

## The Provenance and Ages of Glacial Sediments on Long Island

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During the last glacial maximum the Laurentia ice sheet advanced southward across New York State, stalled where Long Island is today, and retreated. This is evidenced by ridges of elevated topography running west to east across the length of the island as glacial moraines (Bennington, 2016). Based on evidence of erosional and depositional features and age dating of minerals from the sediments and erratics in the moraine, debate exists about the exact direction the glaciers moved over Long Island and the provenance of the glacial deposits.

1. A northwest to southeast direction of glacial advance is proposed for western to central Long Island (e.g., Sirkin & Mills, 1975; Sanders & Merguerian, 1994; Sanders & Mergurian, 1998, Isachsen, 2000; Bennington & Young, 2005). The associated glacial deposits should thus be made up of rocks of the Grenville, Taconic, and Acadian orogenic terrains to the northwest.
2. In contrast, a northerly origin is proposed for glacial deposits from central Long Island with glaciers sampling the younger Acadian and Avalonian terrains in Connecticut, Massachusetts, and Long Island Sound (Pacholik et al., 2001; Zhong, 2001; Kundic et al., 2012).
3. Finally, a northeasterly origin is proposed for the south fork of eastern LI with rocks having an Avalonian provenance from eastern Massachusetts and Rhode Island (Kundic et al., 2007).

Our goal is to determine the provenance of the rocks that make up the moraines of Long Island from east to west in order to unravel the direction and distance glaciers moved and thus constrain the geologic history of the glacial deposits of Long Island. To date we have sampled sand-sized grains from glacial deposits on the north side of Long at Island Kings Point, Huntington, Caumsett State Park, Hither Hills and Greenport. We will analyze zircon grains to determine the dominant ages of the sands and measure heavy mineral concentrates to determine rock provenance. This will allow us to quantify the volume of Grenville, Taconic, Acadian, and Avalonian-derived source rocks in the glacial formations of Long Island.

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