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A new depositional model for glacial sediments in Killiney Bay during the Late Devensian deglaciation - East Central Ireland

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During the last glaciation in northwestern Europe, major studies are consistent with the hypothesis of an ice-stream flowing southward in the Irish Sea Basin, in connection with tributary flows on the eastern of the Irish Cap. During deglaciation, sediment deposition processes are predominant, leaving a record of glacially influenced environments. Evidence of such deposits still remains on the coast of the UK and Ireland today. Although these deposits have been studied for many decades, their depositional environment is still under debate and interpretations are evolving, together with new concepts.

The present work focuses on the study of the Killiney Bay section, South Dublin, located in a topographic depression, expected to be a former subglacial tunnel valley in connection with an offshore canyon in the Irish Sea. Geometry and architecture have been approached by using panoramic photographs. In addition, fifteen detailed logs describe the stratigraphic succession, erosive surfaces and variations of small-scale sedimentary features.
Seven Facies Associations were defined and used to reconstruct depositional environments. Although the section is affected by glaciotectonic deformation, primary sedimentological figures are well preserved. Within the section, a 600m long depression has been observed, in which a Gilbert-type delta has developed. Laterally, this delta evolves into prograding sheet-like structures interpreted as subaqueous fans. The corresponding facies association is composed of four main facies:
-Matrix-supported coarse-grained facies (granules to cobbles) arranged in prograding sheet-like structures (dip angle 5-9° N160).
-Massive sand to diffusely graded sand.
-Coarse-to-medium sand facies with long wavelength ripples (1-2m), oriented N160.
-Medium-to-coarse sand with climbing ripples and current ripples.

These facies associations are characteristic of subaqueous (probably glaciolacustrine) environments. The transition from delta to fan delta has already been described in other regions and is expected to be driven by glacier front oscillations and relative sea-level changes. Moreover, these preliminary observations on facies definition are consistent with a subaqueous depositional model associated with hydraulic jump. This model could explain the distribution of the four facies and their distance from a subglacial tunnel portal, from proximal to distal area, in an ice-contact to ice-proximal subaqueous (probably glaciolacustrine) environment.