UNH Department of Earth Sciences

The Tales that Rocks Can Tell

UNH Student Studies Major New England Fault System

By Sharon Keeler
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DURHAM, N.H. -- Rocks tell great stories to those trained to read their verse. Within their folds and fractures are tales of collisional geological processes responsible for creating great structures like the Himalayas and New Hampshire's White Mountains millions of years ago.

Jack Loveless is a geology major at the University of New Hampshire and, under the guidance of Earth Sciences Professor Wally Bothner, is learning to tell Earth's narrative. His research involves examining rocks for evidence of fault formation. The most obvious manifestations of active faulting are earthquakes.

"A fault is a major rock fracture caused by two units moving against each other," Loveless explains, fingering a series of folds in a fist-sized rock sample. "The Earth's crust is brittle, so you'll see a series of fractures in faulted rocks at the surface. As you get deeper, the temperature increases and the rock becomes more pliable, creating waves and folds."

Loveless is describing a sample from his research site in an area of New Hampshire called the Epping quadrangle, a 50-square-mile section of terrain. Within this region is a rock unit called the Calef Member of the Eliot Formation which is thought to be fault bounded. Loveless brings back samples of rock from the field and examines thin sections under the microscope to see if there is increased deformation -- stress and strain -- concentrated on the fault. By characterizing the rock, the fault can be more accurately mapped.

"There's a major fault that goes all the way up through Maine called the Norumbega System," says Loveless.

"There are smaller faults that diverge off this system like streams off a river. We're trying to find out if the Calef Member is part of that larger system. Confirming this would be a major contribution to the understanding of New England geology."

According to Loveless, Bothner has proposed that the Calef Fault exists because rocks found here are unusual for the area. They indicate that a structural event happened that forced hardened sediment from below the ground to rise to the surface.

The first student to receive funding from UNH's Karen L. Harrower Undergraduate Research Fund, Loveless -- who is headed to graduate school at Cornell University -- says he originally planned to study physics, but was drawn to geology because he likes being outdoors. Incidentally, Bothner cited the same reason in an interview years ago.

"I remember taking a course my sophomore year where we spent eight hours per week in the field," Loveless says . "We went out to Adams Point to map the area. I loved looking at the folds in the rocks and trying to figure out what they meant. From that day I became hooked on structural geology. To make a map from scratch, to come up with a finished project that tells a story about the rocks, about that area, that's an unbelievable experience."

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