International Council for
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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 1983

The nineteenth annual International 0-group fish survey was made during the period 21 August - 8 September 1983 in the Barents Sea and adjacent waters. The following research vessels participated in the survey:

State	Name of vessel	Survey time	Research Institute
Norway	"Eldjarn"	21 August - 8 September	Institute of Marine Research, Bergen
Norway	"G.O. Sars"	21 August - 5 September	" "
Norway	"Michael Sars"	21 August - 5 September	" "
USSR	"Persey III"	22 August - 5 September	The Polar Research Institute of Marine Fisheries and Oceanography, Murmansk
USSR	"Poisk"	24 August - 3 September	" "
USSR	"Alaid"	20 August - 26 August	" "

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

Survey data were analysed 5-6 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 lack of time 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 "Eldjarn" took trawl stations in the period 7 September - 8 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 1983 (except "Poisk") 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 headling 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 10-19, as filled and open symbols respectively. The density grading is based on catch in number per 1.0 nautical mile trawling.

HYDROGRAPHY

Hydrographical observation were made along all the survey tracks normally after each 30 nautical 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. Compared with 1982 the temperature was almost $1^{o}C$ higher. In the layers 0-200 and 50-200 m the temperature was higher than the average long-term level. It's absolute values turned out to be the highest during the whole period of

investigations. In the layer 0-50 m the temperature conditions reached the level of warm years (1974, 1976). The anomalies at this section were 0.8°C for the layer 0-50 m, 1.0°C for 0-200 m and 1.2°C for 50-200 m.

CAPE KANIN SECTION. In the northern part of the section the temperature was 1.4°C higher compared with 1982. Compared with the average long-term value the anomaly in this part of the section was 0.7°C; in the southern part it was 1.0°C.

NORTH CAPE - BEAR ISLAND SECTION. The mean temperature in the 0-200 m has increased from 5.8° in 1982 to 6.3° in 1983. The anomaly was 0.7°C.

BEAR ISLAND WEST SECTION. In the 0-200 m layer the temperature has increased by 0.2°C compared with the previous year, which is higher than the average long-term level for the period 1965-1982 by 0.7°C.

Thus, in late August - early September 1983 the water temperature was higher than the previous year and above the average long-term value both in the eastern and western part of the survey area. The temperature conditions approached the level of warm years.

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 7.

A new sets of abundance indices have been calculated for 0-group cod and haddock (Table 6) as described by RANDA (1983). They are based on the number caught during a standard trawl haul of one nautical mile.

Herring (Fig. 10)

0-group herring was found on a far larger number of stations and the numbers of specimens at each station were also far greater than it has been observed since the international 0-group surveys started in 1965. The double shading indicates more than 1000 specimen per haul of 1 n.mile. 0-group herring were found in large areas of central and western parts of the Barents Sea and the most dense concentrations were found at the south-western limit of the survey area.

The extension of the distribution towards south-west, along the norwegian coast is thus not covered in this survey but reports from Norwegian fishermen indicates that the 0-group herring is also distributed south of the Lofoten islands. It is therefore concluded that the overal density of 0-group herring is very high this year compared to all years after 1965.

Capelin (Fig. 11)

The area of distribution and the overall density is similar to that in 1982, and indicate that the 1983 year class may be as abundant as the 1982 year class. The density of capelin this year is somewhat higher in the north-western part of the survey area (off Spitsbergen) than in previous years.

Cod (Fig. 12)

The 0-group cod was distributed in two separated areas as in 1982, north of the Finnmark and Murman coast and west of Spitsbergen. Two different indices of year class strength are given in Table 5 and 6. Both indices indicate that the 1983 year class is a rich year class, even more abundant than the 1975 year class which has dominated the fishery in the recent years.

Haddock (Fig. 13)

The distribution extended into more northeastern waters than in 1982. The two indices of year class strength indicate that the 1983 year class is stronger than the 1975 year class which has dominated the fishery in the late seventies and early eighties. The 1983 year class was stronger in the 0-group survey than the 1982 year class. However, a groundfish survey in winter 1983 indicates that the 1982 year class is stronger than recorded in the 0-group survey.

Polar Cod (Fig. 14)

0-group Polar Cod was as usually found in two separated areas. Areas of high concentrations was found mostly in the Spitsbergen area, and the abundance index indicate that the western components is the most abundant. The index for the eastern component indicate it to be less abundant than last year. The total index indicate the 1983 year class is somewhat more abundant than the 1982 year class. It is, however, quite possible that 0-group polar cod is distributed outside the investigated area in high numbers.

Redfish (Fig. 15)

The distribution of 0-group redfish is similar to the one found last year, indicating that the 1983 year class is another strong one.

Greenland Halibut (Fig. 16)

0-group Greenland Halibut was as usually found in the Bear Island - West Spitsbergen area. The abundance index for the 1983 year class is similar to the one for the 1982 year class and close to the long time average.

Long Rough Dab (Fig. 17)

0-group long rough dab was found further to the north than in 1982. The calculated index is lower than the very high 1982 index and close to the 1981 figure.

Saithe (Fig. 18)

0-group saithe was found in an exceptionally large area in the central Barents Sea. The shaded area in Fig. 18 represents more than 85 specimen per haul of 1.0 nautical mile. 0-group saithe has not been observed in such high numbers during the 0-group survey since 1967. No index of abundance has been calculated because 0-group saithe is not found every year in the survey area.

Blue Whiting (Fig. 19)

0-group blue whiting was recorded south of N 75° and between E 20° and E 35°. This is the first year 0-group blue whiting has been recorded during the 0-group survey in the Barents Sea. As for saithe no index of abundance has been calculated.

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): 1-24. (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, 1978(G:53): 1-25. (Mimeo.)

RANDA, K., 1983. Abundance and distribution of 0-group Arcto-Norwegian cod and haddock 1965-1982. Contribution to the PINRO/IMR-symposium in Leningrad, September 1983. 1-26. (Mimeo.)

Table 1. Mean water temperature in the Murmansk Current, the Kola section (between 70°30'N and 69°30'N) at the end of August and the beginning of September 1983 (t°C).

Year / Layer	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	Average 1965-1983
0-50 m	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	8.1	7.3
50-200 m	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	4.8	3.6
0-200 m	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	5.6	4.6

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 1983 (t°C).

Year / Layer	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	Average 1965-1983
68°45'N 70°05'N	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	5.1	4.1
71°00'N 72°00'N	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	4.2	3.5

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 end of August and at the beginning of September 1983 (t°C).

Year / Layer	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	Average 1965-1983
0-200 m	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	6.3	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 1983 (t°C).

Year / Layer	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	Average 1965-1983
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	5.1	4.4

Table 5. Abundance indices.

Year \ Species	Cod	Haddock	Polar cod West	Polar cod East	Redfish	Greenland Halibut	Long rough dab
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	17.0	150
1983	386	184	48	39	851	15.8	80

Table 6. Estimated indices with 90% confidence limits of year class abundance for 0-group cod and haddock in the total area.

Year-class	Cod			Haddock		
	Logarithmic index	Confidence limits (95%)		Logarithmic index	Confidence limits (95%)	
1965	+			0.01	0.00	0.04
1966	0.02	0.01	0.04	0.01	0.00	0.03
1967	0.04	0.02	0.08	0.08	0.03	0.13
1968	0.02	0.01	0.04	0.00	0.00	0.02
1969	0.25	0.17	0.34	0.29	0.20	0.41
1970	2.51	2.02	3.05	0.64	0.42	0.91
1971	0.77	0.57	1.01	0.26	0.18	0.36
1972	0.52	0.35	0.72	0.16	0.09	0.27
1973	1.48	1.18	1.82	0.26	0.15	0.40
1974	0.29	0.18	0.42	0.51	0.39	0.68
1975	0.90	0.66	1.17	0.60	0.40	0.85
1976	0.13	0.06	0.22	0.38	0.24	0.51
1977	0.49	0.36	0.65	0.33	0.21	0.48
1978	0.22	0.14	0.32	0.12	0.07	0.19
1979	0.40	0.25	0.59	0.20	0.12	0.28
1980	0.13	0.08	0.18	0.15	0.10	0.20
1981	0.10	0.06	0.18	0.03	0.00	0.05
1982	0.59	0.43	0.77	0.38	0.30	0.52
1983	1.69	1.34	2.08	0.62	0.48	0.77

Table 7. Length distribution of 0-group fish in percent.

Length mm	Herring	Capelin	Polar cod	Greenland Halibut	Long rough dab	Haddock	Cod	Redfish	Saithe	Blue Whiting
10-14								+		
15-19								0.2		
20-24		+	2.3		1.4			1.9		
25-29		0.1	19.2		4.1		+	6.1		0.1
30-34	+	0.6	31.9	0.4	13.0		+	11.4		1.0
35-39	+	6.0	20.8		22.1	0.1	0.2	15.2		2.6
40-44	+	16.7	16.7	2.8	34.9	0.8	0.8	21.1		5.4
45-49	0.1	18.4	5.3	7.9	19.5	1.5	1.7	22.7		4.9
50-54	0.4	21.8	3.3	7.9	1.9	3.0	2.8	14.4		7.9
55-59	0.9	20.9	0.3	4.7	+	3.1	3.5	5.8		8.3
60-64	3.2	10.6	0.1	18.5	+	5.1	6.0	0.9		16.2
65-69	9.0	4.6	+	18.9		5.8	7.4	+		15.9
70-74	17.3	0.4	+	29.9		6.3	13.6	+		13.4
75-79	13.2	+	+	4.3		7.3	18.9	+		11.0
80-84	13.6			3.5		8.9	16.8	+	0.4	7.9
85-89	12.9		+	1.2		8.5	12.7	+	1.0	4.1
90-94	13.4					10.3	7.9		3.1	1.7
95-99	8.9					8.5	3.7		2.3	0.4
100-104	5.8					8.6	2.6		7.3	0.1
105-109	1.0					6.2	0.7		9.0	
110-114	0.3					6.9	0.3		11.2	
115-119	0.1					4.6	0.1		19.2	
120-124						2.1	+		19.8	
125-129						0.1	+		16.4	
130-134						+	+		19.9	
135-139						+	+		17.3	
140-144						+	+		10.6	
145-149									4.4	
150-154									2.0	
155-159									0.3	
160-164									0.1	
N	96533	380747	56499	254	1191	6109	16550	430684	1373	761
Mean length mm	82.6	51.7	35.6	65.2	39.3	88.7	78.0	42.9	124.8	65.6

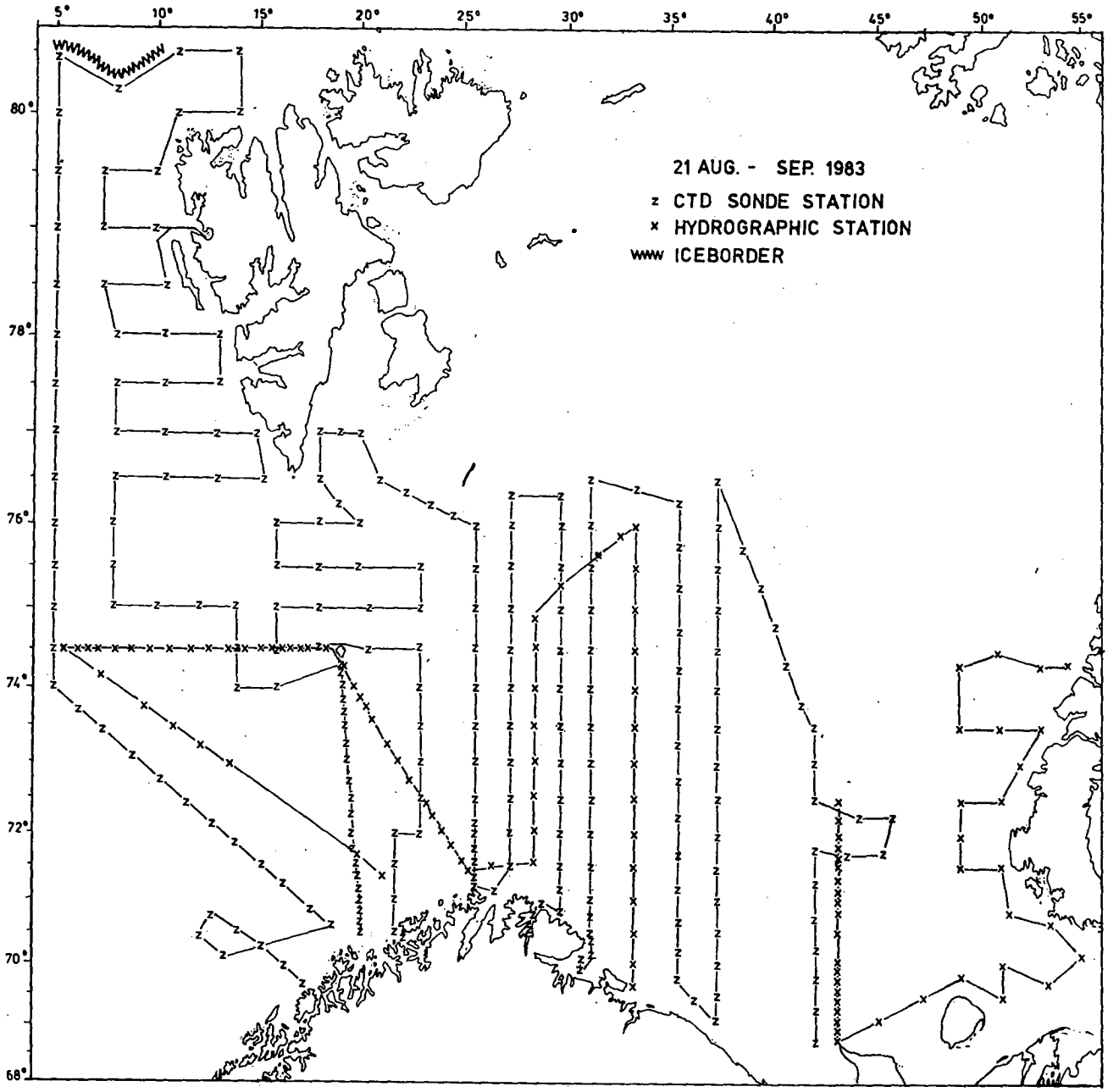

Fig. 1 Survey tracks of the ships and the grid of hydrographic stations.

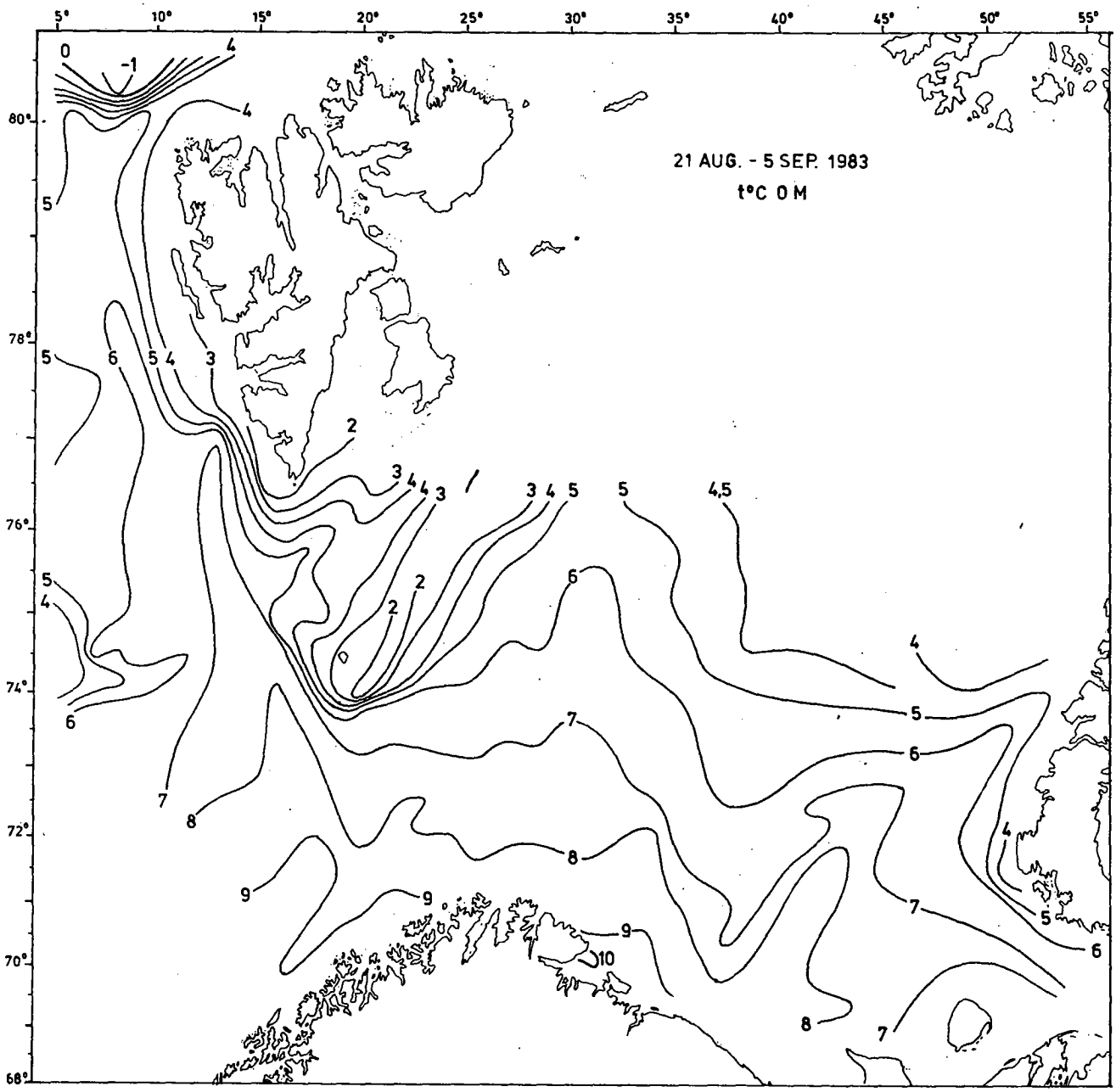

Fig. 2 Isoterms at 0 m.

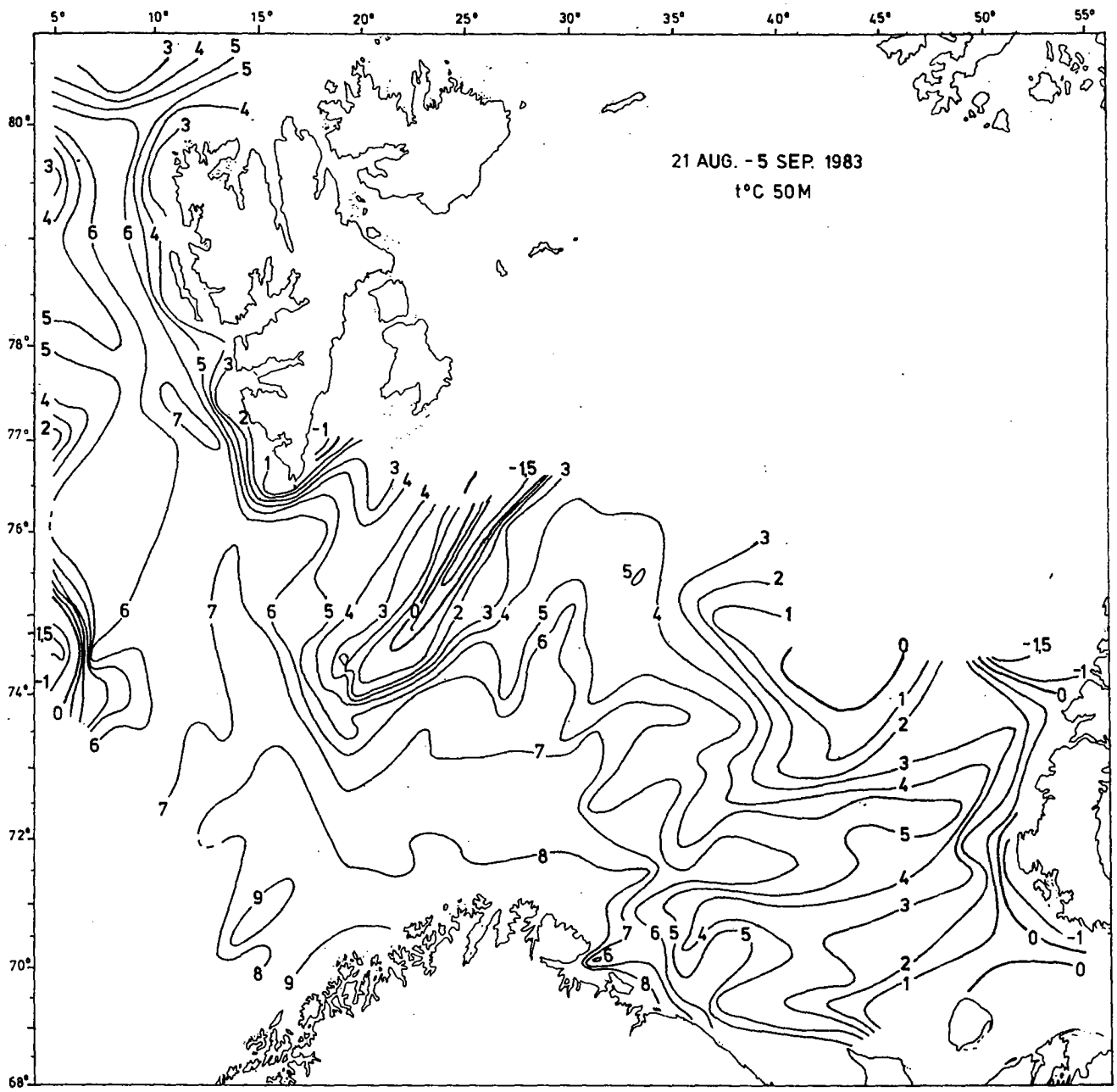

Fig. 3 Isoterms at 50 m.

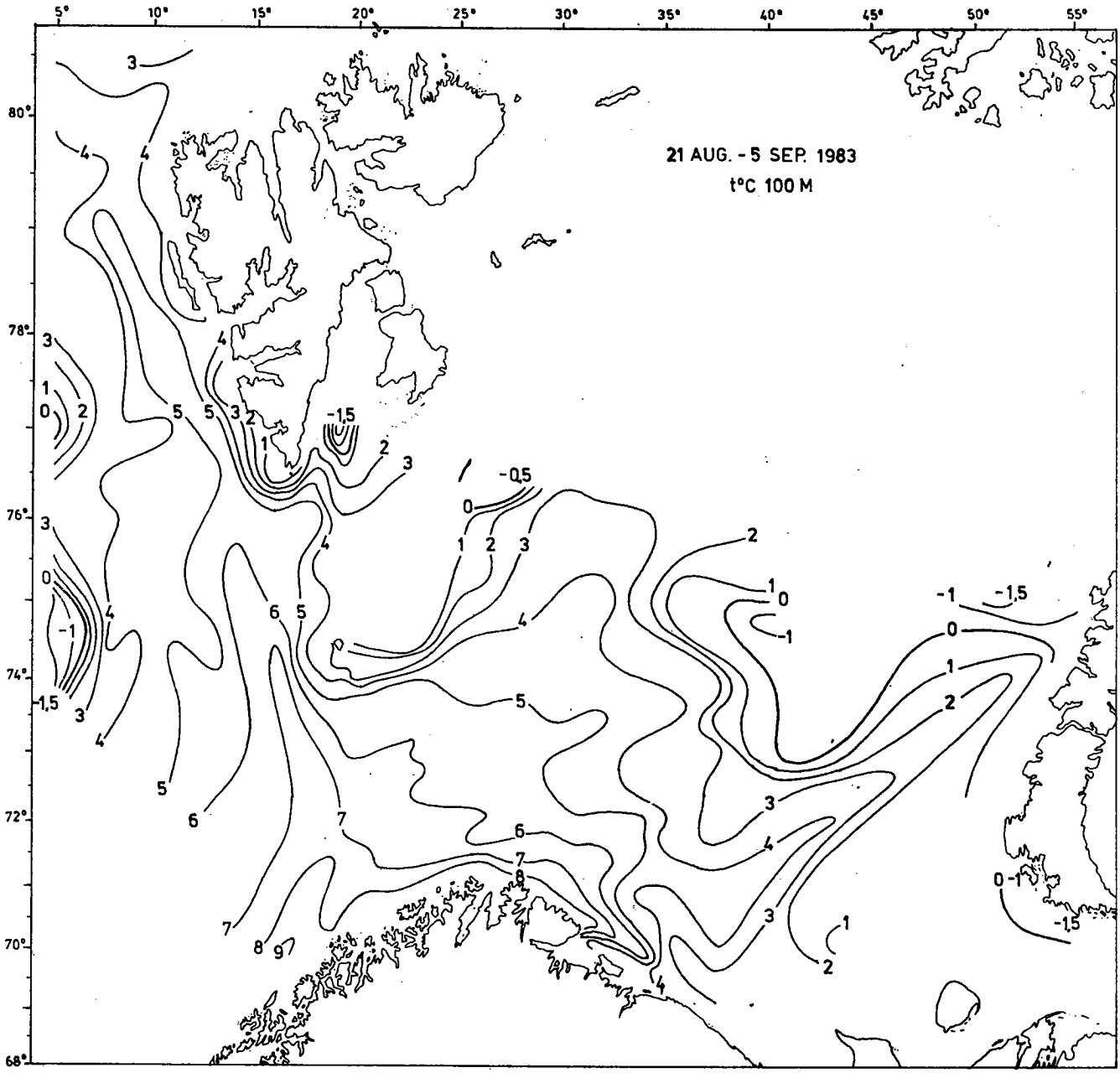

Fig. 4 Isoterms at 100 m.

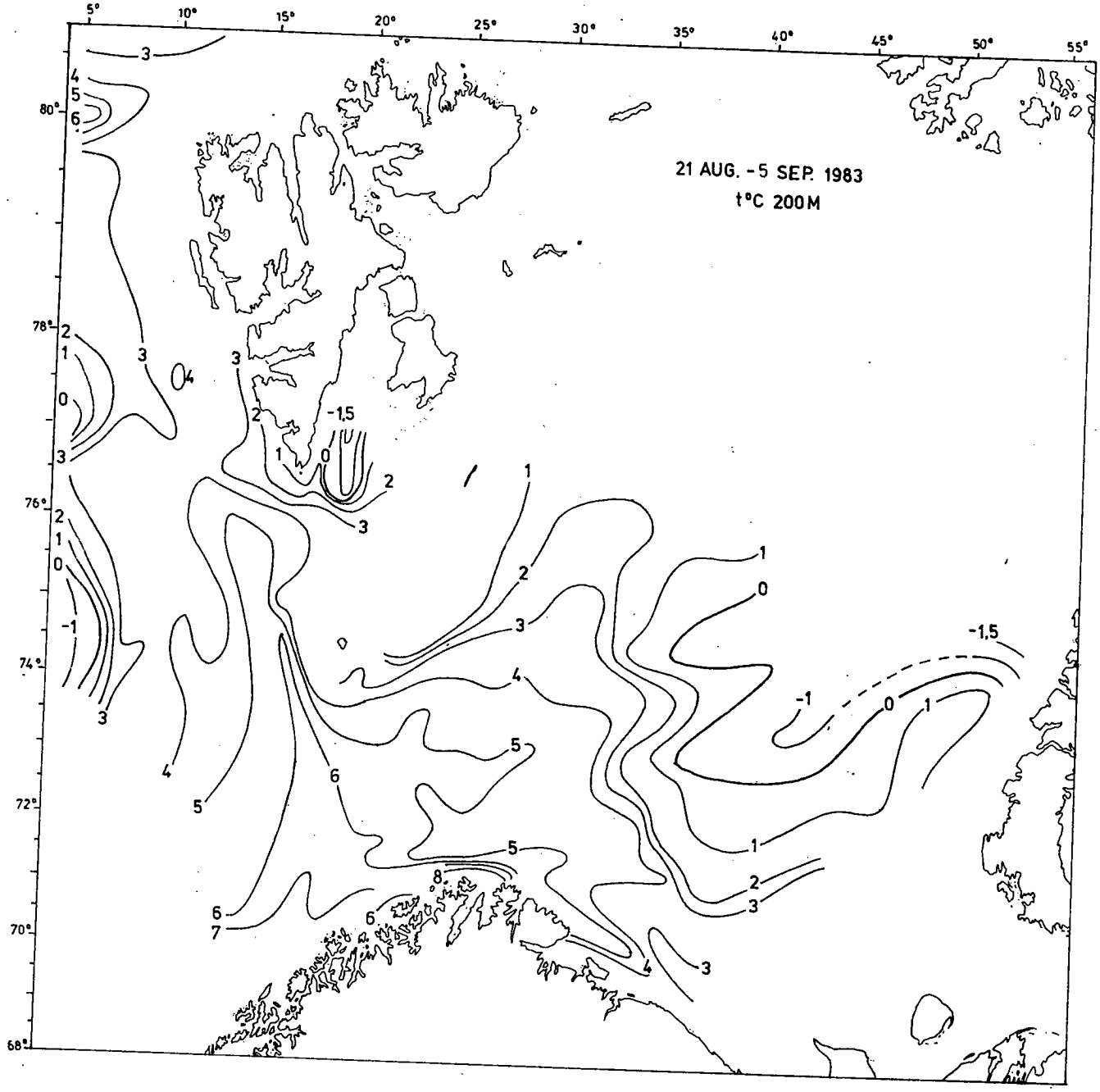

Fig. 5 Isoterms at 200 m.

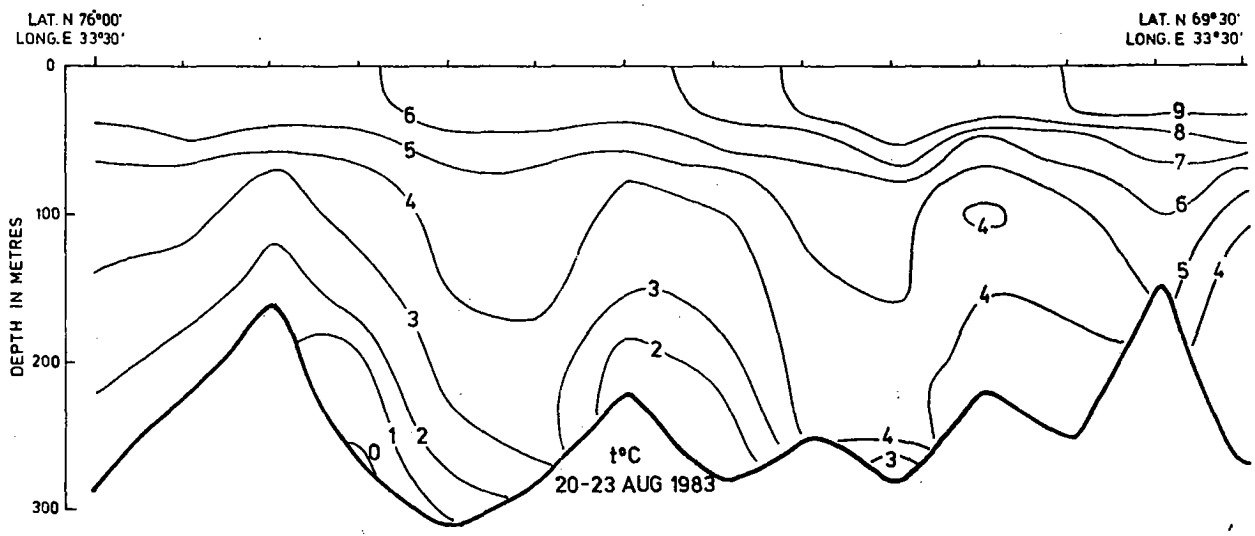

Fig. 6 Temperature section along the Kola meredian.

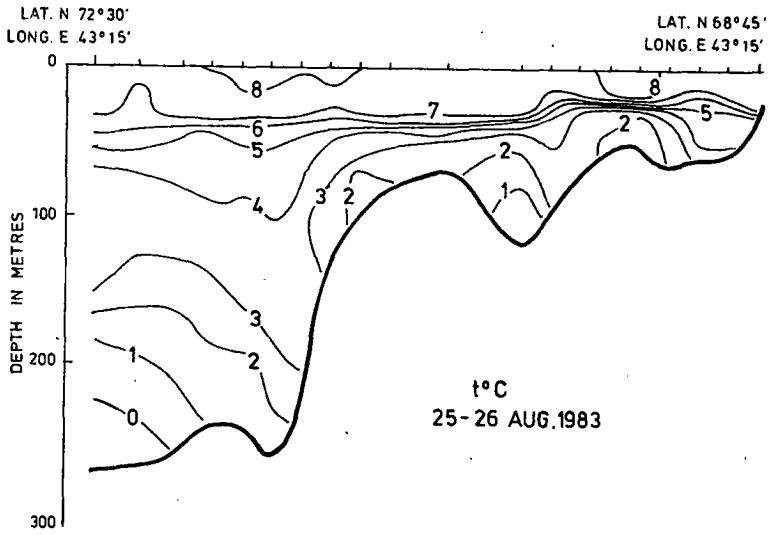

Fig. 7 Temperature section Cape Kanin - North.

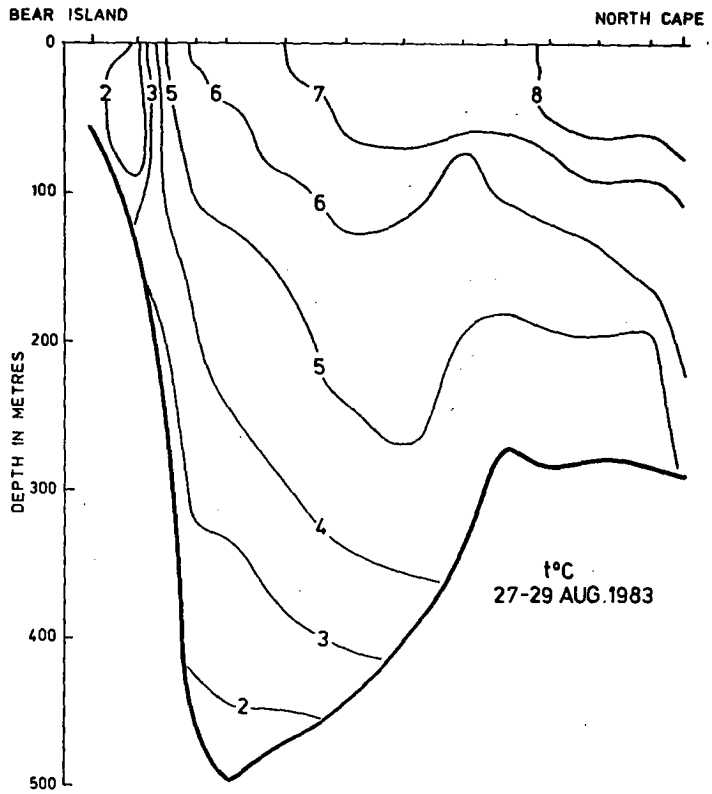

Fig. 8 Temperature section Bear Island - North Cape.

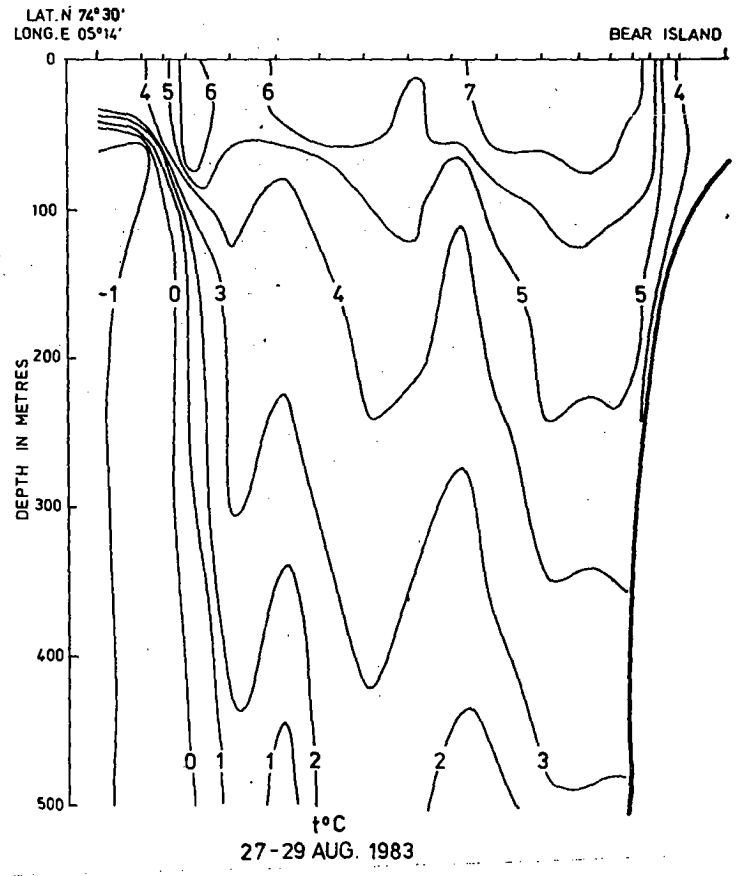

Fig. 9 Temperature section Bear Island - West

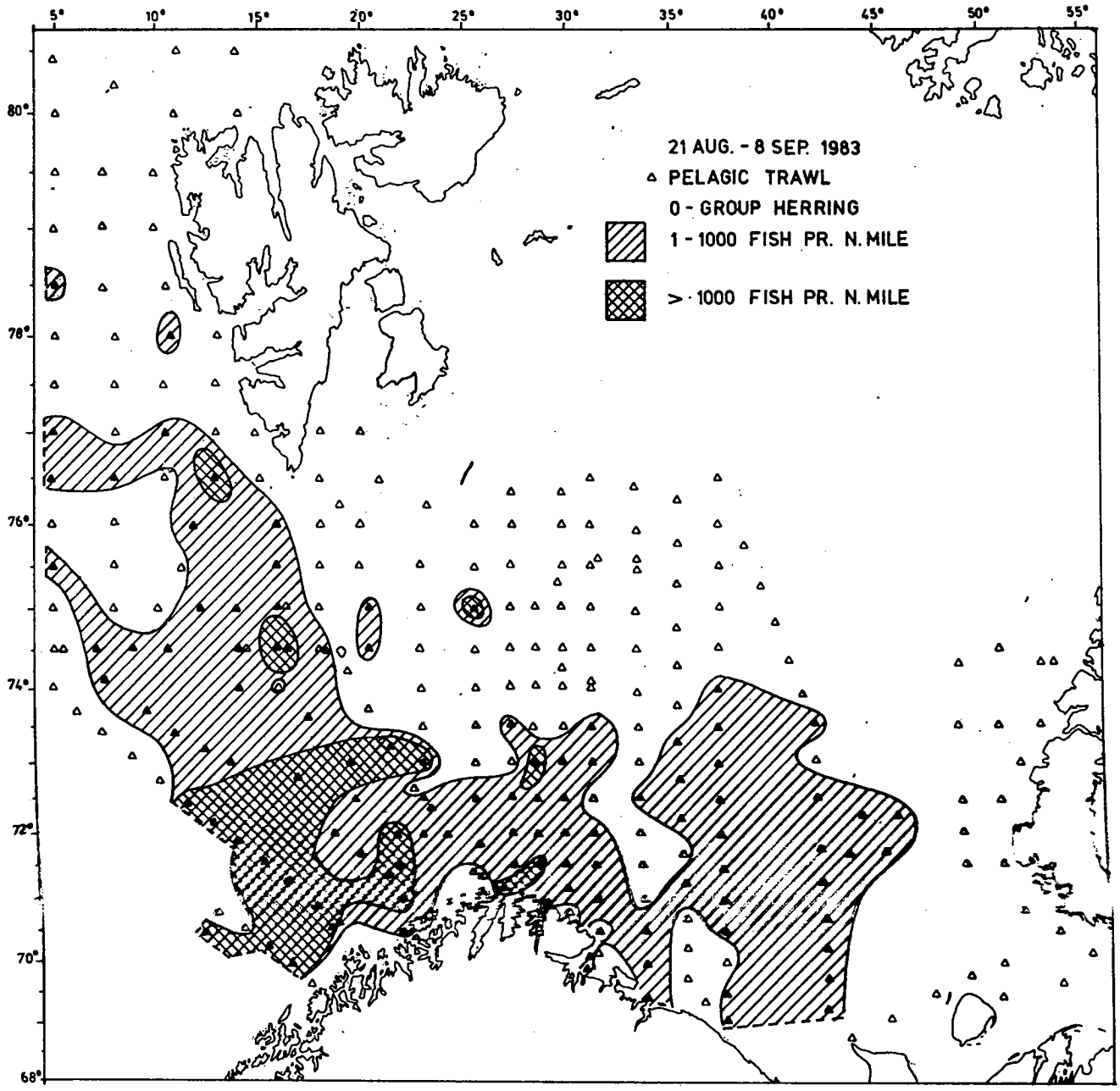

Fig. 10 Distribution of 0-group herring.

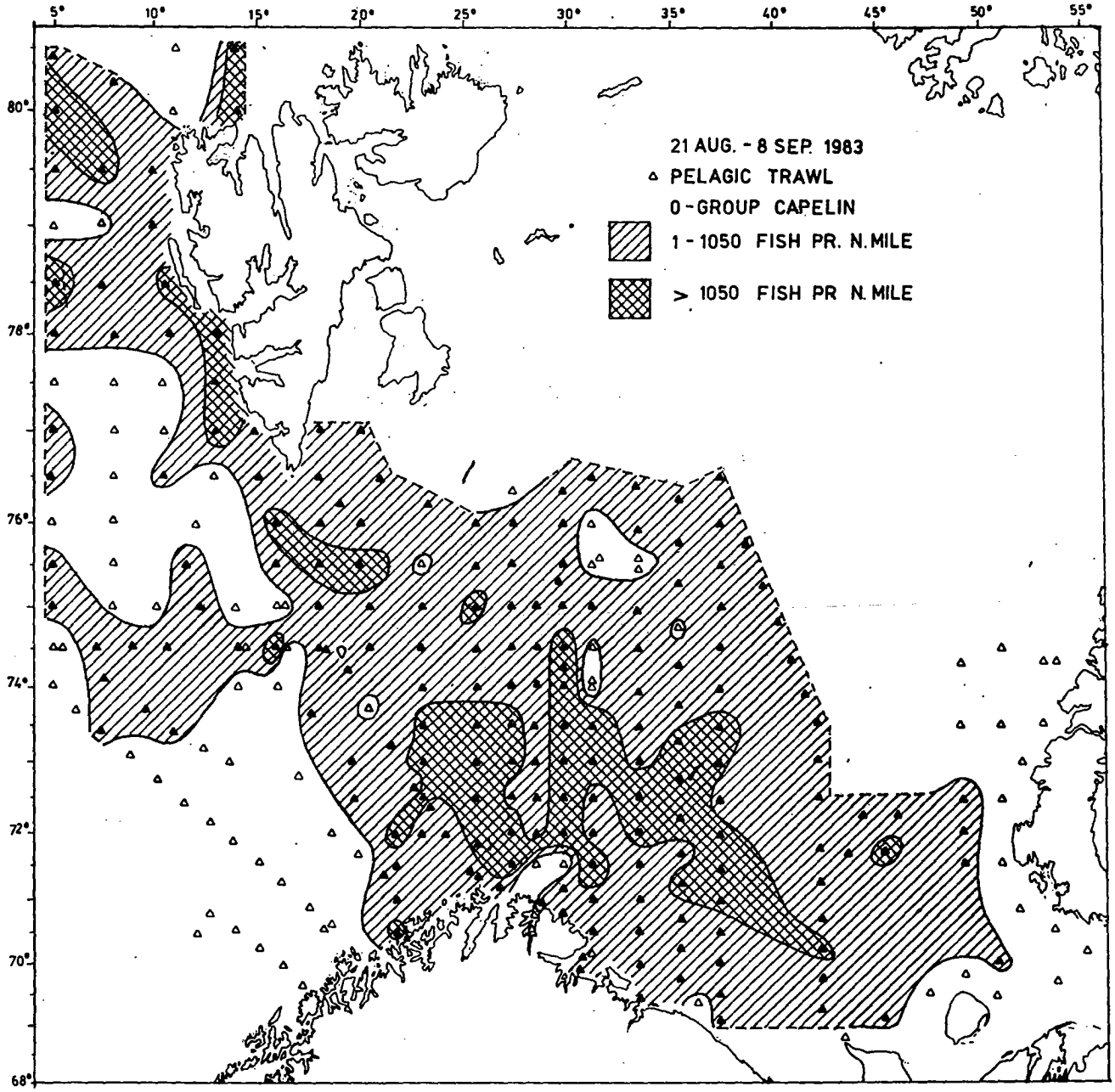

Fig. 11 Distribution of 0-group capelin.

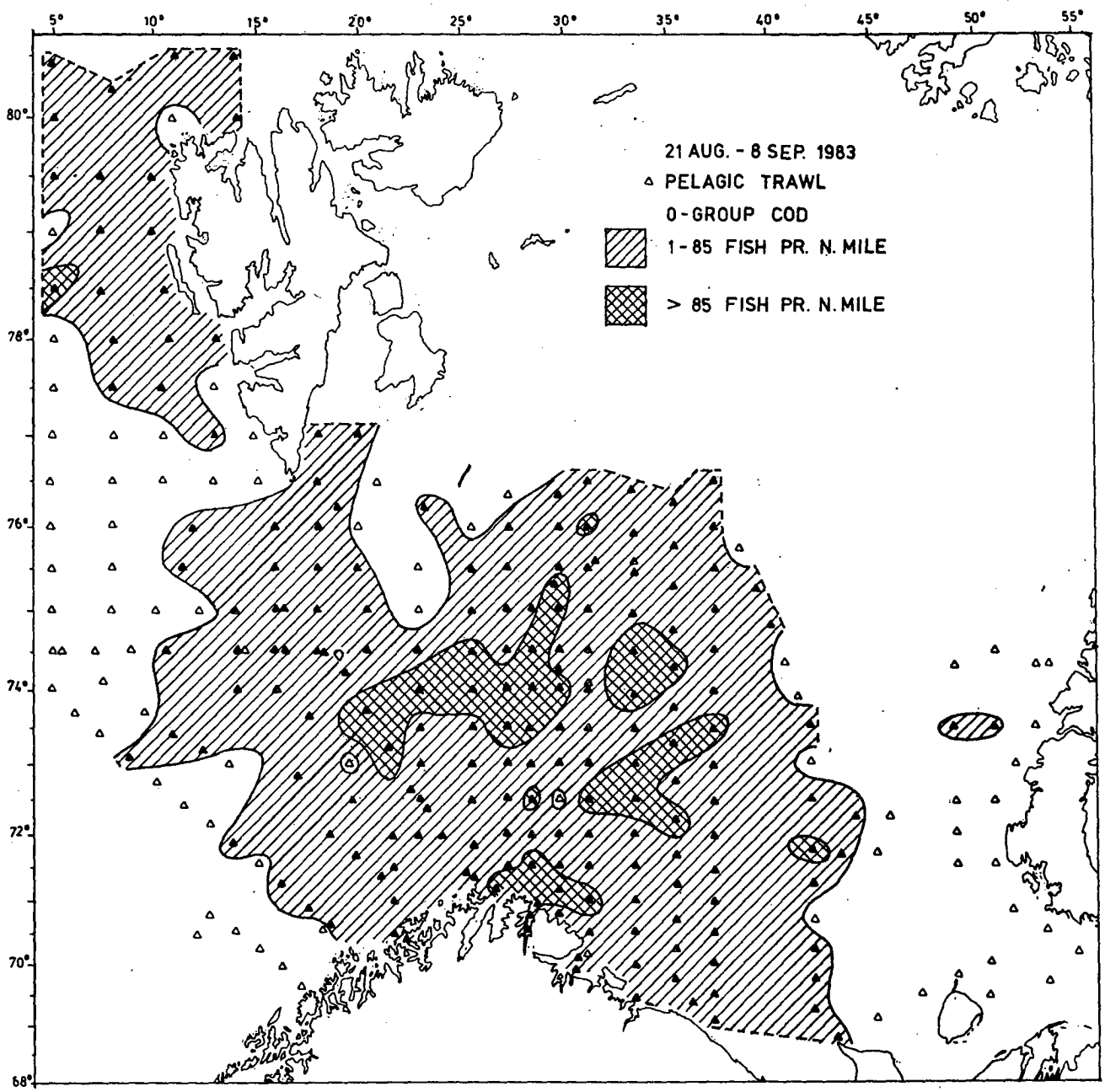

Fig. 12 Distribution of 0-group cod.

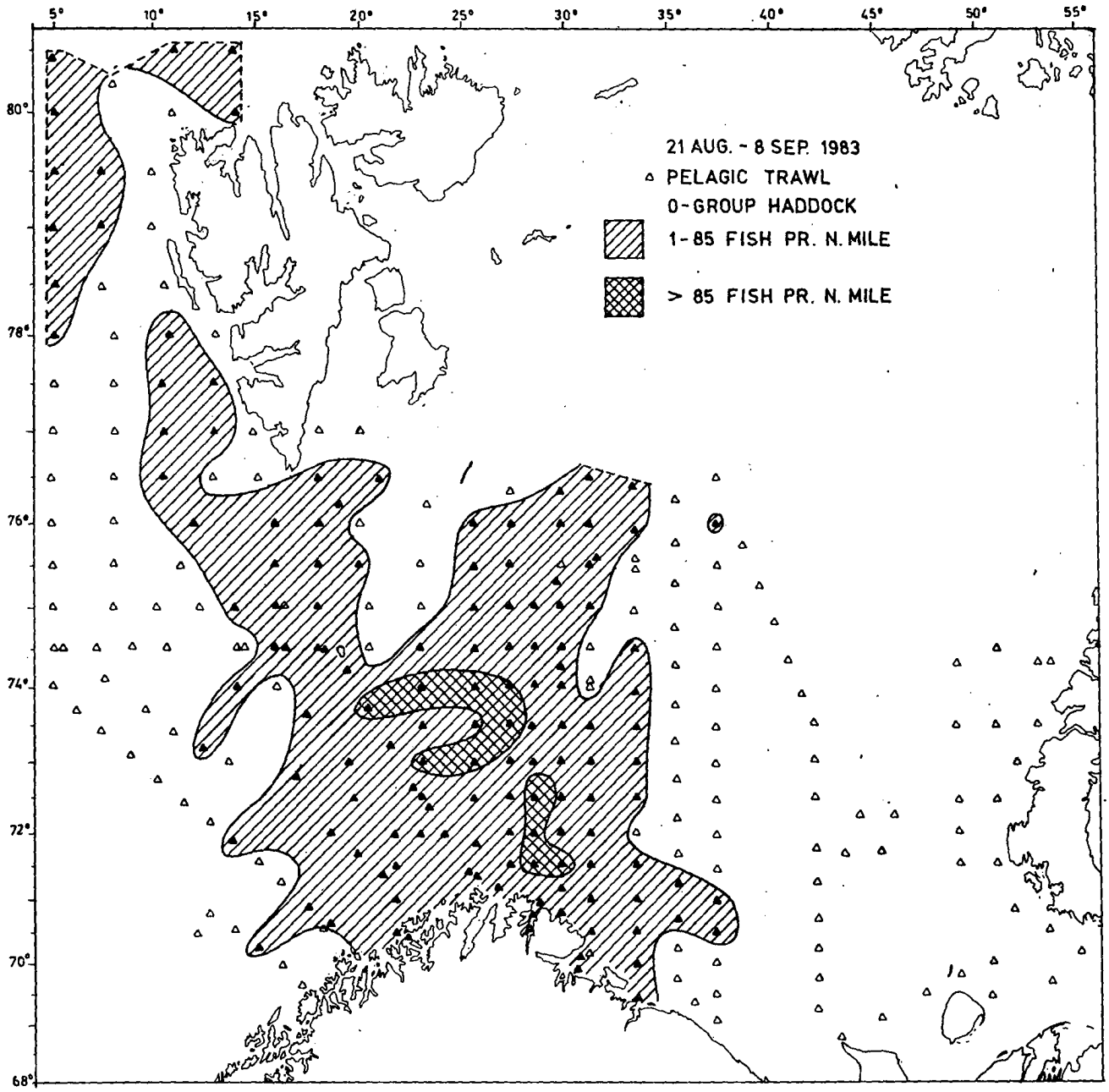

Fig. 13 Distribution of 0-group haddock.

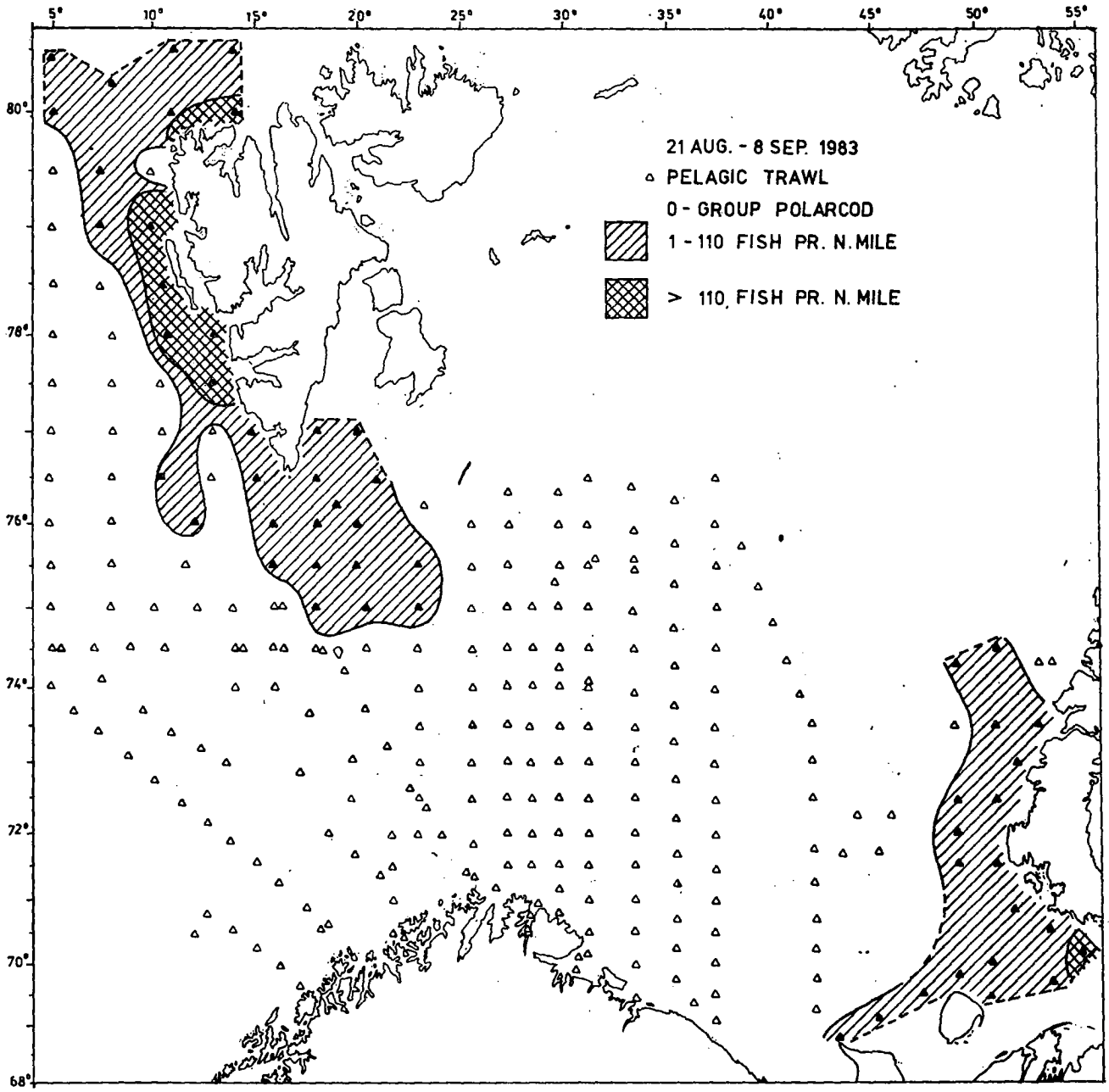

Fig. 14 Distribution of 0-group polar cod.

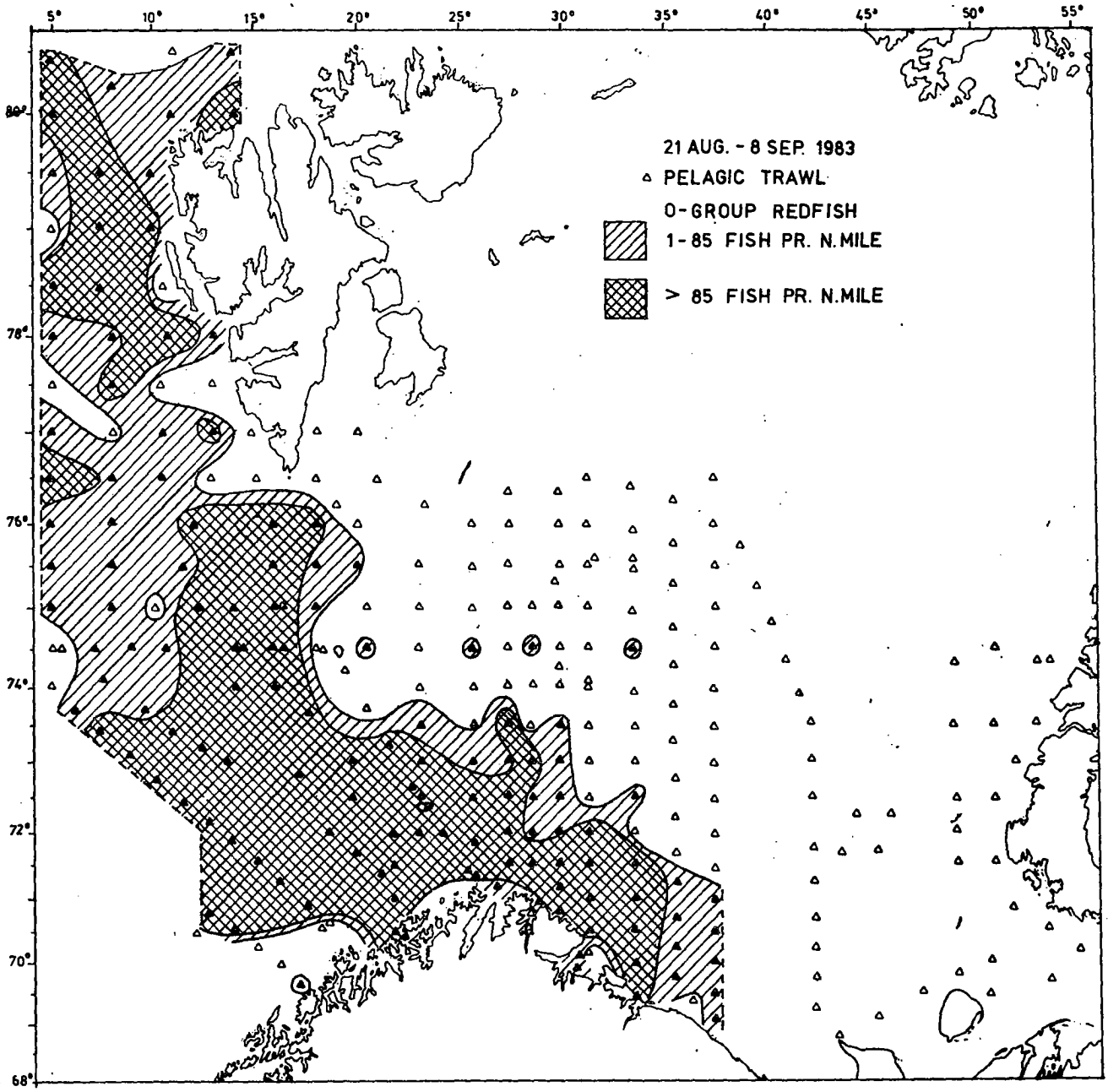

Fig. 15 Distribution of 0-group redfish.

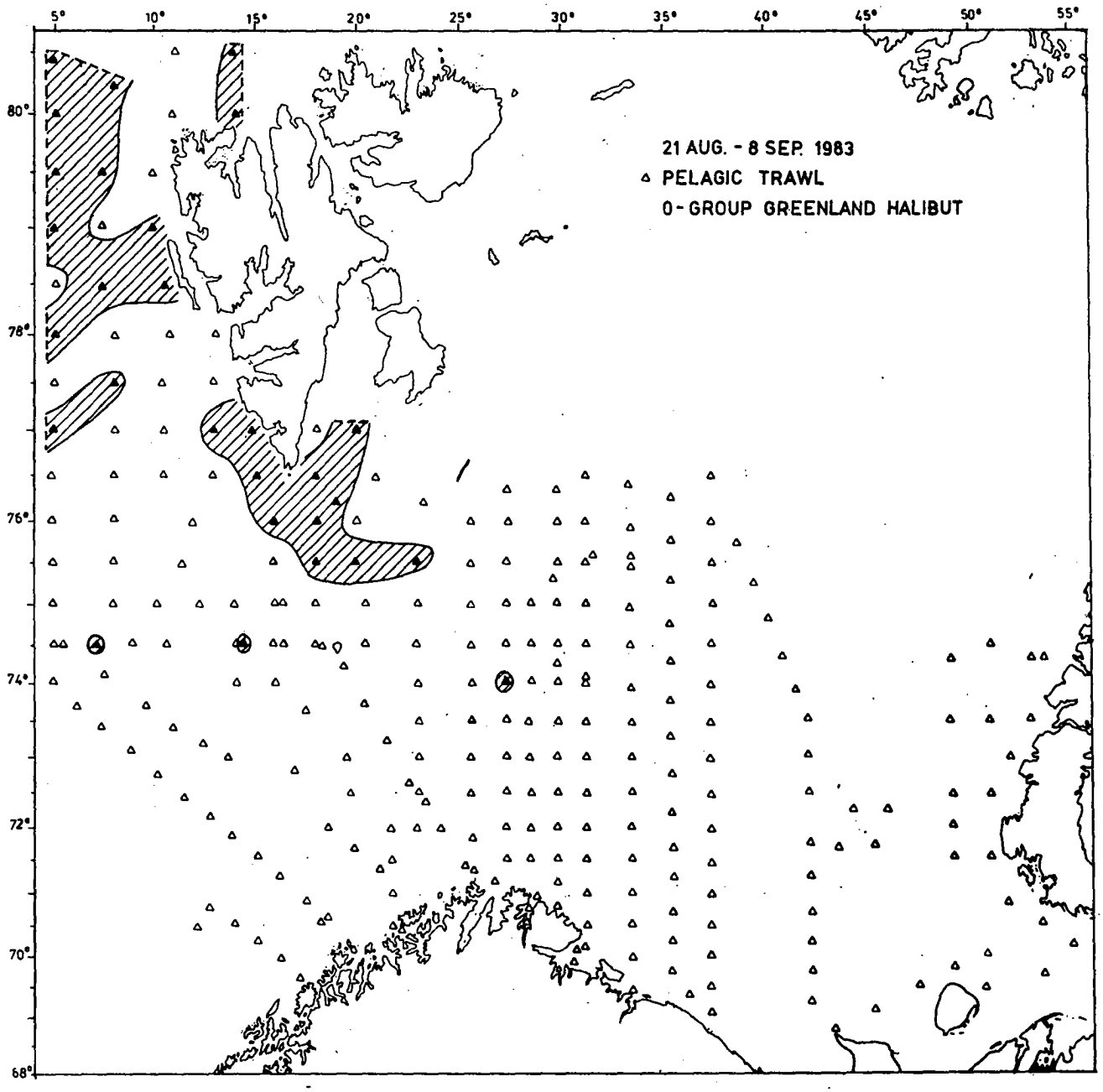

Fig. 16 Distribution of 0-group Greenland halibut.

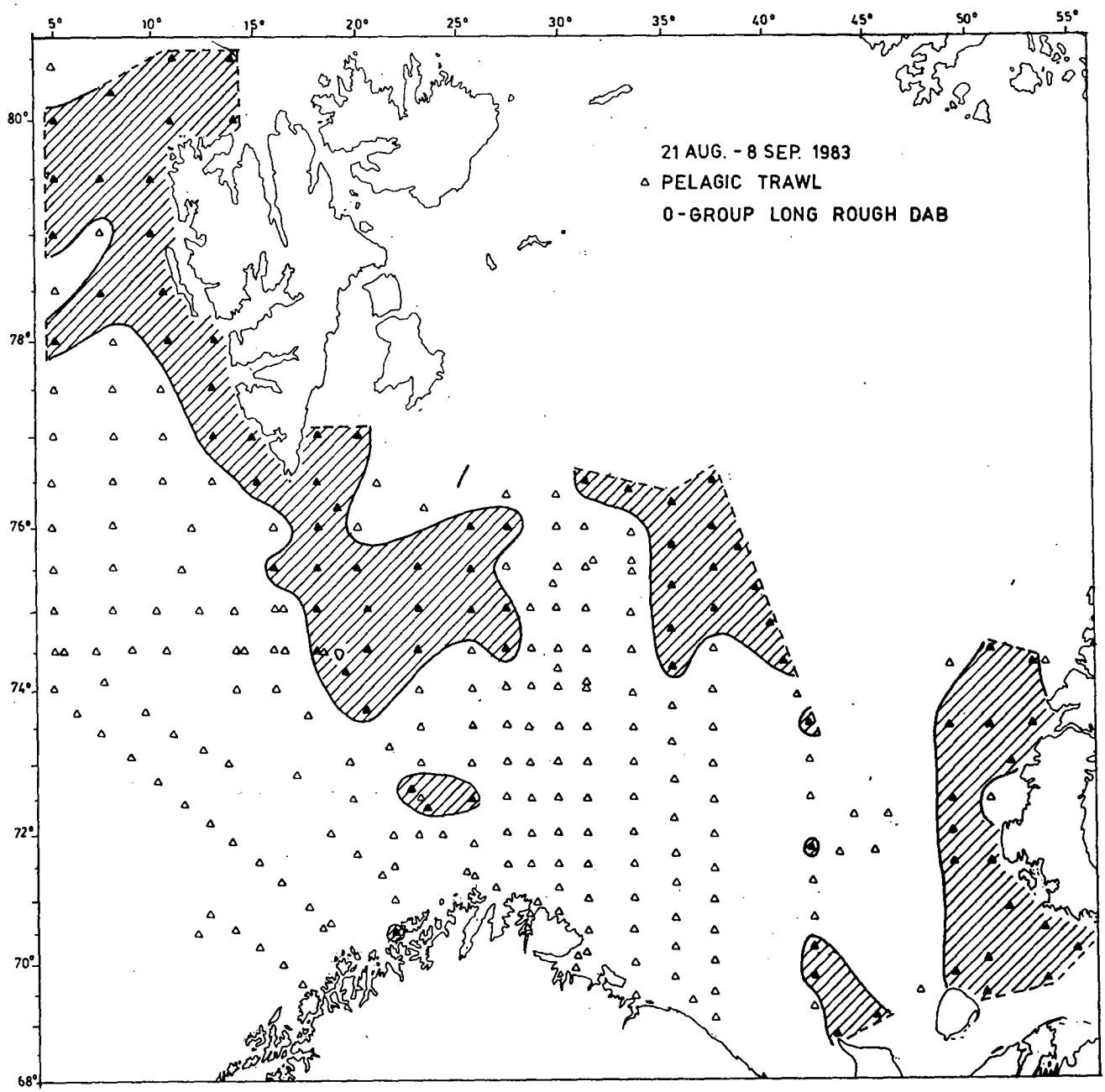

Fig. 17 Distribution of 0-group long rough dab.

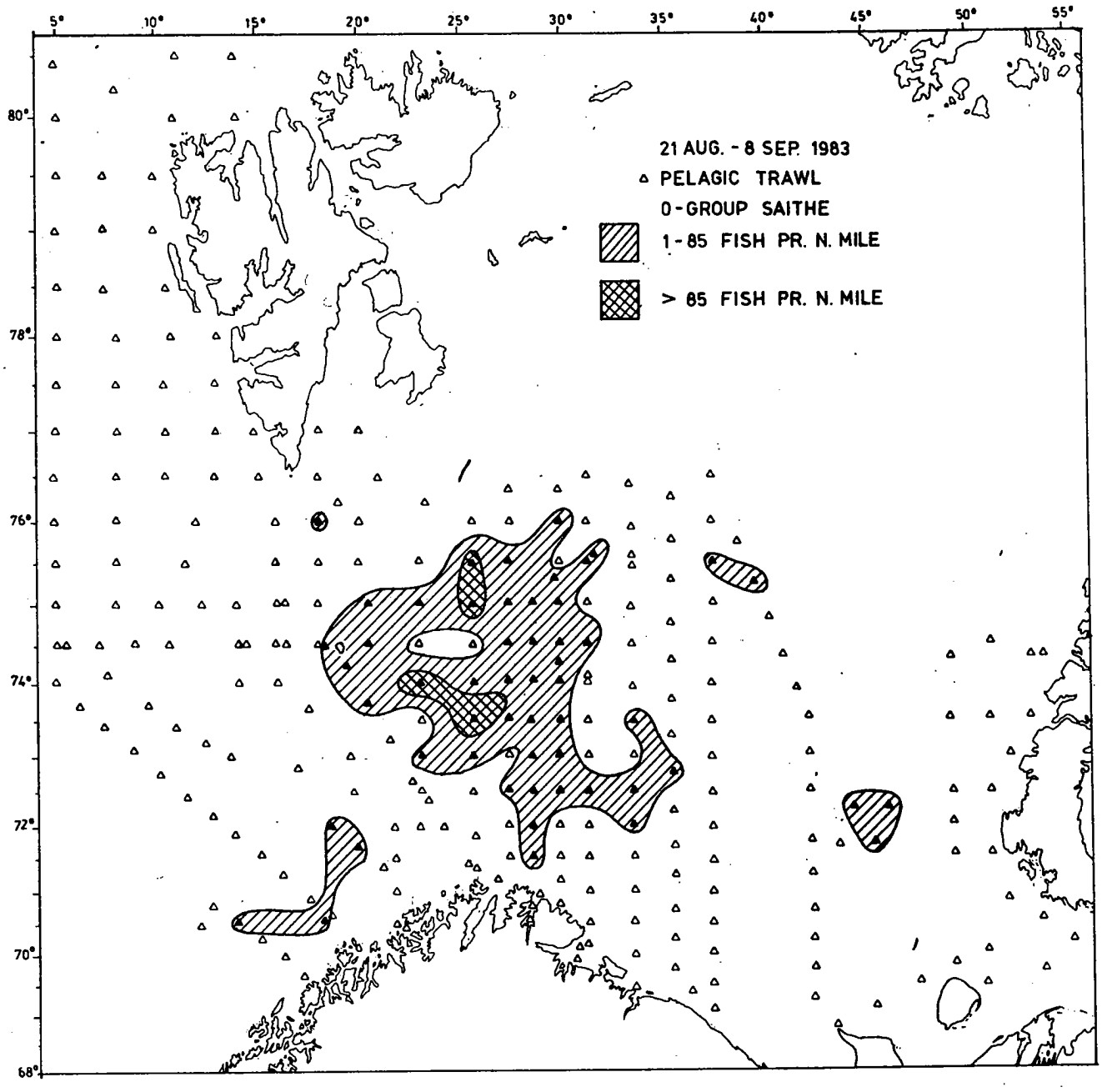

Fig. 18 Distribution of 0-group saithe.

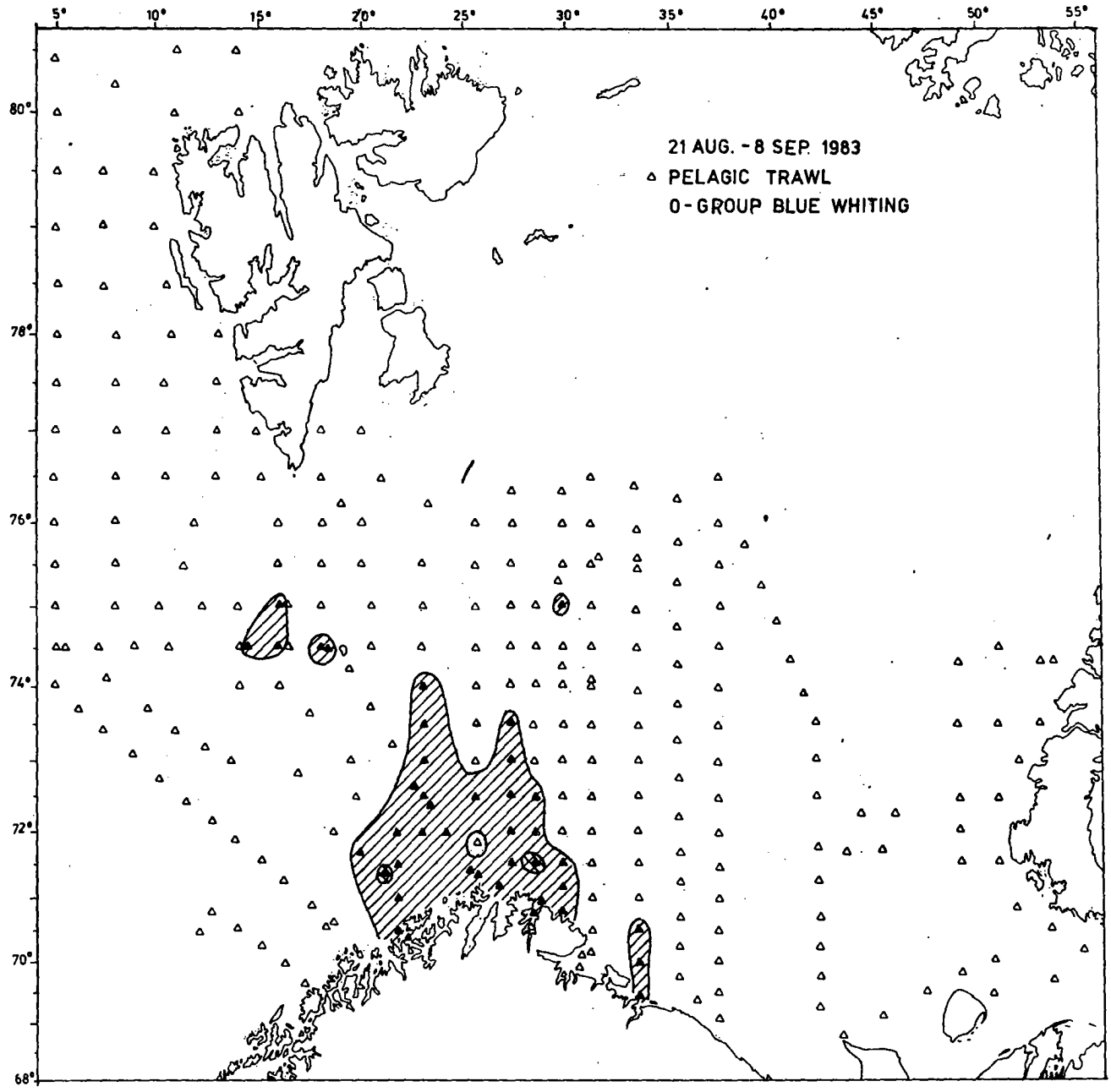

Fig. 19 Distribution of 0-group blue whiting.

Appendix

Survey period	Research vessel	Research Institute	Participants
24 August - 3 September	"Poisk"	Polar Research Institute of Marine Fisheries and Oceanography, Murmansk	I.V. Borkin, E.N. Loparev. V.N. Nen'ko.
22 August - 5 September	"Persey III"	" "	S.V. Belikov, N.V. Bryzgalova, E.S. Demidenko, P.V. Fedorov, V.A. Khljupin, L.N. Korol, V.I. Shapovalov, Ju.F. Shevtso, M.V. Shkatova, E.S. Shishkin, N.G. Ushakov, N.V. Vanjukhino, A.D. Voloshin.
24 August - 3 September	"Alaid"	" "	N.P. Chebotok, A.Ph. Pshenichnov.
21 August - 5 September	"G.O. Sars"	Institute of Marine Research, Bergen	B. Brynildsen, A. Hylen, H. Kismul, L. Pettersen, J. Røttingen, A.M. Skorpen, I. Svellingen, B. Tveranger, E. Øvretvedt.
21 August - 5 September	"Michael Sars"	" "	I.M. Beck, K. Gjertsen, B. Kvinge, E. Molvær, H. Myran, R. Thoresen.
21 August - 8 September	"Eldjarn"	" "	O.R. Godø, B. Hoffstad, F. Lie, H. Ludvigsen, J.E. Klæt, M. Møgster, H. Mørner, K. Randa, A. Romslo, A.K. Solheim, Ø. Torgersen, S. Torheim.