



Detailed mapping of alluvial fans geomorphology in periglacial environment of Svalbard: application of unmanned aerial vehicle (UAV) surveys

Aleksandra Tomczyk and Marek Ewertowski

Faculty of Geographical and Geological Studies, Adam Mickiewicz University, Poznań, Poland (alto@amu.edu.pl)

Landforms, whose shape resemble fans and cones are common elements in many mountain areas in all climatic zones. Different processes are responsible for their construction, including whole range from gravitational mass movements to fluvial transport and deposition. To understand fan evolution and its response to environmental changes it is necessary to obtain knowledge of fan morphology, processes acting on fans, and how these processes change in various temporal and spatial settings.

The purpose of this research is to provide detailed data on geomorphology of fan surfaces in periglacial environment. The study was conducted on Spitsbergen Island, which is part of the Svalbard archipelago, located in the high-Arctic. Detailed geomorphological mapping of surfaces of several fans located in the vicinity of Longyearbyen, capital of Svalbard and near the Petuniabukta, were performed based on UAV surveys. Surveys were conducted using small quadcopters in 2015, 2016 and 2017. Orthomosaics and digital elevation models (DEMs) with cm-scale resolution were produced from each survey session. Mapping revealed a complex pattern of fine scale landforms, which records different types of geomorphological processes operating within surface of fans. Further interpretation allowed us to distinguished palimpsest of landforms related to several different periods of geomorphological activity.

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