



UiT The Arctic University of Norway

# New results on the dynamics of the NW part of the Svalbard Ice Sheet during the deglaciation of the Woodfjorden Trough

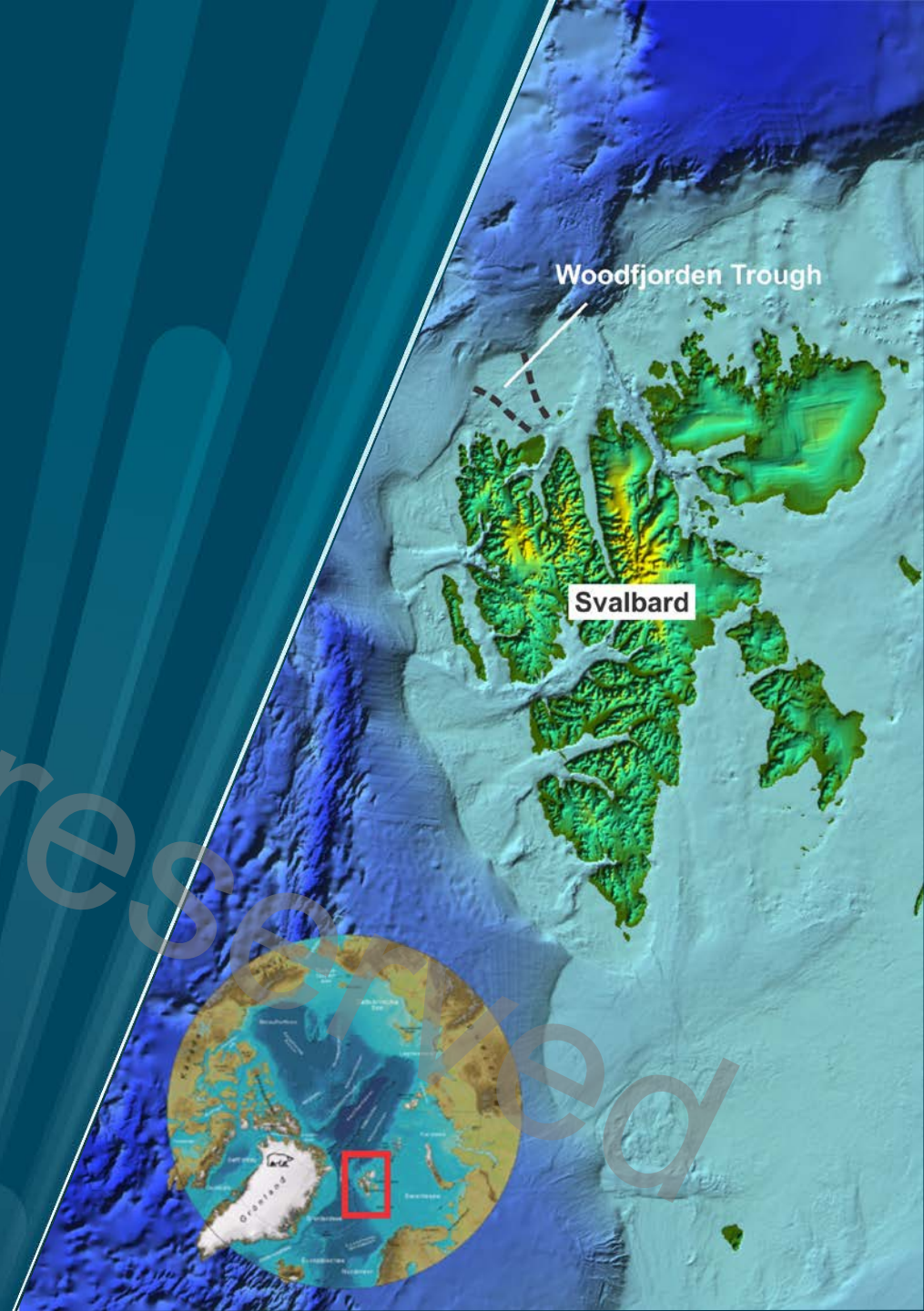
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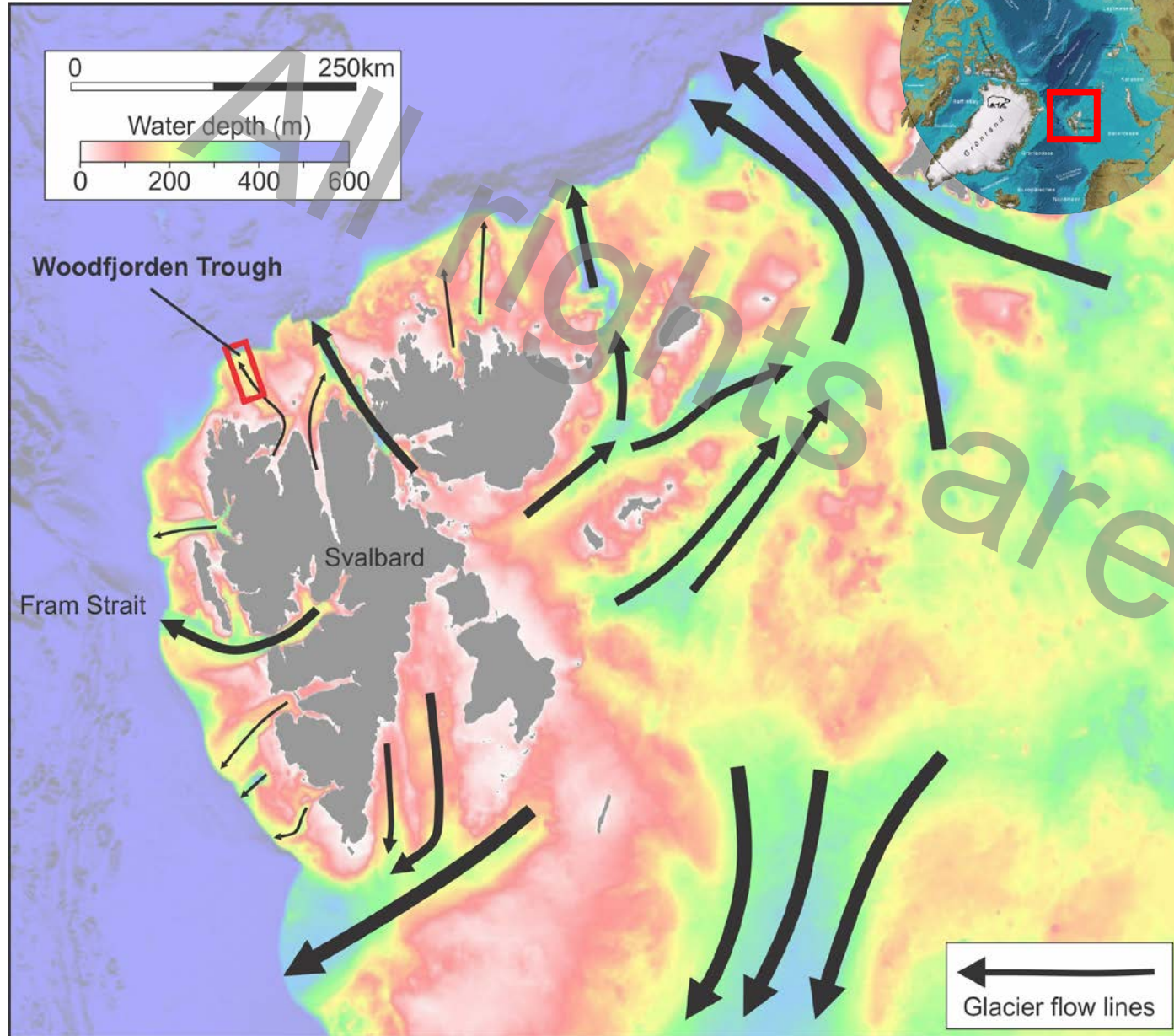
2: Research Centre for Arctic Petroleum Exploration (ARCEX), UiT The Arctic University of Norway, Department of Geosciences

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## Study area



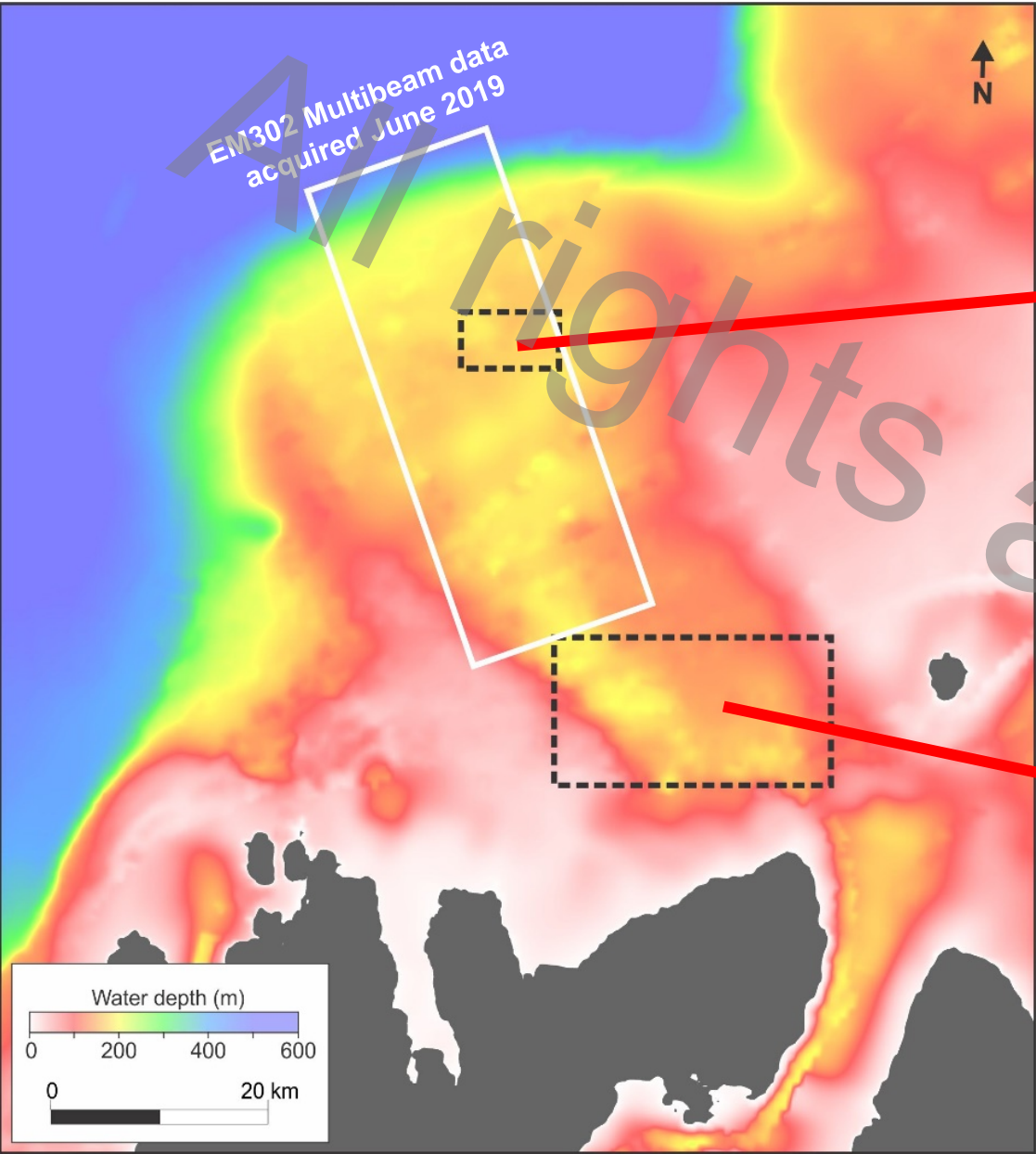
The Woodfjorden Trough is an up to 60 km long and 40 km wide shelf-transverse trough on the northwestern part of the Svalbard continental shelf.

Previous investigations have shown that this trough was occupied by an ice stream draining the Svalbard Ice Sheet during the last glacial.

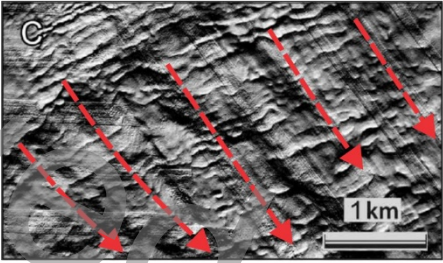
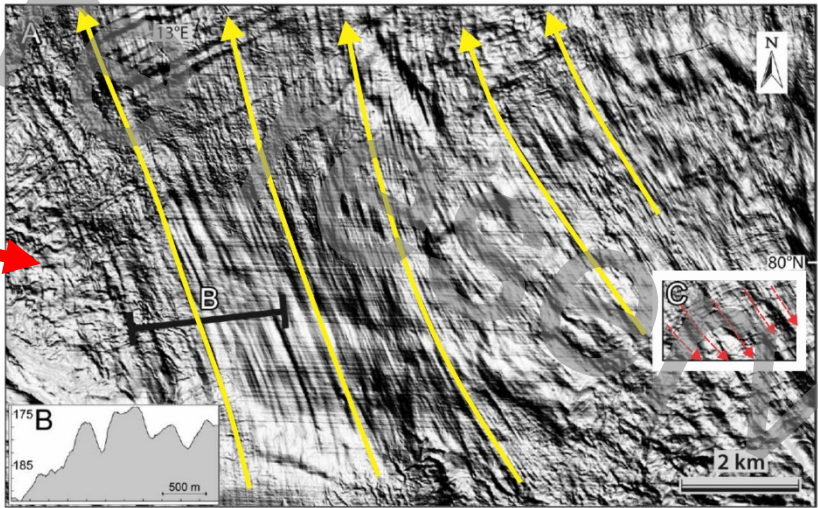
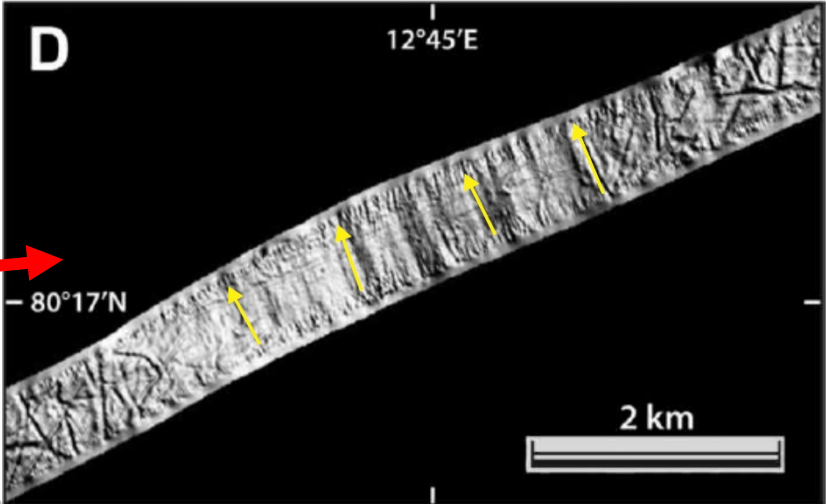
**The deglacial dynamics of this sector of the Svalbard Ice Sheet are presently not well constrained.**

**New multi-beam bathymetric data was acquired in July 2019 (red box).**

Background: present status



Previous mapping of the trough has shown that megascale glacial lineations and recessional moraines characterize the seabed morphology (Ottesen et al., 2007).

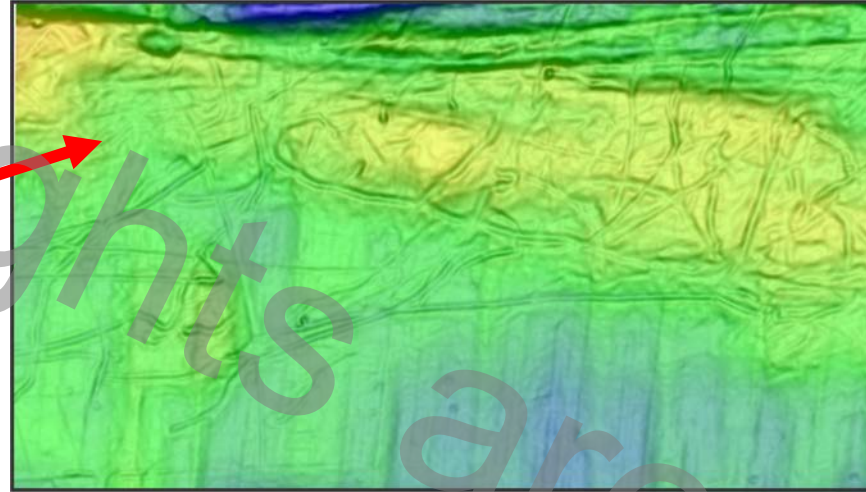
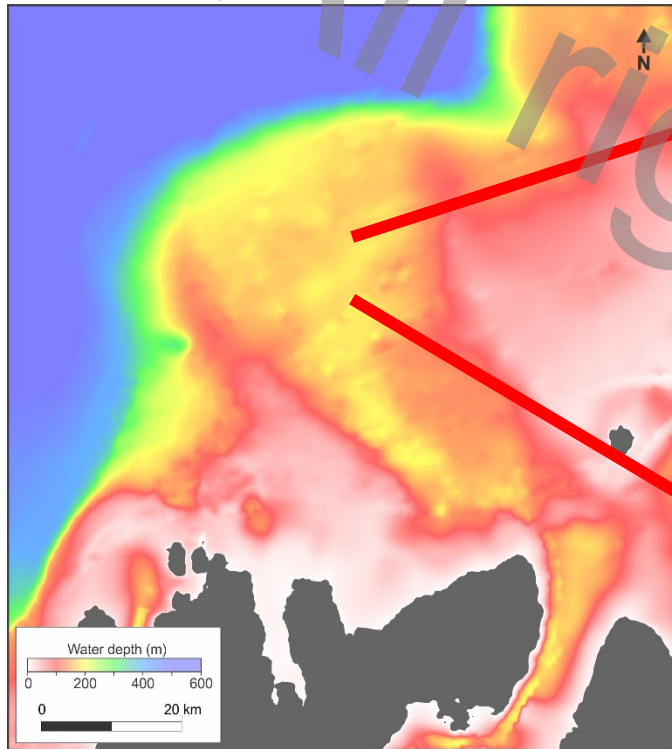


Yellow arrows indicate ice flow direction parallel to the longest axis of the Woodfjorden Trough.

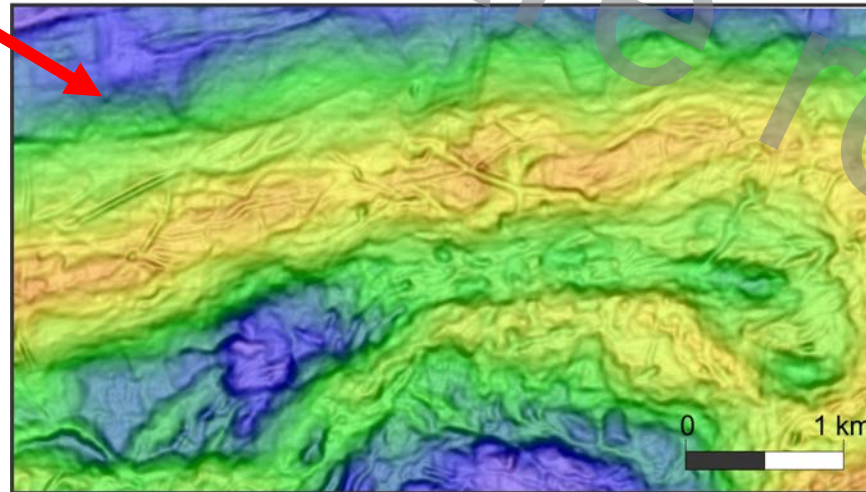
Red arrows indicate stepwise retreat of the ice front during the final deglaciation of the Woodfjorden Trough.

## New mapping based on data acquired in July 2019

The new data reveal a complex seabed morphology including larger (2 km wide, 50 m high) and smaller (100 m wide, 3 m high) ridges, as well as sediment wedges (1 to 2 km wide, 30 m high), partly showing crosscutting relationships.



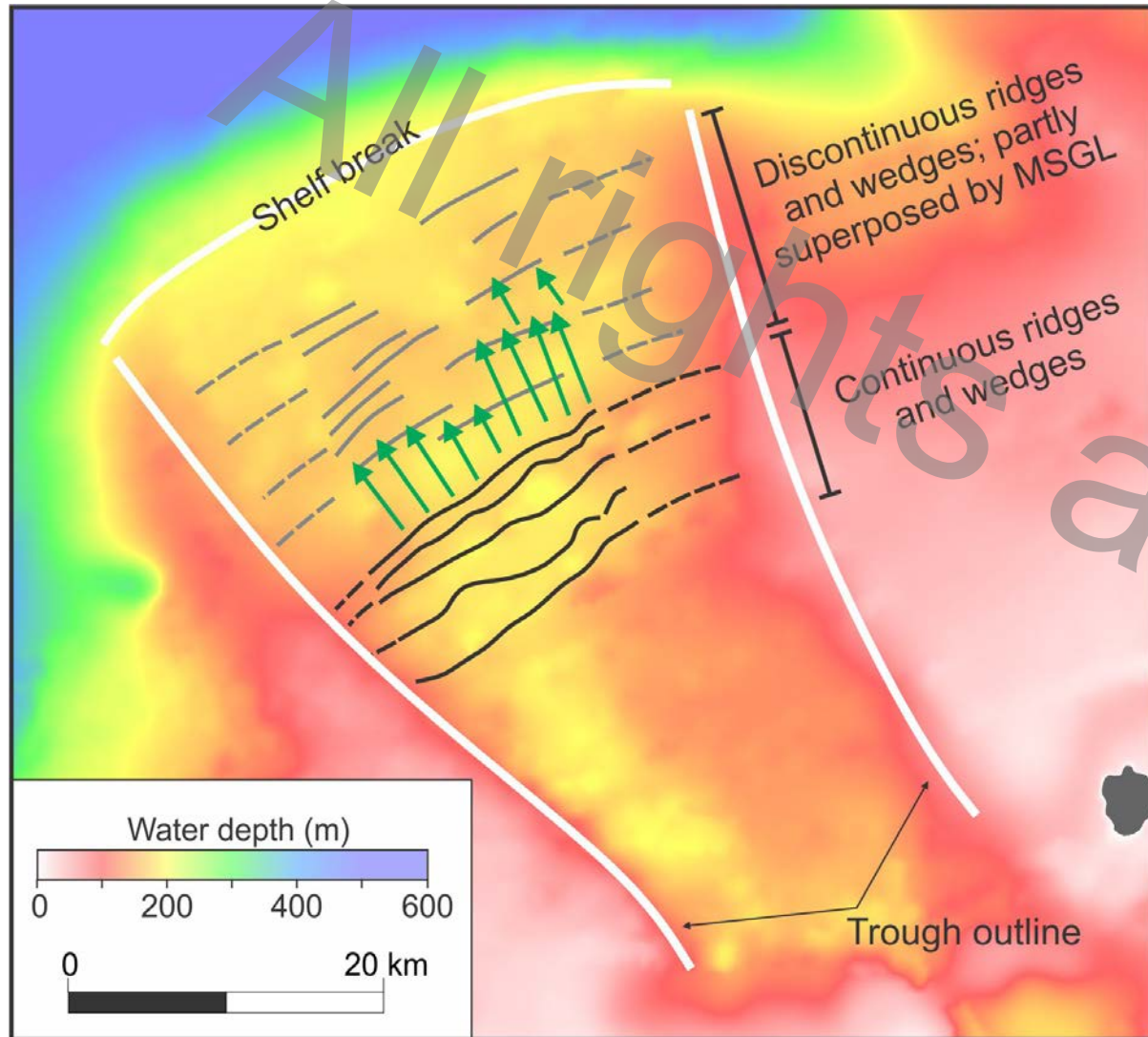
The ridges and wedges are discontinuous in the outer part of the trough, where they are partly superposed by glacial lineations and small- to larger sized iceberg ploughmarks (up to 1500 m wide and 30 m deep).



In the middle part of the trough, more continuous ridges dominate.

**The ridges and wedges are interpreted to be glacial landforms formed by grounded ice within the Woodfjorden Trough.**

## Deglaciation dynamics



The crosscutting relationships of landforms testify to a complex deglaciation, including several advances and still stands of the ice front during overall ice retreat.

Based on their discontinuous characteristics, the ridges and wedges in the outer part of the trough may pre-date the final Late Weichselian deglaciation, i.e. they may have been overridden by a grounded glacier.

The more continuous character of the ridges in the middle part of the trough indicate that these likely date from the Late Weichselian deglaciation.

**The glacial landforms identified here are rather atypical for glacial troughs, and they testify to a highly dynamic grounded ice occupying the outer part of the trough, with a retreat characterized by several periods of ice margin stability, interrupted by readvances.**