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Spatial distribution and classification of rock glaciers in Kyrgyz Ala-Too Range, Central Asia

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In the arid and semi-arid region of Central Asia, Tien Shan Mountains is known as important water tower in Central Asia. Although the current situation of mountain glaciers and permafrost should be researched for estimate of water resources, mountain permafrost is not clarified in the Tien Shan (Marchenko et al., 2007; Sorg et al., 2012). In recent years, landslides caused by the melting of mountain permafrost in Ak-Shiyrak mountains, show that recent changes of mountain permafrost begin to influence to mountain environment including the disaster. In this study, to clarify mountain permafrost environment, we researched spatial distribution and classification of rock glaciers in Kyrgyz Ala-Too Range, Tien Shan Mountains. In addition, we applied InSAR analysis to the ALOS PALAR data obtained in 2007-2010, to research moving of rock glaciers. We extracted polygon data of rock glaciers based on aerial photo interpretation and ALOS PRISM, using ArcGIS. Rock glaciers were classified an active and inactive-fossil types by NDVI (Normalized Difference Vegetation Index) of ALOS AVNIR-2 and field observation in the summer 2013. The distributions of active rock glaciers show the lower limit of mountain permafrost is 3300m in the northern part and 3500m in the southern part of the Kyrgyz Ala-Too Range. We confirmed moving of some rock glaciers in this mountain area using InSAR analysis. In particularly, the moving of rock glaciers in the southern part of the range is remarkable. The most of these active rock glaciers developed from glacier ice. We report the results in detail in JpGU meeting.

Keywords: mountain permafrost, rock glacier, InSAR, ALOS PALSAR, Tien Shan Mountains