

Ref.#: Ge_5
joacwi@igf.edu.pl

ABSTRACT

Submarine morphological features in the coastal zone as a result of the Hans Glacier retreat and the influence of oceanographic conditions in Hornsund (Spitsbergen, Isbjørnhamna, Hansbukta)

Joanna Cwiąkała¹ Mateusz Moskalik¹

¹*Institute of Geophysics, Polish Academy of Sciences - Centre for Polar Studies KNOW (Leading National Research Centre) , Polar and Marine Research Department, Poland,*

Geomorphology of the seabeds of fjords in the Arctic is changing all in time under the influence of the dynamic marine processes (wave, tides, sea currents) and an activity of tidewater glaciers (outflows, calving, retreat). Therefore, the relief of the bottom of fjords can be more or less varied. The study concentrates on the recognition and specification of the submarine morphology of two bays on southern Spitsbergen – Isbjørnhamna and Hansbukta. The important goal of research is to attempt to clarify the origin of submarine features of the fjords.

The study area is located near the mouth of Hornsund Fjord, what causes that the open sea has a big influence on its oceanographic conditions. The division of study area into two bays is mainly due to XX-century warming. Hansbukta started to form during the Hans Glacier retreat. Isbjørnhamna is bordered on the north by Hansbukta. In Hansbukta the dominance of morphogenetic factor is the tidewater glacier. This bay is very deep and it is partly closed by the peninsulas Baranowskiødden and Oseanograftangen. These attributes cause that the dynamic marine processes do not have direct matter of its situation on the relief of bottom. Hansbukta is expanding all the time because of glacier retreat. It is the main reason for creation and modification of the submarine morphology in this bay. The activity of Hans Glacier causes accumulation features like moraines, flat areas in a deep part. The instability of slopes of moraines causes to form the submarine mass movements. Near the east coast of this bay, where the bottom is shallower we can distinguish forms of icebergs erosion like plough marks and pits. Marine process like wave causes a transport of the icebergs. When they reach to the shallower places, they erode the bottom and form pits and plough marks. The forms in this part of the bay show the processes of big icebergs calving from the glacier. In turn, Isbjørnhamna is less deep bay. It is open on the impact of the sea, what causes of enter waves to this bay and modify the submarine morphology. The tidewater glacier does not have a direct impact on the geomorphology in Isbjørnhamna. The icebergs are transported to Isbjørnhamna and erode the bottom under the influence of oceanographic conditions. Marine processes (wave, sea currents) and icebergs transport the sedimentation material. Wave causes forming ripple marks. Transport

of icebergs causes forming plough marks and pits on the shallower parts of the bay. The accumulation forms like flat areas and terminal moraine are situated in the inner part of Isbjørnhamna. Flat areas are dived by rock sills. In turn, pockmarks have termogenetic/biogenetic genesis and they are related with geology.

The diversity of submarine forms on the seabed of fjords in Spitsbergen is huge. The analysis of data lets to better known submarine features and influence of the fluctuations oceanographic conditions and the activity of tidewater glacier effect on them.

Acknowledgement: The work has been financed by: Leading National Research Centre (KNOW), National Science Centre project 2013/09/B/ST10/04141