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the Exploration of the Sea

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Pelagic Fish (Northern) Committee  
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Fish (N) Committees

Preliminary report of the International o-group fish survey  
in the Barents Sea and adjacent waters in August-September 1975

INTRODUCTION

The following vessels and scientists participated in the eleventh international survey to study the abundance and distribution of o-group fish in the Barents Sea and Svalbard region:

USSR:	"Fridtjof Nansen"	V.N. Kusnetsov J.F. Shevtsov
	"Poisk"	V.V. Rossov A.S. Galkin E.A. Jakovlenkov
Norway :	"Johan Hjort"	J.Hamre V.Ausen
	"G.O.Sars"	L.Midttun A.Beltestad
U.K.:	"Cirolana"	B.W.Jones H.R. Stewardson M.R. Vince

A meeting was held in Murmansk between the scientists of PINRO and "G.O.Sars" to make final arrangement for the coordination of the survey. The period of the survey was from 25 August to 7 September, and a meeting of scientists was held in Hammerfest on 8-9 September to analyse the data and to prepare the report.

## MATERIAL AND METHODS

The distribution and density of the pelagic scattering layers was estimated from echo-sounder paper records, from echo integrator measurements, and by fishing with small meshed pelagic trawls. Depth metering devices were used for the accurate control of the depth of trawling. All vessels used the modified capelin trawl with an opening of  $(18 \times 15)\text{m}^2$  except for "Fridtjof Nansen", which used a smaller trawl with an opening of  $(6 \times 10)\text{m}^2$ .

Figs 1 and 2 show the survey tracks of the ships and the trawl and hydrographic stations worked.

## RESULTS

### Hydrography (Figs. 3-9)

Comparing the temperature distribution in the 0 m layer for this year and previous years, and from Table 1 it is possible to conclude that a weak insolation warming of the western Barents Sea waters (in the 0-50 m layer) had occurred.

But because of fairly high temperature in the 50-200 m layer due to increased heat transport, the mean water temperature in the 0-200 m layer along the Kola section was above the normal. On the section North Cape - Bear Island it was close to the norm (Table 2), although a little colder near surface in the southern part.

This year an increased heat transport into the south-western Barents Sea is particularly apparent in the 100 m layer, similar to that of 1973, but differs from that of 1974 by the more eastern position of the  $5^\circ$  and  $6^\circ$  isotherms. It is supposed that the eastern distributions of main 0-group cod concentrations was due to a considerably greater than average inflow of the Norwegian Current water into the Barents Sea. Compared to 1973/74 lower temperatures were registered in the 0-50 m layer not only in the south-western Barents Sea but also in the area between Hope Island and Bear Island and in the north-easternmost part of the area. But in 1975 temperatures as low as in 1974 in the 200 m layer in the north-eastern Barents Sea were not observed.

Low water temperatures near the surface, relatively high ones in

the deeper layers caused only a weak development of thermocline in the western Barents Sea. Temperatures above the long-term average were recorded in the whole 0-200 m layer on the section west of Bear Island.

#### 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. 10-16. Estimates of abundance were calculated by the method of Haug and Nakken (1973) and these are given in Table 4 where they can be compared with estimates prepared from earlier surveys. Some qualifying remarks on the validity of these abundance indices are made in the comments on some of the species given below. Length frequency distributions of the main species are shown in Fig.17.

#### Herring

Only two specimens were taken during the entire survey indicating once again no recovery of the herring stock in the Barents Sea.

#### Cod (Fig.10)

0-group cod were distributed over a wide area in the central Barents Sea with the area of greatest density near the coast between 30°E and 40°E. Only one specimen was taken in the waters west of Spitsbergen. The calculated abundance index indicates the 1975 year-class to be a strong one, although less abundant than the very strong year-classes of 1970 and 1973.

#### Haddock (Fig. 11)

The distribution was very similar to that of cod. Very few were caught in the Svalbard area and the area of greatest abundance was in an area off the Finmark-Murman coast. The abundance index for haddock is the highest on record and the 1975 year-class is considered to be abundant.

#### Redfish (Fig.12)

The redfish distribution was similar to that in previous years,

The areas of high density were not as extensive as in 1974. The 1975 year-class is a strong one, but less abundant than the very strong 1974 year-class.

Capelin (Fig.13)

Capelin were distributed in the eastern Barents Sea but not as far north as usual. Only small numbers were recorded north of 74°N. None were taken in the Svalbard area. This year there was an extensive summer spawning in Varanger Fjord in June and newly hatched larvae were observed in late June. The smaller size of the larvae in the southern part of the area is associated with this late spawning.

With our better knowledge of the vertical distribution of 0-group capelin (Beltestad, Nakken and Smedstad 1975, in press), sampling has been more efficient in 1974 and 1975. Consequently any comparison of abundance indices for these years with earlier years is likely to be misleading. During day time the larvae are up at the surface and concentrated in a very narrow depth range. At night they become much more dispersed in a much wider depth range. Accordingly the numbers caught in surface hauls during daylight will be much greater than those during the night. Also large numbers of capelin larvae are caught in the meshes of the trawls. These problems make it difficult to assess the abundance but it appears similar to 1974.

Long Rough Dab (Fig. 14)

This species was distributed over a wide area, but at a low density. The overall abundance appears to be about, or slightly above average.

Polar Cod (Fig. 15)

Very few Polar Cod were caught this year in the eastern Barents Sea although survey coverage on the coast Novaya Zemlya was less extensive than in previous years. The 1975 year-class in this area is considered to be of low abundance. In the Svalbard area catches indicated an abundance rather higher than usual.

Greenland Halibut (Fig. 16)

This species was recorded in the Svalbard area with a similar distribution to earlier years.

Mackerel

No mackerel were recorded this year.

Other species

Small numbers of catfish and saithe were caught during the survey. O-group Leptagonus, Liparis and Cottus were widely distributed in the colder water. O-group sandeels were abundant in the south-eastern Barents Sea.

REFERENCE

BELTESTAD, A.K., NAKKEN, O . and SMEDSTAD, O.M. 1975.

Investigations on diel vertical migration of  
O-group fish in the Barents Sea. FiskDir.Skr.Ser.  
HavUnders. 17:000-000, (In press)

HAUG, A. and NAKKEN, O. 1973. Echo abundance indices of o-group fish in the Barents Sea 1965-1972. ICES/FAO/ICNAF Symposium on Acoustic Methods in Fisheries Research Bergen, June 1973. 1-13, 4 tab., 27 figs. [Mimeo.]

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 (°C).

Year	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	Average 1965-1975
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	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	3.8
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	4.7

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 (°C).

Year	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	Average 1965-1975
Layer												
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	5.8

Table 3. Mean water temperature in the West Spitsbergen current along the West Bear Island section (between 06°34'E and 05°55'E) in early September.

Year	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	Average 1965-1975
Layer											
0-200 m	3.3	4.2	3.6	4.2	No data	4.2	3.9	5.0	4.6	4.9	4.2

Table 4. Abundance indices.

Species Year	Cod	Capelin	Haddock	Redfish	Polar cod	Long rough dab
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
1971	157	151	73	172	181	81
1972	140	275	46	177	140	65
1973	684	125	54	385	(26)	67
1974	51	359	147	468	227	83
1975	343	320	170	315	75	113

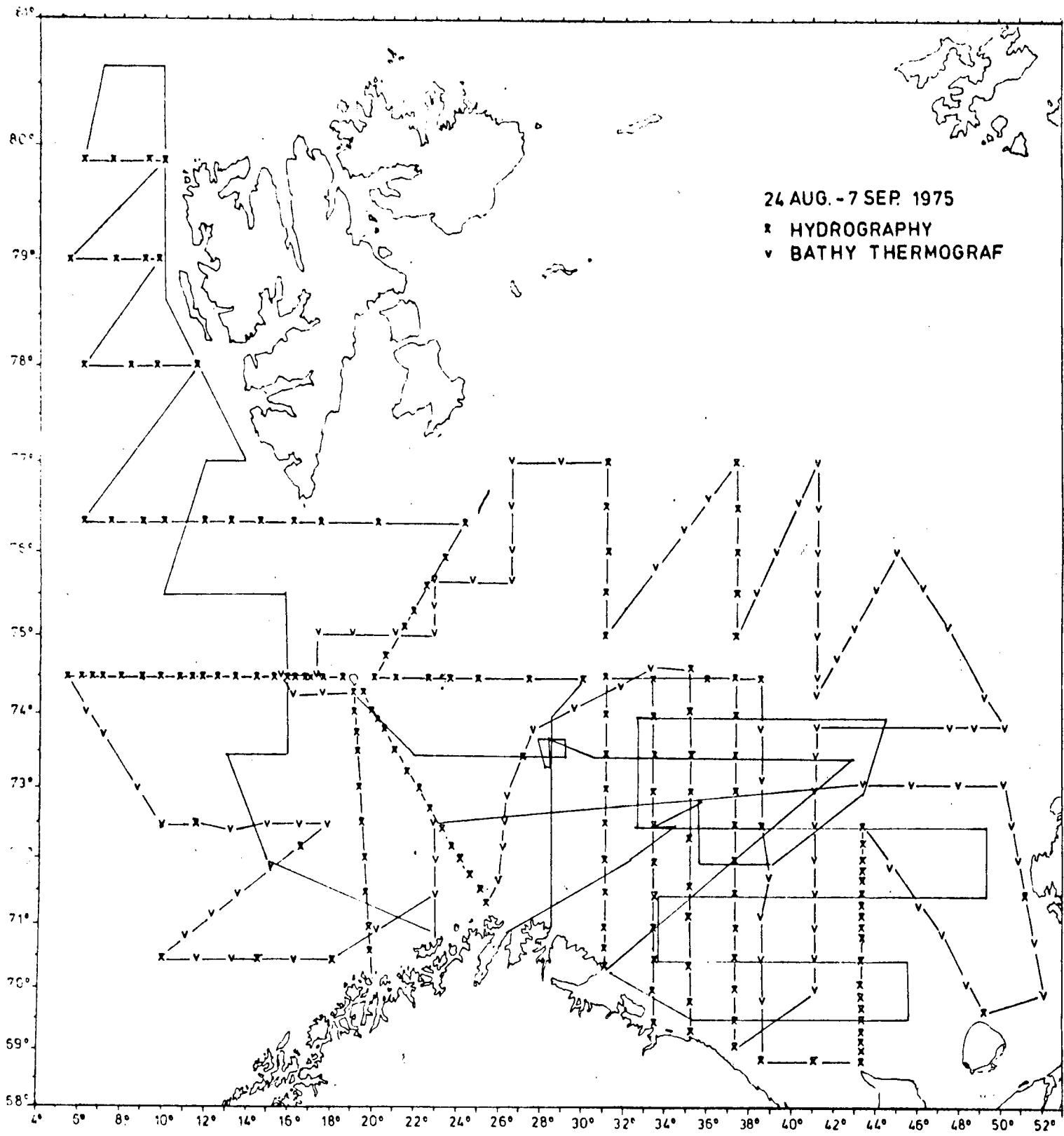


Fig. 1. Survey routes and grid of hydrographic stations.



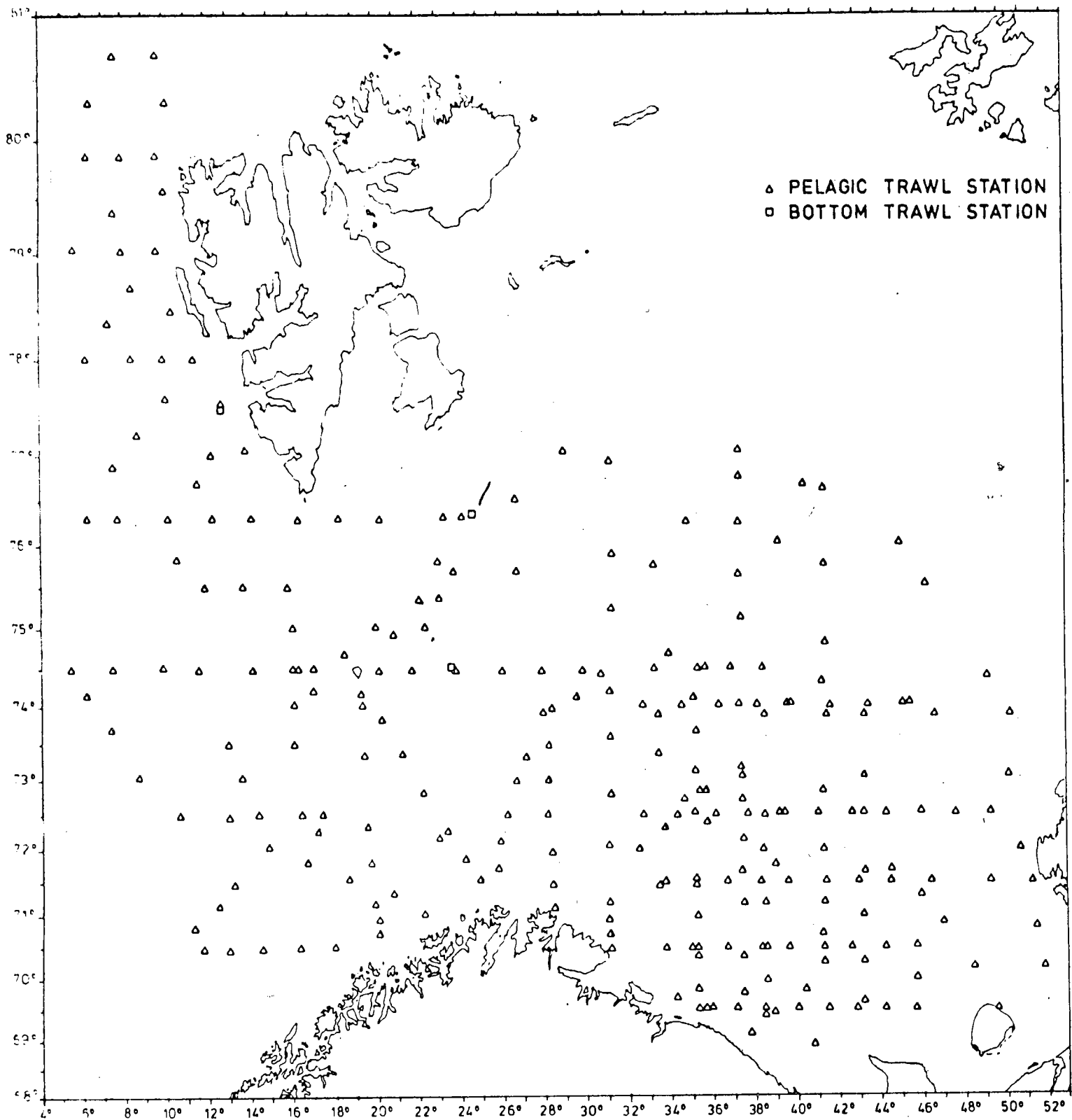


Fig. 2. Trawlstations. △ pelagic trawl, □ bottom trawl

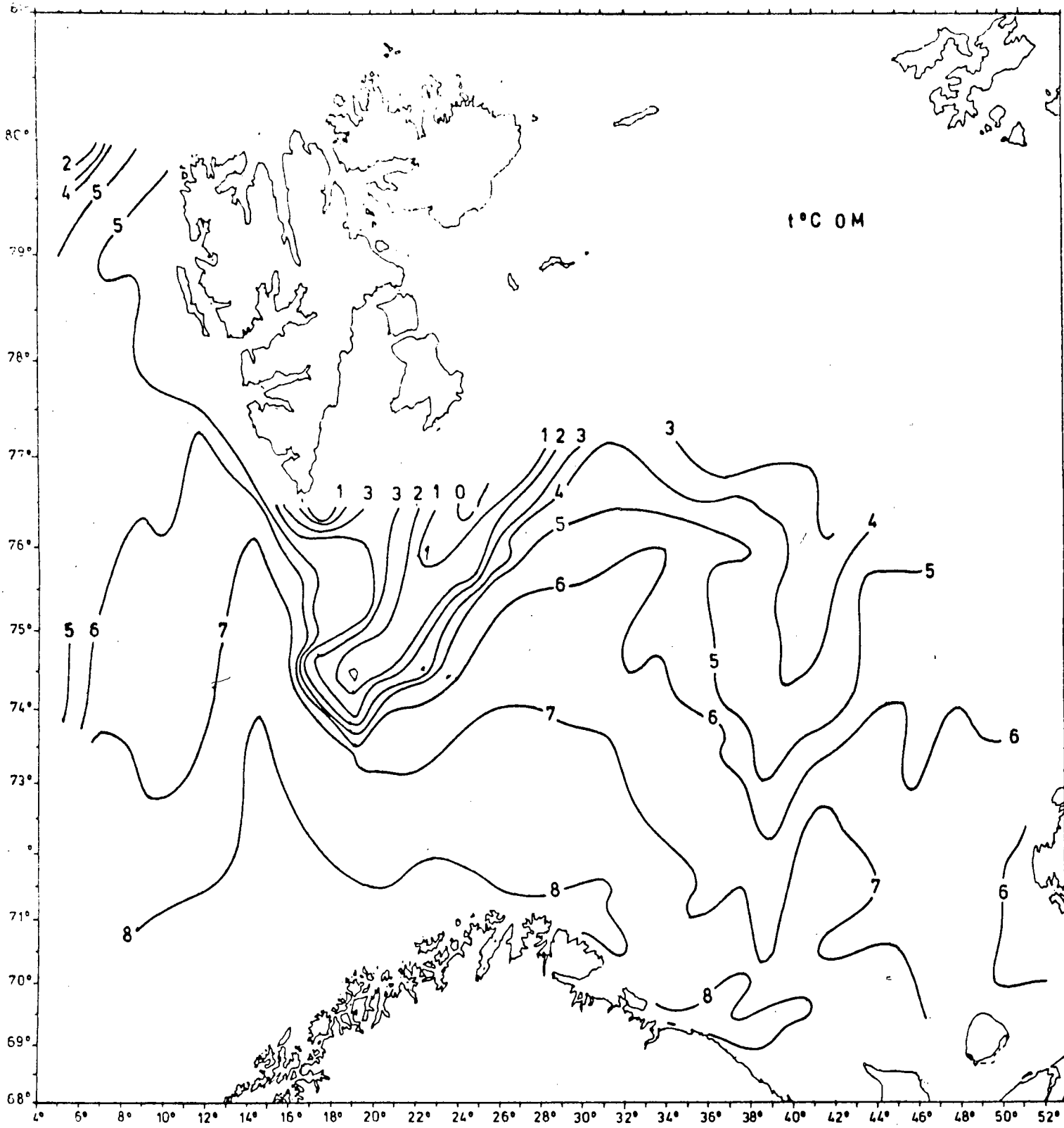


Fig. 3. Isotherms at 0 m.

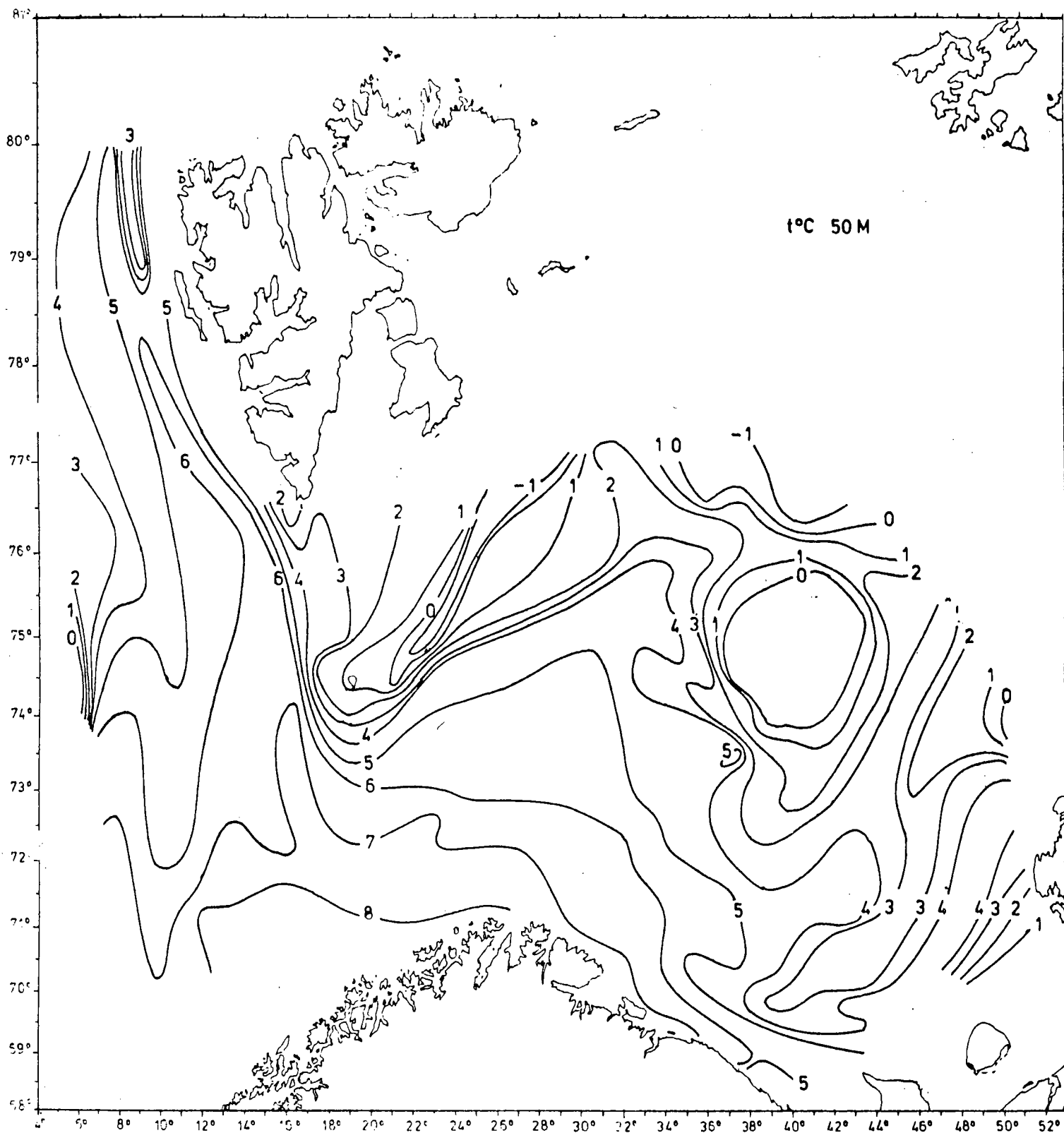


Fig. 4. Isotherms at 50 m.

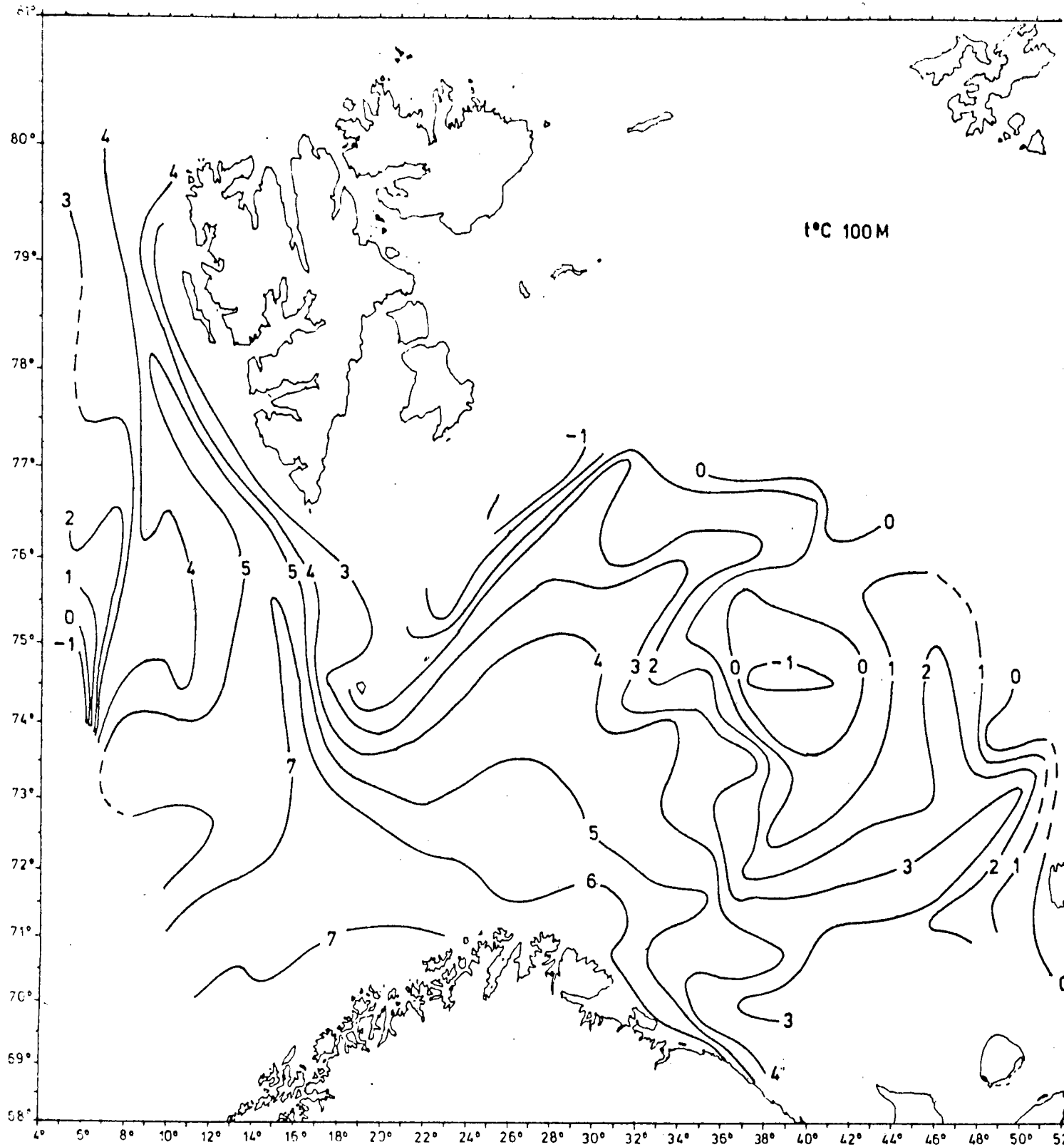


Fig. 5. Isotherms at 100 m.

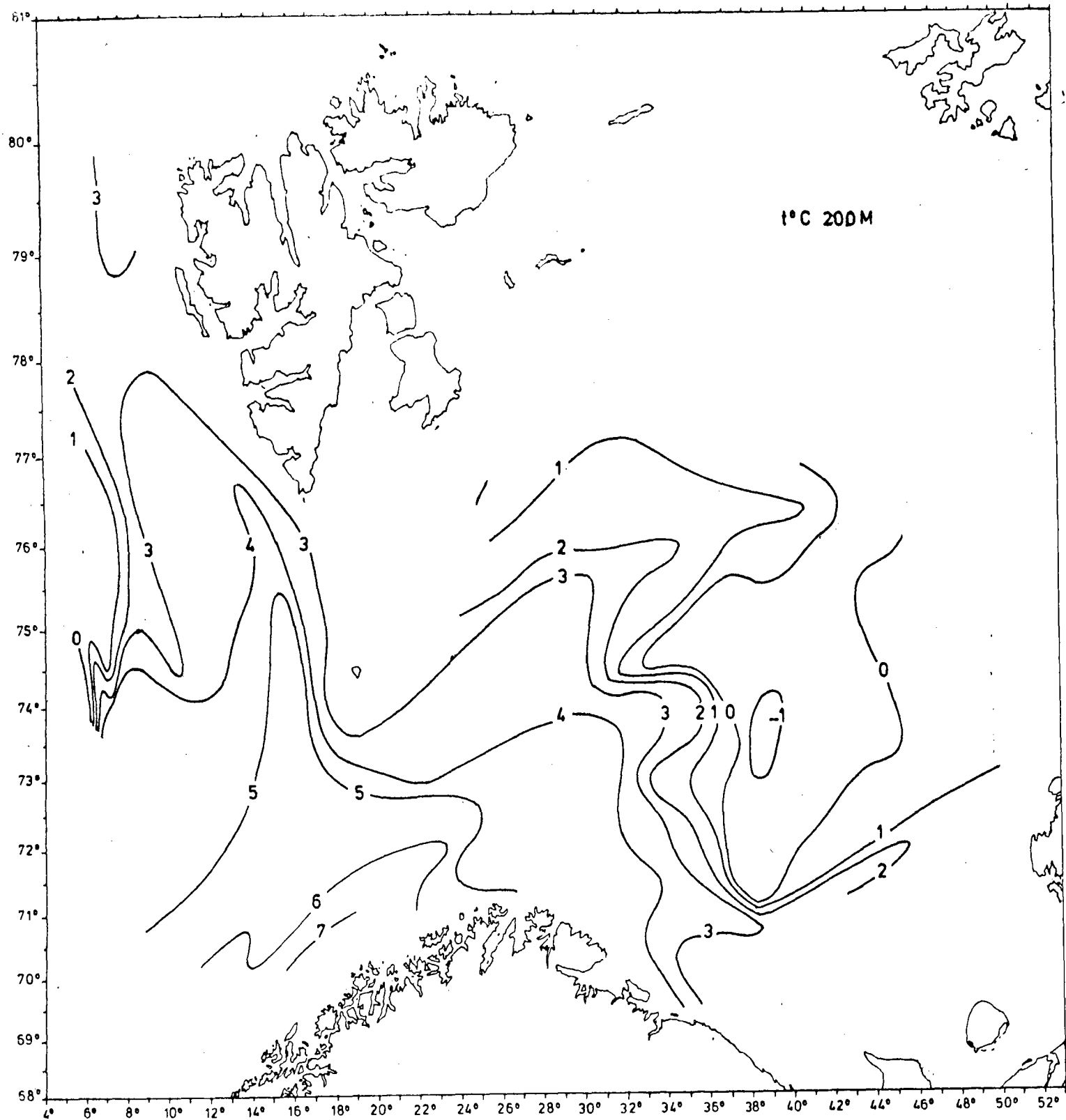


Fig. 6. Isotherms at 200 m.

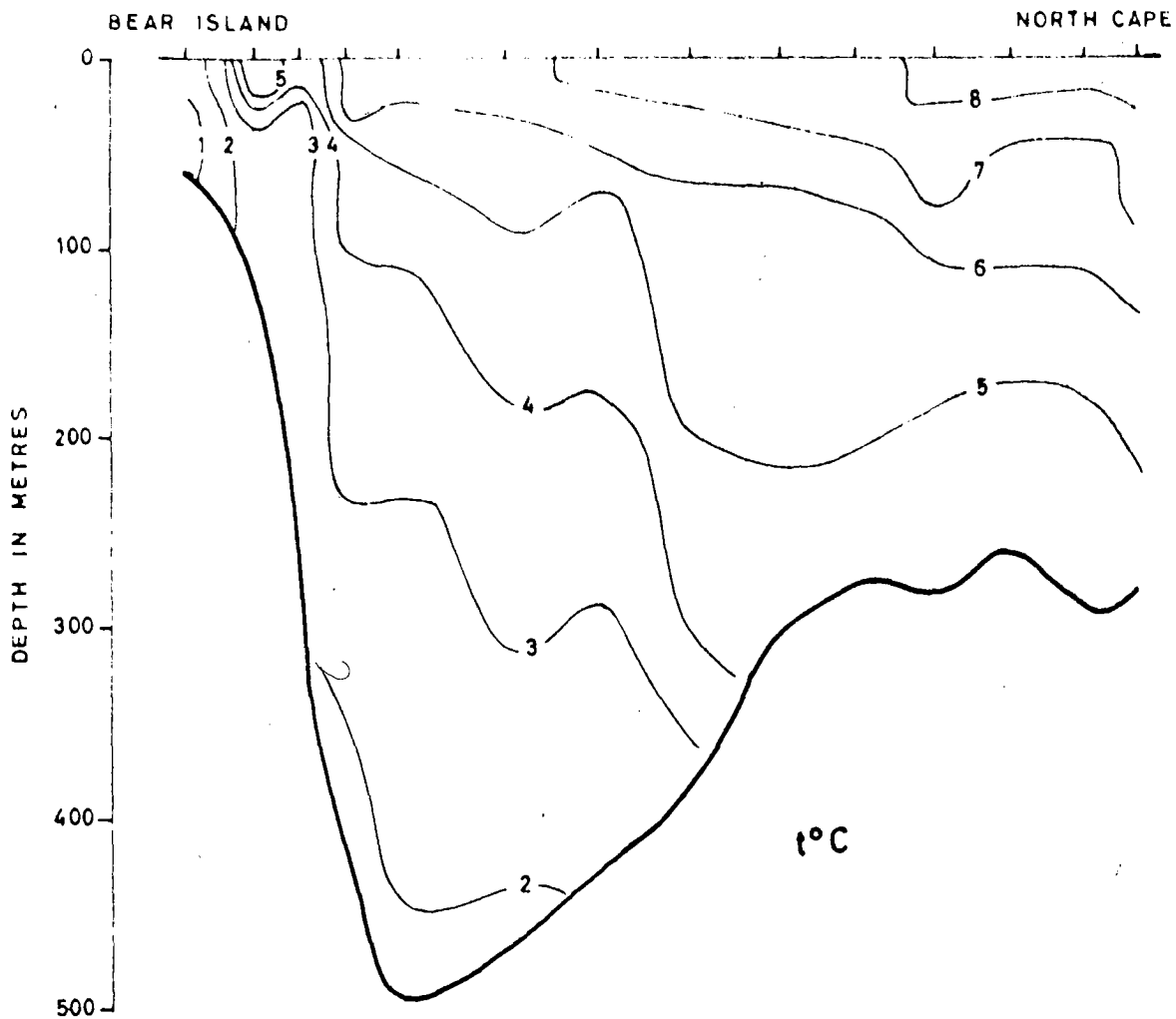


Fig. 7. Temperature section Bear Island - North Cape.

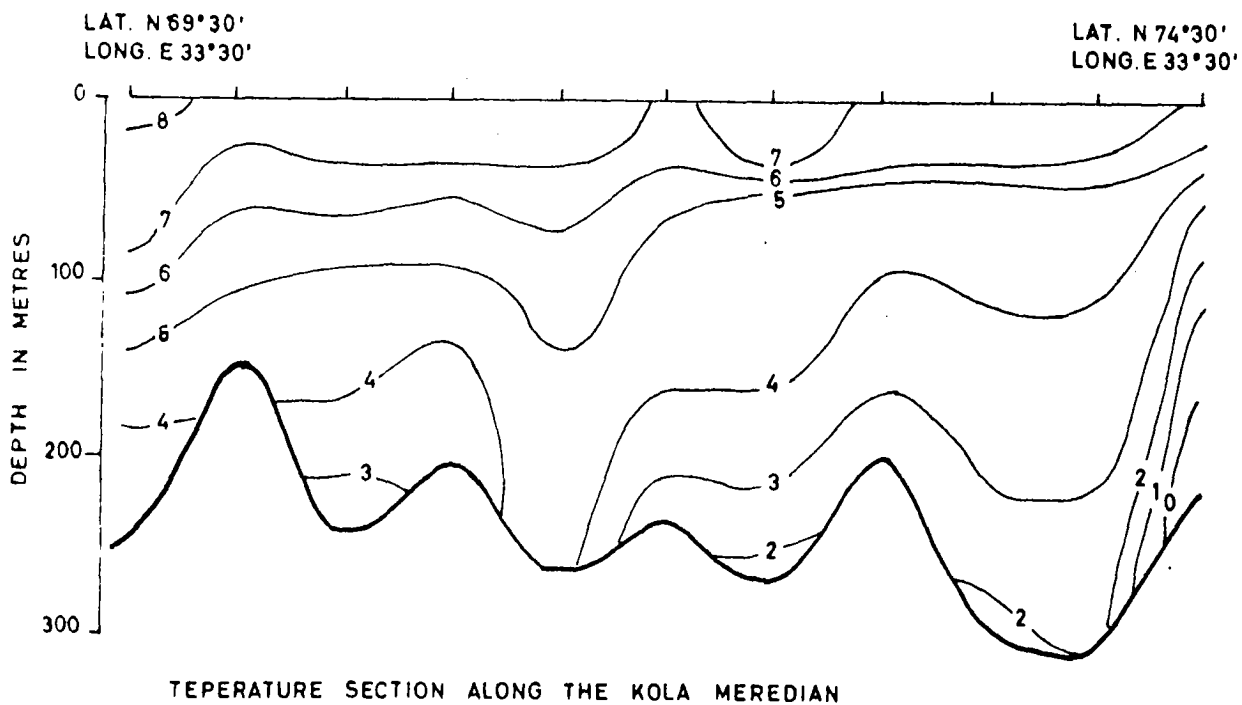


Fig. 8. Temperature section along the Kola meridian.

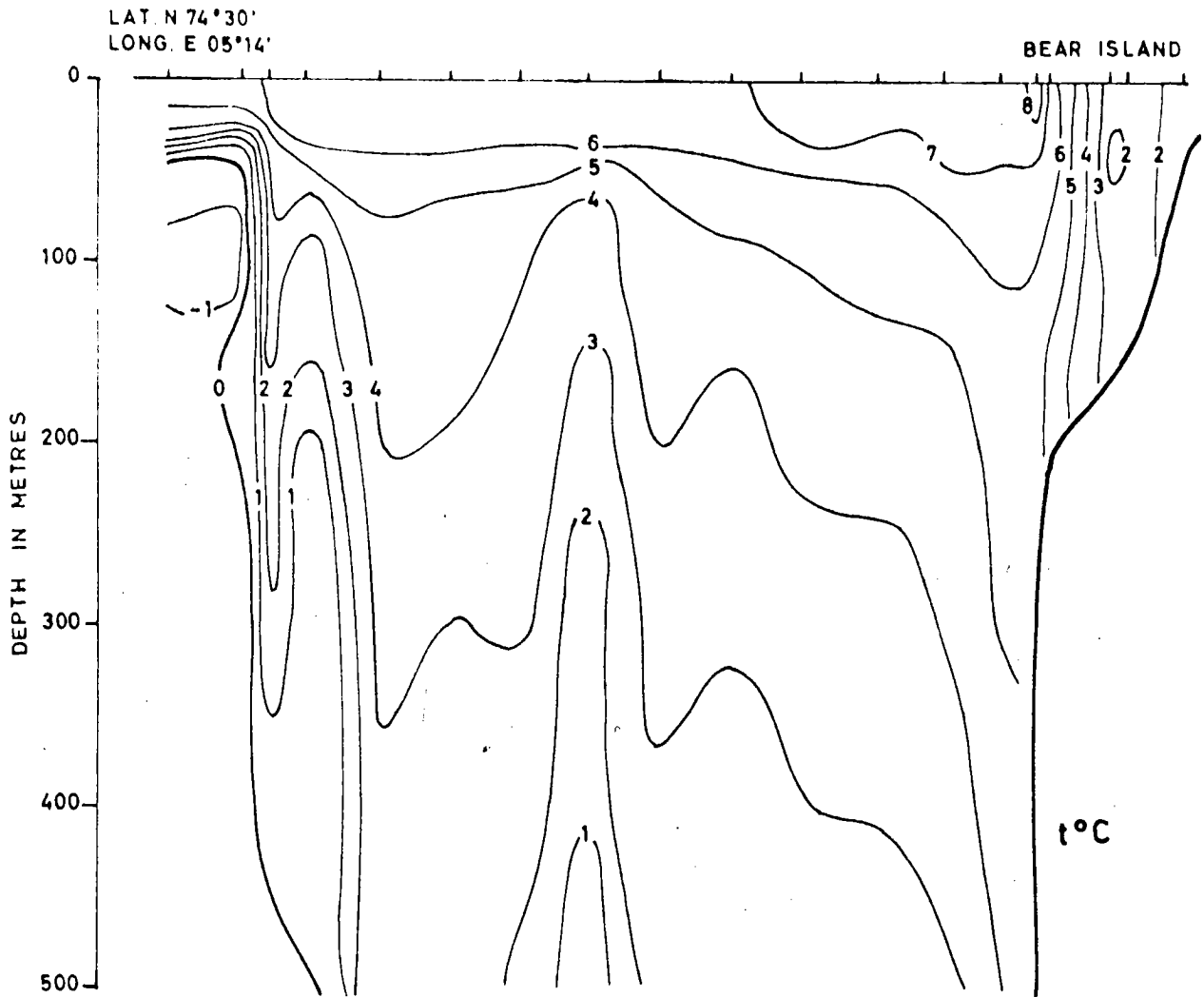


Fig. 9. Temperature section Bear Island - West.

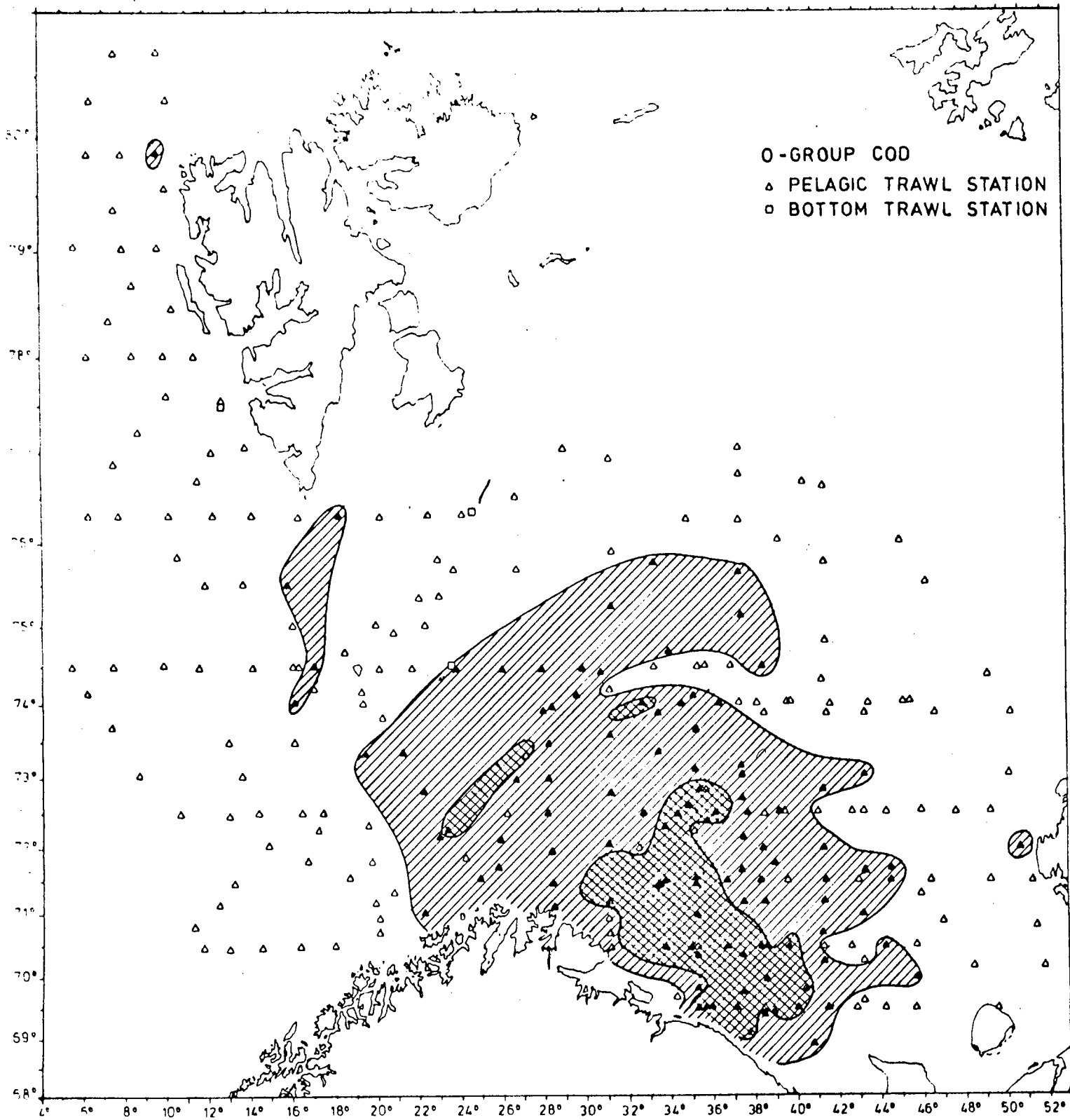


Fig. 10. Distribution of 0-group cod.



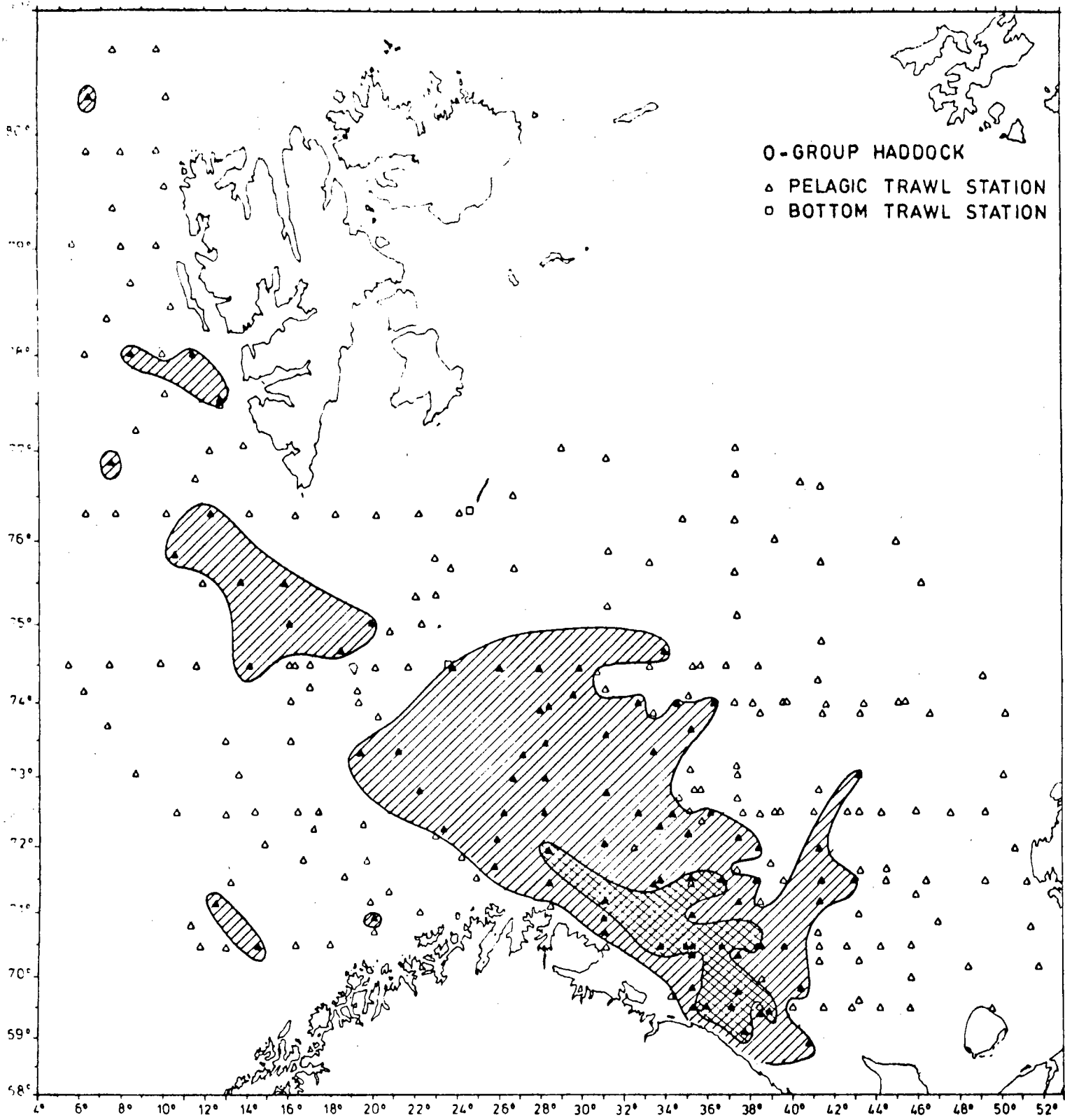


Fig. 11. Distribution of 0-group haddock.

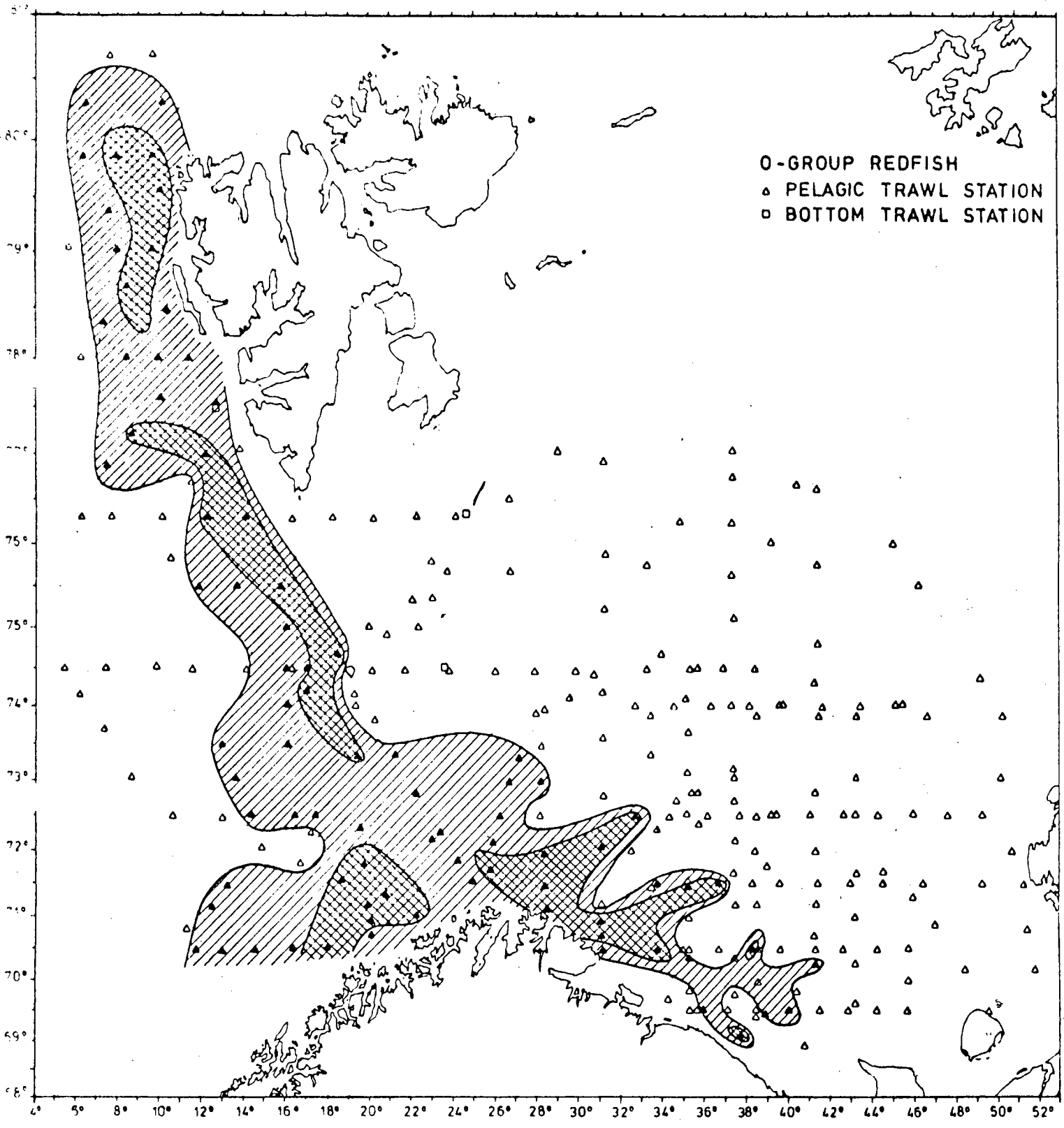


Fig. 12. Distribution of 0-group redfish.

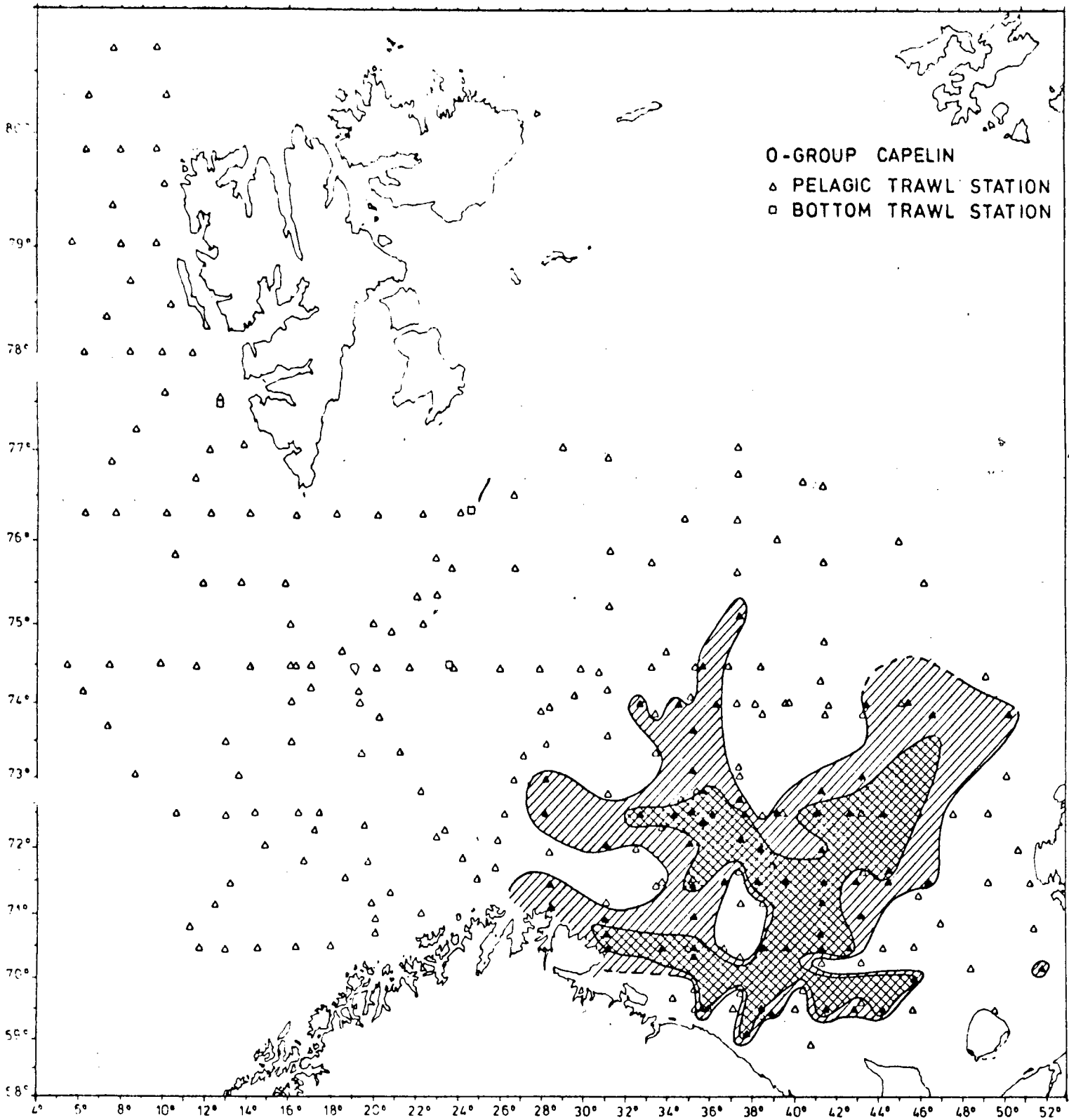


Fig. 13. Distribution of 0-group capelin.

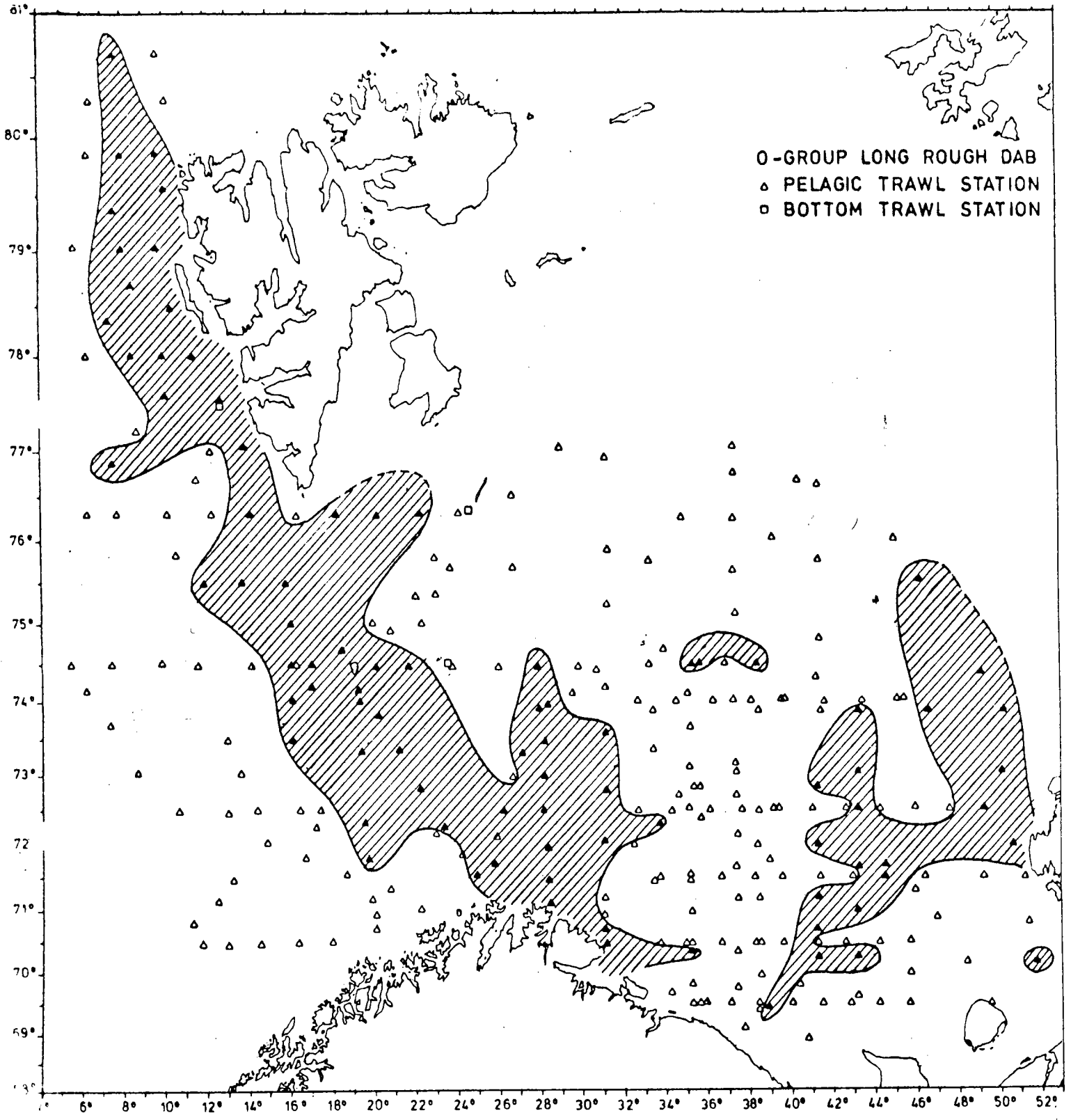


Fig. 14. Distribution of 0-group long rough dab.

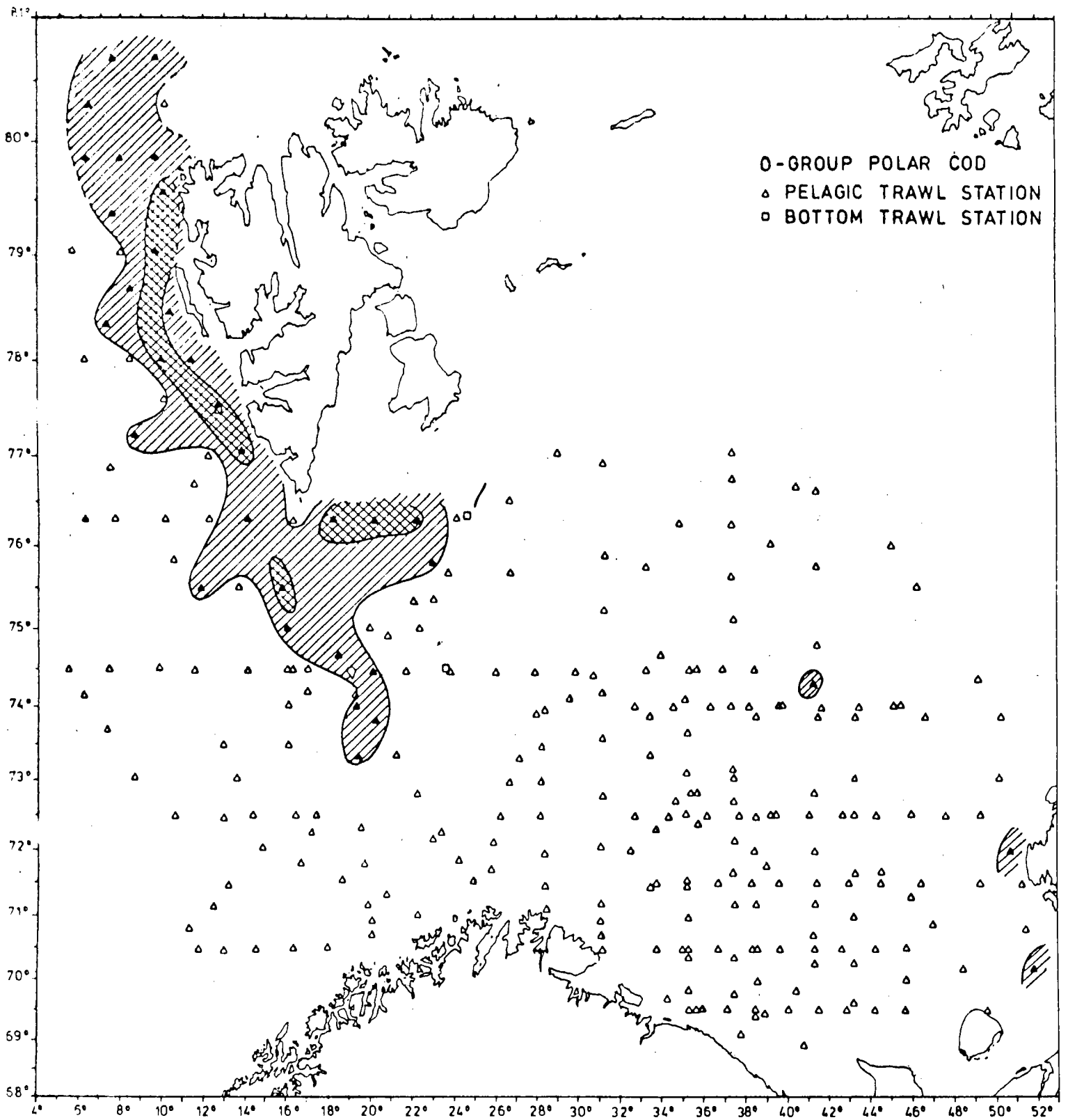


Fig. 15. Distribution of 0-group polar cod.

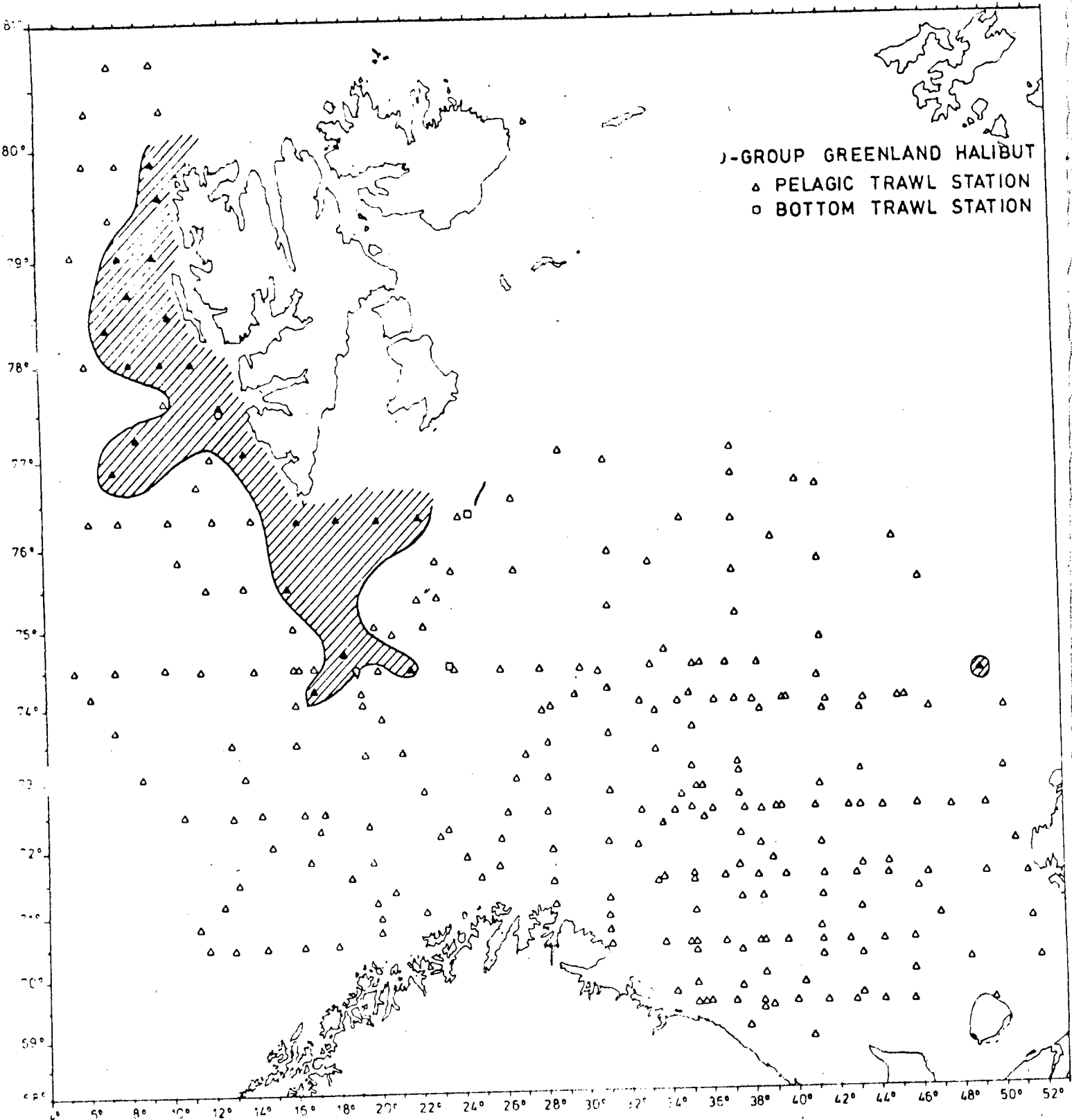


Fig. 16. Distribution of 0-group Greenland halibut.

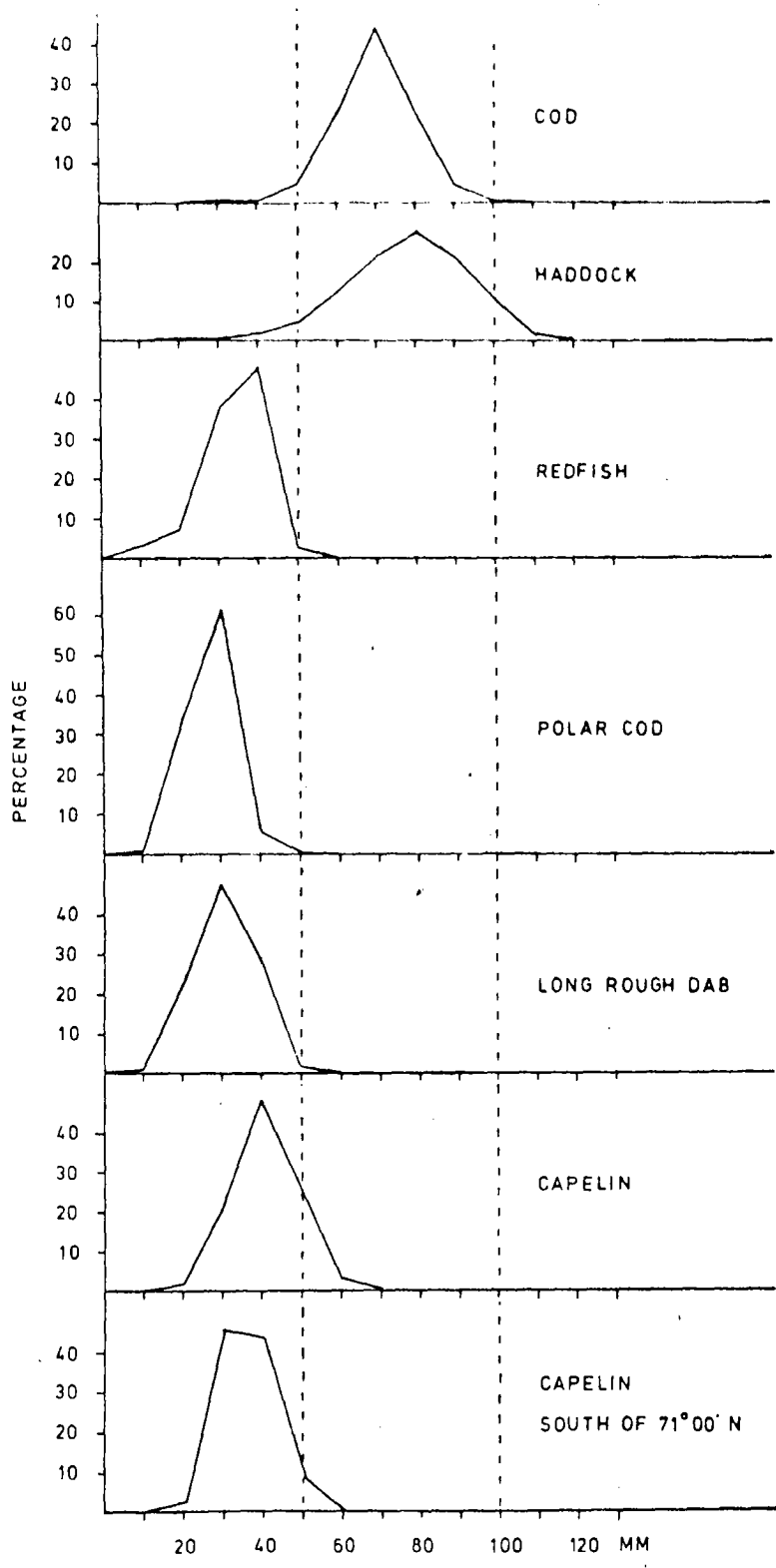


Fig. 17. Length distribution of 0-group fish.