Potentially dangerous glacial lakes in Kyrgyzstan
Research overview of 2004-2015

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Territory
Kyrgyz republic
Area: 198,500 km²
Population: 5.3 mil.
Population density: 25 people/km²
Capital: Bishkek
Mnt ranges: Tien Shan, Pamir, Alay
Mean altitude: 2,750 m asl
Highest peak: Pik Pobedy 7,439 m asl
Glacier area: 8,169 km²
Areas of interest

Methods
Hydrology: stream discharge, lake water level monitoring, bathymetric measurements, physical parameters of water
Climatology: basic meteorological parameters measurement
Geodesy: demarcation of lake shoreline, glacier terminus, valley and channel profiles
Geomorphology: analysis of lake’s watershed
Geophysics: gravimetry, GPR, geoelectric methods
Engineering-geology, hydrogeology
Helicopter monitoring flights

Major sites
Petrova
Retreating glacier Petrova (40-60 m/yr) causes lake area and volume growth. Now the lake has area over 4 km² and volume of 70 ml. m³. It is dammed by a large complex frontal moraine in which there are over 30 thermokarst lakes. ERT showed existence of buried ice inside the dam. Lowering of lake level to reduce pressure on the dam was proposed and conducted.

Lake outbursts
There are several recorded outbursts per year in Kyrgyzstan, those in distant regions without settlement may occur unnoticed. To study the site right after an outburst is very useful for proper understanding of possible outburst mechanisms. Lakes where repeated outburst occurred should be monitored to learn circumstances preceding the event. Various sensors are tested to serve as part of early warning system.

Lake Zyljan after drainage
Channel below the lake

Lake Tester had repeated outbursts, last event was in July 2012. The lake 16 days before outburst (left) – the usually empty depression was partly filled. Despite lake’s small volume the flood transformed into a debris flow with estimated max discharge of 300 m³/s. Ala Archa channel (downstream of Tester) 4 hours after the lake drained (right). The flood was recorded in 40 km distant capital.

Lake Cherkanak suburface drainage channel

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