

Earthquakes & Faulting in Connecticut



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Abstract

From the 1500's to the present, over 1200 earthquakes have rocked New England; 137 of the originated in the subsurface of Connecticut. A husband-and-wife team of environmental geologist and their students investigate the evidence of fault activity along the two major seismically active zones in the state

Storyline

On March 11th, 2008, an earthquake measuring 2.0 on the Richter magnitude scale woke the sleepy town of Chester, CT, located along the Connecticut River. A less severe 1.8 magnitude quake had startled residents in North Branford, CT in February of 2001. These earthquakes were recent evidence of repeated activity along two different fault zones, triggered by deep-seated along fractures in the Earth's crust movement. Activity along the Eastern Border Fault (EBF), the west margin of the Connecticut River Valley running from under Long Island Sound south of New Haven to Keene, NH, has shown sporadic motion since its activation 200 million years ago during the first phase of the opening of the present Atlantic Ocean. The resulting so-called Hartford Basin is one of 16 sediment and lava-filled basins stretching from Nova Scotia into the subsurface of Alabama. Quakes like the North Branford event have altered the saltwater marshes and lakes developed along the EBF.

The second seismically active area, to which the Chester earthquake is related, runs along the HoneyHill-Lake Char Fault (HHLC), from Branford CT, through Massachusetts. The wide fault zone, which has brought rocks from 25 feet up to the roadside along Route 9, represents a coalitional suture between

North Africa and North America, marking the closing of the previous Atlantic Ocean.

Records of severe earthquakes along both these fault zones include anecdotes and eye-witness accounts of the impact on the populace. The most severe earthquake May 16 16th, 1791, resulted in ground rupture and destruction of stone walls and chimneys throughout the area around the village of Moodus (East Haddam, CT). The captain of a boat in the Clinton harbor reported fish jumping out of the water as far as the eye could see to the horizon'. Over 100 aftershocks were recorded. The Moodus area named for the Machimoodus tribe, who were said to interpret the noises of the thunder god Hobokomo, is a derivative of the Pequot, Mohegan and Narragansett Indian named for "land of many noises". The area has puzzled scientists for years. Though closely adjacent to the Honey Hill fault, there is no documented direct connection.

Dr. Cynthia Coron (CRC), a structural and environmental hazards geologist, and her husband Richard Sams (RDS), a hydrologist and high school earth science teacher live in Moodus, and work with their students to document evidence of fault movement along both zones. Such evidence can include springs, swamps, sag ponds, linear lakes, brecciated rocks, silica mineralization and mylonites (half melted-half deformed rocks). The investigators have utilized shallow geophysical techniques, most notably cesium magnetometer surveys (strong magnetic signature differences across the fault), to map branches of the Eastern Border Fault.

Undergraduate students have been involved in all phases of field work along EBF from Durham to East Haven (CRC), some associated with coursework, others with individual research projects, and have visited the Honey Hill-Lake Char zone. Plans to include high school students (RDS) are underway.

Exhibits could include rock sample and drill core (EBF core stored at the DEP facility; one 4800' core drilled at Hadlyme into The HHLC), accompanied by photographic stills, cross-sections, video. Photos illustrating one of the field locales may be viewed at www.southernct.edu/~coron/CRCresearch.htm. An example of the available video showing CRC at one of the field sites along the seismically active Eastern Border Fault, part of a collaborative effort to construct virtual fieldtrip modules for Learning Tools in Earth Science (LTES), may be found

at www.easternct.edu/depts/LTES/LTES-ver5/vftmodule. Access Bedrock Sites in the index, followed by Central Valley Volcanic Rocks, followed by Finding Faults.

Scientific concepts demonstrated are consonant with K-12 science content (especially landform development, earth materials and plate tectonics) and NSTA inquiry standards. Southern, we are proud to say it is.



The Dynamic Earth: Geology