GEOLOGY OF THE LONG ISLAND PLATFORM

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The strata of the Long Island Platform include Upper Cretaceous marine sediments and Pleistocene glacial and nonglacial deposits. The basement rock where sampled is similar to the early Paleozoic gneisses of southern New York and New England. Palynology of borehole samples from a west to east transect of the Island reveals Upper Cretaceous pollen zones that range from Zone IV (Cenomanian) through MA-1/CA-6 (Maestrichtian) and indicate direct correlations with the outcropping Upper Cretaceous formations of New Jersey. Pleistocene pollen assemblages suggest temperate conditions. The Cretaceous sediments of central Long Island fill an assymetrical flexure that has an apparent dip to the south. The presence of high-angle faults on the continental shelf south of Long Island and a Mesozoic basin to the north suggests the possibility of a related structure at depth beneath the Island.

Upper Pleistocene glacial and nonglacial sediments overlie the Cretaceous. These include evidence of two glaciations (two drift sheets with morainal features), and marine beds that represent three warm intervals. The older drift predates 42,000 BP and was previously assigned to the early Wisconsinan. However, new evidence suggests an Illinoian age for that glaciation. Pleistocene marine clays stratigraphically above the uppermost Cretaceous beds in southeastern Long Island and glacially-thrusted clays in the interlobate moraine in Gardiners Island have both been referred to as the "Gardiners Clay" and assigned to the last or Sangamon interglacial. The southshore unit which contains a temperate microflora may represent the interglacial warm interval. The thrusted clay has a cool to cold microflora and a cold water marine fauna that suggest interstadial conditions. Marine and freshwater sediments, dated between 42,000 and 21,750 BP and known informally as the Portwashingtonian Beds provide palynologic evidence of climatic fluctuations from cold to warm to cold during this interval and are placed in the mid-Wisconsinan. Late Wisconsinan drift that dates from 21,750 BP mantles the older glacial sediments. This drift was deposited from a lobate ice front dominated by the Hudson Lobe on the west, the Connecticut Lobe in central Long Island and the Connecticut-Rhode Island Lobe in the east. The Hudson and Connecticut lobes are separated by an extensive north to south trending interlobate zone in west central Long Island. Thus, the last ice advance to the end moraine position can be dated at 21,750 BP. Glacial recession began shortly after the ice reached the maximum position and several sequences of recessional moraines that mirror the lobate form mantle northern Long Island. The moraine map depicts these recessional positions and the offshore trend of the late Pleistocene end moraine in southeastern Long Island. Palnology and radiocarbon dating show that Long Island was ice free by about 20,000 BP.

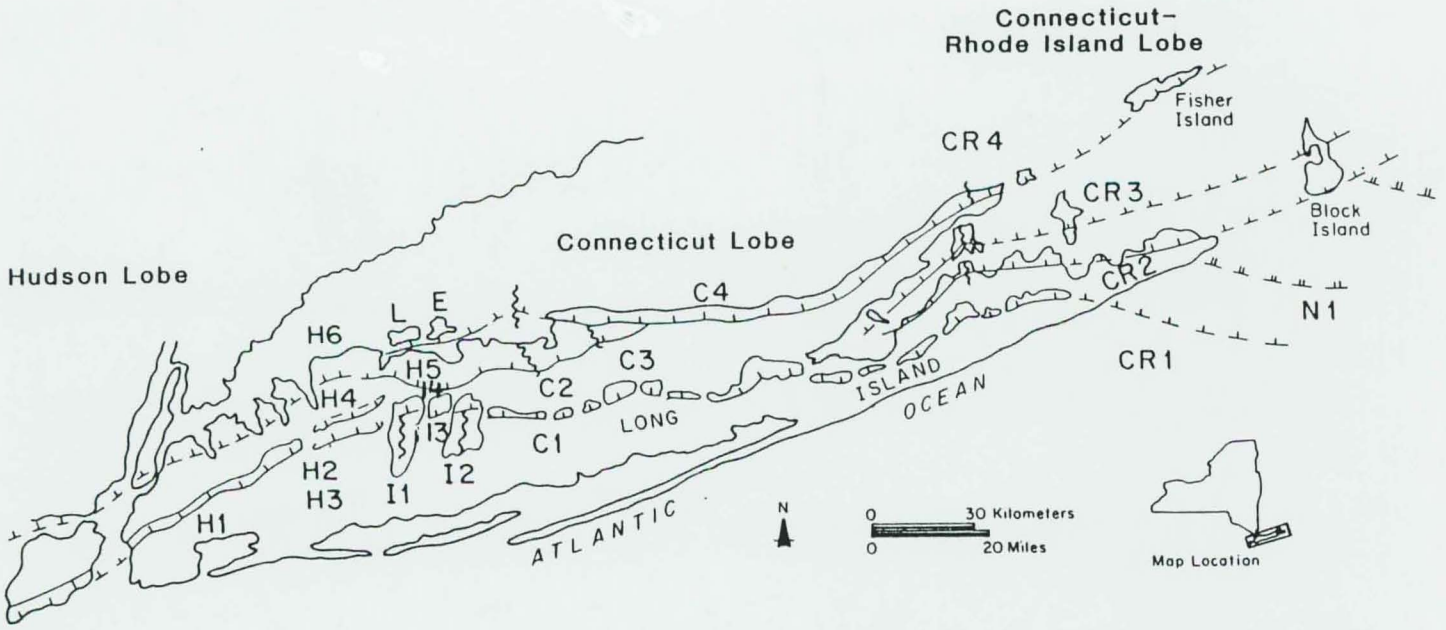

Figure . Map of Long Island glacial end and recessional moraines and the relative positions of glacial lobes, keyed as follows:

H1 Harbor Hill Moraine
H2 Jericho Moraine
H3 Old Westbury Lobe
H4 Oyster Bay Moraine
H5 Northport Moraine
H6 Sands Point Moraine

Interlobate Moraine

I1 Manetto Hills Lobe
I2 Dix Hills Lobe
I3 South Huntington Lobe
I4 High Hill Interlobate Moraine

Connecticut Lobe Ice Margins

C1 Ronkonkoma Moraine–Shinnecock Moraine
C2 Stony Brook Moraine
C3 Mount Sinai Moraine
C4 Roanoke Point Moraine

Connecticut Lobe and Eastern Connecticut–Western Rhode Island Ice Margins

CR1 Amagansett Moraine
CR2 Sebonack Neck–Noyack–Prospect Hill Morainal Envelope
CR3 Robins Island–Shelter Island–Gardiners Island–Morainal Envelope
CR4 Roanoke Point–Orient Point–Fishers Island Moraines

Narragansett Lobe

N1 Montauk Point (Altonian)

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