GLACIOTECTONIC THRUSTING WITHIN THE SELDEN HILL: IMPLICATIONS FOR PREVIOUS MODELS

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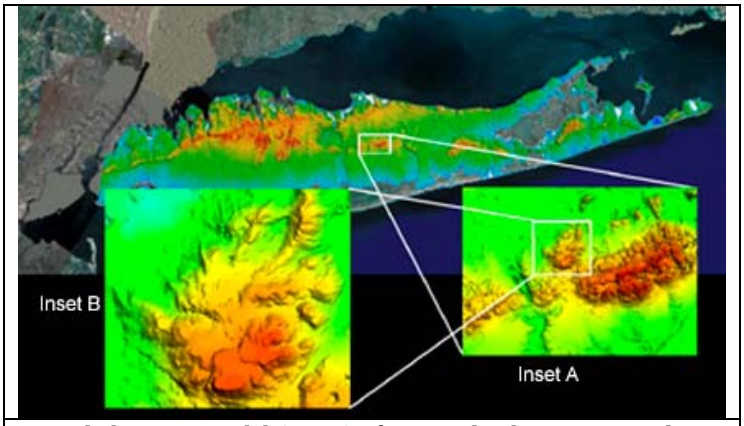
Recent GPR data along a North-South transit of the eastern margin of the Selden Hill revealed sedimentary structures that indicate glaciotectonic thrusting that may have resulted from a coupling of glacio-fluvial sediments with the advancing ice margin (Tvelia, 2007). Although this is not unique to glacial settings in general, the Selden Hill is a unique structure when compared to other glacial structures in its direct vicinity. Identifying such varied structures over relatively short geographic range ultimately leads to the question of how glaciotectonic processes can vary over a relatively short geographic range. This study suggests that the occurrence of this variation is a manifestation of the underlying strata and a result of multiple glacial episodes that may represent seasonal retreat and advance.



Digital elevation model (DEM) of Long Island superimposed on satellite image. Inset A shows region of study and associated structures. Inset B is the Selden Hill.

Numerical models produced by Anderson *et al*., Figure 1, demonstrated the development of forethrusts in unconsolidated sediments as a result of mass load caused by an overlying ice sheet on a slightly inclined decollement surface (Anderson *et.al*., 2005) . This model correlates well with GPR data and core logs of glaciofluvial sediments produced near Hojby in northwest Zealand (Denmark), as shown in Figure 1 (Overgaard & Jakobsen, 2002). Core logs at this site show an inclined clay unit that correlates with the basal decollement surface of the thrust zone.

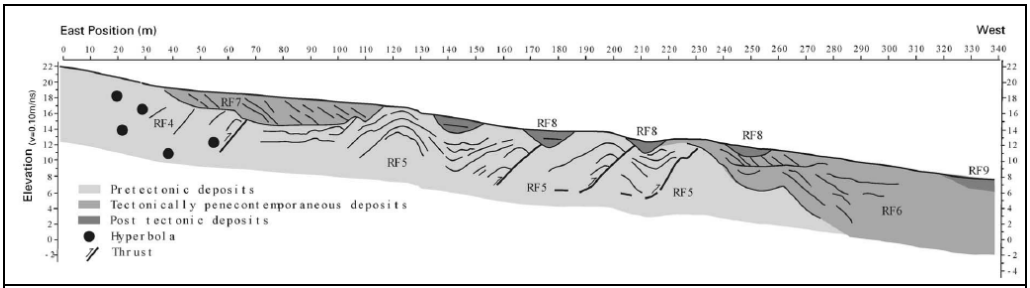


Figure 1. Radar profile near Hojby in north west Zealand, Denmark, showing glaciotectonic thrusting similar to that within the Selden Hill. Adapted from Jakobsen and Overgard (2002).

Similar to the Hojby site, GPR surveys of the Selden Hill also show a series of thrust fold structures along a north-south transit (the direction of glacial advance). Well logs produced by the Suffolk County Water Authority in areas directly north and south of the Selden Hill also suggest the possible occurrence of an underlying south-dipping clay layer that may have acted as a decollement surface provided that deformation occurred during permafrost conditions (Tvelia, 2007). If this is the case the structure of the Selden Hill may be a result of glaciotectonic processes acting on a previously unidentified clay unit—the presence of which has further implications to our current understanding of the development of the Ronkonkoma Moraine.

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