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Analysis of the Spanish Catches of White Hake (*Urophycis tenuis*) in NAFO Regulatory Area, 2000-2003

by

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Abstract

The Spanish fleet that operates in NAFO Regulatory Area has captured white hake in a regular way during the last years. Before 2002, the level of catches of this species has not been very high (300 tons per year) and these catches were part of the by-catch of the different fisheries that Spanish fleet carries out in NAFO Area (Greenland halibut, skates, redfish). Catches have been increased substantially in the last two years, being captured in the year 2003 more than 1 800 tons.

The Spanish fishery directed to white hake began in the year 2002 and it is developed mainly in the Div. 3O among the depths 200-500 meters. The biggest catches are carried out during the third quarter, and more than 80% of the catches, in abundance and biomass, are mature.

Introduction

The Spanish fleet that operates in NAFO Regulatory Area has captured white hake in a regular way during the last years. Before 2002, the level of catches of this species has not been very high (300 tons per year) and these catches were part of the by-catch of the different fisheries that Spanish fleet carries out in NAFO Area (Greenland halibut, skates, redfish). Catches have been increased substantially in the last two years, being captured in the year 2003 more than 1 800 tons.

The objective of this study is to present the catch data of the Spanish fleet for the last years (2000-2003) to analyse the characteristics of this new fishery in NAFO Regulatory Area.

Material and Methods

All the information on catches for this study was obtained from NAFO Observers on board the commercial fleet in NAFO Regulatory Area. These observers report on hours fishing, hauls position, depth, catches and discards. The study of the species catch composition is focus in Div. 3NO and it have been selected the hauls where hake was captured.

All information analysed in this paper about length distributions are based in the data recollected by the Spanish observers.

Results and Discussion

1.- Catches and Species Composition

Table 1 shows the white hake Spanish catches by Division and quarter for the period 2000-2003. Before year 2002, total Spanish catches were about 300 tons and most of the catches were in Div. 3LM. From year 2002, catches were increased substantially, being reached the 1 800 tons in the year 2003. This increment was much more accused

in the Div. 3O where it was carried out more than 60% of the white hake catches in year 2003. In the years 2002-2003, most of the catches were taken during the third quarter.

Table 2 presents the ratio of white hake catches in the total catches by year and Division, it can observe that the ratio is low and is more or less constant between years in Div. 3LM, but in Div. 3O it passes from less than 1% in year 2000 to 45% in year 2003 and in Div. 3N the ratio was increased a little, this is the reason for which catches in Div. 3NO have been studied with more detail.

The hauls where white hake was catch in Div. 3NO were selected, to analyse the species composition of these hauls. Tables 3, 4, 5 and 6, shows the relative catch composition by Div. (3NO) and depth strata for the years 2000, 2001, 2002 and 2003, respectively.

In year 2000 (Table 3), in Div. 3N the percentage of the white hake catches is low (2%) in both depth strata, the white hake catches were by-catch of the skate fishery in less than 600 meters depth strata and by-catch of the Greenland halibut fishery in the strata more than 600 meters depth. In Div. 3O, the percentages were low too (1%) and the white hake catches seem to be by-catch of the redfish fishery in both strata. In year 2001 (Table 4), the situation was more or less the same than in year 2000.

In year 2002 (Table 5), in Div. 3N, the white hake catches were one of the main species (6%) of the by-catch of the skate in the strata of less than 600 meters depth and in the strata more than 600 meters depth, white hake (3%) was by-catch of the Greenland halibut and skate fishery. In Div. 3O, white hake was the species more abundant in the catches (44%), and skate (28%) was the main species in the by-catch of these hauls in the strata of less 600 meters depth. In the other strata, the percentage of white hake catches was low (4%) and seems to be by-catch of the Greenland halibut fishery.

In 2003 (Table 6), in the strata of less than 600 meters of Div. 3N, white hake was the species more abundant in the catches (49%) and skate (24%) was the main species in the by-catch. In the strata of more than 600 meters, white hake catches were a by catch of the Greenland halibut and skate fishery. In Div. 3O, white hake was the main species in the catches (56%-53%) and redfish was the main by-catch (22%-21%) in both strata.

2.- Fishery Length Distributions

Table 8 presents the samples catches length distributions as well as the mature ratio in abundance (SSA) and in biomass (SSB) by month and sex. Samples only cover Div. 3O in 2002. Table 7 shows the values of the length-weight relationship parameters used to transform the length distributions in weight and the length of first maturity by sex to calculate the SSA and SSB ratio. Figure 1 shows the length distributions in percentage for Div. 3O in the year 2002 and Fig. 2 presents the maturity ratio of this length distributions in biomass and abundance by sex and total. More than 95% in abundance and biomass of the males are mature and for females 70% of the abundance and 80% of the biomass are mature. In the total length distributions more than 80% in abundance and biomass are mature.

3.- Fishery grounds

Figure 3 plot the positions in Div. 3NO of the hauls with white hake catches for 2000-2003 and Fig. 4 shows the hauls in the same Divisions with percentage of white hake catches more than 30% of the total catches. In Figure 3, It can be observed that most of the hauls with catches of white hake in all years were carried out in the skate and Greenland halibut fishery grounds, but if it is observed only the hauls with more than 30% (Fig. 4), the great majority of the hauls were in Div. 3O between 200 and 500 meters deep in the years 2002 and 2003, in 2001 there was very few hauls and in the year 2000 none.

4.- Conclusion

The Spanish fishery directed to white hake began in the year 2002 and it is developed mainly in the Div. 3O among the depths 200-500 meters. The biggest catches are carried out during the third quarter, and more than 80% of the catches, in abundance and biomass, are mature.

References

DFO, 2002. White hake in Division 3L, 3N, 3O and Subdivision 3Ps. DFO Science Stock Status Report A2-06 (2002).

Table 1.- White hake Spanish catches by Division and quarter for the period 2000-2003

HKW (ton)		Year 2000			
Division	1° Q	2° Q	3°Q	4° Q	Total (ton)
3L	30	7	18	26	80
3M	88	79	6	9	182
3N	11	4	17	5	37
3O	0	1	1	4	7
Total (ton)	129	90	42	45	306

HKW (ton)		Year 2001			
Division	1° Q	2° Q	3°Q	4° Q	Total (ton)
3L	42	39	20	58	158
3M	44	41	7	32	123
3N	8	15	6	8	37
3O	7	6	2	12	27
Total (ton)	101	101	34	109	345

HKW (ton)		Year 2002			
Division	1° Q	2° Q	3°Q	4° Q	Total (ton)
3L	23	22	33	34	112
3M	66	54	9	14	143
3N	12	11	32	49	103
3O	33	52	265	100	450
Total (ton)	134	139	338	197	808

HKW (ton)		Year 2003			
Division	1° Q	2° Q	3°Q	4° Q	Total (ton)
3L	36	46	43	28	154
3M	66	105	16	31	218
3N	8	37	255	31	332
3O	152	309	608	67	1136
Total (ton)	262	498	922	158	1840

Table 2.- Percentage of white hake in the total catches by Divisions

Division	Year			
	2000	2001	2002	2003
3L	0,01	0,01	0,01	0,01
3M	0,02	0,01	0,02	0,03
3N	0,00	0	0,01	0,03
3O	0,00	0,02	0,34	0,45

Table 3.- Relative catch composition by depth strata for Div. 3NO in year 2000.

Year 2000							
Division 3N				Division 3O			
Species	<600 m.	>600 m.	Total 3N	Species	<600 m.	>600 m.	Total 3O
SKA	0,40	0,26	0,31	RED	0,84	0,61	0,81
GHL	0,05	0,40	0,29	PLA	0,06	0,05	0,06
PLA	0,36	0,05	0,15	YEL	0,03	0,00	0,03
RNG	0,02	0,08	0,06	SKA	0,02	0,03	0,02
RHG	0,00	0,05	0,04	GHL	0,00	0,18	0,02
WIT	0,02	0,04	0,03	WIT	0,01	0,03	0,02
YEL	0,05	0,01	0,02	COD	0,01	0,01	0,01
HKW	0,02	0,02	0,02	HKW	0,01	0,01	0,01
Others	0,08	0,09	0,09	Others	0,01	0,08	0,02

Table 4.- Relative catch composition by depth strata for Div. 3NO in year 2001.

Year 2001							
Division 3N				Division 3O			
Species	<600 m.	>600 m.	Total 3N	Species	<600 m.	>600 m.	Total 3O
GHL	0.01	0.46	0.32	RED	0.72	0.23	0.58
SKA	0.54	0.20	0.30	PLA	0.06	0.31	0.14
PLA	0.22	0.06	0.11	SKA	0.09	0.06	0.08
YEL	0.19	0.01	0.06	GHL	0.01	0.23	0.07
RHG	0.00	0.07	0.05	WIT	0.04	0.05	0.04
RNG	0.00	0.05	0.03	HKW	0.04	0.05	0.04
WIT	0.00	0.04	0.03	COD	0.01	0.00	0.01
RED	0.02	0.03	0.03	RHG	0.00	0.02	0.01
Others	0.01	0.08	0.06	Others	0.02	0.05	0.03

Table 5.- Relative catch composition by depth strata for Div. 3NO in year 2002.

Year 2002							
Division 3N				Division 3O			
Species	<600 m.	>600 m.	Total 3N	Species	<600 m.	>600 m.	Total 3O
SKA	0.79	0.20	0.49	HKW	0.44	0.04	0.33
GHL	0.02	0.44	0.23	SKA	0.28	0.06	0.22
PLA	0.07	0.03	0.05	GHL	0.00	0.48	0.13
HKW	0.06	0.03	0.04	PLA	0.09	0.03	0.07
RNG	0.00	0.08	0.04	RED	0.09	0.02	0.07
WIT	0.02	0.04	0.03	WIT	0.04	0.03	0.04
RHG	0.00	0.06	0.03	DGX	0.00	0.10	0.03
RED	0.00	0.04	0.02	OTH	0.03	0.02	0.02
Others	0.03	0.09	0.06	Others	0.04	0.22	0.09

Table 6.- Relative catch composition by depth strata for Div. 3NO in year 2003.

Year 2003							
Species	Division 3N			Species	Division 3O		
	<600 m.	>600 m.	Total 3N		<600 m.	>600 m.	Total 3O
GHL	0.03	0.27	0.22	HKW	0.56	0.53	0.56
SKA	0.24	0.21	0.21	RED	0.22	0.21	0.22
HKW	0.49	0.08	0.18	SKA	0.06	0.05	0.06
RNG	0.02	0.19	0.15	PLA	0.04	0.04	0.04
RED	0.03	0.04	0.04	ANG	0.03	0.02	0.03
DGX	0.01	0.05	0.04	WIT	0.02	0.04	0.03
RHG	0.01	0.05	0.04	HAD	0.01	0.01	0.01
PLA	0.05	0.03	0.03	POK	0.01	0.00	0.01
Others	0.11	0.08	0.09	Others	0.03	0.10	0.04

Table 7.- Parameters of length-weight relationship and length of first maturation of white hake

a	0.004	Length (cm)
b	3.172	
		Mature Males >39
		Mature Females >46

Table 8.- Length distributions and mature ratio by month and sex for Div. 3O in 2002.

Division 3O Length (cm)	July			September			Total		
	Males	Females	Total	Males	Females	Total	Males	Females	Total
31	389	0	389	0	0	0	393	0	393
32	0	0	0	0	0	0	0	0	0
33	294	0	294	0	0	0	297	0	297
34	0	0	0	0	0	0	0	0	0
35	164	0	164	0	0	0	165	0	165
36	389	0	389	0	0	0	393	0	393
37	553	396	949	0	0	0	558	400	958
38	1011	553	1564	0	0	0	1021	558	1579
39	1796	854	2650	0	0	0	1814	863	2677
40	2356	1639	3995	431	0	431	2815	1656	4471
41	4323	2097	6420	323	0	323	4693	2119	6812
42	6518	3046	9564	108	405	513	6693	3486	10179
43	9825	4584	14409	943	270	1213	10878	4904	15782
44	9927	5827	15754	728	675	1403	10764	6568	17332
45	12316	6899	19215	1132	646	1778	13586	7622	21208
46	12370	8538	20908	1108	1242	2350	13616	9880	23496
47	9981	9876	19857	1379	1779	3158	11476	11773	23249
48	7357	8866	16223	594	943	1537	8032	9909	17941
49	5035	8244	13279	649	809	1458	5741	9145	14886
50	3333	7753	11086	1565	890	2455	4949	8732	13681
51	1996	6052	8048	405	811	1216	2425	6933	9358
52	1537	5369	6906	270	809	1079	1826	6241	8067
53	683	4910	5593	189	1781	1970	881	6760	7641
54	164	3729	3893	215	1482	1697	383	5264	5647
55	854	2486	3340	108	864	972	972	3385	4357
56	1475	2322	3797	81	189	270	1573	2537	4110
57	690	1934	2624	108	620	728	806	2580	3386
58	294	1475	1769	297	270	567	597	1764	2361
59	0	1181	1181	108	297	405	109	1493	1602
60	164	854	1018	189	297	486	357	1163	1520
61	683	396	1079	0	81	81	690	482	1172
62	396	0	396	0	215	215	400	218	618
63	0	396	396	297	378	675	300	782	1082
64	690	0	690	108	189	297	806	191	997
65	0	294	294	108	0	108	109	297	406
66	294	0	294	0	0	0	297	0	297
67	0	854	854	0	215	215	0	1081	1081
68	0	0	0	0	512	512	0	517	517
69	0	294	294	0	215	215	0	515	515
70	0	0	0	108	215	323	109	218	327
71	0	0	0	0	323	323	0	326	326
72	0	294	294	108	108	216	109	406	515
73	0	0	0	0	108	108	0	109	109
74	0	0	0	0	81	81	0	82	82
75	0	0	0	0	0	0	0	0	0
76	0	0	0	0	0	0	0	0	0
77	0	0	0	0	0	0	0	0	0
78	0	0	0	0	0	0	0	0	0
79	0	0	0	0	0	0	0	0	0
80	0	0	0	0	0	0	0	0	0
81	0	0	0	0	0	0	0	0	0
82	0	0	0	0	0	0	0	0	0
83	0	0	0	0	215	215	0	218	218
TOTAL	97857	102012	199869	11659	17934	29593	110634	121177	231810
Ind. Sampled	327	324	651	118	179	297	445	503	948
N° Samples			4			2			6
Raised catches			167712			31903			201654
Ratio SSA	0,95	0,66	0,80	1,00	0,82	0,89	0,96	0,69	0,82
Ratio SSB	0,98	0,77	0,86	1,00	0,90	0,94	0,98	0,80	0,87

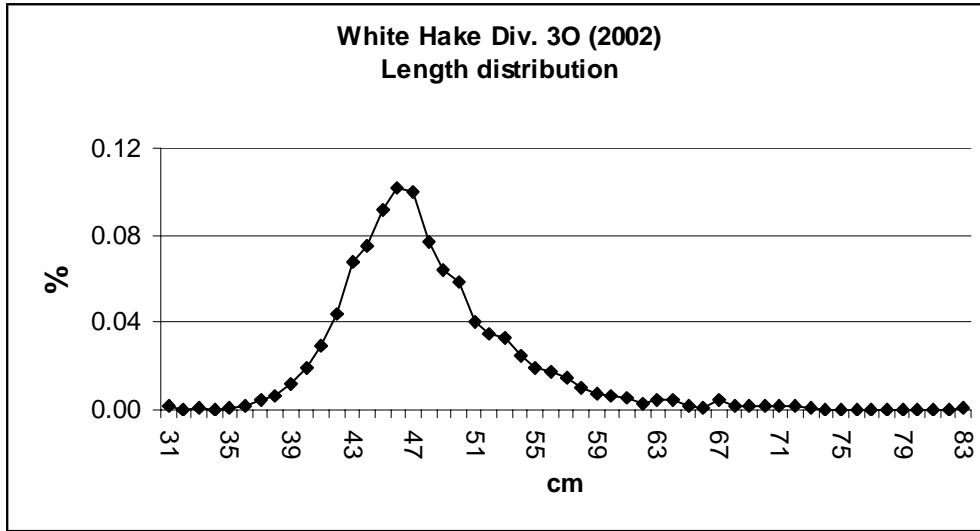


Fig. 1. White hake length distribution ratio for Div. 30 in year 2002.

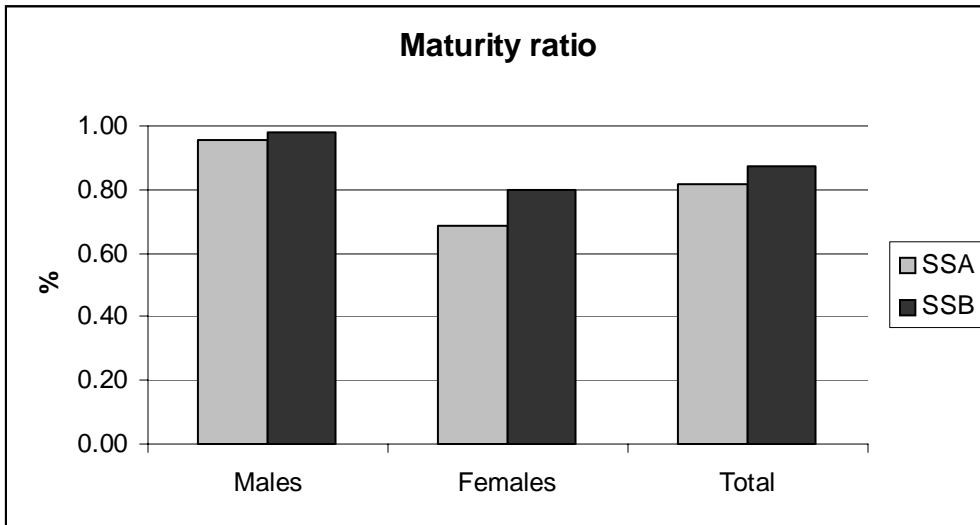


Fig. 2. Maturity ratio of the length distributions in abundance (SSA) and biomass (SSB) by sex and total.

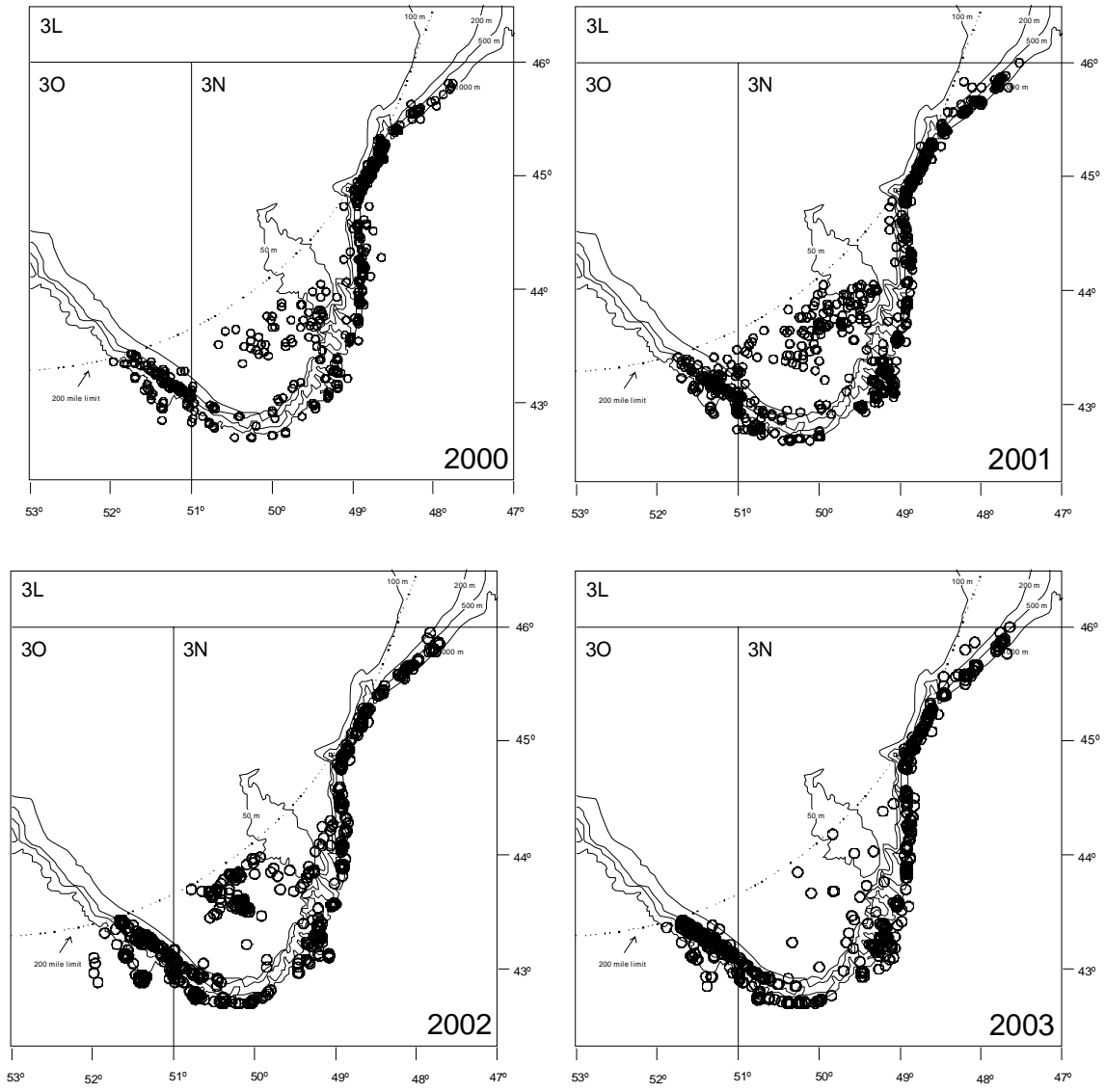


Fig. 3. Position of the hauls where were white hake catches in Div. 3NO (2000-2003)

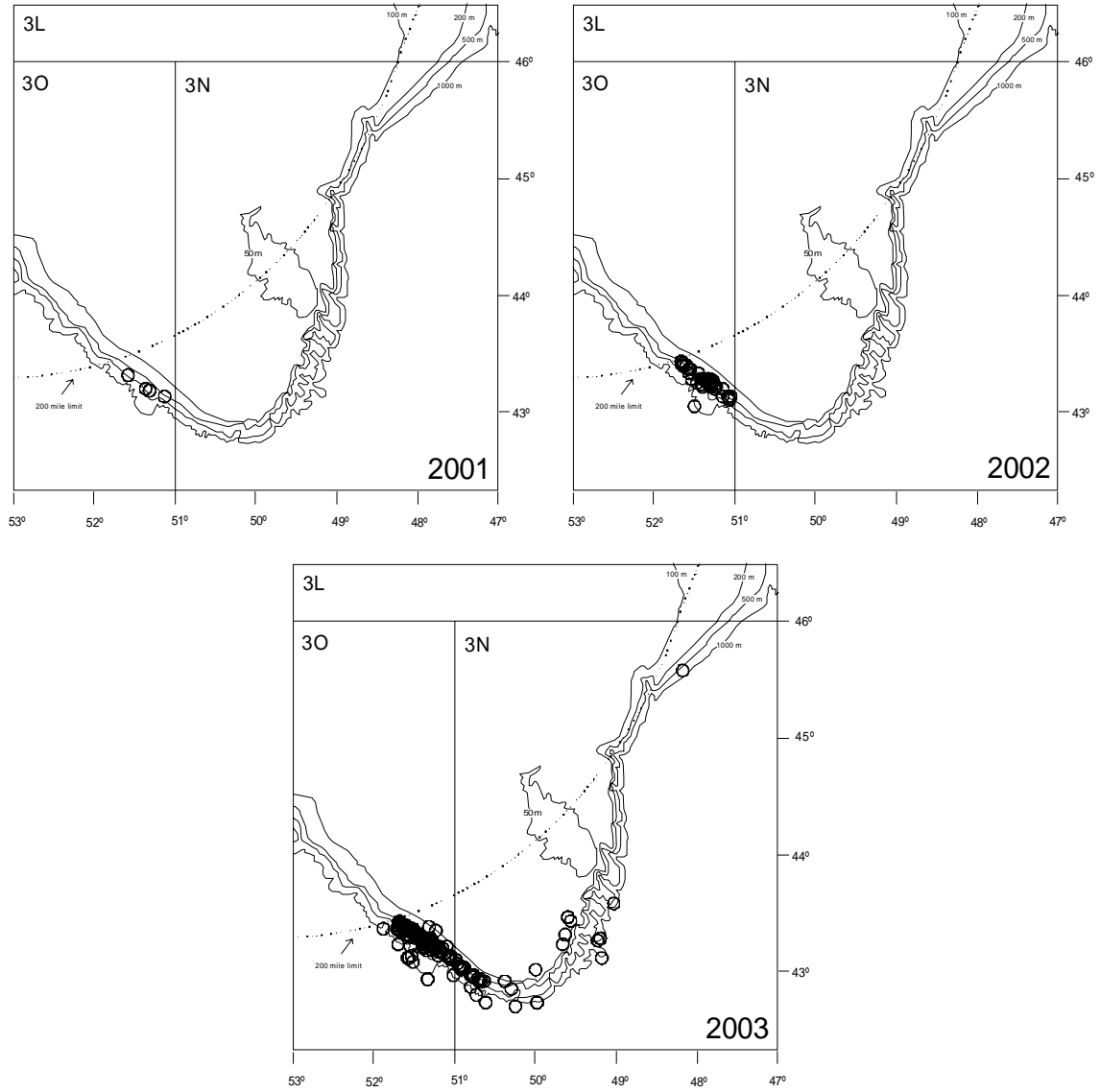


Fig. 4. Position of the hauls where white hake catches were more than 30% of the total catches in Div. 3NO (2000-2003)