

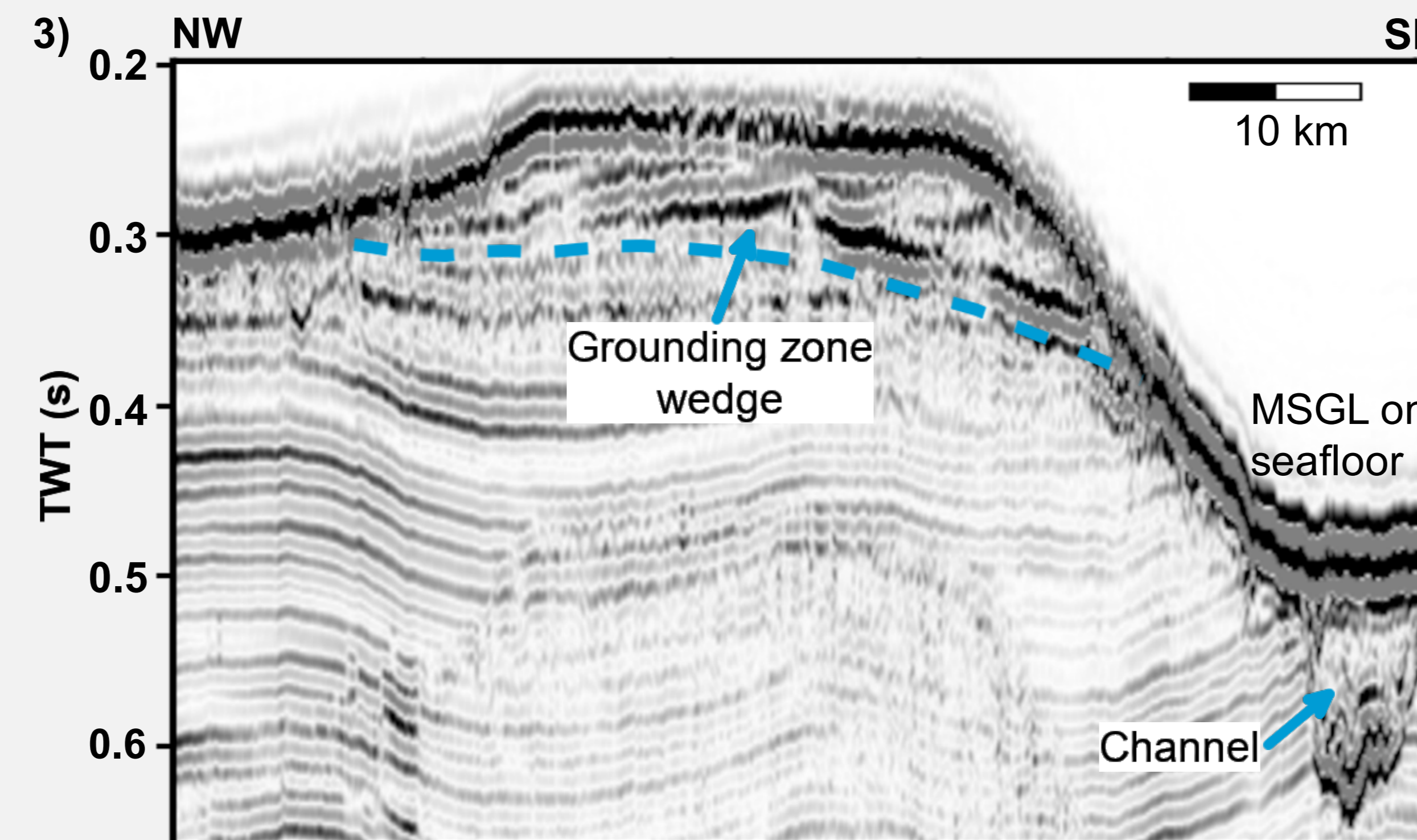
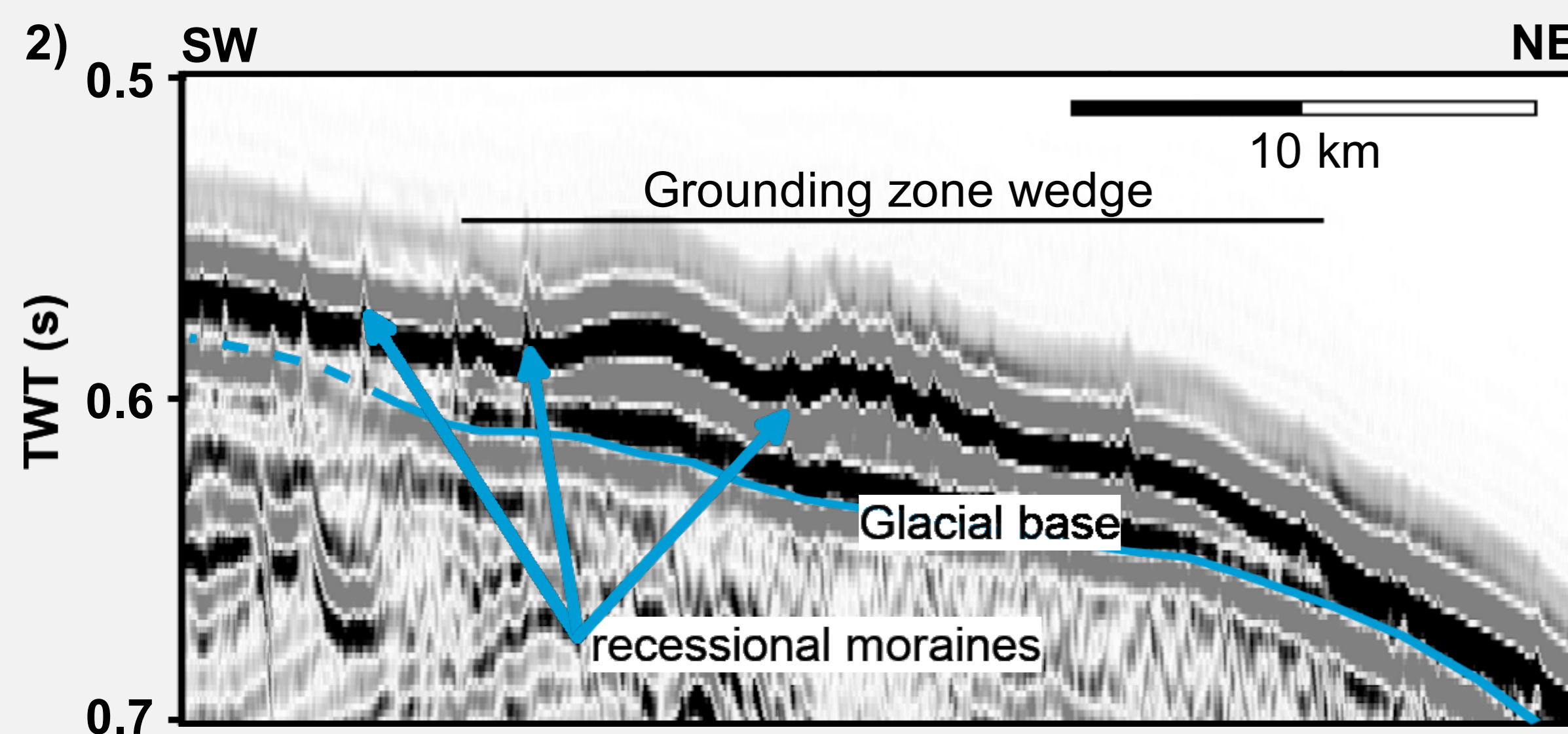
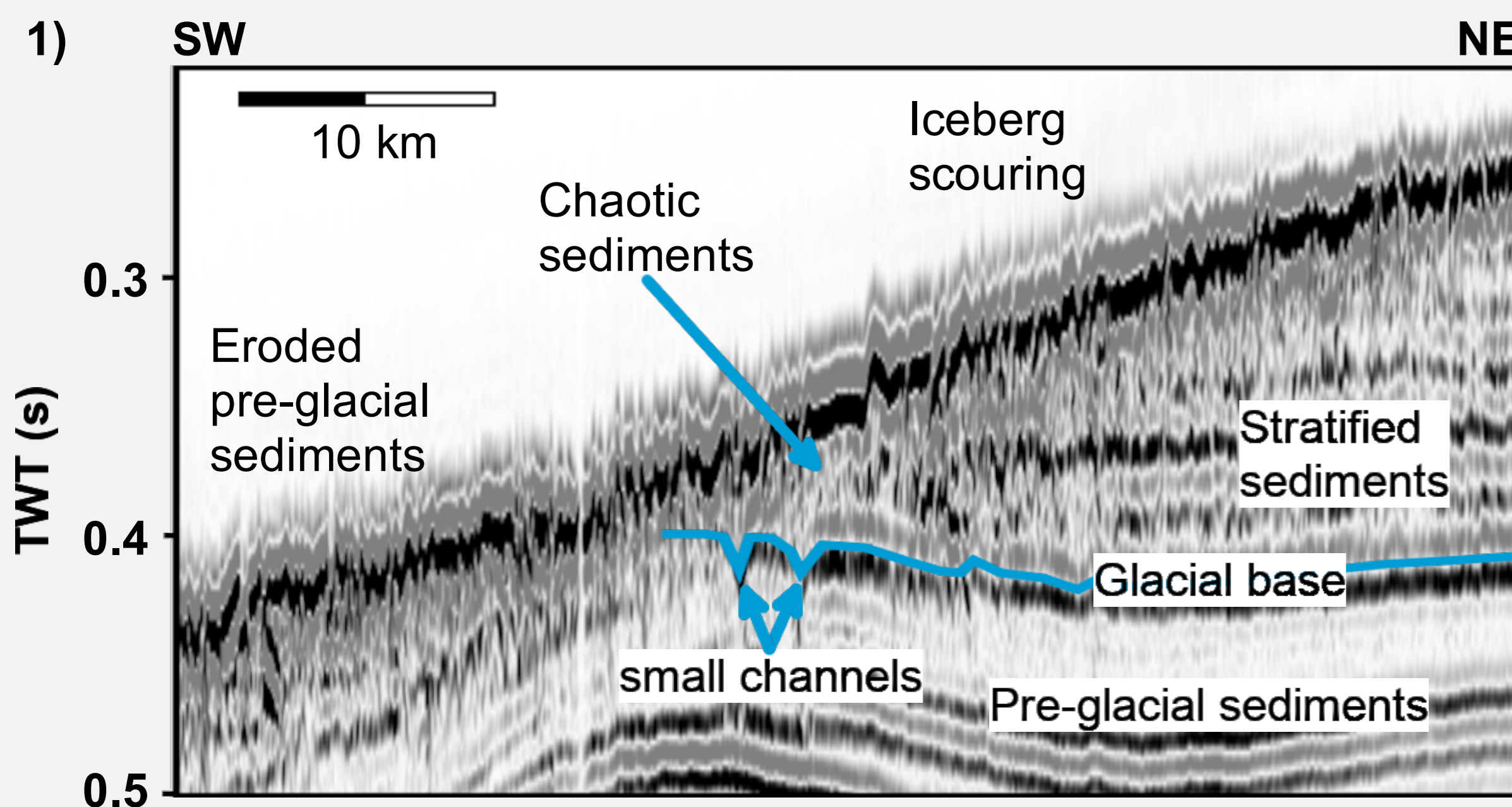
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1. Introduction

The Chukchi Shelf is a broad and shallow shelf in the Arctic Ocean. Recent multibeam data show a widespread impact of grounded ice on the outer Chukchi Shelf and Borderland in water depth shallower than 900 m, dismissing the theory of the absence of ice sheets in this region.

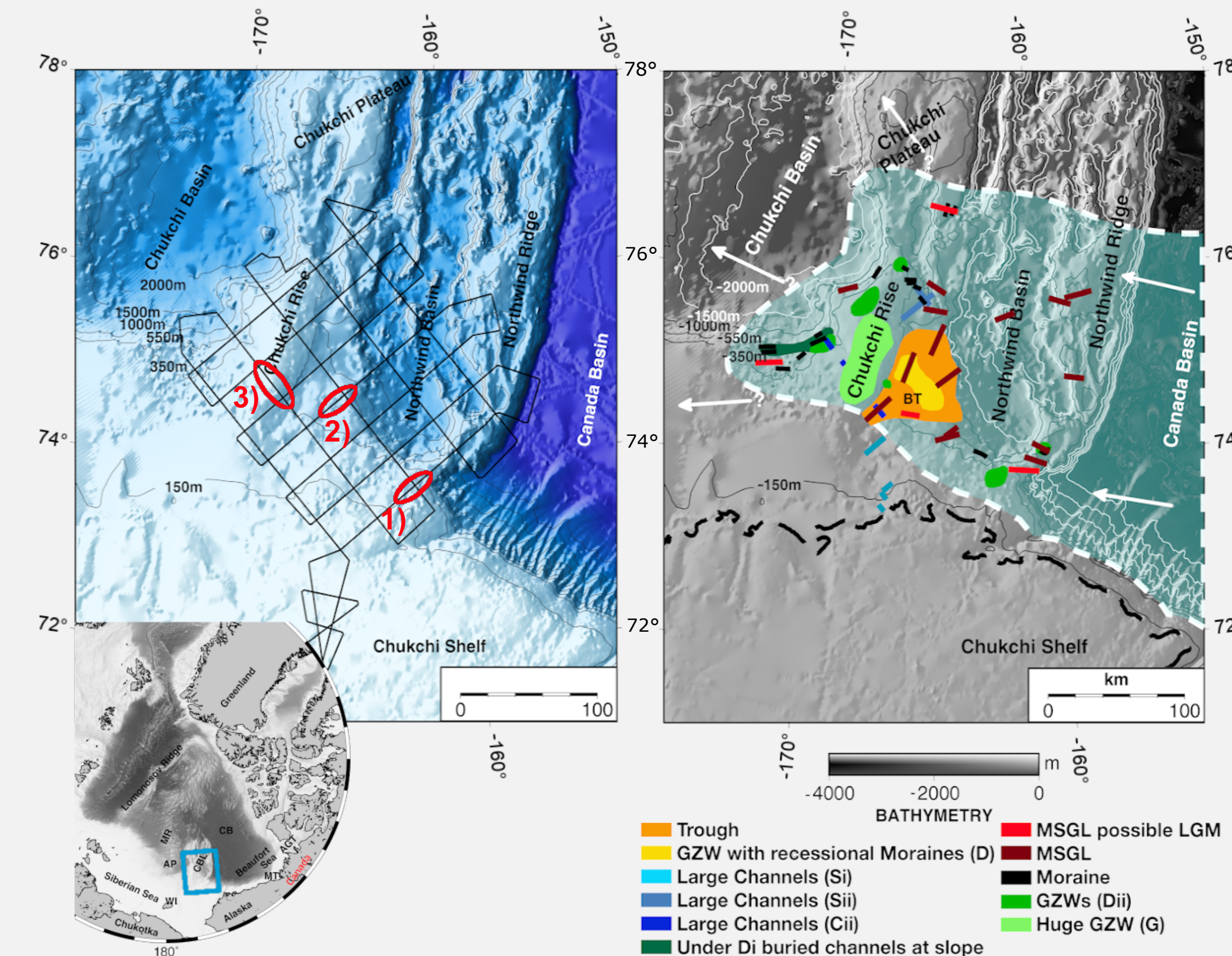
We present reprocessed seismic reflection data of a survey carried out by the RV Marcus G. Langseth in 2011 (Coakley, 2011) to constrain the thickness and distribution of glacial sediments.

2. Results



3. Conclusions

1. A glacial base reflection, which is present over large parts of the Chukchi Shelf and within a bathymetric trough, together with north-south trending seafloor features provide evidence for a grounded ice sheet-shelf system.
2. The erosion of the glacial base reflection, reworked glacial-/interglacial sediments and westward directed glacial bedforms indicate a later glacial erosion on outer shelf.
3. A huge, 48 km x 75 km, grounding zone wedge with a height up to ~145 m on the Chukchi Rise probably formed over the course of several glacial cycles.
4. Channels with a width of up to 12 km and depths of 300 m suggest the existence of large glacial drainage systems and/or melt water outbursts.
5. Several smaller channels of up to 1 km width and 50 m depth, as well as gullies at the western shelf break, show a high supply of melt water.
6. The glacial base reflection is likely an amalgamated surface formed during several glacial episodes.



Left: Overview map of the study area; right: glacial landform distribution over the Chukchi Shelf and Borderland. Light blue: Suggested extension of a thin ice shelf extended from the Laurentide ice sheet during the LGM. This estimation bases on dated sediment cores (Polyak et al. 2007; Park et al. 2017), moraines (Dove et al. 2014), the shallowest MSGLs (Dove, 2014, light red), GZWs on western side of bathymetric highs (medium green) and the areas of erosion

- 1) - stratified sediments in southwestern area, cover high amplitude reflection
 - chaotic sediments and truncation of glacial and pre-glacial material at the transition to Chukchi Borderland below 150 m water depth
 - small-scale channels with ~1 km width distributed over shelf
 - scours on the seafloor between 130 m and 350 m water depth
- 2) - small ridges between 400 m and 600 m water depth
 - assemblage of transparent sediments above glacial base
- 3) - semi-transparent sediments with dipping internal reflections
 - channels with >10 km width
 - mega scale lineations on top of the channel

4. References:
- Coakley, B (2011), „Summary report MGL11-12.“
 Dove, D., et al. (2014), doi:10.1017/S0954102008001557
 Jakobsson, M., et al. (2016), doi: 10.1038/ncomms10365
 Niessen, F., et al. (2013), doi:10.1038/ngeo1904
 Park, K., et al. (2017), doi: 10.1016/j.polar.2017.01.002
 Polyak, L., et al. (2007), doi: 10.1016/j.yqres.2006.08.001

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