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Mountain lakes of Kyrgyzstan with regard to the risk of their rupture

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More than 2,000 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 the lake basin and melting of buried ice inside the moraine.

According to the last inventarization in total 328 lakes have been catalogued as potentially dangerous, 12 lakes are considered as actually dangerous, another 25 feature high potential hazard. Since 1952 more than 70 disastrous cases of lake outbursts have been registered. The hazardous alpine lakes have been studied in Kyrgyzstan systematically since 1966. Over the last six years the monitoring work has been carried out within the programme of Czech-Kyrgyz cooperation.

Alpine lakes in the territory of Kyrgyzstan can be classified into several renetic types and sub-types. The moraine-glacial lakes are considered as the most dangerous type including 47% of listed lakes. The largest lake of this type is the Petrov lake, which has been studied and monitored in detail by Czech-Kyrgyz team over the last four years. According to the recent knowledge the lake has an area of 390 hectares, the water volume of more than 60 mil. m^3 and the maximum depth 69 m. During the last 50 years, the area of the lake has expanded 4 times and, during the recent period (from 1999 to 2006), the water surface has been increasing by more than 9 ha a year. The annual retreat of frontal part of glacier tongue is 50 – 65 m during the last decade.

The danger of outburst is increasing significantly due to the influence of recent climate changes and rapid glacier retreat. The evidence for this fact is the outburst of Zyndan lake in 2008. Three people died besides the damage of some houses and infrastructure. The lake of estimated volume of 480,000 m^3 appeared during last five years just in front of terminal part of small glacier.

The hazardousness of other lake types is more limited but it is necessary to pay attention especially to the lakes dammed by landslides and debris-flows. These lakes are characterised by high volume of water. The outbursts of this type of lakes are less frequent but regarding the water volume can be very disastrous. As the pilot locality for long-term studies was chosen the Koltor lake in northern Kyrgyzstan. The lake of the area 22.15 hectares and the volume 1,9 mil. m^3 is endangering the lower part of the valley and adjacent part of densely populated Chu depression.

Besides the mentioned localities, the Adygine pilot locality is monitored in the long-term. The climatological and glaciological programme have been implemented in addition to the lake monitoring.