



Thermal properties and phase composition of water for frozen rocks of Por-Bajin island (Republic of Tuva, Russia)

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We investigated current permafrost state, thermal properties and phase composition of water for frozen rocks of Por-Bajin Island (Tere-Hol Lake, south-east part of Tuva republic, Russia). Rocks of the island are represented by dispersing grounds in permafrost state. The architectural monument Por-Bajin fortress (the middle of the VIII century) located at the island can be destructed due to thawing of frozen rocks resulted by water level rising in the surrounding Por-Bajin lake. Seasonally thawed layer on the island varies from 1.1 to 1.8 meters based on drilling observations from 13 drill holes the. Measured in the field the thermal conductivity indicates the low values in seasonally thawed layer (from 0.14 to 0.19 Wm-1K-1). Twenty most typical for the studied area frozen handsamples were collected from several holes in the depth interval from 1.5 to 10.15 meters. The humidity of sampled specimens varies from 13 to 270 percents and density varies from 1.21 to 2.17 g/cm³. Investigations of grain-size composition, thermal properties and liquid phase composition were undertaken using laboratory methods. The grain-size composition of Por-Bajin grounds varies from clays to gritstones and gravelites with clay-silt matrix. Phase composition of water in the frozen grounds was studied by contact and cryoscopic methods. Thermal properties were investigated by the I-st type regular mode method (a-calorimeter). Based on obtained data computer model allowed to forecast the evolution of permafrost at the island and predict the destiny of Por-Bajin monument. This work was supported by grant from President of the Russian Federation NSh – 4078.2008.5