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Report No. 82-3
July 1982

Winter Flow, Ice and Weather Conditions of the Upper St. Lawrence River, 1971-81 Volume II: Ice Cover Thickness

Hung Tao Shen
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Prepared with the support of
Great Lakes Environmental Research Laboratory
National Oceanic and Atmospheric Administration
U.S. Department of Commerce

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WINTER FLOW, ICE, AND WEATHER CONDITIONS OF
THE UPPER ST. LAWRENCE RIVER, 1971-81

VOLUME II: ICE COVER THICKNESS

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ABSTRACT

The International Section of the St. Lawrence River between Kingston and the Moses-Saunders Power Dam near Massena is the outlet of the Great Lakes. This river is being utilized for hydro-power production and serves as the only navigation passage for shipping between the Atlantic Ocean and the Great Lakes. The river flow is regulated by the Power Dam, which is part of the St. Lawrence Project completed in 1959 as a joint venture of the United States and Canada. Planning for the winter flow regulation is closely related to the ice conditions in the river, which effect both the amount of power generated and the length of navigation season.

Due to interest in the effective utilization of the St. Lawrence, a number of agencies are engaged in collecting flow and ice data on the river. These data provide a valuable data base for ice modeling and management. In this four volume report, information on flow, ice, and weather conditions are assembled for winters between 1971 and 1981. Data for the four month period between December 1st and April 30th of each year are included. Major sources of data upon which this report is based are as follows:

<u>Agency</u>	<u>Data</u>
Power Authority of the State of New York, Massena	Water levels, discharge, and water temperatures.
St. Lawrence Seaway Authority, Cornwall	Ice thickness data.

<u>Agency</u>	<u>Data</u>
St. Lawrence Seaway Development Corporation, Massena	Ice cover mosaics, water levels, discharges, and water temperatures.
Ontario Hydro, Cornwall/ Toronto	Water temperature and ice thickness data.

The title and contents of each volume are:

Volume I:	Ice Cover Charts
	Part A, 1971-76
	Part B, 1976-77
Volume II:	Ice Cover Thickness
Volume III:	Water Level, Discharge, and Temperature
Volume IV:	Air Temperature and Precipitation

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Chapter I

INTRODUCTION

Analyses of the growth and decay of ice cover thickness and effects of hanging ice dams are important elements in river ice modeling. In this volume, ice thickness data collected by the St. Lawrence Seaway Authority and Ontario Hydro for the period between December 1, 1971 and April 30, 1981 are assembled. The data obtained by the St. Lawrence Seaway Authority, for stations located along the shipping channel, are summarized in Chapter II. In Chapter III, data obtained by Ontario Hydro along several transverse lines between Sparrowhawk Point and the Power Dam are summarized.

Field surveys have been carried out in the Ogden Island region since the winter of 1975-76, with the support of the St. Lawrence Seaway Development Corporation. Flow and ice thickness data obtained in these surveys are reported in References 1-5 and will not be included in this report.

Chapter II

ICE THICKNESS ALONG THE SHIPPING CHANNEL

The St. Lawrence Seaway Authority has installed and monitors 38 ice thickness stations between Montreal and Lake Ontario along the shipping channel in the St. Lawrence River. In this chapter, ice thickness data for stations upstream of the Power Dam are included. Locations of ice thickness stations are given in Table 2.1 and Figure 2.1. Available ice thickness data are summarized in Table 2.2. All of these data are presented chronologically in both tabular and graphical forms following Table 2.2.

Table 2.1. Locations of Ice Thickness Stations Along the Shipping Channel

Station	Latitude	Longitude	Location
E1	44 58 32	74 52 20	Willey-Dondero Canal; 1 mile above Eisenhower Lock - Mile 88
E2	44 57 48	74 56 24	Willey-Dondero Canal; 1 mile below Richard's Point - Mile 92
F1	44 56 27	75 01 57	Opposite Buoy 63 Chrysler Park - Mile 96
F2	44 52 52	75 12 07	Foot of Ogden Island Opposite Light 92 - Mile 108
G1	44 50 05	75 18 36	Iroquois Lock; Opposite Tile Wall
G2	44 49 26	75 19 05	Iroquois Lock; Opposite Light 111
H1	44 48 44	75 18 45	Toussaint Island; Opposite Light 114
H2	44 44 44	75 26 12	Upper Drummond Island at Light 128; Mile 121
H3	44 41 32	75 31 32	One mile above Boom-Prescott; Mile 127
H4	44 37 46	75 36 25	Opposite Maitland (Stone Tower); Mile 133
H5	44 26 05	75 49 33	Lower Grenadier Island; Mile 150
H7	44 12 15	76 14 06	Wolfe Island Bandford Pt. Opposite Light; Mile 179
H8	44 05 00	76 26 00	Lake Ontario - Opposite Big Sand Bay; Mile 192
U.S.1	44 46 24	75 25 27	Near Adams Island
U.S.2	44 44 16	75 25 55	South of Chimney Island
U.S.3	44 45 22	75 24 19	South of Galop Canal
G0	44 51 13	75 16 27	Below Iroquois; Pine Tree Point
H7a	44 13 36	76 10 09	Lower end Wolfe Island

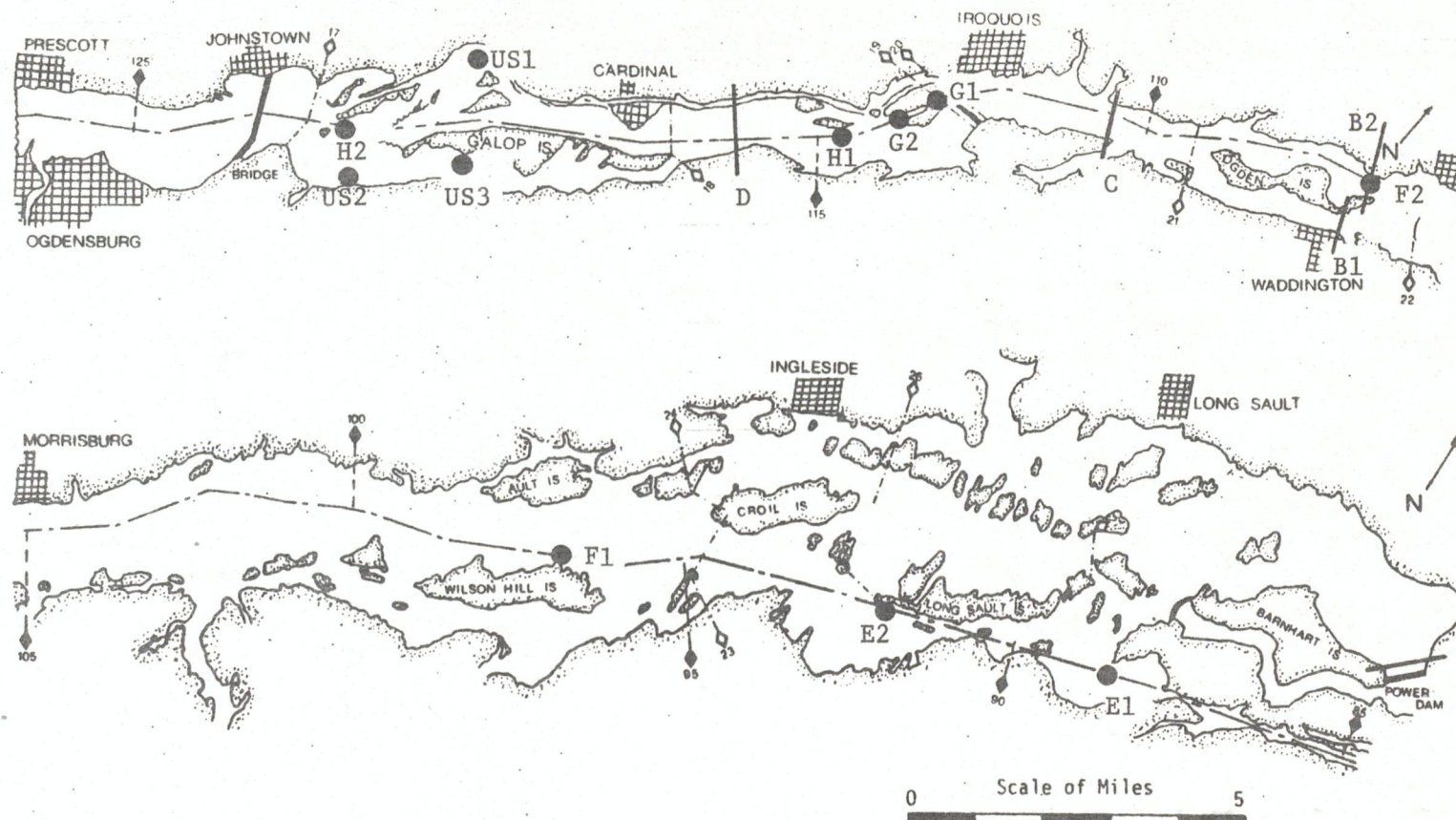


Figure 2.1. Ice Thickness Stations

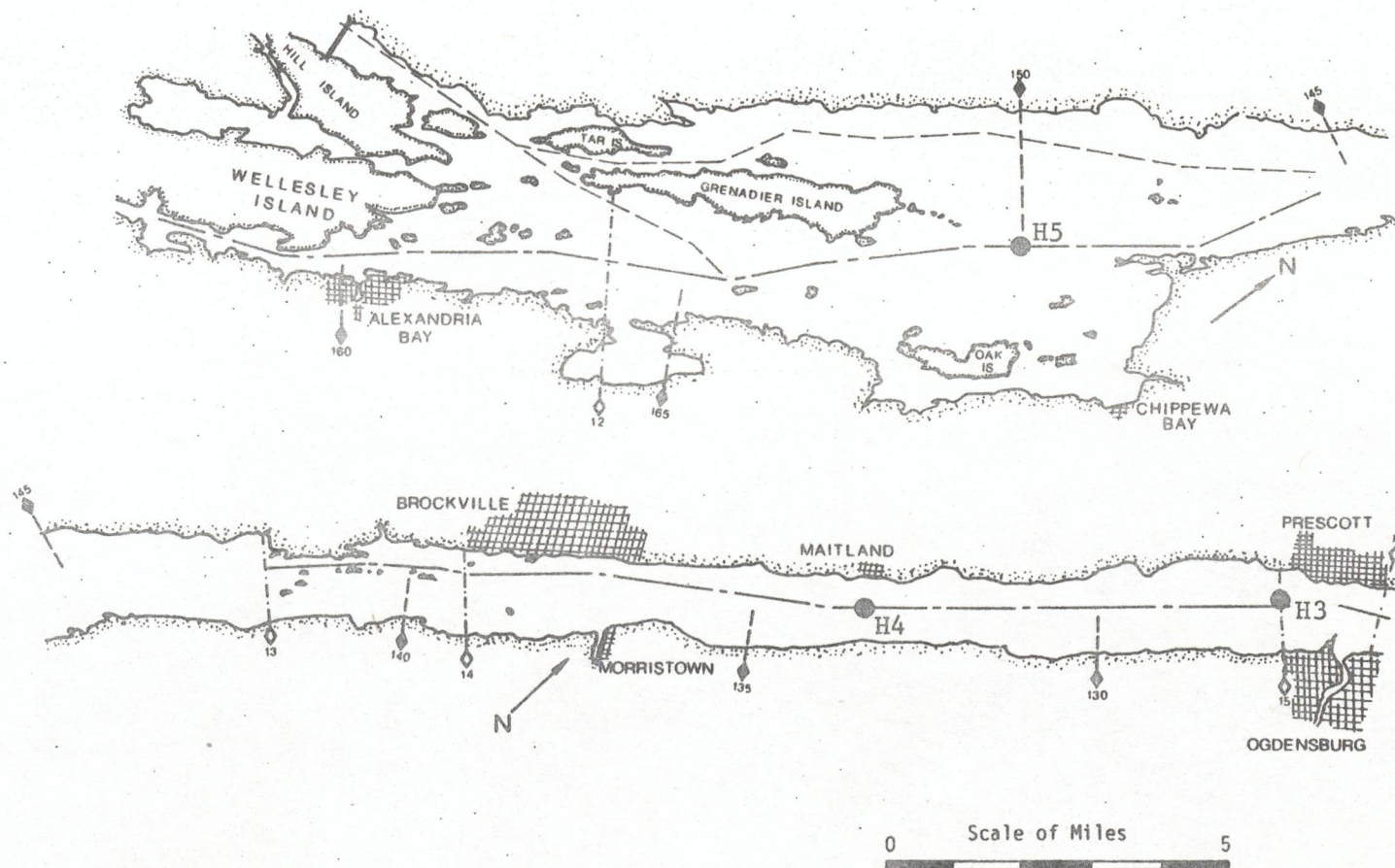


Figure 2.1. (Cont'd) Ice Thickness Stations

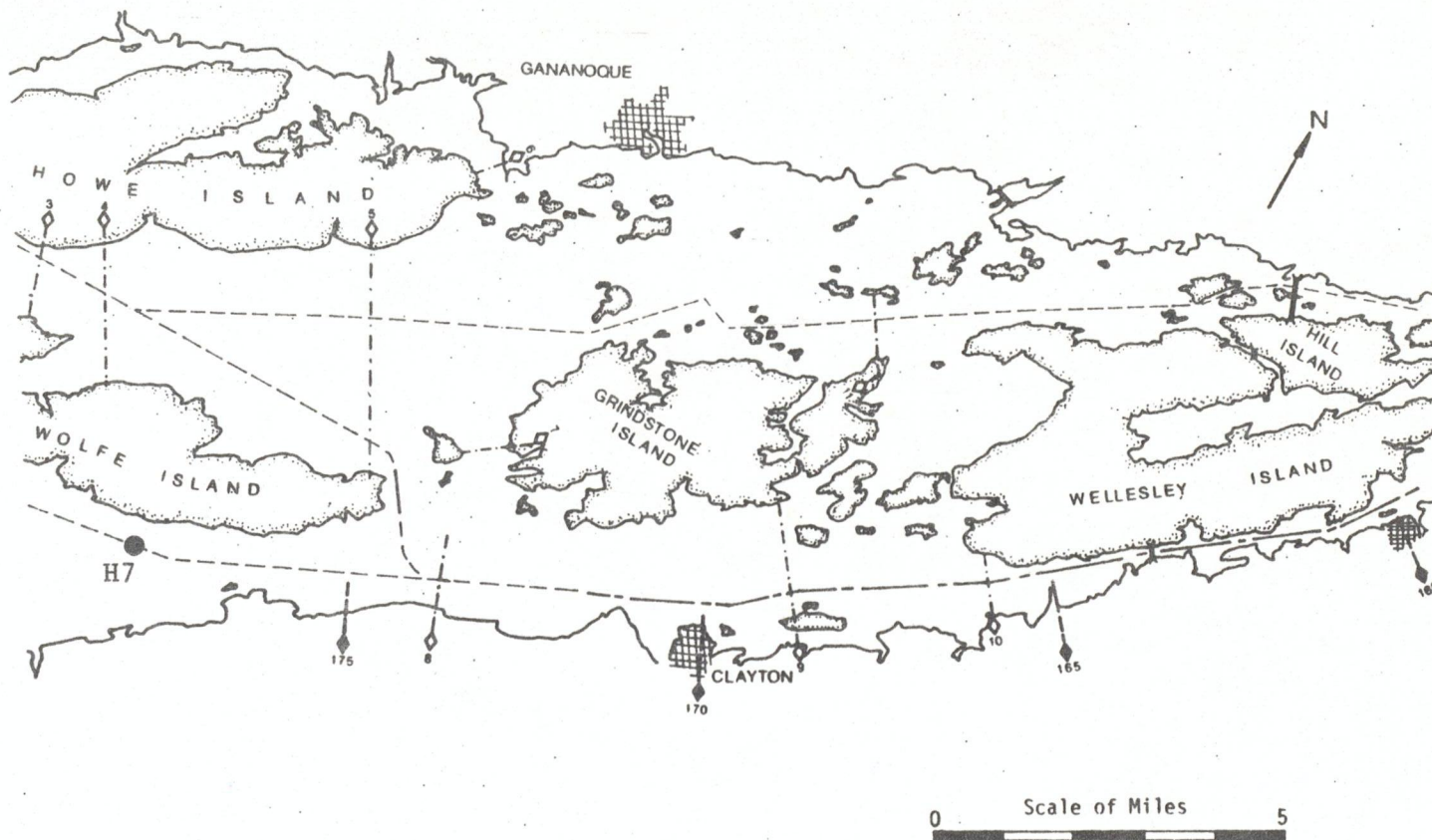


Figure 2.1. (Cont'd) Ice Thickness Stations

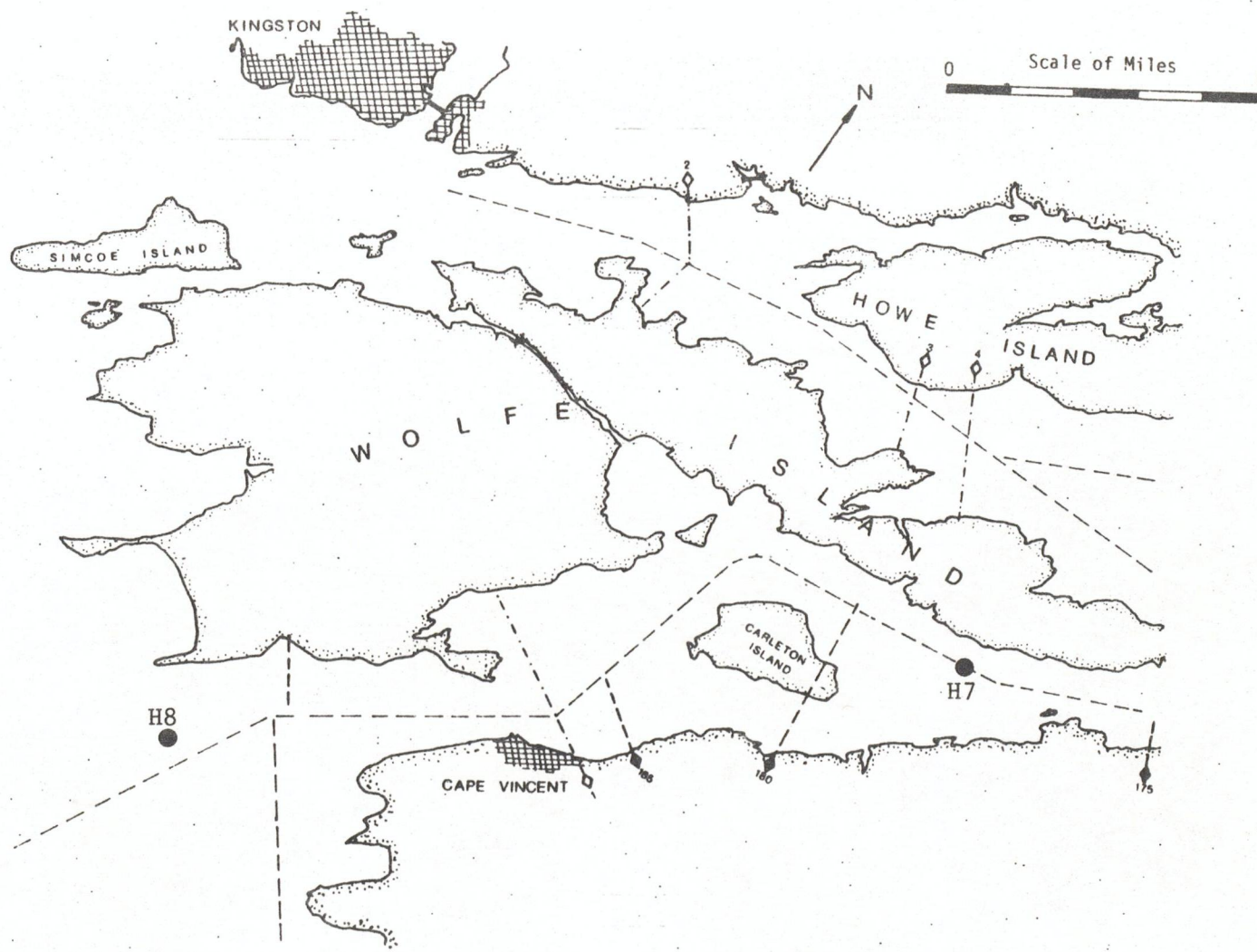


Figure 2.1. (Cont'd) Ice Thickness Stations

Ice Thickness Data Along Shipping Channels
between Power Dam and Lake Ontario
(St. Lawrence Seaway Authority)

Station El, Winter 1971-72

Date	Ice (in.)	Snow (in.)	Remarks
1/10/72	6.5	-	Smooth surface
1/19/72	8.5	-	Smooth surface
1/27/72	10.0	-	Smooth surface
2/8/72	13.0	7	Smooth surface
2/16/72	12.0	2	2" water on ice, (smooth)
2/23/72	17.0	6	Smooth surface
2/28/72	18.0	7	Smooth surface
3/8/72	19.5	8	Smooth surface
3/15/72	27.0	1	Smooth surface
3/20/72	23.0	0	Smooth surface

Station El, Winter 1971-72

Date	Ice (in.)	Snow (in.)	Remarks
2/8/72	11.0	1	Smooth
2/16/72	15.0	1	Smooth
2/23/72	19.5	6	Smooth
2/28/72	22.0	6	Smooth
3/8/72	16.5	7	Smooth
3/15/72	23.0	5	Smooth
3/20/72	20.0	0	Smooth

Station F1, Winter 1971-72

Date	Ice (in.)	Snow (in.)	Remarks
2/9/72	10.5	7	Smooth
2/16/72	13.0	2	Smooth
2/23/72	19.0	5	Smooth
2/28/72	19.0	6	Smooth
3/8/72	21.0	7	Smooth
3/15/72	22.0	2	Smooth
3/20/72	24.5	1	Smooth

Station F2, Winter 1971-72

Date	Ice (in.)	Snow (in.)	Remarks
2/9/72	14.0	9	Med. ridging, frazil 10'
2/16/72	14.0	4	Light ridging, frazil 5'
2/23/82	17.0	4	2 layers of ice, frazil 6'
2/28/72	16.5	5	Light ridging, no frazil
3/8/72	21.0	5	Light ridging, frazil 1'
3/15/72	19.0	1	Light ridging, no frazil
3/20/72	22.0	0	Light ridging
3/27/72	22.0	1	Light ridging
4/4/72	Open water (ice breaker Simcoe thru)		

Station G0, Winter 1971-72

Date	Ice (in.)	Snow (in.)	Remarks
2/9/72	12	-	Med. smooth, frazil 3'

Station G1, Winter 1971-72

Date	Ice (in.)	Snow (in.)	Remarks
1/20/72	1	-	Thin ice
1/26/72	0.5	-	Solid ice
2/6/72	9.0	12.0	Smooth surface
2/16/72	12.0	1.0	Smooth surface
2/23/72	13.0	5.0	Smooth surface
2/23/72	14.5	2.0	Smooth surface
3/8/72	16.0	2.0	Smooth surface
3/15/72	15.5	3.0	Cracks
3/20/72	15.0	0	Cracks
3/27/72	15.0	1.0	Cracks
4/4/72	Open water (ice breaker Simcoe thru)		

Station G2, Winter 1971-72

Date	Ice (in.)	Snow (in.)	Remarks
1/20/72	3	-	Smooth surface
1/26/72	6	0.8	Smooth surface
2/8/72	16	12.0	Light ridging
2/16/72	18.5	1.0	Smooth surface
2/23/72	17.5	4.0	Smooth surface
2/28/72	18.0	5.0	Smooth surface
3/8/72	22.0	5.0	Smooth surface
3/15/72	24.0	3.0	Cracks
3/20/72	23.0	0	Cracks
3/27/72	23.0	2	Cracks
4/4/72	Ice water (ice breaker Simcoe thru)		

Station H2, Winter 1971-72

Date	Ice (in.)	Snow (in.)	Remarks
2/9/72	40"+	9	Could not drill thru.

Station H3, Winter 1971-72

Date	Ice (in.)	Snow (in.)	Remarks
2/9/72	8.5	8	Smooth
2/16/72	13.5	1	Smooth
2/23/72	12.0	3	Smooth
2/28/72	13.5	3	Smooth
3/8/72	15.0	4	Smooth
3/15/72	16	1	Smooth
3/20/72	16	1	Smooth

Station H4, Winter 1971-72

Date	Ice (in.)	Snow (in.)	Remarks
2/9/72	7.5	9	Smooth surface
2/16/72	11.0	-	Smooth, water between, 2" water
2/23/72	11.0	3	Smooth surface
2/28/72	10.5	7	Smooth surface
3/8/72	15.0	3	Smooth surface
3/15/72	16.5	0.5	Smooth surface
3/20/72	17.0	0	Smooth cracks

Station H5, Winter 1971-72

Date	Ice (in.)	Snow (in.)	Remarks
2/9/72	12	1	Smooth surface
2/16/72	11.5	-	Smooth surface
2/23/72	12.5	3	Smooth surface
2/28/72	11.5	7	Smooth surface
3/8/72	16.0	-	Smooth surface
3/15/72	14.0	1	Smooth surface
3/20/72	14.5	1	Smooth cracks

Station H7, Winter 1971-72

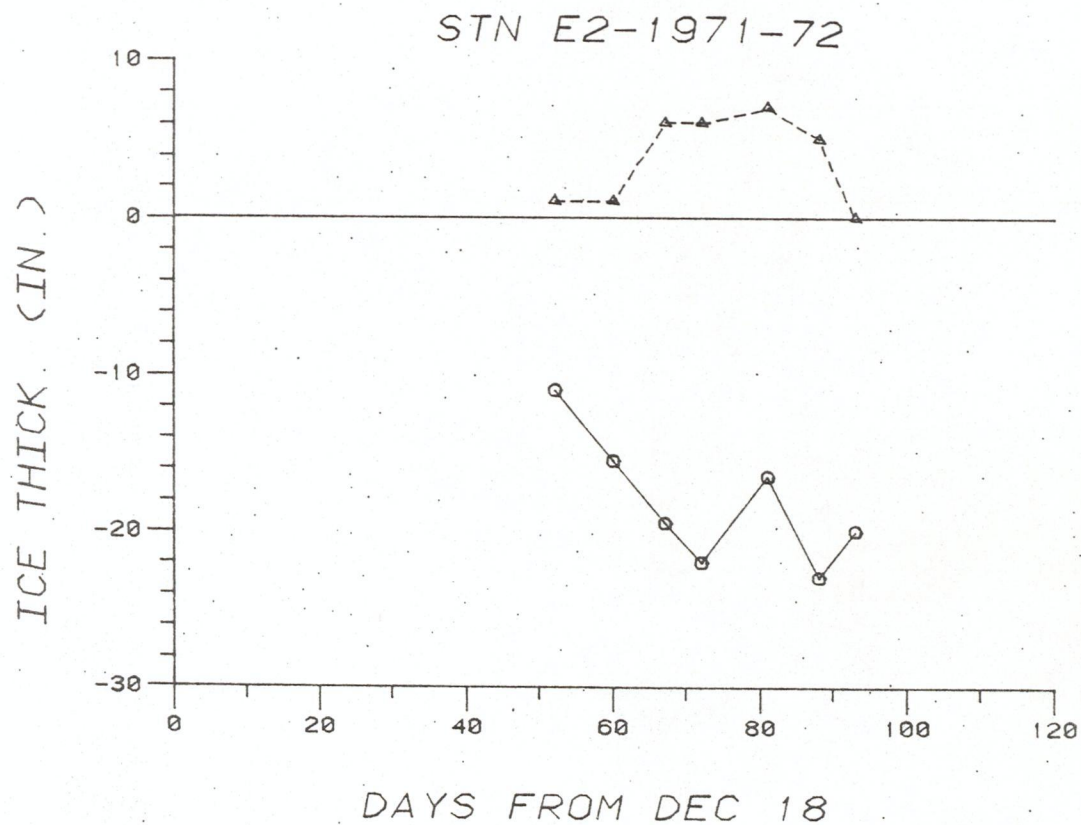
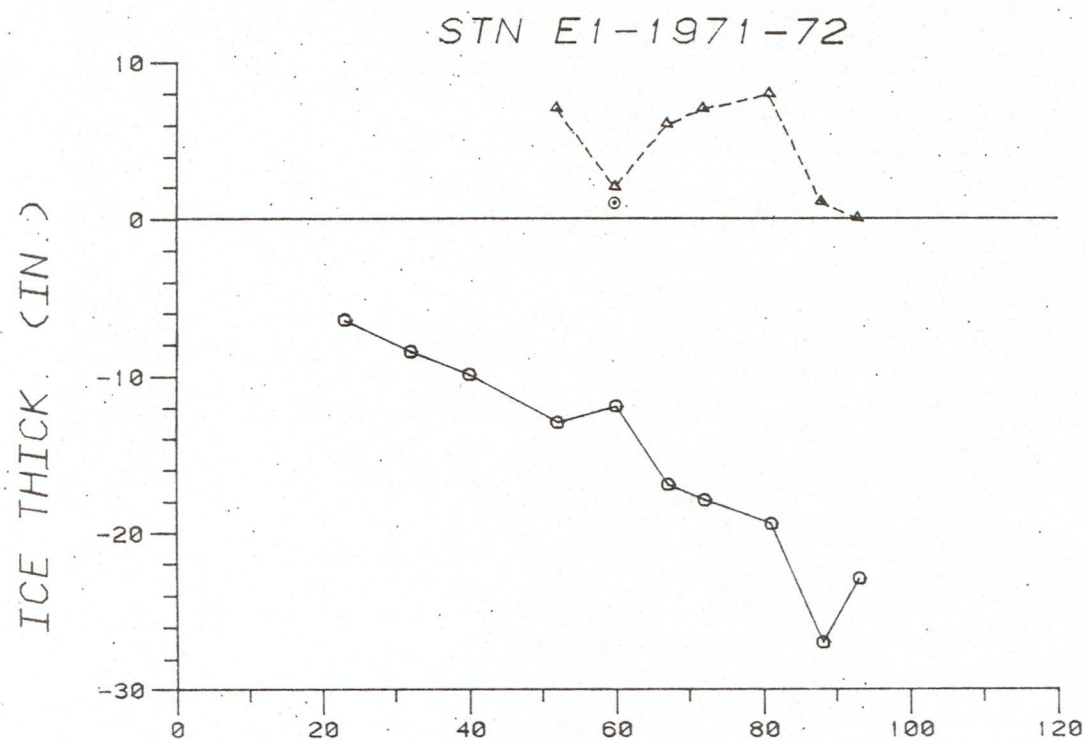
Date	Ice (in.)	Snow (in.)	Remarks
2/16/72	11.0	-	Smooth surface
2/23/72	11.0	1	Smooth surface
2/28/72	10.5	4	Smooth surface
3/8/72	14.0	2	Smooth surface
3/15/72	13.0	2	Smooth surface
3/20/72	13.0	0	Smooth, cracks

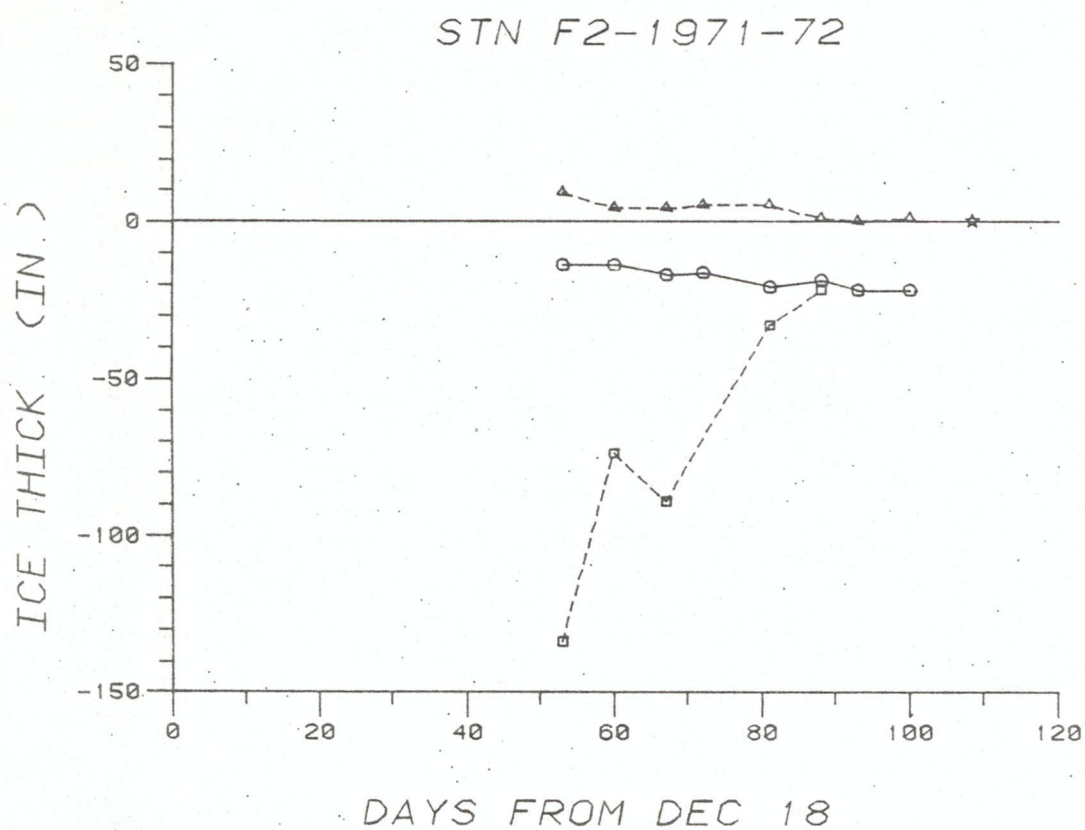
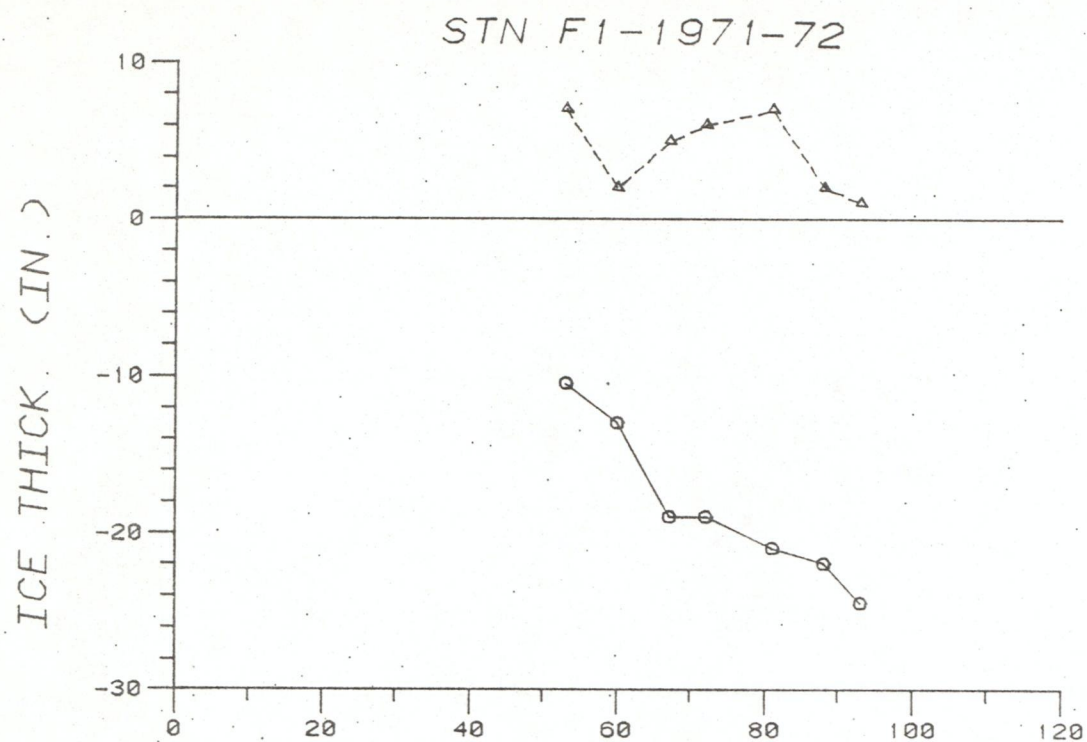
Station H7A, Winter 1971-72

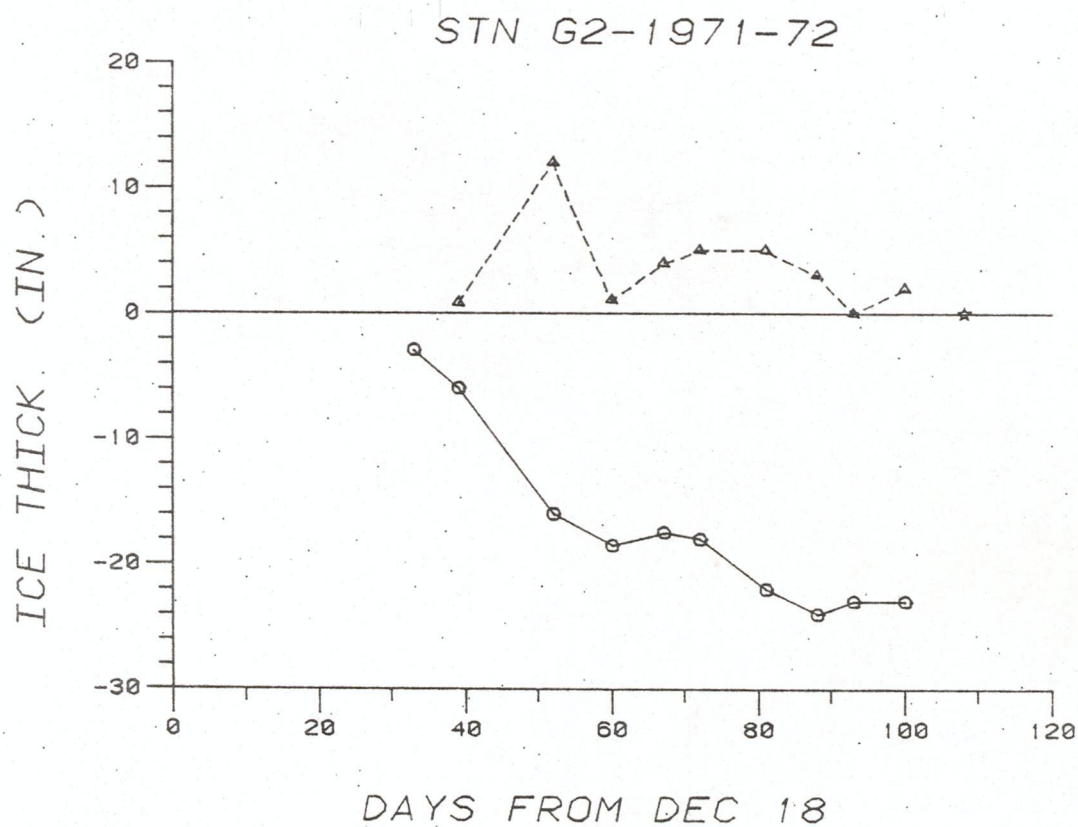
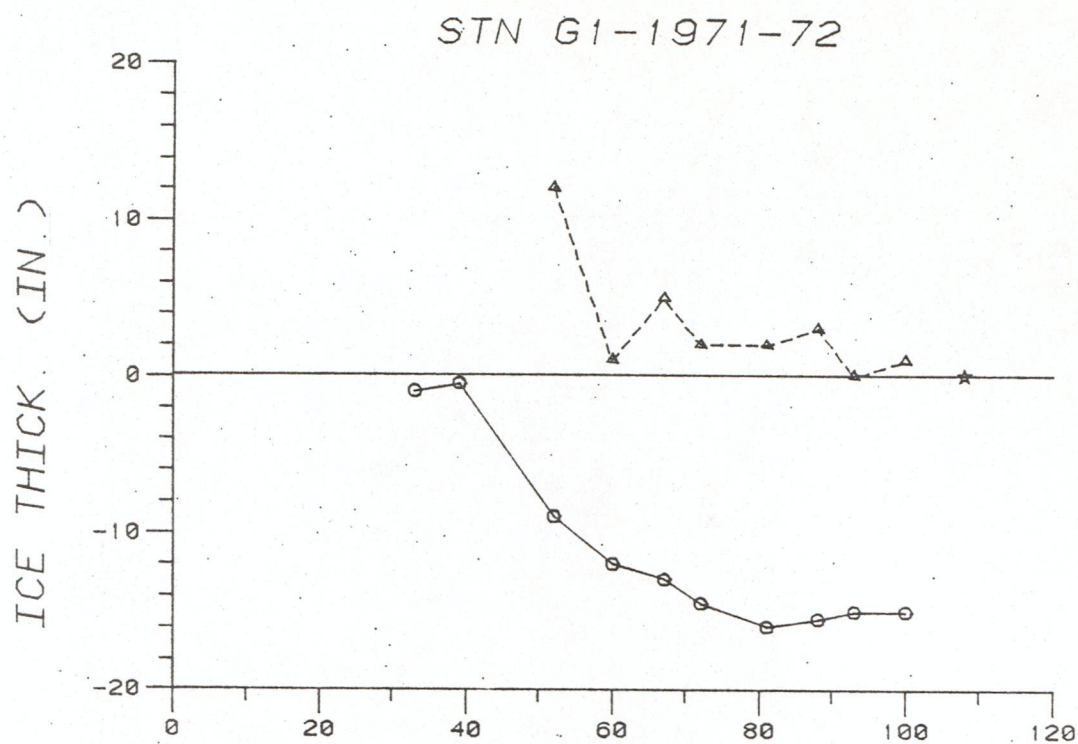
Date	Ice (in.)	Snow (in.)	Remarks
2/9/72	5.5	4	Smooth surface
2/16/72	9.5	-	Smooth surface
2/23/72	10.0	2	Smooth surface
2/28/72	11.0	2	Smooth surface
3/8/72	15.0	-	Smooth surface
3/15/72	13.0	2	Smooth surface
3/20/72	12.5	0	Smooth, cracks

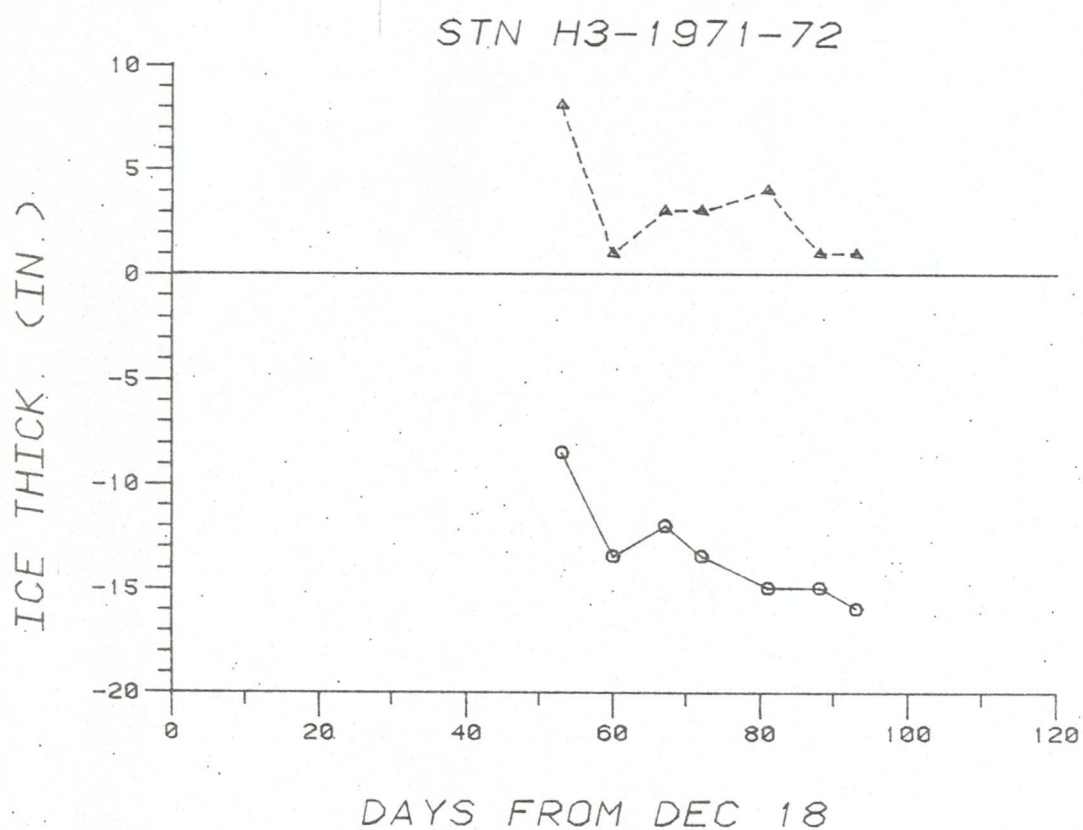
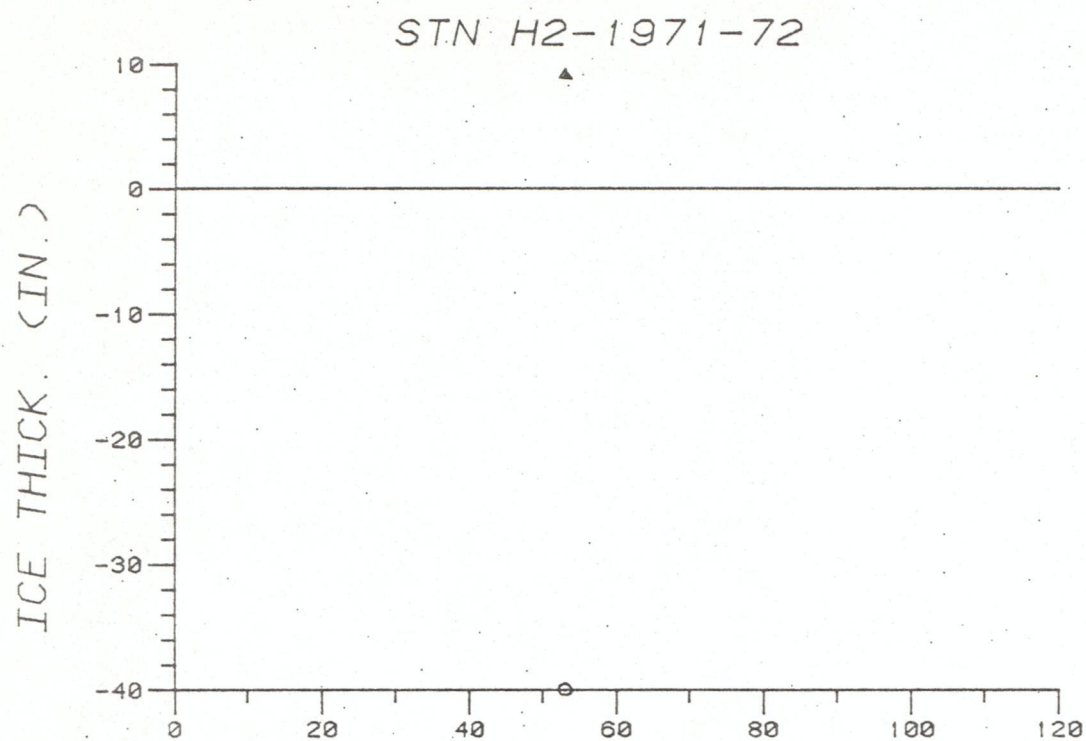
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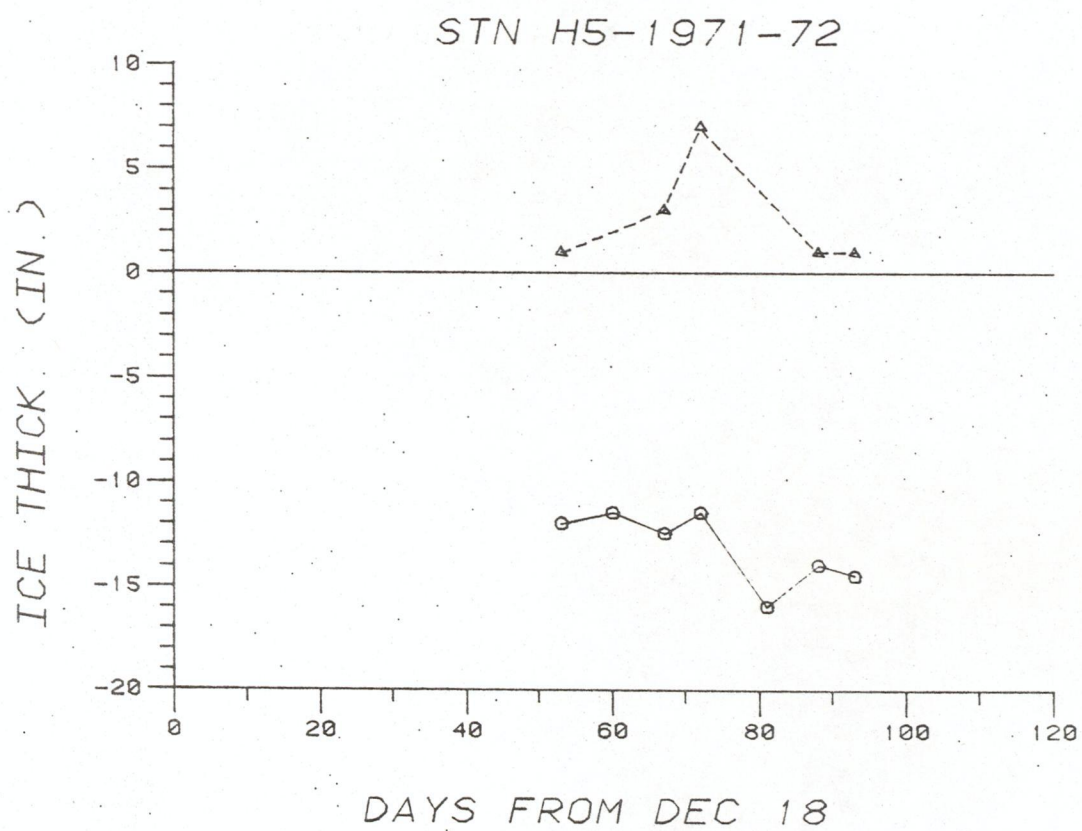
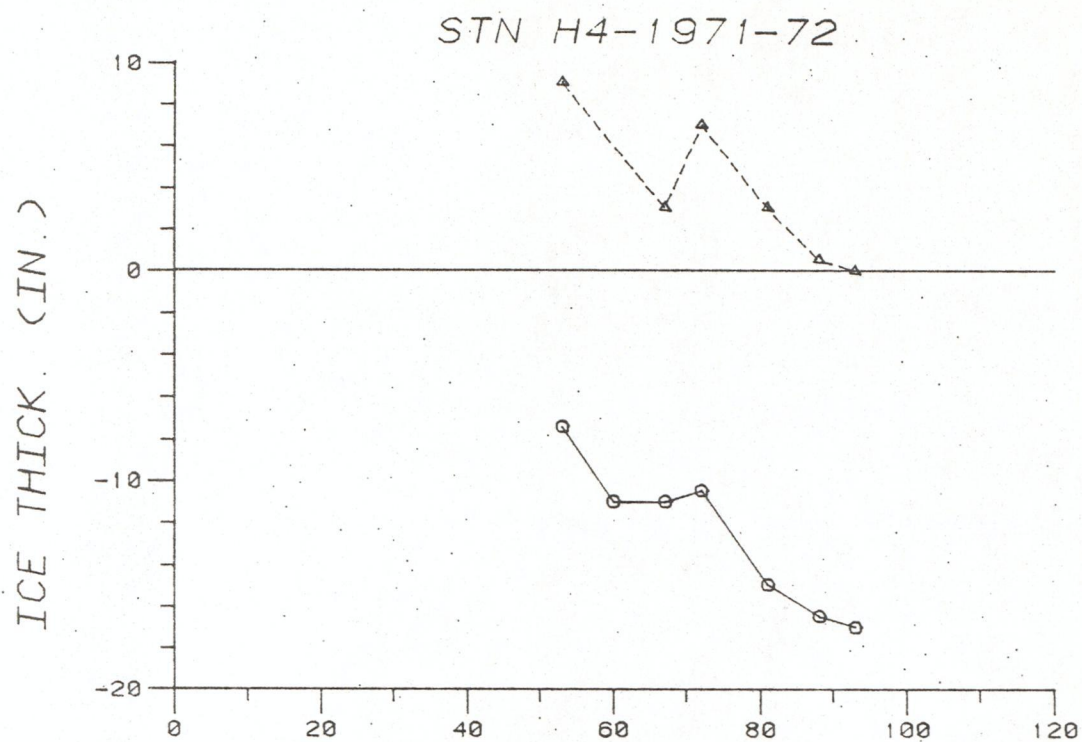
Date	Ice (in.)	Snow (in.)	Remarks
2/9/72	13.0	-	Med. smooth, few cracks
2/16/72	15.5	-	Light ridging
2/23/72	19.0	2	Light ridging
2/28/72	24.0	3	Light ridging
3/8/72	22.0	1	Light ridging
3/15/72	22.0	2	Light ridging
3/20/72	22.0	0	Smooth, cracks



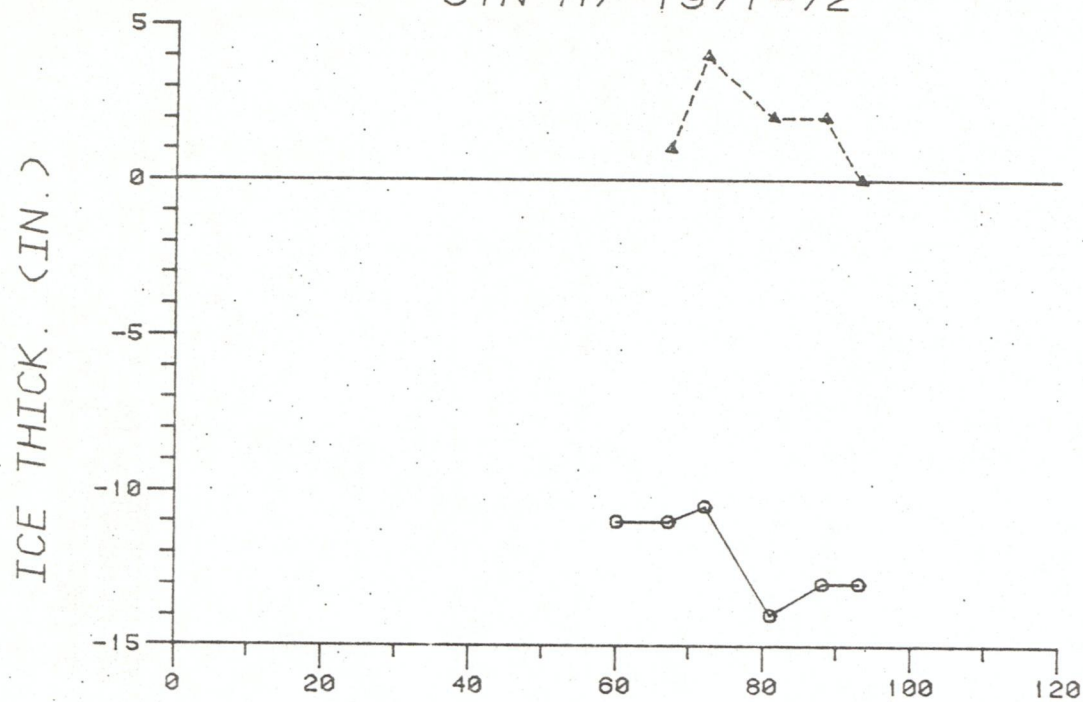




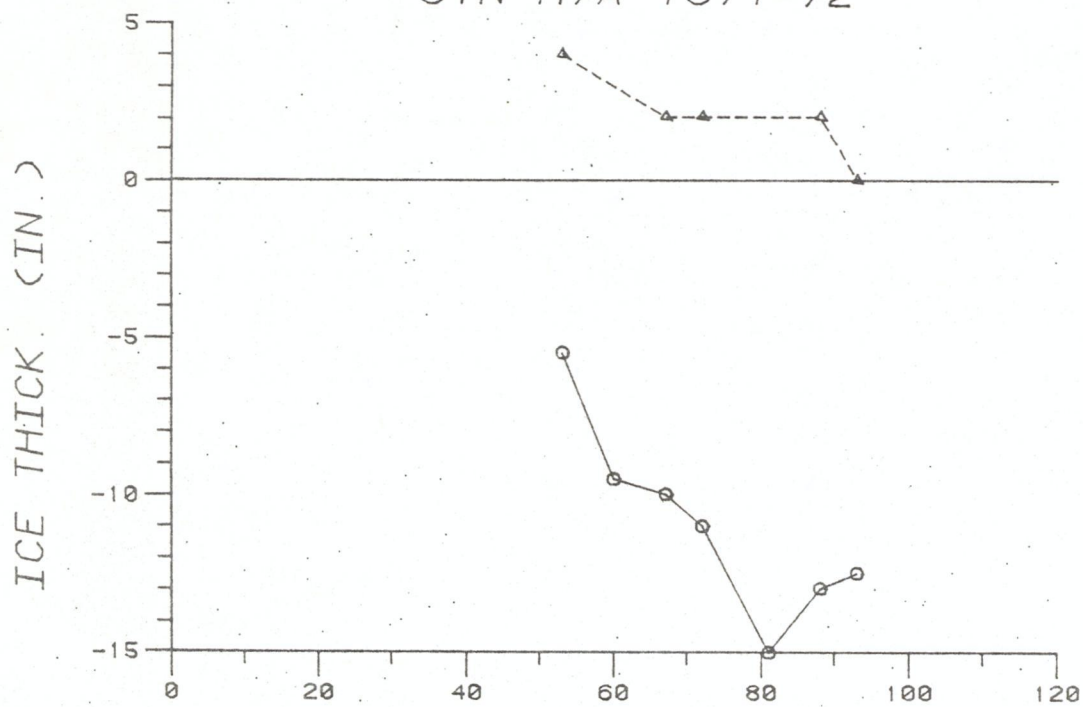




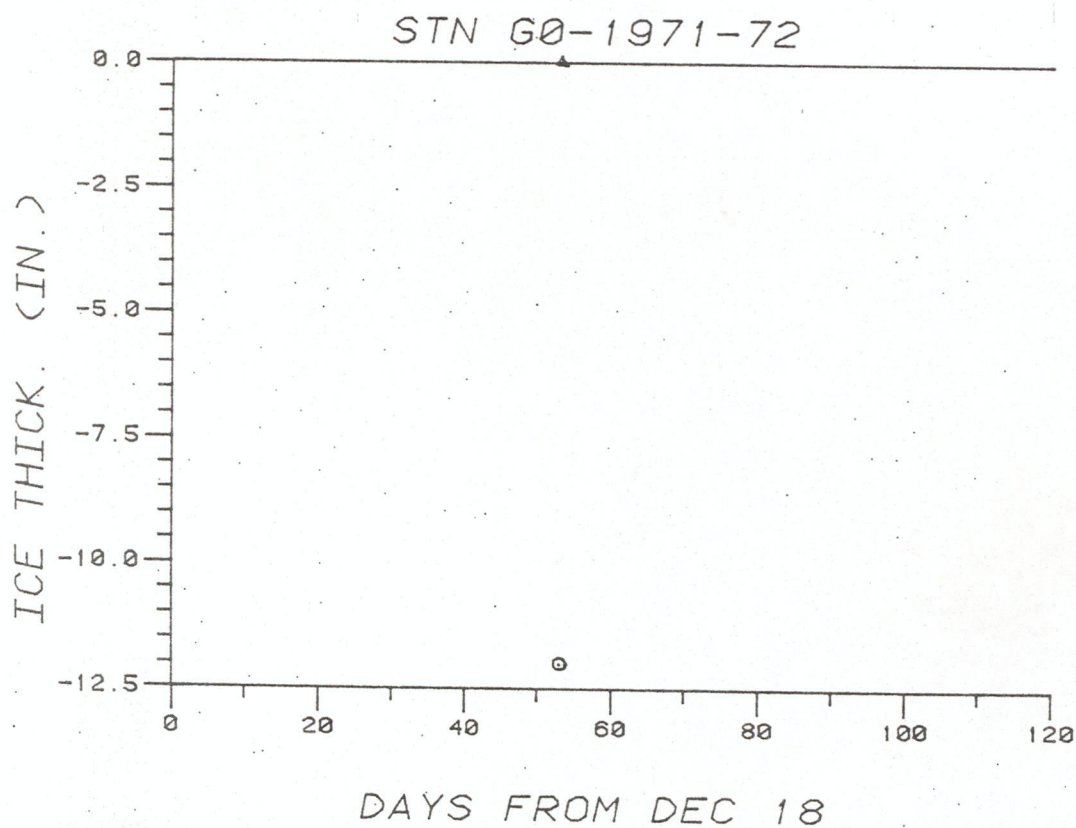
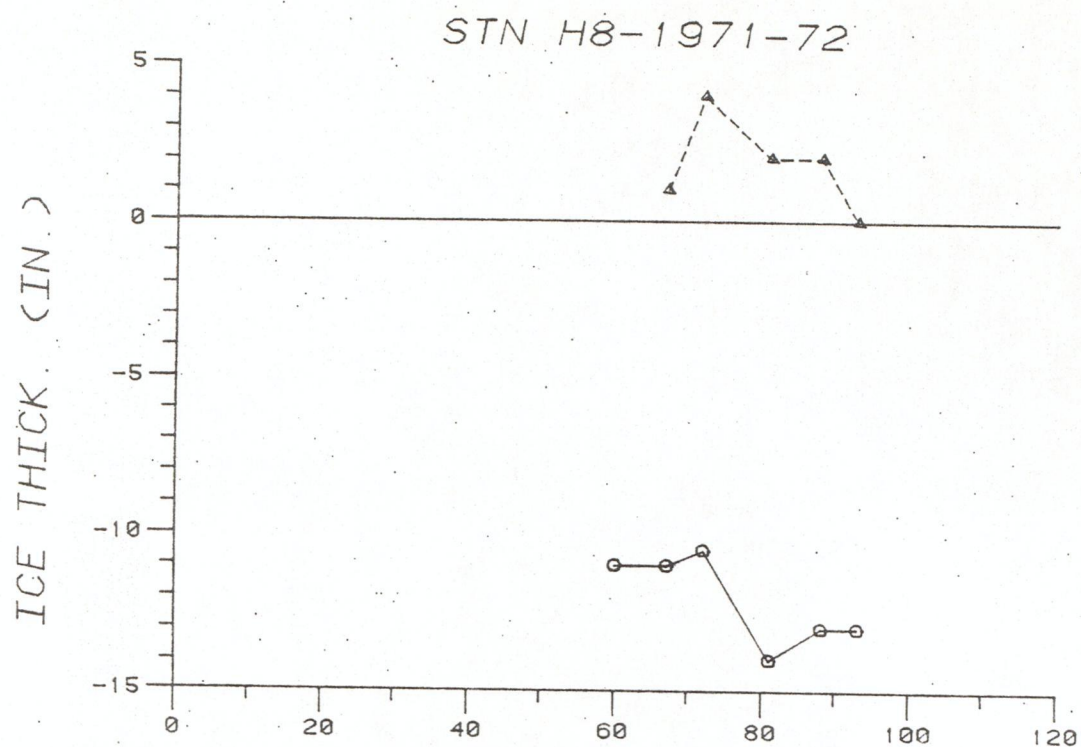
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Station E1, Winter 1972-73

Date	Ice (in.)	Snow (in.)	Remarks
1/16/73	16	0.5	Smooth
1/22/73	Measurement not taken. Unit displaced. Unit to be reset next week if conditions are favorable.		
1/29/73	13.9	1.2	Unit reset
2/5/73	15.3	-	Smooth
2/12/73	17.6	1	Smooth
2/23/73	19.5	3	Smooth
2/28/73	20.8	3	Smooth
3/6/73	20.6	0	3" of water
3/14/73	13.6	-	Smooth

Station E2, Winter 1972-73

Date	Ice (in.)	Snow (in.)	Remarks
1/16/73	10.8	0.5	Smooth
1/22/73	Measurement not taken. Unit displaced. Unit to be reset next week if conditions are favorable.		
1/29/73	7.1	1.0	Unit reset, smooth
2/5/73	9.8	-	Smooth
2/12/73	11.8	1.5	Smooth
2/23/73	13.4	4.0	Smooth
2/28/73	14.0	4.0	Smooth
3/6/73	12.5	0	3" water on ice
3/14/73			Open water

Station F1, Winter 1972-73

Date	Ice (in.)	Snow (in.)	Remarks
1/16/73	7.5	0.5	
1/22/73	7.6	0	Measuring unit displaced - was reset in proper position.
1/29/73	6.8	0	Unit reset; was loose
2/5/73	10.3	-	Smooth
2/12/73	12.1	1.5	Smooth
2/23/73	13.8	5.5	Smooth
2/28/73	14.6	5.0	Smooth
3/6/73	13.4	0	2" crust, 3" water, smooth
3/14/73			Open water

Station F2, Winter 1972-73

Date	Ice (in.)	Snow (in.)	Remarks
1/16/73	11.5	0.5	
1/22		0	Open water, measuring device missing - to be installed.
1/29/73			Open water
2/5/73			Open water
2/12/73			Open water
2/23/73			Open water

Station G1, Winter 1972-73

Date	Ice (in.)	Snow (in.)	Remarks
1/11/73	6.4	0	Smooth
1/23/73	8.9	0	1" of water on ice
1/30/73	9.1	2.5	Smooth
2/5/73	11.1	0	Smooth
2/12/73	12.5	2	Smooth
2/21/73	13.4	4	Smooth
2/28/73	13.9	4	Smooth
3/6/73	12.3	4	Smooth, 1" water, 2" crust
3/14/73			Open water

Station G2, Winter 1972-73

Date	Ice (in.)	Snow (in.)	Remarks
1/11/73	11.4	0	1" of water on ice
1/23/73	12.5	0	Smooth
1/30/73	13.4	1	Smooth
2/5/73	15.3	0	Smooth
2/12/73	17.3	1.5	Smooth
2/21/73	19.3	3	Smooth
2/28/73	20.0	3	Smooth
3/6/73	19.3	0	3" crust, smooth
3/14/73			Open water

Station H2, Winter 1972-73

Date	Ice (in.)	Snow (in.)	Remarks
2/28/73	16.0	1.0	Smooth, open water nearby
3/6/73			Broken ice
3/14/73			Open water

Station H3, Winter 1972-73

Date	Ice (in.)	Snow (in.)	Remarks
2/5/73	9.1	0	Smooth, open water in area
2/12/73	6.8	1	Smooth
2/23/73	4.4	0	Smooth, 2" crust
2/28/73	7.5	0	Smooth
3/6/73	3.8	0	Removed meas. device
3/14/73			Open water

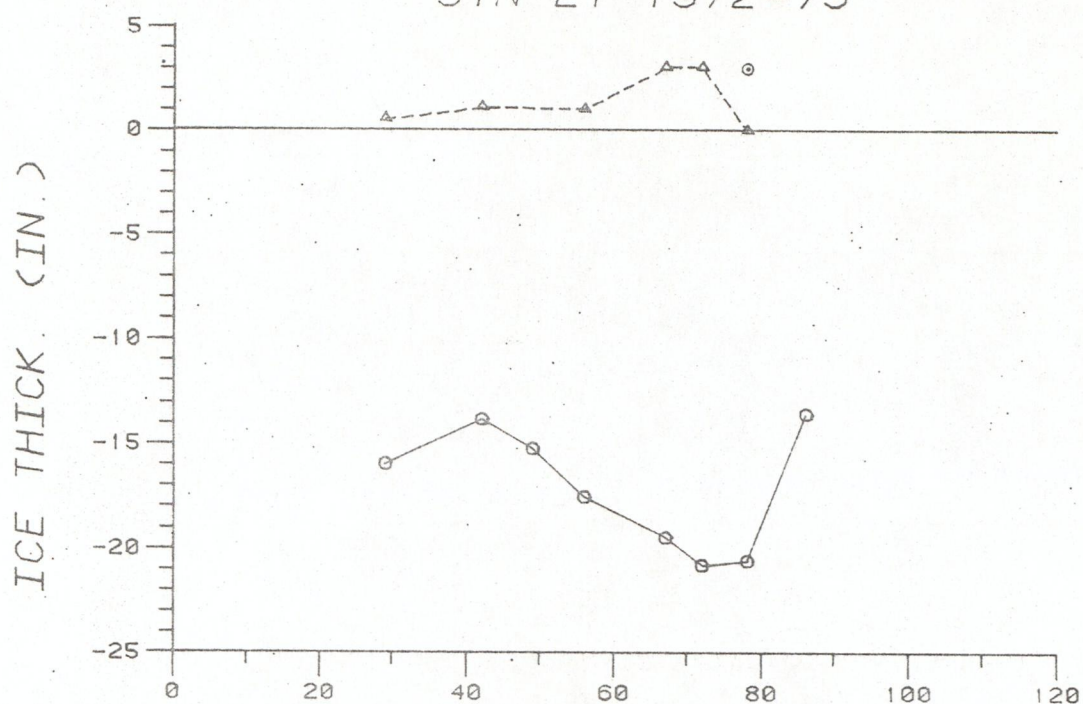
Station H4, Winter 1972-73

Date	Ice (in.)	Snow (in.)	Remarks
2/12/73	7.3	-	Smooth
2/23/73	5.4	0	2" crust, smooth
2/28/73	7.3	0	Smooth
3/6/73	4.0	0	Ice rotten - unsafe
3/14/73	0	-	Open water

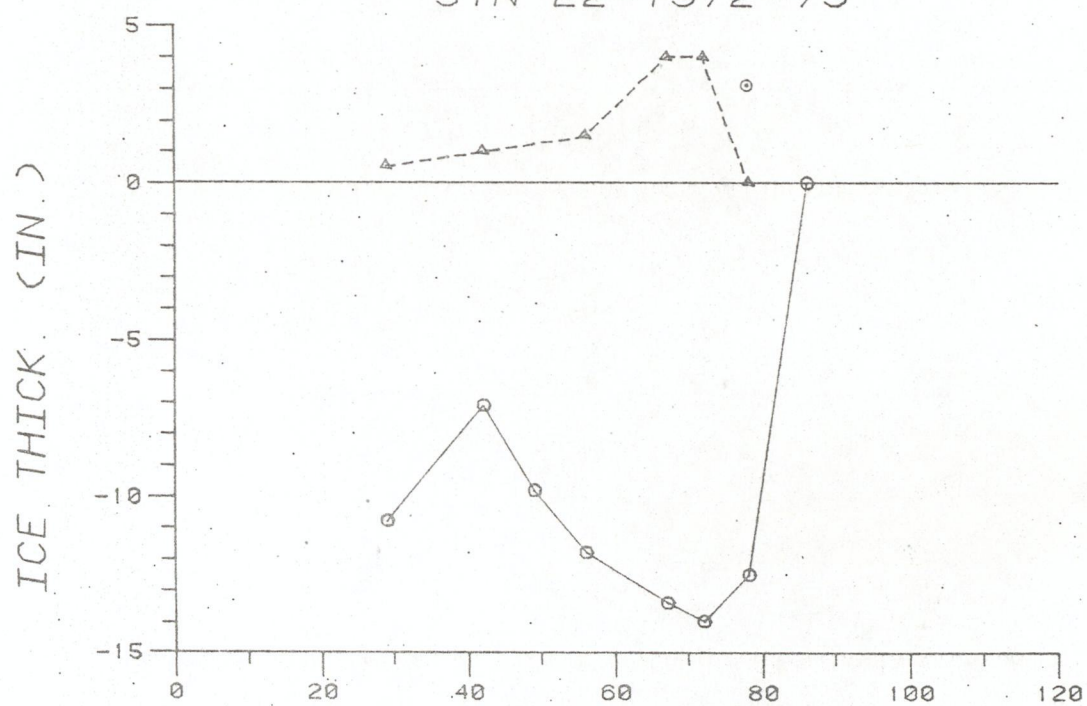
Station H5, Winter 1972-73

Date	Ice (in.)	Snow (in.)	Remarks
2/12/73	7	0	Smooth
2/23/73	5.8	0	Smooth
2/28/73	6.5	0	Smooth
3/3/73	0	0	Very thin ice - open water (device in bottom)
3/14/73			Open water

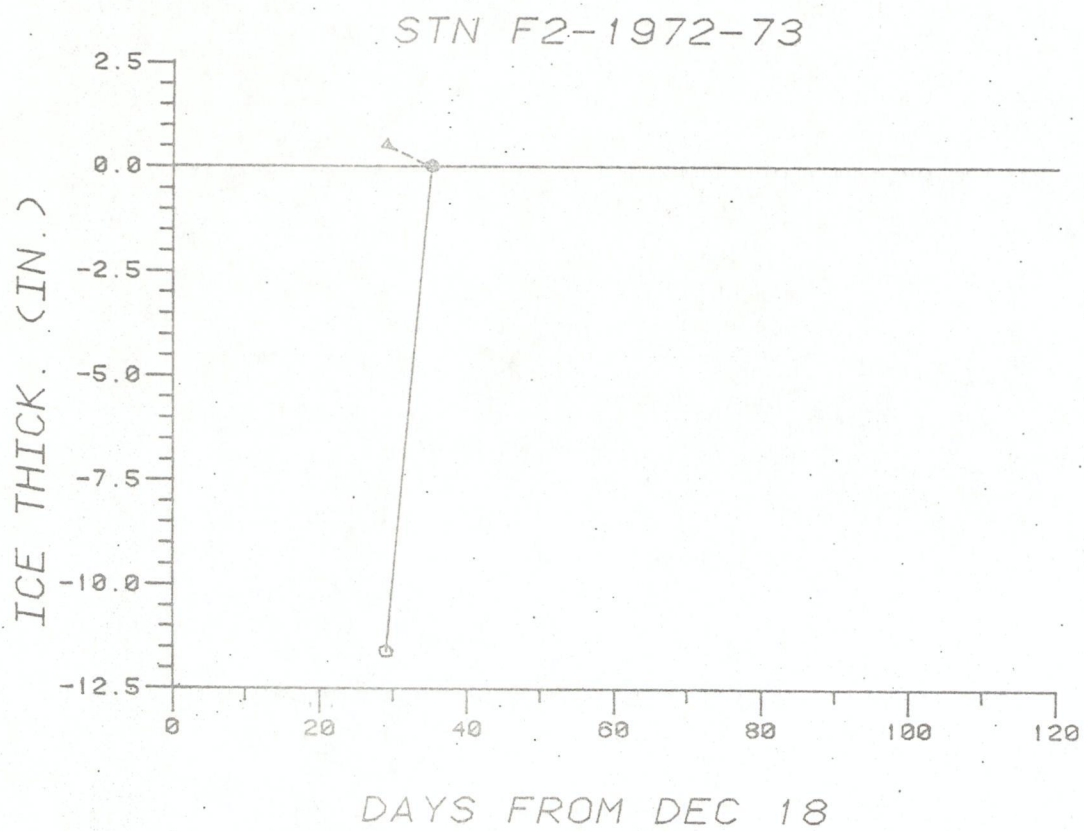
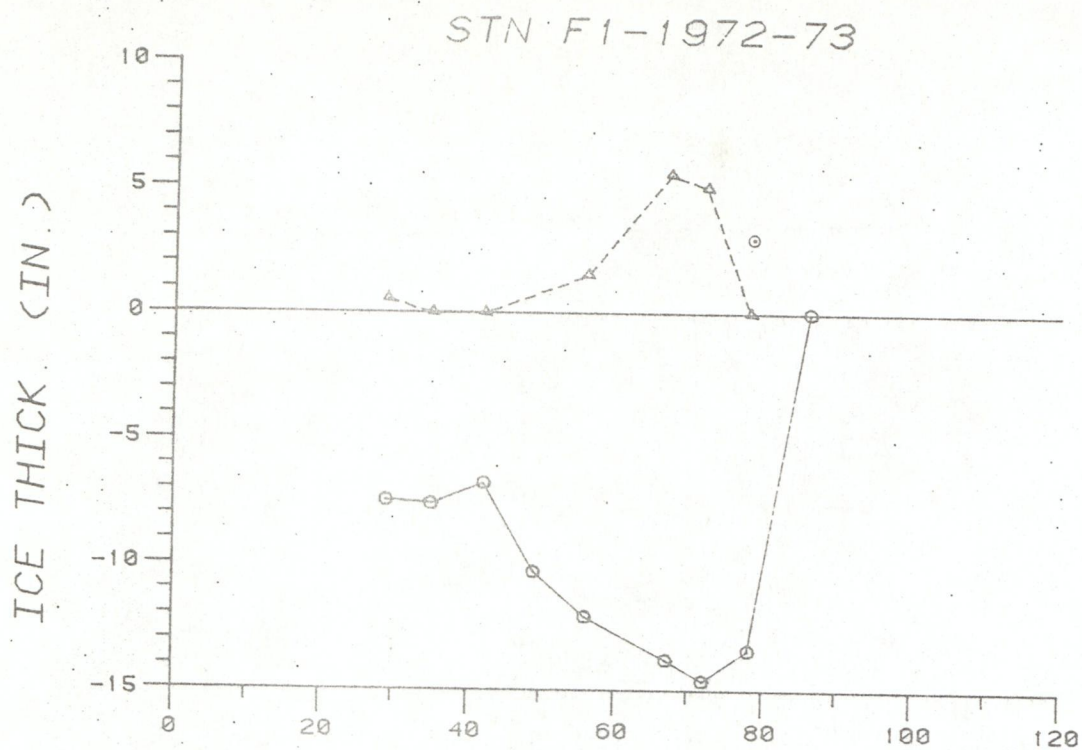
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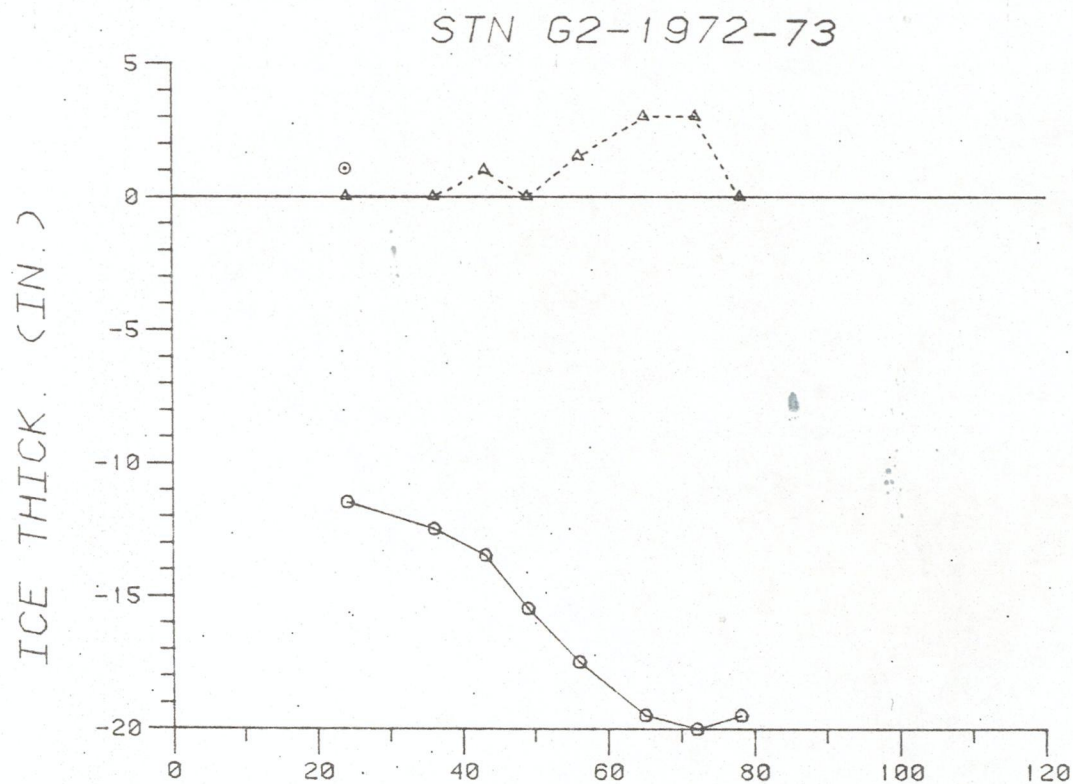
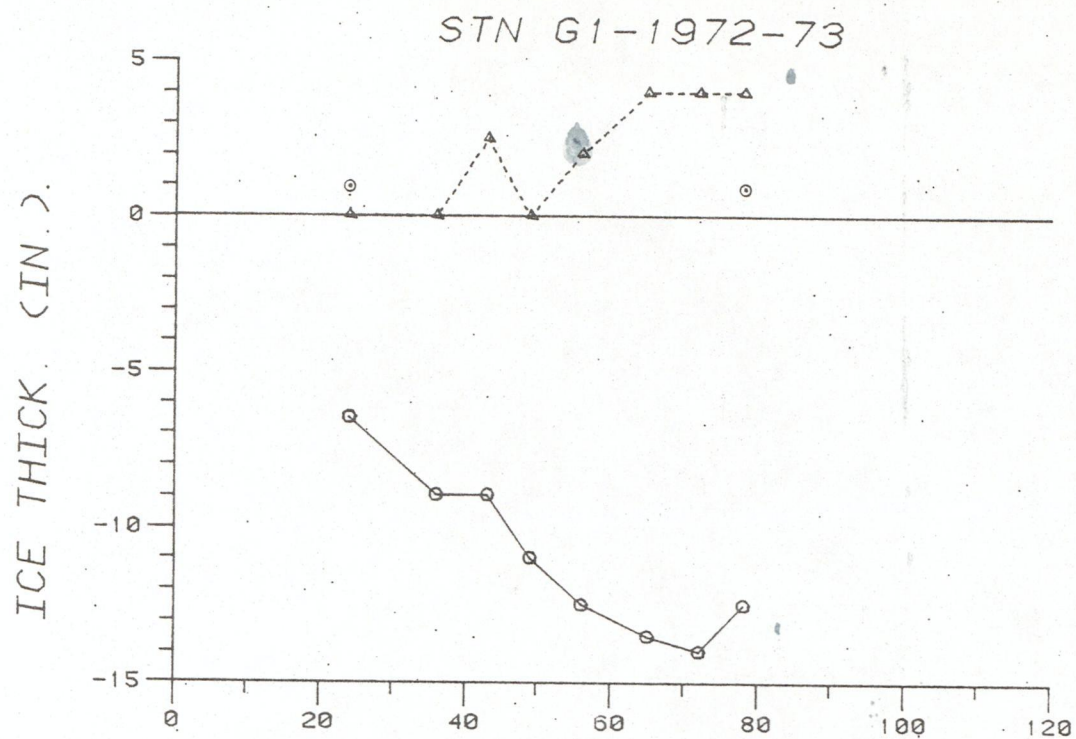


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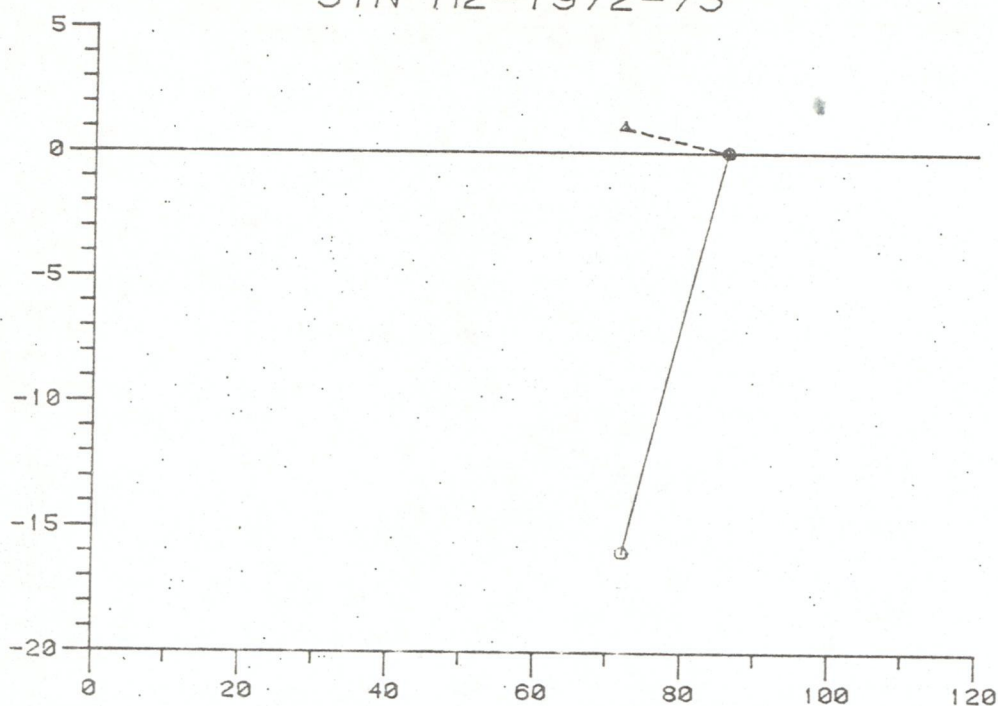




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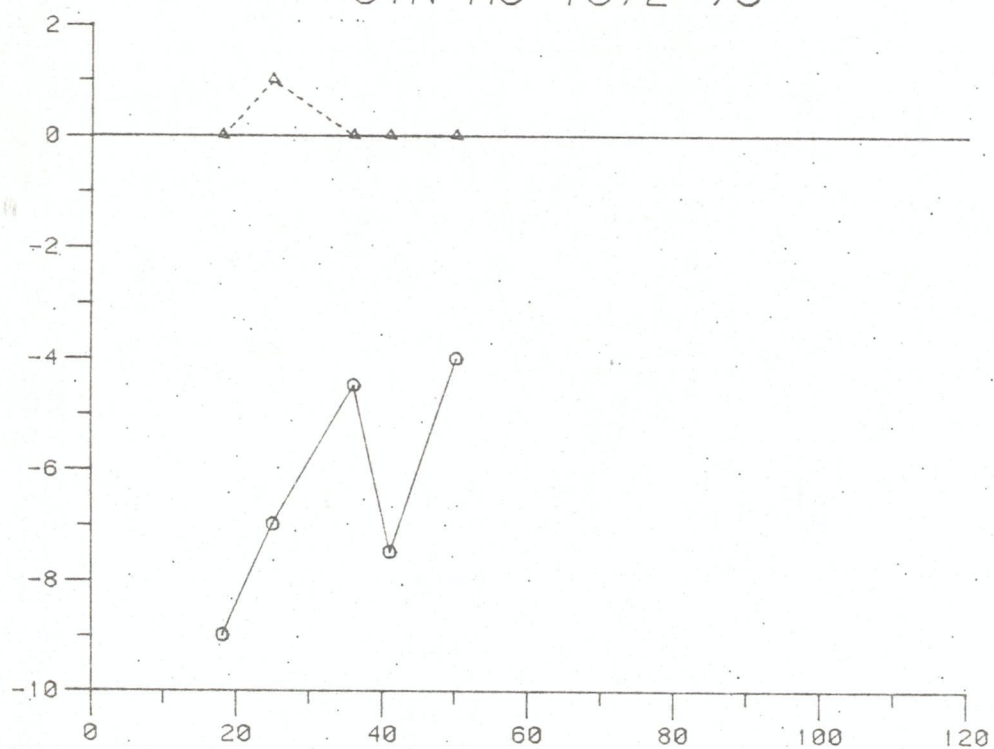
ICE THICK. (IN.)

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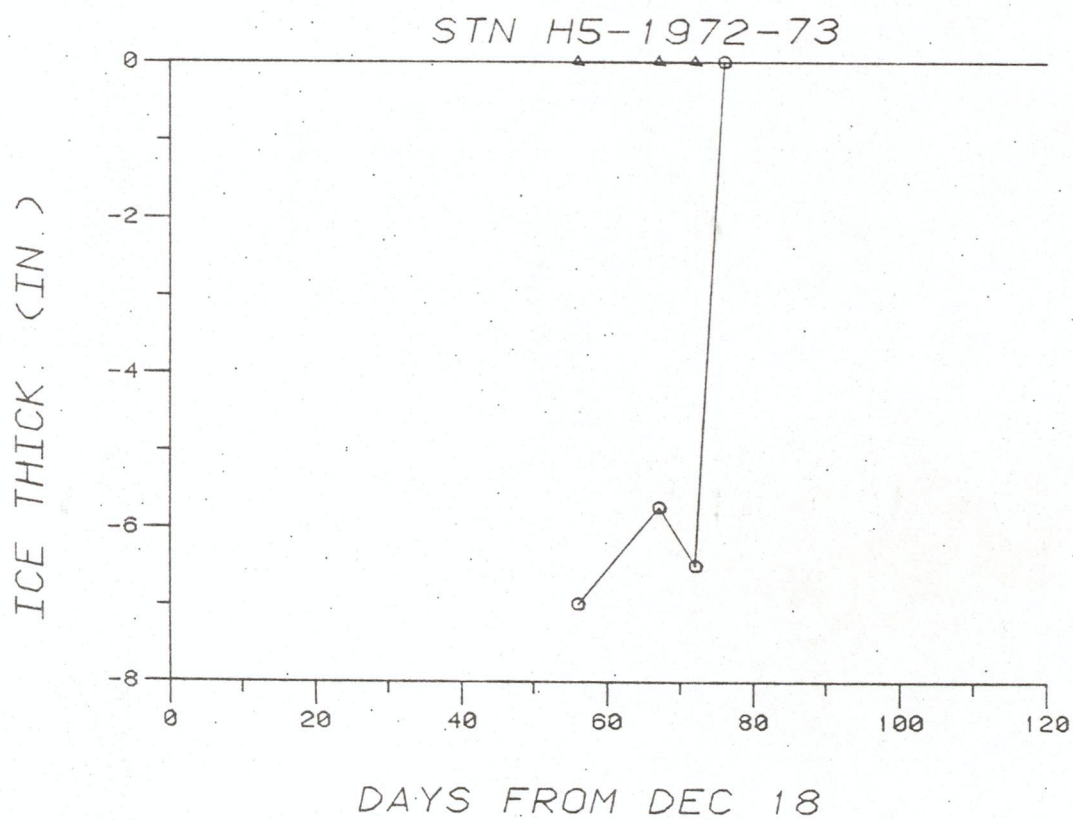
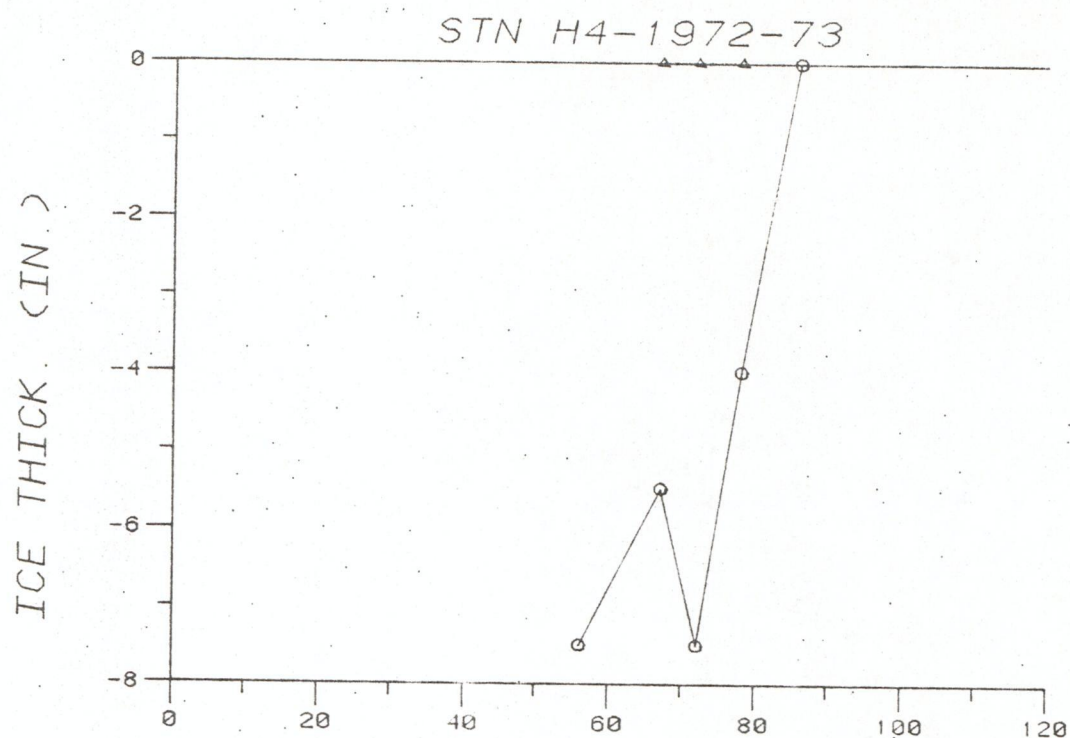


ICE THICK. (IN.)

STN H3-1972-73



DAYS FROM DEC 18



Station E1, Winter 1973-74

Date	Ice (in.)	Snow (in.)	Remarks
1/18/74	9.0	1	Smooth surface
1/24/74	12.4	2	Smooth surface
1/30/74	10.4	1	Smooth surface
2/6/74	14.1	0	Smooth surface
2/11/74	16.6	1.5	Smooth surface
2/18/74	18.6	1	Smooth surface
2/27/74	21.4	0	Smooth surface
3/6/74	16.1	0	Weak ice
3/13/74	9.6	0	Ice breaker pass thru

Station E2, Winter 1973-74

Date	Ice (in.)	Snow (in.)	Remarks
1/18/74	11.8	1	Smooth surface
1/24/74	14.0	0	Smooth surface
1/30/74	10.3	1	Smooth surface
2/6/74	10.8	1	Smooth surface
2/11/74	12.0	2	Smooth surface
2/18/74	13.0	1	Smooth surface
2/27/74	13.8	0	Smooth surface
3/6/74			Open water

Station F1, Winter 1973-74

Date	Ice (in.)	Snow (in.)	Remarks
1/18/74	11.8	1	Smooth surface
1/24/74	16.4	0	Smooth surface
1/30/74	13.1	0.5	Smooth surface
2/6/74	15.6	0.5	Smooth surface
2/11/74	17.1	2	Smooth surface
2/18/74	18.9	1	Smooth surface
2/27/74	20.6	1	Smooth surface
3/6/74	9.9	0	Weak ice

Station F2, Winter 1973-74

Date	Ice (in.)	Snow (in.)	Remarks
1/18/74	10.4	1	Smooth
1/24/74	11.8	0	Smooth
1/30/74	7.5	0	Smooth
2/6/74	Missing	Missing	Smooth (defective apparatus)
2/11/74	27.0	1	Smooth (defective apparatus)
2/18/74	16.5 (Approx)	1	Smooth
2/27/74	12.5 (Approx)	1	Smooth
3/6/74			Open water

Station G1, Winter 1973-74

Date	Ice (in.)	Snow (in.)	Remarks
1/18/74	10.0	2	Smooth surface
1/24/74	12.9	0	Smooth surface
1/30/74	11.6	0	Smooth surface
2/6/74	15.1	0	Smooth surface
2/11/74	17.4	1.5	Smooth surface
2/18/74	20.1	1	Smooth surface
2/27/74	21.9	0.5	Smooth surface
3/6/74	18.4	0	Smooth surface
3/13/74		.	Broken ice - unsafe

Station G2, Winter 1973-74

Date	Ice (in.)	Snow (in.)	Remarks
1/18/74	15.4	1	Smooth surface
1/24/74	17.8	1	Smooth surface
1/30/74	16.3	0	Smooth surface
2/6/74	Missing	Missing	Smooth surface
2/8/74	9.8	0	New apparatus installed
2/18/74	13.8	1	Smooth surface
2/27/74	16.0	1	Smooth surface
3/6/74	12.0	0	Weak ice
3/13/74			Open water

Station H1, Winter 1973-74

Date	Ice (in.)	Snow (in.)	Remarks
1/18/74	12.4	1	Smooth surface
1/24/74	14.4	1	Smooth surface
1/30/74	0	-	Surface ice
2/6/74	NA		Smooth (unsafe)
2/11/74	14.0 (Approx)	1	Smooth (unsafe)
2/18/74	12.0 (Approx)	1	Smooth (unsafe)
2/27/74			Open water

Station H2, Winter 1973-74

Date	Ice (in.)	Snow (in.)	Remarks
1/18/74	11.1	2	Smooth surface
1/24/74	11.4	0	Smooth surface
1/30/74			Some ice
2/6/74	NA	NA	No ice
2/11/74	NA		Unsafe
2/18/74	NA		Unsafe
2/27/74			Open water

Station H3, Winter 1973-74

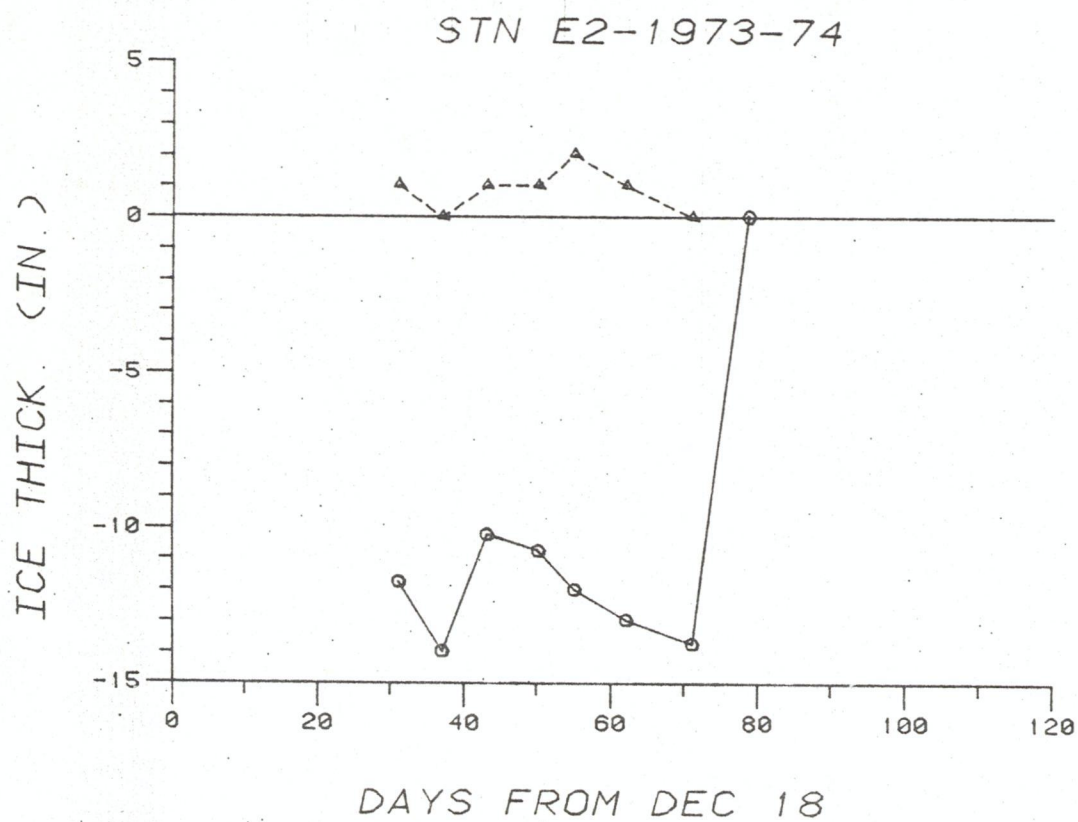
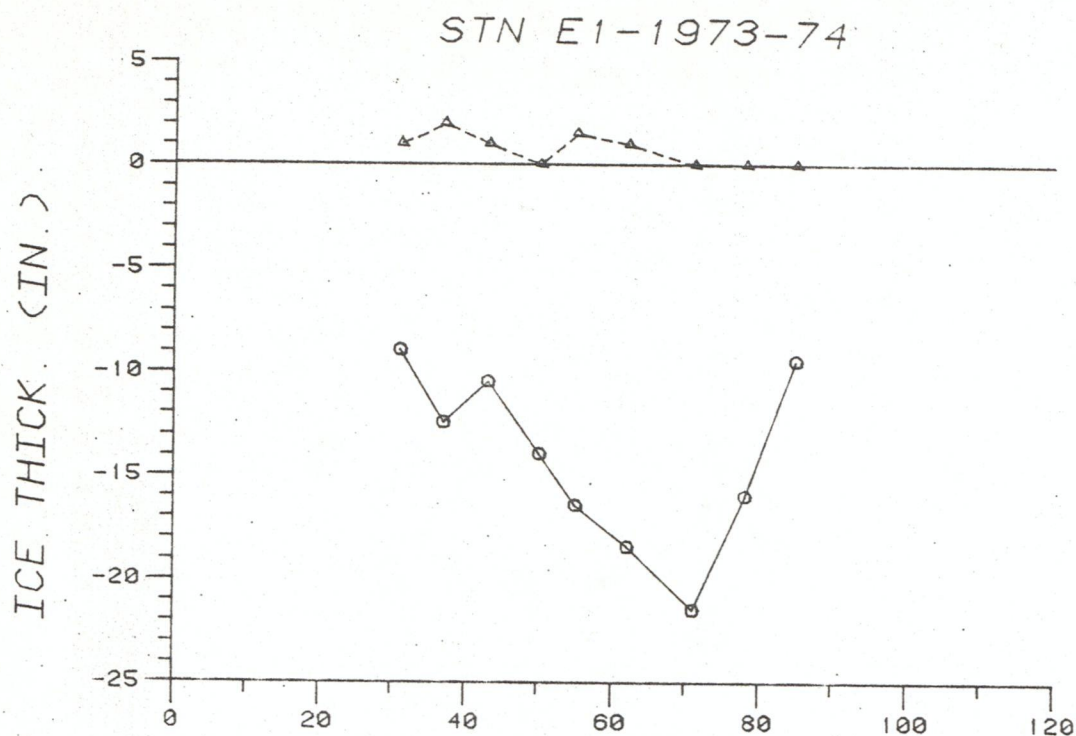
Date	Ice (in.)	Snow (in.)	Remarks
1/18/74	8.0	1	Smooth surface
1/24/74	9.0	1	Smooth surface
1/30/74			Some ice
2/6/74	6.5 (Approx)	0	New ice
2/11/74	9.0 (Approx)	0	
2/18/74	8.0 (Approx)	0	Smooth surface
2/27/74			Ice unsafe (thin ice)

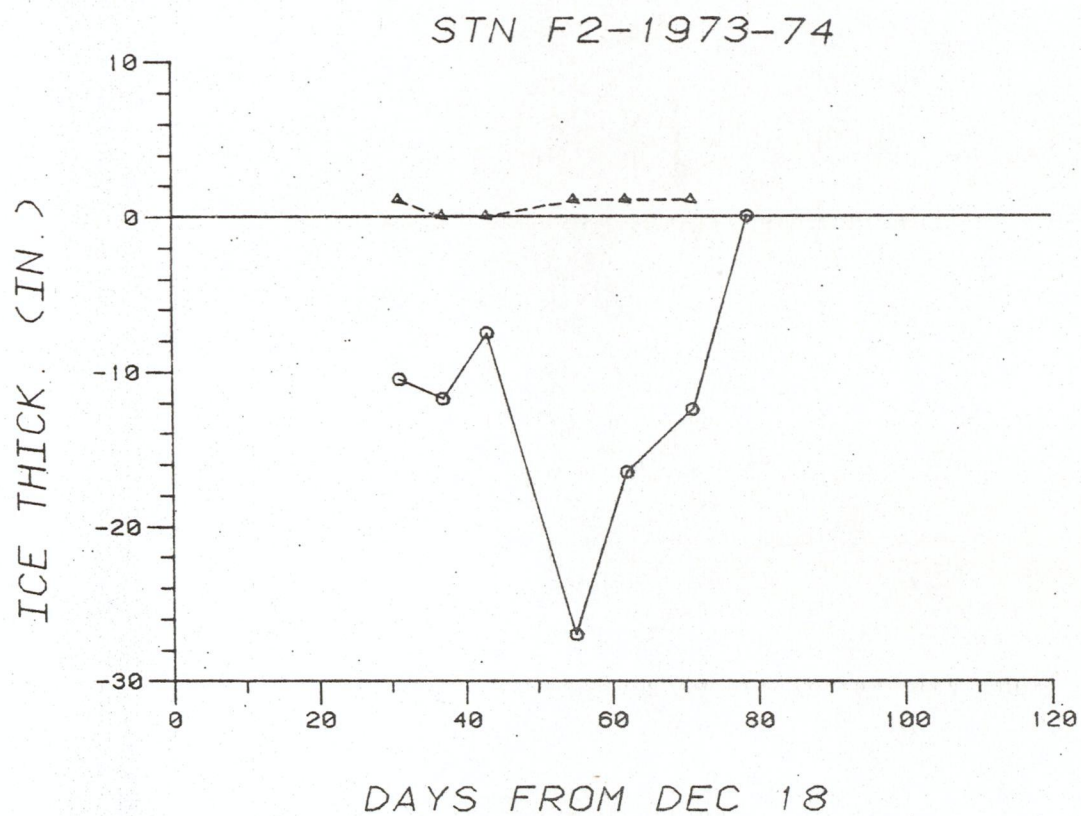
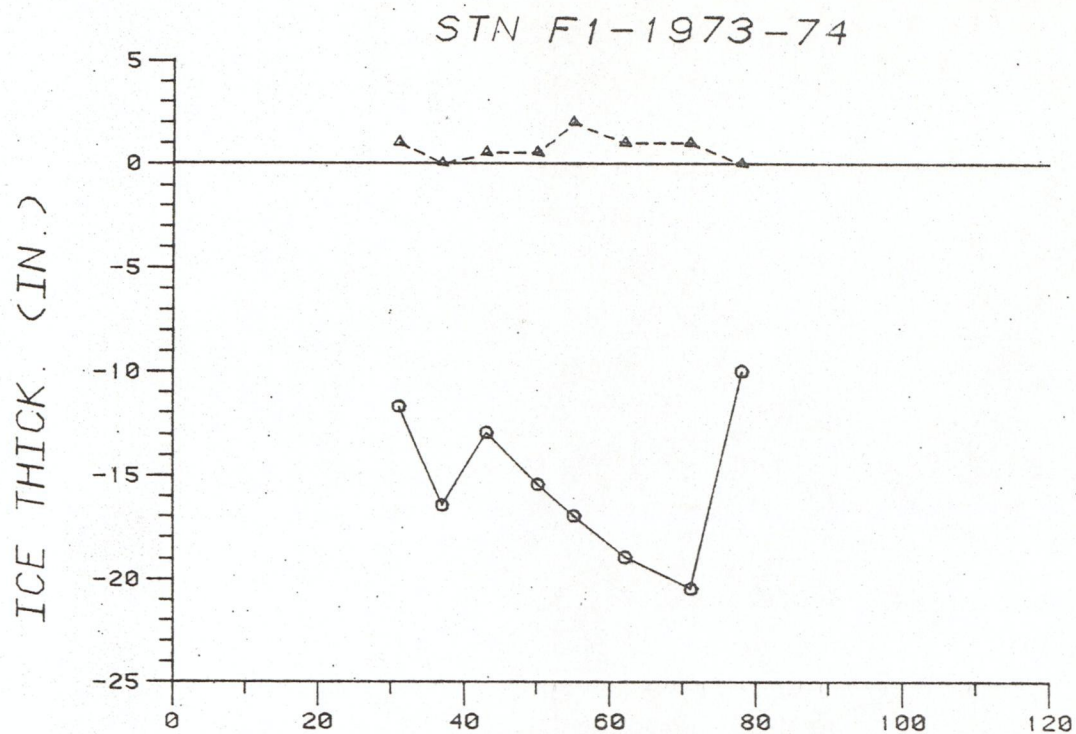
Station H4, Winter 1973-74

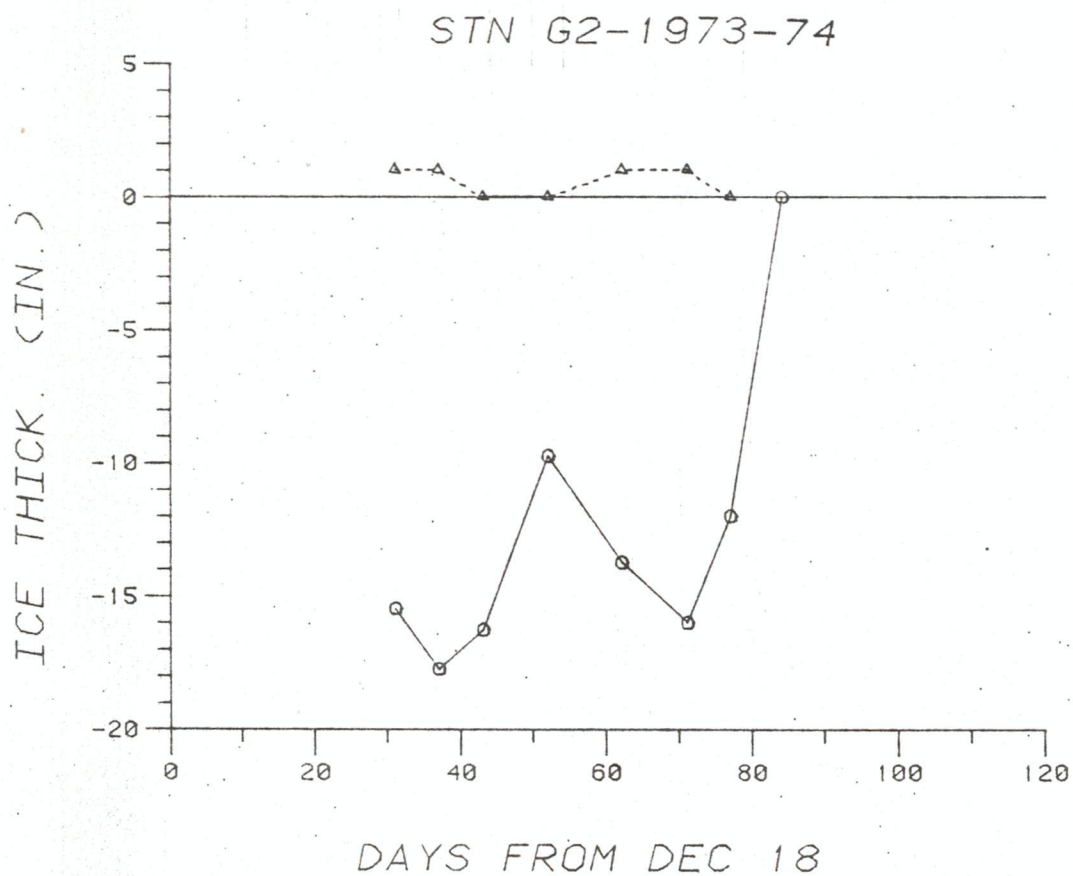
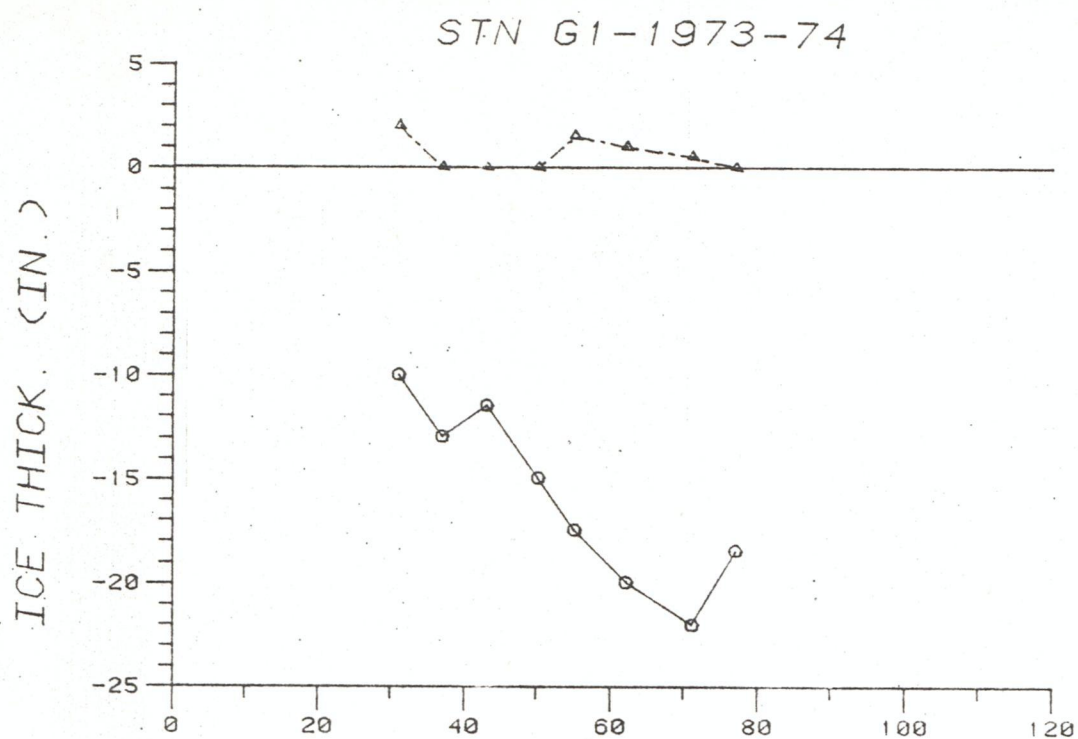
Date	Ice (in.)	Snow (in.)	Remarks
1/18/74	7.6	2	Smooth surface
1/24/74	7.8	0	Smooth surface
1/30/74			
2/6/74	NA	NA	Some ice
2/11/74	8.5 (Approx)	1	New ice - unsafe
2/18/74	7.0 (Approx)	0	Smooth surface
2/27/74			Ice unsafe (thin ice)

Station H5, Winter 1973-74

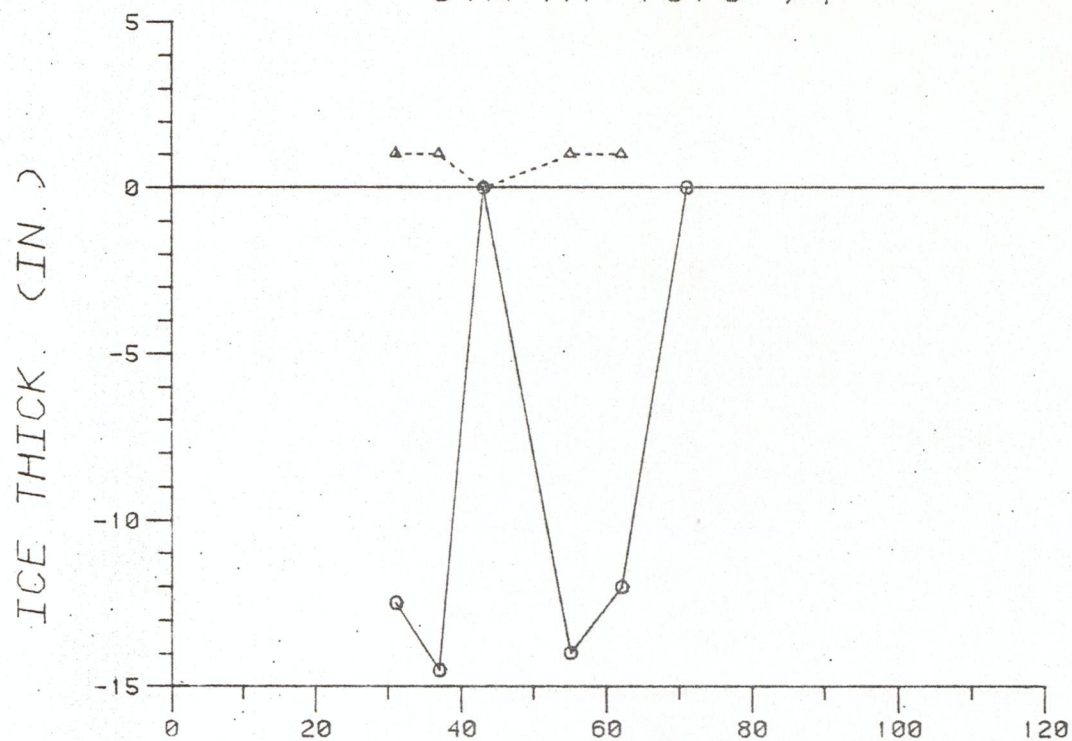
Date	Ice (in.)	Snow (in.)	Remarks
1/18/74	6.5	0.5	Smooth surface
1/24/74			Ice unsafe
1/30/74			Some ice
2/6/74	7.5 (Approx)	0	New ice
2/11/74	7.5 (Approx)	0.5	
2/18/74	3.0 (Approx)	0	
2/27/74			Open water



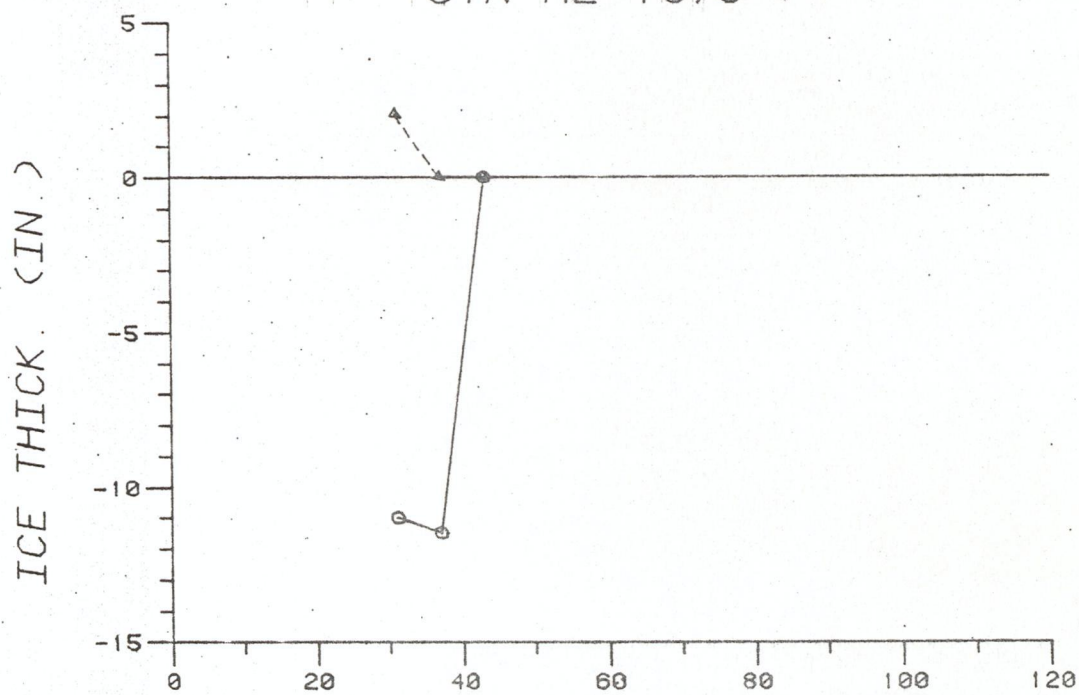




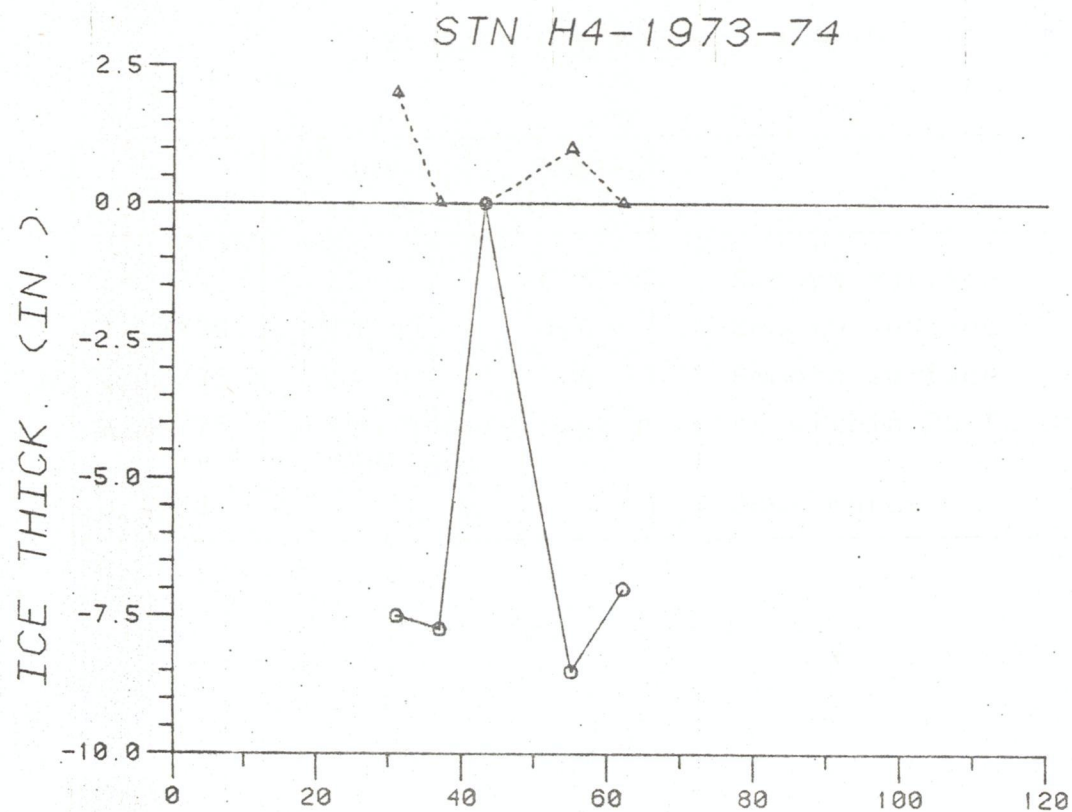
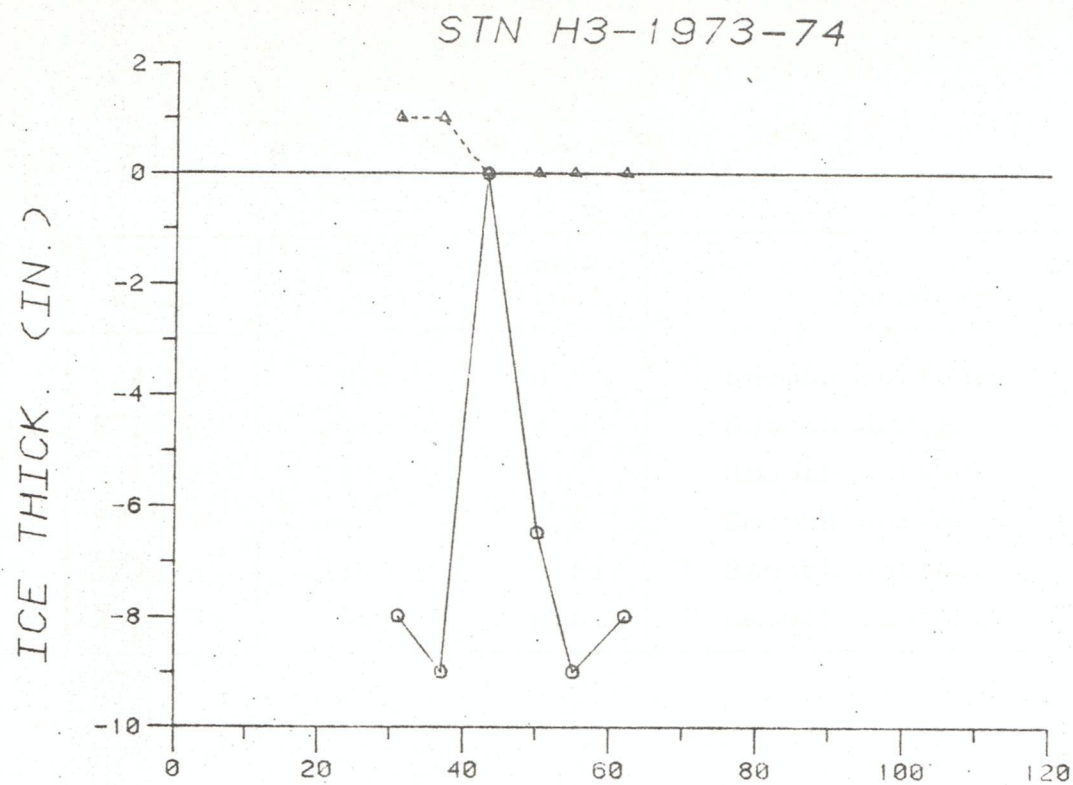
STN H1-1973-74



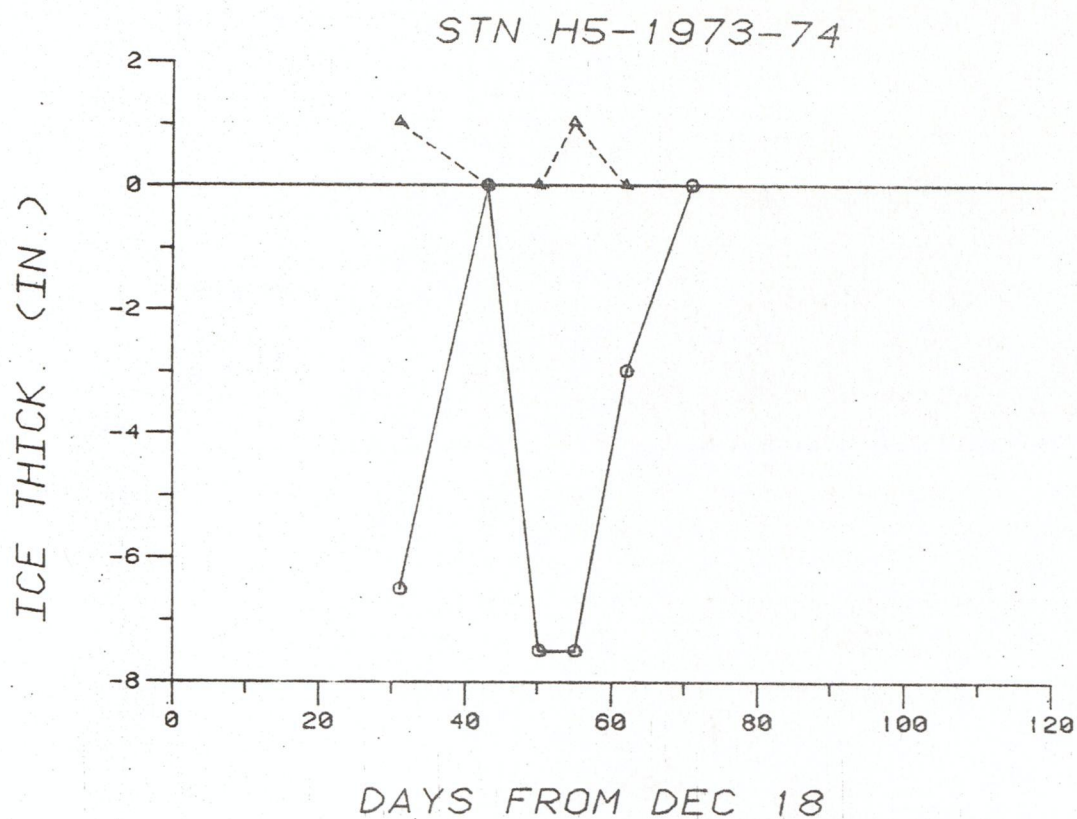
STN H2-1973-74



DAYS FROM DEC 18



DAYS FROM DEC 18



Station F1, Winter 1974-75

Date	Ice (in.)	Snow (in.)	Remarks
2/4/75	10.5	0.5	Smooth surface
2/12/75	12.6	4.0	Smooth surface
2/18/75	14.1	5.0	Smooth surface
2/27/75	14.3	0.5	Smooth surface
3/4/75	13.8	-	Smooth surface
3/11/75	13.5	3.0	Smooth surface

Station F2, Winter 1974-75

Date	Ice (in.)	Snow (in.)	Remarks
2/4/75	11.9	0	Smooth surface, 2' frazil Rafted ice in vicinity
2/12/75	14.5	3.0	
2/18/75	16.0	5.0	
2/27/75			Ice unsafe - open within 20' of station
3/4/75			Open water

Station G1, Winter 1974-75

Date	Ice (in.)	Snow (in.)	Remarks
2/4/75	9.5	0	Smooth surface
2/12/75	11.3	4.0	Smooth surface
2/18/75	12.3	5.0	Smooth surface
2/27/75	10.5	0.5	Smooth surface
3/4/75	11.3	0.5	Smooth surface
3/11/75	9.3	3.0	Smooth surface

Station G2, Winter 1974-75

Date	Ice (in.)	Snow (in.)	Remarks
2/4/75	11.0	0.5	Smooth surface
2/12/75	13.1	4.0	Smooth surface
2/18/75	14.3	3.0	Smooth surface
2/27/75	Ice unsafe - open water within 20 ft of station		
3/4/75			Open water

Station H1, Winter 1974-75

Date	Ice (in.)	Snow (in.)	Remarks
2/18/75			Open water (last report)

Station H3, Winter 1974-75

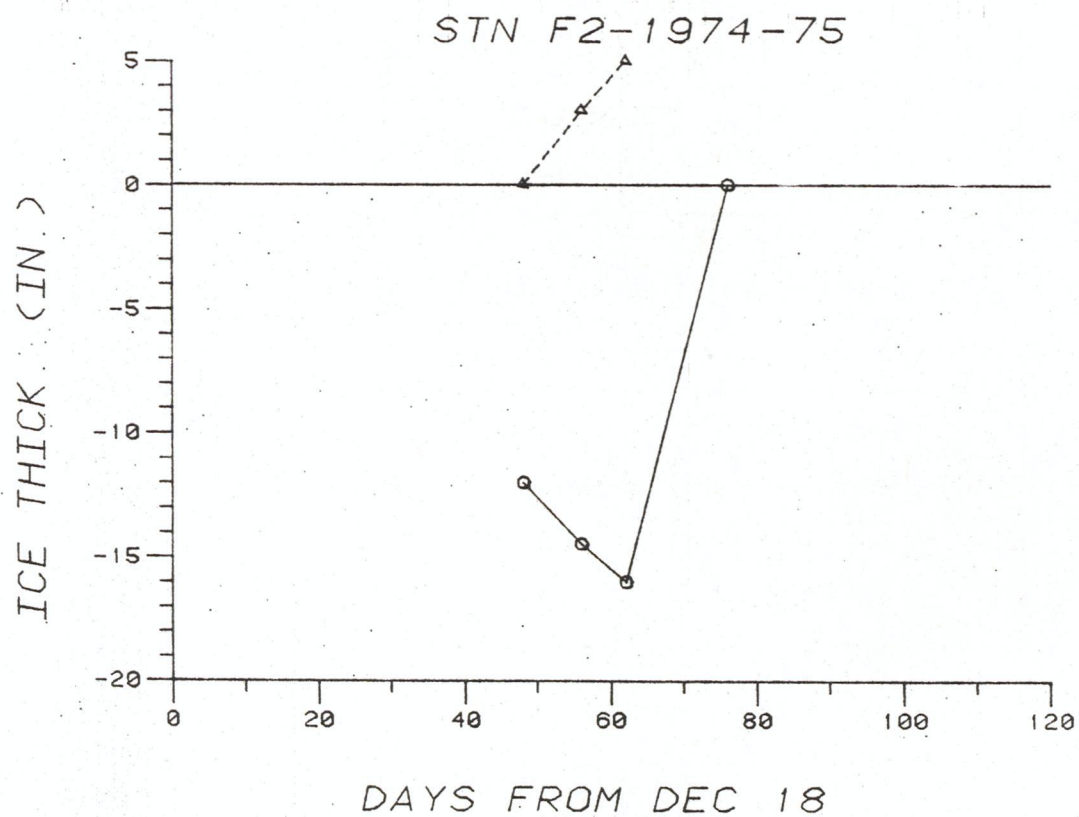
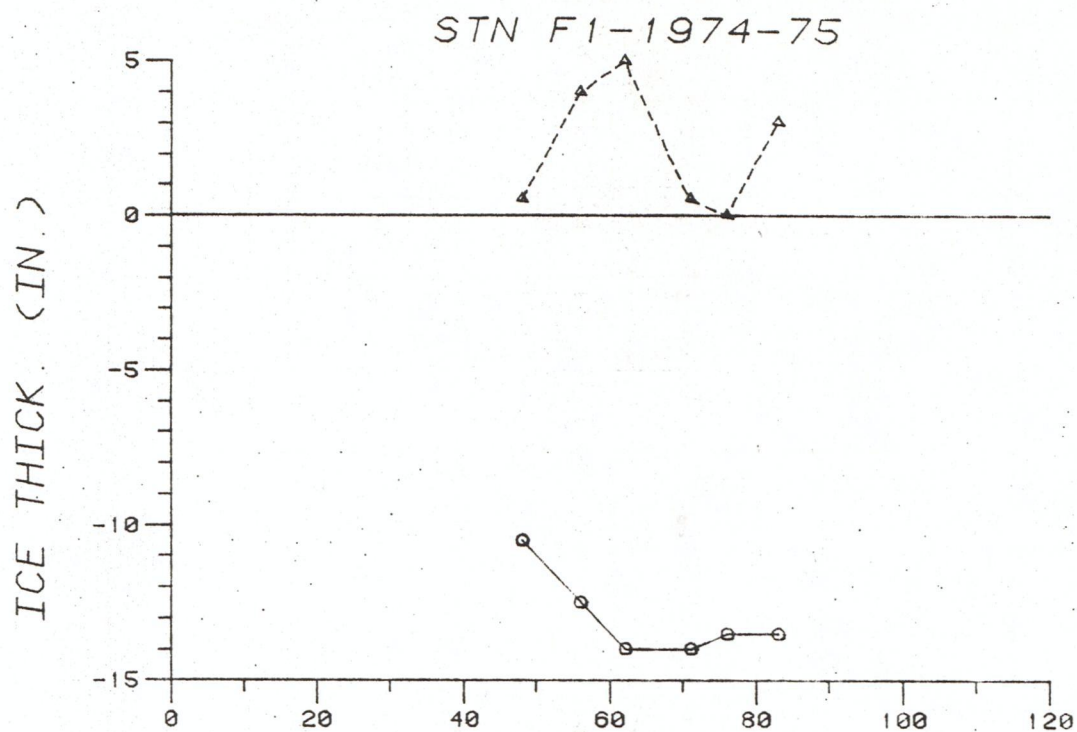
Date	Ice (in.)	Snow (in.)	Remarks
2/18/75	2 to 4	0	Unsafe
2/27/75			Open water

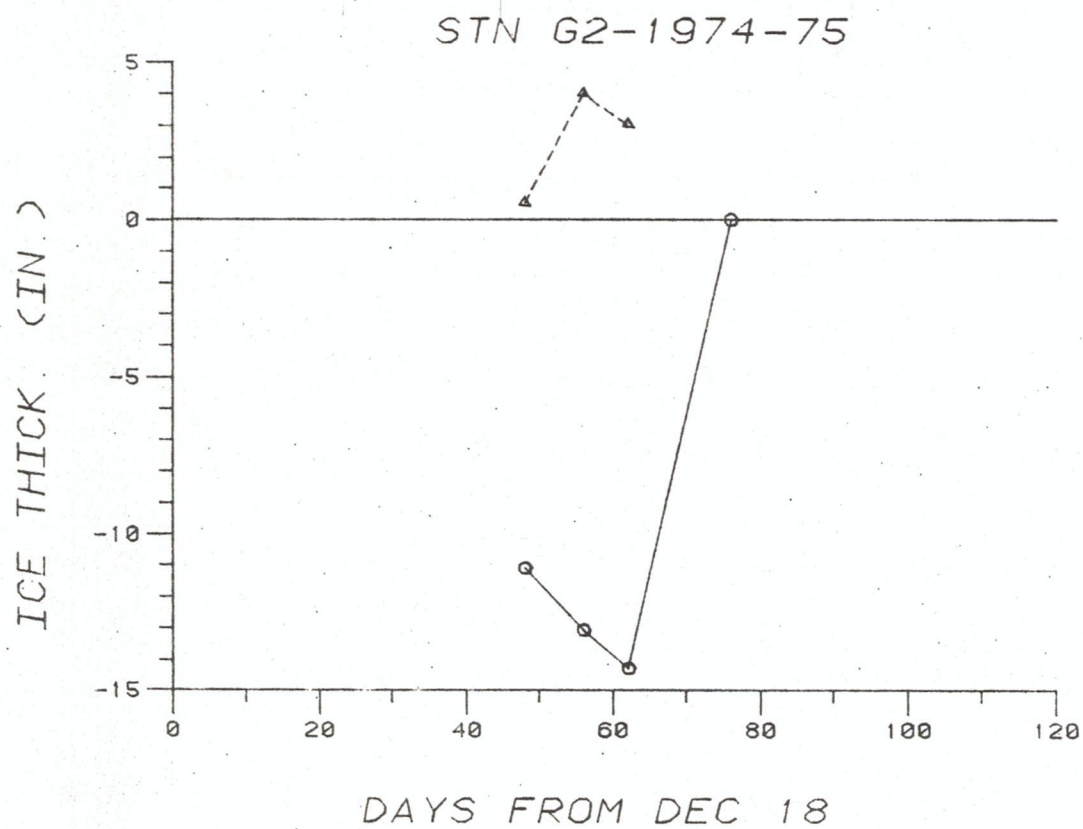
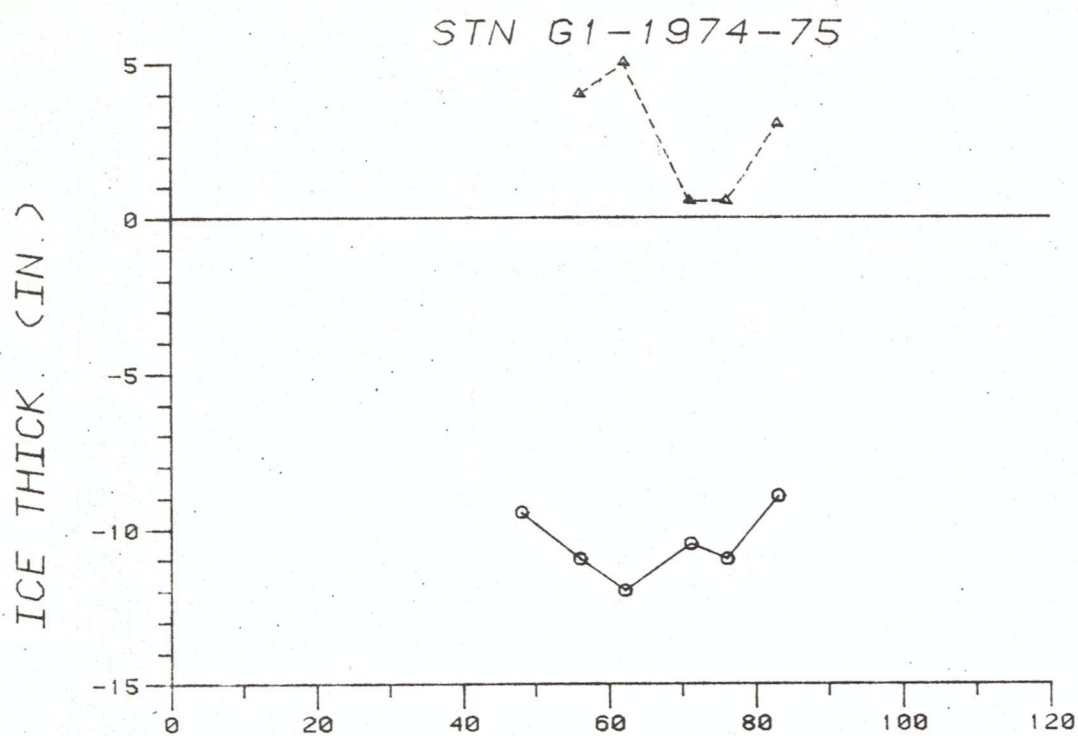
Station H4, Winter 1974-75

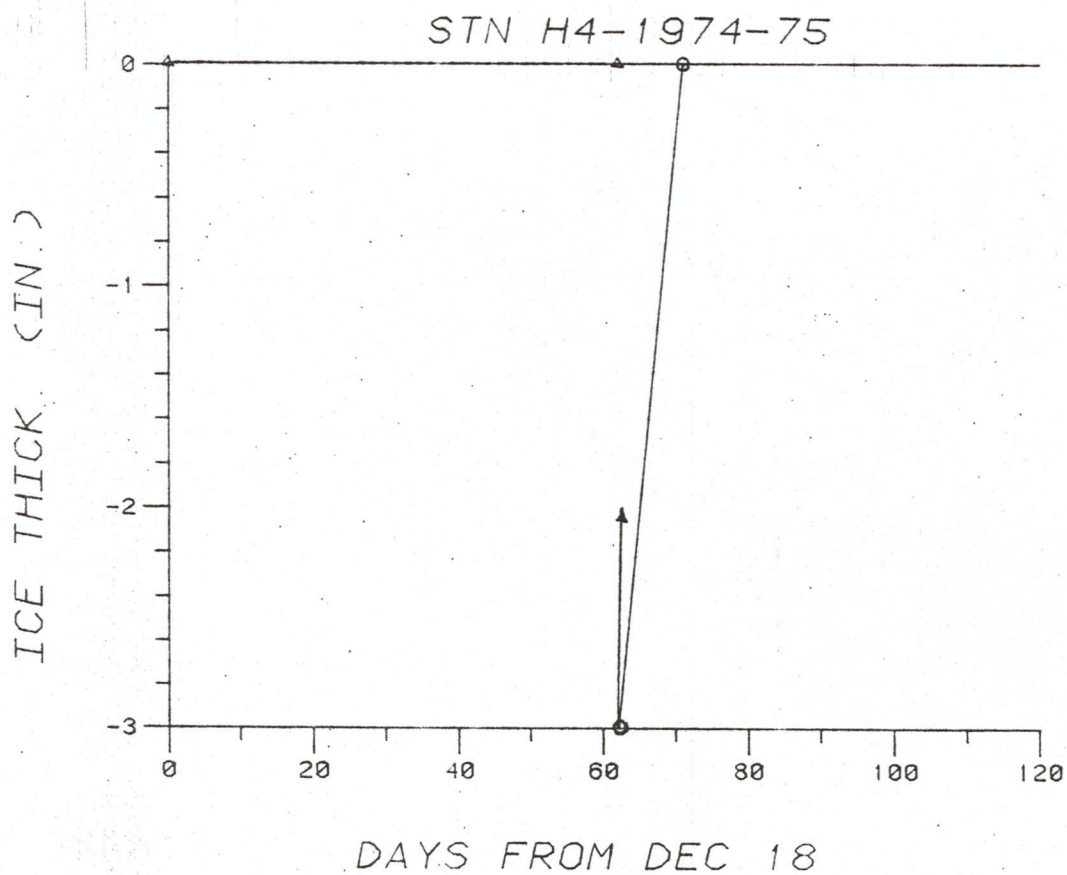
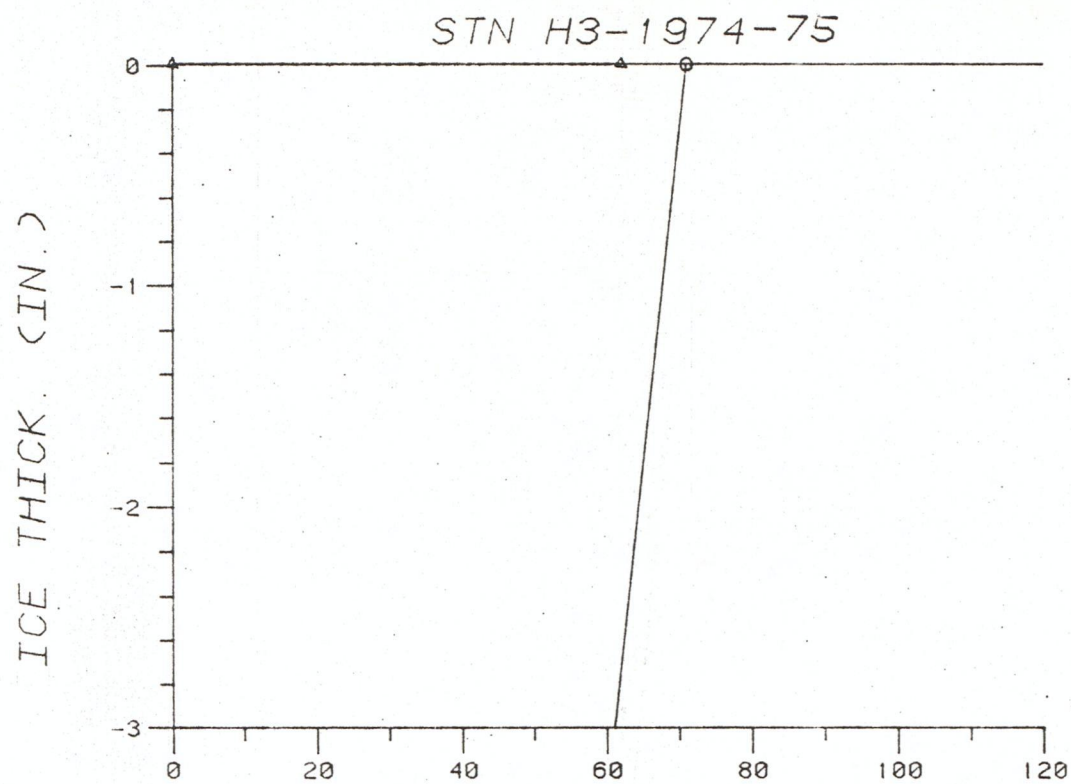
Date	Ice (in.)	Snow (in.)	Remarks
2/18/75	2 to 4	0	
2/27/75			Open water

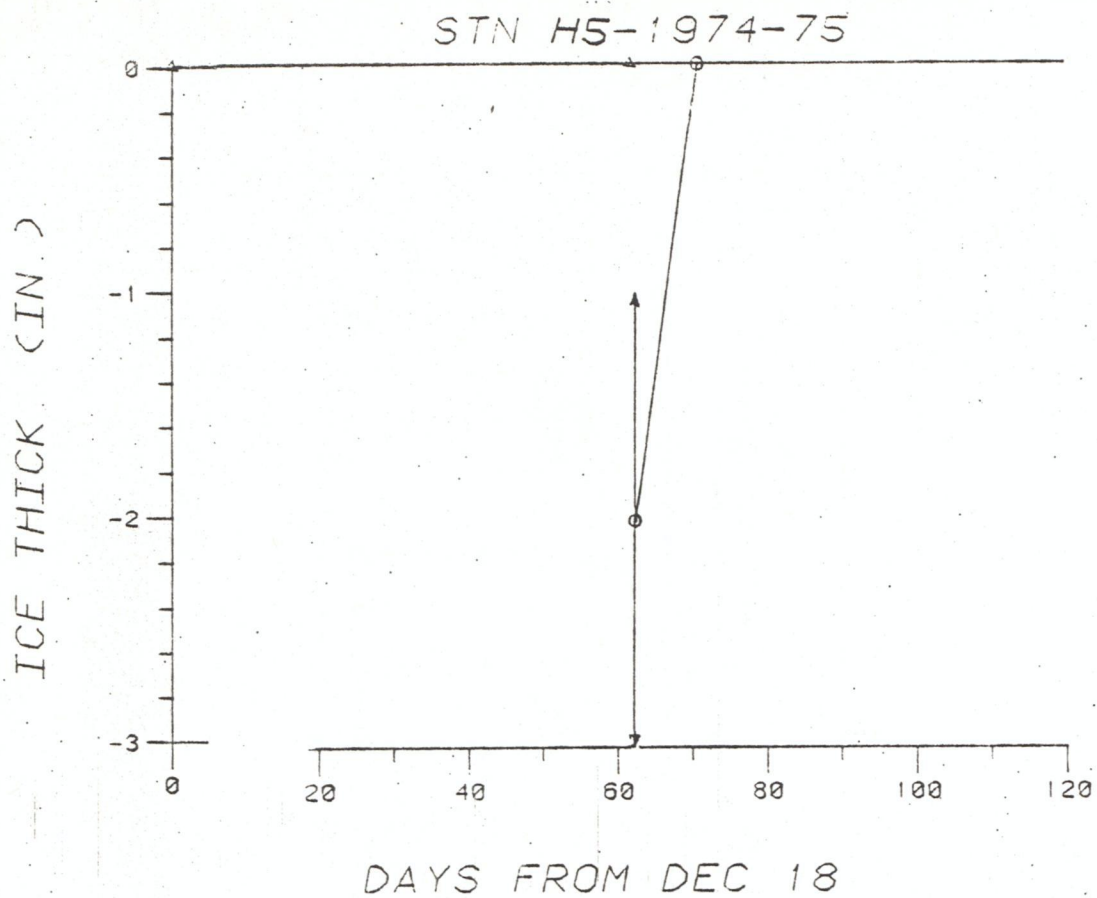
Station H5, Winter 1974-75

Date	Ice (in.)	Snow (in.)	Remarks
2/18/75	1 to 3	0	Unsafe, water on ice
2/27/75			Open water









Station F1, Winter 1975-76

Date	Ice (in.)	Snow (in.)	Remarks
1/22/76	13.8	1	Smooth surface
1/27/76	18.0	0	2" slush
2/5/76	21.0	1	Smooth surface
2/10/76	22.5	1	Smooth surface
2/24/76	24.0	1	Smooth surface
3/9/76	25.5	-	Smooth surface
3/16/76	23.0	-	Smooth surface
3/23/76	15.3	0	Smooth surface
3/29/76			Open water

Station F2, Winter 1975-76

Date	Ice (in.)	Snow (in.)	Remarks
1/22/76	14.5	1	Smooth surface, 24" frazil
1/27/76	18.8	1	Smooth surface
2/5/76	22.8	0	Smooth surface
2/10/76	25.0	2	Smooth surface
2/24/76	26.5	0	Smooth surface
3/9/76			Unsafe, water within 20'
3/23/76	Open water (Ice breaker Simcoe thru)		

Station G1, Winter 1975-76

Date	Ice (in.)	Snow (in.)	Remarks
1/22/76	13.3	5	Smooth surface
1/27/76	16.3	1	Smooth surface
2/5/76	18.3	0	Smooth surface
2/10/76	20.0	1	Smooth surface
2/24/76	21.5	1	Smooth surface
3/9/76	25.3	-	Smooth surface
3/16/76	23.5	-	Smooth surface
3/23/76			Simcoe pass thru

Station G2, Winter 1975-76

Date	Ice (in.)	Snow (in.)	Remarks
1/22/76	13.5	2	Smooth surface
1/27/76	17.0	1	Smooth surface
2/5/76	20.0		Smooth surface
2/10/76	21.5	2	Smooth surface
2/24/76	22.5	1	Smooth surface
3/9/76	24.0	-	Smooth surface
3/16/76	23.3	-	Smooth surface
3/23/76			Simcoe pass thru

Station H1, Winter 1975-76

Date	Ice (in.)	Snow (in.)	Remarks
1/27/76	12.8	0	Smooth surface
2/5/76	15.0	0	Smooth surface (broken equip)
2/10/76	16.3	4	New apparatus, smooth surface
2/24/76			Open water
3/9/76			Open water

Station H2, Winter 1975-76

Date	Ice (in.)	Snow (in.)	Remarks
1/27/76	5.8	1	Dented surface
2/5/76	9.8	1	Dented surface
2/10/76	8.8	2	Dented surface
2/24/76			Open water
3/9/76			Open water

Station H3, Winter 1975-76

Date	Ice (in.)	Snow (in.)	Remarks
1/22/76	8.3	1	Smooth surface
1/27/76	11.5	1	Smooth surface
2/5/76	12.8	1	Smooth surface
2/10/76	13.3	5	Smooth surface
2/24/76	5.8	0	Smooth surface
3/9/76	+3" of ice broken by Simcoe		

Station H4, Winter 1975-76

Date	Ice (in.)	Snow (in.)	Remarks
1/22/76	3.0	1	Approx. measure
1/22/76	10.8	1	Smooth surface
2/5/76	8.8	1	Smooth surface
2/10/76	8.8	4	Smooth surface
2/24/76	4.0		Smooth surface
3/9/76			Ice broken by Simcoe

Station H5, Winter 1975-76

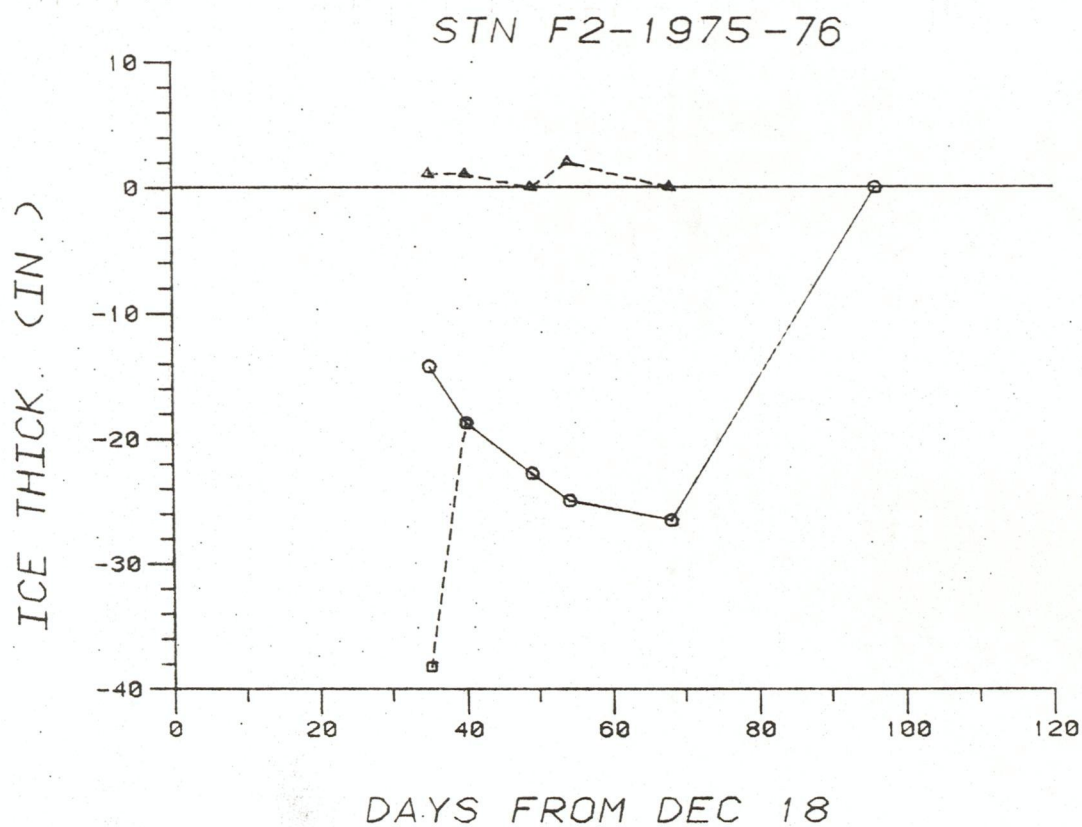
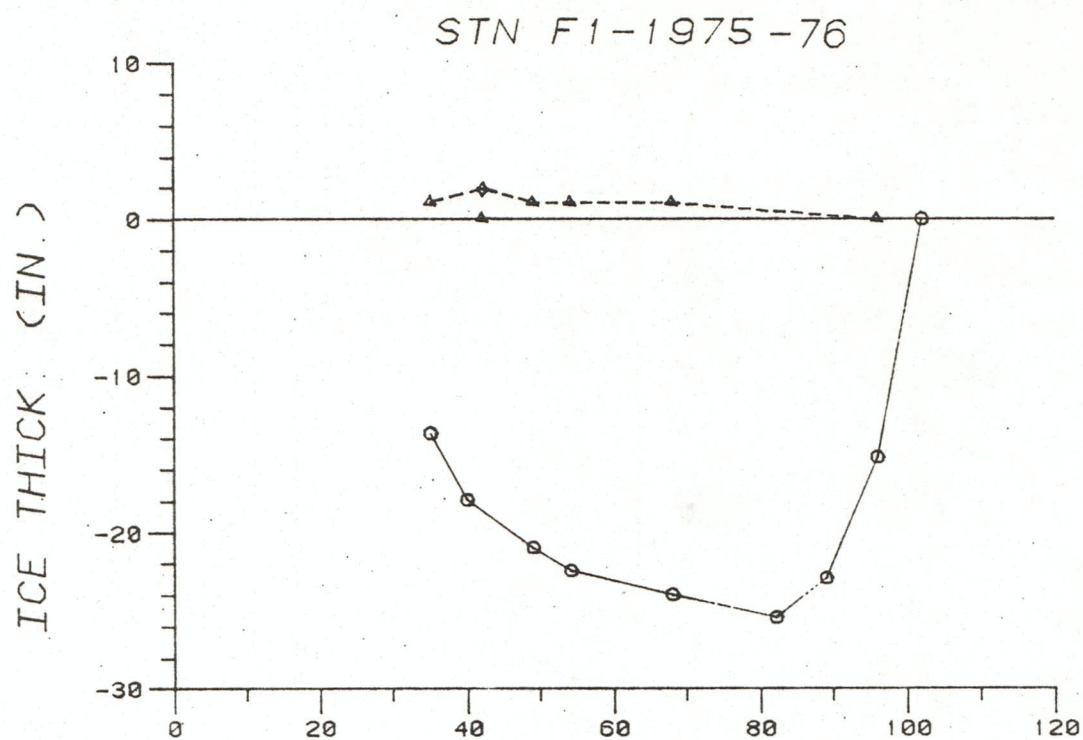
Date	Ice (in.)	Snow (in.)	Remarks
1/27/76	11.5	1	Smooth surface
2/5/76	10.5		Smooth surface
2/10/76	10.5	3	Smooth surface (Ridges in vicinity)
2/24/76	+2"		Water nearby - unsafe
3/9/76			Ice broken

Station H7, Winter 1975-76

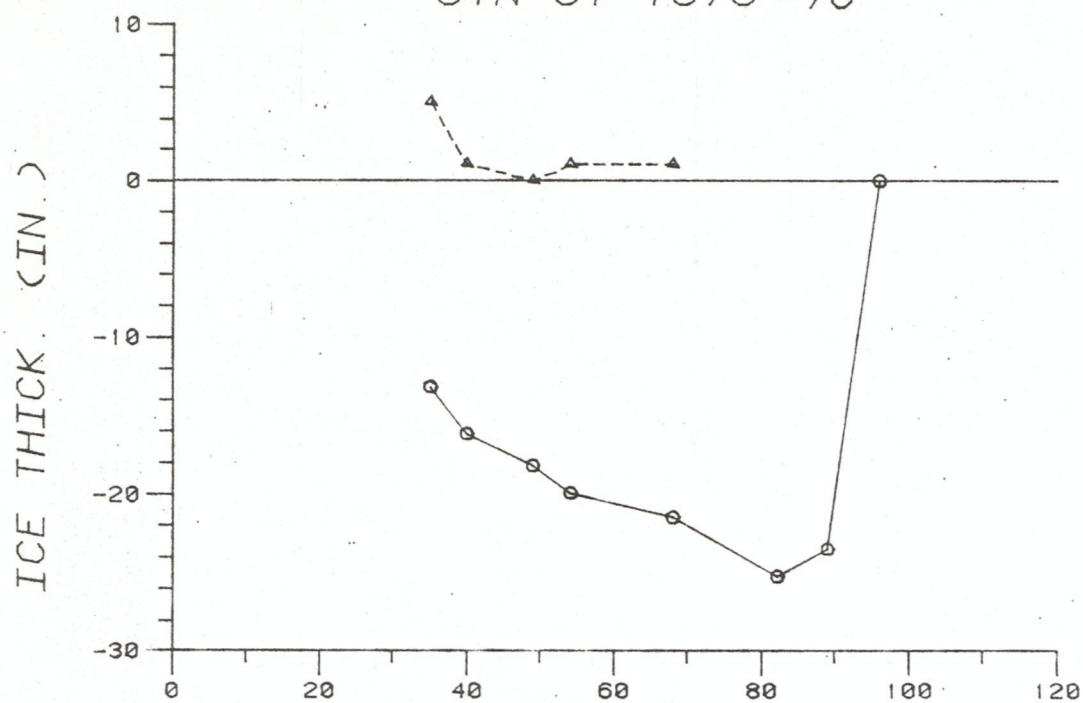
Date	Ice (in.)	Snow (in.)	Remarks
2/5/76	12.8		Smooth surface
2/10/76	12.8	1	Smooth surface
2/24/76	+2"		Free water nearby - unsafe
3/9/76	4.8	-	Smooth surface
3/16/76			Ice broken by Simcoe

Station H8, Winter 1975-76

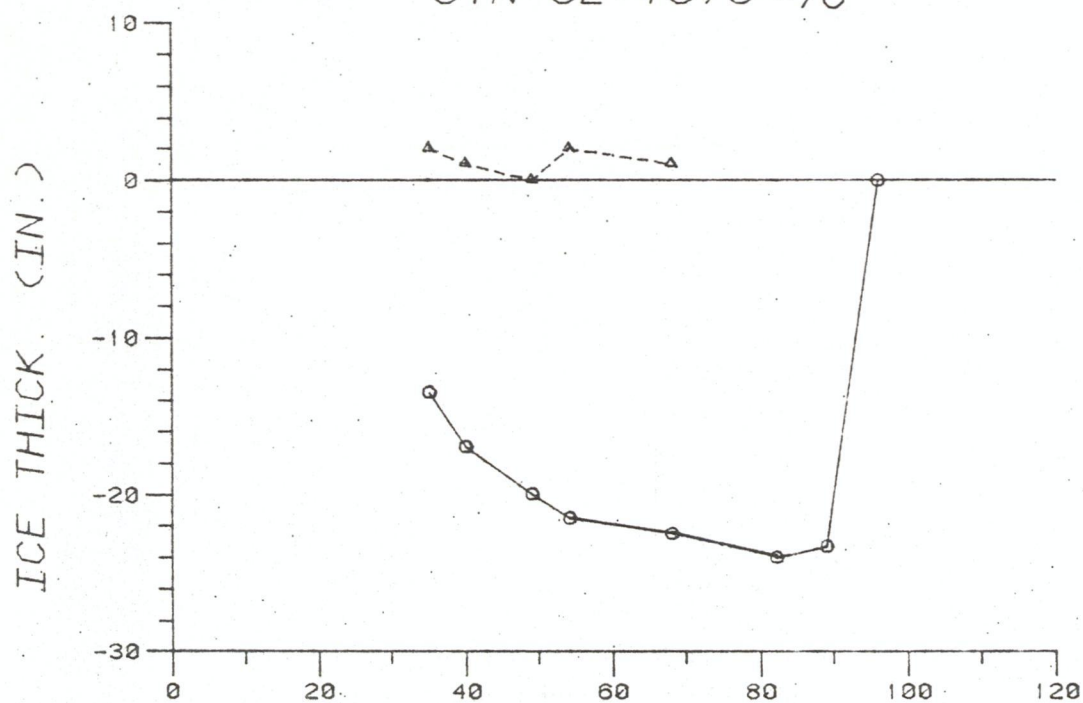
Date	Ice (in.)	Snow (in.)	Remarks
2/5/76	16.8	1	Smooth surface
2/10/76	17.8		Smooth surface
2/24/76	16.0		
3/9/76			Ice broken
3/9/76	8.0		Taken by Simcoe



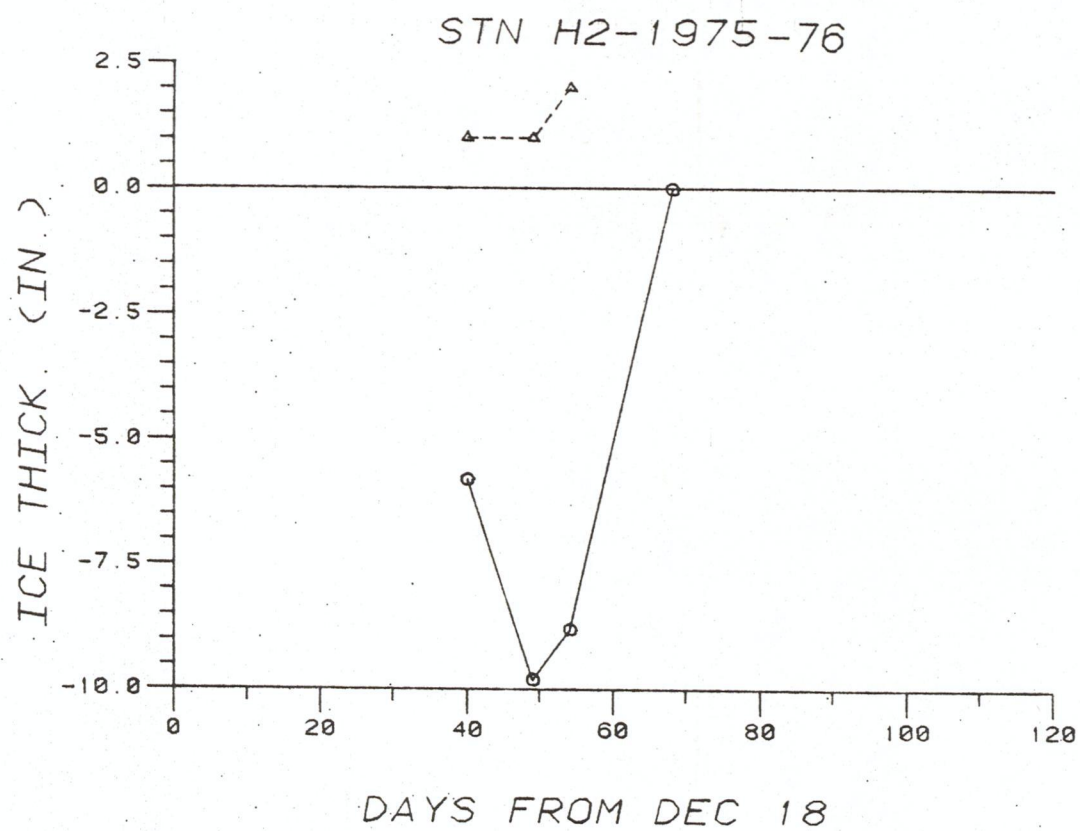
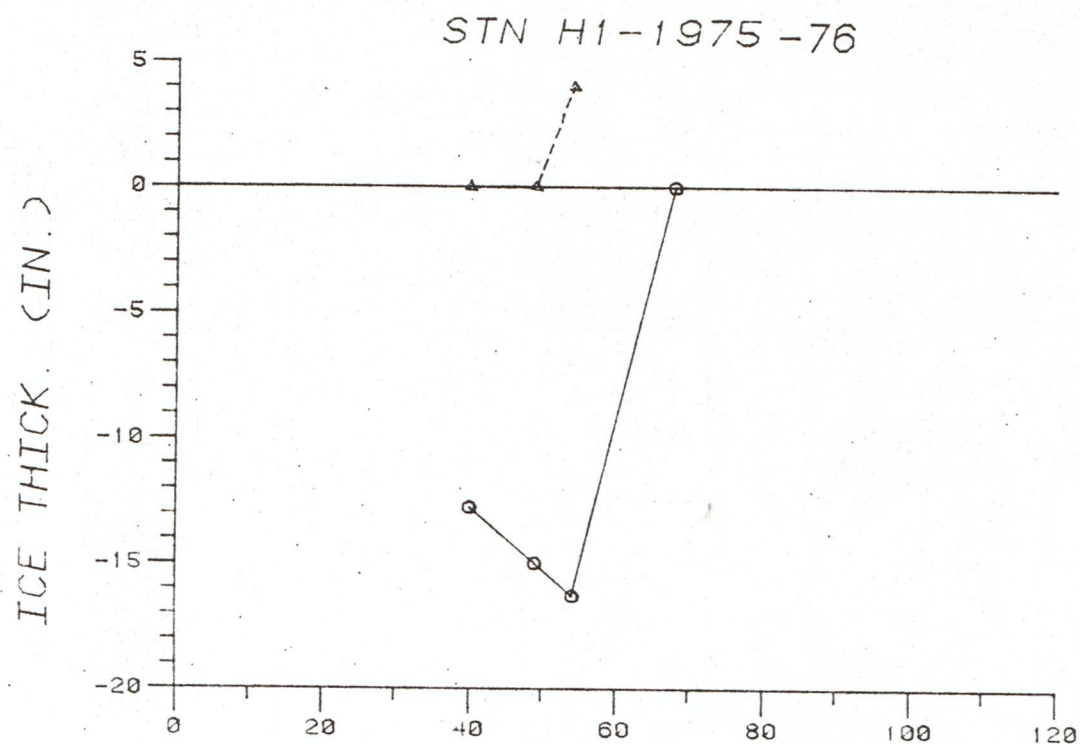
STN G1-1975-76

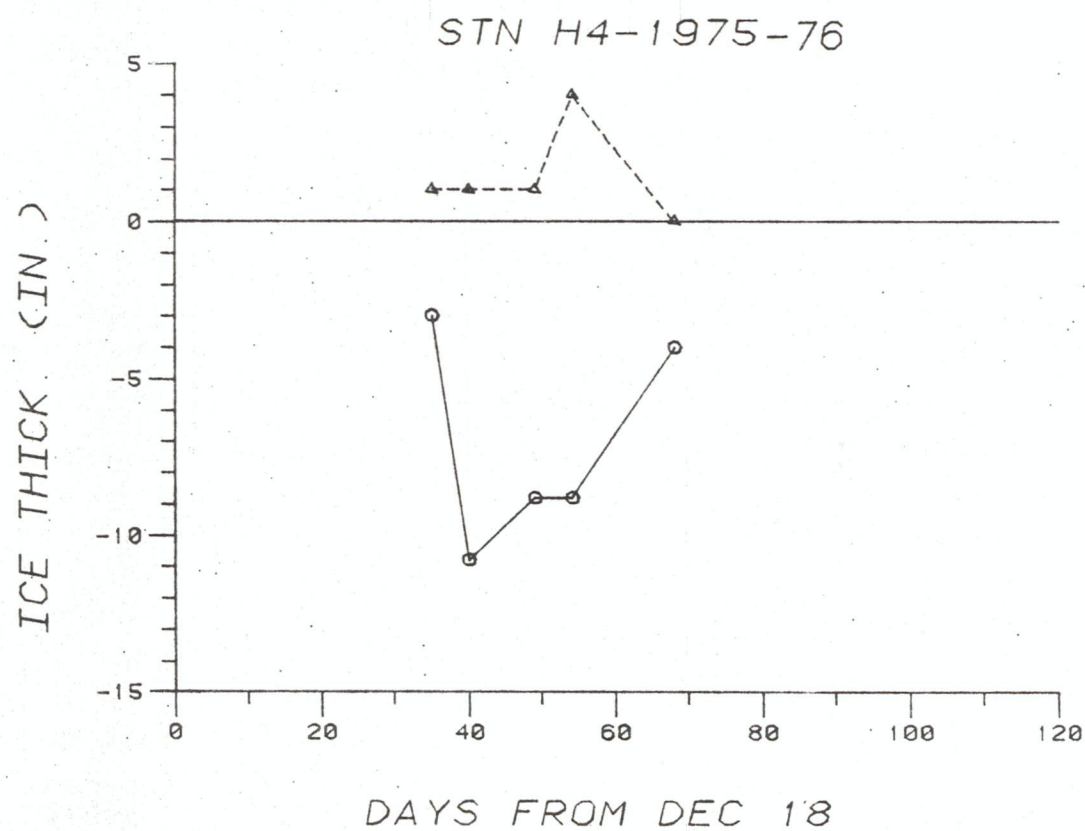
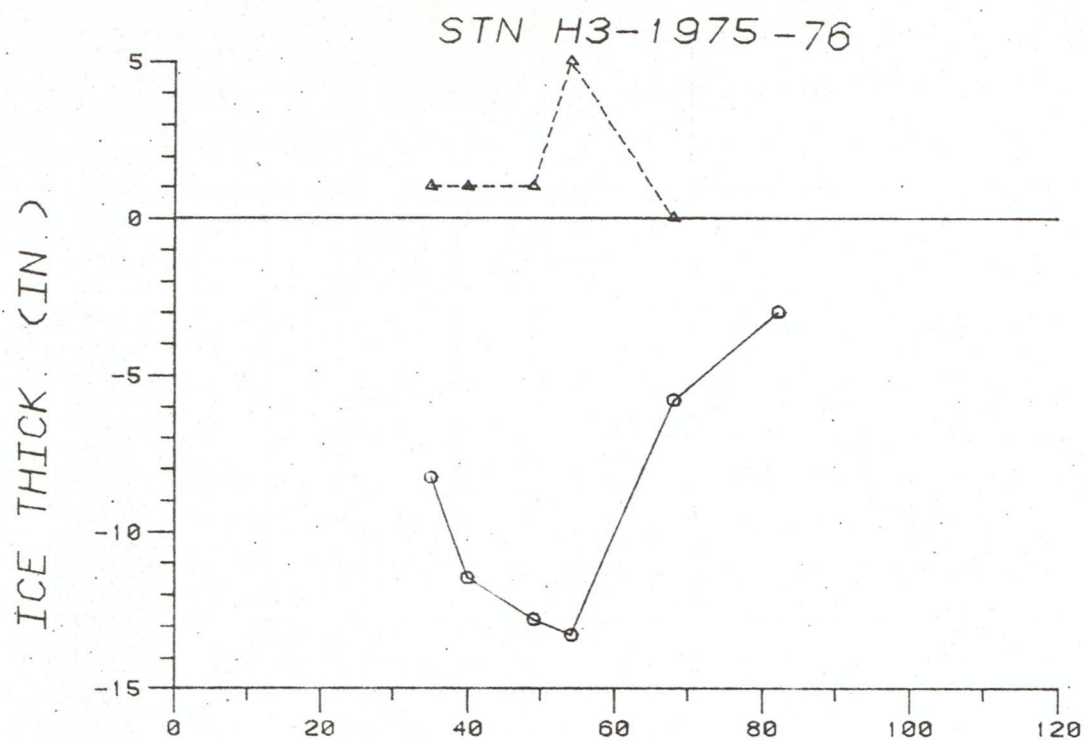


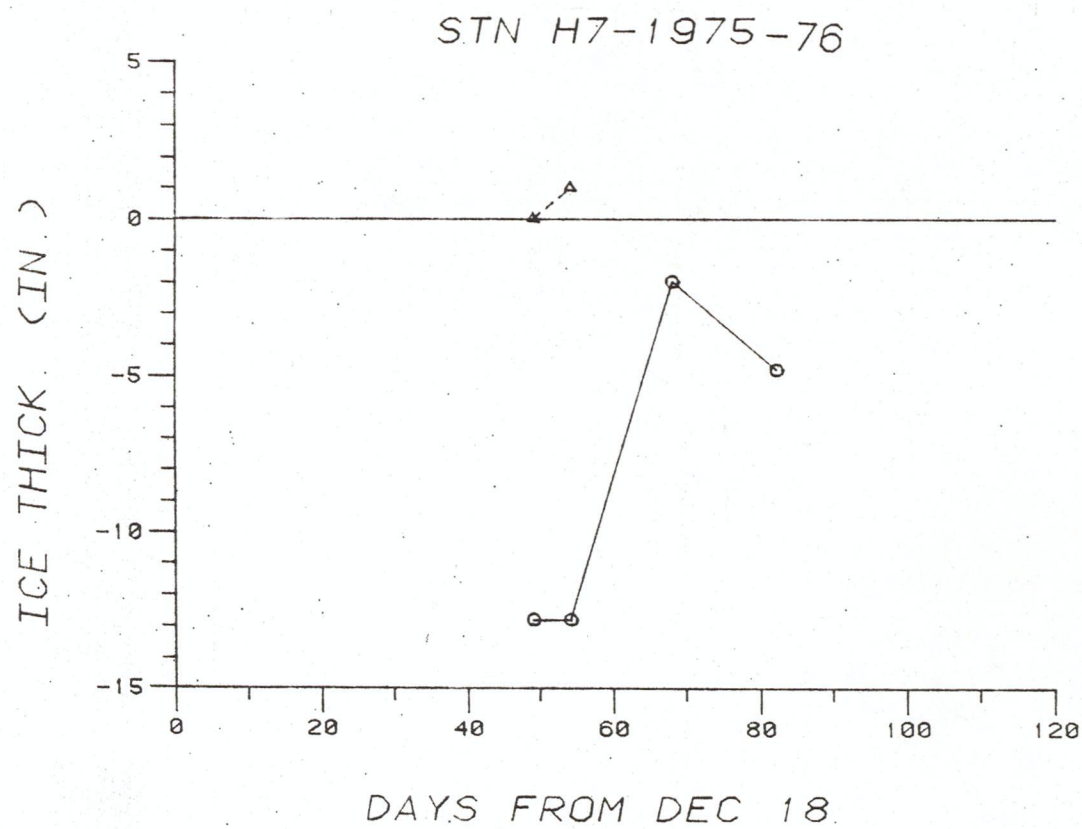
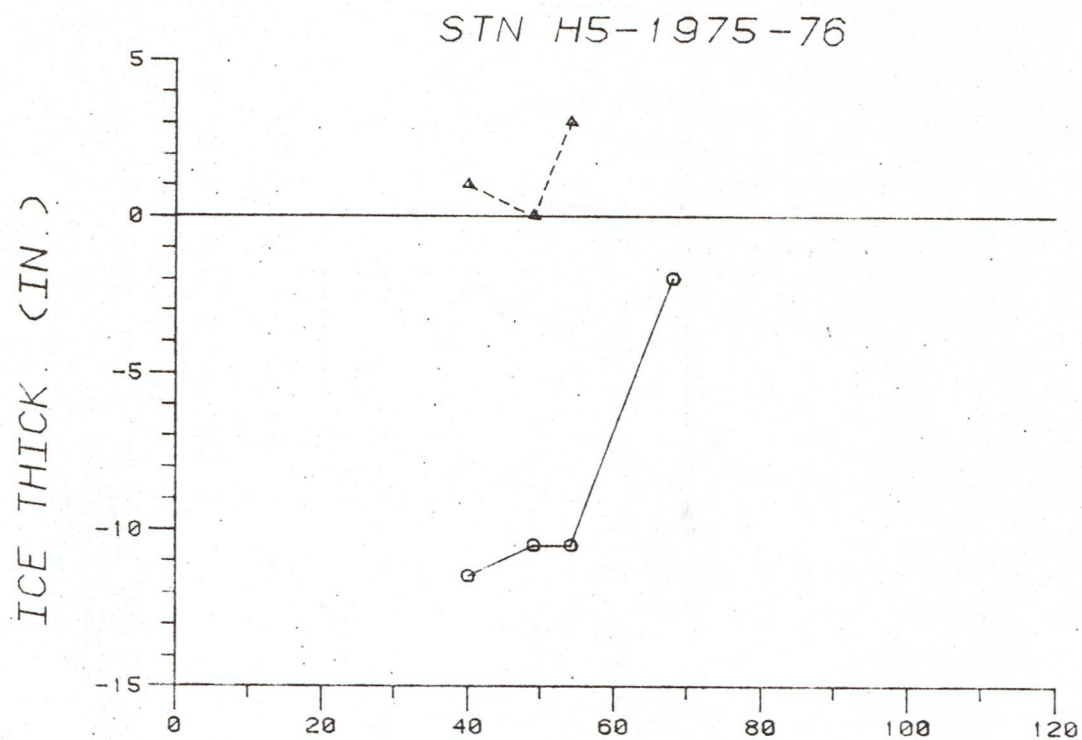
STN G2-1975-76

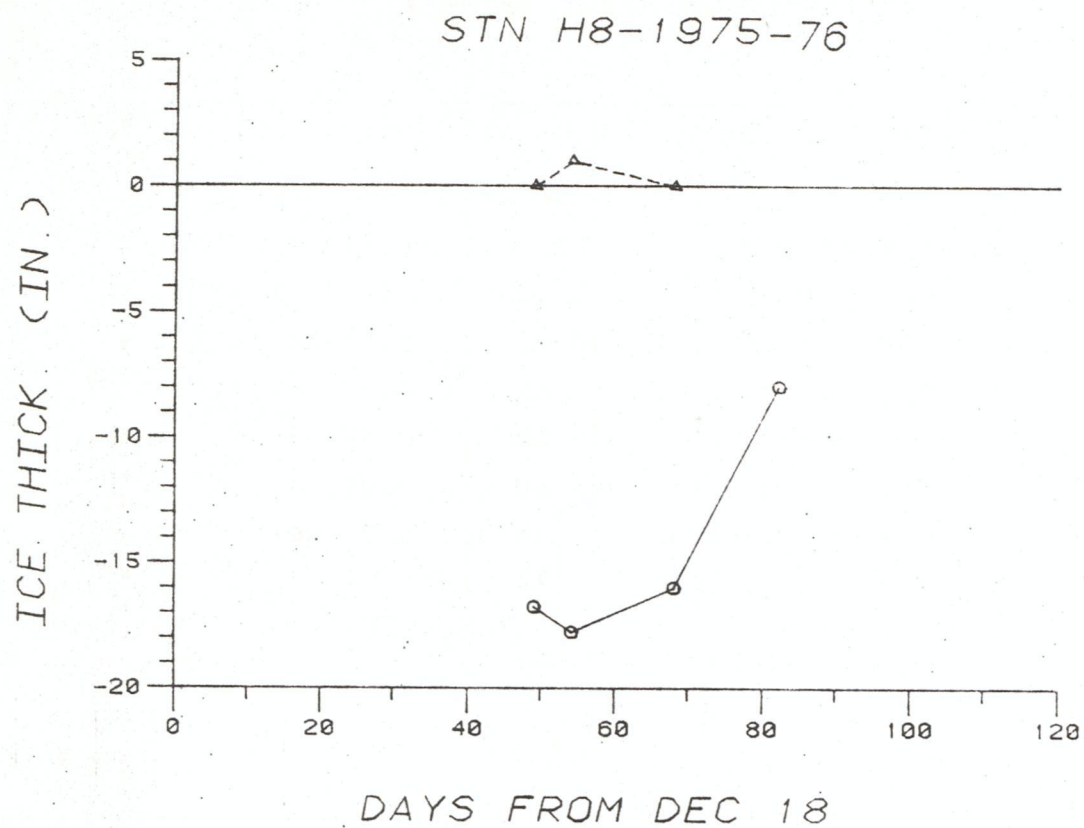


DAYS FROM DEC 18









Station E1, Winter 1976-77

Date	Ice (in.)	Snow (in.)	Remarks
1/26/77	17.3	12	Smooth surface
2/4/77	24.3	3	Smooth surface
2/8/77	24.8	3	Smooth surface
2/15/77	25.0	2	Smooth surface
2/22/77	26.5	1	Smooth surface
3/3/77	28.0	No snow	Smooth surface
3/8/77	28.0	No snow	Smooth surface
3/15/77	20.0	No snow	2" slush
3/22/77			Inaccessible

Station E2, Winter 1976-77

Date	Ice (in.)	Snow (in.)	Remarks
1/26/77	14.3	12	Surface roughness (medium)
2/4/77	20.3	3	Surface roughness (medium)
2/8/77	20.8	3	Surface roughness (medium)
2/15/77	23.5	No snow	Surface roughness (medium)
2/22/77	25.3	1	Surface roughness (medium)
3/1/77	26.5	No snow	Surface roughness (medium)
3/8/77	25.8	No snow	Surface roughness (medium)
3/15/77	13.0	No snow	3" slush

Station F1, Winter 1976-77

Date	Ice (in.)	Snow (in.)	Remarks
1/26/77	21.8	6	Smooth surface
2/4/77	23.0	4	Smooth surface
2/8/77	23.3	5	Smooth surface
2/15/77	24.3	3	Smooth surface
2/22/77	25.3	3	Smooth surface
3/1/77	26.8	1	Smooth surface
3/8/77	27	No snow	Smooth surface
3/15/77	17.5	No snow	Several cracks
3/22/77			Inaccessible

Station F2, Winter 1976-77

Date	Ice (in.)	Snow (in.)	Remarks
1/26/77	20.8	5	48" frazil
2/4/77	21.8	8	
2/8/77	22	11	
2/15/77	23	10	
2/22/77	24.5	9	
3/1/77	27	6	Broken edge
3/8/77	NA	6	Broken edge (Approx. meas.)
3/15/77			Open water

Station G1, Winter 1976-77

Date	Ice (in.)	Snow (in.)	Remarks
1/26/77	12.3	4	Smooth surface
2/4/77	13.8	2	Smooth surface
2/8/77	14.3	4	Smooth surface
2/15/77	16.0	No snow	Smooth surface
2/22/77	17.0	No snow	Smooth surface
3/1/77	16.5	No snow	Smooth surface
3/8/77	15.0	No snow	Smooth surface
3/15/77			Open water

Station G2, Winter 1976-77

Date	Ice (in.)	Snow (in.)	Remarks
1/26/77	14.3	6	Smooth surface
2/4/77	16.0	3	Smooth surface
2/8/77	17.8	6	Smooth surface
2/15/77	19.3	2	Smooth surface
2/22/77	20.8	2	Smooth surface
3/1/77	21.8	No snow	Smooth surface
3/8/77	21.8	No snow	Smooth surface
3/15/77	14.0	No snow	Free water upstream

Station H1, Winter 1976-77

Date	Ice (in.)	Snow (in.)	Remarks
1/28/77	13.0	6	3" water on ice
2/4/77	21.0	2	Smooth surface
2/8/77	21.0	3	Smooth surface
2/15/77	21.0	1	Broken edge (Approx. meas.)
2/22/77	22.0	No snow	Broken edge (Approx. meas.)
3/1/77	19.0	No snow	New apparatus installed
3/8/77	12.5	No snow	Smooth surface
3/15/77			Open water

Station H2, Winter 1976-77

Date	Ice (in.)	Snow (in.)	Remarks
1/28/77	13.25	2	Smooth surface
2/4/77	13	3	Edge damaged (Approx. meas.)
2/8/77	13	2	Edge damaged (Approx. meas.)
2/15/77	9	No snow	
2/22/77	8	No snow	Smooth surface
3/1/77	2	No snow	Unsafe, clear water in the Neighborhood
3/8/77			Open water

Station H3, Winter 1976-77

Date	Ice (in.)	Snow (in.)	Remarks
1/28/77	13.5	4	Smooth surface
2/4/77	16.5	3	Smooth surface
2/8/77	16.5	5	Smooth surface
2/15/77	15.5	1	Smooth surface
2/22/77	15.0	1	Smooth surface
3/1/77	13.5	No snow	Smooth surface
3/8/77	9.8	No snow	Smooth surface
3/15/77			Free open water

Station H4, Winter 1976-77

Date	Ice (in.)	Snow (in.)	Remarks
1/28/77	16.0	5	Smooth surface
2/4/77	17.0	4	Smooth surface
2/8/77	17.0	6	Smooth surface
2/15/77	17.0	2	Smooth surface
2/22/77	16.0	2	Smooth surface
3/1/77	15.0	No snow	Smooth surface
3/8/77	11.0	No snow	Smooth surface
3/15/77	Open water (a few ice pieces in movement)		

Station H5, Winter 1976-77

Date	Ice (in.)	Snow (in.)	Remarks
2/3/77	7.0	2	7" of slush
2/8/77	7.0	7	Smooth surface
2/15/77	13.5		Smooth surface
2/22/77	12.0		Smooth surface
3/1/77	9.0		Equip. defective
3/8/77			Open water

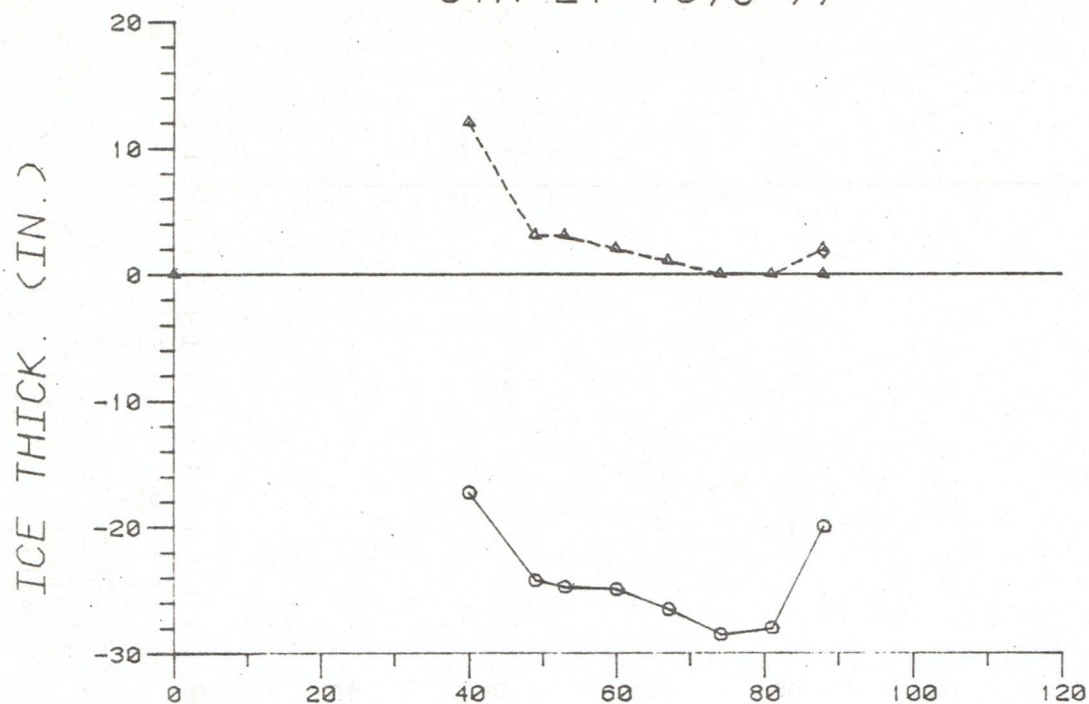
Station H7, Winter 1976-77

Date	Ice (in.)	Snow (in.)	Remarks
2/3/77	15.0	1	Smooth surface
2/8/77	15.0	7	Smooth surface
2/15/77	15.0	No snow	Smooth surface
2/22/77	15.5	No snow	Smooth surface
3/1/77	12.0	No snow	Smooth surface
3/8/77	7.3	No snow	Smooth surface
3/15/77			Open water

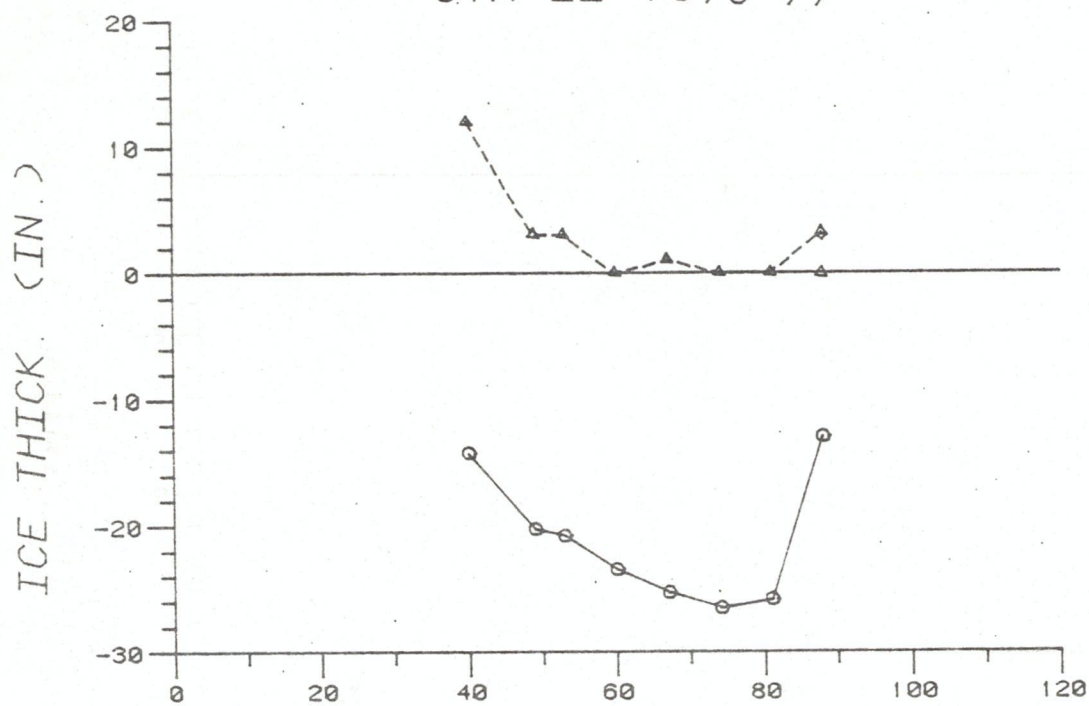
Station H8, Winter 1976-77

Date	Ice (in.)	Snow (in.)	Remarks
2/8/77	22.0	10	Smooth surface (1" water on ice)
2/15/77	23.75	3	Smooth surface
2/22/77	24.25	1	Smooth surface
3/1/77	25.75	1	Smooth surface
3/8/77	24.25	No snow	Smooth surface
3/15/77	17.0	1	Smooth surface
3/22/77			Inaccessible

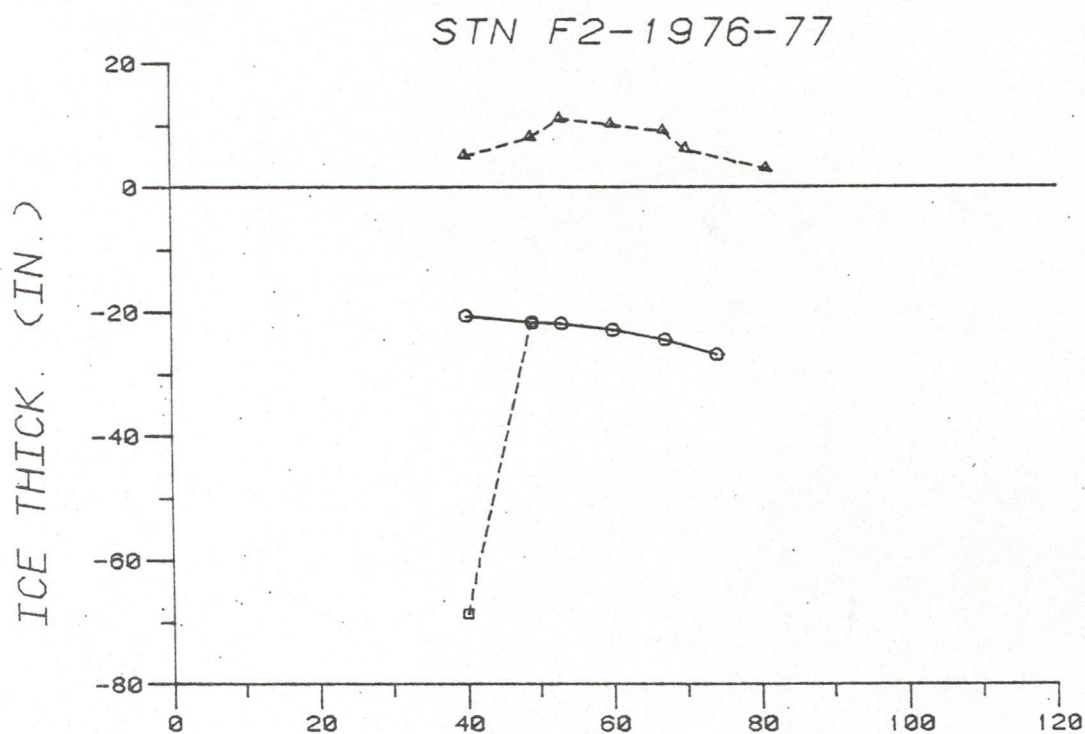
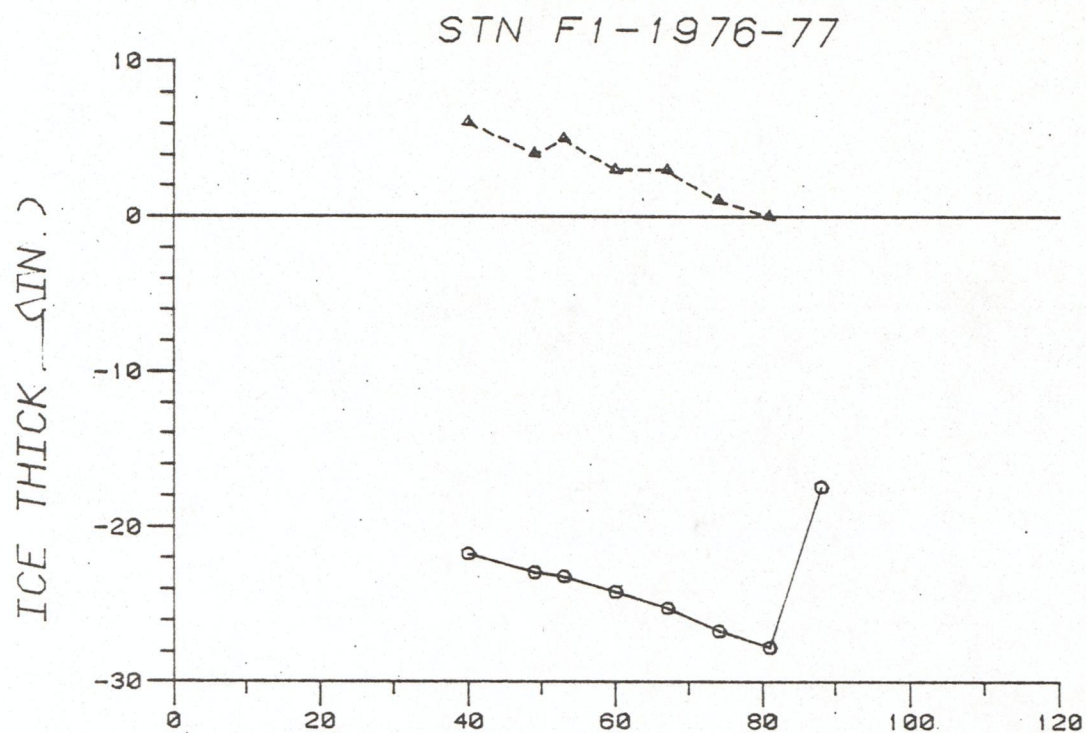
STN E1-1976-77



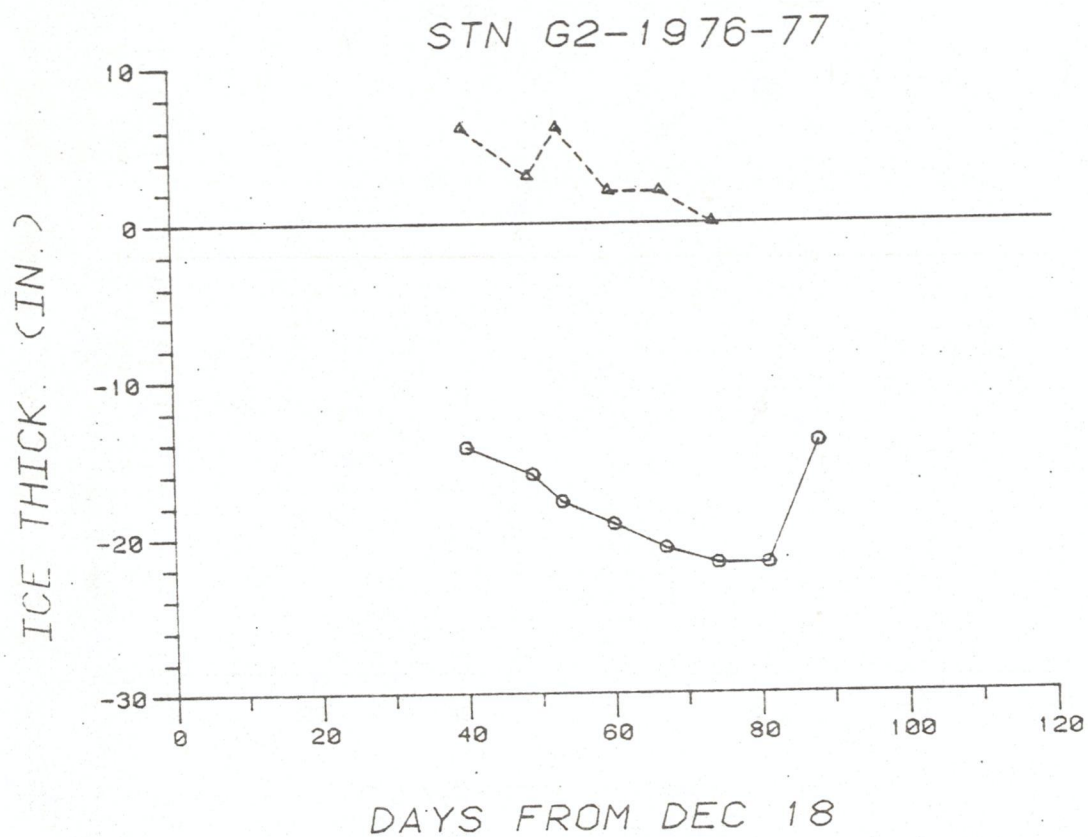
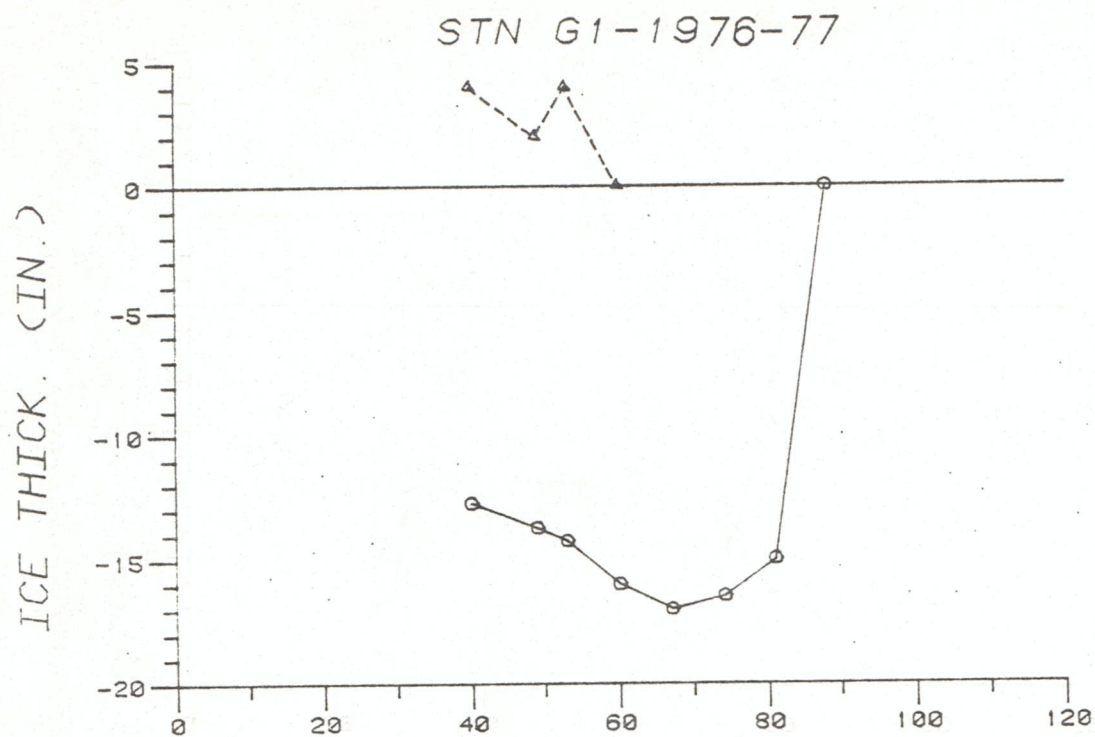
STN E2-1976-77

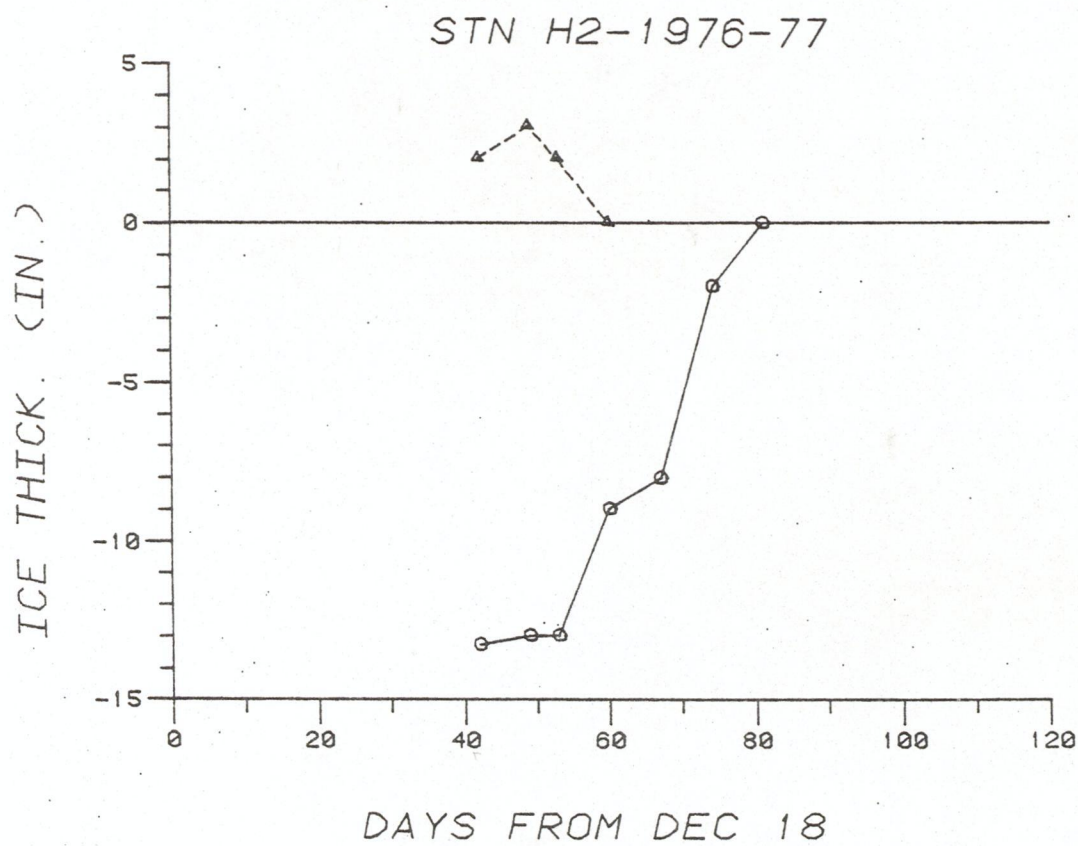
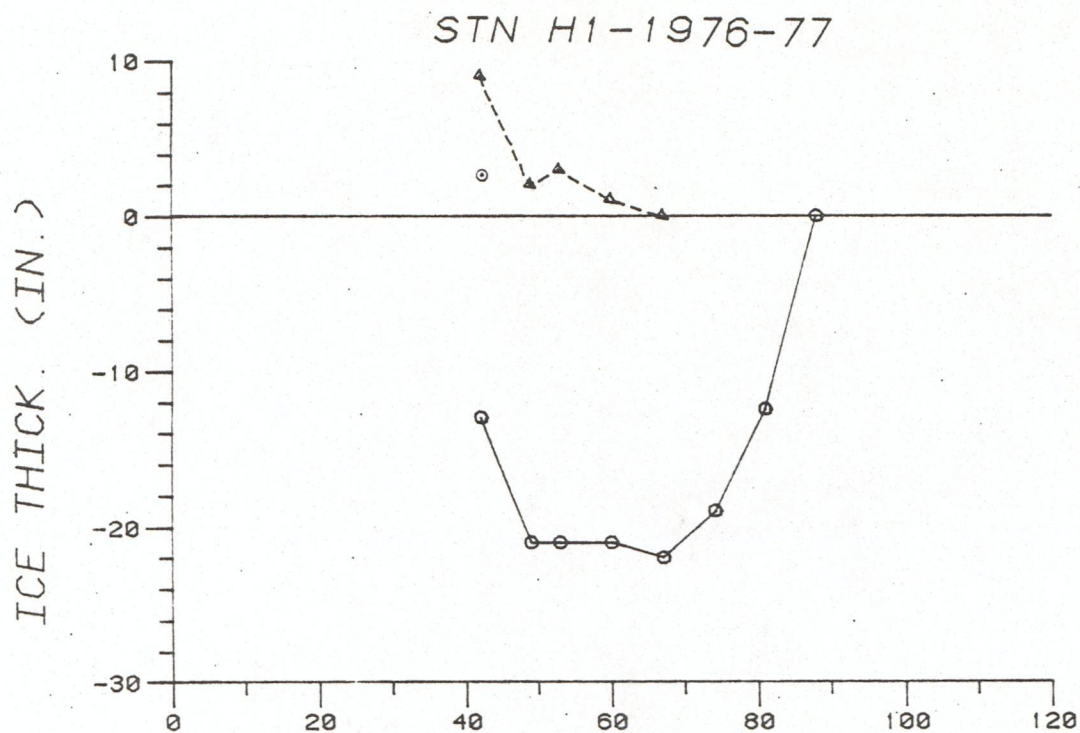


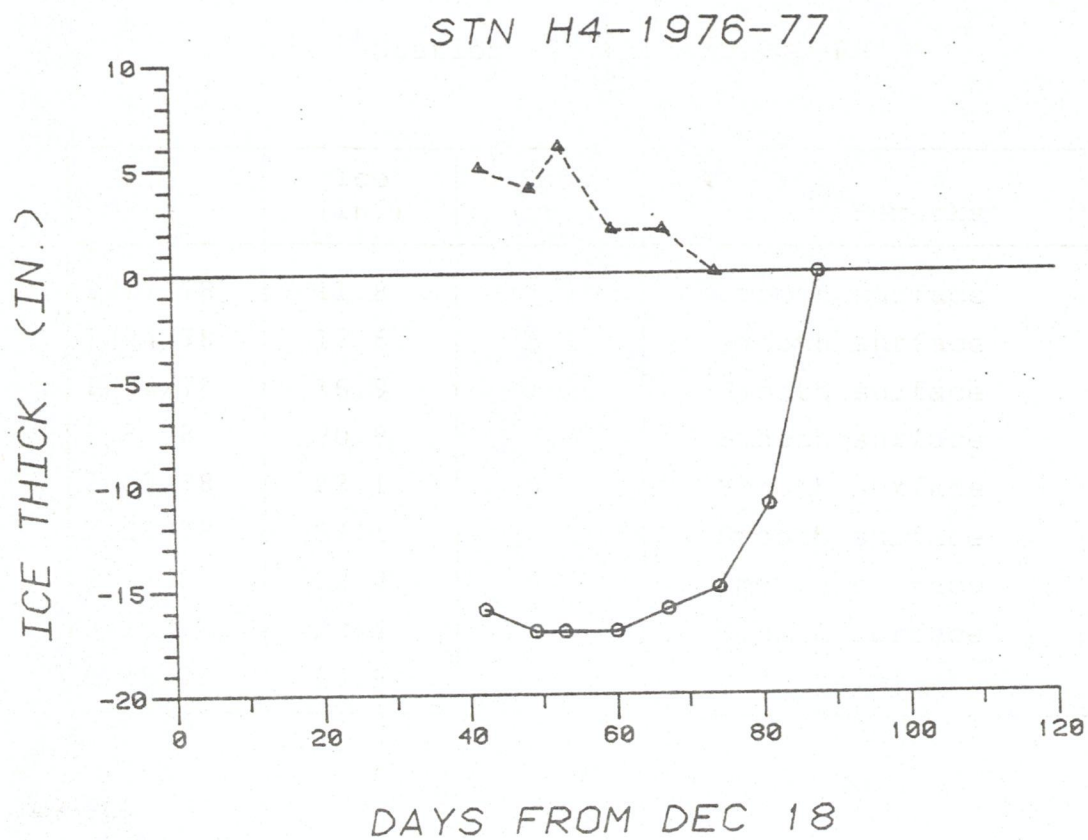
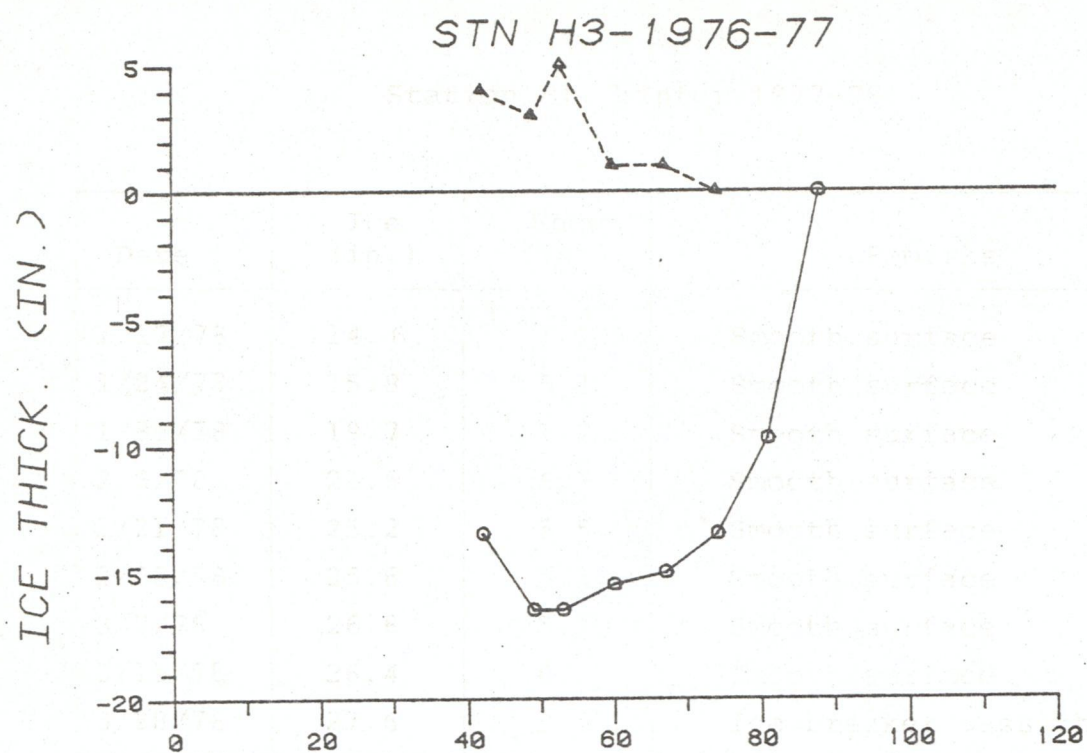
DAYS FROM DEC 18

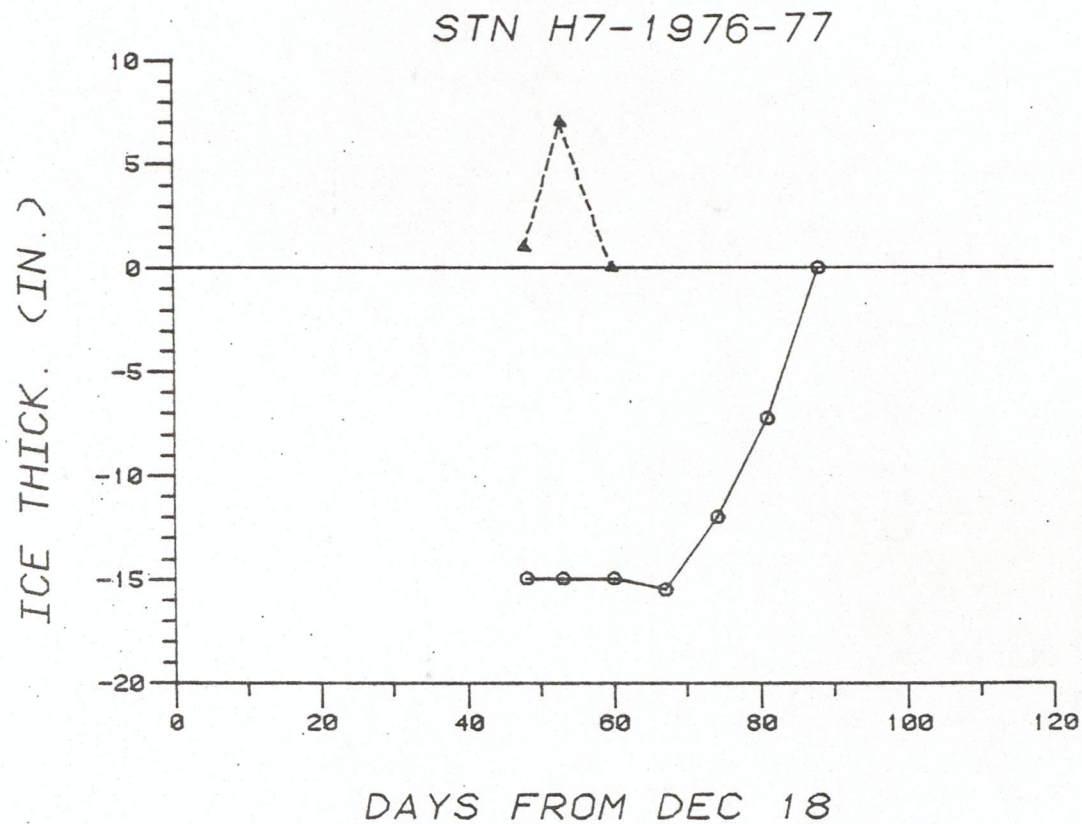
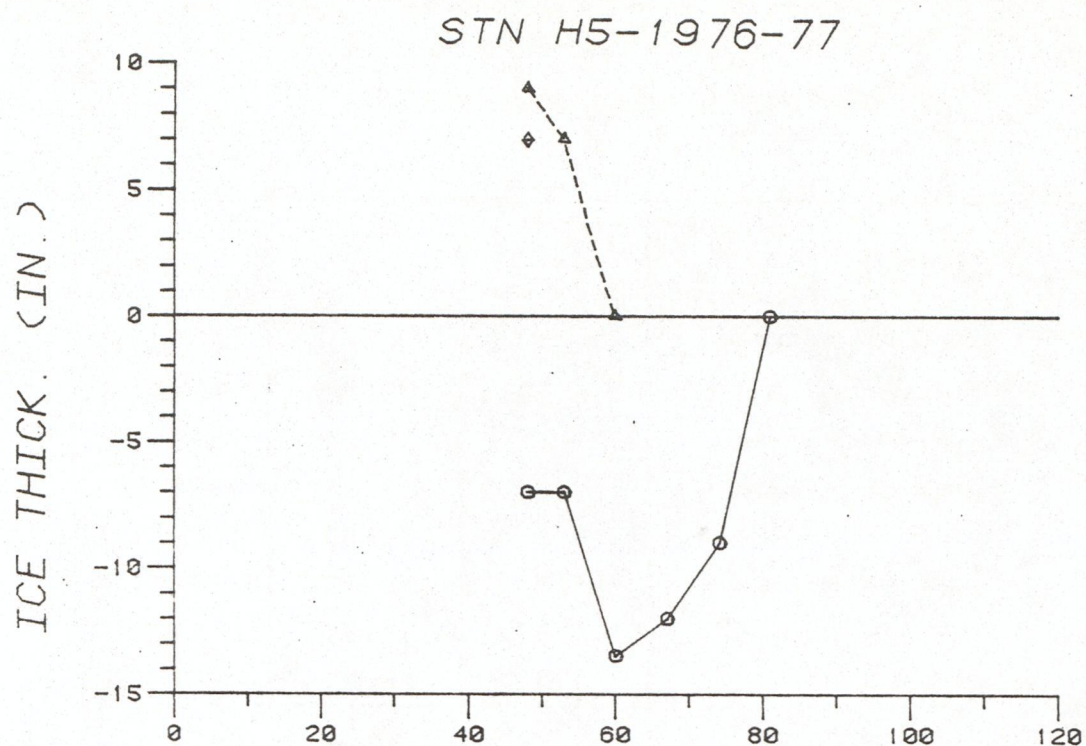


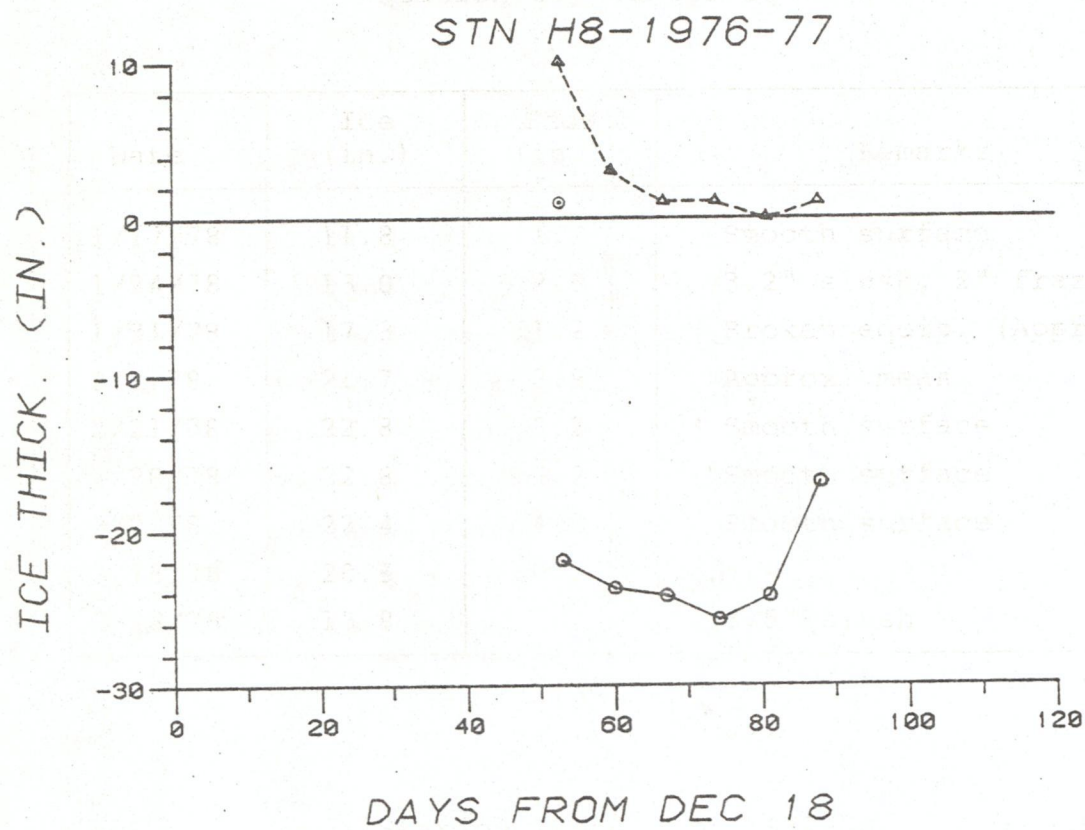
DAYS FROM DEC 18











Station E1, Winter 1977-78

Date	Ice (in.)	Snow (in.)	Remarks
1/17/78	14.6	1.2	Smooth surface
1/24/78	15.8	5.1	Smooth surface
1/31/78	19.7	1.2	Smooth surface
2/8/78	23.6	6.7	Smooth surface
2/21/78	25.2	5.5	Smooth surface
2/28/78	25.6	5.1	Smooth surface
3/7/78	26.8	5.1	Smooth surface
3/15/78	26.4	0.8	Smooth surface
3/28/78	27.6	1.6	Ice breaker pass thru

Station E2, Winter 1977-78

Date	Ice (in.)	Snow (in.)	Remarks
1/17/78	11.8	1.2	Smooth surface
1/24/78	12.6	5.1	Smooth surface
1/31/78	16.9	1.2	Smooth surface
2/8/78	20.9	7.9	Smooth surface
2/21/78	22.1	5.9	Smooth surface
2/28/78	22.1	5.9	Smooth surface
3/7/78	22.8	5.9	Smooth surface
3/15/78	22.4	0.8	Smooth surface
3/28/78	18.9		0.8" of slush

Station F1, Winter 1977-78

Date	Ice (in.)	Snow (in.)	Remarks
1/17/78	14.6	1.6	Smooth surface
1/24/78	15.0	13.0	Smooth surface
1/31/78	20.9	5.9	Smooth surface
2/8/78	23.2	11.8	Smooth surface
2/21/78	25.2	7.9	Smooth surface
2/28/78	26.0	9.8	Smooth surface
3/7/78	26.8	9.8	Smooth surface
3/15/78	26.8		4.7" slush
3/28/78	27.6	3.5	

Station F2, Winter 1977-78

Date	Ice (in.)	Snow (in.)	Remarks
1/17/78	12.2	1.2	Approx. 35.4" frazil
1/24/78	14.6	7.1	Ice stacks or contraction of neighborhood
1/31/78	17.3	5.9	Ice stacks or contraction of neighborhood
2/8/78	22.4	9.1	Ice stacks or contraction of neighborhood
2/21/78	24.8	7.1	Ice stacks or contraction of neighborhood
2/28/78	25.6	7.1	Ice stacks or contraction of neighborhood
3/7/78	27.2	7.9	Ice stacks or contraction of neighborhood
3/15/78	27.6	0	3.9" of water on ice

Station G1, Winter 1977-78

Date	Ice (in.)	Snow (in.)	Remarks
1/17/78	11.8	1.2	Smooth surface
1/24/78	13.0	2.0	3.2" slush, 2" frazil
1/31/78	17.3	1.2	Broken equip. (Approx. meas.)
2/8/78	21.7	3.9	Approx. meas.
2/21/78	22.8	3.2	Smooth surface
2/28/78	22.8	3.2	Smooth surface
3/7/78	22.4	4.3	Smooth surface
3/15/78	20.5	0	
3/28/78	13.8		3.5" slush

Station G2, Winter 1977-78

Date	Ice (in.)	Snow (in.)	Remarks
1/17/78	13.0	1.2	Smooth surface
1/24/78	13.8	7.9	Smooth surface
1/31/78	16.9	5.1	Smooth surface
2/8/78	20.5	6.7	Smooth surface
2/21/78	22.1	4.7	Smooth surface
2/28/78	22.4	4.7	Smooth surface
3/7/78	22.4	4.7	Smooth surface
3/15/78	24.0	0.8	Smooth surface
3/28/78	24.0		1.6" slush

Station H1, Winter 1977-78

Date	Ice (in.)	Snow (in.)	Remarks
1/17/78	9.8	1.2	Smooth surface, approx. 22.6" frazil
1/24/78	11.8	9.8	Smooth surface (2" slush)
1/31/78	13.8	7.1	
2/8/78	18.5	3.9	Smooth surface (defective equip.)
2/21/78	20.9	4.7	Broken equip. (Approx. meas.)
2/28/78	20.1	4.7	Broken equip. (Approx. meas.)
3/7/78	20.9	4.7	Broken equip. (Approx. meas.)
3/15/78	17.3	0	Broken equip. (Approx. meas.)

Station H2, Winter 1977-78

Date	Ice (in.)	Snow (in.)	Remarks
1/17/78	15.0	1.2	Smooth surface
1/24/78	15.8	1.2	Smooth surface
1/31/78	14.6	3.2	Smooth surface
2/8/78	14.2	1.2	Smooth surface
2/21/78	12.2	1.2	Smooth surface
2/28/78	11.0	1.2	Approx. meas.
3/7/78	9.1	9.1	Approx. meas.
3/15/78			Free water on ice

Station H3, Winter 1977-78

Date	Ice (in.)	Snow (in.)	Remarks
1/17/78	11.0	0	Smooth surface
1/24/78	11.0	5.1	Smooth surface
1/31/78	15.0	1.2	Smooth surface
2/8/78	17.3	1.2	Smooth surface
2/21/78	20.5	0.8	Smooth surface
2/28/78	20.5	2.4	Smooth surface
3/7/78	20.9	2.0	Smooth surface
3/15/78	18.5	0	

Station H4, Winter 1977-78

Date	Ice (in.)	Snow (in.)	Remarks
1/17/78	10.6	1.2	Smooth surface
1/24/78	10.6	5.1	Smooth surface
1/31/78	13.0	1.2	Smooth surface
2/8/78	16.9	1.2	Smooth surface
2/21/78	18.1	2.4	Smooth surface
2/28/78	18.1	1.2	Smooth surface
3/7/78	17.7	1.6	Smooth surface
3/15/78	15.0	0	Few openings in area (Ice rotten)

STN H5-1977-78

Station H5, Winter 1977-78

Date	Ice (in.)	Snow (in.)	Remarks
1/17/78	6.3	2.0	Smooth surface
1/24/78	11.8	3.9	Smooth surface
1/31/78	11.8	2.0	Smooth surface
2/8/78	14.2	3.9	Smooth surface
2/21/78	14.6	3.9	Smooth surface
2/28/78	13.4	3.9	Smooth surface
3/7/78	13.0	3.9	Smooth surface
3/15/78	10.2	0	Many openings in area (Ice rotten)

STN H7-1977-78

Station H7, Winter 1977-78

Date	Ice (in.)	Snow (in.)	Remarks
1/17/78	7.1	1.2	Smooth surface
1/24/78	7.1	9.8	Smooth surface
1/31/78	10.2	1.2	Smooth surface
2/8/78	14.2	0	Smooth surface
2/21/78	13.8	1.2	Smooth surface
2/28/78	12.2	0.8	Smooth surface
3/7/78	11.8	2.4	Smooth surface
3/15/78	9.1	Many openings in area (Ice rotten)	

Station H8, Winter 1977-78

Date	Ice (in.)	Snow (in.)	Remarks
1/17/78	4.3	0	Smooth surface
1/24/78	8.3	0	Smooth surface
1/31/78	11.4	0	Equip. missing (Approx. meas.)
2/8/78	18.9	0	New edge is coming (183 cm)
2/21/78	22.1	1.2	
2/28/78	23.2	0.8	Smooth surface
3/7/78	24.8	0.8	Smooth surface
3/15/78	24.4	0.8	Smooth surface

Station US1, Winter 1977-78

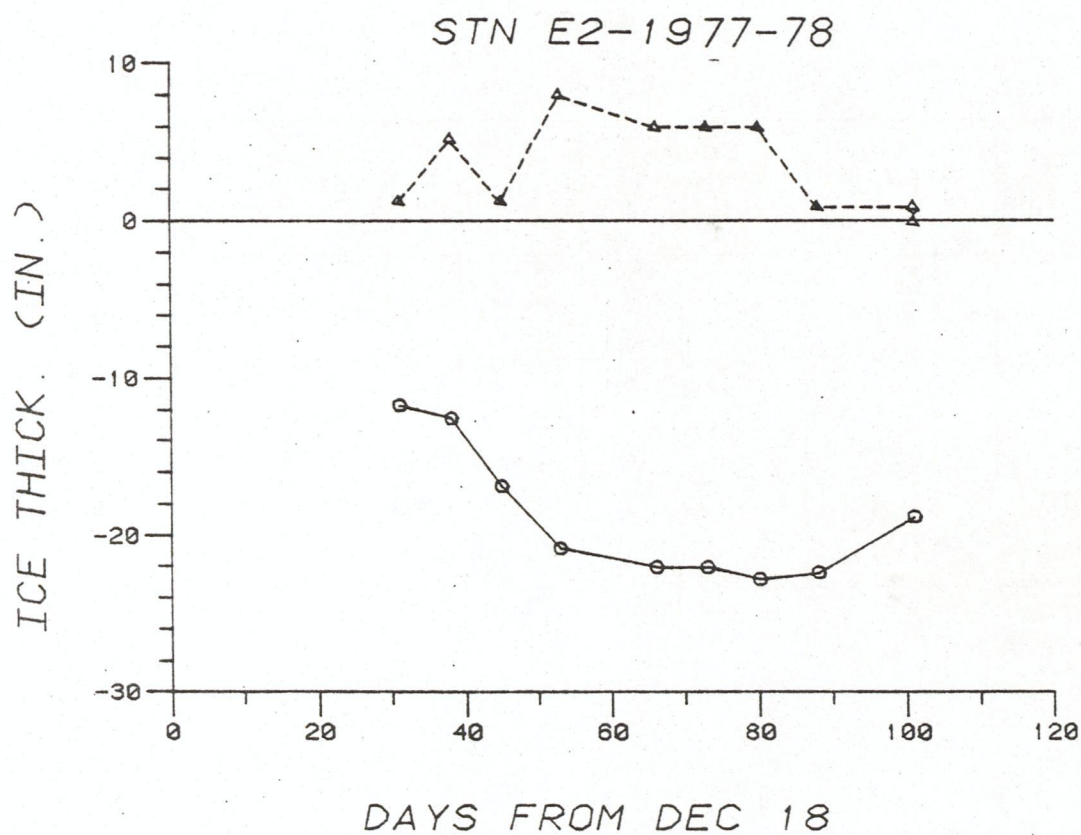
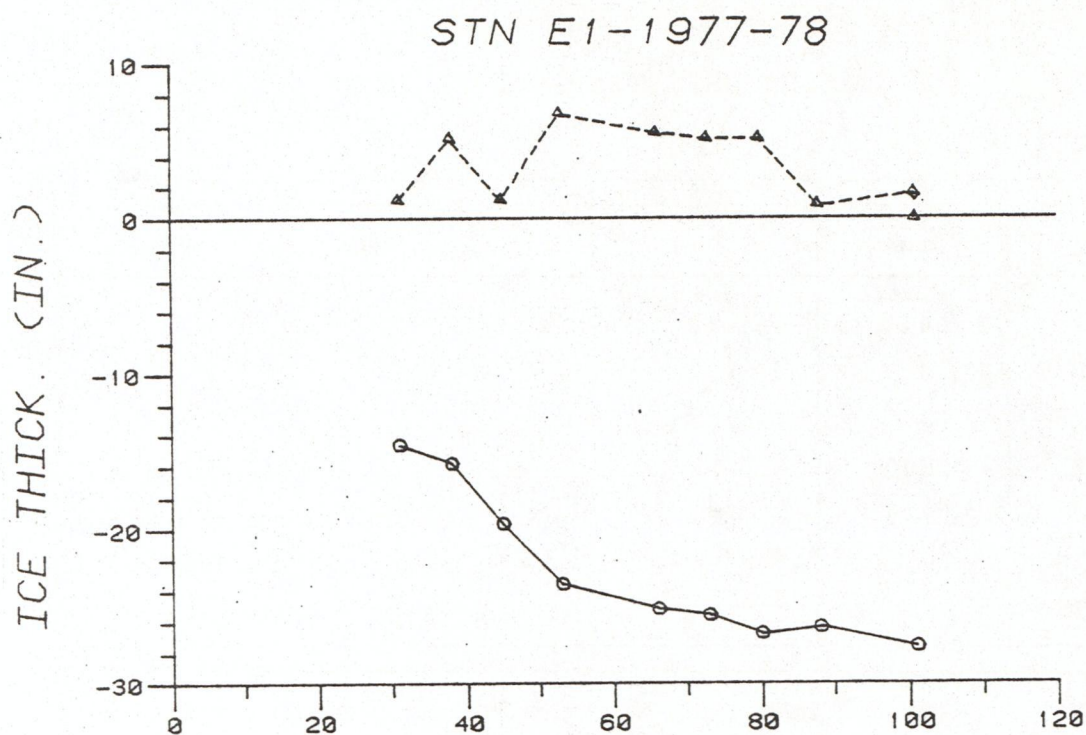
Date	Ice (in.)	Snow (in.)	Remarks
1/31/78	12.2	2.0	Smooth surface
2/8/78	15.8	3.9	Smooth surface
2/21/78	15.8	3.5	Smooth surface
2/28/78	15.0	3.9	Smooth surface
3/7/78	14.6	3.9	Smooth surface
3/15/78	10.6	0.8	Many openings in area (Ice rotten)
2/28/78			Open water

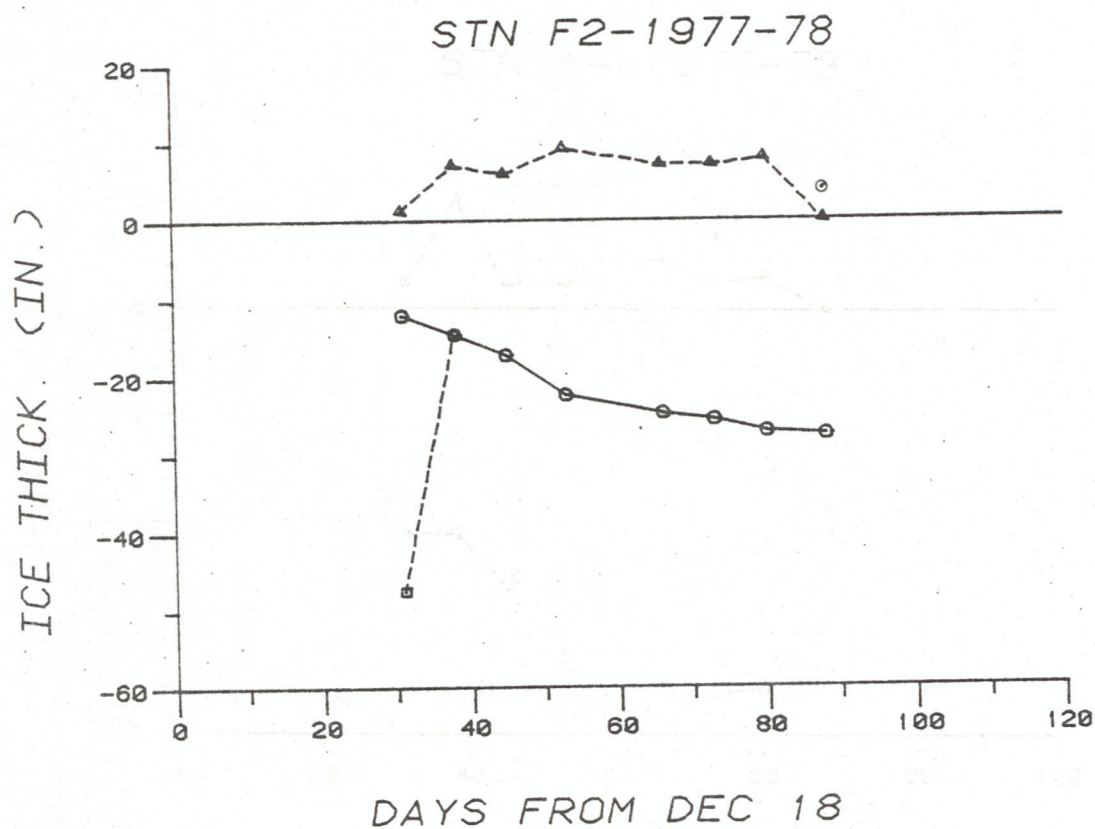
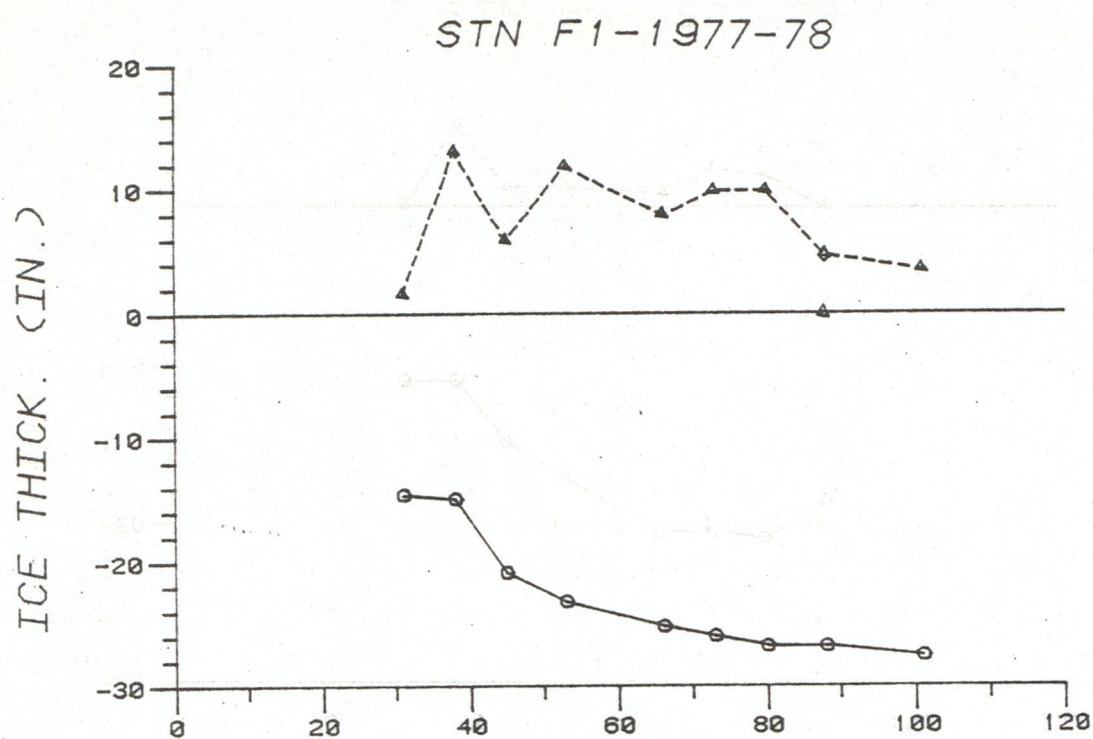
STN 51-1977-78
Station US2, Winter 1977-78

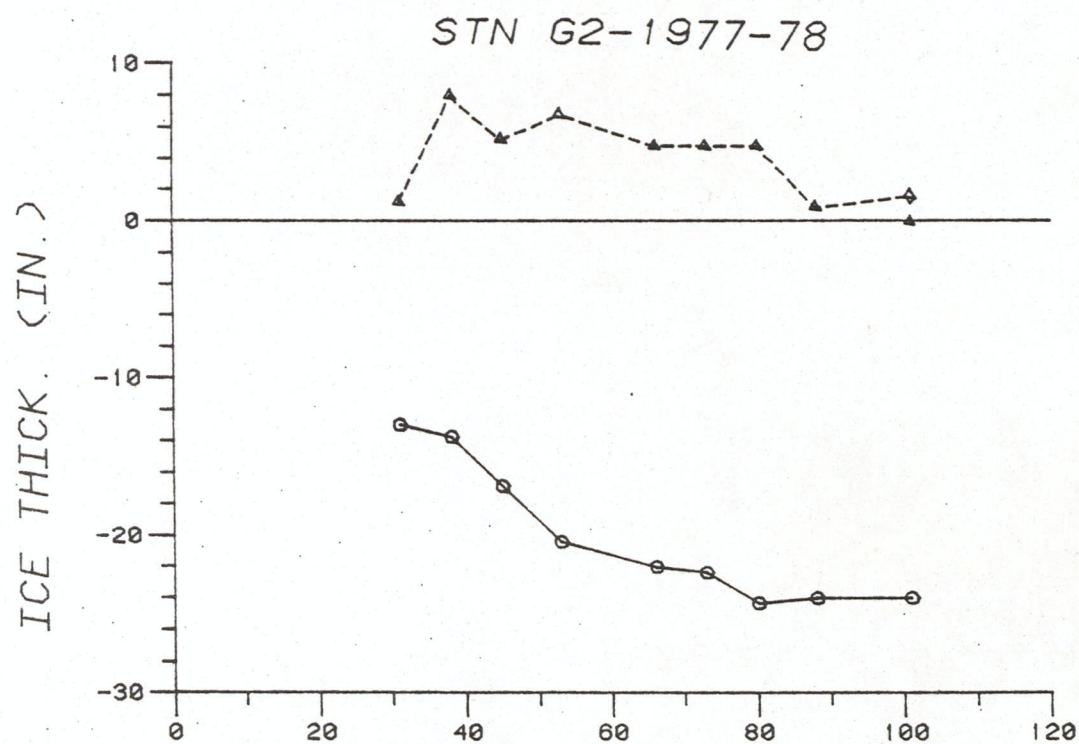
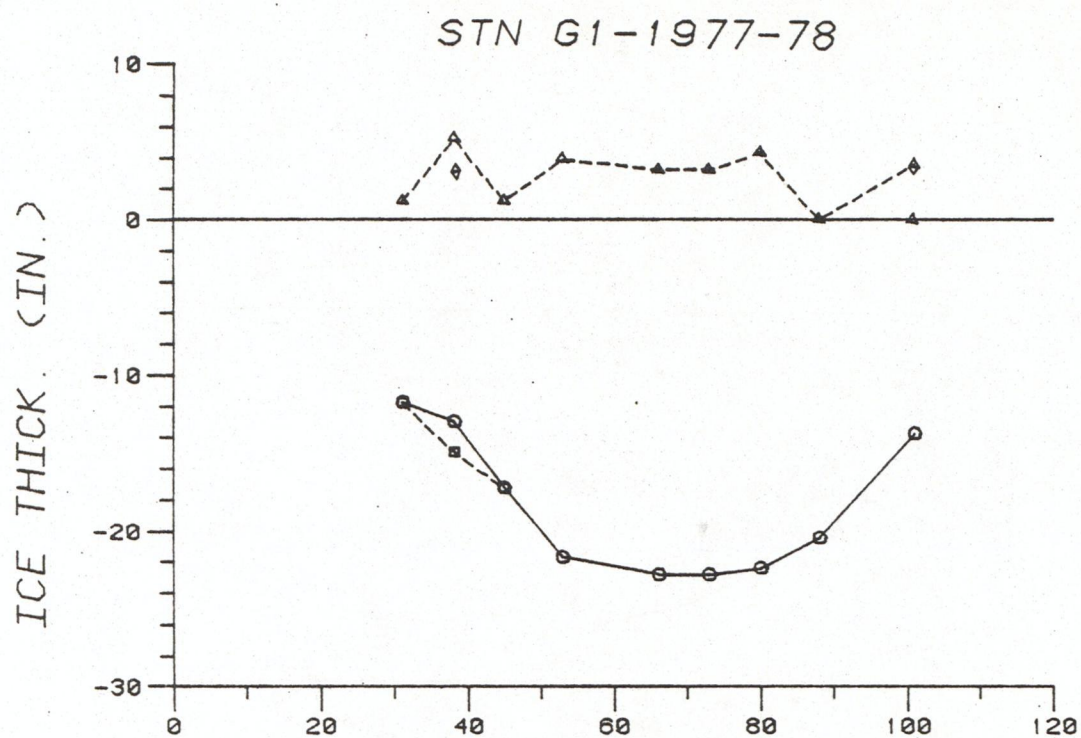
Date	Ice (in.)	Snow (in.)	Remarks
1/31/78	14.6	1.2	
2/8/78	17.7	4.7	
2/21/78	18.5	3.5	
2/28/78	18.1	4.7	
3/7/78	18.1	4.7	
3/15/78	10.6		Many openings in ice area
3/28/78			Open water

STN 52-1977-78
Station US3, Winter 1977-78

Date	Ice (in.)	Snow (in.)	Remarks
1/31/78	14.2	3.2	Smooth surface
2/8/78	16.1	3.9	Smooth surface
2/21/78	16.9	3.2	Smooth surface
2/28/78	16.1	3.5	Smooth surface
3/7/78	15.8	3.5	Smooth surface
3/15/78	11.4	3.2	Many openings in ice area
3/28/78			Open water

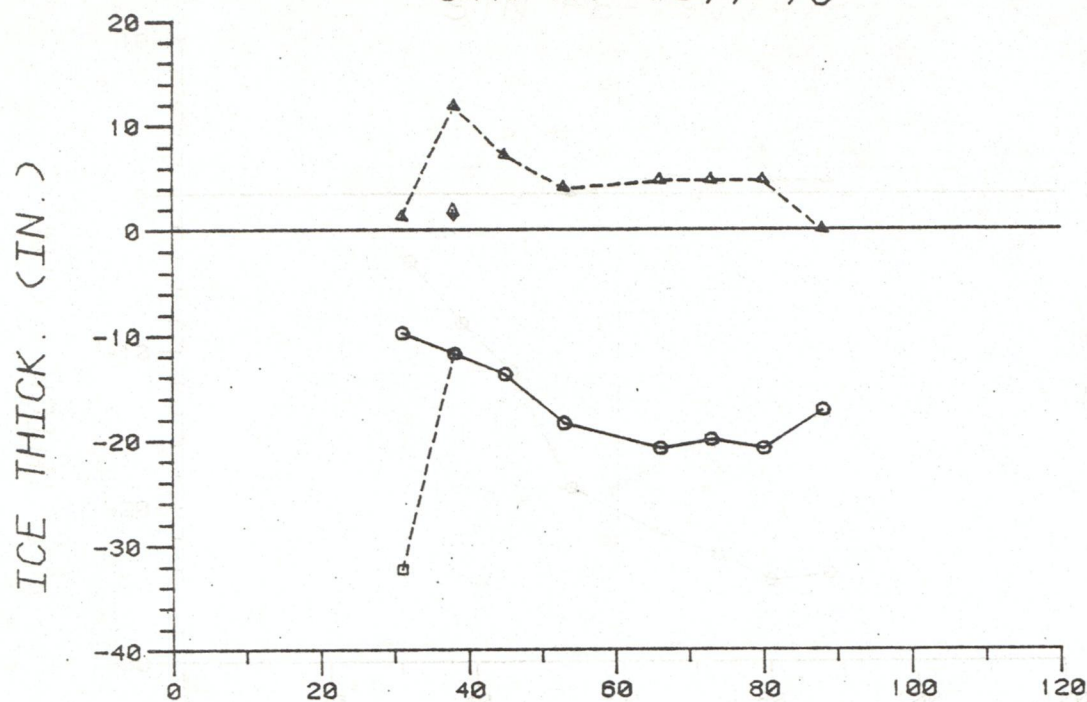




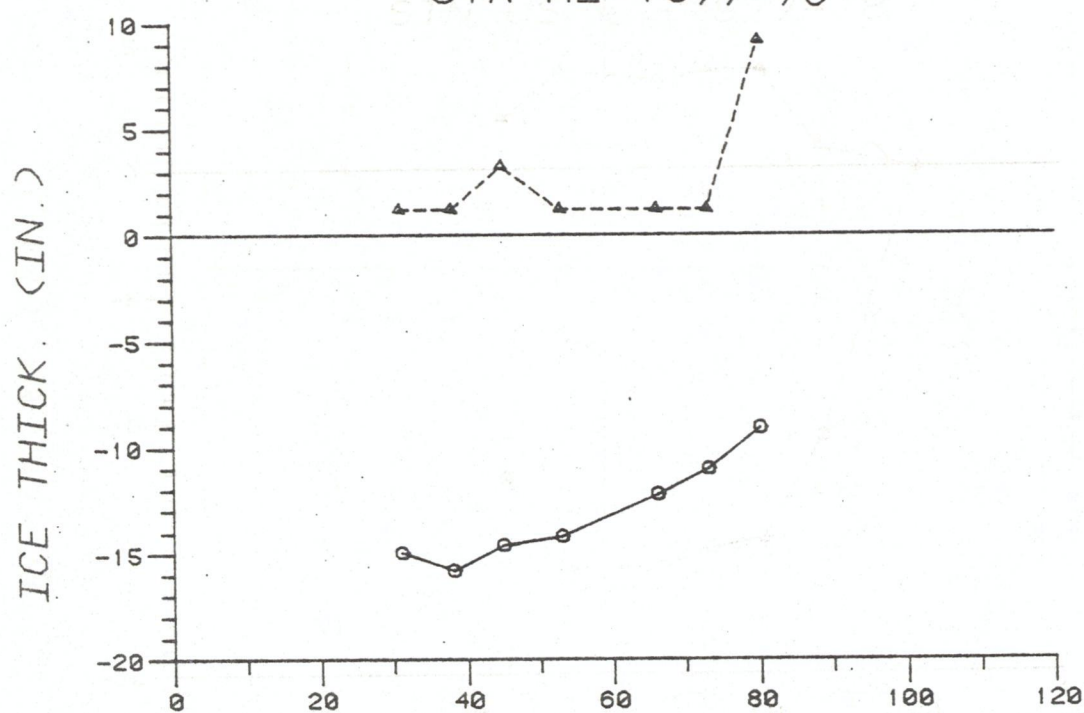


DAYS FROM DEC 18

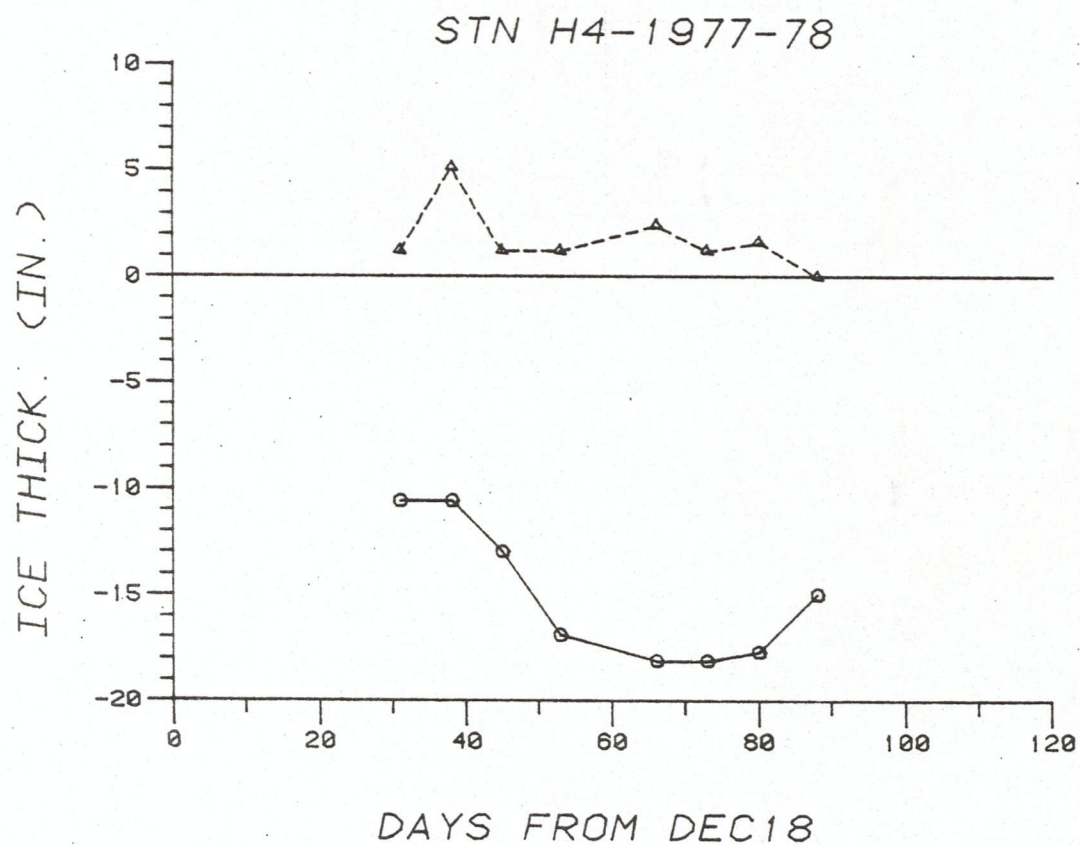
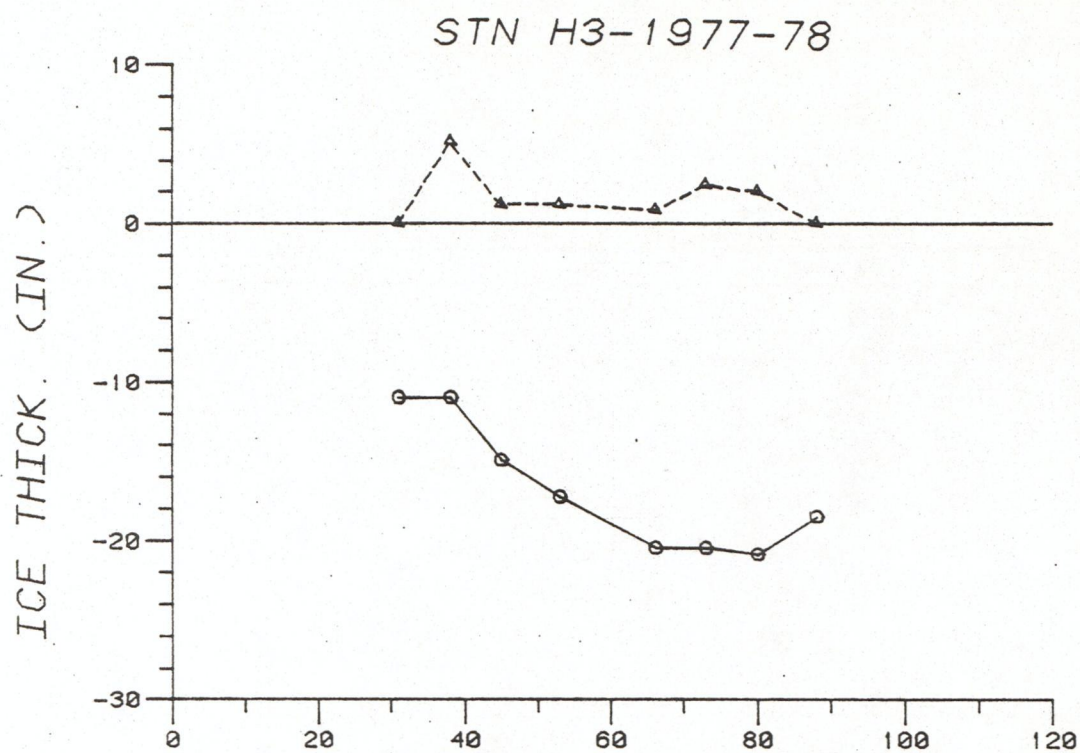
STN H1-1977-78



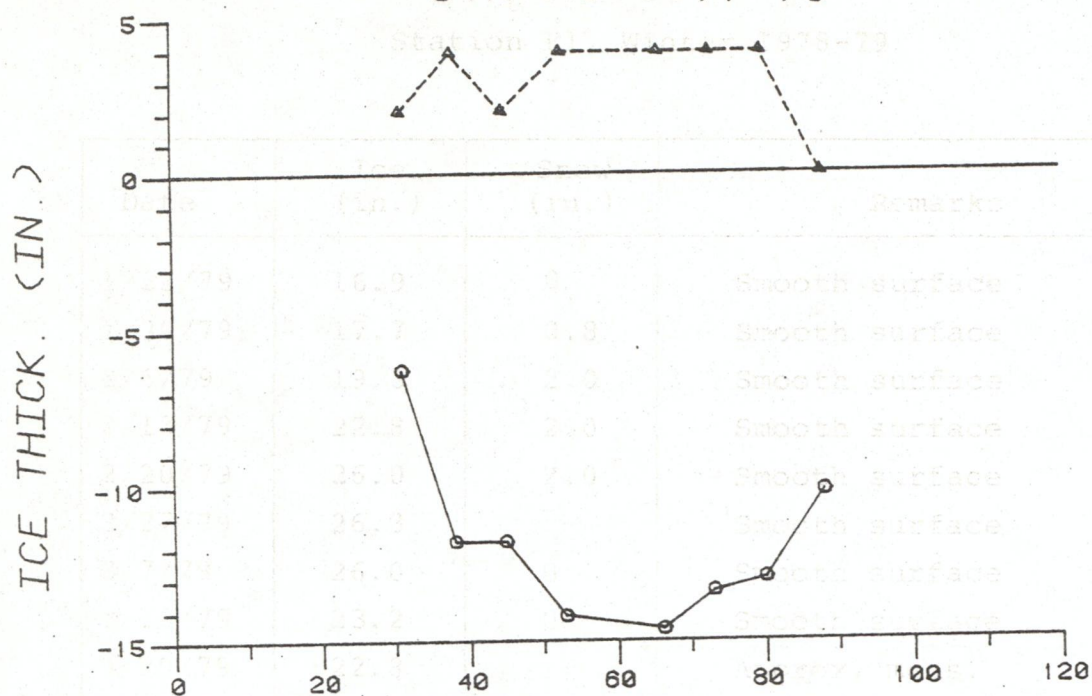
STN H2-1977-78



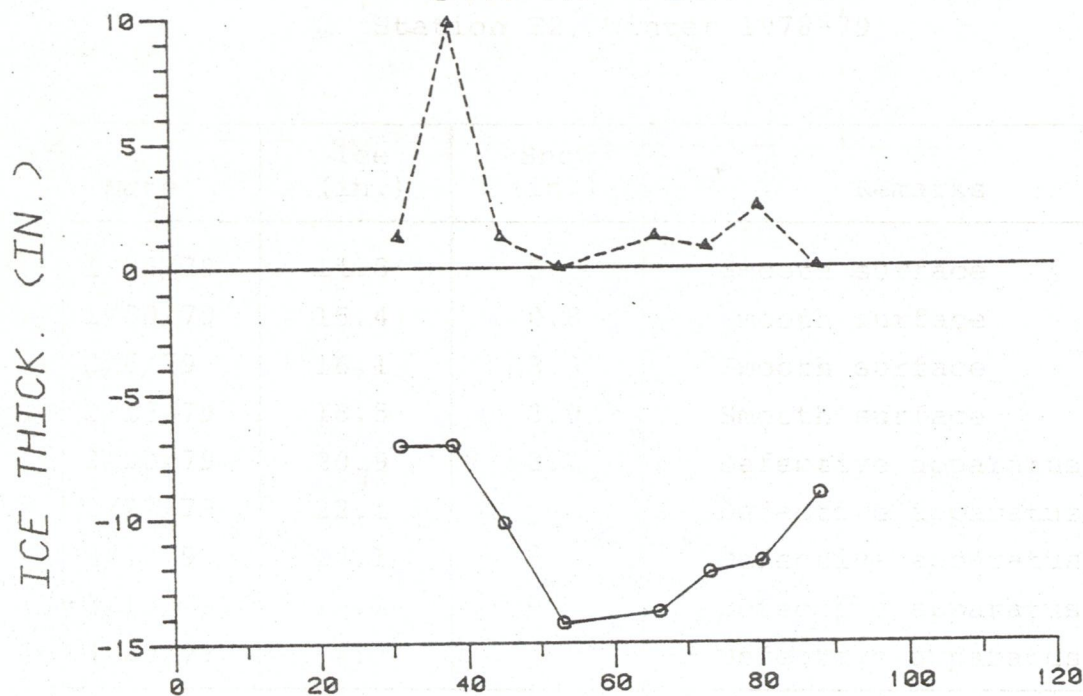
DAYS FROM DEC 18



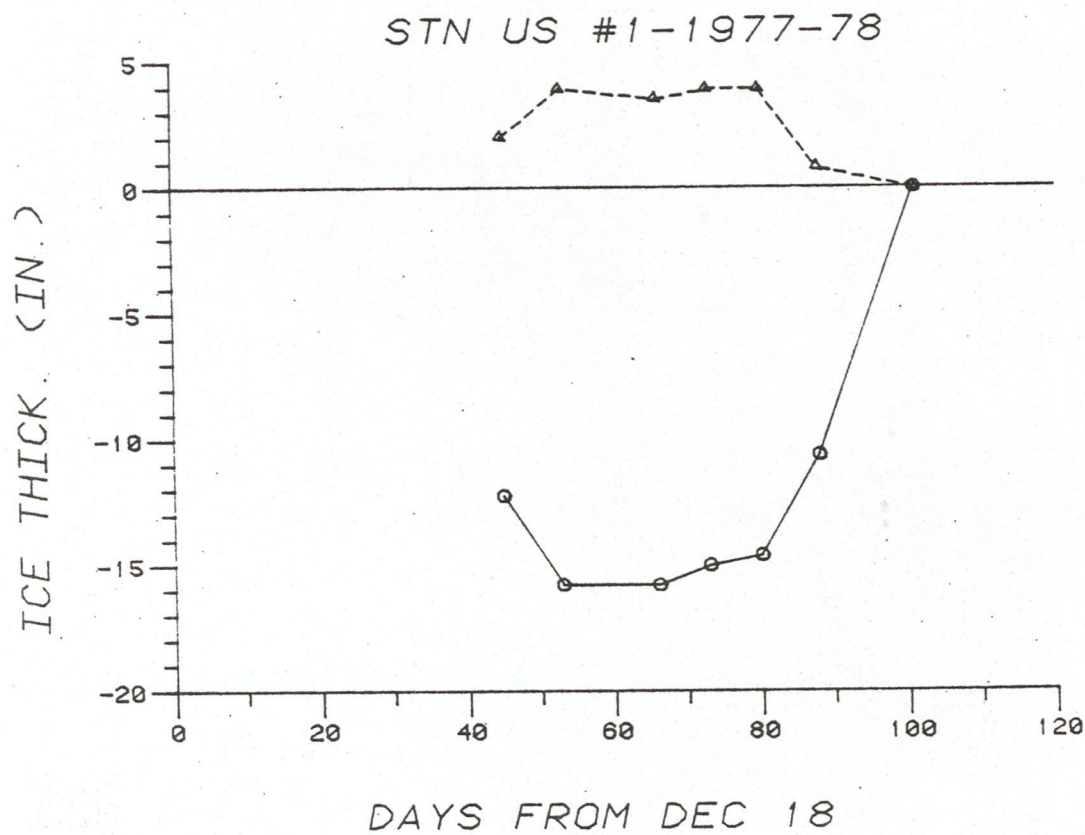
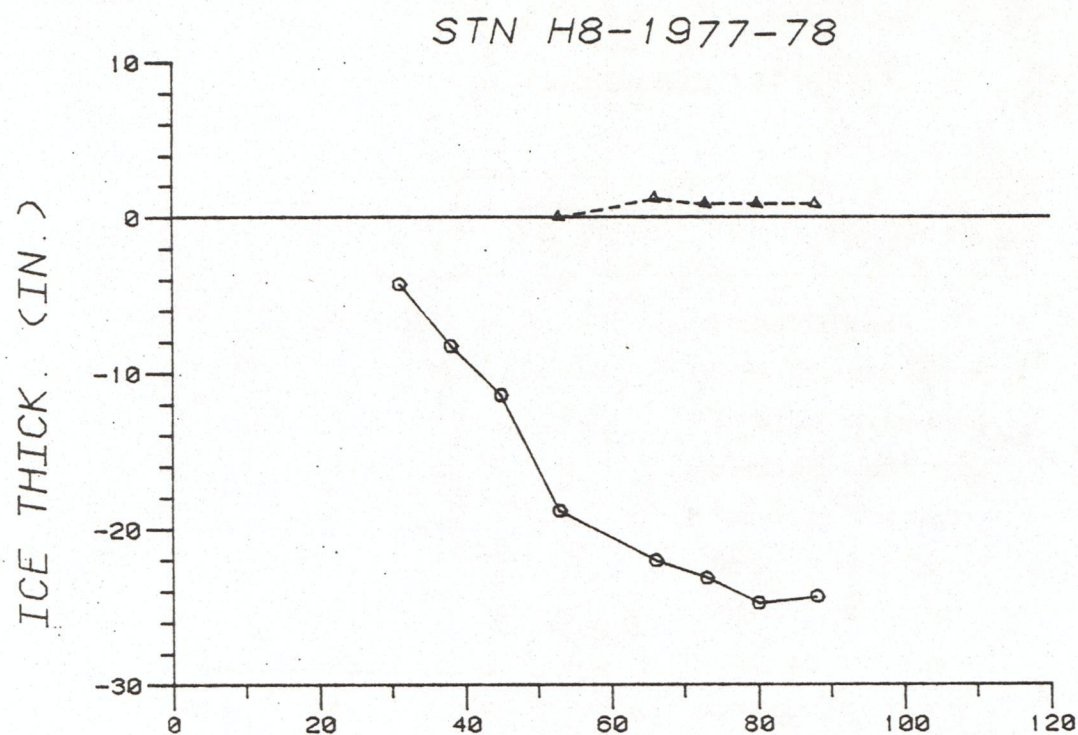
STN H5-1977-78



STN H7-1977-78

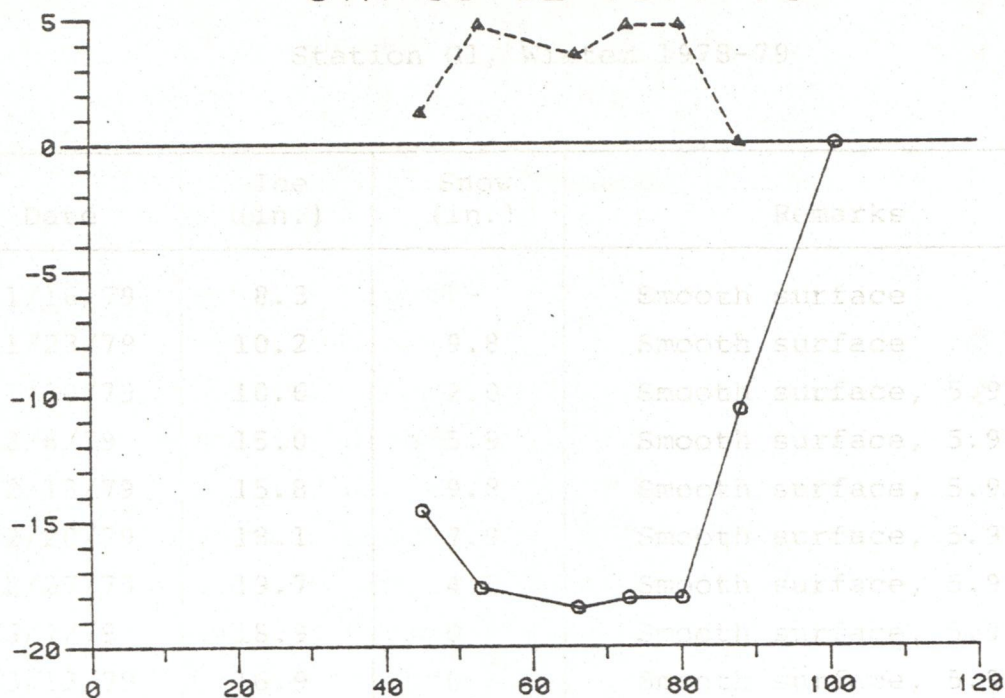


DAYS FROM DEC 18



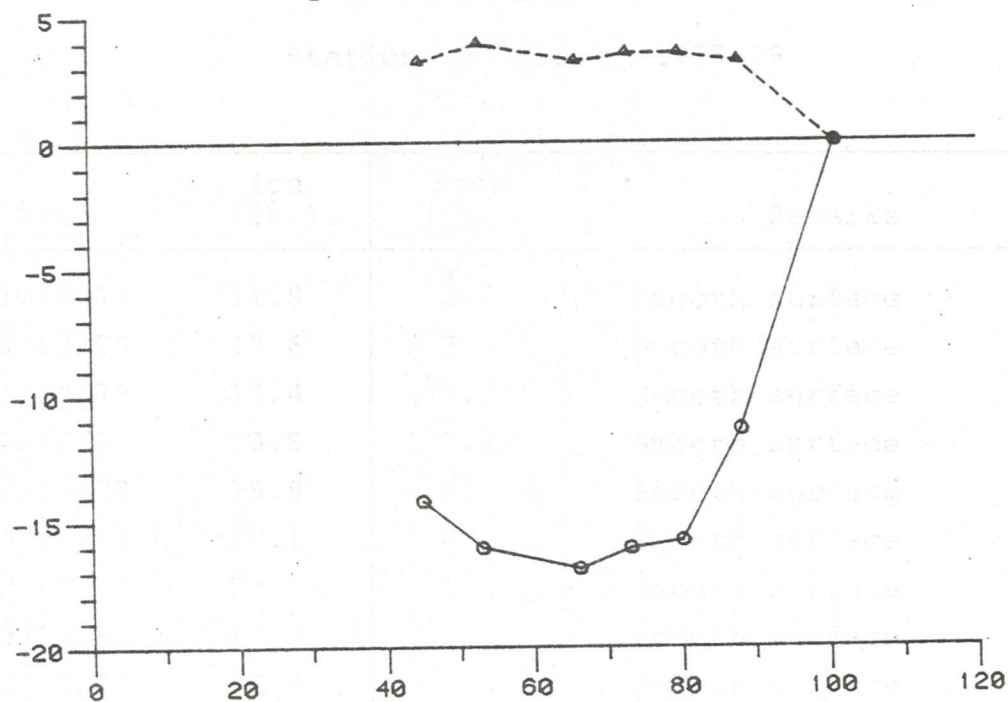
STN US #2-1977-78

ICE THICK. (IN.)



STN US #3-1977-78

ICE THICK. (IN.)



DAYS FROM DEC 18

Station E1, Winter 1978-79

Date	Ice (in.)	Snow (in.)	Remarks
1/23/79	16.9	0	Smooth surface
1/30/79	17.7	0.8	Smooth surface
2/6/79	19.3	2.0	Smooth surface
2/13/79	22.8	2.0	Smooth surface
2/20/79	26.0	2.0	Smooth surface
2/27/79	26.8	-	Smooth surface
3/7/79	26.0	0	Smooth surface
3/13/79	23.2	0	Smooth surface
3/20/79	22.8	-	Approx. meas.

Station E2, Winter 1978-79

Date	Ice (in.)	Snow (in.)	Remarks
1/23/79	11.8	0	Smooth surface
1/30/79	15.4	0.8	Smooth surface
2/6/79	16.1	3.9	Smooth surface
2/13/79	18.5	3.9	Smooth surface
2/20/79	20.9	2.4	Defective apparatus
2/27/79	22.1	-	Defective apparatus
3/7/79	20.1	0	Defective apparatus
3/13/79	16.1	0	Defective apparatus
3/20/79	4.7	-	Defective apparatus

Station F1, Winter 1978-79

Date	Ice (in.)	Snow (in.)	Remarks
1/23/79	13.0	0	Smooth surface
1/30/79	13.0	3.9	Smooth surface
2/6/79	16.1	3.9	Smooth surface
2/13/79	19.3	3.9	Smooth surface
2/20/79	22.8	2.8	Smooth surface
2/27/79	25.2	-	Smooth surface
3/7/79	22.4	0	Smooth surface
3/13/79	17.7	0	Smooth surface
3/20/79	12.6	0	Smooth surface

Station F2, Winter 1978-79

Date	Ice (in.)	Snow (in.)	Remarks
1/23/79	13.0	-	Smooth surface, 2' frazil
1/30/79	13.4	5.9	Smooth surface
2/6/79	16.9	3.9	Smooth surface
2/13/79	18.1	7.9	Smooth surface
2/20/79	27.6	6.7	Smooth surface
2/27/79	26.0	3.5	Broken equip. (Approx. meas.)
3/7/79	20.1	0	Broken equip. (Approx. meas.)
3/13/79	9.1	-	Broken equip. (Approx. meas.)
3/20/79			Open water

Station G1, Winter 1978-79

Date	Ice (in.)	Snow (in.)	Remarks
1/16/79	8.3	-	Smooth surface
1/23/79	10.2	9.8	Smooth surface
1/30/79	10.6	2.0	Smooth surface, 5.9" slush
2/6/79	15.0	5.9	Smooth surface, 5.9" slush
2/13/79	15.8	9.8	Smooth surface, 5.9" slush
2/20/79	18.1	7.9	Smooth surface, 5.9" slush
2/27/79	19.7	4.7	Smooth surface, 5.9" slush
3/7/79	18.9	0	Smooth surface, 5.9" slush
3/13/79	16.9	0	Smooth surface, 5.9" slush
3/20/79	14.2	0	Smooth surface, 5.9" slush

Station G2, Winter 1978-79

Date	Ice (in.)	Snow (in.)	Remarks
1/16/79	11.8	2.0	Smooth surface
1/23/79	12.6	5.9	Smooth surface
1/30/79	13.4	5.9	Smooth surface
2/6/79	13.8	7.9	Smooth surface
2/13/79	15.8	8.7	Smooth surface
2/20/79	18.1	7.1	Smooth surface
2/27/79	20.1	1.2	Smooth surface
3/7/79	17.7	0	Smooth surface
3/13/79	16.9	0	Smooth surface
3/20/79	16.1	0	Smooth surface

Station H1, Winter 1978-79

Date	Ice (in.)	Snow (in.)	Remarks
1/16/79	8.7	2.9	Open water
1/23/79	8.3	2.9	Thin ice, open spaces
1/30/79	12.8	7.9	Unsafe, open spaces
2/6/79	13.8	2.9	Approx. meas.
2/13/79	22.1	2.0	Approx. meas. (39" frazil)
2/20/79	26.0	0	Approx. meas. (no frazil)
2/27/79	15.0	-	Approx. meas., smooth surface
3/7/79			Open water

Station H2, Winter 1978-79

Date	Ice (in.)	Snow (in.)	Remarks
1/16/79	3.2	11.8	Rough ice
1/23/79	11.0		Smooth surface, 2" of water on ice
1/30/79	8.3	0	Smooth surface
2/6/79	5.9	2.0	Smooth surface
2/13/79	7.1	1.2	Smooth surface
2/20/79	9.8	0.8	Smooth surface
2/27/79	-		Unsafe, clear water
3/7/79	0	0	Open water

Station H3, Winter 1978-79

Date	Ice (in.)	Snow (in.)	Remarks
1/23/79	10.2	-	Smooth surface
1/30/79	12.6	0.8	Smooth surface
2/6/79	11.4	3.9	Smooth surface
2/13/79	12.6	3.9	Smooth surface
2/20/79	15.0	4.7	Smooth surface
2/27/79	13.8	3.2	Smooth surface
3/7/79	7.9	0	Smooth surface
3/13/79			Open water

Station H4, Winter 1978-79

Date	Ice (in.)	Snow (in.)	Remarks
1/17/79	10.2	0	Smooth surface
1/23/79	10.2	5.9	Smooth surface
1/30/79	9.5	0	Smooth surface, 5.9" slush
2/6/79	9.8	3.9	Smooth surface
2/13/79	11.0	5.9	Smooth surface
2/20/79	13.0	5.1	Smooth surface
2/27/79	10.6	-	Smooth surface
3/7/79	13.0	0	Smooth surface
3/13/79	-		Open water

Station H5, Winter 1978-79

Date	Ice (in.)	Snow (in.)	Remarks
1/17/79	8.7	0	Smooth surface
1/23/79	9.8	3.9	Smooth surface
1/30/79	8.7	0	4.7" of slush
2/6/79	8.7	4.7	Smooth surface
2/13/79	8.3	5.9	Smooth surface
2/20/79	9.8	4.7	Smooth surface
2/27/79	7.9	3.9	Smooth surface
3/7/79	NA	0	Unsafe
3/13/79			Clear water

Station H7, Winter 1978-79

Date	Ice (in.)	Snow (in.)	Remarks
1/23/79	8.3	3.9	Smooth surface
1/30/79	7.1	3.9	Smooth surface, 3.9" slush
2/6/79	6.3	3.9	Smooth surface, 3.9" slush
2/13/79	6.7	5.9	Smooth surface, 3.9" slush
2/20/79	7.5	5.5	Smooth surface, 3.9" slush
2/27/79	6.7	2.0	Smooth surface, 3.9" slush
3/7/79	1.6	0	Water surrounded (Approx. meas.)
3/13/79			Clear water

Station H8, Winter 1978-79

Date	Ice (in.)	Snow (in.)	Remarks
1/23/79	8.7	3.9	Smooth surface
1/30/79	8.3	3.9	Smooth surface, 3.9" slush
2/6/79	12.6	7.9	Smooth surface, 3.9" slush
2/13/79	14.6	7.9	Smooth surface, 3.9" slush
2/20/79	16.5	5.9	Smooth surface, 3.9" slush
2/27/79	17.3	2.0	Smooth surface, 3.9" slush
3/7/79	11.8	0	Water surrounded (Approx. meas.)
3/13/79	NA		

Station US1, Winter 1978-79

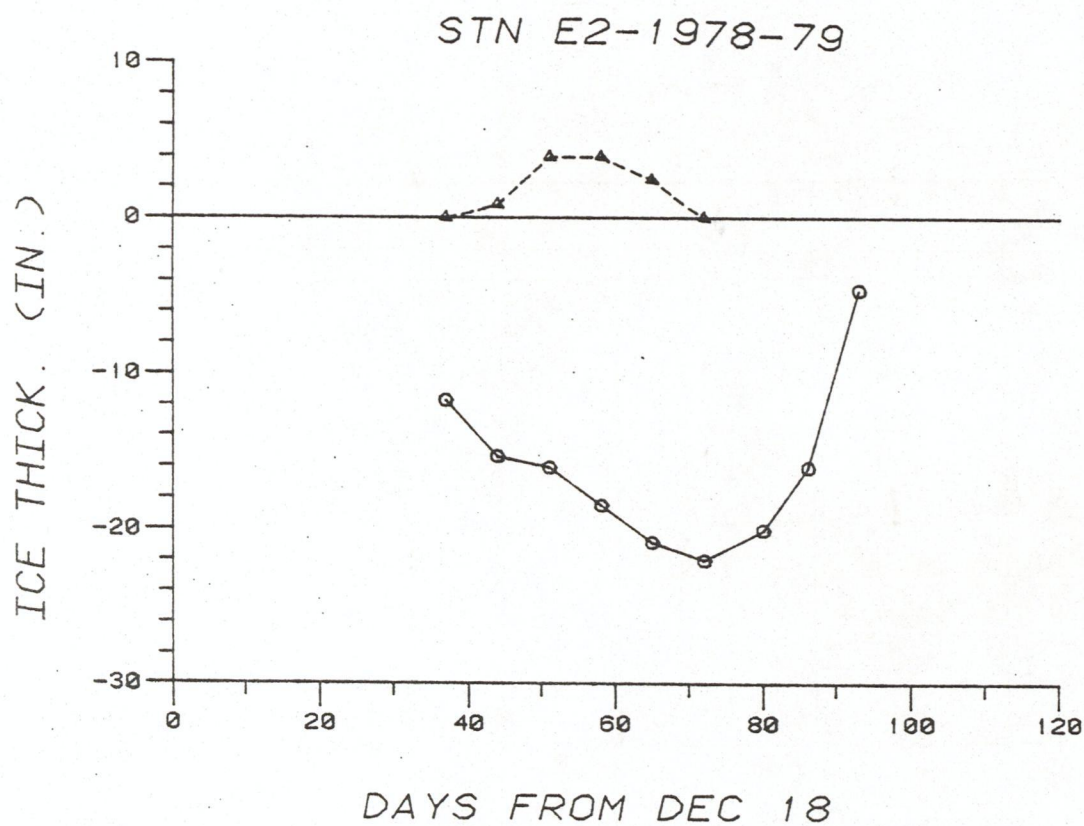
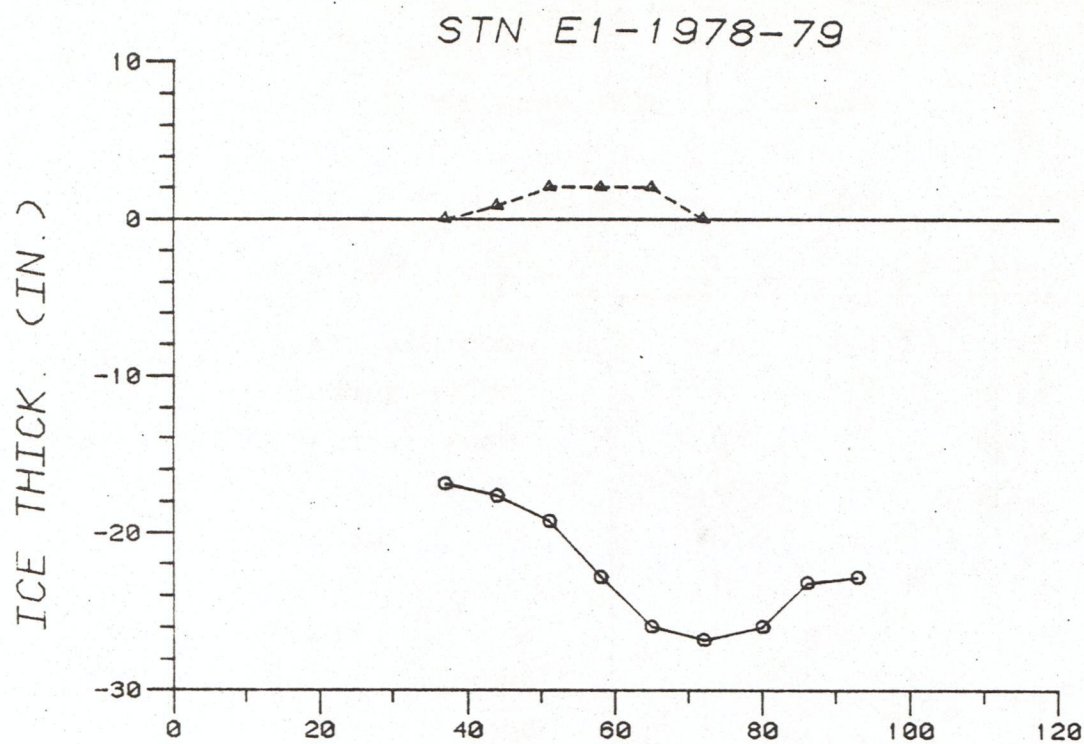
Date	Ice (in.)	Snow (in.)	Remarks
1/16/79	7.5	5.9	Smooth surface
1/23/79	8.7	0	Smooth surface
1/30/79	6.7	5.9	Smooth surface, 5.9" slush
2/6/79	9.5	5.9	Smooth surface
2/13/79	11.0	5.1	Smooth surface
2/20/79	13.4	-	Smooth surface
2/27/79	12.6	0	Smooth surface
3/7/79	NA		Free water

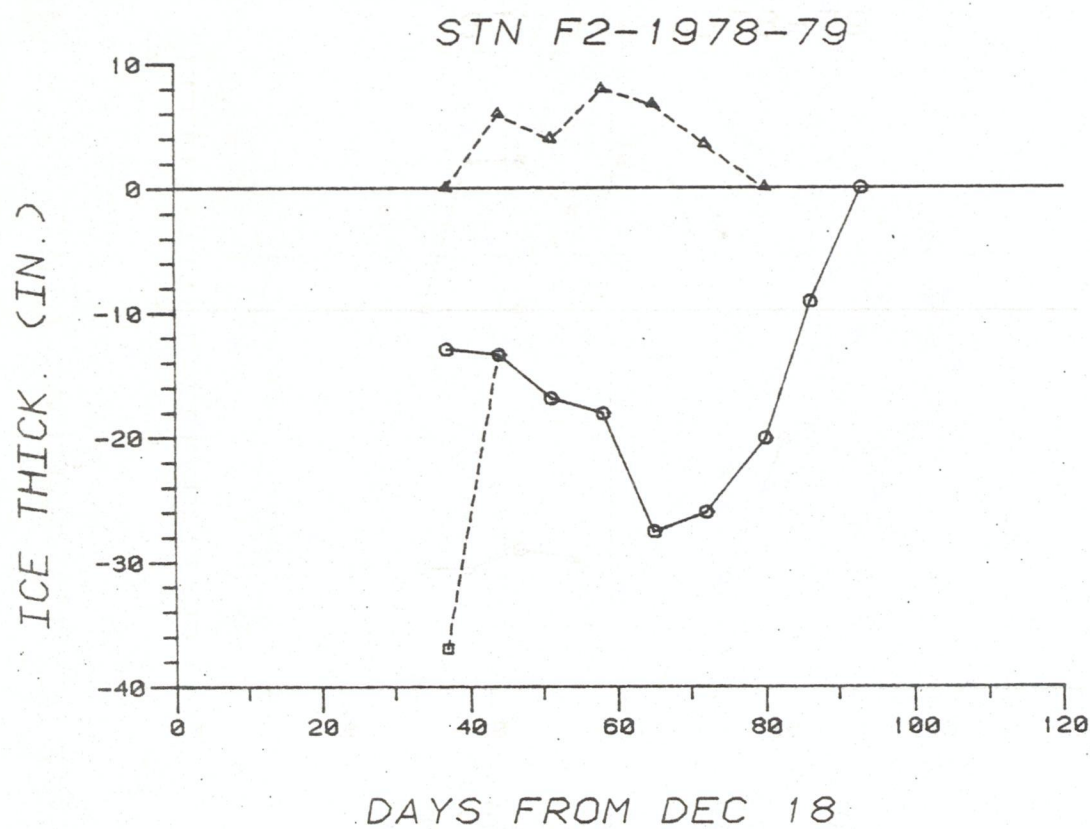
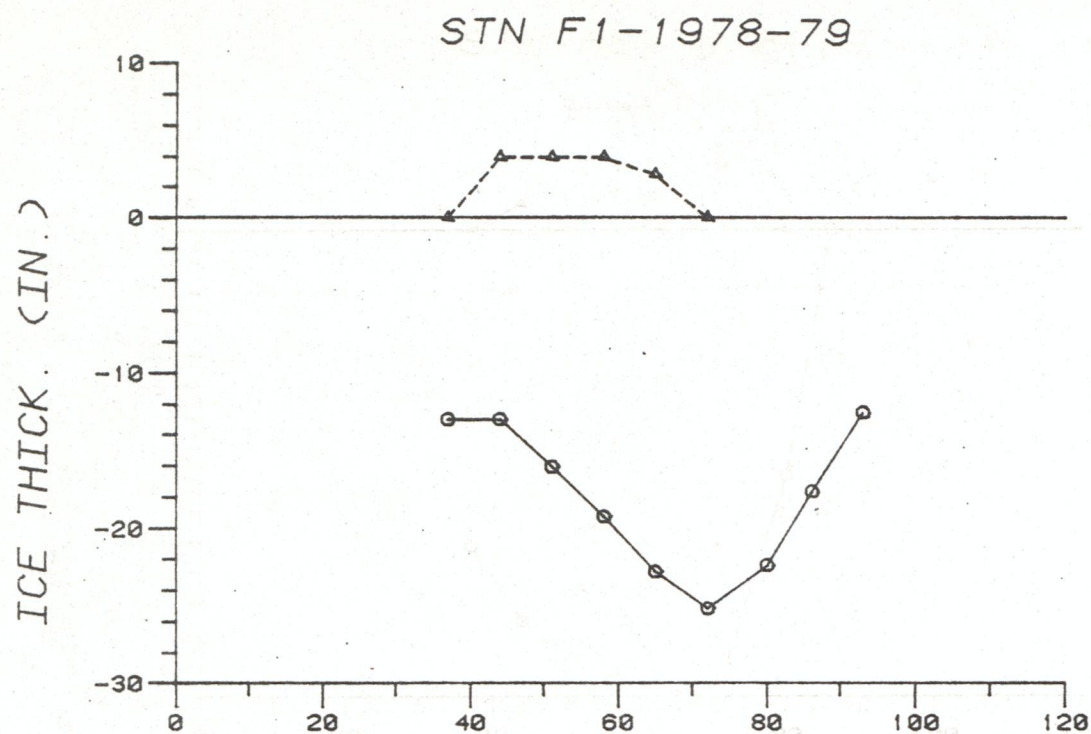
Station US2, Winter 1978-79

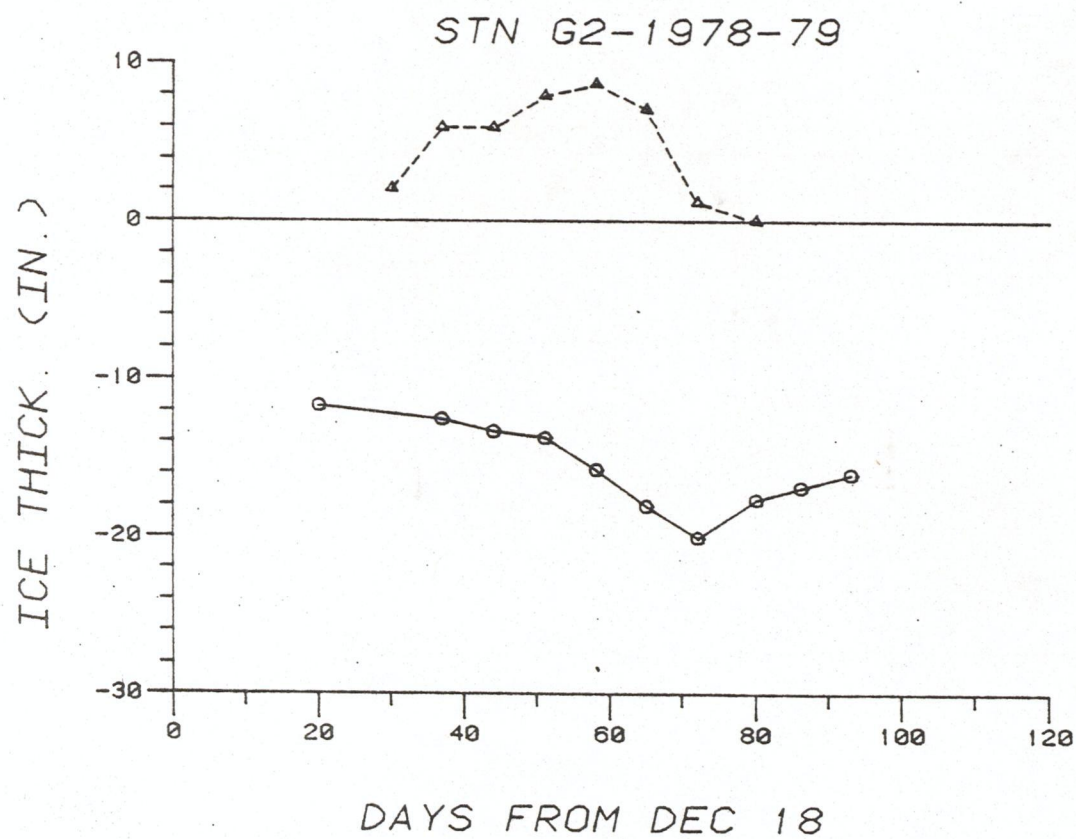
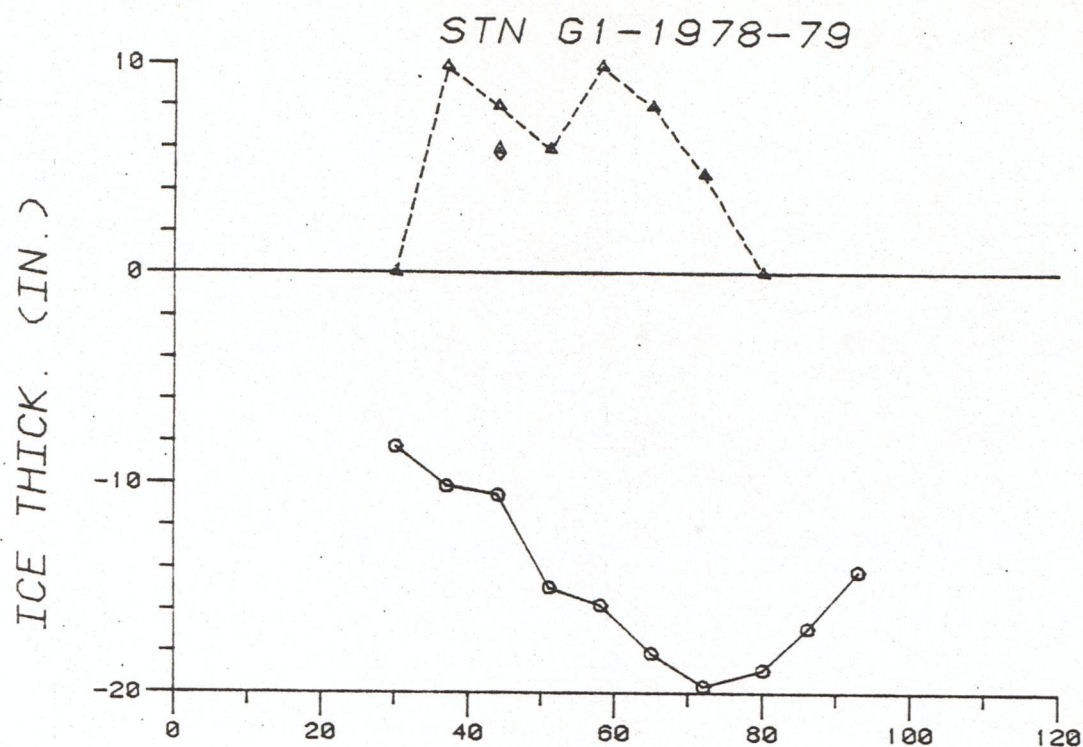
Date	Ice (in.)	Snow (in.)	Remarks
1/16/79	7.5		Smooth surface
1/23/79	9.5	4.7	Smooth surface
1/30/79	8.7	0	Smooth surface, 5.9" slush
2/6/79	9.8	3.9	Smooth surface
2/13/79	12.2	3.9	Smooth surface
2/20/79	14.6	3.9	Smooth surface
2/27/79	13.0	2.0	Smooth surface
3/7/79	4.7	0	Smooth surface
3/13/79	NA		Smooth surface

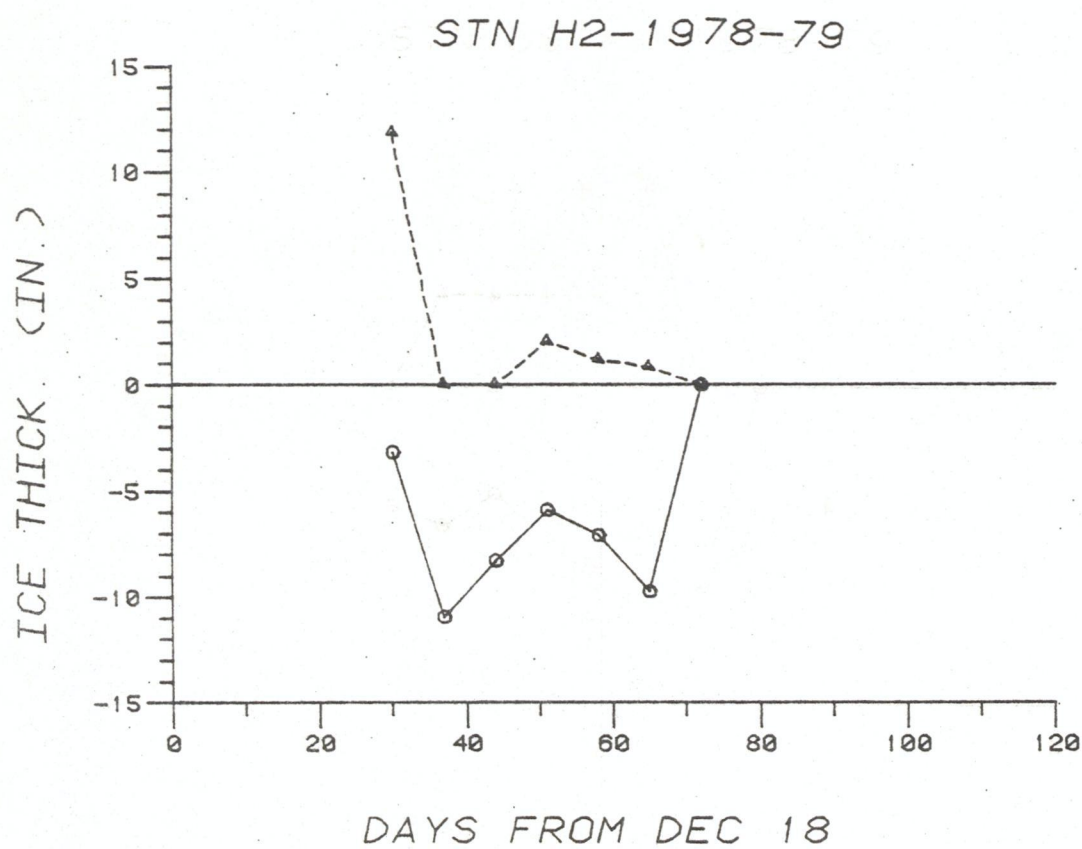
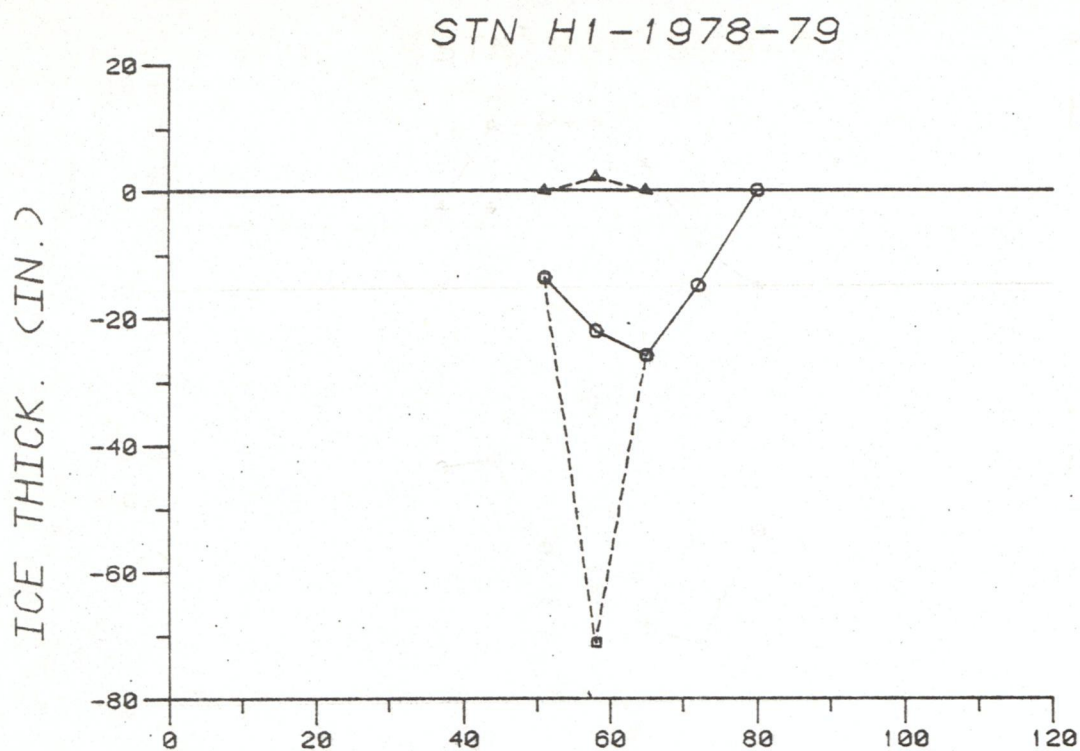
Station US3, Winter 1978-79

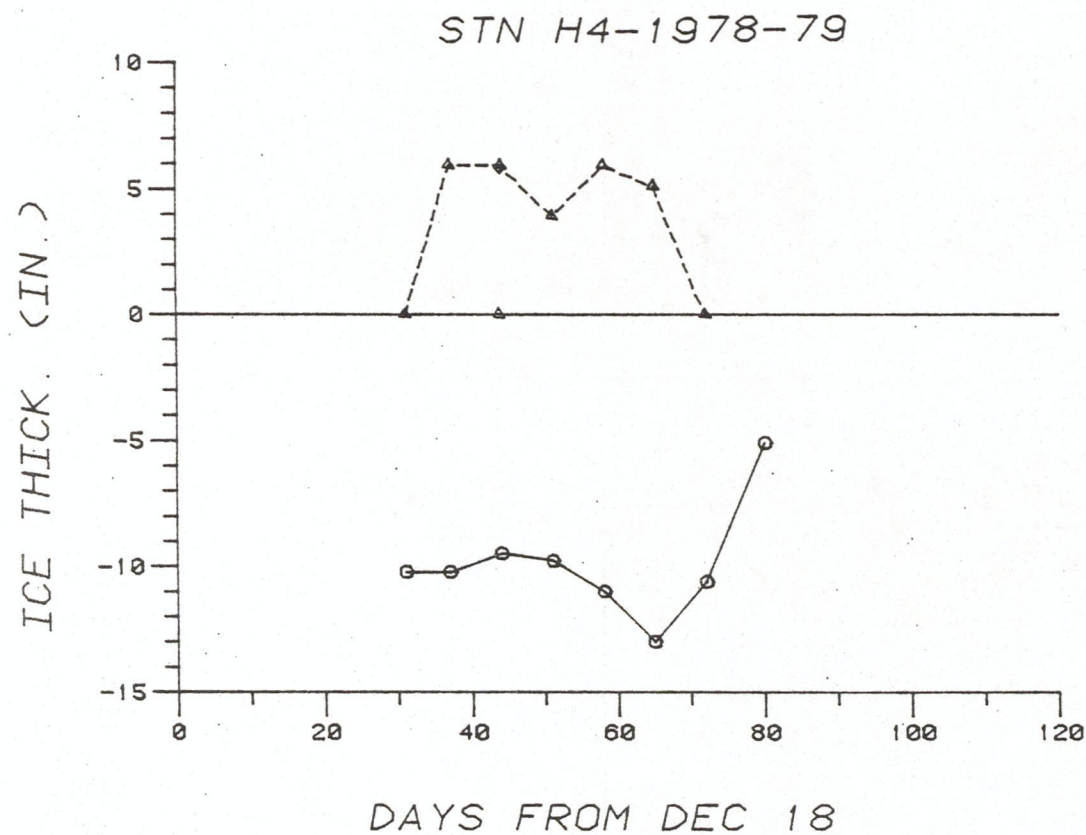
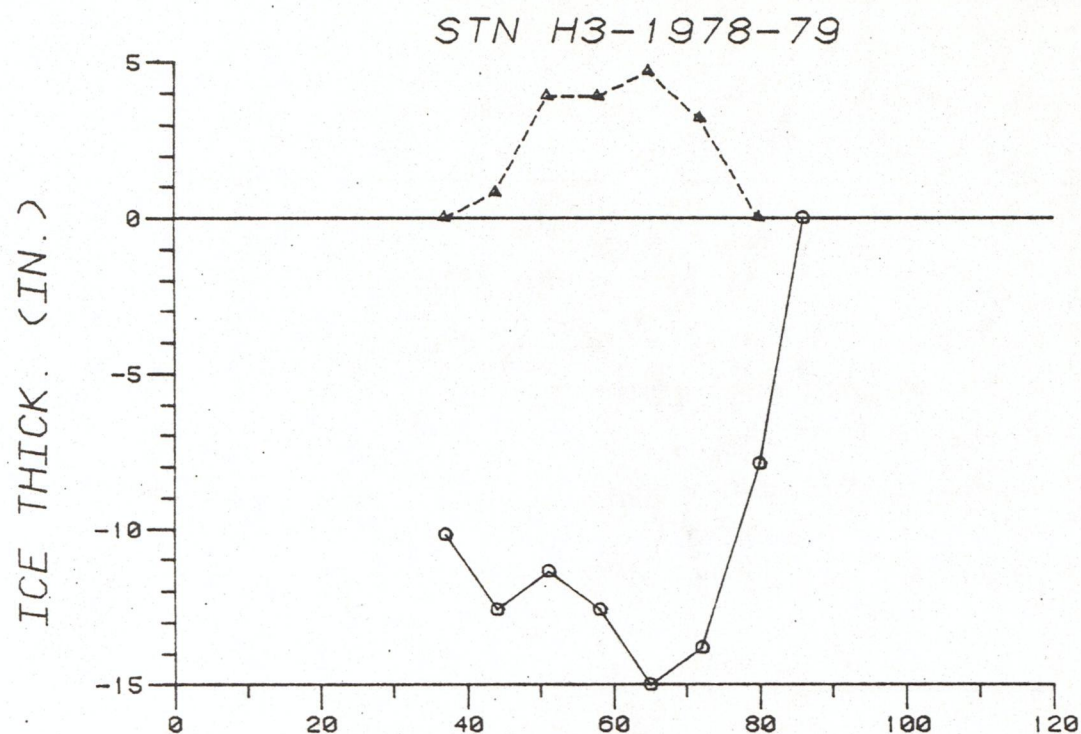
Date	Ice (in.)	Snow (in.)	Remarks
1/16/79	8.7	0.4	Smooth surface
1/23/79	10.2	5.9	Smooth surface
1/30/79	7.9	0	Smooth surface, 5.9" slush
2/6/79	9.8	2.0	Smooth surface
2/13/79	12.2	2.0	Smooth surface
2/20/79	14.6	3.9	Smooth surface
2/27/79	11.8	1.2	Smooth surface
3/7/79	NA	0	Unsafe
3/13/79			Free water



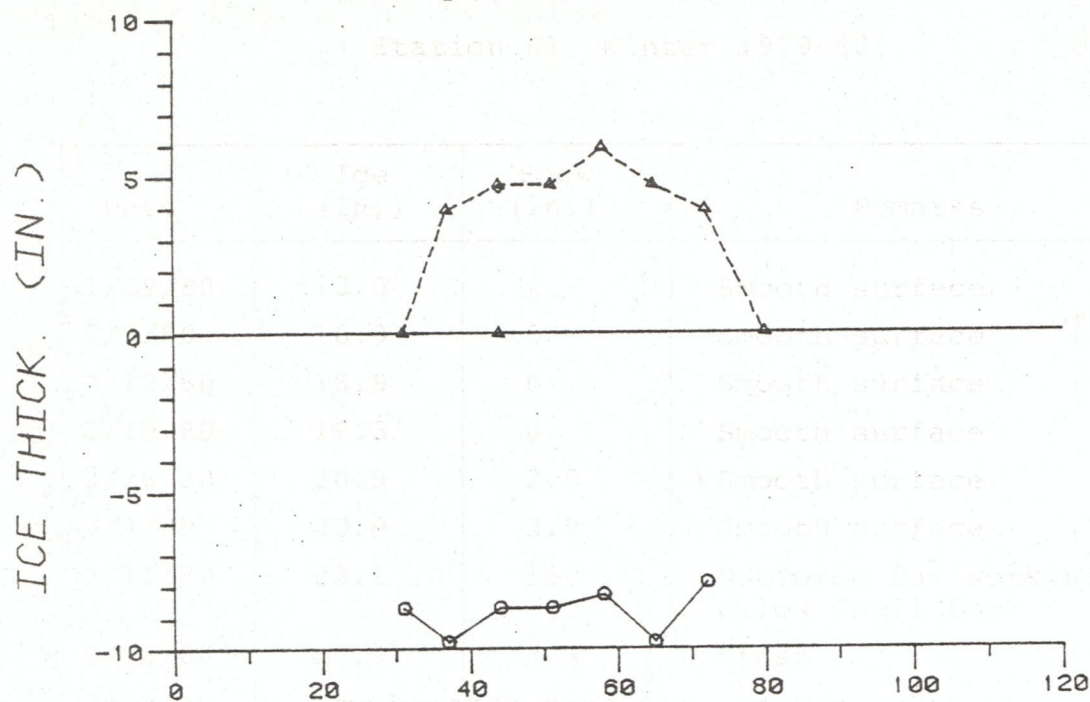




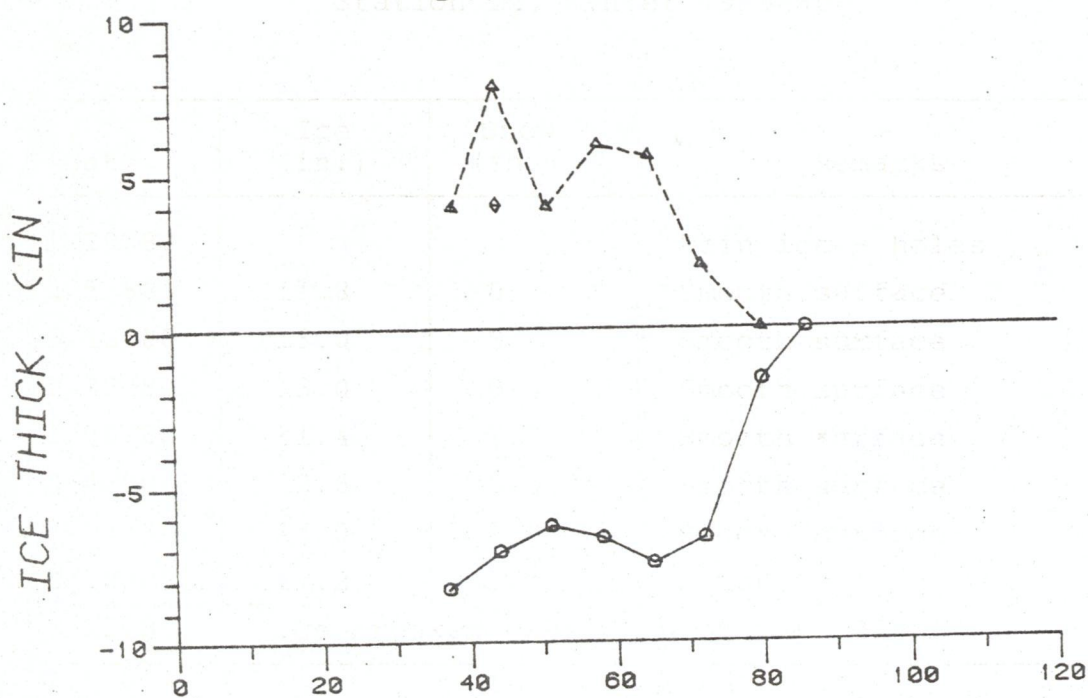




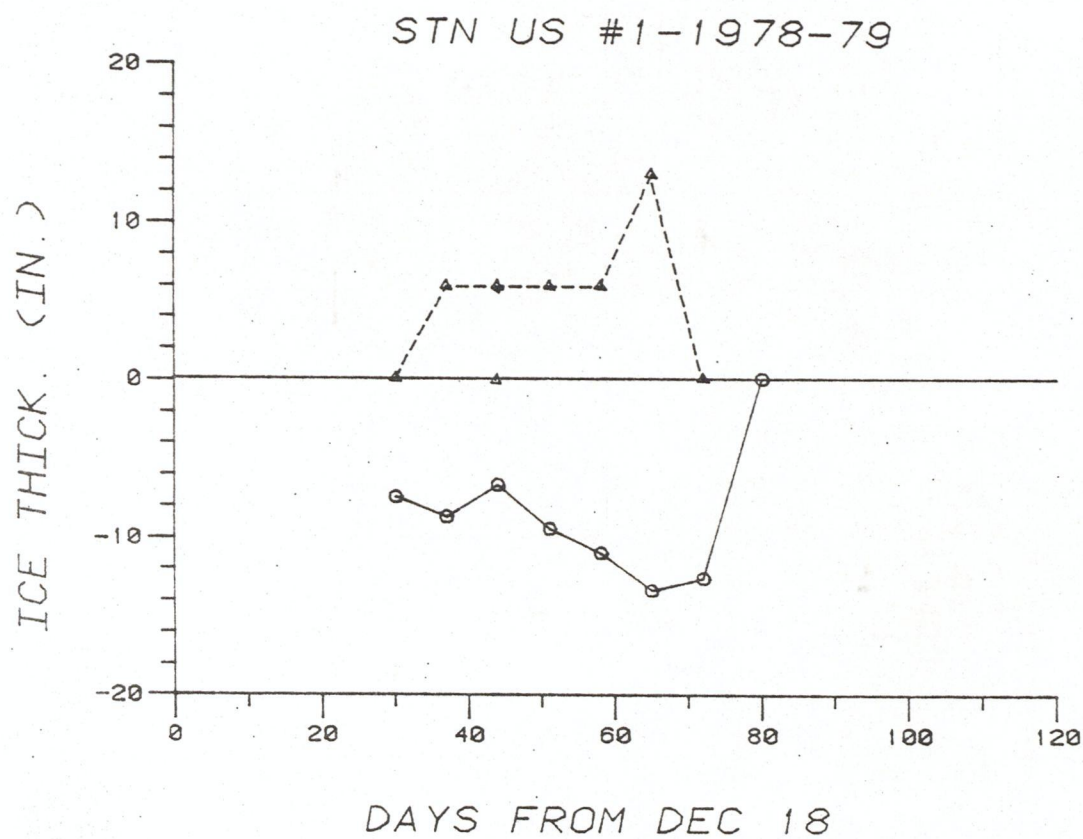
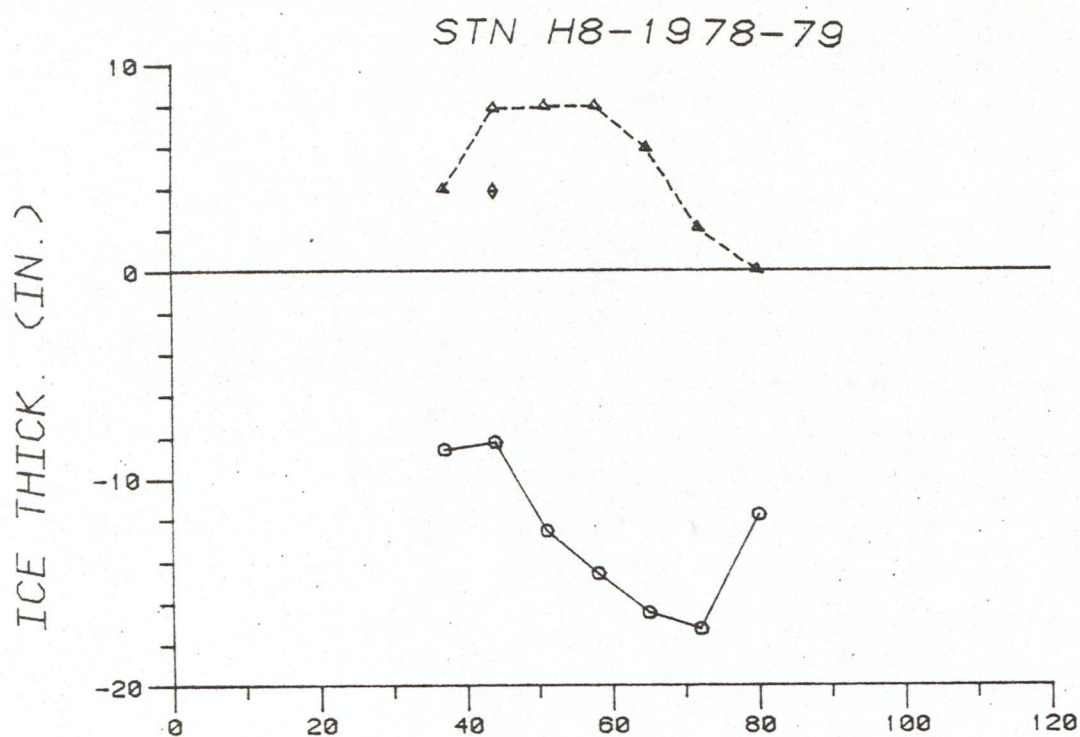
STN H5-1978-79



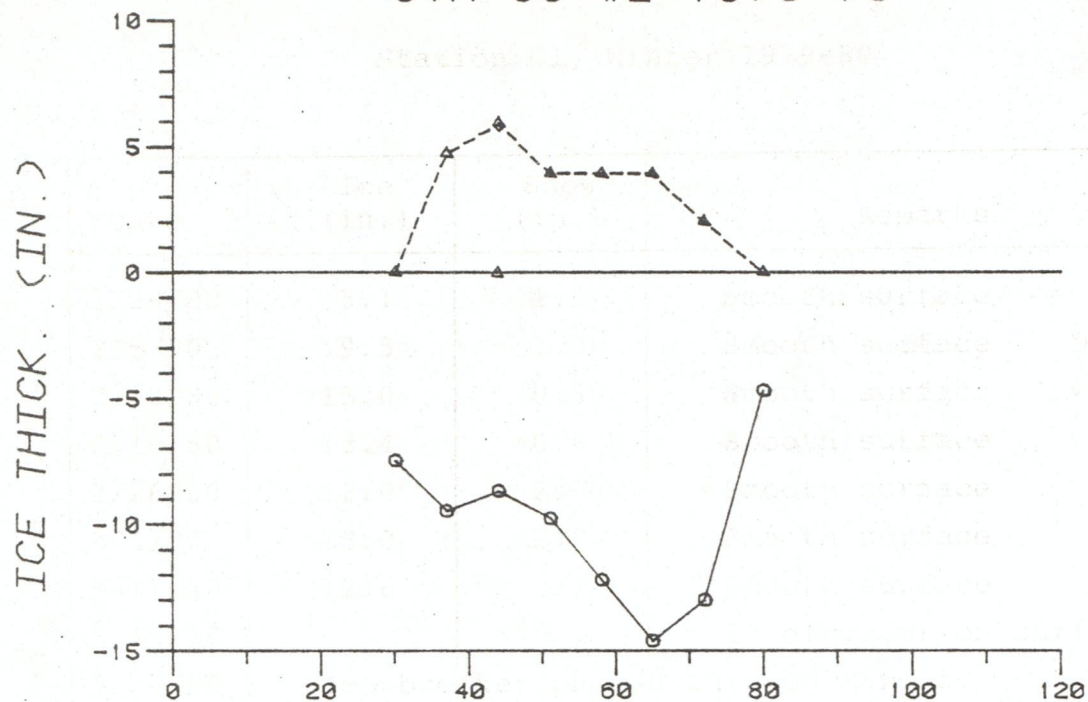
STN H7-1978-79



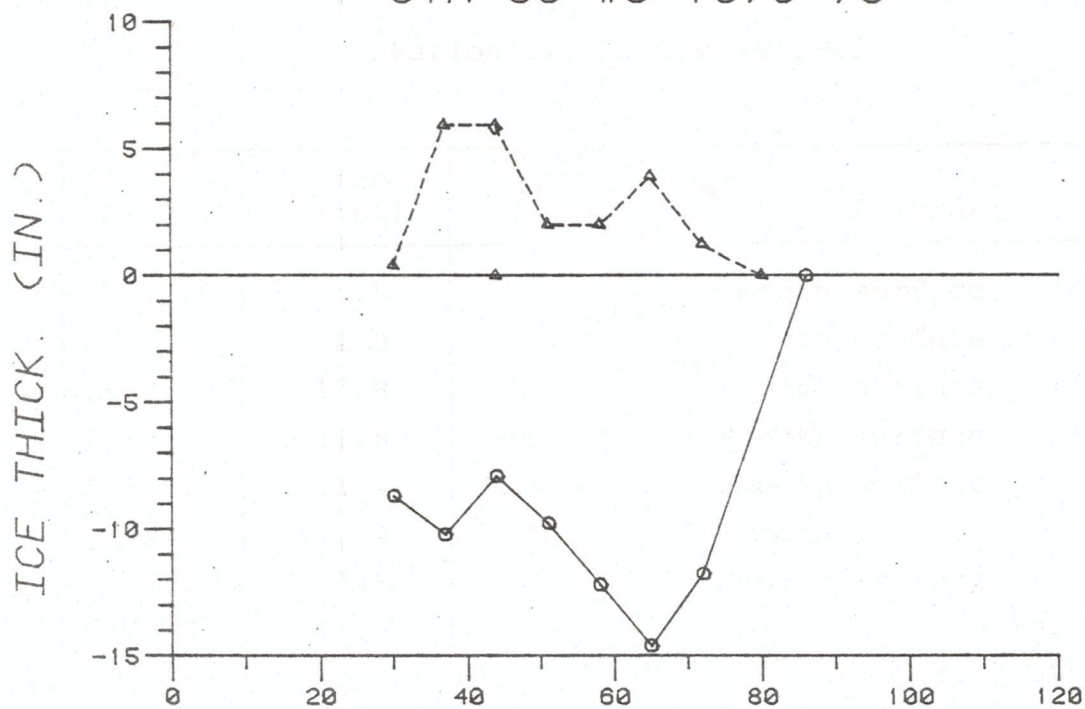
DAYS FROM DEC 18



STN US #2-1978-79



STN US #3-1978-79



DAYS FROM DEC 18

Station E1, Winter 1979-80

Date	Ice (in.)	Snow (in.)	Remarks
1/29/80	13.0	0	Smooth surface
2/5/80	16.9	0	Smooth surface
2/12/80	18.9	0	Smooth surface
2/19/80	19.3	0	Smooth surface
2/26/80	20.9	2.0	Smooth surface
3/4/80	20.9	3.9	Smooth surface
3/11/80	22.1	1.0	Robinson Bay working below Snell Lock
3/18/80	20.9	4.3	Slush
3/22/80	Ice breaker pass thru on Mar. 22		

Station E2, Winter 1979-80

Date	Ice (in.)	Snow (in.)	Remarks
1/29/80			Thin ice - holes
2/5/80	11.8	0	Smooth surface
2/12/80	13.0	0	Smooth surface
2/19/80	13.0	0	Smooth surface
2/26/80	11.4	1.2	Smooth surface
3/4/80	12.6	3.0	Smooth surface
3/11/80	15.0	1.0	Smooth surface
3/18/80	14.2	1.0	Slush
3/22/80	Ice breaker pass thru on Mar. 22		

Station F1, Winter 1979-80

Date	Ice (in.)	Snow (in.)	Remarks
1/29/80			Thin ice - holes
2/5/80	11.8	0	Smooth surface
2/12/80	13.4	0	Smooth surface
2/19/80	13.8	0	Smooth surface
2/26/80	13.8	1.2	Smooth surface
3/4/80	15.0	2.0	Smooth surface
3/11/80	16.9	1.0	Smooth surface
3/18/80	16.1	2.0	Slush
3/22/80	Ice breaker passed thru on Mar. 22		

Station F2, Winter 1979-80

Date	Ice (in.)	Snow (in.)	Remarks
1/29/80			Free water, little ice
2/5/80	9.9	0	Free water, little ice
2/12/80	11.8	0	Free water, little ice
2/19/80	11.4	0	Free water, little ice
2/26/80	5.9	0	Free water, little ice
3/4/80			Unsafe area, open water within 50'
3/11/80			Open water
3/18/80			Open water
3/23/80	Ice breaker passed thru on Mar. 23		

Station G1, Winter 1979-80

Date	Ice (in.)	Snow (in.)	Remarks
1/29/80	5.1	1.2	Smooth surface
2/5/80	9.5	1.2	Smooth surface
2/12/80	13.0	0.8	Smooth surface
2/19/80	13.4	0.8	Smooth surface
2/26/80	13.0	2.0	Smooth surface
3/4/80	13.0	2.0	Smooth surface
3/11/80	12.6	3.2	Smooth surface
3/18/80			1" of water on surface
3/23/80	Ice breaker passed thru on Mar. 23		

Station G2, Winter 1979-80

Date	Ice (in.)	Snow (in.)	Remarks
1/29/80	5.5		Smooth surface
2/5/80	11.0	1.2	Smooth surface
2/12/80	11.8	0	Smooth surface
2/19/80	11.8	0	Smooth surface
2/26/80	11.4	1.2	Smooth surface
3/4/80	11.4	2.0	Smooth surface
3/11/80	11.8	0	Smooth surface
3/18/80	11.8		1" of water on ice
3/23/80	Commercial vessel "Canadian Olympic" passed thru on Mar. 23		

Station H1, Winter 1979-80

Date	Ice (in.)	Snow (in.)	Remarks
1/29/80			Free water
2/5/80			Free water
2/12/80			No ice
2/19/80			No ice
2/26/80			Free water
3/4/80			Free water
3/11/80			Free water
3/18/80			Free water
3/23/80	Commercial vessel "Canadian Olympic" passed thru on Mar. 23		

Station H2, Winter 1979-80

Date	Ice (in.)	Snow (in.)	Remarks
1/20/80			Free water
2/5/80			Free water
2/12/80			No ice
2/19/80			No ice
2/26/80			No ice
3/4/80			Free water
3/11/80			Free water
3/18/80			Free water
3/23/80	Commercial vessel "Canadian Olympic" passed thru on Mar. 23		

Station H3, Winter 1979-80

Date	Ice (in.)	Snow (in.)	Remarks
1/29/80	2.4	0.4	Smooth surface
2/5/80	4.0	0	Smooth surface
2/12/80	7.5	0.4	Smooth surface
2/19/80	7.1	0.4	Smooth surface
2/26/80		0	Unsafe, broken ice, open spaces
3/4/80			Unsafe, broken ice
3/11/80			Ice breaker passed thru
3/18/80			Free water

Station H4, Winter 1979-80

Date	Ice (in.)	Snow (in.)	Remarks
2/5/80			
2/12/80	0.8 (Approx.)		Unsafe
2/19/80	0.8 (Approx.)		Unsafe
2/26/80			Unsafe, thin ice, open spaces
3/4/80	0.8 to 2.0		Unsafe, thin ice, open spaces
3/11/80			Free water, ice breaker passed thru Mar. 11

Station H5, Winter 1979-80

Date	Ice (in.)	Snow (in.)	Remarks
2/12/80	0.8 (Approx.)		Unsafe
2/19/80			Unsafe
2/26/80			Unsafe
3/4/80	0.8 to 2.0		Unsafe, thin ice
3/11			Ice breaker passed thru

Station H7, Winter 1979-80

Date	Ice (in.)	Snow (in.)	Remarks
2/19/80	0.8 to 1.6		Unsafe, very thin ice
2/26/80			Unsafe
3/4/80			Unsafe, many openings
3/11/80			Ice breaker passed thru
3/18/80			Free water

Station H8, Winter 1979-80

Date	Ice (in.)	Snow (in.)	Remarks
2/19/80	8.3		Superimposed ice
2/26/80	0		Free water
3/4/80	0.8 to 1.6		Superimposed ice
3/11/80	0.8		Unsafe
3/18/80			Ice breaker passed thru on Mar. 11

Station US1, Winter 1979-80

Date	Ice (in.)	Snow (in.)	Remarks
1/29/80	7.9		Unsafe
2/12/80	7.9		Unsafe
2/19/80	7.5		Unsafe
2/26/80	NA		
3/4/80	7.5		Many openings
3/11/80			Open water
3/18/80			Open water

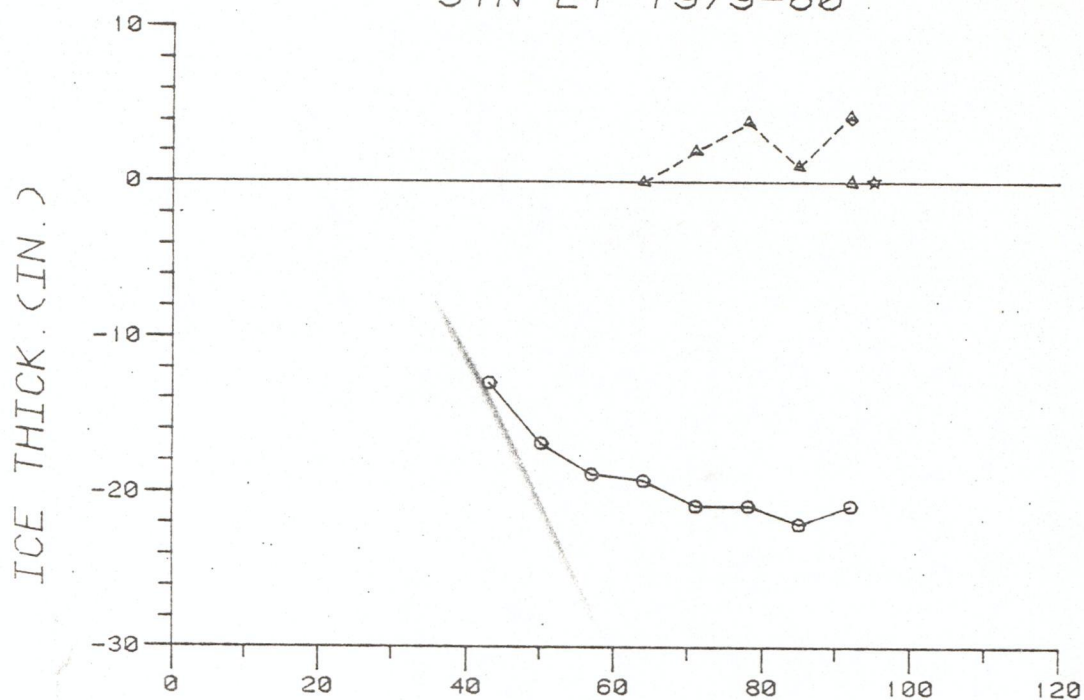
Station US2, Winter 1979-80

Date	Ice (in.)	Snow (in.)	Remarks
1/29/80	-		Unsafe
2/12/80	9.5	0	Smooth surface
2/19/80	9.1	Ice eroding, many openings U/S	
2/26/80	NA		
3/4/80	NA		Unsafe
3/11/80	NA		Open water
3/18/80	NA		Open water

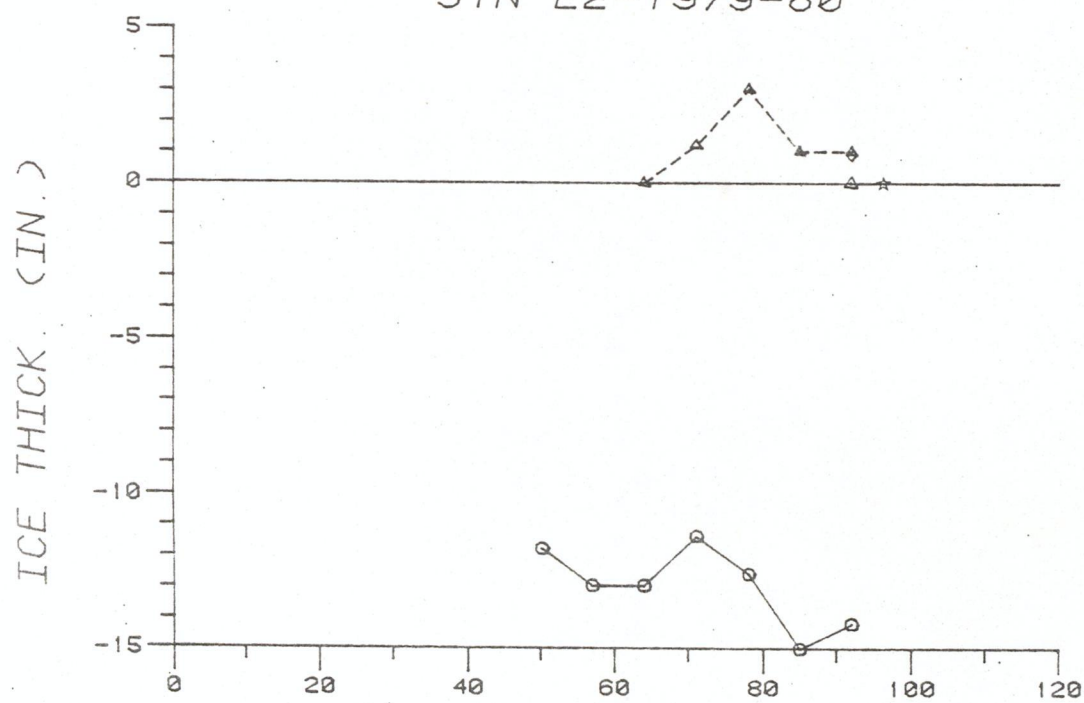
Station US3, Winter 1979-80

Date	Ice (in.)	Snow (in.)	Remarks
1/29/80			Unsafe
2/12/80			Unsafe
2/19/80			Unsafe
2/26/80	NA		
3/4/80	NA		Unsafe, many openings
3/11/80	NA		Open water
3/18/80	NA		Open water

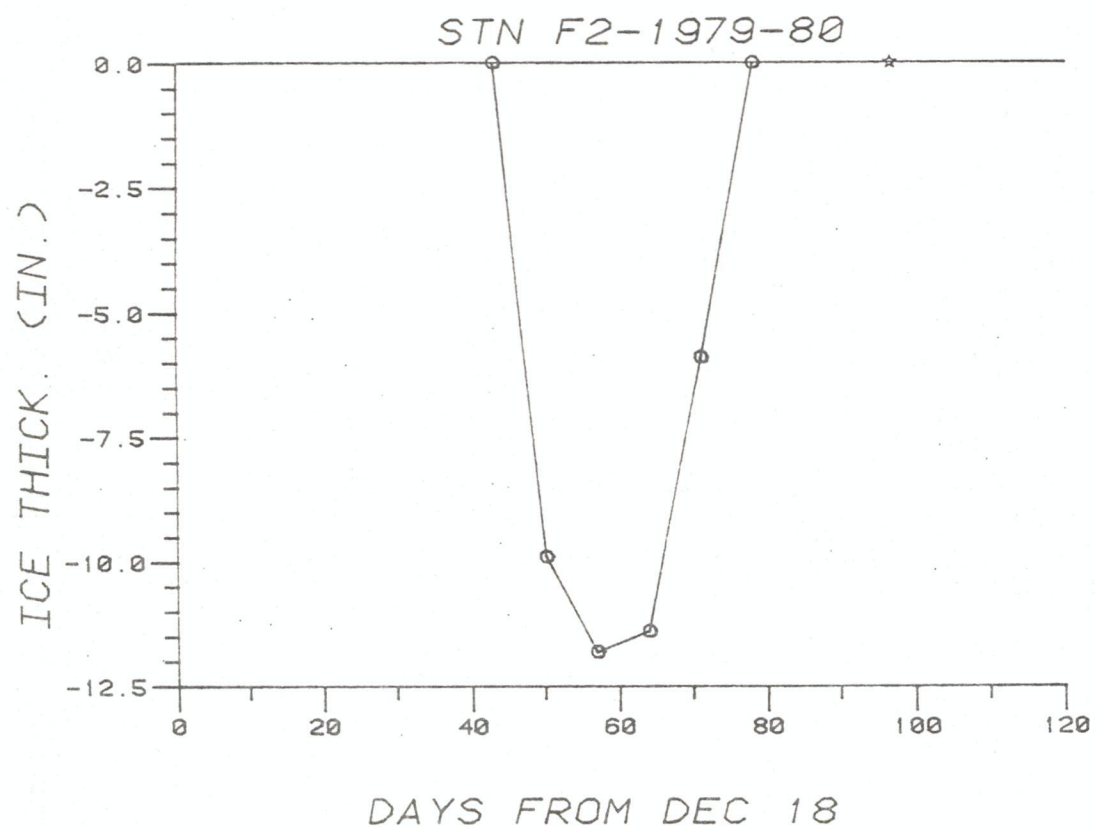
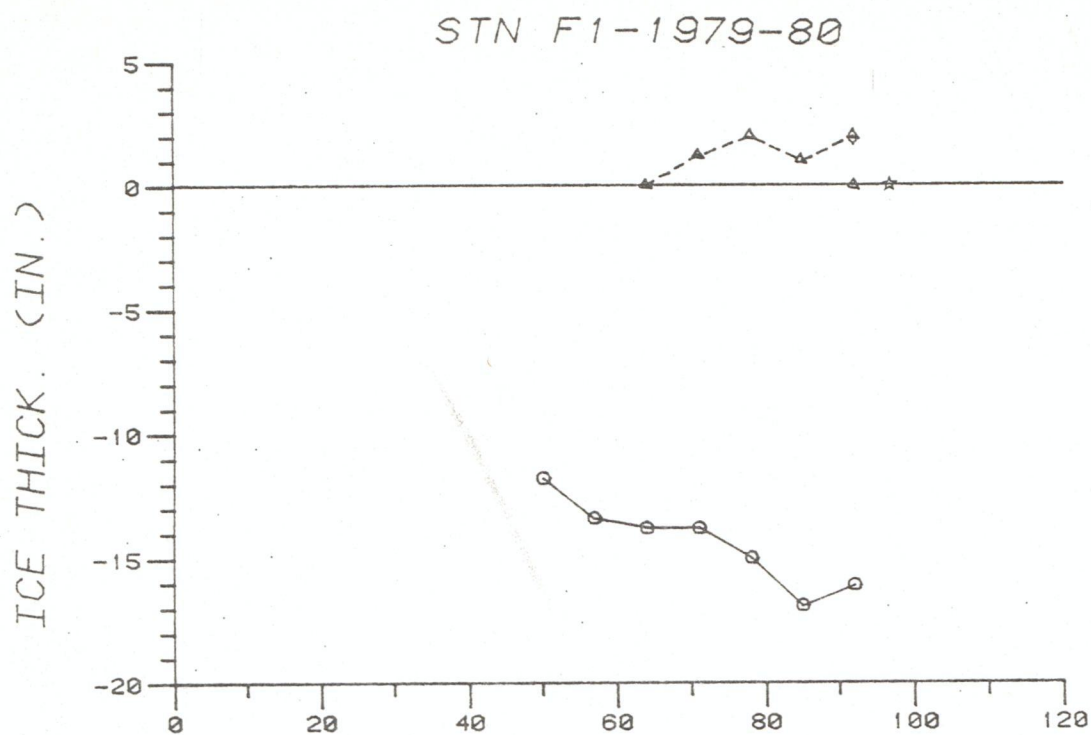
STN E1-1979-80

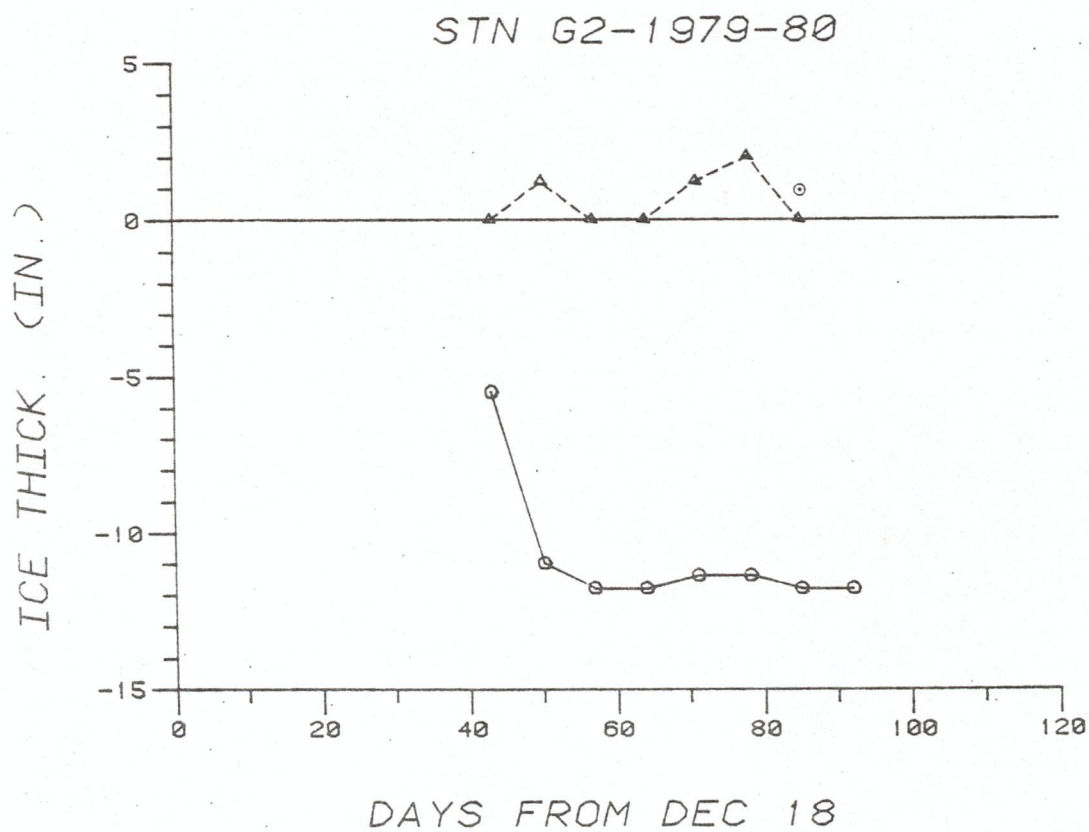
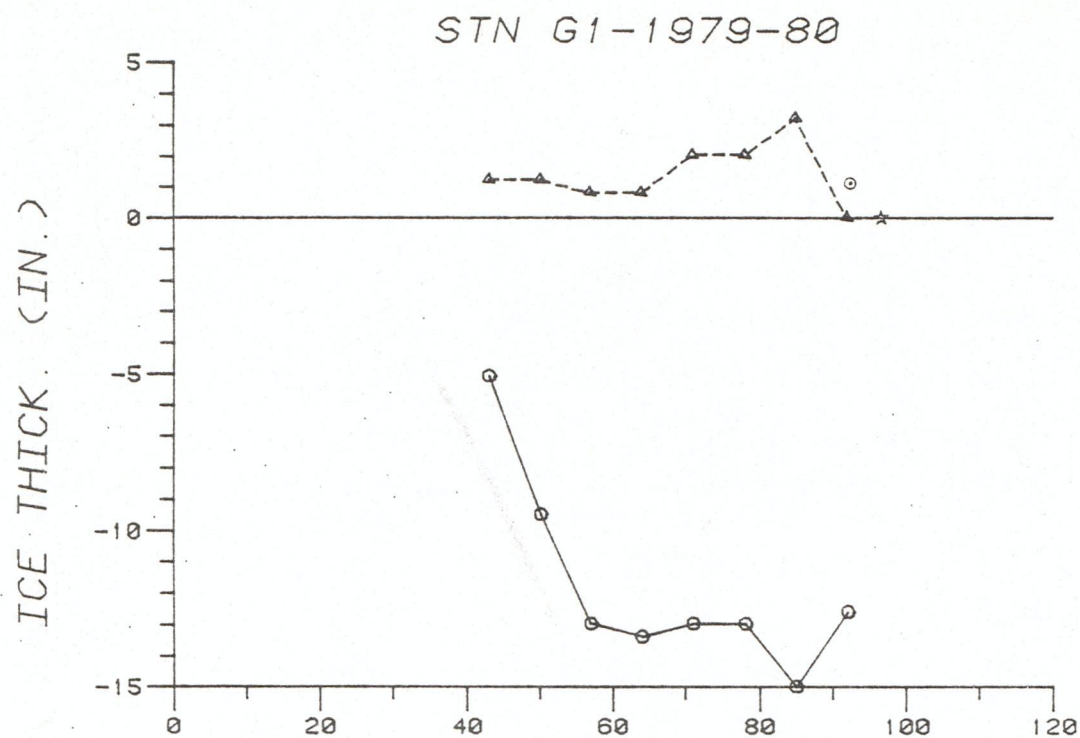


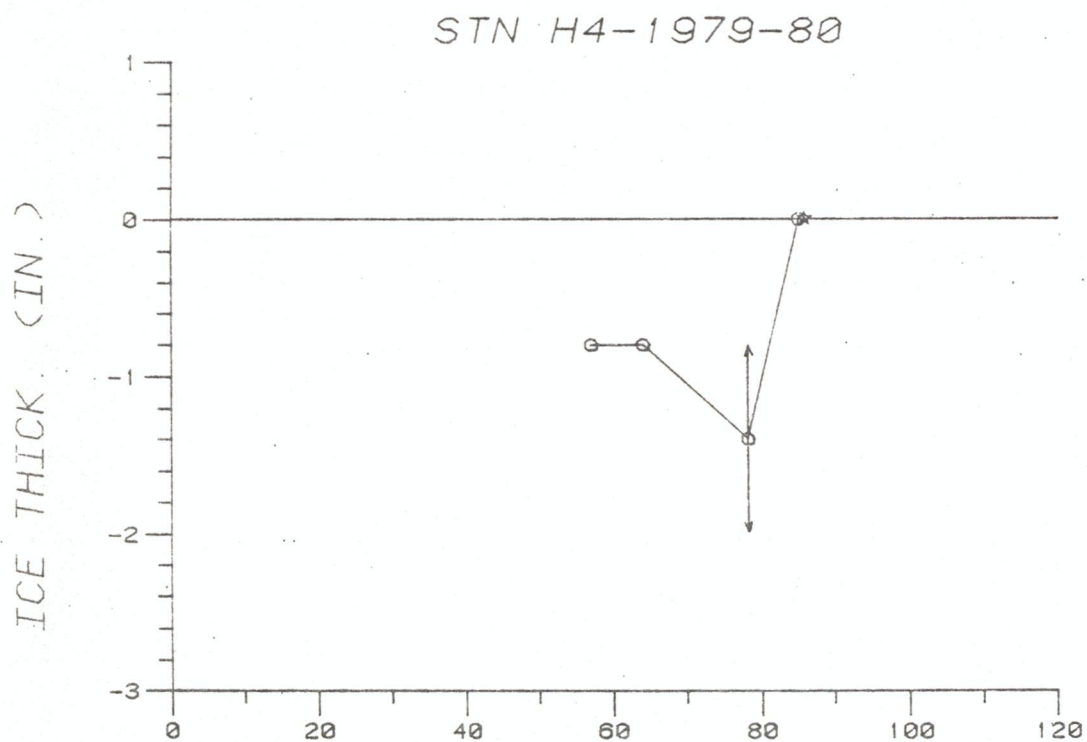
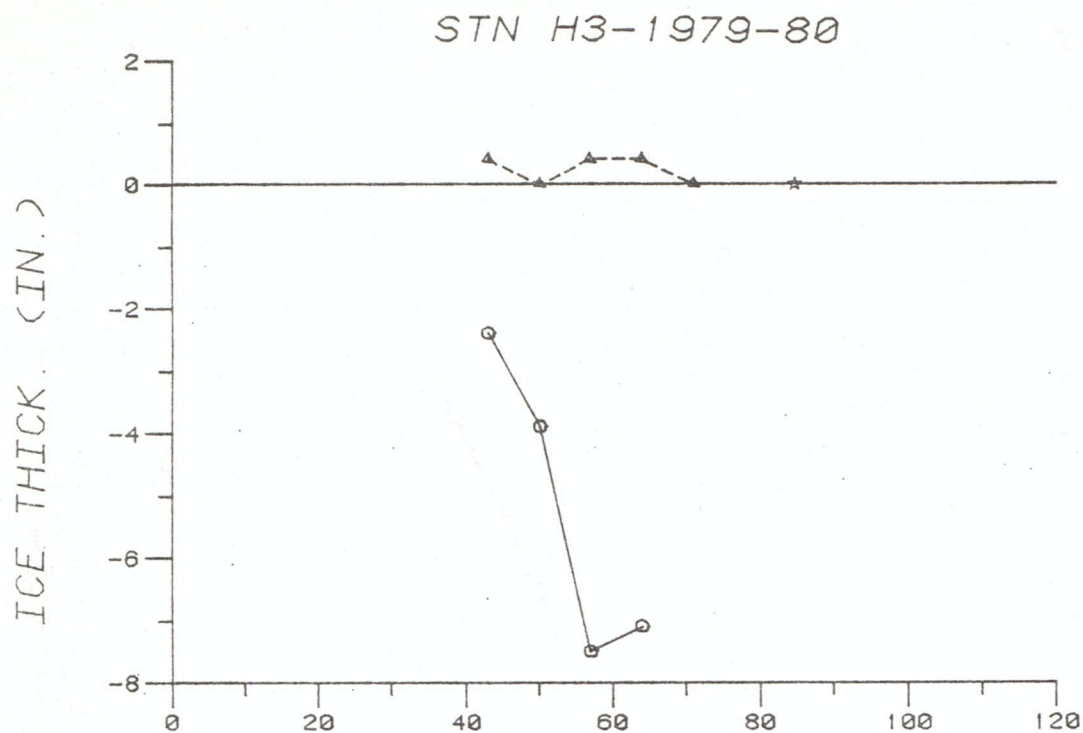
STN E2-1979-80



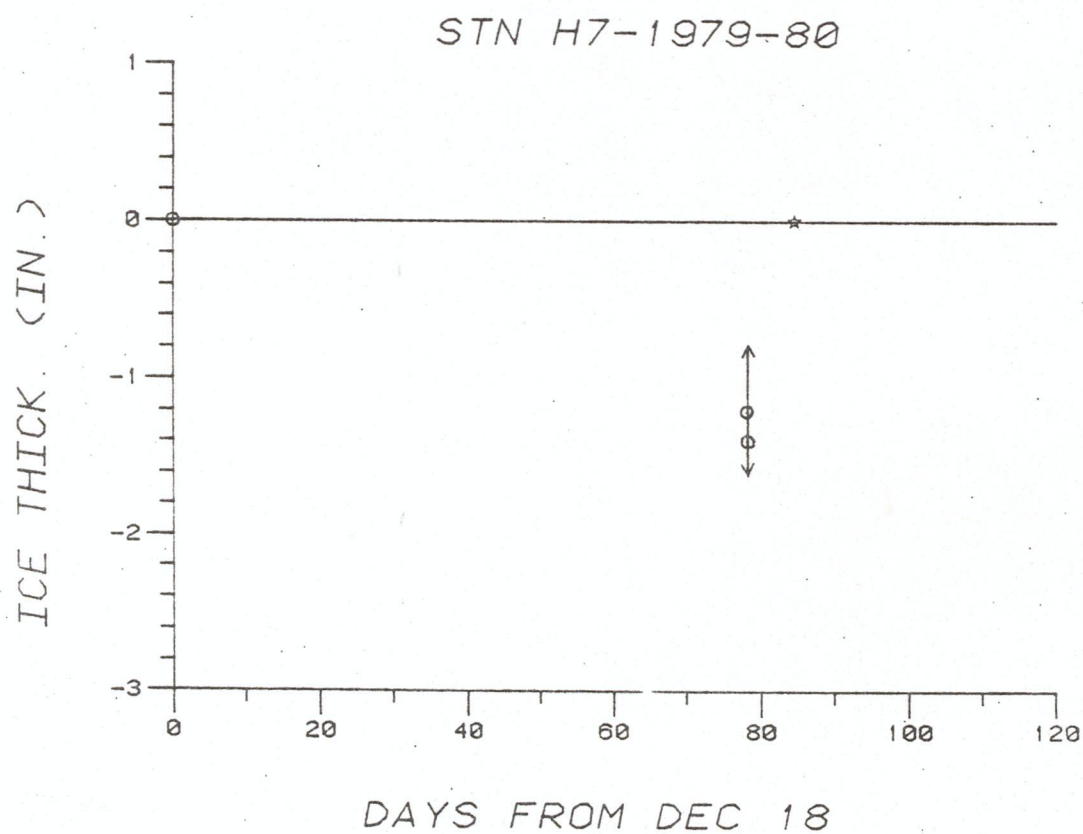
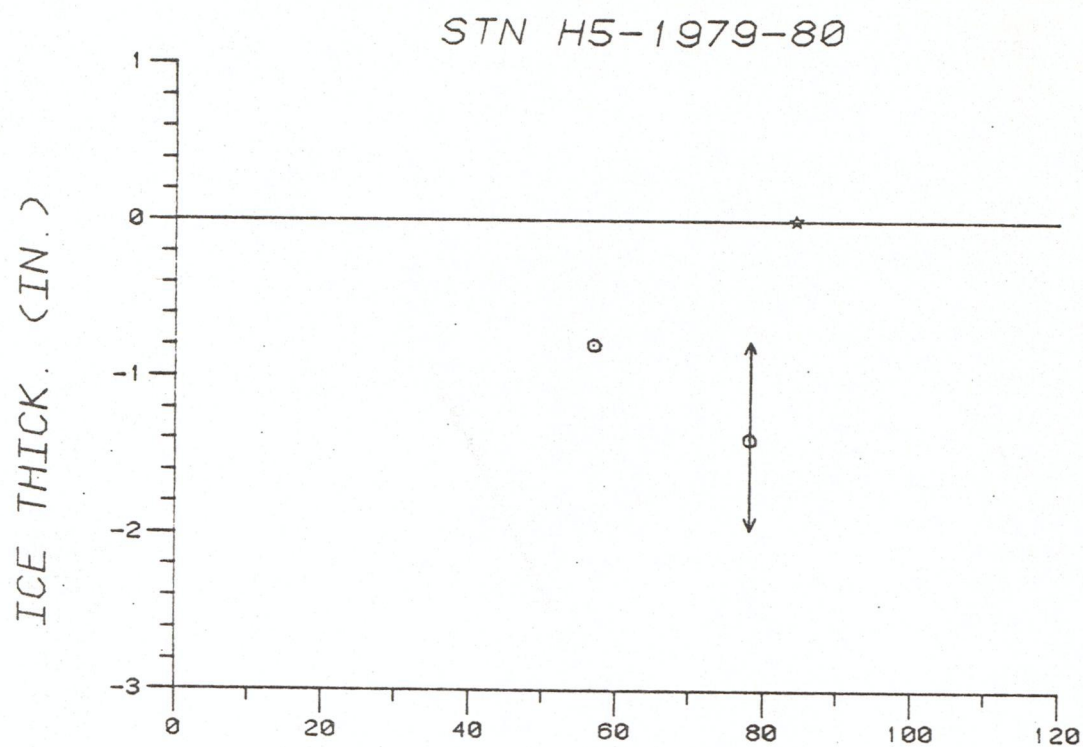
DAYS FROM DEC 18

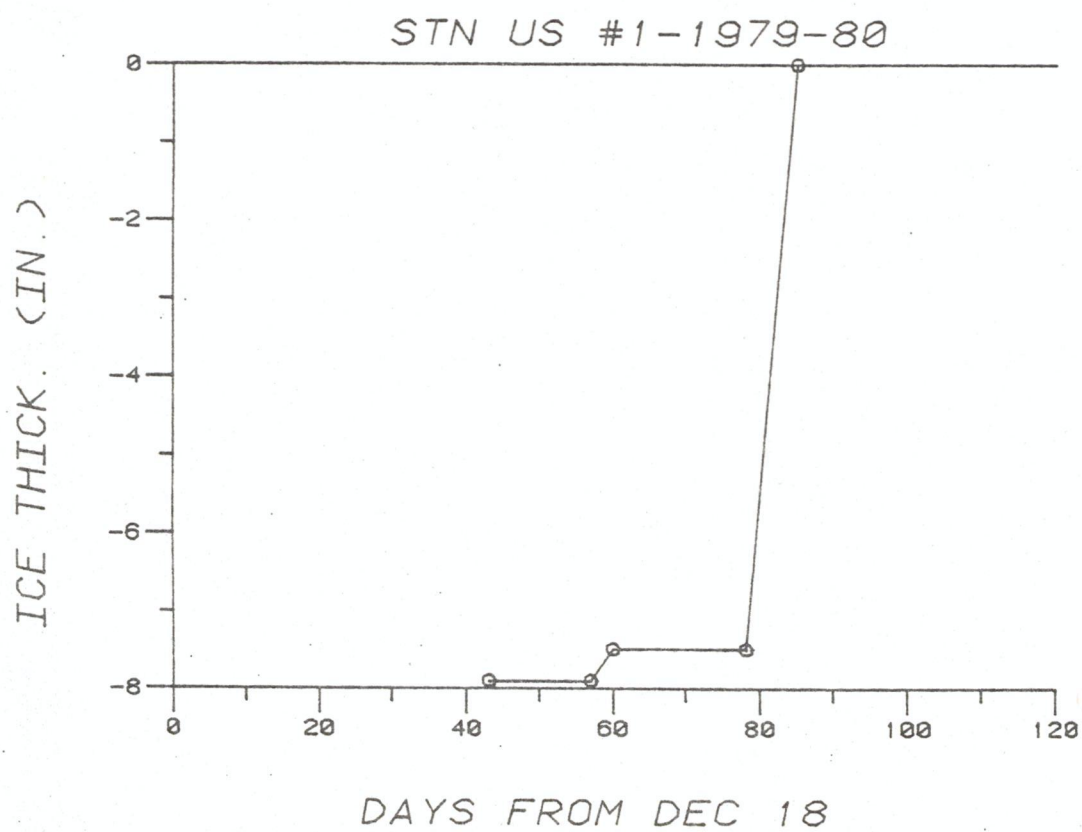
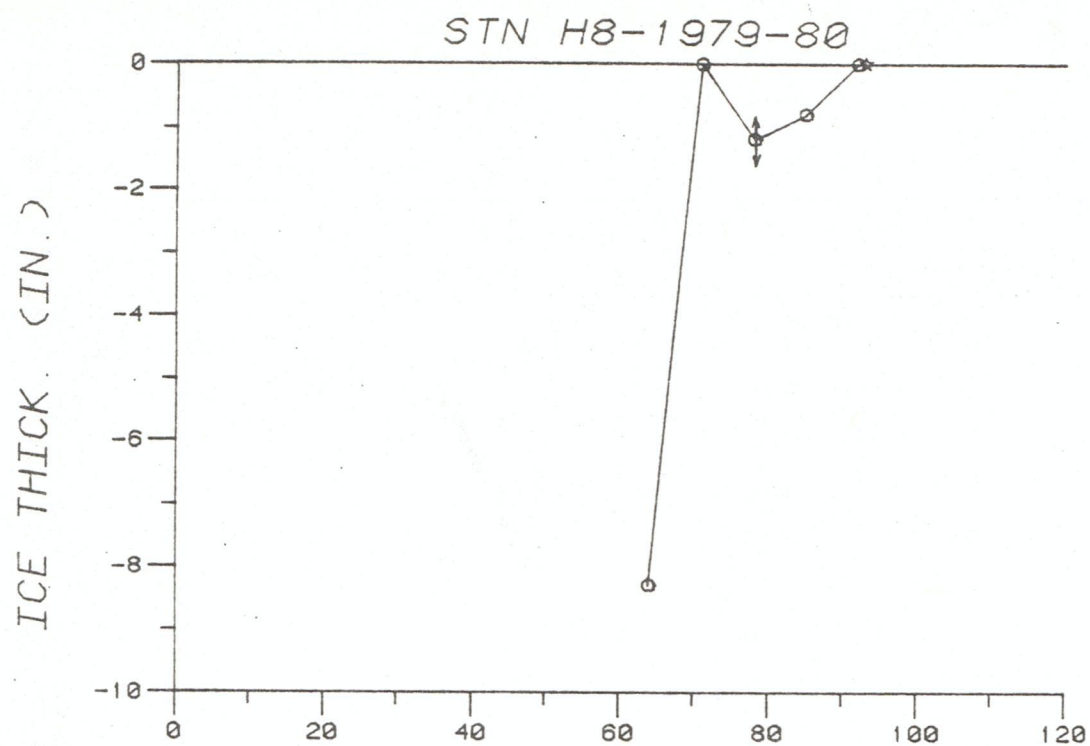


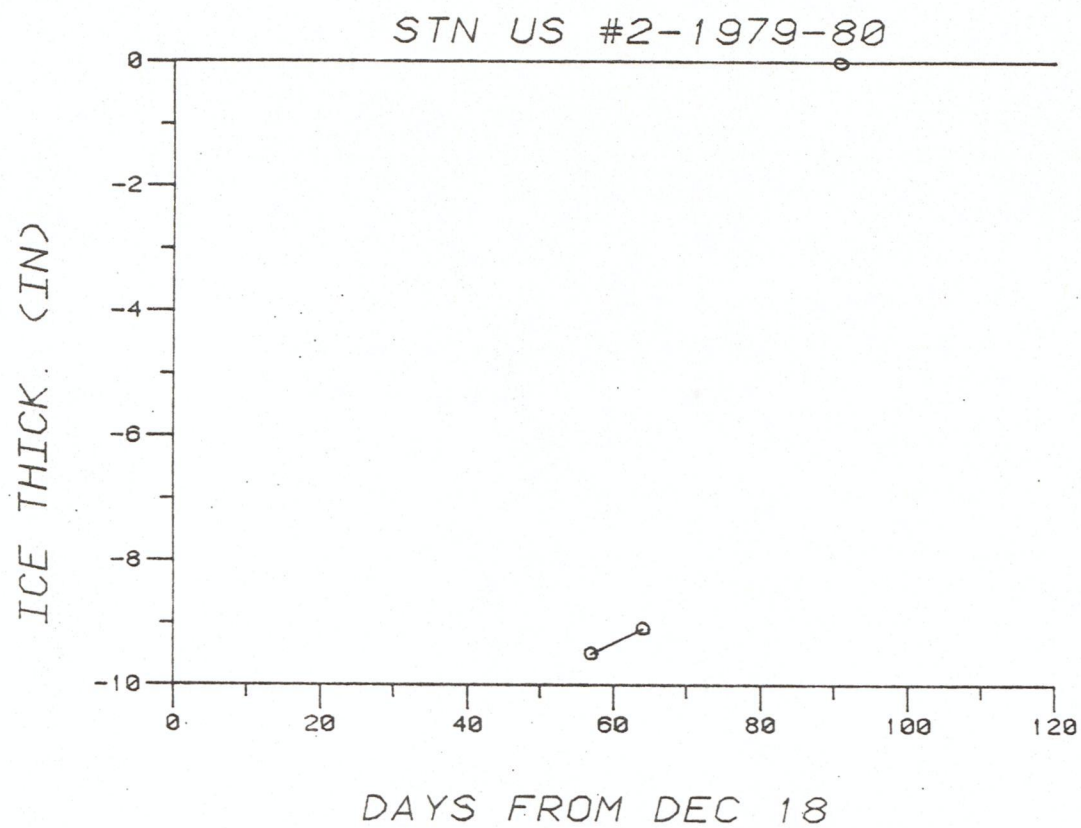




DAYS FROM DEC 18







Station E1, Winter 1980-81

Date	Ice (in.)	Snow (in.)	Remarks
1/14/81	20.5	0.8	Smooth surface
1/20/81	22.0	0.8	Smooth surface
1/27/81	22.8	0	Smooth surface
2/3/81	24.0	0	Smooth surface
2/10/81	25.6	0.8	Smooth surface
2/17/81	24.4	0	Smooth surface
2/26/81	15.7	0	Smooth surface
3/5/81			Unsafe
3/10/81			Open water

Station E2, Winter 1980-81

Date	Ice (in.)	Snow (in.)	Remarks
1/14/81	18.5	0	Smooth surface
1/20/81	20.5	1.2	
1/27/81	20.9	0	
2/3/81	18.9	0	
2/10/81	16.9	0	Equip. broken (Approx. meas.)
2/17/81	14.2		Equip. broken (Approx. meas.)
2/26/81	NA		Open water
3/5/81			Open water
3/10/81			Open water

Station F1, Winter 1980-81

Date	Ice (in.)	Snow (in.)	Remarks
1/14/81	20.1	0	Smooth surface
1/20/81	21.7	3.1	Smooth surface
1/27/81	22.4	0	Smooth surface
2/3/81	22.4	0	Smooth surface
2/10/81	22.8	0.4	Smooth surface
2/17/81	20.1	0	1" water on ice
2/26/81			Open water
3/5/81			Ice within arch bay only
3/10/81			Ice within arch bay only

Station F2, Winter 1980-81

Date	Ice (in.)	Snow (in.)	Remarks
1/14/81	18.1	0	Smooth surface
1/20/81	22.0	0.8	Smooth surface
1/27/81	18.5	0	Smooth surface
2/3/81	16.5	0	Smooth surface
2/10/81	16.9	1	Smooth surface
2/17/81	12.2	0	Smooth surface
2/20/81			Open water
2/26/81			Open water
3/5/81			Open water
3/10/81			Open water

Station G1, Winter 1980-81

Date	Ice (in.)	Snow (in.)	Remarks
1/14/81	20.1	0.8	Smooth surface
1/20/81	21.3	2.0	Smooth surface
1/27/81	22.4	0	Smooth surface
2/3/81	23.2	0	Smooth surface
2/10/81	24.8	0.8	Smooth surface
2/17/81	22.8	0	Smooth surface
2/26/81	Unsafe	0	
3/5/81	Unsafe	0	
3/10/81	Unsafe	0	
3/17/81			Open water

Station G2, Winter 1980-81

Date	Ice (in.)	Snow (in.)	Remarks
1/14/81	13.4	3.9	Smooth surface
1/20/81	15.4	4.7	Smooth surface
1/27/81	16.1	0	Smooth surface
2/3/81	19.3	0	Smooth surface
2/10/81	20.9	0.4	Smooth surface
2/17/81	19.7	0	Smooth surface
2/26/81	Unsafe	0	
3/5/81	Unsafe	0	
3/10/81	Unsafe	0	
3/17/81			Open water

Station H1, Winter 1980-81

Date	Ice (in.)	Snow (in.)	Remarks
1/14/81	14.2		Smooth surface, equip. broken
1/20/81	16.9	0	Smooth surface, new apparatus
1/27/81	14.6	0	Smooth surface
2/3/81	15.0	0	Smooth surface
2/10/81	15.7	0	Open water in the vicinity
2/17/81	Unsafe	0	Unsafe - some free water
2/20/81			Open water
2/26/81			Open water
3/5/81			Open water
3/10/81			Open water

Station H2, Winter 1980-81

Date	Ice (in.)	Snow (in.)	Remarks
1/14/81			Unsafe - free water
1/20/81			Unsafe - free water
1/27/81			Unsafe - free water
2/3/81			Unsafe - free water
2/10/81			Unsafe - free water
2/17/81			Unsafe - free water
2/20/81			Open water
2/26/81			Open water
3/5/81			Open water
3/10/81			Open water

Station H3, Winter 1980-81

Date	Ice (in.)	Snow (in.)	Remarks
1/14/81	11.8	0	Smooth surface
1/20/81	11.4	0.8	Smooth surface
1/27/81	7.5	0	Smooth surface
2/3/81	7.9	0	Smooth surface
2/10/81	7.5	0	Smooth surface
2/17/81	4.7	0	Smooth surface
2/20/81			Open water
3/5/81			Open water
3/10/81			Open water

Station H4, Winter 1980-81

Date	Ice (in.)	Snow (in.)	Remarks
1/14/81	11.8	0	Smooth surface
1/20/81	11.8	0	Smooth surface
1/27/81	7.9	0	Smooth surface
2/3/81	5.9		Smooth surface
2/10/81	6.7	0.4	Smooth surface
2/17/81	3.1	0	Smooth surface
2/20/81			Open water
2/26/81			
3/5/81			
3/10/81			

Station H5, Winter 1980-81

Date	Ice (in.)	Snow (in.)	Remarks
1/14/81	12.2	0	Smooth surface
1/20/81	12.6	2.0	Smooth surface
1/27/81	5.5	0	Smooth surface
2/3/81	3.9	0	Smooth surface
2/10/81	Unsafe	Thin ice, openings in the neighborhood	
2/17/81			Open water
2/23/81			Open water
2/26/81			Open water
3/5/81			Open water
3/10/81			Open water

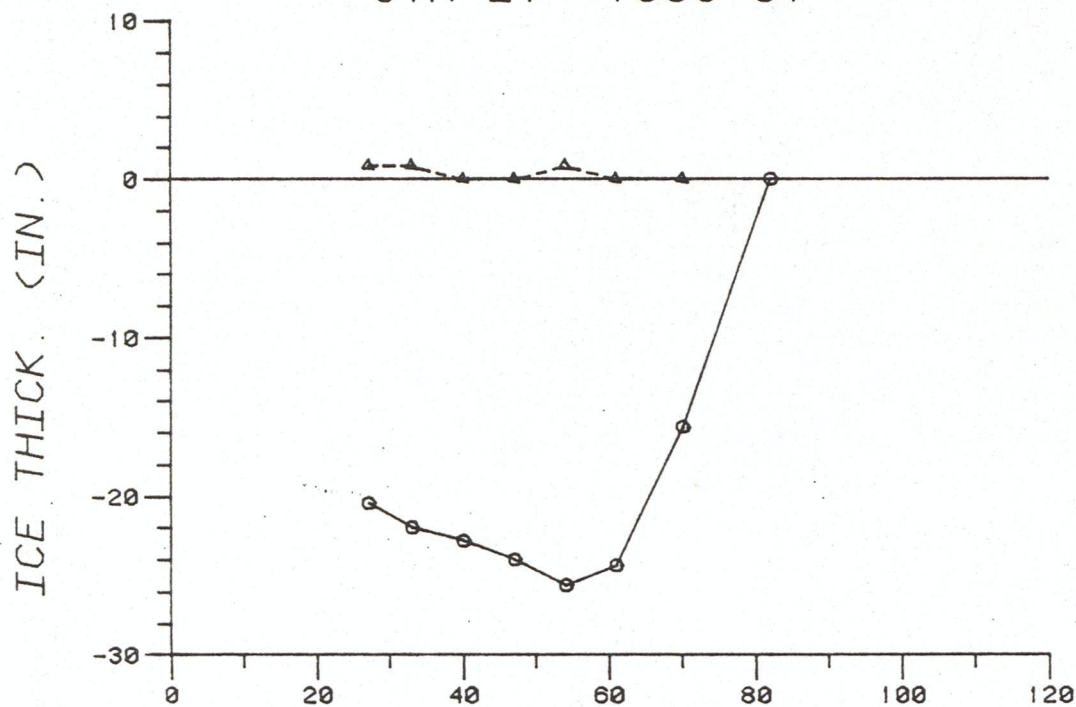
Station H7, Winter 1980-81

Date	Ice (in.)	Snow (in.)	Remarks
1/20/81	9.1	0	Smooth surface
1/27/81			Unsafe - openings
2/3/81			Smooth surface
2/10/81	1.6	0	Smooth surface
2/17/81			Unsafe
2/23/81			Open water
2/26/81			Open water
3/5/81			Open water
3/10/81			Open water

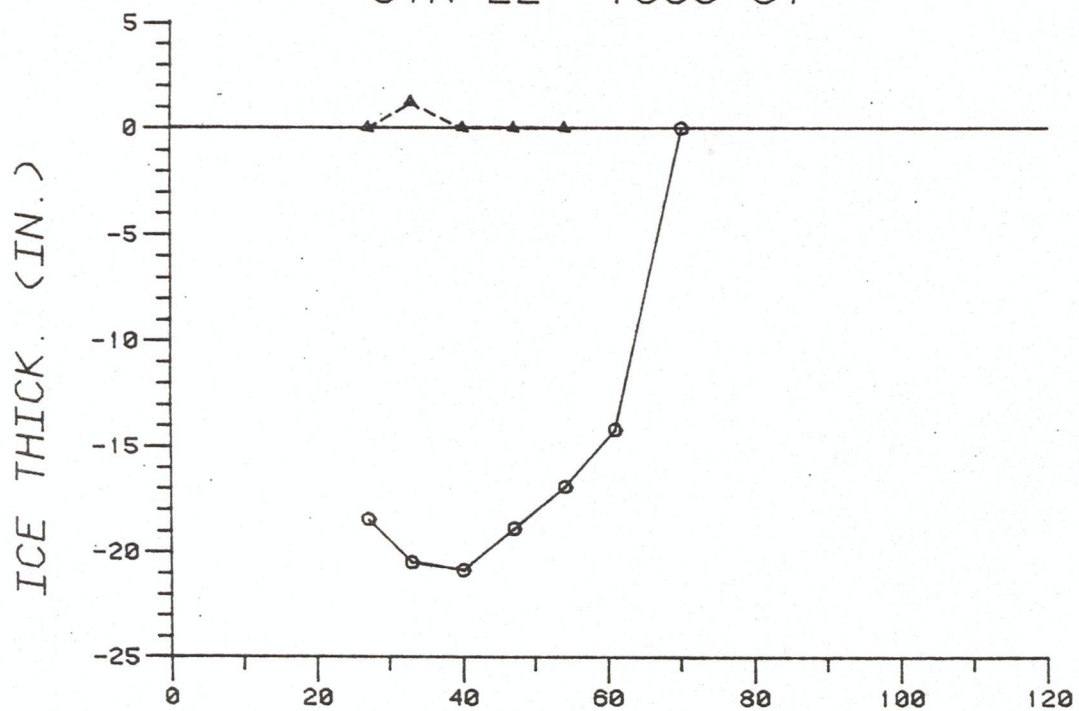
Station H8, Winter 1980-81

Date	Ice (in.)	Snow (in.)	Remarks
1/20/81	14.6	0	Smooth surface
1/27/81	13.4	0	Smooth surface
2/3/81	13.8	0	Smooth surface
2/10/81	16.1	3.9	Smooth surface
2/17/81	Unsafe	0	Smooth surface
2/26/81	Unsafe		
3/5/81			
3/10/81			Open water

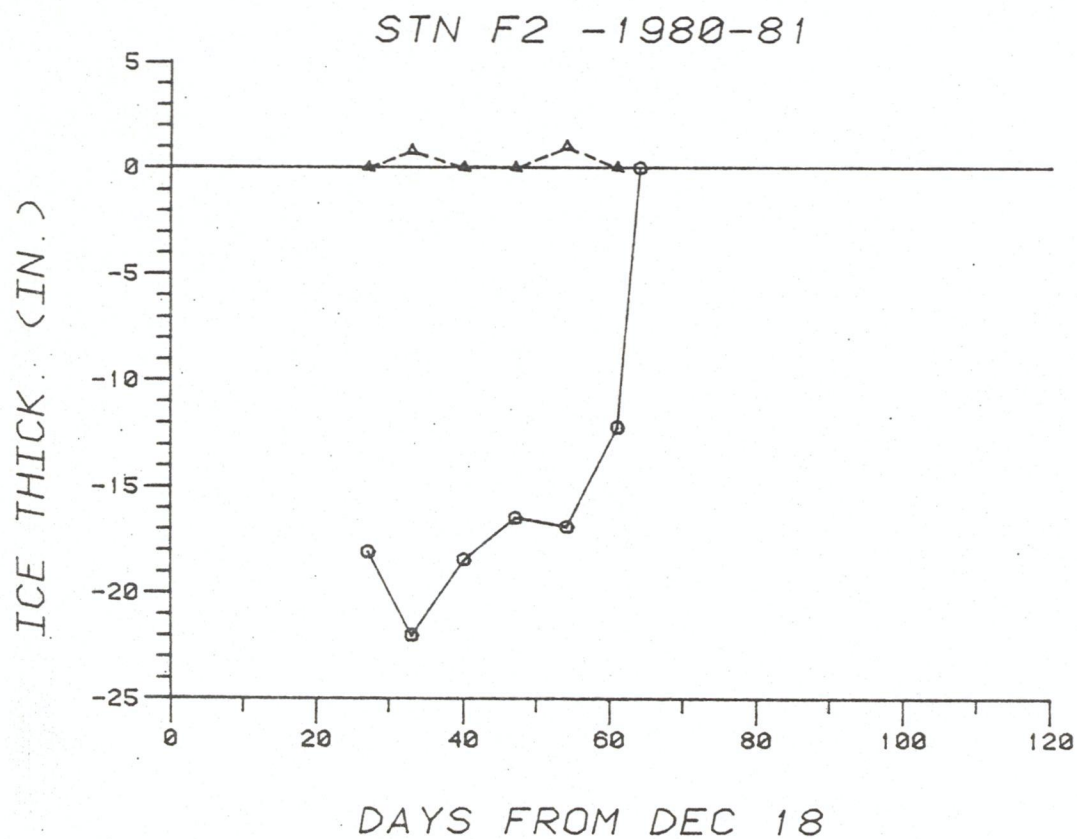
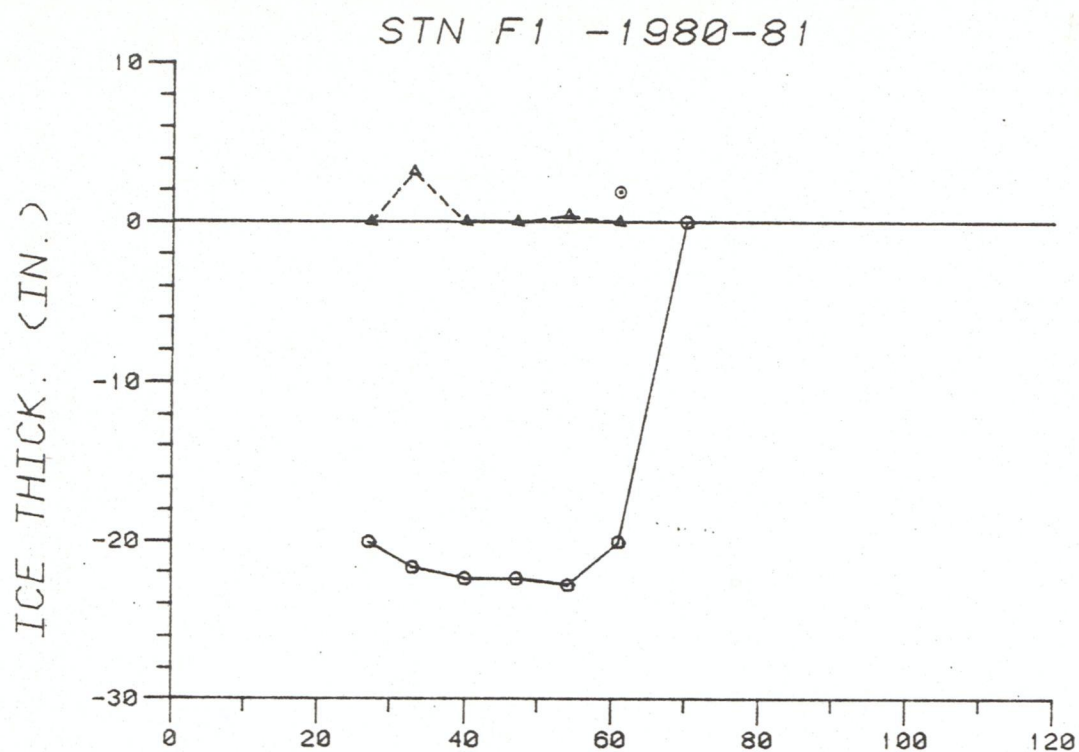
STN E1 -1980-81

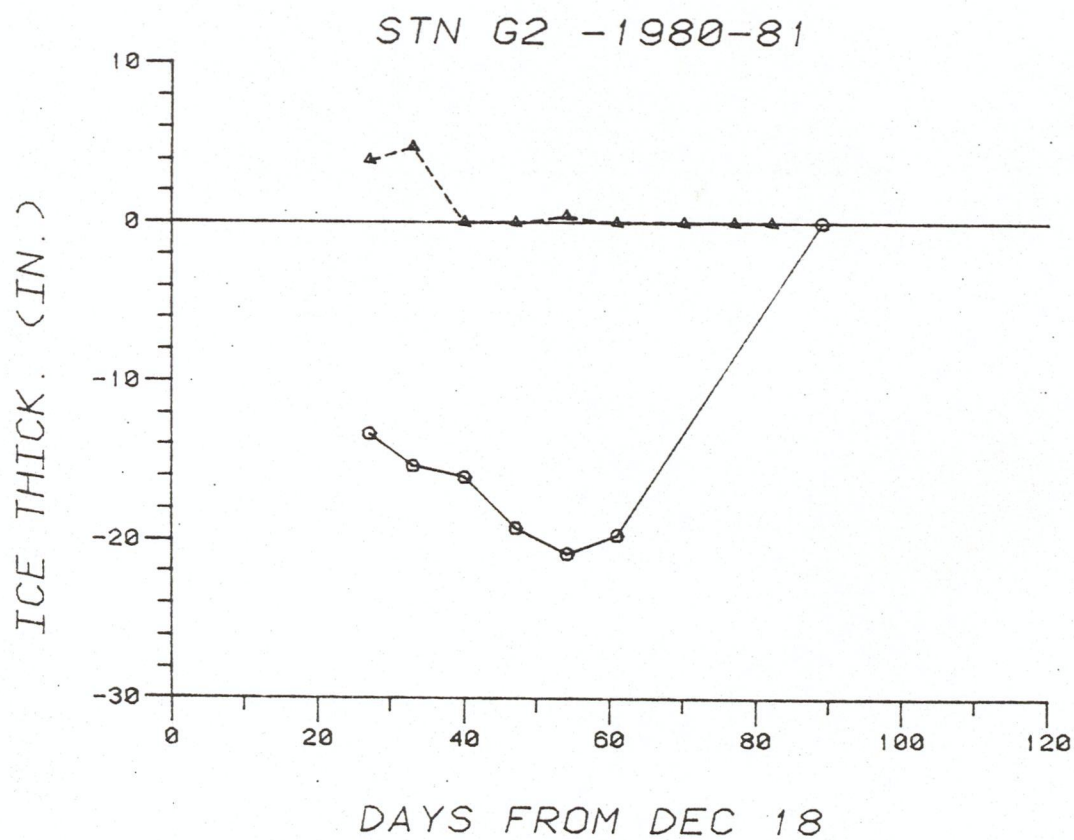
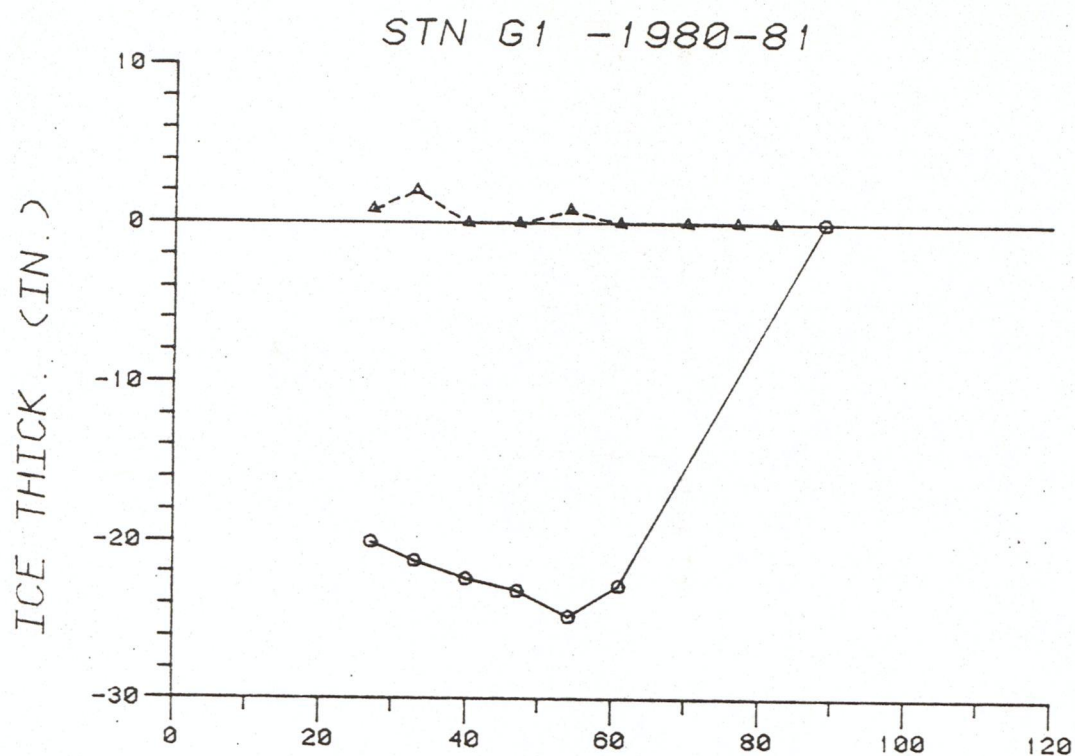


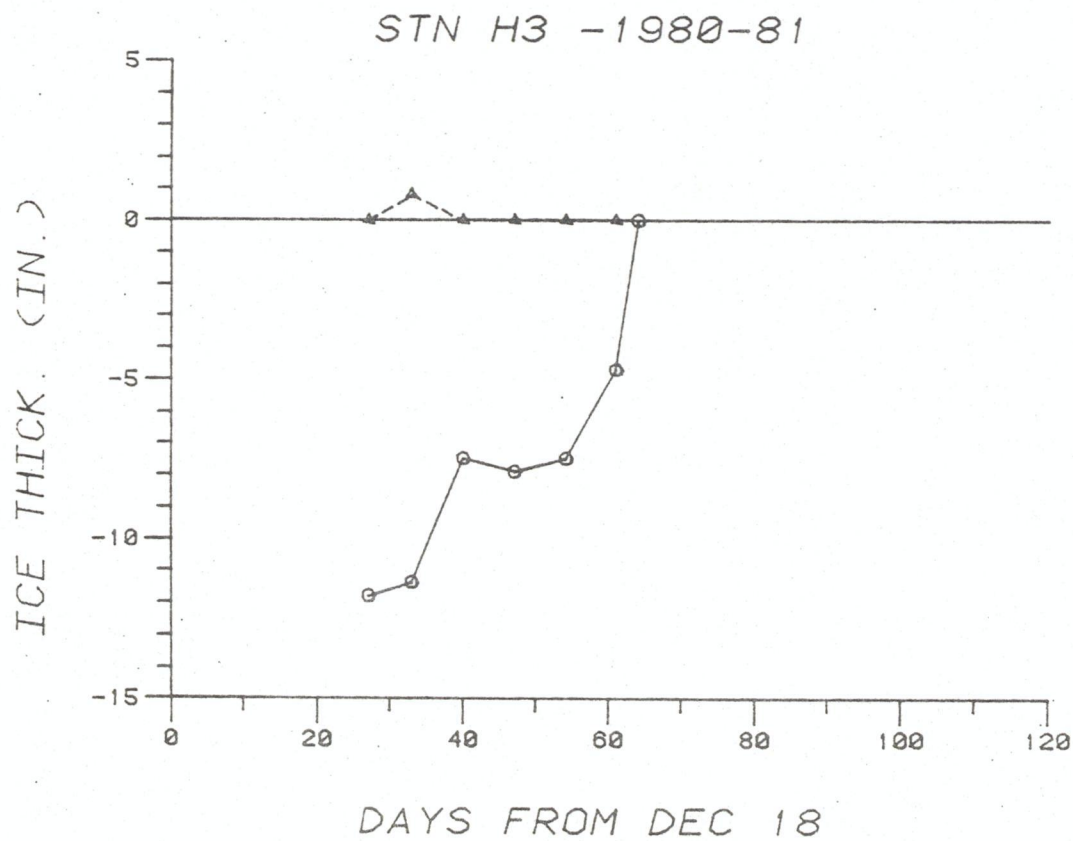
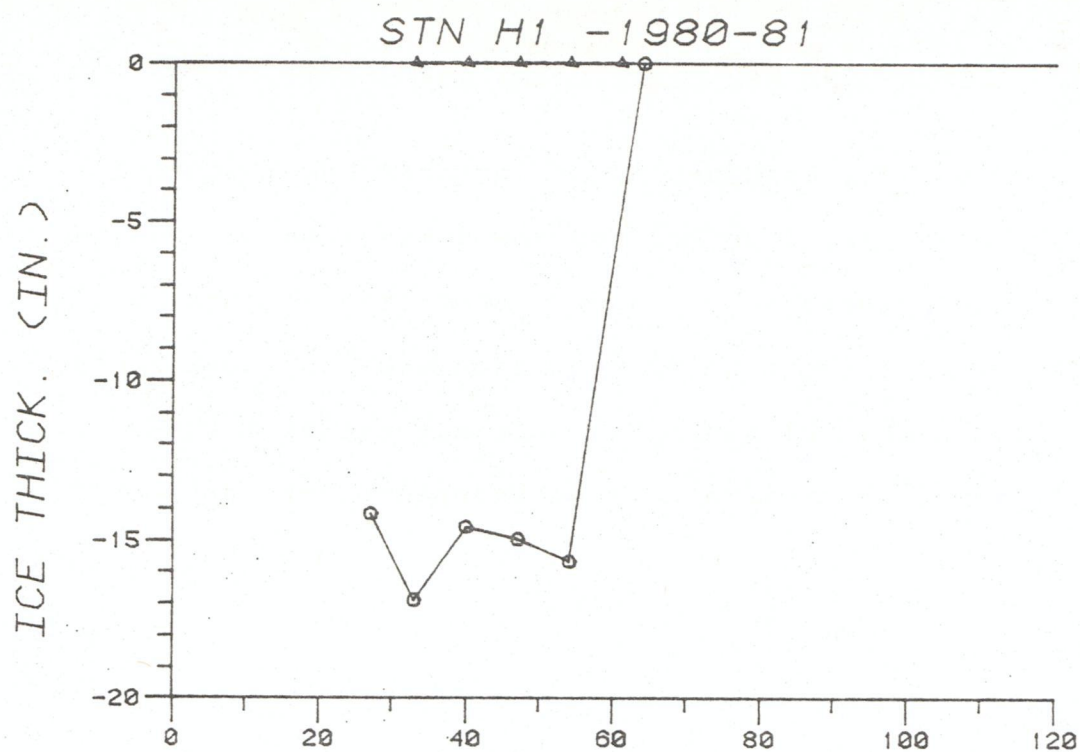
STN E2 -1980-81



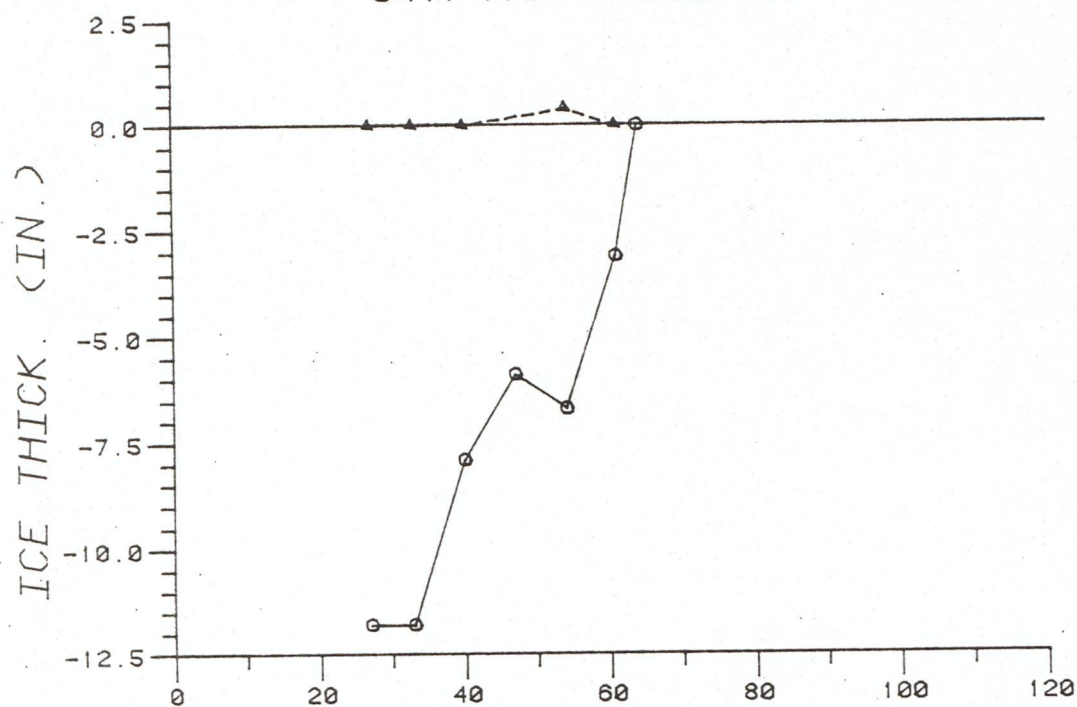
DAYS FROM DEC 18



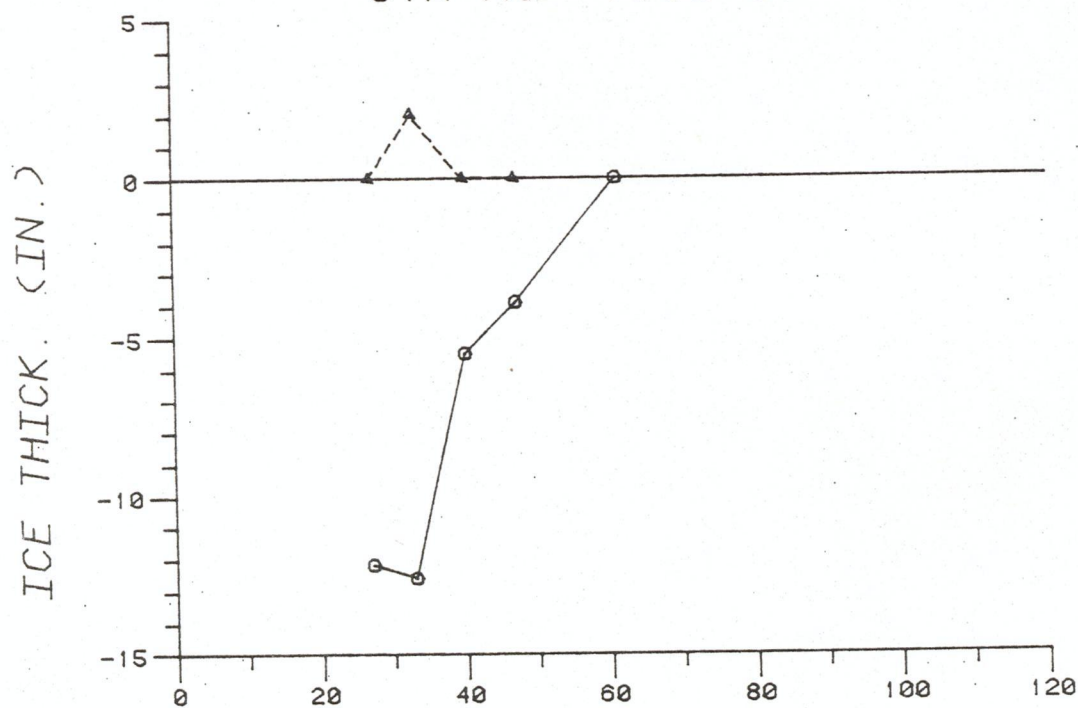




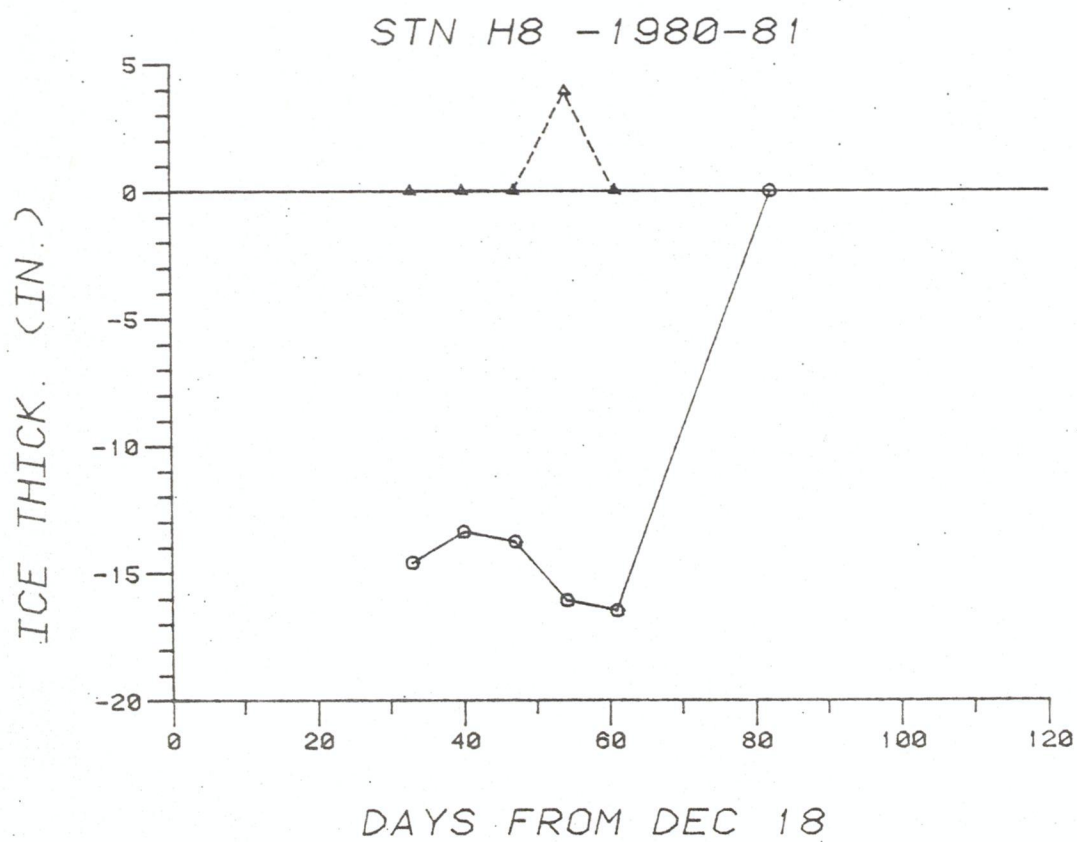
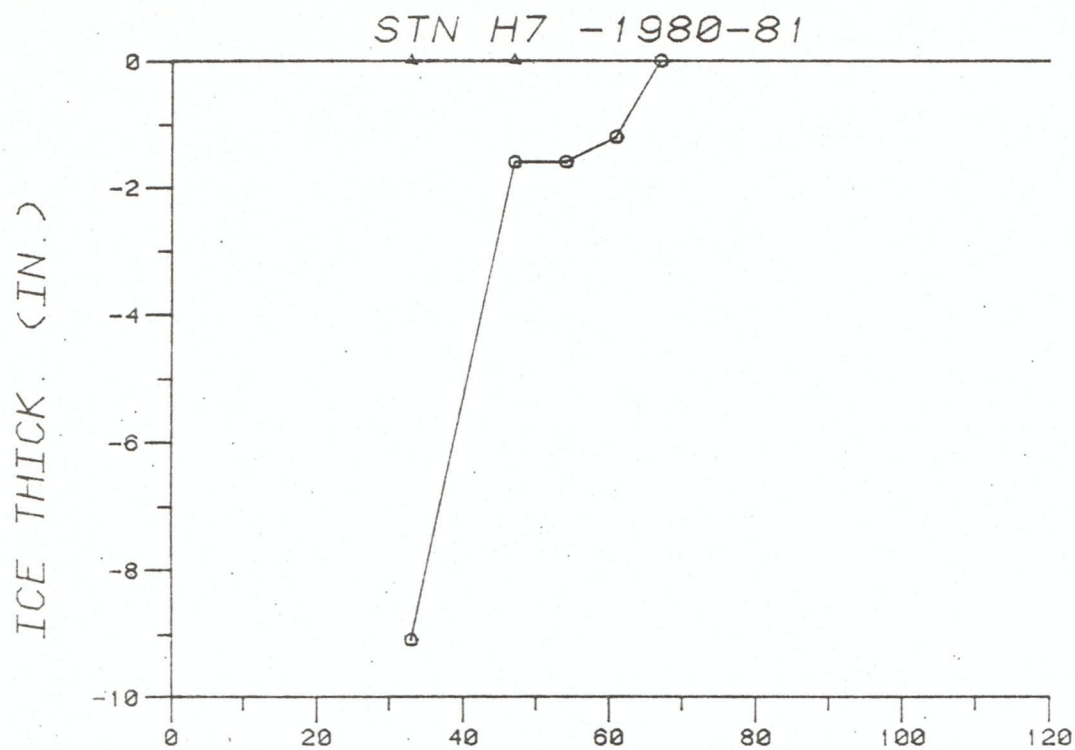
STN H4 -1980-81



STN H5 -1980-81



DAYS FROM DEC 18



Chapter III

ICE COVER AND HANGING DAM THICKNESS

Ice cover and hanging dam thicknesses are measured by Ontario Hydro near the Power Dam and at locations where hanging ice dams are often formed. Locations of transverse cross sections where measurements were taken are listed in Table 3.1. These cross sections are also indicated in Figure 2.1. All measured data are presented in tabular form following Table 3.1.

Table 3.1. Locations of Hanging Dam Thickness Measurement

Cross Section	Locations
A (Power Dam)	800 ft. upstream of the Power Dam from Barnhart Island to Canadian Shore
B1 (Waddington)	Out from pumphouse at the east end of the Village of Waddington to Ogden Island
B2 (Morristown)	From the east end of the Village of Morristown to Ogden Island
C (Pine Tree Pt.)	At Pine Tree Point from Canadian Shore to American Shore
D (Cardinal)	Out from 0.8 miles east of Cardinal to St. Lawrence Shipping Channel Monument No. 29 U.S. mainland

Ice Cover and Hanging Dam Thickness Data
(Ontario Hydro)

CROSS SECTION A(Power Dam), Feb. 17, 1971

<u>Location</u>	<u>Ice Thickness</u>	<u>and</u>	<u>Remarks</u>
1+50	19"	Solid Ice	
3+00	20"		
4+50	17½"		
6+10	15½"		
7+50	16"		
9+00	15"		
10+50	22"		
12+00	23"		
13+50	20"		
15+00	23"		
16+50	21"		
18+00	21"		
19+50	21"		
21+00	21"		
22+50	22"		
24+00	18"		
25+50	21"		
27+00	24"		
28+50	20½"		
30+00	18"		
31+50	15"		
33+00	20"		
34+50	20"		
36+50	Canadian Shore		

CROSS SECTION B1 (Waddington), Feb. 16, 1971

<u>Location</u>	<u>Ice Thickness</u>	<u>and</u>	<u>Remarks</u>
1+50	19½" Solid Ice		No Slush
3+00	18½" Solid Ice		
4+50	15" Solid Ice		
6+00	23" Solid Ice		
7+50	25" Solid Ice		
9+00	28" Solid Ice		
10+50	26" Solid Ice		
12+00	21" Solid Ice	Black Ice -	Clear Ice
13+50	18" Solid Ice	Black Ice -	Clear Ice
15+00	22" Solid Ice	Black Ice -	Clear Ice
17+00	Ogden Island		

CROSS SECTION B2 (Mariatown), Feb. 16, 1971

<u>Location</u>	<u>Ice Thickness</u>	<u>and</u>	<u>Remarks</u>
1+50	20" Solid Ice	No Slush	
3+00	22" Solid Ice	Light Slush-Bottom of cover rough	
4+50	23" Solid Ice	No Slush-Bottom of cover rough	
6+00	23" Solid Ice	No Slush - Silt evident	
7+50	18" Solid Ice	No Slush	
9+00	20½" Solid Ice	13' Slush Ice	
10+50	24" Solid Ice	Heavy Slush	
12+00	25" Solid Ice	27' Heavy Slush - Silt evident	
13+50	27" Solid Ice	Light Slush	
15+00	18" Solid Ice	No Slush	
17+00	Ogden Island		

CROSS SECTION C(Pinetree Pt.), Feb. 17, 1971

<u>Location</u>	<u>Ice Thickness</u>	<u>and</u>	<u>Remarks</u>
1+50	16½" Solid Ice	No Slush	
3+00	18" Solid Ice	No Slush	
4+50	19"		
6+00	19"		
7+50	20"		
9+00	22"	Light Slush - North Edge of Packed Ice	
10+50	13"	Light Slush Solid Ice	
12+00	27"		
13+50	24"		
15+00	23"		
16+50	21"		
18+00	27½"	Light Slush - Bottom of Cover Uneven	
19+50	15"	Cake Ice on Underside of Cover	
21+00	19"	Cake Ice on Underside of Cover	
22+50	15"	Cake Ice on Underside of Cover	
25+50	U.S. Shore		

CROSS SECTION D(Cardinal), Feb. 24, 1971

<u>Location</u>	<u>Ice Thickness</u>	<u>and</u>	<u>Remarks</u>
1+50	19" Solid Ice	No Slush	
3+00	16" Solid Ice	No Slush	
4+50	18" Solid Ice	No Slush	
6+00	19½" Solid Ice	No Slush	
7+50	19½" Solid Ice	No Slush	
9+00	21" Solid Ice	No Slush	
10+50	24"	6' Slush	
12+00	26"	10' Heavy Slush	
13+50	25½"	19½' Heavy Slush	
15+00	2' Packed Snow No Cover	18' Heavy Slush	
16+50	No Cover	21' Heavy Slush	
18+00	No Cover	25' Heavy Slush	
19+50	No Cover	19' Heavy Slush	
21+00	No Cover	15' Heavy Slush	
22+50	10' Packed Ice	12' Heavy Slush	
24+00	17½' Packed Ice	6' Light Slush	
25+50	11" Solid Ice	No Slush	
27+00	12" Solid Ice	No Slush	
28+50	6" Solid Ice	No Slush	
30+50	D.O.T. Ship Channel American Shore Monument #29		

CROSS SECTION A(Power Dam), Feb. 29, 1972

<u>Location</u>	<u>Ice Thickness</u>	<u>and</u>	<u>Remarks</u>
1+50	17" Solid Ice		
3+00	15½" Solid Ice		
4+50	19½"	Top 10" Snow Cover	
6+00	11" Solid Ice		
7+50	13" Solid Ice		
9+00	14" Solid Ice		
10+50	12½" Solid Ice		
12+00	13" Solid Ice		
13+50	14½" Solid Ice		
15+00	14" Solid Ice		
16+50	14" Solid Ice		
18+00	14½" Solid Ice		
19+50	13" Solid Ice		
21+00	13½" Solid Ice		
22+50	15" Solid Ice		
24+00	14" Solid Ice		
25+50	19" Solid Ice		
27+00	15½" Solid Ice		
28+50	16" Solid Ice		
30+00	15" Solid Ice		
31+50	16" Solid Ice		
33+00	15" Solid Ice		
34+50	14" Solid Ice		
36+00	16" Solid Ice		
37+50	14½" Solid Ice		
39+00	17" Solid Ice		
41+00	U.S. Mainland		

CROSS SECTION B2 (Mariatown), Feb. 9, 1972

<u>Location</u>	<u>Ice Thickness</u>	<u>and</u>	<u>Remarks</u>
1+50	12" Broken Pack Ice		14' Light Slush
3+00	13" Broken Pack Ice		12' Heavy Slush
4+50	8" Broken Pack Ice		23' Heavy Slush
6+00	8" Broken Pack Ice		18' Heavy Slush
7+50	9" Broken Pack Ice		6' Heavy Slush & Cake Ice
9+00	13" Broken Pack Ice		4' Slush & Cake Ice
10+50	9" Broken Pack Ice		13' Slush & Cake Ice
12+00	11" Solid Ice		12' Slush & Cake Ice
19+00	Ogden Island		

CROSS SECTION B2 (Mariatown), Feb. 23, 1972

<u>Location</u>	<u>Ice Thickness</u>	<u>and</u>	<u>Remarks</u>
1+50	12" Solid Ice	4'-6'	Cake Ice - Light Slush
3+00	12" Solid Ice	4'-6'	Cake Ice - Light Slush
4+50	13" Solid Ice	4'-6'	Cake Ice - Light Slush
6+00	13" Solid Ice	4'-6'	Cake Ice - Light Slush
7+50	14" Solid Ice	4'-6'	Cake Ice - Light Slush
9+00	16" Solid Ice	4'-6'	Cake Ice - Light Slush
12+00	12" Broken Pack Ice		Cake Ice
15+00	12" Solid Ice		Light Slush
18+00	14" Solid Ice		Light Slush
19+00	Ogden Island		

CROSS SECTION B1 (Waddington), Feb. 29, 1972

<u>Location</u>	<u>Ice Thickness</u>	<u>and</u>	<u>Remarks</u>
1+50	17½" Solid Ice	No Slush	
3+00	14½" Solid Ice	No Slush	
4+50	13" Solid Ice	9' Slush	
6+00	11" Solid Ice	12' Slush	
7+50	9" Solid Ice	10' Slush	
9+00	10" Solid Ice	5' Slush	
10+50	16" Solid Ice	Light Slush	
12+00	16" Solid Ice	No Slush	
13+50	13" Solid Ice	No Slush	
15+50	Odgen Island		

CROSS SECTION C(Pinetree Pt.), Feb. 23, 1972

<u>Location</u>	<u>Ice Thickness</u>	<u>and</u>	<u>Remarks</u>
1+50	16" Solid Ice		Light Slush
3+00	16" Solid Ice		Light Slush
4+50	No Cover		Light Slush
6+00	No Cover		Light Slush
7+50	15" Solid Ice		Light Slush
9+00	19" Solid Ice		Light Slush
10+50	15" Solid Ice		7' Slush
12+00	18" Solid Ice		12' Slush
13+50	19" Solid Ice		10' Heavy Slush
15+00	10" Solid Ice		4' Heavy Slush
16+50	19" Solid Ice		3' Heavy Slush
18+00	18½" Solid Ice		Light Slush
19+50	18" Solid Ice		Light Slush
21+00	21" Solid Ice		Light Slush
22+50	27" Solid Ice		Light Slush
24+00	18" Solid Ice		Light Slush
27+00	American Mainland		

CROSS SECTION D(Cardinal), Mar. 1, 1972

<u>Location</u>	<u>Ice Thickness</u>	<u>and</u>	<u>Remarks</u>
1+50	10½" Solid Ice		Light Slush
3+00	6½" Solid Ice		Light Slush
4+50	9" Solid Ice		No Slush
6+00	9" Solid Ice		No Slush
7+50	7" Solid Ice		No Slush
9+00	7" Solid Ice		Light Slush
10+50	6" Solid Ice		Light Slush
12+00	8" Solid Ice		Light Slush
13+50	8" Snow Ice - No Cover - Heavy Slush North Edge of Packed Channel Ice		
15+00	Cover - Mixture Broken Ice & Snow	6'	Heavy Slush
16+50	Cover - Mixture Broken Ice & Snow	10'	Heavy Slush
18+00	Cover - Mixture Broken Ice & Snow	12'	Heavy Slush
19+50	Cover - Mixture Broken Ice & Snow	6'	Heavy Slush
21+00	Cover - Mixture Broken Ice & Snow	8'	Heavy Slush
22+50	Cover - Mixture Broken Ice & Snow	8'	Slush
24+00	Cover - Mixture Broken Ice & Snow	5'	Slush
25+50	Cover - Mixture Broken Ice & Snow	3'	Slush
27+00	13" Solid Ice	5'	Slush
28+50	7" Solid Ice	2'	Slush
30+00	21" Solid Ice	7'	Slush
32+00	U.S. Mainland		

CROSS SECTION A(Power Dam), Feb. 14, 1973

<u>Location</u>	<u>Ice Thickness</u>	<u>and</u>	<u>Remarks</u>
1+50	13"	Solid Ice	
3+00	15"	Solid Ice	
4+50	13"	Solid Ice	
6+00	14"	Solid Ice	
7+50	16"	Solid Ice	
9+00	15"	Solid Ice	
10+50	16"	Solid Ice	
12+00	15"	Solid Ice	
13+50	16"	Solid Ice	
15+00	16"	Solid Ice	
16+50	15"	Solid Ice	
18+00	19"	Solid Ice	
19+50	16"	Solid Ice	
21+00	16"	Solid Ice	
22+50	14"	Solid Ice	
24+00	14"	Solid Ice	
25+50	15"	Solid Ice	
27+00	16"	Solid Ice	
28+50	14"	Solid Ice	
30+00	15"	Solid Ice	
31+50	14"	Solid Ice	
33+00	15"	Solid Ice	
34+50	15"	Solid Ice	
36+00	16"	Solid Ice	
37+50	17"	Solid Ice	
39+00	17"	Solid Ice	
41+00	U.S.	Mainland	

CROSS SECTION B1 (Waddington), Feb. 14, 1973

<u>Location</u>	<u>Ice Thickness</u>	<u>and</u>	<u>Remarks</u>
1+50	12" Solid Ice	No Slush	
3+00	14" Solid Ice	No Slush	
4+50	20" Solid Ice	4' Broken Pack Ice	
6+00	16" Solid Ice		
7+50	18" Solid Ice	Light Slush	
9+00	12" Solid Ice		
10+50	18" Solid Ice		
12+00	13" Solid Ice	5' Broken Pack Ice	
13+50	20" Solid Ice		
15+00	16" Solid Ice	2' Broken Pack Ice	
16+00	Ogden Island		

CROSS SECTION B2 (Mariatown), Feb. 28, 1973

<u>Location</u>	<u>Ice Thickness</u>	<u>and</u>	<u>Remarks</u>
1+50	8' Solid Broken Pack Ice		
3+00	18" Solid Broken Pack Ice	3' Light Slush	
4+50	19½" Solid Broken Pack Ice	2' Light Slush	
6+00	25" Solid Broken Pack Ice	6' Medium Slush	
7+50	19" Solid Broken Pack Ice	7' Medium Slush	
9+00	27" Solid Broken Pack Ice	9' Heavy Slush	
10+50	31" Solid Broken Pack Ice	18' Heavy Slush	
12+00	20" Solid Broken Pack Ice	7' Heavy Slush	
13+50	20" Solid Broken Pack Ice	2' Light Slush	
15+00	23" Solid Broken Pack Ice	2' Light Slush	
17+00	Ogden Island		

CROSS SECTION C(Pinetree Pt.), Feb. 20, 1973

<u>Location</u>	<u>Ice Thickness</u>	<u>and</u>	<u>Remarks</u>
1+50	14" Solid Ice	2'	Light Slush
3+00	15" Solid Ice	No	Slush
4+50	15" Solid Ice	No	Slush
6+00	11" Solid Ice	No	Slush
7+50	11" Solid Ice	No	Slush
9+00	2' Solid Broken Pack Ice		
10+50	6" Solid Ice	10'	Heavy Slush
12+00	17" Solid Ice	18'	Heavy Slush
13+50	11" Broken Pack Ice	9'	Heavy Slush
15+00	12" Broken Pack Ice	9'	Heavy Slush
16+50	12" Solid Ice	4'	Light Slush
18+00	14" Solid Ice	4'	Light Slush
19+50	13" Solid Ice	2'	Light Slush
21+00	13" Solid Ice	No	Slush
22+50	16" Solid Ice	No	Slush
24+00	14" Solid Ice	No	Slush
25+50	13" Solid Ice	No	Slush
27+00	U.S. Mainland		

CROSS SECTION A(Power Dam), Feb. 20, 1974

<u>Location</u>	<u>Ice Thickenss</u>	<u>and</u>	<u>Remarks</u>
1+50	13"	Solid Ice	
3+00	13"	Solid Ice	
4+50	14"	Solid Ice	
6+00	14"	Solid Ice	
7+50	13"	Solid Ice	
9+00	16"	Solid Ice	
10+50	15"	Solid Ice	
12+00	14½"	Solid Ice	
13+50	16"	Solid Ice	
15+00	12"	Solid Ice	
16+50	16"	Solid Ice	
17+50	16"	Solid Ice	
19+00	16"	Solid Ice	
20+50	16"	Solid Ice	
22+00	11"	Solid Ice	
23+50	13"	Solid Ice	
25+00	11"	Solid Ice	
26+50	11"	Solid Ice	
28+00	14"	Solid Ice	
29+50	11½"	Solid Ice	
31+00	11"	Solid Ice	
32+50	11"	Solid Ice	
34+00	10"	Solid Ice	
35+50	11"	Solid Ice	
37+50	U.S.	Shore	

CROSS SECTION Bl(Waddington), Feb. 19, 1974

<u>Location</u>	<u>Ice Thickness</u>	<u>and</u>	<u>Remarks</u>
1+50	17" Solid Ice	No Slush	
3+00	18" Solid Ice	No Slush	
4+50	18" Solid Ice	No Slush	
6+00	16½" Solid Ice	No Slush	
7+50	18" Solid Ice	No Slush	
9+00	17½" Solid Ice	No Slush	
10+50	17" Solid Ice	No Slush	
12+00	18" Solid Ice	No Slush	
13+50	18" Solid Ice	No Slush	
15+00	19" Solid Ice	No Slush	
16+50	17½" Solid Ice	No Slush	
18+50	Ogden Island		

CROSS SECTION A(Power Dam^{*}), Feb. 19, 1975

* Cross section located at 1000' upstream of the Power Dam.

<u>Location</u>	<u>Ice Thickness</u>	<u>and</u>	<u>Remarks</u>
1+50	13"	Solid Ice	
3+00	15"	Solid Ice	
4+50	15"	Solid Ice	
6+00	16"	Solid Broken Pack Ice	
7+50	14"	Solid Broken Pack Ice	
9+00	15½"	Solid Broken Pack Ice	
10+50	14"	Solid Broken Pack Ice	
12+00	14"	Solid Broken Pack Ice	
13+50	10½"	Solid Broken Pack Ice	
15+00	13"	Solid Broken Pack Ice	
16+50	16"	Solid Broken Pack Ice	
18+00	15½"	Solid Broken Pack Ice	
19+50	15½"	Solid Broken Pack Ice	
21+00	13"	Solid Broken Pack Ice	
22+50	14"	Solid Broken Pack Ice	
24+00	14"	Solid Broken Pack Ice	
25+50	21"	Solid Broken Pack Ice	
27+00	13"	Solid Broken Pack Ice	

Cross Section A'(Power Dam^{*}), Feb. 19, 1975(continued)

<u>Location</u>	<u>Ice Thickness</u>	<u>and</u>	<u>Remarks</u>
28+50	13" Solid Broken		Pack Ice
30+00	14" Solid Broken		Pack Ice
31+50	13" Solid Broken		Pack Ice
33+00	13" Solid Broken		Pack Ice
34+50	12" Solid Broken		Pack Ice
36+00	11" Solid Broken		Pack Ice
37+50	10" Solid Broken		Pack Ice
38+00	Canadian Shore		

* Cross section located at 1000' upstream of the Power Dam

CROSS SECTION B2 (Mariatown), Feb. 21, 1974

<u>Location</u>	<u>Ice Thickness</u>	<u>and</u>	<u>Remarks</u>
1+50	13" Solid Ice		
3+00	15" Solid Ice		
4+50	12" Solid Ice		
6+00	14" Solid Ice		
7+50	14" Solid Ice		
9+00	15" Solid Ice		
10+50	25" Solid Ice	Light Slush	
12+00	24" Solid Ice	Light Slush	
13+50	23½" Solid Ice	Light Slush	
15+00	23" Solid Ice	Light Slush	
16+50	17½" Solid Ice	No Slush	
18+00	16" Solid Ice	No Slush	
20+00	Ogden Island		

CROSS SECTION A' (Power Dam^{*}), Feb. 25, 1976

* Cross section located at 1000' upstream of the Power Dam.

<u>Location</u>	<u>Ice Thickness</u>	<u>and</u>	<u>Remarks</u>
1+25	17"	Solid Ice	
2+50	13"	Solid Ice	
3+75	18"	Solid Ice	
5+00	18½"	Solid Ice	
6+25	20"	Solid Ice	
7+50	19½"	Solid Ice	
8+75	22"	Solid Ice	
10+00	19"	Solid Ice	
11+25	19"	Solid Ice	
12+50	20"	Solid Ice	
13+75	20"	Solid Ice	
15+00	19"	Solid Ice	
16+25	21"	Solid Ice	
17+50	21½"	Solid Ice	
18+75	18"	Solid Ice	
20+00	20"	Solid Ice	
21+25	23"	Solid Ice	
22+50	23"	Solid Ice	
23+75	21"	Solid Ice	
25+00	20"	Solid Ice	
26+25	20"	Solid Ice	
27+50	20"	Solid Ice	
28+75	18"	Solid Ice	
30+00	20"	Solid Ice	
31+25	22"	Solid Ice	
32+50	24"	Solid Ice	
34+35	Barnhart Island		

CROSS SECTION B1(Waddington), Feb. 19, 1975

<u>Location</u>	<u>Ice Thickness</u>	<u>and</u>	<u>Remarks</u>
1+50	12"	Solid Ice	
3+00	12"	Solid Ice, Light Slush	
4+50	13½"	Solid Ice, Light Slush	
6+00	13"	Solid Ice, Light Slush	
7+50	13"	Solid Ice, Light Slush	
9+00	12"	Solid Ice, Light Slush	
10+50	8"	Solid Ice, No Slush	
12+00	15"	Solid Ice, No Slush	
13+50	12"	Solid Ice, Light Slush	
15+00	13"	Solid Ice, No Slush	
16+50	9"	Solid Ice, No Slush	
17+00	Ogden Island		

Cross Sections Near Waddington*, Feb. 10, 1976

* Cross sections for ice thickness measurements are shown in Figure 3.1.

a) Thickness measured along line ABC.

<u>Location</u>	<u>Ice Thickness</u>	<u>and</u>	<u>Remarks</u>
0+00 (A)	18" Solid Ice	8'	Broken Pack & Slush
5+00	14" Solid Ice	10'	Broken Pack & Slush
10+00	30" Solid Ice	9'6"	Broken Pack & Slush
15+00	27" Solid Ice	9'3"	Broken Pack & Slush
20+00	24" Solid Ice	12'	Broken Pack & Slush
25+00	24" Solid Ice	11'	Broken Pack & Slush
30+00 (B)	21" Solid Ice	13'	Broken Pack & Slush
35+00	23" Solid Ice	10'	Broken Pack & Slush
38+50	East End Pack Ice		
38+75	22" Solid Ice	6'	Broken Pack & Slush
40+00 (C)	16" Solid Ice	No Slush	

b) Thickness measured along line DBE.

<u>Location</u>	<u>Ice Thickness</u>	<u>and</u>	<u>Remarks</u>
0+00 (D)	North Edge of Pack Ice, 21" Solid Ice	4'	Broken Pack & Slush
2+50	28" Solid Ice	12'	Broken Pack & Slush
5+00 (B)			
7+50	South Edge of Pack 22" Solid Ice	3'	Broken Pack & Slush
11+00 (E)	24" Solid Ice	10½"	Broken Pack & Slush



Figure 3.1 Ice Thickness Sections Near Waddington-Mariatown, Feb. 1976.

CROSS SECTION B1(Waddington), Feb. 18, 1976

a) Thickness measured along CROSS SECTION B1.

<u>Location</u>	<u>Ice Thickness</u>	<u>and</u>	<u>Remarks</u>
1+25	13" Solid Pack	8'	Heavy Slush & Broken Pack
2+50	21" Solid Pack	9'	Heavy Slush & Broken Pack
3+75	16" Solid Pack	9'	Heavy Slush & Broken Pack
5+00	19" Solid Pack	9'	Heavy Slush & Broken Pack
6+25	16" Solid Pack	9'	Heavy Slush & Broken Pack
7+50 (A)	19" Solid Pack	8'	Heavy Slush & Broken Pack
8+75	17" Solid Pack	6'6"	Heavy Slush & Broken Pack
10+00	16" Solid Pack	9'6"	Heavy Slush & Broken Pack
11+25	16" Solid Pack	5'	Light Slush
12+50	18" Solid Pack		No Slush
16+00	Ogden Island		

b) Thickness measured along line AF(Fig. 3.1).

<u>Location</u>	<u>Ice Thickness</u>	<u>and</u>	<u>Remarks</u>
0+00 (A)			
2+50	16" Solid Pack	6'	Heavy Slush & Broken Pack Ice
5+00 (F)	17" Solid Pack	4'	Heavy Slush & Broken Pack Ice

Cross Sections near Mariatown*

*Cross sections for ice thickness measurements are shown in Fig. 3.1.

a) Thickness measured along line GHI.

<u>Location</u>	<u>Ice Thickness</u>	<u>and</u>	<u>Remarks</u>
0+00 (G)	20" Solid Ice	5'6"	Pack Ice & Slush
5+00	20" Solid Ice	1'6"	Slush
10+00	19" Solid Ice	12'	Slush
15+00	20" Solid Ice	11'6"	Pack Ice & Slush
18+75	East End of Main Jam of Channel		
20+00 (H)	19' Broken Pack & Heavy Slush		
25+00	30" Solid Ice	14½'	Broken Pack & Slush
30+00	19" Solid Ice	9'	Broken Pack & Slush
35+00	18" Solid Ice	6'6"	Broken Pack & Slush
40+00 (I)	19" Solid Ice	6'	Broken Pack & Slush

b) Thickness measured along line HJ.

<u>Location</u>	<u>Ice Thickness</u>	<u>and</u>	<u>Remarks</u>
0+00 (H)			
2+50	15' Broken Pack & Heavy Slush		
4+00 (J)	Open Water		

CROSS SECTION B2 (Mariatown), Feb. 18, 1976

<u>Location</u>	<u>Ice Thickness</u>	<u>and</u>	<u>Remarks</u>
2+50	17" Solid Ice	No Slush	
3+75	17" Solid Ice	No Slush	
5+00	20" Solid Ice	No Slush	
6+25	20" Solid Ice	4' Light Slush	
7+50	22" Solid Ice	13' Heavy Slush	
8+75	19" Solid Ice	10' Heavy Slush	
10+00	19" Solid Ice	19' Heavy Slush	
11+25	19" Solid Ice	18'6" Heavy Slush	
12+50	21" Solid Ice	12' Heavy Slush	
13+75	25" Solid Ice	No Slush	
17+75	Ogden Island		

CROSS SECTION A¹ (Power Dam^{*}), Feb. 15, 1977

* Cross section located at 1000' upstream of the Power Dam.

<u>Location</u>	<u>Ice Thickness</u>	<u>and</u>	<u>Remarks</u>
1+50	17"	Solid Ice	
3+00	18"	Solid Ice	
4+50	19"	Solid Ice	
6+00	20"	Solid Ice	
7+50	19"	Solid Ice	
9+00	17"	Solid Ice	
10+50	20"	Solid Ice	
12+00	20"	Solid Ice	
13+50	16"	Solid Ice	
15+00	24"	Solid Ice	
16+50	22"	Solid Ice	
18+00	25"	Solid Ice	
19+50	17"	Solid Ice	
21+00	24"	Solid Ice	
22+50	18"	Solid Ice	
24+00	16"	Solid Ice	
25+50	22"	Solid Ice	
27+00	21"	Solid Ice	
28+50	23"	Solid Ice	
31+50	15"	Solid Ice	
34+50	Canadian Shore		

CROSS SECTION B1 (Waddington), Feb. 15, 1977

Cross Section located at 1000' upstream of the Power House

<u>Location</u>	<u>Ice Thickness</u>	<u>and</u>	<u>Remarks</u>
1+50	15" Solid Ice		Light Slush
3+00	18" Solid Ice	5'	Heavy Slush
4+50	20" Solid Ice	3'	Med. to Light Slush
6+00	17" Solid Ice	6'	Heavy Slush
7+50	20" Solid Ice	4'	Heavy Slush
9+00	20" Solid Ice	2'	Light Slush
10+50	24" Solid Ice	10'	Heavy Slush
12+00	25" Solid Ice	6'	Heavy Slush
13+50	14" Solid Ice		No Slush
15+00	24" Solid Ice		No Slush
18+50	Ogden Island		

Underside of cover noticeably rough - This evident at holes where no slush observed.

21+00	22" Solid Ice
22+50	19" Solid Ice
24+00	19" Solid Ice
25+50	20" Solid Ice
27+00	18" Solid Ice
28+50	22" Solid Ice
30+00	20" Solid Ice
31+50	20" Solid Ice
33+00	16" Solid Ice
4+50	Canadian Shore

CROSS SECTION B2 (Mariatown), Feb. 16, 1977

<u>Location</u>	<u>Ice Thickness</u>	<u>and</u>	<u>Remarks</u>
1+50	24" Solid Ice	1' Slush	
3+00	23" Solid Ice	1' Slush	
4+50	30" Solid Ice	1' Slush	
6+00	18" Solid Ice	2' Slush	
7+50	29" Solid Ice	10' Heavy Slush	
9+00	21" Solid Ice	16' Heavy Slush	
10+50	21" Solid Ice	20' Heavy Slush	
12+00	20" Solid Ice	14' Heavy Slush	
13+50	19" Solid Ice	5' Heavy Slush	
15+00	16" Solid Ice	No Slush	
18+50	Ogden Island		

CROSS SECTION D(Cardinal), Feb. 16, 1977

<u>Location</u>	<u>Ice Thickness</u>	<u>and</u>	<u>Remarks</u>
3+00	17" Solid Ice	No Slush	
6+00	11" Solid Ice	No Slush	
9+00	17" Solid Ice	8' Med. Slush	
10+50	18" Solid Ice	13' Heavy Slush	
12+00	24" Solid Ice	16' Heavy Slush	
13+50	18' Broken Pack	and Heavy Slush	
15+00	20' Broken Pack	and Heavy Slush	
16+50	18' Broken Pack	and Heavy Slush	
18+00	13' Broken Pack	and Heavy Slush	
19+50	10' Broken Pack	and Medium Slush	
21+00	5' Broken Pack	and Light Slush	
22+50	6' Broken Pack	and Light Slush	
24+00	24" Solid Ice	Light Slush	
25+50	4' Broken Pack	and Light Slush	
27+00	3' Broken Pack	and Light Slush	
28+50	4' Broken Pack	and Light Slush	
30+00	16" Solid Ice	No Slush	
31+50	21" Solid Ice	No Slush	
32+00	American Shore		

CROSS SECTION A' (Power Dam^{*}), Feb. 21, 1978

* Cross section located at 1000' upstream of the Power Dam.

<u>Location</u>	<u>Ice Thickness</u>	<u>and</u>	<u>Remarks</u>
1+50	22"	Solid Ice	
3+00	21½"	Solid Ice	
4+50	21"	Solid Ice	
6+00	21½"	Solid Ice	
7+50	20"	Solid Ice	
9+00	32"	Solid Ice	
10+50	21"	Solid Ice	
12+00	21½"	Solid Ice	
13+50	22"	Solid Ice	
15+00	22½"	Solid Ice	
16+50	21½"	Solid Ice	
18+00	20"	Solid Ice	
19+50	24"	Solid Ice	
21+00	22"	Solid Ice	
22+50	19½"	Solid Ice	
24+00	19"	Solid Ice	
25+50	20"	Solid Ice	
27+00	18"	Solid Ice	
28+50	22"	Solid Ice	
30+00	20½"	Solid Ice	
31+50	20½"	Solid Ice	
33+00	16"	Solid Ice	
34+50		Canadian Shore	

CROSS SECTION B1 (Waddington), Feb. 21, 1978

<u>Location</u>	<u>Ice Thickness</u>	<u>and</u>	<u>Remarks</u>
1+50	26" Solid Ice	No Slush	
3+00	28" Solid Broken Pack Ice	4' Light Slush	
4+50	27" Solid Broken Pack Ice	2½' Light Slush	
6+00	17" Solid Broken Pack Ice	5' Heavy Slush, Broken Pack under cover	
7+50	19" Solid Broken Pack Ice	3' Heavy Slush, Broken Pack	
9+00	23" Solid Broken Pack Ice	3' Heavy Slush, Broken Pack	
10+50	19" Solid Broken Pack Ice	9' Heavy Slush, Broken Pack	
12+00	22½" Solid Broken Pack Ice	5' Slush	
13+50	25" Solid Ice	No Slush	
15+00	25" Solid Ice	No slush	
16+00	Ogden Island		

Underside of cover noticeably rough.

CROSS SECTION B2 (Mariatown), Feb. 20, 1978

<u>Location</u>	<u>Ice Thickness</u>	<u>and</u>	<u>Remarks</u>
1+50	18" Solid Broken Pack Ice	4'	Light Slush
3+00	22" Solid Broken Pack Ice	3'	Light Slush
4+50	16" Solid Broken Pack Ice	5'	Med. Slush, Evidence of Broken Pack Ice Under Cover
6+00	12" Solid Broken Pack Ice	8'	Heavy Slush, Broken Pack Ice
7+50	8" Solid Broken Pack Ice	13'	Heavy Slush, Broken Pack Ice Not Evident
9+00	15½" Solid Broken Pack Ice	11'	Heavy Slush, Broken Pack Ice Not Evident
10+50	15" Solid Broken Pack Ice	12'	Heavy Slush, Broken Pack Ice Not Evident
12+00	19" Solid Broken Pack Ice	11'	Heavy Slush, Broken Pack Under Cover
13+50	17" Solid Broken Pack Ice	9'	Heavy Slush, Broken Pack Under Cover
15+00	23" Natural Ice		No Slush South Edge of Surface Pack Ice
16+50	21" Natural Ice		No Slush South Edge of Surface Pack Ice
18+50	Ogden Island		

Underside of cover noted to be quite rough.

CROSS SECTION B2 (Mariatown), Mar. 13, 1978

<u>Location</u>	<u>Ice Thickness</u>	<u>and</u>	<u>Remarks</u>
(Recheck of Feb. 20 Ice Measurements)			
1+50	19" Solid Pack Ice	No Slush	
3+00	23" Solid Pack Ice	No Slush	
4+50	19" Solid Pack Ice	No Slush	
6+00	18" Solid Pack Ice	3' Light Slush - Underside of Cover Rough	
7+50	18" Solid Pack Ice	3' Light Slush - Underside of Cover Rough	
9+00	23" Solid Pack Ice	Light Slush - Underside of Cover Rough	
10+50	19" Solid Pack Ice	Light Slush - Underside of Cover Rough	
12+00	20" Solid Pack Ice	Light Slush - Underside of Cover Rough	
13+50	20" Solid Pack Ice	5' Light Slush	
15+00	29½" Solid Ice	No Slush South Edge of Pack Ice - Natural Cover	
16+50	22" Solid Ice	No Slush South Edge of Pack Ice - Natural Cover	
18+00	Ogden Island		
(10+50 to 16+50 Observed at the Original Holes)			

CROSS SECTION D(Cardinal), Feb. 22, 1978

<u>Location</u>	<u>Ice Thickness</u>	<u>and</u>	<u>Remarks</u>
1+50	17" Solid Ice	No Slush	
3+00	15½" Solid Ice	No Slush	
4+50	18" Solid Ice	No Slush	
6+00	17" Solid Ice	No Slush	
7+50	19" Solid Ice	No Slush	
9+00	19" Solid Ice	No Slush	
10+50	21" Solid Ice	2' Light Slush	
12+00	22" Solid Ice	14' Heavy Slush	
13+50	26" Broken Pack Ice	26' Heavy Slush	
14+00	North Edge of Heavy, Surface Pack Ice		
15+00	17' Broken Pack &	Heavy Slush	
16+50	25' Broken Pack &	Heavy Slush	
18+00	20' Broken Pack &	Heavy Slush	
19+50	8' Broken Pack &	Medium Slush	
21+00	14" Broken Pack	No Slush	
22+50	10" Broken Pack	No Slush	
24+00	19" Broken Pack	No Slush	
25+50	12" Broken Pack	Light Slush	
27+00	12" Broken Pack	3' Light Slush	
28+50	19" Broken Pack	2' Light Slush	
29+75	South Edge of Surface Pack Ice		
30+00	23" Solid Ice		
32+00	American Shore D.O.T. Monument No. 29		

CROSS SECTION D(Cardinal), Mar. 13, 1978

<u>Location</u>	<u>Ice Thickness</u>	<u>and</u>	<u>Remarks</u>
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(Recheck of Feb. 22 Ice Measurements Observed at Original Holes Throughout the Section.)

1+50	13" Solid Ice	No Slush	
3+00	12½" Solid Ice	No Slush	
4+50	16" Solid Ice	No Slush	
6+00	16½" Solid Ice	No Slush	
7+50	16½" Solid Ice	No Slush	
9+00	17½" Solid Ice	No Slush	
10+50	23" Solid Ice	No Slush	
12+00	26" Broken Pack	8' Medium Slush	
13+50	12" Broken Pack	24' Heavy Slush	
14+00	North Edge of Ridged Broken Pack		
15+00	21' Broken Pack	Heavy Slush	
16+50	14' Broken Pack	Heavy Slush	
18+00	11' Broken Pack	Medium Slush	
19+50	6" Solid Ice	No Slush - Small Open Holes in Cover Not Safe to Traverse beyond this Chainage	

Open Water Channel 300' x 1000'. 100' Downstream from
Ice Section at Chainage 19+50.

CROSS SECTION A(Power Dam), Feb. 20, 1979

<u>Location</u>	<u>Ice Thickness</u>	<u>and</u>	<u>Remarks</u>
0+00	Barnhart Island		
1+50	21"	Solid Ice	
4+50	21"	Solid Ice	
7+50	21"	Solid Ice	
10+50	22"	Solid Ice	
13+50	22"	Solid Ice	
16+50	21"	Solid Ice	
19+50	22"	Solid Ice	
22+50	20"	Solid Ice	
25+50	21"	Solid Ice	
28+50	22"	Solid Ice	
31+50	20"	Solid Ice	
34+50	19"	Solid Ice	
35+00	Canadian Shore		

CROSS SECTION B1 (Waddington), Feb. 21, 1979

<u>Location</u>	<u>Ice Thickness</u>	<u>and</u>	<u>Remarks</u>
1+50	19" Solid Ice	No Slush	
3+00	22" Solid Ice	Light Slush	
4+50	17" Solid Ice	2' Light Slush	
6+00	22" Solid Ice	Light Slush	
7+50	23" Solid Ice	5' Light Slush	
9+00	23" Solid Ice	4' Light Slush	
10+50	20" Solid Ice	6' Light Slush	
12+00	23" Solid Ice	2' Light Slush	
13+50	20" Solid Ice	No Slush	
14+50	Ogden Island		

CROSS SECTION B2 (Mariatown), Feb. 20, 1979

<u>Location</u>	<u>Ice Thickness</u>	<u>and</u>	<u>Remarks</u>
1+50	19" Solid Pack Ice		Clear
3+00	22" Solid Pack Ice	24"	Light Slush
4+50	22" Solid Pack Ice	20"	Light Slush
6+00	21½" Solid Pack Ice	18"	Light Slush
7+50	24" Solid Pack Ice	24"	Light Slush
9+00	25" Solid Pack Ice		Light Slush
10+50	23½" Solid Pack Ice		Light Slush
12+00	22" Solid Pack Ice		Light Slush
13+50	23" Solid Pack Ice		Clear
15+00	19" Solid Pack Ice		Clear
17+50	Ogden Island		

CROSS SECTION D(Cardinal), Feb. 21, 1979

<u>Location</u>	<u>Ice Thickness</u>	<u>and</u>	<u>Remarks</u>
3+00	20" Solid Ice	8'	Medium Slush
4+50	20" Solid Ice	10'	Medium Slush
6+00	21" Solid Ice		Light Slush
7+50	20" Solid Ice	6'	Light Slush
9+00	20" Solid Ice	12'	Heavy Slush
10+50	20" Solid Ice	16'	Heavy Slush
12+00	23" Solid Ice	20'	Heavy Slush North Edge of Heavy Pack Ice
13+50	33" Broken Pack Ice	20'	Heavy Slush
15+00	32' Broken Pack Ice		Heavy Slush
16+50	26' Broken Pack Ice		Heavy Slush
18+00	17' Broken Pack Ice		Heavy Slush
19+50	8' Broken Pack Ice		Heavy Slush
21+00	19" Solid Ice		No Slush
22+50	16" Solid Ice		No Slush
24+00	21" Solid Ice		Light Slush
25+50	15" Solid Ice		No Slush
27+00	17" Solid Ice		No Slush
28+50	17" Solid Ice	14'	Medium Slush
30+50	U.S.A. Mainland		

CROSS SECTION A(Power Dam), Feb. 19, 1980

<u>Location</u>	<u>Ice Thickness</u>	<u>and</u>	<u>Remarks</u>
1+50	14"	Consolidated	
		Fragmented Cover	
3+00	10"		
4+50	9"		
6+00	14"		
7+50	15"		
9+00	9"		
10+50	11"		
12+00	12½"		
13+50	14"		
15+00	14"		
16+50	14½"		
18+00	15"		
19+50	14½"		
21+00	10"		
22+50	14"		
24+00	12"		
25+50	15"		
27+00	7"		
28+50	9½"		
30+00	11"		
31+50	13½"		
33+00	14"		
34+50	Canadian Shore		

Clear Black Ice

CROSS SECTION B1(Waddington), Feb. 19, 1980

<u>Location</u>	<u>Ice Thickness</u>	<u>and</u>	<u>Remarks</u>
1+50	14" Consolidated Fragmented Cover	No Slush	
3+00	10"		
4+50	9"		
6+00	10½"		
7+50	8"		
9+00	10"		
10+50	7"		
12+00	10½"		
13+50	14"		
15+00	15"		
16+50	Ogden Island		

Clear Black Ice

CROSS SECTION B2 (Mariatown), Feb. 20, 1980

<u>Location</u>	<u>Ice Thickness</u>	<u>and</u>	<u>Remarks</u>
1+50	10" Consolidated Fragmented Cover	No Slush	
3+00	9"		
4+50	7"		
6+00	11"		
7+50	9"		
9+00	11½"		
10+50	9"		
12+00	5½"		
13+50	9½"		
15+00	12"		
16+50	13"		
18+00	14"		
18+50	Ogden Island		

(Composition of Ice not as good as Powerhouse and
Waddington.)

CROSS SECTION A(Power Dam), Feb. 16, 1981

<u>Location</u>	<u>Ice Thickness</u>	<u>and</u>	<u>Remarks</u>
1+50	14½"	Consolidated	
		Fragmented Cover	
3+00	14½"	Consolidated	
		Fragmented Cover	
4+50	16½"		
6+00	15"		
7+50	11½"		
9+00	16"		
10+50	13"		
12+00	16"		
13+50	19"		
15+00	17"		
16+50	18"		
18+00	17½"		
19+50	15"		
21+00	18"		
22+50	16½"		
24+00	13½"		
25+50	18"		
27+00	17"		
28+50	11"		
30+00	Canadian Shore		

CROSS SECTION B1(Waddington), Feb. 16, 1981

<u>Location</u>	<u>Ice Thickness</u>	<u>and</u>	<u>Remarks</u>
1+50	18½" Consolidated Fragmented Cover	No Slush	
3+00	19" Consolidated Fragmented Cover	No Slush	
4+50	21"		
6+00	17"		
7+50	15½"		
9+00	16"		
10+50	20"		
12+00	20½"		
13+50	23"		
15+00	Ogden Island		

CROSS SECTION B2 (Mariatown), Feb. 17, 1981

REFERENCES

1. Batson, G.B., Glebas, T., "Investigation of Ice Conditions in the St. Lawrence River, Winter 1980-81," Report No. DTSL55-80-C-C1281, U.S. Department of Transportation, Washington, D.C., June 1981.

1+50	10"	Solid Ice	No Slush
3+00	8½"	Solid Ice	No Slush
2. Batson, G.B., Shen, H.T., and Ackermann, N.L., "Investigation of Ice Conditions in the St. Lawrence River, Winter of 1979-80," Report No. DTSL55-80-C-C0330, U.S. Department of Transportation, Washington, D.C., August 1980.

4+50	8"		
7+50	13"		
3. Batson, G.B., Shen, H.T., Ackermann, N.L., Candee, K.I., and Landry, S.J., "Investigation of Flow and Ice Conditions, Sparrowhawk Point to Murphy Island, St. Lawrence River, Winter 1978-79," Report No. DOT-SL-79-552, U.S. Department of Transportation, Washington, D.C., July 1979.

9+00			
10+50			
12+00			
13+50			
4. Batson, G.B., Ackermann, N.L., Shen, H.T., and Candee, K.I., "Survey of Flow and Ice Conditions in the Ogden Island Reach, St. Lawrence River, Winter of 1977-78," Report No. DOT-SL-78-519, U.S. Department of Transportation, Washington, D.C., June 1978.

15+00			
16+50			
21½"			
5. Dean, A.M., "Remote Sensing of Accumulated Frazil Ice in the St. Lawrence River," CRREL Report 77-08, U.S. Army Cold Regions Research and Engineering Laboratory, Hanover, New Hampshire, 1977.

CROSS SECTION A(Power Dam), Feb. 22, 1982

<u>Location</u>	<u>Ice Thickness</u>	<u>and</u>	<u>Remarks</u>
0+00	Barnhart Island		
1+50	16"	Solid Ice	
3+00	17"	Solid Ice	
4+50	19"	Solid Ice	
6+00	17"	Solid Ice	
7+50	15"	Solid Ice	
9+00	18"	Solid Ice	
10+50	18½"	Solid Ice	
12+00	25"	Solid Ice	
13+50	21"	Solid Ice	
15+00	21"	Solid Ice	
16+50	18"	Solid Ice	
18+00	21"	Solid Ice	
19+50	16"	Solid Ice	
21+00	21"	Solid Ice	
22+50	26"	Solid Ice	
24+00	20"	Solid Ice	
26+50	18"	Solid Ice	
28+00	21"	Solid Ice	
29+50	Canadian Shore		

CROSS SECTION A(Power Dam), Feb. 22, 1982

<u>Location</u>	<u>Ice Thickness</u>	<u>and</u>	<u>Remarks</u>
0+00	Barnhart Island		
1+50	16" Solid Ice		
3+00	17" Solid Ice		
4+50	19" Solid Ice		
6+00	17" Solid Ice		
7+50	15" Solid Ice		
9+00	18" Solid Ice		
10+50	18½" Solid Ice		
12+00	25" Solid Ice		
13+50	21" Solid Ice		
15+00	21" Solid Ice		
16+50	18" Solid Ice		
18+00	21" Solid Ice		
19+50	16" Solid Ice		
21+00	21" Solid Ice		
22+50	26" Solid Ice		
24+00	20" Solid Ice		
26+50	18" Solid Ice		
28+00	21" Solid Ice		
29+50	Canadian Shore		

REFERENCES

1. Batson, G.B., Glebas, T., "Investigation of Ice Conditions in the St. Lawrence River, Winter 1980-81," Report No. DTSL55-80-C-C1281, U.S. Department of Transportation, Washington, D.C., June 1981.
2. Batson, G.B., Shen, H.T., and Ackermann, N.L., "Investigation of Ice Conditions in the St. Lawrence River, Winter of 1979-80," Report No. DTSL55-80-C-C0330, U.S. Department of Transportation, Washington, D.C., August 1980.
3. Batson, G.B., Shen, H.T., Ackermann, N.L., Candee, K.I., and Landry, S.J., "Investigation of Flow and Ice Conditions, Sparrowhawk Point to Murphy Island, St. Lawrence River, Winter 1978-79," Report No. DOT-SL-79-552, U.S. Department of Transportation, Washington, D.C., July 1979.
4. Batson, G.B., Ackermann, N.L., Shen, H.T., and Candee, I.I., "Survey of Flow and Ice Conditions in the Ogden Island Reach, St. Lawrence River, Winter of 1977-78," Report No. DOT-SL-78-519, U.S. Department of Transportation, Washington, D.C., June 1978.
5. Dean, A.M., "Remote Sensing of Accumulated Frazil Ice in the St. Lawrence River," CRREL Report 77-08, U.S. Army Cold Regions Research and Engineering Laboratory, Hanover, New Hampshire, 1977.

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