

Shedding light on Long Island's glacial history: A luminescence dating approach aimed to involve undergraduate students in field- and laboratory-based research.

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The upper portion of Long Island's, geological layers formed during the Wisconsin Glacial Episode (from ~95 to 11,000 years ago) as the Laurentide Ice Sheet retreated. The Ronkonkoma moraine lies at the south shore of LI and is thought to have been the terminus of the ice sheet deposited ~20,000 years ago [1]. Northwards, the Harbor Hills moraine is assumed to have formed later during glacial retreat. Cosmogenic nuclide dating of boulders suggests that the Harbor Hills moraine was deposited after 18 ka [2-3]. However, based on recent measurements of till directions and bedrock orientation [4], it is possible that the HH moraine was deposited as early as 20,000 years ago. Previously research on the glacial history of Long Island have primarily focused on the nature and structure of the deposits. Yet, little work has been done to directly date the moraines and constrain the timing of formation across Long Island.

The luminescence dating technique is a robust tool for late quaternary deposits. It measures the amount of time since sediments were last exposed to light [5]. Our project aims to directly date glacial sediment deposits using the luminescence dating technique and provide the first comprehensive chronology of glacial deposition across Long Island, NY.

The location of the Luminescence dating research laboratory at Stony Brook University provides unique research opportunities to undergraduate students from field surveys to age determination.

During the presentation, the principle of the luminescence dating will be presented, preliminary luminescence dating results will be discussed, and we will describe our efforts to involve undergraduate students in research projects.

¹ Sirkin, L., 1982, Wisconsinan glaciation of Long Island, New York to Block Island, Rhode Island, in Larson, G.J., Stone, B.D., eds. Late Wisconsinan glaciation of New England: Kendall/Hunt.

² Das, S., Origin and Evolution of Dry Valleys South of Ronkonkoma Moraine, M.S. Thesis, Stony Brook University, 2007.

³ McCabe, M., Kelly, M. A., Schaefer, J. M., Schwartz, R., Hanson, G. N., and Benimoff, A. I., 2006, Dating glacial features in New York's Lower Hudson Valley - The last deglaciation of the Eastern Laurentide Ice Sheet: Geological Society of America Abstracts with Programs, 38, no. 7, p. 72.

⁴ Sanders, J. E., and Merguerian, Charles, 1994b, The glacial geology of New York City and vicinity, p. 93-200 in A. I. Benimoff, ed., The Geology of Staten Island, New York, Field guide and proceedings, The Geological Association of New Jersey, XI Annual Meeting, 296 p.

⁵ Aitken, M.J., 1998. An introduction to optical dating -The dating of quaternary sediments by the use of photon-stimulated luminescence. Oxf. Univ. Press 266.