GEOLOGICAL SURVEY OF CANADA

OPEN FILE 4173

A Digital Database of Permafrost Thickness in Canada

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ABSTRACT

A permafrost thickness database for northern Canada is presented. This national database includes publicly available information from published and unpublished sources for 1005 sites; 916 of these are terrestrial sites and 89 are marine sites. Much of the data were collected between 1960 and mid 1980s. The depth of the 0°C isotherm and the base of ice-bearing permafrost is recorded in the database. Also included is information on site characteristics such as air temperature, geology and vegetation, which influence the thickness of permafrost at a particular site. The reference for the site is also included and may be consulted for further information.

The database is presented digitally as an Excel spreadsheet. A series of maps and graphs illustrate site distribution, permafrost thickness and other attributes of the database.

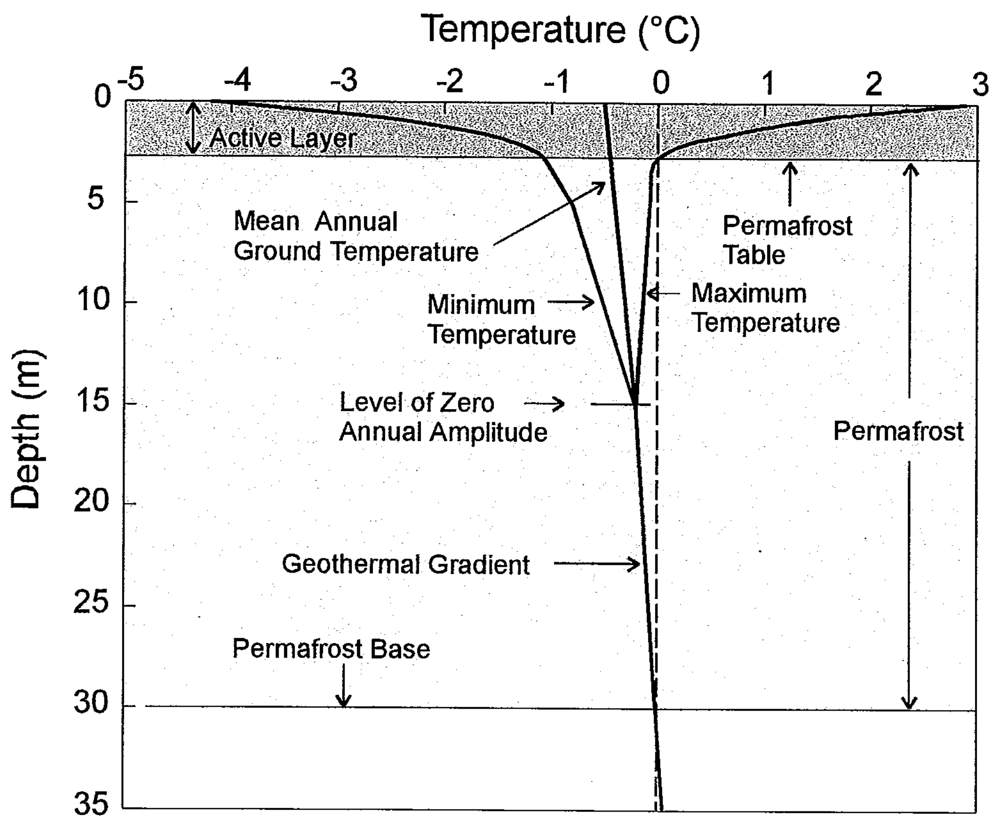

Figure 1. Features of the ground thermal regime in permafrost based on data from a Yellowknife site (data from Brown, 1973).

INTRODUCTION

Publicly available information from published and unpublished sources has been compiled to produce a database of permafrost thickness, distribution and related conditions for northern Canada. The database builds upon an unpublished permafrost database for the Canadian permafrost region that was originally developed at the Geological Survey of Canada (GSC) in the mid 1980s by Young and Judge (1986) and complements the summary ground temperature database for northern Canada (Smith and Burgess, 2000). Permafrost-related information for 1005 sites in the Canadian permafrost region is reported. The database also includes climatic data and information on site characteristics which influence the ground thermal regime and permafrost thickness at a particular site such as vegetation, surficial materials and lithology.

The main features of the ground thermal regime in areas where permafrost is present are described below in order to define the terms that are used in the database. The various techniques employed for determining permafrost thickness are then outlined followed by a description of the database structure and a review of sources of information. A general discussion of the data is presented, including a series of summary maps and tables.

GROUND TEMPERATURE REGIME IN PERMAFROST

A generalized description of the ground temperature regime for a site at which permafrost occurs is presented in Figure 1. Permafrost exists where ground temperatures remain at or below of 0°C for at least two consecutive years (International Permafrost Association, 1998a). The permafrost base is defined by the lower position of the 0°C isotherm. Near the ground surface, ground temperatures rise above 0°C for part of the year. This seasonally thawed layer above the permafrost is called the active layer.

The maximum and minimum temperature experienced annually at each depth define the annual ground temperature envelope. Seasonal variations in ground temperature are similar to the annual wave of air temperature but the amplitude of the wave decreases with depth and lags progressively behind that of air temperature. This is illustrated by the decreasing range between the maximum and minimum ground temperature with depth. The level of zero annual amplitude is the depth at which there is no annual variation in ground temperature. Below the level of zero annual amplitude, temperatures increase with depth according to the geothermal gradient. The mean annual ground temperature profile is defined by the average annual temperature at each depth. The mean annual ground surface temperature can be estimated by upward extrapolation of the geothermal gradient from the level of zero annual amplitude (Lunardini, 1981) provided the measured gradient is in equilibrium with surface conditions.

The above provides a very brief general description of the main features of the ground temperature regime in permafrost. Further information on the nature and distribution of permafrost can be found in Williams and Smith (1991), Heginbottom et al. (1995) and French (1996). The factors influencing the shallow ground thermal regime are also discussed by Burgess and Smith (2000) and information on the challenges permafrost presents to northern development is provided by Smith et al. (2001).

TECHNIQUES FOR DETERMINING THE THICKNESS OF PERMAFROST

The base of permafrost corresponds to the lower position of the 0 °C isotherm, which may only be delineated on the basis of precise temperature surveys. The base of ice-bearing permafrost (IBPF) may be interpreted from petrophysical (downhole) well logs in exploration drill holes. The position of the 0 °C isotherm and the base of IBPF rarely coincide due to the freezing point depression of pore water which is a function of pressure, chemical and soil particle effects. The freezing point depression ranges from 1.28 °C in coarse-grained sands to 8.24 °C in shales (D&S Petrophysical, 1983; Hardy, 1984a). At average geothermal gradients of 30 mK/m or °C/km, the base of IBPF may be 40 to 275 m above the 0 °C isotherm. In the database, either the base of ice bearing permafrost or the depth of the 0°C isotherm, or in some cases both, are provided for each site. The location of sites included in the database is shown in Figure 2. Each site has been classified according to the definition of the permafrost base adopted (i.e. base of ice-bearing permafrost or depth of 0°C isotherm).

The geophysical methods used to determine the base of ice-bearing permafrost have been outlined by D & S Petrophysical Consultants (1983), Hardy Associates Ltd. (1984a and 1984b) and Thurber Consultants Ltd. (1986 and 1988). These techniques were used to determine the thickness of permafrost at exploration well sites in the Mackenzie Delta/Beaufort Sea region, the islands of the Arctic Archipelago, the Mackenzie valley and Yukon Territory. There is a characteristic response as the downhole logging tool moves upwards from unfrozen material into the zone of ice-bearing permafrost. Up to eight individual petrophysical logs were used in combination to determine the presence of ice-bearing permafrost (Hardy, 1984a, 1984b) in each exploration well. Frozen porous formations are more electrically resistive than unfrozen ones and an abrupt increase in electrical resistivity occurs at the base of ice-bearing permafrost. Sonic or acoustic logs are also useful in determining the location of the base of ice-bearing permafrost. Sonic velocities are higher when ice is present and a shift from low to high velocity is expected when passing up-hole into ice-bearing material. The faster sonic travel times may be obscured however when thawing of borehole walls occurs during drilling of permafrost. The result is "cycle skipping" which may also be used as an indicator of permafrost. An increase in well bore diameter on the caliper log may also be used as an indicator of ice-bearing permafrost because the use of drilling mud may lead to thaw of ground ice. Other logs which may be used are spontaneous potential, gamma ray, formation density, neutron porosity, and crystal cable data. Temperature surveys were run using a down hole tool in some wells. The base of the ice-bearing permafrost is indicated by a marked change in temperature gradient and this information may be used to confirm the permafrost "picks" derived from other sources.

Most well logs exhibit a transition zone below the base of IBPF within which resistivity and sonic travel times gradually change (Hardy 1984a). The thickness of this zone is dependent on lithology and varies from 10 to greater than 100 m in very fine-grained material. Ice and water may coexist in fine pore spaces and the transition zone probably represents the increase in unfrozen water content as temperature increases with depth.

The above geophysical logs are generally run during or immediately after drilling of exploration wells, such that the thermal disturbance from drilling has not yet dissipated. Some wells however, were drilled or preserved for scientific research or temperature surveys, usually by

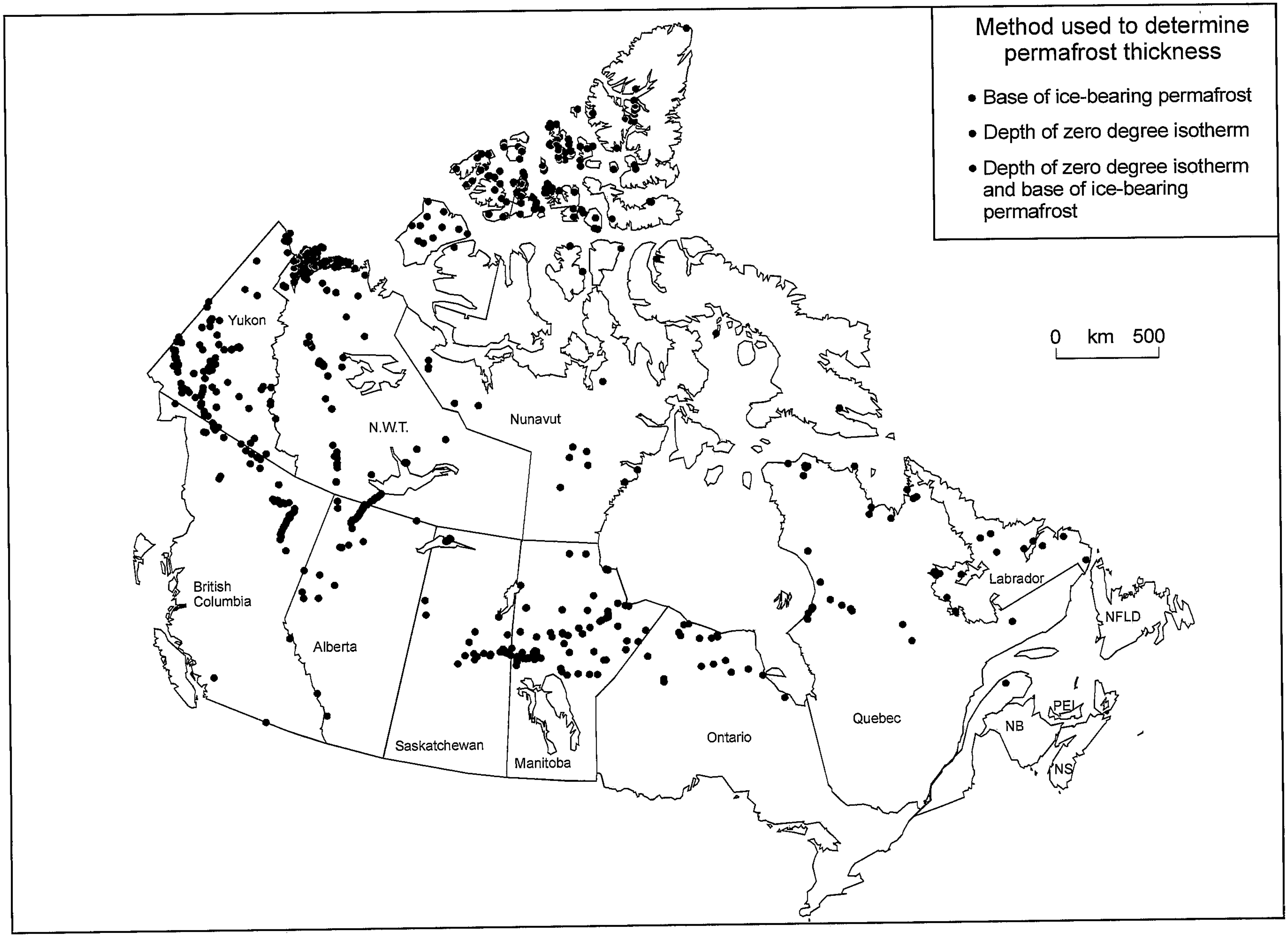

Figure 2 . Location of terrestrial sites included in the database. Each site has been classified according to the method used to determine the location of the base of permafrost.

the former Earth Physics Branch (now the Geological Survey of Canada of Natural Resources Canada). These studies (see Taylor et al. 1982) for which high precision temperature data are available, provided information on the equilibrium position of the 0°C isotherm and temperature gradients.

At some sites, the depth to the zero degree isotherm has been determined from ground temperature records of short duration or from deep extrapolation of temperature profiles from shallow drill holes. In some cases the location of the base of permafrost is determined by visual observations of ice in recovered core. In these cases the recorded location of the permafrost base is less reliable than those provided from precise temperature data from deep drill holes.

DATABASE STRUCTURE

The permafrost database was compiled using the Microsoft Excel spreadsheet program and contains the following fields, each of which is described below:
Site location and site identifier; latitude and longitude; elevation; period; determination, base of ice-bearing permafrost and depth of zero degree isotherm; permafrost zone; active layer thickness; mean annual ground temperature; temperature gradient; mean annual air temperature; average annual snowfall; slope; ecoclimatic region; vegetation cover; earth materials and lithology; geologic region; nearest water body; other features; references.

No judgements were made by the authors about the quality of the data in the database. For some sites, comments related to data quality have been included in the database if reported by the original source.

Database Fields

Site Location and Site Identifier

The location of the site was generally given a name by the source of the information. Often this is the name of the well. Where no name was given, a general broad regional name was assigned to the entry. Some locations have information for more than one site and in these cases each site name as given in the original source has been included.

Latitude and Longitude

Latitude (°N) and longitude (°W) coordinates were usually provided by the original source. For sites lacking this information in the original documentation, close approximations were estimated from maps.

Elevation (m)

The elevation of each site is given in metres above sea level where available. Offshore sites in the database are indicated by an elevation less than zero.

Period

The period over which measurements were made is given where available. In the case of geophysical interpretations of the base of ice-bearing permafrost, the value in this field is the period over which the geophysical logs were run. In other cases this value represents the period over which ground temperatures were measured to determine the depth of the 0°C isotherm.

Determination (Det.)

This field gives the method used in the determination of the permafrost base for both the base of ice-bearing permafrost and 0°C position. The symbols used in this field are defined below.

G Geophysics

E Equilibrium temperature

X Temperature extrapolated downwards from measured temperature gradient

> Estimated permafrost thickness probably greater than value listed - This might be the case if, for example, the borehole did not extend below the base of permafrost (geophysical logging was not carried out below the base of permafrost) or if temperature measurements were not deep enough to adequately determine the position of the 0°C isotherm.

< No more than listed value - This might be the case if, for example, the base of ice bearing permafrost was above the bottom of the well casing and its depth could therefore not be determined from geophysical logs.

\+ Interpolation of latest temperature log, probably an underestimation

Vis Visual observation of ice in recovered core or in field

U Unreliable value (Note: if a "U" appears without a value for the permafrost base, it indicates that permafrost is believed to be present at that site but there is no reliable value for its thickness)

Permafrost Base (Base of IBPF, Base of Transition Zone, Zero isotherm)

The depth (metres) to the base of ice-bearing permafrost (IBPF), the depth to base of the transition zone (Trans) and depth to the position of the 0°C isotherm (Zero Isotherm) are given where available. The absence of permafrost at a site is indicated by a "no pf" entry in these fields.

Permafrost Zone

Each terrestrial site has been classified as being located in the continuous permafrost zone (Cont.), discontinuous permafrost zone (Disc.) or alpine/mountain permafrost zone (Alpine) based on the map of Heginbottom et al. (1995).

Active Layer Thickness (cm)

At permafrost sites, the maximum depth of seasonal thawing was in some cases provided by the original data source. In cases for which this value was not available, it was sometimes possible to estimate active layer thickness from the shallow ground temperature data if provided by the data source.

Mean Annual Ground Temperature (MAGT, °C)

Mean annual ground surface temperatures have been reported for several sites and are recorded in the database. Smith and Burgess (2000) have compiled a summary ground temperature database which may be consulted for more detailed information on the ground temperature regime for several sites.

Temperature Gradient (Geotherm Grad and PF Grad (°C/km))

For a few sites, the geothermal gradient (Geotherm Grad) has been reported by the original source and is recorded in the database. Deep borehole temperatures (bottom hole temperatures) were measured in many of the exploration wells in N.W.T., Yukon and Nunavut (Geotech, 1983, 1984 and 1988) and these have been used to estimate the average geothermal gradient. The values presented in the database however, are approximations based on a temperature of -1°C at the base of the ice-bearing permafrost (as interpreted from petrophysical data). Precise temperature data (Taylor et al., 1982) collected for the upper few hundred metres have been used to estimate the temperature gradient in permafrost (PF Grad) at a few sites included in the database.

Mean Annual Air Temperatures (MAAT, °C)

Mean annual air temperature quoted by the original source has been included in the database. If this information was not given, other sources such as climate normal data from the nearest Environment Canada weather station were used. In this case, the name of the station accompanies the temperature value. Since much of the original data were acquired prior to the mid 1980s, climate normals from 1951-1980 are generally reported (AES, 1982a).

Average Annual Snowfall (cm)

This value indicates the average annual snowfall as recorded in the region for the same period as the mean annual air temperature or climate normal. Snow provides an insulating layer that buffers the ground from variations in temperature and is an important factor influencing the distribution of permafrost. If this value was not provided by the original source, climate normals from the nearest Environment Canada weather station (AES, 1982b) were used.

Slope

Aspect and degree of slope can be an important determinant in permafrost occurrence and thickness. However, this information was seldom reported by the original source and is only given in the database for a few sites.

Ecoclimatic Region

Ecoclimatic regions are broad areas characterized by distinctive ecological responses to climate as expressed by vegetation and reflected in soils, wildlife, and water. Within ecoclimatic regions the 'ecologically effective' climate will result in "the development of similar trends in vegetation succession on similar soils occurring on similar parent materials and positions on the landscape" (Ecoregions Working Group 1989). Local effects of variations in soil and landform have been eliminated in the classification of ecoclimatic regions. Ecoclimatic regions have been grouped into more generalized ecoclimatic provinces which include more variety within their borders. There is however, a resemblance in the vegetation development within ecoclimatic provinces that distinguishes them from neighbouring provinces. Table 1 provides a brief description of the ecoclimatic provinces occurring within the permafrost region.

Table 1. Description of Ecoclimatic Provinces (from Ecoregions Working Group, 1989). Temp. refers to mean annual air temperature and Precip. refers to mean annual precipitation.

Ecoclimatic Provinces	Vegetation Development	Temp. (°C)	Precip. (mm)
Arctic	Treeless with tundra, polar semi-desert, or polar desert	-12 to -18	<100-300 (LAm 600-800)
Subarctic	Open-canopied conifer woodlands, with tundra patches	-2 to -10	250-800 (MSm 1100)
Boreal	Closed-canopied forests of conifer or mixed conifer-hardwood	7 to -3	400-1500
Subarctic Cordilleran	Open-canopied conifer woodland and alpine tundra in elevational zones	-5 to -10	250-400
Cordilleran	Closed-canopied conifer or mixed wood forests, open-canopied conifer woodland, and alpine tundra in elevational zones	7 to -6	200-1100
Interior Cordilleran	Grassland with or without scattered trees), closed-canopied conifer or mixed wood forest, open-canopied conifer woodland, and alpine tundra in elevational and rain shadow zones	10 to -2	200-1500
Pacific Cordilleran	Closed-canopied conifer forest, open-canopied conifer woodland, and alpine tundra in elevational zones	6 to -15	500-1800

Broad climatic trends across Canada influence the distribution and type of vegetation found in various locations. The distribution of permafrost is also influenced by climatic conditions and vegetation cover. The inclusion of ecoclimatic regions in the database provides a generalized description of climatic and vegetation conditions in the vicinity of each site. The symbols used in this field are defined in Appendix A.

Vegetation Cover

Information on vegetation type if provided by the original source, is reported in the database. In the discontinuous permafrost zone, vegetation can be an important factor influencing the distribution of permafrost (Brown and Pewe, 1973). Symbols used in this field are defined in the legend in Appendix A.

Earth Materials and Lithology

Information on surficial material and bedrock geology may provide an indication of the thermal properties of soil and rock, and is reported where available. Symbols used in these fields are defined in the legend in Appendix A.

Geologic Region (Geol. Region)

Canada is divided geologically into a shield region, four platform regions, three orogens, and three continental shelves (Price and Douglas, 1972; Geological Survey of Canada, 1981). The Canadian Shield region has been relatively stable geologically since Precambrian time. The surrounding platform regions are underlain by flat-laying Paleozoic and younger strata resting on Precambrian basement. The orogens have been affected by tectonic activity with accompanying igneous activity and metamorphism.

Stable regions such as the Canadian Shield will have lower values of terrestrial heat flow than areas which have been active since the Precambrian such as the orogens (Majorowicz et. al. 1988). Since terrestrial heat flow is an important factor determining geothermal gradients and hence permafrost thickness, the distribution of permafrost should also be related to the geologic regions. Symbols used in this field are defined in Appendix A.

Nearest Water Body (km)

Where available, the distance to the nearest body of water is recorded in kilometres. Ground temperatures are strongly moderated by the presence of bodies of water. Permafrost may be absent under large and deep water bodies. Water bodies frequently produce a warming influence on ground temperatures of the surrounding shores or banks. Dynamic processes such as migration of river channels and shifting of shorelines and bars lead to changes in vegetation, snow cover, ground temperatures and permafrost distribution (Smith and Hwang, 1973; Dyke, 2000).

Other Features (comments)

Additional information about the site or data set is presented in this field. This may include any special or unique site specific features of that particular location or information related to data quality.

References

The reference source(s) for each location are indicated by number in this field. The complete reference list can be found in Appendix B.

Spreadsheet Workbook

The database is contained on the accompanying diskette. The spreadsheet workbook (Permafrost Database3.xls) consists of four pages:

Page 1 (NWT/Nunavut) - Contains sites in Nunavut and Northwest Territories, including offshore Beaufort and Arctic Archipelago sites.

Page 2 (Yukon) - Contains sites located in the Yukon Territory

Page 3 (Provinces) - Contains sites located in British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, Quebec and Labrador.

Page 4 (Summary) - Contains a condensed version of the database which is presented as Table 2.

The entire database can also be found in PDF format (page1.pdf, page2.pdf, page3.pdf, page4.pdf) on the accompanying diskette.

SOURCES OF DATA

Numerous reference sources have been utilized in the compilation of the permafrost thickness database. The majority of information was obtained from reports commissioned and/or published by the former Earth Physics Branch of Energy Mines and Resources (now the Geological Survey of Canada of the Department of Natural Resources) and which summarize ground temperature and geophysical data obtained from the logs of industrial exploration wells. A number of other sources, such as the work of the late Roger Brown, were found in scientific journals and reports. The major data sources are discussed briefly below.

Geophysical Data from Oil and Gas Exploration Wells

Much of the information for the Mackenzie valley, Mackenzie Delta and Arctic Islands was obtained from geophysical logs from industrial exploration wells. D & S Petrophysical Consultants (1983), Hardy Associates Ltd. (1984a and 1984b) and Thurber Consultants Ltd. (1986 and 1988) examined all available logs for 589 oil and gas exploration wells in the Mackenzie Delta/Beaufort Sea region, the Islands of the Arctic Archipelago, the Mackenzie valley and northern Yukon Territory to determine the base of ice bearing permafrost (IBPF). These wells were drilled for hydrocarbon exploration and therefore there is a concentration of wells in areas such as the Mackenzie Delta region. Generally no data on IBPF are available in the upper 200 to 300 m of the exploration wells because of the regulatory requirement for installation of steel casing. Information on the distribution of shallow IBPF in the Mackenzie valley is therefore limited. Any statistics computed using this data set will be biassed towards thicker IBPF.

Canadian Geothermal Data Collection

The Canadian Geothermal Data Collection is published in Taylor and Judge (1974, 1975, 1976 and 1977) , Judge et al. (1979 and 1981) and Taylor et al. (1982). This collection contains all non-confidential subsurface temperature data collected by the former Earth Physics Branch prior to 1982 from boreholes of depths greater than 125 m within the Canadian permafrost regions. Geothermal studies in preserved industrial wells in the Arctic Archipelago, Yukon, Mackenzie valley, Mackenzie Delta and northern Quebec are a major source of data in this collection. The acquisition and accuracy of the data are discussed in Taylor and Judge (1974).

The drilling process disturbs the thermal equilibrium. The time required for stabilization of temperatures ranges from several months to several years or even decades depending on drilling fluid temperature, duration of drilling, soil water content and amount of heat released during freeze-back. Equilibrium temperatures have been calculated for boreholes at which several temperature measurements were made over time after the completion of drilling and after freeze-back using the technique described in Taylor and Judge (1974). The depth to the 0°C isotherm was determined from the equilibrium temperature profiles. At sites where the borehole does not extend below the permafrost, the permafrost base was determined by downward extrapolation of

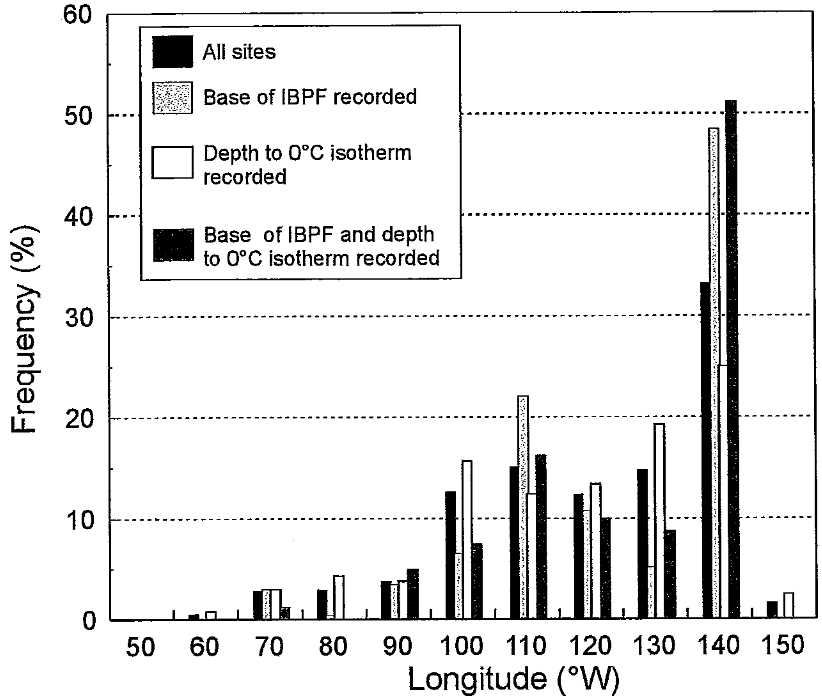

Figure 3. Longitudinal distribution of sites.

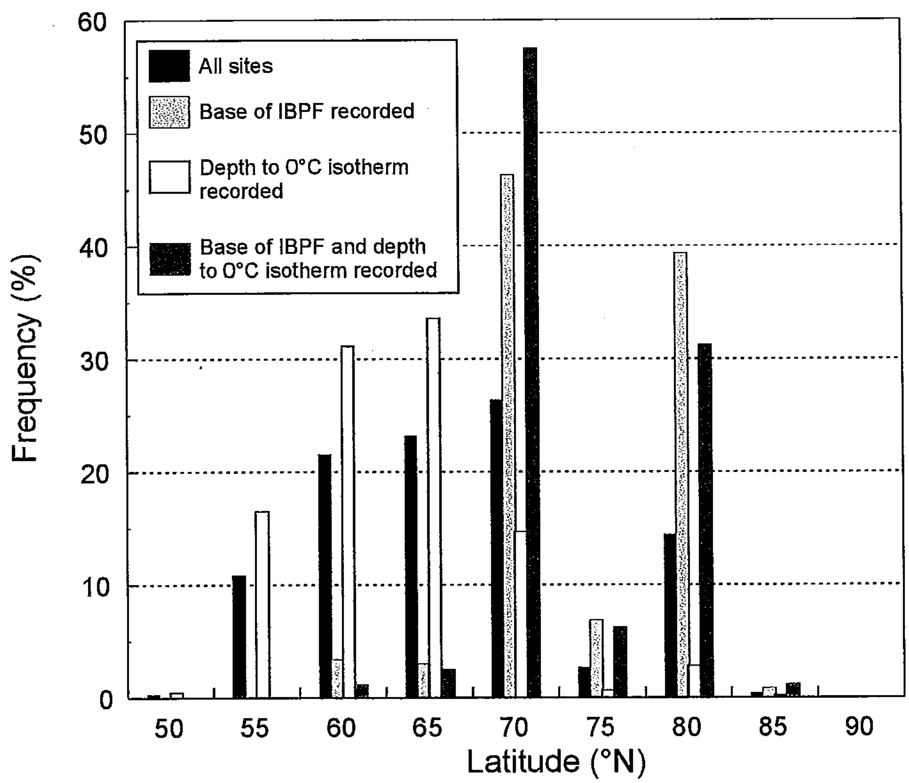

Figure 4. Latitudinal distribution of sites.

the temperature profile. In addition, a mean annual ground surface temperature intercept value was extrapolated from the published temperature-depth graphs for these sites.

All temperature logs for these published sites are also available digitally in the Global Geocryological Database published by the International Permafrost Association (1998b). Additional data collected by the GSC in deep wells after 1982 are also included.

Yukon Ground Temperature Data Collection - 1966 to August 1981

The Yukon Ground Temperature Data Collection (Burgess et al., 1982) presents subsurface temperature measurements recorded from 1966 to August 1981 in the Yukon Territory. This collection includes information obtained from holes shallower than 125 m. These measurements were obtained in cooperation with the mining, petroleum, engineering and consulting industries, and the Department of Indian and Northern Affairs. The depth to the 0°C isotherm was determined for these in a manner similar to that for sites included in the Canadian Geothermal Collection.

Norman Wells Pipeline Monitoring Program

The Permafrost and Terrain Research and Monitoring (PTRM) Program (MacInnes et al. 1989 and 1990) was established in 1983 to monitor permafrost and terrain stability in the Mackenzie Valley along the right-of-way of a buried oil pipeline which traverses the discontinuous permafrost zone from Norman Wells N.W.T. to Zama, Alberta. The distribution of permafrost varies from widespread to scattered along the pipeline route. Ground temperature data continue to be collected at over 25 monitoring sites located in a variety of terrain types from organic terrain with thick peat covers to fine and coarse-grained mineral soils. Multi-sensor temperature cables 20 m in length have been installed adjacent to the pipeline right-of-way at each site. Thermistors are spaced 0.5 to 1 m apart near the ground surface and 2 or 3 m apart at depth. Data collected (Burgess, 1987) from these undisturbed sites during the first year of operation were used to determine the presence and thickness of permafrost (depth to zero degree isotherm). Other information such as snow cover thickness, active layer thickness and lithology is reported for these sites in Pilon et al. (1989) and Burgess (1993). Analyses of ground temperatures and terrain stability at these sites have been reported in Burgess and Riseborough (1990), Burgess and Lawrence (1997), Nixon and Burgess (1999) and Burgess and Smith (2000).

Northern Quebec - Ungava Bay Sites

Surface and downhole geophysics have been used by Laval University (Centre d'etudes Nordiques) to map permafrost in Northern Quebec (eg. Seguin, 1978; Seguin et al. 1989). The characteristics of the ground thermal regime and the associated distribution of permafrost in the Nunavik region of northern Quebec have also been investigated (eg. Seguin et al., 1989; Levesque et al., 1990; Ben-Miloud and Seguin, 1990; Allard et al., 1995). Study sites are located near the shore of Ungava Bay and Hudson Strait. Surface and downhole geophysics and ground temperature monitoring have been used in the Kangiqsualujjuaq region to map the permafrost distribution and to estimate permafrost and active layer thickness. At sites located at the extreme north of the Ungava Peninsula, permafrost temperatures have been monitored down to a depth of 20 m since 1988. Although these temperature data are insufficient to determine the thickness of permafrost, these data have been used to determine the active layer thickness and mean annual ground temperature at these sites.

Other Sources of Permafrost Information

Very little recent information (collected in the 1990s) on permafrost thickness is available. Many reports and scientific papers published prior to 1990 however, have provided a great deal of the information presented in the database.

A major contribution to the database is the work of R.J.E. Brown. Much of these data were collected during a program of field surveys initiated by the Division of Building Research (DBR), National Research Council of Canada and conducted in Alberta, Mackenzie River District, Saskatchewan, Manitoba, British Columbia, Yukon, Quebec and Labrador (eg. Brown, 1964, 1965, 1967a, 1968, 1975). Engineering problems encountered during development in the southern fringe of the permafrost zone provided the stimulus for this program. Brown (1967b) also produced a permafrost distribution map which includes permafrost thickness and ground surface temperature information. Some sites however had incomplete ground temperature records, records of short duration or data of questionable reliability due to observer or instrument error.

A study on the thermal regime of the Mackenzie valley was conducted by Judge (1973) to provide information for the assessment of pipeline proposals. The report included geothermal measurements and permafrost thickness for over 50 locations.

Data were also obtained from numerous other scientific papers and studies related to engineering design or environmental impact assessment. These include for example, studies in the Schefferville area by Nicholson and Thom (1973), data from boreholes drilled by Hydro-Quebec in the Great Whale River Basin (Poitevin and Gray, 1982), information on permafrost in the Mackenzie Delta from Mackay (1974) and studies in southern Yukon (Burn, 1991).

DISCUSSION AND DATA SUMMARY

A summary table (Table 2) provides information on depth of the base of ice-bearing permafrost and depth of the zero degree isotherm for sites in the database. The table is divided into 3 sections, corresponding to each page in the database file. Permafrost thickness and related data have been recorded for 1005 sites, 916 of which are terrestrial sites. Information for all fields is reported for a limited number of sites; most sites are lacking information for some fields. In several cases only active layer data or mean annual ground temperature are reported.

The spatial distribution of sites is not uniform (Fig. 2). More sites are located in western Canada (Figs. 2 and 3) with a concentration of sites in the Mackenzie valley and Mackenzie Delta regions. Many of the observations in these areas are the result of hydrocarbon exploration. Information about permafrost distribution is very limited for the shield areas west of Hudson Bay where little deep drilling has been carried out. The majority of sites are located between 55 and 70°N (Figs. 2 and 4). The data set includes sites throughout the continuous and discontinuous zone (Table 3 and Fig. 5) but only a few sites are located in the alpine permafrost regions.

Table 3. Distribution of sites by permafrost zone.

Permafrost Zone	Percent of Sites
Continuous	43.32
Discontinuous	56.03
Alpine	0.65

Figure 5 shows the sites at which permafrost was determined to exist. Permafrost is believed to be present at 93% of the sites included in the database. The absence of permafrost at a given site, however, does not preclude the possibility of permafrost at another site a short distance away which has different environmental conditions such as the presence of an organic layer. Similarly, the occurrence of permafrost at a given site does not necessarily mean that permafrost is present over a wide area in that region. This is particularly true in the southern portion of the permafrost region where permafrost tends to be patchy.

The depth to the base of ice-bearing permafrost and the depth of the zero degree isotherm at terrestrial sites has been mapped in Figures 6 and 7 respectively. Sites with uncertain values for the permafrost base have not been included on the maps. All information on the base of ice-bearing permafrost and the depth of the zero degree isotherm has been combined to produce a map which shows the general spatial distribution of permafrost thickness (Fig. 8). Larger scale maps have also been produced to show the spatial distribution of permafrost thickness for the Mackenzie valley, Mackenzie Delta, the islands of the Arctic Archipelago (Figs. 9, 10 and 11). Permafrost thickness at offshore sites is shown in Figure 12.

Permafrost thickness at terrestrial sites shows a general increase with latitude (Figs. 6, 7 and 8) but this relationship exhibits a large amount of scatter (Fig. 13). Although ground temperature and the occurrence of permafrost are influenced by general climatic conditions (eg. air temperature) which are related to latitude, other factors such as elevation, vegetation

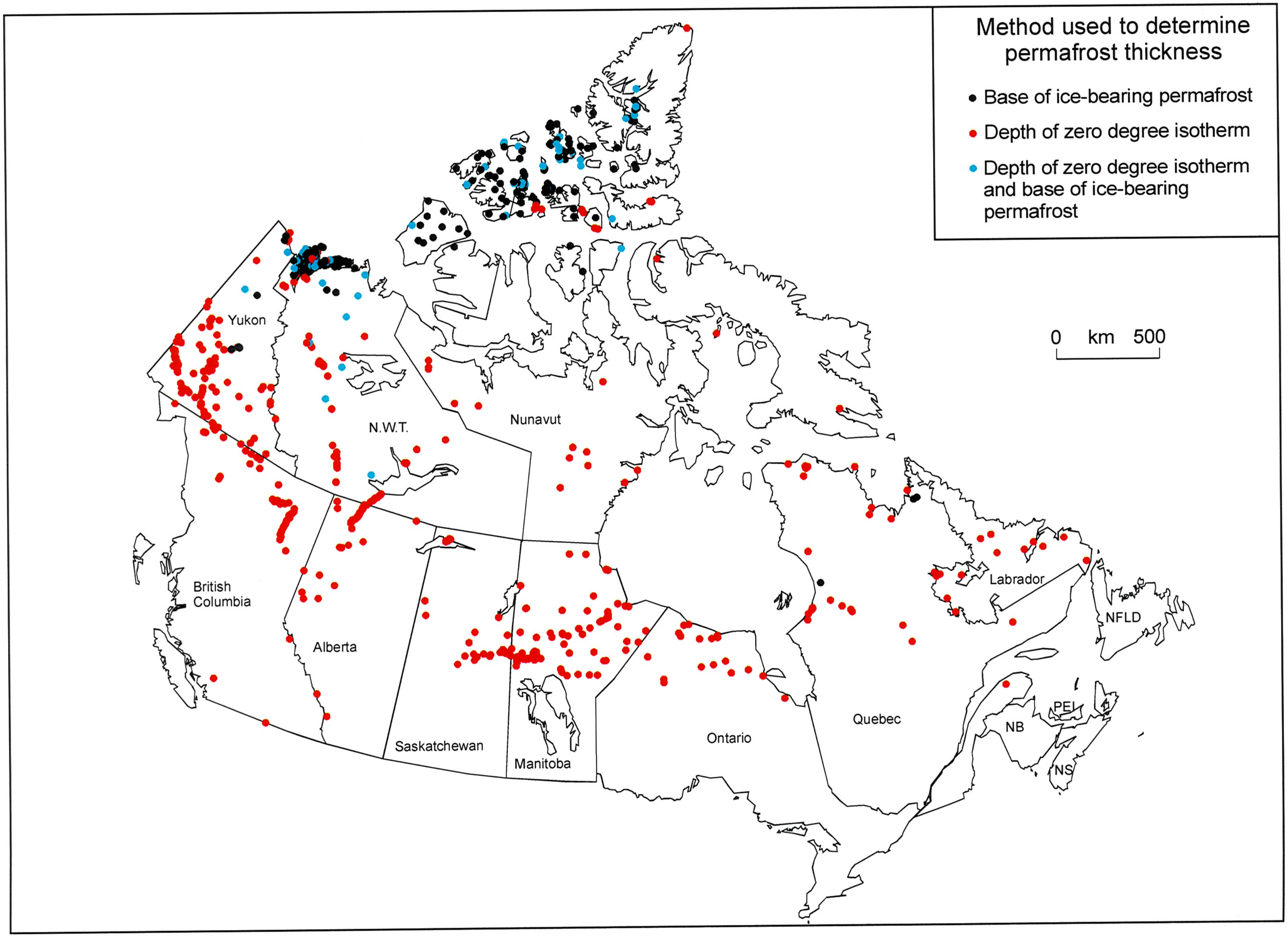

Figure 2 . Location of terrestrial sites included in the database. Each site has been classified according to the method used to determine the location of the base of permafrost.

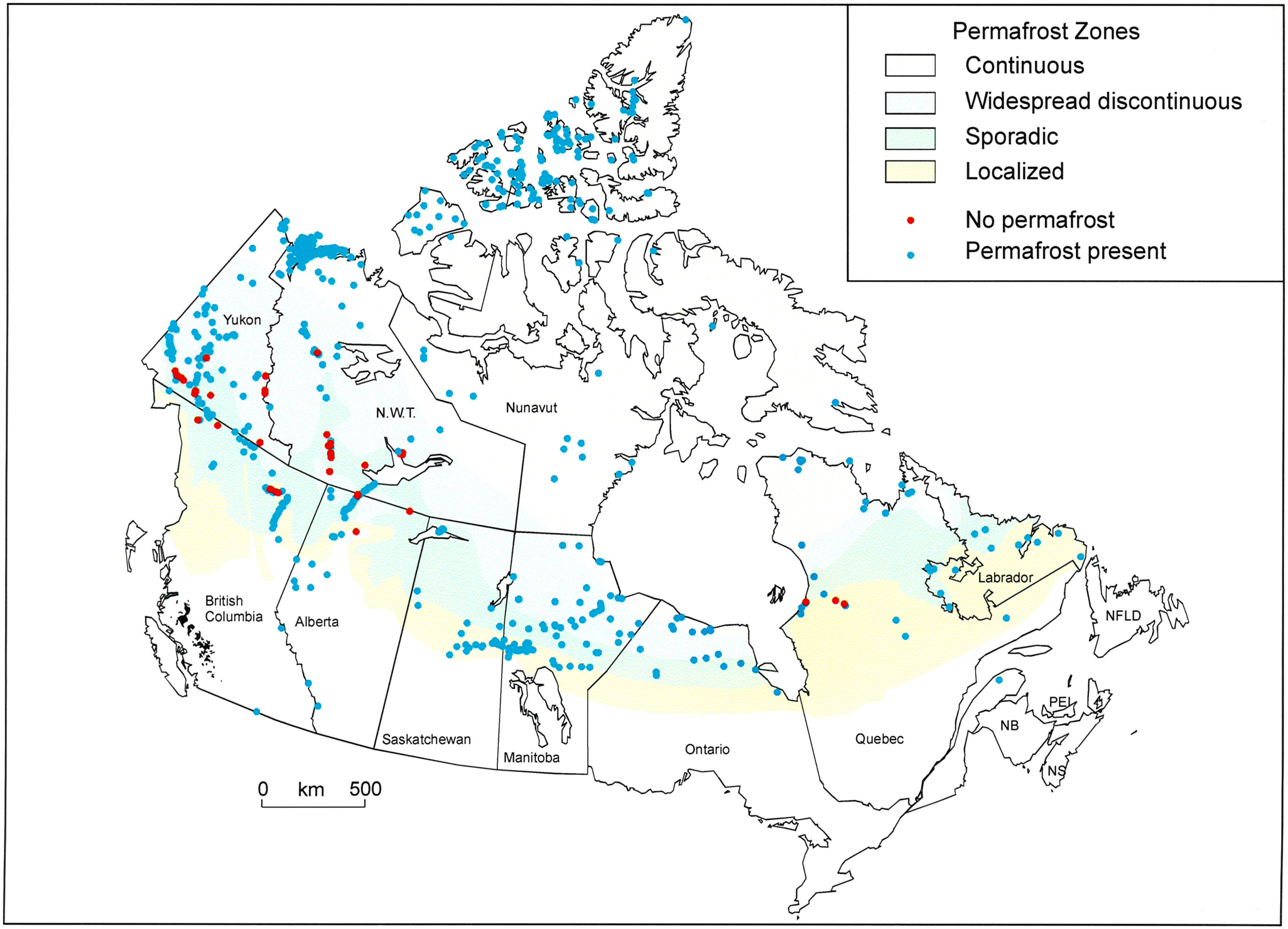

Figure 5. Permafrost occurrence, based on borehole data for terrestrial sites, superimposed on the permafrost distribution map of Canada. Permafrost zones are extracted from the map of Kettles et al. (1997) and are based on that of Heginbottom et al. (1995).

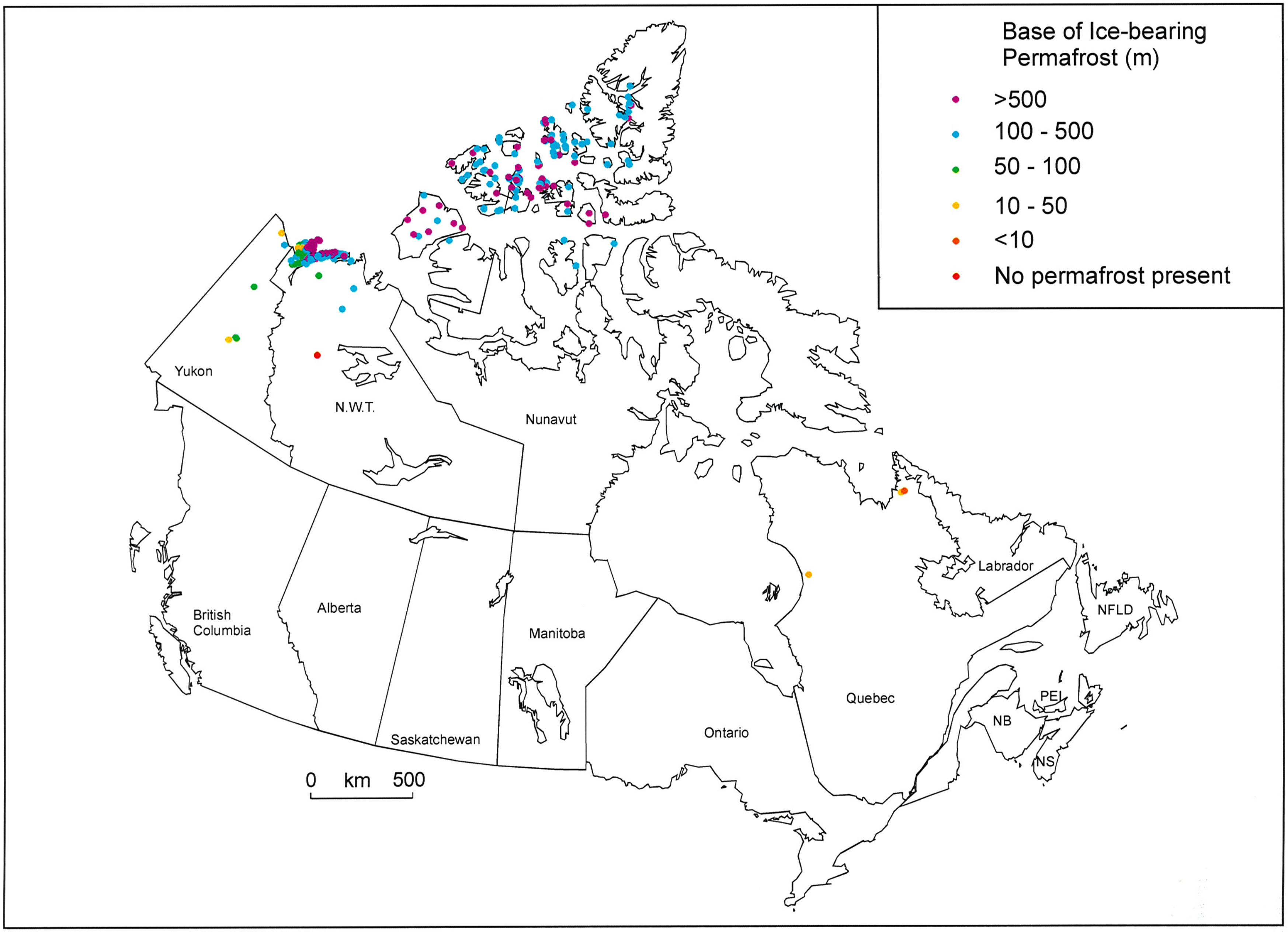

Figure 6. Base of ice-bearing permafrost for terrestrial sites included in the database. Sites with uncertain values for the base of ice-bearing permafrost have not been included on the map.

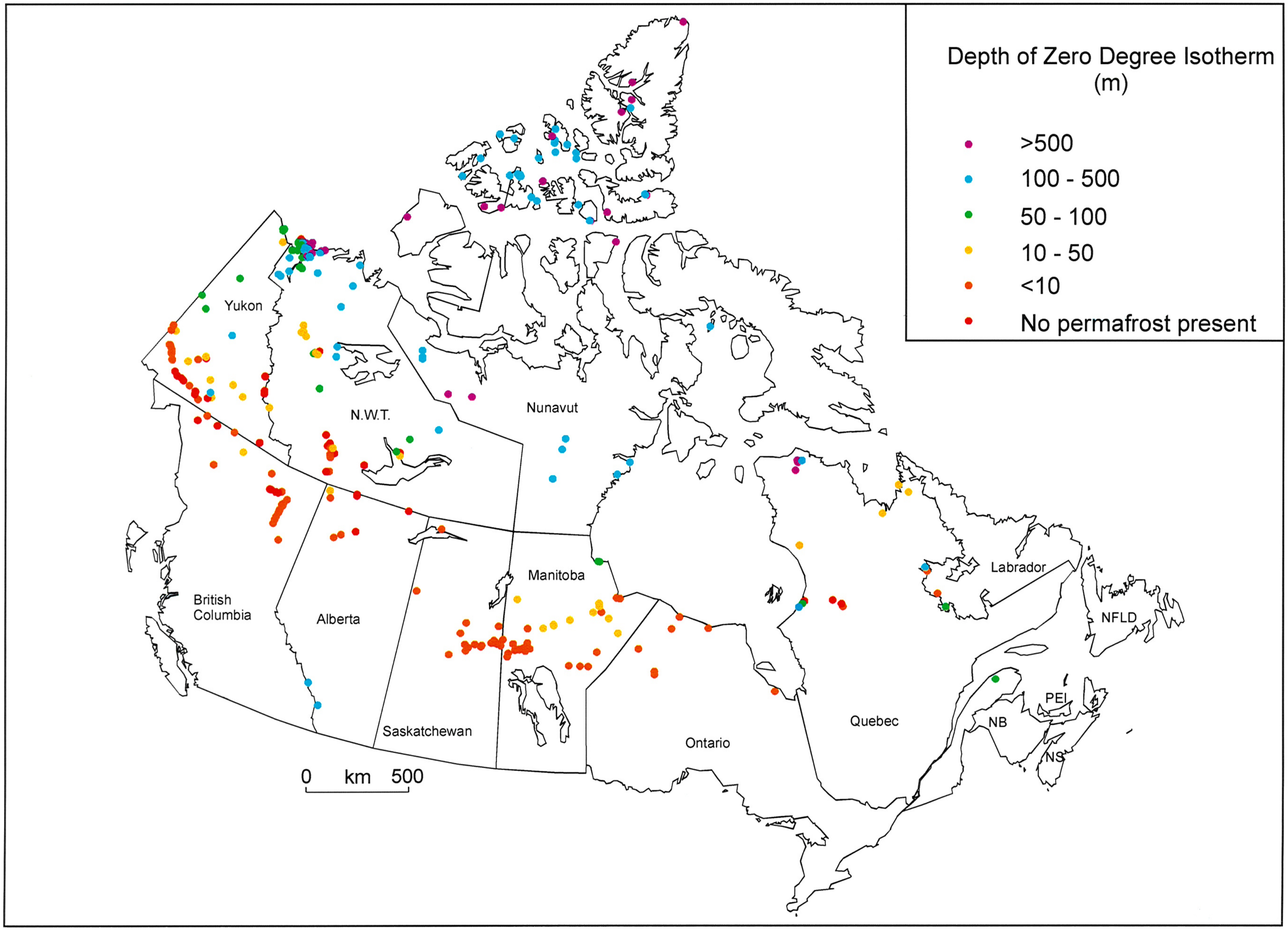

Figure 7. Depth of the zero degree isotherm for terrestrial sites included in the database. Sites with uncertain values for the depth of the 0°C isotherm have not been included on the map.

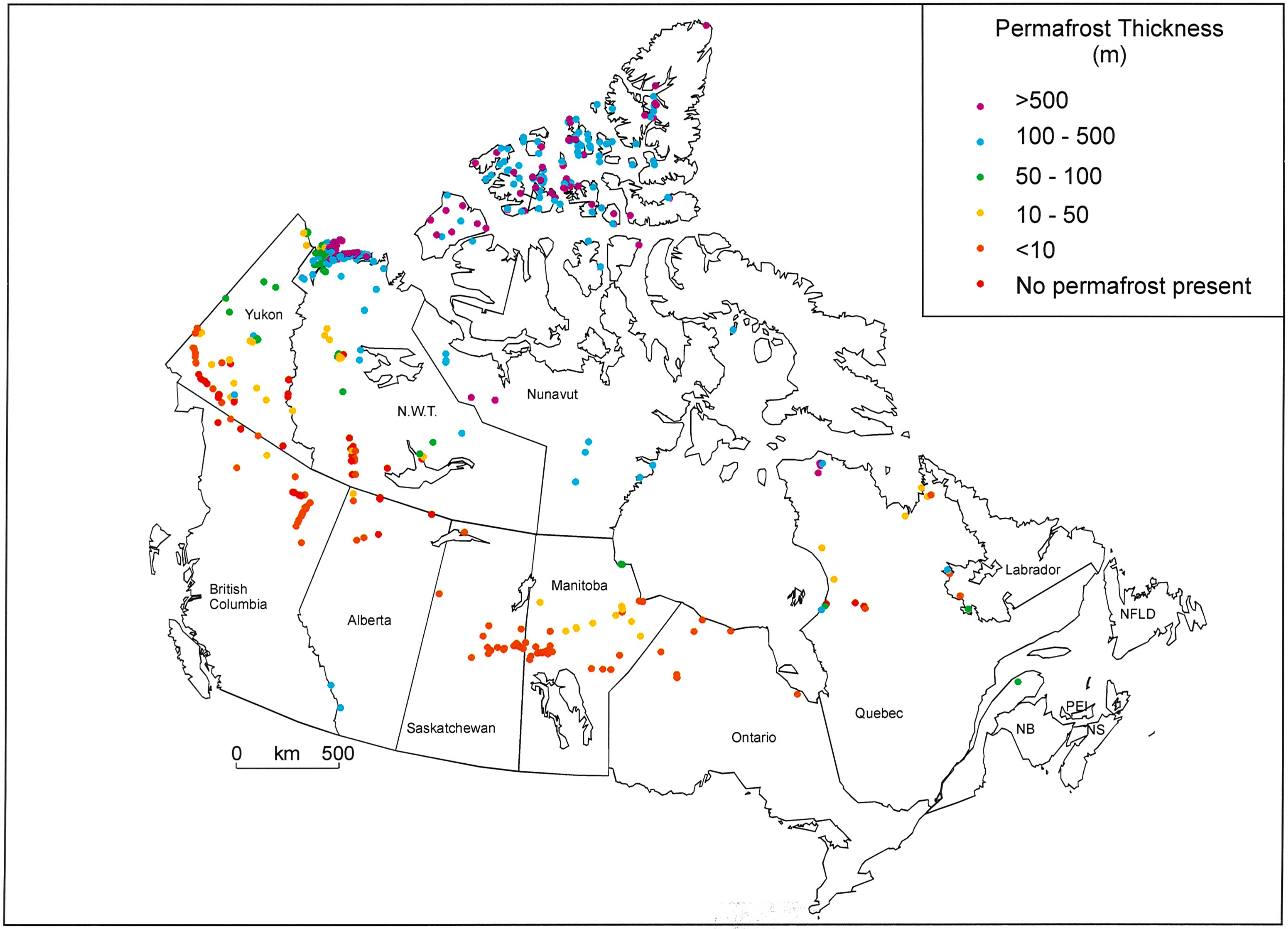

Figure 8. Permafrost thickness for terrestrial sites based on combined observations of base of ice-bearing permafrost and depth to 0°C isotherm. Sites with uncertain values are not included on the map.

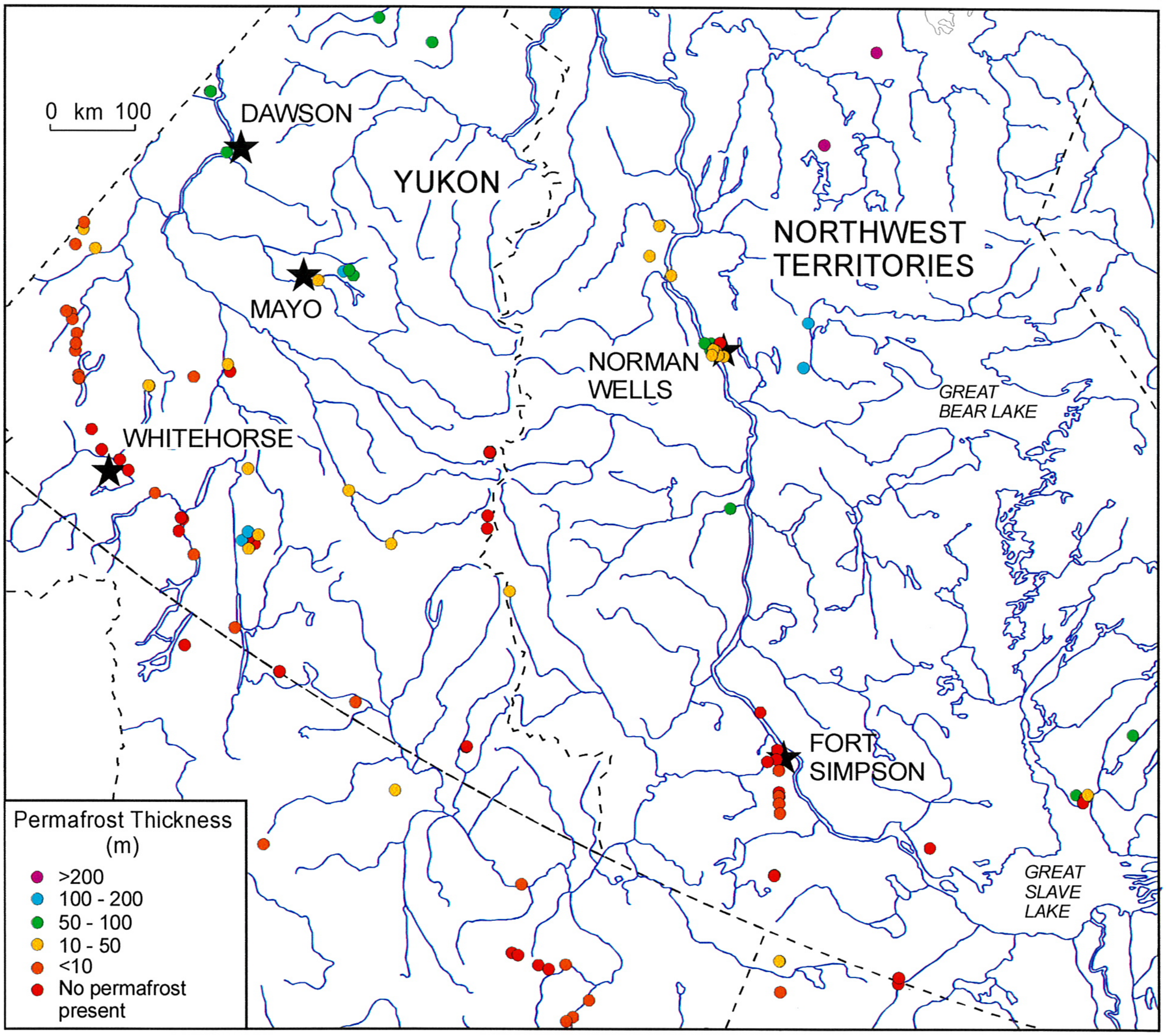

Figure 9. Permafrost thickness in the Yukon and Mackenzie valley region based on combined observations of base of ice-bearing permafrost and depth to 0°C isotherm. Sites with uncertain values for the permafrost base have not been included on the map.

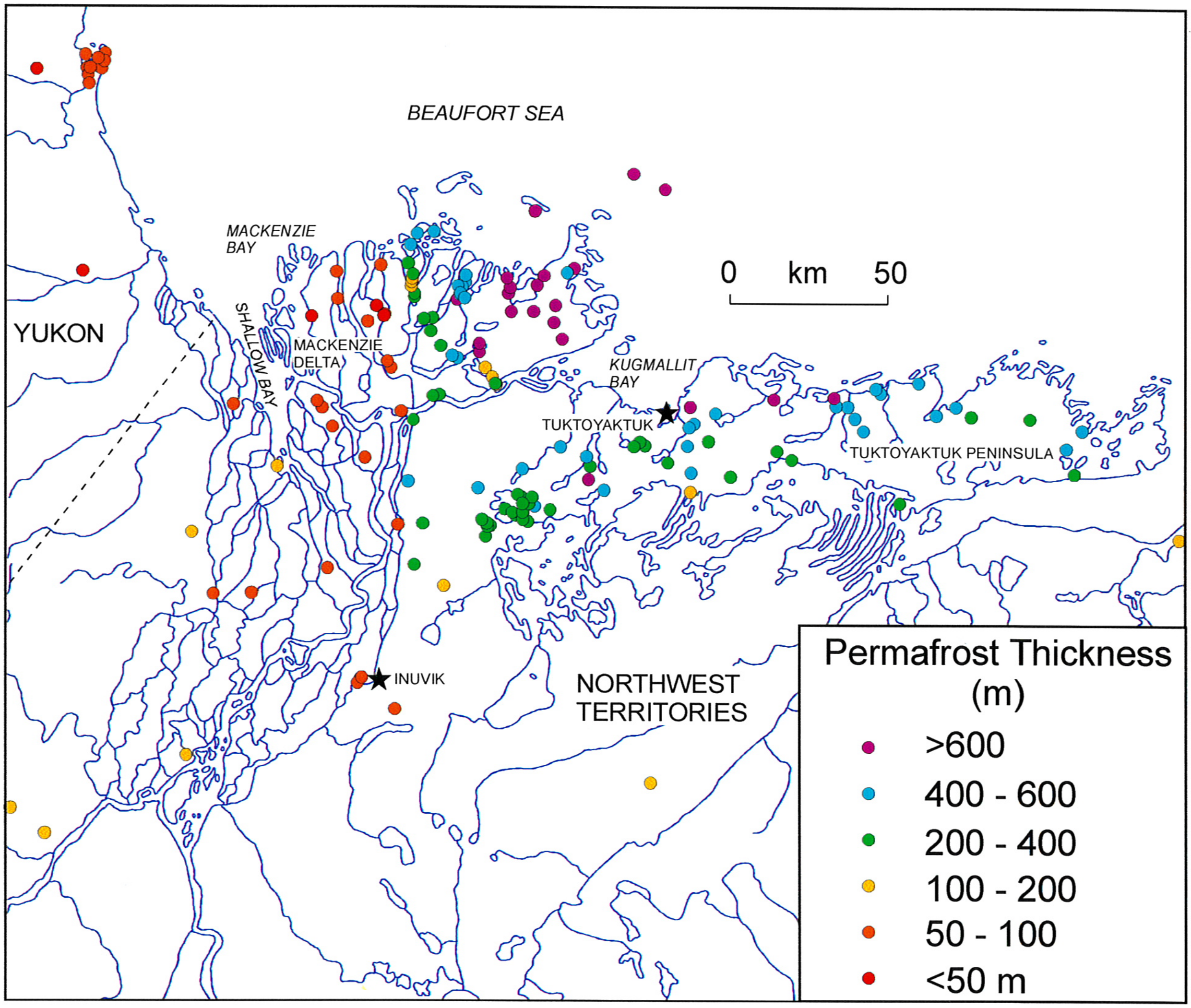

Figure 10 . Permafrost thickness in the Mackenzie Delta and Yukon coastal region based on combined observations of base of ice-bearing permafrost and depth to 0°C isotherm. Sites with uncertain values for the permafrost base have not been included on the map.

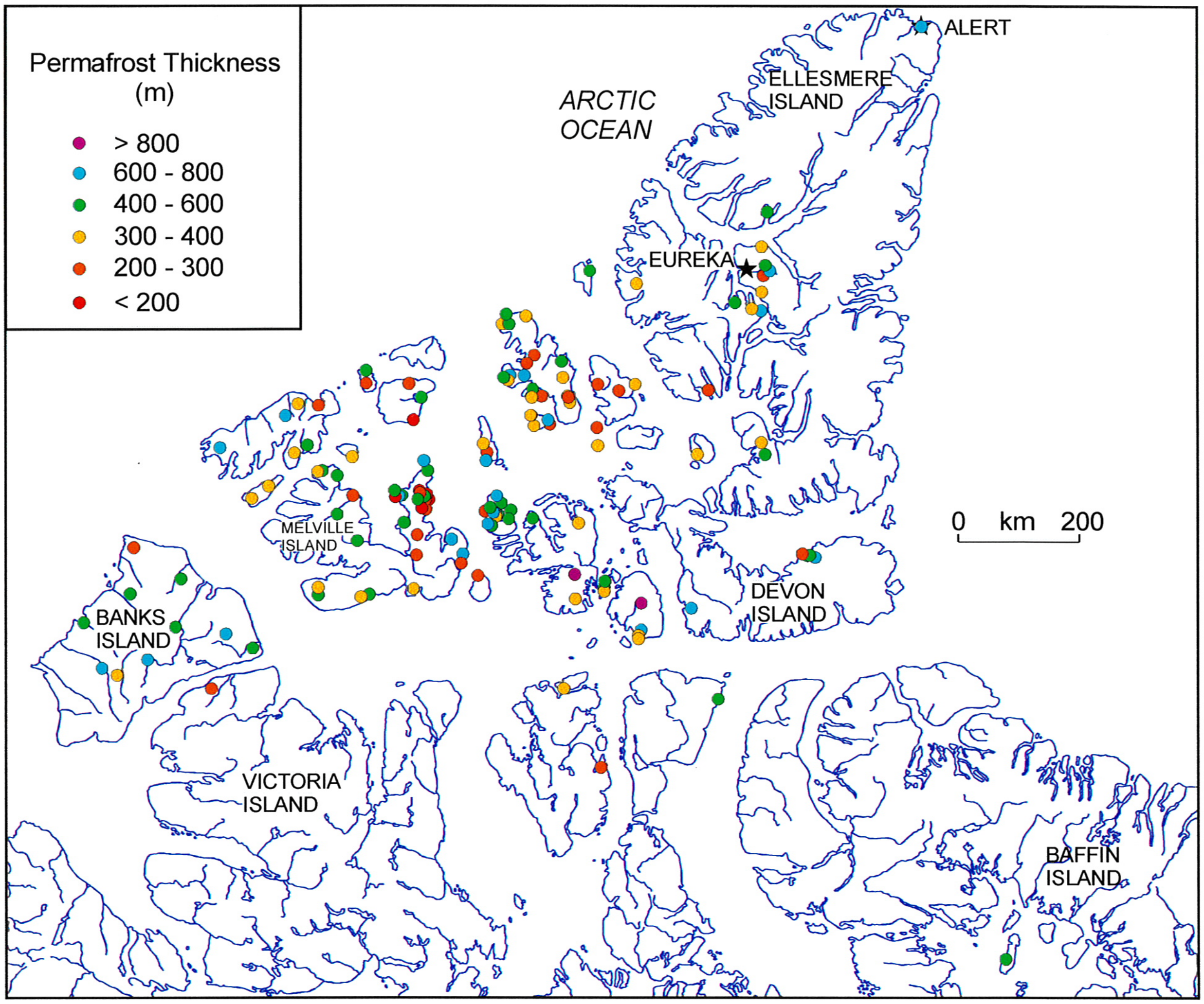

Figure 11. Permafrost thickness for sites on the islands of the Arctic Archipelago based on combined observations of base of ice-bearing permafrost and depth to 0°C isotherm. Sites with uncertain values for the permafrost base have not been included on the map.

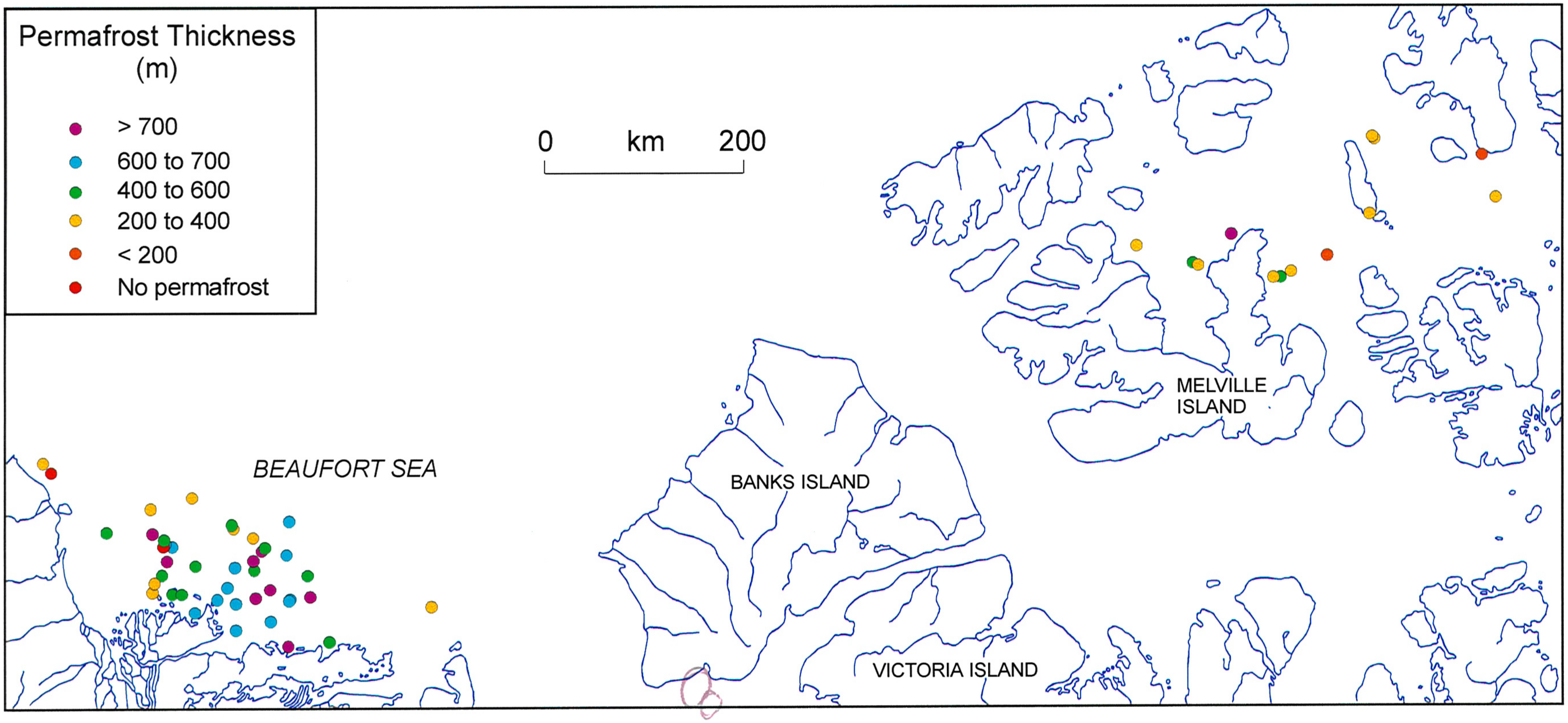

Figure 12. Permafrost thickness at offshore sites based mainly on the base of ice-bearing permafrost.

distribution, geology and the geothermal heat flux are also important factors that determine the distribution and thickness of permafrost. The climatic and geologic history is also an important factor. Permafrost in coastal regions of the Arctic Islands for example, is much thinner than would be expected under the current climatic conditions. These regions were previously submerged and have emerged as a result of post glacial uplift in the past several thousand years. Low elevation sites have only recently been exposed to lower air temperatures (less than -20°C). Ground temperatures are presently decreasing and permafrost is aggrading in some coastal regions (Taylor, 1991).

The database described in this report provides information on permafrost thickness and related factors that is relevant to northern development, infrastructure design and climate change studies. These data may also be used for the development and validation of climate change models and permafrost models.

The database was developed to record baseline conditions and was not envisaged as a means to keep an ongoing record of changes in permafrost characteristics such as thickness, temperature or active layer thickness over time. However, with increased focus on climate change, the need for long-term monitoring of permafrost conditions has been recognized. A global network of permafrost observatories, the Global Terrestrial Network for Permafrost (GTN-P) has recently been established under the World Meteorological Organization and the Global Climate Observing System (Burgess et al., 2000). The network consists of two components, (i) the existing Circumpolar Active Layer Monitoring (CALM) Program which focusses on active layer characteristics, and (ii) a new borehole temperature network to focus on monitoring permafrost thermal state.

The authors recognize that the database is not exhaustive, and welcome submission of data that have been inadvertently omitted or recently acquired.

ACKNOWLEDGEMENTS

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REFERENCES

Allard, M., Wang B. and Pilon, J.A.
1995: Recent cooling along the southern shore of Hudson Strait, Quebec, Canada, documented from permafrost temperature measurements; Arctic and Alpine Research, v. 27, p. 157-166.

Atmospheric Environment Service (AES)
1982a: Temperature 1951-1980; Canadian Climate Normals, Environment Canada, Atmospheric Environment Service, v. 2, 306 p.

Atmospheric Environment Service (AES)
1982b: Precipitation 1951-1980; Canadian Climate Normals, Environment Canada, Atmospheric Environment Service, v. 3, 602 p.

Ben-Miloud, K. and Seguin, M.-K.
1990: Stratigraphy, distribution of active layer and discontinuous permafrost in Kangiqsualujjuaq Basin, Northern Quebec; Proceedings of Fifth Canadian Permafrost Conference, Université Laval Collection Nordicana No. 54, p. 131-136.

Brown, R.J.E.
1964: Permafrost investigation on the Mackenzie Highway in Alberta and Mackenzie District; National Research Council of Canada, Division of Building Research, Technical Paper 175, National Research Council 7885, 27 p. Ottawa.

Brown, R.J.E.
1965: Permafrost investigations in Saskatchewan and Manitoba; National Research Council of Canada, Division of Building Research, Technical Paper 193, National Research Council 8375, 36 p. Ottawa.

Brown, R.J.E.
1967a: Permafrost investigations in British Columbia and Yukon Territory; National Research Council of Canada, Division of Building Research, Technical Paper 253, National Research Council 9762, 55 p. Ottawa.

Brown, R.J.E.
1967b: Permafrost in Canada; Geological Survey of Canada Map 1246A - National Research Council Publication 99769.

Brown, R.J.E.
1968: Permafrost investigations in northern Ontario and eastern Manitoba; National Research Council of Canada, Division of Building Research, Technical Paper 291, National Research Council 10465, 40 p. Ottawa.

Brown, R.J.E.
1973: Influence of climatic and terrain factors on ground temperatures at three locations in the permafrost region of Canada; North American Contribution, Second International Permafrost Conference, Yakutsk, USSR, Washington D.C., National Academy of Science, p. 20-25.

Brown, R.J.E.
1975: Permafrost investigations in Quebec and Newfoundland (Labrador); National Research Council of Canada, Division of Building Research, Technical Paper 449, National Research Council of Canada 14966, 36 p., Ottawa.

Brown, R.J.E. and Pewe, T.L.
1973: Distribution of permafrost in North America and its relationship to the environment: A review, 1963-1973; North American Contribution, Second International Permafrost Conference, Yakutsk, USSR, Washington D.C., National Academy of Science, p. 71-100.

Burgess, M.M.
1987: Norman Wells pipeline monitoring sites ground temperature data file 1986; Geological Survey of Canada Open File Report 1621.

Burgess M.M.
1993: Snow depth and density measurements Norman Wells pipeline study sites Mackenzie Valley, 1985-1991; Geological Survey of Canada Open File 2626.

Burgess, M.M., Judge, A.S. and Taylor, A.E.
1982: Yukon ground temperature data collection - 1966 to August 1981; Earth Physics Branch Open File Report 82-1. Energy Mines and Resources Canada, Ottawa.

Burgess, M.M. and Lawrence, D.E.
1997: Thaw settlement in permafrost soils: 12 years of observations on the Norman Wells pipeline right-of-way; *in* Proceedings of the 50th Canadian Geotechnical Society Conference, Ottawa, p. 77-84.

Burgess, M.M. and Riseborough, D.W.
1990: Observations on the thermal response of discontinuous permafrost terrain to development and climate change - an 800 km transect along the Norman Wells pipeline; Proceedings of the Fifth Canadian Permafrost Conference, Collection Nordicana No. 54, Laval University, p. 291-297.

Burgess, M.M. and Smith, S.L.
2000: Shallow ground temperatures; *in* The Physical Environment of the Mackenzie Valley, Northwest Territories: a Base Line for the Assessment of Environmental Change, (ed.) L.D. Dyke and G.R. Brooks; Geological Survey of Canada, Bulletin 547, p. 89-103.

Burgess, M.M., Smith, S.L., Brown, J., Romanovsky, V. and Hinkel, K.
2000: The Global Terrestrial Network for Permafrost (GTNet-P): Permafrost monitoring contributing to global climate observations; *in* Current Research 2000E, Geological Survey of Canada, 8 p. (available online; http://www.nrcan.gc.ca/gsc/bookstore).

Burn, C.R.
1991: Permafrost and ground ice conditions reported during recent geotechnical investigations in the Mayo District, Yukon Territory; Permafrost and Periglacial Processes, v. 2, p. 259-268.

D & S Group
1983: Study of well logs in the Mackenzie Delta - Beaufort Sea to outline permafrost thickness and/or gas hydrate occurrence; Earth Physics Branch Open File Report 83-10, Energy Mines and Resources Canada, Ottawa, 242 p.

Dyke, L.D.
2000: Shoreline permafrost along the Mackenzie River; *in* The Physical Environment of the Mackenzie River Valley, Northwest Territories: a Base Line for the Assessment of Environmental Change, (ed.) L.D. Dyke and G.R. Brooks; Geological Survey of Canada, Bulletin 547, p. 143-151.

Ecoregions Working Group
1989: Ecoclimatic regions of Canada. Canada Committee on Ecological Land Classification, Environment Canada; Environment Canada, Ecological Land Classification Series, No. 23.

French, H.M.
1996: The Periglacial Environment (2nd edition); Longman Group Ltd., New York, 341 p.

Geological Survey of Canada
1981: Geology and Canada; Energy Mines and Resources Canada, 32 p.

GEOTECH
1983: Subsurface temperature data from Arctic wells; Earth Physics Branch, Energy Mines and Resources Canada Open File Number 83-11.

GEOTECH
1984: Subsurface temperature data from wells north of sixty Yukon-Northwest Territories; Earth Physics Branch Energy Mines and Resources Canada Open File Number 84-28, 557 p.

GEOTECH
1988: Subsurface temperature data from Arctic wells; Addendum Prepared for Earth Physics Branch, Energy Mines and Resources Canada.

Hardy Associates Ltd.
1984a: Study of well logs in the Arctic Islands to outline permafrost thickness and/or gas hydrate occurrence; Earth Physics Branch Open File Report 84-8, Energy Mines and Resources Canada, Ottawa. 374 p.

Hardy Associates Ltd
1984b: Study of well logs in the western N.W.T. and Yukon to outline permafrost thickness and/or gas hydrate occurrence; Earth Physics Branch Open File Report 84-27. Energy Mines and Resources Canada, Ottawa. 290 p.

Heginbottom, J.A., Dubreuil, M-A., and Harker, P.A. (comp.)
1995: Canada - Permafrost; National Atlas of Canada (fifth edition), Plate 2.1; Geomatics Canada, National Atlas Information Service, and Geological Survey of Canada, MCR 4177, scale 1:75 000 000.

International Permafrost Association
1998a: Multi-language glossary of permafrost and related ground ice terms, version 2.0; (ed.) R.O. van Everdingen, University of Calgary, Calgary, Alberta, 278 p.

International Permafrost Association
1998b: Global Geocryological Database; CAPS version 1 CD-rom. Published by the National Snow and Ice Data Centre, Boulder Colorado.

Judge, A.S.
1973: The thermal regime of the Mackenzie valley: observations of the natural state; Environmental Social Comm. Northern Pipelines (Canada), Task Force on Northern Oil Development Report 73-38, 177 p.

Judge, A.S., Burgess M. Taylor, A.E., and Allen, V.S.
1981: Canadian geothermal data collection - Northern wells 1978-80; Geothermal Series Number 12, Geothermal Service Canada, Earth Physics Branch, Energy Mines and Resources Canada, 190 p.

Judge, A.S., Taylor, A.E. and Burgess, M.
1979: Canadian geothermal data collection - Northern wells 1977-78; Geothermal Series Number 11, Geothermal Service Canada, Earth Physics Branch, Energy Mines and Resources Canada, 188 p.

Kettles, I.M., Tarnocai, C. and Bauke, S.D.
1997: Predicted permafrost distribution in Canada under a climate warming scenario; *in* Current Research 1997-E; Geological Survey of Canada, p. 109-115.

Levesque, R. Allard, M., Sequin, M.K. and Pilon, J.-A.
1990: Données préliminaires sur le régime thermique du pergélisol dans quelques localités du Nunavik, Québec; *in* Proceedings of Fifth Canadian Permafrost Conference, Université Laval Collection Nordicana No. 54, p. 207-213.

Lunardini, V.J.
1981: Heat Transfer in Cold Climates; Van Nostrand Reinhold Co., 731 p.

MacInnes, K.L., Burgess, M.M., Harry, D.G. and Baker, T.H.W.
1989: Permafrost and terrain research and monitoring: Norman Wells Pipeline, Vol I Environmental and engineering considerations; Northern Affairs Program, Dept. Of Indian Affairs and Northern Development, Environmental Studies Report No. 64, 132 p.

MacInnes, K.L., Burgess, M.M., Harry, D.G. and Baker, T.H.W.
1990: Permafrost and terrain research and monitoring: Norman Wells Pipeline, Vol II Research and monitoring results: 1983-1988; Northern Affairs Program, Dept. Of Indian Affairs and Northern Development, Environmental Studies Report No. 64, 204 p.

Mackay, J.R.
1974: Seismic shot holes and ground temperature, Mackenzie Delta Area, N.W.T.; Geological Survey of Canada Paper 74-1 Part A, p. 389-390.

Majorowicz, J.A., Jones, F.W. and Jessop, A.M.
1988: Preliminary geothermics of the sedimentary basins in the Yukon and Northwest Territories (60°N-70°N) - Estimates from petroleum bottom-hole temperature data; Bulletin of Canadian Petroleum Geology, v. 36, p. 39-51.

Nicholson, F.H. and Thom, B.G.
1973: Studies at the Timmins 4 permafrost site; *in,* North American Contribution, Permafrost Second International Conference, Yakutsk, USSR, p. 159-166.

Nixon, J.F. and Burgess, M.M.
1999: Norman Wells Pipeline settlement and uplift movement; Canadian Geotechnical Journal, v. 36, p. 119-135.

Pilon, J.A., Burgess, M.M., Judge, A.S., Allen, V.S., MacInnes, K.L., Harry, D.G., Tarnocai, C. and Baker, H.
1989: Norman Wells to Zama oil pipeline permafrost and terrain research and monitoring program: site establishment report; Geological Survey of Canada Open File 2044, 332 p.

Poitevin, J. and Gray, J.T.
1982: Distribution du pergelisol dans le bassin del la Grande Riviere de la Baleine, Quebec; Nat. Can. (Rev. Ecol. Sypt.) v. 109, p. 445-455.

Price, R.A. and Douglas, R.J.W. eds.
1972: Variations in Tectonic Styles in Canada; The Geological Association of Canada Special Paper No. 11, 688 p. .

Seguin, M.K.
1978: Temperature - electrical resistivity relationships in continuous permafrost at Purtuniq, Ungava Peninsula; *in* Third International Conference on Permafrost, Edmonton, Alberta Proceedings, v. 1, p. 138-144.

Seguin, M.K., Allard, M. and Gahe, E.
1989: Surface and downhole geophysics for permafrost mapping in Ungava, Quebec; Physical Geography, v. 10, p. 201-232.

Smith, M.W. and Hwang, C.T.
1973: Thermal disturbance due to channel shifting, Mackenzie Delta, N.W.T., Canada; in Permafrost: North American Contribution to the 2nd International Conference on Permafrost, National Academy of Sciences, Washington, D.C., p. 51-60.

Smith, S. and Burgess, M.
2000: Ground temperature database for northern Canada; Geological Survey of Canada Open File Report #3954, 57 p.

Smith, S.L., Burgess, M.M. and Heginbottom, J.A.
2001: Permafrost in Canada, a challenge to northern development; *in* A Synthesis of Geological Hazards in Canada, (ed.) G.R. Brooks; Geological Survey of Canada, Bulletin 548, p. 241-264.

Taylor, A.E.
1991: Marine transgression, shoreline emergence: evidence in seabed and terrestrial ground temperatures of changing relative sea levels, Arctic Canada; J. Geophysical. Research, v. 96, p. 6893-6909.

Taylor, A.E., Burgess M.M., Judge, A.S., and Allen, V.S.
1982: Canadian geothermal data collection - Northern wells 1981; Geothermal Series Number 13, Geothermal Service Canada, Earth Physics Branch, Energy Mines and Resources Canada, 153 p.

Taylor, A.E. and Judge, A.S.
1974: Canadian geothermal data collection - Northern wells, 1955 to February 1974; Geothermal Series Number 1, Geothermal Service Canada, Earth Physics Branch, Energy Mines and Resources Canada, 171 p.

Taylor, A.E. and Judge, A.S.
1975: Canadian geothermal data collection - Northern wells, 1974; Geothermal Series Number 3, Earth Physics Branch, Geothermal Service Canada, Energy Mines and Resources Canada, 127 p.

Taylor, A.E. and Judge, A.S.
1976: Canadian geothermal data collection - Northern wells, 1975; Geothermal Series Number 6, Geothermal Service Canada, Earth Physics Branch, Energy Mines and Resources Canada, 142 p.

Taylor, A.E. and Judge, A.S.
1977: Canadian geothermal data collection - Northern wells 1976-77; Geothermal Series Number 10, Geothermal Service Canada, Earth Physics Branch, Energy Mines and Resources Canada, 194 p.

Thurber Consultants Ltd.
1986: Study of well logs in the Mackenzie Delta/Beaufort Sea area and Arctic Islands to outline permafrost thickness and/or gas hydrate occurrence: An update of wells; Prepared for DSS on behalf of Earth Physics Branch, Energy Mines and Resources Canada, DSS File: 15SQ.23235-5-1145.

Thurber Consultants Ltd.
1988: Update of well log studies Mackenzie Delta/Beaufort Sea Area, Arctic Islands and offshore East Coast Vol. 1: Arctic Canada; Prepared for Supply and Services Canada on behalf of GSC, Energy Mines and Resources Canada, SSC File: 692.23233-7-0925.

Williams, P.J. and Smith, M.W.
1991: The Frozen Earth. Fundamentals of Geocryology; Cambridge University Press, United Kingdom, 306 p.

Young, S. and Judge, A.S.
1986: Canadian permafrost distribution and thickness data collection: a discussion; Proc. Of National Student Conference on Northern Studies, W.P Adams and P.G. Johnson eds., p. 223 - 228.

Table 2

Summary table extracted from the permafrost thickness database.

Fields:

Site Location
Site Identifier
Lat (°N) - Latitude
Long (°W) - Longitude
Det. - Determination (method used to determine permafrost base)
Base IBPF (m) - Depth of the base of ice-bearing permafrost
Trans (m) - Depth to the base of the transition zone
Zero Isotherm (m) - Depth to the position of the 0°C isotherm
References

SITE LOCATION	SITE IDENTIFIER	LAT (°N)	LONG (°W)	Det. IBPF	Base IBPF (m)	Trans (m)	Det. Zero isotherm	Zero isotherm (m)	REFERENCES
Northwest Territories									
Fort Smith, NWT	-	60.02	111.97	-	-	-	-	no pf	8, 10
Northwest Territories	3	60.77	115.88	-	-	-	U	-	6
Northwest Territories	5	60.72	115.90	-	-	-	U	-	6
Northwest Territories	9	60.65	116.02	-	-	-	U	-	6
Northwest Territories	18	60.57	116.10	-	-	-	U	-	6
Northwest Territories	23	60.50	116.28	-	-	-	U	-	6
Northwest Territories	26	60.47	116.30	-	-	-	U	-	6
Northwest Territories	31	60.40	116.37	-	-	-	U	-	6
Northwest Territories	32	60.35	116.40	-	-	-	U >	2.4	6
Northwest Territories	34	60.28	116.55	-	-	-	U	-	6
Northwest Territories	33	60.28	116.55	-	-	-	U	-	6
Northwest Territories	35	60.27	116.57	-	-	-	U	-	6
Northwest Territories	39	60.07	116.82	-	-	-	U >	0.9	6
Cameron B-13	EPB #293	60.04	117.05	-	-	-	-	no pf	45, 70, 38
Redknife Hills A	85-13 A	60.57	120.29	-	-	-	-	3.5	19
Redknife Hills B	85-13 B	60.57	120.29	-	-	-	-	7	19
Redknife Hills C	85-13 C	60.56	120.29	-	-	-	-	no pf	19
Fort Providence A-47	EPB #70	61.44	117.37	G <	71	-	+	no pf	45, 70, 64,15, 32
Fort Simpson	FS #1	61.79	121.30	-	-	-	+	no pf	45, 70, 64,15
Fort Simpson	FS #2	61.70	121.24	-	-	-	+	no pf	45, 70, 64,15
Fort Simpson	FS #3	61.64	121.41	-	-	-	+	no pf	45, 70, 64,15
Fort Simpson	-	61.87	121.35	-	-	-	>	12.2	8,10
N Wells PumpStn3	85-9	61.39	120.90	-	-	-	-	no pf	19
Mackenzie Hwy S	85-10A	61.35	120.86	-	-	-	-	no pf	19
Mackenzie Hwy S	85-10B	61.35	120.87	-	-	-	-	2	19
Moraine South	85-11	61.28	120.80	-	-	-	-	4	19
Jean Marie Ck.	85-12A	61.19	120.70	-	-	-	-	no pf	19
Jean Marie Ck.	85-12B	61.19	120.70	-	-	-	-	3.9	19
Manners Ck.	85-8A	61.60	121.09	-	-	-	-	12	19
Manners Ck.	85-8B	61.60	121.09	-	-	-	-	4	19
Manners Ck.	85-8C	61.60	121.09	-	-	-	-	4	19
Trail River	84-4A	62.08	121.99	-	-	-	-	no pf	19
Trail River	84-4B	62.08	121.99	-	-	-	-	no pf	19
Yellowknife	EPB #66	62.51	114.42	-	-	-	+	no pf	45,70,22,15,64
Yellowknife, NWT.	-	62.47	114.45	-	-	-	-	61-91.4	8,10
Yellowknife, NWT.	1) black rock	62.47	114.45	-	-	-	-	no pf	12
Yellowknife, NWT.	2) white rock	62.47	114.45	-	-	-	-	no pf	12
Yellowknife, NWT.	3) red rock	62.47	114.45	-	-	-	-	no pf	12

SITE LOCATION	SITE IDENTIFIER	LAT (°N)	LONG (°W)	Det. IBPF	Base IBPF (m)	Trans (m)	Det. Zero isotherm	Zero isotherm (m)	REFERENCES
Yellowknife, NWT.	4) till	62.47	114.45	-	-	-	-	no pf	12
Yellowknife, NWT.	5) beach ridge	62.47	114.45	-	-	-	-	no pf	12
Yellowknife, NWT.	6) burned peatland	62.47	114.45	-	-	-	-	no pf	12
Yellowknife, NWT.	7) sedge peatland	62.47	114.45	-	-	-	-	30	12
Yellowknife, NWT.	8) spruce peatland	62.47	114.45	-	-	-	-	50	12
Giant Yellowknife	-	62.48	114.63	-	-	-	-	85.3	56
Canadian Tungsten	-	62.00	128.25	-	-	-	+	10.7	9,56
Table Mountain	85-7A	63.61	123.64	-	-	-	-	40	19
Table Mountain	85-7B	63.60	123.62	-	-	-	-	70	19
Table Mountain	85-7C	63.60	123.62	-	-	-	-	50	19
Consolidated Discovery Yellowknife	-	63.25	113.83	-	-	-	-	91	56
Dahadinni River M-43A	EPB #94	63.88	124.66	G	284	357	E	51	15,32,45,65,70
Taurcanis, NWT	-	64.03	111.17	-	-	-	-	274	8
Great Bear R.	84-3A	64.91	125.58	-	-	-	-	74	19
Great Bear R.	84-3B	64.91	125.57	-	-	-	-	57	19
Norman Wells Pump Stn	84-1	65.29	126.88	-	-	-	-	55	19
Kee Scarp	HT137	65.31	126.73	-	-	-	-	no pf	19
Canyon Ck North	84-2A	65.29	126.88	-	-	-	-	33	19
Canyon Ck North	84-2B	65.27	126.52	-	-	-	X	30	19
Canyon Ck South	84-2C	65.22	126.51	-	-	-	-	53	19
West Whitefish	EPB #151	65.56	124.60	G	299	424	E	112	15,45,65,70,79
Norman Wells Canol 30x	EPB #88	65.29	126.87	-	-	-	U	143	15,45,64,70,79
Norman Wells Canol 19x	EPB #88	65.29	126.88	-	-	-	U	58	15,45,64,70,79
Norman Wells Canol 18x	EPB #88	65.29	126.87	-	-	-	U	76	15,45,64,70,79
Norman Wells Canol 7x	EPB #88	65.28	126.85	-	-	-	U	128	15,45,64,70,79
Norman Wells Canol 33x	-	65.28	126.84	-	-	-	+	62	15,45,64,70,79
Norman Wells Bear 13	EPB #88	65.26	126.89	-	-	-	U	67	15,45,64,70,79
Norman Wells Bear 7	EPB #88	65.26	126.88	-	-	-	U	52	15,45,64,70,79
Norman Wells	NW #3	65.28	126.75	-	-	-	+	37	15,18,45,79
Norman Wells	NW #7	65.25	126.64	-	-	-	+	26	15,18,45,79
Norman Wells	NW #4	65.34	127.07	-	-	-	-	-	15,18,45,79
Norman Wells	NW #2	65.25	127.00	-	-	-	-	-	15,18,45,79
Norman Wells	NW #6	65.23	127.12	-	-	-	-	-	15,18,45,79
Norman Wells	-	65.30	126.82	-	-	-	-	47.5-61	8,10
Norman Wells	NW #1	65.35	127.17	-	-	-	-	-	15,18,45,79
Norman Wells	NW #5	65.26	126.63	-	-	-	-	-	15,18,45,79
Norman Wells	Hole #7	65.28	126.83	-	-	-	-	47	75a
Norman Wells	Hole #10	65.28	126.83	-	-	-	-	30	75a

SITE LOCATION	SITE IDENTIFIER	LAT (°N)	LONG (°W)	Det. IBPF	Base IBPF (m)	Trans (m)	Det. Zero isotherm	Zero isotherm (m)	REFERENCES
Norman Wells	Hole #12	65.28	126.83	-	-	-	-	18	75a
Norman Wells	Hole #13	65.28	126.83	-	-	-	-	15	75a
Norman Wells	Hole #17	65.28	126.83	-	-	-	-	very thin or absent	75a
Fort Good Hope	FGH #1	65.74	128.69	-	-	-	X	48	15,18,45,70,79
Fort Good Hope	FGH #3	65.78	128.87	-	-	-	-	-	15,18,45,70,79
Hume River D-53	EPB #100	65.87	129.18	G	390	472	+	35	32,47
Fort Good Hope	FGH #2	65.80	129.42	-	-	-	U	25	15,18,45,70,79
Great Bear Lake	Eldorado Mine	66.00	125.00	-	-	-	-	104	50
Fort Good Hope	FGH #4	66.12	129.61	-	-	-	X	33	15,18,45,70,79
Izok Lake	Onshore	67.33	123.80	-	-	-	>	20	38
Izok Lake	Beneath Lake	67.33	123.80	-	-	-	-	no pf	38
Tedji Lake K-24	EPB #253	67.73	126.83	G	375	448	E	449	32,47
Mackenzie Delta	No. 4	67.85	134.58	-	-	-	X	100	39
Arctic Red River (NWT)	Red R #1	67.43	135.10	-	-	-	X	107	45,61,77
Fort McPherson (NWT)	MP #1	67.43	135.42	-	-	-	X	90	45,51,79
Fort McPherson (NWT)	MP #2	67.43	135.42	-	-	-	X	150	45,51,79
Fort McPherson (NWT)	MP #3	67.43	135.42	-	-	-	X	150	45,51,79
Fort McPherson (NWT)	Mac #1	67.43	135.42	-	-	-	X	120	45,51
Sadene D-02	EPB #281	68.85	126.79	G	307	-	+	309	23,45,70,47
Crossley Lake S-K-60	-	68.50	129.48	G <	215	-	-	-	23
Wolverine H-34	-	68.38	130.63	G <	471	-	-	-	23
Kuglauk N-02	-	68.53	131.52	G	98	-	-	-	23
Kugaluk N-02	EPB #76	68.53	131.52	-	-	-	E	102	15,23,45,64,70
Kamik F-38	-	68.95	133.40	G <	536	-	-	-	23
Kamik D-48	EPB #273	68.95	133.46	G	390	-	E X	370	15,23,70
Inuvik, NWT	-	68.30	133.48	-	-	-	>	91	8,10,79
Kamik D-58	-	68.95	133.50	G	317	332	-	-	23
Parsons F-09	-	68.97	133.53	G	384	-	-	-	23
Parsons D-20	EPB #285	68.99	133.57	G	352+/-8	-	E	364	15,70
Parsons D-20	EPB #285	68.99	133.57	G <	1050	-	E	370	23
Parsons N-17	EPB #275	68.95	133.57	G	320+/-15	-	E	355	15,70,47
Parsons N-17	EPB #275	68.95	133.57	G	286	-	E	361	23
Parsons O-27	-	68.95	133.60	G	348	-	-	-	23
East Reindeer C-38	-	68.78	133.65	G <	490	-	-	-	23
Parsons L-37	EPB #279	68.95	133.67	G <	1016	-	X +	308	23
Parsons L-37	EPB #279	68.95	133.67	G	312+/-8	-	X +	300	15,70,47
Parsons P-41	-	68.85	133.67	G	220	-	-	-	23
Parsons A-44	-	68.88	133.68	G	352	-	-	-	23
Parsons L-43	EPB #272	68.88	133.70	G	247	-	E	302	23
Parsons L-43	EPB #272	68.88	133.70	G	259+/-15	-	E	347	15,70,47

SITE LOCATION	SITE IDENTIFIER	LAT (°N)	LONG (°W)	Det. IBPF	Base IBPF (m)	Trans (m)	Det. Zero isotherm	Zero isotherm (m)	REFERENCES
East Reindeer P-60	-	68.67	133.72	G	158	-	-	-	23
Parsons P-53	-	68.88	133.72	G	307	-	-	-	23
Onigat D-52	-	68.68	133.73	G	580	650	-	-	74
Scurry Inuvik D-54	-	68.38	133.73	G <	384	-	-	-	23
Ogeoqeoq J-06	-	68.77	133.77	G <	164	-	-	-	23
East Reindeer G-04	-	68.88	133.77	G	320	-	-	-	23
Inuvik, NWT	no. 3	68.30	133.83	-	-	-	X	76	17,41,42,79
Mackenzie Delta Lake	-	68.32	133.83	-	-	-	-	76.2-91.4	8,10
Inuvik, NWT	no. 4	68.30	133.83	-	-	-	X	91	17,41,42,79
Inuvik, NWT	no. 2	68.30	133.83	-	-	-	> X	115	17,41,42,79
NRC Lake	-	68.32	133.83	-	-	-	-	60	53
Atigi O-48	EPB #194	68.95	133.94	G	564+/-15	-	E X	588	15,70
Atigi O-48	EPB #194	68.95	133.94	G	509	-	E X	594	23
Skakgatlatachig D-50	-	68.65	133.95	G	675	745	-	-	74
East Reindeer A-01	-	68.67	134.00	G	214	-	-	-	23
Ikhil I-37	EPB #193	68.78	134.13	G	341+/-8	-	E	347	15,70
Ikhil I-37	EPB #193	68.78	134.13	G	351	-	E	354	23
Williams Is,50km NW of Inuvik	1	68.73	134.28	-	-	-	X	8.5	45,52,62,63
Williams Is,50km NW of Inuvik	2	68.73	134.28	-	-	-	X	17	45,52,62,63
Williams Is,50km NW of Inuvik	3	68.73	134.28	-	-	-	X	22	45,52,62,63
Williams Is,50km NW of Inuvik	4	68.73	134.28	-	-	-	X	2	45,52,62,63
Williams Is,50km NW of Inuvik	5	68.73	134.28	-	-	-	X	66	45,52,62,63
Ogruknang M-31	-	68.85	134.42	G	539	-	-	-	23
Napartok M-01	-	68.52	134.53	G	71	-	-	-	23
Tununuk F-30	-	68.98	134.62	G <	166	-	-	-	23
Kipnik O-20	-	68.83	134.80	G	76	-	-	-	23
Napoiak F-31	-	68.33	134.90	G	92	97	-	-	23
Aklavik, NWT	-	68.23	135.00	-	-	-	>	91	8
Aklavik F-17	-	68.10	135.07	G <	161	-	-	-	23
Aklavik A-37	-	68.27	135.13	G	67	103	-	-	23
Tulugak K-31	-	68.85	135.15	G	73	102	-	-	23
Aklavik F-38	-	68.12	135.15	G <	841	-	-	-	23
Kugpik O-13	EPB #192	68.88	135.30	G <	171	-	E	95	15,23,70
Unak B-11	-	68.67	135.32	G	158	-	-	-	23
Kugpik L-24	-	68.88	135.37	G	88	107	-	-	23
Beaver House H-13	EPB # 89	68.37	135.55	G	112	135	E	197	15,23,45,65,70
Ulu A-35	EPB #276	68.73	135.88	G <	227	-	E	90	15,23,70,71
Fish River B-60	-	68.65	136.22	G <	232	-	-	-	23

SITE LOCATION	SITE IDENTIFIER	LAT (°N)	LONG (°W)	Det. IBPF	Base IBPF (m)	Trans (m)	Det. Zero isotherm	Zero isotherm (m)	REFERENCES
Horton River G-02	EPB #77	69.86	127.27	G <	371	-	E	141	23,45,70,71
Nicholson N-45	-	69.92	128.93	G	198	-	-	-	23
Nicholson G-56	-	69.92	129.97	G	378	-	-	-	23
Kapik J-39	-	69.97	130.13	G	509	527	-	-	23
Nuvorak O-09	-	69.98	130.52	G	360	-	-	-	23
Amorak N-44	-	69.90	130.93	G	350	-	-	-	23
Amaguk H-16	-	69.58	131.05	G	210	-	-	-	23
Kanguk I-24	-	69.90	131.08	G	421	-	-	-	23
Kanguk F-42	-	69.85	131.18	G	473	479	-	-	23
Kiligvak I-29	-	69.48	131.33	G <	158	-	-	-	23
Louth K-45	-	69.90	131.45	G	564	598	-	-	23
Natagnak K-23	-	69.70	131.62	G	535	-	-	-	23
Natagnak H-50	-	69.82	131.67	G	538	546	-	-	23
Natagnak 0-59	-	69.82	131.72	G	585	810	-	-	73
Natagnak K-53	-	69.72	131.73	G	561	576	-	-	23
Atkinson H-25	-	69.73	131.83	G	533	-	-	-	23
Atkinson M-33	-	69.72	131.92	G	490	512	-	-	23
Atkinson A-55	-	69.73	131.97	G	619	-	-	-	23
Itkrilek B-52	-	69.52	131.98	G	340	425	-	-	74
Maguk A-32	-	69.52	132.12	G	236	-	-	-	23
Akku F-14	-	69.38	132.32	G	229	-	-	-	23
Kimik D-29	EPB #261	69.64	132.37	G	631	-	X	663	15,23,67,70
Eskimo J-07	-	69.28	132.52	G	155	201	-	-	23
Pikiolik G-21	-	69.33	132.60	G	400	650	-	-	73
Pikiolik M-26	EPB #263	69.43	132.62	G	340	-	+	362	15,23,66,70
Atertak F-41	EPB #262	69.51	132.70	-	-	-	+	535	15,67,70
Pikiolik E-54	EPB #264	69.39	132.74	G	425	-	+	432	15,24,66,70
Tuktu O-19	-	69.32	132.80	G	335	-	-	-	23
Mayogiak J-17	-	69.45	132.80	G	433	-	-	-	23
Mayogiak M-16	-	69.43	132.82	G	411	-	-	-	23
Mayogiak L-39	-	69.48	132.90	G	636	-	-	-	23
Tuk M-09	-	69.32	133.03	G	355	450	-	-	74
Tuk F-18	-	69.28	133.07	G <	575	-	-	-	23
Tuk H-30	-	69.32	133.08	G	385	-	-	-	74
Tuk J-29	-	69.30	133.10	G	370	45	-	-	74
Imnak J-29	-	69.15	133.10	G	533	-	-	-	23
Nuna A-10	-	69.15	133.25	G	930	1013	-	-	73
Wagnark G-12	-	69.18	133.30	G	387	-	-	-	14
Nuna A-32	-	69.02	133.37	G	390	-	-	-	23
Wagnark C-23	-	69.20	133.37	G	518	-	-	-	3

SITE LOCATION	SITE IDENTIFIER	LAT (°N)	LONG (°W)	Det. IBPF	Base IBPF (m)	Trans (m)	Det. Zero isotherm	Zero isotherm (m)	REFERENCES
Kamik L-60	-	69.00	133.48	G	402	-	-	-	23
Parsons N-10	EPB #178	69.00	133.53	G	341+/-15	-	E	354	15,70,71
Parsons N-10	EPB #178	69.00	133.53	G	332	-	E	360	23
Siku A-12	EPB #277	69.02	133.54	G	343+/-8	-	E	360	15,70
Siku A-12	EPB #277	69.02	133.54	G	358	-	E	365	23
Red Fox P-21	EPB #260	69.18	133.58	G	610	640	>	575	15,23,67,70
Siku E-21	EPB #284	69.00	133.62	G	389+/-8	-	E	394	15,70
Siku E-21	EPB #284	69.00	133.62	G	326	-	E	403	23
Siku C-11	EPB #274	69.00	133.65	G	358+/-8	-	E	378	15,70
Siku C-11	EPB #274	69.00	133.65	G	357	-	E	385	23
Siku C-55	-	69.07	133.73	G	463	-	-	-	23
Lousy Point	BH91-6	69.24	134.44	-	-	-	X U	128	25
Lousy Point	BH91-10	69.23	134.35	-	-	-	X U	156	25
Lousy Point	BH91-12	69.22	134.30	-	-	-	X U	369	25
Lousy Point	BH91-13	69.22	135.29	-	-	-	X U	151	25
Kilagmiotak M-16	-	69.43	134.07	G	740	790	-	-	23
Itiyok I-27	-	69.95	134.08	G	692	738	-	-	73
Kilagmiotak F-48	EPB #165	69.46	134.20	G	716	747	X	600	23,70,15
Umiak N-10	-	69.50	134.27	G	701	768	-	-	23
Ivik N-17	-	69.62	134.32	G	672	697	-	-	23
Ivik J-26	EPB #266	69.60	134.34	-	-	-	X	500	15,67,70
Isserk E-27	-	69.93	134.37	G	674	-	-	-	23
Umiak J-37	-	69.45	134.38	G	669	733	-	-	23
Ivik C-52	-	69.52	134.48	G	649	-	-	-	23
Ivik K-54	-	69.55	134.48	G	668	726	-	-	23
Mallik A-06	EPB #265	69.42	134.51	G	640	-	>	250	15,23,66,70
Ya Ya I-17	-	69.27	134.55	G	685	721	-	-	23
Ya Ya A-28	EPB #254	69.29	134.59	G	674	728	E X	665	15,23,70
Reindeer D-27	EPB #63	69.10	134.62	G	338+/-15	-	E	370	15,44,45,70,71
Richards Island	-	69.10	134.62	G <	464	-	E	375	23
Reindeer F-36	EPB #179	69.09	134.65	G	338+/-15	-	E X	357	15,70,71
Reindeer F-36	EPB #179	69.09	134.65	G	342	-	E	363	23
Mallik J-37	-	69.45	134.63	G	622	652	-	-	23
Mallik L-38	-	69.47	134.65	G	613	637	-	-	23
Ya Ya M-33	-	69.22	134.67	G	470	548	-	-	23
Reindeer A-41	-	69.00	134.67	G	335	420	-	-	23
Ya Ya P-53	EPB #176	69.21	134.71	G	402+/-15	438	E	433	15,23,70
Mallik P-59	-	69.48	134.72	G	645	707	-	-	23
Tununuk K-10	-	69.00	134.78	G	96	137	-	-	23
Toapolok H-24	-	69.22	134.83	G	335	357	-	-	23

SITE LOCATION	SITE IDENTIFIER	LAT (°N)	LONG (°W)	Det. IBPF	Base IBPF (m)	Trans (m)	Det. Zero isotherm	Zero isotherm (m)	REFERENCES
Nuktak C-22	-	69.68	134.85	G	701	-	-	-	23
Taglu G-33	-	69.37	134.90	G	543	-	-	-	23
Kikoralok N-46	-	69.10	134.93	G <	161	-	-	-	23
Taglu N-43	EPB #282	69.38	134.94	-	-	-	>	270	15,70,47
Taglu C-42	EPB #267	69.35	134.94	G	564	670	X +	600	15,24,70,47
Taglu D-43	EPB #268	69.37	134.95	-	-	-	X	620	15,70,47
Taglu F-43	-	69.37	134.95	G	548	618	-	-	23
Toapolok O-54	-	69.23	134.97	G	207	216	-	-	23
Taglu D-55	EPB #269	69.40	134.97	G>,<	533,884	-	+	500	15,23,70,47
Taglu H-54	EPB #287	69.39	134.97	G	504+/-15	-	E	533	15,23,70,47
Taglu West H-06	-	69.42	135.00	G	525	640	-	-	74
Taglu West P-03	-	69.38	135.00	G	482	-	-	-	23
Kumak J-06	-	69.27	135.02	G	243	291	-	-	23
Titalik O-15	-	69.08	135.05	G	97	107	-	-	23
Kumak K-16	-	69.25	135.07	G	241	311	-	-	23
Titalik K-26	EPB #177	69.09	135.11	G <	55	-	+	65	15,23,64,70
Kumak C-58	-	69.28	135.23	G	247	283	-	-	23
Kumak E-58	EPB #280	69.29	135.25	G	217	288	E	275	15,23,70
Niglintagak B-19	EPB #278	69.30	135.31	G	168+/-15	198	E	173	15,23,70
Niglintagak M-19	EPB #270	69.31	135.32	G	58	213	>	140	15,23,70
Niglintgak H-30	EPB #173	69.32	135.34	G	89	189	E	144	15,23,70
Unipkat I-22	EPB #167	69.20	135.34	G	58	88	E	86	15,23,70
Upluk C-21	-	69.33	135.35	G	233	-	-	-	23
Kurk M-39	-	69.15	135.42	G	61	-	-	-	23
Upluk M-38	-	69.47	135.42	G	409	433	-	-	23
Ellice Island	No. 3	69.20	135.43	-	-	-	X	26	39
Upluk A-42	-	69.35	135.43	G	348	378	-	-	23
Garry P-04	EPB #288	69.40	135.51	G	486	-	+	502	15,23,70,71
Garry G-07	-	69.43	135.52	G	422	-	-	-	23
Langley E-29	-	69.30	135.60	G	67	82	-	-	23
Ellice Island	No. 3	69.15	135.72	-	-	-	X	53	39
Ellice Island	No. 5	69.15	135.72	-	-	-	X	76	39
Ellice Island	No. 4	69.15	135.72	-	-	-	X	69	39
Ellice O-14	-	69.07	135.80	-	38	-	-	-	23
Adgo C-15	-	69.40	135.82	G <	38	-	-	-	23
Adgo P-25	EPB #255	69.42	135.84	G <	170	-	-	0	15,23,66,70
North Ellice J-23	EPB #271	69.21	135.85	G	52+/-8	-	E	74	15,70,71
North Ellice J-23	EPB #271	69.21	135.85	G <	158	-	E	84	23
Taglu	92GSCTaglu	69.37	134.95	-	451+	-	-	-	39a
Kumak	92GSCKumak	69.19	135.34	-	217	-	-	-	39a

SITE LOCATION	SITE IDENTIFIER	LAT (°N)	LONG (°W)	Det. IBPF	Base IBPF (m)	Trans (m)	Det. Zero isotherm	Zero isotherm (m)	REFERENCES
Unipkat	92GSCUnipkat	69.19	135.34	-	48	-	-	-	39a
Russell H-23	-	70.03	130.10	G	455	506	-	-	23
Victoria Island F-36	-	72.75	117.18	G	235	290	-	-	31
Tiritchik M-48	-	72.80	120.75	G	764	829	-	-	31
Ikkariktok M-64	-	72.40	121.85	G	305	360	-	-	31
Orksut I-44	-	72.40	122.70	G	616	680	-	-	31
Storkerson Bay A-15	EPB #98	72.90	124.56	G	529	561	X	500	15,31,64,70
Parker River J-72	-	73.53	115.87	G	523	607	-	-	31
Muskox D-87	-	73.60	117.45	G	765	825	-	-	73
Kusrhaak D-16	-	73.42	120.08	G	434	503	-	-	31
Uminmak H-07	-	73.60	123.00	G	539	640	-	-	31
Nanuk D-76	-	73.08	123.40	G <	603	-	-	-	31
Winter Harbour	EPB #73	74.80	110.51	G	384	-	E	535	15,31,44,64,70
Herne F-85	-	74.73	110.93	G	310	340	-	-	31
Dundas C-80	EPB #168	74.65	113.38	G	479	543	E	577	15,31,70,47
N. Dundas N-82	-	74.70	113.43	G	342	420	-	-	31
Castel Bay C-68	-	74.12	120.83	G	514	555	-	-	31
Bar Harbour E-46	-	74.25	123.90	G	283	363	-	-	31
Sabine Bay A-07	-	75.43	111.00	G <	366	-	-	-	31
Apollo C-73	-	75.53	111.98	G	549	671	-	-	31
Zeus F-11	-	75.83	113.60	G	445	524	-	-	31
Eglinton P-24	-	75.90	118.13	G	317	415	-	-	31
Peddler Point D-49	EPB #257	75.64	118.81	G	283	-	E	343	15,31,67,70
E Hecla C-32	-	76.35	110.23	G	486	529	-	-	31
Hecla J-60	-	76.33	110.33	G	750	814	-	-	31
Hecla I-69	EPB #200	76.31	110.39	G	347	381	E	143	15,31,70,47
Hecla F-62	-	76.35	110.42	G	411	457	-	-	31
W. Hecla C-05	-	76.40	110.53	G	500	541	-	-	31
Kitson R. C-71	-	76.17	112.98	G	296	360	-	-	31
Emerald K-33	-	76.72	113.72	G	396	466	-	-	31
Depot Island E-44	-	76.38	114.30	G	506	613	-	-	31
Sandy Point L-46	-	76.38	115.30	G	491	546	-	-	31
Marie Bay D-02	-	76.35	115.55	G	393	-	-	-	31
Jameson Bay C-31	EPB #91	76.67	116.73	G	396	466	E	483	31,63,76
Wilkie Point J-51	-	76.50	117.33	G	305	344	-	-	31
Intrepid Inlet H-49	-	76.97	118.75	G	628	692	-	-	31
Dyer Bay L-49	-	76.15	121.82	G	652	783	-	-	31
Cape Allison L-50	-	77.83	110.30	G	567	-	-	-	31
Cape Norem A-80	-	77.48	110.45	G	177	259	-	-	31
Wilkins E-60	EPB #87	77.99	111.36	G <	366	451	+	271	15,31,70,64

SITE LOCATION	SITE IDENTIFIER	LAT (°N)	LONG (°W)	Det. IBPF	Base IBPF (m)	Trans (m)	Det. Zero isotherm	Zero isotherm (m)	REFERENCES
Brock C-50	-	77.82	114.28	G	293	-	-	-	31
Satellite F-68	-	77.28	116.92	G	210	271	-	-	31
Andreasen L-32	-	77.20	118.23	G	302	396	-	-	31
Brock I-20	EPB #158	78.00	114.57	G	460	571	E	429	15,31,70,67
Offshore Beaufort and Arctic Archipelago									
West Atkinson L-17	-	69.78	132.08	G	739	794	-	-	73
Alerk P-23	-	69.88	132.83	G	609	693	-	-	73
Kugmallit H-59	-	69.63	133.47	G	685	-	-	-	23
Amerk O-09	-	69.98	133.52	G	719	809	-	-	74
Arnak L-30	-	69.83	133.87	G	654	-	-	-	23
Pullen E-17	-	69.77	134.33	G	602	-	-	-	23
Unark L-24	-	69.55	134.62	G	647	-	-	-	23
Imerk B-48	-	69.62	135.18	G	539	-	-	-	23
Nipterk A-19	-	69.90	135.33	G	509	604	-	-	74
Sarpik B-35	-	69.40	135.38	G <	34	-	-	-	23
Pelly B-35	-	69.57	135.38	G	447	-	-	-	23
Adgo H-29	-	69.47	135.83	G	277	367	-	-	74
Adgo J-27	-	69.43	135.85	G <	193	-	-	-	23
Adgo F-28	-	69.45	135.85	G <	149	-	-	-	23
Netserk F-40	-	69.65	135.90	G	510	-	-	-	23
Kiggavik A-43	-	69.87	135.92	G <	780	827	-	-	73
Netserk B-44	-	69.55	135.93	G	377	-	-	-	23
Kadluk O-07	-	69.78	136.02	G	711	791	-	-	74
E. Tarsiut N-44/N-44A	-	69.90	136.20	G	668	693	-	-	73
Ikattok J-17	-	69.28	136.30	G <	162	-	-	-	23
Tariut A-25	-	69.90	136.33	G	677	-	-	-	73
Tarsiut H-25	-	69.90	136.33	G	no pf	-	-	-	23
Tarsiut P-45	-	69.92	136.42	G	585	670	-	-	74
Pitsiulak A-05	-	69.90	136.77	G	723	803	-	-	74
Adlartok P-09	-	69.65	137.75	G	400	450	-	-	74
Natsek E-56	-	69.75	139.90	G	no pf		-	-	23
Edlok N-56	-	69.77	140.23	G	361	416	-	-	74
Kilannak A-77	-	70.78	129.35	G	275	-	-	-	74,76
Kannerk G-42	-	70.02	131.22	G	593	657	-	-	23
Uviluk P-66	-	70.27	132.32	G	700	725	-	-	73
Aiverk 2I-45	-	70.42	132.70	G	563	708	-	-	74
Ukalerk 2C-50	-	70.15	132.73	G	647	660	-	-	23
Ukalerk C-50	-	70.13	132.73	G	648	-	-	-	23
Nerlerk J-67	-	70.45	133.32	G <	635	-	-	-	74,76

SITE LOCATION	SITE IDENTIFIER	LAT (°N)	LONG (°W)	Det. IBPF	Base IBPF (m)	Trans (m)	Det. Zero isotherm	Zero isotherm (m)	REFERENCES
Kogyuk N-67	-	70.12	133.33	G	717	742	-	-	73
Nerlerk M-98	-	70.47	133.50	G	616	-	-	-	23
Kenalooak J-94	-	70.73	133.97	G	532-857	-	-	-	73,76
Tingmiark K-91	-	70.18	133.98	G	524	-	-	-	23
Koakoak O-2	-	70.37	134.12	G	750	-	-	-	76
Koakoak O-22	-	70.38	134.12	G	591	671	-	-	74
Akpak 2P-35	-	70.25	134.15	G	745	855	-	-	74
Issungnak O-61	-	70.02	134.30	G <	899	-	-	-	23
N. Issungnak L-86	-	70.10	134.45	G	658	683	-	-	73
Siulik I-05	-	70.42	134.52	G	248	293	-	-	74
Kopanoar M-13	-	70.38	135.10	G	345	-	-	-	23
Kopanoar I-44	-	70.40	135.20	G	354	-	-	-	23
Kopanoar L-34	-	70.40	135.20	G	407	442	-	-	73
Arluk E-90	-	70.32	135.87	G	-	382	-	-	74
Nektoralik K-59	-	70.48	136.28	G <	168	-	-	-	23
Orvilruk O-03	-	70.38	136.52	G	340	-	-	-	73,76
Natiak O-44	-	70.07	137.22	G	277	357	-	-	74
Amauligak corehole	-	70.06	133.63	-	500+	-	-	-	39a
Isserk corehole	-	69.91	134.30	-	663	-	-	-	39a
90GSC	BH2	69.74	134.28	-	600+	-	-	-	39a
90GSC	BH3	69.78	134.22	-	600+	-	-	-	39a
90GSC	BH4	69.81	134.17	-	600+	-	-	-	39a
90GSC	BH5	69.88	134.06	-	600+	-	-	-	39a
N.W. Hecla M-25	-	76.42	110.18	G <	290	-	-	-	31
W. Hecla N-52	-	76.37	110.85	G	209	258	-	-	31
W. Hecla P-62	-	76.37	110.87	G	430	491	-	-	31
S.W. Hecla C-58	-	76.28	111.35	G <	318	-	-	-	31
Grassy I-34	-	76.40	113.18	G	266	336	-	-	31
Hazen F-54	-	77.05	110.65	G <	445	-	-	-	31
Nunavut									
North Rankin Nickel	-	62.82	92.08	-	-	-	-	274.3	56
Rankin Inlet, NWT	-	62.82	92.08	-	-	-	-	304.8	8,10
Rankin Inlet, NWT	-	62.82	92.08	-	-	-	>	270	16, 77
Lac CInquante -1	EPB #294	62.59	98.63	-	-	-	X +	400	70,47, 15
Lac Cinquante -2	EPB #294	62.59	98.64	-	-	-	X +	400	70,47, 15
Iqaluit Permafrost Site	-	63.80	68.50	-	-	-	X>	20	40
Chesterfield Inlet	-	63.35	90.70	-	-	-	-	304.8	8,16
Kazan River	Well Drained	63.65	95.85	-	-	-	-	-	78
Kazan River	Poorly Drained	63.65	95.85	-	-	-	-	-	78

SITE LOCATION	SITE IDENTIFIER	LAT (°N)	LONG (°W)	Det. IBPF	Base IBPF (m)	Trans (m)	Det. Zero isotherm	Zero isotherm (m)	REFERENCES
Kazan River	Marine Beach	63.65	95.85	-	-	-	-	-	78
Kazan River	Organic Terrain	63.65	95.85	-	-	-	-	-	78
Baker Lake	Thelon River	64.30	96.00	-	-	-	>	500	16
Baker Lake	Kiggavik Mine Site	64.50	97.50	-	-	-	-	180-210	27
Baker Lake	-	64.00	97.82	-	-	-	-	195	27
Hackett River 190-2	EPB #190	65.92	108.47	-	-	-	+	500	15,45,65,70
Hackett River 190-1	EPB #190	65.92	108.47	-	-	-	+	500	15,45,65,70
Lupin	-	65.78	111.20	-	-	-	-	1480	25,43
Contwoyto Lake	-	65.78	111.20	-	-	-	-	525	43
Hayes River	Well Drained	67.57	94.07	-	-	-	-	-	78
Hayes River	Imperfectly Drained	67.57	94.07	-	-	-	-	-	78
Hayes River	Well Drained	67.57	94.07	-	-	-	-	-	78
Hayes River	Poorly Drained	67.57	94.07	-	-	-	-	-	78
Hayes River	Fluvial Terrace	67.57	94.07	-	-	-	-	-	78
Muskox	south	67.01	115.22	-	-	-	+	180	15,45,64,70
Muskox	north	67.09	115.28	-	-	-	+	370	15,45,64,70
Tundra Mines Ltd., NWT.	-	67.38	115.53	-	-	-	-	274	10
Rowley M-04	EPB #95	69.07	79.06	-	-	-	E	400	15,70,47
Young Bay F-62	-	72.68	96.83	G	253	277	-	-	31
Strathcona Sound	Mining Project	73.03	85.15	-	-	-	>	500	28
Garnier O-21	EPB #92	73.68	90.61	G	274	311	+	500	15,31,64,70
Russell E-82	-	73.85	98.95	G	305	349	-	-	31
Lobitos Resolute L-41	EPB #55	74.68	94.74	G	518	-	E X	600	8,15,31,64,70
Resolute 1	0	74.68	94.90	-	-	-	X	380	8,15,64,70
Resolute	-	74.68	94.90	-	-	-	-	396	8,10,15,64
Devon Island:TrueloveLowlands	Upland Plateau (G)	75.65	84.38	-	-	-	-	659	12,14,46
Devon Island:TrueloveLowlands	Granite Gneiss (F)	75.67	84.45	-	-	-	-	588	12,14,46
Devon Island:TrueloveLowlands	Tundra-Meadow (C)	75.67	84.47	-	-	-	X	525	12,14,46
Devon Island:TrueloveLowlands	Limestone-Inland (E)	75.67	84.60	-	-	-	-	470	12,14,46
Devon Island:TrueloveLowlands	Limestone-Coast (D)	75.68	84.65	-	-	-	-	250	12,14,46
Devon E-45	EPB #99	75.07	91.81	-	780	875	X +	600	15,31,70,47
Cornwallis Central Dome K-40	-	75.17	94.72	G	860	1021	-	-	31
Polaris -1	EPB #157	75.40	96.93	-	-	-	X	470	15,31,70
Polaris -2	EPB #157	75.40	96.93	-	-	-	X	365	15,31,70
Polaris -3	EPB #157	75.40	96.93	-	-	-	X	570	15,31,70
Polaris -4	EPB #157	75.40	96.93	-	-	-	X	335	15,31,70

SITE LOCATION	SITE IDENTIFIER	LAT (°N)	LONG (°W)	Det. IBPF	Base IBPF (m)	Trans (m)	Det. Zero isotherm	Zero isotherm (m)	REFERENCES
Polaris -5	EPB #157	75.40	96.93	-	-	-	X	400	15,31,70
Polaris -8	#157	75.40	96.93	-	-	-	X+	300	39a
Polaris - 10	#157	75.40	96.93	-	-	-	X+	331	39a
Polaris - 11	#157	75.40	96.93	-	-	-	X+	229	39a
Polar Gas PG-9A-77	#214-7	75.53	97.23	-	-	-	X+	185	39a
Polar Gas	PG-7-76	75.40	104.49	-	-	-	EX	203	39a
Polar Gas	PG-11-76	75.54	105.60	-	-	-	EX	290	39a
Assistance Bay PG-7-77	#214-6	74.64	94.36	-	-	-	X+	242	39a
Allison R. N-12	-	75.20	98.60	G	396	454	-	-	31
Bathurst Caledonian R. J-34	-	75.57	98.72	G	808	846	-	-	31
Richardson Point G-12	-	75.68	105.58	G	747	768	-	-	31
Rea Point	-	75.36	105.75	-	-	-	>	500	2,3
Towson Point F-63	-	75.87	106.42	G	646	-	-	-	31
Beverley Inlet G-13	-	75.03	108.08	G	308	357	-	-	31
King Point West B-53	-	75.53	108.33	G	296	335	-	-	31
Weatherall O-10	-	75.83	108.53	G	235	352	-	-	31
Eldridge Bay E-79	-	75.97	109.50	G	509	631	-	-	31
Young Inlet D-21	-	76.33	98.67	G	399	495	-	-	31
Stokes Range J-11	-	76.35	101.58	G	521	692	-	-	31
Charles Point G-07	-	76.43	103.02	G	457	597	-	-	31
Sophie Point G-19	-	76.30	103.08	G	597	674	-	-	31
Cape Fleetwood M-21	-	76.52	103.68	G	466	614	-	-	31
Bent Horn A-57	-	76.35	103.82	G	539	660	-	-	31
Bent Horn N-72	EPB #196	76.36	103.94	G	680+/-15	732	E	726	15,31,70
Bent Horn F-72A	EPB #286	76.36	103.97	G	587	701	E	660	15,70
W. Bent Horn I-01/01A	-	76.33	104.02	G <	610	-	-	-	31
W. Bent Horn A-02	-	76.35	104.02	G	224	320	-	-	31
W. Bent Horn G-02	-	76.35	104.02	G	300	465	-	-	74
Robert Harbour K-07	-	76.62	104.03	G	622	707	-	-	31
Hotspur J-20	-	76.17	104.08	G	530	573	-	-	31
W. Bent Horn M-12	-	76.37	104.12	G	695	-	-	-	31
Pym Point C-44	-	76.38	104.23	G	419	500	-	-	31
Bent Horn E-43	-	76.37	104.32	G	262	299	-	-	31
Key Point O-51	-	76.18	104.33	G	779	831	-	-	31
Drake B-44	EPB #172	76.39	108.27	G	131	224	E	188	15,31,70
Sherard O-54	-	76.23	108.33	G	248	349	-	-	31
Drake E-78	EPB #199	76.46	108.49	G	530	552	E	171	15,31,70
Drake D-73	EPB #259	76.37	108.49	G	432	-	E	288	15,31,70
Drake F-16	-	76.42	108.60	G	411	491	-	-	31
Sherard Bay F-14	-	76.23	108.60	G	183	259	-	-	31

SITE LOCATION	SITE IDENTIFIER	LAT (°N)	LONG (°W)	Det. IBPF	Base IBPF (m)	Trans (m)	Det. Zero isotherm	Zero isotherm (m)	REFERENCES
Collingwood K-33	-	76.55	108.72	G <	610	-	-	-	31
Sherard Bay F-34	-	76.22	108.73	G <	368	-	-	-	74
N. Sabine H-49	-	76.80	108.75	G	436	511	-	-	31
Drake Point K-67	-	76.45	108.92	G	-	-	-	-	31
Drake Point L-67	-	76.45	108.92	G	238	277	-	-	31
Drake Point N-67	-	76.45	108.92	G	-	-	-	-	31
Drake D-68	EPB #198	76.45	108.93	G <	420	-	E	264	15,31,65,70
Marryatt K-71	-	76.35	108.97	G	550	850	X+	354	74,39a
Drake Point K-79	-	76.48	108.98	G	174	299	-	-	31
Vesey A-27	-	76.93	109.13	G	690	785	-	-	31
Chads Creek B-64	-	76.38	109.90	G <	421	-	-	-	31
Blue Fiord E-46	-	77.25	86.30	G	430	527	-	-	31
Eids M-66	-	77.43	86.43	G	338	393	-	-	31
Graham C-52	-	77.35	90.85	G	308	475	-	-	31
Cornwall O-30	EPB #291	77.50	97.65	G	555	673	+	325	15,31,70,47
Linckens Island P-46	EPB #195	77.76	97.76	G	131	280	E	253	15,31,70,71
King Christian N-06	-	77.77	101.03	G	229	366	-	-	31
King Christian D-18A	-	77.78	101.12	G	728	-	-	-	31
King Christian D-18	-	77.78	101.12	G	-	-	-	-	31
Sutherland O-23	EPB #256	77.72	102.14	G	253	290	E	316	15,31,70,47
Wallis K-62	-	77.87	102.42	G	393	491	-	-	31
Wallis A-73	-	77.87	102.45	G	375	440	-	-	31
Skybattle Bay C-15	-	77.23	105.10	G	244	335	-	-	31
Skybattle Bay M-11	-	77.18	105.12	G	755	815	-	-	74
Pat Bay A-72	EPB #258	77.35	105.45	G	475	567	+	300	15,31,70,47
Sherwood P-37	-	78.28	89.75	G	247	299	-	-	31
E. Amund M-05	-	78.42	95.07	G	357	364	-	-	31
Amund Central Dome H-40	-	78.32	96.27	G	285	-	-	-	31
West Amund I-44	-	78.40	97.83	G	256	320	-	-	31
Hoodoo E-05	-	78.07	99.57	G <	239	-	-	-	31
Hoodoo Dome H-37	EPB #86	78.11	99.76	G	192	259	E	306	15,31,70,67
Hoodoo L-41	-	78.18	99.90	G	241	296	-	-	31
N. Hoodoo N-52	-	78.20	99.97	G	390	450	-	-	31
Dumbbells E-49	-	78.47	100.40	G	366	457	-	-	31
Helicopter J-12	-	78.70	100.62	G	436	550	-	-	31
Jackson G16/G16A	-	78.08	101.12	G <	314	-	-	-	31
Elve M-40	-	78.17	101.83	G	204	296	-	-	31
Kristoffer Bay B-06	EPB #155	78.26	102.53	G	326	376	E	445	15,31,70,47
Thor P-38	EPB #170	78.13	102.53	G	253	344	E	336	15,31,70,47
Louise Bay O-25	EPB #169	78.75	102.70	G <	221	271	E	256	15,31,70,67

SITE LOCATION	SITE IDENTIFIER	LAT (°N)	LONG (°W)	Det. IBPF	Base IBPF (m)	Trans (m)	Det. Zero isotherm	Zero isotherm (m)	REFERENCES
Thor H-28	-	78.62	103.18	G	213	-	-	-	31
Dome Bay P-36	EPB #171	78.43	103.26	G	661	756	X	660	15,31,70,65
Noice G-44	-	78.38	104.37	G	628	768	-	-	31
Noice D-41	-	78.33	104.40	G	320	365	-	-	31
Mocklin Point D-23	-	78.37	104.75	G	524	605	-	-	31
W. Pollux E-59	-	79.13	105.48	G	361	408	-	-	31
Pollux G-60	-	79.15	104.95	G	509	564	-	-	31
Isachsen J-37	-	79.28	105.28	G	556	591	-	-	31
Sirius K-28	-	79.30	103.73	G	338	460	-	-	31
May Point H-02	-	79.35	85.02	G	610	655	-	-	31
Depot Pt. L-24	-	79.40	85.73	G	372	-	-	-	31
Mokka A-02	EPB #166	79.52	87.02	G	460	503	E X	500	15,31,70,47
Fosheim N-27	EPB #97	79.62	84.72	G	252	296	+	300	15,31,70,64
Romulus C-42	-	79.85	84.38	G	262	407	-	-	31
Mid Fiord J-53	-	79.88	94.95	G	332	375	-	-	31
Talemen J-34	-	79.90	83.78	G	716	762	-	-	31
Gemini E-10	EPB #175	79.99	84.07	G	411	539	E	502	15,31,70,47
Crocker I-53	-	80.05	98.92	G	494	-	-	-	31
Halycon O-16	-	80.27	84.12	G	384	530	-	-	31
Neil O-15	EPB #197	80.74	83.08	G	373	495	E	549	15,31,70,47
Alert	-	82.50	62.43	-	-	-	X +	600	69
Offshore Arctic Archipelago									
Desbarats B-73	-	76.70	105.95	G	86	191	-	-	31
N.E. Drake P-40	-	76.50	107.20	G	324	397	-	-	31
East Drake L-06	-	76.43	107.55	G	448	498	-	-	74
East Drake I-55	-	76.42	107.82	G	227	-	-	-	31
Drake F-76	-	76.42	108.48	G <	341	414	-	-	31
Roche Pt. O-43	-	76.72	109.77	G	727	-	-	-	31
Buckingham B-69	-	77.13	91.40	G <	356	-	-	-	74
Cape MacMillan 2K-15	-	77.75	99.10	G <	472	-	-	-	73
Char G-07	-	77.60	99.52	G <	344	-	-	-	31
Grenadier A-26	-	77.40	99.58	G	307	377	-	-	74
Cape Alison C-47	-	77.77	100.28	G <	351	-	-	391	74,39a
Balaena D-58	-	77.62	100.37	G <	60	-	-	-	31
Maclean I-72	-	77.53	103.93	G <	342	-	-	-	31
Sculpin K-08	-	77.13	104.57	G	339	399	-	-	73
Skate C-59	-	77.80	104.85	G	395	595	-	-	74
Skate B-80	-	77.82	104.95	G	332	429	-	-	31
Cisco M-22	-	77.37	106.18	G <	325	-	-	-	74

SITE LOCATION	SITE IDENTIFIER	LAT (°N)	LONG (°W)	Det. IBPF	Base IBPF (m)	Trans (m)	Det. Zero isotherm	Zero isotherm (m)	REFERENCES
Cisco C-42	-	77.35	106.28	G <	177	-	-	-	74
Cisco K-58	-	77.47	106.35	G <	322	-	-	-	74
Cisco B-66	-	77.42	106.40	G <	1418	-	-	-	31
Whitefish A-26	-	77.25	106.63	G <	232	-	-	-	74
Whitefish H-63/2H-63	-	77.20	106.88	G <	335	-	-	-	31
Cape Mamen F-24	-	77.60	109.17	G <	350	-	-	-	73
Polaris -6	# 157	75.50	97.03	-	-	-	X+	145	39a
Polaris - 7	#157	75.45	97.00	-	-	-	X+	160	39a
Polaris -9	#157	75.40	96.93	-	-	-	X+	100	39a
Yukon									
Otter Creek -1	EPB #297	60.35	127.40	-	-	-	-	no pf	20
Otter Creek -2	EPB #297	60.35	127.40	-	-	-	-	no pf	15,45,70
Otter Creek -3	EPB #297	60.36	127.40	-	-	-	-	no pf	15,45,70
Lower Liard Canyon Site	-	60.02	128.60	-	-	-	U	-	9
False Canyon Site	-	60.72	129.08	-	-	-	vis U >	2.4	9
Lower Canyon Dam Site	-	60.43	129.18	-	-	-	U	-	9
Yukon Territory	82	60.02	129.20	-	-	-	vis U	-	9
Yukon Territory	83	60.17	129.90	-	-	-	vis U	0.2	9
Logtung -1	EPB #139	60.01	131.60	-	-	-	-	no pf	15,45,70,47
Logtung -2	EPB #139	60.01	131.61	-	-	-	-	no pf	15,45,70,47
Logtung -3	EPB #139	60.01	131.60	-	-	-	-	no pf	15,45,70,47
Logtung -4	EPB #139	60.01	131.61	-	-	-	-	no pf	15,45,70,47
Wolf River	-	60.27	132.55	-	-	-	U	-	9
Yukon Territory	94	60.08	132.65	-	-	-	vis U >	0.8	9
Yukon Territory	93	60.08	132.65	-	-	-	vis U >	0.9	9
Teslin	-	60.17	132.73	-	-	-	U	-	9
Yukon Territory	95	60.13	132.90	-	-	-	vis U >	1	9
Yukon Territory	97	60.13	132.90	-	-	-	vis U	0.3	9
Yukon Territory	96	60.13	132.90	-	-	-	vis U >	0.2	9
Yukon Territory	99	60.27	133.08	-	-	-	vis U >	0.5	9
Yukon Territory	101	60.30	133.23	-	-	-	vis U >	1.7	9
Yukon Territory	100	60.30	133.23	-	-	-	vis U >	0.5	9
Red Mountain -1	EPB #289	60.99	133.76	-	-	-	-	no pf	15,20,45,70
Red Mountain -2	EPB #289	60.99	133.75	-	-	-	-	no pf	15,20,45,70
Red Mountain -3	EPB #289	60.99	133.75	-	-	-	-	no pf	15,20,45,70
Red Mountain -4	EPB #289	60.99	133.75	-	-	-	-	no pf	15,20,45,70
Red Mountain -5	EPB #289	60.99	133.75	-	-	-	-	115	20
Red Mountain -6	EPB #289	60.99	133.75	-	-	-	-	115	20
Red Mountain -7	EPB #289	60.99	133.75	-	-	-	-	40	15,20,45,70

SITE LOCATION	SITE IDENTIFIER	LAT (°N)	LONG (°W)	Det. IBPF	Base IBPF (m)	Trans (m)	Det. Zero isotherm	Zero isotherm (m)	REFERENCES
Red Mountain -8	EPB #289	60.99	133.75	-	-	-	-	40	15,20,45,70
Yukon Territory	103	60.43	133.95	-	-	-	vis U >	0.2	9
Yukon Territory	107	60.35	134.22	-	-	-	vis U	-	9
Yukon Territory	108	60.52	134.50	-	-	-	vis U	0.1	9
Whitehorse	-	60.72	135.08	-	-	-	U	-	9
Whitehorse Copper -1	EPB #122	60.62	135.05	-	-	-	-	no pf	20
Whitehorse Copper -2	EPB #122	60.75	135.13	-	-	-	-	no pf	20
Whitehorse Copper -3	EPB #122	60.75	135.18	-	-	-	-	no pf	20
Foothills CS -2	EPB #231	60.80	135.95	-	-	-	-	5	20
Alcan Foothills -13	EPB #226	60.85	136.99	-	-	-	-	no pf	20
Alcan Foothills -14	EPB #226	60.82	136.70	-	-	-	-	no pf	20
Squaw Creek	-	60.00	137.12	-	-	-	U	-	9
Kathleen Canyon Dam Site	-	60.75	137.42	-	-	-	U	-	9
Alsek River	-	60.58	137.25	-	-	-	U	-	9
Foothills CS -1	EPB #231	60.81	137.43	-	-	-	-	no pf	20
Haines Junction	-	60.77	137.53	-	-	-	U	-	9
Alcan Foothills -12	EPB #226	60.92	137.87	-	-	-	-	no pf	20
Finlayson Lake	-	61.78	131.06	-	-	-	+	18	20
Foothills CS -3	EPB #231	61.58	134.63	-	-	-	-	12	20
Yukon Territory	132	61.65	135.20	-	-	-	vis U	-	9
Yukon Territory	127	61.02	135.58	-	-	-	vis U	-	9
Yukon Territory	128	61.13	135.67	-	-	-	vis U	-	9
Yukon Territory	130	61.27	135.75	-	-	-	vis U	-	9
Yukon Territory	131	61.38	135.92	-	-	-	vis U	-	9
Yukon Territory	133	61.78	136.30	-	-	-	vis U	-	9
Aishihik	-	61.65	137.47	-	-	-	U	27	9
Aishihik	-	61.65	137.47	-	-	-	U	14	9
Aishihik	-	61.65	137.48	-	-	-	-	15-30	8,10
Alcan Foothills -3	EPB #226	61.59	139.45	-	-	-	+	3	20
Alcan Foothills -4	EPB #226	61.45	139.23	-	-	-	+	7	20
Alcan Foothills -5	EPB #226	61.27	138.84	-	-	-	+	5	20
Alcan Foothills -6	EPB #226	61.24	138.78	-	-	-	+	6	20
Alcan Foothills -7	EPB #226	61.72	139.84	-	-	-	+	8	20
Alcan Foothills -8	EPB #226	61.71	139.84	-	-	-	+	8	20
Alcan Foothills -9	EPB #226	61.68	139.73	-	-	-	-	8	20
Alcan Foothills -10	EPB #226	61.51	139.32	-	-	-	-	4	20
Alcan Foothills -11	EPB #226	61.25	138.80	-	-	-	-	9	20
Yukon Territory	112	61.35	139.08	-	-	-	vis U	-	9
Yukon Territory	113	61.53	139.20	-	-	-	vis U	-	9
Donjek River	-	61.65	139.78	-	-	-	U	-	9

SITE LOCATION	SITE IDENTIFIER	LAT (°N)	LONG (°W)	Det. IBPF	Base IBPF (m)	Trans (m)	Det. Zero isotherm	Zero isotherm (m)	REFERENCES
Kluane Canyon Site	-	61.50	139.17	-	-	-	U	-	9
Wolf Creek	-	61.33	139.50	-	-	-	U	-	9
Yukon Territory	116	61.70	139.95	-	-	-	vis U	6.1	9
Yukon Territory	117	61.73	140.02	-	-	-	vis U	-	9
Yukon Territory	118	61.83	140.17	-	-	-	vis U	-	9
Koidern River	-	61.90	140.23	-	-	-	U >	13	9
Yukon Territory	119	61.95	140.33	-	-	-	vis U	-	9
White River Dam Site	-	61.92	140.50	-	-	-	U	-	9
Howards Pass -1	EPB #290	62.57	129.54	-	-	-	-	no pf	15,20,45,70,47
Howards Pass -2	EPB #290	62.45	129.40	-	-	-	-	no pf	15,20,45,70
Ross River	-	62.83	131.00	-	-	-	U	-	9
Ross River School	-	62.00	132.50	G	24	-	-	-	37
Boundary	-	62.25	134.25	-	-	-	U >	46	9
Carmacks	-	62.60	136.32	-	-	-	U	-	9
Monenco -1	EPB #232	62.02	136.82	-	-	-	+	9	20
Monenco -2	EPB #232	62.29	136.24	-	-	-	-	no pf	20
Monenco -3	EPB #232	62.34	136.38	-	-	-	+	18	20
Yukon Territory	138	62.83	136.70	-	-	-	vis U	-	9
Yukon Territory	134	62.17	136.40	-	-	-	vis U	-	9
Yukon Territory	135	62.30	136.67	-	-	-	vis U	-	9
Yukon Territory	136	62.57	136.90	-	-	-	vis U	-	9
Yukon River	Selwyn Dam	62.78	138.23	-	-	-	U	-	9
Yukon River	Britannia Dam	62.87	138.77	-	-	-	U	-	9
Snag	-	62.40	140.37	-	-	-	U	19	9
Snag	-	62.40	140.37	-	-	-	U	15	9
Snag	Near Beaver Ck	62.47	140.86	-	-	-	-	1.5-10	75
Alcan Foothills -1	EPB #226	62.53	140.95	-	-	-	+	6	20
Alcan Foothills -2	EPB #226	62.29	140.77	-	-	-	+	7	20
Macmillan Pass -1	EPB #296	63.15	130.25	-	-	-	-	no pf	15,20,45,70
Macmillan Pass -2	EPB #296	63.15	130.26	-	-	-	-	no pf	15,20,45,70
Macmillan Pass -3	EPB #296	63.15	130.26	-	-	-	-	no pf	15,20,45,70
Macmillan Pass -4	EPB #296	63.15	130.25	-	-	-	-	no pf	15,20,45,70
Macmillan Pass -4	EPB #296	63.15	130.25	-	-	-	-	no pf	15,20,45,70
Macmillan Pass -5	EPB #296	63.15	130.26	-	-	-	-	no pf	20,45,70
Macmillan Pass -5	EPB #296	63.15	130.26	-	-	-	-	no pf	20,45,70
Macmillan Pass -6	EPB #296	63.16	130.27	-	-	-	-	no pf	20,45,70
Macmillan Pass -7	EPB #296	63.15	130.27	-	-	-	-	no pf	20,45,70
Macmillan Pass -8	EPB #296	63.15	130.25	-	-	-	-	no pf	20,45,70
MacMillan River	-	63.00	131.00	-	-	-	U	-	9
Keno City	-	63.90	135.30	-	-	-	U	-	9

SITE LOCATION	SITE IDENTIFIER	LAT (°N)	LONG (°W)	Det. IBPF	Base IBPF (m)	Trans (m)	Det. Zero isotherm	Zero isotherm (m)	REFERENCES
United Keno Hill Mines Ltd.	-	63.85	135.52	-	-	-	-	137.2	10
Sourdough Hill	Bellekeno Mine	63.88	135.27	Vis	75	-	-	-	21
Galena Hill	Elsa Mine	63.90	135.42	Vis	90	-	-	-	21
Galena Hill	Silver King Mine	63.90	135.42	Vis	60	-	-	-	21
Mayo	-	63.58	135.85	-	-	-	U	-	9
Mayo	glaciolacustrine sed	63.62	135.87	Vis	29-31	-	-	34	21
Mayo	recent alluvial sed	63.62	135.87	Vis	20	-	-	-	21
Mayo	Group home	63.62	135.87	Vis	37	-	-	-	21
Mayo	RCMP compound	63.62	135.87	Vis	26	-	-	-	21
Yukon Territory	140	63.38	136.50	-	-	-	vis U	-	9
Yukon Territory	141	63.43	137.27	-	-	-	vis U	-	9
Yukon Territory	141	63.43	137.27	-	-	-	vis U	-	9
Yukon Territory	143	63.73	138.02	-	-	-	vis U	-	9
Eldorado Creek	-	63.83	139.17	-	-	-	U >	61	9
Yukon River	Lower Ogilvie Dam	63.57	139.75	-	-	-	U	-	9
Yukon Territory	145	64.33	138.80	-	-	-	vis U	-	9
Dawson	-	64.07	139.48	-	-	-	U	61	9
Dawson	-	64.07	139.48	-	-	-	-	61	10
Yukon River	Upper Dawson Dam	64.03	139.53	-	-	-	U	-	9
Yukon River	Lower Dawson Dam	64.18	139.55	-	-	-	U	-	9
Clinton Creek -1	EPB #112	64.44	140.74	-	-	-	-	60	20
Clinton Creek -2	EPB #112	64.44	140.74	-	-	-	-	60	20
Clinton Creek -3	EPB #112	64.44	140.74	-	-	-	-	60	20
Clinton Creek -4	EPB #112	64.44	140.74	-	-	-	-	60	20
Yukon River	Boundary Dam	64.68	140.98	-	-	-	U	-	9
N. Parkin YT D-61	-	66.33	137.22	G	61	-	-	-	32
North Cath B-62	EPB #62	66.19	138.70	G <	244	-	E	89	15,32,45,64,70
Old Crow	-	67.58	139.83	-	-	-	U	-	9
Blow River	-	68.77	137.45	G	238	-	+	45	20,24
Kay Point -1	EPB #205	69.25	138.36	-	-	-	+	60	20
Kay Point -2	EPB #205	69.25	138.33	-	-	-	+	60	20
Kay Point -3	EPB #205	69.29	138.39	-	-	-	+	60	20
Kay Point -4	EPB #205	69.27	138.35	-	-	-	+	60	20
Kay Point -5	EPB #205	69.27	138.41	-	-	-	+	60	20
Kay Point -6	EPB #205	69.23	138.43	-	-	-	+	60	20
Kay Point -7	EPB #205	69.21	138.39	-	-	-	+	60	20

SITE LOCATION	SITE IDENTIFIER	LAT (°N)	LONG (°W)	Det. IBPF	Base IBPF (m)	Trans (m)	Det. Zero isotherm	Zero isotherm (m)	REFERENCES
Kay Point -8	EPB #205	69.20	138.34	-	-	-	+	60	20
Kay Point -9	EPB #205	69.23	138.41	-	-	-	+	60	20
Kay Point -10	EPB #205	69.25	138.50	-	-	-	+	60	20
Spring River YT N-58	-	69.13	138.73	G	46	-	-	-	23
Hershel Island	-	69.57	138.80	-	-	-	U	-	9
Roland Bay Yt L-41	-	69.33	138.95	G <	142	-	-	-	23
British Columbia									
Grand Forks	-	49.03	118.45	-	-	-	U	-	9
Garibaldi Park	-	50.00	123.00	-	-	-	U	-	9
British Columbia	5	56.70	122.00	-	-	-	vis U	1.8	9
British Columbia	11	57.07	122.83	-	-	-	vis U >	0.3	9
British Columbia	13	57.22	122.85	-	-	-	vis U >	1.3	9
British Columbia	29	57.83	122.97	-	-	-	vis U	1	9
British Columbia	30	57.83	122.97	-	-	-	vis U	0.5	9
British Columbia	29	57.83	122.97	-	-	-	vis U	0.5	9
British Columbia	31	57.95	122.98	-	-	-	vis U	0.5	9
British Columbia	25	57.72	123.00	-	-	-	vis U >	1.2	9
British Columbia	26	57.72	123.00	-	-	-	vis U >	0.3	9
British Columbia	28	57.72	123.00	-	-	-	vis U >	0.7	9
British Columbia	18	57.38	123.00	-	-	-	vis U >	1.8	9
British Columbia	16	57.30	123.00	-	-	-	vis U	1.8	9
British Columbia	20	57.48	123.02	-	-	-	vis U >	0.5	9
British Columbia	20	57.48	123.02	-	-	-	vis U	0.8	9
British Columbia	22	57.63	123.02	-	-	-	vis U	0.6	9
British Columbia	23	57.63	123.02	-	-	-	vis U	2.3	9
British Columbia	44	58.52	122.77	-	-	-	vis U >	1.1	9
British Columbia	43	58.48	122.77	-	-	-	vis U	-	9
British Columbia	46	58.57	122.77	-	-	-	vis U	1.5	9
British Columbia	48	58.65	122.82	-	-	-	vis U >	1.8	9
British Columbia	42	58.38	122.85	-	-	-	vis U >	1.4	9
British Columbia	35	58.17	122.85	-	-	-	vis U >	0.2	9
British Columbia	36	58.22	122.88	-	-	-	vis U	4.3	9
British Columbia	41	58.33	122.92	-	-	-	vis U	0.3	9
British Columbia	38	58.25	122.92	-	-	-	vis U	0.9	9
British Columbia	41	58.33	122.92	-	-	-	vis U	0.9	9
British Columbia	40	58.30	122.97	-	-	-	vis U	-	9
British Columbia	33	58.02	122.98	-	-	-	vis U	1.4	9
British Columbia	32	58.02	122.98	-	-	-	vis U	1	9
British Columbia	39	58.27	123.00	-	-	-	vis U	0.7	9

SITE LOCATION	SITE IDENTIFIER	LAT (°N)	LONG (°W)	Det. IBPF	Base IBPF (m)	Trans (m)	Det. Zero isotherm	Zero isotherm (m)	REFERENCES
British Columbia	54	58.80	123.50	-	-	-	vis U >	2.7	9
British Columbia	52	58.80	123.50	-	-	-	vis U	0.6	9
British Columbia	50	58.80	123.50	-	-	-	vis U	0.7	9
British Columbia	56	58.57	124.15	-	-	-	vis U >	1.1	9
British Columbia	58	58.55	124.70	-	-	-	vis U >	0.9	9
British Columbia	60	58.62	124.95	-	-	-	vis U >	1.7	9
British Columbia	62	58.62	124.95	-	-	-	vis U >	0.6	9
British Columbia	61	58.62	124.95	-	-	-	vis U >	1	9
Summit Lake A	Summit Pass	58.63	124.70	-	-	-	>	21.5	33,34
Summit Lake B	Upper Testa R	58.66	124.58	-	-	-	-	no pf	33
Summit Lake C	Lower Testa R	58.67	124.45	-	-	-	-	no pf	33
Summit Lake D	Mill Ck	58.67	123.99	-	-	-	-	no pf	33
Summit Lake E	Steamboat	58.68	123.77	-	-	-	-	no pf	33
Gnat Pass (summit)	-	58.25	130.00	-	-	-	vis U	-	9
British Columbia	122	58.38	130.00	-	-	-	vis U	0.1	9
Grayling River	-	59.35	125.03	-	-	-	varies, U	.6-1.2	9
British Columbia	73	59.62	127.27	-	-	-	vis U >	0.2	9
British Columbia	71	59.62	127.27	-	-	-	vis U >	0.5	9
Eldorado Mining and Refining	-	59.58	128.25	-	-	-	-	0-18.3	56
Cracker Creek	-	59.75	133.23	-	-	-	U	-	9
Ruby Creek -1	EPB #188	59.71	133.41	-	-	-	-	no pf	20
Ruby Creek -2	EPB #188	59.71	133.40	-	-	-	-	no pf	20
Ruby Creek -3	EPB #188	59.71	133.41	-	-	-	-	no pf	20
Ruby Creek -4	EPB #188	59.71	133.40	-	-	-	-	no pf	20
British Columbia	75	60.00	127.63	-	-	-	vis U >	1.2	9
British Columbia	78	60.00	128.00	-	-	-	vis U >	0.8	9
Alberta									
Plateau Mt. (Alta)	-	50.20	114.53	-	-	-	X	213	34,35,36
Lookout Mt. (Alta)	-	51.05	115.70	-	-	-	X	150	35,36
Marmot Basin	#1	53.00	119.00	-	-	-	>	17.5	34
Wapiti	-	54.97	119.13	-	-	-	U	-	6
Debolt	-	55.22	118.02	-	-	-	U	-	6
Beaverlodge	-	55.22	119.43	-	-	-	U	-	6
Nampa	-	56.03	117.13	-	-	-	U	-	6
Hines Creek	-	56.25	118.60	-	-	-	U	-	6
Cherry Pt. Junction	-	56.18	119.95	-	-	-	U	-	6
Alberta	87	57.80	117.67	-	-	-	U	-	6
Alberta	86	57.80	117.67	-	-	-	U	-	6

SITE LOCATION	SITE IDENTIFIER	LAT (°N)	LONG (°W)	Det. IBPF	Base IBPF (m)	Trans (m)	Det. Zero isotherm	Zero isotherm (m)	REFERENCES
Alberta	88	57.78	117.68	-	-	-	U	1.3	6
Keg River, Alta.	-	57.78	117.83	-	-	-	>	1.5	8,10
Fort Vermilion, Alta.	-	58.38	116.05	-	-	-	-	no pf	8,10
Alberta	85	58.02	117.17	-	-	-	U	0.7	6
Alberta	83	58.80	117.38	-	-	-	U >	0.5	6
Alberta	41	59.98	116.98	-	-	-	U >	0.7	6
Alberta	43	59.95	117.00	-	-	-	U	-	6
Tathlina Lake	EPB #292	59.98	117.02	-	-	-	-	no pf	15,45,70,47
Alberta	44	59.95	117.02	-	-	-	U	-	6
Alberta	49	59.93	117.03	-	-	-	U >	0.9	6
Alberta	55	59.87	117.05	-	-	-	U >	2.4	6
Alberta	54	59.88	117.05	-	-	-	U	-	6
Alberta	53	59.90	117.05	-	-	-	U >	0.3	6
Alberta	56	59.82	117.07	-	-	-	U >	1.1	6
Alberta	58	59.80	117.07	-	-	-	U	-	6
Alberta	57	59.82	117.07	-	-	-	U	-	6
Indian 9-8	EPB #295	59.85	117.09	-	-	-	-	-	15,45,70
Alberta	62	59.68	117.15	-	-	-	U >	0.6	6
Alberta	63	59.63	117.18	-	-	-	U >	0.6	6
Alberta	64	59.62	117.18	-	-	-	U	-	6
Alberta	68	59.52	117.18	-	-	-	U >	0.6	6
Alberta	65	59.58	117.18	-	-	-	U	-	6
Alberta	66	59.57	117.20	-	-	-	U >	1.2	6
Alberta	69	59.43	117.22	-	-	-	U	-	6
Alberta	70	59.42	117.25	-	-	-	U	-	6
Alberta	71	59.38	117.28	-	-	-	U	-	6
Alberta	72	59.37	117.30	-	-	-	U	-	6
Alberta	73	59.28	117.35	-	-	-	U >	3.5	6
Alberta	74	59.20	117.52	-	-	-	U	-	6
Alberta	75	59.20	117.53	-	-	-	U	-	6
Alberta	77	59.13	117.62	-	-	-	U >	1.3	6
Alberta	80	59.00	117.63	-	-	-	U >	0.5	6
Alberta	76	59.17	117.63	-	-	-	U >	0.2	6
Alberta	78	59.10	117.67	-	-	-	U	-	6
Petitot River N	84-5A	59.75	119.50	-	-	-	-	17	19
Petitot River N	84-5B	59.75	119.51	-	-	-	-	13.5	19
Petitot River S	84-6	59.45	119.25	-	-	-	-	6	19

SITE LOCATION	SITE IDENTIFIER	LAT (°N)	LONG (°W)	Det. IBPF	Base IBPF (m)	Trans (m)	Det. Zero isotherm	Zero isotherm (m)	REFERENCES
Saskatchewan									
Saskatchewan	34	53.90	105.95	-	-	-	U	0.6	7
Saskatchewan	34	53.90	105.95	-	-	-	U	-	7
Saskatchewan	116	54.62	101.92	-	-	-	U	-	7
Saskatchewan	119	54.65	102.00	-	-	-	U	0.2	7
Saskatchewan	115	54.67	102.03	-	-	-	U	1.8	7
Saskatchewan	114	54.68	102.17	-	-	-	U >	0.6	7
Saskatchewan	111	54.70	102.30	-	-	-	U	1.3	7
Saskatchewan	109	54.72	102.33	-	-	-	U	0.2	7
Saskatchewan	108	54.80	102.47	-	-	-	U	0.8	7
Saskatchewan	106	54.73	102.58	-	-	-	U	0.8	7
Saskatchewan	117	54.83	102.58	-	-	-	U	0.2	7
Saskatchewan	118	54.85	102.58	-	-	-	U	0.2	7
Saskatchewan	105	54.72	102.77	-	-	-	U	0.5	7
Saskatchewan	100	54.55	103.50	-	-	-	U	0.4	7
Saskatchewan	98	54.48	103.55	-	-	-	U	0.4	7
Saskatchewan	97	54.48	103.55	-	-	-	U	0.5	7
Saskatchewan	90	54.55	104.05	-	-	-	U	0.2	7
Saskatchewan	84	54.37	104.53	-	-	-	U	0.1	7
Saskatchewan	78	54.20	104.70	-	-	-	U	0.6	7
Saskatchewan	94	54.48	104.83	-	-	-	U >	0.7	7
Saskatchewan	96	54.48	104.83	-	-	-	U	1	7
Saskatchewan	48	54.97	105.33	-	-	-	U	0.3	7
Saskatchewan	39	54.33	105.50	-	-	-	U	-	7
Island Falls	-	55.53	102.35	-	-	-	U	4.6-6	7
Saskatchewan	70	55.48	105.00	-	-	-	U	1.1	7
Saskatchewan	55	55.48	105.00	-	-	-	U	0.6	7
Saskatchewan	64	55.48	105.00	-	-	-	U	0.5	7
Saskatchewan	76	55.48	105.00	-	-	-	U	0.4	7
Saskatchewan	63	55.48	105.00	-	-	-	U <	0.1	7
Saskatchewan	58	55.48	105.00	-	-	-	U	0.8	7
Saskatchewan	57	55.48	105.00	-	-	-	U >	0.2	7
Saskatchewan	56	55.48	105.00	-	-	-	U	0.5	7
Saskatchewan	69	55.48	105.00	-	-	-	U	0.2	7
Saskatchewan	60	55.48	105.00	-	-	-	U >	0.3	7
Saskatchewan	59	55.48	105.00	-	-	-	U	0.5	7
Saskatchewan	61	55.48	105.00	-	-	-	U	0.5	7
Camsell Portage	-	55.85	109.22	-	-	-	U	-	7
Southend	-	56.32	103.23	-	-	-	U	-	7
Saskatchewan	24	56.50	109.55	-	-	-	U	0.6	7

SITE LOCATION	SITE IDENTIFIER	LAT (°N)	LONG (°W)	Det. IBPF	Base IBPF (m)	Trans (m)	Det. Zero Isotherm	Zero isotherm (m)	REFERENCES
Beaverlodge (Eldorado)	-	59.55	108.50	-	-	-	U	-	7
Uranium City, Sask.	-	59.57	108.62	-	-	-	~	9	8,10
Uranium City	-	59.57	108.62	-	-	-	U	-	7
Milliken Lake	-	59.43	108.72	-	-	-	U	-	7
Gunnar	-	59.38	108.87	-	-	-	U >	18	7
Langley Bay	-	59.43	108.88	-	-	-	U	-	7
Manitoba									
Manitoba	37	53.88	95.00	-	-	-	U	0.3	11
Manitoba	38	53.90	95.63	-	-	-	U	0.7	11
Manitoba	39	53.92	96.52	-	-	-	U	1.8	11
Manitoba	40	53.85	97.37	-	-	-	U >	1.7	11
Manitoba	36	54.55	94.32	-	-	-	U	1	11
Gods Lake Narrows	-	54.55	94.48	-	-	-	U	-	7
Oxford House	-	54.95	95.27	-	-	-	U	-	7
Wabowden	-	54.90	97.23	-	-	-	U	-	7
Norway House	-	54.00	97.78	-	-	-	U	-	7
Manitoba	41	54.15	97.88	-	-	-	U >	1.4	11
Wekusko	-	54.58	99.50	-	-	-	U	-	7
Manitoba	194	54.62	99.67	-	-	-	U >	0.9	7
Manitoba	197	54.62	99.67	-	-	-	U	3.4	7
Manitoba	192	54.58	99.83	-	-	-	U >	1.2	7
Manitoba	187	54.88	99.88	-	-	-	U	2.4	7
Manitoba	186	54.88	99.88	-	-	-	U	0.1	7
Manitoba	185	54.82	99.98	-	-	-	U >	5.6	7
Manitoba	190	54.55	99.98	-	-	-	U >	1.3	7
Manitoba	182	54.67	100.00	-	-	-	U	-	7
Manitoba	178	54.63	100.00	-	-	-	U	-	7
Manitoba	177	54.68	100.00	-	-	-	U	-	7
Manitoba	153	54.50	100.00	-	-	-	U	0.2	7
Manitoba	183	54.80	100.00	-	-	-	U	-	7
Manitoba	183	54.70	100.00	-	-	-	U >	1.8	7
Snow Lake	-	54.90	100.03	-	-	-	U	-	7
Manitoba	176	54.67	100.10	-	-	-	U >	1.3	7
Chisel Lake	-	54.83	100.12	-	-	-	U	-	7
Manitoba	175	54.65	100.13	-	-	-	U	-	7
Manitoba	174	54.63	100.15	-	-	-	U	0.6	7
Manitoba	172	54.62	100.18	-	-	-	U >	1.2	7
Manitoba	171	54.58	100.30	-	-	-	U	0.2	7
Manitoba	169	54.57	100.40	-	-	-	U	0.2	7

SITE LOCATION	SITE IDENTIFIER	LAT (°N)	LONG (°W)	Det. IBPF	Base IBPF (m)	Trans (m)	Det. Zero isotherm	Zero isotherm (m)	REFERENCES
Manitoba	167	54.53	100.47	-	-	-	U	0.2	7
Manitoba	165	54.55	100.58	-	-	-	U	0.6	7
Athapapuskow Lake	-	54.50	100.67	-	-	-	U	-	7
Manitoba	163	54.53	100.68	-	-	-	U	1.2	7
Manitoba	161	54.52	100.75	-	-	-	U	0.3	7
Manitoba	160	54.50	100.83	-	-	-	U	0.4	7
Manitoba	-	54.78	101.02	-	-	-	U	1.2	7
Manitoba	152	54.47	101.30	-	-	-	U >	1.2	7
Manitoba	125	54.33	101.33	-	-	-	U	0.3	7
Manitoba	-	54.17	101.38	-	-	-	U	0.3	7
Cranbery Portage	-	54.58	101.38	-	-	-	U	-	7
Simonhouse	-	54.43	101.38	-	-	-	U	-	7
Flin Flon	-	54.93	101.87	-	-	-	varies, U	3-6	7
Manitoba	34	55.33	91.67	-	-	-	U	-	11
Manitoba	35	55.00	92.72	-	-	-	U	-	11
Mid-Canada Line	-	55.77	96.22	-	-	-	U	-	7
Mid-Canada Line	-	55.68	97.38	-	-	-	-	-	7
Landing Lake	-	55.30	97.70	-	-	-	U	-	7
Thompson	-	55.75	97.83	-	-	-	U	1.5-15	7
Thompson, Man.	A	55.80	97.87	-	-	-	-	-	12
Thompson, Man.	B	55.80	97.87	-	-	-	-	-	12
Thompson, Man.	C	55.80	97.87	-	-	-	-	2.7	12
Thompson, Man.	D	55.80	97.87	-	-	-	-	6	12
Thompson, Man.	E	55.80	97.87	-	-	-	-	12	12
Thompson, Man.	-	55.60	98.70	-	-	-	~	15	8,10
Nelson House	-	55.78	98.85	-	-	-	U	-	7
Manitoba	26	55.55	99.97	-	-	-	U	0.9	7
Pukatawagan	-	55.73	101.32	-	-	-	U	-	7
Amery	-	56.55	94.07	-	-	-	U	9	7
Wier River (settlement)	-	56.82	94.10	-	-	-	U	12	7
Bird	-	56.50	94.23	-	-	-	U	-	7
Kettle Rapids	-	56.40	94.60	-	-	-	U	12	7
Gillam	-	56.35	94.77	-	-	-	U	-	7
Ilford	-	56.07	95.60	-	-	-	U >	5	7
Little Churchill River	-	56.87	95.83	-	-	-	U	-	7
Kelsey Generating Station	-	56.03	96.52	-	-	-	varies, U	1.5-15	7
Kelsey, Man.	-	56.03	96.53	-	-	-	>	9.1	8,10
MacBride Lake	-	56.87	97.95	-	-	-	U	-	7
Agassiz Mines Ltd.	-	56.87	100.98	-	-	-	U	-	7

SITE LOCATION	SITE IDENTIFIER	LAT (°N)	LONG (°W)	Det. IBPF	Base IBPF (m)	Trans (m)	Det. Zero isotherm	Zero isotherm (m)	REFERENCES
Lynn Lake	-	56.85	101.03	-	-	-	U	30	7
York Factory	-	57.02	92.30	-	-	-	U	6	7
Port Nelson	-	57.05	92.60	-	-	-	U	9	7
Weir River (area)	-	57.17	93.23	-	-	-	U >	27	7
Churchill River	-	57.55	95.30	-	-	-	U	-	7
Brochet	-	57.88	101.67	-	-	-	U	-	7
Churchill, Man.	2	58.75	94.00	-	-	-	-	-	16
Churchill, Man.	1	58.75	94.00	-	-	-	-	60	16
Churchill, Man.	3	58.75	94.00	-	-	-	-	-	16
Churchill, Man.	4	58.75	94.00	-	-	-	-	-	16
Churchill, Man.	-	58.77	94.13	-	-	-	-	30-61	8,10
Churchill	-	58.78	94.18	-	-	-	U >	48	7
Caribou River	-	59.50	96.00	-	-	-	U	-	7
Wolverine River	-	59.50	97.50	-	-	-	U	-	7
Charlebois Siding	R69-2 Peat Plateau	56.69	94.07	-	-	-	X	25-30	26
N of Gods River	R59-1 Peat Plateau	55.40	92.60	-	-	-	X	14	26
S of Pennycuttaway River	R65-4 Peat Plateau	56.10	93.30	-	-	-	X	16	26
Ontario									
Northern Ontario	5	51.78	81.08	-	-	-	varies U	1.4	11
Attawapiskat River	-	53.00	82.32	-	-	-	U	-	11
Northern Ontario	9	53.42	83.33	-	-	-	U	-	11
Northern Ontario	22	53.42	84.67	-	-	-	U	-	11
Northern Ontario	11	53.92	85.92	-	-	-	U	-	11
Big Beaver House	-	53.90	86.88	-	-	-	U	-	11
Northern Ontario	30	53.38	89.88	-	-	-	U	0.2	11
Northern Ontario	31	53.53	89.88	-	-	-	U	0.5	11
Northern Ontario	21	54.00	84.95	-	-	-	U	-	11
Northern Ontario	33	54.63	91.00	-	-	-	U	2	11
Winisk	-	55.23	85.25	-	-	-	U	6	11
Northern Ontario	13	55.13	85.25	-	-	-	U	-	11
Northern Ontario	14	55.13	85.75	-	-	-	U	-	11
Northern Ontario	15	55.20	86.72	-	-	-	U	-	11
Fort Severn	-	55.93	87.45	-	-	-	U	4	11
Northern Ontario	20	55.92	87.83	-	-	-	U	-	11
Northern Ontario	17	55.43	88.22	-	-	-	U	0.2	11
Northern Ontario	19	55.58	88.33	-	-	-	U	-	11
Northern Ontario	32	55.83	91.00	-	-	-	U	-	11

SITE LOCATION	SITE IDENTIFIER	LAT (°N)	LONG (°W)	Det. IBPF	Base IBPF (m)	Trans (m)	Det. Zero isotherm	Zero isotherm (m)	REFERENCES
Quebec and Labrador									
Mont Jacques-Cartier (PQ)	-	48.93	65.92	-	-	-	X	60	30
Labrador	90	51.92	56.47	-	-	-	U	-	13
Quebec	55	51.30	63.45	-	-	-	U	-	13
Wabush - Labrador City	-	52.93	66.87	-	-	-	U	91	13
Quebec	38	52.50	70.77	-	-	-	U	-	13
Labrador	85	53.40	56.85	-	-	-	U	-	13
Labrador	84	53.58	58.58	-	-	-	U	-	13
Labrador	80	53.93	59.92	-	-	-	U	-	13
Labrador	43	53.67	67.00	-	-	-	U	0.2	13
Quebec	35	53.35	70.97	-	-	-	U	-	13
Labrador	78	54.00	59.00	-	-	-	U	-	13
Labrador	67	54.45	61.88	-	-	-	U	-	13
Labrador	46	54.33	65.18	-	-	-	U	-	13
Schefferville, PQ.	-	54.82	66.68	-	-	-	>	76.2	8,10
Quebec	44	54.80	67.00	-	-	-	U	0.3	13
Quebec	28	54.77	74.30	-	-	-	U	0.2	13
Great Whale River Basin (PQ)	GB -3	54.88	74.33	-	-	-	-	no pf	15,29,58
Labrador	70	55.33	61.55	-	-	-	U	-	13
Labrador	69	55.40	62.47	-	-	-	U	-	13
Schefferville, PQ.	Timmins 4	55.00	67.00	-	-	-	varying,+/-	100	54,55
Great Whale River Basin (PQ)	GB -2	55.17	74.92	-	-	-	-	no pf	15,29,58
Quebec	18	55.58	75.67	-	-	-	U >	0.3	13
Quebec	16	55.47	77.23	-	-	-	U	-	13
Great Whale River Basin (PQ)	Domanchin	55.50	77.25	-	-	-	-	no pf	15,29,58
Great Whale River Basin (PQ)	GB - 1	55.42	77.33	-	-	-	X	180	15,29,58
Great Whale River Basin (PQ)	GB - 1	55.42	77.33	-	-	-	X	80	15,29,58
Kuujjuarapik	-	55.29	77.70	-	-	-	-	160	5
Quebec	13	55.02	77.88	-	-	-	U	-	13
Nastapoca	-	56.50	76.00	G	14.3	-	-	-	48
Kangiqsualujjuaq Valley	Site #1	58.50	65.83	G	14-15	-	-	-	4
Kangiqsualujjuaq Valley	Site #2	58.50	65.83	G	12-14	-	-	-	4
Kangiqsualujjuaq Valley	Site #3	58.50	65.83	G	14	-	-	-	4
Kangiqsualujjuaq	Till site	58.50	65.50	G	3.5-20	-	-	-	61
Kangiqsualujjuaq	PF mounds	58.50	65.50	G	8	-	-	-	61
Kangiqsualujjuaq	Marine terrace	58.50	65.50	G	17	-	-	-	61

SITE LOCATION	SITE IDENTIFIER	LAT (°N)	LONG (°W)	Det. IBPF	Base IBPF (m)	Trans (m)	Det. Zero isotherm	Zero isotherm (m)	REFERENCES
Kangiqsualujjuaq	Supratidal	58.50	65.50	G	15	-	X	17.2	61
Kangiqsualujjuaq	Tidal marsh	58.50	65.50	G	1.5-9	-	-	-	61
Fort Chimo	-	58.12	68.38	-	-	-	U	30-38	13
Lac Pio	-	58.97	69.58	-	-	-	X >	195	57
Nastapoca River	-	58.07	76.22	-	-	-	-	17.5	48
Tasiujaq	rock	58.70	70.00		-	-	>	20	49
Kangiqsualuijjuaq	-	59.00	66.00	-	-	-	-	23	
Asbestos Hill, P.Q.	-	61.83	73.75	-	-	-	+	283.5	8,10,59
Asbestos Hill, P.Q.	-	61.90	73.97	-	-	-	E	540	68
Asbestos Hill, P.Q.	-	61.90	73.97	-	-	-	> X	300	8,15,59
Asbestos Hill -1	EPB #114	61.82	73.97	-	-	-	X +	500	15,66,70
Asbestos Hill -2	EPB #114	61.80	73.97	-	-	-	X +	500	15,67,70
Asbestos Hill -3	EPB #114	61.82	73.96	-	-	-	X +	540	15,66,70
Asbestos Hill -6	EPB #114	61.82	73.96	-	-	-	X +	500	15,70,71
Asbestos Hill -7	EPB #114	61.82	73.96	-	-	-	X +	500	15,70,71
Asbestos Hill -8	EPB #114	61.83	73.95	-	-	-	X +	500	15,70,47
Purtunig, Ungava Peninsula	-	61.82	73.97	-	-	-	X	615	60
Kenty Lake -1	EPB #283	61.49	74.44	-	-	-	X +	500	15,70,71
Quaqtaq	rock	61.03	69.50	-	-	-	>	20	49
Salluit	rock	62.25	75.50	-	-	-	>	20	1,49

APPENDIX A

LEGEND FOR DATABASE TABLES

VEGETATION COVER

P - Poplar	T - Tamarack	M - Moss other than sphagnum
J - Jack Pine	W - Willow	Tc - Tundra communities
S - Spruce	A - Alder	Ln - Lichen
B - Birch	Mu - Muskeg	Lt - Labrador tea
Se - Sedge	H - Hummocky	F - Forest Litter
G - Grass	C - Conifers	Bd - Bedrock
	Sph - Sphagnum	Bg - Bare ground

EARTH MATERIALS

G - Gravel	X - Scattered stones
Sa - Sand	O - Organic
Si - Silt	P - Peat
C - Clay	T - Till
	I - Ice

GEOLOGIC REGIONS

CANADIAN SHIELD

1 - Grenville
2 - Nain
3 - Superior
4 - Churchill
5 - Slave
6 - Bear

PHANEROZOIC OROGENS

7 - Innutian
8 - Cordilleran
9 - Appalachian

CONTINENTAL SHELVES AND PLATFORMS

10 - Hudson Platform
11 - Interior Platform
12 - Arctic Platform
13 - Arctic Coastal Plain
14 - Arctic Continental Shelf

ECOCLIMATIC REGIONS OF CANADA

Arctic Ecoclimatic Province
Ecolimatic Regions
HAo Oceanic High Arctic
HA High Arctic
MA Mid-Arctic
LA Low Arctic
LAm Moist Low Arctic

Subarctic Ecoclimatic Province
Ecolimatic Regions
HS High Subarctic
MS Mid-Subarctic
MSm Maritime Mid-Subarctic
LS Low Subarctic
LSa Atlantic Low Subarctic

Boreal Ecoclimatic Province
Ecoclimatic Regions
HBa Atlantic High Boreal
HBh Humid High Boreal
HBm Maritime High Boreal
Hbo Oceanic High Boreal
HBp Perhumid High Boreal
HBs Subhumid High Boreal
HBx Moist High Boreal
MBa Atlantic Mid-Boreal
MBh Humid Mid-Boreal
MBm Maritime Mid-Boreal
MBx Moist Mid-Boreal

Subarctic Cordilleran Ecoclimatic Province
Ecoclimatic Regions
NSCa Alpine Northern Subarctic Cordilleran
NSCs Subalpine Northern Subarctic Cordilleran

Cordilleran Ecoclimatic Province
Ecoclimatic Regions
NCa Alpine Northern Cordilleran
NCs Subalpine Northern Cordilleran
NCb Boreal Northern Cordilleran
MCa Alpine Mid-Cordilleran

MCs Subalpine Mid-Cordilleran
MCb Boreal Mid-Cordilleran
SCa Alpine Southern Cordilleran
SCs Subalpine Southern Cordilleran
SCb Boreal Southern Cordilleran

Interior Cordilleran Ecoclimatic Province
Ecoclimatic Regions
ICb Boreal Interior Cordilleran
ICv Ecoclimatic Regions of the Vertically Stratified Interior Cordilleran Map Unit

Pacific Cordilleran Ecoclimatic Province
Ecoclimatic Regions
SPa Alpine South Pacific Cordilleran
SPs Subalpine South Pacific Cordilleran
SPm Maritime South Pacific Cordilleran

APPENDIX B

REFERENCES USED IN COMPILATION OF THE DATABASE

1. Allard, M., Wang B. and Pilon, J.A.
   1995: Recent cooling along the southern shore of Hudson Strait, Quebec, Canada, documented from permafrost temperature measurements; Arctic and Alpine Research, v. 27, p. 157-166.

2. Bennett, L.P. and French, H.M.
   1988: Observations on near-surface creep in permafrost, eastern Melville Island Arctic Canada; Fifth International Conference on Permafrost Proceedings, v. 1, p. 683-688.

3. Bennett, L.P. and French, H.M.
   1990: In situ permafrost creep, Melville Island, and implications for global change; Proceedings of Fifth Canadian Permafrost Conference, Université Laval Collection Nordicana No. 54, p. 119-123

4. Ben-Miloud, K. and Seguin, M.-K.
   1990: Stratigraphy, distribution of active layer and discontinuous permafrost in Kangiqsualujjuaq Basin, Northern Quebec; Proceedings of Fifth Canadian Permafrost Conference, Université Laval Collection Nordicana No. 54, p. 131-136.

5. Botteron, G., Gilbert, C., Locat, C. and Gray, J.T.
   1979: Observations preliminaires sur la repartition du pergelisol dans le bassin de la grande riviere de la Baleine, Nouveau-Quebec; Géographie Physique Quaternaire, v. 33, p. 291-298.

6. Brown, R.J.E.
   1964: Permafrost investigation on the Mackenzie Highway in Alberta and Mackenzie District; National Research Council of Canada, Division Building Research, Technical Paper 175, National Research Council 7885, 27 p., Ottawa.

7. Brown, R.J.E.
   1965: Permafrost investigations in Saskatchewan and Manitoba; National Research Council of Canada, Division Building Research, Technical Paper 193, National Research Council of Canada 8375, 36 p., Ottawa.

8. Brown, R.J.E.
   1966: Relation between mean annual air and ground temperatures in the permafrost regions of Canada; *in* Permafrost International Conference Proceedings, Lafayette, Indiana, National Academy Sciences - National Research Council Publication 1287, p. 241-247.

9. Brown, R.J.E.
1967a: Permafrost investigations in British Columbia and Yukon Territory; National Research Council of Canada, Division Building Research, Technical Paper 253, National Research Council 9762, 55 p., Ottawa.

10. Brown, R.J.E.
1967b: Permafrost in Canada; Geol. Surv. Can. Map 1246A - National Research Council Publication 99769.

11. Brown, R.J.E.
1968: Permafrost investigations in northern Ontario and eastern Manitoba; National Research Council of Canada, Division Building Research, Technical Paper 291, National Research Council 10465, 40 p., Ottawa.

12. Brown, R.J.E.
1973: Influence of climatic and terrain factors on ground temperatures at three locations in the permafrost region of Canada; North American Contribution, Second International Permafrost Conference, Yakutsk, USSR, Washington D.C., National Academy of Sciences, p. 20-25.

13. Brown, R.J.E.
1975: Permafrost investigations in Quebec and Newfoundland (Labrador); National Research Council of Canada, Division Building Research Technical Paper 449, National Research Council 14966, 36 p., Ottawa.

14. Brown, R.J.E.
1977: Permafrost investigations on Truelove Lowland; *in* Truelove Lowlands, Devon Island, Canada: A High Arctic Ecosystem, Univ. of Alberta, Edmonton, p. 15-26.

15. Brown, R.J.E.
1977: Permafrost Map; Hydrological Atlas of Canada, Canadian Committee International Hydrological Decade.

16. Brown, R.J.E.
1978: Influence of climate and terrain on ground temperatures in the continuous permafrost zone of north Manitoba and Keewatin District, Canada; *in* Third International Conference on Permafrost, Edmonton Alberta, Proceedings, v. 1, p. 15-21.

17. Brown, W.G., Johnston, G.H. and Brown, R.J.E.
1964: Comparison of observed and calculated ground temperature with permafrost distribution under a Northern lake; Canadian Geotechnical Journal, v. 1, no. 3, p. 147-154.

18. Burgess, M.M.
1983: Analysis of the ground thermal regime at Norman Wells and Fort Good Hope: 1971-1974; M.A. Thesis, Carleton University, 153 p.

19. Burgess, M.M.
1987: Norman Wells pipeline monitoring sites ground temperature data file 1986; Geological Survey of Canada Open File Report 1621.

20. Burgess, M.M., A.S. Judge and Taylor, A.E.
1982: Yukon ground temperature data collection - 1966 to August 1981; Earth Physics Branch Open File Report 82-1. Energy Mines and Resources Canada, Ottawa.

21. Burn, C.R.
1991: Permafrost and ground ice conditions reported during recent geotechnical investigations in the Mayo District, Yukon Territory; Permafrost and Periglacial Processes, v. 2, p. 259-268.

22. Canada's North
1983: The Reference Manual. Indian and Northern Affairs Canada. Ottawa.

23. D & S Petrophysical
1983: Study of well logs in the Mackenzie Delta - Beaufort Sea to outline permafrost thickness and/or gas hydrate occurrence; Earth Physics Branch Open File Report 83-10. Energy Mines and Resources Canada, Ottawa, 242 p.

24. Dallimore, S.
1995: Mackenzie Delta Transect; GSC Draft Open File Report

25. Dufour, S. and Holubec, I.
1988: Performance of two earthfill dams at Lupin N.W.T.; Fifth International Conference on Permafrost Proceedings, v. 2, p. 1217-1222.

26. EBA Engineering Consultants Ltd.
1977: Geotechnical investigations of peatlands, spring 1977 including Churchill and Nelson River crossings Hudson Bay Lowlands; Report to Polar Gas.

27. Federal Environmental Assessment Review Office (FEARO)
1990: Compendium of submissions received by the Kiggavik Uranium Mine Environmental Assessment Panel regarding Urangesellschaft Canada Ltd.'s Environmental Assessment Reports.

28. Gibson, R.B.
1978: The Strathcona Sound mining project: a case study of decision making; Science Council of Canada Background Study No. 42, 274 p.

29. Gray, J.T.
1983: Extraction and compilation of available temperature and snowfall data in the Ungava Peninsula as input to geothermal modelling of quaternary paleoclimates; Earth Physics Branch file no. MAS20SU. 23235-2-13285, Serial no.: OSU82-00401.

30. Gray, J.T. and Brown, R.J.E.
1982: The influence of terrain factors on the distribution of permafrost bodies in the Chic-Choc Mountains, Gaspesie, Quebec; *in* Proceedings of the Fourth Canadian Permafrost Conference, Calgary, Alberta, The Roger J. E. Memorial Volume National Research Council of Canada, Ottawa. p. 23-35.

31. Hardy Associates Ltd.
1984a: Study of well logs in the Arctic Islands to outline permafrost thickness and/or gas hydrate occurrence; Earth Physics Branch Open File Report 84-8. Energy Mines and Resources Canada, Ottawa, 374 p.

32. Hardy Associates Ltd
1984b: Study of well logs in the western N.W.T. and Yukon to outline permafrost thickness and/or gas hydrate occurrence; Earth Physics Branch Open File Report 84-27. Energy Mines and Resources Canada, Ottawa, 290 p.

33. Harris, S.A.
1982: Summit Lake permafrost study; Harris Environmental Research Ltd., Report to Energy Mines and Resources Canada.

34.. Harris, S.A.
1990: Long-term air and ground temperature records from the Canadian Cordillera and the probable effects of moisture changes; Proceedings of Fifth Canadian Permafrost Conference, Université Laval Collection Nordicana No. 54, p. 151-157.

35. Harris, S.A. and Brown, R.J.E.
1978: Plateau Mountain: A case study of alpine permafrost in the Canadian Rocky Mountains; *in* Third International Conference on Permafrost, Edmonton, Alberta, Proceedings, v. 1, p. 386-391.

36. Harris, S.A. and Brown, R.J.E.
1982: Permafrost distribution along the Rocky Mountains in Alberta; *in* Proceedings Fourth Canadian Permafrost Conference Calgary, Alberta, The Roger J. E. Memorial Volume National Research Council of Canada, Ottawa. p. 59-67.

37. Hayley, D.W.
1982: Application of heat pipes to design of shallow foundations on permafrost; *in* Proceedings Fourth Canadian Permafrost Conference Calgary, Alberta, The Roger J. E. Memorial Volume National Research Council of Canada, Ottawa, p. 535-544.

38. Hayley, D.W.
1994: Personal Communication.

39. Imperial Oil Ltd
Arctic coordination. Ground temperature measurements - Canadian western arctic; Unpublished report.

39a. International Permafrost Association
1998: Global Geocryological Database; CAPS version 1 CD-rom. Published by the National Snow and Ice Data Centre, Boulder Colorado.

40. Jacobs, J.D.
1995: Personal communication. A brief note on temperature trends at the Iqaluit permafrost site.

41. Johnston G.H. and Brown, R.J.E.
1961: Effects of a lake on distribution of permafrost in the Mackenzie River Delta; Nature, v. 192, p. 251-252.

42. Johnston G.H. and Brown, R.J.E.
1964: Some observations on permafrost distribution at a lake in the Mackenzie Delta, N.W.T., Canada; Arctic v. 17, p. 162-175.

43. Judge, A.S.
1994: Personal Communication.

44. Judge, A.S.
1973a: Deep temperature observations in the Canadian north; *in* North American Contribution, Permafrost Second International Conference, Yakutsk, USSR, p. 35-40.

45. Judge, A.S.
1973b: The thermal regime of the Mackenzie valley: observations of the natural state; Environmental Social Comm. Northern Pipelines (Canada), Task Force on Northern Oil Development Report 73-38, 177 p.

46. Judge, A.S.
1977: Permafrost investigations on Truelove Lowland; *in* Truelove Lowlands, Devon Island, Canada: A High Arctic Ecosystem. University of Alberta, Edmonton, p. 26-30.

47. Judge, A.S., Taylor, A.E., Burgess, M.M. and Allen, V.S.
1981: Canadian geothermal data collection - northern wells 1978-1980; Geothermal Series No. 12, Geothermal Service of Canada, Earth Physics Branch, Energy Mines and Resources Canada, Ottawa, 190 p.

48. Levesque, R. Allard, M. and Seguin, M.K.
1988: Le Pergelisol dans les formations quaternaires de la region des rivieres Nastapoca et Sheldrake, Quebec nordique; Centre d'etudes nordiques, Université Laval Collection Nordicana No. 51.

49. Levesque, R. Allard, M., Sequin, M.K. and Pilon, J.-A.
1990: Données préliminaires sur le régime thermique du pergélisol dans quelques localités du Nunavik, Québec; Proceedings of Fifth Canadian Permafrost Conference Université Laval Collection Nordicana No. 54, p. 207-213.

50. Lord, 1949 - source unknown.

51. Mackay, J.R.
1967: Permafrost depths, lower Mackenzie Valley, Northwest Territories; Arctic, v. 20, p. 21-26.

52. Mackay, J.R.
1974: Seismic shot holes and ground temperature, Mackenzie Delta Area, N.W.T.; Geological Survey of Canada Paper 74-1 Part A, p. 389-390.

53. Marsh, P.
1990: Permafrost and lakes in Mackenzie Delta; Proceedings of Fifth Canadian Permafrost Conference, Université Laval Collection Nordicana No. 54, p. 131-136.

54. Nicholson, F.H. and Granberg, H.B.
1973: Permafrost and snowcover relationships near Schefferville; *in* North American Contribution, Permafrost Second International Conference, Yakutsk, USSR, p. 151-158.

55. Nicholson, F.H. and Thom, B.G.
1973: Studies at the Timmins 4 permafrost site; *in* North American Contribution, Permafrost Second International Conference, Yakutsk, USSR, p. 159-166.

56. Pike, A.E.
1966: Mining in permafrost; *in* Permafrost International Conference, Proceedings; National Academy of Sciences - National Research Council Publication 1287, p. 512-515.

57. Pilon, J.A.
1982: Etude de la couche active et du pergelisol dans la region de baie aux feuilles, Ungava; Ph.D. Thesis, Université de Montreal, 341 p.

58. Poitevin, J. and Gray, J.T.
1982: Distribution du pergelisol dans le bassin del la Grande Riviere de la Baleine, Quebec; Nat. Can. (Rev. Ecol. Sypt.), v. 109, p. 445-455.

59. Samson, L. and Tordon, F.
1969: Experience with engineering site investigations in northern Quebec and northern Baffin Island; Proceedings of the Third Canadian Conference on Permafrost, National Research Council Canada Technical Memo No. 96, p. 21-38.

60. Seguin, M.K.
1978: Temperature - electrical resistivity relationships in continuous permafrost at Purtuniq, Ungava Peninsula; *in* Third International Conference on Permafrost, Edmonton, Alberta Proceedings, v. 1, p. 138-144.

61. Seguin, M.K., Allard, M. and Gahe, E.
1989: Surface and downhole geophysics for permafrost mapping in Ungava, Quebec; Physical Geography, v. 10, p. 201-232.

62. Smith M.W.
1973: Factors afecting the distribution of permafrost - Mackenzie Delta, N.W.T.; Ph.D. Thesis University of British Columbia, 186 p.

63. Smith, M.W.
1976: Permafrost in the Mackenzie Delta, Northwest Territories; Geological Survey of Canada Paper 75-28, 34 p.

64. Taylor, A.E. and Judge, A.S.
1974: Canadian Geothermal Data Collection-Northern Wells 1955 to February 1974; Geothermal Series #1, Geothermal Service Canada, Earth Physics Branch, Energy Mines and Resources Canada.

65. Taylor, A.E. and Judge, A.S.
1975: Canadian Geothermal Data Collection-Northern Wells 1974; Geothermal Series #3, Geothermal Service Canada, Earth Physics Branch, Energy Mines and Resources Canada.

66. Taylor, A.E. and Judge, A.S.
1976: Canadian Geothermal Data Collection-Northern Wells 1975; Geothermal Series #6, Geothermal Service Canada, Earth Physics Branch, Energy Mines and Resources Canada.

67. Taylor, A.E. and Judge, A.S.
1977: Canadian Geothermal Data Collection-Northern Wells 1976-77; Geothermal Series #10, Geothermal Service Canada, Earth Physics Branch, Energy Mines and Resources Canada.

68. Taylor, A.E. and Judge, A.S.
1979: Permafrost studies in northern Quebec; Géographie Physique Quaternaire, v. XXXIII, no. 3-4, p. 245-251.

69. Taylor, A.E., Brown, R.J.E., Pilon, J. and Judge, A.S.
1982: Permafrost and the shallow thermal regime at Alert, N.W.T.; *in* Proc. of the Fourth Canadian Permafrost Conference, Calgary, Alberta, The Roger J.E. Brown Memorial Volume. National. Research Council of Canada, Ottawa, p. 12-22.

70. Taylor, A.E., Burgess, M.M., Judge, A.S. and Allen, V.S.
1982: Canadian geothermal Series No. 13; Geothermal Service of Canada, Earth Physics Branch, Energy Mines and Resources Canada, Ottawa.

71. Judge, A.S., Taylor, A.E., and Burgess, M.M.
1979: Canadian Geothermal Data Collection-Northern Wells 1977-78; Geothermal Series #11, Geothermal Service Canada, Earth Physics Branch, Energy Mines and Resources Canada.

73. Thurber Consultants Ltd.
1986: Study of well logs in the Mackenzie Delta/Beaufort Sea area and Arctic Islands to outline permafrost thickness and/or gas hydrate occurrence: An update of wells; Prepared for DSS on behalf of Earth Physics Branch, Energy Mines and Resources Canada, DSS File: 15SQ.23235-5-1145.

74. Thurber Consultants Ltd
1988: Update of well log studies Mackenzie Delta/Beaufort Sea Area, Arctic Islands and offshore East Coast Vol. 1: Arctic Canada; Prepared for Supply and Services Canada on behalf of Geological Survey of Canada, Energy Mines and Resources Canada SSC File: 692.23233-7-0925.

75. Van Everdingen, R.O.
1988: Perennial discharge of subpermafrost groundwater in two small drainage basins Yukon, Canada; Fifth International Conference on Permafrost Proceedings, v. 1, p. 639-643.

75a. Van Everdingen, R.O. and Banner, J.A.
1975: Groundwater-level and ground-temperature observations, Norman Wells, N.W.T.; Open File Environmental Social Program Northern Pipelines.

76. Weaver, J.S. and Stewart, J.M.
1982: In situ hydrates under the Beaufort Sea shelf; *in* Proceedings of the Fourth Canadian Permafrost Conference, Calgary, Alberta, The Roger J.E. Brown Memorial Volume, National Research Council of Canada, Ottawa, p. 312-319.

77. Weber, W.W. and Teal, S.S.
1959: A subarctic mining operation; Canadian Mining and Metallurgical Bulletin, v. 62, p. 252-256.

78. Zoltai, S.C. and Johnson, J.D.
1977: Vegetation-soil studies reference sites, northern Keewatin; Preliminary Rept. ESCOM No. A1-19.

79. Zoltai, S.C. and Pettappiece, W.W.
1973: Studies of vegetation, landform and permafrost in the Mackenzie Valley: terrain, vegetation and permafrost relationships in the northern part of the Mackenzie Valley and northern Yukon; Environmental - Social Program, Northern Pipelines, Report 73-4.