



Impact of the climate change on the Petrov Lake evolution (Tien Shan mountains, Kyrgyzstan)

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An intensive melting and retreat of glaciers is observed in the majority of high mountains all over the world. Melting water of glaciers influences changes in hydrological regime of water streams and causes overfilling of high mountain lakes basins. Dams of many lakes are very unstable and they often burst open.

More than 2000 of alpine lakes covering more than 0,1 hectare are recognized in a territory of Kyrgyzstan. Nearly 20 % of this number is supposed to be potentially dangerous because of instability of moraine or landslide dams, frequent overflowing, rapid development of lake basin and melting of buried ice inside the moraine.

According to the last inventarization in total 328 lakes have been catalogized as potentially dangerous, 12 lakes are considered as actually dangerous, other 25 feature high potential hazard. Since 1952 more than 70 disastrous cases of lake outburst have been registered. The hazardous alpine lakes are studied in Kyrgyzstan systematically since 1966. Last six years the monitoring work is carried out within the programme of Czech-Kyrgyz cooperation. The cooperation of experts from the fields of hydrology, glaciology, geomorphology and geophysics has been adopted. For the hazard assessment, evolution of glaciers and lakes was reconstructed using historical reports, aerial photographs and satellite images.

Within an interdisciplinary study, an assessment of glacier-related hazards in the Petrov lake region (Ak-Shijrak Range, the Inner Tien-Sahn, Kyrgyzstan) was performed. The cooperation of experts from the fields of hydrology, glaciology, geomorphology and geophysics has been adopted. For the hazard assessment, evolution of the Petrov glacier and lake was reconstructed using historical reports, aerial photographs and satellite images. Geomorphological mapping and geophysical soundings was applied to the lake territory and the moraine dam. A potentially hazardous areas of the dam were thus discovered. Though no direct evidence for imminent outburst was found, subsurface drainage zones and cracks that could potentially cause a sudden extremely high discharge were identified. In past three decades the Petrov Lake doubled in size by more than twice while in recent years its area has been increasing by more than 92 thousand square meters per year.