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Glacial geomorphological data from the Amundsen Sea shelf provide new insights into the dynamics of the West Antarctic Ice Sheet since the Last Glacial Maximum

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Palaeo-ice sheet beds that are exposed today on polar continental shelves provide unique archives of conditions at the base of ice sheets that are difficult to assess beneath their modern counterparts. During the last decade, several of these palaeo-ice sheet beds have been studied in detail to reconstruct the flow, extent, and retreat of the West Antarctic Ice Sheet (WAIS) at and since the Last Glacial Maximum (LGM), respectively. The focus of these investigations, however, lay on troughs eroded by palaeo-ice streams into the shelf.

Multibeam swath bathymetry mapping of a mid-shelf bank between the troughs of the Pine Island-Thwaites and Cosgrove palaeo-ice streams on the eastern Amundsen Sea shelf has revealed well-preserved sub- and proglacial bedforms, including large-scale ribbed moraines, hill-hole pairs, terminal moraines, and crevasse-squeeze ridges. Together, these features form a landform assemblage that is entirely different from previously described glacial bedforms in the adjacent troughs and allows us to reconstruct ice flow and retreat dynamics in an inter-ice stream area. This research closes an important gap in the understanding of past WAIS behaviour in the eastern Amundsen Sea Embayment and will serve as a diagnostic tool in future studies on similar inter-ice stream ridge areas.

Another geomorphological study of a previously unmapped area of the West Antarctic continental shelf conducted systematic mapping of the West Antarctic continental shelf in the western Amundsen Sea, offshore from the westernmost Getz Ice Shelf. Here, a landward deepening palaeo-ice stream trough is incised into the shelf. The seafloor within the western-central part of the trough is characterized by a large, $\sim$70 m thick and $\sim$17 km long grounding zone wedge (GZW). The back-slope of the GZW is characterized by highly elongate streamlined bedforms suggesting fast palaeo-ice flow towards NW. In contrast, the outer shelf seafloor offshore from the GZW is predominantly smooth and at numerous locations scoured by icebergs. The GZW either marks the maximum WAIS extent in this area at the LGM or a pause in ice-stream retreat during the last deglaciation.

We will characterise and interpret the bedforms in these two areas and use them for reconstructing the extent, flow, bed conditions and retreat history of the WAIS since the LGM.