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The Proportion of Cod Biomass in the Regulatory Area of Division 3L in Relation to the Whole of Division 3L

by

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Introduction

The proportion of cod biomass in the Regulatory Area of Div. 3L was assessed at the June 1988 meeting of the Scientific Council. The results of the spring 1988 Canadian survey in Div. 3L are now available and are incorporated here.

Discussion and Results

The proportion of cod biomass in the Regulatory Area of Div. 3L in the spring has varied from the range .4 to 6.1% (Table 1). These values may be somewhat overestimated since the area of the survey does not include a portion of the area adjacent to the coast (Fig. 1).

The distribution of cod in spring with respect to depth and bottom temperature has recently been reviewed (Wells, Brodie, Bishop, and Baird, 1988). Concentrations of cod in Div. 3L in the spring surveys are usually found in the vicinity of the Virgin Rocks, off Cape Bonavista and the northern edge of the Grand Bank and - to a much lesser degree - in the Regulatory Area (the nose of the Bank) (Fig. 2-12).

In some years concentrations are found mostly on the slope (Fig. 5, 8) but concentrations also usually occur in depths less than 200 m even when the bottom water temperature is less than -1°C (Fig. 8, 9). Bottom temperatures in the spring in Div. 3L are, in any case, usually less than 0°C within the 50-200 m depth range. Except in warmish years (1978, 1979) bottom temperatures are lower than 1°C on the top of the Bank in Div. 3L. Warm water is, of course,

always present ~~in deeper water~~ along the slope. It might be concluded that cod concentrations will form in the spring in Div. 3L in shoal water shoreward from the slope even when bottom temperatures are quite low.

The 0°C isotherm in winter 1985 followed the 200 m contour along the slope (Fig. 13). Shoreward on the Bank, temperatures were invariably lower than 0°C and often lower than -1°C. Cod concentrations were found all along the northeast slope, including the Regulatory Area. In winter 1986 the temperature situation was similar and cod distribution was similar.

In summary, concentrations of cod in winter tend to be found mainly in deep warm water on the slopes. In the spring, concentrations on the slope are reduced considerably while concentrations in shallow water shoreward increase.

From Table 1, the average proportion of cod biomass in the Regulatory Area in spring is 2.8%. In autumn the proportion is 3.3% and in winter 25.3% (Sum. Doc. 88/20). It should be noted that cod in Div. 3L are a part of the Div. 2J3KL stock and the proportion that cod in the Regulatory Area with respect to the total stock is considerably lower.

References

NAFO Scientific Council Reports 1988, p. 77.

Wells, R., W. B. Brodie, C. A. Bishop, and J. W. Baird. 1988. Distribution and Abundance of Three Fish Species on the Grand Bank in Relation to Depth and Temperature of the Water. NAFO Res. Doc. 88/94.

Table 1. Estimates of cod biomass outside the 200 mi. fishery zone in Division 3L by strata and depth zone from surveys conducted in the spring over the period 1977-86. The number of successful sets is in parenthesis.

Strata	Depth zone (fath)	% Area outside 200 mi. zone	ATC 262 (102) 1977	ATC 276 (94) 1978	ATC 290 (141) 1979	ATC 304-305 (115) 1980	ATC 317-318 (77) 1981	ATC ATC 329 (103) 1982	WT 28-30 (211) 1985	WT 48 (211) 1986	WT 59-60 (181) 1987	WT 70-71 (154) 1988
385	51-100	5	21	4	56	314	21	0	104	21	53	107
390	"	55	278	437	1,169	1,539	275	119	144	223	277	0
389	101-150	62	833	659	681	4,292	296	1,031	3,825	558	401	429
391	"	100	634	356	1,048	2,064	1,212	95	429	826	201	41
387	151-200	37	45	68	170	95	90	871	7,952	2,425	72	192
388	"	99	1,169	179	346	107	188	1,308	343	1,556	10	177
392	"	100	30	66	189	0	128	256	2,237	435	3	98
729	201-300	100							35	-	-	-
731	"	100							36	-	-	-
733	"	50			not surveyed				158	-	-	-
730	301-400	100			beyond 200 fathoms				0	-	-	-
732	"	100							0	-	-	-
734	"	67							0	-	-	-
Biomass outside 200 miles			3,010	1,769	3,659	8,411	2,210	3,680	15,263	6,044	1,017	1,044
Total 3L biomass			70,877	78,118	129,116	139,030	218,214	140,578	267,515	239,857	257,564	259,080
outside 200 miles			4.3	2.3	2.8	6.1	1.0	2.6	5.7	2.5	0.4	0.4

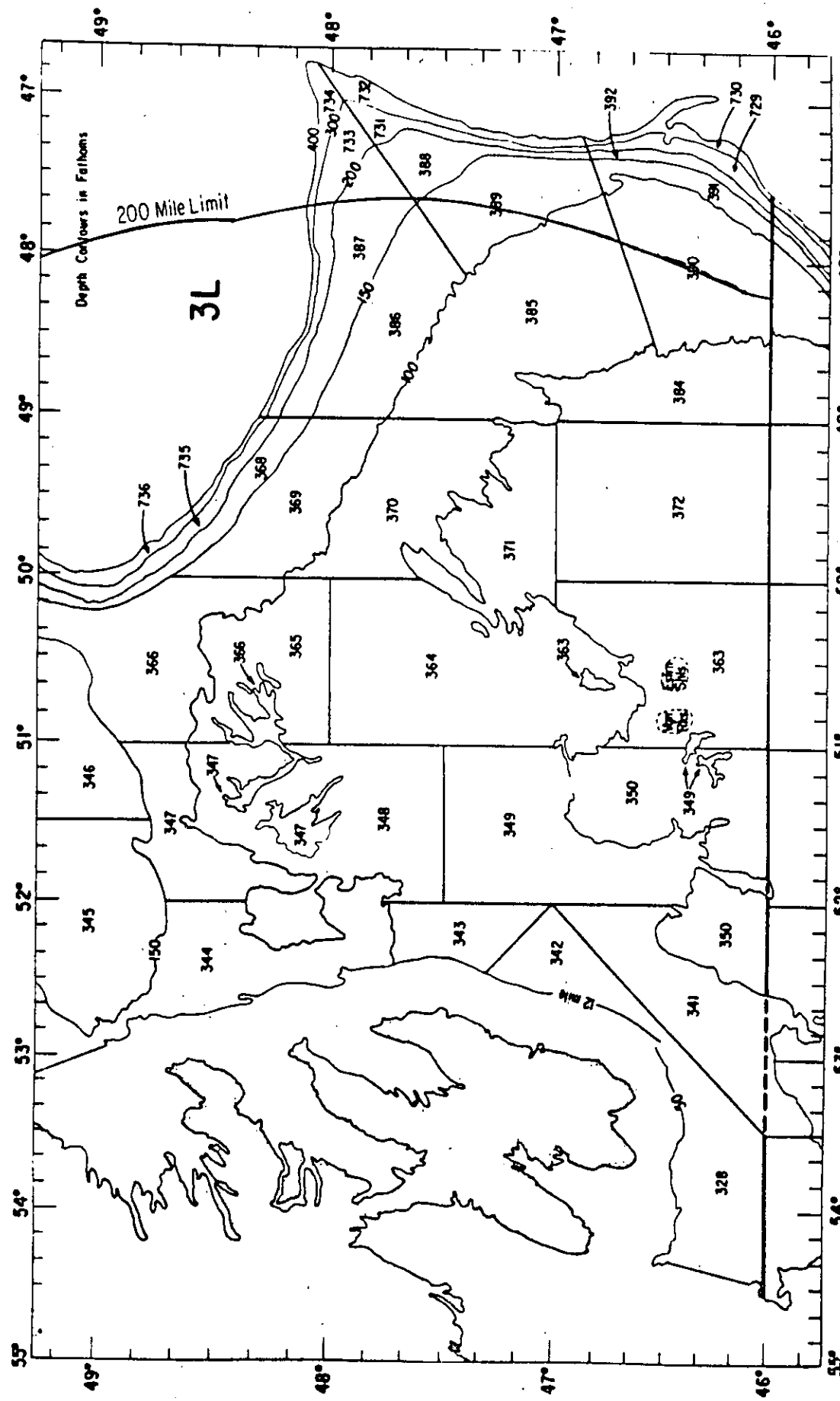


Fig. 1. Stratification scheme for NAFO Div. 3L relative to the 200 mi. economic zone.

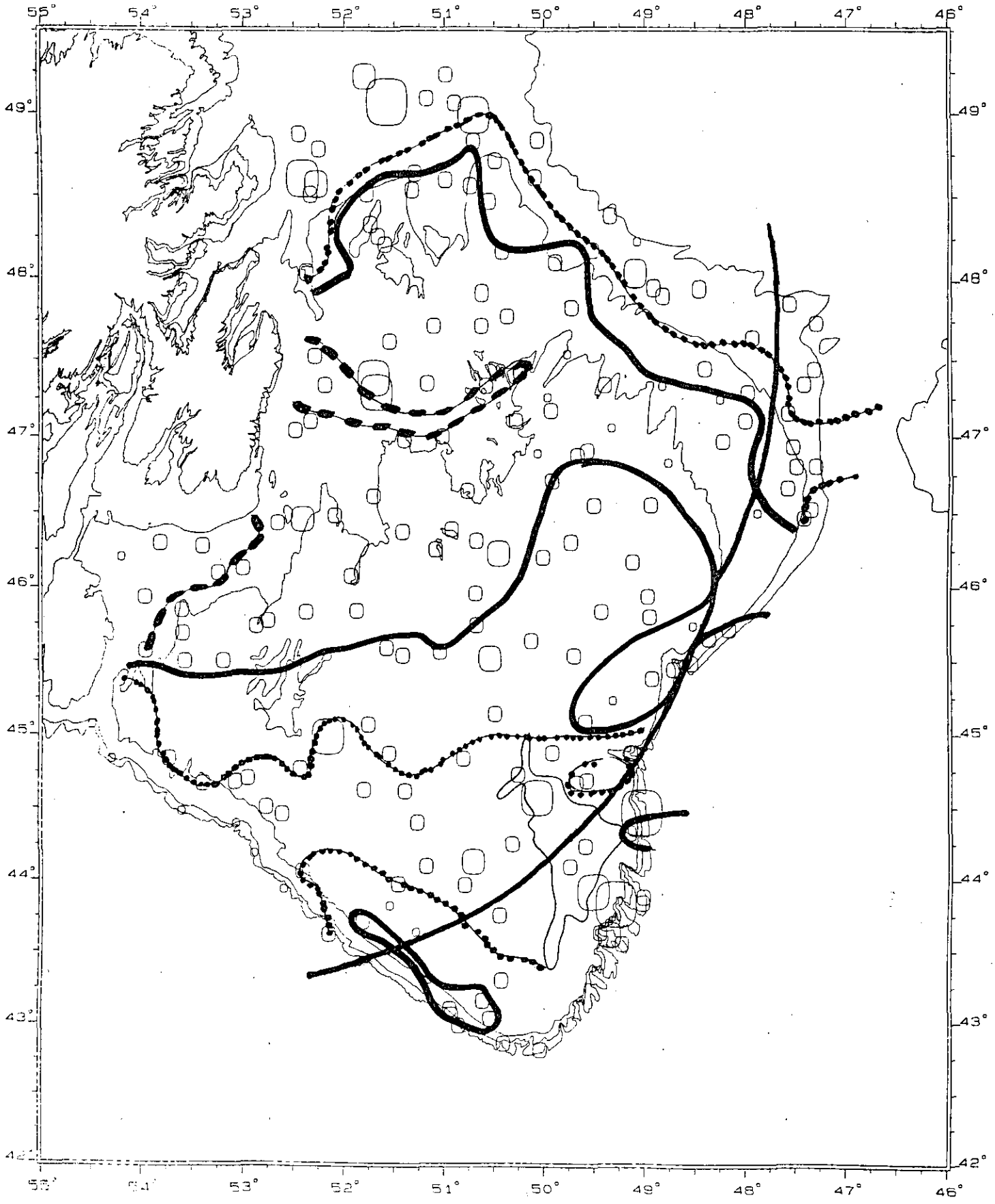


Fig. 2. Catch per tow (kg) of cod in spring 1977. The area of the circle is proportionate to the catch per tow. Isotherms are represented as follows: solid line 0^{o}, dotted line $1^{o}C$, dashed line $-1^{o}C$

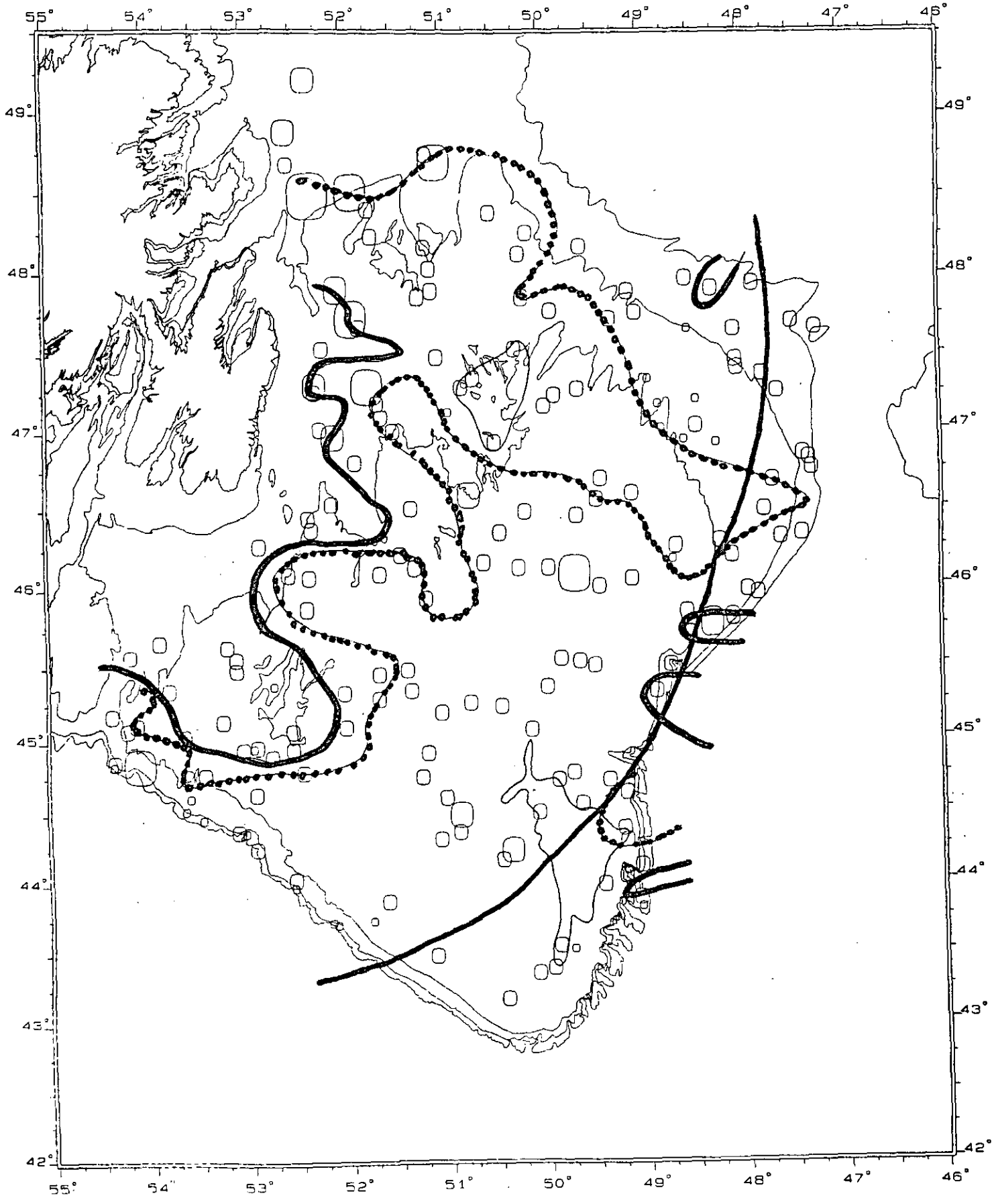


Fig. 3. Catch per tow (kg) of cod in spring 1978. The area of the circle is proportionate to the catch per two. Isotherms are represented as follows: solid line 0°C, dotted line 1°C, dashed line -1°C.

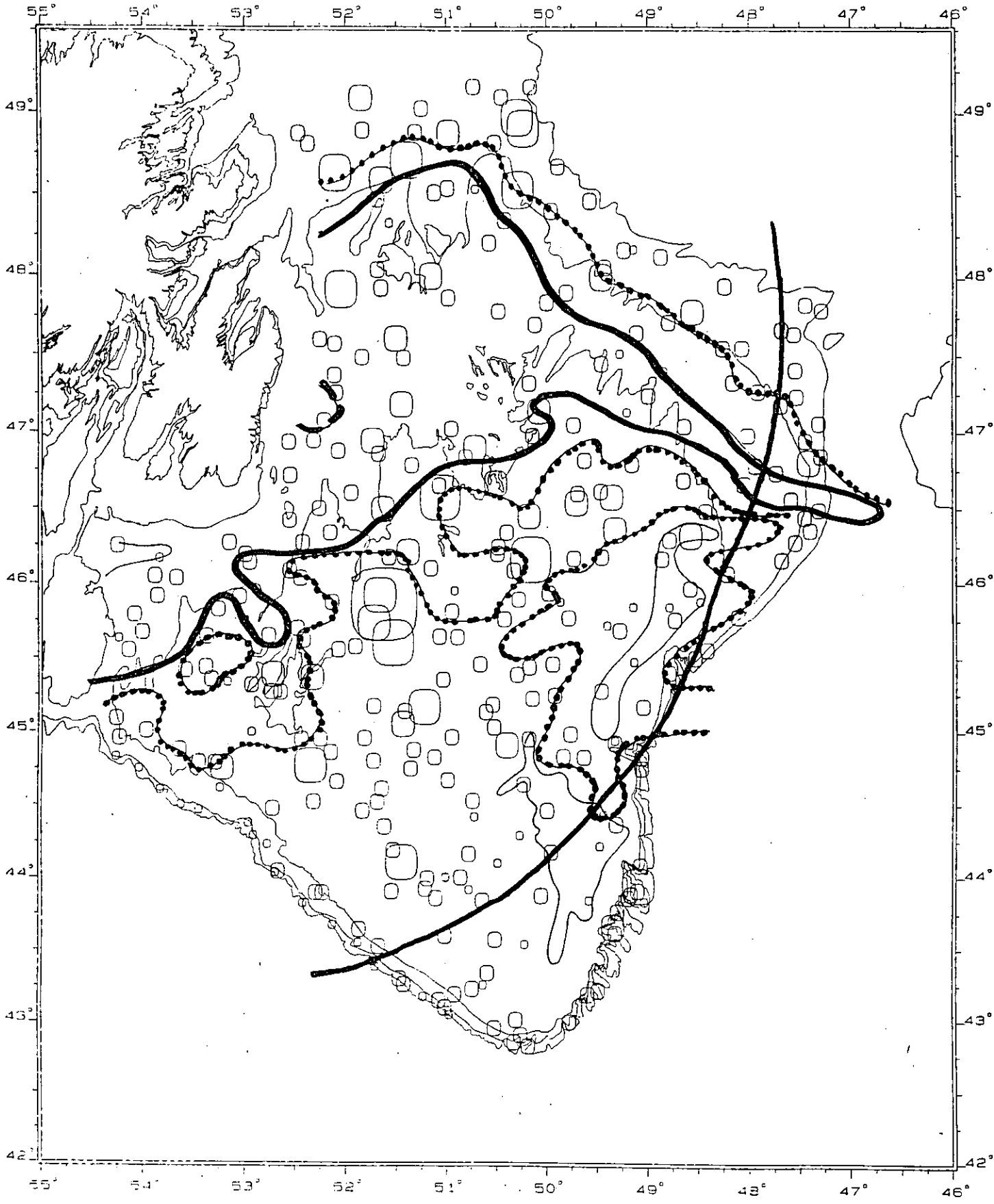


Fig. 4. Catch per tow (kg) of cod in spring 1979. The area of the circle is proportionate to the catch per two. Isotherms are represented as follows: solid line 0°C, dotted line 1°C, dashed line -1°C.

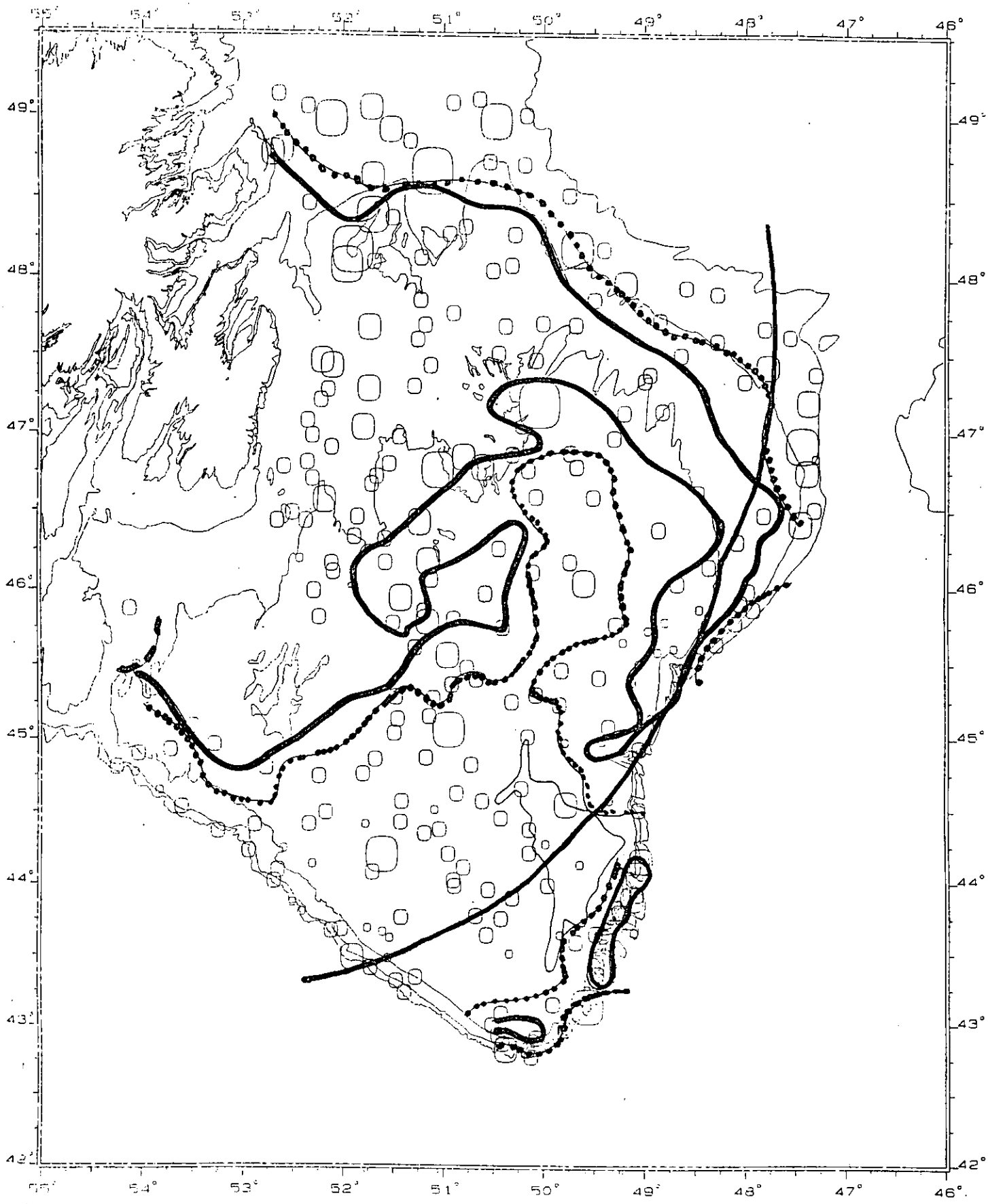


Fig. 5. Catch per tow (kg) of cod in spring 1980. The area of the circle is proportionate to the catch per two. Isotherms are represented as follows: solid line 0°C, dotted line 1°C, dashed line -1°C.

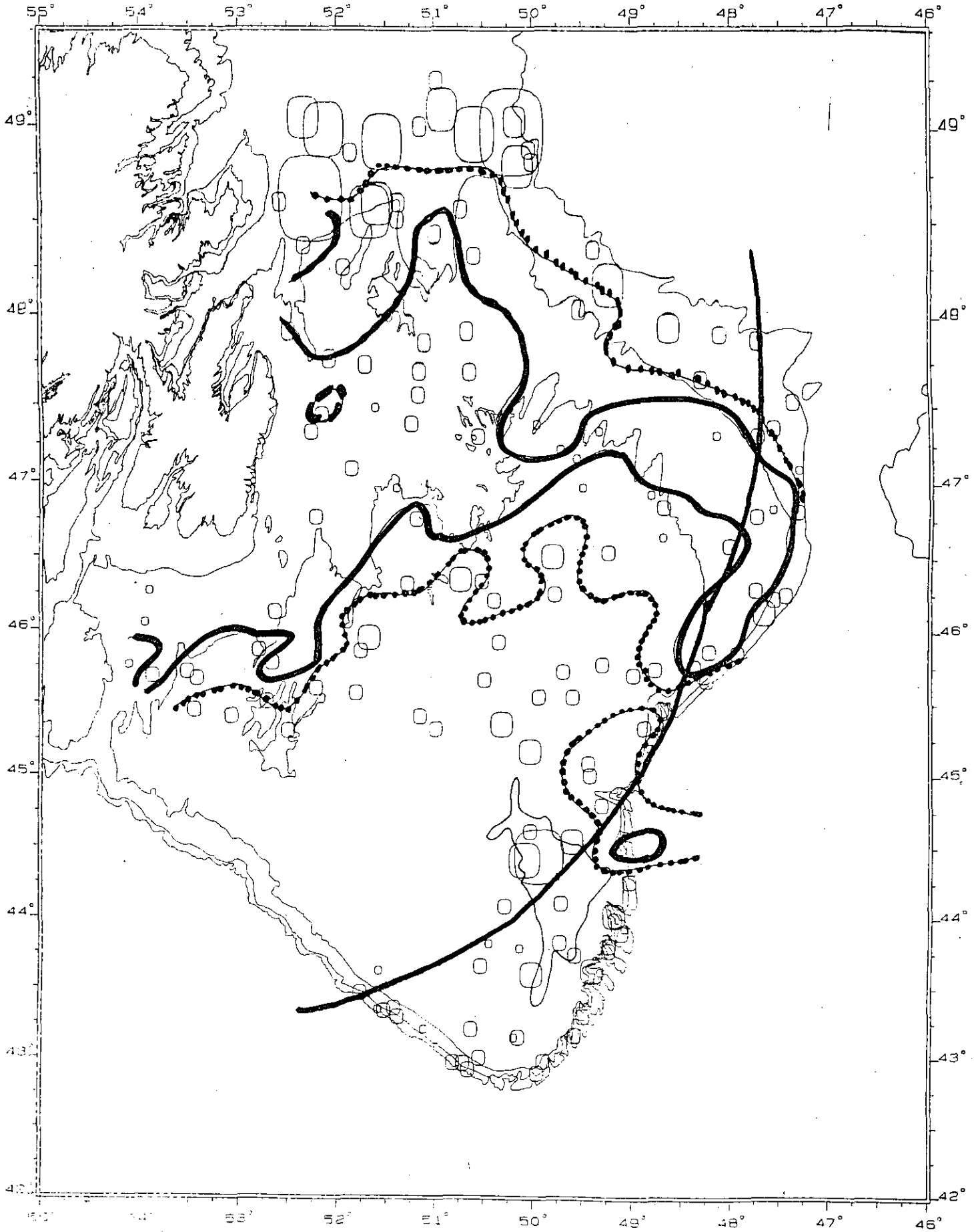
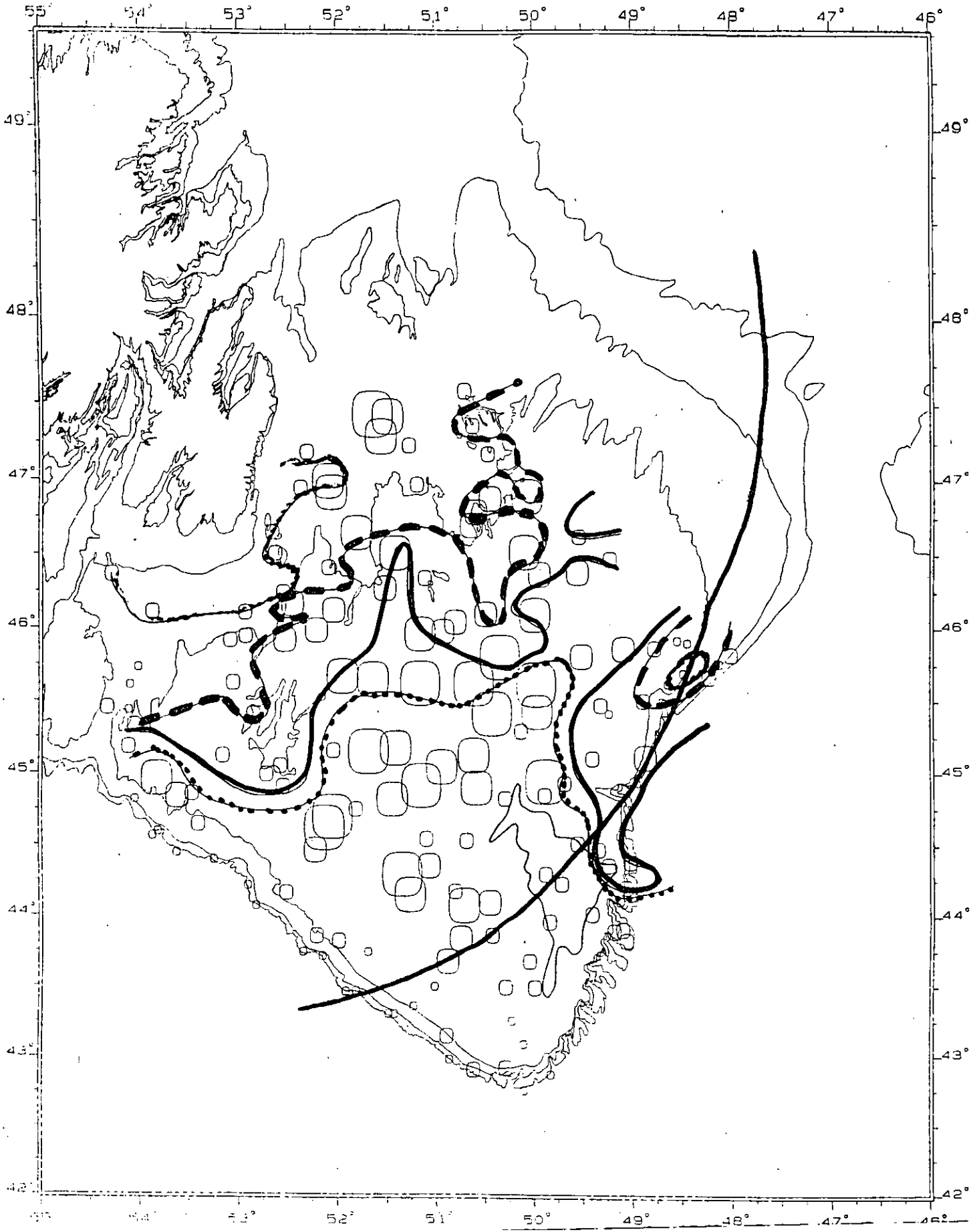


Fig. 6 Catch per tow (kg) of [illegible] in spring 1991

Fig. 7. Catch per tow (kg) of cod in spring 1982. The area of the circle is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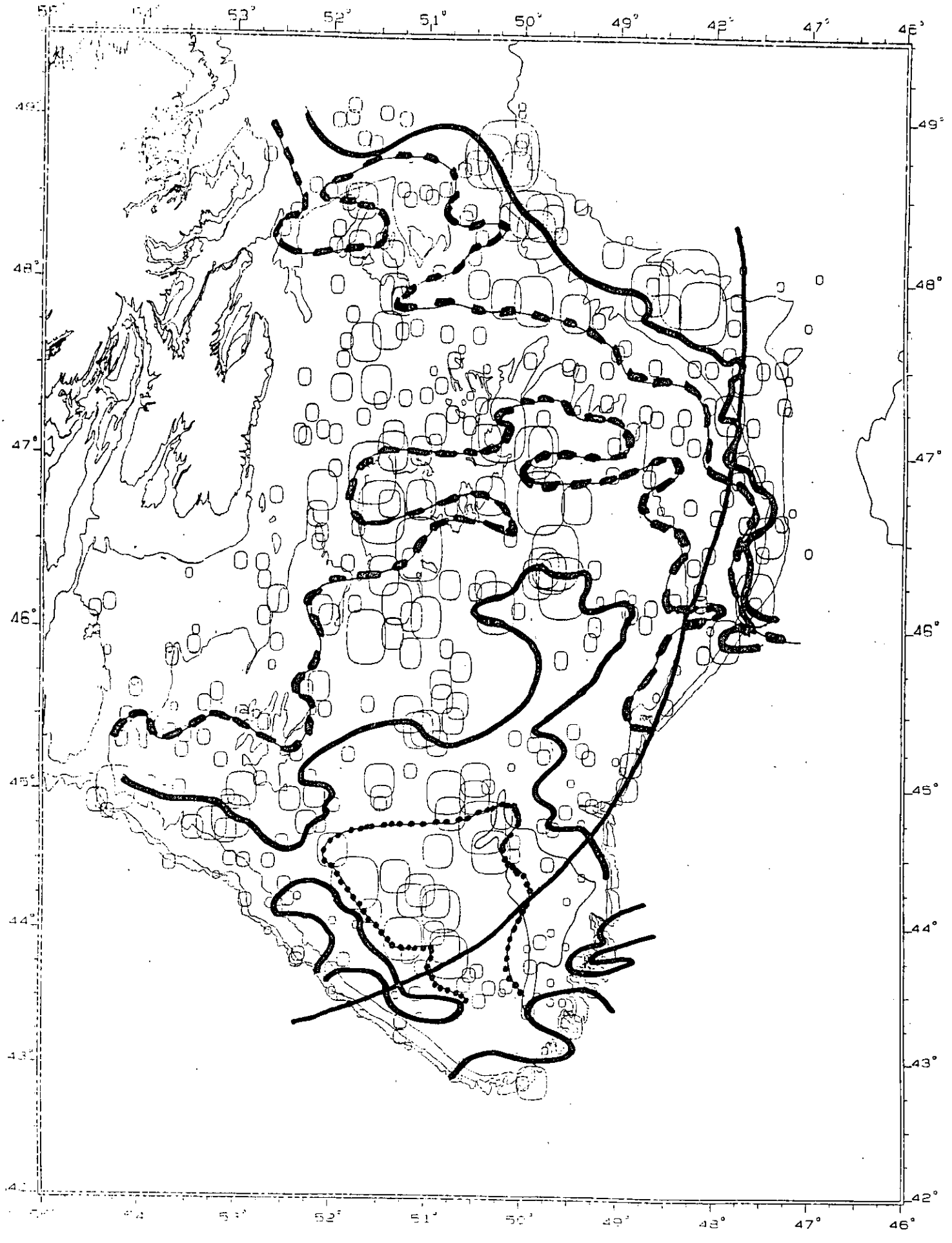
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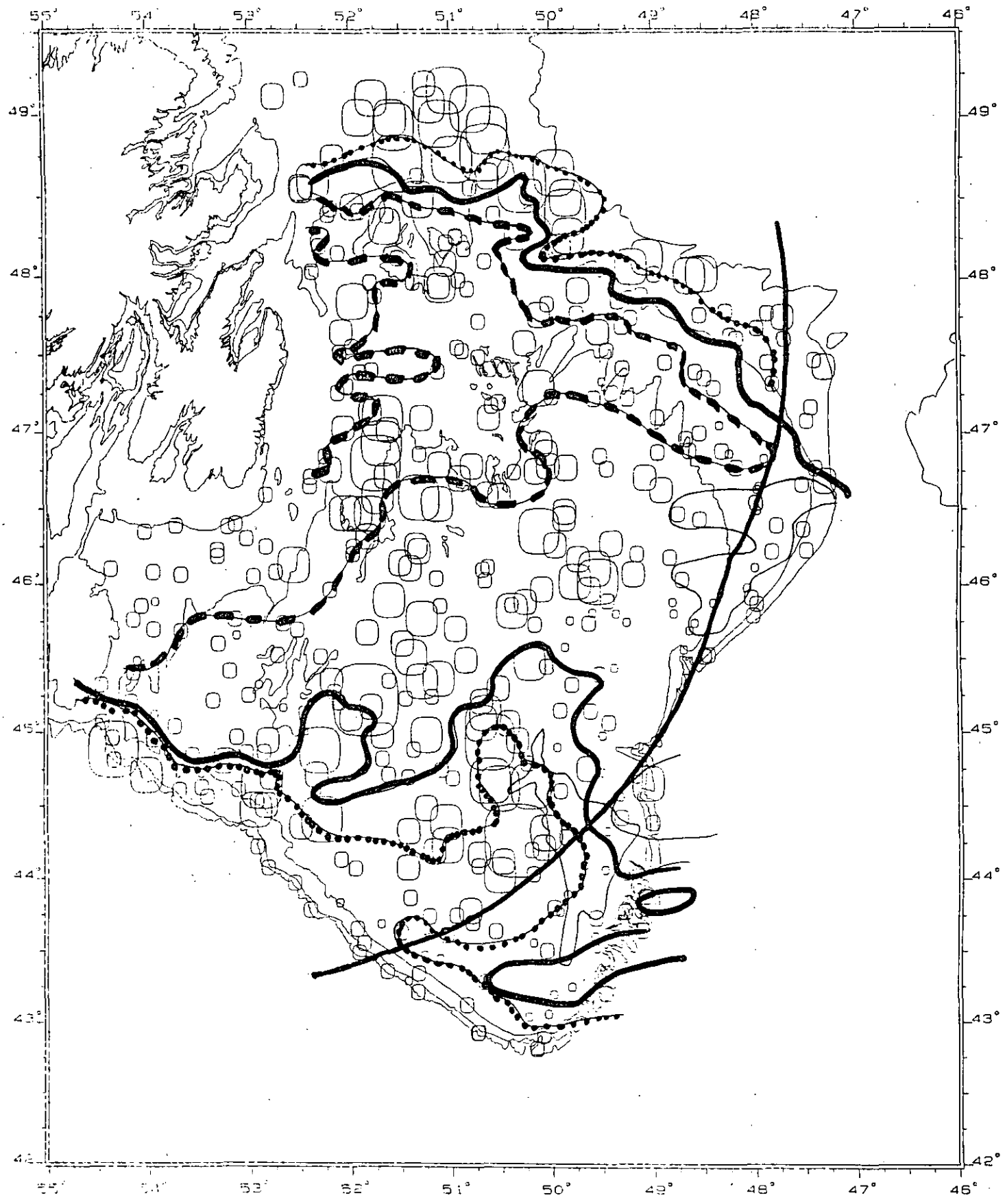

Fig. 10. Catch per tow (kg) of cod in spring 1986. The area of the circle is proportionate to the catch per two. Isotherms are represented as follows: solid line 0°C, dotted line 1°C, dashed line -1°C.

Fig. 11. Catch per tow (kg) of cod in spring 1987. The area of the circle is proportionate to the catch per two. Isotherms are represented as follows: solid line 0°C, dotted line 1°C, dashed line -1°C.

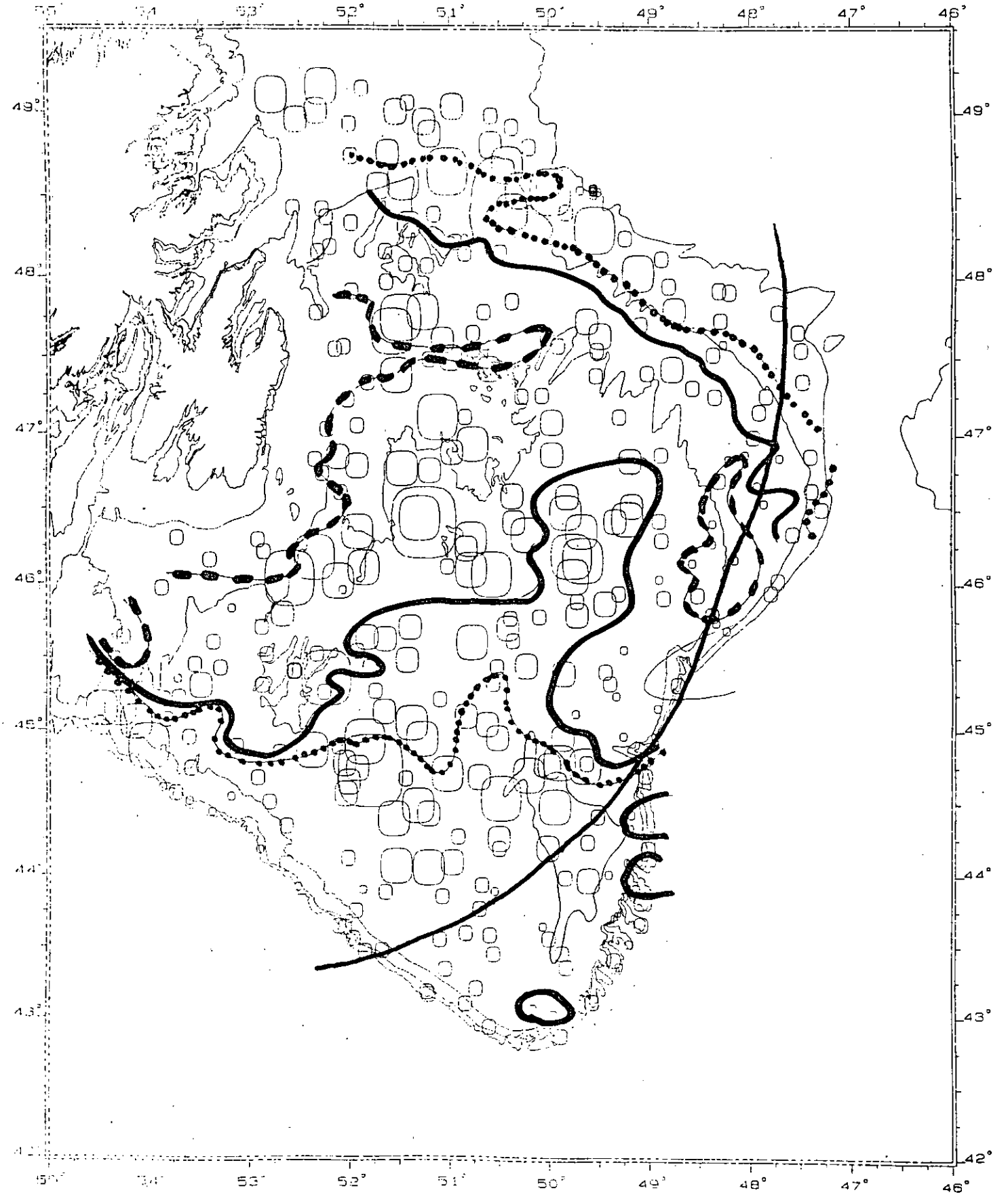

Fig. 12. Catch per tow (kg) of cod in spring 1988. The area of the circle is proportionate to the catch per two. Isotherms are represented as follows: solid line 0°C, dotted line 1°C, dashed line -1°C.

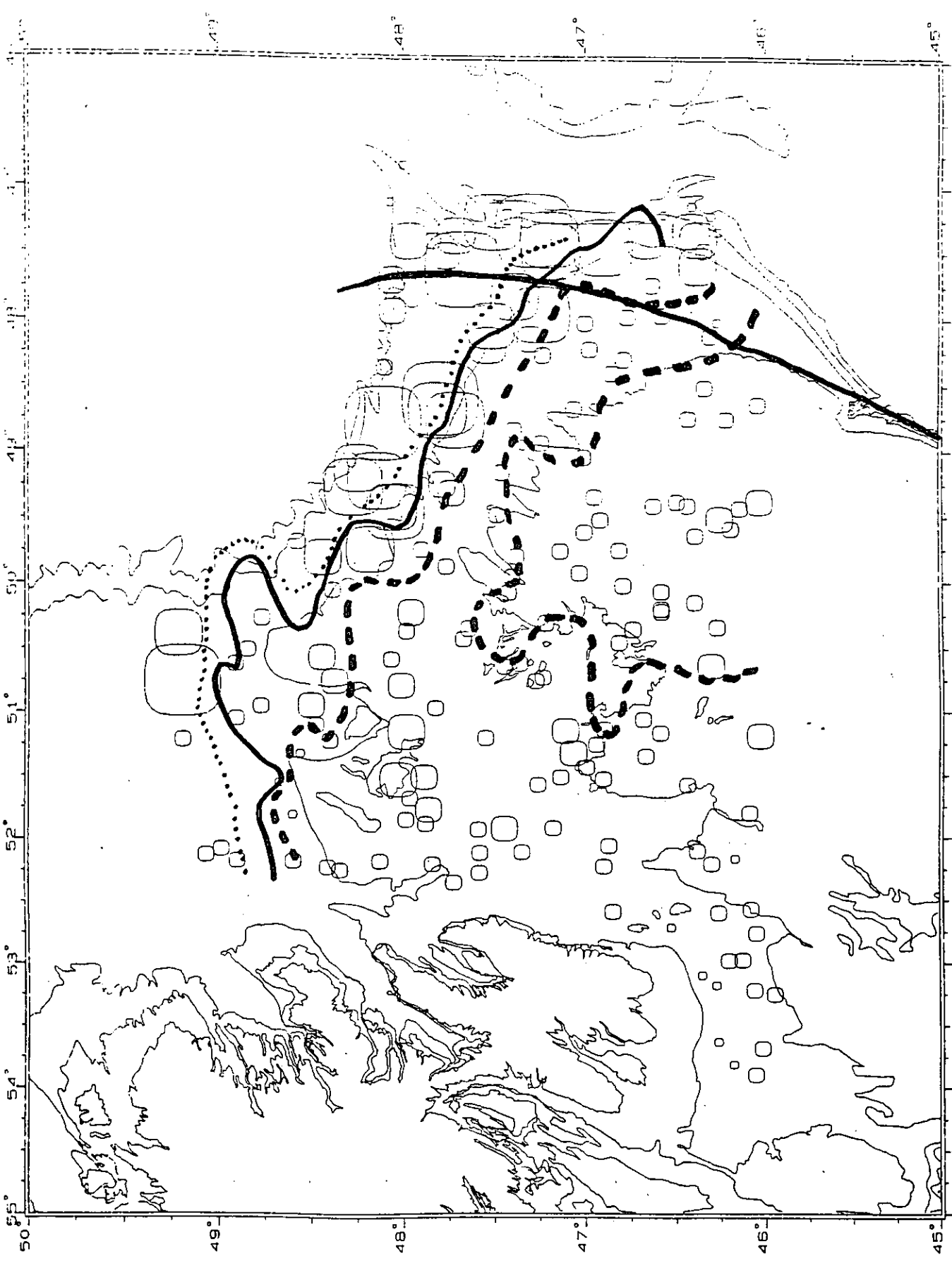

Fig. 13. Catch per two (kg) of cod in winter 1985. The area of the circule is proportionate to the catch per two. Isotherms are represented as follows: solid line 0°C, dotted line 1°C, dashed line -1°C.