

Application of ground-penetrating radar and high-density electrical sounding for the study of seasonally frozen ground

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(Received September 28, 2006; Revised manuscript accepted November 25, 2007)

Abstract

Ground- penetrating radar (GPR) and high-density electrical sounding surveys were conducted on a seasonally frozen ground at the Kitami Institute of Technology, northern Japan. The GPR survey detected the frozen ground as a weak echo zone in two and/or three dimensions. The high-density electrical sounding surveys showed that the electrode arrangement of the Wenner array effectively revealed the frozen layer as a resistive zone. The frost depth estimated from both surveys, especially the GPR profile, corresponded well to measurement done by a frost depth meter (frost tube). The results of this study show the applicability of non-destructive surveys in geophysical exploration on seasonally frozen ground. GPR surveys could be especially effective in conducting repeated investigation on large areas of seasonally frozen ground.