

New multibeam mapping data from Ammassalik Basin, SE Greenland: A tale of glacial landforms influenced by variable basement lithologies

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Abstract

The Ammassalik Basin, offshore SE Greenland near Tasiilaq, is a Mesozoic rift basin bounded to the west by Precambrian basement rocks. The basin was heavily influenced by Paleogene volcanism associated with the Iceland mantle plume and eventual opening of the North Atlantic (Gerlings et al., 2017). Eastward of where basin sedimentary rocks sub-crop below the seabed, subaerially extruded flood basalts cover the basin and give way seawards to a thick pile of seaward dipping reflectors characteristic of volcanic rifted margins (Pérez-Gussinyé et al., 2023). In addition, it has been suggested that parts of the margin may be underlain by older, Proterozoic–early Paleozoic meta-sedimentary rocks (e.g. Fyhn et al., 2012; Guarnieri et al. 2022).

In 2022 as part of the SEAMS project (SurvEy of AMmassalik basin Sediments), a collaborative effort between GEUS and Aarhus University with support from the Danish Center for Marine Research and Danish Arctic Command, we collected ~3000 km² of multibeam data supplemented by Innomar sub-bottom profiler data on the Danish patrol vessel *HDMS Lauge Koch*.

The data illuminate a number of glacially influenced landforms that appear to be in part controlled by the underlying substrate. Areas interpreted by Gerlings et al. (2017) as older meta-sedimentary rocks appear strongly eroded by ice tongues that must have covered the shelf, with several broad U-shaped valleys. Over the main part of the Mesozoic basin, only limited erosion is observed, but crag-and-tail features associated with sub-cropping basaltic sills are apparent, not unlike similar features that have been found in the Vaigat in West Greenland, where a sill intruded Cretaceous basin sub-crops below seabed. The hard Precambrian basement to the west, and the flood basalts to the east, do not appear to be greatly affected by glaciation, with no evidence for flow parallel striations, though these areas appear to have scour marks that could have resulted from icebergs.

References

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