

2005 Salt Lake City Annual Meeting (October 16–19, 2005)

Paper No. 201-1

Presentation Time: 1:30 PM-5:30 PM

DETECTING SUBSURFACE ARCTIC COASTAL HAZARDS USING GROUND PENETRATING RADAR

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Numerous subsurface hazards along the coastal margin of the Mackenzie Delta have become problematic in conducting safe petroleum exploration. The ability to detect potential hazards is crucial to decision making processes that guide winter projects in this area. Four aspects of the coastal environment; ice morphology, ice movement, bathymetry and the thermal properties of sub-bottom sediments, can create hazardous conditions. Two GPR systems run simultaneously with 100 MHz and 250 MHz antenna frequencies were towed in tandem covering 143 line km. This data acquisition technique proved useful to rapid data collection and acted to enhance data interpretation. Profile interpretation relied on the recognition of recurring radar signatures defined by primary and secondary reflection patterns. Hazards relating to ice morphology are described as zones of floating and bottom-fast ice that are indicated by secondary radar reflections. Spatially, ice morphology in this region was shown to be highly variable. Potential ice collapse features relate to the occurrence of water lenses trapped within the ice mass that are formed from major ice movement, over ice flooding and subsequent downward freezing. Indications of minor ice movement (i.e. ice fractures and pressure ridges) were also detectable. Bathymetric hazards in regions of floating ice were found to result from the presence of a subaqueous channel ~50 m in width. Subsurface thermal structures pose a particularly serious hazard to the stability of developmental infrastructure and were delineated by a strong laterally continuous reflection. Mapping of these features provides for better spatial understanding of coastal hazards that are present in arctic environments.

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Session No. 201--Booth# 163

[Geophysical Studies for Improving Management of Land, Water, Environment, and Hazards \(Posters\)](#)

Salt Palace Convention Center: Hall C

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