

Polyphase structural evolution of a fine-grained, fold-dominated end moraine, Brúarjökull surge-type glacier, Iceland

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Abstract – *The glaciotectonic architecture and structural evolution of a fine-grained end moraine formed by the 1890 glacier surge of Brúarjökull is described from four excavated cross-sections. The end moraine ridge is a morphological expression of a marginal sedimentary wedge formed during the last days of the surge. The actual end-moraine ridge was formed on the last day of the 1890 surge when the glacier became coupled to the bed and ploughed into the reverse slope of the marginal sediment wedge. Ductile deformation, favoured by high porewater pressure, dominated the construction of the end moraine while brittle deformation was induced when porewater pressure decreased, particularly at the end of the surge. Thus, the deformation was polyphase, developing from open folding to multiple overfolding when porewater pressure was high and finally to overthrusting, faulting and shearing at the very end of the surge when porewater pressure dropped severely upon porewater blow-out in front of the moraine. This structural continuum is exhibited by the four cross-sections. The glaciotectonic stress was absorbed within a relatively narrow zone due to high friction along a basal décollement. A new model illustrates the structural evolution of a fine-grained, fold-dominated end moraine and may serve as an analogue to similar end moraines in modern and Pleistocene environments.*