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OVERFLOW '73 - DENMARK STRAIT:
VOLUME 3 - TEMPERATURE, SALINITY,
AND SIGMA-T SECTIONS*

by

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ABSTRACT

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Bellefontaine, L., Pritchard, J., and Reiniger, R. 1982. Atlas of physical oceanographic data for the Gulf Stream System - 1972.

Can. Tech. Rep. Hydrogr. Ocean Sci. 15: 51 p.

Physical oceanographic data from an area approximately south-east of the Grand Banks of Newfoundland, bounded roughly between 35° and 43° North latitude, and 39° West longitude are presented in vertical sections.

Data from current meters moored within this same general area but north of, and parallel to, the Tail of the Grand Banks are presented in various graphical displays including time series, progressive vector, and stick plots.

RÉSUMÉ

Bellefontaine, L., Pritchard, J., and Reiniger, R. 1982. Atlas of physical oceanographic data for the Gulf Stream system - 1972.

Can. Tech. Rep. Hydrogr. Ocean Sci. 15: 51 p.

L'auteur présente dans des coupes transversales certaines données océanographiques provenant d'une zone située à peu près au sud-est des Grands bancs de Terre-Neuve et approximativement comprise entre les 35^e et 43^e parallèles nord et les 39^e et 50^e méridiens ouest.

D'autres données sont tirées des courantomètres ancrés à l'intérieur de cette zone, mais au nord de la Queue des Grands bancs et en parallèle avec celle-ci. Elles sont présentées au moyen de graphiques et diagrammes divers, comprenant notamment des séries chronologiques, des vecteurs progressifs et des graphiques des vecteurs sous forme de "bâtonnets".

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OCEANOGRAPHIC SECTIONS

STATIONS	P A G E S		
	TEMPERATURE	SALINITY	SIGMA-T
2-4	10	26	42
5-12	10	26	42
13-17	11	27	43
18-23	11	27	43
24-30	12	28	44
31-37	12	28	44
38-45	12	28	44
47-57	13	29	45
58-67	14	30	46
68-74	15	31	47
75-77	15	31	47
78-83	16	32	48
84-94	16	32	48
94-100	17	33	49
100-104	17	33	49
105-108	18	34	50
111-120	19	35	51
138-145	20	36	52
147-157	21	37	53
158-167	22	38	54
174-181	23	39	55
188-193	24	40	56
194-198	25	41	57
199-203	25	41	57



INTRODUCTION

The ICES Expedition Overflow '73 was a multinational investigation of the overflow of water from the Norwegian Sea across the Greenland/Scotland ridge. The experiment took place between mid-August and mid-September, 1973. The Atlantic Oceanographic Laboratory of the Bedford Institute of Oceanography participated in the expedition on board the CSS Hudson.

This report presents vertical sections of the temperature, salinity and sigma-t data collected by Hudson in Denmark Strait. The other data collected by Hudson have been presented in two companion volumes (Coote and Hiltz, 1978; Ross, 1977). An account of the data collected by other institutions participating in Overflow '73 is given in Overflow '73 Inventory (ICES, 1976).

DATA REDUCTION

The CTP casts were made using a Howaldt Bathysonde T87 mounted on a rosette sampler equipped with 10 water sample bottles. The instrument was lowered and raised at a nominal speed of 1 m/s. The data from the CTP were logged using a PDP-8L computer at a rate of 4 scans per second of temperature, pressure and conductivity. The computer developed a fault in its memory stack so no CTP profiles were recorded for stations 1 to 23. A pinger on the rosette sampler cage allowed the water column to be profiled to within a few metres of the bottom. The rosette sampler was used to collect samples for chemical determinations and calibration points for the CTP. Each station generated 10 salinity and 5 temperature (and pressure on deeper samples) points.

The Bathysonde divides its operating ranges into nine subranges of temperature and conductivity of which about half were required in Denmark Strait. The calibration of each subrange was done in the laboratory and fitted by a polynomial. Bennett's (1976) equations were used to calculate salinity from conductivity, temperature and pressure.

The salinity, temperature and pressure values generated by the rosette sampler were used for the in situ calibration. The laboratory calibration for pressure was found to be acceptable and only a small adjustment was required for temperature. The conductivity sensor was calibrated by comparing the value from the CTP with that computed (via iterative method using Bennett's equations) at the in situ temperature and pressure to give the water sample's salinity. The calibrations for temperature and conductivity did change with time. However, for data processing, the frequency of change of calibration was kept to a minimum consistent with the expected accuracy of the instrument. The calibration data indicated an accuracy better than 0.02°C in temperature, 0.03‰ in salinity and 5 decibars or 0.5% in pressure.

No allowance was made for the mismatch in time constants between the temperature and conductivity sensors. This mismatch was particularly noticeable in the strong thermal gradients above the overflow water. The resulting salinity spikes were manually edited out of the data.

GRAPHICAL PRESENTATIONS

Vertical section plots of temperature, salinity and sigma-t are presented. The order of presentation is grouped to have all temperature sections followed by salinity and concluded with sigma-t. Within each grouping the sections are ordered by increasing station number as much as possible. The geographical location of each station is shown in Figures 1 to 4.

The horizontal spacing between stations is found by performing a least squares straight line fit to all the stations forming the section and projecting each station onto this line. Sections that were occupied more than once used all stations to generate the section line. Each section plot shows a dot where the rosette sampler collected a value of the parameter being displayed. The bottom profile is generated by the sounding taken at each station.

Two vertical scales were used for presenting the data; one for sections less than 1000 m maximum depth and another for the deeper sections. The horizontal scale is correspondingly adjusted to maintain the same vertical exaggeration (1:125) on all plots.

ACKNOWLEDGEMENTS

I would like to thank all those who participated in collecting, processing and presenting the data. The excellent co-operation of the ship's company and scientific party during the data collection is very much appreciated. Several people have been involved in processing and editing the data as it passed through a number of software systems and computers. Mr. John Pritchard accomplished the layout of the diagrams in this data report.

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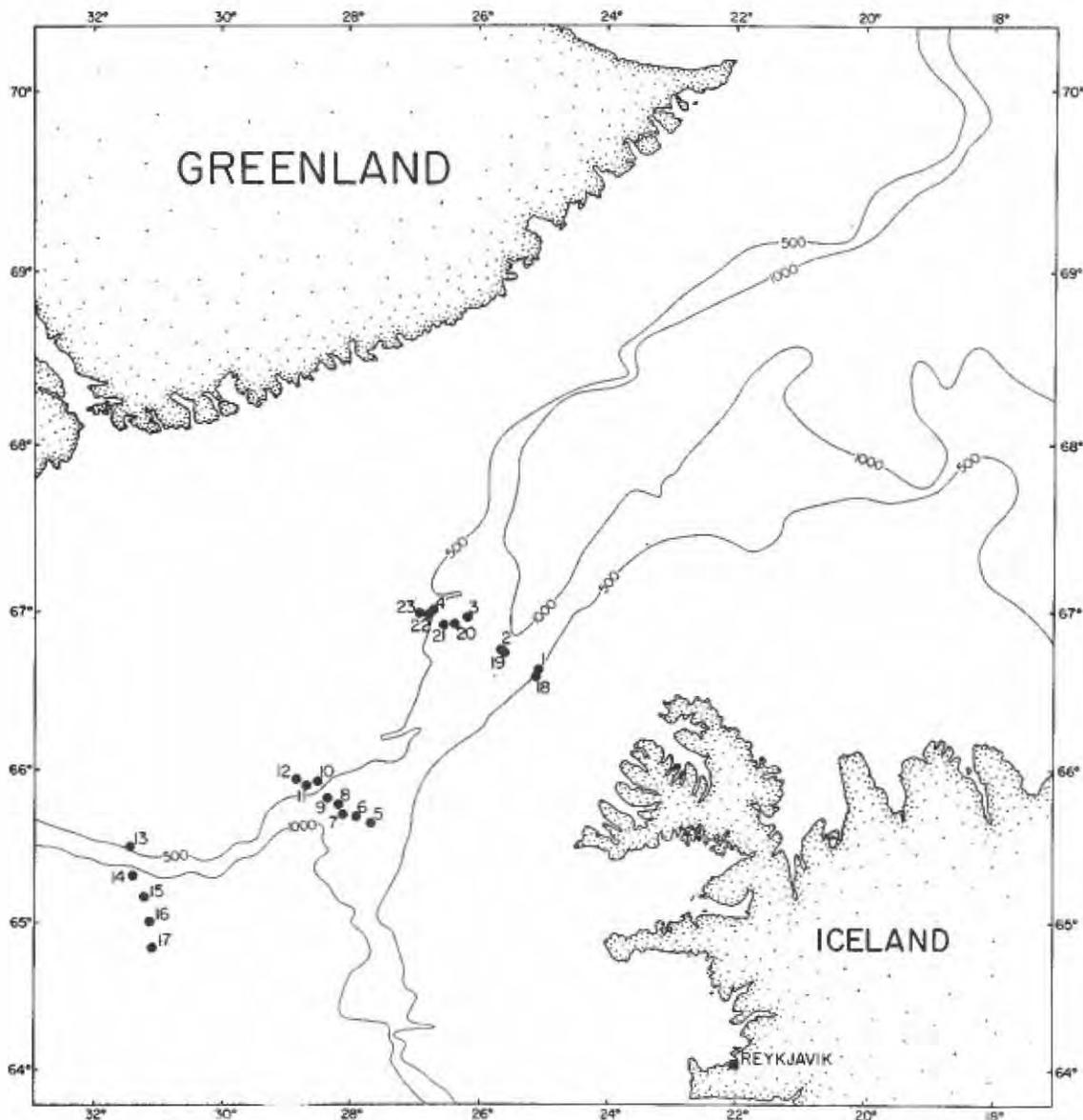


Figure 1: Phase I station positions, August 10 to August 16, 1973.

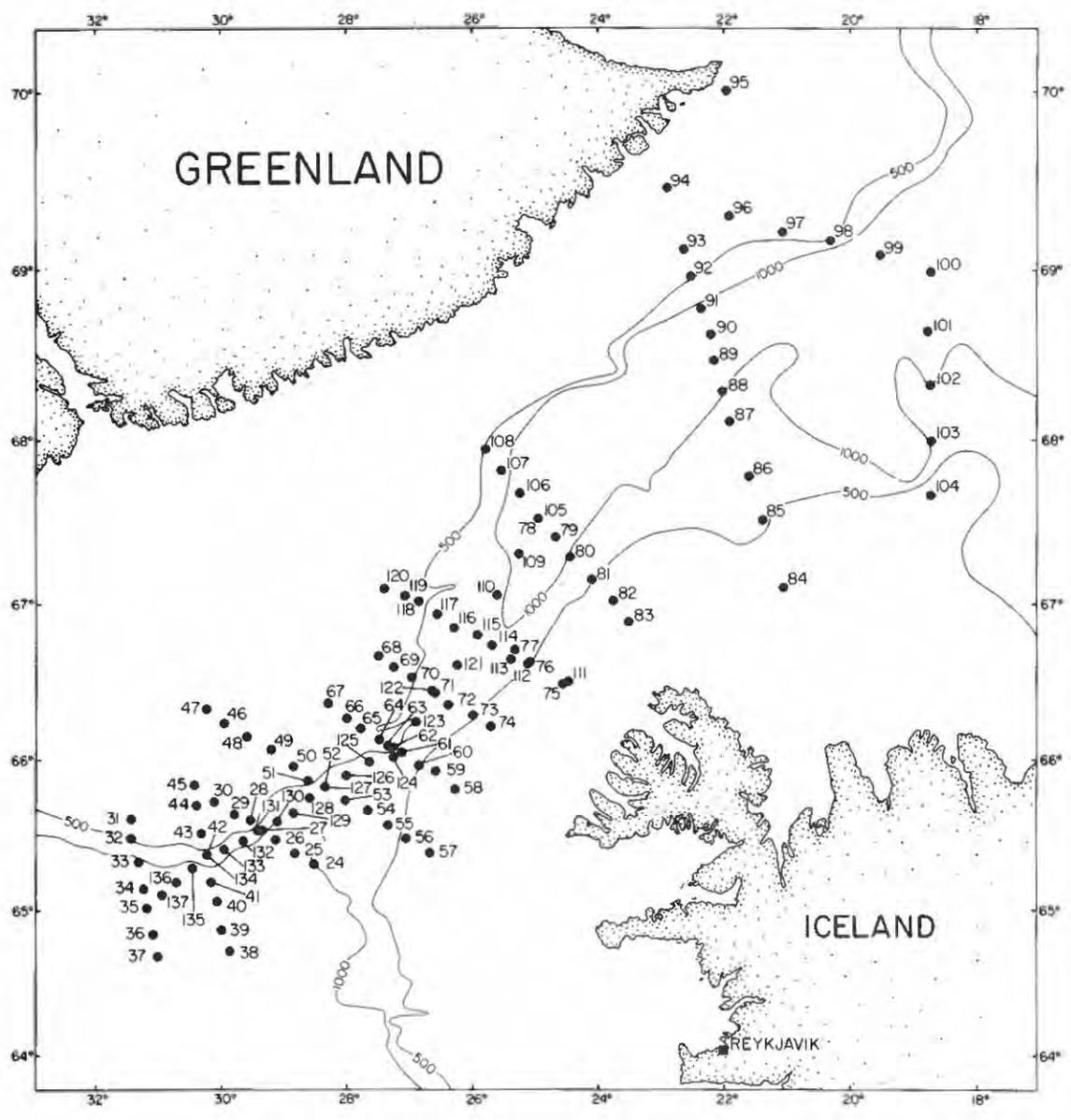


Figure 2: Phase IIa station positions, August 21 to September 5, 1973.

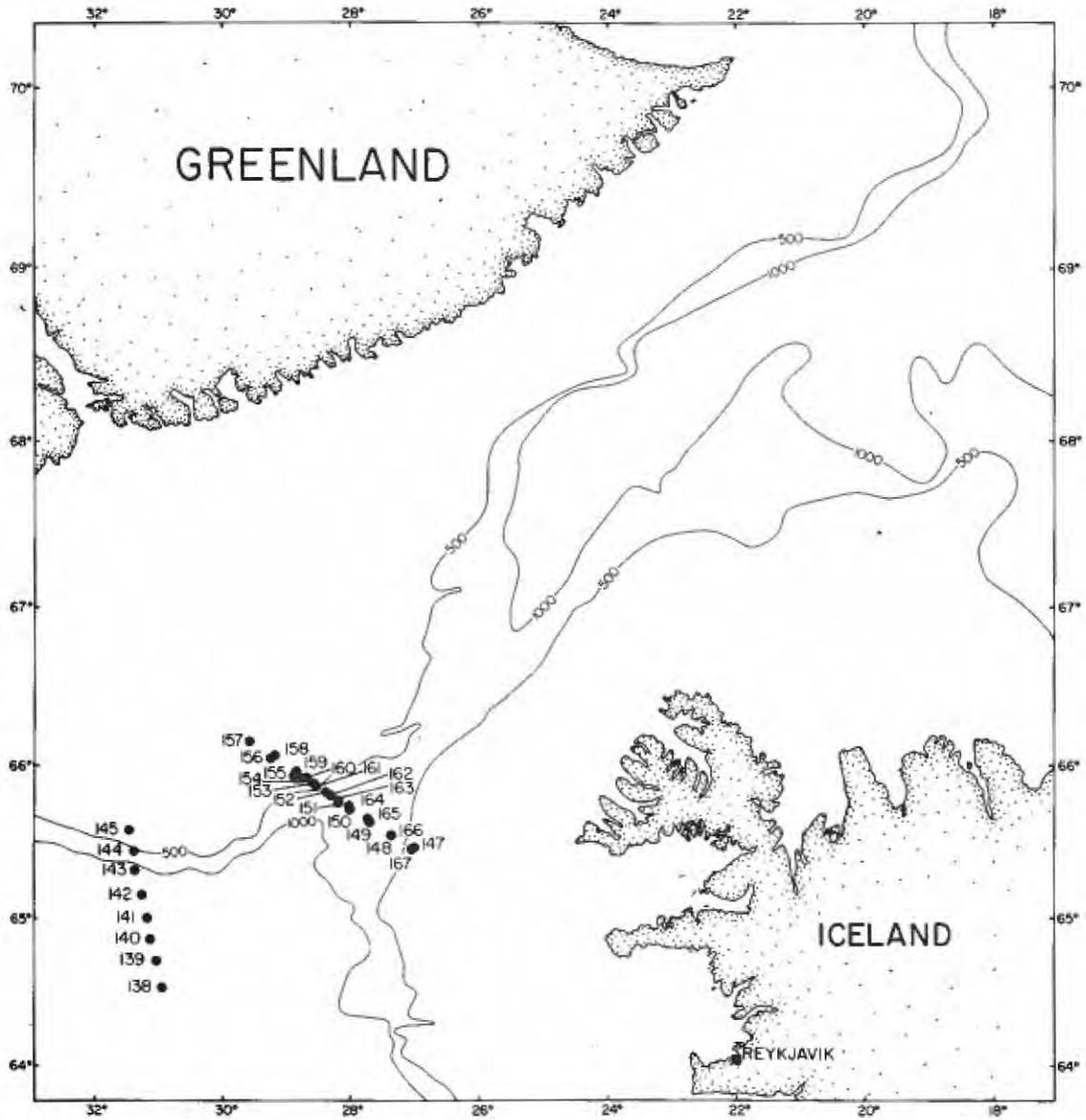


Figure 3: Phase IIb station positions,
September 5 to September 9, 1973.

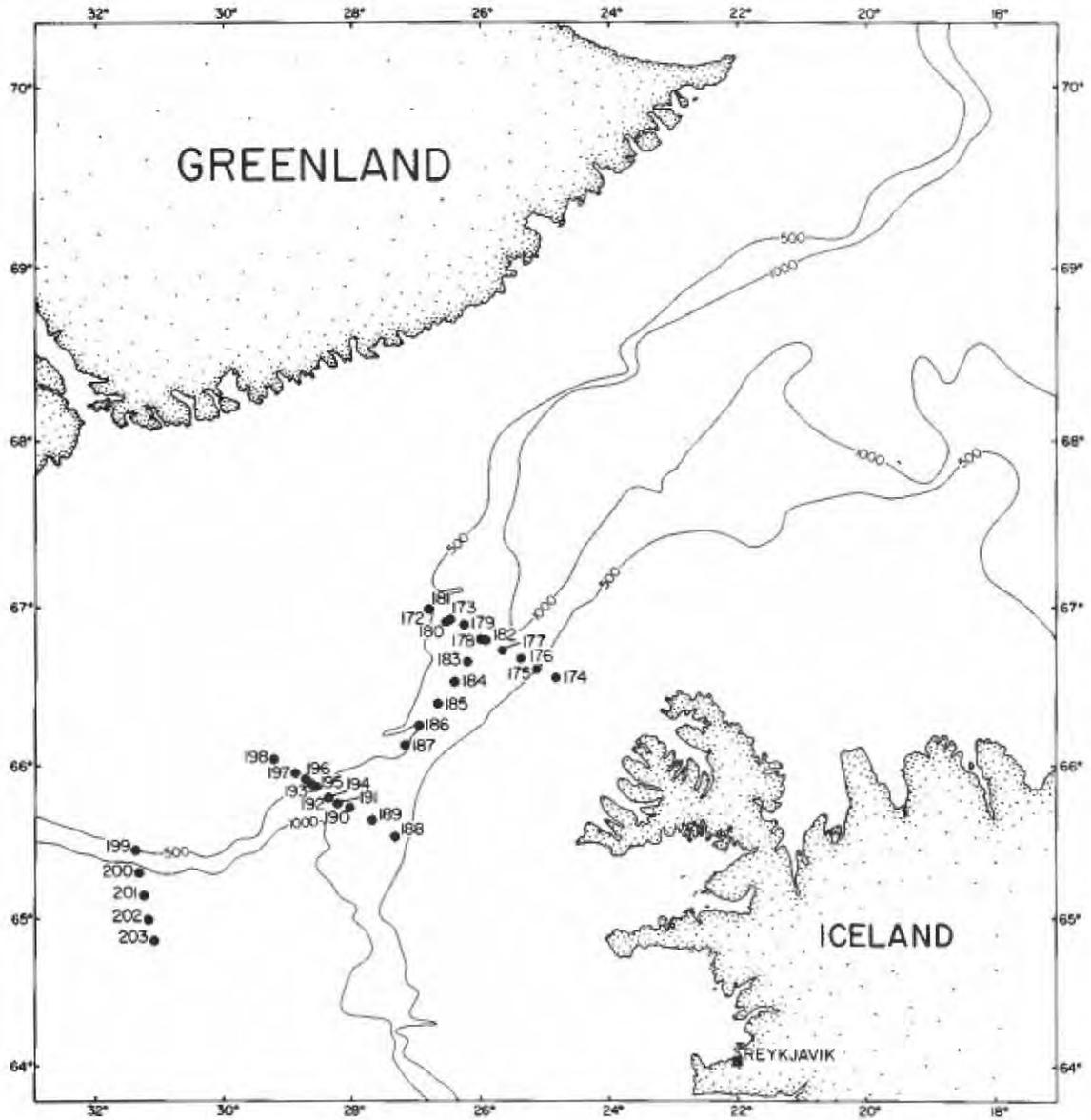
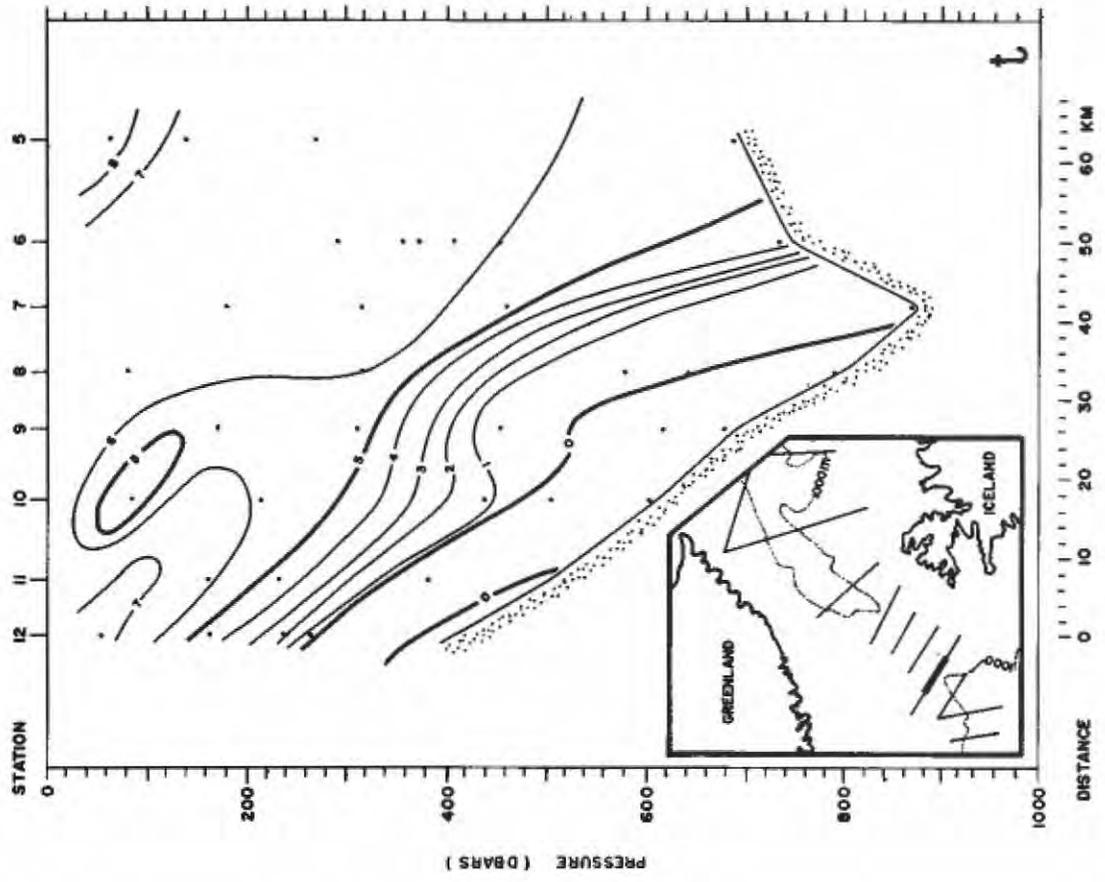
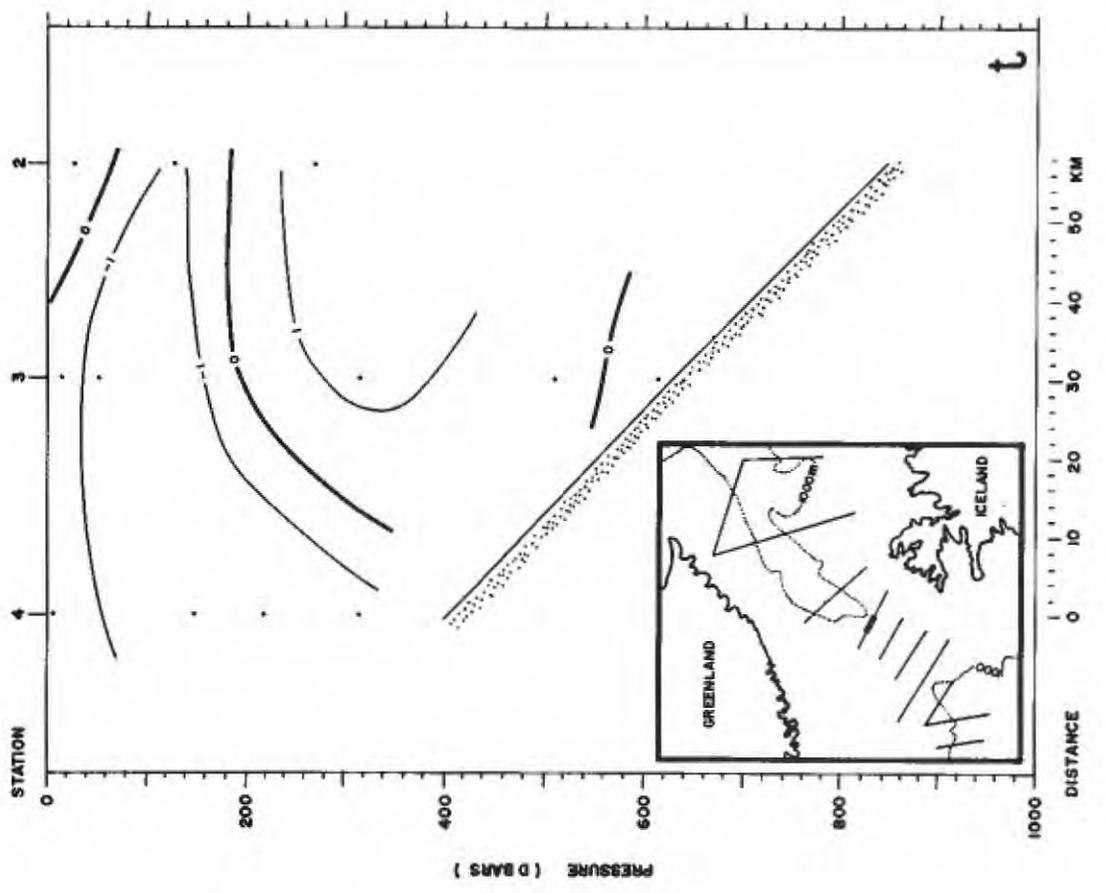


Figure 4: Phase III station positions,
September 15 to September 20, 1973.

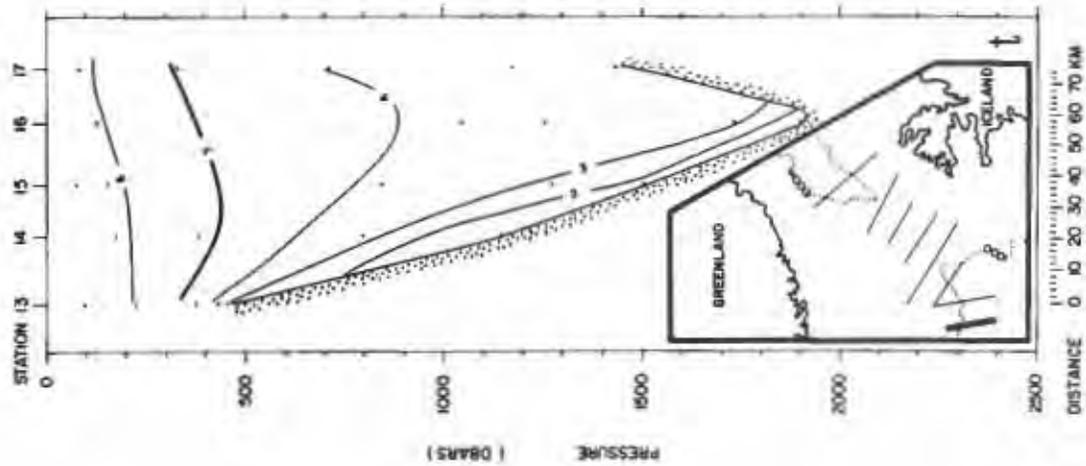
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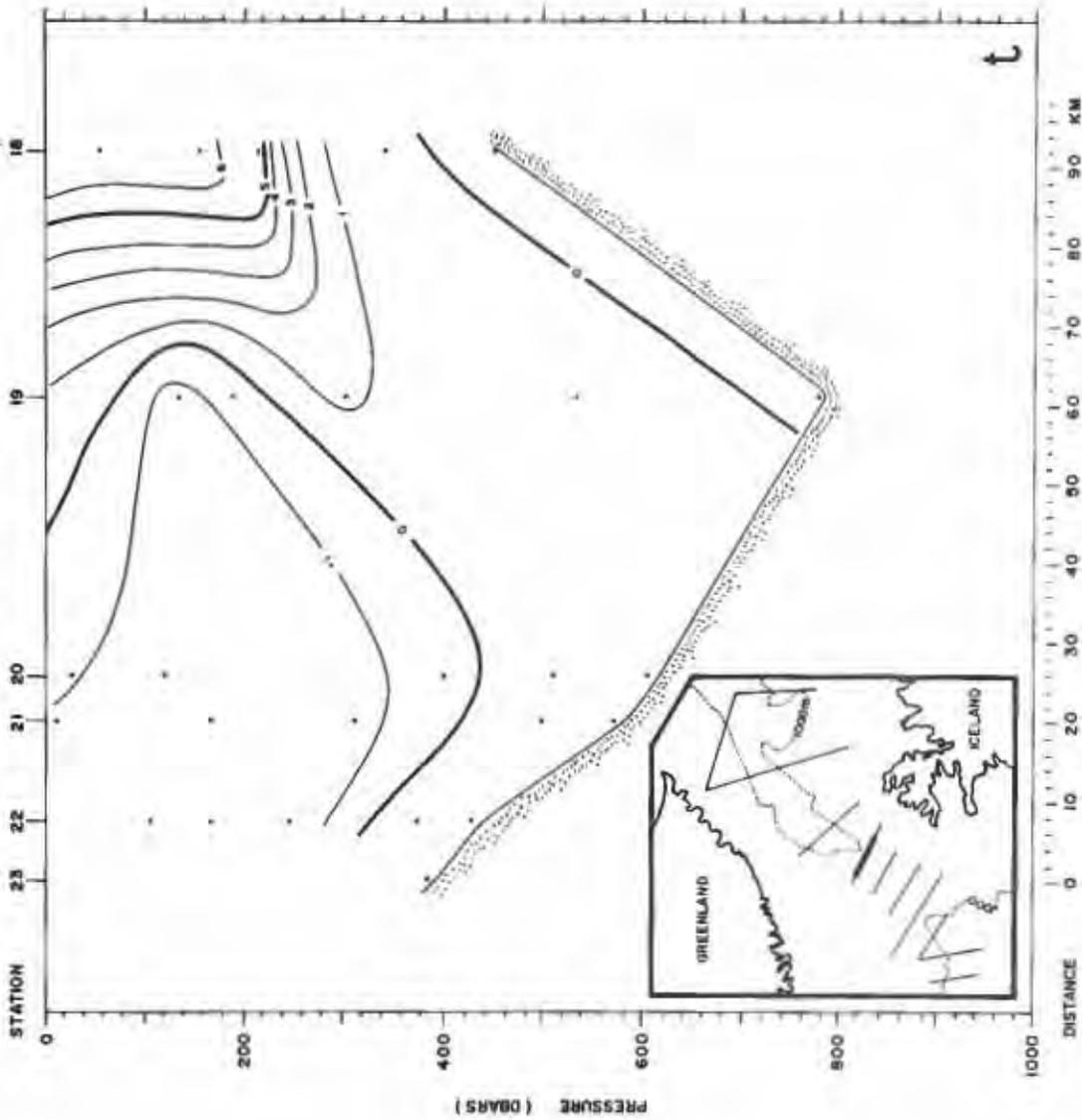
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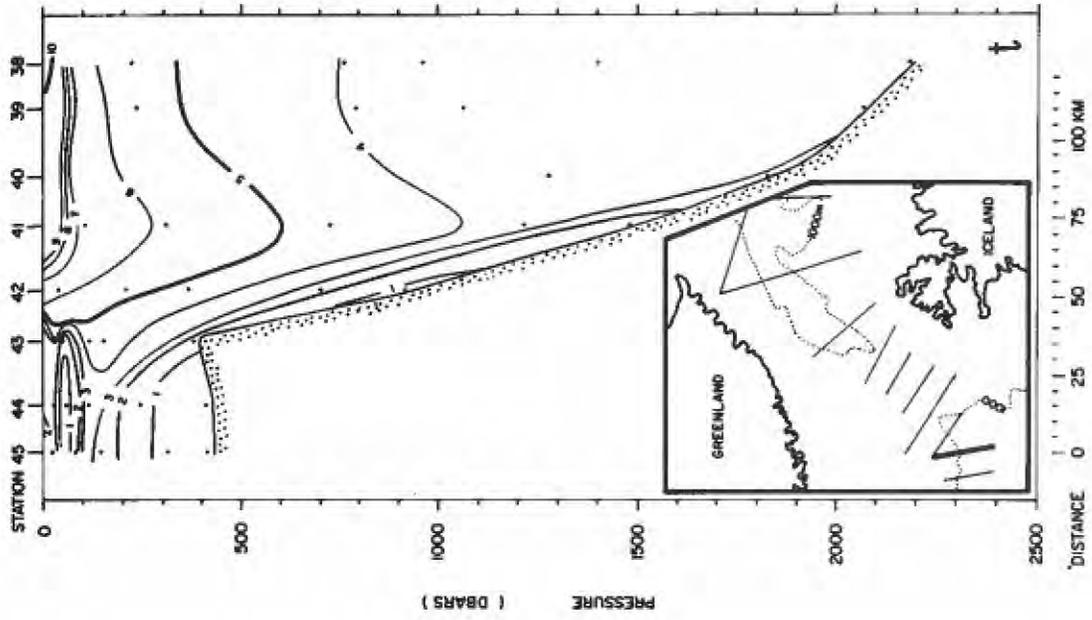
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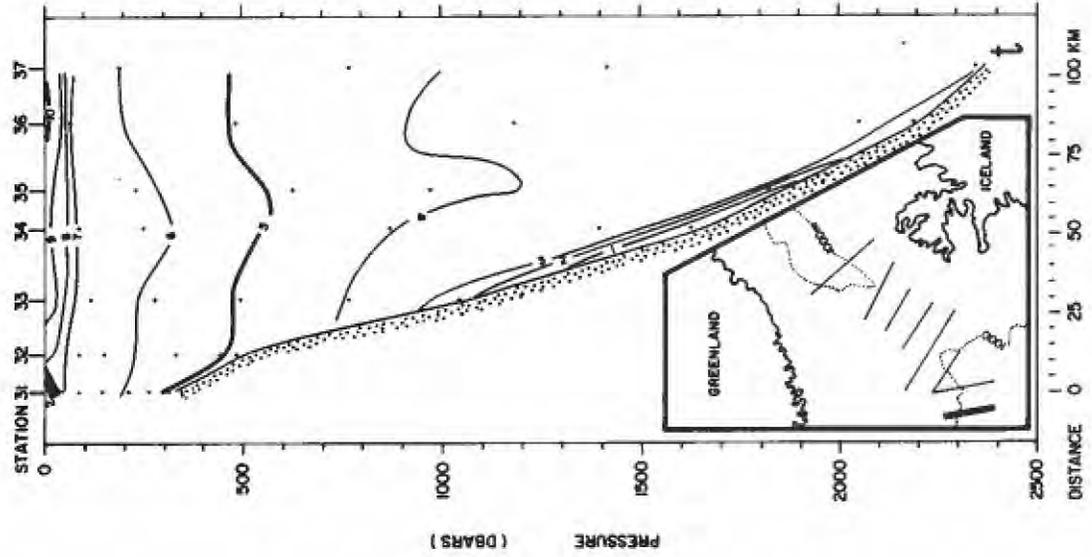
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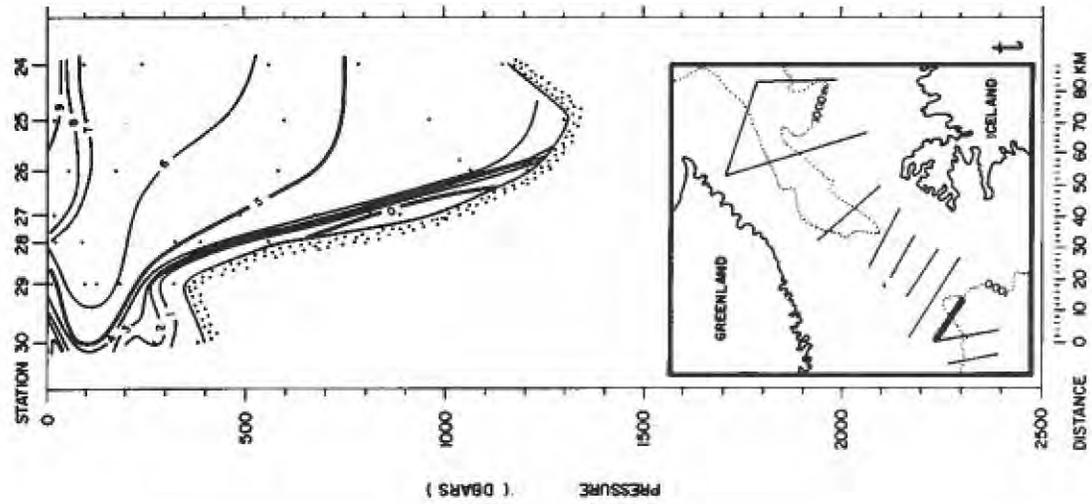
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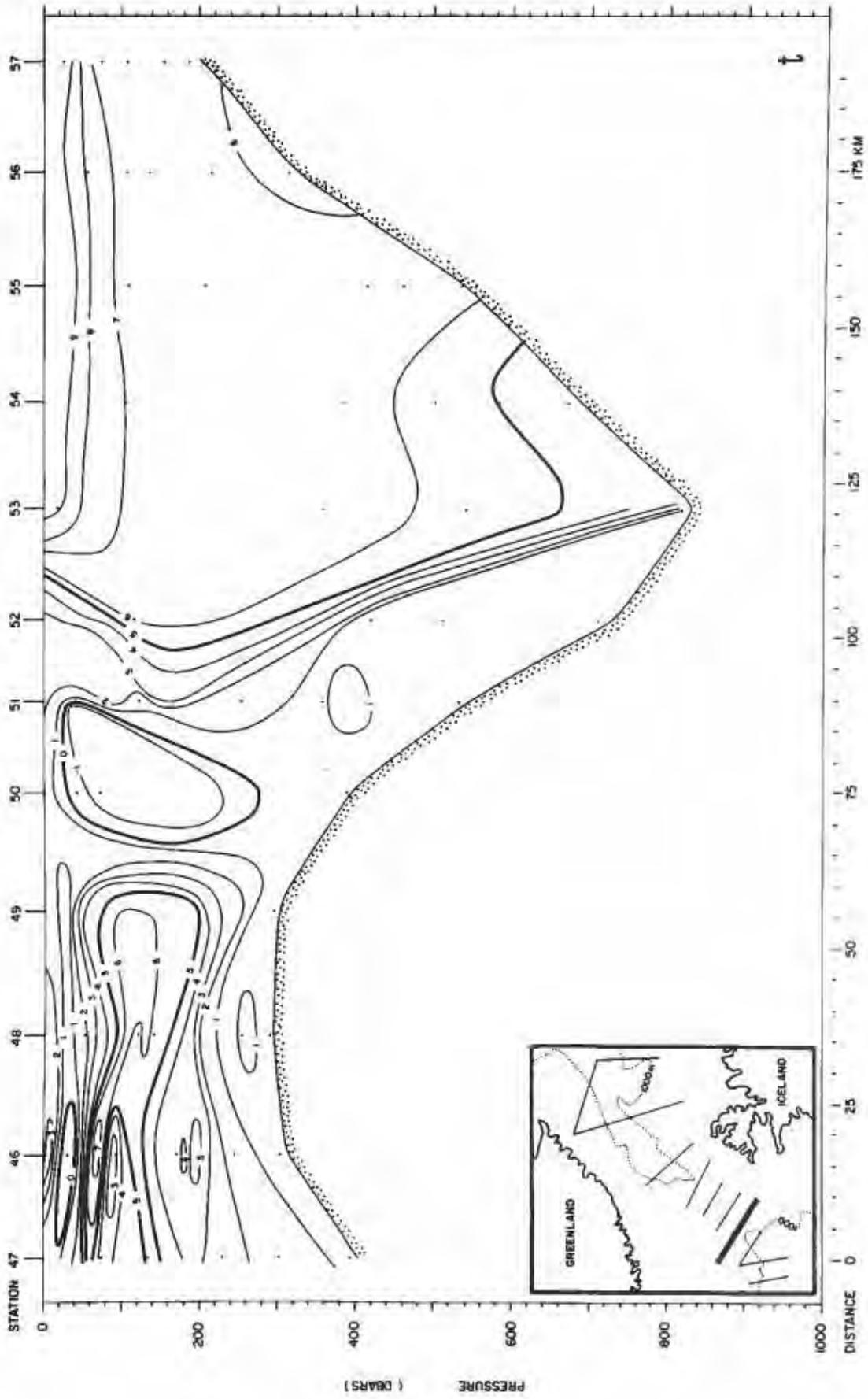
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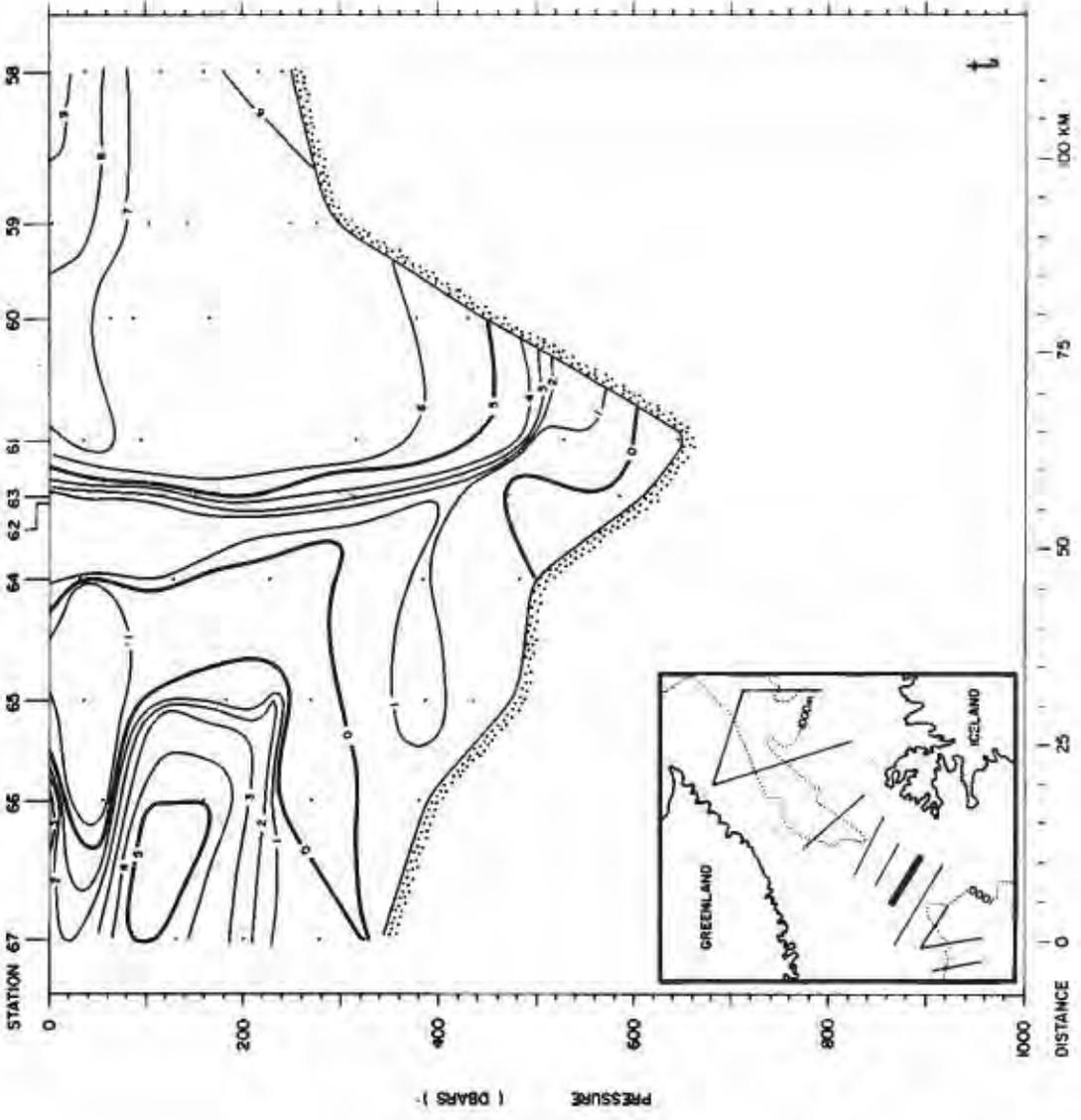
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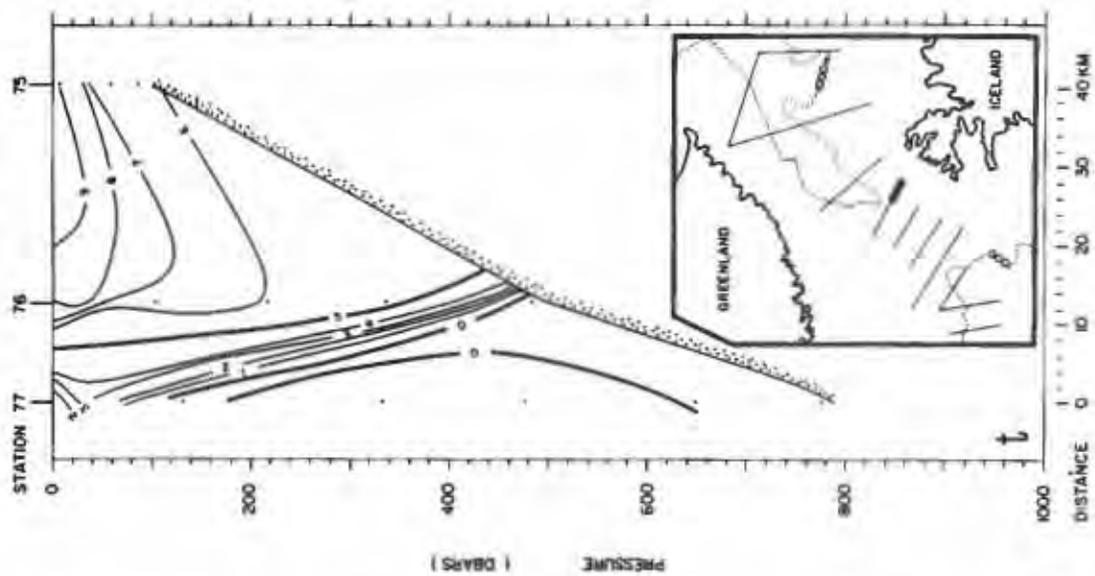
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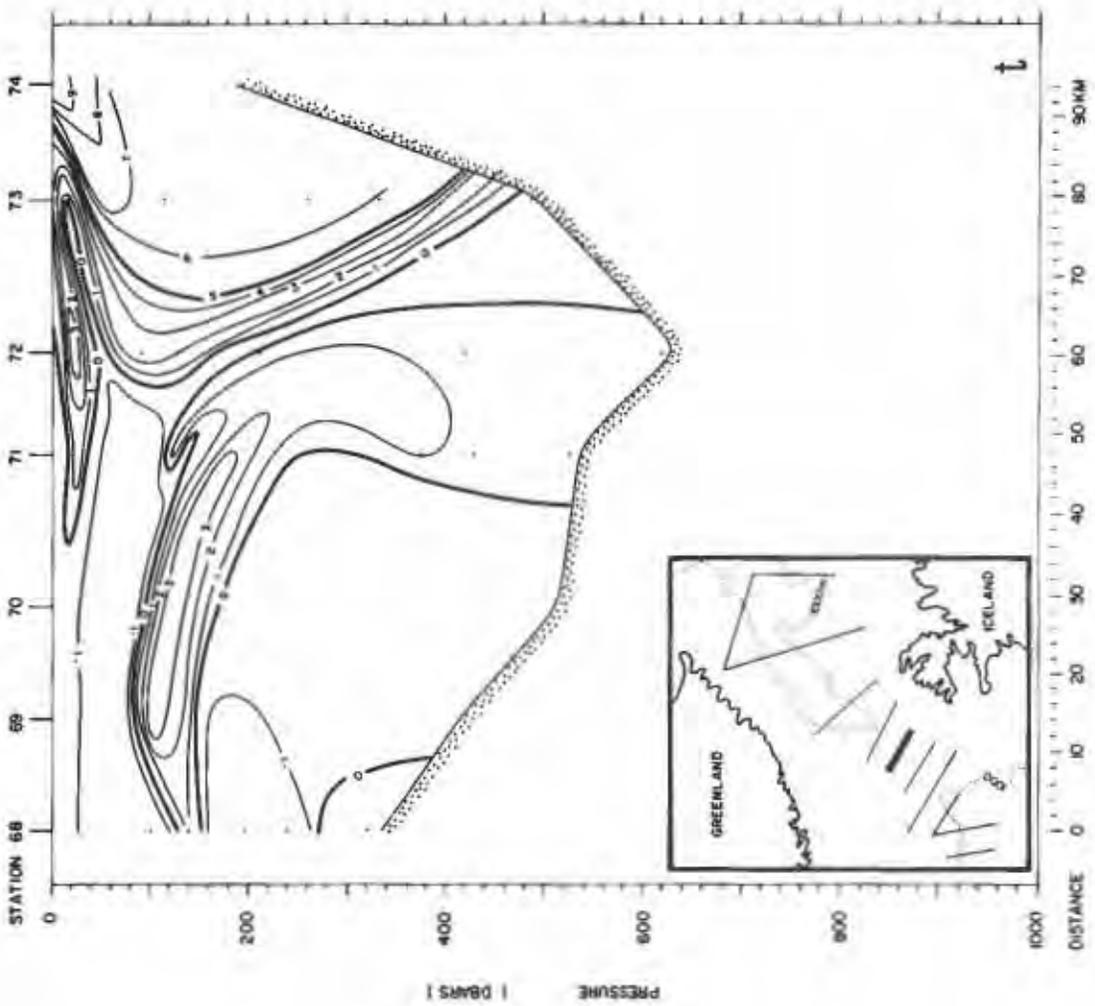
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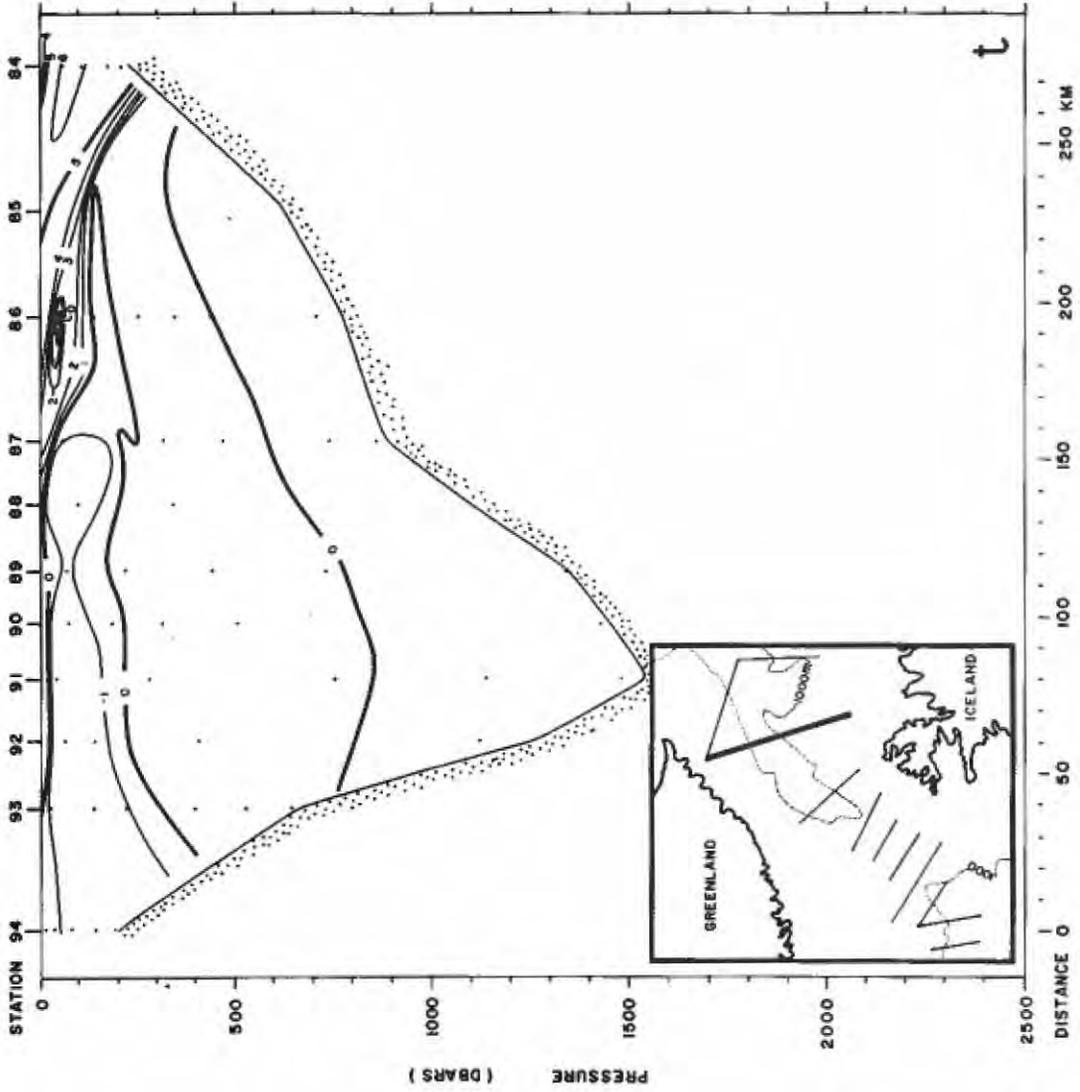
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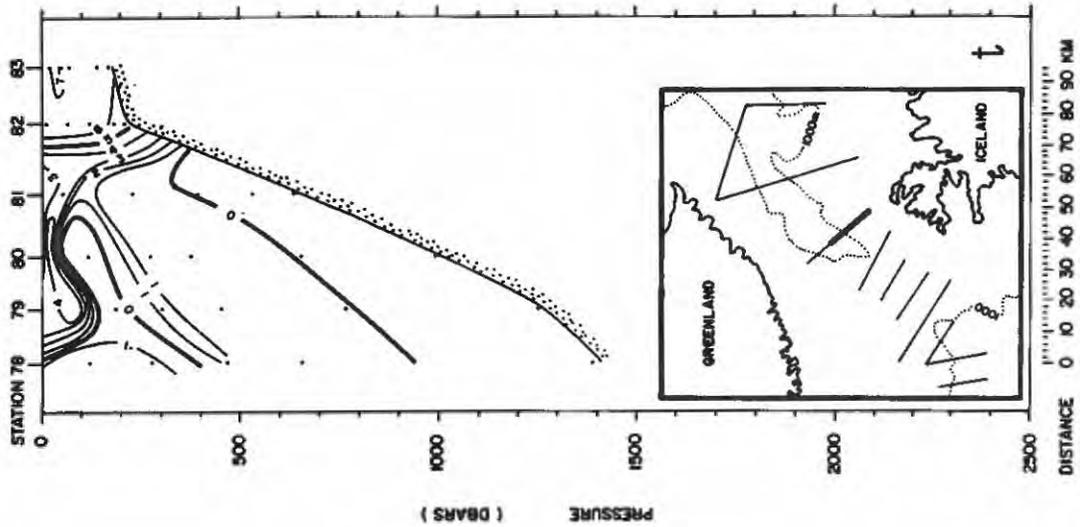
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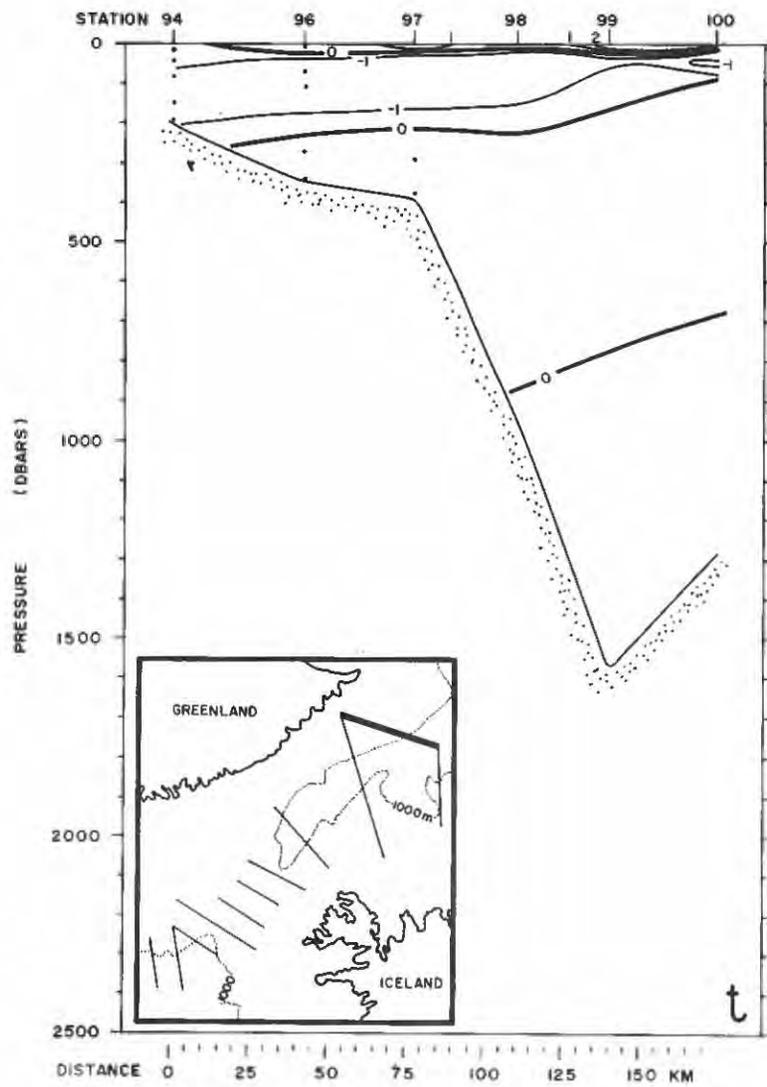
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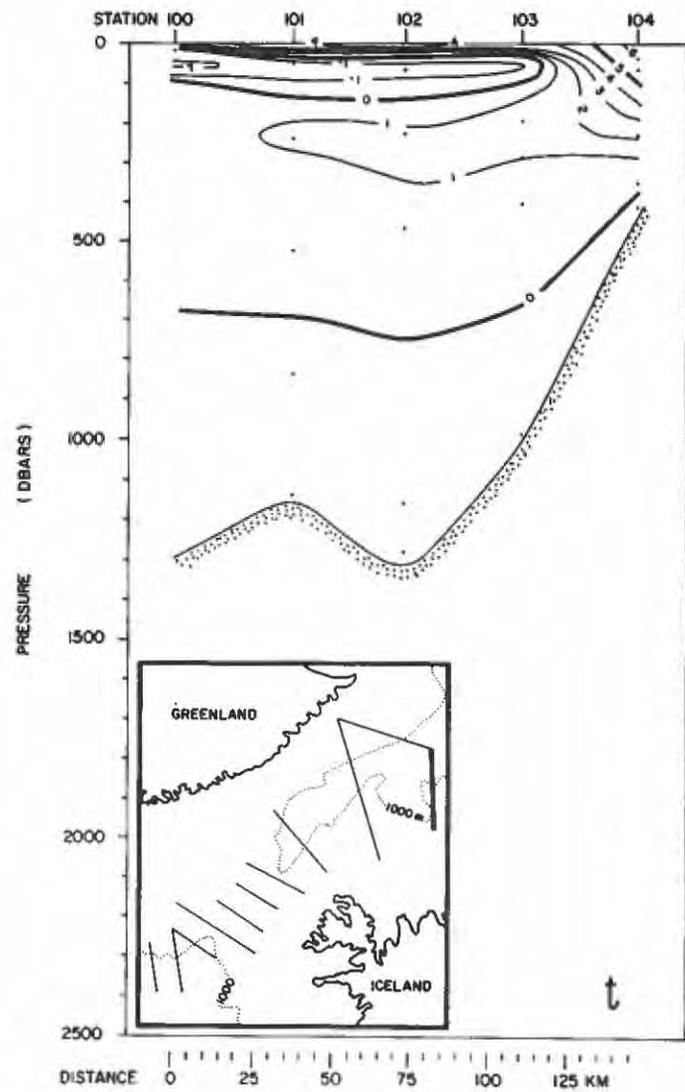
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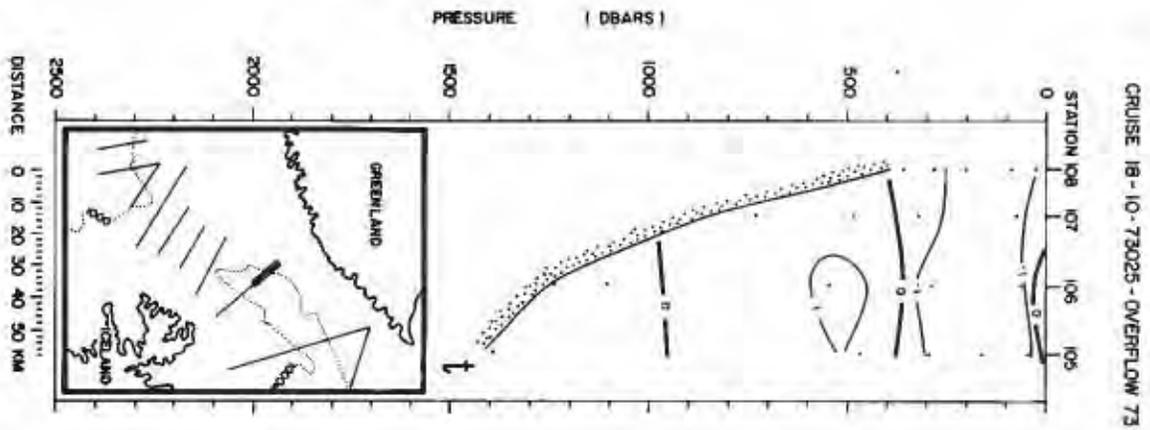


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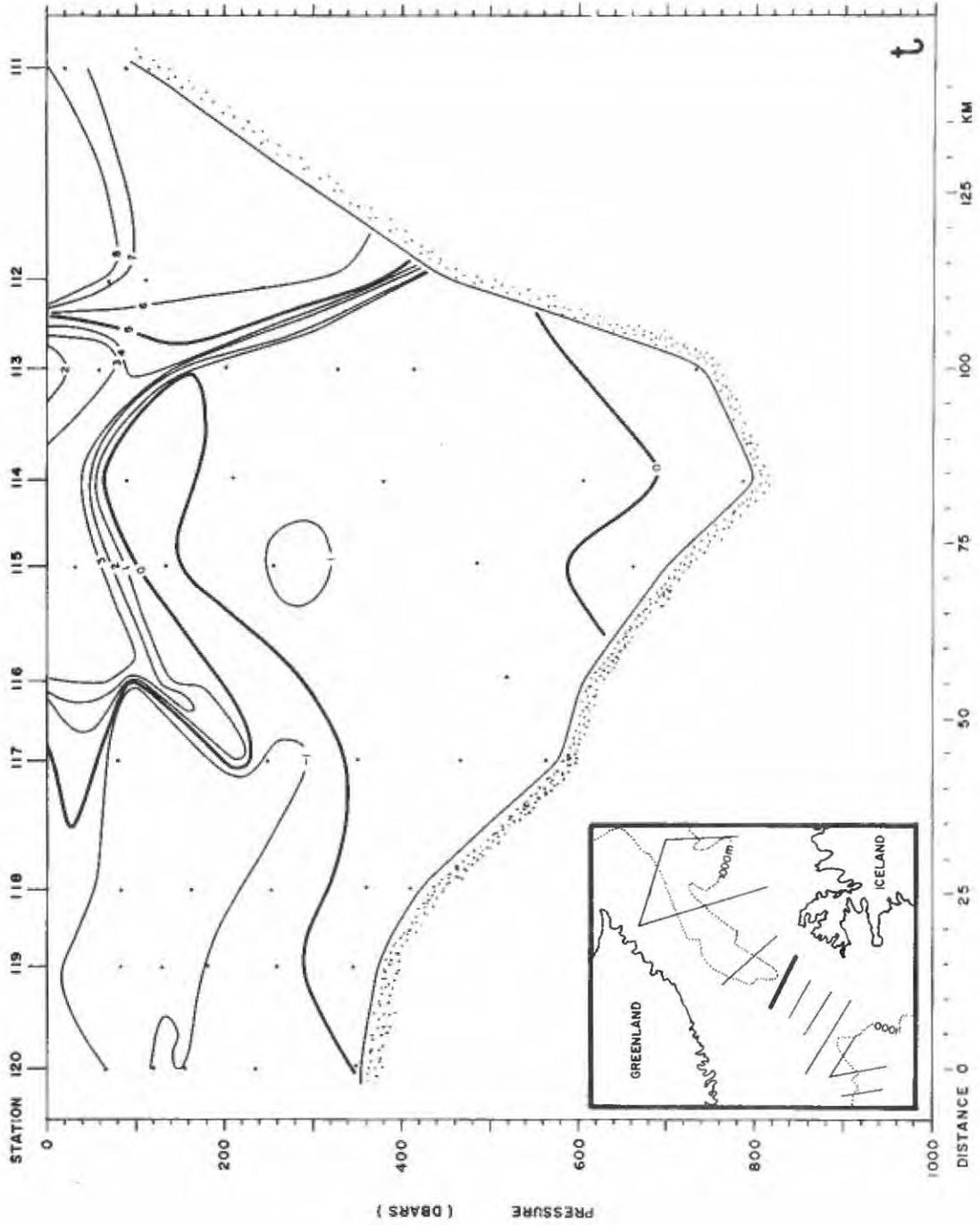


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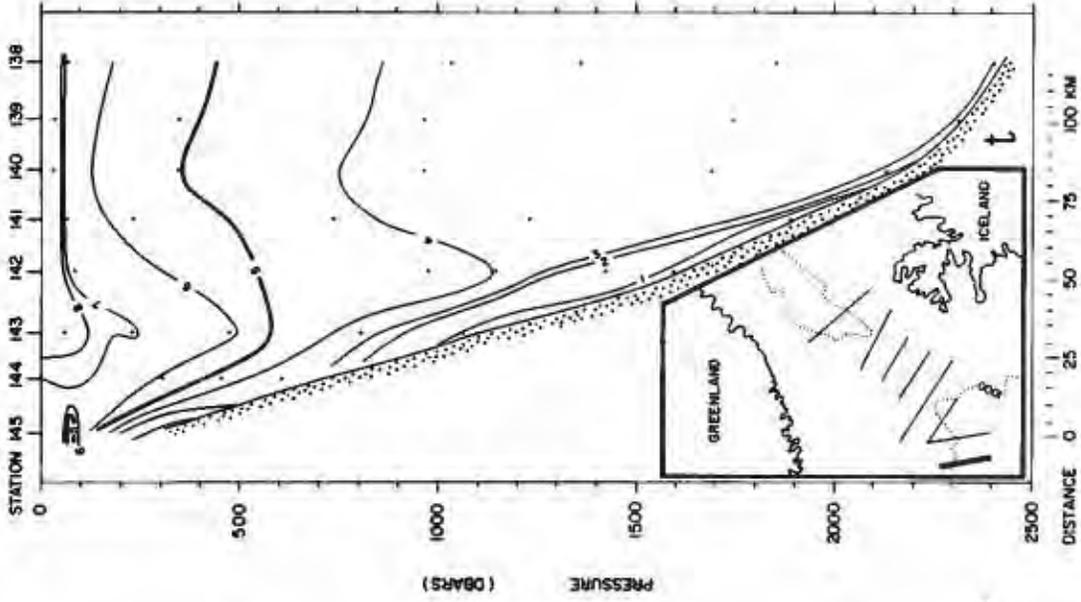




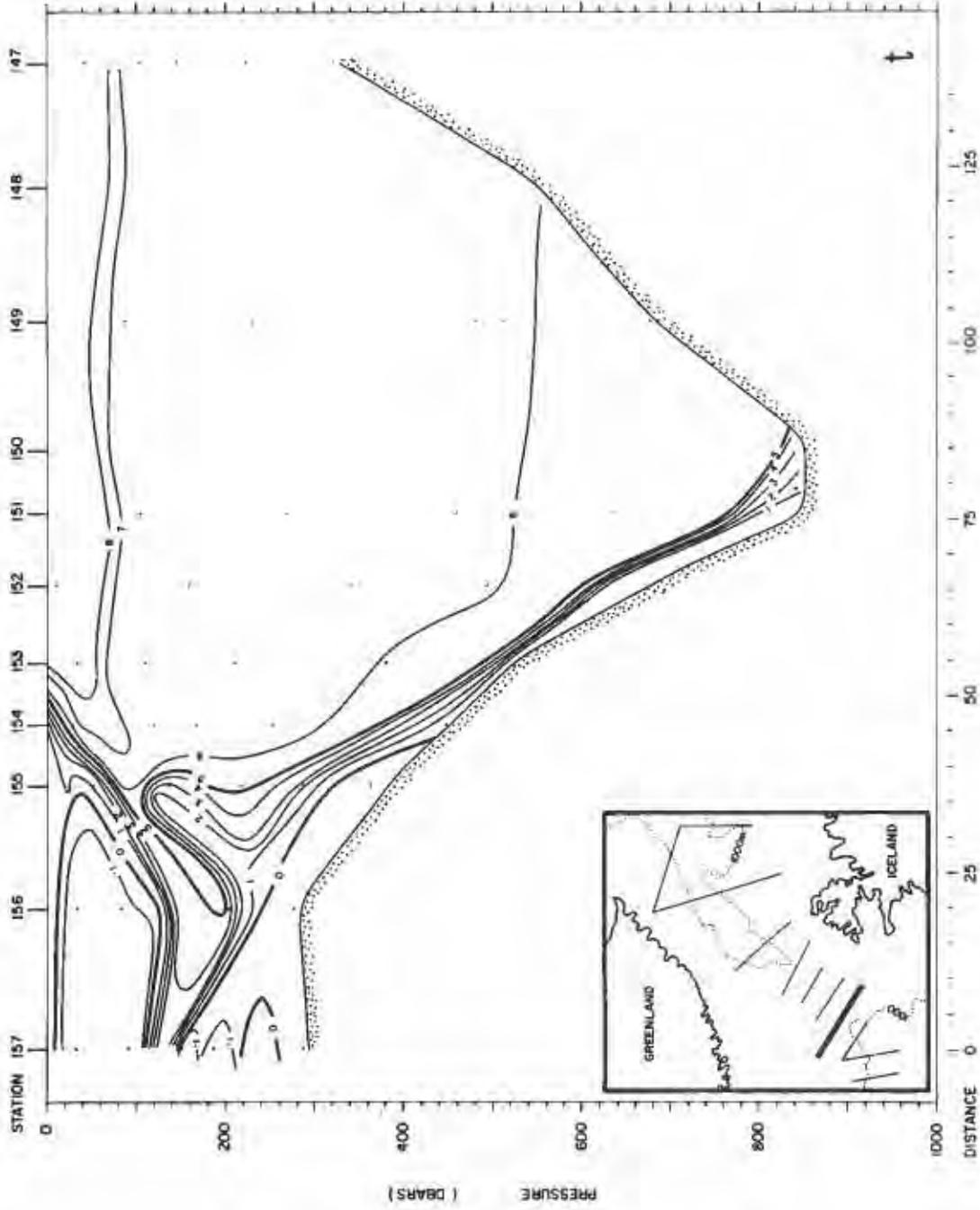
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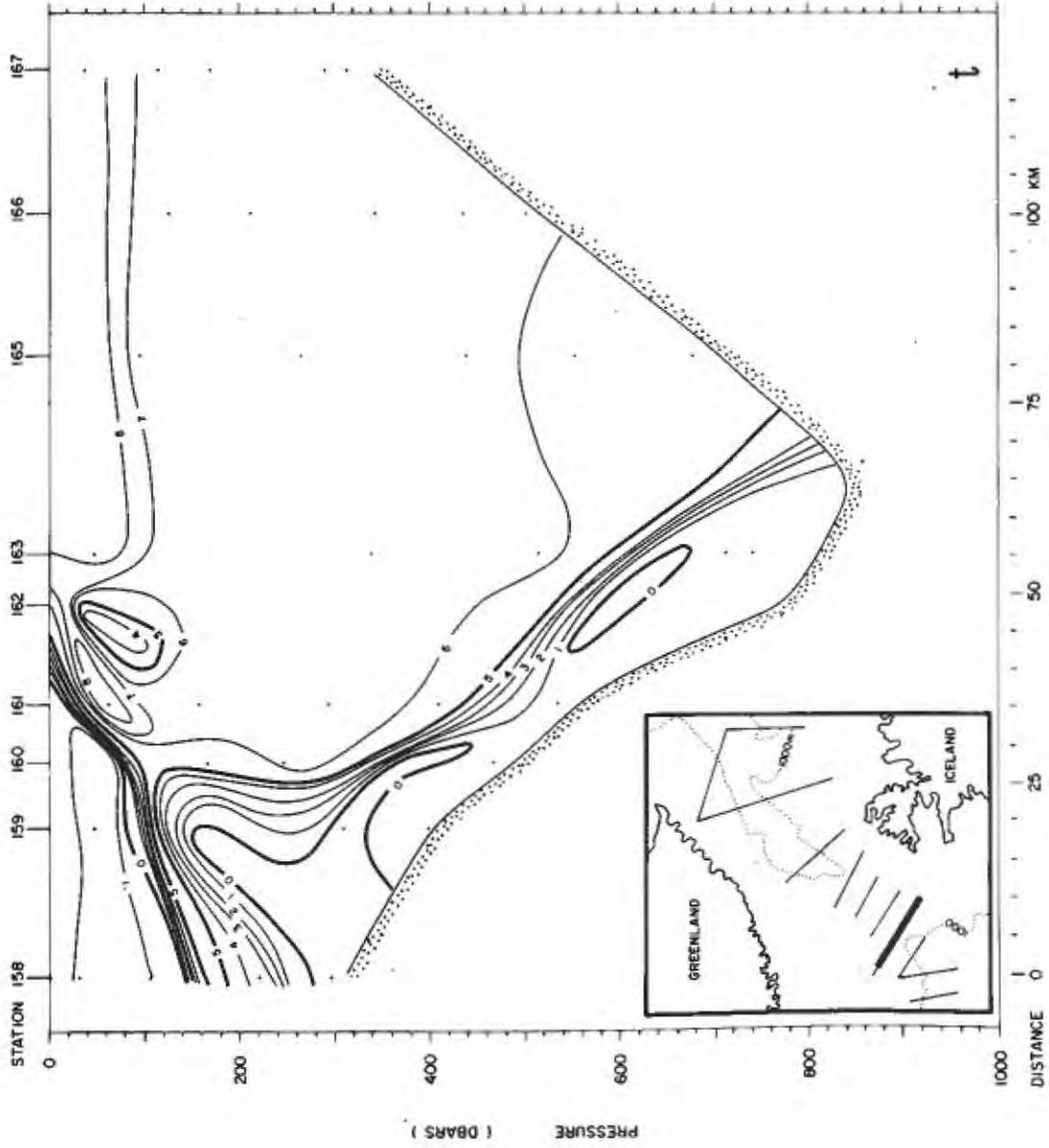


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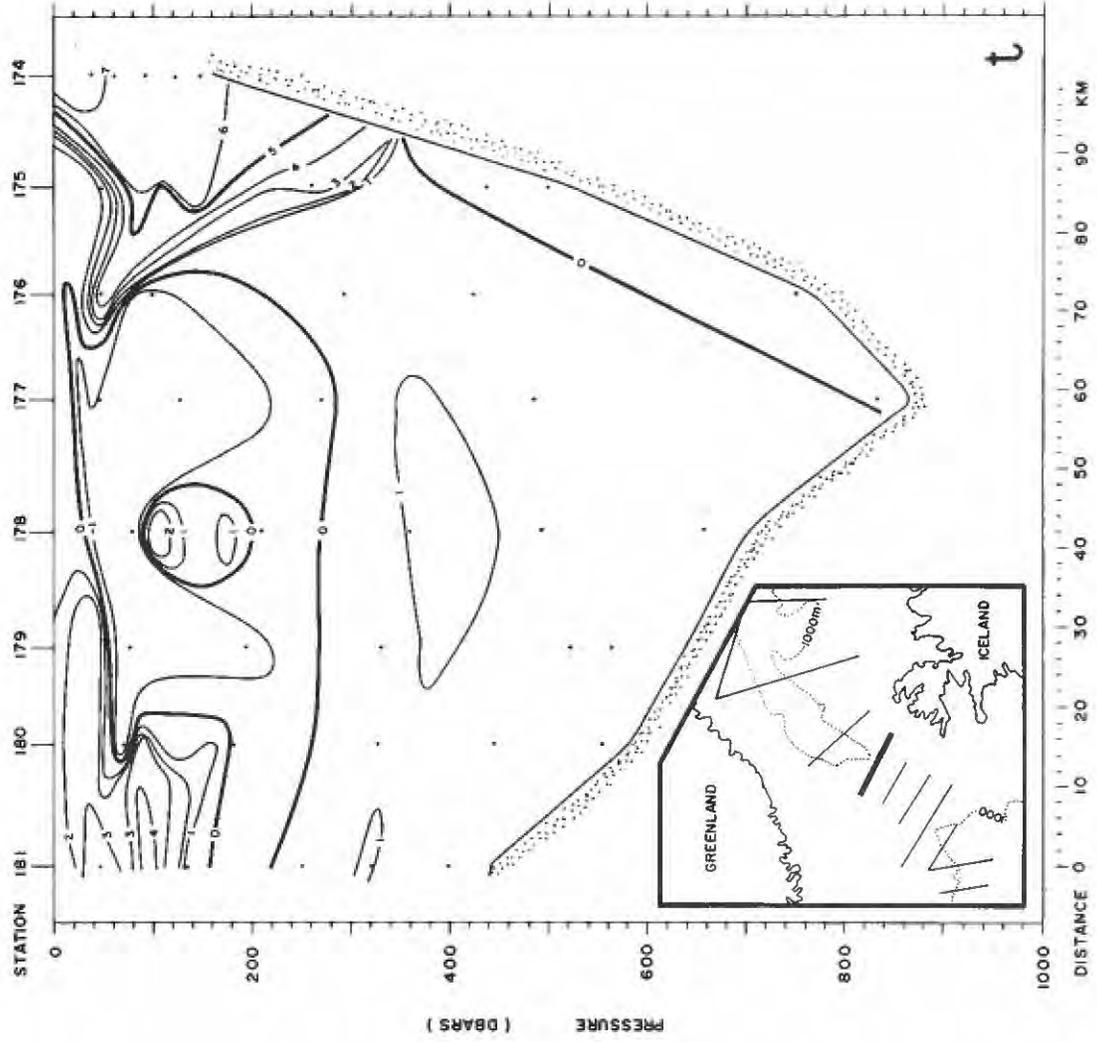


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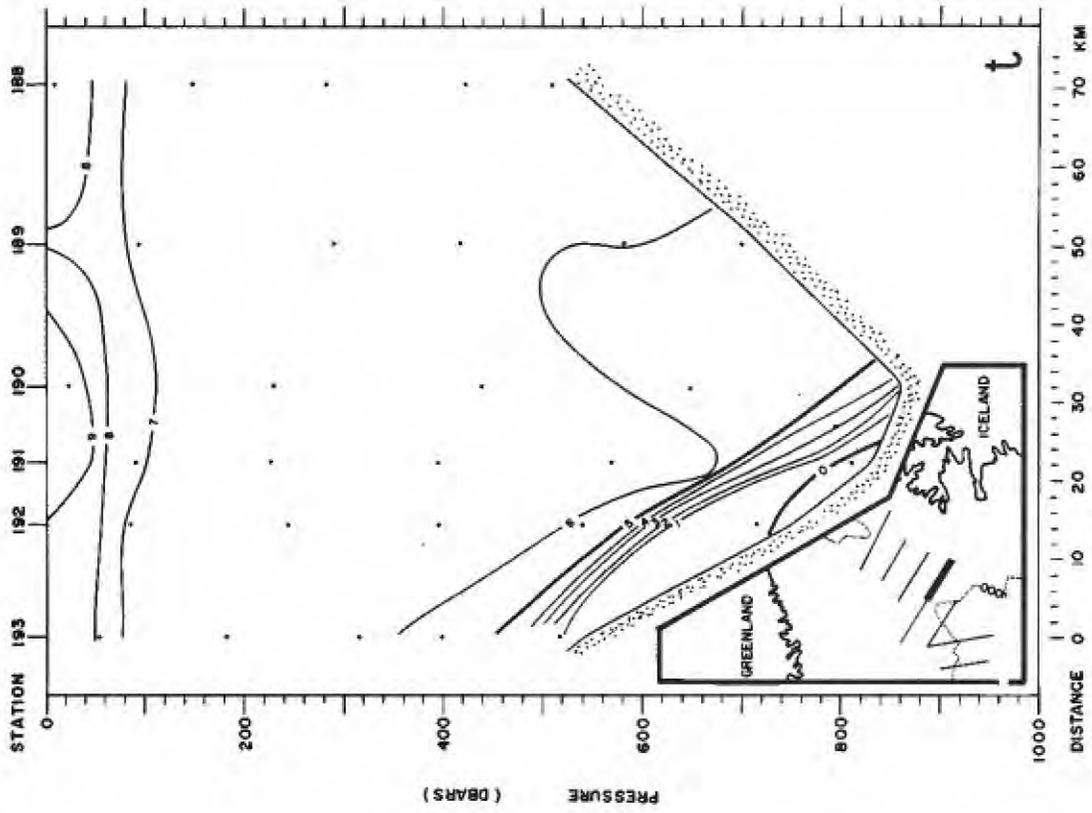
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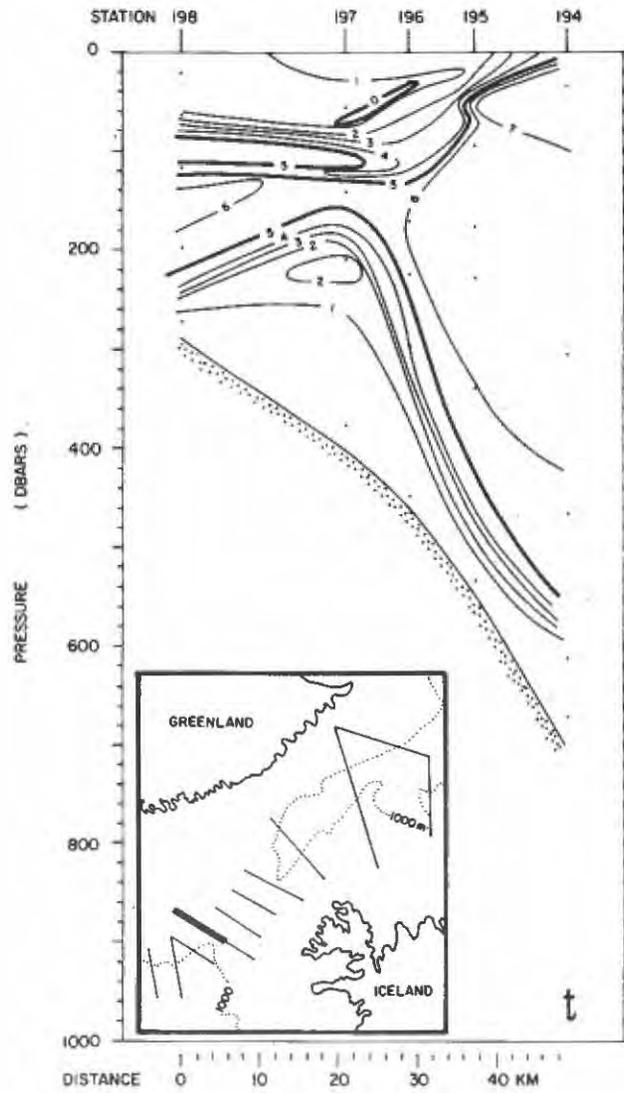
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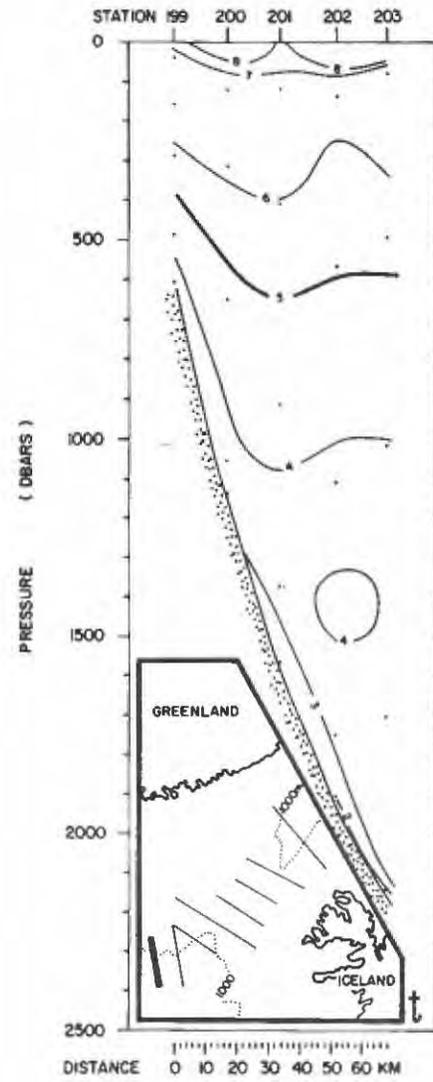
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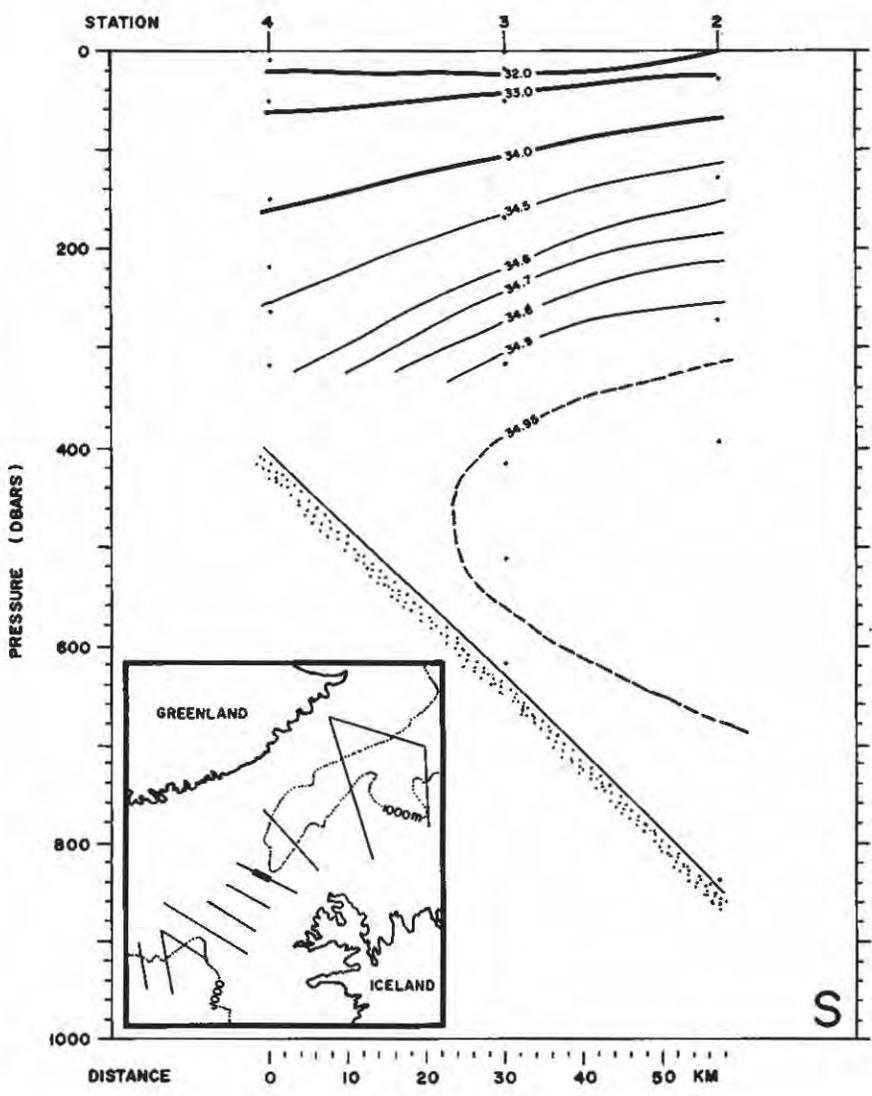
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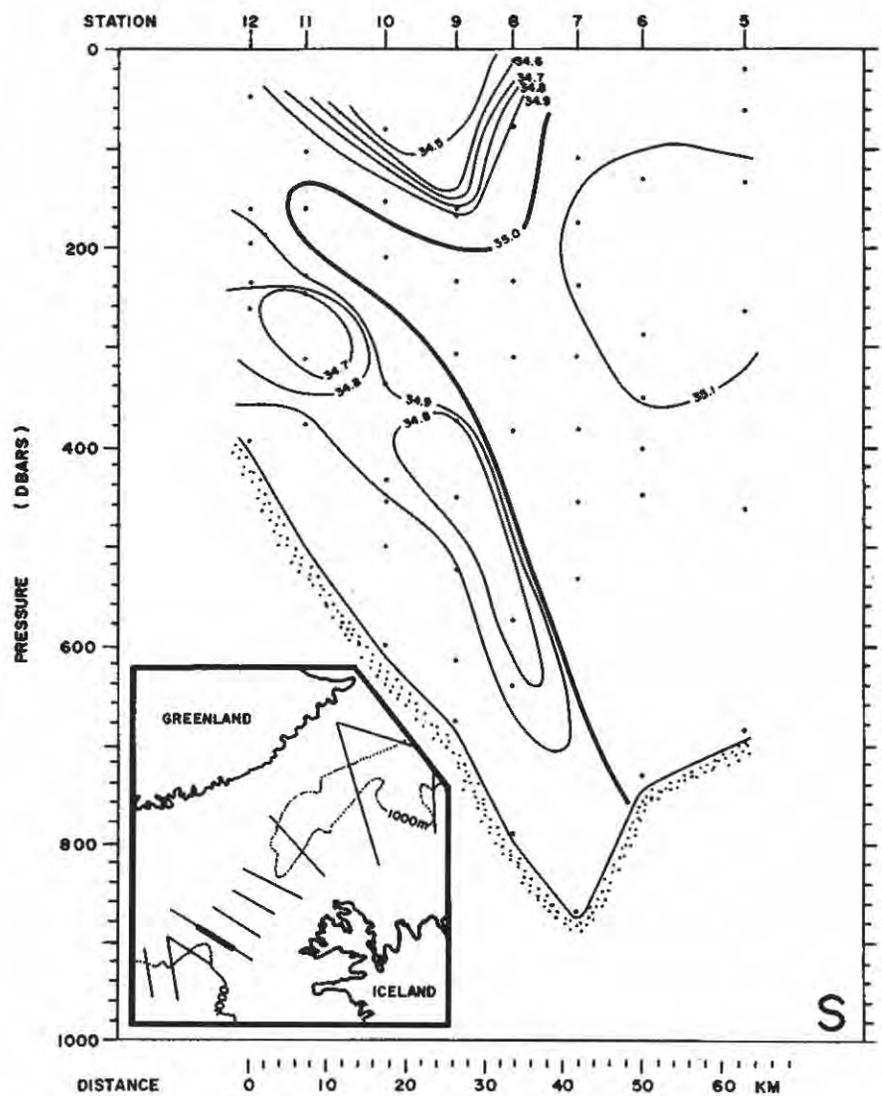
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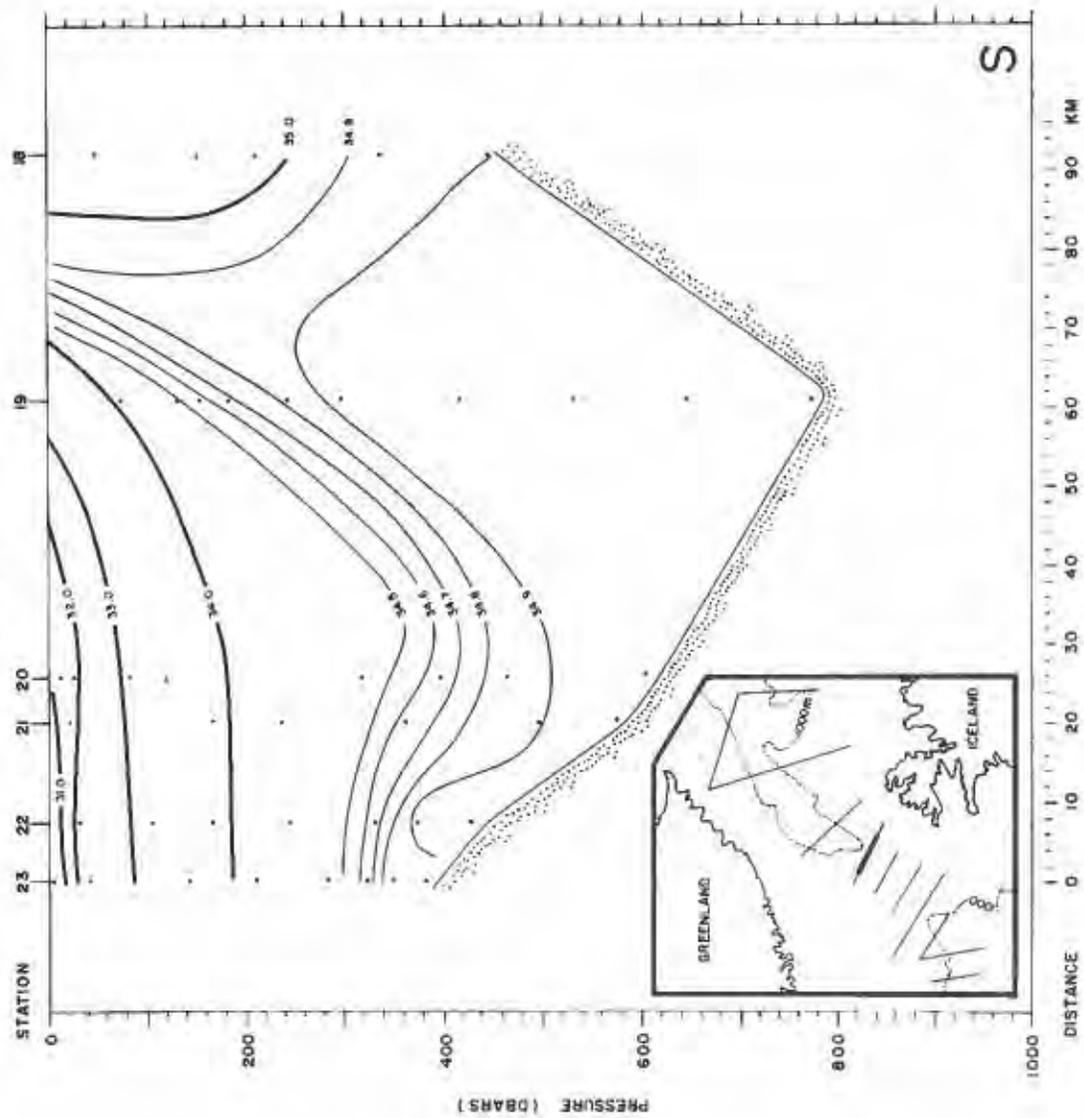
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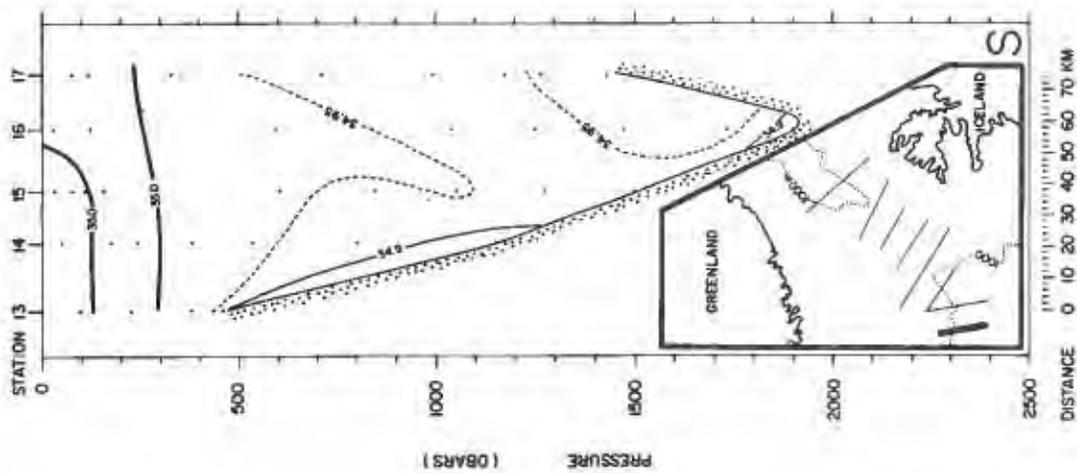
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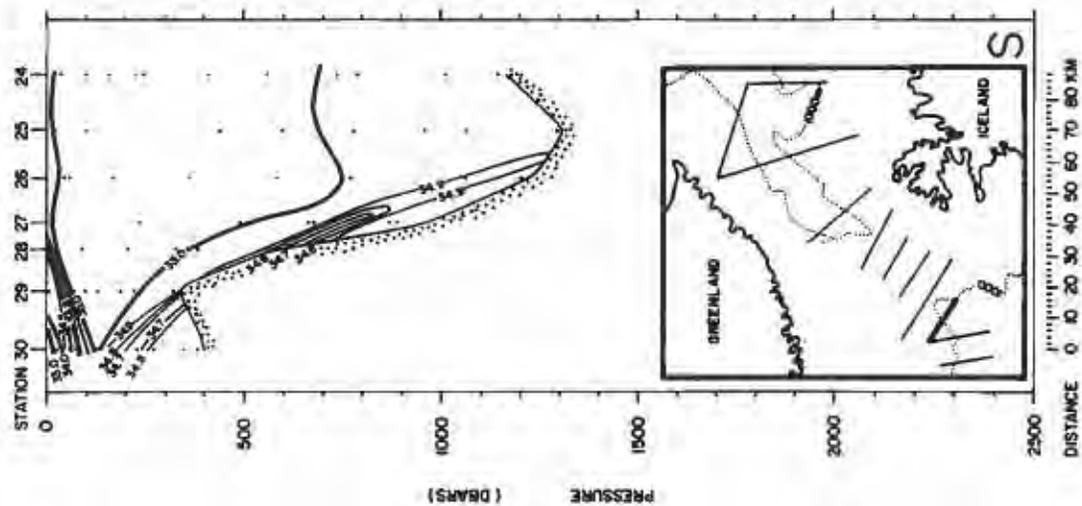
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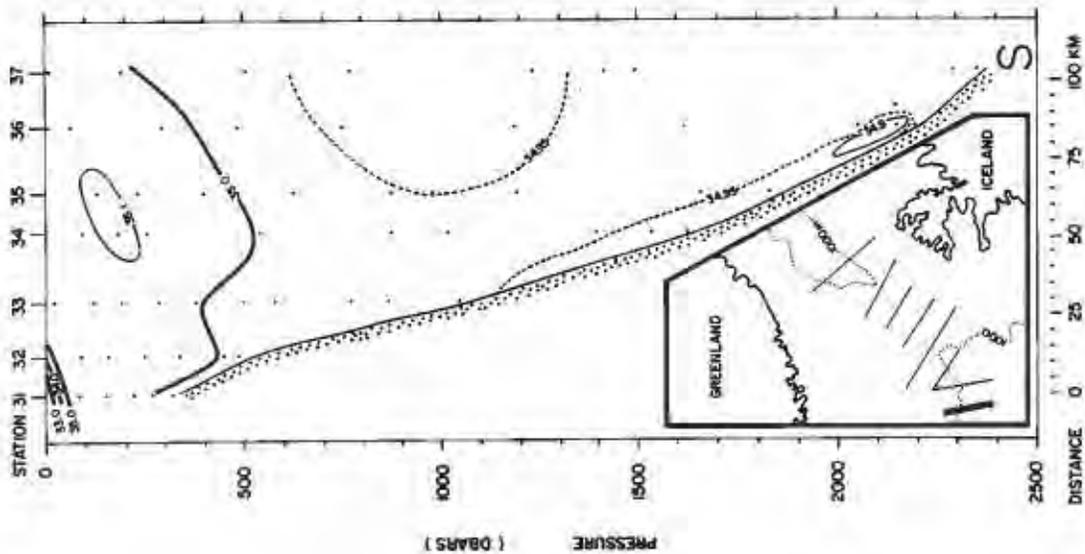
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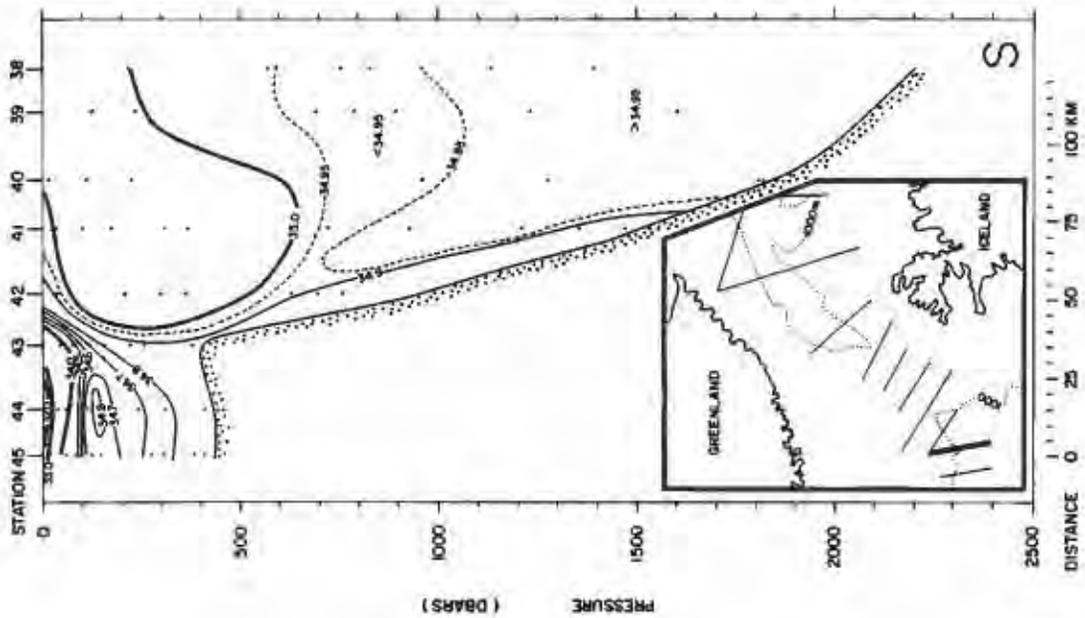
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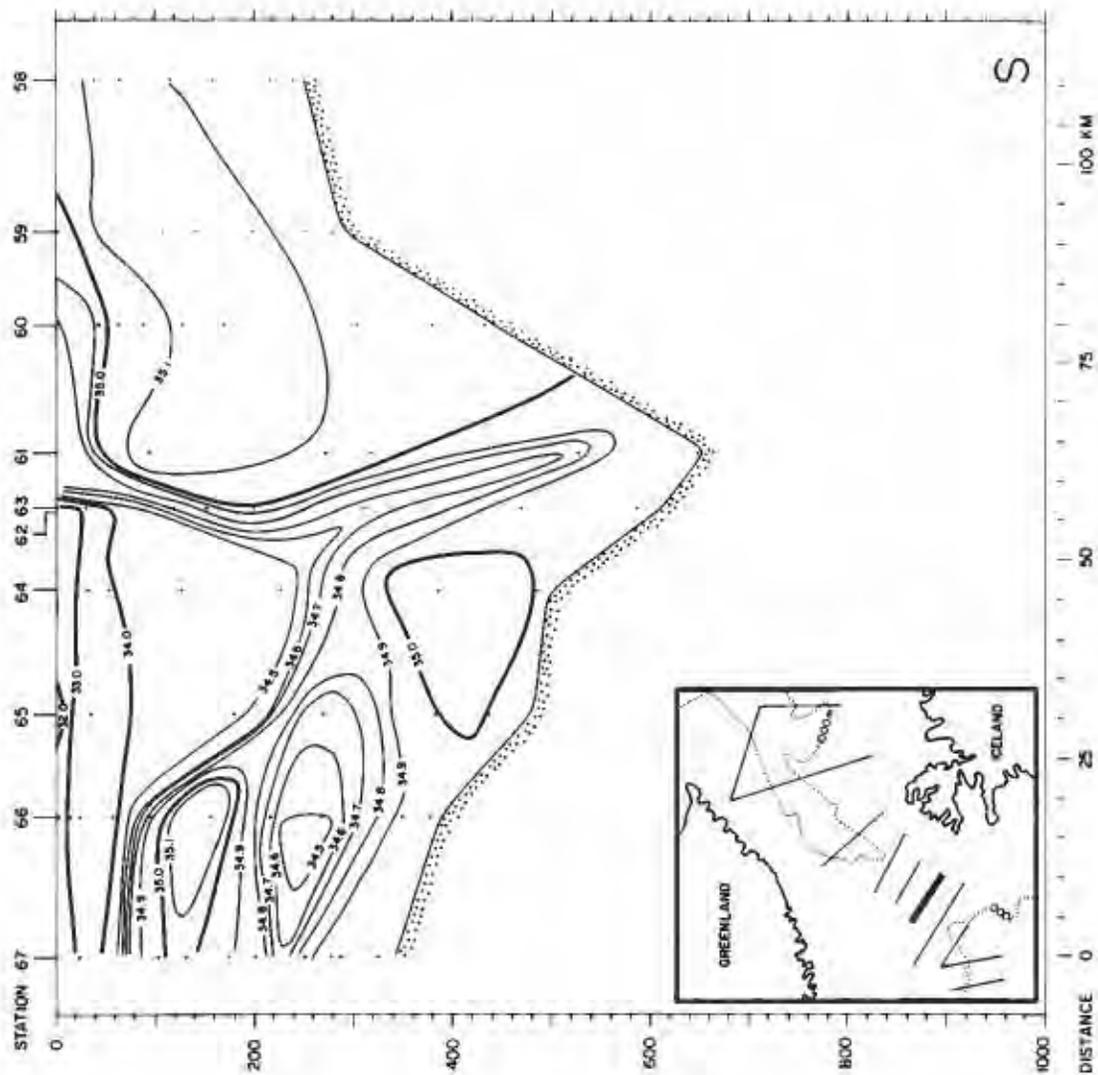
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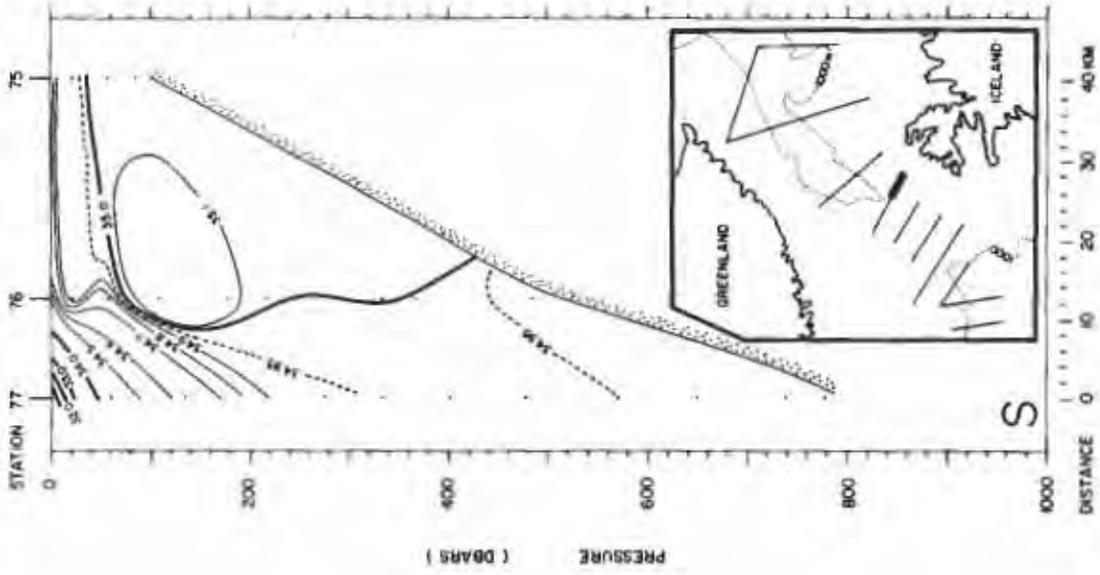
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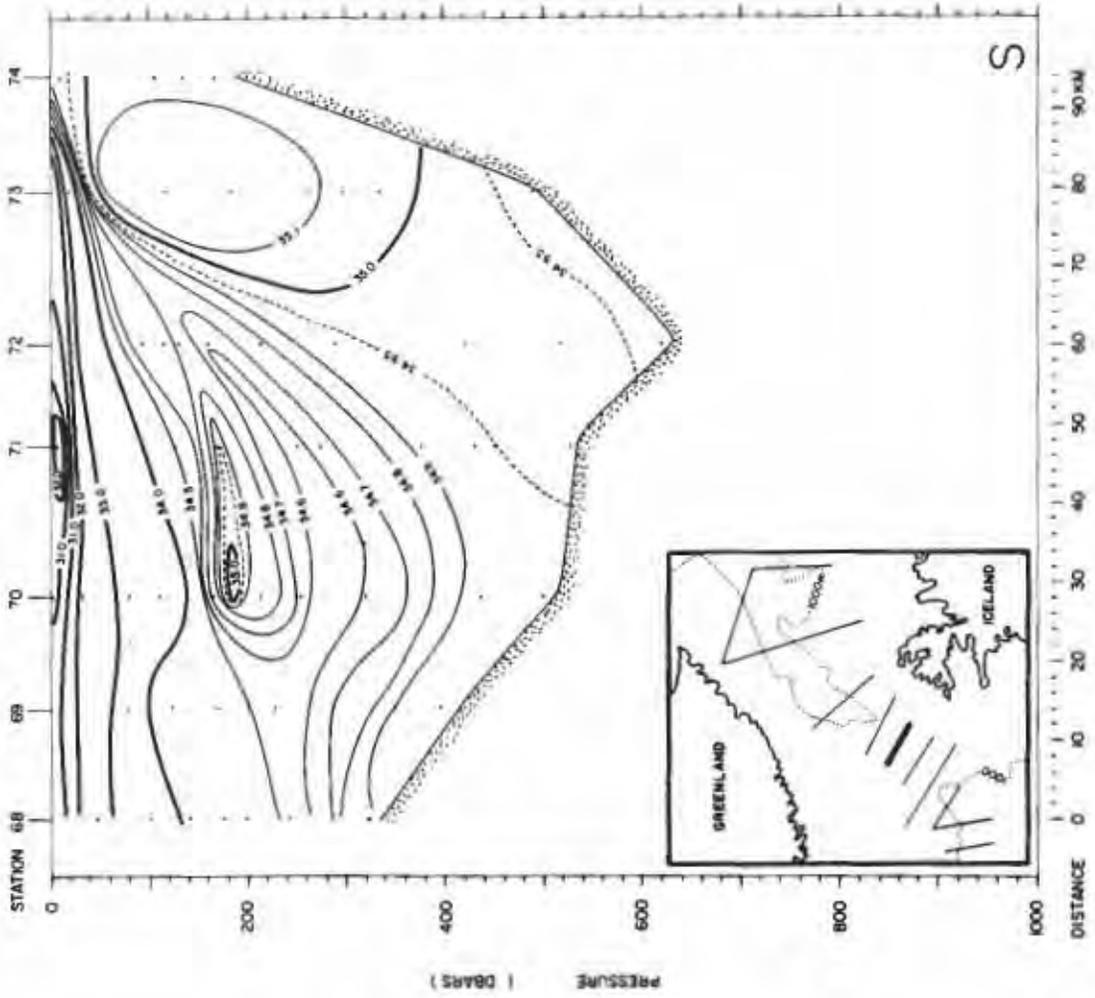
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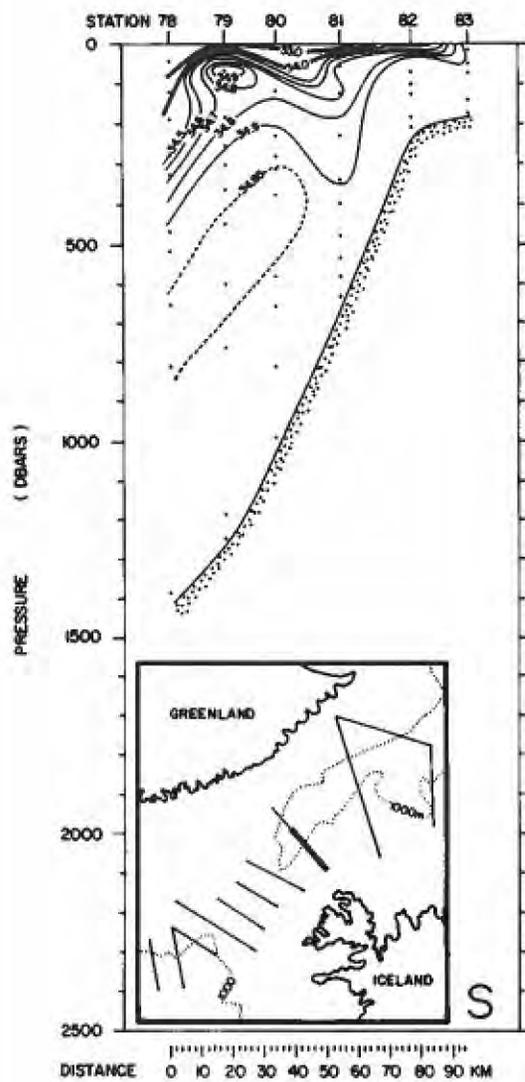
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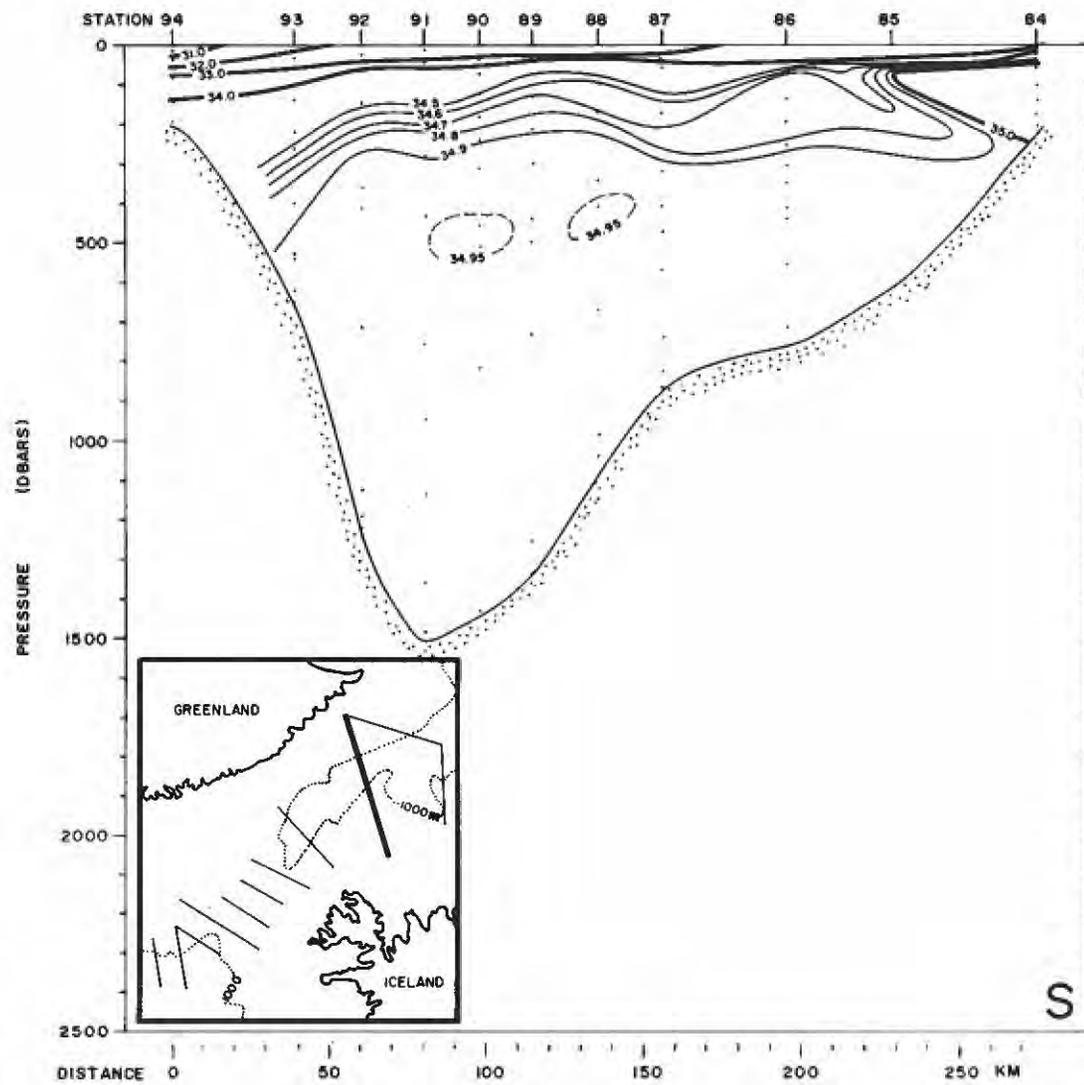
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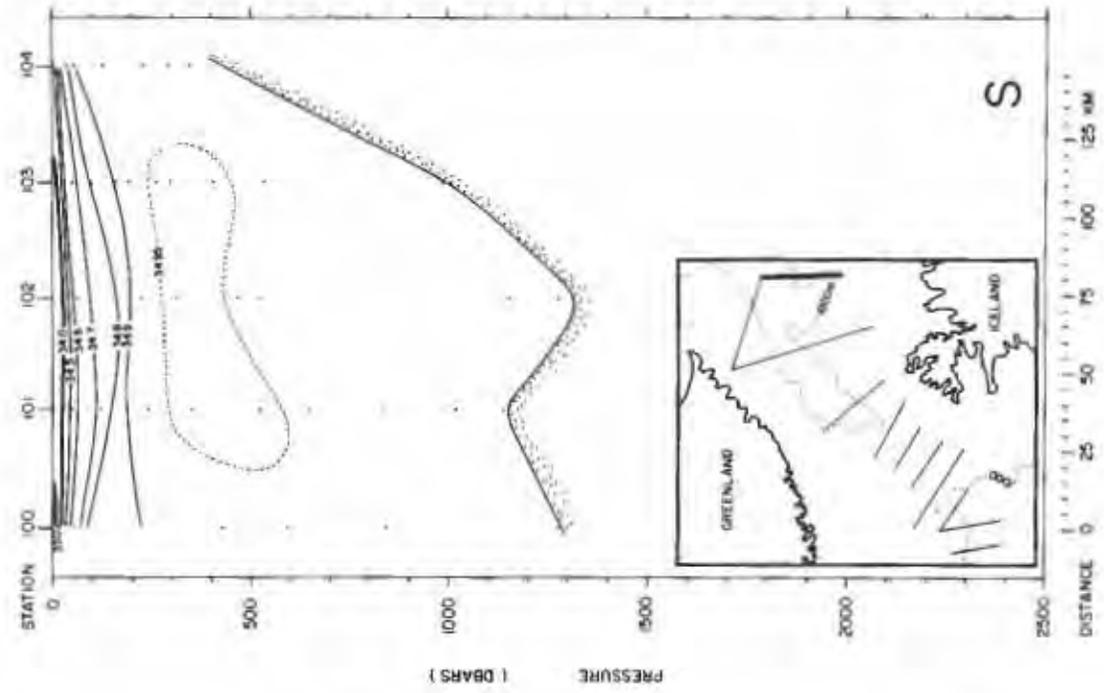
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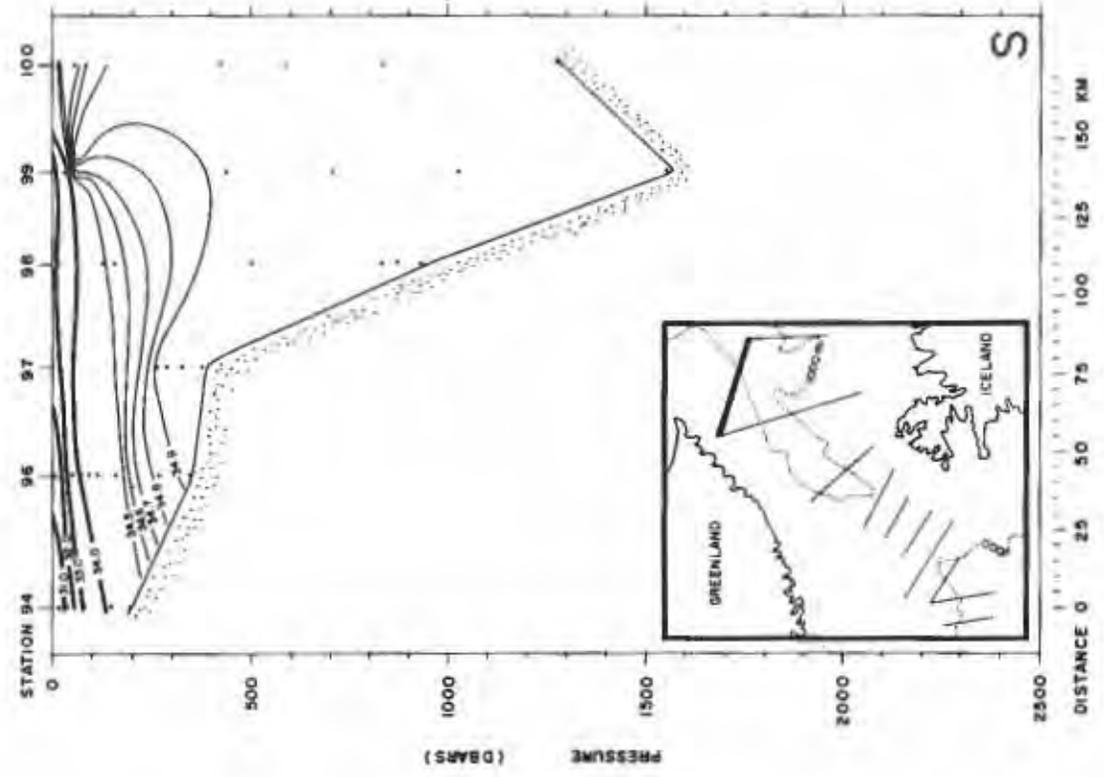
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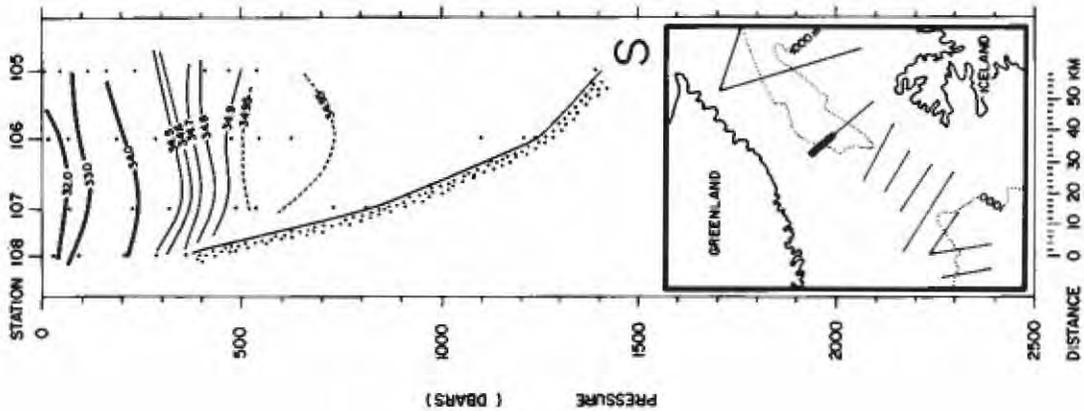
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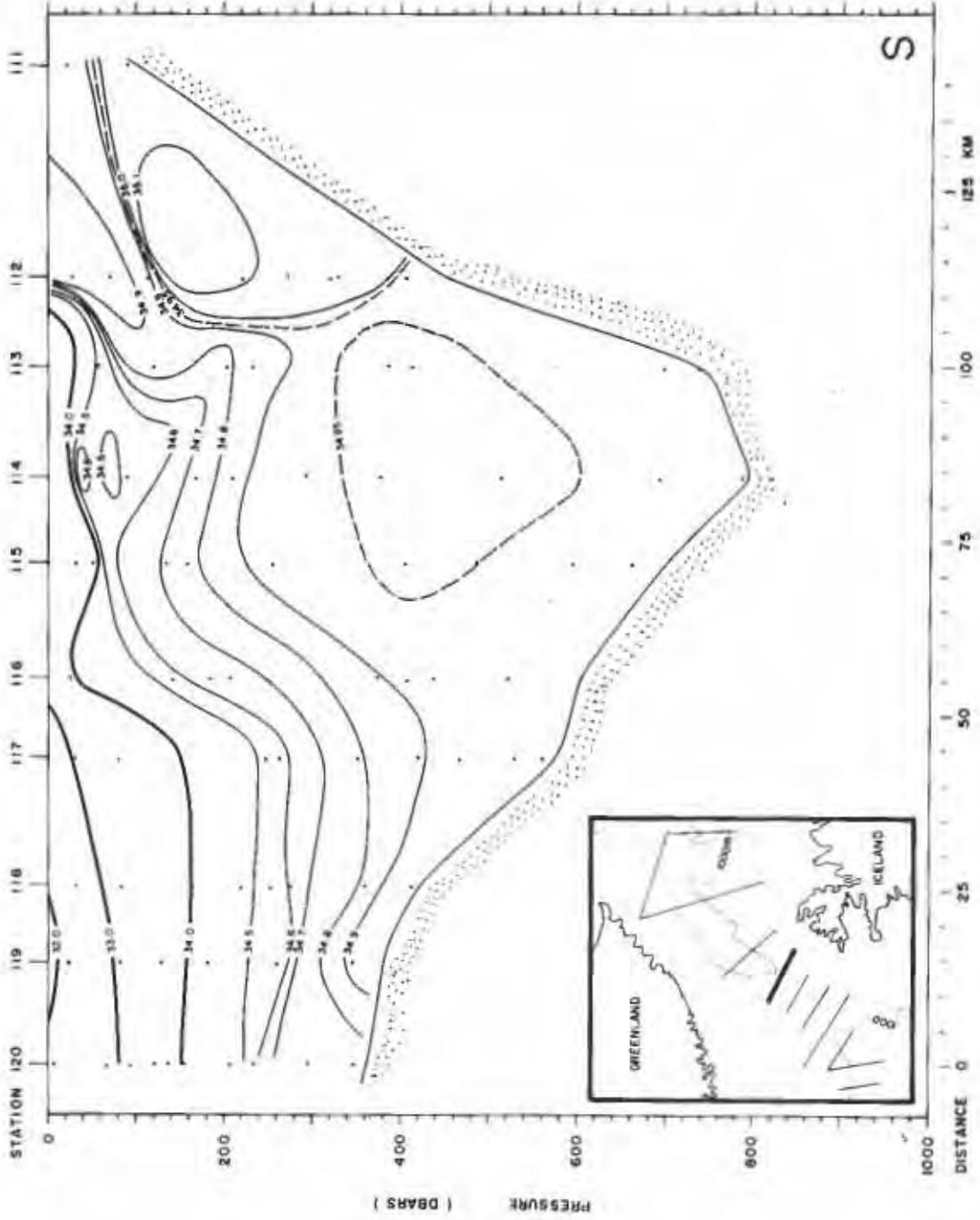
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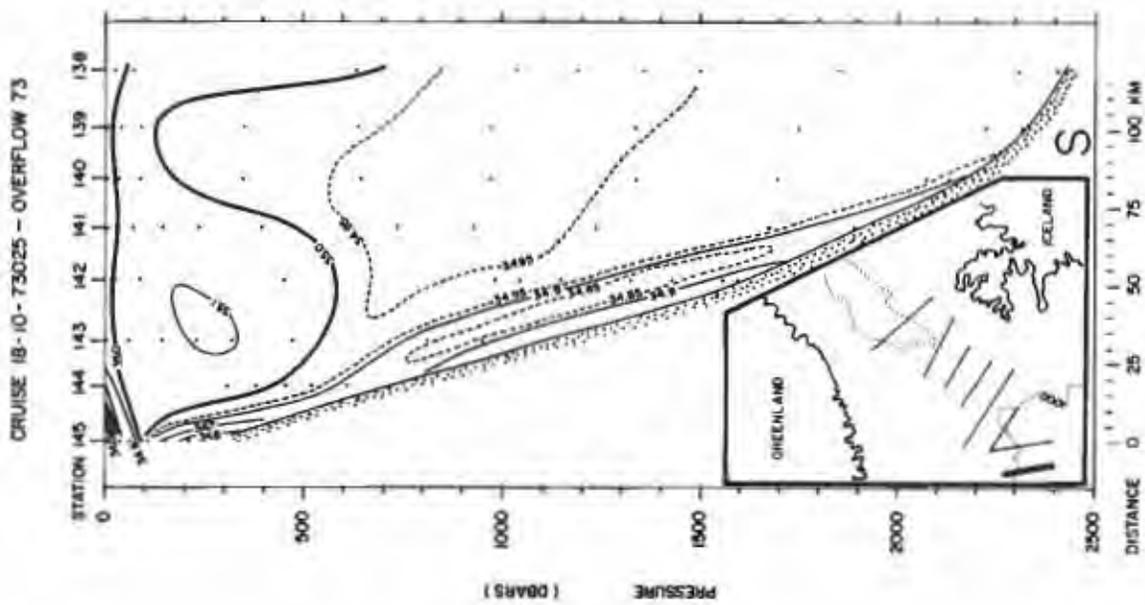


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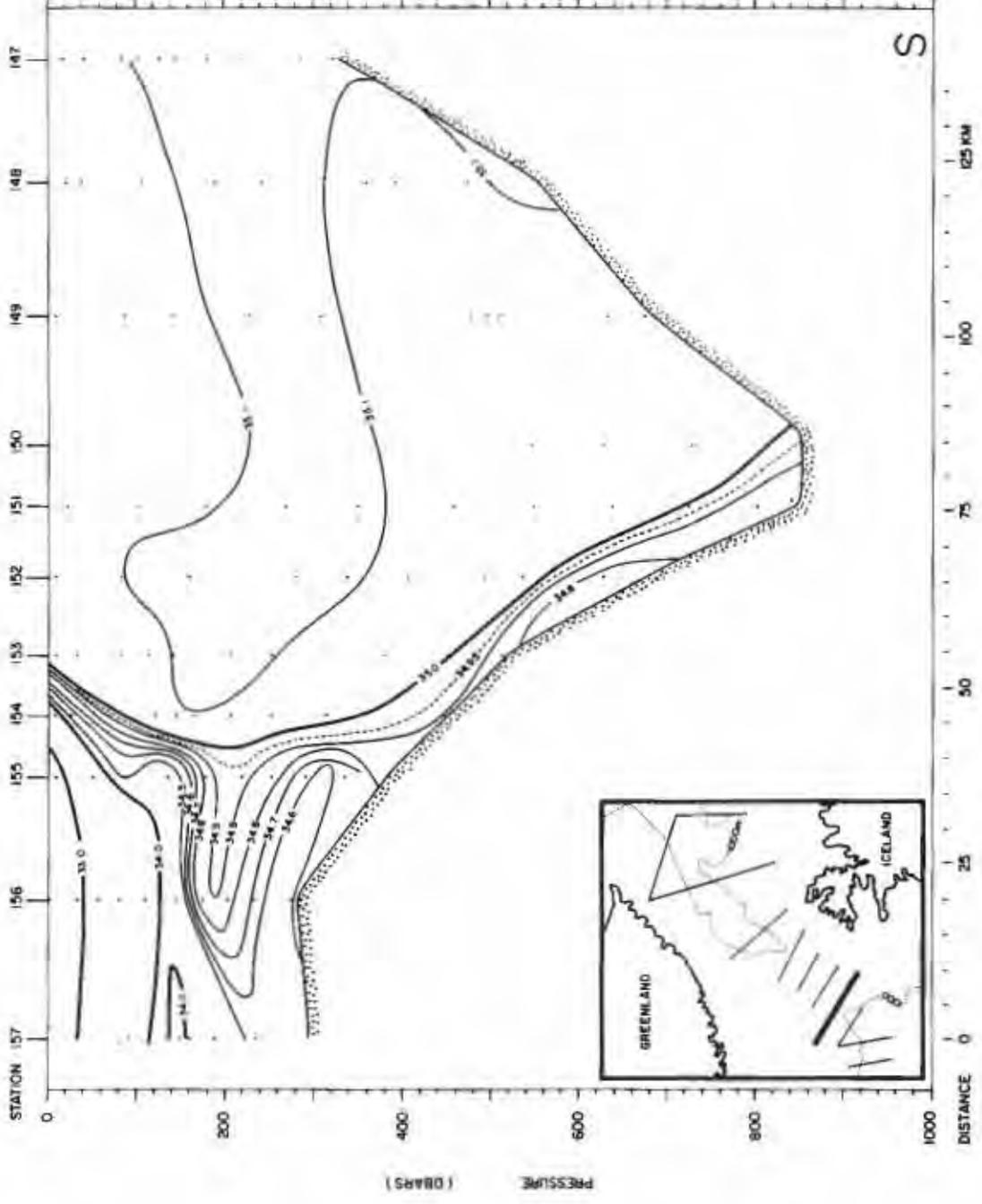


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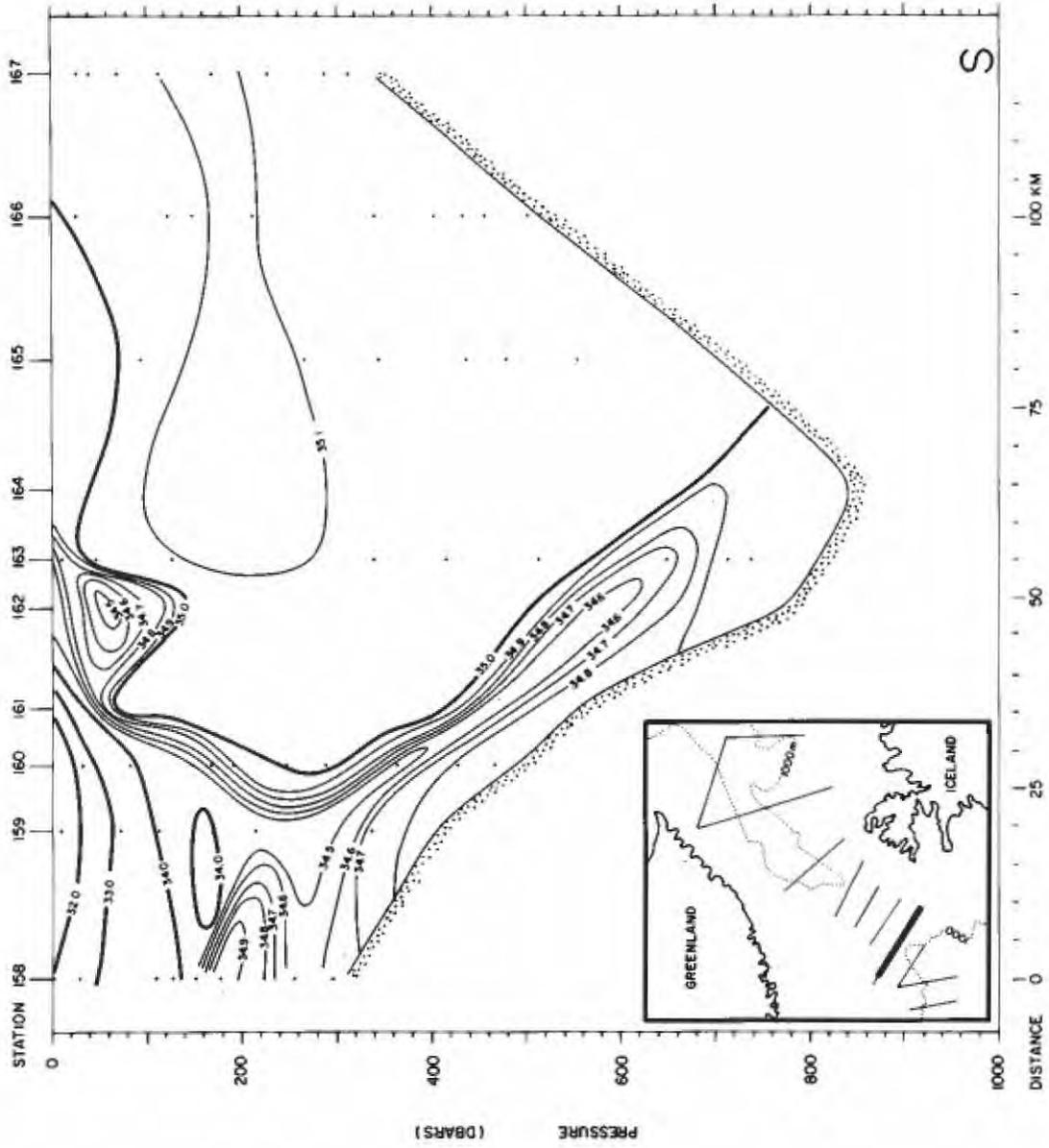




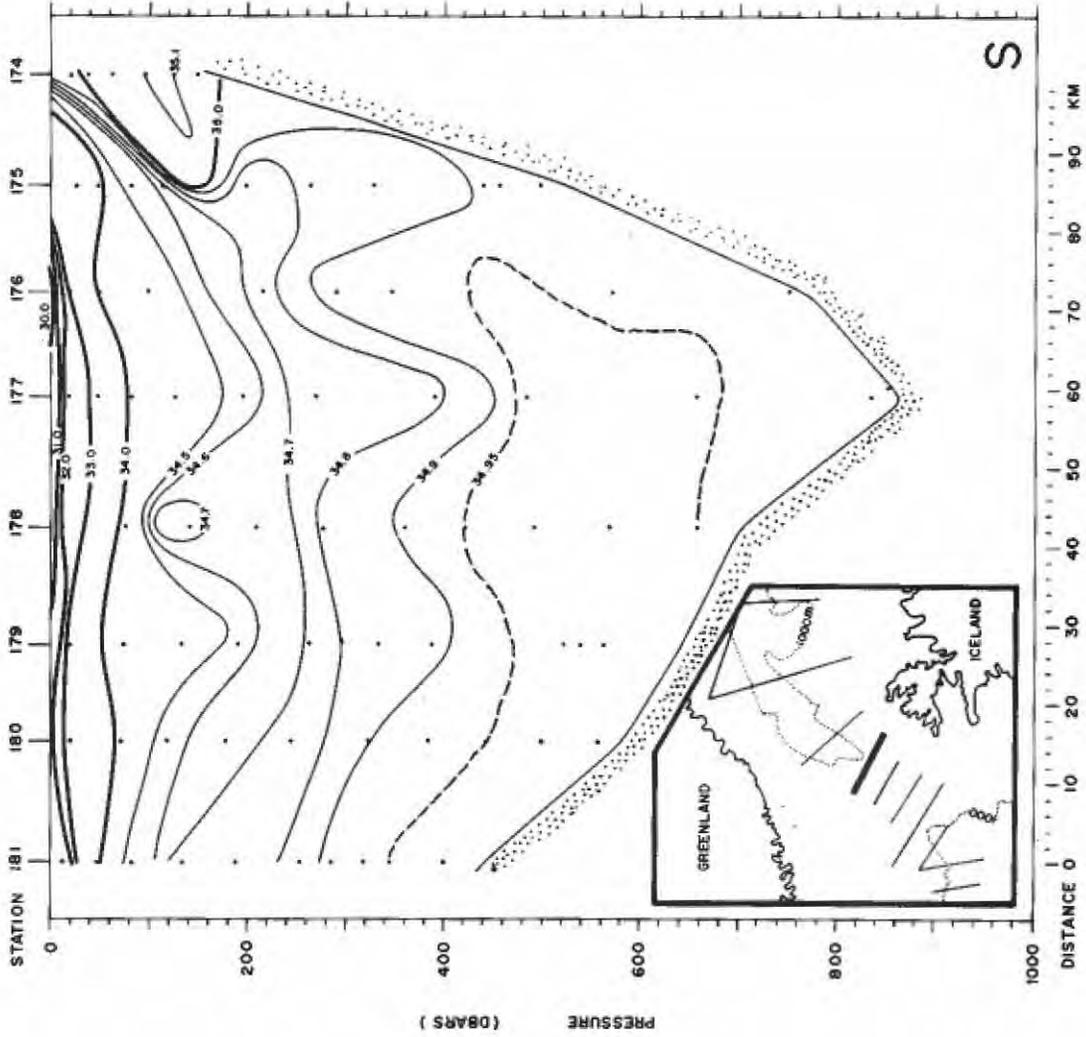
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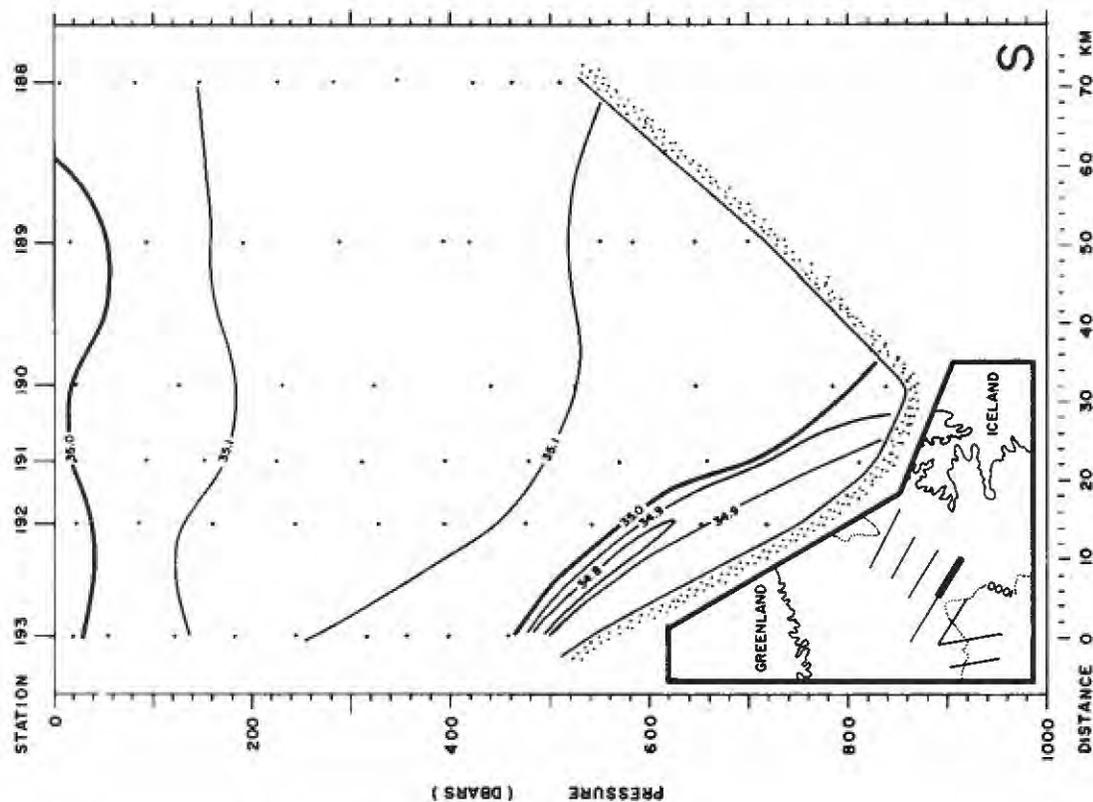
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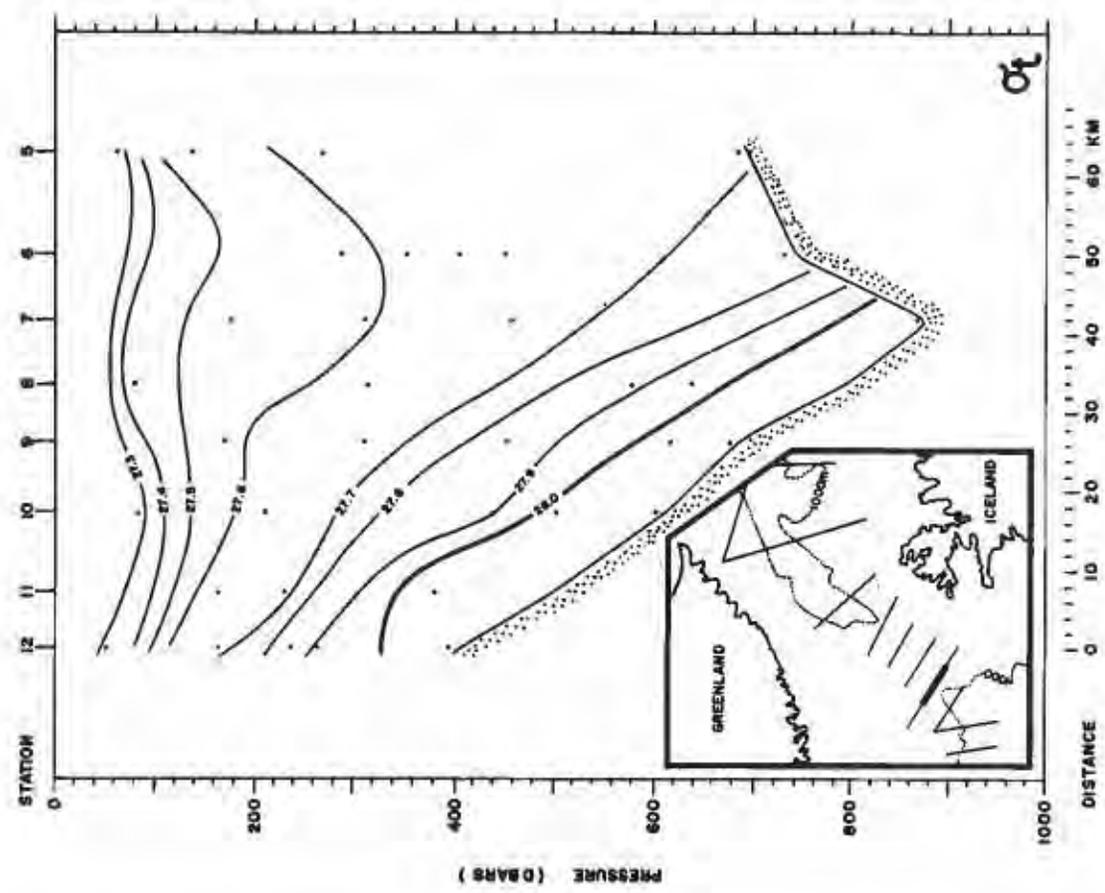
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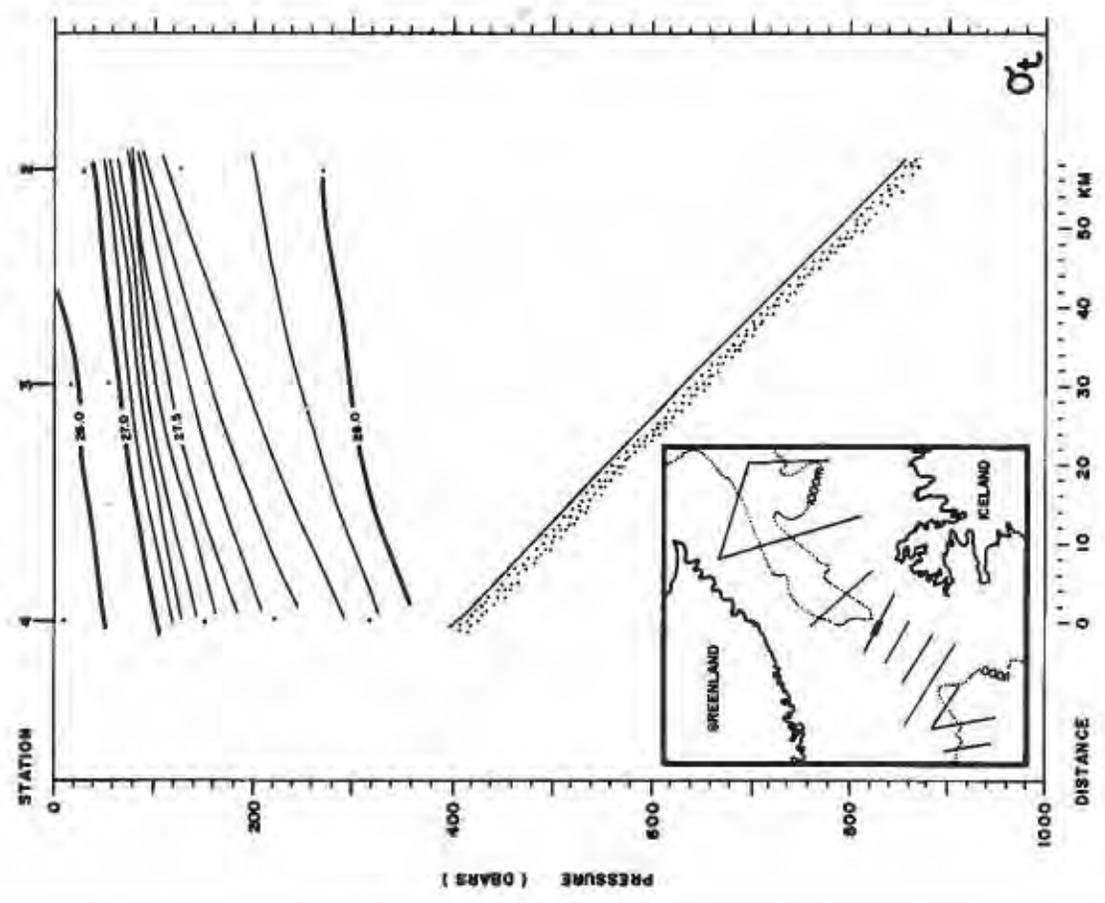
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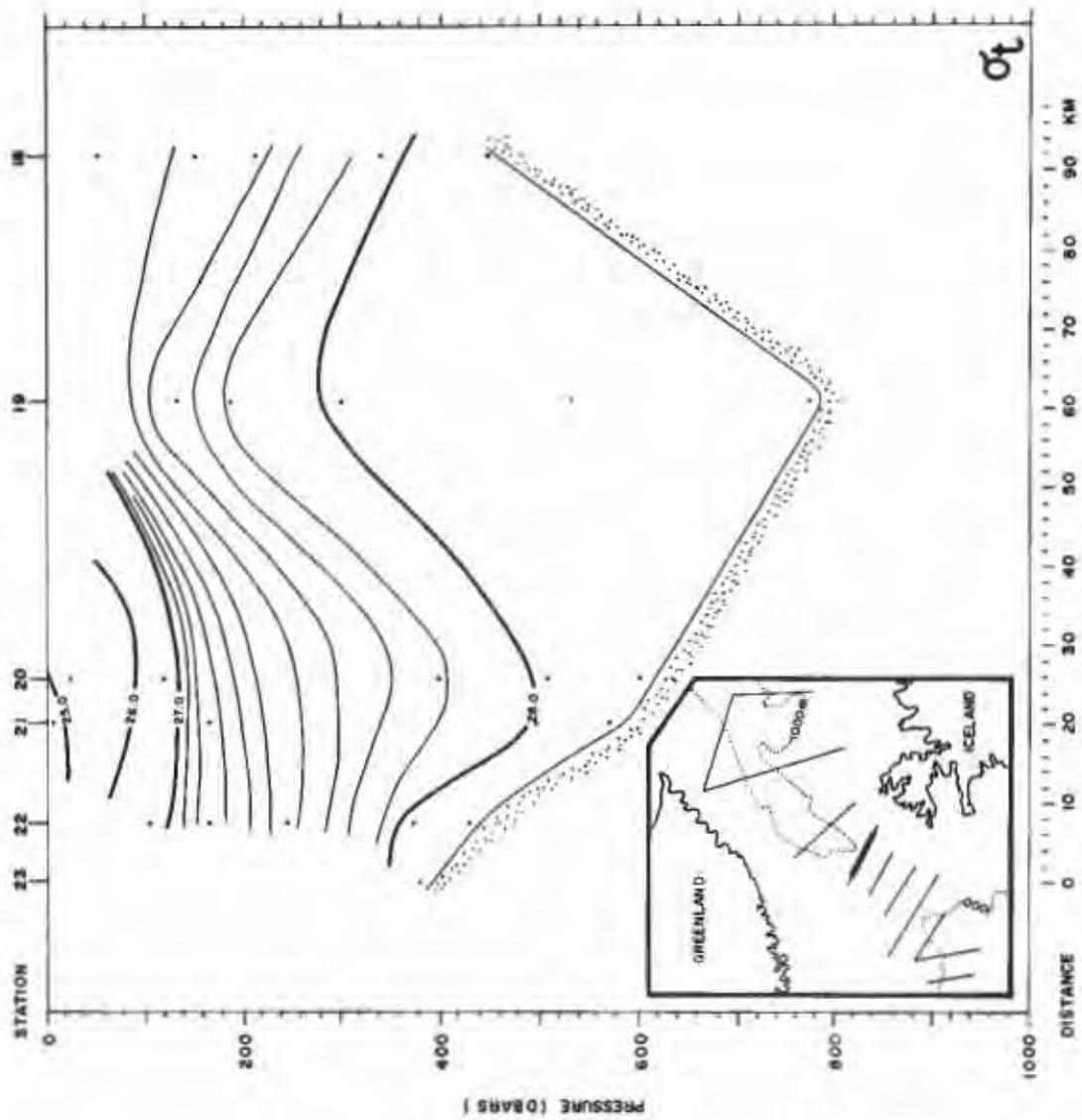
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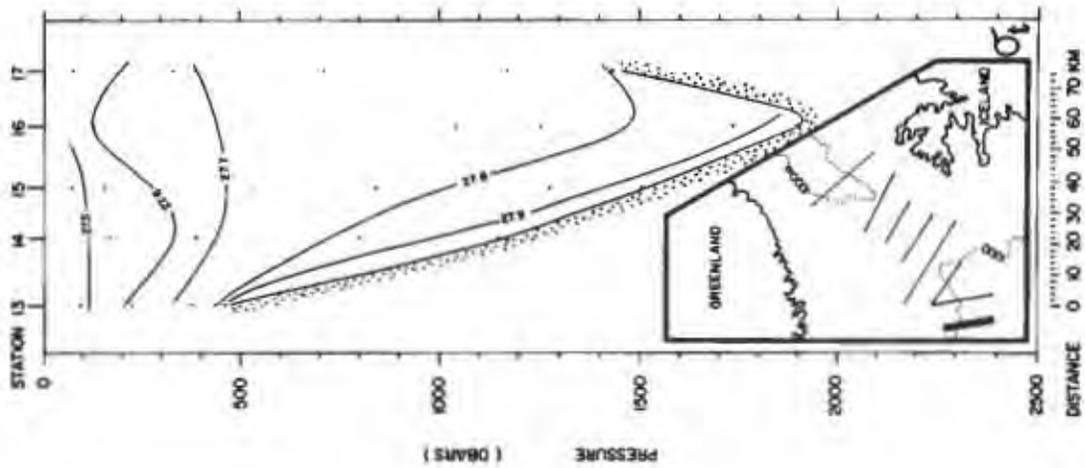
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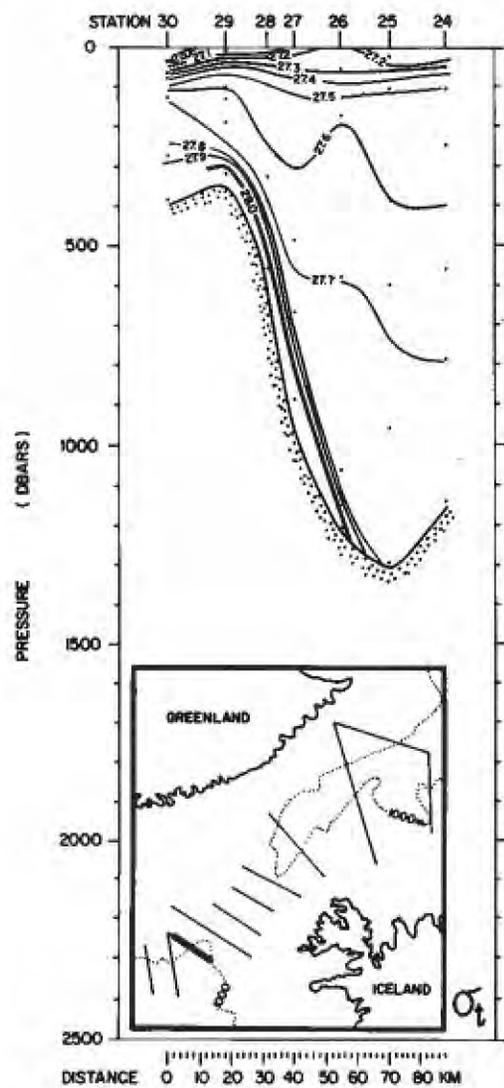
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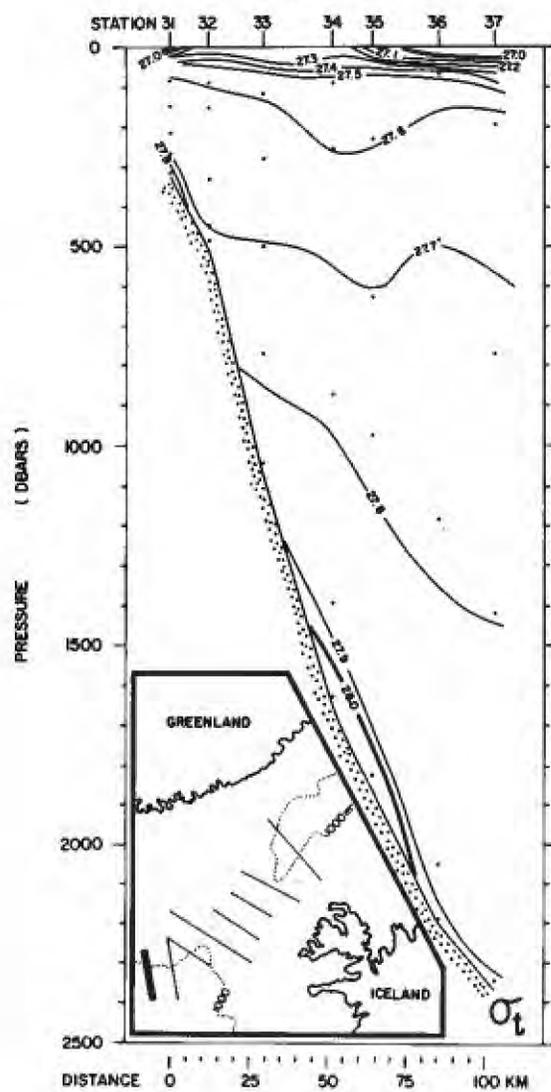
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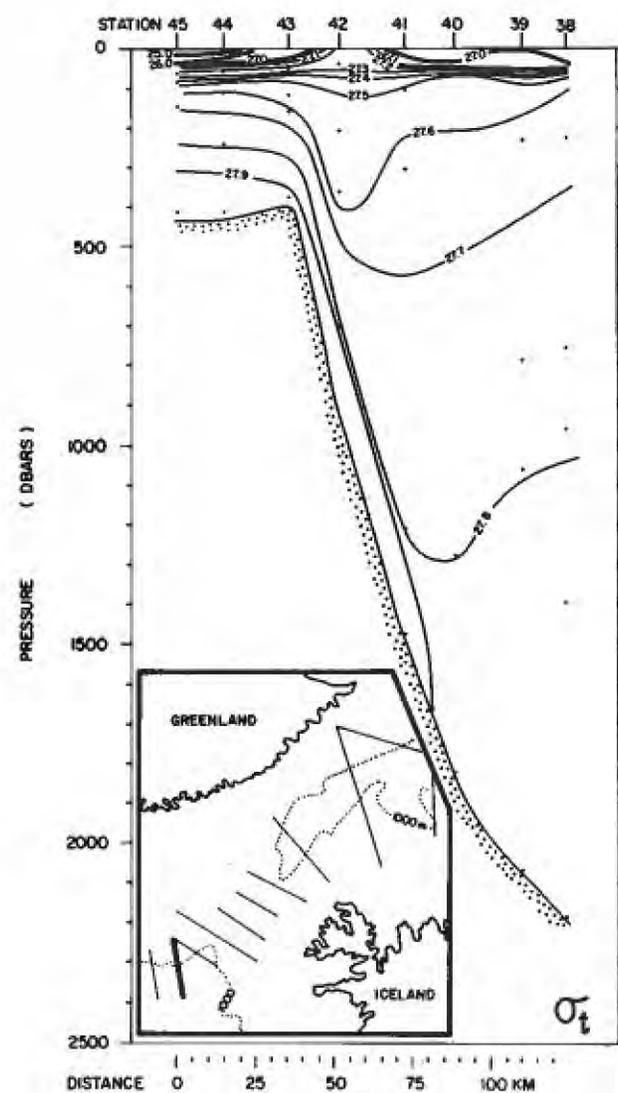
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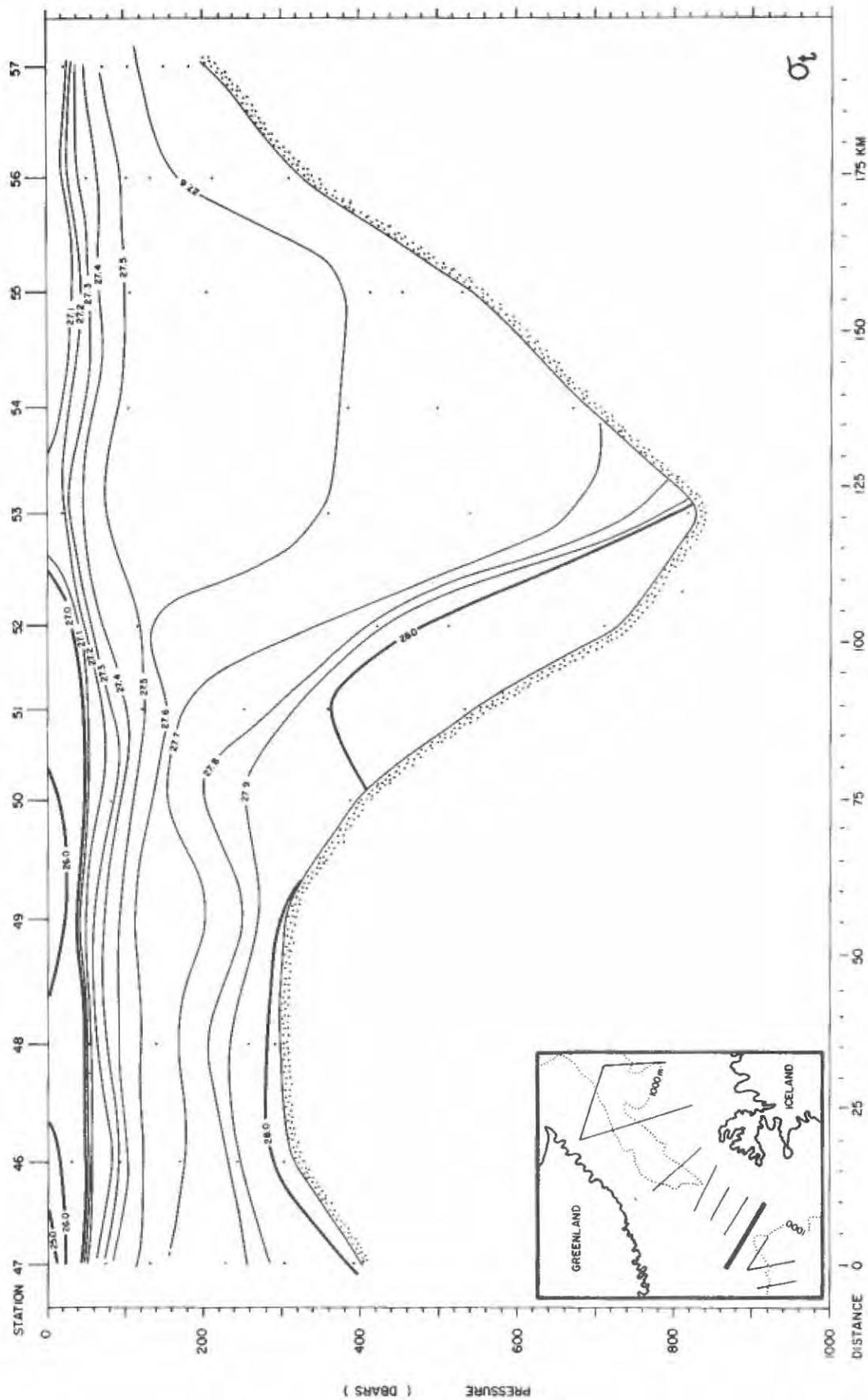
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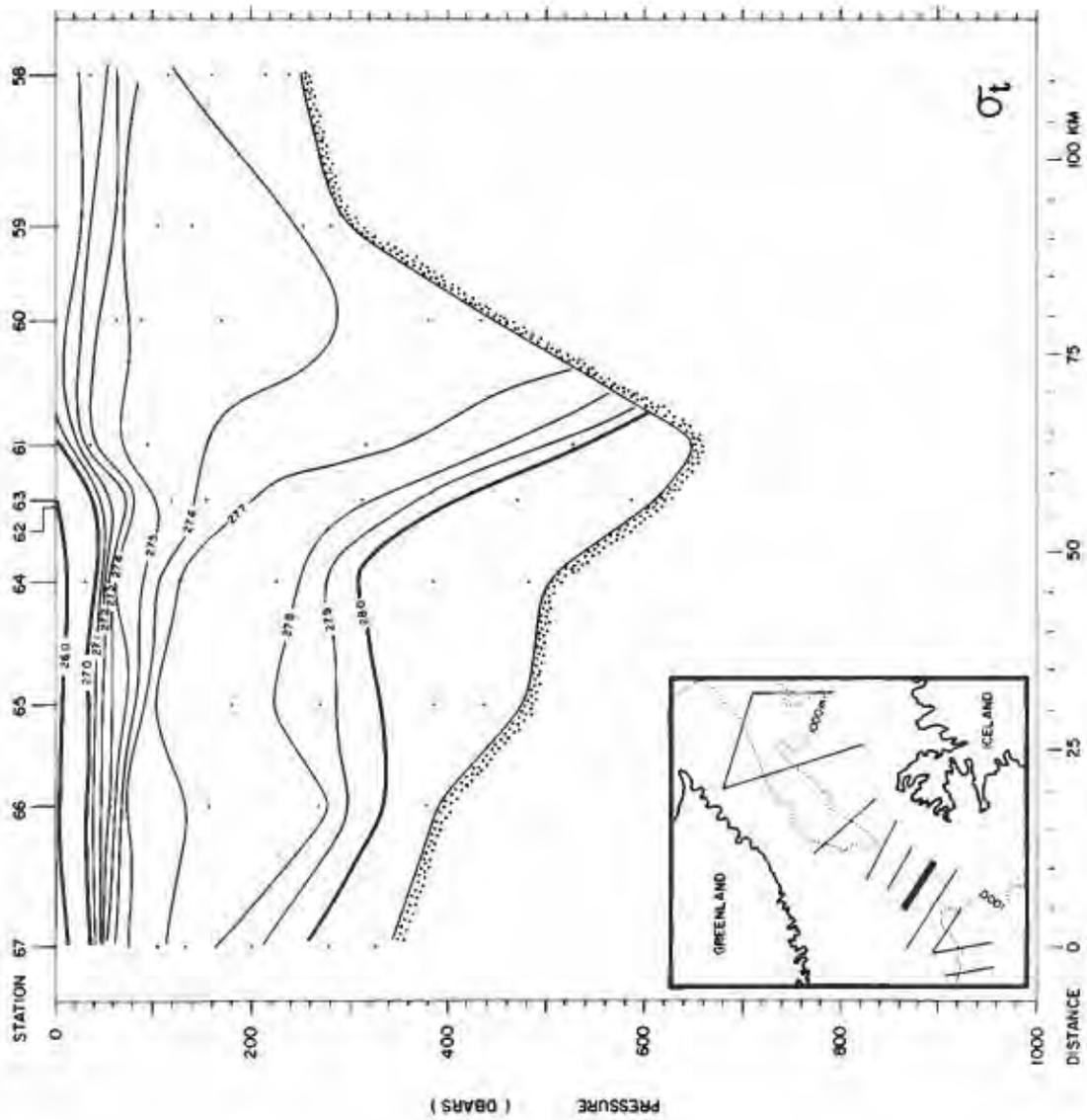
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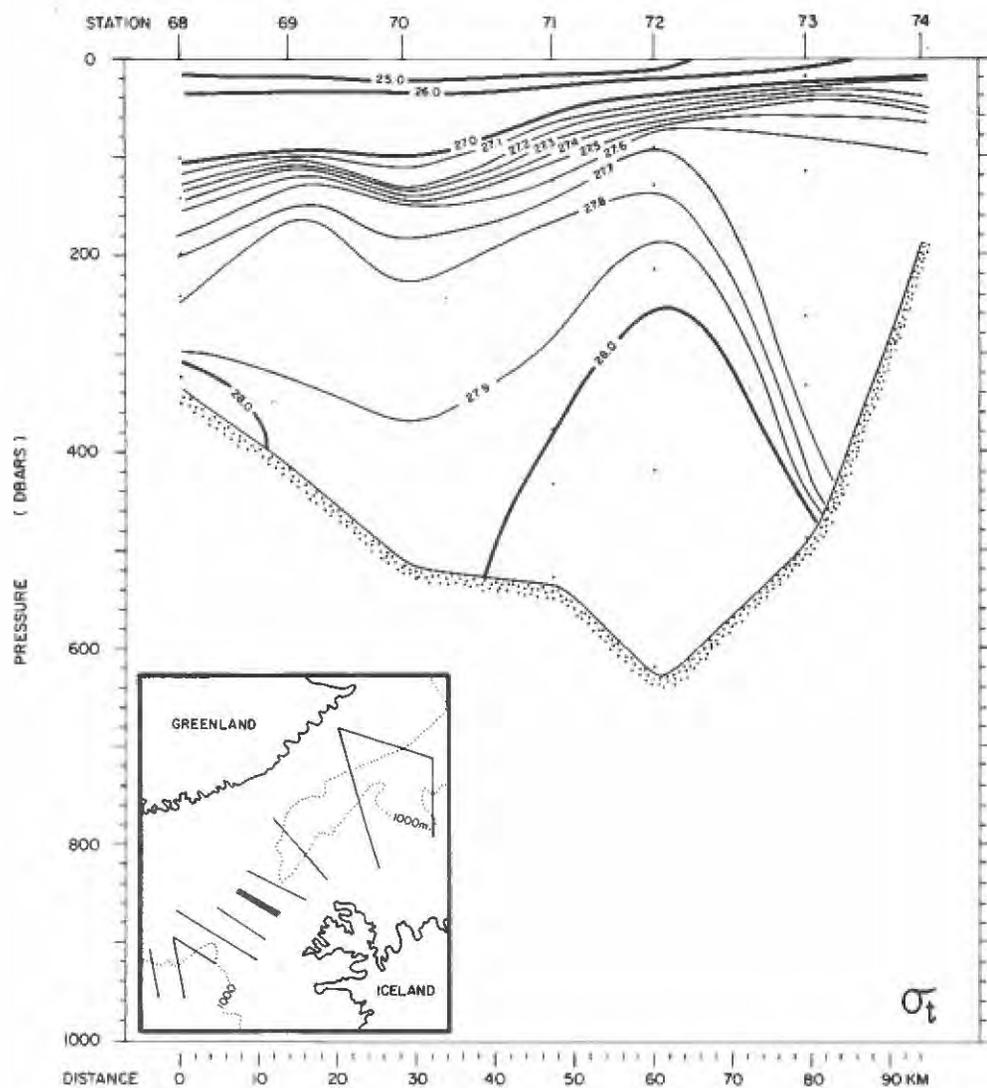
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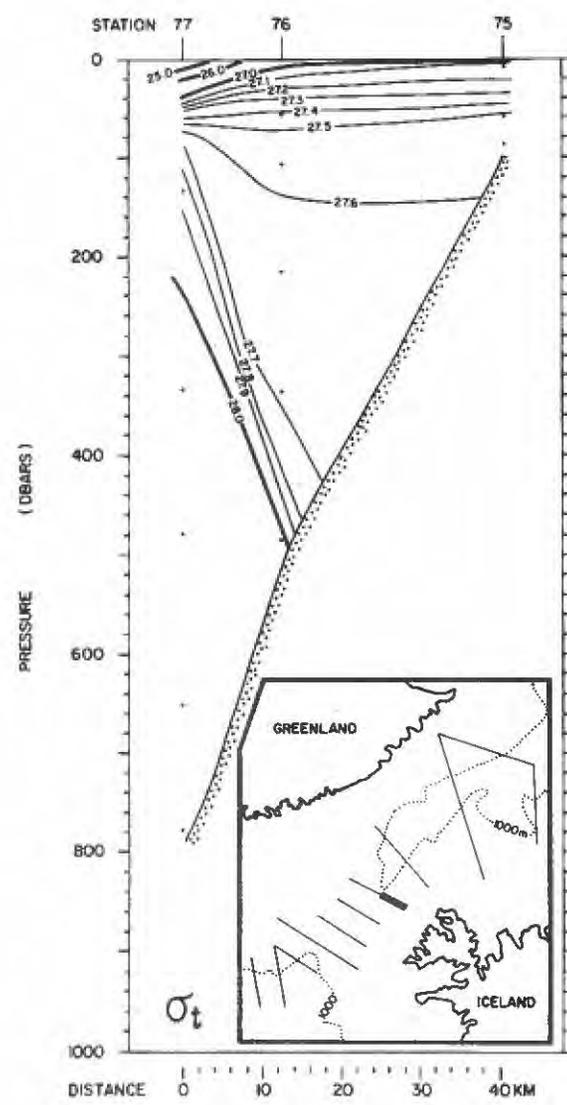
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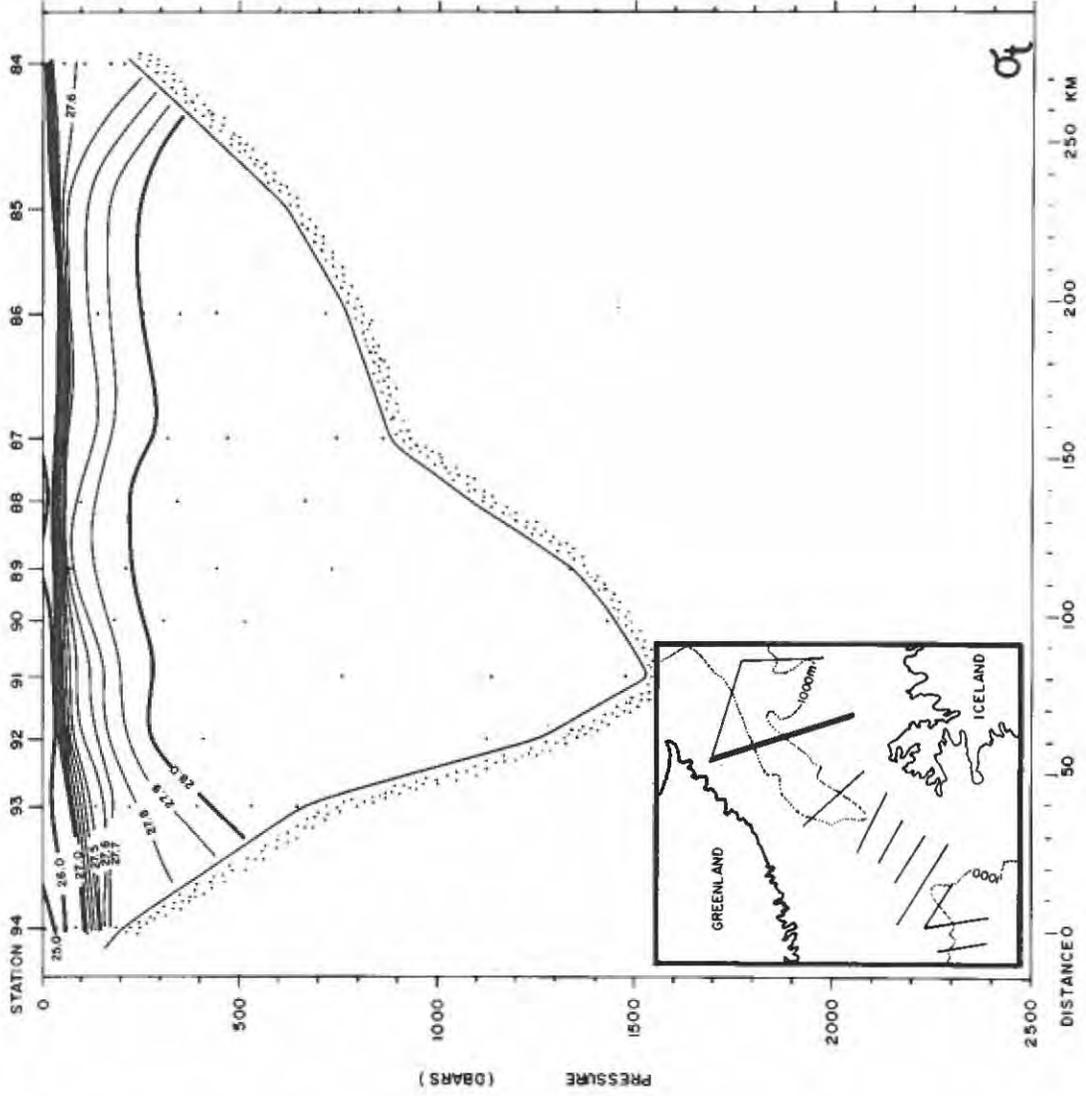
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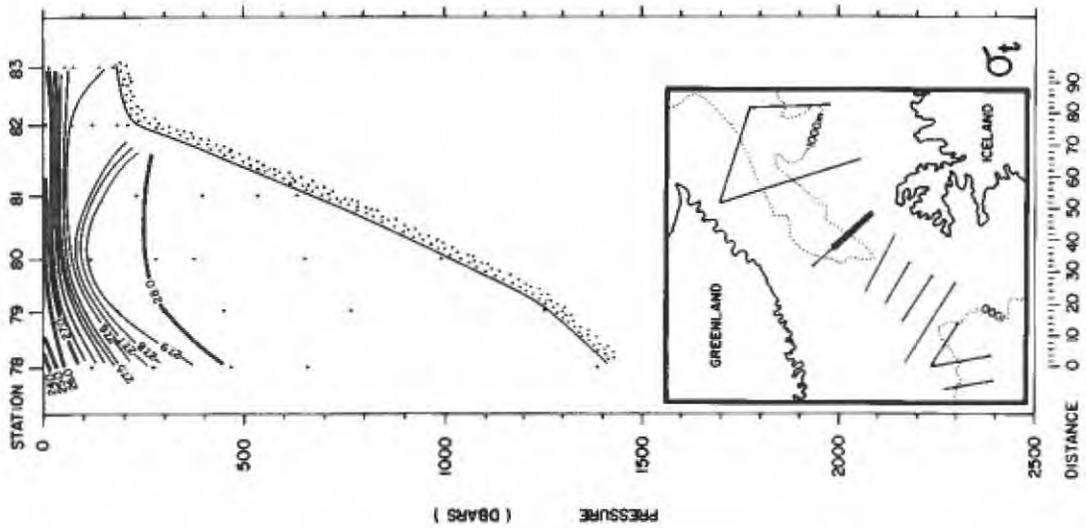
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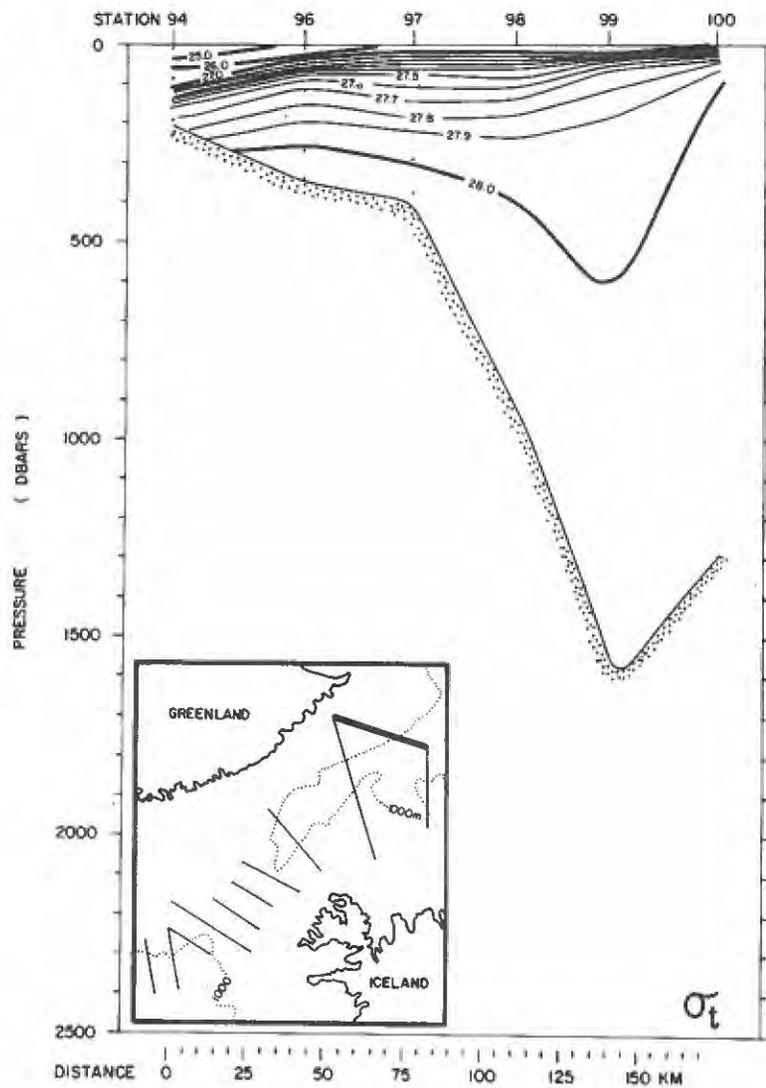
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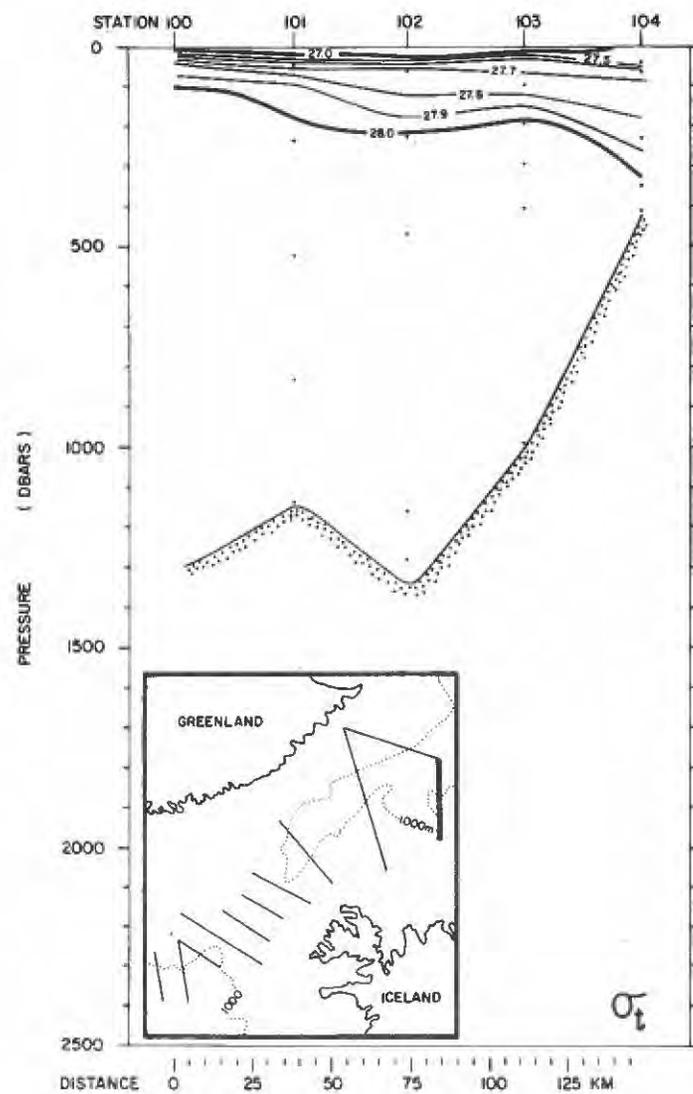
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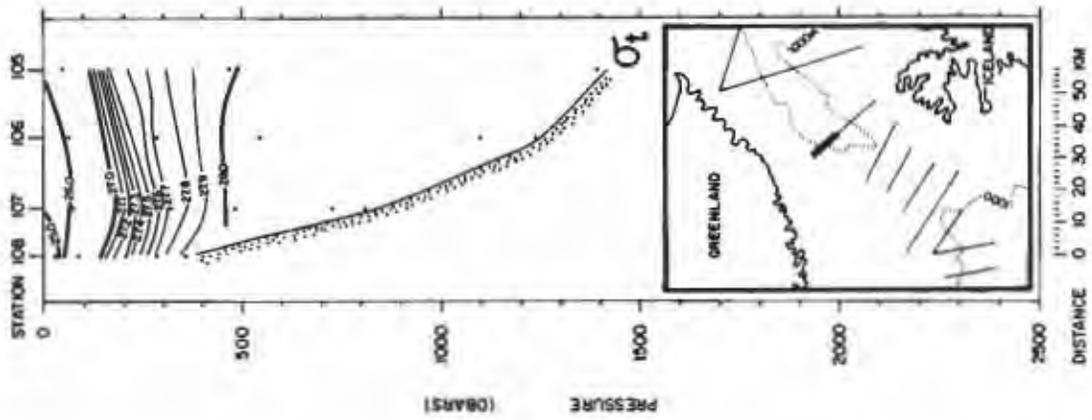
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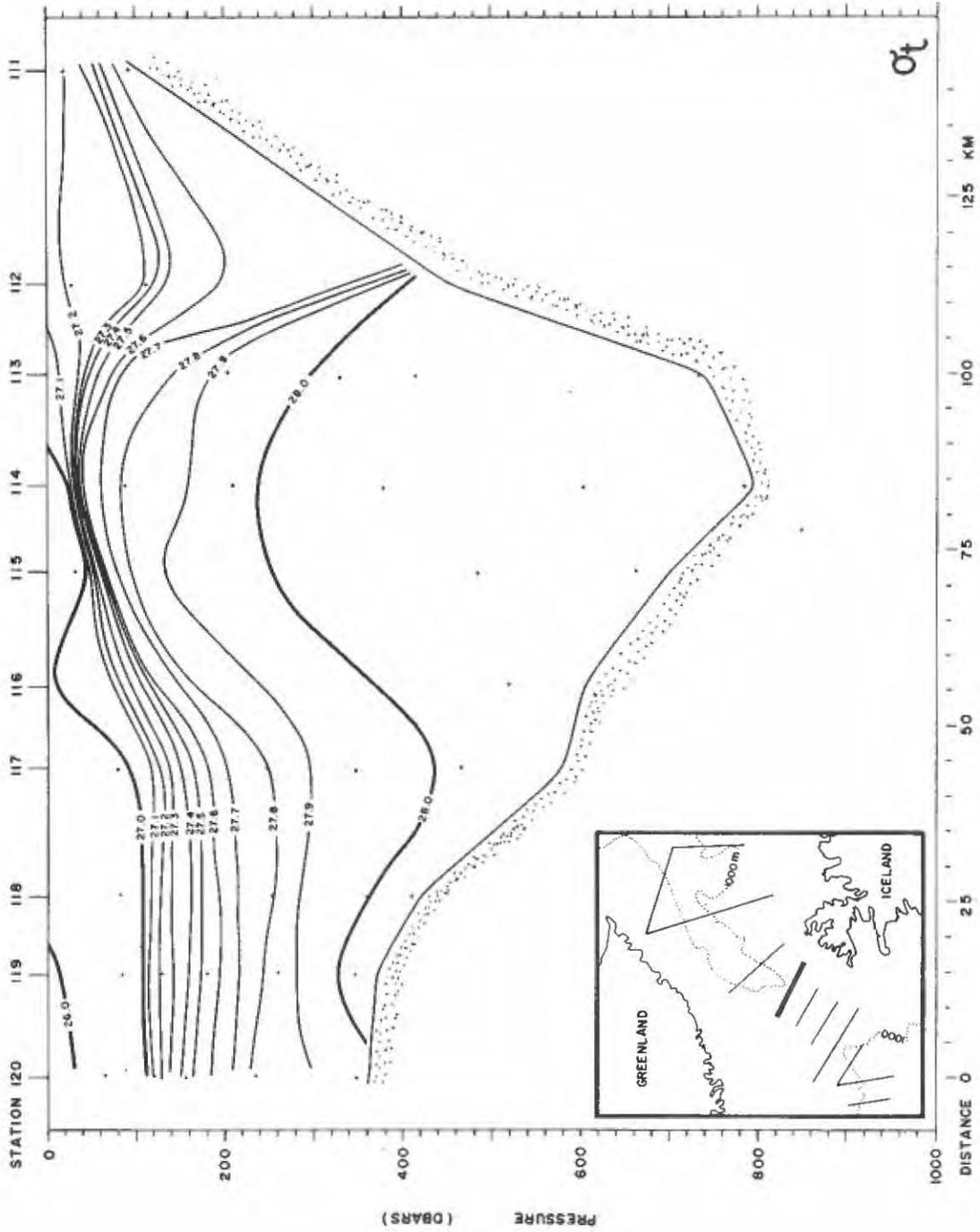
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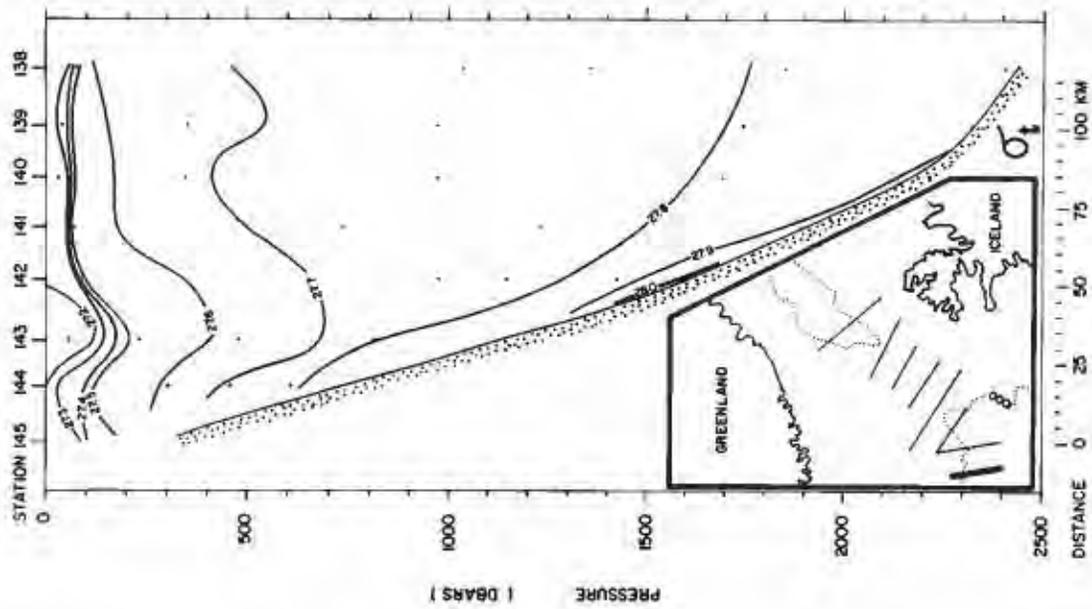
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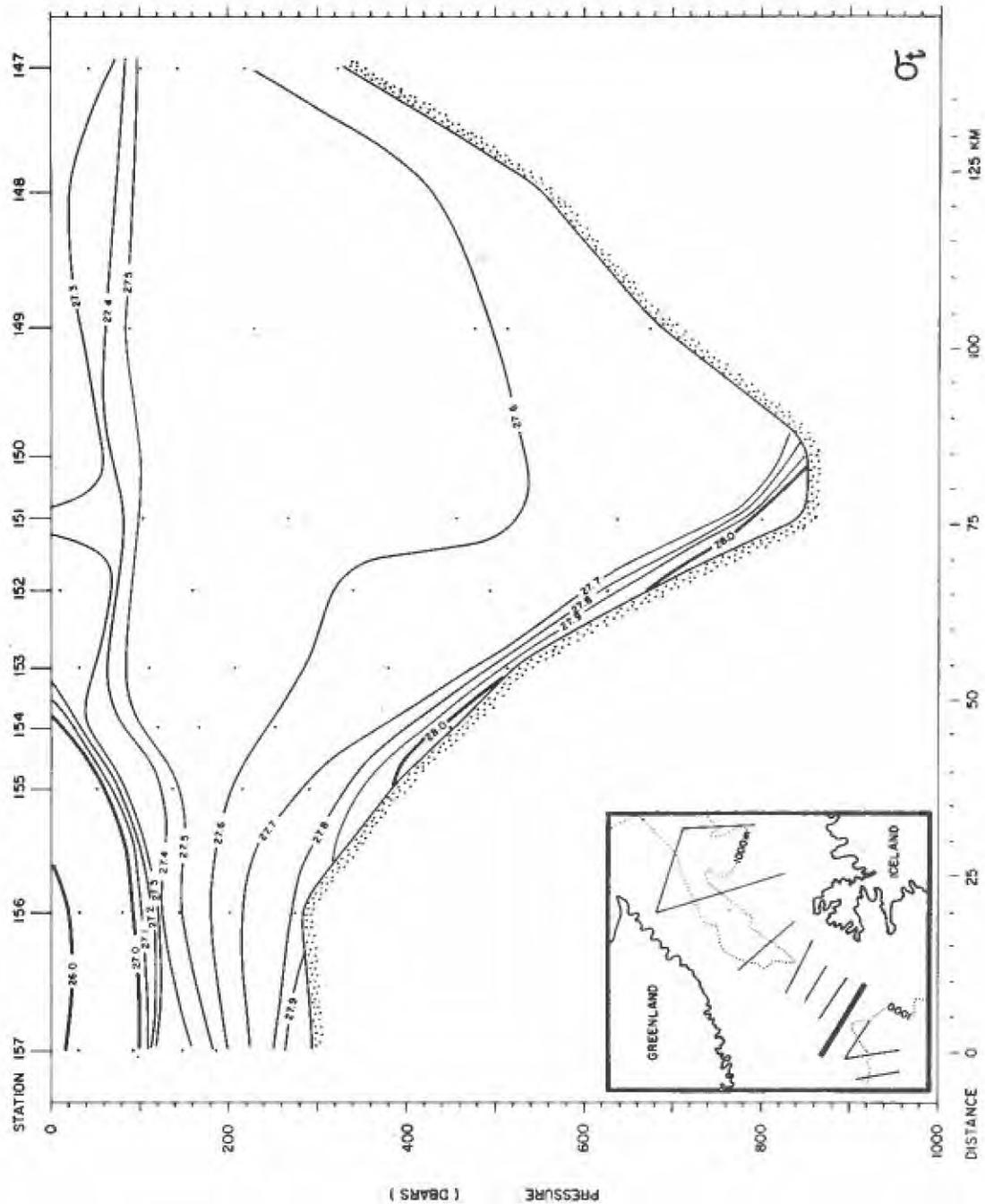
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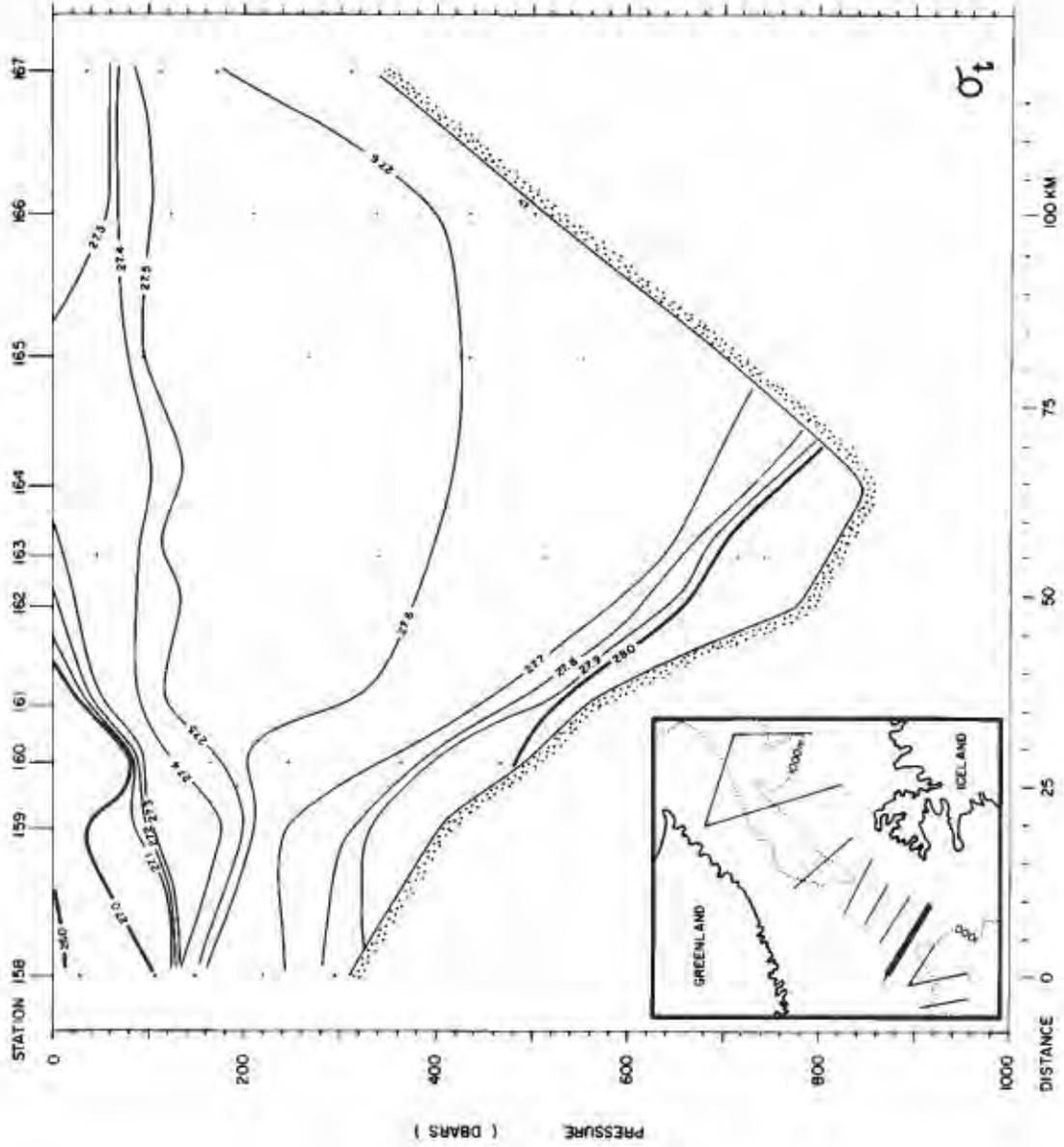
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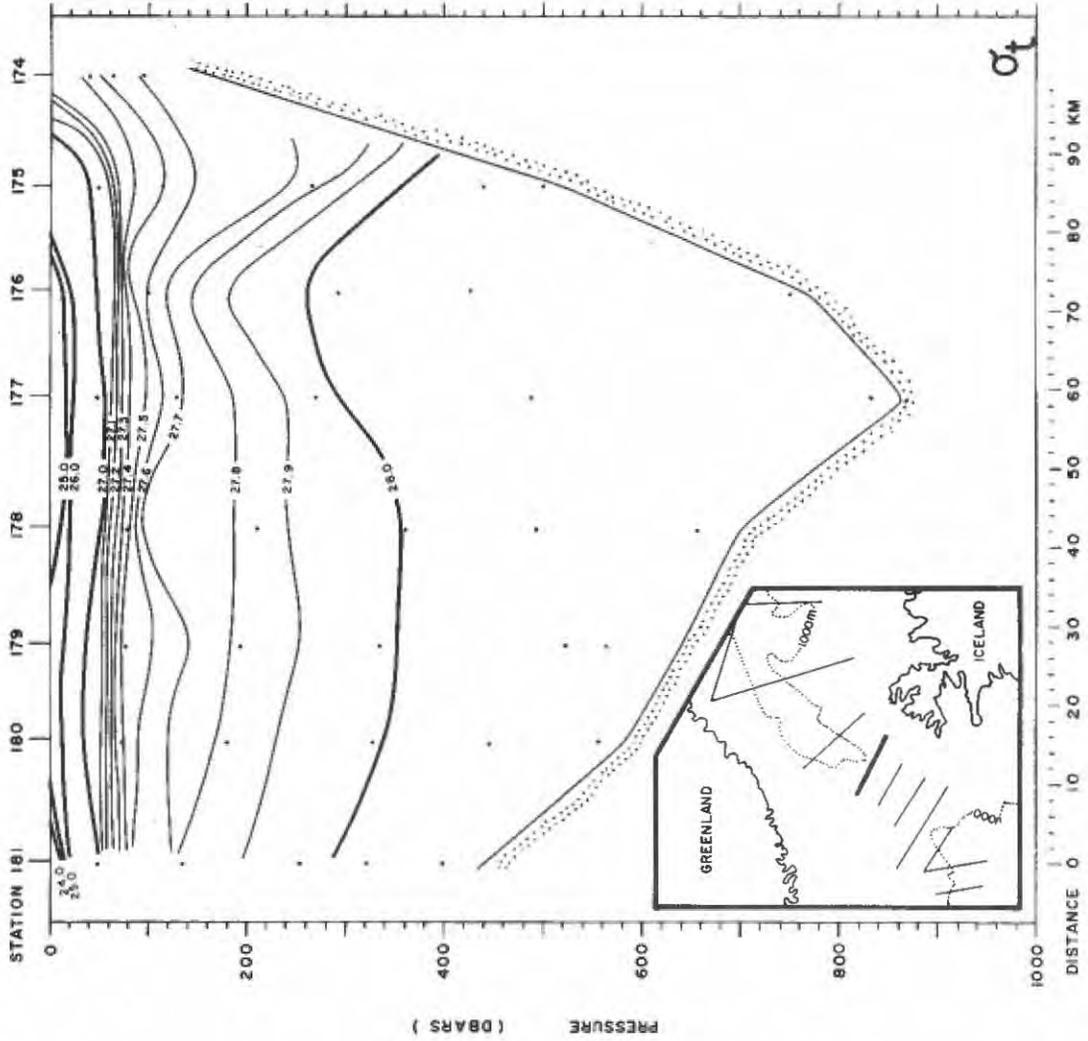
CRUISE 18-10-73025 - OVERFLOW 73



CRUISE 18-10-73025 - OVERFLOW 73



CRUISE 18-10-73025-OVERFLOW 73



CRUISE 18-10-73025-OVERFLOW 73

