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Mengunarvöktun í lífríki sjávar við Ísland 2006 og 2007/ Monitoring of the marine biosphere around Iceland 2006 and 2007

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<i>Ágrip á íslensku:</i>	<p>Í þessari skýrslu eru birtar niðurstöður árlegs vöktunarverkefnis á vegum Umhverfissráðuneytisins fyrir árin 2006 og 2007. Markmið með þessari vöktun er að uppfylla skuldbindingar Íslands varðandi Oslóar- og Parísarsamninginn (OSPAR), auk AMAP (Arctic Monitoring Assessment Program). Gögnin hafa verið send í gagnabanka Alþjóðahafrannsóknarráðsins (ICES). Hafrannsóknastofnun sér um að afla sýna og Matis hefur umsjón með undirbúningi sýna og mælingum á snefilefnum í lífríki hafsins. Sýnin eru mæld á Matis og á Rannsóknastofu í lyfja- og eiturefnafræði.</p> <p>Mæld voru ýmis ólífræn snefilefni og klórlífræn efni í þorski veiddum í árlegu vorralli Hafró í mars 2007 og í kræklingi sem safnað var á 11 stöðum í kringum landið í ágúst/sept 2006. Vöktun í lífríki sjávar við Ísland hófst 1989.</p>		
<i>Lykilorð á íslensku:</i>	OSPAR, AMAP, vöktun á lífríki sjávar, ólífræn snefilefni, klórlífræn efni, þorskur, kræklingur.		
<i>Summary in English:</i>	<p>This report contains results of the annual monitoring of the biosphere around Iceland in 2006 and 2007. The project, overseen by the Environmental and Food Agency of Iceland, is to fulfil the OSPAR (Oslo and Paris agreement) and AMAP (Arctic Monitoring Assessment Program) agreements. The data has been submitted to the ICES databank (ices.dk), collection of data began 1989. Matis ohf is the coordinator for marine biota monitoring and is responsible for methods relating to sampling, preparation and analysis of samples. The samples were analyzed at the Matis and at the Department of Pharmacology and Toxicology at the University of Iceland.</p> <p>Trace metals and organochlorines were analysed in cod (<i>Gadus morhua</i>) caught in March 2007 and in blue mussel (<i>Mytilus edulis</i>) collected in August/Sept 2006. Marine monitoring began in Iceland 1989.</p>		
<i>English keywords:</i>	OSPAR, AMAP, monitoring, trace metals, organochlorine compounds, cod (<i>Gadus Morhua</i>), blue mussel (<i>Mytilus edulis</i>).		

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- VIII. Graphs of metals and organic compounds in Cod (*Gadus morhua*) 1990-2007.

I. Introduction

This report contains the results of the annual monitoring of heavy metals and organochlorine analyses for blue mussel (*Mytilus edulis*), collected in the waters around Iceland in 2006, as well as for cod (*Gadus morhua*), which collected in Icelandic territorial waters in 2007. Annual monitoring of trace metals in the marine biota around Iceland began in 1989 and the monitoring of organochlorine compounds a few years later, in 1991. Several reports have already been published on this matter (1-13). To meet the requirements of the OSPAR (Oslo and Paris agreement) and the AMAP (Arctic Monitoring Assessment Program), data has been submitted to the ICES databank (ices.dk), the first data from 1989. The project is supervised by the Environment and Food Agency in Iceland and financed by The Ministry for the Environment as well as the Ministry of Fisheries. Matís ohf is the coordinator for the marine biota monitoring and responsible for methods relating to sampling, preparation and analysis of samples. The samples were analyzed at the Matís and at the Department of Pharmacology and Toxicology at the University of Iceland.

II. Sampling and preparation of samples

The Marine Research Institute handles all sampling, whereas the Matís is responsible for the storage of samples, preparation and chemical analysis.

2.1 Sampling

Using standard sampling guidelines (JMP, ICES and OSPAR), the sampling of cod (30-45 cm length, 3 samples (N-NW(1), N-NW(2) and NE) was carried out in the annual bottom trawl survey in March 2007. Blue mussel, 4-6 cm length, was collected from 11 sites around the country in August/September 2006. Sampling sites for cod and blue mussel are shown in Figure 1 and coordinates are given in appendix I and II. Icelandic waters have been divided into five main locations (N-NW, NE, SE-E, S, and SW) (6).

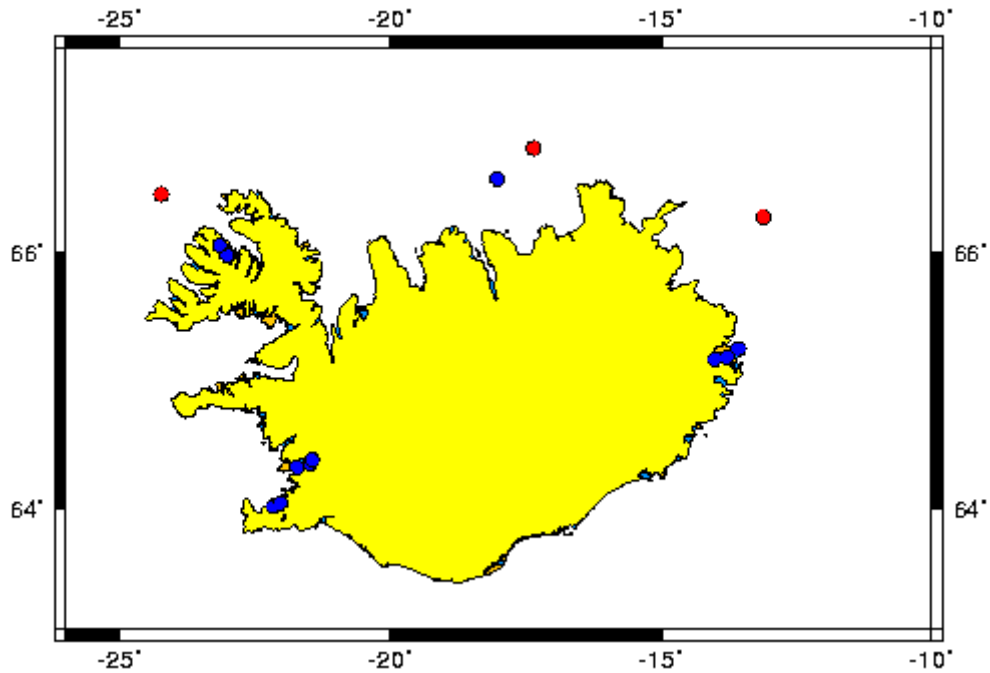


Figure 1. Locations for sampling of cod (*Gadus morhua*) (red dots) 2007 and blue mussel (*Mytilus edulis*) (blue dots) 2006.

2.2 Preparation of samples prior to analysing

Each sample of mussel contained 50 ± 5 individuals. Each mussel was weighed and its length (4-6 cm), height and width measured. The flesh and the shell were then weighed separately (Appendix I). After each sample (50 individuals) had been homogenized it was kept frozen until the analysis took place.

30-45 cm long cod was selected, each sample containing 25 ± 5 individuals. At the time of the sampling, the total weight as well as the gender of each fish was determined, livers were put in pre-weighed and pre-cleaned glass jars and, finally, the fish was gutted. All samples were kept frozen until further preparation for analysis took place. Later, the otoliths were removed for age determination, the fish was filleted, skinned, and the flesh weighed (Appendix II). Finally, each sample of flesh (25 ± 5 individuals) was homogenized. The livers of each cod sample were divided into sub samples, according to the weight of the livers. All liver samples were homogenized and kept frozen until analysis took place.

III. Analysis

3.1 Metals and organic contaminants in biota

The trace metal analysis of lead, cadmium, copper, zinc, mercury, arsenic and selenium was carried out at Matís, as well as analysis of the supporting parameters, dry matter and fat. The following organic compounds were analysed at the Department of Pharmacology and Toxicology at the University of Iceland: 11 PCBs, HCB, α -HCH, β -HCH and γ -HCH, p,p'-DDT, o,p'-DDT, p,p'-DDE and p,p'-DDD, transnonachlor, α -chlordan, γ -chlordan, oxychlordan, Tox-26, Tox-50, Tox-62, PBDE-47, PBDE-99, and PBDE-100. Table 1 presents the samples and all the parameters measured in each sample.

Table 1. Parameters measured in different samples.

Species	Number of Samples	Number of Individuals	Type of Samples	Number of Group	Inorganic Contaminants	Organic Contaminants	Others
Mussel, 2006 (<i>Mytilus edulis</i>)	11	50	Whole soft body		Cu,Zn,As,Se Cd,Hg,Pb	X*	Dry matter and Fat
Cod, 2007 (<i>Gadus morhua</i>)	3	25	Flesh	3	Hg		Dry matter and Fat
			Liver	16	Cu,Zn,As, Se,Cd,Pb	X*	Dry matter and Fat
Labels: Cod-N-NW (1) 07 Cod-N-NW (2) 07 Cod-NE 07							

X*: PCB28, PCB31, PCB52, PCB101, PCB105, PCB118, PCB138, PCB153, PCB156, PCB170, PCB180, α , β , γ -HCH, HCB, p,p'-DDT, o,p'-DDT, p,p'-DDE, p,p'-DDD, Transnonachlor, α -Chlordan, γ -Chlordan, Oxychlordan, Tox-26, Tox-50, Tox-62, PBDE-47, PBDE-99, and PBDE-100.

3.2 Methods

Inorganic contaminants (Cd, Cu, Zn, As, Se, Hg, Pb) in the samples were determined by ICP-MS after mineralization of the samples with closed vessel acid digestion. Portions (up to 200 mg weighed to 0.1 mg) of freeze dried samples (cod liver was used wet) together with 3 ml HNO₃ were transferred to 50 ml Parr digestion bombs. Samples were digested for 6 hours at 180 °C (cod liver 18 hours at 180 °C). The

digested sample solutions were quantitatively transferred to 50 ml polypropylene tubes and diluted to 30 ml with Milli-Q water. The concentration of the different elements (Cd, Cu, Zn, As, Se, Hg, Pb) in these digests was determined by ICP-MS (Agilent 7500ce, Waldbronn, Germany). ^{45}Sc , ^{72}Ge , ^{115}In and ^{205}Tl were used as internal standards. The organochlorine compounds were analysed by GC-ECD using HP5890 Series II with an automatic injector (HP7673). A detailed description of the analyses of organic compounds and supporting parameters (dry matter and fat) is given in previous report (7).

3.3 Quality assurance

The quality of the metal analysis was checked in several ways. Certified reference materials are routinely treated and analysed in the same manner as the samples. Results for analysis of reference materials, recovery of standard additions and limits of detection are shown in Table 2 and 3 in appendix III. Also shown are Z scores for the reference materials. The trace analytical lab at the Mátis has participated in Quasimeme annually with satisfactory results. Also, Mátis participated in Quash with satisfactory results. The average field blank (C_B), derived from the sample field blanks, and three times its standard deviation ($3xS_B$), and were used to evaluate the limit of detection (LOD).

For **organic contaminants**, a solvent blank and sample of certified reference material was extracted with each batch of samples. A certified standard solution was also run with the samples to check own standards. The limit of detection was estimated to be 3 x STDEV of the blanks. The Department of Pharmacology and Toxicology at the University of Iceland has participated in Quasimeme annually with satisfactory results. Results for analysis in certificate mussel and cod liver samples are presented in appendix III, Tables 4 and 5 along with relevant detection limits in Table 6.

IV. Results

This report contains data from the years 2006 and 2007 which has not been statistically evaluated in connection with previous results in order to evaluate time trend or spatial difference. However, there are apparently no obvious changes in contaminant concentrations pattern seen in previous years (see graphical representation in appendices VII and VIII). To be able to monitor long term trends and to indicate large scale spatial difference in the marine biota around Iceland, data from many years needs to be assessed with statistical models.

4.1 Biological variations

Figures 2a-d in appendix VI shows the biological variation in cod (*Gadus morhua*) 1990-2007, (average age, average weight of ungutted fish, average weight of liver, and average fat content in liver).

4.2 Heavy metals

Results for metals in blue mussel (2006) and cod (2007) are presented in Tables 7 and 8 in appendix IV. New data is presented along with data from previous years (1, 4-13) in figures 3a-c and 4a-c (Appendix VII) for blue mussel and in figures 6a, b and 7a-f (Appendix VIII) for cod, giving an overview of a period of 15-16 years. It should be noted that results for cod are on a wet weight basis but for mussel on a dry weight basis.

4.2.1 Blue mussel

Figures 3a-c in appendix VII show the average concentration of heavy metals in blue mussel 1991-2006, on a dry weight basis. The horizontal red line shows the ICES90 75% baseline (11). Figures 4a-c in appendix VII show average concentrations (dw), of heavy metals in blue mussel from different sampling sites, 1990-2006. Metal concentrations vary considerably between years and different locations. Concentration of arsenic is noticeably higher at Úlfsá, Skutulsfjordur than any other sample place for blue mussel. The results show low values for Hg in blue mussel when compared with ICES90 75% baseline values. Cu and Zn are close to these values but Cd is high in

blue mussel from Icelandic coasts, compared to other areas. This cadmium is considered to be of natural origin since no anthropogenic source is known.

4.2.2 Cod

Figures 6a-b in appendix VIII show the average heavy metal concentration in livers of 30-45 cm cod (wet weight), caught in Icelandic waters in March every year between 1990-2007. Figures 7a-f in appendix VIII show average concentrations (ww), of heavy metals in cod from different sampling sites, 1990-2007. Mercury is measured in the flesh and liver as well. Lead concentration was below the limits of detection in all samples. Variations in concentration between years and locations over the time interval can be seen. The concentration of heavy metals in cod from Icelandic waters is low compared to cod from other northern locations (6). As for the blue mussel the only exception is cadmium which is probably of natural origin reflecting the natural background values. However, the amount of cadmium in cod and other species in Icelandic coastal waters is far below the TWI (Tolerable Weekly Intake) standard of WHO, even with heavy consumption (6).

4.3 Organic compounds

Results for organic compounds in blue mussel (2006) and cod (2007) are presented in appendix V, Tables 9 and 10. The results for cod are presented on a wet-weight basis but results for blue mussel are on a dry-weight basis. New data is shown along with data from previous years (1, 4-10) in figures 5a-b (Appendix VII) for blue mussel and in figures 8 and 9a-e (Appendix VIII) for cod, giving an overview of a 15-17 year period.

4.3.1 Blue mussel

Figures 5a-b in appendix VII show the concentration on a dry-weight basis of organic compounds in blue mussel from different locations in Iceland 1991-2006. The most common organochlorines found in blue mussel are PCBs. The concentration of PCBs in blue mussel found in Iceland are comparable with values found in mussels from remote areas of the west coast of United States and also similar to the lowest values found in mussels on the coast of the United Kingdom and Ireland (6). In general, concentration of HCH, HCB and DDE is low, close to the limit of detection.

4.3.2 Cod

Figure 8 in appendix VIII shows the average concentration on a wet-weight basis of organic compounds in livers of 30-45 cm cod, caught in Icelandic waters in March every year between 1991-2007. Figures 9a-e in appendix VIII show average concentrations (ww) of some organic compounds in cod from different sampling sites, 1991-2007. The sum of seven PCBs (PCB-28, PCB-52, PCB-101, PCB-118, PCB-138, PCB-153 and PCB-180) is about 90% of the 11 PCBs measured. The concentrations of the organic substances that are measured in cod from Icelandic waters correspond to the lowest values observed elsewhere (6).

V. Conclusion

This report contains the results of an evaluation of trace elements in Icelandic marine biota for the years 2006 and 2007. It adds to the information gathered every year to determine: if the concentration of trace elements is increasing, decreasing or not changing; if current situation is a cause for health concerns; and if the marine environment is being threatened by pollution.

This data has not been statistically evaluated in connection with previous results in order to evaluate time trend or spatial difference. However, there are apparently no obvious changes in contaminant concentrations pattern seen in previous years. **A full statistical analysis of all data is needed to confirm changes if any.** This was done in 1998 (6) but new data calls for a new evaluation. In addition, when comparing data of livers it is necessary to keep in mind the factors (i.e. fat, age, dw) that may affect the quantity and concentration of trace elements.

Iceland is unique in terms of geology, oceanography and meteorology. High levels of heavy metals, particularly cadmium, occur naturally in the environment in Iceland. Therefore, natural background values need to be kept in mind when comparing contamination levels with other countries.

VI. Acknowledgement

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Appendix I.

Biological measurements of Blue mussel (*Mytilus edulis*)

2006

Species:	Blue mussel (<i>Mytilus edulis</i>)			Date of sampling:	8.9.2006	
Length:	4-6 cm			Sampled by:	Marine Inst.	
Location:	Úlfsá/Sigurðarbúð, Skutulsfjörður			Date of preparation:	2.10.2008	
Coordinates:	660360-230996					
	Length (mm)	Width (mm)	Height (mm)	Total weight (g)	Weight soft body (g)	Weight shell (g)
1	54,2	27,7	23,3	14,94	8,55	6,05
2	44,2	25,2	17,2	8,50	4,67	3,37
3	50,4	24,9	20,7	12,96	6,71	5,67
4	55,4	27,3	25,9	20,12	10,55	8,99
5	57,1	29,9	25,3	24,86	12,74	11,36
6	57,8	26,6	24,9	18,29	10,09	7,73
7	59,3	26,4	23,6	19,28	9,73	8,96
8	56,0	25,7	24,9	20,54	10,79	9,41
9	55,9	26,3	24,6	20,49	10,07	10,2
10	48,7	23,8	19,0	11,35	6,51	4,75
11	52,0	26,6	21,9	15,15	8,12	6,85
12	45,7	23,4	18,1	9,75	5,75	3,82
13	49,3	25,3	21,5	13,30	8,42	4,71
14	56,8	28,1	23,1	19,33	9,91	9,12
15	54,8	24,6	21,9	15,26	8,49	6,69
16	49,9	22,2	19,9	11,09	6,10	4,89
17	51,6	22,4	22,8	14,55	7,23	7,22
18	50,5	23,7	20,2	11,97	6,07	5,76
19	52,1	24,2	21,5	12,11	6,71	5,31
20	46,7	22,9	20,3	10,31	5,87	4,26
21	48,0	23,6	20,6	11,12	6,08	4,84
22	58,8	29,3	27,2	24,20	12,95	10,70
23	52,1	24,3	23,3	16,22	7,96	8,05
24	43,5	21,8	17,8	9,63	5,09	4,25
25	59,3	24,1	24,9	20,18	10,11	9,44
26	56,3	26,1	24,1	17,55	10,47	6,61
27	54,2	23,3	21,1	15,26	8,35	6,44
28	56,4	27,1	20,1	13,99	8,49	5,09
29	49,0	22,9	18,7	10,05	6,01	3,77
30	44,9	23,6	19,4	12,14	5,64	6,05
31	58,5	27,0	23,4	20,28	11,24	8,49
32	51,2	25,1	21,6	16,57	7,81	8,19
33	51,4	24,9	22,7	14,56	7,97	6,23
34	50,6	24,8	23,8	12,98	7,14	5,61
35	47,6	23,7	20,4	10,42	5,42	4,77
36	45,9	21,8	19,8	9,12	4,66	4,10
37	58,3	26,1	25,3	19,61	9,81	9,07
38	58,6	25,8	26,9	22,36	10,58	11,29
39	50,1	22,2	18,8	10,11	5,10	4,76
40	46,8	21,3	22,5	11,35	5,66	5,38
41	48,0	24,2	20,3	12,71	6,47	5,75
42	42,0	18,9	17,3	6,97	3,66	2,81
43	45,8	20,9	20,1	10,29	5,44	4,38
44	60,1	27,2	28,7	26,73	12,46	11,34
45	54,4	23,6	25,3	17,24	8,52	8,19
46	53,4	25,6	24,3	18,61	9,73	8,53
47	45,2	21,4	18,7	9,25	5,16	3,86
48	52,0	26,3	23,6	14,97	8,42	6,36
49	51,7	24,9	21,4	13,95	7,33	6,49
50	52,1	24,7	20,8	11,40	6,97	4,19
	Length	Width	Height	Total weight	Weight soft body	Weight shell
Average	51,9	24,7	22,1	14,88	7,88	6,60
Stdev	4,8	2,2	2,7	4,68	2,29	2,30
Min	42,0	18,9	17,2	6,97	3,66	2,81
Max	60,1	29,9	28,7	26,73	12,95	11,36

Species:	Blue mussel (<i>Mytilus edulis</i>)		Date of sampling:	7.9.2006		
Length:	4-6 cm		Sampled by:	Marine. Inst.		
Location:	Eyri, Hvalfjordur		Date of preparation:	26.9.2007		
Coordinates:	642050-214390					
	Length (mm)	Width (mm)	Height (mm)	Total weight (g)	Weight soft body (g)	Weight shell (g)
1	41,3	19,8	15,1	6,27	3,13	2,92
2	39,8	17,9	15,0	5,89	3,20	2,52
3	45,4	20,4	18,1	8,87	5,09	3,59
4	40,0	19,5	15,7	5,91	3,18	2,72
5	46,1	22,3	17,5	8,97	5,16	3,59
6	44,1	21,4	18,7	8,90	5,03	3,66
7	40,9	20,4	15,1	5,90	2,99	2,63
8	44,9	21,6	12,1	7,75	3,95	3,51
9	40,9	20,9	16,7	6,30	2,92	2,71
10	41,3	20,5	15,9	6,35	2,57	3,31
11	41,4	20,9	15,2	6,79	4,06	2,49
12	42,4	21,5	15,4	6,67	3,77	2,80
13	47,9	23,3	18,8	10,11	5,83	4,12
14	45,0	22,6	17,5	8,41	4,70	3,55
15	41,1	19,7	15,4	5,86	3,51	2,20
16	48,6	23,2	20,9	10,90	6,49	4,29
17	40,7	19,8	16,8	6,28	3,42	2,67
18	44,3	22,4	17,7	9,05	5,10	3,73
19	43,8	20,2	16,3	7,16	4,03	2,89
20	44,7	22,7	15,9	8,11	4,18	3,62
21	45,7	21,8	18,4	9,78	5,21	4,45
22	47,9	23,1	19,4	9,97	5,82	3,94
23	43,8	21,9	15,8	6,78	3,79	2,86
24	42,3	22,2	16,2	7,11	3,74	3,23
25	40,0	20,1	16,3	6,21	3,11	2,99
26	43,3	21,1	18,0	7,89	4,61	3,16
27	42,3	21,1	16,6	6,29	3,43	2,56
28	45,3	21,4	17,5	8,71	4,71	3,80
29	40,2	20,6	13,3	5,28	2,38	2,53
30	42,4	18,9	15,5	5,56	2,74	2,48
31	43,6	22,2	15,9	7,55	4,45	3,01
32	40,0	20,4	16,2	5,87	3,45	2,26
33	45,4	21,7	16,6	8,13	4,75	3,31
34	43,0	20,5	16,4	7,18	4,32	2,76
35	44,5	22,0	17,2	8,25	5,02	3,03
36	43,2	21,3	17,5	7,36	4,19	3,00
37	42,3	22,0	16,2	7,16	4,37	2,62
38	43,1	21,6	16,2	7,22	4,09	2,94
39	46,1	22,1	17,6	9,14	5,17	3,85
40	44,8	21,7	17,2	8,45	4,80	3,41
41	41,1	19,3	13,2	6,24	3,51	2,60
42	46,2	22,6	18,0	8,45	5,50	3,28
43	46,2	23,8	18,3	9,56	5,45	3,91
44	39,9	20,6	14,1	5,56	2,84	2,62
45	41,2	20,9	15,3	6,51	3,93	2,46
46	42,6	19,8	15,2	6,37	3,62	2,61
47	49,5	23,5	18,6	10,07	6,07	3,91
48	45,3	20,4	17,9	7,86	4,63	3,08
49	41,0	20,6	16,2	5,85	3,63	2,14
50	45,8	22,3	16,8	8,11	4,78	3,20
	Length	Width	Height	Total weight	Weight soft body	Weight shell
Average	43,5	21,3	16,5	7,50	4,21	3,11
Stdev	2,5	1,3	1,6	1,44	0,98	0,57
Min	39,8	17,9	12,1	5,28	2,38	2,14
Max	49,5	23,8	20,9	10,90	6,49	4,45

Species:	Blue mussel (<i>Mytilus edulis</i>)		Date of sampling:	7.9.2006		
Length:	4-6 cm		Sampled by:	Marine Inst.		
Location:	Hvítanes, Hvalfjörður		Date of preparation:	24.9.2007		
Coordinates:	642185-212970					
	Length (mm)	Width (mm)	Height (mm)	Total weight (g)	Weight soft body (g)	Weight shell (g)
1	54,7	27,4	22,0	18,27	8,59	9,26
2	52,3	25,7	23,8	15,73	9,11	6,53
3	54,0	29,4	24,2	19,92	10,33	9,46
4	54,6	25,1	20,7	15,16	7,05	7,80
5	42,2	20,1	17,5	8,42	4,61	3,58
6	44,5	23,1	18,0	9,19	5,01	3,97
7	41,3	20,0	18,8	8,43	4,11	3,90
8	42,9	22,1	17,3	8,10	4,50	3,40
9	39,8	21,2	21,0	8,52	4,52	3,74
10	43,9	20,0	20,8	10,37	3,93	5,97
11	41,4	19,3	11,6	6,08	3,26	2,71
12	45,0	21,2	20,8	9,81	6,02	3,67
13	43,5	22,4	18,3	8,54	4,68	3,81
14	43,2	20,2	18,0	8,67	4,87	3,65
15	59,0	27,3	27,2	21,25	13,63	7,51
16	48,3	24,5	22,4	14,25	8,38	5,79
17	44,8	24,1	20,0	10,84	5,97	4,76
18	41,7	19,5	19,6	8,75	4,91	3,80
19	41,3	21,2	18,2	9,07	4,62	4,23
20	44,5	23,0	18,3	8,90	4,98	3,72
21	50,8	26,1	24,7	20,10	9,55	10,43
22	55,7	29,7	25,1	22,05	9,99	12,03
23	47,1	22,4	19,7	10,03	6,17	3,83
24	48,0	23,8	18,7	10,99	6,90	4,10
25	43,4	20,8	18,0	8,72	4,97	3,69
26	43,3	21,6	19,9	8,86	5,07	3,73
27	39,8	21,1	18,3	7,84	4,32	3,50
28	40,8	19,3	17,0	8,17	4,41	3,73
29	45,6	20,8	19,6	9,80	5,38	4,39
30	46,4	23,8	18,8	9,89	5,65	4,12
31	39,6	19,8	17,3	7,72	4,28	3,34
32	40,3	21,0	15,1	5,97	3,34	2,53
33	41,9	24,6	19,2	10,21	5,31	4,86
34	58,7	24,7	29,7	21,01	9,70	11,14
35	54,0	25,0	23,6	16,19	8,48	7,63
36	43,5	22,6	18,7	8,95	4,07	4,39
37	42,0	18,8	20,1	9,08	4,30	4,43
38	49,0	23,5	19,7	10,57	5,80	4,23
39	46,7	26,2	22,1	13,31	7,94	4,93
40	47,5	24,6	18,5	11,80	4,28	6,25
41	57,2	38,7	22,9	19,57	10,13	9,38
42	51,4	23,5	22,8	14,92	9,03	5,77
43	49,7	25,1	23,1	15,06	8,18	6,86
44	49,0	23,0	21,4	12,36	7,17	5,13
45	48,9	24,2	19,2	10,79	6,50	4,19
46	42,4	20,7	19,9	9,94	5,29	4,60
47	41,5	22,9	20,7	10,20	5,94	4,19
48	48,6	25,4	21,8	12,14	6,56	5,36
49	45,0	21,1	17,6	7,71	4,40	3,20
50	40,5	21,5	17,9	8,58	3,87	4,50
	Length	Width	Height	Total weight	Weight soft body	Weight shell
Average	46,4	23,3	20,2	11,62	6,20	5,23
Stdev	5,3	3,4	3,0	4,27	2,26	2,26
Min	39,6	18,8	11,6	5,97	3,26	2,53
Max	59,0	38,7	29,7	22,05	13,63	12,03

Species:	Blue mussel (<i>Mytilus edulis</i>)	Date of sampling:	6.9.2006			
Length:	4-6 cm	Sampled by:	Marine Inst.			
Location:	Hvassahraun	Date of preparation:	2.10.2007			
Coordinates:	640125-220900					
	Length (mm)	Width (mm)	Height (mm)	Total weight (g)	Weight soft body (g)	Weight shell (g)
1	41,0	20,3	16,5	6,90	3,27	3,31
2	40,1	19,9	17,0	7,90	3,79	3,82
3	43,5	19,4	15,9	7,09	2,66	4,23
4	41,6	20,8	17,6	8,49	3,97	4,26
5	44,7	18,9	18,0	8,73	4,08	4,41
6	54,0	22,9	21,1	15,50	7,88	7,36
7	46,9	21,4	21,0	11,83	5,60	5,77
8	41,4	22,3	16,8	8,02	4,16	3,78
9	44,4	22,3	17,0	9,22	4,63	4,45
10	42,3	20,7	18,1	9,18	4,52	4,58
11	40,9	23,2	16,5	7,32	4,18	2,94
12	40,0	21,4	15,7	7,42	3,54	3,71
13	44,2	20,1	19,8	9,33	4,74	4,50
14	46,4	23,8	18,9	9,91	5,49	4,23
15	55,0	24,5	21,8	16,60	7,51	8,86
16	40,1	19,4	15,6	6,29	3,30	2,84
17	42,9	20,4	19,3	8,61	4,04	4,47
18	46,5	23,1	18,4	10,70	5,44	5,17
19	45,3	22,9	19,5	10,94	5,58	4,77
20	49,2	24,0	21,6	14,03	7,78	6,03
21	41,7	20,8	15,7	7,50	3,53	3,63
22	43,8	21,2	18,9	9,35	4,58	4,63
23	45,2	19,2	19,2	10,08	4,88	5,07
24	42,8	21,8	16,9	7,53	4,32	3,03
25	48,1	23,0	20,3	12,51	6,20	6,11
26	41,9	20,1	15,9	7,30	3,73	3,43
27	40,4	20,5	17,0	8,39	3,91	4,32
28	43,4	20,3	18,9	8,86	4,60	4,15
29	44,5	23,3	19,2	10,56	6,33	4,12
30	49,9	23,1	20,4	13,94	6,94	6,82
31	41,4	22,6	18,5	9,72	4,54	5,08
32	42,2	21,9	16,1	7,75	3,89	3,61
33	45,7	20,9	19,4	10,02	5,05	4,87
34	45,8	20,6	18,0	10,16	5,21	4,86
35	44,8	20,3	18,6	10,86	5,58	5,14
36	40,6	22,7	17,2	8,19	4,06	3,74
37	44,7	21,0	18,8	9,34	5,23	3,99
38	44,4	22,2	18,6	9,15	4,95	4,10
39	47,5	23,3	21,3	13,52	6,06	7,22
40	47,3	22,0	19,8	11,81	5,79	5,89
41	41,1	22,0	17,9	8,65	4,70	3,85
42	41,4	21,5	17,4	8,72	4,26	4,34
43	45,3	23,2	18,5	10,50	5,43	4,83
44	47,6	22,5	19,9	12,86	6,71	6,05
45	47,7	23,0	19,0	11,81	6,13	5,59
46	41,2	21,9	16,2	7,47	3,43	3,89
47	42,8	22,0	18,4	9,14	5,03	3,98
48	43,2	19,6	19,9	10,02	5,30	4,64
49	44,4	23,7	19,5	11,26	6,11	5,04
50	42,4	22,0	18,9	9,79	4,73	4,91
	Length	Width	Height	Total weight	Weight soft body	Weight shell
Average	44,3	21,7	18,4	9,82	4,95	4,69
Stdev	3,3	1,4	1,7	2,26	1,19	1,18
Min	40,0	18,9	15,6	6,29	2,66	2,84
Max	55,0	24,5	21,8	16,60	7,88	8,86

Species:	Blue mussel (<i>Mytilus edulis</i>)	Date of sampling:	6.9.2006			
Length:	4-6 cm	Sampled by:	Marine Inst.			
Location:	Straumur, Straumsvík	Date of preparation:	24.9.2007			
Coordinates:	640260-220250					
	Length (mm)	Width (mm)	Height (mm)	Total weight (g)	Weight soft body (g)	Weight shell (g)
1	44,2	19,4	20,4	8,65	4,99	3,27
2	58,4	27,4	25,3	22,13	11,20	9,78
3	50,8	23,5	22,0	11,79	7,31	3,91
4	51,2	22,9	20,6	10,08	5,16	4,33
5	54,7	25,2	22,9	16,53	8,74	6,93
6	44,0	21,4	20,6	11,56	6,34	4,69
7	47,3	24,5	22,1	11,80	6,62	4,75
8	53,8	24,4	22,1	14,81	6,93	7,33
9	51,9	27,5	21,6	16,69	9,38	6,76
10	47,8	21,9	18,7	11,05	6,61	4,28
11	54,8	28,4	21,9	19,50	11,09	7,72
12	59,2	20,4	26,7	7,99	3,53	4,14
13	60,0	19,3	28,4	9,96	5,29	4,26
14	59,9	20,6	25,9	6,84	3,54	2,89
15	60,1	22,0	28,2	10,46	5,45	4,61
16	55,7	24,1	22,6	14,36	8,18	5,77
17	44,1	21,5	20,5	9,86	5,06	4,68
18	48,4	21,4	18,7	10,16	5,51	4,32
19	43,1	19,1	18,2	7,62	4,37	3,20
20	58,7	41,5	23,7	17,91	10,39	7,39
21	47,0	41,6	21,3	10,93	6,13	4,63
22	53,5	39,7	24,1	14,71	8,60	5,50
23	46,7	35,7	19,3	9,00	4,97	3,67
24	56,7	25,1	25,5	18,91	11,02	7,29
25	48,0	20,8	21,7	10,57	6,03	4,12
26	58,3	26,1	24,5	16,01	10,02	5,71
27	48,9	23,5	20,5	10,70	5,53	4,85
28	59,7	26,1	24,8	18,97	10,99	7,43
29	56,4	24,2	19,9	12,73	7,49	4,83
30	45,2	23,0	19,2	9,97	5,90	3,35
31	42,7	20,9	18,6	8,18	3,74	3,69
32	44,5	18,8	18,3	8,71	3,59	4,17
33	46,9	16,9	18,9	8,16	4,32	3,17
34	44,3	21,0	20,3	7,14	2,93	3,72
35	49,9	22,0	22,1	11,90	7,15	4,13
36	47,2	23,1	20,6	11,47	5,90	5,17
37	55,4	28,2	24,7	17,95	9,51	7,83
38	53,4	22,4	21,6	14,07	7,60	6,05
39	55,8	22,0	17,1	14,18	8,41	5,50
40	54,3	21,1	21,1	11,55	7,08	4,08
41	45,2	20,3	19,5	9,37	5,53	3,61
42	41,8	21,0	15,3	7,53	3,73	4,48
43	40,8	21,4	16,4	7,69	4,15	3,35
44	51,3	21,2	23,4	14,59	7,50	4,76
45	42,1	19,6	19,2	9,04	4,54	4,09
46	60,0	27,7	52,3	21,81	11,39	9,62
47	52,9	27,7	20,4	15,23	9,31	5,37
48	50,4	23,7	22,2	16,03	8,16	7,04
49	59,9	25,3	53,9	22,04	11,72	9,06
50	46,8	20,2	46,8	9,50	5,42	3,94
	Length	Width	Height	Total weight	Weight soft body	Weight shell
Average	51,1	24,1	23,3	12,57	6,88	5,18
Stdev	5,9	5,4	7,6	4,20	2,44	1,73
Min	40,8	16,9	15,3	6,84	2,93	2,89
Max	60,1	41,6	53,9	22,13	11,72	9,78

Species:	Blue mussel (<i>Mytilus edulis</i>)		Date of sampling:	11.9.2006		
Length:	4-6 cm		Sampled by:	Marine Inst.		
Location:	Mjoifjordur I (head)		Date of preparation:	4.10.2007		
Coordinates:	651115-140012					
	Length (mm)	Width (mm)	Height (mm)	Total weight (g)	Weight soft body (g)	Weight shell (g)
1	58,8	26,1	21,2	16,19	9,71	6,28
2	55,6	25,9	19,4	13,69	8,46	5,15
3	49,3	24,7	19,5	12,22	6,81	5,21
4	43,1	20,8	17,1	7,43	4,34	2,97
5	46,2	21,7	19,0	9,59	5,37	4,20
6	53,8	25,3	23,3	15,42	9,23	5,99
7	51,5	23,1	25,8	15,97	9,68	6,14
8	54,7	24,1	25,5	18,20	9,56	8,45
9	49,3	23,8	18,4	10,58	6,47	4,04
10	41,6	20,6	16,5	6,94	3,82	2,90
11	48,3	22,4	23,1	13,17	8,09	5,16
12	50,7	24,0	21,6	14,55	8,34	6,12
13	47,9	24,0	22,2	14,99	7,23	7,65
14	47,4	22,5	21,2	11,62	6,42	4,87
15	47,3	22,3	22,0	13,13	6,98	6,14
16	40,4	22,7	20,9	9,66	5,51	4,03
17	46,4	23,9	19,0	10,37	6,18	4,16
18	42,4	20,6	20,1	9,26	5,11	4,05
19	44,4	21,0	19,6	8,17	4,72	3,37
20	42,6	20,3	18,4	8,55	4,71	3,65
21	52,1	24,7	19,5	12,70	7,22	5,30
22	51,6	25,3	23,9	16,25	9,16	7,03
23	51,5	24,5	20,9	12,58	7,56	4,80
24	48,1	21,1	20,0	10,66	6,59	4,06
25	51,9	26,6	18,9	12,40	7,42	4,98
26	50,5	23,8	21,5	13,29	8,11	5,17
27	49,5	23,2	19,0	10,39	6,37	4,06
28	46,9	20,8	18,7	9,48	5,91	3,31
29	43,8	21,4	16,5	8,49	4,42	3,99
30	42,2	21,3	19,1	9,00	5,15	3,60
31	55,4	27,8	23,3	17,68	11,34	6,27
32	53,0	26,9	23,8	17,01	11,00	6,72
33	55,6	25,0	23,5	15,94	9,63	5,99
34	50,4	23,6	20,5	11,59	7,60	3,89
35	52,8	24,3	21,1	13,30	8,59	4,49
36	49,3	24,5	19,5	12,06	7,12	4,85
37	55,8	27,2	23,8	16,78	10,54	6,22
38	53,6	25,9	20,6	14,22	8,51	5,65
39	41,1	21,1	18,4	8,00	4,58	3,38
40	45,0	21,9	19,5	9,10	4,77	4,18
41	56,8	25,7	22,4	15,20	9,55	5,57
42	46,0	22,7	22,4	12,25	7,09	5,00
43	50,7	23,8	21,5	12,59	7,66	4,62
44	43,0	20,9	21,2	10,58	6,11	4,44
45	50,9	24,5	21,2	12,95	7,82	5,07
46	52,1	25,0	22,6	14,24	8,83	5,27
47	45,9	23,2	20,9	11,48	5,47	4,73
48	53,5	25,6	22,1	15,68	9,12	6,40
49	51,1	24,9	22,9	14,91	8,56	6,23
50	46,1	21,5	20,3	10,73	6,20	4,45
	Length		Height	Total weight	Weight soft body	Weight shell
Average	49,16	23,6	20,9	12,42	7,29	5,01
Stdev	4,6	2,0	2,1	2,91	1,89	1,21
Min	40,4	20,3	16,5	6,94	3,82	2,90
Max	58,8	27,8	25,8	18,20	11,34	8,45

Species:	Blue mussel (<i>Mytilus edulis</i>)		Date of sampling:	12.9.2006		
Length:	4-6 cm		Sampled by:	Marine Inst.		
Location:	Mjoifjordur II, Hofsa, bryggja		Date of preparation:	3.10.2007		
Coordinates:	651220-134850					
	Length (mm)	Width (mm)	Height (mm)	Total weight (g)	Weight soft body (g)	Weight shell (g)
1	49,7	22,4	22,3	13,37	6,30	6,61
2	45,6	24,3	19,1	10,59	5,68	4,63
3	51,6	22,8	20,5	13,50	6,67	6,68
4	48,5	22,4	19,9	10,91	6,15	4,65
5	49,8	23,3	19,2	11,36	6,41	4,82
6	47,9	24,8	18,7	10,90	6,12	4,62
7	42,0	20,9	16,7	6,66	3,66	2,84
8	45,2	21,6	19,9	8,51	4,57	3,75
9	45,5	21,4	18,9	8,24	4,86	3,17
10	47,8	22,7	18,2	9,45	5,12	4,11
11	44,2	21,8	19,2	9,21	4,72	4,27
12	44,7	20,9	19,1	8,93	4,74	4,02
13	47,8	20,7	16,7	6,82	3,77	2,87
14	45,1	23,9	20,3	9,97	5,51	4,31
15	43,1	22,2	18,5	6,60	2,78	3,49
16	43,8	19,6	16,9	6,92	3,54	3,04
17	43,7	21,9	18,7	8,49	4,62	3,70
18	47,7	21,8	16,1	6,78	3,84	2,79
19	46,8	20,6	19,1	9,09	5,11	3,71
20	45,9	21,2	19,8	10,04	5,09	4,74
21	44,9	24,9	14,1	10,30	5,41	4,74
22	48,8	23,5	20,0	10,86	6,09	4,61
23	44,7	22,0	18,4	8,32	4,87	3,34
24	43,4	21,1	18,2	8,57	4,23	4,15
25	47,6	22,6	18,4	7,63	3,25	4,21
26	46,9	23,7	16,8	8,96	4,28	4,30
27	44,6	22,4	17,6	9,13	5,04	3,59
28	41,3	20,3	18,2	7,77	3,81	3,81
29	41,7	22,0	17,8	8,16	4,38	3,63
30	48,1	23,7	18,2	10,14	5,21	4,77
31	49,1	23,4	21,9	13,51	6,58	6,69
32	60,5	28,0	23,3	18,65	11,07	7,34
33	52,0	27,0	19,9	14,02	8,04	4,94
34	46,4	24,1	19,8	10,99	5,60	5,19
35	45,6	23,1	17,4	9,29	4,43	4,60
36	49,7	24,9	18,9	11,07	6,07	4,87
37	47,5	23,4	19,7	10,24	5,97	4,02
38	41,6	22,0	17,4	7,91	4,21	3,55
39	48,6	24,5	19,1	11,68	6,01	5,41
40	46,3	24,0	16,7	7,31	3,25	3,70
41	46,9	23,4	19,5	10,43	5,76	4,47
42	44,4	21,4	19,4	8,13	4,86	3,18
43	47,8	22,6	19,2	10,31	5,22	4,71
44	47,6	22,3	19,7	10,87	4,59	5,58
45	46,1	22,4	18,8	9,40	4,26	4,76
46	43,1	21,6	17,8	7,00	3,62	3,12
47	47,3	22,8	18,8	9,74	5,59	4,01
48	43,2	21,2	17,2	6,83	3,74	3,04
49	42,3	22,0	19,0	7,74	3,86	3,81
50	45,7	20,3	19,0	8,41	4,80	3,46
	Length	Width	Height	Total weight	Weight soft body	Weight shell
Average	46,40	22,64	18,76	9,59	5,07	4,29
Stdev	3,26	1,63	1,56	2,29	1,37	1,03
Min	41,30	19,60	14,10	6,60	2,78	2,79
Max	60,50	28,00	23,30	18,65	11,07	7,34

Species:	Blue mussel (<i>Mytilus edulis</i>)	Date of sampling:	12.9.2006			
Length:	4-6 cm	Sampled by:	Marine Inst.			
Location:	Mjoifjordur III, Daltangi	Date of preparation:	28.9.2007			
Coordinates:	651612-133430					
	Length (mm)	Width (mm)	Height (mm)	Total weight (g)	Weight soft body (g)	Weight shell (g)
1	48,1	22,8	21,2	13,22	7,40	5,58
2	49,8	24,7	18,4	11,87	5,98	5,72
3	49,7	21,9	20,7	12,59	7,05	5,39
4	54,7	26,5	23,8	18,40	10,95	7,28
5	46,2	21,5	20,6	11,80	5,69	5,92
6	46,0	22,9	18,4	10,80	5,56	5,02
7	49,7	25,5	19,9	10,60	4,44	6,00
8	55,6	25,3	22,5	20,83	10,12	10,52
9	47,2	24,6	19,4	13,05	7,33	5,66
10	46,2	20,2	22,4	12,22	6,04	5,95
11	41,7	21,4	18,2	9,08	4,07	4,87
12	51,9	22,9	22,5	16,50	8,64	7,20
13	48,0	24,3	20,2	13,80	7,41	6,19
14	45,2	21,5	18,0	8,28	4,13	4,03
15	48,2	22,9	17,7	12,09	6,34	5,57
16	42,2	20,9	19,2	10,89	5,33	5,24
17	45,1	20,0	18,0	9,36	4,86	4,36
18	45,5	21,9	19,4	9,27	4,47	4,66
19	44,0	21,5	17,4	7,59	3,42	4,05
20	43,2	22,3	17,9	8,70	4,91	3,42
21	41,2	20,2	18,3	6,75	3,59	3,09
22	46,5	26,2	17,8	11,20	5,56	5,58
23	42,2	25,2	18,5	12,78	6,63	6,05
24	51,5	19,8	19,9	8,94	3,03	5,59
25	47,0	23,3	22,1	10,35	4,10	6,08
26	42,4	23,0	18,3	10,65	5,00	5,38
27	47,4	22,4	20,6	12,42	6,20	6,03
28	45,5	22,4	17,4	9,25	4,80	4,13
29	48,4	23,8	20,3	13,09	6,92	6,05
30	51,9	26,4	20,9	16,22	8,73	7,2
31	47,2	21,2	20,8	11,50	3,94	7,42
32	46,7	20,6	18,7	10,45	5,93	4,44
33	43,0	21,2	17,3	9,30	4,41	4,65
34	51,4	24,1	21,8	15,86	7,86	7,72
35	53,4	26,1	23,7	17,83	9,34	8,3
36	45,4	22,8	22,6	12,22	7,32	4,75
37	43,8	22,3	18,4	12,43	6,10	6,16
38	43,0	21,2	15,5	9,44	4,61	4,56
39	50,3	23,5	19,2	13,86	6,96	6,53
40	47,7	23,4	19,3	12,71	6,01	6,36
41	45,0	22,0	18,1	8,16	3,00	4,99
42	45,9	24,4	18,1	11,64	5,60	3,92
43	46,9	21,1	19,5	13,06	5,66	6,92
44	51,6	24,0	19,7	13,47	7,38	5,97
45	46,3	24,8	21,9	13,29	7,32	5,88
46	47,7	25,0	18,7	10,57	5,19	5,24
47	41,5	20,5	18,2	7,04	3,46	3,48
48	50,2	25,1	20,5	15,04	7,64	7,26
49	42,2	22,2	16,6	8,70	3,94	4,43
50	42,5	21,5	18,0	9,35	3,91	5,15
	Length	Width	Height	Total weight	Weight soft body	Weight shell
Average	46,9	22,9	19,5	11,77	5,89	5,64
Stdev	3,6	1,8	1,9	2,95	1,83	1,36
Min	41,2	19,8	15,5	6,75	3,00	3,09
Max	55,6	26,5	23,8	20,83	10,95	10,52

Species:	Blue mussel (<i>Mytilus edulis</i>)		Date of sampling:	7.9.2006		
Length:	4-6 cm		Sampled by:	Marine Inst.		
Location:	Hvalstod, Hvalfjordur		Date of preparation:	25.9.2007		
Coordinates:	642375-212670					
	Length (mm)	Width (mm)	Height (mm)	Total weight (g)	Weight soft body (g)	Weight shell (g)
1	47,9	24,2	21,1	14,89	7,26	7,20
2	57,6	26,1	26,6	27,14	12,24	14,22
3	43,3	22,3	17,1	9,09	5,21	3,63
4	45,5	23,7	20,1	11,93	6,55	5,03
5	40,2	21,8	17,2	7,75	4,40	3,07
6	40,3	20,6	16,9	7,66	4,24	3,60
7	40,8	21,4	17,7	8,30	4,74	3,75
8	41,3	22,6	18,9	10,07	5,37	4,99
9	54,0	26,2	19,7	16,15	8,88	7,82
10	57,3	28,0	23,9	20,60	11,65	9,64
11	53,7	28,7	20,4	17,89	9,88	7,90
12	57,7	25,9	22,3	18,31	10,29	7,88
13	52,3	24,2	21,0	12,70	7,47	5,34
14	60,2	23,9	22,6	20,37	12,09	8,51
15	45,3	21,2	16,9	8,34	4,79	3,58
16	43,1	21,7	15,6	6,90	4,13	3,03
17	48,6	21,6	19,5	10,25	5,39	5,36
18	45,4	23,9	18,9	9,82	6,09	4,26
19	58,6	24,9	23,2	18,82	11,80	7,57
20	57,4	25,3	22,6	18,60	10,74	8,40
21	44,5	21,5	21,5	12,67	6,91	6,16
22	39,9	21,7	16,2	7,71	4,39	3,20
23	40,0	19,6	17,3	7,52	3,96	3,44
24	54,9	24,8	26,9	22,01	11,88	10,36
25	51,4	27,2	19,9	14,48	8,07	6,53
26	46,5	22,0	16,9	9,23	5,30	4,04
27	41,9	21,5	17,9	8,90	4,89	4,14
28	40,0	18,8	18,0	7,44	4,20	3,01
29	42,9	20,7	16,9	8,30	4,47	3,58
30	42,9	21,0	16,5	7,65	4,36	3,11
31	46,7	22,3	19,4	11,82	6,10	5,71
32	50,6	24,1	18,4	13,19	7,46	5,76
33	44,6	22,4	17,3	9,16	5,31	3,90
34	57,8	26,8	25,0	23,01	13,46	9,53
35	55,9	27,6	22,8	19,75	12,39	8,18
36	53,5	24,8	22,8	16,65	9,94	7,46
37	52,9	22,2	21,9	15,14	8,22	7,40
38	47,0	23,1	18,8	10,35	6,01	4,56
39	50,5	24,6	21,4	14,00	7,71	6,08
40	41,4	22,0	16,1	7,54	4,20	3,18
41	39,9	19,0	16,2	6,64	3,82	2,66
42	56,1	25,3	23,2	18,99	10,36	8,11
43	58,9	25,6	24,1	22,73	12,16	10,18
44	47,5	21,4	18,9	11,28	6,43	4,65
45	40,6	20,4	14,9	6,58	3,39	2,96
46	42,7	21,9	16,4	7,97	4,60	3,15
47	46,2	23,9	18,7	9,82	5,42	4,13
48	51,0	23,5	20,3	12,99	6,76	6,04
49	60,0	28,0	26,9	29,02	14,78	13,76
50	50,4	23,6	22,7	15,06	8,56	6,30
	Length	Width	Height	Total weight	Weight soft body	Weight shell
Average	48,6	23,4	19,9	13,26	7,37	5,92
Stdev	6,6	2,4	3,1	5,72	3,09	2,74
Min	39,9	18,8	14,9	6,58	3,39	2,66
Max	60,2	28,7	26,9	29,02	14,78	14,22

Species:	Blue mussel (<i>Mytilus edulis</i>)	Date of sampling:	8.9.2006			
Length:	4-6 cm	Sampled by:	Marine Inst.			
Location:	Dvergasteinn, Álftafjörður	Date of preparation:	27.9.2007			
Coordinates:	655989-230215					
	Length (mm)	Width (mm)	Height (mm)	Total weight (g)	Weight soft body (g)	Weight shell (g)
1	50,6	24,8	20,2	11,33	7,14	4,13
2	53,4	24,1	23,9	19,06	8,46	9,86
3	49,2	23,3	19,4	11,31	6,43	4,70
4	50,9	26,2	16,5	10,41	5,22	4,52
5	45,7	24,5	20,0	10,64	6,26	4,29
6	48,3	23,4	21,1	11,99	6,99	4,83
7	47,9	22,1	20,6	10,64	5,84	4,70
8	48,3	23,8	19,5	11,31	6,67	4,57
9	48,4	24,9	21,3	13,39	7,35	5,79
10	40,2	20,7	16,4	6,32	3,62	2,60
11	50,0	26,2	19,8	11,99	7,25	4,50
12	50,1	25,7	19,1	13,31	7,90	5,30
13	43,3	21,1	17,4	7,94	4,86	3,12
14	46,5	23,4	19,9	10,48	6,16	4,26
15	42,3	20,5	15,8	6,66	4,05	2,48
16	57,8	26,1	24,5	22,68	11,97	10,60
17	44,1	20,9	19,1	8,86	5,27	3,54
18	44,5	21,3	17,1	8,09	4,73	3,29
19	50,4	23,5	19,9	12,15	7,25	4,74
20	47,0	23,4	17,9	9,09	5,41	3,62
21	41,0	19,8	16,7	7,15	3,75	3,29
22	40,6	18,7	16,5	6,35	3,54	2,65
23	49,7	24,3	20,3	11,71	6,94	4,65
24	43,4	21,5	18,1	8,50	4,42	3,73
25	47,1	26,0	19,0	11,23	5,89	5,21
26	48,2	22,0	18,2	10,19	5,57	4,53
27	41,8	21,7	15,2	6,39	3,54	2,76
28	44,4	22,7	19,2	10,50	5,69	4,76
29	43,1	22,2	16,2	7,22	3,75	3,27
30	43,1	20,1	16,5	7,21	4,36	2,78
31	43,7	25,0	19,2	13,90	7,70	6,14
32	46,2	22,4	17,3	8,23	5,02	3,12
33	44,5	22,3	17,3	8,76	5,01	3,37
34	55,1	25,9	22,0	15,09	8,79	6,07
35	43,6	20,5	16,7	6,21	3,06	2,99
36	49,0	23,0	21,4	13,42	7,20	6,11
37	45,3	21,8	17,6	8,89	4,75	3,98
38	45,3	22,9	17,7	8,16	4,35	3,70
39	42,6	20,9	16,7	6,89	4,14	2,59
40	46,4	23,1	17,8	8,07	4,93	3,09
41	48,6	24,4	19,7	12,28	6,65	5,47
42	42,6	22,0	15,0	5,89	2,96	2,74
43	43,9	22,2	17,5	8,92	4,63	4,09
44	49,8	23,8	20,6	12,66	7,02	5,57
45	45,9	21,7	17,1	8,62	5,21	3,32
46	48,8	22,4	21,2	9,16	4,10	5,02
47	43,0	20,3	17,8	7,15	4,06	3,01
48	51,3	22,4	26,0	16,05	7,40	8,58
49	51,0	25,0	20,7	13,70	8,08	5,51
50	49,6	23,8	21,6	12,58	7,54	4,99
	Length	Width	Height	Total weight	Weight soft body	Weight shell
Average	46,8	22,9	18,9	10,37	5,78	4,45
Stdev	3,8	1,9	2,4	3,37	1,77	1,70
Min	40,2	18,7	15,0	5,89	2,96	2,48
Max	57,8	26,2	26,0	22,68	11,97	10,60

Species:	Blue mussel (<i>Mytilus edulis</i>)	Date of sampling:	23.8.2006			
Length:	4-6 cm	Sampled by:	Marine Inst.			
Location:	Grimsey	Date of preparation:	8.10.2007			
Coordinates:	663400-180170					
	Length (mm)	Width (mm)	Height (mm)	Total weight (g)	Weight soft body (g)	Weight shell (g)
1	58,2	27,1	25,5	21,82	11,33	10,18
2	51,2	23,8	22,9	12,15	2,15	8,88
3	59,8	30,4	24,8	24,36	12,73	11,07
4	56,4	25,5	21,2	17,46	7,61	8,75
5	54,1	21,3	22,2	19,36	9,30	9,34
6	52,2	23,7	21,0	14,01	7,55	6,25
7	52,0	24,5	26,9	19,79	9,81	9,81
8	48,0	22,9	20,8	15,60	7,54	7,65
9	48,8	24,1	20,7	12,25	5,60	6,12
10	63,8	29,7	24,3	20,01	10,05	9,92
11	60,5	28,8	24,4	22,19	12,38	9,69
12	58,6	27,9	22,9	21,82	11,07	10,22
13	56,6	25,3	21,1	15,00	6,13	7,31
14	52,7	25,4	23,8	18,93	8,77	9,54
15	57,8	25,5	26,2	23,19	10,58	12,08
16	65,9	27,4	23,2	17,33	7,99	8,81
17	59,8	27,7	24,0	19,01	8,70	10,1
18	60,5	28,7	26,6	21,21	9,25	11,51
19	57,2	24,4	24,2	19,90	9,45	9,99
20	64,8	29,3	26,6	20,51	7,64	12,41
21	67,4	32,2	26,3	28,31	11,10	16,35
22	62,5	28,5	25,1	22,36	12,49	9,38
23	55,1	27,3	20,8	17,68	8,21	9,07
24	54,8	25,5	20,1	14,63	7,40	7,22
25	51,6	22,9	21,5	13,12	7,39	5,73
26	53,7	24,7	23,4	19,92	9,21	10,41
27	55,1	25,9	22,7	18,38	9,03	9,24
28	47,6	24,6	21,0	11,78	5,21	6,45
29	47,1	22,3	19,4	12,40	5,47	6,38
30	55,4	27,1	24,3	17,86	9,01	8,64
31	55,2	24,6	23,6	16,98	7,1	9,22
32	52,6	24,2	19,7	14,51	5,77	8,52
33	53,6	27,5	21,2	16,67	8,21	7,79
34	56,8	28,8	22,6	18,77	8,65	9,51
35	53,9	27,1	23,4	16,82	7,99	8,33
36	64,7	31,4	23,7	20,78	10,23	9,91
37	52,4	25,3	24,6	15,47	7,05	7,84
38	61,2	29,3	25,1	18,96	8,90	9,68
39	54,8	23,5	21,6	25,23	8,42	6,36
40	62,3	29,0	26,6	23,3	10,75	12,38
41	51,4	23,2	24,4	14,76	6,58	7,87
42	52,5	24,1	22,9	14,14	5,67	8,03
43	54,8	24,9	24,4	19,24	8,52	9,55
44	56,5	28,1	25,4	17,97	8,35	9,41
45	53,3	23,6	21,1	14,62	6,01	7,99
46	46,3	24,5	19,2	11,02	4,55	6,10
47	57,2	25,3	22,4	18,84	9,62	8,84
48	51,0	25,9	20,3	14,22	7,14	6,78
49	57,2	27,7	22,3	19,37	10,34	8,55
50	51,6	26,5	21,4	16,36	8,87	7,11
	Length	Width	Height	Total weight	Weight soft body	Weight shell
Average	55,8	26,2	23,1	18,01	8,38	8,97
Stdev	5,0	2,5	2,1	3,77	2,13	1,96
Min	46,3	21,3	19,2	11,02	2,15	5,73
Max	67,4	32,2	26,9	28,31	12,73	16,35

Appendix II.

Biological measurements of Cod (*Gadus morhua*) 2007

Species:	Cod (<i>Gadus Morhua</i>)	exped./station	664662 192134	date	12.3.2007	n	25
Location:	North-Northwest of Iceland (1)	B3-2007-190					
Lenght:	30-45cm						
Ship:	Bjarni Sæmundsson						
Expd.leader:	Björn Ævar Steinsson						

Group	exped.-station	Weight jar IFL g	Weight jar and liver g	Weight liver g	Weight ungutted fish, g	Sex 0=female 1=male	Lenght cm	Weight gutted fish, g	Weight fillets g	Age
H 1	190	101,85	108,48	6,63	337	0	33	293,6	58,9	3
	190	106,73	118,39	11,66	340	1	33	231,3	81,1	3
	190	97,81	109,90	12,09	769	1	44	694,4	175,2	4
	190	98,66	112,46	13,80	322	0	32	246,1	62,5	3
	190	102,38	116,37	13,99	325	0	33	267,8	71,9	3
				Sum	58,17	2093,0		175,0	1733,2	449,6
			Average	11,63	418,6		35,0	346,6	89,9	3,2
			STDEV	2,98	196,0		5,0	195,8	48,4	0,4
			Min	6,63	322,0		32,0	231,3	58,9	3
			Max	13,99	769,0		44,0	694,4	175,2	4
H 2	190	98,39	113,78	15,39	358	1	35	314,87	91,1	3
	190	98,25	114,54	16,29	293	0	31	251,2	77,5	3
	190	98,79	119,17	20,38	375	0	34	308,8	79	4
	190	106,11	126,63	20,52	389	0	34	319,8	72,9	3
	190	102,43	123,82	21,39	288	0	31	232,9	54,4	3
	190	97,82	119,74	21,92	362	0	33	306,1	84,4	3
			Sum	115,89	2065,0		198,0	1733,7	459,3	19,0
			Average	19,32	344,2		33,0	288,9	76,6	3,2
			STDEV	2,77	43,0		1,7	37,1	12,5	0,4
			Min	15,39	288,0		31,0	232,9	54,4	3
			Max	21,92	389,0		35,0	319,8	91,1	4
H 3	190	103,49	126,00	22,51	375	0	33	237,1	66,1	4
	190	97,76	121,45	23,69	384	1	35	323,3	92,1	3
	190	101,66	127,72	26,06	446	1	35	355,1	87,7	3
	190	97,96	124,41	26,45	523	0	38	439,3	124,8	3
	190	107,56	134,08	26,52	474	1	35	349,9	82,3	3
	190	98,71	126,67	27,96	476	0	36	409,6	138,4	3
190	112,27	141,38	29,11	637	1	41	530	113,7	4	
			Sum	182,30	3315,0		253,0	2644,3	705,1	23,0
			Average	26,04	473,6		36,1	377,8	100,7	3,3
			STDEV	2,29	89,1		2,6	93,1	25,7	0,5
			Min	22,51	375,0		33,0	237,1	66,1	3
			Max	29,11	637,0		41,0	530,0	138,4	4
H 4	190	98,22	129,07	30,85	598	1	40	516,6	152,2	4
	190	110,72	144,39	33,67	754	1	43	651,4	169,8	4
	190	97,77	136,06	38,29	547	0	31	442	130	3
			Sum	102,81	1899,0		114,0	1610,0	452,0	11,0
			Average	34,27	633,0		38,0	536,7	150,7	3,7
			STDEV	3,76	107,8		6,2	106,1	19,9	0,6
			Min	30,85	547,0		31,0	442,0	130,0	3
			Max	38,29	754,0		43,0	651,4	169,8	4
H 5	190	102,26	150,30	48,04	841	0	44	685,5	155,2	4
	190	98,61	147,88	49,27	675	1	40	5,94	131,8	4
				Sum	97,31	1516,0		84,0	685,5	287,0
			Average	48,66	758,0		42,0	685,5	143,5	4,0
			STDEV	0,87	117,4		2,8	#DIV/0!	16,5	0,0
			Min	48,04	675,0		40,0	685,5	131,8	4,0
			Max	49,27	841,0		44,0	685,5	155,2	4,0
H 6	190	97,95	152,15	54,20	670	1	40	540	172,2	5
	190	101,89	161,30	59,41	904	0	42	708	136,7	4
				Sum	113,61	1574,0		82,0	1248,0	308,9
			Average	56,81	787,0		41,0	624,0	154,5	4,5
			STDEV	3,68	165,5		1,4	118,8	25,1	0,7
			Min	54,20	670,0		40,0	540,0	136,7	4,0
			Max	59,41	904,0		42,0	708,0	172,2	5,0
H1, H2, H3, H4, H5, H6			Sum	670,09	12462,00		906,00	9654,67	2661,90	86,00
			Average	26,80	498,48		36,24	402,28	106,48	3,44
			STDEV	13,79	183,67		4,26	158,58	38,73	0,58
			Min	6,63	288,00		31,00	231,30	54,40	3,00
			Max	59,41	904,00		44,00	708,00	175,20	5,00

Species:	Cod (<i>Gadus Morhua</i>)	exped./station			date	n
Location:	North- Northwest of Iceland (2)	TP1-2007-96	665026	241965	15.3.2007	1
Lenght:	30-45cm	TP1-2007-97	664701	241756	15.3.2007	4
Ship:	Páll Pálsson ÍS-102	TP1-2007-98	664034	241745	15.3.2007	3
Expd.leader:	Hjalti Karlsson	TP1-2007-99	662230	245859	15.3.2007	7
		TP1-2007-100	661429	253025	16.3.2007	10
		662633	247419			25

Group	exped.-station	Weight jar IFL g	Weight jar and liver g	Weight liver g	Weight ungutted fish, g	Sex 0=female 1=male	Lenght cm	Weight gutted fish, g	Weight fillets g	Age
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H 1	100	97,75	105,62	7,87	304	1	32,0	241,0	77,4	2
	96	102,40	112,24	9,84	270	0	31,0	243,0	77,4	3
	100	102,65	114,58	11,93	251	0	30,0	212,0	64,6	2
	100	106,91	120,06	13,15	731	1	43,0	643,5	145,3	4
	99	97,68	111,14	13,46	340	0	35,0	297,3	79,9	3
					Sum	1896,0		171,0	1636,8	444,6
				Average	379,2		34,2	327,4	88,9	2,8
				STDEV	199,6		5,3	179,4	32,1	0,8
				Min	251,0		30,0	212,0	64,6	2
				Max	731,0		43,0	643,5	145,3	4

H 2	99	97,93	113,91	15,98	662	1	43,0	601,3	136,4	4	
	100	102,12	120,65	18,53	576	1	40,0	476,9	82,4	3	
	100	97,57	116,55	18,98	715	0	42,0	627,1	173,4	4	
	97	98,00	118,94	20,94	685	0	41,0	571,6	66,4	3	
					Sum	2638,0		166,0	2276,9	458,6	14,0
					Average	659,5		41,5	569,2	114,7	3,5
				STDEV	59,7		1,3	65,6	49,3	0,6	
				Min	576,0		40,0	476,9	66,4	3	
				Max	715,0		43,0	627,1	173,4	4	

H 3	100	97,70	125,83	28,13	552	1	39,0	475,0	88,6	4	
	98	98,26	126,84	28,58	505	1	37,0	417,6	101,2	3	
	100	110,62	139,65	29,03	619	0	40,0	527,2	171	3	
	97	112,68	142,89	30,21	600	0	42,0	511,8	115,5	3	
	99	97,90	128,52	30,62	477	0	38,0	407,7	105,1	3	
	97	98,54	130,94	32,40	489	1	38,0	402,9	116,8	3	
	100	112,08	144,79	32,71	746	1	44,0	629,2	100,8	4	
					Sum	3988,00		278,0	3371,4	799,0	23,0
					Average	569,71		39,7	481,6	114,1	3,3
				STDEV	94,90		2,5	82,2	26,8	0,5	
				Min	477,00		37,0	402,9	88,6	3	
				Max	746,00		44,0	629,2	171,0	4	

H 4	99	106,58	139,63	33,05	702,0	0	43,0	557,2	123,4	3	
	99	97,93	132,90	34,97	603,0	0	40,0	426,4	132,6	3	
	98	106,41	142,54	36,13	676,0	1	43,0	549,0	137,4	4	
	100	107,32	144,74	37,42	527,0	0	39,0	436,3	87,6	3	
	99	98,78	137,06	38,28	873,0	0	44,0	672,4	171,5	4	
					Sum	3381,0		209,0	2641,3	652,5	17,0
					Average	676,2		41,8	528,3	130,5	3,4
				STDEV	129,4		2,2	101,1	30,1	0,5	
				Min	527,0		39,0	426,4	87,6	3	
				Max	873,0		44,0	672,4	171,5	4	

H 5	100	98,36	138,54	40,18	615,0	0	41,0	532,7	138,2	4	
	98	97,79	140,05	42,26	596,0	0	41,0	503,5	145,9	3	
	99	97,74	142,76	45,02	860,0	0	43,0	648,9	195,5	3	
	97	98,33	143,53	45,20	617,0	1	40,0	504,8	165,0	3	
					Sum	2688,0		165,0	2189,9	644,6	13,0
					Average	672,0		41,3	547,5	161,2	3,3
					STDEV	125,7		1,3	68,9	25,5	0,5
				Min	596,0		40,0	503,5	138,2	3,0	
				Max	860,0		43,0	648,9	195,5	4,0	

H1, H2, H3, H4, H5				Sum	694,87	14591,00		989,0	12116,30	2999,30	81,00
				Average	27,79	583,64		39,56	484,65	119,97	3,24
				STDEV	11,39	164,0		3,9	131,5	37,5	0,6
				Min	7,87	251,0		30,0	212,0	64,6	2,0
				Max	45,20	873,00		44,00	672,40	195,50	4,00

Species:	Cod (<i>Gadus Morhua</i>)	exped./station			date	n
Location:	Northeast of Iceland	TB1-2007-101	662175	131175	11.3.2007	11
Lenght:	30-45cm	TB1-2007-109	661140	122985	12.3.2007	14
Ship:	Bjartur NK	661595 126588,6				25
Expd leader:	Jónbjörn Pálsson					

Group	exped.-station	Weight jar IFL g	Weight jar and liver g	Weight liver g	Weight ungutted fish, g	Sex 0=female 1=male	Lenght cm	Weight gutted fish, g	Weight fillets g	Age
H 1	101	98,34	104,95	6,61	513	1	38,0	458,0	141,1	4
	101	106,45	113,73	7,28	332	1	33,0	292,0	91,1	3
	101	102,52	111,17	8,65	470	0	39,0	404,0	138,1	4
	109	97,83	107,62	9,79	331	1	34,0	298,0	81,1	3
	109	98,17	108,05	9,88	362	0	36,0	312,0	70	4
	101	102,54	112,69	10,15	532	0	39,0	466,0	155,9	4
			Sum	52,36	2540,0		219,0	2230,0	677,3	22,0
		Average	8,73	423,3		36,5	371,7	112,9	3,7	
		STDEV	1,49	92,4		2,6	80,9	36,3	0,5	
		Min	6,61	331,0		33,0	292,0	70,0	3	
		Max	10,15	532,0		39,0	466,0	155,9	4	
H 2	101	97,63	110,00	12,37	331	1	34,0	285,0	80,6	3
	101	97,58	110,08	12,50	396	0	35,0	349,0	102	3
	109	98,58	111,98	13,40	445	1	38,0	389,0	84,2	5
	101	102,94	116,98	14,04	387	1	36,0	329,0	107,6	4
	109	102,82	117,94	15,12	387	1	35,0	322,0	81	3
			Sum	67,43	1946,0		178,0	1674,0	455,4	18,0
			Average	13,49	389,2		35,6	334,8	91,1	3,6
		STDEV	1,14	40,5		1,5	38,1	12,8	0,9	
		Min	12,37	331,0		34,0	285,0	80,6	3	
		Max	15,12	445,0		38,0	389,0	107,6	5	
H 3	109	98,55	115,53	16,98	383	1	35,0	331,0	66,2	6
	101	98,46	115,72	17,26	473	0	37,0	407,0	119,3	4
	109	101,65	119,57	17,92	383	1	36,0	315,0	56	5
	101	102,48	122,75	20,27	524	0	39,0	453,0	122,7	4
	101	98,52	119,72	21,20	526	1	38,0	454,0	141,6	4
	109	97,73	119,19	21,46	380	0	36,0	316,0	77,5	5
			Sum	115,09	2669,00		221,0	2276,0	583,3	28,0
		Average	19,18	444,83		36,8	379,3	97,2	4,7	
		STDEV	2,03	71,41		1,5	66,7	35,1	0,8	
		Min	16,98	380,00		35,0	315,0	56,0	4	
		Max	21,46	526,00		39,0	454,0	141,6	6	
H 4	101	101,26	125,72	24,46	376,0	1	34,0	316,0	87,7	3
	109	98,37	125,67	27,30	478,0	0	37,0	408,0	89,8	3
	109	98,09	126,16	28,07	583,0	1	39,0	509,0	101,5	4
	109	102,85	131,25	28,40	551,0	1	38,0	478,0	120,8	4
			Sum	108,23	1988,0		148,0	1711,0	399,8	14,0
			Average	27,06	497,0		37,0	427,8	100,0	3,5
			STDEV	1,79	91,9		2,2	85,6	15,2	0,6
		Min	24,46	376,0		34,0	316,0	87,7	3	
		Max	28,40	583,0		39,0	509,0	120,8	4	
H 5	109	102,33	133,84	31,51	518,0	0	37,0	435,0	101,3	3
	109	102,56	137,31	34,75	518,0	1	38,0	436,0	146,0	4
	109	98,87	134,08	35,21	530,0	0	38,0	438,0	117,2	4
	109	102,64	137,92	35,28	528,0	1	38,0	445,0	108,8	4
			Sum	136,75	2094,0		151,0	1754,0	473,3	15,0
			Average	34,19	523,5		37,8	438,5	118,3	3,8
			STDEV	1,80	6,4		0,5	4,5	19,6	0,5
		Min	31,51	518,0		37,0	435,0	101,3	3,0	
		Max	35,28	530,0		38,0	445,0	146,0	4,0	
H1, H2, H3, H4, H5		Sum	479,86	11237,00		917,00	9645,00	2589,10	97,00	
		Average	19,19	449,48		36,68	385,80	103,56	3,88	
		STDEV	9,2	80,0		1,8	69,4	27,2	0,8	
		Min	6,6	331,0		33,0	285,0	56,0	3,0	
		Max	35,28	583,00		39,00	509,00	155,90	6,00	

Appendix III.

Quality assurance in metal analysis and persistent organochlorines analysis

Table 2. Results for trace metals in certified reference materials (mussel tissue 278 and Quasimeme R50) for the year 2006.

Analyte	QTM76BT Quasimeme R50 µg/g	I Z-scoreI	Mussel Tissue ERM-CE278 mg/kg	I Z-score*I	MLOD** mg/kg
As					0,3
<i>Measured</i>	2,320		6,52 ± 0,30		
<i>Certified</i>	2,438	-0,40	6.07 ± 0.13	0,29	
Cd					0,03
<i>Measured</i>	140,000		0,373 ± 0,018		
<i>Certified</i>	169,903	-1,00	0.348 ± 0.007	0,05	
Cu					0,6
<i>Measured</i>	934,000		9,60 ± 0,38		
<i>Certified</i>	1154,253	-1,10	9.45 ± 0.13	0,29	
Hg					0,03
<i>Measured</i>	NA	-	0,162 ± 0,002		
<i>Certified</i>			0,196 ± 0,009	0,49	
Pb					0,03
<i>Measured</i>	175,000		1,72 ± 0,03		
<i>Certified</i>	147,779	1,30	2.00 ± 0.04	0,04	
Se					0,3
<i>Measured</i>	446,000		2,22 ± 0,08		
<i>Certified</i>	480,301	-0,50	1.84 ± 0.10	0,35	
Zn					1,5
<i>Measured</i>	36,100		96,96 ± 9,69		
<i>Certified</i>	37,843	-0,30	83.1 ± 1.7	0,14	

* Z-score ((measured value-certified value)/certified value*0,125)

** MLOD is on dry weight basis

NA: not analyzed

Table 3. Results for trace metals in certified reference materials (DOLT-3 and Quasimeme R50) for the year 2007.

Analyte	QTM75BT Quasimeme R50 µg/g	 Z-score 	DOLT-3 NRC-CNRC mg/kg	 Z-score* 	MLOD** mg/kg
As					
<i>Measured</i>	1,522		9,07 ± 0,79		0,3
<i>Certified</i>	1,616	-0,40	10.2 ± 0.5	0,62	
Cd					
<i>Measured</i>	8,289		17,79 ± 0,69		0,03
<i>Certified</i>	7,834	0,30	19.4 ± 0.6	0,22	
Cu					
<i>Measured</i>	794,000		28,13 ± 2,57		0,6
<i>Certified</i>	721,381	0,50	31.2 ± 1.0	0,33	
Hg					
<i>Measured</i>	NA	–	3,52 ± 0,09		0,03
<i>Certified</i>			3.37 ± 0.14	0,33	
Pb					
<i>Measured</i>	NA	–	0,35 ± 0,09		0,03
<i>Certified</i>			0.319 ± 0.045	0,47	
Se					
<i>Measured</i>	1211,000		7,44 ± 0,83		0,3
<i>Certified</i>	1477,638	-1,40	7.06 ± 0.48	0,38	
Zn					
<i>Measured</i>	5,955		85,05 ± 4,43		1,5
<i>Certified</i>	5,811	0,10	86.6 ± 2.4	0,08	

* Z-score ((measured value-certified value)/certified value*0,125)

** MLOD is on dry weight basis

NA: not analyzed

Table 4. Qualitative assurance. Persistent organochlorines (ng/g ww) in a certified mussel sample from quasimeme, that were analysed with the mussel samples from 2006.

Blue mussel 2006								assign			
chemical	CRM	weight basis	anal. 1	anal. 2	anal. 3	mean	SD	value	time	Z	Det. Lim.
PCB28	QOR091BT	wet weight	0,14	0,12	0,18	0,15	0,03	0,14	2 weeks	0,22	0,01
PCB31	QOR091BT	wet weight	0,10	0,08	0,15	0,11	0,04	0,10	2 weeks	0,39	0,01
PCB52	QOR091BT	wet weight	0,26	0,26	0,32	0,28	0,03	0,27	2 weeks	0,22	0,01
PCB101	QOR091BT	wet weight	1,19	1,12	1,12	1,14	0,04	1,09	2 weeks	0,36	0,01
PCB105	QOR091BT	wet weight	0,19	0,17	0,18	0,18	0,01	0,17	2 weeks	0,30	0,01
PCB118	QOR091BT	wet weight	0,99	0,94	0,95	0,96	0,03	0,92	2 weeks	0,31	0,01
PCB138	QOR091BT	wet weight	2,40	2,23	2,24	2,29	0,10	2,32	2 weeks	-0,10	0,01
PCB153	QOR091BT	wet weight	3,88	3,70	3,75	3,78	0,09	3,61	2 weeks	0,36	0,01
PCB156	QOR091BT	wet weight	0,08	0,08	0,09	0,08	0,01	0,08	2 weeks	0,15	0,01
PCB180	QOR091BT	wet weight	0,16	0,18	0,18	0,17	0,01	0,18	2 weeks	-0,19	0,02
HCB	QOR091BT	wet weight	0,04	0,04	0,04	0,04	0,00	0,04	2 weeks	0,00	0,01
α -HCH	QOR091BT	wet weight	0,02	0,02	0,02	0,02	0,00	0,02	2 weeks	0,00	0,02
β -HCH	QOR091BT	wet weight	0,01	0,02	0,03	0,02	0,01		2 weeks		0,02
γ -HCH	QOR091BT	wet weight	0,06	0,06	0,08	0,07	0,01	0,05	2 weeks	0,92	0,02
pp'-DDE	QOR091BT	wet weight	0,67	0,71	0,67	0,68	0,02	0,65	2 weeks	0,36	0,01
pp'-DDD	QOR091BT	wet weight	0,19	0,22	0,22	0,21	0,02	0,20	2 weeks	0,27	0,01
pp'-DDT	QOR091BT	wet weight	0,05	0,04	0,14	0,08	0,06	0,07	2 weeks	*	0,02
op'-DDT	QOR091BT	wet weight	0,06	0,05	0,08	0,06	0,02	0,07	2 weeks	*	0,02
transn-chlor	QOR091BT	wet weight	0,06	0,05	0,05	0,05	0,01	0,05	2 weeks	0,18	0,01
* "assigned value" only "indicative". Quasimeme does not assign %error and thus Z-score can not be calculated.											
α - and γ -chlordane, oxychlordane and toxaphenes are not certified in this sample by quasimeme											

Table 5. Qualitative assurance. Persistent organochlorines (ng/g ww) in a certified cod liver sample from quasimeme, that were analysed with the cod liver samples from 2007.

Cod liver 2007								assign			
chemical	CRM	weight basis	anal. 1	anal. 2	anal. 3	mean	SD	value	time	Z	Det. Lim.
PCB28	QOR086BT	wet weight	10,1	10,1	9,50	9,90	0,35	9,64	2 weeks	0,21	0,20
PCB31	QOR086BT	wet weight	4,03	4,26	3,60	3,96	0,34	3,86	2 weeks	0,21	0,20
PCB52	QOR086BT	wet weight	24,5	24,5	23,9	24,3	0,35	23,8	2 weeks	0,17	0,10
PCB101	QOR086BT	wet weight	61,8	59,6	60,6	60,7	1,10	65,3	2 weeks	-0,57	0,20
PCB105	QOR086BT	wet weight	18,6	18,3	17,1	18,0	0,79	17,1	2 weeks	0,42	0,05
PCB118	QOR086BT	wet weight	68,9	67,6	65,8	67,4	1,56	73,1	2 weeks	-0,62	0,05
PCB138	QOR086BT	wet weight	131	129	126	129	2,5	136	2 weeks	-0,43	0,05
PCB153	QOR086BT	wet weight	217	223	214	218	4,6	220	2 weeks	-0,07	0,05
PCB156	QOR086BT	wet weight	8,62	8,61	8,87	8,70	0,15	8,59	2 weeks	0,10	0,05
PCB180	QOR086BT	wet weight	42,7	43,3	41,6	42,5	0,86	45,5	2 weeks	-0,52	0,05
HCB	QOR086BT	wet weight	14,0	14,5	13,7	14,1	0,40	13,5	2 weeks	0,33	0,05
α-HCH	QOR086BT	wet weight	1,63	1,62	1,58	1,61	0,03	1,54	2 weeks	0,34	0,05
β-HCH	QOR086BT	wet weight	2,03	2,12	1,83	1,99	0,15	1,83	2 weeks	0,68	0,05
γ-HCH	QOR086BT	wet weight	1,18	1,08	0,98	1,08	0,10	1,03	2 weeks	0,35	0,05
pp'-DDE	QOR086BT	wet weight	80,8	79,8	77,3	79,3	1,80	83,3	2 weeks	-0,38	0,10
pp'-DDD	QOR086BT	wet weight	27,2	27,4	26,7	27,1	0,36	26,0	2 weeks	0,34	0,10
pp'-DDT	QOR086BT	wet weight	< 0.5	0	0			0.61	2 weeks	*	0,20
op'-DDT	QOR086BT	wet weight	0	0	0			0.18	2 weeks	*	0,20
transn-chlor	QOR086BT	wet weight	8,44	8,13	7,80	8,1	0,32	7,80	2 weeks	0,33	0,05
* "assigned value" only "indicative". Quasimeme does not assign %error and thus Z-score can not be calculated.											
α- and γ-chlordane, oxychlordane and toxaphenes are not certified in this sample by quasimeme											

Table 6. Detection limits* (ng/g)

chemical	Detection limits	
	mussel ng/sample dw	Cod liver ng/sample ww
α-HCH	0,05	0,05
HCB	0,01	0,05
β-HCH	0,10	0,05
γ-HCH	0,10	0,05
PCB-31	0,10	0,20
PCB-28	0,10	0,20
PCB-52	0,10	0,10
oxychlorane	0,10	0,20
γ-Chl.	0,10	0,05
PCB-101	0,05	0,20
α-Chl.	0,10	0,05
transnonachlor	0,10	0,05
p,p'-DDE	0,10	0,10
tox 26	0,10	0,10
PCB-118	0,05	0,05
p,p'-DDD	0,10	0,10
o,p'-DDT	0,10	0,20
PCB-153	0,05	0,05
PCB-105	0,05	0,05
p,p'-DDT	0,10	0,20
PCB-138	0,05	0,05
tox 50	0,10	0,10
PCB-156	0,05	0,05
PCB-180	0,20	0,05
tox 62	0,10	0,20
PCB-170	0,05	0,05
PBDE-47	0,10	0,20
PBDE-99	0,10	0,20

*Detection limits are $3 \times$ std. of blanks, or $3 \times$ noise level or higher when Other peaks interfere.

Appendix IV.

Results of trace metal analysis for Blue mussel (*Mytilus edulis*) 2006 and Cod (*Gadus Morhua*) 2007

Table 7. Results of trace metals in Blue mussel (*Mytilus edulis*) 2006 (dw)

Samples	Fat		Dry matter		Pb, mg/kg		Cd, mg/kg		Cu, mg/kg		Zn, mg/kg		As, mg/kg		Se, mg/kg		Hg, mg/kg	
	%	±	%	±	dw	±	dw	±	dw	±	dw	±	dw	±	dw	±	dw	±
Grímsey 06	0,38	0,01	8,5	0,1	0,495	0,033	7,20	0,50	11,23	0,79	336,7	17,5	32,5	1,2	5,88	0,06	0,112	0,004
Hvasshraun 06	0,27	0,01	8,28	0,01	0,176	0,006	1,32	0,01	5,56	0,24	121,8	3,7	16,7	0,8	3,25	0,19	0,048	0,007
Hvítanes, Hvalfjörður 06	0,87	0,01	12,89	0,09	0,081	0,005	1,16	0,03	8,8	0,4	145,2	2,9	10,08	0,30	4,17	0,31	0,032	0,002
Eyri, Hvalfjörður 06	0,70	0,01	12,16	0,05	0,048	0,003	0,71	0,01	6,03	0,40	118,0	2,8	9,01	0,40	3,82	0,22	0,025	0,003
Hvalstöð, Hvalfjörður 06	0,49	0,02	10,1	0,2	0,055	0,008	1,30	0,04	5,65	0,24	158,2	3,1	11,38	0,19	3,83	0,05	0,036	0,002
Mjóifjörður, Hofsá 06	0,28	0,01	7,97	0,09	0,415	0,030	4,96	0,14	11,01	1,59	367,2	29,5	20,6	2,0	6,10	0,95	0,085	0,007
Mjóifjörður, Dalatangi 06	0,18	0,02	6,58	0,03	0,357	0,024	3,16	0,04	6,62	0,75	262,2	6,0	21,4	1,0	3,62	0,25	0,101	0,005
Mjóifjörður, head 06	0,34	0,03	8,60	0,10	0,230	0,034	3,30	0,26	9,83	0,82	232,0	18,8	20,4	1,5	6,20	0,51	0,059	0,006
Úlfsá, Skutulsfjörður 06	0,20	0,01	6,76	0,09	0,654	0,056	2,19	0,06	9,65	0,73	209,5	10,5	153,3	9,2	4,61	0,31	0,126	0,007
Dvergasteinn, Álftafjörður 06	0,44	0,01	9,55	0,04	0,353	0,021	8,03	0,59	12,19	0,85	204,7	15,4	25,2	1,8	6,67	0,50	0,052	0,002
Straumur, Straumsvík 06	0,35	0,01	7,64	0,01	0,142	0,006	3,47	0,08	5,66	0,40	171,9	6,1	15,16	0,68	4,43	0,19	0,054	0,001
Limit of detection for samples (MLOD)					0,03		0,03		0,60		1,5		0,3		0,30		0,03	

Table 8. Results of trace metals in liver and flesh of Cod (*Gadus morhua*) 2007 (ww)

Sample		Fat %		Dry matter %		Pb, µg/g	Cd, µg/g		Cu, µg/g		Zn, µg/g		As, µg/g		Se, µg/g		Dry matter %		Fat %		Hg, µg/g	
		Liver	±	Liver	±	Liver	Liver	±	Liver	±	Liver	±	Liver	±	Liver	±	Flesh*	±	Flesh*	±	Flesh*	±
Cod N-NW (1) 07	Group 1	44,0	0,09	57,1	0,3	< 0,03	0,335	0,003	3,18	0,13	16,25	0,11	7,52	0,08	1,09	0,02						
	Group 2	55,7	0,3	66,5	0,01	< 0,03	0,241	0,002	1,99	0,04	10,59	0,11	7,02	0,06	0,64	0,02						
	Group 3	55,7	0,3	66,3	0,2	< 0,03	0,193	0,001	2,27	0,02	10,41	0,25	5,51	0,08	0,64	0,04						
	Group 4	59,5	0,3	69,9	0,01	< 0,03	0,188	0,003	2,28	0,03	9,81	0,21	6,08	0,12	0,63	0,03						
	Group 5	63,6	0,01	72,4	0,08	< 0,03	0,150	0,005	1,35	0,04	9,08	0,38	5,06	0,23	0,55	0,02						
	Group 6	68,9	0,2	77,3	0,3	< 0,03	0,170	0,003	1,94	0,06	8,68	0,26	4,84	0,16	0,52	0,02						
	Average						0,213		2,17		10,80		6,01		0,68		19,20	0,4	0,2	0,17	0,035	0,001
Cod N-NW (2) 07	Group 1	43,3	0,2	55,5	0,02	< 0,03	0,355	0,008	3,44	0,04	16,76	0,60	7,26	0,29	1,14	0,05						
	Group 2	34,9	0,1	49,1	0,03	< 0,03	0,315	0,002	4,10	0,06	17,93	0,82	7,48	0,23	1,24	0,10						
	Group 3	61,3	0,2	70,5	0,1	< 0,03	0,341	0,004	3,16	0,03	12,15	0,69	4,97	0,29	0,64	0,04						
	Group 4	63,3	0,3	71,9	0,2	< 0,03	0,371	0,011	3,44	0,08	13,07	0,62	5,15	0,25	0,69	0,06						
	Group 5	64,4	0,2	73,2	0,08	< 0,03	0,169	0,003	2,64	0,08	12,07	0,75	6,36	0,31	0,60	0,01						
	Average						0,310		3,36		14,40		6,24		0,86		18,8	0,4	0,2	0,17	0,049	0,001
Cod NE 07	Group 1	34,1	0,06	48,8	0,05	< 0,03	0,365	0,005	4,88	0,12	20,95	1,71	8,07	0,17	1,34	0,04						
	Group 2	41,3	0,1	53,8	0,03	< 0,03	0,317	0,001	3,60	0,17	17,32	0,18	6,15	0,10	1,24	0,04						
	Group 3	49,4	0,1	61,0	0,1	< 0,03	0,319	0,003	3,37	0,12	15,10	0,18	6,66	0,05	1,23	0,03						
	Group 4	55,6	0,04	67,4	0,05	< 0,03	0,140	0,002	3,42	0,05	13,34	0,33	6,73	0,14	0,91	0,04						
	Group 5	60,6	0,1	70,7	0,3	< 0,03	0,162	0,003	2,40	0,03	10,68	0,18	5,77	0,09	0,78	0,00						
	Average						0,261		3,53		15,48		6,68		1,10		18,6	0,4	0,1	0,12	0,030	0,000
Average of all measurements							0,26		2,97		13,39		6,29		0,87						0,04	
Limit of detection for samples (MLOD)						0,03	0,030		0,60		1,5		0,3		0,30						0,03	

*Flesh was pooled into one sample

Appendix V.

**Results of organochlorine analysis for
Blue mussel (*Mytilus edulis*) 2006 and
Cod (*Gadus morhua*) 2007**

Table 9. Persistent organochlorines in Blue mussel (*Mytilus edulis*, ng/g dw) 2006.

	Grimsey 06	Úlfásá 06	Dvergasteinn 06	Dalatangi 06	Mjóifj. Bryggja 06	Mjóifj. botn 06	Hvalstöð 06	Hvítanes 06
PCB28	<0,1	0,15	<0,1	0,29	0,20	0,19	0,13	0,14
PCB31	<0,1	0,11	<0,1	0,31	0,21	0,22	0,13	0,12
PCB52	<0,1	0,23	0,27	0,48	0,26	0,32	0,26	0,25
PCB101	0,23	0,93	1,44	0,77	0,81	0,24	0,88	0,86
PCB105	<0,05	0,17	0,92	0,11	0,13	<0,05	0,22	0,21
PCB118	0,16	0,68	2,74	0,43	0,47	0,19	0,92	0,90
PCB138	0,40	1,51	3,28	0,92	2,76	0,45	1,95	1,88
PCB153	0,72	2,28	3,16	1,70	3,00	0,56	2,74	2,76
PCB156	<0,05	0,10	0,46	<0,05	0,18	<0,05	0,07	0,08
PCB170	<0,05	<0,05	<0,05	<0,05	0,10	<0,05	<0,05	<0,05
PCB180	<0,2	<0,2	<0,2	<0,2	0,55	<0,2	<0,2	<0,2
Σ3PCB*	1,3	4,5	9,2	3,1	6,2	1,2	5,6	5,5
HCB	0,10	0,18	0,12	0,09	0,06	0,07	0,09	0,12
α-HCH	0,17	0,11	0,14	0,15	0,16	0,16	0,18	0,24
β-HCH	<0,1	<0,1	<0,1	<0,1	<0,1	<0,1	<0,1	<0,1
γ-HCH	0,12	<0,1	<0,1	0,27	0,24	0,17	0,17	0,19
p,p'-DDE	0,62	0,63	0,41	1,15	0,67	0,48	0,98	0,96
p,p'-DDD	0,11	0,17	<0,1	0,14	<0,1	0,12	0,22	0,27
p,p'-DDT	<0,1	0,24	0,15	0,18	<0,1	<0,1	0,17	0,16
o,p'-DDT	0,19	0,38	<0,1	0,53	0,30	0,13	0,10	<0,1
PCB153/DDE	1,2	3,6	7,7	1,5	4,5	1,2	2,8	2,9
transnonachlor	0,27	0,45	0,29	0,62	0,36	0,24	0,36	0,38
α-chlordan	0,17	0,11	0,21	0,12	0,26	0,19	0,18	0,28
γ-chlordan	<0,1	<0,1	<0,1	<0,1	0,10	<0,1	<0,1	<0,1
oxychlordan	<0,1	<0,1	<0,1	<0,1	<0,1	<0,1	<0,1	<0,1
Tox-26	0,22	0,23	0,31	0,28	0,28	0,27	0,30	0,36
Tox-50	0,35	0,37	0,53	0,57	0,46	0,46	0,43	0,48
Tox-62	<0,1	0,11	0,18	<0,1	0,10	<0,1	<0,1	<0,1
PBDE-47	<0,1	0,96	<0,1	0,15	0,13	<0,1	0,44	0,46
PBDE-99	<0,1	0,47	<0,1	<0,1	<0,1	<0,1	<0,1	<0,1
% extracted fat	0,48	0,27	0,53	0,22	0,30	0,35	0,49	0,94
% fat	0,4	0,2	0,4	0,2	0,3	0,3	0,5	0,9
% dw	8,5	6,8	9,5	6,6	8,0	8,6	10,1	12,9

*PCB # 118, 138 and 153

Table 9. Cont. Persistent organochlorines in Blue mussel (*Mytilus edulis*, ng/g dw) 2006.

	Hvassahraun 06	Eyri Hvalfj. 06		mean**	Straumur 06
		A	B		
PCB28	0,15	0,28	0,27	0,28	0,13
PCB31	0,13	0,26	0,24	0,25	0,12
PCB52	0,29	0,54	0,45	0,50	0,24
PCB101	0,56	0,97	0,96	0,97	0,83
PCB105	0,12	0,19	0,21	0,20	0,17
PCB118	0,55	0,95	0,88	0,92	0,71
PCB138	0,92	1,77	1,61	1,69	1,72
PCB153	1,22	2,28	2,10	2,19	2,46
PCB156	0,05	0,08	0,08	0,08	0,09
PCB170	<0,05	<0,05	<0,05	<0,05	<0,05
PCB180	<0,2	<0,2	<0,2	<0,2	<0,2
Σ3PCB*	2,7	5,0	4,6	4,8	4,9
HCB	0,10	0,16	0,16	0,16	0,09
α-HCH	<0,1	0,21	0,22	0,22	0,11
β-HCH	<0,1	<0,1	<0,1	<0,1	<0,1
γ-HCH	<0,1	0,23	0,23	0,23	<0,1
p,p'-DDE	0,59	0,80	0,83	0,82	0,72
p,p'-DDD	0,12	0,16	0,26	0,21	0,31
p,p'-DDT	<0,1	0,10	0,16	0,13	0,52
o,p'-DDT	0,27	<0,1	<0,1	<0,1	0,40
PCB153/DDE	2,1	2,9	2,5	2,7	3,4
transnonachlor	0,20	0,33	0,34	0,34	0,23
α-chlordan	0,16	0,26	0,26	0,26	0,14
γ-chlordan	<0,1	<0,1	<0,1	<0,1	0,12
oxychlordan	<0,1	<0,1	<0,1	<0,1	<0,1
Tox-26	0,18	0,36	0,35	0,36	0,24
Tox-50	0,29	0,52	0,51	0,52	0,38
Tox-62	<0,1	0,11	<0,1	<0,11	<0,1
PBDE-47	0,20	0,60	0,60	0,60	0,53
PBDE-99	<0,1	0,16	0,16	0,16	<0,1
% extracted fat	0,38	0,78	0,76	0,77	0,46
% fat	0,3			0,7	0,3
% dw	8,3			12,2	7,6

*PCB # 118, 138 and 153

**Mean of two analysis A and B performed one week apart

Table 10. Persistent organochlorines in cod liver from 2007 (ng/g ww).

	Cod N-NW(1) H1	Cod N-NW(1) H2	Cod N-NW(1) H3	Cod N-NW(1) H4	Cod N-NW(1) H5	Cod N-NW(1) H6
PCB28	1,4	1,5	1,5	1,4	1,5	1,5
PCB31	0,88	1,1	0,96	0,92	1,2	1,3
PCB52	4,5	4,7	4,6	4,3	4,4	5,0
PCB101	7,2	5,6	5,6	5,1	5,2	6,4
PCB105	1,6	0,90	1,0	0,85	0,97	1,1
PCB118	10,5	7,0	7,9	6,8	7,4	8,9
PCB138	16,2	10,1	14,2	12,9	13,9	16,4
PCB153	27,4	17,5	21,0	17,0	19,6	20,9
PCB156	1,3	1,2	1,3	1,1	1,2	1,3
PCB170	2,1	1,4	1,8	1,3	1,8	1,8
PCB180	5,5	4,1	5,2	3,6	5,1	4,7
Σ7PCB*	72,7	50,5	60,0	51,1	57,1	63,8
HCB	11,2	14,8	14,6	14,0	14,9	15,4
α-HCH	4,0	5,0	4,9	5,2	5,8	6,0
β-HCH	0,61	0,73	0,75	0,77	0,91	0,99
γ-HCH	1,1	1,3	1,3	1,4	1,6	1,7
p,p'-DDE	45,5	31,5	31,4	31,6	30,4	42,8
p,p'-DDD	10,9	12,1	11,5	11,3	12,1	13,7
p,p'-DDT	9,2	5,2	9,4	9,3	9,0	12,0
o,p'-DDT	6,5	5,7	6,3	7,7	6,4	8,2
ΣDDT	72,1	54,5	58,6	59,9	57,9	76,7
PCB153/DDE	0,60	0,56	0,67	0,54	0,64	0,49
transnonachlor	20,0	15,4	16,7	15,7	15,1	19,3
α-chlordan	11,9	12,7	12,9	12,1	13,0	12,7
γ-chlordan	3,5	4,2	4,2	3,8	4,3	4,0
oxychlordan	4,6	4,4	4,6	4,1	4,2	5,1
ΣCHL	40,0	36,7	38,4	35,7	36,6	41,1
Tox-26	16,2	16,0	15,9	15,5	15,3	17,0
Tox-50	26,9	27,8	27,1	27,8	26,6	28,6
Tox-62	11,9	14,1	14,2	14,0	14,2	15,8
PBDE-47	2,6	2,7	2,4	2,3	2,3	3,0
PBDE-99	0,20	<0,2	<0,2	<0,2	<0,2	<0,2
PBDE-100	0,47	<0,2	0,35	0,29	0,34	0,44
% extracted fat	45,3	55,5	55,7	58,1	65,9	64,1

*PCB # 28, 52, 101, 118, 138, 153 and 180

Table 10. Cont. Persistent organochlorines in cod liver from 2007 (ng/g ww).

	Cod N-NW(2)	Cod N-NW(2)	Cod N-NW(2)		Cod N-NW(2)	Cod N-NW(2)	Cod N-NW(2)
	H1	H2	H3 A	H3 B	H3**	H4	H5
PCB28	2,1	1,6	2,3	2,2	2,3	2,2	2,5
PCB31	1,7	1,3	1,5	1,6	1,6	1,8	2,4
PCB52	6,6	4,8	7,3	6,7	7,0	6,4	7,9
PCB101	8,5	7,0	9,0	8,7	8,9	7,8	8,0
PCB105	1,3	1,3	1,4	1,1	1,3	1,2	1,4
PCB118	10,2	9,2	10,0	10,0	10,0	8,9	10,1
PCB138	18,4	15,9	19,1	20,0	19,6	17,2	19,5
PCB153	24,8	21,4	24,7	26,5	25,6	20,7	23,3
PCB156	1,6	1,2	1,9	1,3	1,6	1,6	1,9
PCB170	1,9	1,7	1,6	1,7	1,7	1,5	1,7
PCB180	5,5	5,1	5,2	5,4	5,3	4,7	5,4
∑7PCB*	76,1	65,0	77,6	79,5	78,6	67,9	76,7
HCB	16,1	12,2	21,2	22,6	21,9	19,6	22,2
α-HCH	2,5	2,0	3,6	3,8	3,7	3,6	3,7
β-HCH	0,67	0,45	0,79	0,73	0,76	0,80	0,77
γ-HCH	0,51	0,39	0,75	0,78	0,77	0,70	0,74
p,p'-DDE	61,7	50,3	59,2	52,3	55,8	53,6	55,8
p,p'-DDD	16,0	12,8	19,5	21,1	20,3	17,2	19,5
p,p'-DDT	5,5	5,0	8,6	13,9	11,3	9,4	11,0
o,p'-DDT	3,8	3,3	6,7	9,7	8,2	6,0	7,0
∑DDT	87,0	71,4	94,0	97,0	95,5	86,2	93,3
PCB153/DDE	0,40	0,43	0,42	0,51	0,46	0,39	0,42
transnonachlor	23,7	19,8	24,7	26,0	25,4	21,4	24,0
α-chlordan	19,4	14,1	21,2	23,8	22,5	19,2	22,6
γ-chlordan	6,0	4,3	6,8	7,2	7,0	6,7	7,2
oxychlordan	5,1	3,9	6,0	5,9	6,0	4,8	6,1
∑CHL	54,2	42,1	58,7	62,9	60,8	52,1	59,9
Tox-26	20,3	15,6	24,0	25,8	24,9	19,9	23,8
Tox-50	32,2	25,5	42,5	47,1	44,8	36,1	41,2
Tox-62	7,7	7,7	14,0	23,8	18,9	14,5	17,1
PBDE-47	4,0	3,7	3,8	3,4	3,6	3,6	3,6
PBDE-99	<0,2	<0,2	<0,2	<0,2	<0,2	<0,2	<0,2
PBDE-100	0,49	0,40	0,43	0,55	0,49	0,39	0,40
% extracted fat	44,2	34,9	63,2	60,4	61,8	64,3	66,6

*PCB # 28, 52, 101, 118, 138, 153 and 180

**Mean of two different analysis performed one week apart

Table 10. Cont. Persistent organochlorines in cod liver from 2007 (ng/g ww).

	Cod NE H1	Cod NE H2	Cod NE H3	Cod NE H4	Cod NE H5
PCB28	1,7	1,8	1,7	1,6	1,5
PCB31	1,1	1,3	1,3	1,1	1,2
PCB52	6,0	5,9	5,8	5,0	4,5
PCB101	9,1	8,6	8,1	5,7	5,6
PCB105	1,7	1,3	1,2	0,89	0,89
PCB118	10,2	8,9	8,4	6,8	6,8
PCB138	18,8	16,5	15,2	12,4	13,0
PCB153	27,5	22,7	19,9	15,6	15,7
PCB156	1,7	1,5	2,4	1,2	1,2
PCB170	2,2	1,9	1,6	0,94	1,2
PCB180	6,6	5,7	5,0	3,2	3,9
Σ7PCB*	79,9	70,1	64,1	50,3	51,0
HCB	12,0	13,0	14,3	17,0	15,7
α-HCH	3,3	3,9	4,3	5,0	5,1
β-HCH	0,58	0,61	0,66	0,76	0,77
γ-HCH	0,88	1,1	1,1	1,3	1,4
p,p'-DDE	59,6	43,4	39,5	30,6	31,3
p,p'-DDD	15,2	13,6	13,9	12,9	12,7
p,p'-DDT	9,3	9,3	8,8	7,5	8,0
o,p'-DDT	5,3	6,0	6,8	5,7	5,5
ΣDDT	89,4	72,3	69,0	56,7	57,5
PCB153/DDE	0,46	0,52	0,50	0,51	0,50
transnonachlor	24,9	20,3	17,7	15,3	14,9
α-chlordan	13,8	14,2	14,2	13,9	13,1
γ-chlordan	4,7	4,8	5,1	4,7	4,6
oxychlordan	4,7	4,1	4,0	3,7	3,5
ΣCHL	48,1	43,4	41,0	37,6	36,1
Tox-26	19,3	17,8	17,5	15,6	15,5
Tox-50	32,3	30,6	29,7	27,8	28,0
Tox-62	10,3	10,6	12,7	13,5	14,1
PBDE-47	3,4	3,1	3,0	2,4	2,5
PBDE-99	<0,2	<0,2	<0,2	<0,2	<0,2
PBDE-100	0,50	0,43	0,43	0,36	0,29
% extracted fat	35,1	43,2	50,3	56,2	58,6

*PCB # 28, 52, 101, 118, 138, 153 and 180

Appendix VI.

Graphs of biological variation in Cod (*Gadus morhua*) 1990-2007

Biological variation in 30-45 cm Cod (*Gadus morhua*) from Icelandic waters in March 1990-2007

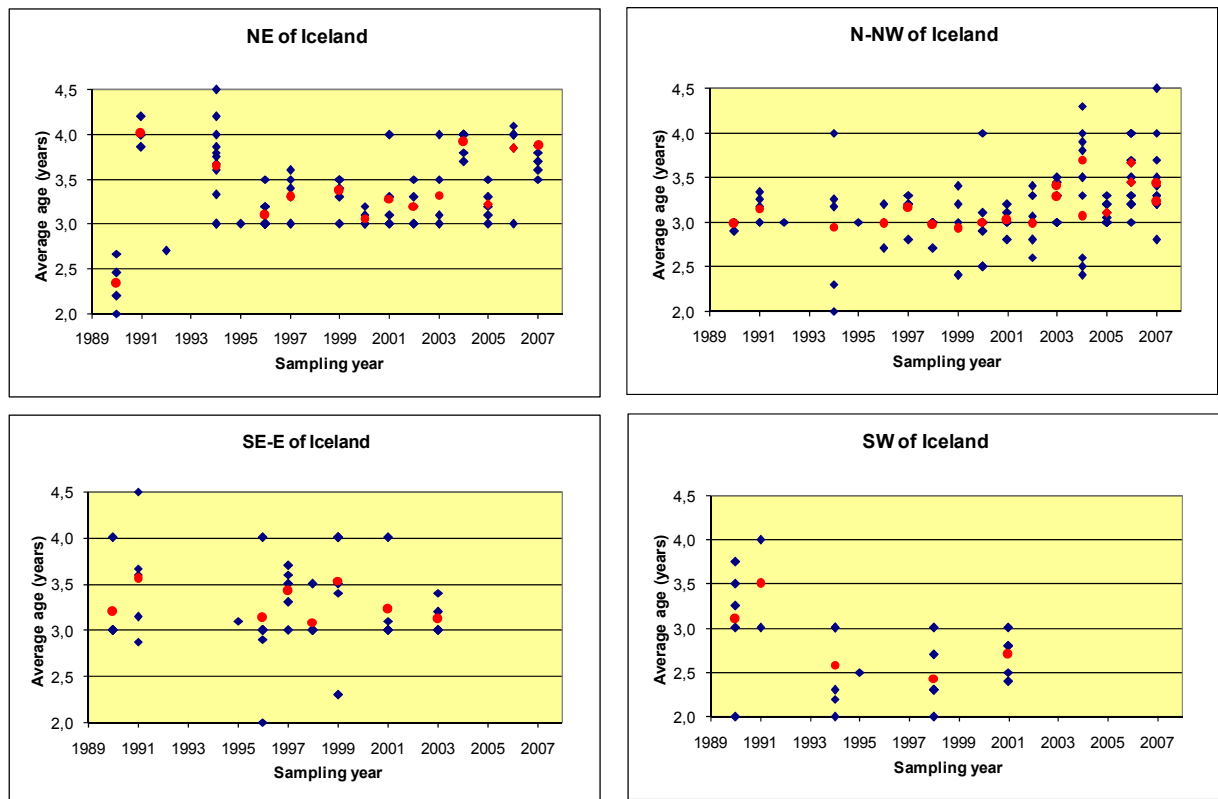


Figure 2a. Average age in 30-45 cm Cod (*Gadus morhua*) from Icelandic waters in March 1990-2007. The red dots represent the average values.

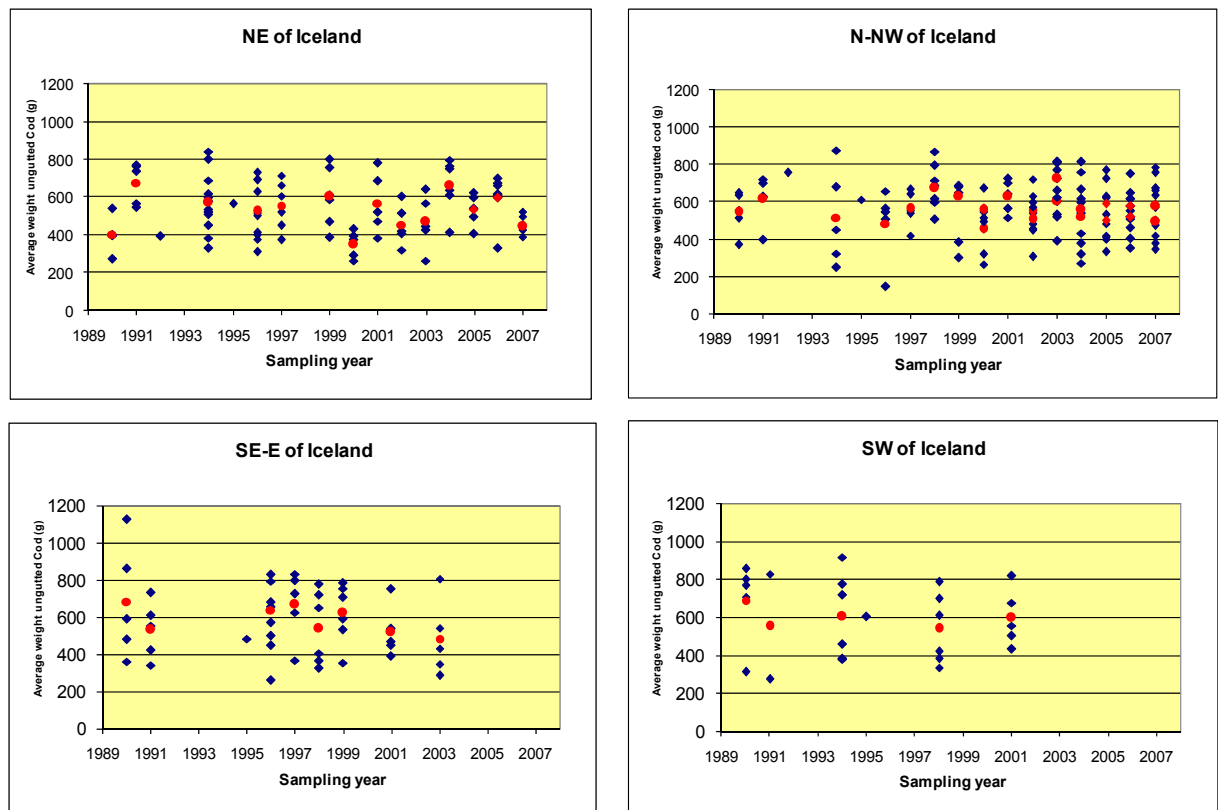


Figure 2b. Average weight un-gutted Cod (*Gadus morhua*), 30-45 cm, from Icelandic waters in March 1990-2007. The red dots represent the average values.

Biological variation in 30-45 cm Cod (*Gadus morhua*) from Icelandic waters in March 1990-2007

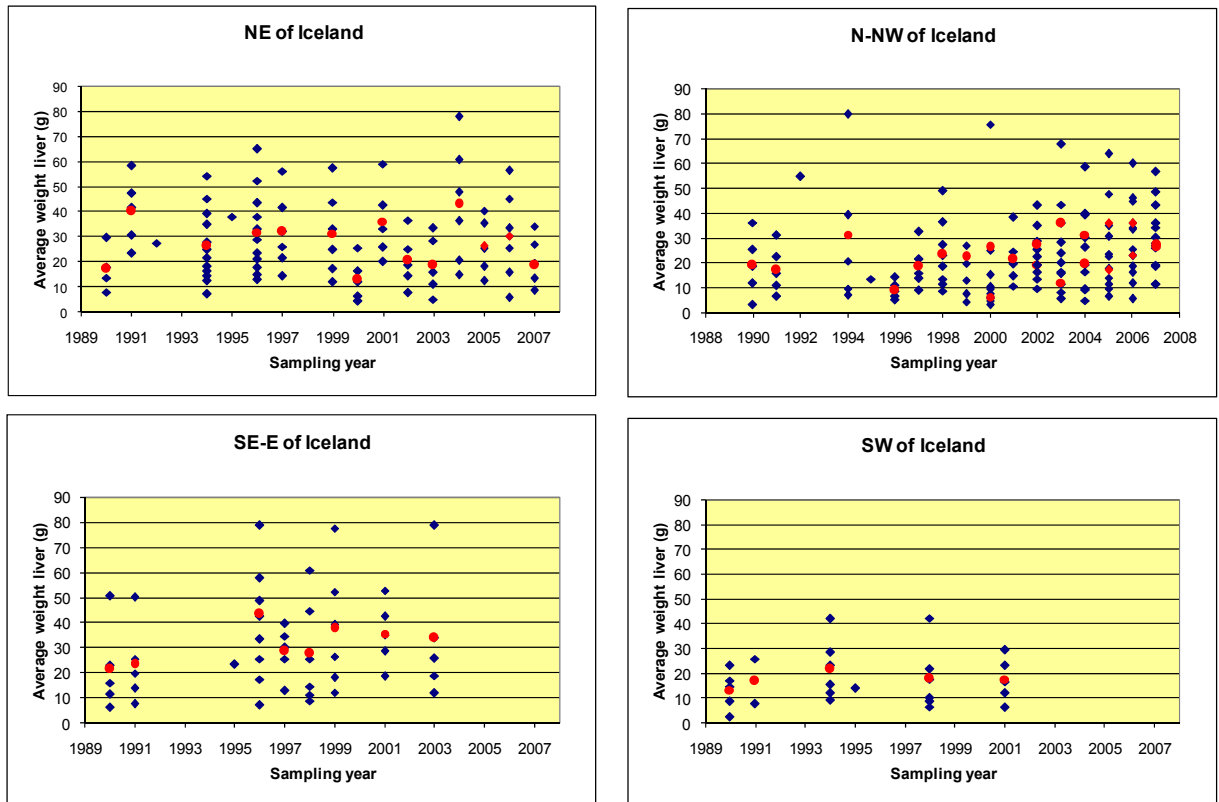


Figure 2c. Average weight liver of Cod (*Gadus morhua*), 30-45 cm, from Icelandic waters in March 1990-2007. The red dots represent the average values.

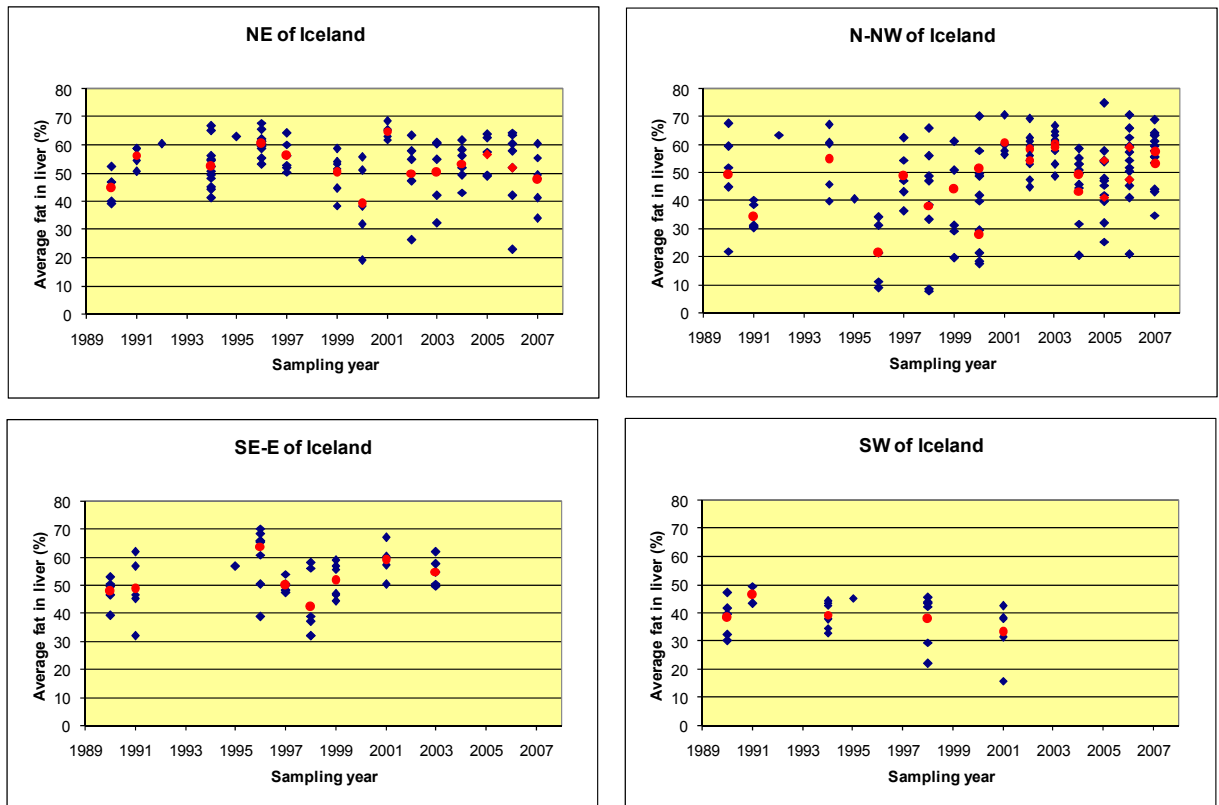


Figure 2d. Average fat (%) in liver of Cod (*Gadus morhua*), 30-45 cm, from Icelandic waters in March 1990-2007. The red dots represent the average values.

Appendix VII.

Graphs of metals and organic compounds in Blue mussel (*Mytilus edulis*) 1990-2006

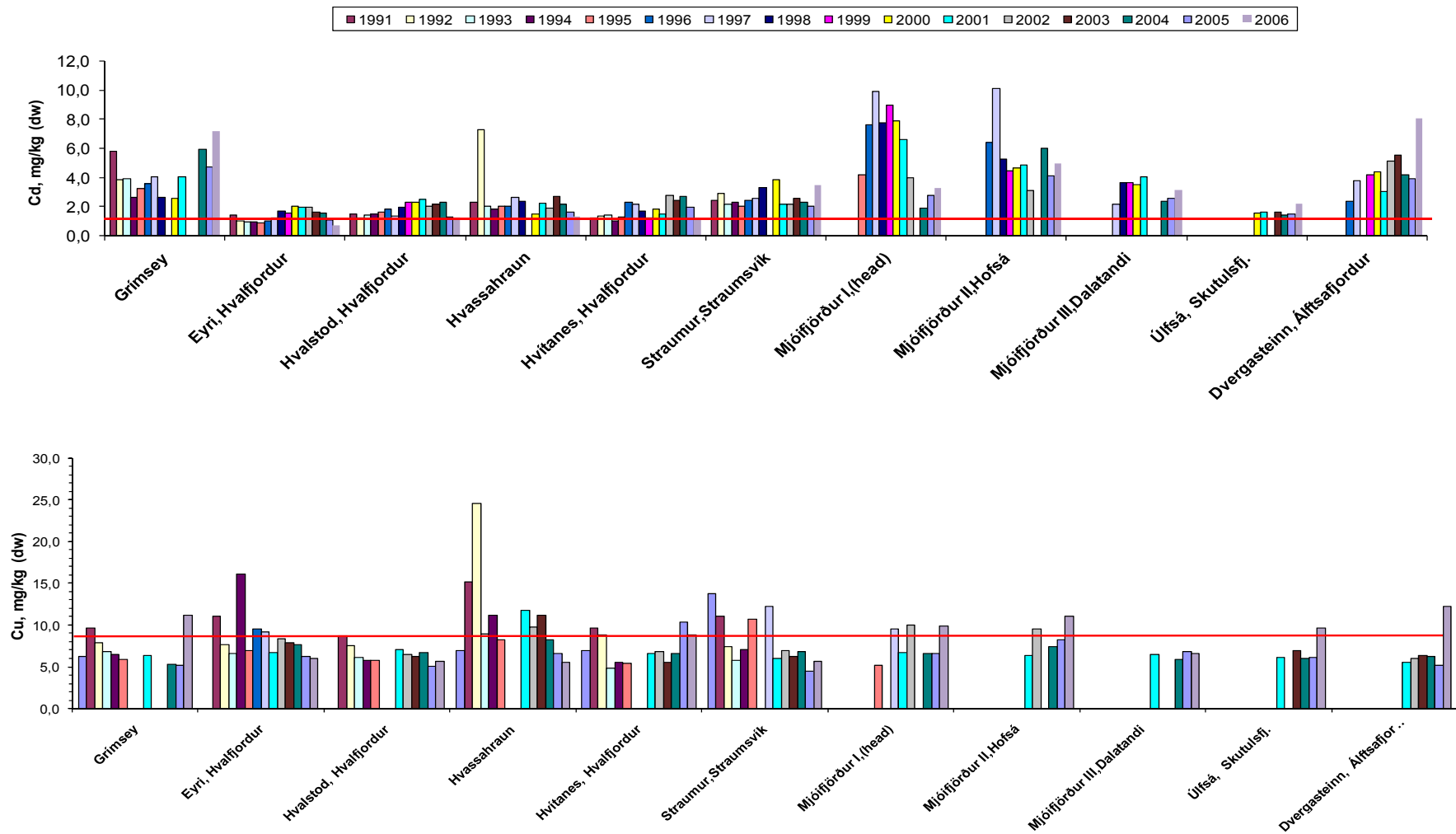


Figure 3a. Cadmium and copper concentration (dw) in Blue mussel (*Mytilus edulis*) around Iceland 1990-2006. Red line indicates ICES 90 75% baseline (11).

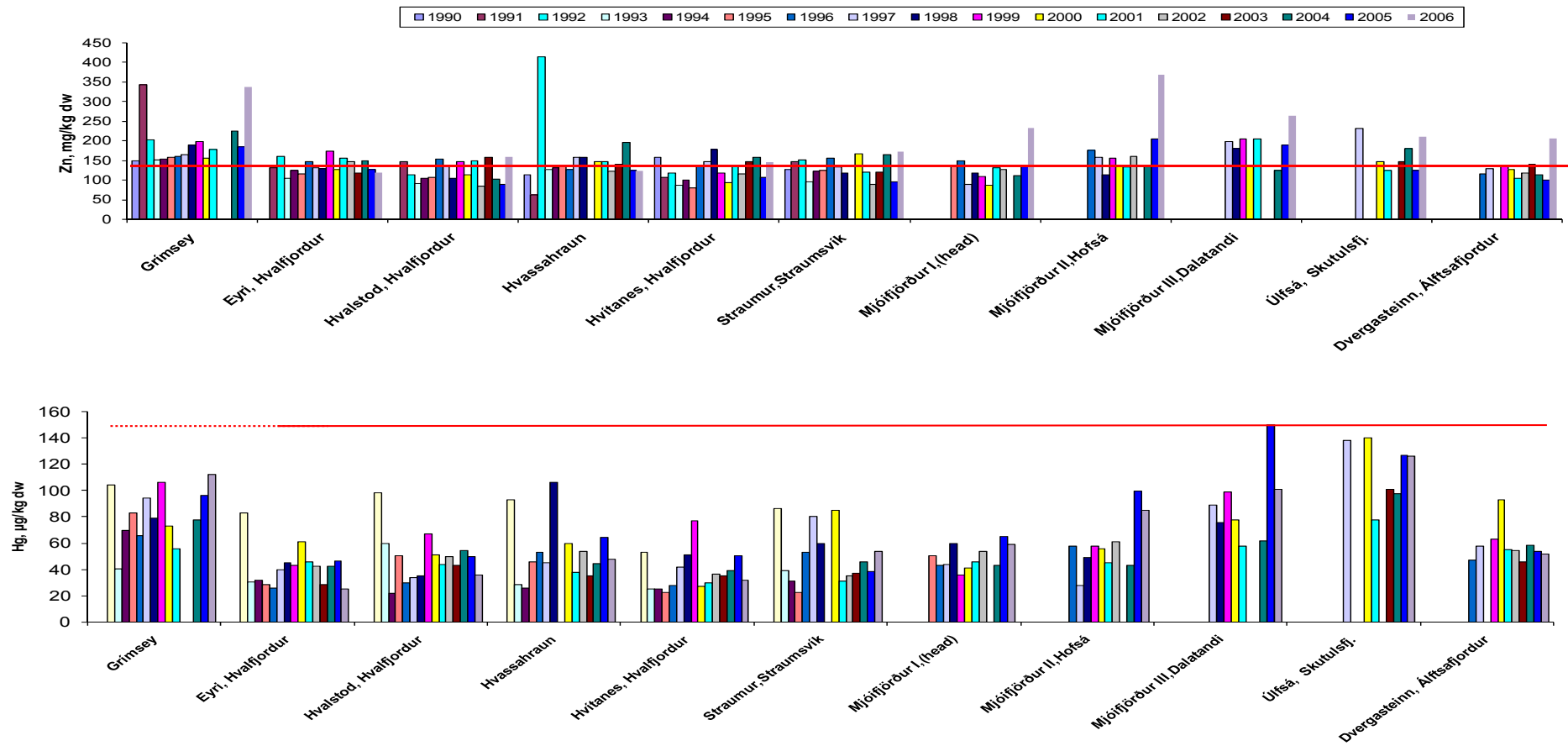


Figure 3b. Zinc and mercury concentration (dw) in Blue mussel (*Mytilus edulis*) around Iceland 1990-2006. Red line indicates ICES 90 75% baseline (11).

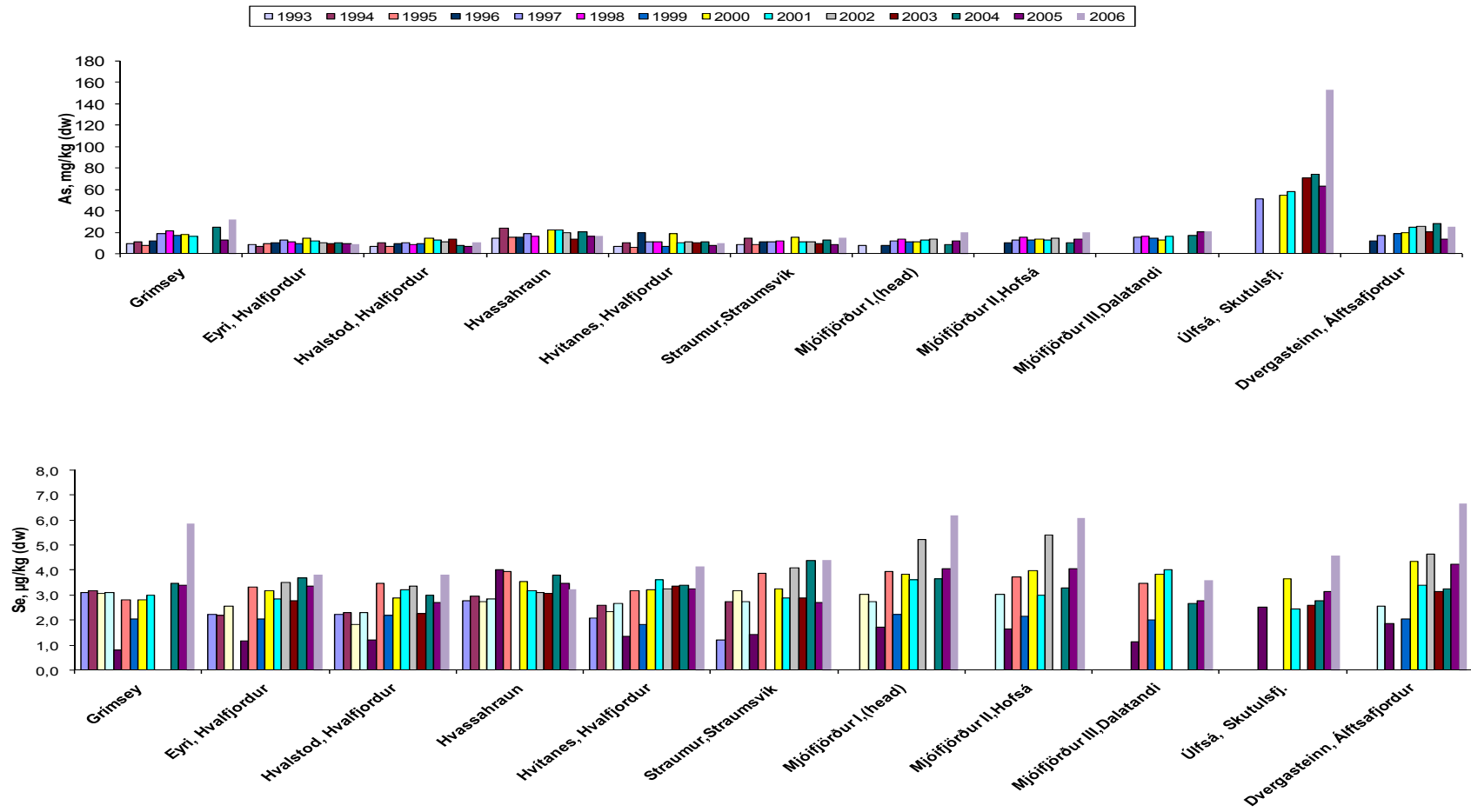


Figure 3c. Arsenic and selenium concentration (dw) in Blue mussel (*Mytilus edulis*) around Iceland 1990-2006.

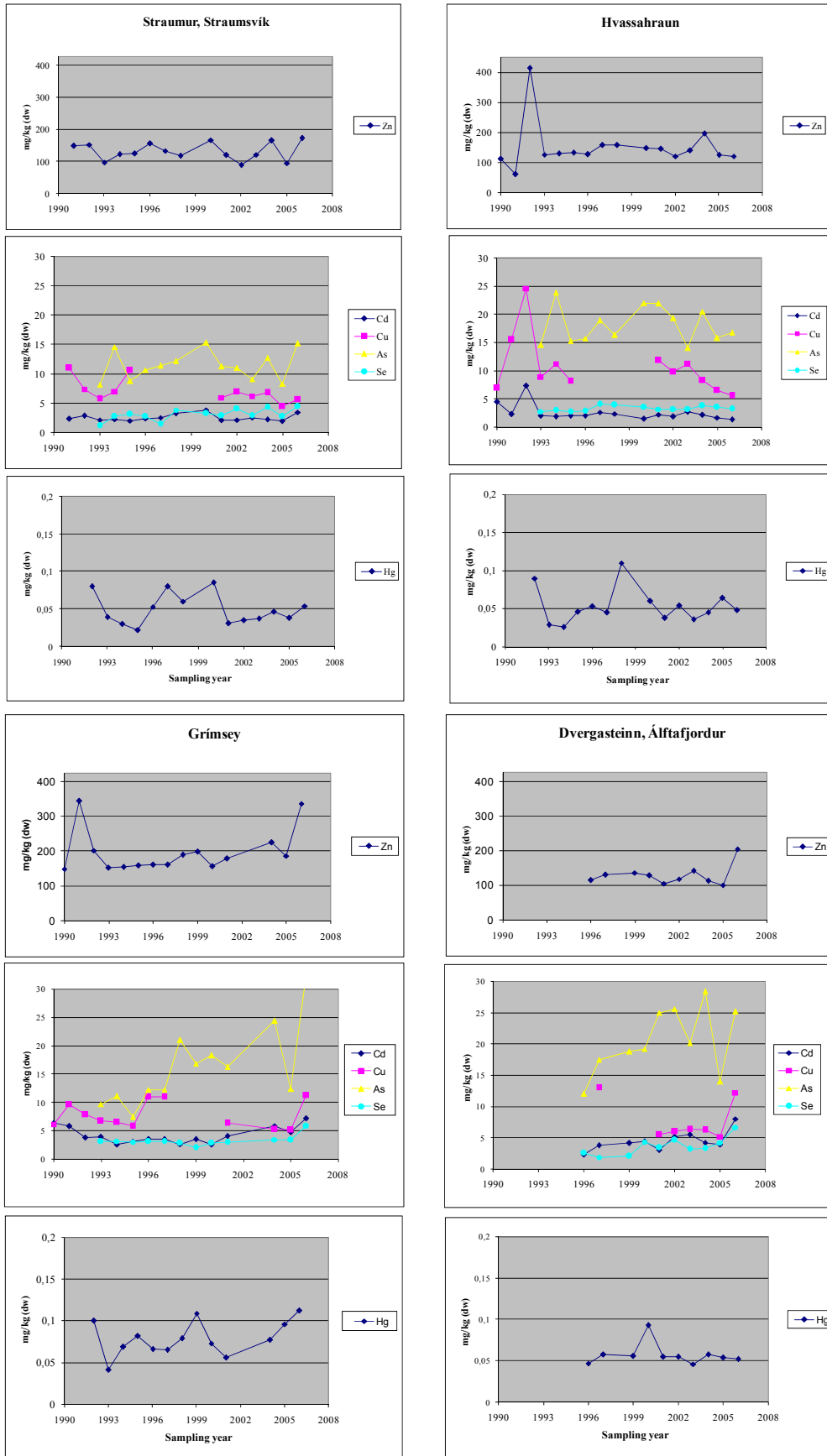


Figure 4a. Concentration of heavy metals (dry weight) in Blue mussel from different sampling sites around Iceland, 1991-2006.

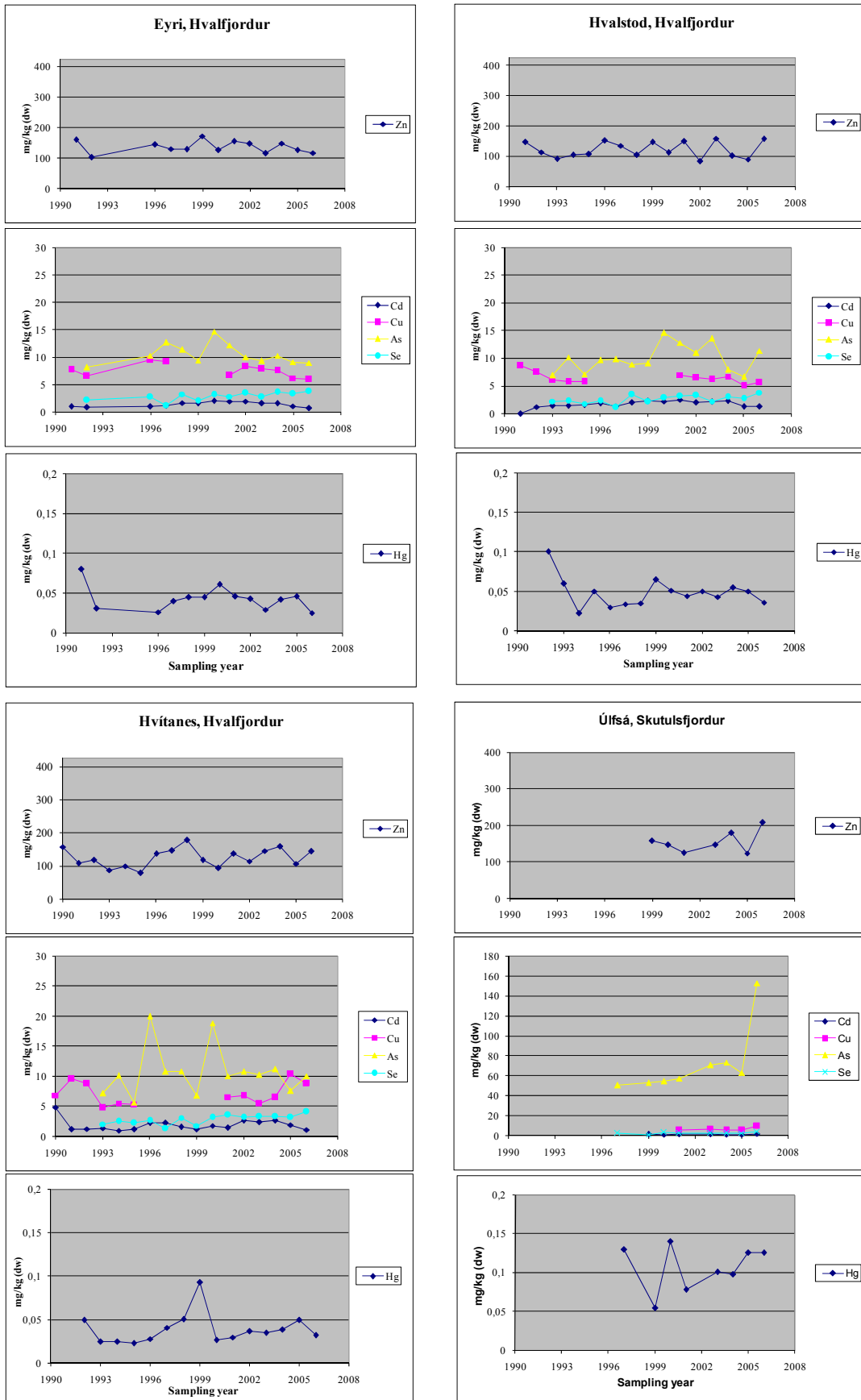


Figure 4b. Concentration of heavy metals (dry weight) in Blue mussel from different sampling sites around Iceland, 1991-2006.

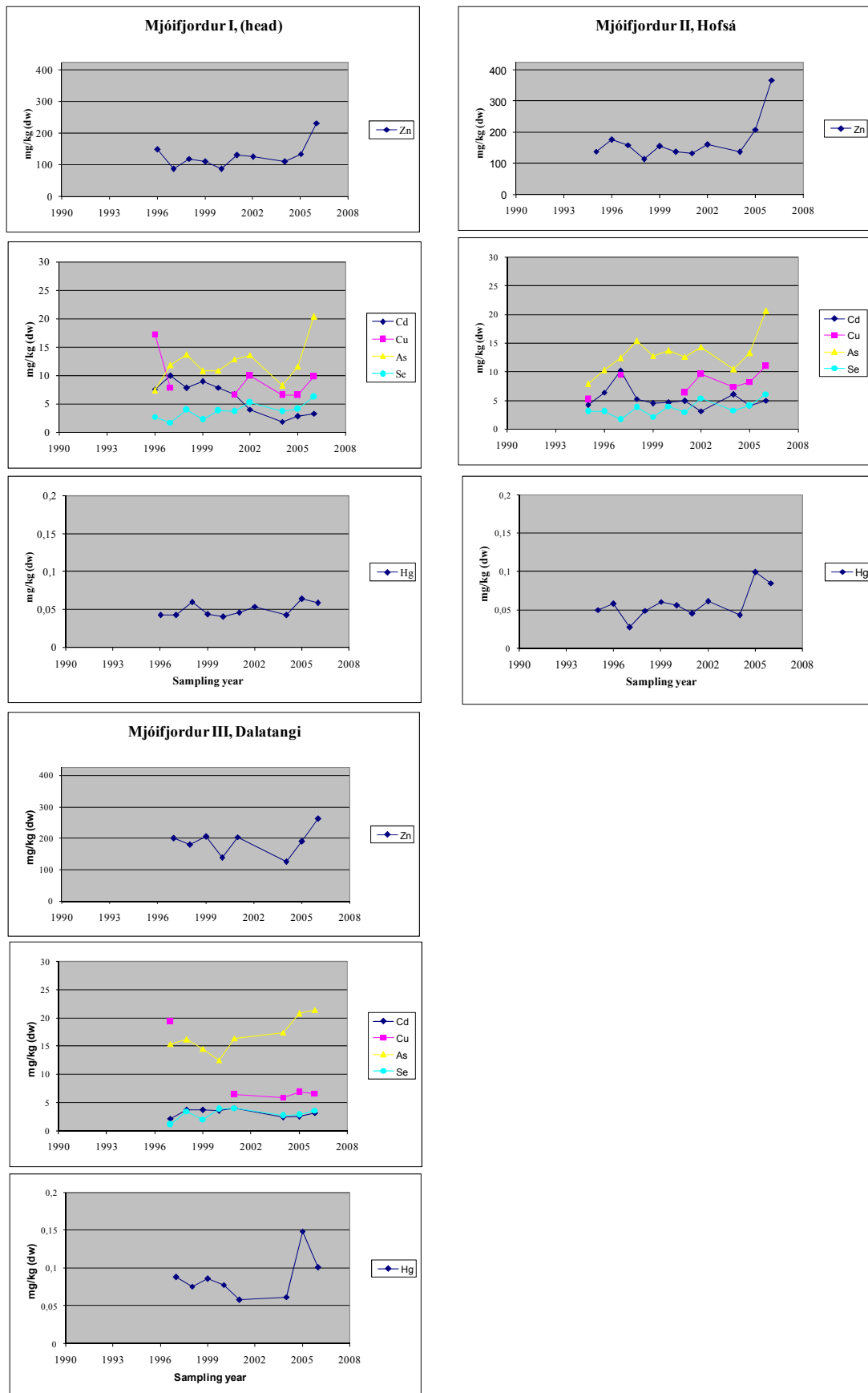


Figure 4c. Concentration of heavy metals (dry weight) in Blue mussel from different sampling sites around Iceland, 1991-2006.

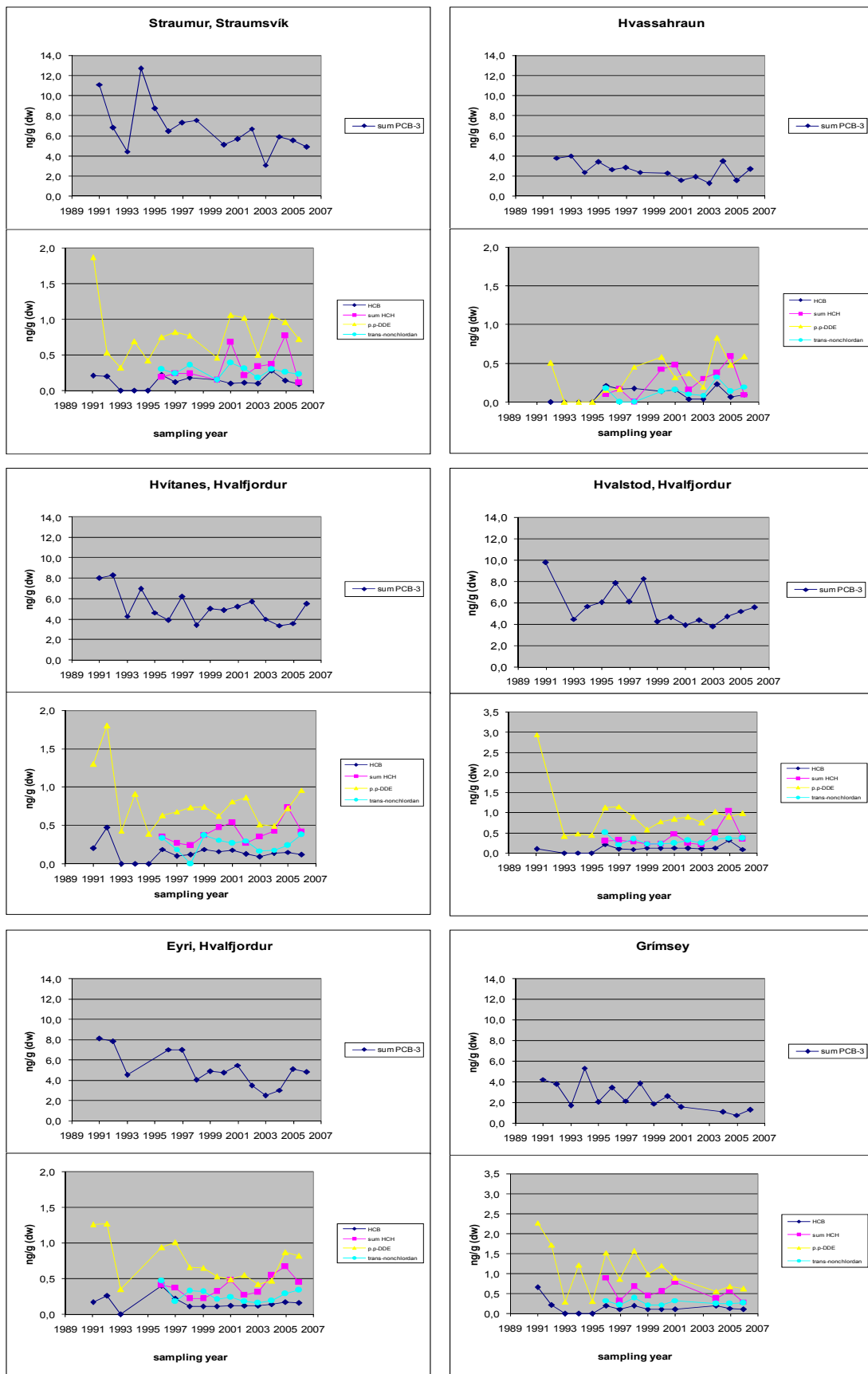


Figure 5a. Concentration of organochlorine compounds (dw) in Blue mussel (*Mytilus edulis*) at different locations 1991-2006.

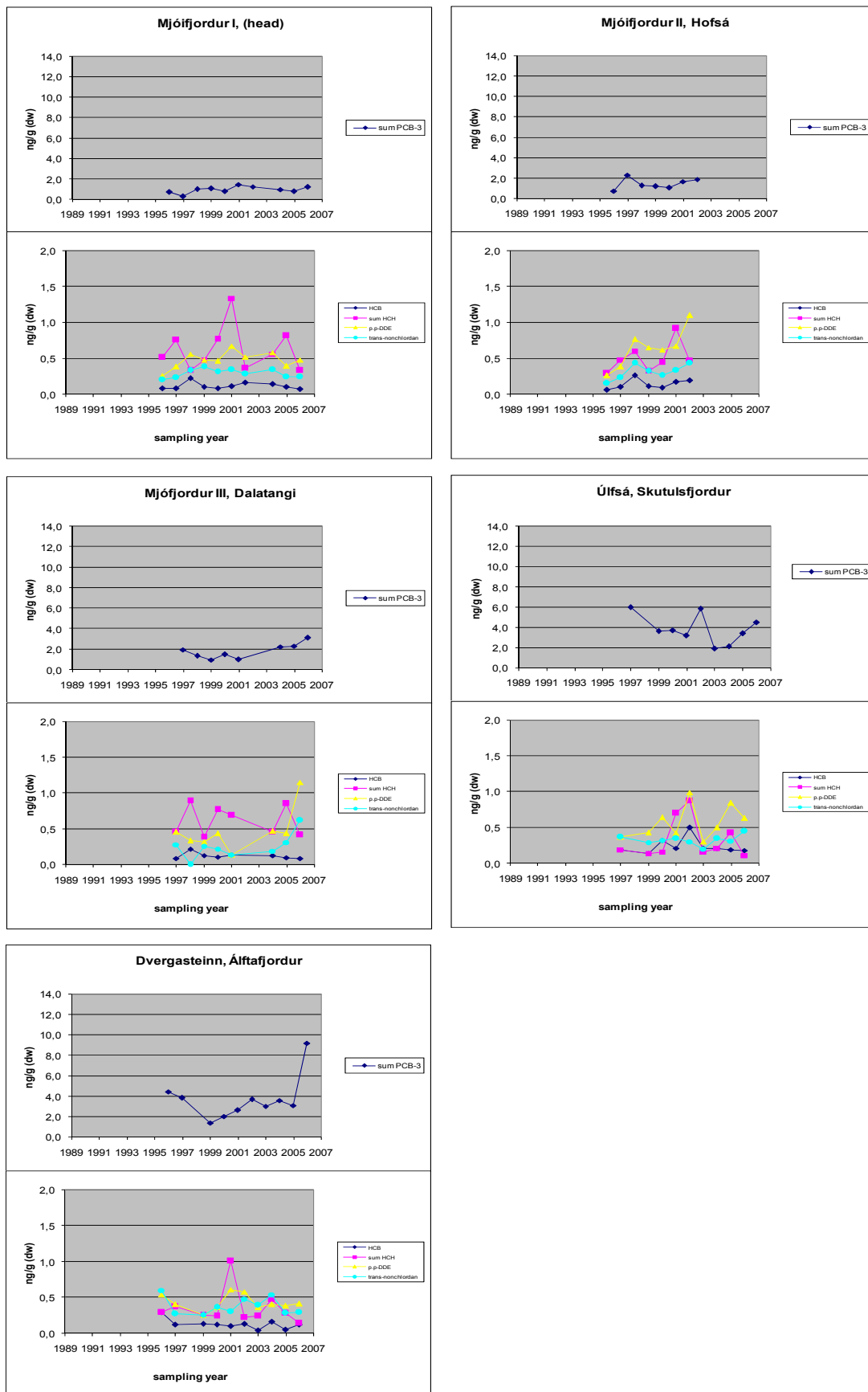


Figure 5b. Concentration of organochlorine compounds (dw) in Blue mussel (*Mytilus edulis*) at different locations 1991-2006.

Appendix VIII.

Graphs of metals and organic compounds in Cod (*Gadus morhua*) 1990-2007

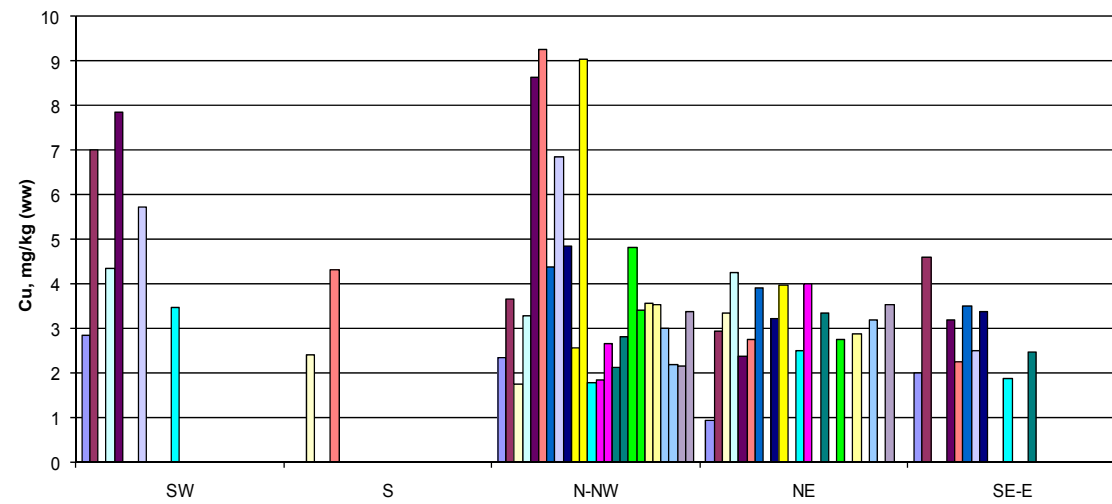
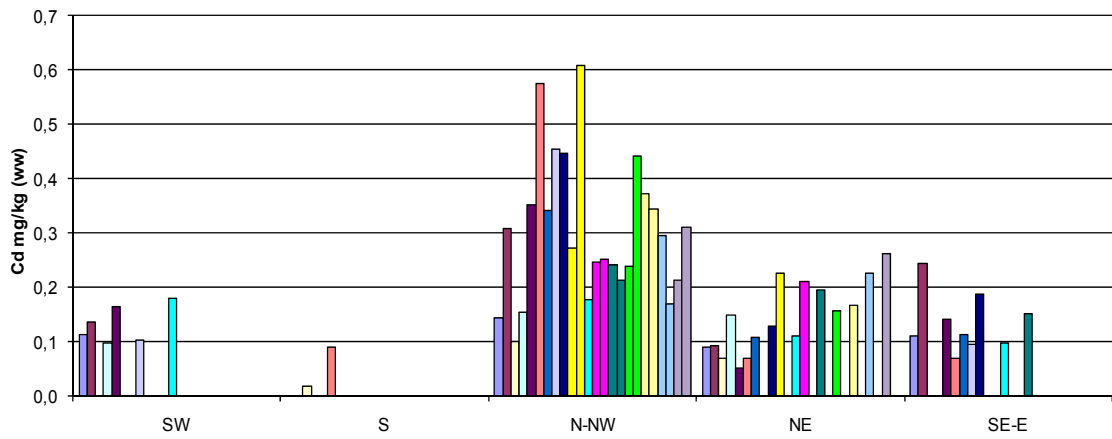
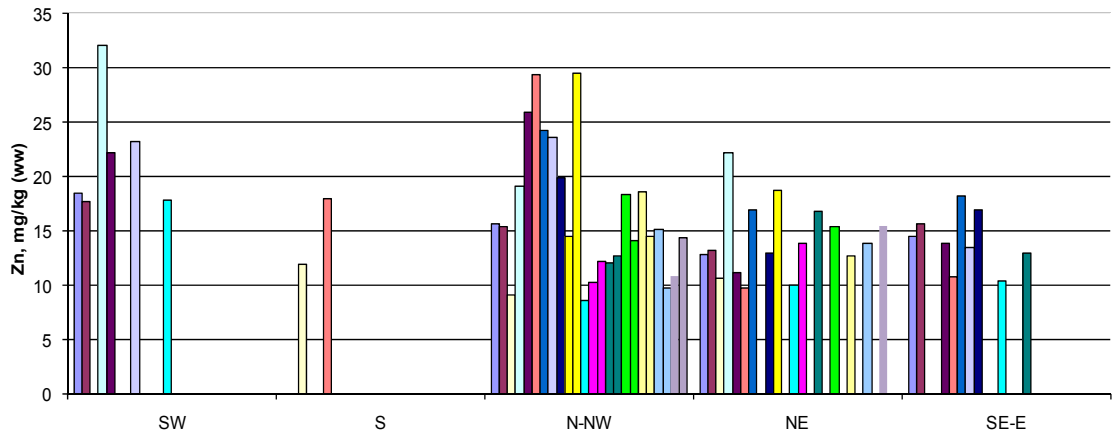
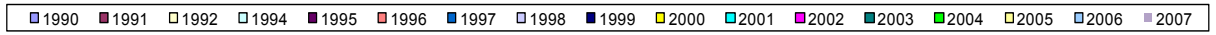


Figure 6a. Heavy metal concentration (ww) in livers of 30-45cm cod (*Gadus morhua*) from Icelandic waters in March 1990-2007.

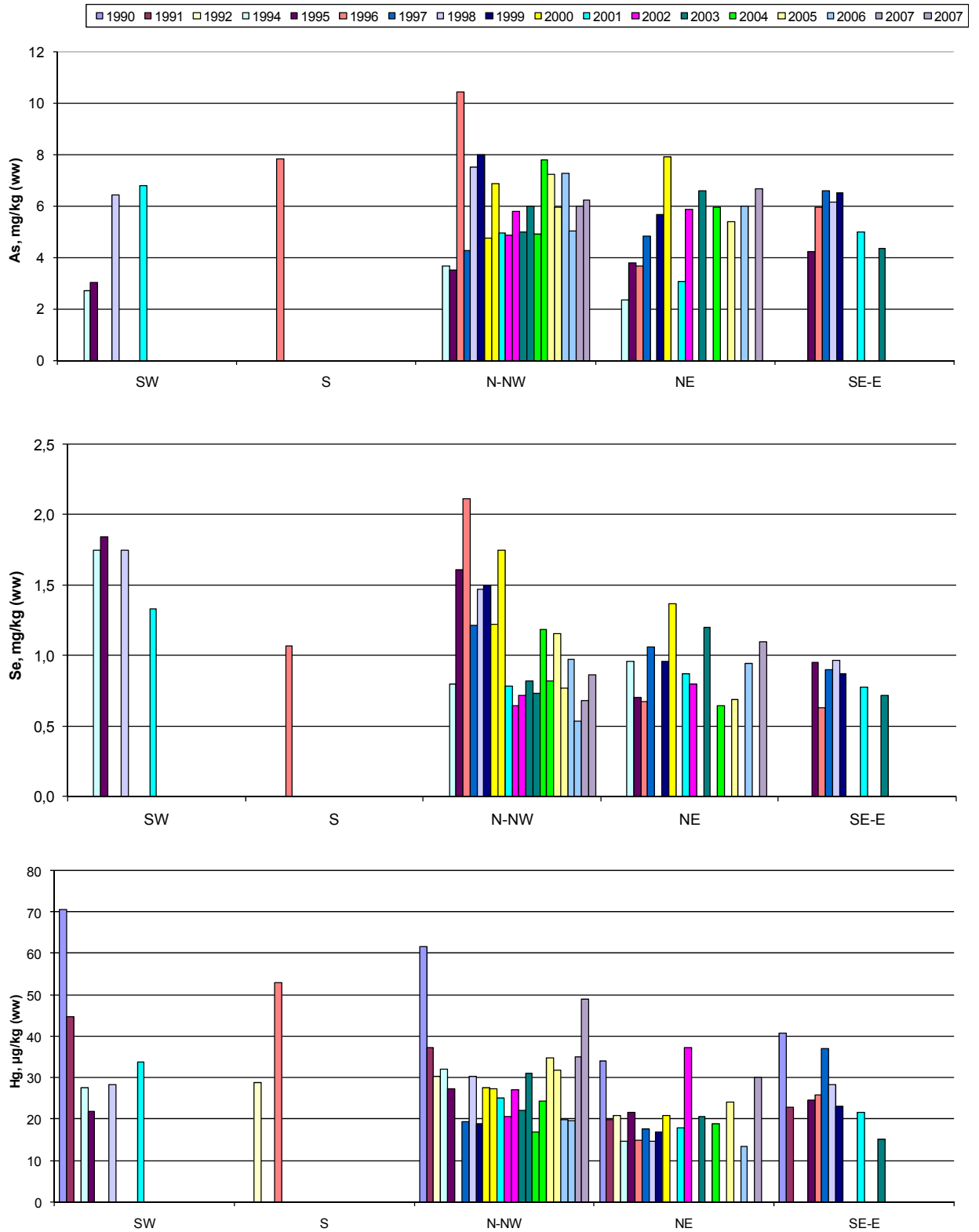


Figure 6b. Heavy metal concentration (ww) in livers of 30-45cm cod (*Gadus morhua*) from Icelandic waters in March 1990-2007. Mercury (Hg) was analysed in the flesh.

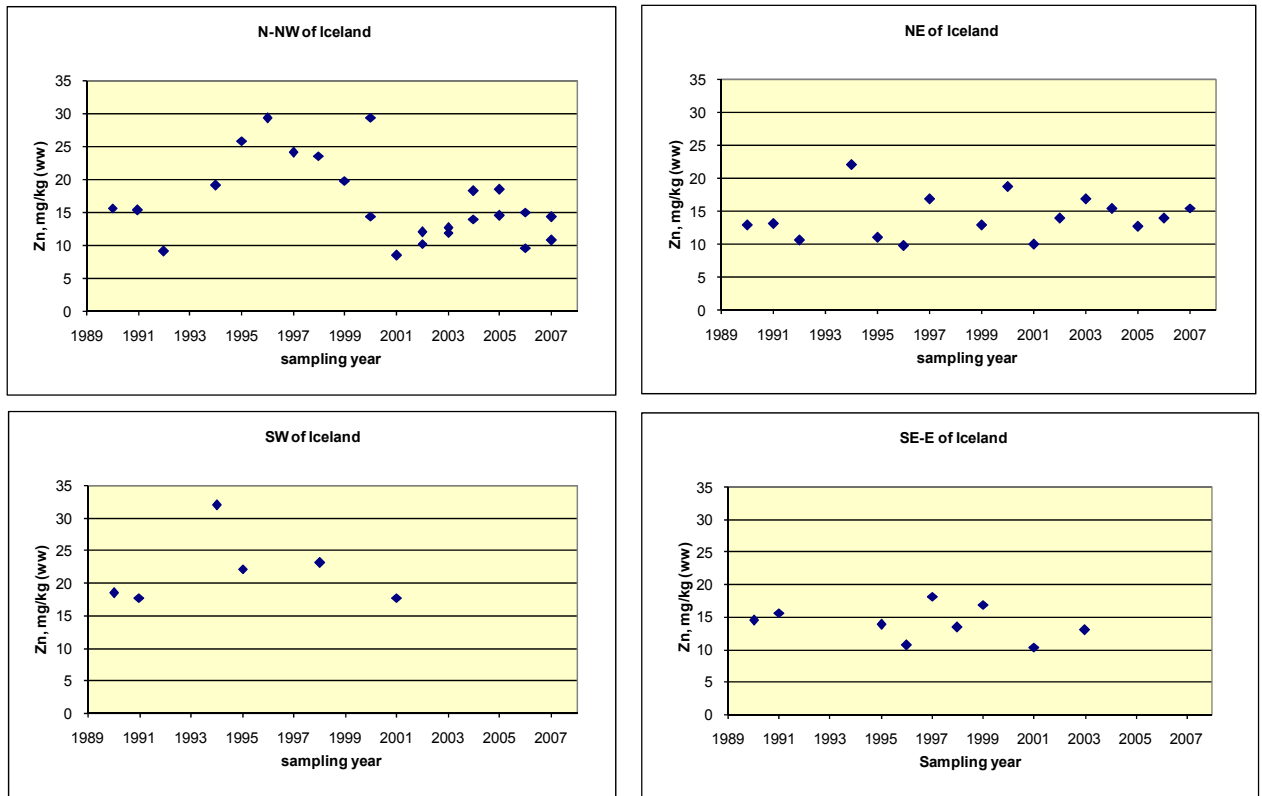


Figure 7a. Average concentration of Zinc (ww) in livers of 30-45 cm Cod (*Gadus morhua*) from different locations in Icelandic waters in March 1990-2007.

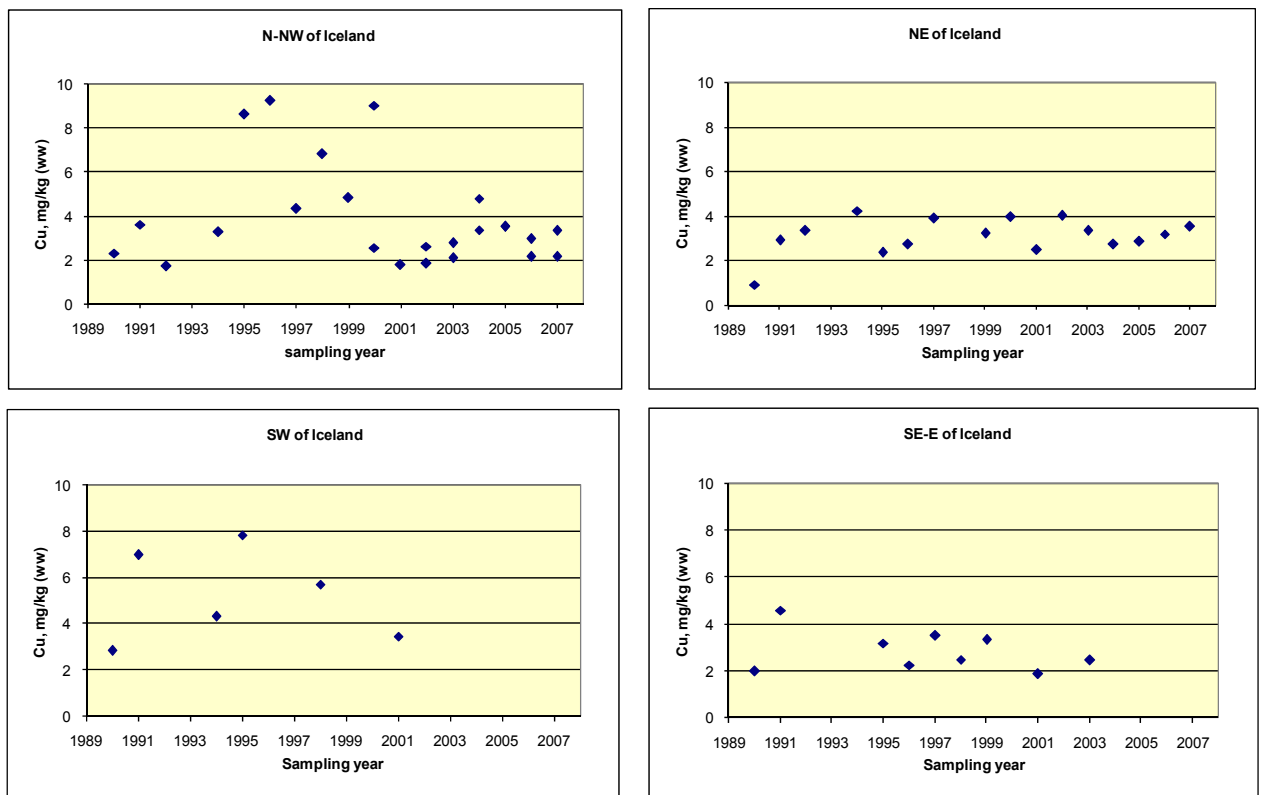


Figure 7b. Average concentration of Copper (ww) in livers of 30-45 cm Cod (*Gadus morhua*) from different locations in Icelandic waters in March 1990-2007.

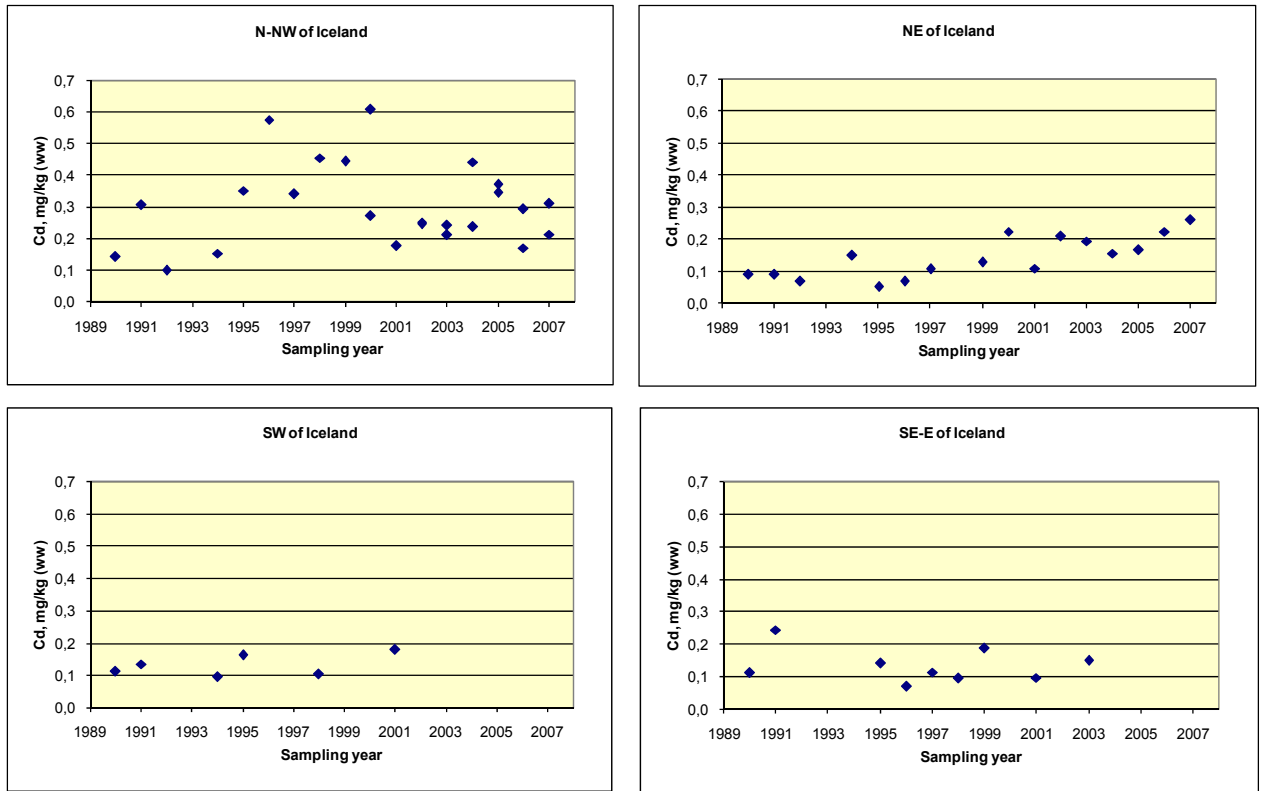


Figure 7c. Average concentration of Cadmium (ww) in livers of 30-45 cm Cod (*Gadus morhua*) from different locations in Icelandic waters in March 1990-2007.

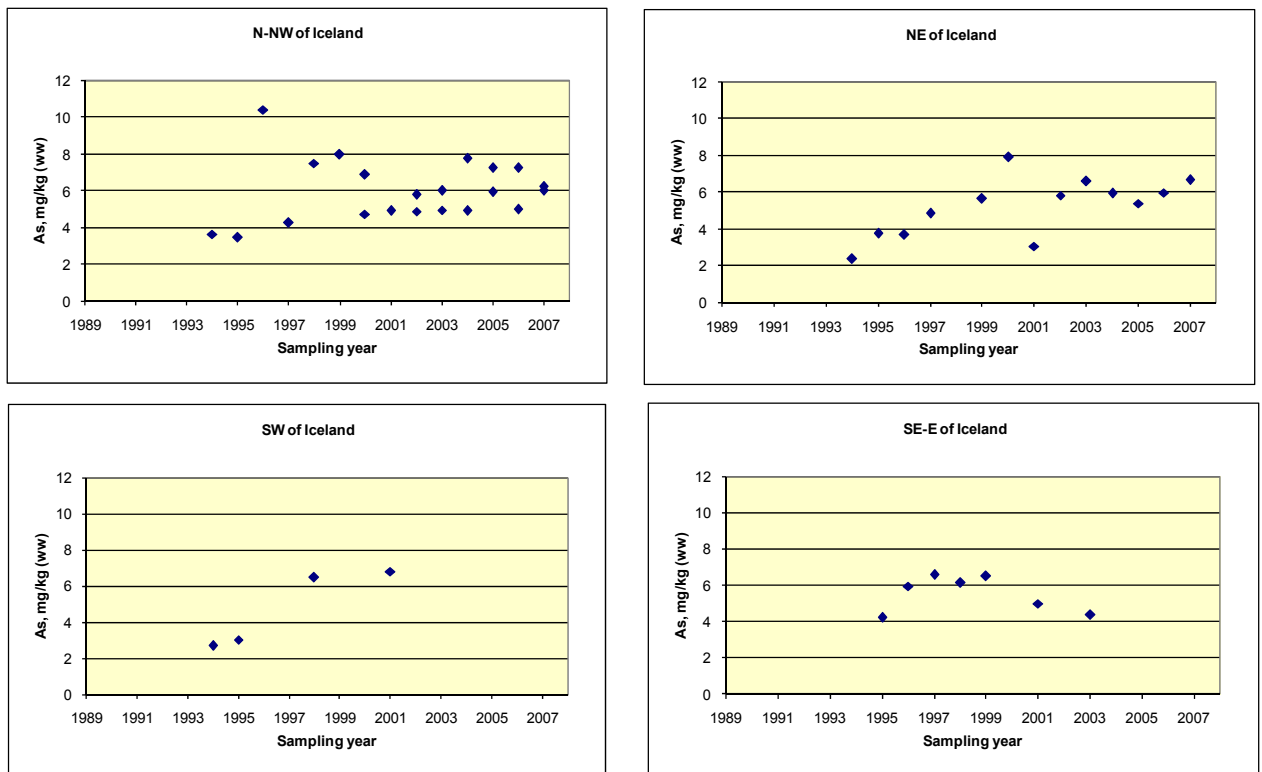


Figure 7d. Average concentration of Arsenic (ww) in livers of 30-45 cm Cod (*Gadus morhua*) from different locations in Icelandic waters in March 1990-2007.

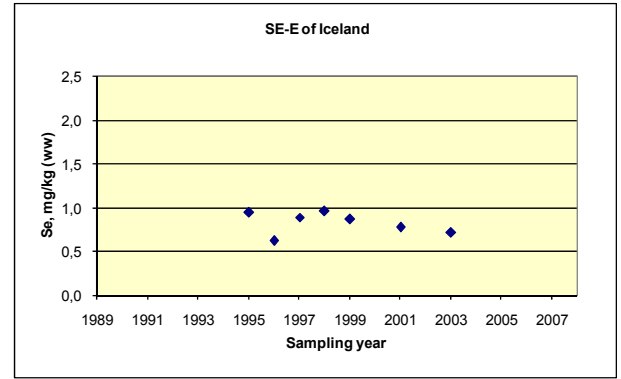
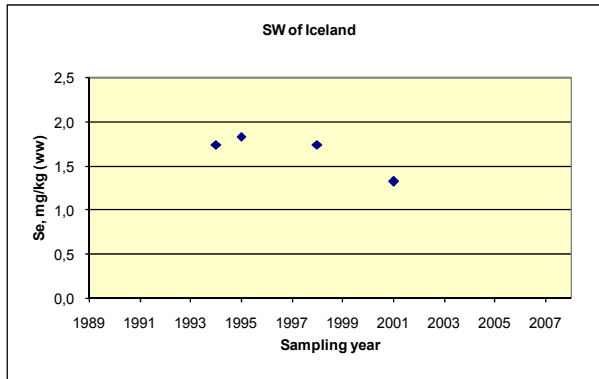
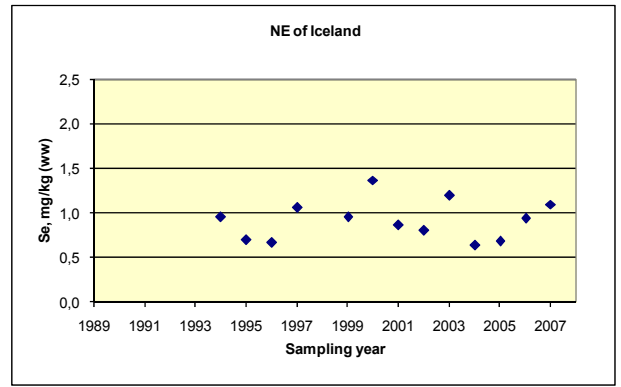
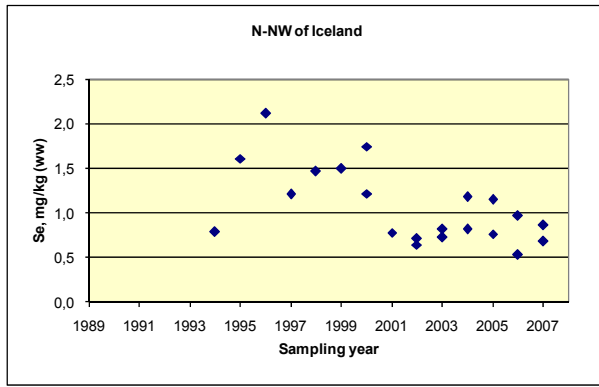


Figure 7e. Average concentration of Selenium (ww) in livers of 30-45 cm Cod (*Gadus morhua*) from different locations in Icelandic waters in March 1990-2007.

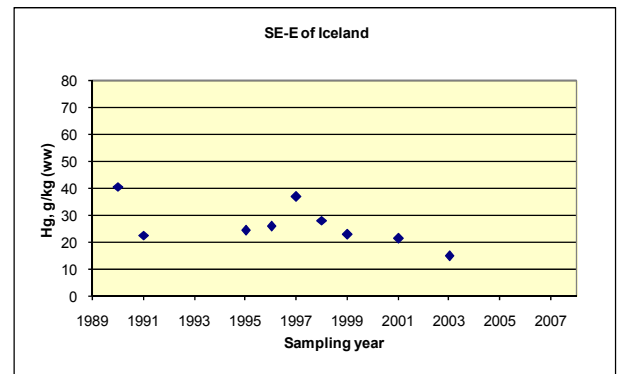
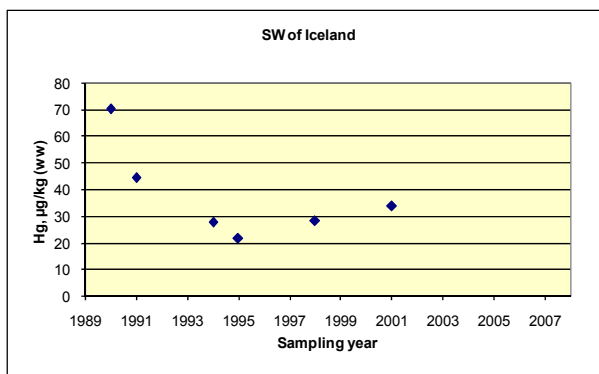
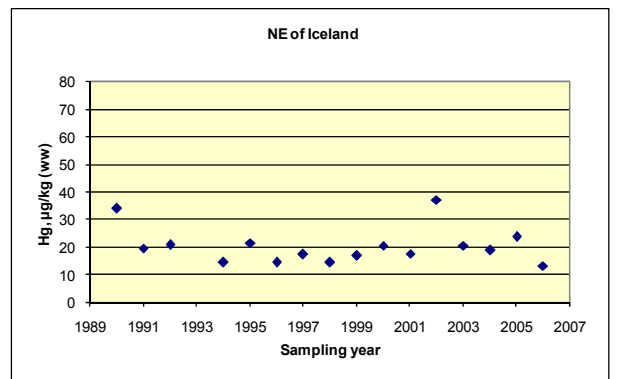
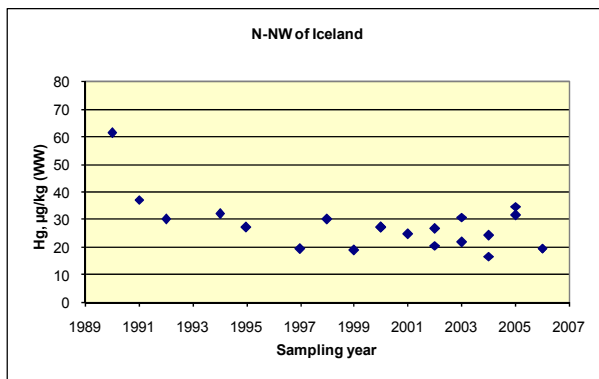


Figure 7f. Average concentration of Mercury (ww) in flesh of 30-45 cm Cod (*Gadus morhua*) from different locations in Icelandic waters in March 1990-2007.

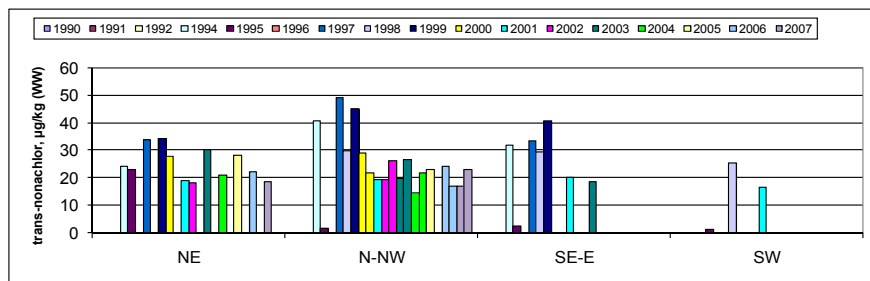
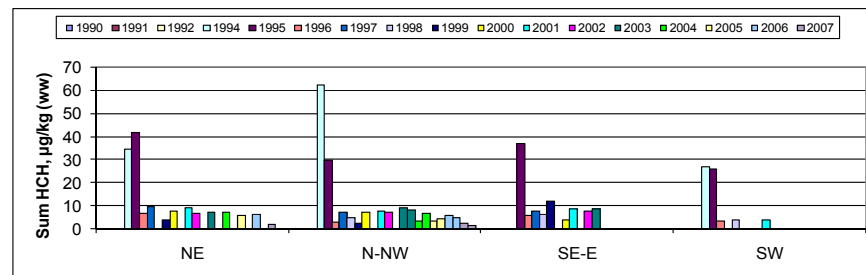
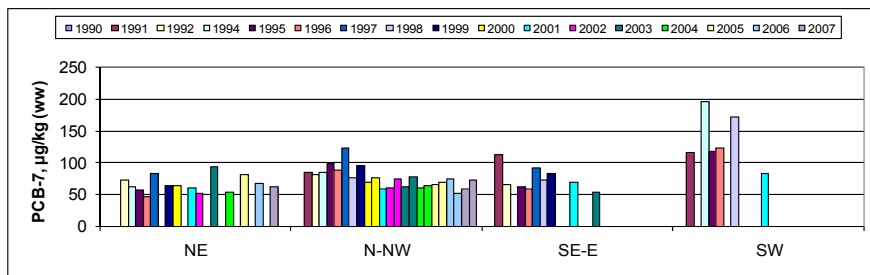
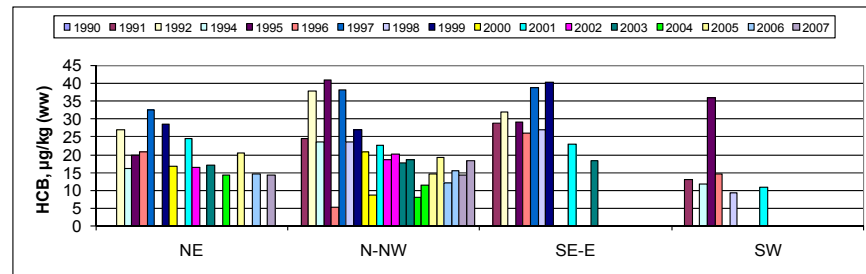
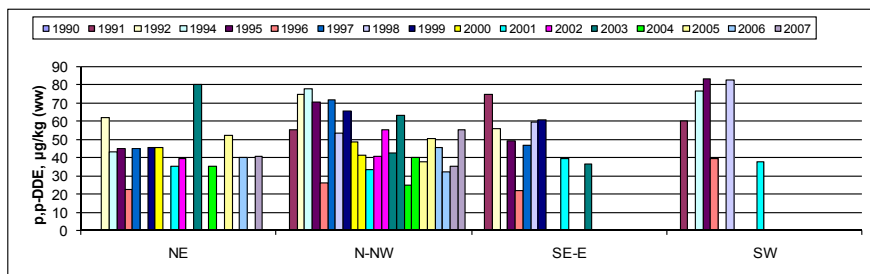


Figure 8. Average concentration of organochlorine compounds (ww) in livers of 30-45 cm Cod (*Gadus morhua*) from different locations in Icelandic waters in March 1991-2007.

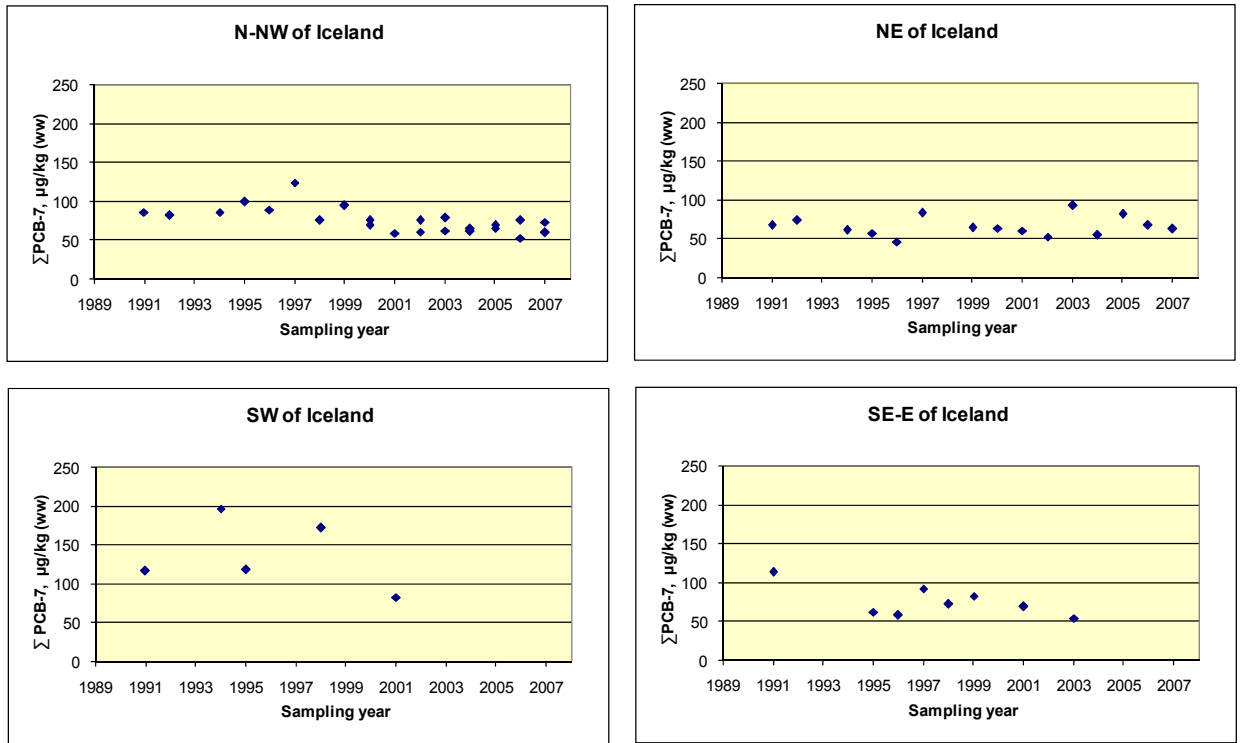


Figure 9a. Average concentration of Σ PCB-7 (ww) in livers of 30-45 cm Cod (*Gadus morhua*) from different locations in Icelandic waters in March 1991-2007.

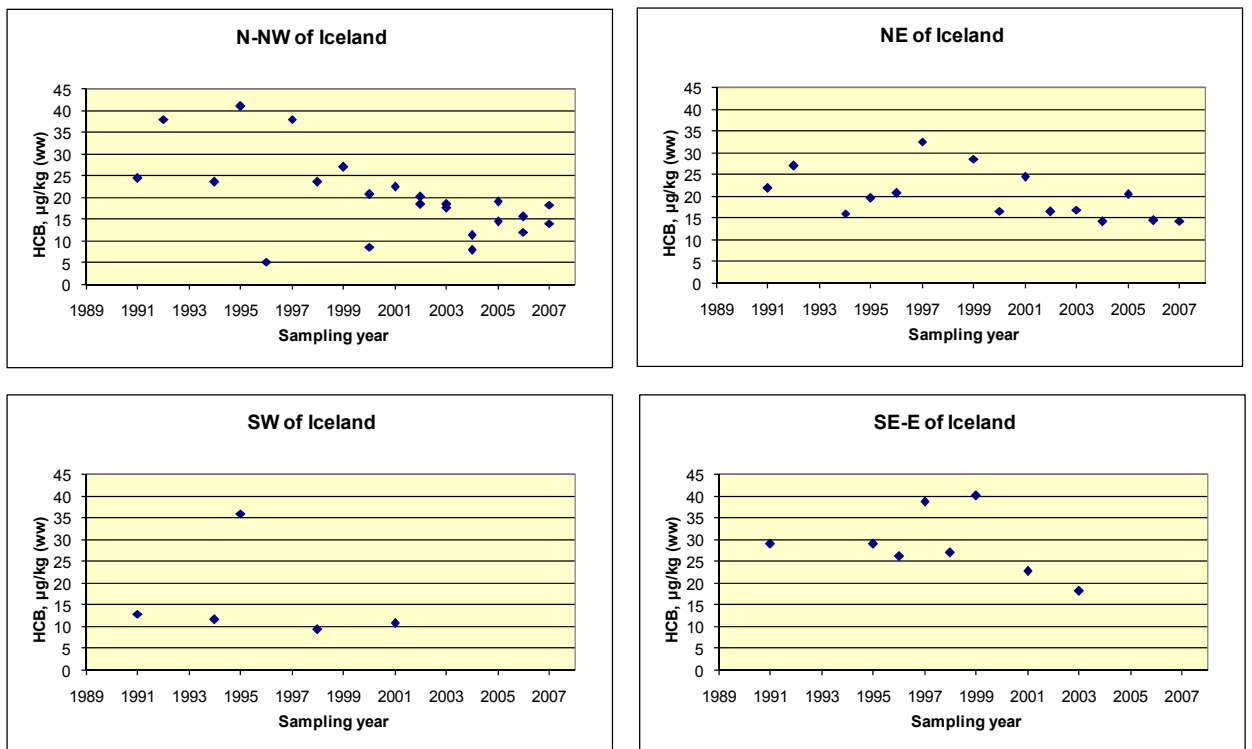


Figure 9b. Average concentration of HCB (ww) in livers of 30-45 cm Cod (*Gadus morhua*) from different locations in Icelandic waters in March 1991-2007.

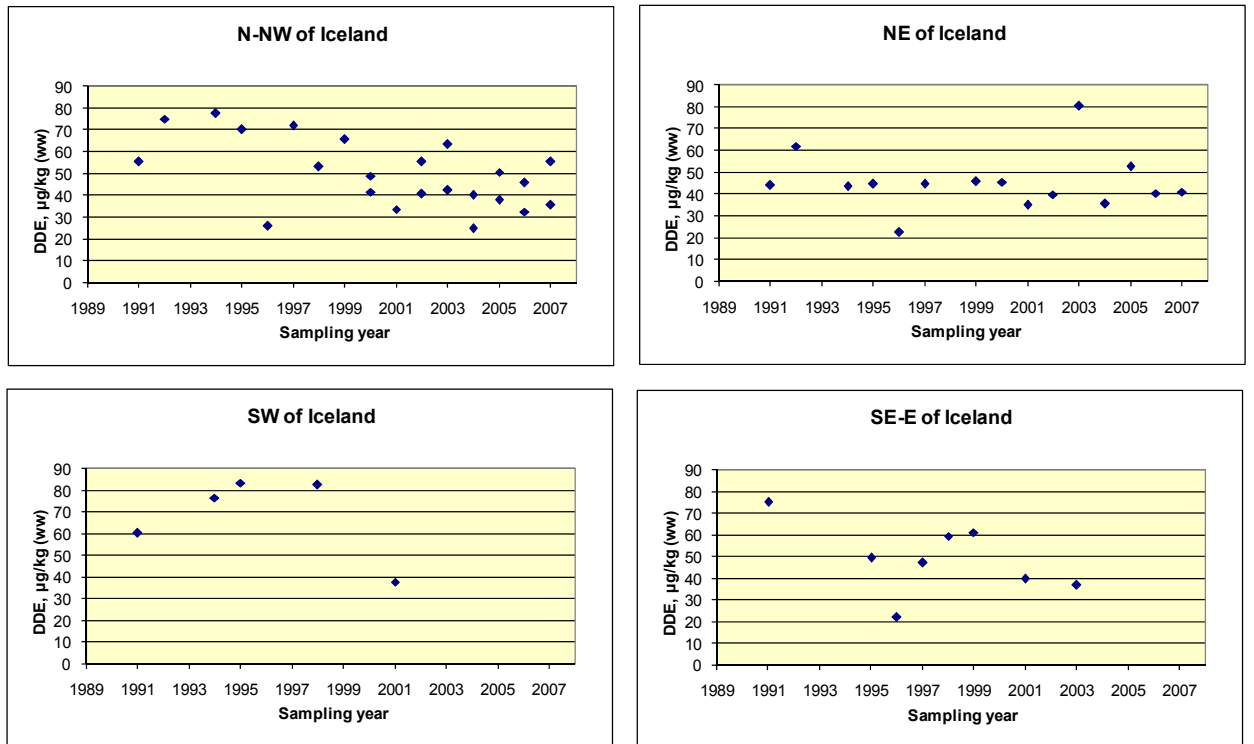


Figure 9c. Average concentration of DDE (ww) in livers of 30-45 cm Cod (*Gadus morhua*) from different locations in Icelandic waters in March 1991-2007.

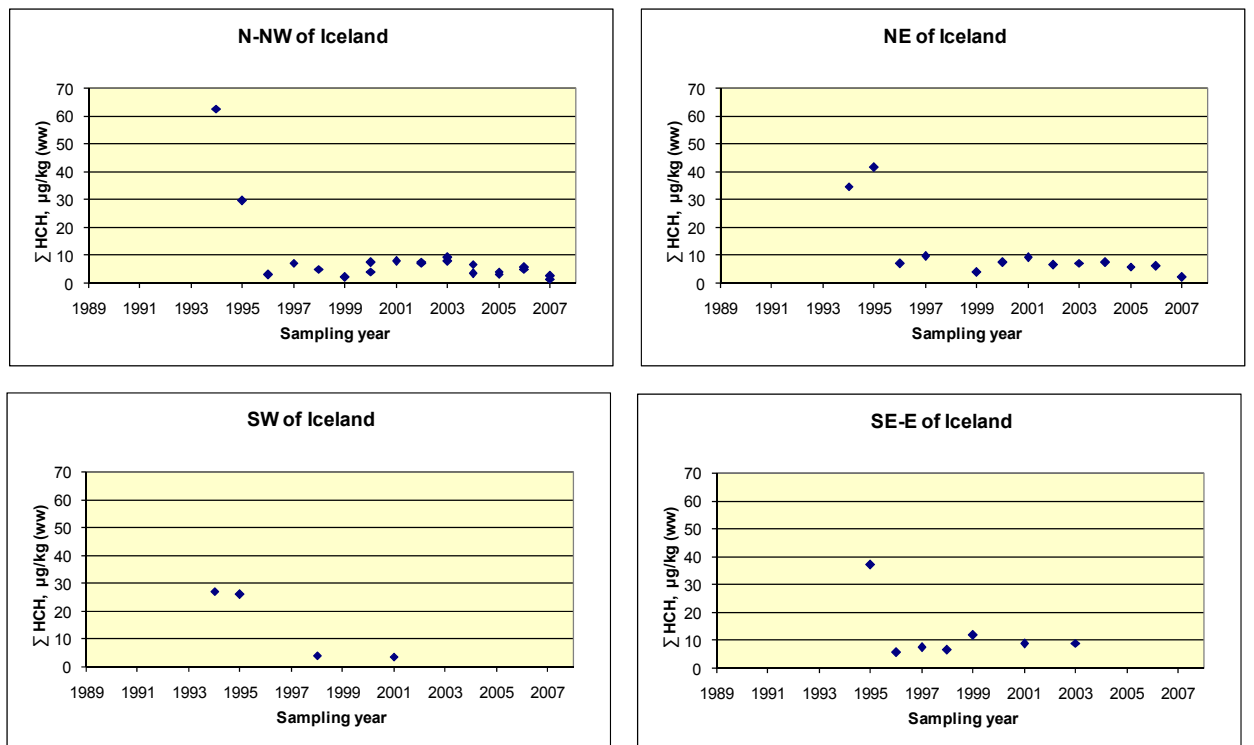


Figure 9d. Average concentration of ΣHCH (ww) in livers of 30-45 cm Cod (*Gadus morhua*) from different locations in Icelandic waters in March 1991-2007.

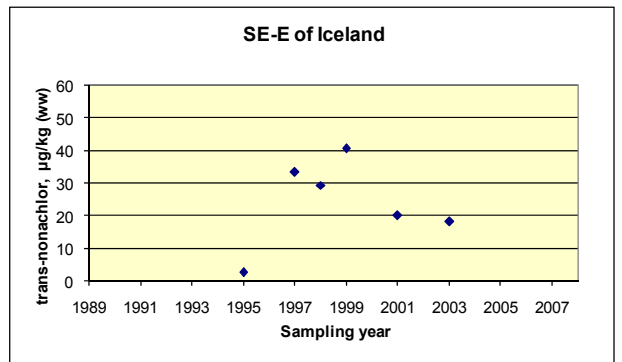
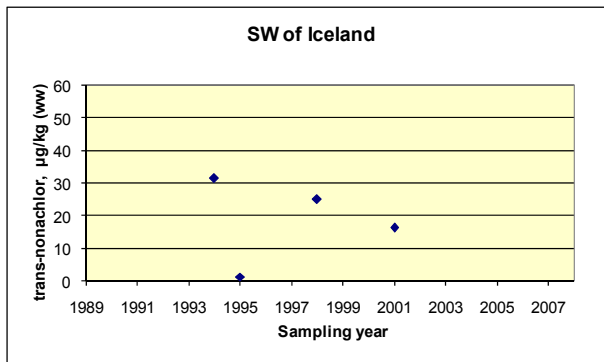
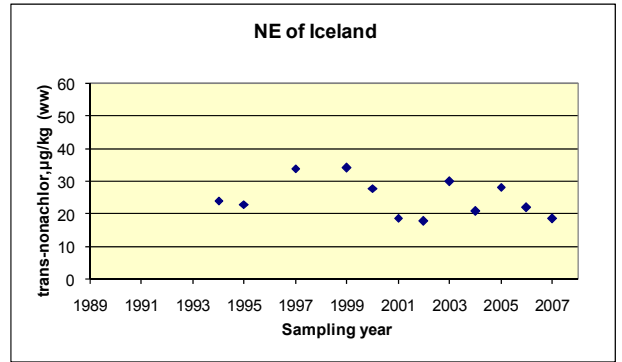
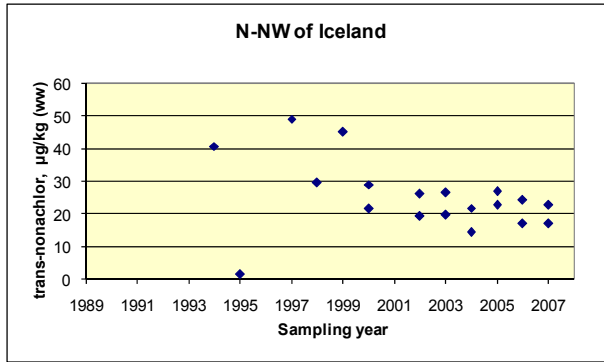


Figure 9e. Average concentration of transnonachlor (ww) in livers of 30-45 cm Cod (*Gadus morhua*) from different locations in Icelandic waters in March 1991-2007.