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in selected portions of the
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from historical data sources**

David Fissel, Rick Birch, John Marko

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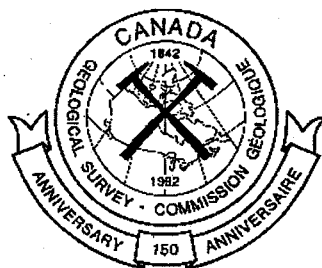
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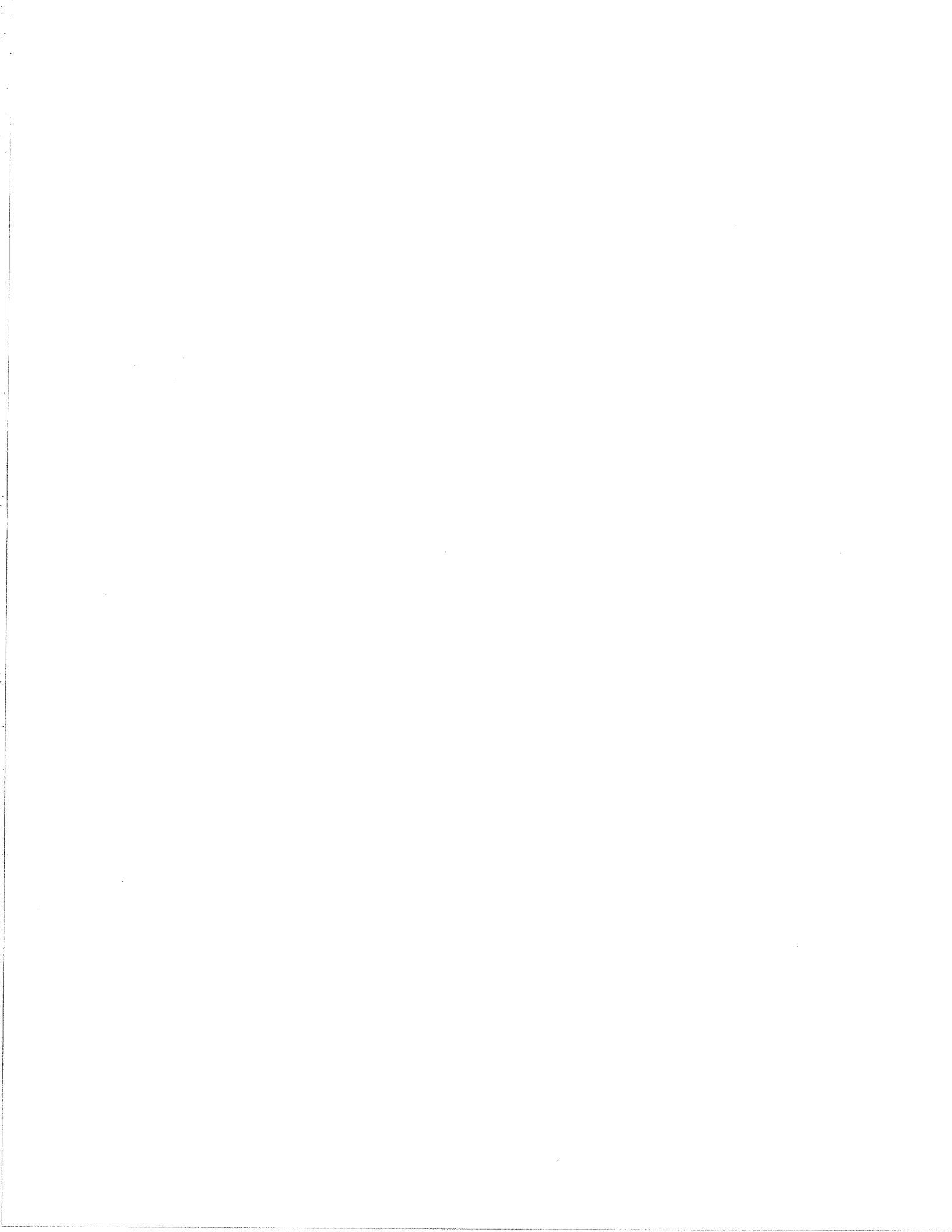


**MAPPING NEAR BOTTOM OCEAN TEMPERATURES
IN SELECTED PORTIONS OF THE CANADIAN BEAUFORT SEA
FROM HISTORICAL DATA SOURCES**

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ABSTRACT

Existing oceanographic and sea ice data were compiled, processed and analyzed to examine the potential importance of near-bottom ocean temperatures on sediment temperature profiles and the depth of permafrost beneath the sea bed. The existing oceanographic database of Fissel and Melling (1992) were used to map the minimum, mean and maximum near-bottom water temperatures on a 10 km by 10 km grid over the Akpak plateau and adjoining areas for two periods of the year: spring and summer. The degree of inter-annual variability in near-bottom water temperatures was also examined by mapping the difference between the maximum and minimum observed values for both the spring and summer periods.

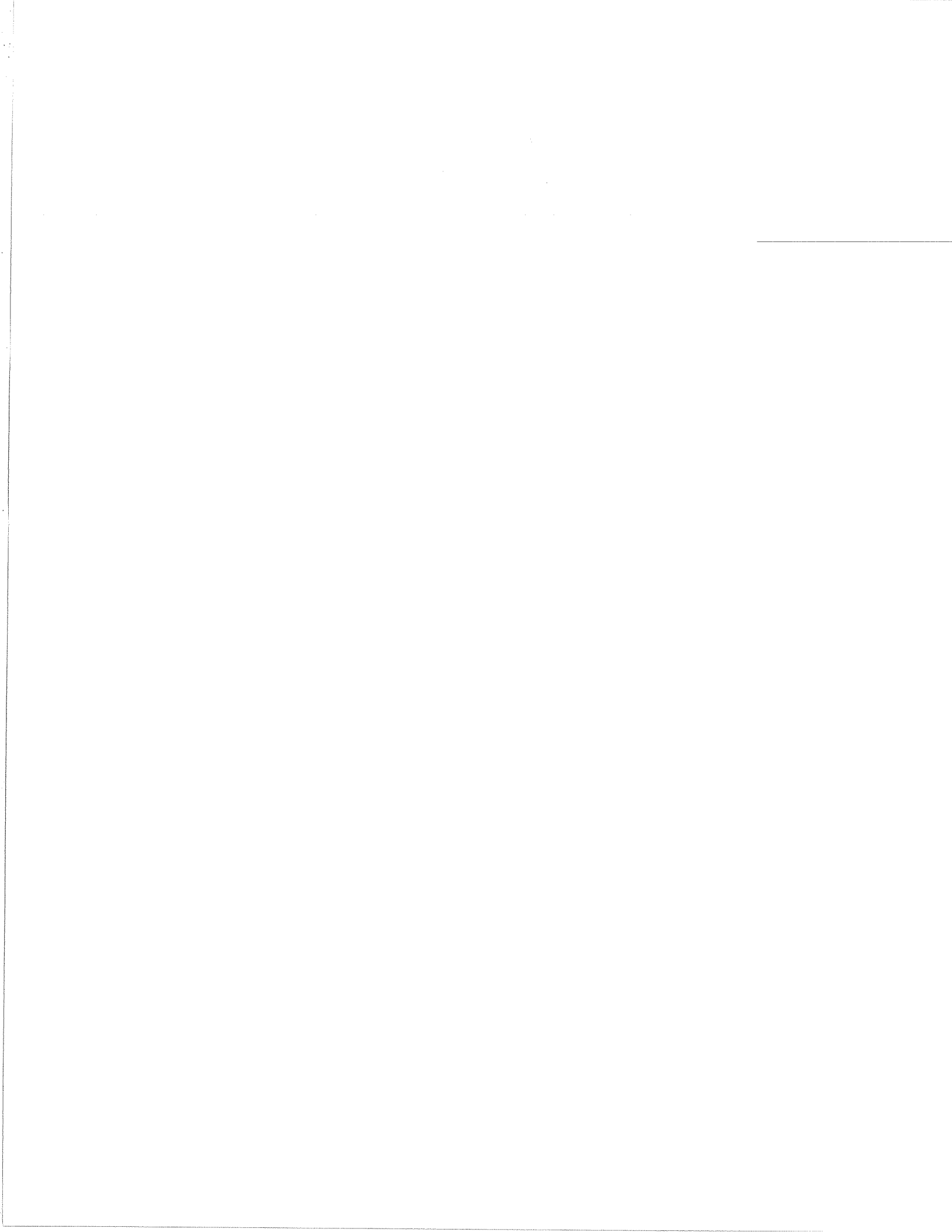
The locations of the landfast ice edge in late spring were also mapped for nine individual years spanning the period 1974 to 1986. This ice edge location marks the shoreward boundary of the shear or transition zone, an active area throughout the winter and spring in which large heat losses can occur by way of direct ice groundings or heat loss from the water column.

ACKNOWLEDGMENT

This project was funded through the Panel on Energy Research and Development, EMR Canada.

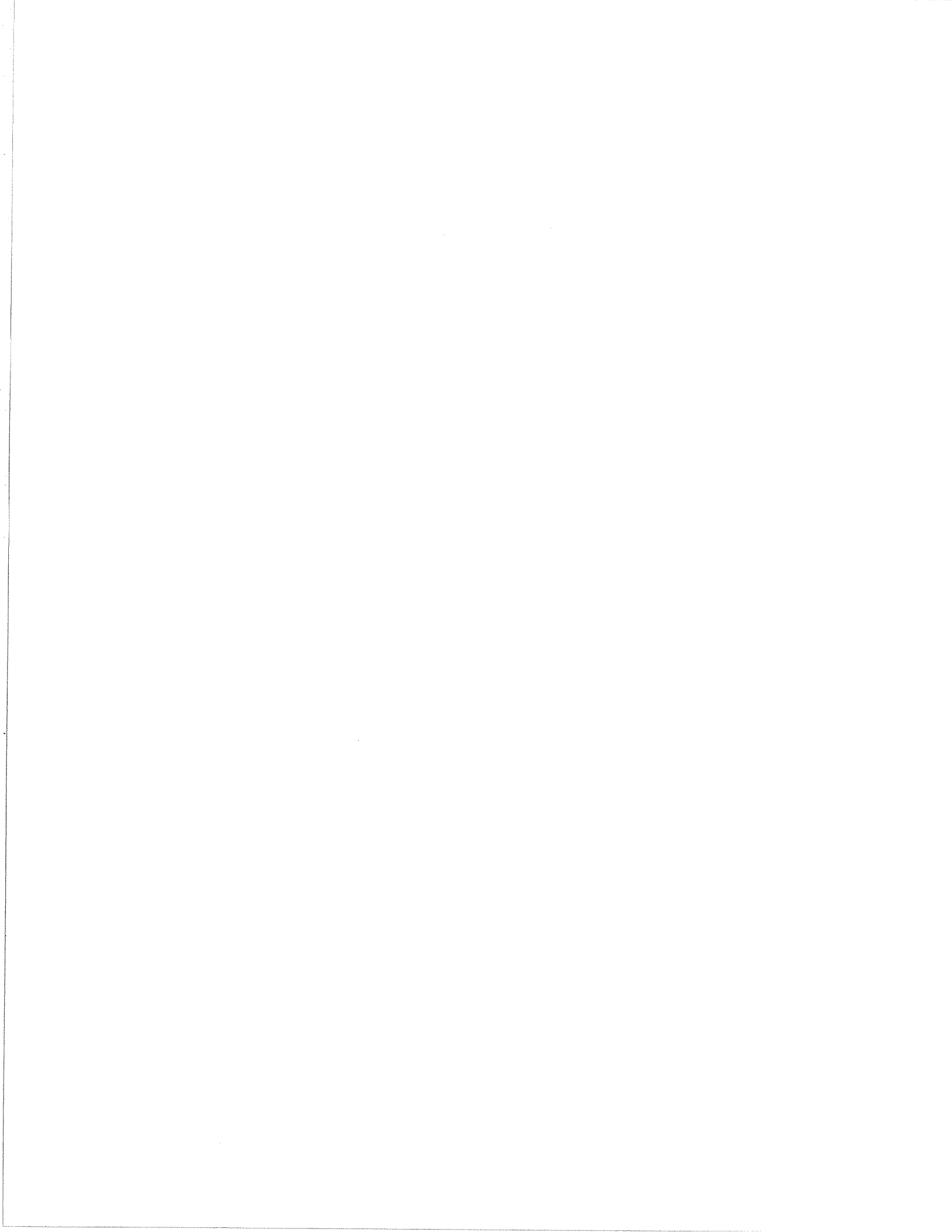
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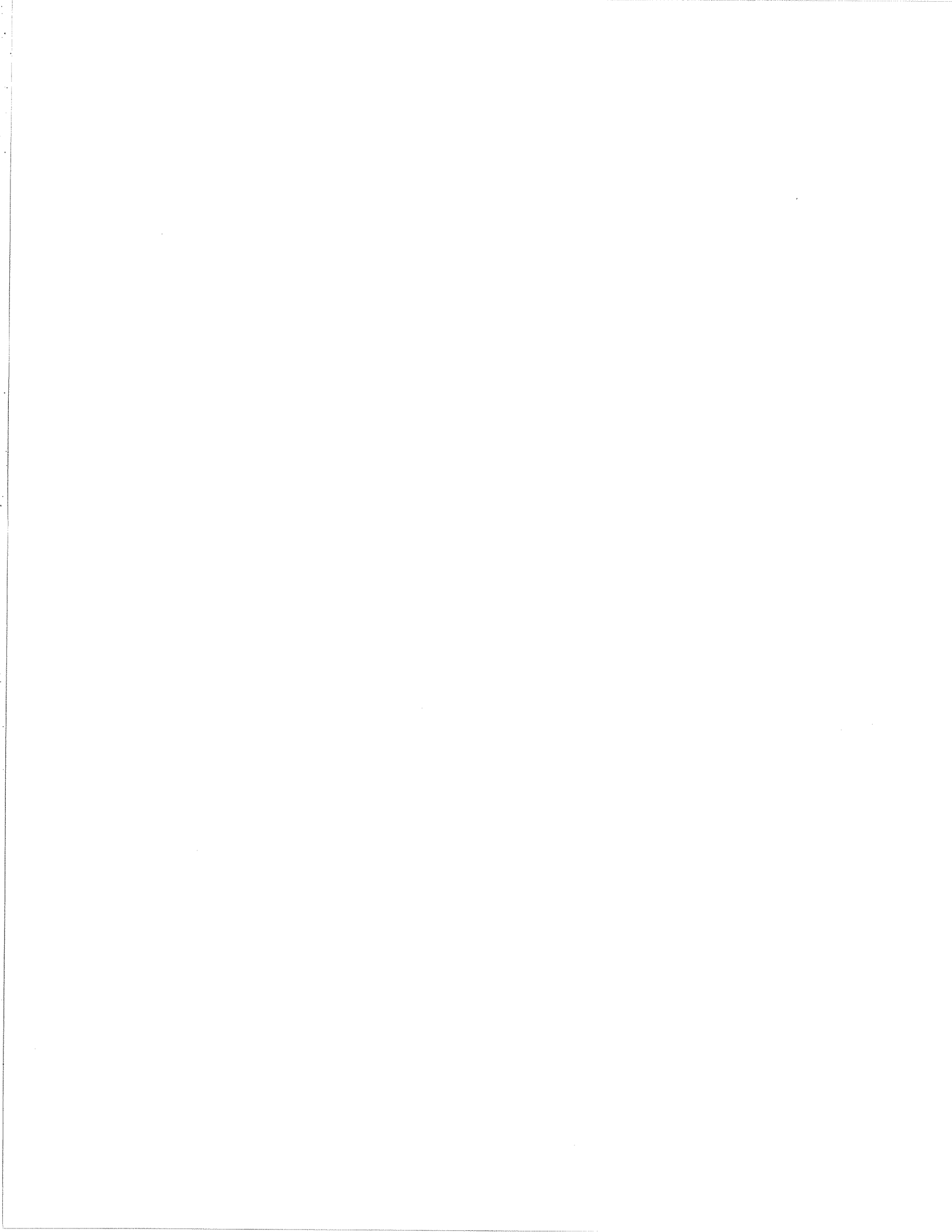
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1. BACKGROUND

Over the past two decades, seismic studies conducted over the shallow shelf of the Canadian Beaufort Sea (Hunter et al., 1978; MacAulay and Hunter, 1982; Morack et al., 1983) have led to the identification and mapping of ice-bonded permafrost which underlie most of the shelf out to the 90 m isobath. The upper surface of the permafrost, as interpreted from the shallow seismic data, is irregular in depth, varying between 5 and 50 m (Morack et al., 1983). To better understand the spatial variability in the depth of the permafrost beneath the seabed, Taylor and Allen (1987) examined the upper 3 m of the sediments by measuring shallow sediment temperature profiles and sediment thermal conductivities, applying techniques developed for deep-ocean heat-flow investigations. The study revealed negative temperature gradients and nonlinearities in the temperature profiles, as well as considerable spatial differences among the 33 sampling locations. Temporal variability in bottom water temperatures over periods of months to years offer one hypothesis to explain the variations in the sediment temperature profiles (Taylor and Allen, 1987).

More recently, direct measurements of the permafrost distribution from a transect of boreholes extending northward from North Head, Richards Island, reveal that the permafrost rises to within 10 m of the sea bed in this area located approximately 20 km offshore. The region of shallower permafrost roughly coincides with the edge of the landfast ice zone in the Akpak plateau.

Physical oceanographic studies of the Canadian Beaufort Sea shelf region extend back to the early 1950's when large area reconnaissance surveys were carried out each summer from U.S. and Canadian icebreakers. Following a period of comparatively little data collection in the 1960's, the search for offshore oil and gas resulted in a large increase in physical oceanographic data collection from 1972 to the late 1980's. Fissel and Melling (1990) assembled the ocean temperature and salinity profile data obtained from 1950 to 1987, reviewed individual data sets for quality, and then used these data to examine the interannual variability of oceanographic conditions within the region. The study showed that large amplitude variations occur in both temperature and salinity over synoptic (2 to 10 days), seasonal and interannual time scales; the latter appear to vary on decadal, as well as, possibly, longer term time scales.

The interannual variations in summer ocean temperatures and salinity, can be explained, in part, by the degree of sea ice clearing from the shelf which occurred during the late spring and summer period (Fissel and Melling, 1990).

For thermal conditions in the spring, the presence of the shear zone in the ice cover, which forms to the offshore side of the landfast ice edge, may have significant consequences on cooling and heat losses throughout the water column. In the shear zone, heat losses to the atmosphere are very large in the form of latent and sensible heat. Grounded ice could also result in direct heat conduction between the sediments and the surface.

The interrelatedness of heat flow fluctuations, as inferred from sediment temperature profiles, and bottom water temperature fluctuations, has been used to advantage in other areas (eg. Laurenbruch and Marshall, 1968). The "long memory" of the sub-bottom sediment temperatures for thermal events on its surface, may provide a useful technique for the study of physical oceanographic processes above the seabed.

2. OBJECTIVES

The present project is part of a first order examination of the role of the variability in bottom water temperature on the sediment temperature profiles and the depth of permafrost below the seabed. Specifically, in this project, the existing database of oceanographic observations (temperature and salinity) assembled for the Fissel and Melling (1990) study were used to:

- determine the minimum and maximum bottom water temperatures, from 1951 to 1987, over a set of gridpoints in the vicinity of the area of shallow permafrost in the vicinity of the Akpak plateau.
- determine the interannual and seasonal variability of bottom water temperatures on the same set of gridpoints;
- provide information on the location of the winter landfast ice cover, and the shear zone, in the area of interest for the years 1974 to 1986.

The results of this project provide input to a study of shallow sediment temperature perturbations being conducted by the Terrain Sciences Division of GSC.

3. METHODOLOGY AND RESULTS

3.1 Task 1: Extraction of Gridded Bottom Water Temperatures from the Existing Data Base

A computer program was developed to extract bottom water temperature measurements from the existing database of Fissel and Melling (1990). The program extracted the data in the area of interest over a grid, as determined in conjunction with the Scientific Authority. The gridded area measured about 100 km in the north-south direction by approximately 150 km east-west (see Figure 1) coinciding with the area of prime interest in terms of the requirement to interpret and understand permafrost distributions (see Section 1). A total of 543 temperature profiles were available from the Fissel and Melling (1990) database within the defined area of interest.

To help ensure that the deepest temperature measurement obtained from each profile was representative of the ocean temperature immediately above the sea bed, the measurement depth was required to be within 25% of the total water depth from the seabed (eg. within 2.5 m of the seabed in 10 m water depth; within 12.5 of the seabed in 50 m water depth). As a further check of anomalous values, the near-bottom water temperature gradient, as computed from the deepest and next-to-deepest measured value, was tested for vertical gradients exceeding $0.3^{\circ}\text{C m}^{-1}$.

Initially each grid element was chosen to have a 5 km linear dimension. However, given that the majority of these small grids were found to contain no observations, the grid cell size was subsequently increased to a 10 km linear dimension. The grid array used hereafter consists of 10 rows, starting at 69.5°N with increments of 0.10 deg and 18 columns, beginning at 132°W and incrementing by 0.28 deg. Thus the top left grid element represents the area bounded by $136.76\text{-}137.04^{\circ}\text{W}$ and $70.40\text{-}70.50^{\circ}\text{N}$.

The spatial distribution of bottom water temperature data by grid element for all months of the year, in the March to May period and the July to September period is shown in Table 1. The data availability is not spatially uniform, with the Akpak Plateau and Kugmallit Valley regions enjoying the greatest coverage. Most of the available observations were collected in the July to September period, while nearly all of the remainder were collected in the months March to May inclusive. In the spring period, there is a paucity of observation north of 70°N associated with the thinner and more dynamic ice conditions in these deeper more northerly shelf waters. The much larger amount of data in portions of the grid lying south of 70°N is consistent with the presence of a stable landfast ice spring measurement platform in such areas.

The extracted bottom water temperature data have been summarized for each grid as:

- the maximum and minimum temperatures for individual years, by season (Appendix 1).
- the average, maximum and minimum temperatures and the salinity (at maximum temperatures) for all years; by season (spring - Tables 2-4; summer - Tables 6-8), and for all months (Tables 10-12).
- the difference between maximum and minimum temperatures observed during spring (Table 5) and summer (Table 9), all years.

The results of the data extraction and computation are also provided on floppy diskette, in ASCII character files, in the same format as the Tables.

The distribution of mean near-bottom temperatures for the spring and summer seasons is given in Figure 2. As expected, the spring temperatures on the shelf are always cold and were never observed to exceed 0°C. The summer temperatures reveal much larger mean values, in inshore areas (water depths of 20 m or less). Some areas appear to be warmer than others in the inshore zone, particularly off Pullen Island and in the most southeastern grids, along the Tuktoyaktuk Peninsula shoreline. However, caution should be used in attaching too much significance to the apparent spatial patterns, given the very large degree of interannual variability apparent in the historical database. An indication of the latter is presented in Tables 5 and 9. Because of the comparatively small quantity (and years available) of observations, the patterns of near-bottom temperature may change considerably had more uniform sampling, by year, been available in constructing the maps.

3.2 Time Series Measurements of Near Bottom Temperatures

An alternate source of historical data is available from internally recording oceanographic instruments that have been located at or near the ocean sea floor for extended periods of time. A review of data sources (Table 13) was carried out for this project, focusing on our previously published data inventory for the area (Birch et al., 1987), which was valid up to and including 1986, and more recent data holdings of Arctic Sciences Ltd. and the Institute of Ocean Sciences. The review was carried out for time series records of one month or longer in duration which were located in or near the study area. We present only those data sets which included measurements in the spring and/or summer seasons.

An example of the information available in such data sets is provided in Figure 3, which

is the longest (14 month) continuous measurement of near-bottom temperatures available for the region (near the Tarsiut drill site, August 1981 to Sept. 1982 from Birch et al., 1982). Note that the temperatures at this depth (~ 25 m) are near the freezing point throughout the fall, winter and spring periods. The two summer periods exhibit very considerable differences, underscoring the large degree of interannual variability as noted in Fissel and Melling (1990) and previously in this report.

3.3 Task 2: Mapping of the Landfast Ice Edge and Shear Zone Area in Spring

Using ice charts and NOAA-AVHRR satellite imagery available at Arctic Sciences Ltd., the location of the landfast ice edge was mapped for the spring of each year. The outer edge of the landfast ice edge is generally stable over most of the spring period until breakup which usually occurs around mid-June. The landfast ice edge marks the inner edge of the shear or transition zone, an area of thin, highly variable width which separates the landfast ice from the thicker pack ice found further offshore.

Images were located for the following dates:

1974	19 June
1978	29 June
1979	1 June
1980	30 May, 4 June
1981	30 May, 8 June
1982	7 June
1983	25 May
1985	29 May
1986	15 April

The results (Figures 4 and 5 and Appendix 2) indicate that the interannual variability of the outer edge of the landfast ice is comparatively small in the region north of Richards Island, with a typical range of 10 km. Much larger variability in ice edge location is evident to the west in the Mackenzie Bay area and to the east off the Tuktoyaktuk Peninsula; in the latter area, the typical year-to-year variation in ice edge location amounts to 20 - 40 km.

As input to the database being assembled, the landfast ice edge for each year was digitally mapped and is provided as ASCII data files on diskette.

4. RECOMMENDATIONS

In the present study, we have: (1) extracted relevant bottom water temperature information from the historical database of temperature-salinity profiles (Fissel and Melling, 1990) in a computer-based format and (2) provided preliminary mappings of the landfast ice edge in late spring over several years. These data products represent first order inputs to further studies of the role of ocean bottom temperatures and sea-ice distributions in the distribution of permafrost below the seabed.

Additional information can be extracted from existing data sources that would be useful in further studies of the subject. These include:

- (1) Time Series Bottom Temperature Data Sets - From the tabulations presented in this report, along with consideration of the availability of sub-bottom temperature profile data sets for the same times and local areas, select the most important time series data sets for further data processing. The original time series data would be processed to provide daily mean temperatures after low-pass filtering to remove higher frequency fluctuations. This data set could be used as a "source" or input to modelling the thermal response of the sea bed to changing ocean temperatures.
- (2) Ocean Temperature-Salinity Profile Data Sets - (a) develop more rigorous synoptic maps of near-bottom temperatures for summer periods when relatively extensive data coverage is available and (b) investigate the possibility of accessing drillship monitoring records of ocean temperatures which were collected extensively from 1976 to the mid-1980's (a small number of such data sets were included in the historical data base of Fissel and Melling (1990) but time limitations and questions of the accuracy and completeness of these data sets collected precluded a full work-up of the data).
- (3) Sea Ice Data Sets - Initially, investigations should be focused on the thermal properties at the segments of the landfast ice edge for which large degrees of interannual variability was noted (Section 4). If there is evidence of some correspondence or features of interest in the permafrost distributions, the information available can be extended in two ways: (a) updating the late spring ice edge mappings to the more recent years (up to 1992) and (b) examining the development and stabilization of the ice edge through the winter and spring months within individual years, from analysis of NOAA AVHRR satellite imagery available from IOS or Environment Canada Ice Centre, Ottawa. (In the present study, we concentrated on the end of season ice edge locations; however, the process of stabilization of the ice edge is not fully understood and the edge may vary considerably during the winter period when air temperatures and heat losses are at their yearly extreme values.)

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Table 1. Distribution of near-bottom temperature measurements from the Beaufort Sea Data Base, 1951-1987. All months, months 3-5, and months 7-9.

Distribution of Near Bottom Temperature Measurements from Beaufort Sea Data Base, 1951-1987. Number of temperature values per grid; grid size 10km.

ALL MONTHS (1-12); total number of data values: 543

Min.Lon	136.8	136.5	136.2	135.9	135.6	135.4	135.1	134.8	134.5	134.2	134.0	133.7	133.4	133.1	132.8	132.6	132.3	132.0
70.40	0	3	1	3	0	0	1	3	0	6	4	5	3	0	4	1	0	1
70.30	1	9	3	1	0	6	12	4	2	0	10	4	0	0	3	0	1	8
70.20	0	0	2	1	1	2	2	4	2	0	4	0	5	1	2	3	2	0
70.10	1	0	2	3	0	1	1	2	1	5	5	1	28	1	5	2	1	2
70.00	2	1	0	2	1	0	1	3	1	26	5	5	2	3	3	0	7	2
69.90	0	0	1	4	2	0	2	5	4	3	10	5	51	11	5	2	3	2
69.80	0	0	3	2	3	0	5	5	2	6	6	3	1	11	5	2	3	2
69.70	0	1	0	0	3	0	2	0	2	3	4	7	5	11	1	2	8	1
69.60	0	4	0	2	0	1	0	0	0	0	2	2	6	22	9	1	0	0
69.50	5	0	1	6	0	0	0	0	0	0	0	0	0	5	0	0	0	0

SPRING (months 3-5); total number of data values: 110

Min.Lon	136.8	136.5	136.2	135.9	135.6	135.4	135.1	134.8	134.5	134.2	134.0	133.7	133.4	133.1	132.8	132.6	132.3	132.0
70.40	0	1	0	2	0	0	1	0	0	1	0	0	1	0	0	0	0	0
70.30	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0
70.20	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	1	0	0
70.10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
70.00	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0
69.90	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	3	1
69.80	0	0	1	0	1	0	1	0	0	2	2	48	1	1	1	1	1	0
69.70	0	0	0	0	0	0	0	0	0	3	1	0	0	0	1	0	4	0
69.60	0	0	0	0	0	0	0	0	0	0	2	0	2	2	0	0	3	0
69.50	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	1	0	0

SUMMER (months 7-9); total number of data values: 424

Min.Lon	136.8	136.5	136.2	135.9	135.6	135.4	135.1	134.8	134.5	134.2	134.0	133.7	133.4	133.1	132.8	132.6	132.3	132.0
70.40	0	2	1	1	0	0	0	3	0	5	4	4	2	0	4	1	0	1
70.30	1	8	3	1	0	6	12	4	1	0	10	3	0	0	3	0	1	8
70.20	0	0	2	1	0	0	2	4	2	0	4	0	5	1	2	2	2	0
70.10	1	0	2	3	0	1	1	2	1	4	4	1	28	1	5	2	1	2
70.00	1	1	0	2	1	0	1	3	1	15	4	5	2	3	3	0	4	1
69.90	0	0	1	4	2	0	2	5	3	3	8	3	3	9	4	1	2	2
69.80	0	0	2	2	2	0	4	5	2	6	3	1	1	9	4	2	4	1
69.70	0	1	0	0	3	0	2	0	2	3	2	7	3	9	1	2	2	1
69.60	0	4	0	2	0	1	0	0	0	0	2	2	6	9	1	2	2	1
69.50	5	0	1	6	0	0	0	0	0	0	0	0	0	5	8	0	0	0

Table 2. Average bottom-water temperatures; spring (Mar.-May); all years (1951-1987)

Near Bottom Temperature Measurements from Beaufort Data Base
 Average temperatures between months 3 and 5; all years
 Total number of data values 110; Grid size is 10km

Min.Lon	136.8	136.5	136.2	135.9	135.6	135.4	135.1	134.8	134.5	134.2	134.0	133.7	133.4	133.1	132.8	132.6	132.3	132.0
Min.Lat																		
70.40	+	0.33	+	-1.59	+	+	-1.52	+	+	-1.57	+	+	-1.49	+	+	+	+	+
70.30	+	+	+	+	+	+	+	+	-1.43	+	+	-1.41	+	+	+	+	+	+
70.20	+	+	+	+	+	-1.57	+	+	+	+	+	+	+	+	+	+	-1.50	+
70.10	+	+	+	+	+	+	+	+	+	-1.61	-1.65	+	+	+	+	+	+	+
70.00	-1.58	+	+	+	+	+	+	+	+	-1.66	-1.70	+	+	+	+	+	+	+
69.90	+	+	+	+	+	+	+	+	-1.64	+	-1.65	-1.63	-1.61	-1.65	-1.66	-1.70	-1.67	-1.69
69.80	+	+	-1.58	+	-1.82	+	-1.70	+	+	+	-0.97	-1.64	+	+	-1.80	+	-1.21	+
69.70	+	+	+	+	+	+	+	+	+	+	-0.16	+	-0.72	-0.65	+	+	-0.55	+
69.60	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
69.50	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-0.16	-0.30	-0.01	+

Number of data values per grid; Grid size is 10km

Min.Lon	136.8	136.5	136.2	135.9	135.6	135.4	135.1	134.8	134.5	134.2	134.0	133.7	133.4	133.1	132.8	132.6	132.3	132.0
Min.Lat																		
70.40	0	1	0	2	0	0	1	0	0	1	0	0	1	0	0	0	0	0
70.30	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0
70.20	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	1	0	0
70.10	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0
70.00	1	0	0	0	0	0	0	0	0	9	1	0	0	0	0	0	3	1
69.90	0	0	0	0	0	0	0	0	1	0	2	2	48	1	1	1	1	0
69.80	0	0	1	0	1	0	1	0	0	0	3	1	0	0	1	0	4	0
69.70	0	0	0	0	0	0	0	0	0	2	0	2	2	0	0	0	3	0
69.60	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	1	0	0
69.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 3. Maximum observed bottom-water temperatures; spring (Mar.-May); all years (1951-1987)

Min.Lon	136.8	136.5	136.2	135.9	135.6	135.4	135.1	134.8	134.5	134.2	134.0	133.7	133.4	133.1	132.8	132.6	132.3	132.0	
Min.Lat																			
70.40	+	0.33	+	-1.59	+	+	-1.52	+	+	-1.57	+	+	-1.49	+	+	+	+	+	
70.30	+	+	+	+	+	+	+	+	-1.43	+	+	-1.41	+	+	+	+	+	+	
70.20	+	+	+	+	+	-1.45	+	+	+	+	+	+	+	+	+	+	+	+	
70.10	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-1.50	+	+	
70.00	-1.58	+	+	+	+	+	+	+	+	-1.61	-1.65	+	+	+	+	+	+	+	
69.90	+	+	+	+	+	+	+	+	+	-0.74	-1.70	+	+	+	+	+	+	-1.68	-1.60
69.80	+	+	-1.58	+	-1.82	+	-1.70	+	+	-1.64	+	-1.64	-1.62	-1.46	-1.65	-1.66	-1.70	-1.67	+
69.70	+	+	+	+	+	+	+	+	+	+	-0.47	-1.64	+	+	-1.80	+	-0.83	+	
69.60	+	+	+	+	+	+	+	+	+	+	-0.15	+	-0.16	-0.20	+	+	-0.26	+	
69.50	+	+	+	+	+	+	+	+	+	+	+	+	+	-0.01	-0.30	-0.01	+	+	

Grid size: 10km. Total number of data values: 110

Depth (m) of maximum temperatures:

Min.Lon	136.8	136.5	136.2	135.9	135.6	135.4	135.1	134.8	134.5	134.2	134.0	133.7	133.4	133.1	132.8	132.6	132.3	132.0	
Min.Lat																			
70.40	+	303.1	+	56.4	+	+	58.1	+	+	50.5	+	+	40.4	+	+	+	+	+	
70.30	+	+	+	+	+	+	+	+	41.3	+	+	57.5	+	+	+	+	+	+	
70.20	+	+	+	+	+	48.5	+	+	+	+	+	+	+	+	+	+	+	+	
70.10	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	31.0	+	+	
70.00	35.3	+	+	+	+	+	+	+	+	21.0	34.5	+	+	+	+	+	+	+	
69.90	+	+	+	+	+	+	+	+	+	14.1	15.8	+	+	+	+	+	+	15.4	16.8
69.80	+	+	20.8	+	17.1	+	18.2	+	15.0	+	8.6	14.0	6.0	21.0	17.1	12.6	13.4	+	
69.70	+	+	+	+	+	+	+	+	+	+	5.7	12.4	+	+	13.2	+	7.4	+	
69.60	+	+	+	+	+	+	+	+	+	+	3.1	+	3.3	5.0	+	+	4.4	+	
69.50	+	+	+	+	+	+	+	+	+	+	+	+	+	3.2	4.0	2.0	+	+	

Number of temperature values per grid:

Min.Lon	136.8	136.5	136.2	135.9	135.6	135.4	135.1	134.8	134.5	134.2	134.0	133.7	133.4	133.1	132.8	132.6	132.3	132.0
Min.Lat																		
70.40	0	1	0	2	0	0	1	0	0	1	0	0	1	0	0	0	0	0
70.30	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0
70.20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
70.10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
70.00	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0
69.90	0	0	0	0	0	0	0	0	9	1	0	0	0	0	0	0	3	1
69.80	0	0	1	0	1	0	1	0	0	2	2	48	1	1	1	1	1	0
69.70	0	0	0	0	0	0	0	0	0	3	1	0	0	1	0	4	0	
69.60	0	0	0	0	0	0	0	0	0	2	0	2	2	2	0	0	3	0
69.50	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	1	0	0

Salinity at maximum temperature:

Min.Lon	136.8	136.5	136.2	135.9	135.6	135.4	135.1	134.8	134.5	134.2	134.0	133.7	133.4	133.1	132.8	132.6	132.3	132.0
Min.Lat																		
70.40	+	34.8	+	32.3	+	+	32.4	+	+	32.4	+	+	32.2	+	+	+	+	+
70.30	+	+	+	+	+	+	+	+	+	31.1	+	+	32.4	+	+	+	+	+
70.20	+	+	+	+	+	32.4	+	+	+	+	+	+	+	+	+	+	+	+
70.10	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
70.00	31.6	+	+	+	+	+	+	+	+	30.3	32.0	+	+	+	+	+	+	+
69.90	+	+	+	+	+	+	+	+	+	24.5	31.4	+	+	+	+	+	+	+
69.80	+	+	30.3	+	33.0	+	31.5	+	30.3	+	31.1	30.3	28.1	30.8	31.1	26.1	31.4	+
69.70	+	+	+	+	+	+	+	+	+	+	8.5	31.1	+	+	33.0	+	29.5	+
69.60	+	+	+	+	+	+	+	+	+	+	2.6	+	3.1	21.0	+	+	4.4	+
69.50	+	+	+	+	+	+	+	+	+	+	+	+	+	+	5.5	0.3	+	+

Table 4. Minimum observed bottom-water temperatures; spring (Mar.-May); all years (1951-1987)

Min.Lon	136.8	136.5	136.2	135.9	135.6	135.4	135.1	134.8	134.5	134.2	134.0	133.7	133.4	133.1	132.8	132.6	132.3	132.0
Min.Lat																		
70.40	+	0.33	+	-1.59	+	+	-1.52	+	+	-1.57	+	+	-1.49	+	+	+	+	+
70.30	+	+	+	+	+	+	+	+	-1.43	+	+	-1.41	+	+	+	+	+	+
70.20	+	+	+	+	+	+	-1.69	+	+	+	+	+	+	+	+	+	+	+
70.10	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-1.50	+
70.00	-1.58	+	+	+	+	+	+	+	+	-1.61	-1.65	+	+	+	+	+	+	+
69.90	+	+	+	+	+	+	+	+	+	-1.80	-1.70	+	+	+	+	+	+	-1.70
69.80	+	+	-1.58	+	-1.82	+	-1.70	+	+	-1.64	+	-1.66	-1.64	-1.70	-1.65	-1.66	-1.70	-1.67
69.70	+	+	+	+	+	+	+	+	+	+	-1.64	-1.64	+	+	-1.80	+	-1.58	+
69.60	+	+	+	+	+	+	+	+	+	+	-0.18	+	-1.28	-1.10	+	+	-0.73	+
69.50	+	+	+	+	+	+	+	+	+	+	+	+	+	-0.30	-0.30	-0.01	+	+

Grid size: 10km. Total number of data values: 110

Depth (m) of minimum temperatures:

Min.Lon	136.8	136.5	136.2	135.9	135.6	135.4	135.1	134.8	134.5	134.2	134.0	133.7	133.4	133.1	132.8	132.6	132.3	132.0
Min.Lat																		
70.40	+	303.1	+	56.2	+	+	58.1	+	+	50.5	+	+	40.4	+	+	+	+	+
70.30	+	+	+	+	+	+	+	+	41.3	+	+	57.5	+	+	+	+	+	+
70.20	+	+	+	+	+	+	46.2	+	+	+	+	+	+	+	+	+	+	+
70.10	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	31.0	+	+
70.00	35.3	+	+	+	+	+	+	+	+	21.0	34.5	+	+	+	+	+	+	+
69.90	+	+	+	+	+	+	+	+	+	27.3	15.8	+	+	+	+	+	+	+
69.80	+	+	20.8	+	17.1	+	18.2	+	+	15.0	+	10.9	16.0	20.6	21.0	17.1	12.6	13.4
69.70	+	+	+	+	+	+	+	+	+	+	14.8	12.4	+	+	13.2	+	10.7	+
69.60	+	+	+	+	+	+	+	+	+	+	4.4	+	7.3	6.1	+	+	6.2	+
69.50	+	+	+	+	+	+	+	+	+	+	+	+	+	3.5	4.0	2.0	+	+

Number of temperature values per grid:

Min.Lon	136.8	136.5	136.2	135.9	135.6	135.4	135.1	134.8	134.5	134.2	134.0	133.7	133.4	133.1	132.8	132.6	132.3	132.0
Min.Lat																		
70.40	0	1	0	2	0	0	1	0	0	1	0	0	1	0	0	0	0	0
70.30	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0
70.20	0	0	0	0	0	2	0	0	0	0	0	1	0	0	0	0	0	0
70.10	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0
70.00	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0
69.90	0	0	0	0	0	0	0	0	0	9	1	0	0	0	0	0	3	1
69.80	0	0	1	0	1	0	1	0	0	2	2	48	1	1	1	1	1	0
69.70	0	0	0	0	0	0	0	0	0	3	1	0	0	1	0	4	0	0
69.60	0	0	0	0	0	0	0	0	0	2	0	2	2	2	0	3	0	0
69.50	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	1	0	0

Salinity at minimum temperature:

Min.Lon	136.8	136.5	136.2	135.9	135.6	135.4	135.1	134.8	134.5	134.2	134.0	133.7	133.4	133.1	132.8	132.6	132.3	132.0
Min.Lat																		
70.40	+	34.8	+	32.3	+	+	32.4	+	+	32.4	+	+	32.2	+	+	+	+	+
70.30	+	+	+	+	+	+	+	+	31.1	+	+	32.4	+	+	+	+	+	+
70.20	+	+	+	+	+	+	31.7	+	+	+	+	+	+	+	+	+	+	+
70.10	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	31.3	+	+
70.00	31.6	+	+	+	+	+	+	+	+	30.3	32.0	+	+	+	+	+	+	+
69.90	+	+	+	+	+	+	+	+	+	33.1	31.4	+	+	+	+	+	31.9	31.7
69.80	+	+	30.3	+	33.0	+	31.5	+	+	30.3	+	31.3	31.1	31.0	30.8	31.1	26.1	31.4
69.70	+	+	+	+	+	+	+	+	+	+	31.5	31.1	+	+	33.0	+	31.2	+
69.60	+	+	+	+	+	+	+	+	+	+	3.2	+	28.1	24.9	+	+	26.3	+
69.50	+	+	+	+	+	+	+	+	+	+	+	+	+	5.0	5.5	0.3	+	+

Table 5. Difference between maximum and minimum observed bottom-water temperatures; spring (Mar.-May); all years (1951-1987)

Near Bottom Temperature Measurements from Beaufort Sea Data Base

Grid size: 10km. Total number of data values: 110

Maximum minus minimum temperatures for months 3 thru 5; all years

Min.Lon	136.8	136.5	136.2	135.9	135.6	135.4	135.1	134.8	134.5	134.2	134.0	133.7	133.4	133.1	132.8	132.6	132.3	132.0
Min.Lat																		
70.40	+	+	+	0.00	+	+	+	+	+	+	+	+	+	+	+	+	+	+
70.30	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
70.20	+	+	+	+	+	0.24	+	+	+	+	+	+	+	+	+	+	+	+
70.10	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
70.00	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
69.90	+	+	+	+	+	+	+	+	+	1.06	+	+	+	+	+	+	+	0.02
69.80	+	+	+	+	+	+	+	+	+	+	0.02	0.02	0.24	+	+	+	+	+
69.70	+	+	+	+	+	+	+	+	+	+	1.17	+	+	+	+	+	+	0.75
69.60	+	+	+	+	+	+	+	+	+	+	0.03	+	1.12	0.90	+	+	+	0.47
69.50	+	+	+	+	+	+	+	+	+	+	+	+	+	0.29	+	+	+	+

Number of temperature values per grid:

Min.Lon	132.0	132.3	132.6	132.8	133.1	133.4	133.7	134.0	134.2	134.5	134.8	135.1	135.4	135.6	135.9	136.2	136.5	136.8
Min.Lat																		
70.40	0	1	0	2	0	0	1	0	0	1	0	0	1	0	0	0	0	0
70.30	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0
70.20	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	1	0
70.10	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0
70.00	1	0	0	0	0	0	0	0	0	9	1	0	0	0	0	0	0	0
69.90	0	0	0	0	0	0	0	0	1	0	2	2	48	1	1	1	1	1
69.80	0	0	1	0	1	0	1	0	0	0	2	2	1	1	1	1	1	1
69.70	0	0	0	0	0	0	0	0	0	0	3	1	0	0	1	0	0	4
69.60	0	0	0	0	0	0	0	0	0	0	2	0	2	2	0	0	0	3
69.50	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	1	0	0

Table 6. Average bottom-water temperatures; summer (Jul.-Sep.); all years (1951-1987)

Near Bottom Temperature Measurements from Beaufort Data Base
 Average temperatures between months 7 and 9; all years
 Total number of data values 424; Grid size is 10km

Min.Lon	136.8	136.5	136.2	135.9	135.6	135.4	135.1	134.8	134.5	134.2	134.0	133.7	133.4	133.1	132.8	132.6	132.3	132.0
Min.Lat																		
70.40	+	-1.12	-1.56	-1.51	+	+	+	-1.47	+	-1.59	-1.39	-1.41	-1.65	+	-1.32	-0.51	+	-1.34
70.30	-0.74	-1.30	-0.90	-1.59	+	-1.60	-1.22	-1.44	-1.52	+	-1.37	-1.44	+	+	-1.22	+	-0.90	-1.18
70.20	+	+	-1.52	-1.44	+	+	-1.43	-1.52	-1.40	+	-1.52	+	-1.33	-0.14	-1.16	-0.76	-1.25	+
70.10	-1.53	+	-0.96	-1.52	+	-1.51	-1.58	-1.43	-1.58	-1.62	-0.58	-1.70	-1.22	-0.86	-0.79	-1.20	-1.37	-0.18
70.00	-1.68	-1.49	+	0.25	-1.55	+	-1.57	-1.27	-1.31	-0.93	2.22	0.24	-1.13	-1.03	-1.03	+	-0.30	-0.58
69.90	+	+	-1.10	-0.19	-1.59	+	-1.56	-0.23	-0.15	1.91	2.73	3.22	-0.63	0.07	1.92	1.85	2.55	-0.56
69.80	+	+	-0.52	4.30	2.81	+	0.84	3.12	-0.53	4.20	4.67	2.82	-0.24	0.63	1.02	1.78	3.88	3.08
69.70	+	0.16	+	+	3.06	+	-0.05	+	-1.13	5.29	11.06	2.48	-1.32	2.41	5.40	9.81	5.16	12.29
69.60	+	-0.61	+	5.97	+	1.80	+	+	+	+	+	+	+	+	+	+	+	+
69.50	0.29	+	1.53	3.58	+	+	+	+	+	+	+	+	+	5.13	+	+	+	+

Number of data values per grid; Grid size is 10km

Min.Lon	136.8	136.5	136.2	135.9	135.6	135.4	135.1	134.8	134.5	134.2	134.0	133.7	133.4	133.1	132.8	132.6	132.3	132.0
Min.Lat																		
70.40	0	2	1	1	0	0	0	3	0	5	4	4	2	0	4	1	0	1
70.30	1	8	3	1	0	6	12	4	1	0	10	3	0	0	3	0	1	8
70.20	0	0	2	1	0	0	2	4	2	0	4	0	5	1	2	2	2	0
70.10	1	0	2	3	0	1	1	2	1	4	4	1	28	1	5	2	1	2
70.00	1	1	0	2	1	0	1	3	1	15	4	5	2	3	3	0	4	1
69.90	0	0	1	4	2	0	2	5	3	3	8	3	3	9	4	1	2	2
69.80	0	0	2	2	2	0	4	5	2	6	3	1	1	9	4	2	4	1
69.70	0	1	0	0	3	0	2	0	2	3	2	7	3	9	1	2	2	1
69.60	0	4	0	2	0	1	0	0	0	0	2	2	6	20	8	0	0	0
69.50	5	0	1	6	0	0	0	0	0	0	0	0	0	5	0	0	0	0

Table 7. Maximum observed bottom-water temperatures; summer (Jul.-Sep.); all years (1951-1987)

Min.Lon	136.8	136.5	136.2	135.9	135.6	135.4	135.1	134.8	134.5	134.2	134.0	133.7	133.4	133.1	132.8	132.6	132.3	132.0	
Min.Lat																			
70.40	+	-0.72	-1.56	-1.51	+	+	+	-1.44	+	-1.49	-1.32	-1.21	-1.60	+	-1.25	-0.51	+	-1.34	
70.30	-0.74	0.30	-0.57	-1.59	+	-1.21	-0.60	-1.38	-1.52	+	0.50	-1.13	+	+	-0.98	+	-0.90	-0.27	
70.20	+	+	-1.50	-1.44	+	+	-1.43	-1.47	-1.40	+	-1.46	+	+	-1.06	-0.14	-1.10	-0.76	-1.07	+
70.10	-1.53	+	-0.41	-1.44	+	-1.51	-1.58	-1.40	-1.58	-1.57	1.57	-1.70	-0.55	-0.86	0.00	-1.10	-1.37	0.64	
70.00	-1.68	-1.49	+	1.79	-1.55	+	-1.57	-1.00	-1.31	1.00	4.11	4.65	-0.57	-0.55	-0.66	+	0.30	-0.58	
69.90	+	+	-1.10	3.09	-1.58	+	-1.56	2.11	1.29	3.00	10.27	6.25	-0.11	4.31	3.58	1.85	6.40	0.34	
69.80	+	+	-0.52	4.32	4.50	+	3.57	5.37	0.18	11.17	9.58	2.82	-0.24	4.91	3.32	2.05	8.00	3.08	
69.70	+	0.16	+	+	5.15	+	0.60	+	-1.00	5.46	12.35	9.88	-0.94	9.89	5.40	10.72	10.42	12.29	
69.60	+	0.77	+	11.11	+	1.80	+	+	+	+	6.76	6.30	10.67	8.90	10.20	+	+	+	
69.50	2.53	+	1.53	7.08	+	+	+	+	+	+	+	+	+	10.25	+	+	+	+	

Depth (m) of maximum temperatures:

Grid size: 10km. Total number of data values: 424

Min.Lon	136.8	136.5	136.2	135.9	135.6	135.4	135.1	134.8	134.5	134.2	134.0	133.7	133.4	133.1	132.8	132.6	132.3	132.0	
Min.Lat																			
70.40	+	86.0	50.5	60.7	+	+	+	56.3	+	40.0	41.4	40.0	60.0	+	40.4	38.4	+	31.0	
70.30	222.2	50.5	53.0	47.4	+	45.4	50.5	50.5	41.1	+	47.4	50.0	+	+	30.3	+	23.5	20.2	
70.20	+	+	45.4	40.4	+	+	51.0	40.8	40.4	+	43.4	+	44.0	27.3	28.2	30.3	28.6	+	
70.10	37.5	+	43.0	35.3	+	39.0	45.4	29.8	24.5	31.0	36.0	23.4	42.2	21.8	30.3	30.3	29.2	25.2	
70.00	30.3	25.5	+	31.0	30.3	+	28.7	20.9	24.2	26.5	16.2	23.0	29.0	26.0	22.7	+	16.8	15.1	
69.90	+	+	20.2	20.0	20.3	+	25.6	14.2	13.1	11.0	12.5	12.0	18.2	9.1	15.9	10.3	16.1	14.7	
69.80	+	+	17.2	16.0	14.0	+	10.1	5.5	11.0	5.2	11.4	7.1	14.0	7.0	10.8	8.1	7.1	14.1	
69.70	+	13.8	+	+	9.1	+	9.1	+	5.0	6.3	3.9	3.0	8.4	4.7	6.6	4.7	6.5	4.4	
69.60	+	11.1	+	2.7	+	5.2	+	+	+	+	3.0	5.0	3.3	11.6	5.0	+	+	+	
69.50	15.2	+	7.8	5.3	+	+	+	+	+	+	+	+	+	4.0	+	+	+	+	

Number of temperature values per grid:

Min.Lon	136.8	136.5	136.2	135.9	135.6	135.4	135.1	134.8	134.5	134.2	134.0	133.7	133.4	133.1	132.8	132.6	132.3	132.0	
Min.Lat																			
70.40	0	2	1	1	0	0	0	3	0	5	4	4	2	0	4	1	0	1	
70.30	1	8	3	1	0	6	12	4	1	0	10	3	0	0	3	0	1	8	
70.20	0	0	2	1	0	0	2	4	2	0	4	0	5	1	2	2	2	0	
70.10	1	0	2	3	0	1	1	2	1	4	4	1	28	1	5	2	1	2	
70.00	1	1	0	2	1	0	1	3	1	15	4	5	2	3	3	0	4	1	
69.90	0	0	1	4	2	0	2	5	3	3	8	3	3	9	4	1	2	2	
69.80	0	0	2	2	2	0	4	5	2	6	3	1	1	9	4	2	4	1	
69.70	0	1	0	0	3	0	2	0	2	3	2	7	3	9	1	2	2	1	
69.60	0	4	0	2	0	1	0	0	0	0	2	2	6	20	8	0	0	0	
69.50	5	0	1	6	0	0	0	0	0	0	0	0	0	5	0	0	0	0	

Salinity at maximum temperature:

Min.Lon	136.8	136.5	136.2	135.9	135.6	135.4	135.1	134.8	134.5	134.2	134.0	133.7	133.4	133.1	132.8	132.6	132.3	132.0	
Min.Lat																			
70.40	+	31.7	32.2	32.5	+	+	+	32.3	+	32.7	32.2	33.3	32.9	+	31.6	31.9	+	32.1	
70.30	34.1	32.8	32.1	31.6	+	31.6	31.3	32.4	31.7	+	31.6	32.2	+	+	32.0	+	31.5	30.7	
70.20	+	+	32.1	31.9	+	+	32.0	32.1	31.6	+	32.3	+	31.9	32.1	31.9	31.4	31.2	+	
70.10	31.7	+	31.9	32.1	+	31.6	32.3	31.6	30.1	30.9	31.2	31.4	31.6	32.0	31.7	23.4	32.2	31.4	
70.00	32.2	32.4	+	31.1	32.1	+	31.0	31.2	31.4	30.8	21.7	28.3	31.2	31.4	31.5	+	30.9	32.2	
69.90	+	+	19.1	30.4	30.2	+	31.4	26.9	27.6	26.2	14.9	24.7	31.8	23.9	28.6	19.5	30.2	30.9	
69.80	+	+	26.8	20.5	29.3	+	20.0	16.9	29.8	14.0	15.3	6.8	30.7	13.1	28.6	26.6	6.9	25.5	
69.70	+	28.0	+	+	20.5	+	24.4	+	23.3	16.5	12.8	16.1	29.0	23.6	9.3	20.6	9.5	16.7	
69.60	+	29.5	+	29.2	+	19.3	+	+	+	+	3.4	7.8	15.5	15.8	9.5	+	+	+	
69.50	28.0	+	16.1	11.6	+	+	+	+	+	+	+	+	15.0	+	+	+	+	+	

Table 8. Minimum observed bottom-water temperatures; summer (Jul.-Sep.); all years (1951-1987)

Min.Lon	136.8	136.5	136.2	135.9	135.6	135.4	135.1	134.8	134.5	134.2	134.0	133.7	133.4	133.1	132.8	132.6	132.3	132.0
Min.Lat																		
70.40	+	-1.52	-1.56	-1.51	+	+	+	-1.50	+	-1.67	-1.45	-1.73	-1.70	+	-1.41	-0.51	+	-1.34
70.30	-0.74	-1.80	-1.57	-1.59	+	-1.76	-1.67	-1.51	-1.52	+	-1.80	-1.68	+	+	-1.37	+	-0.90	-1.67
70.20	+	+	-1.54	-1.44	+	+	-1.44	-1.60	-1.40	+	-1.67	+	-1.51	-0.14	-1.22	-0.76	-1.42	+
70.10	-1.53	+	-1.50	-1.60	+	-1.51	-1.58	-1.47	-1.58	-1.70	-1.39	-1.70	-1.80	-0.86	-1.25	-1.30	-1.37	-1.01
70.00	-1.68	-1.49	+	-1.30	-1.55	+	-1.57	-1.52	-1.31	-1.57	-1.12	-1.33	-1.70	-1.70	-1.52	+	-0.53	-0.58
69.90	+	+	-1.10	-1.59	-1.59	+	-1.57	-1.44	-1.51	0.62	-1.18	0.50	-1.54	-1.50	-1.10	1.85	-1.30	-1.46
69.80	+	+	-0.52	4.29	1.12	+	-1.39	0.20	-1.23	-1.00	0.24	2.82	-0.24	-1.57	-1.36	1.51	2.31	3.08
69.70	+	0.16	+	+	-0.80	+	-0.70	+	-1.26	5.00	9.78	-1.46	-1.55	-1.16	5.40	8.90	-0.11	+
69.60	+	-1.56	+	0.83	+	1.80	+	+	+	+	1.24	1.44	1.20	-1.03	-0.59	+	+	+
69.50	-1.51	+	1.53	1.51	+	+	+	+	+	+	+	+	+	2.67	+	+	+	+

Depth (m) of minimum temperatures:

Grid size: 10km. Total number of data values: 424

Min.Lon	136.8	136.5	136.2	135.9	135.6	135.4	135.1	134.8	134.5	134.2	134.0	133.7	133.4	133.1	132.8	132.6	132.3	132.0
Min.Lat																		
70.40	+	45.4	50.5	60.7	+	+	+	54.9	+	60.6	52.9	45.4	45.0	+	39.2	38.4	+	31.0
70.30	222.2	50.5	45.4	47.4	+	40.0	51.5	41.4	41.1	+	48.5	35.3	+	+	30.6	+	23.5	30.0
70.20	+	+	45.4	40.4	+	+	51.0	40.4	40.4	+	40.4	+	40.4	27.3	32.8	30.3	28.1	+
70.10	37.5	+	40.4	40.4	+	39.0	45.4	36.3	24.5	35.0	32.6	23.4	40.0	21.8	50.5	20.2	29.2	22.5
70.00	30.3	25.5	+	24.2	30.3	+	28.7	19.5	24.2	24.2	23.6	30.1	30.0	25.0	20.0	+	20.2	15.1
69.90	+	+	20.2	24.0	20.3	+	32.0	17.6	14.4	9.1	12.0	19.3	18.0	20.0	17.2	10.3	15.5	13.8
69.80	+	+	17.2	16.0	14.1	+	10.1	5.0	9.2	7.1	5.0	7.1	14.0	10.1	5.0	10.1	8.1	14.1
69.70	+	13.8	+	+	6.1	+	10.1	+	5.0	3.9	4.1	5.0	9.1	5.0	6.6	1.8	5.1	+
69.60	+	13.9	+	6.3	+	5.2	+	+	+	+	5.0	4.0	5.0	5.0	5.0	+	+	+
69.50	15.5	+	7.8	6.3	+	+	+	+	+	+	+	+	+	5.0	+	+	+	+

Number of temperature values per grid:

Min.Lon	136.8	136.5	136.2	135.9	135.6	135.4	135.1	134.8	134.5	134.2	134.0	133.7	133.4	133.1	132.8	132.6	132.3	132.0
Min.Lat																		
70.40	0	2	1	1	0	0	0	3	0	5	4	4	2	0	4	1	0	1
70.30	1	8	3	1	0	6	12	4	1	0	10	3	0	0	3	1	0	1
70.20	0	0	2	1	0	0	2	4	2	0	4	0	5	1	2	2	2	0
70.10	1	0	2	3	0	1	1	2	1	4	4	1	28	1	5	2	1	2
70.00	1	1	0	2	1	0	1	3	1	15	4	5	2	3	3	0	4	1
69.90	0	0	1	4	2	0	2	5	3	3	8	3	3	9	4	1	2	2
69.80	0	0	2	2	2	0	4	5	2	6	3	1	1	9	4	2	4	1
69.70	0	1	0	0	3	0	2	0	2	3	2	7	3	9	1	2	2	1
69.60	0	4	0	2	0	1	0	0	0	0	2	2	6	20	8	0	0	0
69.50	5	0	1	6	0	0	0	0	0	0	0	0	0	5	0	0	0	0

Salinity at minimum temperature:

Min.Lon	136.8	136.5	136.2	135.9	135.6	135.4	135.1	134.8	134.5	134.2	134.0	133.7	133.4	133.1	132.8	132.6	132.3	132.0
Min.Lat																		
70.40	+	31.9	32.2	32.5	+	+	+	32.4	+	32.8	32.4	32.1	32.9	+	32.0	31.9	+	32.1
70.30	34.1	34.0	31.8	31.6	+	32.6	33.0	32.1	31.7	+	32.9	32.9	+	+	31.9	+	31.5	33.1
70.20	+	+	32.5	31.9	+	+	32.0	31.9	31.6	+	32.6	+	32.0	32.1	31.9	31.4	31.8	+
70.10	31.7	+	32.2	32.5	+	31.6	32.3	31.6	30.1	30.9	32.0	31.4	30.6	32.0	32.0	23.4	32.2	30.4
70.00	32.2	32.4	+	31.8	32.1	+	31.0	29.7	31.4	30.2	31.4	32.1	31.4	30.2	30.2	+	27.6	32.2
69.90	+	+	19.1	30.4	30.5	+	30.9	29.0	31.0	30.4	28.0	30.8	30.1	31.5	30.7	19.5	32.1	28.7
69.80	+	+	26.8	20.6	28.4	+	32.0	23.2	28.4	26.2	23.9	6.8	30.7	30.8	29.3	23.8	25.0	25.5
69.70	+	28.0	+	+	31.0	+	31.1	+	24.8	15.3	13.7	28.7	30.2	26.6	9.3	1.1	31.8	+
69.60	+	30.8	+	21.7	+	19.3	+	+	+	+	24.7	4.8	16.3	27.3	27.6	+	+	+
69.50	31.3	+	16.1	28.4	+	+	+	+	+	+	+	+	+	20.9	+	+	+	+

Table 9. Difference between maximum and minimum observed bottom-water temperatures; summer (Jul.-Sep.); all years (1951-1987)

Near Bottom Temperature Measurements from Beaufort Sea Data Base

Grid size: 10km. Total number of data values: 424

Maximum minus minimum temperatures for months 7 thru 9; all years

Min.Lon	136.8	136.5	136.2	135.9	135.6	135.4	135.1	134.8	134.5	134.2	134.0	133.7	133.4	133.1	132.8	132.6	132.3	132.0		
Min.Lat																				
70.40	+	0.80	+	+	+	+	+	0.06	+	0.18	0.13	0.52	0.10	+	0.16	+	+	+		
70.30	+	2.10	1.00	+	+	0.55	1.07	0.13	+	+	2.30	0.55	+	+	0.39	+	+	1.40		
70.20	+	+	0.04	+	+	+	0.01	0.13	0.00	+	0.21	+	0.45	+	0.12	0.00	0.35	+		
70.10	+	+	1.09	0.16	+	+	+	0.07	+	0.13	2.96	+	1.25	+	1.25	0.20	+	1.65		
70.00	+	+	+	3.09	+	+	+	0.52	+	2.57	5.23	5.98	1.13	1.15	0.86	+	0.83	+		
69.90	+	+	+	4.68	0.01	+	0.01	3.55	2.80	2.38	11.45	5.75	1.43	5.81	4.68	+	7.70	1.80		
69.80	+	+	0.00	0.03	3.38	+	4.96	5.17	1.41	12.17	9.34	+	+	6.48	4.68	0.54	5.69	+		
69.70	+	+	+	+	5.95	+	1.30	+	+	+	0.26	0.46	2.57	11.34	0.61	11.05	+	1.82	10.53	+
69.60	+	2.33	+	10.28	+	+	+	+	+	+	5.52	4.86	9.47	9.93	10.79	+	+	+	+	+
69.50	4.04	+	+	5.57	+	+	+	+	+	+	+	+	+	7.58	+	+	+	+	+	+

Number of temperature values per grid:

Min.Lon	132.0	132.3	132.6	132.8	133.1	133.4	133.7	134.0	134.2	134.5	134.8	135.1	135.4	135.6	135.9	136.2	136.5	136.8
Min.Lat																		
70.40	0	2	1	1	0	0	0	3	0	5	4	4	2	0	4	1	0	1
70.30	1	8	3	1	0	6	12	4	1	0	10	4	2	0	4	1	0	1
70.20	0	0	2	1	0	0	2	4	2	0	4	3	5	1	2	2	2	8
70.10	1	0	2	3	0	1	1	2	1	4	4	1	28	1	5	2	1	0
70.00	1	1	0	2	1	0	1	3	1	15	4	5	2	3	3	0	4	2
69.90	0	0	1	4	2	0	2	5	3	3	8	3	3	9	4	1	2	1
69.80	0	0	2	2	2	0	4	5	2	6	3	1	1	9	4	2	4	1
69.70	0	1	0	0	3	0	2	0	2	3	2	7	3	9	1	2	2	1
69.60	0	4	0	2	0	1	0	0	0	0	2	7	3	9	1	2	2	1
69.50	5	0	1	6	0	0	0	0	0	0	2	2	6	20	8	0	0	0

Table 10. Average bottom-water temperatures; Jan. through Dec.; all years (1951-1987)

Near Bottom Temperature Measurements from Beaufort Data Base
 Average temperatures between months 1 and 12; all years
 Total number of data values 543; Grid size is 10km

Min.Lon	136.8	136.5	136.2	135.9	135.6	135.4	135.1	134.8	134.5	134.2	134.0	133.7	133.4	133.1	132.8	132.6	132.3	132.0
70.40	+	-0.64	-1.56	-1.56	+	+	-1.52	-1.47	+	-1.59	-1.39	-1.41	-1.59	+	-1.32	-0.51	+	-1.34
70.30	-0.74	-1.32	-0.90	-1.59	+	-1.60	-1.22	-1.44	-1.47	+	-1.37	-1.43	+	+	-1.22	+	-0.90	-1.18
70.20	+	+	-1.52	-1.44	-1.38	-1.57	-1.43	-1.52	-1.40	+	-1.52	+	-1.33	-0.14	-1.16	-1.01	-1.25	+
70.10	-1.53	+	-0.96	-1.52	+	-1.51	-1.58	-1.43	-1.58	-1.61	-0.79	-1.70	-1.22	-0.86	-0.79	-1.20	-1.37	-0.18
70.00	-1.63	-1.49	+	0.25	-1.55	+	-1.57	-1.27	-1.31	-1.19	1.44	0.24	-1.13	-1.03	-1.03	+	-0.90	-1.09
69.90	+	+	-1.10	-0.19	-1.59	+	-1.56	-0.23	-0.52	1.91	1.85	1.28	-1.55	0.41	1.20	0.08	1.14	-0.56
69.80	+	+	-0.87	4.30	1.27	+	0.33	3.12	-0.53	4.20	1.85	0.19	-0.24	1.67	0.46	1.78	1.33	3.08
69.70	+	0.16	+	+	3.06	+	-0.05	+	-1.13	5.29	5.45	2.48	-1.08	1.85	5.40	9.81	1.73	12.29
69.60	+	-0.61	+	5.97	+	1.80	+	+	+	+	+	+	+	5.13	+	+	+	+
69.50	0.29	+	1.53	3.58	+	+	+	+	+	+	+	+	+	+	+	+	+	+

Number of data values per grid; Grid size is 10km

Min.Lon	136.8	136.5	136.2	135.9	135.6	135.4	135.1	134.8	134.5	134.2	134.0	133.7	133.4	133.1	132.8	132.6	132.3	132.0
70.40	0	3	1	3	0	0	1	3	0	6	4	5	3	0	4	1	0	1
70.30	1	9	3	1	0	6	12	4	2	0	10	5	0	0	3	0	1	8
70.20	0	0	2	1	1	2	2	4	2	0	4	0	5	1	2	3	2	0
70.10	1	0	2	3	0	1	1	2	1	5	5	1	28	1	5	2	1	2
70.00	2	1	0	2	1	0	1	3	1	26	5	5	2	3	3	0	7	2
69.90	0	0	1	4	2	0	2	5	4	3	10	5	5	11	5	2	3	2
69.80	0	0	3	2	3	0	5	5	2	6	6	3	1	11	5	2	8	1
69.70	0	1	0	0	3	0	2	0	2	3	4	7	5	11	1	2	5	1
69.60	0	4	0	2	0	1	0	0	2	3	4	7	5	11	1	2	5	1
69.50	5	0	1	6	0	0	0	0	0	0	0	2	2	6	22	9	1	0

Table 11. Maximum observed bottom-water temperatures; Jan. through Dec.; all years (1951-1987)

Min.Lon	136.8	136.5	136.2	135.9	135.6	135.4	135.1	134.8	134.5	134.2	134.0	133.7	133.4	133.1	132.8	132.6	132.3	132.0
Min.Lat																		
70.40	+	0.33	-1.56	-1.51	+	+	-1.52	-1.44	+	-1.49	-1.32	-1.21	-1.49	+	-1.25	-0.51	+	-1.34
70.30	-0.74	0.30	-0.57	-1.59	+	-1.21	-0.60	-1.38	-1.43	+	0.50	-1.13	+	+	-0.98	+	-0.90	-0.27
70.20	+	+	-1.50	-1.44	-1.38	-1.45	-1.43	-1.47	-1.40	+	-1.46	+	-1.06	-0.14	-1.10	-0.76	-1.07	+
70.10	-1.53	+	-0.41	-1.44	+	-1.51	-1.58	-1.40	-1.58	-1.57	1.57	-1.70	-0.55	-0.86	0.00	-1.10	-1.37	0.64
70.00	-1.58	-1.49	+	1.79	-1.55	+	-1.57	-1.00	-1.31	1.00	4.11	4.65	-0.57	-0.55	-0.66	+	0.30	-0.58
69.90	+	+	-1.10	3.09	-1.58	+	-1.56	2.11	1.29	3.00	10.27	6.25	-0.11	5.48	3.58	1.85	6.40	0.34
69.80	+	+	-0.52	4.32	4.50	+	3.57	5.37	0.18	11.17	9.58	2.82	-0.24	6.39	3.32	2.05	8.00	3.08
69.70	+	0.16	+	+	5.15	+	0.60	+	-1.00	5.46	12.35	9.88	-0.16	9.89	5.40	10.72	10.42	12.29
69.60	+	0.77	+	11.11	+	1.80	+	+	+	+	+	+	+	+	+	+	+	+
69.50	2.53	+	1.53	7.08	+	+	+	+	+	+	6.76	6.30	10.67	8.90	10.20	-0.01	+	+

Grid size: 10km. Total number of data values: 543

Depth (m) of maximum temperatures:

Min.Lon	136.8	136.5	136.2	135.9	135.6	135.4	135.1	134.8	134.5	134.2	134.0	133.7	133.4	133.1	132.8	132.6	132.3	132.0
Min.Lat																		
70.40	+	303.1	50.5	60.7	+	+	58.1	56.3	+	40.0	41.4	40.0	40.4	+	40.4	38.4	+	31.0
70.30	222.2	50.5	53.0	47.4	+	45.4	50.5	50.5	41.3	+	47.4	50.0	+	+	30.3	+	23.5	20.2
70.20	+	+	45.4	40.4	55.5	48.5	51.0	40.8	40.4	+	43.4	+	44.0	27.3	28.2	30.3	28.6	+
70.10	37.5	+	43.0	35.3	+	39.0	45.4	29.8	24.5	31.0	36.0	23.4	42.2	21.8	30.3	30.3	29.2	25.2
70.00	35.3	25.5	+	31.0	30.3	+	28.7	20.9	24.2	26.5	16.2	23.0	29.0	26.0	22.7	+	16.8	15.1
69.90	+	+	20.2	20.0	20.3	+	25.6	14.2	13.1	11.0	12.5	12.0	18.2	17.0	15.9	10.3	16.1	14.7
69.80	+	+	17.2	16.0	14.0	+	10.1	5.5	11.0	5.2	11.4	7.1	14.0	11.0	10.8	8.1	7.1	14.1
69.70	+	13.8	+	+	9.1	+	9.1	+	5.0	6.3	3.9	3.0	3.3	4.7	6.6	4.7	6.5	4.4
69.60	+	11.1	+	2.7	+	5.2	+	+	+	+	3.0	5.0	3.3	11.6	5.0	2.0	+	+
69.50	15.2	+	7.8	5.3	+	+	+	+	+	+	+	+	4.0	+	+	+	+	+

Number of temperature values per grid:

Min.Lon	136.8	136.5	136.2	135.9	135.6	135.4	135.1	134.8	134.5	134.2	134.0	133.7	133.4	133.1	132.8	132.6	132.3	132.0
Min.Lat																		
70.40	0	3	1	3	0	0	1	3	0	6	4	5	3	0	4	1	0	1
70.30	1	9	3	1	0	6	12	4	2	0	10	4	0	0	3	0	1	8
70.20	0	0	2	1	1	2	2	4	2	0	4	0	5	1	2	3	2	0
70.10	1	0	2	3	0	1	1	2	1	5	5	1	28	1	5	2	1	2
70.00	2	1	0	2	1	0	1	3	1	26	5	5	2	3	3	0	7	2
69.90	0	0	1	4	2	0	2	5	4	3	10	5	5	11	5	2	3	2
69.80	0	0	3	2	3	0	5	5	2	6	6	3	1	11	5	2	8	1
69.70	0	1	0	0	3	0	2	0	2	3	4	7	5	11	1	2	5	1
69.60	0	4	0	2	0	1	0	0	0	0	2	2	6	22	9	1	0	0
69.50	5	0	1	6	0	0	0	0	0	0	0	0	0	5	0	0	0	0

Salinity at maximum temperature:

Min.Lon	136.8	136.5	136.2	135.9	135.6	135.4	135.1	134.8	134.5	134.2	134.0	133.7	133.4	133.1	132.8	132.6	132.3	132.0
Min.Lat																		
70.40	+	34.8	32.2	32.5	+	+	32.4	32.3	+	32.7	32.2	33.3	32.2	+	31.6	31.9	+	32.1
70.30	34.1	32.8	32.1	31.6	+	31.6	31.3	32.4	31.1	+	31.6	32.2	+	+	32.0	+	31.5	30.7
70.20	+	+	32.1	31.9	32.4	32.4	32.0	32.1	31.6	+	32.3	+	31.9	32.1	31.9	31.4	31.2	+
70.10	31.7	+	31.9	32.1	+	31.6	32.3	31.6	30.1	30.9	31.2	31.4	31.6	32.0	31.7	23.4	32.2	31.4
70.00	31.6	32.4	+	31.1	32.1	+	31.0	31.2	31.4	30.8	21.7	28.3	31.2	31.4	31.5	+	30.9	32.2
69.90	+	+	19.1	30.4	30.2	+	31.4	26.9	27.6	26.2	14.9	24.7	31.8	26.9	28.6	19.5	30.2	30.9
69.80	+	+	26.8	20.5	29.3	+	20.0	16.9	29.8	14.0	15.3	6.8	30.7	24.0	28.6	26.6	6.9	25.5
69.70	+	28.0	+	+	20.5	+	24.4	+	23.3	16.5	12.8	16.1	3.1	23.6	9.3	20.6	9.5	16.7
69.60	+	29.5	+	29.2	+	19.3	+	+	+	+	+	+	+	+	+	+	+	+
69.50	28.0	+	16.1	11.6	+	+	+	+	+	+	3.4	7.8	15.5	15.8	9.5	0.3	+	+

Table 12. Minimum observed bottom-water temperatures; Jan. through Dec.; all years (1951-1987)

Min.Lon	136.8	136.5	136.2	135.9	135.6	135.4	135.1	134.8	134.5	134.2	134.0	133.7	133.4	133.1	132.8	132.6	132.3	132.0	
Min.Lat																			
70.40	+	-1.52	-1.56	-1.59	+	+	-1.52	-1.50	+	-1.67	-1.45	-1.73	-1.70	+	-1.41	-0.51	+	-1.34	
70.30	-0.74	-1.80	-1.57	-1.59	+	-1.76	-1.67	-1.51	-1.52	+	-1.80	-1.68	+	+	-1.37	+	-0.90	-1.67	
70.20	+	+	-1.54	-1.44	-1.38	-1.69	-1.44	-1.60	-1.40	+	-1.67	+	-1.51	-0.14	-1.22	-1.50	-1.42	+	
70.10	-1.53	+	-1.50	-1.60	+	-1.51	-1.58	-1.47	-1.58	-1.70	-1.65	-1.70	-1.80	-0.86	-1.25	-1.30	-1.37	-1.01	
70.00	-1.68	-1.49	+	-1.30	-1.55	+	-1.57	-1.52	-1.31	-1.80	-1.70	-1.33	-1.70	-1.70	-1.52	+	-1.70	-1.60	
69.90	+	+	-1.10	-1.59	-1.59	+	-1.57	-1.44	-1.64	0.62	-1.66	-1.64	-1.70	-1.65	-1.66	-1.70	-1.67	-1.46	
69.80	+	+	-1.58	4.29	-1.82	+	-1.70	0.20	-1.23	-1.00	-1.64	-1.64	-0.24	-1.57	-1.80	1.51	-1.58	3.08	
69.70	+	0.16	+	+	-0.80	+	-0.70	+	-1.26	5.00	-0.18	-1.46	-1.55	-1.16	5.40	8.90	-0.73	+	
69.60	+	-1.56	+	0.83	+	1.80	+	+	+	+	1.24	1.44	1.20	-1.03	-0.59	-0.01	+	+	
69.50	-1.51	+	1.53	1.51	+	+	+	+	+	+	+	+	+	2.67	+	+	+	+	

Grid size: 10km. Total number of data values: 543

Depth (m) of minimum temperatures:

Min.Lon	136.8	136.5	136.2	135.9	135.6	135.4	135.1	134.8	134.5	134.2	134.0	133.7	133.4	133.1	132.8	132.6	132.3	132.0	
Min.Lat																			
70.40	+	45.4	50.5	56.2	+	+	58.1	54.9	+	60.6	52.9	45.4	45.0	+	39.2	38.4	+	31.0	
70.30	222.2	50.5	45.4	47.4	+	40.0	51.5	41.4	41.1	+	48.5	35.3	+	+	30.6	+	23.5	30.0	
70.20	+	+	45.4	40.4	55.5	46.2	51.0	40.4	40.4	+	40.4	+	40.4	27.3	32.8	31.0	28.1	+	
70.10	37.5	+	40.4	40.4	+	39.0	45.4	36.3	24.5	35.0	34.5	23.4	40.0	21.8	50.5	20.2	29.2	22.5	
70.00	30.3	25.5	+	24.2	30.3	+	28.7	19.5	24.2	27.3	15.8	30.1	30.0	25.0	20.0	+	19.2	16.8	
69.90	+	+	20.2	24.0	20.3	+	32.0	17.6	15.0	9.1	10.9	16.0	20.6	21.0	17.1	12.6	13.4	13.8	
69.80	+	+	20.8	16.0	17.1	+	18.2	5.0	9.2	7.1	14.8	12.4	14.0	10.1	13.2	10.1	10.7	14.1	
69.70	+	13.8	+	+	6.1	+	10.1	+	5.0	3.9	4.4	5.0	9.1	5.0	6.6	1.8	6.2	+	
69.60	+	13.9	+	6.3	+	5.2	+	+	+	+	5.0	4.0	5.0	5.0	5.0	2.0	+	+	
69.50	15.5	+	7.8	6.3	+	+	+	+	+	+	+	+	5.0	+	+	+	+	+	

Number of temperature values per grid:

Min.Lon	136.8	136.5	136.2	135.9	135.6	135.4	135.1	134.8	134.5	134.2	134.0	133.7	133.4	133.1	132.8	132.6	132.3	132.0	
Min.Lat																			
70.40	0	3	1	3	0	0	1	3	0	6	4	5	3	0	4	1	0	1	
70.30	1	9	3	1	0	6	12	4	2	0	10	4	0	0	3	0	1	8	
70.20	0	0	2	1	1	2	2	4	2	0	4	0	5	1	2	3	2	0	
70.10	1	0	2	3	0	1	1	2	1	5	5	1	28	1	5	2	1	2	
70.00	2	1	0	2	1	0	1	3	1	26	5	5	2	3	3	0	7	2	
69.90	0	0	1	4	2	0	2	5	4	3	10	5	51	11	5	2	3	2	
69.80	0	0	3	2	3	0	5	5	2	6	6	3	1	11	5	2	3	2	
69.70	0	1	0	0	3	0	2	0	2	3	4	7	5	11	1	2	5	1	
69.60	0	4	0	2	0	1	0	0	0	0	0	2	6	22	9	1	0	0	
69.50	5	0	1	6	0	0	0	0	0	0	0	0	0	5	0	0	0	0	

Salinity at minimum temperature:

Min.Lon	136.8	136.5	136.2	135.9	135.6	135.4	135.1	134.8	134.5	134.2	134.0	133.7	133.4	133.1	132.8	132.6	132.3	132.0	
Min.Lat																			
70.40	+	31.9	32.2	32.3	+	+	32.4	32.4	+	32.8	32.4	32.1	32.9	+	32.0	31.9	+	32.1	
70.30	34.1	34.0	31.8	31.6	+	32.6	33.0	32.1	31.7	+	32.9	32.9	+	+	31.9	+	31.5	33.1	
70.20	+	+	32.5	31.9	32.4	31.7	32.0	31.9	31.6	+	32.6	+	32.0	32.1	31.9	31.3	31.8	+	
70.10	31.7	+	32.2	32.5	+	31.6	32.3	31.6	30.1	30.9	32.0	31.4	30.6	32.0	32.0	23.4	32.2	30.4	
70.00	32.2	32.4	+	31.8	32.1	+	31.0	29.7	31.4	33.1	31.4	32.1	31.4	30.2	30.2	+	31.9	31.7	
69.90	+	+	19.1	30.4	30.5	+	30.9	29.0	30.3	30.4	31.3	31.1	31.0	30.8	31.1	26.1	31.4	28.7	
69.80	+	+	30.3	20.6	33.0	+	31.5	23.2	28.4	26.2	31.5	31.1	30.7	30.8	33.0	23.8	31.2	25.5	
69.70	+	28.0	+	+	31.0	+	31.1	+	24.8	15.3	3.2	28.7	30.2	26.6	9.3	1.1	26.3	+	
69.60	+	30.8	+	21.7	+	19.3	+	+	+	+	+	+	24.7	4.8	16.3	27.3	27.6	+	
69.50	31.3	+	16.1	28.4	+	+	+	+	+	+	+	+	+	20.9	+	+	+	+	

TABLE 13: Summary of bottom water temperature data available from moored instrumentation (locations are also shown in Figure 1; see location code in the first column).

Locn/Year/ Data Set No.	Site	Lat. ddmm	Lon. ddmm	D (m)	Lev (m)	Start dd/ mm	Stop dd/ mm	# Mon	Ins tr
A.74-0005	BSP-4	69 42	137 09	43	40	09/05	30/01	8.7	cm
A.75-0007	BSP-5	70 23	136 46	67	64	30/04	11/09	4.4	cm
B.75-0007	BSP-8	71 13	131 20	77	74	26/04	4/08	3.3	cm
B.75-0007	BSP-9	70 44	131 15	45	42	26/04	6/11	3.4	cm
B.75-0007	BSP13	70 08	134 20	33	30	27/04	30/07	3.1	cm
B.75-0007	BSP15	70 17	133 35	54	51	29/04	6/08	3.3	cm
C.81-0001	CM-1	71 12	132 07	99	94	01/04	16/08	4.5	cm
C.81-0001	CM-2	70 56	133 31	77	72	01/04	16/08	4.5	cm
C.81-0001	CM-3	71 23	130 21	62	57	01/04	16/08	4.5	cm
D.81-002A	Trst	69 57	136 12	26	23	18/01	5/05	3.6	cm
D.81-002A	Uvfk	70 16	132 19	25	19	18/01	5/08	6.6	cm
D.81-002B	Trst	69 54	136 12	25	19	11/08	05/09	12.8	cm
E.81-0016	Iss.	69 59	134 21	16	15	06/08	20/09	1.5	cm
E.81-0016	Alk	69 55	134 42	12	11	08/08	20/09	1.4	cm
F.82-0003	Iss.	69 56	134 23	7	6	05/08	14/09	1.3	cm
G.84-0046	Nptk	69 50	135 26	15	13	20/07	26/09	2.2	bp
H.85-0029	Arnk	69 48	133 50	8	6	27/08	03/10	1.2	cm
H.85-0029	Nptk	69 49	135 26	12	10	25/08	14/10	1.7	cm
H.85-0029	Adgo	69 29	135 52	3	3	15/08	27/09	1.4	bp
J.85-0032	KC50	70 43	133 07	54	54	?/03	?/04	13	bp
J.85-0032	3	70 13	135 34	?	?	?/03	?/04	13	cm
K.86-0009	T1.1	69 51	134 48	11	10	18/08	24/09	1.2	bp
K.86-0009	T1.2	69 45	134 36	6	5	18/08	24/09	1.2	bp
L.87-ASL	AM-2	70 03	133 40	32	28	18/08	5/10	1.6	cm
L.87-ASL	AM-3	70 04	133 38	33	29	18/08	5/10	1.6	cm
L.87-ASL	AM-4	70 05	133 32	32	28	18/08	21/09	1.1	cm

Locn/Year/ Data Set No.	Site	Lat. ddmm	Lon. ddmm	D (m)	Lev (m)	Start dd/ mm	Stop dd/ mm	# Mon	Ins tr
L.87-ASL	AM-5	70 05	133 13	26	22	19/08	21/09	1.1	cm
L.87-ASL	TB-2	69 35	133 00	3	2	27/08	17/09	0.8	cm
L.87-ASL	TB-3	69 35	133 00	5	3	27/08	17/09	.8	cm
M.88-ASL	Ppe-1	69 54	133 58	9	10	23/07	26/09	2.1	cm
M.88-ASL	AM-1	70 02	133 41	30	26	16/03	05/09	5.6	cm
N.89-IOS	Kngrk	69 42	137 26	58	53	25/07	03/10	2.3	cm
O.90-IOS	CD-10	70 22	129 05	11	11	08/03	09/06	3.1	bp
O.90-IOS	90 1A	70 19	133 37	56	50	30/03	30/08	5.0	cm
O.90-IOS	90 2A	70 49	133 43	76	70	5/04	31/08	4.9	cm
O.90-IOS	90 1B	70 21	133 44	76	70	08/09	13/03	6.1	cm
O.90-IOS	90 2B	70 58	133 41	82	76	08/09	14/03	6.2	cm
O.90-IOS	Nh010	69 53	134 47	12	12	09/03	12/05	2.1	bp

LEGEND: Data Set numbers refer to inventory of Birch et al. (1987), except for data sets since 1986 (data held by: ASL - Arctic Sciences Ltd. and IOS - Institute of Ocean Sciences). "cm" and "bp" refers to data collected from current meters and bottom pressure devices, respectively.

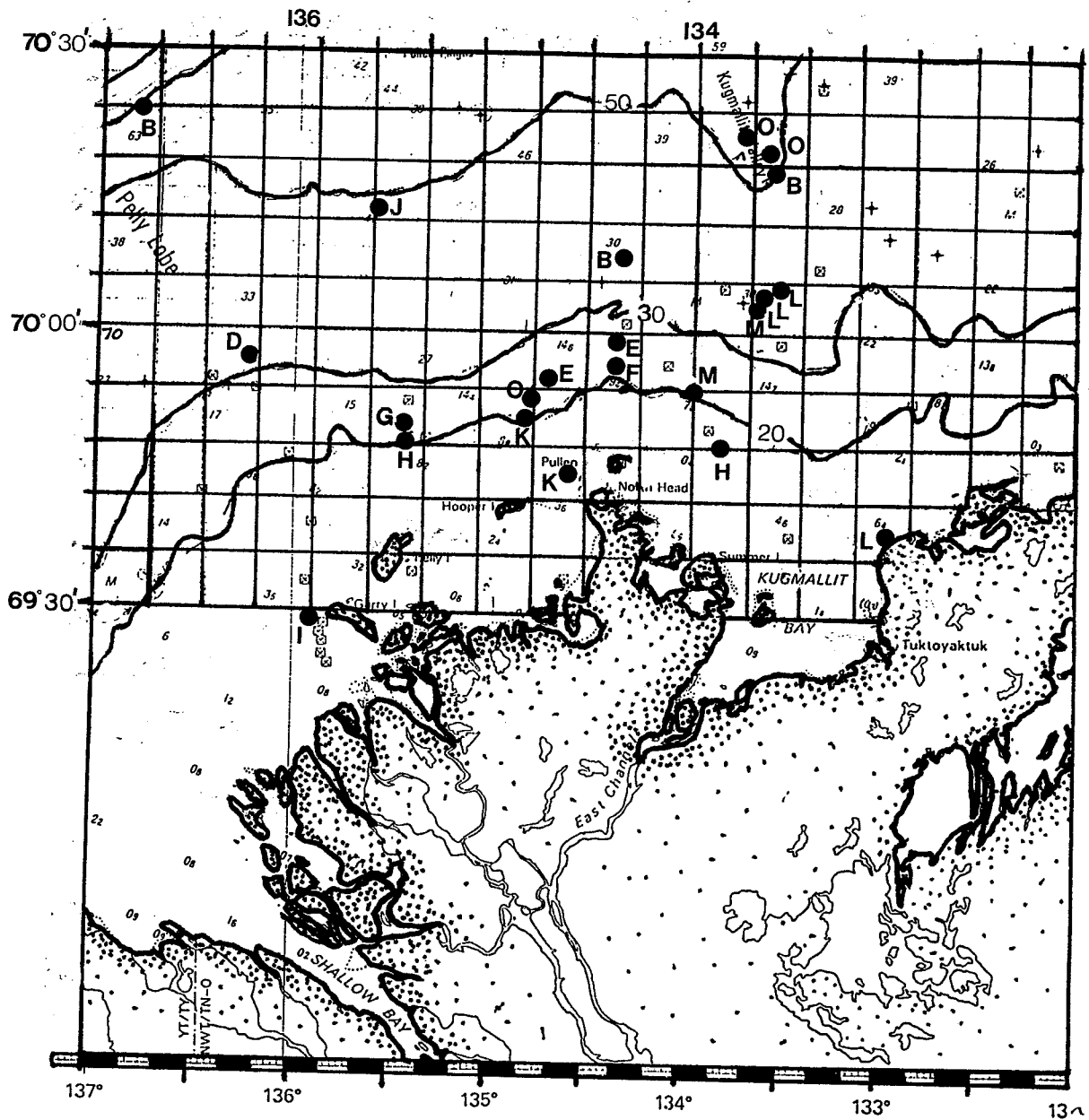
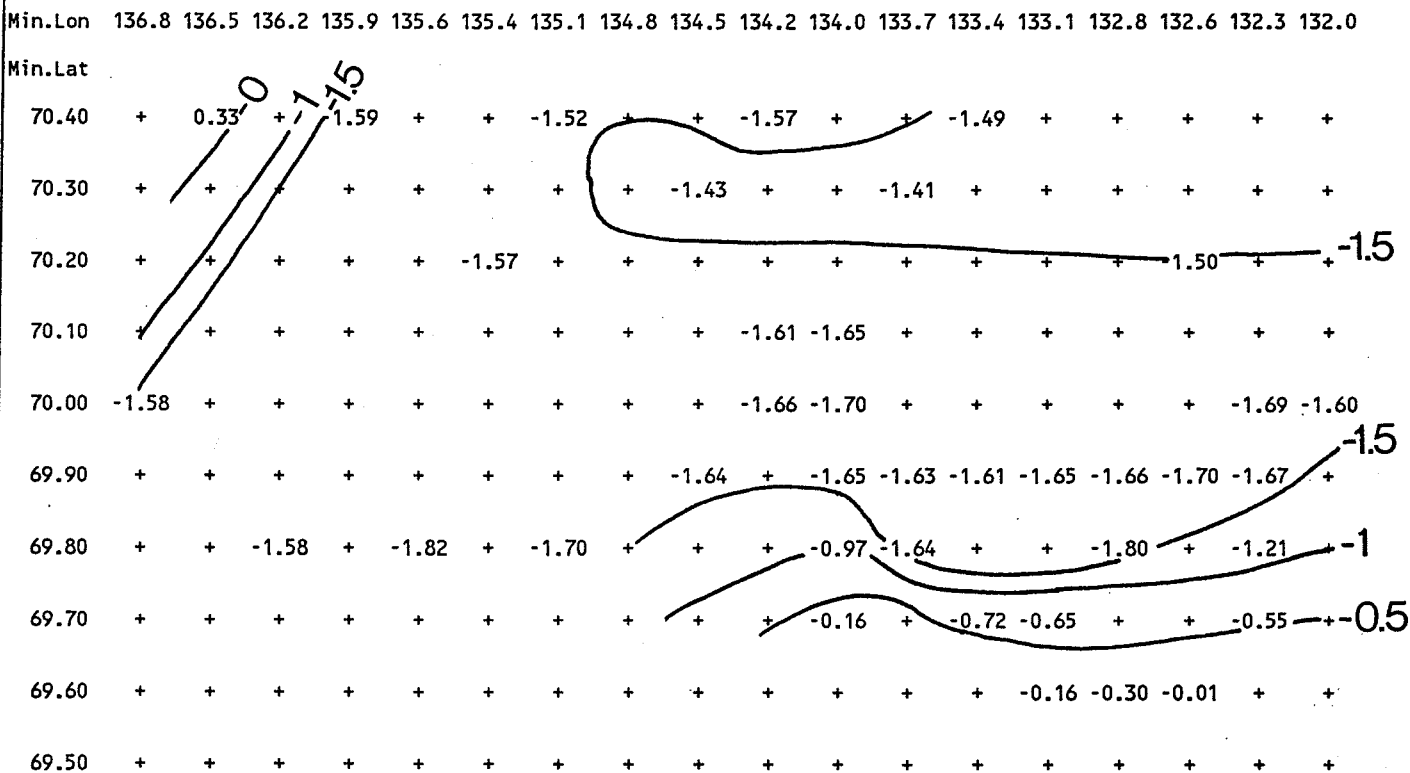


Figure 1: The study area delineated by the coarse grid (10 km by 10 km). Also shown are measurement locations of extended time series data sets of near-bottom temperature (see Table 13).

Average temperatures between months 3 and 5; all years
 Total number of data values 110; Grid size is 10km



Average temperatures between months 7 and 9; all years
 Total number of data values 424; Grid size is 10km

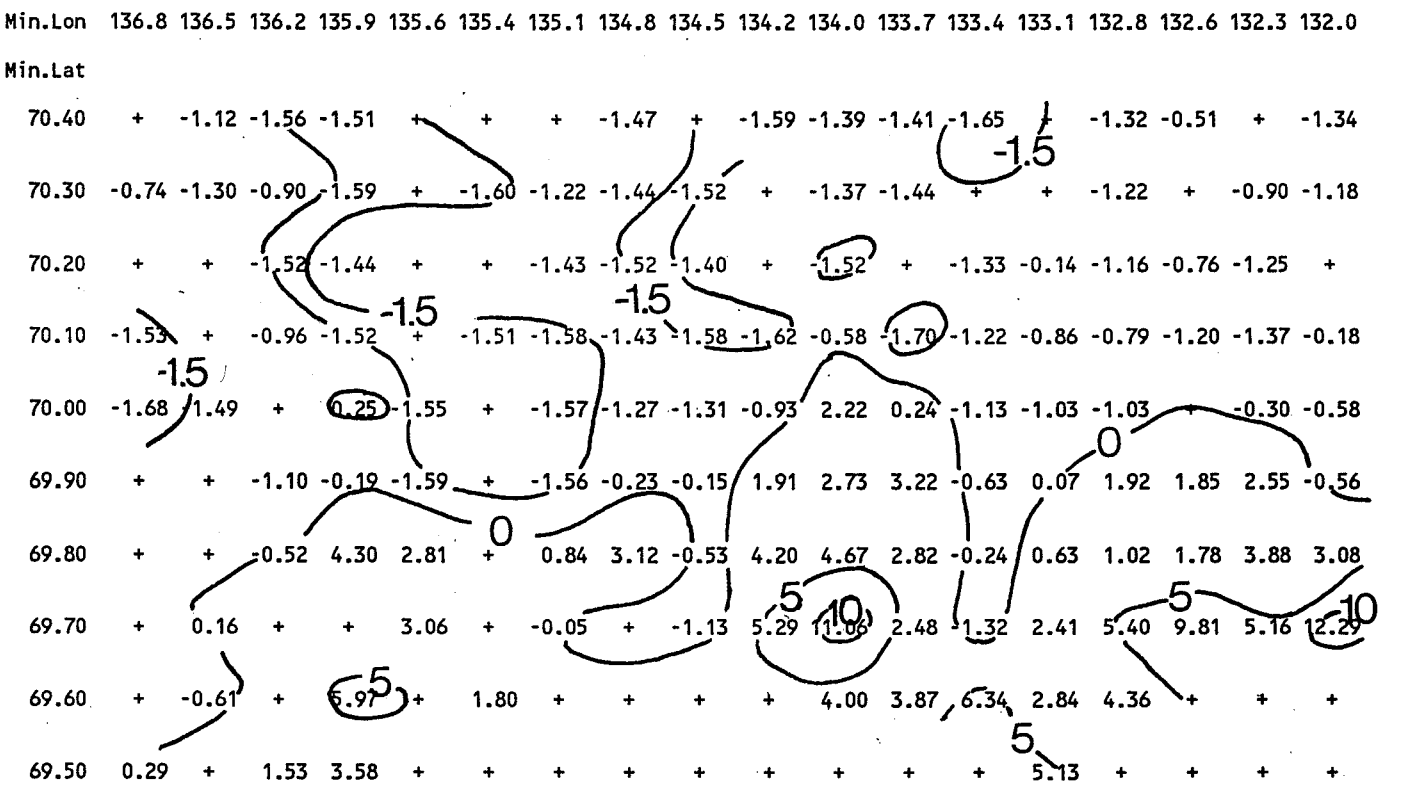


Figure 2: Average of all near-bottom temperatures for the spring (months 3-5) and summer (months 7-9) seasons.

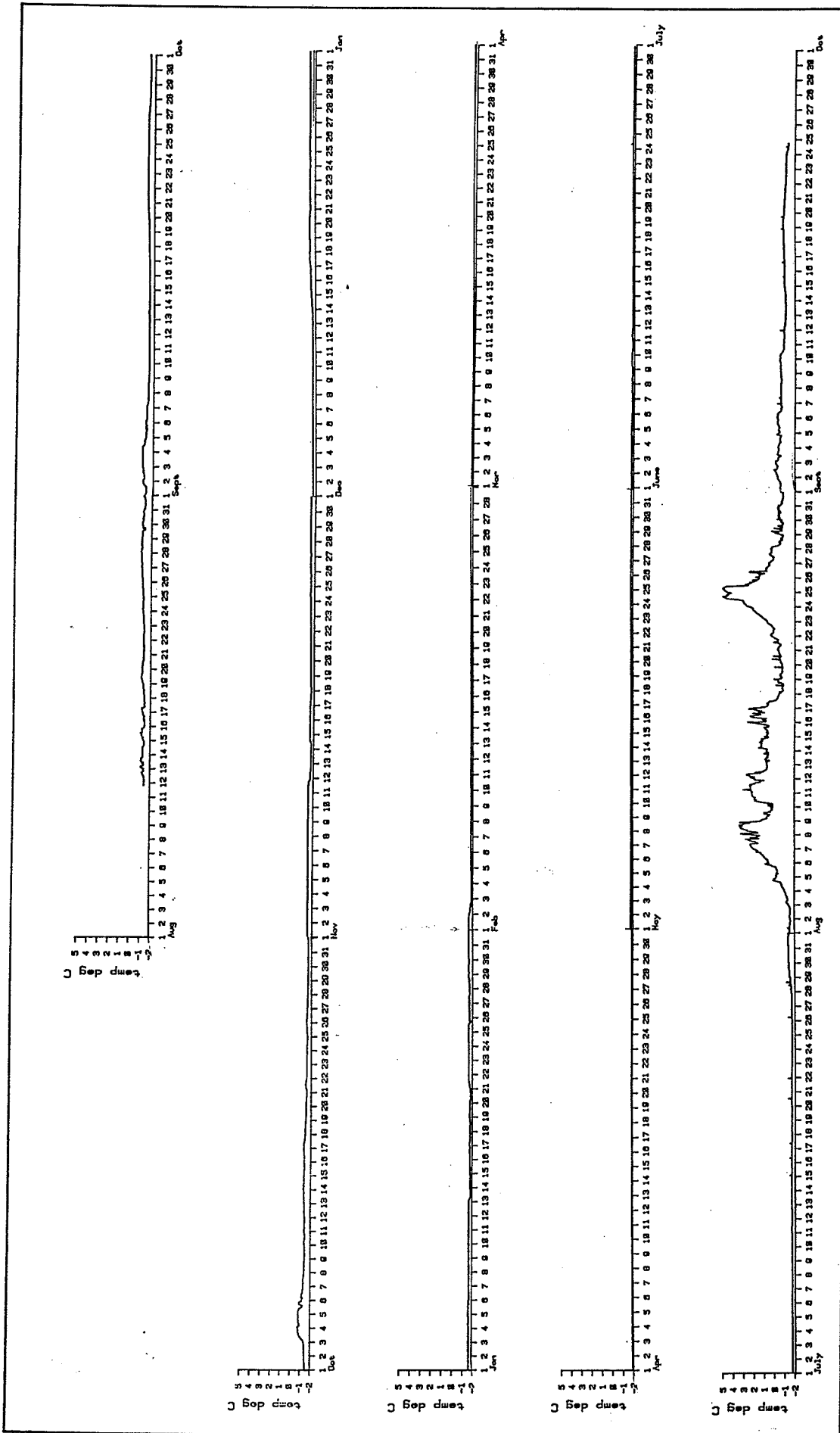


Figure 3: Year-long record (Aug. 11 '81 to Sept. 24 '82) of bottom water temperature obtained using an Aanderaa current meter moored at a depth of 27 m (3 m off bottom) at 69°57.6'N 136°12.0'N, near the Tarsiut drill site.

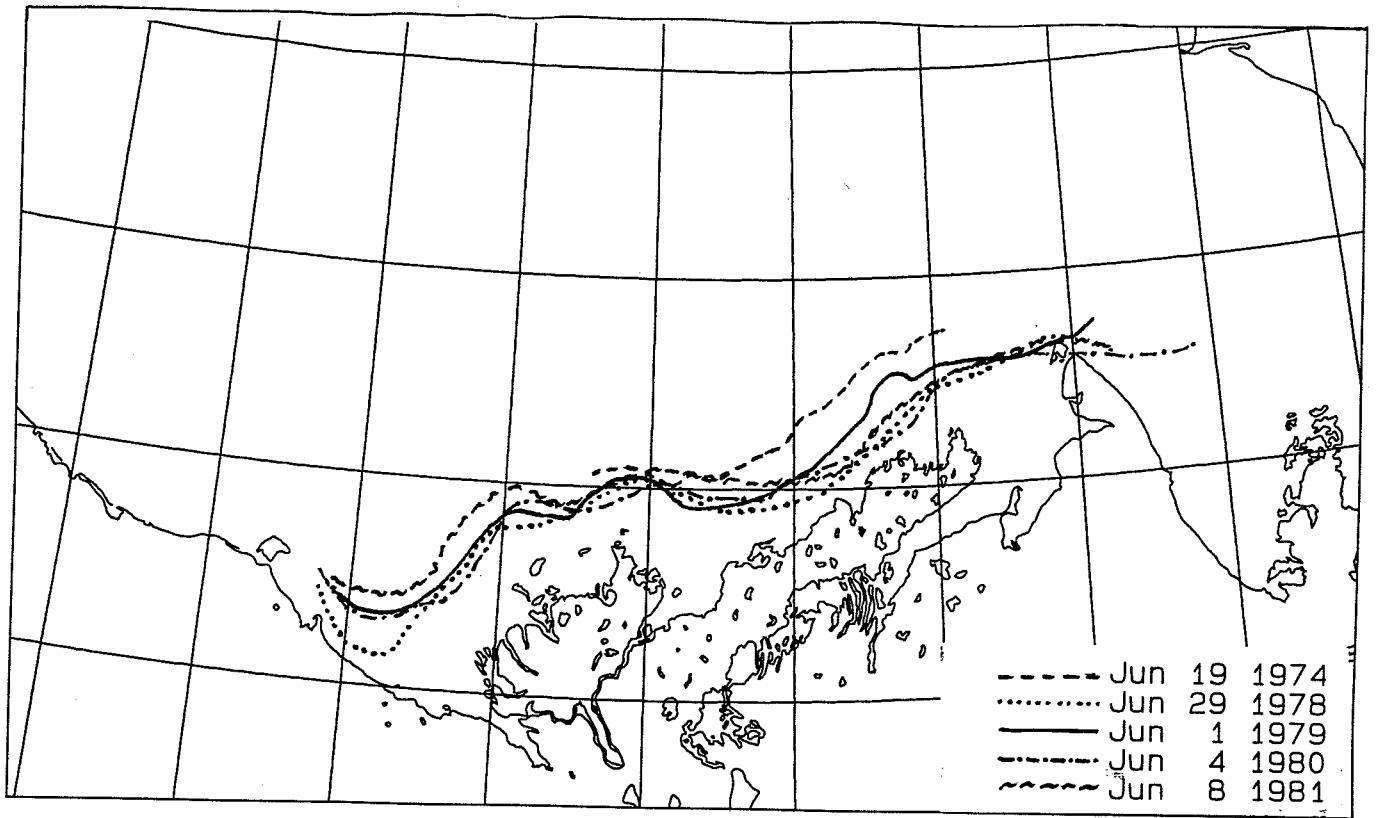


Figure 4: Location of spring ice edges for the years 1974 and 1978 to 1981 inclusive.

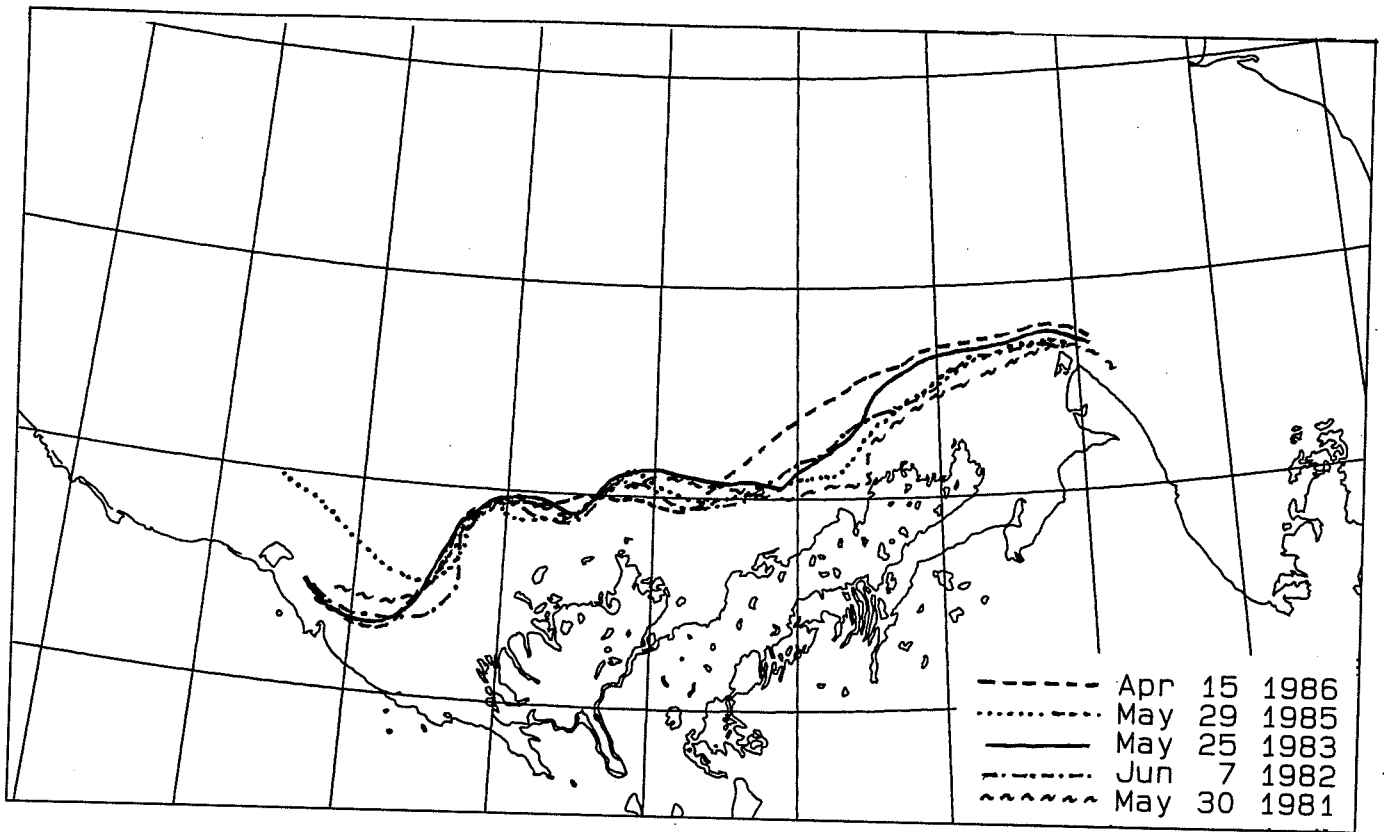


Figure 5: Location of spring ice edges for the years 1981, 1982, 1983, 1985 and 1986.

APPENDIX 1

Yearly summaries (for spring and summer) of near-bottom ocean temperatures

Near-bottom temperature data for the Beaufort Sea, 1951 through 1987. Data are grouped into 10 km square grids, 0.1 degrees latitude by 0.2 degrees longitude; starting at 69.5 deg. north / 132 deg. west. The data are grouped by year and season: spring (Mar. through May); summer (July through Sept.). Each page shows the maximum and minimum near-bottom temperatures for that year and season, and the number of temperature values in each grid. Also shown are the depths of the maximum temperature values. The database was edited to exclude values that were not close enough to bottom to be considered representative.

Near Bottom Temperature Measurements from Beaufort Sea Data Base. Year= 1952. Months 7 through 9
 Grid size: 10km. Total number of data points: 61

Maximum temperatures:

Min.Lon	136.8	136.5	136.2	135.9	135.6	135.4	135.1	134.8	134.5	134.2	134.0	133.7	133.4	133.1	132.8	132.6	132.3	132.0	
Min.Lat																			
70.40	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
70.30	-0.74	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-0.51	+	+	+
70.20	+	+	-1.54	+	+	+	+	+	+	+	+	+	+	+	-0.98	+	+	+	+
70.10	+	+	+	-1.60	+	+	+	-1.60	+	+	+	+	+	+	-0.14	+	+	+	+
70.00	-1.68	+	+	+	+	+	+	-1.58	+	+	+	+	+	+	+	+	+	+	+
69.90	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-0.85	+	+	+	-0.58
69.80	+	+	+	+	+	+	+	3.57	0.20	+	-1.00	4.18	+	-0.11	-0.37	+	+	+	+
69.70	+	+	+	+	4.84	+	+	+	+	-1.00	+	+	0.86	-1.48	-1.11	-1.36	1.51	+	3.08
69.60	+	-1.38	+	+	+	+	+	+	+	+	+	6.76	1.44	6.95	7.94	-0.59	+	+	+
69.50	+	+	+	+	+	+	+	+	+	+	+	+	+	+	4.59	+	+	+	+

Minimum temperatures:

Min.Lon	136.8	136.5	136.2	135.9	135.6	135.4	135.1	134.8	134.5	134.2	134.0	133.7	133.4	133.1	132.8	132.6	132.3	132.0	
Min.Lat																			
70.40	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
70.30	-0.74	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-0.51	+	+	+
70.20	+	+	-1.54	+	+	+	+	+	+	+	+	+	+	+	-0.98	+	+	+	+
70.10	+	+	+	-1.60	+	+	+	-1.60	+	+	+	+	+	+	-0.14	+	+	+	+
70.00	-1.68	+	+	+	+	+	+	-1.58	+	+	+	+	+	+	+	+	+	+	+
69.90	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-0.85	+	+	+	-0.58
69.80	+	+	+	+	+	+	+	-1.39	0.20	+	-1.00	0.24	+	-0.11	-1.06	+	+	+	+
69.70	+	+	+	+	-0.80	+	+	+	+	-1.26	+	+	-1.46	-1.55	-1.16	-1.36	1.51	+	3.08
69.60	+	-1.38	+	+	+	+	+	+	+	+	+	1.24	1.44	1.20	-1.03	-0.59	+	+	+
69.50	+	+	+	+	+	+	+	+	+	+	+	+	+	+	2.67	+	+	+	+

Depth (m) of temperature values:

Min.Lon	136.8	136.5	136.2	135.9	135.6	135.4	135.1	134.8	134.5	134.2	134.0	133.7	133.4	133.1	132.8	132.6	132.3	132.0	
Min.Lat																			
70.40	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
70.30	222.2	+	+	+	+	+	+	+	+	+	+	+	+	+	+	38.4	+	+	+
70.20	+	+	45.4	+	+	+	+	+	+	+	+	+	+	+	30.3	+	+	+	+
70.10	+	+	+	40.4	+	+	+	40.4	+	+	+	+	+	+	27.3	+	+	+	+
70.00	30.3	+	+	+	+	+	+	45.4	+	+	+	+	+	+	+	+	+	+	+
69.90	+	+	+	+	+	+	+	+	+	+	+	+	+	+	15.1	+	+	+	15.1
69.80	+	+	+	+	+	+	+	+	+	9.1	+	+	+	18.2	15.1	+	+	+	+
69.70	+	+	+	+	7.1	+	+	10.1	5.0	+	7.1	7.1	+	+	10.1	5.0	10.1	+	14.1
69.60	+	10.1	+	+	+	+	+	+	+	5.0	+	+	5.0	5.0	5.0	+	+	+	+
69.50	+	+	+	+	+	+	+	+	+	+	+	3.0	4.0	7.1	3.0	5.0	+	+	+

Number of temperature values per grid:

Min.Lon	136.8	136.5	136.2	135.9	135.6	135.4	135.1	134.8	134.5	134.2	134.0	133.7	133.4	133.1	132.8	132.6	132.3	132.0	
Min.Lat																			
70.40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
70.30	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
70.20	0	0	1	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0
70.10	0	0	0	1	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0
70.00	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
69.90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
69.80	0	0	0	0	0	0	3	1	0	1	0	0	1	4	0	0	0	0	0
69.70	0	0	0	0	2	0	0	0	2	1	2	0	0	1	1	1	1	0	1
69.60	0	1	0	0	0	0	0	0	0	0	4	2	2	2	0	0	0	0	0
69.50	0	0	0	0	0	0	0	0	0	0	2	1	2	12	1	0	0	0	0

Near Bottom Temperature Measurements from Beaufort Sea Data Base. Year= 1973. Months 7 through 9
 Grid size: 10km. Total number of data points: 5

Maximum temperatures:

Min.Lon	136.8	136.5	136.2	135.9	135.6	135.4	135.1	134.8	134.5	134.2	134.0	133.7	133.4	133.1	132.8	132.6	132.3	132.0
Min.Lat																		
70.40	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
70.30	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
70.20	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
70.10	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
70.00	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
69.90	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
69.80	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
69.70	+	+	+	+	+	+	+	+	+	2.80	+	+	+	+	+	+	+	+
69.60	+	+	+	+	+	+	0.60	+	+	+	+	+	+	+	+	+	8.00	+
69.50	+	+	+	+	+	+	+	+	+	+	+	6.30	+	+	+	+	+	+

Minimum temperatures:

Min.Lon	136.8	136.5	136.2	135.9	135.6	135.4	135.1	134.8	134.5	134.2	134.0	133.7	133.4	133.1	132.8	132.6	132.3	132.0
Min.Lat																		
70.40	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
70.30	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
70.20	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
70.10	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
70.00	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
69.90	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
69.80	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
69.70	+	+	+	+	+	+	+	+	+	2.80	+	+	+	+	+	+	+	+
69.60	+	+	+	+	+	+	0.60	+	+	+	+	+	+	+	+	5.40	+	8.00
69.50	+	+	+	+	+	+	+	+	+	+	+	6.30	+	+	+	+	+	+

Depth (m) of temperature values:

Min.Lon	136.8	136.5	136.2	135.9	135.6	135.4	135.1	134.8	134.5	134.2	134.0	133.7	133.4	133.1	132.8	132.6	132.3	132.0
Min.Lat																		
70.40	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
70.30	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
70.20	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
70.10	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
70.00	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
69.90	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
69.80	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
69.70	+	+	+	+	+	+	+	+	+	8.1	+	+	+	+	+	+	+	7.1
69.60	+	+	+	+	+	+	9.1	+	+	+	+	+	+	+	+	6.6	+	+
69.50	+	+	+	+	+	+	+	+	+	+	+	5.0	+	+	+	+	+	+

Number of temperature values per grid:

Min.Lon	136.8	136.5	136.2	135.9	135.6	135.4	135.1	134.8	134.5	134.2	134.0	133.7	133.4	133.1	132.8	132.6	132.3	132.0
Min.Lat																		
70.40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
70.30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
70.20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
70.10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
70.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
69.90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
69.80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
69.70	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
69.60	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0
69.50	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0

Near Bottom Temperature Measurements from Beaufort Sea Data Base. Year= 1974. Months 3 through 5
 Grid size: 10km. Total number of data points: 4

Maximum temperatures:

Min.Lon	136.8	136.5	136.2	135.9	135.6	135.4	135.1	134.8	134.5	134.2	134.0	133.7	133.4	133.1	132.8	132.6	132.3	132.0
Min.Lat																		
70.40	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
70.30	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
70.20	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
70.10	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
70.00	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
69.90	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
69.80	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
69.70	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
69.60	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
69.50	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-0.20	-0.30	+	+

Minimum temperatures:

Min.Lon	136.8	136.5	136.2	135.9	135.6	135.4	135.1	134.8	134.5	134.2	134.0	133.7	133.4	133.1	132.8	132.6	132.3	132.0
Min.Lat																		
70.40	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
70.30	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
70.20	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
70.10	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
70.00	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
69.90	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
69.80	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
69.70	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
69.60	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
69.50	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-1.10	-0.30	-0.30	+

Depth (m) of temperature values:

Min.Lon	136.8	136.5	136.2	135.9	135.6	135.4	135.1	134.8	134.5	134.2	134.0	133.7	133.4	133.1	132.8	132.6	132.3	132.0
Min.Lat																		
70.40	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
70.30	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
70.20	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
70.10	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
70.00	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
69.90	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
69.80	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
69.70	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
69.60	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
69.50	+	+	+	+	+	+	+	+	+	+	+	+	+	+	5.0	3.5	4.0	+

Number of temperature values per grid:

Min.Lon	136.8	136.5	136.2	135.9	135.6	135.4	135.1	134.8	134.5	134.2	134.0	133.7	133.4	133.1	132.8	132.6	132.3	132.0
Min.Lat																		
70.40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
70.30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
70.20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
70.10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
70.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
69.90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
69.80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
69.70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
69.60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
69.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	1	0

Near Bottom Temperature Measurements from Beaufort Sea Data Base. Year= 1981. Months 7 through 9
 Grid size: 10km. Total number of data points: 24

Maximum temperatures:

Min.Lon	136.8	136.5	136.2	135.9	135.6	135.4	135.1	134.8	134.5	134.2	134.0	133.7	133.4	133.1	132.8	132.6	132.3	132.0
Min.Lat																		
70.40	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
70.30	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
70.20	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
70.10	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
70.00	+	+	+	+	+	+	+	+	+	-1.70	-1.20	+	-1.80	+	+	+	+	+
69.90	+	+	+	+	+	+	+	+	+	0.90	+	+	-1.70	-1.70	+	+	+	+
69.80	+	+	+	+	+	+	+	3.80	+	+	+	2.90	+	0.60	+	+	+	+
69.70	+	+	+	+	+	+	+	+	+	+	+	+	+	3.40	+	+	+	+
69.60	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
69.50	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	10.20	+	+

Minimum temperatures:

Min.Lon	136.8	136.5	136.2	135.9	135.6	135.4	135.1	134.8	134.5	134.2	134.0	133.7	133.4	133.1	132.8	132.6	132.3	132.0
Min.Lat																		
70.40	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
70.30	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
70.20	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
70.10	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
70.00	+	+	+	+	+	+	+	+	+	-1.70	-1.20	+	-1.80	+	+	+	+	+
69.90	+	+	+	+	+	+	+	+	+	-1.55	+	+	-1.70	-1.70	+	+	+	+
69.80	+	+	+	+	+	+	+	3.80	+	+	+	2.90	+	-1.50	+	+	+	+
69.70	+	+	+	+	+	+	+	+	+	+	+	+	+	-1.00	+	+	+	+
69.60	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
69.50	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+

Depth (m) of temperature values:

Min.Lon	136.8	136.5	136.2	135.9	135.6	135.4	135.1	134.8	134.5	134.2	134.0	133.7	133.4	133.1	132.8	132.6	132.3	132.0
Min.Lat																		
70.40	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
70.30	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
70.20	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
70.10	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
70.00	+	+	+	+	+	+	+	+	+	35.0	29.5	+	40.0	+	+	+	+	+
69.90	+	+	+	+	+	+	+	+	+	19.0	+	+	30.0	25.0	+	+	+	+
69.80	+	+	+	+	+	+	+	+	+	+	+	15.0	+	15.0	+	+	+	+
69.70	+	+	+	+	+	+	+	2.0	+	+	+	+	+	10.0	+	+	+	+
69.60	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
69.50	+	+	+	+	+	+	+	+	+	+	+	+	+	+	5.0	+	+	+

Number of temperature values per grid:

Min.Lon	136.8	136.5	136.2	135.9	135.6	135.4	135.1	134.8	134.5	134.2	134.0	133.7	133.4	133.1	132.8	132.6	132.3	132.0
Min.Lat																		
70.40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
70.30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
70.20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
70.10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
70.00	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0
69.90	0	0	0	0	0	0	0	0	0	11	0	0	1	0	0	0	0	0
69.80	0	0	0	0	0	0	0	0	0	0	0	1	0	3	0	0	0	0
69.70	0	0	0	0	0	0	0	1	0	0	0	0	0	2	0	0	0	0
69.60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
69.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0

Near Bottom Temperature Measurements from Beaufort Sea Data Base. Year= 1983. Months 7 through 9
 Grid size: 10km. Total number of data points: 36

Maximum temperatures:

Min.Lon	136.8	136.5	136.2	135.9	135.6	135.4	135.1	134.8	134.5	134.2	134.0	133.7	133.4	133.1	132.8	132.6	132.3	132.0
Min.Lat																		
70.40	+	+	+	+	+	+	+	+	+	-1.49	+	-1.21	+	+	+	+	+	+
70.30	+	+	+	+	+	-1.65	+	+	+	+	+	+	+	+	+	+	+	+
70.20	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-1.14
70.10	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
70.00	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
69.90	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
69.80	+	+	+	+	+	+	+	-0.24	-0.22	+	+	+	-0.24	+	+	+	+	+
69.70	+	+	+	+	+	+	+	0.18	11.17	+	+	+	-0.24	-0.24	+	+	+	+
69.60	+	+	+	+	+	+	+	+	+	12.35	9.88	+	+	9.89	+	+	+	+
69.50	+	+	+	+	+	+	+	+	+	+	+	+	10.67	8.90	+	10.72	+	12.29
													+	10.25	+	+	+	+

Minimum temperatures:

Min.Lon	136.8	136.5	136.2	135.9	135.6	135.4	135.1	134.8	134.5	134.2	134.0	133.7	133.4	133.1	132.8	132.6	132.3	132.0
Min.Lat																		
70.40	+	+	+	+	+	+	+	+	+	-1.63	+	-1.22	+	+	+	+	+	+
70.30	+	+	+	+	+	-1.76	+	+	+	+	+	+	+	+	+	+	+	+
70.20	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-1.67
70.10	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
70.00	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
69.90	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
69.80	+	+	+	+	+	+	+	-0.24	-0.22	+	+	+	-0.24	+	+	+	+	+
69.70	+	+	+	+	+	+	+	0.18	2.67	+	+	+	-0.24	-0.24	+	+	+	+
69.60	+	+	+	+	+	+	+	+	+	9.78	7.39	+	-0.24	-0.24	+	+	+	+
69.50	+	+	+	+	+	+	+	+	+	+	+	+	7.51	3.06	+	+	+	+
													+	+	+	+	+	+

Depth (m) of temperature values:

Min.Lon	136.8	136.5	136.2	135.9	135.6	135.4	135.1	134.8	134.5	134.2	134.0	133.7	133.4	133.1	132.8	132.6	132.3	132.0
Min.Lat																		
70.40	+	+	+	+	+	+	+	+	+	40.0	+	40.0	+	+	+	+	+	+
70.30	+	+	+	+	+	40.0	+	+	+	+	+	+	+	+	+	+	+	+
70.20	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	30.0
70.10	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
70.00	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
69.90	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
69.80	+	+	+	+	+	+	+	18.4	10.7	+	+	+	19.6	+	+	+	+	+
69.70	+	+	+	+	+	+	+	+	11.0	5.2	+	+	14.0	15.4	+	+	+	+
69.60	+	+	+	+	+	+	+	+	+	+	3.9	3.0	+	4.7	+	+	+	+
69.50	+	+	+	+	+	+	+	+	+	+	+	+	3.3	11.6	+	+	+	+
													+	4.0	+	+	+	+

Number of temperature values per grid:

Min.Lon	136.8	136.5	136.2	135.9	135.6	135.4	135.1	134.8	134.5	134.2	134.0	133.7	133.4	133.1	132.8	132.6	132.3	132.0
Min.Lat																		
70.40	0	0	0	0	0	0	0	0	0	4	0	2	0	0	0	0	0	0
70.30	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0
70.20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
70.10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
70.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
69.90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
69.80	0	0	0	0	0	0	0	1	1	0	0	0	1	0	0	0	0	0
69.70	0	0	0	0	0	0	0	0	1	2	0	0	1	1	0	0	0	0
69.60	0	0	0	0	0	0	0	0	0	2	0	2	0	4	0	1	0	1
69.50	0	0	0	0	0	0	0	0	0	0	0	0	2	3	0	0	0	0
													0	1	0	0	0	0

Near Bottom Temperature Measurements from Beaufort Sea Data Base. Year= 1984. Months 7 through 9
 Grid size: 10km. Total number of data points: 19

Maximum temperatures:

Min.Lon	136.8	136.5	136.2	135.9	135.6	135.4	135.1	134.8	134.5	134.2	134.0	133.7	133.4	133.1	132.8	132.6	132.3	132.0
Min.Lat																		
70.40	+	+	+	+	+	+	+	+	+	+	+	-1.73	+	+	+	+	+	+
70.30	+	+	+	+	+	-1.59	+	+	+	+	+	+	+	+	+	+	+	+
70.20	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-0.27
70.10	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-1.07	+
70.00	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
69.90	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
69.80	+	+	+	+	+	+	+	+	+	+	+	+	+	+	1.75	1.85	+	+
69.70	+	+	+	+	+	+	+	+	+	+	+	+	+	+	1.83	+	2.89	+
69.60	+	+	+	+	+	+	+	+	+	+	+	+	+	-0.56	+	+	+	+
69.50	+	+	1.53	+	+	+	+	+	+	+	+	+	9.46	2.76	+	+	+	+
													3.76	+	+	+	+	+

Minimum temperatures:

Min.Lon	136.8	136.5	136.2	135.9	135.6	135.4	135.1	134.8	134.5	134.2	134.0	133.7	133.4	133.1	132.8	132.6	132.3	132.0
Min.Lat																		
70.40	+	+	+	+	+	+	+	+	+	+	+	-1.73	+	+	+	+	+	+
70.30	+	+	+	+	+	-1.59	+	+	+	+	+	+	+	+	+	+	+	+
70.20	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-1.42
70.10	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
70.00	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
69.90	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
69.80	+	+	+	+	+	+	+	+	+	+	+	+	+	+	1.75	1.85	+	+
69.70	+	+	+	+	+	+	+	+	+	+	+	+	+	+	0.30	+	2.89	+
69.60	+	+	+	+	+	+	+	+	+	+	+	+	+	-0.56	+	+	+	+
69.50	+	+	1.53	+	+	+	+	+	+	+	+	+	9.46	2.76	+	+	+	+
													3.76	+	+	+	+	+

Depth (m) of temperature values:

Min.Lon	136.8	136.5	136.2	135.9	135.6	135.4	135.1	134.8	134.5	134.2	134.0	133.7	133.4	133.1	132.8	132.6	132.3	132.0
Min.Lat																		
70.40	+	+	+	+	+	+	+	+	+	+	+	45.4	+	+	+	+	+	+
70.30	+	+	+	+	+	40.4	+	+	+	+	+	+	+	+	+	+	+	+
70.20	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	20.2
70.10	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	28.6	+
70.00	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
69.90	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
69.80	+	+	+	+	+	+	+	+	+	+	+	+	+	+	12.9	10.3	+	+
69.70	+	+	+	+	+	+	+	+	+	+	+	+	+	+	11.2	+	10.8	+
69.60	+	+	+	+	+	+	+	+	+	+	+	+	+	+	10.1	+	+	+
69.50	+	+	7.8	+	+	+	+	+	+	+	+	+	5.4	6.6	+	+	+	+
													4.9	+	+	+	+	+

Number of temperature values per grid:

Min.Lon	136.8	136.5	136.2	135.9	135.6	135.4	135.1	134.8	134.5	134.2	134.0	133.7	133.4	133.1	132.8	132.6	132.3	132.0
Min.Lat																		
70.40	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
70.30	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
70.20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
70.10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0
70.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
69.90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0
69.80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0
69.70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	0
69.60	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
69.50	0	0	1	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0
													0	1	0	0	0	0

Near Bottom Temperature Measurements from Beaufort Sea Data Base. Year= 1985. Months 3 through 5
 Grid size: 10km. Total number of data points: 18

Maximum temperatures:

Min.Lon	136.8	136.5	136.2	135.9	135.6	135.4	135.1	134.8	134.5	134.2	134.0	133.7	133.4	133.1	132.8	132.6	132.3	132.0
Min.Lat																		
70.40	+	+	+	-1.59	+	+	+	+	+	+	+	+	+	+	+	+	+	+
70.30	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
70.20	+	+	+	+	+	-1.69	+	+	+	+	+	+	+	+	+	+	+	+
70.10	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
70.00	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
69.90	+	+	+	+	+	+	+	+	+	+	-1.70	+	+	+	+	+	-1.68	-1.60
69.80	+	+	+	+	+	+	+	+	+	+	-1.64	+	+	+	+	-1.70	+	+
69.70	+	+	+	+	+	+	+	+	+	+	-0.47	+	+	+	+	+	-0.83	+
69.60	+	+	+	+	+	+	+	+	+	+	-0.15	+	-1.28	+	+	+	-0.26	+
69.50	+	+	+	+	+	+	+	+	+	+	+	+	+	-0.01	+	-0.01	+	+

Minimum temperatures:

Min.Lon	136.8	136.5	136.2	135.9	135.6	135.4	135.1	134.8	134.5	134.2	134.0	133.7	133.4	133.1	132.8	132.6	132.3	132.0
Min.Lat																		
70.40	+	+	+	-1.59	+	+	+	+	+	+	+	+	+	+	+	+	+	+
70.30	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
70.20	+	+	+	+	+	-1.69	+	+	+	+	+	+	+	+	+	+	+	+
70.10	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
70.00	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
69.90	+	+	+	+	+	+	+	+	+	+	-1.70	+	+	+	+	+	-1.68	-1.60
69.80	+	+	+	+	+	+	+	+	+	+	-1.64	+	+	+	+	-1.70	+	+
69.70	+	+	+	+	+	+	+	+	+	+	-0.47	+	+	+	+	+	-1.58	+
69.60	+	+	+	+	+	+	+	+	+	+	-0.15	+	-1.28	+	+	+	-0.65	+
69.50	+	+	+	+	+	+	+	+	+	+	+	+	+	-0.01	+	-0.01	+	+

Depth (m) of temperature values:

Min.Lon	136.8	136.5	136.2	135.9	135.6	135.4	135.1	134.8	134.5	134.2	134.0	133.7	133.4	133.1	132.8	132.6	132.3	132.0
Min.Lat																		
70.40	+	+	+	56.4	+	+	+	+	+	+	+	+	+	+	+	+	+	+
70.30	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
70.20	+	+	+	+	+	46.2	+	+	+	+	+	+	+	+	+	+	+	+
70.10	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
70.00	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
69.90	+	+	+	+	+	+	+	+	+	+	15.8	+	+	+	+	+	15.4	16.8
69.80	+	+	+	+	+	+	+	+	+	+	8.6	+	+	+	+	12.6	+	+
69.70	+	+	+	+	+	+	+	+	+	+	5.7	+	+	+	+	+	7.4	+
69.60	+	+	+	+	+	+	+	+	+	+	3.1	+	7.3	+	+	+	4.4	+
69.50	+	+	+	+	+	+	+	+	+	+	+	+	+	3.2	+	2.0	+	+

Number of temperature values per grid:

Min.Lon	136.8	136.5	136.2	135.9	135.6	135.4	135.1	134.8	134.5	134.2	134.0	133.7	133.4	133.1	132.8	132.6	132.3	132.0
Min.Lat																		
70.40	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
70.30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
70.20	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
70.10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
70.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
69.90	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
69.80	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0
69.70	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	3	0
69.60	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	2	0
69.50	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0

Near Bottom Temperature Measurements from Beaufort Sea Data Base. Year= 1985. Months 7 through 9
 Grid size: 10km. Total number of data points: 18

Maximum temperatures:

Min.Lon	136.8	136.5	136.2	135.9	135.6	135.4	135.1	134.8	134.5	134.2	134.0	133.7	133.4	133.1	132.8	132.6	132.3	132.0
Min.Lat																		
70.40	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
70.30	+	+	+	+	+	-1.21	+	+	+	+	+	+	+	+	+	+	+	+
70.20	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-0.80
70.10	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
70.00	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
69.90	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
69.80	+	+	+	+	+	+	+	+	-1.51	+	+	+	+	+	+	+	+	+
69.70	+	+	+	+	+	+	+	+	-1.23	+	+	+	+	+	+	+	+	0.34
69.60	+	-1.56	+	0.83	+	1.80	+	+	+	5.00	+	1.11	-0.94	+	+	+	+	+
69.50	+	+	+	+	+	+	+	+	+	+	+	+	+	2.51	4.32	+	+	+

Minimum temperatures:

Min.Lon	136.8	136.5	136.2	135.9	135.6	135.4	135.1	134.8	134.5	134.2	134.0	133.7	133.4	133.1	132.8	132.6	132.3	132.0
Min.Lat																		
70.40	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
70.30	+	+	+	+	+	-1.21	+	+	+	+	+	+	+	+	+	+	+	+
70.20	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-1.45
70.10	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
70.00	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
69.90	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
69.80	+	+	+	+	+	+	+	+	-1.51	+	+	+	+	+	+	+	+	+
69.70	+	+	+	+	+	+	+	+	-1.23	+	+	+	+	+	+	+	+	0.34
69.60	+	-1.56	+	0.83	+	1.80	+	+	+	5.00	+	1.11	-0.94	+	+	+	+	+
69.50	+	+	+	+	+	+	+	+	+	+	+	+	+	2.51	2.81	+	+	+

Depth (m) of temperature values:

Min.Lon	136.8	136.5	136.2	135.9	135.6	135.4	135.1	134.8	134.5	134.2	134.0	133.7	133.4	133.1	132.8	132.6	132.3	132.0
Min.Lat																		
70.40	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
70.30	+	+	+	+	+	45.4	+	+	+	+	+	+	+	+	+	+	+	+
70.20	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	30.3
70.10	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
70.00	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
69.90	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
69.80	+	+	+	+	+	+	+	+	14.4	+	+	+	+	+	+	+	+	+
69.70	+	+	+	+	+	+	+	+	9.2	+	+	+	+	+	+	+	+	14.7
69.60	+	13.9	+	6.3	+	5.2	+	+	+	3.9	+	4.9	8.4	+	+	+	+	+
69.50	+	+	+	+	+	+	+	+	+	+	+	+	+	5.1	5.8	+	+	+

Number of temperature values per grid:

Min.Lon	136.8	136.5	136.2	135.9	135.6	135.4	135.1	134.8	134.5	134.2	134.0	133.7	133.4	133.1	132.8	132.6	132.3	132.0
Min.Lat																		
70.40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
70.30	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
70.20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
70.10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
70.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
69.90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
69.80	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
69.70	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
69.60	0	1	0	1	0	1	0	0	0	1	0	1	1	0	0	0	0	0
69.50	0	0	0	0	0	0	0	0	0	0	0	0	0	1	4	0	0	0

Near Bottom Temperature Measurements from Beaufort Sea Data Base. Year= 1986. Months 7 through 9
 Grid size: 10km. Total number of data points: 86

Maximum temperatures:

Min.Lon	136.8	136.5	136.2	135.9	135.6	135.4	135.1	134.8	134.5	134.2	134.0	133.7	133.4	133.1	132.8	132.6	132.3	132.0
Min.Lat																		
70.40	+	-1.52	+	+	+	+	+	-1.46	+	+	-1.45	-1.48	+	+	-1.38	+	+	+
70.30	+	+	-1.57	+	+	+	+	-1.50	+	+	-1.33	-1.52	+	+	-1.32	+	+	+
70.20	+	+	-1.50	+	+	+	+	-1.50	+	+	-1.46	+	-1.46	+	-1.10	+	+	+
70.10	+	+	-1.50	-1.44	+	+	+	-1.40	+	+	-1.30	+	+	+	-1.03	+	+	+
70.00	+	+	+	-1.30	+	+	+	-1.00	+	+	-1.12	-1.27	+	+	-0.66	+	+	-1.37
69.90	+	+	+	-0.67	+	+	+	2.11	+	+	10.27	+	+	4.31	3.58	+	+	-1.30
69.80	+	+	+	+	1.12	+	+	5.37	+	9.26	9.58	+	+	1.94	3.32	+	+	+
69.70	+	+	+	+	5.15	+	+	+	+	5.46	+	+	+	5.44	+	+	+	-0.11
69.60	+	0.77	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
69.50	2.53	+	+	7.08	+	+	+	+	+	+	+	+	2.23	6.04	4.06	+	+	+

Minimum temperatures:

Min.Lon	136.8	136.5	136.2	135.9	135.6	135.4	135.1	134.8	134.5	134.2	134.0	133.7	133.4	133.1	132.8	132.6	132.3	132.0
Min.Lat																		
70.40	+	-1.52	+	+	+	+	+	-1.50	+	+	-1.45	-1.48	+	+	-1.41	+	+	+
70.30	+	+	-1.57	+	+	+	+	-1.51	+	+	-1.45	-1.52	+	+	-1.37	+	+	+
70.20	+	+	-1.50	+	+	+	+	-1.51	+	+	-1.46	+	-1.51	+	-1.22	+	+	+
70.10	+	+	-1.50	-1.44	+	+	+	-1.47	+	+	-1.39	+	+	+	-1.03	+	+	+
70.00	+	+	+	-1.30	+	+	+	-1.28	+	+	-1.12	-1.33	+	+	-0.90	+	+	-1.37
69.90	+	+	+	-0.67	+	+	+	2.11	+	+	-0.67	+	+	-0.01	3.43	+	+	-1.30
69.80	+	+	+	+	1.12	+	+	4.97	+	0.32	9.58	+	+	-1.37	3.32	+	+	+
69.70	+	+	+	+	5.15	+	+	+	+	5.40	+	+	+	5.44	+	+	+	-0.11
69.60	+	-0.26	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
69.50	-1.51	+	+	1.51	+	+	+	+	+	+	+	+	2.23	1.91	4.06	+	+	+

Depth (m) of temperature values:

Min.Lon	136.8	136.5	136.2	135.9	135.6	135.4	135.1	134.8	134.5	134.2	134.0	133.7	133.4	133.1	132.8	132.6	132.3	132.0
Min.Lat																		
70.40	+	45.4	+	+	+	+	+	52.5	+	+	58.3	50.5	+	+	37.0	+	+	+
70.30	+	+	45.4	+	+	+	+	50.9	+	+	31.4	50.5	+	+	35.8	+	+	+
70.20	+	+	45.4	+	+	+	+	39.0	+	+	43.4	+	48.8	+	28.2	+	+	+
70.10	+	+	40.4	35.3	+	+	+	29.8	+	+	26.9	+	+	+	25.1	+	29.2	+
70.00	+	+	+	24.2	+	+	+	20.9	+	+	23.6	31.3	+	+	22.7	+	+	+
69.90	+	+	+	16.2	+	+	+	14.2	+	+	12.5	+	+	9.1	15.9	+	15.5	+
69.80	+	+	+	+	14.1	+	+	5.5	+	11.5	11.4	+	+	10.1	10.8	+	+	+
69.70	+	+	+	+	9.1	+	+	+	+	6.3	+	+	+	6.1	+	+	5.1	+
69.60	+	11.1	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
69.50	15.2	+	+	5.3	+	+	+	+	+	+	+	+	4.0	6.1	5.2	+	+	+

Number of temperature values per grid:

Min.Lon	136.8	136.5	136.2	135.9	135.6	135.4	135.1	134.8	134.5	134.2	134.0	133.7	133.4	133.1	132.8	132.6	132.3	132.0
Min.Lat																		
70.40	0	1	0	0	0	0	0	2	0	0	2	1	0	0	2	0	0	0
70.30	0	0	1	0	0	0	0	2	0	0	2	1	0	0	2	0	0	0
70.20	0	0	1	0	0	0	0	2	0	0	2	0	0	0	2	0	0	0
70.10	0	0	1	1	0	0	0	2	0	0	2	0	0	0	1	0	0	0
70.00	0	0	0	1	0	0	0	2	0	0	2	0	0	0	1	0	0	0
69.90	0	0	0	1	0	0	0	2	0	0	1	3	0	0	2	0	0	0
69.80	0	0	0	0	1	0	0	1	0	0	5	0	0	2	2	0	1	0
69.70	0	0	0	0	1	0	0	2	0	2	1	0	0	3	1	0	0	0
69.60	0	2	0	0	0	0	0	0	0	2	0	0	0	1	0	0	0	0
69.50	4	0	0	5	0	0	0	0	0	0	0	0	0	1	3	1	0	0

Near Bottom Temperature Measurements from Beaufort Sea Data Base. Year= 1987. Months 7 through 9
 Grid size: 10km. Total number of data points: 30

Maximum temperatures:

Min.Lon	136.8	136.5	136.2	135.9	135.6	135.4	135.1	134.8	134.5	134.2	134.0	133.7	133.4	133.1	132.8	132.6	132.3	132.0
Min.Lat																		
70.40	+	-0.72	+	+	+	+	+	+	+	+	-1.33	+	+	+	+	+	+	+
70.30	+	+	-0.57	+	+	+	+	+	+	+	+	-1.13	+	+	+	+	+	+
70.20	+	+	+	+	+	+	+	+	+	+	+	+	-1.06	+	+	+	+	+
70.10	+	+	-0.41	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
70.00	+	+	+	1.79	+	+	+	+	+	+	1.57	-1.70	-0.55	+	+	+	+	+
69.90	+	+	+	3.09	+	+	+	+	+	+	3.04	4.65	-0.57	-0.55	+	+	+	+
69.80	+	+	+	+	4.50	+	+	+	+	+	+	6.25	+	+	+	+	+	6.40
69.70	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
69.60	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
69.50	-1.44	+	+	11.11	+	+	+	+	+	+	+	+	+	8.37	+	+	+	10.42
				2.00	+	+	+	+	+	+	+	+	+	+	7.46	+	+	+

Minimum temperatures:

Min.Lon	136.8	136.5	136.2	135.9	135.6	135.4	135.1	134.8	134.5	134.2	134.0	133.7	133.4	133.1	132.8	132.6	132.3	132.0
Min.Lat																		
70.40	+	-0.72	+	+	+	+	+	+	+	+	-1.33	+	+	+	+	+	+	+
70.30	+	+	-0.57	+	+	+	+	+	+	+	+	-1.13	+	+	+	+	+	+
70.20	+	+	+	+	+	+	+	+	+	+	+	+	-1.37	+	+	+	+	+
70.10	+	+	-0.41	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
70.00	+	+	+	1.79	+	+	+	+	+	+	1.57	-1.70	-0.55	+	+	+	+	+
69.90	+	+	+	3.09	+	+	+	+	+	+	3.04	0.42	-0.57	-0.55	+	+	+	+
69.80	+	+	+	+	4.50	+	+	+	+	+	+	6.25	+	+	+	+	+	6.40
69.70	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
69.60	+	+	+	+	+	+	+	+	+	+	+	+	+	8.37	+	+	+	+
69.50	-1.44	+	+	2.00	+	+	+	+	+	+	+	+	+	+	7.46	+	+	+

Depth (m) of temperature values:

Min.Lon	136.8	136.5	136.2	135.9	135.6	135.4	135.1	134.8	134.5	134.2	134.0	133.7	133.4	133.1	132.8	132.6	132.3	132.0
Min.Lat																		
70.40	+	86.0	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
70.30	+	+	53.0	+	+	+	+	+	+	+	59.3	+	+	+	+	+	+	+
70.20	+	+	+	+	+	+	+	+	+	+	+	50.0	+	+	+	+	+	+
70.10	+	+	43.0	+	+	+	+	+	+	+	+	+	44.0	+	+	+	+	+
70.00	+	+	+	31.0	+	+	+	+	+	+	+	36.0	23.4	42.2	+	+	+	+
69.90	+	+	+	20.0	+	+	+	+	+	+	+	26.0	23.0	29.0	26.0	+	+	+
69.80	+	+	+	+	14.0	+	+	+	+	+	+	+	12.0	+	+	+	+	16.1
69.70	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
69.60	+	+	+	2.7	+	+	+	+	+	+	+	+	+	+	6.0	+	+	6.5
69.50	14.1	+	+	6.5	+	+	+	+	+	+	+	+	+	+	+	5.6	+	+

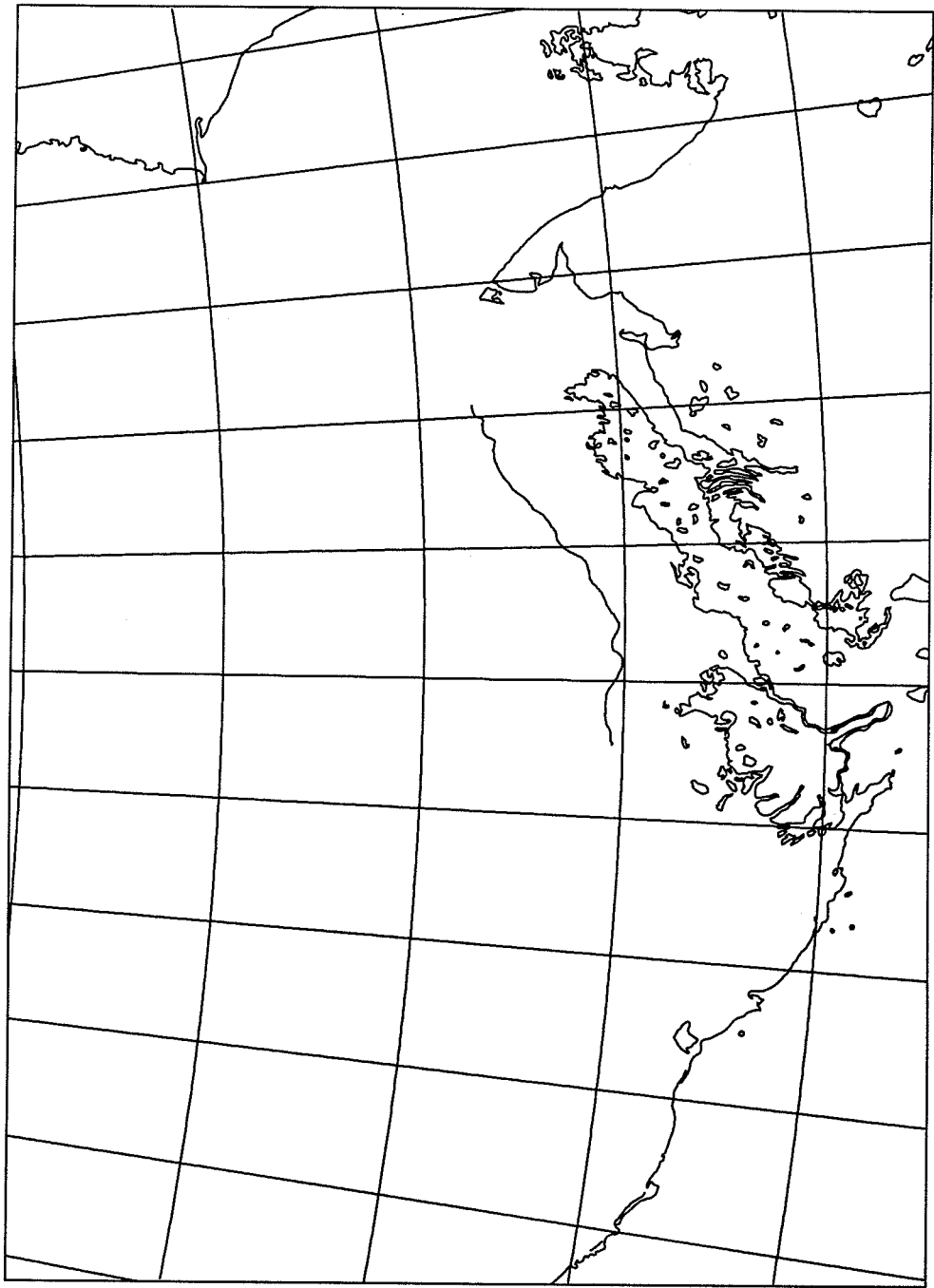
Number of temperature values per grid:

Min.Lon	136.8	136.5	136.2	135.9	135.6	135.4	135.1	134.8	134.5	134.2	134.0	133.7	133.4	133.1	132.8	132.6	132.3	132.0
Min.Lat																		
70.40	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
70.30	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
70.20	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
70.10	0	0	1	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0
70.00	0	0	0	1	0	0	0	0	0	0	1	1	1	0	0	0	0	0
69.90	0	0	0	1	0	0	0	0	0	0	1	2	1	1	0	0	0	0
69.80	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	1
69.70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
69.60	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
69.50	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0

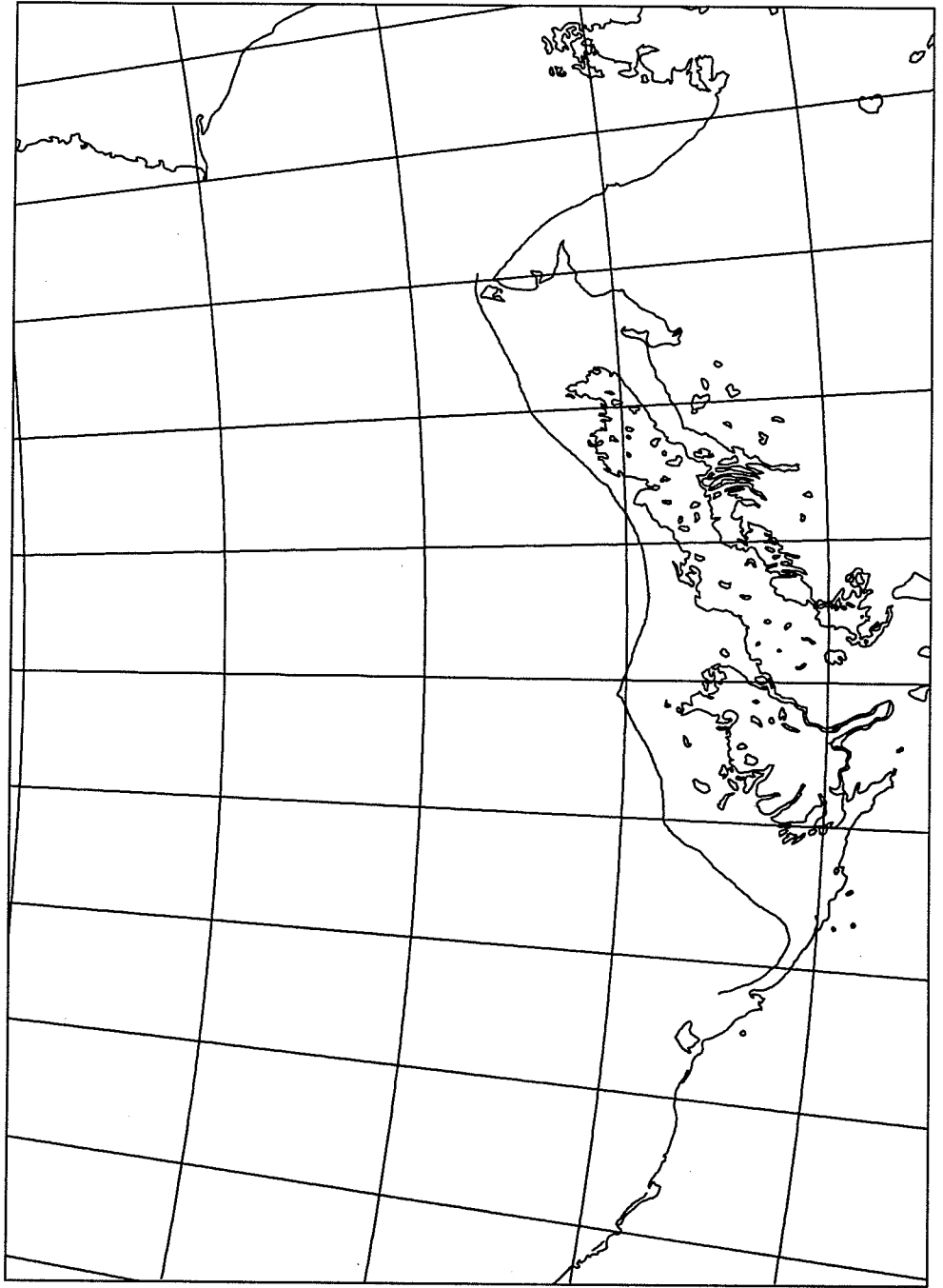
APPENDIX 2

Plots of the edge of the landfast ice in late spring, as digitized from ice charts and NOAA AVHRR imagery.

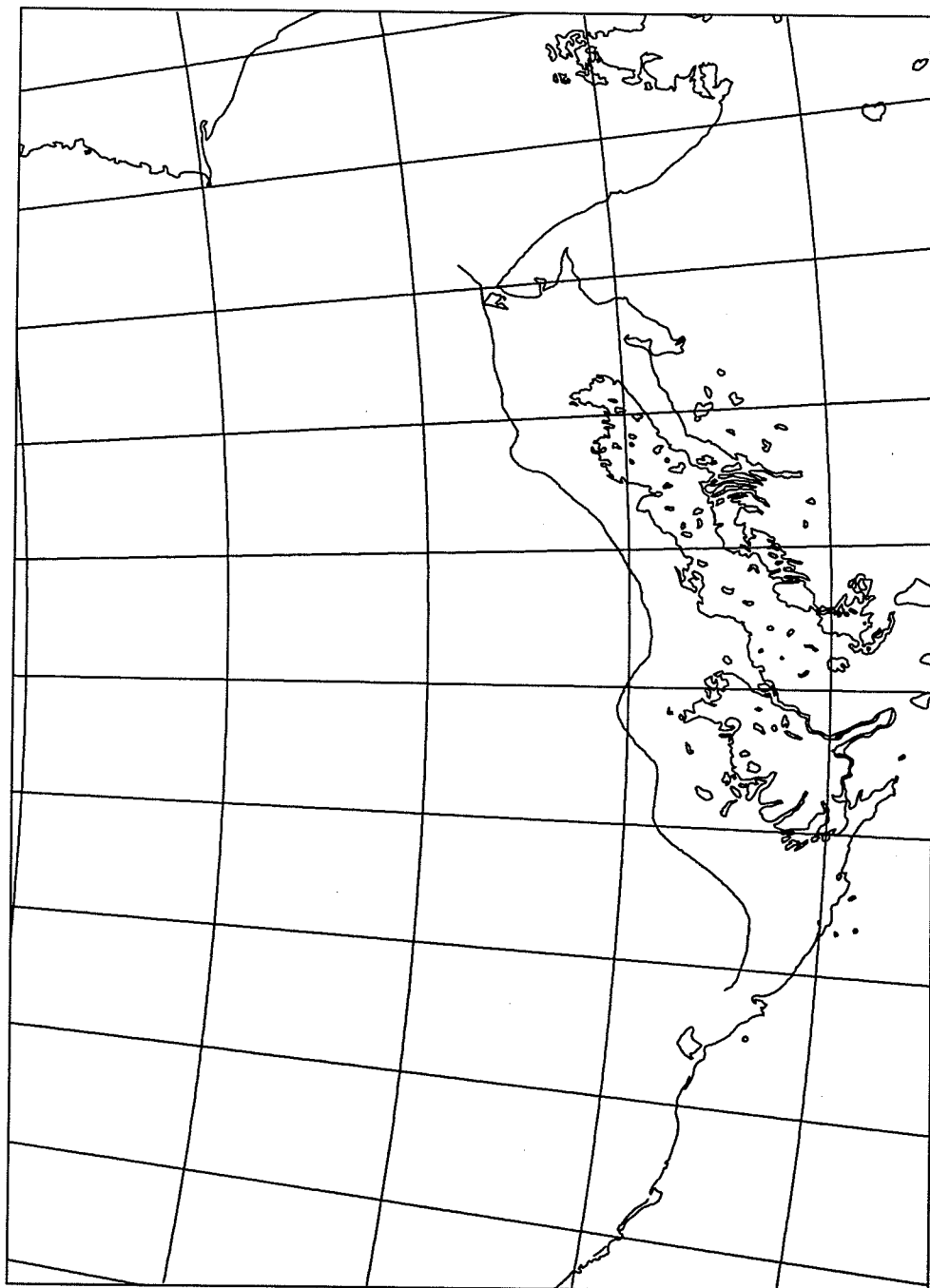
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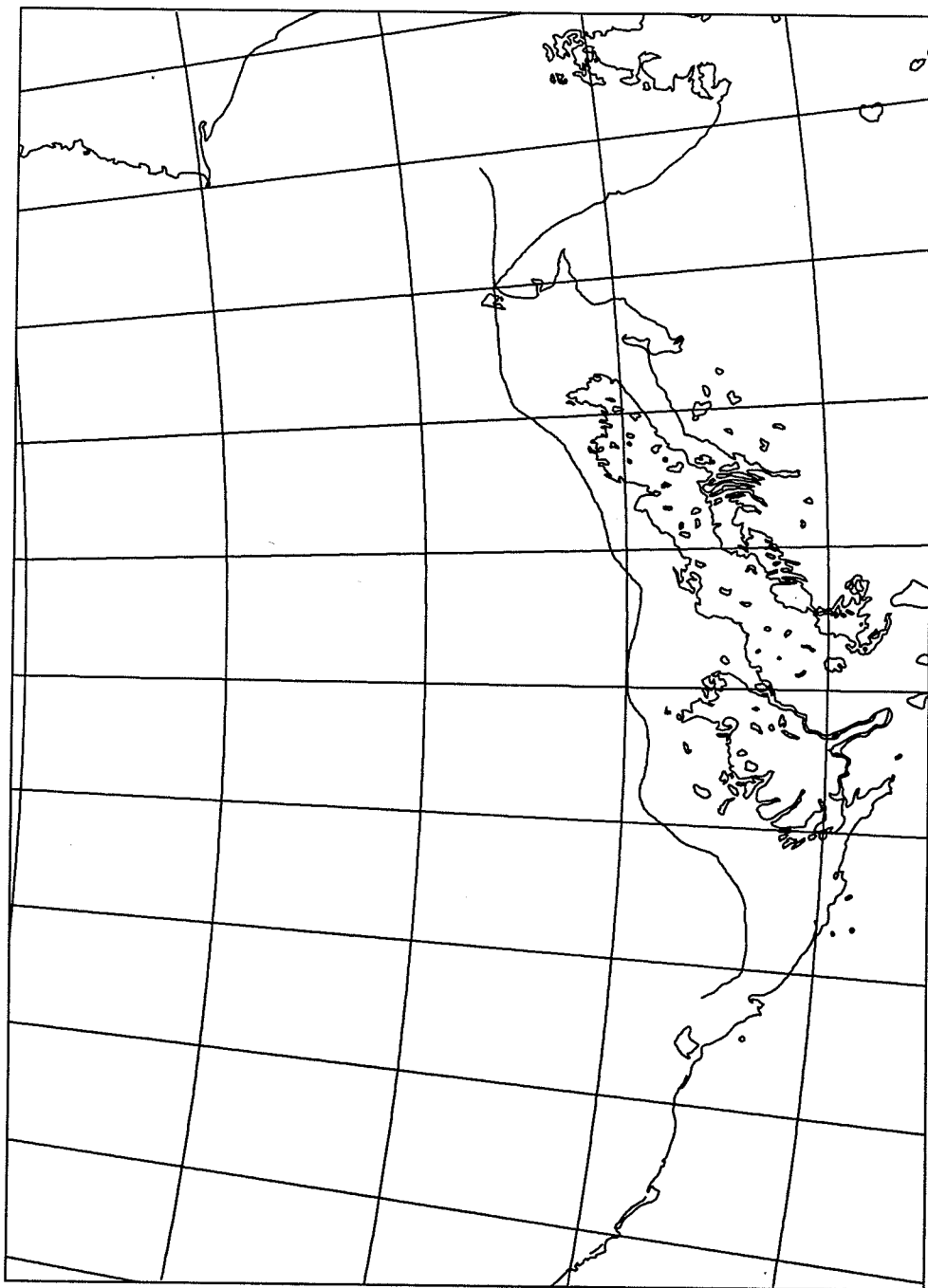
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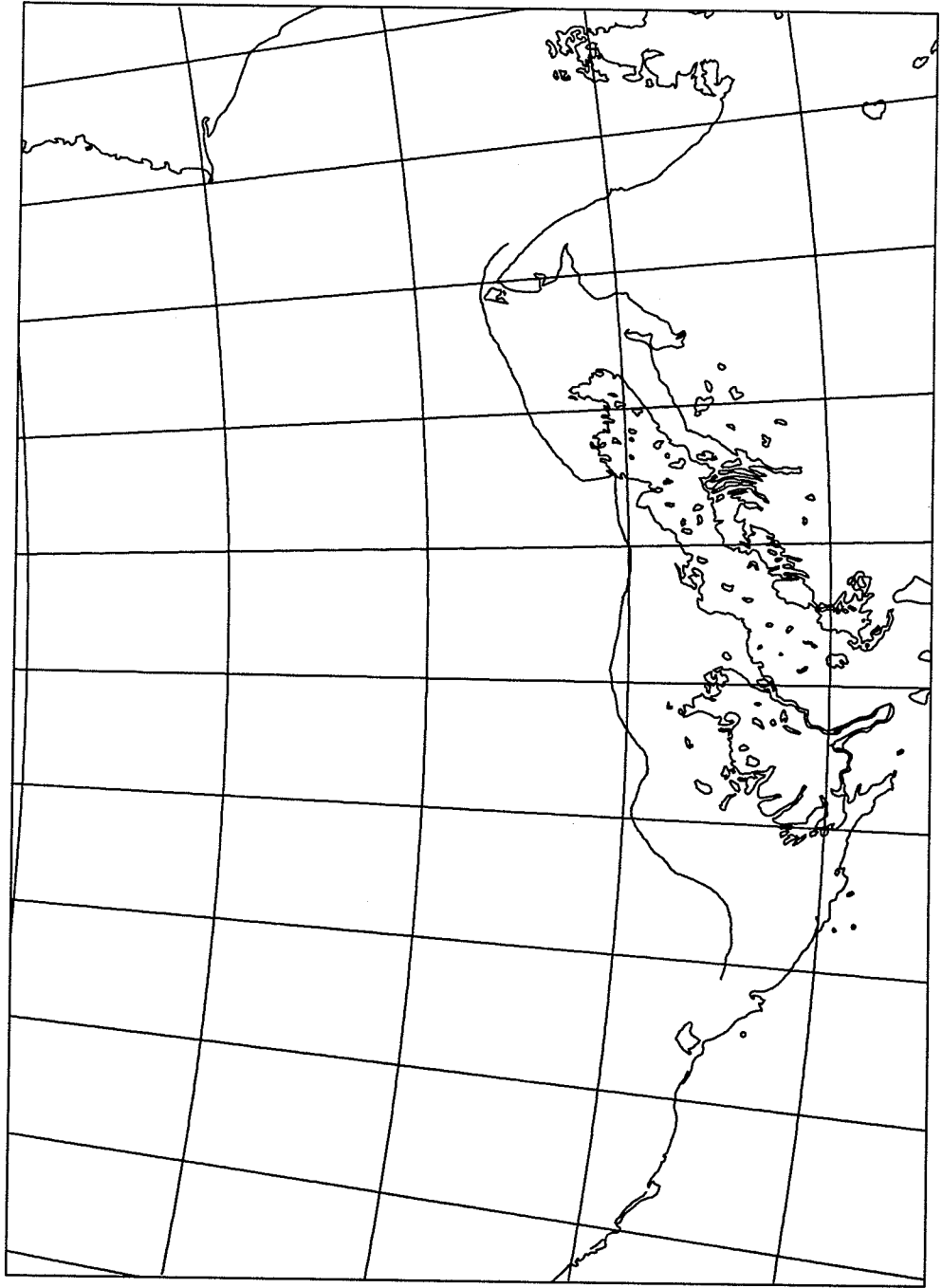
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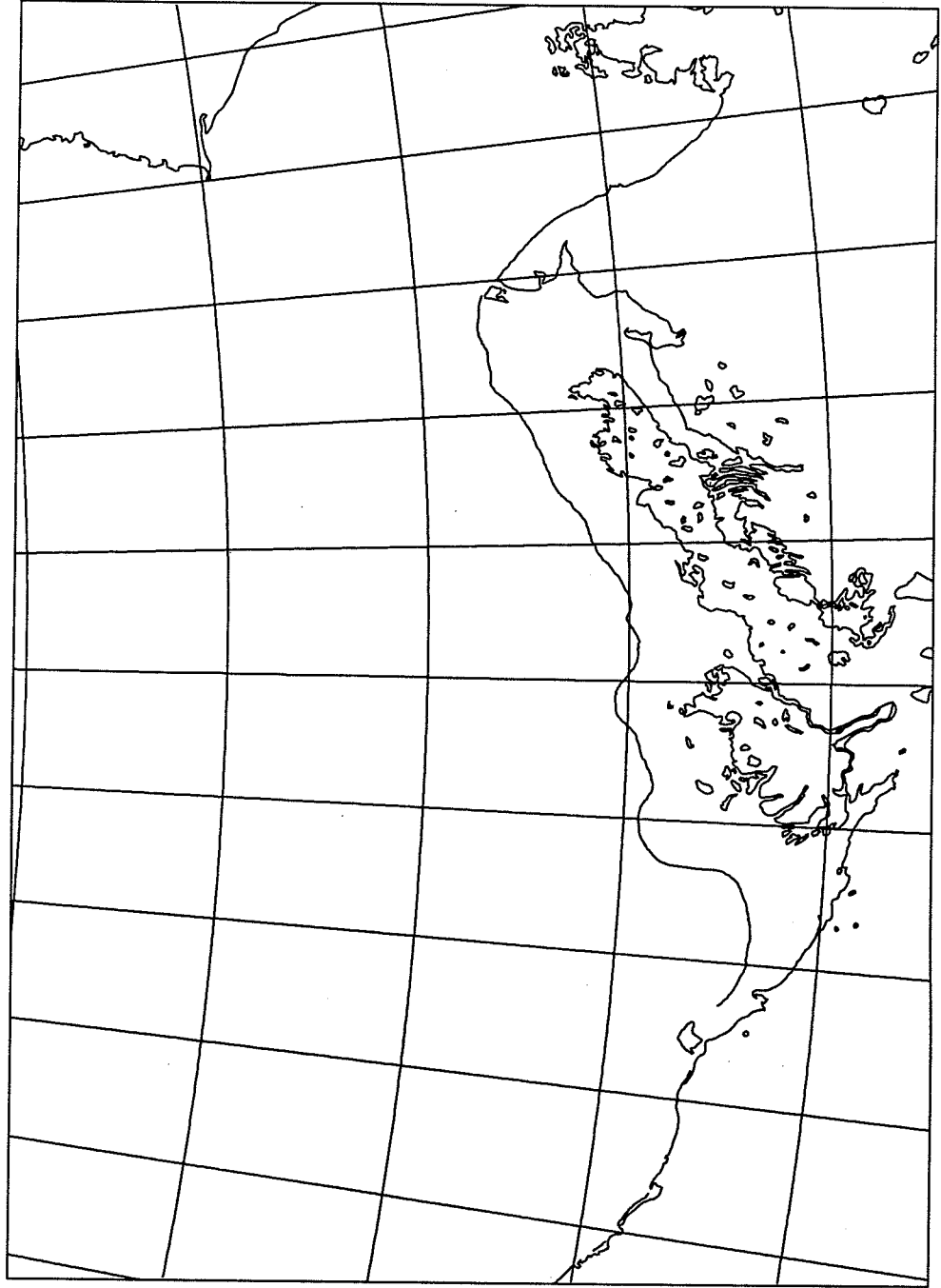
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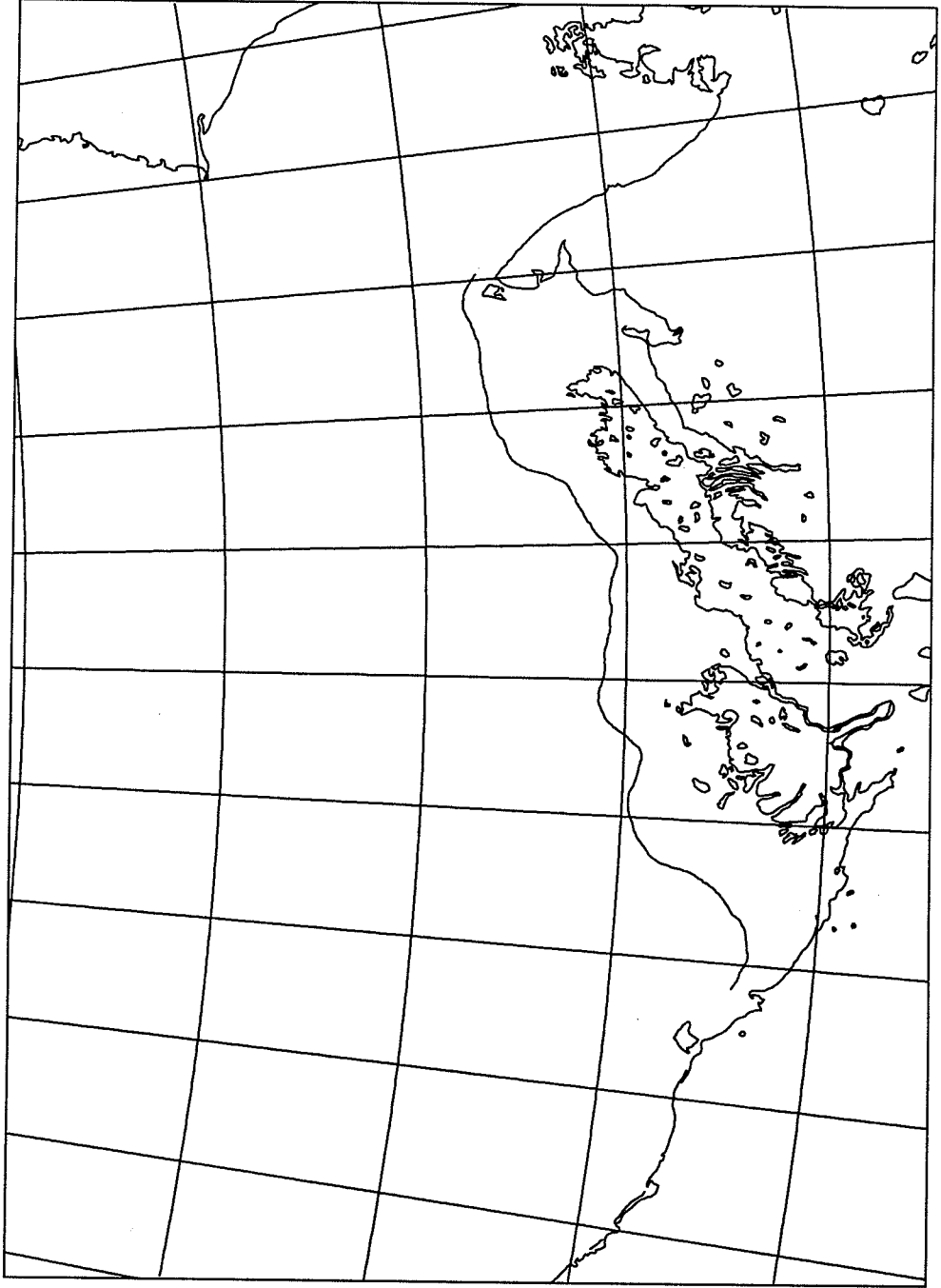
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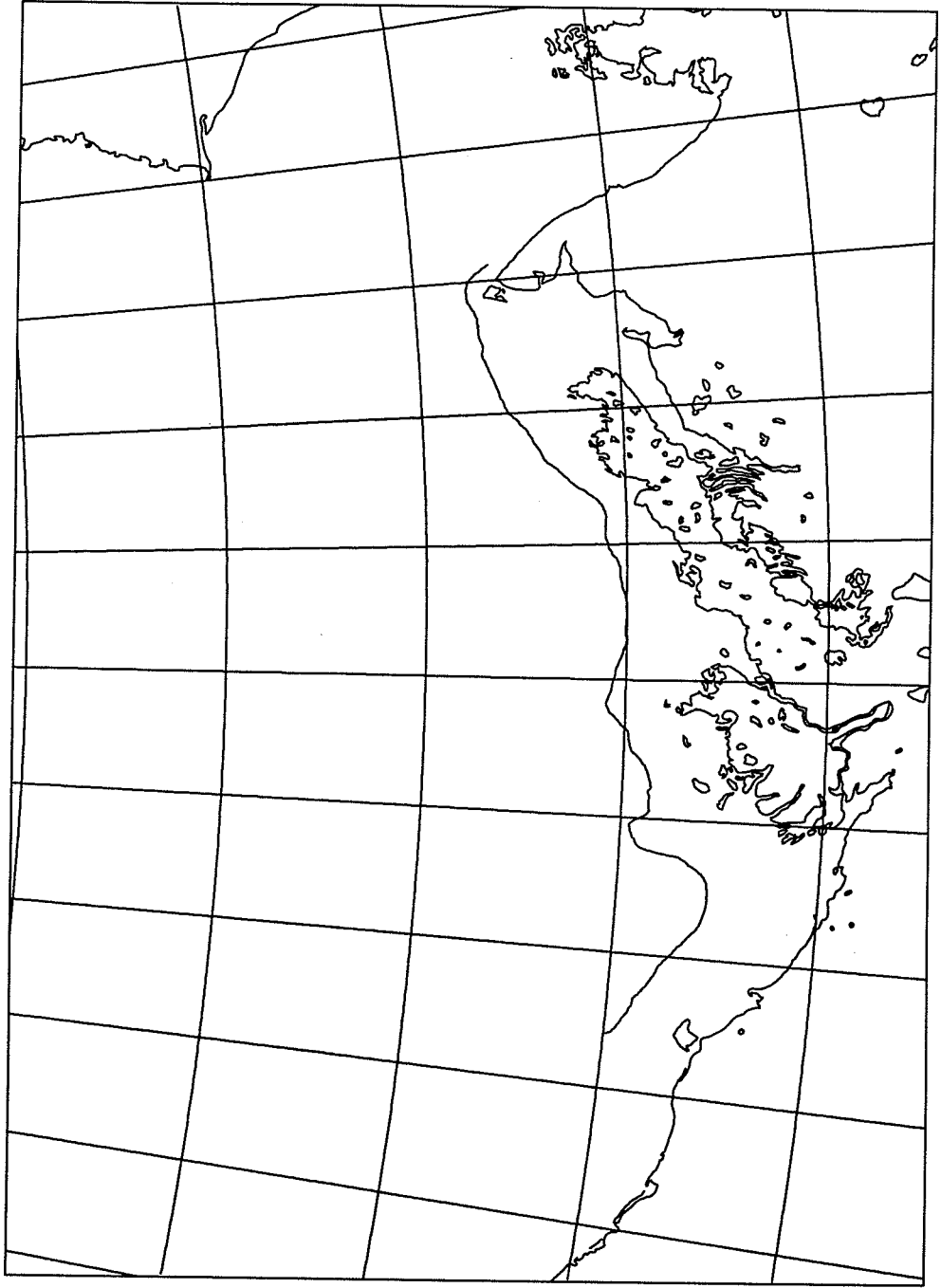
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