



## SCIENTIFIC COUNCIL MEETING – NOVEMBER 2003

The Russian Shrimp Fishery (*Pandalus borealis*) on the Flemish Cap, NAFO Division 3M, in 1993-2003

by

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### Abstract

The paper gives a brief preliminary review of Russian fishery for shrimp on the Flemish Cap during January-December 2002 and April 2003. Maximum catches per unit effort were taken in February 2002. Redfish were the most frequent in by-catch, as well as common wolfish. Besides, spotted wolfish, roughhead grenadier and Greenland halibut were taken as by-catch.

### Introduction

The shrimp fishery in the Flemish Cap area was commenced in 1993 by Canadian, Faroese and Icelandic vessels. In July 1993, two Russian vessels joined the above international fishery. Annual catch of shrimp by Russian vessels rose from 1993 to 1996 having reached 4 500 metric tons in 1996. In 1997 and 1999, the Russian catch retained at the level of 1 000 tons. The maximum catch taken by Russian vessels was registered in 2000 and made up 7 078 tons. Since 2000 the catch had decreased and in 2003 there was almost no fishing for shrimp. The number of vessels varied from 1 to 20. Most of the vessels were 54.8 m and longer with single trawl and a main engine power being above 1 000 h.p. In 1993-2003, the number of fishing days spent by Russian vessels ranged from 0 to 2541.

Monthly reporting of Russian vessels to their respective authorities showed the total catch in the Flemish Cap area in 2002 to be 1 148 tons. The total catch on the Flemish Cap until October 2003 amounted to 3.3 tons.

### Materials and Methods

Based on monthly reporting to Russian authorities total catches, number of vessels and number of fishing days in the shrimp fishery in NAFO Div. 3M were compiled from 1993 to October 2003.

Catch and effort data from individual fishing vessels as reported *via* the "Informrybflot" system using radio communication were analyzed to show the monthly distribution of catches and fishing effort.

When twin trawls were used the effort was always multiplied by 1.9 but the catch was kept the same.

### Results

Nominal catch and number of vessels participated in the shrimp fishery is given in Table 1. Compared to the same period of 2001, the catch taken in 2002 decreased and constituted 1 148 tons. The catch in 2003 so far is 3.3 tons (Table 1).

Distribution of efforts by months and years is presented in Fig. 1-2. In 1993, Russian vessels fished along the northeastern slope. In 1995-1996, most of the efforts were made on the northwestern and southwestern slopes. Since

1997 the shrimp fishery has been conducted along both western and eastern slopes mainly in a depth range of 250 to 350 m. In the year 2002, the pattern of tow stations was similar to that in 1999-2001. Fishing for shrimp in January 2002 started by two vessels on the western and northwestern slopes of the bank. The fishing depths ranged between 300 m and 340 m. Catch rates were 180-190 kg of shrimp per 1-hour tow for vessels rigged with a single trawl and 350-360 kg when using a twin trawl. In February-March the main fishery was shifted to the grounds on the northern and northeastern slopes. Shrimp concentrations were harvested deeper than 350 m. Catch rates reached 500-510 kg per 1-hour tow for vessels with a twin trawl.

In April-May, Russian vessels did not participate in the shrimp fishery on the Flemish Cap. In June, the fishery was recommenced by one vessel fished for concentrations along the western and northeastern slopes of the bank. From July to October the fishery was carried out on the western and eastern slopes in a depth range of 290 m to 340 m. Catch rates varied within 251-361kg per 1-hour tow with the maximum reached in September on the eastern slope. In November-December Russian shrimp fishery was practically stopped; the catch for the two months constituted 1.9 tons.

Catches by depths for the period 1993-2003 are shown in Table 3. In 1993 and 1995 shrimp were harvested mostly in 300-400 m depth. In 1996-2000 the main catches were taken in depths less than 300 m. Since 2001 the main fishing grounds were in a depth range of 300-400 m. In spring 1996 and 1999-2002 the Russian shrimp fishery was conducted in lesser depths compared to the other seasons. From April to March more than 60% of the shrimp were caught in the depths shallower than 300 m while in winter the shrimp were harvested in greater depths.

Mean CPUE for the Russian fleet in 1996 was the least and made up 122 kg per an hour tow. Maximum mean catch per unit effort of 290 kg/h was recorded in 2001. In 2002, mean catch per unit effort decreased down to 213.7 kg per an hour tow for vessels with a single trawl. As for vessels equipped with a twin trawl, CPUE also dropped compared to that in 2001. The maximum catch rates by Russian vessels on the Flemish Cap were attained in February-March 2002.

By-catch of the other species in the shrimp fishery accounted for 1-4.5 % in the year 2002. During the Russian shrimp fishery on the Flemish Cap young redfish were the most frequent in by-catch. Maximum catch of this species was registered on the bank western slope (2.47 percent by weight) in June and August 2002. The redfish length varied from 8 to 23 cm. They occurred in catches taken during operations in the areas of 280-400 m depths, however, in large quantities the redfish were observed in a depth range of 280-320 m. By-catch of the redfish decreased with an increase in the tow depth. Besides the redfish, common wolfish, roughhead grenadier and Greenland halibut occurred in by-catch frequently.

Table 1. Nominal catch (tons) and number of fishing days of Russian vessels at Flemish Cap.

	January – July				August – December			
	Month	No. of Vessels	Fishing Days	Catch, t	Month	No. of Vessels	Fishing Days	Catch, t
1993	Jan Feb Mar Apr May Jun Jul	2	22	54.000	Aug Sep Oct Nov Dec Total	2	22	54.000
1994	Jan Feb Mar Apr May Jun Jul				Aug Sep Oct Nov Dec Total	4 4 4 4 4	90 41 36 167	189.000 86.000 75.000 350.000
1995	Jan Feb Mar Apr May Jun Jul	2 2 2 2 3	104 212 273 274	137.000 645.000 792.000 608.000	Aug Sep Oct Nov Dec Total	3 3 2 1 1 4	277 266 87 23 17 1533	427.000 394.000 193.000 80.000 51.000 3327.000
1996	Jan Feb Mar Apr May Jun Jul	2 6 12 15 14 18 16	26 63 257 383 409 475 409	17.598 78.020 381.916 651.059 800.655 972.500 739.500	Aug Sep Oct Nov Dec Total	13 4 2 2 2 20	338 94 56 26 2541	526.704 184.500 71.069 21.408 4444.829
1997	Jan Feb Mar Apr May Jun Jul	1 1 2 3 3 3	12 29 25 74 85 80	16.078 37.994 47591 126.817 195.038 250.285	Aug Sep Oct Nov Dec Total	3 3 1 1 3 3	68 79 14 22 448	179.912 196.936 15.228 24.000 1089.879
1999	Jan Feb Mar Apr May Jun Jul	1 2 2 2 2 2	6 57 56 36 62	3.596 122.145 131.609 131.048 184.118	Aug Sep Oct Nov Dec Total	2 2 3 3 1 5	26 10 92 70 26 441	94.944 8.773 193.560 209.149 63.024 1141.962
2000	Jan Feb Mar Apr May Jun Jul	2 2 3 5 6 5 5	42 11 92 148 116 148 141	87.763 59.346 652.399 810.717 846.690 1174.386 1010.122	Aug Sep Oct Nov Dec Total	6 8 8 6 5 12	116 179 211 130 68 1411	392.916 612.195 671.986 460.251 299.466 7078.237
2001	Jan Feb Mar Apr May Jun Jul	3 7 10 7 5 4 2	59 107 185 144 99 56 51	374.543 563.294 871.843 864.993 695.469 410.888 343.945	Aug Sep Oct Nov Dec Total	2 2 2 3 3 9	33 53 51 63 46 947	129.876 276.181 348.934 376.907 429.911 5686.784
2002	Jan Feb Mar Apr May Jun Jul	2 2 1 1 1 1	26 22 29 21 23	178.158 200.605 194.748 141.413 113.647	Aug Sep Oct Nov Dec Total	1 1 2 1 1 4	16 25 11 1 196	82.887 174.631 59.485 1.944 1147.518
2003	Jan Feb Mar Apr May Jun Jul	1	2	3.3	Aug Sep Oct Nov Dec Total	1	2	3.3

Table 2. Catch (tons), effort (hours) and catch per effort (kg/hr) from the Russian Shrimp Fishery on Flemish Cap in Div. 3M.

2002									
Month	Single trawl			Twin trawl			Total*		
	Catch, t	Hours	CPUE	Catch, t	Hours	CPUE	Catch, t	Hours	CPUE
January	10.0	53.7	186.1	168.2	466.2	360.8	178.2	939.5	189.7
February	18.1	45.1	400.0	182.6	361.5	505.2	200.7	732.0	274.2
March				194.7	492.4	395.4	194.7	935.6	208.1
April									
May									
June				141.4	436.7	323.8	141.4	829.7	170.4
July				120.6	451.8	266.9	120.6	858.4	140.5
August				82.9	314.6	263.5	82.9	597.7	138.7
September				174.6	483.8	360.9	174.6	919.2	189.9
October	5.2	57.0	91.2	47.3	141.2	335.0	52.5	325.3	161.4
November									
December				1.9	6.3	301.5	1.9	12.0	158.7
<b>Total 2002</b>	<b>33.3</b>	<b>155.8</b>	<b>213.7</b>	<b>1134.2</b>	<b>3150.5</b>	<b>353.7</b>	<b>1147.5</b>	<b>6149.4</b>	<b>186.6</b>
2003									
Month	Single trawl			Twin trawl			Total*		
	Catch, t	Hours	CPUE	Catch, t	Hours	CPUE	Catch, t	Hours	CPUE
January									
February									
March									
April	3.3	12	275.0				3.3	12	<b>275.0</b>
May									
June									
July									
August									
September									
October									
November									
December									
<b>Total 2002</b>	<b>3.3</b>	<b>12</b>	<b>275.0</b>				<b>3.3</b>	<b>12</b>	<b>275.0</b>

\* - the effort of twin trawls is multiplied by 1.9

Table 3. Catch of shrimps (kgs) from logbooks by depth strata on the Flemish Cap 1993-2003.

1993 month	Depth, m 200-300		Depth, m 301-400		Depth, m >401		Total	Total
	Catch, kg	%	Catch, kg	%	Catch, kg	%	Catch, kg	%
1								
2								
3								
4								
5								
6								
7	0	0	90450	90,8	9200	9,2	99650	100
8								
9								
10								
11								
12								
Total	0	0,0	90450	90,8	9200	9,2	99650	100

1995 month	Depth, m 200-300		Depth, m 301-400		Depth, m >401		Total	Total
	Catch, kg	%	Catch, kg	%	Catch, kg	%	Catch, kg	%
1								
2								
3								
4								
5								
6	32000	39,6	44700	55,3	4100	5,1	80800	100
7	6400	6,1	70500	67,5	27600	26,4	104500	100
8	8000	16,4	33300	68,2	7500	15,4	48800	100
9	30700	64,5	16400	34,5	500	1,1	47600	100
10	5800	86,6	900	13,4		0,0	6700	100
11								
12								
Total	82900	28,7	165800	57,5	39700	13,8	288400	100

1996 month	Depth, m 200-300		Depth, m 301-400		Depth, m >401		Total	Total
	Catch, kg	%	Catch, kg	%	Catch, kg	%	Catch, kg	%
1								
2	13200	76,7	4000	23,3		0,0	17200	100
3	335000	42,2	459000	57,8		0,0	794000	100
4	315100	96,2	12600	3,8		0,0	327700	100
5	289700	84,1	53600	15,6	1300	0,4	344600	100
6	289200	77,5	61600	16,5	22200	6,0	373000	100
7	110300	64,7	55900	32,8	4400	2,6	170600	100
8	67900	93,3	4900	6,7		0,0	72800	100
9	77100	100,0		0,0		0,0	77100	100
10	61400	100,0		0,0		0,0	61400	100
11	24300	100,0		0,0		0,0	24300	100
12								
Total	1583200	70,0	651600	28,8	27900	1,2	2262700	100

1997 month	Depth, m 200-300		Depth, m 301-400		Depth, m >401		Total	Total
	Catch, kg	%	Catch, kg	%	Catch, kg	%	Catch, kg	%
1								
2	16070	100,0					16070	100
3	38110	100,0					38110	100
4	47470	100,0					47470	100
5	38150	100,0					38150	100
6	46430	100,0					46430	100
7	58060	100,0					58060	100
8	18850	100,0					18850	100
9	72860	100,0					72860	100
10	15220	100,0					15220	100
11	23040	100,0					23040	100
12								
Total	374260	100,0	0	0	0	0	374260	100

Table 3 (continued).

1999	Depth, m 200-300		Depth, m 301-400		Depth, m >401		Total	Total
	Catch, kg	%	Catch, kg	%	Catch, kg	%	Catch, kg	%
1								
2								
3	3500	100,0		0,0		0,0	3500	100
4	115300	96,6	4100	3,4		0,0	119400	100
5	91200	71,5	36400	28,5		0,0	127600	100
6	21600	17,5	93900	76,2	7700	6,3	123200	100
7	68400	84,5	11400	14,1	1100	1,4	80900	100
8	94100	99,4	600	0,6		0,0	94700	100
9								
10								
11								
12								
<b>Total</b>	<b>394100</b>	<b>71,7</b>	<b>146400</b>	<b>26,7</b>	<b>8800</b>	<b>1,6</b>	<b>549300</b>	<b>100</b>

2000	Depth, m 200-300		Depth, m 301-400		Depth, m >401		Total	Total
	Catch, kg	%	Catch, kg	%	Catch, kg	%	Catch, kg	%
1								
2								
3	125392	94,5	7235	5,5		0,0	132627	100
4	138623	59,2	86911	37,1	8690	3,7	234224	100
5	214028	91,5	19931	8,5		0,0	233959	100
6	58830	21,1	207404	74,2	13214	4,7	279448	100
7	26398	13,1	130746	64,8	44528	22,1	201672	100
8								
9	67602	38,9	106253	61,1		0,0	173855	100
10	142209	72,3	54493	27,7		0,0	196702	100
11	135156	71,7	53268	28,3		0,0	188424	100
12	25842	11,1	206599	88,9		0,0	232441	100
<b>Total</b>	<b>934080</b>	<b>49,9</b>	<b>872840</b>	<b>46,6</b>	<b>66432</b>	<b>3,5</b>	<b>1873352</b>	<b>100</b>

2001	Depth, m 200-300		Depth, m 301-400		Depth, m >401		Total	Total
	Catch, kg	%	Catch, kg	%	Catch, kg	%	Catch, kg	%
1	13211	4,8	220030	80,4	40315	14,7	273556	100
2	104125	26,5	282217	71,8	6970	1,8	393312	100
3	359941	58,6	237047	38,6	17160	2,8	614148	100
4	239088	45,4	243034	46,1	45030	8,5	527152	100
5	306160	67,9	138971	30,8	6000	1,3	451131	100
6	5380	1,4	364313	95,8	10759	2,8	380452	100
7		0,0	337338	94,8	18528	5,2	355866	100
8		0,0	74770	56,9	56537	43,1	131307	100
9	7466	2,6	183678	64,6	93109	32,8	284253	100
10		0,0	351177	100,0		0,0	351177	100
11	85088	19,8	344296	80,2		0,0	429384	100
12	159236	49,6	161734	50,4		0,0	320970	100
<b>Total</b>	<b>1279695</b>	<b>28,4</b>	<b>2938605</b>	<b>65,1</b>	<b>294408</b>	<b>6,5</b>	<b>4512708</b>	<b>100</b>

2002	Depth, m 200-300		Depth, m 301-400		Depth, m >401		Total	Total
	Catch, kg	%	Catch, kg	%	Catch, kg	%	Catch, kg	%
1	6700	3,7	174220	96,3			180920	100
2	16371	9,7	152787	90,3			169158	100
3		0,0	95664	100,0			95664	100
4								
5								
6	35217	29,4	84410	70,6			119627	100
7	23673	20,8	89988	79,2			113661	100
8	39516	46,3	45868	53,7			85384	100
9	81067	46,4	93815	53,6			174882	100
10	14757	28,1	37725	71,9			52482	100
11								
12		0,0	1940	100,0			1940	100
<b>Total</b>	<b>217301</b>	<b>21,9</b>	<b>776417</b>	<b>78,1</b>	<b>0</b>	<b>0</b>	<b>993718</b>	<b>100</b>

Table 3 (continued).

2003	Depth, m 200-300		Depth, m 301-400		Depth, m >401		Total	Total
month	Catch, kg	%	Catch, kg	%	Catch, kg	%	Catch, kg	%
1								
2								
3								
4	3276	100		0		0	3276	100
5								
6								
7								
8								
9								
10								
11								
12								
Total	3276	100	0	0	0	0	3276	100

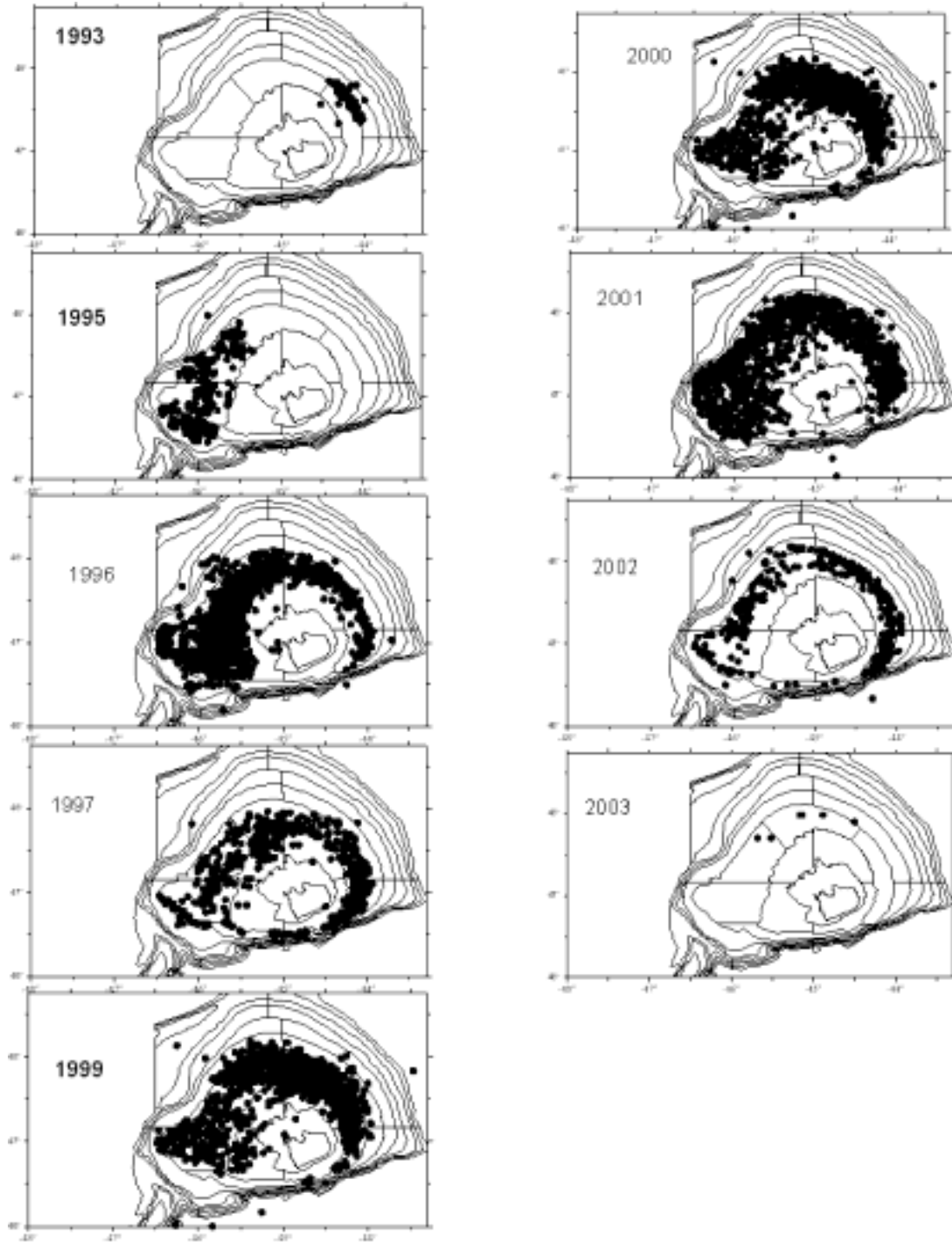


Fig. 1. Towing position in the Russian fleet on Flemish Cap by years 1993-2003.



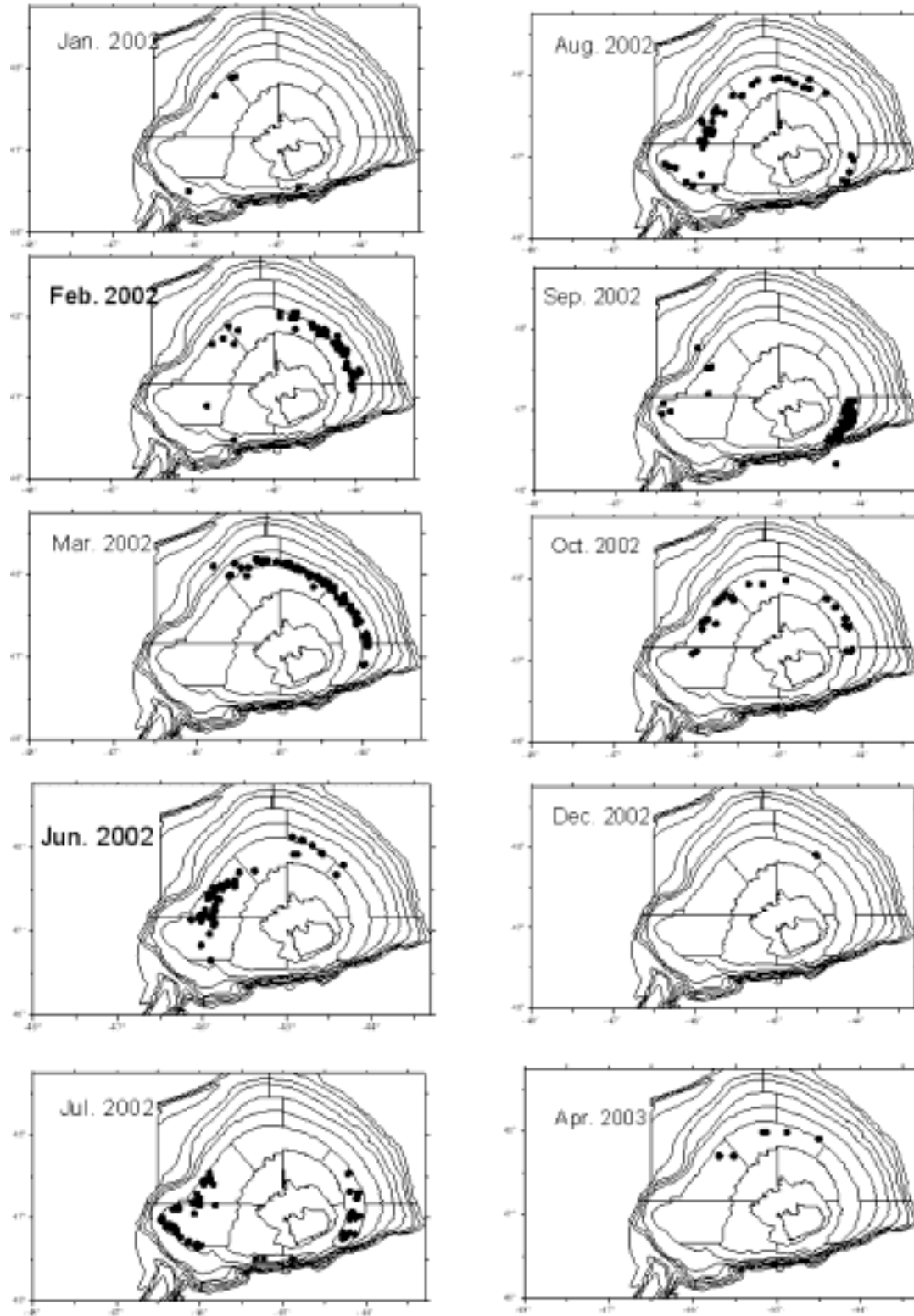


Fig. 1. Towing position in the Russian fleet on Flemish Cap by month 2002-2003.