



## **Polygenetic, diachronic and glacitectonic diamicton facies associations provide a window into the dynamics of subglacial till rheology**

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Subglacial deformation structures of a complexly deformed glacigenic sequence at Killiney Bay, Ireland provide a window in the subglacial rheological dynamics of tills. Deformation geometries are dominated by pure shear, simple shear and compressional deformation styles with abundant evidence for glacitectonic induced fracturing and hydrofracturing. Glacigenic diamicton facies associations (FA's) are interpreted as glacitectonically stacked diachroneous units younging laterally away from palaeo-icemargins. Simultaneous deposition of proximal overconsolidated subglacial tills and distal low-viscosity flow tills occurred, with the latter being deformed during re-advances. Structural chronology of deformation styles demonstrates polygenesis of FA's: initially deposited as low viscosity flow tills with vertical deformation styles, glacial overriding resulted in overconsolidated and redeformed subglacial tills with pure and simple shear styles. Low viscosity, low density diamictons later subglacially deformed and dewatered to form overconsolidated tills. This is reflected in tills showing density driven deformation, which are overprinted by brittle deformation associated with shear. Such overprinting indicates a rise in viscosity and shear strength of the tills during deformation. Two types are recognised: one associated with deformed diapirs and another with fluid escape structures.