

International Council for
the Exploration of the Sea

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

Preliminary report of the International 0-group fish survey in
the Barents Sea and adjacent waters in August-September 1973.

INTRODUCTION

This was the ninth in a series of international surveys to study the abundance of 0-group fish in the Barents Sea and the Svalbard region.

The following vessels and scientists took part in the survey:

USSR	: R/V "Fritjof Nansen"	V.N.Kusnetsov, V.V.Rossov, N.Y.Ushakov.
	R/V "Poisk"	V.N.Shleinik, Z.M.Berdichevski
Norway	: "Johan Hjort"	O.Nakken, O.Smedstad, I.Hoff
	"G.O.Sars"	L.Midttun, O.Dragesund, G.Vestnes
U.K.	"Cirolana"	R.W.Blacker, K.Brandner, W.Huggins, M.Vine

Preliminary plans for the survey were made at a meeting in Bergen in May 1973, and final arrangements for coordination were made in Kirkenes and Murmansk immediately before the commencement of the survey. The main part of the survey was carried out between 28 August and 11 September but "Cirolana" commenced and finished a little earlier. The survey was followed by a meeting in Hammerfest 12-14 September. Material was exchanged and a report worked out.

MATERIAL AND METHODS

The distribution and density of the pelagic scattering layers was estimated from echo sounder paper records but also to some extent from echo integrator measurements. The organisms forming the scattering layers were identified by sampling with small meshed pelagic trawls. Various depth metering devices on the trawl were used for the accurate control of the trawling depth.

An attempt was made to compare the fishing power of the trawls used by "Poisk", "Fritjof Nansen", "Johan Hjort" and "G.O.Sars". Two parallel tows were made on the same recording of 0-group redfish. The results are too few to give a reliable comparison, but they indicate that comparability increases with increasing size of the trawl gape.

No comparison could be made with the "Cirolana"'s gear, but most of the hauls were made with a Norwegian trawl similar to that used on the "Johan Hjort" and "G.O.Sars".

Fig. 1 and 2 show the area surveyed and the ship's tracks together with trawl and hydrographic stations worked.

RESULTS

Hydrography

Hydrographic observations were made along the same standard section as in previous years. Preliminary analyses of the data are given in Figs.3-9.

Comparison of the hydrographic conditions in the Barents Sea in 1973 with those of previous years shows that temperatures were similar to the very warm conditions of 1972 (Tables 1 and 2).

TABLE 1

Mean water temperature in the Murman Current, the Kola section at the end of August in the years 1965-1973.

Year	1965	1966	1967	1968	1969	1970	1971	1972	1973
Layer									
0-50 m	6.7	6.7	7.5	6.4	6.7	7.8	7.1	8.7	7.7
50-200 m	3.8	2.6	4.1	3.7	3.1	3.6	3.2	4.0	4.5
0-200 m	4.6	3.6	4.9	4.4	4.0	4.7	4.2	5.2	5.2

TABLE 2

Mean water temperature in the North Cape Current, the North Cape-Bear Island section at the beginning of September in the years 1965-1973.

Year	1965	1966	1967	1968	1969	1970	1971	1972	1973
Layer									
0-200 m	5.1	5.5	5.6	5.4	6.0	6.1	5.7	6.3	6.2

The surface temperature in the southern part of the Barents Sea was about 1°C colder than in 1972, but at 50 m depth conditions were much warmer and the limit of water colder than 0°C was nearly 100 n.miles further north along longitude 40°E than in 1972.

The temperature of the 50-200 m layer of the Murman Current was the highest recorded in the period 1965-1973. This indicate intensive advection of warm water in the Murman Current in 1973, in contrast to the situation in 1972 when the warm conditions were mainly attributable to high solar radiation.

In the Bear Island - Hope Island area the influence of the Cold Bear Island current was weak, and the sub-zero temperatures typical of the 50-100 m layer were not found in 1973.

The West Spitsbergen current was also very warm in 1973 compared with conditions in 1971 and 1972 (Table 3).

TABLE 3

Mean water temperature in the Spitsbergen Current west of Bear Island at the beginning of September in the years 1971-1973.

Year	1971	1972	1973
Layer			
0-200 m	4.5	4.6	5.4

Distribution and abundance of 0-group fish.

In previous years a map has been given showing the total echo density based on a subjective evaluation of the echo sounder paper records. Improvements in echo-sounding techniques has now introduced more accurate assessments by the use of echo integrators which can measure relative fish density parameters and even absolute density, provided some calibration constants are known.

Last year total echo abundance from echo integrator deflection values was given.

Last year's data are given in fig. 10, which is based on data from the "G.O.Sars" and "Johan Hjort" with additional information from "Poisk". Both "Poisk" and "Cirolana" have integrators, but in order to compare the results with those from "G.O.Sars" and "Johan Hjort" calibration trials must be made between the ships. This was not possible with "Cirolana", but some comparable values were obtained from "G.O.Sars", "Johan Hjort" and "Poisk". More information is needed before all the data can be combined.

It is recommended that next year's survey programme should allow time for these essential calibration runs.

The "G.O.Sars" carried out some initial trials to relate integrator values to absolute abundance for some species. These values need confirmation from additional experiments.

The distribution of the 0-group fish of various species are shown by the shaded areas in Figs. 11-19 and the length distributions of selected species are shown in Fig. 20.

The estimates of the relative abundance in the following comments have been based mainly on the trawl catches, but the echo abundance indices as used by HAUG and NAKKEN (1973) have also been taken into account.

Herring (Fig. 11)

For the first time since 1966 0-group herring were recorded in more than a few scattered hauls. The main area of distribution was similar to that found in 1966, but none were found west of 19°E .

Cod (Fig. 12)

As in 1972 0-group cod were distributed over a wide area of the Barents Sea from 17° - 18°E to Novaya Zemlya and south of $76^{\circ}30'\text{N}$ latitude. The highest concentrations were found in the east and south-east Barents Sea. 0-group cod were virtually absent west of Spitsbergen and only small numbers were caught in Storfjordrenna. The indications are that the 1973 year-class is a strong one.

Haddock (Fig. 13)

The distribution of haddock extended further south and east in the southern Barents Sea than in 1972, but off West Spitsbergen its range was less extensive. The abundance was estimated to be similar to that of the 1972 year-class which was below the average of the 1969-1971 year-classes.

Redfish (Fig. 14)

Like the cod and haddock the distribution of 0-group redfish extended further south and east into the Barents Sea than in 1972. Redfish were much less abundant than usual west of Spitsbergen. The 1973 year-class was considered to be strong.

Capelin (Fig. 15 and 16)

0-group capelin were sparsely distributed except in the eastern Barents Sea. None were caught off West Spitsbergen. I-group

capelin were widely distributed over the north and eastern Barents Sea, but few were caught west of Spitsbergen. Catches of I-group capelin seem to confirm last year's estimate that the 1972 year-class was a strong one. The abundance of the 1973 year-class appears to be low compared with the 1971 and 1972 year-classes.

Long Rough Dab (Fig. 17)

The distribution of 0-group long rough dab is broadly similar to that found in 1972, except that few were caught in the Hope Island area, and its abundance is about the same as the 1972 year-class.

Polar cod (Fig. 18)

Polar cod were found in areas west, south and east of Spitsbergen and also off Novaya Zemlya as in 1972. Assessment of the abundance of 0-group polar cod must await data from the "Akademik Knipovich".

Greenland Halibut (Fig. 19)

0-group Greenland halibut were found in small numbers north west of Spitsbergen.

Other species (Fig. 20)

Small numbers of mackerel, saithe, catfish and 0-group blue whiting were caught during the survey, and 0-group Leptagonus, Lumpenus and Liparis were widely distributed. 0-group sand eels were abundant and widely distributed in the south east Barents Sea.

Adult fish

Adult Blue Whiting were caught over deep water of the Norwegian Sea, everywhere from 79°29'N southwards. Small numbers of Lump sucker (Cyclopterus lumpus) were also caught. Off north west Spitsbergen cod of the 1970 year-class occurred pelagically along the edge of the shelf.

REFERENCES

HAUG, A. and NAKKEN, O. 1973. Echo abundance indices of 0-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., 2 Fig. (Mimeo).

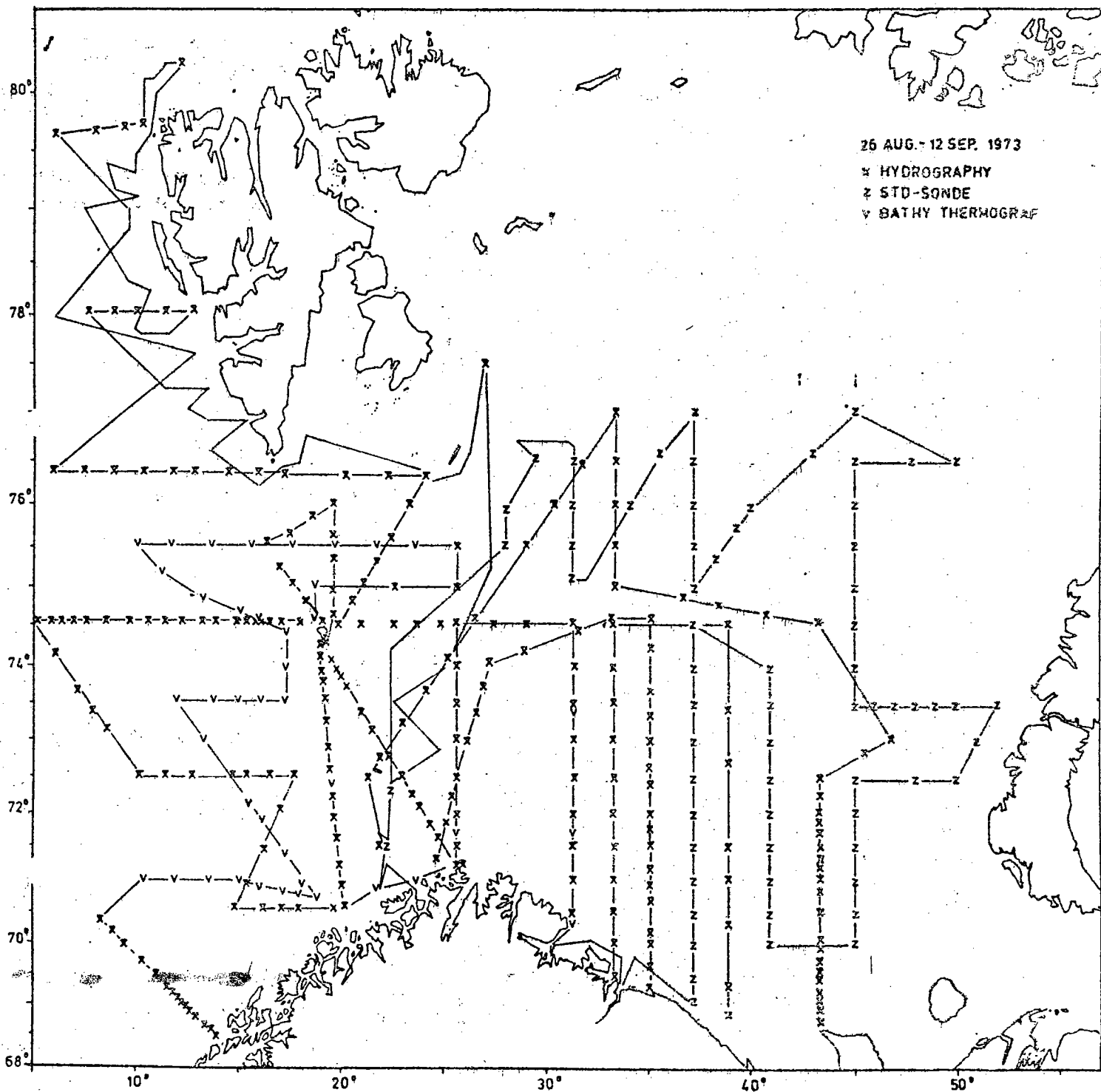


Fig. 1. Survey routes and grid of hydrographic stations.

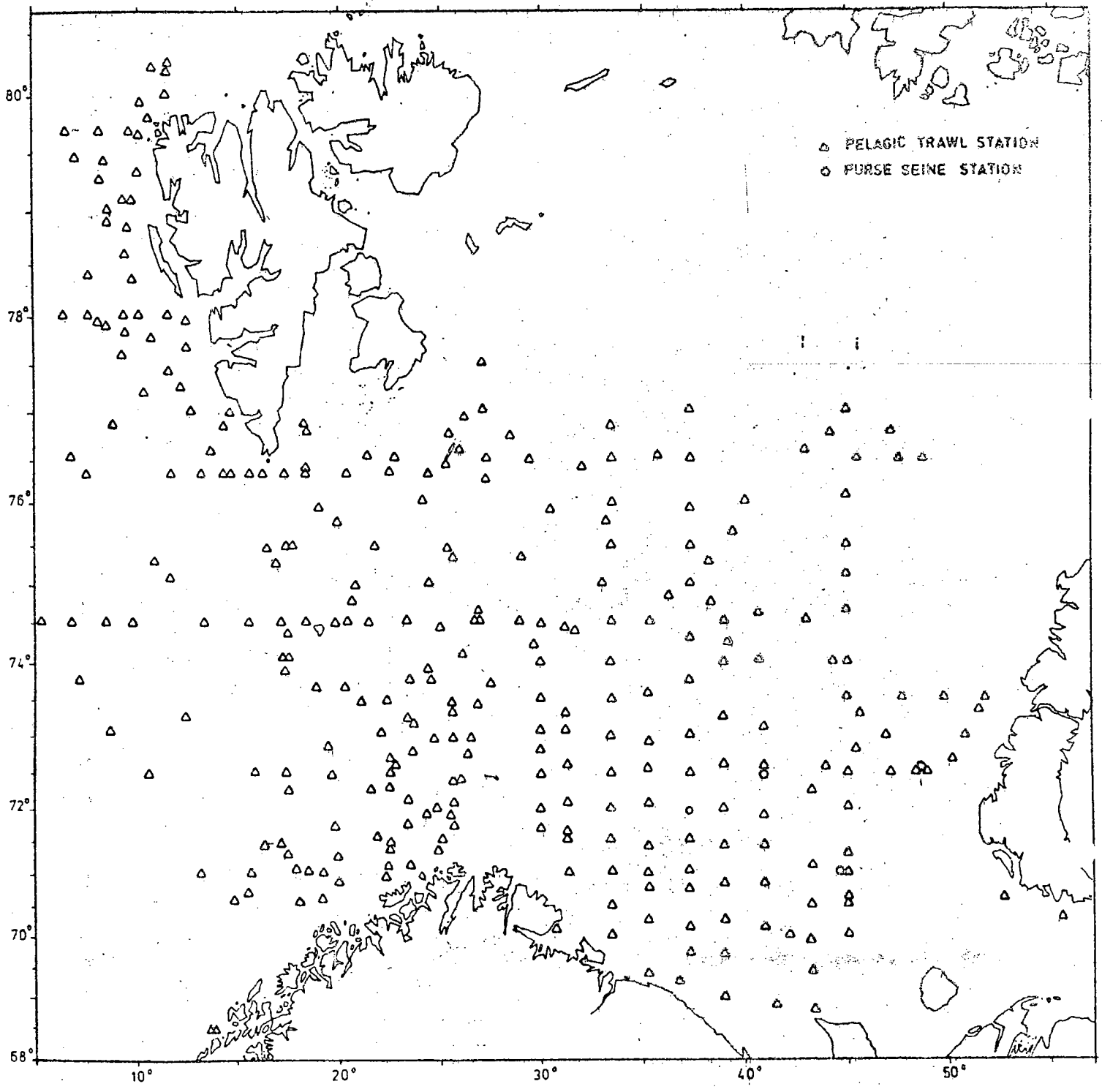


Fig. 2. Trawlstations. Δ pelagic trawl, \circ purse seine.

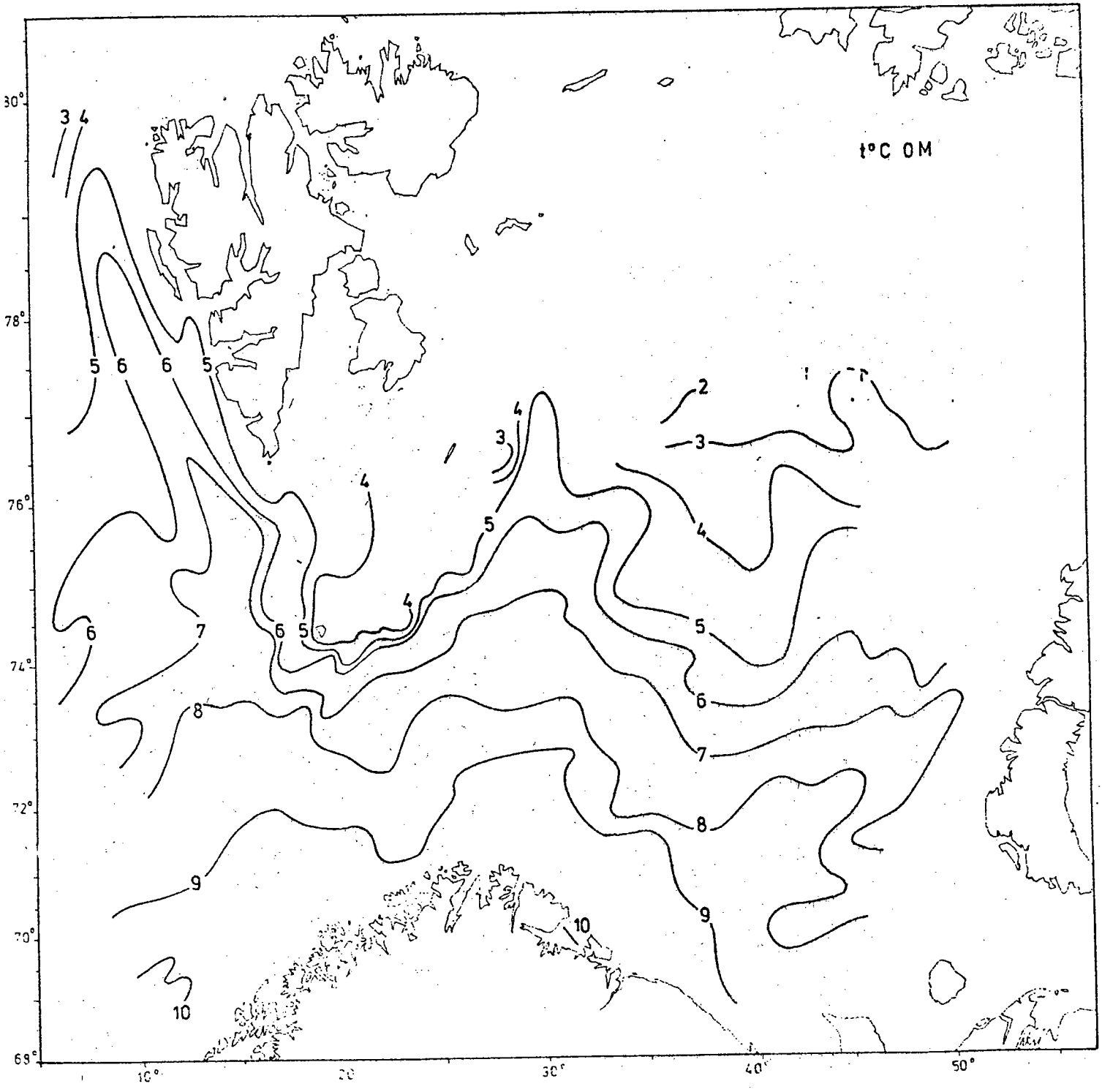


Fig. 3. Isotherms at 0 m.

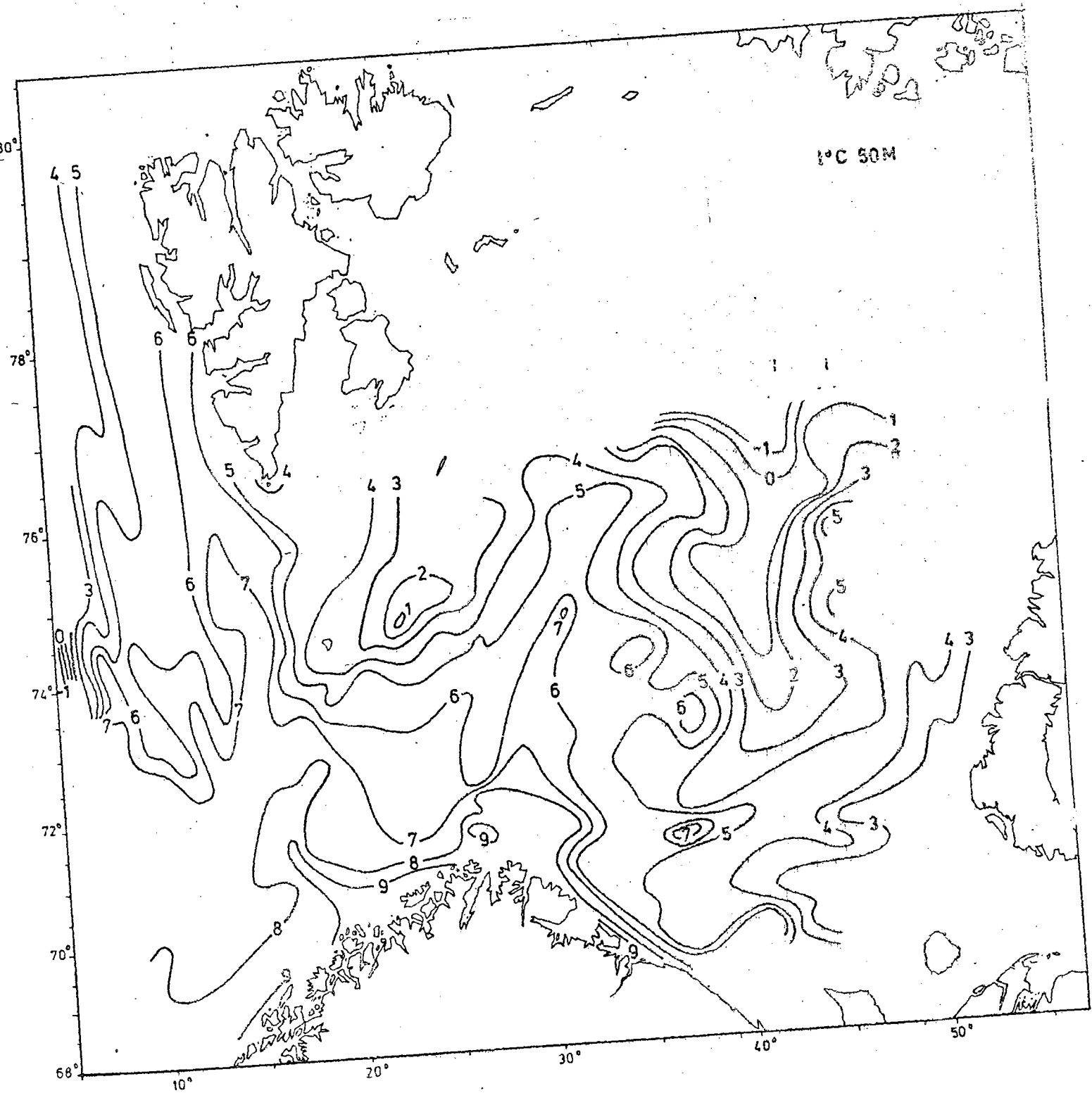


Fig. 4. Isotherms at 50 m.

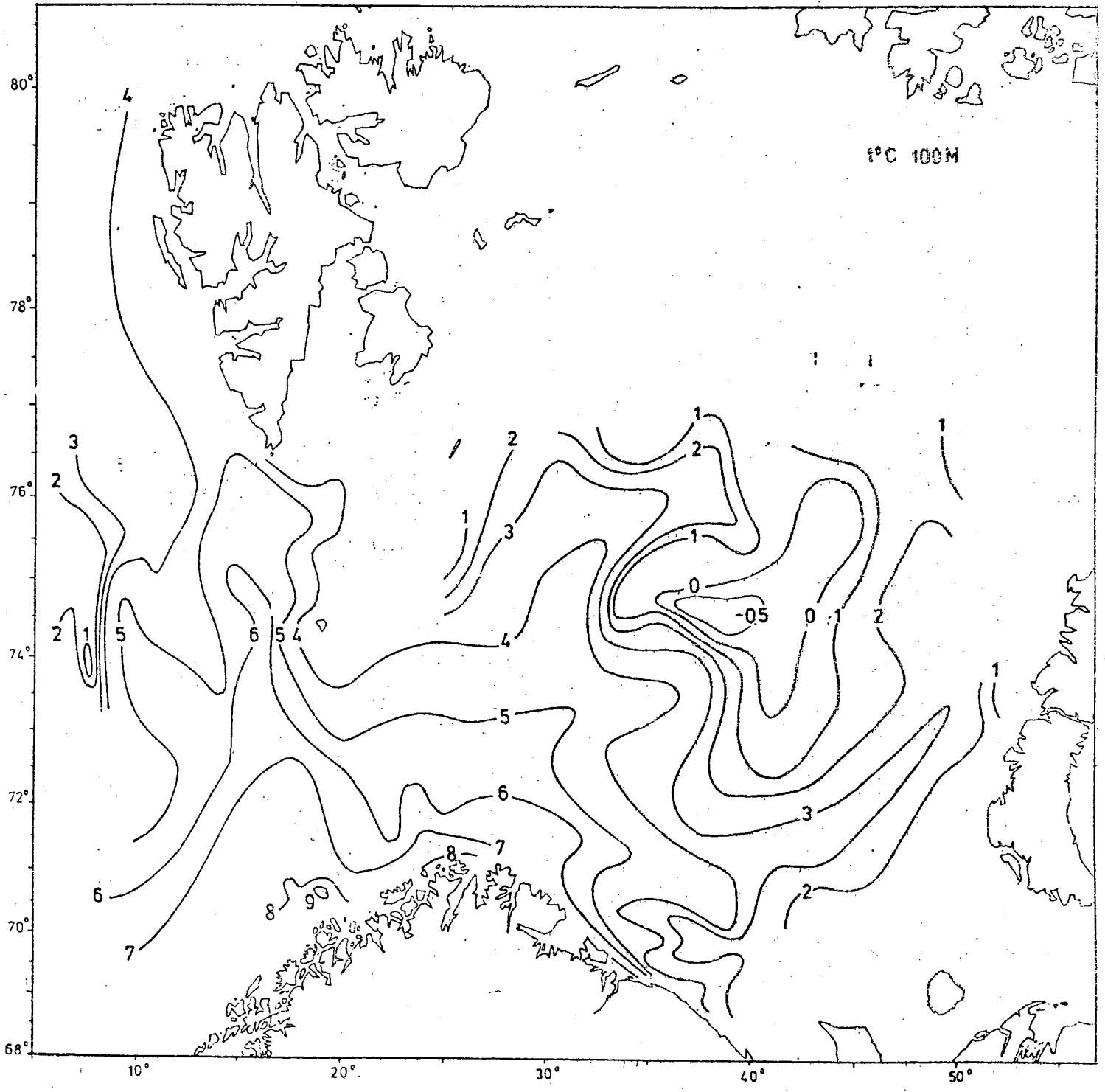


Fig. 5. Isotherms at 100 m.

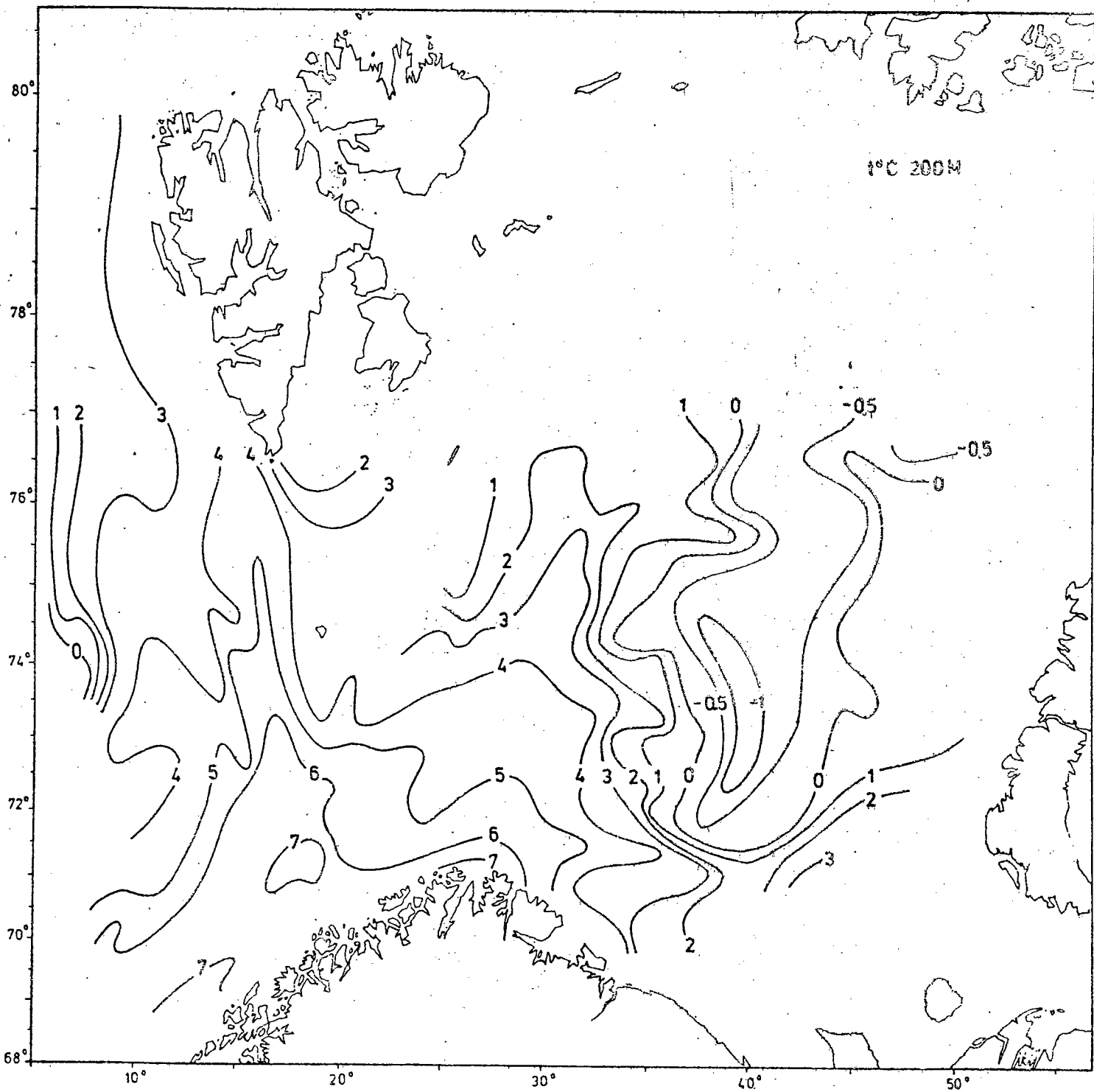


Fig. 6. Isotherms at 200 m.

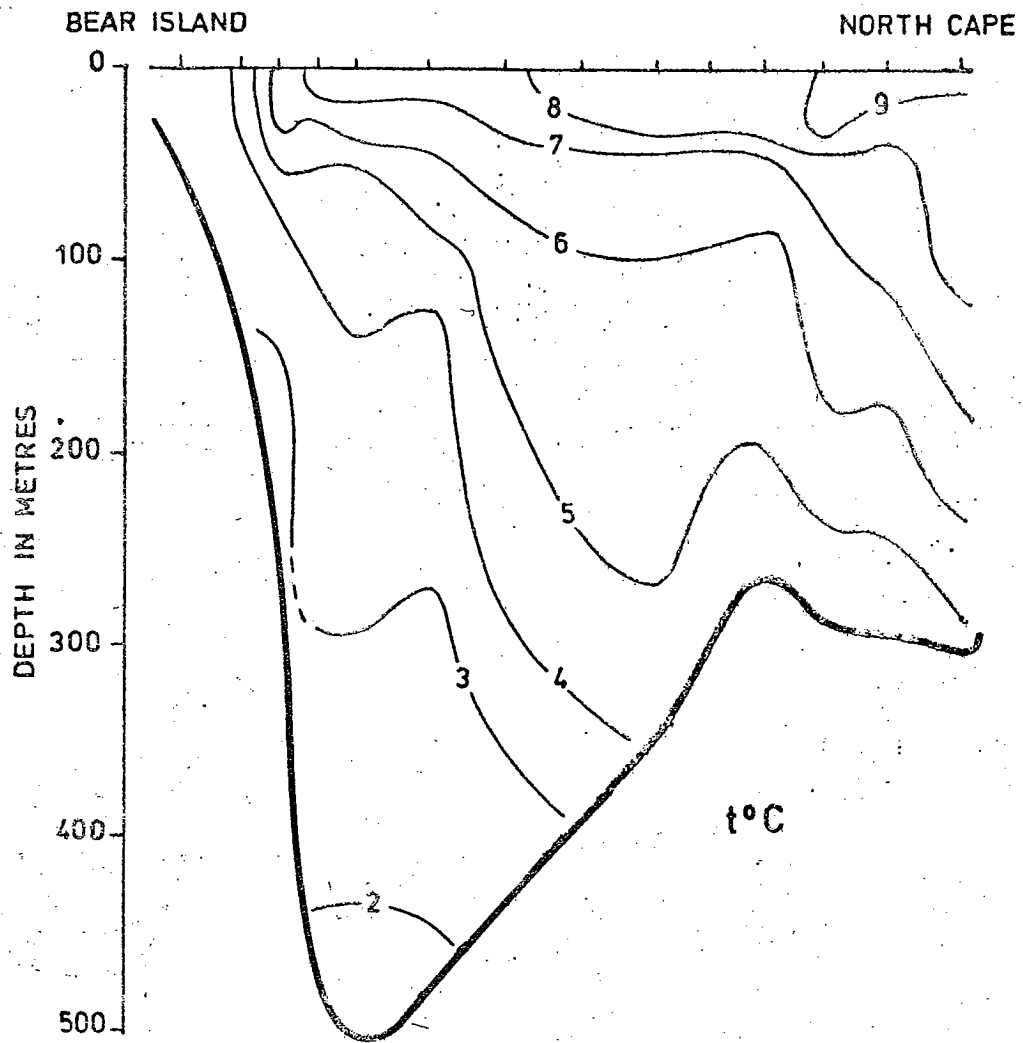


Fig. 7. Temperature section Bear Island - North Cape.

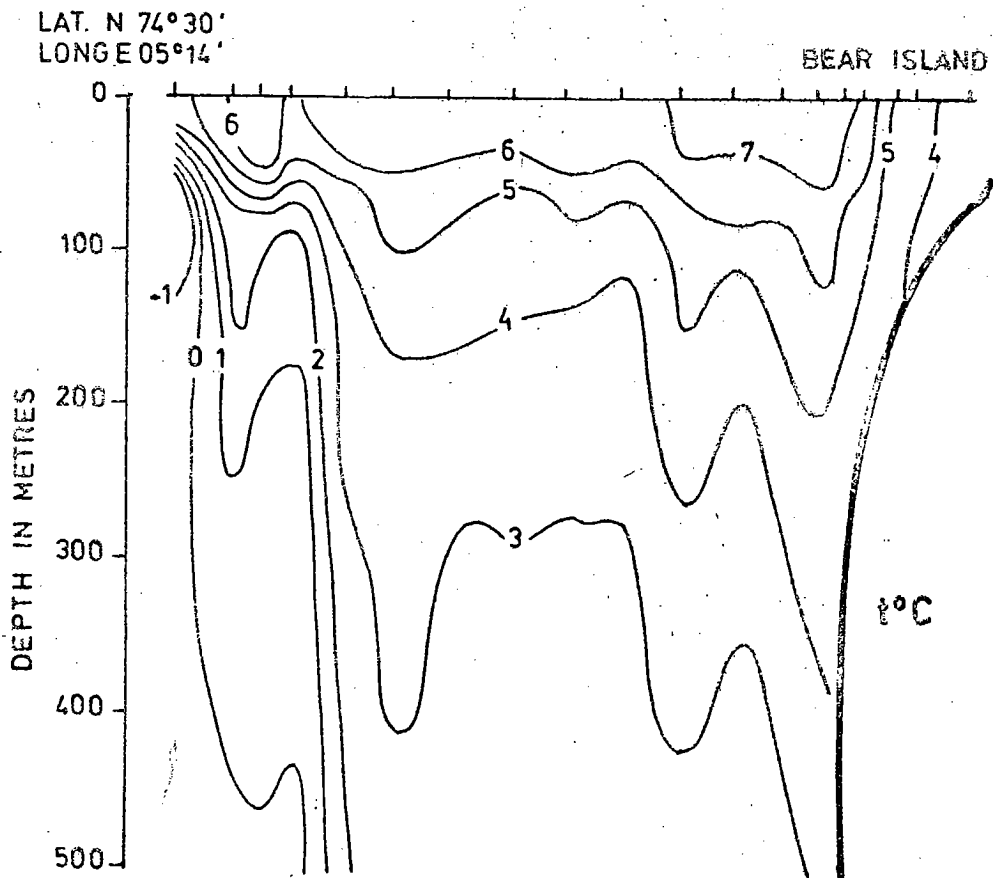


Fig. 8. Temperature section Bear Island - West.

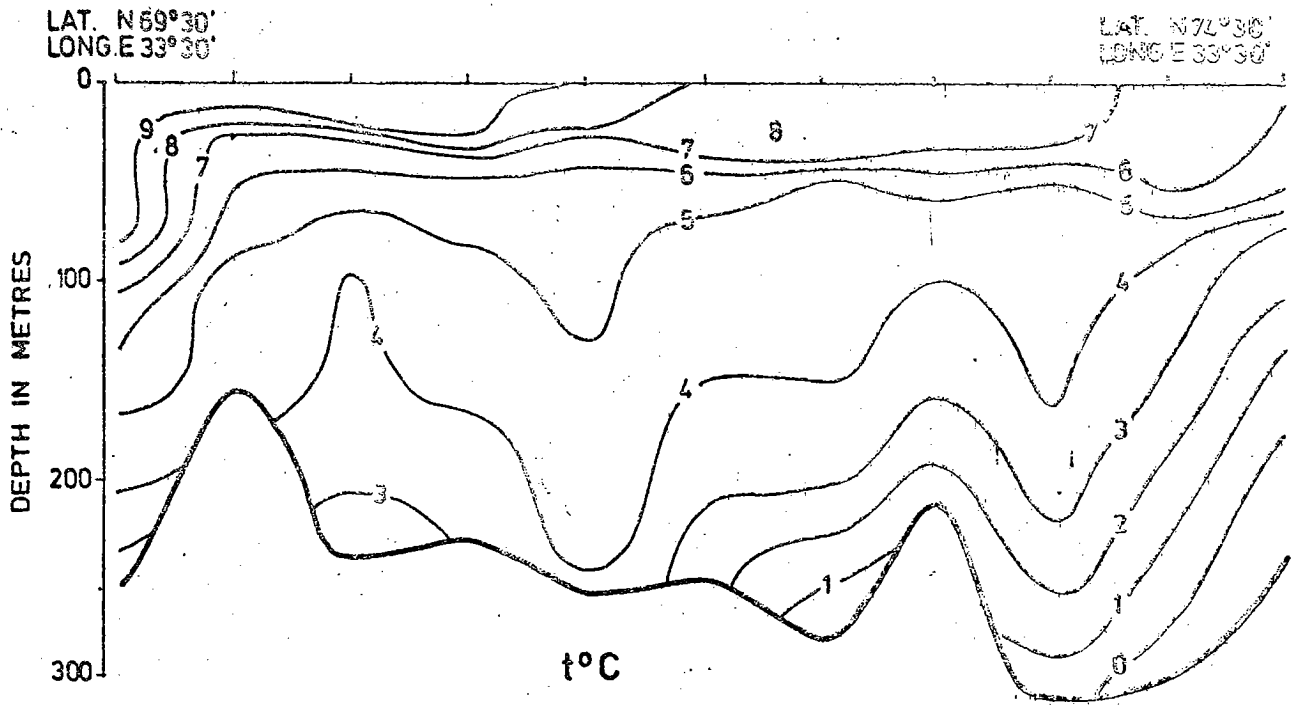


Fig. 9. Temperature section along the Kola meridian

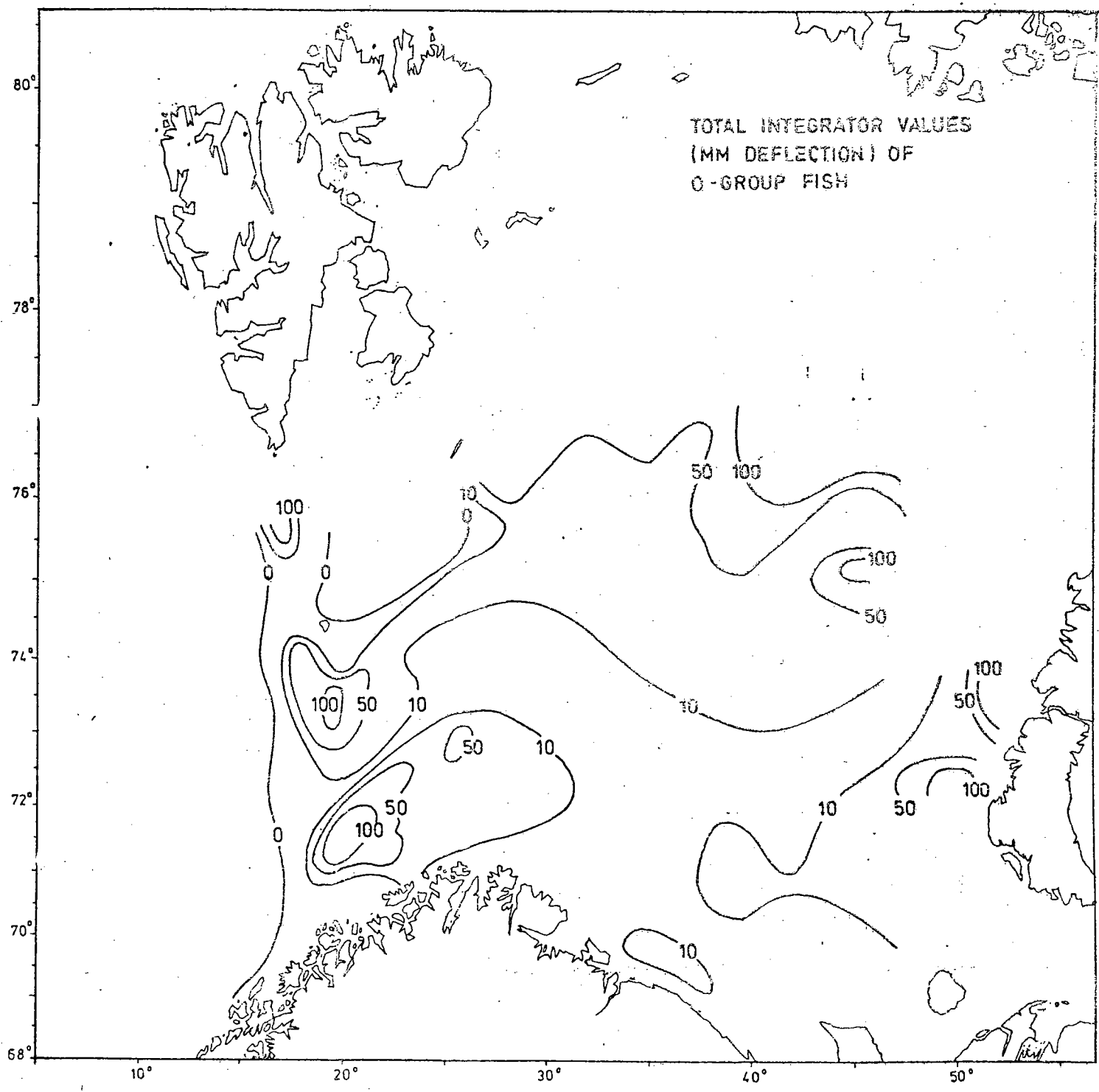


Fig. 10. Total integrator values (mm deflection) of 0-group fish.

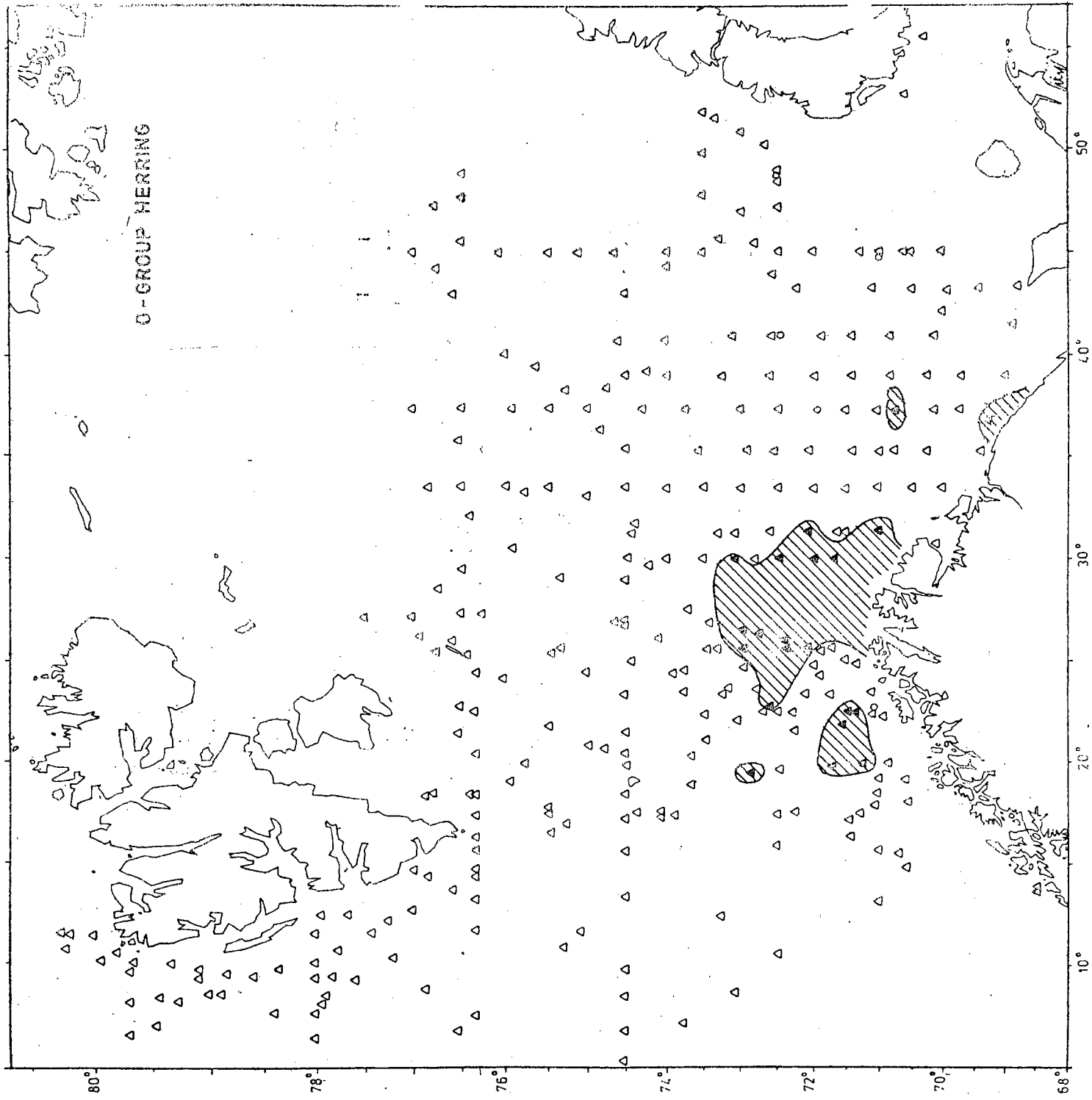


Fig. 11. Distribution of 0-group herring.

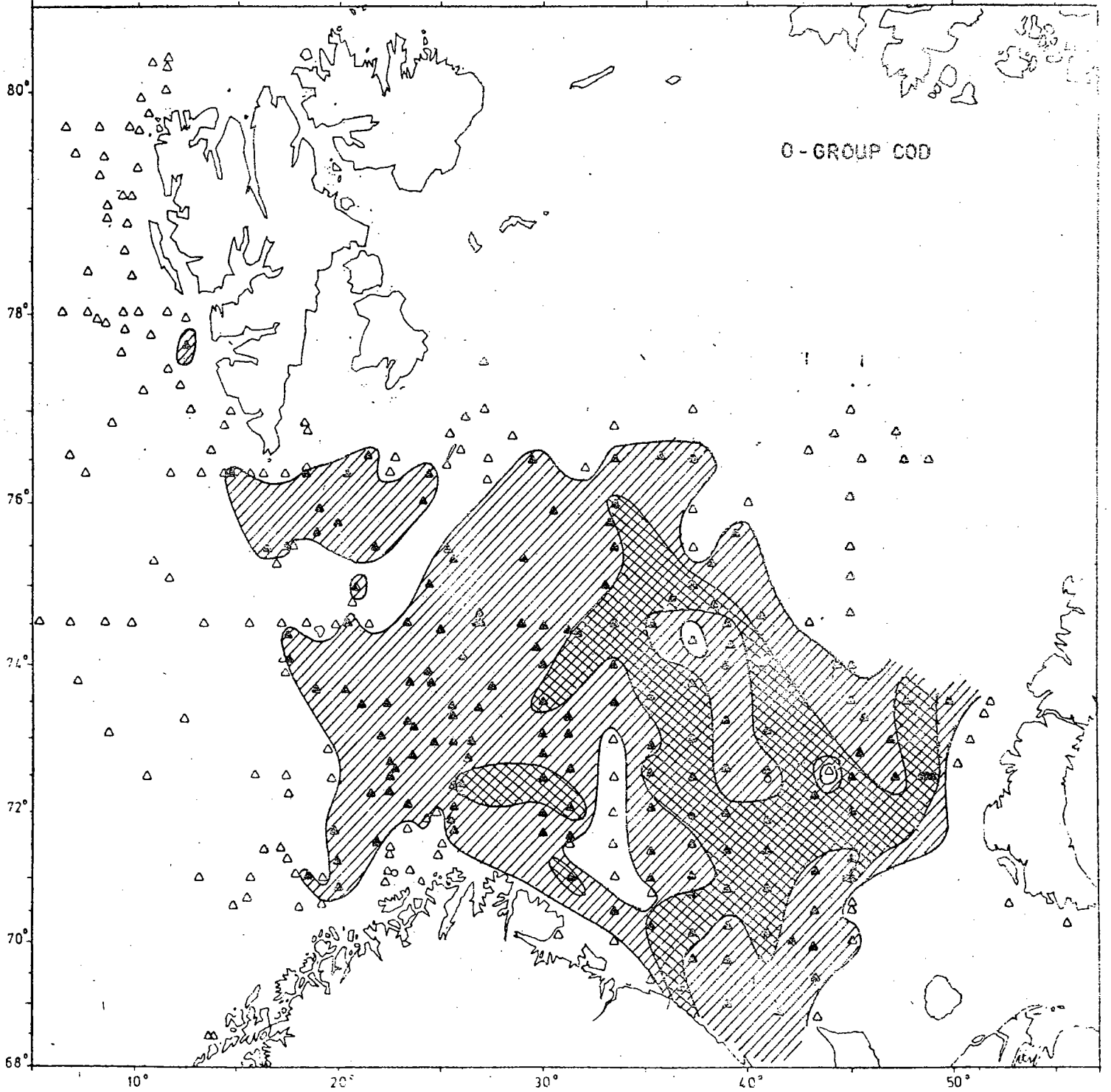


Fig. 12. Distribution of 0-group cod.

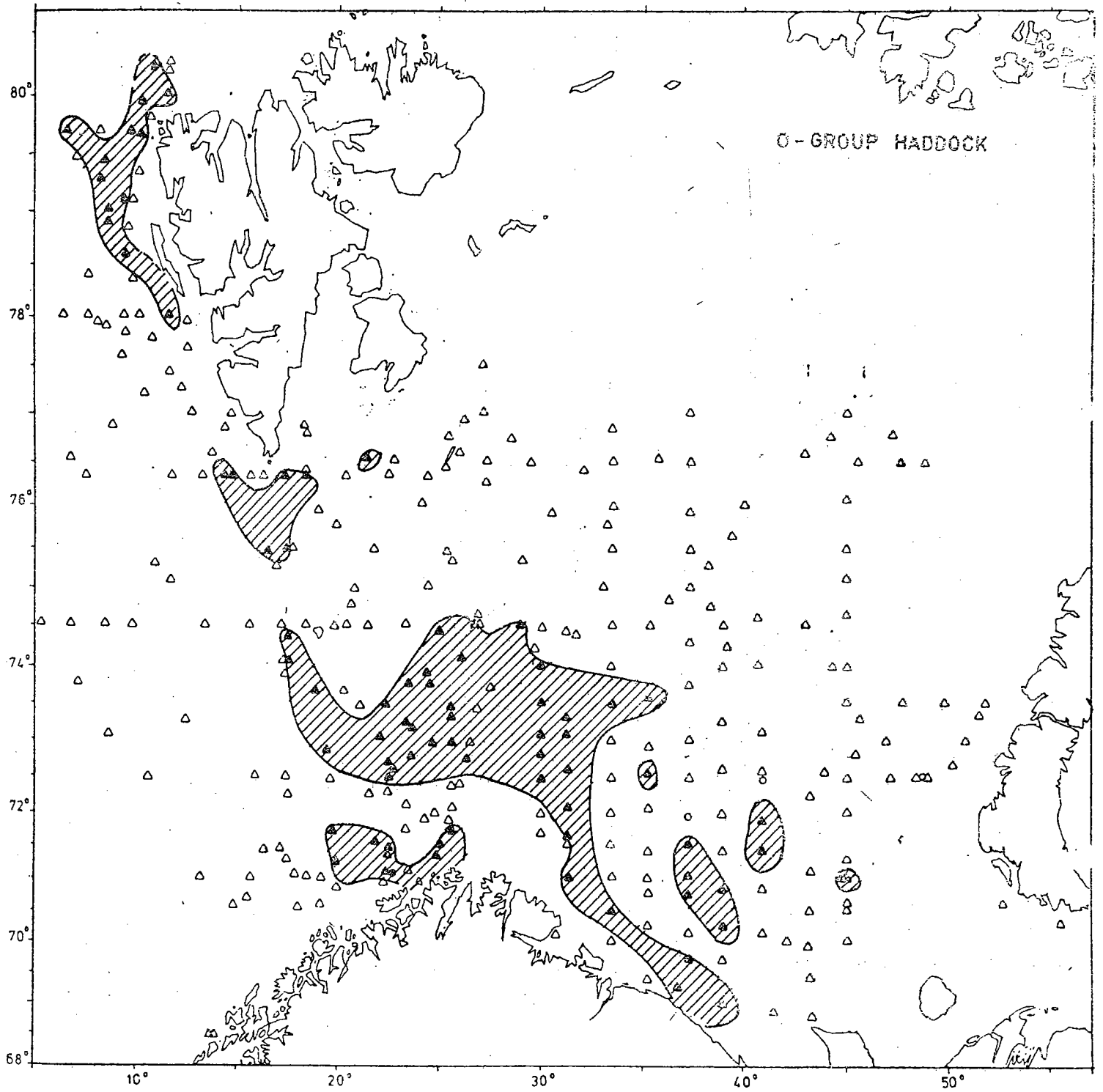


Fig. 13. Distribution of 0-group haddock.

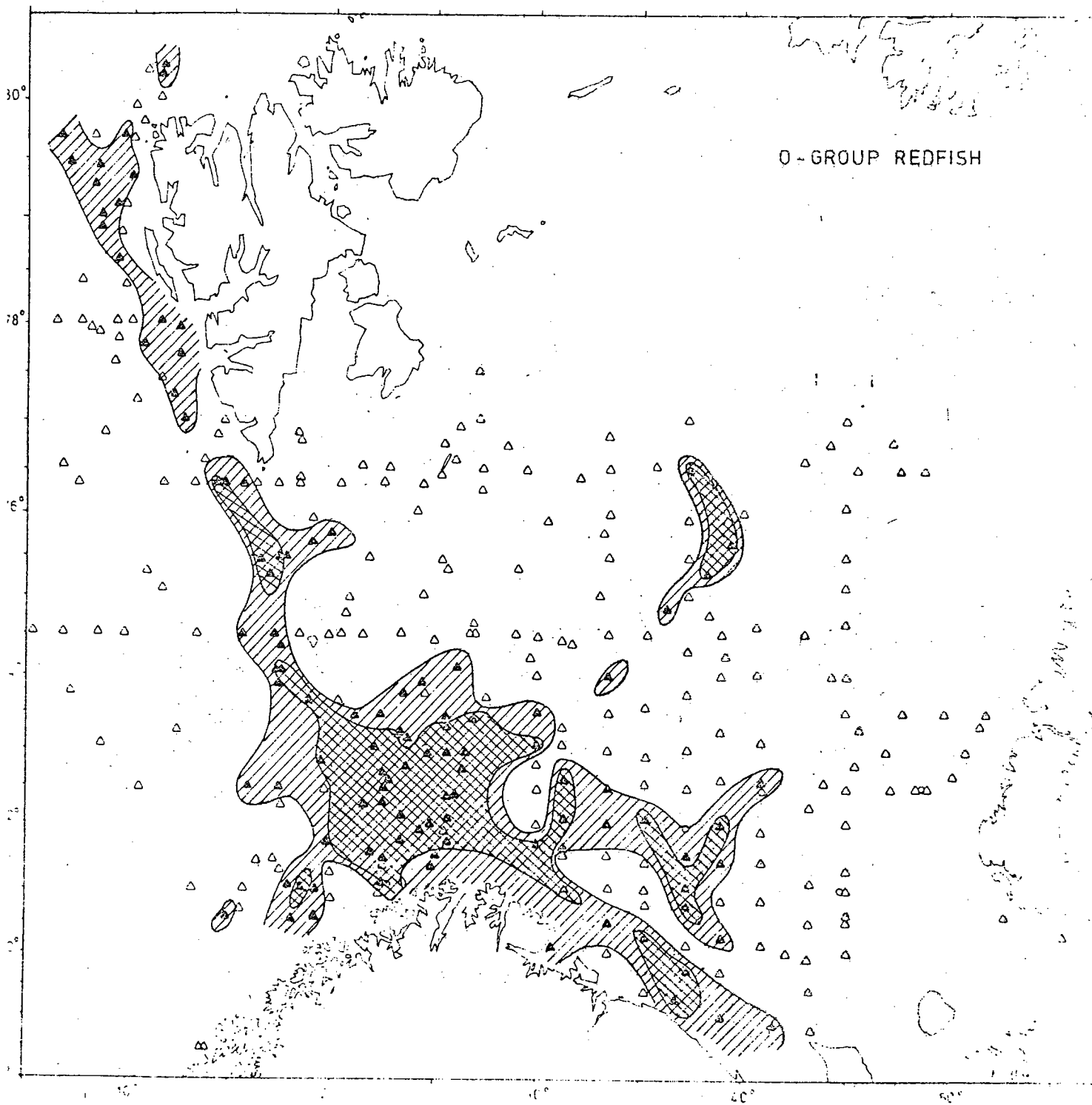


Fig. 14. Distribution of 0-group redfish.

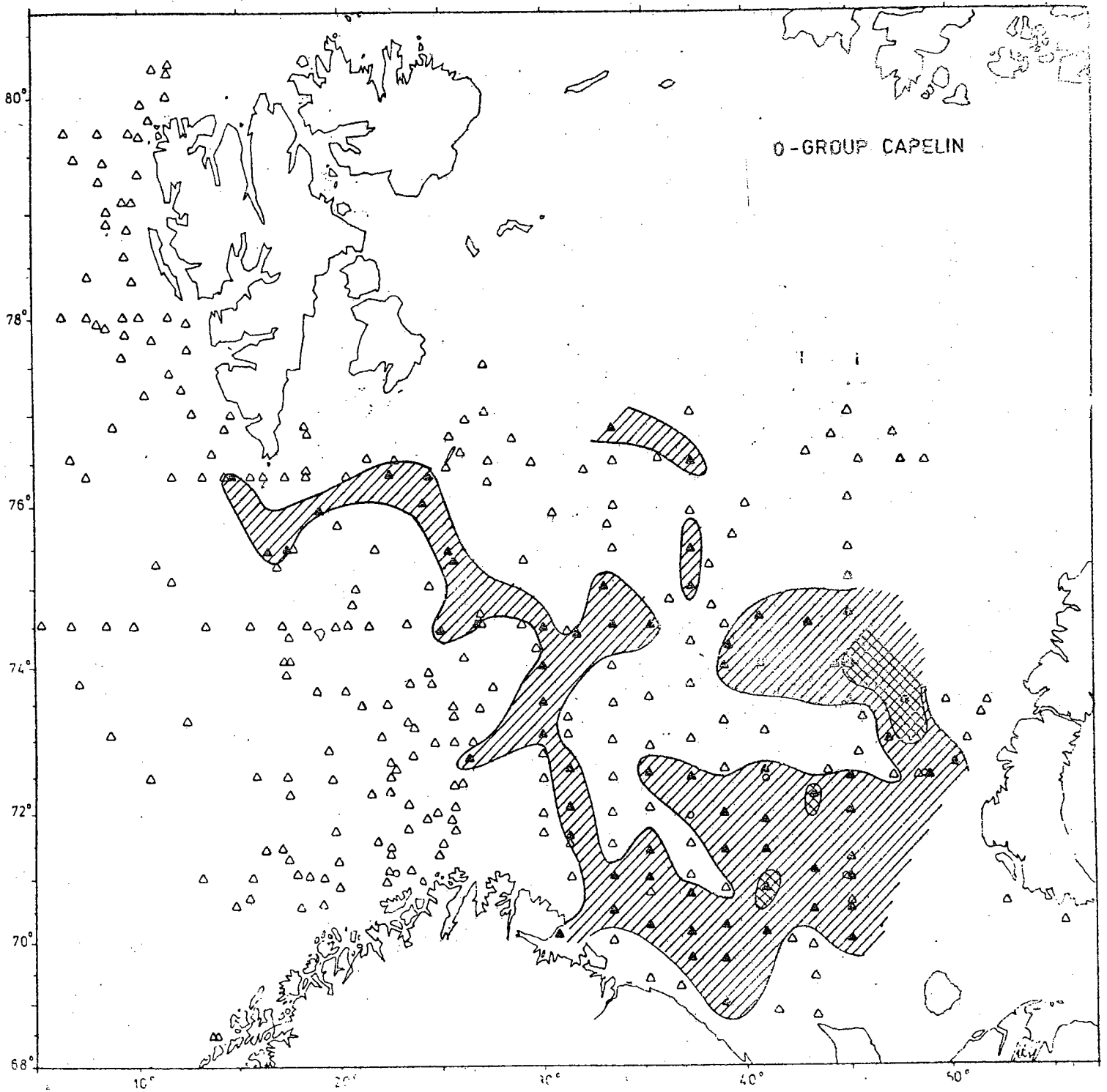


Fig. 15. Distribution of 0-group capelin.

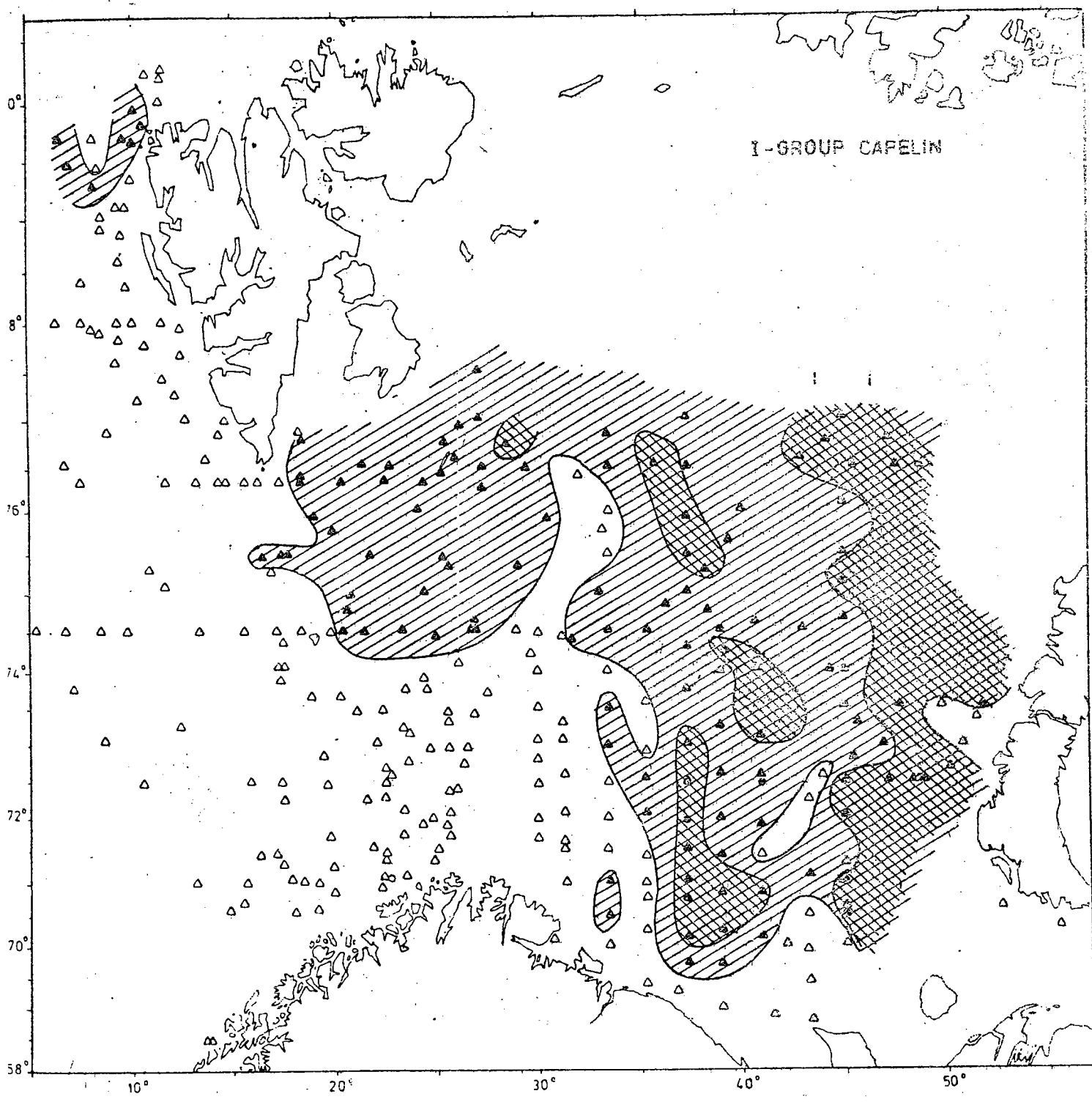


Fig. 16. Distribution of 1-group capelin.

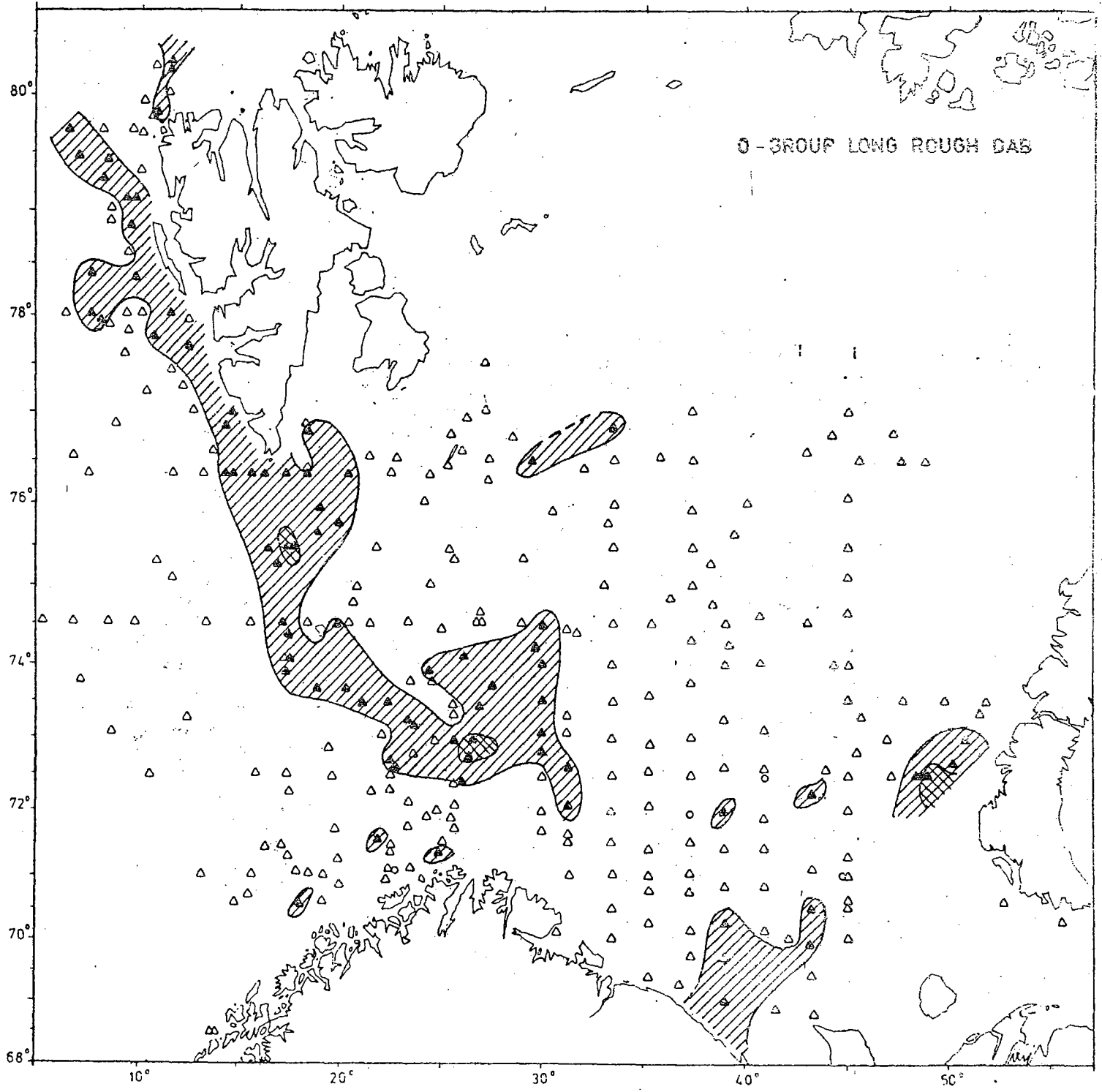


Fig. 17. Distribution of 0-group long rough dab.

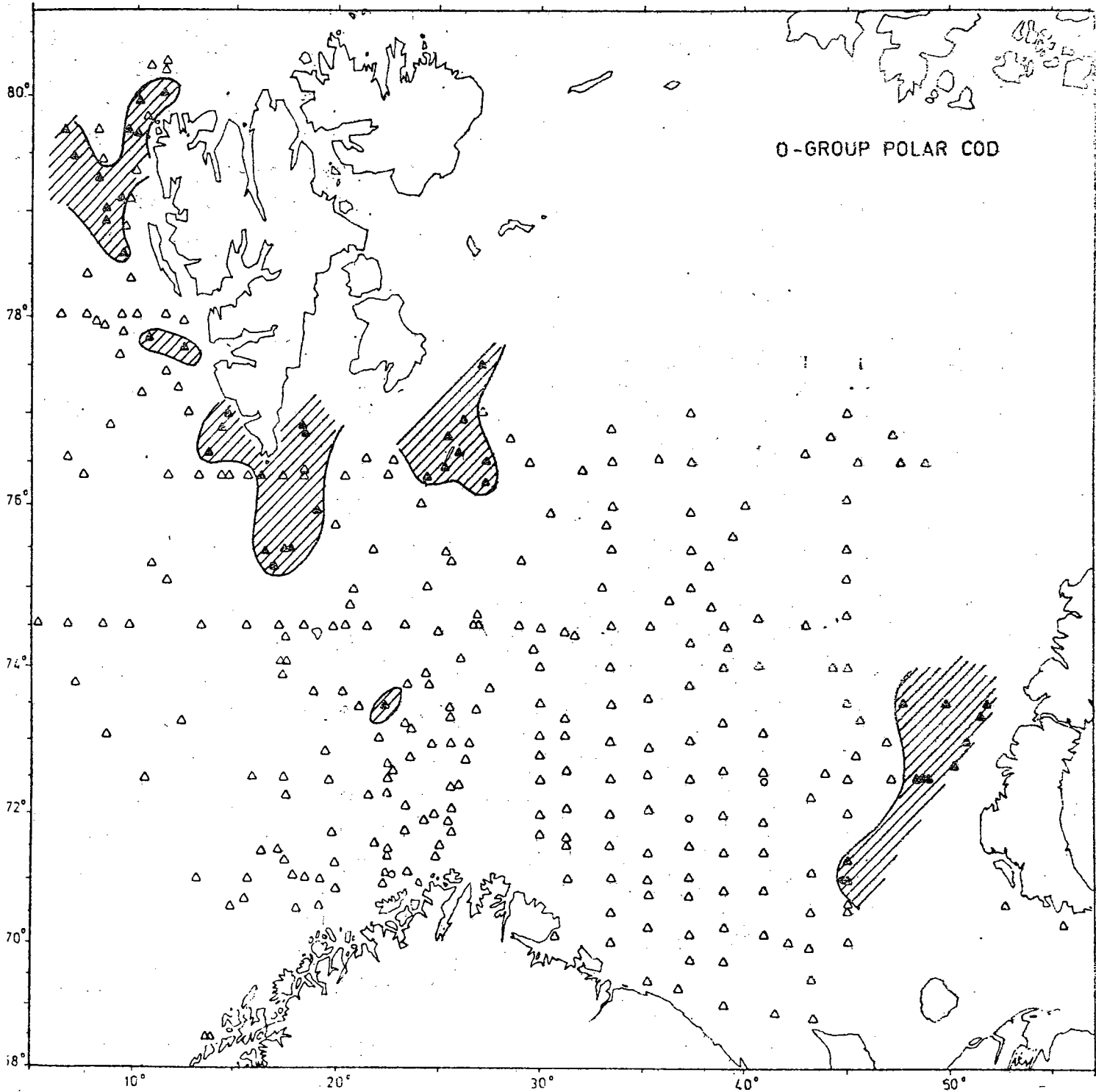


Fig. 18. Distribution of 0-group polar cod.

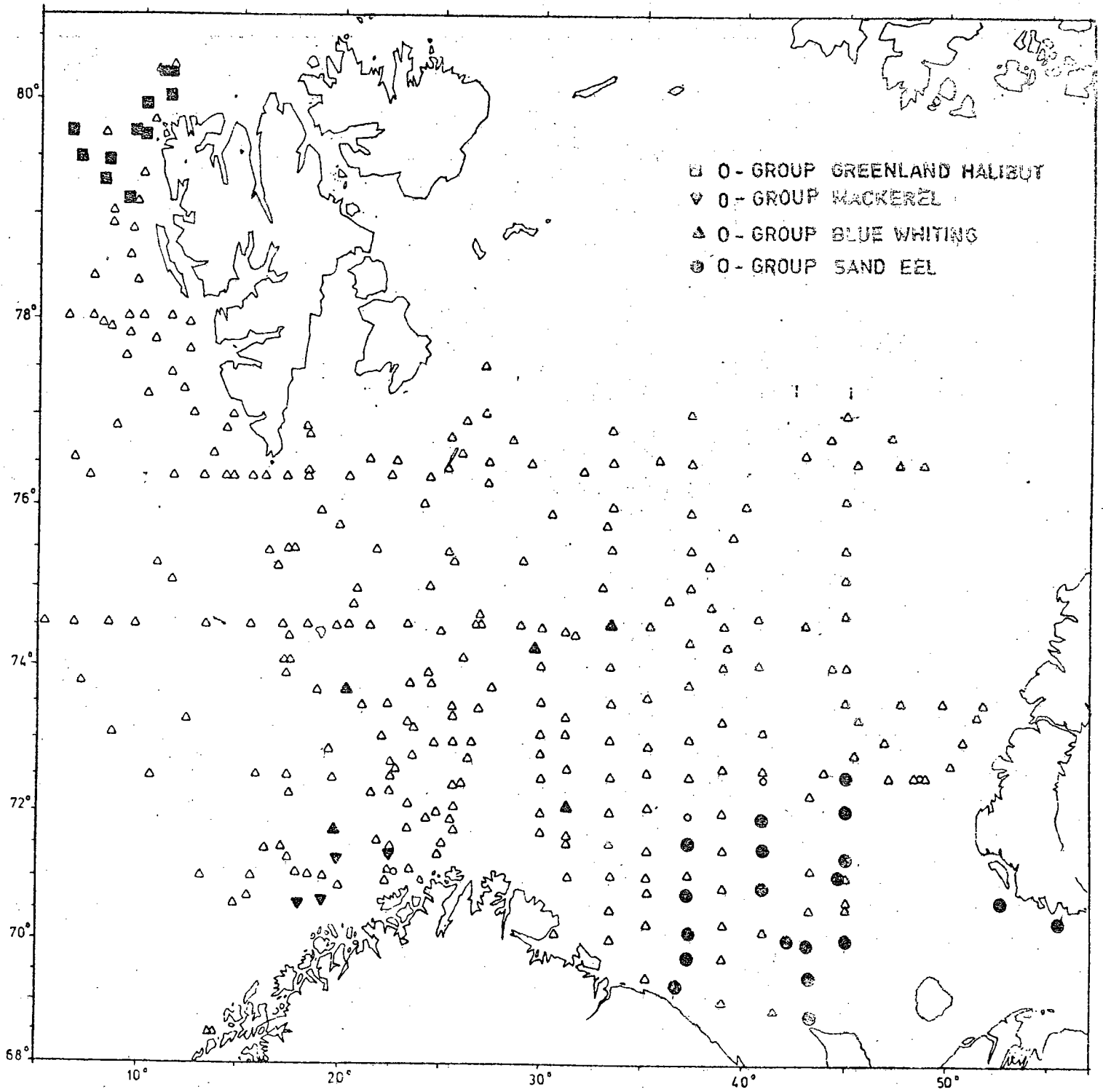


Fig. 19. Distribution of 0-group greenland halibut, mackerel, blue whiting and sand eel.

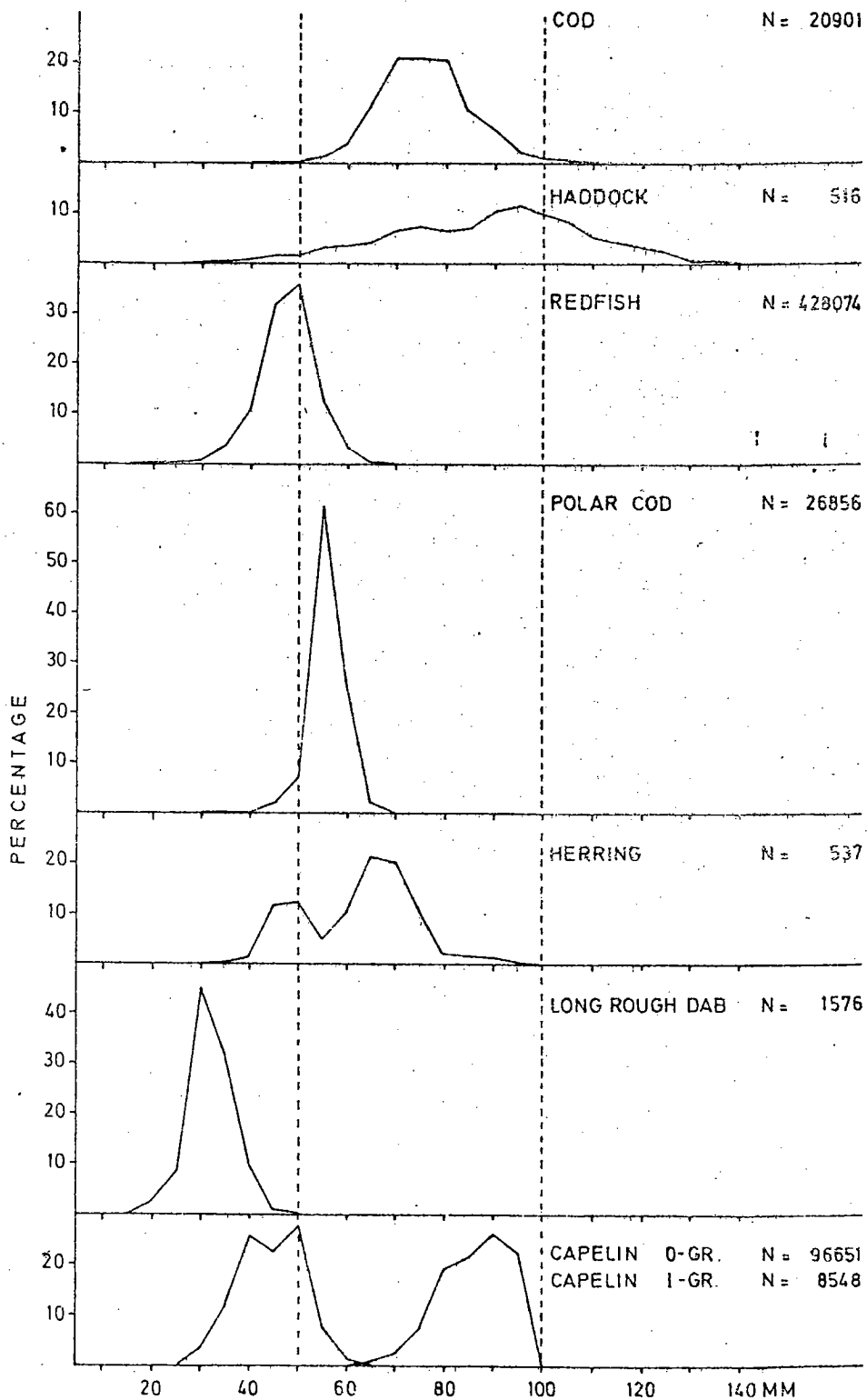


Fig. 20. Length distribution of 0-group fish.

