

GEOLOGY ADVISER

Middlebury College

FALL 2006 NEWSLETTER

DAVE WEST:

I continue to focus my research efforts on deformed and metamorphosed rocks in Maine and this summer I spent several weeks mapping bedrock for the Maine Geological Survey. In conjunction with this work, Joel Cubley ('05) and I recently published a geologic map and report on an approximately 50 square mile region just north of Brunswick, Maine. In late September I led a field trip through that field area (~ 45 participants) in association with the New England Intercollegiate Geological Conference. I also have a big paper coming out in *American Journal of Science* later this year on the origin of a very unusual igneous intrusion in south-central Maine. This work is based in part on the senior thesis work of Mike Reilly ('03) and Ray Coish is also a co-author. At the national GSA conference in October I will be presenting some of the work Nellie Barnard ('06) and I have completed on an arsenic-bearing metamorphosed ironstone formation in south-central Maine. Finally, I was recently elected Chair of the Northeastern Section of the Geological Society of America and I continue to serve as the secretary and publications editor of the Vermont Geological Society.

PAT MANLEY LECTURE ON ANTARCTIC RESEARCH

FRIDAY, OCTOBER 27

MBH 417

12:30 PM

LUNCH PROVIDED AT 12:15 PM

JEFF MUNROE

I'm teaching Arctic and Alpine Environments (GEOL0250) and Geomorphology (GEOL0251) this fall. In January I will once again offer my Paleolimnology course, in which we retrieve a lake sediment core through the ice of a local lake, and analyze the stratigraphy and sedimentology in the lab. In the spring I will teach Environmental Geology (GEOL0112).

I'm currently involved in five different research projects:

1) In Utah, I am nearing the end of two simultaneous National Science Foundation grants that supported work focused on developing paleoclimate records from glacial moraines and lake sediment cores. One project is directed at determining the timing of the last deglaciation and climatic conditions during the glacial-postglacial transition. A paper presenting some of those results is in the current (October) issue of *Geology* (co-authored with Jeremy Shakun, '03). The other project is focused on the record of mega-droughts in northeastern Utah during the Holocene. The mountains in this area deliver 10% of the streamflow in the Colorado River system, so there is considerable societal relevance in understanding their long-term drought regime. Several Middlebury students (Claire Anderson, Dan Berkman, Lee Corbett, and Chris Rodgers) have assisted in fieldwork for these projects over the past three summers, and many others have helped out in the lab. Currently, Lee Corbett ('07) and Logan Duran ('07.5) are working on some of these cores for their senior theses. Note that I will make a presentation about this work in the Geology Department speaker series on Friday, Nov. 3.

Geology Department

OCTOBER 2007

Special points of interest:

- *Faculty Updates*
- *Registration for Winter & Spring 2007*
- *Theses on the Web*

Faculty Offices

*Ray Coish
Room 426*

*Pat Manley
Room 427*

*Dave West, Chair
Room 428*

*Pete Ryan
Room 429*

*Tom Manley
Room 415*

*Jeff Munroe
Room 414*

*Eileen Fahey
Coordinator, Room 412*

REGISTRATION—SPRING 2007

Keep on the alert for emails from the Registrar's Office regarding dates, times, and other details on registering for Winter and Spring term courses.

PAT MANLEY

This summer I attended a Cutting Edge Workshop on teaching Sedimentary Geology. Tom and I then traveled for two weeks to several National Parks in Utah. This fall I have started my duties as Associate Dean for Undergraduate Research. I have given a talk at Southern Illinois University, Carbondale, IL on Mud-wave morphology: Indicators of bottom flow direction or relict structures? South Gardar Drift, North Atlantic. and also a seminar for the geology department "Hiking in the National Parks of Utah."

More from Jeff Munroe:

In northern Alaska, I'm working on a project applying high-resolution, 3-D ground-penetrating radar (GPR) analysis to inventory the organic carbon content of drained lake basins near Barrow. My colleagues and I are also interested in the potential of this GPR technique, which has not been previously applied to frozen, fine-grained marine sediments, to image important cryostructures in the near-surface permafrost. Last April we were successful in imaging fine-scale structures in the permafrost, including ice-wedge polygons and the base of the active layer. We also retrieved numerous frozen core samples that were analyzed for their organic content and ice chemistry.



Thesis Posting on the Geology Web Page

The department has been working with Web Management to list and display all thesis work published by recent Geology majors. When completing your own thesis, you'll be asked to sign a release of publication—talk with your adviser. In the meantime, check it out; go to <http://www.middlebury.edu/academics/ump/majors/geol/> then "Students," then "Student Theses."

THE GEOLOGY OF MAPLE SYRUP - JEFF MUNROE WITH LEE CORBETT '07

In Vermont, Lee Corbett ('07) and I continue to work with John Elder and two members of the faculty in Food Science at UVM in our investigation of the terroir of maple syrup. The French concept of terroir holds that the flavor of a wine embodies the total wine producing environment, from the soils and climate to the culture. Numerous geological studies have documented that geology (mineralogy, substrate, hydrogeology, etc.) exert fundamental a fundamental control on the flavor profile of wine. Similarly, groundwater chemistry is an important control over the flavor of beer. Given this background, I became interested in the possibility that geology influences the taste of maple syrup, and last spring Lee and I worked to test this theory using sugarbushes around the state. Our results, which Lee will present at the GSA meeting in Philadelphia, demonstrate that there are significant differences in the chemical composition of syrups derived from different bedrock types. Furthermore, our preliminary tastings have shown that there is a discernable flavor difference related to the chemistry. More work remains to be done, but this project is attracting considerable attention. We hosted a reporter from the New York Times for a tasting in my lab last month, and as I write this, we are preparing for a 65-person dinner/tasting at Shelburne Farms. We also plan to give a presentation in the spring ES colloquium about this project.

EVEN MORE FROM JEFF...



On Mt. Mansfield, I continue to study the origin, evolution, and properties of our state's highest elevation soils. Very little is known about alpine soils in the northeastern U.S., and yet these soils are greatly threatened by recreational impacts and treeline migration related to warming temperatures. My work on Mansfield, in which I have been assisted by Pete Ryan and Gianina Farrugia ('05), has documented that these soils are more developed than previously thought, and that a surprising amount of chemical weathering is occurring in this environment. Comparison of trace element ratios in soils and underlying rock also suggests that the formation of alpine soils on Mt. Mansfield involves at least a minor input of eolian sediment. The first results from this project were published online last month in [Catena](#), and I will present more data, including results from dataloggers monitoring soil temperatures in the alpine zone, at the GSA in Philadelphia.

5) Finally, in northeastern Vermont, I've begun investigating the glacial geology of the Nulhegan Basin, east of Island Pond. This area features a complex landscape of ice-stagnation features intermixed with striated bedrock ledges and other landforms indicative of active, flowing ice. Figuring out the pattern of ice stagnation and post-glacial landscape adjustment is an intriguing problem. I'm joined in this effort by Chris Rodgers ('07) who is studying two lake sediment cores we retrieved from ponds in the Basin last winter for his senior thesis. We hope to present results of our work at the Northeastern GSA at UNH next March.