



## New York State Geological Association

81<sup>st</sup> Annual Meeting  
New Paltz, New York  
September 25-27, 2009



### Event Schedule, Field Trip Descriptions and Registration Form

[www.newpaltz.edu/geology/nysga](http://www.newpaltz.edu/geology/nysga)  
Revised August 12, 2009

#### EVENT SCHEDULE

##### Friday, September 25

- 5:30 – 8:30 pm Registration, SUNY New Paltz College Terrace
- 6:30 – 8:30 pm Welcoming Reception, SUNY New Paltz College Terrace

##### Saturday, September 26

- 7:00 - 8:00 am Registration and Bag Lunch pickup, Wooster Science Building
- 8:00 am Field trips depart from lots adjacent to Wooster Science Building
- 6:30 - 8:30 pm Banquet and Keynote address: "*The Impact of Appalachian Orogenies on America's Midcontinent*" by Stephen Marshak, University of Illinois, Urbana. SUNY New Paltz Terrace

##### Sunday, September 27

- 7:00 - 8:00 am Registration and Bag Lunch pickup, Wooster Science Building
- 7:30 am Field Trip 9 leaves from lot adjacent to Wooster Science Building
- 8:00 am All other Field trips depart from lots adjacent to Wooster Science Building

*We strongly encourage participants to car pool for the field trips. Car pooling not only conserves energy, it helps alleviate concerns about long car trains and limited parking at outcrops. We greatly appreciate universities and other institutions with access to vans who can make extra seats available to participants.*

#### FIELD TRIP DESCRIPTIONS

##### Saturday, September 26

###### **Trip 1 - Structures of the Hudson-Valley Fold-Thrust Belt in the Appalachian Foreland of Eastern New York**

*Leaders: Stephen Marshak (University of Illinois, Urbana), Kurtis C. Burmeister (University of the Pacific), Pragnyadipta Sen (University of Illinois, Urbana), Petr Yakovlev, and Yvette Kuiper (Boston College)*

Outcrops west of the Hudson River in the central Hudson Valley, NY, provide excellent exposures of a thin-skinned, foreland fold-thrust belt. This Hudson Valley fold-thrust belt (HVB), which involves Late Silurian through Middle Devonian strata, is generally less than 4 km wide. Thus, first-order structures are small enough to be seen in their entirety. Also, within a short distance along strike, it is possible to examine changes in fold-thrust belt architecture that reflect along-strike changes in stratigraphy and across-strike strain. The HVB also provides exposures of the Taconic unconformity, mesoscopic structures, Lower Devonian faunas and shallow-marine carbonate facies, an orocline, and a context for considering orogenic timing and the transition between the central and northern Appalachians. This trip will begin at classic Route 23 roadcuts near Catskill, will proceed south to examine deformation features near Kingston, and will conclude near Rosendale. The trip includes visits to roadcuts, stream cuts, abandoned room-and-pillar cement mines, and open-pit quarries. This trip is a modification of a trip that the lead authors ran for the 2006 Geological Society of America meeting.

## **Trip 2 - Hydrothermal Alteration, Mass Transfer and Magnetite Mineralization in Dextral Shear Zones, Western Hudson Highlands, NY**

*Leaders: Michael J. Kalczynski, Alexander E. Gates (Rutgers University, Newark), Matthew L. Gorrying (Montclair State University), and Marian V. Lupulescu (New York State Museum).*

The New Jersey and Hudson Highlands host thousands of iron deposits. This trip will focus on several iron oxide deposits located within New York's Harriman State Park. These hydrothermally mineralized, massive magnetite deposits formed in an open fracture system within ~NE trending shear zones, in crystalline rocks of the western Hudson Highlands. Metamorphic fluids flushed through fractures and reacted with wall rocks, mobilized elements and buffered the composition of the fluids depending upon the composition of the local country rock. As these fluids encountered favorable physical or chemical conditions, they deposited varying minerals, in cm-scale bands of different assemblages and compositions. The banding reflects the changing chemistries of the fluids from changes in flux, fluid source, and/or physical conditions. Stops will include several of the abandoned magnetite mines, as well as outcrops both inside and out of the ~NE trending shear system to examine differing structures and lithologies, in and adjacent to the iron deposits and shear zones. *Note: Some hiking required.*

## **Trip 3 - Stratigraphic and Structural Relationships of the Ordovician Flysch and Molasse Along the Western Boundary of the Taconic Allochthon Near Kingston NY**

*Leader: Gerald Pratt (New York State Department of Environmental Conservation)*

This trip will visit recently described exposures of the allochthonous Ordovician Normanskill Group juxtaposed against autochthonous Quassaic and Martinsburg sedimentary rocks. Exposures in the Kingston and Esopus Townships demonstrate through stratigraphic position, sedimentary structures and fossils, the collapse of a foredeep basin and subsequent downwarping of a foreland basin during the latest stages of the Taconic Orogeny. The trip includes several stops at outcroppings of the allochthon strata, Taconic Unconformity and the later arenites of the Quassaic which contain an unusual molasse facies.

## **Trip 4 - Deglaciation in the Southeastern Laurentide Sector and the Hudson Valley - 15,000 Years of Vegetational and Climate History**

*Leaders: Dorothy Peteet (Lamont Doherty), Kirsten Menking (Vassar), Guy Robinson (Fordham), John Rayburn (SUNY New Paltz), and Byron Stone (United States Geological Survey).*

The history of deglaciation in the Hudson Valley is extremely controversial, with disparate data sets revealing chronologies of deglaciation ranging from 23 to 15 kyr. This full-day excursion explores the various types of sites used for chronology, ranging from moraines, lakes, swamps, and bogs to varve outcrops. Important features to be discussed are stratigraphic sequences, landscape reconstructions from plant and animal macrofossils, Be dates from glacial erratics, and the nature of abrupt shifts in climate. We will discuss major regional vegetational shifts at the Younger Dryas, the early Holocene, the Medieval Warming, and the Little Ice Age. At least five stops are planned, ranging from Lake Mohonk and Rhododendron Swamp (adjacent to a Native American Rockshelter), Pine Island Mastodon region, Croton Peninsula, and Iona Marsh on the Hudson. *Note: Bring boots.*

## **Trip 5 - The Use of Imagery in Popular Geoscience Writing About the Ice Age History of North/South Lake State Park**

*Leader: Robert Titus (Hartwick College)*

The Ice Age provides endless wonderful popular writing for a geologist. To communicate the nature of the Ice Age to the general public, it is appropriate to explore the use of the very graphic images that can be imagined for that time. The North Lake vicinity experienced a complex glaciation. The trip will visit a number of sites that display the evidence and ice age images will be constructed. The hope is to develop better ways to communicate our science to the community around us. Robert Titus is the author of *The Catskills in the Ice Age*, *The Catskills: A Geological Guide*, and *The Other Side of Time: Essays by "The Catskill Geologist"* published by Purple Mountain Press. *Note: This trip involves extensive hiking, participants must be physically fit and prepared for a full day of hiking.*

## **Trip 6 - Economic Geology of the Hudson Valley**

*Leaders: Paul Griggs, Jeff Lang (Griggs-Lang Consulting Geologists)*

The geology of the Hudson Valley has shaped the industrial history of New York State. The combination of access to the New York City Metropolitan area via the Hudson River and the presence of materials suitable for aggregate and cement manufacture are responsible for the presence of a number of large mines in the Hudson Valley. This trip will visit the only active underground aggregate mine in New York, examine those endangered species--sand and gravel mines and conclude with the Holcim (US) Catskill and Greenport Quarries. The trip will discuss the storied history of cement making in the Hudson Valley and critical shortages of construction materials. Angular unconformities, the classic Tri-States and Helderberg

Group stratigraphy and their significance in the cement-making process, 800 foot deep rock cores, dramatic thrust faulting and karst features will be examined as the role of the geologist in mining is explored.

## **Sunday, September 27**

### **Trip 7 - The Classic Devonian of the Catskill Front: The Foreland Basin Record of Acadian Orogenesis, Volcanism, Depositional Environments, and Sea Level History**

*Leader: Charles A. Ver Straeten (New York State Museum)*

This field trip is designed to present an overview of the classic Devonian and uppermost Silurian strata of the Catskill Front, and key events and processes preserved in them. A thick wedge of Devonian clastic rocks, with minor carbonates lower in the section, were deposited in the area of the Catskill Front over a period of approximately 42 million years (418 to ca. 376 Ma). The preserved part of this succession today, between Catskill and Slide Mountain, comprises approximately 2.7 km/1.7 miles of Uppermost Silurian and Lower to Upper Devonian strata. Sediments were initially deposited in marine environments in the Appalachian foreland basin. By the Middle Devonian, the seaway became progressively overfilled with synorogenic clastics shed off of the Acadian Orogen in New England. This resulted in a very thick succession of terrestrial environments that preserve the oldest and most intensively studied forests known in the world at present. The trip will make stops in various marine and terrestrial units, and examine the record of Acadian orogenesis, volcanism, and sea level and environmental change through the rock succession. *Note: Some hiking will be required, wear appropriate footwear.*

### **Trip 8 - Fluvial Geomorphology of Upper Esopus Creek and Implications for Water Quality**

*Leaders: Dan Davis, Peter Knuepfer (Binghamton University), Mark Vian (New York City Department of Environmental Protection), and Nicolas Miller (Field Geology Services)*

The upper Esopus Creek watershed is an important contributor to the drinking water supply for the New York City water system. Water quality in Ashokan Reservoir is strongly linked to sediment transport in Esopus Creek, and bank erosion and channel migrations can greatly change (especially increase) sediment transport rates and suspended sediment loading. This trip is a tour of the upper Esopus Creek watershed to examine evidence of changing fluvial geomorphic conditions and their implications for effective and multi-objective watershed and stream management strategies. How does erosion into the proglacial lake clays and glacial till affect water quality and channel stability? How much has the channel shifted historically, and why? Can we effectively manage for these conditions? This one-day trip will visit several sites that represent a range of channel/valley morphologies and processes, different states of channel evolution, and different management strategies.

### **Trip 9 - Pre-Ottawan (1100 Ma) Rocks and Tectonic Infrastructure of the Hudson Highlands and Manhattan Prong**

*Leaders: Nicholas M. Ratcliffe and John Aleinikoff USGS (United States Geological Survey)*

This trip will visit 8 recently dated pre- Grenville rocks of the northern Hudson Highlands and Manhattan Prong which support intrusive and tectonic events in the time period 1350 Ma to 1134 Ma., which are older than the 1.09 Ma Ottawan orogeny of Rivers (1997). Zircon SHRIMP data and geologic mapping support a long history of intrusive activity and deformation prior to the Ottawan. This older infrastructure also occurs in the Green Mountains and gneiss domes of Vermont and probably elsewhere in the northern Appalachians. The two known areas provide linkages with similar intrusive and deformational events in the Grenvillian of the Adirondacks and Canada. The trip starts near Luddingtonville, NY and ends north of Peekskill on the Hudson River close to the Bear Mountain Bridge. Stops will be in the Poughquag, Lake Carmel, Brewster, Peach Lake, and Peekskill NY quadrangles. Please bring lunch. *Note: This trip will begin at 7:30 am. The first stop will be at 8:45 am at I-84 Exit 17 opposite west bound entrance ramp. The trip will end north of Peekskill.*

### **Trip 10 - Analysis of a Basin-Margin Parallel Paleocological Gradient in the Middle Devonian (basal Givetian) of the Appalachian Basin**

*Leaders: Alexander Bartholomew, Thomas Schramm (SUNY New Paltz), Charles A. Ver Straeten (New York State Museum)*

This trip will examine a suite of exposures focusing on the paleoecology of the dark shales of the Marcellus sub-Group, an interval of recent economic interest. Participants will examine exposures of the East Berne Member of the Mount Marion Fm., focusing on the paleoecology a single fossiliferous horizon, the Dave Elliot Bed. This bed is the first richly fossiliferous horizon above the Cherry Valley Member and preserves the oldest known suite of biofacies composed of the classic Hamilton Fauna of the Middle Devonian Appalachian Basin. Biofacies preserved within the Dave Elliot Bed interval range from deep-water, dysoxic, dark-gray shales to shallow-water, coral-rich assemblages.

### **Trip 11 - The Classic Barrovian Metamorphic Sequence of Dutchess County and Its Structural and Stratigraphic Context in the Taconic Orogeny**

*Leaders: Jeffrey Walker (Vassar) and Frederick Vollmer (SUNY New Paltz)*

This trip will visit classic localities exhibiting regional progressive metamorphism in Dutchess County, New York, from the Hudson River near Poughkeepsie east to the Connecticut border. The index mineral zones include chlorite, biotite, garnet,

staurolite, kyanite and sillimanite-K-feldspar, following the classic Barrovian sequence. This sequence results from the progressive metamorphism of Ordovician pelites exposed in, and below, the Taconic Allochthon. Cambro-Ordovician shelf carbonates and sandstones are also exposed and show similar progressive metamorphism. In contrast to “classic” sequences, disequilibrium assemblages, including coexisting kyanite and sillimanite, are present. The majority of stops will be in metapelites and quartzo-feldspathic rocks, however we will also examine some calc-silicates (diopside, tremolite, phlogopite) to compare metamorphism of the different protoliths.

**Trip 12 - The Shawangunk and Martinsburg Formations Revisited: Sedimentology, Stratigraphy, Mineralogy, Geochemistry, Structure and Paleontology**

*Leaders: Howard R. Feldman (American Museum of Natural History), Jack Epstein (United States Geological Survey), and John A. Smoliga (Boehringer Ingelheim Pharmaceuticals)*

This trip will look at the relationship between the early Paleozoic Martinsburg and Shawangunk formations with respect to origin and tectonics, examine the general structure of the region and observe various faults, an enigmatic “diamictite,” glacial features and sulphide mineralization related to faulting. We will have a discussion of the regional and local relations of the Ss/Om unconformity, with perhaps a stop atop The Shawangunk ridge. In addition we will visit an Ordovician faunule in the Martinsburg dominated by crinoids, with brachiopods, trilobites, bivalves, ostracodes and conulariids.

**REGISTRATION FORM**



# New York State Geological Association

**81<sup>st</sup> Annual Meeting  
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First Name	M.I.	Last Name
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Institution or Company	Department		
Street Address	City	State	Zip
Phone	e-mail		

Check one:

<input type="checkbox"/> Professional (\$70)	<input type="checkbox"/> Student (\$40)	<input type="checkbox"/> Student without Guidebook (\$20)	<input type="checkbox"/> Trip Leader (\$0)	<b>Amount</b>
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Registration includes two Field Trips, the Welcoming Reception (Friday, 6:30 pm, College Terrace), and, for most, the Guidebook. Registration does **NOT** include the Banquet or Lunches (see below for prices).

**Field Trips** - Registration includes one (1) Saturday and one (1) Sunday trip. Availability on some trips may be limited, please select your first and second choices for each day. See Field Trip Descriptions for trip information.

<b>Saturday, September 26</b>	<b>Abbreviated title</b>	<b>1<sup>st</sup></b>	<b>2<sup>nd</sup></b>
Trip 1 Marshak/Burmeister/Sen/Yakovlev/Kuiper	Structures of Hudson-Valley fold-thrust belt	<input type="checkbox"/>	<input type="checkbox"/>
Trip 2 Kalczynski/Gates/Gorring/Lupulescu	Mineralization, shear zones, Hudson Highlands	<input type="checkbox"/>	<input type="checkbox"/>
Trip 3 Pratt	Stratigraphy and structure, Ordovician, Kingston	<input type="checkbox"/>	<input type="checkbox"/>
Trip 4 Peteet/Menking/Robinson/Rayburn/Stone	Deglaciation, SE Laurentide and Hudson Valley	<input type="checkbox"/>	<input type="checkbox"/>
Trip 5 Titus	Imagery in geoscience writing, Ice Age	<input type="checkbox"/>	<input type="checkbox"/>
Trip 6 Griggs/Lang	Economic geology of Hudson Valley	<input type="checkbox"/>	<input type="checkbox"/>
<b>Sunday, September 27</b>	<b>Abbreviated title</b>	<b>1<sup>st</sup></b>	<b>2<sup>nd</sup></b>
Trip 7 Ver Straeten	Devonian of Catskill front, Acadian orogenesis	<input type="checkbox"/>	<input type="checkbox"/>
Trip 8 Davis/Knuepfer/Miller/Vian	Fluvial geomorphology of upper Esopus Creek	<input type="checkbox"/>	<input type="checkbox"/>
Trip 9 Ratcliffe/Aleinikoff	Pre-Ottawan, Hudson Highlands/Manhattan Prong	<input type="checkbox"/>	<input type="checkbox"/>
Trip 10 Bartholomew/Schramm/Ver Straeten	Basin-margin paleoecology, Middle Devonian	<input type="checkbox"/>	<input type="checkbox"/>
Trip 11 Vollmer/Walker	Metamorphic sequence of Dutchess County	<input type="checkbox"/>	<input type="checkbox"/>
Trip 12 Feldman/Epstein/Smoliga	Shawangunk/Martinsburg Formations revisited	<input type="checkbox"/>	<input type="checkbox"/>

<b>Prepaid Optional Items</b> – To insure availability optional items require registration <b>BEFORE September 11<sup>th</sup></b>			
Banquet (Saturday, 6:30 pm, College Terrace):	<input type="checkbox"/> Dinner Professional (\$30)	<input type="checkbox"/> Dinner Student (\$20)	_____
<i>Select one:</i>	<input type="checkbox"/> Steak	<input type="checkbox"/> Salmon	<input type="checkbox"/> Vegetarian
Keynote speaker Stephen Marshak: <i>The Impact of Appalachian Orogenies on America's Midcontinent</i>			
Box lunch for Field Trips:	<input type="checkbox"/> Sat Lunch (\$8)	<input type="checkbox"/> Sun Lunch (\$8)	_____
<b>Total Amount Due</b>			_____

**FULL PAYMENT MUST ACCOMPANY REGISTRATION FORM**

Please make out check for total amount (sorry, no credit cards) to “CAS NYSGA” and mail to:  
SUNY New Paltz, Department of Geological Sciences, NYSGA Registration, 1 Hawk Drive, New Paltz, NY 12561