Downslope and alongslope sedimentary processes on a high latitude continental margin: NW Barents Sea

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Abstract

The development of high latitude continental margin has been mainly controlled by glacigenic processes during the glacial maxima. Superimposed to these, there are both downslope and alongslope sedimentary processes (turbidites and contourites). This study is part of a PhD project, aiming to study the relationships between the glacial sedimentary input and the water circulation in NW Barents Sea (Kveithola to Isfjorden Trough Mouth Fans). This portion of the Barents Sea has been the target of several surveys in the last decade: SVAIS (R/V Hesperides) in 2007, EGLACOM (R/V OGS Explora) in 2008, GLACIBAR (R/V Jan Mayen) in 2009,

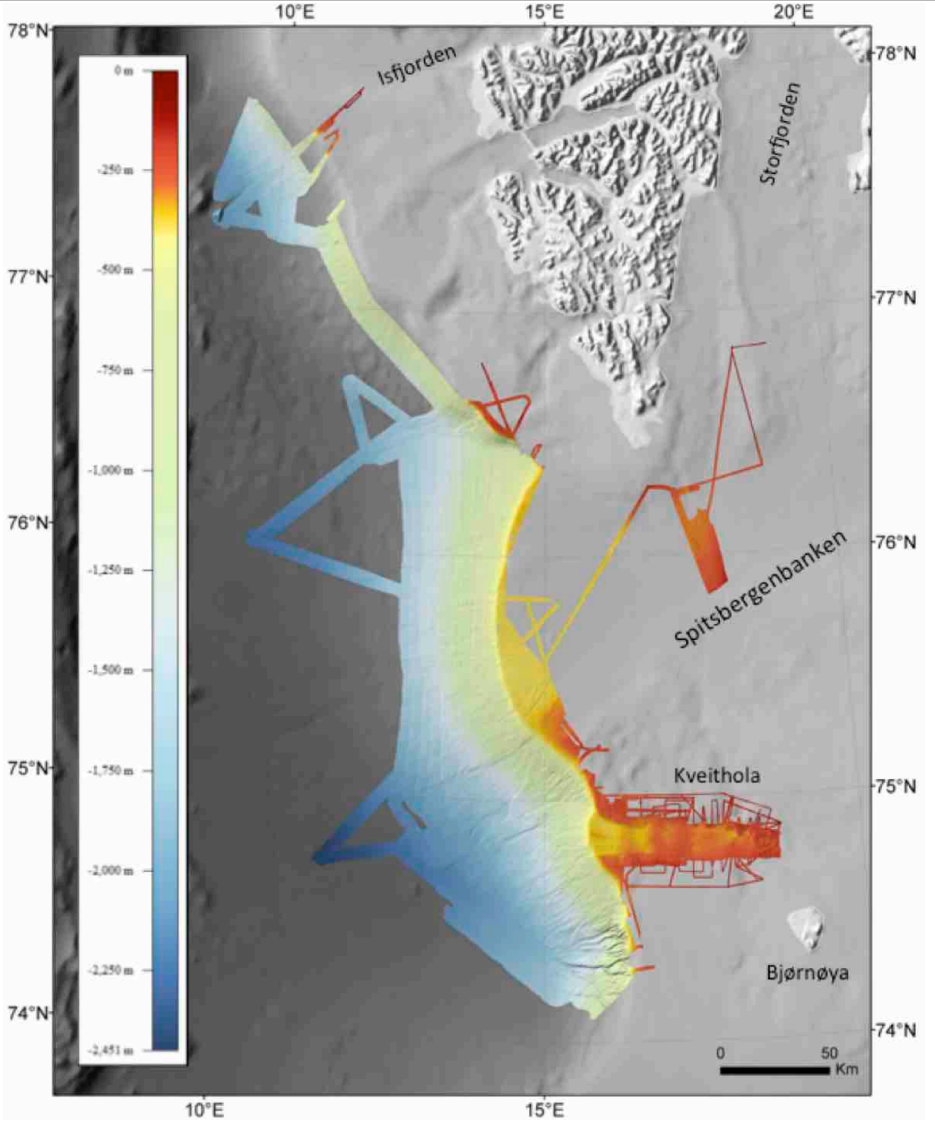

Figure 1: *Multibeam bathymetry dataset collected during various international cruises on the NW Barents Sea continental margin and jointly processed at OGS*

CORIBAR (R/V Maria S. Merian) in 2013, PREPARED (R/V G.O. Sars) in 2014 and the EDIPO and DEGLABAR cruises (R/V OGS Explora) in 2015. These cruises allowed the acquisition of a wealth of new multibeam data that are now jointly processed at OGS (Figure 1). During the most recent EDIPO and the DEGLABAR cruises, from 20th September to 5th October 2015, we have been able to collect geophysical data, in particular Multibeam data, Sub-bottom profiles and Multichannel seismic profiles, as well as oceanographic data, including CTD and ADCP profiles. The EDIPO/ DEGLABAR cruise focused the study of two areas in particular: the first one being the one W-SW of Isfjorden, on

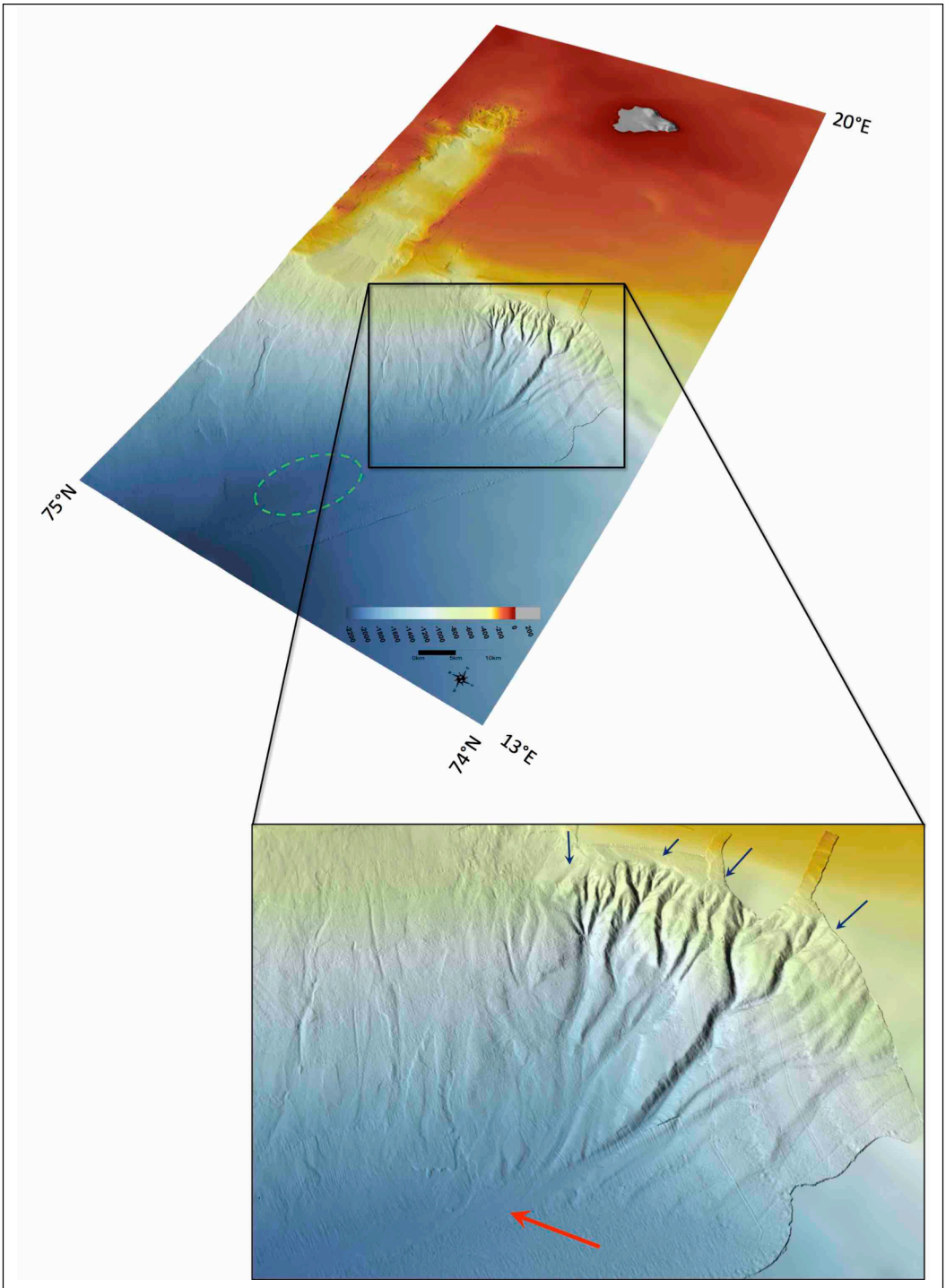

Figure 2: *Multibeam map of the contiental margin south of Kveithola Trough (above) and zoom (below) of the tributary cannels (blue arrows) converging in the trunk-type INBIS Channel (red arrow) inferred to be leading to a deep sea lobe system (light green oval).*

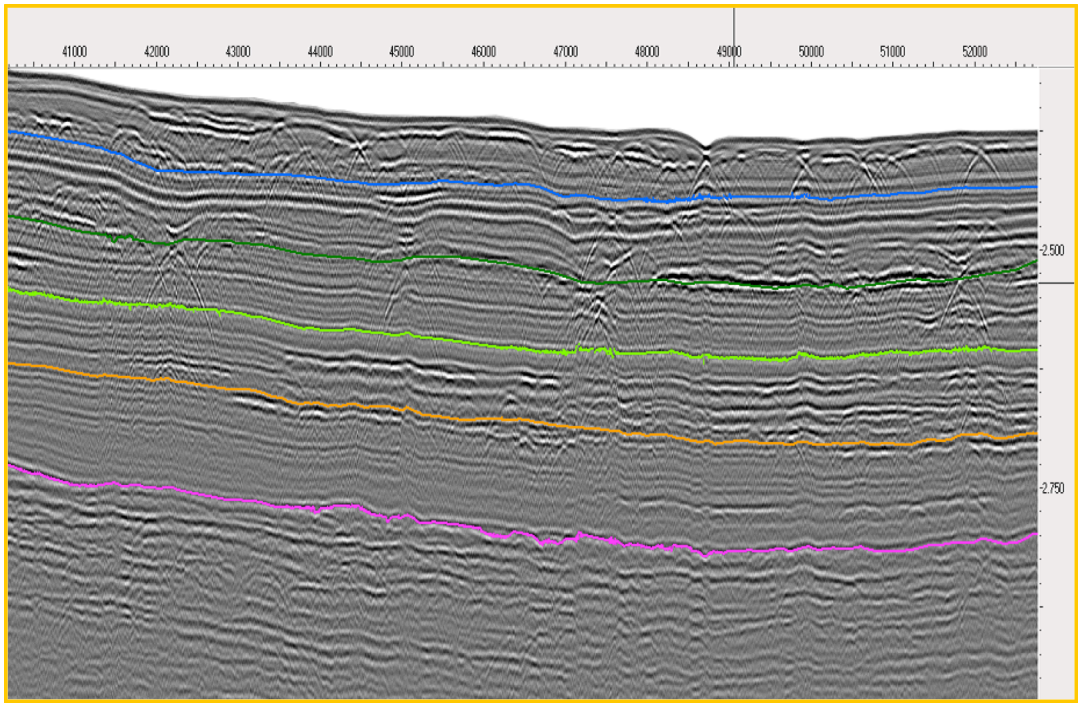

Figure 3: *A portion of seismic profile SV15_03, between two TMFs. The erosions seen in the figure are interpreted as gullies; these erosions can be either produced by dense shelf water cascading, such as meltwaters, or by turbidity flows.*

the Isfjorden TMF; the second one at SW of the Kveithola trough, on the INBIS channel. The INBIS channel originates from a series of tributary canyons, converging in a trunk-type channel, leading to a deep sea lobe system. The INBIS channel is inferred to have been produced by turbidity flows, flowing from tributary canyons incising the upper part of the continental slope between Bear Island TMF and Kveithola TMF. The INBIS channel is a very peculiar structure in the Barents Sea; channel systems are in fact rare on the Northern Norwegian margin and confined to the INBIS and Lofoten Basin channels. At W-SW of Isfjorden there is the evidence of alongslope sedimentary process, in the form of the Isfjorden drift. This structure is asymmetric, with a limited vertical relief. It is elongated alongslope, subparallel to the contour, due to the main current in that area, the north-flowing West Spitsbergen current. The analysis of the EDIPO/DEGLABAR data, integrated with all the other available information will allow to contribute to the comprehension of the relationships between the glacial sedimentary input and the water circulation in NW Barents Sea.

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