



Serial No. 3912
(D.c.1)

ICNAF Res.Doc. 76/VI/92

ANNUAL MEETING - JUNE 1976

Hydrographic conditions off West Greenland and on the East Greenland shelf during the summer of 1975

by

M. Stein
Bundesforschungsanstalt für Fischerei
Institut für Seefischerei, Hamburg, FRG

Introduction

Between July 29th, 1975 and August 15th, 1975 hydrographic investigations were performed from board of *R/V Walter Herwig* in ICNAF Division 1 D, 1 E and 1 F as well as on the East Greenland Shelf. The measurements consist of Nansen casts and BT-records. According to the recommendations of the ICNAF (Environmental Subcommittee) four standard sections off West Greenland were completed:

- 29.7.75 Cape Farwell (4)
- 31.7./1.8.75 Frederikshaab Bank (5)
- 4.8.75 Fyllas Bank (6)
- 7.8.75 Cape Desolation (4)

The numbers in brackets refer to the amount of hydrographic stations on each section. All surface measurements were used to plot a horizontal distribution of temperature and salinity (Figs. 2,3). In addition the readings of a thermograph were taken for the surface temperature chart. At each fishing station a bottomwater sample was taken; the results are given in Figs. 4,5. Figs. 6 to 9 show the mean vertical distribution of temperature and salinity on the standard sections. The cruise track and the location of the hydrographic sections is plotted in Fig. 1.

Horizontal distribution of temperature and salinity

All surface and bottom measurements of temperature and salinity were taken to draw horizontal charts of both parameters. The mean temperature distribution at the sea surface (Fig. 2) shows very clearly the meandering path of the Polar Front which follows the continental margin. Off West Greenland this frontal zone

broadens when going northward. Even the bottom measurements (Fig. 5) reveal this sharp boarder between the two components of the West- and East Greenland current system: The curvature of the isohalines follows the mean shape of the bottom contours.

The vertical distribution of temperature and salinity

Off West Greenland four hydrographic standard sections have been completed. Due to ice conditions the inner station of section I and II (Cape Farewell, Cape Desolation) were omitted. In detail the following stations have been worked out:

Table 1: List of Standard Oceanographic Stations off West Greenland

<i>Section Name</i>	<i>Latitude</i>	<i>Longitude</i>	<i>Stat.No.</i>
<i>Cape Farewell (I)</i>	58°46'N	45°50'W	1
	59 00	45 20	2
	59 16	44 46	3
	59 24	44 35	4 *
<i>Cape Desolation (II)</i>	60 02	51 27	61
	60 15	50 44	62
	60 28	50 00	63
	60 43	49 17	64 *
<i>Frederikshaab (III)</i>	61 34	52 30	9 *
	61 41	51 45	10 *
	61 47	51 09	11 *
	61 52	50 35	17
	61 57	50 00	18
<i>Fyllas Bank (IV)</i>	63 45	54 30	41
	63 48	53 56	42
	63 53	53 22	43
	63 55	53 07	44
	63 58	52 44	45
	64 02	52 20	46 *

(the asterik characterizes non-standard stations)

The influence of the arctic component of the West Greenland Current on the vertical structure of the water column becomes apparent on section I, II and III. Thus the nearshore part of all sections shows a distinct frontal zone, whereas on section IV only a core of cold water is visible on the western slope of the Fyllas Bank.

Since the measurements extend down to 1200m only the upper part of the Labrador Sea water was observed (3,4°C potential temperature, 34,89 o/oo).

July temperature and salinity changes on the Fyllas Bank

The amount of temperature and salinity changes on the Fyllas Bank is estimated at stat. 43 (63°53'N, 53°22'W). Since the German measurements are very scarcely in this area during summer, Danish observations on the same position are used as reference values

(Hermann 1967). Although these values represent the mean conditions for July, the comparison shows the trend of the data collected at August 4 th, 1975. Additionally a set of German data- observed on the same position at July 25 th, 1968 is listed in Table 2:

Table 2: Deviations of temperature and salinity at stat. 43 (63°53'N, 53°22'W) on the slope of Fyllas Bank; mean values from 1950-66

a) $T^{\circ}C$

Depth range	\overline{T}_{July}	1968 25.7.68	1975 4.8.75	ΔT_{68}	ΔT_{75}
0-50	2.07	1.39	1.90	-0.68	-0.17
50-100	1.33	0.39	0.45	-0.94	-0.88
100-200	1.85	1.19	2.00	-0.66	0.15
200-300	2.88	2.80	4.05	-0.08	1.17
300-400	3.79	3.57	4.48	-0.22	0.69
400-500	4.22	3.76	4.23	-0.46	0.01
0-500	2.89	2.12	2.60	-0.77	-0.29

b) S o/oo

Depth range	\overline{S}_{July}	1968 25.7.68	1975 4.8.75	ΔS_{68}	ΔS_{75}
0-50	33.29	32.86	32.37	-0.43	-0.92
50-100	33.65	33.55	33.09	-0.10	-0.56
100-200	34.00	34.03	33.78	0.03	-0.22
200-300	34.39	34.46	34.57	0.07	0.18
300-400	34.67	34.75	34.80	0.08	0.13
400-500	34.81	34.84	34.83	0.03	0.02
0-500	34.27	33.69	33.40	-0.58	-0.87

Compared to the mean hydrographic situation as well as to the results from 1968 the measurements from 1975 yield a rather warm deep layer (200-400 m) whereas the stratum 50-100 m was colder than usual. The temperature was, however, not as low as in 1968 when a deviation of $-0.94^{\circ}C$ from the mean value was observed.

Large changes in salinity in the near surface layers indicate a strong influence of the arctic component of the West Greenland Current.

Altogether (0-500m) the deviation was negative in both years.

References

- Hermann, F. 1967: Temperature variations in the West Greenland area since 1950.
ICNAF Redbook 1967, Part IV,
p.76-85.

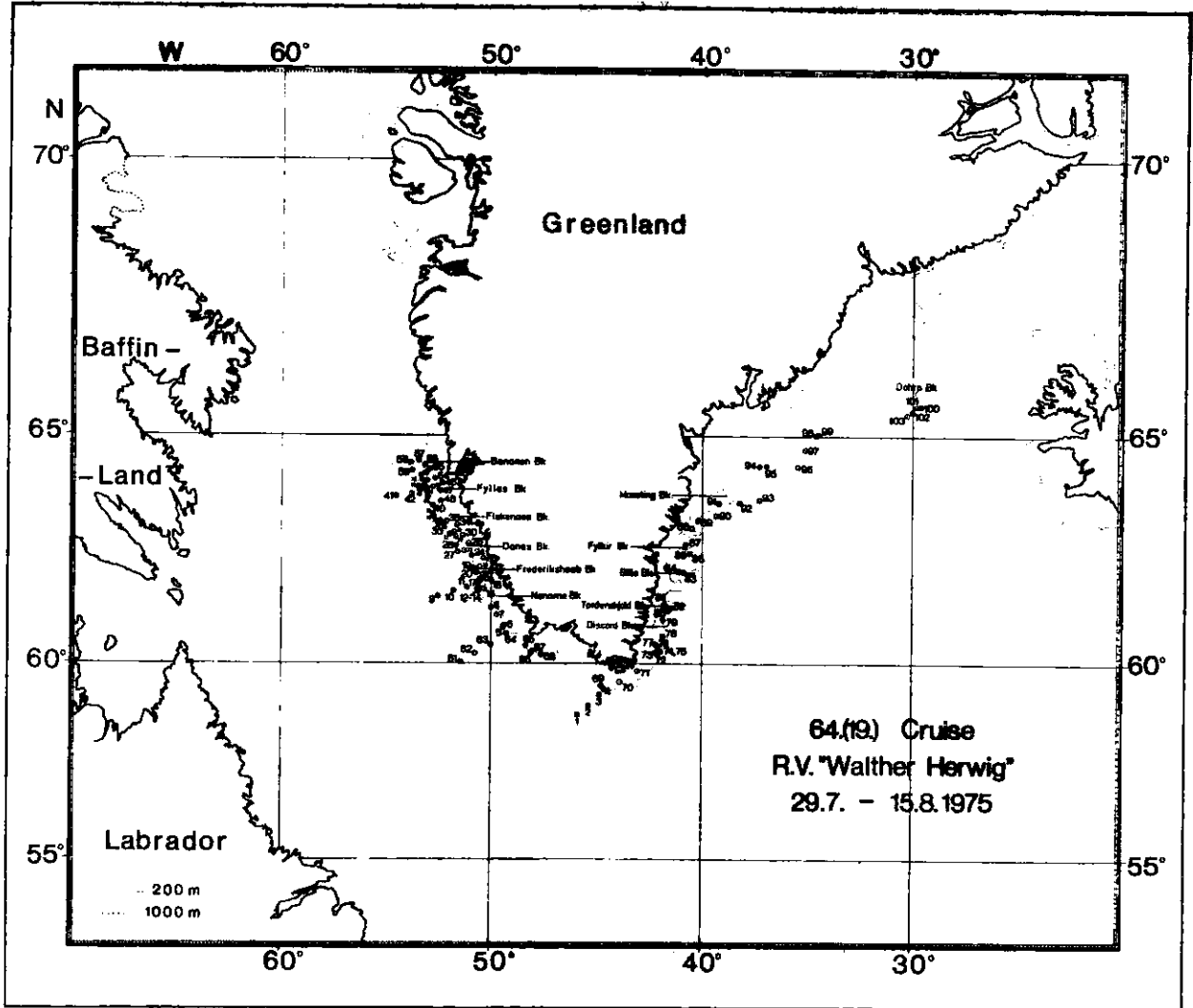


Figure 1.

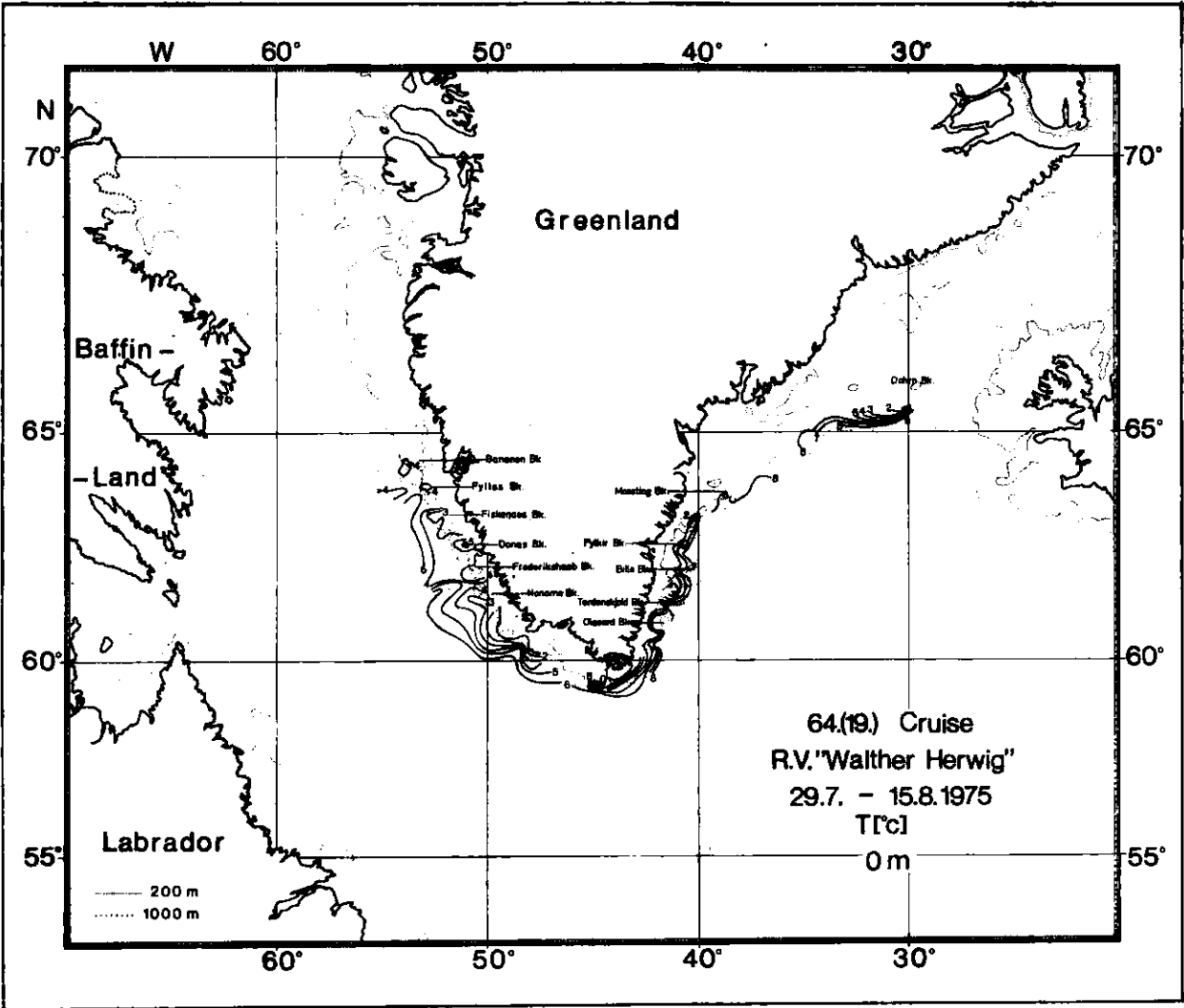


Figure 2.

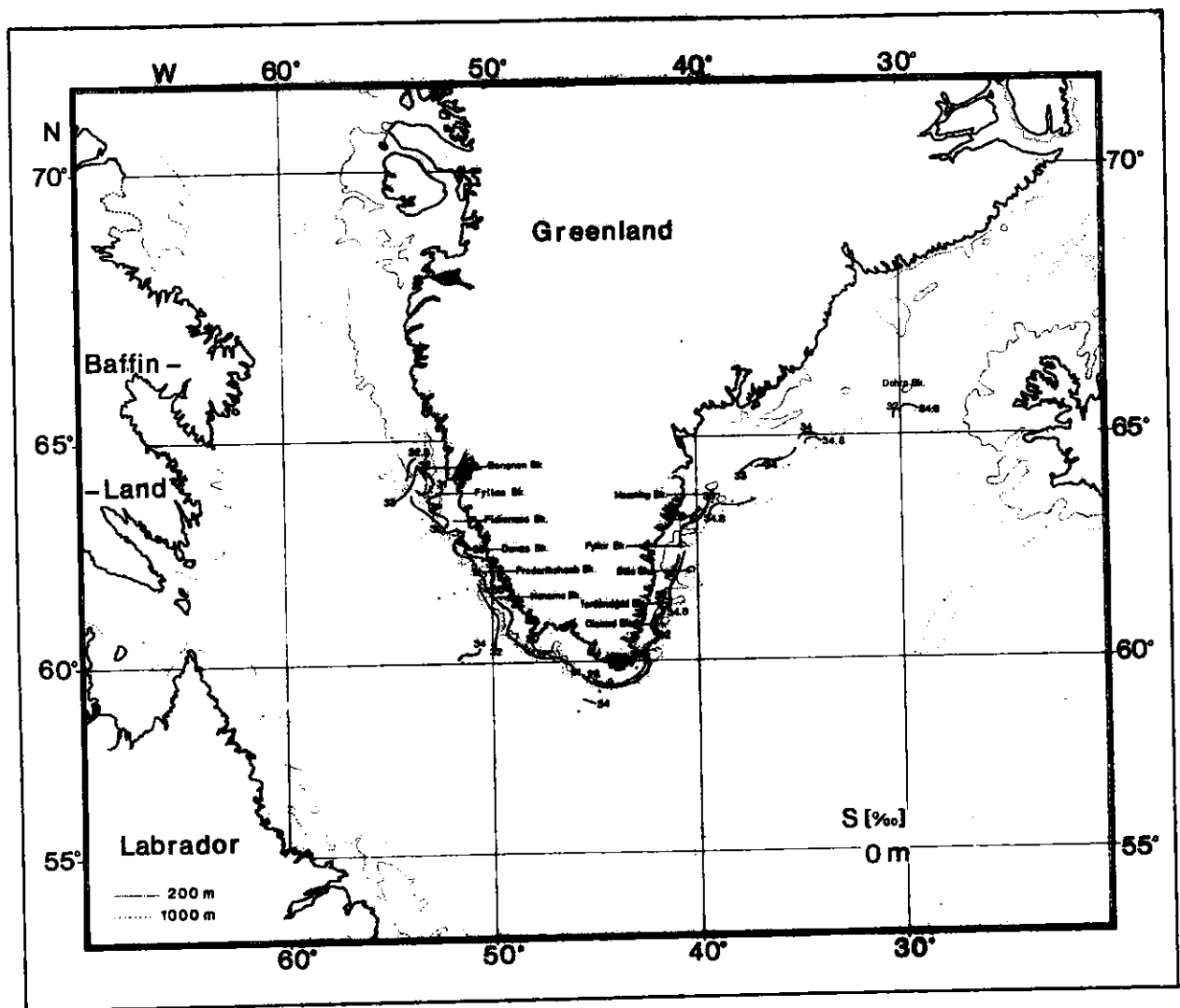


Figure 3.

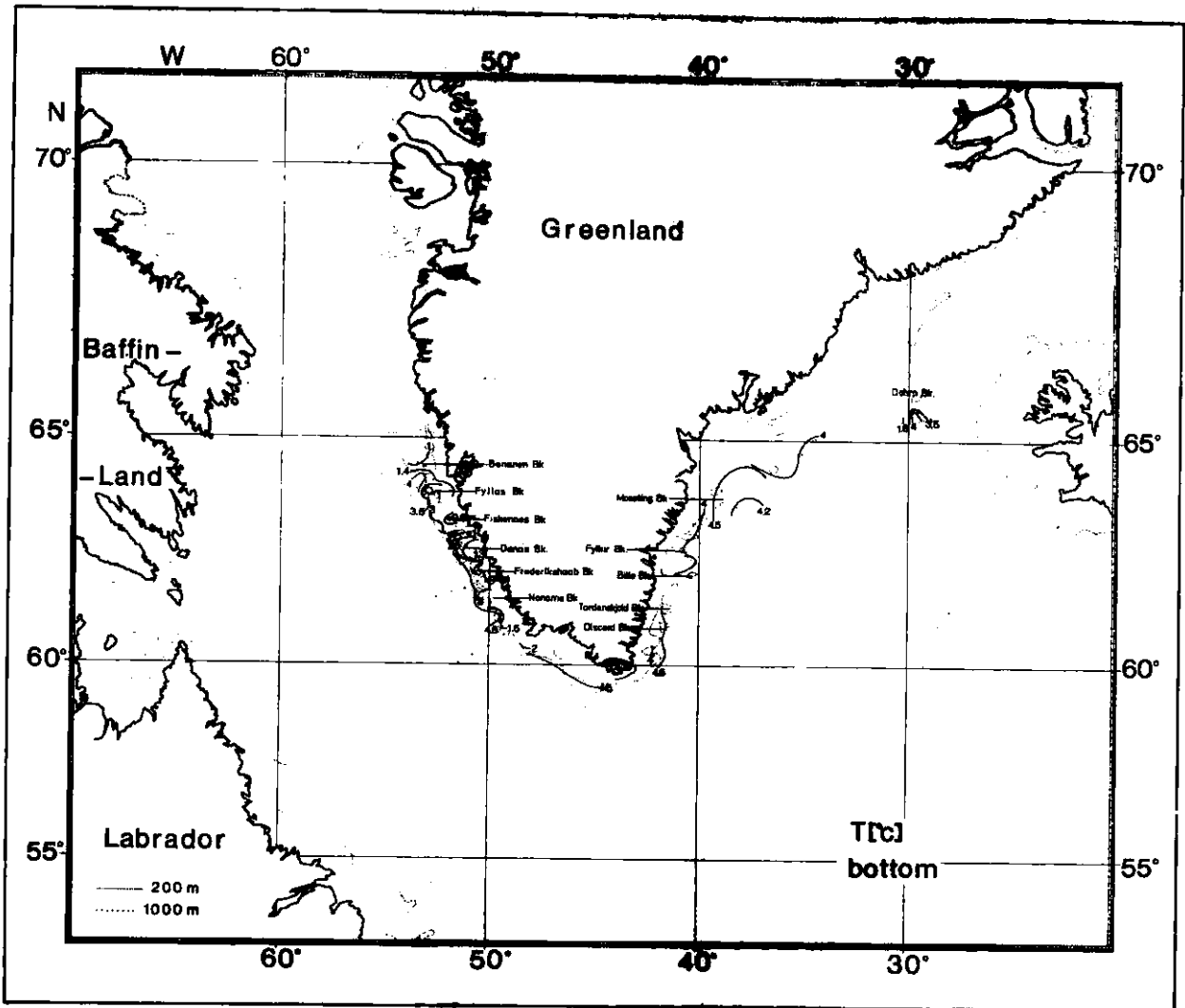


Figure 4.

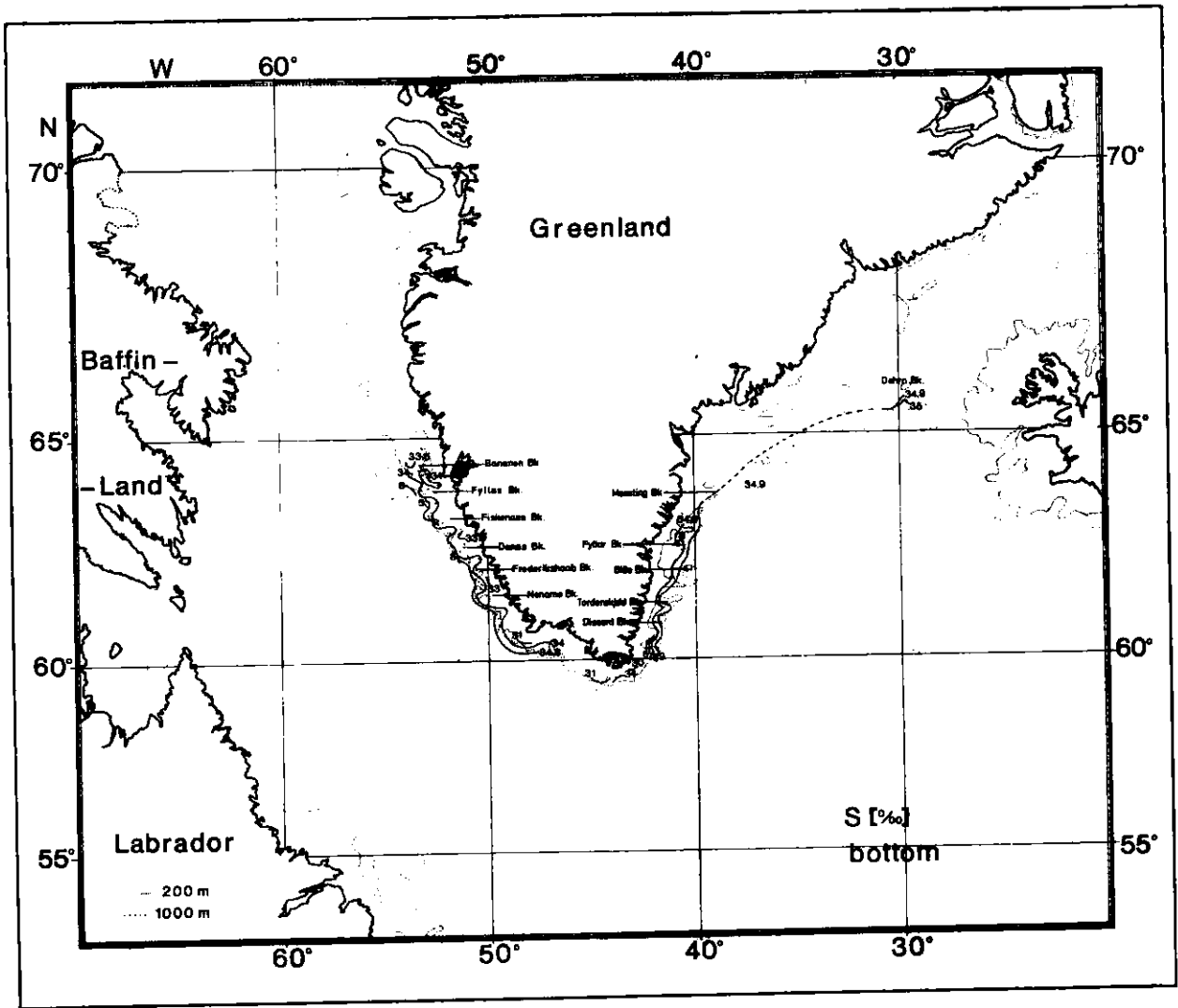


Figure 5.

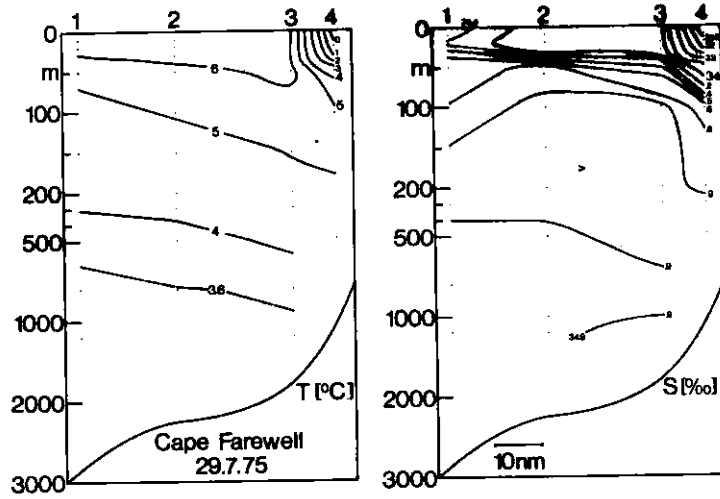


Figure 6.

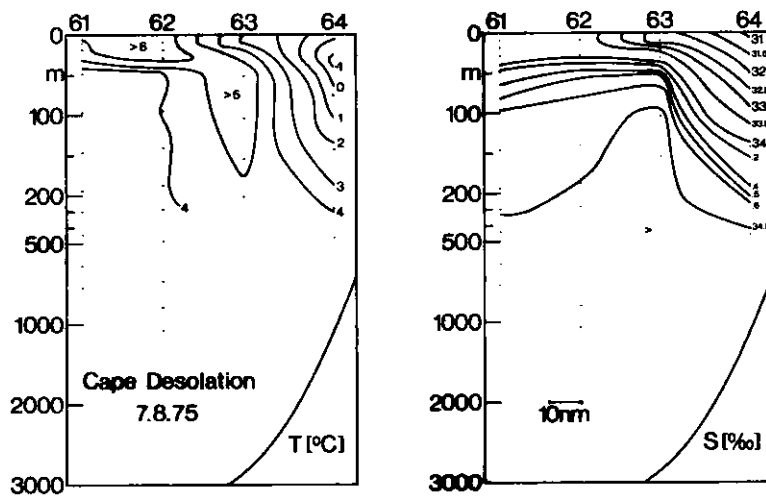


Figure 7.

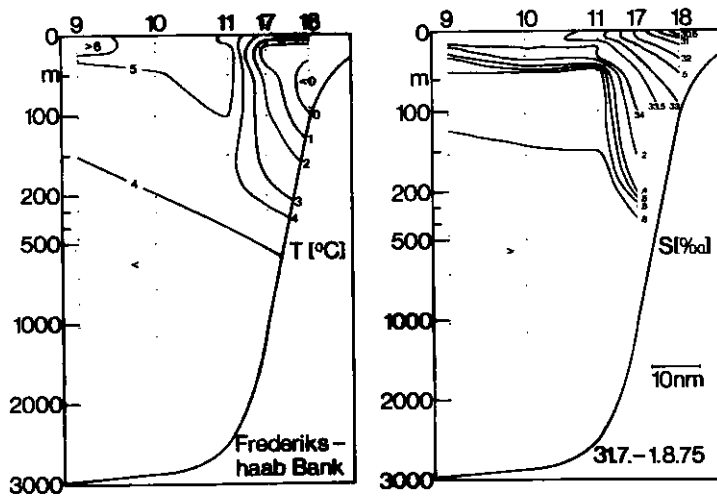


Figure 8.

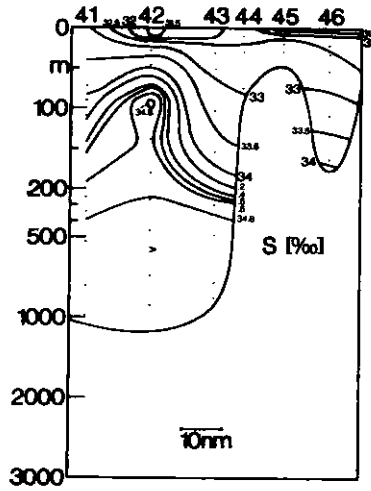
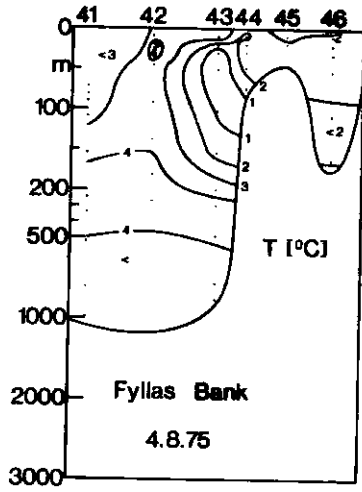


Figure 9.