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International Council for
the Exploration of the Sea

CM 1979/H: 65
Pelagic Fish Committee
Ref: Demersal Fish and
Hydrographic Committees

Preliminary report of the International 0-group fish survey in
the Barents Sea and adjacent waters in August - September 1979.

The fifteenth annual International 0-group fish survey was made during the period 19 August - 14 September 1979 in the Barents Sea and adjacent waters. The following research vessels participated in the survey:

State	Name of vessel	Survey time	Research Institute
Norway	"Johan Hjort"	26 August - 14 September	Institute of Marine Research, Bergen.
Norway	"G.O. Sars"	19 August - 14 September	" "
USSR	"Poisk"	29 August - 14 September	The Polar Research Institute of Marine Fisheries and Oceanography, Murmansk
USSR	"Achill"	1 September - 3 September	" "

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

The survey data was analysed the 15-16 September in Hammerfest. Observations concerning the geographical distribution of 0-group fish and their abundance are given in this report together with a brief discription of the temperature condition in the area.

MATERIAL AND METHODS

Most of the trawl hauls are made at the depth of the heaviest trace of 0-group fish recorded on the echosounder, mainly between 0-50 m. Trawling procedure has been the same as in 1977 and 1978 (Ann.biol. 1978).

R/V "G.O. Sars" and R/V "Johan Hjort" are operating the midwater trawl from the stern, while R/V "Poisk" does it from the side of the vessel. The midwater trawl used by the Norwegian vessels has a 16 fathom horizontal and vertical opening, while the measures of the trawl used by the USSR vessel are 8-11 m and 4 m respectively. Norwegian vessels are able to trawl near the surface by using 4 bigger floats on the headline. Such floats are not used by the USSR vessel, and she is, therefore, not able to trawl in the near surface layer. All these factors give a low catch performance of the USSR vessel, specially for redfish and capelin. The catch rates of this vessel have, therefore, only been used as a guideline in the drawing of distribution charts for 0-group fish.

Survey tracks and hydrographical stations are given in Fig. 1. Trawl stations with and without catch are given on the distribution charts in Fig. 10-18, as filled and open symbols respectively.

RESULTS

Hydrography (Figs. 2-9 and Tables 1-4)

Hydrographic observations were made along all survey tracks, mainly at each 30 nautical mile. Horizontal temperature distributions are shown for 0, 50 100 and 200 m depth (Figs. 2-5). Temperature condition is given in Figs. 6-9 for four standard hydrographic sections, and the average temperature in these sections are given in Tables 1-4. Some general comments are given:

1) Kola section

The cooling of the 0-50 m, 50-200 m and 0-200 m layers observed from 1976 to 1978 was nearly reversed in 1979.

However, the average temperature is still below the average for the period 1965-1979, with an anomalie of -0.7° for all three layers.

2) Cape Kanin - North section

A further decrease of average temperature in the 0 to bottom layer was observed from 1978 to 1979 in the southern part of the section (2.4°C to 2.0°C). In the northern part, the average temperature increased from 1.7°C to 1.8°C . For both parts of the section the temperature condition was at the lowest level recorded for the period, with anomalies of -2.2° and -1.5° respectively.

3) North Cape - Bear Island section

The average temperature in the 0-200 m layer increased from 5.0°C in 1978 to 5.3°C in 1979. However, the anomaly is still -0.3° .

4) Bear Island - West section

The average temperature in the 0-200 m layer increased from 4.1°C in 1978 to 4.4°C in 1979, compared with the average 4.3°C for the period 1966-1979.

In general, the temperatures in the Barents Sea were low in 1979. This should indicate a low water transport by the main current in this area. The average temperature condition west of Bear Island indicates a more normal transport by the Spitsbergen current.

DISTRIBUTION AND ABUNDANCE OF 0-GROUP FISH

Geographical distribution of 0-group fish are shown by shaded areas in Figs. 10-18. Double shading indicates dense concentrations. Criteria used to discriminate between scattered and dense concentrations are the same as used in earlier reports (Ann. biol. 1978).

Abundance indices estimated as the area of distribution, areas of high densities weighted by 10, are given in Table 5. Length-frequency distributions of the main species are given in Fig. 19.

Herring (Fig. 10)

0-group herring was distributed over an area slightly larger than in 1978, but the overall density was lower. In addition to the observations along the coast of northern Norway, smaller areas or patches were located in the area west of Spitsbergen and in the Barents Sea. The offshore patches of herring in the Barents Sea were observed in areas with dense concentration of 0-group capelin. This might have been created by difficulties in selecting 0-group herring from the catches, completely dominated by 0-group capelin.

Capelin (Fig. 11)

The 0-group capelin was mostly confined to the near surface layer and almost all capelin caught were found entangled in the trawlnets. It was distributed over a much wider area than in the recent 3 years, and dense concentrations covered the main part of the area. This created the highest abundance index recorded for the period 1965-1979. However, in spite of the rather low correlation between 0-group indices and acoustic abundance estimate of the year class as two year old, the high abundance index indicates that the 1979 year class is good.

Cod (Fig. 12)

0-group cod was not observed as far north west of Spitsbergen as in 1978, but the 1979 year class was recorded further to the east than last year. More than 85 0-group cod, the number discriminating between scattered and dense concentrations, was only caught on 2 trawl stations. The estimated abundance index indicates that the 1979 year class is below average, the same classification as given for the 1978 year class.

Haddock (Fig. 13)

0-group haddock was not observed west of Spitsbergen as in 1978. The distribution in other parts of the area was similar to that

in 1978. No dense concentrations were recorded, and the abundance index indicates that the 1979 year class is below average strength, similar to the preceding year class.

Saithe (Fig. 14)

In most years, only few 0-group saithe have been recorded outside the Norwegian coastal waters. However, in 1979 a patch was observed in the area west of Spitsbergen, a situation similar to that in 1967. No abundance index of any significance can be estimated on the basis of the survey data.

Polar cod (Fig. 15)

The distribution of 0-group polar cod was more or less similar to those of the preceding two years, with the Spitsbergen and the Novaya Zemlja components. Because of limited research vessel time, the area of distribution was not adequately covered, either in 1978 or in 1979. The estimated abundance indices are therefore too low for both components. However, even so the high abundance index of the 1979 year class in the eastern component indicate a good year class.

Redfish (Fig. 16)

The area of distribution was similar to that in 1978. However, a bigger area of dense concentration was observed. This involve a high abundance index, the highest recorded, which indicates another rich year class, the seventh in succession.

Greenland halibut (Fig. 17)

The distribution of 0-group Greenland halibut was similar to those of the two previous year classes, located mainly in the Spitsbergen area. The abundance index for the 1979 year class indicates that it is above average strength.

Long rough dab (Fig. 18)

Unlike the previous two years, 0-group long rough dab was nearly absent in the area west of Spitsbergen. It extended further to the east in the Barents Sea than in 1978. The abundance index indicates a year class of average strength.

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	1978	1979	Average 1965-1979
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	7.2
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	3.6
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

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

Year	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	Average 1965-1979
68°45'N																
70°05'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	4.2
71°00'N																
72°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	3.3

Table 3. 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	1978	1979	Average 1965-1979
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	5.6

Table 4. 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	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	Average 1966-1979
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	4.3

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

APPENDIX

Survey period	Research vessel	Research Institute	Participants
19 August - 14 September	"G.O. Sars"	Institute of Marine Research, Bergen.	A. Asenjo, E. Anziani, O. Alvheim, H. Abrahamsen, J. Blindheim, A. Dommasnes, I. Forberg, H. Gundersen, J. Hamre, K. Hansen, K. Hestenes, A. Hysten, E. Molvær, A. Nødtvedt, A. Pedersen, A. Romslo, J. Røttingen, I. Svellingen.
26 August - 14 September	"Johan Hjort"	Institute of Marine Research, Bergen.	V.N. Bande, V. Frivoll, I. Hoff, E. Lifjell, S. Lygren, O. Martinsen, T. Monstad, Ø. Torgersen.
29 August - 14 September	"Poisk"	Polar Research Institute of Marine Fisheries and Oceano- graphy, Murmansk.	N.G. Ushakov, V.S. Mamylov, N.P. Chebotok, B.N. Nenko, A.V. Averchenko, V.N. Zaitsev.
1 September - 3 September	"Akhill"	Polar Research Institute of Marine Fisheries and Oceano- graphy, Murmansk.	

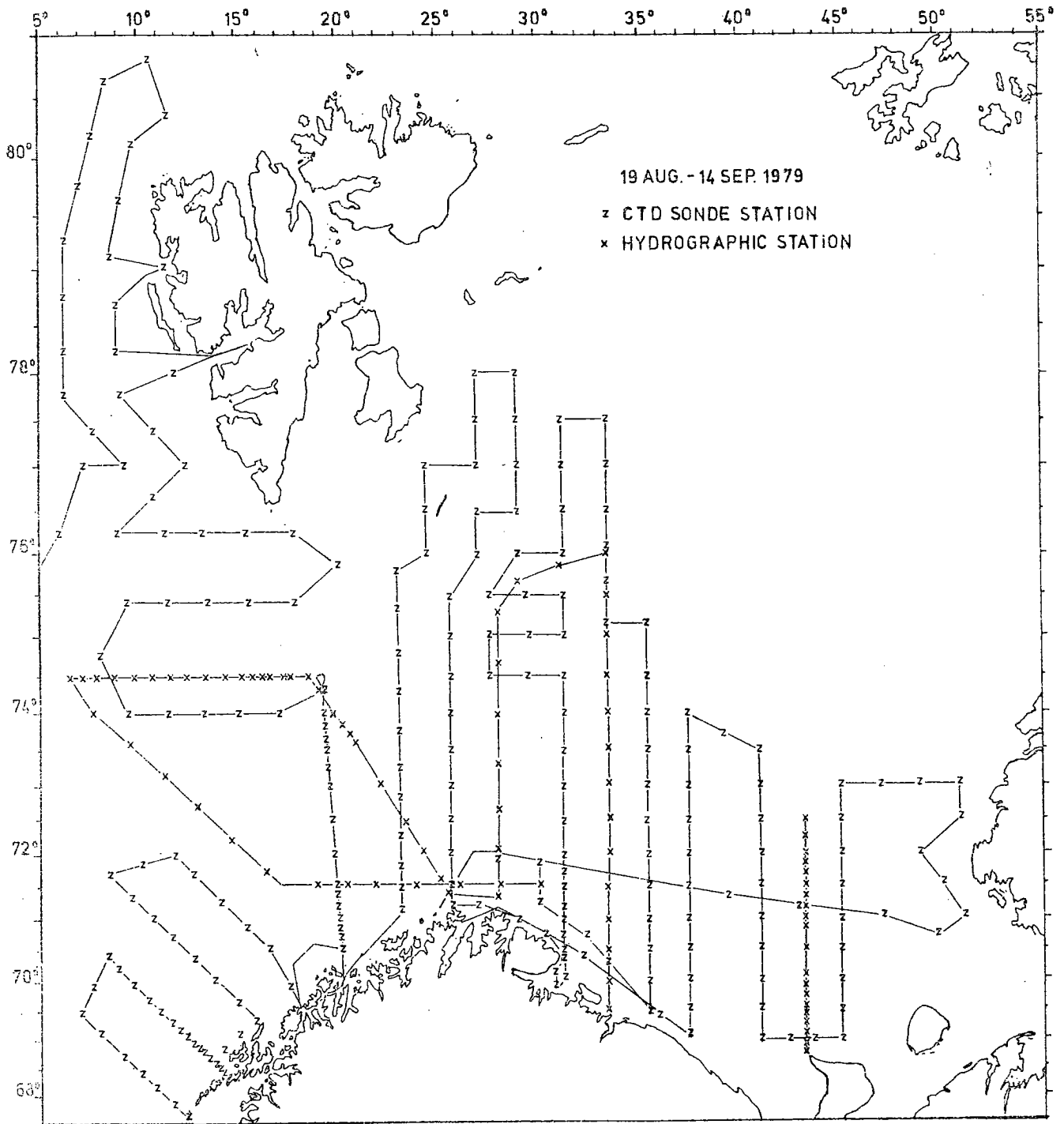


Fig. 1. Survey tracks of the ships and the grid of hydrographic stations.

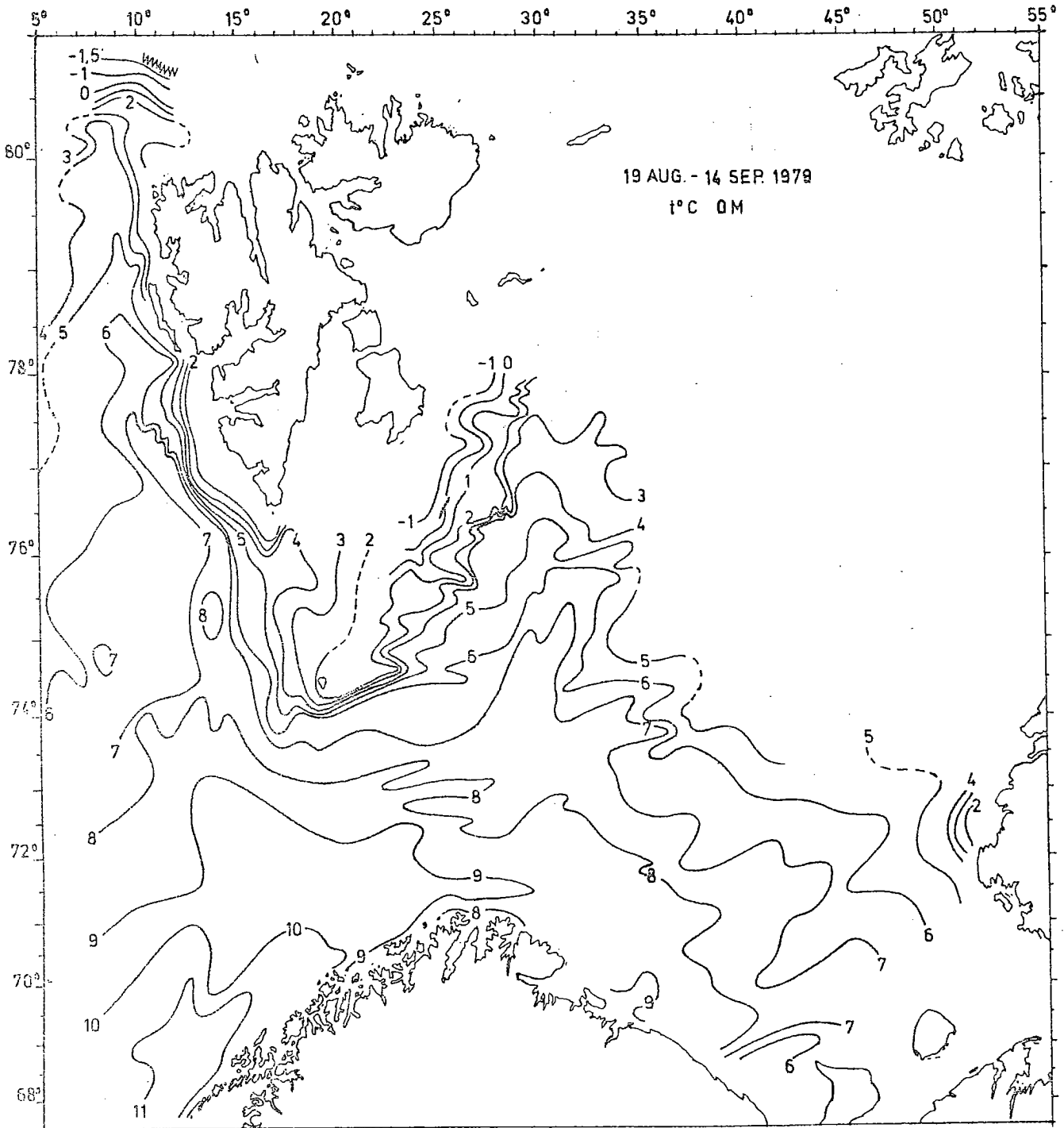


Fig. 2. Isotherms at 0 m.

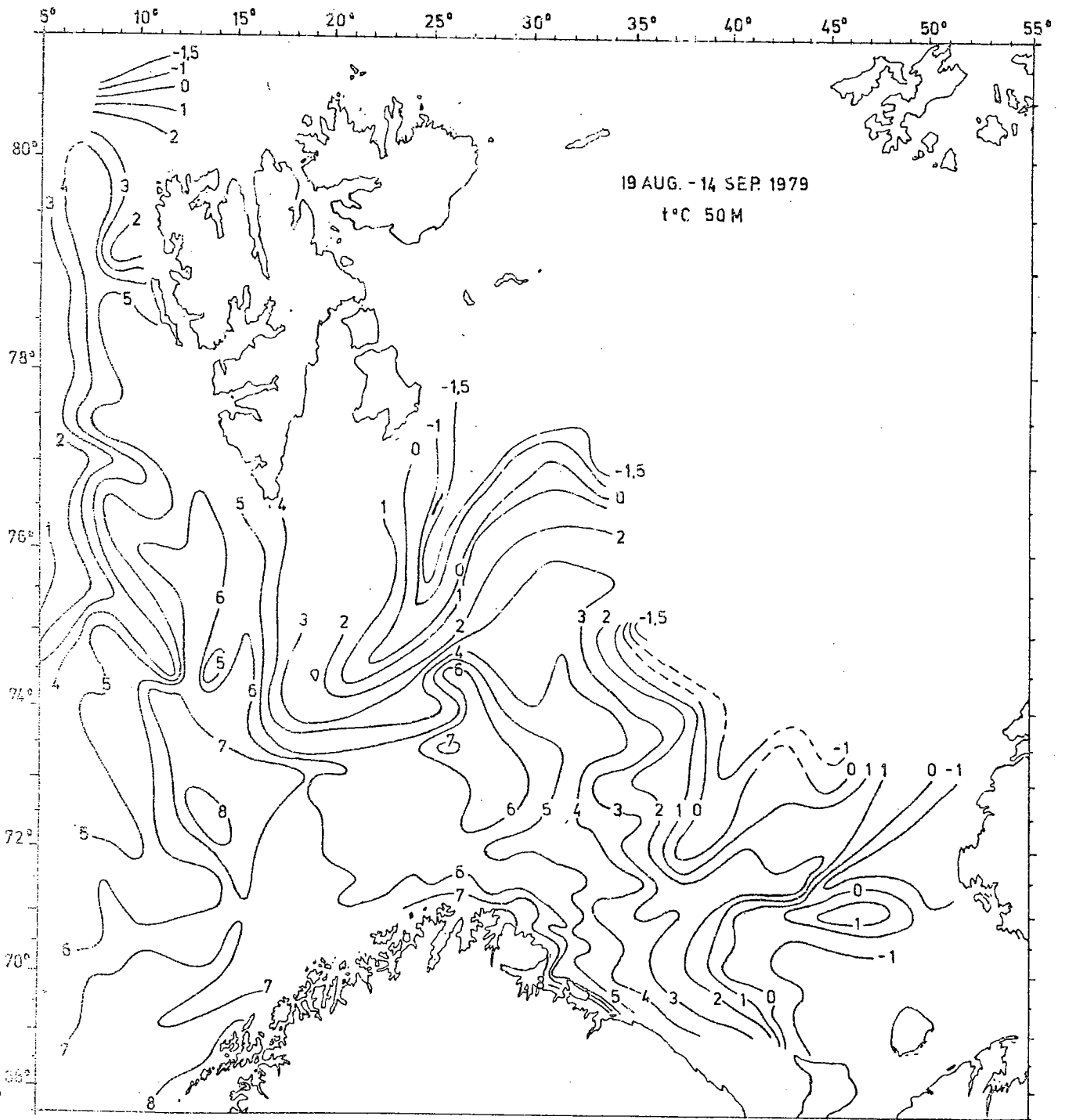


Fig. 2. Isotherms at 50 m.

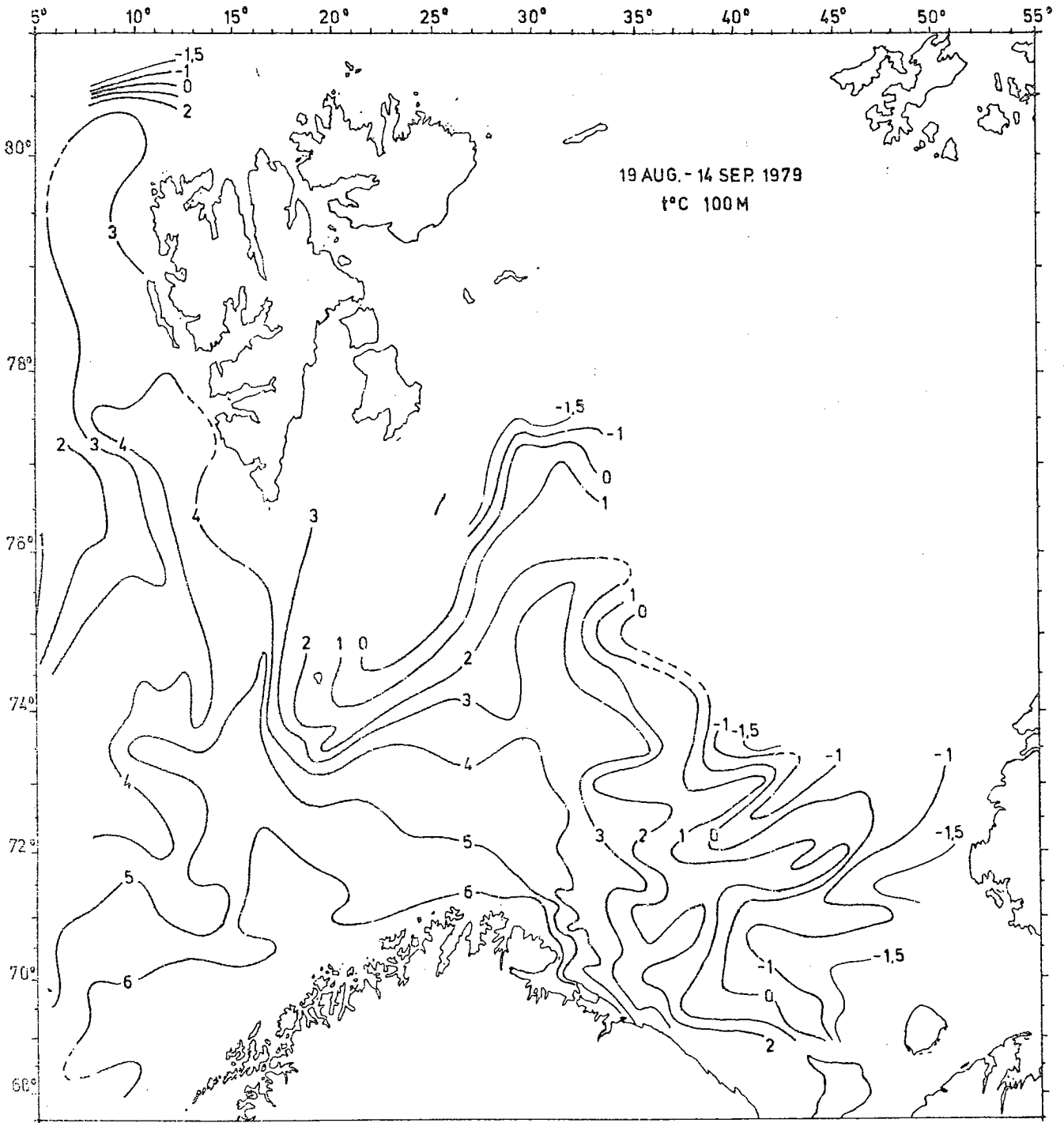


Fig. 4. Isotherms at 100 m.

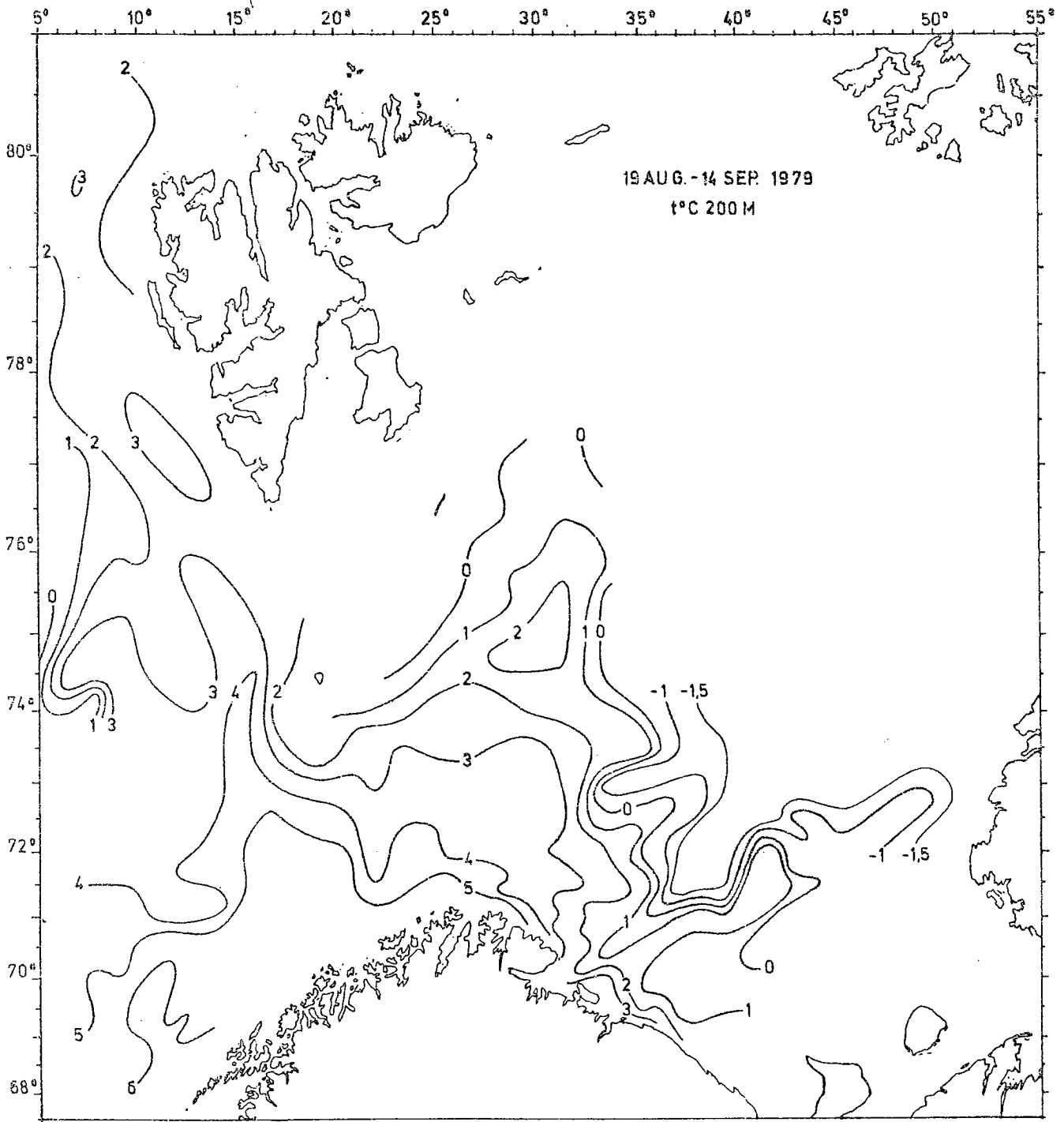


Fig. 5. Isotherms at 200 m.

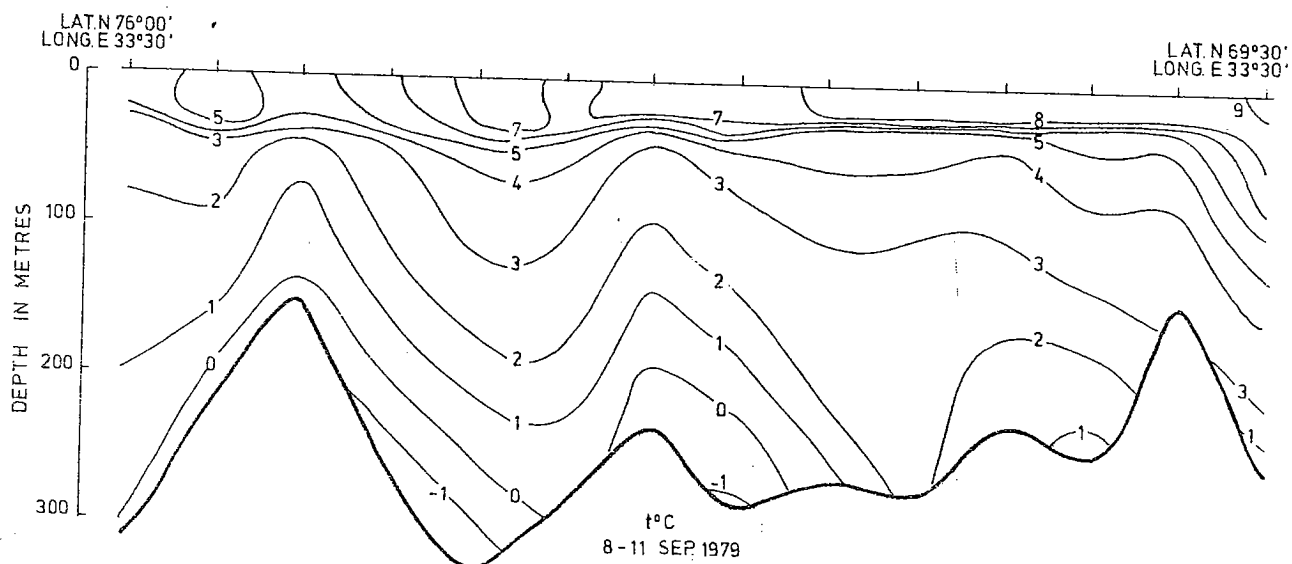


Fig. 6. Temperature section along the Kola meridian.

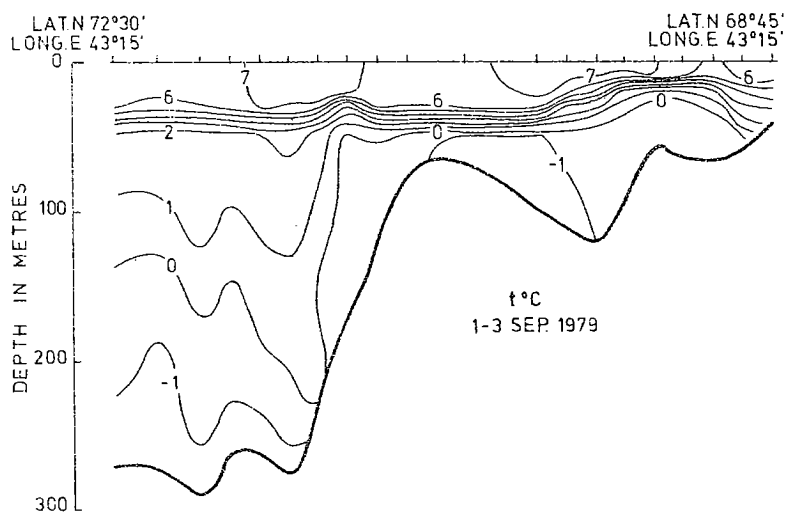


Fig. 7. Temperature section Cape Kanin - North.

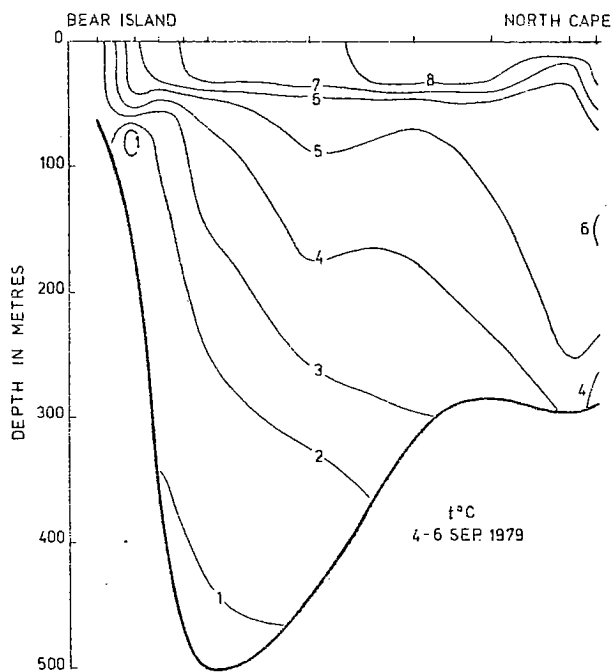


Fig. 8. Temperature section Bear Island - North Cape.

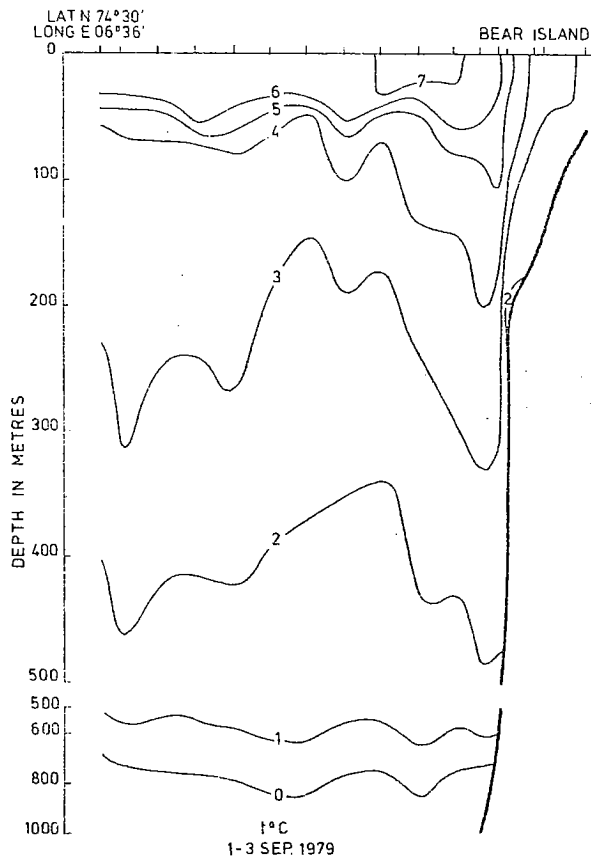


Fig. 9. Temperature section Bear Island - West.

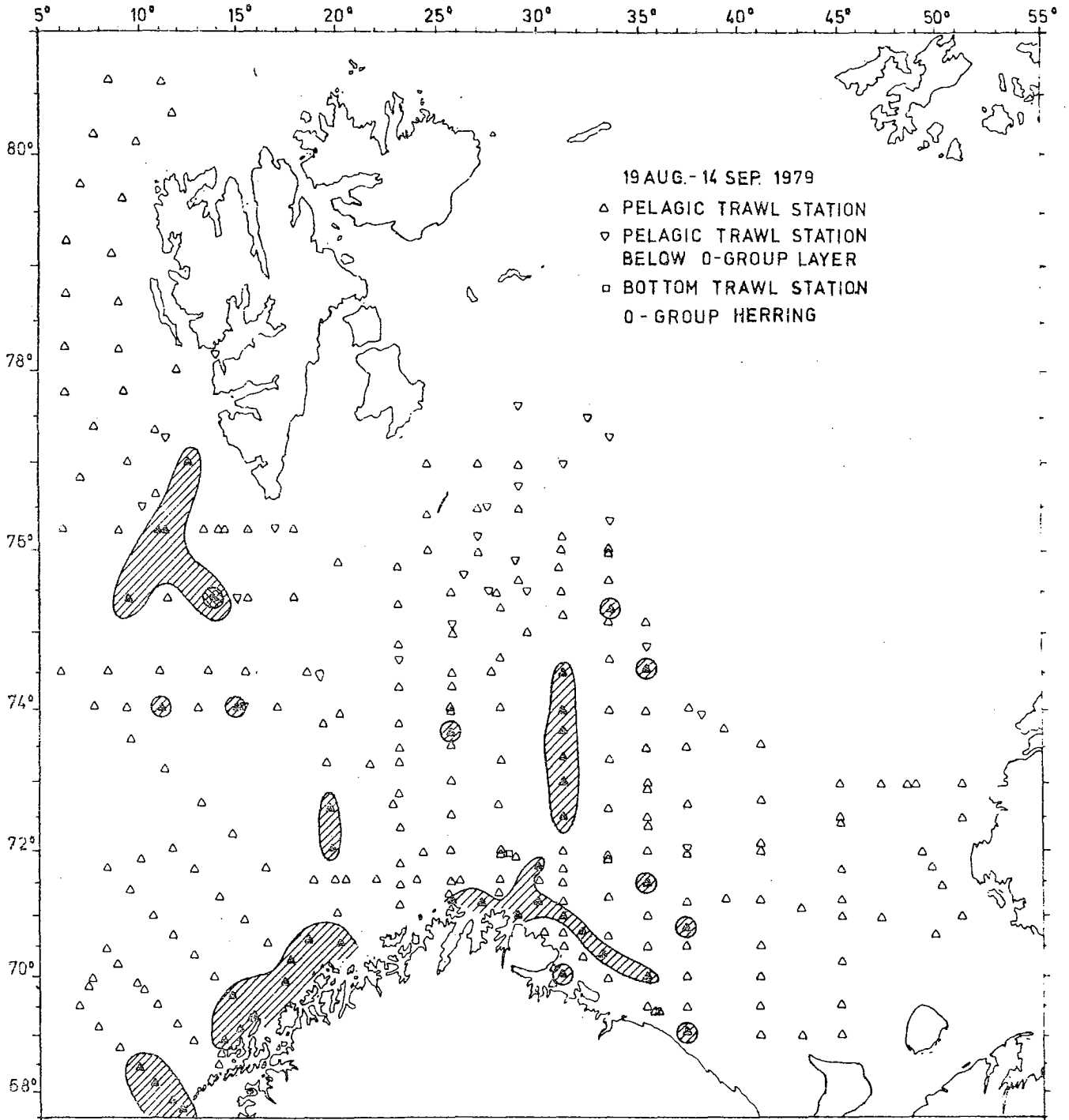


Fig. 10. Distribution of 0-group herring.

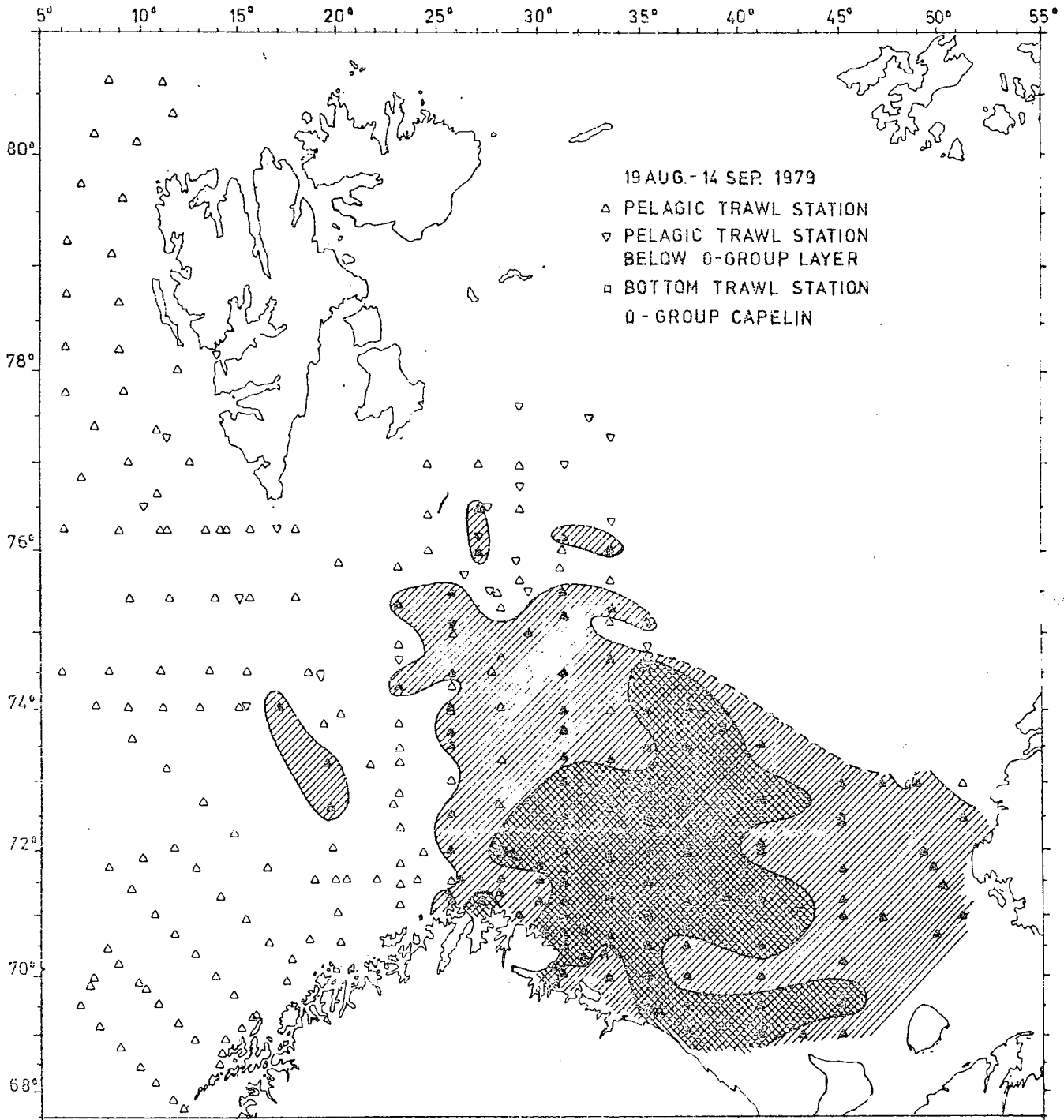


Fig. 11. Distribution of 0-group capelin.

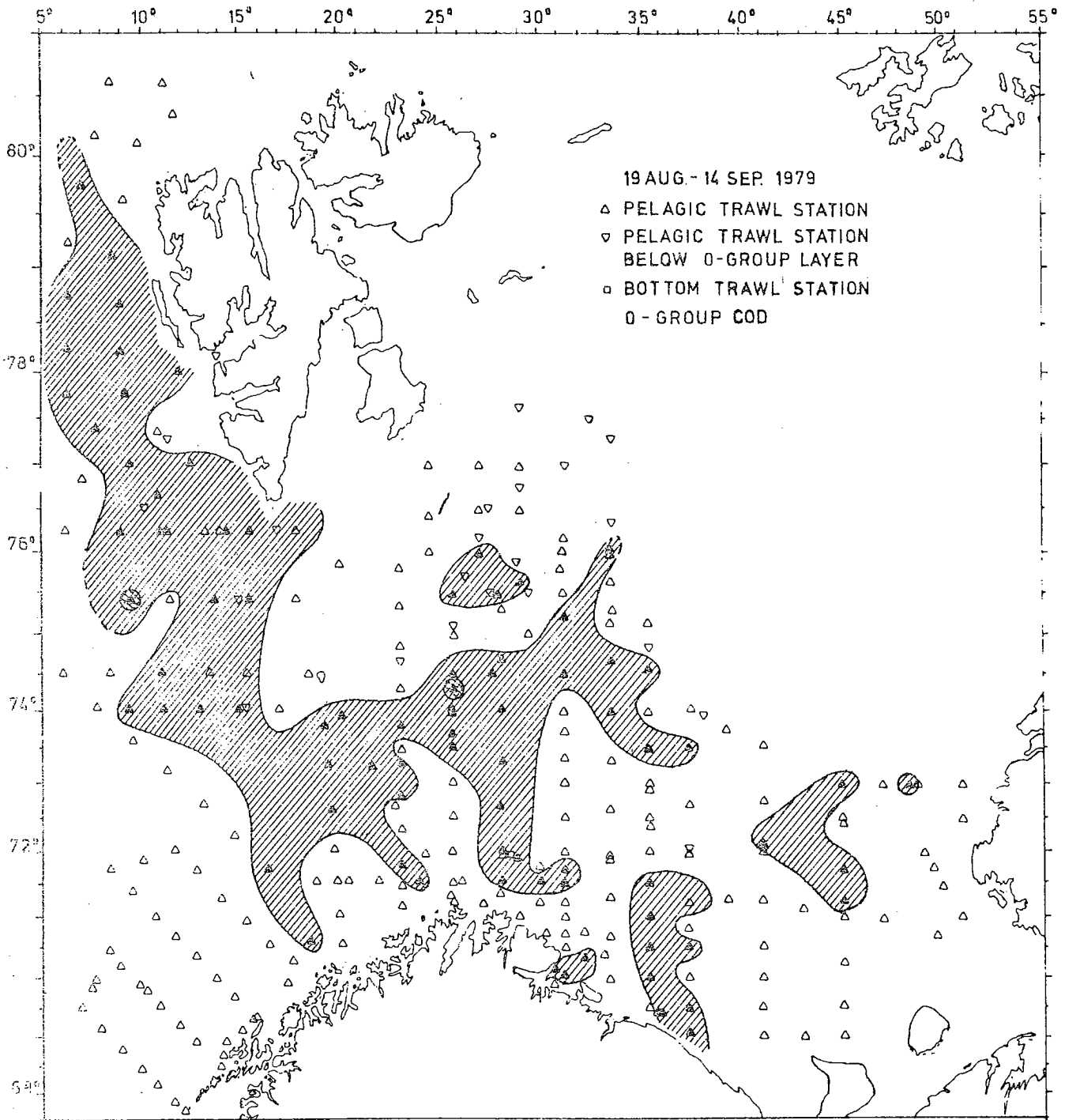


Fig. 12. Distribution of 0-group cod.

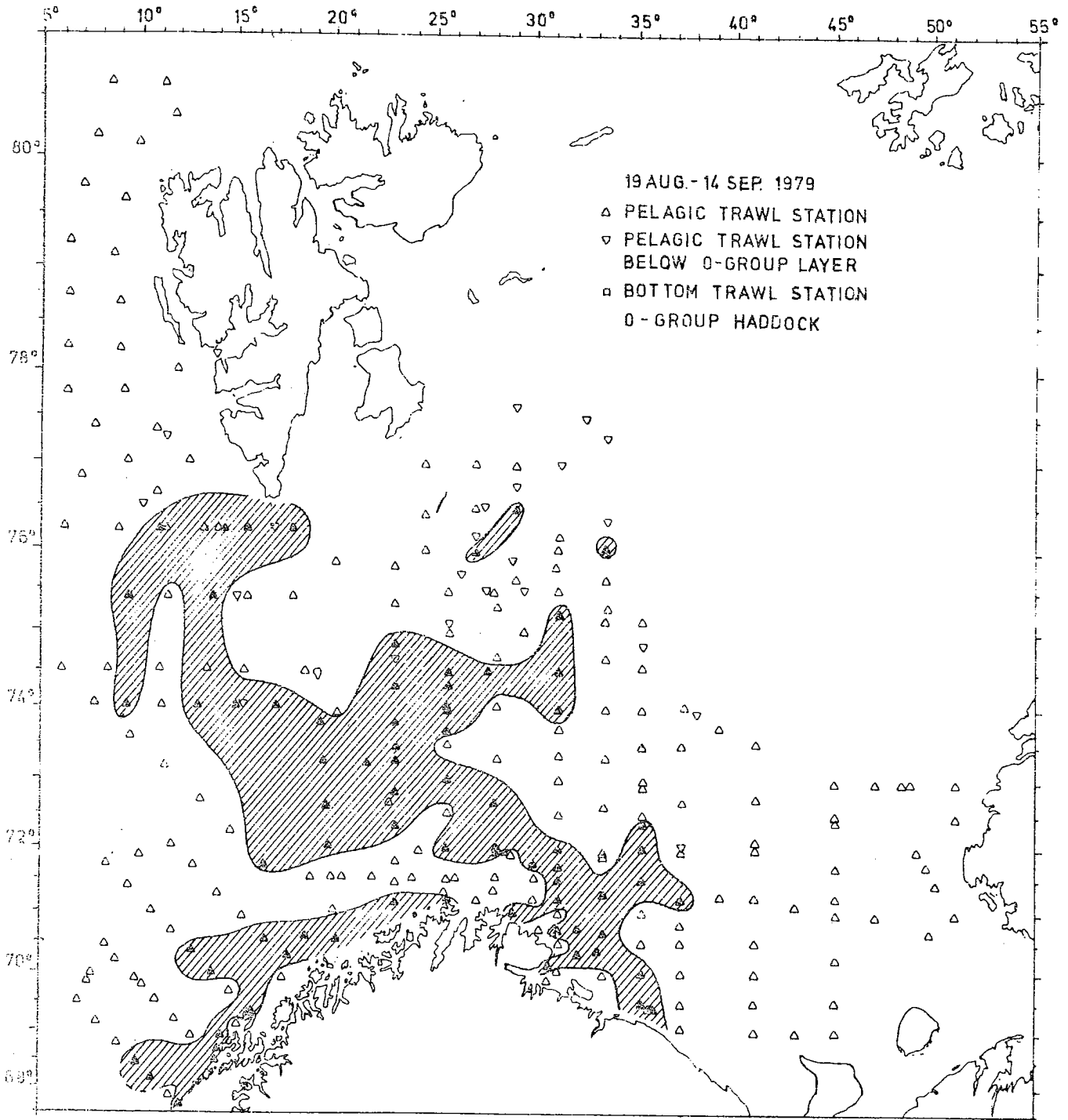


Fig. 13. Distribution of 0-group haddock.

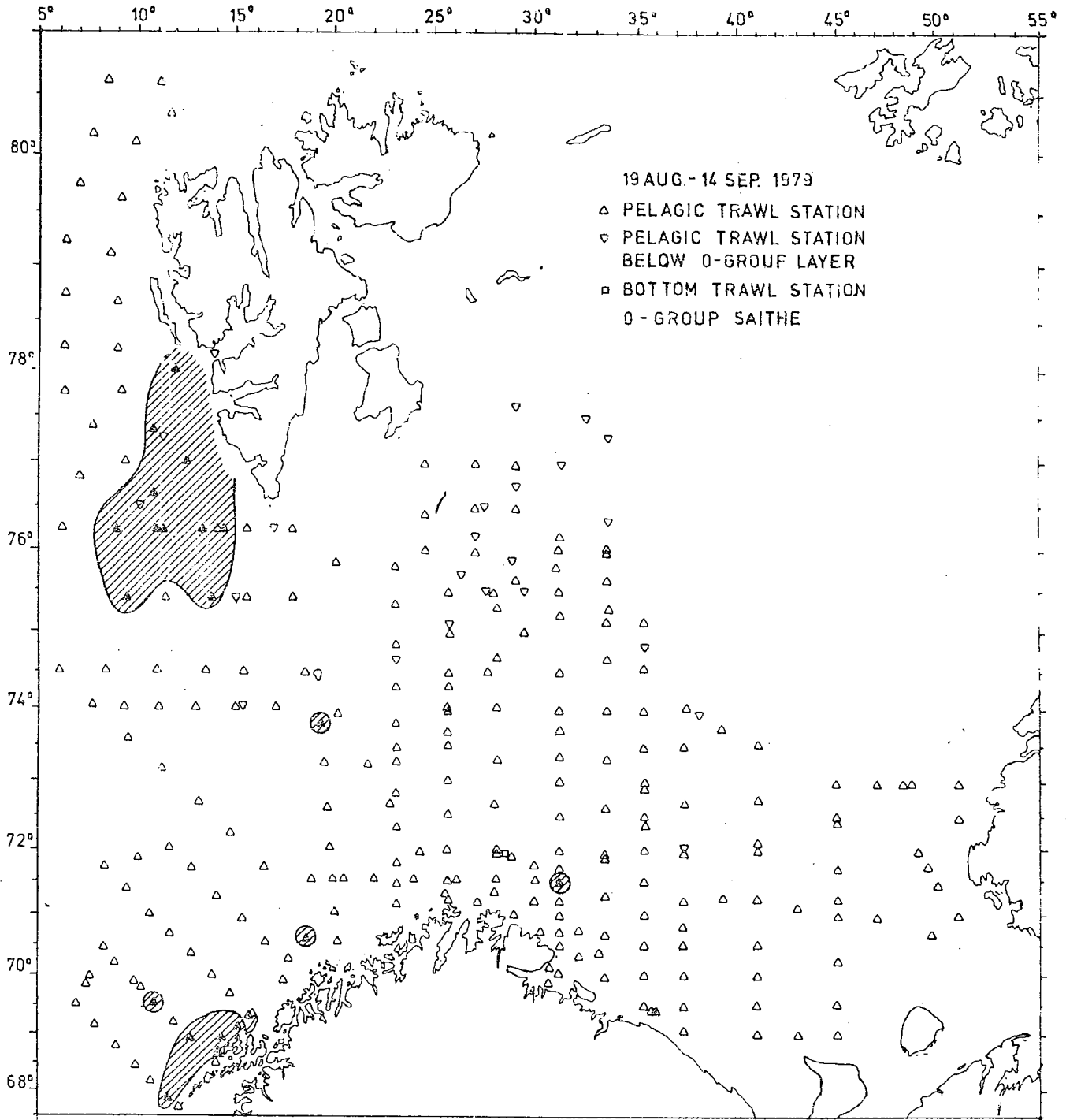


Fig. 14. Distribution of 0-group saithe.

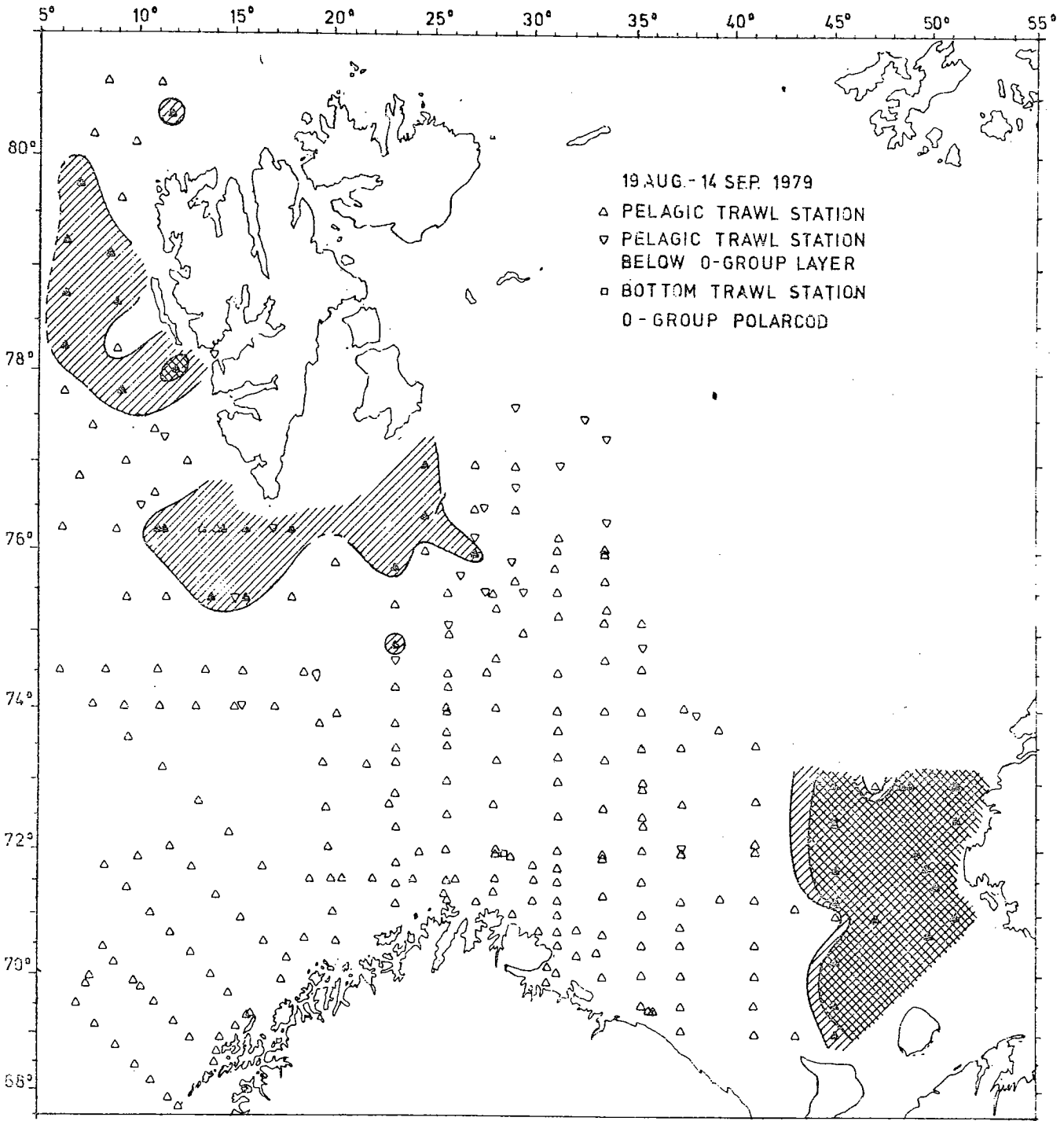


Fig. 15. Distribution of 0-group polar cod.

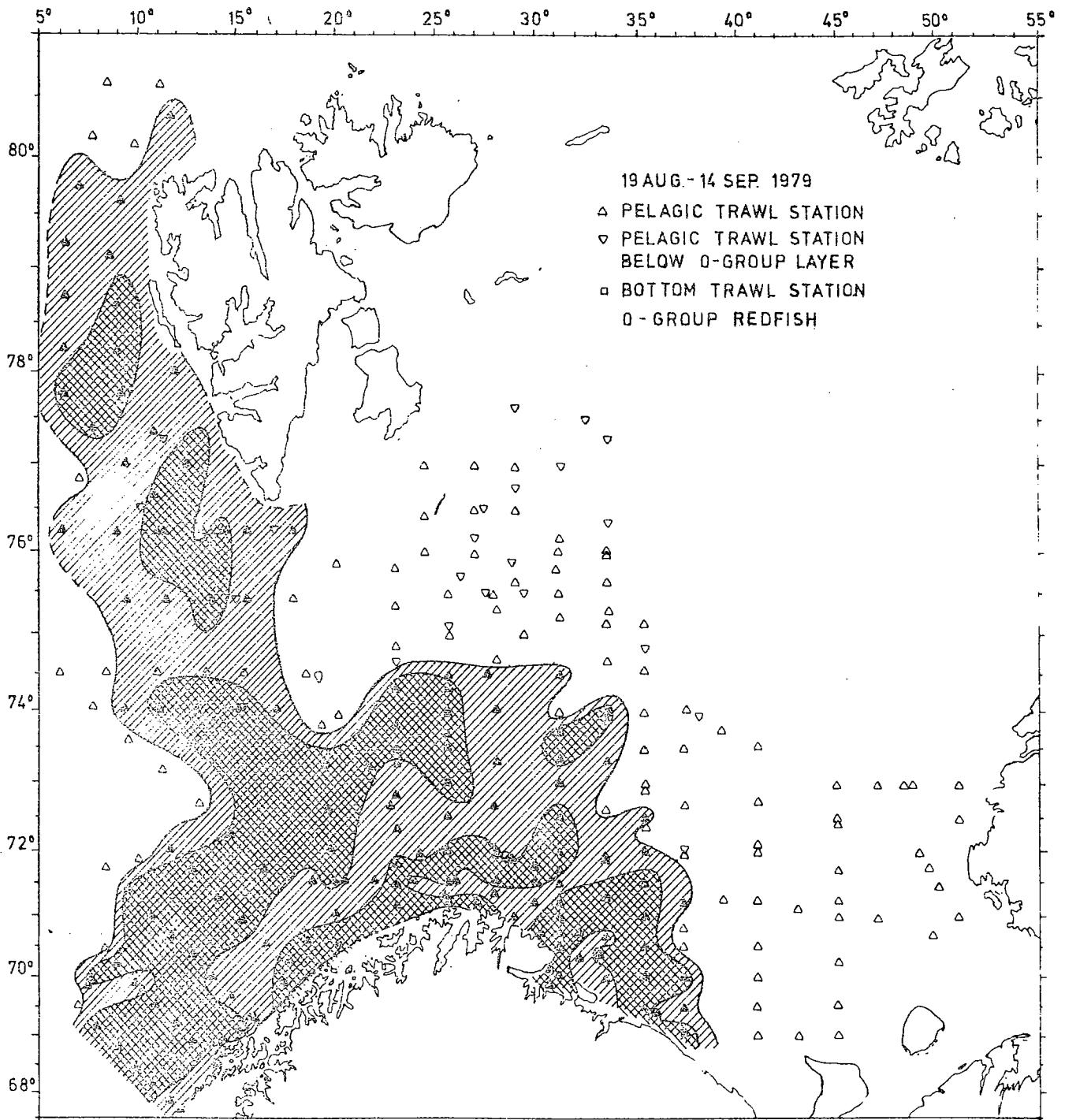


Fig. 16. Distribution of 0-group redfish.

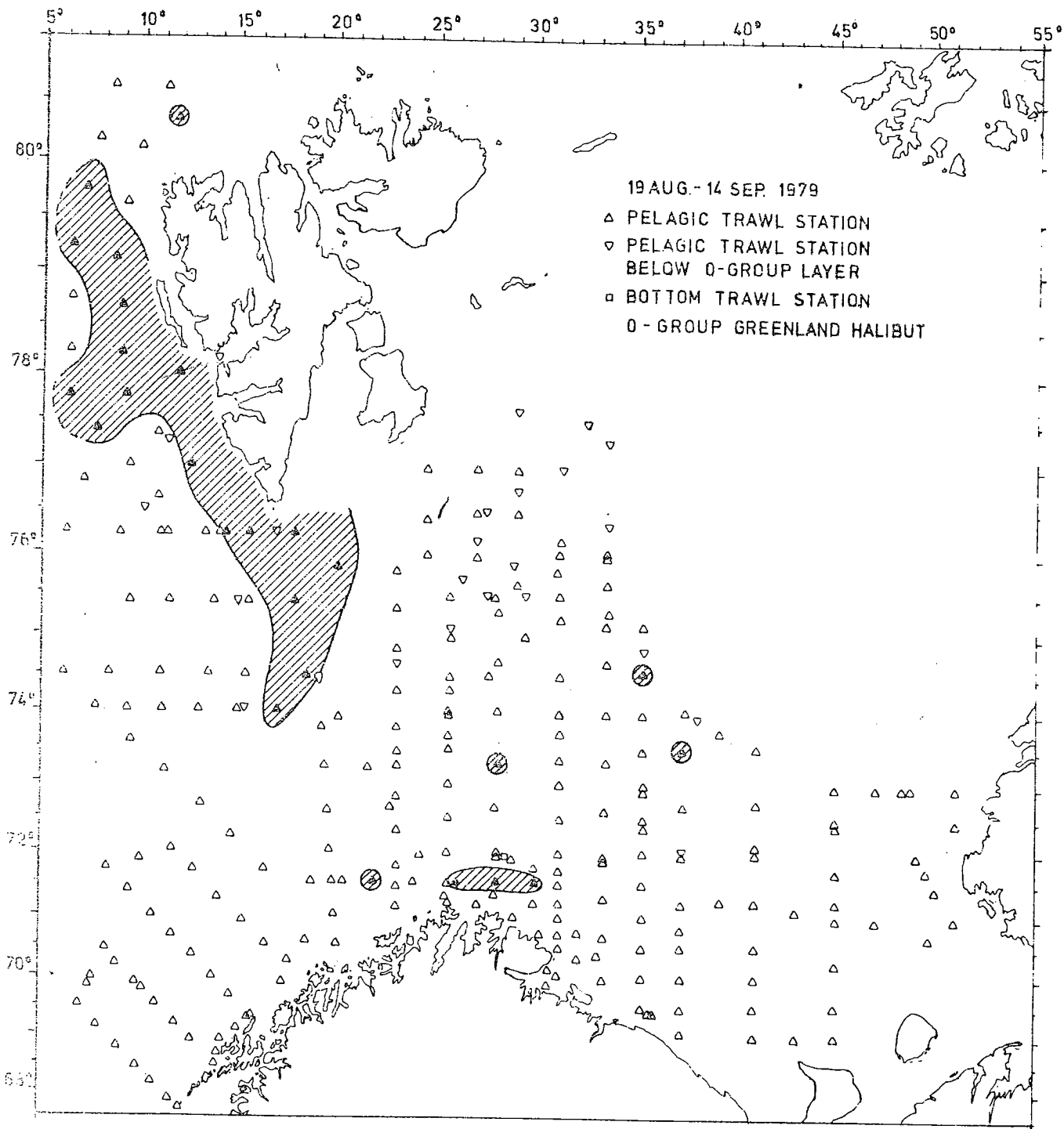


Fig. 17. Distribution of 0-group Greenland halibut.

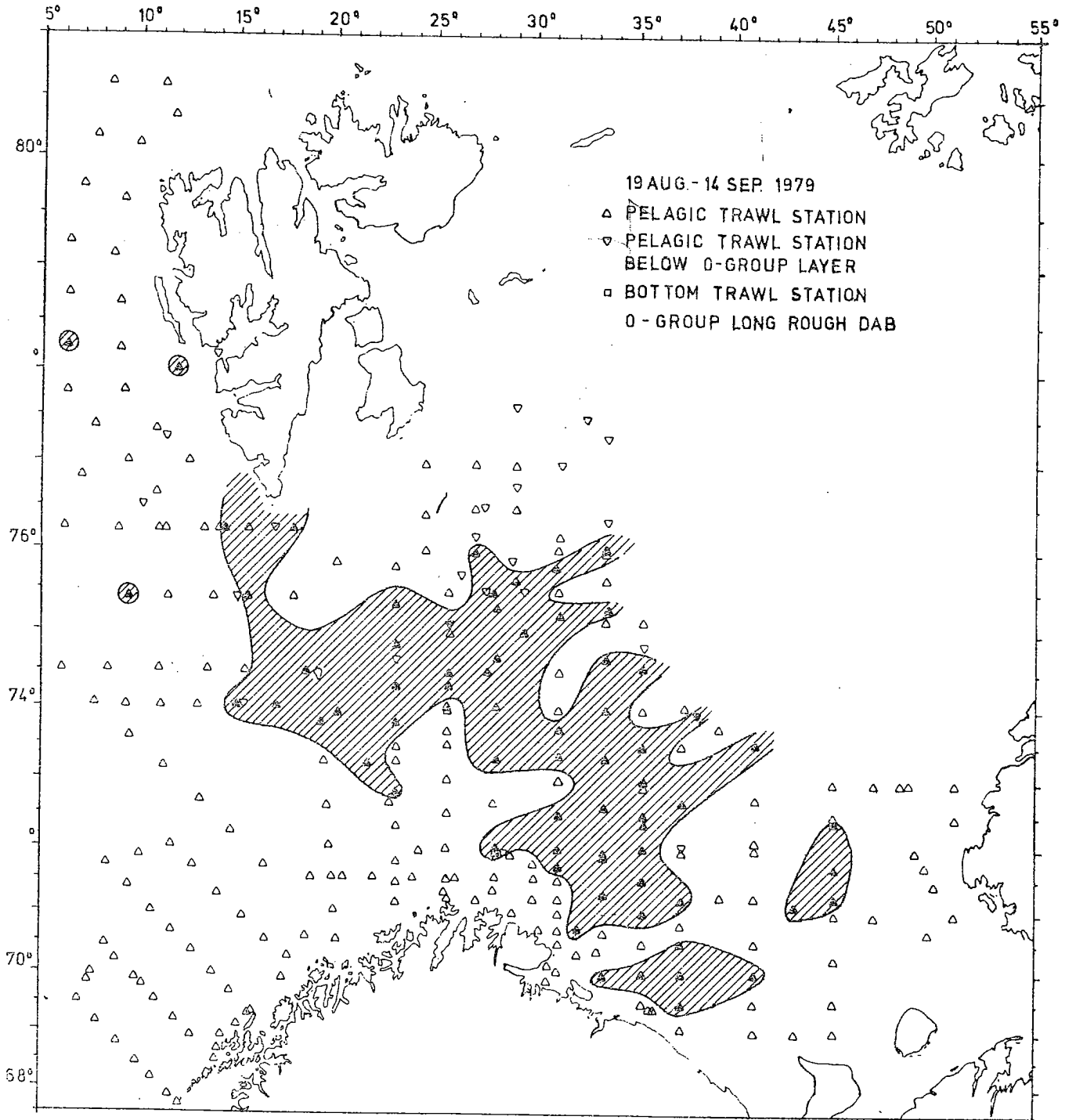


Fig. 18. Distribution of 0-group long rough dab.

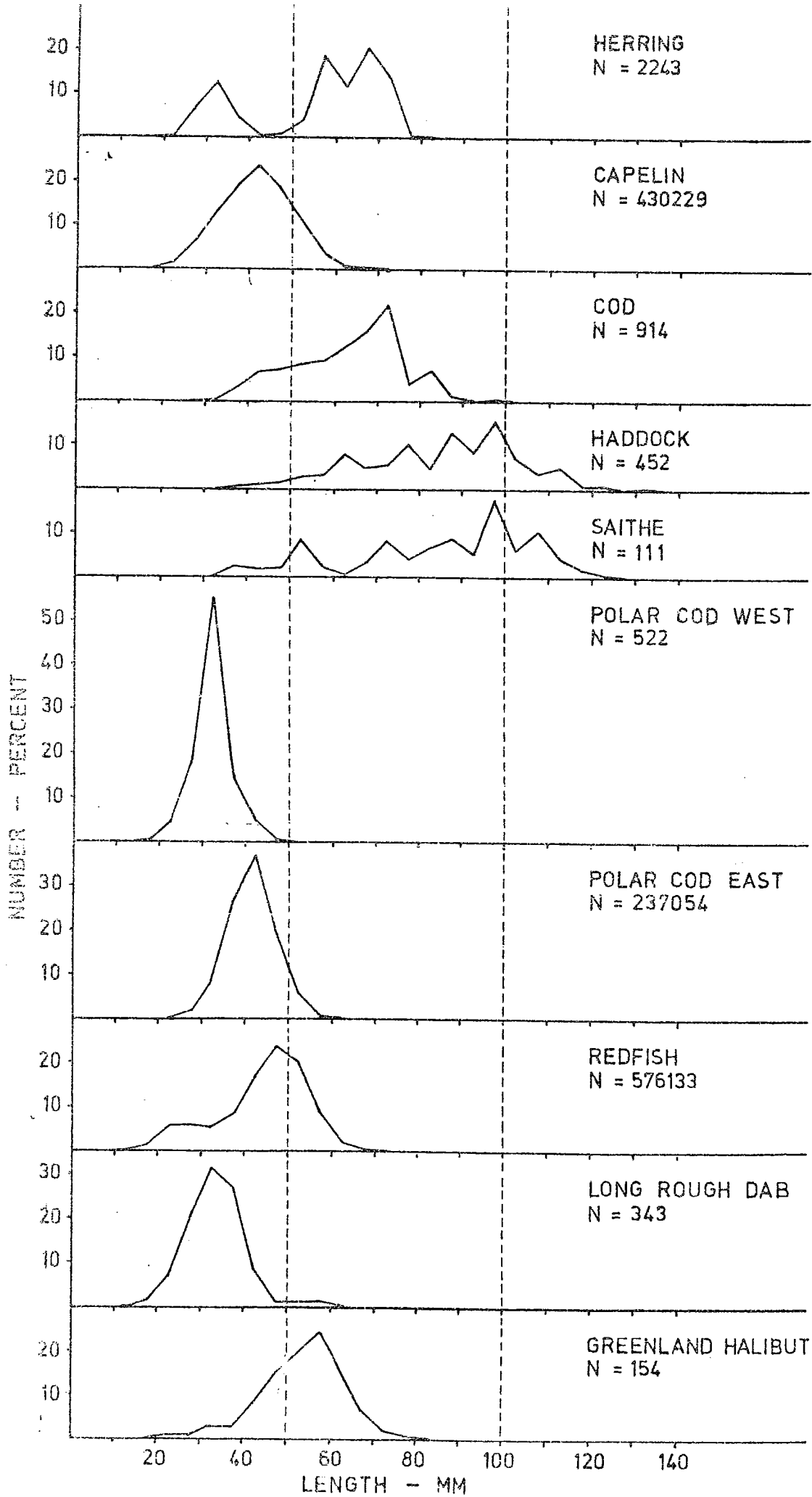


Fig. 19. Length distribution of 0-group fish.