Downslope and alongslope sedimentary processes on NW Barents Sea continental margin: new results from the EDIPO-DEGLABAR 2015 cruise.

Andrea Caburlotto[1], José Luis Casamor[2], Lorenzo Facchin[1], Fabrizio Zgur[1], Daniela Accettella[1], Vedrana Kovacevic[1], Marina Monti[1], Davide Deponte[1], Leonardo Rui[1], Paolo Visnovic[1], Claudio Pelos[1], Diego Cotterle[1].

[1]OGS, Istituto Nazionale di Oceanografia e Geofisica Sperimentale; acaburlotto@inogs.it
[2]Universitat de Barcelona;

Abstract

The NW Barents Sea continental margin 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, CORIBAR (R/V Maria S. Merian) in 2013, PREPARED (R/V G.O. Sars) in 2014 and the EDIPO-DEGLABAR cruise (R/V OGS Explora) in 2015.
These cruises allowed the acquisition of a wealth of new geophysical, sedimentological and oceanographic data that allowed improving the knowledge on glacial and climatic history of thia area.

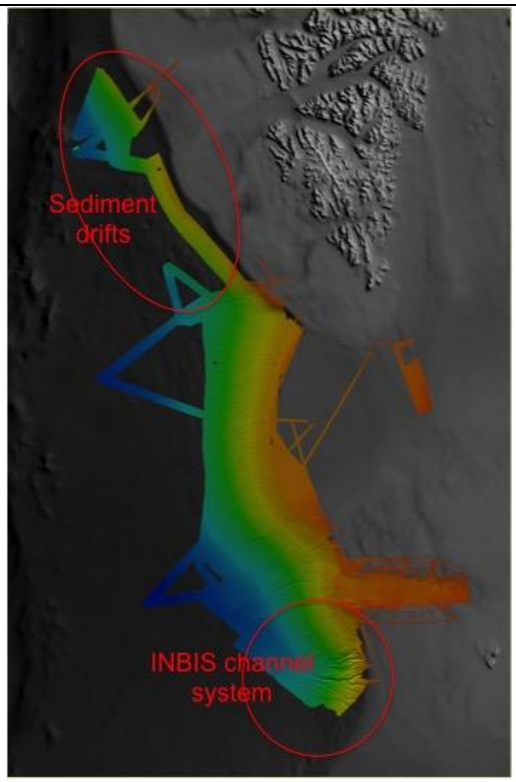

Figure 1: *The multibeam dataset acquired on the NW Barents Sea continental margin since 2007 with the 2 areas deeply investigated by the EDIPO-DEGLABAR 2015 cruise*

During the most recent EDIPO-DEGLABAR cruise (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 the Isfjorden Trough Mouth Fan (TMF); the second one at SW of the Kveithola trough, on the INBIS channel (Fig. 1).
Atlantic water is advected northward through the eastern Fram Strait in the West Spitsbergen Current (WSC). This warm water keep the large areas west and north of Spitsbergen nearly ice-free in winter and thus has implication for the Arctic climate: hence, its flow changes during the past are of great interest from a climatological point of view. Recent studies (*Amundsen et al., 2011; Sarkar et al., 2011*) infer that contour currents on the Svalbard margin were influencing the sedimentation during during Early Pleistocene. Along the Western continental margin of the Svalbard archipelago two sediment drifts (Isfjorden and Bellsund Drift Drift;) developed under the influence of the WSC (*Rebesco et al., 2013*) and have been the subject of recent geological and oceanographic studies in the frame of the project EUROFLEETS2-PREPARED (*Present and past flow regime On contourite drifts west of Spitsbergen)* during summer 2014.

Preliminary results indicate that the two sedimentary deposits are characterized by high sedimentation rates, and characterized by a very expanded and continues Holocene sequence (up to 5-6 metres). These features make this area of particular interest to study the relationship between deepwater ocean circulation and climate change, a topic of great importance but still much discussed in the international scientific community.
During the EDIPO-DEGLABAR cruise, new geophysical (multibeam, MCS and sub-bottom profiler) and oceanographic (CTD and XBT) data have been acquired on the two sediment drifts, that, 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.

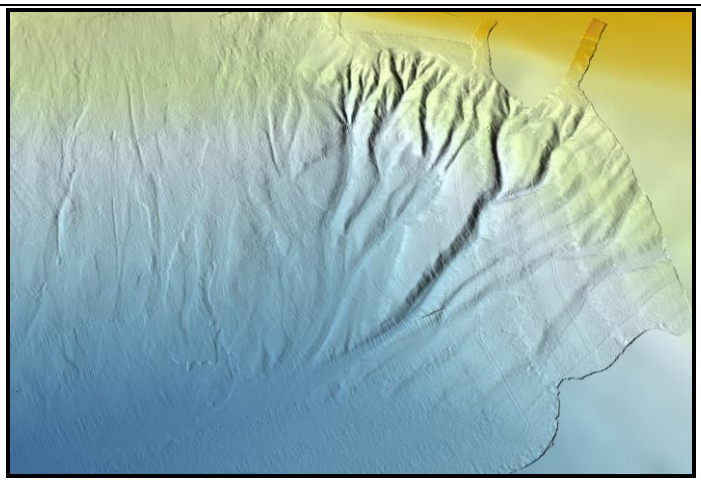

Figure 1: *The multibeam dataset acquired on the INBIS channel system*

The INBIS channel (*Vorren et al., 1998*) is located SW of the Kveithola Trough, directly S of the Kveithola Trough Mouth Fan (Fig. 2). 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.
The INBIS channel originates from a series of tributary canyons, converging in a trunk-type channel, leading to a deep sea lobe system, and 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 presence of a channel system like this, not blanked by glacial sediments, might be due to it's position: this area was relatively protected from Ice Streams fluctuation from Bjørnøya.

References

Amundsen, I.M.H., Blinova, M., Hjelstuen, B.O., Mjelde, R., Haflidason, H., 2011. The Cenozoic western Svalbard margin: Sediment geometry and sedimentary processes in an area of ultraslow oceanic spreading. Marine Geophysical Research, 32 (4), pp. 441-453.

Rebesco, M., Wåhlin, A., Laberg, J.S., Schauer, A., Brezcynska-Möller, A., Lucchi, R.G., Noormets, R., Accettella, D., Zarayskaya, Y., Diviacco, P., 2013. Contourite drifts of the Western Spitsbergen margin. Deep-sea Res. Part I 79, 156e168

Sarkar, S.,Berndt,C.,Chabert,A.,Masson,D.G.,Minshull,T.A.,Westbrook,G.K., 2011. Switching of a paleo-icestream in northwest Svalbard. Quat.Sci.Rev.30, 1710–1725.

Vorren TO, Laberg JS, Blaumme F, Dowdeswell JA, Kenyon NH, Mienert J, Rumohr J, Werner F, 1998. The Norwegian-Greenland Sea continental margins: morphology and late quaternary sedimentary processes and environment. Quat Sci Rev 17, 273-302