Geophysical Investigations of Saline Permafrost at Ilulissat, Greenland

The technical properties and general state of permafrost in Greenland is not well documented. A new coordinated investigation has been initiated, for ground temperature measurements and permafrost mapping in Greenlandic towns in sporadic, discontinuous and continuous permafrost zones. We present investigation results from one of the sites, located at Ilulissat, in an area of discontinuous saline permafrost. We have established ground temperature measurement stations and conducted a shallow geoelectrical study. Our results show that the sediments in the studied area mainly consist of very frost susceptible silty clays. The area has permafrost with a maximum active layer thickness between 0.9 and 1 m. In spite of low permafrost temperatures a considerable part of the pore water is unfrozen, due to high residual salt concentrations. Consequently, the unfrozen water content dominates the technical properties, and the sediments have a limited heat capacity available, should the temperature conditions change.

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