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Fish (N) Cttees

Preliminary report of the International 0-group fish survey in The
Barents Sea and adjacent waters in August - September 1974.

INTRODUCTION

This was the tenth international survey to study the abundance and distribution of 0-group fish in the Barents Sea and Svalbard region.

The following vessels and scientists participated in the survey:

USSR	"Akademik Knipovich"	N.G. Ushakov A.Y. Lysota
	"Poisk"	V.V. Rossov A.S. Galkin Z.M. Berdichevski
NORWAY	"G.O. Sars"	L. Midttun O. Dragesund
	"Havdrøn"	O. Nakken O. Smedstad A. Beltestad
UK	"Cirolana"	B.W. Jones J.G. Pope A.J. Burridge

A meeting was held in Murmansk between the scientists of "Poisk" and "G.O. Sars" to make final arrangements for the coordination of the survey. "Cirolana" commenced surveying on 28 August with the other vessels joining shortly after. The main aim of "Havdrøn" was to undertake special observations on the behaviour of 0-group fish. The survey was completed on 11 September, and was followed by a meeting of scientists in Tromsø 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. Various depth metering devices were used for the accurate control of the depth of trawling. This year "Poisk" and "Akademik Knipovich" used a smaller trawl (opening $(6 \times 10) \text{ m}^2$) whereas the other vessels were using the modified capelin trawl agreed upon earlier (opening $(18 \times 15) \text{ m}^2$).

Figs. 1 and 2 show the area worked and the ships' tracks together with the trawl and hydrographic stations worked.

RESULTS

Hydrography

Hydrographic observations were made along the same standard sections as in previous years. Preliminary analyses of the data are given in Figs. 3-8. Mean water temperature in three hydrographic sections across the main water currents are given in Tables 1-3 for each of the ten years of the surveys, together with the ten-year average temperature.

Table 1

Mean water temperature in the Murman Current, along the Kola section at the end of August in the years 1965-1974.

Year:	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	Average 1965-1974
Layer											
0 - 50 m	6.7	6.7	7.5	6.4	6.7	7.8	7.1	8.7	7.7	8.1	7.3
50-200 m	3.8	2.6	4.1	3.7	3.1	3.6	3.2	4.0	4.5	3.9	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	4.6

Table 2

Mean water temperature in the North Cape Current along the North Cape - Bear Island section in early September in the years 1965-1974.

Year:	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	Average 1965-1974
Layer											
0-200 m	5.1	5.5	5.6	5.4	6.0	6.1	5.7	6.3	6.2	6.1	5.8

Table 3

Mean water temperature in the West Spitsbergen Current along the Bear Island - West section in early September in the years 1971 - 1974.

Year:	1971	1972	1973	1974	Average 1971-1974
Layer 0-200 m	4.5	4.6	5.4	6.1	5.2

The temperature in the 0-200 m layer in the Murman Current was close to the long-term average, but in the 0-50 m layer it was 0.8°C above the average. The temperature along the North-Cape - Bear Island section was also slightly above the long-term average. The high temperature in the West Spitsbergen Current indicated a strong northward inflow of warm water. The ice edge north of Spitsbergen was further to the north than in previous years.

Distribution and abundance of 0-group fish.

Total echo integrator values of 0-group fish observed by the two Norwegian vessels are shown in Fig. 9. The chart reflects mainly redfish in the western and central part and polar cod in the eastern area. Distribution of the 0-group fish of various species are shown by the shaded areas in Figs. 10-17. The estimates of the relative abundance in the following comments have been based mainly on trawl catch data and echo abundance indices calculated by the method of HAUG and NAKKEN (1973). The catch data from the Soviet vessels have not been converted to the standard trawl size.

Herring (Fig. 10)

Only 3 specimens of herring were taken during the entire survey indicating that the 1974 year-class is of very low abundance.

Cod (Fig. 11)

Cod were distributed over a fairly wide area but at a low density. The abundance was well below average and the 1974 year-class must be described as poor. It was noted that the cod this year were smaller than in previous years (Fig. 18)

Haddock (Fig. 12)

The distribution of haddock covered a wide area and was typical for this species. The abundance was well above average indicating a rich year-class. There was a higher proportion of larger fish in the catches compared with 1973.

Redfish (Fig.13)

Redfish this year had a normal distribution which was similar to that of 1973. The area of distribution extended well to the north on the west side of Spitsbergen. The density of redfish was much greater than in previous years indicating a very abundant year-class.

Capelin (Figs.14 and 15)

The area of distribution of 0-group capelin was smaller than in some of the earlier years with very few west of 25°E. None were recorded west of Spitsbergen and this is consistent with the distribution of spawning, which this year was east of North Cape. The apparent density in the main concentrations was very high. Experimental work carried out aboard "Havdrøn" showed capelin to be distributed close to the surface except for a few hours at night when they descend to a lower level. This means that a significant proportion of the capelin are undetected by echo sounders because they are above the level of the transducers. Awareness of the distribution pattern resulted in sampling of this species becoming more efficient this year and producing an apparent increase in abundance. Nevertheless it is considered that the abundance recorded in this year's survey is indicative of a rich year-class.

I-group capelin had a distribution similar to that recorded last year. The abundance of I-group capelin was similar to or slightly lower than the high level recorded last year. The preliminary assessment of I-group fish this year suggests that the 1973 year-class is more abundant than last years 0-group survey indicated, but a more detailed survey will be undertaken immediately after the 0-group survey.

The combined length distribution of 0-group and I-group capelin is shown in Fig.18. The size of 0-group fish is similar to 1973 but the I-group fish are larger.

Long rough Dab (Fig. 16)

The distribution of this species was similar to that of 1973 being mainly in the central area and westwards with an extension west of Spitsbergen. This year-class appears to be a strong one.

Polar Cod (Fig. 17)

Polar cod were distributed to the west and south of Spitsbergen and in the eastern Barents Sea. In the latter area the density of fish was high indicating a very rich year-class. As usual the Polar cod in the eastern Barents Sea were larger than those in the Spitsbergen area.

Greenland Halibut (Fig. 10)

0-group Greenland Halibut were found in average numbers west and south of Spitsbergen.

Mackerel (Fig. 10)

Mackerel were recorded in greater abundance than in previous years and their distribution extended further to the east. The length composition (Fig. 18) shows two modes, the larger fish being caught in the south-western part of the area.

Other Species

Small numbers of catfish and a single specimen of saithe were caught during the survey. 0-group Leptagonus, Liparis and Cottus were widely distributed in the colder water. 0-group sand eels were abundant in the south-eastern Barents Sea.

Adult fish

Adult blue whiting were recorded over the deep water of the Norwegian Sea south of 77°N. The distribution also extended eastwards to the longitude of Vardø and to the north of Central Bank. Blue whiting have not been recorded this far east in previous years. Small numbers of lump sucker (Cyclopterus lumpus), 3-spined stickleback and Maurolicus were also caught.

RECOMMENDATIONS

In order to improve the accuracy of the 0-group surveys it is recommended that studies in the behaviour of the 0-group fish should be continued in the future.

REFERENCE

- 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 Figs. (Mimeo)

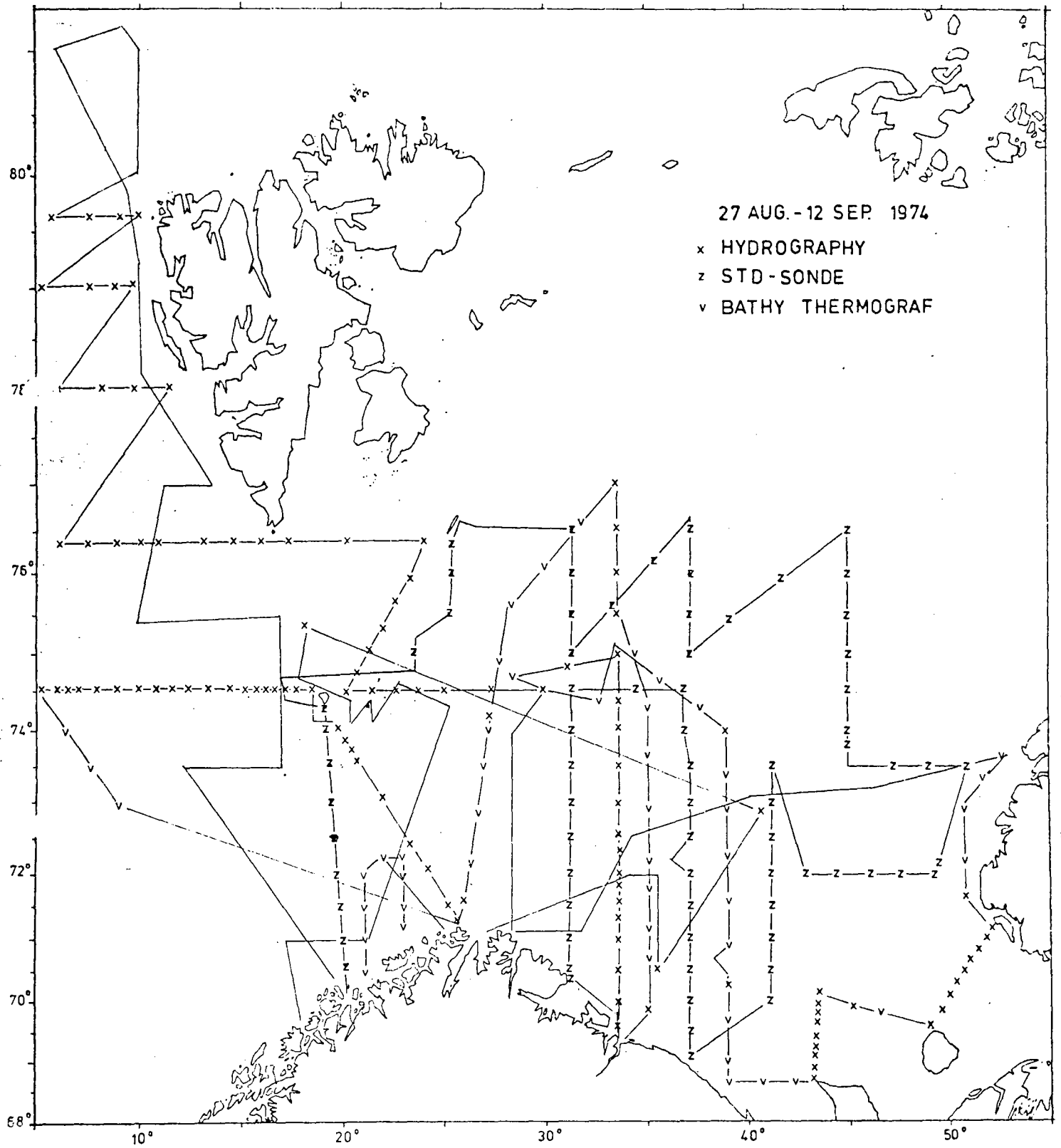


Fig. 1. Survey routes and grid of hydrographic stations.

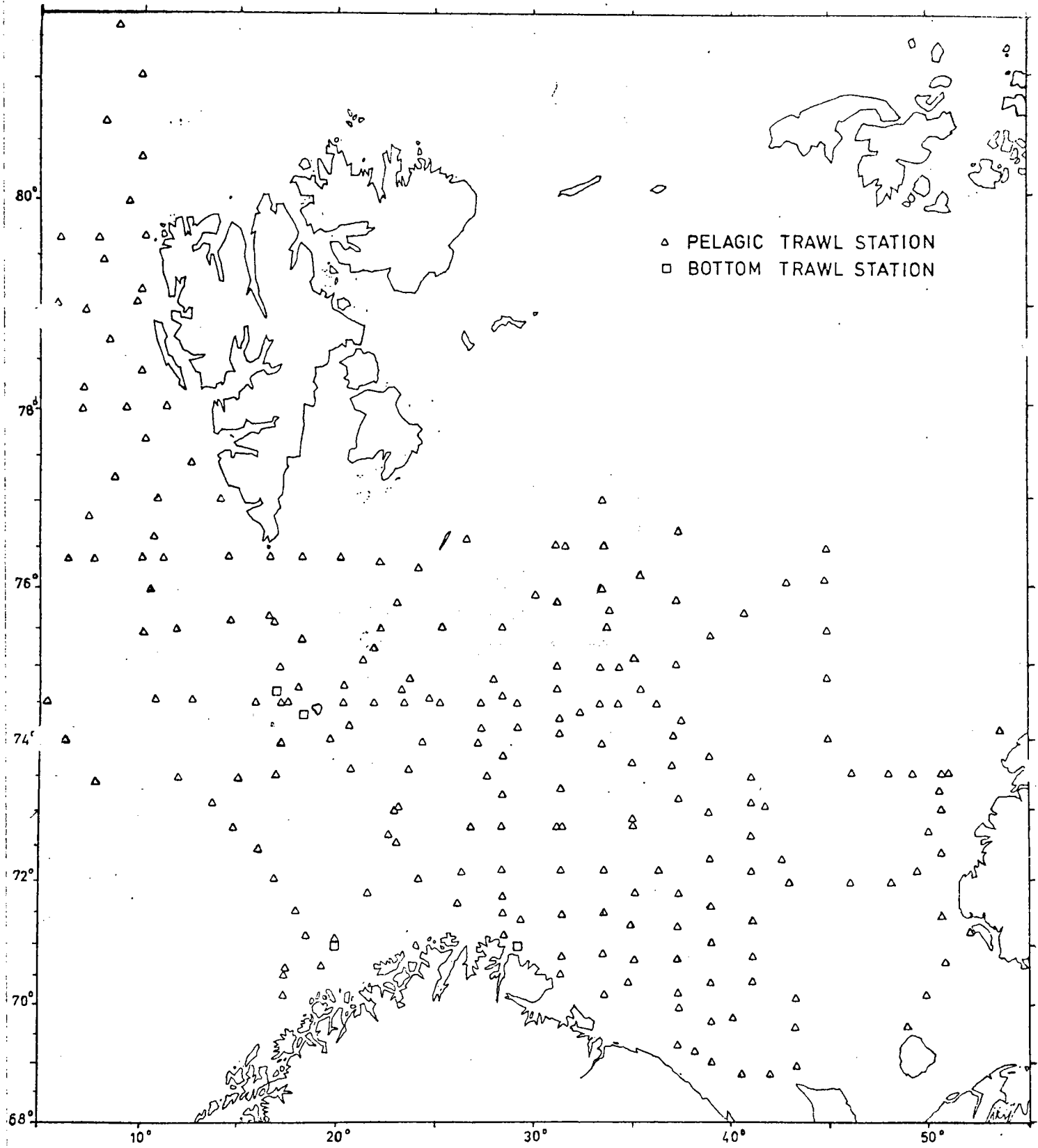


Fig. 2. Trawlstations. △ pelagic trawl, □ bottom trawl.

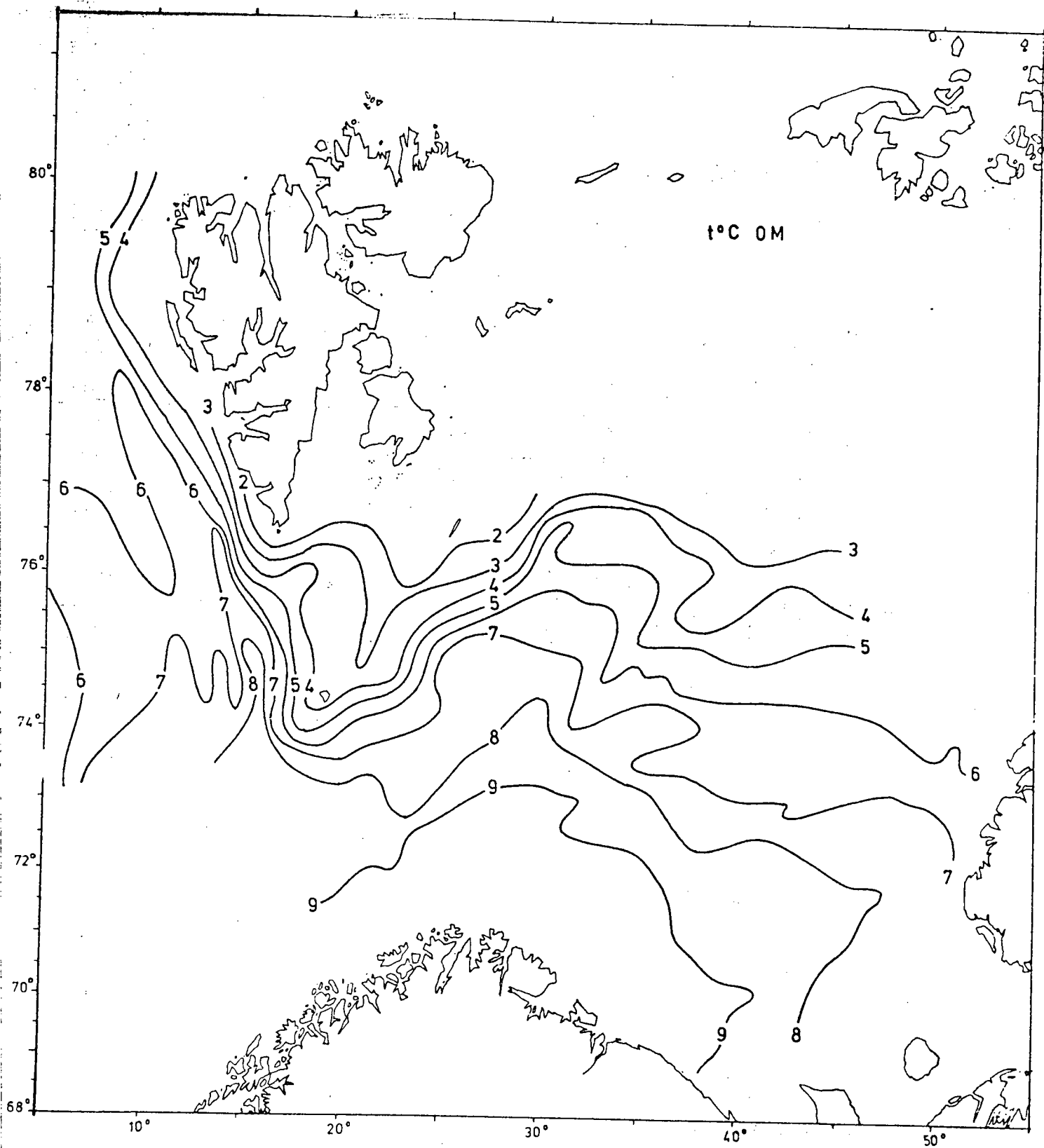


Fig. 3. Isotherms at 0 m.

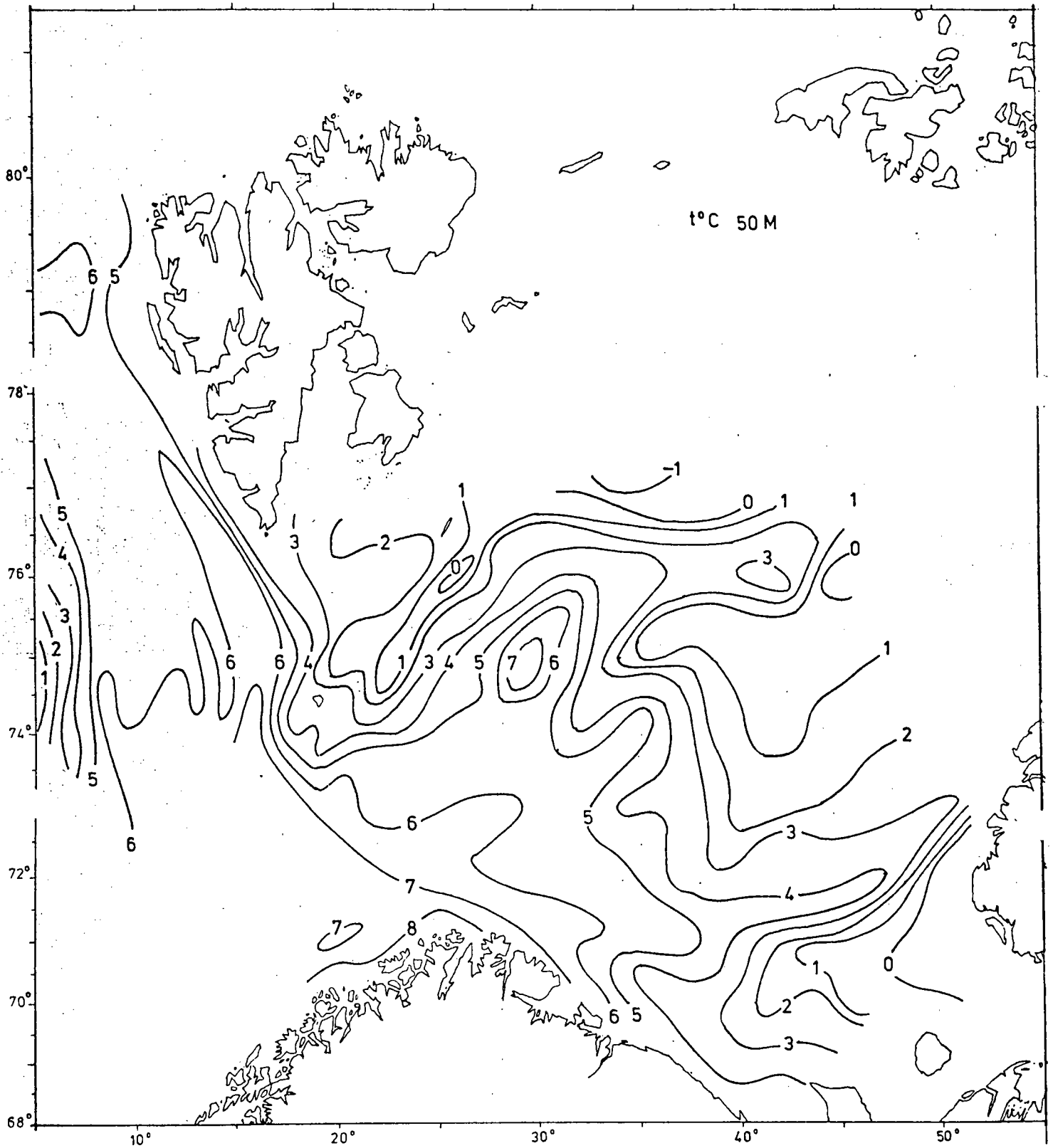


Fig. 4. Isotherms at 50 m.

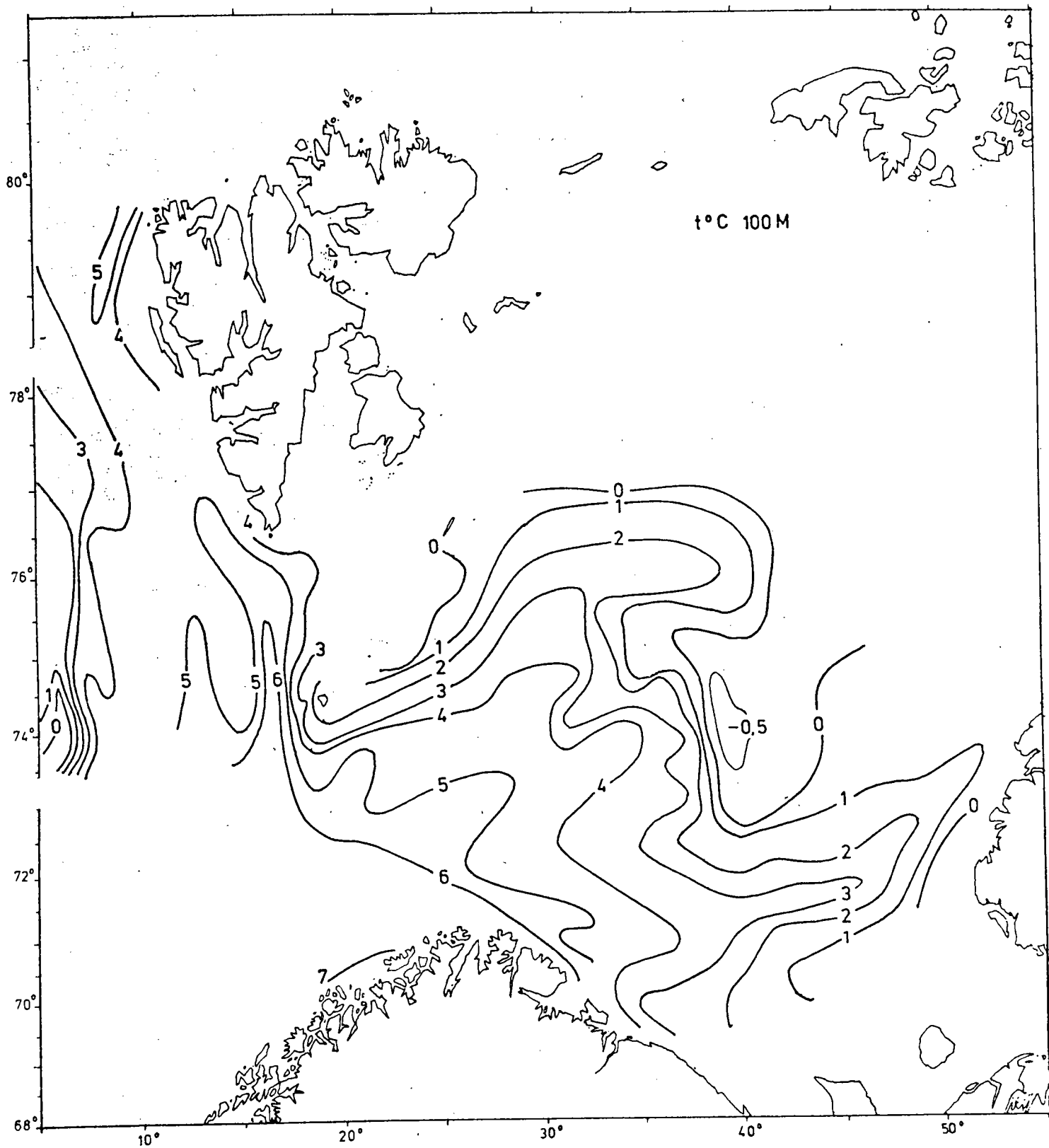


Fig. 5. Isotherms at 100 m.

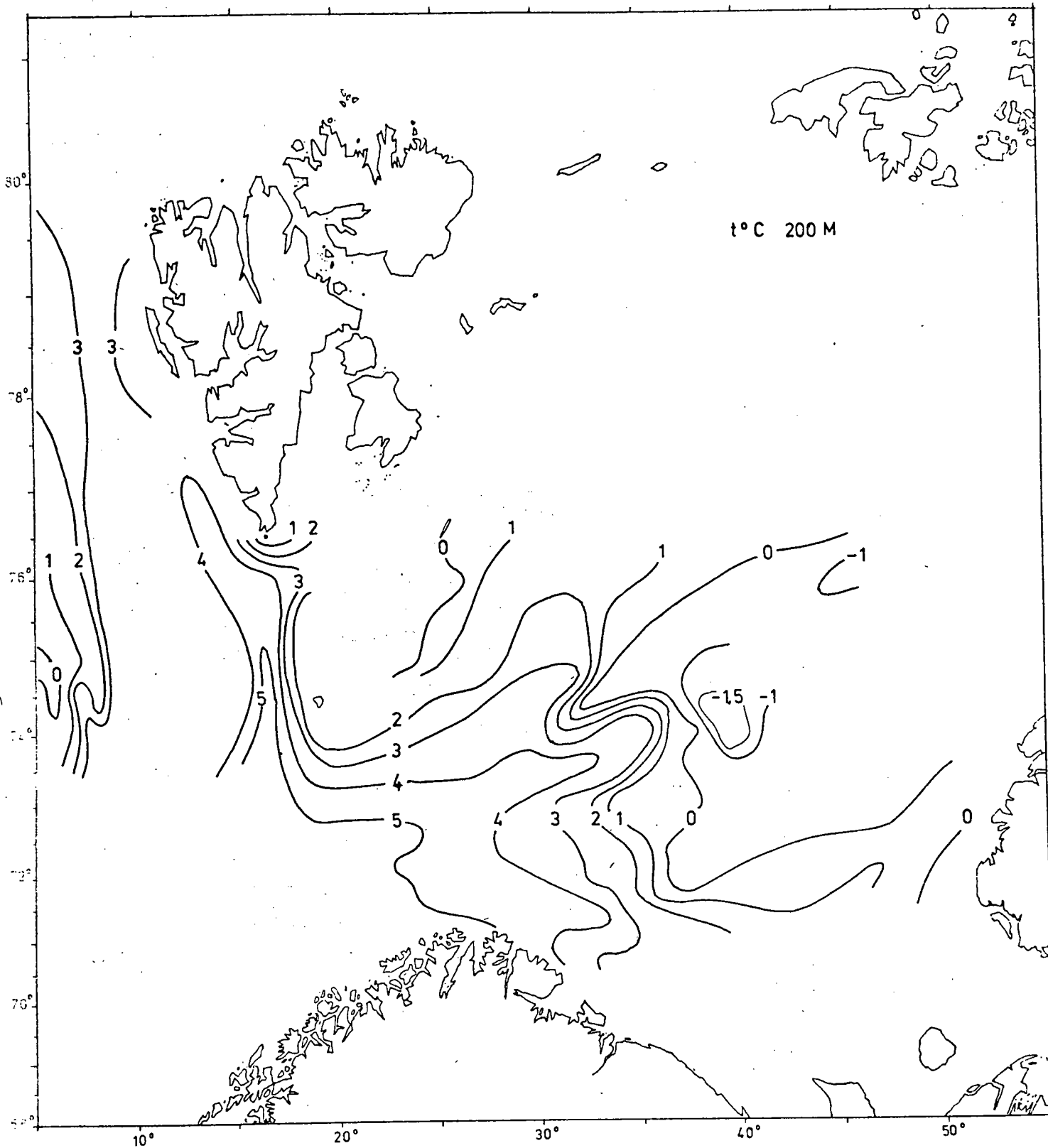


Fig. 6. Isotherms at 200 m.

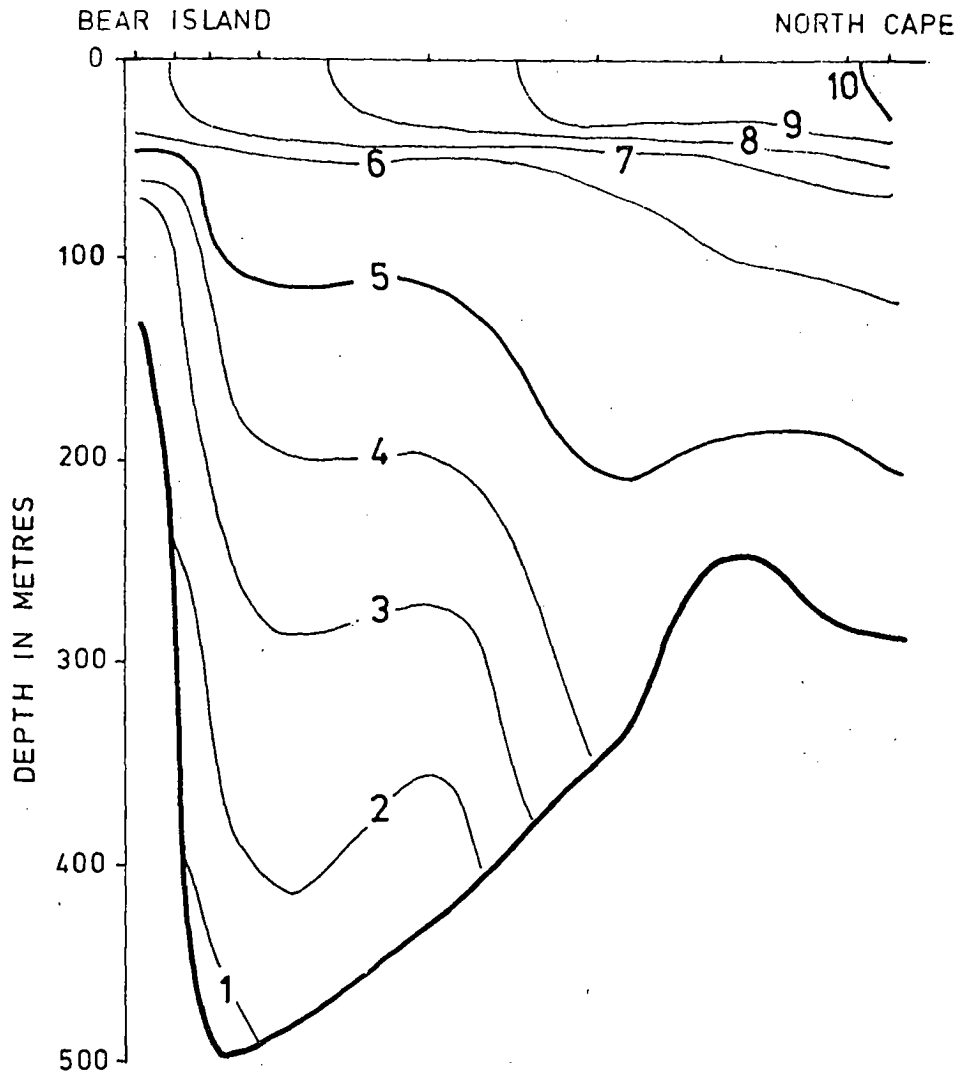


Fig. 7. Temperature section Bear Island - North Cape.

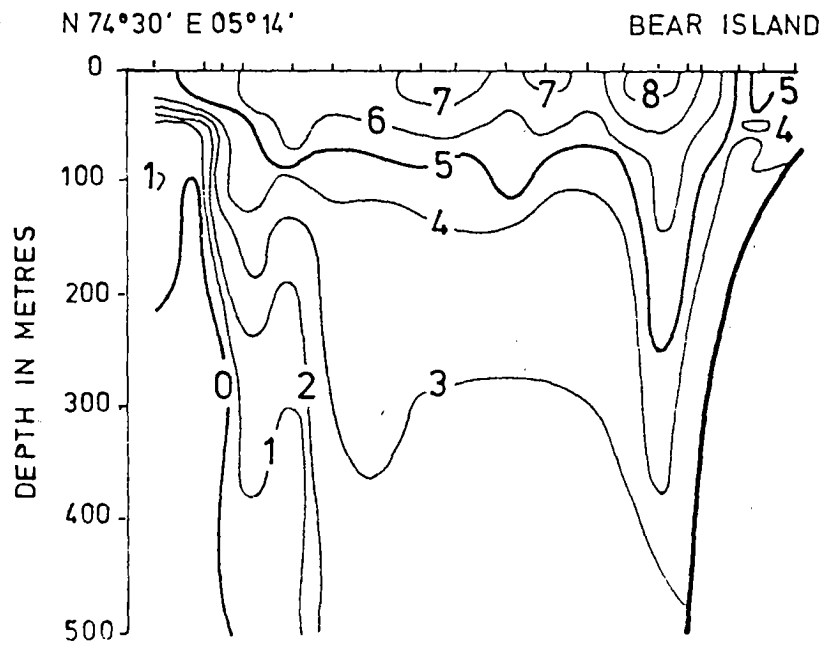


Fig. 8. Temperature section Bear Island - West.

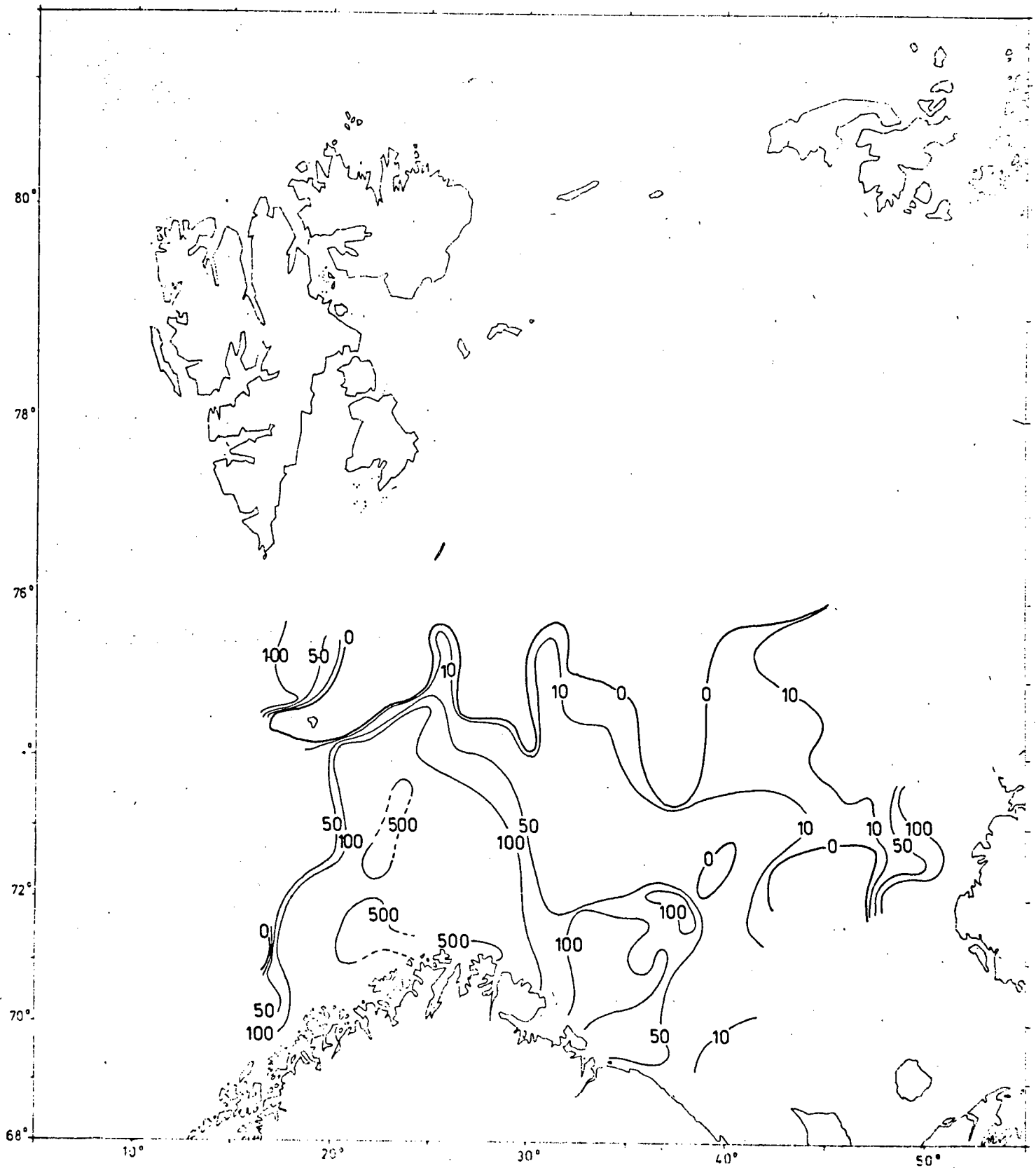


Fig. 9. Total integrator values (mm deflection) of 0-group fish.

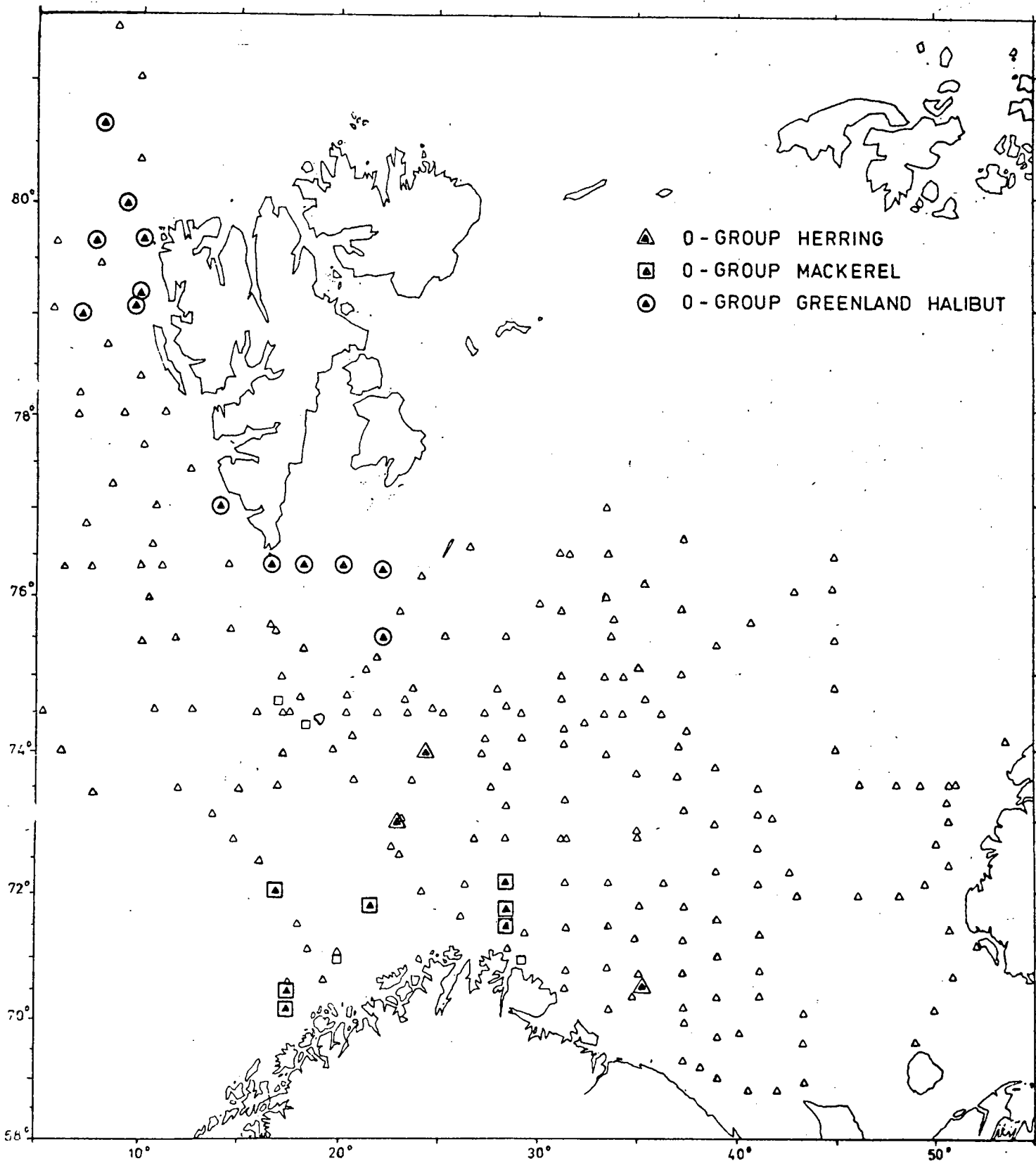


Fig. 10. Distribution of 0-group herring, mackerel and halibut.

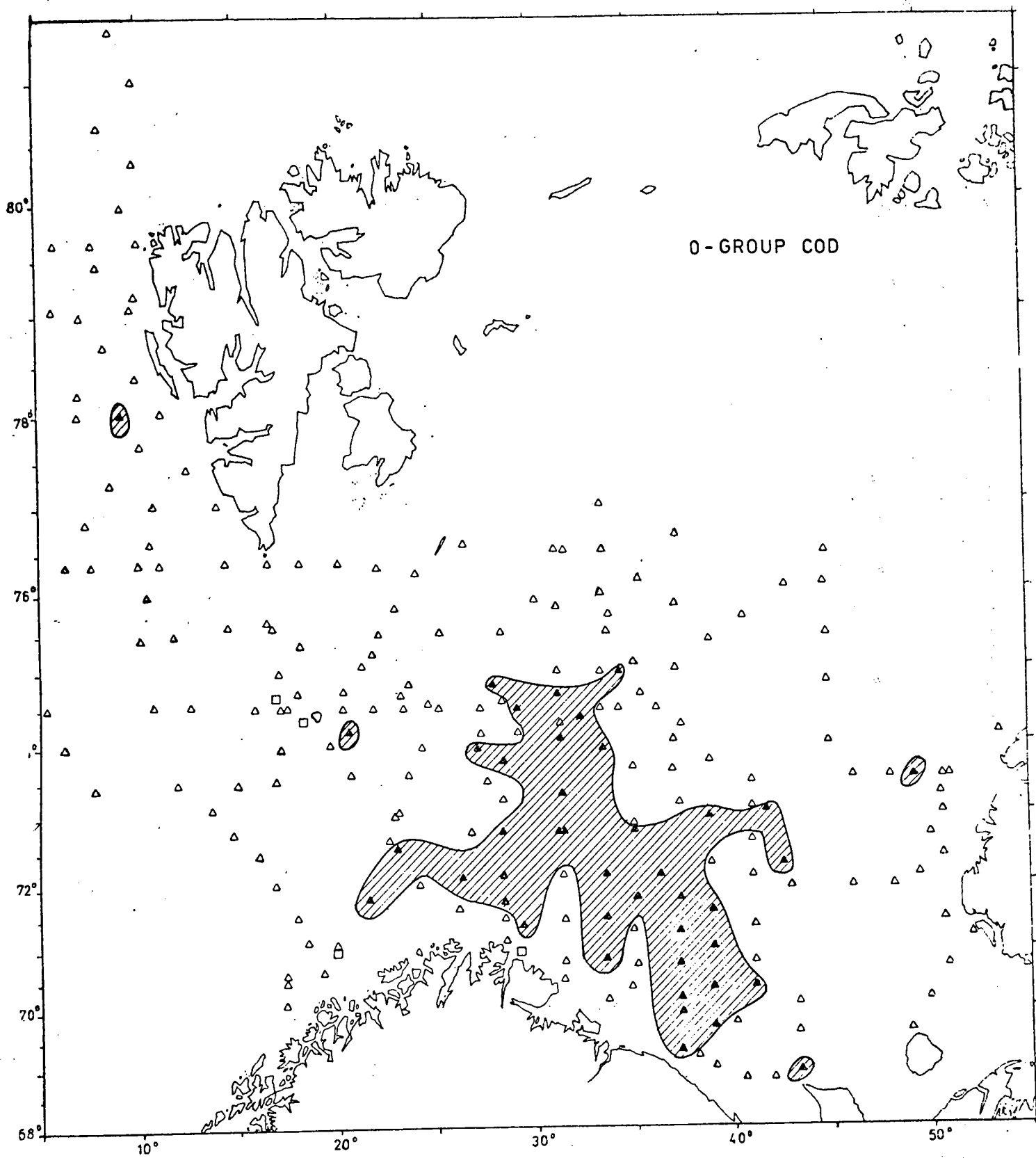


Fig. 11. Distribution of 0-group cod.

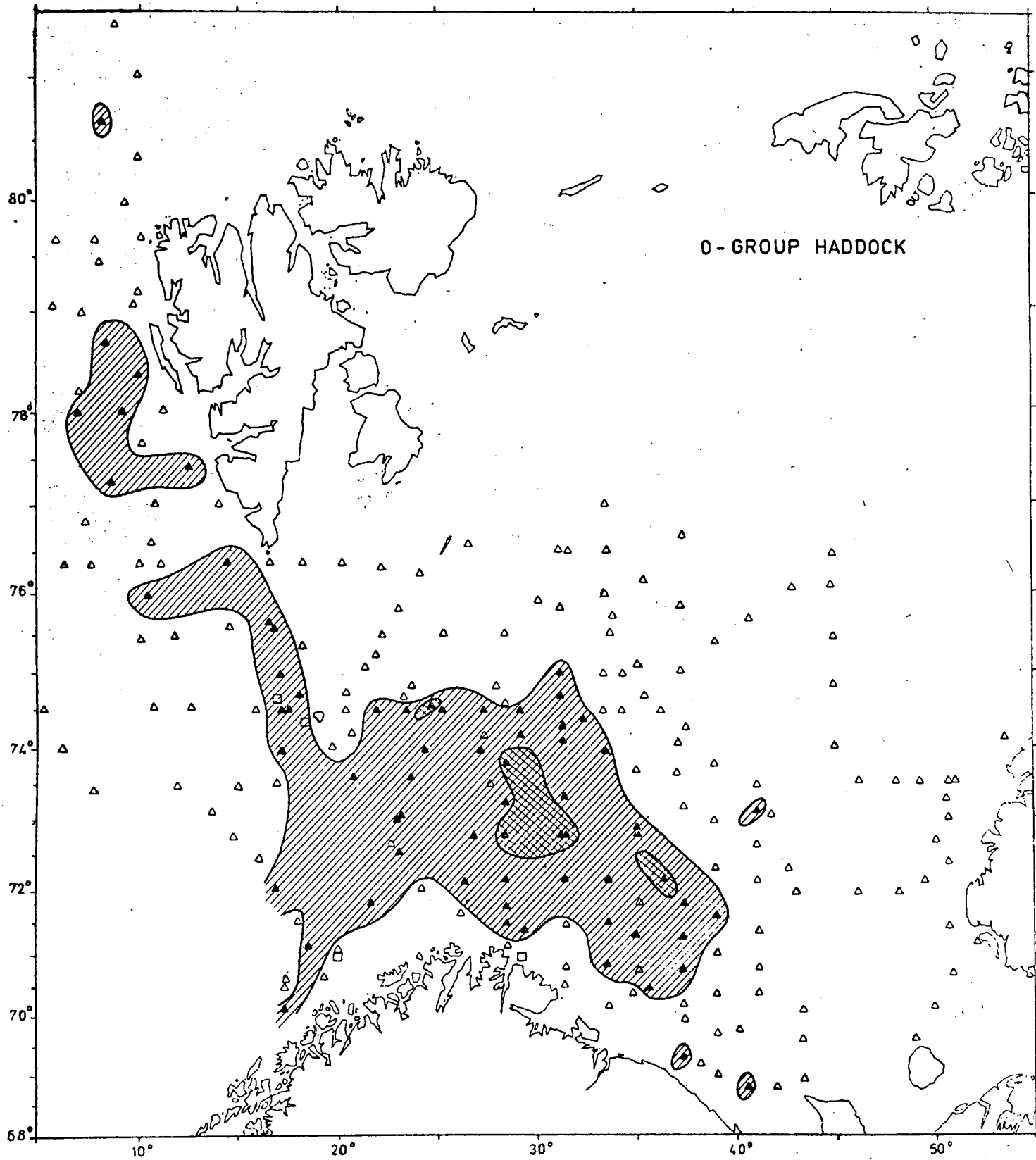


Fig. 12. Distribution of 0-group haddock.

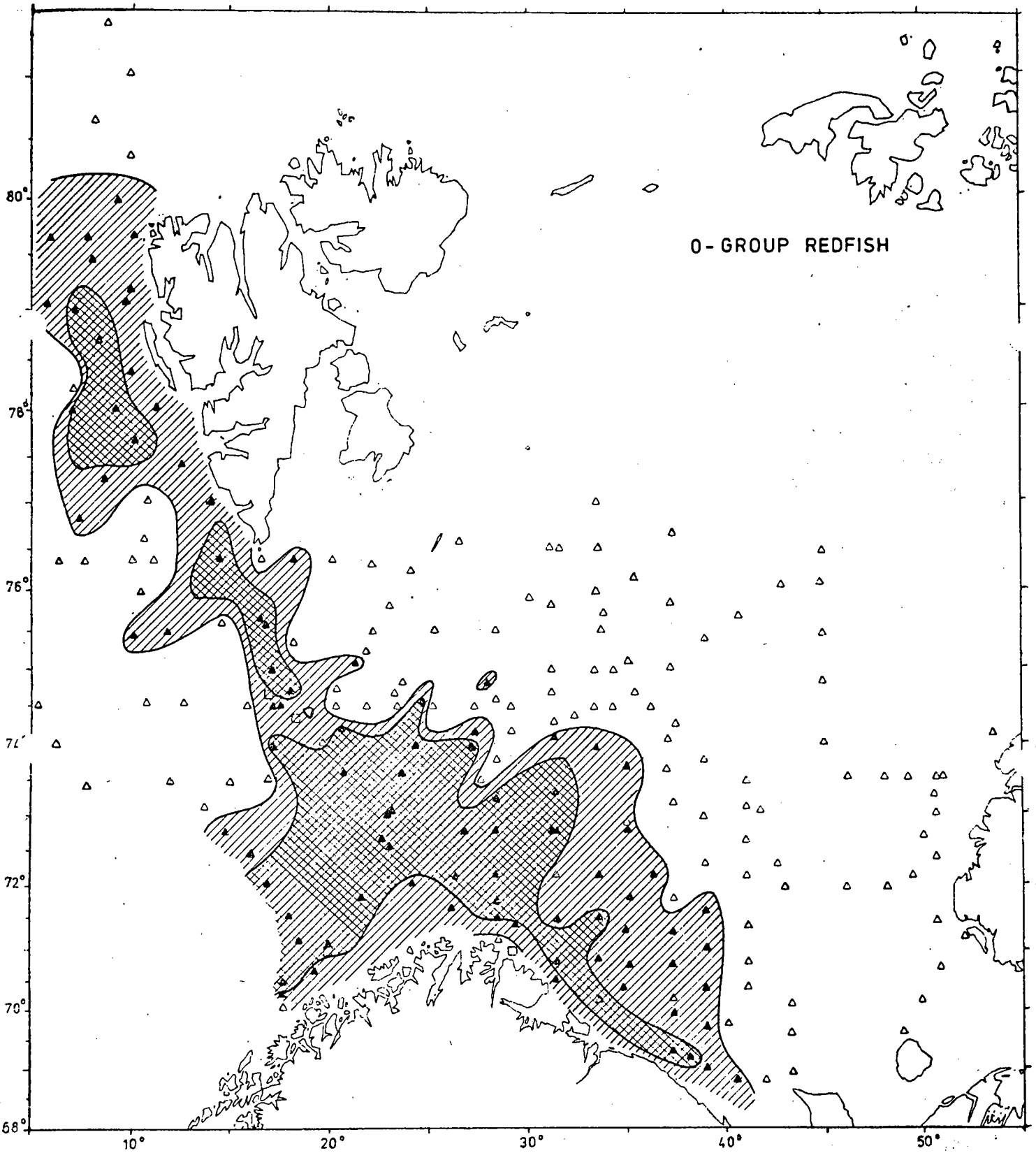


Fig. 13. Distribution of 0-group redfish.

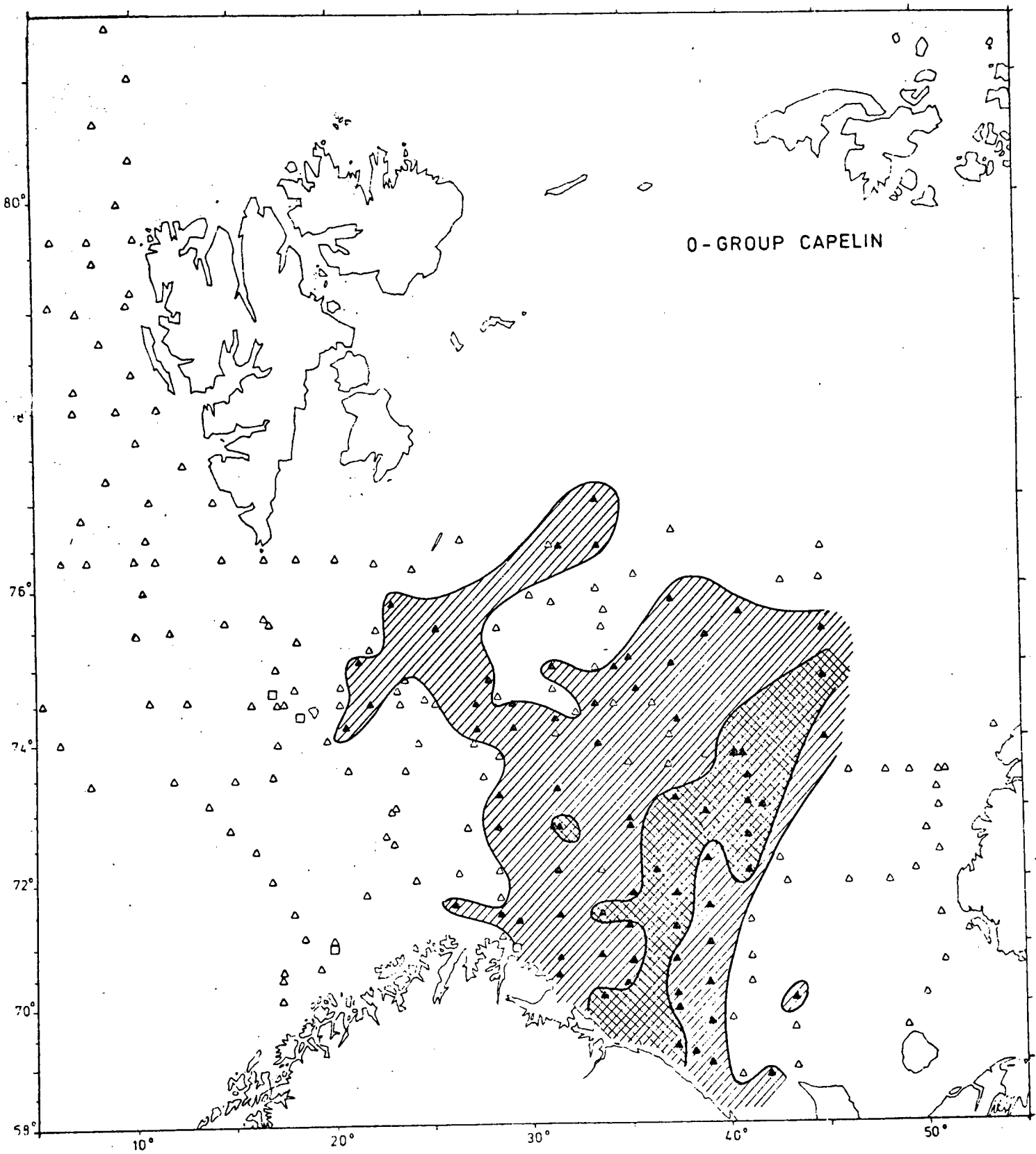


Fig. 14. Distribution of 0-group capelin.

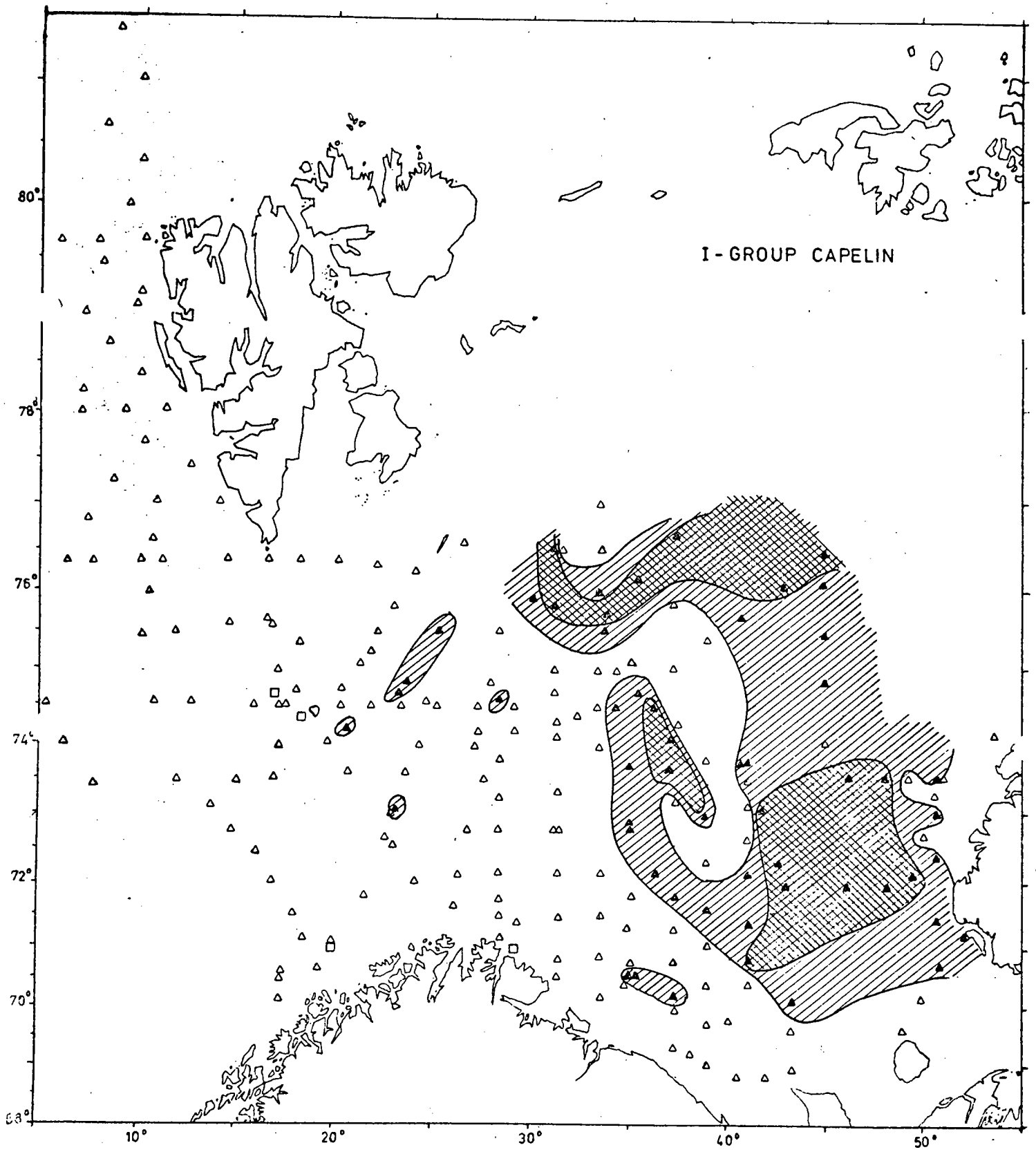


Fig. 15. Distribution of I-group capelin.

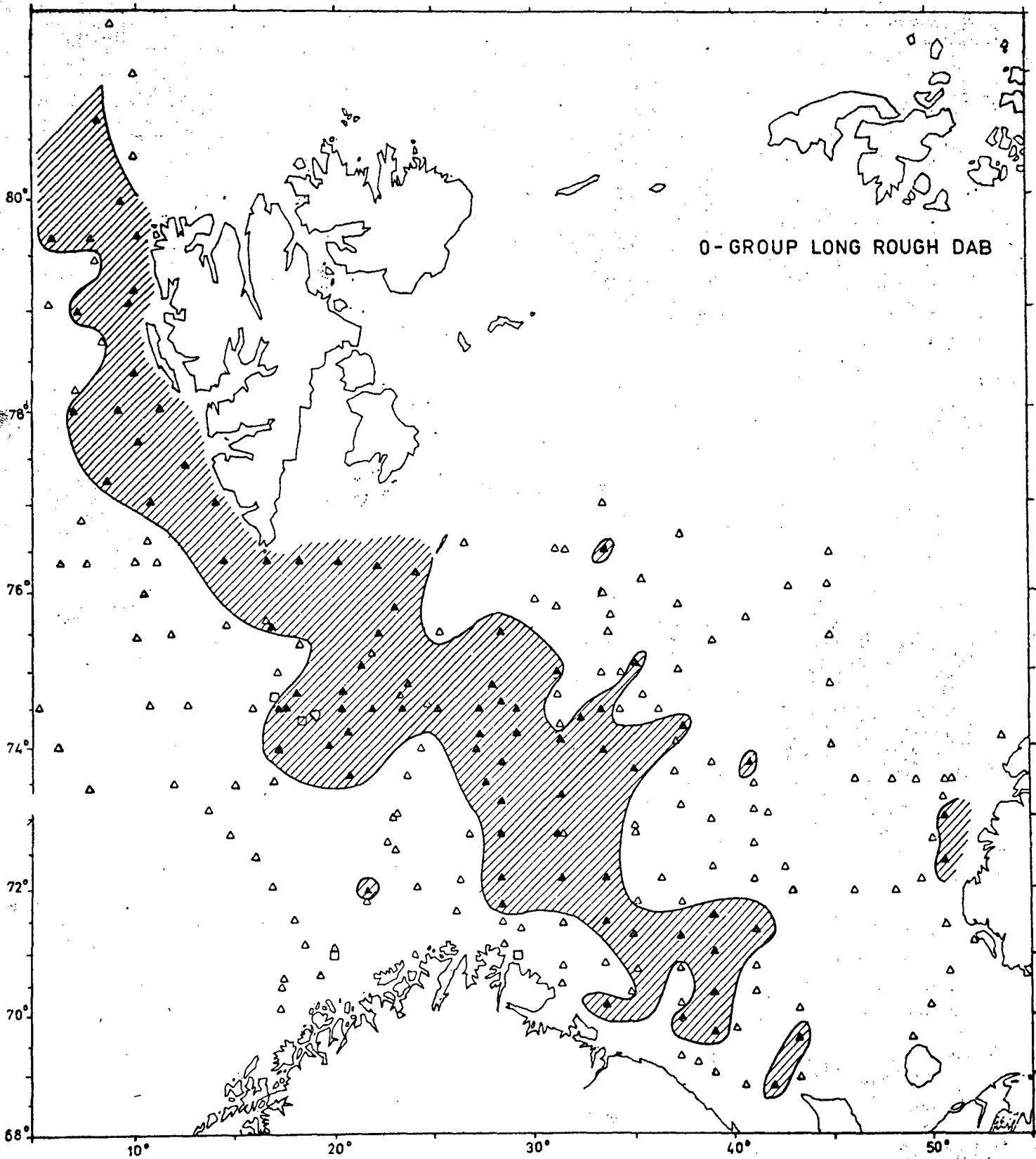


Fig. 16. Distribution of long rough dab.

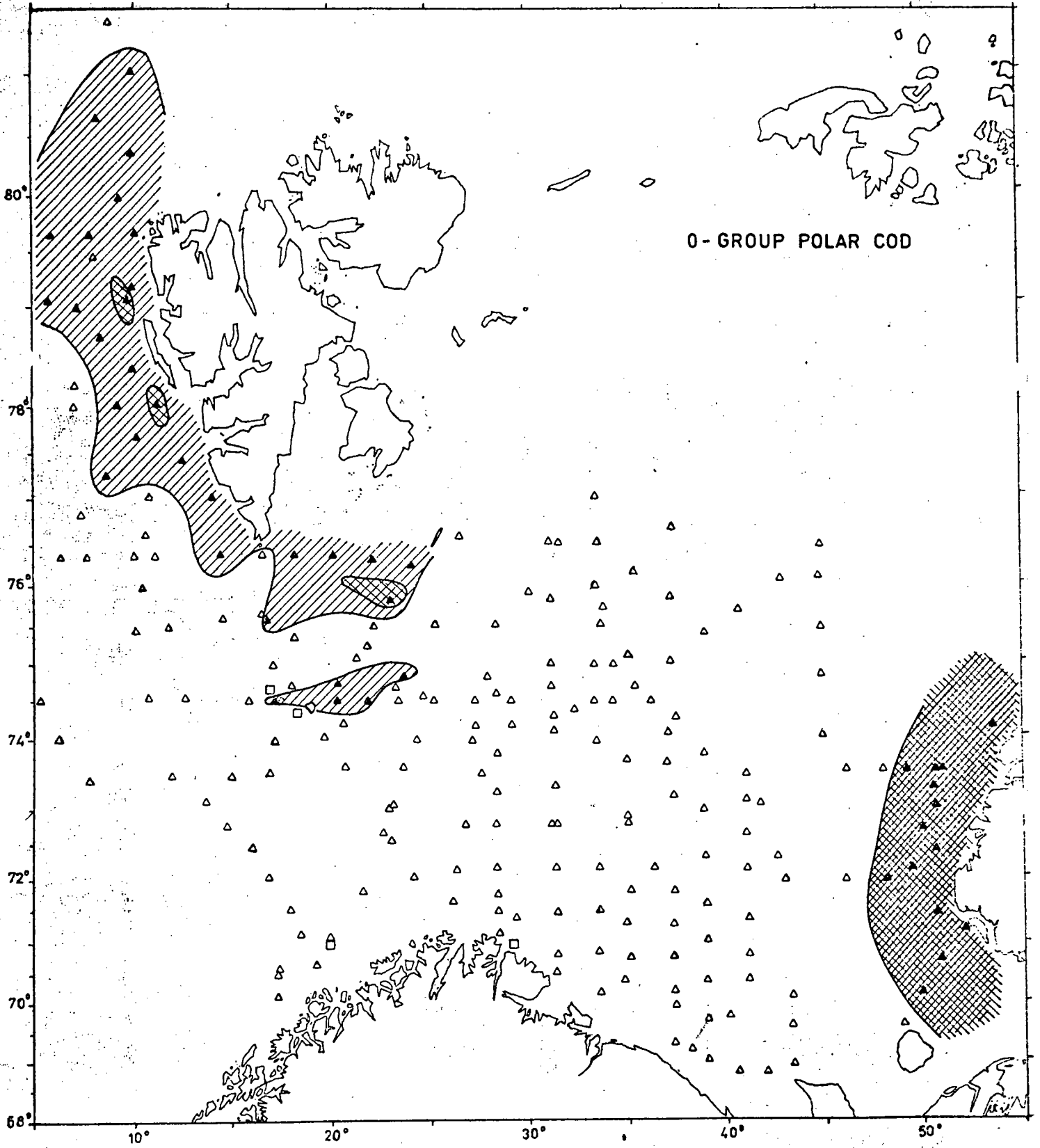


Fig. 17. Distribution of 0-group polar cod.

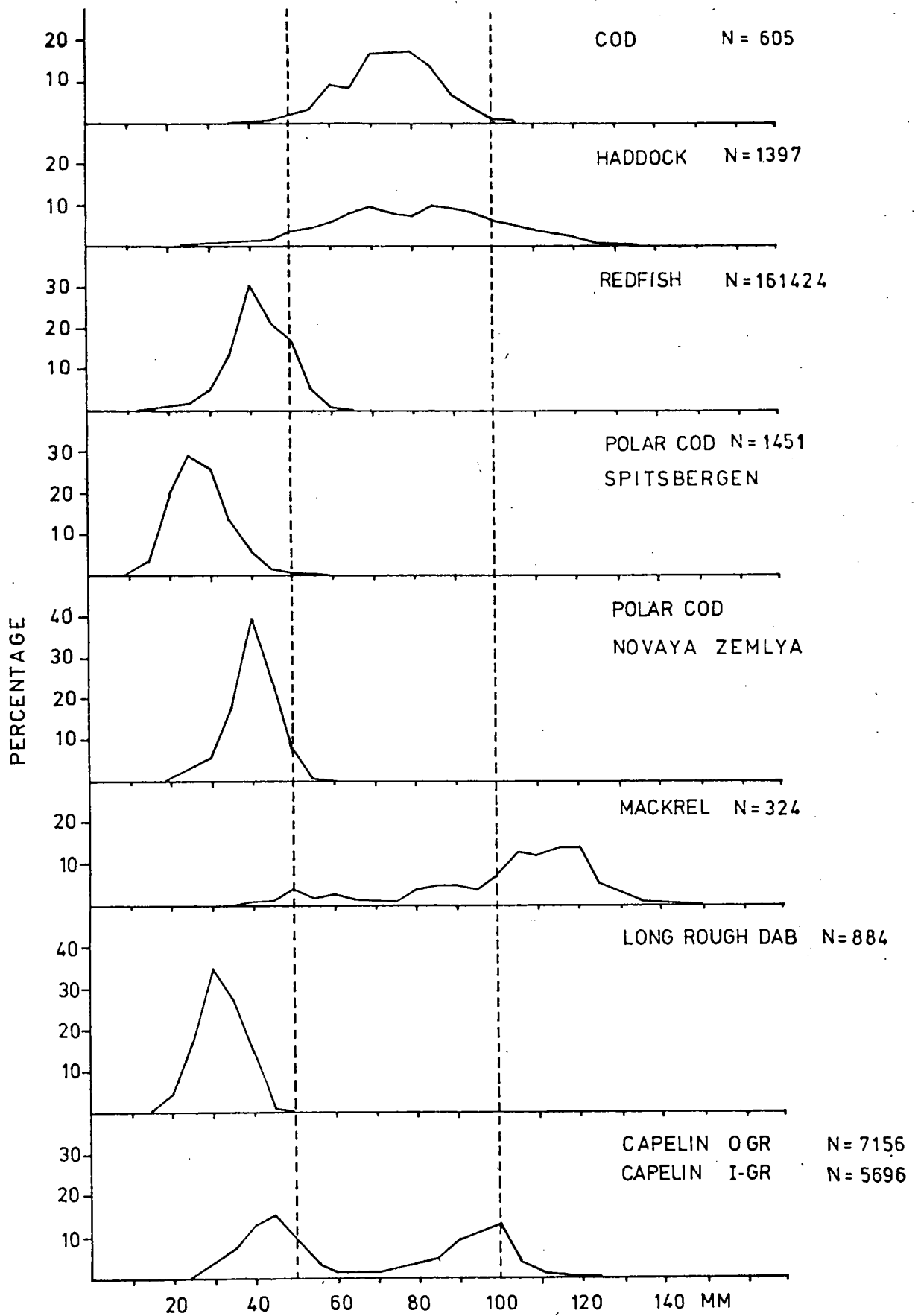


Fig. 18. Length distribution of 0-group fish.