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Geomorphology, distribution and composition of subglacial triangular hummocks (murtoos) in Sweden and Finland

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Triangular hummocks of subglacial origin have been identified in Sweden and Finland due to the increased resolution provided by LiDAR imagery. Their triangular shape is distinctive and recognizable as clearly identifiable landforms. These forms have been previously mapped in some cases as dead-ice hummocks, but geomorphic relationships with eskers, flutes ribbed moraine and De Geer moraines show these to be subglacial. We refer to these new landforms as ‘murtoos.’ Morphometric measurements show murtoos to be 50 to 200 m long and 50 to 100 m wide. The orientation of their apices strongly correlates with local ice-flow orientation. They form preferentially on beds that slope down-ice. In many cases, they occur in patches in an ice-flow parallel path with eskers, defining corridors we believe to be of subglacial meltwater origin. Murtoos are composed primarily of heterogeneous diamicton with variable amounts of bedded sand and gravel. Murtoos are most common where glacier-melt rates were high during deglaciation (Bølling-Allerød and Holocene), and they are absent where extensive frozen-bed conditions were present. We suggest murtoos are a landform produced as a glacier-bed adjustment to increased delivery of supraglacial meltwater during deglaciation.

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