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Experimental research of joint influence of salinization and petrolium pollution on thermal properties of frozen kaolinitic clay

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Currently the majority of gas and petroleum deposits is situated in permafrost zones, some of them – on saline territories. Often leaks happen. It deals with development of deposits, petroleum keeping and transportation. During the petroleum extraction high mineralizing water inrushes are possible. Bringing in soil of different solutions and petroleum essentially changes its thermal and mechanical properties. These changes can lead to changes of bearing capacity. Also buildings deformations are possible. So it is necessary to know how different pollutants influe on ground properties. There are researches on properties of saline soils and on properties of soils polluted with petroleum. Currently there is no studies that describe changes of ground properties with joint pollution of salt and petroleum.

We had for an object to research joint influence of salinization and petroleum pollution on thermal characteristics of thawed and frozen grounds, particularly on thermal conductivity, heat and temperature conductivity. We made an experimental research of clean, saline, polluted and join saline and polluted soil. In addition we made experimental research of granulometric composition and control measuring of salinization.

We carried out tests on pastes with different gradations of salinization (Ds=0%, Ds=1,0%, Ds=2,0%) and petroleum pollution (z=0%, z=2,5%, z=10%). Thermal characteristics were measured by regular condition method and by monotonous warming up method. Granulometric composition was identified by areometr, and gradation of salinization was detected by electroconductivity measuring of water extract. Influence of pollution and salinization is different for sand, loam and clay. In this work we used kaolinitic clay as a model ground.

In our report the results are considered and dependence of thermal characteristics from salinization and petroleum pollution is discussed. The research was made in wild temperature diapason.

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