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International Council for the Exploration of the Sea

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Pelagic Fish (Northern) Committee
Ref: Demersal Fish (Northern) and Hydrographic Committees

Preliminary report of the International 0-group fish survey in the Barents Sea and adjacent waters in August - September 1977

INTRODUCTION

The following research vessels participated in the thirteenth international 0-group fish survey in the Barents Sea and the Svalbard region:

State	Name of vessel	Survey period	Research Institute
Norway	"G.O. Sars"	22 Aug. -11 Sept.	Institute of Marine Research, Bergen.
Norway	"Johan Hjort"	20 Aug. -11 Sept.	" " "
USSR	"Odissey"	31 Aug. -11 Sept.	The Polar Research Institute of Marine Fisheries and Oceanography, Murmansk.
USSR	"Fridtjof Nansen"	26 Aug. -11 Sept.	" " "
USSR	"Poisk"	25 Aug. -11 Sept.	" " "

The scientists and technician who took part on the different vessels are given in the Appendix.

The aim of the survey has each year been to study the distribution and the abundance of 0-group fish in the area. Preliminary plan for the 1977 survey was discussed by correspondance. Final arrangements for the coordination of the survey were discussed in Murmansk on the 22 August between scientists from the two Institutes responsible for the

investigation. The survey program was covered in the period 20 August - 11 September. A meeting of scientists from the two participating countries was held in Hammerfest on 12 - 13 September to analyse the data and to prepare a report.

MATERIAL AND METHODS

The geographical distribution and density of the 0-group fish were estimated by fishing with small meshed midwater trawls in the pelagic scattering layer, mainly between 0-50 m. However, echo sounder paper records and echo integrator measurements were also used as guide in these estimations.

A trawl haul was made about every 30 nautical miles sailed. Trawling distance was mainly 1 n.mile, and the trawling speed was about 3 knots. In layer with no 0-group fish recordings the hauls were made in the surface by using floats on the headline of the trawl and 50 m wire. On localities with some 0-group fish recordings in the 0-35 m layer the trawl with floats was towed for 0.5 n.mile in the surface and 0.5 n.mile at 25 m by using 25 m more wire. By trawling deeper than 35 m the trawl had to be used without floats, and depth metering devices were used for accurate control of the depth of trawling. All vessels used the modified capelin trawl with an opening of $(18 \cdot 15)m^2$ except for "Fridtjof Nansen" and "Poisk", who used a smaller trawl with an opening of $(6 \cdot 10)m^2$.

The described trawling procedure has involved a higher trawling frequency in the surface during the 1977 survey than in previous surveys. Such improved sampling techniques results probably in higher index of abundance for 0-group capelin (Beltestad et.al. 1975).

Fig. 1 show the survey tracks of the ships and the hydrographic stations worked. Position of trawl stations are indicated on the species distribution charts (Fig. 9-16).

RESULTS

Hydrography (Figs. 2-8).

As in previous years hydrographic observations were carried out along the survey tracks. The temperature conditions are shown in Figs. 2-5. At three main sections (Figs. 6-8) the mean tempearture have been compared with the average temperature from the period 1965-1977. The results are listed in Tables 1-3. Some few comments are given:

a) The Kola Section
The mean temperature in all layers are somewhat lower than normal. The anomalies are -0.6°, -0.3° and -0.3° for the layers 0-50 m, 50-200 m and 0-200 m respectively.

b) The North Cape - Bear Island Section
The mean temperature in the 0-200 m layer is 4.9° or 0.8° lower than the 1965-1977 average. This is the lowest mean temperature observed for the period 1965-1977.

c) The Bear Island - West Section
The mean temperature is 0.3° below the average for the period 1966-1977.

Generally, the temperature conditions in the Barents Sea and West Spitsbergen waters are low in 1977. This should indicate low water transport of the main current systems, particularly low inflow to the Barents Sea.

Distribution and abundance of 0-group fish

The distribution of 0-group fish of the main species are shown by the shaded areas in Figs. 9-16. Estimates of abundance which were calculated by the method of Haug and Nakken (1977), are given in Table 4 where they can be compared with estimates prepared from earlier surveys, yearly reported to ICES. Length frequency distribution of the main species are shown in Fig. 17.

Herring (Fig. 9)

A small patch of 0-group herring was observed along the coast of Northern Norway, extending from Senja Island to the North Cape area. The distribution area was slightly larger than last year, but the density was lower. The herring were small in size and the metamorphosis had not started.

Capelin (Fig. 10)

0-group capelin was distributed in several patches in the central and eastern part of the Barents Sea. The abundance was lower than the three previous years. The capelin were small in size and mainly distributed in the very surface layer.

Cod (Fig. 11)

The 0-group cod was mainly distributed in the central part of the Barents Sea. However, in contrast to the three preceeding years cod were also observed in the Bear Island - Spitsbergen area up to 80°N. The index of abundance indicates that the 1977 year class is of above average strength (Table 4). This year the cod were smaller in size compared to 1976.

Haddock (Fig. 12)

The distribution of haddock was similar to that observed in 1976. However, the abundance was higher in the Bear Island - Spitsbergen area. The 1977 year class is an abundant one, but not as abundant as the 1975 and 1974 year classes. The size of the 0-group haddock was smaller this year than in 1976, and the specimens caught in the northwestern part of the survey area was smaller than the specimens in the central part.

Polar cod (Fig. 13)

Polar cod was as in earlier years distributed in two separate areas. The distribution in the Spitsbergen area was similar to that of 1976, and the abundance index indicates that the year class was above average.

The area of distribution along the coast of Novaya Zemlja was larger than last year, but the density was very low. The abundance index for this component indicates that the 1977 year class is of low abundance.

The size distributions are approximately the same as that of 1976.

Redfish (Fig. 14)

The 0-group redfish had a more western distribution than previous years, but the area of dense consentrations was similar to that of 1976. The index of abundance indicates that the 1977 year class is a very rich year class comparable to that of 1974 and 1976. The 0-group redfish were slightly smaller in size compared to 1976, especially in the western part of the survey area.

Greenland halibut (Fig. 15)

As in previous years, Greenland halibut were only recorded in the West Spitsbergen area. The abundance was lower than the three previous years.

Long rough dab (Fig. 16)

This species was distributed over a wide area, but at low density like previous years. The abundance index indicates that the 1977 year class is of average abundance. The size of the fish was approximately similar to 1976.

Other species

Small numbers of 0-group mackerel, saithe, catfish and blue whiting

were caught on a few trawl stations during the survey. 0-group Leptagonus, Liparis, Lumpenus and Acanthocottus were widely distributed in the colder water. 0-group sandeels were as in previous years abundant in the south-eastern Barents Sea.

REFERENCES

BELTESTAD, A.K., NAKKEN, O. and SMEDSTAD, O.M. 1975. Investigations on diel vertical migration of 0-group fish in the Barents Sea. FiskDir.Skr.Ser.HavUnders., 16: 229-244.

HAUG, A. and NAKKEN, O. 1977. Echo abundance indices of 0-group fish in the Barents Sea 1965-1972. Rapp.P.-v. Reun.Cons.int.Explor.Mer, 170: 259-264.

Table 1. Mean water temperature in the Murmansk current, the Kola section (between 70°30'N and 72°30'N) at the end of August (t°C).

Year / Layer	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	Average 1965 - 1977
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	7.3
50-200 m	3.8	2.6	4.1	3.7	3.1	3.6	3.2	4.0	4.5	3.9	4.6	4.1	3.4	3.7
0-200 m	4.6	3.6	4.9	4.4	4.0	4.7	4.2	5.2	5.2	4.9	5.2	5.1	4.3	4.6

Table 2. Mean water temperature in the North Cape current, the North Cape to Bear Island section (between 71°33'N, 25°02'E and 73°35'N, 20°46'E) at the beginning of September (t°C).

Year / Layer	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	Average 1965 - 1977
0-200 m	5.1	5.5	5.6	5.4	6.0	6.1	5.7	6.3	6.2	6.1	5.7	5.7	4.9	5.7

Table 3. Mean water temperature in the West Spitsbergen current along the West Bear Island section (between 06°34'E and 15°55'E) in early September (t°C).

Year / Layer	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	Average 1966 - 1977
0-200 m	3.3	4.2	3.6	4.2	No data	4.2	3.9	5.0	4.6	4.9	5.0	4.0	4.3

Table 4. Abundance indices.

Species / Year	Cod	Capelin	Haddock	Redfish	Polar cod West	Polar cod East	Long rough dab	Greenland Halibut
1965	6	37	7	159	0		66	
1966	<1	119	<1	236	129		97	
1967	34	89	42	44	165		73	
1968	25	99	8	21	60		17	
1969	93	109	82	295	208		26	
1970	606	51	115	247	197		12	<1
1971	157	151	73	172	181		81	<1
1972	140	275	46	177	140		65	8.0
1973	684	125	54	385	(26)		67	3.2
1974	51	359	147	468	227		83	13.4
1975	343	320	170	315	75		113	21.1
1976	43	281	112	447	131		96	15.6
1977	173	194	116	472	157	70	72	9.0

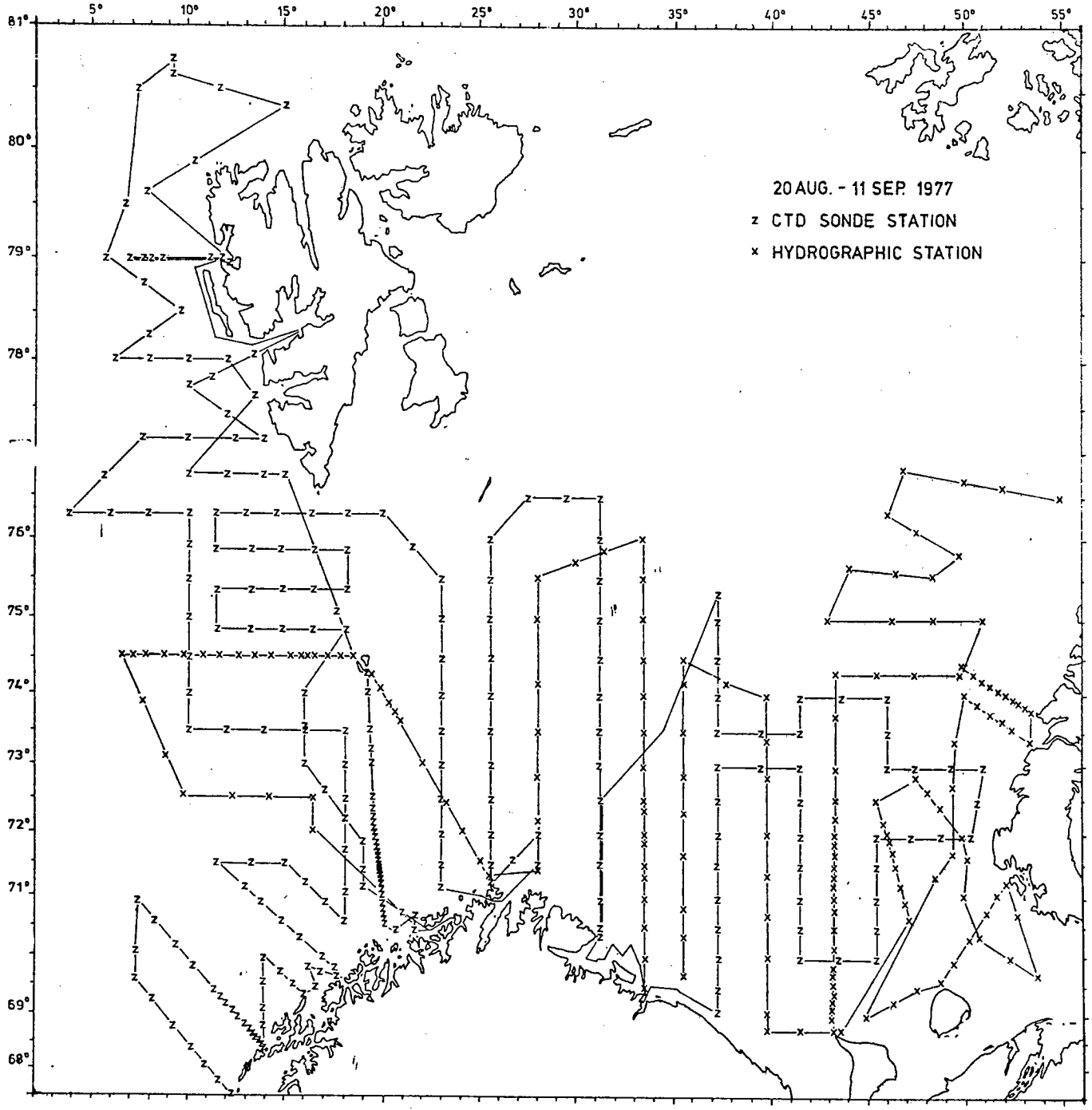

Fig. 1. Survey tracks of the ships and the grid of hydrographic stations.

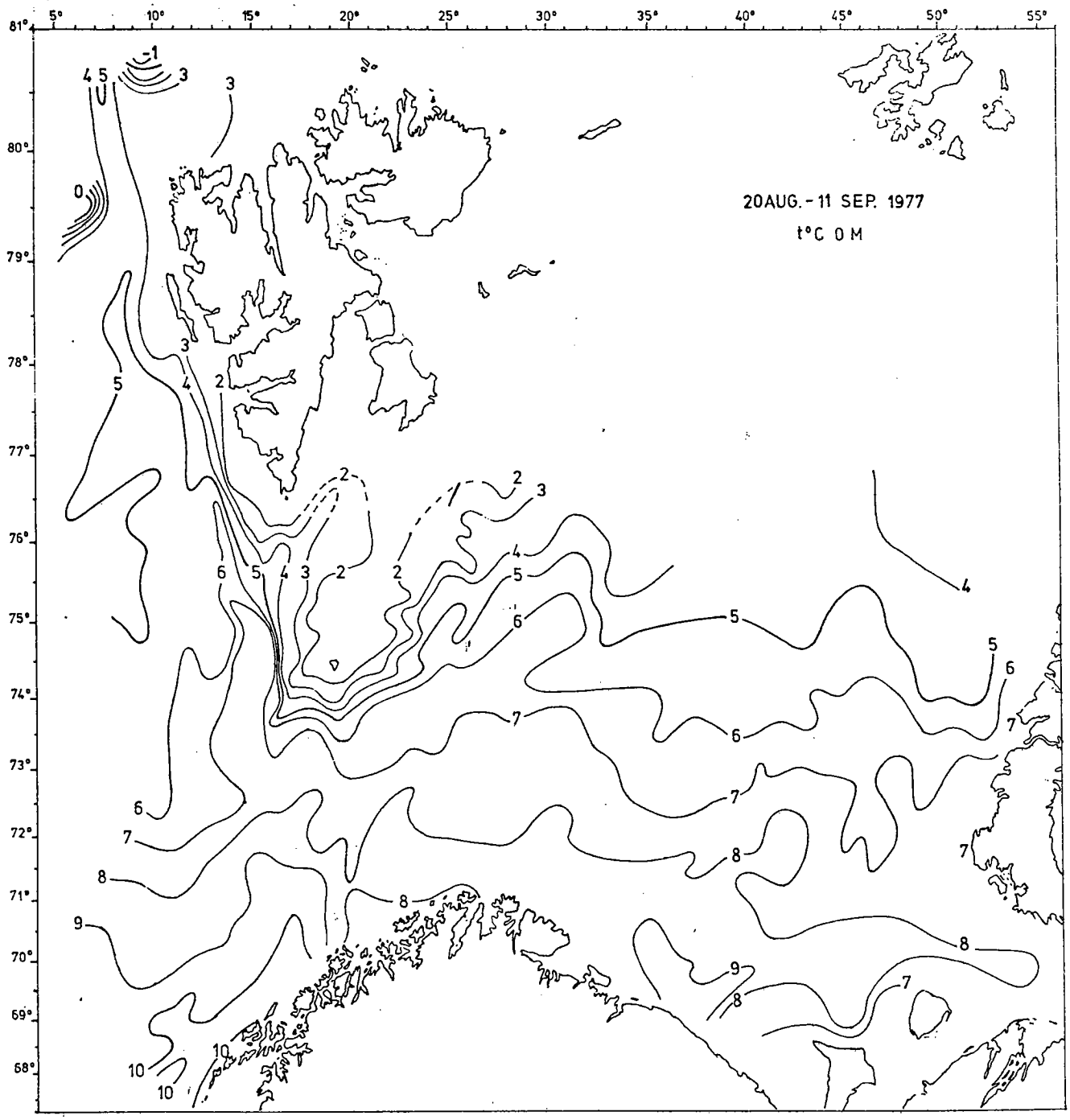

Fig. 2. Isotherms at 0 m.

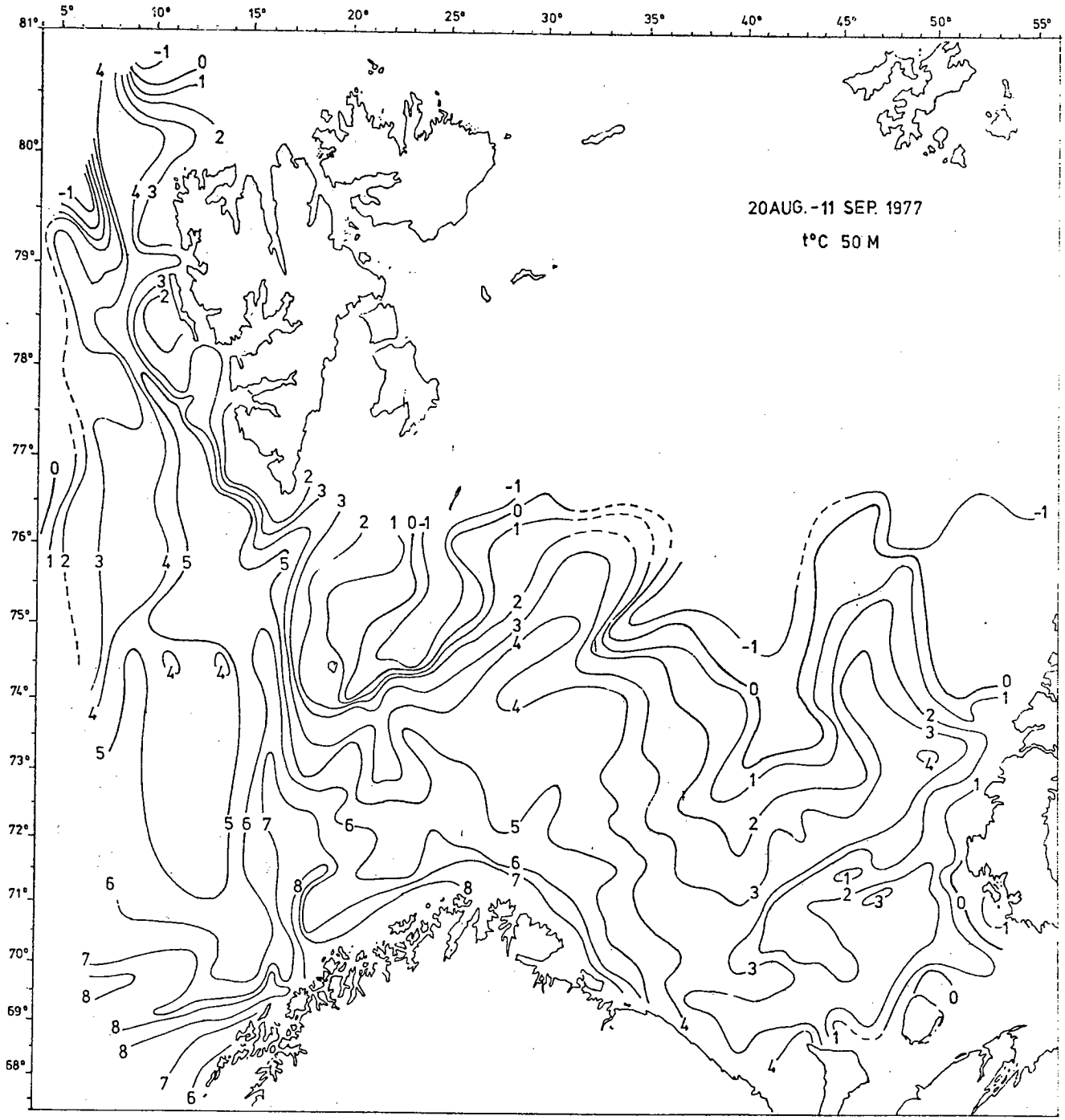

Fig. 3. Isotherms at 50 m.

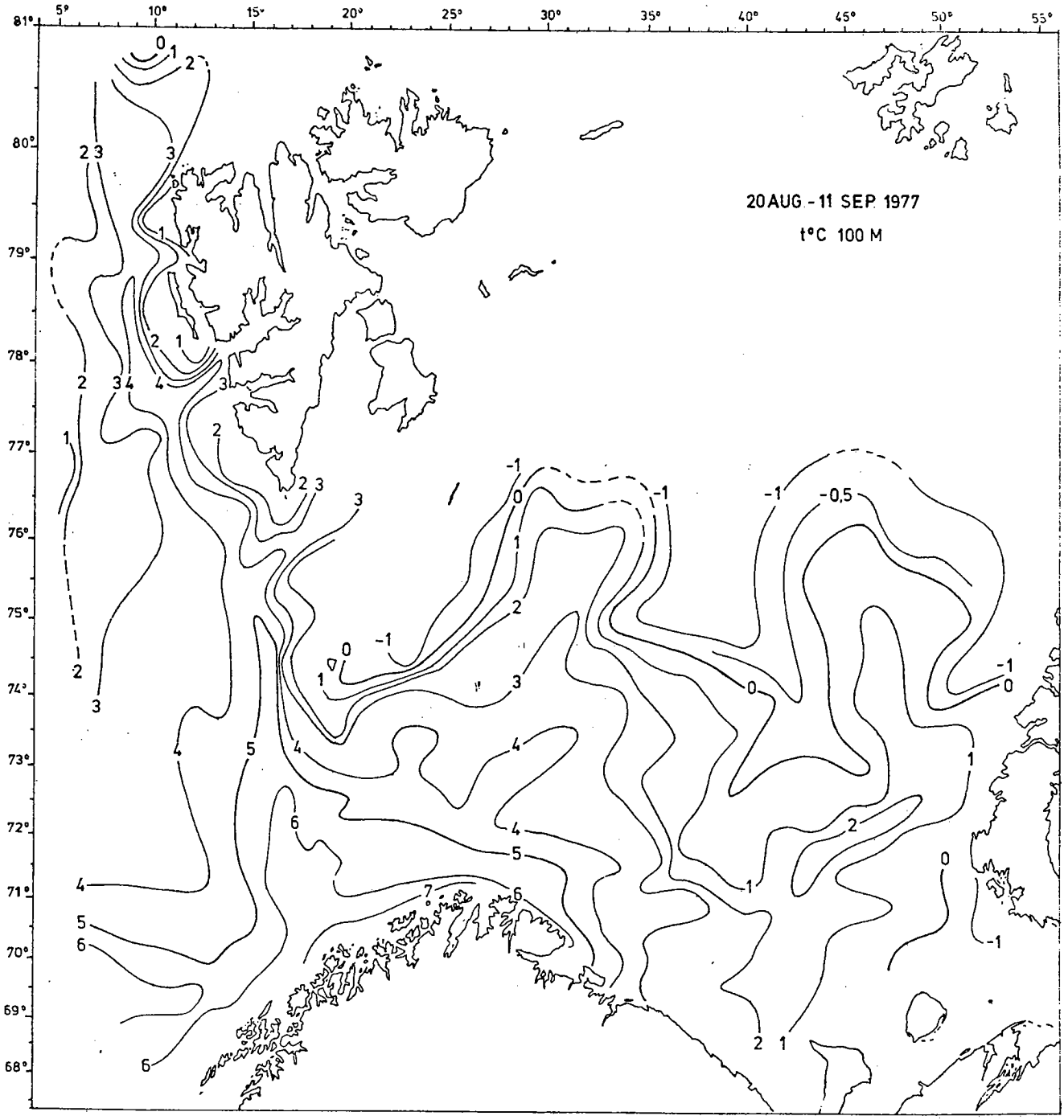

Fig. 4. Isotherms at 100 m.

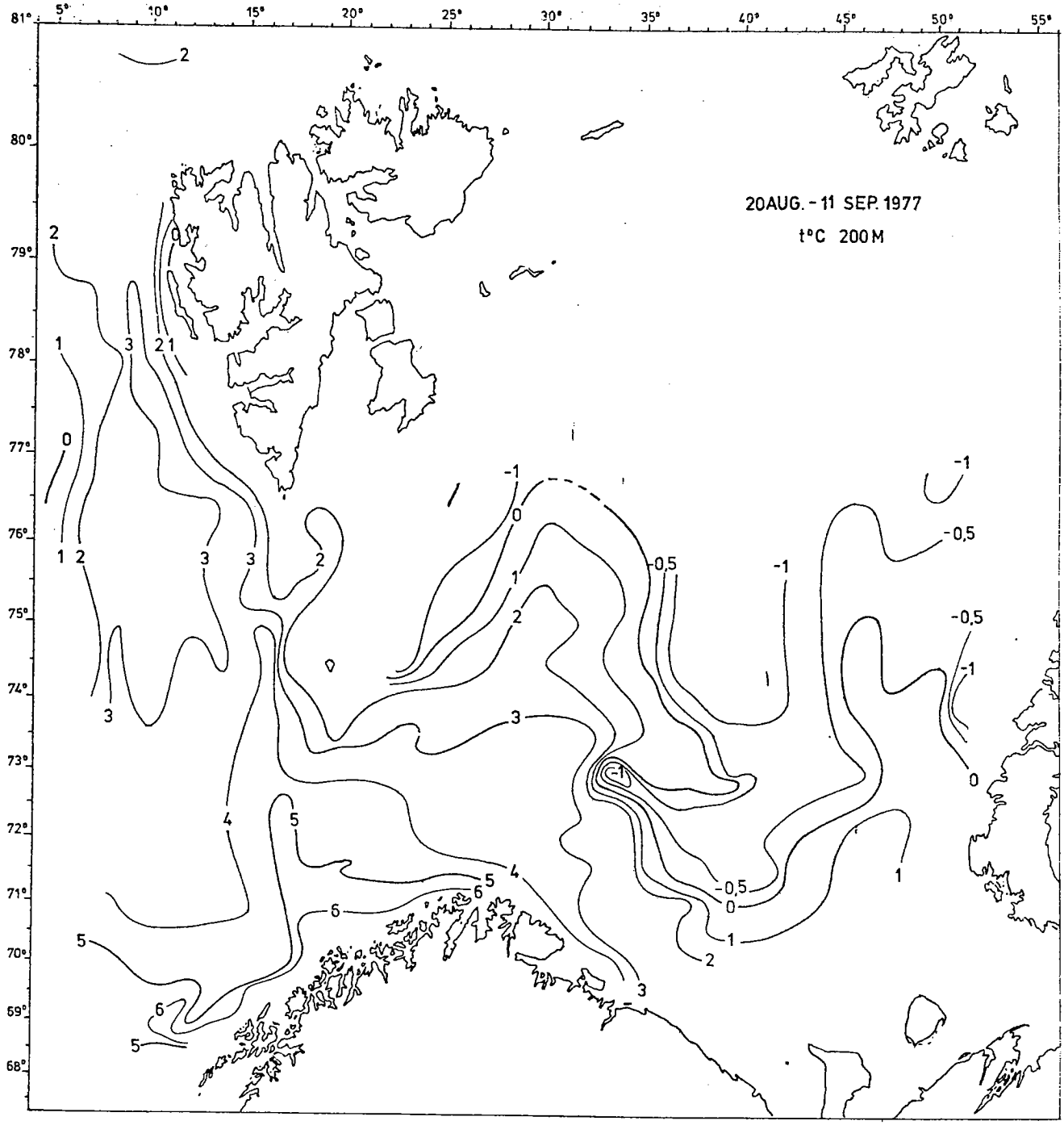

Fig. 5. Isotherms at 200 m.

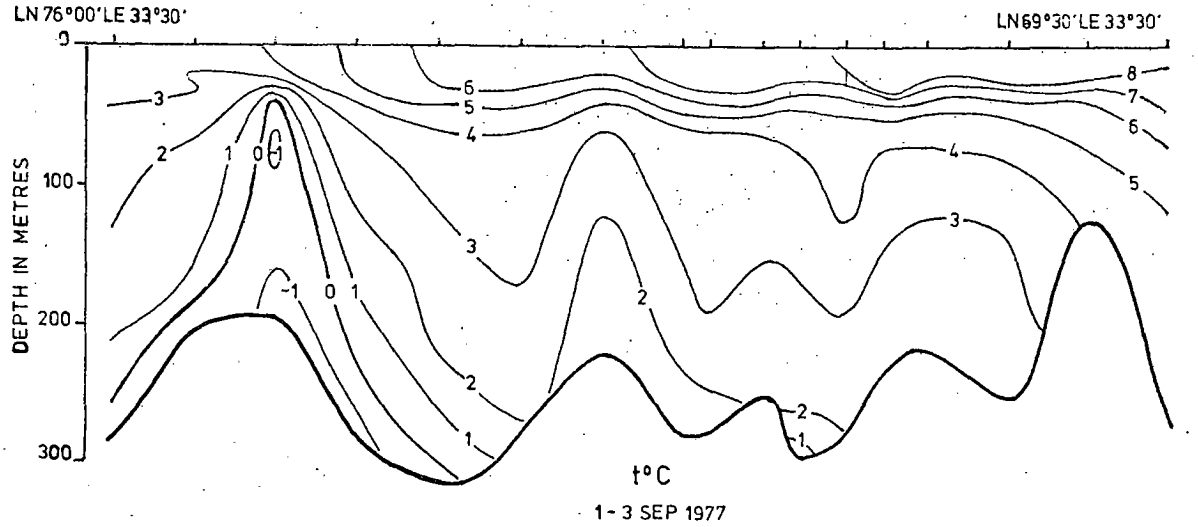

Fig. 6. Temperature section along the Kola meridian.

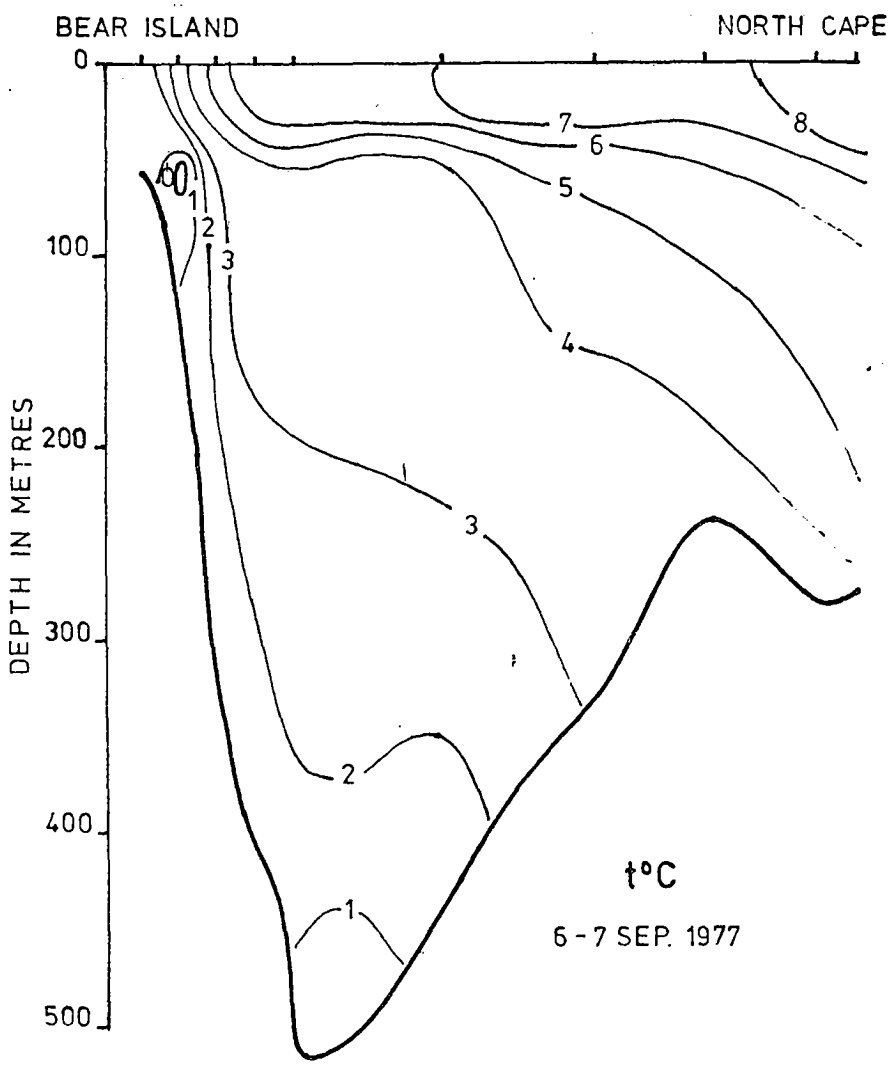

Fig. 7. Temperature section Bear Island - North Cape.

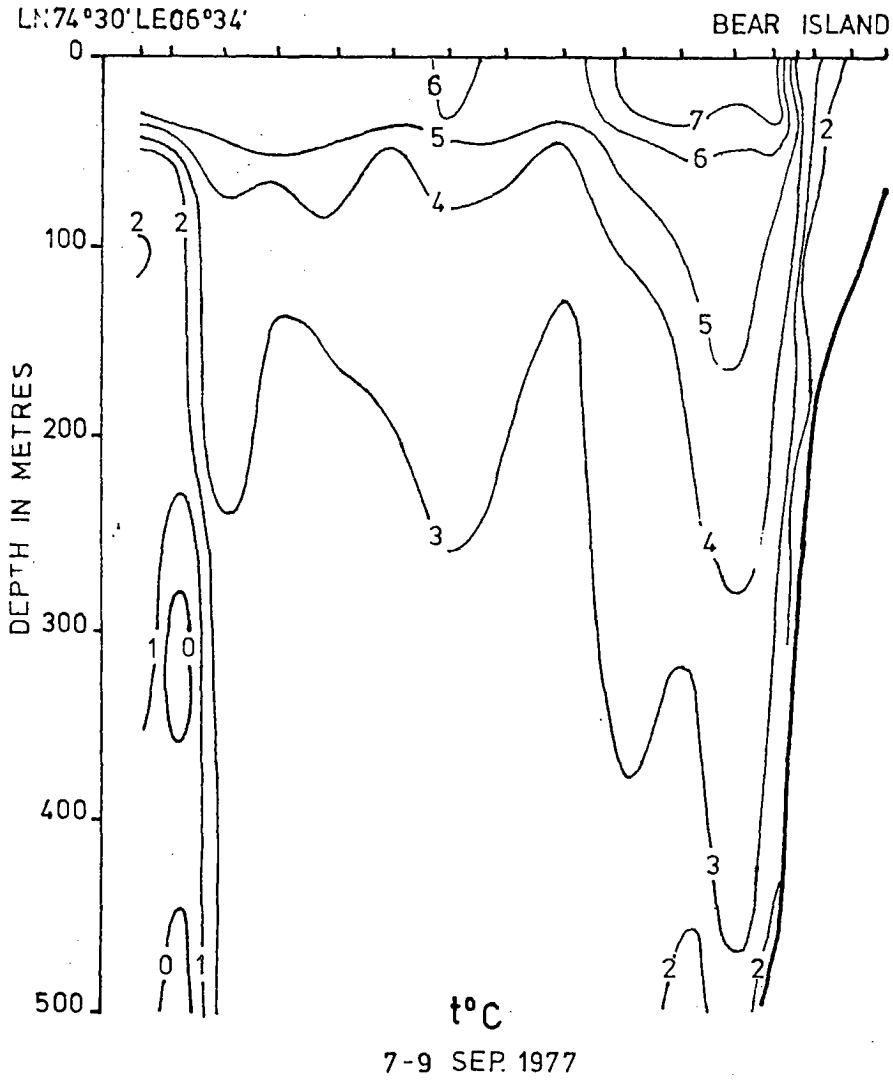

Fig. 8. Temperature section Bear Island - West.

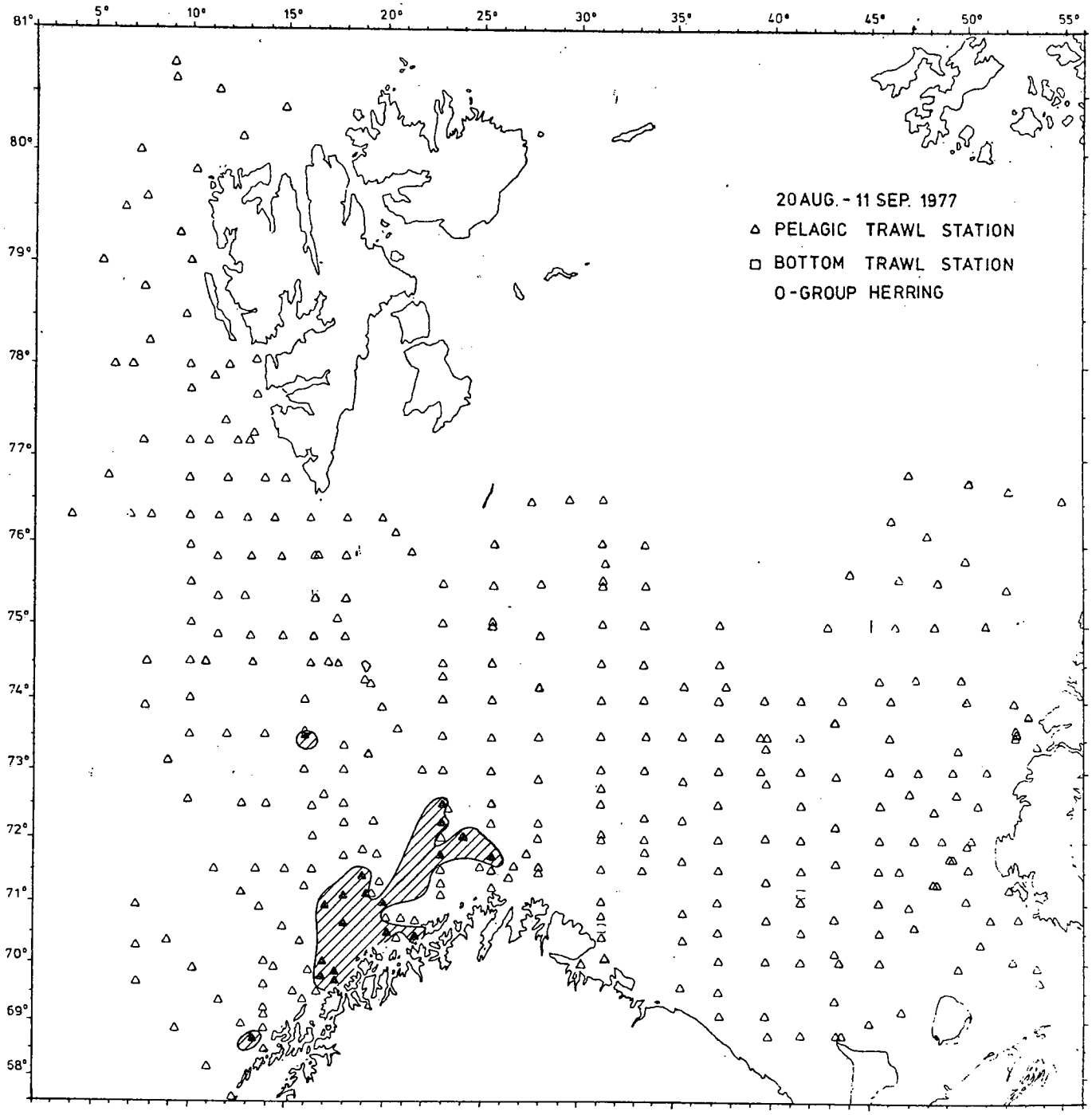

Fig. 9. Distribution of 0-group herring.

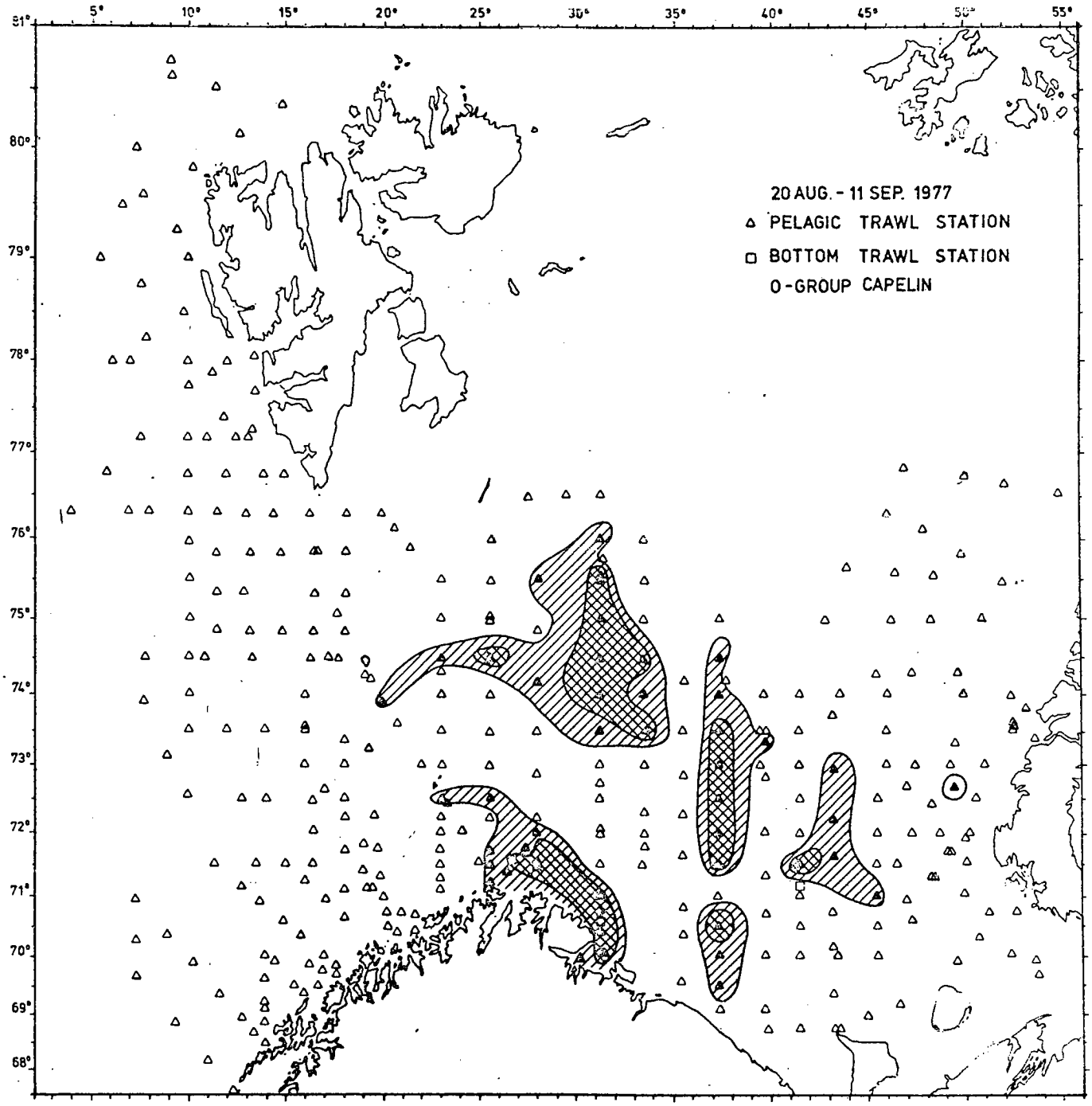

Fig. 10. Distribution of 0-group capelin.

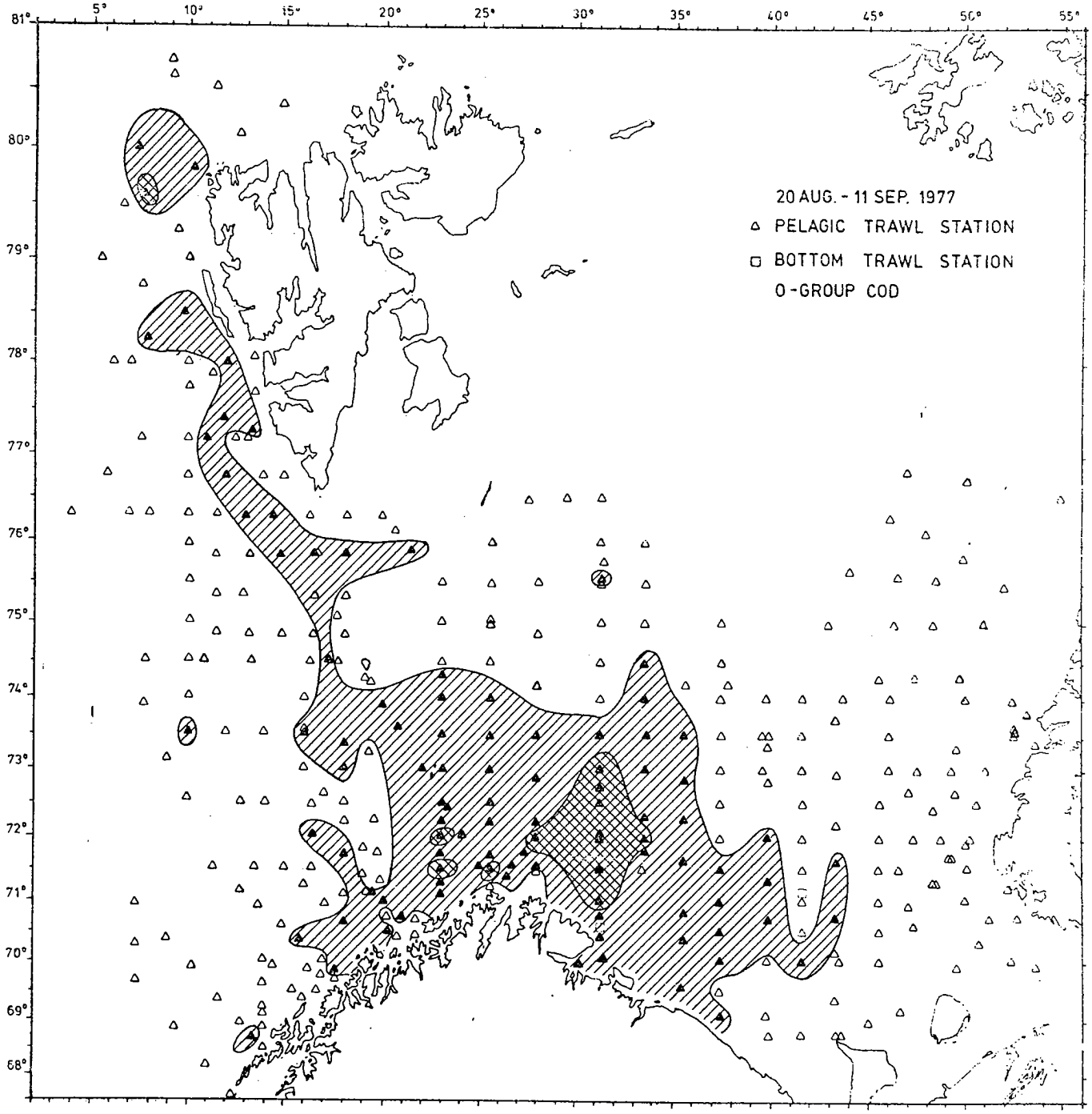

Fig. 11. Distribution of 0-group cod.

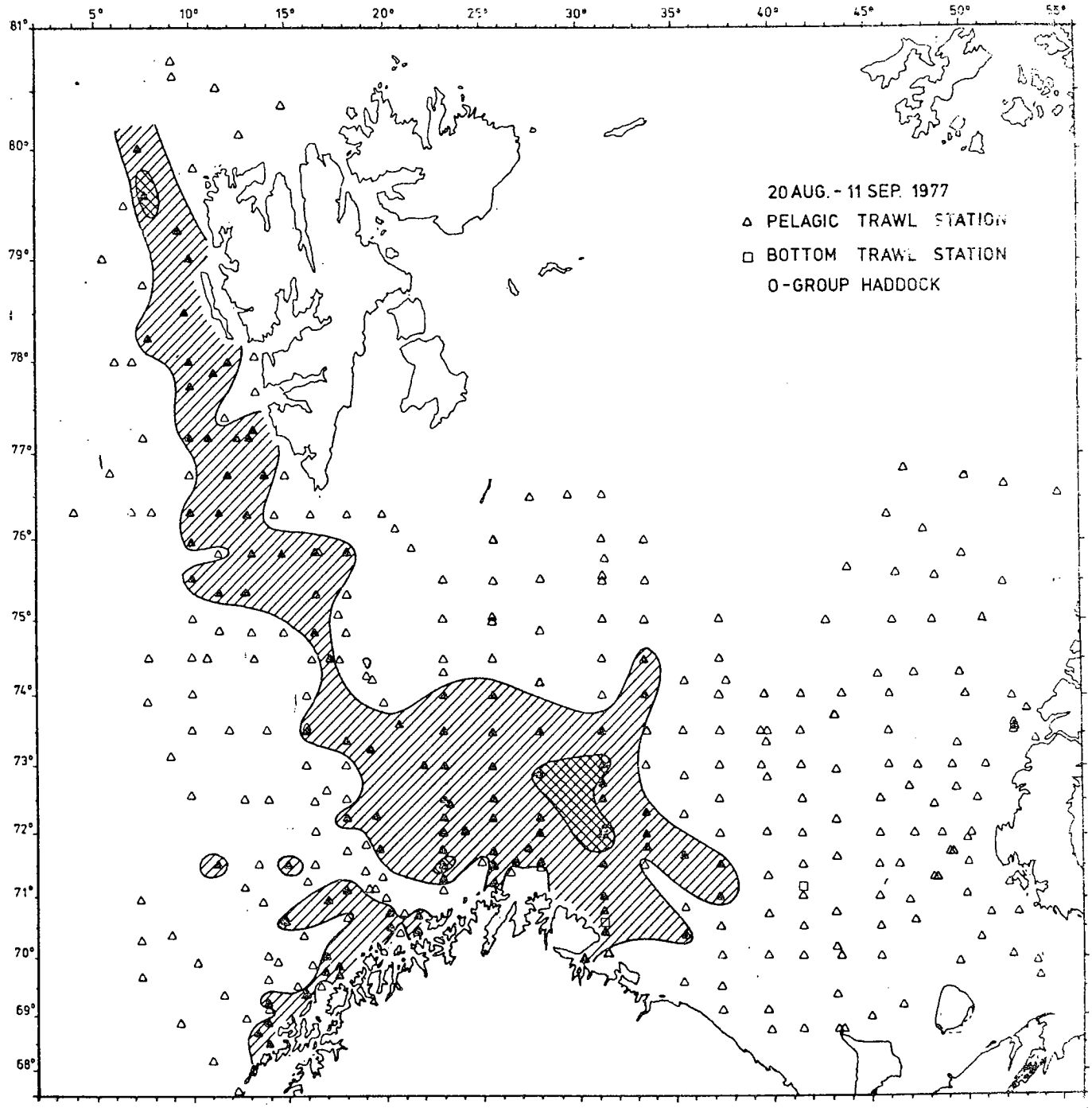

Fig. 12. Distribution of 0-group haddock.

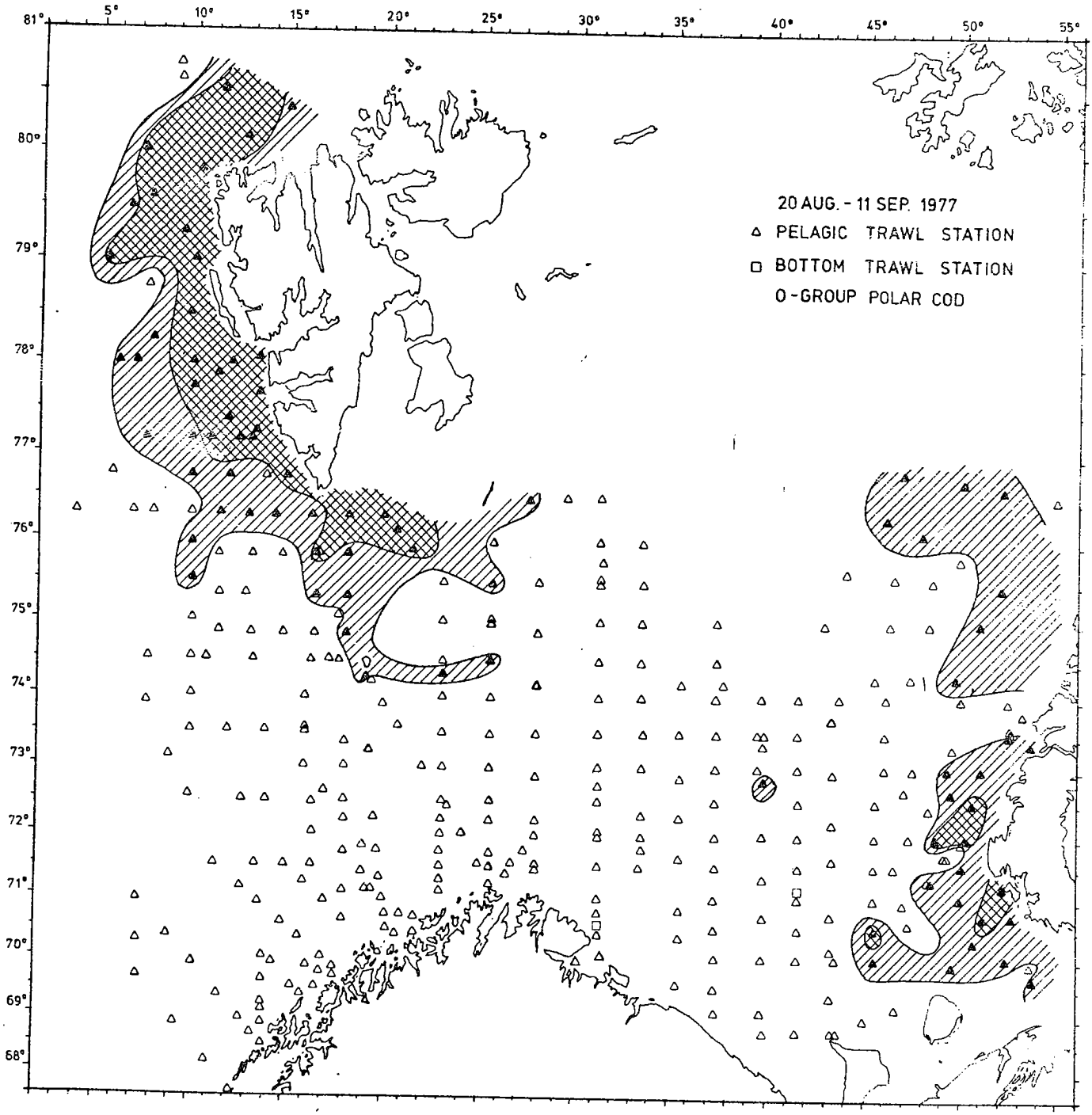

Fig. 13. Distribution of 0-group polar cod.

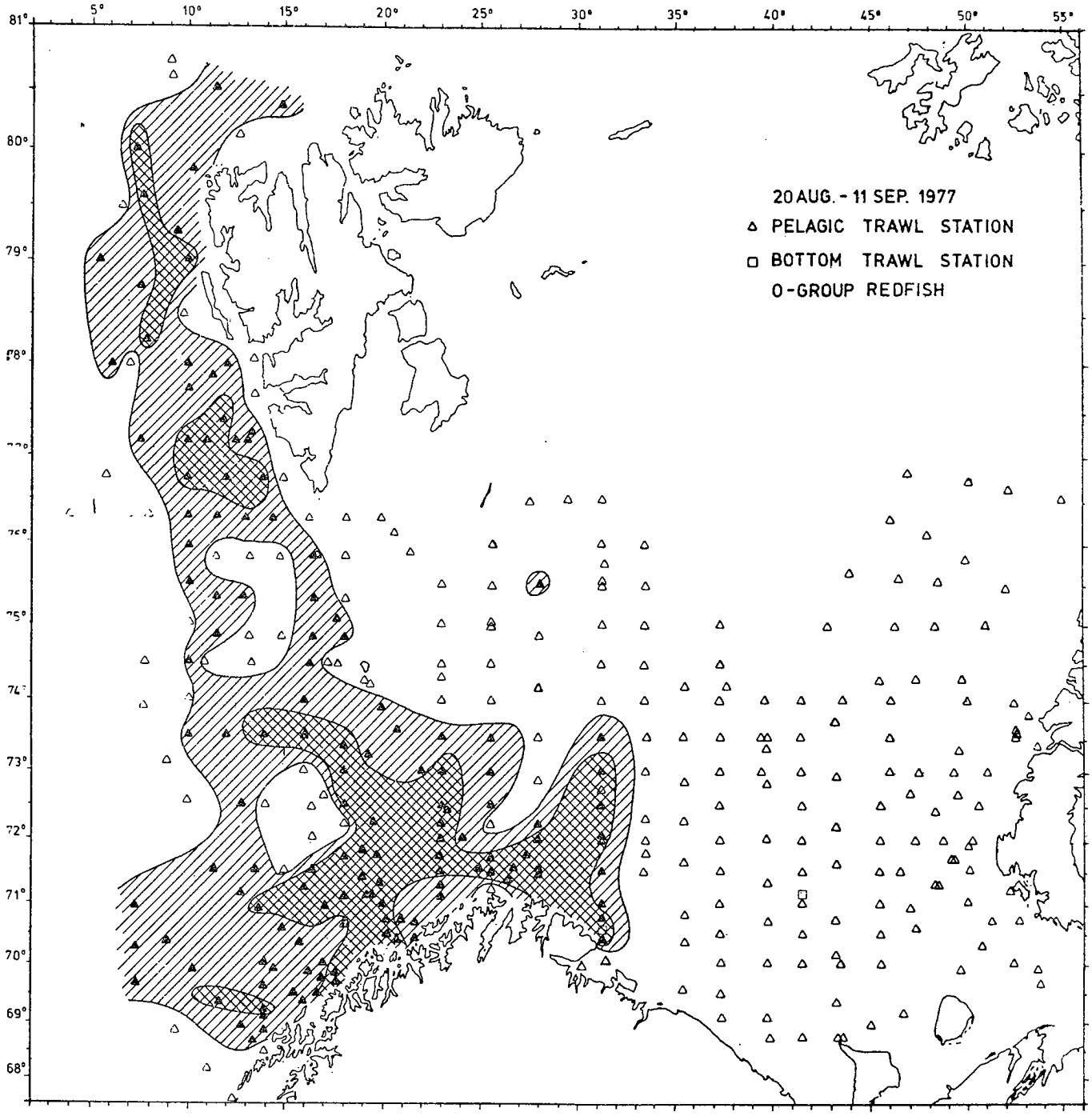

Fig. 14. Distribution of 0-group redfish.

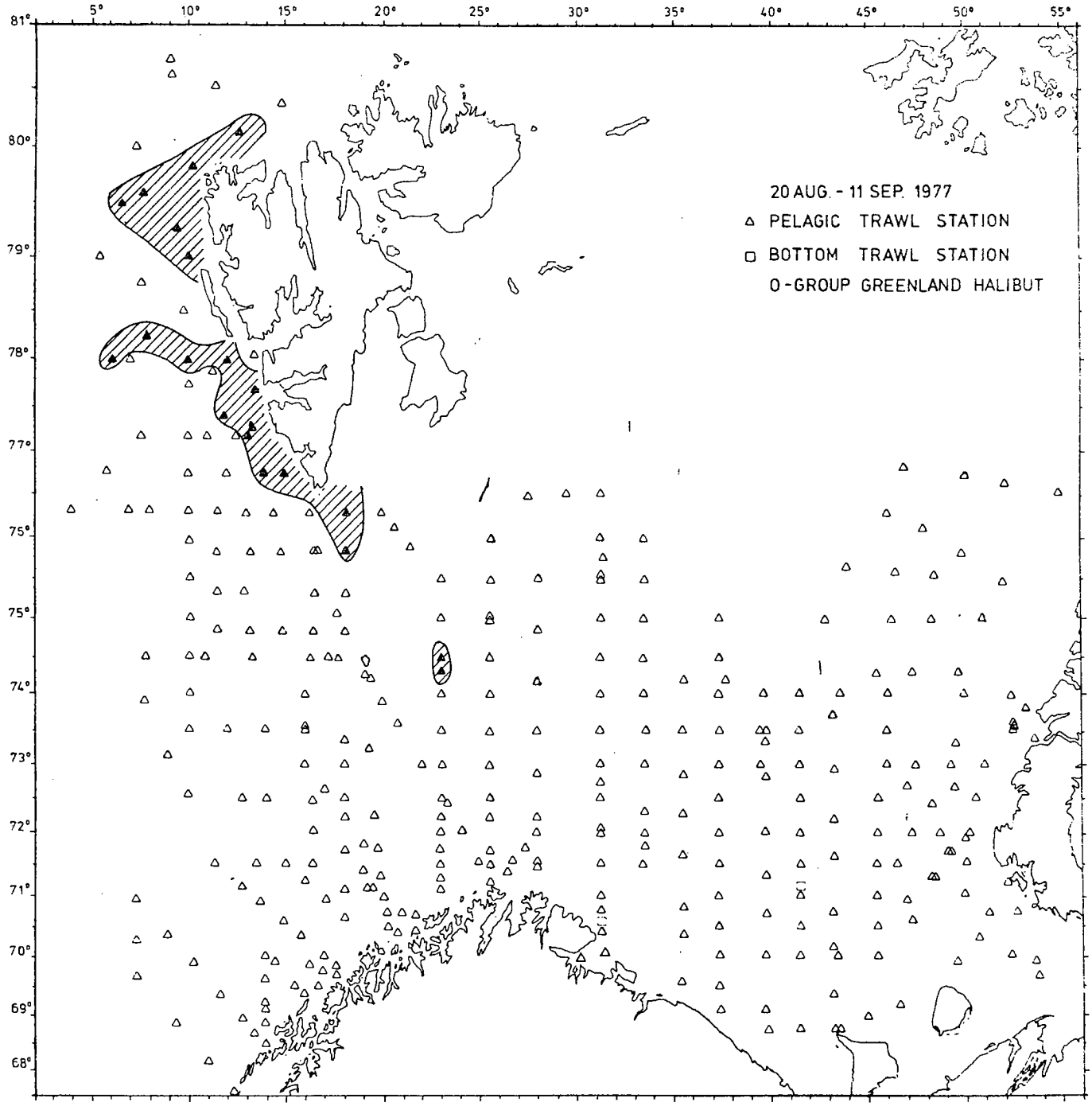

Fig. 15. Distribution of 0-group Greenland halibut.

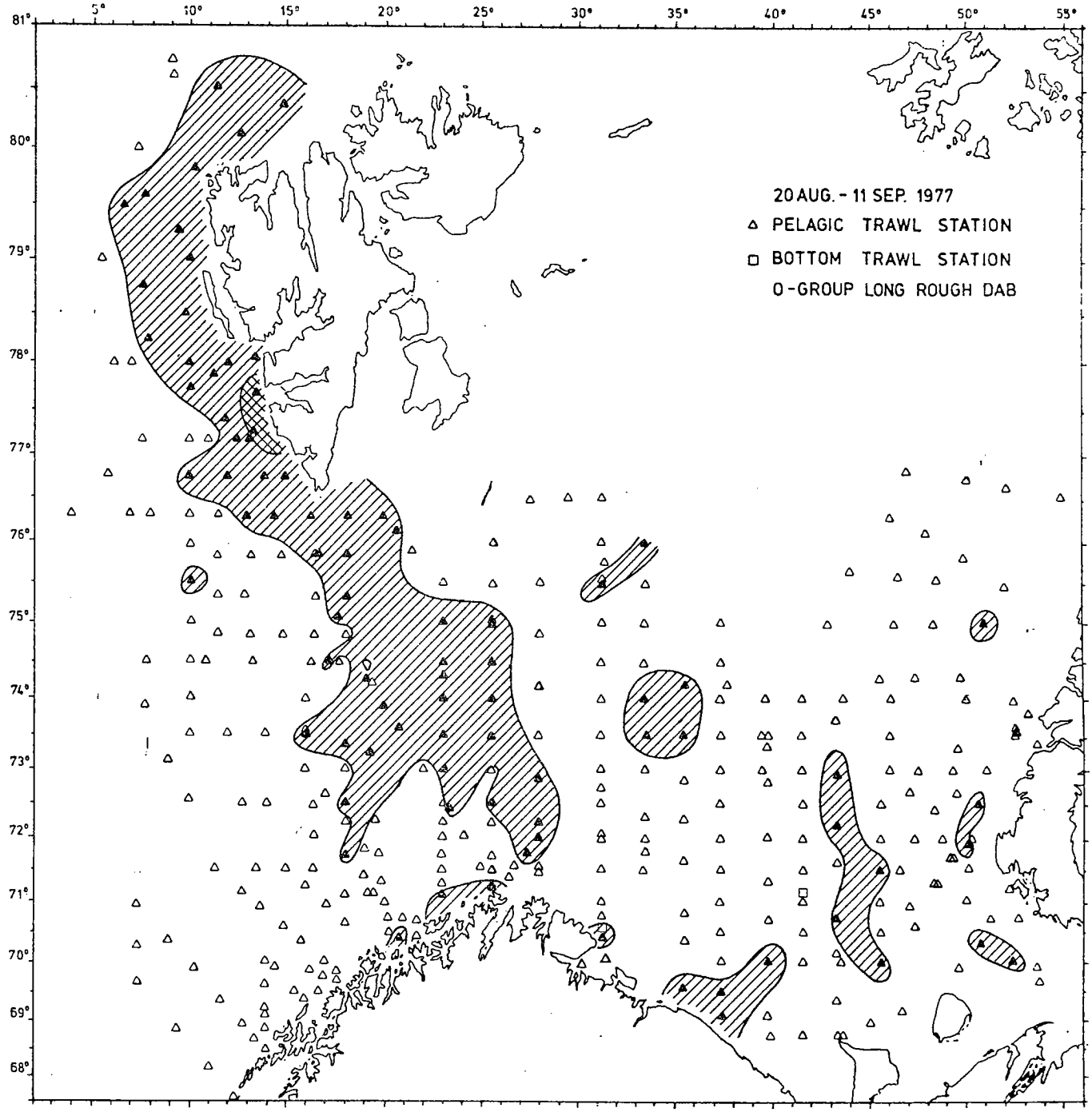

Fig. 16. Distribution of 0-group long rough dab.

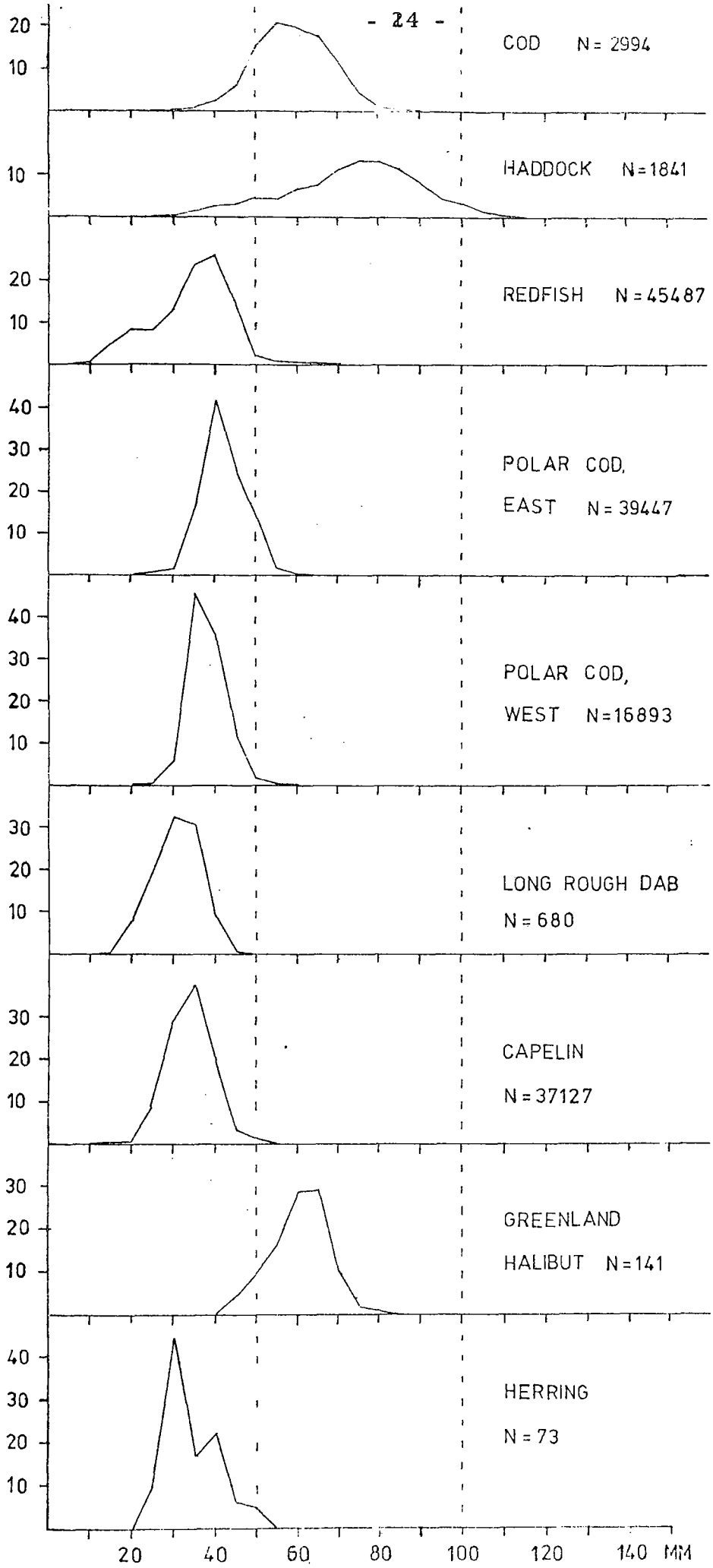

Fig. 17 Length distribution of 0-group fish.

APPENDIX

Survey period	Research vessel	Research Institute	Participants
22 August - 11 September	"G.O. Sars"	Institute of Marine Research, Bergen.	O. Annaniassen, O. Alvheim, S. Brattås, J. Dalen, K. Hansen, A. Hylen, H. Kismul, H.P. Knudsen, E. Lifjell, L. Midttun, O.M. Smedstad.
20 August - 11 September	"Johan Hjort"	Institute of Marine Research, Bergen.	I. Hoff, K.A. Larsen, S. Lygren, J. Monstad, T. Monstad, O. Martinsen, A. Pedersen, I. Røttingen, B. Skarsten, Ø. Torgersen.
31 August - 11 September	"Odissey"	Polar Research Institute of Marine Fisheries and Oceanography, Murmansk.	V.N. Kuznetsov, A.S. Galkin, S.D. Melnikov, O.F. Pavlov, V.S. Mamylov, E.A. Sorokin, V.V. Vidosov, V.N. Ryazantsev, H.I. Kovtsov, G.V. Popkov, Mrs. A.V. Il'ina, Miss L.N. Popova, A.M. Gavrikov.
26 August - 11 September	"Fridtjof Nansen"	Polar Research Institute of Marine Fisheries and Oceanography, Murmansk.	I.V. Borkin, Yu.F. Shevtsov, S.V. Rochitelev, N.P. Chebotok.
25 August - 11 September	"Poisk"	Polar Research Institute of Marine Fisheries and Oceanography, Murmansk.	E.N. Gavrilov, N.A. Isaev, T.P. Yarovoy.