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Distribution of some Groundfish Species on the Scotian Shelf Slopes during the 1983 Fishing Season from Data Obtained by USSR Observers

by

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Abstract

Silver hake, haddock, cod and redfish catch distribution per hauling hour in May and June 1983 in the region alloted for foreign fishery was studied. The distribution of the afore--mentioned species was found to differ from that observed in previous years beginning from introduction of 200-mile zones. So, massive hake migration began as early as second ten-day period of June, and actually completed by the end of the month. By-catches of haddock, cod and redfish were insignificant throughout the season. The abundance of haddock by the third ten-day period of June, and that of cod in the second ten-day period of the same month south of the small mesh gear line might have increased.

Introduction

In 1983 the Soviet observers continued silver hake sampling from commercial catches taken in the NAFO Division 4VWX in the region open for the foreign fishing. Also the species composition of the catches was studied. The purpose of the present paper is to give the analysis of distribution of silver hake and some other groundfish species during the 1983 fishing season compared with the similar data for the previous years.

Materials and Methods

The sampling was made by two Soviet observers staying aboard commercial ships. Sampling methods were similar to those used in the previous years (Rikhter et al., 1980). A total of 39827 hake specimens was measured (199 samples) and 1104 pair of otoliths taken for age determinations. Mean catch per hauling hour was estimated for each rectangle with the 10 x 10 minutes square (Waldron, 1978, 1979). As previously, calculations of mean catches by species were made on the basis of catches including these species. Cardinal change of fishing conditions in June 1983 compared with the previous years accounted for a more detailed (by ten-day period) analysis of the species distribution during that time period.

Results

Silver hake

Distribution of hake catches in May and June (by ten-day period) is shown in figs.1-4. During the observation period this species was found in all catches. Unlike 1982 (Rikhter et al., 1983), in May 1983 the aggregations were distributed over a considerably greater area, although with a lower density (fig.1). In the first and second ten-day periods of June changes in distribution were insignificant compared with May (figs.2,3), although the number of hauls tended to be reduced. A sharp decline of hake catches took place in the third ten-day period (fig.4). In all likelihood, hake abundance drastically decreased in the fishing ground by the end of June, which can be attributed to massive migration of the fish northward of the small mesh gear line. In May and June hake catches per hauling hour amounted to 2771 and 2778 kg respectively. These values are considerably lower than in 1982, but exceed the 1981 level (table 1). In May 150 m to 280 m depths were mainly fished. The greatest fished depth was 320 m. In June most hauls were made within the depth range of 120-210 m with the greatest fished depth of

340 m. Compared with the two previous years the fishing was conducted at lesser depths in the same period of 1981, and in 1982 fishing depths were lesser in May, but somewhat greater in June (table 2).

Haddock

In May haddock, as a small by-catch, was caught in the area between 60° and 63°W (fig.5). In the first and second ten-day periods of June its proportion in the catches slightly increased remaining insignificant on the whole (figs.6,7). In the last ten-day period of June the abundance of haddock on the shelf slopes perhaps increased (fig.8), which coincided with massive migration of hake from the alloted fishing ground. Increased by-catch in that period might be explained by markedly grown scouting activities of the fleet. Haddock catches per hauling hour made up 17 and 40 kg in May and June respectively (table 1).

Cod

In May insignificant by-catches of this species were taken mainly in the eastern section of the fishing ground (60°00' - 61°40'W) (fig.9). However in the first and, especially, second ten-day periods cod abundance on the shelf slopes seemed to increase judging by the catches (fig.10,11). In the last ten-day period the records showed another sharp decrease of the cod by-catch (fig.12). The catches per hauling hour constituted 46 and 101 kg in May and June respectively (table 1). It should be noted that the abundance of cod observed in the second ten-day period of June 1983 in the alloted fishing area had had no analogues over the entire observation period since introduction of the 200-mile zone (Rikhter et al., 1980,1981,1982,1983).

Redfish

Redfish catches were very small in May. However, unlike the previous years, it was found everywhere (fig.13). In June the redfish by-catch was also insignificant with a certain in-

crease in the second ten-day period (figs.14,15,16). Mean catches per hauling hour were 34 kg in May and 49 kg in July (table 1).

Conclusion

The month of June in the 1983 fishing season appeared to be extremely peculiar in terms of the distribution pattern of the above-mentioned fish species in the region alloted for foreign fishery. Nothing of the kind had ever been observed either in 1977 through 1981 or in 1982. The differences might have been primarily caused by peculiarities of hydrometeorological conditions in 1983, and a detailed analysis of these conditions compared to previous years is most desirable. The distribution of some fish species in the fishing ground can be also accounted for to a certain degree by the hake abundance there. It is no mere chance that in April-June 1982 the by-catch of all fish species was the least in the period following introduction of the 200-mile zone. On the whole, the by-catch of haddock and redfish in May, June and apparently April, when the density of hake aggregations was the highest, turned out to be insignificant. At the same time the haddock abundance on the shelf slope in the second ten-day period of June seemed to be relatively large.

References

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2. Rikhter V.A., V.F.Turok and Yu.S.Grinkov, 1981. Distribution of some groundfish species and short-finned squid on the Scotian Shelf during the 1980 fishing season from the data of the Soviet observers. NAFO SCR Doc.81/VI/49.

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TABLE 1. Catches per hauling hour (kg) by species and month in 1981-1983 (in parentheses number of hauls is given).

Year	Month	Species			
		Silver hake	Haddock	Cod	Redfish
1981	May	2368 (33)	3 (10)	2 (4)	106 (3)
	June	1121 (69)	20 (46)	30 (31)	1 (2)
	July	1909 (68)	8 (37)	64 (67)	- -
1982	May	8654 (34)	22 (23)	-	-
	June	5471 (103)	-	-	96 (41)
	July	1724 (99)	10 (74)	14 (94)	- -
1983	May	2771 (160)	17 (81)	46 (65)	34 (118)
	June	2778 (105)	40 (90)	101 (87)	49 (53)

TABLE 2. Hauling depths by month in 1981-1983.

Year	Month	Major hauling depths, m	Greatest hauling depths, m	No. of hauls
	May	100-130	250	36
1981	June	100-170	250	98
	July	90-140	180	117
	May	130-200	350	72
1982	June	140-250	370	111
	July	100-165	220	99
	May	150-280	320	160
1983				
	June	120-210	340	105

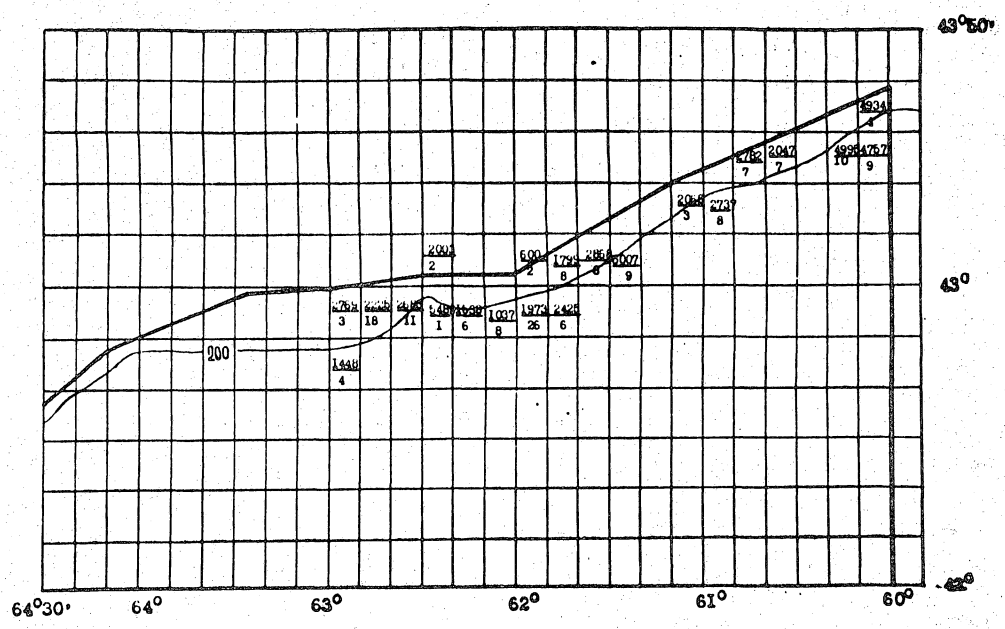

Fig.1 Silver hake catches per hauling hour (kg) in May 1983 (denominator shows number of hauls).

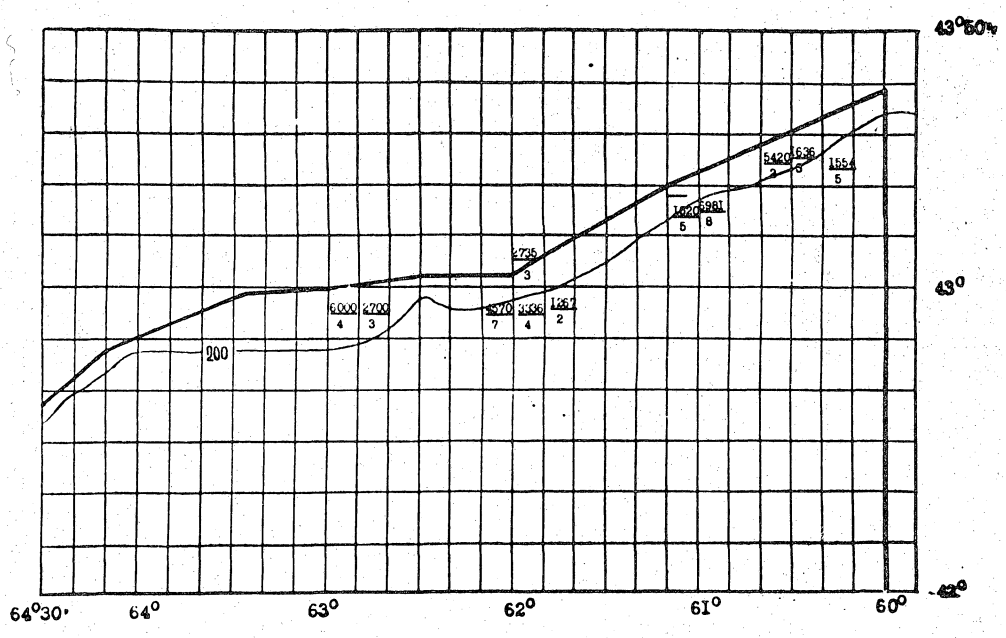

Fig.2 Silver hake catches per hauling hour (kg) in the first ten-day period of June 1983.

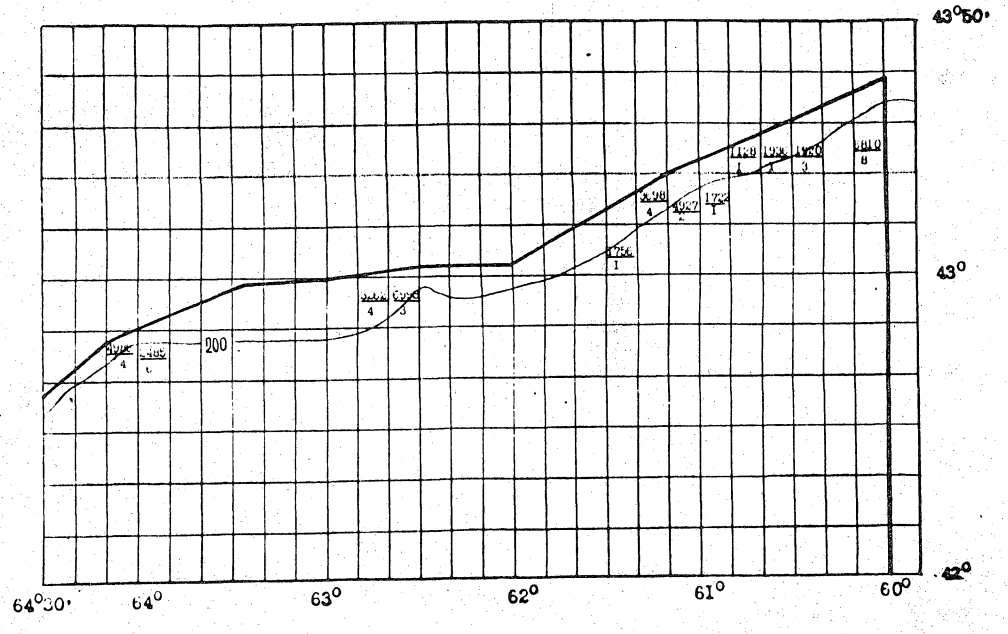

Fig.3 Silver hake catches per hauling hour (kg) in the second ten-day period of June 1983.

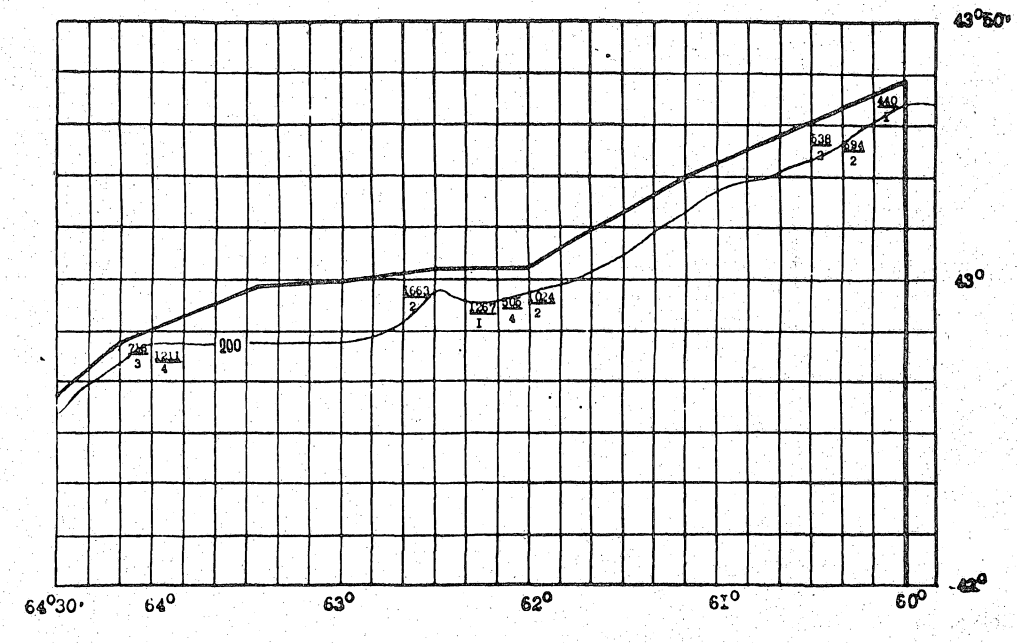

Fig.4 Silver hake catches per hauling hour (kg) in the third ten-day period of June 1983.

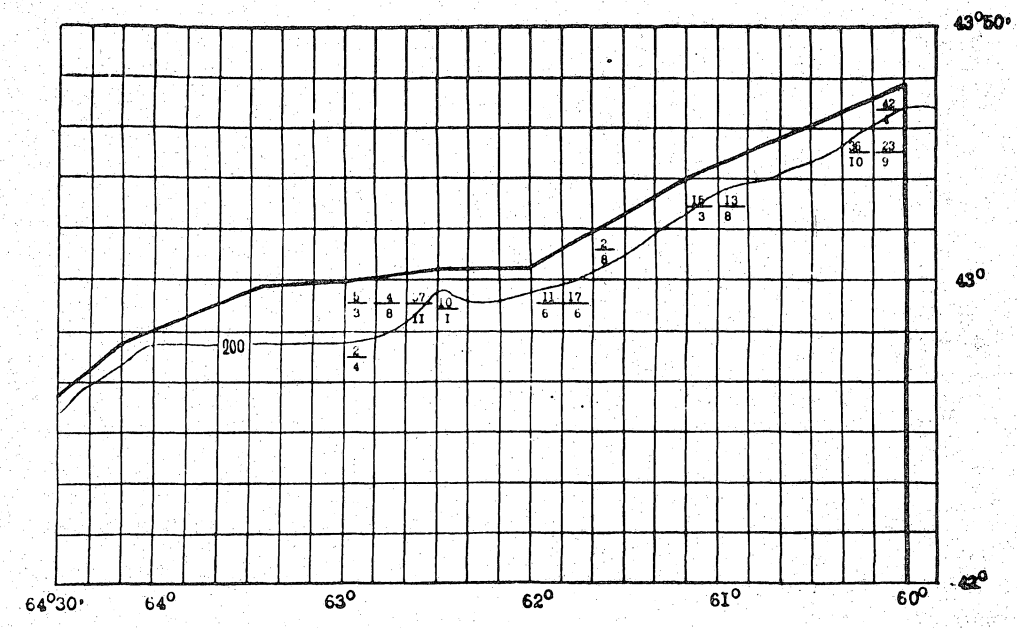

Fig.5 Haddock catches per hauling hour (kg) in May 1983.

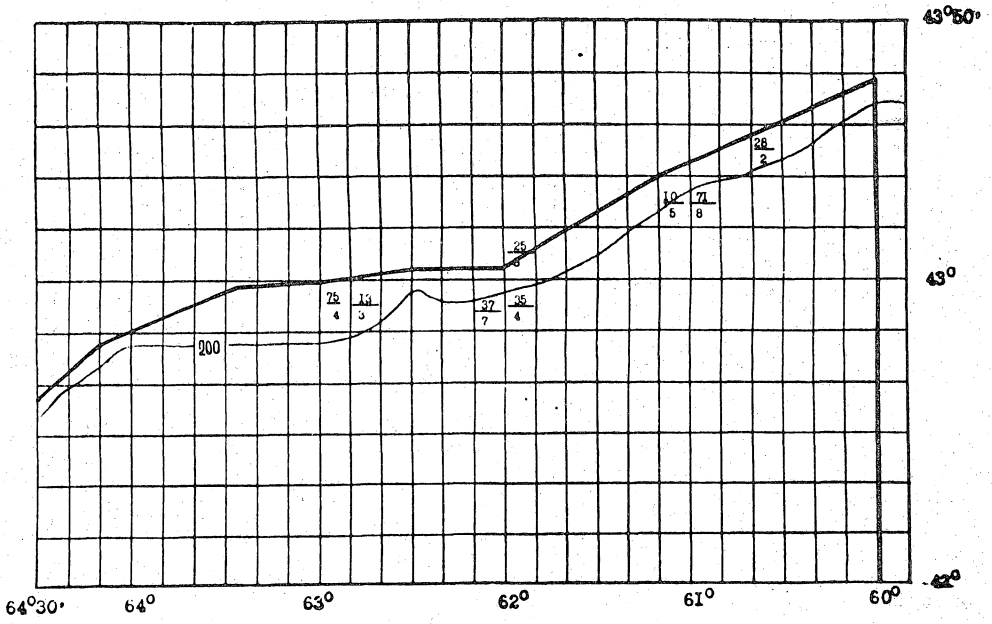

Fig.6 Haddock catches per hauling hour (kg) in the first ten-day period of June 1983.

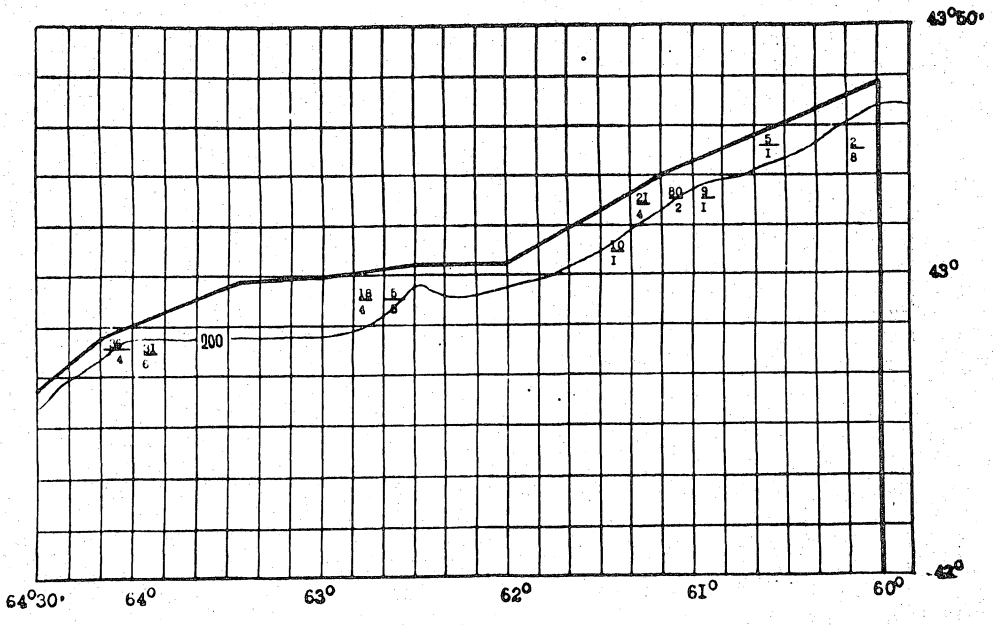

Fig.7 Haddock catches per hauling hour (kg) in the second ten-day period of June 1983.

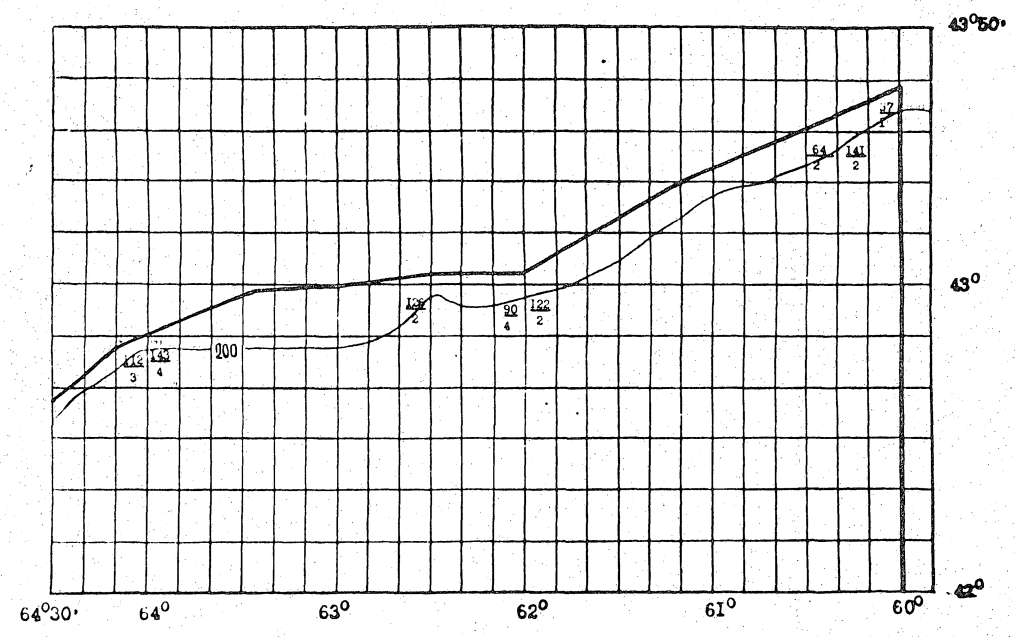

Fig.8 Haddock catches per hauling hour (kg) in the third ten-day period of June 1983.

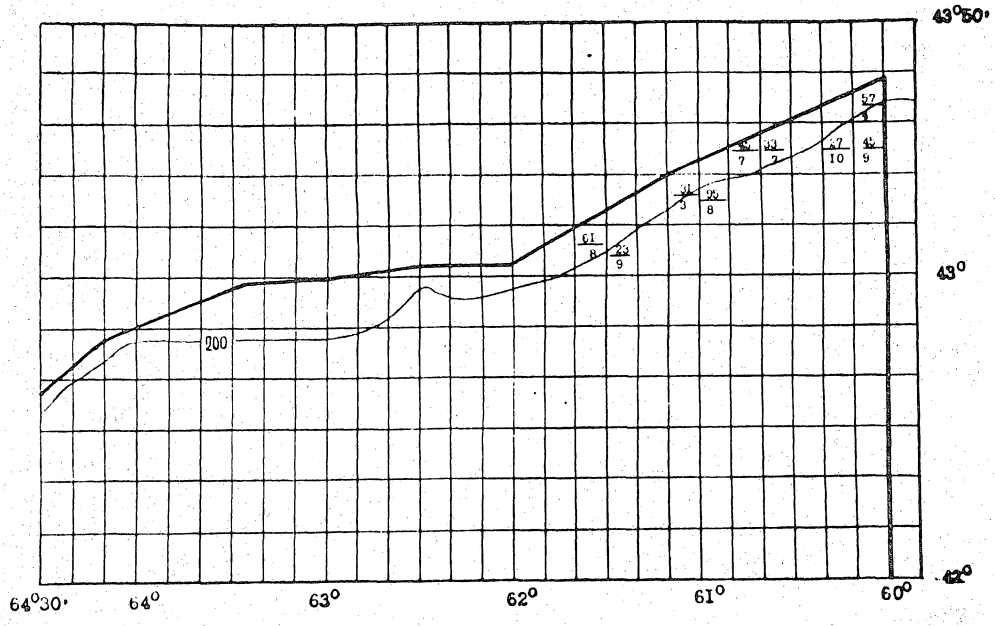

Fig.9 Cod catches per hauling hour (kg) in May 1983.

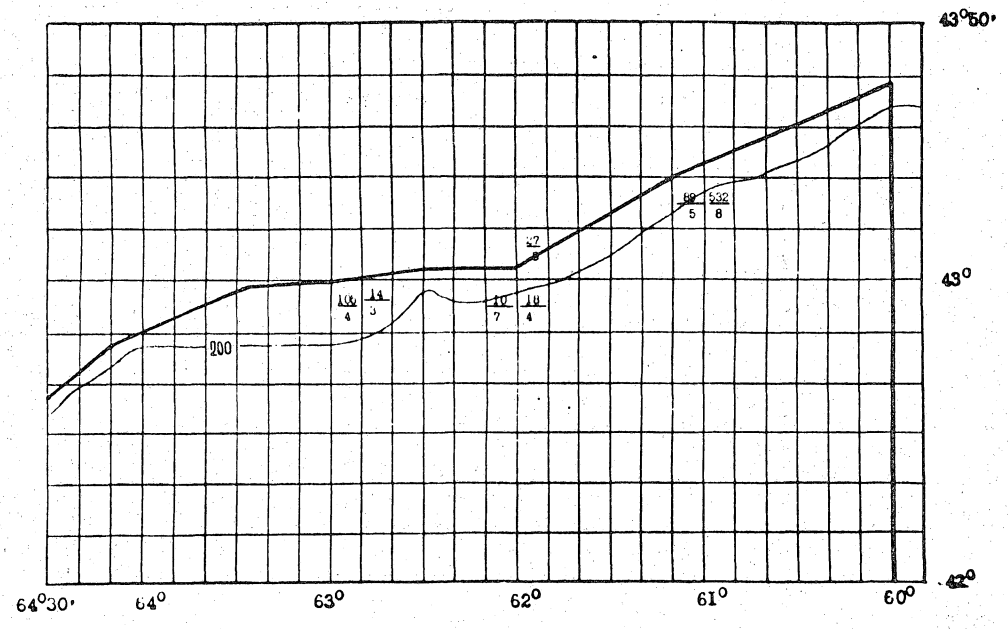

Fig.10 Cod catches per hauling hour (kg) in the first ten-day period of June 1983.

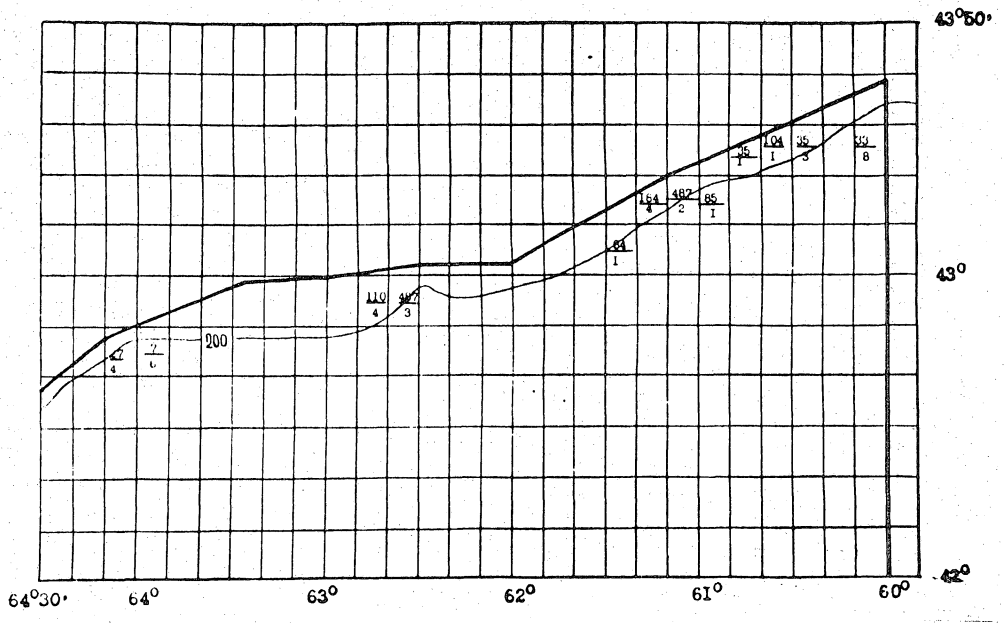

Fig.11 Cod catches per hauling hour (kg) in the second ten--day period of June 1983.

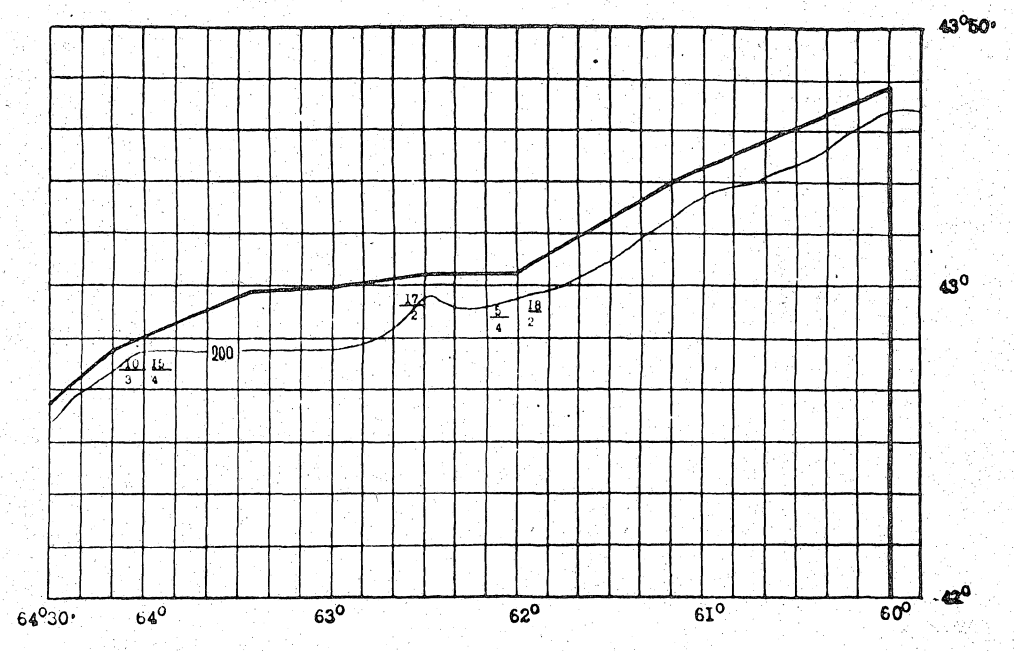

Fig.12 Cod catches per hauling hour (kg) in the third ten-day period of June 1983.

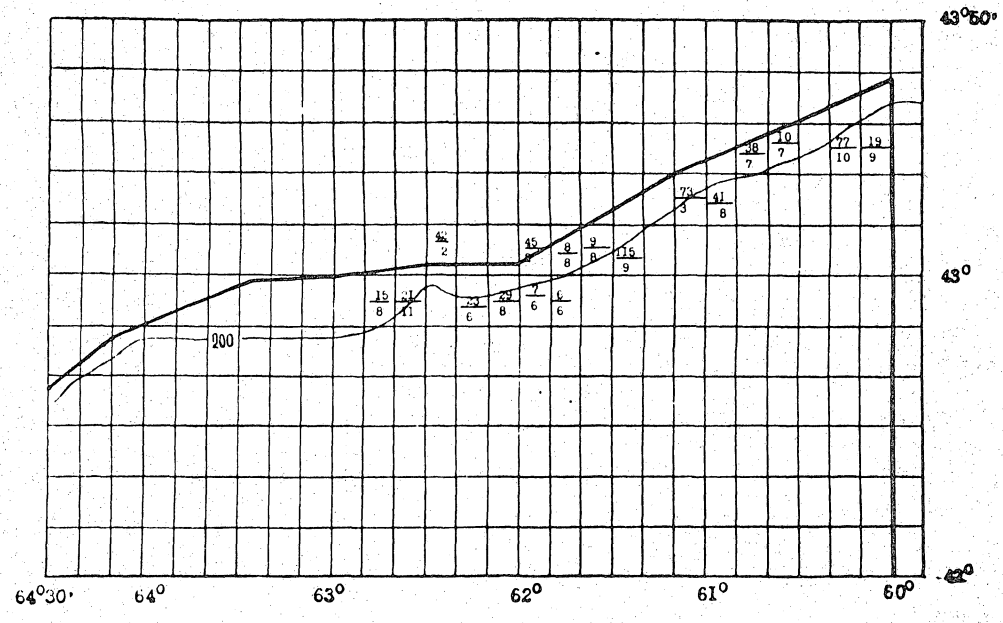

Fig.13 Redfish catches per hauling hour (kg) in May 1983.

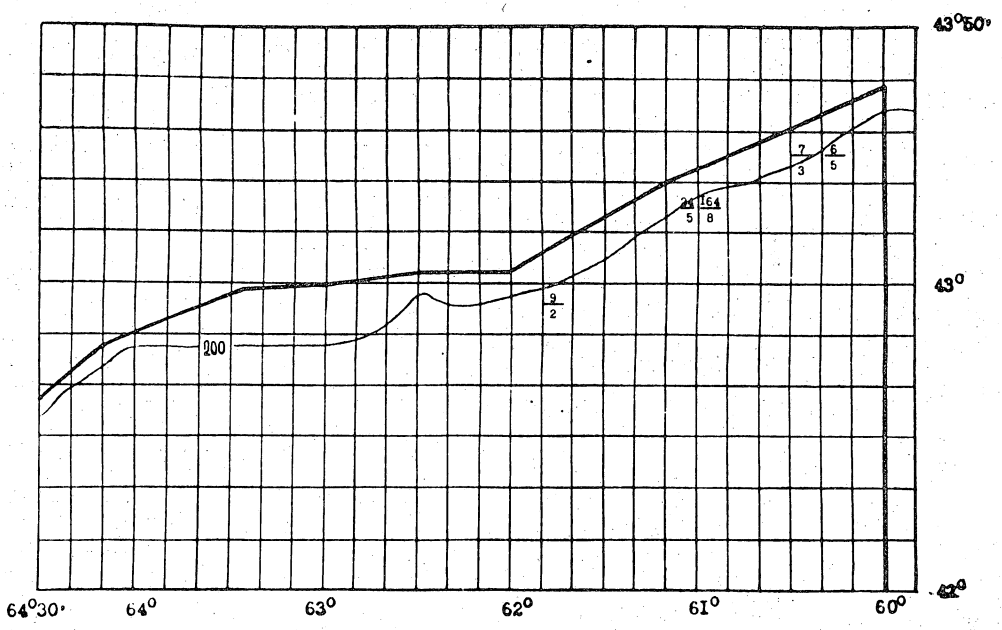

Fig.14 Redfish catches per hauling hour (kg) in the first ten-day period of June 1983.

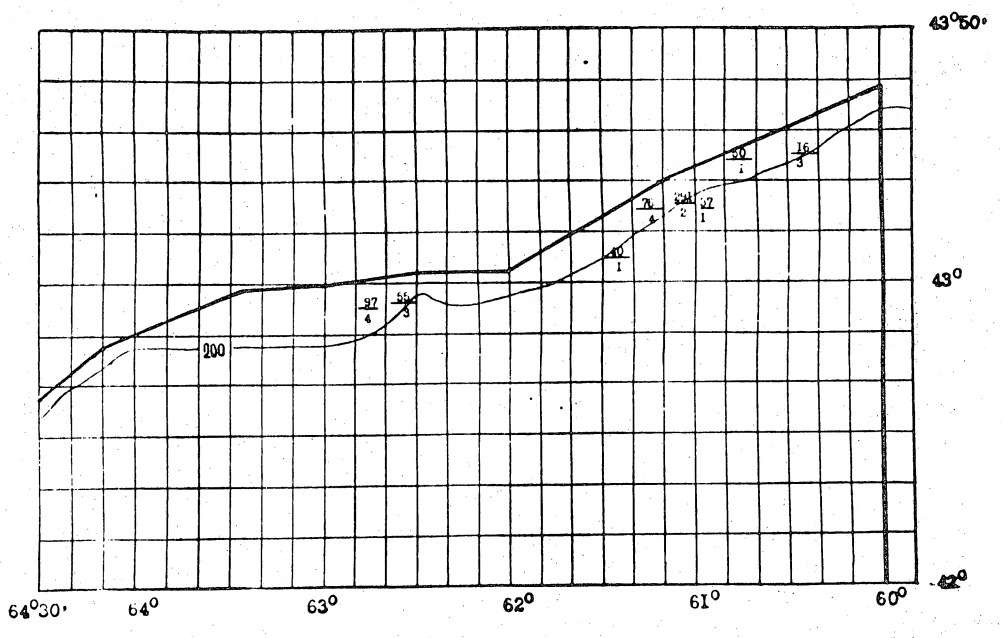

Fig.15 Redfish catches per hauling hour (kg) in the second ten-day period of June 1983.

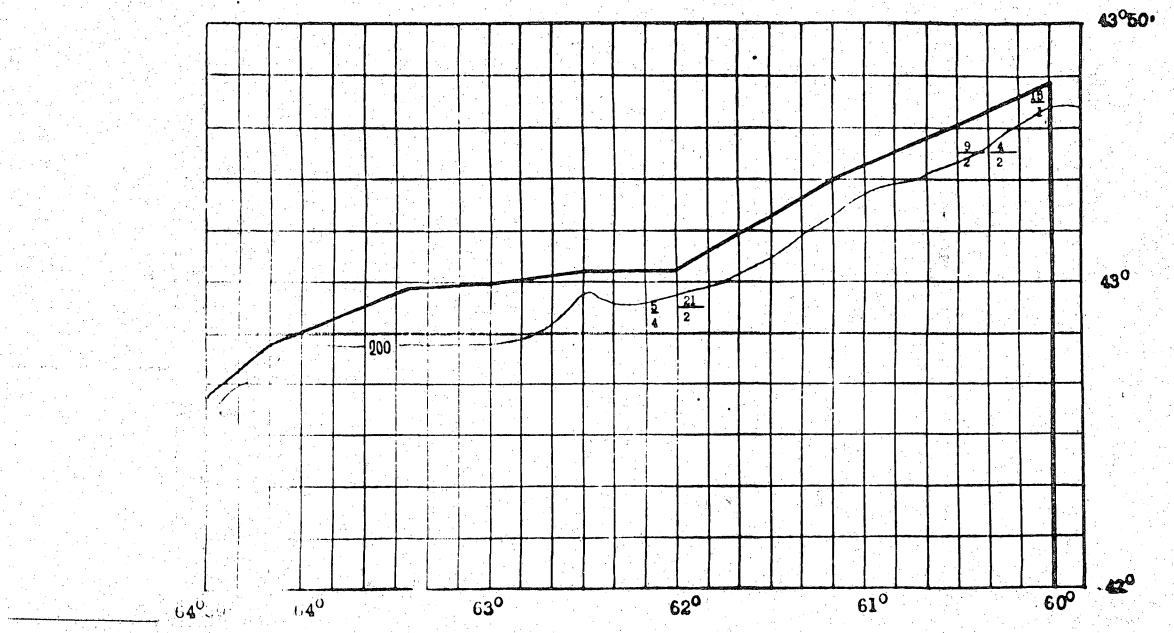

Fig.16 Redfish catches per hauling hour (kg) in the third period of June 1983.