Geophysical Research Abstracts
Vol. 13, EGU2011-5589, 2011
EGU General Assembly 2011

Two-dimensional distribution of ground temperatures at Iskoras, northern Norway

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The inner part of northern Norway (Finnmarksvidda) is an undulating peneplain with some higher elevation areas. Permafrost appears to be common above the tree-line, with snow depth being the primary control on its presence or absence. Permafrost conditions were investigated in detail at Iskoras, a west-east aligned mountain ridge, using measurements of temperatures at the ground surface (miniature dataloggers and BTS) and in two boreholes, and geophysical surveys (electrical resistivity tomography (ERT) and refraction seismics). The borehole measurements show warm permafrost (>-1°C) extending to depths >60 m with active layer thicknesses of several metres. The thermal properties and density of a core sample from one of the boreholes were evaluated in the laboratory. Further, the ERT and seismic data sets are combined to estimate the ice and water content of the subsurface by applying the so-called 4-phase model. A north-south aligned 2-D model of ground temperature distribution developed using the finite element software product TEMP/W and the laboratory analyses is compared to a long ERT profile over the mountain.