

A re-investigation of a classic area of ice sheet decay using geomorphological and sedimentological evidence in the Vomb area, southern Sweden

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Hummocky moraine is a glacial sediment-landform assemblage which has previously been used as an all-encompassing descriptive terminology strongly associated with dead ice meltout and passive deglaciation. A 80 km² large area in south-central Scania (Fig. 1), Sweden, previously described as ‘hummocky moraine’ has been re-investigated using LiDAR data and sedimentological analysis. The goal of this study has been to confirm or confute the associated chaotic component of the hummocky landscape, and to reconstruct the processes of how the resulting landscape in the study area formed.

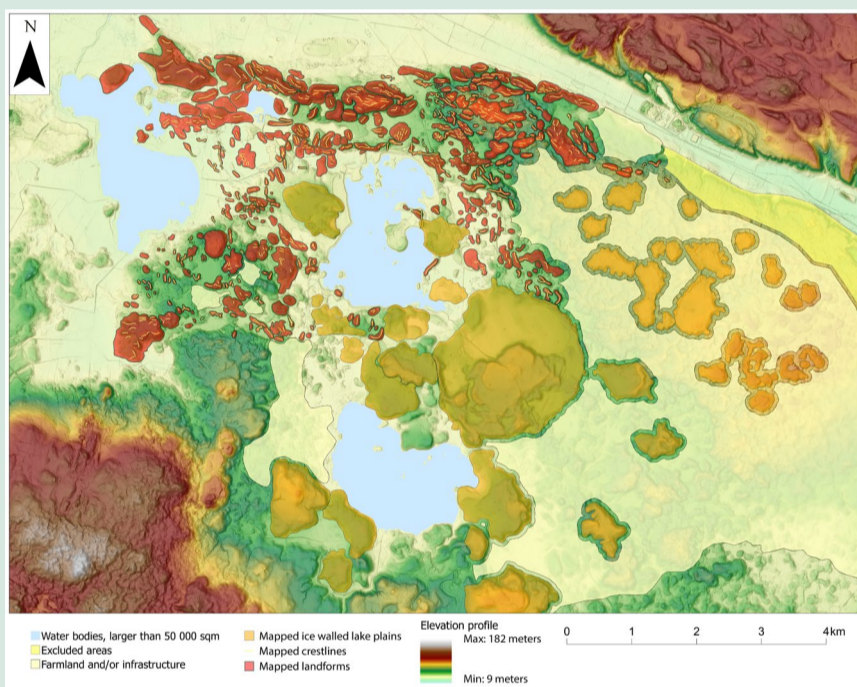


Fig 2. Map displaying the outlined landforms and crestinelines in the study area.

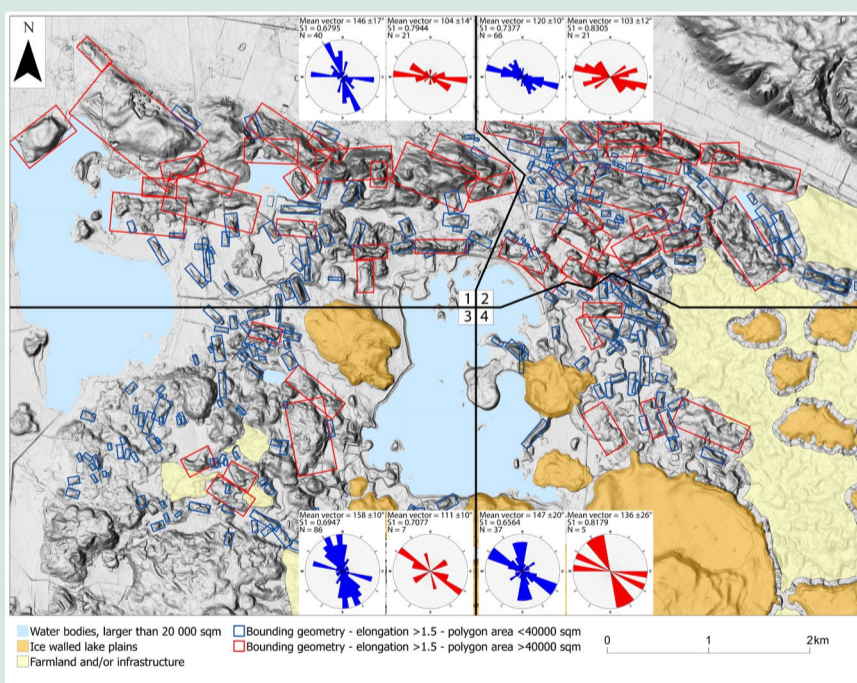


Fig 3. Map marking the elongated hummocks in bounding geometry, with directional elements projected as stereonets.

Conclusions

1. Based on the evidence, the hummocky moraine in the study area have been linked to processes of both active and stagnant ice.
2. It has been demonstrated that the term hummocky moraine is too broad and terminologically loaded with dead ice meltout or ‘passive’ deglaciation.

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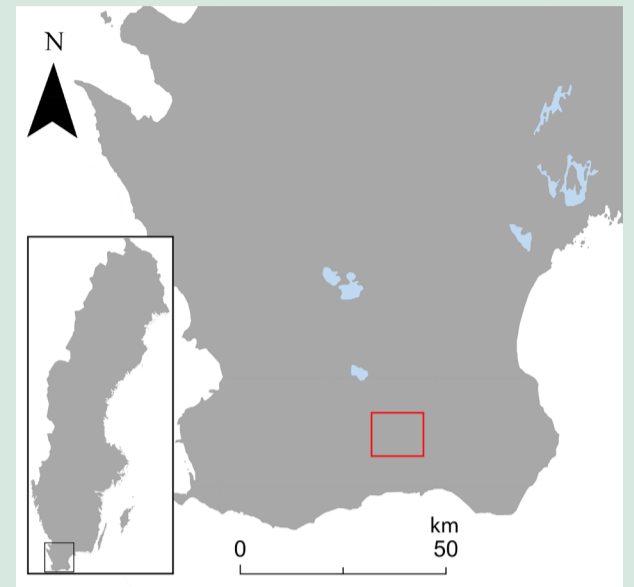


Fig 1. Southern Sweden and the study area marked.

Remote sensing

Through remote sensing a total number of 367 hummocks, 691 crestinelines, and 41 ice-walled lake plains (Fig. 2). 283 hummocks showed an elongation ratio of >1.5 and their spatial component and orientation were analysed and summarized into stereonet projections (Fig. 3). The combined results show a clear trend in hummock orientation from the NW to SE (Fig. 4).

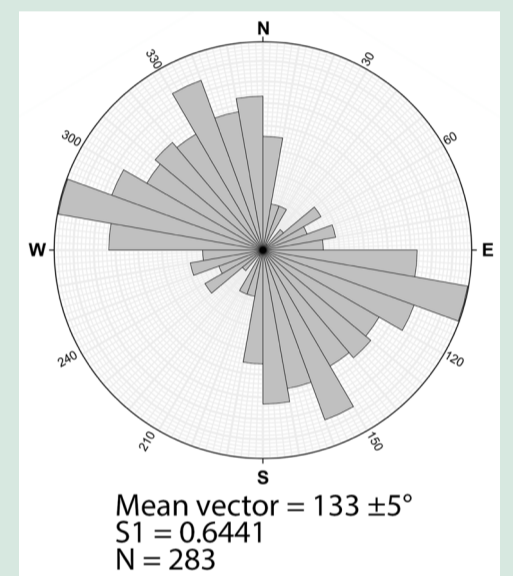


Fig 4. The directional element of all elongated hummocks

Sedimentology

An exposure (fig. 5) belonging to a hummock within the northern part of the study area consisted of well-sorted fine to medium sand with dark lamination believed to have originally been deposited in a glaciolacustrine environment. The units displayed interfingering on a large scale, and an abundance of thrust-faults and deformation structures associated with lateral compression and proglacial push.

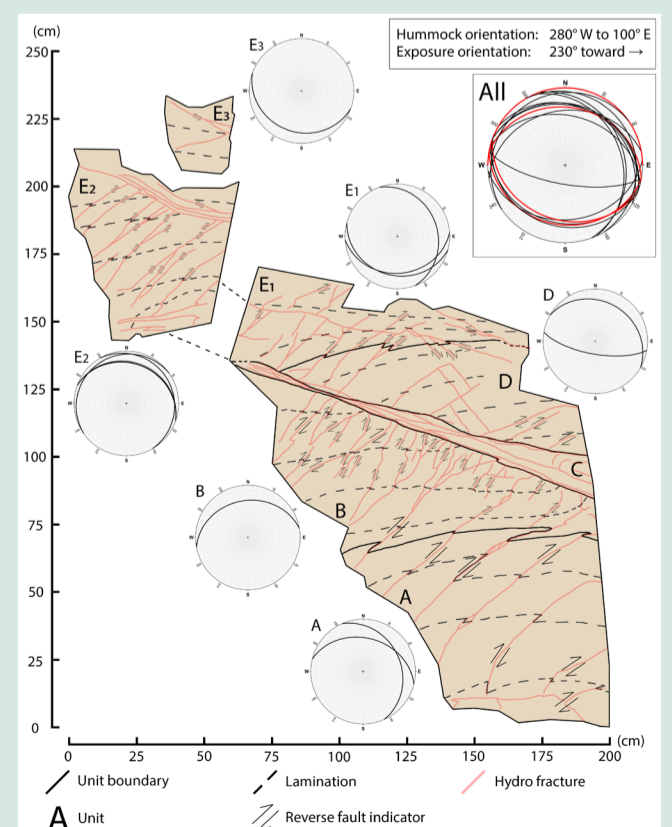


Fig 5. 2D-log of a logged exposure. Stereonet show fault planes (black) and contact planes (red)