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The Greenland glaciated margin: morphology and controlling glacial processes

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Greenland is at present dominated by the largest ice cap on the northern hemisphere, which cover approximately 80% of the landmass. The remaining 20 % ice-free area is situated along the coast and dominated by bedrock, high mountains and deep valleys. The more than 44.000 km long coastline is characterized by peninsulas, islands and archipelagos and some of the world's largest fjord systems.

The morphology of the continental margin surrounding Greenland is marked by major shelf troughs and fan protrusions generated by former ice streams, and a slope affected by glacial-induced mass transport, canyons and meltwater channel systems.

However, the margin is not morphologically uniform. While the southern parts are characterized by narrow shelves and very steep slopes, the northern parts have broad shelves and more gentle slopes. These morphological differences indicate dissimilarities in the glacial evolution and controlling glacial processes along the length of the margin. The large variation in both latitude and longitude may explain some of these differences, as may the large-scale variations in the bedrock topography and geology.

Another important factor is the variation of the oceanographic setting along the Greenland margin, which do not only differ geographically but also known to have fluctuated through the glacial-interglacial cycles. The latter has in places caused a marked difference between glacial and inter-glacial depositional environments, easing the discrimination of deposits from different glacial advances. In other places, the increasing bottom current strength during the inter-glacial period has altered the geomorphological imprints from the presiding glacial period.