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Hydrographic Conditions  
in Icelandic Waters  
in May-June 1979.

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by

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Abstract

This report was intended as a contribution to *Annls biol.* 36 (1979) but could not be ready on time. It was however thought to be of interest to present it as a Hydrography committee paper in order to keep the Icelandic annual records up to date, and also to encourage discussions on the usefulness or value of hydrographic records in *Annls biol.* for e.g. biological and climatological aspects. The main conclusion of this report is as follows: in spring 1979 temperatures in Icelandic waters were below normal, up to 1°C below normal at the south and west coasts, but many degrees below normal north and east of Iceland, where arctic conditions dominated in the whole water column, even to a greater extent than during some of the so-called ice years in the sixties.

## Introduction

In 1979 the annual spring survey of Icelandic waters was carried out from 27 May to 15 June. Figures 1 and 2 show the location of the stations and the distribution of temperature and salinity at 20 m depth. Figure 3 shows the temperature and salinity isopleths of monthly means for all data collected inside a study area within latitude 67-69°N and longitude 11-15°W during the years 1968-1979. Figure 4 shows the May-June 1961-1979 deviations of sea temperature and salinity derived from the 1961-1970 means at different depths at the hydrographic station S-3 (66°32'N, 18°50'W; Malmberg, *Annls. biol.*, Copenh. 35:59). The mean values for the years 1925-1960 are also shown (Stefánsson, *Rit Fiskideildar* 3). Table 1 shows temperature and salinity deviations from the mean values of the period 1961-1970 at the hydrographic Station K-3 (66°53'N, 23°19'W) of the Kögur section in May-June 1961-1979. Table 2 shows the deviations of temperature and salinity at 25 m depth within latitudes 67-69°N and longitudes 11-15°W in June 1977, 1978 and 1979 (reference period 1950-1958, Malmberg, *Annls biol.*, Copenh. 35:55). Attention is drawn to slight corrections of the deviation values from those published in the *Annls biol.* cited above as well as in articles by the author in *Ægir*, Nos. 7 & 9, 1979.

Table 3 shows temperature and salinity at different depths in May-June 1971-1979 at two selected stations on the Selvogsbanki section (63°19'N, 21°07'W and 63°00'N, 21°28'W).

## Results

The main features of the hydrographic conditions in Icelandic waters in May and June 1979 were as follows:

No drift-ice was observed during the May-June survey despite the fact that drift-ice in North Icelandic waters occurred more frequently in late winter 1979 than it had done since the ice years in the sixties (1965-1970).

The temperature of the Atlantic water south and west of Iceland was in May and June 1979 below normal (0.5-1.0°C), with a slight warming-up at the surface. The salinity in these waters was about or even slightly above normal (Figs. 1-2, Table 3).

Off the northwest peninsula the conditions were unfavourable in 1979 as in 1978 and only a weak Atlantic influx (temperatures 3-4.5°C and salinities 34.8-35.05 o/oo) had reached the Kögur section. Further east in North Icelandic waters, where no Atlantic influx was observed (Fig. 4), conditions were extremely unfavourable, even compared with some of the so-called ice years of the period 1965-1970 (temperatures of 0-3°C and salinities of 34.0-34.8 o/oo).

In the oceanic area northeast of Iceland, or in the East Icelandic current, the hydrographic conditions were also relatively unfavourable in spring 1979 (Fig. 3, Table 2), with salinities of about 34.6-34.7 o/oo in the surface layers and temperatures from less than 0°C to 2°C. These conditions are, however, not nearly as unfavourable as during the ice years in the sixties but more comparable with the findings in the seventies (Malmberg, *Annls biol.*, Copenh. 35:55).

In the coastal area east of Iceland low temperatures were observed (0-3°C), comparable only with findings in 1965, 1967 and 1968. In spring 1979 the arctic water of the East Icelandic current also had an unusually wide extension both to the east and south, and no Atlantic water was found in the "warm water tongue" at about 65°N, 10°W.

It can be concluded that in spring 1979 temperatures in Icelandic waters were below normal (1950-1960), up to 1°C below normal at the south and west coasts, but many degrees below normal north and east of Iceland, where arctic conditions dominated in the whole water column, even to a greater extent than during some of the so-called ice years in the sixties.

Finally it may be of interest to compare the findings of the hydrographic conditions in Icelandic waters in spring with the results of the 0-group investigations, not only as regards species such as capelin (Malmberg, *Annls biol.*, Copenh. 35:61), but also the Icelandic cod. Seemingly no obvious or simple correlation can yet be found between the observed hydrographic conditions and the 0-groups estimates or calculated 3 year old recruitments of cod (Malmberg, *Ægir* 4, 1980).

Table 1. Deviations of temperature and salinity at station K-3 (66°53'N; 23°19'W) on the Kögur section in May-June 1961-1979 (reference period 1961-1970).

	0 m		20 m		50 m		75 m		100 m		150 m		200 m	
	t°	So/oo	t°	So/oo	t°	So/oo	t°	So/oo	t°	So/oo	t°	So/oo	t°	So/oo
1961	+2.63	+0.77	+1.92	+0.35	+0.67	+0.08	+0.45	+0.03	+0.49	+0.02	+0.90	+0.03	+0.80	+0.04
1962	-0.29	+0.32	+0.06	+0.11	-0.43	-0.03	-0.29	-0.02	-0.18	+0.04	-0.17	+0.04	-0.80	+0.04
1963	-0.33	-0.05	-1.06	-0.45	-1.55	-0.31	-0.85	-0.13	-0.83	-0.15	-0.53	-0.10	-0.14	-0.06
1964	-1.10	-0.11	+0.62	+0.14	+0.83	+0.08	+0.73	+0.03	+0.74	+0.02	+0.91	+0.01	+1.18	0.00
1965	-2.96	-1.23	-1.10	-0.37	+0.41	+0.09	+0.33	+0.04	+0.33	+0.02	+0.40	+0.03	+0.66	+0.05
1966	+1.75	+0.77	+1.07	+0.37	+0.57	+0.10	+0.23	+0.06	0.00	+0.04	-0.20	+0.03	-0.20	+0.03
1967	-1.98	-0.98	-2.71	-0.59	+0.04	+0.01	+0.01	+0.01	+0.10	+0.04	-0.07	+0.04	-0.03	+0.05
1968	+1.29	+0.29	+0.53	-0.10	+0.02	0.00	-0.04	+0.01	+0.01	+0.03	-0.71	-0.05	-1.22	-0.13
1969	-0.36	-0.45	+0.89	+0.29	+0.10	+0.01	+0.20	+0.03	+0.10	+0.03	+0.09	+0.03	+0.14	+0.02
1970	+1.32	+0.63	-0.19	+0.23	-0.69	-0.03	-0.80	-0.07	-0.80	-0.08	-0.65	-0.06	-0.36	-0.04
1971	+1.44	+0.70	+0.09	+0.28	-0.42	-0.02	-0.46	-0.02	-0.30	-0.02	-0.45	-0.03	-0.46	-0.04
1972	+0.54	+0.60	-0.17	+1.91	-0.60	-0.04	-0.40	-0.04	-0.34	-0.06	-0.15	-0.06	+0.26	-0.05
1973	-0.15	+0.09	-0.45	+0.07	-0.64	-0.07	-0.33	-0.04	-0.31	-0.06	-0.23	-0.07	-0.21	-0.08
1974	+1.46	+0.68	+0.76	+0.26	+0.29	-0.01	+0.19	-0.05	+0.22	-0.06	+0.33	-0.05	+0.54	-0.03
1975														
1976	-0.19	+0.43	-0.92	+0.04	-1.55	-0.23	-1.38	-0.19	-1.20	-0.17	-1.17	-0.18	-0.98	-0.19
1977	-3.57	-1.39	-2.53	-0.42	-0.93	-0.17	-0.86	-0.17	-0.54	-0.14	-0.64	-0.16	-0.52	-0.12
1978	-2.72	-0.06	-0.84	-0.11	-0.84	-0.21	-1.07	-0.27	-3.37	-0.50	-3.05	-0.34	-4.03	-0.36
1979	-1.44	+0.40	-2.20	-0.01	-2.65	-0.20	-2.51	-0.21	-2.46	-0.20	-1.88	-0.15	-1.56	-0.15
Means														
1961-1970	4.87	34.36	5.56	34.77	6.03	35.03	6.07	35.08	6.00	35.10	5.71	35.09	5.22	35.08
1925-1960	7.00	34.47	6.87	34.74	6.67	35.02	6.49	35.07	6.33	35.07	6.05	35.10	5.57	35.06

Table 2

Anomalies of temperature and salinity in June 1977, 1978 and 1979 at 25m depth from a study area northeast of Langanes (67-69°N, 11-15°W, reference period 1950-1958).

	t°C	So/oo	
1977	-1.69	-0.27	(not -0.33)
1978	-0.66	-0.16	
1979	-1.90 (not -1.60)	-0.17	(not -0.20)

Table 3a

Temperature and salinity at different depths in May-June 1971-1979 at 63°19'N, 21°07'N on the Selvogsbanki section.

t°C	1971	1972	1973	1974	1975	1976	1977	1978	1979
m									
0	8.27	8.14	6.88	8.50	(8.56)	8.30	7.74	7.55	7.35
10	8.23	8.13	6.91	8.34	7.66	8.28	7.74	7.51	7.35
20	8.16	8.10	6.89	8.16	7.22	8.17	7.74	7.47	7.12
30	7.80	8.08	6.93	8.15	7.06	7.22	7.68	7.47	6.86
50	7.37	8.06	6.98	8.14	6.86	7.02	7.61	7.43	6.76
75	7.26	8.07	-	7.76	6.82	6.97	7.37	7.31	-
100	7.18	8.06	7.00	7.64	6.78	6.90	7.19	7.05	6.72
bottom	7.20	7.97	6.98	7.46	6.44	6.40	6.97	7.00	6.68

So/oo

m	1971	1972	1973	1974	1975	1976	1977	1978	1979
0	35.14	35.16	35.11	35.11	35.12	35.04	35.10	35.08	35.16
10	14	16	11	10	11	04	11	08	16
20	14	16	12	11	11	04	11	08	18
30	16	16	12	11	11	06	11	08	15
50	18	17	12	11	11	06	11	08	14
75	17	16	-	12	11	-	11	09	-
100	17	18	14	13	11	08	10	10	16
bottom	16	16	13	14	07	04	10	09	17

x) So/oo ~ 35.15

Table 3b

Temperature and salinity at different depths in May-June  
1971-1979 at 63°00'N, 21° 28'W on the Selvogsbanki section.

t°C	1971	1972	1973	1974	1975	1976	1977	1978	1979
m									
0	8.49	8.24	7.54	8.67	(8.50)	8.32	7.99	7.90	7.69
10	8.46	8.24	7.56	8.40	7.76	8.32	7.97	7.88	7.59
20	8.46	8.21	7.59	8.16	7.45	8.16	7.94	7.84	7.38
30	8.46	8.16	7.56	8.15	7.37	7.74	7.90	7.80	7.39
50	8.00	8.20	7.56	8.16	7.23	7.72	7.84	7.78	7.38
75	8.06	-	-	7.65	7.18	7.28	7.78	7.75	-
100	7.98	7.98	7.56	7.58	7.14	7.23	7.69	7.50	7.13
150	-	7.90	-	7.50	7.03	7.10	7.52	-	7.08
200	7.81	7.85	7.38	7.53	6.94	7.06	7.49	7.33	7.05
300	-	7.66	-	7.50	6.85	6.90	7.41	7.14	-
400	7.44	7.42	7.14	7.29	6.64	6.76	7.26	6.83	6.85
500	-	-	-	7.07	-	6.56	-	6.47	-
600	6.97	7.49	6.64	6.84	5.90	6.10	6.86	5.89	5.71
800	5.83	5.69	5.72	5.75	4.91	5.02	-	4.88	4.85
1000	-	5.12	-	4.71	-	4.30	-	4.29	
bottom	4.82	-	4.64	4.66	4.40	-	6.50	-	-

So/∞

m									
0	35.15	35.16	35.19	35.11	35.12	35.06	35.12	35.10	34.17
10	15	16	19	11	12	06	12	10	18
20	15	16	19	11	12	06	12	10	17
30	15	16	19	11	12	07	12	10	18
50	17	18	19	11	12	08	12	10	18
75	20	-	-	13	12	11	12	11	-
100	20	19	19	14	12	11	12	12	16
150	-	19	-	15	12	09	13	-	-
200	21	18	17	16	11	09	13	12	16
300	-	18	-	14	11	08	13	10	-
400	20	17	16	16	11	08	11	08	15
500	-	-	-	15	-	08	-	07	-
600	18	12	12	14	08	07	09	05	08
800	10	09	09	09	03	-	-	00	02
1000	-	05	-	04	-	00	-	34.98	-
bottom	01	-	03	04	02	-	09	-	-

x) So/∞ ~ 35.15

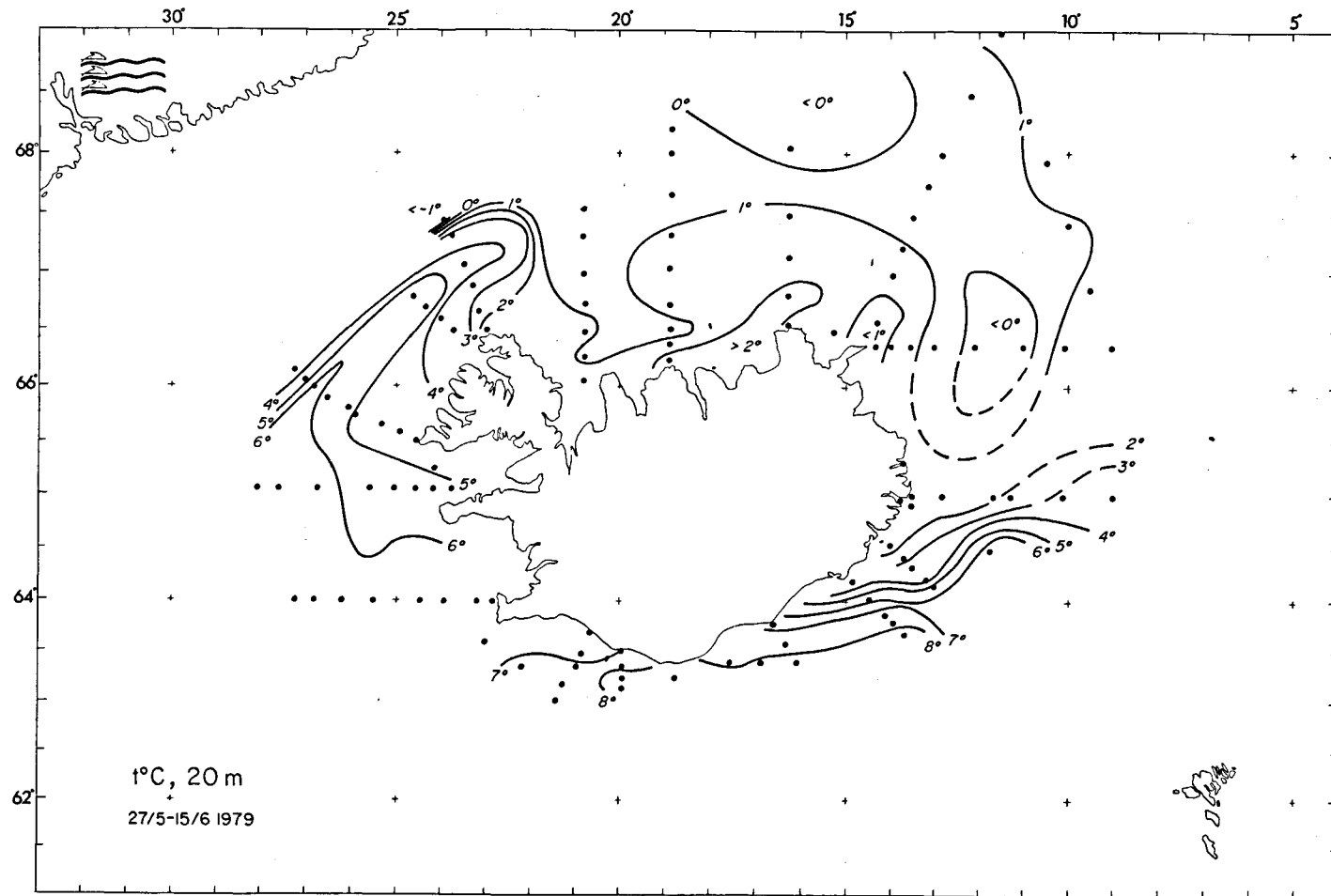


Fig. 1. Temperature, 20 m, 27 May-15 June 1979

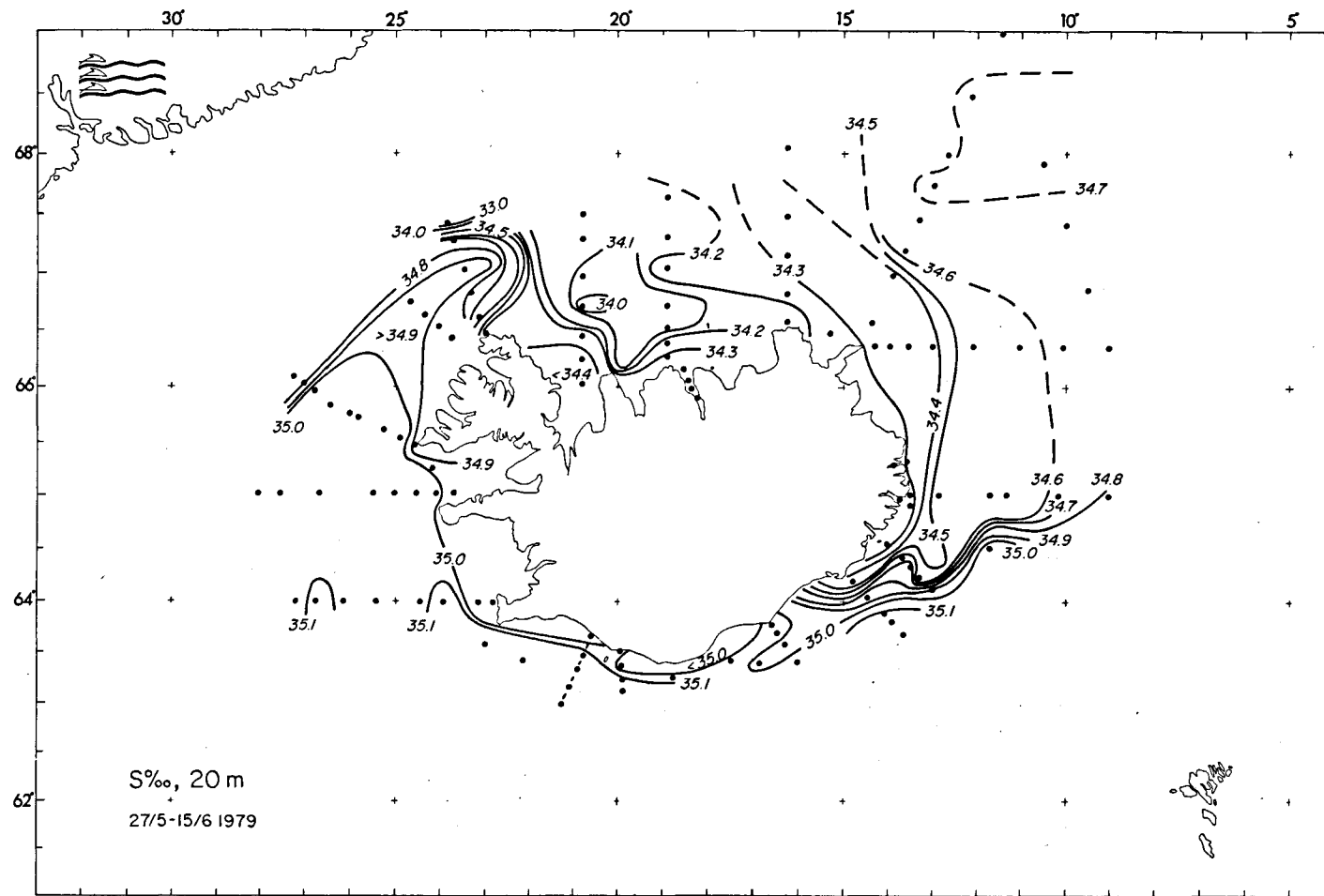


Fig. 2 Salinity, 20 m, 27 May-15 June 1979



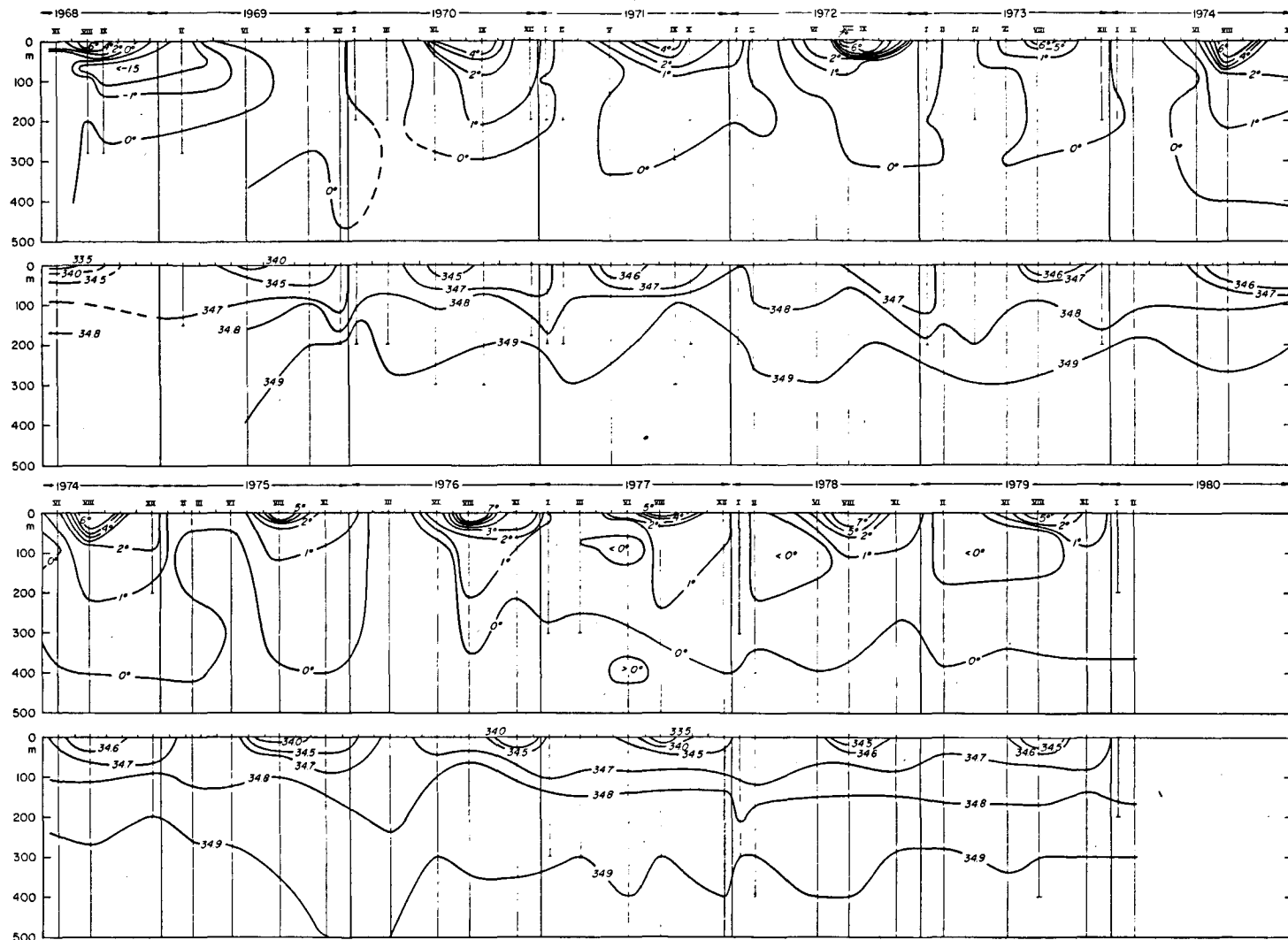


Fig. 3 Temperature and salinity isopleths of monthly means for all data collected inside a study area within latitude 67-69°N and longitude 11-15°W during the years 1968-1979

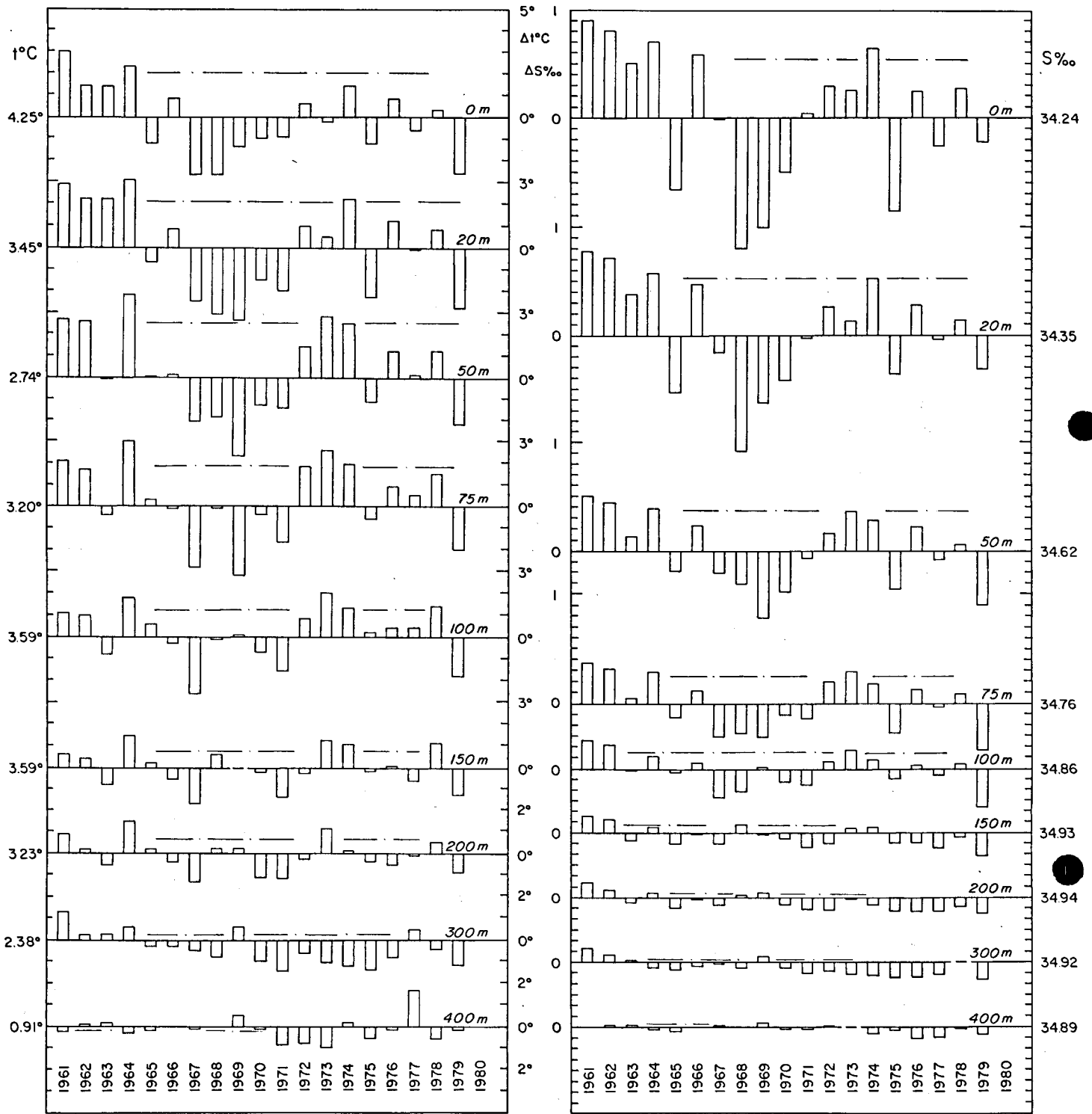


Fig. 4 Deviations of temperature and salinity at station S-3 (66°32'N, 18°50'W) on the siglunes section in May-June 1961-1979 (reference period 1961-1970). The mean values for the years 1925-1960 are also shown (broken lines, Stefánsson, Rit Fiskideildar 3, 1962).