

The development of the marginal zone  
of the Hörbyebreen and the share of proglacial water  
in the formation of the Petuniabukta tidal flat.  
central Spitsbergen

The research programme of the 1986 expedition of the Quaternary Research Institute of Adam Mickiewicz University included, besides geomorphological mapping, the fundamental issue of the development, particularly contemporary, of the marginal zone of the Hörbyebreen as well as the impact of its meltwater on the formation of the Petuniabukta tidal flat.

The choice of the glacier was not a random one. It is one of the few representatives of the type of areal decay, so valuable for comparative studies with the North Polish Plain areas. The investigations sought to determine stages in the development of the marginal zone of the glacier and to detect those factors which were responsible for this type of ice degradation. As ice decays, a large amount of meltwater is released forming a rich system of proglacial runoff. It is connected with the formation of marginal outwash plains and an extra-marginal one. The proglacial runoff is rich and is carried away by three principal systems — an eastern, a middle and a western river. In the marginal zone the river systems are connected by means of numerous ephemeral proglacial lakelets in which a part of mineral material is deposited. A substantial part of it, however, is carried outside the marginal zone and deposited on the extramarginal outwash plain on the tidal flat. This is a morphological-sedimentary contact area between these two zones. In turn, the tidal flat with its inflow-outflow level difference of 1 m is an area of sea action.

The rivers leave the marginal zone through three gorges. Thus, it was possible to get a very general idea (after a month and a half of observations) of the functioning of the marginal zone of the Hörbyebreen and the transport and deposition of mineral matter from the foreland to the tidal flat as a local denudation base.

An analysis was also made of the deposit profile in an exposure located in the Hörbyebreen foreland, at the foot of Gizehfjellet. By establishing the lithofacial properties and the sequence of sedimentation levels, and by making

use of radiocarbon dating and TL analysis, it was possible to attempt a presentation of the paleogeographical development of the Hörbyedalen.

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