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International Council for
the Exploration of the Sea

Demersal Fish Committee
Ref: Pelagic Fish and
Hydrographic Committee

PRELIMINARY REPORT OF THE INTERNATIONAL 0-GROUP FISH SURVEY IN THE BARENTS SEA AND ADJACENT WATERS IN AUGUST-SEPTEMBER 1982

The eightteenth annual International 0-group fish survey was made during the period 18 August - 11 September 1982 in the Barents Sea and adjacent waters and the hydrographical section Bear Island West was made during the period 11 September - 14 September. The following research vessels participated in the survey:

State	Name of vessel	Survey time	Research Institute
Norway	"Johan Hjort"	18 August - 5 September	Institute of Marine Research, Bergen
Norway	"G.O.Sars"	18 August - 5 September	" "
Norway	"Michael Sars"	21 August - 11 September	" "
USSR	"Persey III"	31 August - 5 September	The Polar Research Institute of Marine Fisheries and Oceanography, Murmansk
USSR	"Poisk"	23 August - 5 September	" "
USSR	"Protsion"	28 August - 30 August 11 September - 14 September	" "

Names of scientists and technicians who took part on the different vessels are given in the Appendix.

Survey data were analysed 6-7 September in Hammerfest. Observations concerning the geographical distribution of 0-group fish and their abundance are given in this report together with a brief description of the temperature conditions in the area. Due to several consecutive days with bad weather in the last part of the survey an area west and southwest of Bear Island in particular, was only partly covered. In order to reduce this gap R/V "Michael Sars took trawl stations in the period 9 September - 11 September on her way to a ground fish survey off Spitsbergen after the meeting in Hammerfest. The results from these trawl stations have been incorporated in this report.

MATERIAL AND METHODS

The geographical distribution of 0-group fish were estimated by fishing with a small meshed midwater trawl. The vessels participating in the survey in 1982 used the type of midwater trawl recommended by the meeting held after the survey in 1980 (ANON 1980). The trawling procedure was standardized in accordance with the recommendation made at the same meeting. At about every 30 nautical miles sailed the trawl was towed 0.5 nautical mile at each depth; the headline of the trawl at 0, 20 and 40 m.

Survey tracks and hydrographical stations are given in Fig. 1. Trawl stations with and without catch are given on the distribution charts in Figs. 10-18, as filled with open symbols respectively. The density grading is based on catch in number per 1.0 nautical mile trawling.

HYDROGRAPHY

Hydrographic observation were made along all the survey tracks, normally after each 30 natical miles sailed. Horizontal temperature distribution is shown for 0, 50, 100 and 200 m depth (Figs. 2-5). Figs. 6-9 show the temperature conditions at the four standard sections, and the mean temperature of these sections are given in Tables 1-4. Some general comments are given below:

1. KOLA SECTION. Water temperature have increased in all layers compared with 1981. Temperature in 50-200 and 0-200 m layers exceeded mean long-term level. The temperature in 0-50 m layer was close to the norm. Anomalies were as following:

0- 50 m	-0.1°C
50-200 m	+0.4°C
0-200 m	+0.3°C

2. CAPE CANIN-NORTH SECTION. Since 1981 water temeprature has increased, especially in the southern part of the section, where it increased from 2.7°C to 4.5°C. In the northern part the temperature increase was insignificant (from 2.5°C to 2.8°C). Anomalies in the southern part of the section were +0.4°C, in the northern part -0.4°C.

3. NORTH CAPE-BEAR ISLAND SECTION. Average temperature in 0-200 m layer has increased from 5.3°C in 1981 to 5.8°C in 1982. Anomaly is +0.2°C.

4. BEAR ISLAND WEST SECTION. Average water temperature in 0-200 m layer has increased from 4.4°C in 1981 to 4.9°C in 1982. Anomaly is +0.5°C.

In general, temperature conditions were close to long-term average level exceeding it only by 0.1°-0.5°C in the west of the sea. Weak negative anomalies remained in the eastern part of the sea. These pecularities indicates that since the previous 0-group survey current heat advection into the Barents Sea has increased, whereas solar radiation heating was close to the normal.

DISTRIBUTION AND ABUNDANCE OF 0-GROUP-FISH

Geographical distributions of 0-group fish are shown by shaded areas in Figs. 10-18. Double shading indicates dense concentrations. The criteria for discriminations are the same as used in earlier reports (ANON 1978). Abundance indices, estimated as

the area of distribution with areas of high densities weighted by 10, are given in Table 5. Length frequency distributions of the main species are given in Table 6.

Two new sets of abundance indices have been estimated for 0-group cod as described by RANDA (1982). They are both based on the number caught during standard trawl haul of one nautical mile.

Cod (Fig. 10).

The main distribution of 0-group cod is normally separated into two areas west of Spitsbergen and on area north of Finnmark with an extension southeastward to the Kola peninsula. Although not clearly separated at the time when the survey was conducted, the same general pattern prevails.

The usual 0-group index as given in previous years is given in Table 5. The indicies introduced last year (ANON 1981) and described by RANDA (1982) are given in Table 7.

The 1982 yearclass seems to be about the same size as the 1977 yearclass. That is larger than the last four yearclasses (1978-81), but well below the rich 1975 yearclass that now dominates the fishery.

Haddock (Fig. 11).

The distribution extended into more eastern waters than in 1981 when the distribution was more western than usual. The 0-group index indicates that the 1982 yearclass is stronger than the 1978-1981 yearclasses, and nearly the size of the 1976 and 1977 yearclasses.

Herring (Fig. 12).

0-group herring were found on a larger number of stations than in the previous years. In addition to some isolated patches in the western part of the Barents Sea, 0-group herring were found

over a relatively large area in the central and eastern part of the Barents Sea. The herring were usually found in areas with dense concentrations of 0-group capelin and/or 0-group redfish, and this created some difficulties in sorting out herring from the catches. It should be emphasized that the overall density of 0-group herring is still very low.

Capelin (Fig. 13).

As in 1981 the distribution og 0-group capelin was more westerly than in 1980 and previous years, reflecting a westerly distribution of the spawning. The area of distribution and overall density is also very similar to that in 1981, and indicates that the 1982 yearclass may be abundant as well.

Polar Cod (Fig. 14).

0-group Polar Cod was much less abundant than in the previous years, and the areas of distribution seemed to be smaller both for the eastern and the western components. It is, however, quite possible that a large part of the 0-group Polar cod is outside the investigated area.

Redifsh (Fig. 15).

The distribution and abundance of 0-group redfish was similar to the distribution in 1981, indicating a rich yearclass.

Saithe (Fig. 16).

Saithe were found occasionally in most parts of the area surveyed, and except for one trawl haul off West Spitsbergen only in small numbers. Since the area surveyed only cover a smaller part of the area were 0-group saither occur regularly, the 0-group index has not been calculated.

Greenland halibut (Fig. 17).

The distribution of Greenland halibut was as usual confined chiefly to the Bear Island - West Spitsbergen area. The index (17) is close to the average of 17.8 in the previous 10 years.

Long rough dab (Fig. 18).

The distribution of 0-group long rough dab in 1982 is similar to the one in 1981. The index of abundance is the highest on record.

REFERENCES

ANON 1978 Preliminary report of the International 0-group fish survey in the Barents Sea and adjacent waters in August-September 1978. Coun. Meet. int. Coun. Explor. Sea, 1978 (H:33):1-25. (Mimeo.)

ANON 1980 Preliminary report of the International 0-group fish survey in the Barents Sea and adjacent waters in August-September 1980. Coun. Meet. int. Coun. Explor. Sea, 1980 (G:53):1-25. (Mimeo.)

ANON 1981 Preliminary report of the International 0-group fish survey in the Barents Sea and adjacent waters in August-September 1981. Coun. Meet. int. Coun. Explor. Sea, 1981 (G:78):1-27. (Mimeo.)

RANDA, K. 1982. Recruitment indices for the Arcto-Norwegian Cod for the period 1965-1979 based on the International 0-group fish surveys. Coun. Meet. int. Coun. Explor. Sea, 1982 (G:43):1-22. (Mimeo.)

Table 1. Mean water temperature in the Murmansk Current, the Kola section (betweenn 70°30'N and 69°30'N) at the end of August and the beginning of September 1982 (t°C).

Year	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	Average 1965-1982
Layer																			
0- 50 m	6.7	6.7	7.5	6.4	6.7	7.8	7.1	8.7	7.7	8.1	7.0	8.1	6.9	6.6	6.5	7.4	6.6	7.1	7.2
50-200 m	3.8	2.6	4.0	3.7	3.1	3.6	3.2	4.0	4.5	3.9	4.6	4.0	3.4	2.5	2.9	3.5	2.7	4.0	3.6
0-200 m	4.6	3.6	4.9	4.4	4.0	4.7	4.2	5.2	5.5	4.9	5.2	5.0	4.3	3.6	3.8	4.5	3.7	4.8	4.5

Table 2. Mean water temperature in the Cape Canin - North section (between 68°45'N and 72°00'N) from surface to bottom at the end of August and at the beginning of September 1982 (t°C).

Year	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	Average 1965-1982
Layer																			
68°45'N	4.8	2.0	6.1	4.7	2.6	4.0	4.0	5.1	5.7	4.6	5.6	4.9	4.1	2.4	2.0	3.3	2.7	4.5	4.1
70°05'N																			
71°00'N	4.2	2.5	3.6	3.1	2.3	3.3	3.2	4.1	4.5	-	4.3	4.6	3.3	1.7	1.8	3.0	2.5	2.8	3.2
72°00'N																			

Table 3. Mean water temperature in the North Cape current, the North Cape to Bear Island section (between 71°33', 25°02'E and 73°35'N, 20°46'E) at the end of August and at the beginning of September 1982 (t°C).

Year	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	Average 1965-1982
Layer																			
0-200 m	5.1	5.5	5.6	5.4	6.0	6.1	5.7	6.3	5.9	6.1	5.7	5.7	4.8	5.0	5.3	5.7	5.3	5.6	5.6

Table 4. Mean water temperature in the West Spitsbergen current along the Bear Island West section (between 06°34'E and 15°55'E) at the end of August and at the beginning of September 1982 (t°C).

Year	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	Average 1966-1982
Layer																		
0-200 m	3.3	4.2	3.6	4.2	-	4.2	3.9	5.0	4.6	4.9	5.0	4.0	4.1	4.4	4.9	4.4	4.9	4.4

Table 5. Abundance indices.

Year \ Species	Cod	Haddock	Polar cod		Redfish	Greenland Halibut	Long rough dab
			West	East			
1965	6	7	0		159		66
1966	1	1	129		236		97
1967	34	42	165		44		73
1968	25	8	60		21		17
1969	93	82	208		295		26
1970	606	115	197		247	1	12
1971	157	73	181		172	1	81
1972	140	46	140		177	8.0	65
1973	684	54	(26)		385	3.2	67
1974	51	147	227		468	13.4	83
1975	343	170	75		315	21.1	113
1976	43	112	131		447	15.6	96
1977	173	116	157	70	472	9.0	72
1978	106	61	107	144	460	35.4	76
1979	94	69	23	302	980	22.5	69
1980	49	54	79	247	651	12.0	108
1981	65	30	149	73	861	38.0	95
1982	114	90	14	50	694	17	150

Table 6. Length distribution of 0-group fish in percent.

Length mm	Herring	Capelin	Polar cod East	Polar cod West	Greenland Halibut	Long rough dab	Haddock	Cod	Redfish	Saithe
10- 14									0.2	
15- 19			0.3			0.2			2.3	
20- 24		0.8	5.0	1.7		2.7			6.7	
25- 29		4.2	20.5	6.0		11.9			9.2	
30- 34		10.7	24.8	52.0		30.6	0.1	0.2	15.7	
35- 39	0.1	17.1	23.2	35.4	0.7	28.1	0.9	0.8	20.9	0.3
40- 44	0.4	21.0	15.5	4.3	2.2	20.9	2.1	3.0	20.8	0.1
45- 49	2.4	22.9	8.0	0.4	10.3	5.9	4.0	6.2	17.0	0.3
50- 54	14.8	16.6	2.8		10.3	0.4	5.6	9.3	5.8	0.8
55- 59	30.3	5.2		0.1	29.8		7.2	11.8	1.3	1.1
60- 64	40.7	1.3			16.9		9.0	18.4	0.1	0.1
65- 69	11.2	0.2			14.3		9.3	16.7		
70- 74	0.1				8.8		11.1	16.2		0.1
75- 79					5.1		10.0	9.2		0.1
80- 84					1.1		9.6	5.9		0.2
85- 89	0.1				0.4		9.9	1.7		0.1
90- 94							8.5	0.6		0.9
95- 99							5.6			0.1
100-104							4.0			2.6
105-109							1.7			10.7
110-114							0.8			16.4
115-119							0.4			22.1
120-124							0.1			19.1
125-129										12.1
130-134										9.8
135-139										3.2
N	1788	516856	1104	8994	272	5034	3236	3126	496282	1168
Mean length mm	59.6	43.7	35.4	34.3	60.5	36.0	75.3	64.8	38.2	117.4

Table 7. Abundance indices with 90% confidence limits for 0-group cod.

Year class	Logarithmic indices		Retransformed indices	
	Index	Confidence limits	Index	Confidence limits
1965	0.01	x)	0.10	x)
1966	0.03	0.02-0.05	0.14	0.14-0.15
1967	0.06	0.03-0.11	0.34	0.30-0.37
1968	0.02	0.01-0.05	0.24	0.22-0.26
1969	0.31	0.22-0.43	2.51	2.20-2.87
1970	2.54	2.07-3.01	369.19	268.89-506.91
1971	0.38	0.61-1.08	28.13	9.15-47.11
1972	0.62	0.42-0.86	6.47	5.10-8.19
1973	1.33	1.04-1.66	170.69	126.90-229.60
1974	0.35	0.22-0.51	6.50	4.81-8.12
1975	0.97	0.71-1.27	157.87	114.13-218.39
1976	0.15	0.07-0.26	1.26	1.01-1.56
1977	0.51	0.37-0.69	12.81	4.53-21.08
1978	0.28	0.18-0.39	3.72	3.15-4.39
1979	0.44	0.30-0.61	3.36	2.71-4.17
1980	0.17	0.11-0.24	0.98	0.88-1.09
1981	0.11	0.06-0.19	0.71	0.61-0.82
1982	0.73	0.54-0.94	7.30	5.9-8.9

x) 0-group cod caught only in one haul.

Appendix

Survey period	Research vessel	Research Institute	Participants
23 August - 6 September	"Poisk"	Polar Research Institute of Marine Fisheries and Oceanography, Murmansk	A.V. Iljina, L.N. Korol, V.N. Nenko, V.V. Podolsky, A.M. Sennikov
31 August - 6 September	"Persey III"	" "	Demidenko, K.L. Gnidkin, V.V. Iljin, A.I. Jakimov, Kapralov, S.V. Kusnetzov, V.S. Mamylov, V.K. Oshigin, I.V. Palakov, I.A. Tjumenkova, N.G. Ushakov, N.V. Vanjukhina, A.D. Volozhina, V.P. Zakharenko V.I. Zubov
28 August - 30 August 11 September - 19 September	"Protsion"	" "	A.S. Prozorov
17 August - 5 September	"G.O. Sars"	Institute of Marine Research, Bergen	J. Hamre, K. Hansen, K. Hestenes, A. Hylen, H. Kismul, H. Ludvigsen, L. Midttun, E. Molvær, J.E. Nygaard, A. Nødtvedt, K. Randa, A. Roald, E. Sælen, S. Tjelmeland
21 August - 11 September	"Michael Sars"	" "	H. Abrahamsen, O. Alvheim, A. Dommasnes, K. Gjertsen, M. Myhr, H. Myran, M. Møgster, J.E. Nygaard, A. Romslo, O.M. Smedstad, R. Toresen, S. Torheim
17 August - 5 September	"Johan Hjort"	" "	S. Andreassen, J. Blindheim, P. Bratland, K. Gjertsen, I. Hoff, J.E. Klæt, K. Lauvås, S. Lygren, C.J. Rørvik, J. Rørvik, A.M. Skorpen

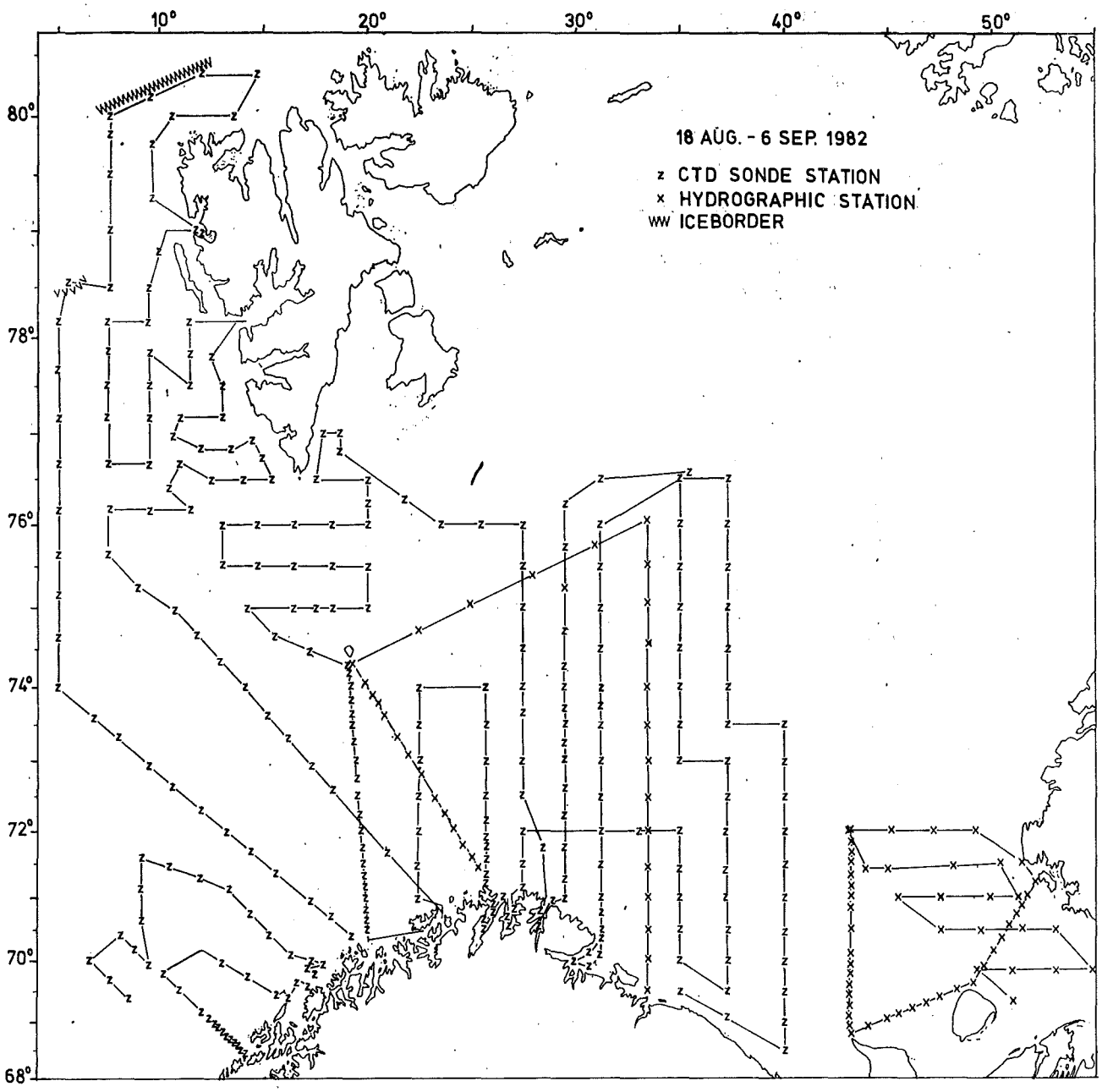

Fig. 1. Survey tracks of the ships and the grid of hydrographic stations.

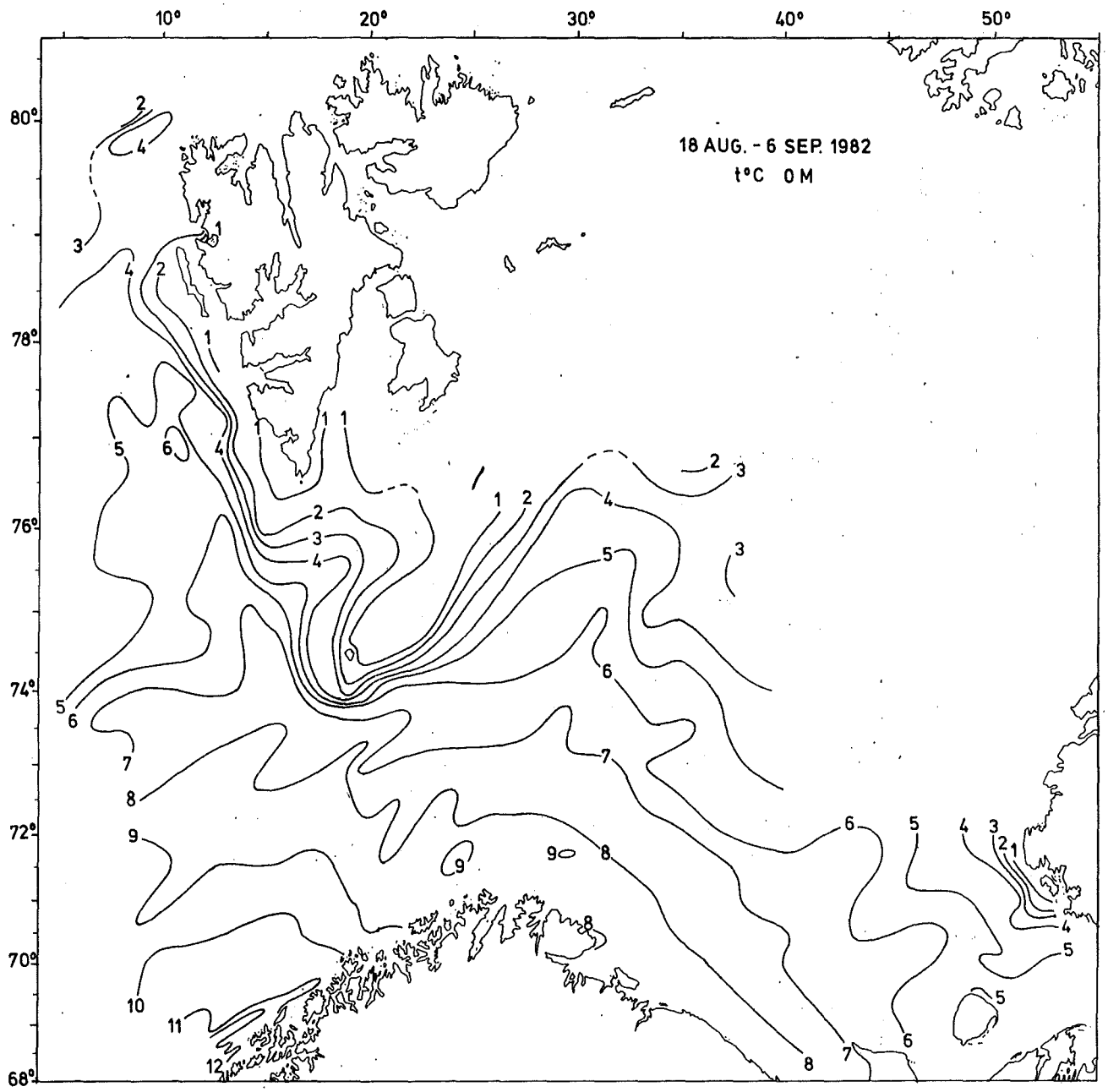

Fig. 2. Isotherms at 0 m.

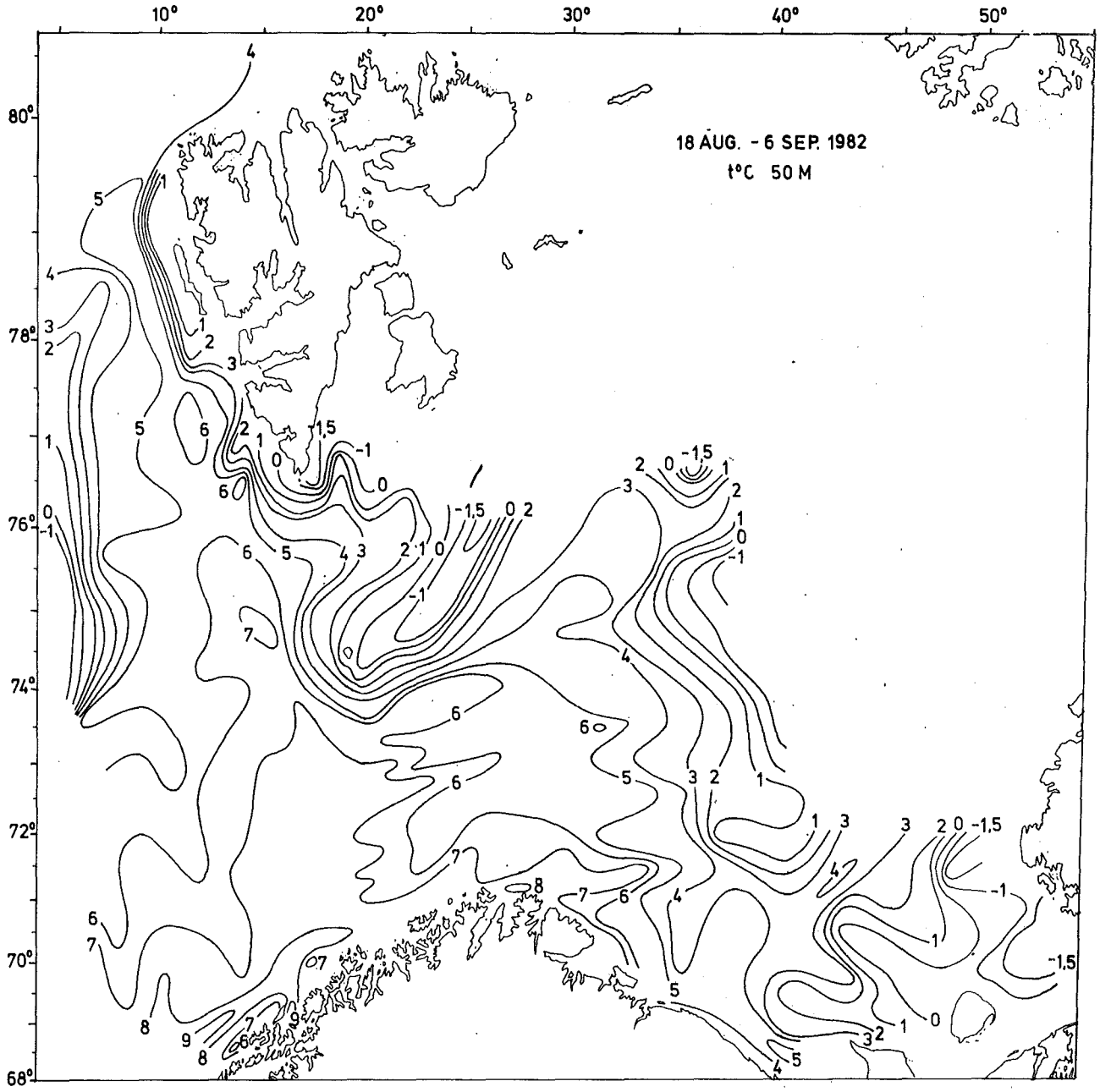

Fig. 3. Isotherms at 50 m.

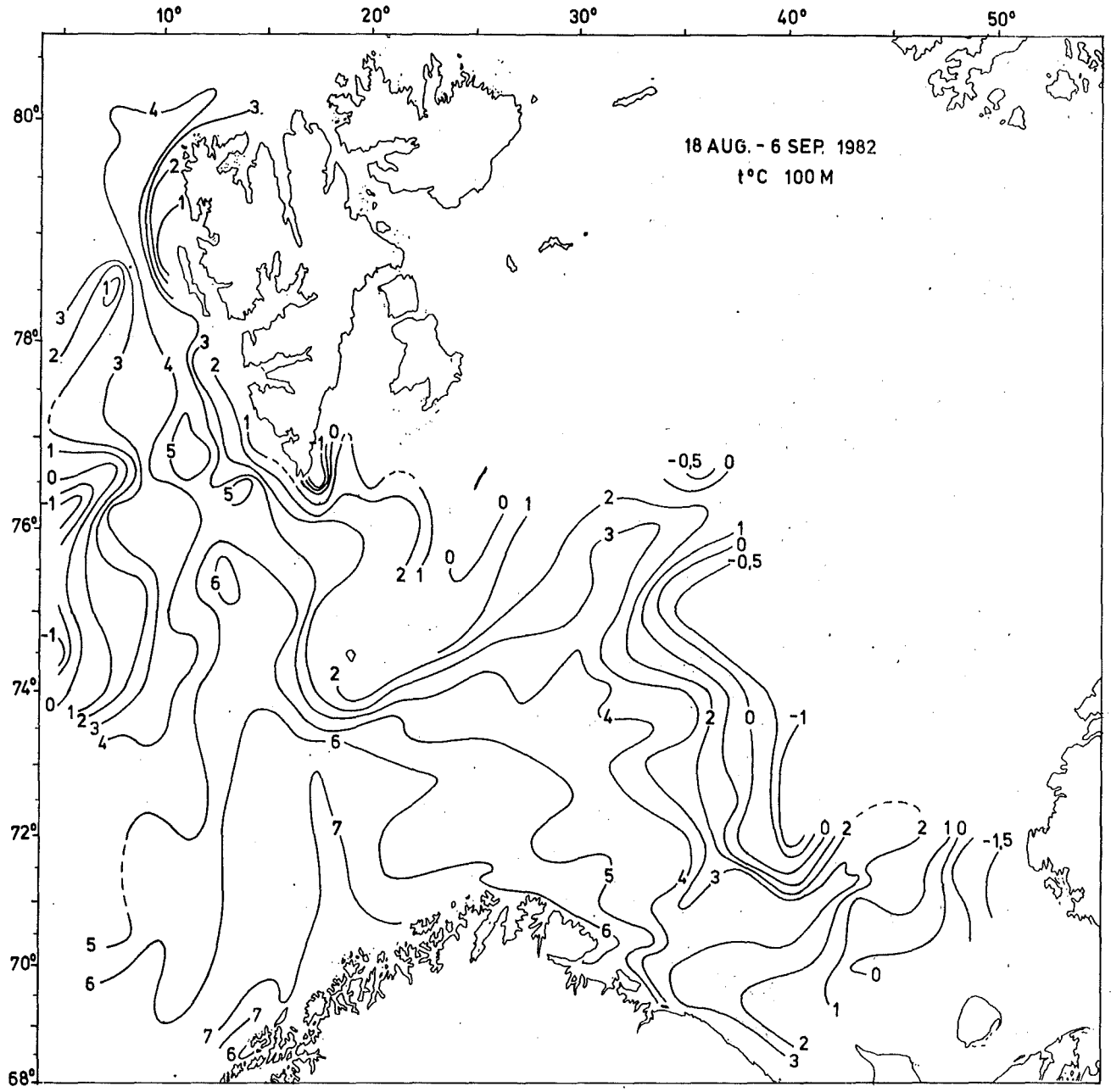

Fig. 4. Isotherms at 100 m.

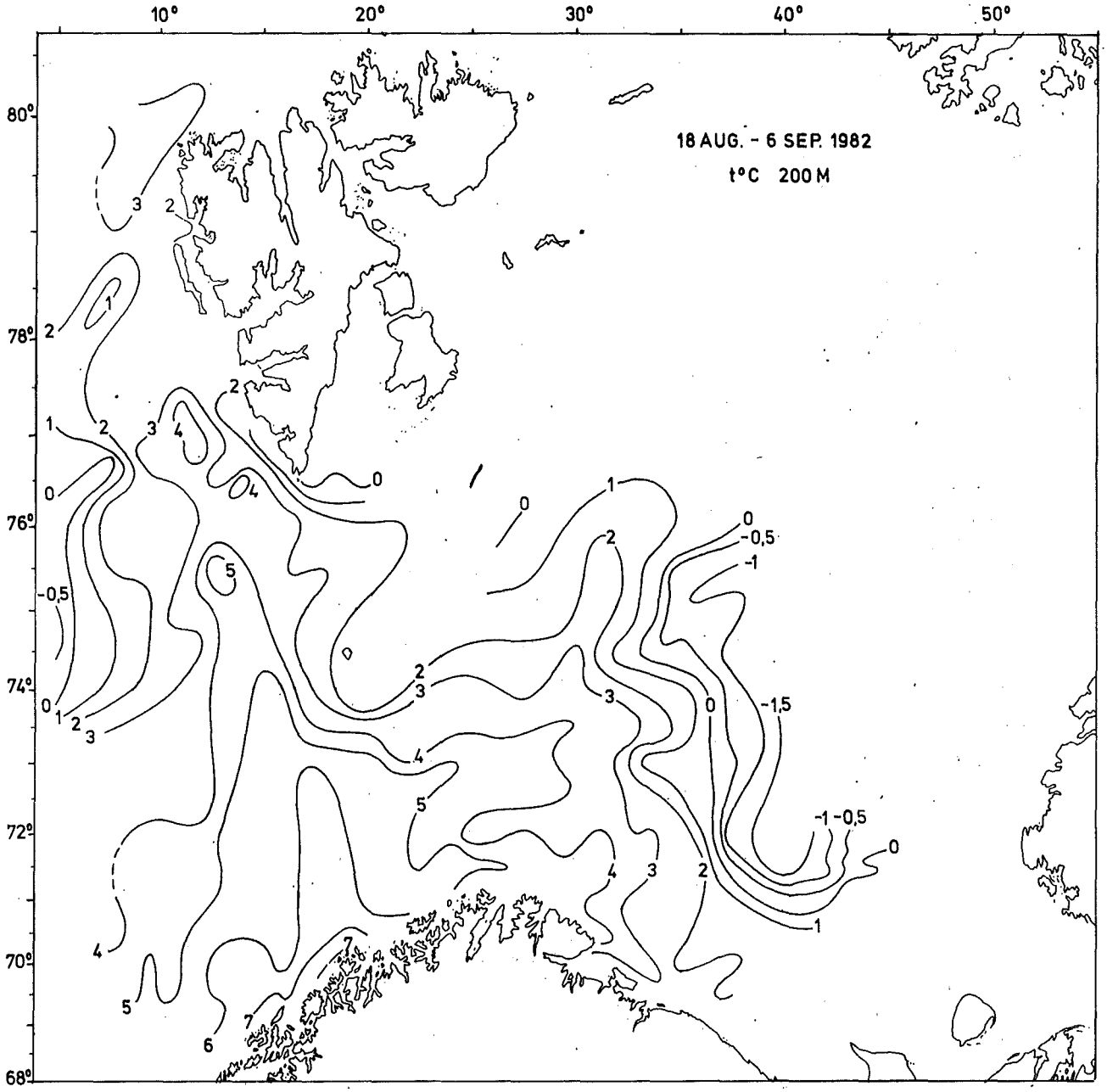

Fig. 5. Isotherms at 200 m.

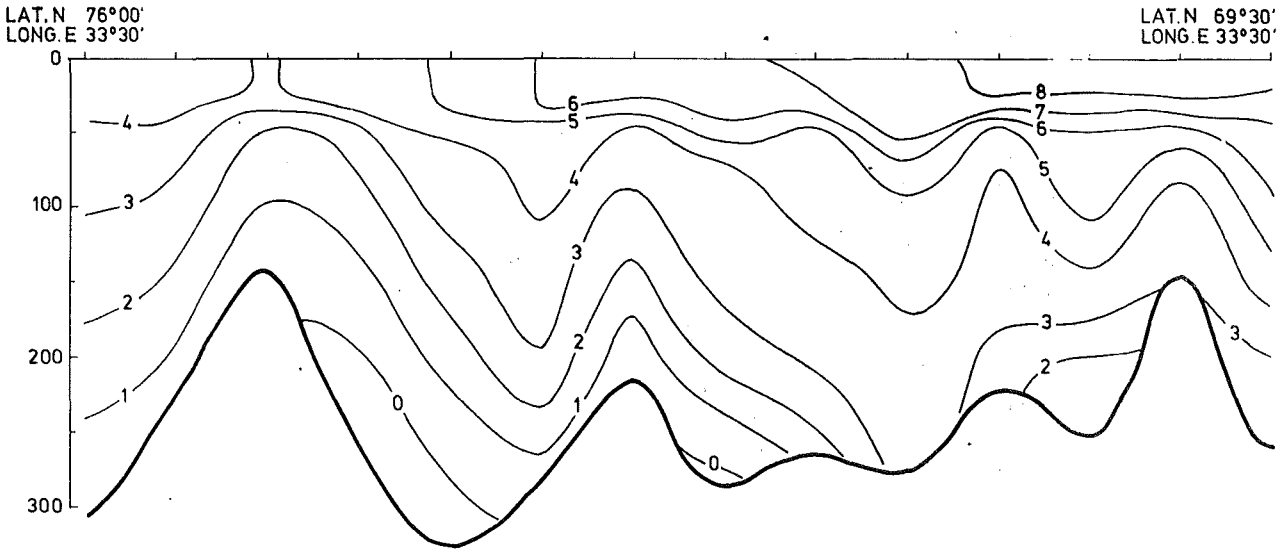

Fig. 6. Temperature section along the Kola meridian.

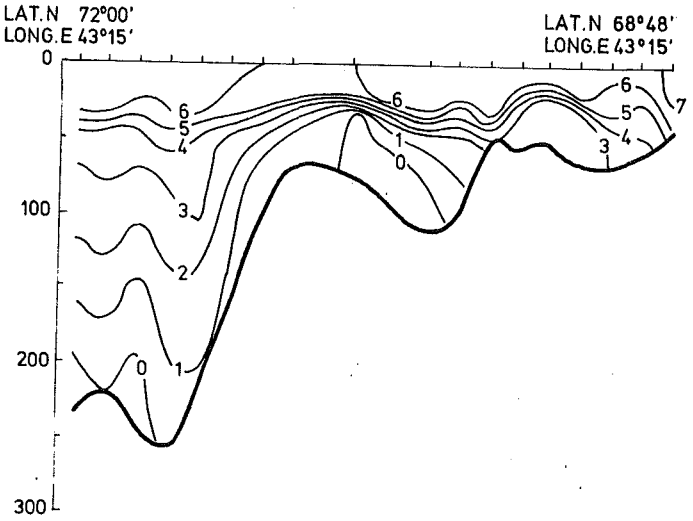

Fig. 7. Temperature section Cape Kanin - North.

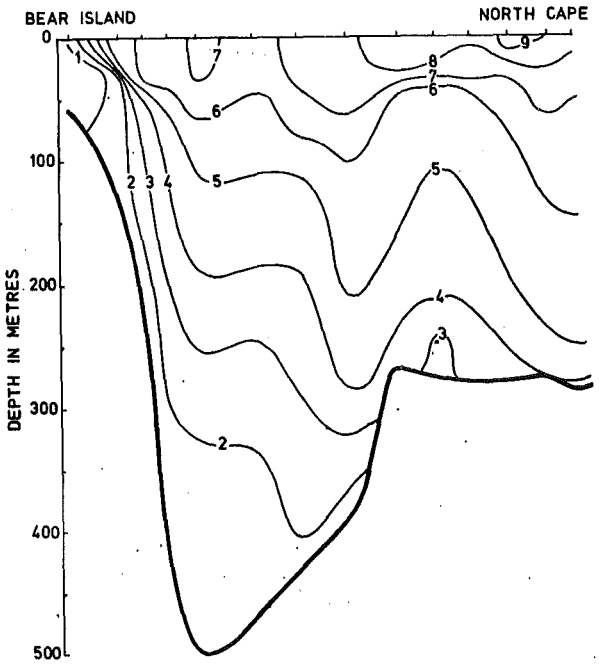

Fig. 8. Temperature section Bear Island - North Cape.

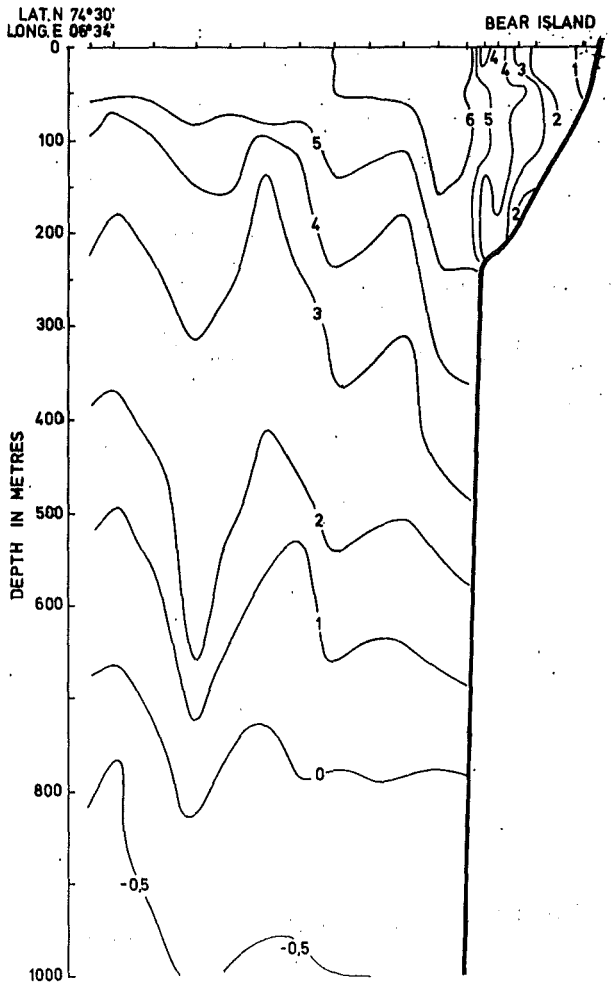

Fig. 9. Temperature section Bear Island - West.

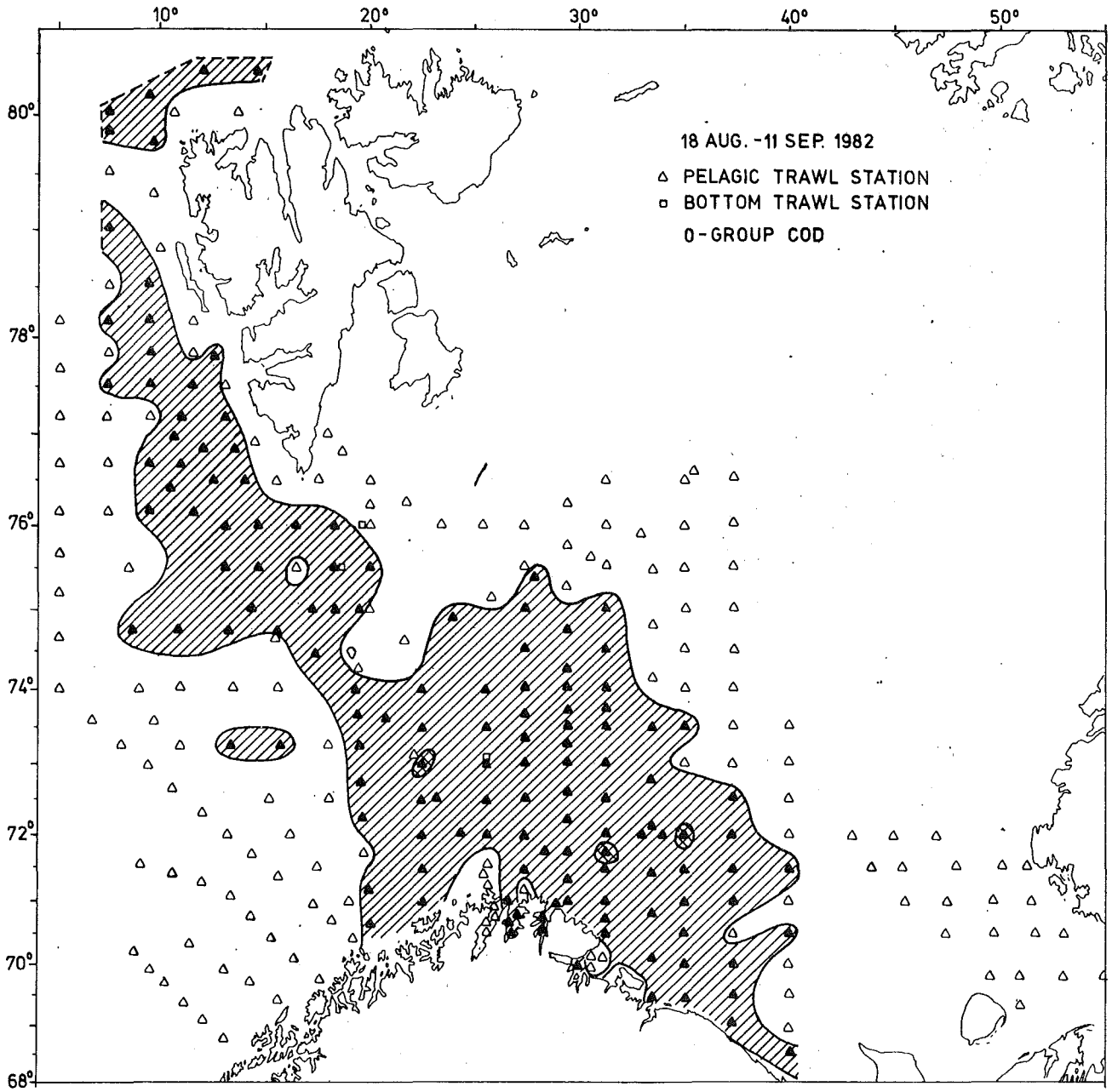

Fig. 10. Distribution of 0-group cod.

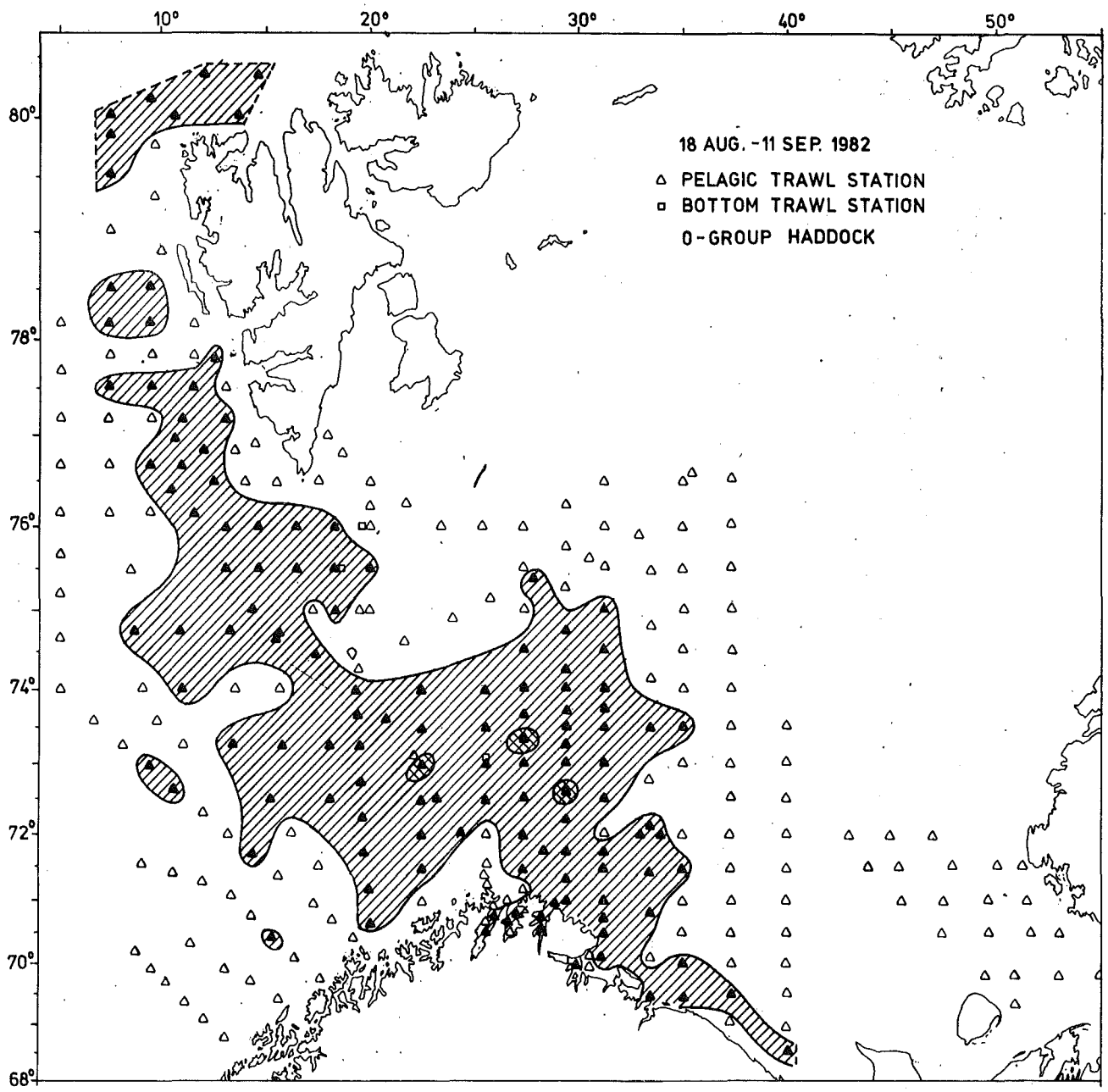

Fig. 11. Distribution of 0-group haddock.

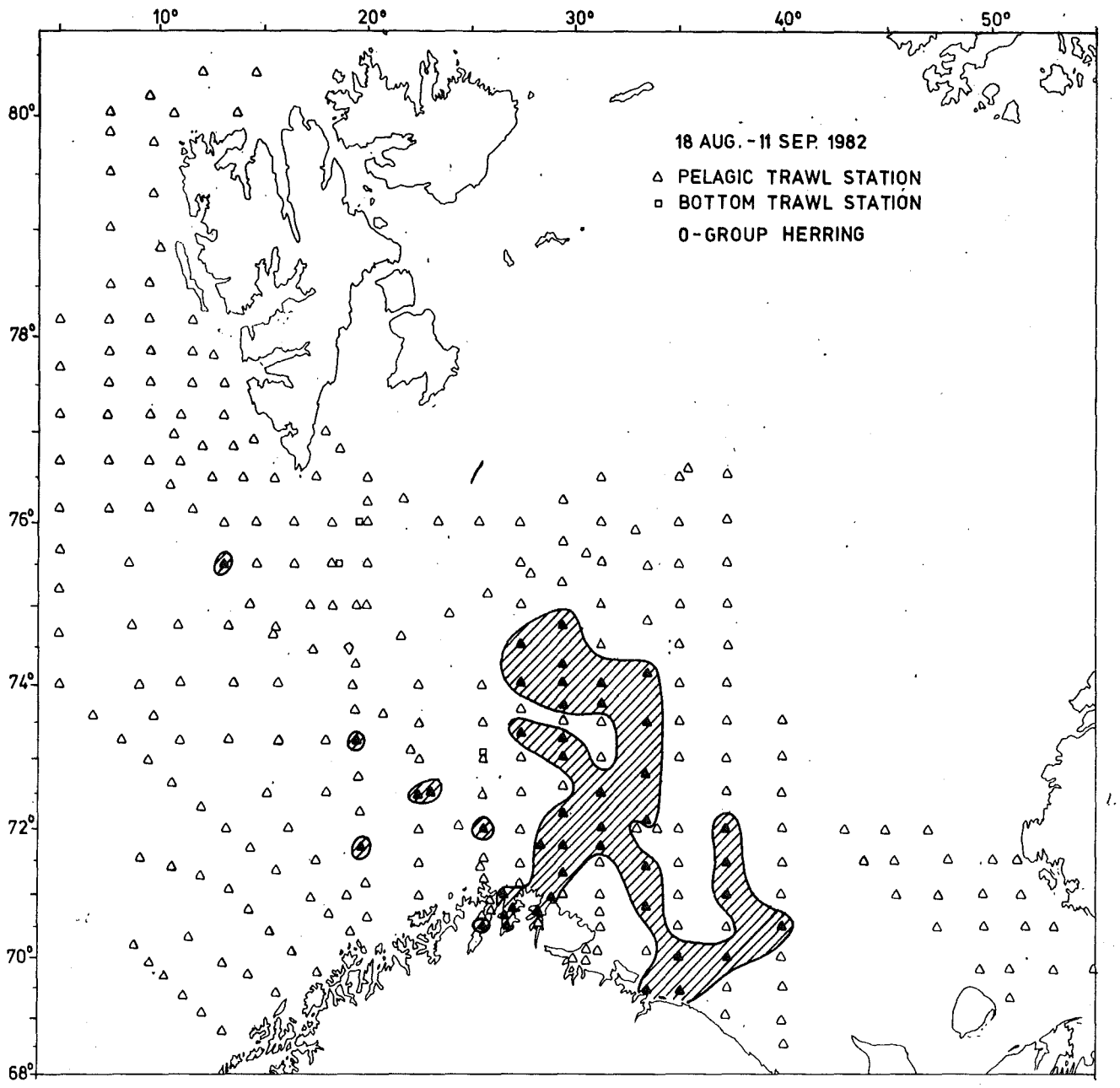

Fig. 12. Distribution of 0-group herring.

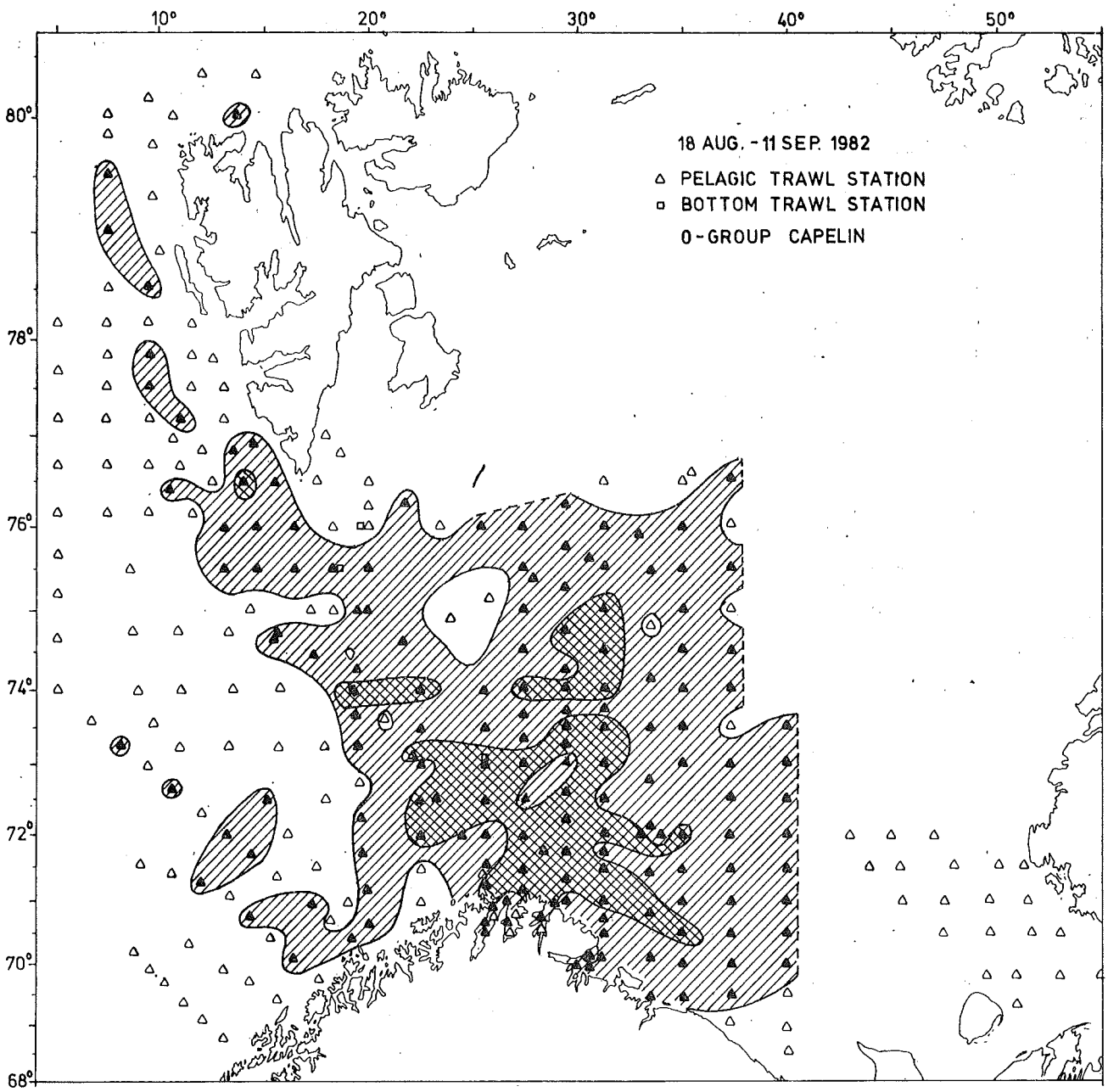

Fig. 13. Distribution of 0-group capelin.

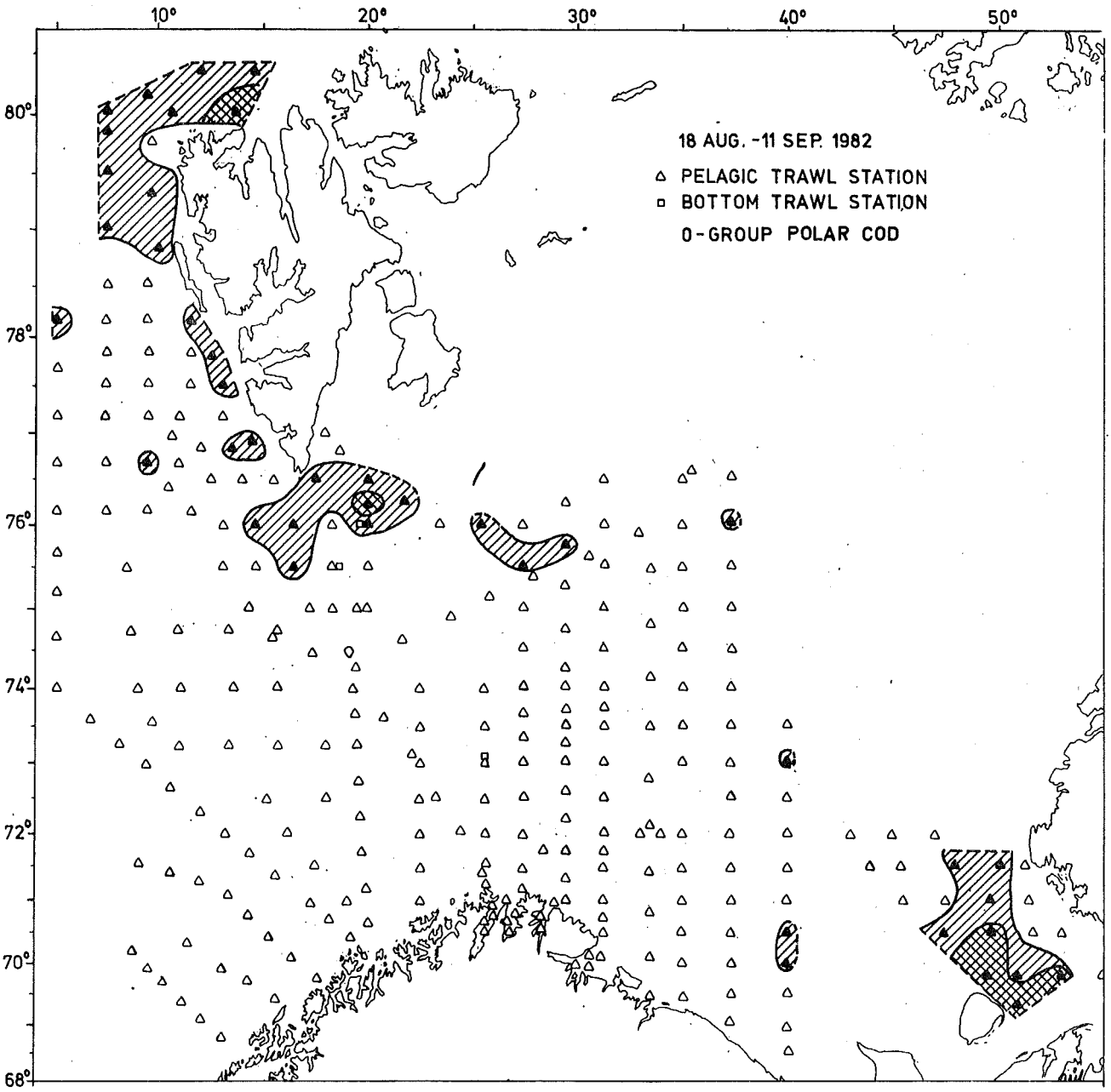

Fig. 14. Distribution of 0-group polar cod.

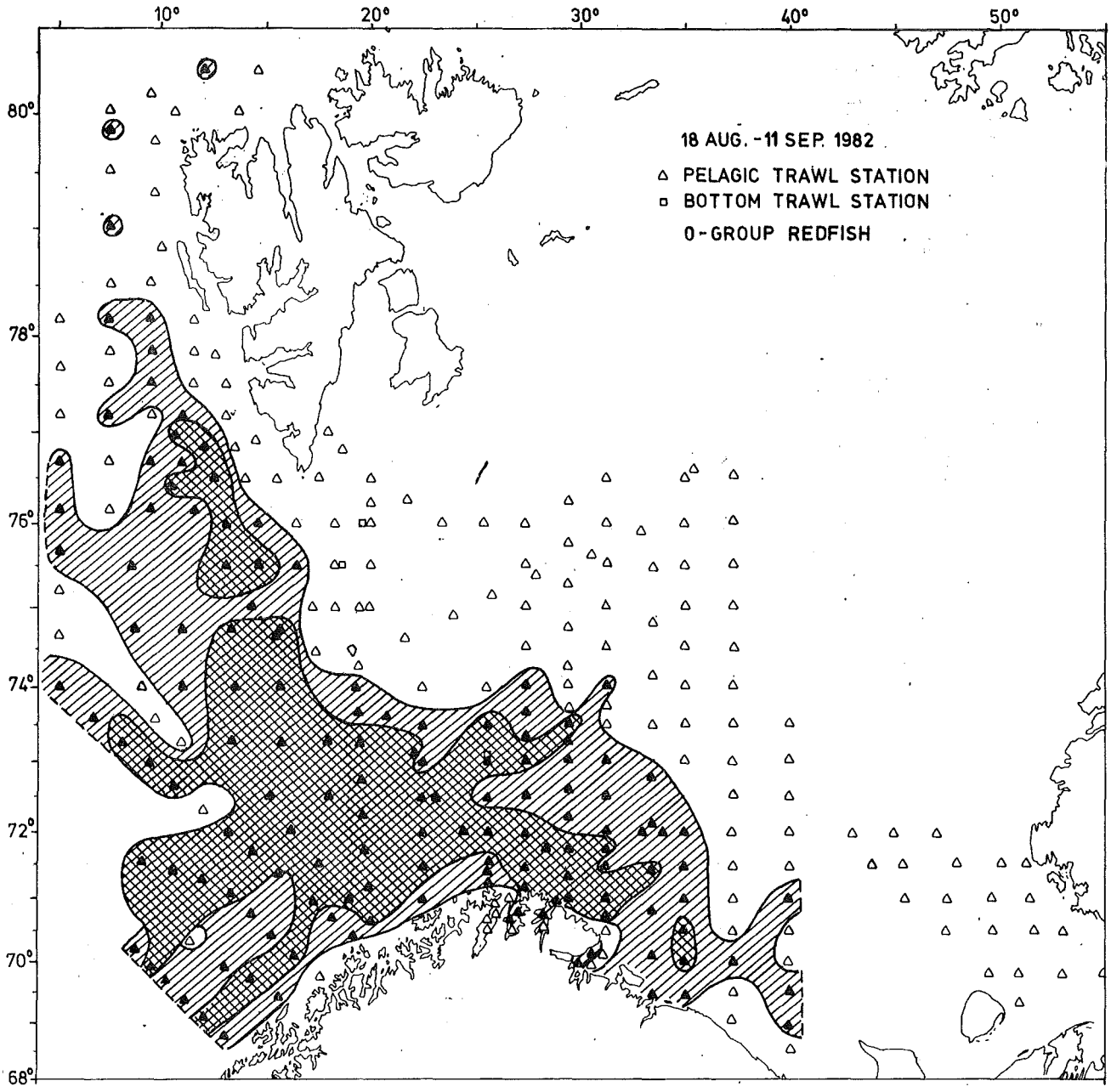

Fig. 15. Distribution of 0-group redfish.

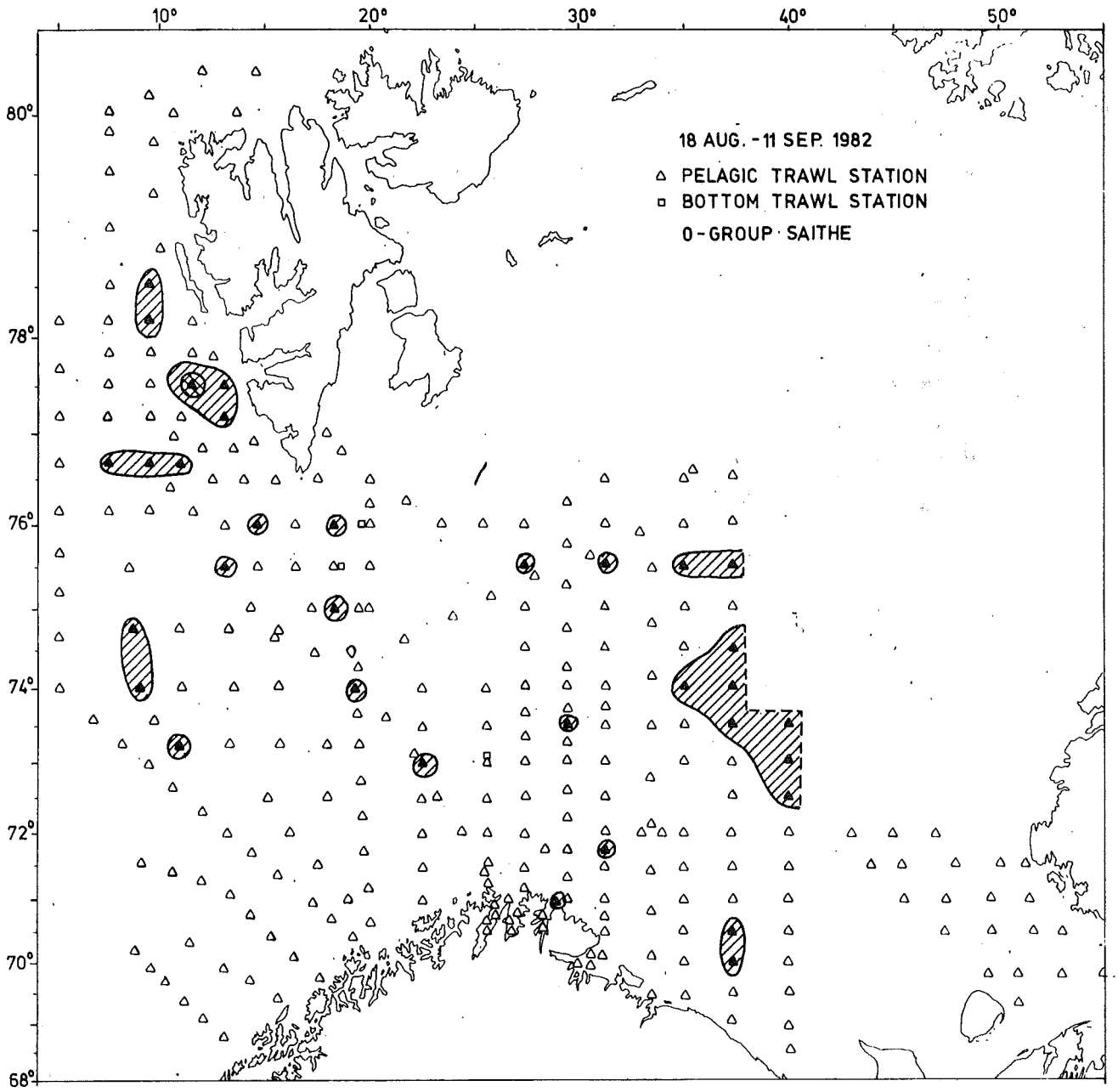

Fig. 16. Distribution of 0-group saith.

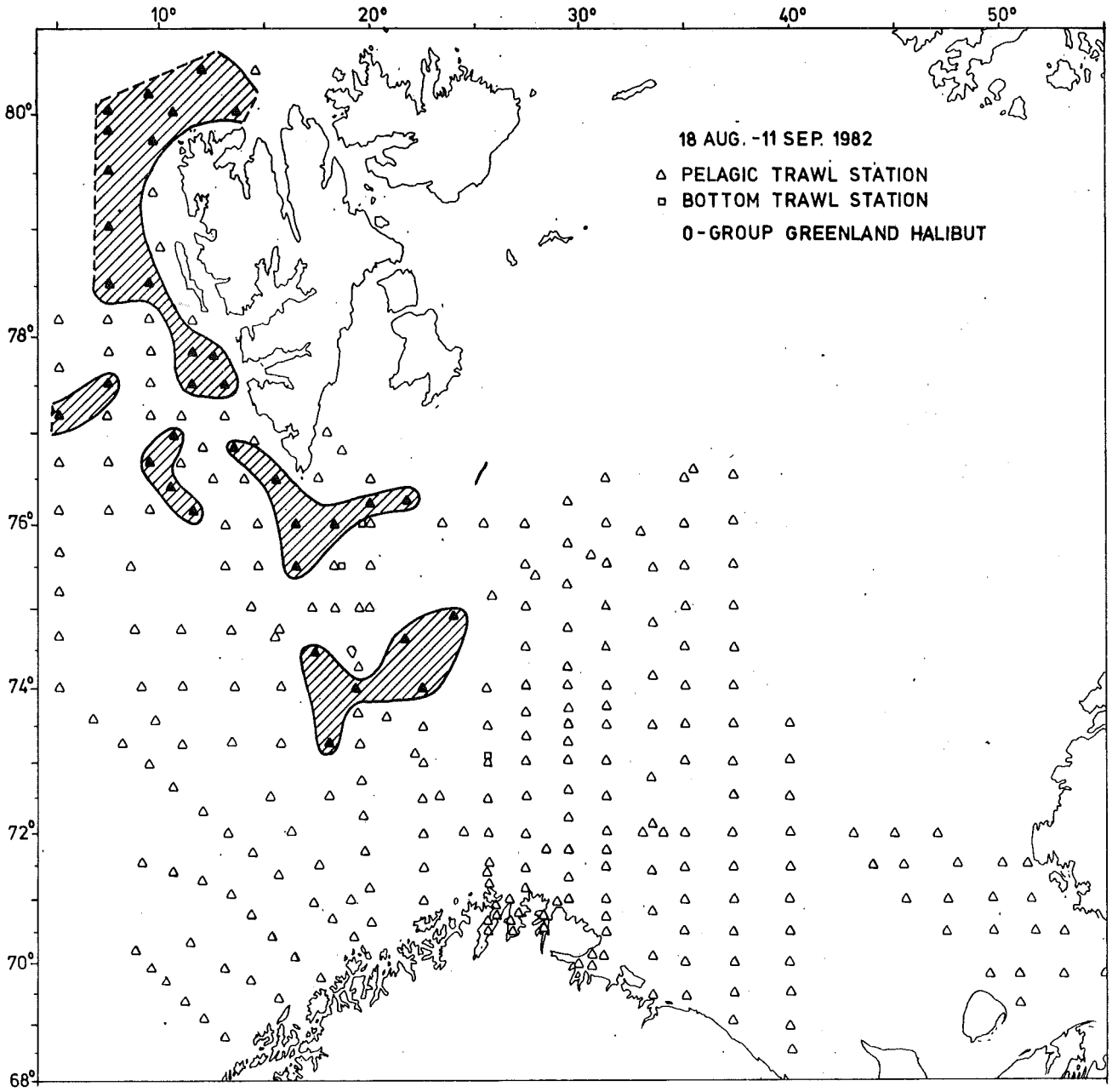

Fig. 17. Distribution of 0-group Greenland halibut.

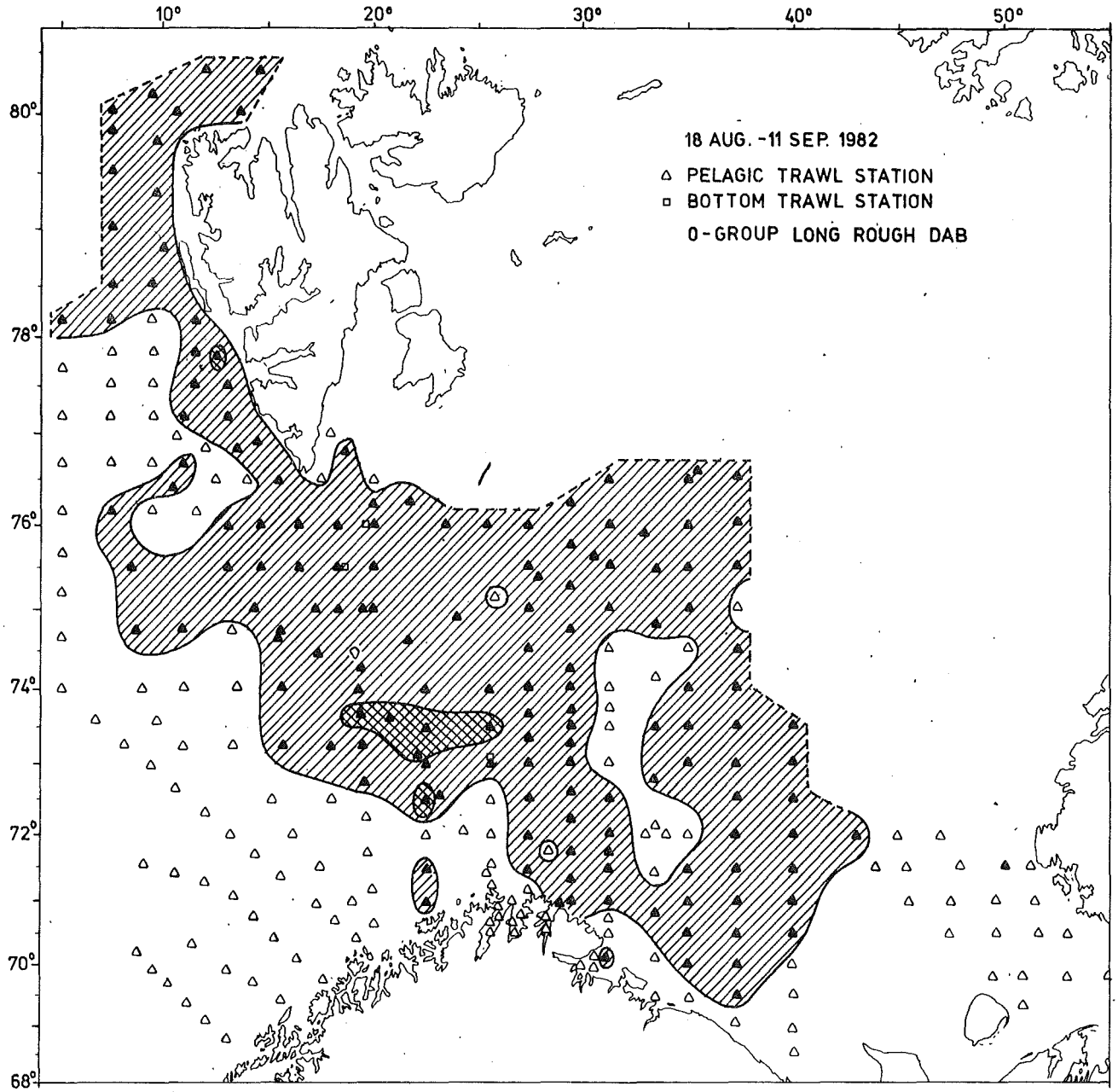

Fig. 18. Distribution of 0-group long rough dab.