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Mengunarvöktun í lífríki sjávar við Ísland 2008 og 2009

Monitoring of the marine biosphere around Iceland 2008 and 2009

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Report summary

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Titill / Title	**Mengunarvöktun í lífríki sjávar við Ísland 2008 og 2009** Monitoring of the marine biosphere around Iceland 2008 and 2009		
Höfundar / Authors	*Hrönn Ólína Jörundsdóttir, Natasa Desnica, Sonja Huld Guðjónsdóttir, Þuríður Ragnarsdóttir and Helga Gunnlaugsdóttir*		
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Ágrip á íslensku:	Í þessari skýrslu eru birtar niðurstöður árlegs vöktunarverkefnis sem styrkt er af Umhverfisráðuneytinu og Sjávarútvegs- og landbúnaðarráðuneytinu. Markmið með þessari vöktun er að uppfylla skuldbindingar Íslands varðandi Oslóar- og Parísarsamninginn (OSPAR), auk AMAP (Artic Monitoring Assessment Program). Gögnin hafa verið send í gagnabanka Alþjóðahafrannsóknarráðsins (ICES). Hafrannsóknastofnun sér um að afla sýna og Matís hefur umsjón með undirbúningi sýna og mælingum á snefilefnum í lífríki hafsins. Sýnin eru mæld á Matís og á Rannsóknastofu í lyfja- og eiturefnafræði. Mæld voru ýmis ólífræn snefilefni og klórlífræn efni í þorski veiddum í árlegu vorralli Hafró í mars 2009 og í kræklingi sem safnað var á 11 stöðum í kringum landið í ágúst/sept 2008. Vöktun í lífríki sjávar við Ísland hófst 1989 og er gögnum safnað saman í gagnagrunn. Í skýrslunni eru birtar yfirlitsmyndir fyrir sum efnanna sem fylgst er með. Kadmín er svæðisbundið hærra í íslenskum kræklingi samanborið við krækling frá öðrum löndum. Litlar breytingar eru á milli ára í styrk ólífrænna og lífrænna efna en þörf er á ítarlegri tölfræðigreiningu á gögnunum til að hægt sé að meta með vísindalegum aðferðum aukningu eða minnkun mengandi efna í lífríki sjávar hér við land.		
Lykilorð á íslensku:	*OSPAR, AMAP, vöktun á lífríki sjávar, ólífræn snefilefni, klórlífræn efni, þorskur, kræklingur.*		
Summary in English:	This report contains results of the annual monitoring of the biosphere around Iceland in 2008 and 2009. 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 project was funded by Ministry for the Environment and Ministry of Fisheries and Agriculture. The data has been submitted to the ICES databank (ices.dk), collection of data began in 1989. Matís 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 Matís and at the Department of Pharmacology and Toxicology at the University of Iceland. Trace metals and organochlorines were analysed in cod *(Gadus morhua)* caught in March 2009 and in blue mussel *(Mytilus edulis)* collected in August/Sept 2008. Marine monitoring began in Iceland 1989. Cadmium is higher in some locations in Iceland compared to other countries. No significant changes were observed in the concentration of organic or inorganic pollutants investigated. However, a thorough statistical evaluation has to be carried out on the available data to analyse spatial and temporal trends of pollutants in the Icelandic marine biosphere.		
English keywords:	*OSPAR, AMAP, monitoring, trace metals, organochlorine compounds, cod (Gadus Morhua), blue mussel (Mytilus edulis).*		

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APPENDICES

1 Introduction

This report contains the results of the annual monitoring of heavy metals and organochlorine analyses for blue mussel (*Mytilus edulis*), collected along the coast around Iceland in 2008, as well as for cod (*Gadus morhua*), collected in Icelandic territorial waters in 2009. 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 (1-15). To meet the requirements of the OSPAR (Oslo and Paris Agreement) and the AMAP (Arctic Monitoring and Assessment Program), data has been submitted to the ICES databank (www.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, the Ministry of Fisheries and Agriculture and Matís. Matís is the coordinator for the marine biota monitoring and responsible for methods relating to sampling, sample preparation, analysis of samples and writing of this report. The samples were analyzed at Matís and the Department of Pharmacology and Toxicology at the University of Iceland.

2 Sampling and preparation of samples

The Marine Research Institute handles all sampling, while Matís is responsible for the storage of samples, sample 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 2008. Blue mussel, 4-6 cm length, were collected from 11 sites along the coast of the country in August/September 2008. Sampling sites for cod and blue mussel are shown in Figure 1 and coordinates are presented in appendix I and II. Icelandic waters have been divided into five main locations (N-NW, NE, SE-E, S, and SW) (6).

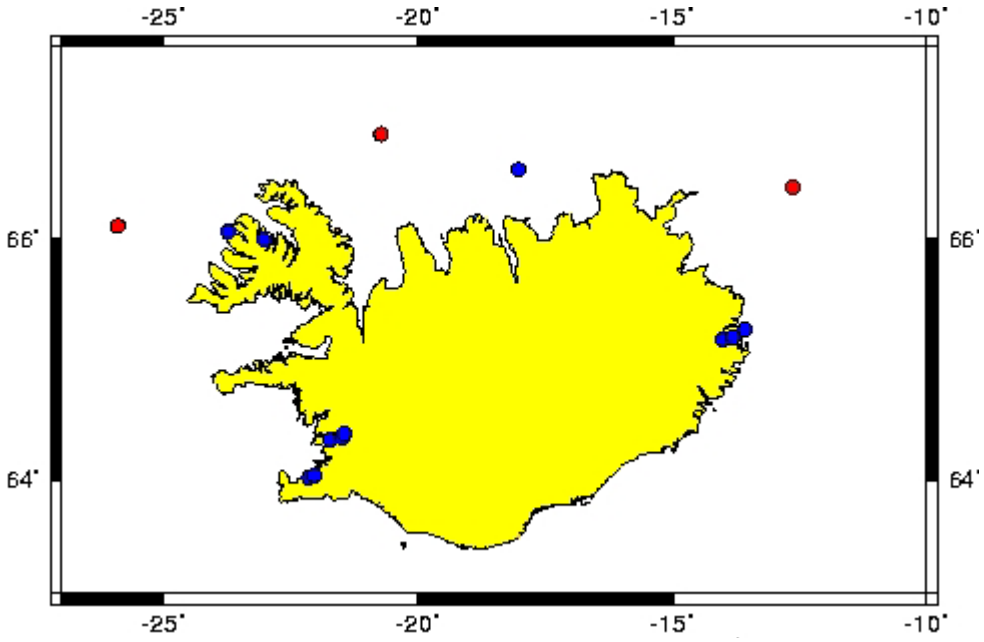

Figure 1. Locations for sampling of cod (Gadus morhua) (red dots) 2009 and blue mussel (Mytilus edulis) (blue dots) 2008.

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 and frozen until analysis was performed.

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 and frozen until analyses were performed. The livers of each cod sample were divided into subsamples, according to the weight of the livers. All liver samples were homogenized and kept frozen until analysis took place.

3 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 sample	Number of group	Inorganic contaminants	Organic contaminants	Other
Mussel, 2008 (*Mytilus edulis*)	11	50			Cu, Zn, As, Se, Cd, Hg, Pb	*	Dry matter and fat
Cod, 2008 (*Gadus morhua*)	3	25	Flesh	1	Hg		Dry matter and fat
			Liver	9	Cu, Zn, As, Se, Cd, Pb	*	Dry matter and fat
Labels: Cod-N-NW(1) 08 Cod-N-NW(2) 07 Cod-NE 07							

* PCB # 28, 31, 52, 101, 105, 118, 138, 153, 156, 170, 180, α-, β-, γ-HCH, HCB, p,p'-DDT, o,p'-DDT, p,p'-DDE, p,p'-DDD, *trans*-nonachlor, α-, γ-Chlordan, Oxychlordan, Toxaphene-26, -50, -62, BDE # 47, 99 and 100.

Only three liver groups from each cod sample were analyzed to optimize the project resources compared to 5-6 liver groups in the previous years. Two cod flesh samples were misplaced when these samples were transported from one location to another when the Matis headquarters were moved at the end of year 2009 and, therefore, only data from one flesh sample is presented in this report.

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 HNO_3 and 1.5 ml H_2O_2 were transferred to 50 ml digestion bombs. Samples were digested in a Mars5 microwave oven (CEM, North Carolina, USA). 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). ^{115}In was used as internal standard. 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) has been given in a 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 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 Matís has participated in QUASIMEME annually with satisfactory results. Also, Matís participated in SLV test 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.

4 Results

This report contains data from the years 2008 and 2009, due to budget constrains these results have not been statistically evaluated using present and previous data from the annual monitoring of the biosphere around Iceland in order to evaluate time trend or spatial difference. However, there are apparently no obvious changes in the contaminant concentrations patterns seen over the time period (for graphical illustrations please refer to 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 (2008) and cod (2009) are presented in Tables 7 and 8 in appendix IV. New data is presented along with data from previous years (1, 4-14) in figures 3a-f 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 18-19 years. It should be noted that results for cod are presented on wet weight basis, while the result for mussel are presented on dry weight basis.

4.2.1 Blue mussel

Figures 3a-f in appendix VII show the average concentration of heavy metals in blue mussel 1990-2008, on 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, 1990-2008. Metal concentrations vary considerably between years and different locations. This year the concentration of cadmium is higher in Grímsey and Dvergasteinn compared to other locations. According to the existing monitoring data (1999-2008) the concentration of arsenic is noticeably higher at Úlfsá, Skutulsfjörður than at any of the other sample locations for blue mussel. The results show low values for mercury in blue mussel when compared with ICES90 75% baseline values. The copper concentrations are generally low in blue mussel, while the zink concentrations are close to the ICES90 75% value. The cadmium levels are high in blue mussels 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 1990-2009. Figures 7a-f in appendix VIII show average concentrations (ww), of heavy metals in cod from different sampling sites, 1990-2009. Mercury is measured in the flesh as well. Lead concentration was below the limits of detection in all samples. Variations in concentration between years and locations over the time interval is shown in Figures 6a-b and 7a-f in Appendix VIII. 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 (2008) and cod (2009) 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 16-18 year period.

4.3.1 Blue mussel

Figures 5a-b in appendix VII show the concentration on dry-weight basis of organic compounds in blue mussel from different locations in Iceland 1991-2008. The PCB congeners included in the Σ3PCBs are CB-118, CB-138 and CB-153 where the sum ranges from 50-80% of the sum of 11 PCB analysed. 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, concentrations of HCH, HCB and DDE are low, close to the limit of detection.

4.3.2 Cod

Figure 8 in appendix VIII shows the average concentration on wet-weight basis of organic compounds in livers of 30-45 cm cod, caught in Icelandic waters in March every year between 1991 and 2009. Figures 9a-e in appendix VIII show the average concentrations (w.w.) of some organic compounds in cod from different sampling sites, 1991-2008. The sum of seven PCBs (CB-28, CB-52, CB-101, CB-118, CB-138, CB-153 and CB-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).

5 Conclusion

This report contains the results of an evaluation of trace elements in Icelandic marine biota for the years 2008 and 2009. 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 using present and 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 additional data collected over the last 10 years calls for a new methodical statistical evaluation of the existing Icelandic monitoring data. In addition, when comparing data of livers it is necessary to keep in mind the factors (i.e. fat, age, d.w.) 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.

6 Acknowledgement

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Appendix I.

Biological measurements of Blue mussel (*Mytilus edulis*) 2008

Species:	**Blue mussel (*Mytilus edulis*)**	Date of sampling:	**2.9.2008**
Length:	4-6 cm	Sampled by:	Marine Inst.
Location:	**Úlfsá/Sigurðarbúð, Skutulsfjordur**	Date of preparation:	28.8.2009
Coordinates:	660355 231000	Matis#:	R09-658-07

	Length (mm)	Width (mm)	Height (mm)	Total weight (g)	Weight soft body (g)	Weight shell (g)
1	43,5	20,4	16,6	7,99	4,89	2,98
2	47,8	21,8	19,8	11,98	5,92	5,96
3	46,4	23,9	19,5	9,80	5,82	3,85
4	49,9	23,9	20,8	11,81	7,50	4,20
5	48,7	22,8	22,0	16,98	7,61	9,25
6	54,6	23,9	24,8	19,74	9,46	10,20
7	55,0	25,2	25,8	22,09	11,01	11,10
8	57,6	26,6	23,5	18,05	9,84	7,99
9	53,1	26,2	26,5	23,63	11,83	11,57
10	55,6	26,2	21,3	18,08	8,32	9,57
11	44,7	22,0	18,5	10,17	5,29	4,83
12	46,6	22,5	19,2	11,57	5,75	5,70
13	42,4	23,6	15,6	7,48	3,91	3,47
14	48,0	23,6	20,4	12,05	5,51	6,47
15	48,7	23,7	20,5	11,27	6,94	4,23
16	48,3	26,1	19,5	12,11	6,70	5,31
17	53,6	23,7	21,7	13,99	8,27	5,65
18	53,7	27,2	25,1	21,50	11,18	10,22
19	54,3	26,4	23,8	11,79	2,20	9,34
20	56,5	26,2	23,1	17,91	10,38	7,15
21	57,6	26,8	25,9	25,56	12,31	13,08
22	46,1	22,1	19,1	12,12	5,88	6,12
23	44,2	23,9	19,4	9,88	4,74	4,08
24	48,8	24,7	18,5	11,43	6,24	5,13
25	47,9	24,7	18,9	10,84	6,72	4,04
26	47,2	23,0	19,6	12,78	6,02	6,67
27	46,8	21,2	20,8	12,10	6,09	5,96
28	50,3	22,0	21,3	14,21	7,55	6,58
29	56,7	24,3	23,0	18,97	8,64	10,16
30	50,1	22,3	20,1	13,45	6,37	6,86
31	48,6	20,4	18,3	11,18	5,63	5,50
32	46,5	23,1	19,8	11,47	6,16	5,27
33	53,4	23,7	22,3	17,33	8,54	8,68
34	52,3	24,5	24,0	15,86	9,12	6,69
35	52,4	27,8	22,1	16,55	9,42	7,05
36	56,7	25,8	26,0	22,71	12,08	10,61
37	57,7	26,9	27,0	24,33	12,73	11,42
38	54,2	25,5	24,1	20,75	10,78	9,85
39	59,4	25,9	26,1	25,10	12,97	11,94
40	48,8	21,5	19,6	11,70	5,89	5,74
41	47,6	22,3	19,0	10,94	6,39	4,04
42	49,3	23,2	21,5	14,16	7,43	6,66
43	54,4	23,5	19,5	13,93	7,79	6,10
44	49,6	25,5	21,8	15,29	7,87	7,40
45	56,2	26,1	23,2	19,34	10,71	9,10
46	54,3	24,4	22,7	17,84	9,19	8,51
47	58,0	30,3	26,9	24,79	14,31	10,34
48	50,5	23,2	20,6	13,06	7,43	5,52
49	57,5	27,1	24,0	22,65	11,79	10,71
50	50,4	25,3	22,8	16,42	9,52	6,84
	Length	**Width**	**Height**	**Total weight**	**Weight soft body**	**Weight shell**
Average	51,3	24,3	21,7	15,53	8,09	7,31
Stdev	4,4	2,1	2,8	4,90	2,64	2,58
Min	42,4	20,4	15,6	7,48	2,20	2,98
Max	59,4	30,3	27,0	25,56	14,31	13,08

Species:	**Blue mussel (*Mytilus edulis*)**	Date of sampling:	**1.9.2008**
Length:	4-6 cm	Sampled by:	Marine. Inst.
Location:	**Eyri, Hvalfjordur**	Date of preparation:	12.10.2009
Coordinates:	642005 214403	Matis#:	R09 658-3

	Length (mm)	Width (mm)	Height (mm)	Total weight (g)	Weight soft body (g)	Weight shell (g)
1	42,9	21,3	17,8	7,64	3,51	4,04
2	42,5	20,8	15,5	6,51	3,66	2,72
3	45,8	20,8	17,8	8,71	4,43	4,17
4	49,8	23,4	20,2	9,84	5,03	4,67
5	55,5	25,9	20,3	15,94	8,22	7,34
6	54,1	23,7	21,8	13,69	8,30	5,30
7	53,5	24,0	21,6	15,02	7,73	7,13
8	54,3	24,6	22,5	16,18	8,96	6,65
9	54,5	23,8	22,4	15,42	7,72	7,31
10	60,3	27,0	23,5	21,02	12,31	8,52
11	54,0	24,8	21,4	13,26	7,00	6,11
12	50,2	21,8	20,0	10,72	5,80	4,78
13	52,2	24,1	22,0	11,51	5,76	5,55
14	49,7	24,0	23,5	14,75	7,89	6,74
15	55,0	25,1	20,5	12,67	6,47	5,78
16	50,1	23,4	20,3	12,84	7,18	5,59
17	50,9	26,1	21,7	14,42	8,40	5,82
18	55,6	26,2	23,5	15,71	6,22	9,04
19	53,4	25,5	21,0	15,51	8,68	6,60
20	55,4	24,2	25,0	14,31	7,54	6,45
21	49,5	23,9	21,1	13,38	7,57	5,67
22	47,3	24,6	17,8	11,15	6,22	4,83
23	46,7	21,4	18,1	10,07	5,39	4,60
24	51,0	23,6	22,9	13,21	7,83	5,19
25	51,6	22,5	19,4	12,96	6,01	5,31
26	48,5	23,2	20,6	11,51	6,07	4,95
27	59,2	26,7	24,2	18,29	10,33	7,66
28	54,7	25,6	19,6	13,32	8,17	4,98
29	50,4	24,5	23,5	14,99	8,65	6,09
30	58,3	27,5	25,0	19,91	10,36	9,30
31	49,9	23,3	20,0	11,63	6,71	4,83
32	47,7	20,6	16,6	8,52	5,10	3,36
33	45,0	20,5	15,6	7,08	3,57	3,54
34	41,1	22,7	21,0	12,25	6,47	5,66
35	56,1	26,1	24,9	18,42	10,77	7,58
36	51,0	24,9	21,6	13,14	7,12	6,13
37	53,8	23,3	20,0	13,90	7,76	6,07
38	58,4	24,0	20,5	10,81	5,63	5,10
39	57,2	28,3	21,7	16,83	9,71	6,74
40	55,0	25,0	20,6	15,86	8,02	7,03
41	39,9	19,9	13,3	4,87	2,64	2,13
42	41,1	20,4	14,0	5,57	3,14	2,23
43	40,6	20,0	14,4	6,02	3,59	2,37
44	45,6	21,2	19,8	9,24	4,80	4,16
45	45,6	20,0	20,0	9,28	5,26	3,96
46	50,0	22,3	21,1	11,53	6,31	5,19
47	46,1	23,3	16,1	8,43	4,66	3,70
48	56,1	25,1	21,8	16,94	9,76	7,08
49	55,6	26,1	22,8	18,20	9,88	8,22
50	58,8	29,9	21,1	18,40	10,26	8,00
	Length	**Width**	**Height**	**Total weight**	**Weight soft body**	**Weight shell**
Average	51,0	23,8	20,4	12,83	6,97	5,64
Stdev	5,3	2,3	2,8	3,84	2,21	1,71
Min	39,9	19,9	13,3	4,87	2,64	2,13
Max	60,3	29,9	25,0	21,02	12,31	9,30

Species:	**Blue mussel (*Mytilus edulis*)**	Date of sampling:	**1.9.2008**
Length:	4-6 cm	Sampled by:	Marine Inst.
Location:	**Hvammsvík, Hvalfjörður**	Date of preparation:	2.10.2009
Coordinates:	642146 213353	Matis#:	R09-658-4

	Length (mm)	Width (mm)	Height (mm)	Total weight (g)	Weight soft body (g)	Weight shell (g)
1	41,0	20,0	14,9	4,67	2,30	2,26
2	41,7	21,0	18,2	6,47	3,48	2,85
3	41,7	21,1	17,0	7,12	3,53	3,52
4	46,1	25,0	18,9	8,82	4,62	4,05
5	47,3	22,5	20,1	10,41	5,73	4,52
6	50,2	24,5	18,8	10,34	6,29	3,99
7	46,7	22,6	19,4	9,78	5,16	4,53
8	44,2	24,2	18,4	7,24	3,55	3,58
9	55,3	26,1	24,5	16,08	9,22	6,75
10	58,3	27,2	23,6	14,91	7,82	6,97
11	41,4	22,7	18,9	8,06	3,96	3,99
12	45,4	23,6	16,6	7,62	4,46	3,10
13	41,8	22,7	16,1	6,66	4,05	2,56
14	44,7	24,5	16,9	7,98	4,77	3,13
15	45,4	24,9	20,4	9,47	4,63	4,57
16	45,6	22,9	18,3	8,69	5,09	2,54
17	43,2	21,6	16,2	6,51	3,04	3,38
18	49,0	23,7	17,8	10,02	5,99	3,96
19	50,3	25,0	22,9	12,04	5,39	6,06
20	54,3	27,8	23,7	17,42	10,36	6,98
21	41,9	12,9	19,4	7,28	3,61	3,54
22	40,0	20,2	16,8	6,63	3,53	3,05
23	42,7	22,1	16,1	6,42	3,05	3,32
24	45,2	25,0	20,5	13,07	5,26	7,63
25	42,8	20,9	22,0	10,33	5,69	4,55
26	43,8	22,4	20,0	8,64	4,52	4,04
27	43,0	23,0	17,1	7,70	3,97	3,56
28	47,2	22,8	16,9	7,17	3,95	3,19
29	51,2	22,5	19,8	11,14	6,20	4,85
30	60,2	26,3	27,0	23,22	13,72	9,34
31	40,7	21,1	17,0	6,10	3,35	2,63
32	44,5	20,7	17,1	7,71	4,36	3,22
33	46,1	21,2	16,5	6,40	3,05	3,30
34	45,4	22,2	17,9	10,11	5,27	4,50
35	48,0	23,4	19,1	11,29	5,42	5,71
36	43,5	21,4	16,6	7,60	3,82	3,59
37	47,6	23,1	16,0	7,71	4,58	3,07
38	46,7	25,2	18,5	9,97	5,45	4,44
39	52,6	26,1	21,0	14,50	8,64	5,77
40	58,8	28,0	23,9	26,03	14,29	11,53
41	40,6	19,7	15,1	6,09	3,06	2,76
42	40,0	19,8	16,4	5,63	2,34	3,03
43	39,9	19,7	15,3	6,06	2,58	3,15
44	39,0	19,6	19,1	5,89	2,35	3,39
45	41,5	21,6	18,6	9,01	5,01	3,91
46	41,5	20,8	19,1	8,73	4,29	4,23
47	40,5	23,0	15,3	7,24	3,99	3,19
48	46,1	24,8	17,4	8,92	4,79	3,56
49	49,4	25,0	18,6	11,15	6,39	4,55
50	48,9	23,4	16,6	8,41	4,11	4,18
	Length	**Width**	**Height**	**Total weight**	**Weight soft body**	**Weight shell**
Average	45,9	22,8	18,6	9,53	5,08	4,28
Stdev	5,1	2,6	2,7	4,15	2,49	1,78
Min	39,0	12,9	14,9	4,67	2,30	2,26
Max	60,2	28,0	27,0	26,03	14,29	11,53

Species:	**Blue mussel (*Mytilus edulis*)**	Date of sampling:	**16.10.2008**
Length:	4-6 cm	Sampled by:	Marine Inst.
Location:	**Hvassahraun**	Date of preparation:	24.9.2009
Coordinates:	640121 220953	Matis#:	R09-658-1

	Length (mm)	Width (mm)	Height (mm)	Total weight (g)	Weight soft body (g)	Weight shell (g)
1	49,3	25,0	21,2	15,05	7,77	6,86
2	49,3	23,9	20,9	13,96	8,18	5,66
3	52,2	25,7	21,9	16,81	9,10	7,60
4	50,4	24,0	21,5	13,66	7,70	5,88
5	51,5	25,8	21,7	16,89	8,92	7,82
6	48,0	26,7	18,9	13,56	6,86	6,57
7	54,8	27,1	25,1	20,77	11,75	8,90
8	53,4	28,5	22,8	15,85	8,13	7,51
9	52,0	25,8	21,0	15,16	7,85	7,08
10	59,4	29,1	22,0	21,40	11,47	9,78
11	47,6	25,7	12,9	11,71	5,74	5,76
12	48,0	22,2	20,0	12,06	6,78	5,10
13	46,3	26,9	20,3	13,32	6,88	6,26
14	45,7	24,8	17,4	11,40	5,35	5,72
15	48,5	24,1	23,3	14,25	7,91	6,05
16	49,8	26,2	19,5	14,24	7,30	6,71
17	47,9	23,7	21,5	11,64	4,94	6,40
18	53,0	26,2	20,2	14,11	7,20	6,51
19	55,5	30,5	22,0	19,88	10,77	8,54
20	58,8	32,2	23,9	23,97	13,12	10,35
21	48,3	25,6	20,0	11,52	4,16	6,20
22	51,7	26,2	21,2	14,42	7,07	6,10
23	45,1	22,3	20,0	11,26	5,25	5,68
24	46,2	24,0	20,1	13,25	5,94	6,95
25	47,3	24,0	20,0	12,07	5,98	5,78
26	56,2	29,9	21,9	22,44	10,77	11,13
27	51,7	26,2	21,2	16,33	8,17	7,90
28	50,1	22,9	21,2	12,98	4,69	7,59
29	60,0	27,9	26,2	25,62	13,34	11,63
30	51,7	26,2	21,2	14,92	6,69	7,66
31	43,0	25,1	14,7	10,87	5,84	5,47
32	52,9	30,0	20,6	17,01	9,44	7,43
33	52,8	26,1	22,3	17,17	8,47	8,60
34	50,6	24,0	20,6	16,21	7,98	8,18
35	50,1	26,7	20,6	15,90	8,24	7,58
36	51,8	27,8	20,5	16,03	5,34	7,46
37	50,6	24,0	20,6	15,98	8,18	7,66
38	52,9	26,2	20,6	17,67	8,98	8,51
39	52,9	26,2	20,0	13,73	7,06	6,53
40	58,4	30,0	23,4	22,29	12,21	9,64
41	58,9	27,8	22,8	22,52	11,80	10,45
42	56,2	30,0	22,8	21,01	10,95	9,65
43	50,1	26,1	18,9	14,63	7,84	6,50
44	52,8	25,0	21,2	14,22	7,29	6,80
45	50,6	26,2	20,0	14,67	7,37	7,17
46	52,9	27,8	21,2	16,83	9,38	7,43
47	46,2	22,8	20,1	12,37	7,02	5,22
48	53,9	25,6	21,7	15,85	8,35	7,40
49	47,9	24,5	17,8	12,36	6,25	6,06
50						
	Length	**Width**	**Height**	**Total weight**	**Weight soft body**	**Weight shell**
Average	51,3	26,1	20,8	15,75	8,04	7,38
Stdev	3,9	2,2	2,2	3,62	2,20	1,56
Min	43,0	22,2	12,9	10,87	4,16	5,10
Max	60,0	32,2	26,2	25,62	13,34	11,63

Species:	**Blue mussel (*Mytilus edulis*)**	Date of sampling:	**16.10.2008**
Length:	4-6 cm	Sampled by:	Marine Inst.
Location:	**Straumur, Straumsvík**	Date of preparation:	15.10.2009
Coordinates:	640254 220270	Matis#:	R09-658-2

	Length (mm)	Width (mm)	Height (mm)	Total weight (g)	Weight soft body (g)	Weight shell (g)
1	44,8	21,1	17,8	8,85	4,82	3,80
2	47,5	24,1	16,7	9,56	5,13	4,19
3	48,1	20,6	19,4	10,89	6,63	4,14
4	47,9	23,2	19,3	11,03	6,19	4,66
5	54,2	25,3	21,9	16,45	9,63	6,61
6	50,5	23,2	19,6	11,48	6,95	4,43
7	52,6	25,8	22,7	16,72	9,39	7,10
8	51,9	24,2	21,2	13,66	8,20	5,33
9	55,0	22,7	22,2	15,35	9,25	5,96
10	58,6	25,2	24,5	19,16	11,03	7,97
11	46,1	28,0	24,4	9,97	5,45	4,28
12	50,3	21,3	18,6	14,11	8,19	5,71
13	46,4	23,3	21,8	13,77	6,94	6,65
14	49,1	22,7	18,9	11,07	6,42	4,33
15	57,9	25,7	24,4	20,30	11,31	8,87
16	55,0	26,1	20,4	14,96	9,25	5,52
17	62,7	25,6	27,0	25,12	15,25	9,55
18	58,5	23,6	23,1	19,34	9,77	9,33
19	54,0	25,7	23,5	16,93	9,98	6,67
20	57,5	23,3	28,1	21,08	12,71	8,18
21	51,1	24,3	21,5	13,25	7,90	5,08
22	49,5	25,4	21,5	13,90	8,01	5,67
23	53,0	24,7	17,3	11,63	6,86	4,54
24	49,1	26,1	19,8	13,25	7,48	5,58
25	51,6	27,0	21,9	14,69	9,11	5,38
26	57,8	26,0	23,2	18,05	10,57	7,15
27	58,8	27,9	21,2	19,71	10,54	8,55
28	58,2	26,9	26,3	23,10	12,78	10,02
29	57,2	25,9	21,8	17,18	9,29	7,59
30	58,2	24,8	24,2	19,14	12,11	6,77
31	47,7	25,8	19,9	12,44	6,87	5,40
32	49,0	22,9	20,6	12,14	7,47	4,58
33	48,8	22,0	21,7	12,92	6,81	6,01
34	55,7	24,3	21,9	14,04	8,37	5,43
35	53,3	23,9	22,5	15,86	8,78	6,92
36	55,6	25,2	23,2	17,27	10,54	6,59
37	55,5	24,8	22,7	17,90	10,37	7,37
38	55,3	27,8	25,5	20,53	12,99	7,33
39	60,9	28,3	25,2	22,33	13,30	8,80
40	62,0	26,8	22,5	20,64	11,89	8,47
41	48,0	23,0	19,8	11,79	6,78	4,76
42	47,6	20,2	21,6	13,42	6,40	6,72
43	49,0	23,4	19,4	11,25	6,18	4,73
44	50,7	23,1	21,4	13,80	8,18	5,44
45	51,2	23,6	21,0	10,55	5,54	4,86
46	56,3	24,3	22,3	17,04	9,71	7,14
47	53,7	25,0	24,1	18,68	9,54	8,87
48	57,0	25,1	22,5	16,99	10,02	6,70
49	56,5	23,6	20,9	15,07	8,78	6,06
50	60,1	26,2	24,8	20,02	11,76	8,21
	Length	**Width**	**Height**	**Total weight**	**Weight soft body**	**Weight shell**
Average	53,3	24,6	22,0	15,57	8,95	6,40
Stdev	4,6	1,9	2,4	3,88	2,38	1,63
	44,8	20,2	16,7	8,85	4,82	3,80
	62,7	28,3	28,1	25,12	15,25	

Species:	**Blue mussel (*Mytilus edulis*)**	Date of sampling:	**3.9.2008**
Length:	4-6 cm	Sampled by:	Marine Inst.
Location:	**Mjoifjordur I (head)**	Date of preparation:	15.10.2009
Coordinates:	651128 140048	Matis#:	R09-658-11

	Length (mm)	Width (mm)	Height (mm)	Total weight (g)	Weight soft body (g)	Weight shell (g)
1	39,8	20,2	17,7	6,44	3,42	2,72
2	40,0	21,0	18,5	7,99	3,57	4,18
3	43,2	21,0	20,3	10,27	4,73	5,41
4	48,8	21,8	20,1	10,38	6,08	4,15
5	50,6	22,6	20,6	10,47	4,92	5,05
6	49,3	26,1	23,6	13,33	5,62	7,47
7	49,5	23,2	23,4	14,28	7,42	6,64
8	54,6	24,5	22,5	13,16	6,54	6,33
9	50,9	23,9	23,0	13,37	5,64	7,33
10	52,3	26,8	23,8	18,04	9,83	8,00
11	40,1	19,3	17,5	7,48	3,96	3,36
12	39,9	19,4	18,2	7,29	3,74	3,39
13	41,1	20,8	16,0	7,38	3,71	3,51
14	44,6	20,5	17,4	7,83	3,55	4,09
15	42,8	21,2	17,9	7,70	4,28	3,32
16	45,7	23,4	20,5	12,38	6,28	5,95
17	47,8	22,0	19,1	10,69	6,38	4,12
18	48,3	24,7	21,2	12,44	7,09	5,24
19	51,5	22,3	22,2	13,70	7,89	5,61
20	49,6	24,0	23,3	14,26	6,63	7,46
21	40,1	20,0	16,8	6,79	3,25	3,09
22	44,9	21,6	18,8	9,83	5,26	4,38
23	46,6	22,0	19,2	10,93	5,87	4,92
24	46,0	21,8	21,7	12,62	5,78	6,33
25	42,5	22,0	20,1	10,06	5,40	4,34
26	47,6	21,8	20,0	10,93	5,67	4,72
27	46,9	23,0	22,5	11,47	6,36	4,70
28	50,6	24,7	21,5	13,18	7,23	5,71
29	49,7	25,5	19,8	13,28	6,85	6,09
30	58,2	28,5	24,9	22,88	12,91	9,78
31	41,6	19,2	18,1	6,41	2,65	3,36
32	42,2	21,5	16,9	8,31	4,53	3,67
33	42,3	20,4	18,1	7,11	3,56	3,45
34	41,4	20,8	18,4	7,66	4,14	3,38
35	41,9	21,2	20,4	11,34	6,11	5,17
36	43,3	22,9	18,4	8,58	4,11	4,24
37	46,2	22,9	18,5	10,01	5,84	4,00
38	46,1	24,1	21,1	12,31	6,82	5,23
39	54,3	25,9	22,7	17,85	10,33	7,39
40	60,0	26,8	24,7	20,52	11,77	8,65
41	42,8	22,3	18,1	8,56	4,40	4,02
42	43,3	21,7	16,7	6,92	3,78	3,03
43	43,7	20,2	20,0	9,40	5,58	3,58
44	44,0	21,4	19,9	10,12	5,27	4,75
45	43,3	20,7	18,8	10,62	4,98	4,87
46	47,1	23,6	20,5	14,42	6,76	5,60
47	50,8	22,1	20,2	11,41	6,92	4,38
48	47,0	25,7	21,1	14,69	7,90	6,71
49	53,8	24,6	23,6	13,76	6,24	7,34
50	48,7	25,3	21,4	15,01	7,65	7,23
	Length		**Height**	**Total weight**	**Weight soft body**	**Weight shell**
Average	46,5	22,7	20,2	11,32	5,90	5,15
Stdev	4,8	2,2	2,3	3,60	2,10	1,64
Min	39,8	19,2	16,0	6,41	2,65	2,72
Max	60,0	28,5	24,9	22,88	12,91	9,78

Species:	**Blue mussel (*Mytilus edulis*)**	Date of sampling:	**3.9.2008**
Length:	4-6 cm	Sampled by:	Marine Inst.
Location:	**Mjoifjordur II, Hofsa**	Date of preparation:	23.9.2009
Coordinates:	651216 134773	Matis#:	R09-658-10

	Length (mm)	Width (mm)	Height (mm)	Total weight (g)	Weight soft body (g)	Weight shell (g)
1	42,0	19,7	15,8	6,49	2,80	3,56
2	40,9	18,8	15,6	10,04	2,44	3,43
3	50,3	21,9	16,8	8,51	5,33	3,09
4	48,8	25,0	20,7	14,06	7,42	6,51
5	47,2	22,0	21,9	12,90	4,61	8,26
6	49,0	24,2	20,9	11,98	4,62	7,24
7	54,5	24,7	19,5	10,73	6,01	4,60
8	59,0	21,8	21,9	13,99	7,95	5,86
9	50,8	28,5	22,7	20,78	8,83	11,70
10	60,3	27,0	23,1	17,21	9,59	7,38
11	43,8	22,0	19,1	9,04	4,44	4,51
12	44,6	21,6	17,4	6,89	3,38	3,41
13	47,2	23,0	18,3	11,58	6,05	5,42
14	52,7	24,1	20,4	10,65	5,50	5,07
15	49,2	24,5	18,3	11,35	6,37	4,89
16	54,2	27,0	19,3	11,56	6,06	5,40
17	51,2	27,8	21,7	14,54	8,72	5,76
18	53,7	25,2	18,4	11,69	5,65	5,83
19	52,6	26,6	19,4	13,07	7,38	5,53
20	60,4	28,9	23,3	19,63	11,44	8,08
21	42,3	20,6	18,9	10,05	4,40	5,53
22	47,4	22,9	16,9	10,56	5,83	4,60
23	47,8	22,0	17,8	8,50	4,73	3,66
24	44,8	23,0	18,9	10,40	4,77	5,54
25	47,3	21,4	19,1	10,09	4,82	5,07
26	48,8	24,6	18,4	11,21	6,74	4,34
27	53,1	24,5	17,7	10,82	6,28	4,43
28	52,2	25,2	18,4	10,60	5,57	4,92
29	58,3	26,2	19,6	15,57	8,35	7,07
30	61,4	26,8	23,5	16,55	8,57	4,64
31	40,5	21,1	15,1	6,15	2,88	3,2
32	44,4	20,6	18,4	9,97	4,93	4,99
33	46,1	20,5	18,3	9,36	5,25	3,97
34	46,8	23,3	18,0	10,28	5,21	5,02
35	47,0	22,5	17,0	9,05	4,23	4,74
36	44,3	23,8	18,4	10,39	6,03	4,28
37	52,4	24,3	16,9	11,91	6,71	5,10
38	40,8	20,3	15,9	7,62	3,86	3,74
39	52,7	24,4	19,5	10,24	6,00	4,18
40	54,2	24,8	18,2	11,87	7,04	4,74
41	42,2	19,7	17,4	8,33	4,15	4,03
42	44,3	18,9	16,5	6,77	2,95	3,65
43	42,5	19,6	16,2	6,46	2,32	3,80
44	45,6	21,3	19,0	10,17	4,32	5,63
45	42,3	20,1	16,1	6,16	3,02	2,90
46	42,7	19,6	15,2	4,08	1,45	2,14
47	42,2	20,6	17,0	7,84	2,12	5,42
48	46,6	22,2	16,0	7,25	4,05	2,90
49	38,8	20,8	18,1	8,62	3,72	4,47
50	49,8	22,3	17,3	8,11	4,11	3,69
	Length	**Width**	**Height**	**Total weight**	**Weight soft body**	**Weight shell**
Average	48,44	23,04	18,56	10,63	5,38	4,96
Stdev	5,67	2,61	2,14	3,36	2,08	1,63
Min	38,80	18,80	15,10	4,08	1,45	2,14
Max	61,40	28,90	23,50	20,78	11,44	11,70

Species:	**Blue mussel (*Mytilus edulis*)**	Date of sampling:	**3.9.2008**
Length:	4-6 cm	Sampled by:	Marine Inst.
Location:	**Mjoifjordur III, Daltangi**	Date of preparation:	31.8.2009
Coordinates:	651610 133456	Matis#:	R09-658-9

	Length (mm)	Width (mm)	Height (mm)	Total weight (g)	Weight soft body (g)	Weight shell (g)
1	42,1	19,7	19,2	8,87	4,90	3,94
2	42,0	20,5	16,0	6,81	2,62	4,15
3	46,6	21,5	18,8	9,61	4,52	5,06
4	48,3	24,5	18,8	11,81	5,81	5,96
5	50,4	24,3	20,9	14,22	7,28	6,88
6	48,1	26,1	25,2	19,42	7,74	11,70
7	43,9	20,5	17,0	8,24	4,61	3,59
8	42,3	20,0	17,5	6,07	2,74	3,28
9	47,9	21,7	21,2	13,12	5,40	7,68
10	46,1	24,2	23,8	14,58	7,64	6,82
11	49,3	24,3	20,3	14,15	6,84	7,11
12	46,0	23,8	21,6	13,74	7,00	6,68
13	48,7	24,8	23,7	18,49	7,20	10,68
14	40,6	20,3	17,9	7,08	2,93	4,06
15	42,4	20,9	17,4	8,98	4,38	4,50
16	42,1	21,4	19,4	10,48	3,92	6,41
17	41,3	21,7	17,2	10,09	3,79	6,11
18	50,8	26,2	22,4	15,97	8,52	7,37
19	42,2	22,9	16,9	7,86	4,19	3,58
20	41,8	20,6	16,0	7,86	4,39	3,44
21	47,9	20,0	19,8	8,70	3,55	5,09
22	48,1	23,5	20,9	14,07	4,49	9,44
23	47,2	23,3	19,7	12,21	6,27	5,88
24	51,6	24,0	19,4	12,89	5,83	6,96
25	50,6	25,0	22,2	20,62	7,83	12,48
26	44,0	22,5	15,9	7,16	2,97	3,92
27	48,6	23,1	22,9	12,14	5,96	5,95
28	46,8	21,9	23,5	8,40	3,50	4,67
29	44,9	21,1	18,2	8,70	4,90	3,60
30	49,2	22,2	18,8	12,38	5,43	6,52
31	40,7	22,8	14,3	6,12	2,89	3,19
32	40,8	21,4	17,8	8,98	4,01	4,90
33	41,2	19,7	16,3	7,87	3,78	4,04
34	46,2	23,5	18,0	11,04	5,05	5,79
35	52,9	24,0	23,2	14,26	5,56	8,59
36	40,0	18,5	16,2	5,97	2,64	3,28
37	42,5	21,8	21,5	11,10	3,94	6,77
38	44,4	21,7	17,6	8,85	4,26	4,50
39	48,1	25,2	18,2	10,54	4,47	5,93
40	51,6	24,2	20,5	16,30	8,28	7,95
41	49,0	21,1	19,6	11,31	6,07	5,19
42	55,3	23,9	25,6	21,88	8,29	13,41
43	53,8	27,5	21,7	14,67	6,22	8,30
44	40,5	20,2	16,1	6,66	2,37	4,23
45	39,6	17,5	15,4	6,08	2,78	3,24
46	39,4	19,0	15,1	4,69	2,03	2,51
47	40,9	20,9	15,1	6,81	3,72	3,05
48	43,1	23,0	18,0	8,32	3,76	4,51
49	51,7	19,1	19,3	12,54	4,88	7,58
50	51,3	24,6	23,8	18,67	8,80	9,82
	Length	**Width**	**Height**	**Total weight**	**Weight soft body**	**Weight shell**
Average	45,9	22,3	19,3	11,15	5,02	6,01
Stdev	4,3	2,2	2,9	4,15	1,82	2,54
Min	39,4	17,5	14,3	4,69	2,03	2,51
Max	55,3	27,5	25,6	21,88	8,80	13,41

Species:	**Blue mussel (*Mytilus edulis*)**	Date of sampling:	**1.9.2008**
Length:	4-6 cm	Sampled by:	Marine Inst.
Location:	**Hvalstod, Hvalfjordur**	Date of preparation:	13.10.2009
Coordinates:	642383 212721	Matis#:	R09-658-5

	Length (mm)	Width (mm)	Height (mm)	Total weight (g)	Weight soft body (g)	Weight shell (g)
1	46,7	24,8	18,5	10,85	5,89	4,78
2	46,7	22,9	20,2	11,02	5,78	4,90
3	55,0	24,9	21,8	16,31	8,48	7,71
4	58,5	27,3	24,0	20,03	10,41	9,44
5	59,1	26,6	26,5	24,50	12,33	12,03
6	60,3	26,6	28,0	25,43	13,86	11,38
7	58,6	27,8	25,6	22,51	12,22	10,22
8	60,3	28,2	23,8	23,19	12,95	10,12
9	56,8	27,6	23,7	20,19	10,80	9,30
10	56,0	27,9	20,3	17,29	9,82	7,29
11	43,8	22,7	16,9	8,17	4,40	3,59
12	52,6	25,7	23,5	16,70	9,01	7,61
13	51,8	24,2	23,7	19,07	9,70	9,23
14	61,0	26,3	22,0	19,30	11,49	7,54
15	61,0	26,4	27,1	23,98	13,11	10,76
16	56,4	27,5	24,2	20,62	10,90	9,35
17	59,4	28,5	23,5	21,60	11,26	10,15
18	60,0	29,1	24,8	22,32	12,19	9,99
19	59,9	28,5	26,3	25,99	14,25	11,16
20	63,7	31,6	24,6	25,76	15,78	9,83
21	56,0	27,9	22,3	19,46	10,76	8,55
22	57,3	28,8	20,3	18,36	9,33	8,82
23	57,9	26,5	22,5	19,25	10,45	8,70
24	58,6	28,0	23,5	21,49	12,41	8,91
25	59,2	26,1	22,1	18,90	10,17	8,52
26	56,9	26,9	23,3	19,61	10,00	9,49
27	56,9	27,6	21,0	18,23	8,96	8,70
28	59,3	26,1	24,3	21,22	12,61	8,45
29	59,2	29,6	23,1	22,31	13,14	9,03
30	60,0	26,3	24,3	22,25	12,18	9,88
31	59,6	25,4	24,4	21,51	11,58	9,67
32	61,9	28,2	23,6	22,44	11,51	10,80
33	59,3	28,6	23,7	21,18	11,35	9,54
34	58,3	29,5	25,2	22,98	12,36	10,44
35	60,4	30,3	27,5	28,31	16,35	11,73
36	55,8	26,7	27,8	21,64	12,44	9,09
37	57,3	25,6	24,7	21,21	10,55	10,44
38	57,2	29,7	24,2	22,56	11,89	10,41
39	61,9	29,5	26,9	28,71	14,14	14,40
40	64,9	29,0	29,8	33,01	16,81	15,66
41	51,3	25,3	21,2	15,14	8,14	6,88
42	53,5	24,4	21,2	15,54	9,02	6,24
43	59,7	30,6	25,7	23,50	13,56	9,74
44	56,7	25,6	24,5	19,96	10,31	9,51
45	51,4	24,3	23,0	16,62	9,45	7,08
46	55,9	28,2	22,5	19,44	10,65	8,65
47	52,3	25,4	23,0	18,51	9,48	8,82
48	57,9	29,2	24,2	21,13	12,01	8,94
49	55,6	25,3	23,2	17,75	9,15	8,24
50	59,0	28,0	22,2	20,00	11,38	8,44
	Length	**Width**	**Height**	**Total weight**	**Weight soft body**	**Weight shell**
Average	57,2	27,2	23,7	20,54	11,14	9,20
Stdev	4,2	2,0	2,4	4,34	2,44	2,07
Min	43,8	22,7	16,9	8,17	4,40	3,59
Max	64,9	31,6	29,8	33,01	16,81	15,66

Species:	**Blue mussel (*Mytilus edulis*)**	Date of sampling:	**2.9.2008**
Length:	4-6 cm	Sampled by:	Marine Inst.
Location:	**Dvergasteinn, Álftafjörður**	Date of preparation:	27.8.2009
Coordinates:	655909 230210	Matis#:	R09-658-6

	Length (mm)	Width (mm)	Height (mm)	Total weight (g)	Weight soft body (g)	Weight shell (g)
1	42,3	20,8	15,4	6,81	3,91	2,87
2	42,9	21,3	16,9	6,39	3,40	2,90
3	44,5	21,8	19,1	8,74	5,56	3,07
4	47,6	24,4	21,6	9,17	4,16	4,78
5	49,3	23,2	20,6	10,75	5,82	4,77
6	45,8	22,0	18,1	6,48	2,87	3,35
7	45,0	22,7	20,9	7,60	2,46	4,99
8	45,2	21,5	20,7	10,04	5,05	4,85
9	48,8	23,9	20,2	10,02	5,10	4,78
10	45,2	22,9	21,6	10,30	6,39	3,83
11	44,9	23,2	18,6	8,77	5,42	3,16
12	49,3	22,2	18,8	10,92	6,20	4,61
13	47,4	22,5	17,0	6,20	2,19	3,80
14	44,1	22,3	16,5	8,14	4,61	3,38
15	46,4	23,0	18,8	9,33	4,78	4,44
16	42,5	22,9	20,1	7,89	3,24	4,51
17	41,5	20,4	17,0	7,55	4,40	3,06
18	41,4	20,2	17,5	5,28	2,7 5	2,48
19	46,0	23,5	18,2	6,32	2,75	3,46
20	46,6	21,0	19,3	7,12	3 ,95	3,00
21	48,5	23,2	16,8	6,07	1,84	4,08
22	49,0	25,4	19,4	12,87	7,73	5,05
23	41,9	21,4	17,0	8,20	4,66	3,45
24	41,1	20,0	18,6	6,89	3,45	3,26
25	41,2	19,6	17,9	4,27	1,77	2,36
26	44,7	19,2	19,2	9,44	5,25	4,07
27	45,4	22,7	20,3	7,77	4,62	3,07
28	45,4	23,7	20,4	10,52	6,20	4,24
29	40,0	20,2	18,7	3,40	1,04	2,30
30	40,2	20,5	16,4	6,24	2,94	3,13
31	40,5	21,3	17,3	7,70	4,71	2,84
32	43,5	22,8	17,2	7,86	4,45	3,19
33	45,2	22,2	17,0	8,07	4,67	3,24
34	49,8	21,7	21,7	12,20	7,05	5,06
35	48,0	23,3	19,4	9,58	4,39	5,01
36	49,9	25,7	21,2	10,15	4,74	5,20
37	46,2	23,7	19,5	8,80	4,58	3,93
38	53,3	26,4	25,3	10,28	4,29	5,88
39	44,3	22,8	18,8	7,21	3,17	3,83
40	48,9	23,3	21,8	11,65	6,85	4,70
41	46,6	24,3	20,2	13,11	7,27	5,68
42	40,5	19,9	17,2	6,05	3,80	2,12
43	45,7	21,3	19,5	9,85	5,11	4,65
44	42,5	22,5	24,3	10,62	5,77	4,64
45	51,3	26,0	22,2	14,02	8,47	5,38
46	44,6	26,6	17,9	8,20	5,25	2,85
47	47,7	23,1	17,8	9,28	6,07	3,15
48	45,3	22,5	19,0	9,51	5,38	3,98
49	50,9	25,4	21,4	13,60	7,95	5,56
50	47,0	22,1	19,4	10,84	6,70	4,08
	Length	**Width**	**Height**	**Total weight**	**Weight soft body**	**Weight shell**
Average	45,5	22,6	19,2	8,76	4,76	3,92
Stdev	3,2	1,8	2,0	2,33	1,67	0,97
Min	40,0	19,2	15,4	3,40	1,04	2,12
Max	53,3	26,6	25,3	14,02	8,47	5,88

Species:	**Blue mussel (*Mytilus edulis*)**	Date of sampling:	**31.8.2008**
Length:	4-6 cm	Sampled by:	Marine Inst.
Location:	**Grímsey**	Date of preparation:	18.8.2009
Coordinates:	663313 180141	Matis#:	R09-658-8

	Length (mm)	Width (mm)	Height (mm)	Total weight (g)	Weight soft body (g)	Weight shell (g)
1	55,6	20,5	24,9	21,46	10,11	11,25
2	53,6	27,5	24,0	20,35	9,45	10,71
3	42,3	21,5	22,7	16,25	5,55	10,49
4	47,2	27,5	22,9	13,77	7,26	6,45
5	50,5	23,6	19,9	13,85	6,95	6,84
6	47,4	23,2	23,3	14,92	6,82	8,09
7	52,2	26,8	19,7	15,08	8,27	6,73
8	46,2	21,8	18,7	9,74	3,99	5,71
9	49,3	24,0	20,1	11,34	3,89	7,21
10	48,5	22,5	18,4	12,04	6,28	5,67
11	49,3	24,5	22,1	17,07	7,69	4,29
12	59,4	26,1	24,1	23,76	11,19	12,37
13	43,9	21,2	18,0	7,46	3,14	4,29
14	44,0	21,5	19,0	11,27	4,91	6,24
15	45,7	23,1	20,2	12,80	6,34	6,34
16	47,3	22,1	19,4	10,75	5,43	5,23
17	50,2	22,9	21,7	13,31	6,60	6,68
18	51,5	21,4	19,6	14,29	7,26	6,77
19	56,2	21,4	20,1	17,83	9,36	8,40
20	49,2	23,0	21,8	16,28	6,15	9,94
21	41,0	22,7	17,9	9,59	4,59	4,87
22	44,1	21,7	19,1	11,73	5,58	6,14
23	47,5	23,7	19,5	9,53	4,64	4,77
24	47,5	22,0	19,9	12,84	6,11	6,60
25	44,0	22,8	18,3	8,20	3,46	4,67
26	47,3	23,0	19,0	11,11	3,64	7,42
27	53,2	23,8	20,1	14,90	7,34	7,45
28	47,7	22,9	19,9	12,45	6,06	6,38
29	50,6	26,6	23,9	18,97	8,72	10,16
30	49,8	27,2	22,7	19,77	8,00	11,72
31	52,8	25,1	22,5	18,65	8,21	10,19
32	52,2	25,6	23,2	18,93	6,65	11,91
33	50,9	22,2	20,1	13,78	7,51	6,27
34	52,9	28,8	20,8	15,58	8,36	7,09
35	42,9	22,9	19,6	11,60	2,43	9,09
36	45,2	22,3	20,6	11,52	4,06	7,36
37	47,7	23,5	18,6	12,05	6,43	5,57
38	50,6	24,8	18,8	9,75	3,52	6,12
39	53,8	24,5	20,5	14,80	7,79	6,88
40	51,5	26,7	21,8	15,34	8,60	6,64
41	47,8	22,5	20,1	13,73	6,93	6,74
42	42,0	22,2	20,4	12,34	5,70	6,62
43	46,8	22,7	20,3	12,50	5,90	6,56
44	46,8	23,0	20,7	12,30	6,57	5,70
45	42,7	21,6	20,1	13,41	4,45	8,83
46	48,3	23,5	20,8	15,15	6,63	8,44
47	45,6	21,5	22,1	13,64	6,21	7,38
48	51,7	23,4	21,6	15,76	8,44	7,25
49	51,9	24,6	20,0	11,22	4,48	6,60
50	43,0	20,0	17,7	7,78	3,30	4,43
	Length	**Width**	**Height**	**Total weight**	**Weight soft body**	**Weight shell**
Average	48,6	23,5	20,6	13,85	6,34	7,31
Stdev	4,0	2,0	1,8	3,53	1,96	2,06
Min	41,0	20,0	17,7	7,46	2,43	4,29
Max	59,4	28,8	24,9	23,76	11,19	12,37

Appendix II.

Biological measurements of Cod (*Gadus morhua*) 2009

Species:	**Cod (*Gadus Morhua*)**	**exped./station**			**date**	**n**
Location:	**North- Northwest of Iceland (2)**	TP1-2009-120	654034	242687	20.3.2009	3
Lenght:	30-45cm	TP1-2009-121	655855	241931	20.3.2009	4
Ship:	Páll Pálsson ÍS-102	TP1-2009-87	665416	243151	17.3.2009	2
Expd.leader:	Hjalti Karlsson	TP1-2009-91	661177	255252	18.3.2009	2
		TP1-2009-99	655890	254949	18.3.2009	5
		TP1-2009-102	655331	253309	18.3.2009	7
		TP1-2009-116	653072	254330	20.3.2009	2

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	121	98,44	102,05	3,61	259	1	31,0			
	120	98,58	105,53	6,95	539	1	39,0			
	121	99,98	107,74	7,76	398	1	35,0			
	99	99,29	107,13	7,84	505	1	38,0			
	99	99,04	107,61	8,57	716	2	43,0			
	120	98,97	107,72	8,75	489	1	37,0			
	102	98,80	108,06	9,26	637	2	41,0			
			Sum	52,74	3543,0		264,0			
			Average	7,53	506,1		37,7			
			STDEV	1,89	150,2		3,9			
			Min	3,61	259,0		31,0			
			Max	9,26	716,0		43,0			
H 2	120	98,85	108,25	9,40	558	2	37,0			
	121	98,78	108,31	9,53	640	1	41,0			
	116	98,78	109,39	10,61	252	1	32,0			
	121	99,54	111,03	11,49	778	2	3,0			
	116	98,99	110,79	11,80	216	1	30,0			
	91	97,79	110,15	12,36	659	2	41,0			
	87	99,78	115,89	16,11	715	1	44,0			
			Sum	81,30	3818,0		228,0			
			Average	11,61	545,4		32,6			
			STDEV	2,28	223,4		14,0			
			Min	9,40	216,0		3,0			
			Max	16,11	778,0		44,0			
H 3	87	99,25	125,74	26,49	671	2	44,0			
	99	99,90	128,61	28,71	580	1	40,0			
	99	98,76	129,27	30,51	465	1	38,0			
	99	98,95	134,14	35,19	724	1	43,0			
	102	99,39	134,83	35,44	561	2	40,0			
			Sum	156,34	3001,00		205,0			
			Average	31,27	500,17		41,0			
			STDEV	3,96	100,70		2,4			
			Min	26,49	465,00		38,0			
			Max	35,44	724,00		44,0			
H 4	102	99,22	141,19	41,97	326,0	1	34,0			
	102	99,21	141,39	42,18	661,0	2	44,0			
	102	98,77	141,45	42,68	647,0	2	42,0			
	102	99,29	143,64	44,35	685,0	2	43,0			
	102	99,22	144,06	44,84	648,0	2	42,0			
			Sum	216,02	2967,0		205,0			
			Average	43,20	593,4		41,0			
			STDEV	1,31	150,3		4,6			
			Min	41,97	326,0		34,0			
			Max	44,84	685,0		44,0			
H 5	91	98,80	151,70	52,90	697,0	1	40,0			
			Sum	52,90	697,0		40,0			
			Average	52,90	697,0		40,0			
			STDEV							
			Min	52,90	697,0		40,0			
			Max	52,90	697,0		40,0			
H1, H2, H3, H4, H5			**Sum**	559,30	14026,00		942,0			
			Average	29,30	568,43		38,46			
			STDEV	1,14	50,6		5,2			
			Min	3,61	216,0		3,0			
			Max	52,90	778,00		44,00			

Species:	**Cod (*Gadus Morhua*)**	**exped./station**		**date**	**n**
Location:	**North-Northwest of Iceland (1)**	B2-2009-129	**664354 182722**	10.3.2009	25
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	129	98,87	106,94	8,07	313	1	35	289	101,4	4
	129	98,59	107,30	8,71	308	1	35	274	83,8	3
	129	98,71	107,74	9,03	368	1	37	326	123,2	3
	129	98,57	108,89	10,32	499	0	40	439	139,6	4
	129	99,21	109,97	10,76	351	1	36	332	137,2	3
	129	98,92	110,92	12,00	405	1	36	366	103,3	3
	129	98,73	111,35	12,62	332	0	35	291	81,1	3
			Sum	46,89	2576		254	2317	769,6	23
			Average	9,38	368		36	331	109,9	3
			STDEV	1,13	67		2	57	23,9	0
			Min	8,07	308		35	274	81,1	3
			Max	10,76	499		40	439	139,6	4
H 2	129	99,24	112,67	13,43	507	0	40	445	127,0	3
	129	98,83	112,60	13,77	387	0	37	361	118,8	4
	129	99,27	113,58	14,31	402	0	37	352	105,2	4
	129	98,79	113,29	14,50	337	1	35	290	92,8	3
	129	99,15	115,43	16,28	338	1	35	301	87,2	3
	129	98,79	115,30	16,51	502	0	40	448	151,2	4
			Sum	88,80	2473		224	2197	682,2	21,0
			Average	14,80	412		37	366	113,7	3,5
			STDEV	1,29	76		2	68	23,8	0,5
			Min	13,43	337		35	290	87,2	3
			Max	16,51	507		40	448	151,2	4
H 3	129	99,00	117,12	18,12	398	1	37	337	95,6	3
	129	99,13	119,15	20,02	510	0	40	465	140,2	3
	129	98,83	120,48	21,65	490	0	38	416	135,9	4
			Sum	59,79	1398		115	1218	371,7	10,0
			Average	19,93	466		38	406	123,9	3,3
			STDEV	1,77	60		2	65	24,6	0,6
			Min	18,12	398		37	337	95,6	3
			Max	21,65	510		40	465	140,2	4
H 4	129	99,43	122,01	22,58	510	1	40	433	128,5	3
	129	99,40	122,68	23,28	534	0	41	457	106,3	4
	129	98,58	123,09	24,51	635	1	43	571	166,2	4
	129	98,87	124,85	25,98	707	0	45	649	162,2	4
			Sum	96,35	2386		169	2110	563,2	15,0
			Average	24,09	597		42	528	140,8	3,8
			STDEV	1,49	91		2	101	28,5	0,5
			Min	22,58	510		40	433	106,3	3
			Max	25,98	707		45	649	166,2	4
H 5	129	99,14	127,65	28,51	677	0	44	610	143,6	4
	129	99,58	130,08	30,50	676	1	43	595	191,6	4
	129	99,67	131,98	32,31	552	0	41	502	120,2	3
			Sum	91,32	1905		128	1707	455,4	11,0
			Average	30,44	635		43	569	151,8	3,7
			STDEV	1,90	72		2	59	36,4	0,6
			Min	28,51	552		41	502	120,2	3,0
			Max	32,31	677		44	610	191,6	4,0
H 6	129	99,74	136,55	36,81	640	0	43	558	182,0	4
	129	98,86	137,79	38,93	611	1	41	516	159,5	3
			Sum	75,74	1251		84	1074	341,5	7,0
			Average	37,87	626		42	537	170,8	3,5
			STDEV	1,50	21		1	30	15,9	0,7
			Min	36,81	611		41	516	159,5	3,0
			Max	38,93	640		43	558	182,0	4,0
H1, H2, H3, H4, H5,H6			**Sum**	483,51	11989,00		974,00	10623,00	3183,60	87,00
			Average	19,34	479,56		38,96	424,92	127,34	3,48
			STDEV	9,03	126,39		3,17	112,24	30,53	0,51
			Min	8,07	308,00		35,00	274,00	81,10	3,00
			Max	38,93	707,00		45,00	649,00	191,60	4,00

Species:	**Cod (*Gadus Morhua*)**	**exped./station**			**date**	**n**
Location:	**Northeast of Iceland**	TB1-2009-87	662695	134355	12.3.2009	24
Lenght:	30-45cm					
Ship:	Bjartur NK					
Expd.leader:	Valur Bogason					

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
								Athugasemd hold fiska vantar !		
H 1	87	98,77	102,51	3,74	212	1	30,0			
	87	99,25	104,14	4,89	214	1	30,0			
	87	98,87	103,86	4,99	229	0	31,0			
	87	100,06	105,45	5,39	287	1	33,0			
	87	98,79	105,47	6,68	281	0	33,0			
	87	99,00	105,72	6,72	205	0	30,0			
	87	99,92	107,49	7,57	261	1	32,0			
	87	99,08	106,74	7,66	292	0	35,0			
			Sum	47,64	1981,0		254,0			
			Average	5,96	247,6		31,8			
			STDEV	1,41	36,6		1,8			
			Min	3,74	205,0		30,0			
			Max	7,66	292,0		35,0			
H 2	87	99,31	108,42	9,11	226	0	30,0			
	87	99,28	110,75	11,47	603	1	41,0			
	87	98,80	110,30	11,50	325	1	34,0			
	87	99,22	111,25	12,03	636	1	43,0			
	87	99,91	113,51	13,60	492	0	39,0			
	87	98,32	112,22	13,90	639	0	43,0			
			Sum	71,61	2921,0		230,0			
			Average	11,94	486,8		38,3			
			STDEV	1,73	175,0		5,3			
			Min	9,11	226,0		30,0			
			Max	13,90	639,0		43,0			
H 3	87	99,66	114,69	15,03	740	0	45,0			
	87	99,14	114,85	15,71	355	0	36,0			
	87	99,64	118,28	18,64	608	1	43,0			
	87	99,52	118,71	19,19	541	1	39,0			
	87	99,06	120,57	21,51	642	1	42,0			
			Sum	90,08	2886,00		205,0			
			Average	18,02	577,20		41,0			
			STDEV	2,66	143,47		3,5			
			Min	15,03	355,00		36,0			
			Max	21,51	740,00		45,0			
H 4	87	99,54	142,22	42,68	808,0	1	45,0			
	87	98,78	142,74	43,96	792,0	1	45,0			
	87	99,50	145,64	46,14	733,0	1	44,0			
			Sum	132,78	2333,0		134,0			
			Average	44,26	777,7		44,7			
			STDEV	1,75	39,5		0,6			
			Min	42,68	733,0		44,0			
			Max	46,14	808,0		45,0			
H5	87	99,54	142,22	42,68	808,0	1	45,0			
	87	98,78	142,74	43,96	792,0	1	45,0			
	87	99,50	145,64	46,14	733,0	1	44,0			
			Sum	132,78	2333,0		134,0			
			Average	44,26	777,7		44,7			
			STDEV	1,75	39,5		0,6			
			Min	42,68	733,0		44,0			
			Max	46,14	808,0		45,0			
H6	87	100,14	157,54	57,4	869	2	45			
			Sum	57,4	869	2	45			
			Average	57,4	869	2	45			
			STDEV							
			Min	57,4	869	2	45			
			Max	57,4	869	2	45			
H1, H2, H3, H4, H5			**Sum**	532,29	13323,00		1002,00			
			Average	30,30	573,40		40,90			
			STDEV	0,5	67,1		2,0			
			Min	3,7	205,0		30,0			
			Max	57,40	869,00		45,00			

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 R82) for the year 2009.

Analyte		QTM080BT Quasimeme R82 µg/g	I Z-scoreI	Mussel Tissue ERM-CE278 mg/kg	I Z-score*I	MLOD** mg/kg
As						0,3
	Measured	2030,000		6,10		
	Certified	2432,000	-1,30	6,07	0,04	
Cd						0,03
	Measured	138,0		0,277		
	Certified	163,0	-0,80	0,348	-1,63	
Cu						0,6
	Measured	705,0		6,89		
	Certified	1147	-2,30	9,45	-2,17	
Hg						0,03
	Measured	NA	-	0,178		
	Certified			0,196	-0,72	
Pb						0,03
	Measured	102,0		1,722		
	Certified	137,0	-1,80	2,00	-1,11	
Se						0,3
	Measured	647,0		1,698		
	Certified	528,3	1,70	1,84	-0,62	
Zn						1,5
	Measured	27,20		78,7		
	Certified	37,10	-1,80	83,1	-0,42	

* Z-score ((mesarured 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 (DORM-2 and Quasimeme R56) for the year 2009.

Analyte		QTM081BT Quasimeme R56 µg/g	I Z-scoreI	DORM-3 NRC-CNRC mg/kg	I Z-score*I	MLOD** mg/kg
As						0,3
	Measured	1,400		6,84		
	Certified	1,630	-1,1	6,88	-0,04	
Cd						0,03
	Measured	84,00		0,271		
	Certified	108,5	-1,0	0,29	-0,52	
Cu						0,6
	Measured	1400		12,3		
	Certified	1661	-1,0	15,5	-1,68	
Hg						0,03
	Measured	19,00		0,319		
	Certified	24,01	-0,4	0,355	-0,81	
Pb						0,03
	Measured	390,0		0,378		
	Certified	433,6	-0,8	0,395	-0,34	

* Z-score ((mesarured 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 2008

Blue mussel control								assign			
chemical	CRM	weight basis	anal. 1	anal. 2	anal. 3	mean	SD	value	time	I Z I**	det. Lim.
CB28	QOR101BT	wet weight	0,35	0,3	0,29	0,31	0,03	0,29	2 weeks	0,48	0,02
CB31	QOR101BT	wet weight	0,2	0,17	0,17	0,18	0,02	0,2	2 weeks	-0,53	0,02
CB52	QOR101BT	wet weight	0,86	0,85	0,85	0,85	0,01	0,8	2 weeks	0,47	0,01
CB101	QOR101BT	wet weight	2,98	3,02	3,12	3,04	0,07	2,82	2 weeks	0,60	0,01
CB105	QOR101BT	wet weight	0,33	0,36	0,36	0,35	0,02	0,34	2 weeks	0,18	0,01
CB118	QOR101BT	wet weight	1,78	1,89	1,83	1,83	0,06	1,72	2 weeks	0,50	0,01
CB138	QOR101BT	wet weight	3,74	3,82	3,87	3,81	0,07	3,71	2 weeks	0,21	0,01
CB153	QOR101BT	wet weight	6,48	6,72	7	6,73	0,26	6,34	2 weeks	0,49	0,01
CB156	QOR101BT	wet weight	0,19	0,2	0,2	0,20	0,01	0,19	2 weeks	0,18	0,01
CB180	QOR101BT	wet weight	0,46	0,47	0,53	0,49	0,04	0,45	2 weeks	0,54	0,01
HCB	QOR101BT	wet weight	0,04	0,04	0,04	0,04	0,00	0,04	2 weeks	0,00	0,01
a-HCH	QOR101BT	wet weight	0,01	0,01	0,01	0,01	0,00	0,03	2 weeks	-1,07	0,02
b-HCH	QOR101BT	wet weight	0,02	0,03	0,03	0,03	0,01	0,048	2 weeks	-1,12	0,02
g-HCH	QOR101BT	wet weight	0,01	0,01	0,02	0,01	0,01	0,043	2 weeks	-1,65	0,02
pp'-DDE	QOR101BT	wet weight	1,15	1,21	1,18	1,18	0,03	1,25	2 weeks	-0,41	0,01
pp'-DDD	QOR101BT	wet weight	0,46	0,48	0,49	0,48	0,02	0,46	2 weeks	0,24	0,01
pp'-DDT	QOR101BT	wet weight	0,03	0,04	0,04	0,04	0,01		2 weeks	*	0,02
op'-DDT	QOR101BT	wet weight	0,04	0,01	0,01	0,02	0,02		2 weeks	*	0,02
transn-chlor	QOR101BT	wet weight	0,06	0,06	0,06	0,06	0	0,07	2 weeks	-0,4761905	0,01

* no assigned value in this sample

**Z=(assigned value-mean)/assigned value*%error by the quasimeme laboratories

a- and g-chlordane, oxychlordane, toxaphenes and PBDEs 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 2009

Cod liver control								assign			
chemical	CRM	weight basis	anal. 1	anal. 2	anal. 3	mean	SD	value	time	I Z I	det. Lim.
CB28	QOR094BT	wet weight	10,4	11	10,4	10,6	0,35	10,10	2 weeks	0,39	0,20
CB31	QOR094BT	wet weight	3,61	3,87	3,59	3,69	0,16	3,62	2 weeks	0,15	0,20
CB52	QOR094BT	wet weight	23,4	24,7	23	23,7	0,89	23,0	2 weeks	0,24	0,10
CB101	QOR094BT	wet weight	66,6	68,4	66,5	67,2	1,07	62,2	2 weeks	0,64	0,20
CB105	QOR094BT	wet weight	16,9	16,9	16	16,6	0,52	15,7	2 weeks	0,45	0,05
CB118	QOR094BT	wet weight	74,4	74	71,7	73,4	1,46	67,5	2 weeks	0,70	0,05
CB138	QOR094BT	wet weight	137,9	141,2	136,4	138,5	2,5	137,6	2 weeks	0,05	0,05
CB153	QOR094BT	wet weight	230,6	239,7	227,1	232,5	6,5	212	2 weeks	0,76	0,05
CB156	QOR094BT	wet weight	9,26	9	8,47	8,91	0,40	8,40	2 weeks	0,48	0,05
CB180	QOR094BT	wet weight	46	47,5	45,5	46,3	1,04	42,5	2 weeks	0,72	0,05
HCB	QOR094BT	wet weight	14	14,3	13,3	13,9	0,51	13,8	2 weeks	0,04	0,05
a-HCH	QOR094BT	wet weight	1,41	1,49	1,41	1,44	0,05	1,33	2 weeks	0,61	0,05
b-HCH	QOR094BT	wet weight	1,87	1,8	1,67	1,78	0,10	1,905	2 weeks	-0,50	0,05
g-HCH	QOR094BT	wet weight	0,89	0,88	0,83	0,87	0,03	0,843	2 weeks	0,20	0,05
pp'-DDE	QOR094BT	wet weight	88,9	94,5	88,7	90,7	3,29	85,5	2 weeks	0,49	0,10
pp'-DDD	QOR094BT	wet weight	27,3	27,7	25,7	26,9	1,06	26,2	2 weeks	0,21	0,10
pp'-DDT	QOR094BT	wet weight	1,05	1	0,98	1,01	0,04	*0,38*	2 weeks	*	0,20
op'-DDT	QOR094BT	wet weight	6,91	7,68	7,7	7,43	0,45	*0,71*	2 weeks	*	0,20
transn-chlor	QOR094BT	wet weight	8,1	8,6	7,87	8,19	0,37	7,96	2 weeks	0,23	0,05

*** "assigned value" only "indicative". Quasimeme does not assign %error and thus Z-score can not be calculated.**

a- and g-chlordane, oxychlordane, toxaphenes and PBDEs are not certified in this sample by quasimeme

Table 6. Detection limits* (ng/g)

	Detection limits	
chemical	**mussel ng/g sample dw**	**Cod liver ng/g sample ww**
a-HCH	0,02	0,01
HCB	0,01	0,01
b-HCH	0,04	0,00
g-HCH	0,04	0,00
PCB-31	0,19	0,09
PCB-28	0,23	0,11
PCB-52	0,04	0,00
oxychlordane	0,00	0,00
gamma-Chl.	0,00	0,00
PCB-101	0,00	0,00
alfa-Chl.	0,00	0,00
transnonachlor	0,02	0,00
4,4'-DDE	0,02	0,00
tox 26	0,05	0,00
PCB-118	0,00	0,00
4,4'-DDD	0,00	0,02
2,4'-DDT	0,02	0,08
PCB-153	0,01	0,00
PCB-105	0,02	0,00
4,4'-DDT	0,00	0,00
PCB-138	0,00	0,00
tox 50	0,00	0,00
PCB-156	0,00	0,00
PCB-180	0,00	0,00
tox 62	0,00	0,03
PCB-170	0,00	0,00
PBDE-47	0,00	0,00
PBDE-100	0,00	0,00
PBDE-99	0,00	0,00

***detection limits are 3 x std of blanks, or 3 x noise level or higher when other peaks interfer.**

Appendix IV.

Results of trace metal analysis for Blue mussel (*Mytilus edulis*) 2008 and Cod (*Gadus morhua*) 2009

Table 7. Results of trace metals in Blue mussel *(Mytilus edulis)* 2008 (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 08	0,20	0,06	7,0	1,2	0,47	0,03	3,6	0,1	3,1	0,04	235	19	12	1	2,1	0,2	0,071	0,002
Hvassahraun 08	0,30	0,06	6,8	1,2	0,37	0,01	1,3	0,04	5,8	0,2	173	7	23	1	3,3	0,1	<0,08	-
Hvítanes, Hvalfjörður 08 (Hvammsvík)	0,70	0,06	12,6	1,2	0,038	0,001	1,2	0,01	6,5	0,05	111	0,4	17	0,4	3,4	0,1	<0,08	-
Eyri, Hvalfjördur 08	0,70	0,06	11,6	1,2	0,039	0,0005	0,95	0,004	4,4	0,04	128	1	12	0,4	2,9	0,3	<0,08	-
Hvalstöd, Hvalfjörður 08	0,40	0,06	9,6	1,2	0,030	0,001	1,4	0,1	3,8	0,1	128	5	15	1	2,7	0,1	<0,08	-
Mjóifjörður, Hofsá (Brekka) 08	0,40	0,06	9,0	1,2	0,31	0,01	2,5	0,1	4,1	0,1	147	3	9,6	0,3	3,1	0,1	0,050	0,002
Mjóifjörður, Dalatangi 08	0,30	0,06	7,2	1,2	0,10	0,001	1,6	0,1	4,9	0,4	127	10	15	1	2,7	0,3	0,064	0,000
Mjóifjörður, head (Botn) 08	0,20	0,06	7,8	1,2	0,094	0,001	2,1	0,1	4,0	0,1	97	3	11	0,2	3,3	0,1	<0,08	-
Úlfsá, Skutulsfjördur 08	0,30	0,06	6,5	1,2	0,51	0,005	1,1	0,01	4,5	0,1	123,0	0,4	73	1	2,5	0,1	0,081	0,001
Dvergasteinn, Álftafjördur 08	0,30	0,06	9,3	1,2	0,15	0,002	2,9	0,04	9,6	0,2	103,1	1,8	9	0	3,3	0,1	0,042	0,002
Straumur, Straumsvík 08	0,30	0,06	7,8	1,2	0,081	0,003	2,2	0,04	5,0	0,1	116,5	2,6	11	0	3,4	0,0	0,047	0,000
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*) 2009 (ww)

Sample	Fat %		Dry matter %		Pb, mg/kg		Cd, mg/kg		Cu,mg/kg		Zn, mg/kg		As, mg/kg		Se, mg/kg		Dry matter %		Fat %		Hg, mg/kg	
	Liver	±	Liver	±	Liver		Liver	±	Liver	±	Liver	±	Liver	±	Liver	±	Flesh*	±	Flesh*	±	Flesh*	±
Cod N-NW (1) 08																						
Group 2	46,9	2,8	58,8	2,3	<0,04		0,28	0,01	2,3	0,1	9,5	0,3	4,5	0,02	0,76	0,03						
Group 5	59,3	2,8	68,3	2,3	0,051	0,000	0,15	0,005	1,8	0,1	9,2	0,5	4,9	0,3	0,63	0,001						
Group 6	61,8	2,8	70,1	2,3	<0,04		0,19	0,01	2,2	0,01	8,0	0,3	4,3	0,1	0,61	0,03						
Average	***57,5***		***65,7***				***0,21***		***2,1***		***8,9***		***4,6***		***0,67***		***19,4***	***1,2***	***0,7***	***0,1***	***0,026***	***0,001***
Cod N-NW (2) 08																						
Group 2	35,0	2,8	49,3	2,3	<0,04		0,39	0,01	5,3	0,04	14	0,4	6,0	0,05	1,3	0,1						
Group 3	65,5	2,8	72,8	2,3	0,003	0,000	0,24	0,01	2,6	0,04	7,2	0,1	4,4	0,2	0,52	0,03						
Group 4	66,3	2,8	72,8	2,3	0,003	0,001	0,31	0,02	3,3	0,2	7,3	0,3	3,9	0,04	0,54	0,02						
Average	***55,6***		***65,0***				***0,32***		***3,7***		***9,6***		***4,7***		***0,78***							
Cod NA 08																						
Group 2	29,7	2,8	45,5	2,3	<0,04		0,28	0,01	3,9	0,05	15	0,4	9,7	0,1	1,3	0,03						
Group 4	62,4	2,8	70,0	2,3	<0,04		0,09	0,01	2,3	0,1	8,2	0,4	4,9	0,04	0,56	0,01						
Group 5	61,7	2,8	69,2	2,3	0,061	0,007	0,10	0,01	2,7	0,1	11	3	5,1	0,1	0,65	0,04						
Average	***51,3***		***61,6***				***0,16***		***2,9***		***11***		***6,6***		***0,82***							
Average of all measurements					0,035		0,23		2,9		9,9		5,3		0,76						0,026	
Limit of detection for samples (MLOD)					0,02		0,020		0,20		0,20		0,02		0,06						0,02	

*Flesh was pooled into one sample

Appendix V.

Results of organochlorine analysis for Blue mussel (*Mytilus edulis*) 2008 and Cod (*Gadus morhua*) 2009

Table 9 a. Persistent organochlorines in Blue mussel (Mytulis edulis, ng/g dw) 2008

	Grímsey 08	Hvammsvík 08	Hvalstöð 08	Úlfsá 08	Dvergasteinn 08	Hvassahraun 08
PCB28	<0,25	<0,25	<0,25	<0,25	<0,25	0,338
PCB31	<0,20	<0,20	<0,20	<0,20	<0,20	0,354
PCB52	0,0665	0,187	0,134	0,186	0,219	0,464
PCB101	0,1005	0,53	0,462	0,684	0,296	0,418
PCB105	0,0555	0,213	0,193	0,172	0,241	0,15
PCB118	0,071	0,542	0,577	0,744	0,661	0,349
PCB138	0,141	0,996	1,116	1,06	0,661	0,678
PCB153	0,2795	1,766	1,903	1,57	0,708	0,967
PCB156	<0,05	<0,05	<0,05	0,104	<0,05	0,057
PCB170	0,0515	0,053	0,051	0,076	0,055	0,16
PCB180	0,0765	0,085	0,103	0,168	0,069	0,302
S3PCB**	0,4915	3,304	3,596	3,374	2,03	1,994
HCB	0,065	0,134	0,117	0,364	0,089	0,074
a-HCH	0,0745	0,141	0,116	0,051	0,066	0,088
b-HCH	<0,1	<0,1	<0,1	<0,1	<0,1	<0,1
g-HCH	<0,06	0,183	0,151	<0,05	<0,05	0,271
p,p'-DDE	0,203	0,628	0,692	0,56	0,197	0,357
p,p'-DDD	0,047	0,147	0,155	0,256	0,072	0,087
p,p'-DDT	<0,2	<0,2	<0,2	<0,2	<0,2	<0,2
o,p'-DDT***	<0,1	<0,1	<0,1	0,206	<0,1	<0,1
PCB153/DDE	1,4	2,8	2,8	2,8	3,6	2,7
transnonachlor	0,1865	0,264	0,229	0,41	0,147	0,162
a-chlordan	0,0825	0,186	0,152	0,213	0,102	0,076
g-chlordan	<0,2	<0,2	<0,2	<0,2	<0,2	<0,2
oxychlordan	<0,1	<0,1	<0,1	<0,1	<0,1	<0,1
Tox-26	0,089	0,277	0,216	0,228	0,191	0,133
Tox-50	0,256	0,415	0,38	0,317	0,443	0,273
Tox-62	<0,1	<0,1	<0,1	<0,1	<0,1	<0,1
PBDE-47	0,211	0,285	0,297	0,702	0,064	0,127
PBDE-99	0,0955	0,132	0,114	0,275	<0,1	<0,1
PBDE-100	<0,1	<0,1	<0,1	<0,1	<0,1	<0,1
% extracted fat	0,26	0,78	0,49	0,26	0,45	0,27
% fat (Matis)	0,2	0,7	0,4	0,3	0,3	0,3
% dw (Matis)	7	12,6	9,6	6,5	9,3	6,8

**** PCB # 118, 138 and 153**

*****Values are highly suspect and these are not certified in QUASIMEME blue mussel**

Table 9 b. Persistent organochlorines in Blue mussel (Mytulis edulis, ng/g dw) 2008

	Straumur 08	Eyri 08	Dalatangi 08	Brekka 08	Botn 08
PCB28	0,3015	<0,25	0,343	0,312	0,437
PCB31	0,264	<0,20	0,347	0,27	0,433
PCB52	0,335	0,214	0,399	0,302	0,291
PCB101	0,7985	0,563	0,686	0,678	0,167
PCB105	0,251	0,228	0,394	0,094	0,08
PCB118	0,8185	0,589	0,893	0,569	0,13
PCB138	1,6735	1,087	0,847	2,589	0,242
PCB153	2,2035	1,858	0,879	3,037	0,419
PCB156	0,0895	0,057	0,051	0,176	<0,05
PCB170	0,075	<0,05	0,084	0,16	0,052
PCB180	0,1335	0,078	0,088	0,599	0,086
S3PCB**	4,6955	3,534	2,619	6,195	0,791
HCB	0,127	0,138	0,091	0,171	0,095
a-HCH	0,1065	0,142	0,123	0,176	0,108
b-HCH	<0,1	<0,1	<0,1	0,144	0,125
g-HCH	0,2295	0,132	0,235	0,183	0,122
p,p'-DDE	0,8615	0,728	0,203	0,983	0,244
p,p'-DDD	0,3695	0,216	0,078	0,189	0,046
p,p'-DDT	<0,2	<0,2	<0,2	<0,2	<0,2
o,p'-DDT***	0,355	<0,1	<0,1	0,3	0,219
PCB153/DDE	2,6	2,6	4,3	3,1	1,7
transnonachlor	0,252	0,297	0,247	0,373	0,182
a-chlordan	0,178	0,234	0,064	0,194	0,096
g-chlordan	<0,2	<0,2	<0,2	<0,2	<0,2
oxychlordan	<0,1	<0,1	<0,1	<0,1	<0,1
Tox-26	0,3045	0,317	0,19	0,35	0,206
Tox-50	0,539	0,629	0,331	0,644	0,538
Tox-62	<0,1	<0,1	<0,1	<0,1	<0,1
PBDE-47	0,703	0,428	<0,05	0,24	<0,05
PBDE-99	0,198	0,102	<0,1	<0,1	<0,1
PBDE-100	<0,1	<0,1	<0,1	<0,1	<0,1
% extracted fat	0,445	0,84	0,29	0,51	0,3
% fat (Matis)	0,3	0,7	0,3	0,4	0,2
% dw (Matis)	7,8	11,6	7,2	9	7,8

**** PCB # 118, 138 and 153**

*****Values are highly suspect and these are not certified in QUASIMEME blue mussel**

Table 10 a. Persistent organochlorines in cod liver 2009 (ng/g ww)

	COD NE	COD NE	COD NE
	H2	H4	H5*
PCB28	1,5	2,1	2
PCB31	0,48	1,1	1,1
PCB52	3,2	4,7	4,8
PCB101	6,4	5,7	5,65
PCB105	2,4	2,4	2,4
PCB118	8,1	6,2	6,4
PCB138	10,2	8,1	8,45
PCB153	20,5	13,9	14,55
PCB156	1,1	0,88	0,945
PCB170	2	1,1	1,2
PCB180	4,2	2,7	2,85
S7PCB**	54,1	43,4	44,7
HCB	10	18,5	18,05
a-HCH	1,2	2,5	2,35
b-HCH	0,44	0,76	0,75
g-HCH	0,47	0,91	0,86
p,p'-DDE	36,6	32,2	33,4
p,p'-DDD	10,3	13	13,65
p,p'-DDT****	(4,2)	(6,5)	(7,4)
o,p'-DDT****	***	***	***
SDDT	46,9	45,2	47,05
PCB153/DDE	0,56	0,43	0,44
transnonachlor	23	21,5	21,25
a-chlordan	12,5	18,9	19,15
g-chlordan	2,8	5,4	5,3
oxychlordan	2,7	3,3	3,45
SCHL	41	49,1	49,15
Tox-26	13,9	18,3	20,9
Tox-50	19,4	33,4	37,6
Tox-62	5	9	10,7
PBDE-47	2,4	2,2	2,15
PBDE-99	<0,2	<0,2	<0,2
PBDE-100	0,42	0,38	0,295
% extracted fat	29,6	61,8	59,85

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

***** Contamination prevents accurate quantification**

****** Not certified values (indicative) in QUASIMEME cod liver**

Table 10 b. Persistent organochlorines in cod liver 2009 (ng/g ww)

	COD NNW1	COD NNW1	COD NNW1	COD NNW2	COD NNW2	COD NNW2
	H2	H5	H6	H2	H3	H4
PCB28	1,7	1,6	1,3	1,7	2,5	2,3
PCB31	0,85	0,81	0,74	0,93	1,2	1,4
PCB52	4,3	3,6	2,3	3,8	6	5,3
PCB101	7,5	4,9	2	6,6	8,2	7,7
PCB105	2,9	2	1,3	2,4	3,1	2,8
PCB118	9	5,3	3,3	8,4	8,7	7,19
PCB138	11,8	7,4	4,1	13,3	11,7	10,55
PCB153	23,6	13,7	5,6	27,1	20,9	17,9
PCB156	1,2	0,88	0,45	1,1	1,4	1,2
PCB170	2,2	1,2	0,38	2,3	1,7	1,6
PCB180	4,7	2,6	1,2	5,6	4,3	4,02
S7PCB**	62,6	39,1	19,8	66,5	62,3	54,96
HCB	13,7	13,1	11,2	13,3	25,6	23,5
a-HCH	1,9	2,2	2	0,82	1,8	1,8
b-HCH	0,62	0,6	0,46	0,42	0,78	0,76
g-HCH	0,68	0,78	0,65	0,3	0,57	0,56
p,p'-DDE	46,8	27,7	14,8	49	56,3	53,7
p,p'-DDD	13,9	10,8	6,9	11,4	19,8	18,9
p,p'-DDT****	(7,6)	(6,3)	(5,4)	(6,1)	(9,9)	(9,7)
o,p'-DDT****	***	***	***	***	***	***
SDDT	60,7	38,5	21,7	60,4	76,1	72,6
PCB153/DDE	0,50	0,49	0,38	0,55	0,37	0,33
transnonachlor	26	17	7,3	25,4	30,4	27,2
a-chlordan	13,6	13,3	6,9	16	25,7	23
g-chlordan	4	4	2,8	3,9	7	6,4
oxychlordan	3,9	3	2	3,1	4,6	4,1
SCHL	47,5	37,3	19	48,4	67,7	60,7
Tox-26	18,7	16,3	9,8	18,2	28,2	25,8
Tox-50	29,4	28	19,6	27,9	49,8	46,6
Tox-62	8,6	8,5	5,6	7	15,4	12,9
PBDE-47	2,8	1,8	0,87	2,5	2,8	2,7
PBDE-99	<0,2	<0,2	<0,2	<0,2	<0,2	<0,2
PBDE-100	0,44	0,24	<0,2	0,44	0,4	0,37
% extracted fat	50,2	58,6	62	35,1	66,2	66

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

***** Contamination prevents accurate quantification**

****** Not certified values (indicative) in QUASIMEME cod liver**

Appendix VI.

Graphs of biological variation in Cod (*Gadus morhua*) 1990-2009

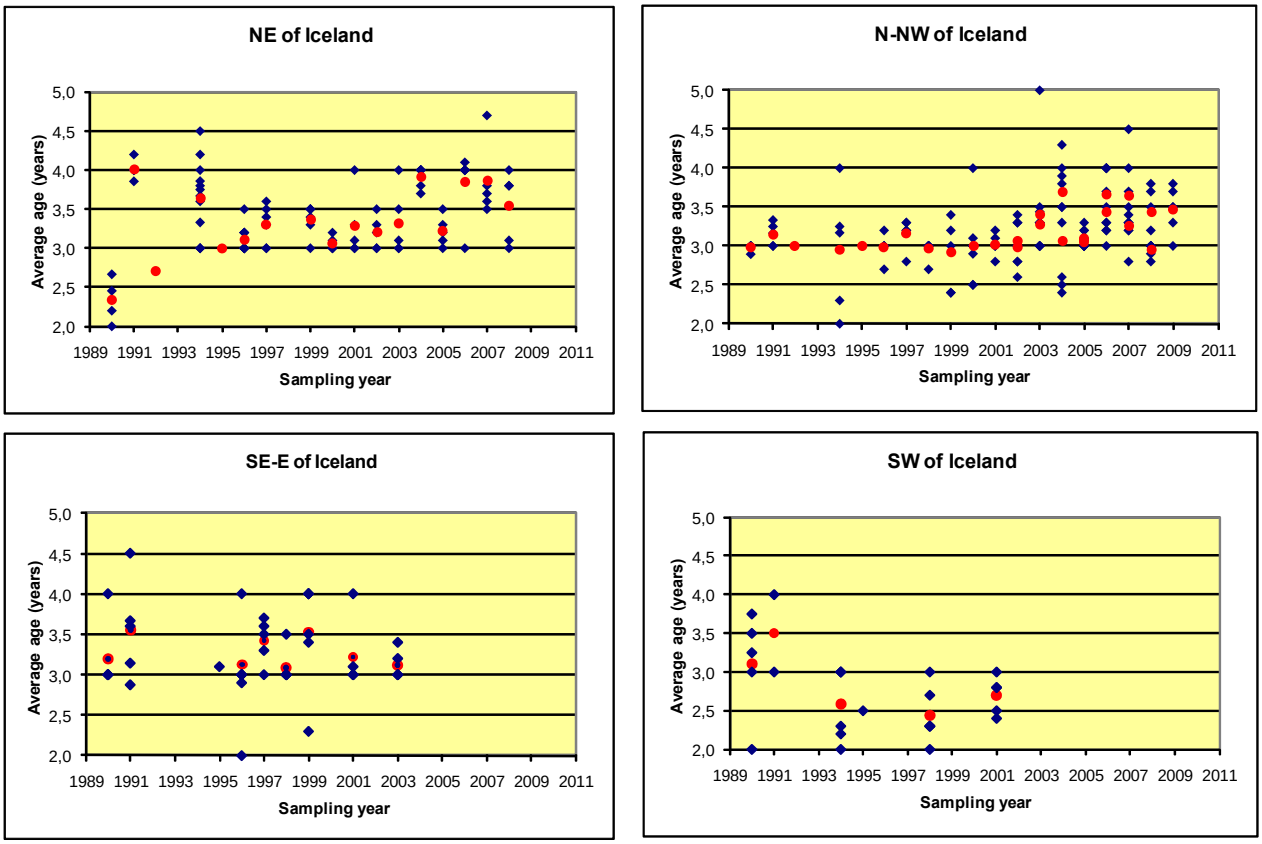


Figure 2a. Average age in 30-45 cm Cod (Gadus morhua) from Icelandic waters in March 1990-2009.The red dots represent the average values.

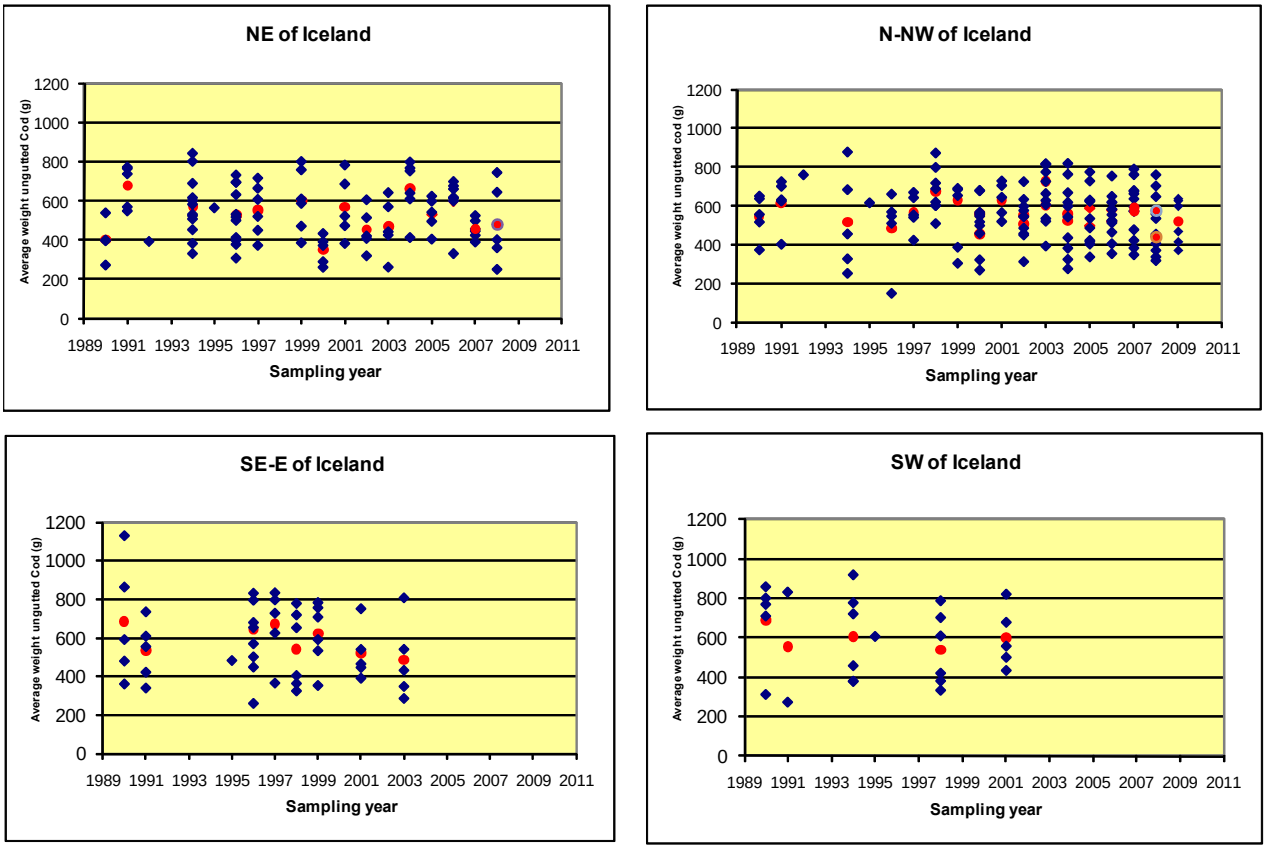


Figure 2b. Average weight ungutted Cod (Gadus morhua), 30-45 cm, from Icelandic waters in March 1990-2009.The red dots represent the average values.

Biological variation in 30-45 cm Cod (Gadus morhua) from Icelandic waters in March 1990-2009

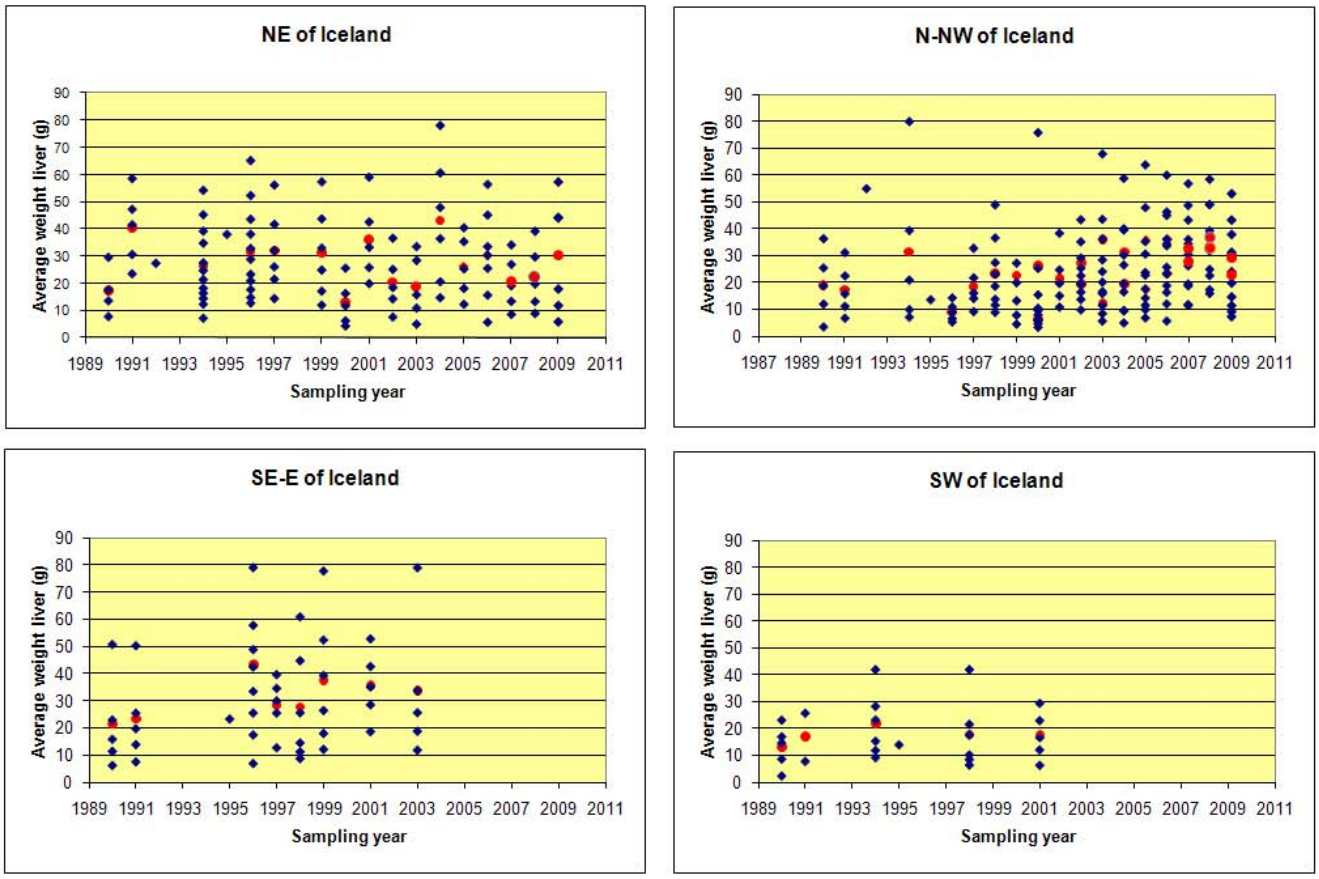


Figure 2c. Average weight liver of Cod (Gadus morhua), 30-45 cm, from Icelandic waters in March 1990-2009.The red dots represent the average values.

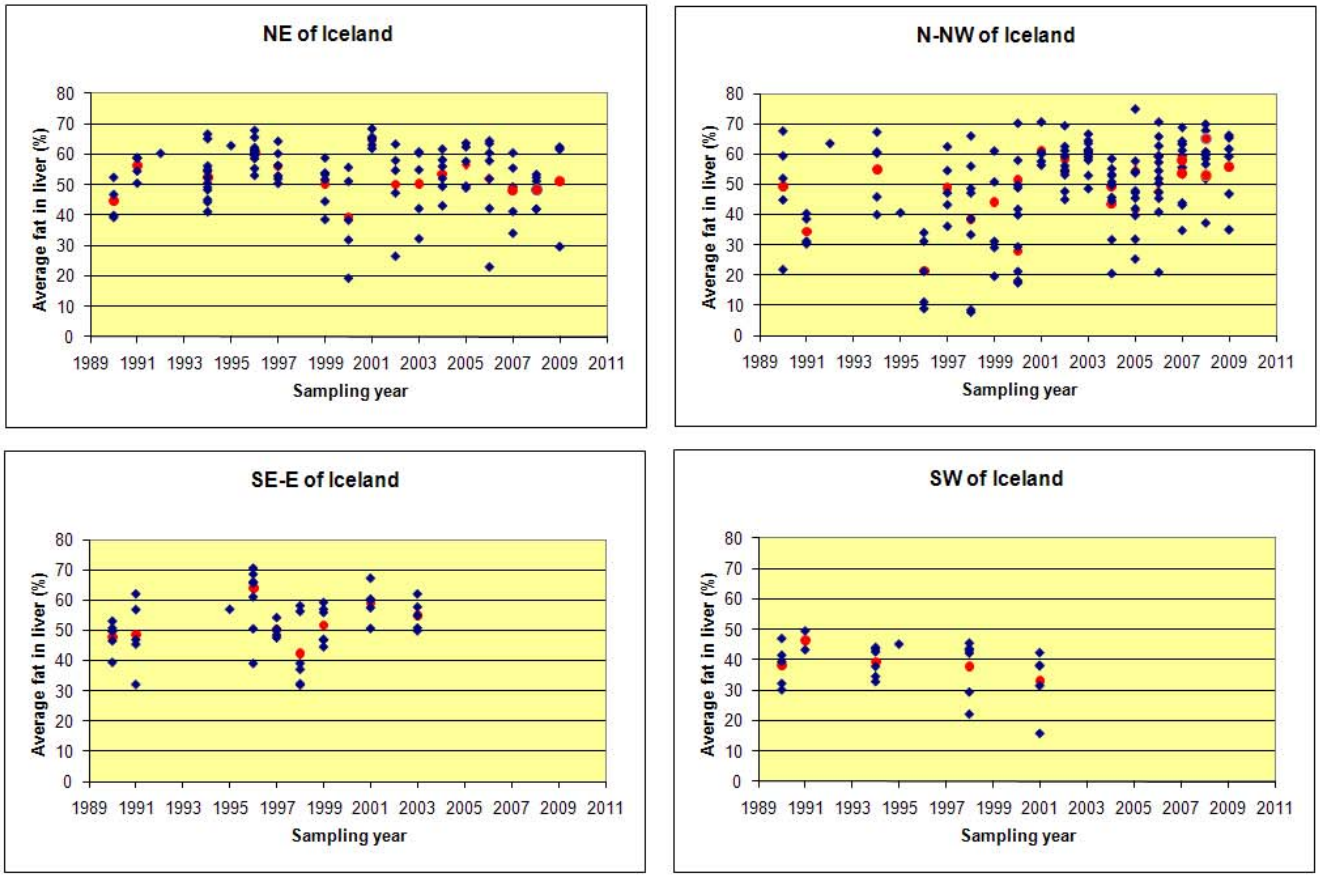


Figure 2d. Average fat (%) in liver of Cod (Gadus morhua), 30-45 cm, from Icelandic waters in March 1990-2009.The red dots represent the average values.

Appendix VII.

Graphs of metals and organic compounds in Blue mussel (*Mytilus edulis*) 1990-2008

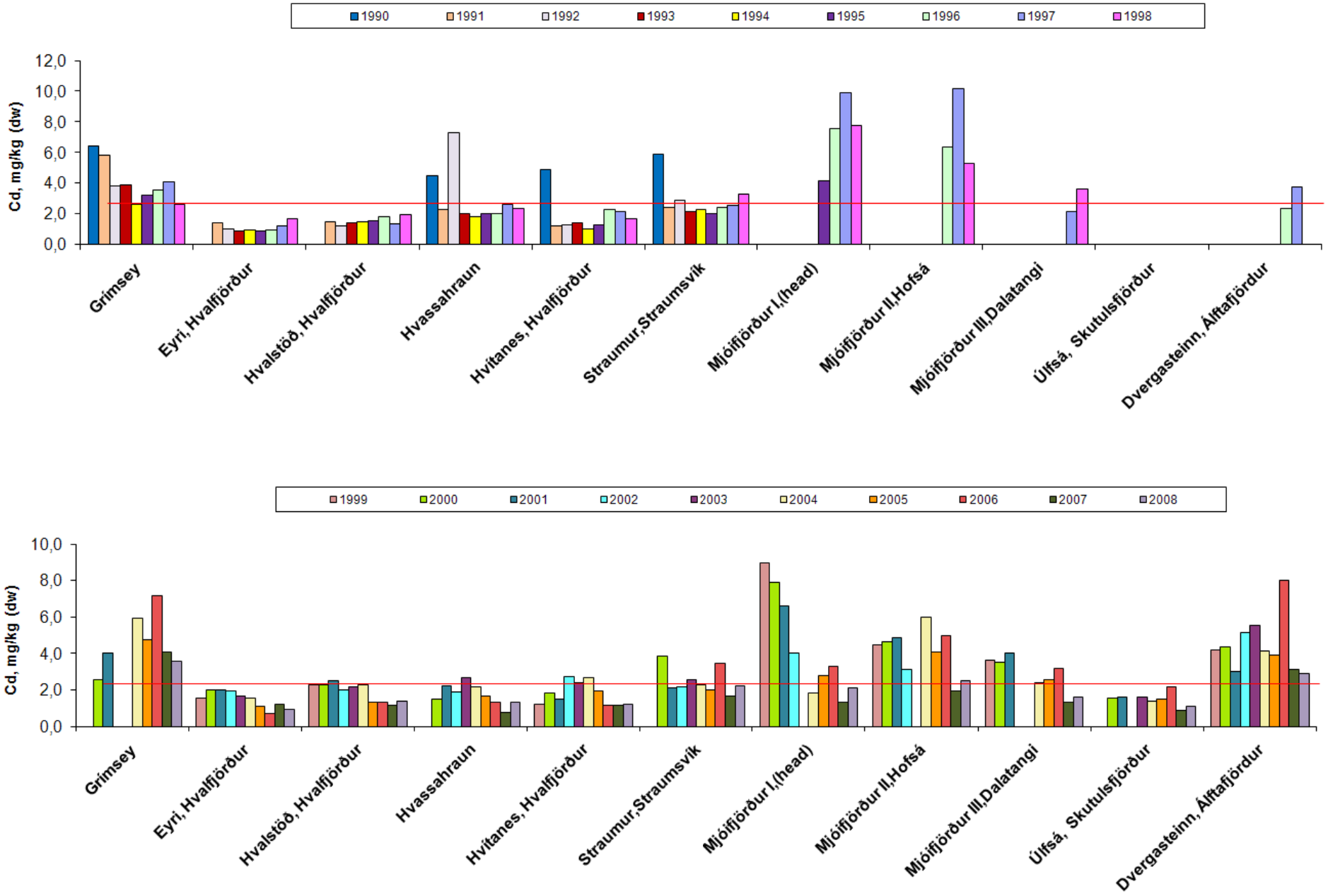


Figure 3a. Cadmium concentration (dw) in Blue mussel (Mytilus edulis) around Iceland 1991-2008. Red line indicates ICES 90 75% baseline (11).

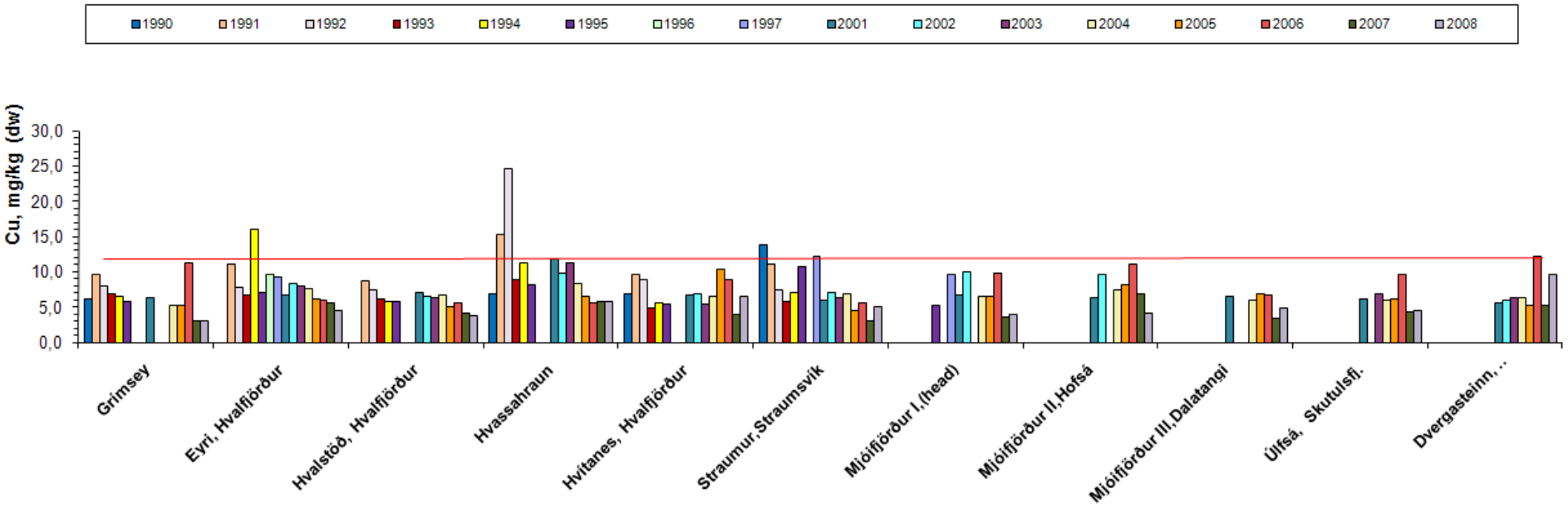


Figure 3b. Copper concentration (dw) in Blue mussel (Mytilus edulis) around Iceland 1990-2008. Red line indicates ICES 90 75% baseline (11).

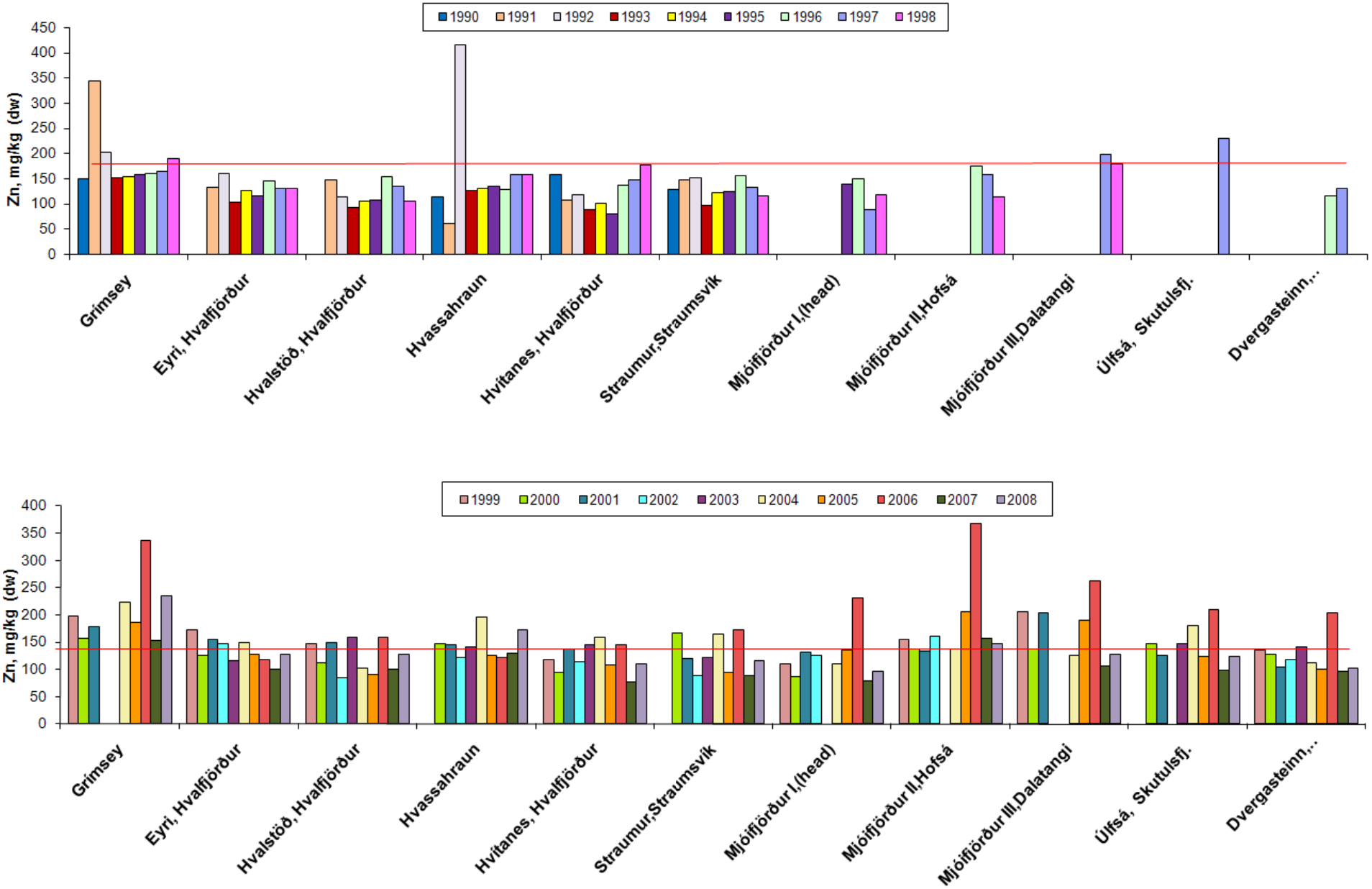


Figure 3c. Zinc concentration (dw) in Blue mussel (Mytilus edulis) around Iceland 1990-2008. Red line indicates ICES 90 75% baseline (11).

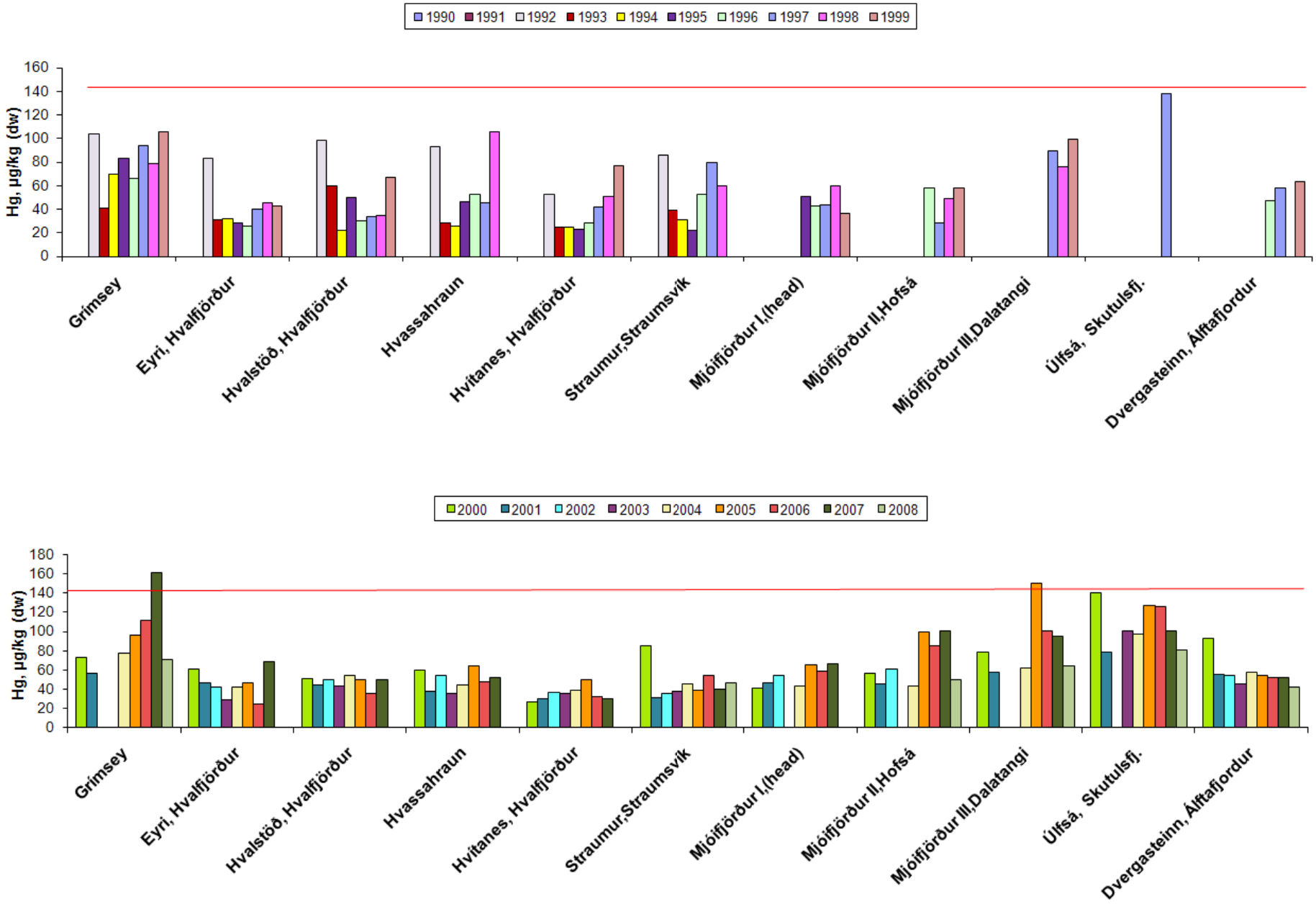


Figure 3d. Mercury concentration (dw) in Blue mussel (Mytilus edulis) around Iceland 1990-2008. Red line indicates ICES 90 75% baseline (11).

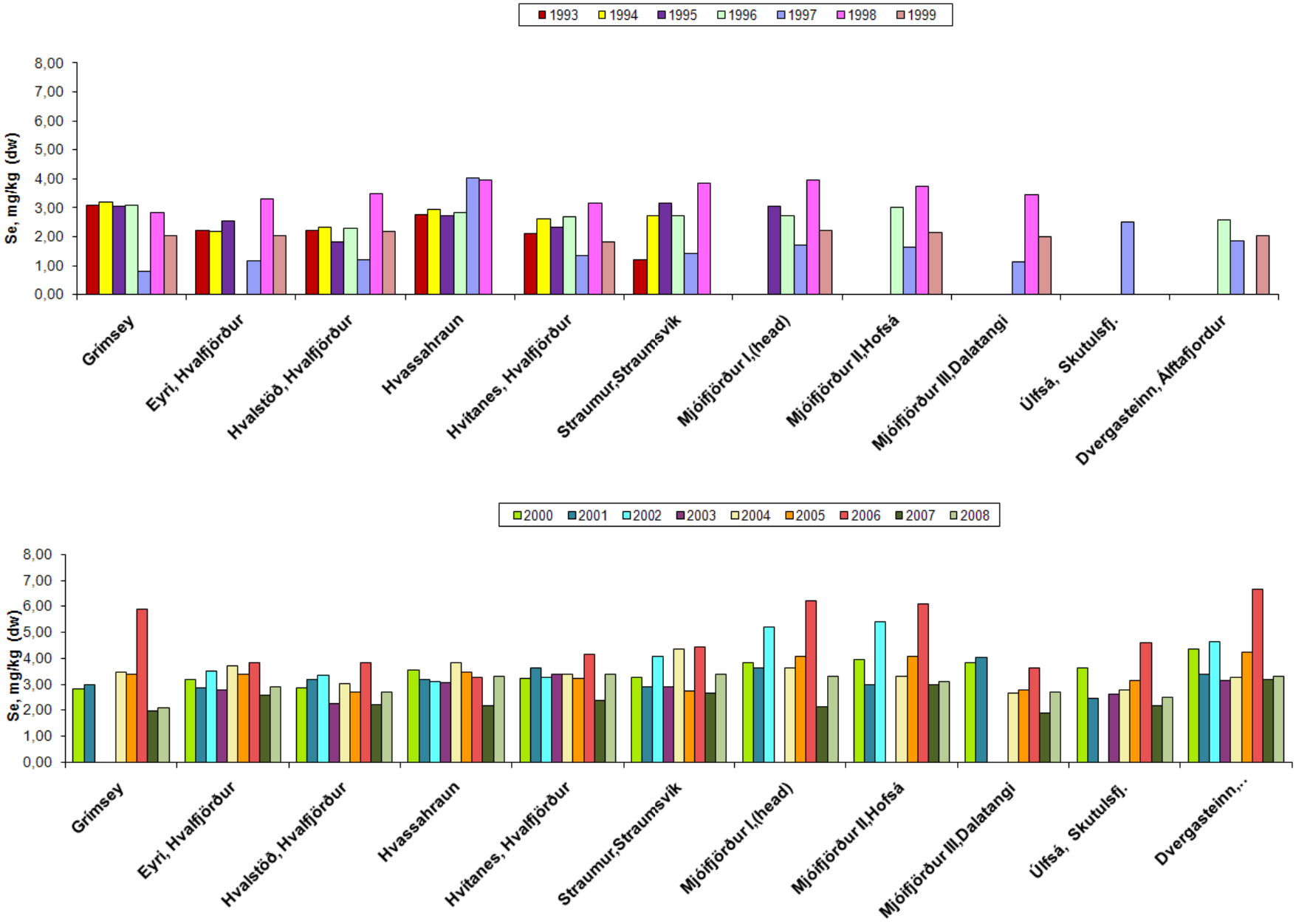


Figure 3e. Selenium concentration (dw) in Blue mussel (Mytilus edulis) around Iceland 1993-2008.

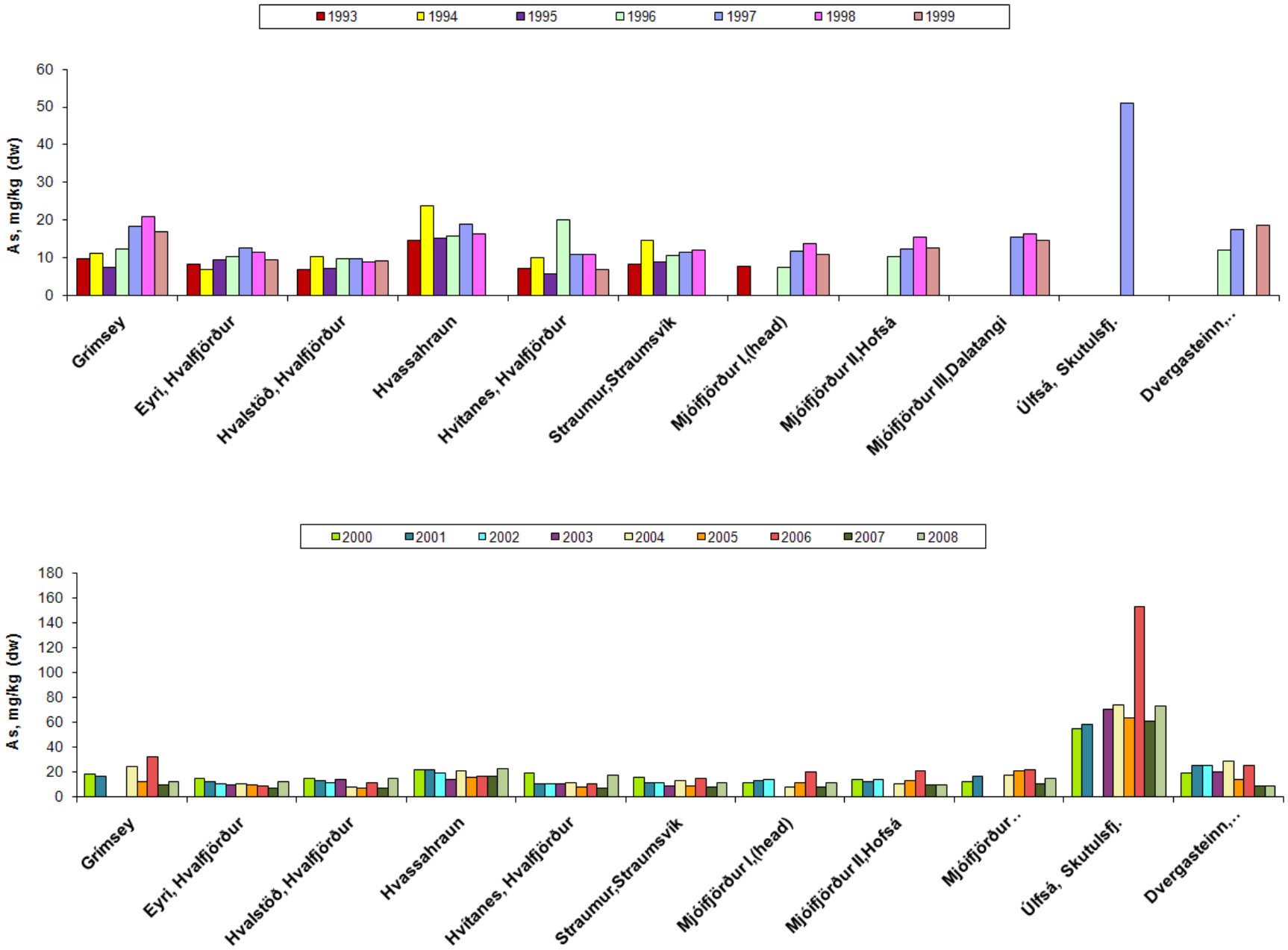


Figure 3f. Arsenic concentration (dw) in Blue mussel (Mytilus edulis) around Iceland 1993-2008.

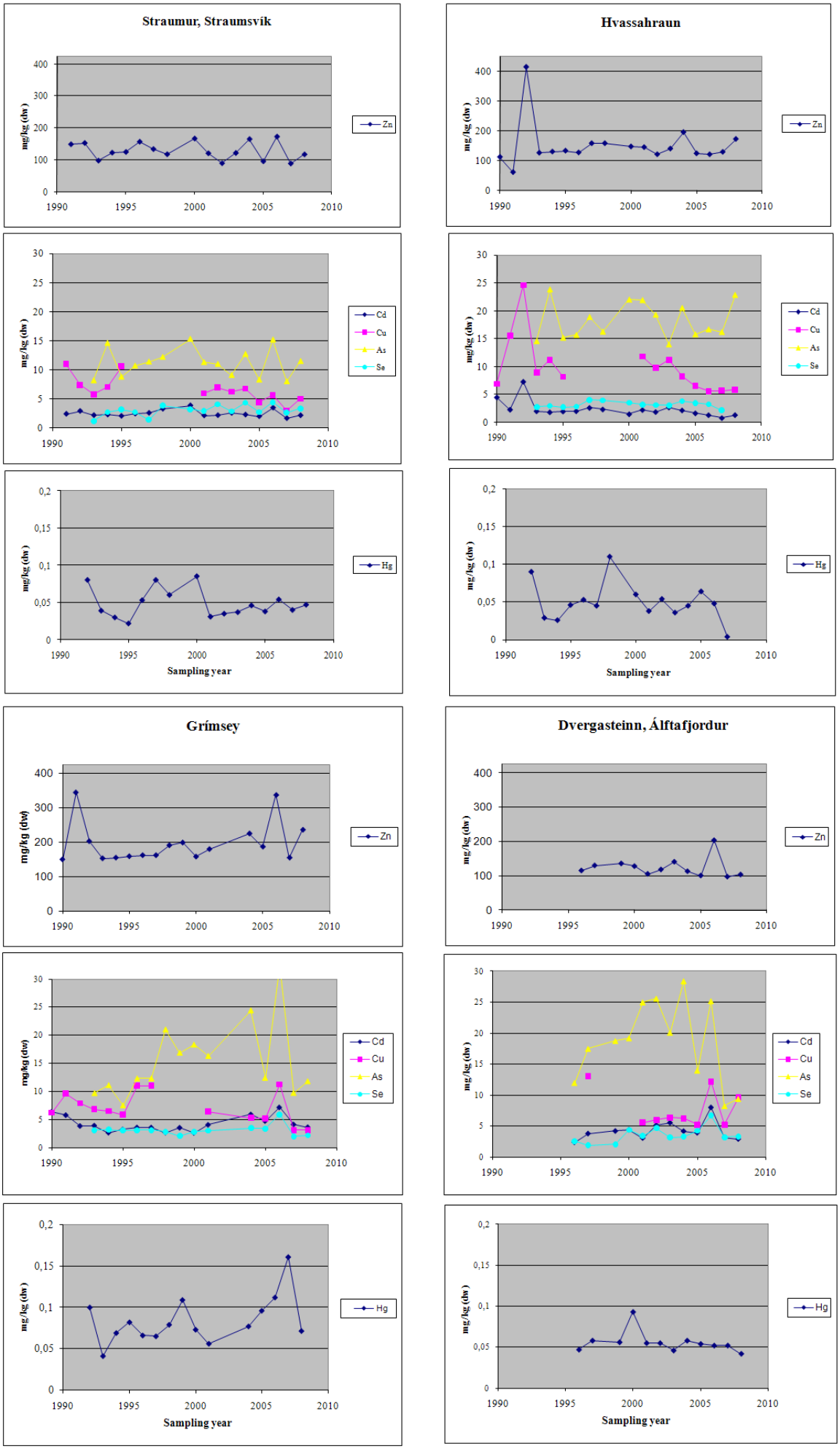


Figure 4a. Concentration of heavy metals (dry weight) in Blue mussel from different sampling sites around Iceland, 1990-2008.

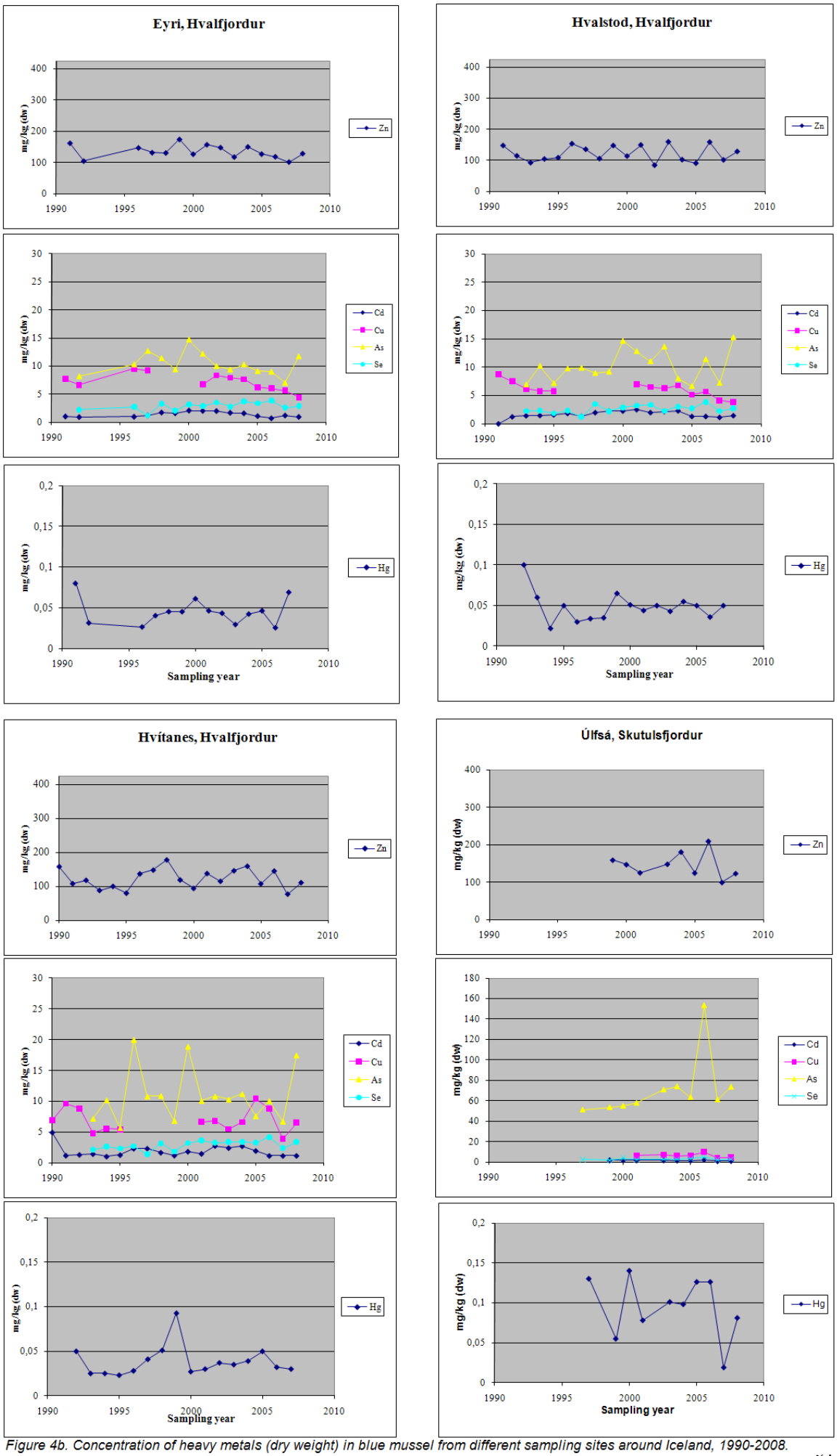


Figure 4b. Concentration of heavy metals (dry weight) in blue mussel from different sampling sites around Iceland, 1990-2008.

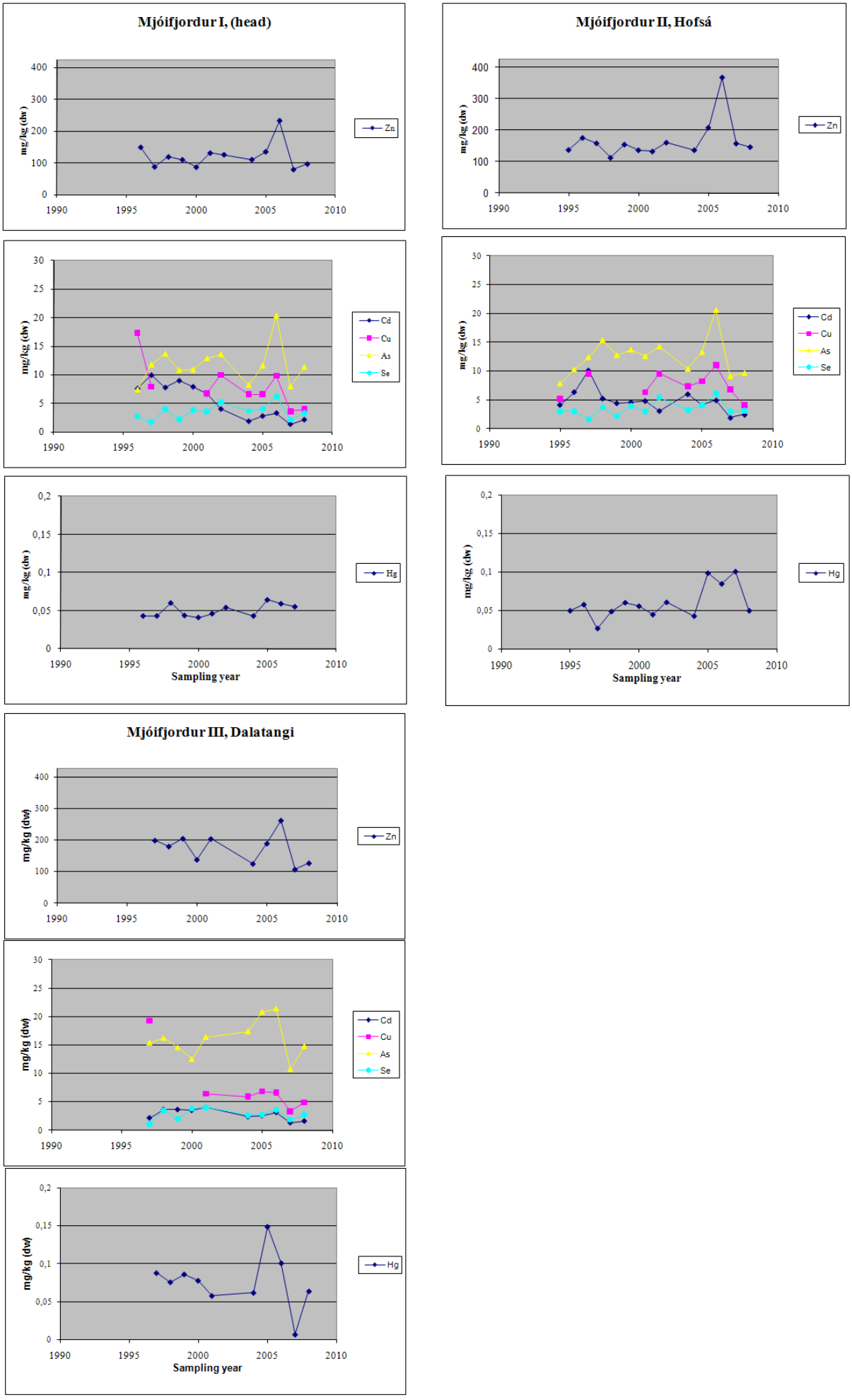


Figure 4c. Concentration of heavy metals (dry weight) in blue mussel from different sampling sites around Iceland, 1990-2008.

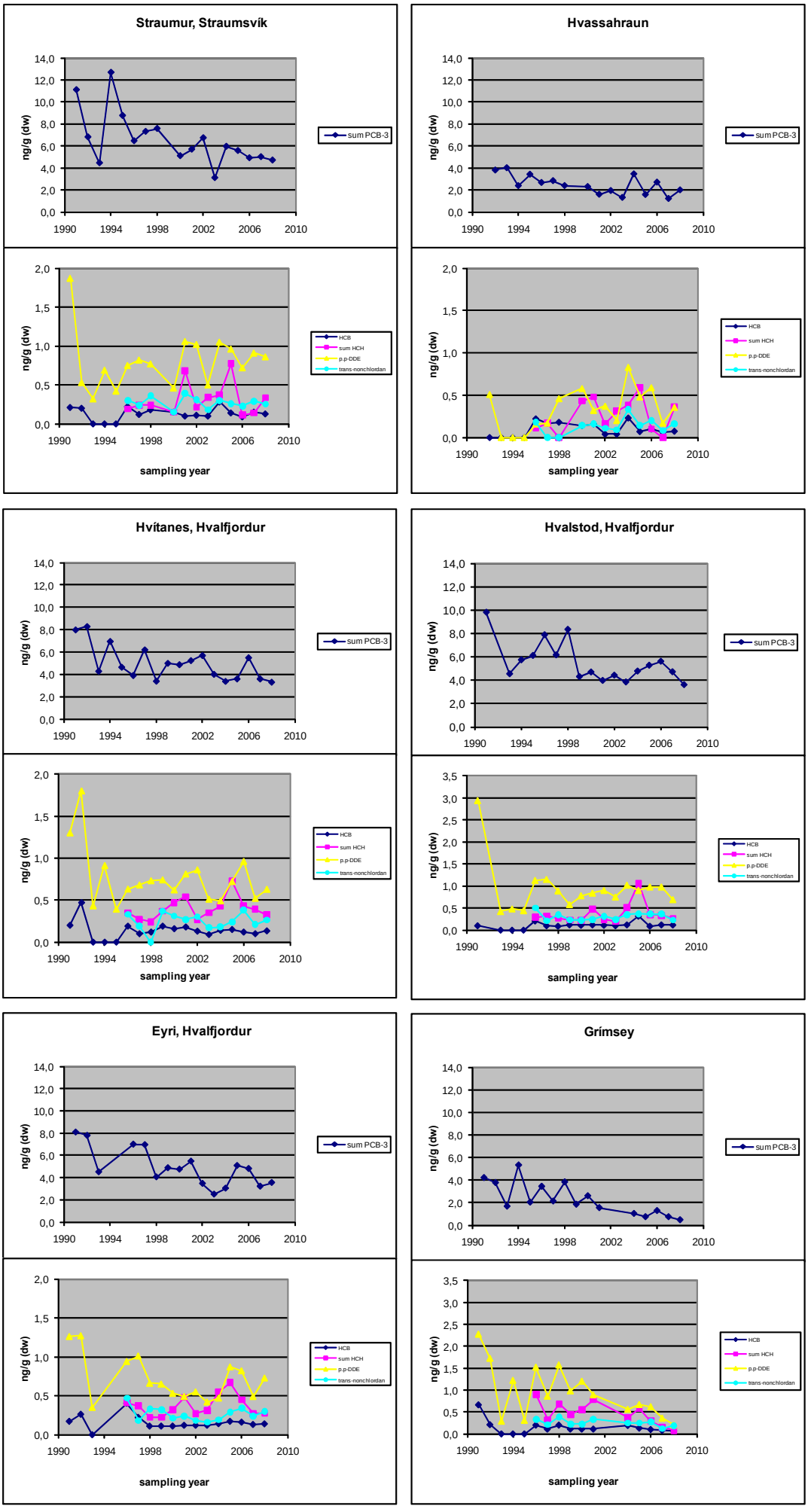


Figure 5a. Concentration of organochlorine compounds (dw) in Blue mussel (Mytilus edulis) at different locations 1991-2008.

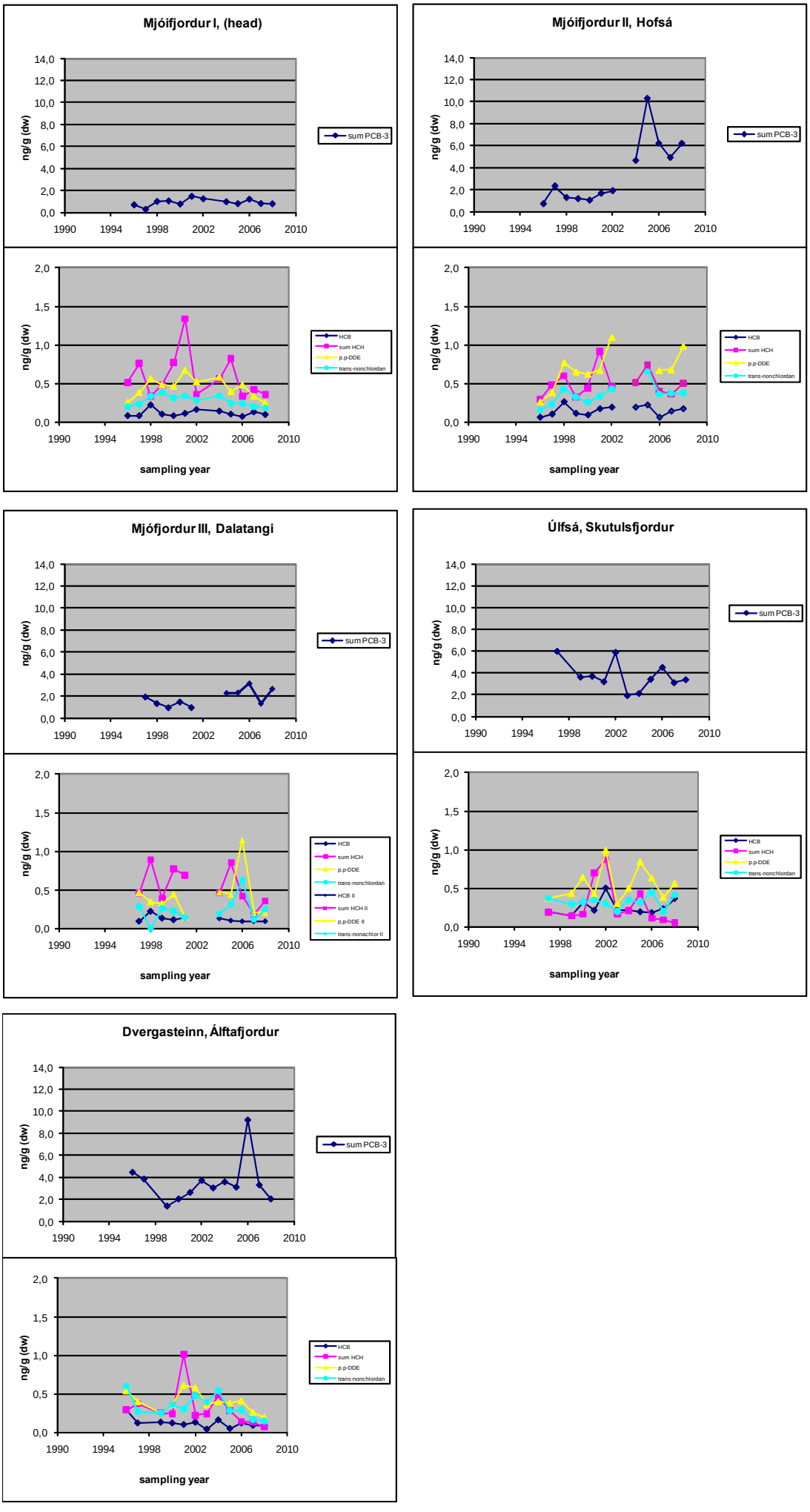


Figure 5b. Concentration of organochlorine compounds (dw) in Blue mussel (Mytilus edulis) at different locations 1991-2008.

Appendix VIII.

Graphs of metals and organic compounds in Cod (*Gadus morhua*) 1990-2009

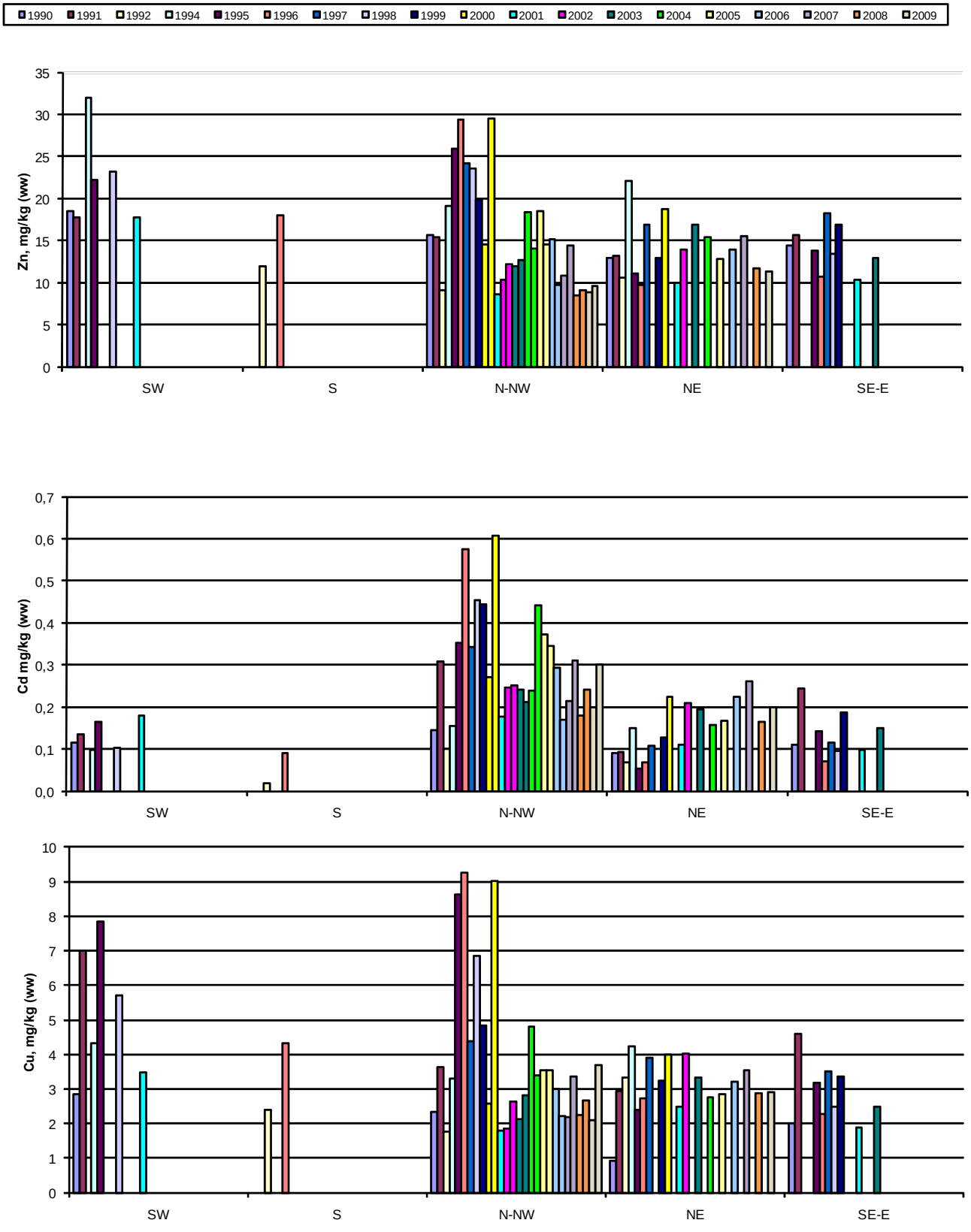


Figure 6a. Heavy metal concentration (ww) in livers of 30-45cm cod (Gadus morhua) from Icelandic waters in March 1990-2008.

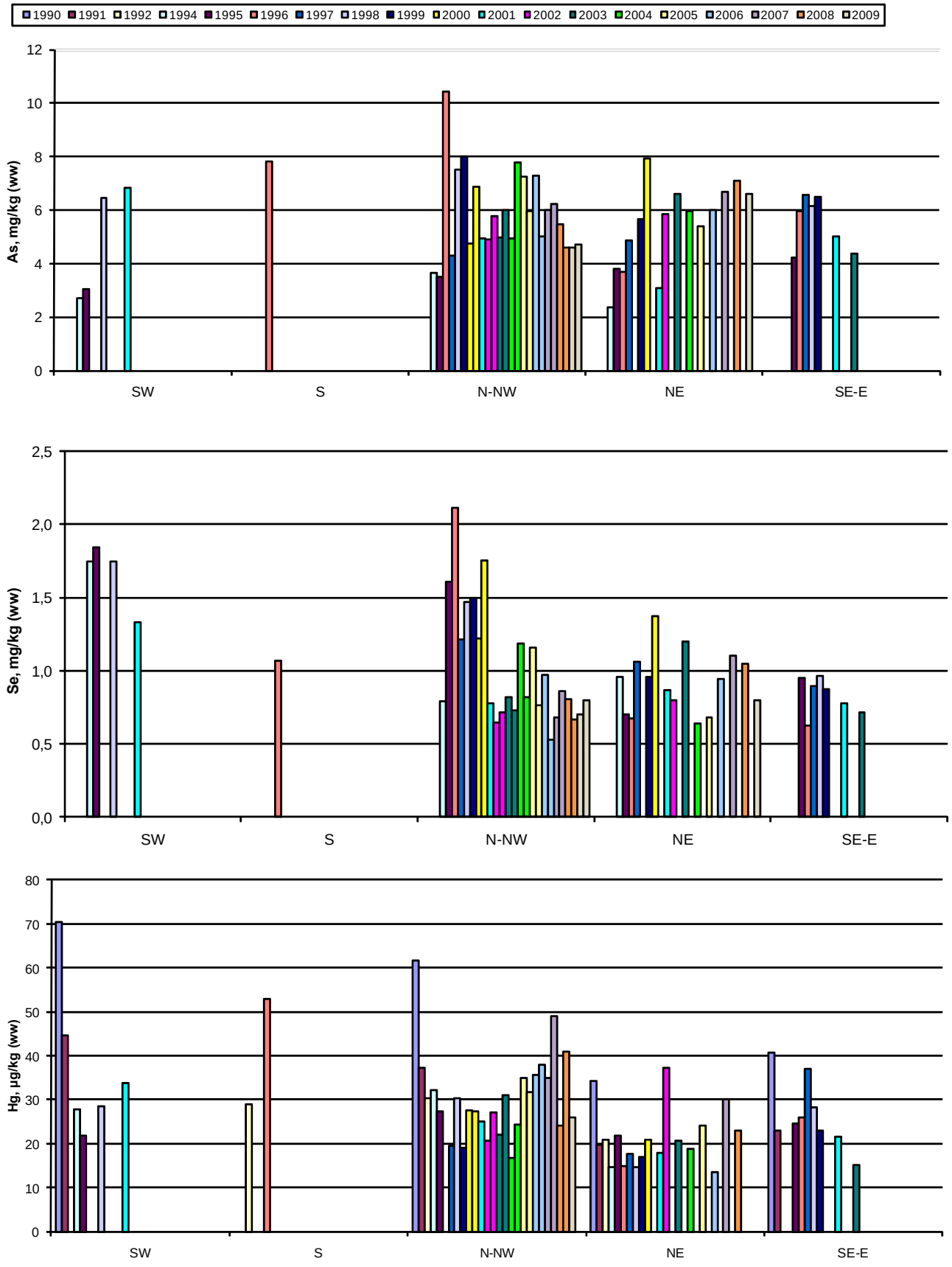


Figure 6b. Heavy metal concentration (ww) in livers of 30-45cm cod (Gadus morhua) from Icelandic waters in March 1990-2009. Mercury (Hg) was analysed in the flesh

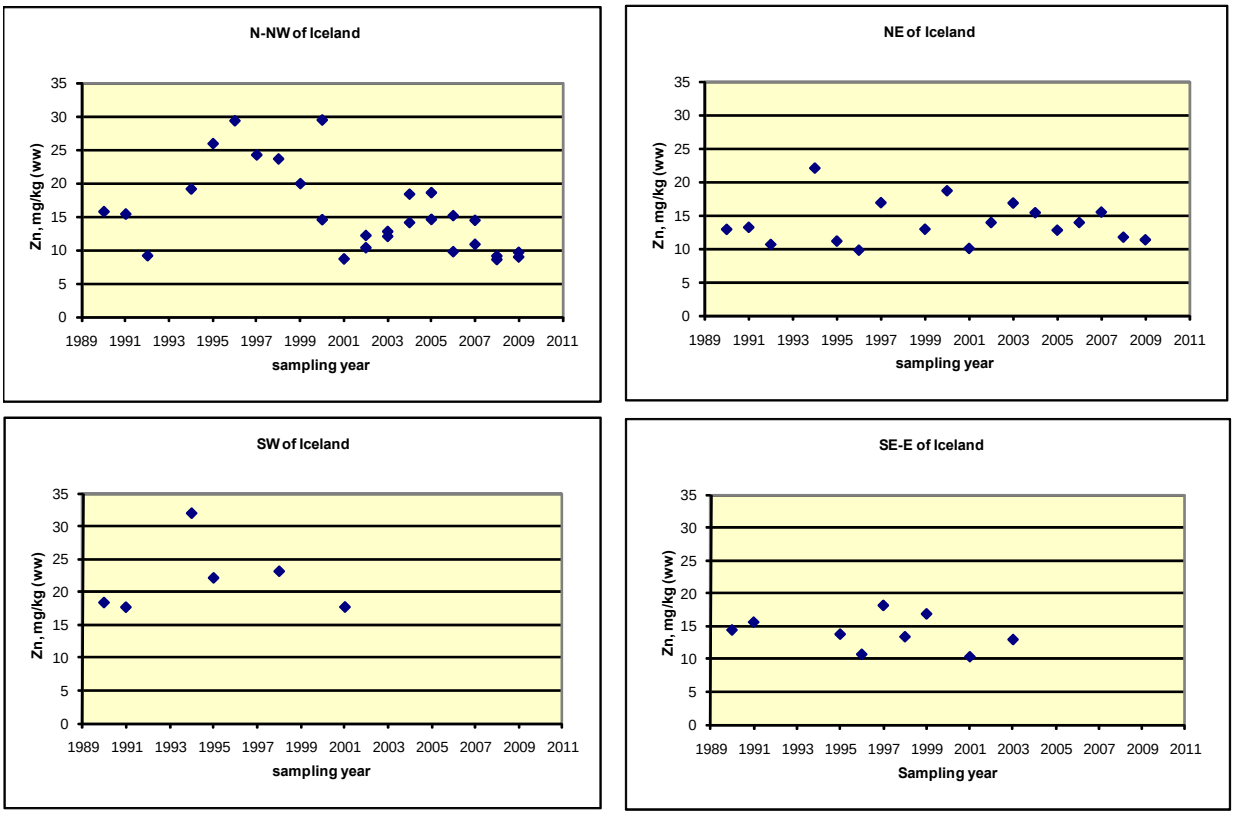


Figure 7a. Average concentration of Zinc (ww) in livers of 30-45 cm Cod (Gadus morhua) from different locations in Icelandic waters in March 1990-2009.

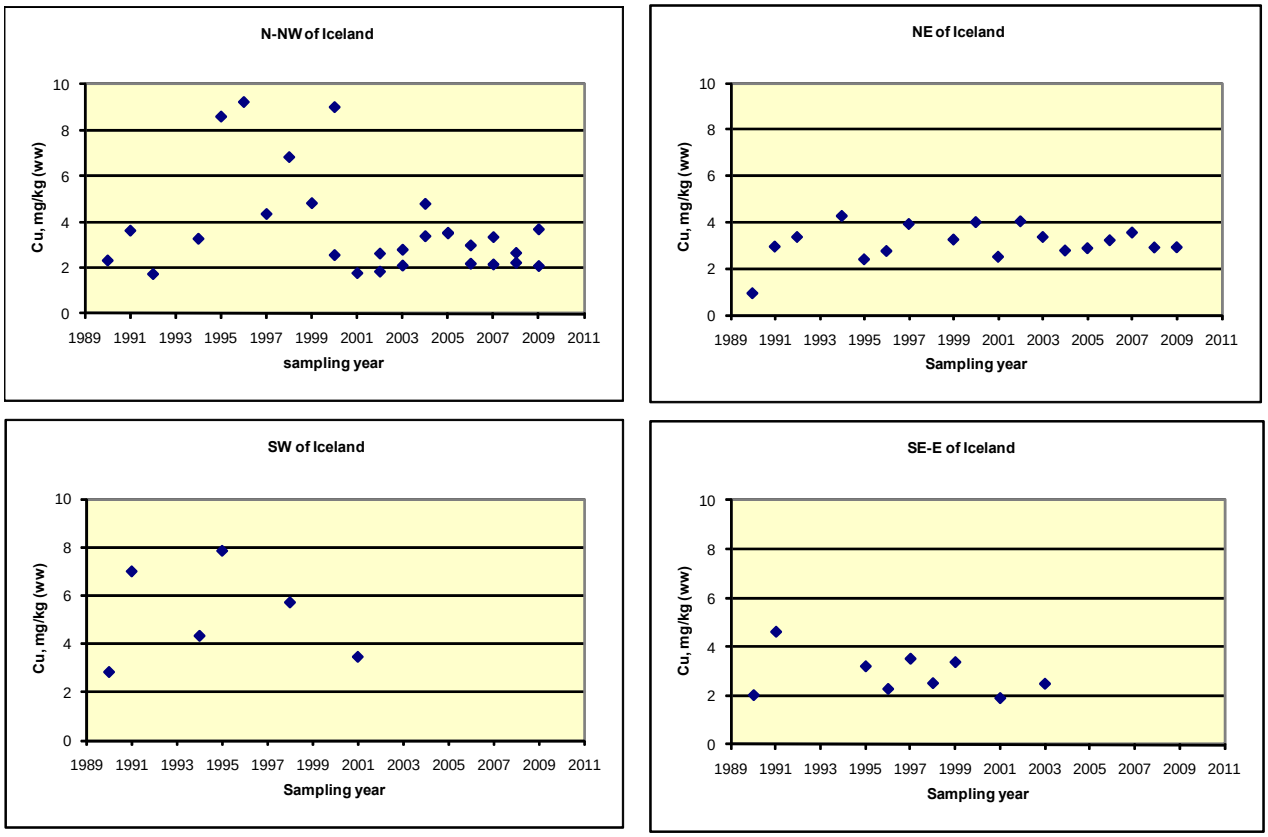


Figure 7b. Average concentration of Copper (ww) in livers of 30-45 cm Cod (Gadus morhua) from different locations in Icelandic waters in March 1990-2009.

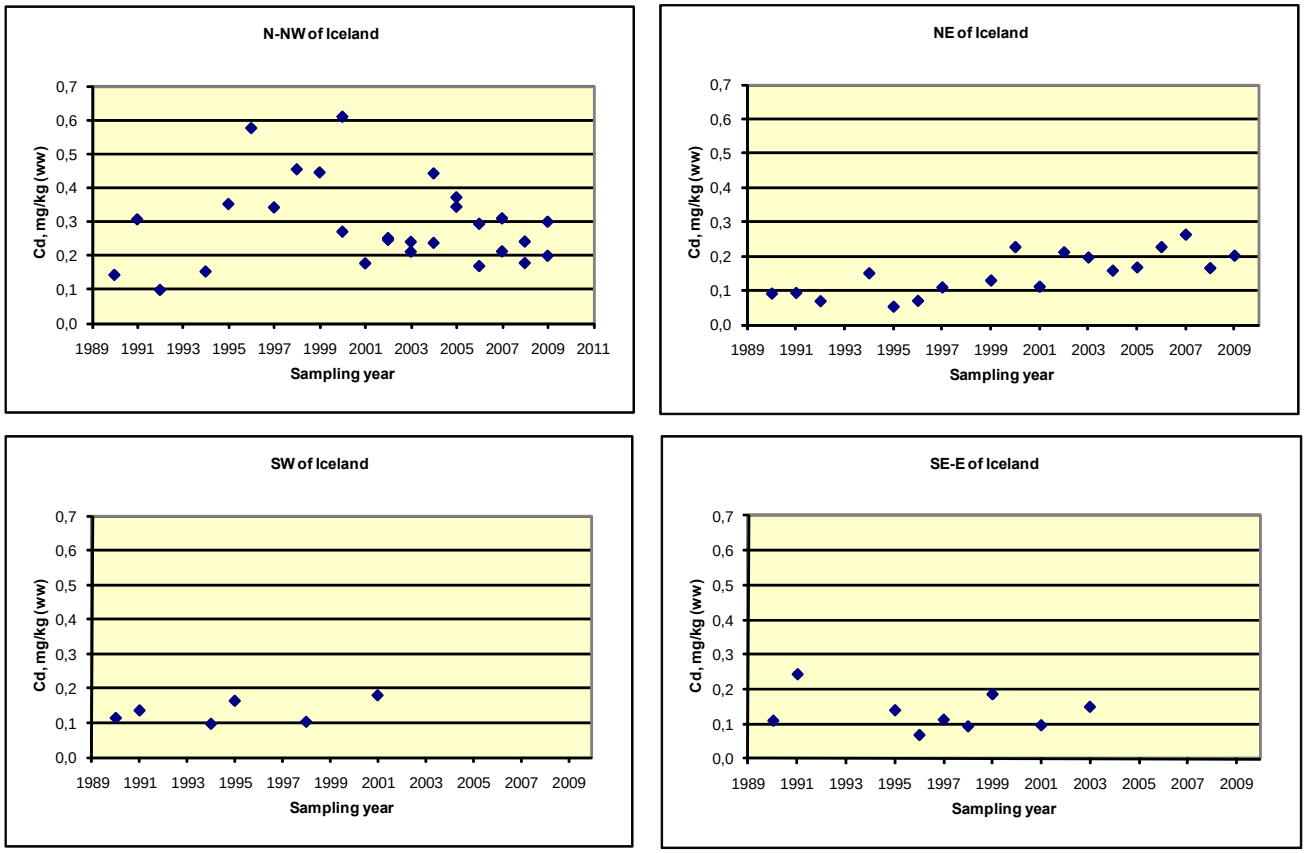


Figure 7c. Average concentration of Cadmium (ww) in livers of 30-45 cm Cod (Gadus morhua) from different locations in Icelandic waters in March 1990-2009.

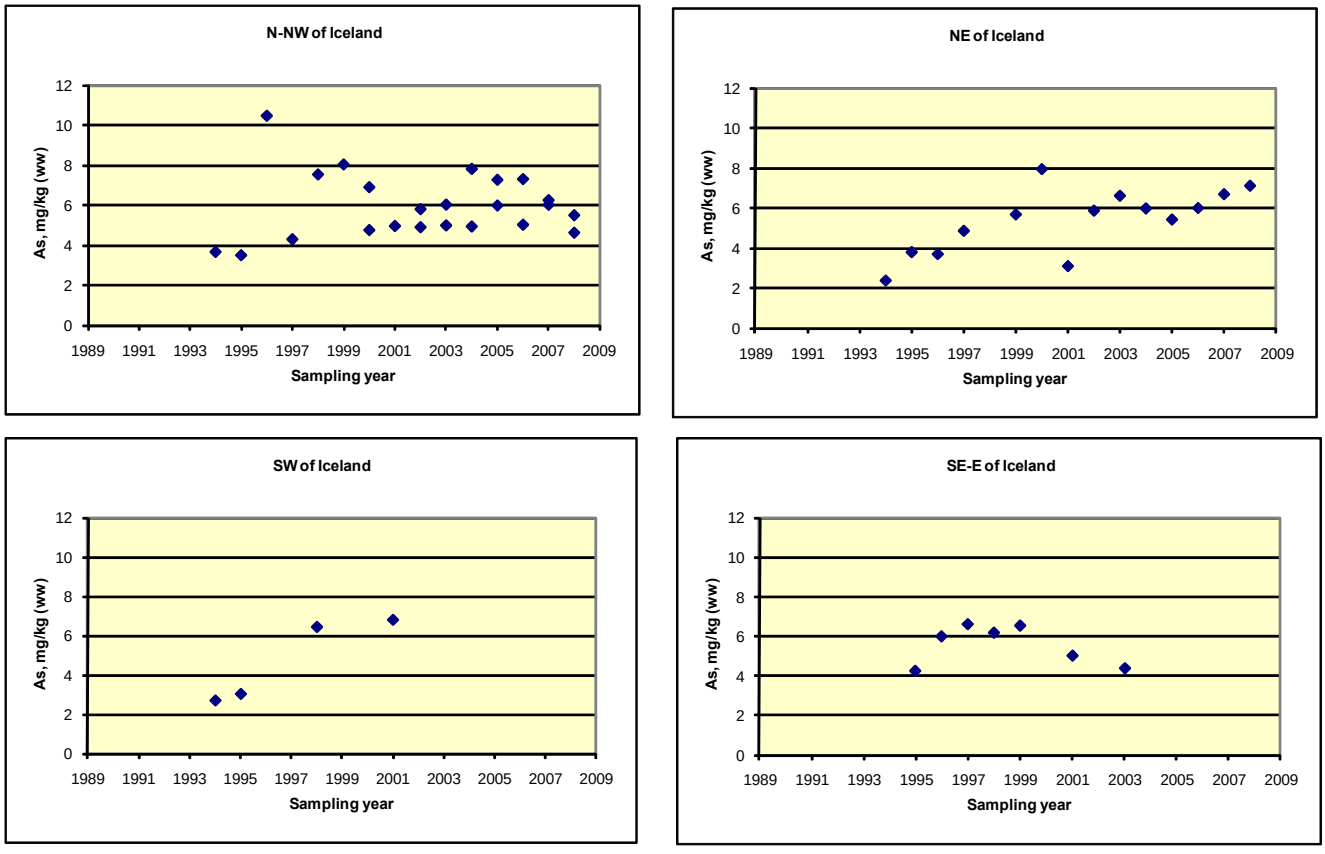


Figure 7d. Average concentration of Arsenic (ww) in livers of 30-45 cm Cod (Gadus morhua) from different locations in Icelandic waters in March 1990-2009.

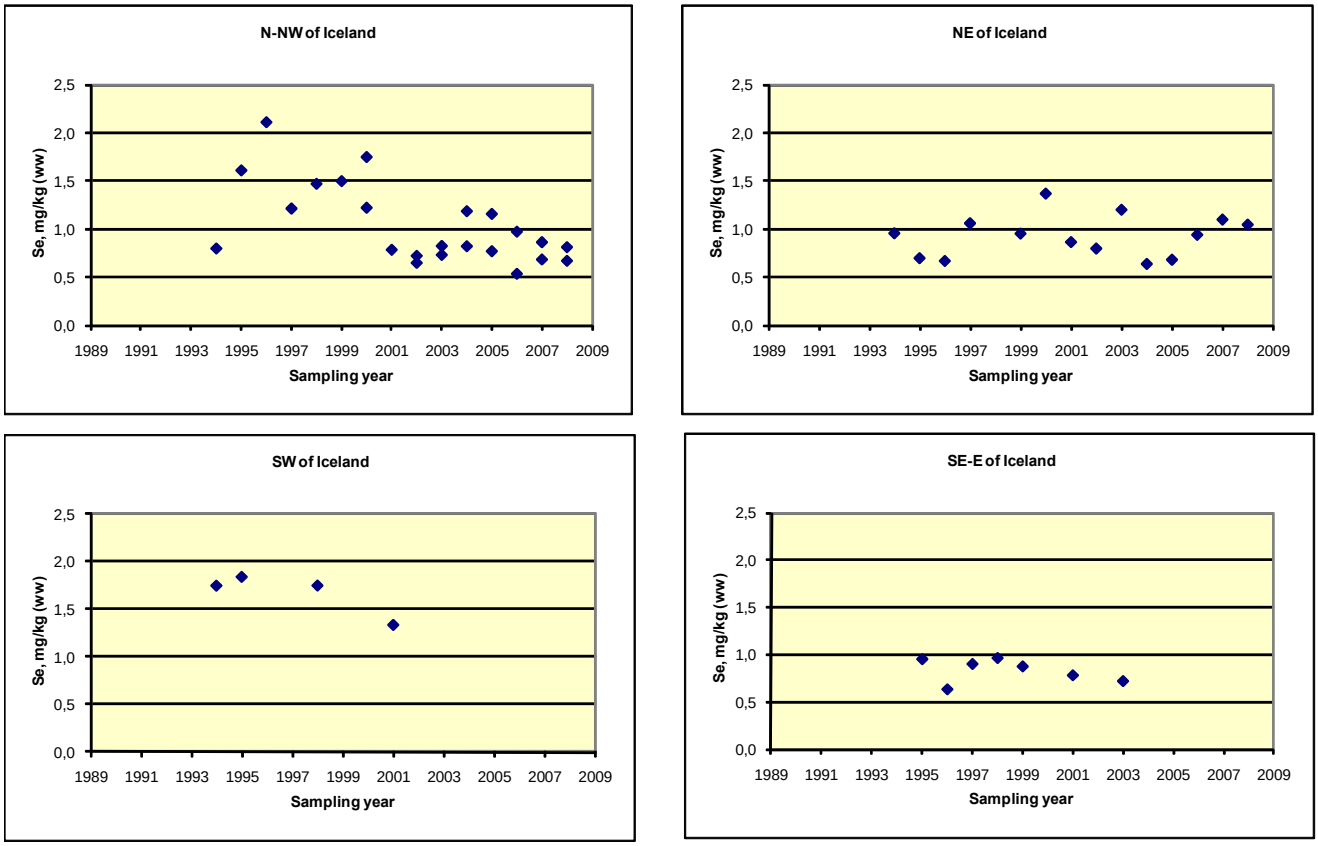


Figure 7e. Average concentration of Selenium (ww) in livers of 30-45 cm Cod (Gadus morhua) from different locations in Icelandic waters in March 1990-2009.

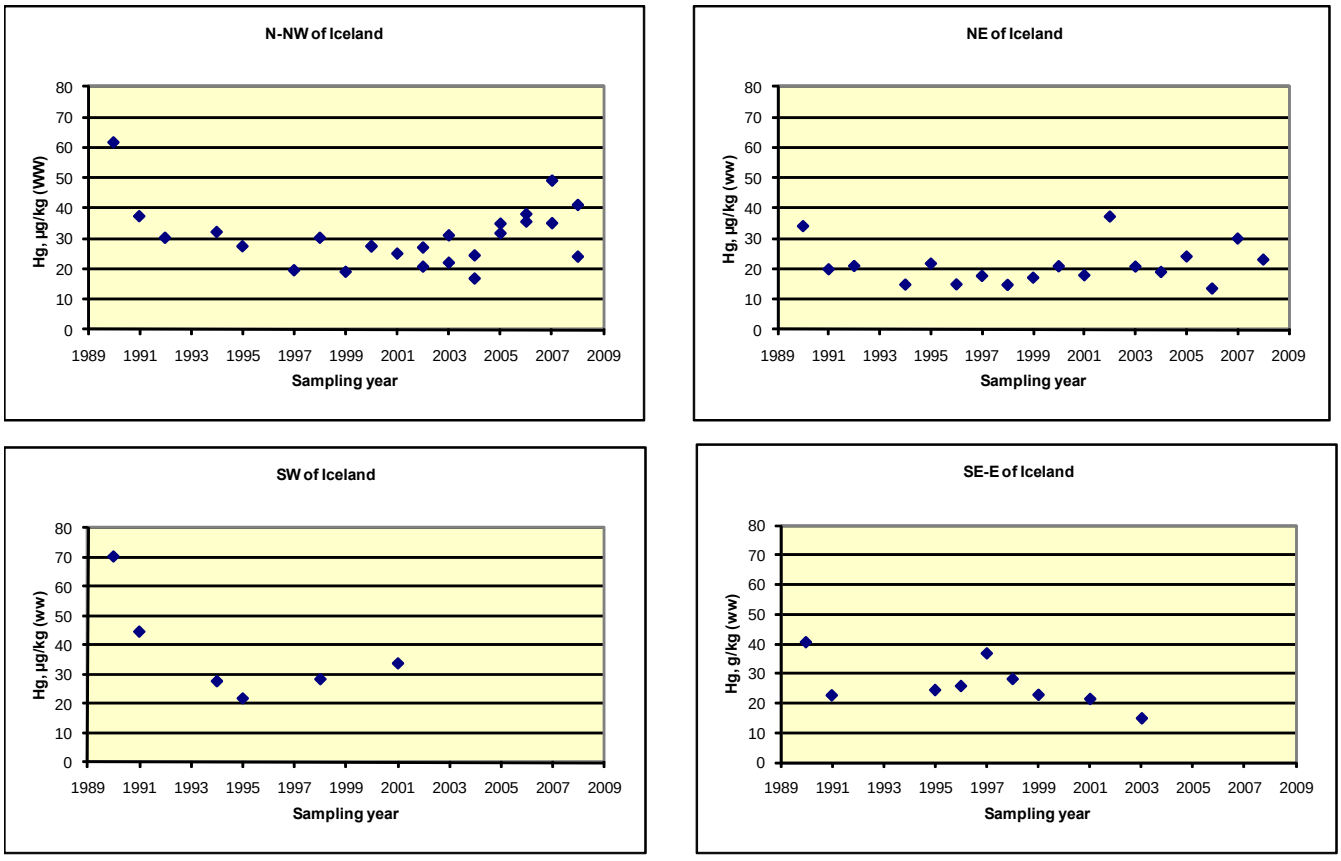
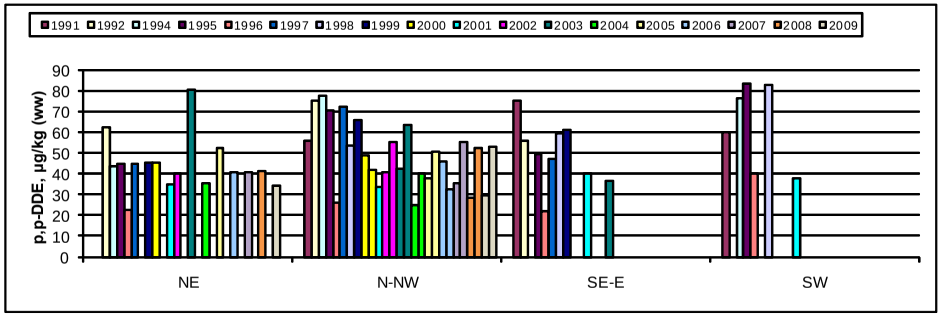
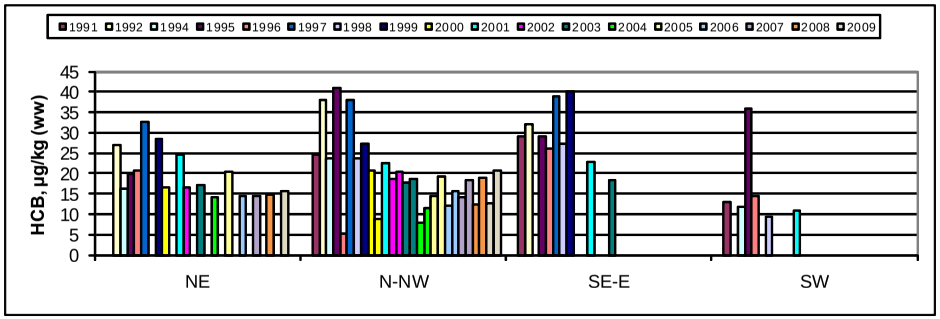
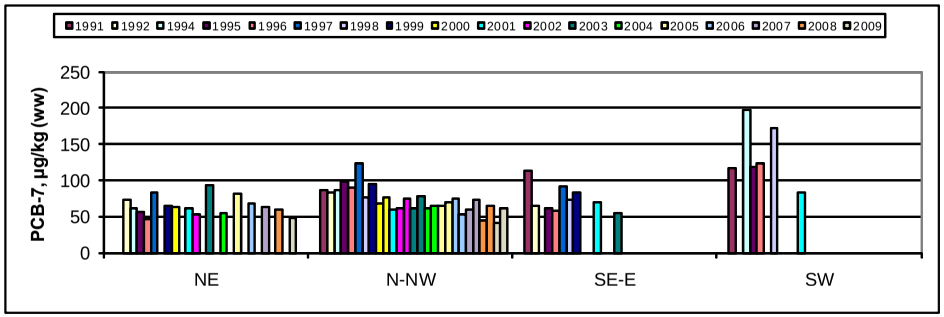
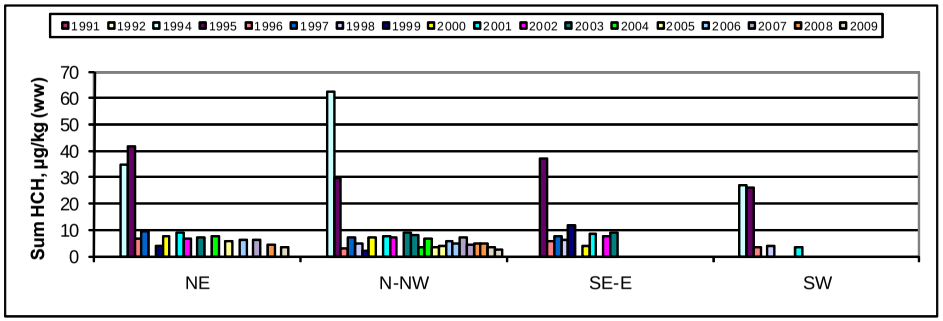


Figure 7f. Average concentration of Mercury (ww) in flesh of 30-45 cm Cod (Gadus morhua) from different locations in Icelandic waters in March 1990-2009.









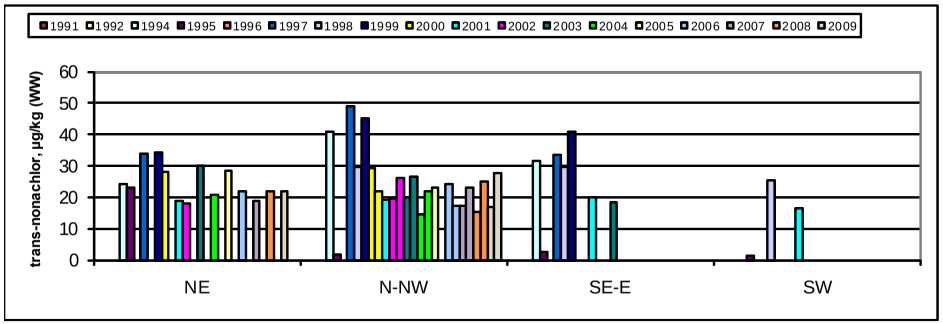


Figure 8. Average concentration of organochlorine compounds (ww) in livers of 30-45 cm Cod (Gadus morhua) from different locations in Icelandic waters in March 1991-2009.

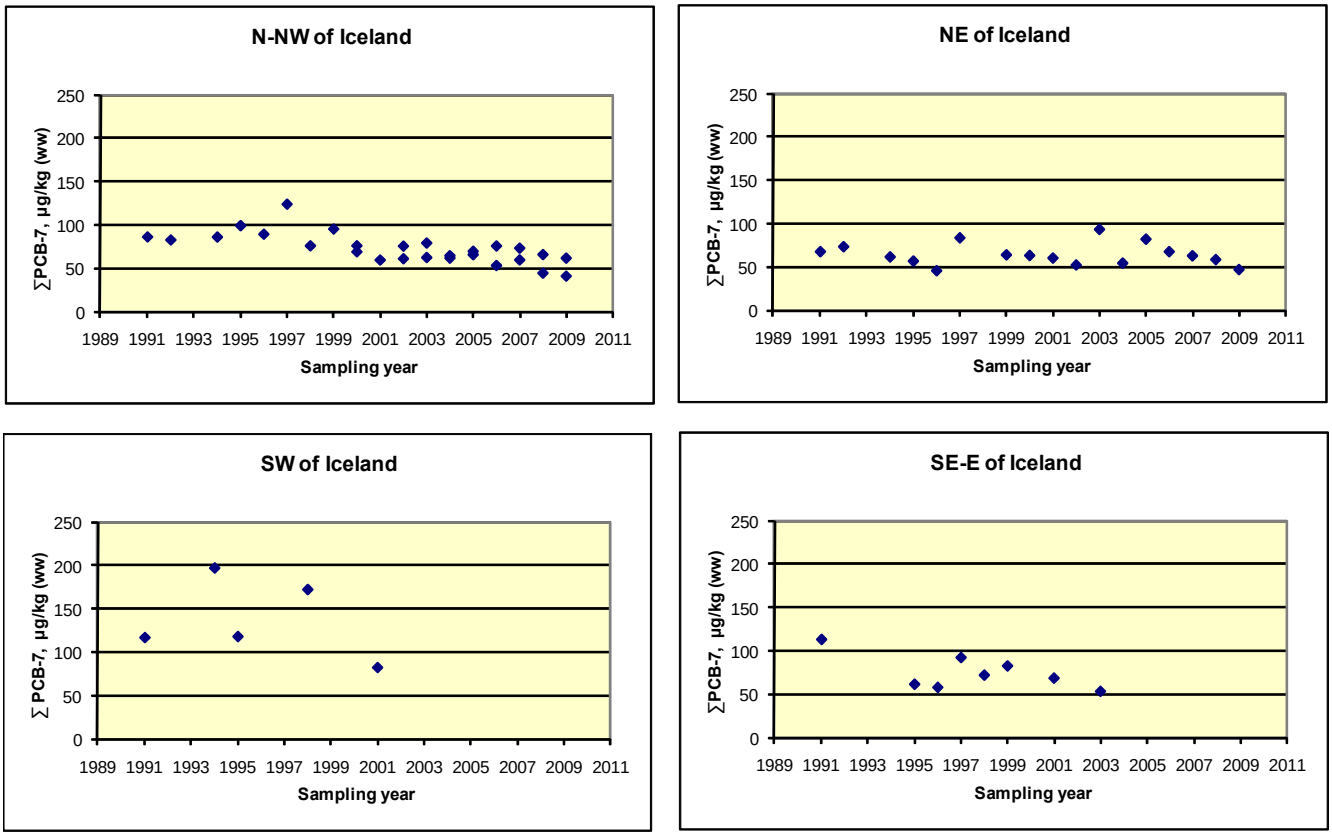


Figure 9a. Average concentration of ∑PCB-7 (ww) in livers of 30-45 cm Cod (Gadus morhua) from different locations in Icelandic waters in March 1991-2009.

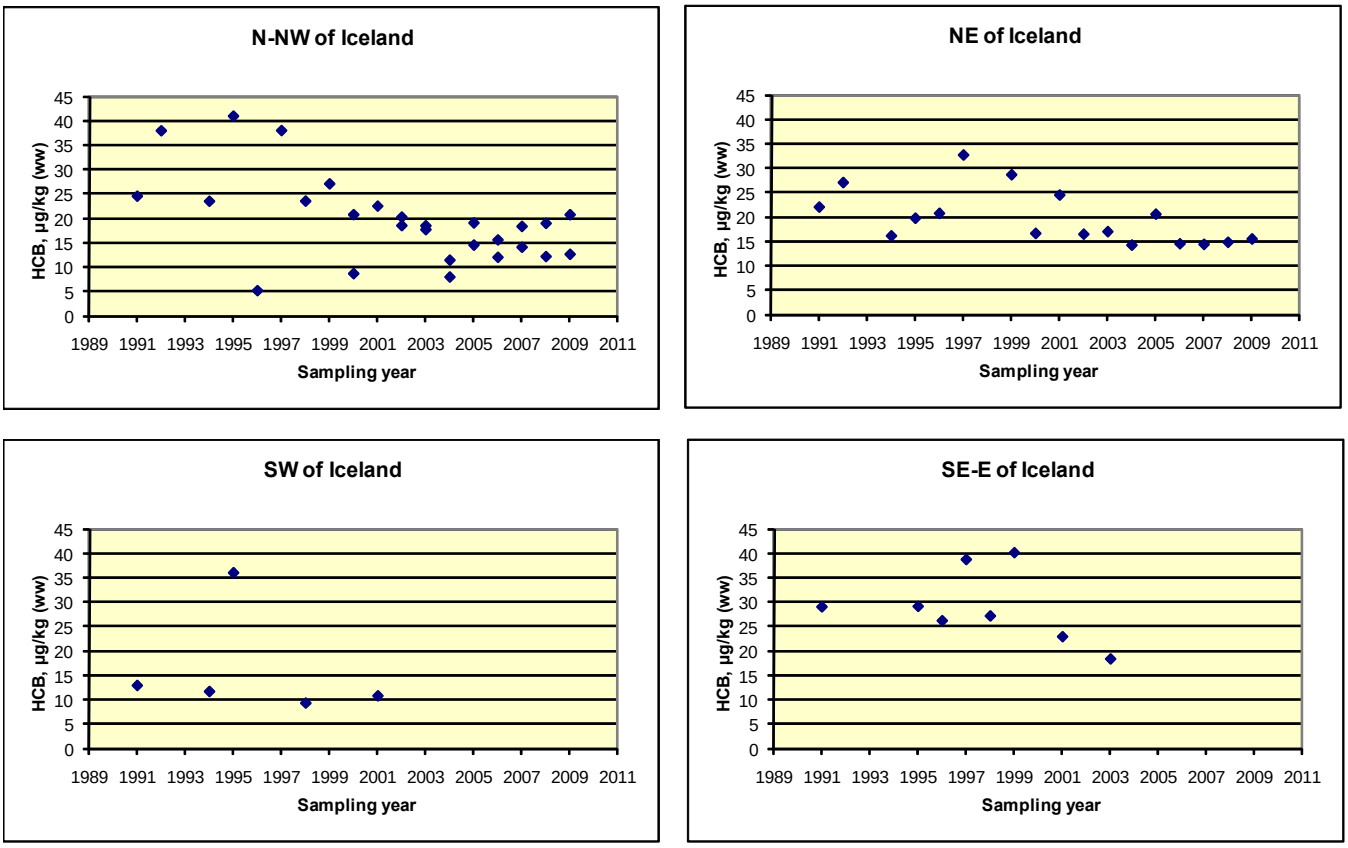


Figure 9b. Average concentration of HCB (ww) in livers of 30-45 cm Cod (Gadus morhua) from different locations in Icelandic waters in March 1991-2009.

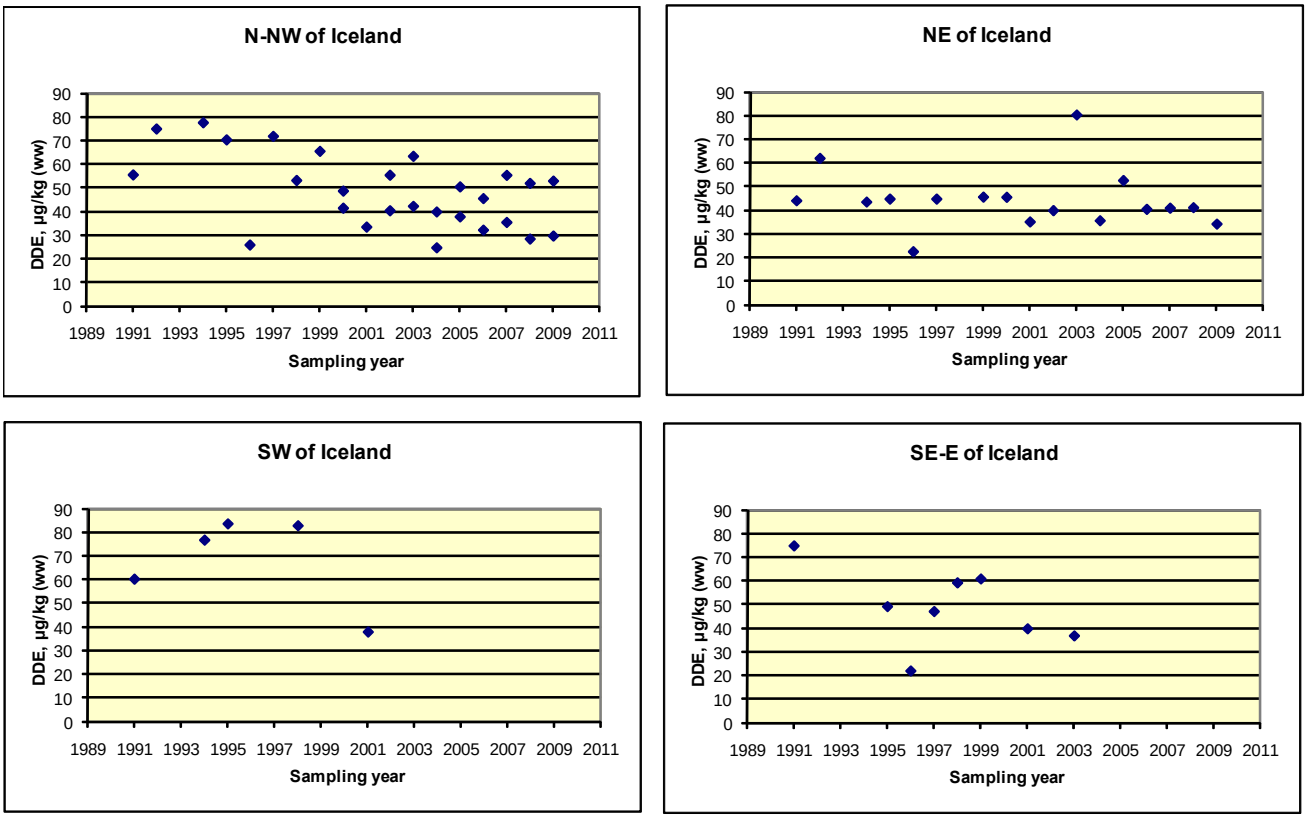


Figure 9c. Average concentration of DDE (ww) in livers of 30-45 cm Cod (Gadus morhua) from different locations in Icelandic waters in March 1991-2009.

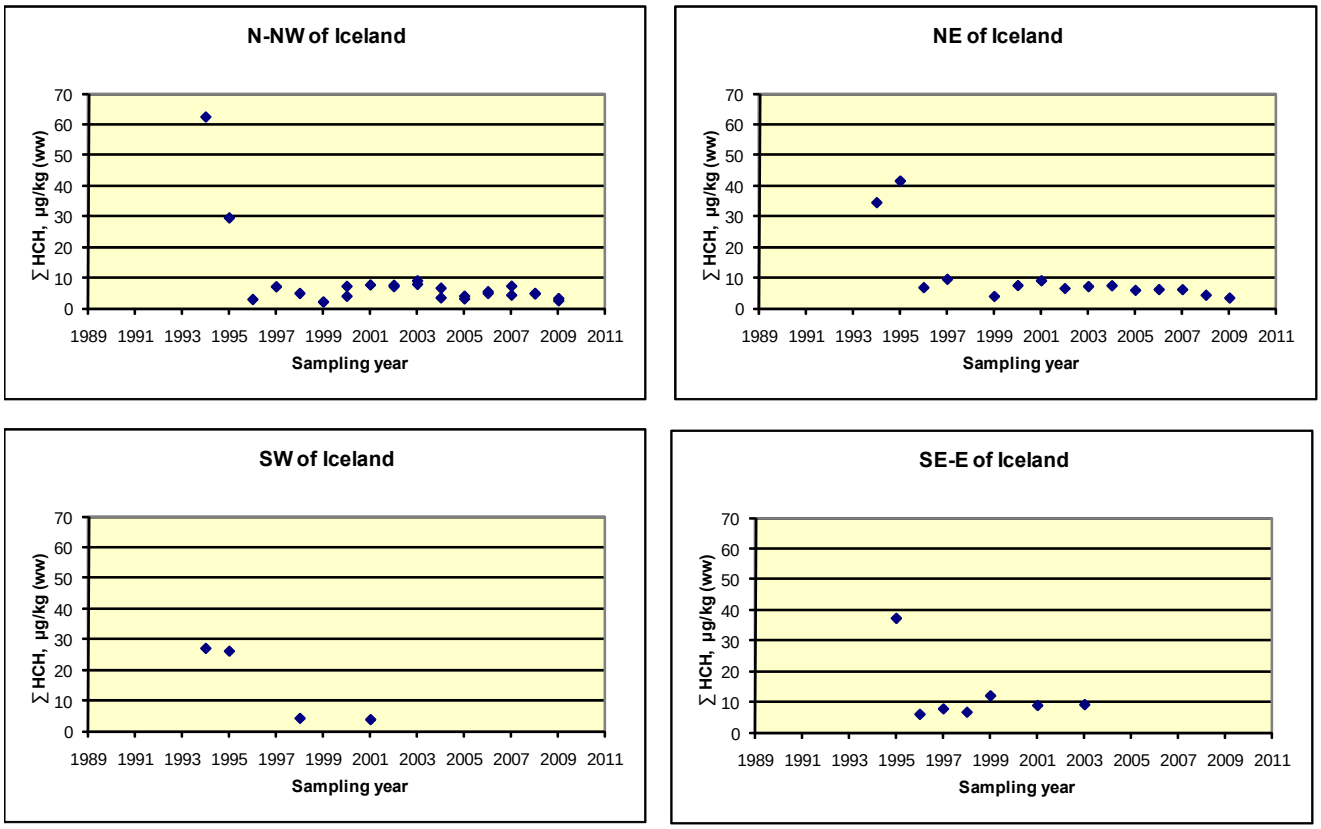


Figure 9d. Average concentration of ∑HCH (ww) in livers of 30-45 cm Cod (Gadus morhua) from different locations in Icelandic waters in March 1991-2009.

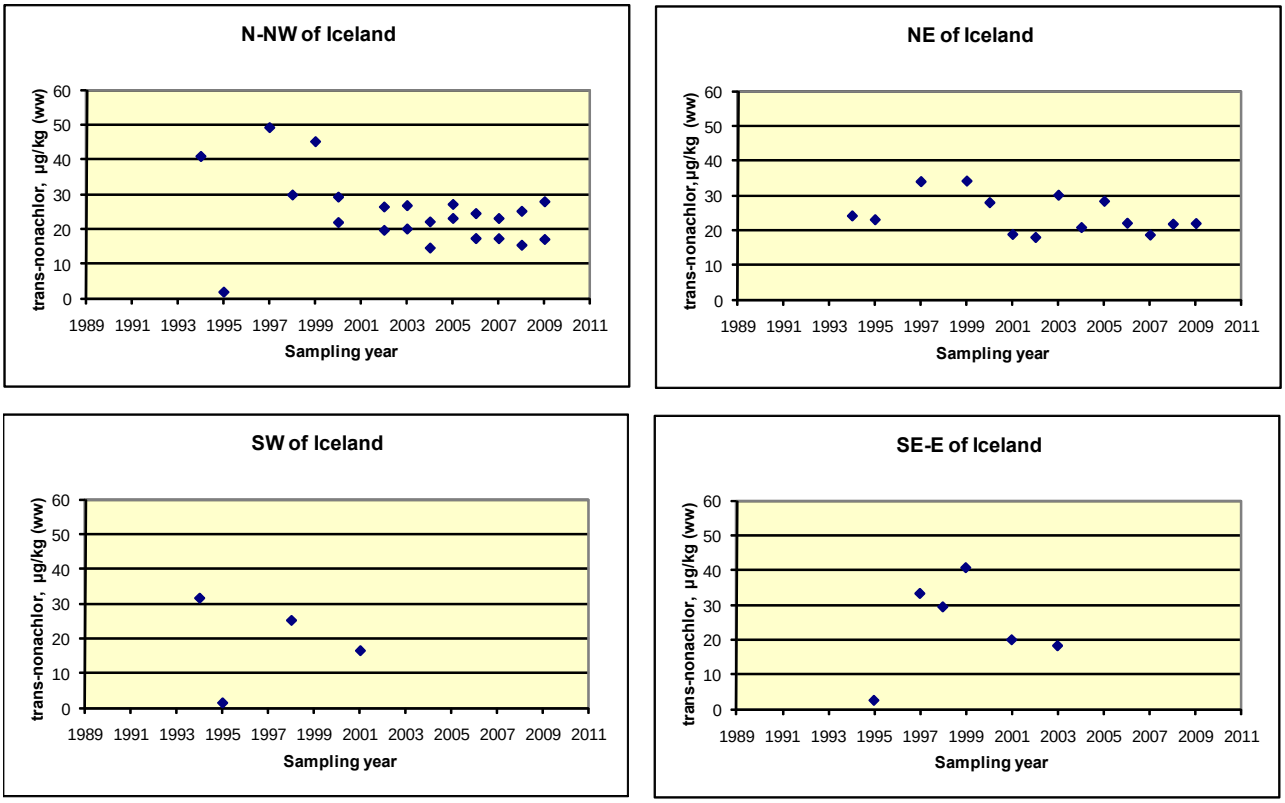


Figure 9e. Average concentration of transnonachlor (ww) in livers of 30-45 cm Cod (Gadus morhua) from different locations in Icelandic waters in March 1991-2009.