

Talus slope development in the time of deglaciation: a case study of the Rev Valley, SW Spitsbergen

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Every high-mountain area is characterized by the occurrence of talus slopes. A process of development this kind of forms depends on among other things climatic conditions. Currently in Spitsbergen, we observe the deglaciation process caused climate changes. This causes that the evolution's tempo of all environments linked with glaciers is very high. It also concerns the talus slopes, which, in the last time, are more often used as key element to paleo-environmental reconstructions for last thousands. In this paper, we present the geophysical surveys of talus slopes conducted in the Rev Valley (SW Spitsbergen). The valley was shaped by glacier, which left behind among other things glacial lake and buried glacial ice in mixed slope-moraine material. Nowadays, the talus slopes in this valley develop under the typical conditions of periglacial environment. In the studies of 15 talus slopes we used the ground-penetrating radar (GPR) and electrical resistivity tomography method (ERT). The studies allowed to recognize the internal structure of talus slopes and to determine a character of their elements, such as thickness of slopes, permafrost table and a depth of active layer, present of buried glacial ice, sedimentological structures caused by various deposition of material on the slope surface, and finally a shape of bedrock. A comparison obtained results indicates on relevant regularity in the development of internal structure of talus slopes. These are for example visible differences in the terms of present of permafrost, which is located from a depth 2-3 m in the oldest slopes to a depth 4-5 m in the youngest. On the other hands, the studies discovers the deviations from the typical evolution models. The buried glacial ice has not been survived in a younger forms, whereas it is present in these older slopes. Based on the results we created the proposition of model of talus slope evolution developing in a periglacial period. In this time the development of slopes characterize a very high variability, not much lower than in previous paraglacial period. This work was financed from the funds of the National Science Centre in Poland received by Krzysztof Senderak in the Preludium 12 project: Determination of the evolution of slopes of southern Spitsbergen on the background of climate changes (2016/23/N/ST10/00162).

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