

GALCIOFLUVIAL AND GLACIOTECTONIC STRUCTURES IN MANORVILLE, LONG ISLAND

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Abstract

This project describes and proposes interpretations of Pleistocene strata found in the Ranco Quarry in Manorville, Long Island. This locality is on the north side of the Ronkonkoma Moraine. Two sections in the quarry were measured, the southern one was 20 m thick and the northern section was 24m thick along a north-south running face. These were divisible into five stratigraphic units from bottom to top, designated A-D.

Descriptions:

Unit A consists dominantly of laminated gravely sand with occasional tabular cross-stratification. The laminations are cm-scale; the majority are horizontal, but there were also low angle laminations and a layer of more steeply dipping cross stratifications. There is an overall fining-upward, as the top of Unit A becomes finer sand with finer laminations. Unit B is matrix-supported diamict with a slight grading from coarse to finer upwards. There is no stratification or other structures present. Unit C consists of fine grained sand with small scale (<1cm) parallel vertical laminations. There were fractures throughout the laminations. Unit C is tectonically deformed by faulting and folding. In some outcrops of Unit C, *Mercenaria mercenaria* fossils were found. These were dated using amino acid racemization as Sagamon Interglacial (122,000-132,000 bp). However, this dating is neither locally correlated nor calibrated. Grain size analyses were performed, and the grain size and degree of sorting in Unit C corresponds closely with that of modern barrier island sands. Unit D consists mostly of massive, matrix-supported diamict which contains gravel, pebbles and intermittent clayey silt stringers. In some areas, imbricated gravel and textural stratification was observed. Unit D is capped by soil and vegetation.

Interpretations:

Based on sedimentary features and stratigraphy, Unit A is interpreted as proximal, but not in ice contact, outwash dominated by sheet flow and longitudinal bars in shallow channels, with no debris flows. The stratigraphic relationship of Unit B to the rest of the strata is uncertain at this point, but is tenuously interpreted as the product of a jöckhlhlauf, a debris flow caused by a glacier-burst flood. These floods are caused by the catastrophic draining of a glacial lake by the rupture of glacial dams, such as sudden breaching of a moraine or unconsolidated rock dam, a result of ice avalanches on the glacier, or glacial surges. Unit C is interpreted as a marine or shoreline sandstone, based on the association of marine *M. mercenaria* fossils, parallel laminations, and well-sorted sands similar to modern barrier island sand, distinctly different from outwash features. These features suggest that Unit C was glaciotectonically transported and possibly thrust on top of younger outwash. This would be consistent with its 'old' amino acid racemization age. One problem with this interpretation is the absence of a repeated section of outwash overlying Unit C. Unit D diamict unconformably overlies Unit C and represents the last glacial advance. However, textural layering and imbrication in some of this unit, and an absence of lodgment till features, suggest that Unit D represents one or several debris flows and related sediment gravity flows, rather than a true basal till.