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Composition, structure and properties of sediment thermal springs of Kamchatka

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The paper deals with the physical and mechanical properties sediment thermal fields Mutnovsky, Lower Koshelevo and Bannyh (Kamchatka). This multi-component soils, mineral and chemical composition of which depends on the formation factors (pH, temperature, salinity of water, composition and structure of the host volcanic rocks).
Samples Lower Koshelevo sediment thermal sources differ in the following composition: smectite, kaolinite, kaolinite-smectite mixed-mineral. Samples of sediment thermal springs Mutnovsky volcano in accordance with the X-ray analysis has the following composition: volcanic glass, crystalline sulfur, plagioclase, smectite, illite-smectite mixed, illite, chlorite, quartz, cristobalite, pyrite, melanterite, kaolinite. Natural moisture content samples of sediment thermal springs from 45 to 121%, hygroscopic moisture content of 1.3 to 3.7%. A large amount of native sulfur (up to 92%) and the presence of amorphous material gives low values of density of solid particles (up to 2.1 g/cm3) samples Mutnovskii thermal field. The values of the density of solids sediment Koshelevo and Bannyh hot springs close to those of the main components of mineral densities (up to 2.6-3.0 g/cm3). The results of the particle size distribution and microaggregate analysis of sediment thermal springs Lower Koshelevo field shows that the predominance observed of particles with a diameter from 0.05 mm to 0.25 mm, the coefficient of soil heterogeneity heterogeneous. In the bottom sediments of the thermal springs of the volcano Mutnovsky poorly traced predominance of one faction. Most prevalent fraction with particle size 0.01 - 0.05 mm. When analyzing the content in the soil microaggregates their content is shifted towards particles with a diameter of 0.25 mm. The contents of a large number of large (1-10 mm), porous rock fragments, due to the deposition of pyroclastic material from the eruptions of the last century. Present in large amounts rounded crystals of native sulfur associated with the rise of mixed solutions, formed at the boundary of secondary boil through faults to the surface thermal boiler (Bortnikova et al., 2009). Calculated flow index and plasticity, shows the classification in accordance with GOST 25100-2011. From these figures it is clear that all the sediments are sandy loam and are in a fluid state.
A clear relationship between temperature, pH and particle size distribution of sediment thermal springs can not be traced, great importance is the geological evolution of the volcanic activity, hydrogeological conditions and the time factor. Therefore, samples with a currently active Mutnovsky volcano - sandy loam, sediments of the thermal springs Koshelevo fields are often to loams. The bottom sediments of thermal springs from the territory of the Lower Koshelevo thermal field in a natural occurrence in a state of higher yield strength, so they are an unstable surface, which may cause landslides. The bottom sediments of thermal springs are low explored subject of engineering geology, it is important to examine their properties to simulate the conditions of formation and the development of dangerous processes.