



Recent glacial erosion of fjords and low-relief surfaces in western Scandinavia

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Although glacial landscapes are characterized by dramatic local relief, they also ubiquitously exhibit high-elevation low-relief surfaces. While these surfaces have been attributed to glacial headward erosion in Alpine settings, the timing and processes responsible for their formation in northern high-latitude regions remain elusive. Here, we investigate the topographic evolution of western Scandinavia during the Late Pliocene and Quaternary glaciations (0-2.8 Ma) by comparing inland erosion and offshore sedimentation. Fjord erosion over the entire western Scandinavia, quantified using the geophysical relief, only accounts for 30-55 % of the total sediment volume deposited offshore Norway. This large mismatch implies that significant erosion must have taken place at high elevation during that period, despite the conspicuous nature of the fjords. Furthermore, comparing the distribution of the low-relief surfaces with Equilibrium Line Altitudes (ELAs) suggests a glacial “buzzsaw” mechanism for their formation. In turn, our results clearly demonstrate that glacial erosion is bimodal: the Scandinavian topography exhibits a strong glacial imprint with synchronous origin for both the deeply-carved fjords and the high-elevation low-relief surfaces. We suggest that similar processes may have created similar morphologies in areas affected by glaciations, and that models of their tectonomorphic evolution models should thus be reappraised.