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The Uummannaq Ice Stream System, West Greenland

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The offshore and coastal geomorphology of the Uummannaq region of West Greenland records evidence for the advance and decay of the Uummannaq Ice Stream system (UISS) during the Last Glacial Maximum (LGM). Regional ice flow patterns across this region show evidence for a large coalescent onset zone formed of smaller ice streams and fjord outlet glaciers which converged into the Uummannaq trough to form a single ice stream which flowed to the continental shelf break at the LGM. Ice stream surface elevation throughout the onset zone is constrained to a minimum of 1000m asl based on striae, bedform and moraine data, and is further supported by cosmogenic exposure ages on erratics that show warm based ice operating up to 975m asl in both ice stream and inter-stream areas. 14C and surface exposure ages along a transect from the mid-shelf to the present ice margin record initial ice surface down-wasting between 25 to 10.5 ka BP, though some ice stream marginal moraines show late stage ice re-thickening prior to extremely rapid ice stream collapse through the Uummannaq trough between 10.5 and 10.1 ka BP. We suggest this pattern of deglaciation reflects strong surface ablation associated with increased air temperatures running up to the Bolling Interstadial (GIS1e) at c. 14 ka BP, followed by ice re-thickening during the Younger Dryas, and late stage rapid marine calving driven by peak sea-level and bathymetric over-deepening at the start of the Holocene.