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Dynamic Ice on the Continental Shelf of NE-Greenland – The Submarine Morphological Record

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The reconstruction of large ice masses in the past is a crucial input and base line parameter for current climate models and for the understanding of ice sheet dynamics including their implementation into numerical modelling. For a long time, the ice sheet extent of the Greenland Ice Sheet (GIS) was mainly reconstructed on the basis of terrestrial work. The outer limit of the GIS during the Late Glacial Maximum (LGM) was placed close to the current coastline. Advances in our understanding on the dynamic behavior of the GIS, especially offshore NE-Greenland, came from hydro-acoustic surveys which indicated a much further extent of GIS, probably until the shelf edge during the LGM.

Here, we present new hydro-acoustic data acquired with RV Polarstern during ARK-XXIV/3 in 2009. We found clear indication for a large ice coverage on the Greenland shelf and dynamic behavior during its retreat. Clear morphological features like drumlins, streamlines, recessional moraines and overridden grounding lines document a highly dynamic GIS on NE-Greenland with fast flowing ice streams, less dynamic inter-ice stream margins and presence of local ice domes on the shelf.