

Abstract

The thesis deals with the transport of sediments in gravel streams in Polar regions. The study of bedload sediments, the transport and changes in their grain size and shape characteristics has a long history, but only recently have they been studied in proglacial rivers of high latitudes. The assigned work aims to study and compare the behaviour of braided gravel-bed rivers and to develop appropriate methods of study and data collection in the Polar regions. Three catchments of proglacial braided gravel-bed streams were selected for the research. Two river catchments are located on the Svalbard archipelago in northern Billefjorden and one river catchment is located on James Ross Island in Antarctica. These catchments of gravel-bed streams are located in the forefield of glaciers, which has been studied since 2016 during the research expeditions. The Munin River catchment on Svalbard was selected due to the morphology of the whole river catchment, the presence of active sediment sources and the well-developed river bed. The second catchment of the Keller River on James Ross Island was selected as a suitable example for assessing the impact of connectivity in the catchment area on sediment transport. The third catchment of the Hørbye River on Svalbard is characterized by gravel sediments in front of the Hørbye glacier and has been used to study their changes in relation to hydrological activity on the floodplain. This work brings new results of fluvial geomorphological research of the mentioned Polar braided rivers. It focuses on the transport of sediments in the forefield of glaciers and the development of grain size and shape characteristics. It evaluates the factors influencing the transport of sediments, such as their different sources and their activity and, last but not least, connectivity in the river catchment. This work provides comprehensive information on the functioning of proglacial river systems in selected river catchments with respect to the interaction between river bed morphology, sediments and hydrological activity associated with climate. The location of sediment sources, their activity (main river tributaries) and the length of transport to the main stream from the source to the mouth are taken into account. At the same time, the influence of the connectivity of the slopes to the river bed and the morphology of the braidplain, which has a dominant influence in the upper parts of the river basin, are assessed. Finally, these effects are reflected in the shape characteristics of the transported petrological types, especially in the different degree of roundness of the clasts.