

## **Luminescence Dating of Glacial Sediments at Hither Hills State Park, NY**

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At Hither Hills State Park on the South Fork of Long Island, there is a series of southwest - northeast trending hills. The hills, 10-15 m high with a  $\approx 100$ m spacing, have previously been surveyed using a shallow geophysical imaging technique known as Ground Penetrating Radar (GPR), in which a radio-frequency signal is transmitted into the subsurface where is reflected and scattered off clasts and layers (Neal, 1998). Within the past 20 years, GPR studies of the hills have confirmed that they are cored by anticlines and have a till at the surface (Goetz, 2005). A separate and nearly horizontal GPR reflector, imaged for over 2 km northward from Montauk Highway, has been hypothesized to be a till forming the detachment surface over which the glaciotectonic folding occurred. This geologic feature is somewhat analogous to modern-day and Pleistocene 'washboard' moraines; however, the ridges found at Hither Hills are substantially larger than in most such settings (Goetz, 2005). We hypothesis that the uppermost pebbly till represents the detachment surface over which the last glaciotectonic folding had occurred (Goetz, 2005).

To test this hypothesis, we undertook a geochronologic study at the Hither Hills cliffs. Luminescence dating is a robust tool for late quaternary deposits. It measures the amount of time since sediments were last exposed to light (Aitken 1998). A series of seven luminescence samples were collected along three sequences where the uppermost pebbly till was prominent and easily accessible. Samples were taken above the till, within the till, and below the till. In the laboratory, samples are sieved, chemically treated to remove carbonates and organics, and are separated using a heavy liquid to isolate Quartz and K-rich Feldspar fractions. Equivalent dose ( $D_e$ ) of quartz samples were measured using the SAR protocol (Murray and Wintle, 2006), and K-rich feldspars were measured using the pIR-IR<sub>290</sub> protocol (Thiel et al., 2011). Dose rate determination for the samples were measured using ICPMS.

During the presentation, the GPR images of the area will be presented, and the luminescence dating results will be discussed. Our goal is to better constrain the timing of these glaciotectonic features, which are hypothesized to date from a time of overall glacial retreat.

### References:

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