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Hydrological regime of Lake Adygine, Tien Shan, Kyrgyzstan

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Glacier retreat in high mountain areas around the world is considered one of the major geosciences research topics of last decades. This process may result in formation and further development of glacial lakes that are often unstable and pose a threat to downstream valleys.
The studied area is situated at the end of a tributary valley on the northern side of Kyrgyz range, about 40 km south of the capital - Bishkek. Glaciers of Central Tien Shan are considered very sensitive indicators of climate change. The studied lake is part of a system of young lakes situated near the front of a retreating glacier therefore it ranks among potentially dangerous ones. The area is closely observed, terrain research including bathymetric, geophysical, geodetic measurements was carried out during last ten years.
The lake level and its dependence on the changing climatic conditions in the area have been monitored in detail at this location since August 2007. Data from two meteorological stations are used to explain lake water level fluctuations, especially during ablation season when the lake is drained by a surface channel. The hydrological regime of the lake is compared with a regime of glacial streams, individual factors that affect it are described and possible trends and uncertainties that arise from it are analysed. The lake is also drained by subsurface channels, and as the water level declines over the cold part of a year, their capacity is studied and compared among years.
The main aim of the study is to explain any deviations or changes found in the hydrological regime of the lake and to decide whether their cause could mean a decreased stability of the lake dam. Part of the dam is made up of moraine with buried ice and as the lake is drained by subsurface channels, their capacity can be changed due to moraine subsidence when the ice melts. This may lead either to sudden enlargement of channels' capacity or to their blockage, both of which could cause lake outburst.