



How quickly do High Arctic coastal environments respond to rapid deglaciation and the paraglacial transformation of proglacial areas? – Answers from Spitsbergen, Svalbard Archipelago

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The coastal zone is one of the most important storage systems for sediments that are eroded and transported by rivers, wind and slope processes from deglaciated valleys and proglacial areas before reaching their final sediment sink (fjords or the open sea).

The Svalbard archipelago provides an excellent location to quantify how High Arctic coasts are responding to climate warming and the associated paraglacial landscape transformations.

In this paper we summarize the results of several coastal surveys carried out by our research teams along the paraglacial coasts of Spitsbergen during the last decade.

We reconstruct the post-Little Ice Age development of selected coastlines in Spitsbergen to illustrate the variable coastal response to paraglacial and periglacial processes activated following the recent retreat of glaciers.

Our surveys use aerial photogrammetric and GIS analyses, sedimentological classification of coastal deposits and field-based geomorphological mapping in Kongsfjorden, Billefjorden, Bellsund, Hornsund and Sørkappland. Our results document dramatic changes in sediment flux and coastal response under intervals characterized by a warming climate, retreating local ice masses, a shortened winter sea-ice season and thawing permafrost.

The study highlights the need for a greater understanding of the controls on High Arctic coastal geomorphology, especially given the potential for future accelerated warming and sea-level rise.