8 minor errors; I can provide copies.

As my career with the USGS winds down, it looks like the final chapter will be on bedrock hydrology, in the Susquehanna River basin and in other locations where clusters of domestic wells tap bedrock. But I'll still be interested in what other Glaciogram contributors are doing and learning about the history and depositional architecture of the Quaternary.

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Most of what has transpired since the Spring Issue of Glaciogram involves continued efforts on projects underway in Alaska, but with application to central NYS. Field work at Sheridan Glacier, initiated in 1999 and continued through 2001, has two primary objectives. With colleagues Palmer Bailey (U.S. Army retired and CRREL) and Jim Albanese (SUNY-Oneonta), plus the efforts of two Oneonta students (Jeremy Wyckoff and Fred Krone, 2001) we are mapping the ice front position in Sheridan Lake and developing a detailed bathymetric map of the lake basin. As a data base for future

work and for comparison with similar ice-contact environments at Bering glacier, we devoted a week in late June and early July to refinement of information collected in previous years and the addition of new depth information along the ice front in general and within an anomalous ice-front notch in which bottom depths plunge from 70 m to 125 m along a horizontal distance of less than 100 m. We are interested in determining how this abrupt deepening relates to subglacial discharge in a lake with less than normal suspended sediment load. In contrast, fresh water lakes in which Bering Glacier fronts carry X.X g/L derived from upwelling vents on the ice front.

The BERG group (Bering Glacier Research Group, based at SUNY-Oneonta) was back on the scene for the 14th consecutive field season on the eastern ice front. While continuing to monitor rapid changes in ice-contact lake depositional conditions in post-surge years (surged from 1993 to 1995), our 2001 efforts concentrated on several projects.

• mapping the bathymetry (with Palmer Bailey and Jim Albanese) of what remains of the two ice-contact lakes that fronted the glacier prior to the surge. From annual bathymetric surveys we are measuring sediment flux and rates of glaciolacutrine sedimentation. Tsivat Lake, which in 1994 received outburst sediments and house-size ice blocks, was entirely filled with 23.5 million cubic meters of sand and silt from ice front vents between 1997 and 1998, while 14.1 million cubic meters were bypassed to Tsiu Lake basin. In the two years that followed, an additional 12 million cubic meters accumulated in the form of a rapid delta aggradation in Tsiu Lake, which continues to lose volume to dynamic sedimentation.

• GPS mapping of the retreating ice front by Jim Albanese and Don Cadwell contributes to the ongoing measurement of rate of retreat from the 1995 surge limit. A third field season of surface ablation measurements yielded down wasting rates of 4 cm/day on overcast, cool days and 8 cm/day on sunny, warm days.

• additional foreland stratigraphic information investigations continue to yield macro and micro-scale evidence for deformation by overriding ice. Working with Ernie Muller and Matt Lachniet, we are developing an extensive and impressive body of information currently being put into manuscript form.

• undergraduate student projects focused on hlaup sediments and landforms on two sandars (Fred Krone) and detailed descriptive work on physical stratigraphy of foreland outwash (Jeremy Wyckoff), all of which is targeted for a poster at NEGSA next spring.

Field season ended in late July, followed by a concentrated period of grant writing in hopes of finding the funds to do it all again in 2002.

I don't think it is premature to announce that I am working with Peter Knuepfer on plans for a 2002 Binghamton Geomorphology Symposium dealing with Ice Sheet sedimentation and landforms in light of recent work in Antarctica and Alaska.

And finally, in 2003 the NYSGA field trip meeting will return to Oneonta to be co-hosted by SUNY-Oneonta and Hartwick College.