Long-Term Marine Sediment Monitoring

Sediment Chemistry Data Summary

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Results and Statistical Summaries

Parameters and Laboratories

Schedule for chemical, total organic carbon (TOC), and grain size analyses for the Long-Term Sediment Monitoring Program, 1989-2016. The next table after this summarizes the schedule for specific chemicals.

Stations	Years	Parameters analyzed
All except Station 13†	1989-1993	Metals, organics, TOC, grain size, sulfides
Station 13†	1989, 1991	
All except Station 13†	1994-1995*	Metals, organics, TOC, grain size*
Station 13†	1994	
Stations 21, 29, 34, 38	1996	Metals, organics, TOC, grain size
Stations 40, 44		Metals, organics, TOC
All stations	1997-1999	Grain size
All stations	2001-2004, 2006-2009, 2011-2014	TOC, grain size
All stations	2000, 2005, 2010	Metals, organics, TOC, grain size
All stations	2015	TOC, grain size, ammonia, sulfides
All stations	2016	Metals, organics, TOC, grain size

†Station 13 (North Hood Canal) was initially a rotational station.
*The grain size results for 1995 were deemed by Ecology to be unusable.

Chemical parameters analyzed in sediments collected for the Long-Term Sediment Monitoring Program**.** Not all parameters were analyzed at each station or each year. Data summaries for chemicals in **bold type** are included in this appendix. Data for all parameters are available in Ecology's Environmental Information Management (EIM) database (http://www.ecy.wa.gov/eim/), Study ID: PSAMP_LT.

Chemicals		**Years**
Total Organic Carbon		1989-1996, 2000-2016
Total Organic Carbon		
Ammonia and Sulfides		1989-1992, 2015
Total Sulfide (Sediment) Total Sulfide (Porewater) (2015 only)		Ammonia (Sediment) (2015 only) Ammonia (Porewater) (2015 only)
Priority Pollutant Metals		1989-1996, 2000, 2005, 2010, 2016
Arsenic **Cadmium** **Chromium** **Copper** **Lead**	**Mercury** **Nickel** **Silver** **Zinc**	Antimony (1989-2000 only) Beryllium (1989-1995 only) **Selenium** (no 1990-1994) Thallium (1989-1995 only)
Ancillary Metals		1989-1993, 2000
Aluminum Barium (no 2000) Calcium (no 2000) Cobalt (no 2000)	Iron Magnesium (no 2000) Manganese	Potassium (1989-1991 only) Sodium (1989-1991 only) Vanadium (no 2000)
Low-Molecular-Weight Polycyclic Aromatic Hydrocarbons (LPAH)		1989-1996, 2000, 2005, 2010, 2016
1-Methylnaphthalene (no 1989-1996) **2-Methylnaphthalene** **Acenaphthene**	**Acenaphthylene** **Anthracene** **Fluorene**	**Naphthalene** **Phenanthrene** **Retene**
High-Molecular-Weight Polycyclic Aromatic Hydrocarbons (HPAH)		1989-1996, 2000, 2005, 2010, 2016
Benzo(a)anthracene **Benzo(a)pyrene** **Benzo(b)fluoranthene** (no 1989-1993) **Benzo(k)fluoranthene** (no 1989-1993)	**Benzo(g,h,i)perylene** **Chrysene** **Dibenzo(a,h)anthracene** **Fluoranthene**	**Indeno(1,2,3-c,d)pyrene** **Perylene** **Pyrene**
Other Polycyclic Aromatic Hydrocarbons (PAH)		1989-1996, 2000, 2005, 2010, 2016
Carbazole	**Dibenzofuran**	
Polychlorinated Biphenyls (PCB) Congeners		2005, 2010, 2016
Congeners 8, 18, 28, 44, 52, 66, 77, 101, 105, 110, 118, 126, 128, 138, 153, 169, 170, 180, 187, 195, 206, 209		
Polychlorinated Biphenyls (PCB) Aroclors		1989-1995, 2000, 2005, 2010, 2016
Aroclors 1016/1242 (1989-1993 only), 1016, 1221, 1232, 1242, 1248, 1254, 1260		
Polybrominated Diphenylethers (PBDE)		2005, 2010, 2016
Congeners 47, 49, 66, 71, 99, 100, 138, 153, 154, 183, 184, 190, 191, 209		
Chlorinated Pesticides		1989-1995, 2000, 2005, 2010
2,4'-DDD (2000, 2005, 2010 only) 2,4'-DDE (2000, 2005, 2010 only) 2,4'-DDT (2000, 2005, 2010 only) Alpha-BHC (1989-1995, 2000 only) Beta-BHC (1989-1995, 2000 only) Delta-BHC (1989-1995, 2000 only) Methoxychlor (1989-1995, 2000 only) Chlorpyriphos (2010 only) Hexachlorobenzene (Method 8081) (2005 only)	4,4'-DDD 4,4'-DDE 4,4'-DDT Aldrin Cis-Chlordane Dieldrin Endosulfan I Endosulfan II	Endosulfan Sulfate Endrin Endrin Aldehyde Endrin Ketone Gamma-BHC (Lindane) Heptachlor Heptachlor Epoxide Toxaphene Trans-Chlordane
Chlorinated Alkanes		1989-1993, 2000
Hexachloroethane		
Chlorinated Alkenes		1989-1993, 2000, 2005, 2010
Hexachlorobutadiene	Hexachlorocyclopentadiene	
Chlorinated Aromatic Compounds		1989-1993, 2000, 2005, 2010

Chemicals		Years
1,2-Dichlorobenzene (no 1989-1990)	1,2,4-Trichlorobenzene	Triclosan (2010 only)
1,3-Dichlorobenzene (no 1989-1990)	Hexachlorobenzene	2-Chloronaphthalene (plus 1994-1996; no 2010)
1,4-Dichlorobenzene (no 1989-1990)		
Chlorinated Aromatic Compounds (Volatile)		1989-1993
Benzene	Ethylbenzene	Toluene
Chlorobenzene	Styrene	Total xylenes
Chlorinated and Nitro-Substituted Phenols		1989-1993, 2000
2,4,5-Trichlorophenol	2,4-Dinitrophenol	4,6-Dinitro-2-methylphenol
2,4,6-Trichlorophenol	2-Chlorophenol	4-Chloro-3-methylphenol
2,4-Dichlorophenol	2-Nitrophenol	4-Nitrophenol
Pentachlorophenol (plus 2005, 2010)		
Esters		2010
Triethyl citrate		
Esters (Volatile)		1989-1993
Vinyl acetate		
Ethers		1989, 1991-1993, 2000, 2010
4-Bromophenyl phenyl ether	Bis(2-chloroethoxy) methane	Bis(2-chloroisopropyl) ether (no 2010)
4-Chlorophenyl phenyl ether	Bis(2-chloroethyl) ether	
Ethers (Volatile)		1989-1993
2-Chloro-ethyl vinyl ether		
Guaiacols		1989-1993
3,4,5-Trichloroguaiacol	4,5-Dichloroguaiacol	Tetrachloroguaiacol
4,5,6-Trichloroguaiacol	Guaiacol	
Halogenated Alkanes (Volatile)		1989-1993
1,1,1-Trichloroethane	1,2-Dichloropropane	Chloroform
1,1,2,2-Tetrachloroethane	Bromodichloromethane	Chloromethane
1,1,2-Trichloro-1,2,2-trifluoroethane	Bromoform	Dibromochloromethane
1,1,2-Tricloroethane	Bromomethane	Dichloromethane
1,1-Dichloroethane	Carbon tetrachloride	Fluoro-trichloromethane
1,2-Dichloroethane	Chloroethane	
Halogenated Alkenes (Volatile)		1989-1993
1,1-Dichloroethene	Monochloroethylene	Trans-1,3-dichloropropene
Cis-1,2-dichloroethene	Tetrachloroethene	Trichloroethene
Cis-1,3-dichloropropene	Trans-1,2-dichloroethene	
Ketones (Volatile)		1989-1993
4-Methyl-2-pentanone	2-Butanone	
Acetone	2-Hexanone	
Miscellaneous Extractable Compounds		1989-1993, 2000, 2005, 2010
1,2-Diphenylhydrazine (2000 only)	Benzoic Acid	Cholesterol (plus 1995)
Benzidine (2000 only)	Benzyl Alcohol	Cymene (p-Isopropyltoluene)
Gamma-Sitosterol (2000 only)	Beta-Coprostanol	Isophorone
Pyridine (2000 only)	Beta-Sitosterol	
Organonitrogen Compounds		1989, 1991-1993, 2000
2,4-Dinitrotoluene	3-Nitroaniline	Nitrobenzene
2,6-Dinitrotoluene	4-Chloroaniline	N-Nitrosodimethylamine
2-Nitroaniline	4-Nitroaniline	N-Nitroso-Di-N-Propylamine
3,3'-Dichlorobenzidine	Aniline (2000 only)	N-Nitrosodiphenylamine
Caffeine (plus 2005, 2010)	N-Nitrosodiphenylamine (plus 2005, 2010)	
Organosulfur Compounds (Volatile)		1989-1993
Carbon disulfide		
Phenols		1989-1993, 2000, 2005, 2010
2,4-Dimethylphenol	4-Methylphenol	Bisphenol A (2010 only)
2-Methylphenol	4-Nonylphenol	Phenol
Phthalate Esters		1989-1993, 2000, 2005, 2010, 2016
Bis(2-ethylhexyl)phthalate	Diethylphthalate	Di-N-Butylphthalate
Butylbenzylphthalate	Dimethylphthalate	Di-N-Octyl Phthalate
Resin Acids		1989-1993

Chemicals		Years
12-Chlorodehydroabietic acid	Dehydroabietic acid	Palustric acid
14-Chlorodehydroabietic acid	Dichlorodehydroabietic acid	Pimaric acid
Abietic acid	Isopimaric acid	Sanadarocopimaric acid
Chlorodehydroabietic acid	Neoabietic acid	
Pharmaceuticals and Personal Care Products (PPCP) – see Long et al., 2013		2010
1,7-Dimethylxanthine	Diazepam	Oxycodone
4-Epianhydrochlortetracycline [EACTC]	Digoxigenin	Oxytetracyclin [OTC]
4-Epianhydrotetracycline [EATC]	Digoxin	Paroxetine
4-Epichlortetracycline [ECTC]	Diltiazem	Penicillin G
4-Epioxytetracycline [EOTC]	Diphenhydramine	Penicillin V
4-Epitetracycline [ETC]	Doxycycline	Prednisolone
Acetaminophen	Enalapril	Prednisone
Albuterol	Enrofloxacin	Promethazine
Alprazolam	Erythromycin-H2O	Propoxyphene
Amitriptyline	Flumequine	Propranolol
Amlodipine	Fluocinonide	Ranitidine
Amphetamine	Fluoxetine	Roxithromycin
Anhydrochlortetracycline [ACTC]	Fluticasone propionate	Sarafloxacin
Anhydrotetracycline [ATC]	Furosemide	Sertraline
Atenolol	Gemfibrozil	Simvastatin
Atorvastatin	Glipizide	Sulfachloropyridazine
Azithromycin	Glyburide	Sulfadiazine
Benzoylecgonine	Hydrochlorothiazide	Sulfadimethoxine
Benztropine	Hydrocodone	Sulfamerazine
Betamethasone	Hydrocortisone	Sulfamethazine
Bisphenol A	Ibuprofen	Sulfamethizole
Caffeine	Isochlortetracycline [ICTC]	Sulfamethoxazole
Carbadox	Lincomycin	Sulfanilamide
Carbamazepine	Lomefloxacin	Sulfathiazole
Cefotaxime	Meprobamate	Tetracycline [TC]
Chlortetracycline [CTC]	Metformin	Theophylline
Cimetidine	Methylprednisolone	Thiabendazole
Ciprofloxacin	Metoprolol	Trenbolone
Clarithromycin	Miconazole	Trenbolone acetate
Clinafloxacin	Minocycline	Tri(2-chloroethyl) phosphate (TCEP)
Clonidine	Naproxen	Triamterene
Cloxacillin	Norfloxacin	Triclocarban
Cocaine	Norfluoxetine	Triclosan
Codeine	Norgestimate	Trimethoprim
Cotinine	Norverapamil	Tylosin
DEET	Ofloxacin	Valsartan
Dehydronifedipine	Ormetoprim	Verapamil
Demeclocycline	Oxacillin	Virginiamycin
Desmethyldiltiazem	Oxolinic Acid	Warfarin
Perfluoroalkyl Substances (PFOA) – see Long et al., 2013		2010
Perfluorobutanoic acid (PFBA)	Perfluorononanoic acid (PFNA)	
Perfluorobutane sulfonate (PFBS)	Perfluorooctanoic acid (PFOA)	
Perfluorodecanoic acid (PFDA)	Perfluorooctane sulfonate (PFOS)	
Perfluorododecanoic acid (PFDoA)	Perfluorooctane sulfonate (PFOSA)	
Perfluoroheptanoic acid (PFHpA)	Perfluoropentanoic acid (PFPeA)	
Perfluorohexanoic acid (PFHxA)	Perfluorundecanoic acid (PFUnA)	
Perfluorohexane sulfonate (PFHxS)		

Analytical laboratories for the Long-Term Sediment Monitoring Program chemical, organic carbon, and grain size analyses, 1989-2015. Methods are specified in Striplin et al. (1988), Dutch et al. (2009), Long et al. (2013), and Dutch et al. (2015).

Year	Laboratory	Parameters analyzed
1989	Analytical Resources, Inc.	Metals, organics, total organic carbon
	Columbia Analytical Services, Inc.	Total sulfides, grain size
1990	Analytical Resources, Inc.	Metals, organics, total sulfides, total organic carbon
	Hart Crowser	Grain size
1991	Analytical Resources, Inc.	Metals, organics, total sulfides, total organic carbon
	Soil Technology, Inc.	Grain size
1992	Analytical Resources, Inc.	Metals, organics, total sulfides, total organic carbon
	Soil Technology, Inc.	Grain size
1993	Analytical Resources, Inc.	Metals, organics, total sulfides, total organic carbon
	Soil Technology, Inc.	Grain size
1994	Manchester Environmental Laboratory	Metals, organics
	Analytical Resources, Inc.	Total organic carbon
	Soil Technology, Inc.	Grain size
1995	Manchester Environmental Laboratory	Metals, organics
	Analytical Resources, Inc.	Total organic carbon
	Columbia Analytical Services, Inc.	Grain size
1996	Manchester Environmental Laboratory	Metals, organics
	Sound Analytical	Total organic carbon
	Soil Technology, Inc.	Grain size
1997	Columbia Analytical Services, Inc.	Grain size
1998	Hart Crowser	Grain size
1999	Rosa Environmental and Geotechnical Laboratory	Grain size
2000	Rosa Environmental and Geotechnical Laboratory	Grain size
	Manchester Environmental Laboratory	Metals, organics, total organic carbon
2001-2004	Rosa Environmental and Geotechnical Laboratory	Grain size
	Manchester Environmental Laboratory	Total organic carbon
2005	Analytical Resources, Inc. (formerly Rosa)	Grain size
	Manchester Environmental Laboratory	Metals, organics, total organic carbon
2006-2009	Analytical Resources, Inc.	Grain size
	Manchester Environmental Laboratory	Total organic carbon
2010	Analytical Resources, Inc.	Grain size
	Manchester Environmental Laboratory	Metals, organics, total organic carbon
	AXYS	Pharmaceuticals, personal care products, perfluoroalkyl substances
2011-	Analytical Resources, Inc.	Grain size
2014	Manchester Environmental Laboratory	Total organic carbon
2015	Analytical Resources, Inc. (ARI)	Ammonia and sulfides in sediment and porewater
	Materials Testing & Consulting, Inc. (ARI spin-off; formerly Rosa)	Grain size
	Manchester Environmental Laboratory	Total organic carbon
2016	Materials Testing & Consulting, Inc.	Grain size
	Manchester Environmental Laboratory	Metals, organics, total organic carbon

Detection Rates

Number of samples analyzed (n) and percent nondetect (% ND) by year over all stations. Only analytes frequently detected in recent years are shown. Field replicates are included in the number of samples; lab duplicates are not included.

Year	1989		1990		1991		1992		1993		1994		1995		1996	
ParameterCode	**n**	**% ND**	**n**	**% ND**	**n**	**% ND**	**n**	**% ND**	**n**	**% ND**	**n**	**% ND**	**n**	**% ND**	**n**	**% ND**
Metals																
Arsenic	16	0.0	15	0.0	16	0.0	15	0.0	15	0.0	16	68.8	18	0.0	6	0.0
Cadmium	16	12.5	15	13.3	16	0.0	15	0.0	15	0.0	16	18.8	18	88.9	6	66.7
Chromium	16	0.0	15	0.0	16	0.0	15	0.0	15	0.0	16	0.0	18	0.0	6	0.0
Copper	16	0.0	15	0.0	16	0.0	15	0.0	15	0.0	16	0.0	18	0.0	6	0.0
Lead	16	0.0	15	0.0	16	0.0	15	0.0	15	0.0	16	0.0	18	0.0	6	0.0
Mercury	16	43.8	15	53.3	16	25.0	15	0.0	15	0.0	16	0.0	18	0.0	6	0.0
Nickel	16	0.0	15	0.0	16	0.0	15	0.0	15	0.0			18	0.0		
Selenium	15	100.0											18	44.4		
Silver	16	6.3	15	0.0	16	6.3	15	0.0	15	0.0	16	93.8	18	33.3	6	0.0
Zinc	16	0.0	15	0.0	16	0.0	15	0.0	15	0.0	16	0.0	18	0.0	6	0.0
Low-molecular-weight PAHs																
1-Methylnaphthalene																
2-Methylnaphthalene	16	68.8			16	56.3	15	46.7	15	26.7	8	25.0	13	15.4		
Acenaphthene	16	81.3	15	73.3	16	87.5	15	80.0	15	46.7	8	62.5	13	61.5	6	33.3
Acenaphthylene	16	75.0	15	73.3	16	75.0	15	80.0	15	40.0	8	12.5	13	61.5		
Anthracene	16	43.8	15	53.3	16	6.3	15	66.7	15	20.0	8	0.0	13	15.4	6	0.0
Fluorene	16	62.5	15	53.3	16	31.3	15	80.0	15	33.3	8	25.0	13	61.5	6	16.7
Naphthalene	16	62.5	15	53.3	16	18.8	15	46.7	15	26.7	8	25.0	13	15.4		
Phenanthrene	16	0.0	15	0.0	16	0.0	15	6.7	15	0.0	8	0.0	13	0.0	6	0.0
Retene	16	18.8			16	25.0	15	6.7	15	0.0			13	7.7	6	0.0
High-molecular-weight PAHs																
Benzo(a)anthracene	16	12.5	15	0.0	16	0.0	15	0.0	15	0.0	8	0.0	13	23.1	6	33.3
Benzo(a)pyrene	16	18.8	15	6.7	16	25.0	15	13.3	15	0.0	8	0.0	13	7.7	6	0.0
Benzo(b)fluoranthene											8	0.0	13	15.4		

Year	1989		1990		1991		1992		1993		1994		1995		1996	
ParameterCode	**n**	**% ND**	**n**	**% ND**	**n**	**% ND**	**n**	**% ND**	**n**	**% ND**	**n**	**% ND**	**n**	**% ND**	**n**	**% ND**
Benzo(g,h,i)perylene	16	31.3	15	80.0	1	0.0	15	46.7	15	0.0	8	0.0	13	7.7		
Benzo(k)fluoranthene											8	12.5	13	23.1		
Chrysene	16	12.5	15	0.0	16	6.3	15	0.0	15	0.0	8	0.0	13	7.7	6	0.0
Dibenzo(a,h)anthracene	16	75.0	15	60.0	16	43.8	15	86.7	15	33.3	8	37.5	13	61.5	6	33.3
Fluoranthene	16	0.0	15	0.0	16	0.0	15	0.0	15	0.0	8	0.0	13	0.0	6	0.0
Indeno(1,2,3-c,d)pyrene	16	37.5	15	33.3	16	50.0	15	66.7	15	0.0	8	0.0	13	7.7		
Perylene	16	6.3			16	37.5	15	6.7	15	0.0						
Pyrene	16	0.0	15	0.0	16	0.0	15	0.0	15	0.0	8	0.0	13	0.0	6	0.0
Miscellaneous PAHs																
Carbazole	16	93.8	15	100.0	16	75.0	15	86.7	15	53.3	8	62.5	13	69.2		
Dibenzofuran	16	81.3	15	86.7	16	56.3	15	80.0	15	26.7	8	12.5	13	61.5	6	16.7
Phthalates																
Bis(2-ethylhexyl)phthalate	16	31.3	15	80.0	16	6.3	15	6.7	15	26.7						
Butylbenzylphthalate	16	87.5	15	93.3	16	62.5	15	93.3	15	60.0						

Year	2000		2005		2010		2016	
ParameterCode	**n**	**% ND**	**n**	**n**	**n**	**% ND**	**n**	**% ND**
Metals								
Arsenic	10	0.0	33	0.0	33	0.0	66	0.0
Cadmium	10	80.0	33	9.1	33	3.0	66	0.0
Chromium	10	0.0	33	0.0	33	0.0	66	0.0
Copper	10	0.0	33	0.0	33	0.0	66	0.0
Lead	10	0.0	33	0.0	33	0.0	66	0.0
Mercury	10	0.0	33	0.0	33	0.0	66	0.0
Nickel	10	0.0	33	0.0	33	0.0	66	0.0
Selenium	10	40.0	33	54.5	33	12.1	66	0.0
Silver	10	20.0	33	21.2	33	18.2	66	18.2
Zinc	10	0.0	33	0.0	33	0.0	66	0.0
Low-molecular-weight PAHs								
1-Methylnaphthalene	10	0.0	33	0.0	33	0.0	66	3.0
2-Methylnaphthalene	10	0.0	33	0.0	33	0.0	66	1.5

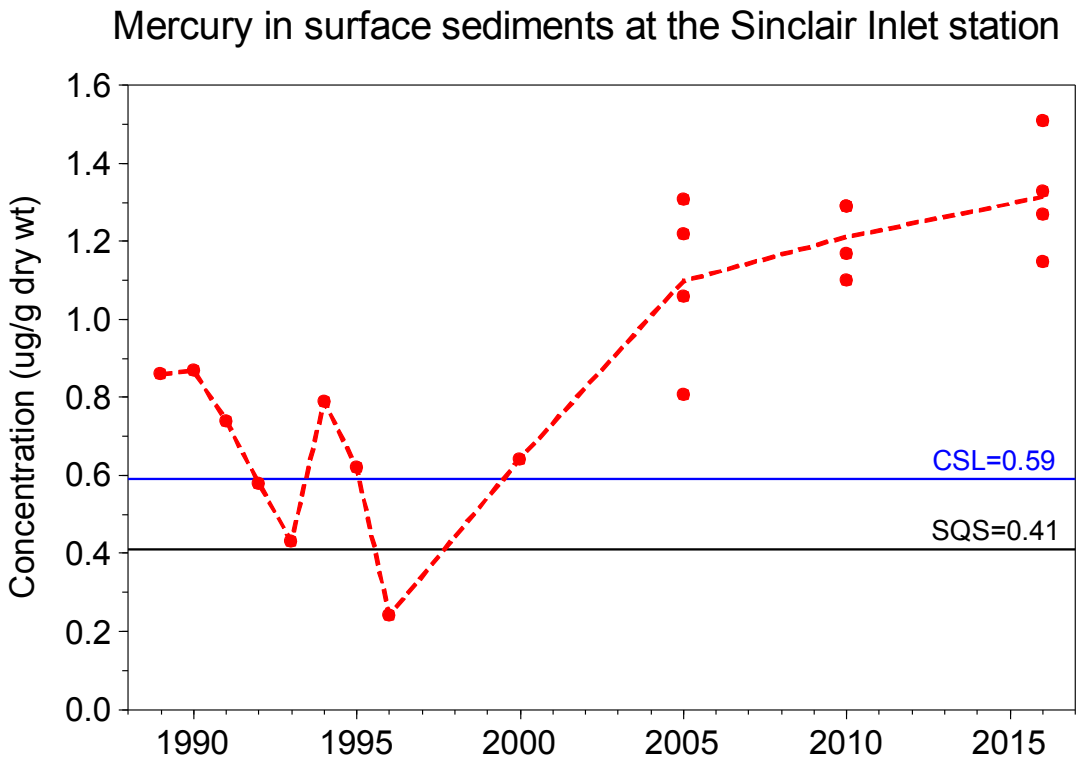
Year	2000		2005		2010		2016	
ParameterCode	n	% ND	n	n	n	% ND	n	% ND
Acenaphthene	10	60.0	33	0.0	33	18.2	66	33.3
Acenaphthylene	10	60.0	33	0.0	33	0.0	66	42.4
Anthracene	10	0.0	33	0.0	33	0.0	66	10.6
Fluorene	10	10.0	33	0.0	33	0.0	66	10.6
Naphthalene	10	0.0	33	0.0	33	0.0	66	13.6
Phenanthrene	10	10.0	33	0.0	33	0.0	66	0.0
Retene	10	0.0	33	0.0	33	0.0	66	0.0
High-molecular-weight PAHs								
Benzo(a)anthracene	10	0.0	33	0.0	33	0.0	66	1.5
Benzo(a)pyrene	10	0.0	33	0.0	33	0.0	66	4.5
Benzo(b)fluoranthene	10	0.0	33	0.0	33	0.0	66	0.0
Benzo(g,h,i)perylene	10	20.0	33	0.0	33	0.0	66	1.5
Benzo(k)fluoranthene	10	0.0	33	0.0	33	3.0	66	7.6
Chrysene	10	10.0	33	0.0	33	0.0	66	0.0
Dibenzo(a,h)anthracene	10	60.0	33	6.1	33	3.0	66	33.3
Fluoranthene	10	0.0	33	0.0	33	0.0	66	0.0
Indeno(1,2,3-c,d)pyrene	10	40.0	33	0.0	33	0.0	66	3.0
Perylene	10	0.0	33	0.0	33	0.0	66	0.0
Pyrene	10	0.0	33	0.0	33	0.0	66	0.0
Miscellaneous PAHs								
Carbazole	10	80.0	33	3.0	33	33.3	66	43.9
Dibenzofuran	10	40.0	33	0.0	33	0.0	66	28.8
Phthalates								
Bis(2-ethylhexyl)phthalate	10	100.0	33	87.9	33	97.0	66	98.5
Butylbenzylphthalate	10	90.0	33	93.9	33	100.0	66	98.5

Number of samples analyzed (n) and percent nondetect (% ND) by station over all years. Only analytes frequently detected in recent years are shown. Field replicates are included in the number of samples; lab duplicates are not included.

Station	3		4		13		21		29	
ParameterCode	**n**	**% ND**	**n**	**% ND**	**n**	**% ND**	**n**	**% ND**	**n**	**% ND**
Metals										
Arsenic	17	0.0	18	0.0	13	0.0	21	0.0	18	5.6
Cadmium	17	11.8	18	11.1	13	38.5	21	14.3	18	16.7
Chromium	17	0.0	18	0.0	13	0.0	21	0.0	18	0.0
Copper	17	0.0	18	0.0	13	0.0	21	0.0	18	0.0
Lead	17	0.0	18	0.0	13	0.0	21	0.0	18	0.0
Mercury	17	11.8	18	5.6	13	15.4	21	9.5	18	5.6
Nickel	16	0.0	17	0.0	12	0.0	19	0.0	16	0.0
Selenium	12	33.3	13	15.4	10	70.0	15	46.7	12	8.3
Silver	17	11.8	18	5.6	13	100.0	21	4.8	18	5.6
Zinc	17	0.0	18	0.0	13	0.0	21	0.0	18	0.0
Low-molecular-weight PAHs										
1-Methylnaphthalene	10	0.0	11	0.0	10	0.0	13	0.0	10	0.0
2-Methylnaphthalene	15	0.0	16	12.5	13	15.4	19	0.0	14	14.3
Acenaphthene	16	43.8	17	41.2	13	69.2	21	4.8	16	31.3
Acenaphthylene	16	62.5	17	64.7	13	38.5	20	10.0	15	33.3
Anthracene	16	18.8	17	23.5	13	15.4	21	0.0	16	12.5
Fluorene	16	25.0	17	29.4	13	23.1	21	0.0	16	12.5
Naphthalene	16	12.5	17	11.8	13	38.5	20	0.0	15	20.0
Phenanthrene	16	0.0	17	0.0	13	0.0	21	0.0	16	0.0
Retene	15	6.7	16	12.5	12	8.3	19	0.0	15	6.7
High-molecular-weight PAHs										
Benzo(a)anthracene	16	12.5	17	5.9	13	7.7	21	0.0	16	0.0
Benzo(a)pyrene	16	18.8	17	17.6	13	15.4	21	0.0	16	0.0
Benzo(b)fluoranthene	11	0.0	12	8.3	11	0.0	15	0.0	10	0.0
Benzo(g,h,i)perylene	15	20.0	16	31.3	12	16.7	19	10.5	14	14.3
Benzo(k)fluoranthene	11	9.1	12	8.3	11	9.1	15	0.0	10	0.0
Chrysene	16	6.3	17	5.9	13	23.1	21	0.0	16	0.0
Dibenzo(a,h)anthracene	16	37.5	17	41.2	13	76.9	21	38.1	16	12.5
Fluoranthene	16	0.0	17	0.0	13	0.0	21	0.0	16	0.0
Indeno(1,2,3-c,d)pyrene	16	31.3	17	29.4	13	23.1	20	5.0	15	20.0
Perylene	14	0.0	15	0.0	12	16.7	17	0.0	14	0.0
Pyrene	16	0.0	17	0.0	13	0.0	21	0.0	16	0.0
Miscellaneous PAHs										
Carbazole	16	62.5	17	70.6	13	84.6	20	25.0	15	33.3
Dibenzofuran	16	37.5	17	35.3	13	30.8	21	4.8	16	25.0
Phthalates										
Bis(2-ethylhexyl)phthalate	15	80.0	16	75.0	12	100.0	18	77.8	15	73.3
Butylbenzylphthalate	15	100.0	16	100.0	12	100.0	18	100.0	15	93.3

Station	34		38		40		44		49	
ParameterCode	n	% ND	n	% ND	n	% ND	n	% ND	n	% ND
Metals										
Arsenic	21	0.0	39	10.3	23	4.3	39	10.3	19	5.3
Cadmium	21	0.0	39	15.4	23	30.4	39	28.2	19	0.0
Chromium	21	0.0	39	0.0	23	0.0	39	0.0	19	0.0
Copper	21	0.0	39	0.0	23	0.0	39	0.0	19	0.0
Lead	21	0.0	39	0.0	23	0.0	39	0.0	19	0.0
Mercury	21	0.0	39	0.0	23	0.0	39	28.2	19	0.0
Nickel	19	0.0	34	0.0	21	0.0	34	0.0	18	0.0
Selenium	15	6.7	18	22.2	17	58.8	18	66.7	14	7.1
Silver	21	0.0	39	10.3	23	17.4	39	43.6	19	5.3
Zinc	21	0.0	39	0.0	23	0.0	39	0.0	19	0.0
Low-molecular-weight PAHs										
1-Methylnaphthalene	13	0.0	10	0.0	12	0.0	10	0.0	12	0.0
2-Methylnaphthalene	19	10.5	34	23.5	21	0.0	26	57.7	17	23.5
Acenaphthene	21	14.3	39	66.7	23	0.0	31	87.1	18	27.8
Acenaphthylene	20	10.0	38	44.7	22	0.0	30	73.3	18	33.3
Anthracene	21	0.0	39	10.3	23	0.0	31	45.2	18	11.1
Fluorene	21	9.5	39	30.8	23	0.0	31	67.7	18	22.2
Naphthalene	20	5.0	38	13.2	22	0.0	30	56.7	18	22.2
Phenanthrene	21	0.0	39	0.0	23	0.0	31	3.2	18	5.6
Retene	19	0.0	31	3.2	21	0.0	27	11.1	17	0.0
High-molecular-weight PAHs										
Benzo(a)anthracene	21	0.0	39	2.6	23	0.0	31	3.2	18	5.6
Benzo(a)pyrene	21	0.0	39	0.0	23	0.0	31	6.5	18	5.6
Benzo(b)fluoranthene	15	0.0	18	0.0	17	0.0	10	0.0	13	7.7
Benzo(g,h,i)perylene	19	5.3	34	8.8	22	0.0	26	26.9	17	11.8
Benzo(k)fluoranthene	15	0.0	18	5.6	17	0.0	10	0.0	13	7.7
Chrysene	21	0.0	39	0.0	23	0.0	31	0.0	18	0.0
Dibenzo(a,h)anthracene	21	4.8	39	33.3	23	0.0	31	74.2	18	33.3
Fluoranthene	21	0.0	39	0.0	23	0.0	31	0.0	18	0.0
Indeno(1,2,3-c,d)pyrene	20	0.0	38	5.3	22	0.0	30	40.0	18	16.7
Perylene	17	0.0	26	0.0	16	0.0	26	15.4	16	12.5
Pyrene	21	0.0	39	0.0	23	0.0	31	0.0	18	0.0
Miscellaneous PAHs										
Carbazole	20	30.0	38	63.2	22	4.5	30	83.3	18	55.6
Dibenzofuran	21	23.8	39	41.0	23	0.0	31	74.2	18	22.2
Phthalates										
Bis(2-ethylhexyl)phthalate	18	61.1	30	43.3	17	47.1	30	70.0	17	82.4
Butylbenzylphthalate	18	61.1	30	73.3	17	76.5	30	100.0	17	100.0

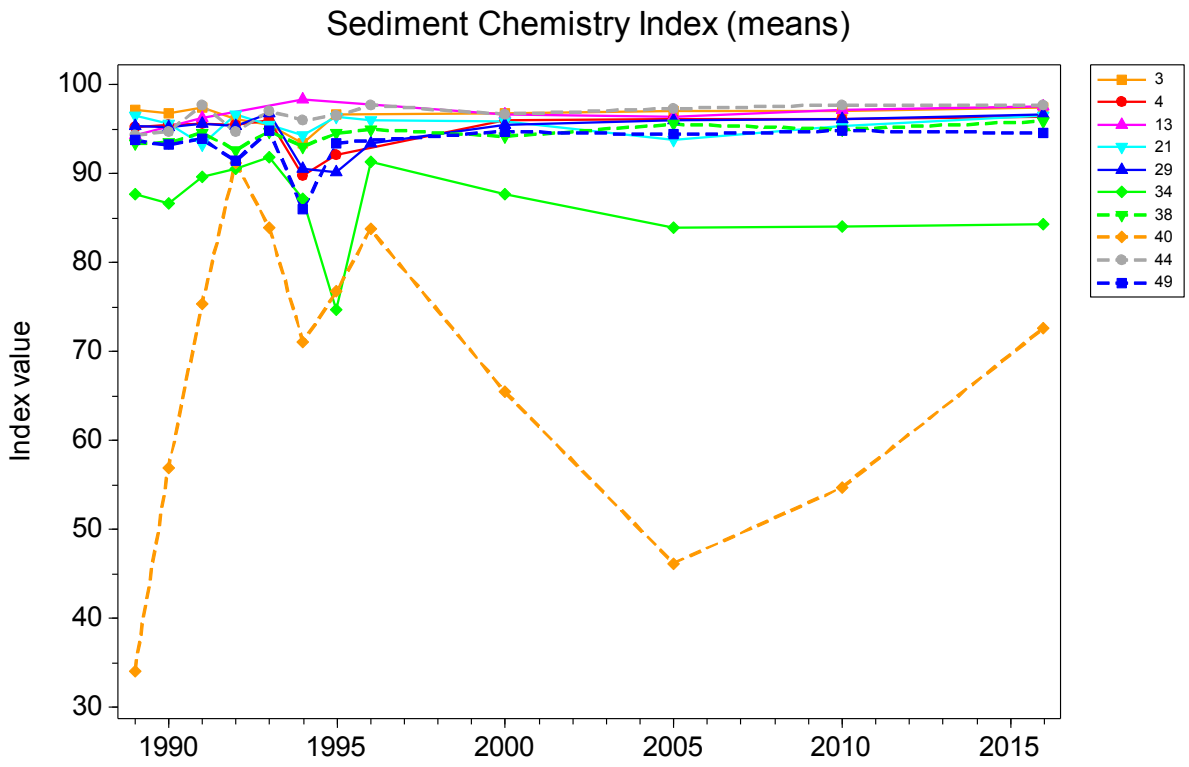
Total mercury concentrations at the Sinclair Inlet station, in comparison to the respective Sediment Quality Standards (SQS) and Cleanup Screening Levels (CSL). Field and laboratory replicates are shown as red dots, and the dashed line connects the means.



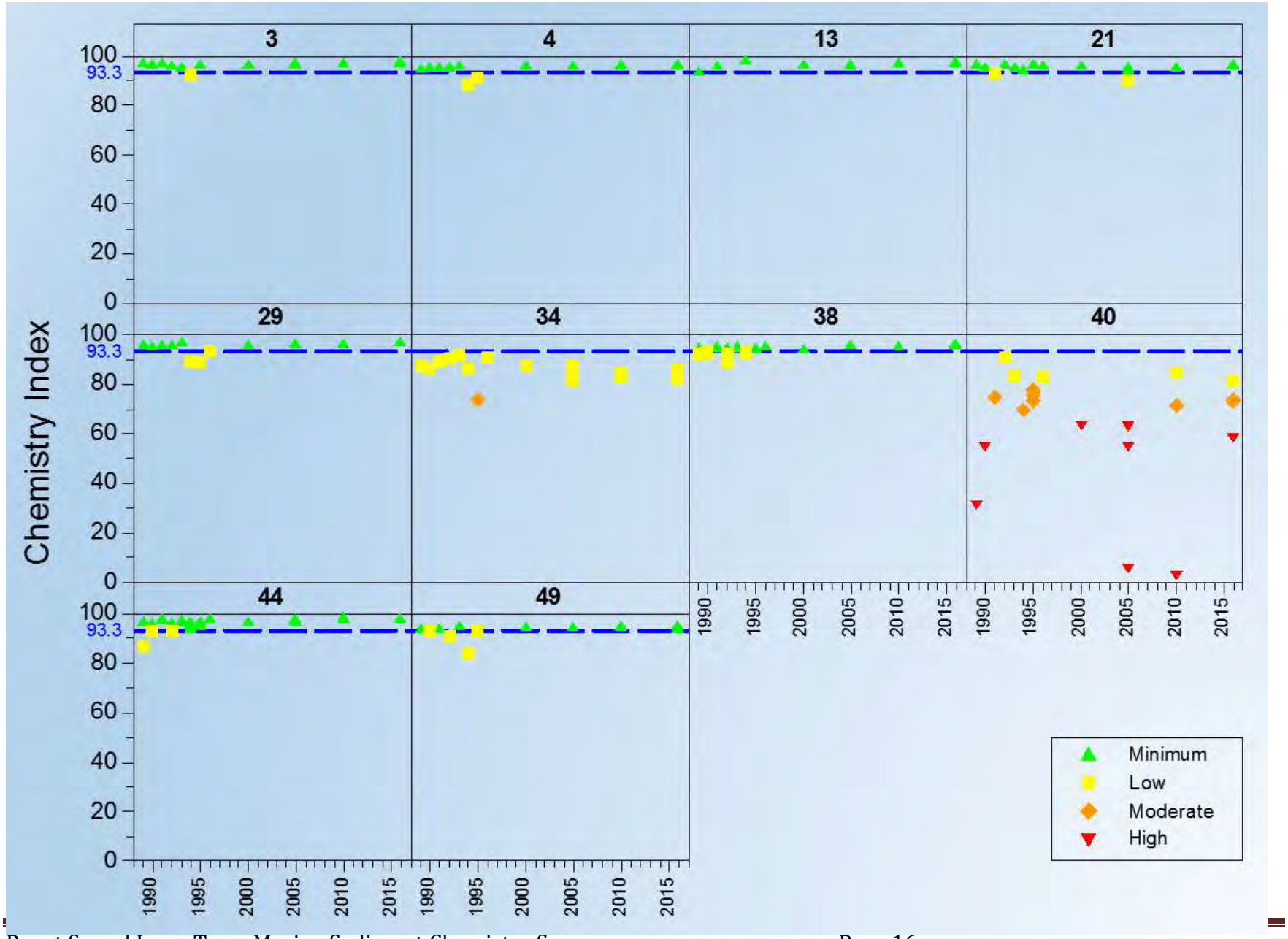
Sediment Chemistry Index

The Chemistry Index is a multi-chemical index that is used to evaluate exposure to complex mixtures of potentially toxic chemicals that may accumulate in the sediments. The index is based on the average ratio of 39 chemical concentrations to their respective SQS values. Index values are used to categorize sediments as having *minimum*, *low*, *moderate*, or *maximum* exposure to these chemicals (Long et al., 2012). The Puget Sound Partnership (PSP) adopted the Chemistry Index as one of the Vital Signs indicating the health of Puget Sound and uses the target value of 93.3, corresponding to the *minimum exposure* category.

Yearly mean Sediment Chemistry Index (Long et al., 2012), by station



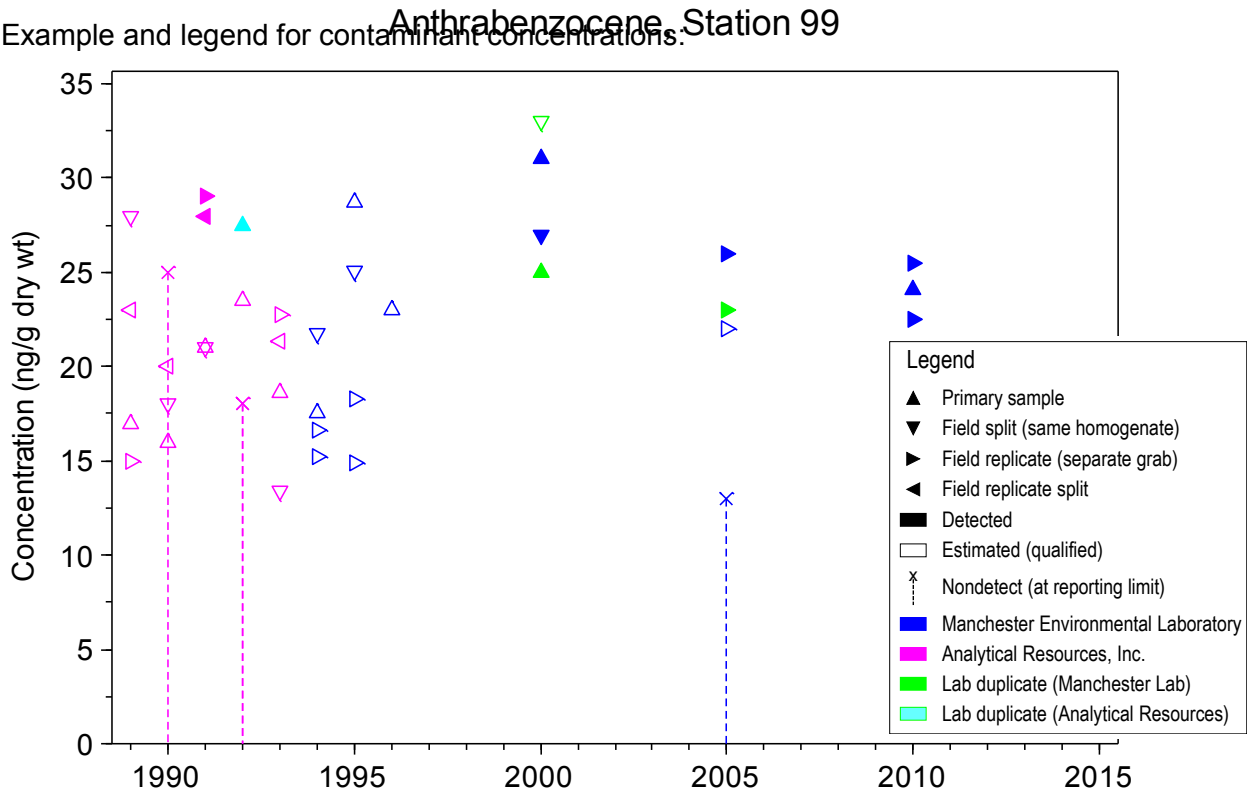
Sediment Chemistry Index at the Puget Sound Long-Term Sediment Monitoring stations, by year. Each dot represents a separate sample. Field replicates are included as separate samples. (Lab duplicates are not included.) The Puget Sound Partnership (PSP) target value of 93.3 is shown as a dashed blue line.


3
4
13
21
29
34
38
40
44
49
Chemistry Index
93.3
0
20
40
60
80
100
1990
1995
2000
2005
2010
2015
Minimum
Low
Moderate
High

Graphical Data Summaries

Contaminant concentrations in sediments collected for the Long-Term Sediment Monitoring Program, by parameter and year, separately for each station (links below). For those contaminants for which there are Washington State Sediment Management Standards (Ecology, 2013), the station summaries also include graphs of SQS quotients, i.e., ratio of contaminant concentration to SQS value[d].

Example and legend for contaminant concentrations:



Station 3, Strait of Georgia
Station 4, Bellingham Bay
Station 13, North Hood Canal
Station 21, Port Gardner
Station 29, Shilshole
Station 34, Sinclair Inlet
Station 38, Point Pully
Station 40, Thea Foss Waterway
Station 44, East Anderson Island
Station 49, Inner Budd Inlet

Each graphical summary is organized as follows:

Group	Parameter	Raw Results Page	SQS Quotient Page
Metal	Arsenic	1	23
	Cadmium	1	23
	Chromium	2	24

	Copper	2	24
	Lead	3	25
	Mercury	3	25
	Nickel	4	
	Selenium	4	
	Silver	5	26
	Zinc	5	26
Low-molecular-weight PAH	1-Methylnaphthalene	6	
	2-Methylnaphthalene	6	27
	Acenaphthene	7	27
	Acenaphthylene	7	28
	Anthracene	8	28
	Fluorene	8	29
	Naphthalene	9	29
	Phenanthrene	9	30
	Retene	10	
	Total LPAH (sum of 6 compounds)[e]	10	30
High-molecular-weight PAH	Benzo(a)anthracene	11	31
	Benzo(a)pyrene	11	31
	Benzo(g,h,i)perylene	12	32
	Total Benzofluoranthenes	12	32
	Benzo(b)fluoranthene	13	
	Benzo(k)fluoranthene	13	
	Chrysene	14	33
	Dibenzo(a,h)anthracene	14	33
	Fluoranthene	15	34
	Indeno(1,2,3-c,d)pyrene	15	34
	Perylene	16	
	Pyrene	16	35
	Total HPAH (sum of 9 compounds)[f]	17	35
Other PAH	Carbazole	18	
	Dibenzofuran	18	36
PBDE	PBDE-47	19	
	PBDE-49	19	
	PBDE-99	20	
	PBDE-209	20	
PCB	Total Aroclors	21	36
	Total PCB Congeners x 2	21	
Phthalate	Bis(2-ethylhexyl)phthalate	22	37
	Butylbenzylphthalate	22	37
Index	Mean SQS Quotient		38
	Sediment Chemistry Index		38

[d] SQS = Sediment Quality Standard (Ecology, 2013)

[e] Acenaphthene, Acenaphthylene, Anthracene, Fluorene, Naphthalene, Phenanthrene

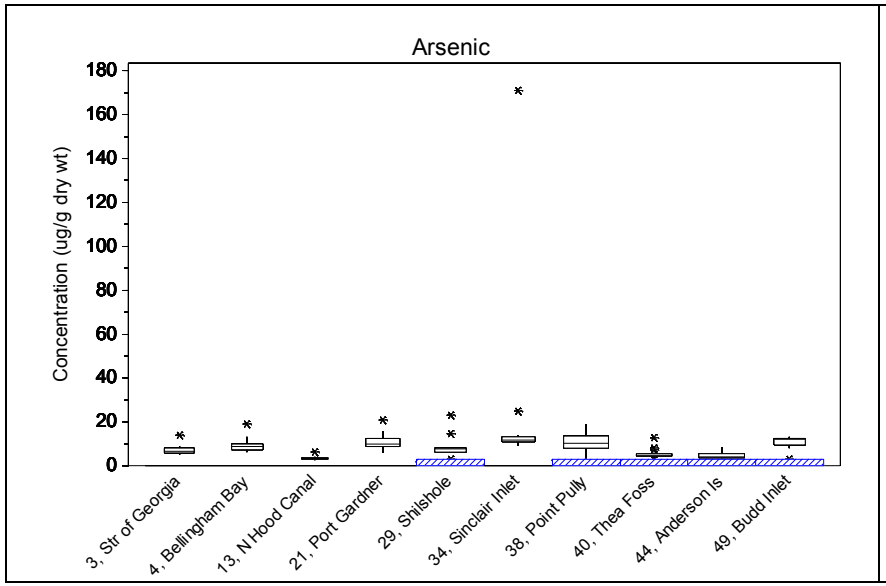
[f] Benzo(a)anthracene, Benzo(a)pyrene, Benzo(g,h,i)perylene, Total Benzofluoranthenes, Chrysene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-c,d)pyrene, Pyrene

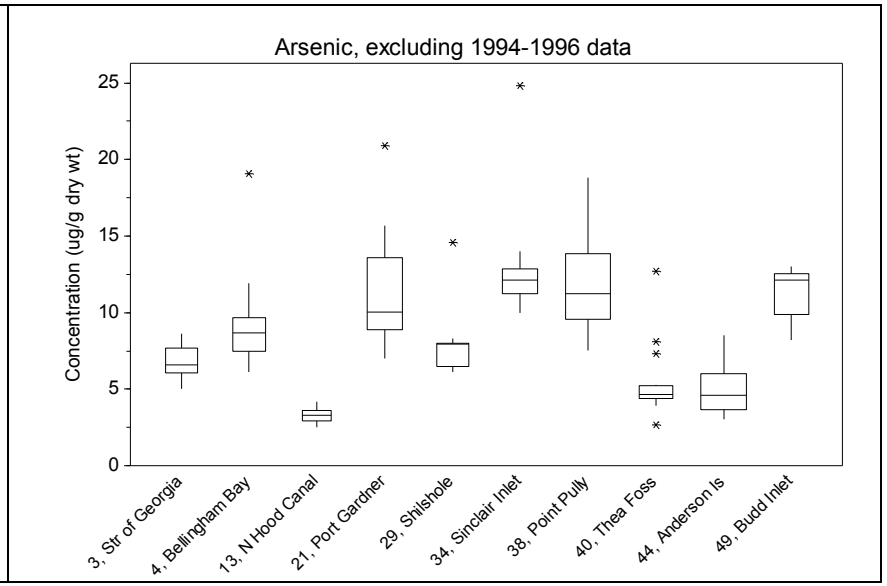
Contaminant concentrations by station

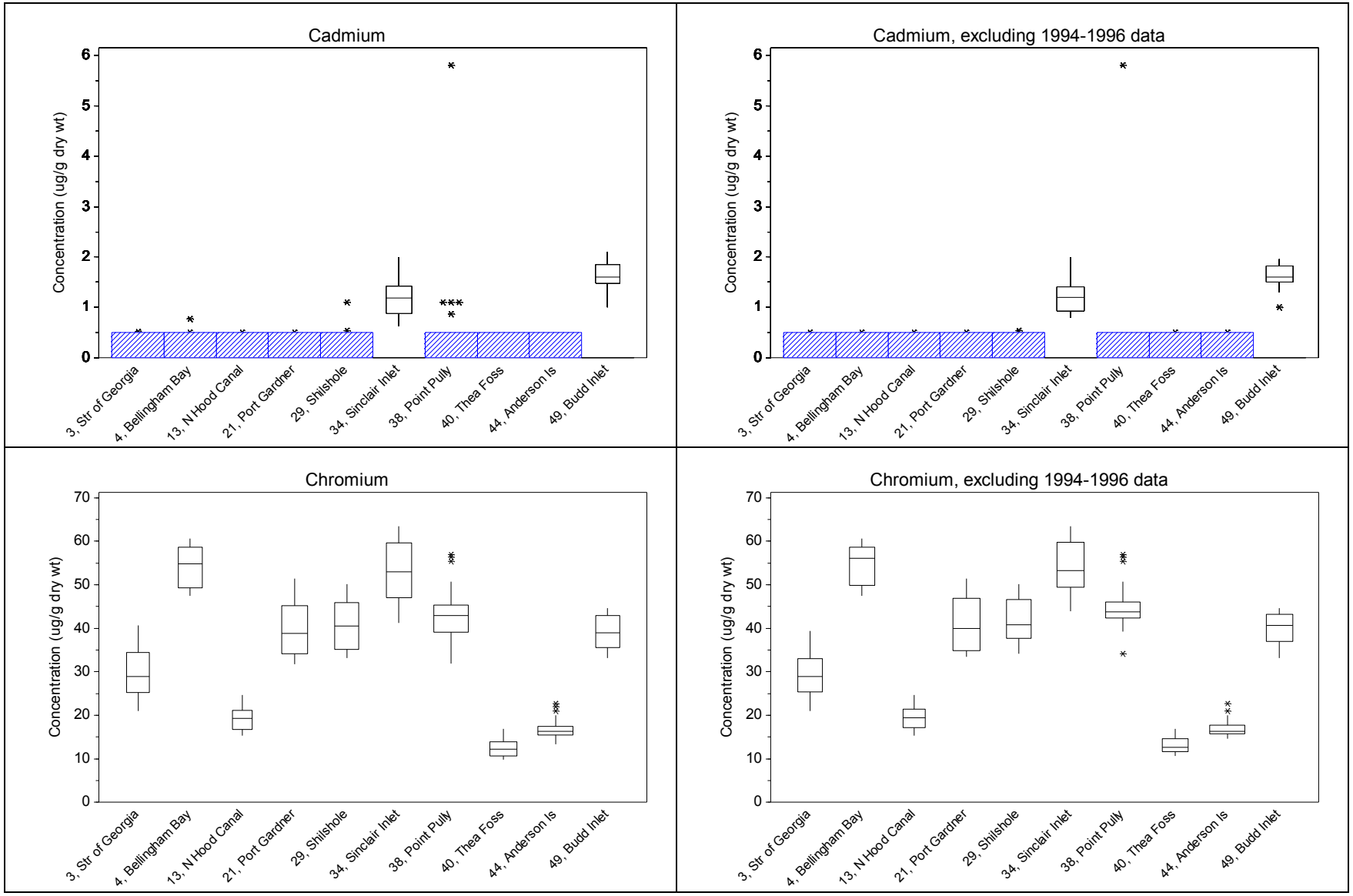
Censored boxplots, by station, over all years 1989-2016 (left) and excluding 1994-1996 (right) for metals and organic contaminants for which there are Washington State Sediment Management Standards (Ecology, 2013). Organic contaminants which were rarely detected are not shown.

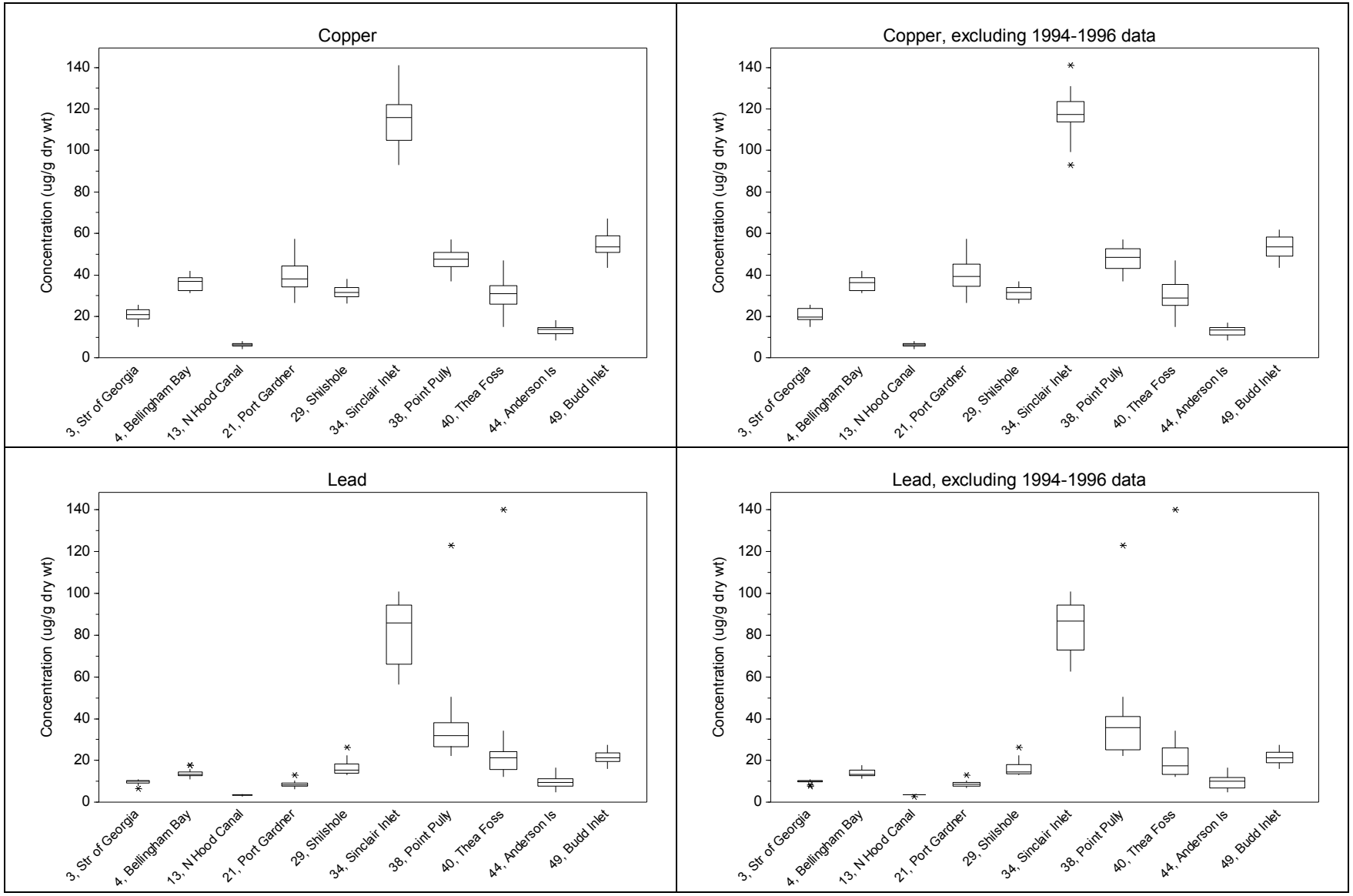
Graphs are ordered alphabetically by contaminant within metals, low-molecular-weight PAHs, high-molecular-weight PAHs, and other.

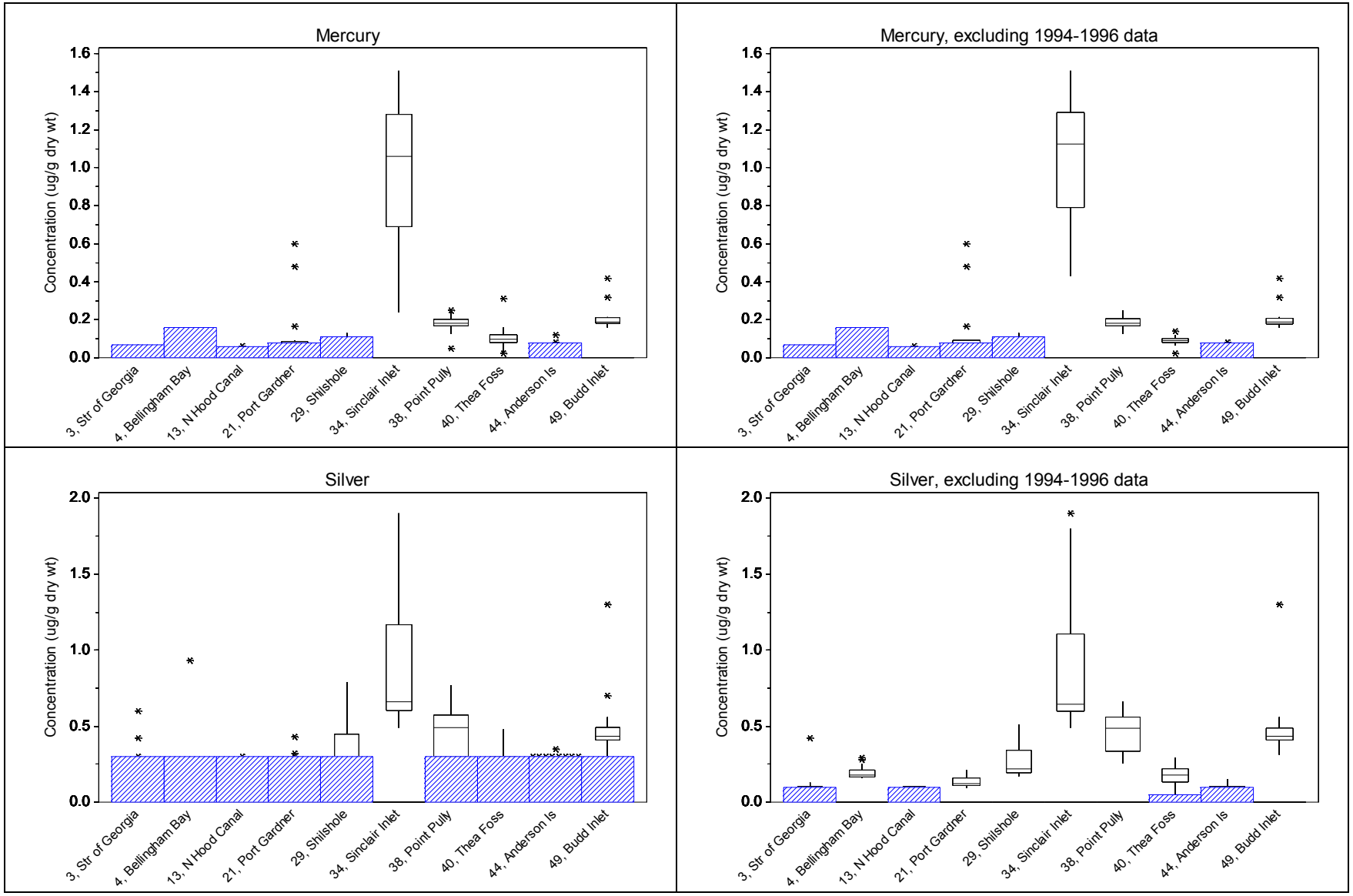
In censored boxplots, the data for a given station are censored (not shown) below the highest detection limit over the years for that station. In most cases, only nondetects are censored; however, any detected concentrations lower than that highest detection limit also are not seen. For a number of the PAHs, the detection limits in 1994-1996 were 5-20 times higher than in other years, hence the inclusion here of a 2nd set of censored boxplots without the 1994-1996 data (detect or nondetect). The boxplots of the detected contaminant results were largely the same with and without the 1994-1996 data, with the exception of arsenic -- at the Sinclair Inlet station in 1995, there was an anomalously high arsenic measurement.

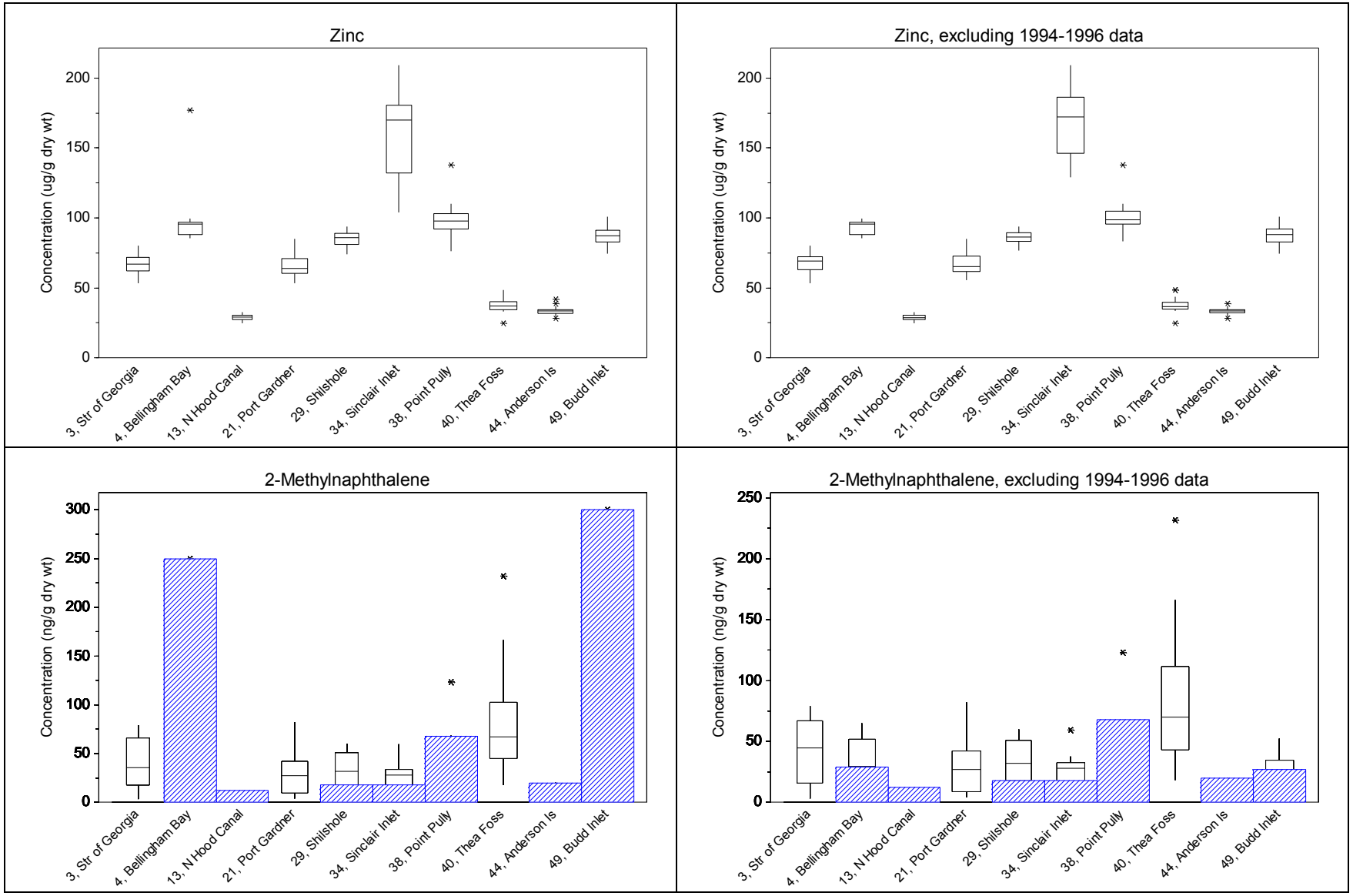


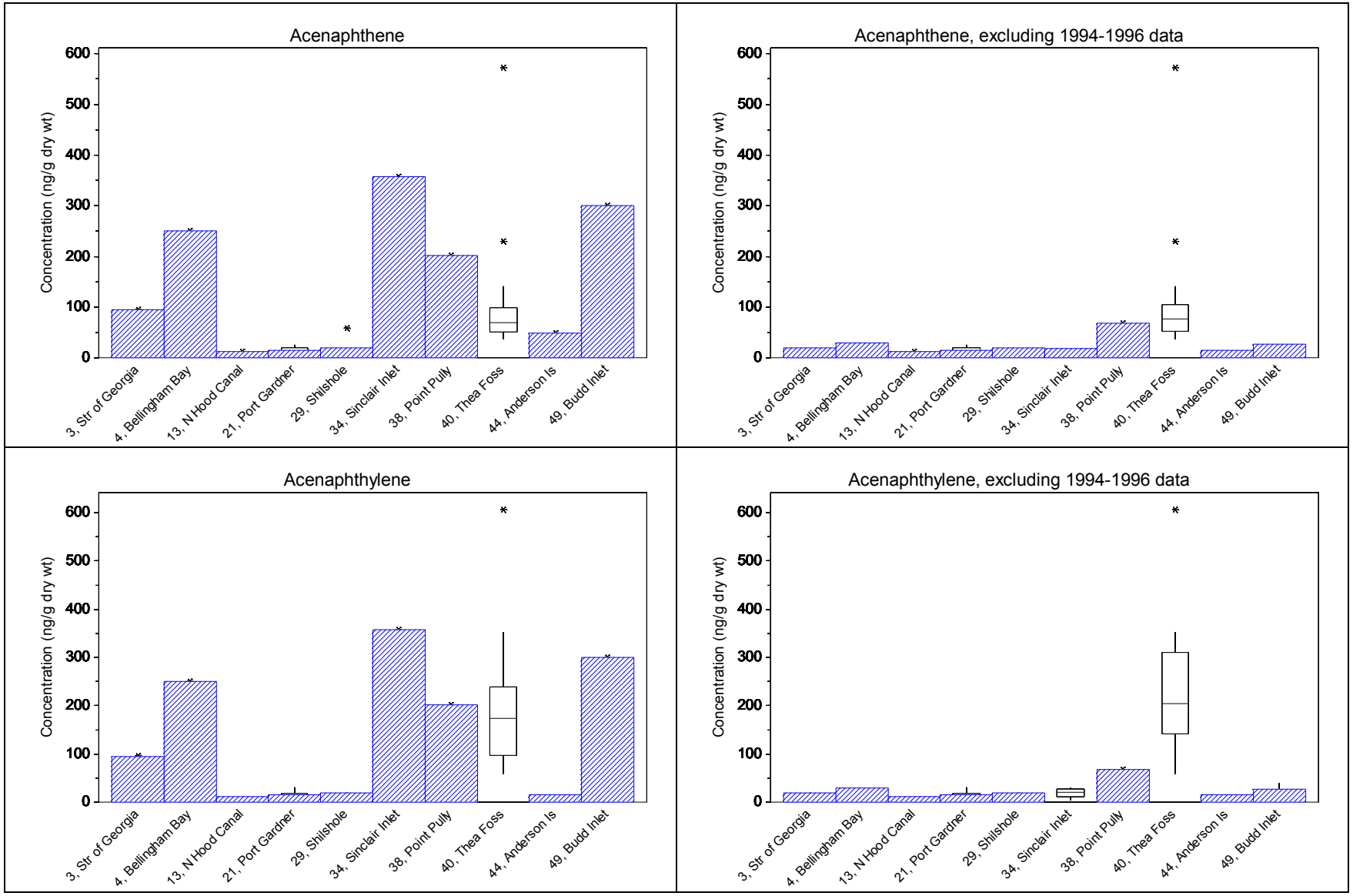


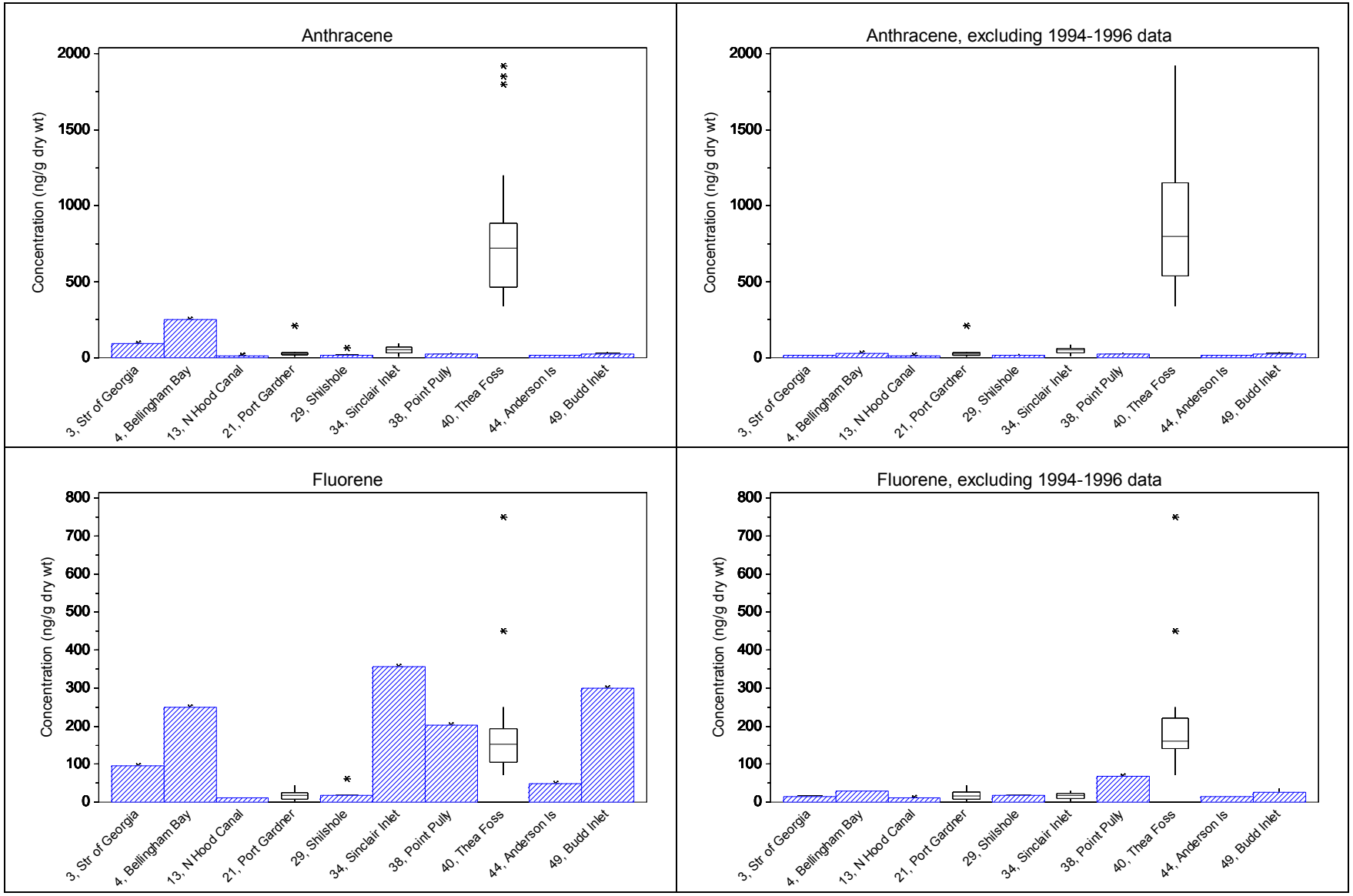

Cadmium
Concentration (ug/g dry wt)
0
1
2
3
4
5
6
3, Str of Georgia
4, Bellingham Bay
13, N Hood Canal
21, Port Gardner
29, Shilshole
34, Sinclair Inlet
38, Point Pully
40, Thea Foss
44, Anderson Is
49, Budd Inlet
Cadmium, excluding 1994-1996 data
Concentration (ug/g dry wt)
0
1
2
3
4
5
6
3, Str of Georgia
4, Bellingham Bay
13, N Hood Canal
21, Port Gardner
29, Shilshole
34, Sinclair Inlet
38, Point Pully
40, Thea Foss
44, Anderson Is
49, Budd Inlet
Chromium
Concentration (ug/g dry wt)
0
10
20
30
40
50
60
70
3, Str of Georgia
4, Bellingham Bay
13, N Hood Canal
21, Port Gardner
29, Shilshole
34, Sinclair Inlet
38, Point Pully
40, Thea Foss
44, Anderson Is
49, Budd Inlet
Chromium, excluding 1994-1996 data
Concentration (ug/g dry wt)
0
10
20
30
40
50
60
70
3, Str of Georgia
4, Bellingham Bay
13, N Hood Canal
21, Port Gardner
29, Shilshole
34, Sinclair Inlet
38, Point Pully
40, Thea Foss
44, Anderson Is
49, Budd Inlet

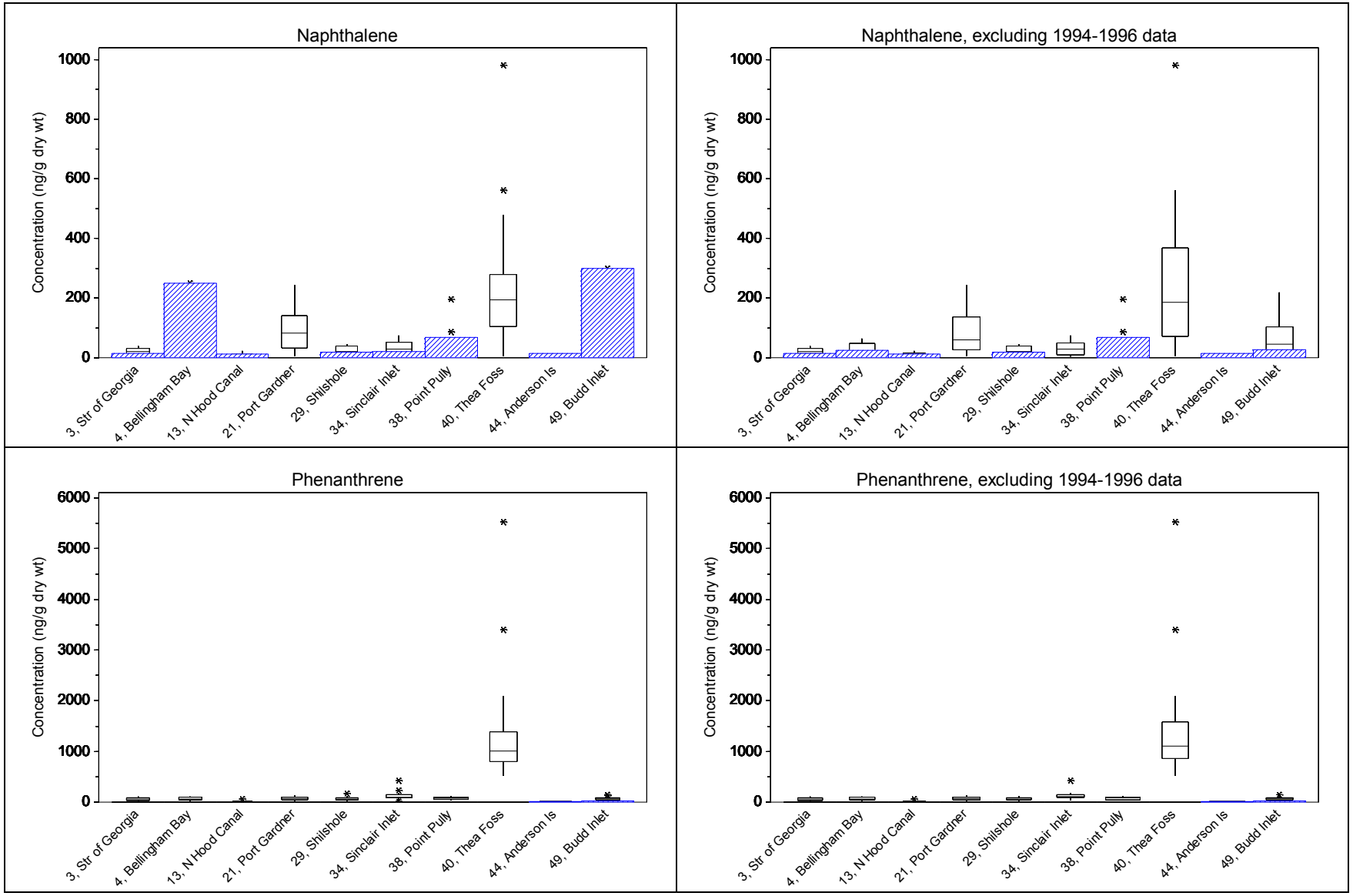

Copper
Concentration (ug/g dry wt)
0
20
40
60
80
100
120
140
3, Str of Georgia
4, Bellingham Bay
13, N Hood Canal
21, Port Gardner
29, Shilshole
34, Sinclair Inlet
38, Point Pully
40, Thea Foss
44, Anderson Is
49, Budd Inlet
Copper, excluding 1994-1996 data
Concentration (ug/g dry wt)
0
20
40
60
80
100
120
140
3, Str of Georgia
4, Bellingham Bay
13, N Hood Canal
21, Port Gardner
29, Shilshole
34, Sinclair Inlet
38, Point Pully
40, Thea Foss
44, Anderson Is
49, Budd Inlet
Lead
Concentration (ug/g dry wt)
0
20
40
60
80
100
120
140
3, Str of Georgia
4, Bellingham Bay
13, N Hood Canal
21, Port Gardner
29, Shilshole
34, Sinclair Inlet
38, Point Pully
40, Thea Foss
44, Anderson Is
49, Budd Inlet
Lead, excluding 1994-1996 data
Concentration (ug/g dry wt)
0
20
40
60
80
100
120
140
3, Str of Georgia
4, Bellingham Bay
13, N Hood Canal
21, Port Gardner
29, Shilshole
34, Sinclair Inlet
38, Point Pully
40, Thea Foss
44, Anderson Is
49, Budd Inlet

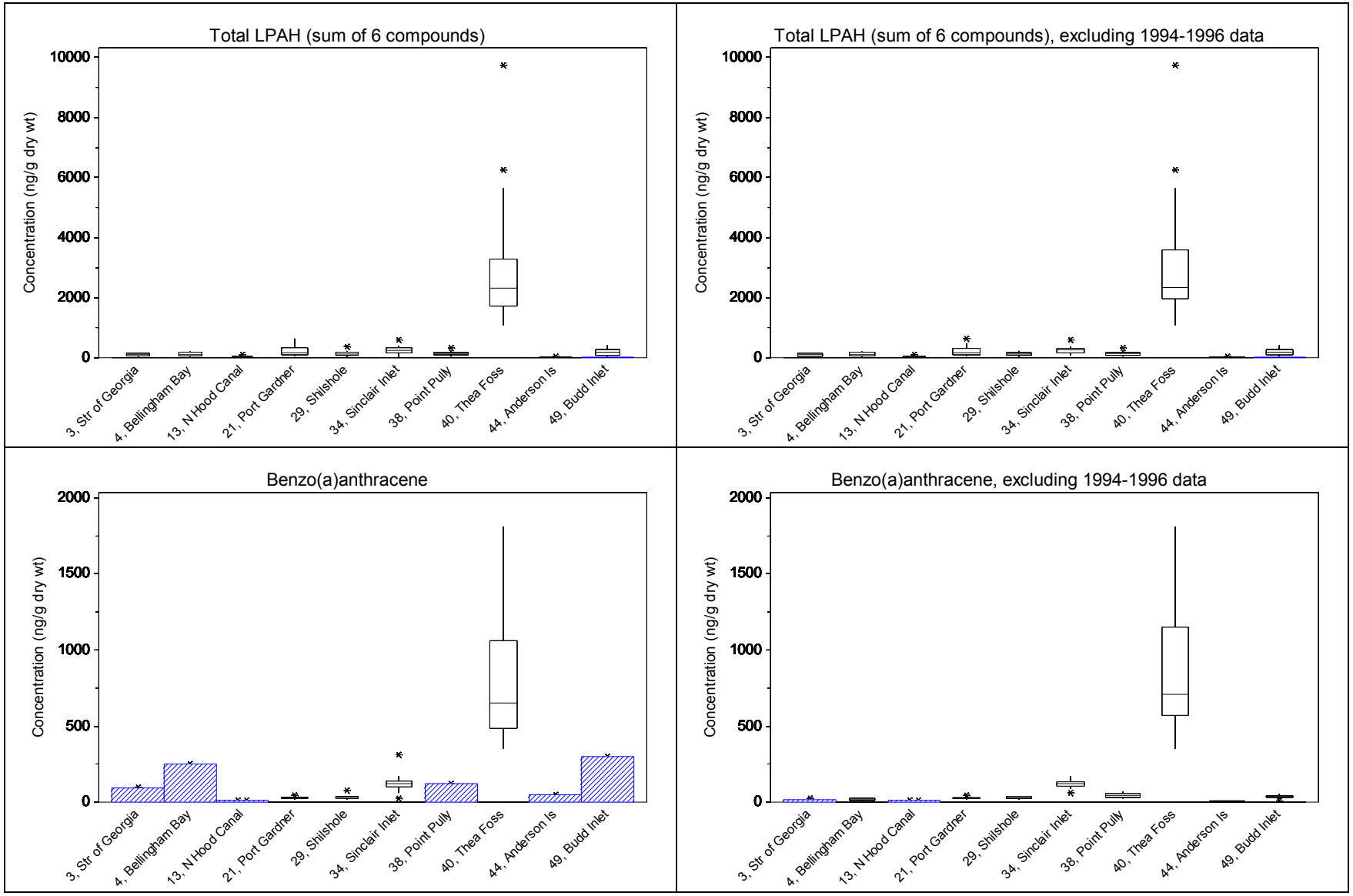

Mercury
Concentration (ug/g dry wt)
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
3, Str of Georgia
4, Bellingham Bay
13, N Hood Canal
21, Port Gardner
29, Shilshole
34, Sinclair Inlet
38, Point Pully
40, Thea Foss
44, Anderson Is
49, Budd Inlet
Mercury, excluding 1994-1996 data
Concentration (ug/g dry wt)
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
3, Str of Georgia
4, Bellingham Bay
13, N Hood Canal
21, Port Gardner
29, Shilshole
34, Sinclair Inlet
38, Point Pully
40, Thea Foss
44, Anderson Is
49, Budd Inlet
Silver
Concentration (ug/g dry wt)
2.0
1.5
1.0
0.5
0.0
3, Str of Georgia
4, Bellingham Bay
13, N Hood Canal
21, Port Gardner
29, Shilshole
34, Sinclair Inlet
38, Point Pully
40, Thea Foss
44, Anderson Is
49, Budd Inlet
Silver, excluding 1994-1996 data
Concentration (ug/g dry wt)
2.0
1.5
1.0
0.5
0.0
3, Str of Georgia
4, Bellingham Bay
13, N Hood Canal
21, Port Gardner
29, Shilshole
34, Sinclair Inlet
38, Point Pully
40, Thea Foss
44, Anderson Is
49, Budd Inlet

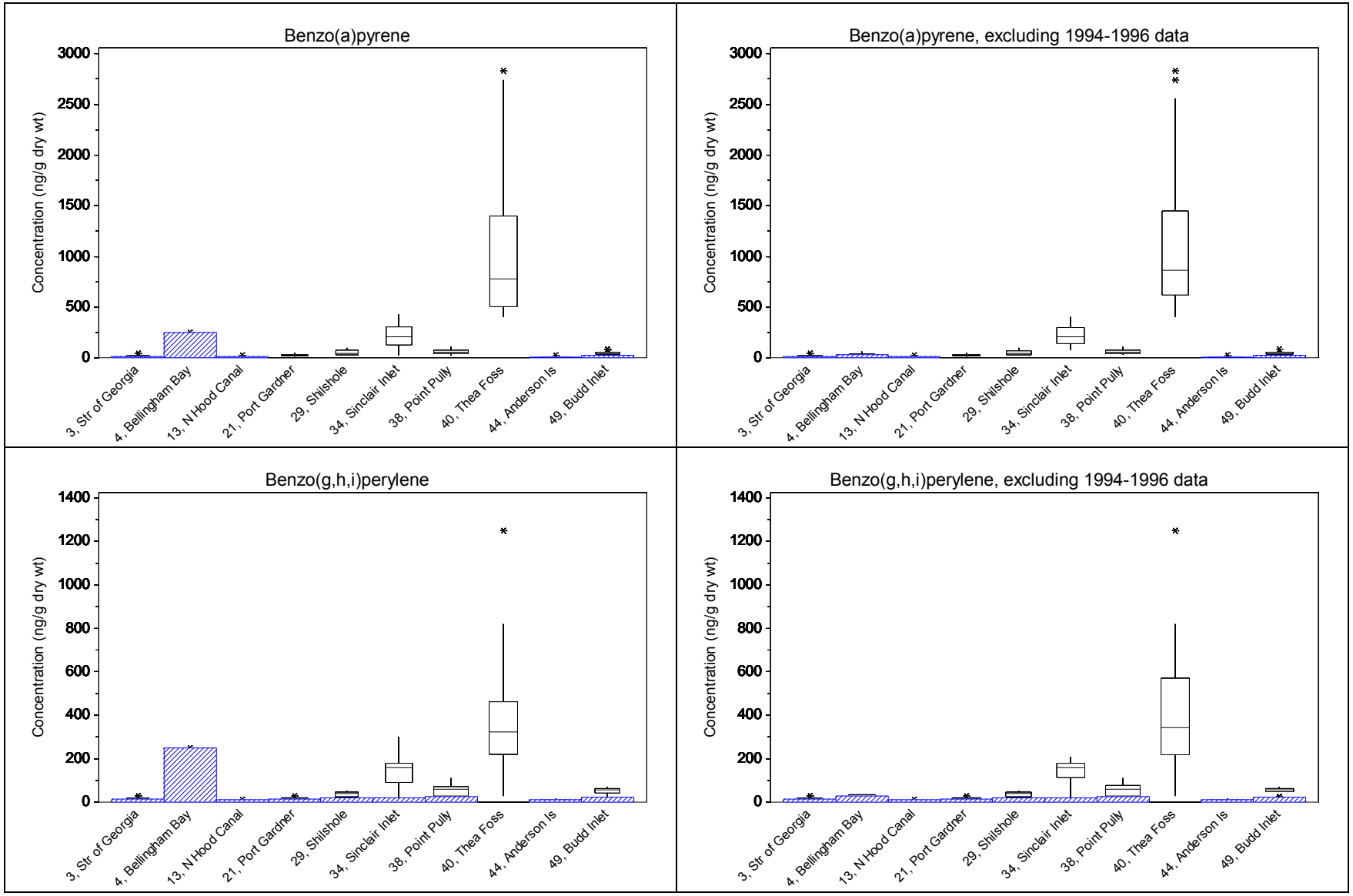

Zinc
Concentration (ug/g dry wt)
0
50
100
150
200
3, Str of Georgia
4, Bellingham Bay
13, N Hood Canal
21, Port Gardner
29, Shilshole
34, Sinclair Inlet
38, Point Pully
40, Thea Foss
44, Anderson Is
49, Budd Inlet
Zinc, excluding 1994-1996 data
Concentration (ug/g dry wt)
0
50
100
150
200
3, Str of Georgia
4, Bellingham Bay
13, N Hood Canal
21, Port Gardner
29, Shilshole
34, Sinclair Inlet
38, Point Pully
40, Thea Foss
44, Anderson Is
49, Budd Inlet
2-Methylnaphthalene
Concentration (ng/g dry wt)
0
50
100
150
200
250
300
3, Str of Georgia
4, Bellingham Bay
13, N Hood Canal
21, Port Gardner
29, Shilshole
34, Sinclair Inlet
38, Point Pully
40, Thea Foss
44, Anderson Is
49, Budd Inlet
2-Methylnaphthalene, excluding 1994-1996 data
Concentration (ng/g dry wt)
0
50
100
150
200
250
3, Str of Georgia
4, Bellingham Bay
13, N Hood Canal
21, Port Gardner
29, Shilshole
34, Sinclair Inlet
38, Point Pully
40, Thea Foss
44, Anderson Is
49, Budd Inlet

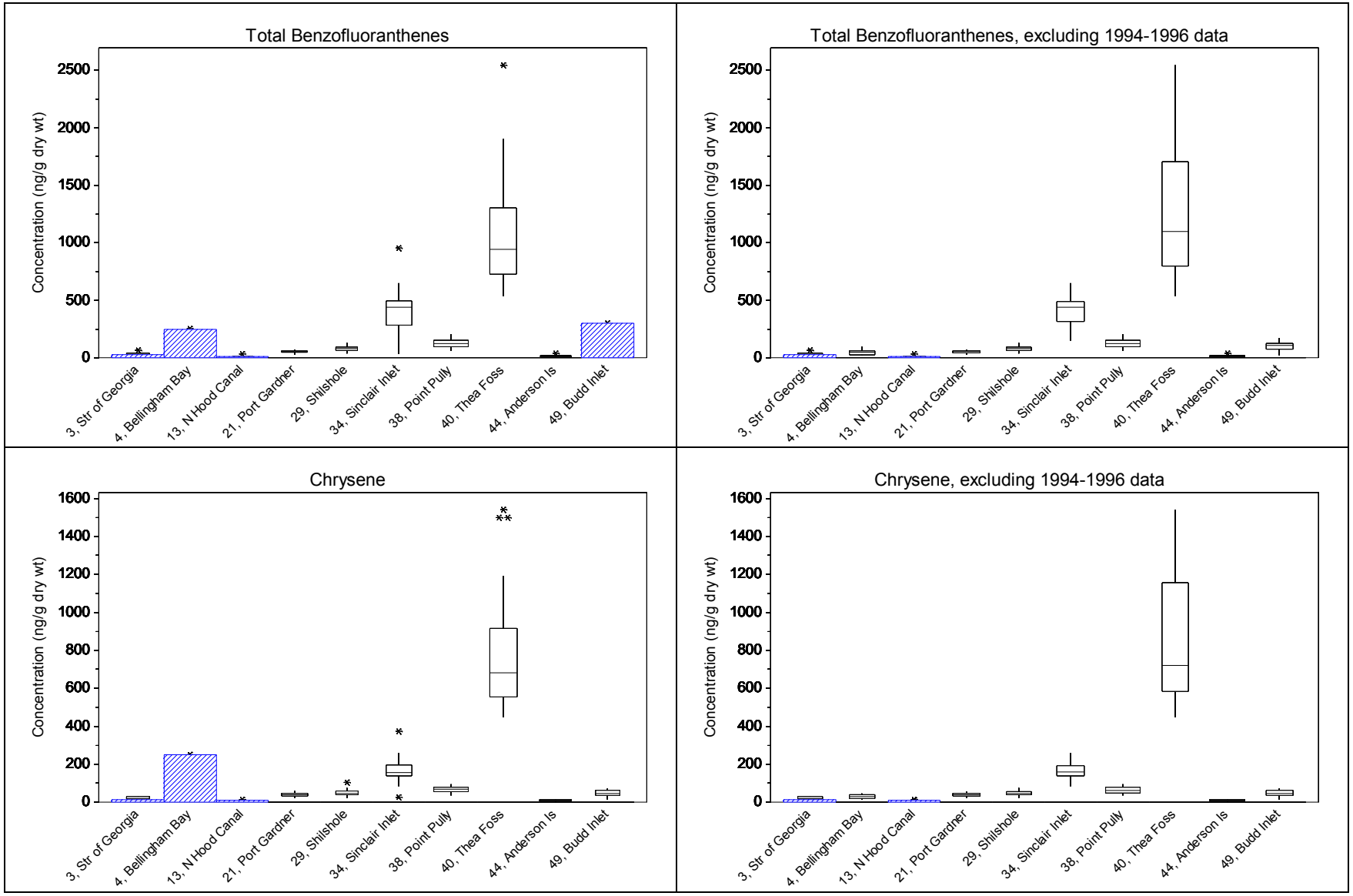

Acenaphthene
Concentration (ng/g dry wt)
0
100
200
300
400
500
600
3, Str of Georgia
4, Bellingham Bay
13, N Hood Canal
21, Port Gardner
29, Shilshole
34, Sinclair Inlet
38, Point Pully
40, Thea Foss
44, Anderson Is
49, Budd Inlet
Acenaphthene, excluding 1994-1996 data
Concentration (ng/g dry wt)
0
100
200
300
400
500
600
3, Str of Georgia
4, Bellingham Bay
13, N Hood Canal
21, Port Gardner
29, Shilshole
34, Sinclair Inlet
38, Point Pully
40, Thea Foss
44, Anderson Is
49, Budd Inlet
Acenaphthylene
Concentration (ng/g dry wt)
0
100
200
300
400
500
600
3, Str of Georgia
4, Bellingham Bay
13, N Hood Canal
21, Port Gardner
29, Shilshole
34, Sinclair Inlet
38, Point Pully
40, Thea Foss
44, Anderson Is
49, Budd Inlet
Acenaphthylene, excluding 1994-1996 data
Concentration (ng/g dry wt)
0
100
200
300
400
500
600
3, Str of Georgia
4, Bellingham Bay
13, N Hood Canal
21, Port Gardner
29, Shilshole
34, Sinclair Inlet
38, Point Pully
40, Thea Foss
44, Anderson Is
49, Budd Inlet

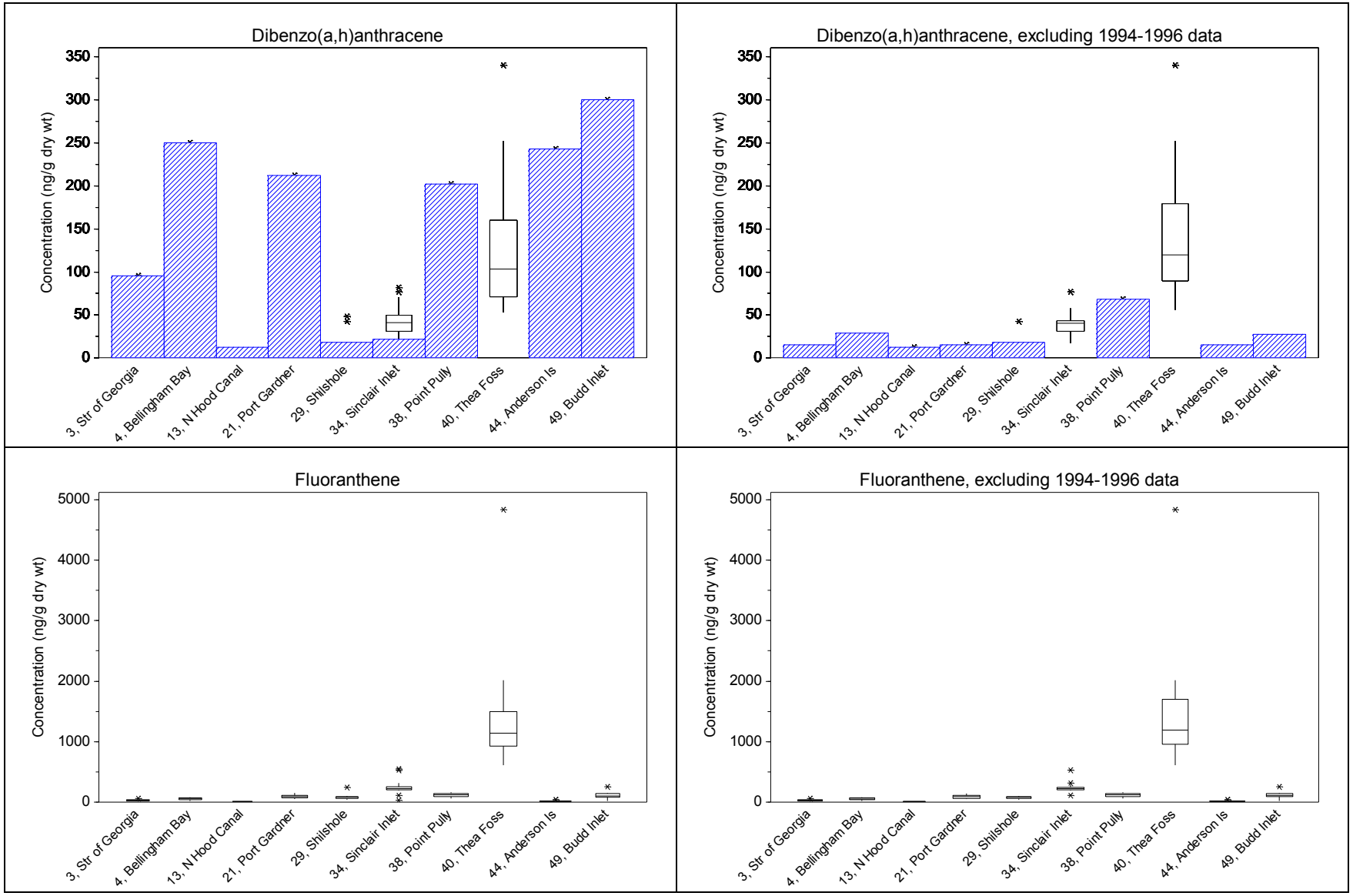

Anthracene
Concentration (ng/g dry wt)
2000
1500
1000
500
0
3, Str of Georgia
4, Bellingham Bay
13, N Hood Canal
21, Port Gardner
29, Shilshole
34, Sinclair Inlet
38, Point Pully
40, Thea Foss
44, Anderson Is
49, Budd Inlet
Anthracene, excluding 1994-1996 data
Concentration (ng/g dry wt)
2000
1500
1000
500
0
3, Str of Georgia
4, Bellingham Bay
13, N Hood Canal
21, Port Gardner
29, Shilshole
34, Sinclair Inlet
38, Point Pully
40, Thea Foss
44, Anderson Is
49, Budd Inlet
Fluorene
Concentration (ng/g dry wt)
800
700
600
500
400
300
200
100
0
3, Str of Georgia
4, Bellingham Bay
13, N Hood Canal
21, Port Gardner
29, Shilshole
34, Sinclair Inlet
38, Point Pully
40, Thea Foss
44, Anderson Is
49, Budd Inlet
Fluorene, excluding 1994-1996 data
Concentration (ng/g dry wt)
800
700
600
500
400
300
200
100
0
3, Str of Georgia
4, Bellingham Bay
13, N Hood Canal
21, Port Gardner
29, Shilshole
34, Sinclair Inlet
38, Point Pully
40, Thea Foss
44, Anderson Is
49, Budd Inlet

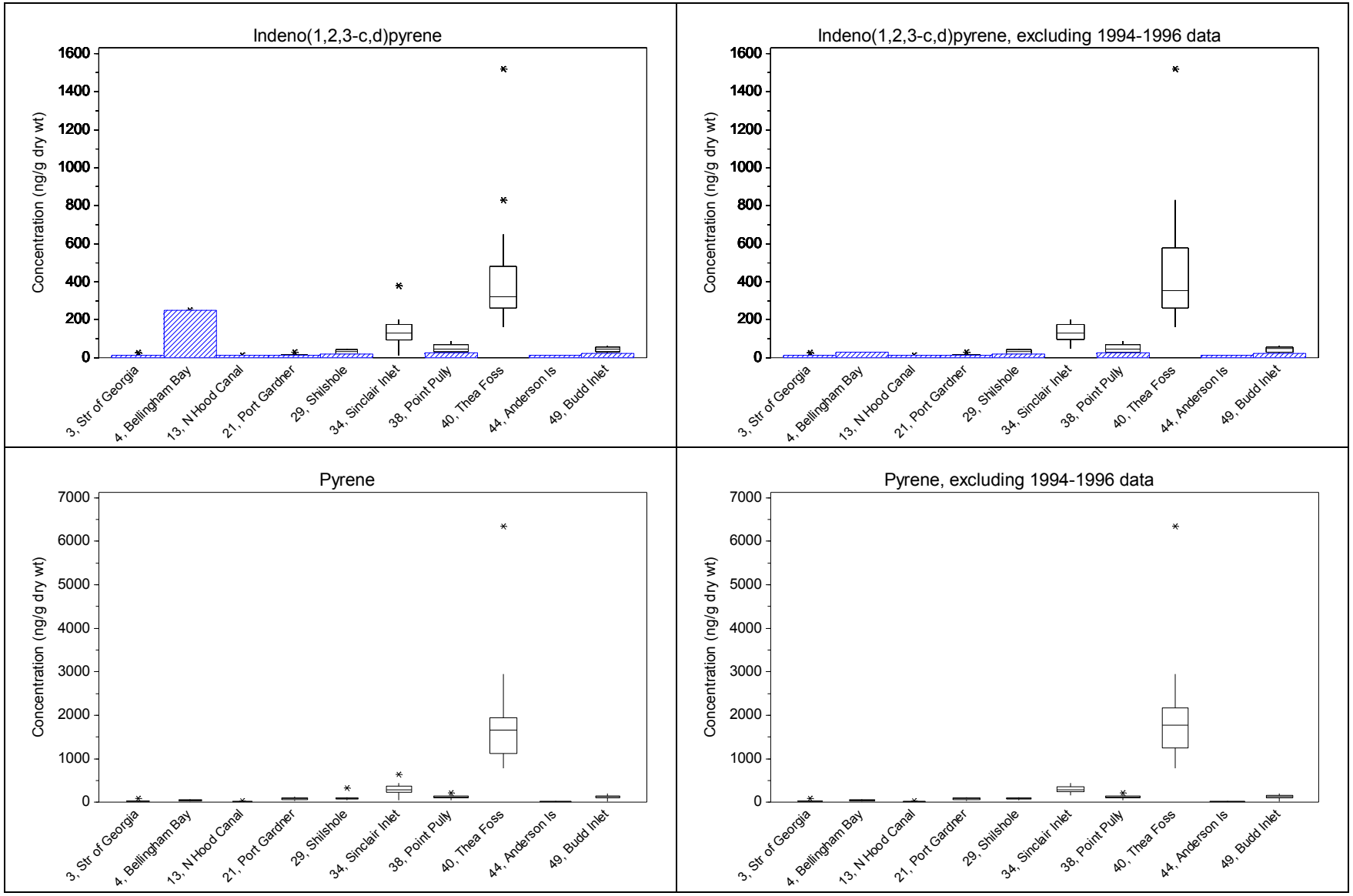

Naphthalene
Concentration (ng/g dry wt)
0
200
400
600
800
1000
3, Str of Georgia
4, Bellingham Bay
13, N Hood Canal
21, Port Gardner
29, Shilshole
34, Sinclair Inlet
38, Point Pully
40, Thea Foss
44, Anderson Is
49, Budd Inlet
Naphthalene, excluding 1994-1996 data
Concentration (ng/g dry wt)
0
200
400
600
800
1000
3, Str of Georgia
4, Bellingham Bay
13, N Hood Canal
21, Port Gardner
29, Shilshole
34, Sinclair Inlet
38, Point Pully
40, Thea Foss
44, Anderson Is
49, Budd Inlet
Phenanthrene
Concentration (ng/g dry wt)
0
1000
2000
3000
4000
5000
6000
3, Str of Georgia
4, Bellingham Bay
13, N Hood Canal
21, Port Gardner
29, Shilshole
34, Sinclair Inlet
38, Point Pully
40, Thea Foss
44, Anderson Is
49, Budd Inlet
Phenanthrene, excluding 1994-1996 data
Concentration (ng/g dry wt)
0
1000
2000
3000
4000
5000
6000
3, Str of Georgia
4, Bellingham Bay
13, N Hood Canal
21, Port Gardner
29, Shilshole
34, Sinclair Inlet
38, Point Pully
40, Thea Foss
44, Anderson Is
49, Budd Inlet

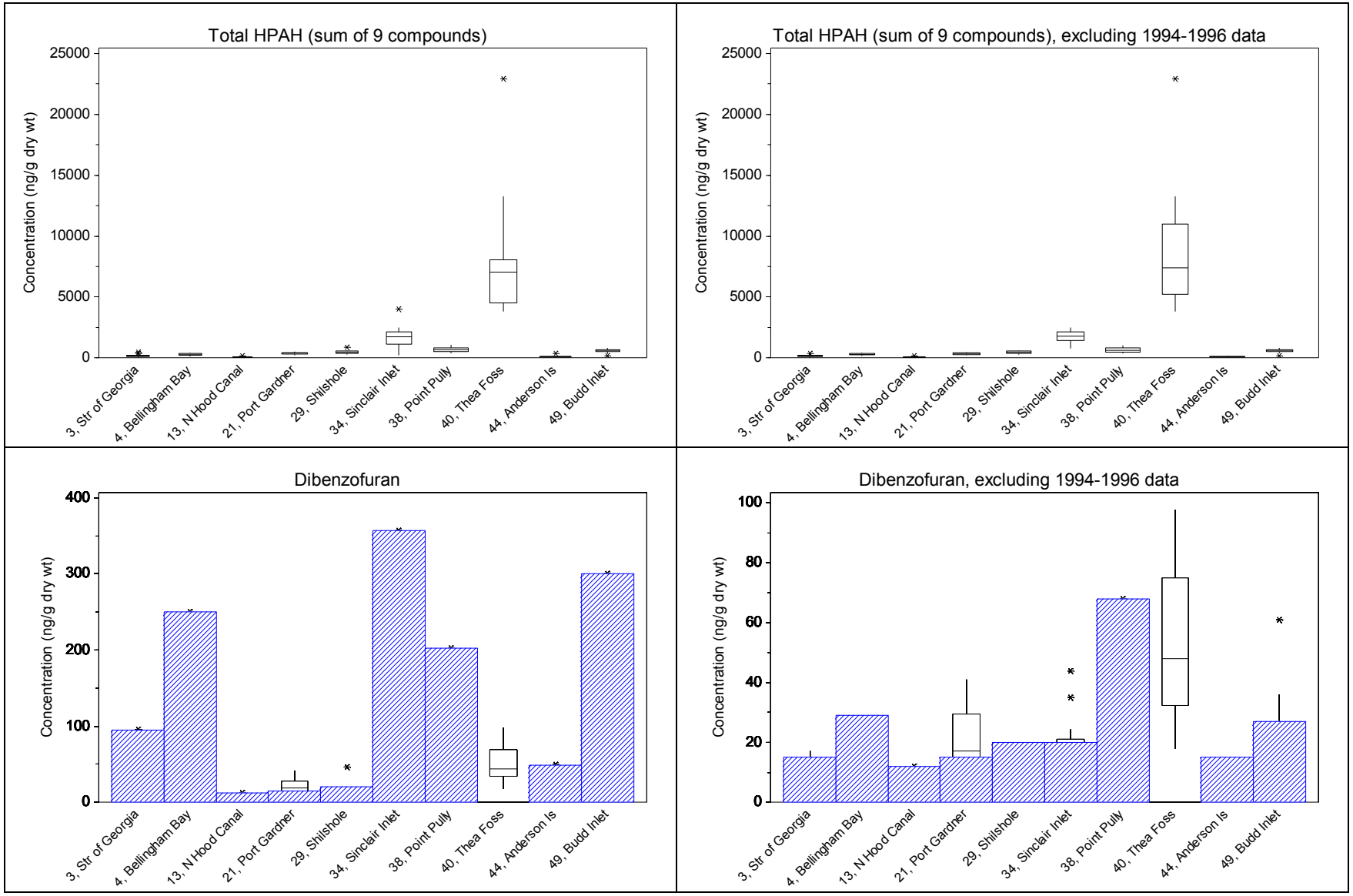

Total LPAH (sum of 6 compounds)
Concentration (ng/g dry wt)
10000
8000
6000
4000
2000
0
3, Str of Georgia
4, Bellingham Bay
13, N Hood Canal
21, Port Gardner
29, Shilshole
34, Sinclair Inlet
38, Point Pully
40, Thea Foss
44, Anderson Is
49, Budd Inlet
Total LPAH (sum of 6 compounds), excluding 1994-1996 data
Concentration (ng/g dry wt)
10000
8000
6000
4000
2000
0
3, Str of Georgia
4, Bellingham Bay
13, N Hood Canal
21, Port Gardner
29, Shilshole
34, Sinclair Inlet
38, Point Pully
40, Thea Foss
44, Anderson Is
49, Budd Inlet
Benzo(a)anthracene
Concentration (ng/g dry wt)
2000
1500
1000
500
0
3, Str of Georgia
4, Bellingham Bay
13, N Hood Canal
21, Port Gardner
29, Shilshole
34, Sinclair Inlet
38, Point Pully
40, Thea Foss
44, Anderson Is
49, Budd Inlet
Benzo(a)anthracene, excluding 1994-1996 data
Concentration (ng/g dry wt)
2000
1500
1000
500
0
3, Str of Georgia
4, Bellingham Bay
13, N Hood Canal
21, Port Gardner
29, Shilshole
34, Sinclair Inlet
38, Point Pully
40, Thea Foss
44, Anderson Is
49, Budd Inlet

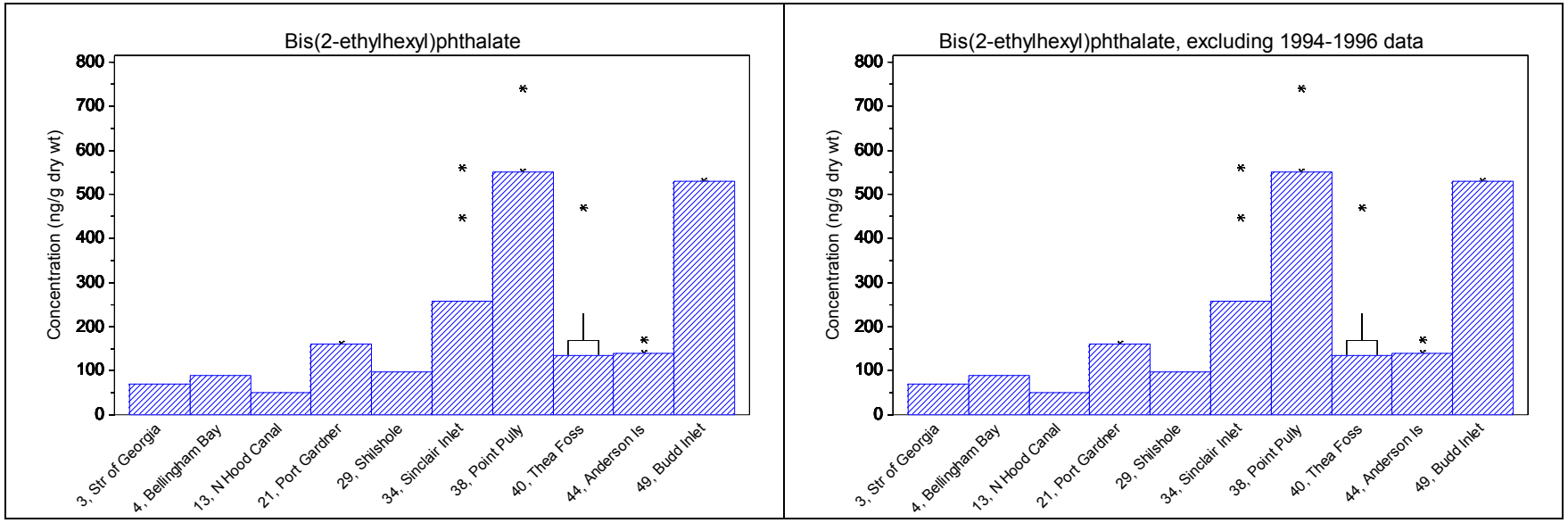

Benzo(a)pyrene
Concentration (ng/g dry wt)
3000
2500
2000
1500
1000
500
0
3, Str of Georgia
4, Bellingham Bay
13, N Hood Canal
21, Port Gardner
29, Shilshole
34, Sinclair Inlet
38, Point Pully
40, Thea Foss
44, Anderson Is
49, Budd Inlet
Benzo(a)pyrene, excluding 1994-1996 data
Concentration (ng/g dry wt)
3000
2500
2000
1500
1000
500
0
3, Str of Georgia
4, Bellingham Bay
13, N Hood Canal
21, Port Gardner
29, Shilshole
34, Sinclair Inlet
38, Point Pully
40, Thea Foss
44, Anderson Is
49, Budd Inlet
Benzo(g,h,i)perylene
Concentration (ng/g dry wt)
1400
1200
1000
800
600
400
200
0
3, Str of Georgia
4, Bellingham Bay
13, N Hood Canal
21, Port Gardner
29, Shilshole
34, Sinclair Inlet
38, Point Pully
40, Thea Foss
44, Anderson Is
49, Budd Inlet
Benzo(g,h,i)perylene, excluding 1994-1996 data
Concentration (ng/g dry wt)
1400
1200
1000
800
600
400
200
0
3, Str of Georgia
4, Bellingham Bay
13, N Hood Canal
21, Port Gardner
29, Shilshole
34, Sinclair Inlet
38, Point Pully
40, Thea Foss
44, Anderson Is
49, Budd Inlet


Total Benzofluoranthenes
Concentration (ng/g dry wt)
0
500
1000
1500
2000
2500
3, Str of Georgia
4, Bellingham Bay
13, N Hood Canal
21, Port Gardner
29, Shilshole
34, Sinclair Inlet
38, Point Pully
40, Thea Foss
44, Anderson Is
49, Budd Inlet
Total Benzofluoranthenes, excluding 1994-1996 data
Concentration (ng/g dry wt)
0
500
1000
1500
2000
2500
3, Str of Georgia
4, Bellingham Bay
13, N Hood Canal
21, Port Gardner
29, Shilshole
34, Sinclair Inlet
38, Point Pully
40, Thea Foss
44, Anderson Is
49, Budd Inlet
Chrysene
Concentration (ng/g dry wt)
0
200
400
600
800
1000
1200
1400
1600
3, Str of Georgia
4, Bellingham Bay
13, N Hood Canal
21, Port Gardner
29, Shilshole
34, Sinclair Inlet
38, Point Pully
40, Thea Foss
44, Anderson Is
49, Budd Inlet
Chrysene, excluding 1994-1996 data
Concentration (ng/g dry wt)
0
200
400
600
800
1000
1200
1400
1600
3, Str of Georgia
4, Bellingham Bay
13, N Hood Canal
21, Port Gardner
29, Shilshole
34, Sinclair Inlet
38, Point Pully
40, Thea Foss
44, Anderson Is
49, Budd Inlet


Dibenzo(a,h)anthracene
Concentration (ng/g dry wt)
0
50
100
150
200
250
300
350
3, Str of Georgia
4, Bellingham Bay
13, N Hood Canal
21, Port Gardner
29, Shilshole
34, Sinclair Inlet
38, Point Pully
40, Thea Foss
44, Anderson Is
49, Budd Inlet
Dibenzo(a,h)anthracene, excluding 1994-1996 data
Concentration (ng/g dry wt)
0
50
100
150
200
250
300
350
3, Str of Georgia
4, Bellingham Bay
13, N Hood Canal
21, Port Gardner
29, Shilshole
34, Sinclair Inlet
38, Point Pully
40, Thea Foss
44, Anderson Is
49, Budd Inlet
Fluoranthene
Concentration (ng/g dry wt)
0
1000
2000
3000
4000
5000
3, Str of Georgia
4, Bellingham Bay
13, N Hood Canal
21, Port Gardner
29, Shilshole
34, Sinclair Inlet
38, Point Pully
40, Thea Foss
44, Anderson Is
49, Budd Inlet
Fluoranthene, excluding 1994-1996 data
Concentration (ng/g dry wt)
0
1000
2000
3000
4000
5000
3, Str of Georgia
4, Bellingham Bay
13, N Hood Canal
21, Port Gardner
29, Shilshole
34, Sinclair Inlet
38, Point Pully
40, Thea Foss
44, Anderson Is
49, Budd Inlet


Indeno(1,2,3-c,d)pyrene
Concentration (ng/g dry wt)
0
200
400
600
800
1000
1200
1400
1600
3, Str of Georgia
4, Bellingham Bay
13, N Hood Canal
21, Port Gardner
29, Shilshole
34, Sinclair Inlet
38, Point Pully
40, Thea Foss
44, Anderson Is
49, Budd Inlet
Indeno(1,2,3-c,d)pyrene, excluding 1994-1996 data
Concentration (ng/g dry wt)
0
200
400
600
800
1000
1200
1400
1600
3, Str of Georgia
4, Bellingham Bay
13, N Hood Canal
21, Port Gardner
29, Shilshole
34, Sinclair Inlet
38, Point Pully
40, Thea Foss
44, Anderson Is
49, Budd Inlet
Pyrene
Concentration (ng/g dry wt)
0
1000
2000
3000
4000
5000
6000
7000
3, Str of Georgia
4, Bellingham Bay
13, N Hood Canal
21, Port Gardner
29, Shilshole
34, Sinclair Inlet
38, Point Pully
40, Thea Foss
44, Anderson Is
49, Budd Inlet
Pyrene, excluding 1994-1996 data
Concentration (ng/g dry wt)
0
1000
2000
3000
4000
5000
6000
7000
3, Str of Georgia
4, Bellingham Bay
13, N Hood Canal
21, Port Gardner
29, Shilshole
34, Sinclair Inlet
38, Point Pully
40, Thea Foss
44, Anderson Is
49, Budd Inlet

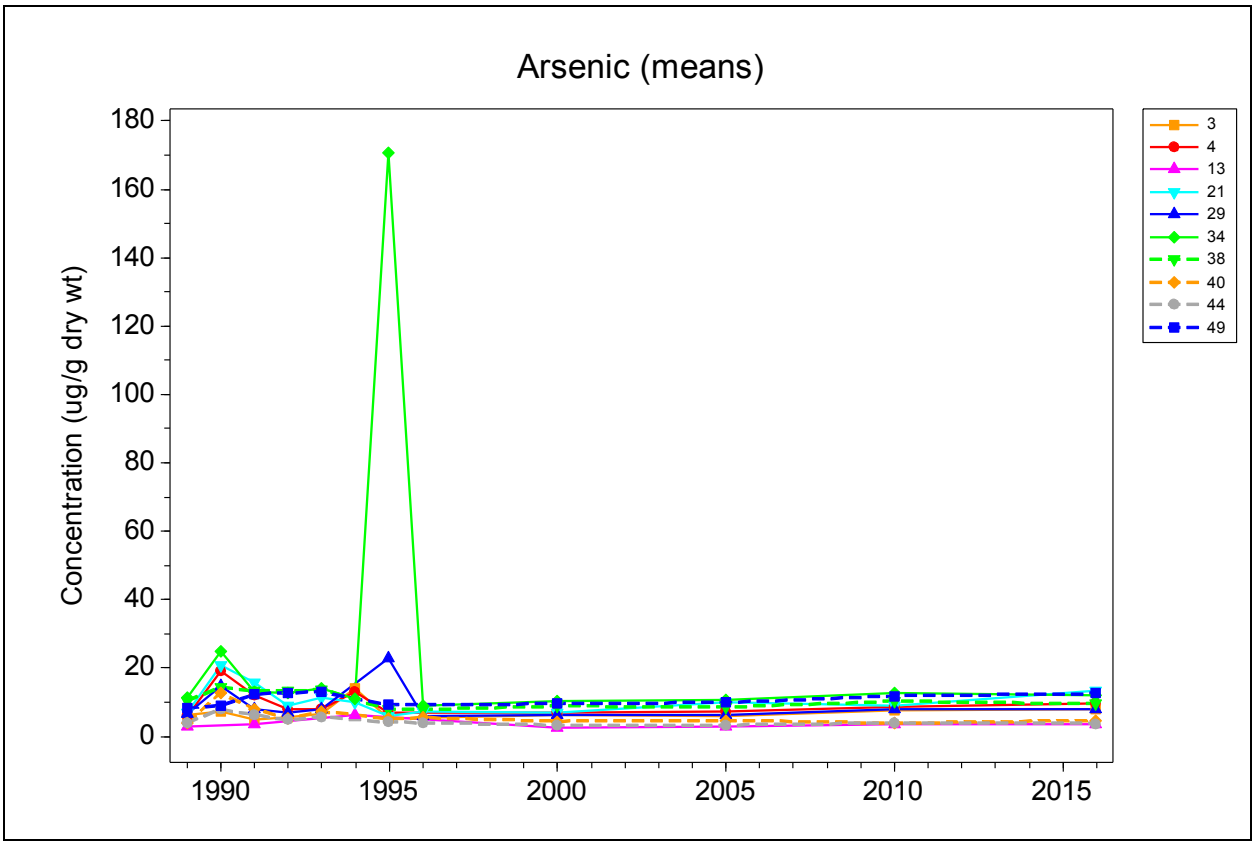

Total HPAH (sum of 9 compounds)
Concentration (ng/g dry wt)
25000
20000
15000
10000
5000
0
3, Str of Georgia
4, Bellingham Bay
13, N Hood Canal
21, Port Gardner
29, Shilshole
34, Sinclair Inlet
38, Point Pully
40, Thea Foss
44, Anderson Is
49, Budd Inlet
Total HPAH (sum of 9 compounds), excluding 1994-1996 data
Concentration (ng/g dry wt)
25000
20000
15000
10000
5000
0
3, Str of Georgia
4, Bellingham Bay
13, N Hood Canal
21, Port Gardner
29, Shilshole
34, Sinclair Inlet
38, Point Pully
40, Thea Foss
44, Anderson Is
49, Budd Inlet
Dibenzofuran
Concentration (ng/g dry wt)
400
300
200
100
0
3, Str of Georgia
4, Bellingham Bay
13, N Hood Canal
21, Port Gardner
29, Shilshole
34, Sinclair Inlet
38, Point Pully
40, Thea Foss
44, Anderson Is
49, Budd Inlet
Dibenzofuran, excluding 1994-1996 data
Concentration (ng/g dry wt)
100
80
60
40
20
0
3, Str of Georgia
4, Bellingham Bay
13, N Hood Canal
21, Port Gardner
29, Shilshole
34, Sinclair Inlet
38, Point Pully
40, Thea Foss
44, Anderson Is
49, Budd Inlet

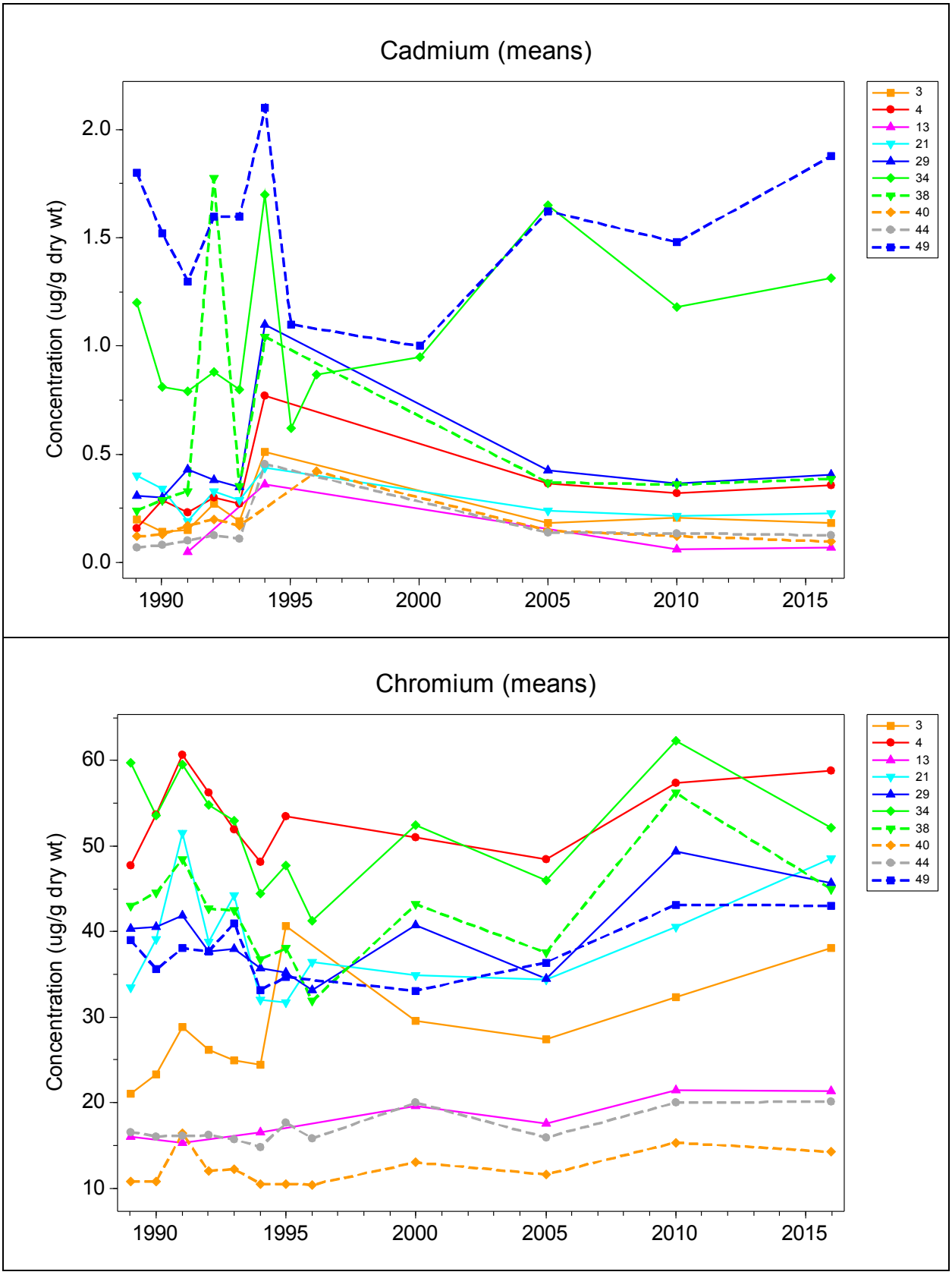

Bis(2-ethylhexyl)phthalate
Concentration (ng/g dry wt)
0
100
200
300
400
500
600
700
800
3, Str of Georgia
4, Bellingham Bay
13, N Hood Canal
21, Port Gardner
29, Shilshole
34, Sinclair Inlet
38, Point Pully
40, Thea Foss
44, Anderson Is
49, Budd Inlet
Bis(2-ethylhexyl)phthalate, excluding 1994-1996 data
Concentration (ng/g dry wt)
0
100
200
300
400
500
600
700
800
3, Str of Georgia
4, Bellingham Bay
13, N Hood Canal
21, Port Gardner
29, Shilshole
34, Sinclair Inlet
38, Point Pully
40, Thea Foss
44, Anderson Is
49, Budd Inlet

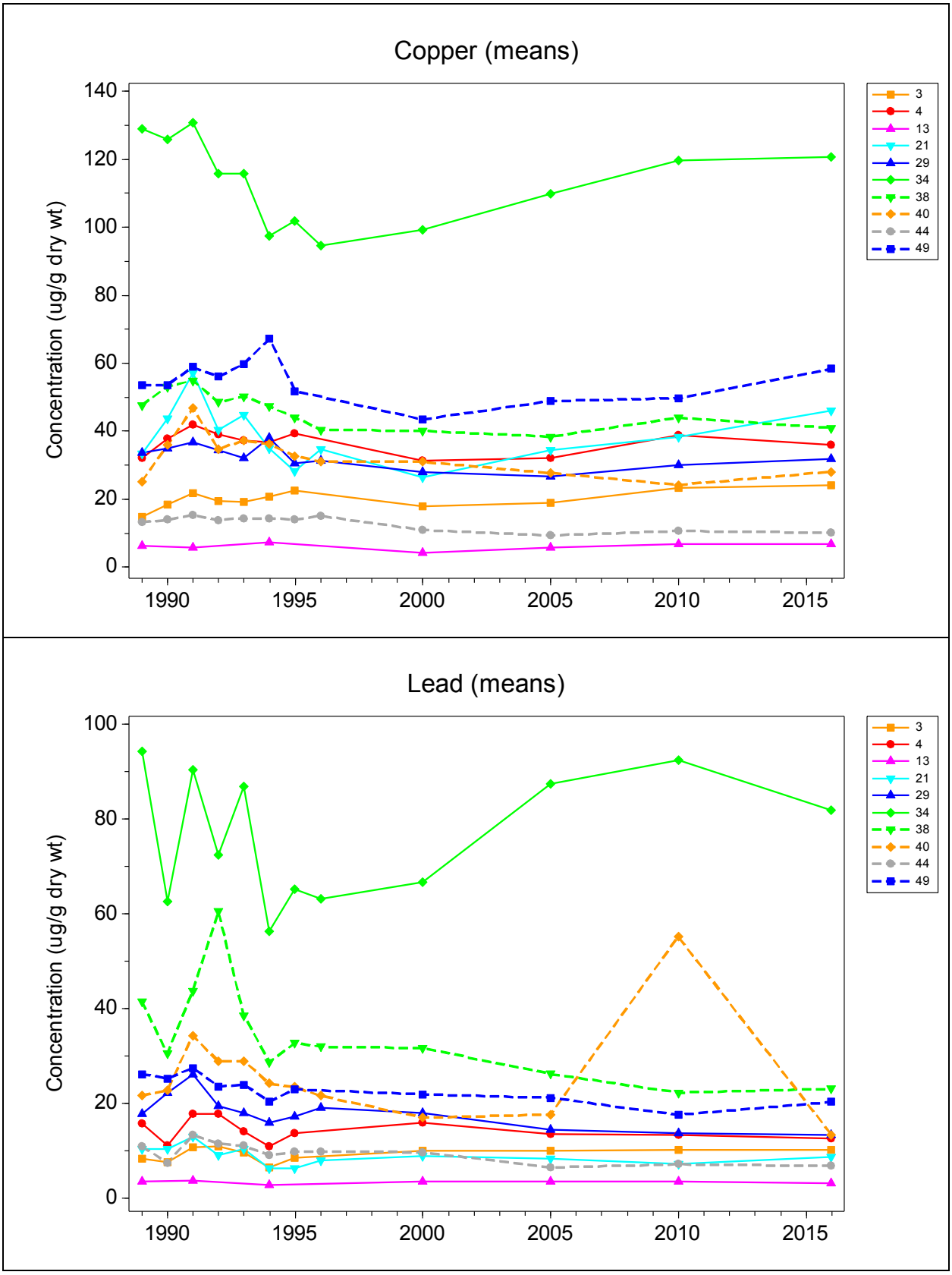
Contaminant concentrations over time

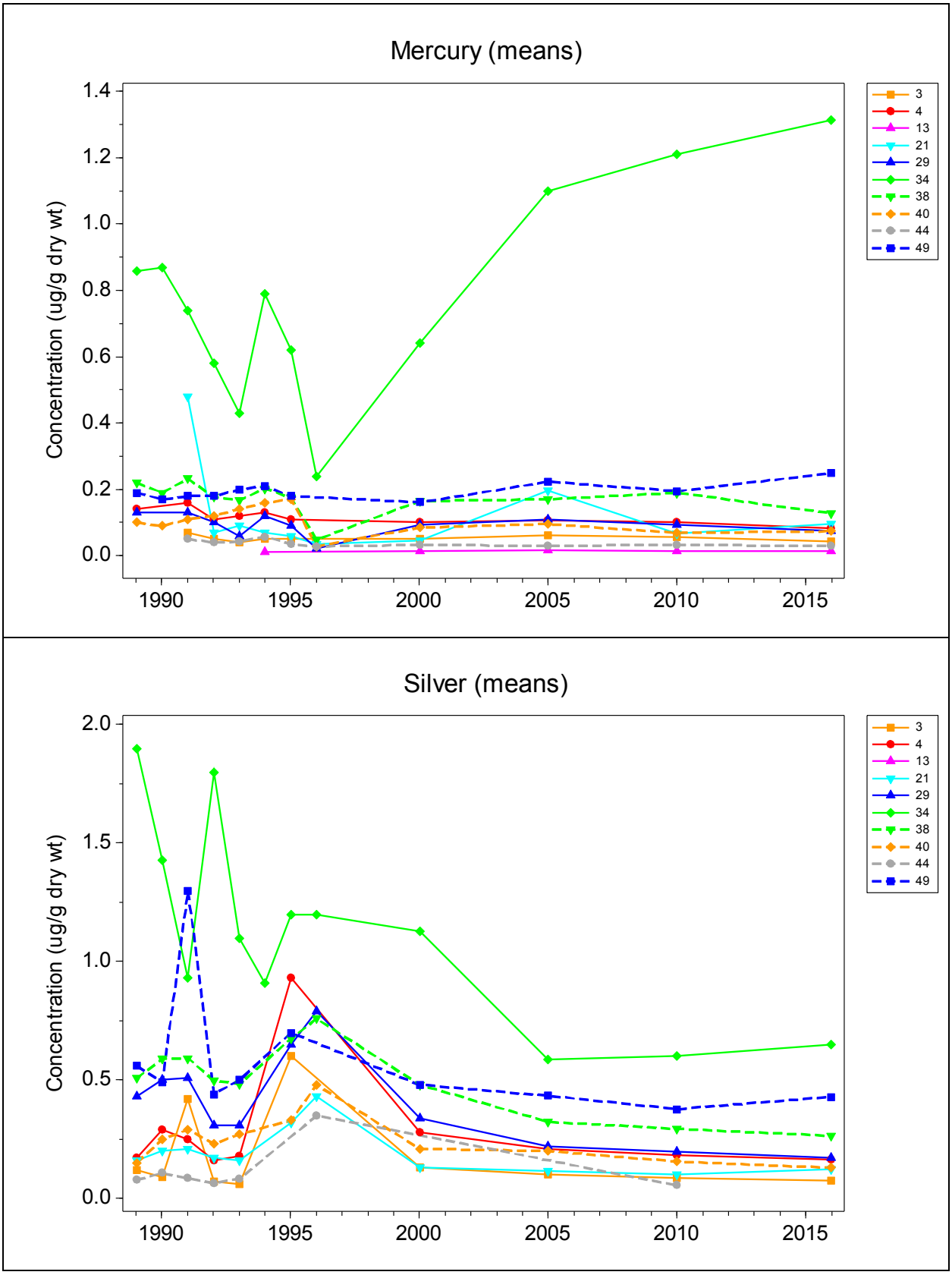
Yearly mean detected (including estimated) contaminant concentrations, by station, for metals and organic contaminants for which there are Washington State Sediment Management Standards (Ecology, 2013). Organic contaminants which were rarely detected are not shown.

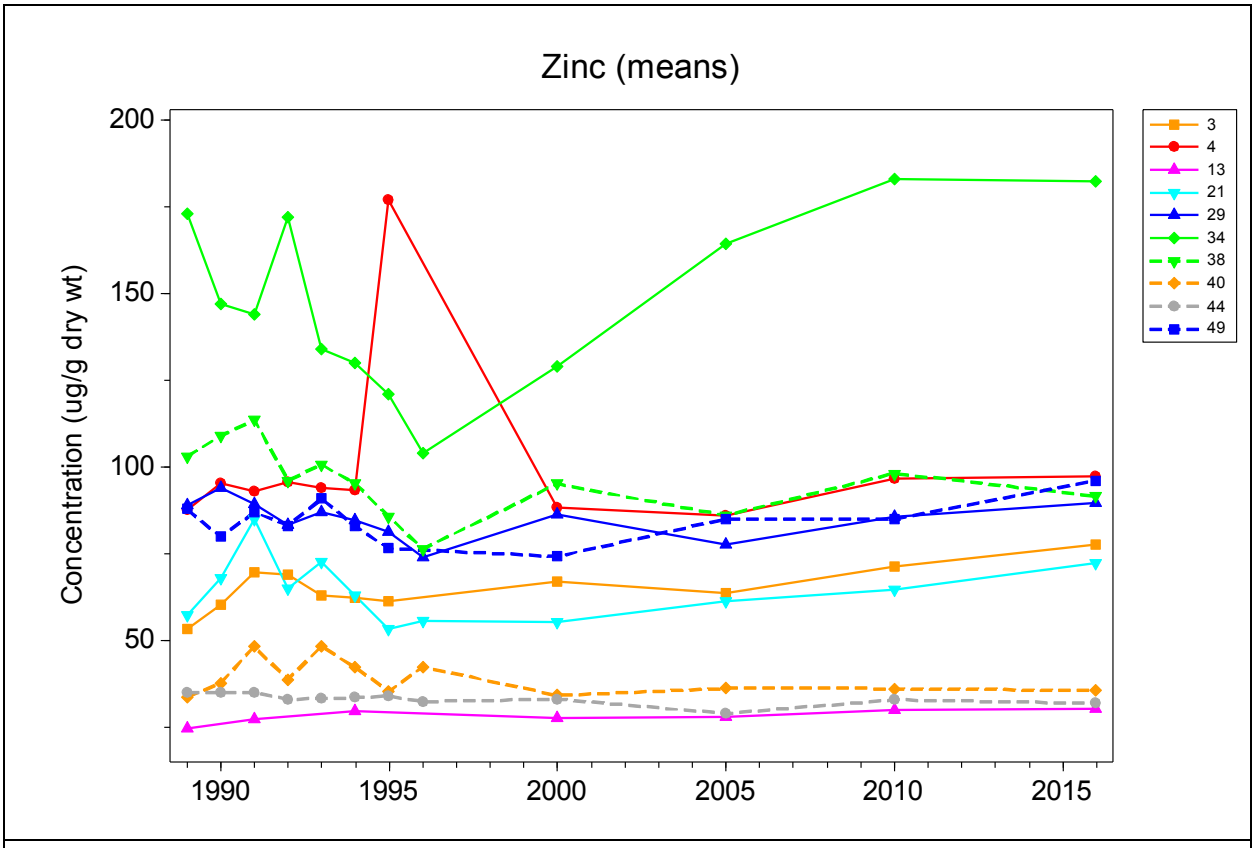
Graphs are ordered alphabetically by contaminant within metals, low-molecular-weight PAHs, high-molecular-weight PAHs, and other.

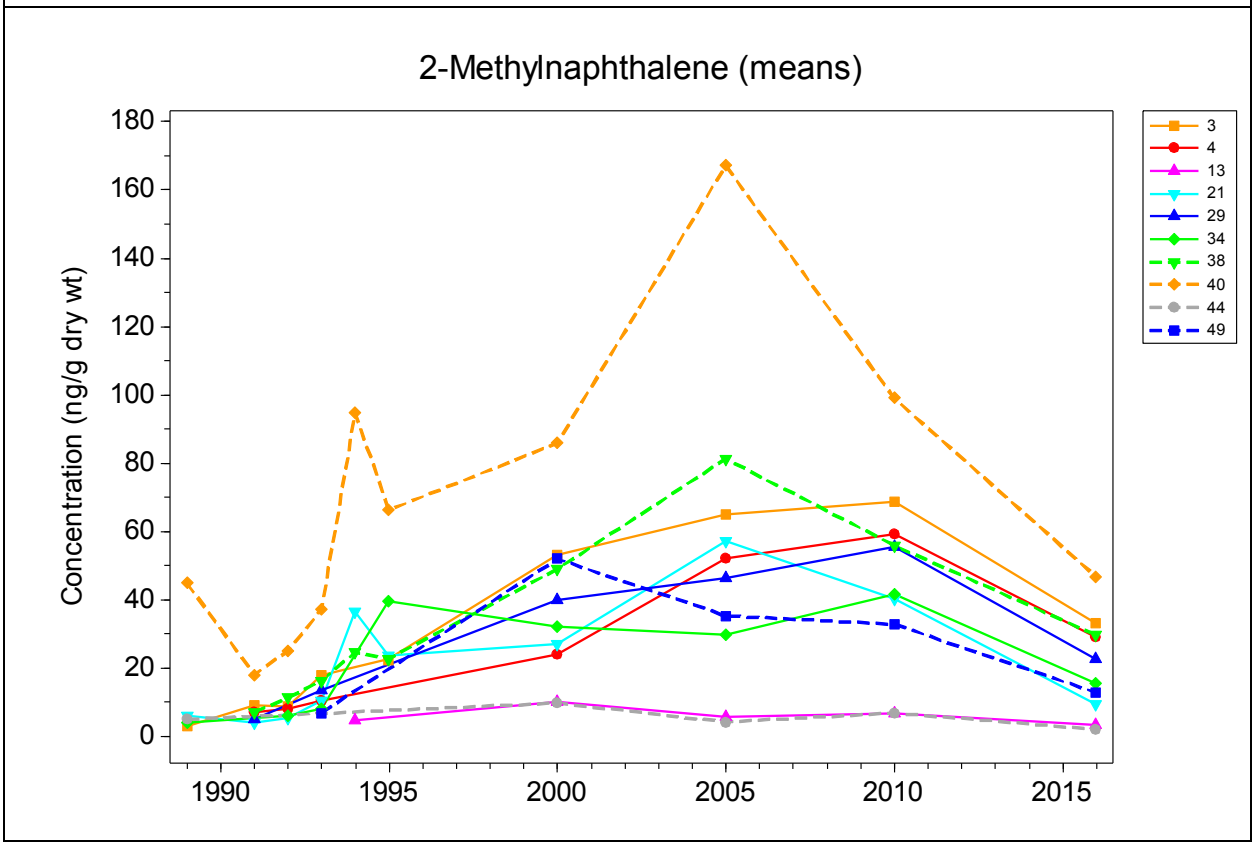


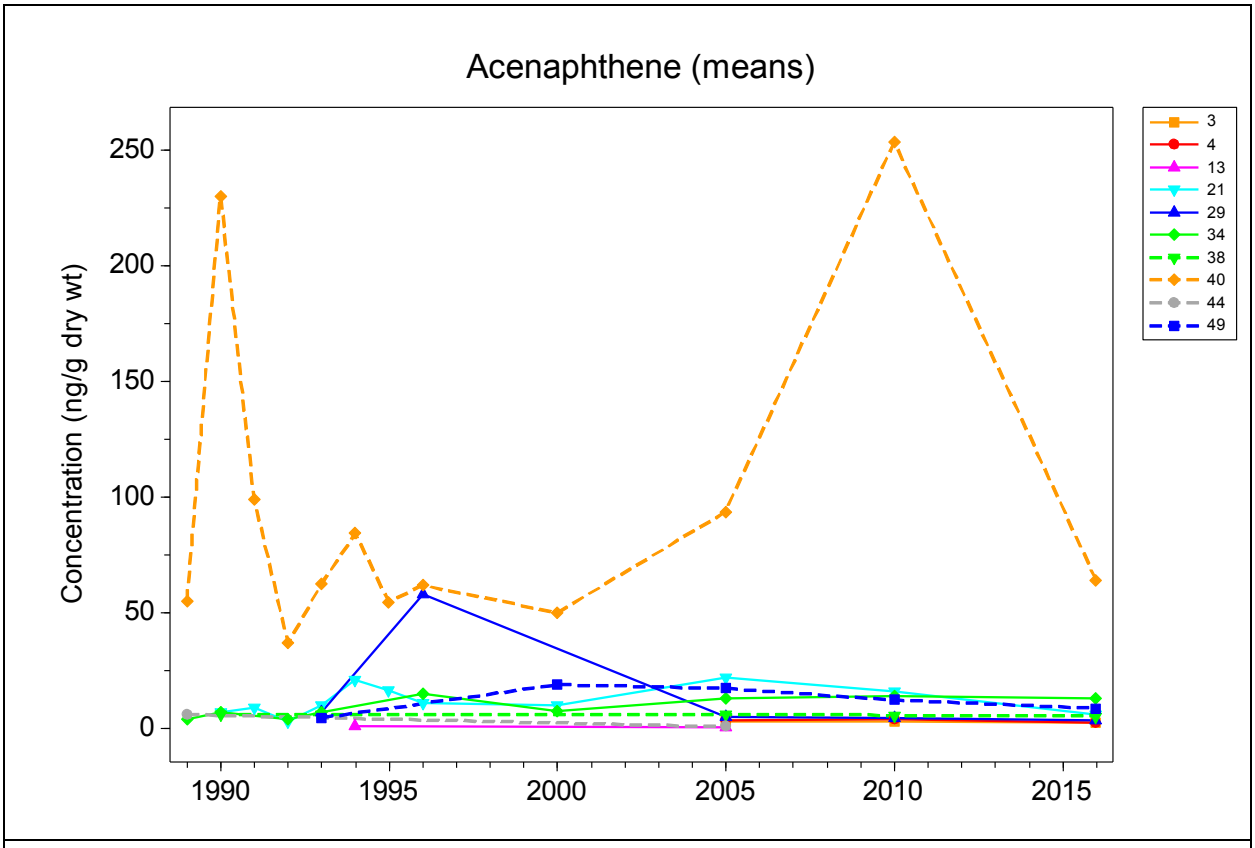

Cadmium (means)
Concentration (ug/g dry wt)
2.0
1.5
1.0
0.5
0.0
1990
1995
2000
2005
2010
2015
3
4
13
21
29
34
38
40
44
49
Chromium (means)
Concentration (ug/g dry wt)
60
50
40
30
20
10
1990
1995
2000
2005
2010
2015
3
4
13
21
29
34
38
40
44
49

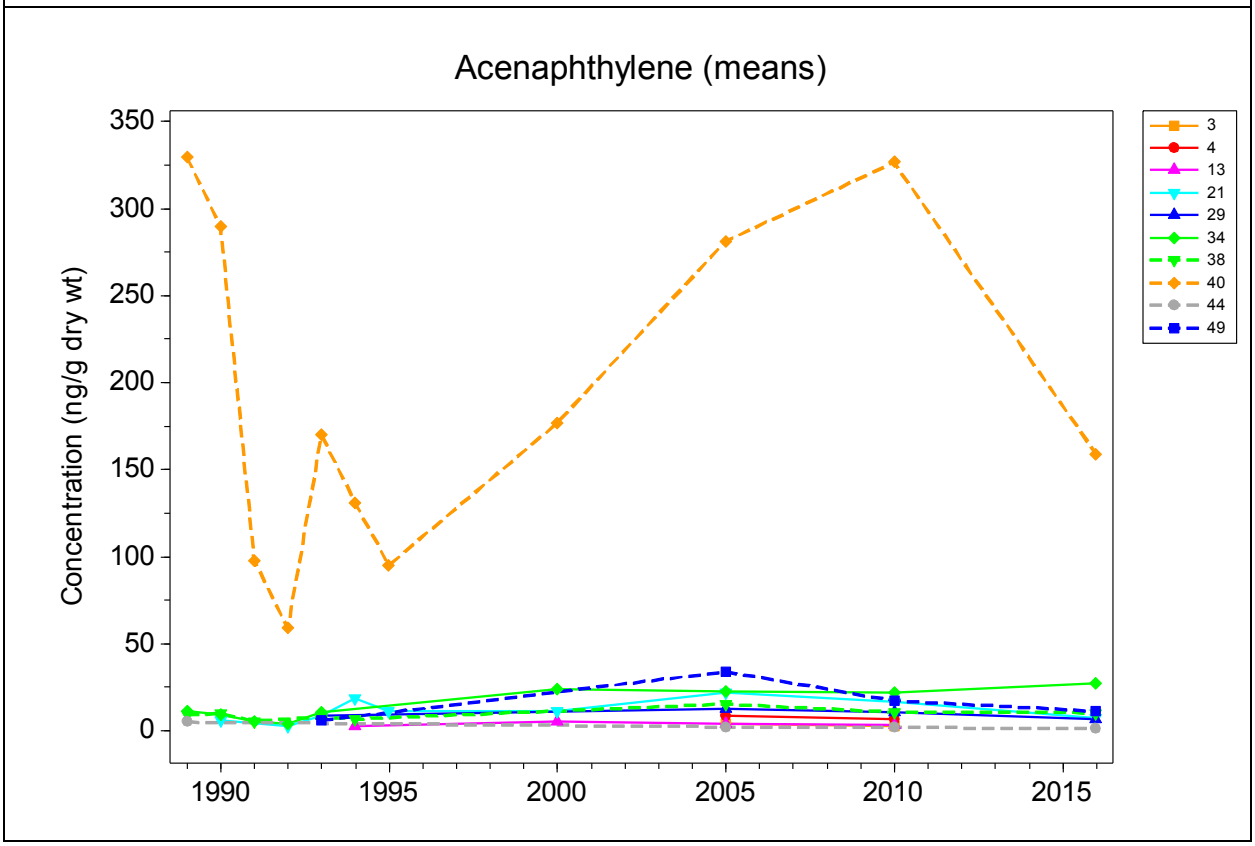

Copper (means)
Concentration (ug/g dry wt)
140
120
100
80
60
40
20
0
1990
1995
2000
2005
2010
2015
3
4
13
21
29
34
38
40
44
49
Lead (means)
Concentration (ug/g dry wt)
100
80
60
40
20
0
1990
1995
2000
2005
2010
2015
3
4
13
21
29
34
38
40
44
49

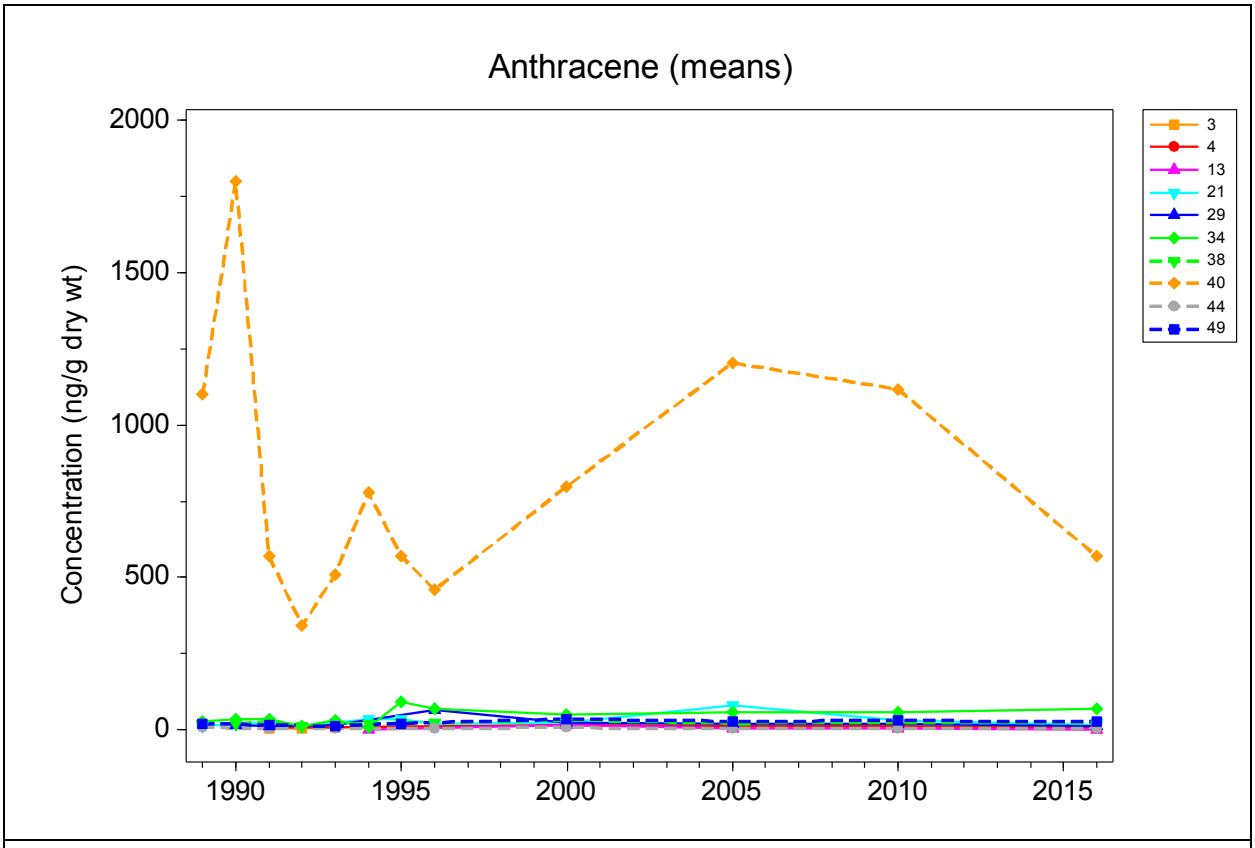

Mercury (means)
Concentration (ug/g dry wt)
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
1990
1995
2000
2005
2010
2015
3
4
13
21
29
34
38
40
44
49
Silver (means)
Concentration (ug/g dry wt)
2.0
1.5
1.0
0.5
0.0
1990
1995
2000
2005
2010
2015
3
4
13
21
29
34
38
40
44
49

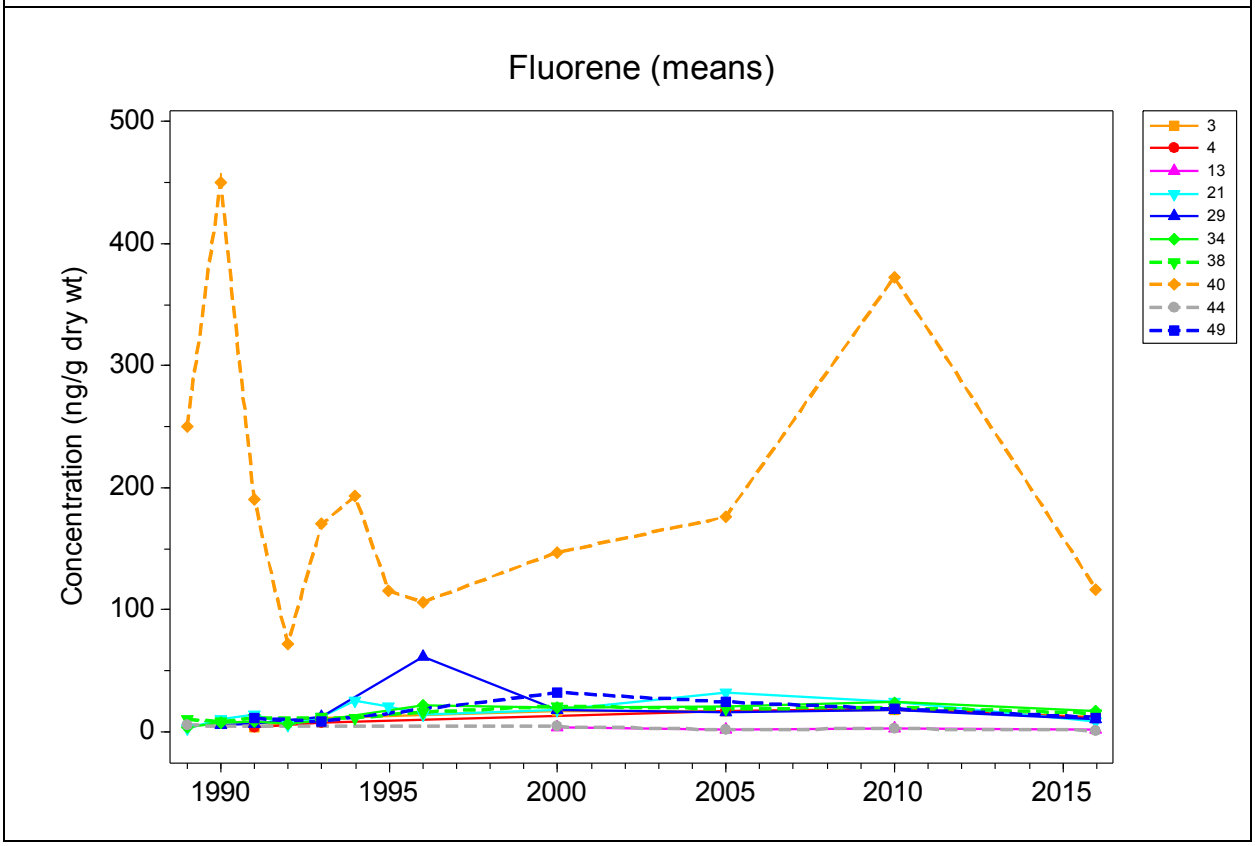

Zinc (means)
Concentration (ug/g dry wt)
200
150
100
50
1990
1995
2000
2005
2010
2015
3
4
13
21
29
34
38
40
44
49

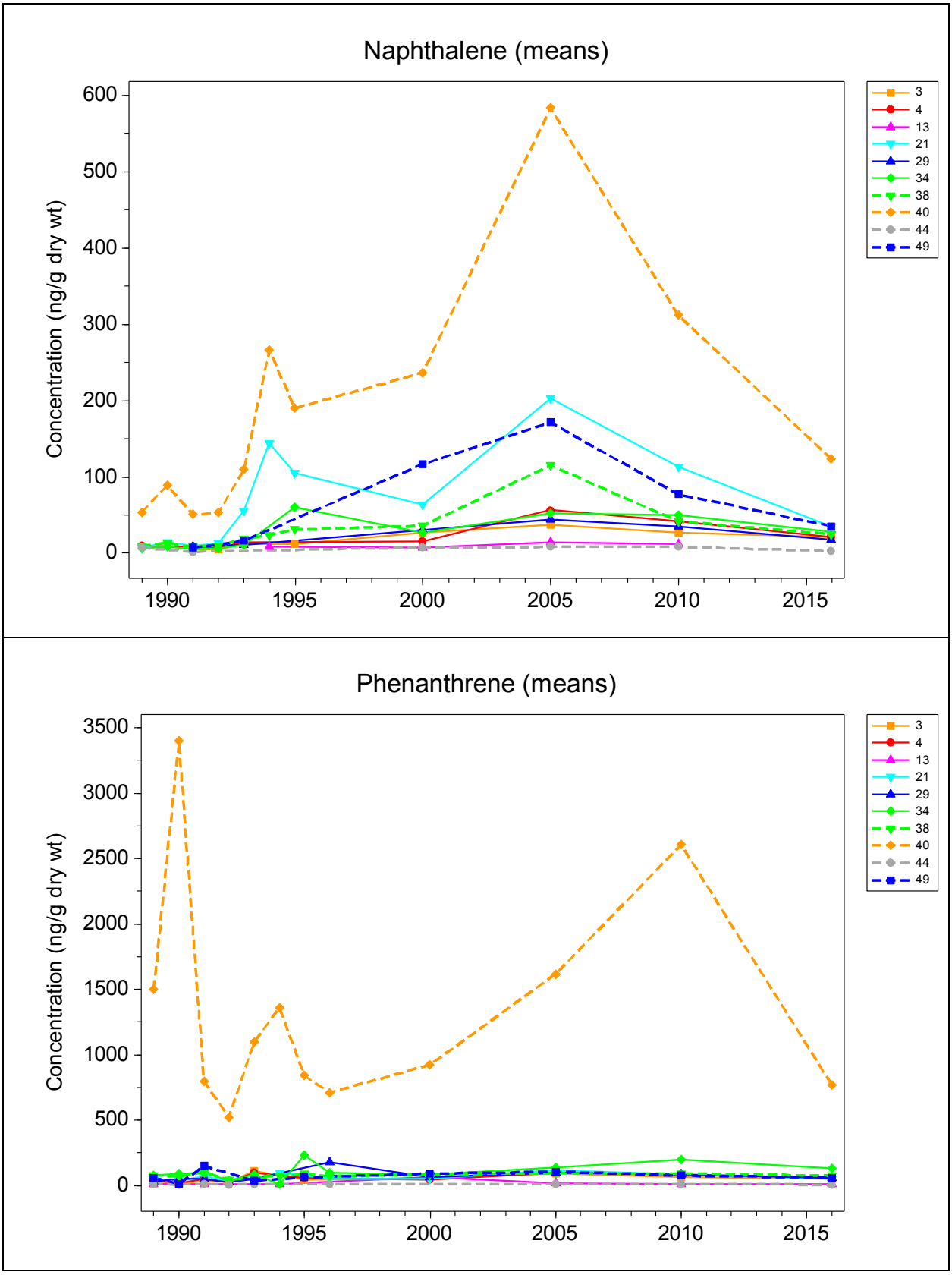

2-Methylnaphthalene (means)
Concentration (ng/g dry wt)
180
160
140
120
100
80
60
40
20
0
1990
1995
2000
2005
2010
2015
3
4
13
21
29
34
38
40
44
49

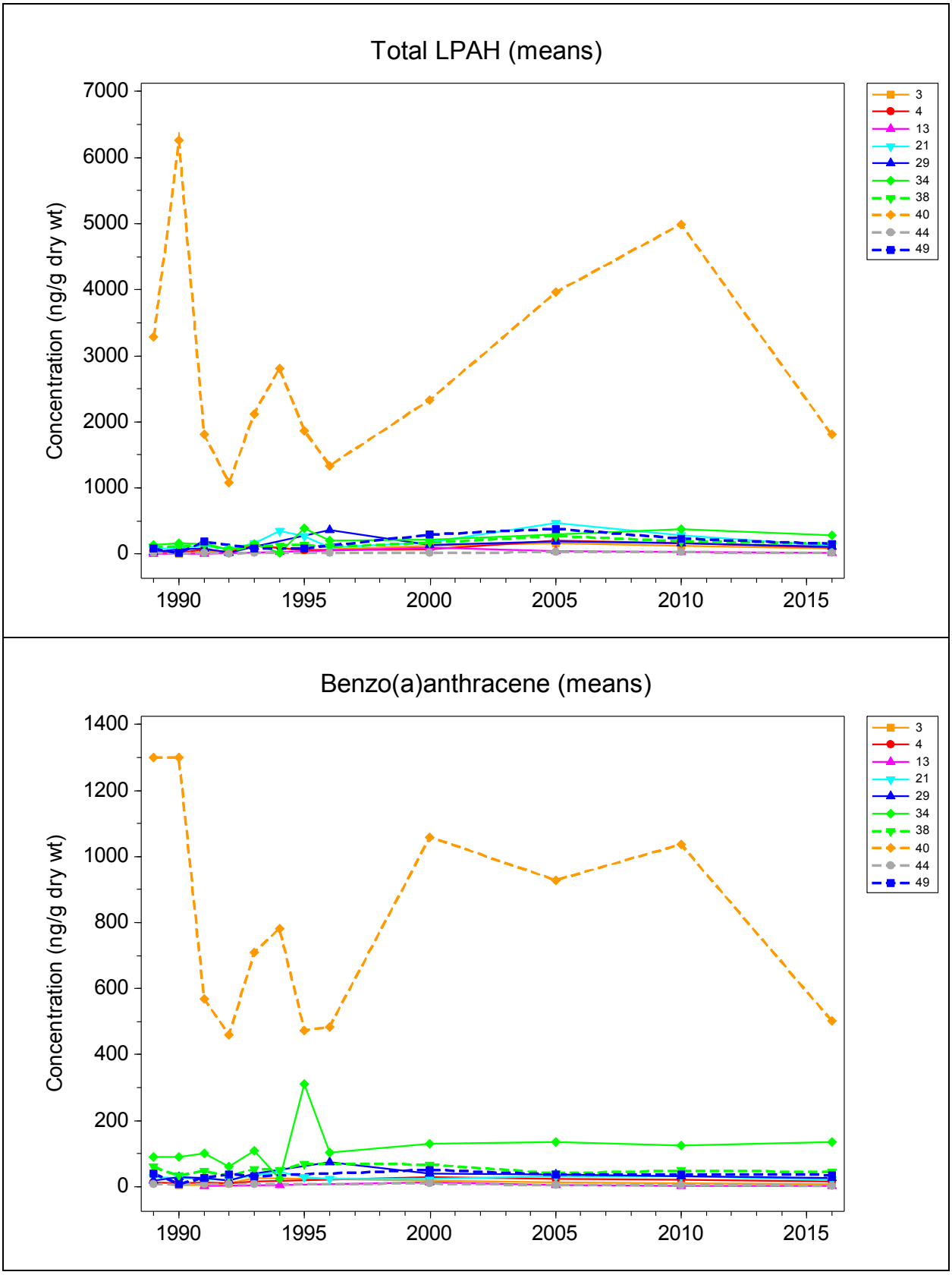

Acenaphthene (means)
Concentration (ng/g dry wt)
0
50
100
150
200
250
1990
1995
2000
2005
2010
2015
3
4
13
21
29
34
38
40
44
49

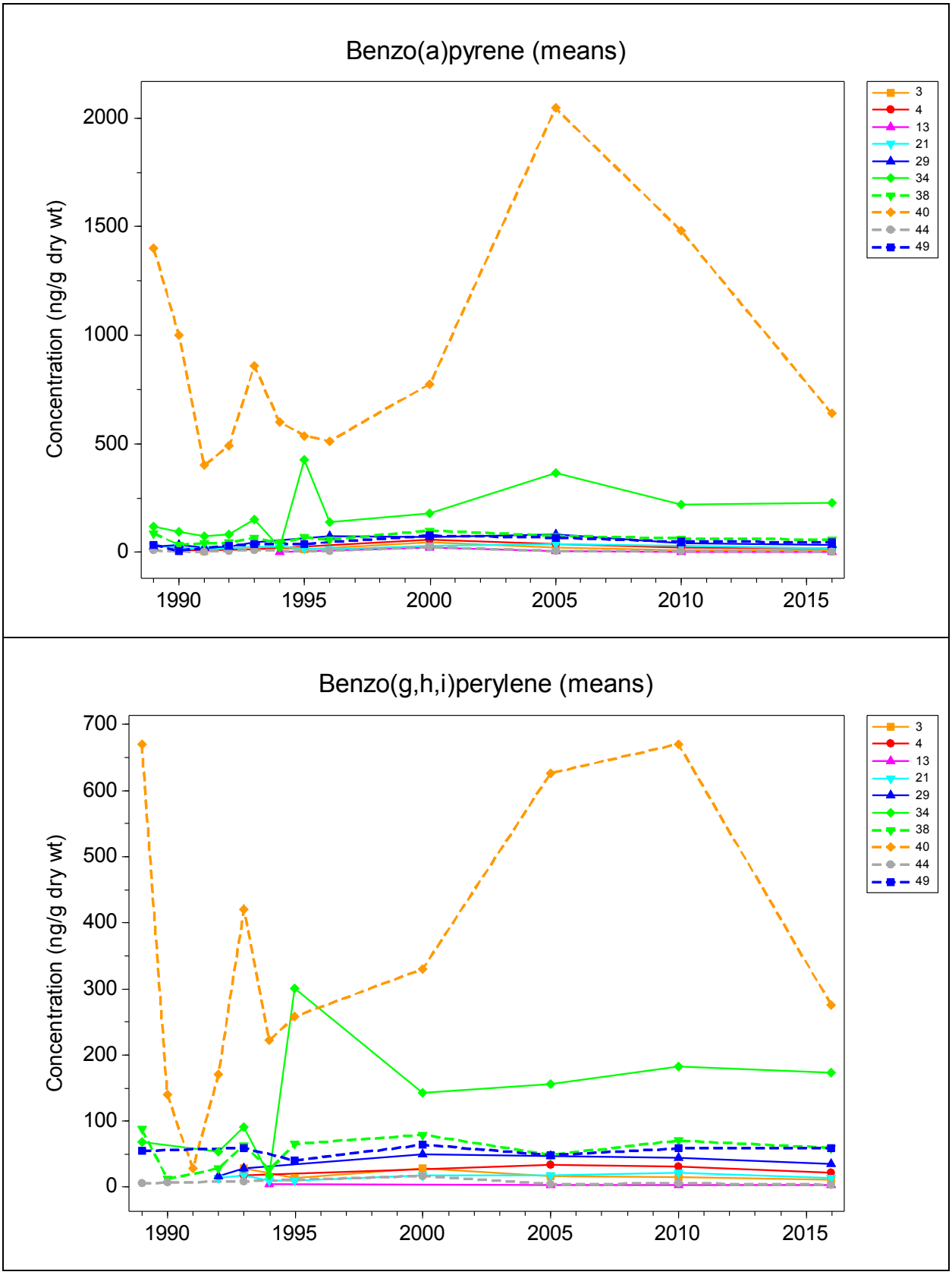

Acenaphthylene (means)
Concentration (ng/g dry wt)
0
50
100
150
200
250
300
350
1990
1995
2000
2005
2010
2015
3
4
13
21
29
34
38
40
44
49

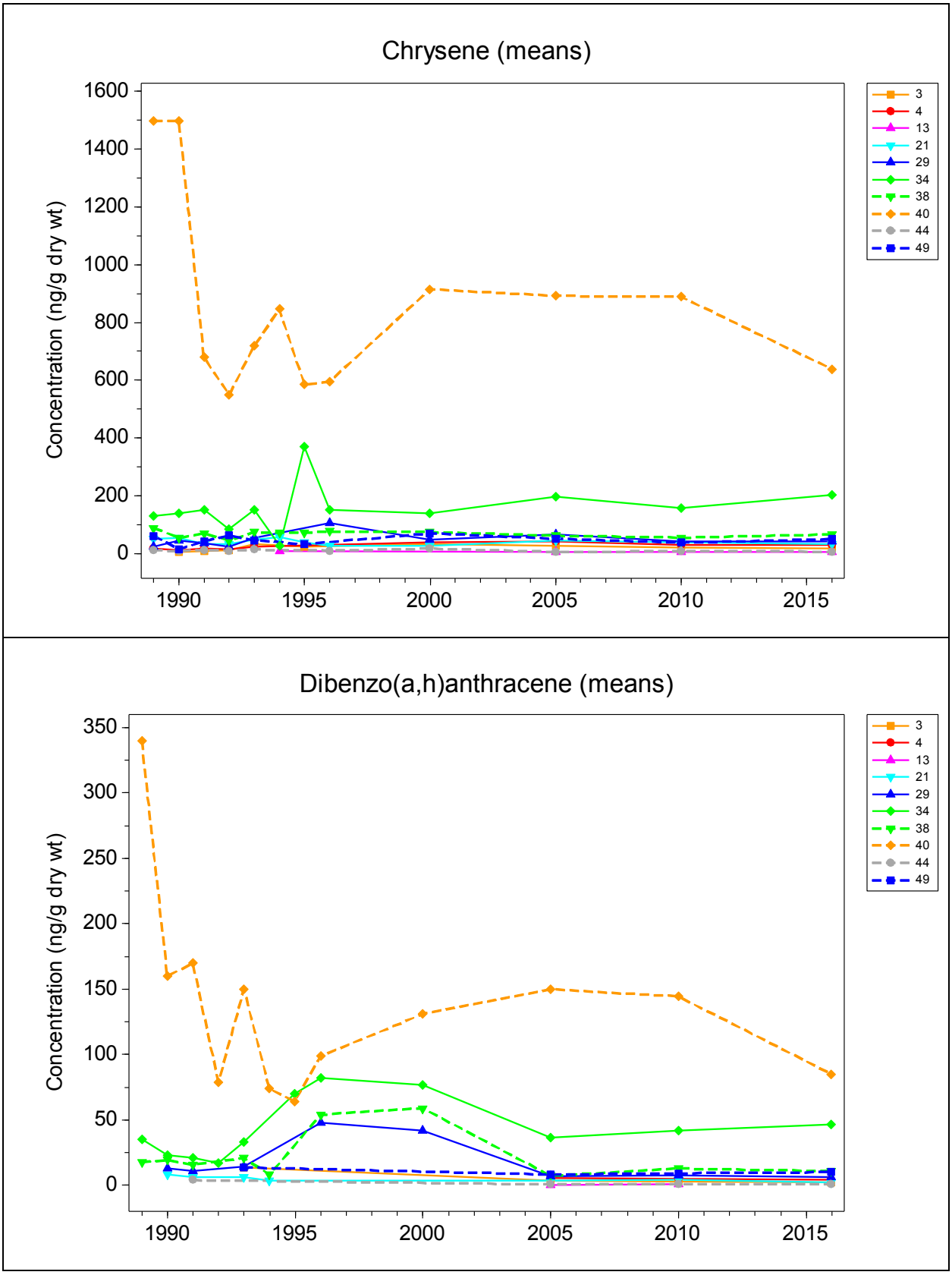

Anthracene (means)
Concentration (ng/g dry wt)
2000
1500
1000
500
0
1990
1995
2000
2005
2010
2015
3
4
13
21
29
34
38
40
44
49

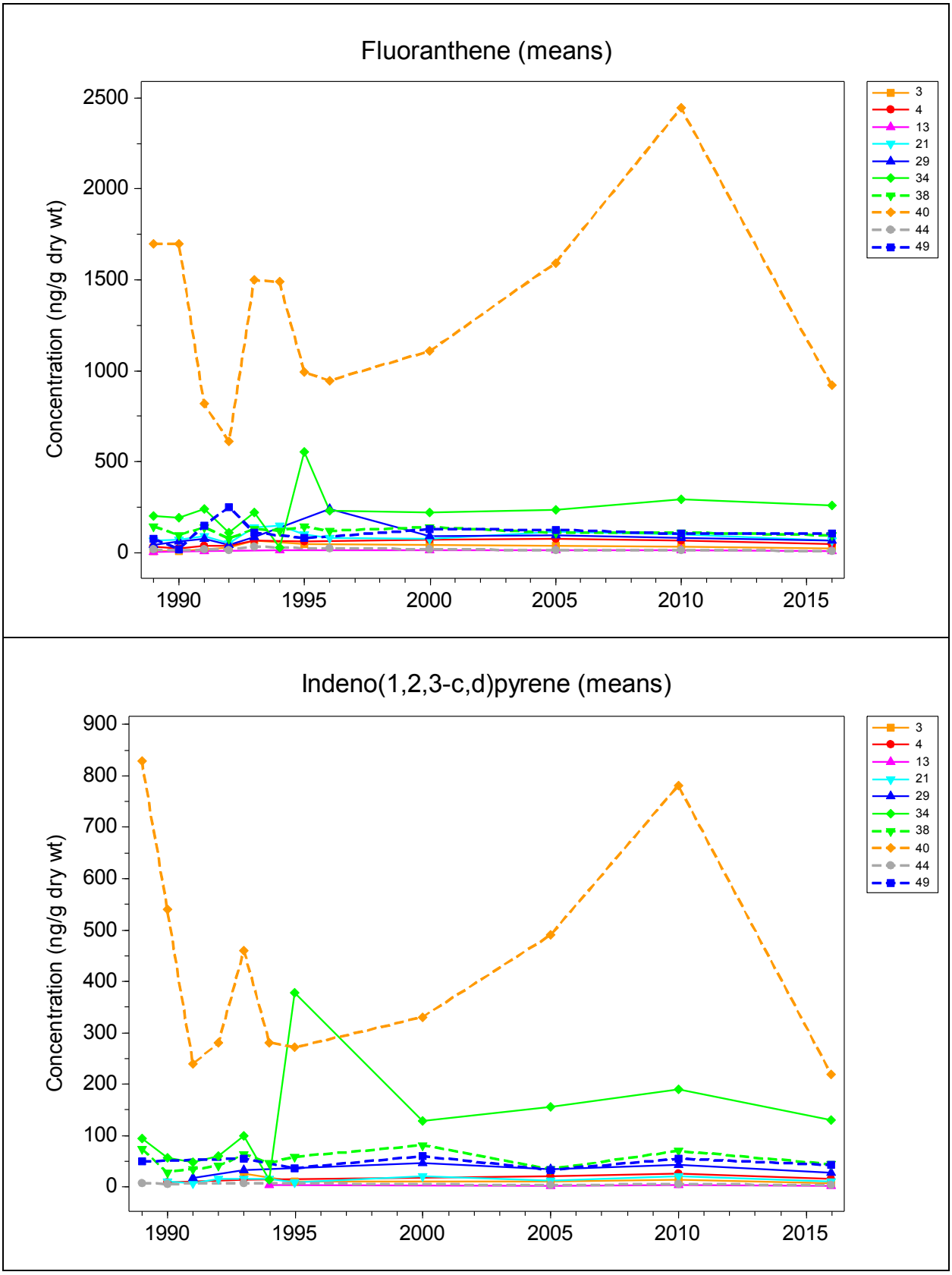

Fluorene (means)
Concentration (ng/g dry wt)
500
400
300
200
100
0
1990
1995
2000
2005
2010
2015
3
4
13
21
29
34
38
40
44
49

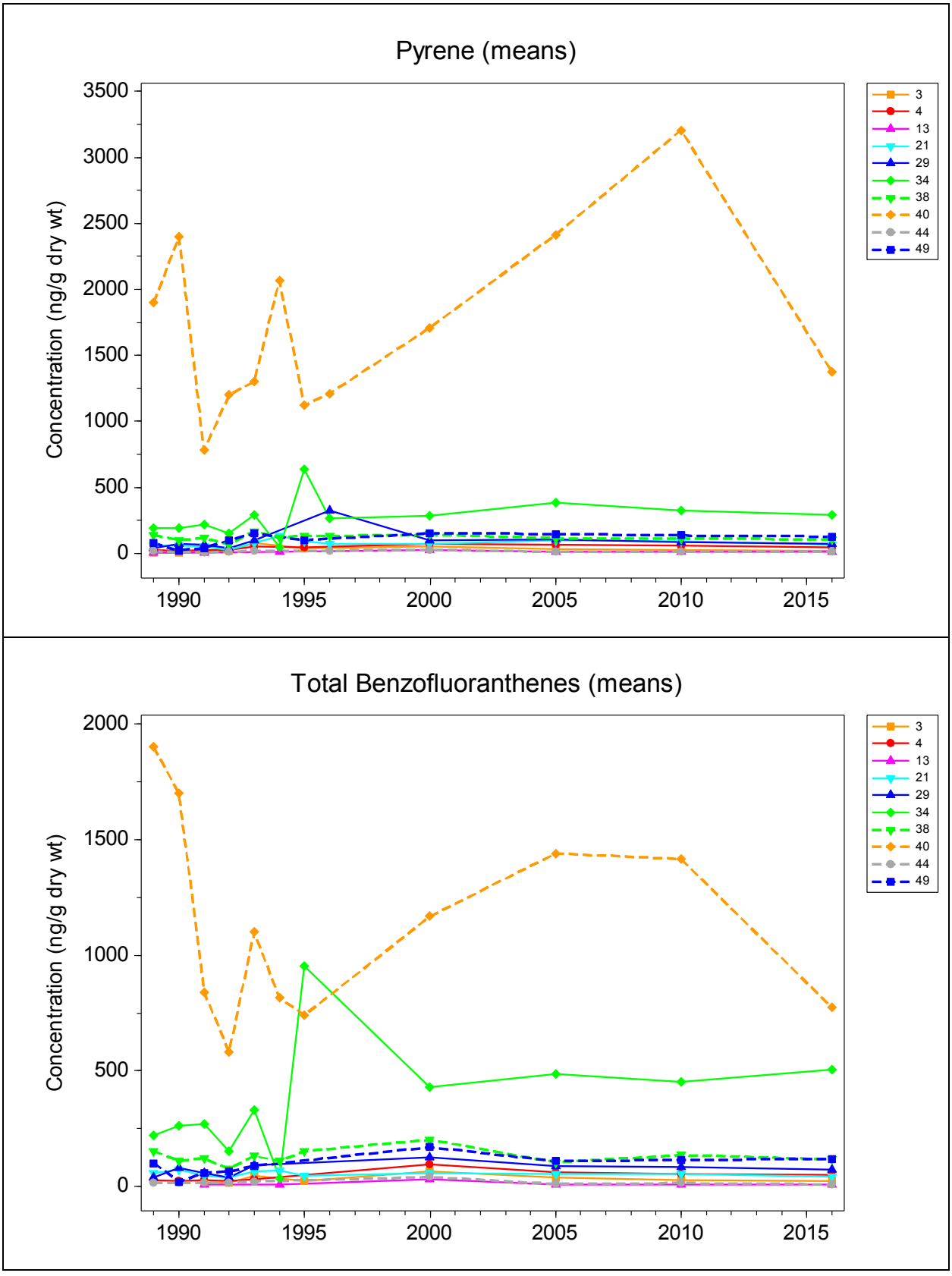

Naphthalene (means)
Concentration (ng/g dry wt)
600
500
400
300
200
100
0
1990
1995
2000
2005
2010
2015
3
4
13
21
29
34
38
40
44
49
Phenanthrene (means)
Concentration (ng/g dry wt)
3500
3000
2500
2000
1500
1000
500
0
1990
1995
2000
2005
2010
2015
3
4
13
21
29
34
38
40
44
49

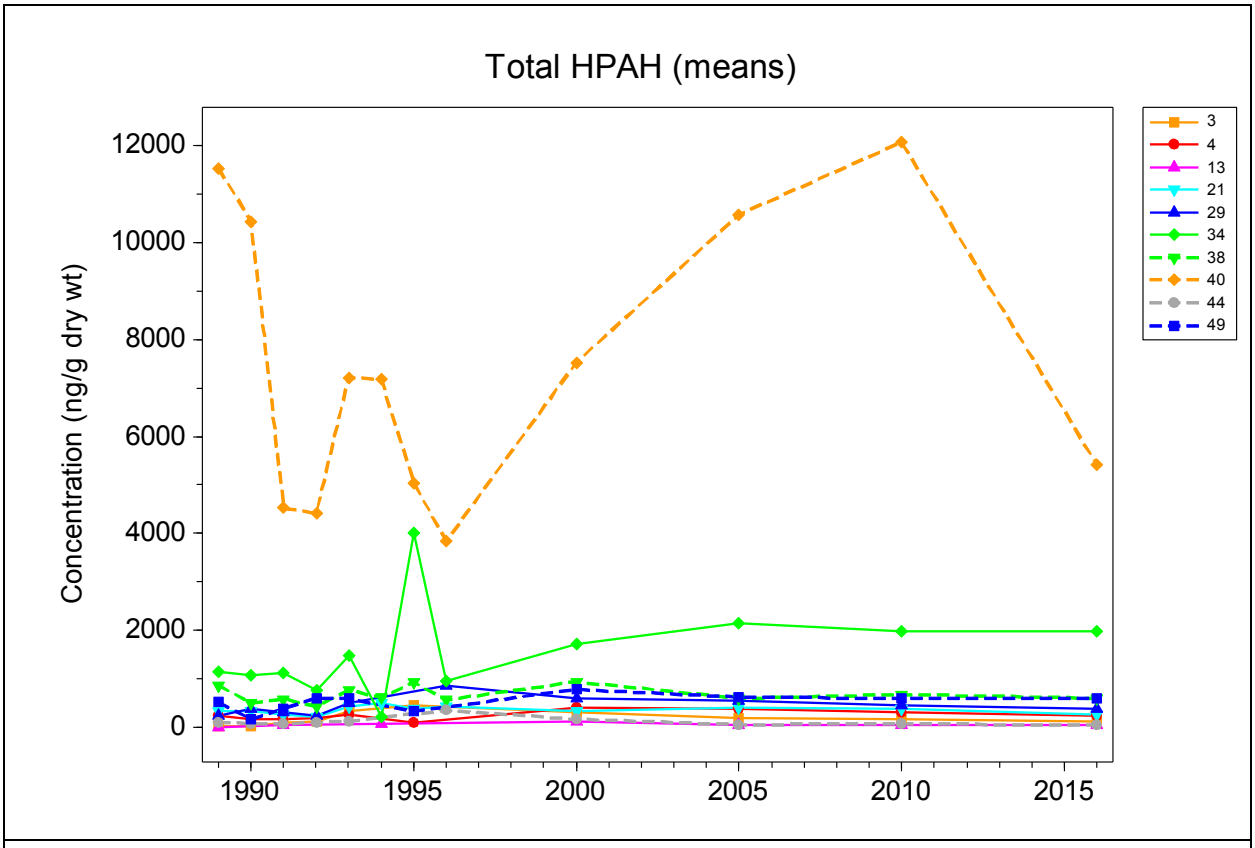

Total LPAH (means)
Concentration (ng/g dry wt)
7000
6000
5000
4000
3000
2000
1000
0
1990
1995
2000
2005
2010
2015
3
4
13
21
29
34
38
40
44
49
Benzo(a)anthracene (means)
Concentration (ng/g dry wt)
1400
1200
1000
800
600
400
200
0
1990
1995
2000
2005
2010
2015
3
4
13
21
29
34
38
40
44
49

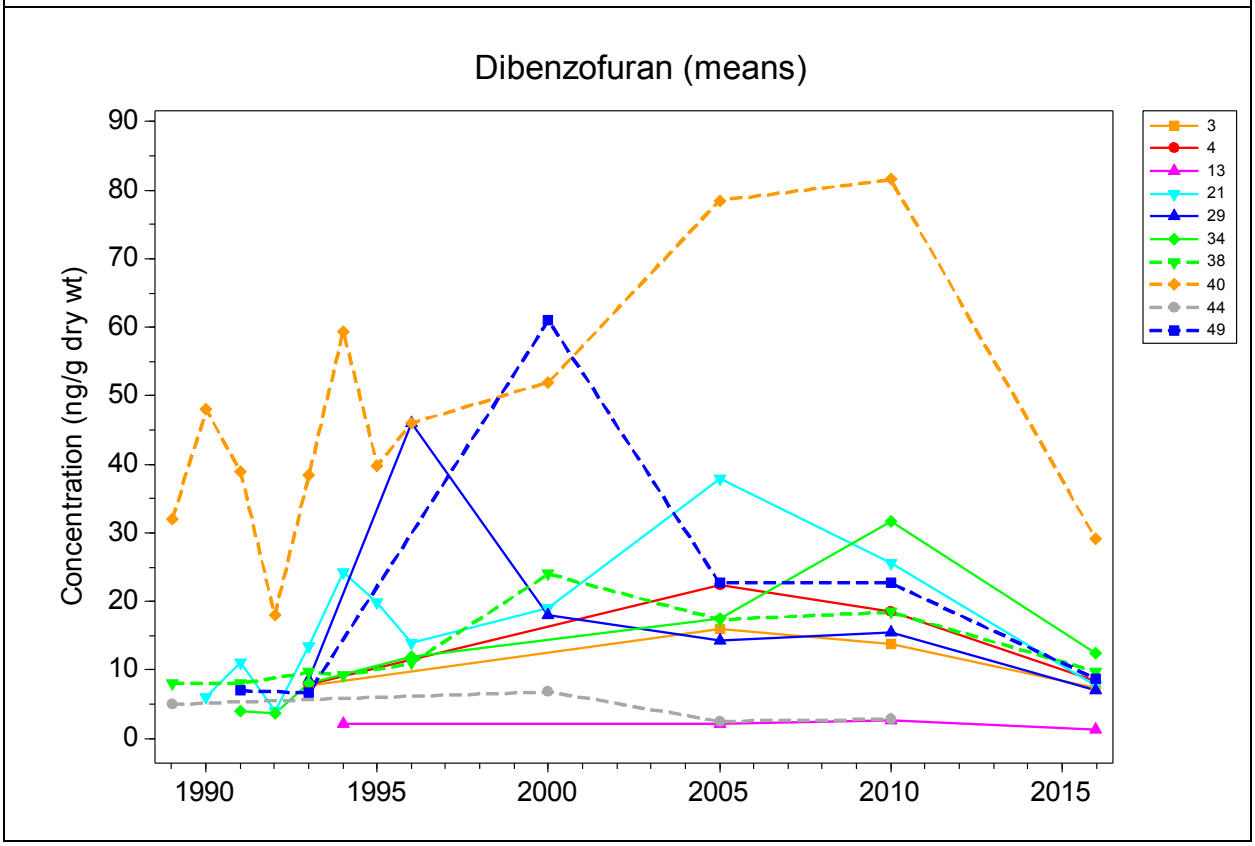

Benzo(a)pyrene (means)
Concentration (ng/g dry wt)
2000
1500
1000
500
0
1990
1995
2000
2005
2010
2015
3
4
13
21
29
34
38
40
44
49
Benzo(g,h,i)perylene (means)
Concentration (ng/g dry wt)
700
600
500
400
300
200
100
0
1990
1995
2000
2005
2010
2015
3
4
13
21
29
34
38
40
44
49

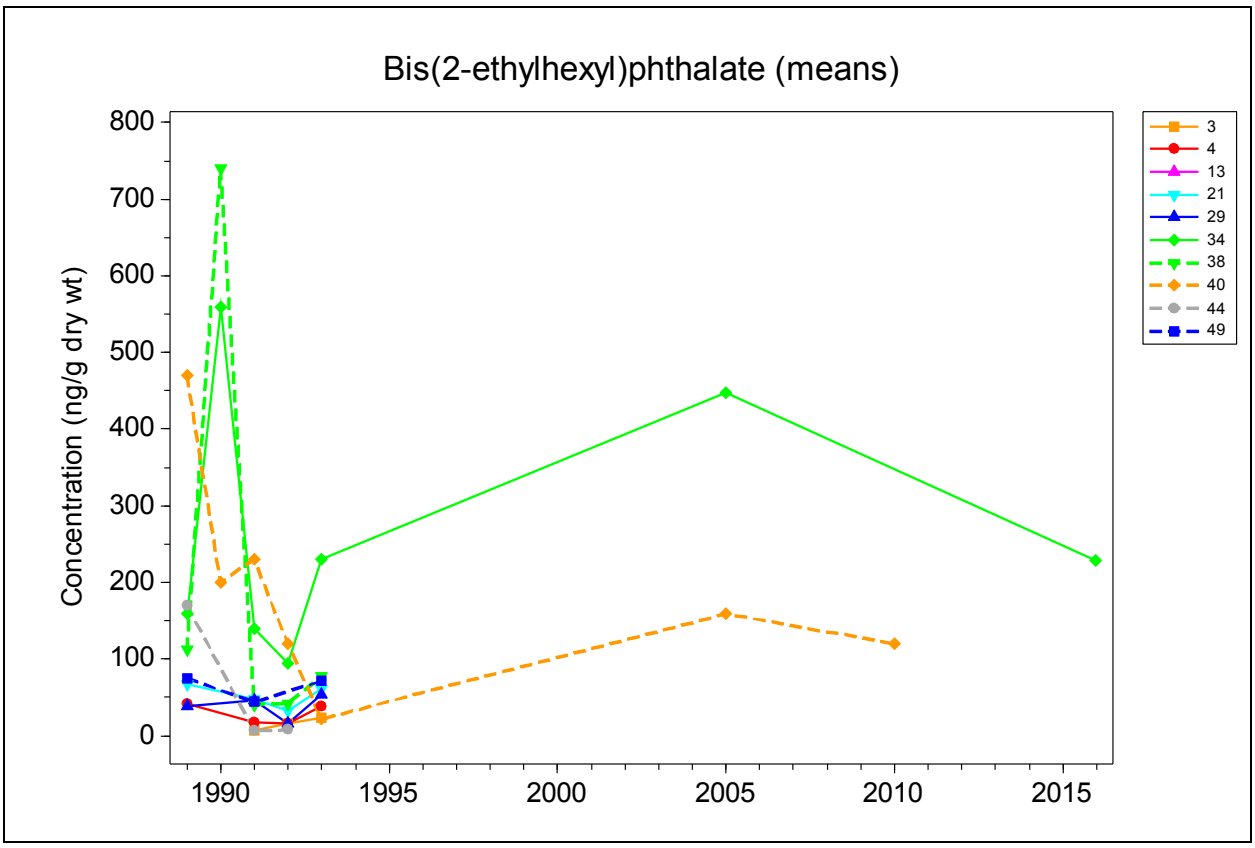

Chrysene (means)
Concentration (ng/g dry wt)
1600
1400
1200
1000
800
600
400
200
0
1990
1995
2000
2005
2010
2015
3
4
13
21
29
34
38
40
44
49
Dibenzo(a,h)anthracene (means)
Concentration (ng/g dry wt)
350
300
250
200
150
100
50
0
1990
1995
2000
2005
2010
2015
3
4
13
21
29
34
38
40
44
49


Fluoranthene (means)
Concentration (ng/g dry wt)
2500
2000
1500
1000
500
0
1990
1995
2000
2005
2010
2015
3
4
13
21
29
34
38
40
44
49
Indeno(1,2,3-c,d)pyrene (means)
Concentration (ng/g dry wt)
900
800
700
600
500
400
300
200
100
0
1990
1995
2000
2005
2010
2015
3
4
13
21
29
34
38
40
44
49


Pyrene (means)
Concentration (ng/g dry wt)
3500
3000
2500
2000
1500
1000
500
0
1990
1995
2000
2005
2010
2015
3
4
13
21
29
34
38
40
44
49
Total Benzofluoranthenes (means)
Concentration (ng/g dry wt)
2000
1500
1000
500
0
1990
1995
2000
2005
2010
2015
3
4
13
21
29
34
38
40
44
49


Total HPAH (means)
Concentration (ng/g dry wt)
12000
10000
8000
6000
4000
2000
0
1990
1995
2000
2005
2010
2015
3
4
13
21
29
34
38
40
44
49


Dibenzofuran (means)
Concentration (ng/g dry wt)
90
80
70
60
50
40
30
20
10
0
1990
1995
2000
2005
2010
2015
3
4
13
21
29
34
38
40
44
49

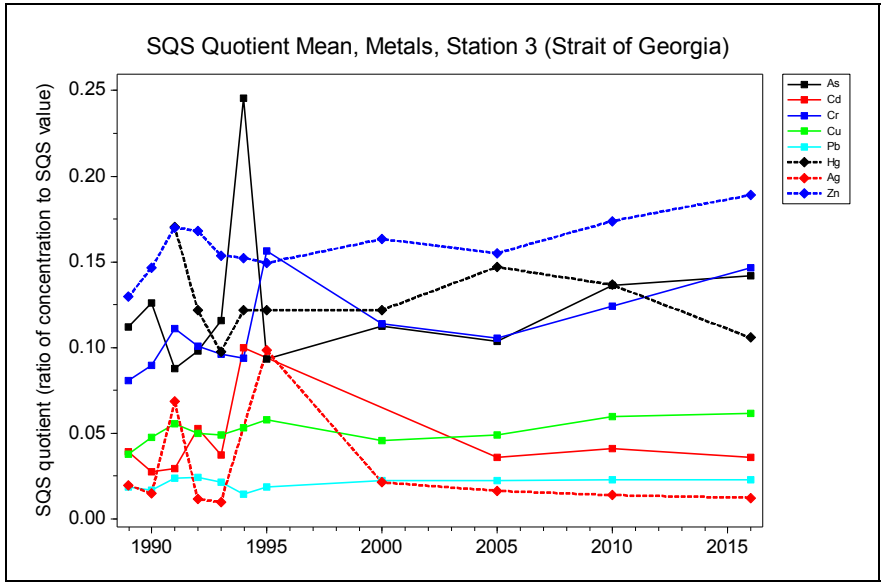

Bis(2-ethylhexyl)phthalate (means)
Concentration (ng/g dry wt)
800
700
600
500
400
300
200
100
0
1990
1995
2000
2005
2010
2015
3
4
13
21
29
34
38
40
44
49

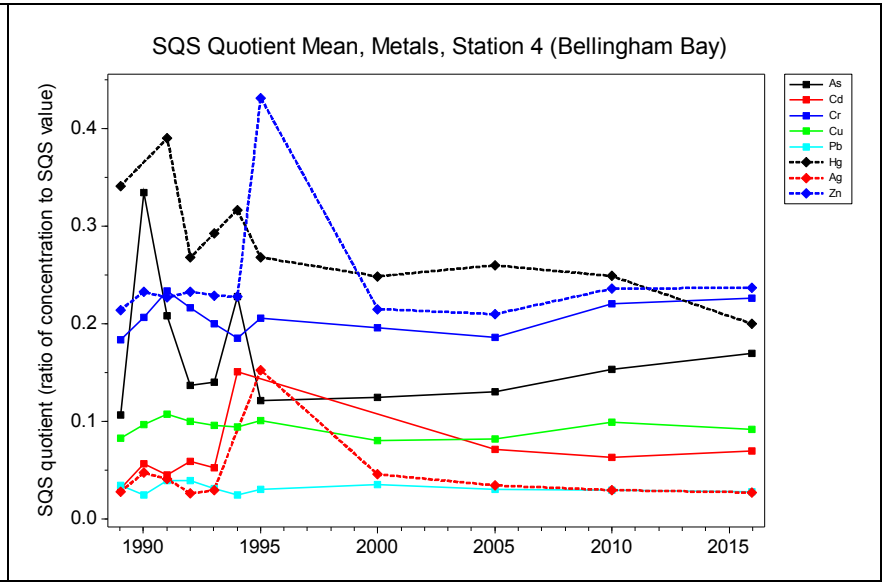
SQS Quotients over time

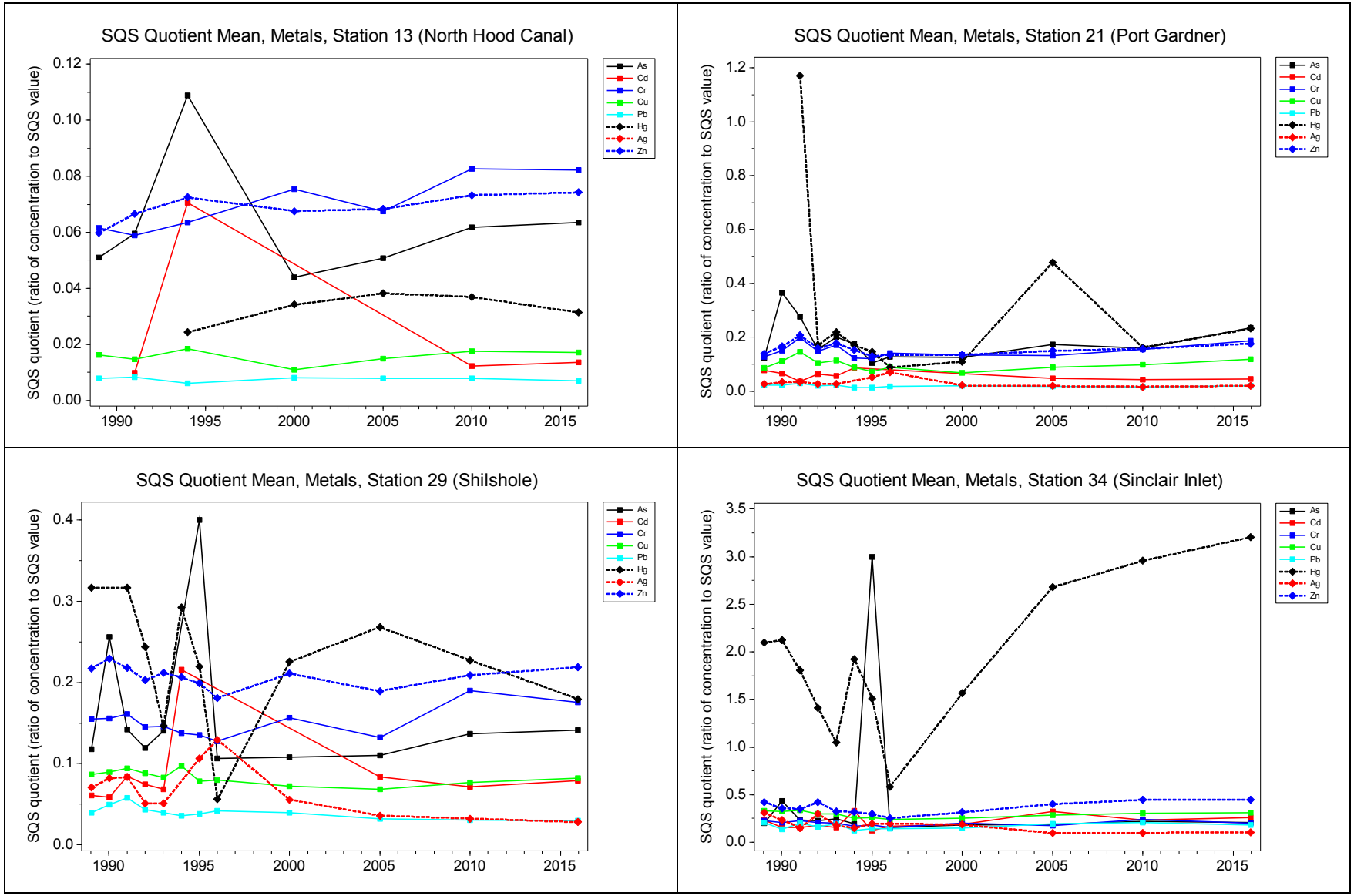
For those contaminants for which there are Washington State Sediment Management Standards, the SQS Quotient is the ratio of the detected contaminant concentration (TOC-normalized for most organics) to the Sediment Quality Standard, which was determined to be the concentration above which harmful effects to benthic organisms are likely to occur (Ecology, 2013).

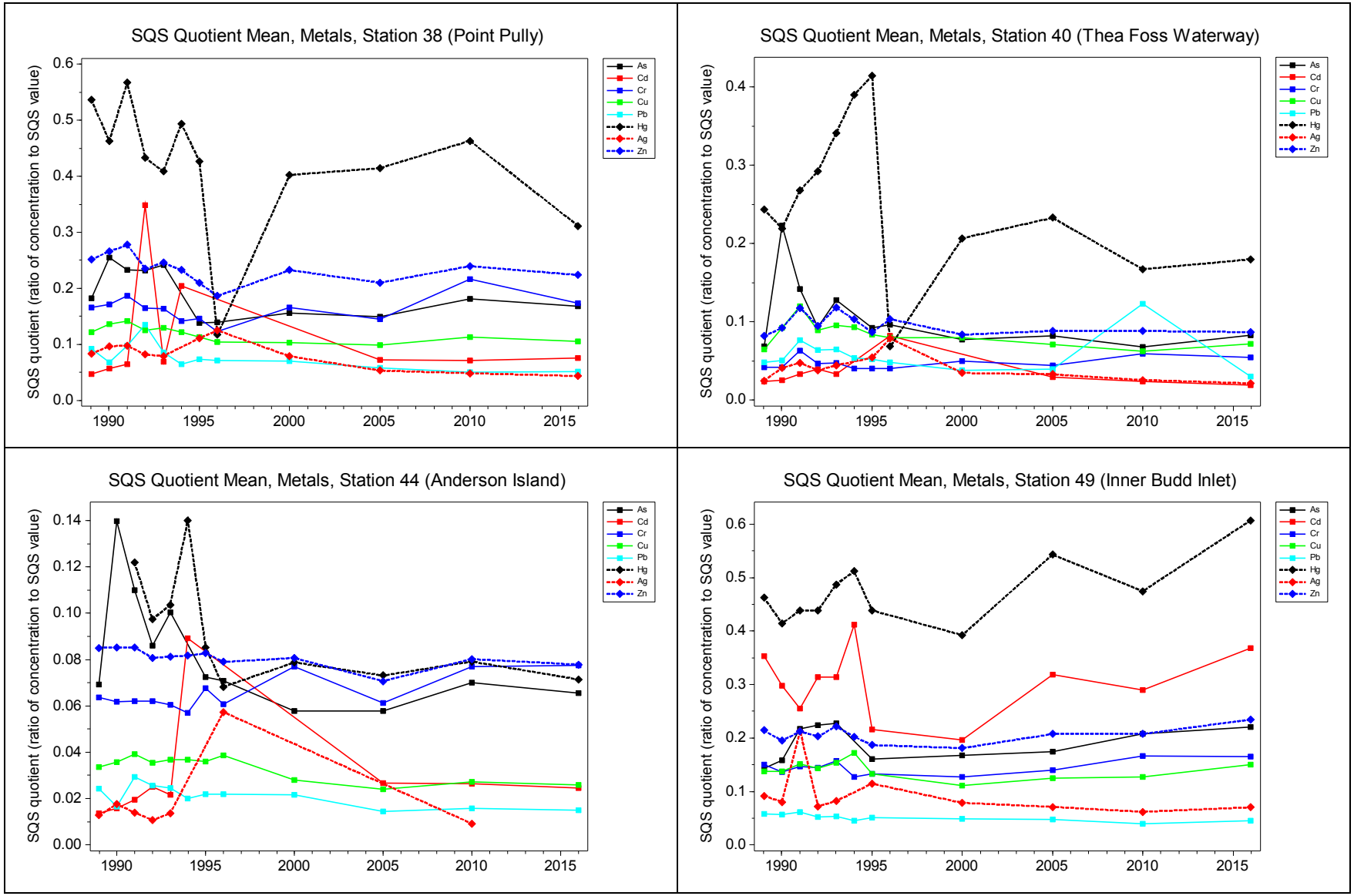
The following graphs depict the yearly mean SQS quotient for each of multiple contaminants, grouped into metals, low-molecular-weight PAHs plus dibenzofuran, and high-molecular-weight PAHs, separately for each station.

Yearly mean SQS quotients for metals (detected only, including estimates), by station.
As = arsenic, Cd = cadmium, Cr = chromium, Cu = copper, Pb = lead, Hg = mercury, Ag = silver, Zn = zinc



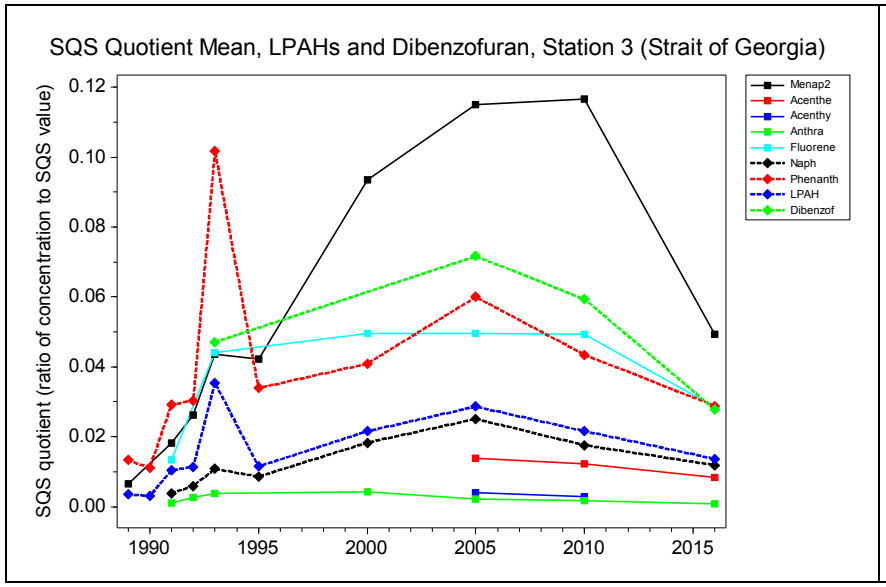


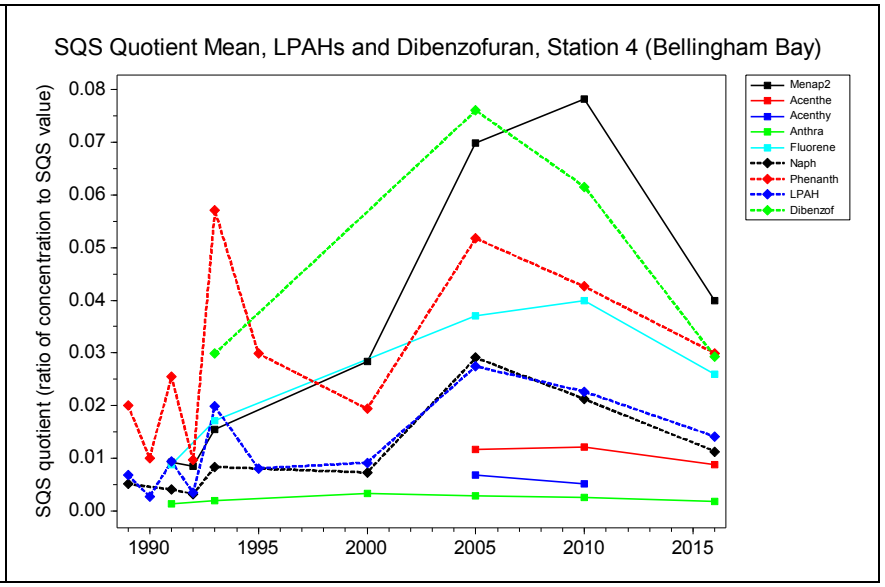

SQS Quotient Mean, Metals, Station 13 (North Hood Canal)
SQS quotient (ratio of concentration to SQS value)
0.00
0.02
0.04
0.06
0.08
0.10
0.12
1990
1995
2000
2005
2010
2015
As
Cd
Cr
Cu
Pb
Hg
Ag
Zn
SQS Quotient Mean, Metals, Station 21 (Port Gardner)
SQS quotient (ratio of concentration to SQS value)
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1990
1995
2000
2005
2010
2015
As
Cd
Cr
Cu
Pb
Hg
Ag
Zn
SQS Quotient Mean, Metals, Station 29 (Shilshole)
SQS quotient (ratio of concentration to SQS value)
0.0
0.1
0.2
0.3
0.4
1990
1995
2000
2005
2010
2015
As
Cd
Cr
Cu
Pb
Hg
Ag
Zn
SQS Quotient Mean, Metals, Station 34 (Sinclair Inlet)
SQS quotient (ratio of concentration to SQS value)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
1990
1995
2000
2005
2010
2015
As
Cd
Cr
Cu
Pb
Hg
Ag
Zn

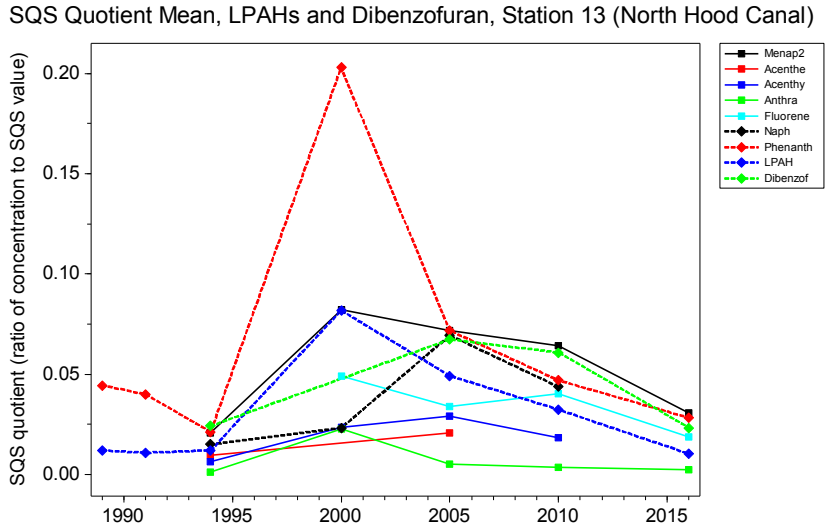

SQS Quotient Mean, Metals, Station 38 (Point Pully)
SQS quotient (ratio of concentration to SQS value)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
1990
1995
2000
2005
2010
2015
As
Cd
Cr
Cu
Pb
Hg
Ag
Zn
SQS Quotient Mean, Metals, Station 40 (Thea Foss Waterway)
SQS quotient (ratio of concentration to SQS value)
0.0
0.1
0.2
0.3
0.4
1990
1995
2000
2005
2010
2015
As
Cd
Cr
Cu
Pb
Hg
Ag
Zn
SQS Quotient Mean, Metals, Station 44 (Anderson Island)
SQS quotient (ratio of concentration to SQS value)
0.00
0.02
0.04
0.06
0.08
0.10
0.12
0.14
1990
1995
2000
2005
2010
2015
As
Cd
Cr
Cu
Pb
Hg
Ag
Zn
SQS Quotient Mean, Metals, Station 49 (Inner Budd Inlet)
SQS quotient (ratio of concentration to SQS value)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
1990
1995
2000
2005
2010
2015
As
Cd
Cr
Cu
Pb
Hg
Ag
Zn

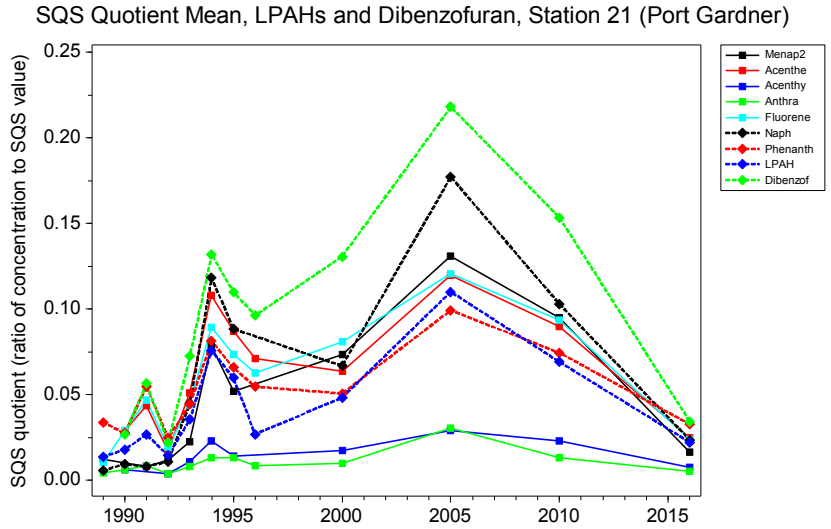
Yearly mean SQS quotients for low-molecular-weight PAHs and dibenzofuran (detected only, including estimates), by station.

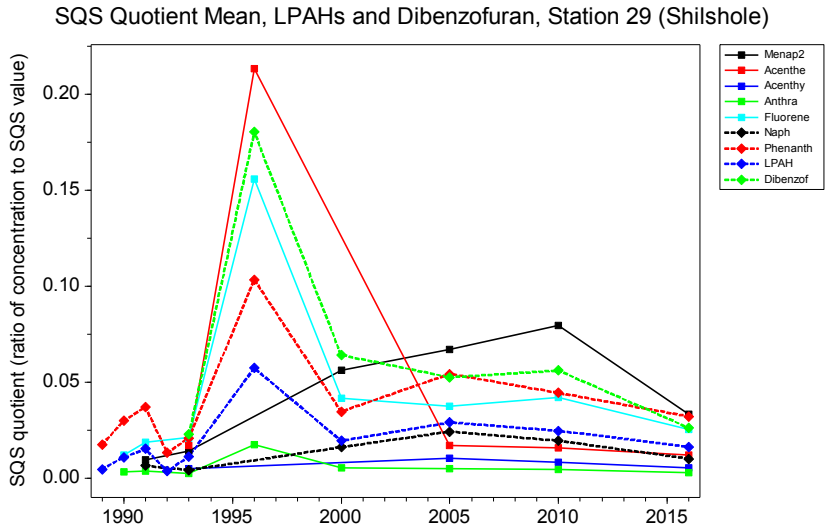
Menap2 = 2-methylnaphthalene; Acenthe = acenaphthene; Acenthy = acenaphthylene; Anthra = anthracene; Fluorene = fluorene; Naph = naphthalene; Phenanth = phenanthrene; LPAH = Total LPAH (sum of 6 compounds); Dibenzof = dibenzofuran

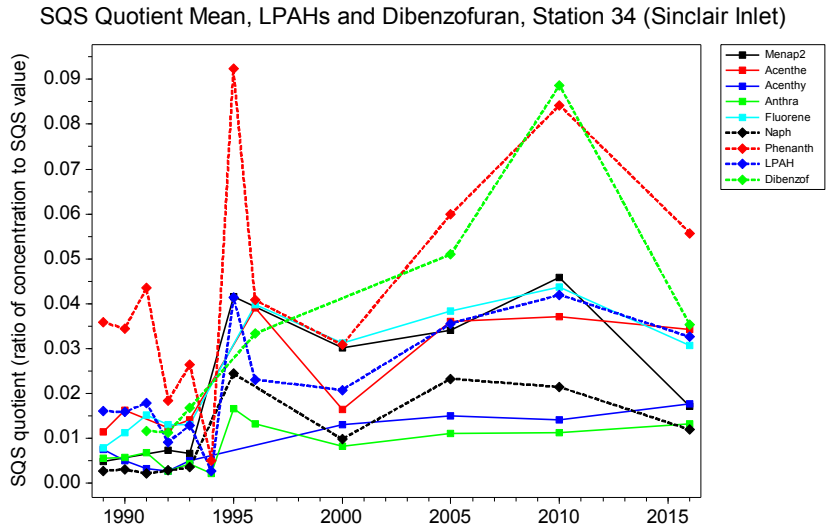


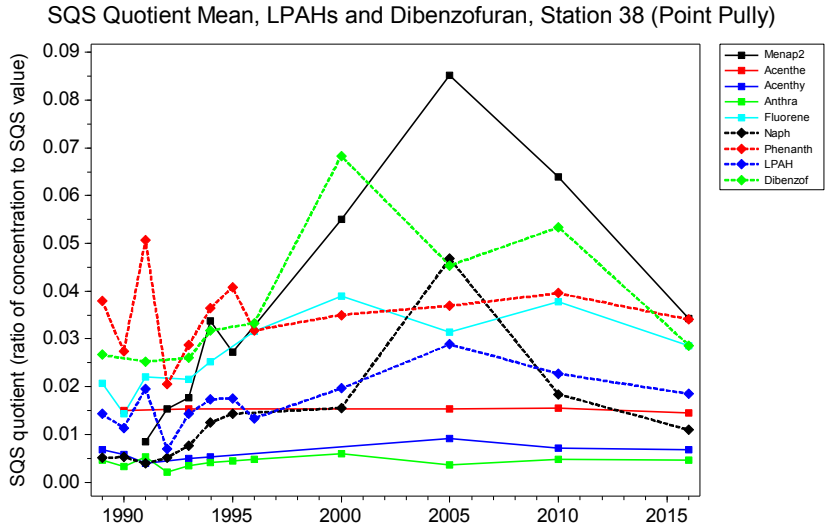


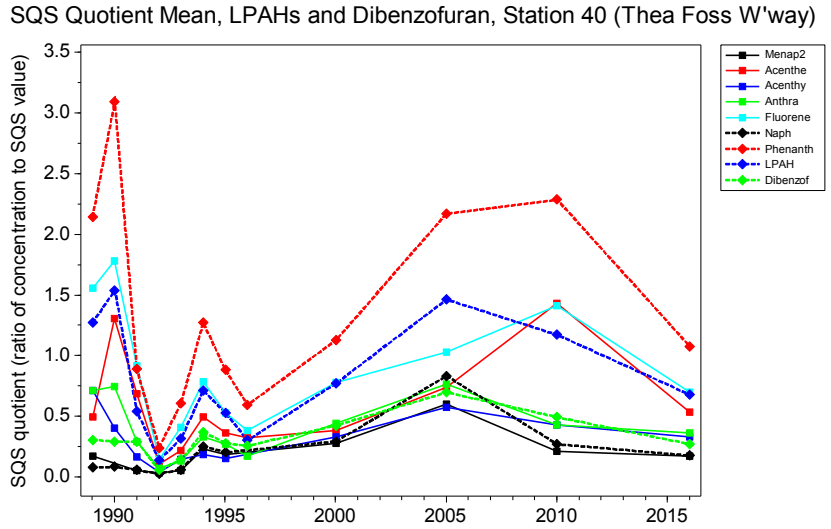

SQS Quotient Mean, LPAHs and Dibenzofuran, Station 13 (North Hood Canal)
SQS quotient (ratio of concentration to SQS value)
0.20
0.15
0.10
0.05
0.00
1990
1995
2000
2005
2010
2015
Menap2
Acenthe
Acenthy
Anthra
Fluorene
Naph
Phenanth
LPAH
Dibenzof

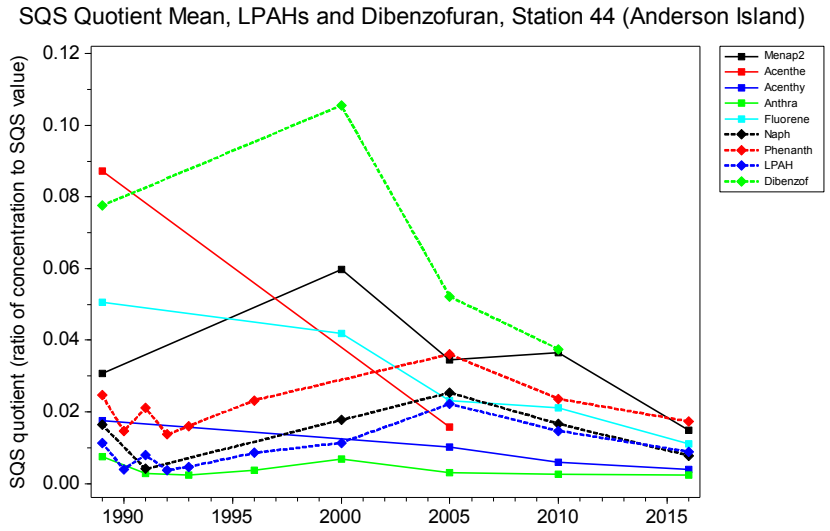

SQS Quotient Mean, LPAHs and Dibenzofuran, Station 21 (Port Gardner)
SQS quotient (ratio of concentration to SQS value)
0.25
0.20
0.15
0.10
0.05
0.00
1990
1995
2000
2005
2010
2015
Menap2
Acenthe
Acenthy
Anthra
Fluorene
Naph
Phenanth
LPAH
Dibenzof

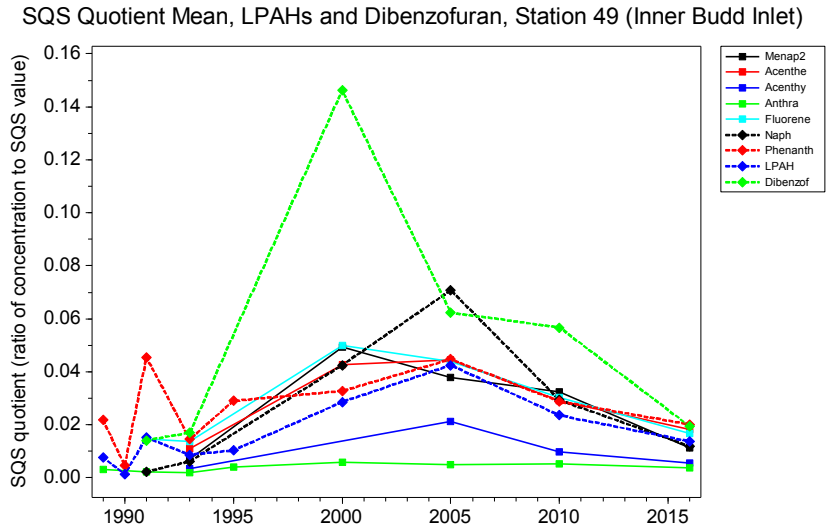

SQS Quotient Mean, LPAHs and Dibenzofuran, Station 29 (Shilshole)
SQS quotient (ratio of concentration to SQS value)
0.20
0.15
0.10
0.05
0.00
1990
1995
2000
2005
2010
2015
Menap2
Acenthe
Acenthy
Anthra
Fluorene
Naph
Phenanth
LPAH
Dibenzof


SQS Quotient Mean, LPAHs and Dibenzofuran, Station 34 (Sinclair Inlet)
SQS quotient (ratio of concentration to SQS value)
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
1990
1995
2000
2005
2010
2015
Menap2
Acenthe
Acenthy
Anthra
Fluorene
Naph
Phenanth
LPAH
Dibenzof

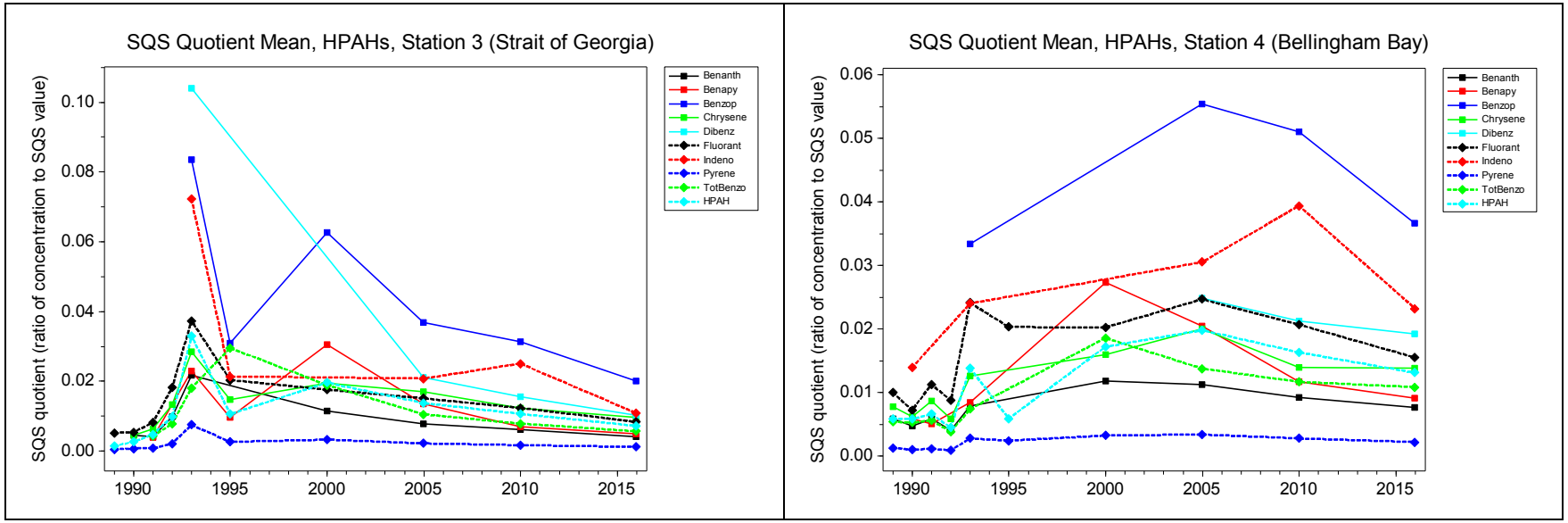

SQS Quotient Mean, LPAHs and Dibenzofuran, Station 38 (Point Pully)
SQS quotient (ratio of concentration to SQS value)
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
1990
1995
2000
2005
2010
2015
Menap2
Acenthe
Acenthy
Anthra
Fluorene
Naph
Phenanth
LPAH
Dibenzof

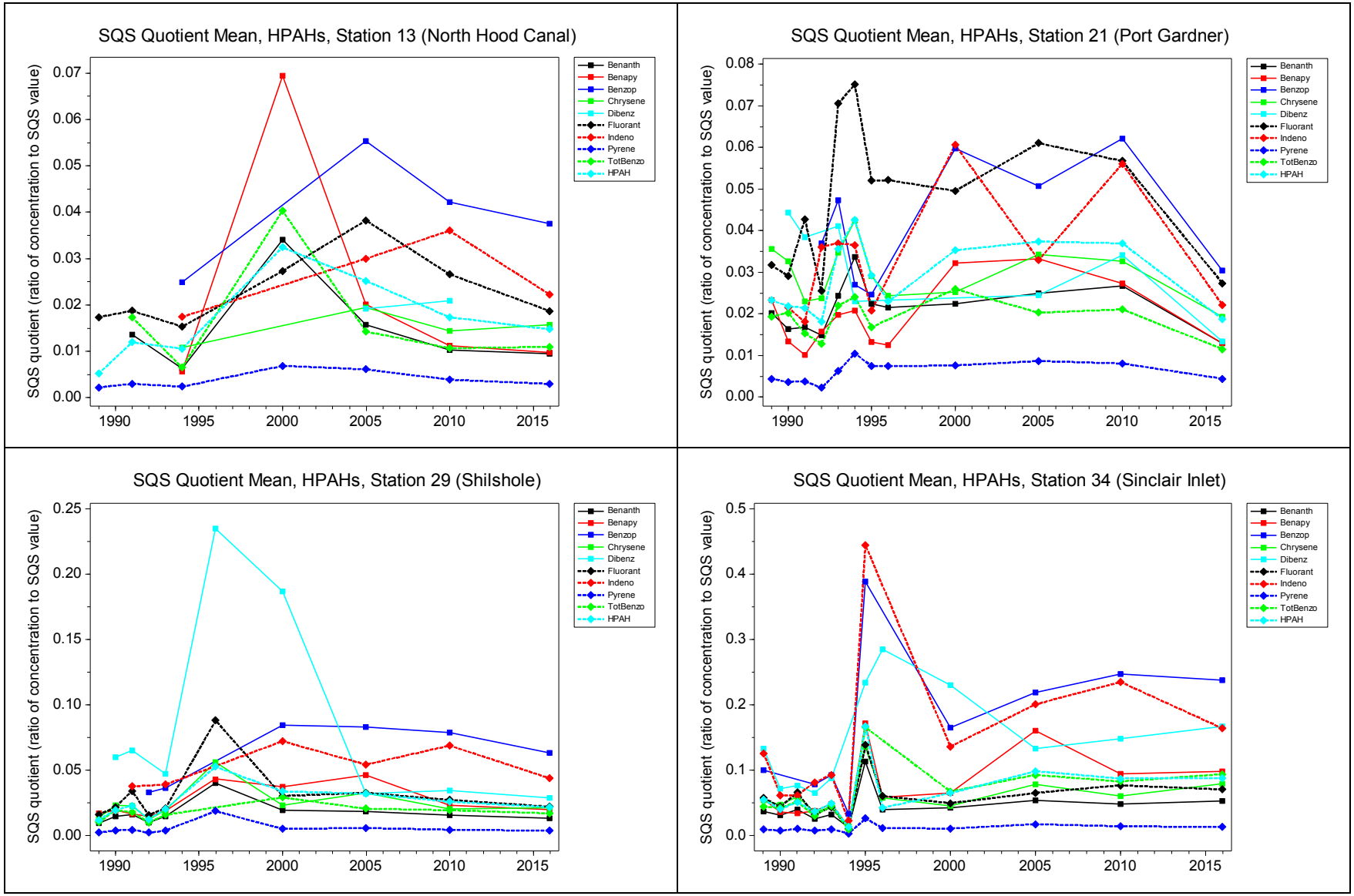

SQS Quotient Mean, LPAHs and Dibenzofuran, Station 40 (Thea Foss W'way)
SQS quotient (ratio of concentration to SQS value)
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
1990
1995
2000
2005
2010
2015
Menap2
Acenthe
Acenthy
Anthra
Fluorene
Naph
Phenanth
LPAH
Dibenzof


SQS Quotient Mean, LPAHs and Dibenzofuran, Station 44 (Anderson Island)
SQS quotient (ratio of concentration to SQS value)
0.12
0.10
0.08
0.06
0.04
0.02
0.00
1990
1995
2000
2005
2010
2015
Menap2
Acenthe
Acenthy
Anthra
Fluorene
Naph
Phenanth
LPAH
Dibenzof


SQS Quotient Mean, LPAHs and Dibenzofuran, Station 49 (Inner Budd Inlet)
SQS quotient (ratio of concentration to SQS value)
0.16
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
1990
1995
2000
2005
2010
2015
Menap2
Acenthe
Acenthy
Anthra
Fluorene
Naph
Phenanth
LPAH
Dibenzof

Yearly mean SQS quotients for high-molecular-weight PAHs (detected only, including estimates), by station.
Benanth = benzo(a)anthracene; Benapy = benzo(a)pyrene; Benzop = benzo(g,h,i)perylene; Chrysene = chrysene;
Dibenz = dibenzo(a,h)anthracene; Fluorant = fluoranthene; Indeno = indeno(1,2,3-c,d)pyrene; TotBenzo = total benzofluoranthenes;
HPAH = Total HPAH (sum of 9 compounds)




SQS Quotient Mean, HPAHs, Station 13 (North Hood Canal)
SQS quotient (ratio of concentration to SQS value)
0.00
0.01
0.02
0.03
0.04
0.05
0.06
0.07
1990
1995
2000
2005
2010
2015
Benanth
Benapy
Benzop
Chrysene
Dibenz
Fluorant
Indeno
Pyrene
TotBenzo
HPAH
SQS Quotient Mean, HPAHs, Station 21 (Port Gardner)
SQS quotient (ratio of concentration to SQS value)
0.00
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08
1990
1995
2000
2005
2010
2015
Benanth
Benapy
Benzop
Chrysene
Dibenz
Fluorant
Indeno
Pyrene
TotBenzo
HPAH
SQS Quotient Mean, HPAHs, Station 29 (Shilshole)
SQS quotient (ratio of concentration to SQS value)
0.00
0.05
0.10
0.15
0.20
0.25
1990
1995
2000
2005
2010
2015
Benanth
Benapy
Benzop
Chrysene
Dibenz
Fluorant
Indeno
Pyrene
TotBenzo
HPAH
SQS Quotient Mean, HPAHs, Station 34 (Sinclair Inlet)
SQS quotient (ratio of concentration to SQS value)
0.0
0.1
0.2
0.3
0.4
0.5
1990
1995
2000
2005
2010
2015
Benanth
Benapy
Benzop
Chrysene
Dibenz
Fluorant
Indeno
Pyrene
TotBenzo
HPAH


SQS Quotient Mean, HPAHs, Station 38 (Point Pully)
SQS quotient (ratio of concentration to SQS value)
0.00
0.05
0.10
0.15
0.20
1990
1995
2000
2005
2010
2015
Benanth
Benapy
Benzop
Chrysene
Dibenz
Fluorant
Indeno
Pyrene
TotBenzo
HPAH
SQS Quotient Mean, HPAHs, Station 40 (Thea Foss Waterway)
SQS quotient (ratio of concentration to SQS value)
0
1
2
3
4
1990
1995
2000
2005
2010
2015
Benanth
Benapy
Benzop
Chrysene
Dibenz
Fluorant
Indeno
Pyrene
TotBenzo
HPAH
SQS Quotient Mean, HPAHs, Station 44 (Anderson Island)
SQS quotient (ratio of concentration to SQS value)
0.00
0.02
0.04
0.06
0.08
0.10
0.12
0.14
1990
1995
2000
2005
2010
2015
Benanth
Benapy
Benzop
Chrysene
Dibenz
Fluorant
Indeno
Pyrene
TotBenzo
HPAH
SQS Quotient Mean, HPAHs, Station 49 (Inner Budd Inlet)
SQS quotient (ratio of concentration to SQS value)
0.00
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08
1990
1995
2000
2005
2010
2015
Benanth
Benapy
Benzop
Chrysene
Dibenz
Fluorant
Indeno
Pyrene
TotBenzo
HPAH

Correlations

Pearson correlation coefficient, *r*, calculated pairwise between concentrations of individual chemicals (detected only), percent fines (silt-clay content) and percent total organic carbon (TOC), at the individual stations. **Bold** signifies correlation significant at individual alpha = 0.05.

Parameter		3, Strait of Georgia		4, Bellingham Bay		13, North Hood Canal		21, Port Gardner		29, Shilshole	
		Fines	TOC	Fines	TOC	Fines	TOC	Fines	TOC	Fines	TOC
TOC	Total Organic Carbon	**0.847**		0.134		**0.875**		**0.613**		-0.340	
Metal	Arsenic	0.118	0.133	**0.534**	-0.089	**0.645**	**0.817**	**0.652**	**0.733**	0.315	-0.173
	Cadmium	-0.129	-0.160	0.152	0.264	0.614	**0.911**	-0.010	0.088	0.250	-0.304
	Chromium	**0.813**	**0.738**	0.008	-0.098	0.280	0.104	**0.719**	**0.622**	**-0.570**	0.079
	Copper	**0.701**	**0.618**	0.428	0.045	**0.716**	0.504	**0.859**	**0.669**	**0.521**	-0.355
	Lead	0.487	0.428	0.127	**0.468**	-0.211	-0.441	**0.679**	0.343	0.481	-0.297
	Mercury	-0.106	-0.065	**0.560**	0.161	-0.136	-0.420	0.385	0.122	-0.109	-0.454
	Silver	-0.124	-0.060	0.279	-0.123	*	*	0.210	-0.172	**0.574**	-0.349
	Zinc	**0.765**	**0.641**	0.222	-0.162	**0.668**	0.531	**0.847**	**0.622**	0.022	0.037
Low-molecular-wt PAH	2-Methylnaphthalene	**0.619**	0.511	**-0.719**	-0.218	-0.112	-0.050	**-0.664**	**-0.582**	**-0.661**	-0.014
	Acenaphthene	**-0.673**	**-0.941**	0.050	0.554	0.535	0.564	**-0.597**	**-0.481**	0.539	-0.208
	Acenaphthylene	0.736	-0.356	0.485	**-0.894**	-0.463	-0.288	**-0.710**	**-0.493**	-0.195	-0.108
	Anthracene	-0.191	-0.230	-0.375	**0.663**	-0.074	0.022	-0.192	-0.160	0.284	-0.128
	Fluorene	0.265	0.181	**-0.725**	0.486	0.088	0.343	**-0.504**	**-0.508**	0.155	-0.078
	Naphthalene	**0.608**	0.510	**-0.593**	-0.246	-0.442	-0.388	**-0.593**	**-0.520**	-0.367	-0.093
	Phenanthrene	**0.537**	0.354	-0.422	-0.431	-0.016	0.118	**-0.445**	-0.397	0.012	0.010
	Total LPAH	**0.672**	**0.503**	**-0.575**	-0.284	-0.079	0.101	**-0.491**	-0.379	-0.090	0.080

High-molecular-wt PAH	Benzo(a)anthracene	-0.013	-0.082	**-0.550**	0.028	0.055	0.128	-0.404	-0.397	0.095	0.231
	Benzo(a)pyrene	-0.220	-0.300	-0.441	**0.660**	-0.065	0.025	**-0.640**	-0.400	-0.099	0.226
	Benzo(g,h,i)perylene	**-0.644**	**-0.693**	-0.511	**0.743**	0.600	0.614	**-0.633**	-0.476	**-0.579**	-0.129
	Total Benzofluoranthenes	0.062	0.006	**-0.550**	0.048	0.087	0.168	-0.355	-0.373	-0.421	0.508
	Chrysene	0.414	0.333	**-0.600**	-0.133	0.618	**0.636**	-0.236	-0.066	0.207	0.182
	Dibenzo(a,h)anthracene	**-0.747**	**-0.836**	0.118	0.057	0.370	0.866	0.272	0.158	0.226	-0.018
	Fluoranthene	0.327	0.103	**-0.502**	-0.149	0.306	0.475	-0.270	-0.431	0.175	0.014
	Indeno(1,2,3-c,d)pyrene	**-0.780**	**-0.841**	-0.541	**0.656**	0.407	0.484	**-0.618**	**-0.590**	**-0.808**	0.344
	Pyrene	0.220	0.021	**-0.585**	-0.111	0.182	0.383	**-0.557**	-0.410	0.223	0.055
	Total HPAH	0.417	0.221	**-0.621**	-0.100	0.264	0.411	**-0.467**	-0.387	-0.100	0.270

Parameter		34, Sinclair Inlet		38, Point Pully		40, Thea Foss Waterway		44, Anderson Island		49, Inner Budd Inlet	
		Fines	TOC	Fines	TOC	Fines	TOC	Fines	TOC	Fines	TOC
TOC	Total Organic Carbon	-0.163		-0.094		0.145		**0.575**		0.255	
Metal	Arsenic	0.204	0.119	**0.526**	0.021	0.333	0.165	**0.466**	**0.371**	-0.029	0.343
	Cadmium	-0.205	**-0.510**	0.034	-0.109	0.108	0.269	0.212	0.019	0.286	0.035
	Chromium	-0.124	0.136	-0.311	0.094	0.280	0.127	**-0.341**	-0.142	-0.147	**0.508**
	Copper	-0.187	0.001	**0.665**	-0.103	**0.621**	0.168	**0.781**	**0.466**	**0.536**	0.145
	Lead	-0.387	-0.036	0.193	-0.122	**-0.792**	0.082	**0.746**	0.249	**0.778**	0.188
	Mercury	**-0.567**	-0.301	0.050	-0.284	**0.554**	0.071	0.270	-0.027	-0.192	0.155
	Silver	**0.468**	0.094	**0.715**	-0.197	0.187	0.186	-0.216	0.089	0.344	0.352
	Zinc	**-0.507**	-0.256	**0.379**	0.009	**0.706**	0.373	**0.640**	0.180	0.221	**0.540**
Low-molecular-wt PAH	2-Methylnaphthalene	0.211	-0.034	**-0.769**	0.295	-0.135	-0.204	**0.660**	0.484	**-0.627**	-0.465
	Acenaphthene	-0.175	-0.264	-0.040	-0.006	**-0.759**	0.011	**0.986**	0.712	-0.398	-0.486
	Acenaphthylene	**-0.502**	-0.111	**-0.647**	0.416	**-0.847**	-0.159	0.543	-0.077	-0.292	**-0.629**
	Anthracene	-0.325	0.149	-0.240	0.027	**-0.659**	-0.212	**0.555**	0.324	**-0.577**	-0.161
	Fluorene	-0.168	-0.106	**-0.748**	0.280	**-0.823**	0.006	**0.748**	0.170	-0.472	-0.529
	Naphthalene	-0.187	-0.191	**-0.621**	0.227	-0.248	-0.252	-0.216	0.095	-0.428	**-0.654**
	Phenanthrene	-0.301	0.102	-0.241	0.184	**-0.806**	-0.035	0.199	**0.369**	-0.348	-0.130
	Total LPAH	-0.400	0.120	**-0.606**	**0.335**	**-0.796**	-0.109	-0.293	-0.096	**-0.641**	-0.375
High-molecular-wt PAH	Benzo(a)anthracene	**-0.456**	0.254	-0.065	-0.099	**-0.828**	-0.119	**0.758**	**0.501**	-0.420	-0.345
	Benzo(a)pyrene	-0.371	0.055	**-0.411**	0.212	**-0.623**	-0.204	0.234	0.107	**-0.571**	-0.188
	Benzo(g,h,i)perylene	-0.416	0.246	-0.259	0.245	**-0.785**	-0.115	**0.549**	**0.458**	0.110	0.383
	Total Benzofluoranthenes	**-0.539**	0.231	-0.111	0.107	**-0.818**	-0.166	**0.519**	**0.386**	**-0.538**	-0.093
	Chrysene	**-0.445**	0.230	0.164	-0.012	**-0.729**	-0.182	**0.697**	**0.544**	-0.075	-0.218
	Dibenzo(a,h)anthracene	0.053	0.153	0.165	0.086	**-0.737**	-0.133	**0.841**	0.535	0.329	0.123
	Fluoranthene	-0.382	0.235	0.081	-0.035	**-0.863**	-0.034	**0.585**	**0.666**	-0.078	-0.383
	Indeno(1,2,3-c,d)pyrene	-0.435	0.159	-0.235	-0.092	**-0.915**	0.011	**0.762**	**0.749**	-0.066	0.185
	Pyrene	-0.434	0.236	0.145	0.210	**-0.827**	-0.079	0.277	**0.484**	**-0.610**	-0.344
	Total HPAH	**-0.572**	0.204	-0.163	0.132	**-0.857**	-0.122	**0.466**	**0.547**	**-0.540**	-0.217

Chemistry Case Narratives

Case narratives for all laboratory analyses are available from the report authors upon request.

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Partridge, V., K. Welch, S. Aasen, and M. Dutch. 2005. Temporal Monitoring of Puget Sound Sediments: Results of the Puget Sound Ambient Monitoring Program, 1989-2000 Washington State Department of Ecology, Olympia, WA. Publication 05-03-016. https://fortress.wa.gov/ecy/publications/SummaryPages/0503016.html.

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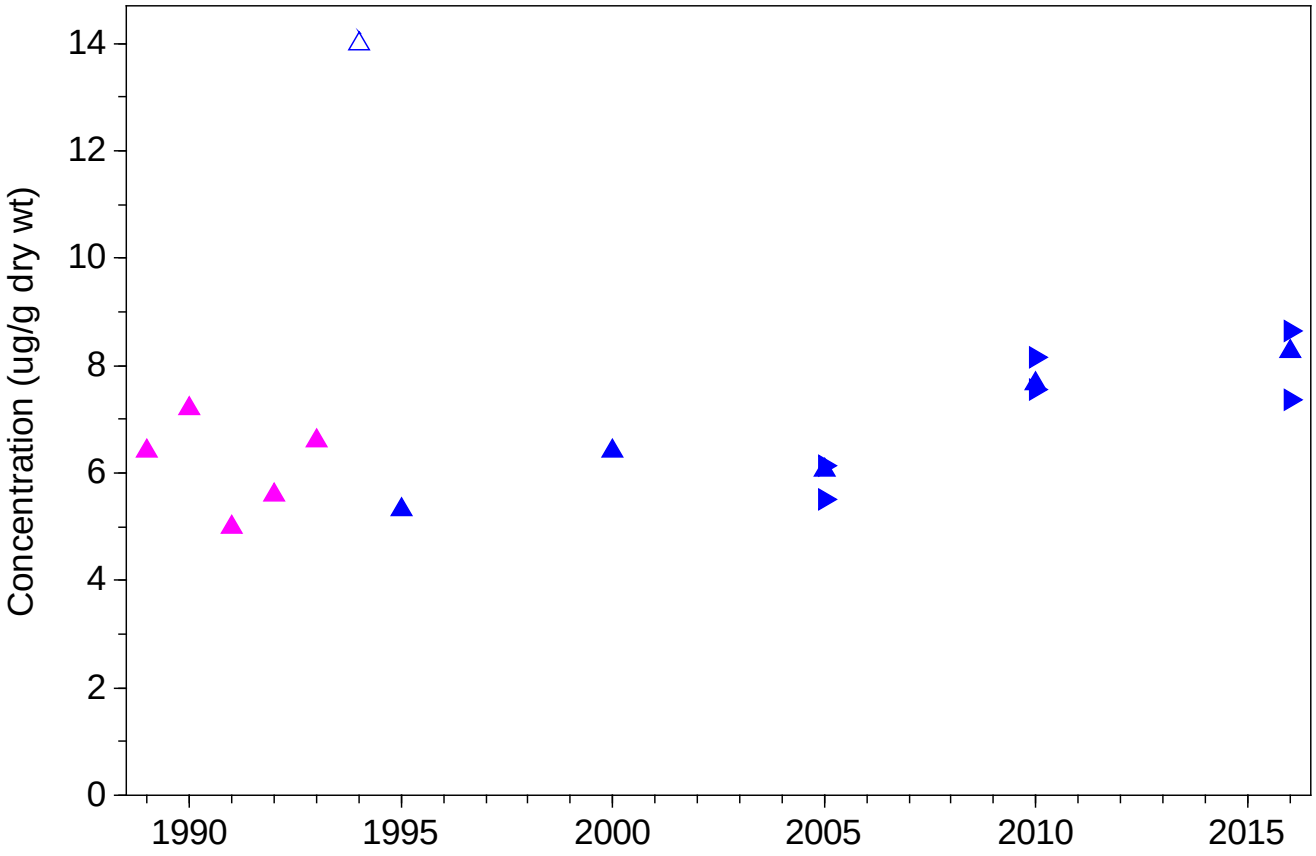
Arsenic, Station 3



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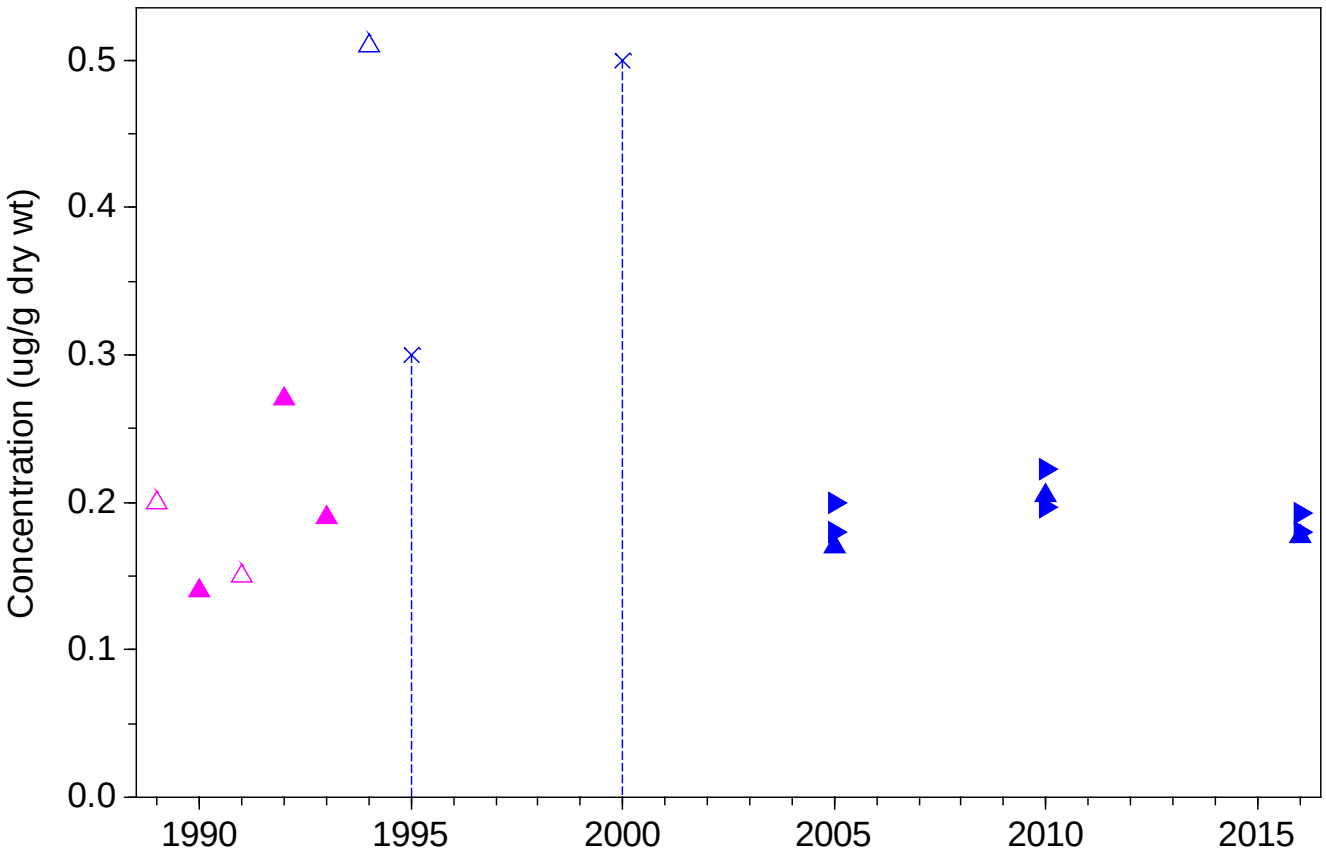

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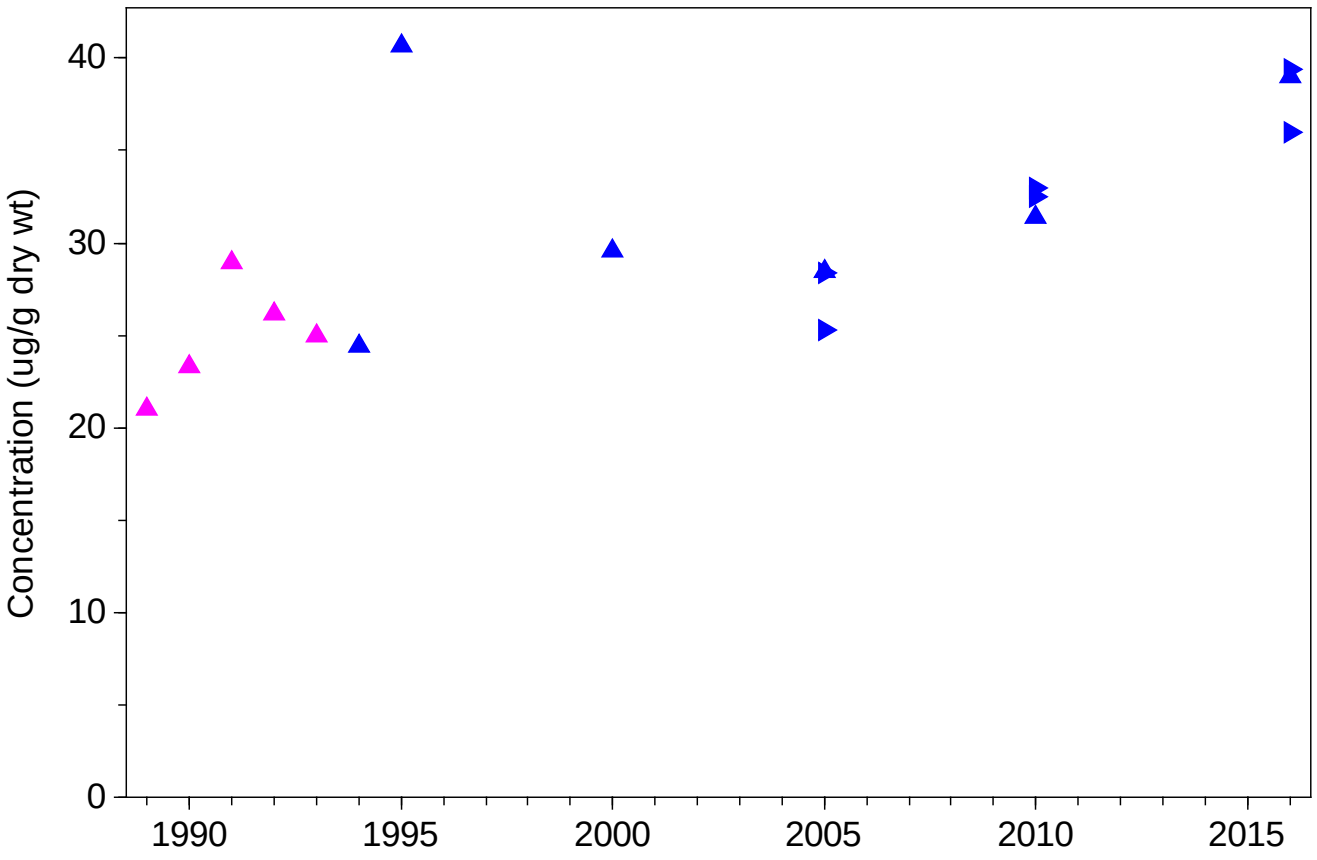

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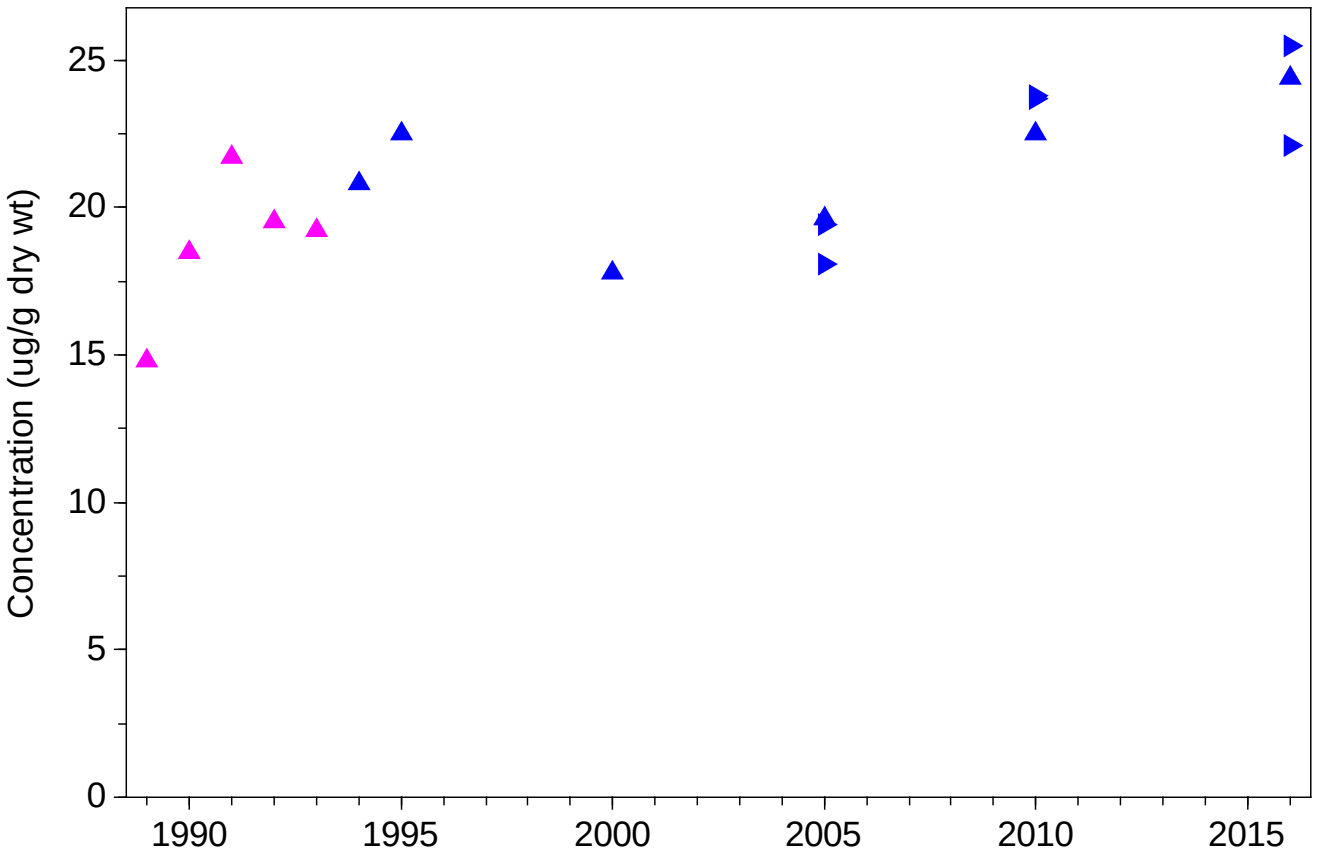

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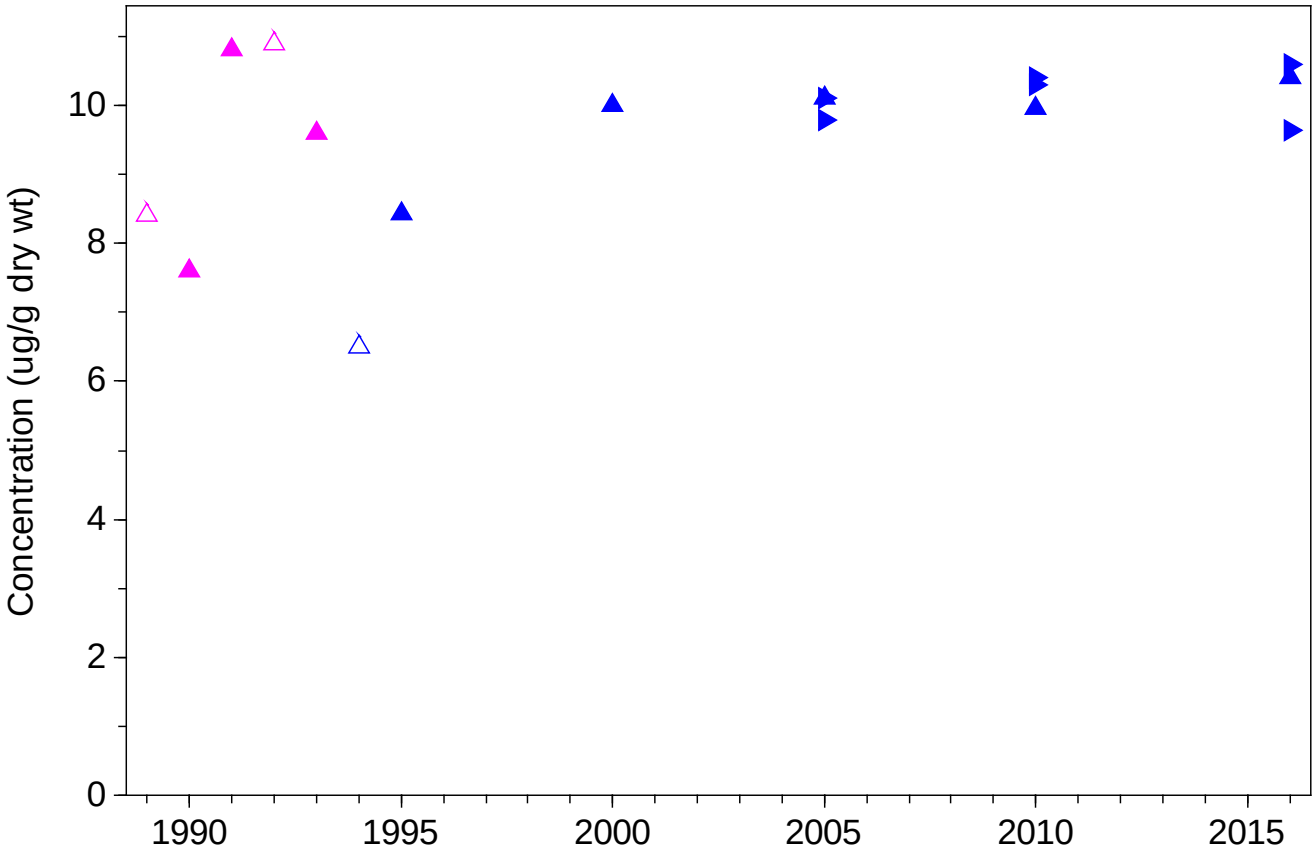

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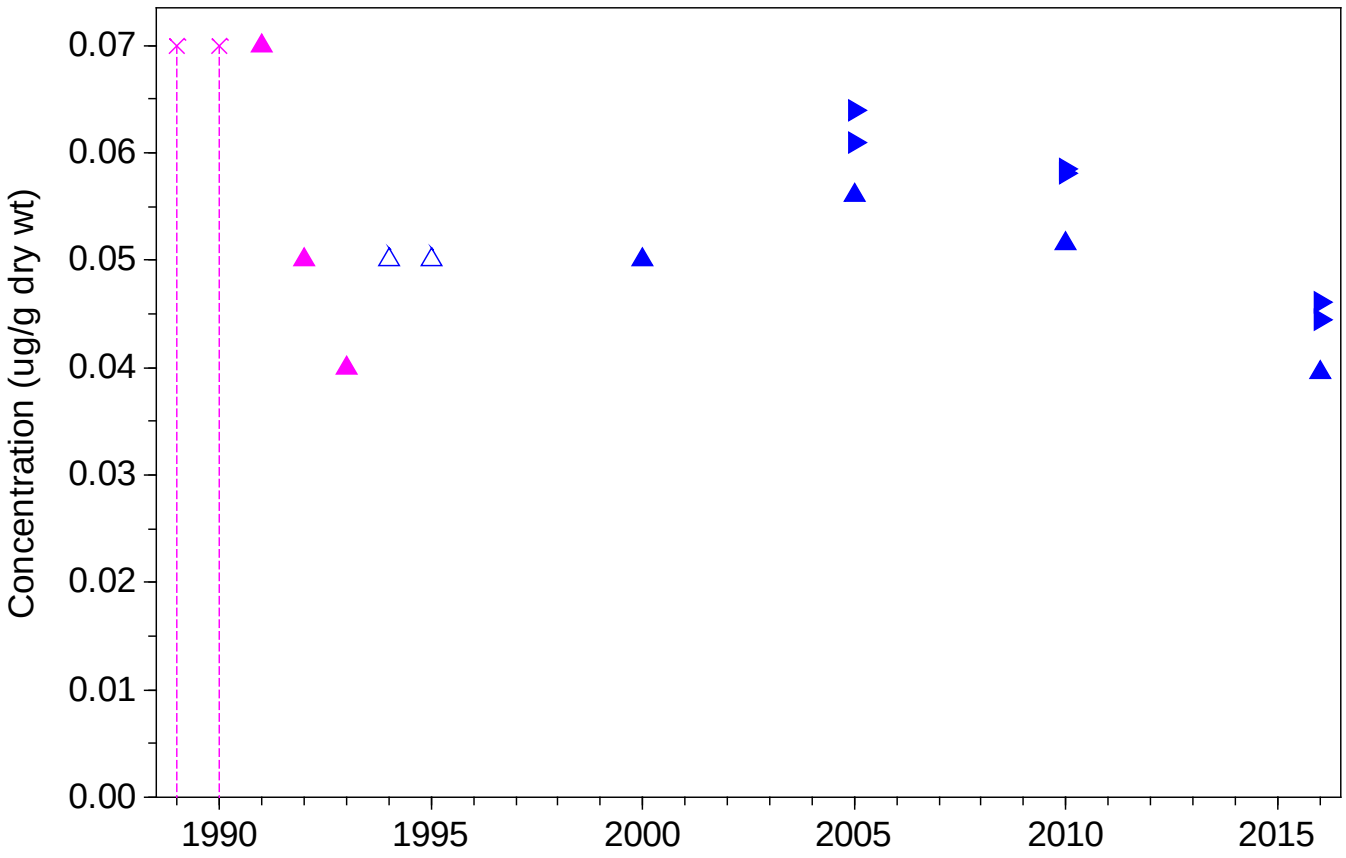

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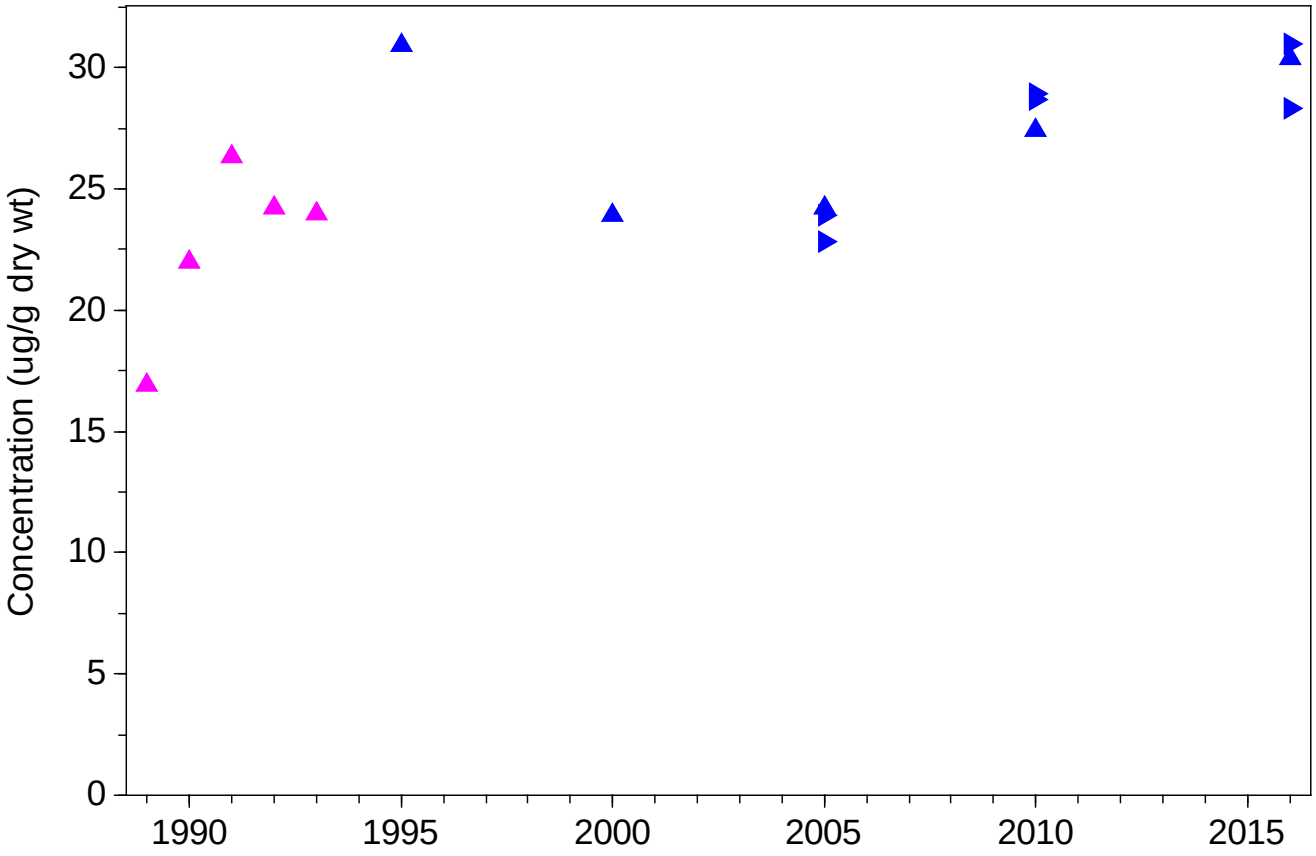

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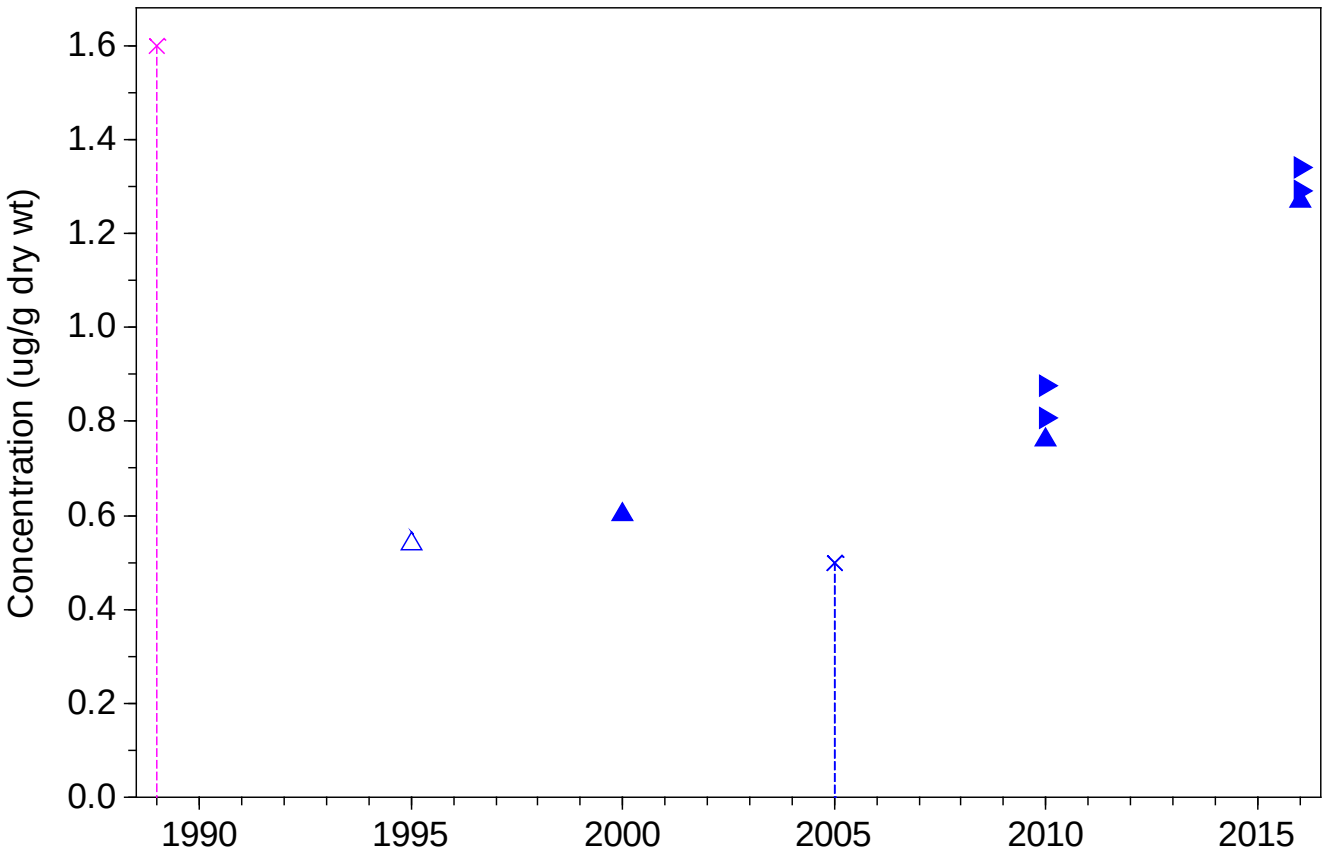
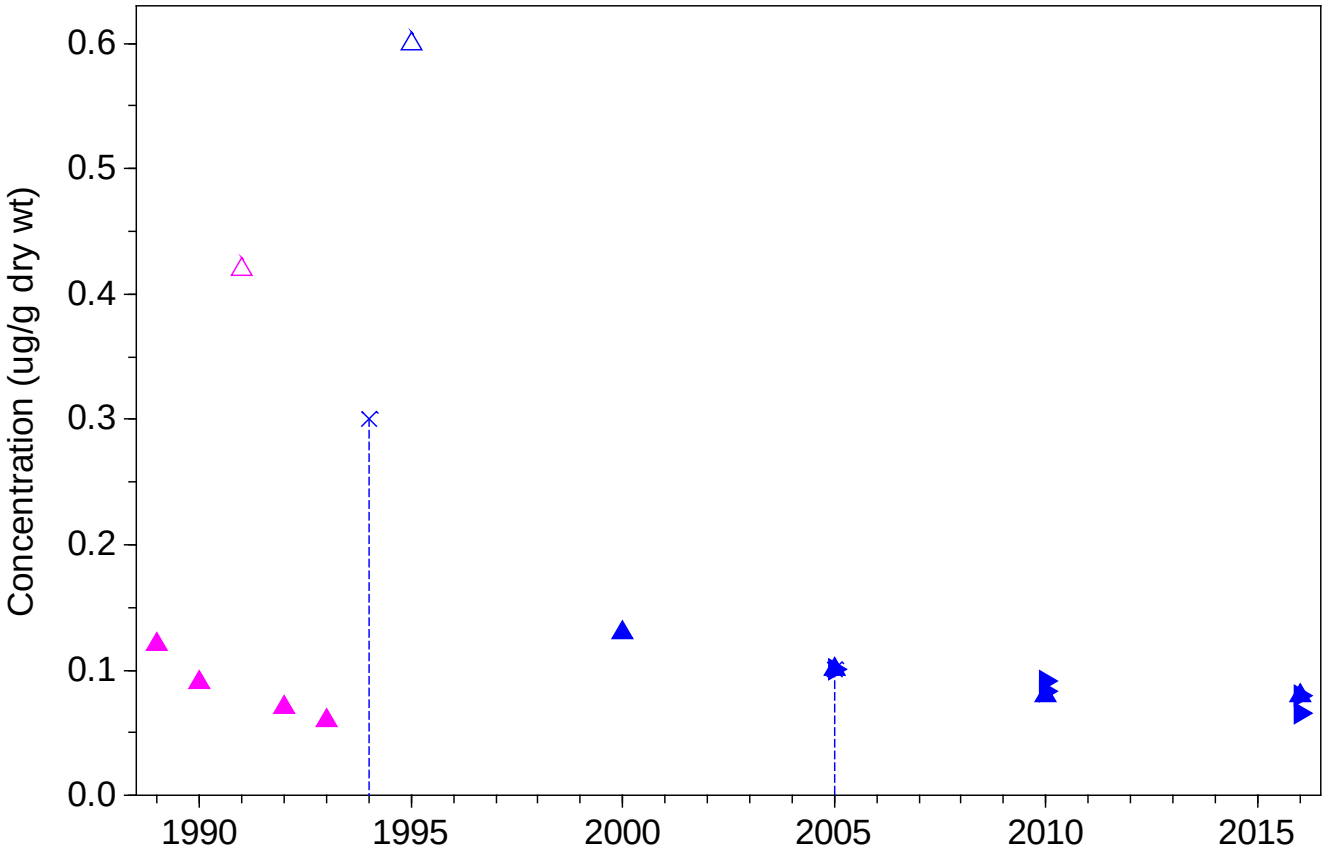


Silver, Station 3



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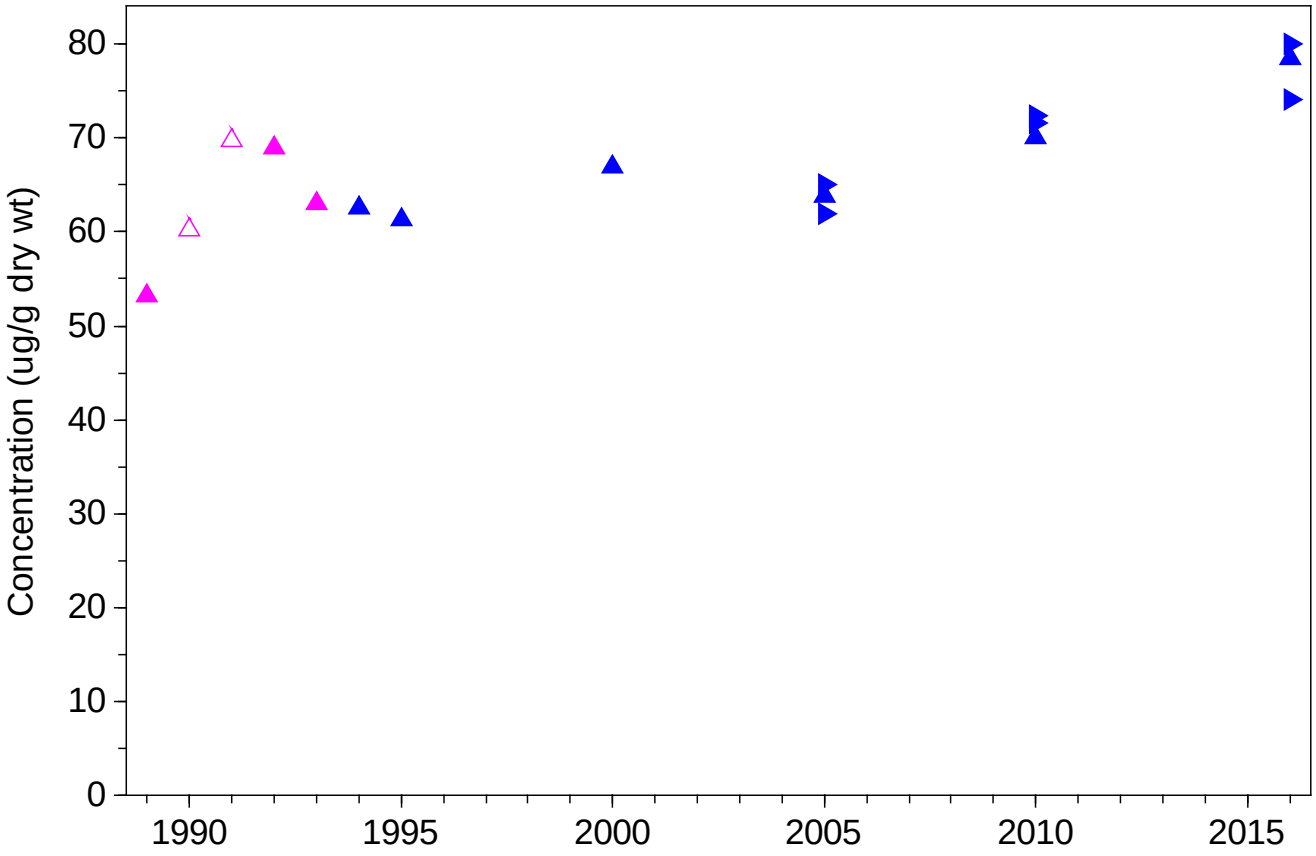
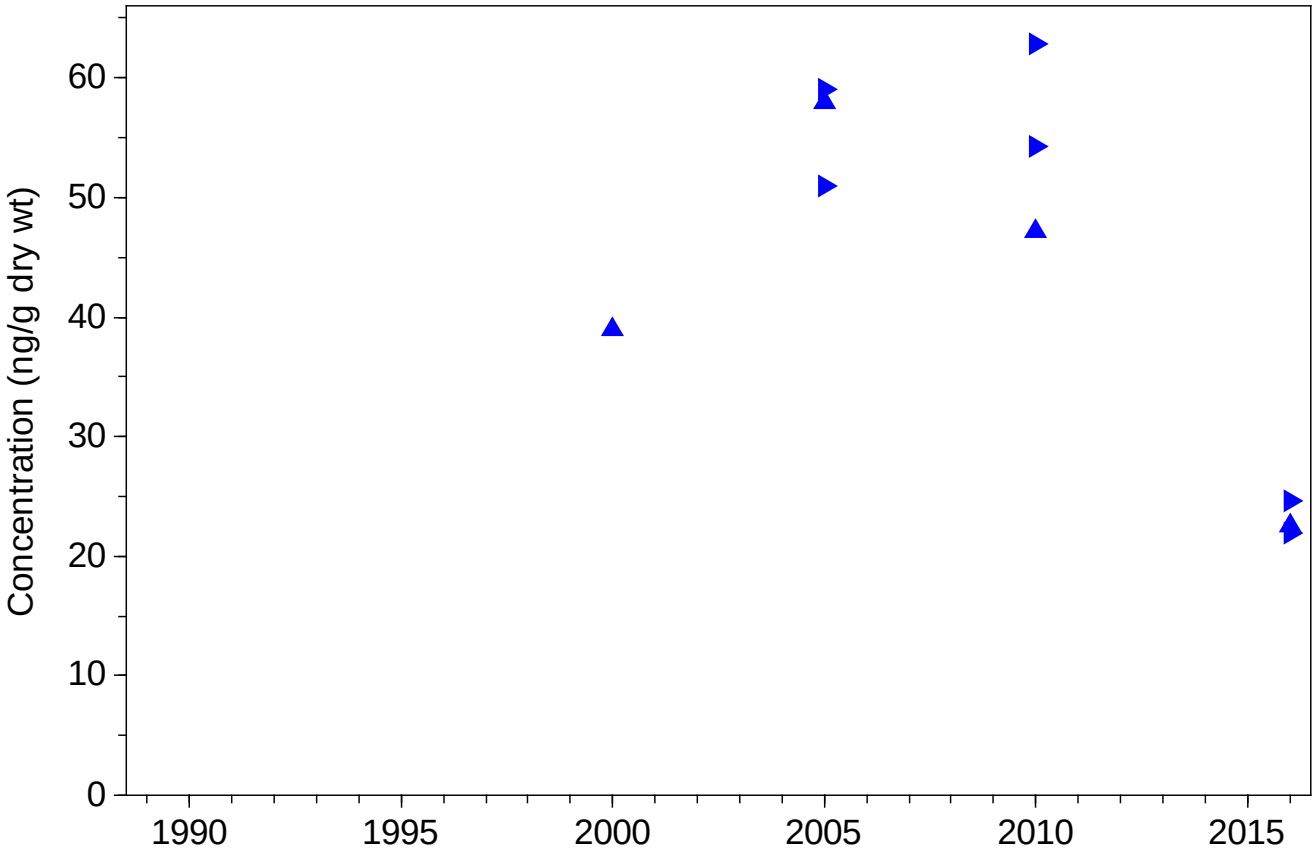


1-Methylnaphthalene, Station 3



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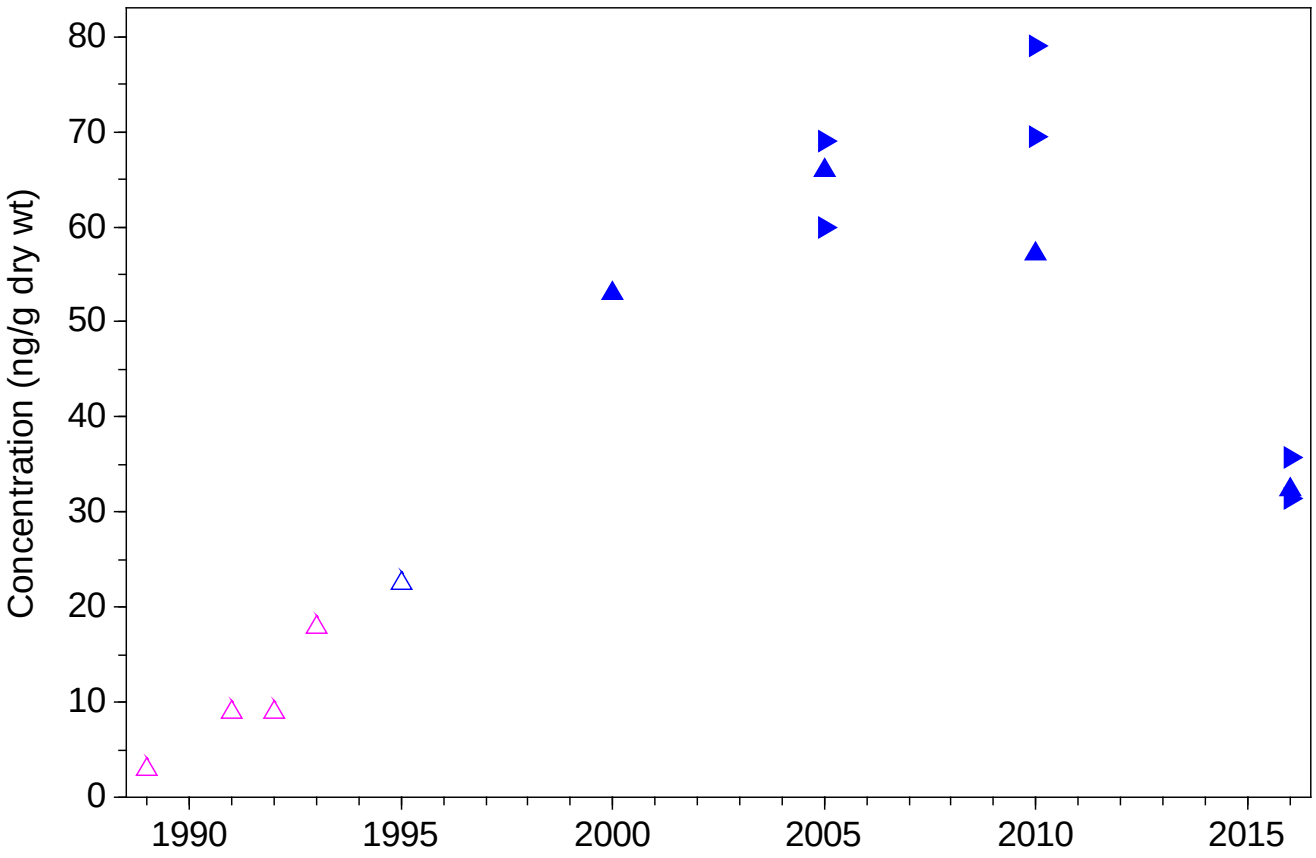
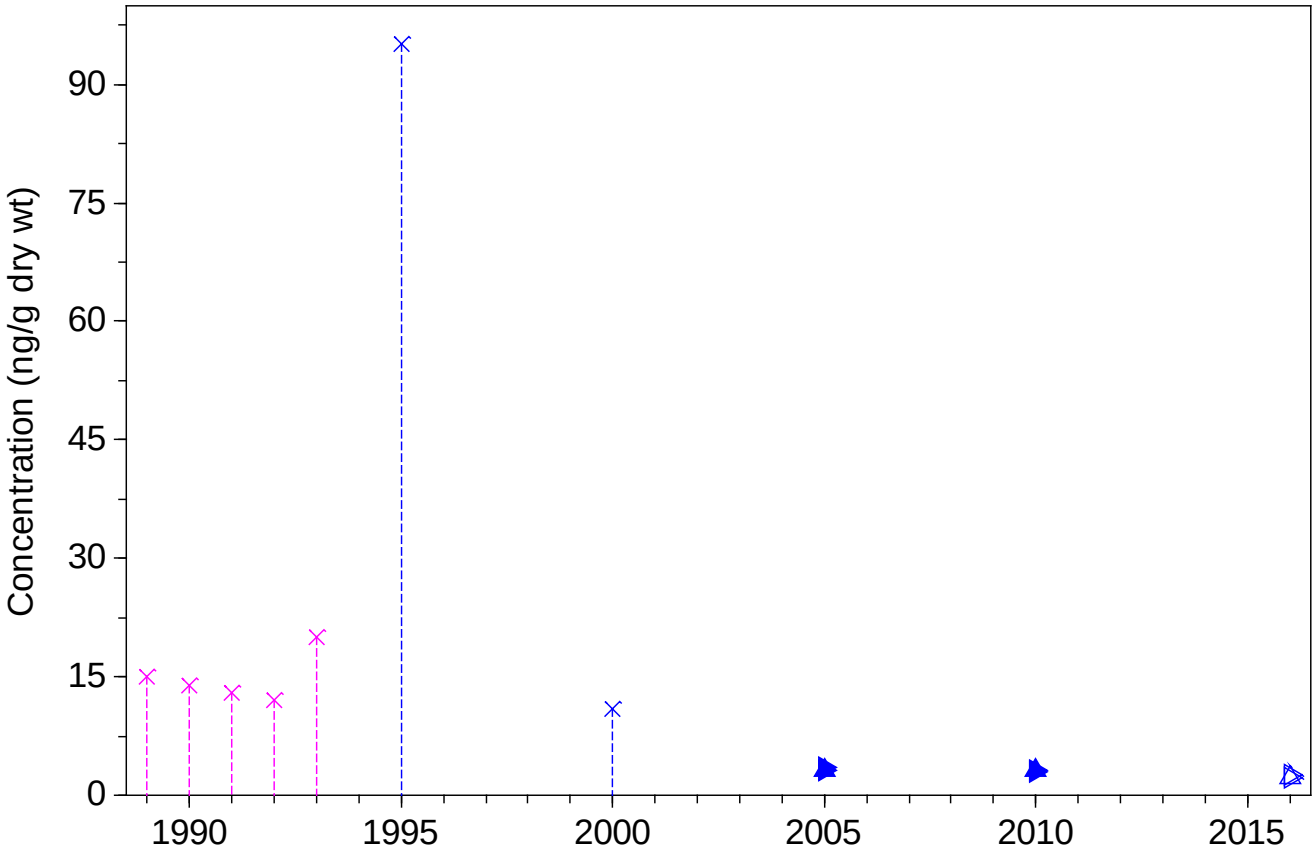


Acenaphthene, Station 3



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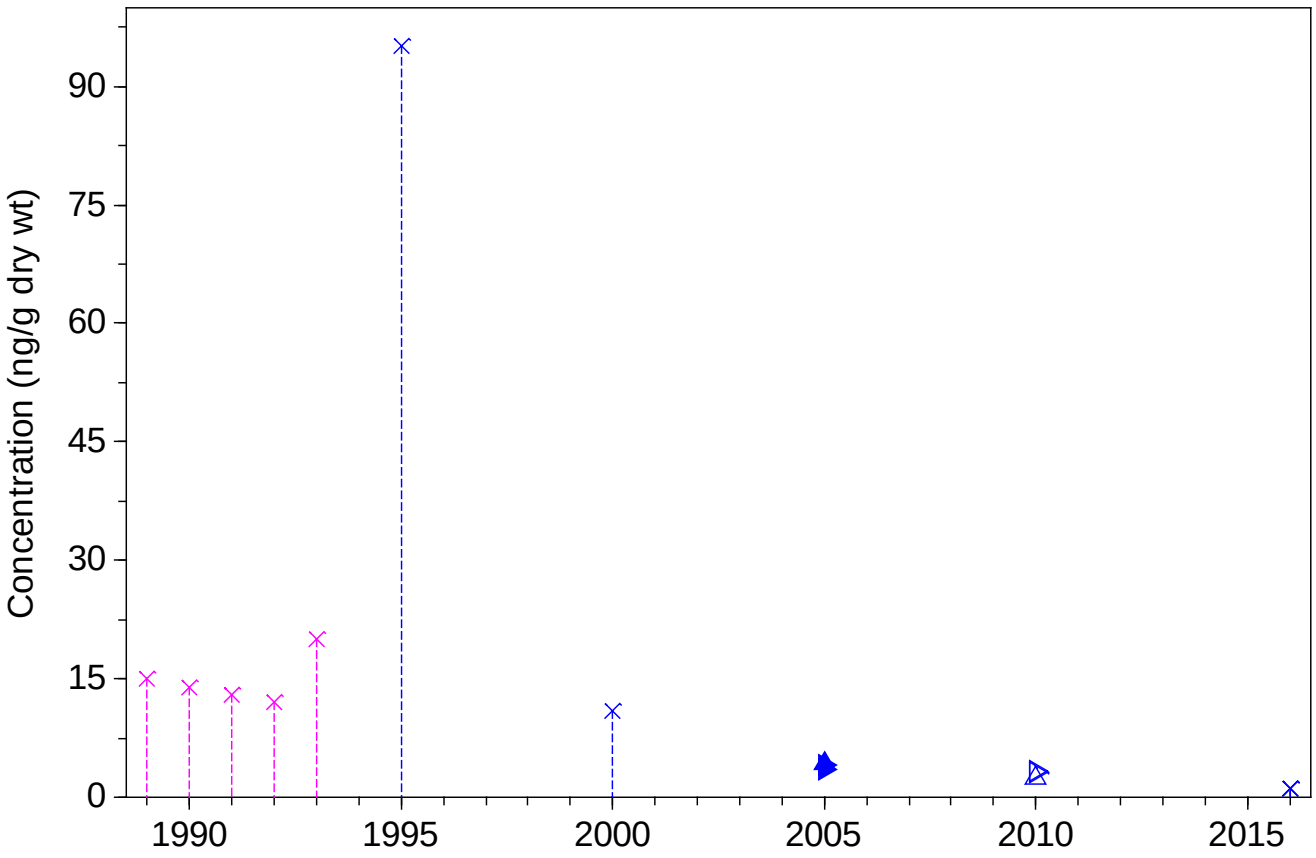

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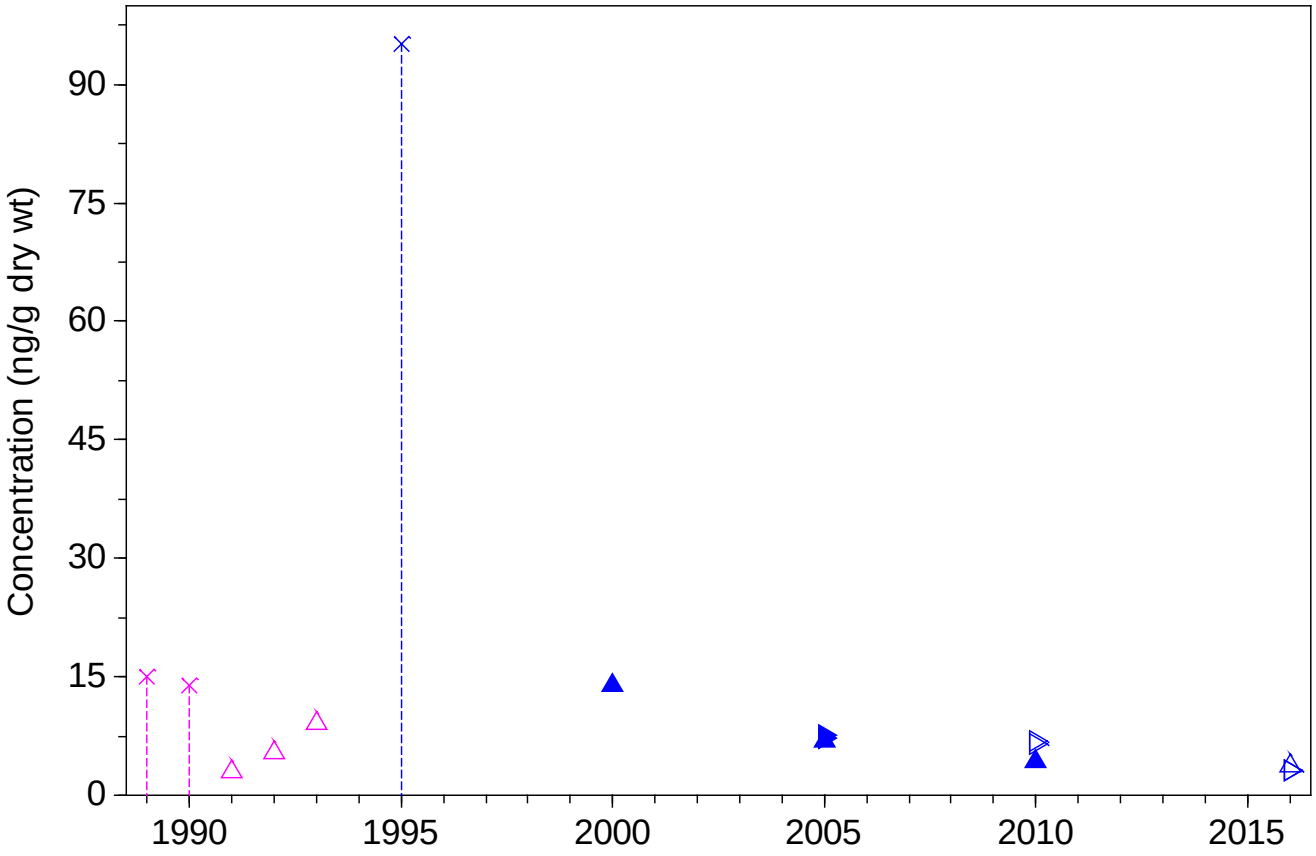

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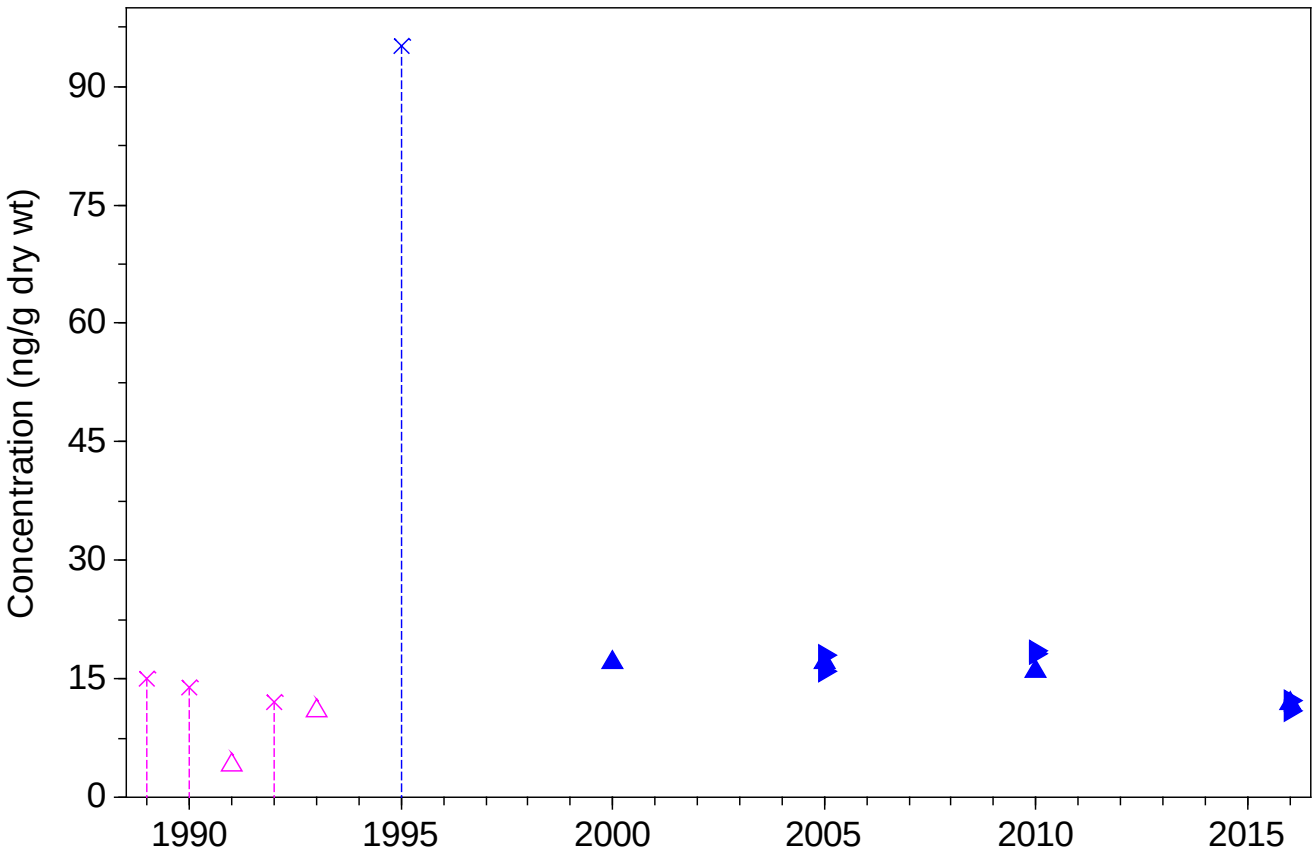

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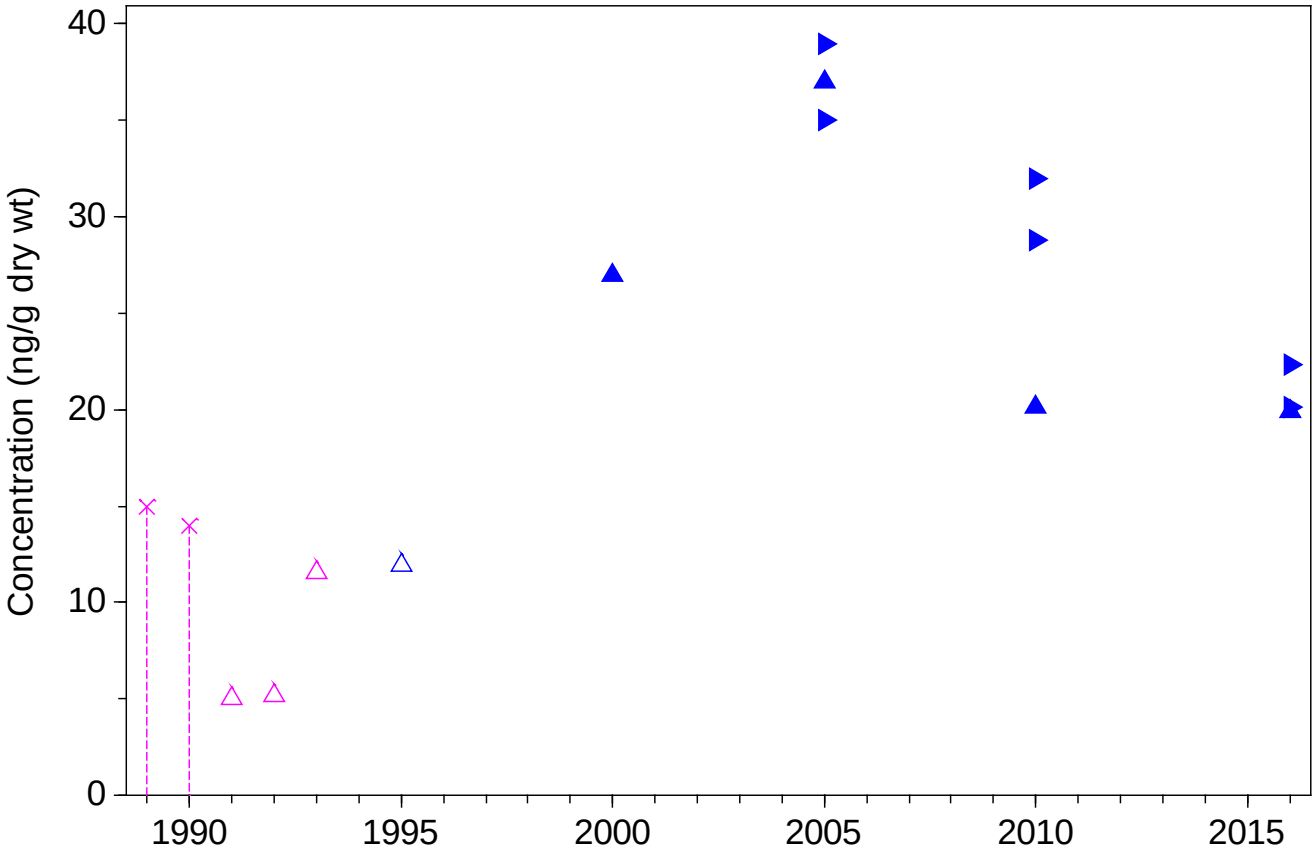
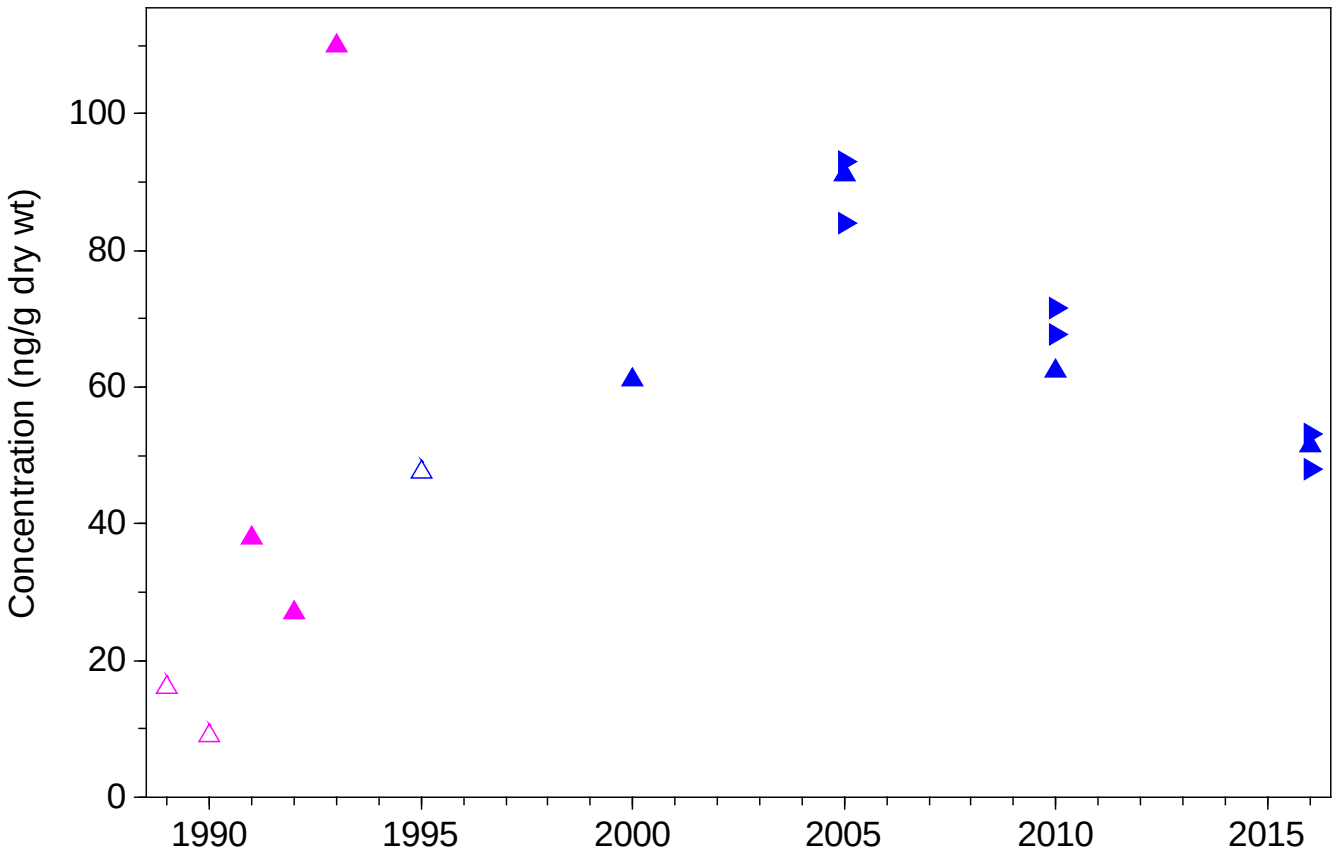
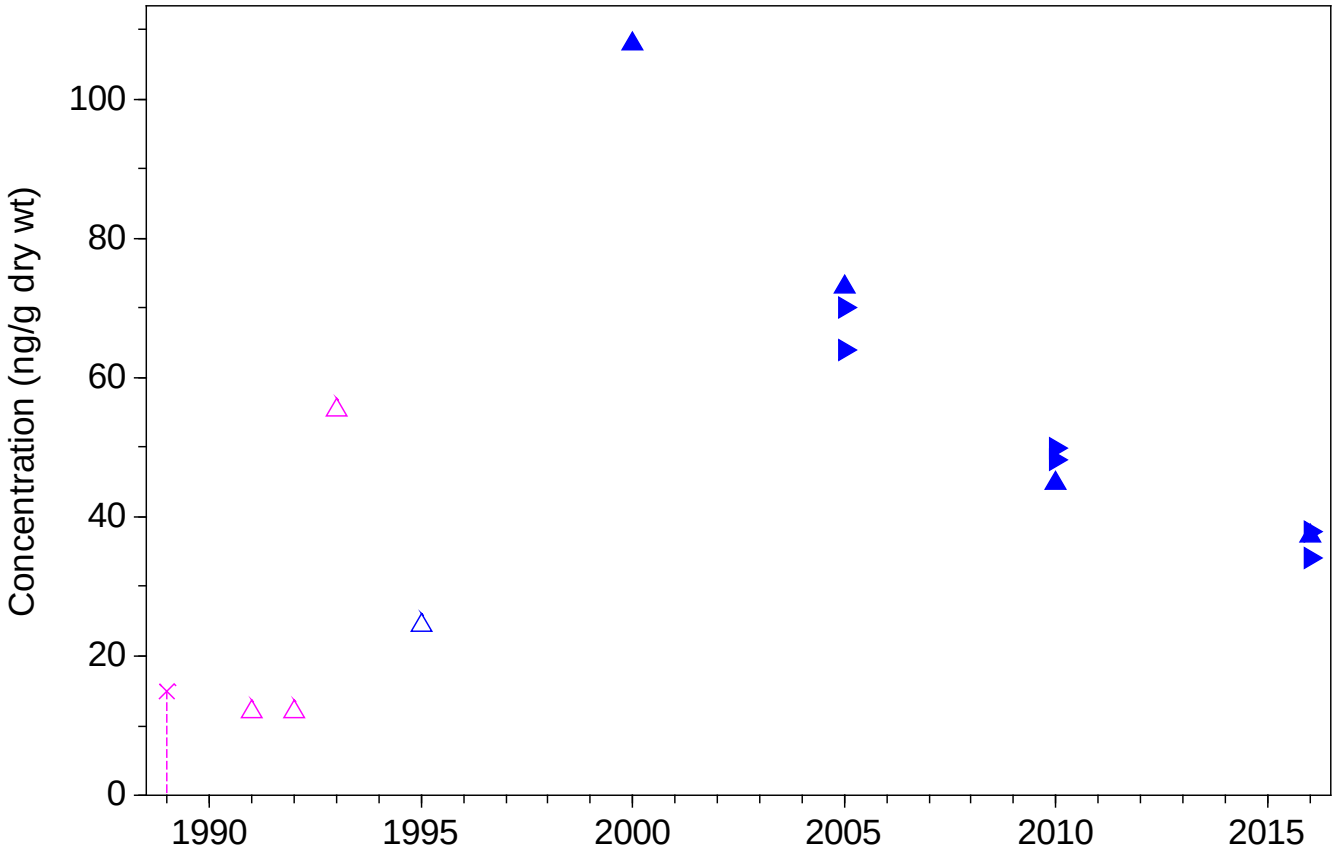


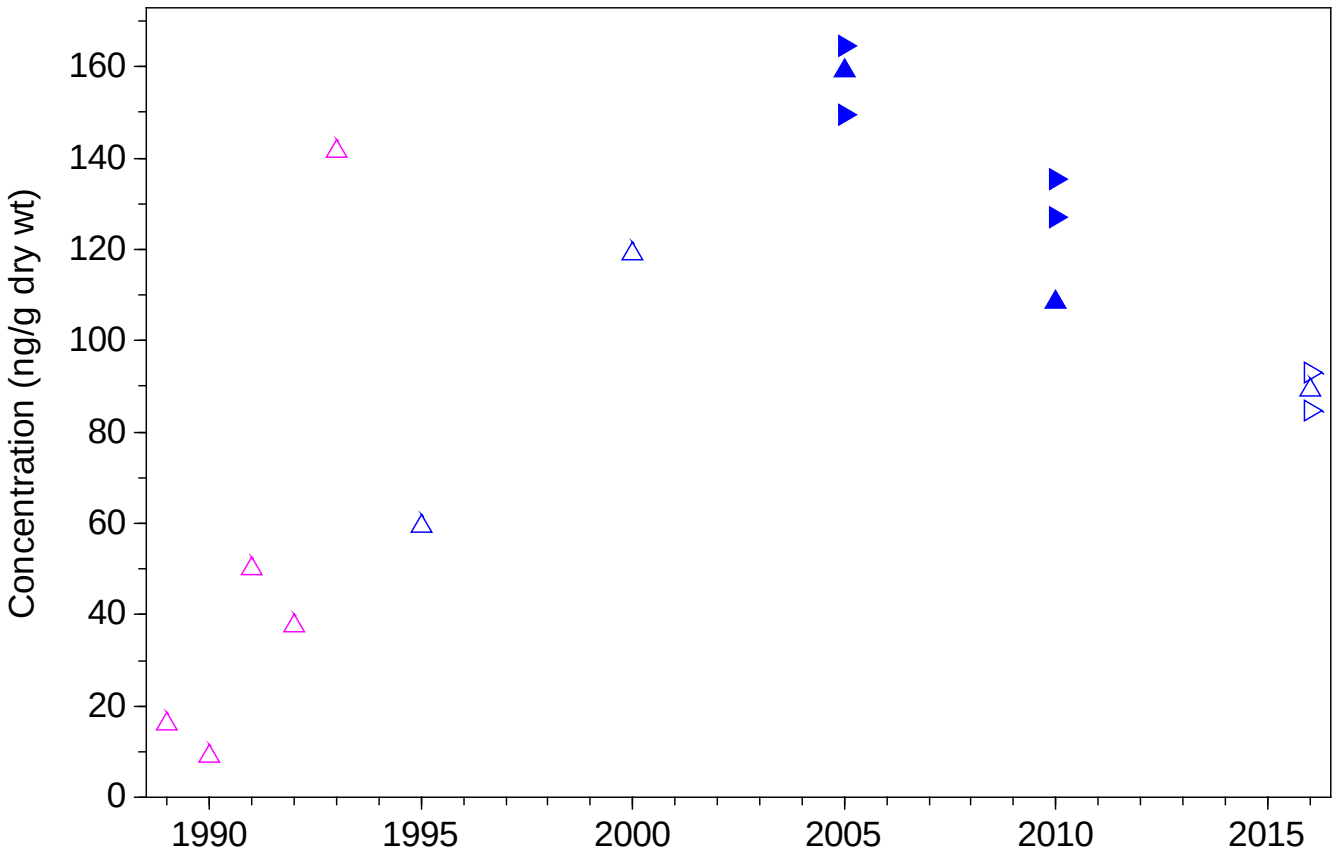
Phenanthrene, Station 3



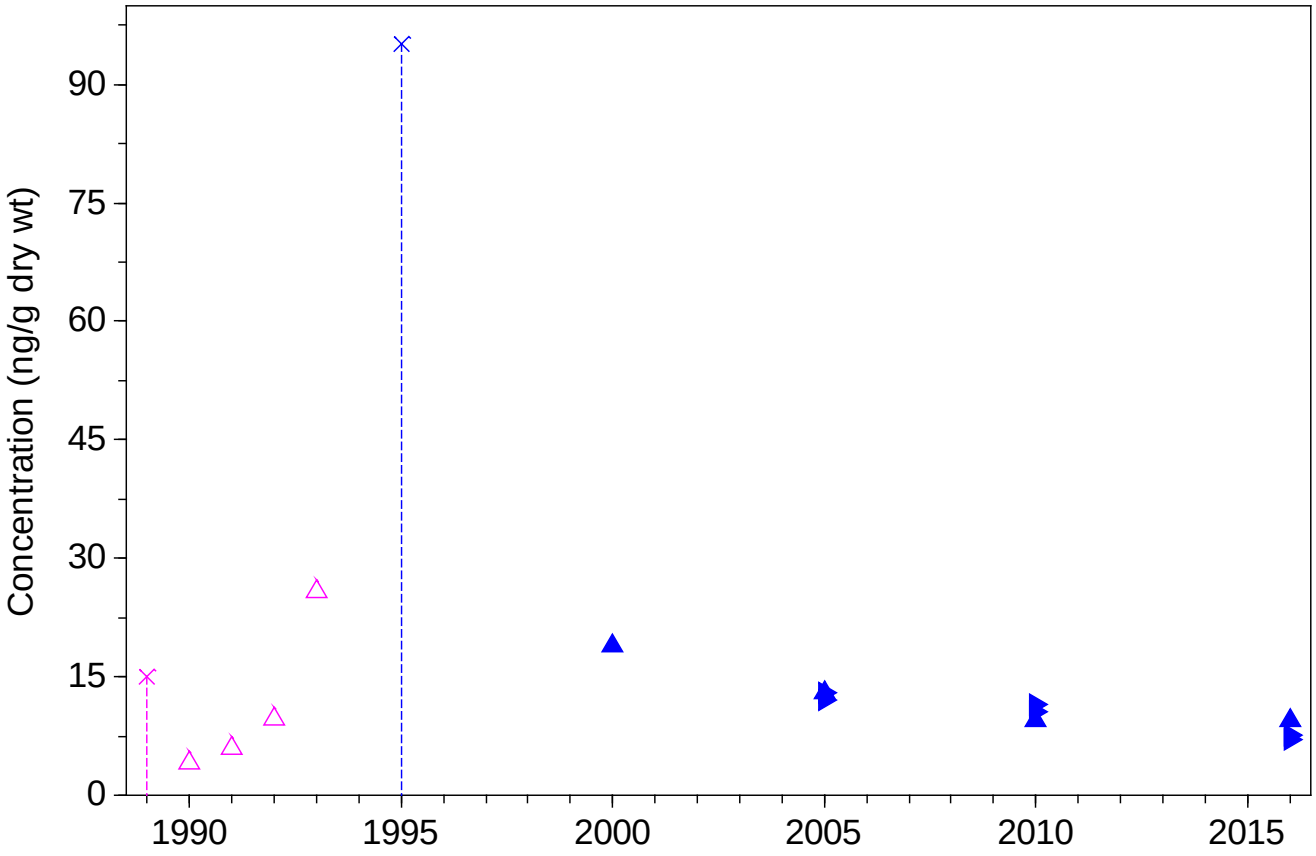
Retene, Station 3



Total LPAH (sum of 6 compounds), Station 3



Benzo(a)anthracene, Station 3



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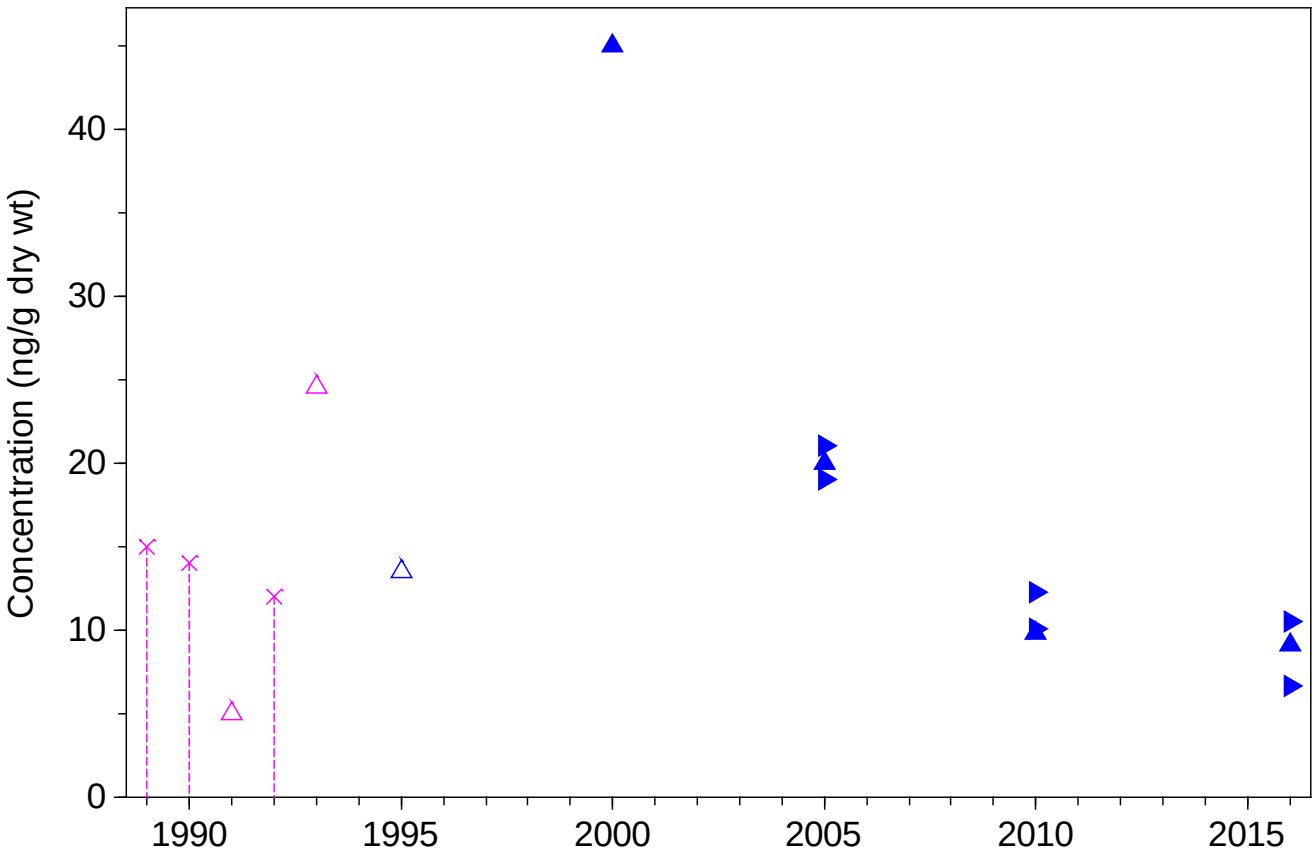
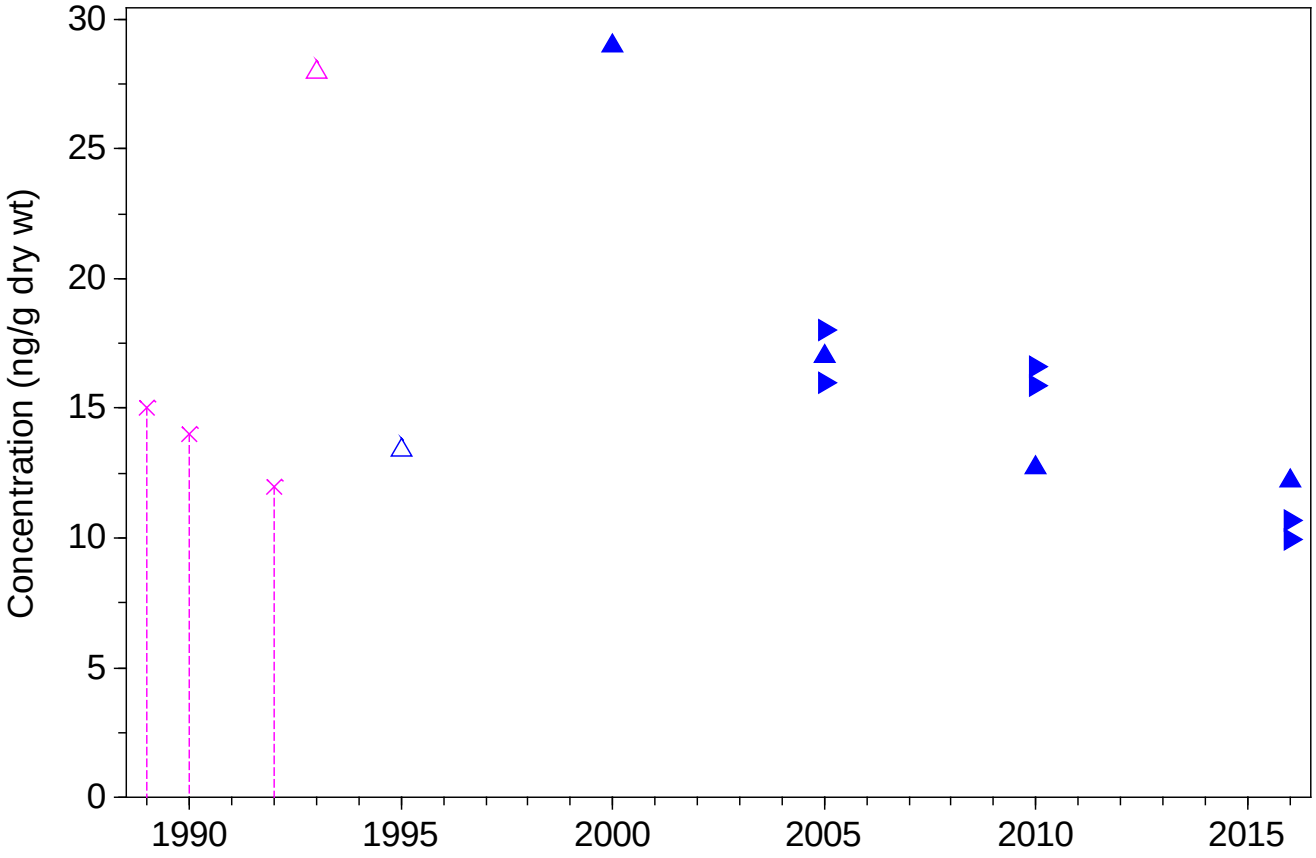
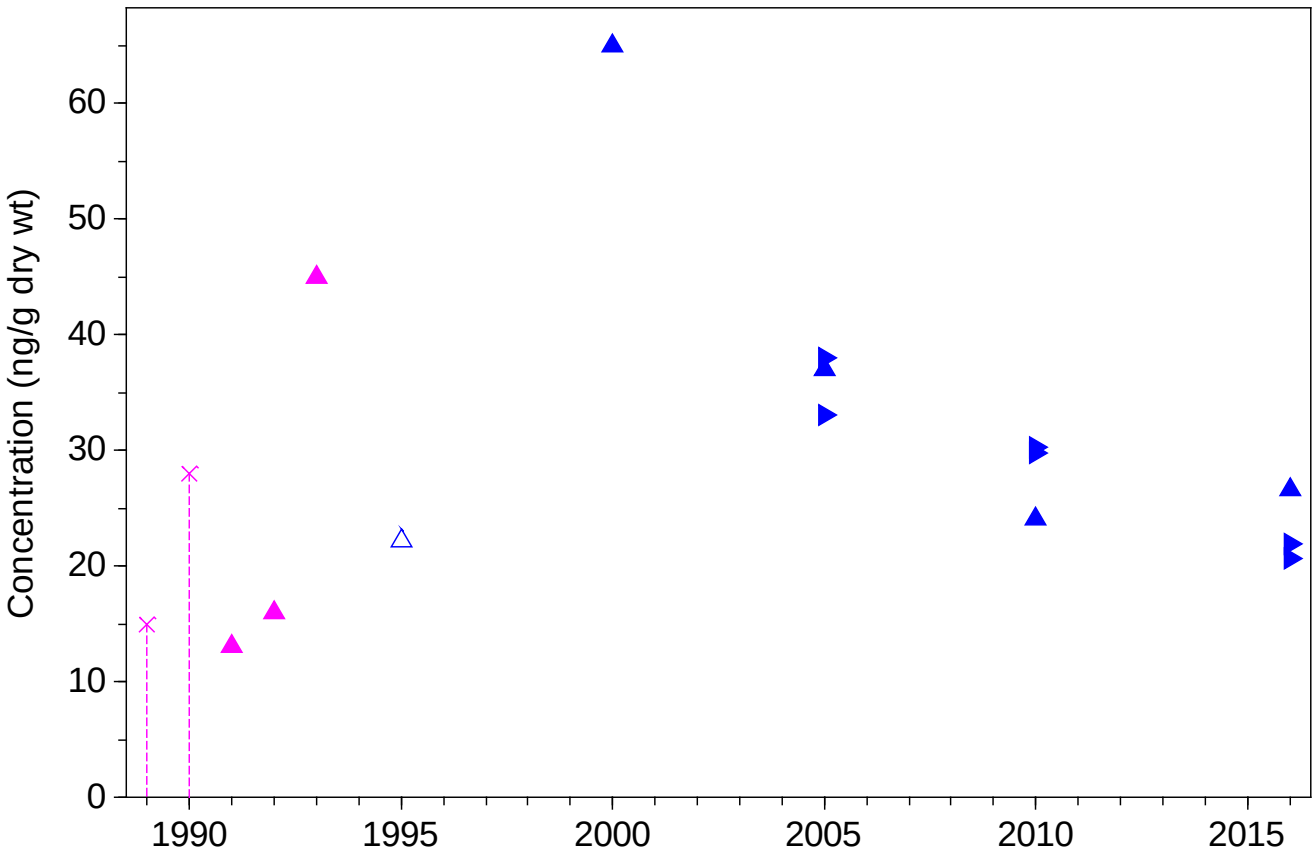


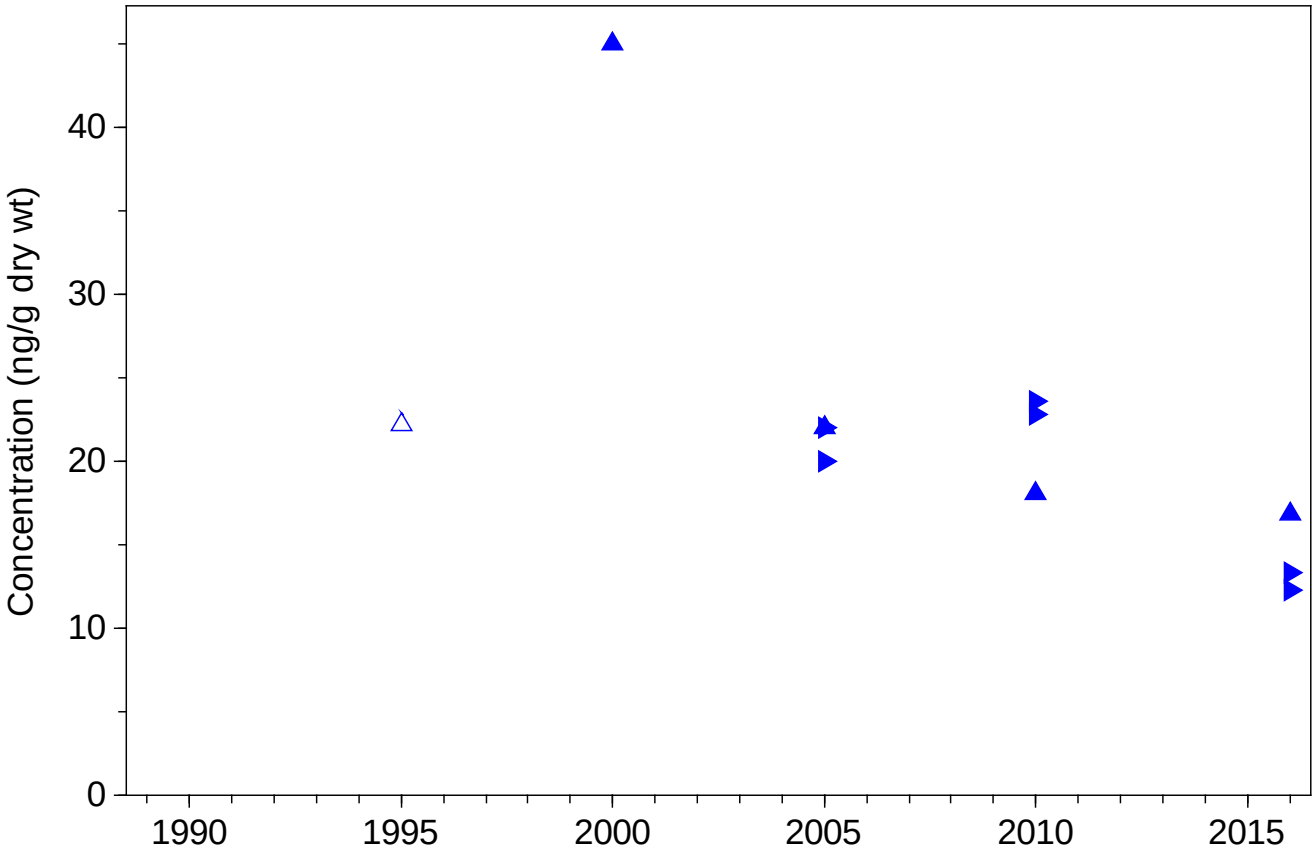
Benzo(g,h,i)perylene, Station 3



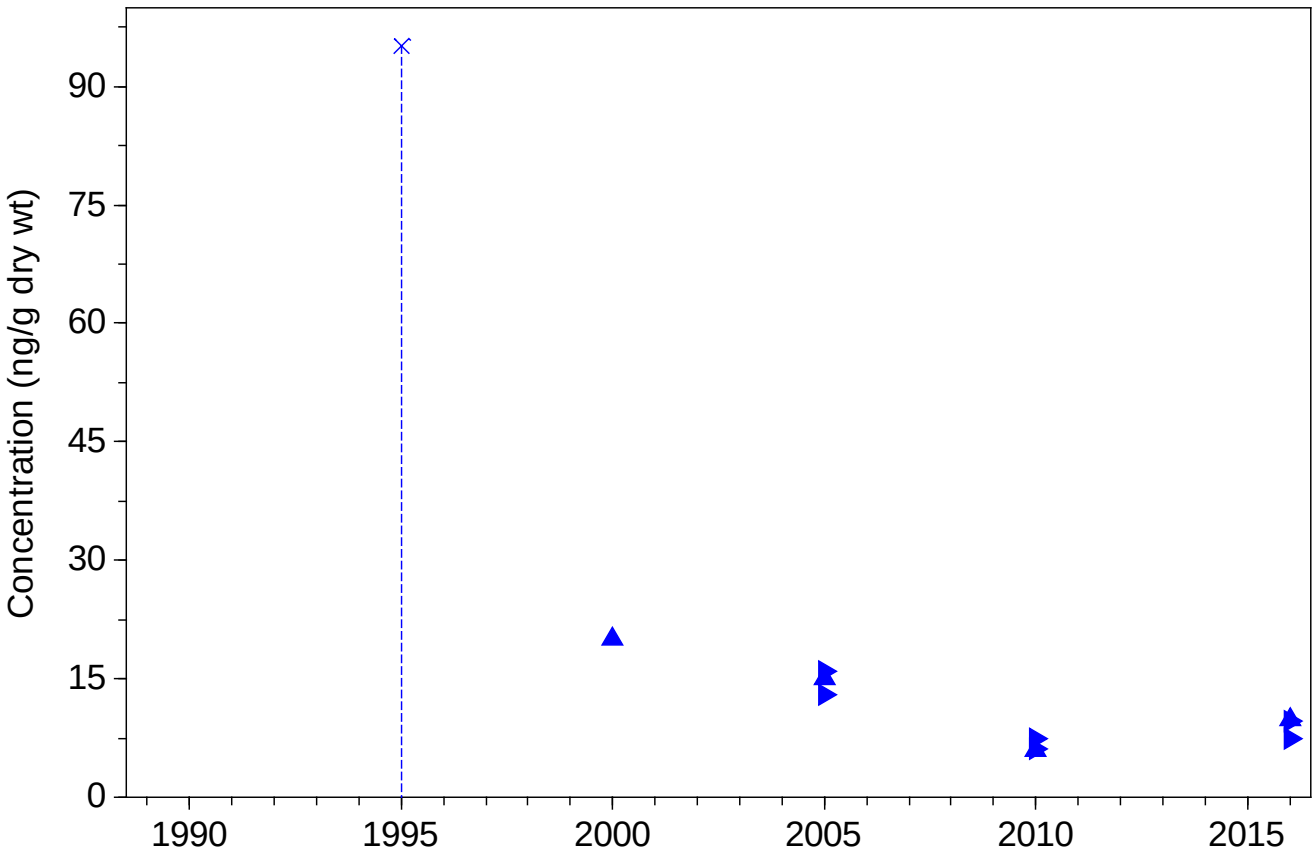
Total Benzofluoranthenes, Station 3



Benzo(b)fluoranthene, Station 3



Benzo(k)fluoranthene, Station 3



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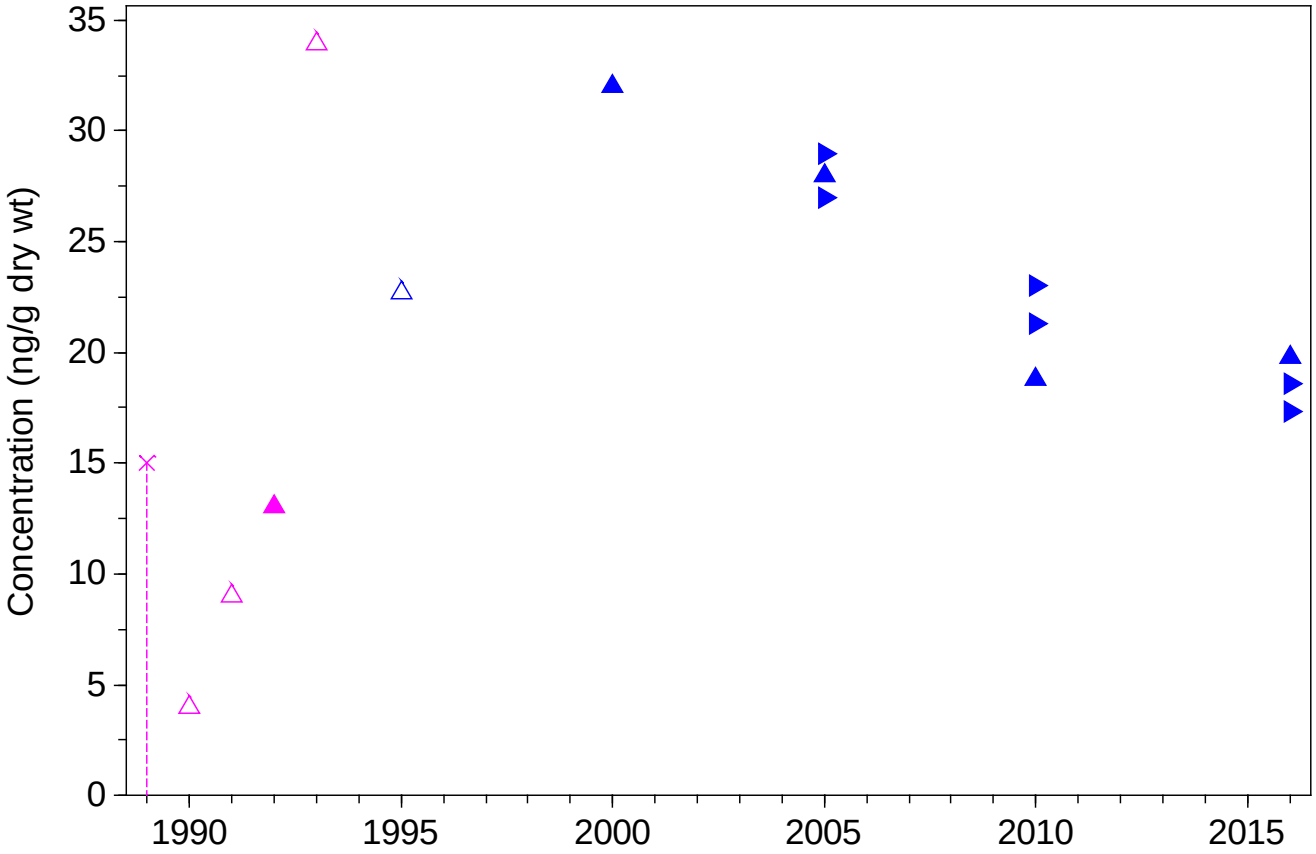
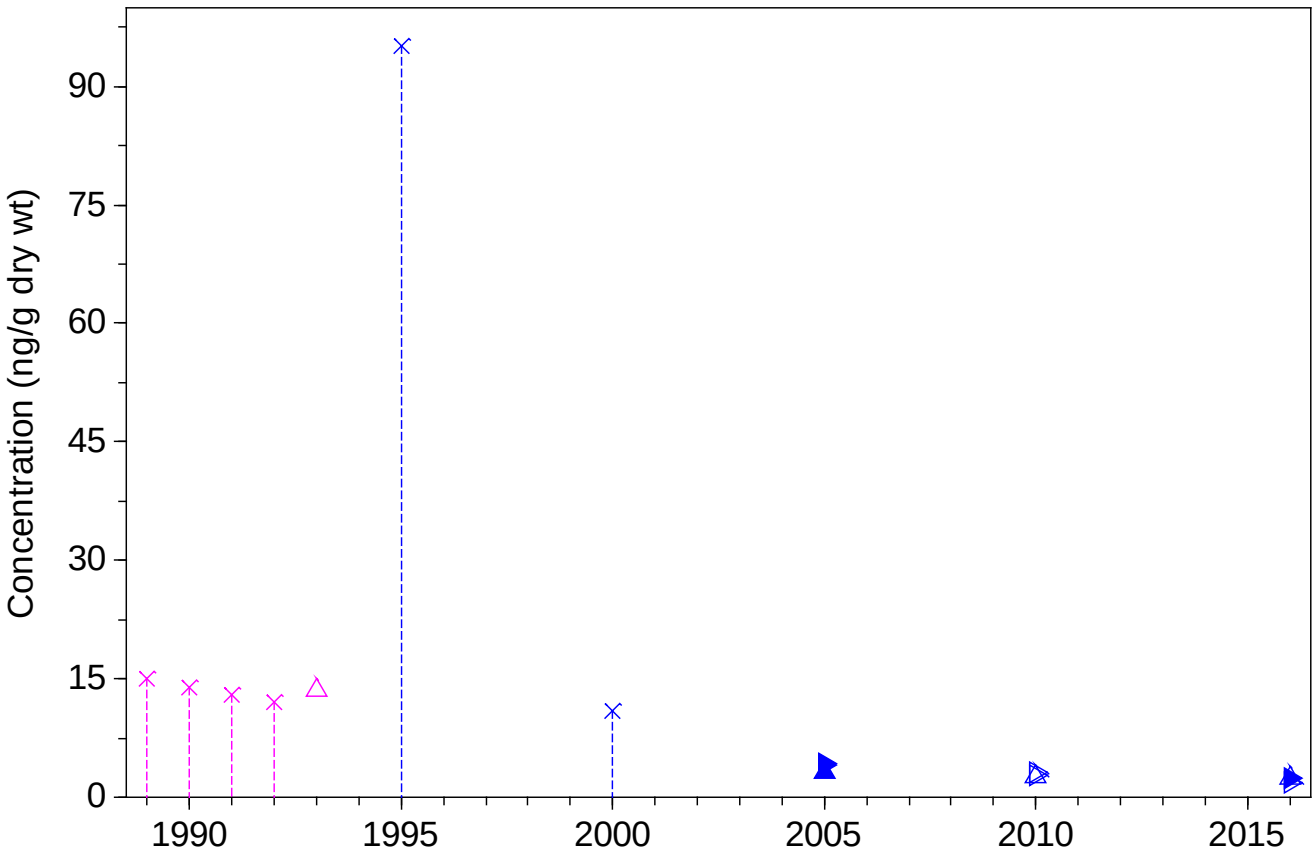


Dibenzo(a,h)anthracene, Station 3



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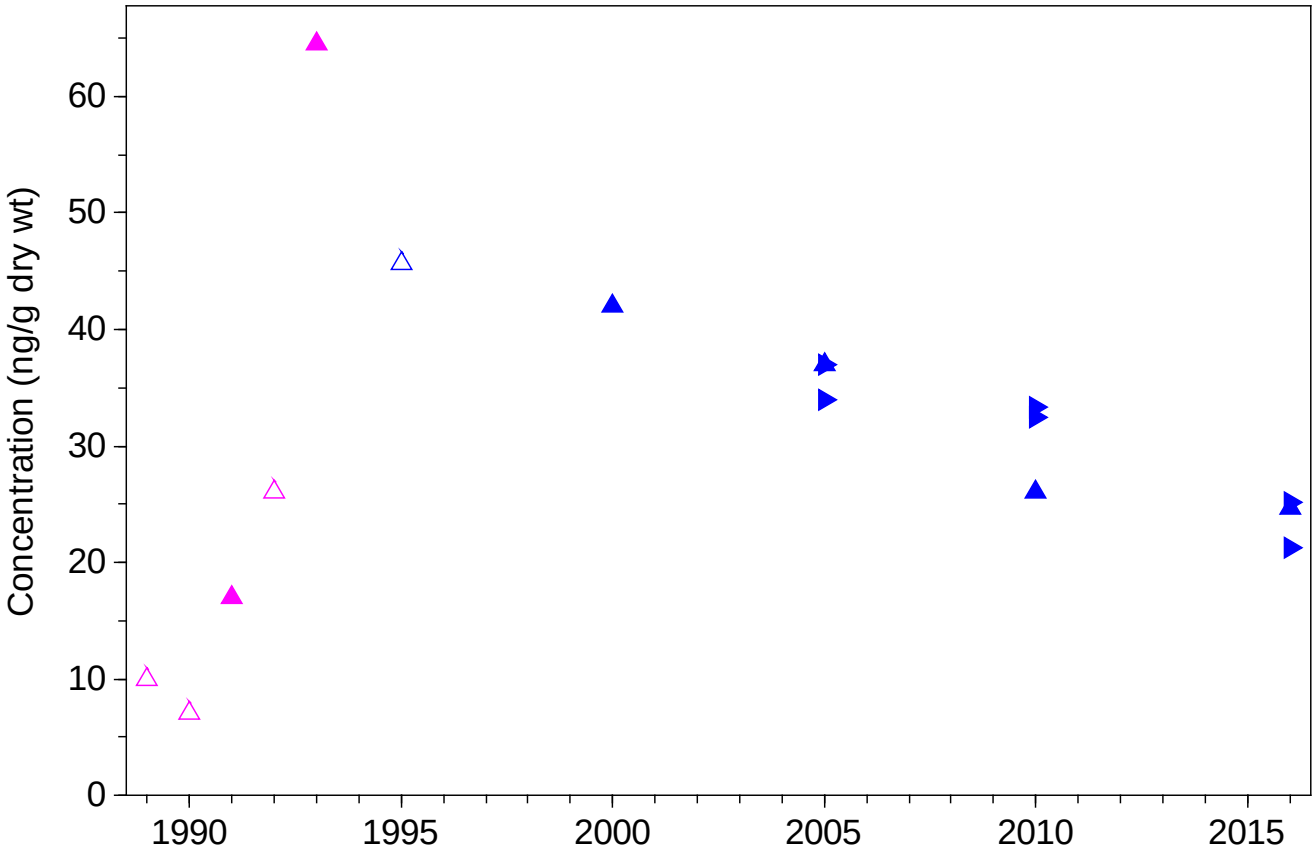
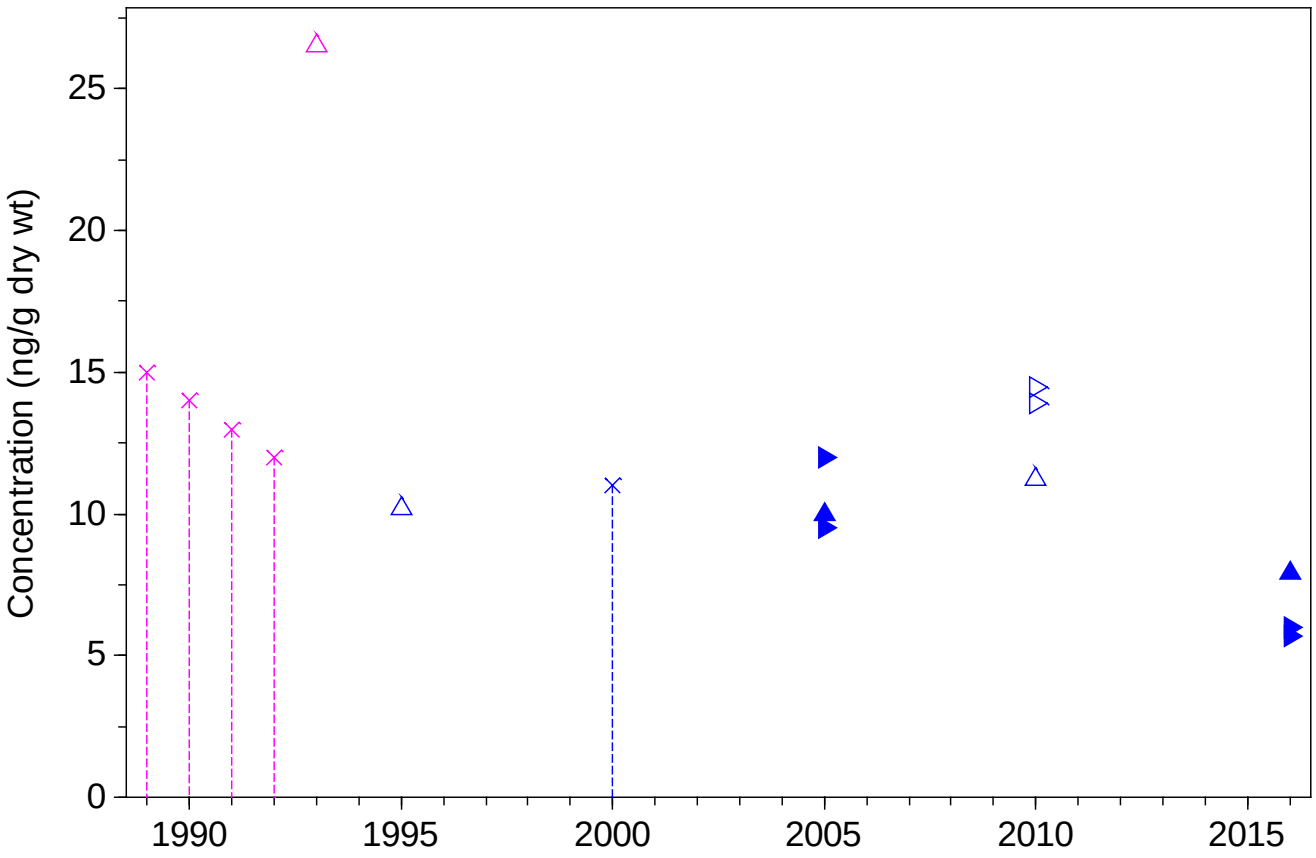
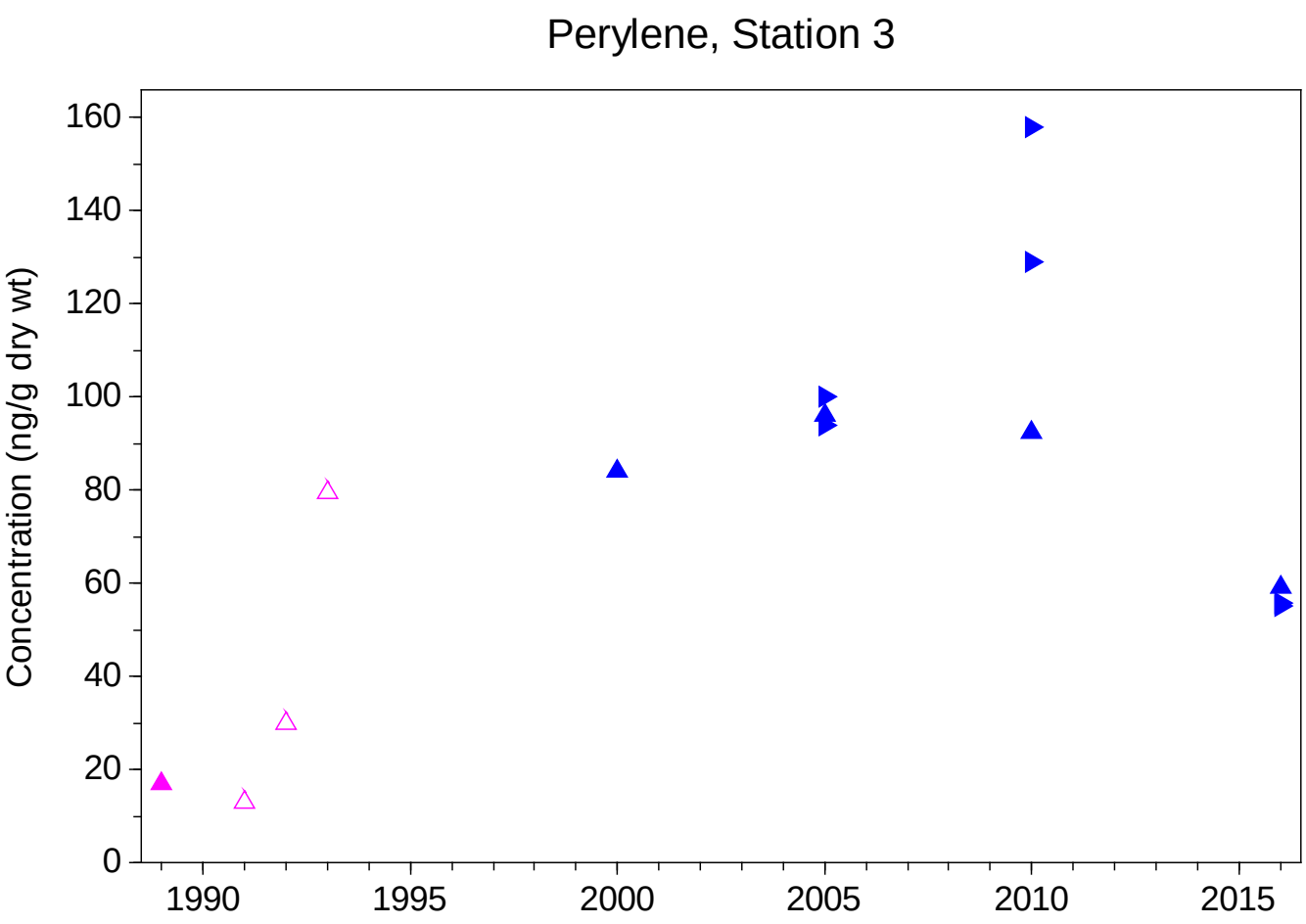
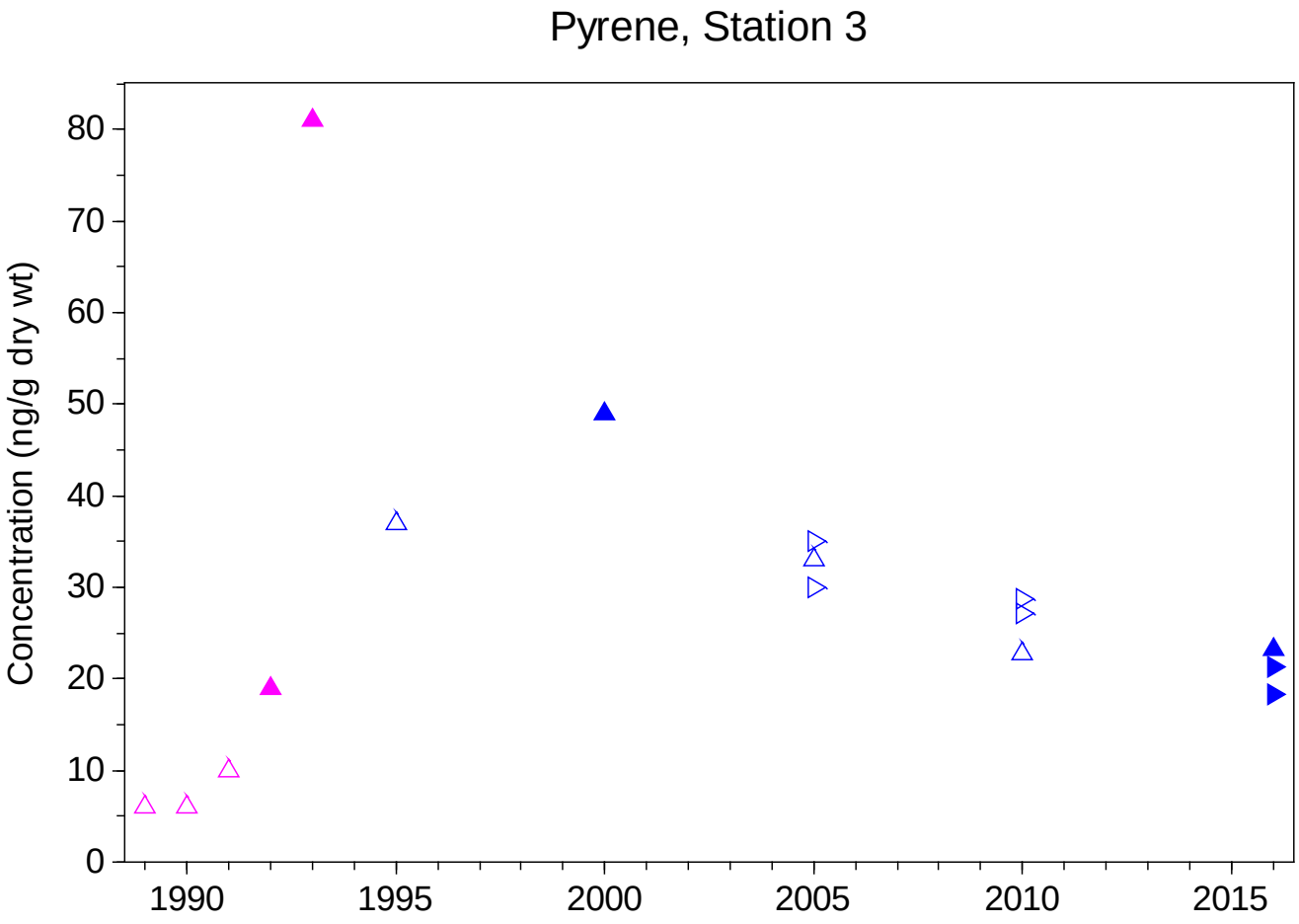


Indeno(1,2,3-c,d)pyrene, Station 3




Perylene, Station 3
Concentration (ng/g dry wt)
0
20
40
60
80
100
120
140
160
1990
1995
2000
2005
2010
2015


Pyrene, Station 3
Concentration (ng/g dry wt)
0
10
20
30
40
50
60
70
80
1990
1995
2000
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2010
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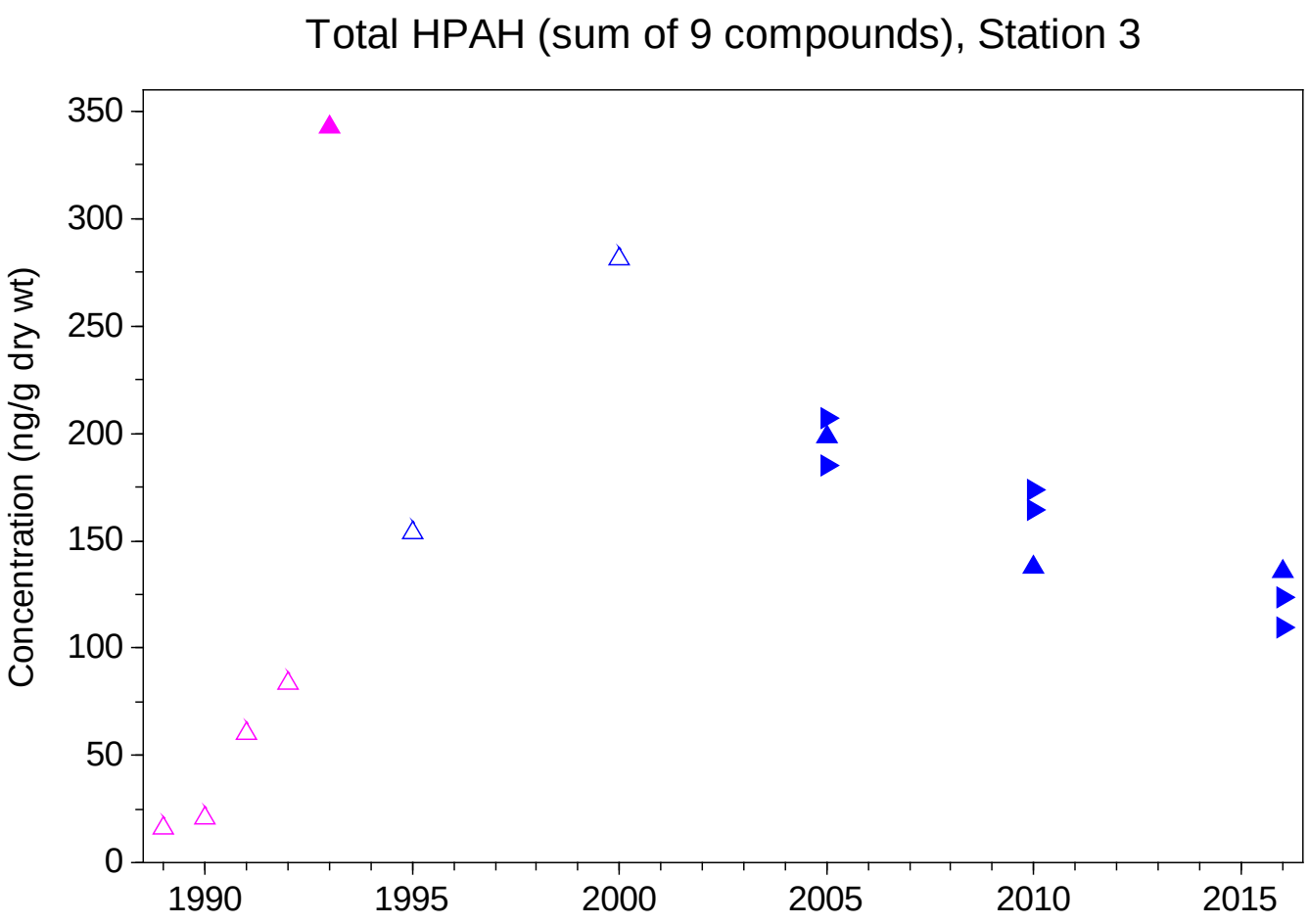

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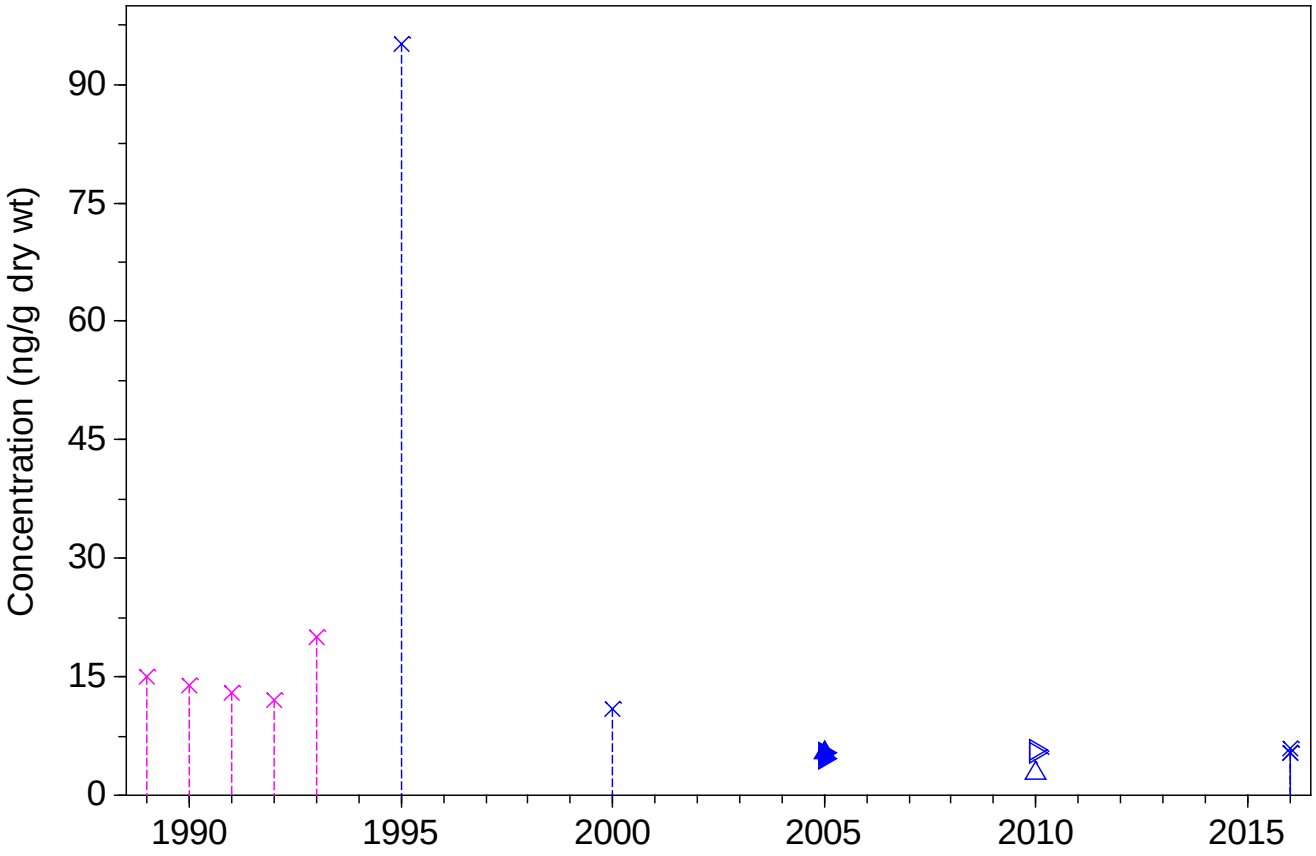
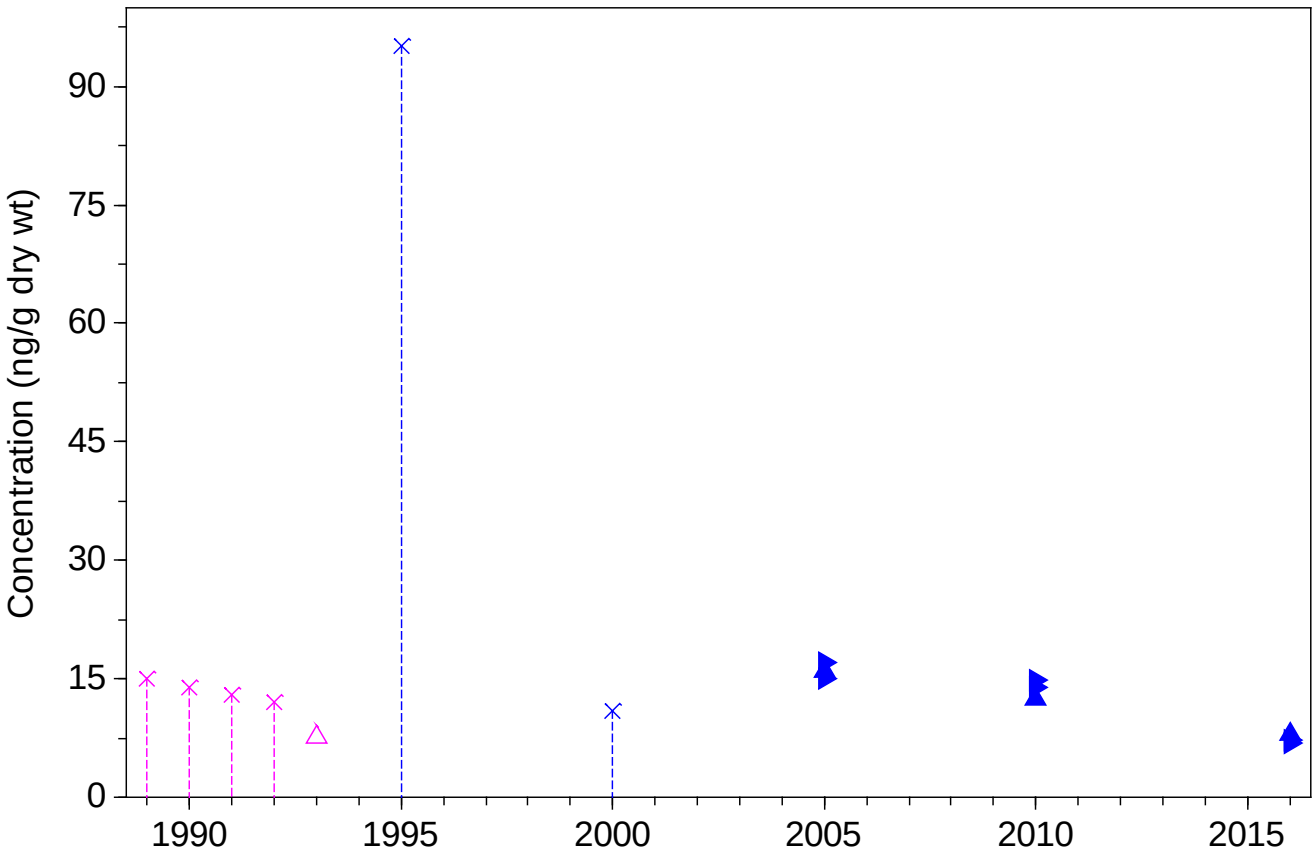
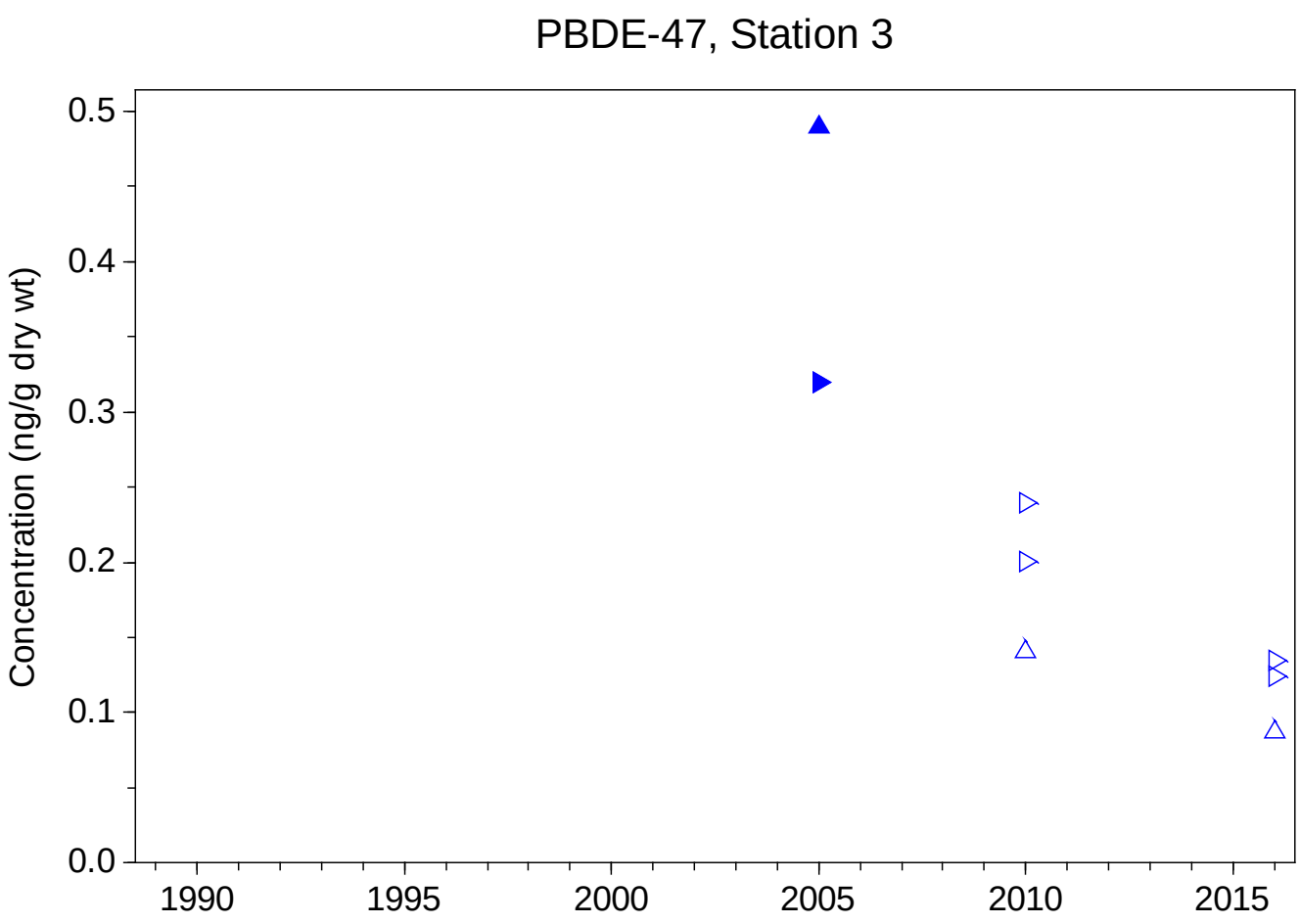
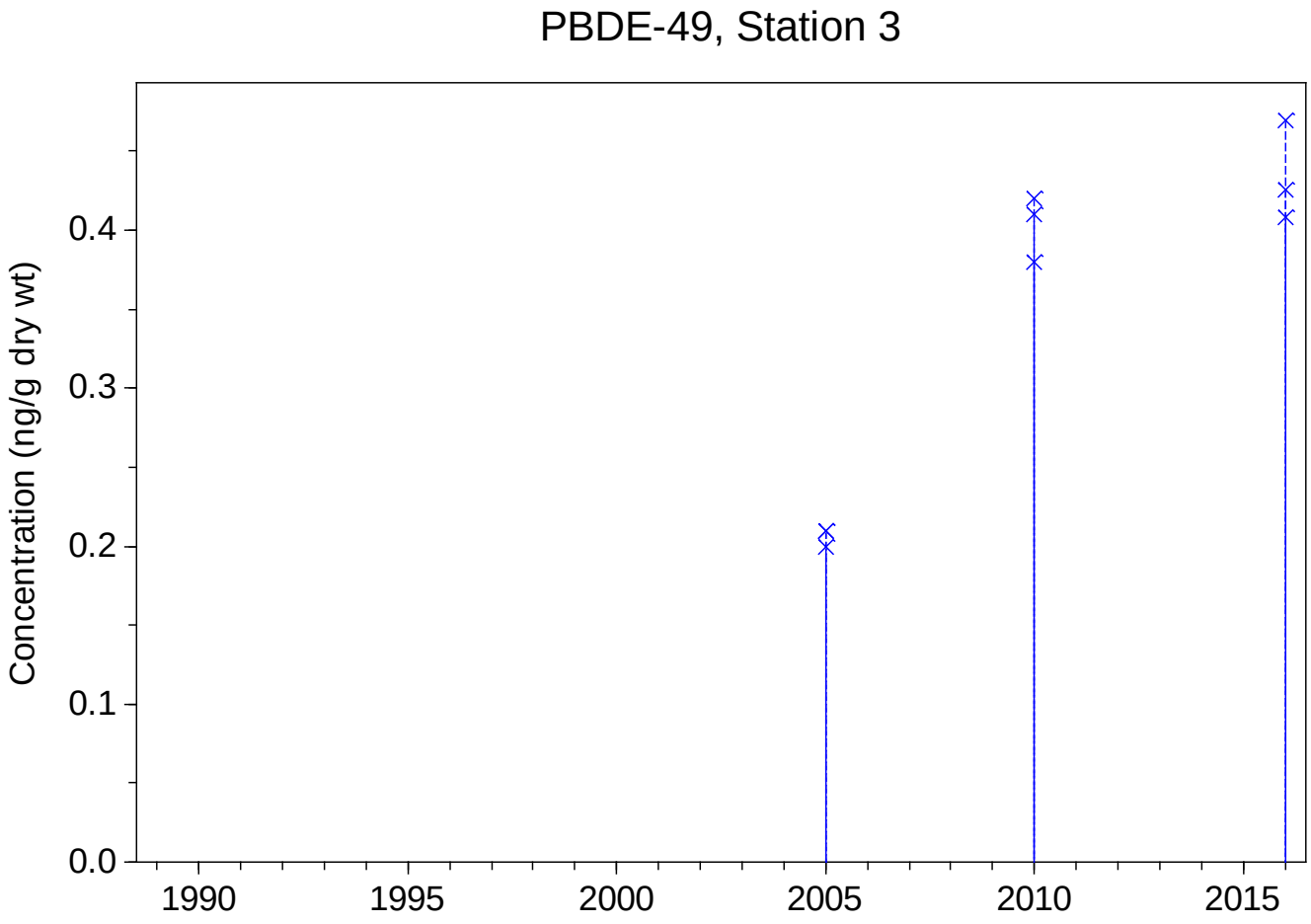


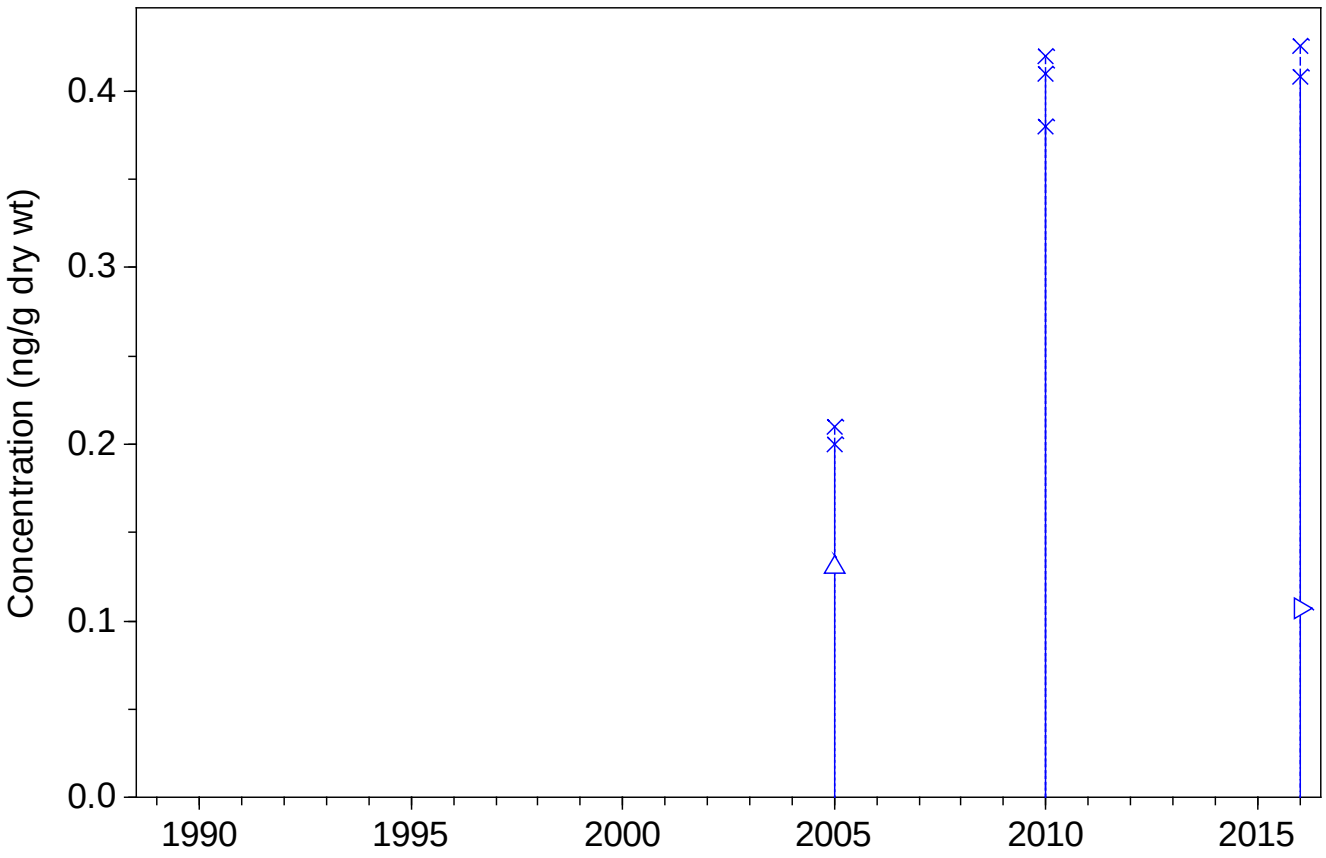
Dibenzofuran, Station 3



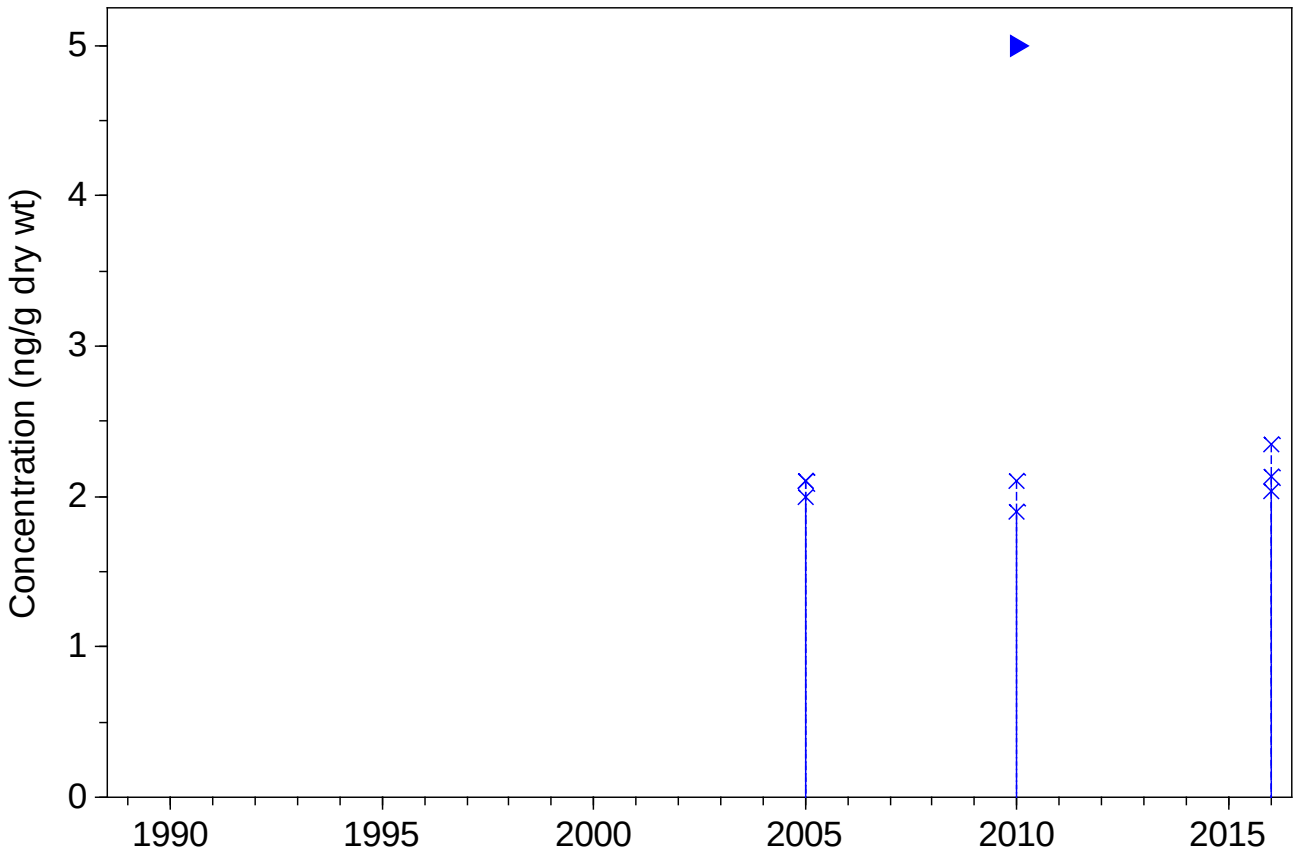

PBDE-47, Station 3
Concentration (ng/g dry wt)
0.0
0.1
0.2
0.3
0.4
0.5
1990
1995
2000
2005
2010
2015


PBDE-49, Station 3
Concentration (ng/g dry wt)
0.0
0.1
0.2
0.3
0.4
1990
1995
2000
2005
2010
2015

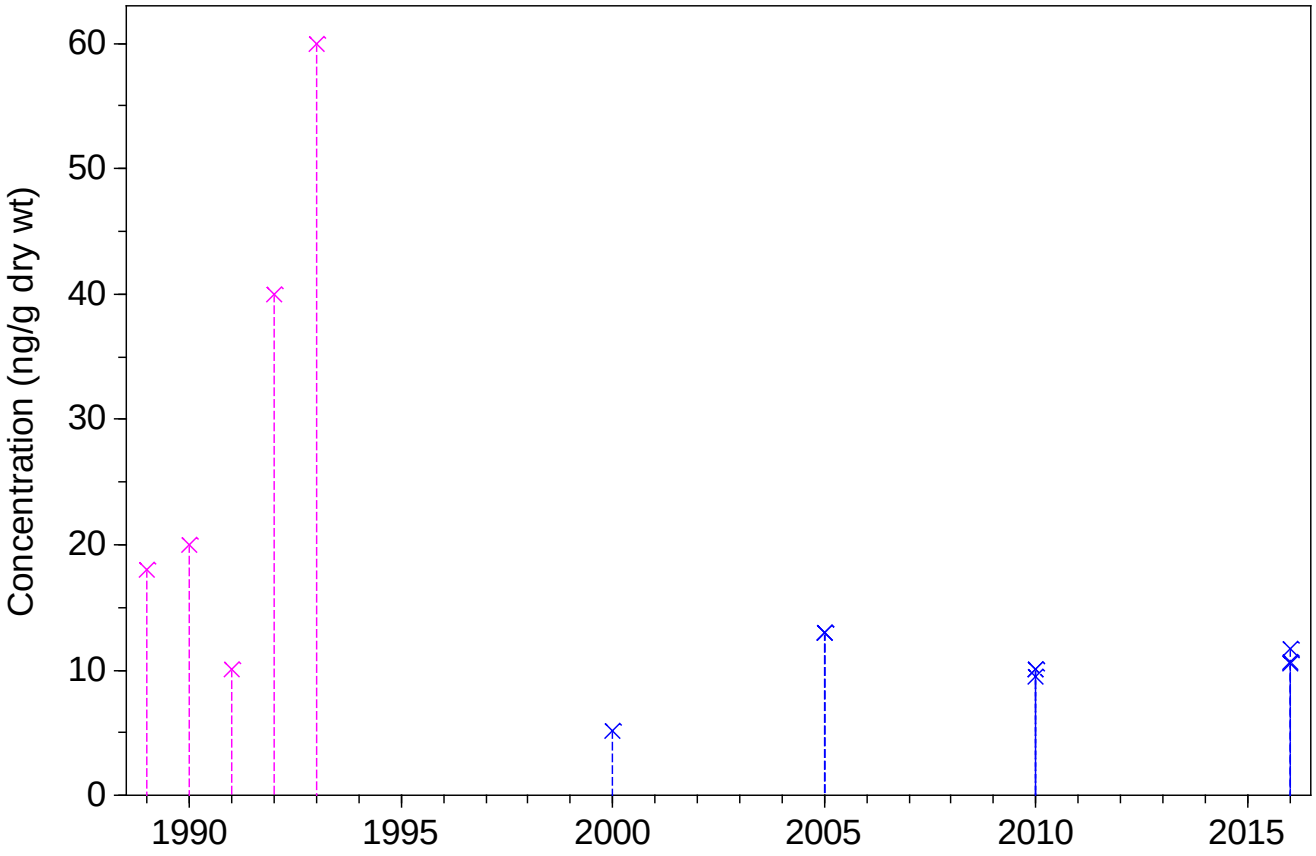
PBDE-99, Station 3



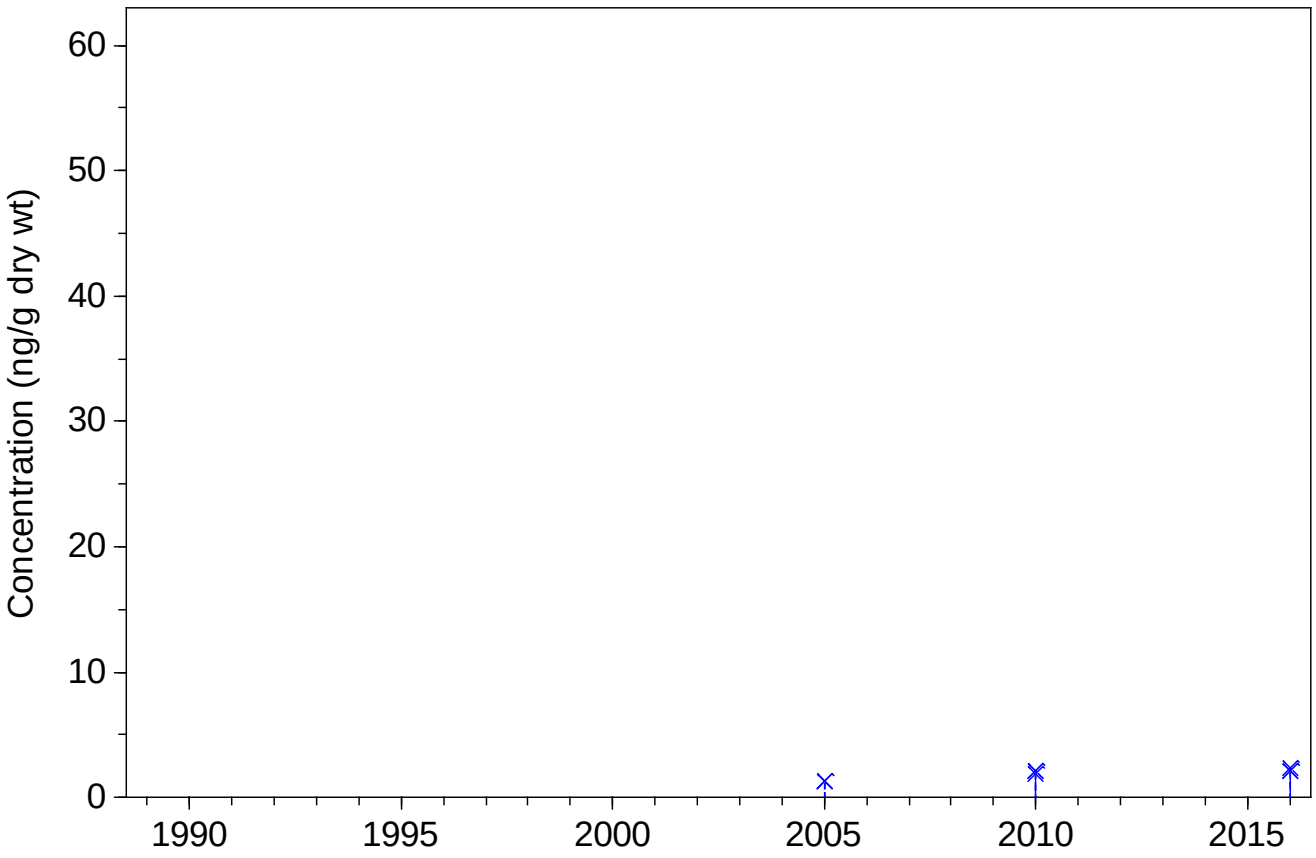
PBDE-209, Station 3



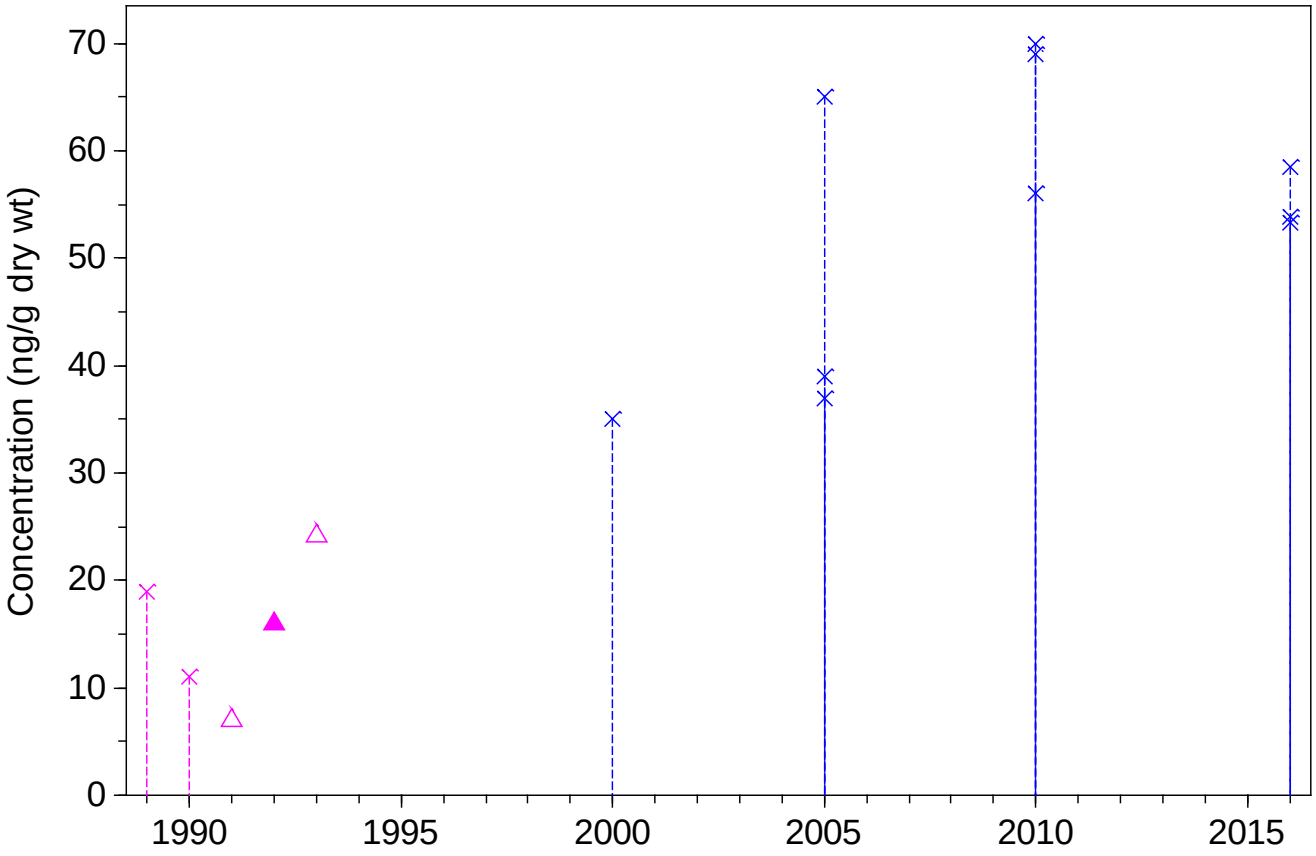
Total Aroclors, Station 3



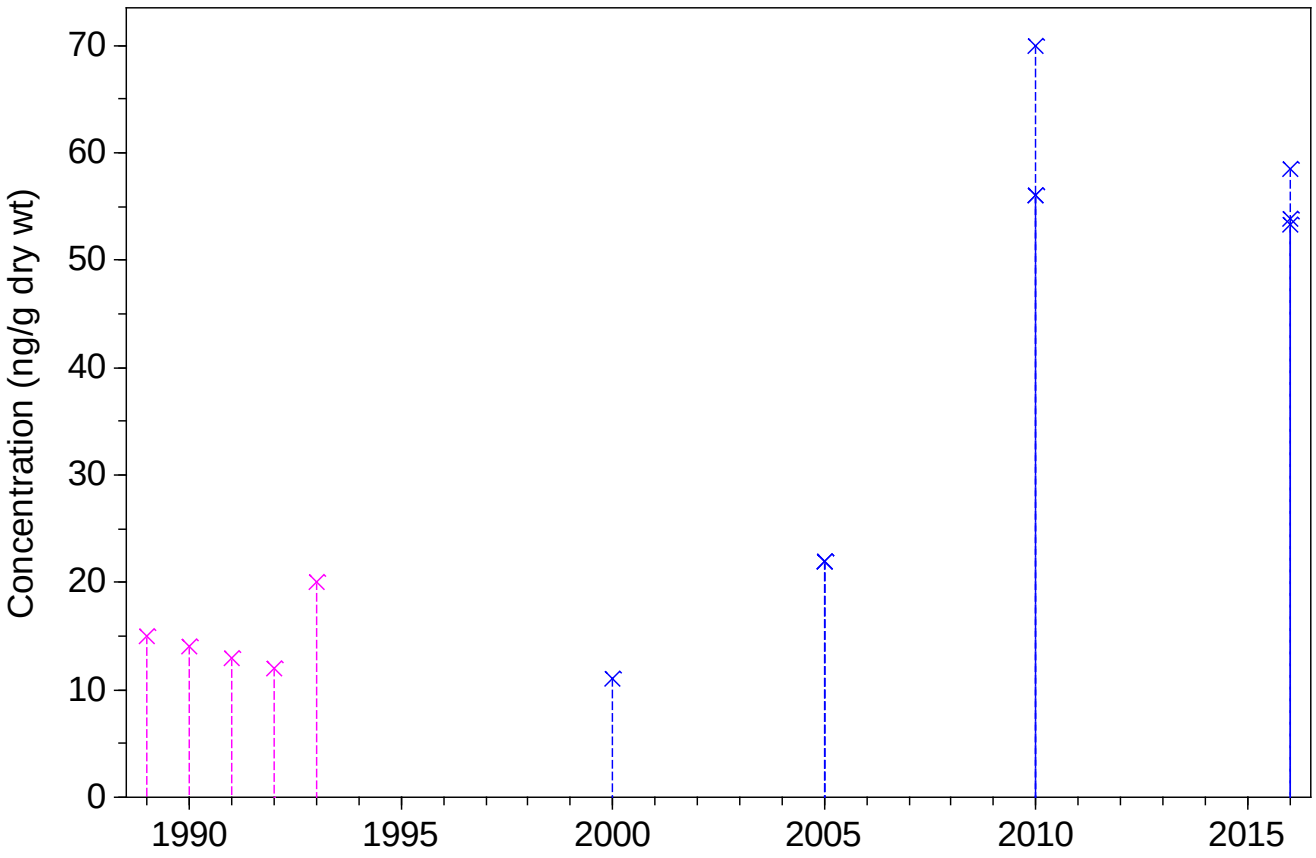
Total PCB Congeners x 2, Station 3



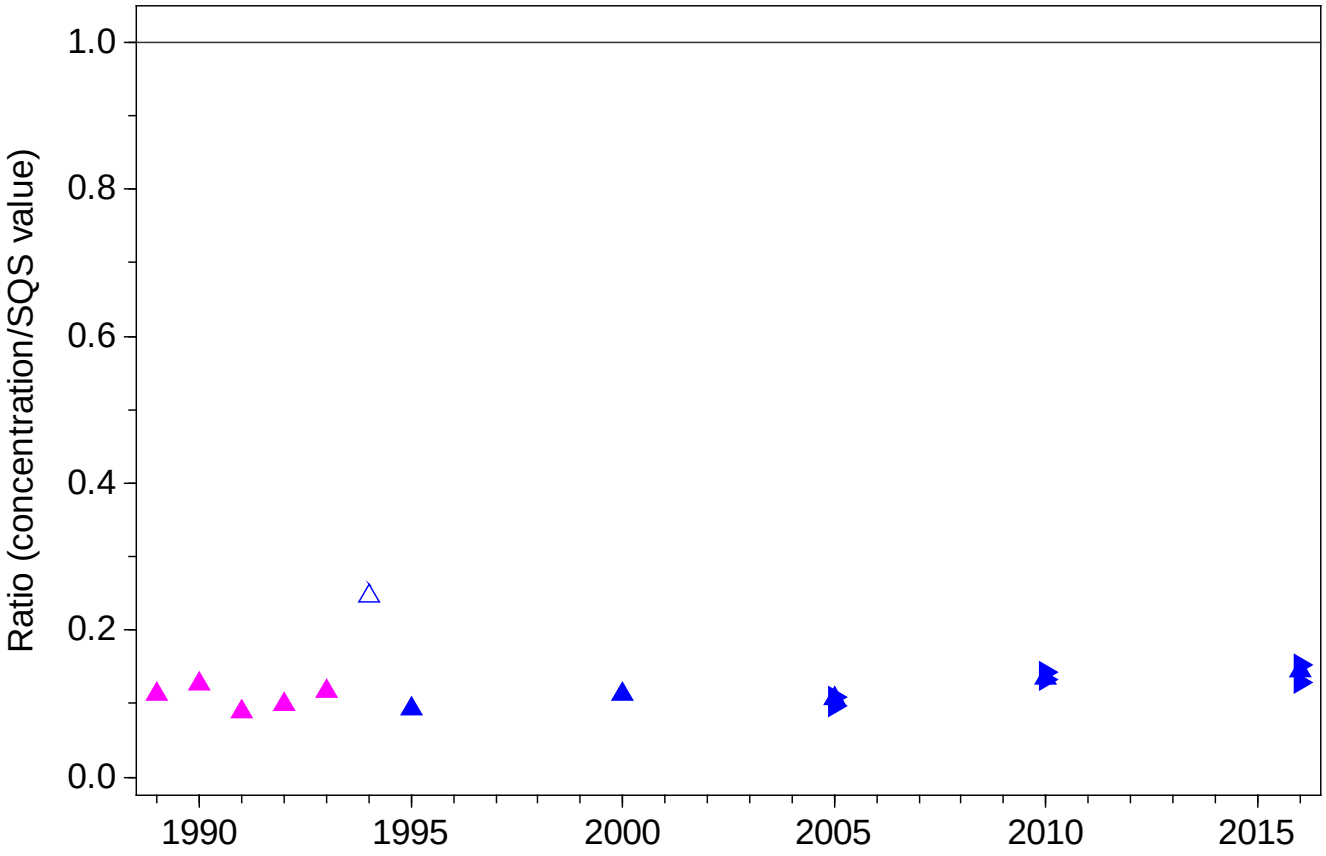
Bis(2-ethylhexyl)phthalate, Station 3



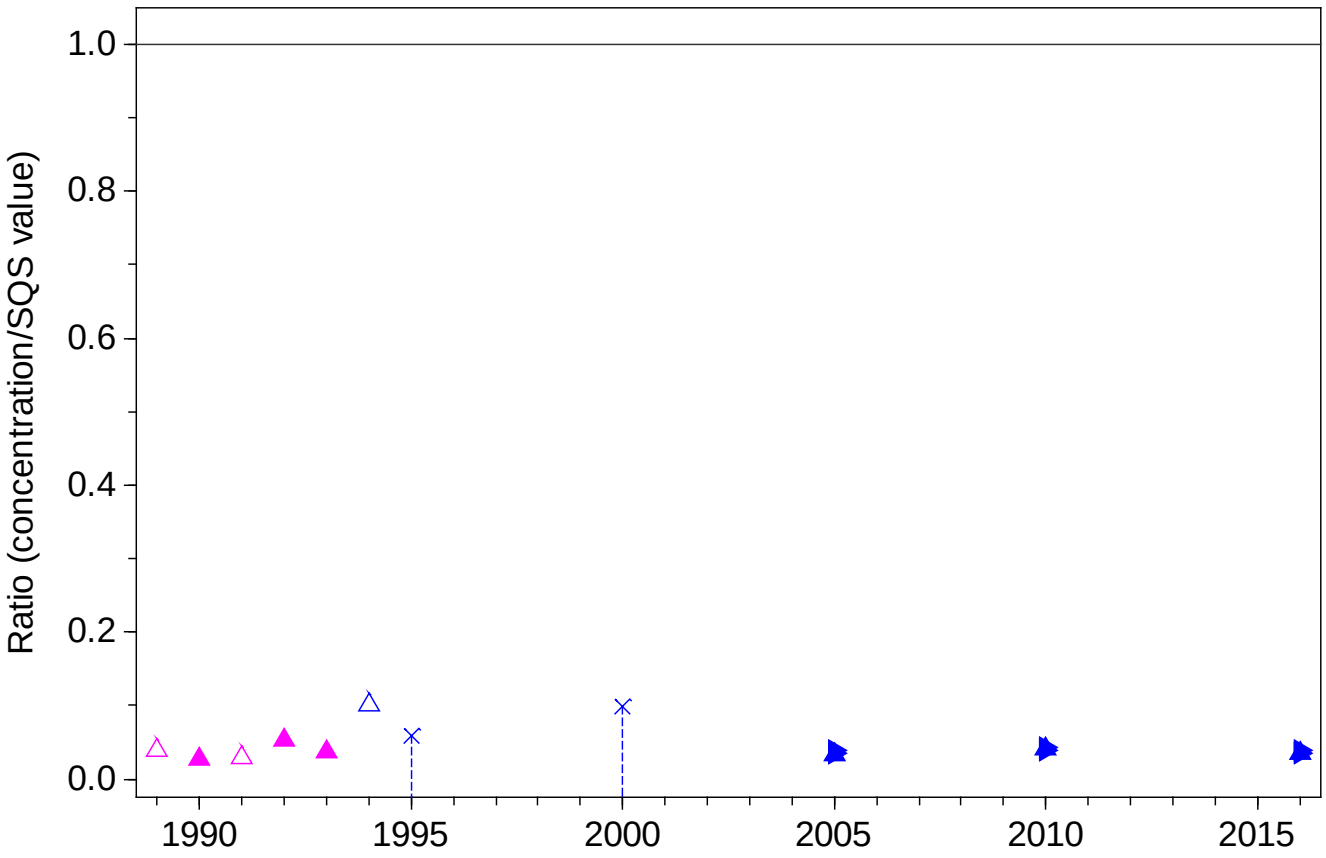
Butylbenzylphthalate, Station 3



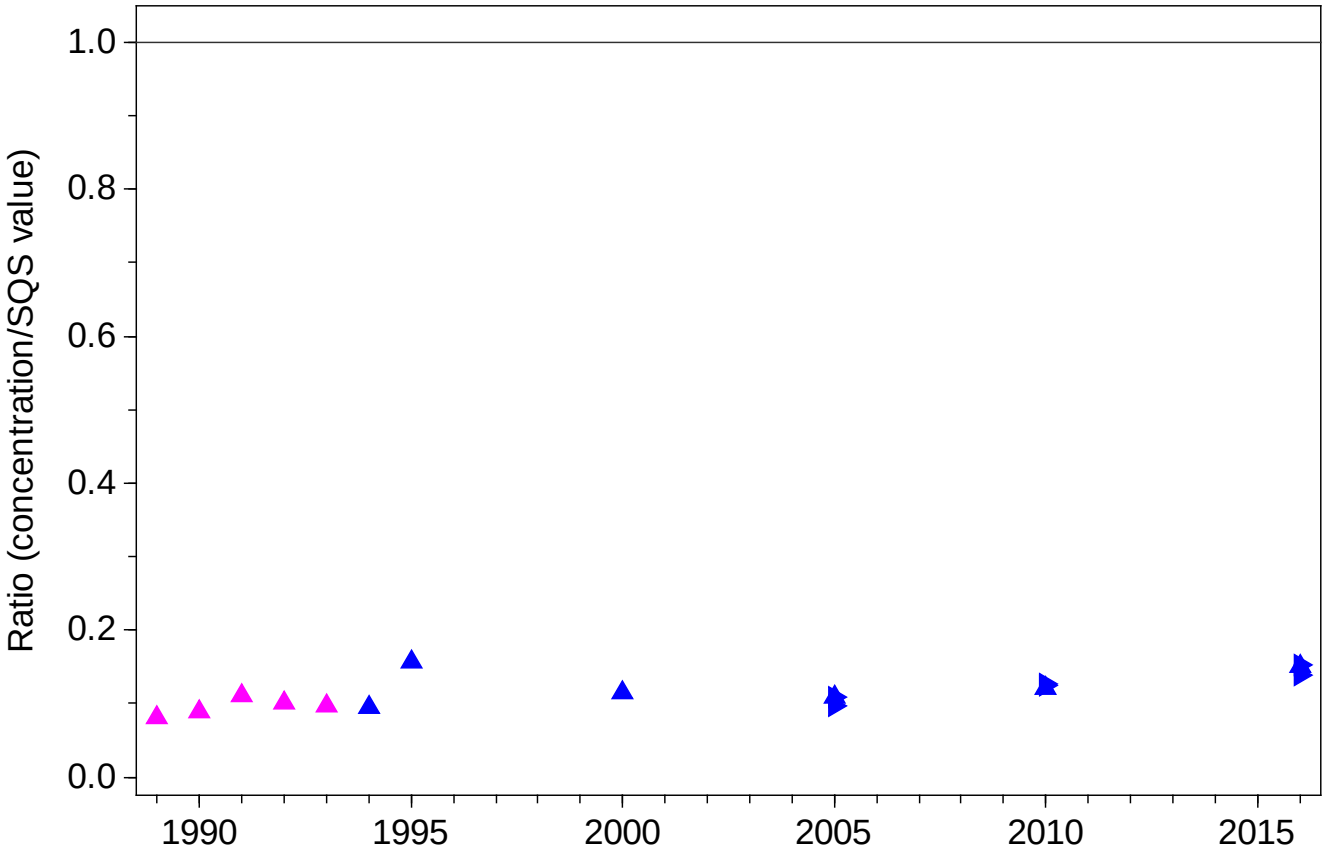
SQS quotient, Arsenic, Station 3



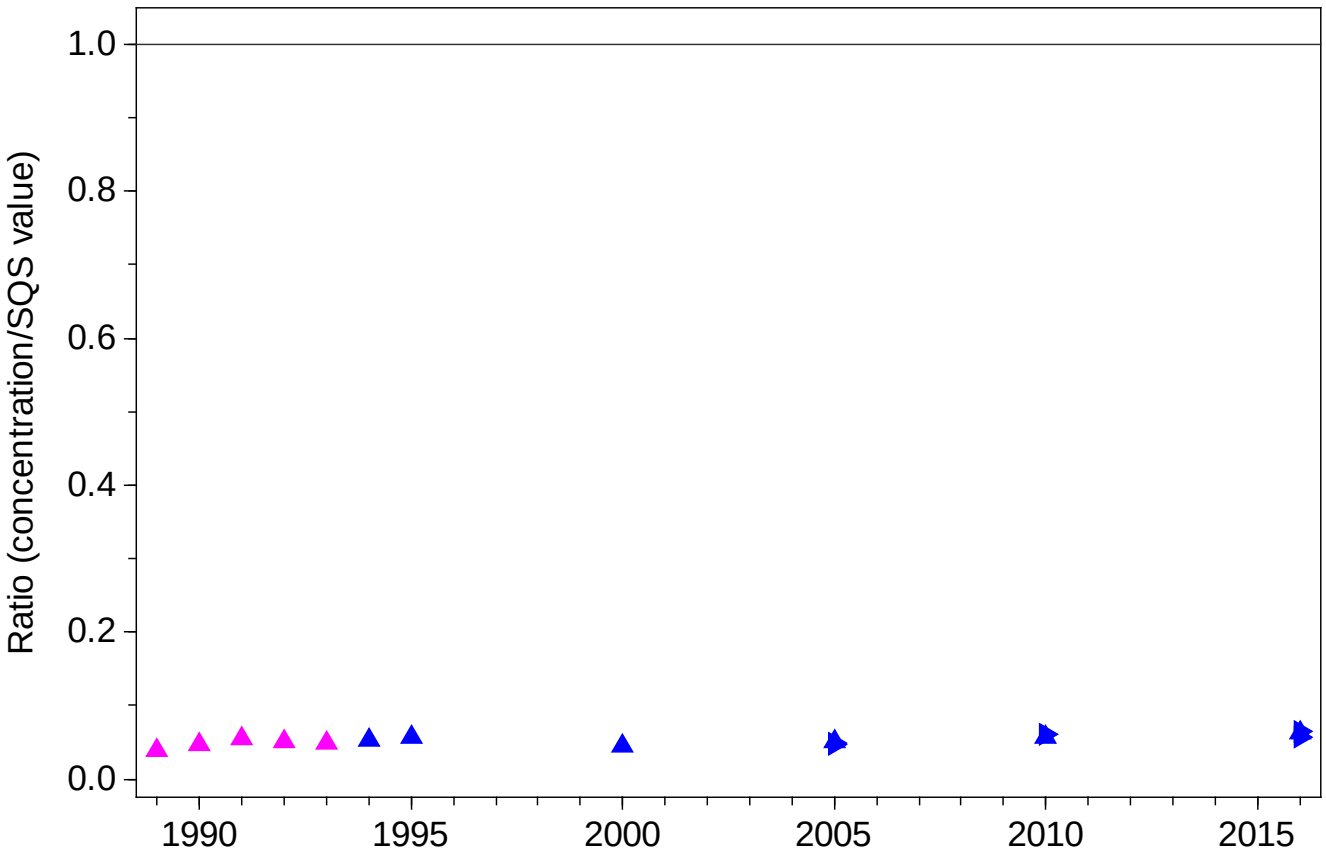
SQS quotient, Cadmium, Station 3



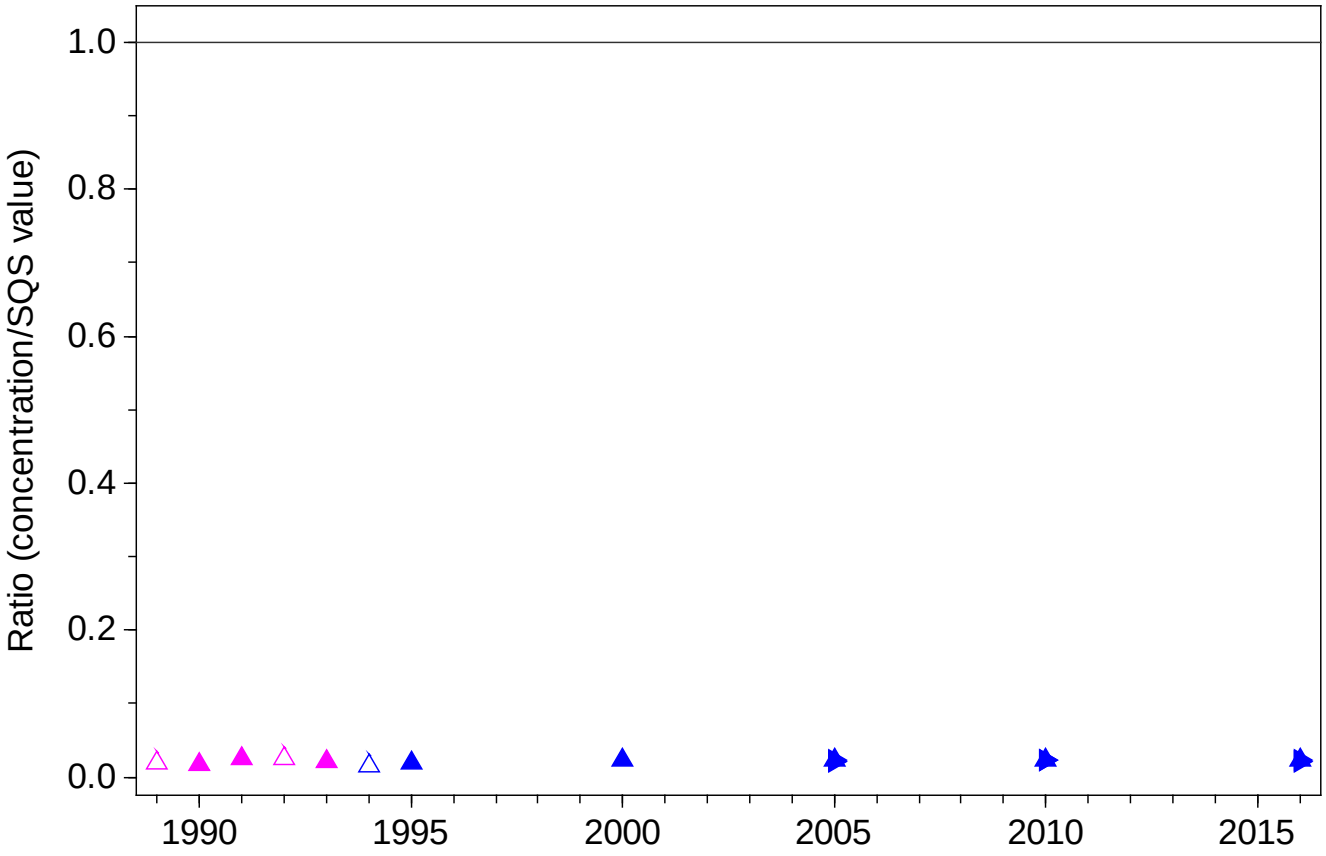
SQS quotient, Chromium, Station 3



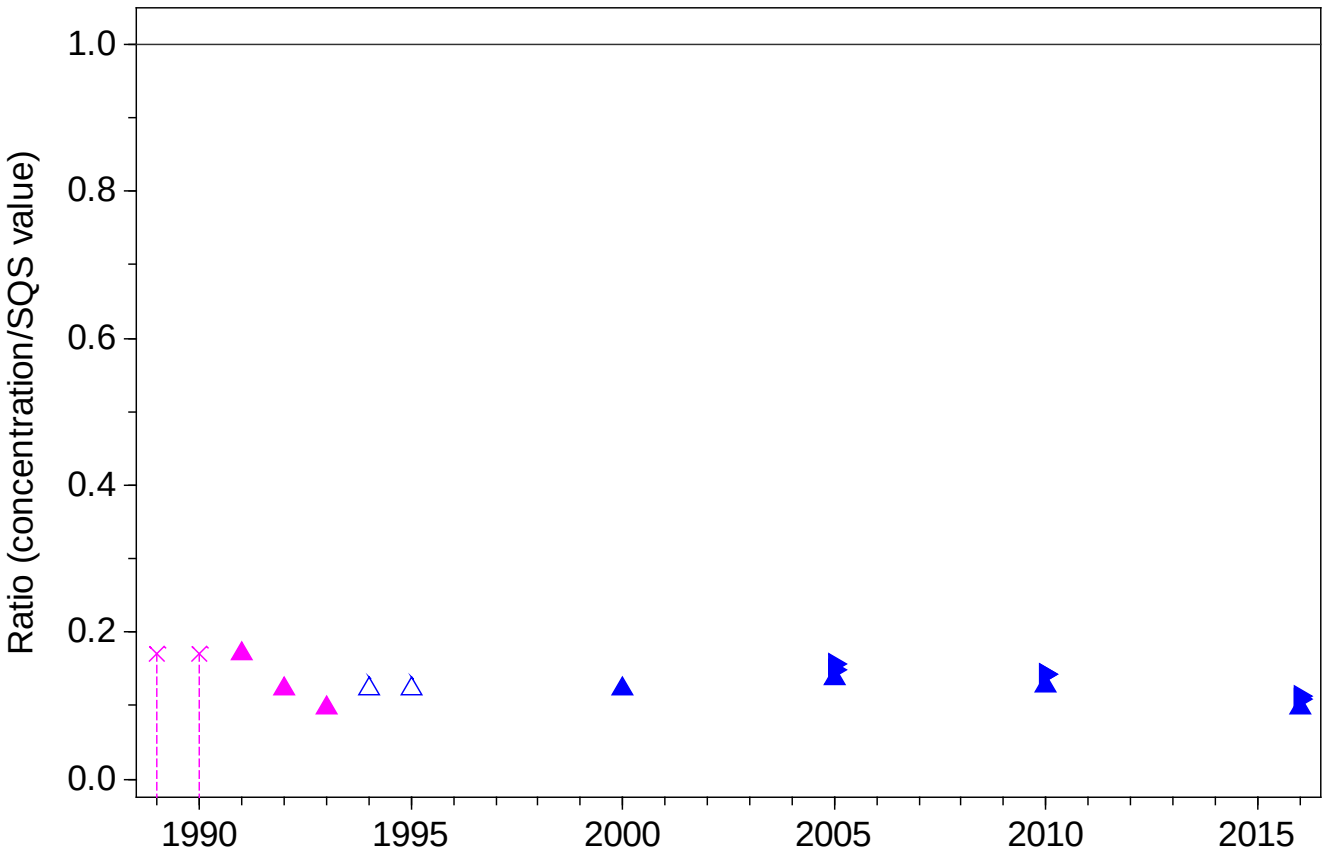
SQS quotient, Copper, Station 3



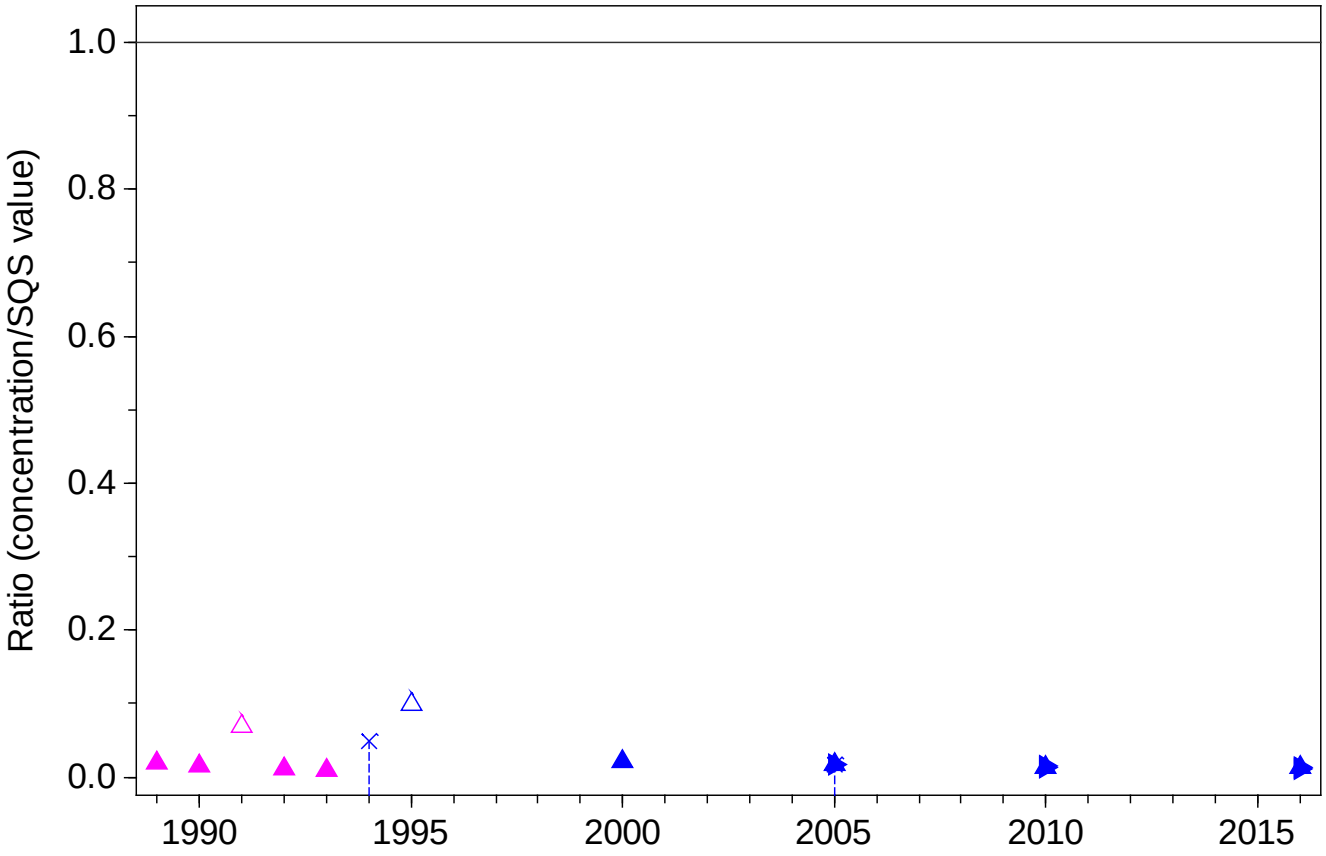
SQS quotient, Lead, Station 3



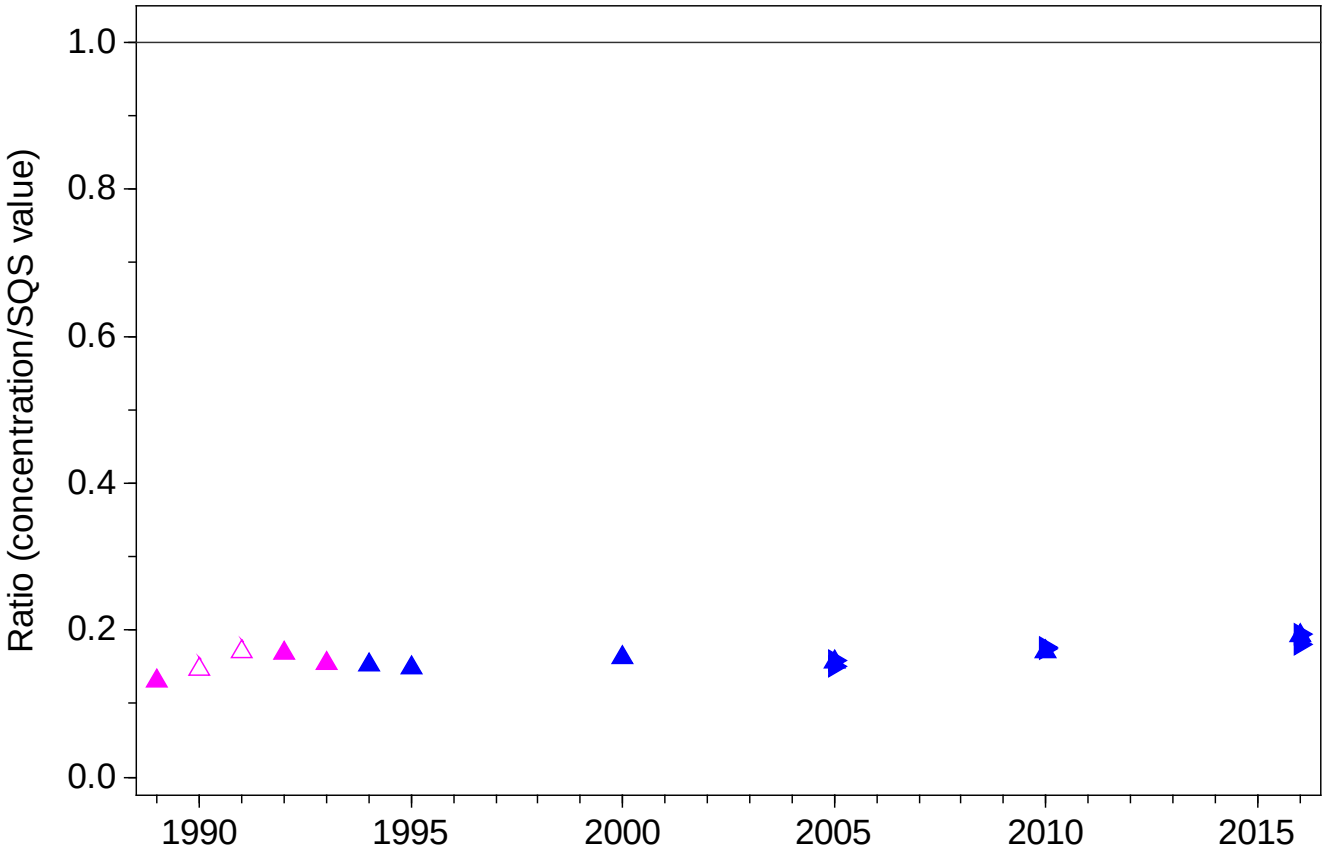
SQS quotient, Mercury, Station 3



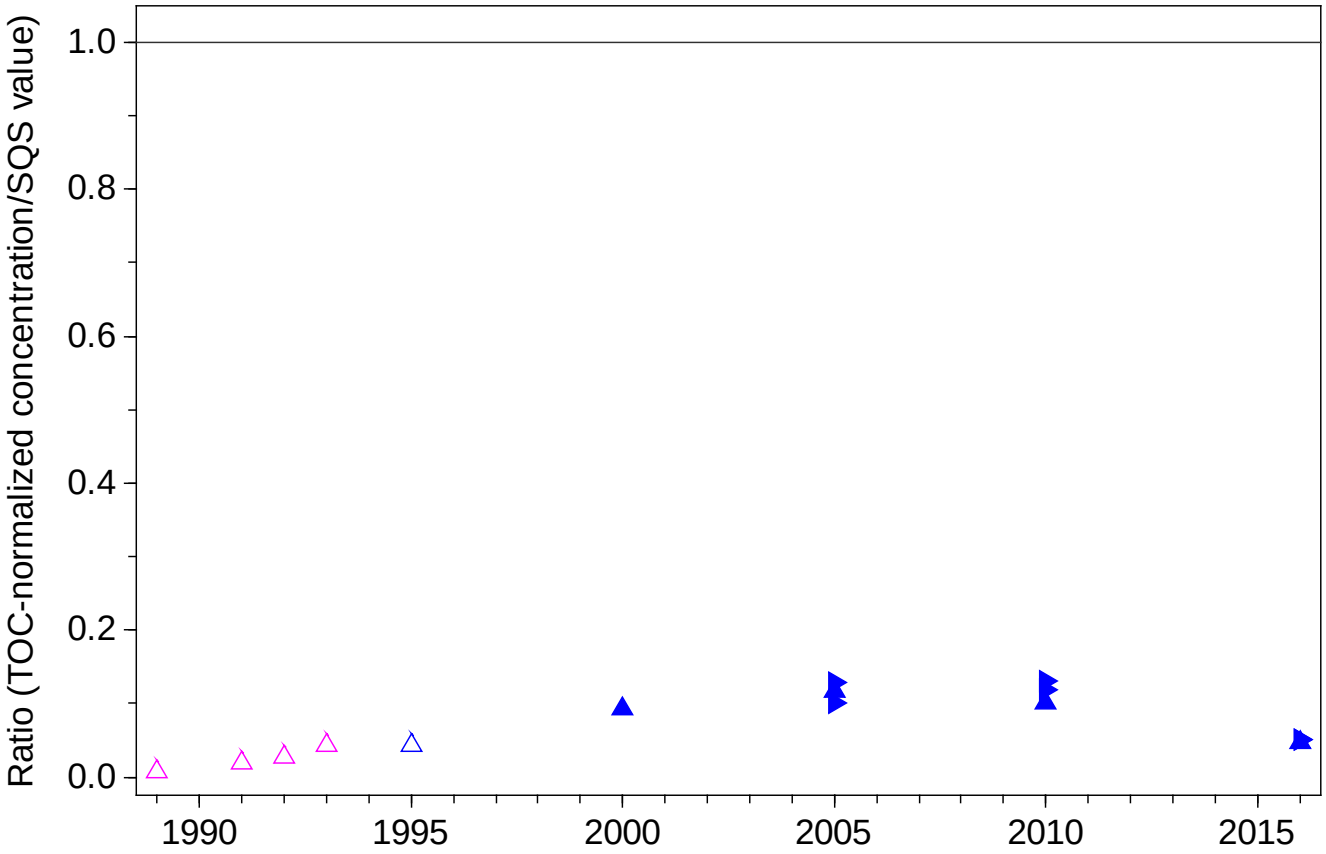
SQS quotient, Silver, Station 3



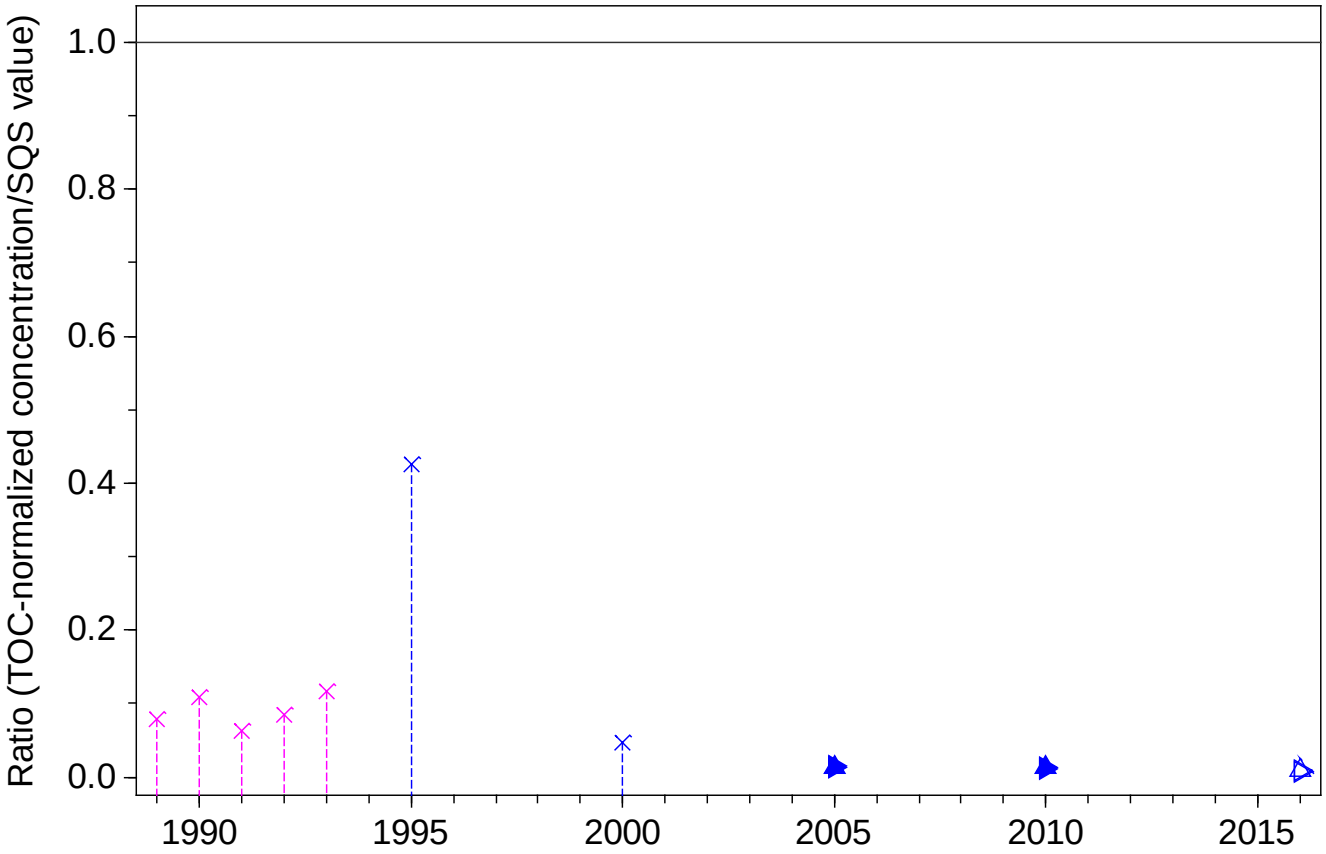
SQS quotient, Zinc, Station 3



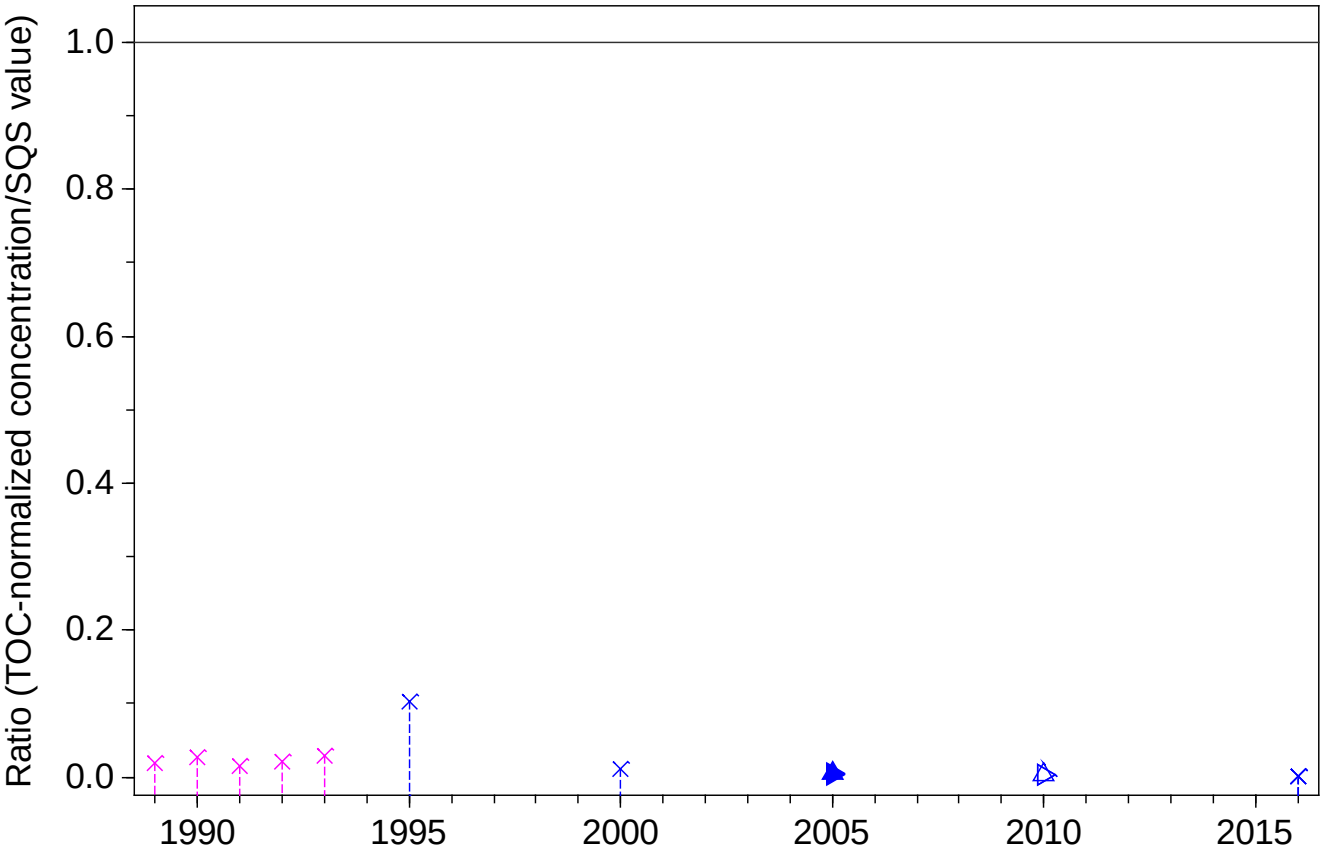
SQS quotient, 2-Methylnaphthalene, Station 3



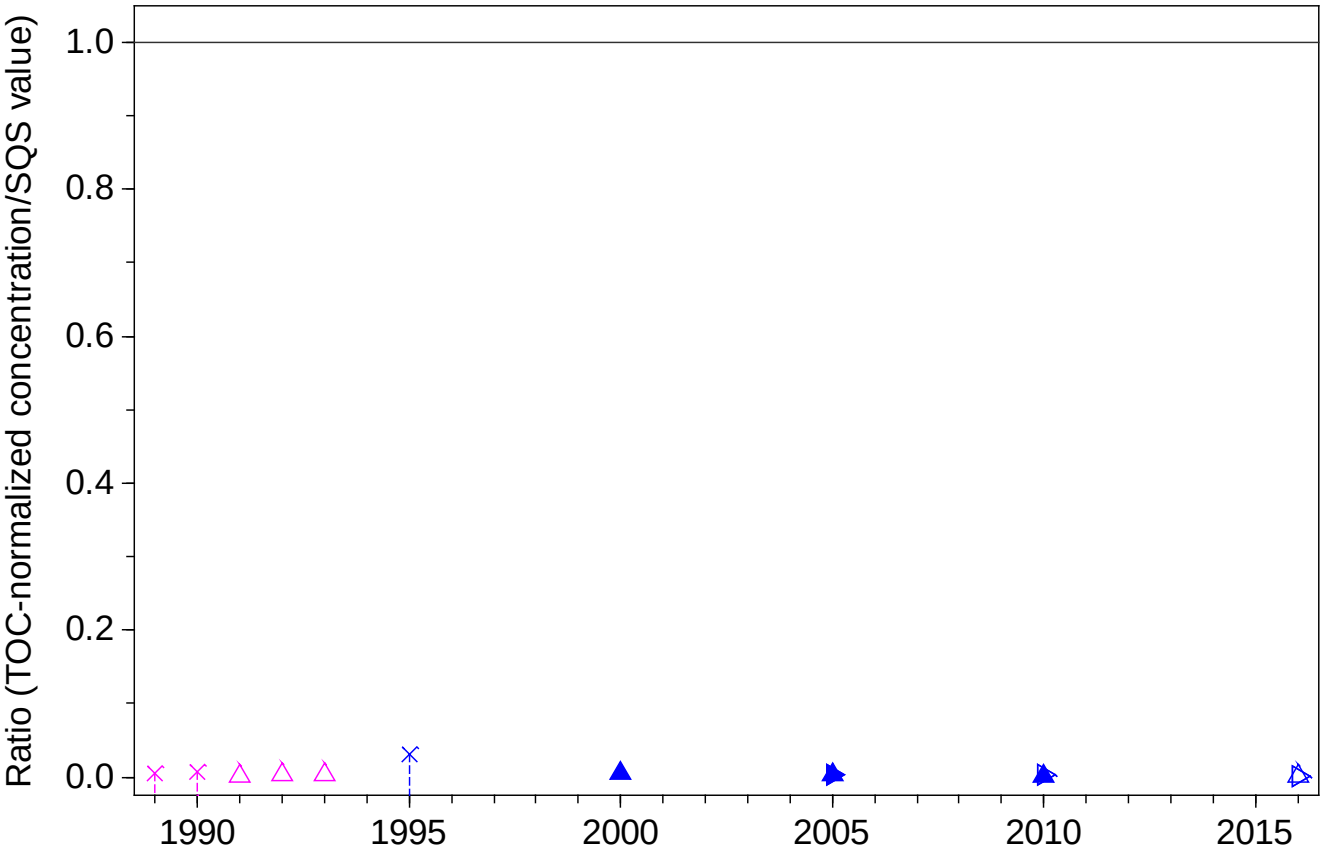
SQS quotient, Acenaphthene, Station 3



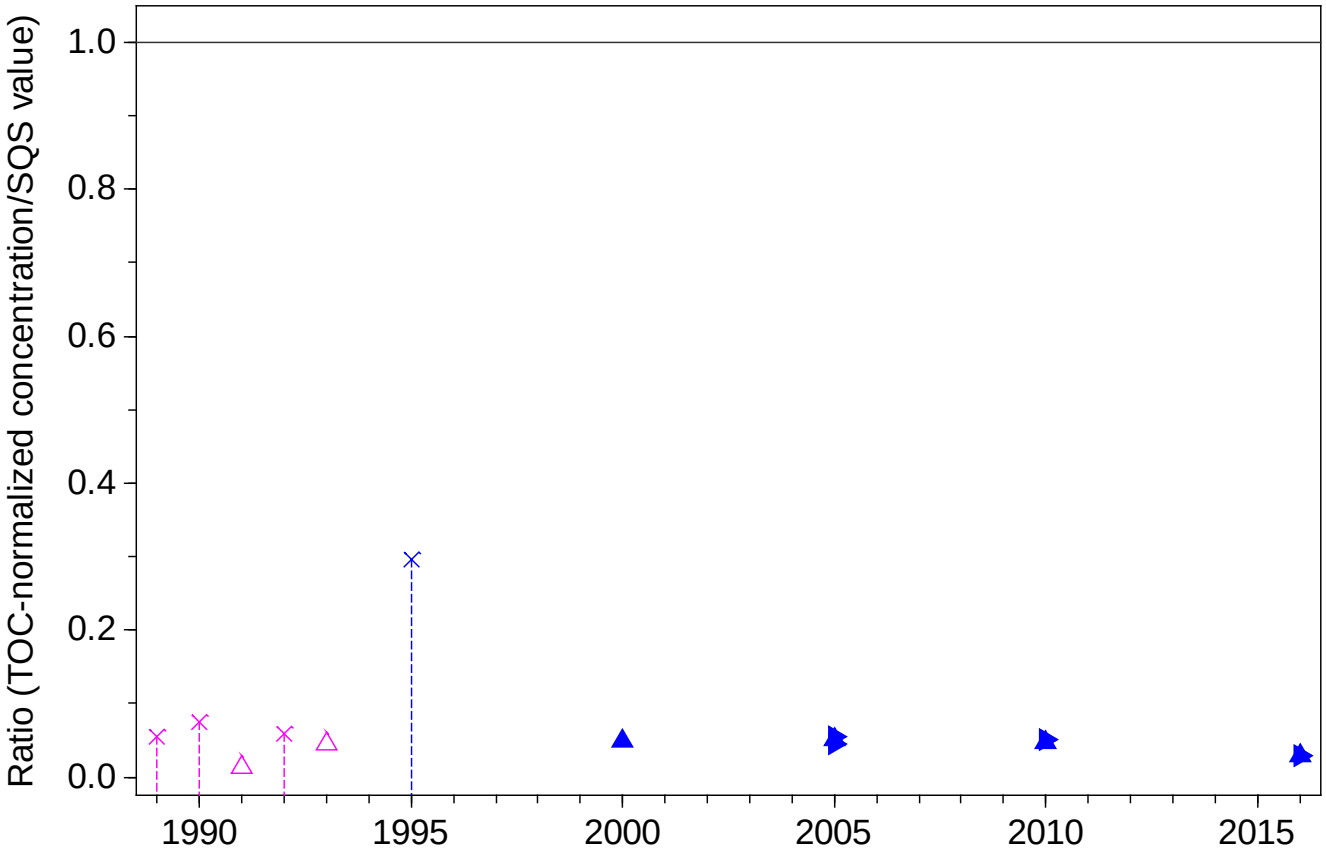
SQS quotient, Acenaphthylene, Station 3



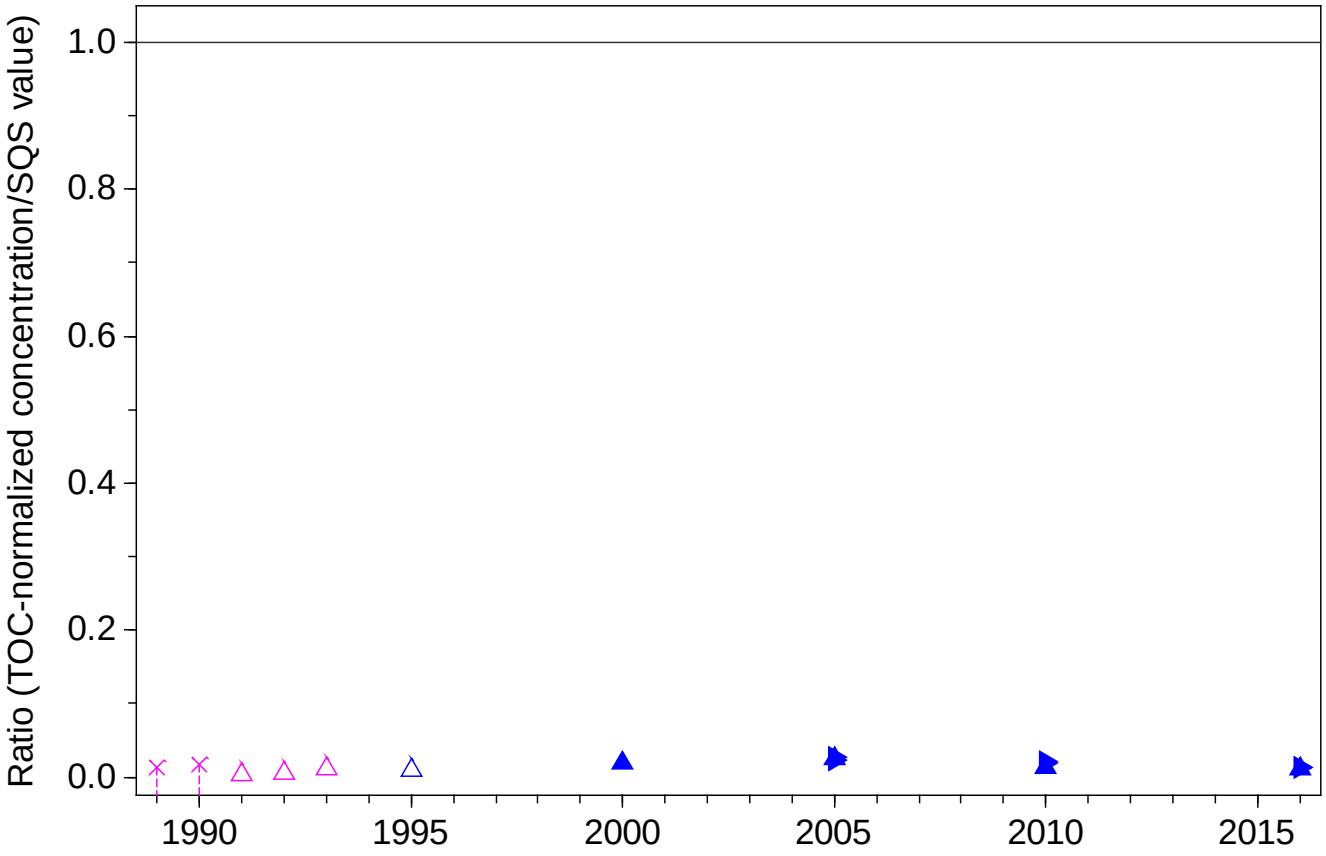
SQS quotient, Anthracene, Station 3



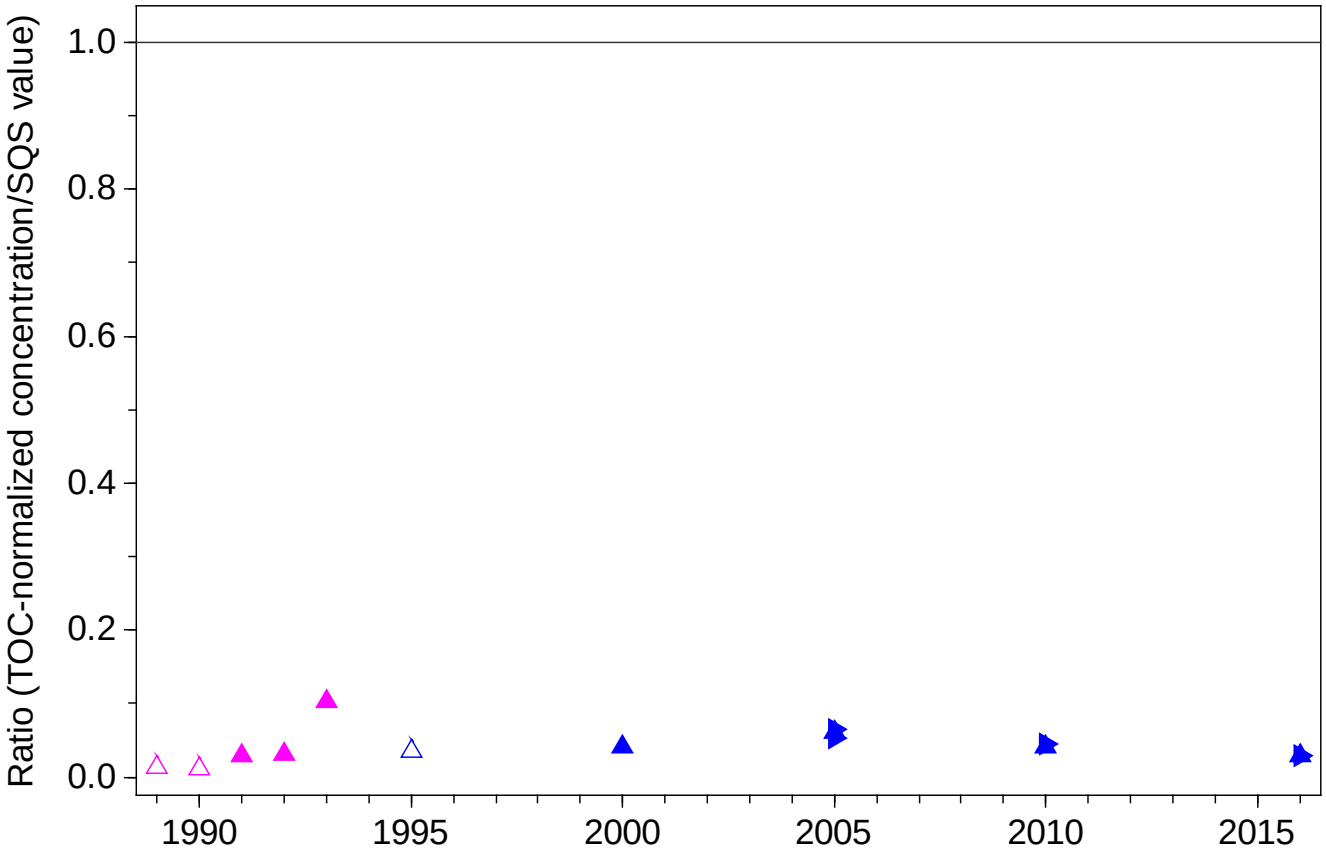
SQS quotient, Fluorene, Station 3



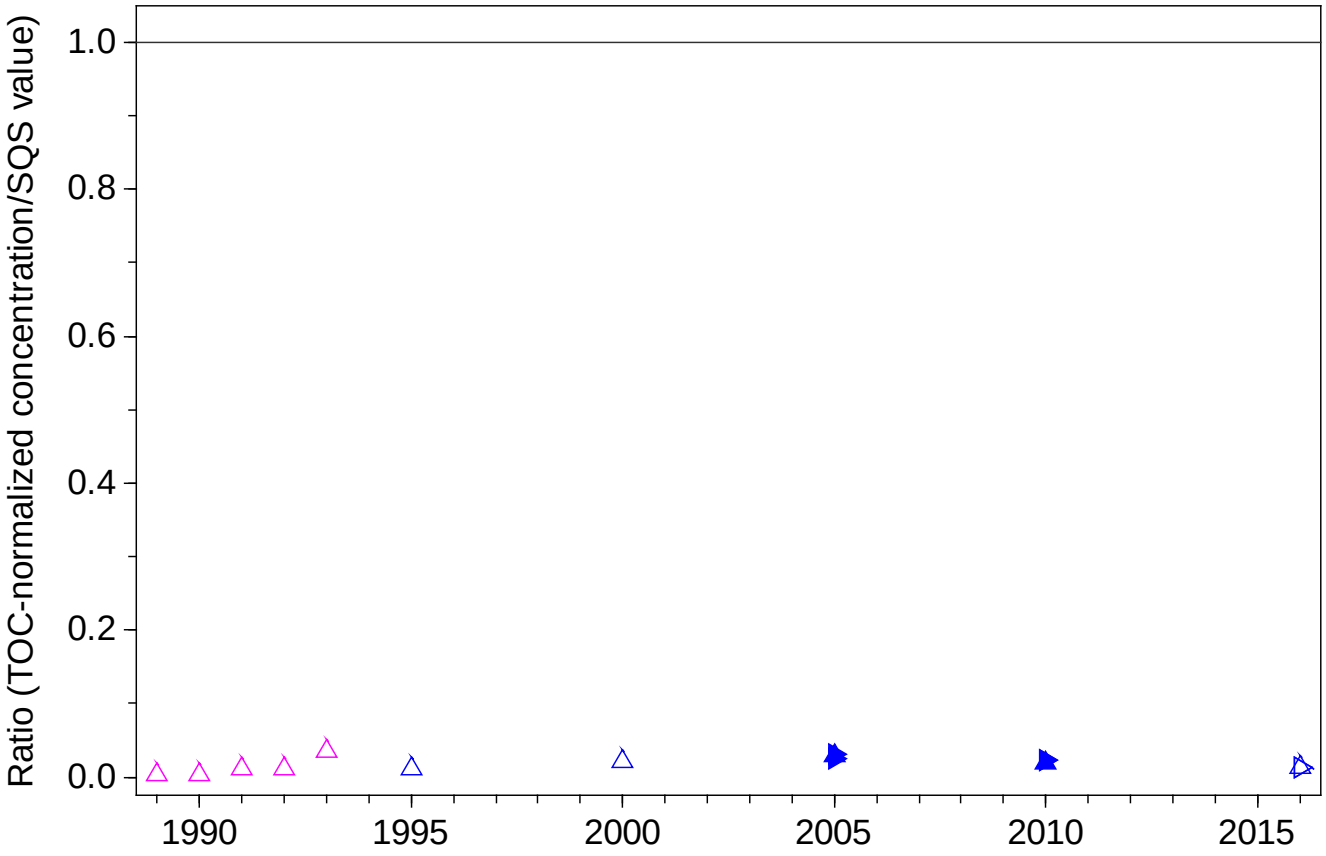
SQS quotient, Naphthalene, Station 3



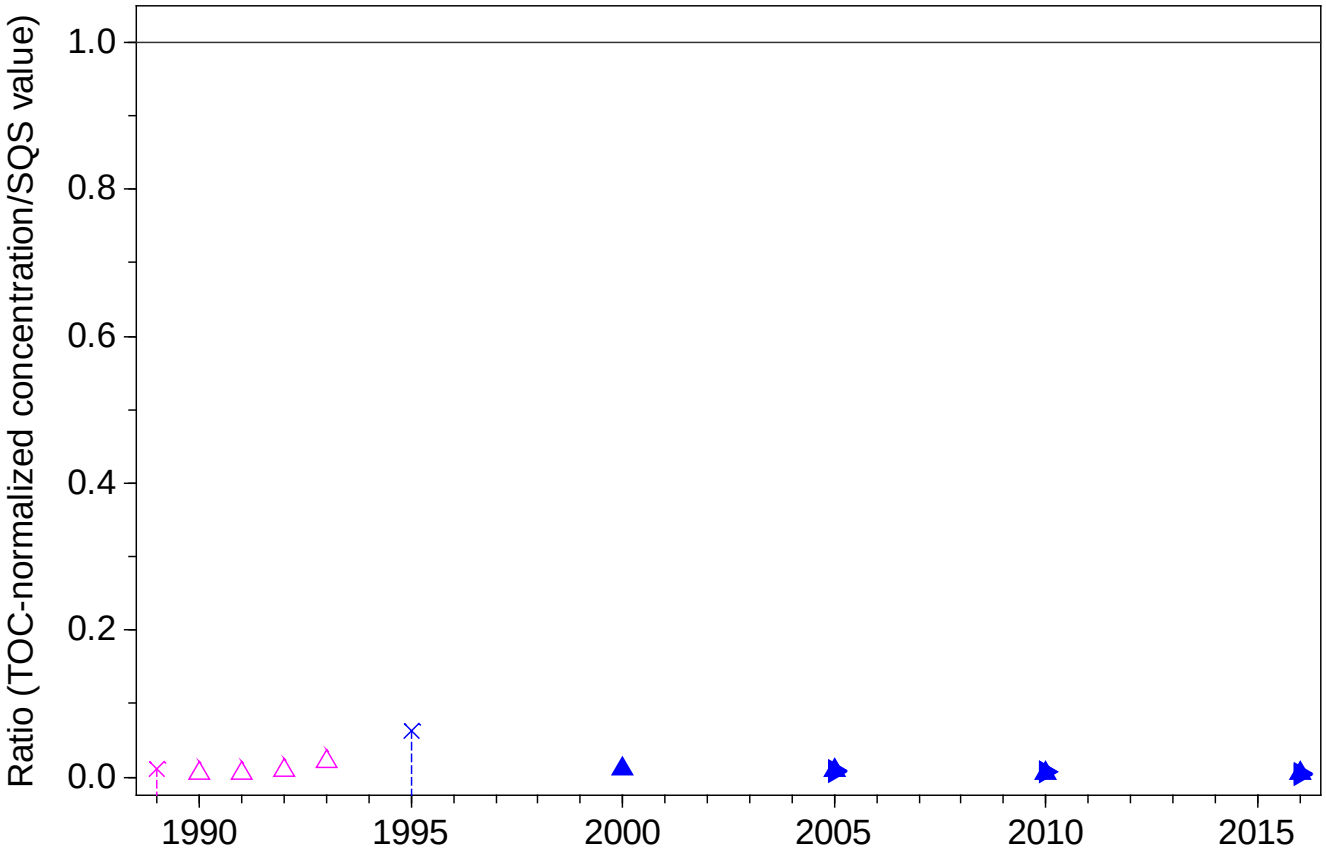
SQS quotient, Phenanthrene, Station 3



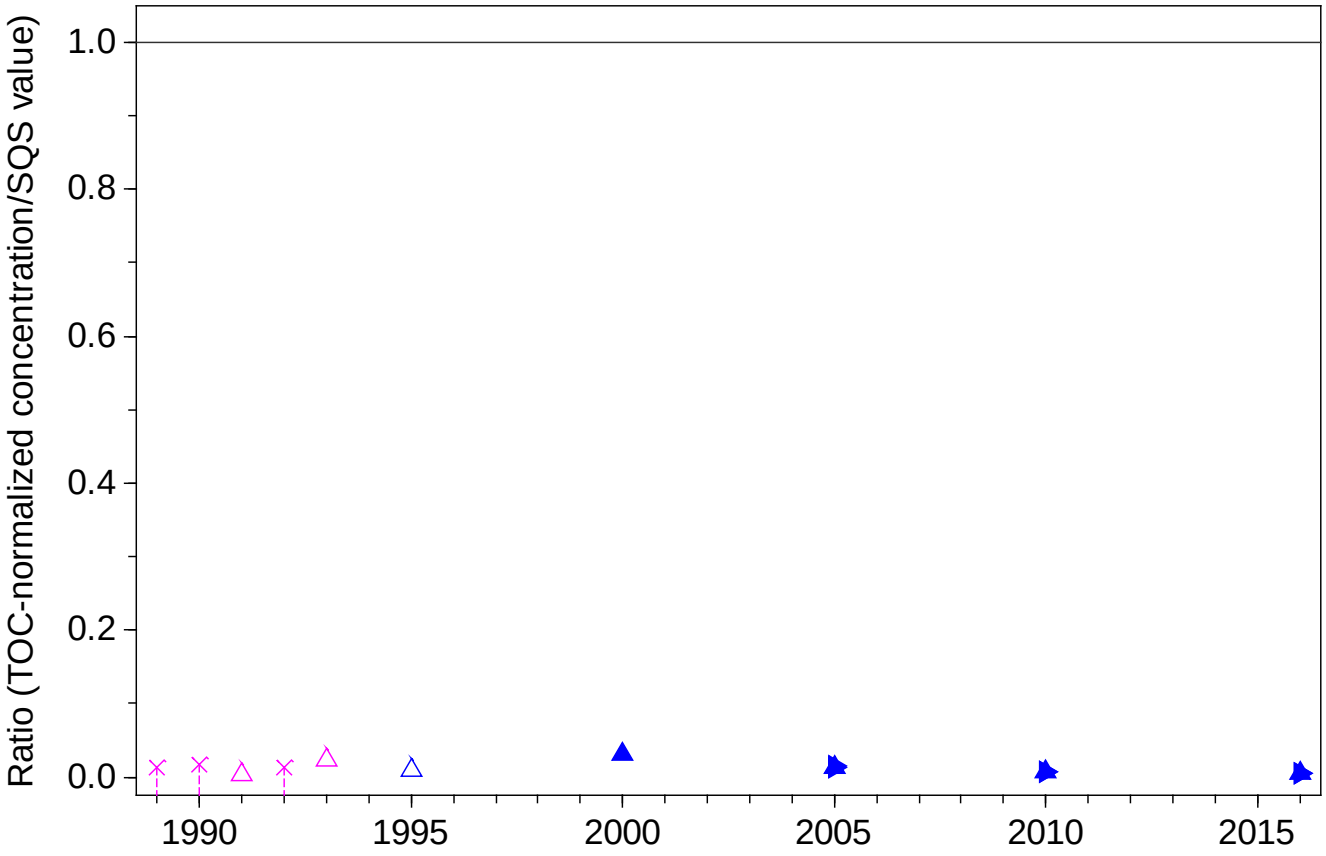
SQS quotient, Total LPAH, Station 3



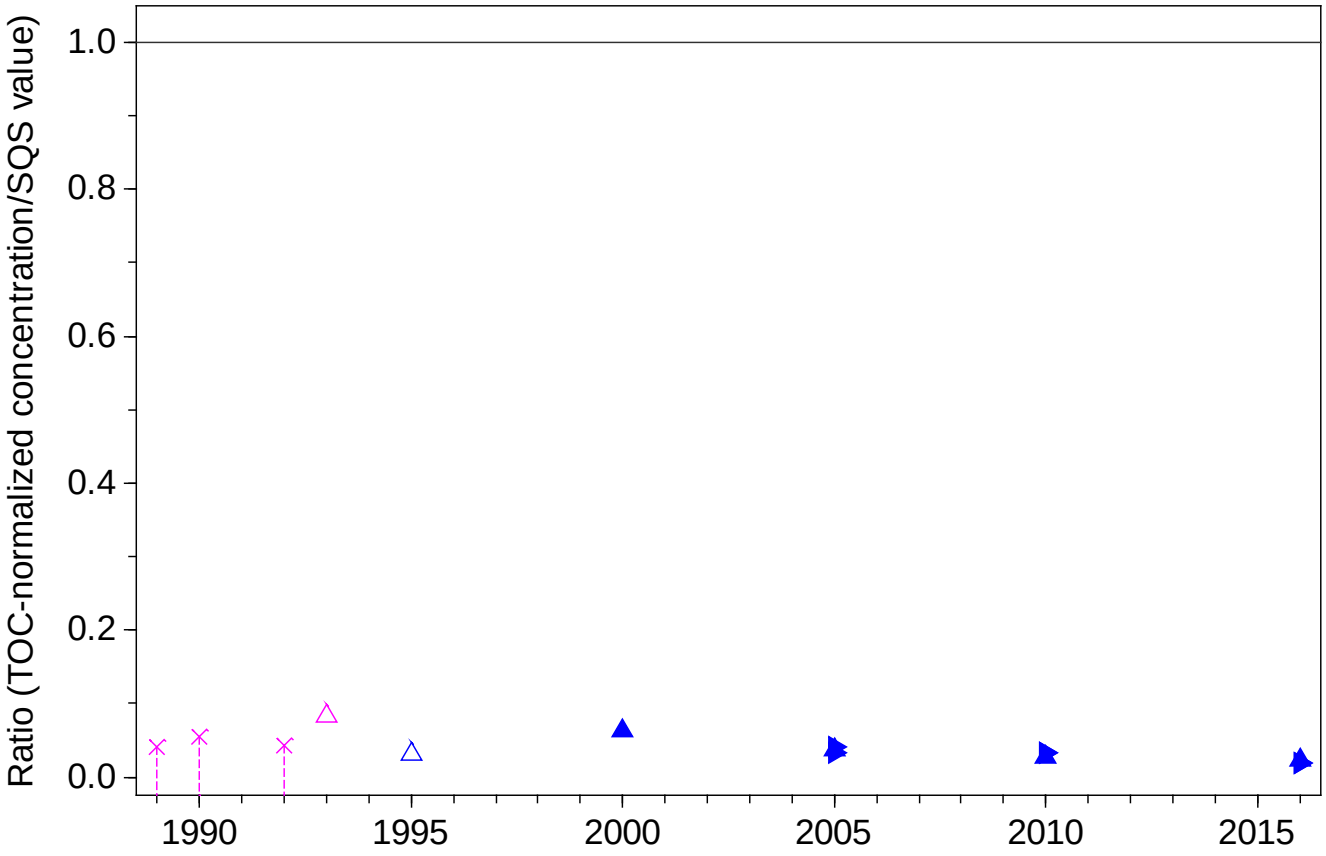
SQS quotient, Benzo(a)anthracene, Station 3



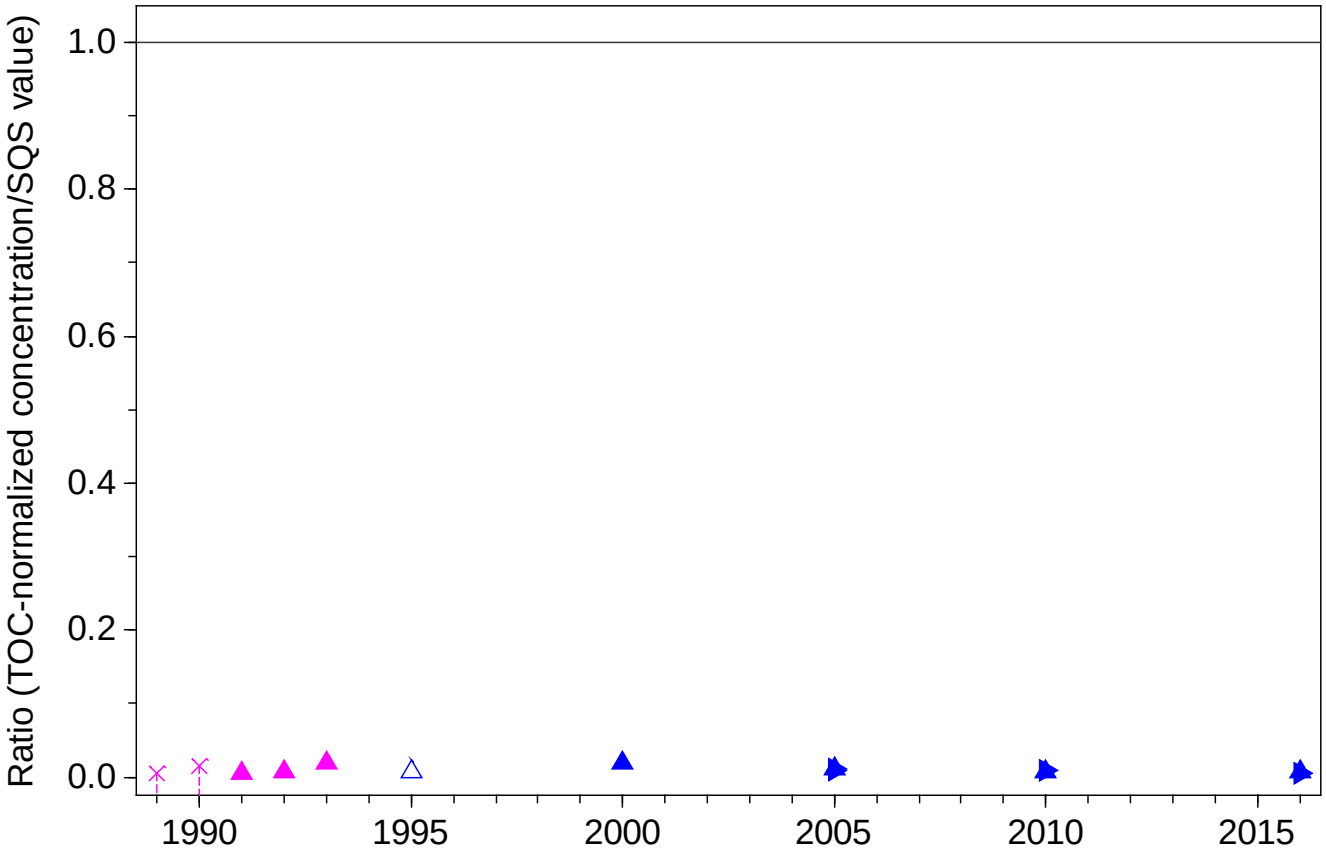
SQS quotient, Benzo(a)pyrene, Station 3



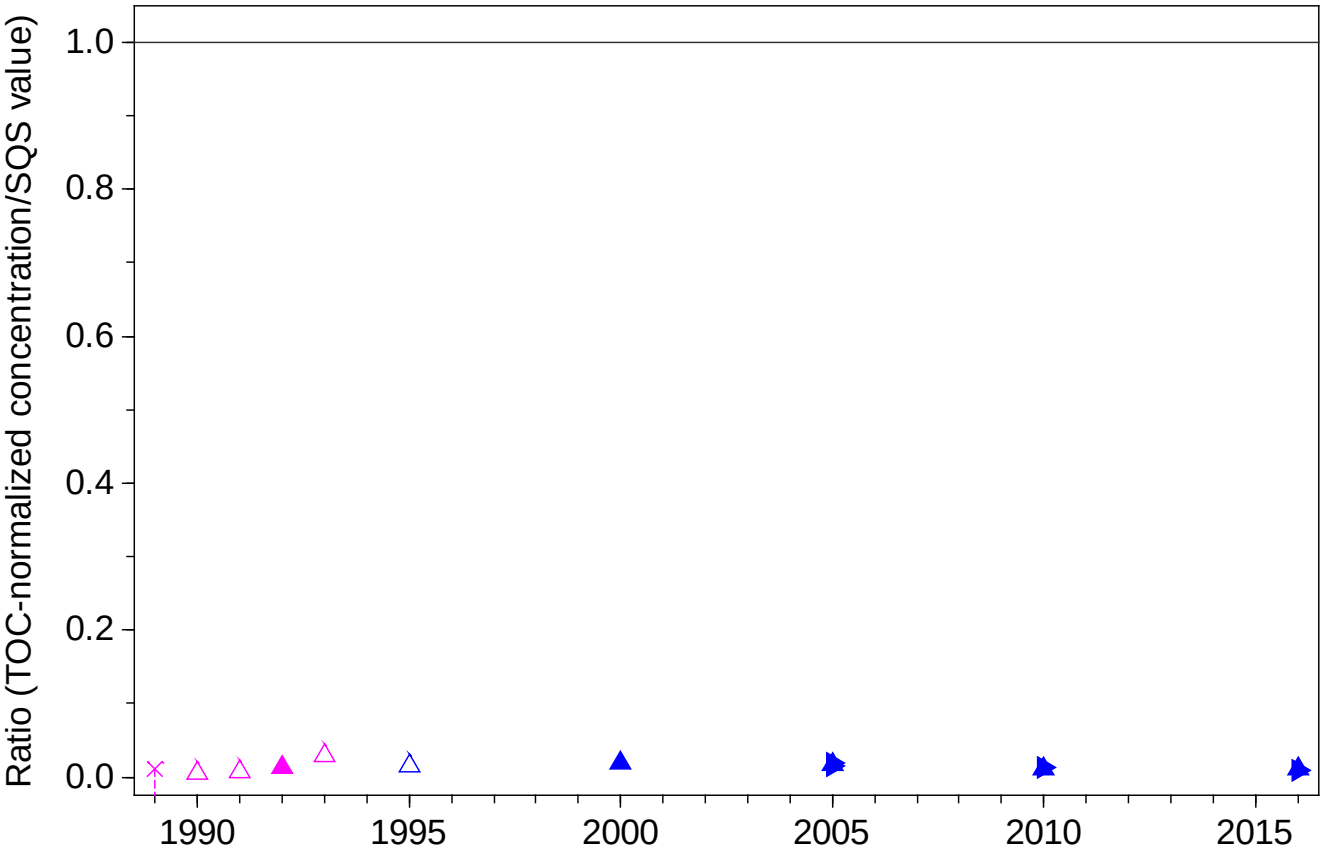
SQS quotient, Benzo(g,h,i)perylene, Station 3



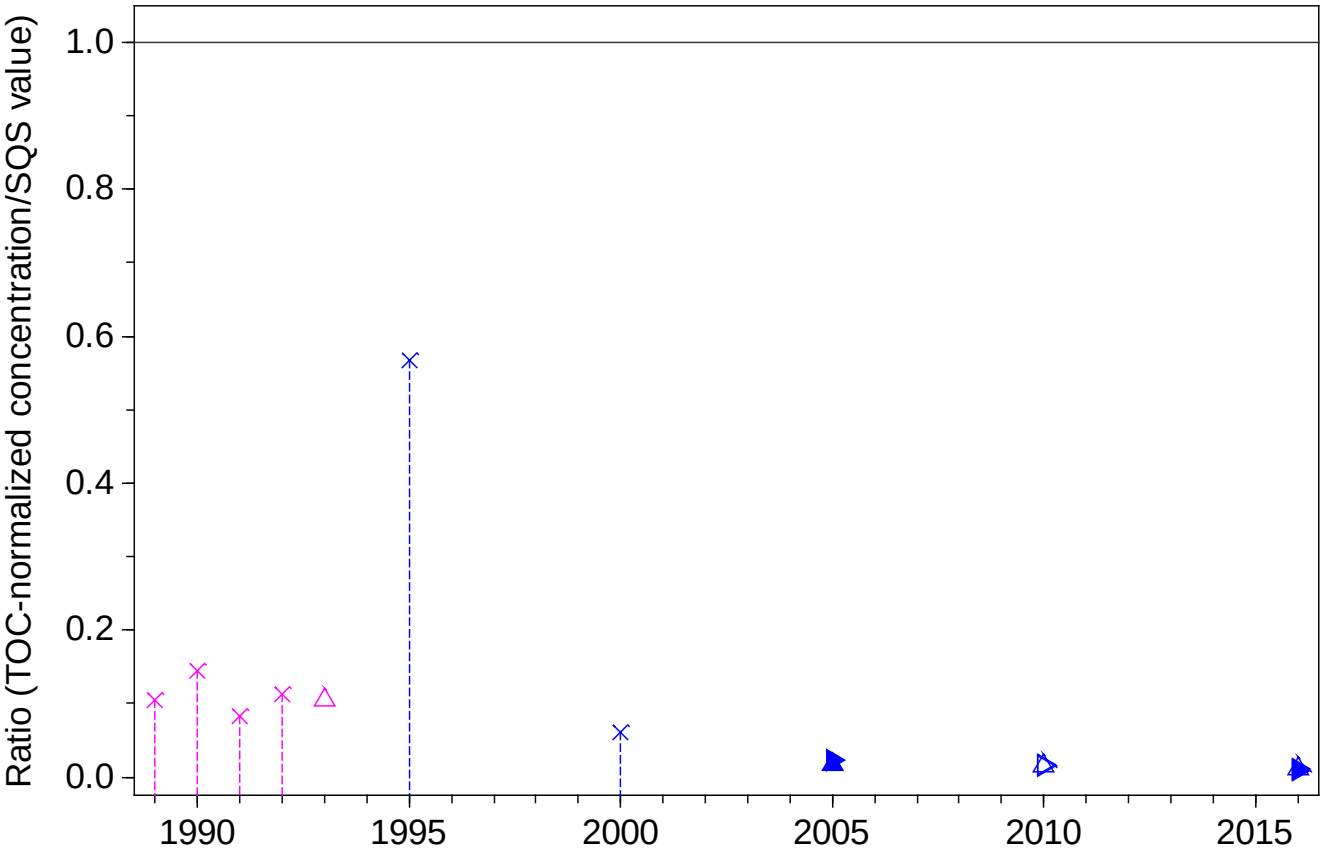
SQS quotient, Total Benzofluoranthenes, Station 3



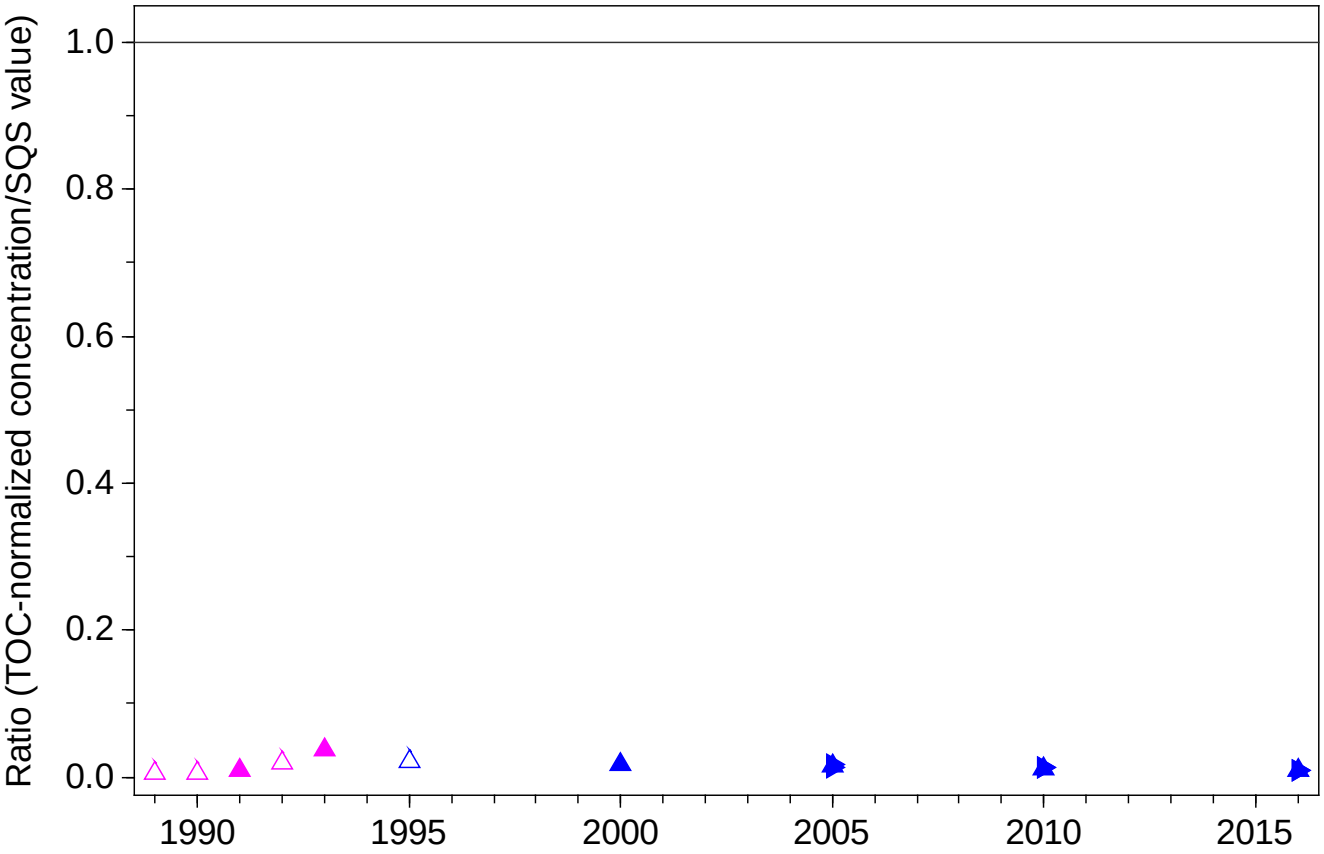
SQS quotient, Chrysene, Station 3



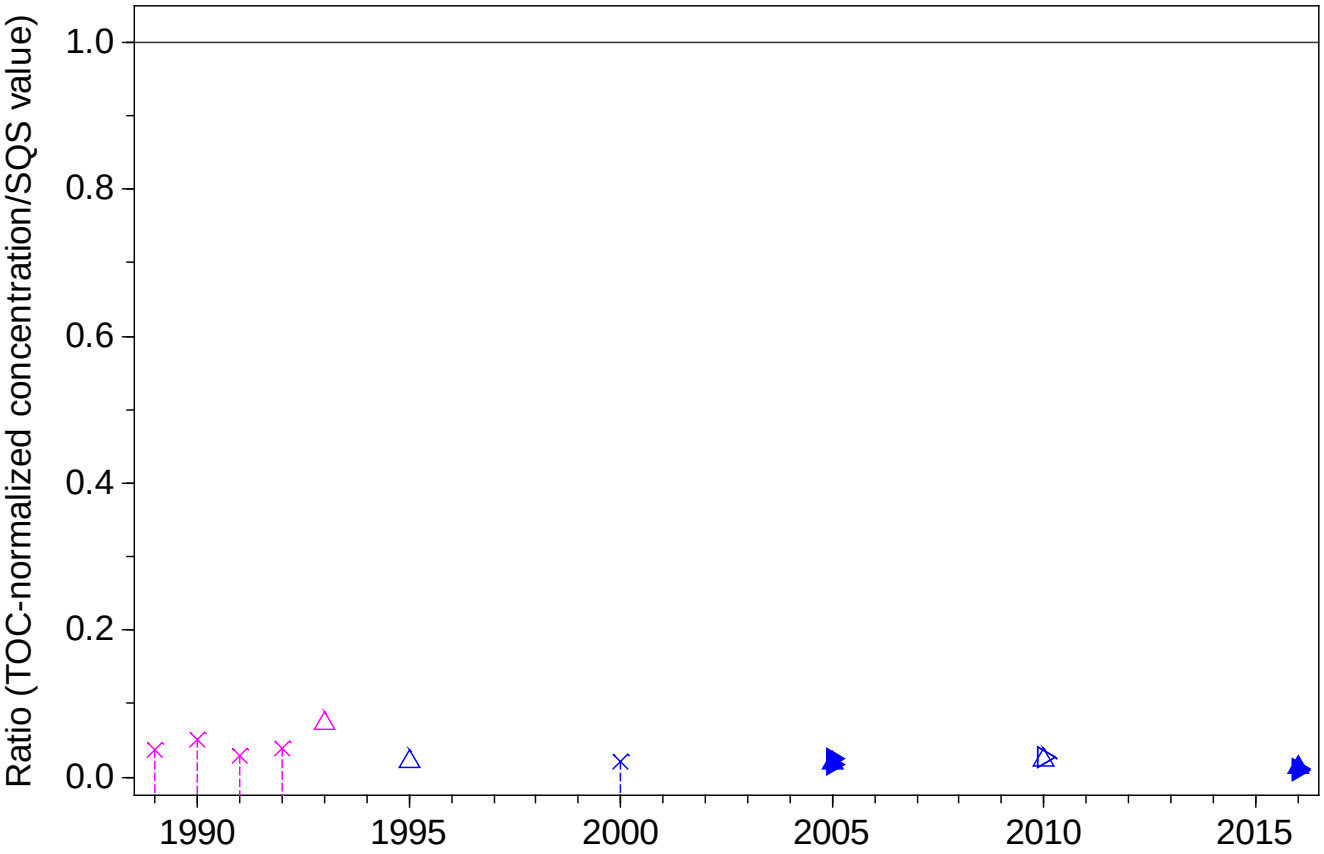
SQS quotient, Dibenzo(a,h)anthracene, Station 3



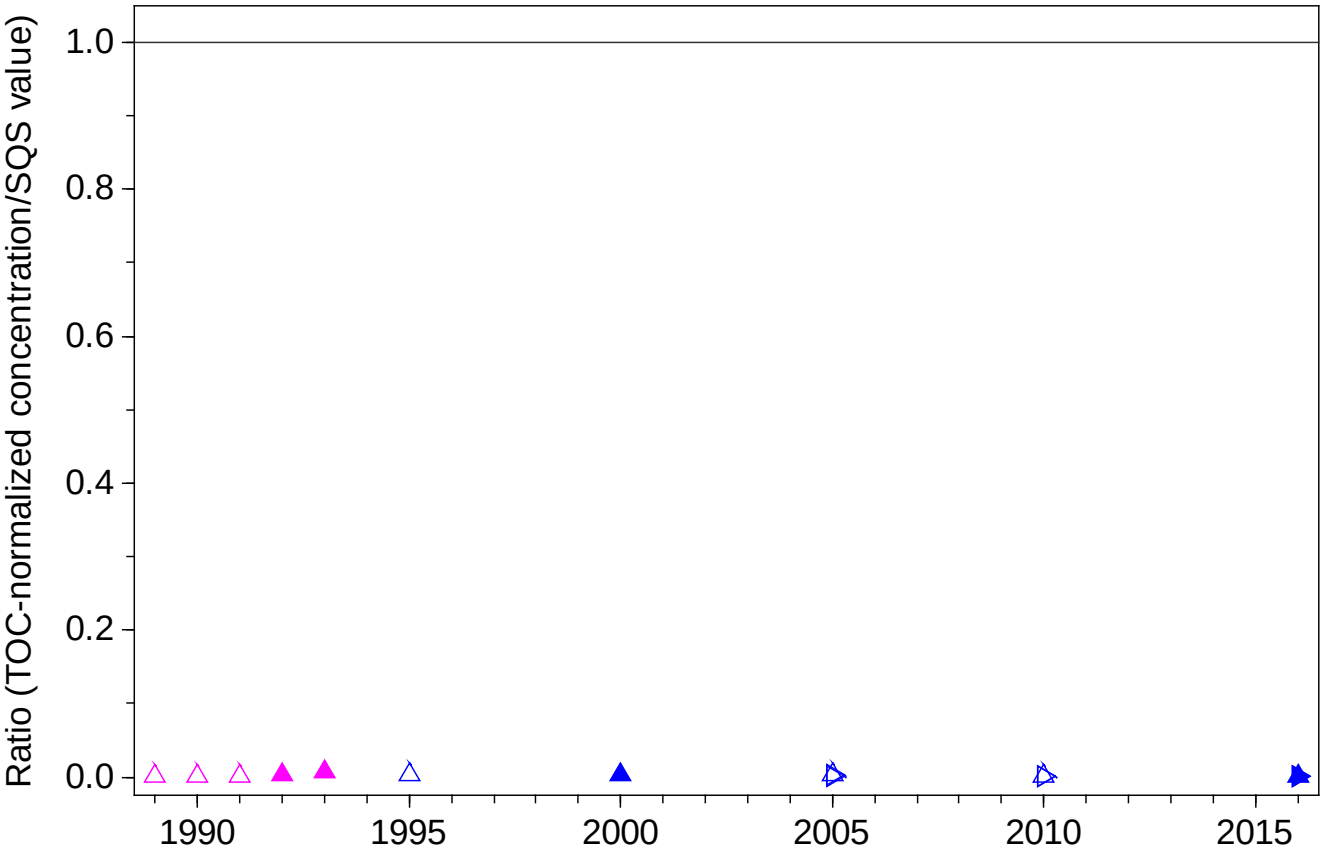
SQS quotient, Fluoranthene, Station 3



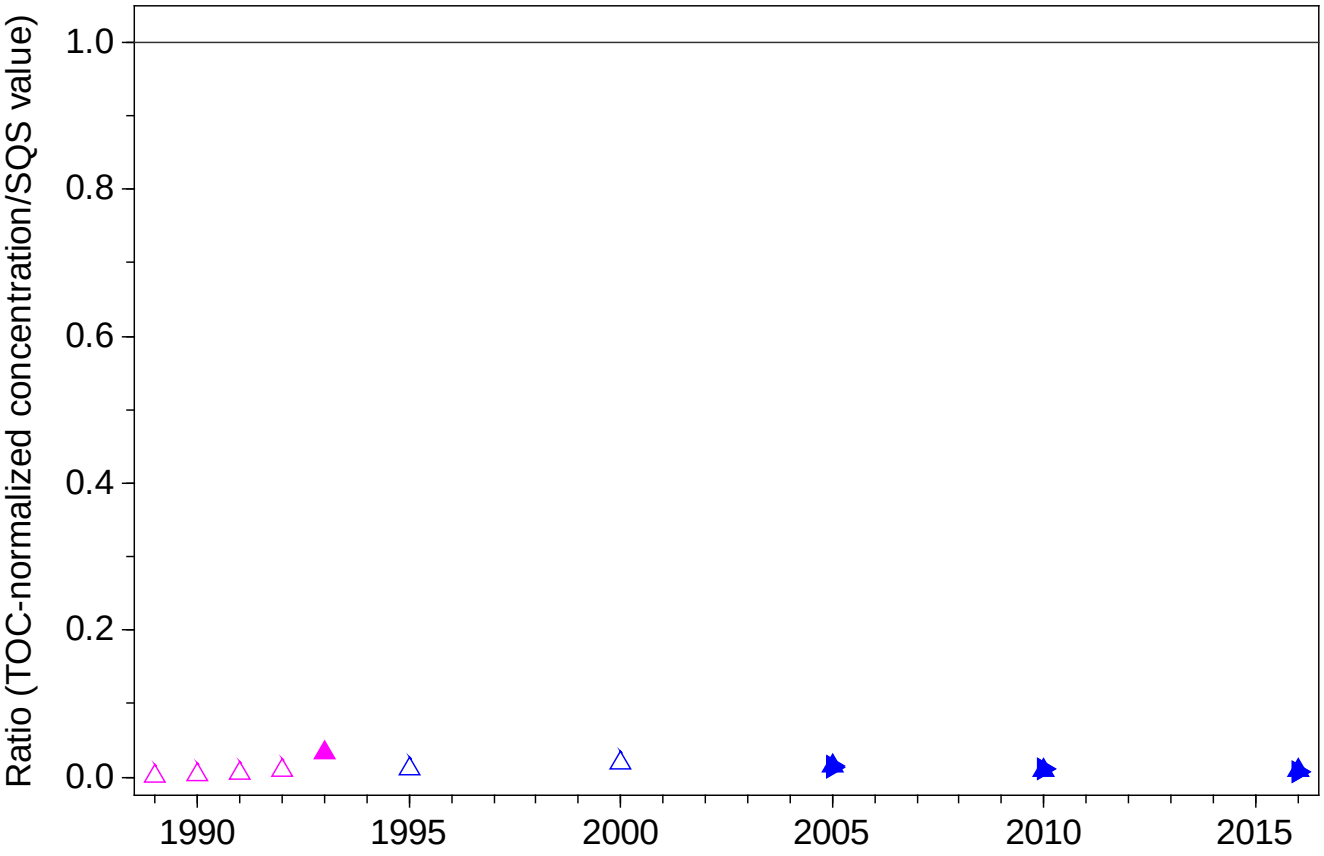
SQS quotient, Indeno(1,2,3-c,d)pyrene, Station 3



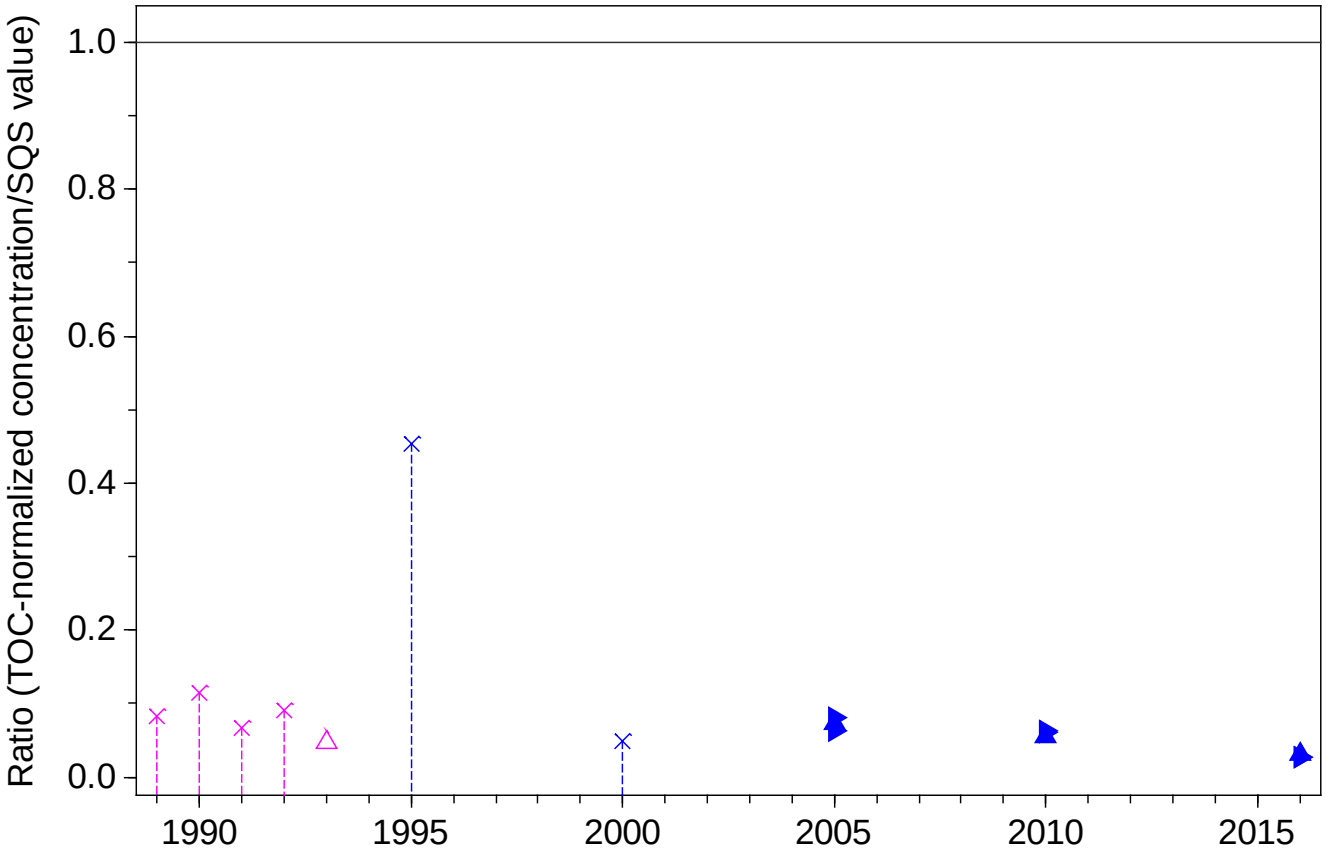
SQS quotient, Pyrene, Station 3



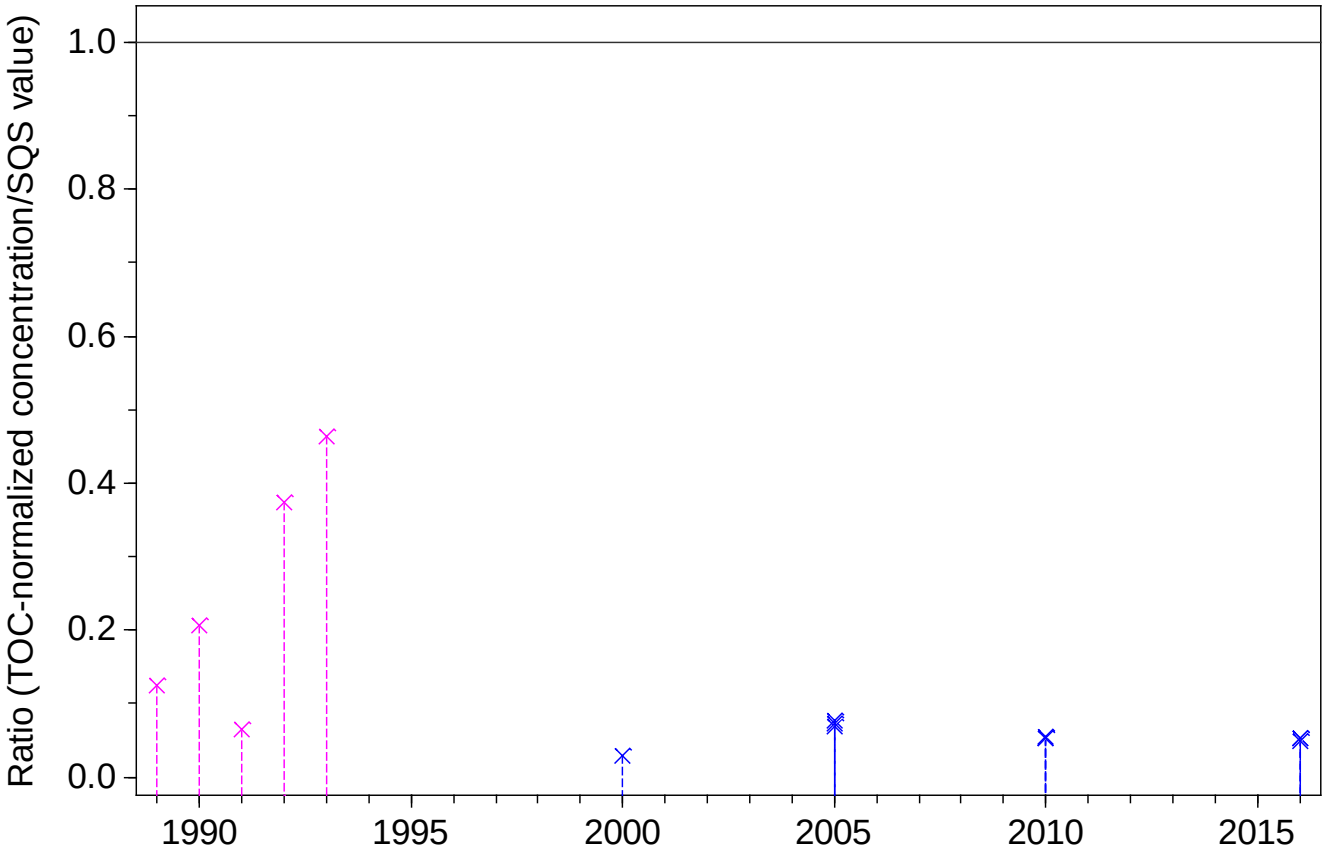
SQS quotient, Total HPAH, Station 3



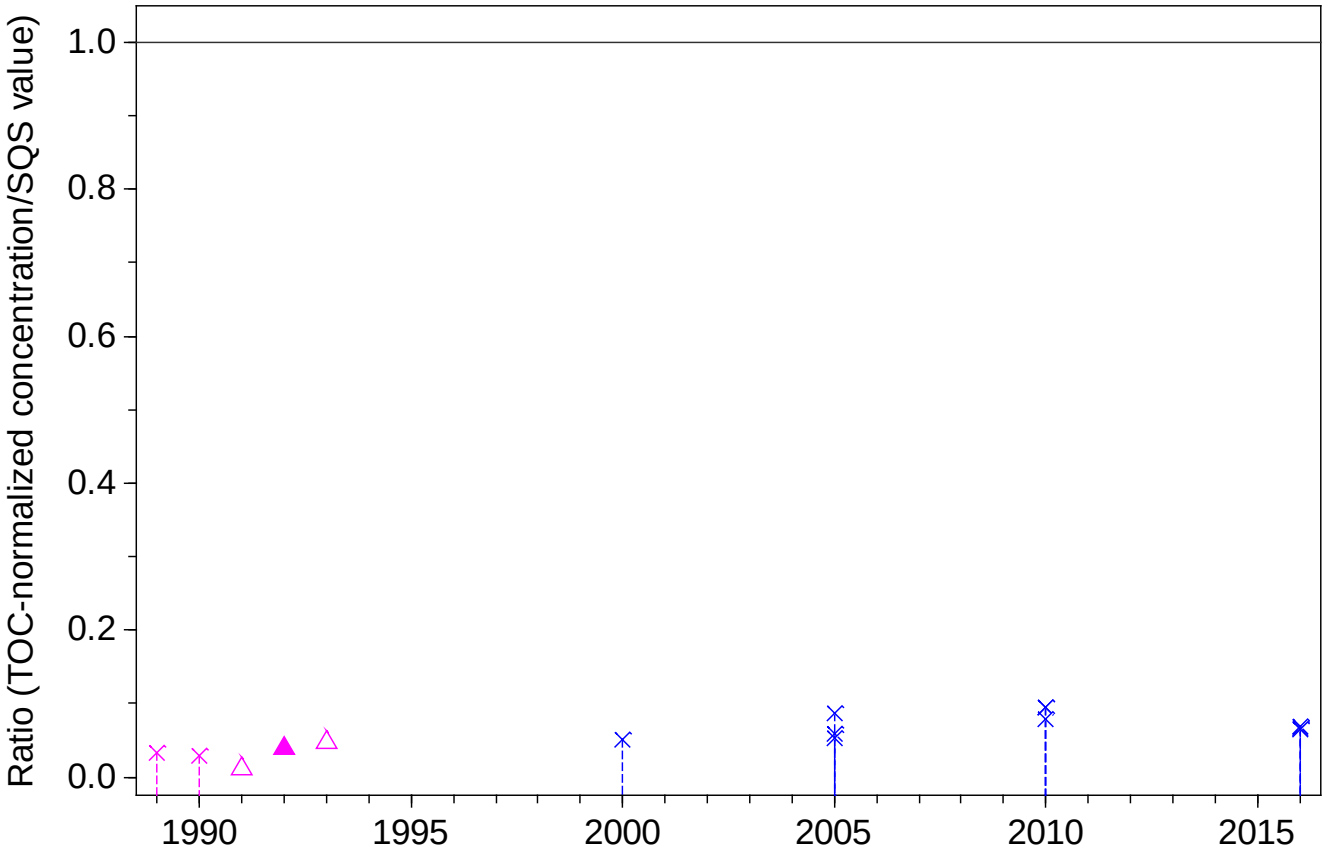
SQS quotient, Dibenzofuran, Station 3



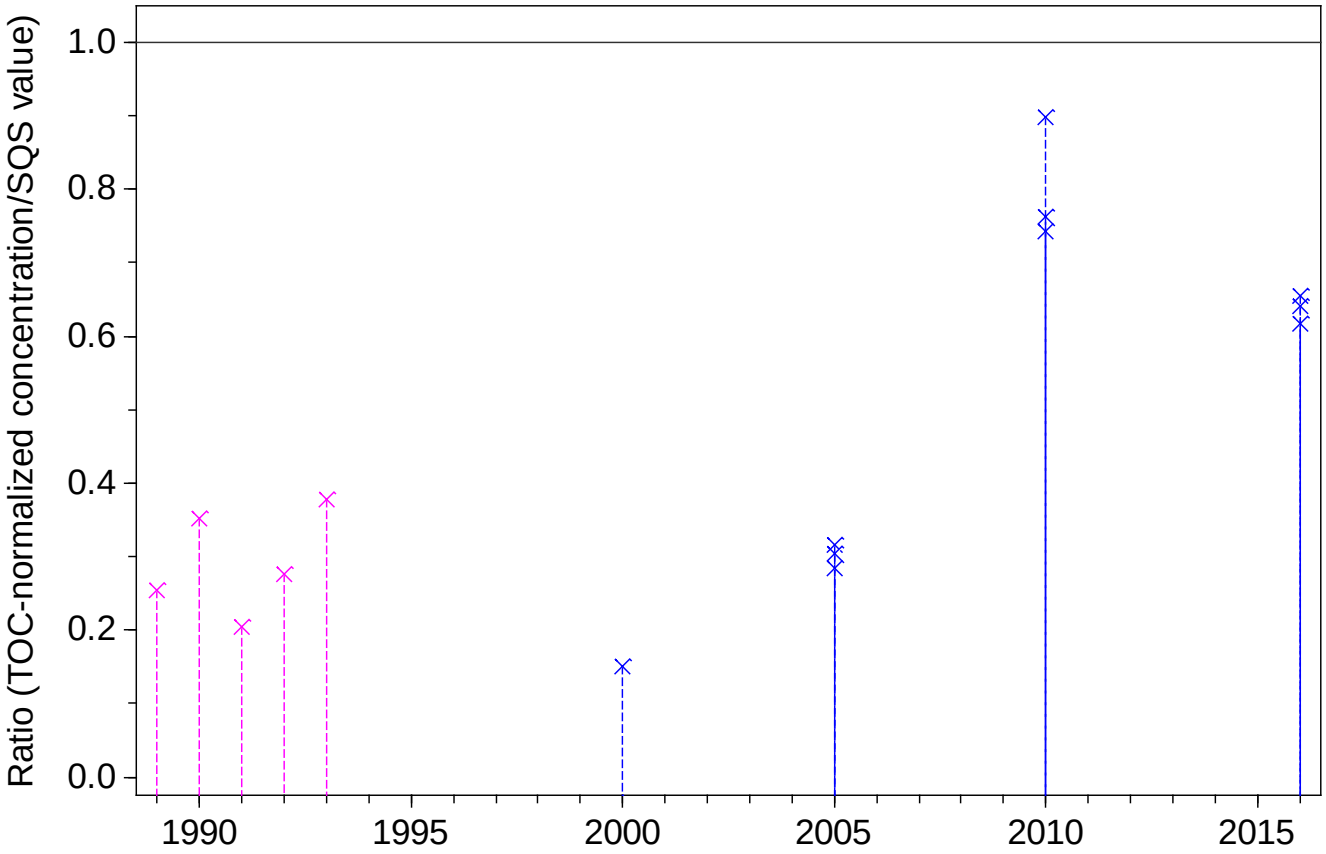
SQS quotient, Total Aroclors, Station 3



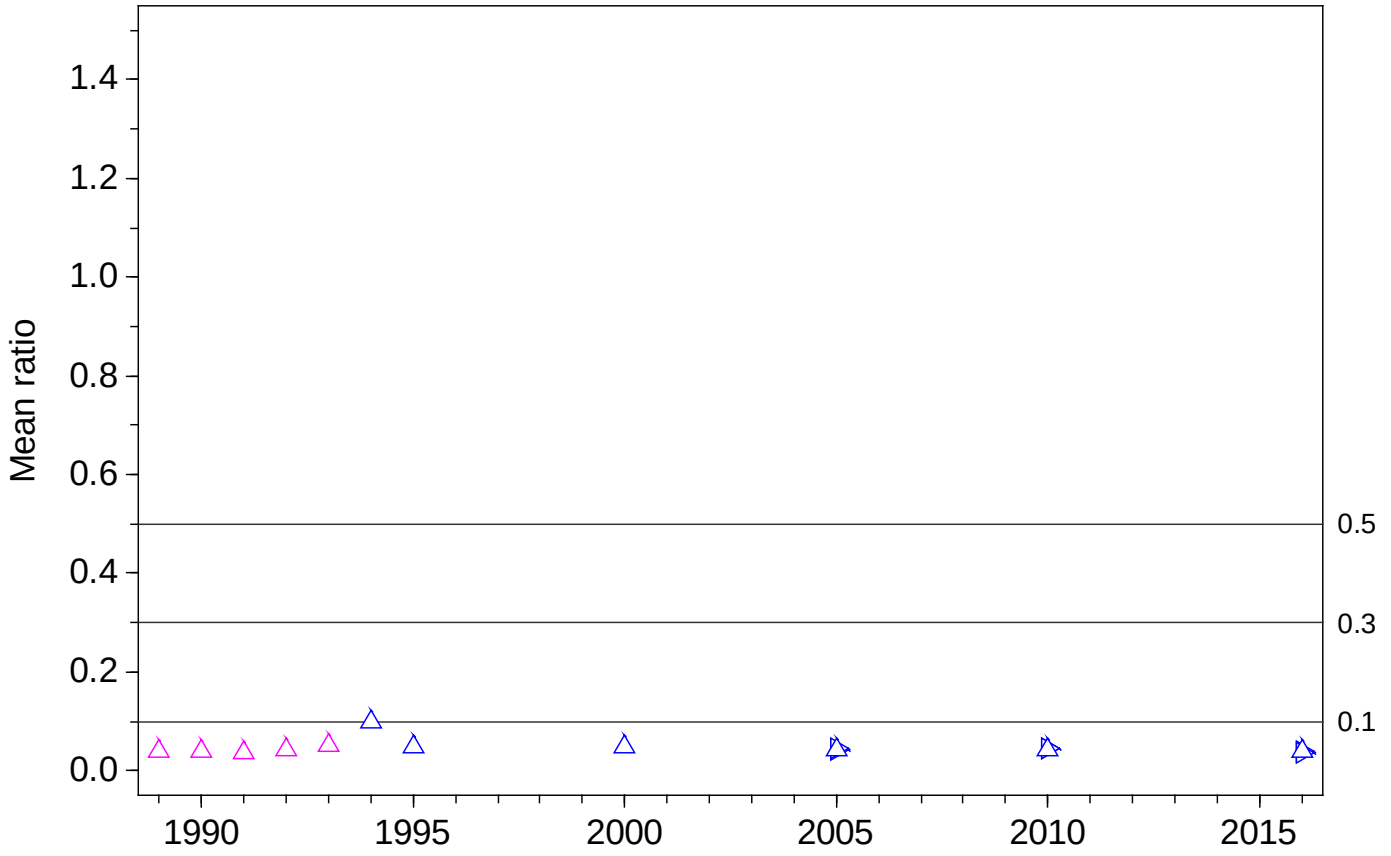
SQS quotient, Bis(2-ethylhexyl)phthalate, Station 3



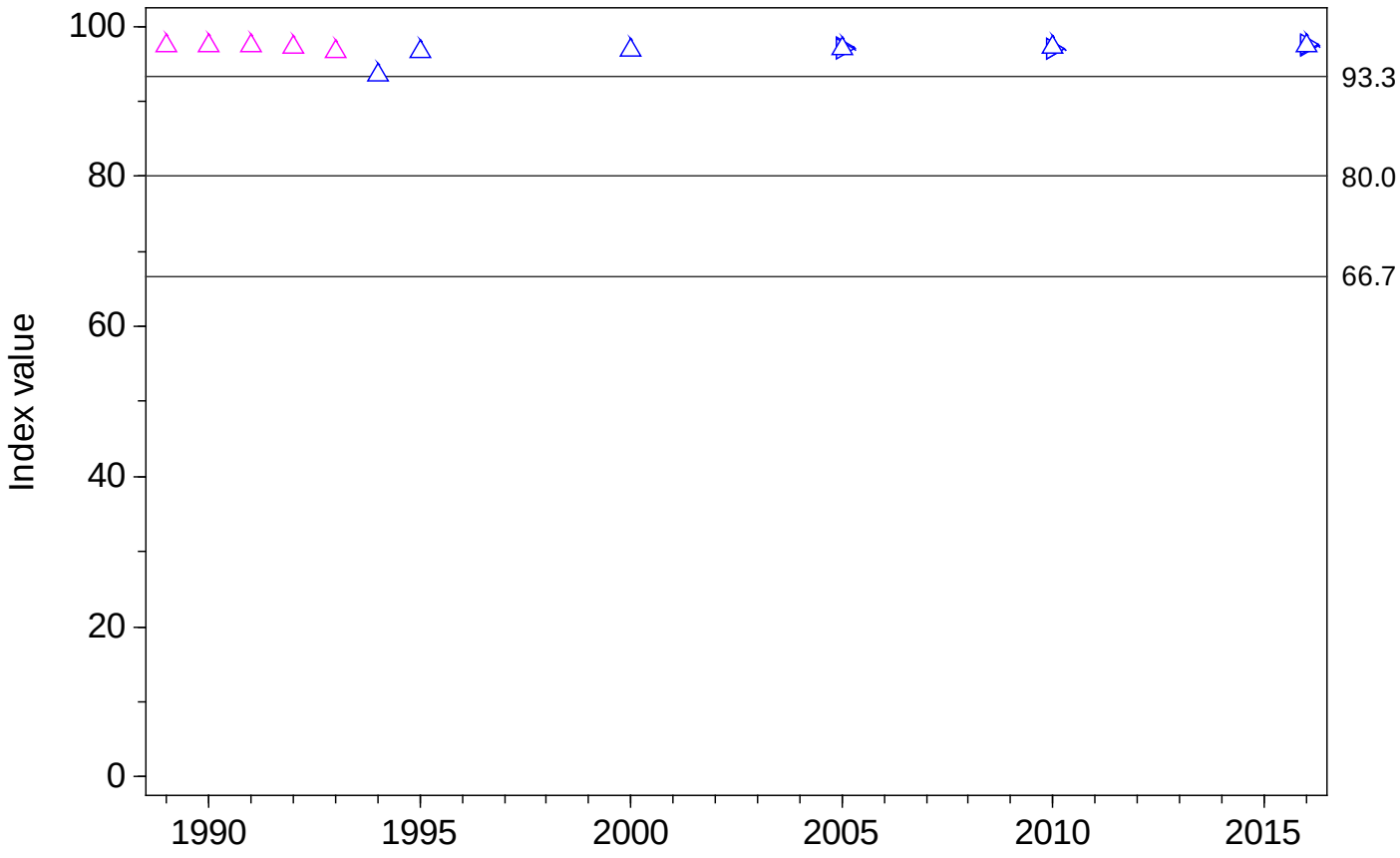
SQS quotient, Butylbenzylphthalate, Station 3



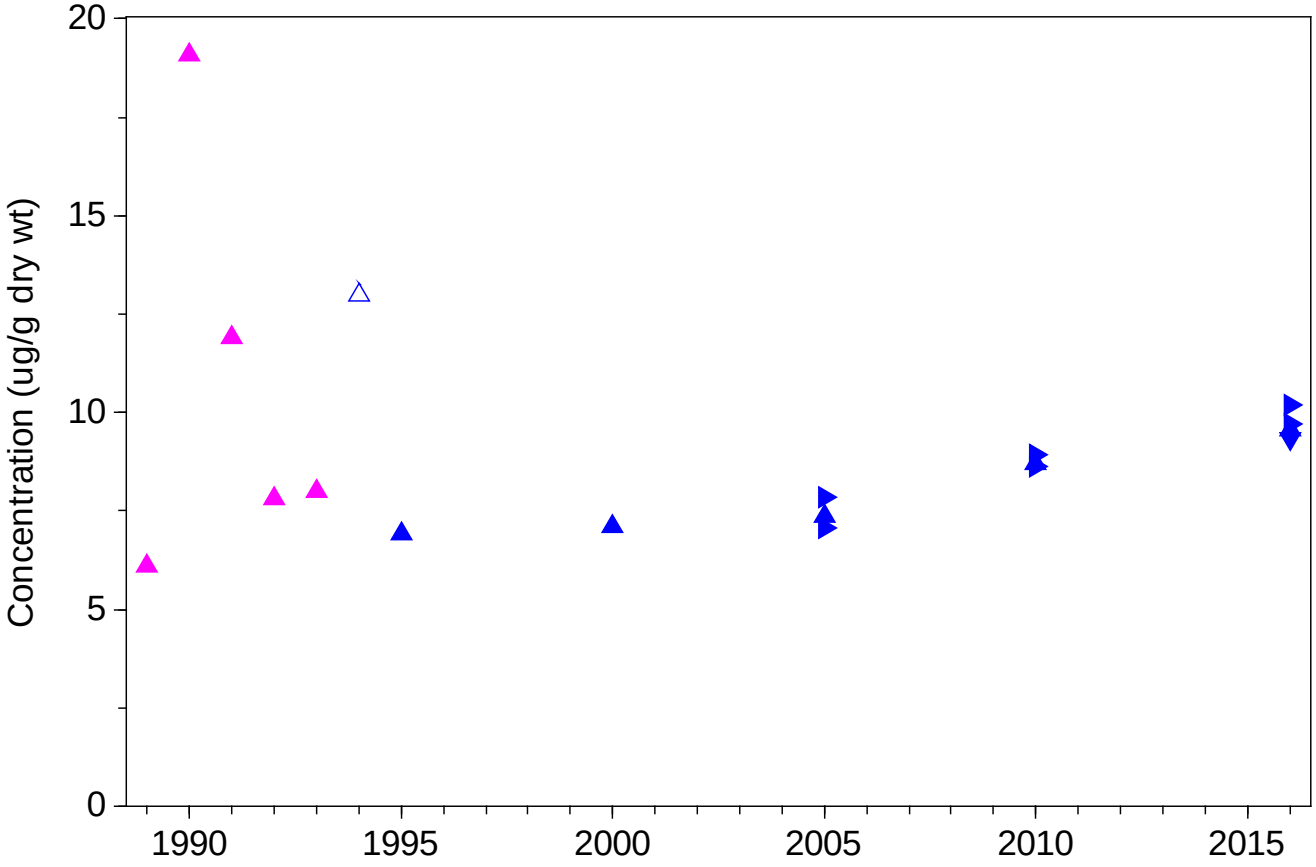
Mean SQS quotient, SCI SQS (no PAH totals), Station 3



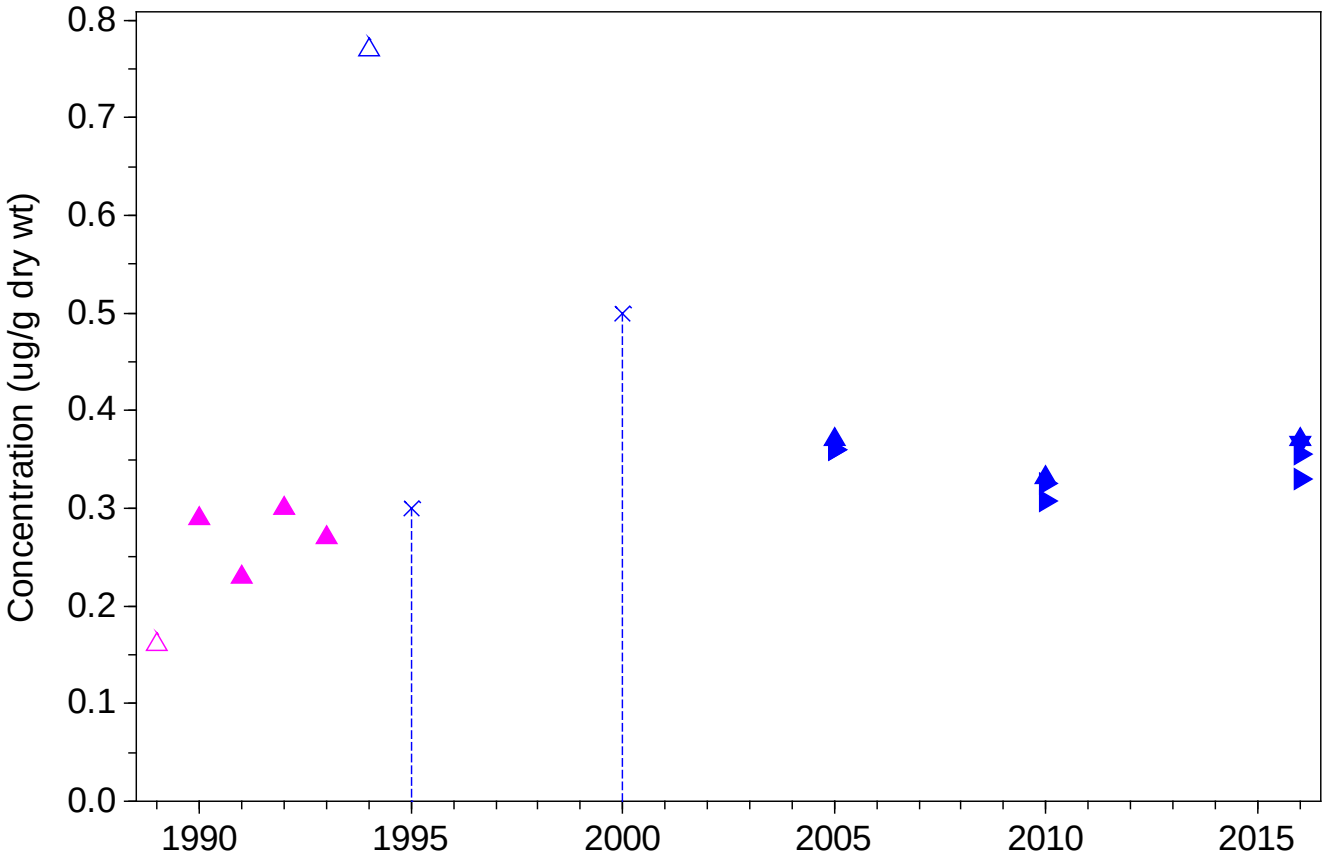
Sediment Chemistry Index, Station 3



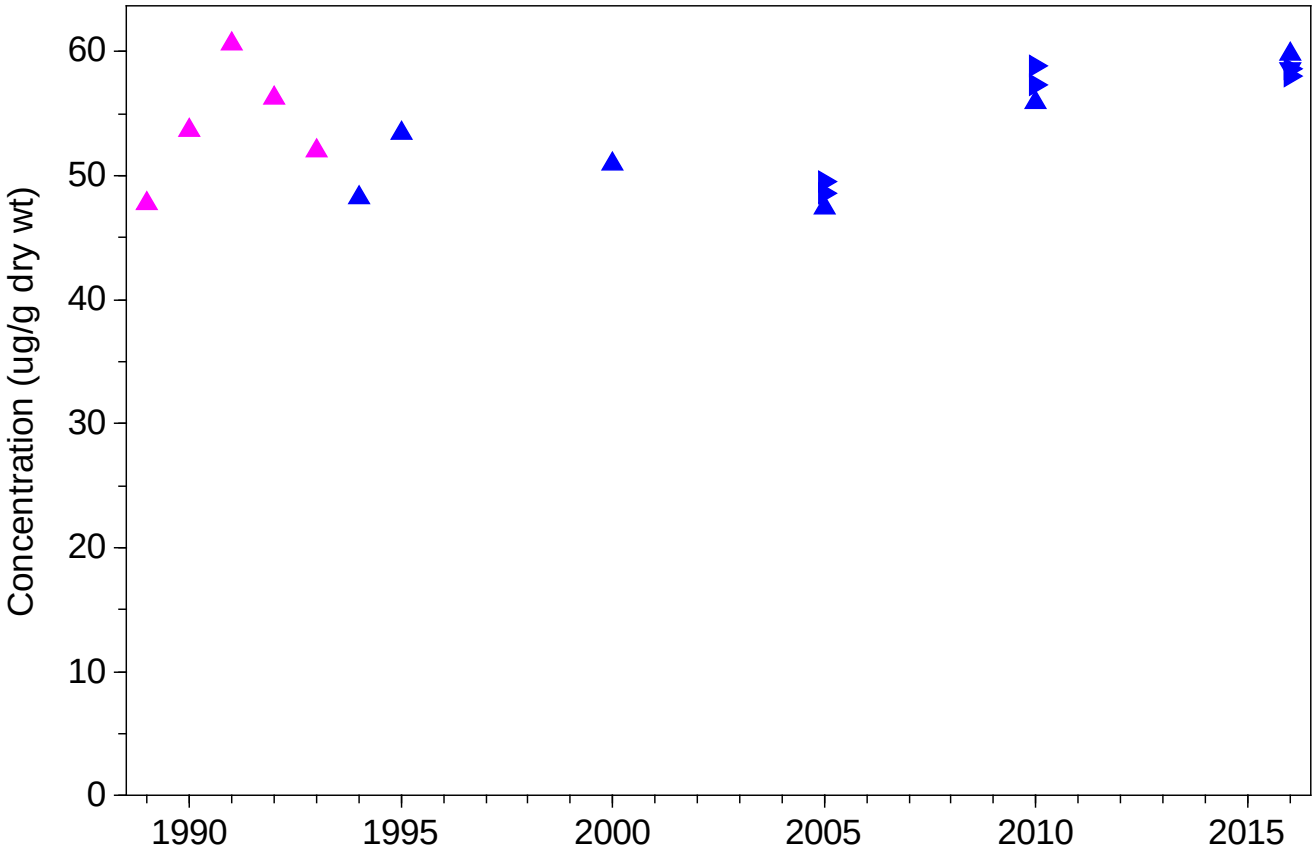
Arsenic, Station 4



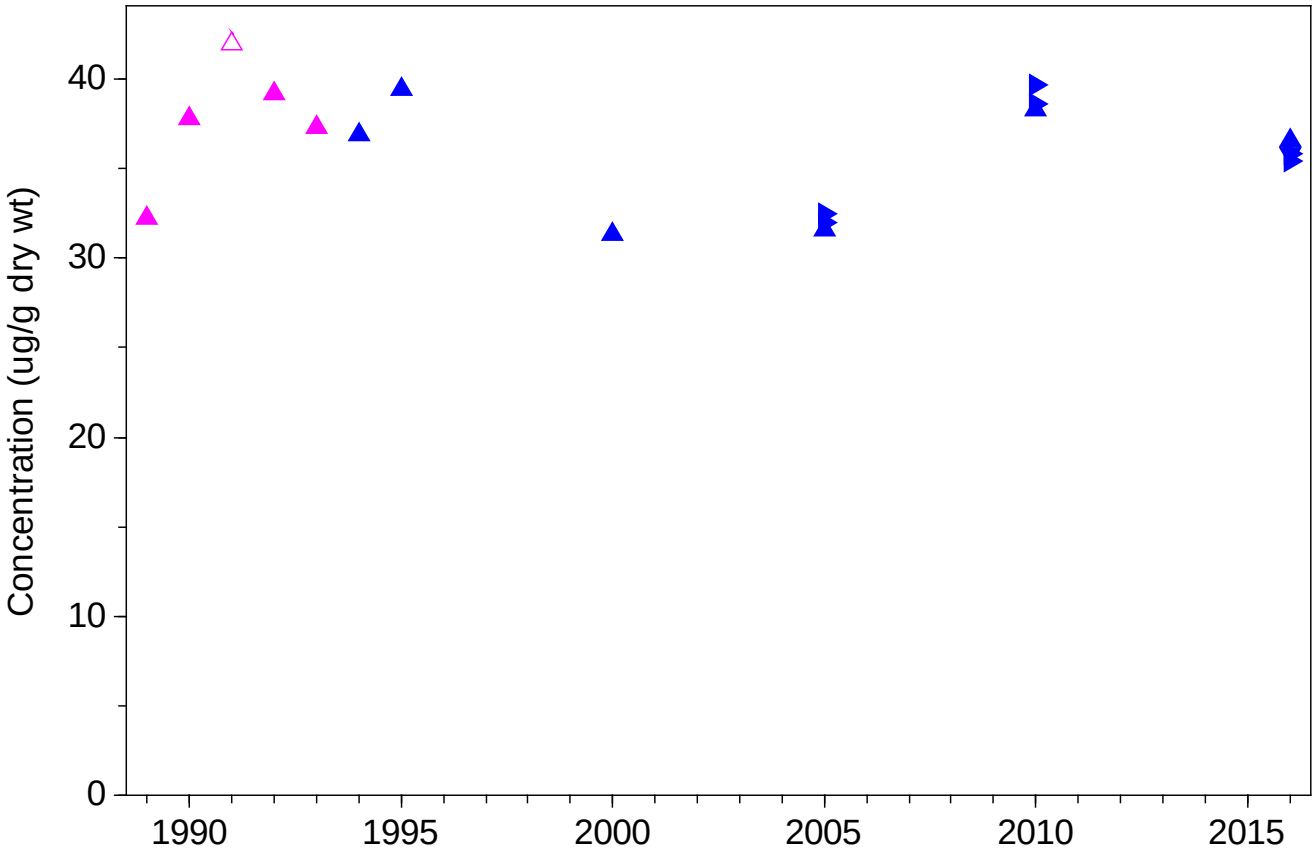
Cadmium, Station 4



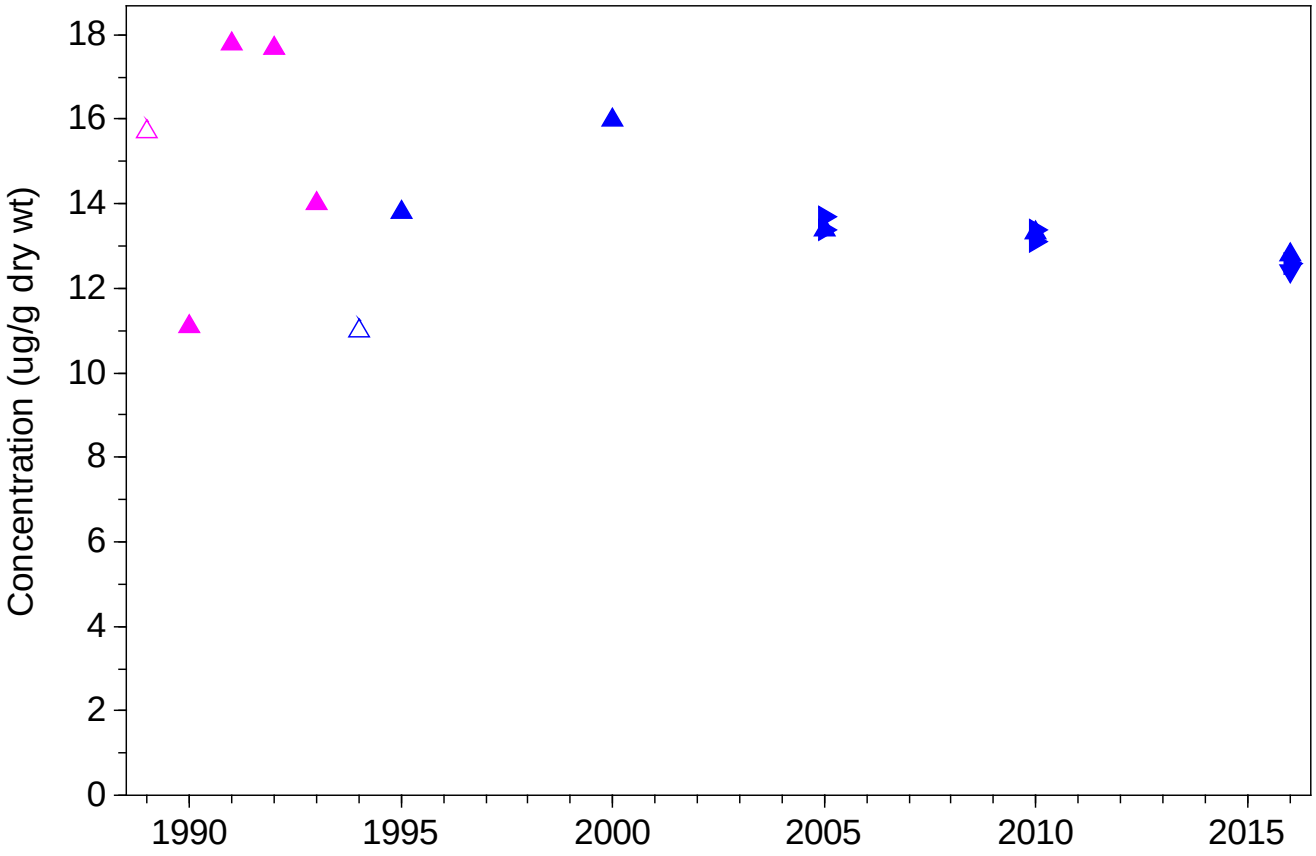
Chromium, Station 4



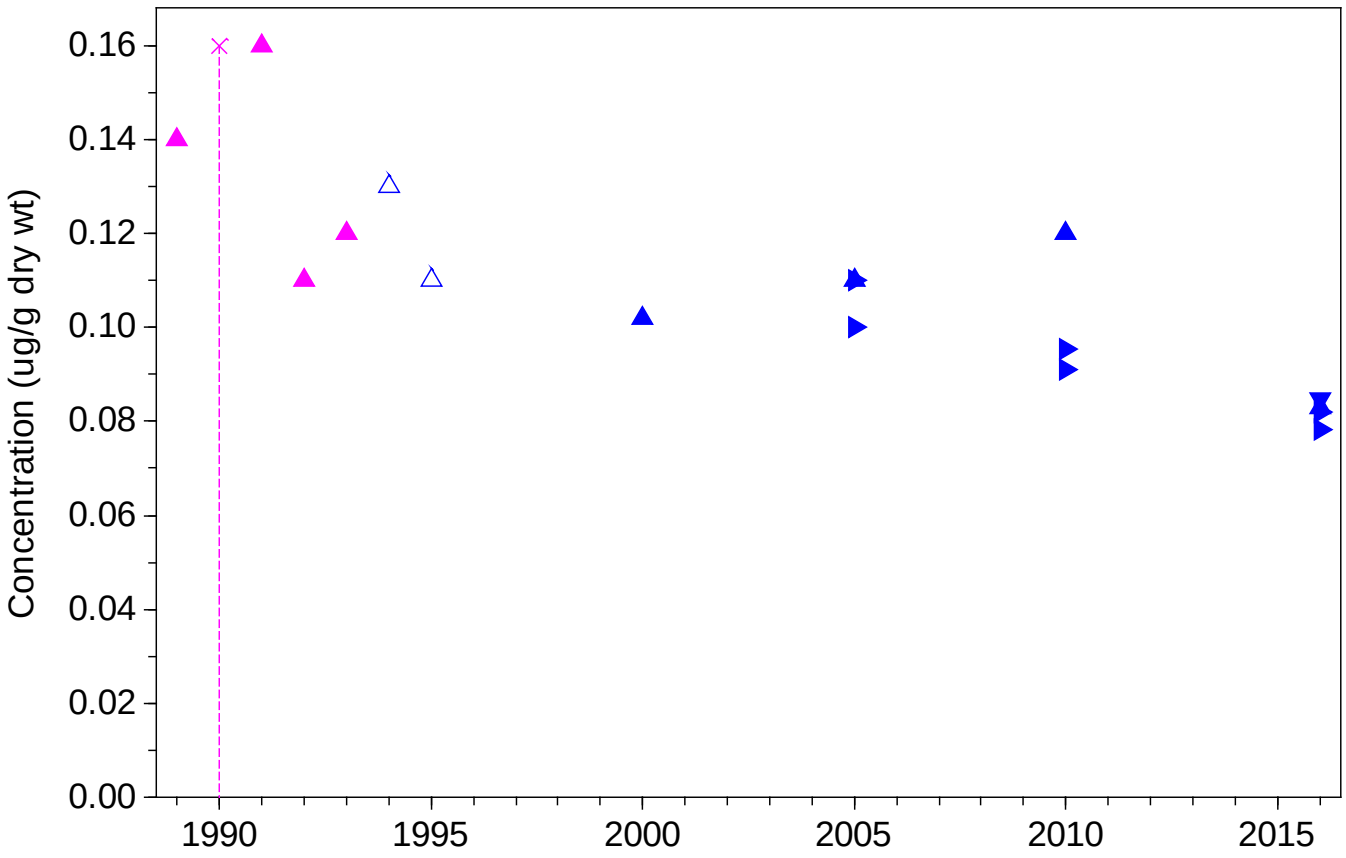
Copper, Station 4



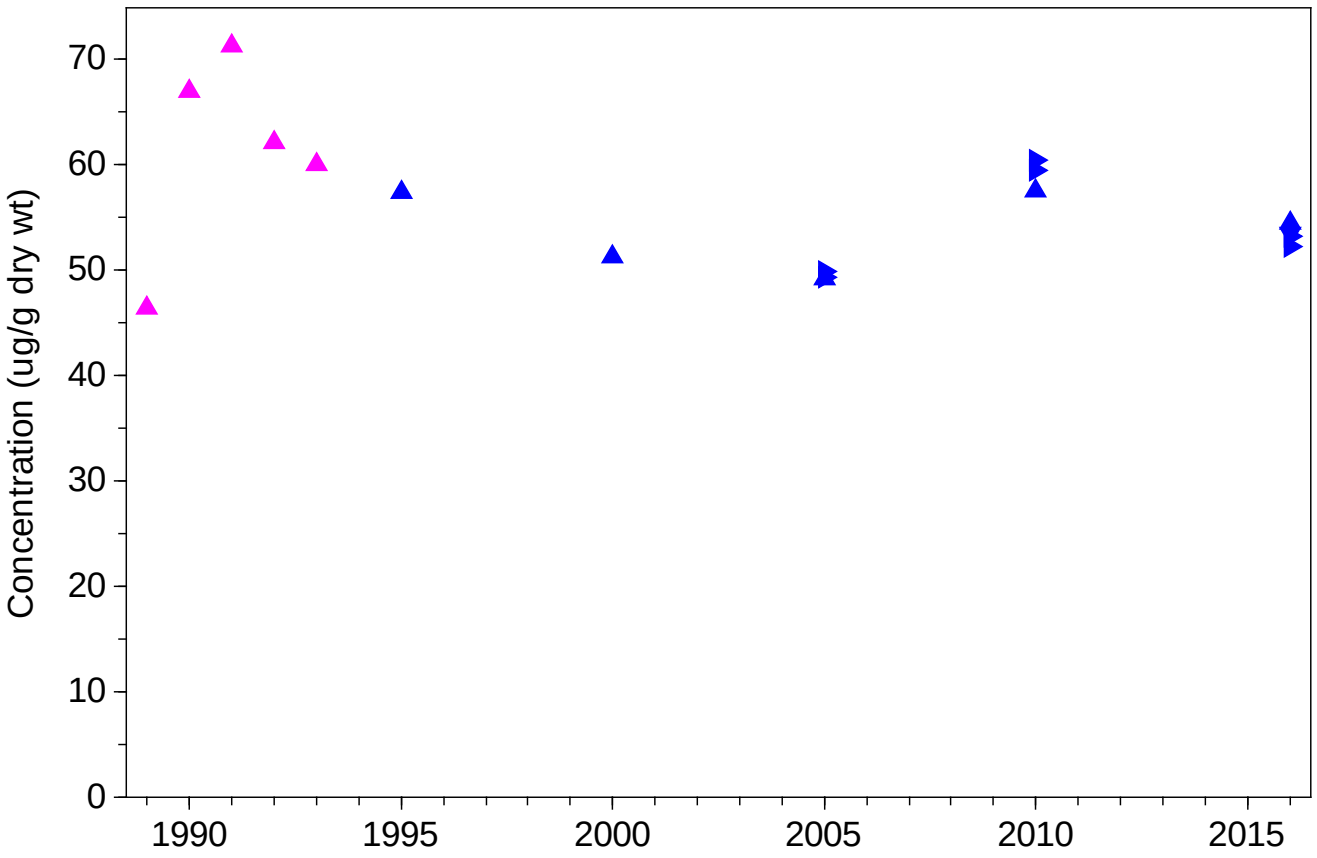
Lead, Station 4



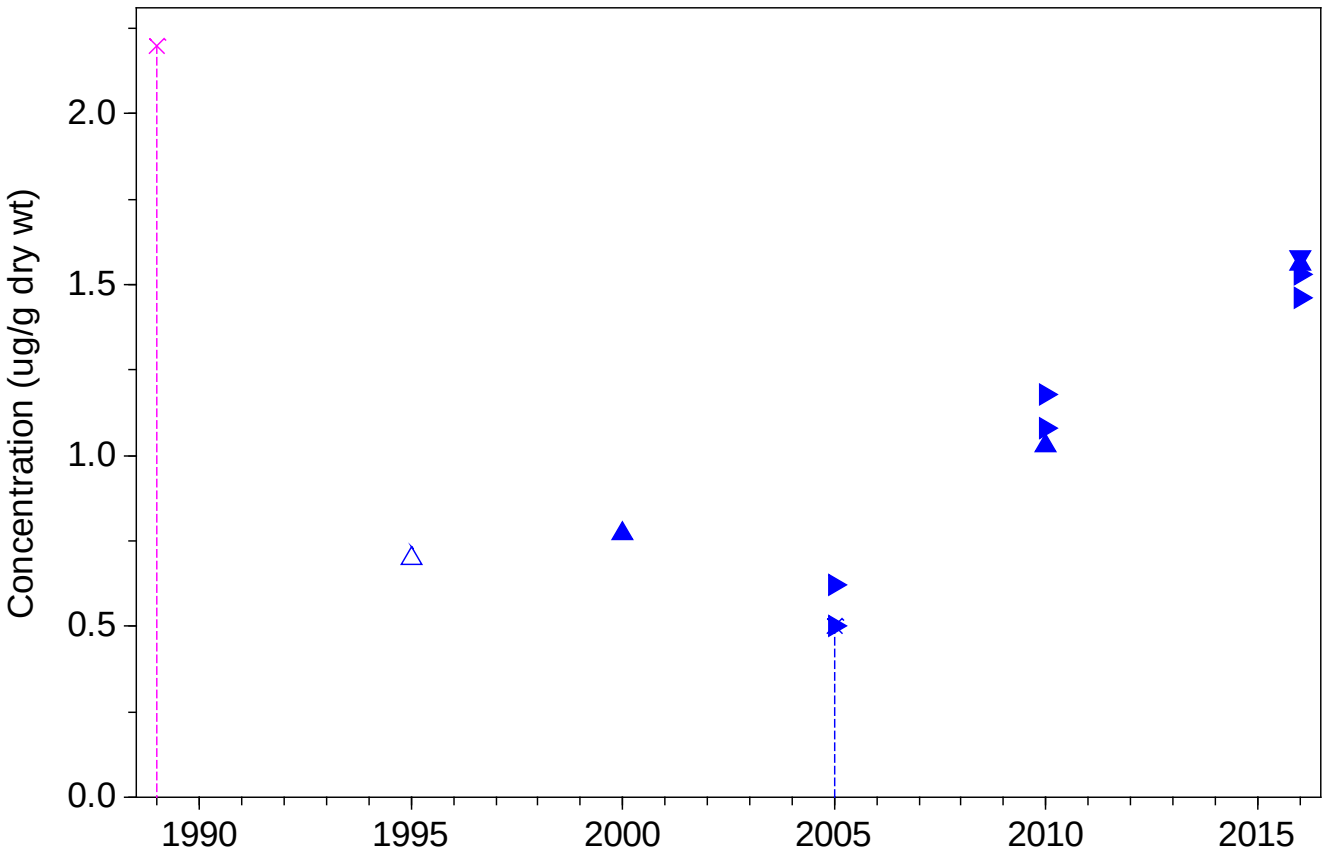
Mercury, Station 4



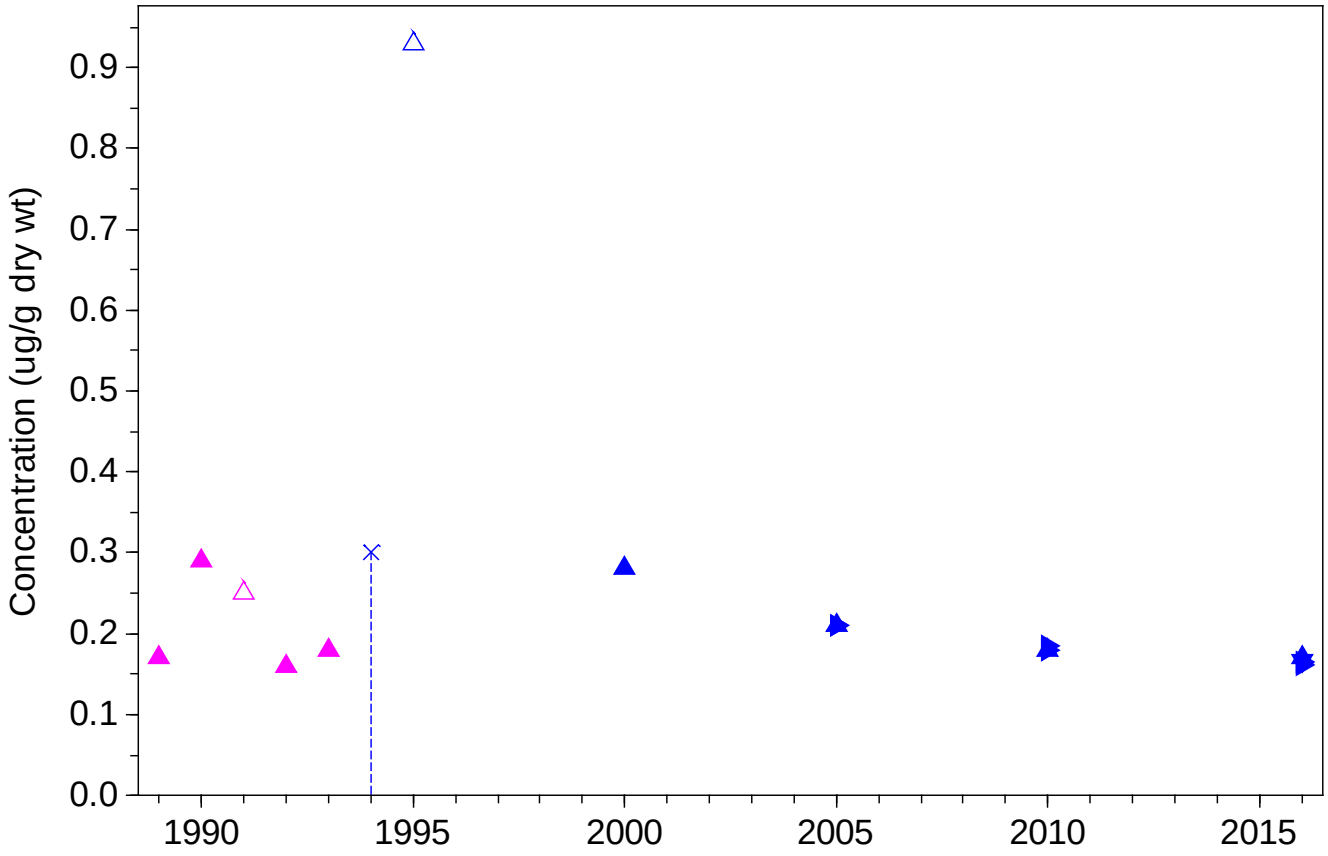
Nickel, Station 4



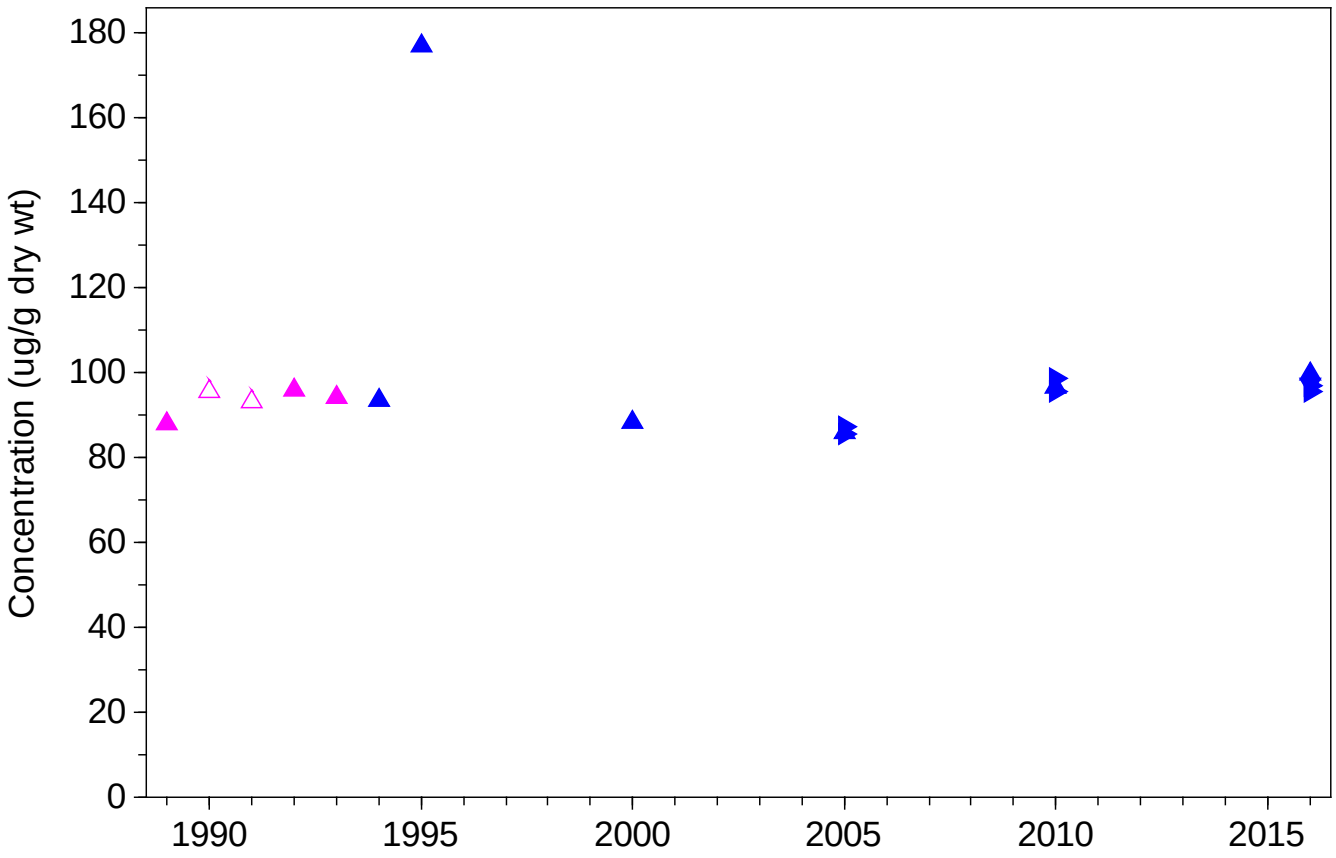
Selenium, Station 4



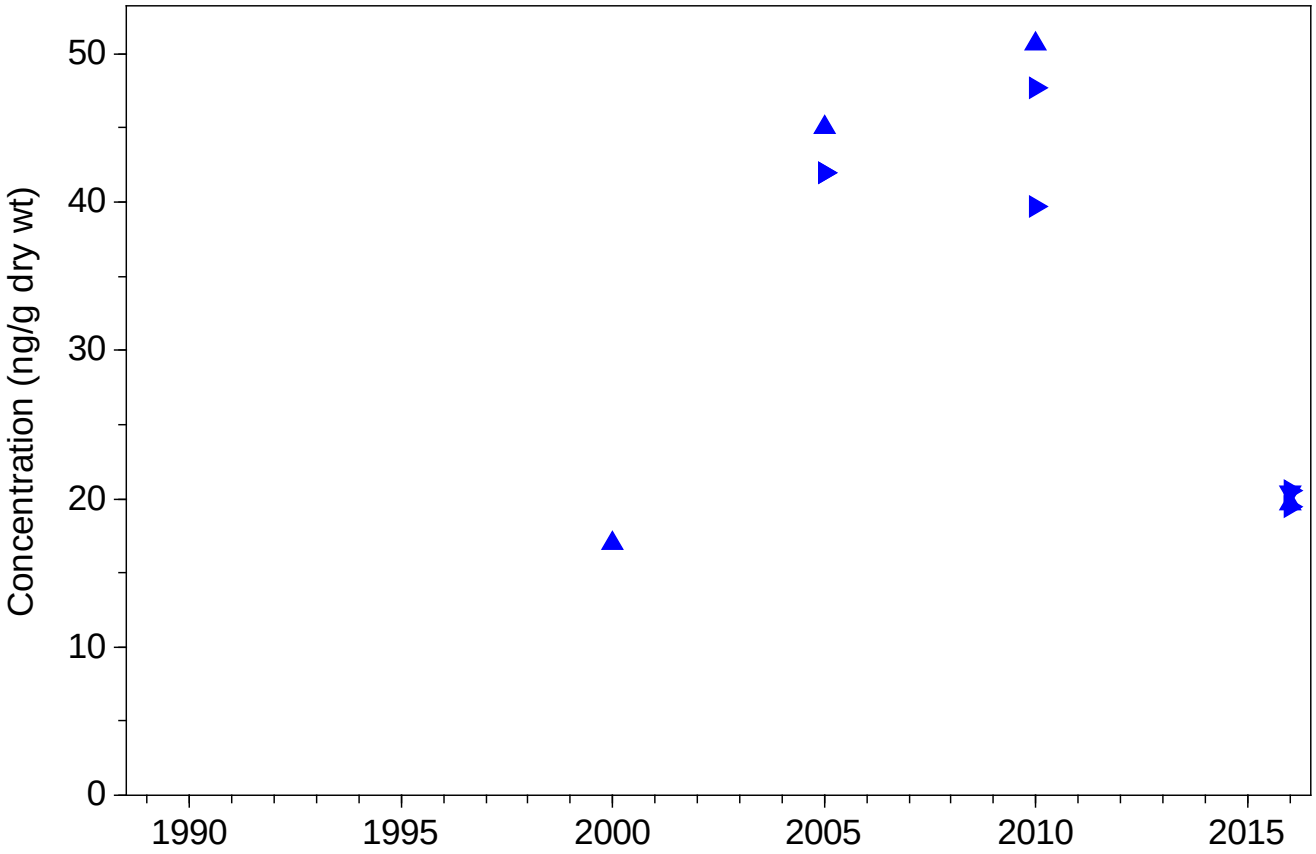
Silver, Station 4



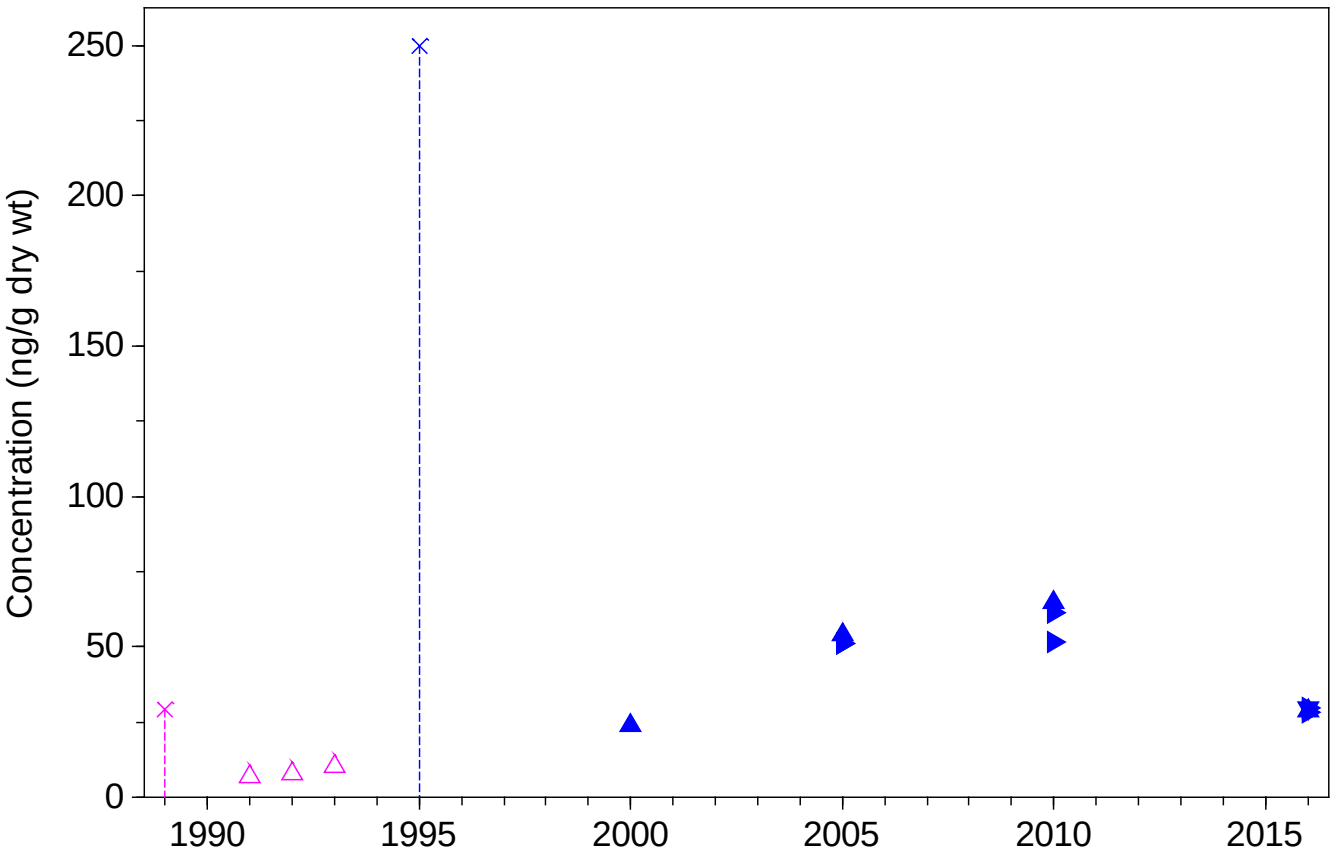
Zinc, Station 4



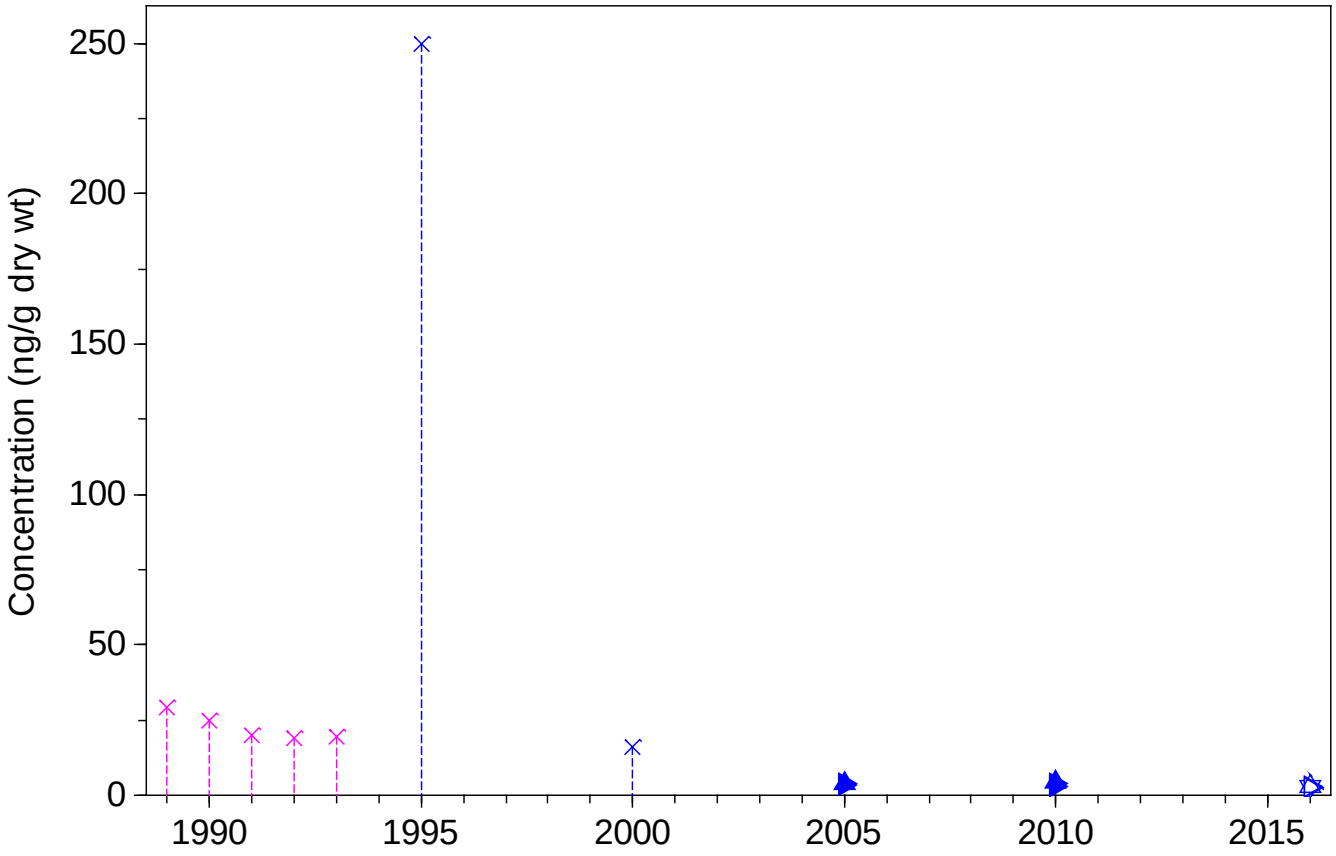
1-Methylnaphthalene, Station 4



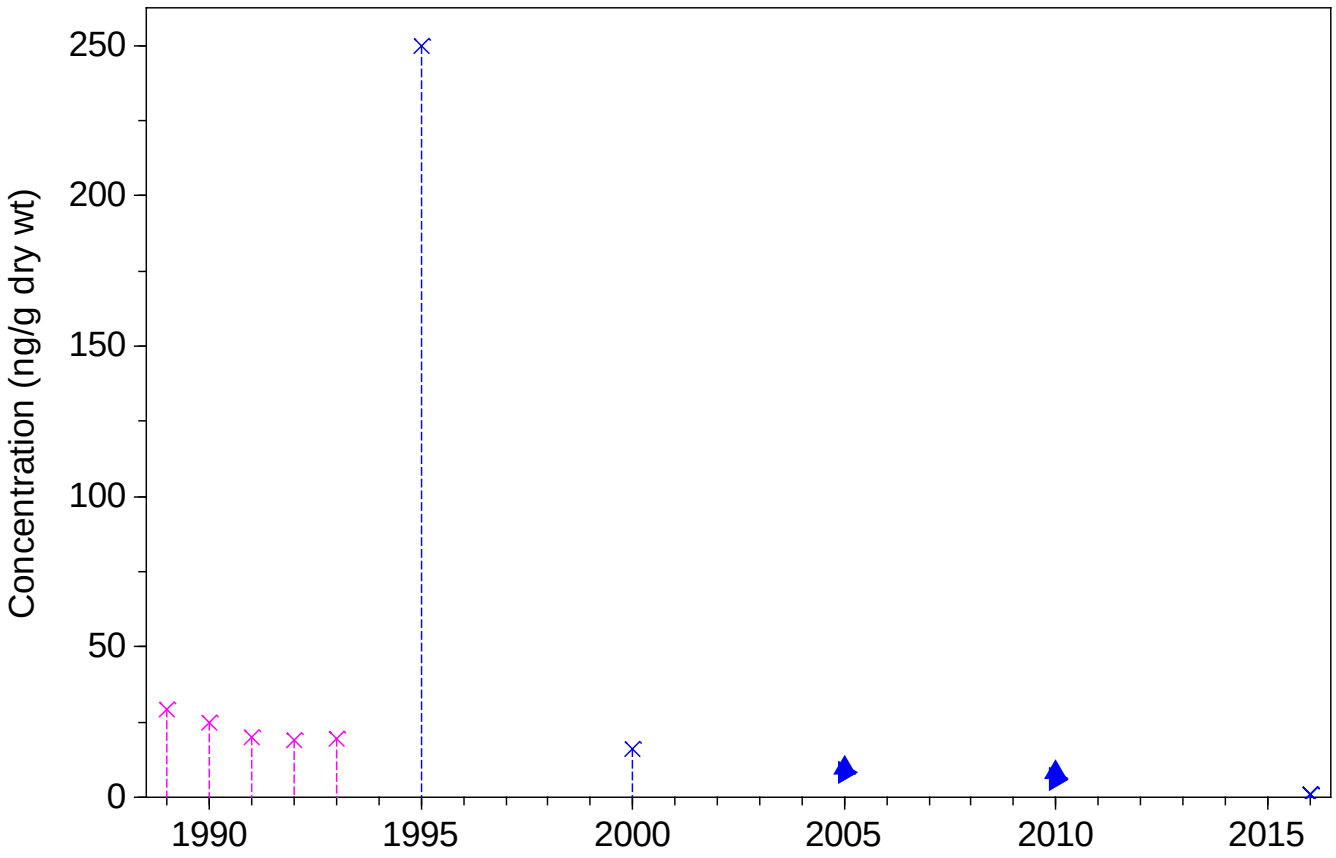
2-Methylnaphthalene, Station 4



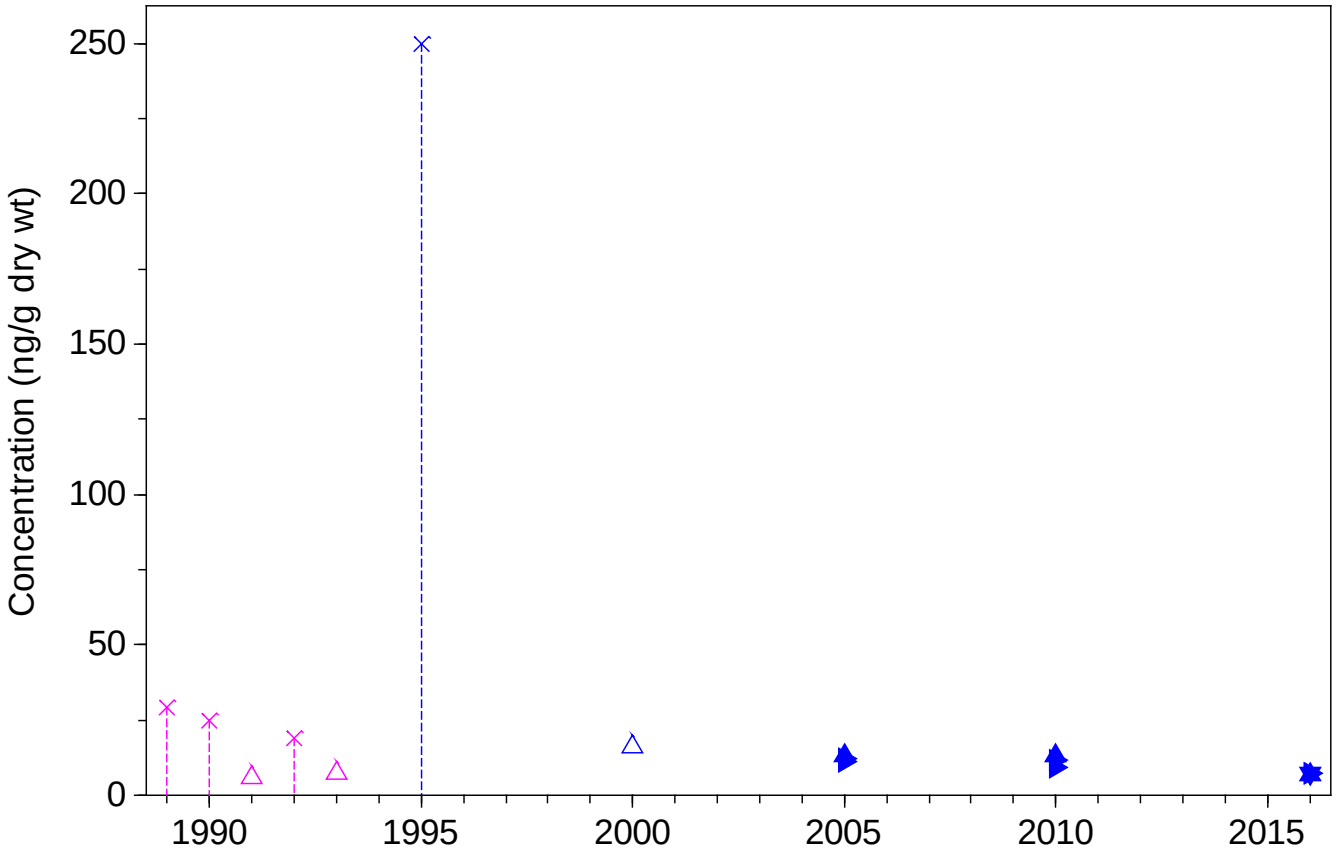
Acenaphthene, Station 4



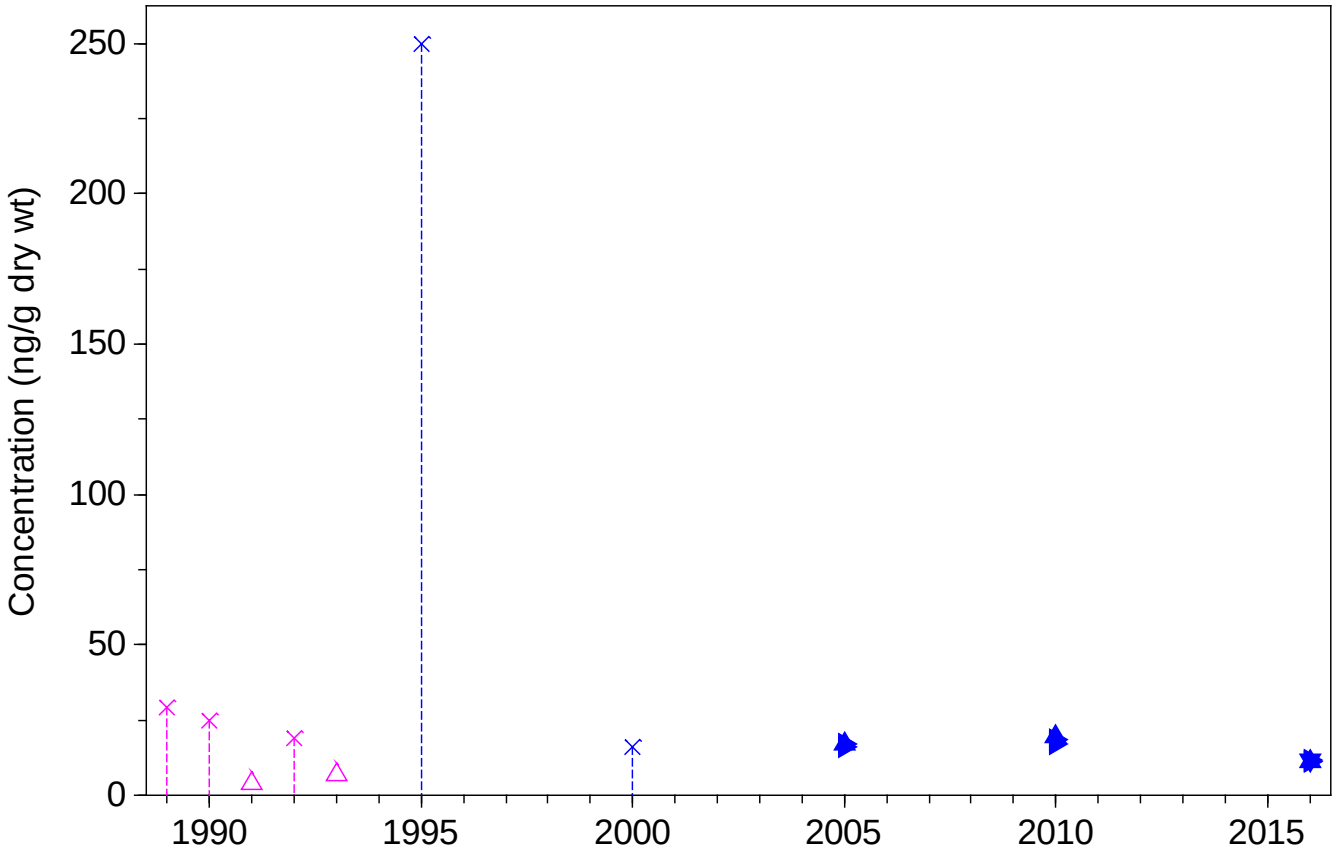
Acenaphthylene, Station 4

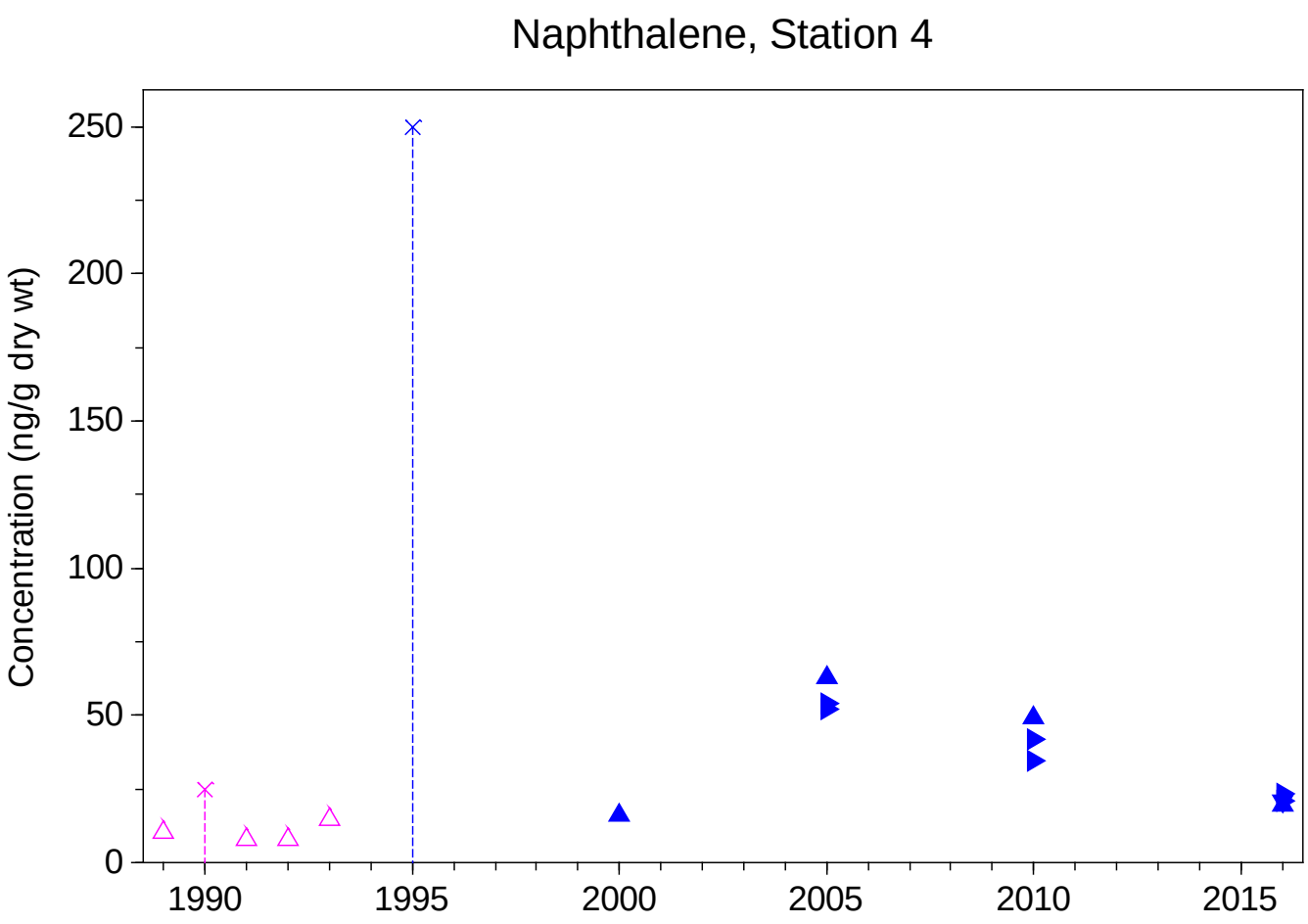


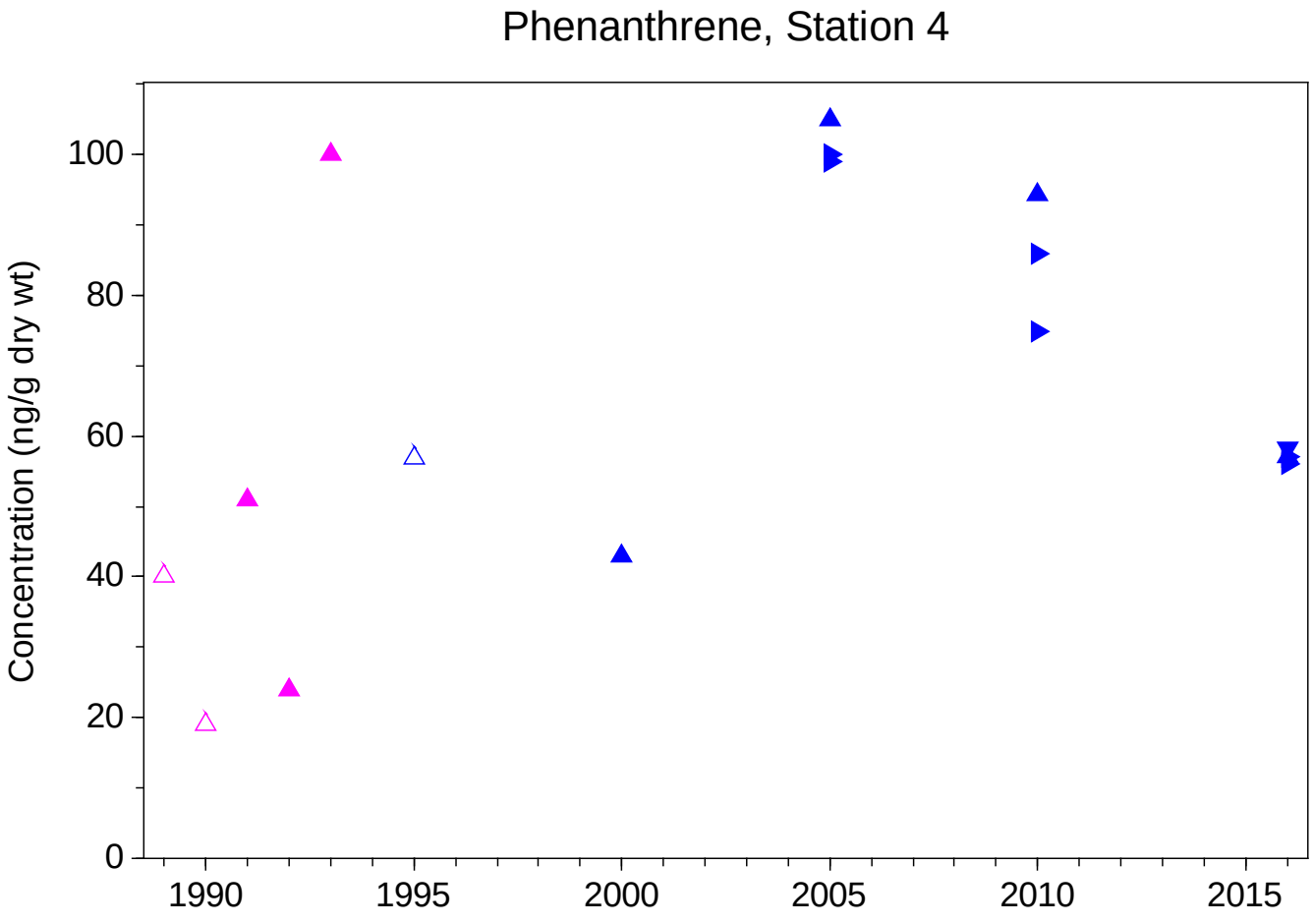
Anthracene, Station 4



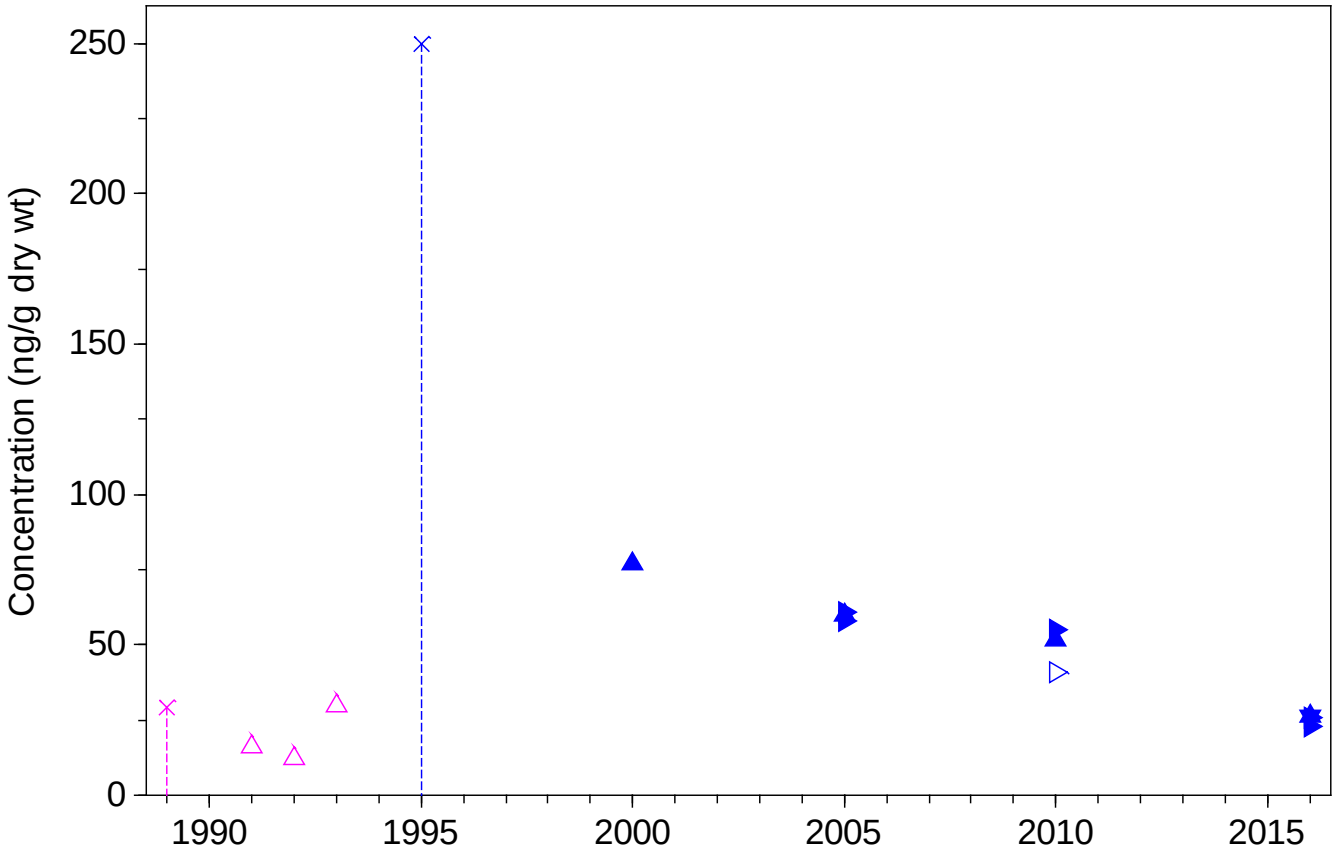
Fluorene, Station 4



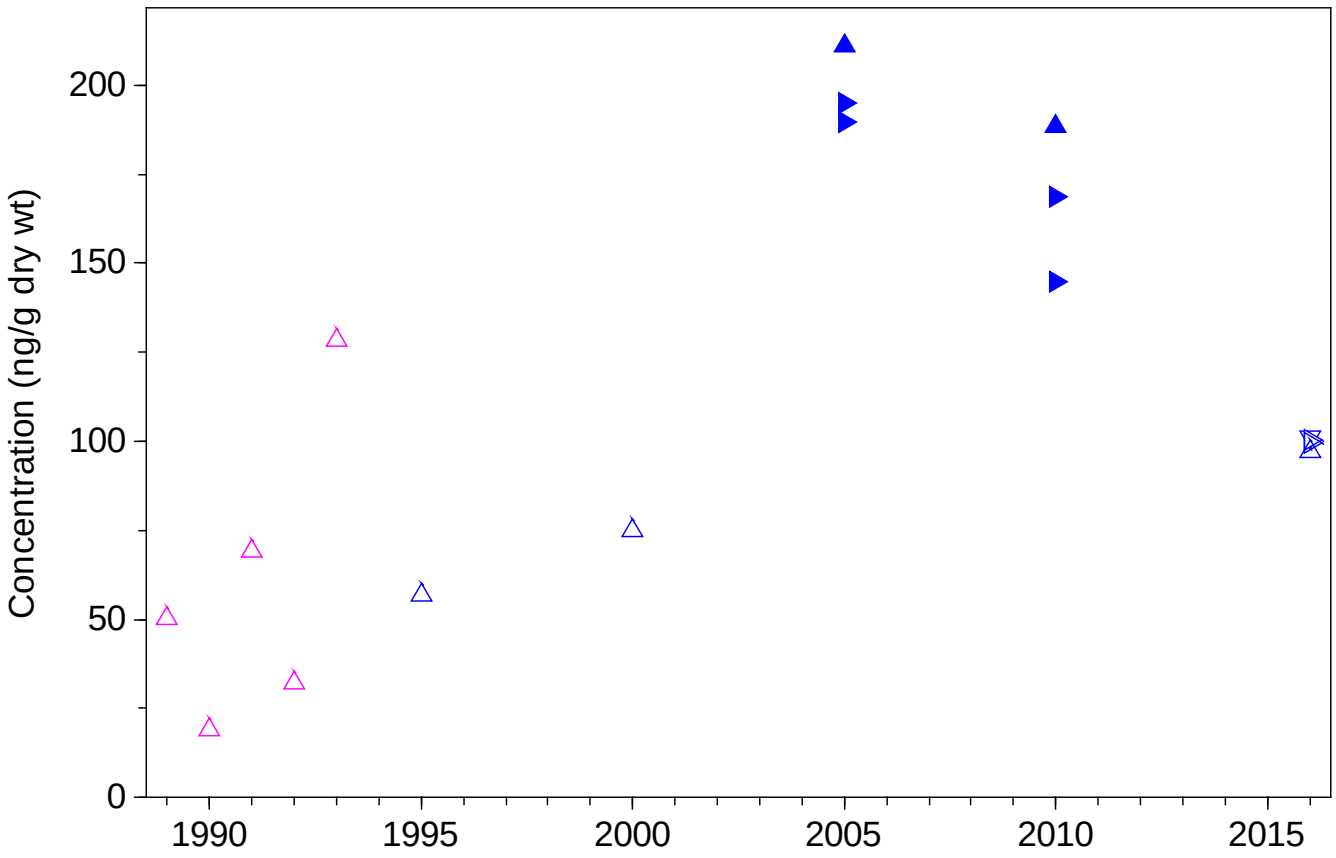

Naphthalene, Station 4
Concentration (ng/g dry wt)
250
200
150
100
50
0
1990
1995
2000
2005
2010
2015

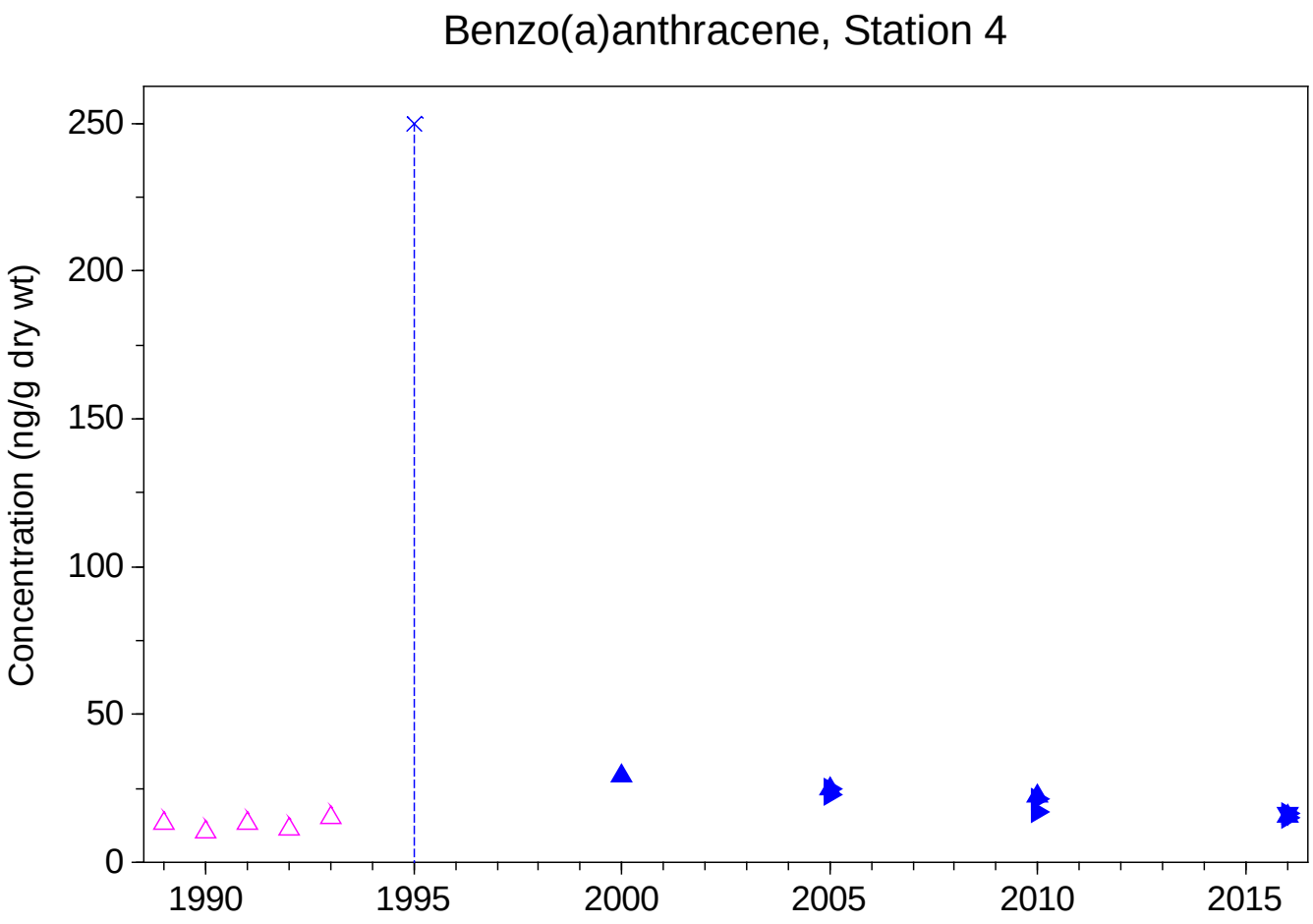

Phenanthrene, Station 4
Concentration (ng/g dry wt)
100
80
60
40
20
0
1990
1995
2000
2005
2010
2015

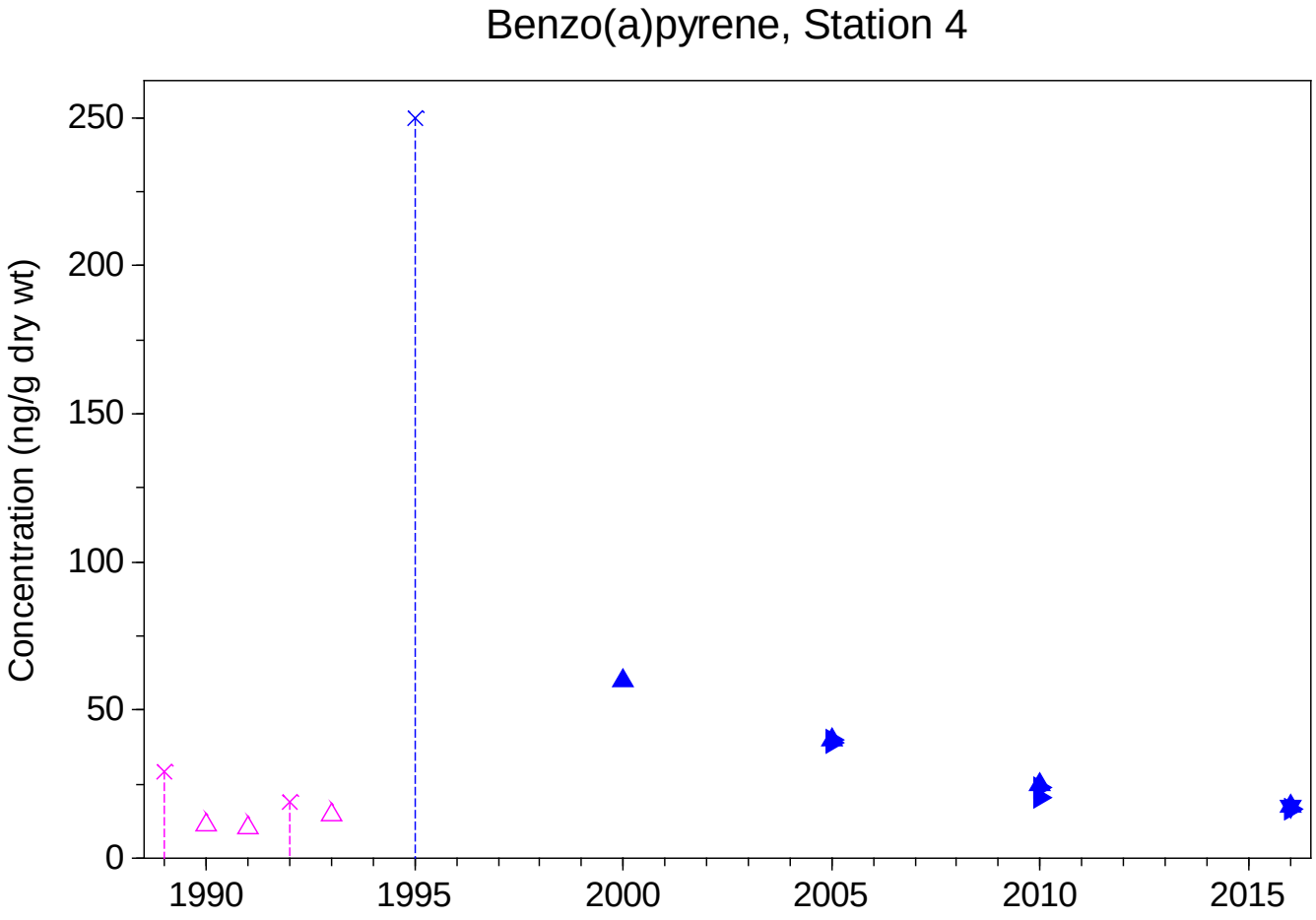
Retene, Station 4



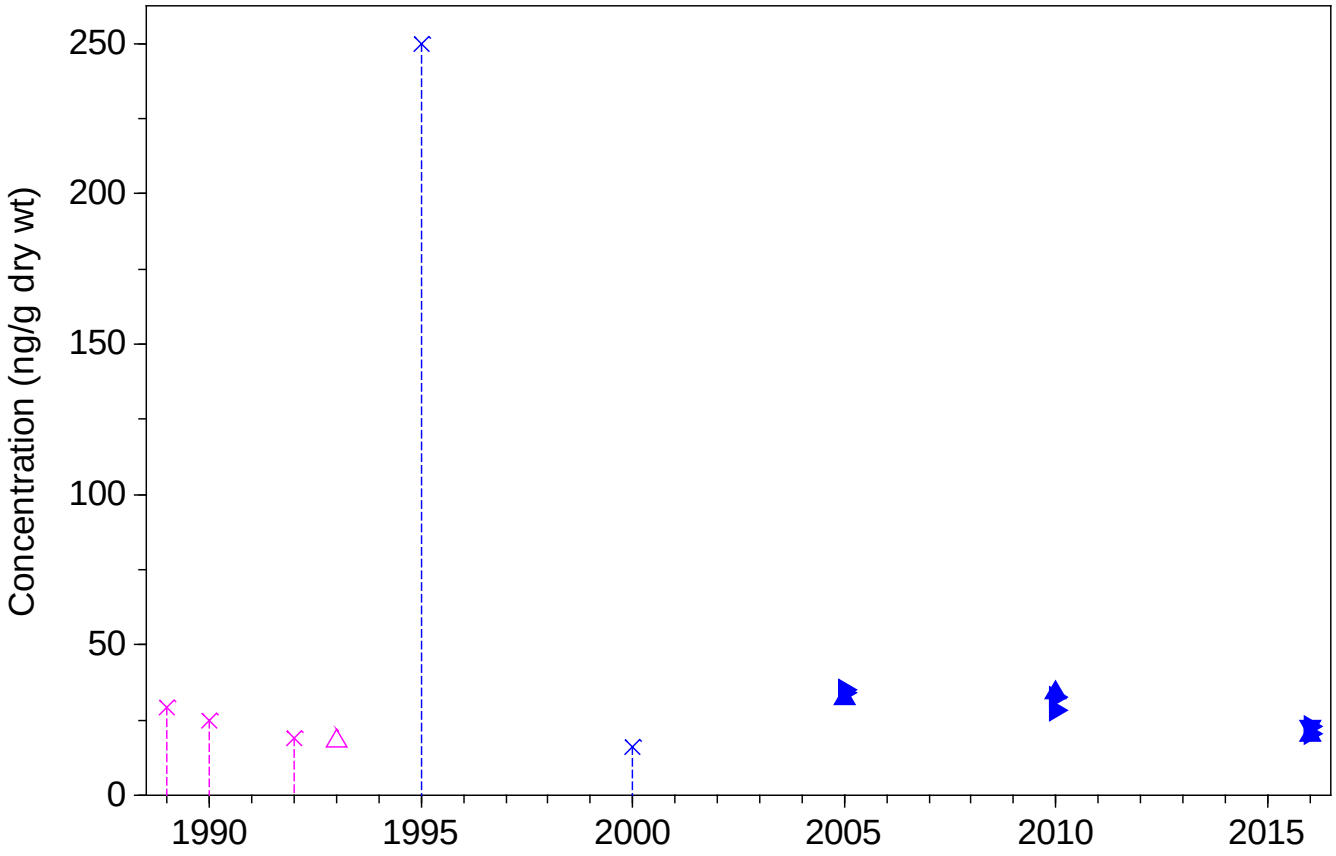
Total LPAH (sum of 6 compounds), Station 4



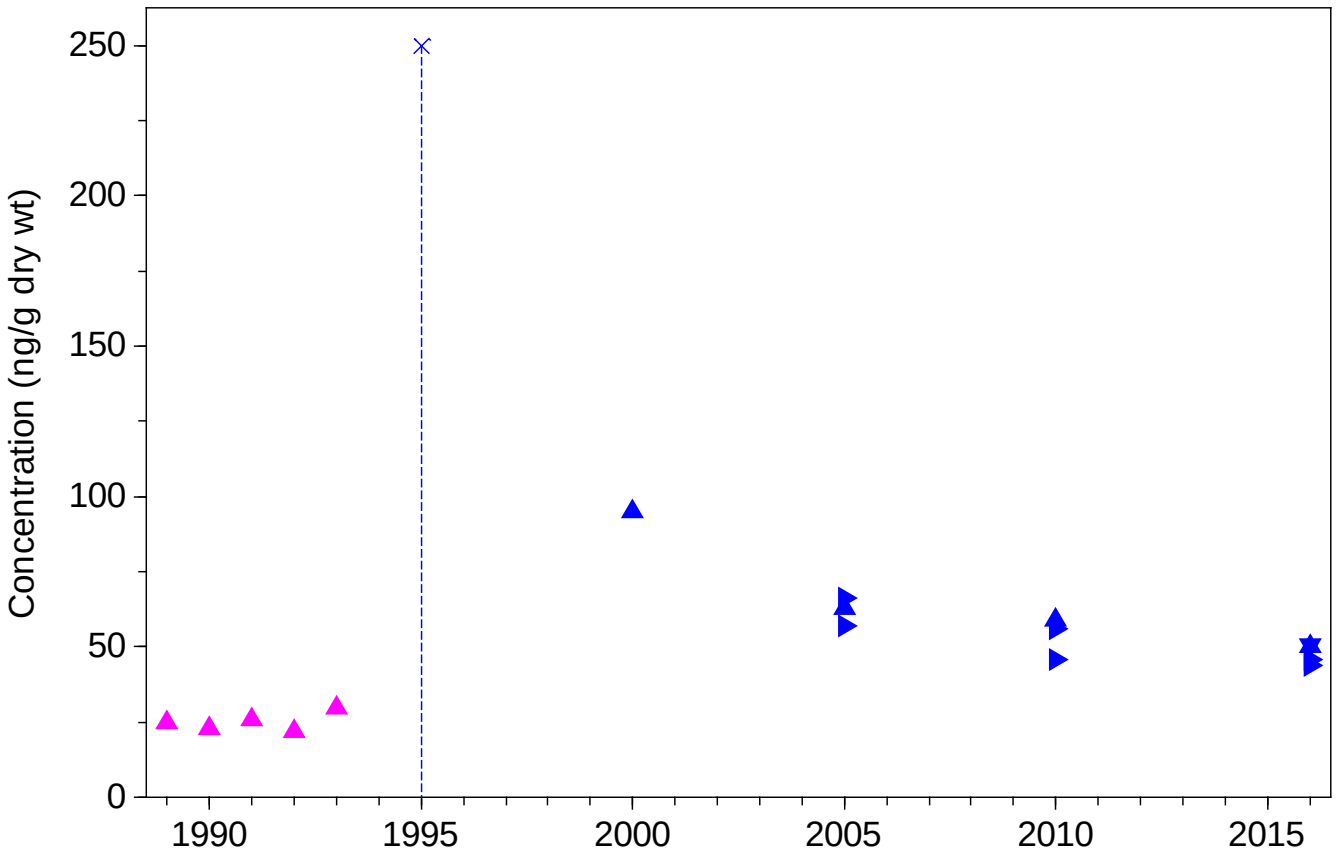

Benzo(a)anthracene, Station 4
Concentration (ng/g dry wt)
250
200
150
100
50
0
1990
1995
2000
2005
2010
2015


Benzo(a)pyrene, Station 4
Concentration (ng/g dry wt)
250
200
150
100
50
0
1990
1995
2000
2005
2010
2015

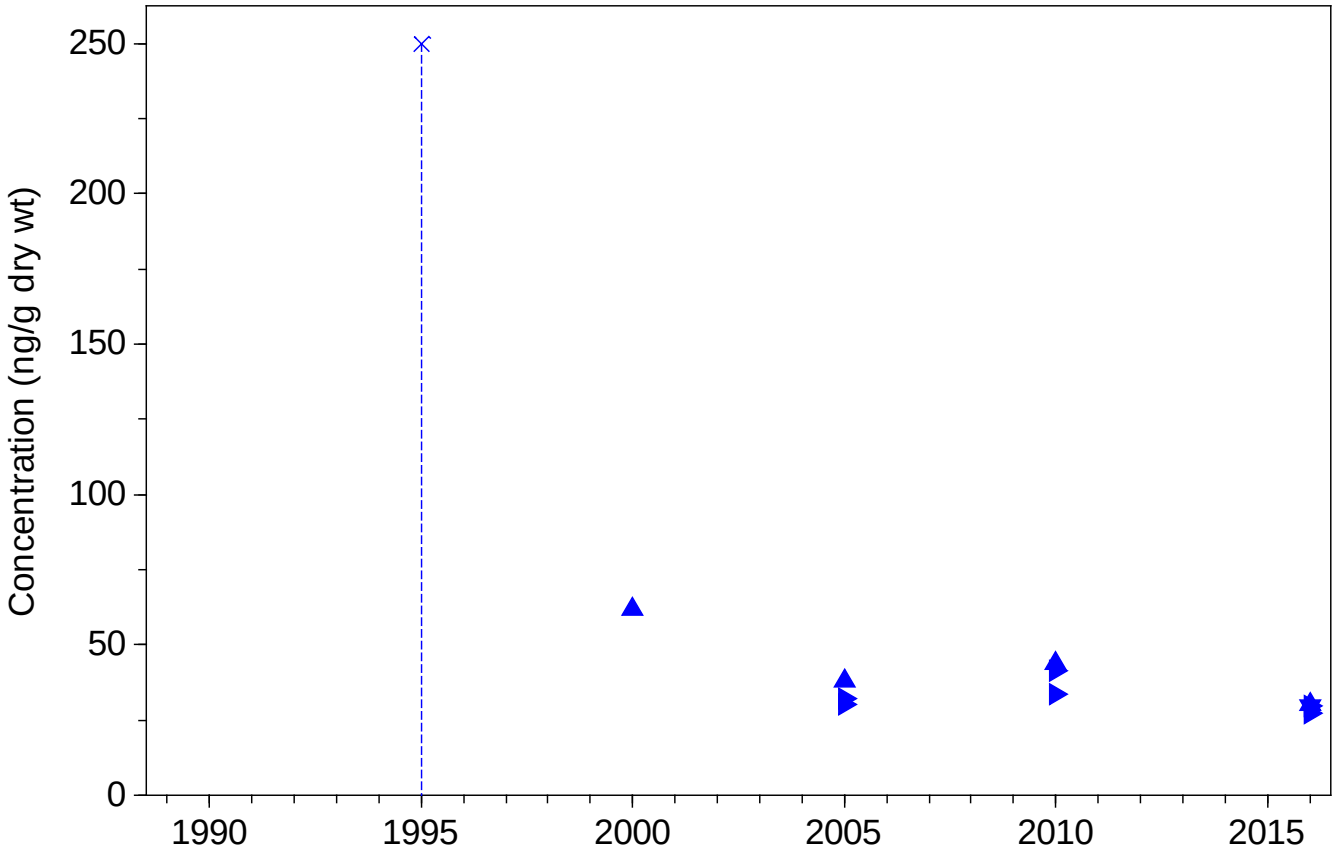
Benzo(g,h,i)perylene, Station 4



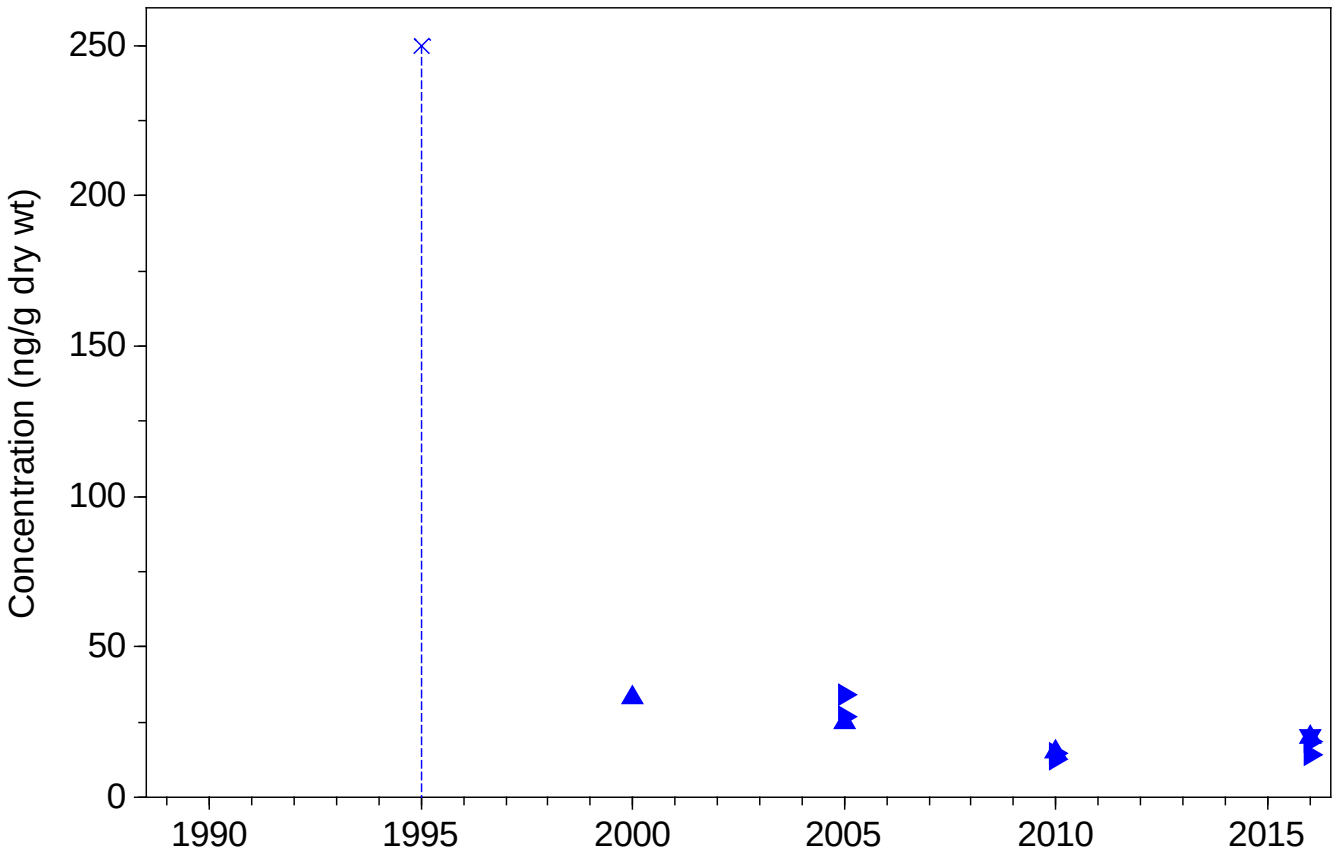
Total Benzofluoranthenes, Station 4



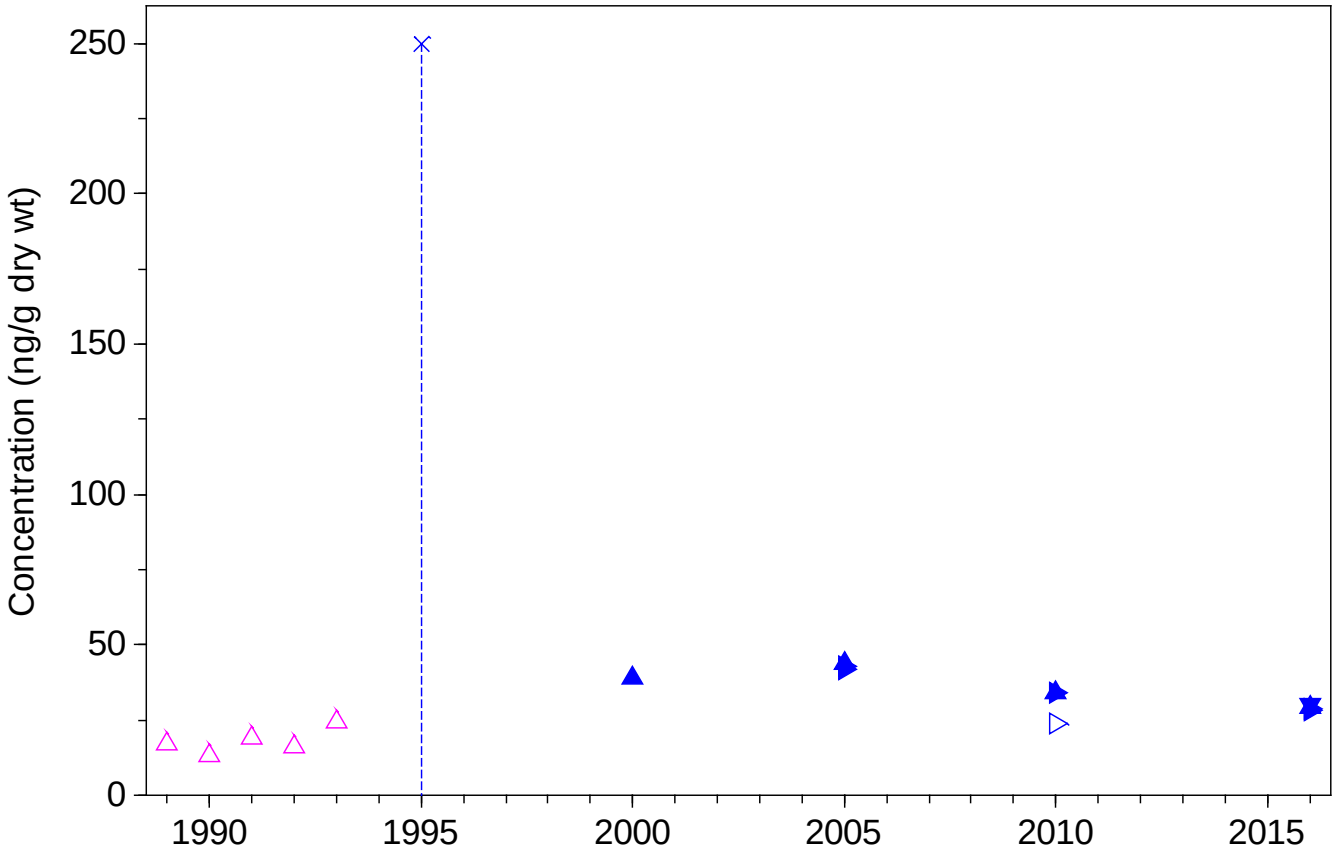
Benzo(b)fluoranthene, Station 4



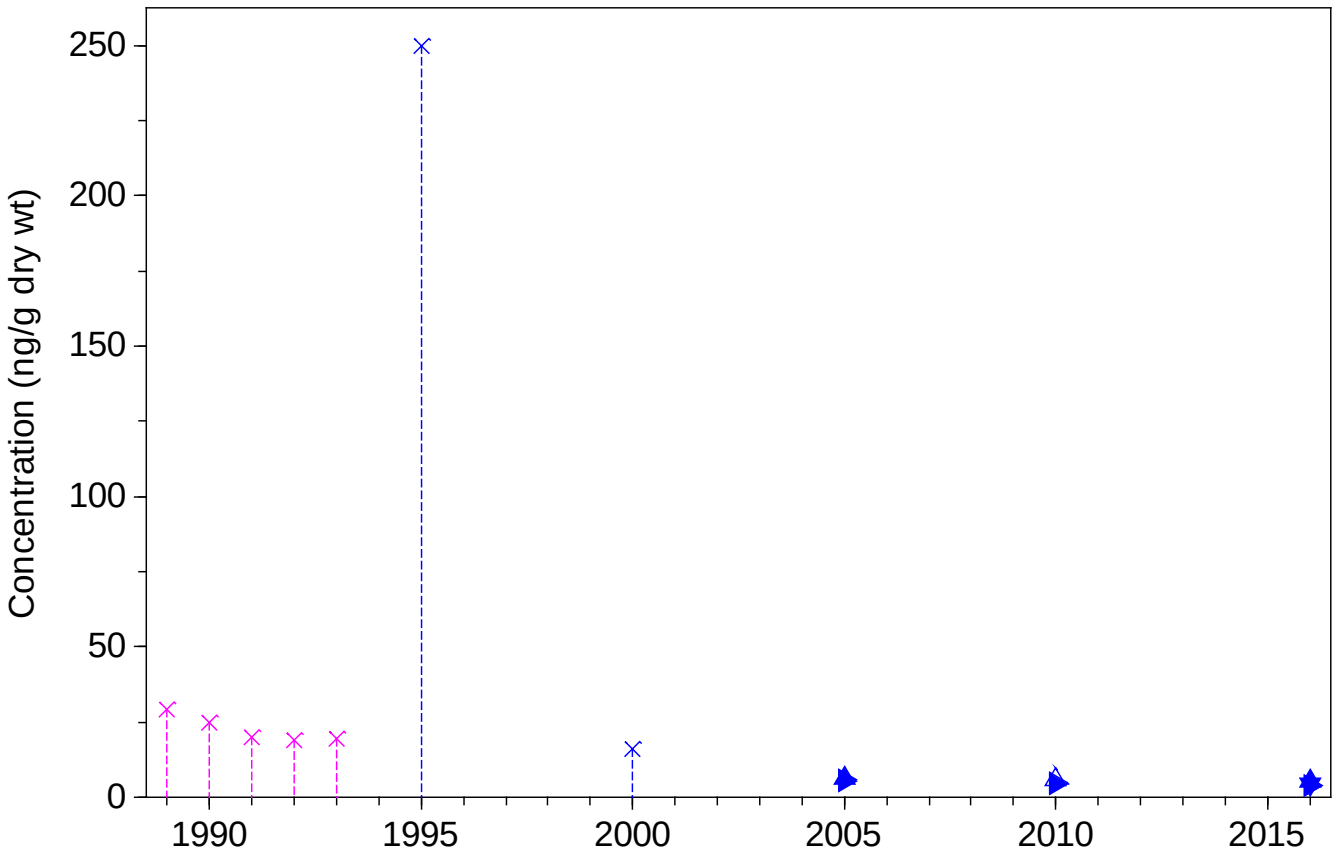
Benzo(k)fluoranthene, Station 4



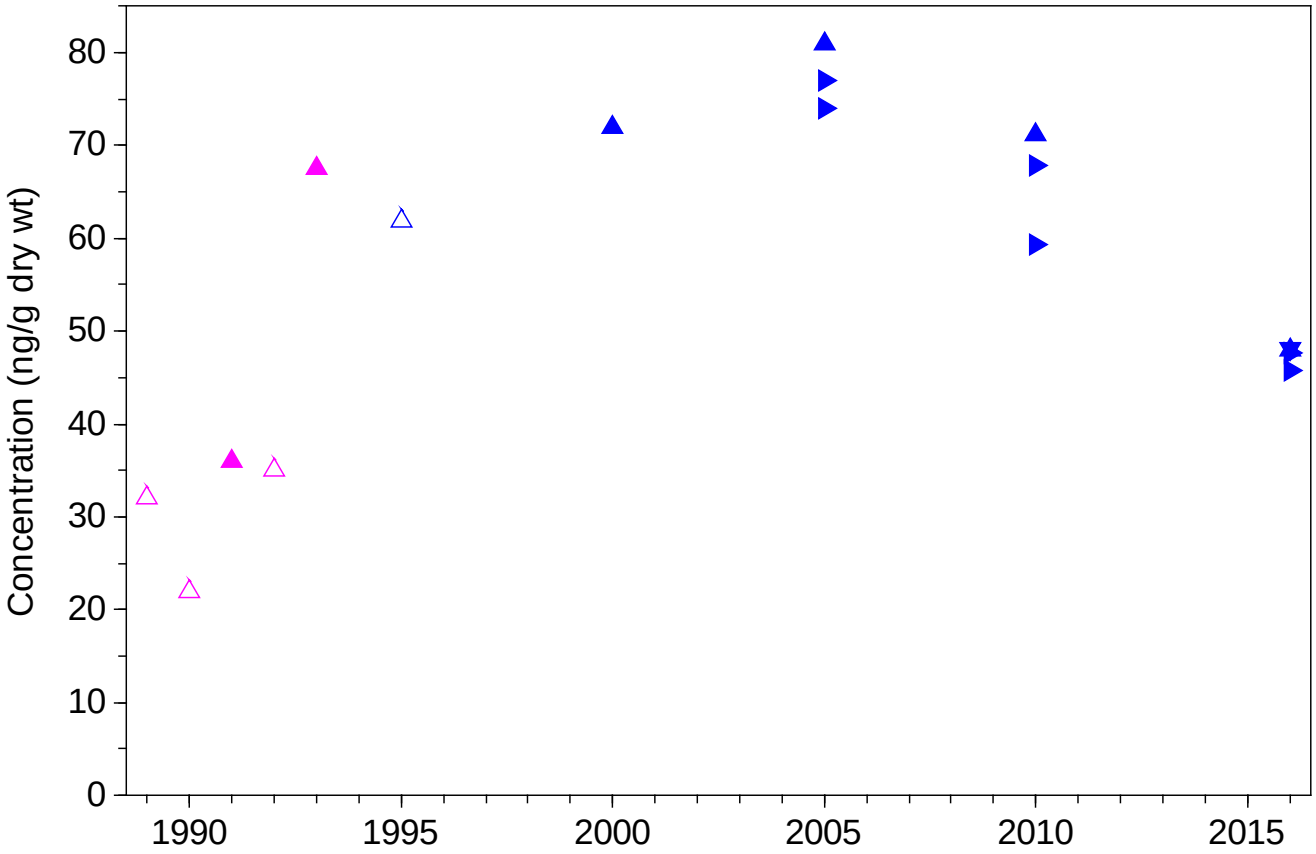
Chrysene, Station 4



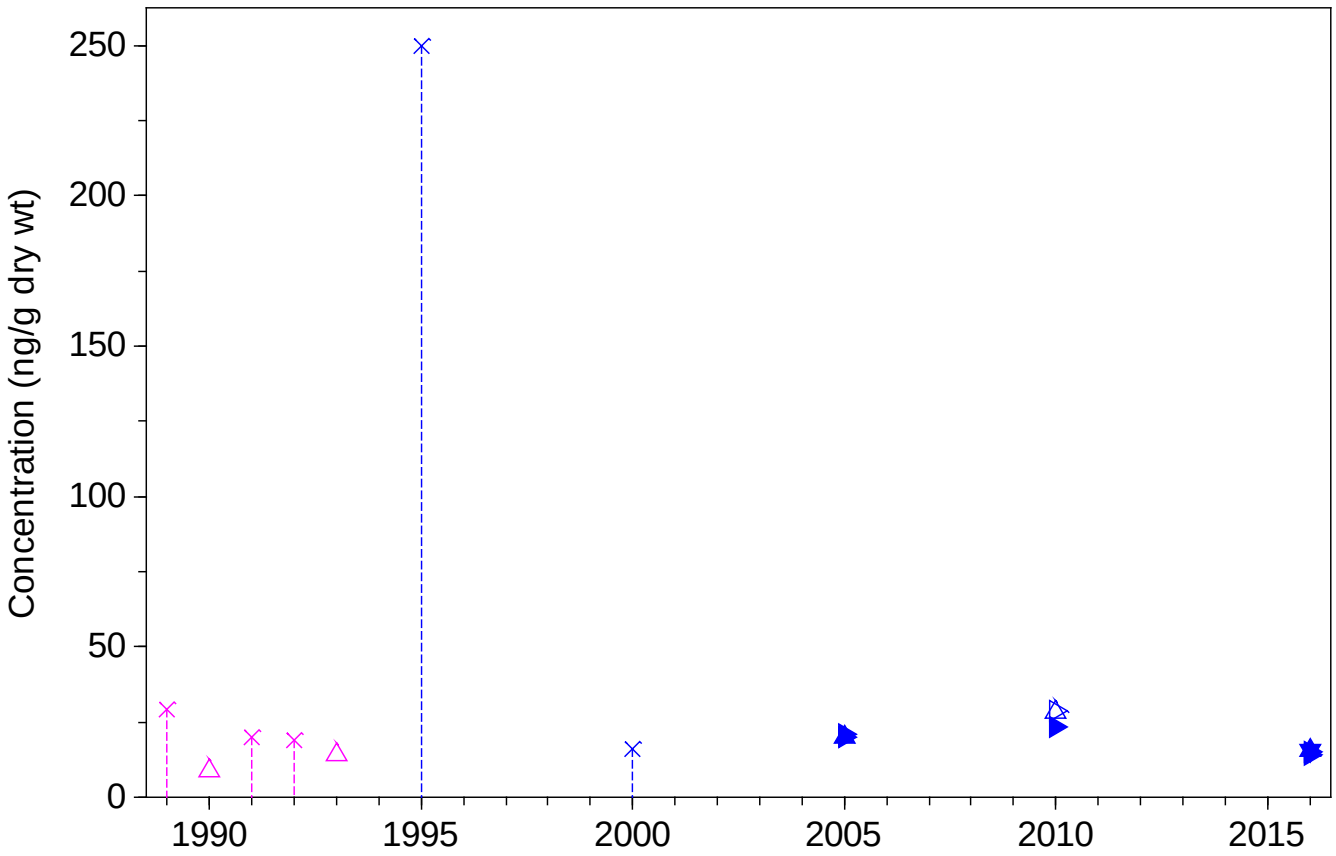
Dibenzo(a,h)anthracene, Station 4



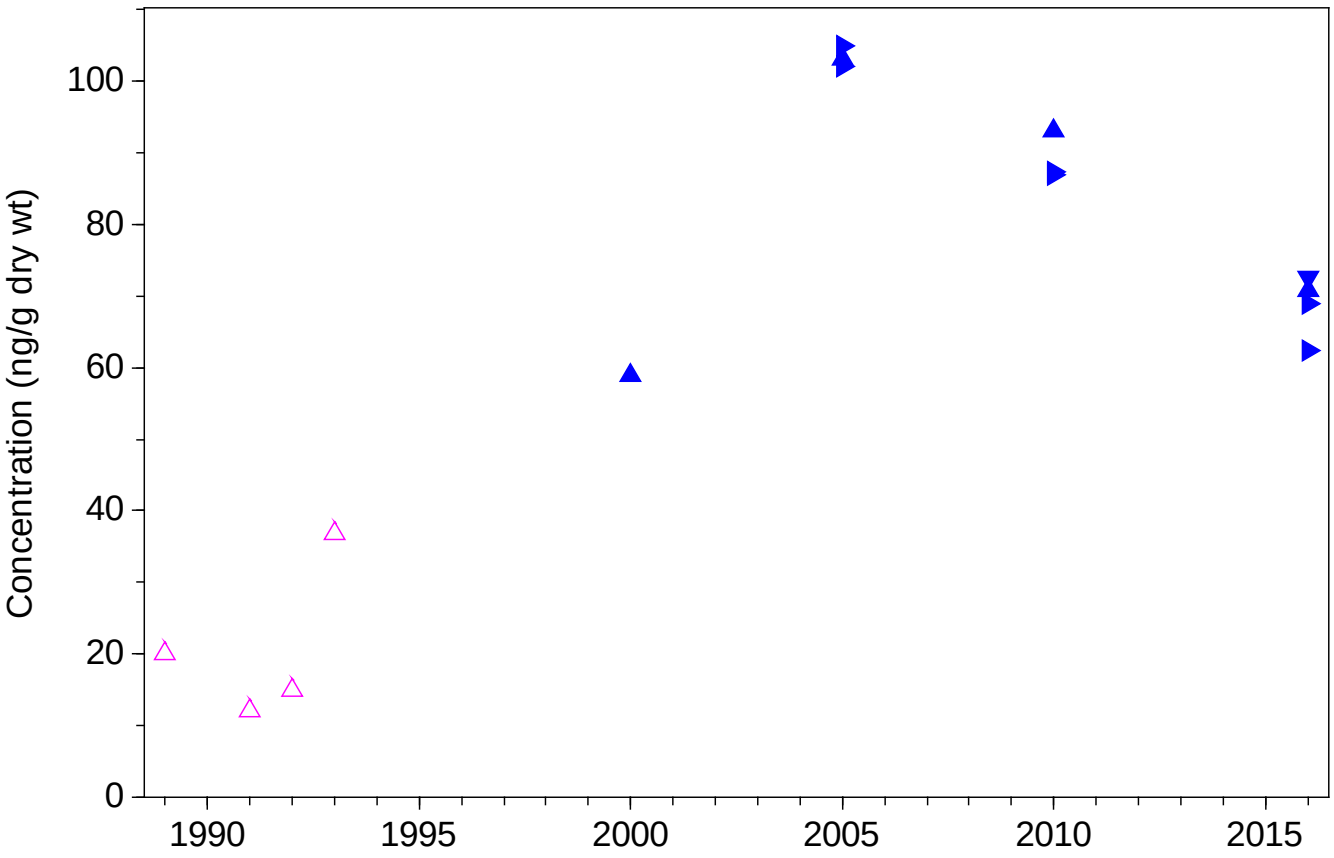
Fluoranthene, Station 4



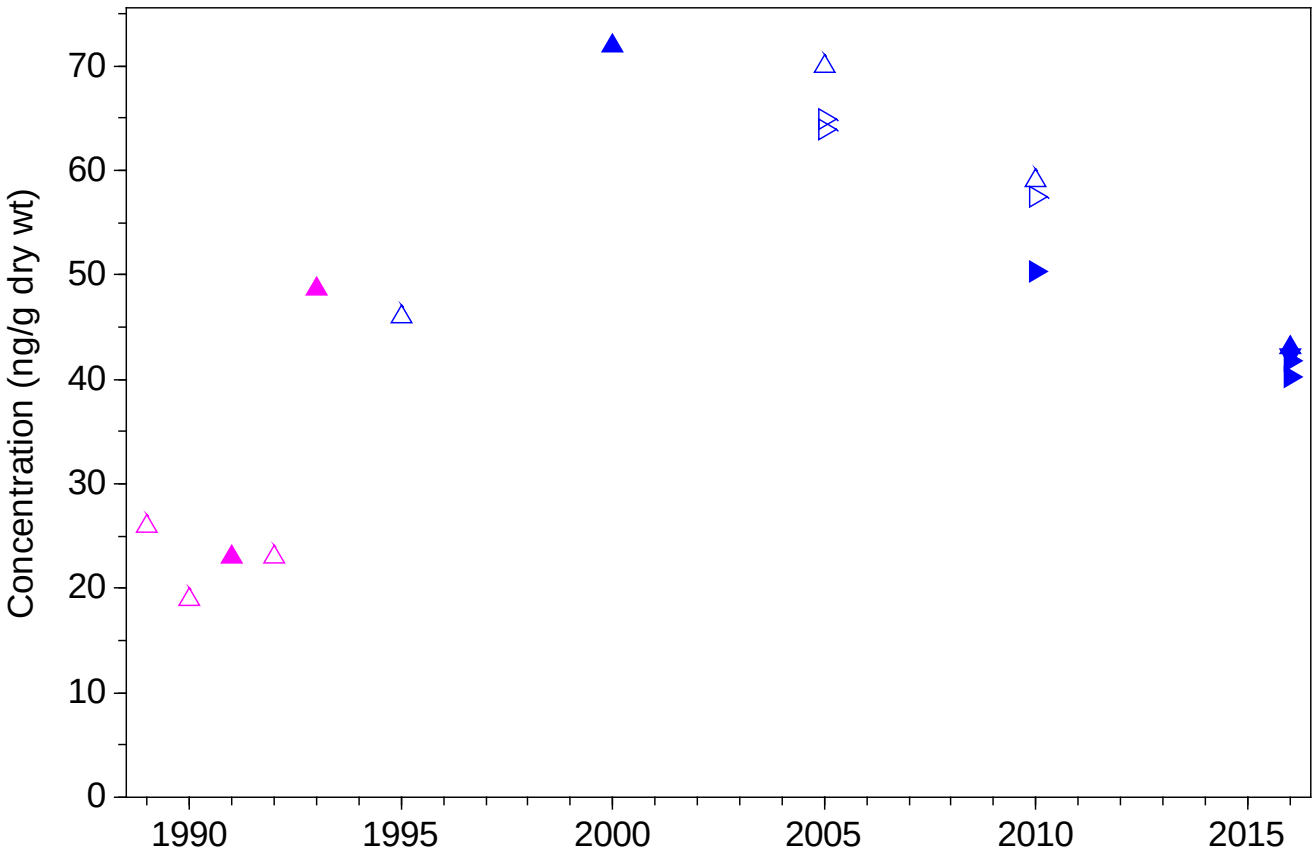
Indeno(1,2,3-c,d)pyrene, Station 4

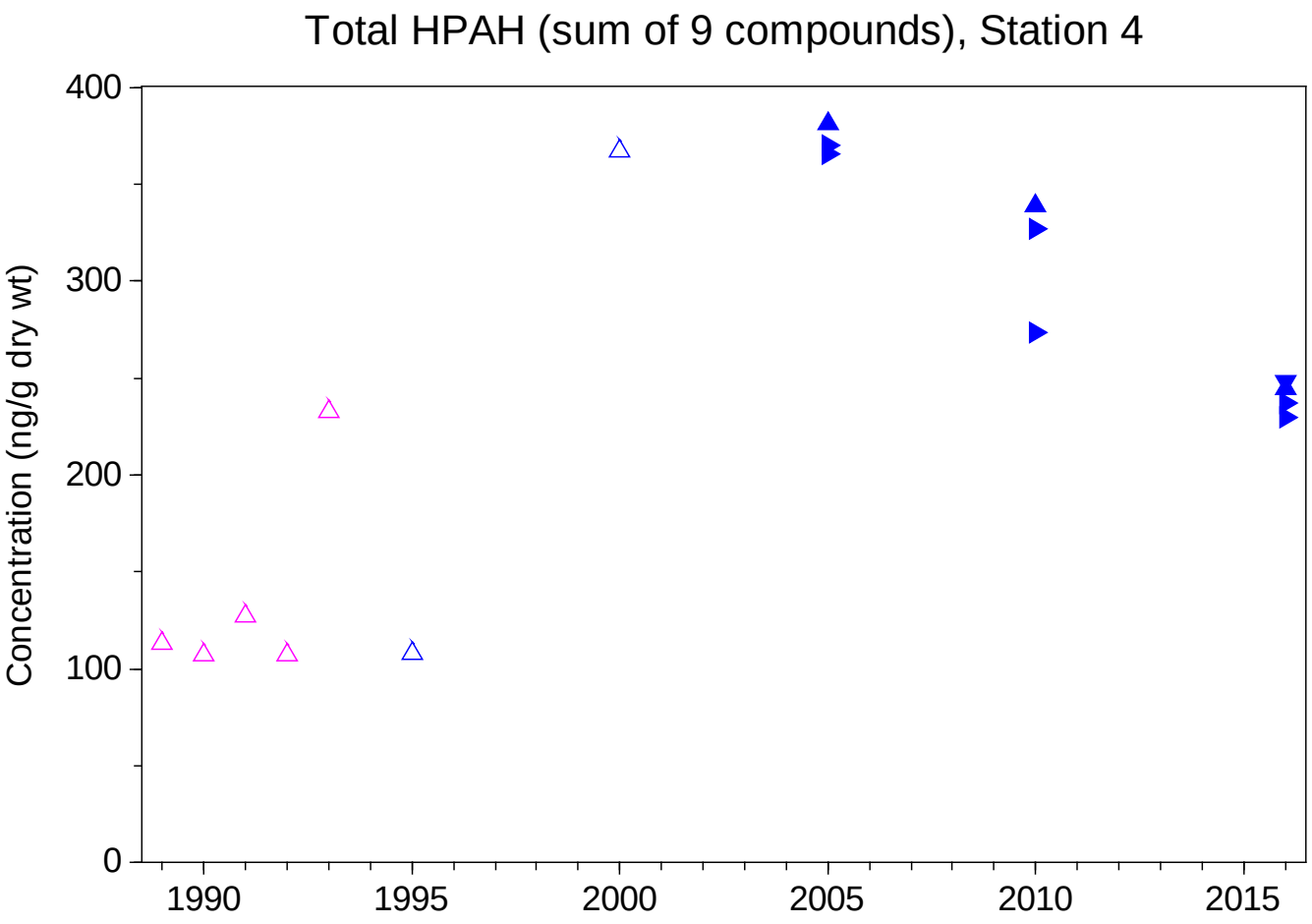


Perylene, Station 4



Pyrene, Station 4





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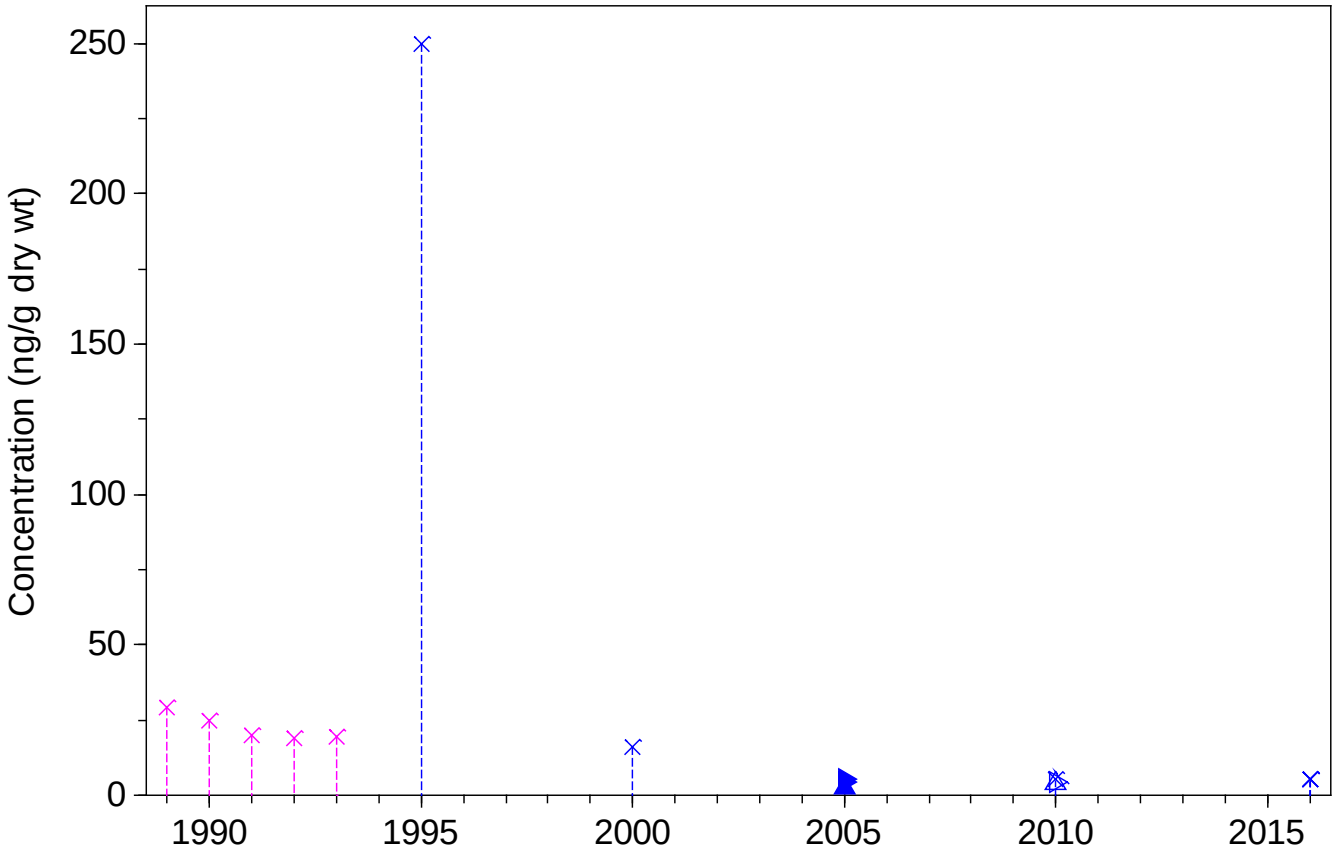
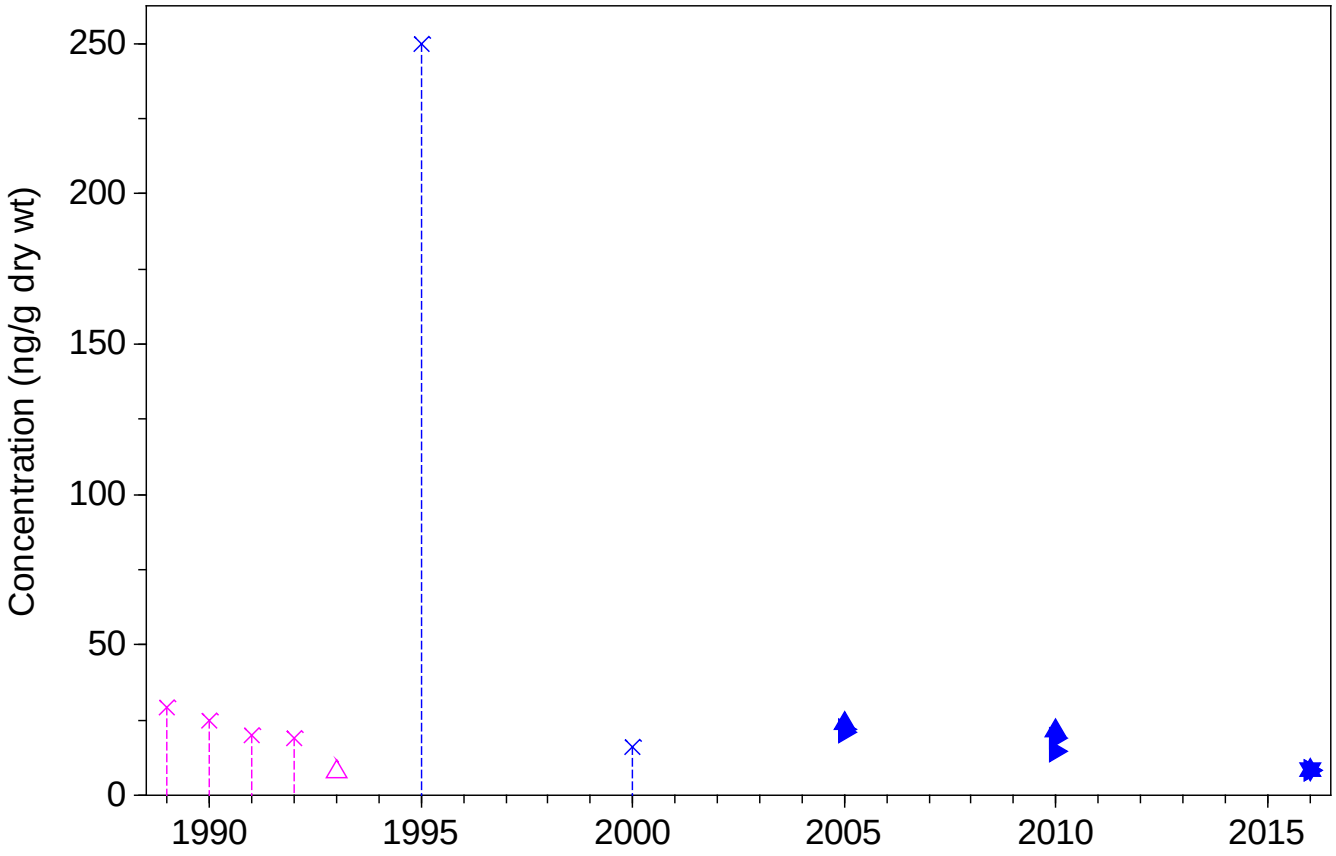
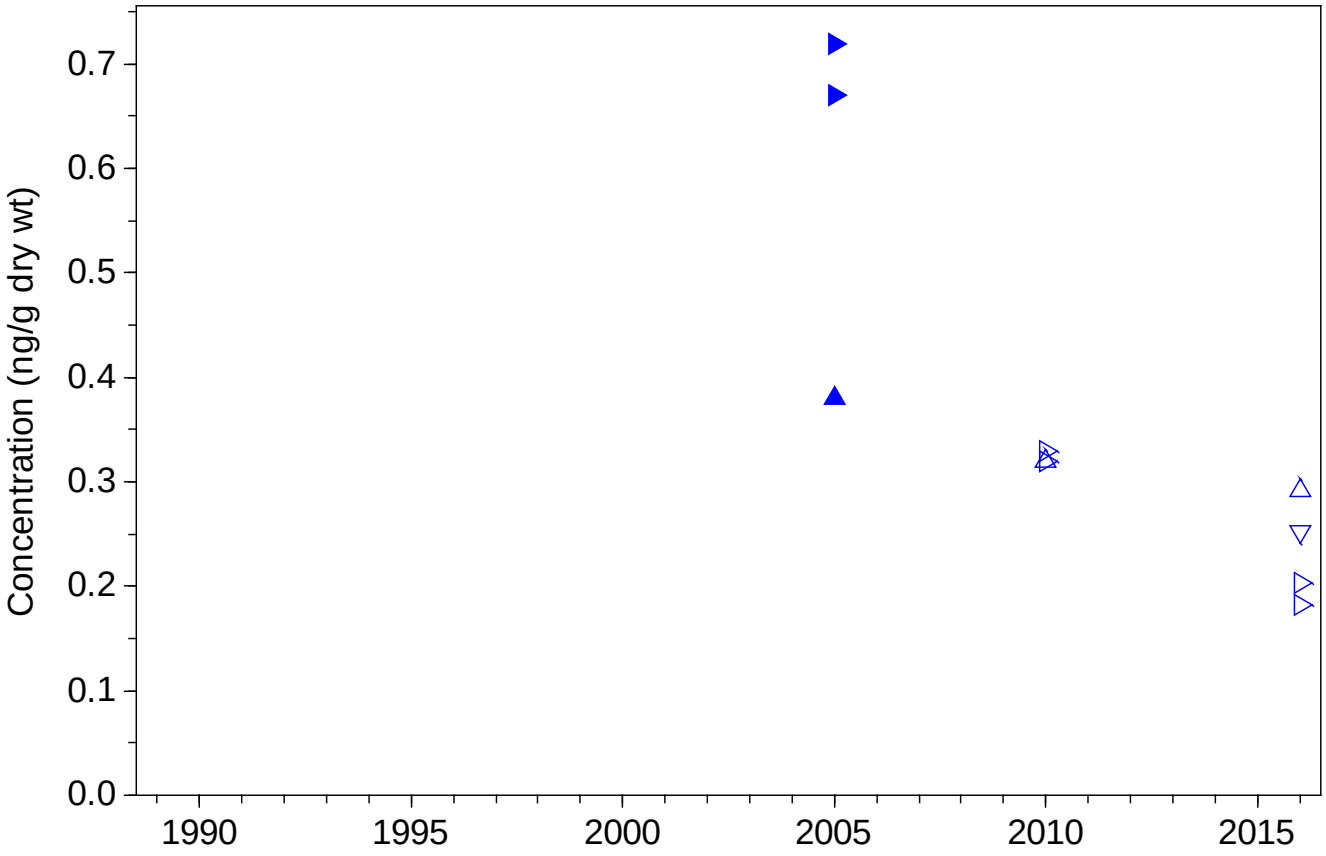
Carbazole, Station 4



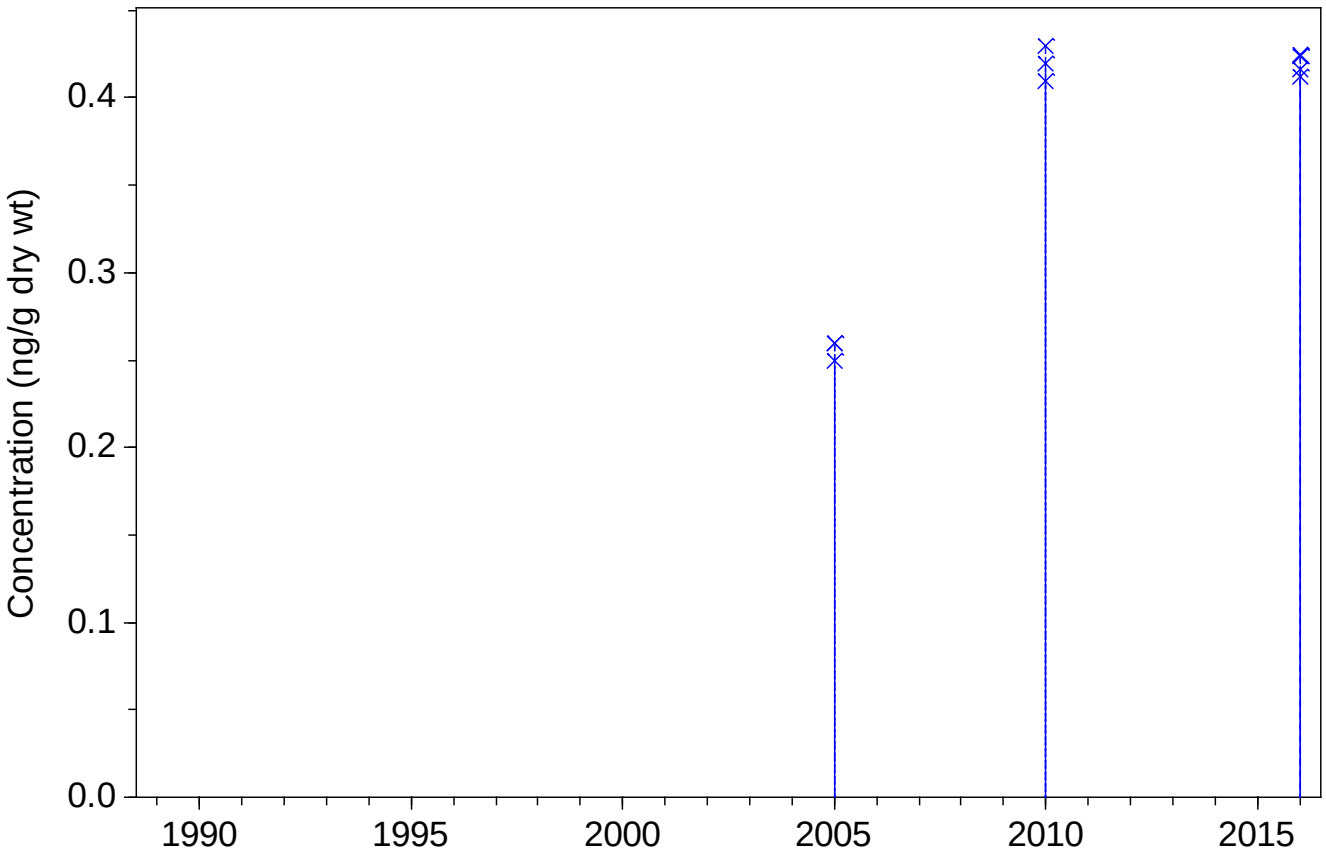
Dibenzofuran, Station 4



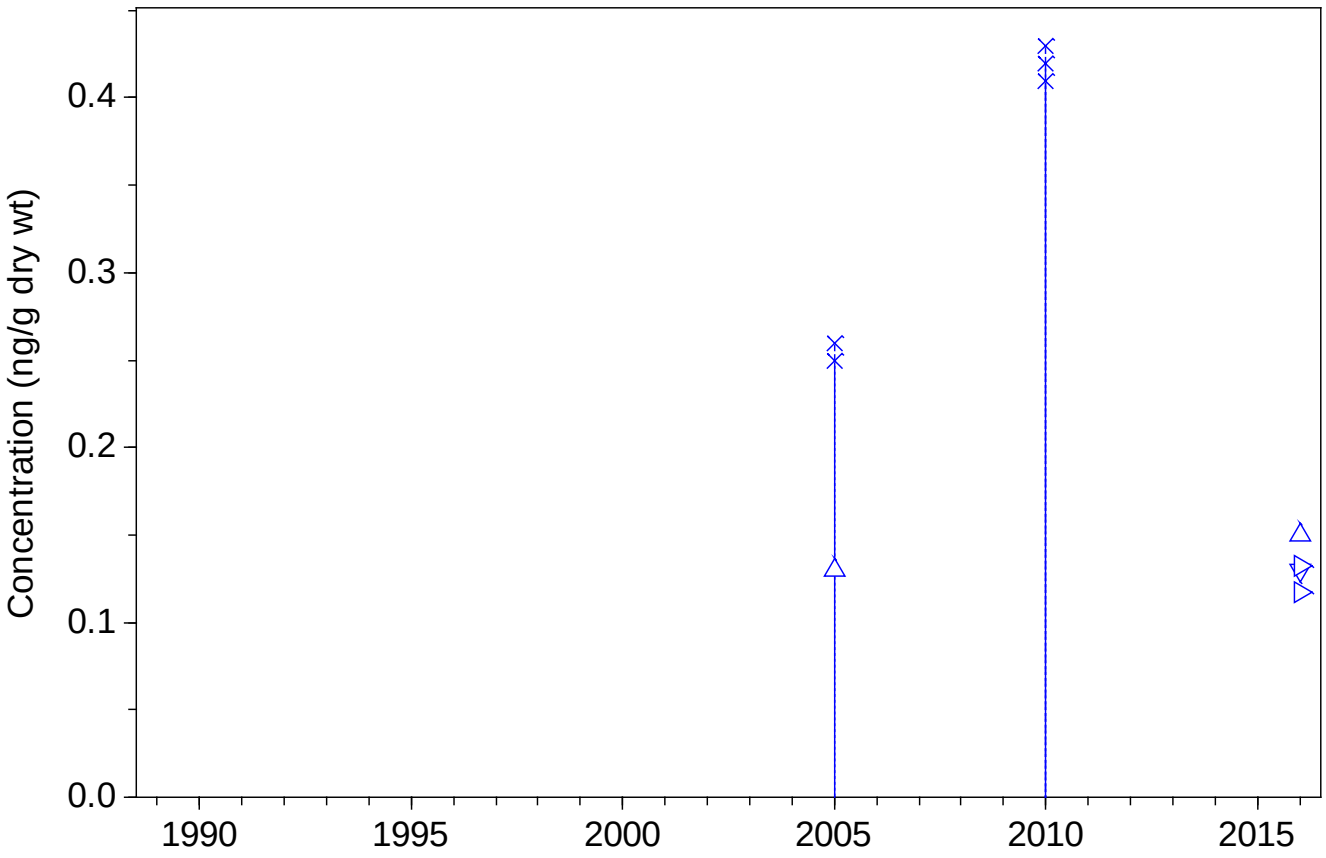
PBDE-47, Station 4



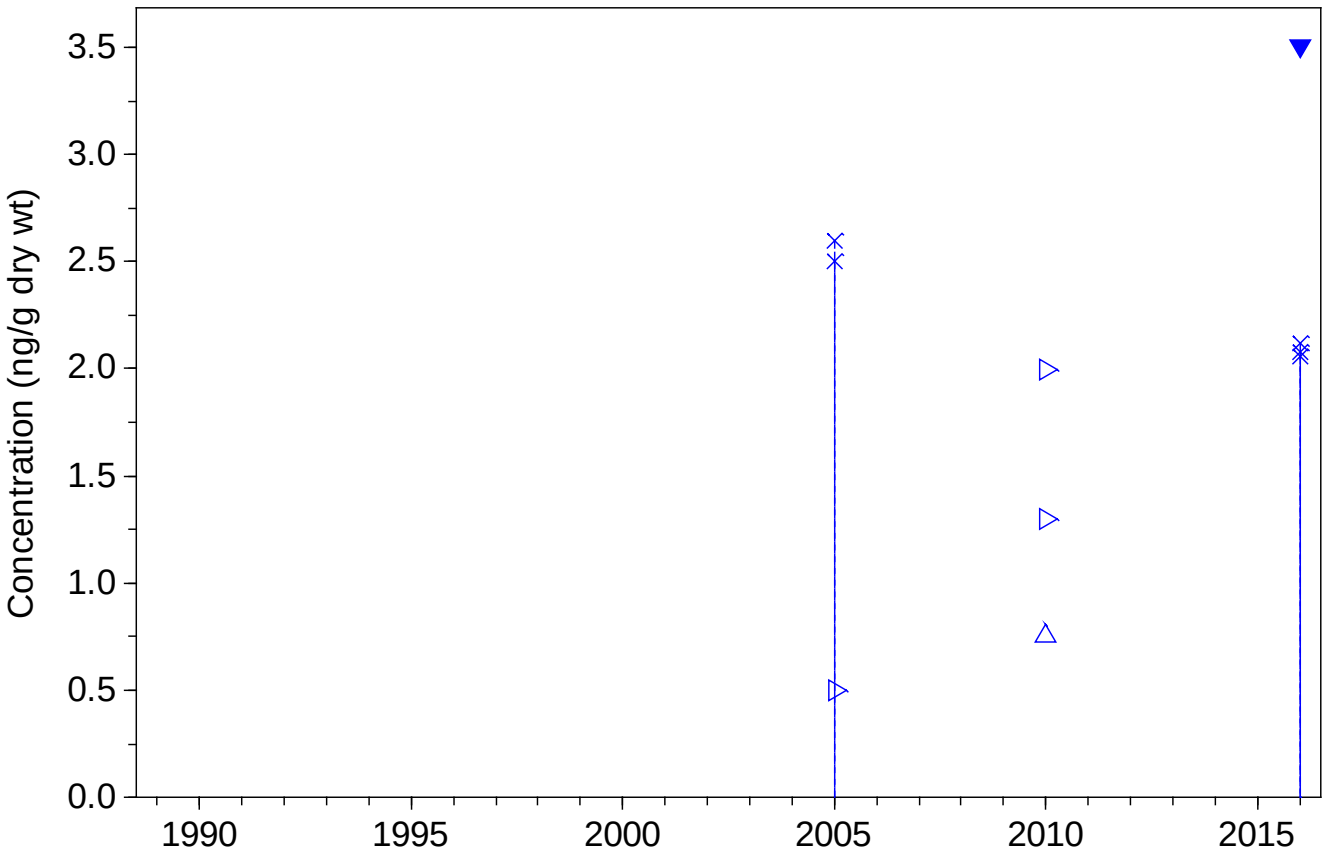
PBDE-49, Station 4



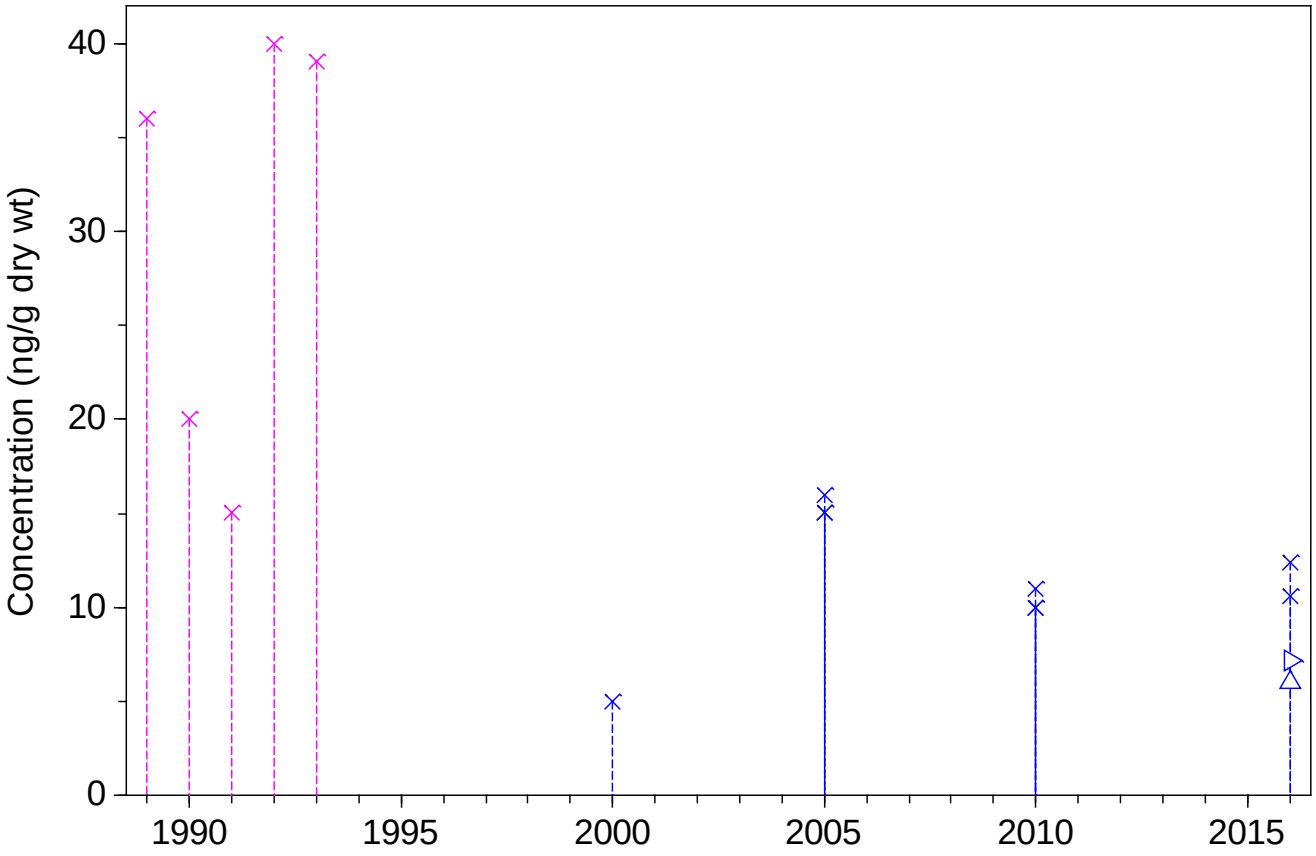
PBDE-99, Station 4



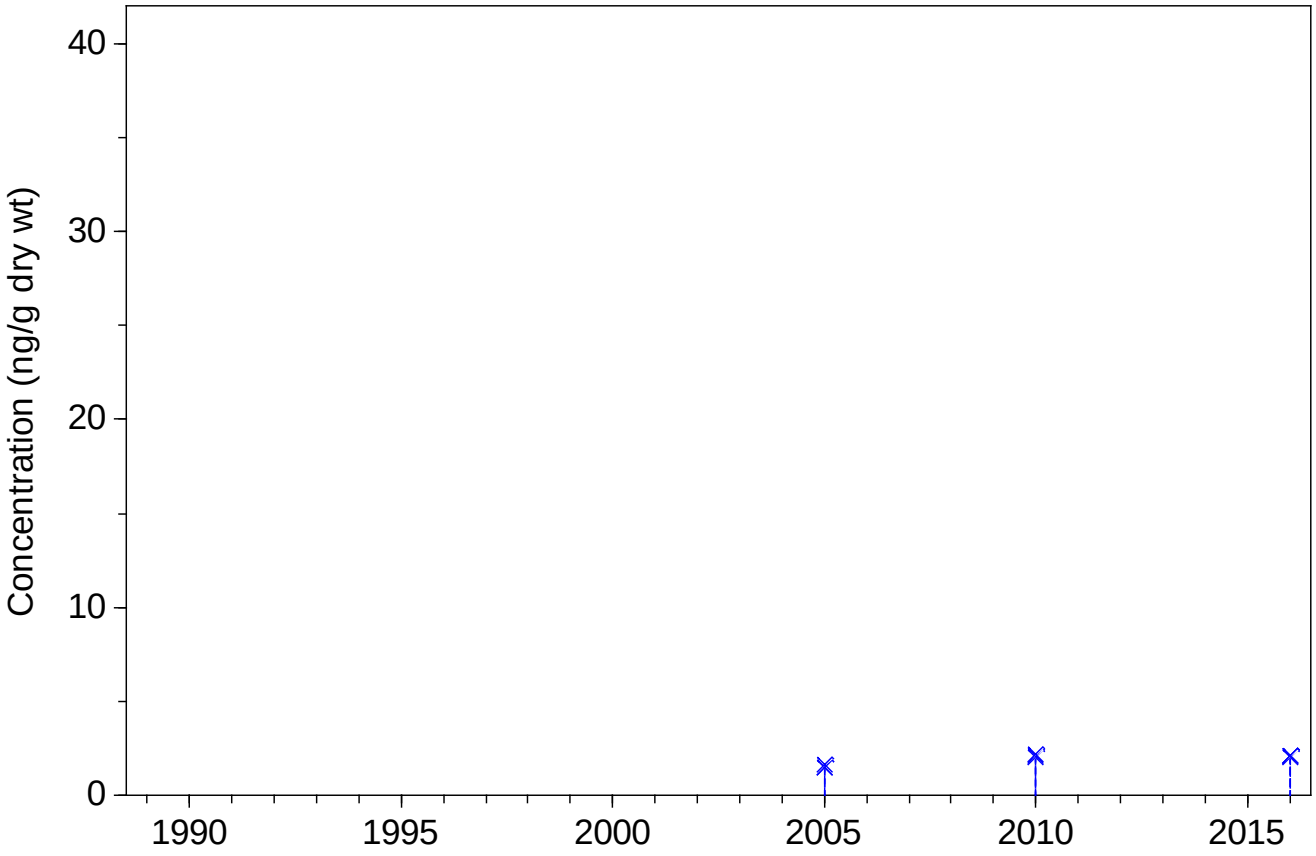
PBDE-209, Station 4



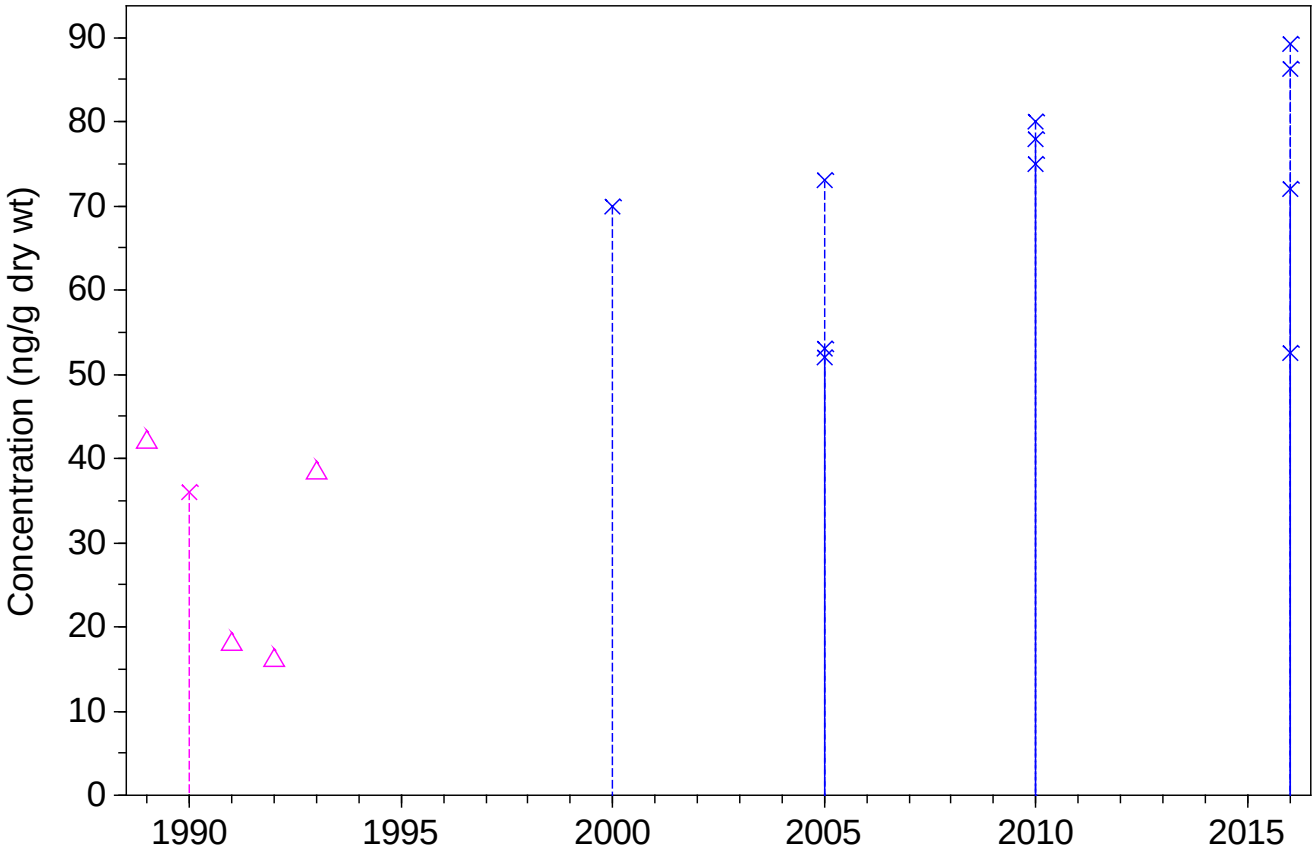
Total Aroclors, Station 4



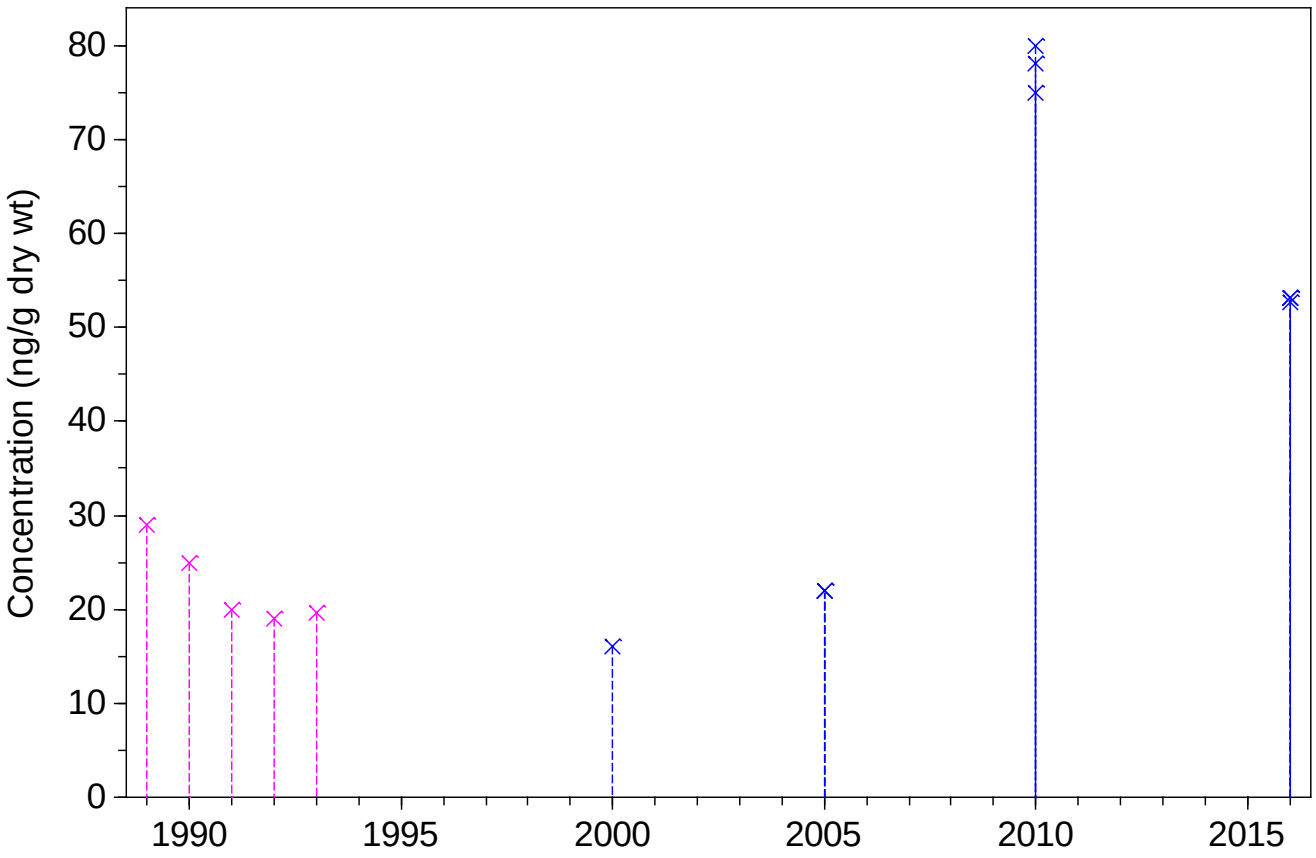
Total PCB Congeners x 2, Station 4



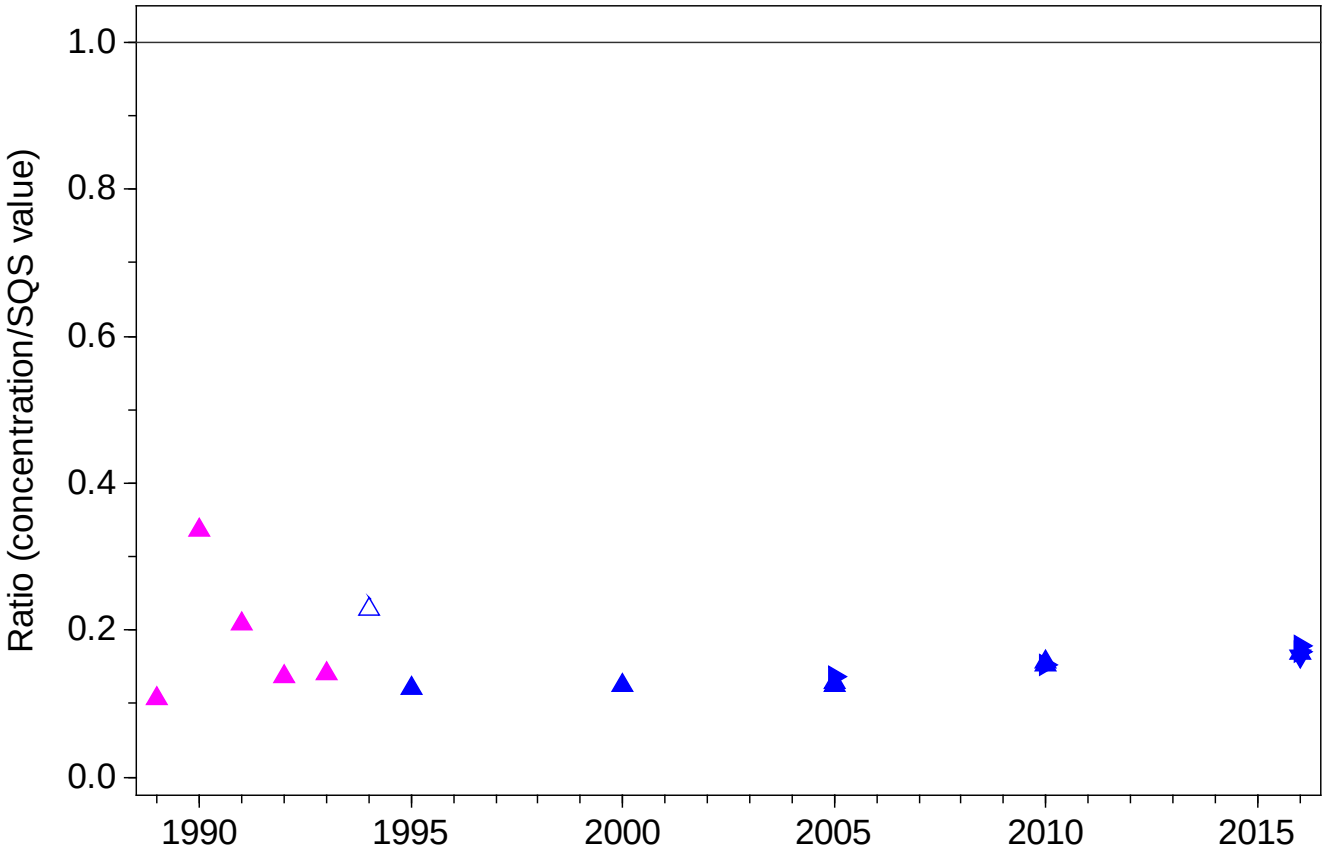
Bis(2-ethylhexyl)phthalate, Station 4



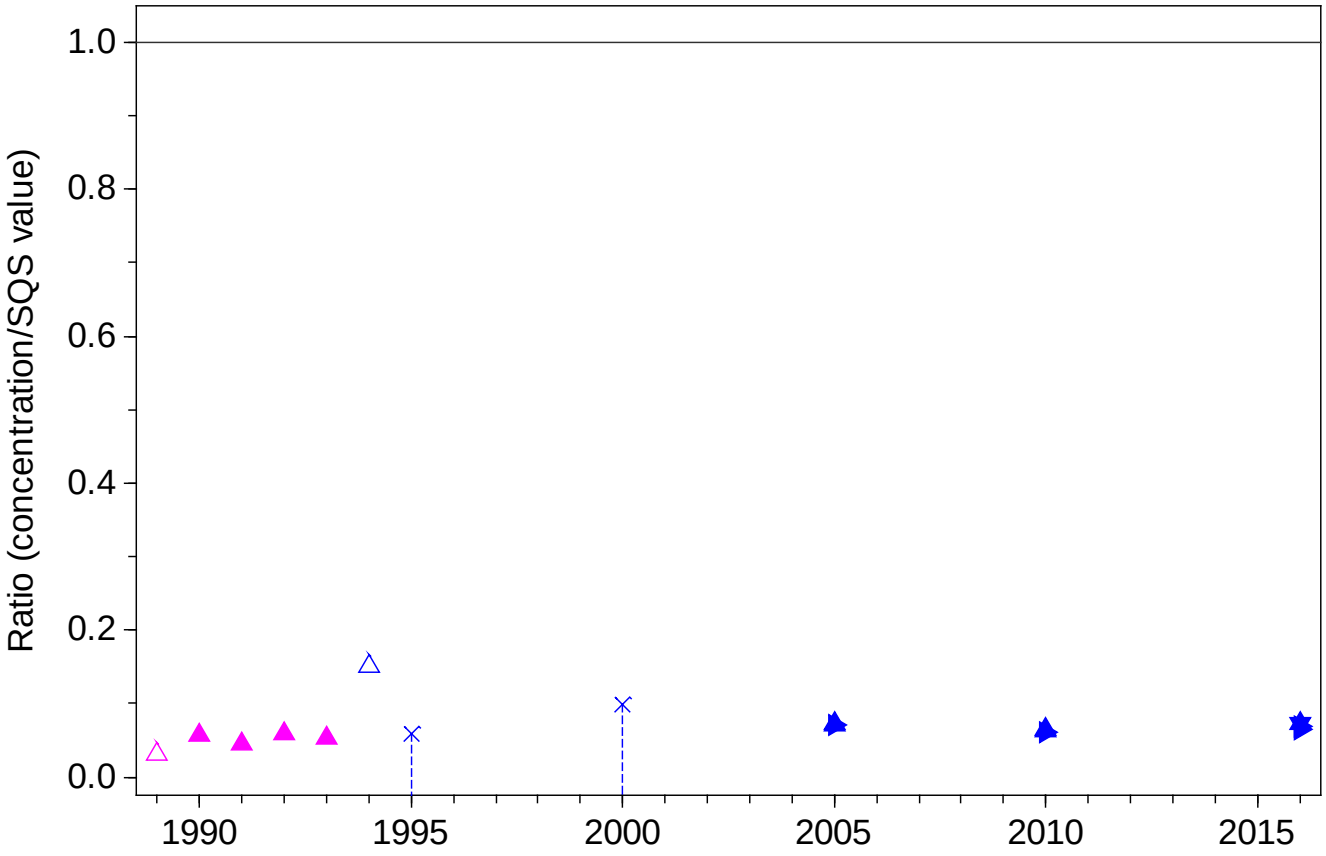
Butylbenzylphthalate, Station 4



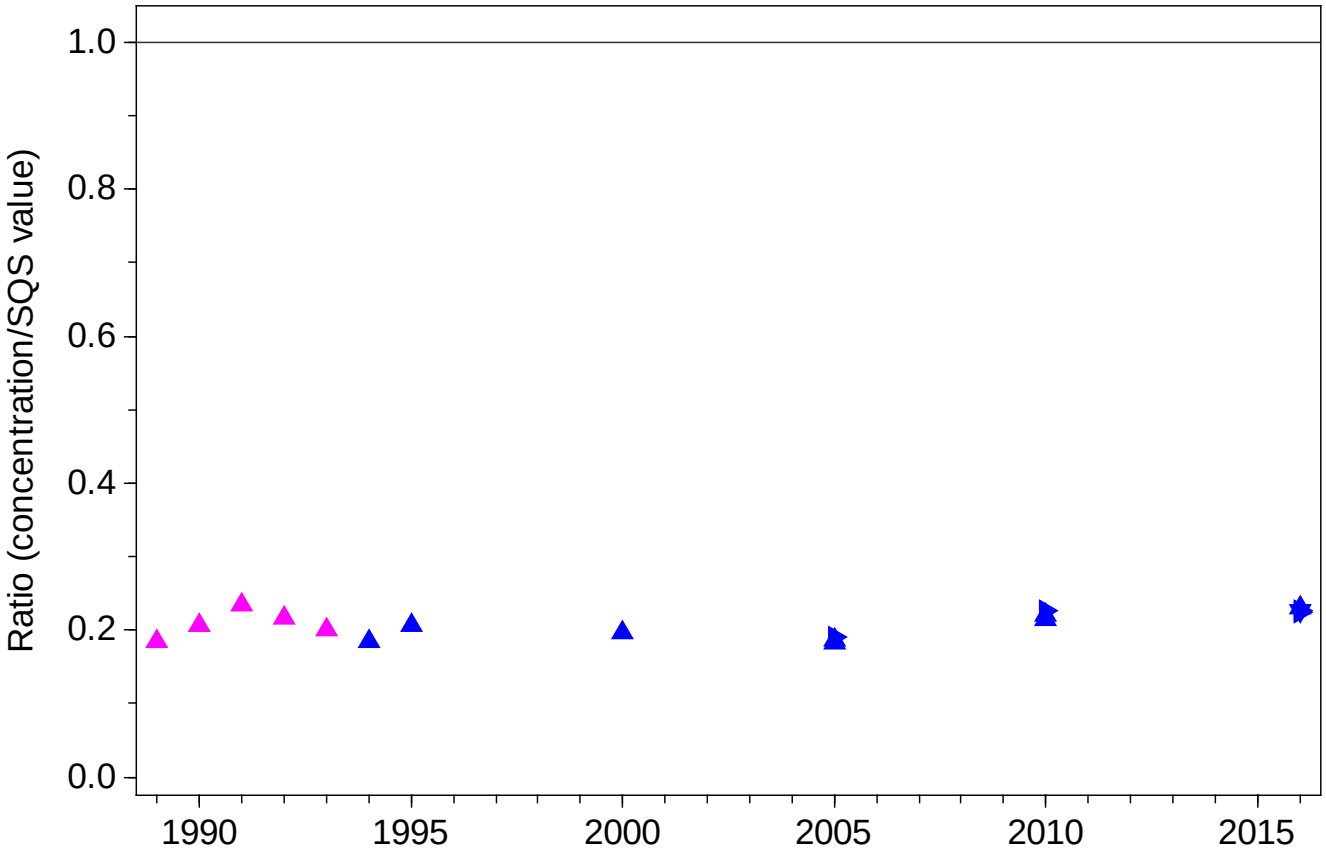
SQS quotient, Arsenic, Station 4



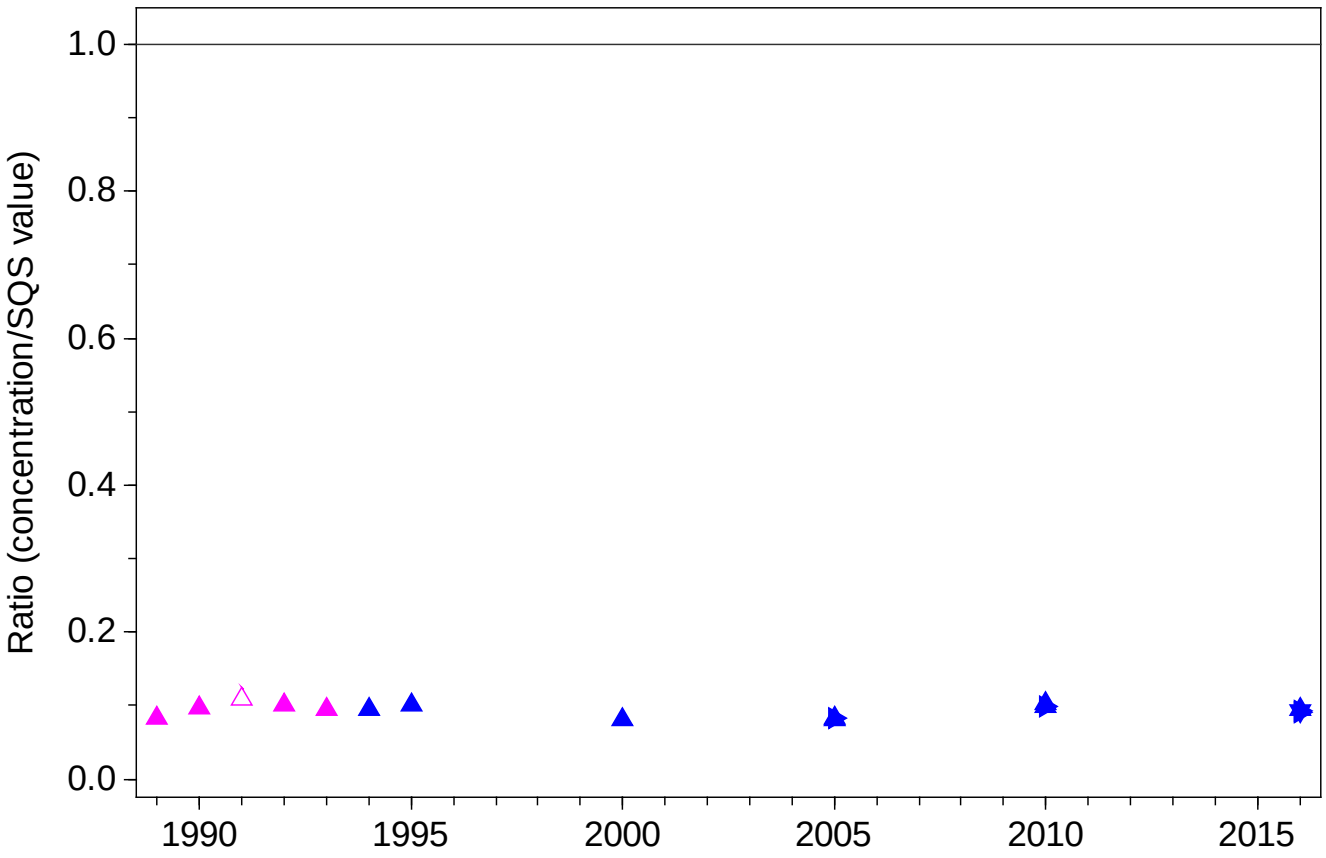
SQS quotient, Cadmium, Station 4



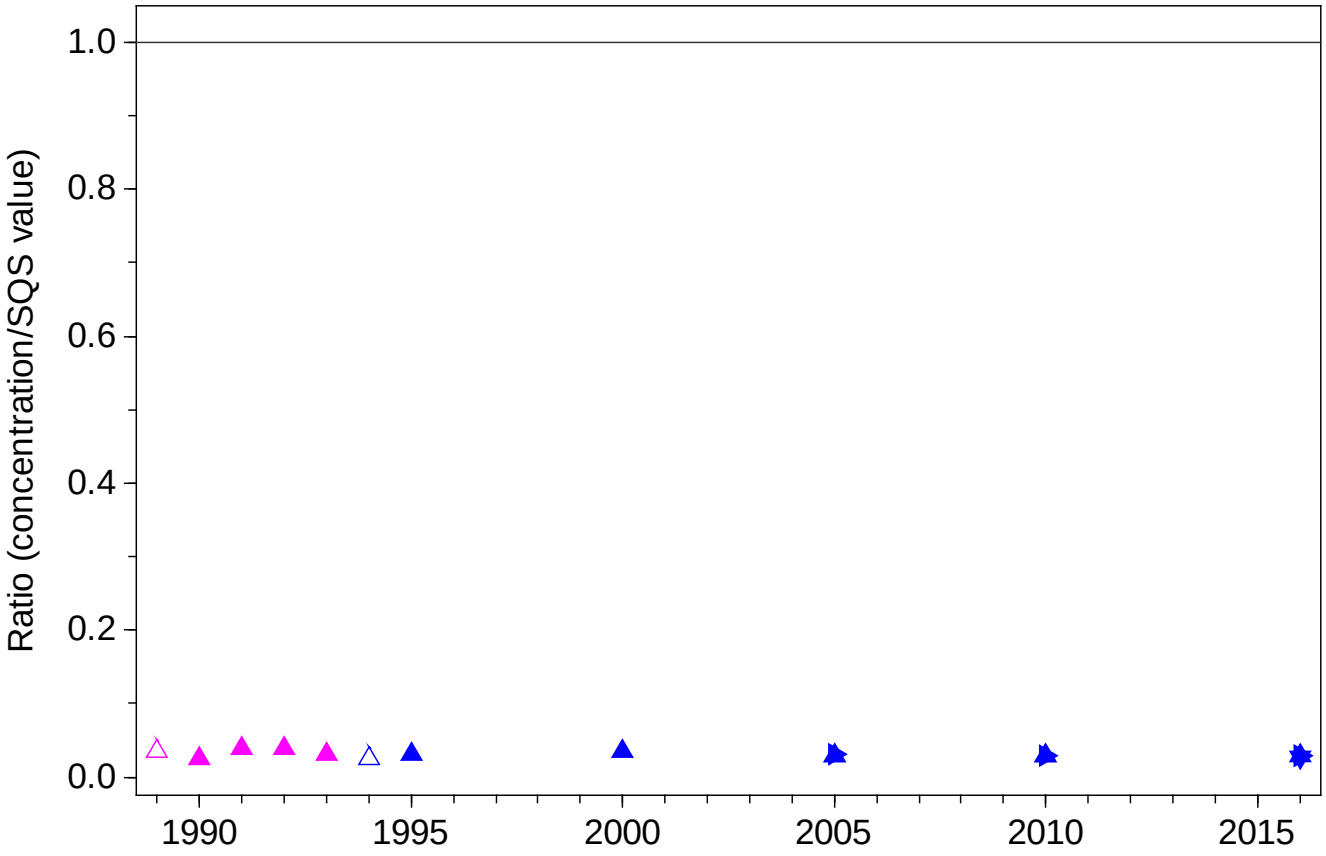
SQS quotient, Chromium, Station 4



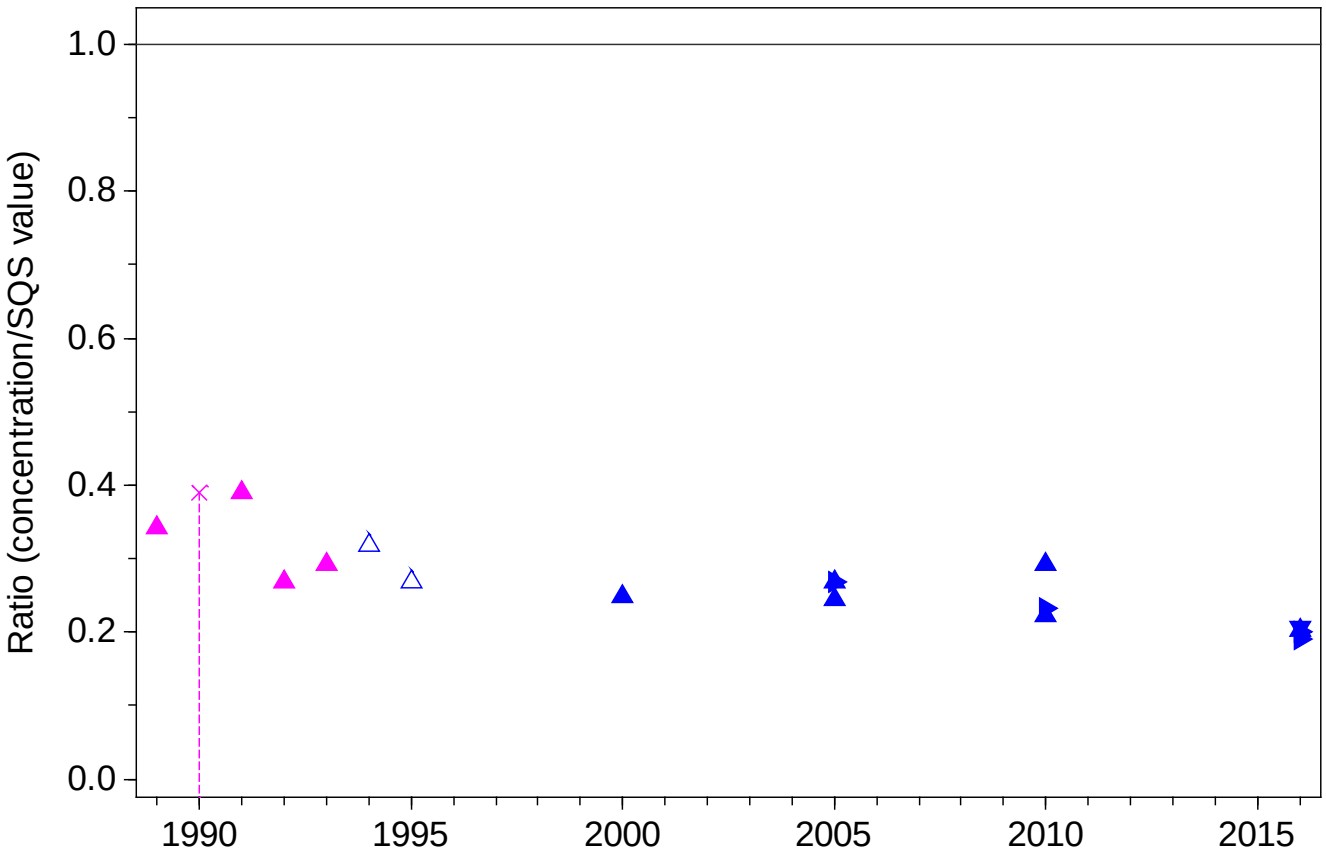
SQS quotient, Copper, Station 4



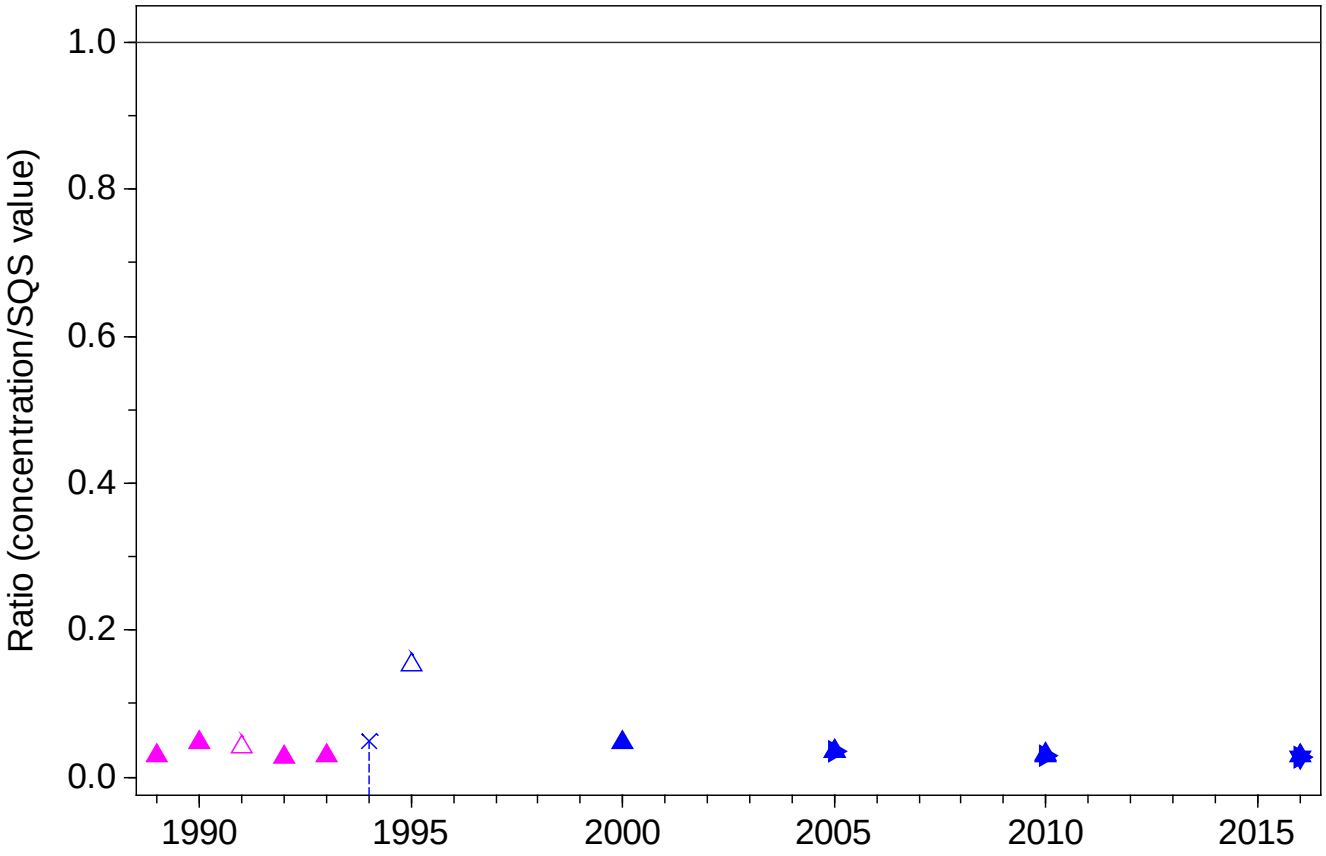
SQS quotient, Lead, Station 4



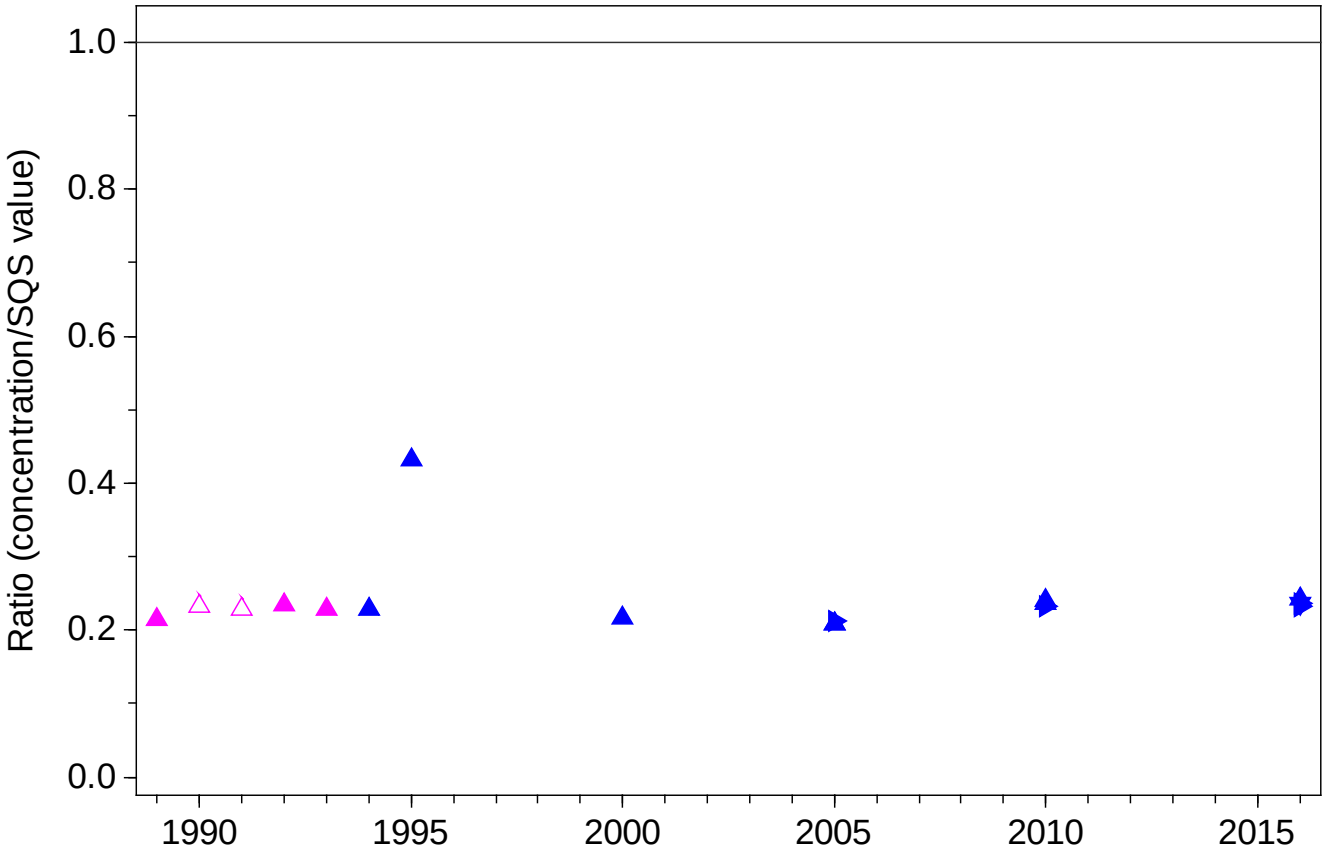
SQS quotient, Mercury, Station 4



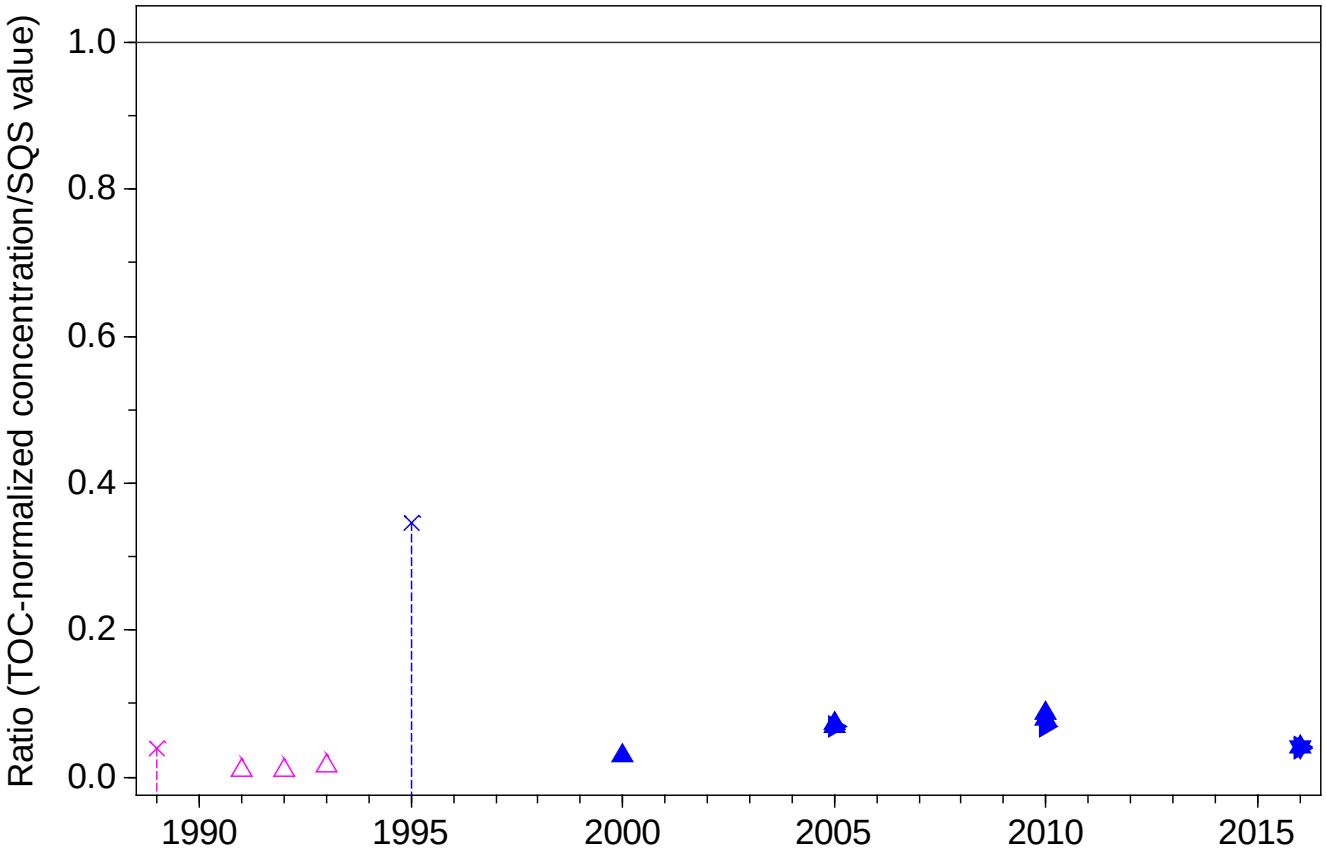
SQS quotient, Silver, Station 4



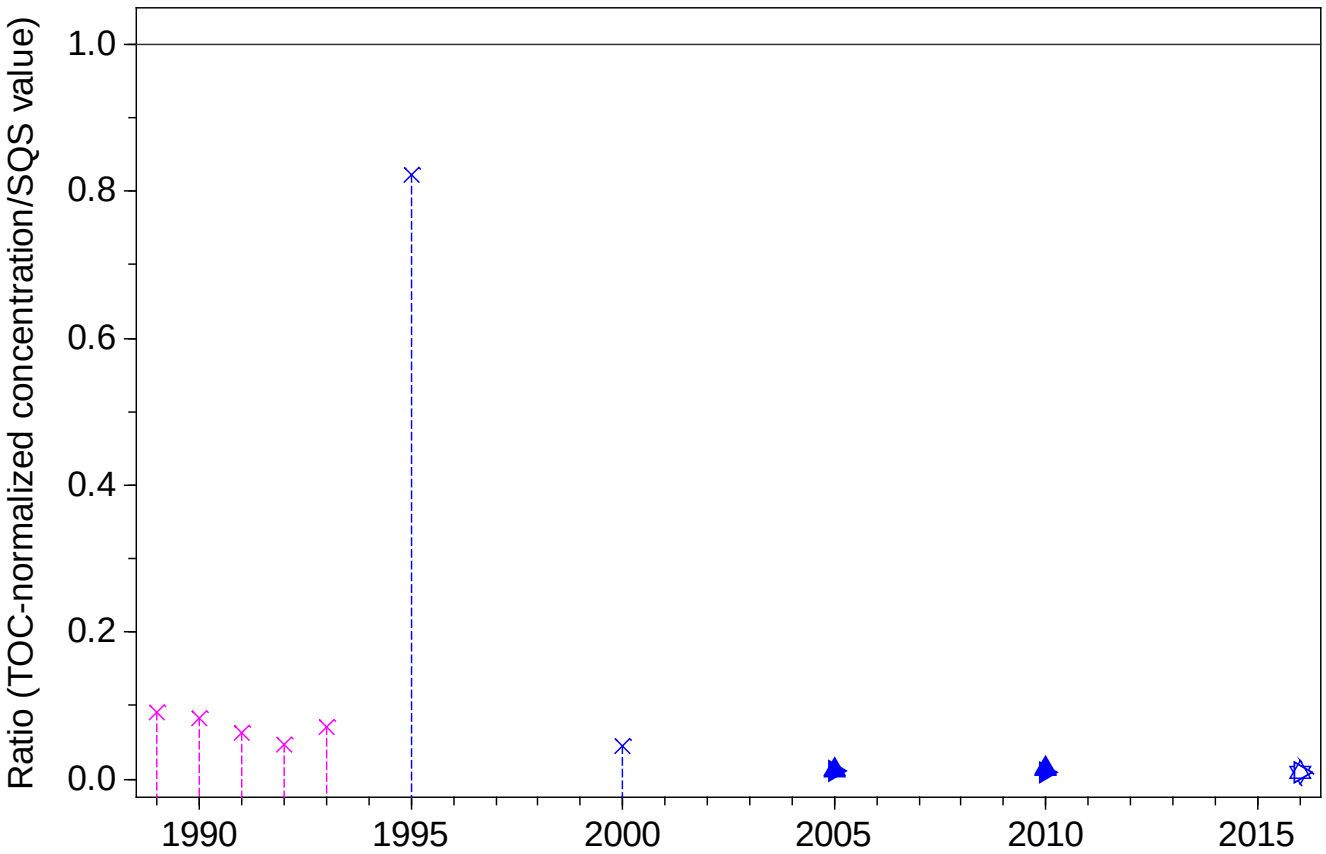
SQS quotient, Zinc, Station 4



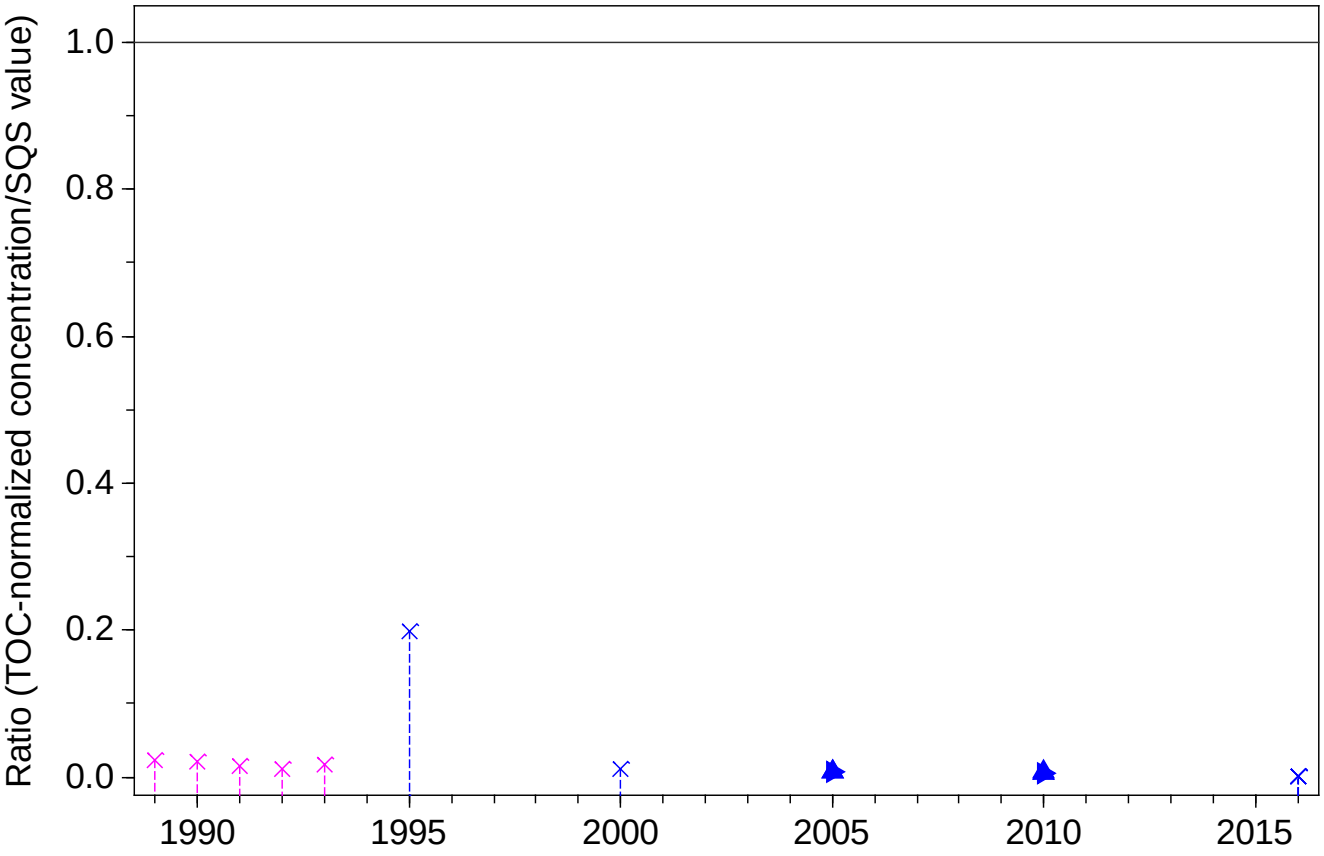
SQS quotient, 2-Methylnaphthalene, Station 4



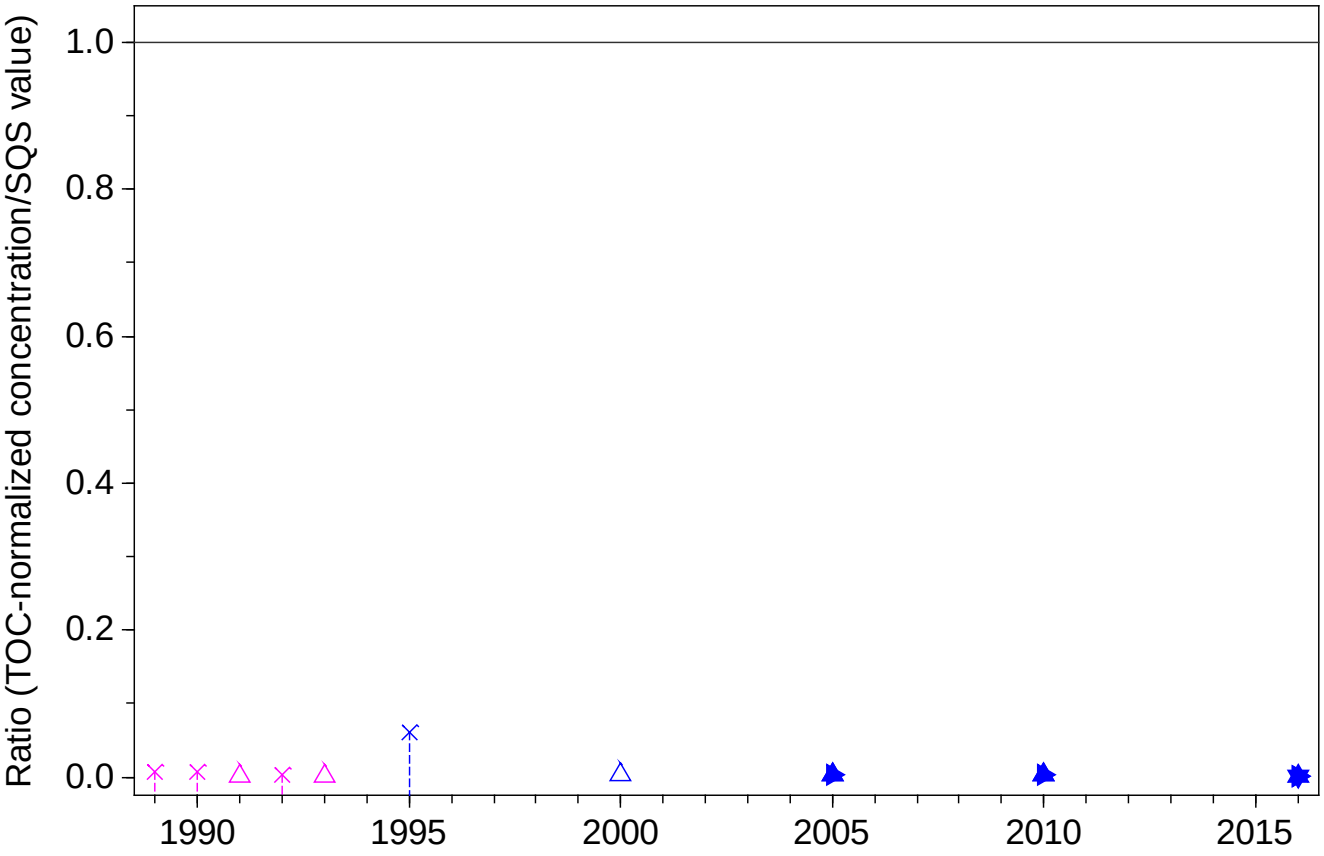
SQS quotient, Acenaphthene, Station 4



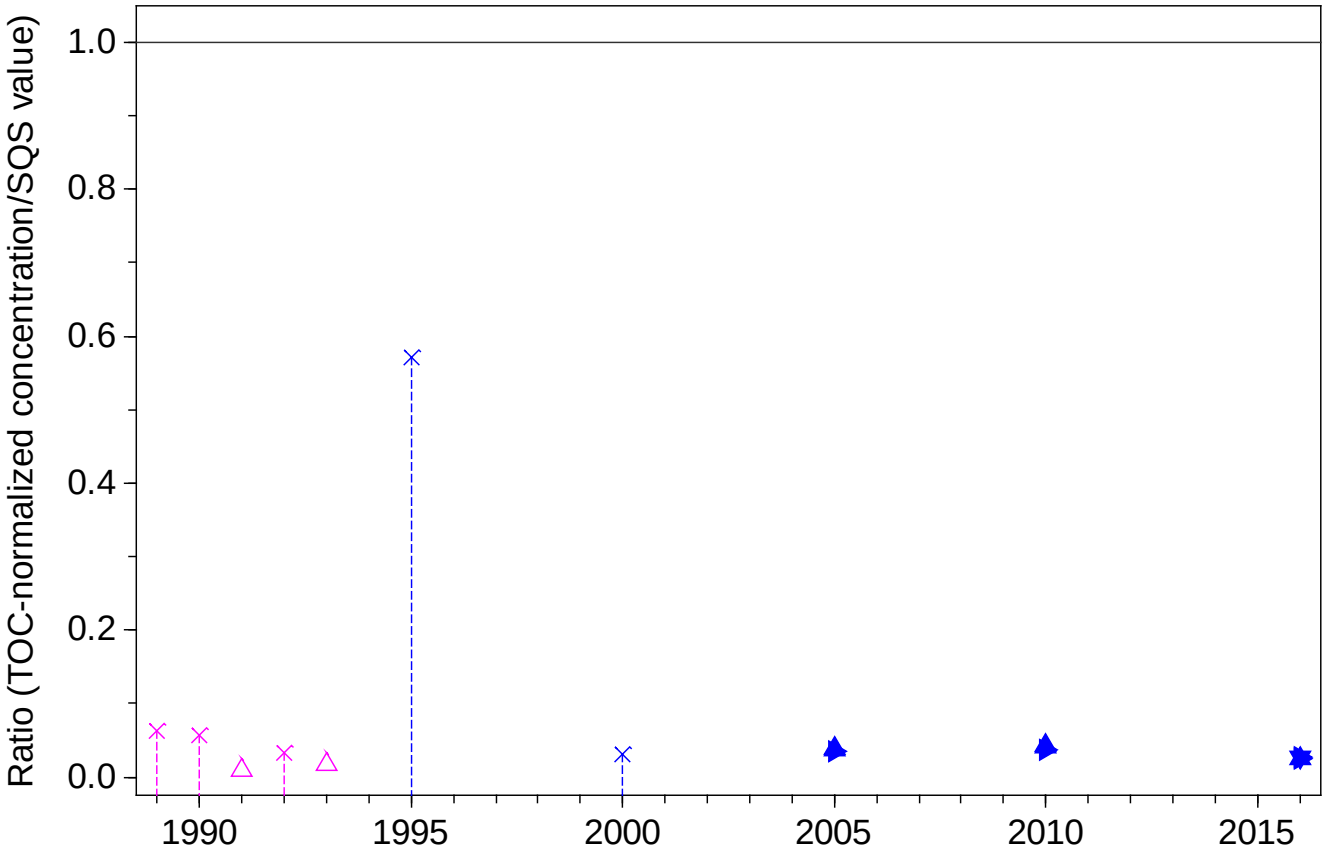
SQS quotient, Acenaphthylene, Station 4



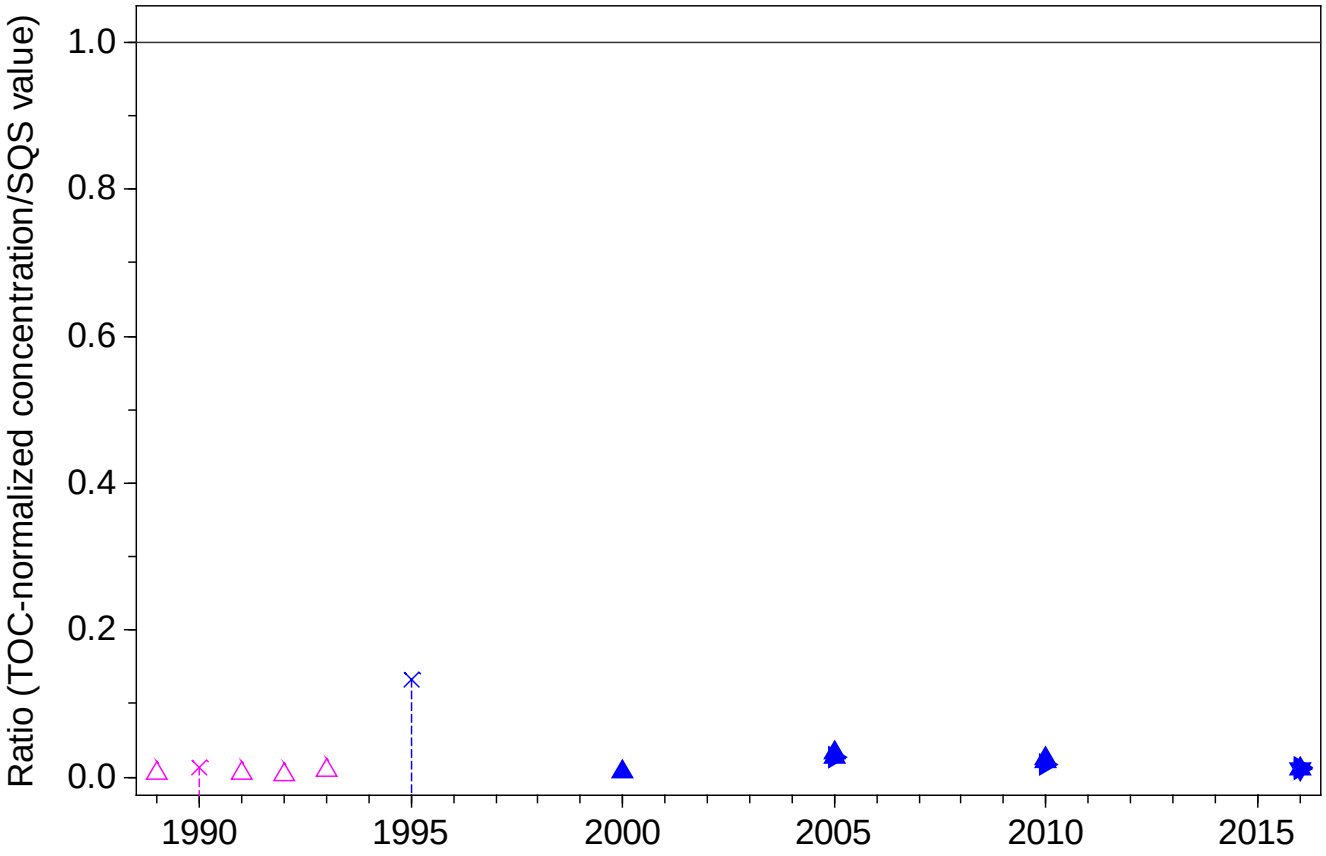
SQS quotient, Anthracene, Station 4



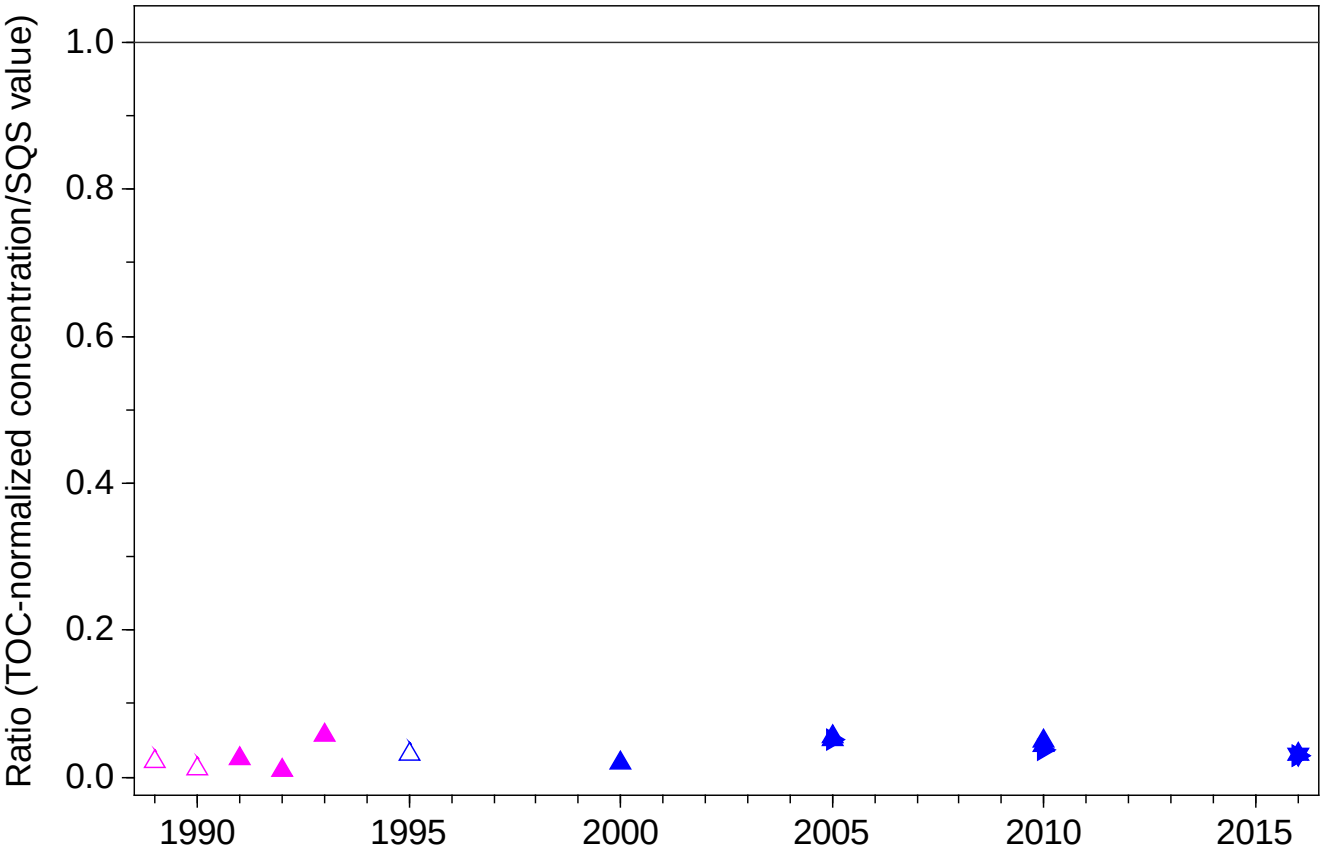
SQS quotient, Fluorene, Station 4



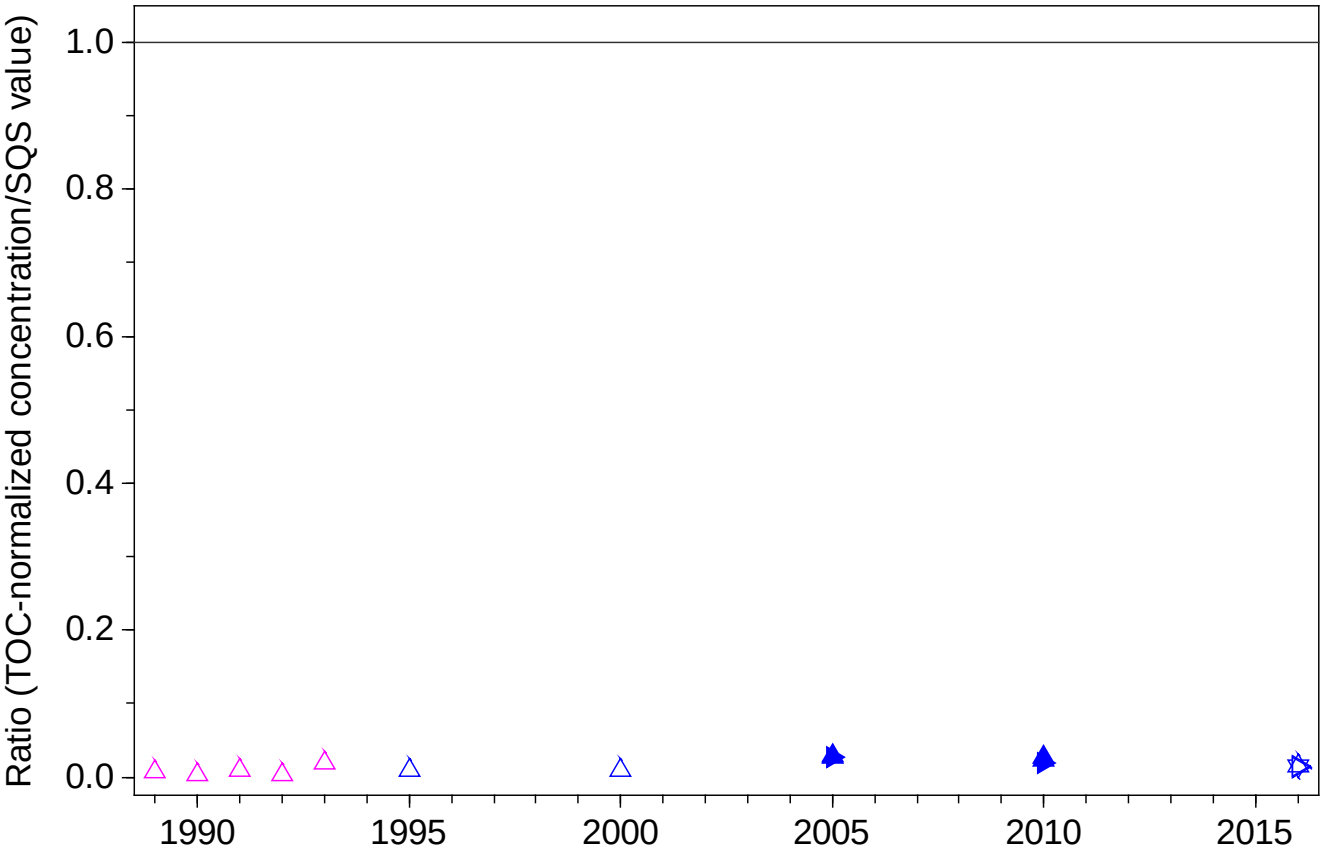
SQS quotient, Naphthalene, Station 4



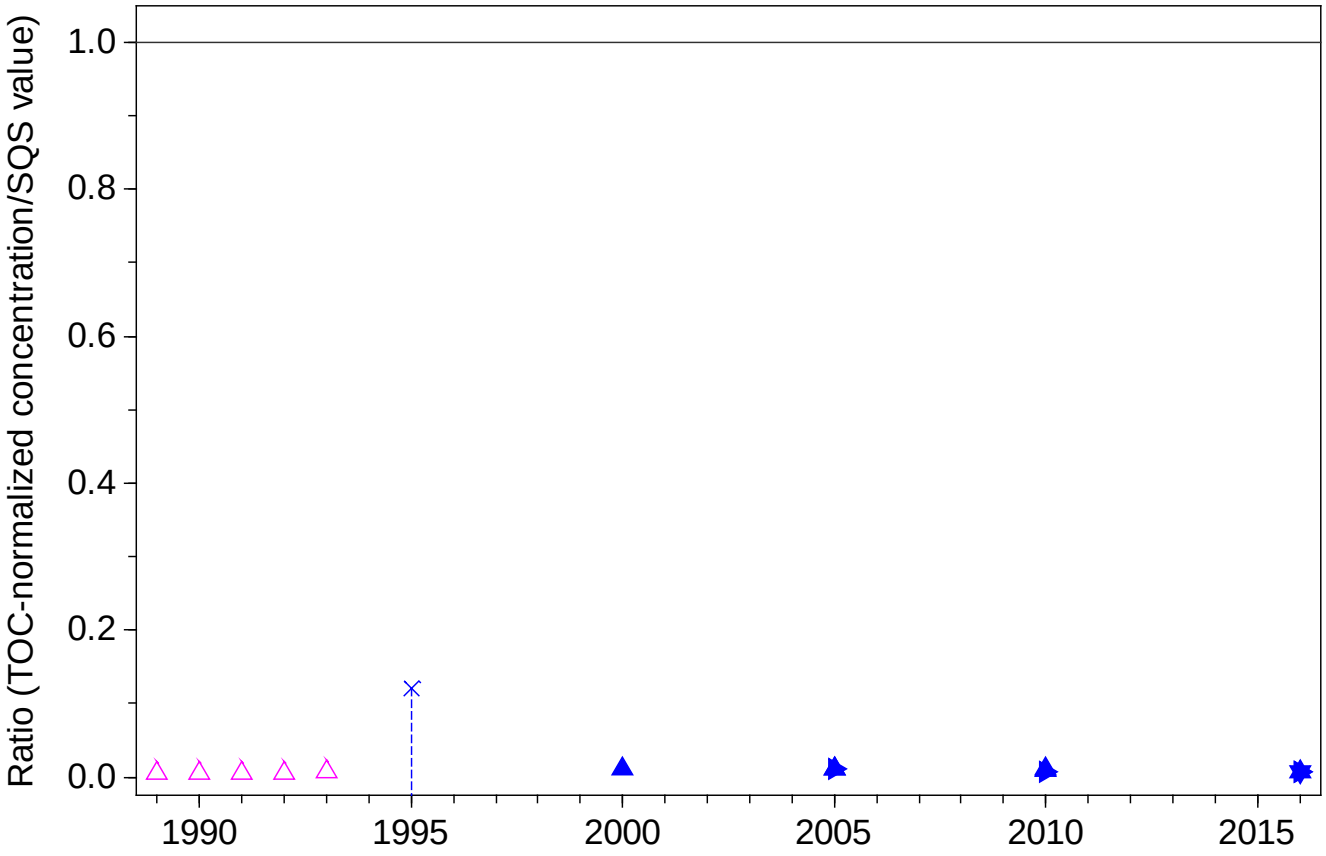
SQS quotient, Phenanthrene, Station 4



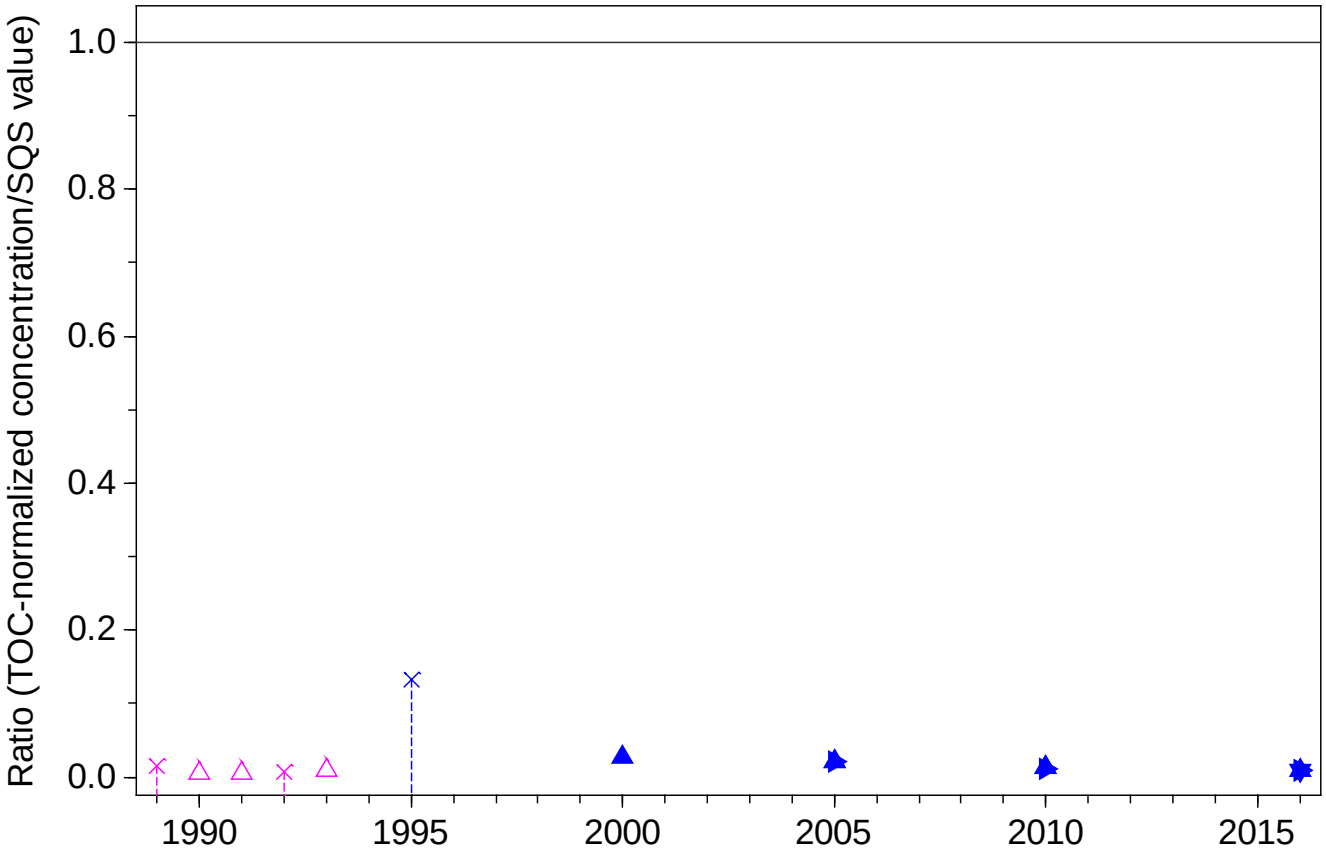
SQS quotient, Total LPAH, Station 4



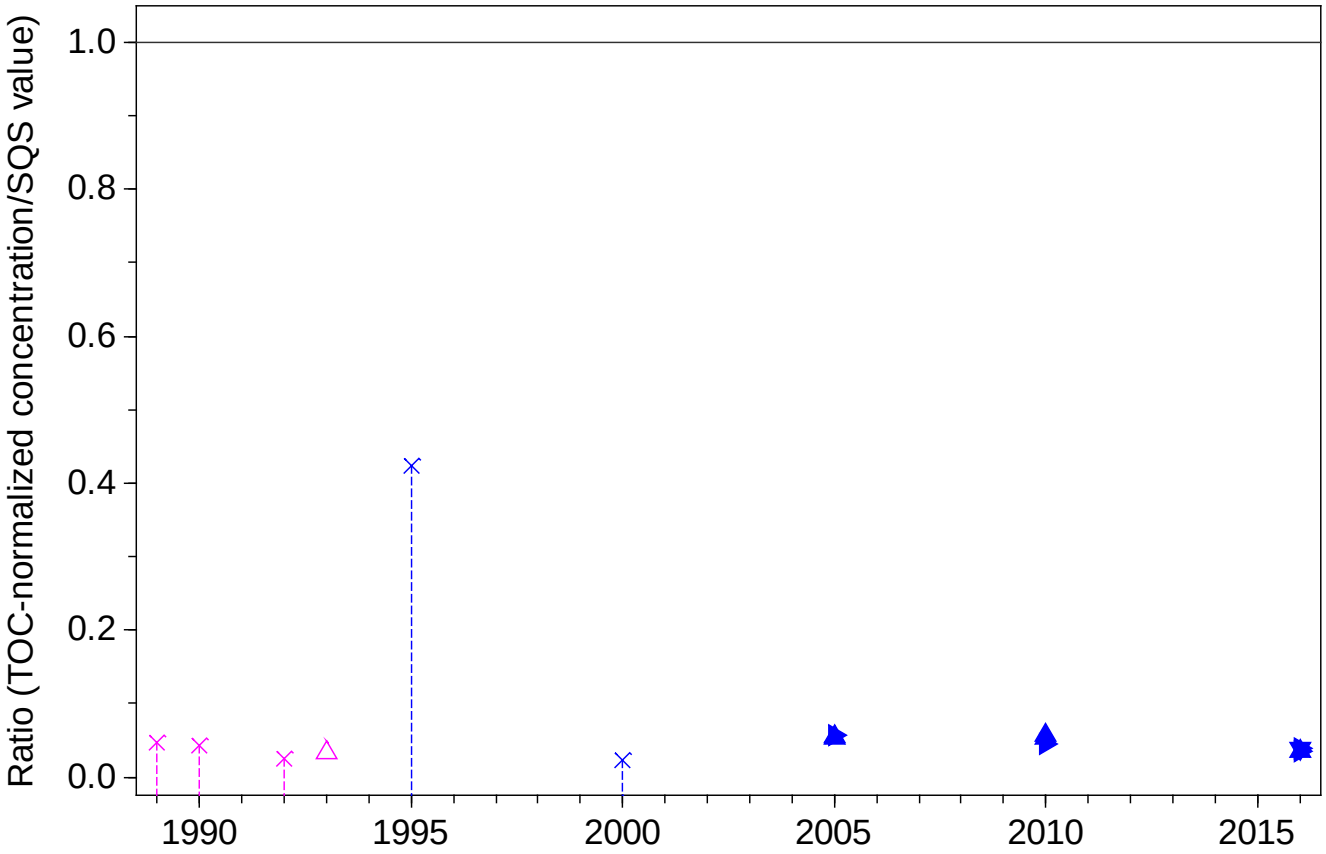
SQS quotient, Benzo(a)anthracene, Station 4



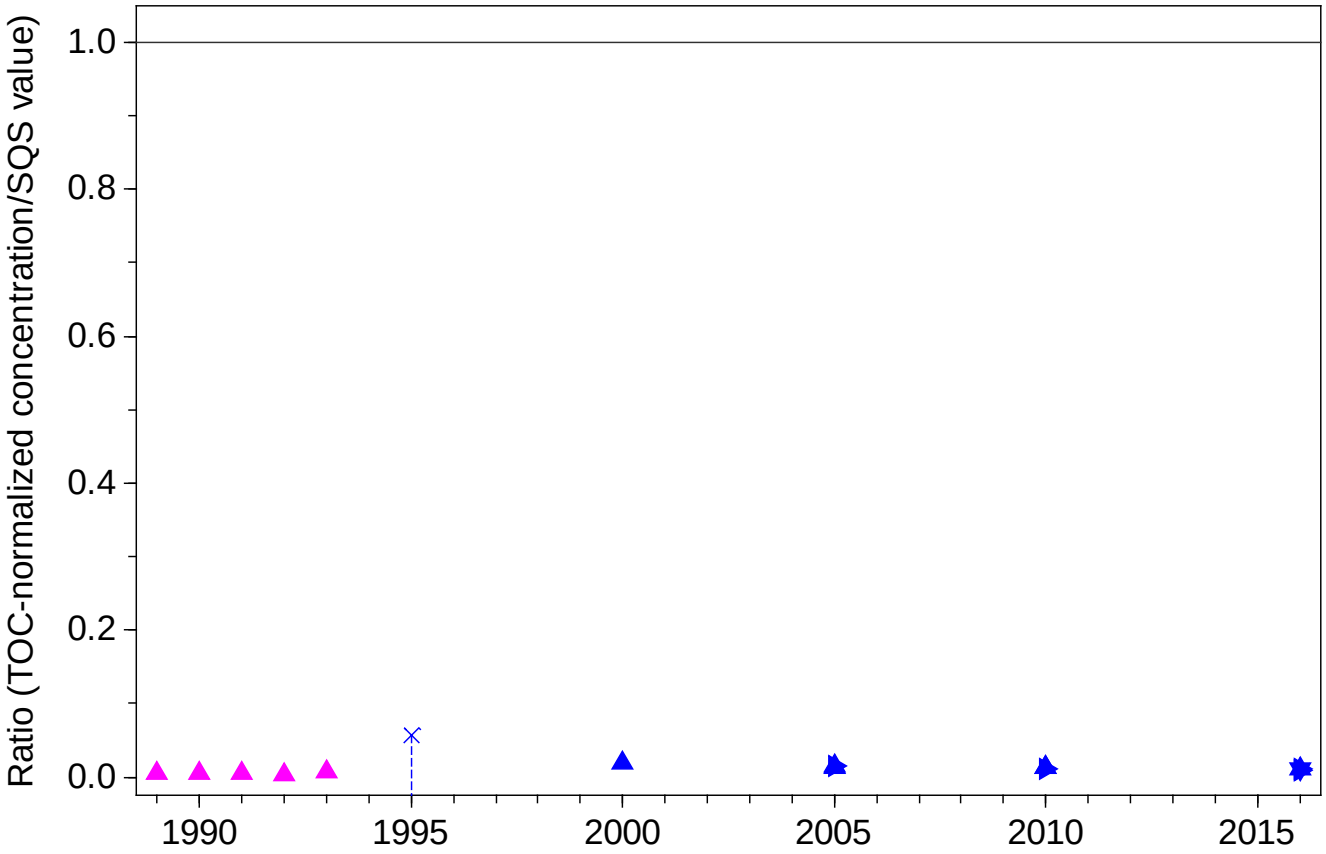
SQS quotient, Benzo(a)pyrene, Station 4



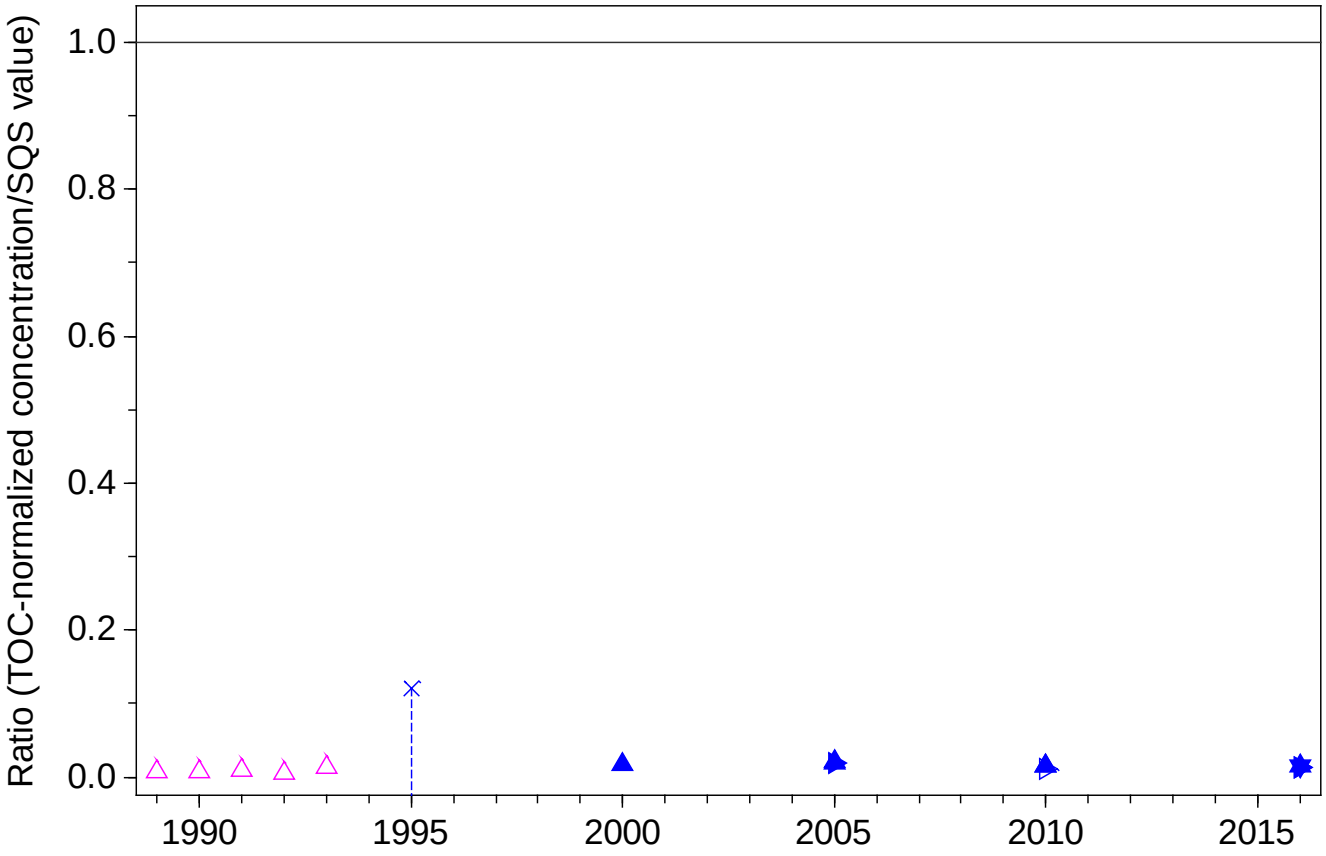
SQS quotient, Benzo(g,h,i)perylene, Station 4



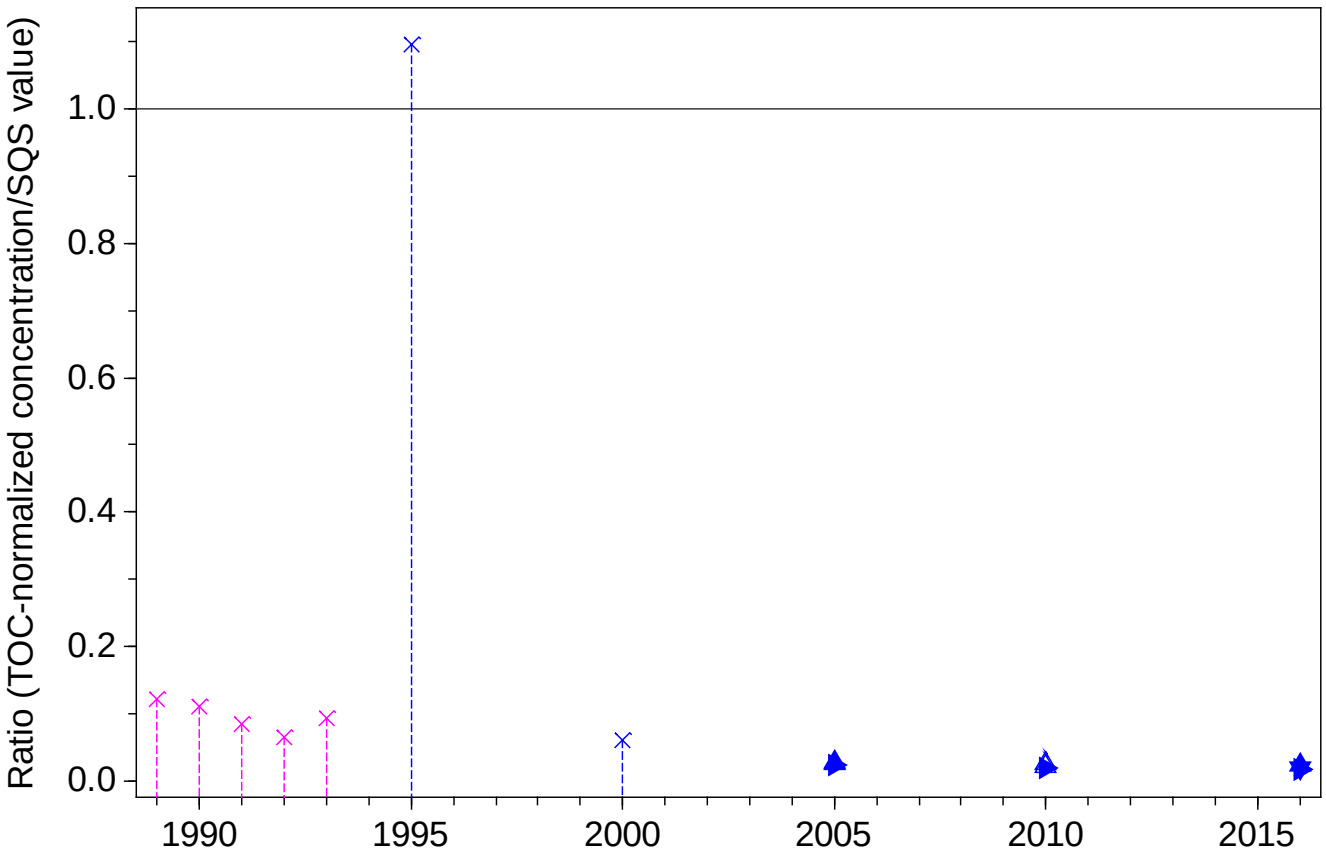
SQS quotient, Total Benzofluoranthenes, Station 4



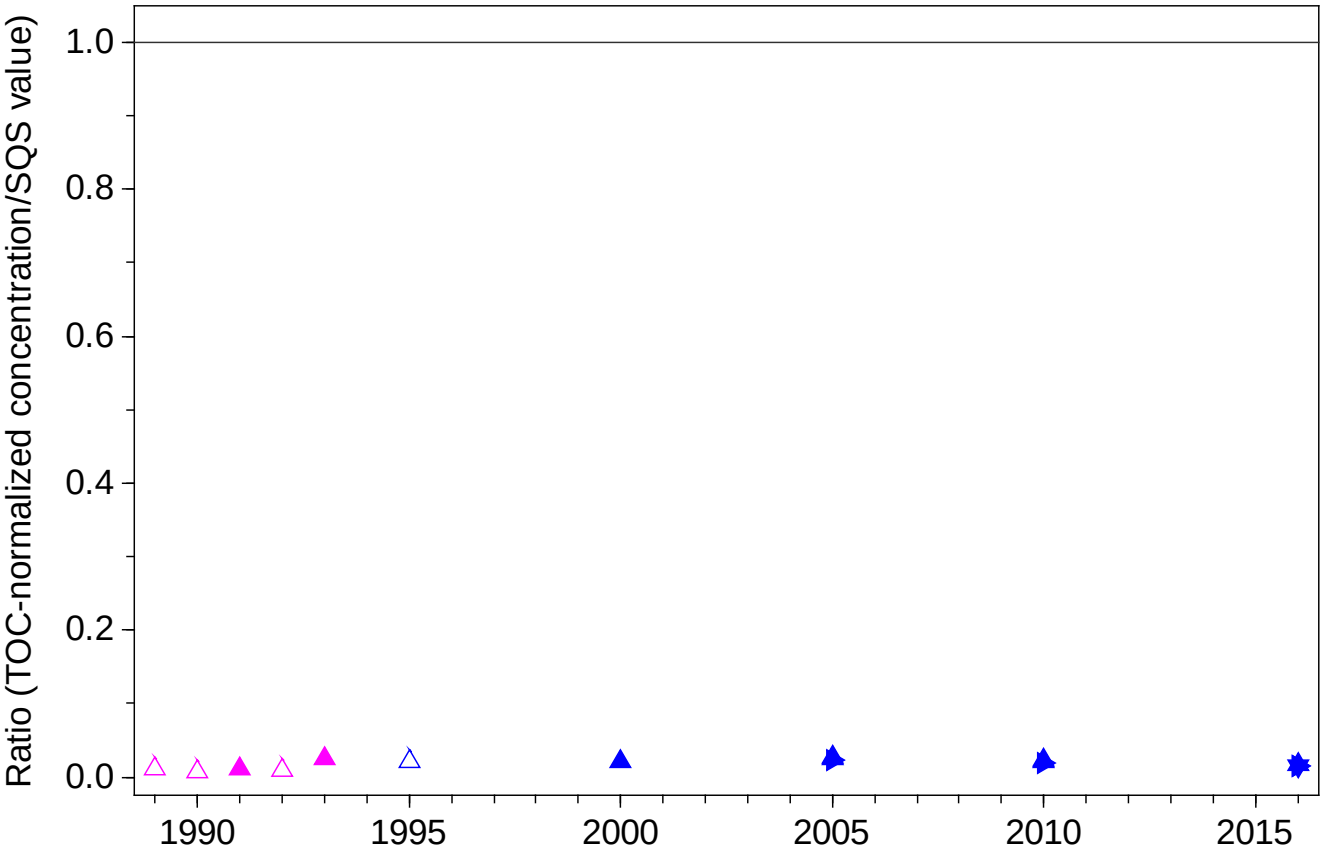
SQS quotient, Chrysene, Station 4



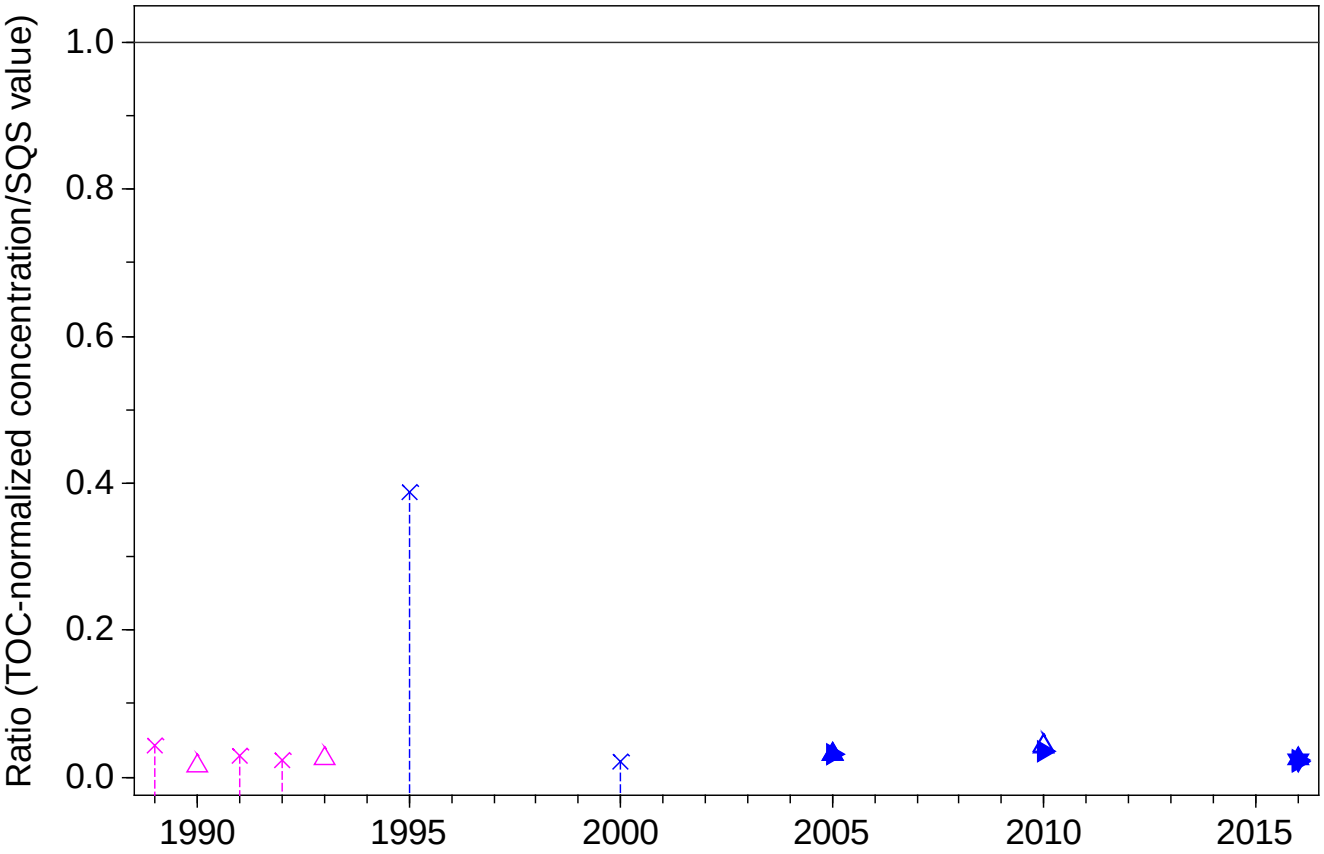
SQS quotient, Dibenzo(a,h)anthracene, Station 4



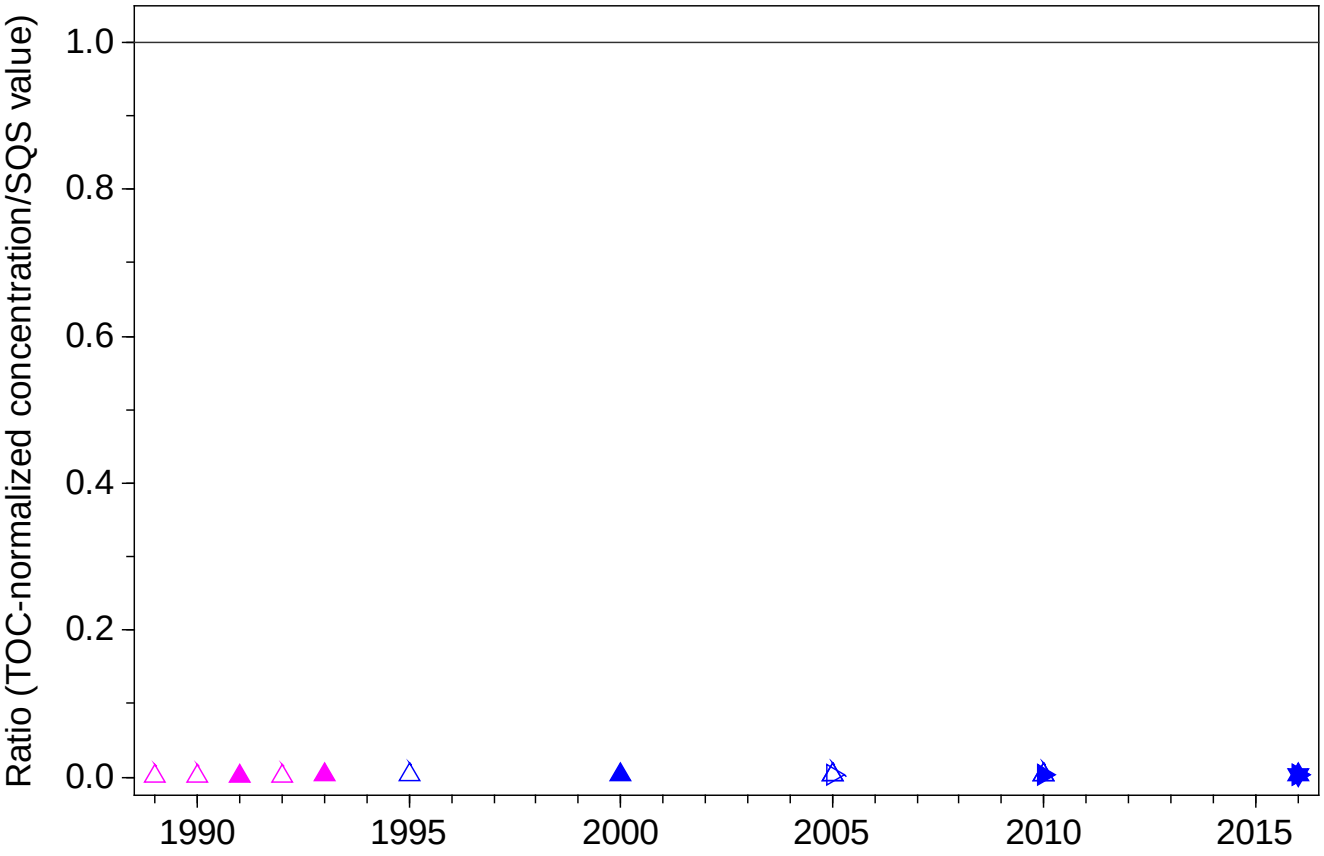
SQS quotient, Fluoranthene, Station 4



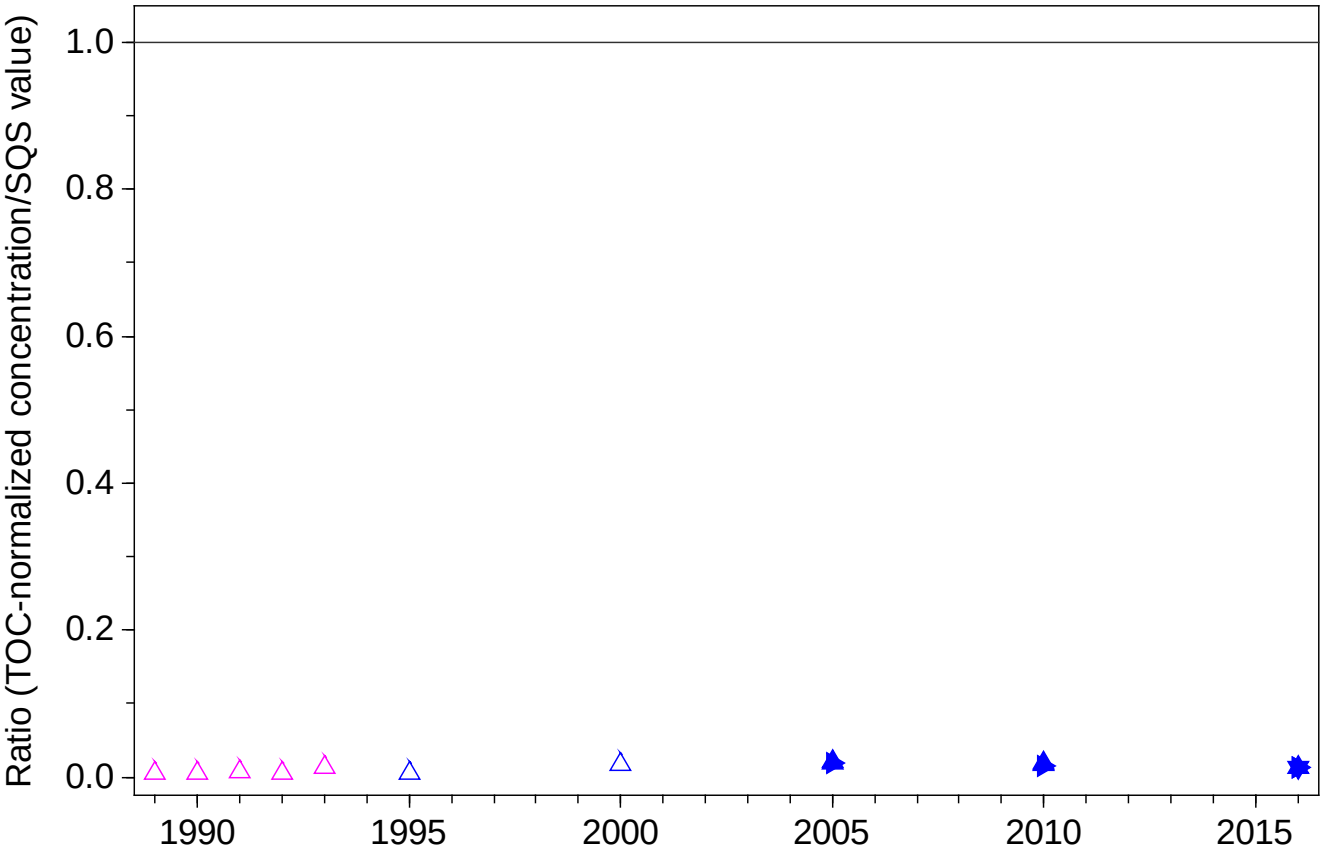
SQS quotient, Indeno(1,2,3-c,d)pyrene, Station 4



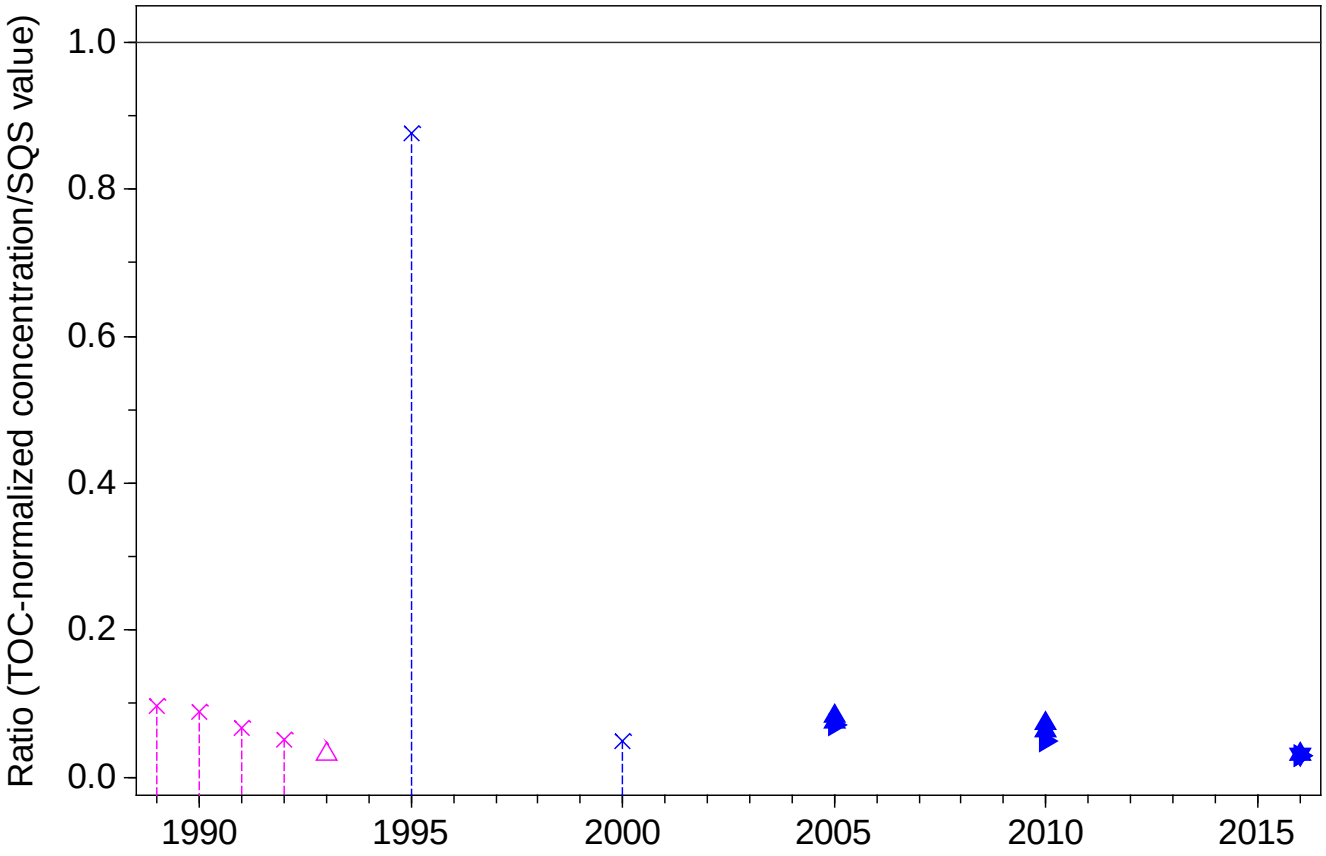
SQS quotient, Pyrene, Station 4



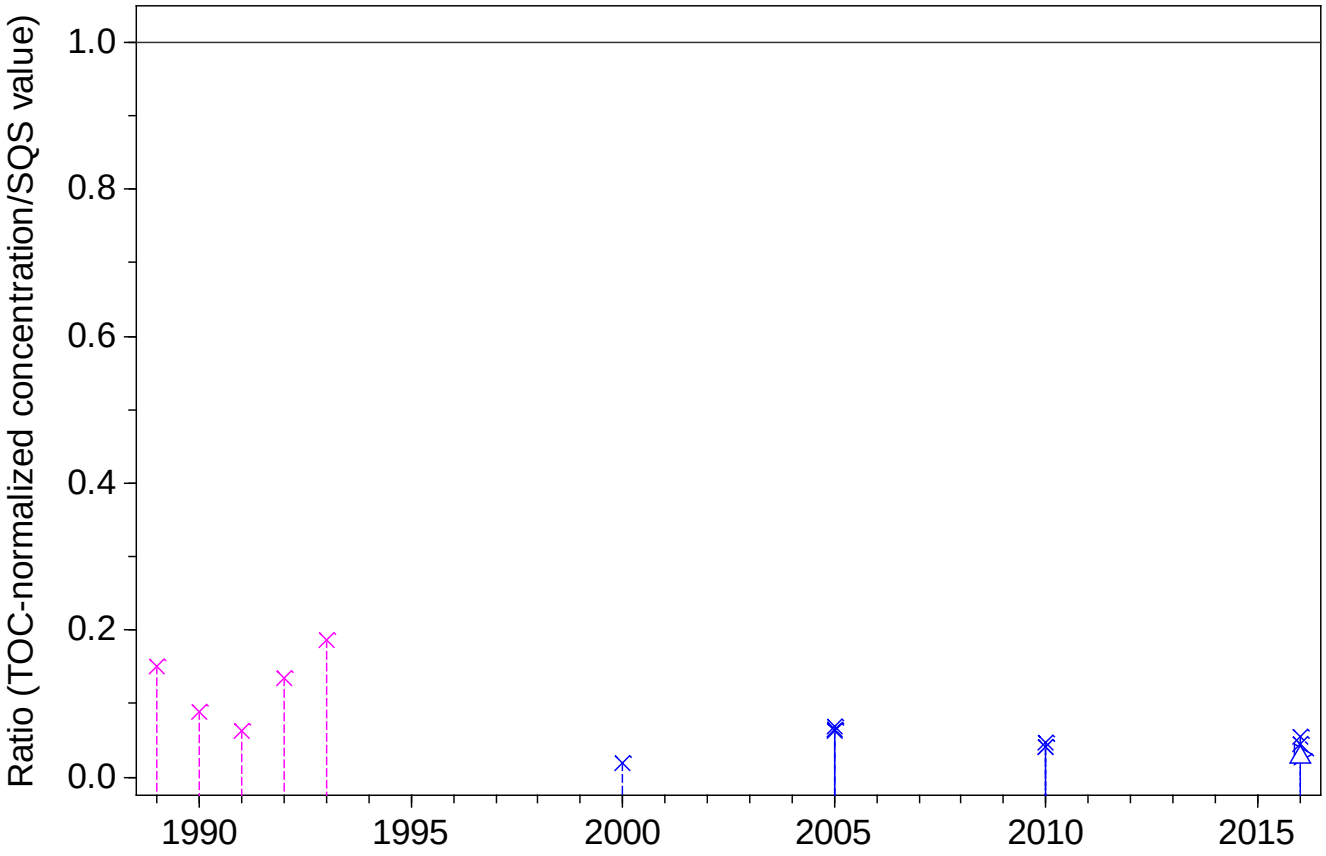
SQS quotient, Total HPAH, Station 4



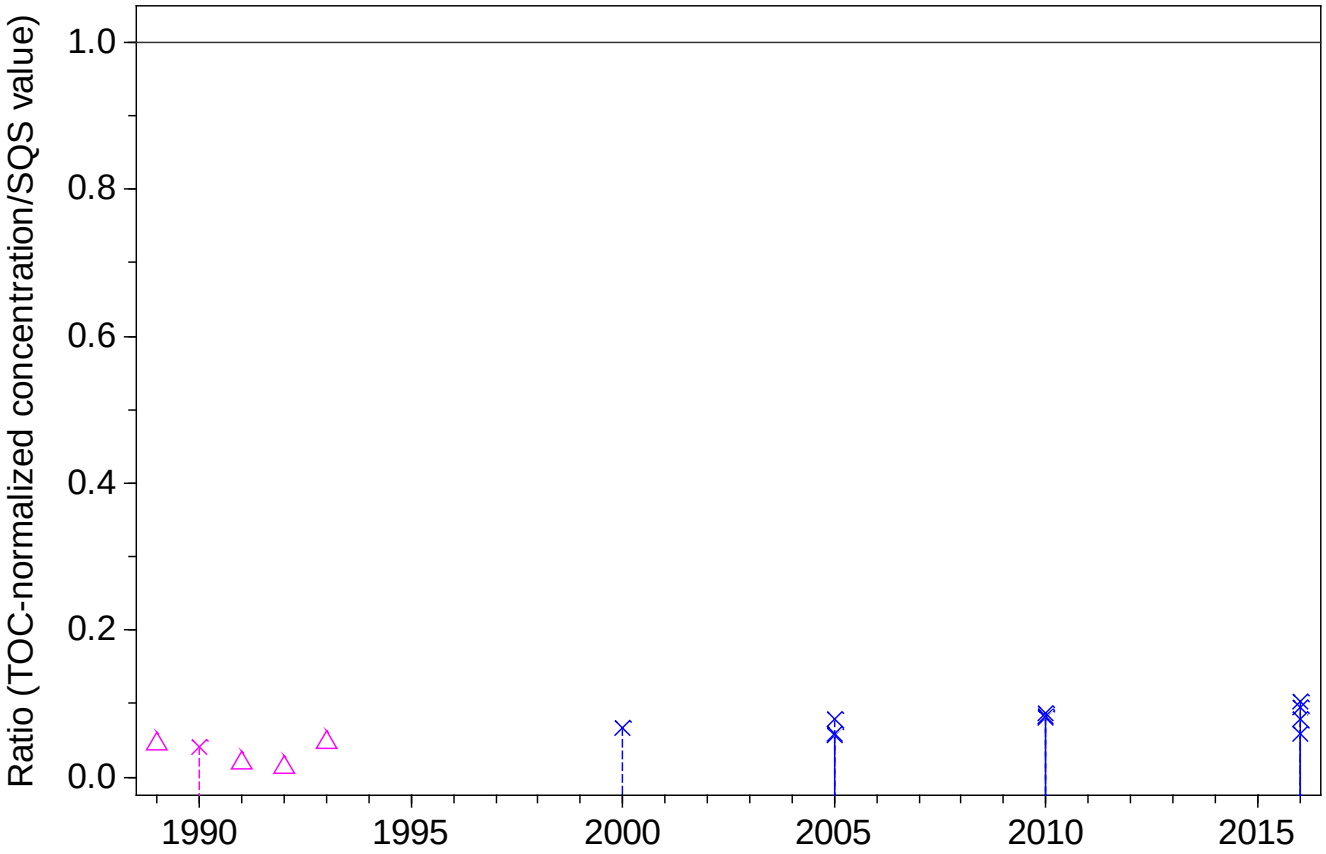
SQS quotient, Dibenzofuran, Station 4



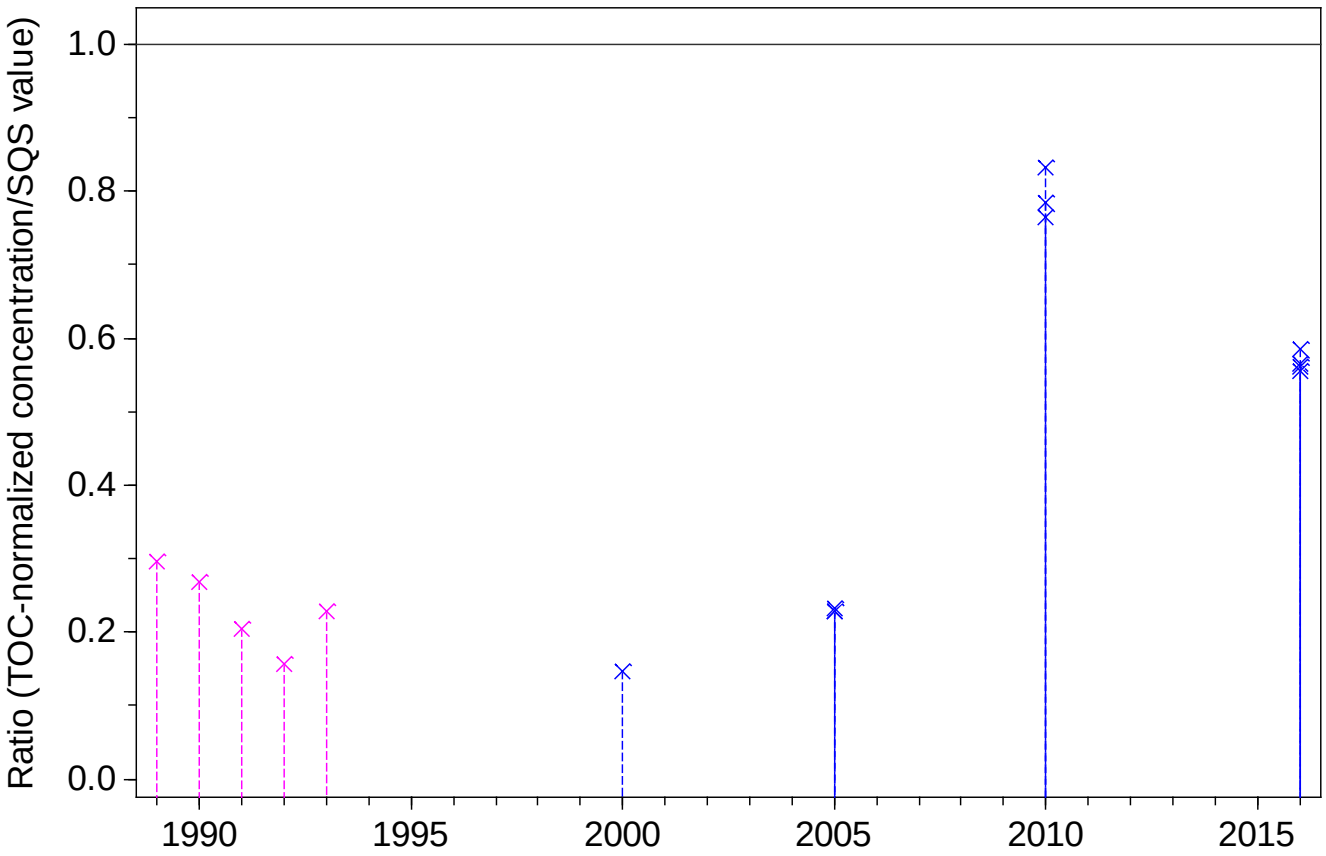
SQS quotient, Total Aroclors, Station 4



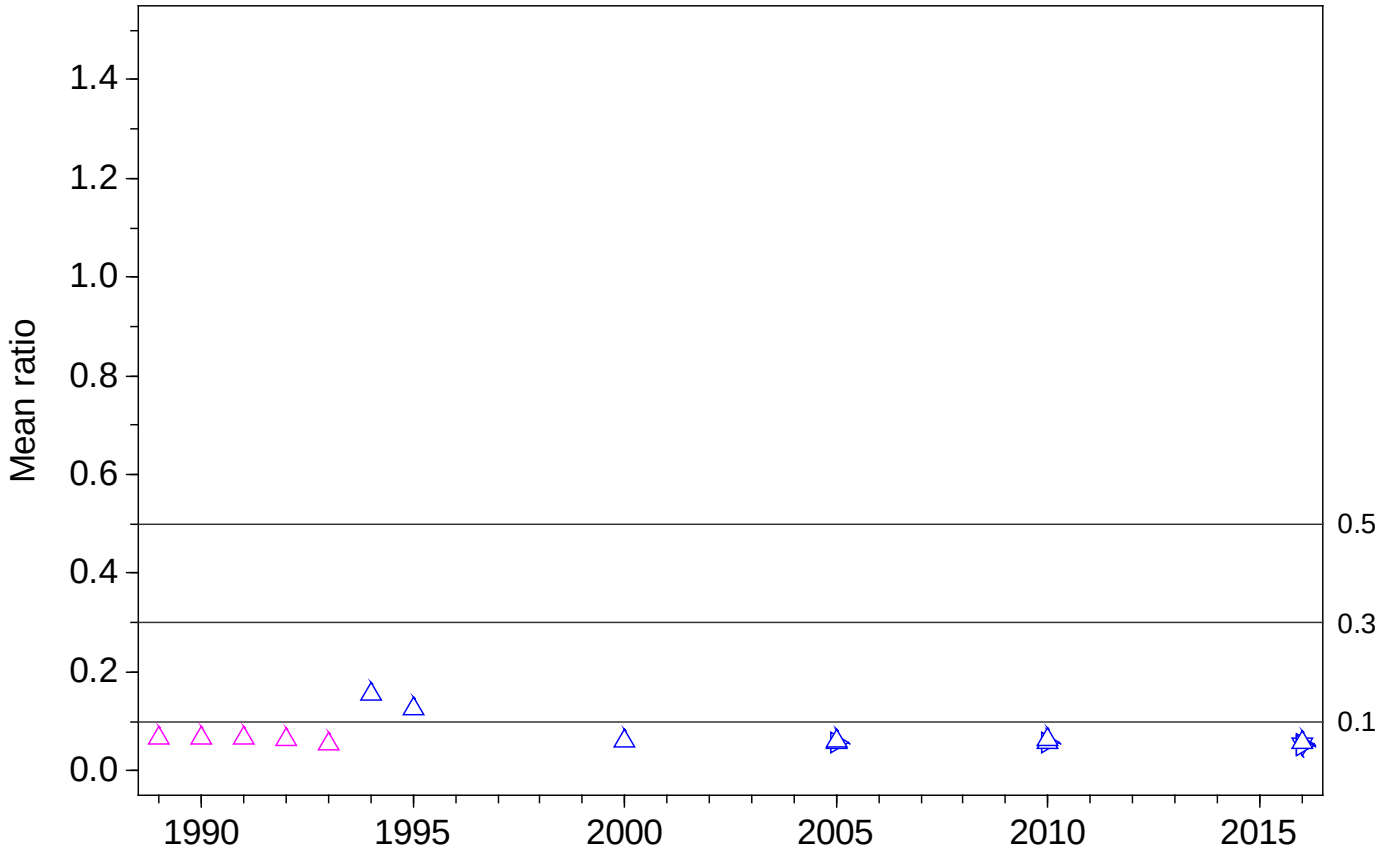
SQS quotient, Bis(2-ethylhexyl)phthalate, Station 4



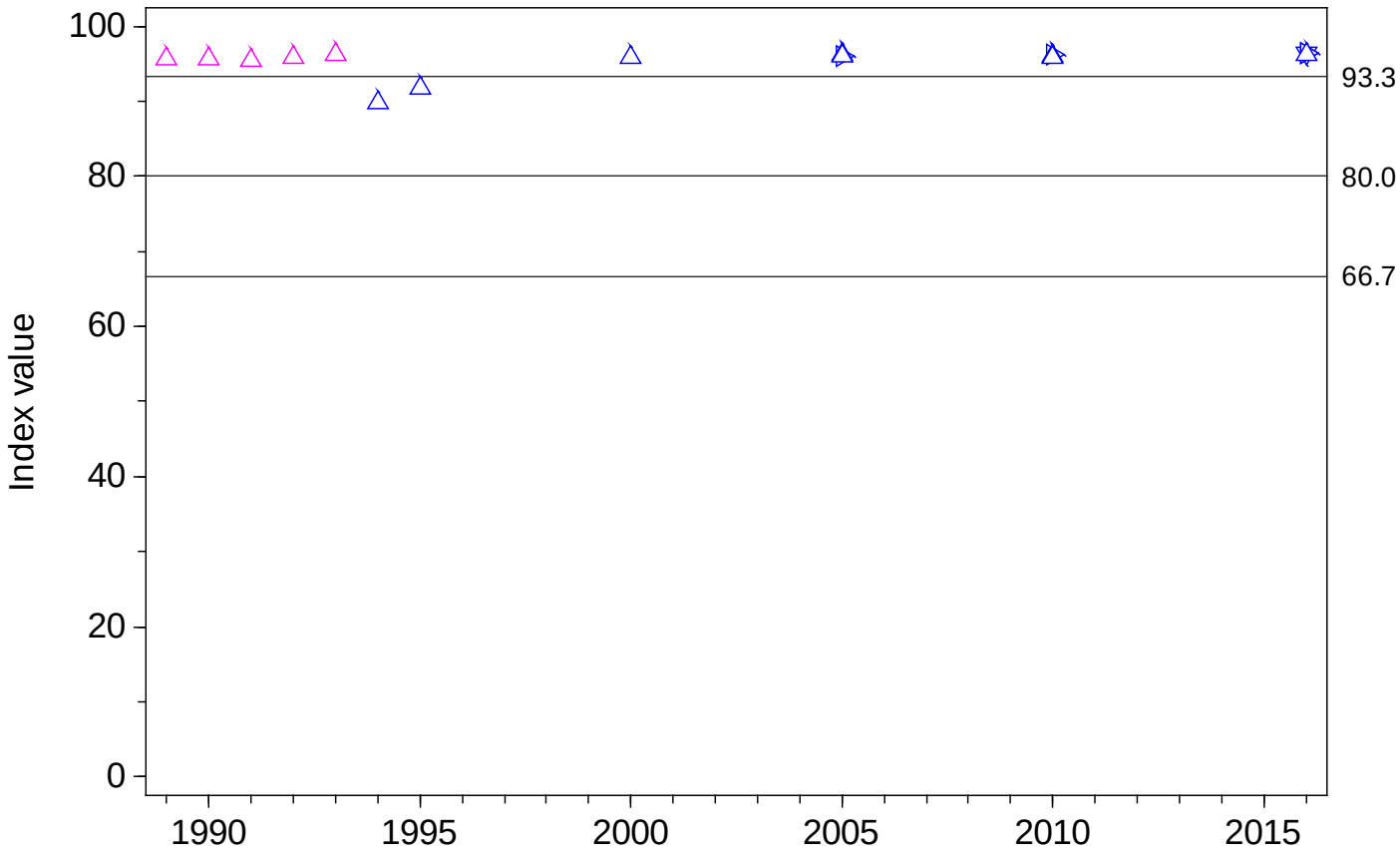
SQS quotient, Butylbenzylphthalate, Station 4



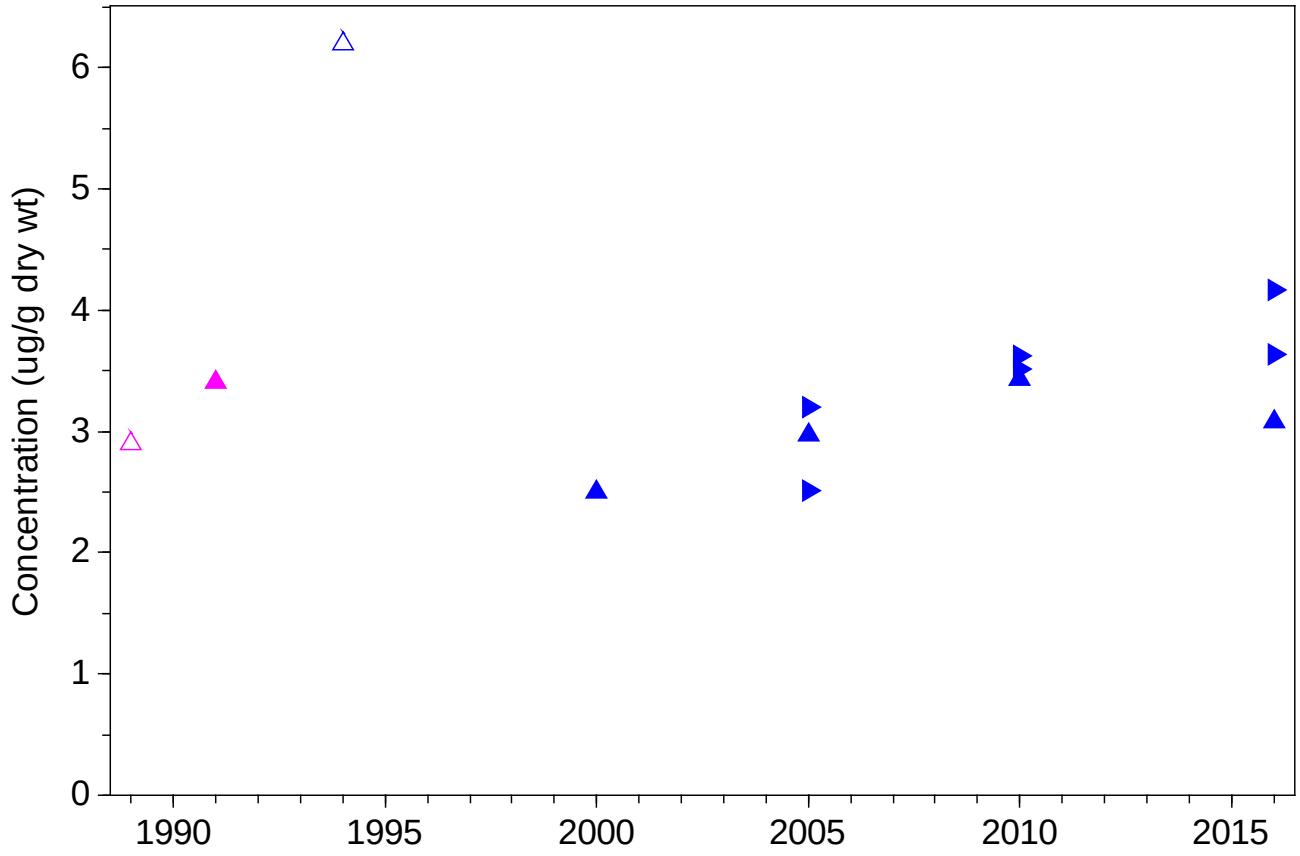
Mean SQS quotient, SCI SQS (no PAH totals), Station 4



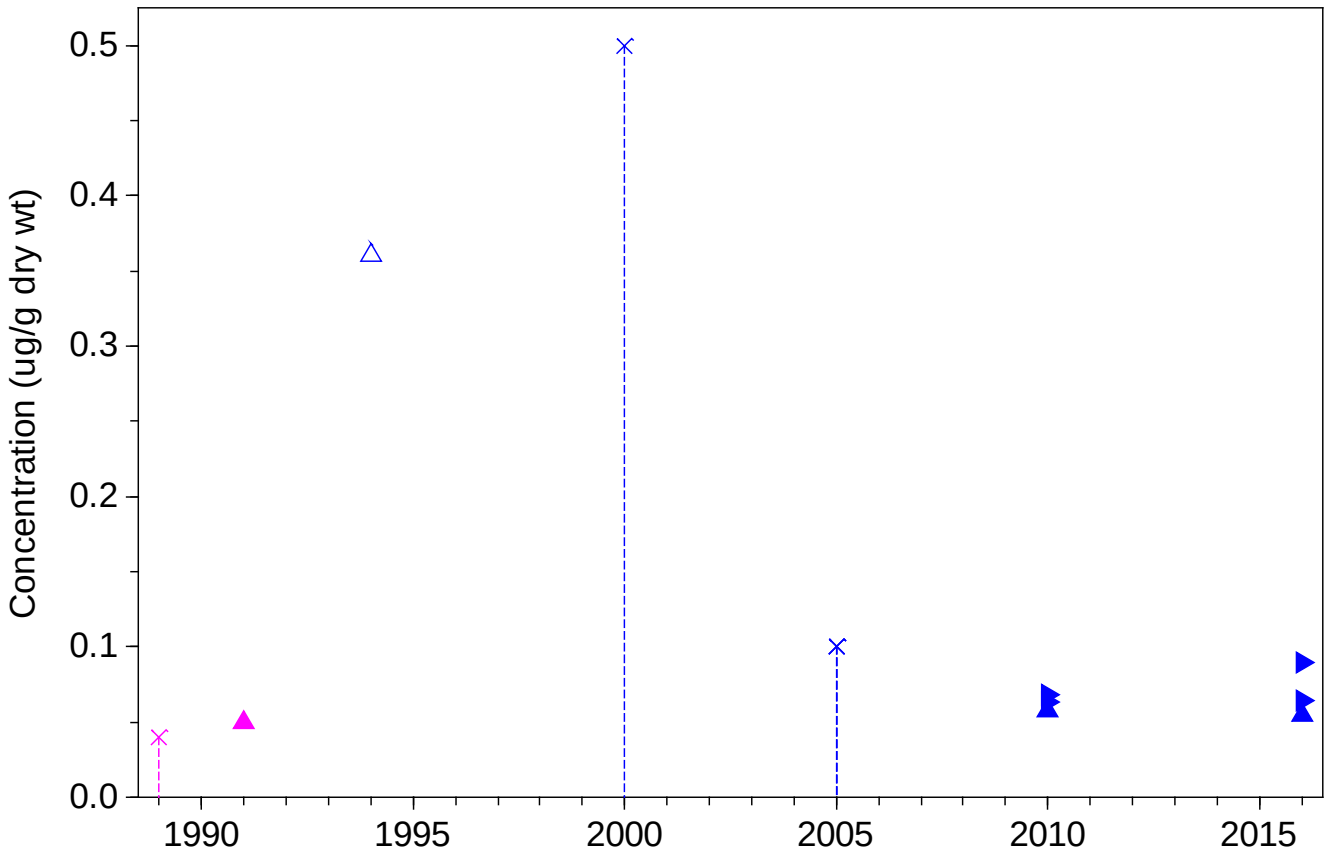
Sediment Chemistry Index, Station 4



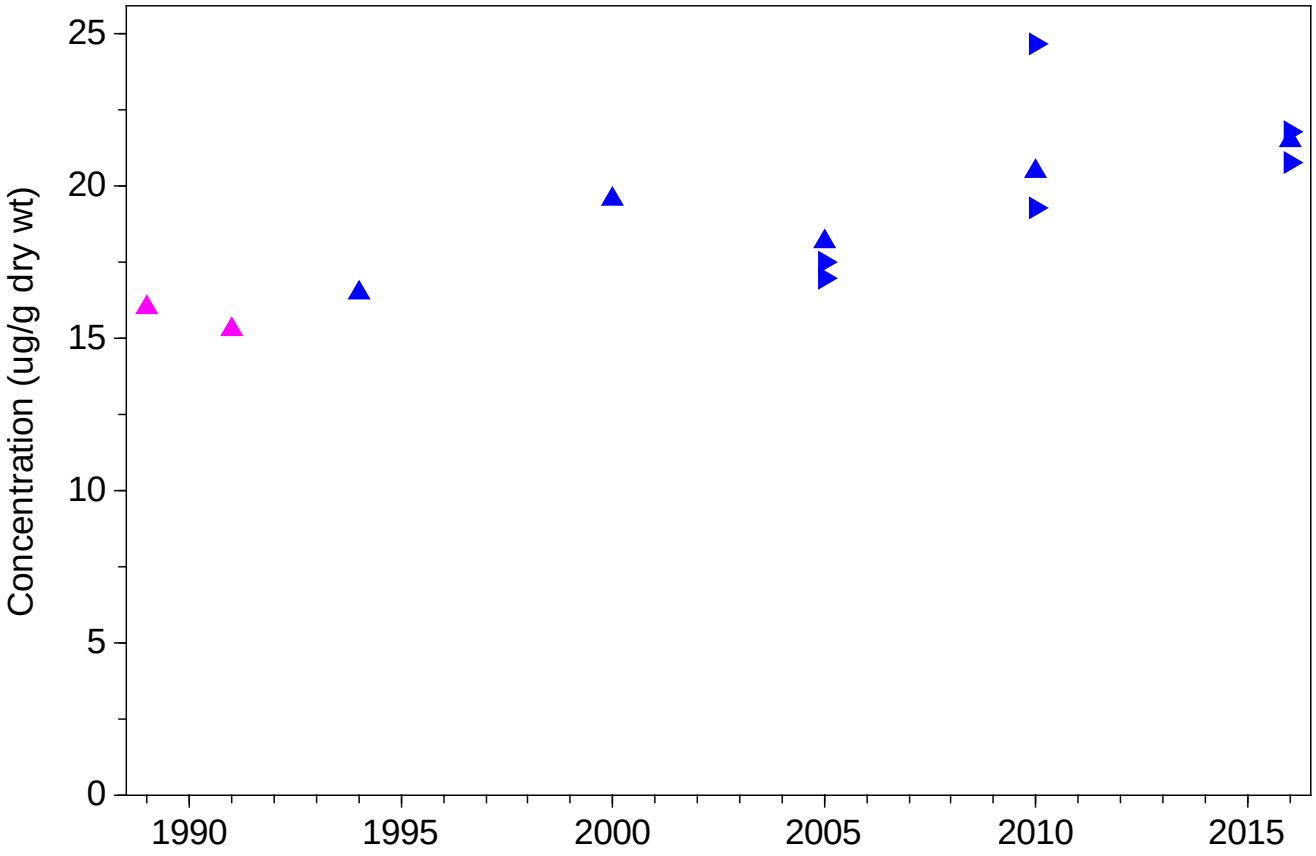
Arsenic, Station 13



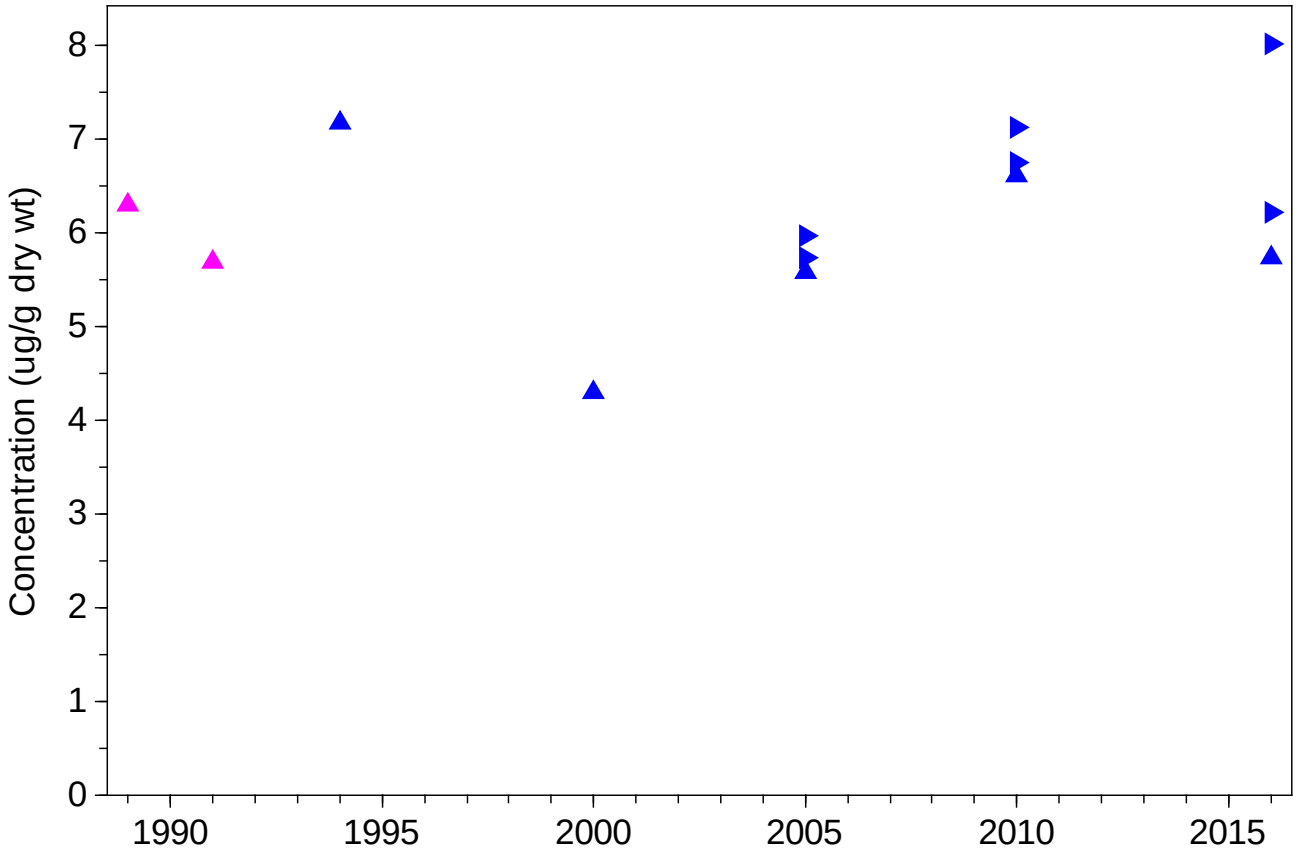
Cadmium, Station 13



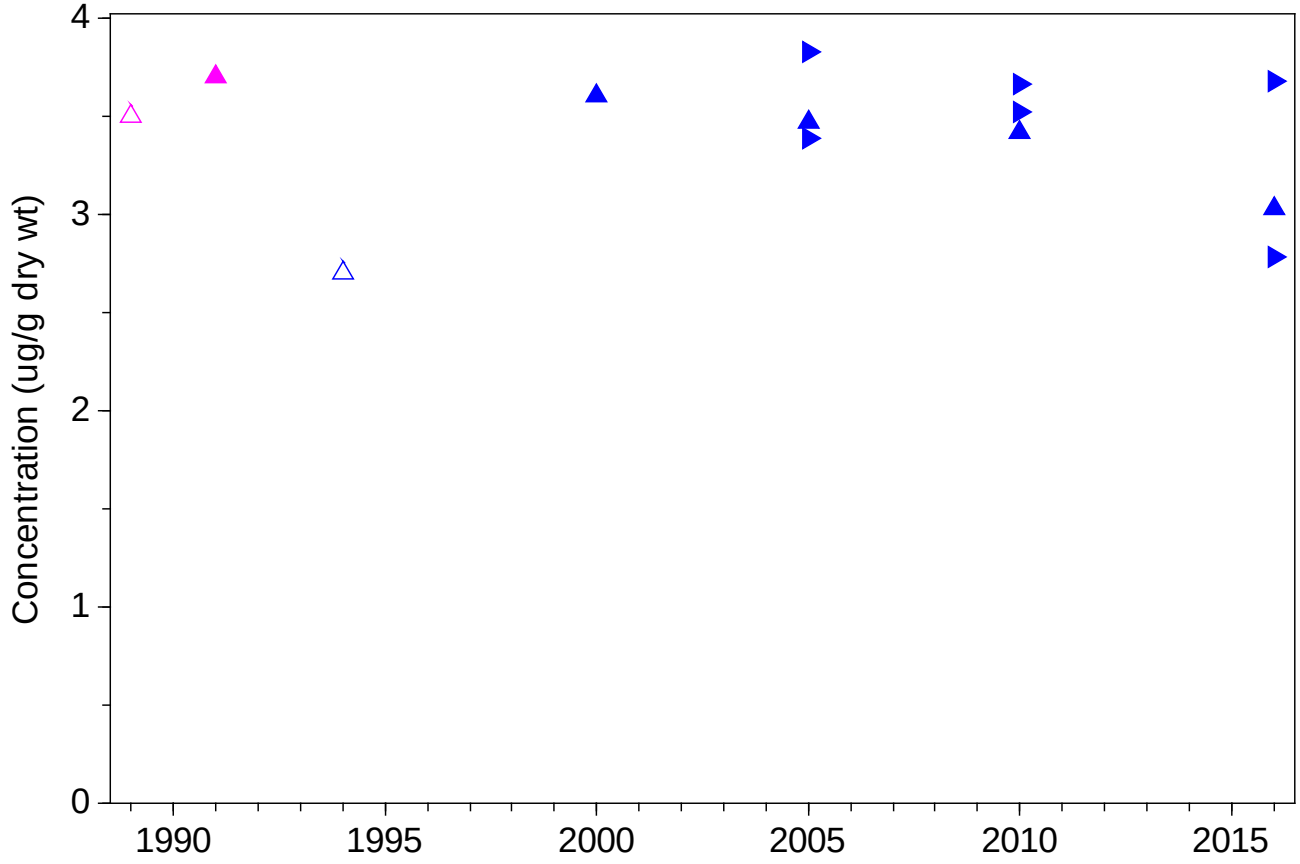
Chromium, Station 13



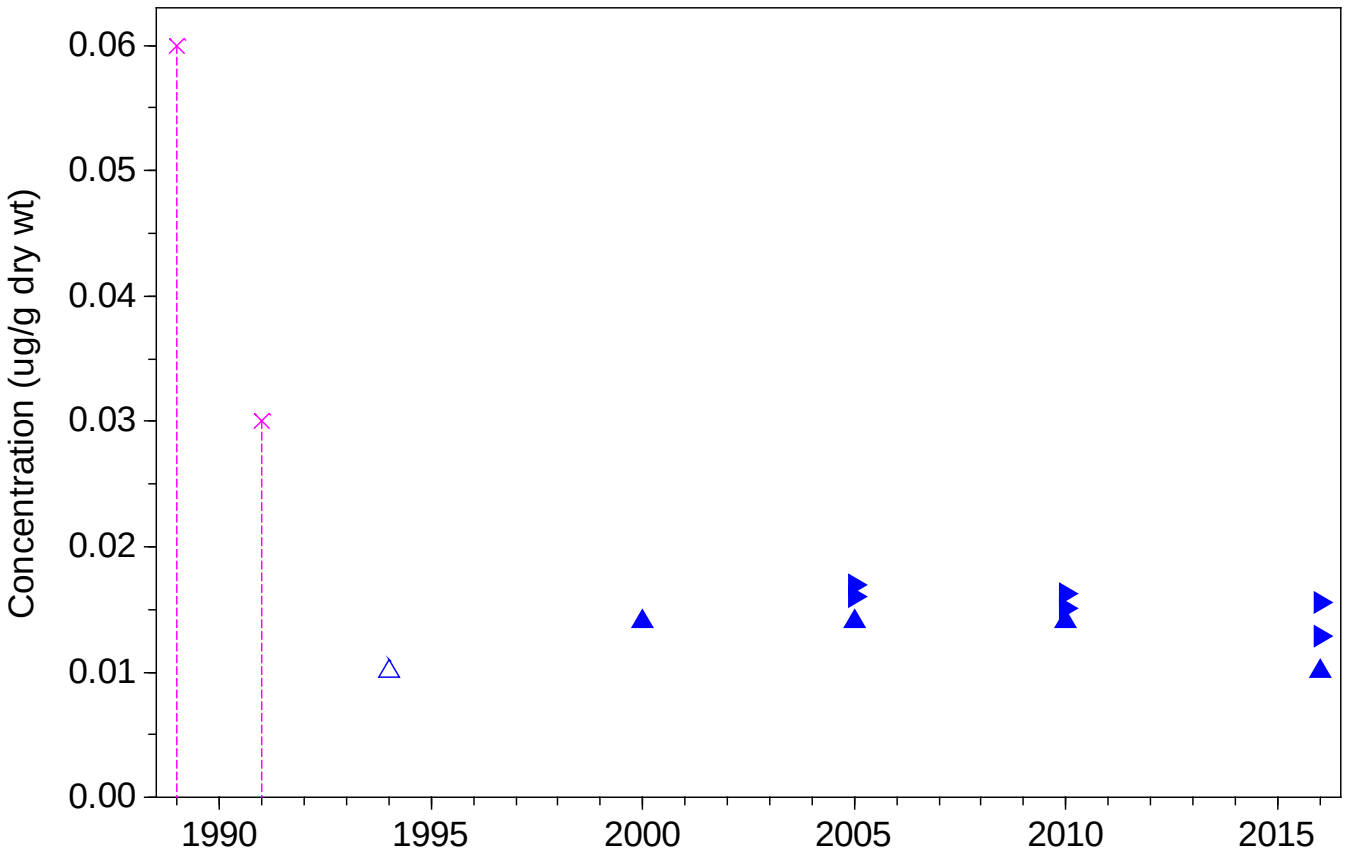
Copper, Station 13



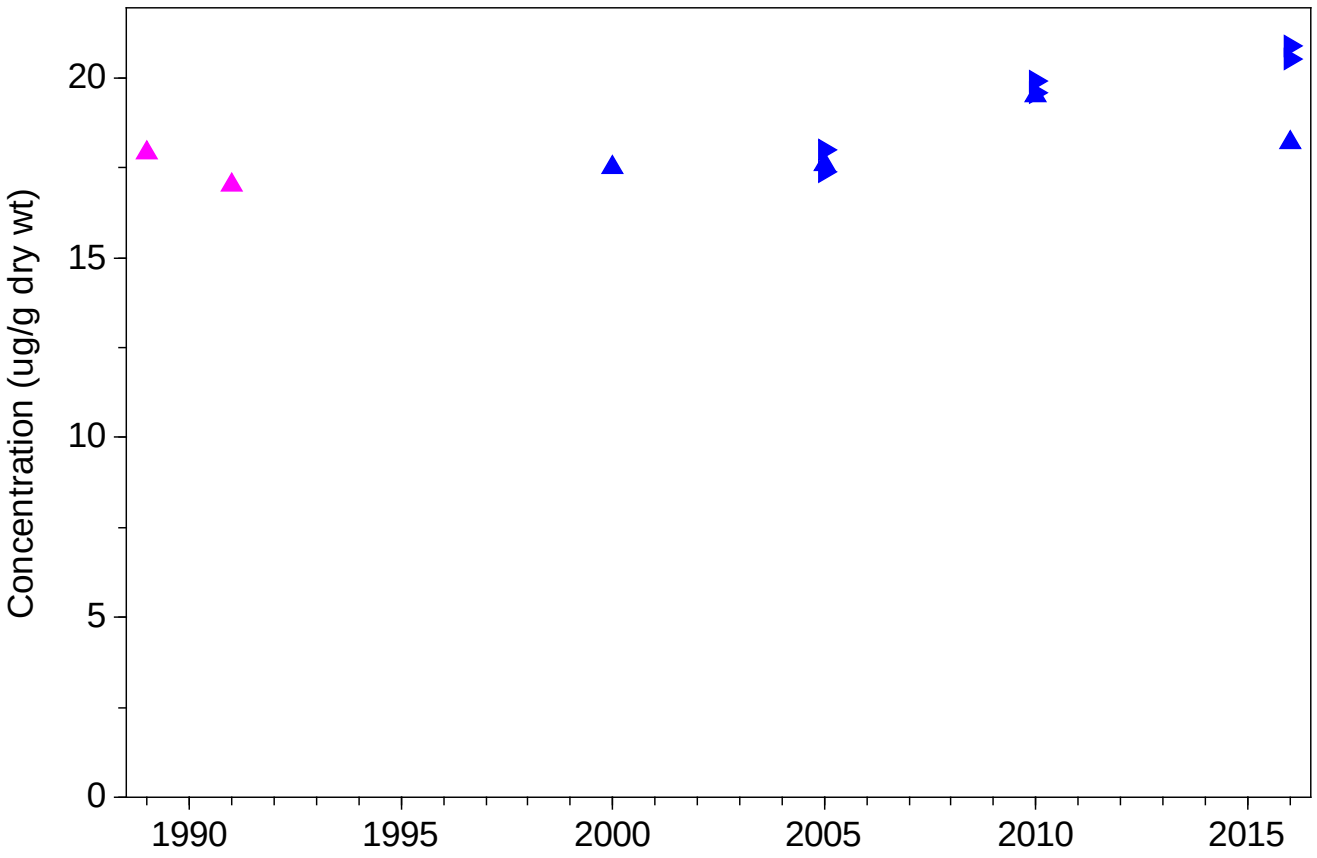
Lead, Station 13



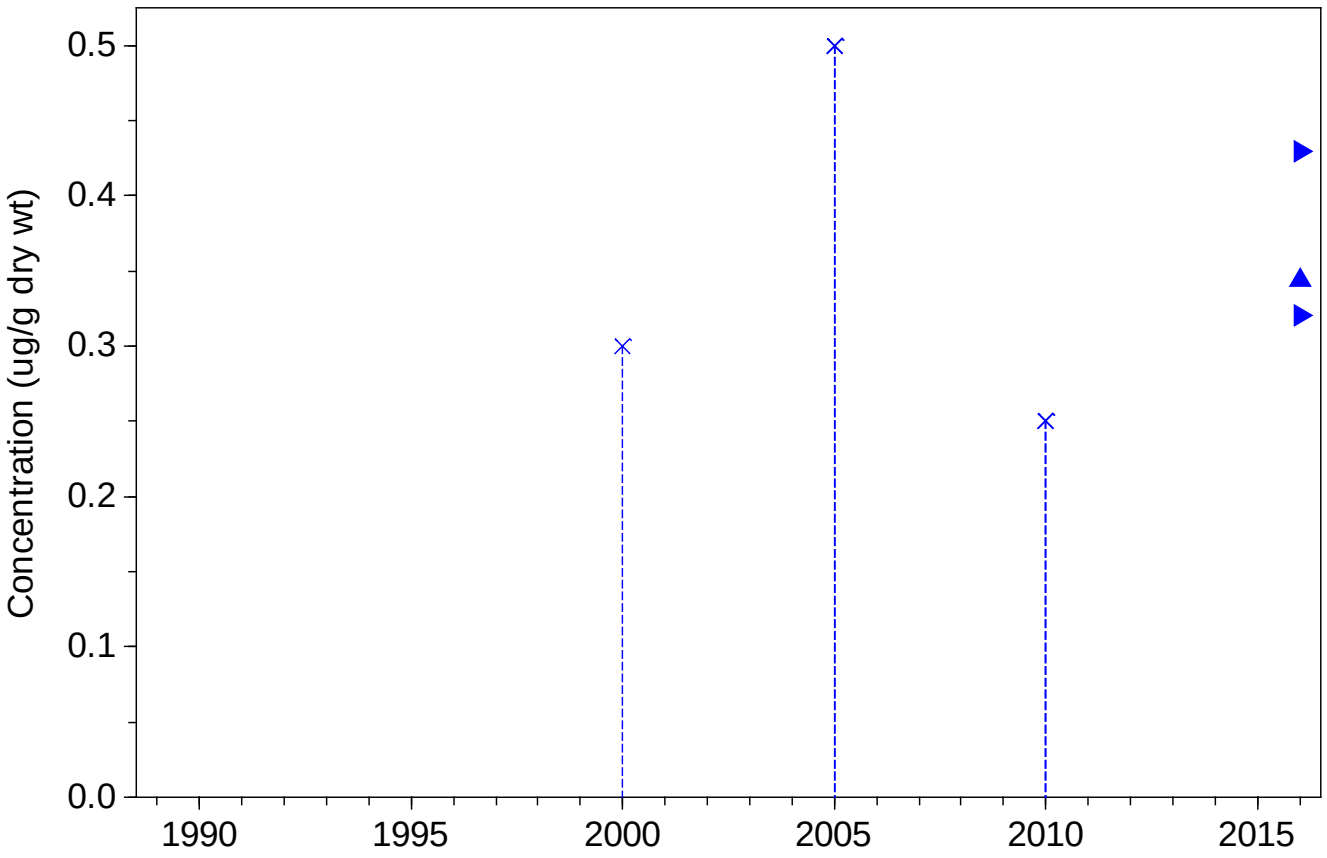
Mercury, Station 13



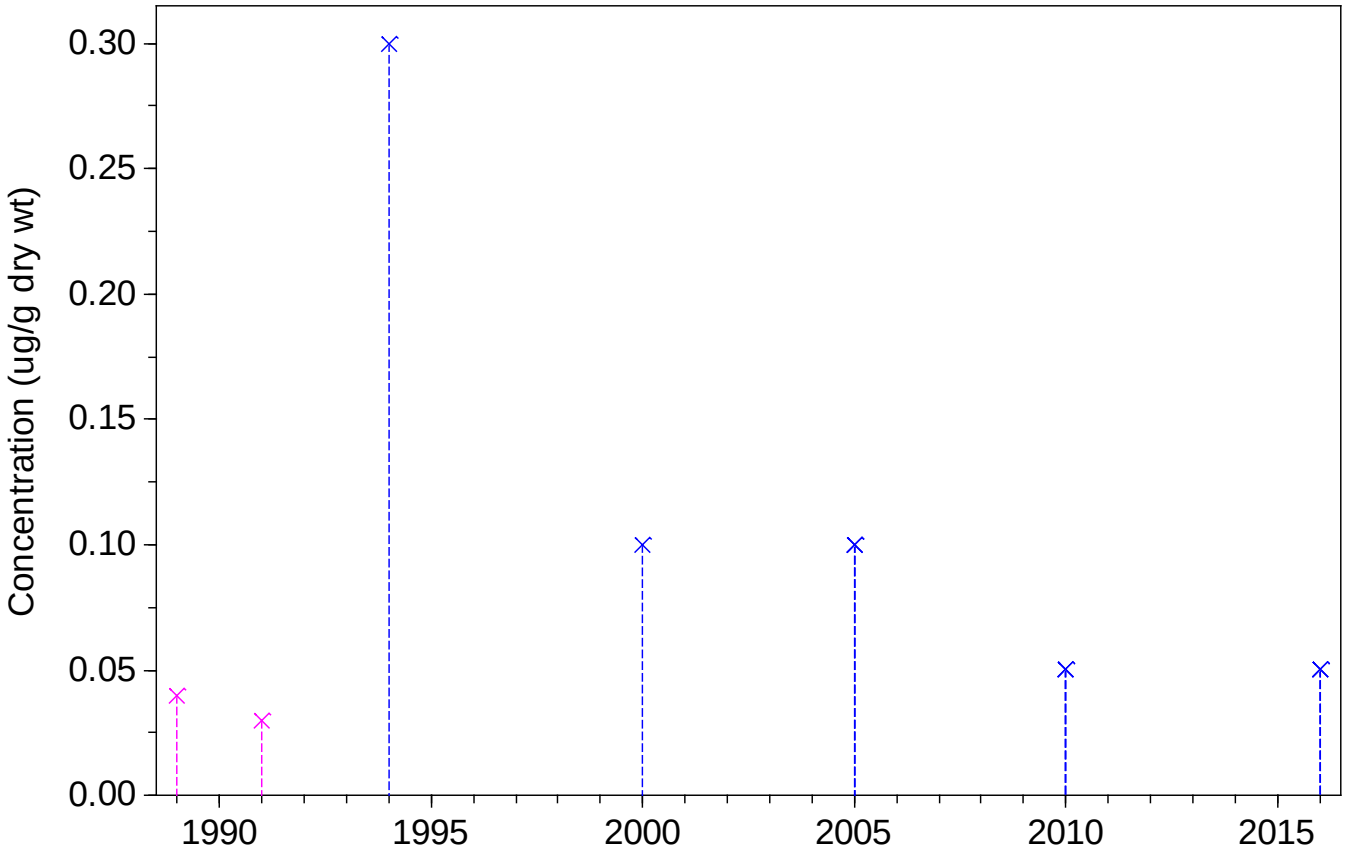
Nickel, Station 13



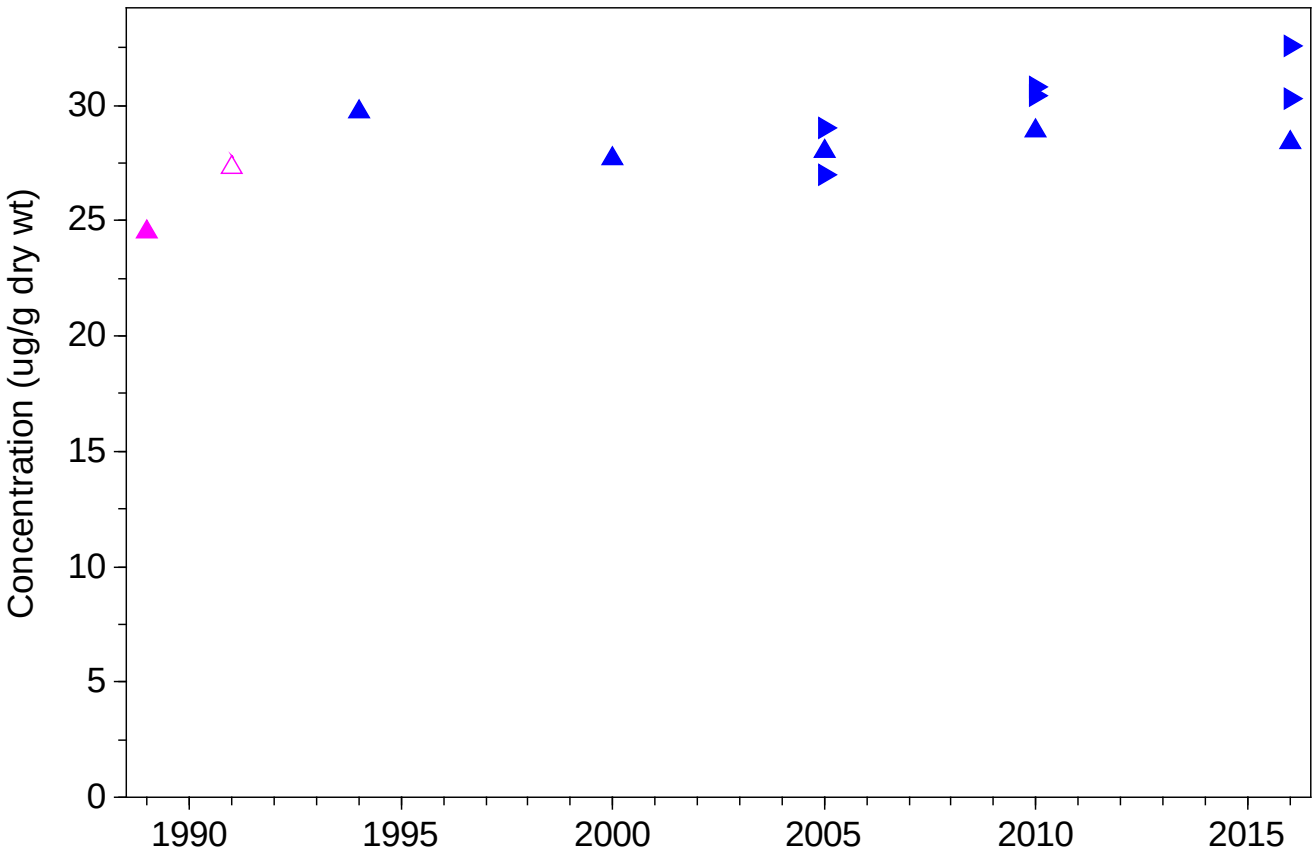
Selenium, Station 13



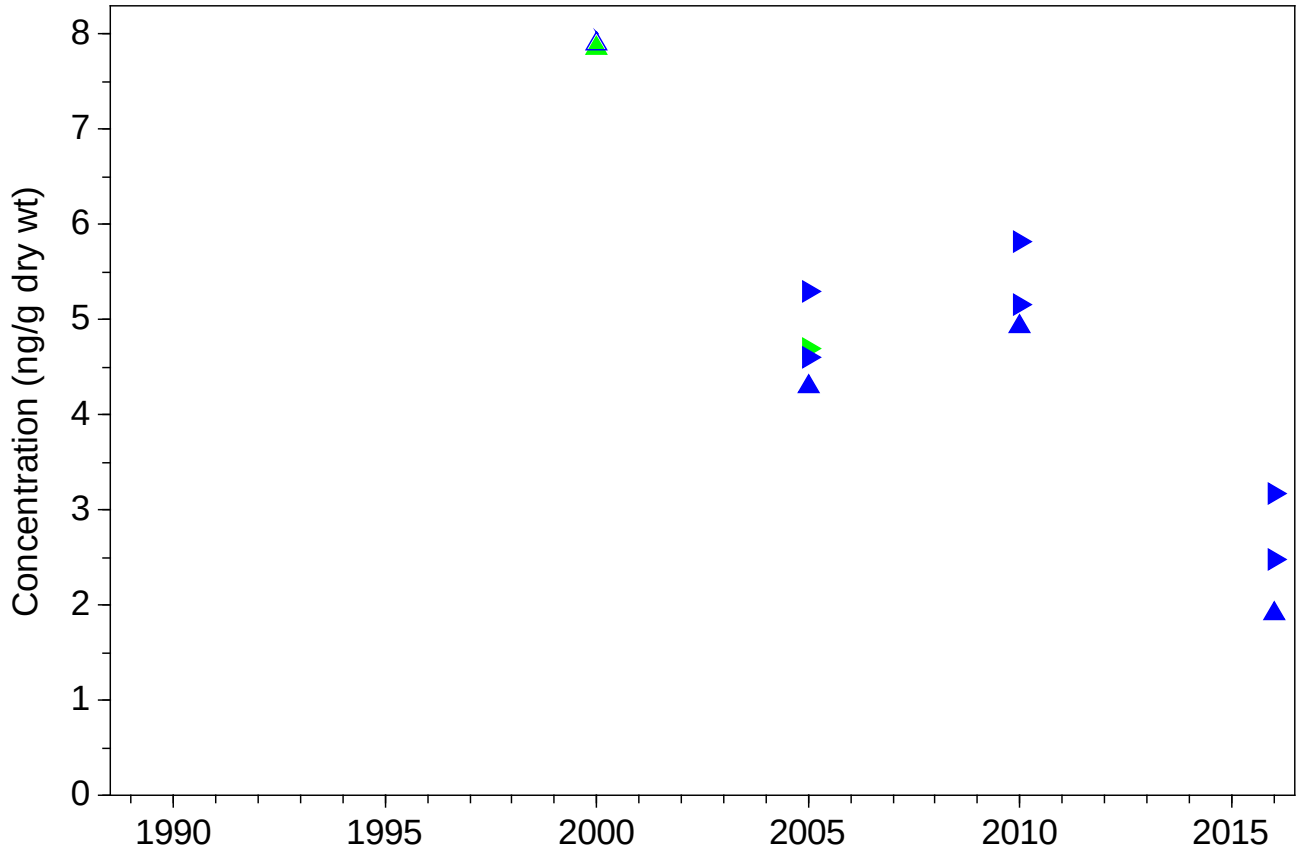
Silver, Station 13



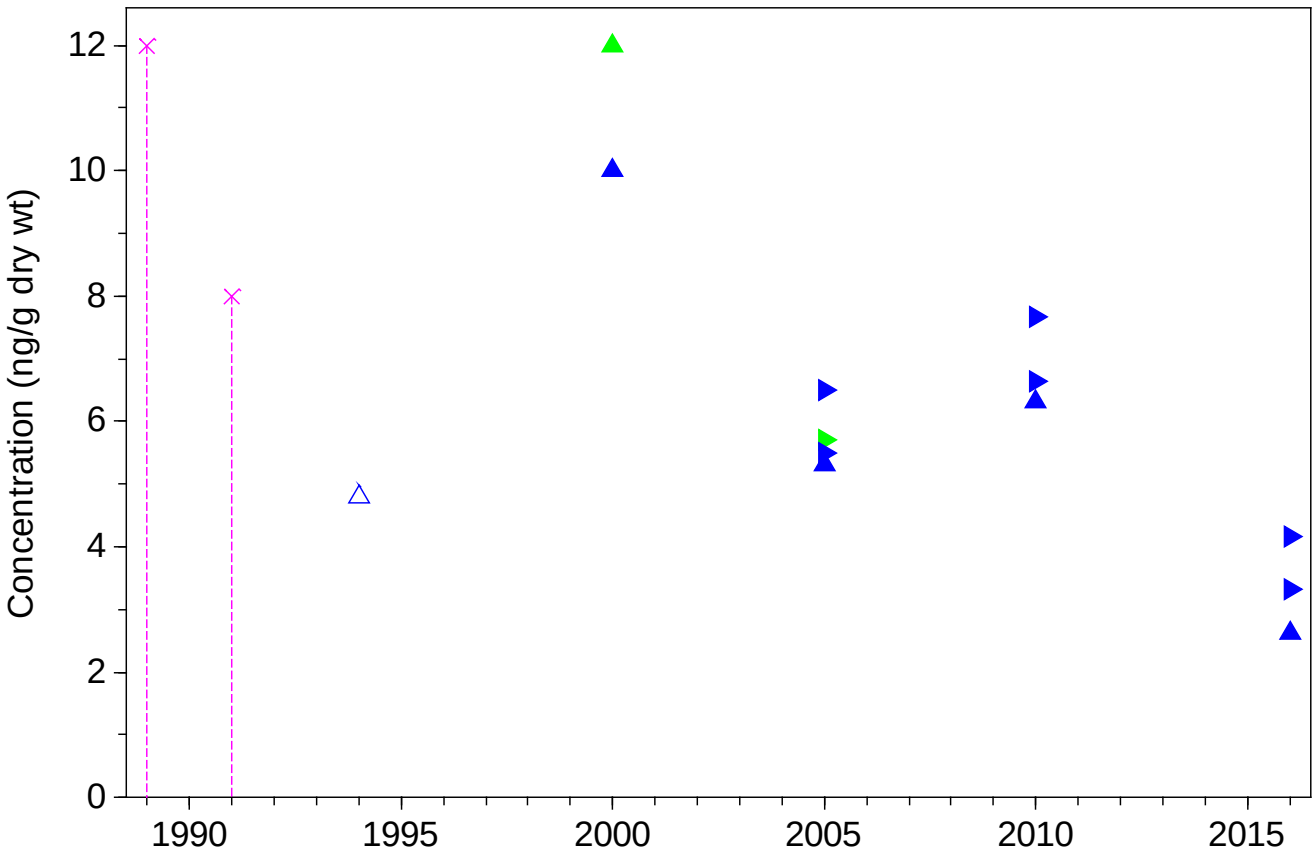
Zinc, Station 13



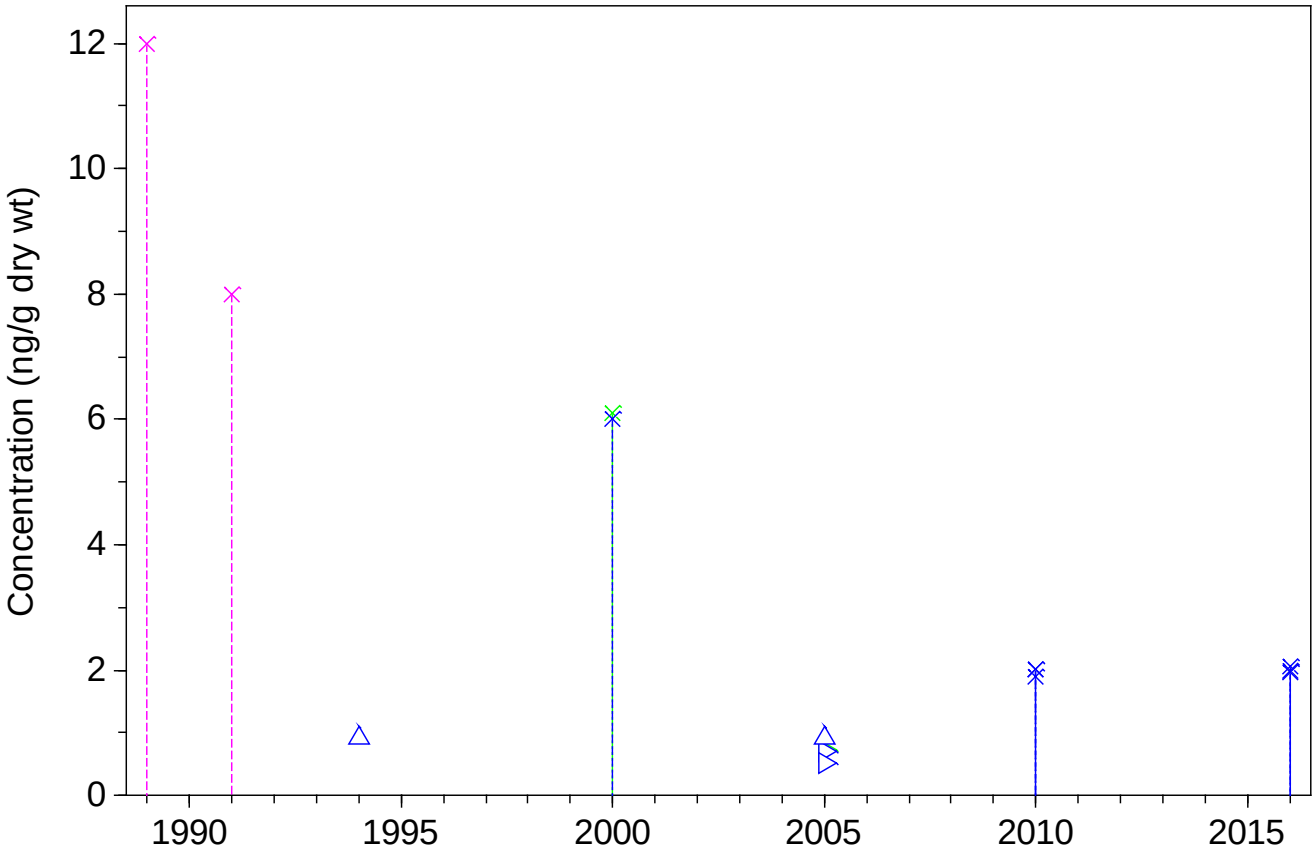
1-Methylnaphthalene, Station 13



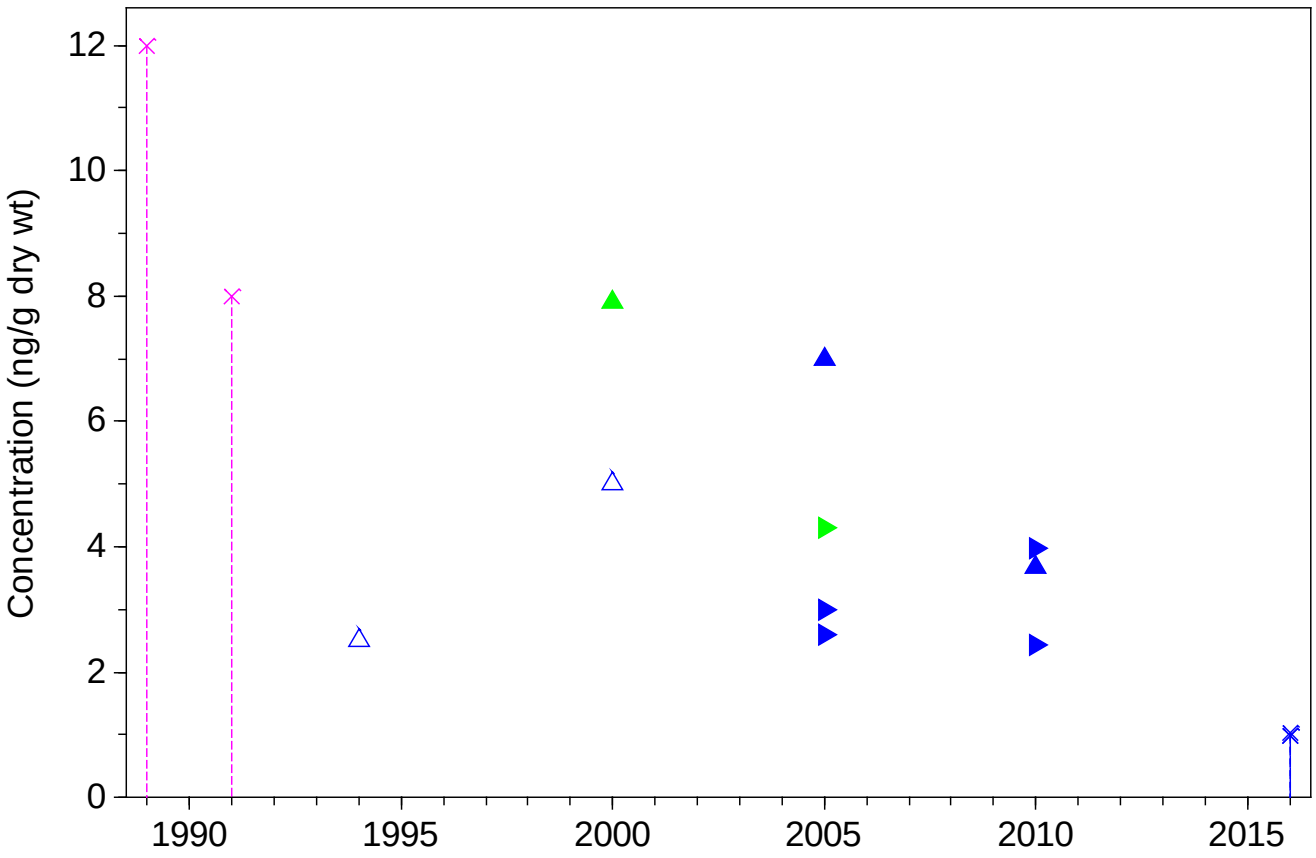
2-Methylnaphthalene, Station 13



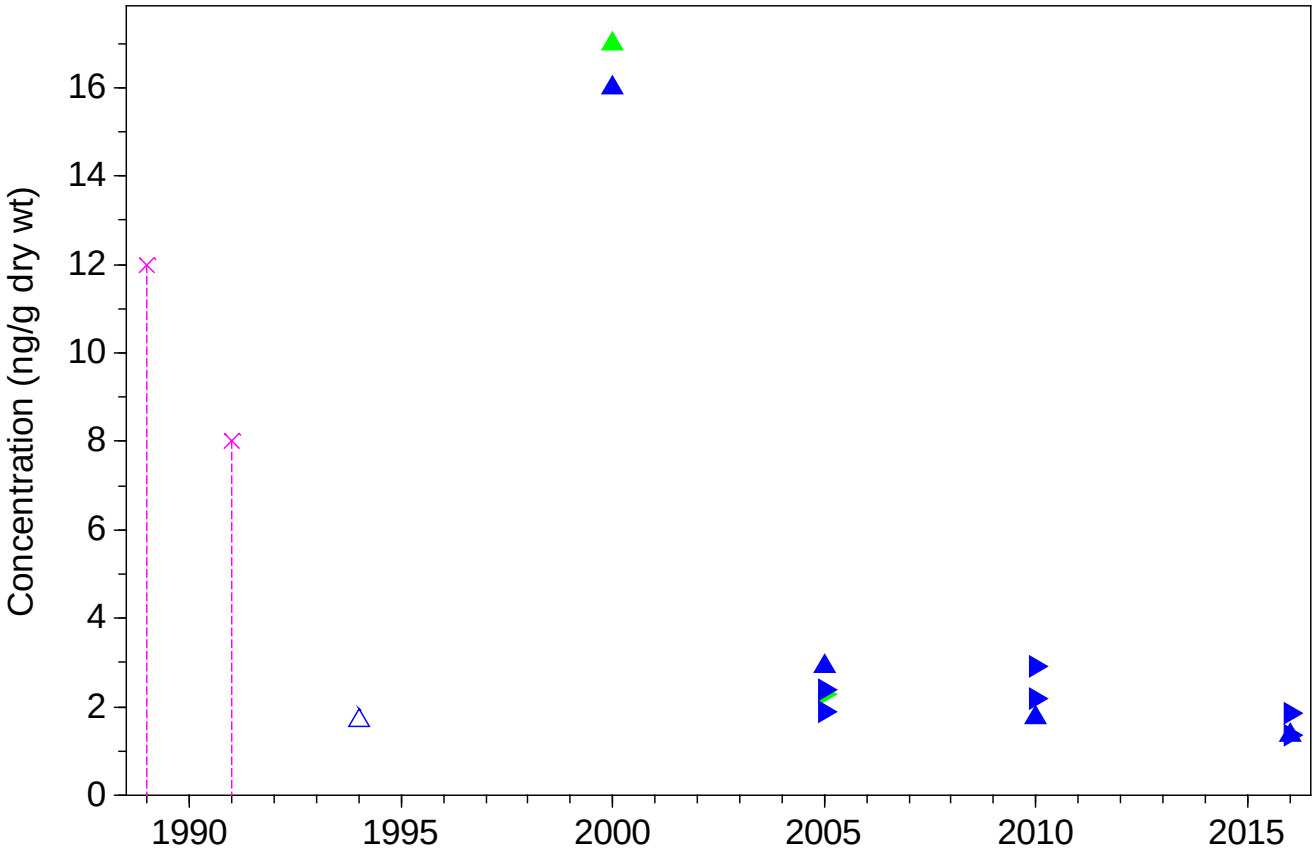
Acenaphthene, Station 13



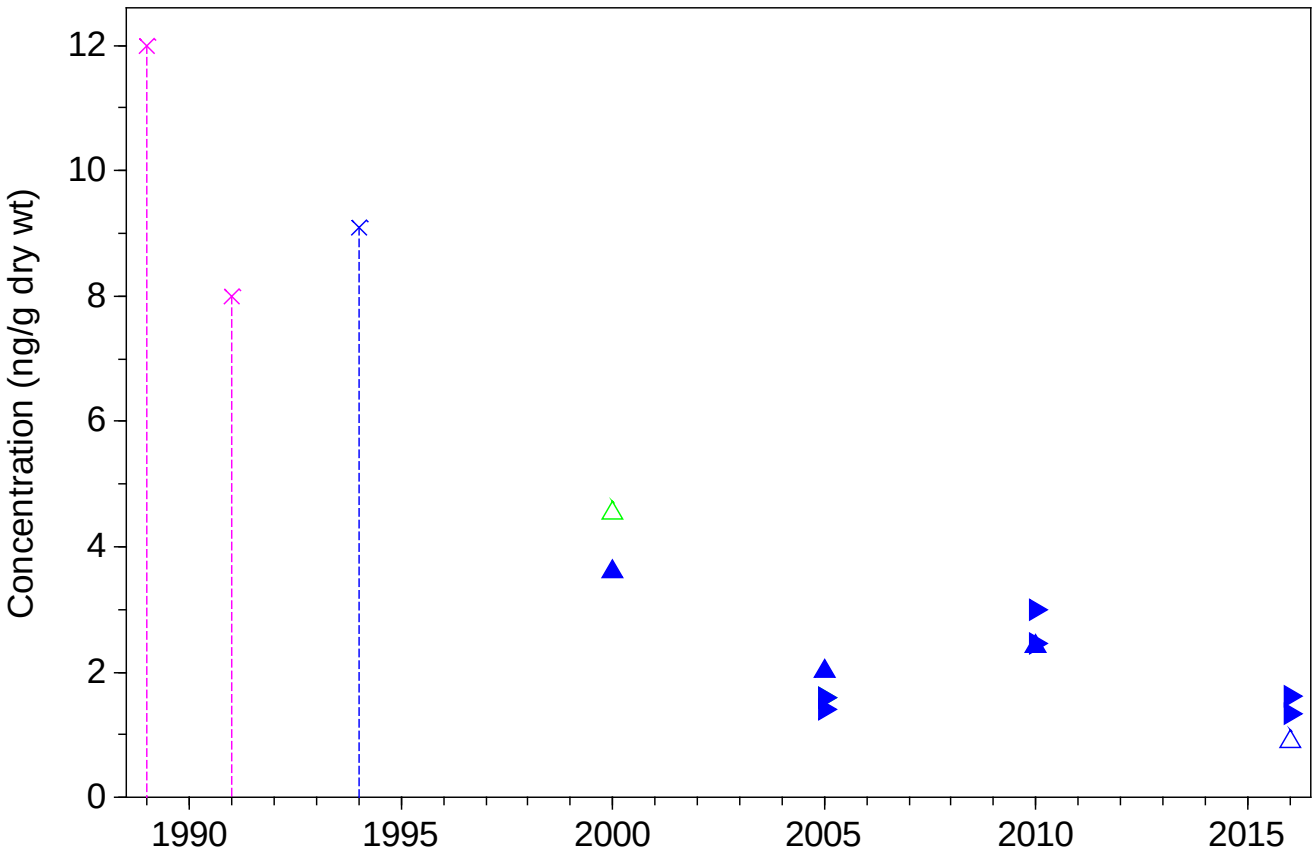
Acenaphthylene, Station 13



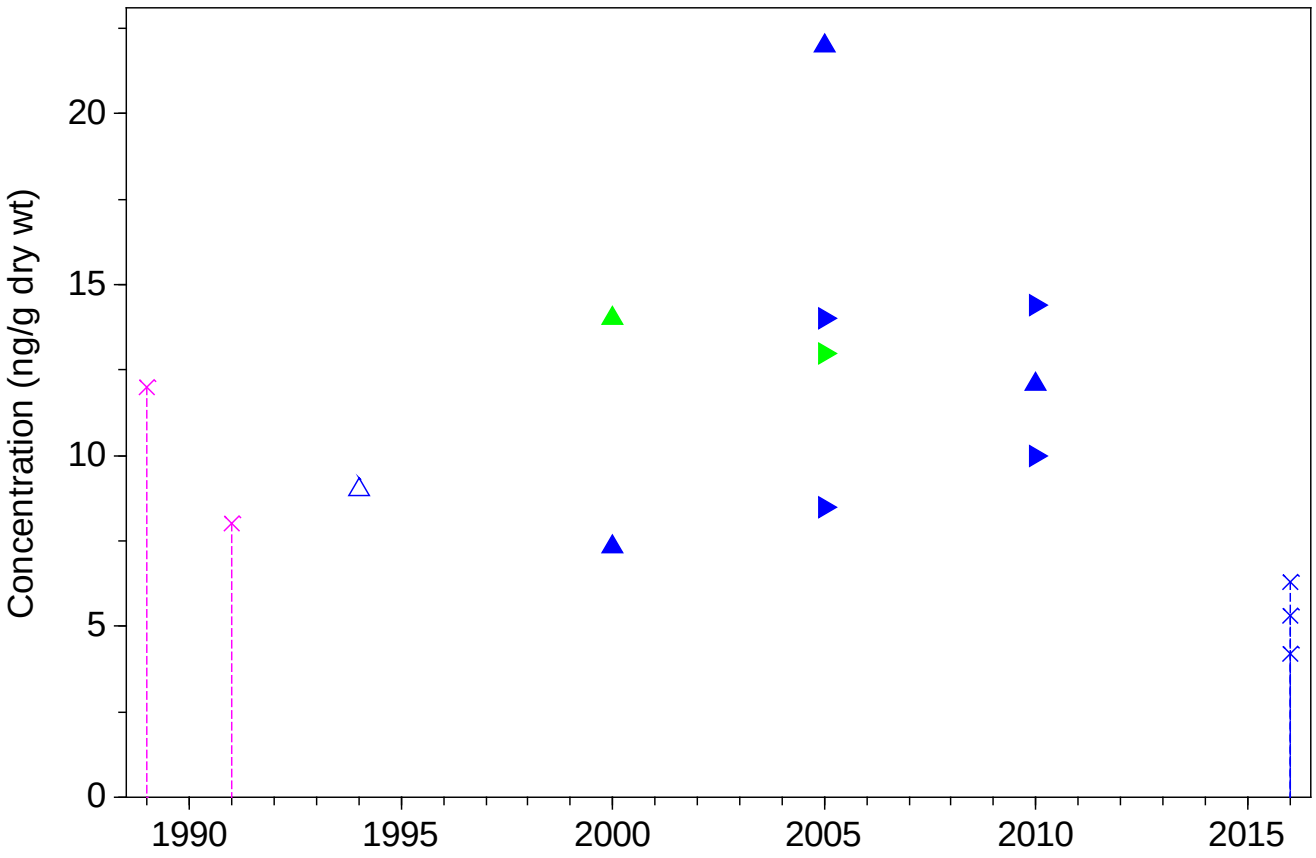
Anthracene, Station 13



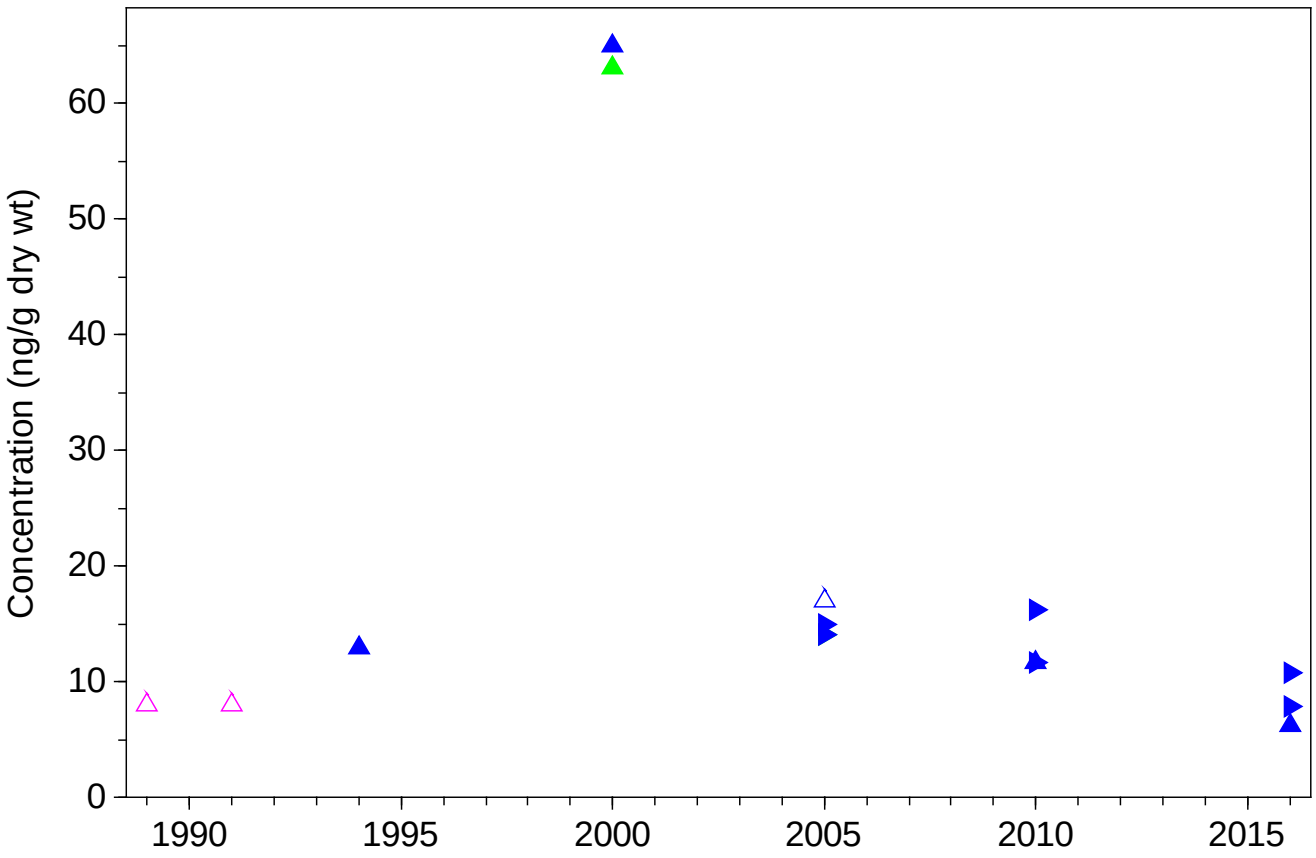
Fluorene, Station 13



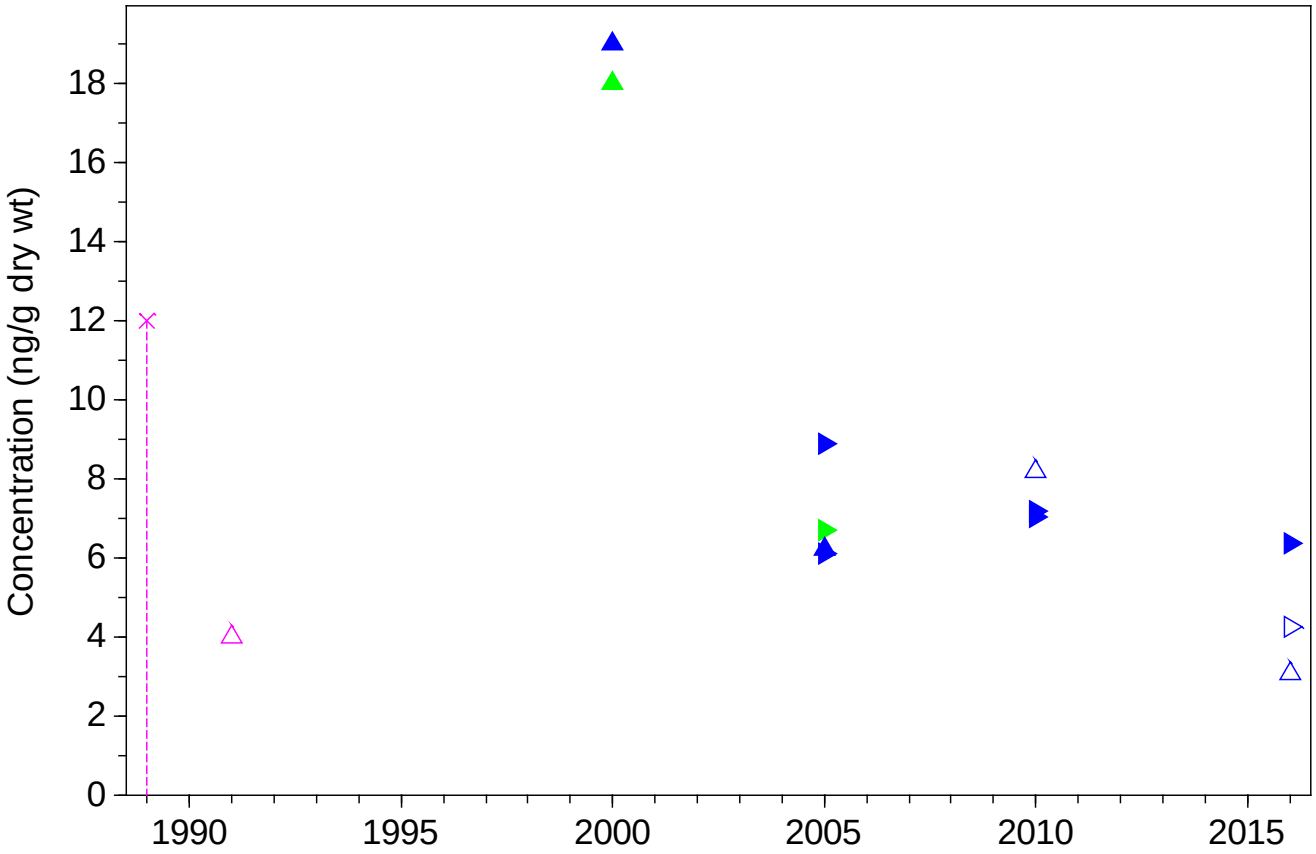
Naphthalene, Station 13



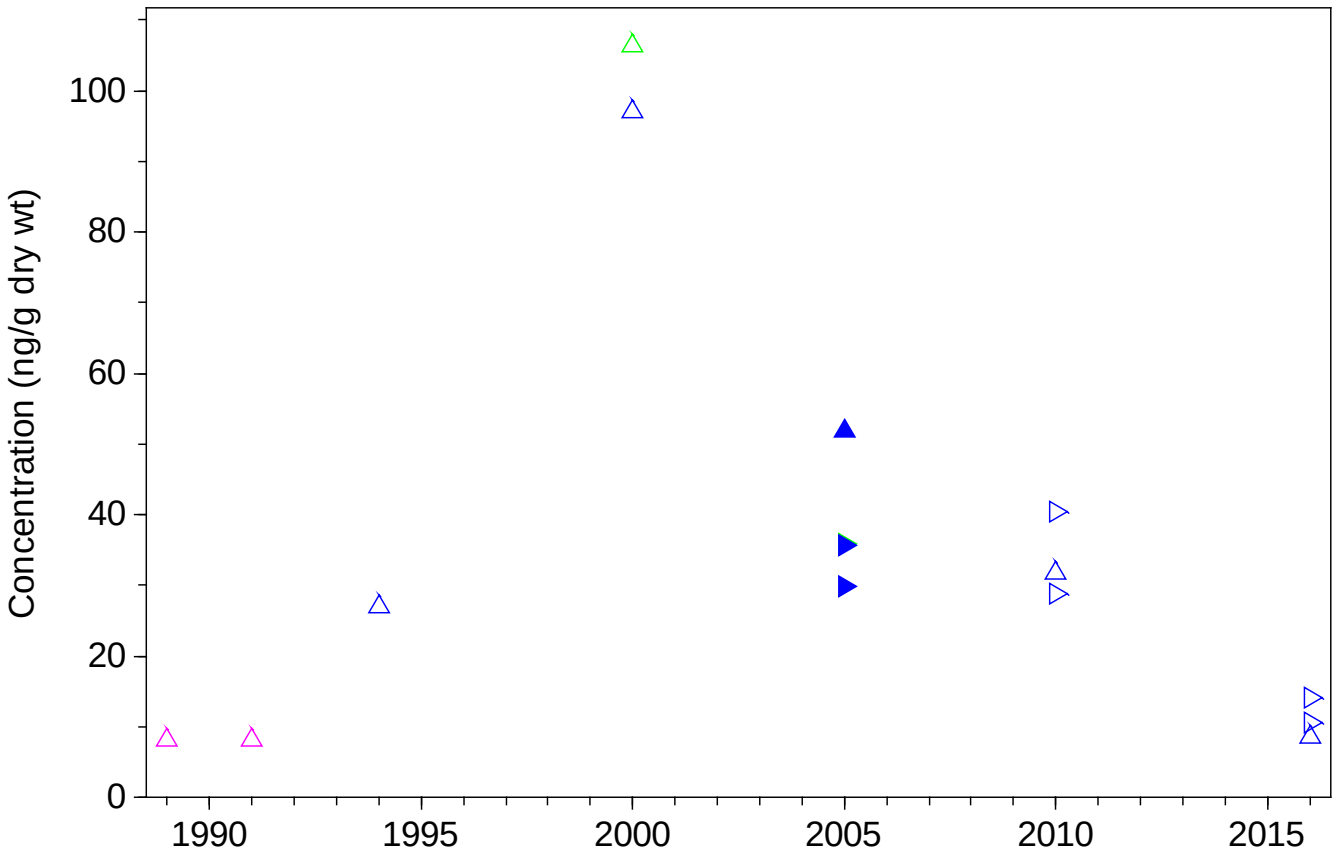
Phenanthrene, Station 13



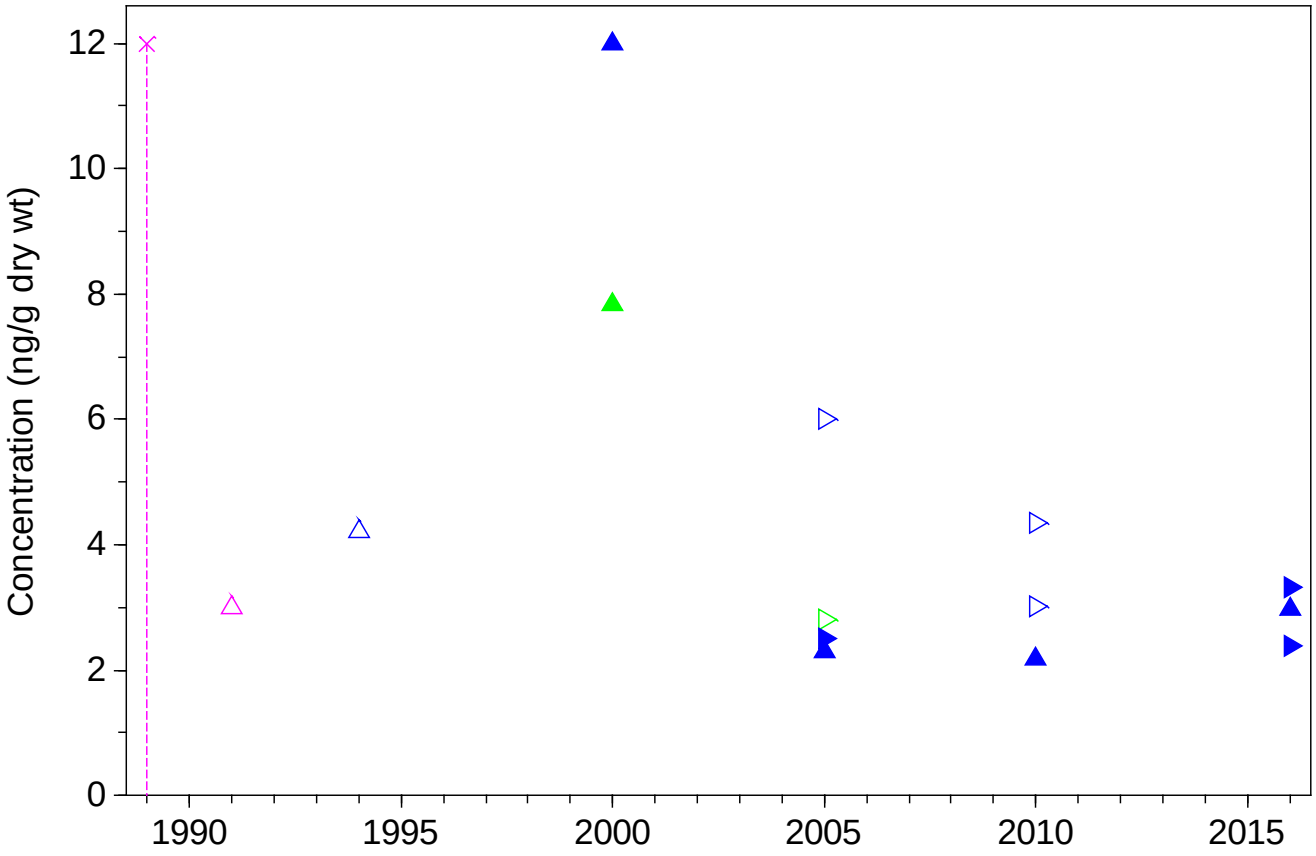
Retene, Station 13



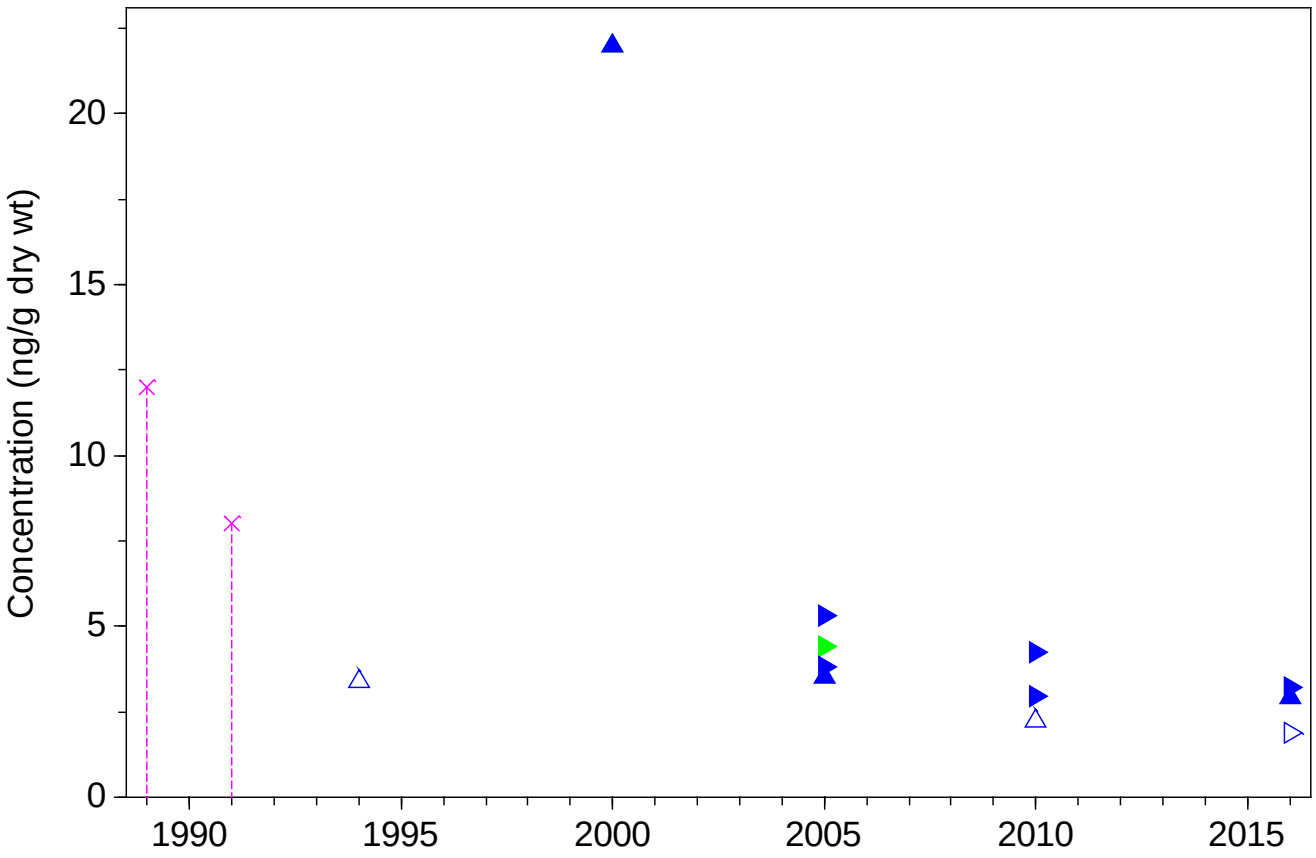
Total LPAH (sum of 6 compounds), Station 13



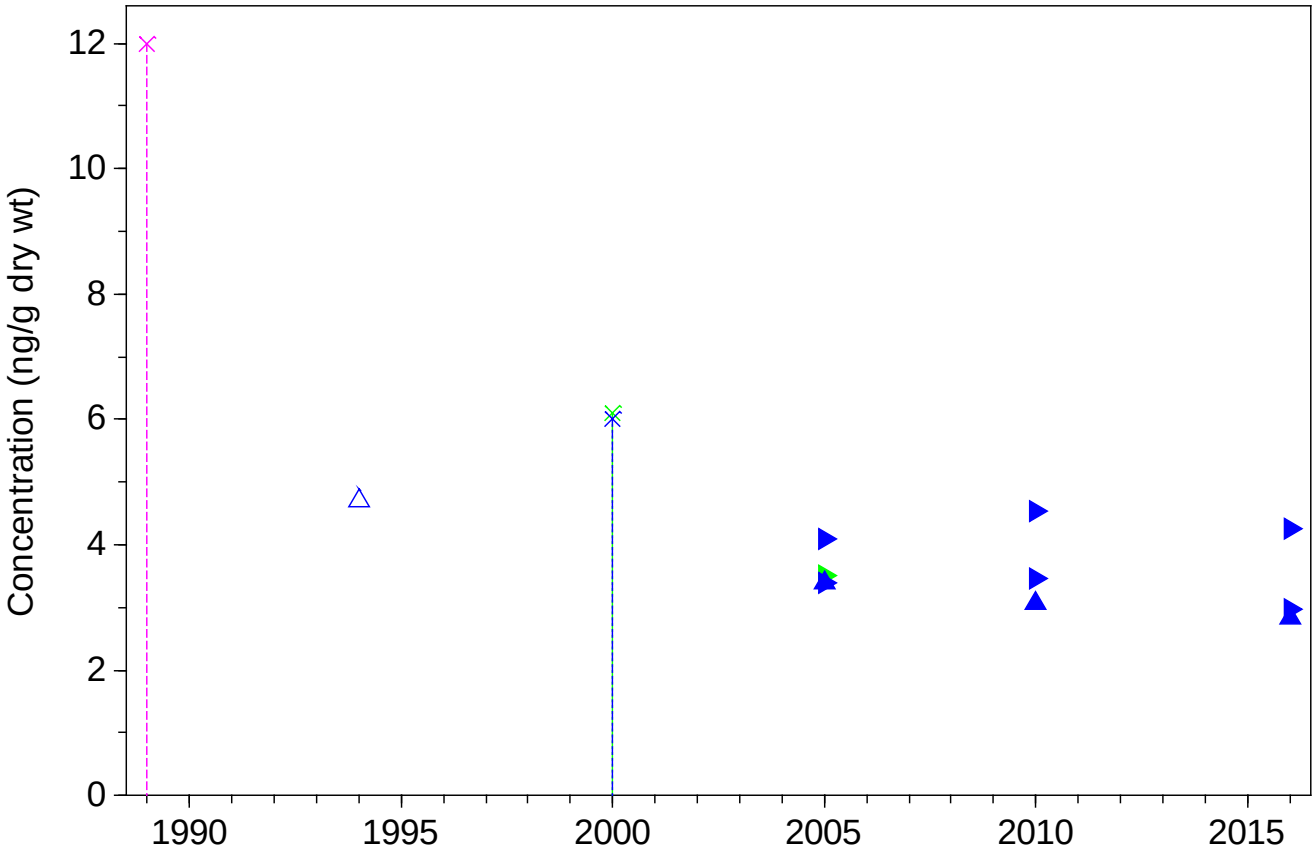
Benzo(a)anthracene, Station 13



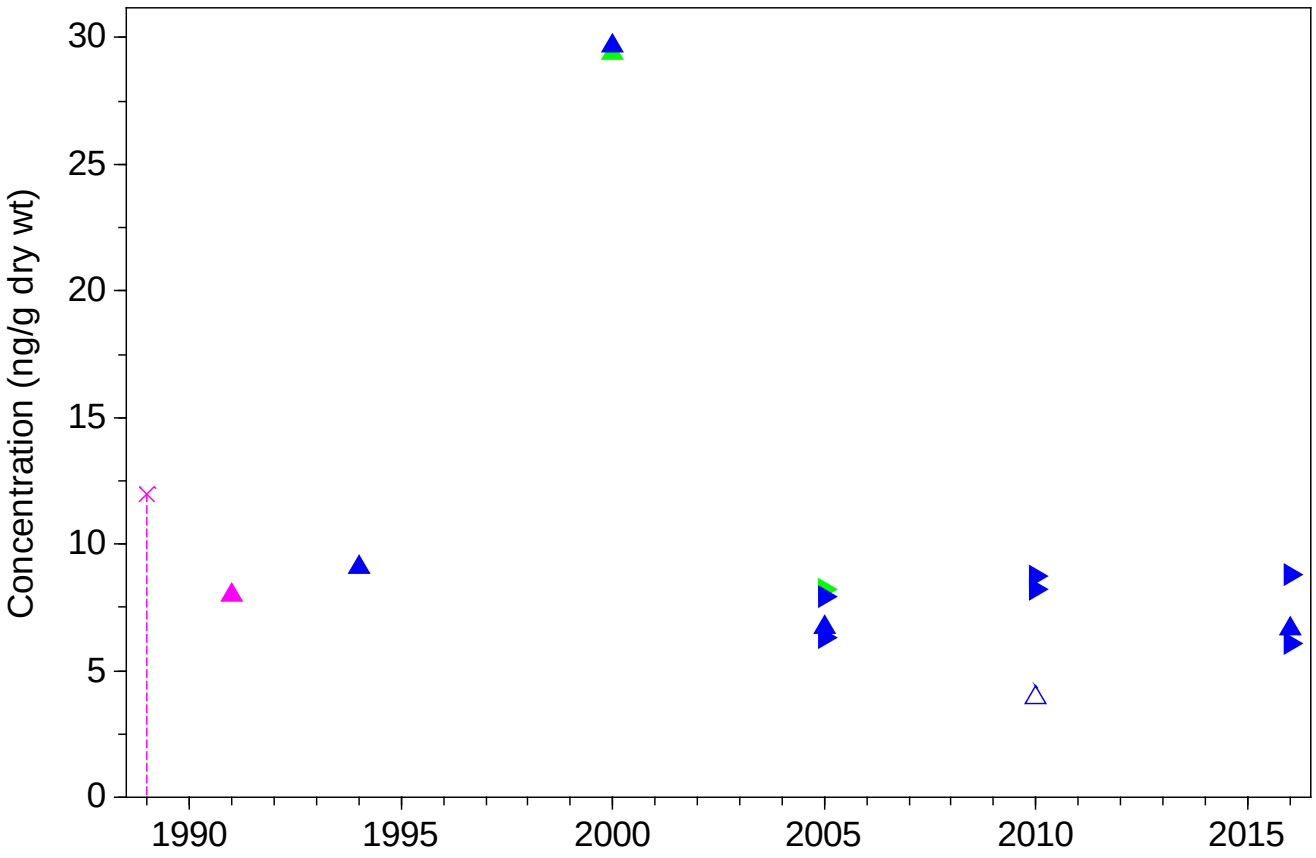
Benzo(a)pyrene, Station 13



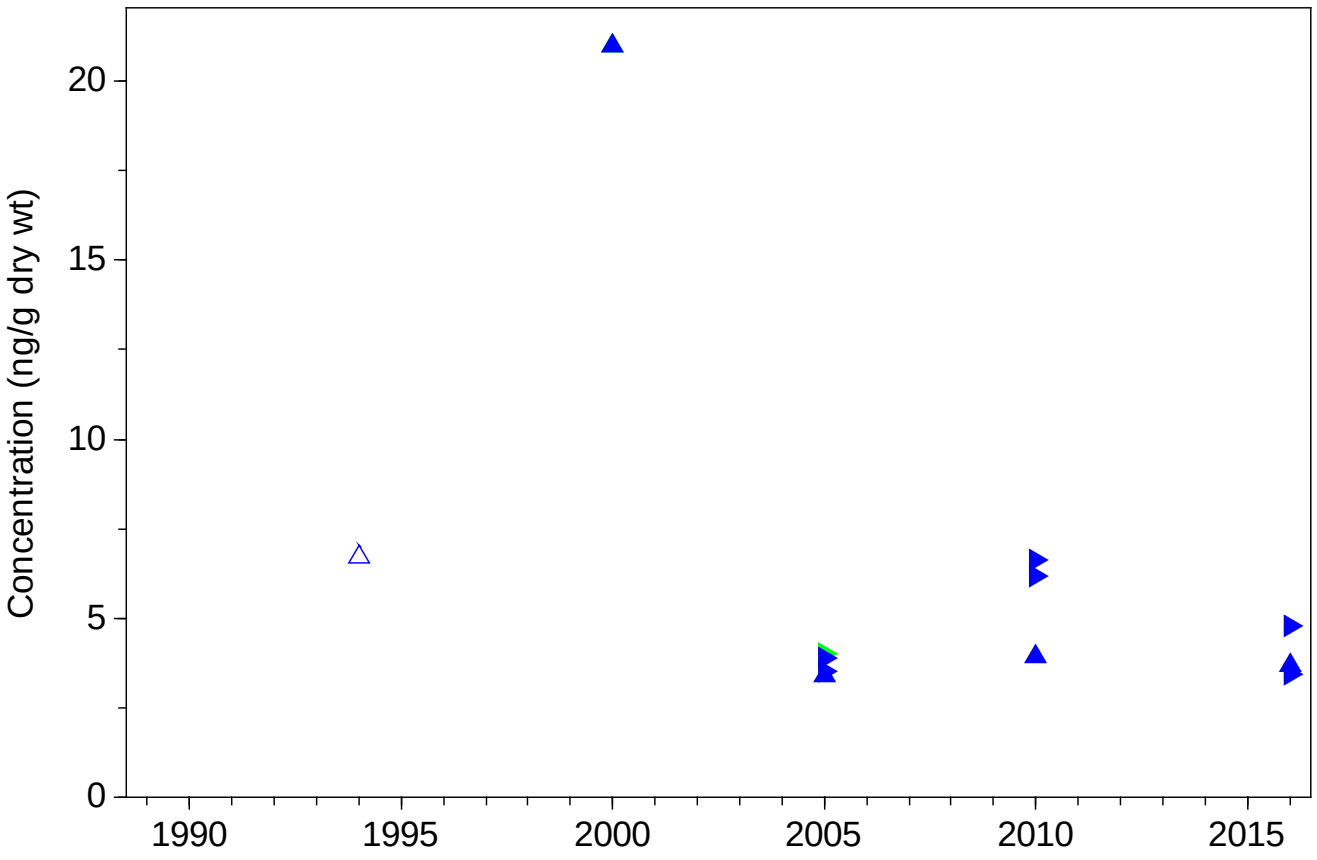
Benzo(g,h,i)perylene, Station 13



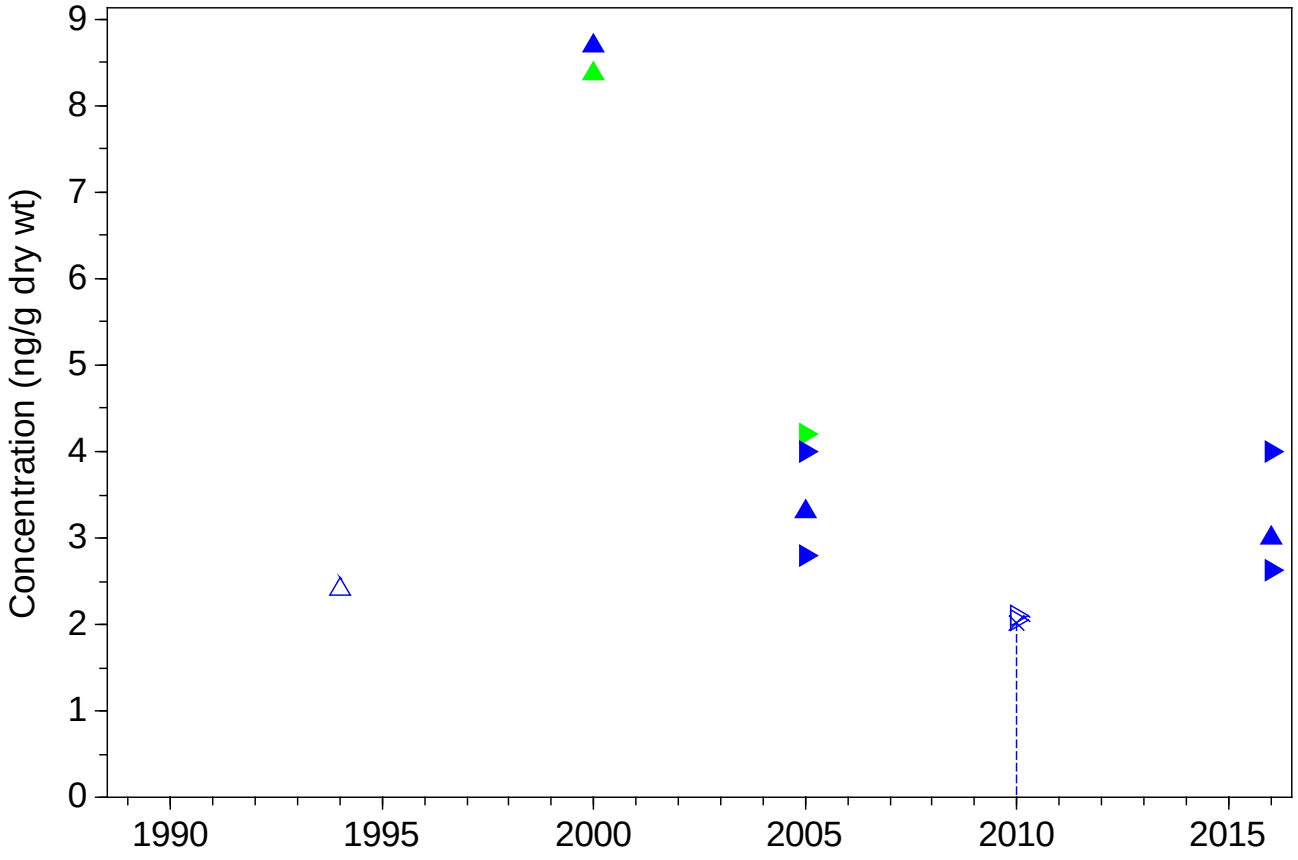
Total Benzofluoranthenes, Station 13



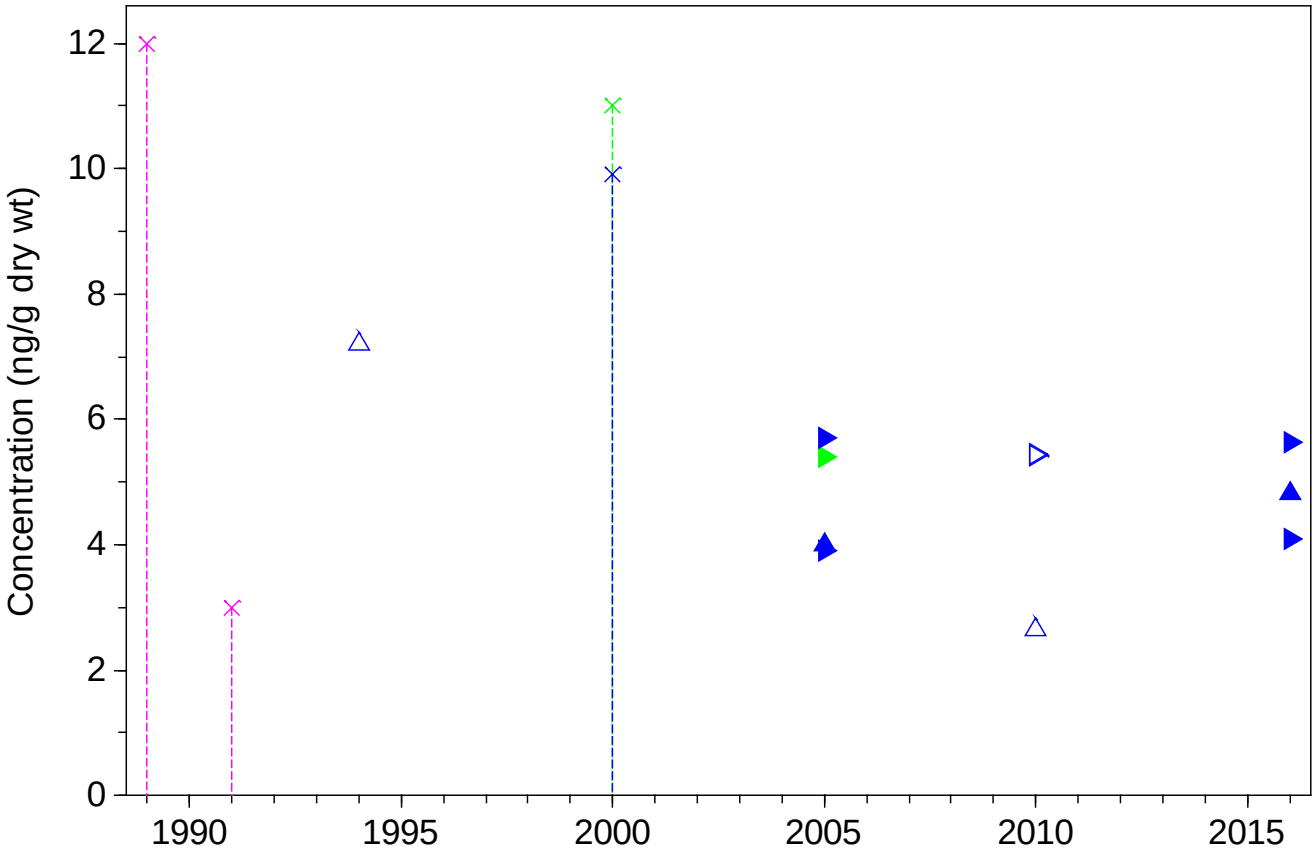
Benzo(b)fluoranthene, Station 13



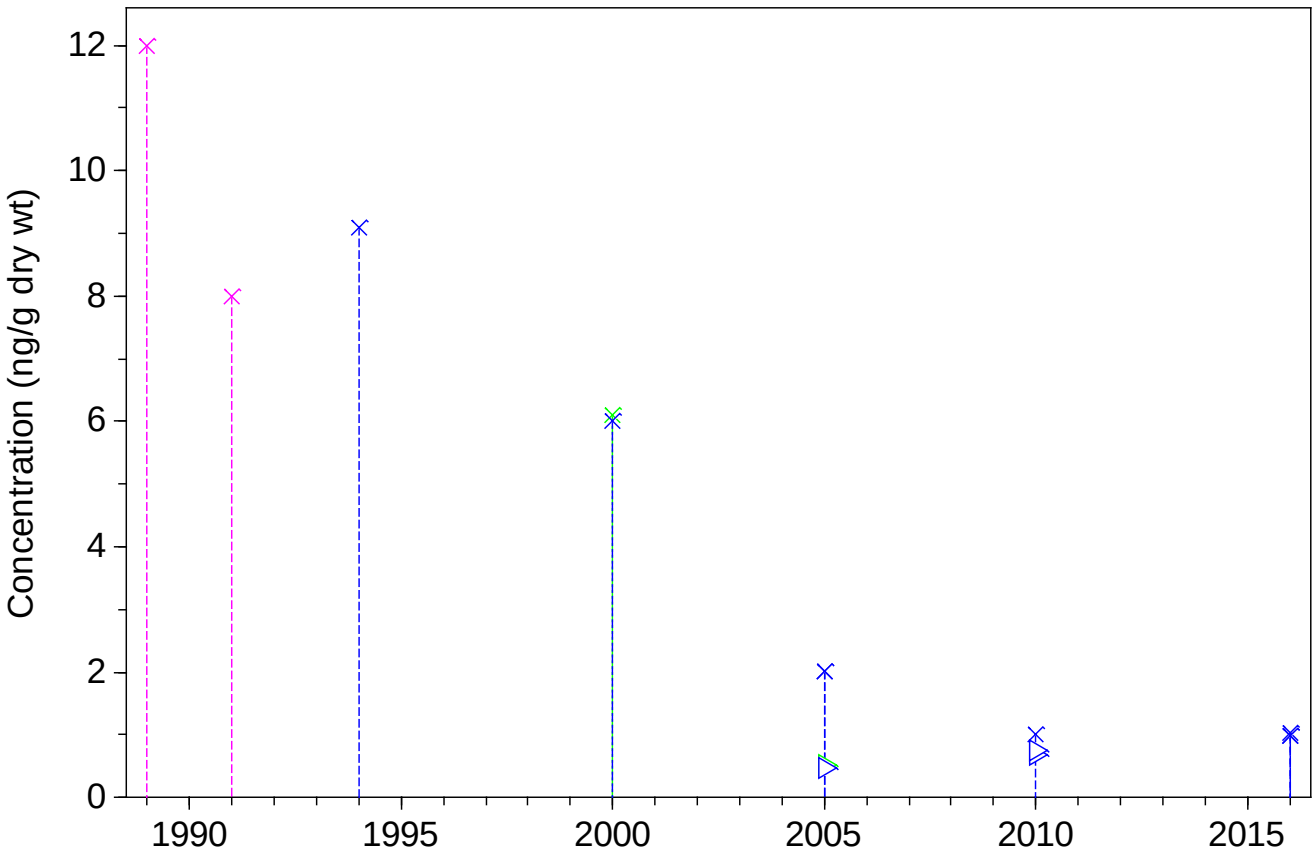
Benzo(k)fluoranthene, Station 13



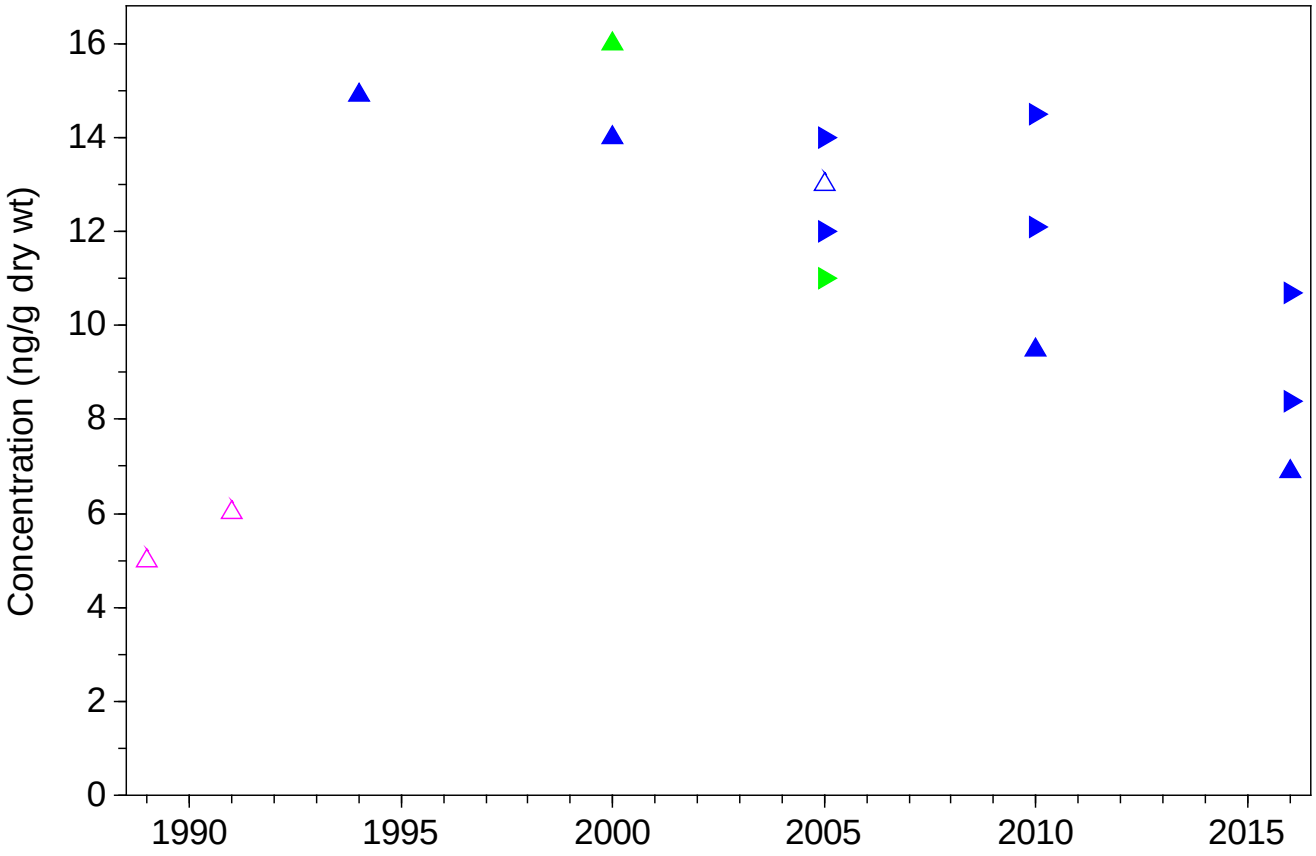
Chrysene, Station 13



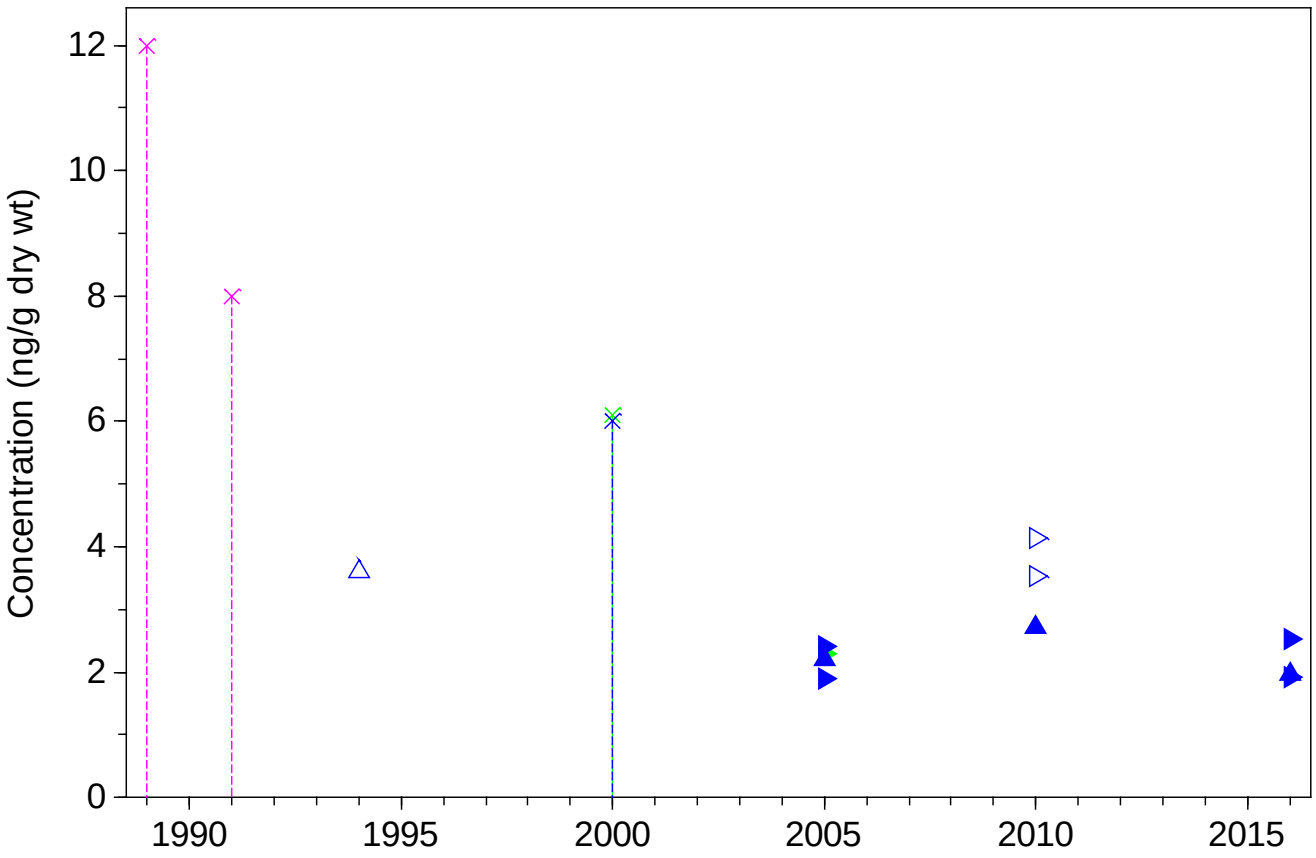
Dibenzo(a,h)anthracene, Station 13



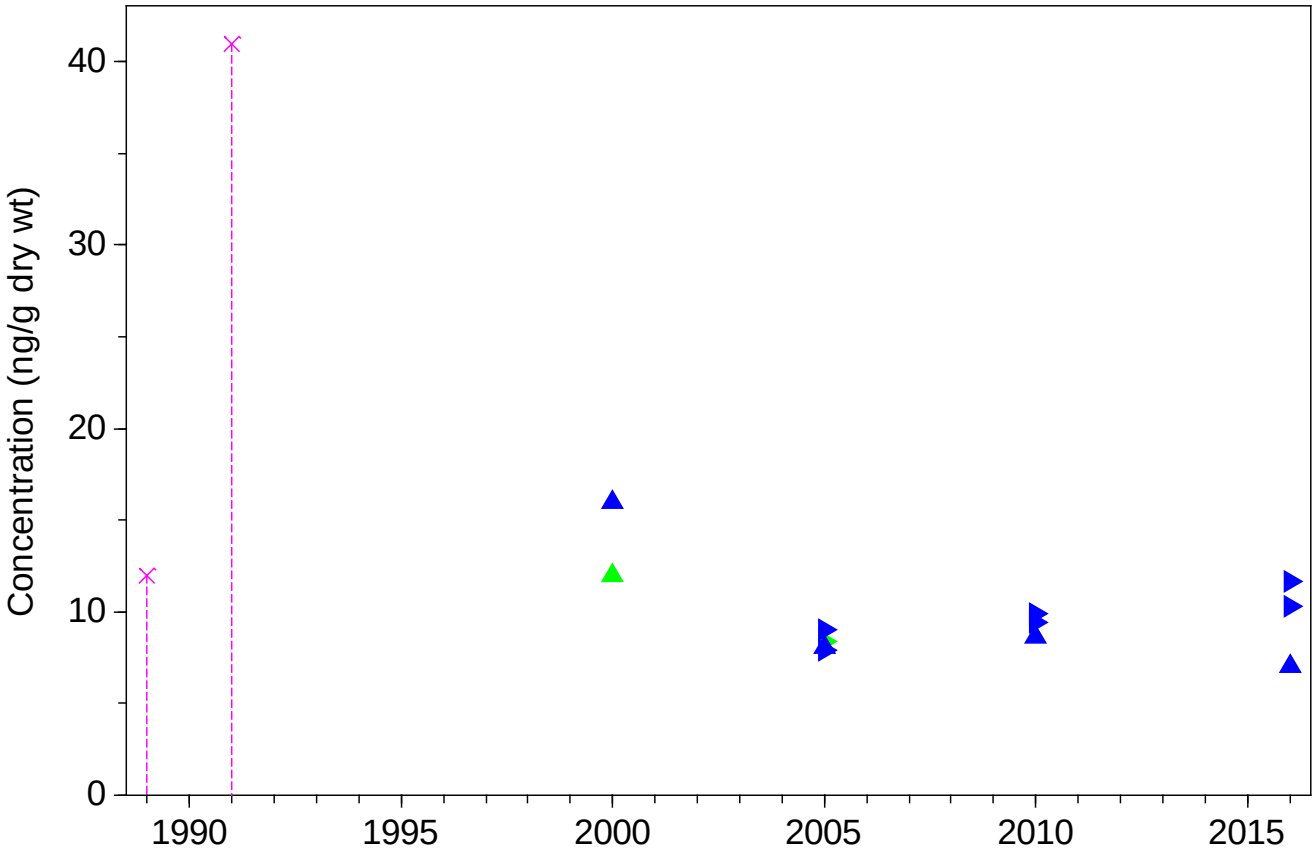
Fluoranthene, Station 13



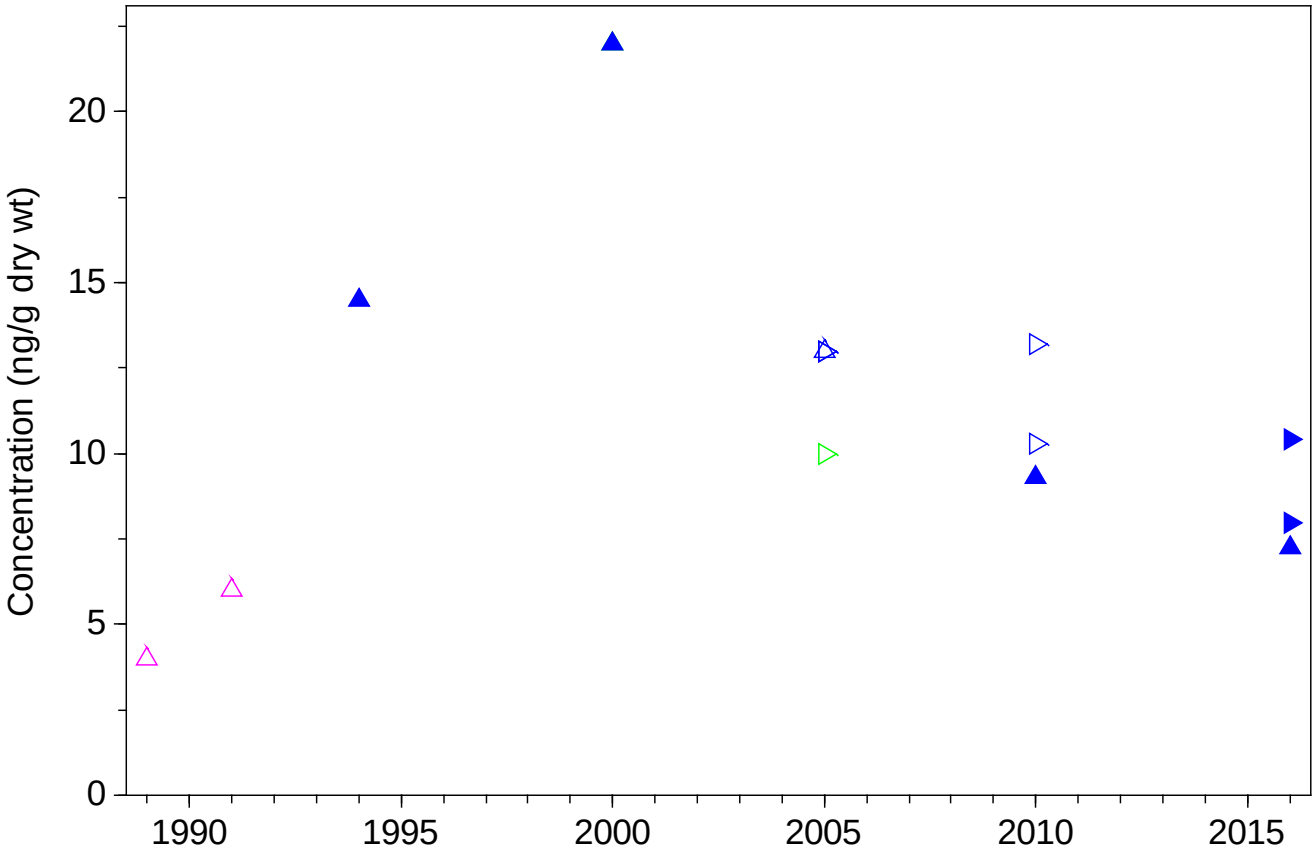
Indeno(1,2,3-c,d)pyrene, Station 13

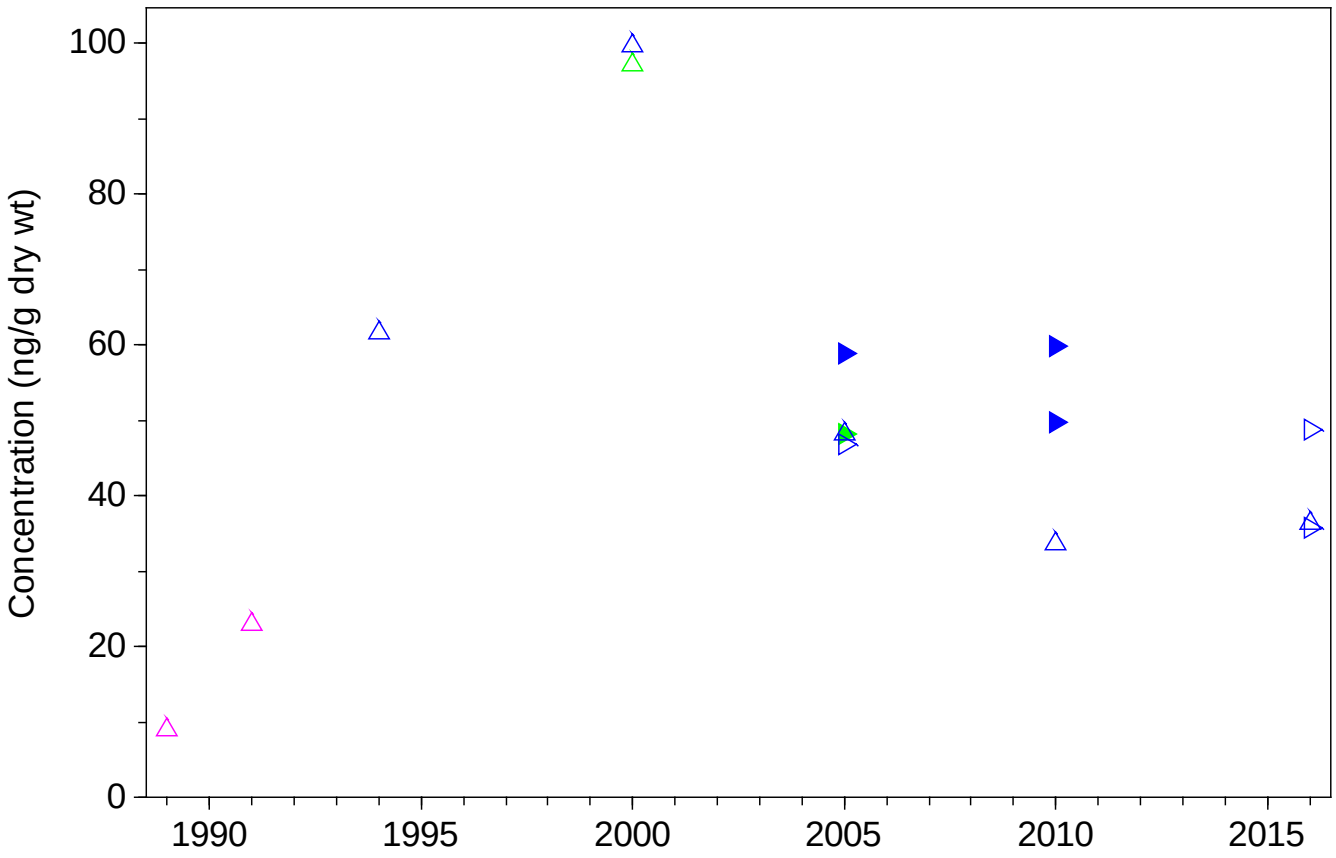


Perylene, Station 13



Pyrene, Station 13





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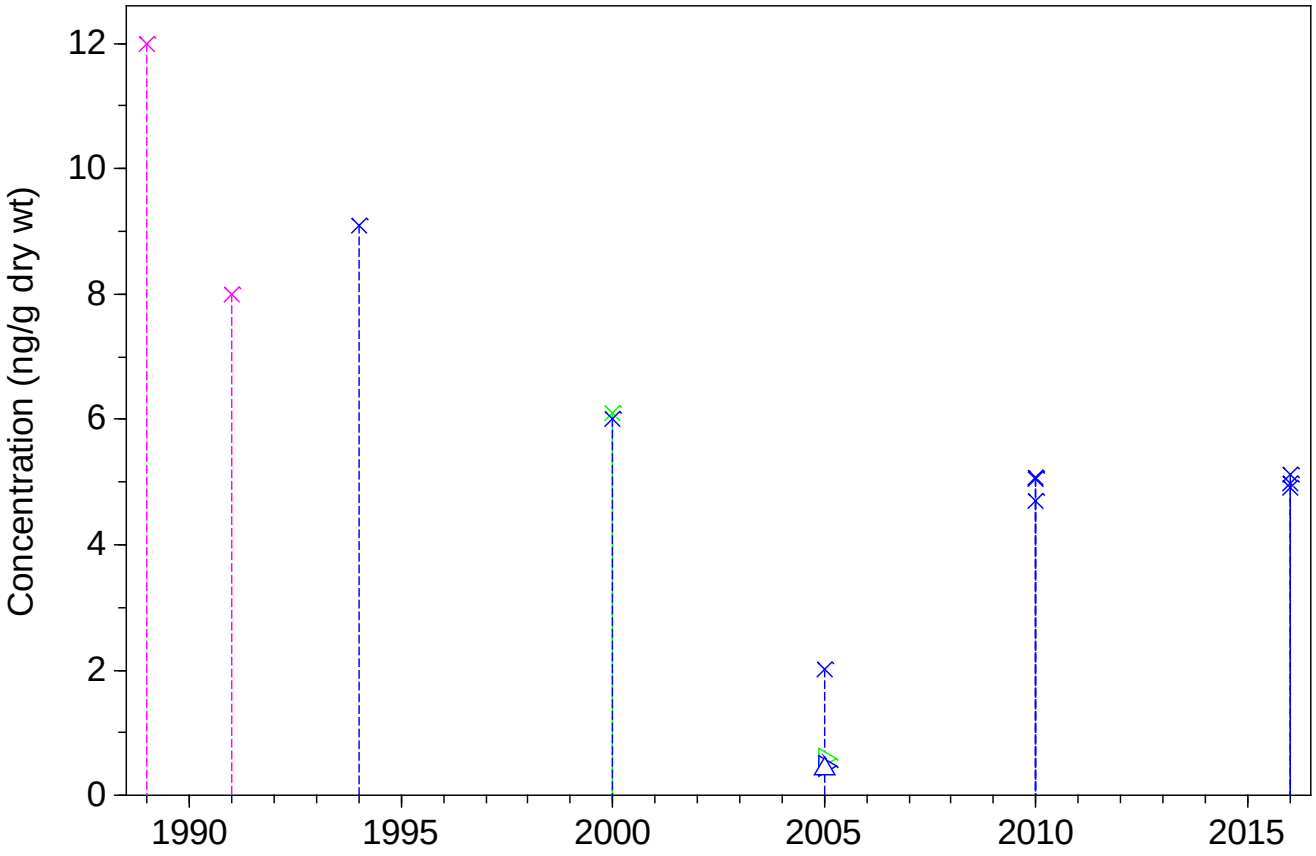
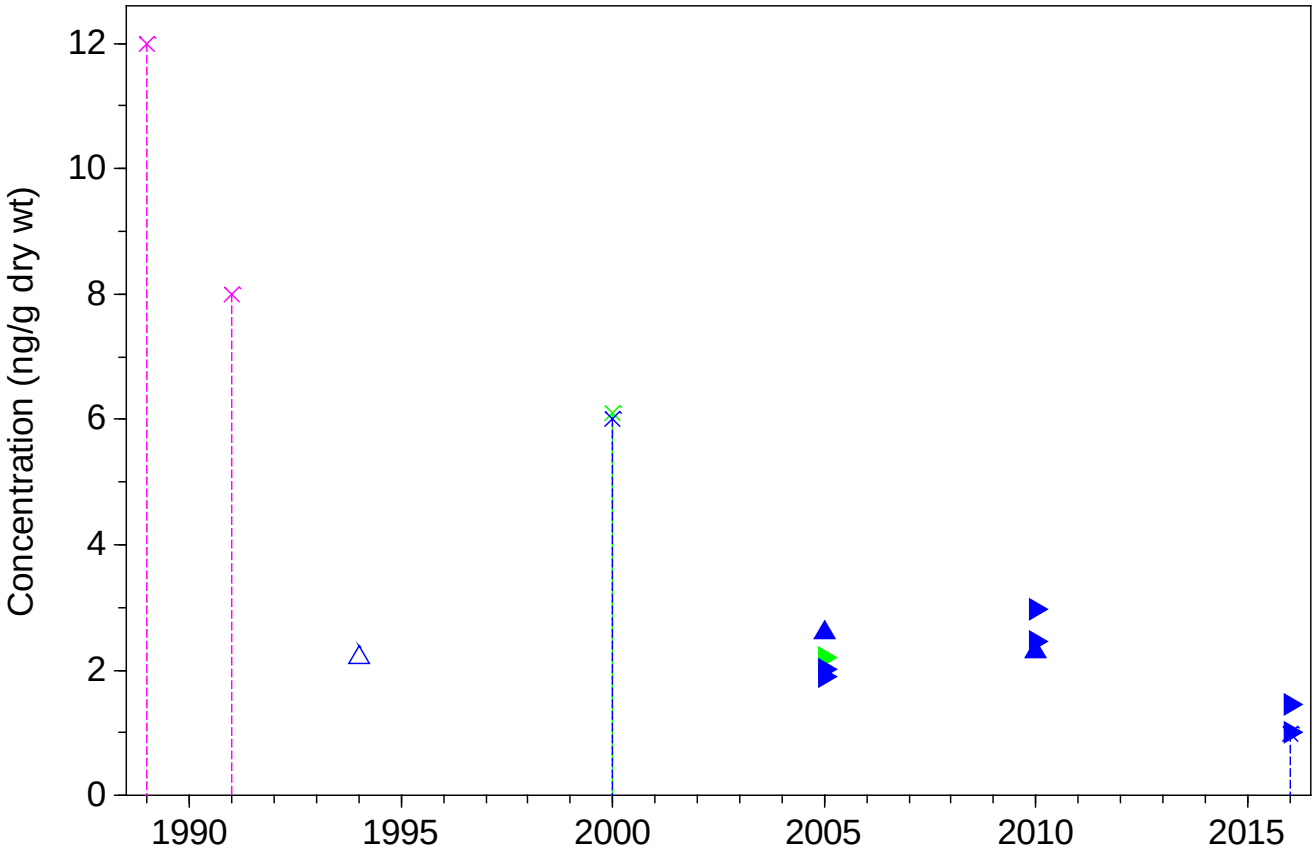
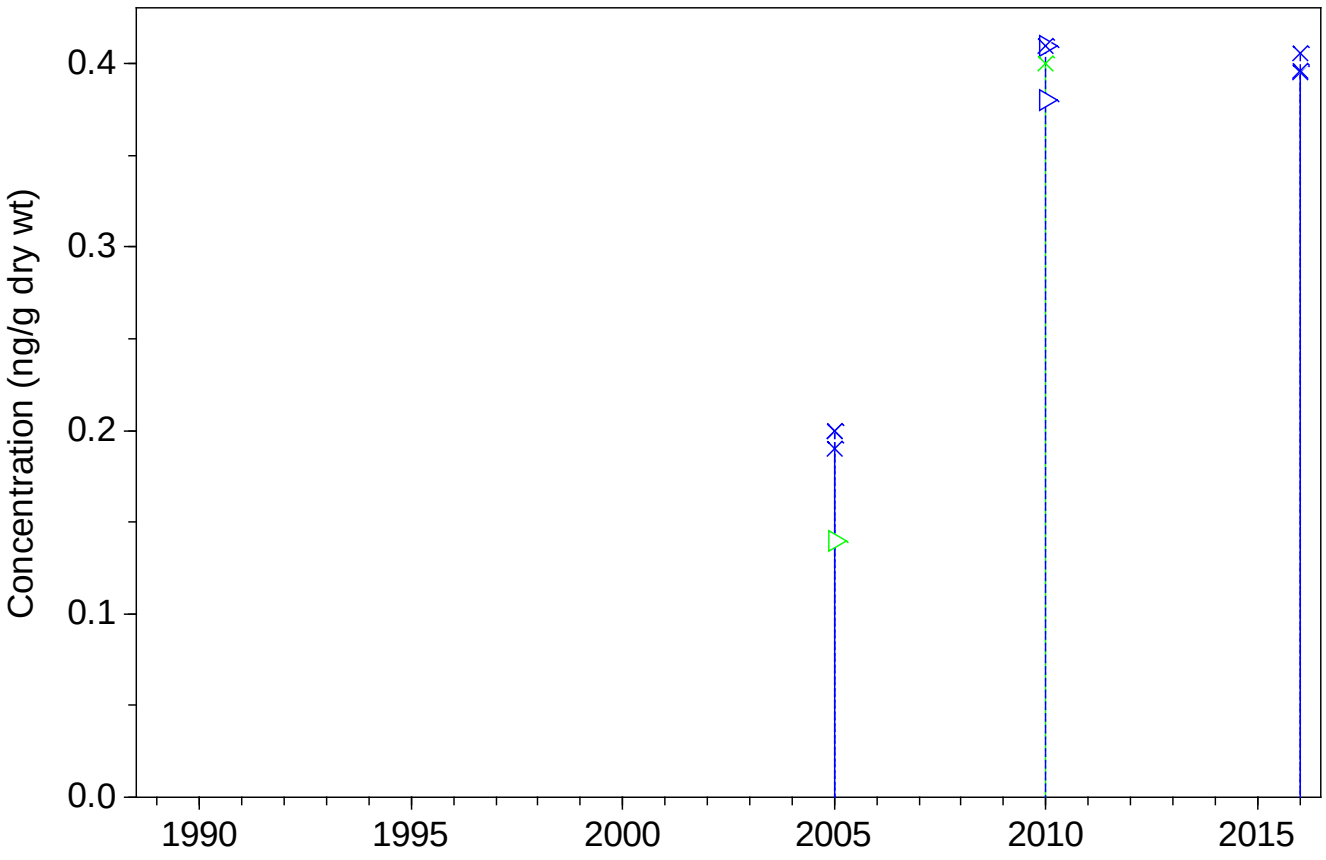
Carbazole, Station 13



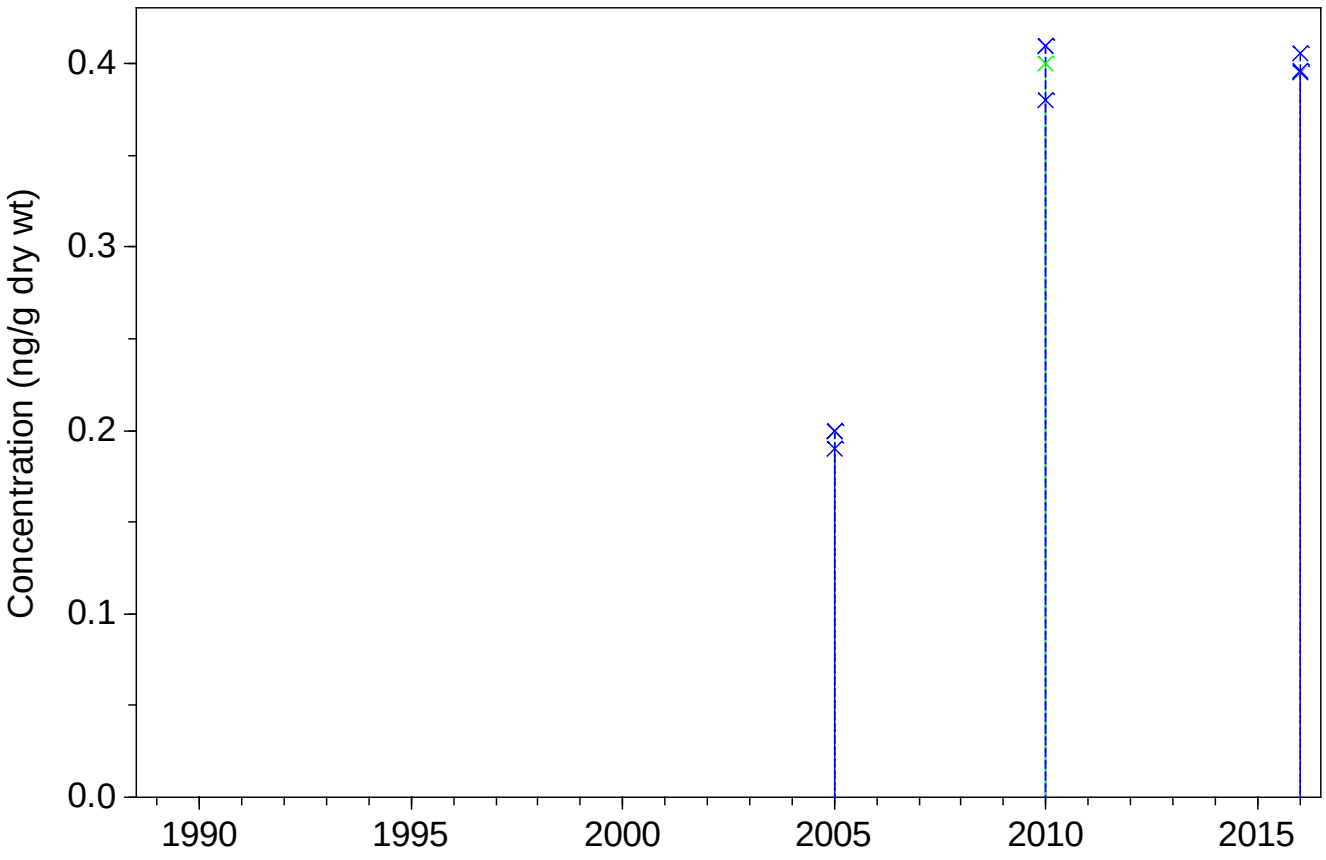
Dibenzofuran, Station 13



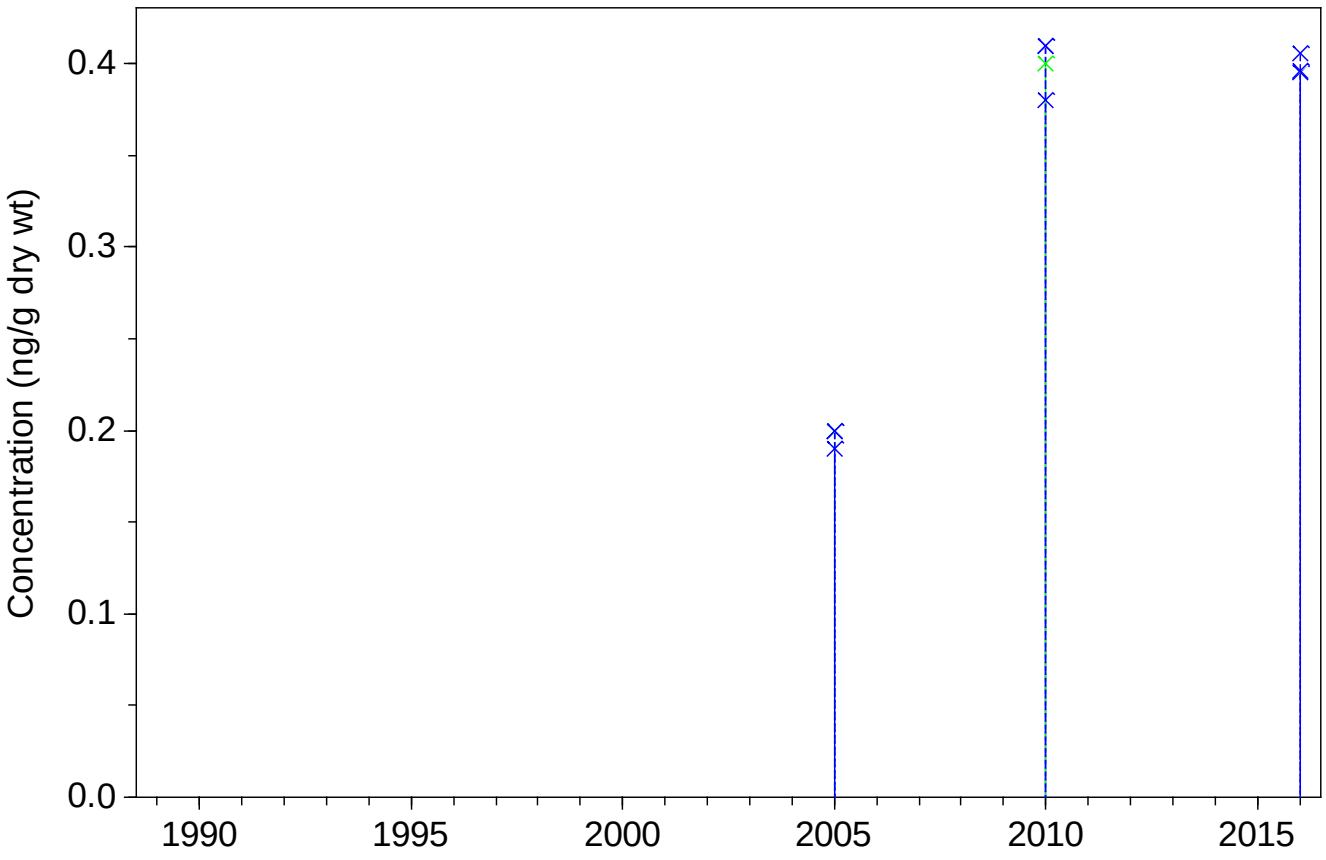
PBDE-47, Station 13



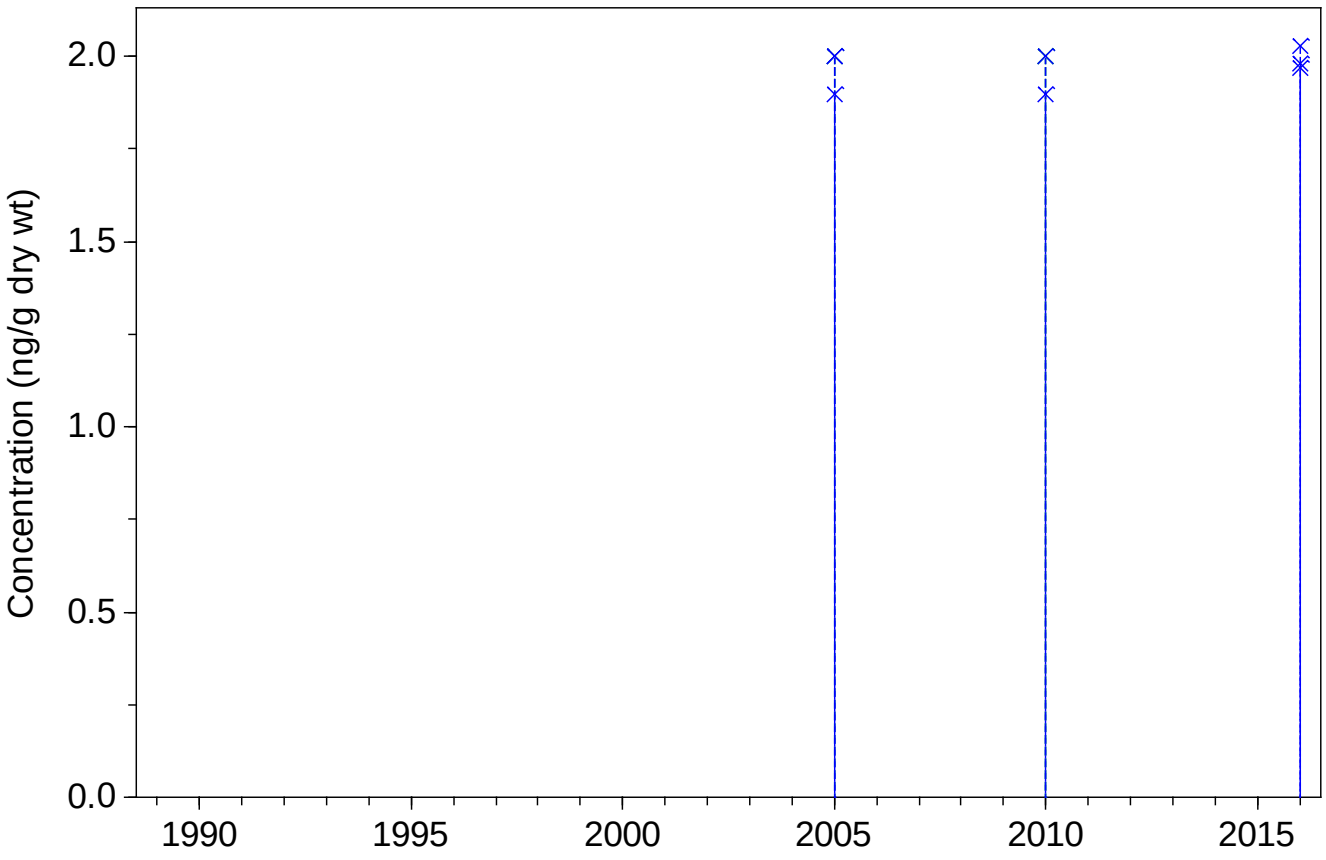
PBDE-49, Station 13



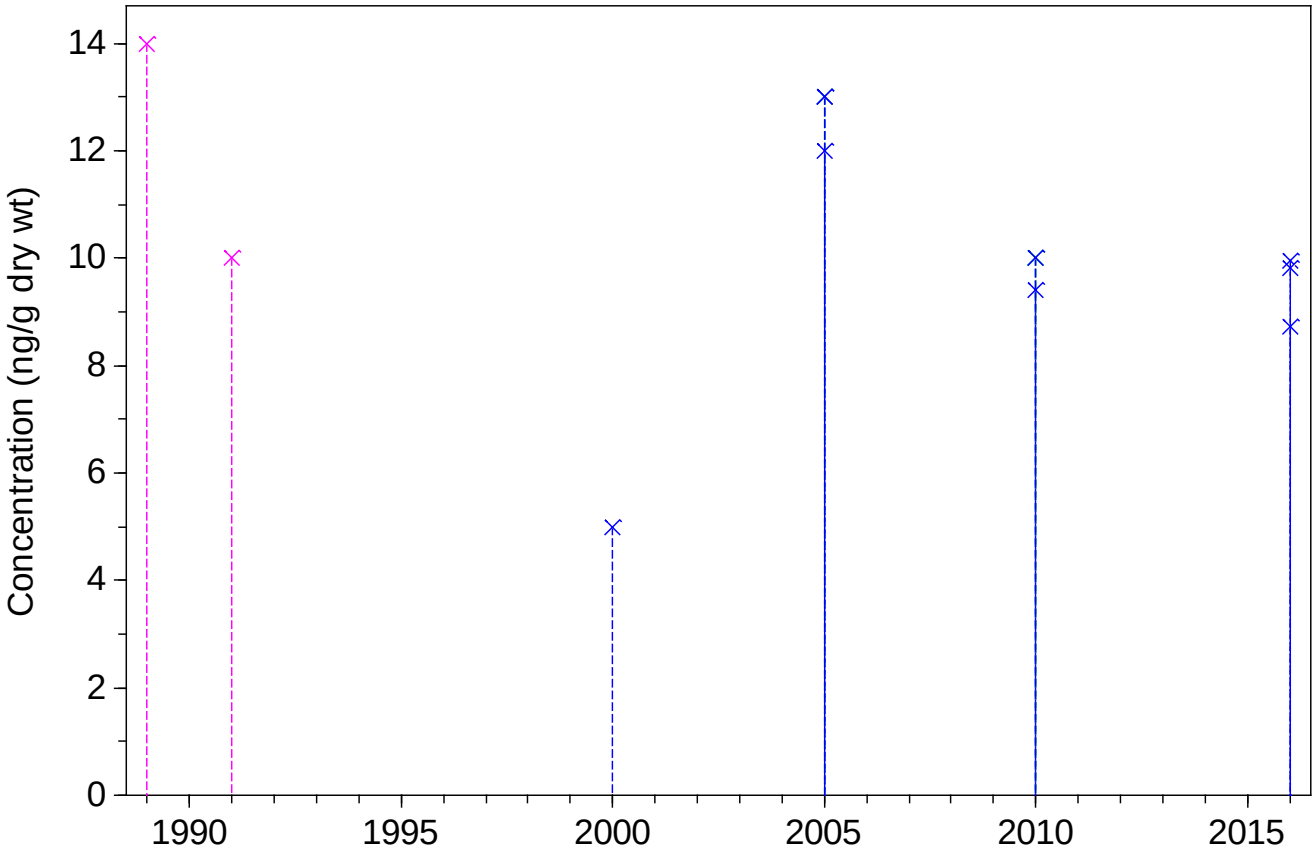
PBDE-99, Station 13



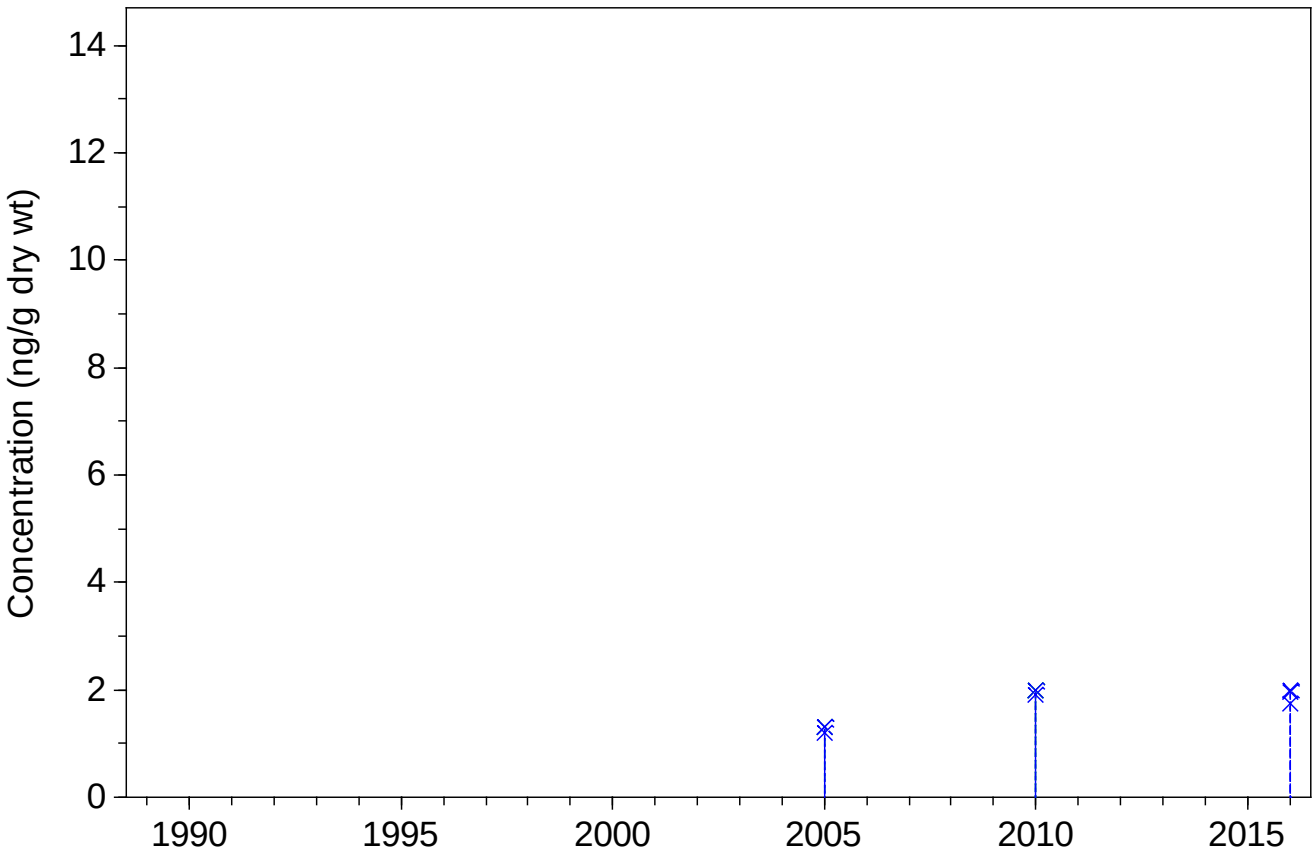
PBDE-209, Station 13



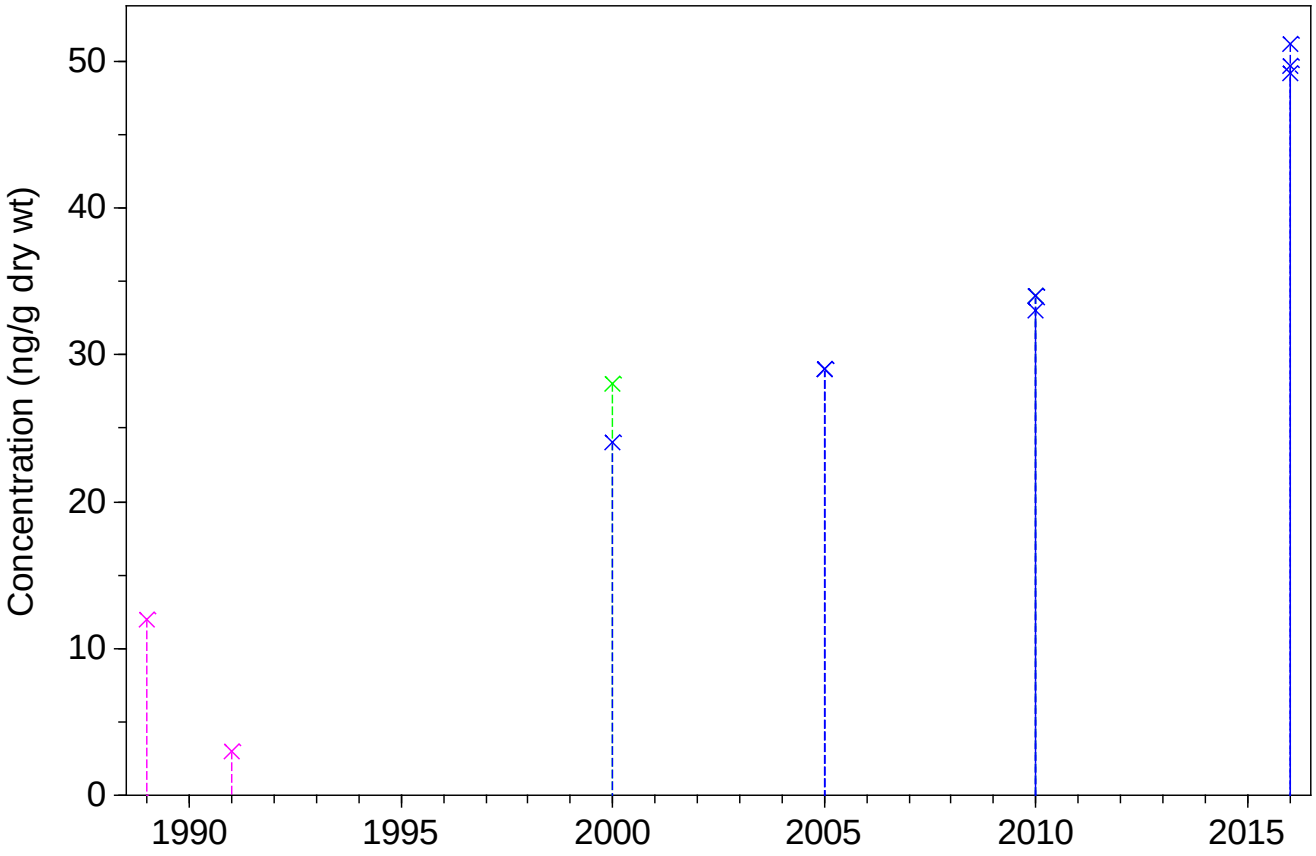
Total Aroclors, Station 13



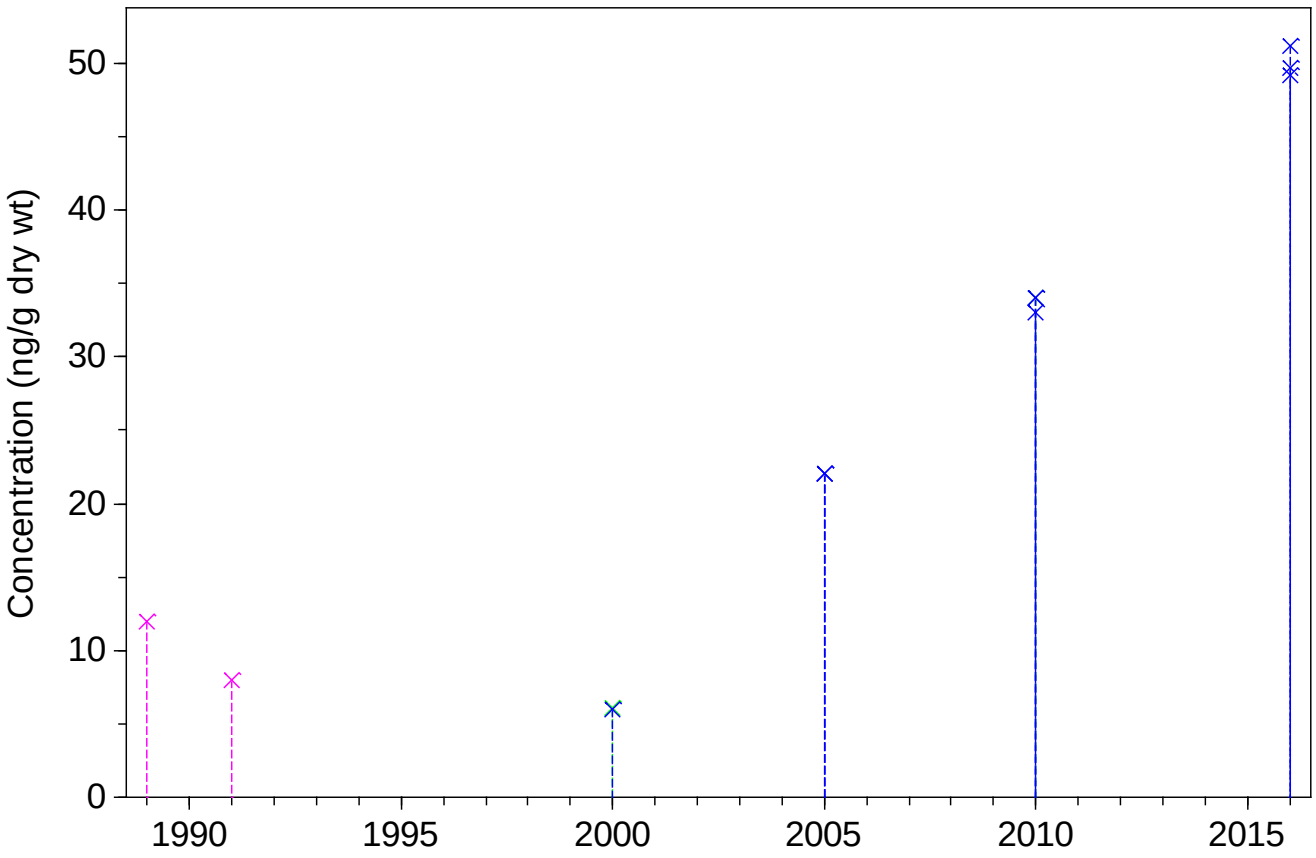
Total PCB Congeners x 2, Station 13



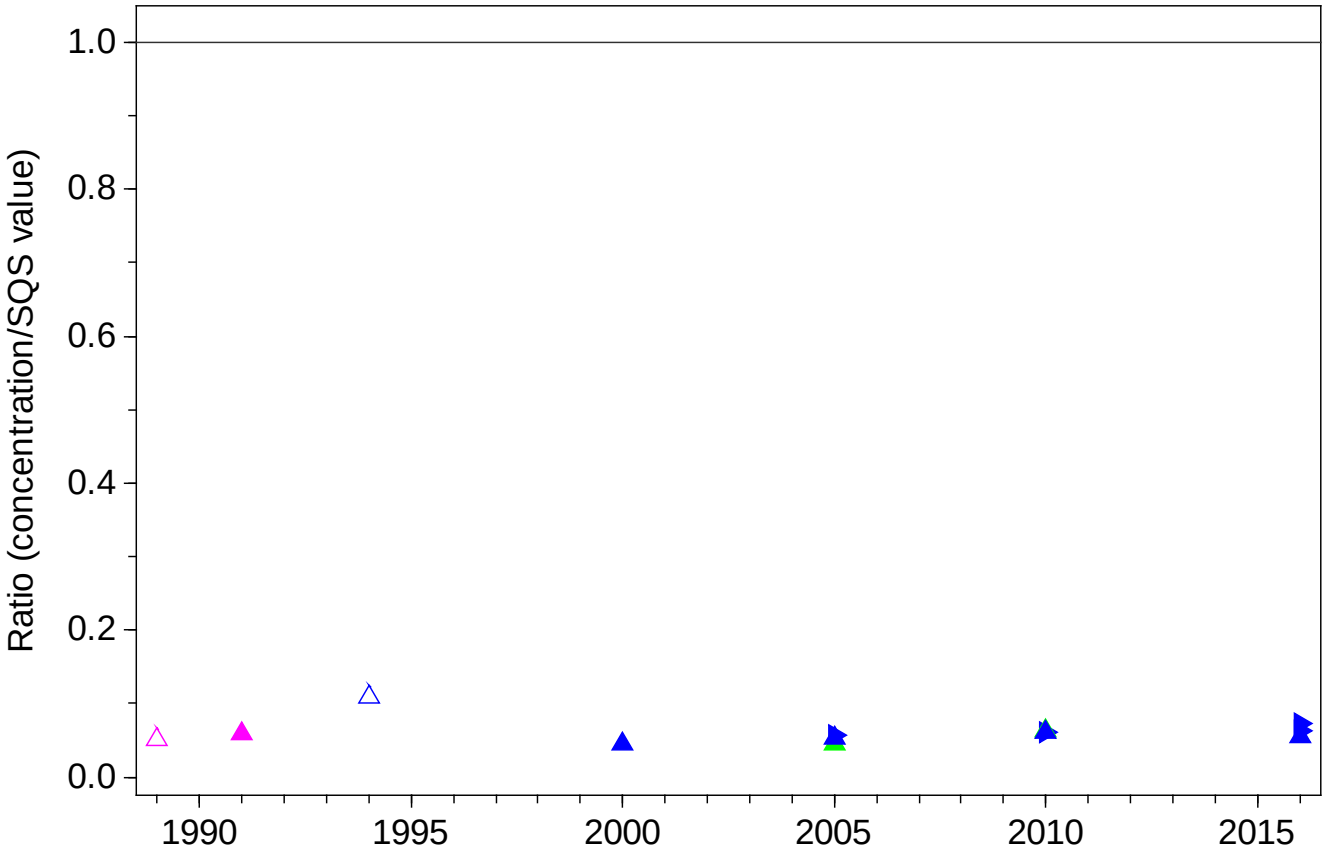
Bis(2-ethylhexyl)phthalate, Station 13



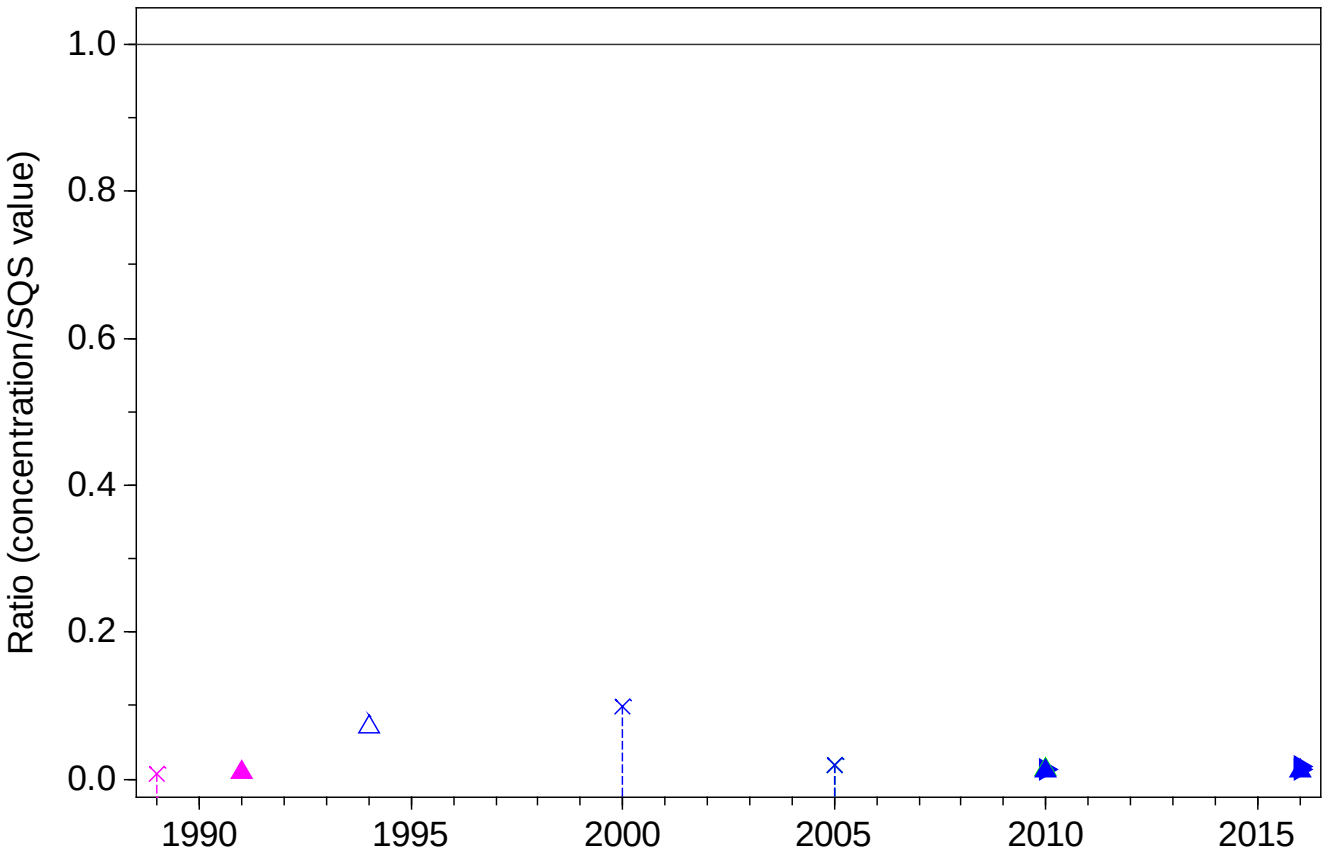
Butylbenzylphthalate, Station 13



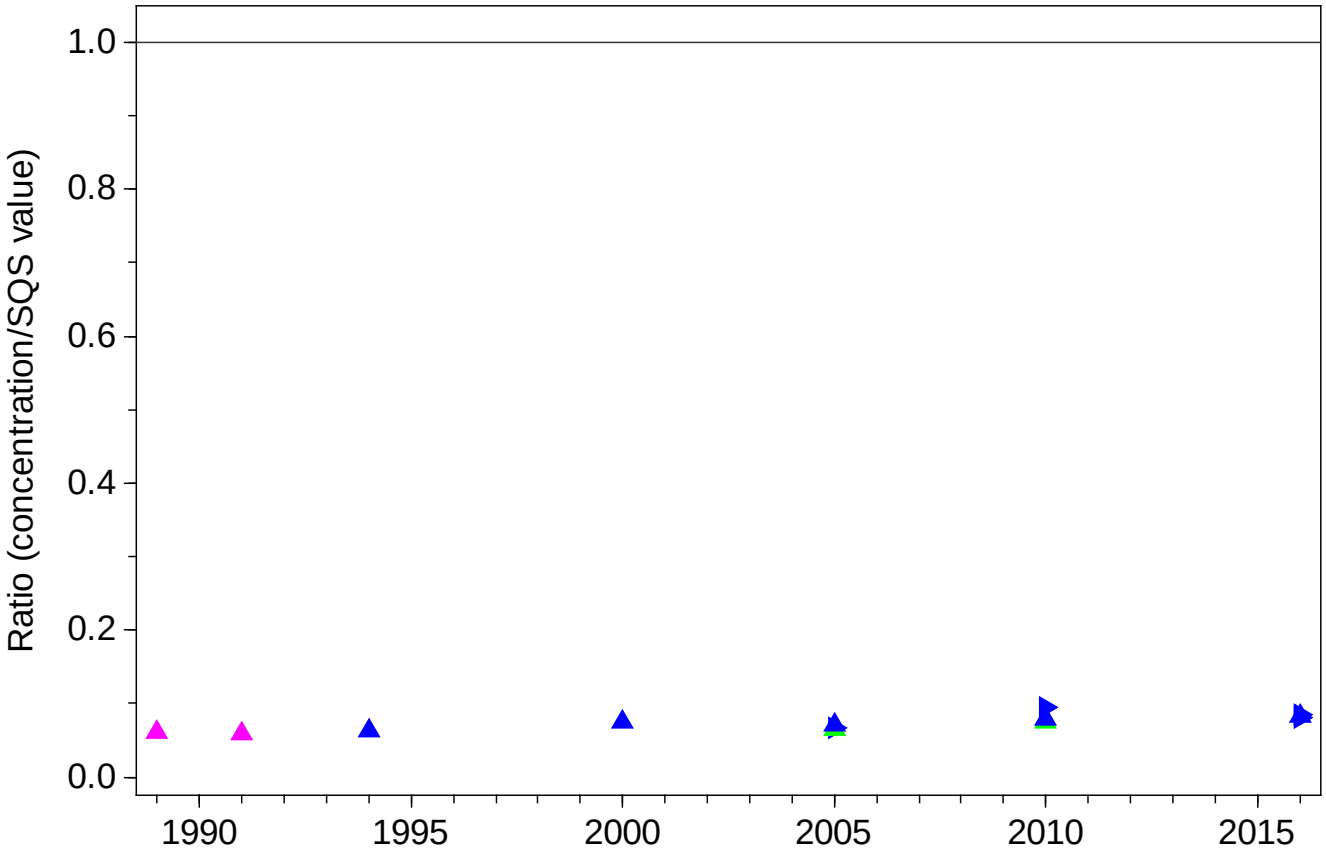
SQS quotient, Arsenic, Station 13



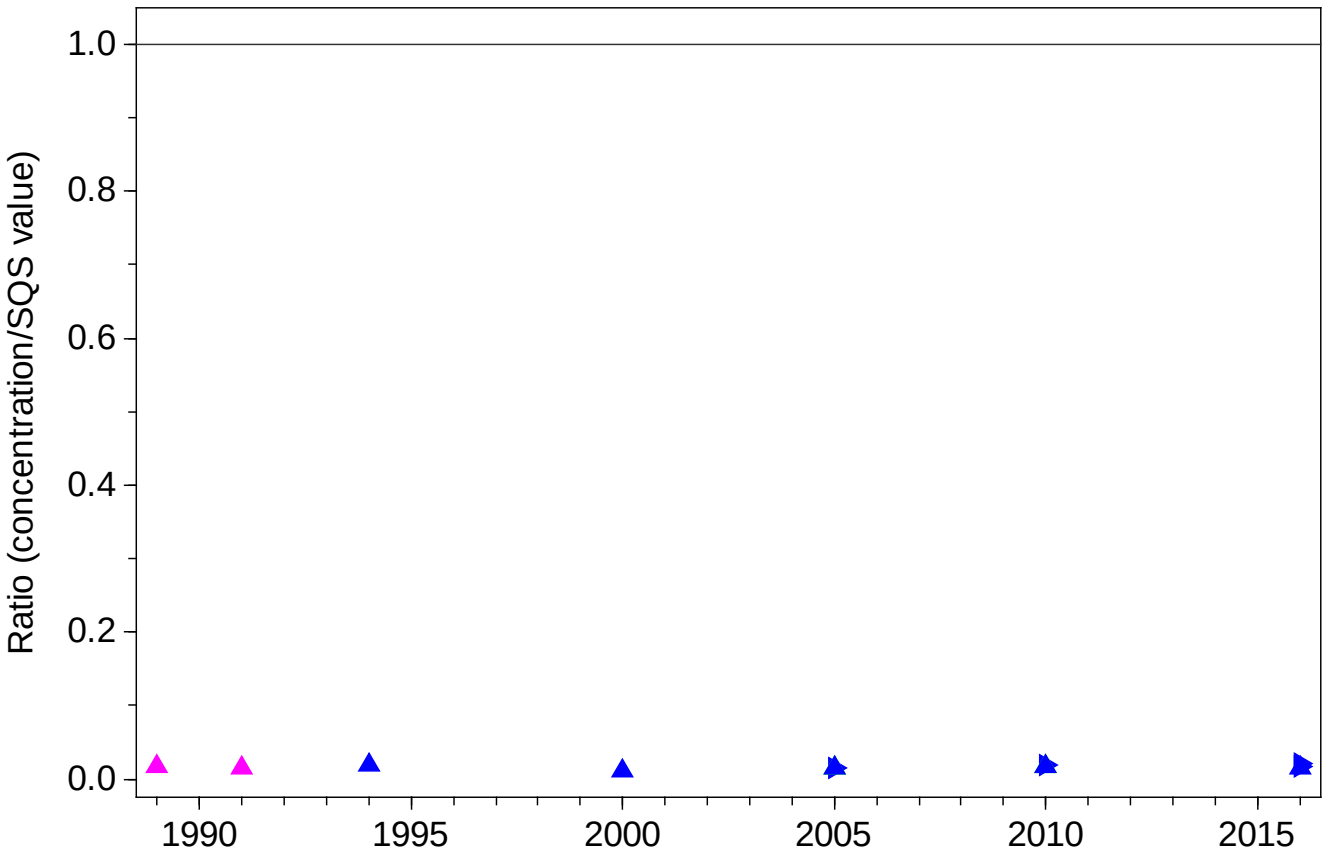
SQS quotient, Cadmium, Station 13



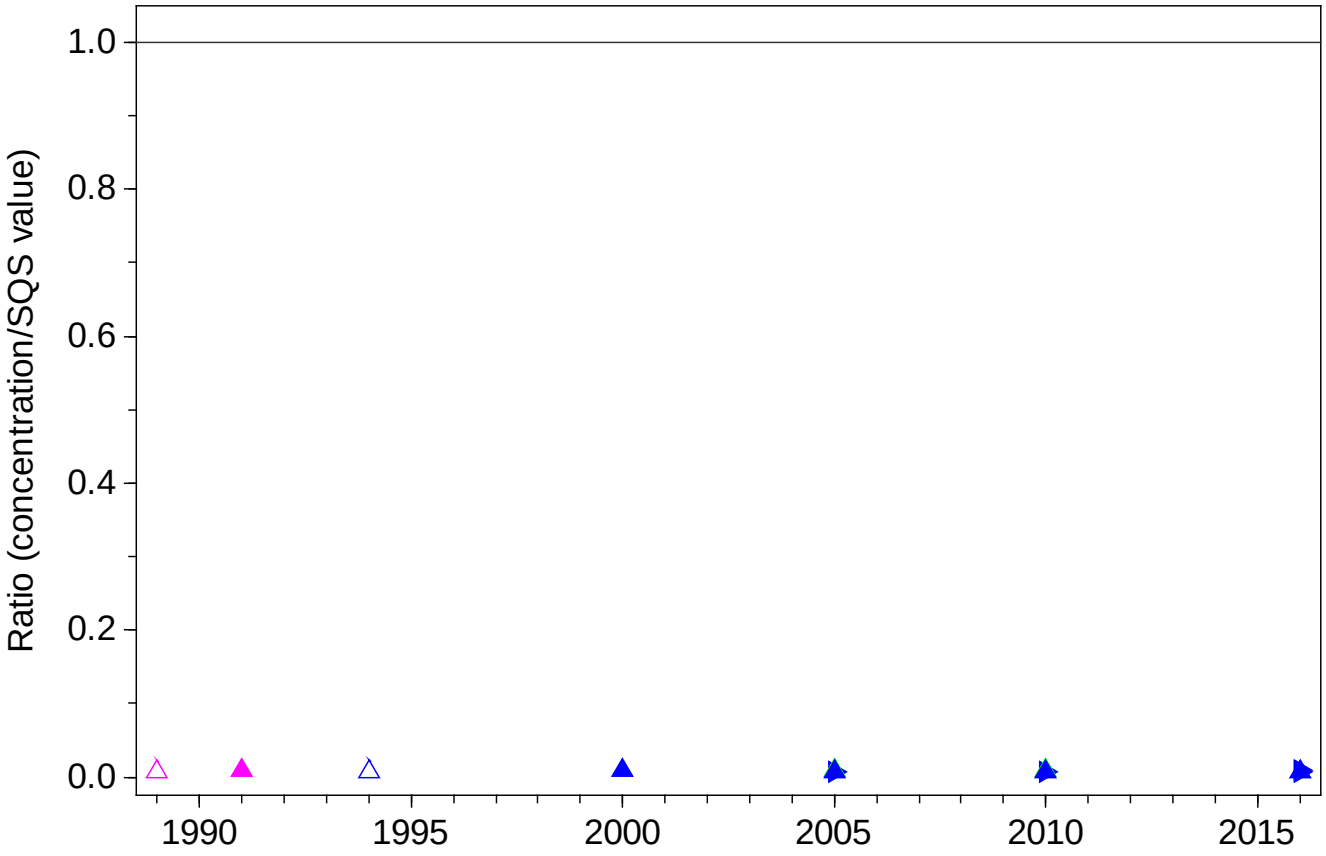
SQS quotient, Chromium, Station 13



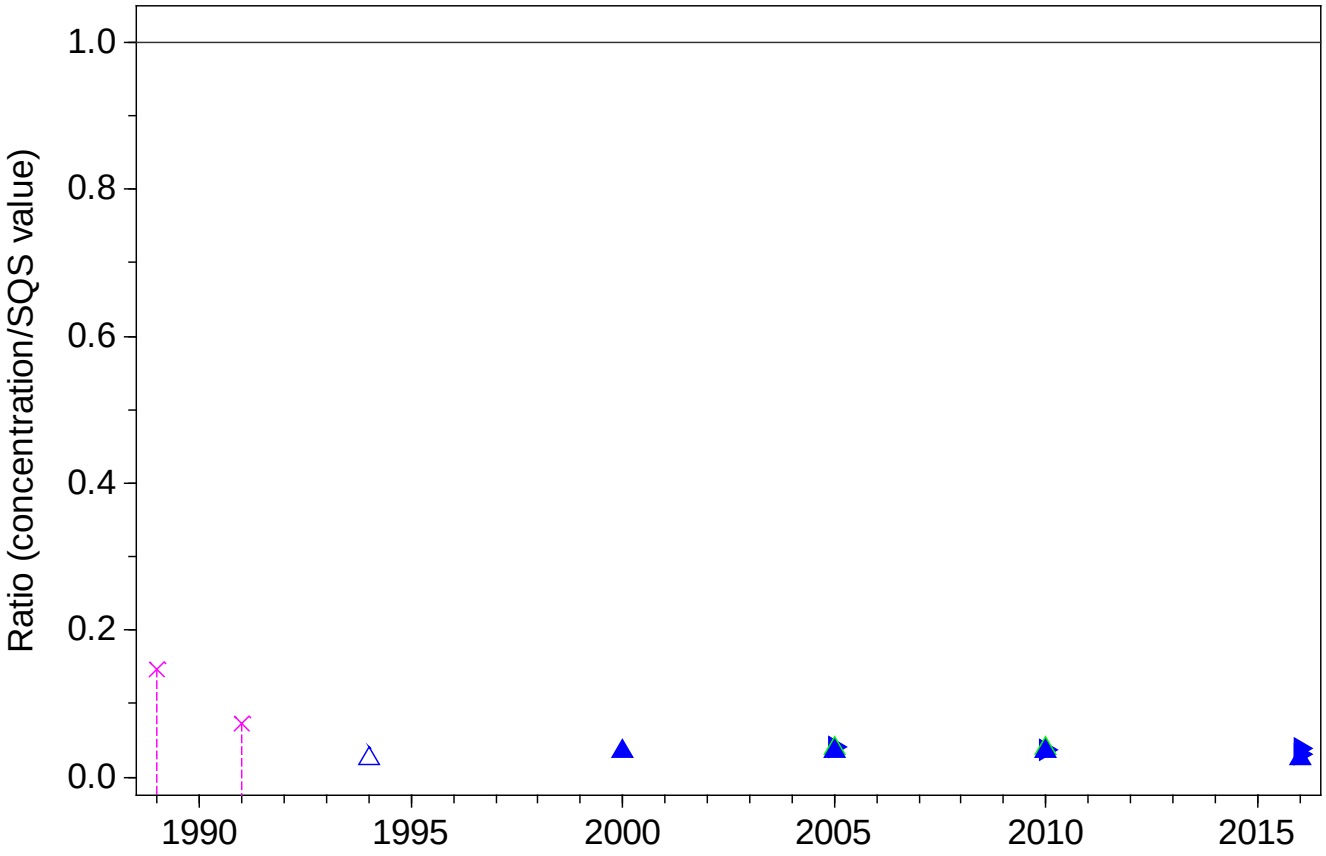
SQS quotient, Copper, Station 13



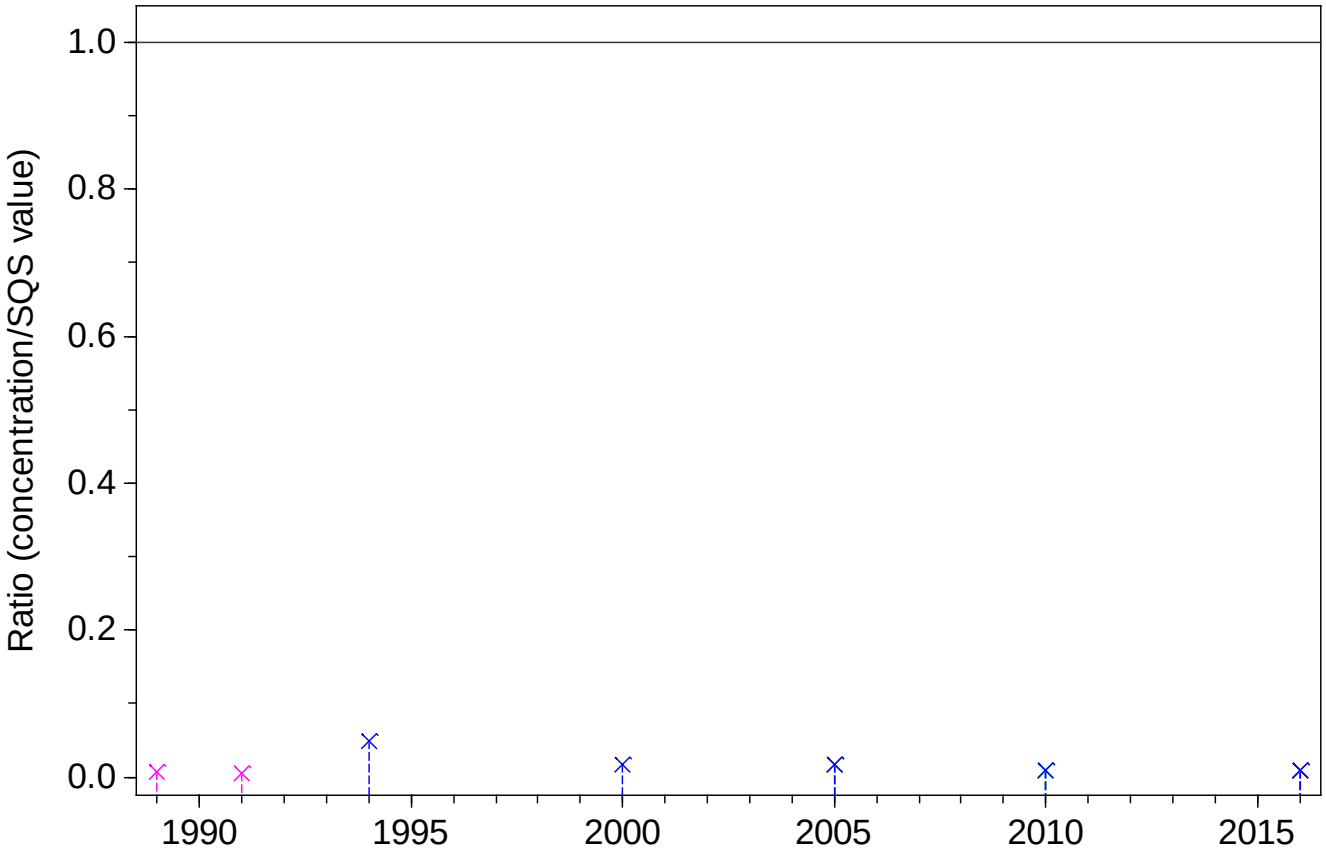
SQS quotient, Lead, Station 13



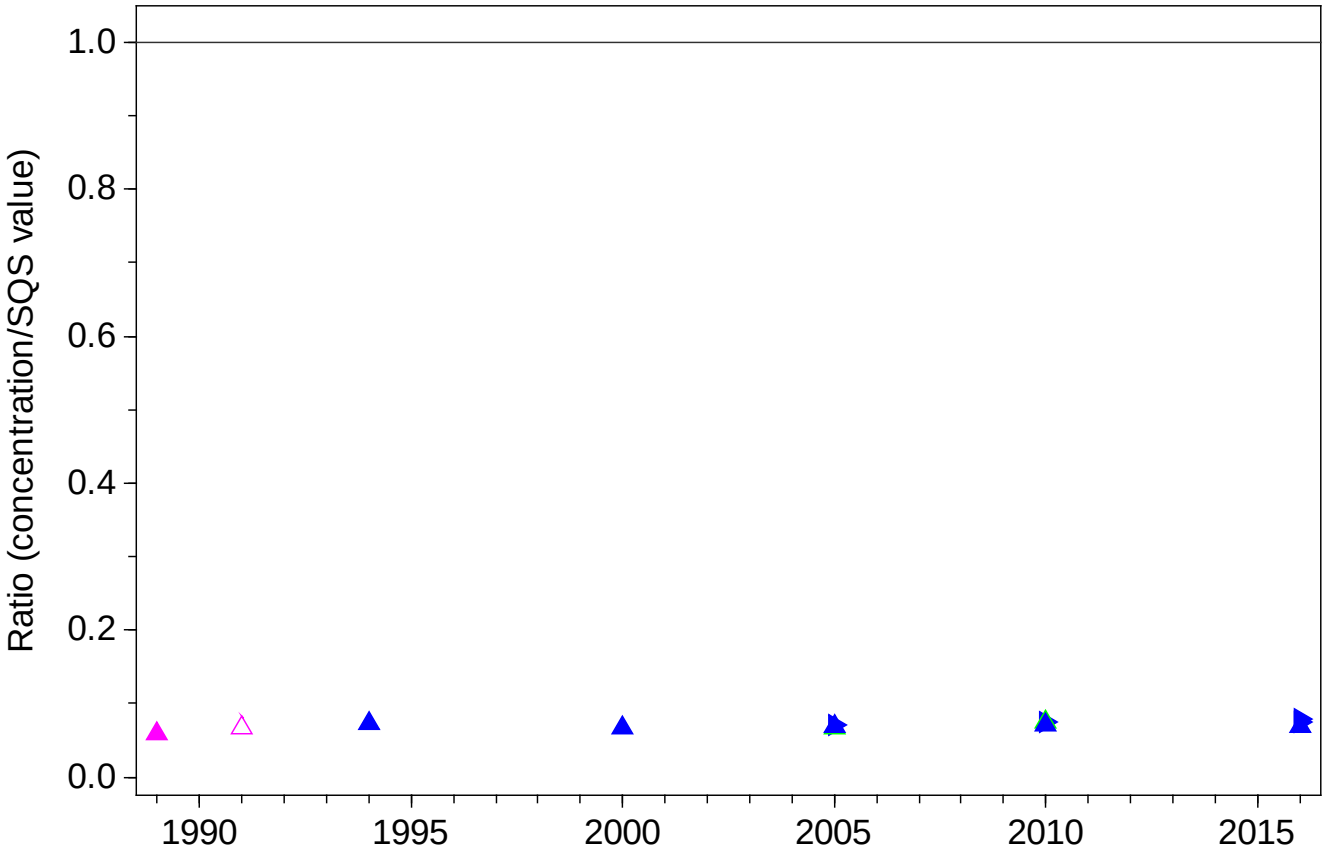
SQS quotient, Mercury, Station 13



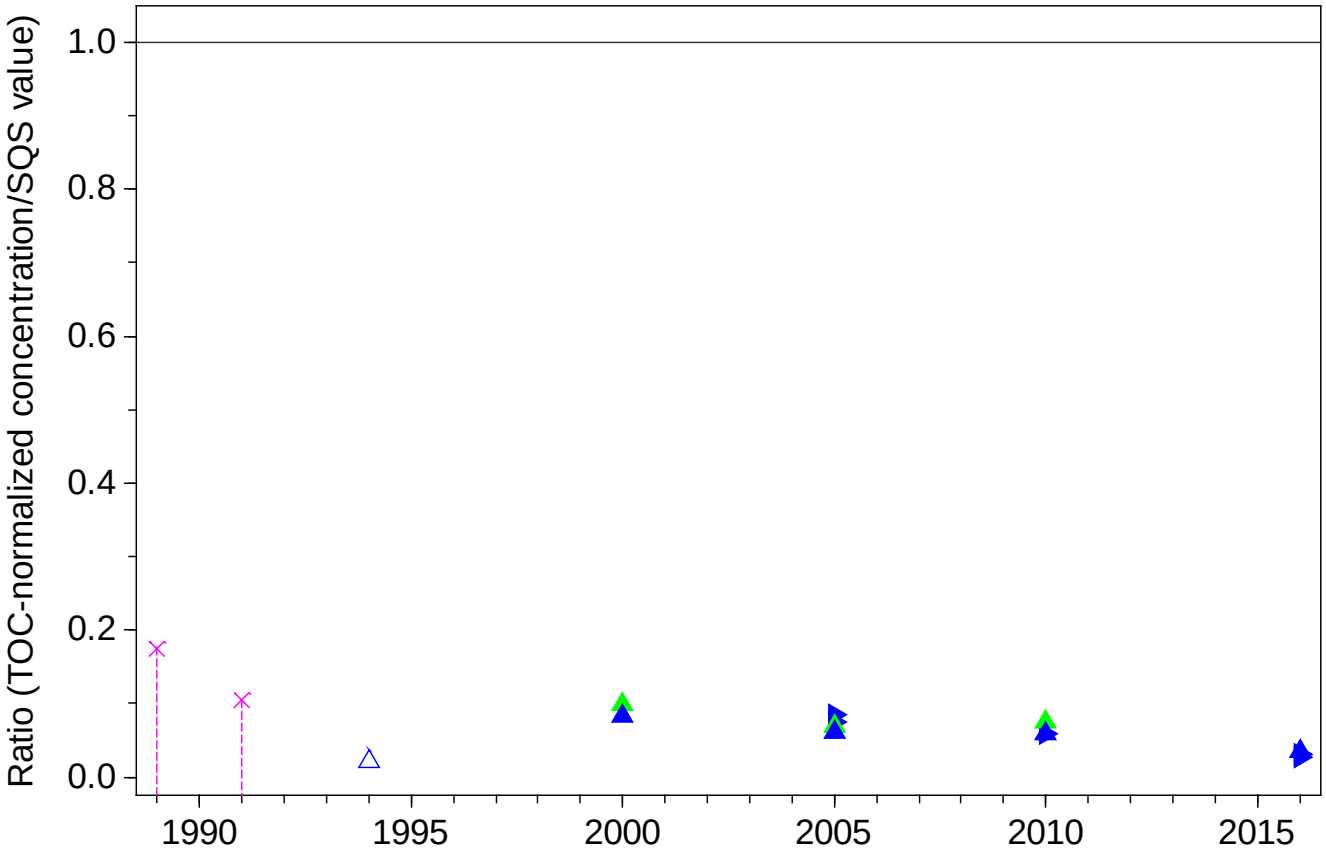
SQS quotient, Silver, Station 13



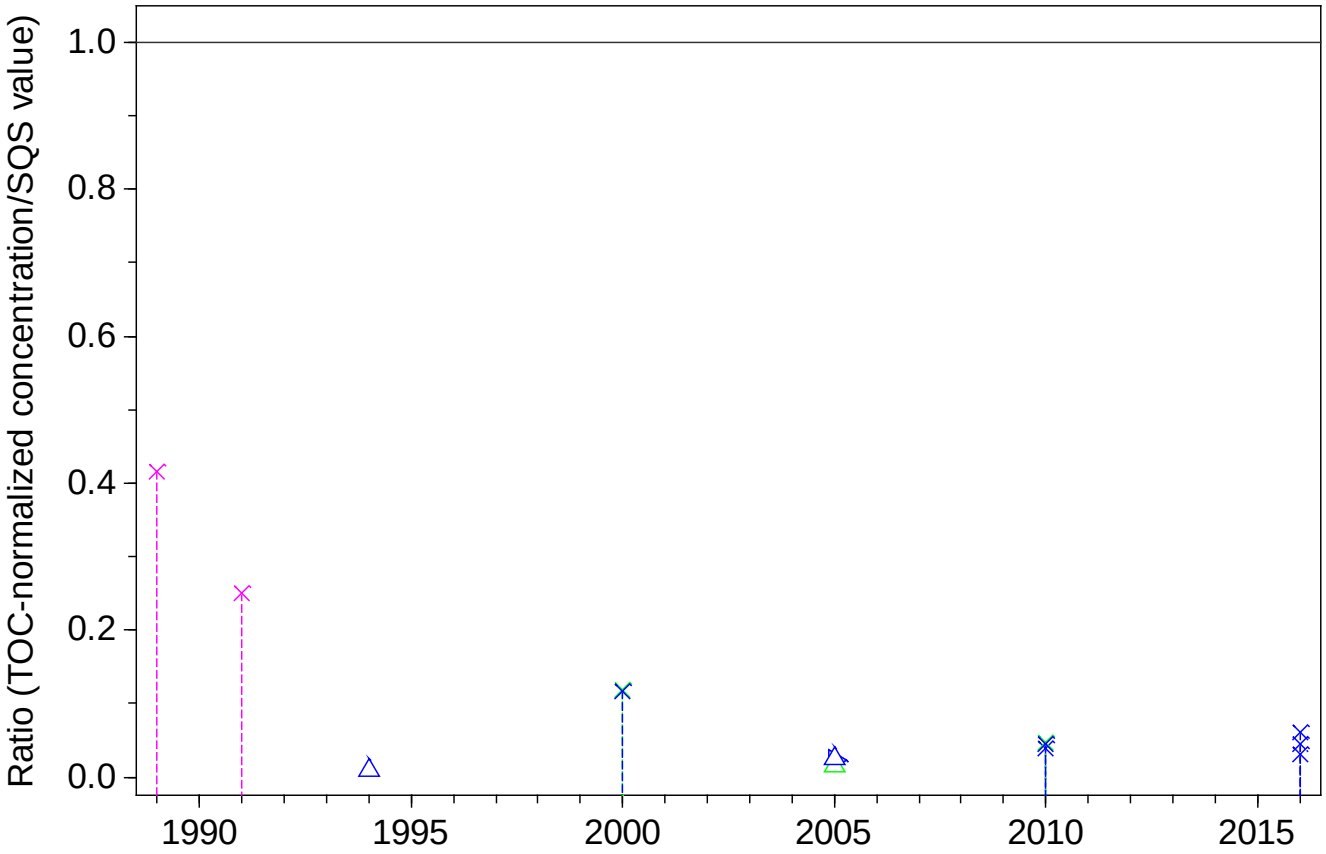
SQS quotient, Zinc, Station 13



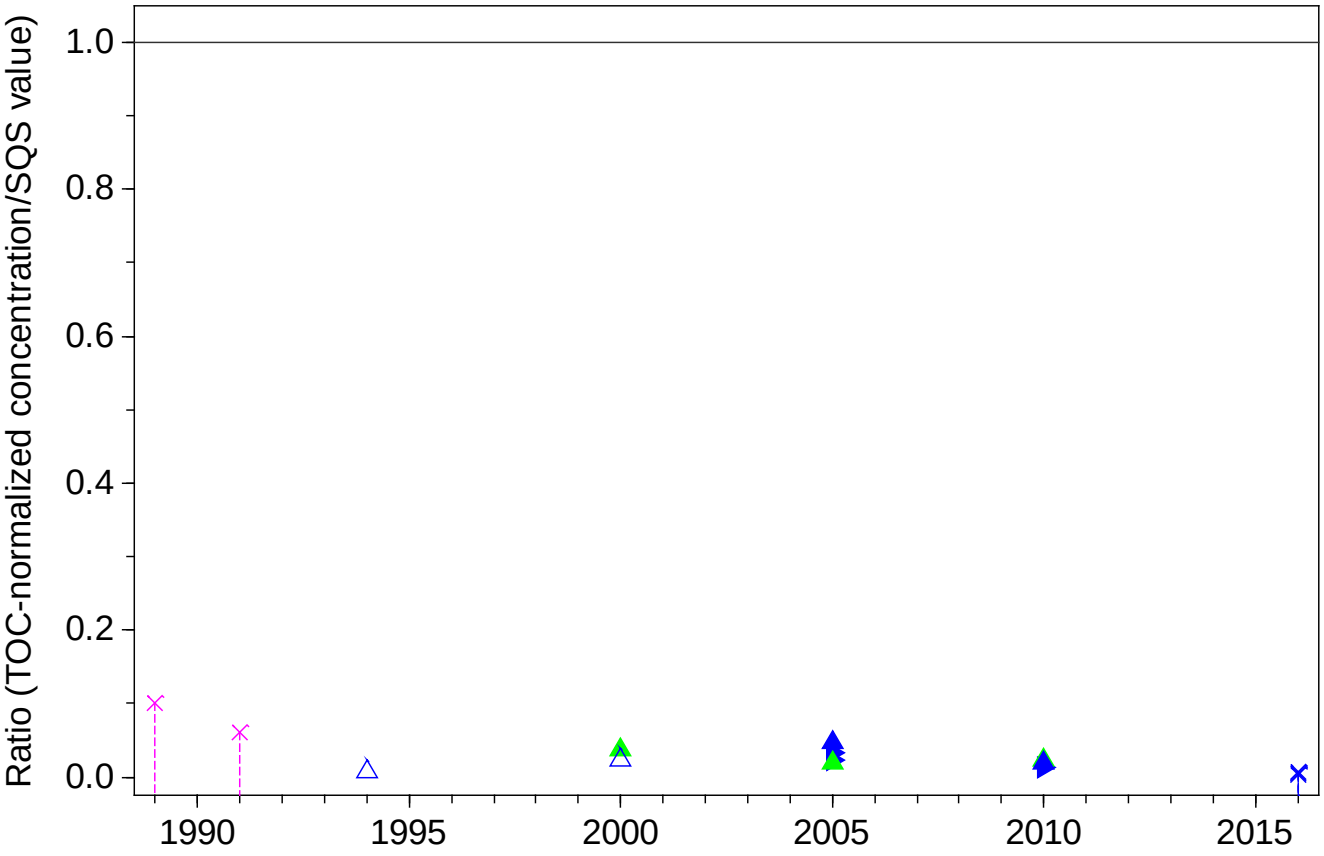
SQS quotient, 2-Methylnaphthalene, Station 13



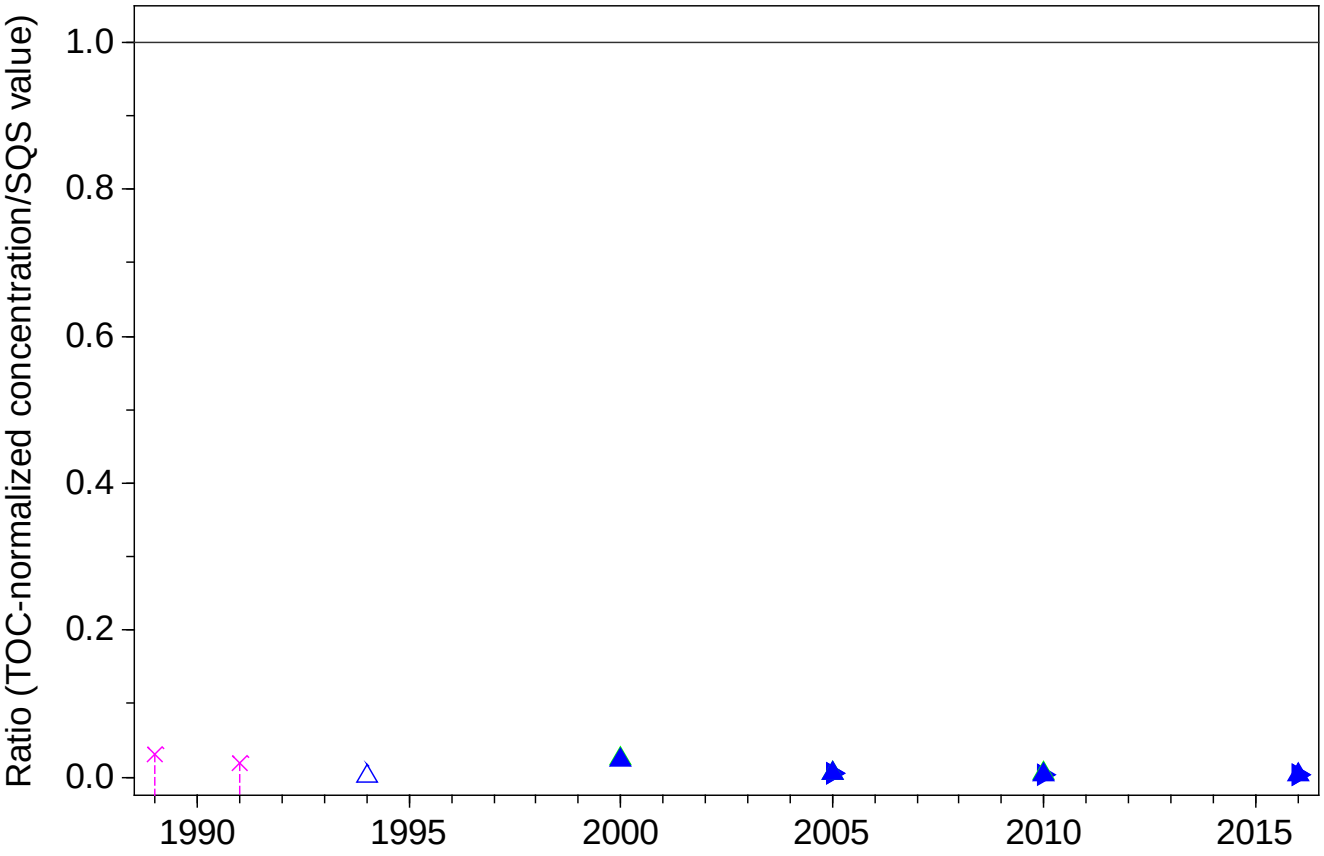
SQS quotient, Acenaphthene, Station 13



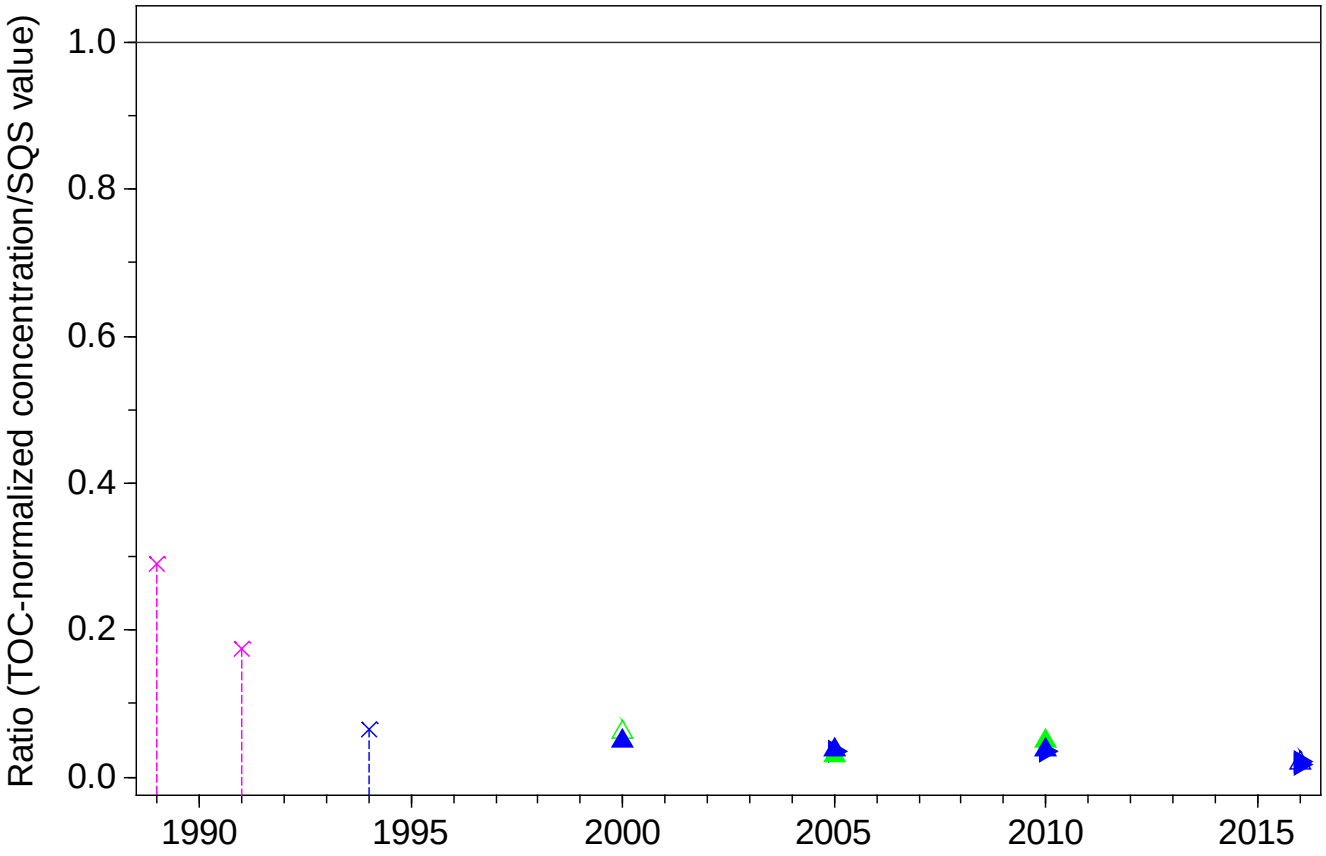
SQS quotient, Acenaphthylene, Station 13



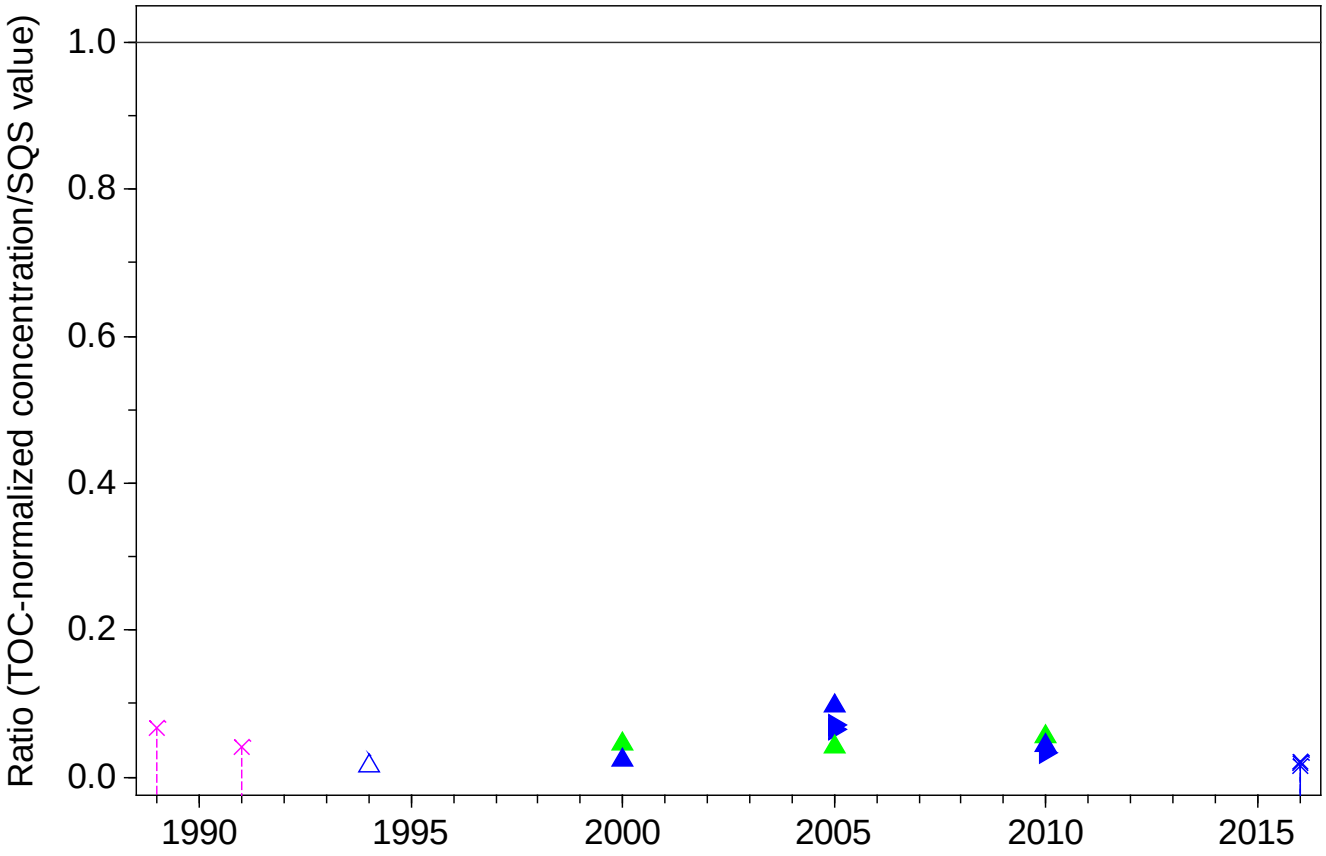
SQS quotient, Anthracene, Station 13



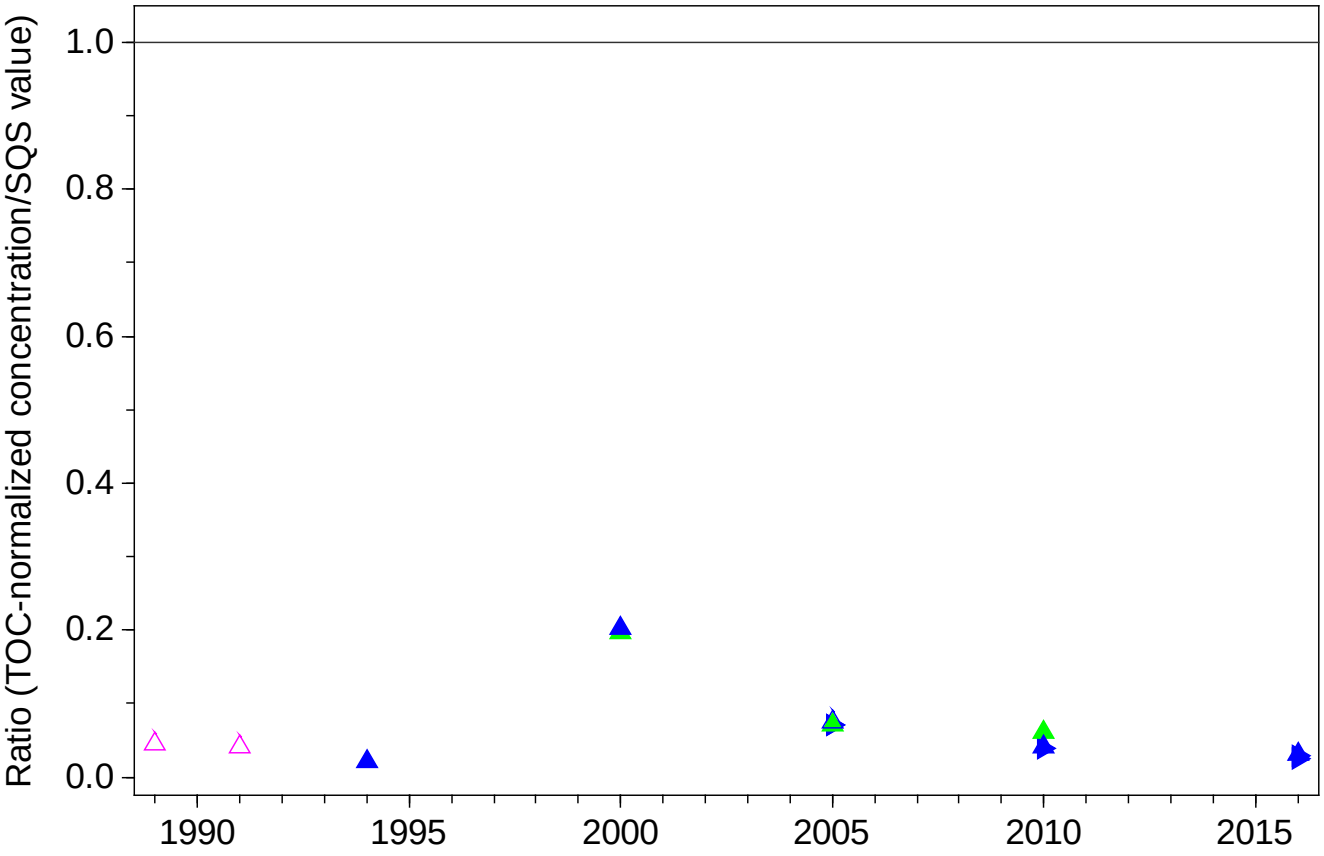
SQS quotient, Fluorene, Station 13



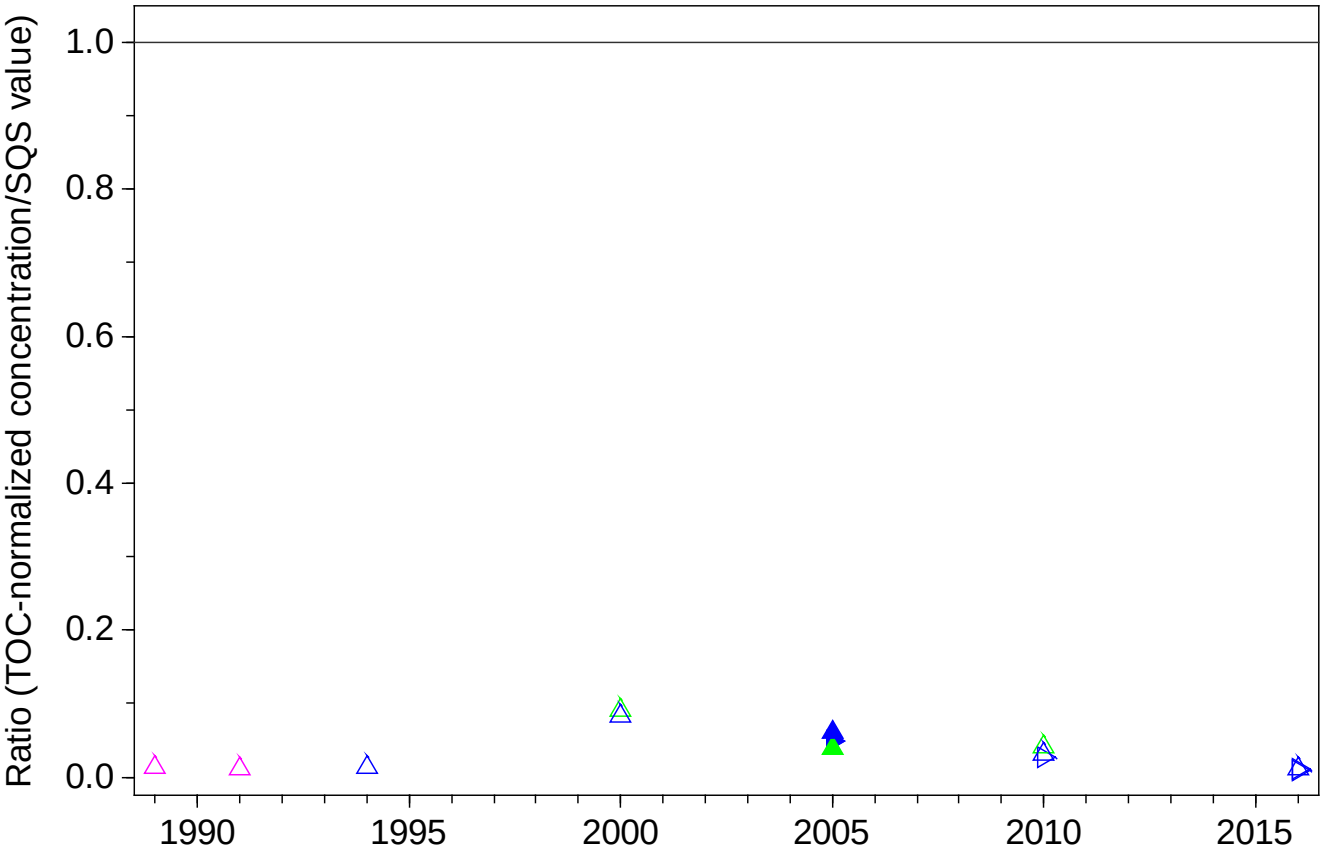
SQS quotient, Naphthalene, Station 13



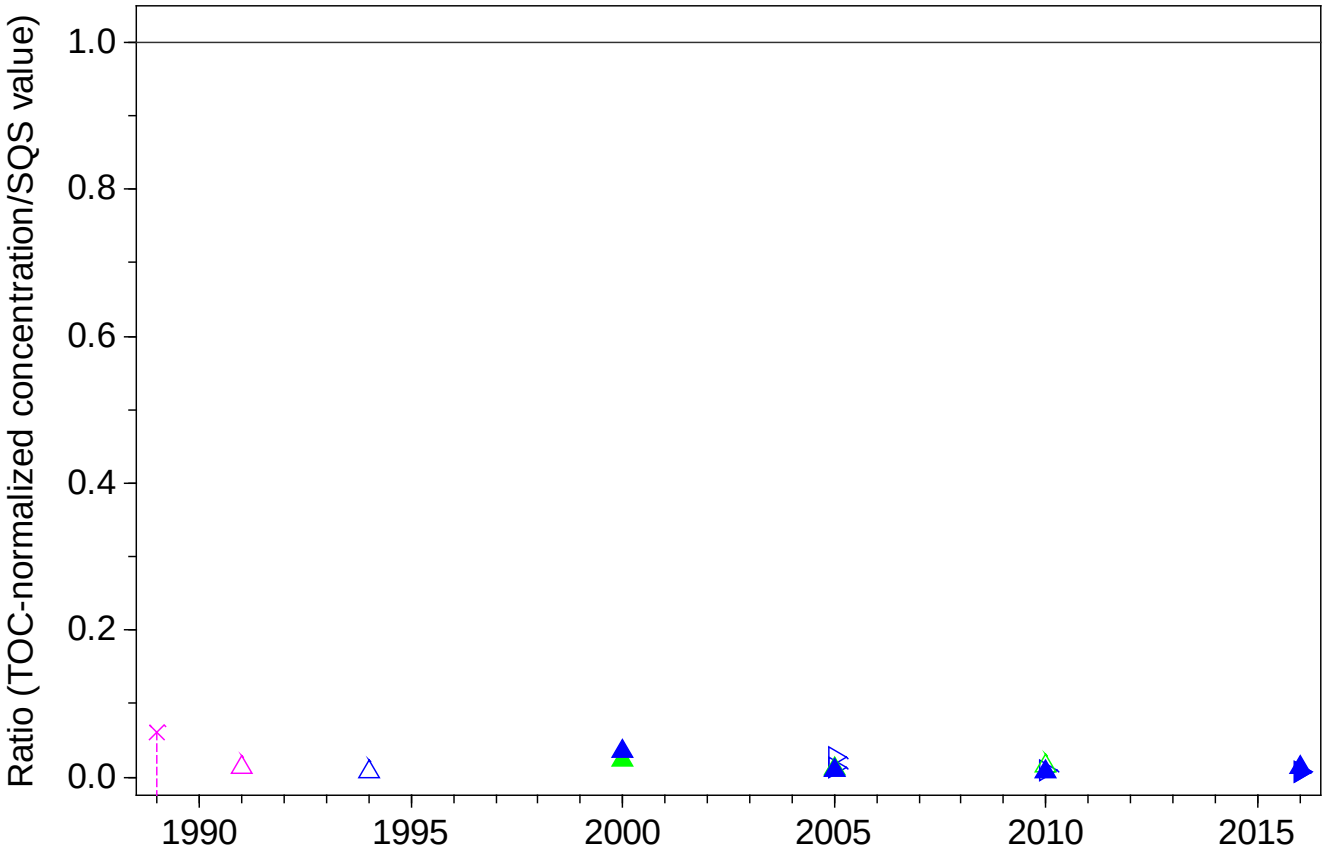
SQS quotient, Phenanthrene, Station 13



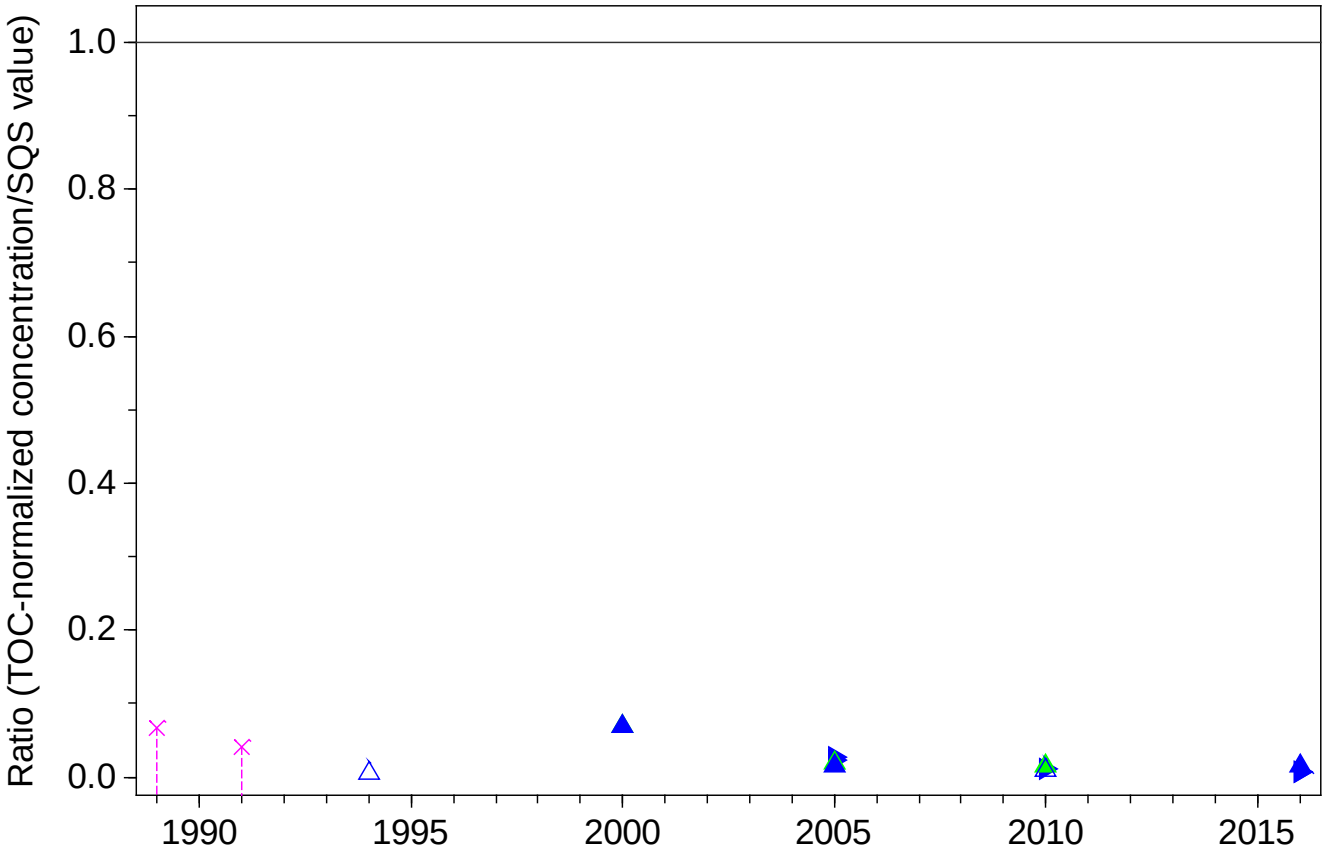
SQS quotient, Total LPAH, Station 13



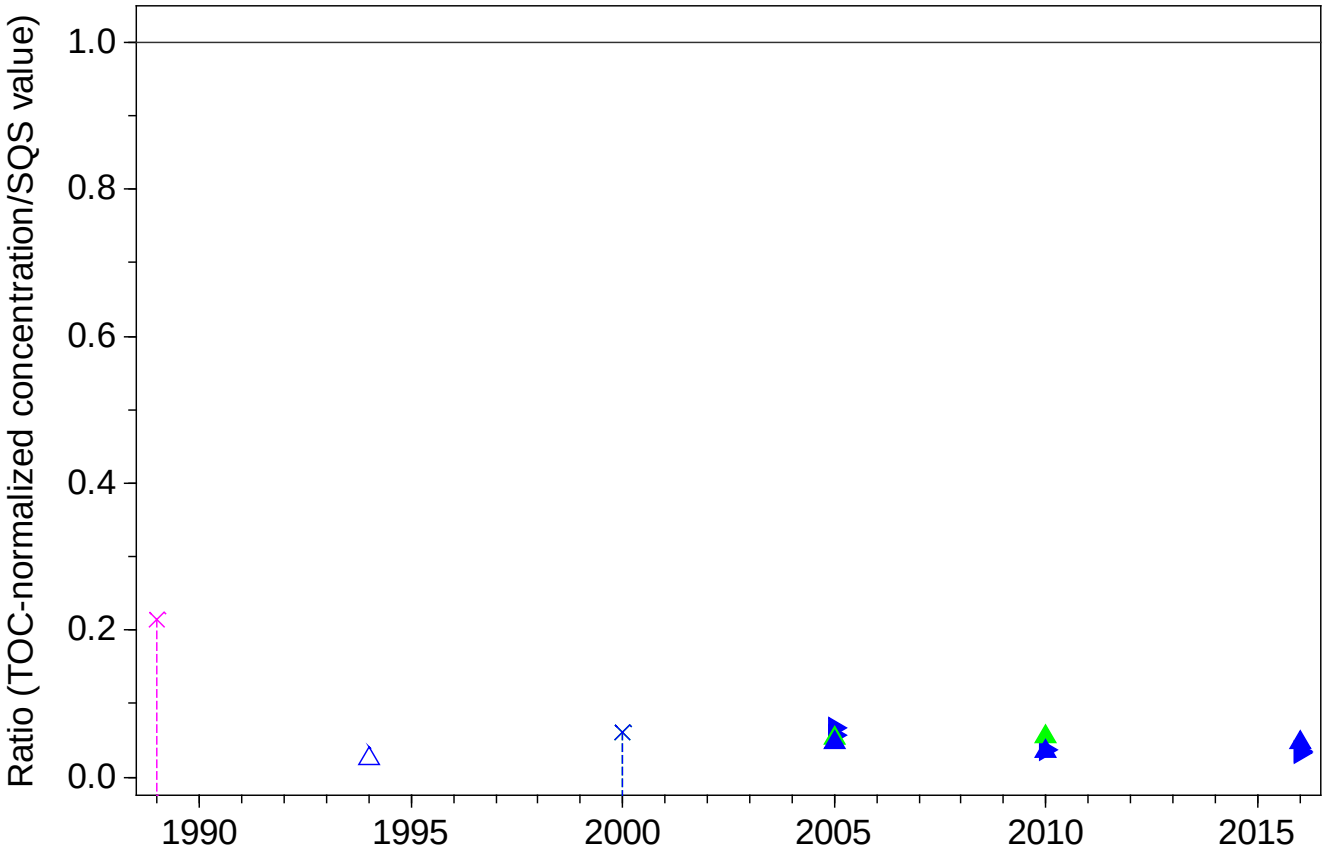
SQS quotient, Benzo(a)anthracene, Station 13



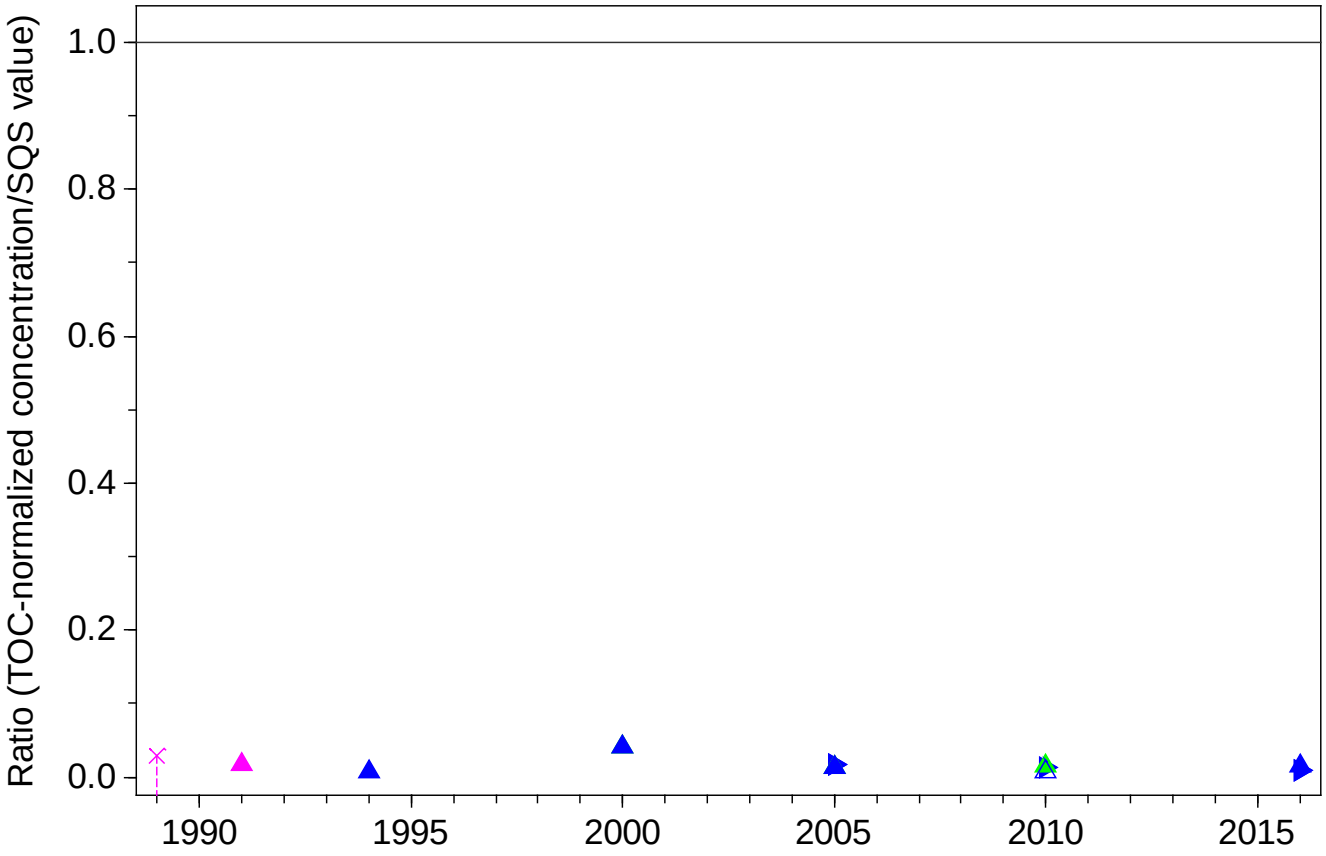
SQS quotient, Benzo(a)pyrene, Station 13



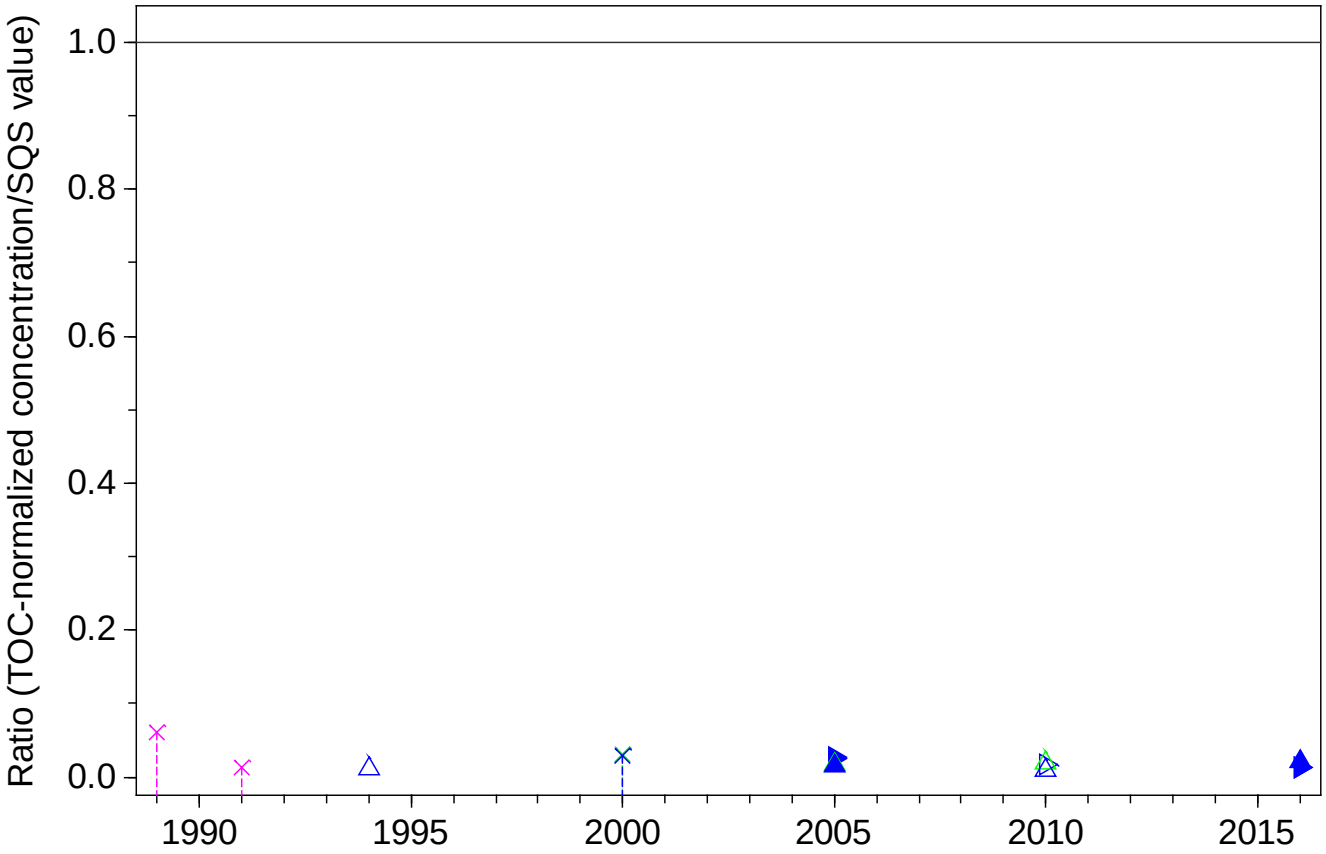
SQS quotient, Benzo(g,h,i)perylene, Station 13



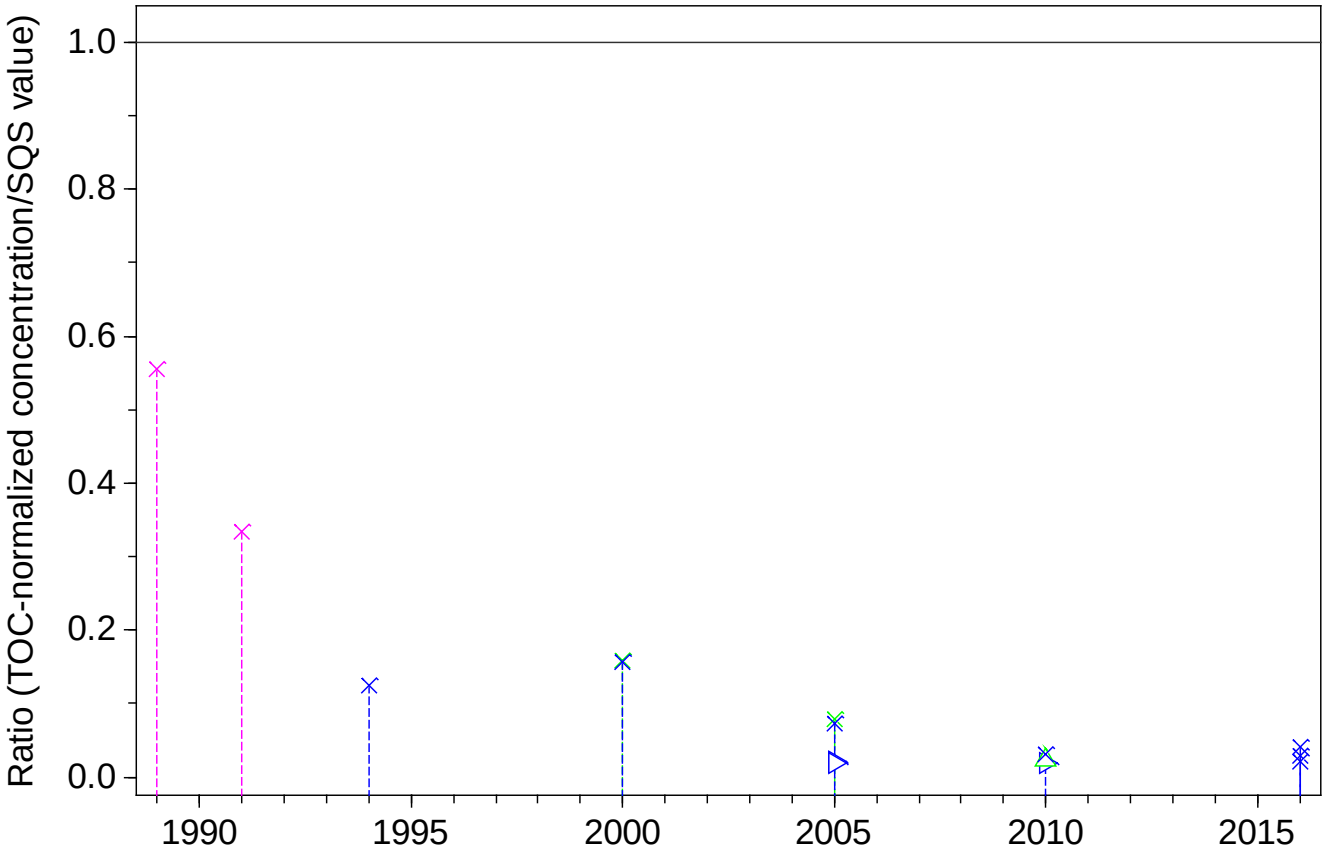
SQS quotient, Total Benzofluoranthenes, Station 13



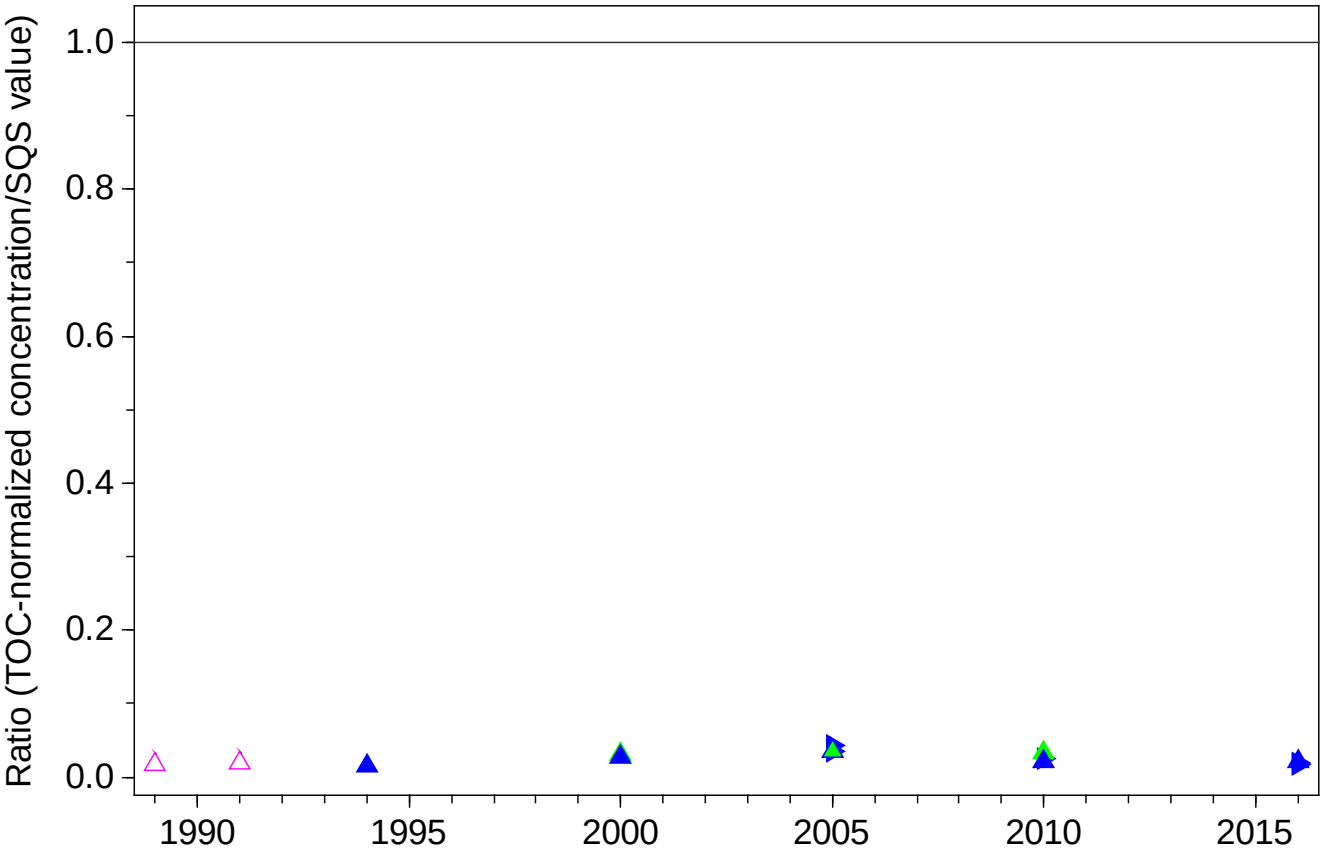
SQS quotient, Chrysene, Station 13



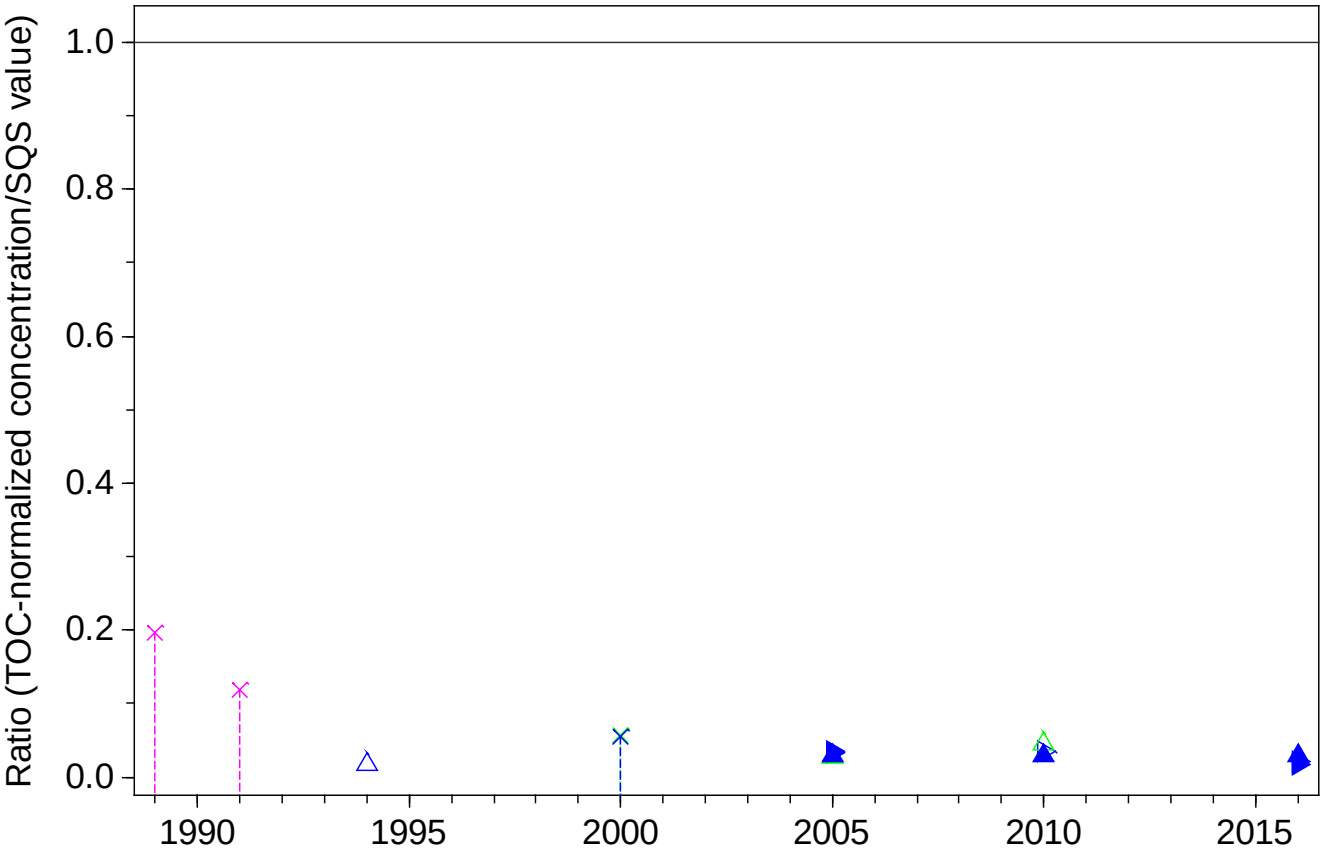
SQS quotient, Dibenzo(a,h)anthracene, Station 13



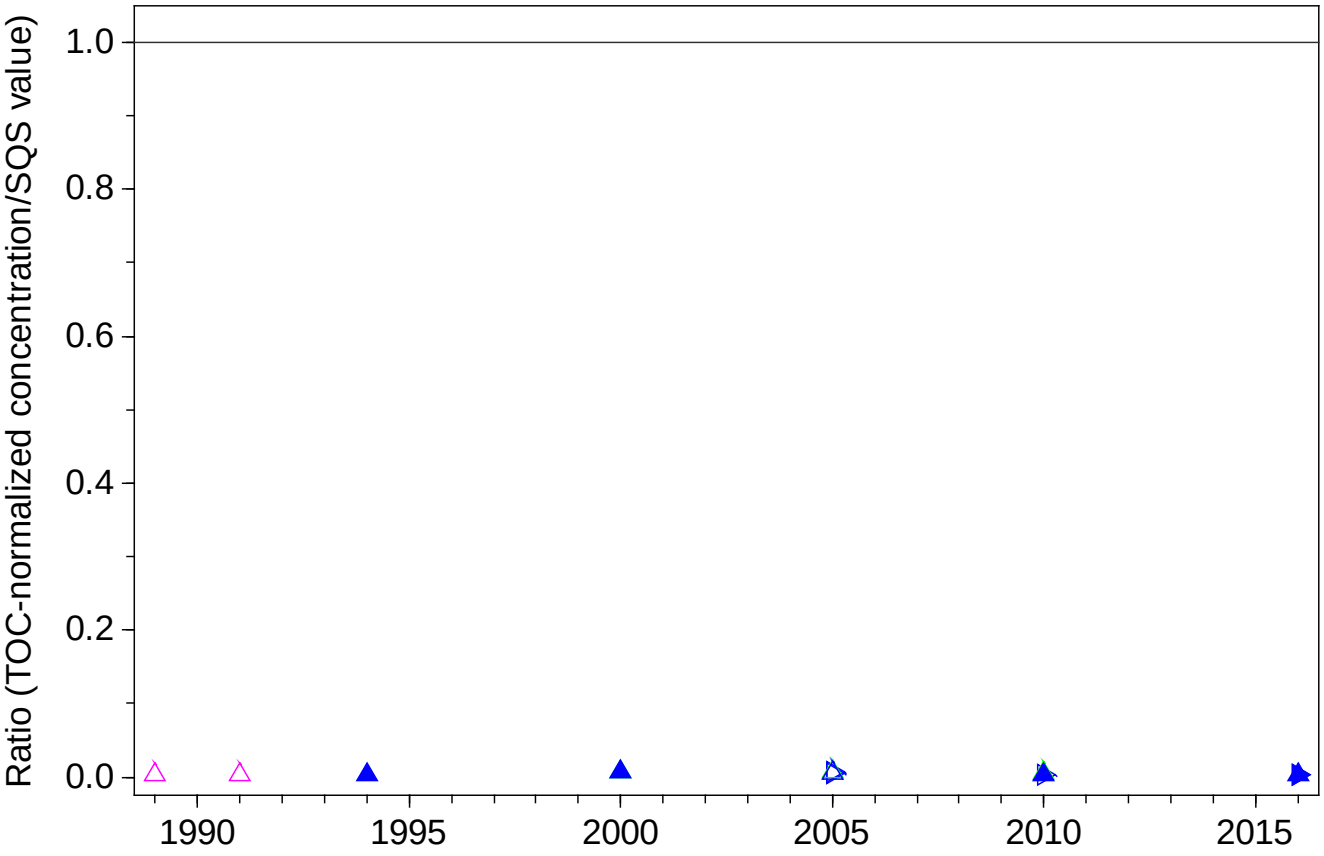
SQS quotient, Fluoranthene, Station 13



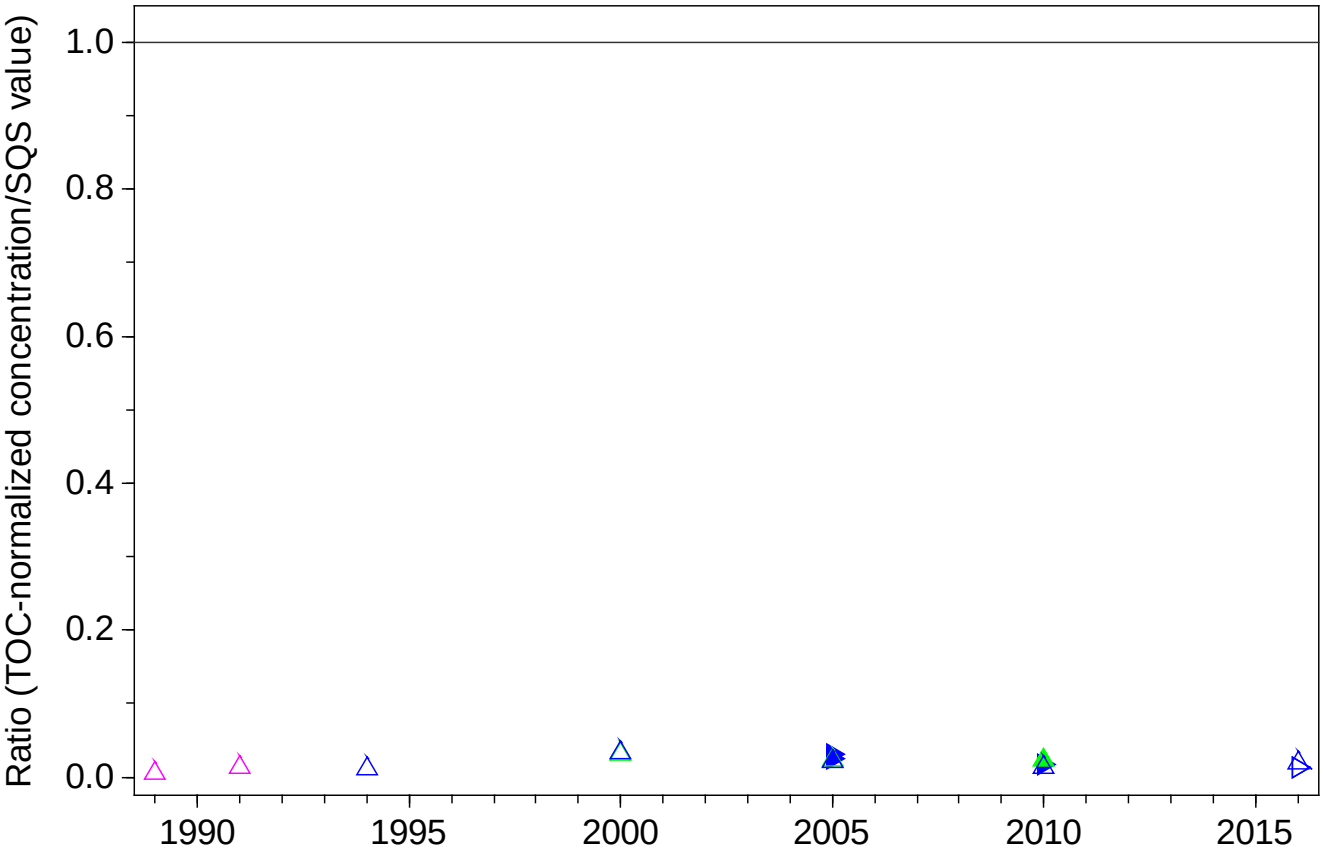
SQS quotient, Indeno(1,2,3-c,d)pyrene, Station 13



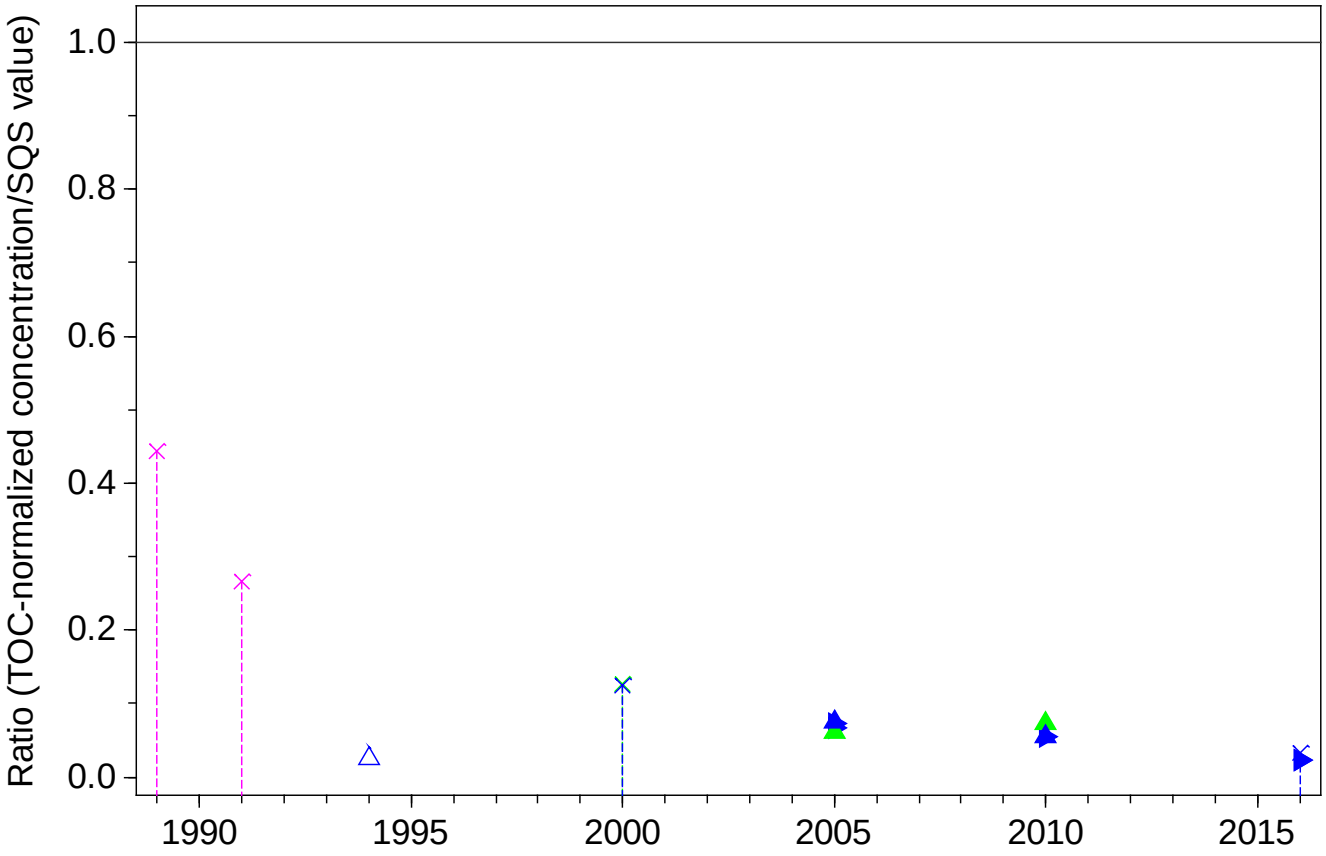
SQS quotient, Pyrene, Station 13



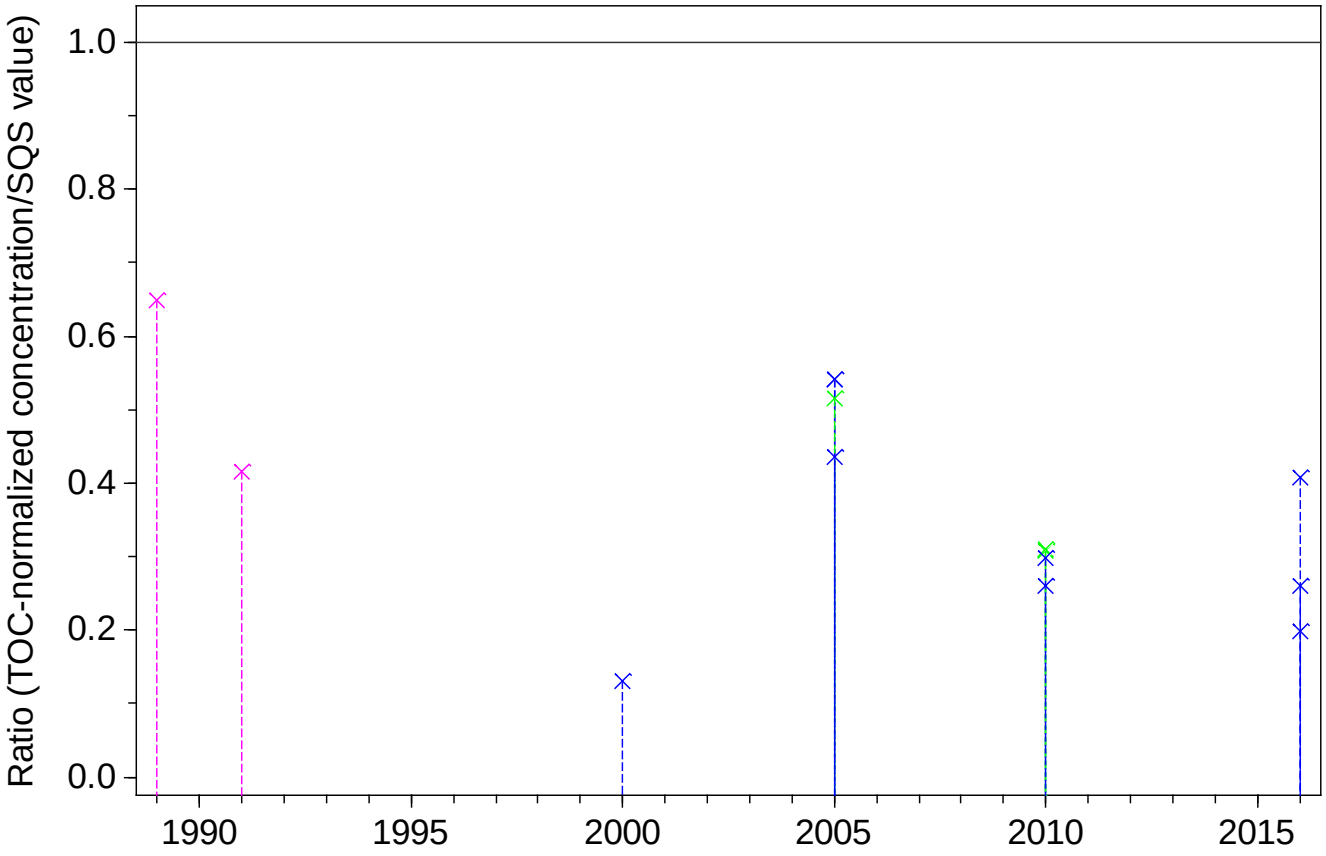
SQS quotient, Total HPAH, Station 13



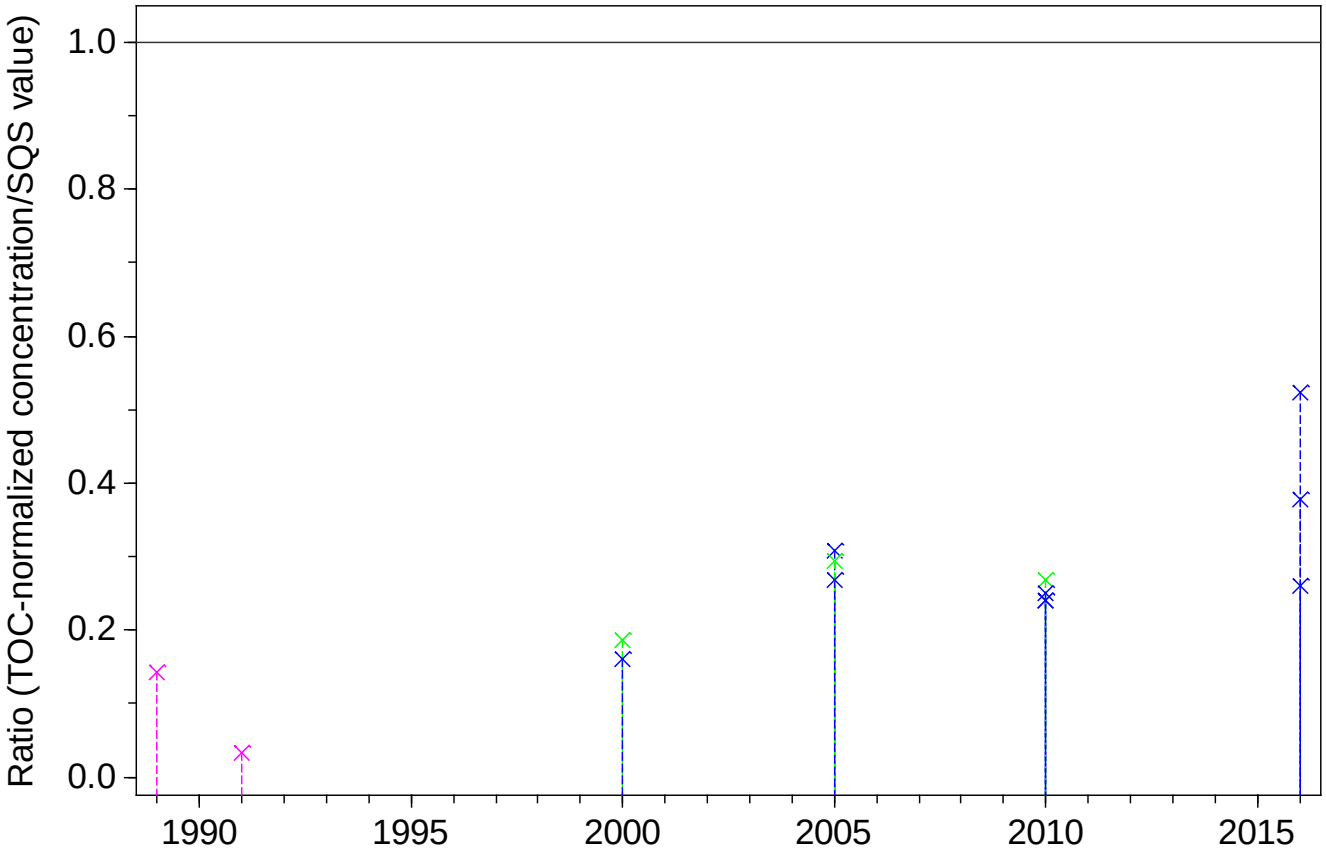
SQS quotient, Dibenzofuran, Station 13



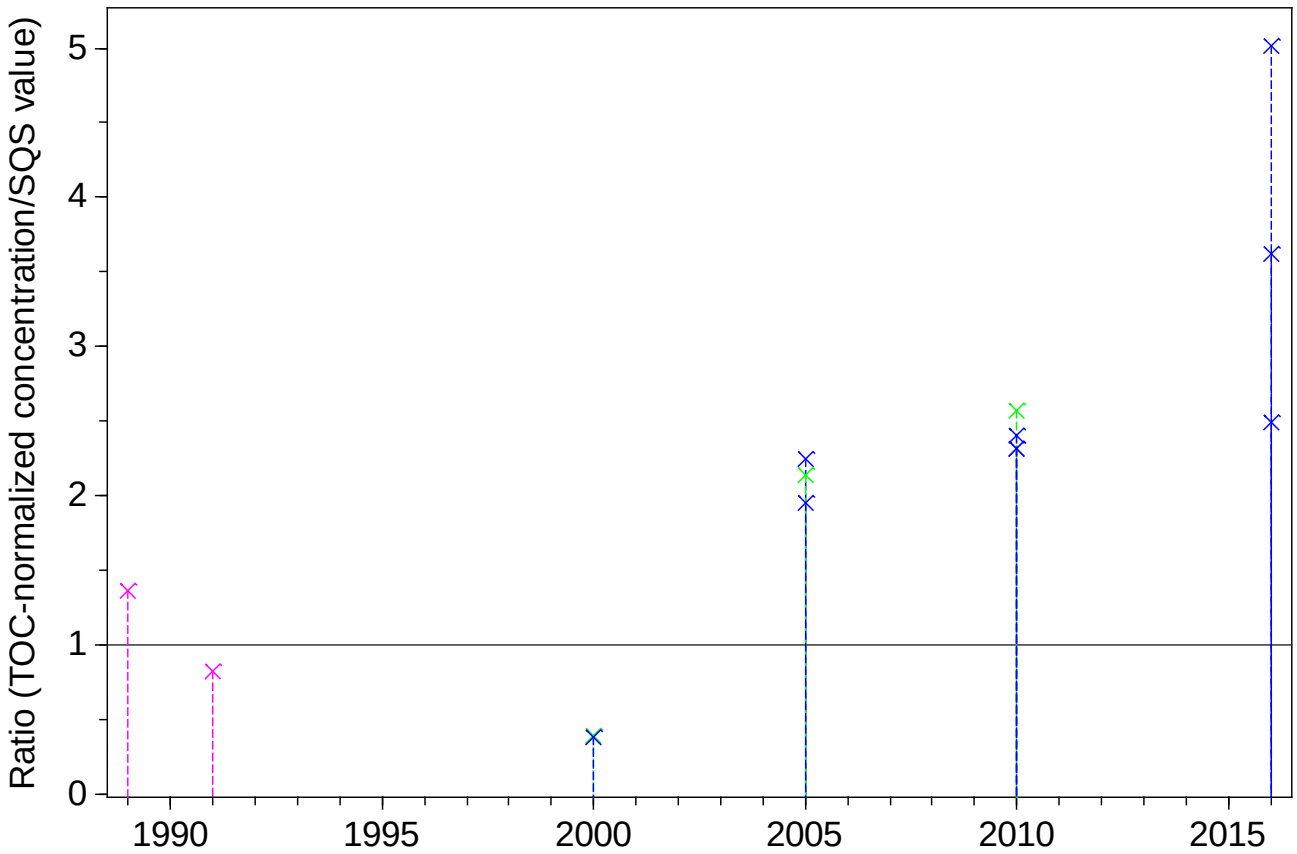
SQS quotient, Total Aroclors, Station 13



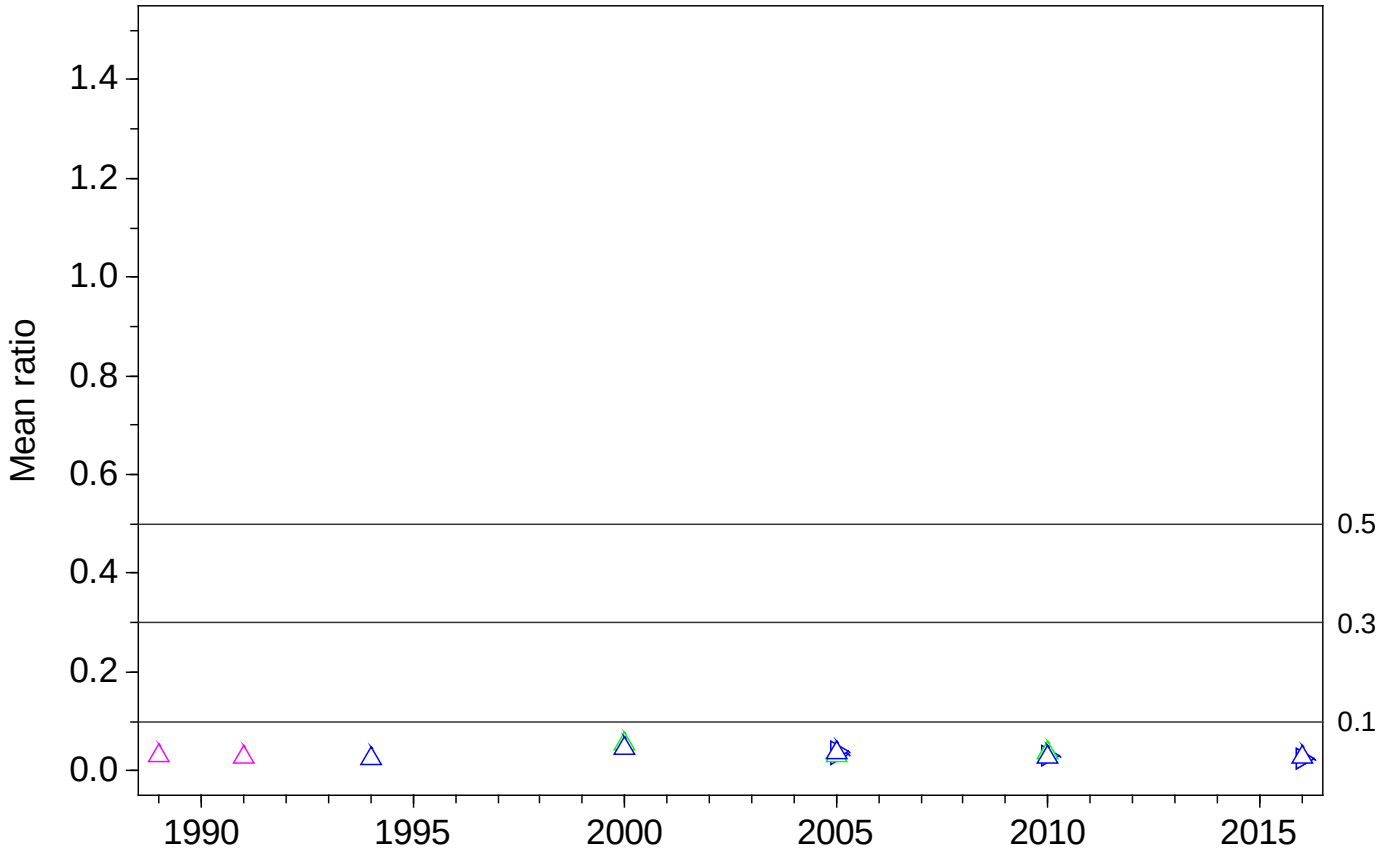
SQS quotient, Bis(2-ethylhexyl)phthalate, Station 13



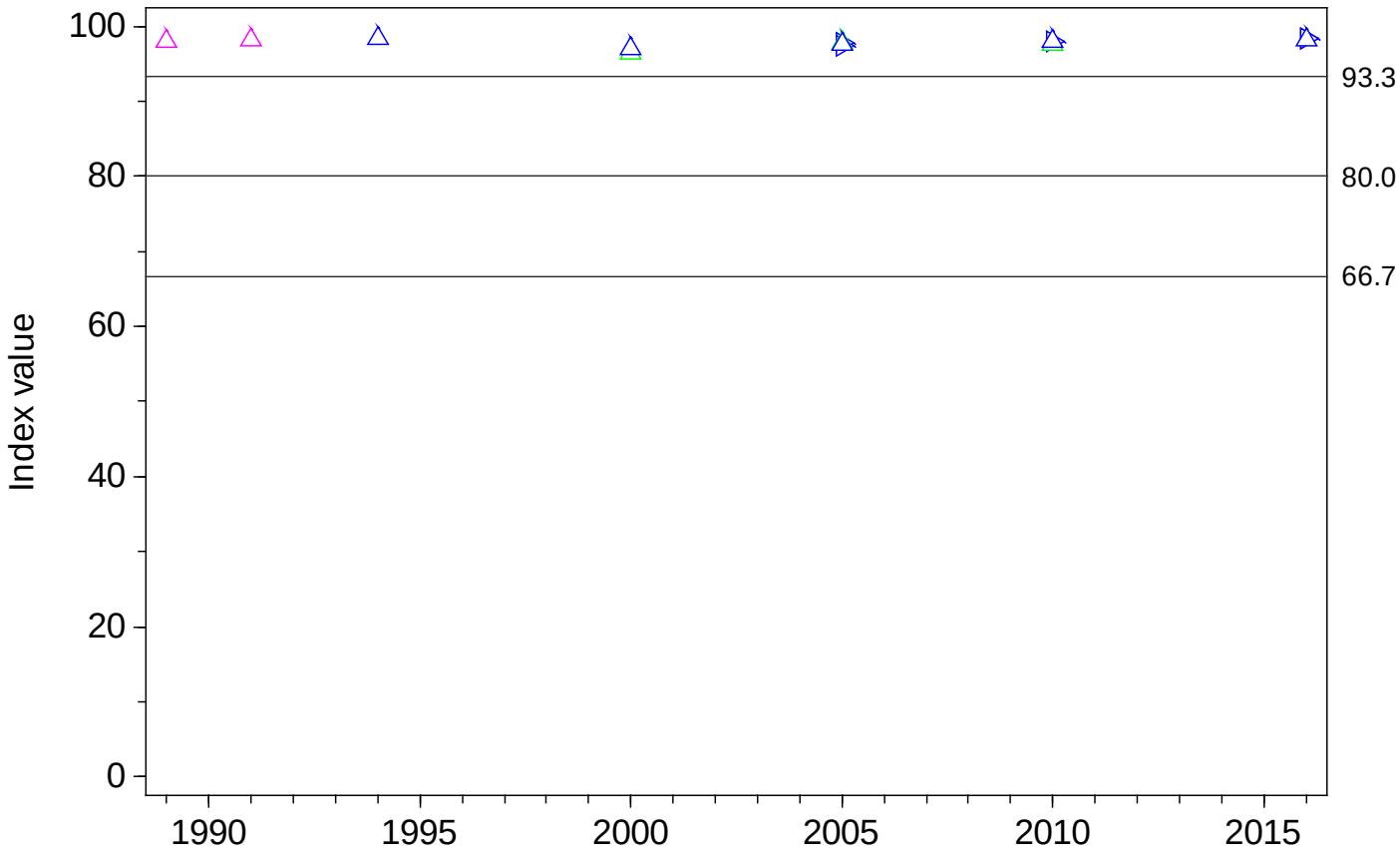
SQS quotient, Butylbenzylphthalate, Station 13



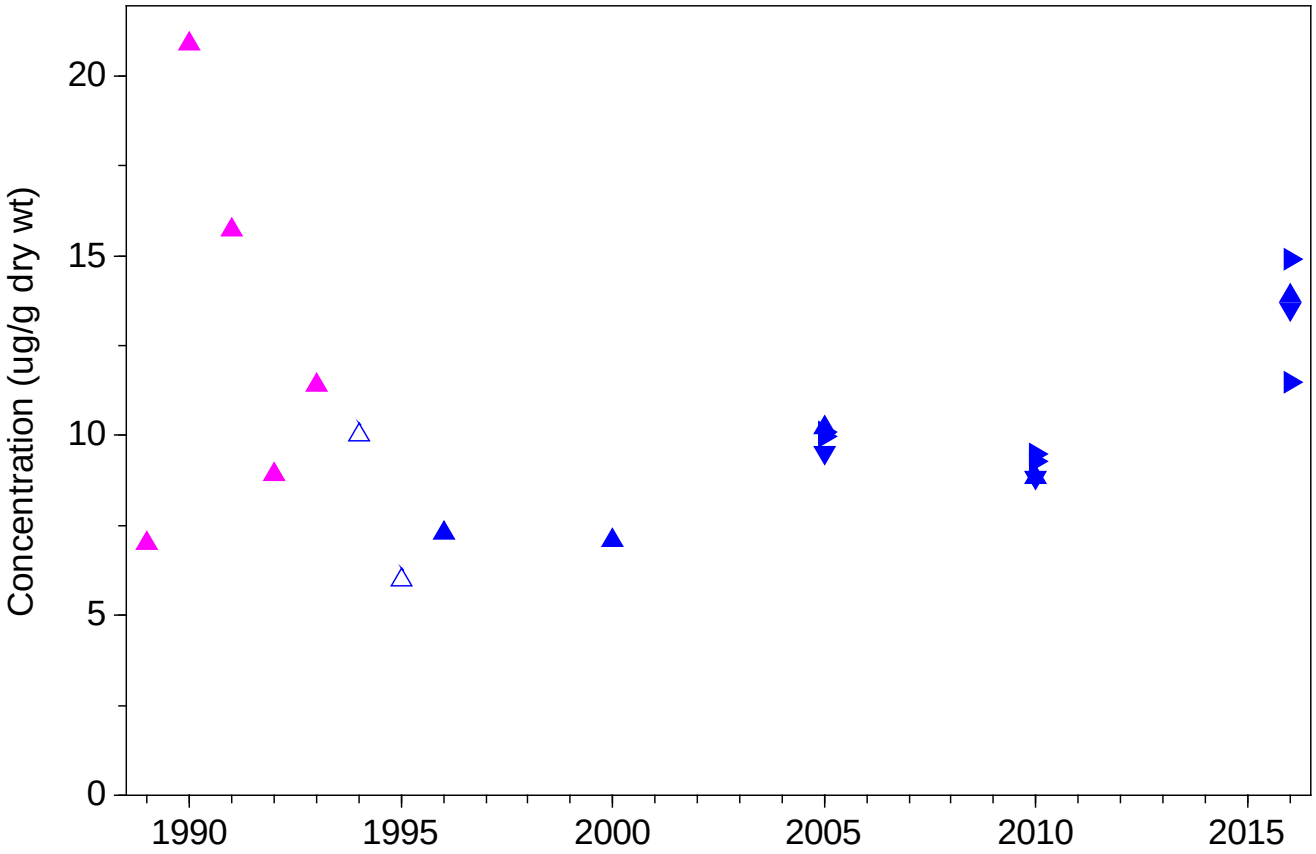
Mean SQS quotient, SCI SQS (no PAH totals), Station 13



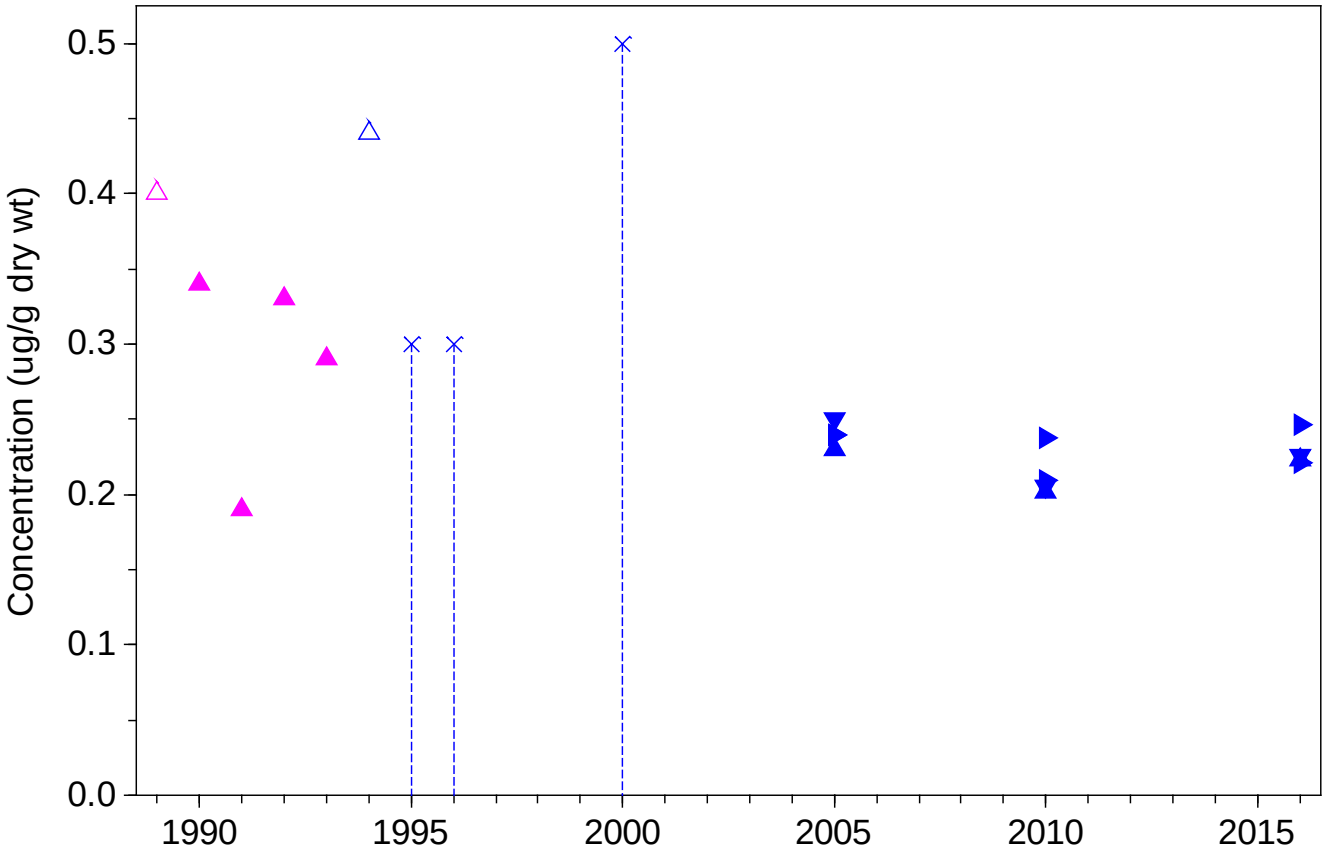
Sediment Chemistry Index, Station 13



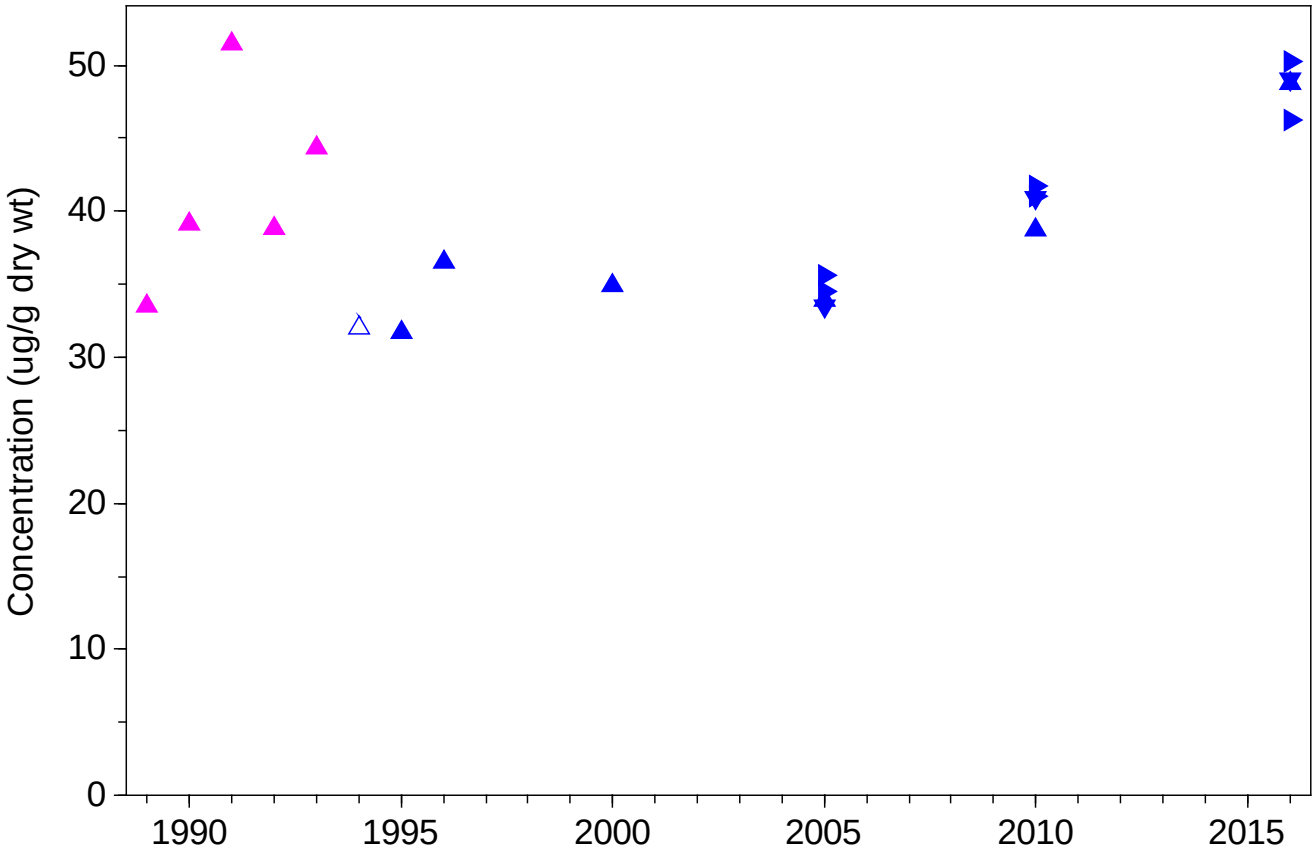
Arsenic, Station 21



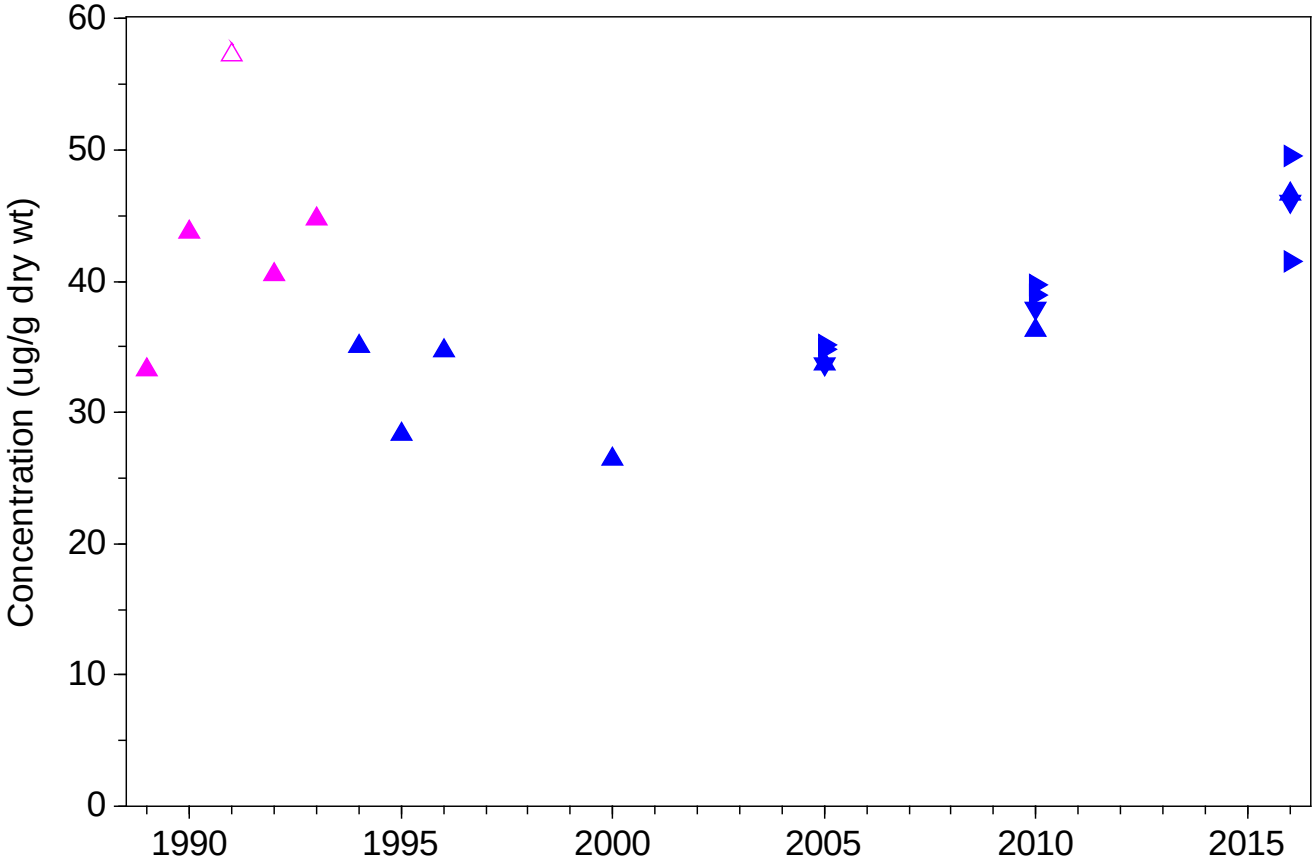
Cadmium, Station 21



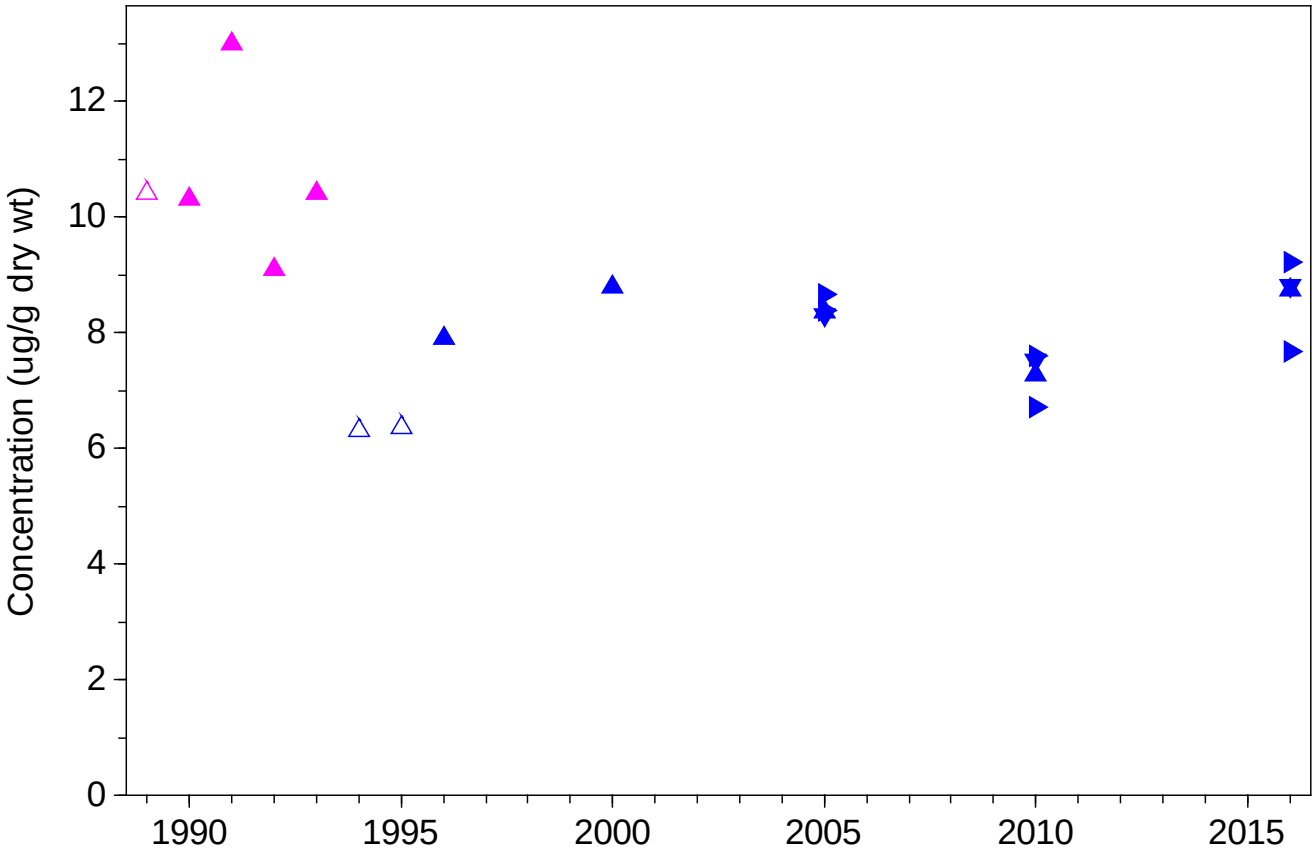
Chromium, Station 21



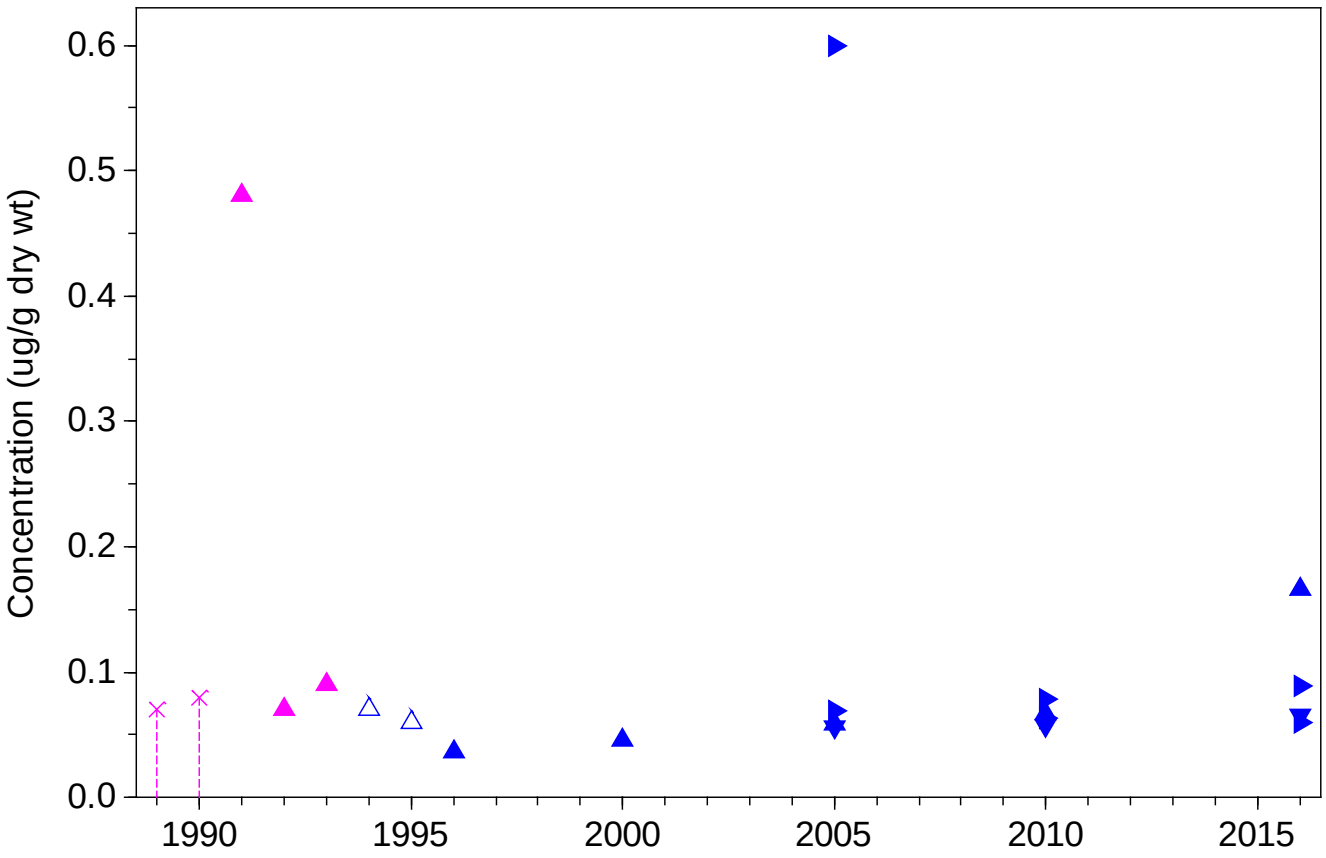
Copper, Station 21



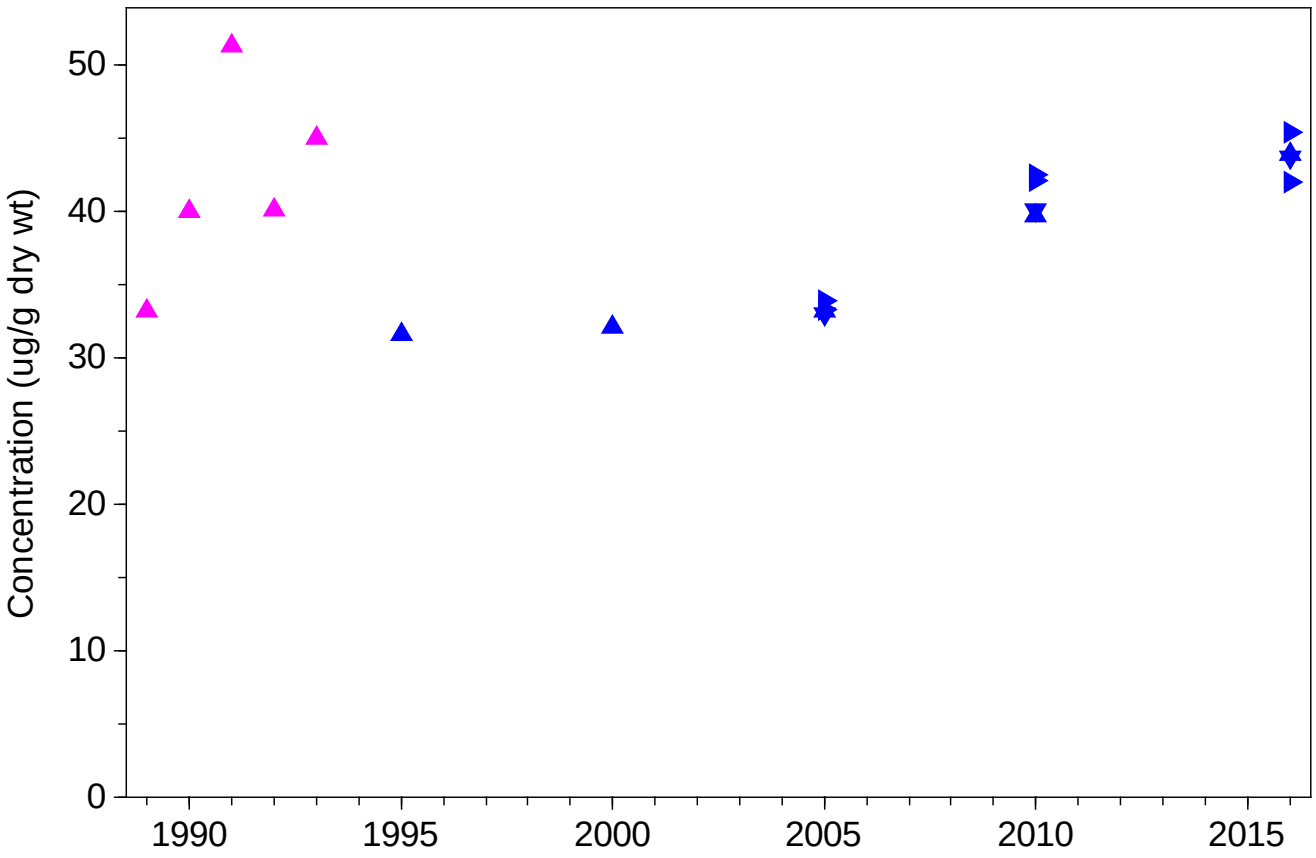
Lead, Station 21



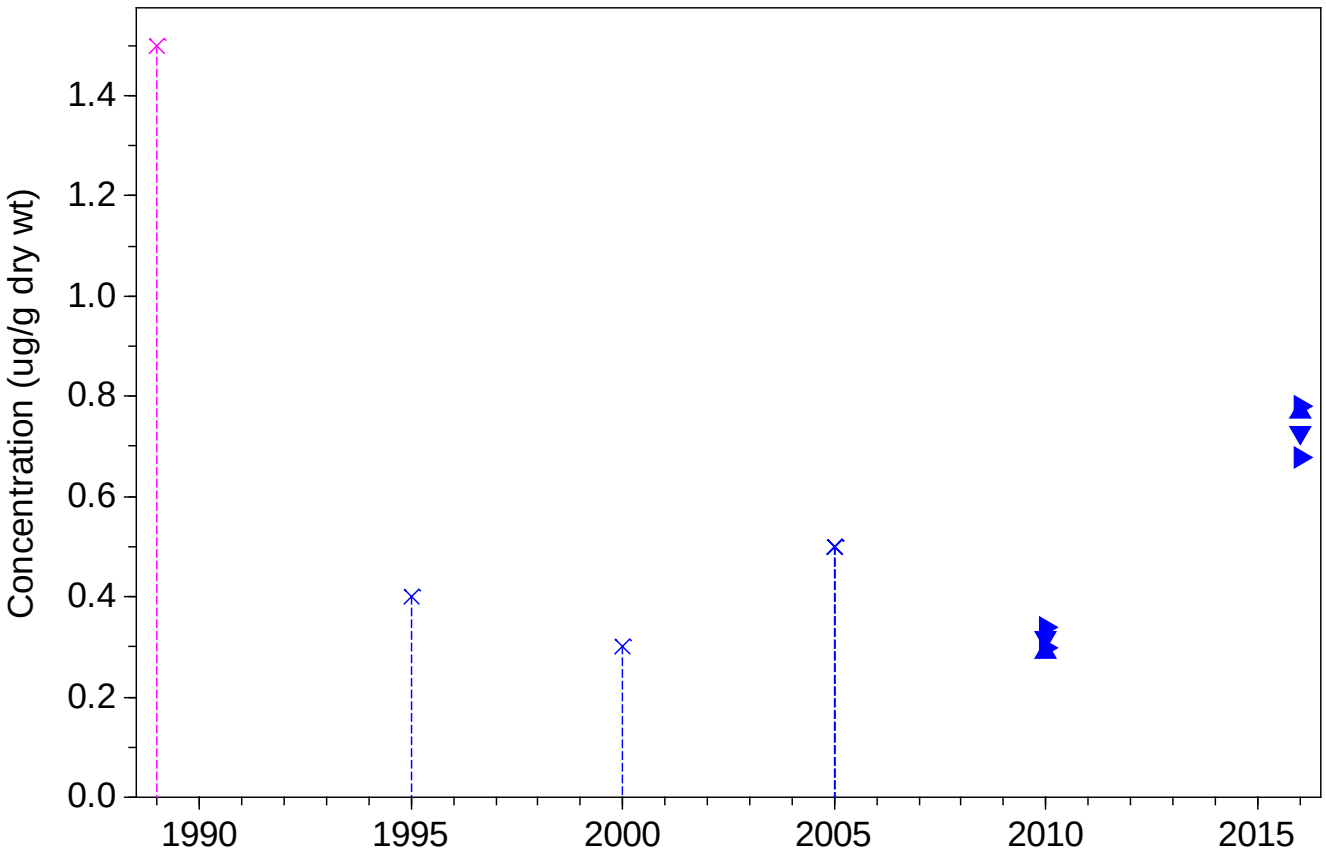
Mercury, Station 21



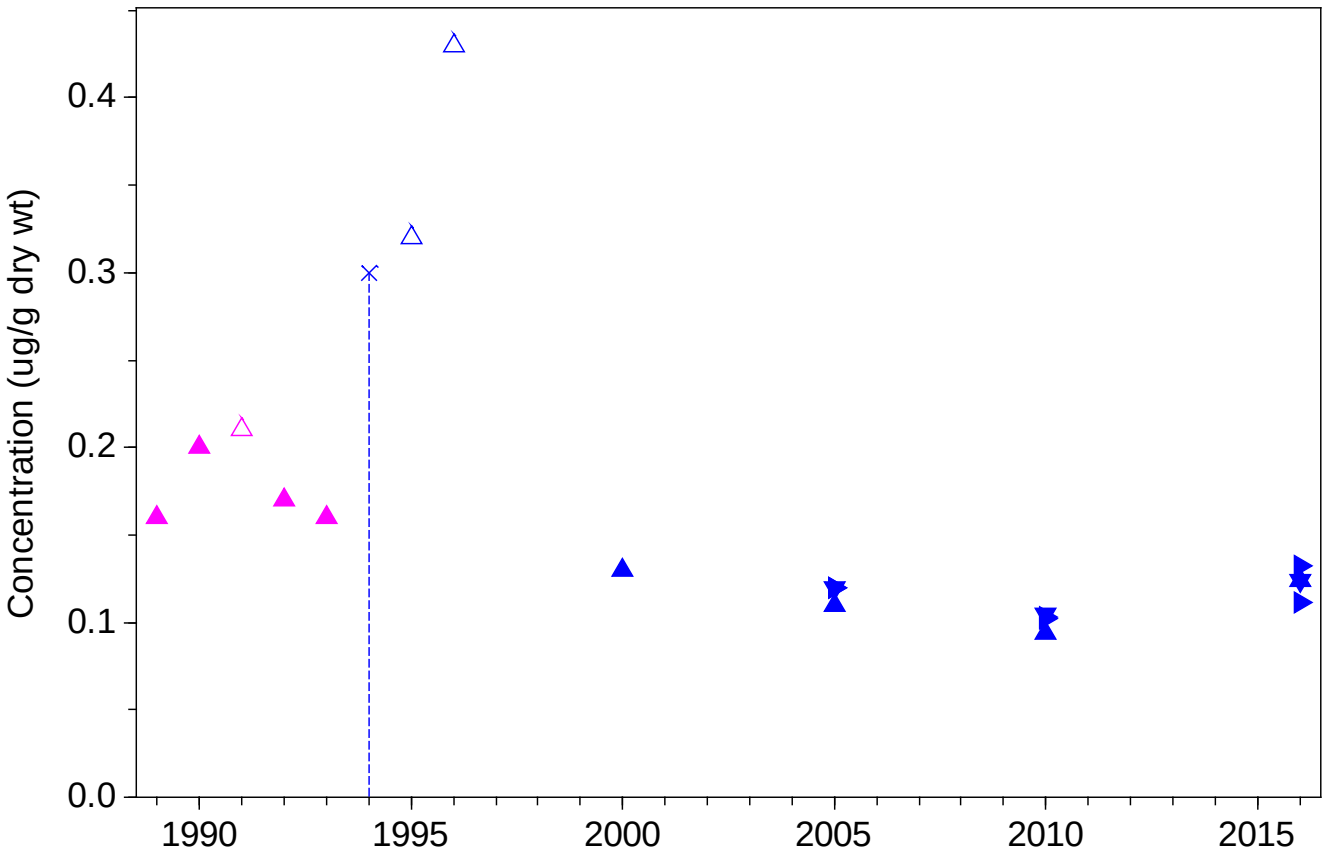
Nickel, Station 21



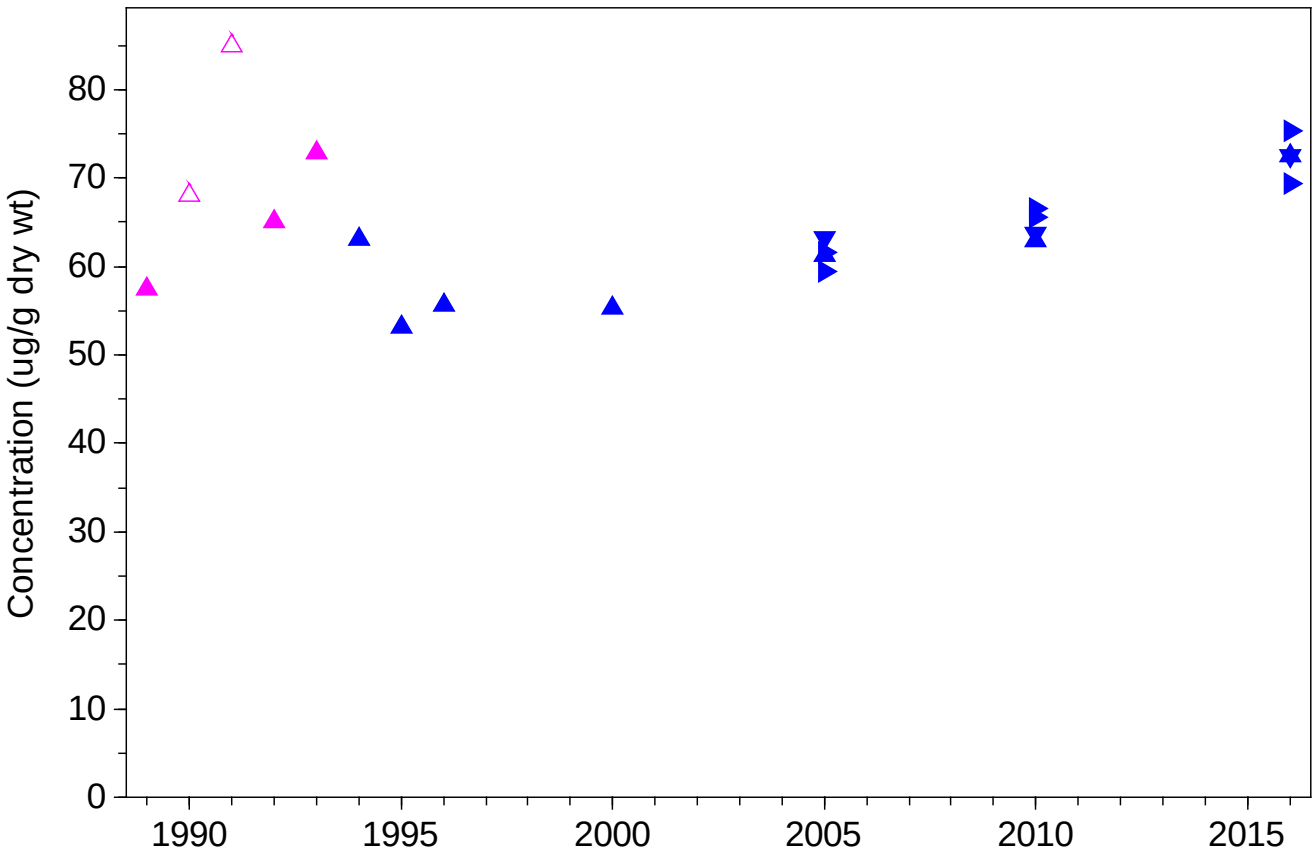
Selenium, Station 21



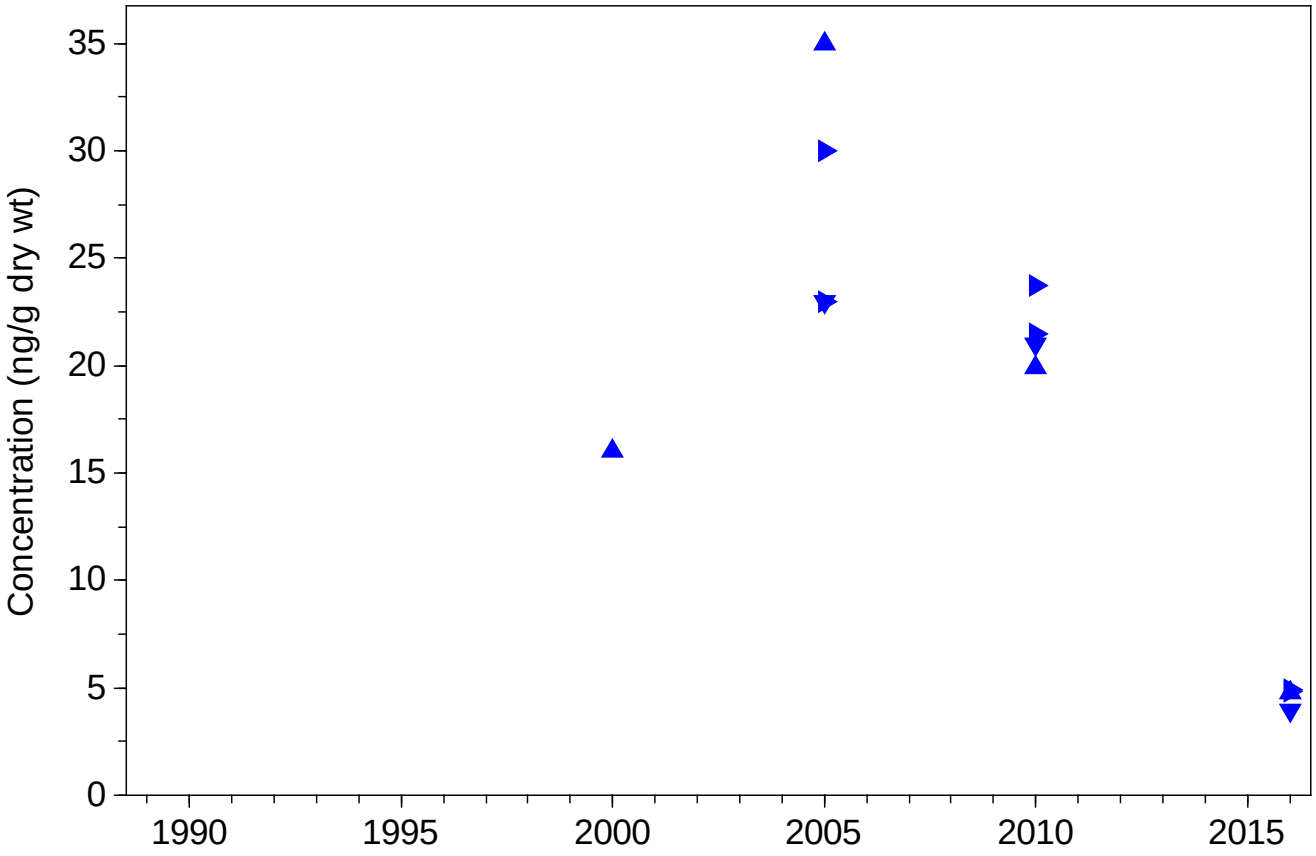
Silver, Station 21



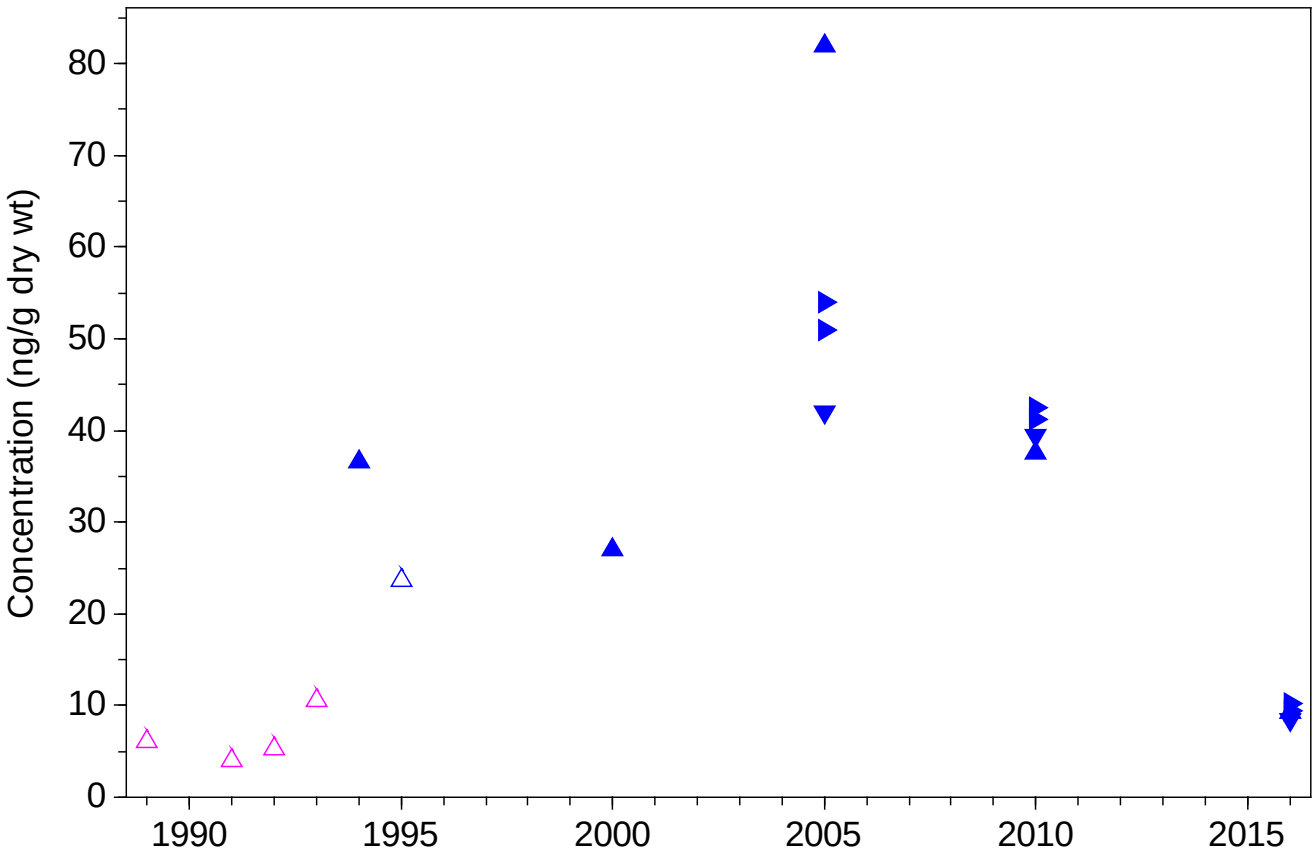
Zinc, Station 21



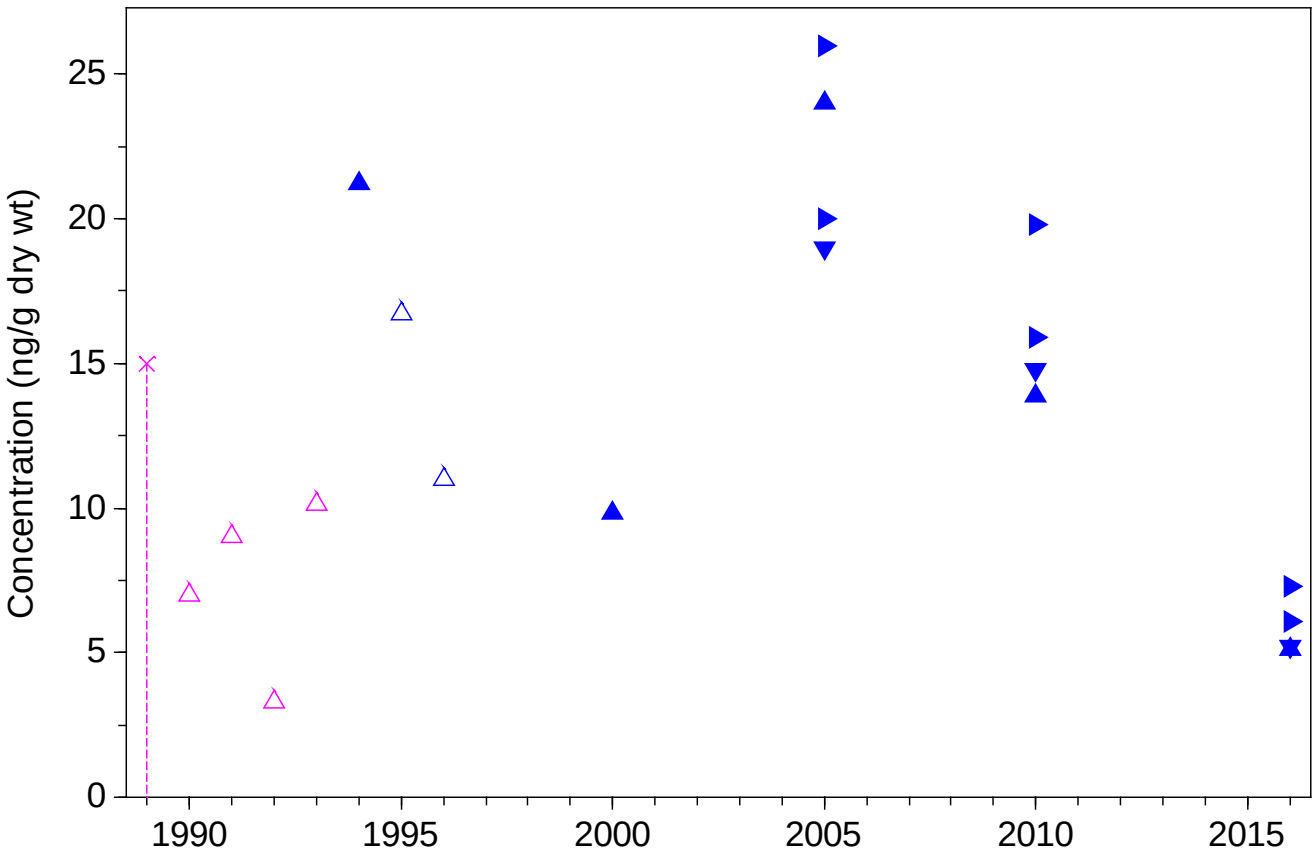
1-Methylnaphthalene, Station 21



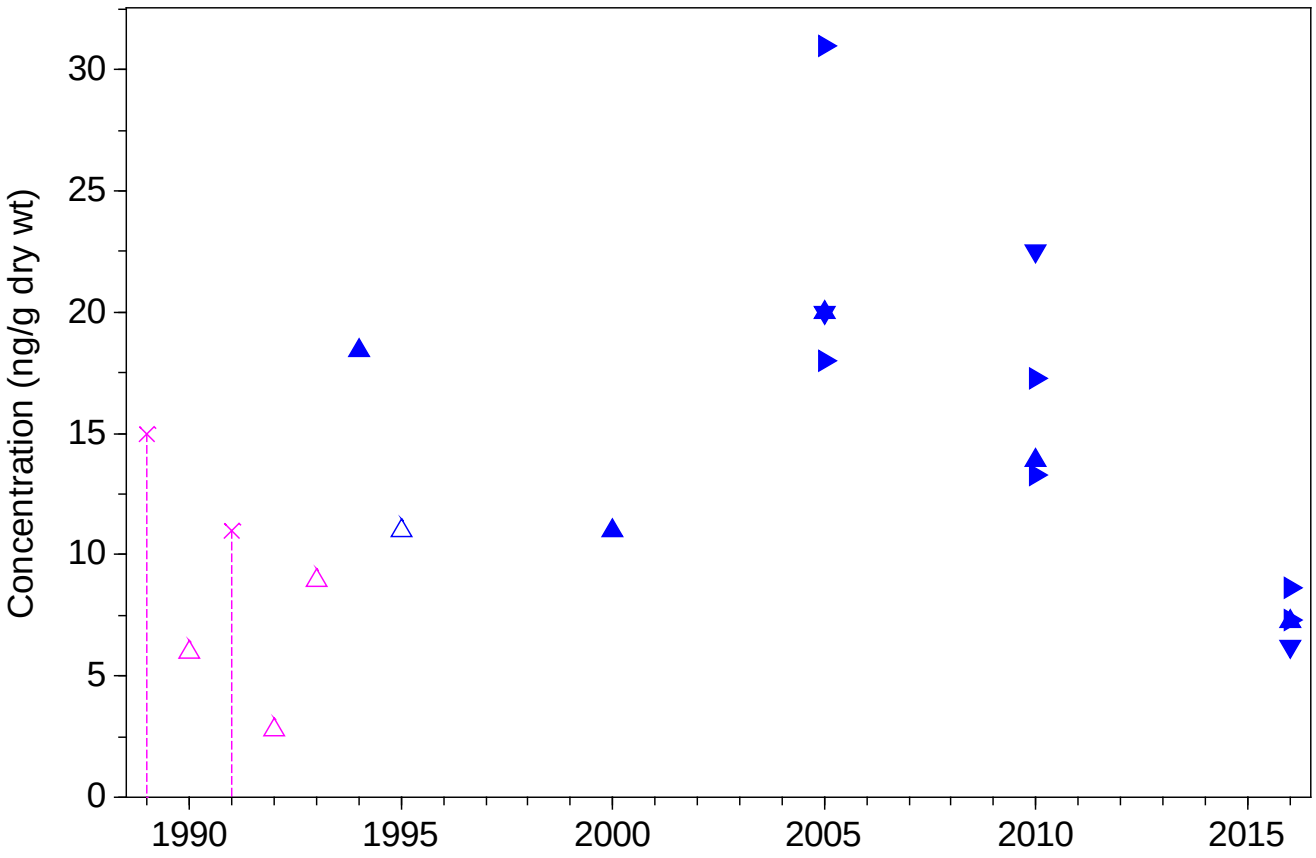
2-Methylnaphthalene, Station 21



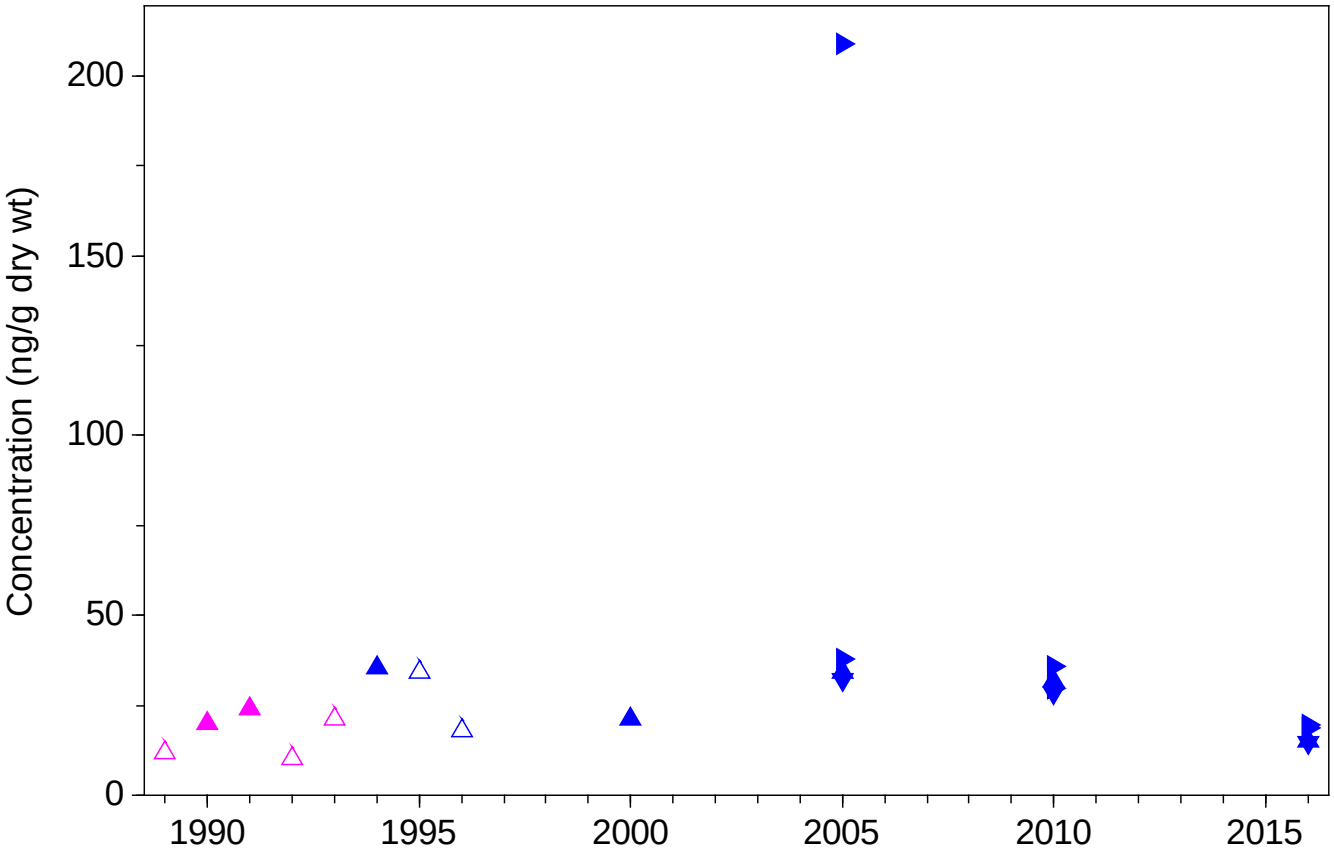
Acenaphthene, Station 21



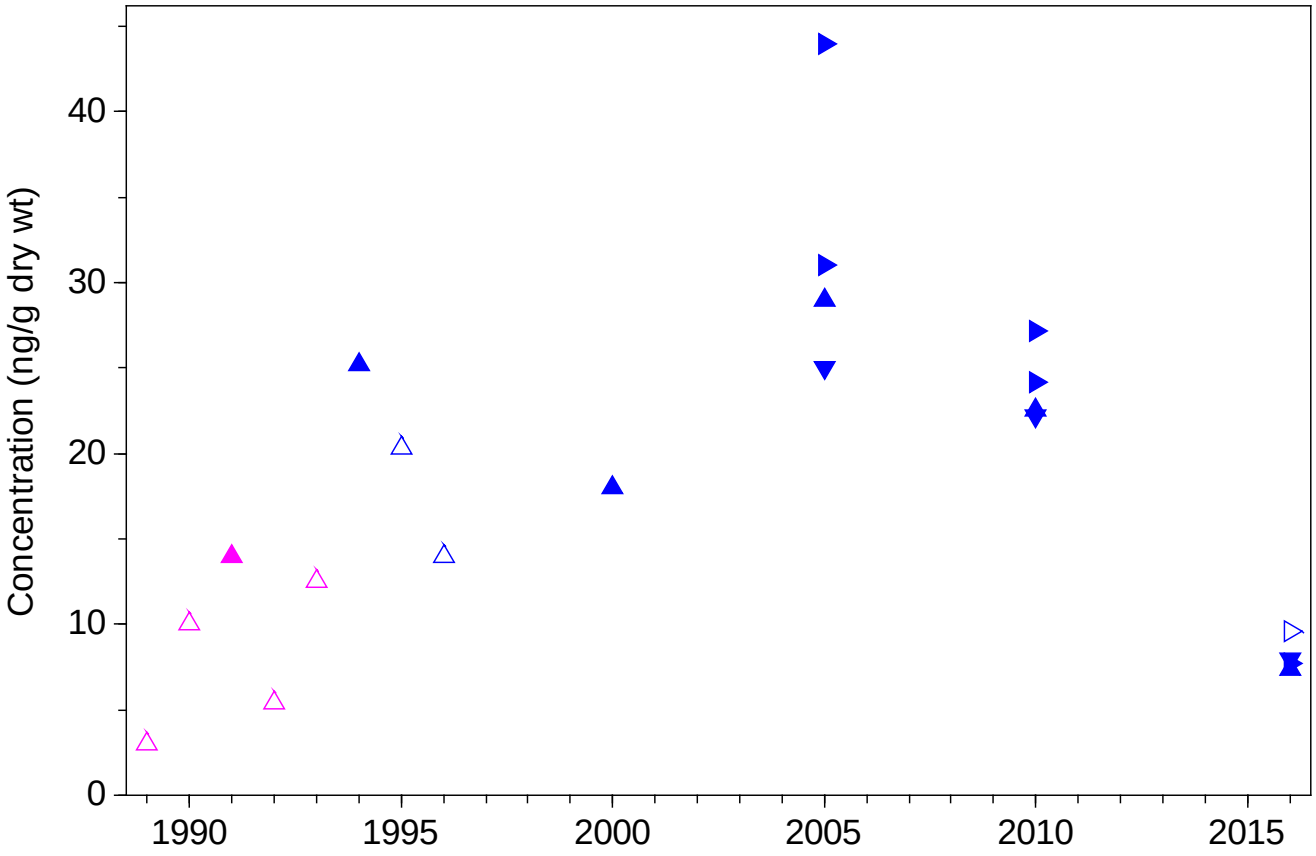
Acenaphthylene, Station 21



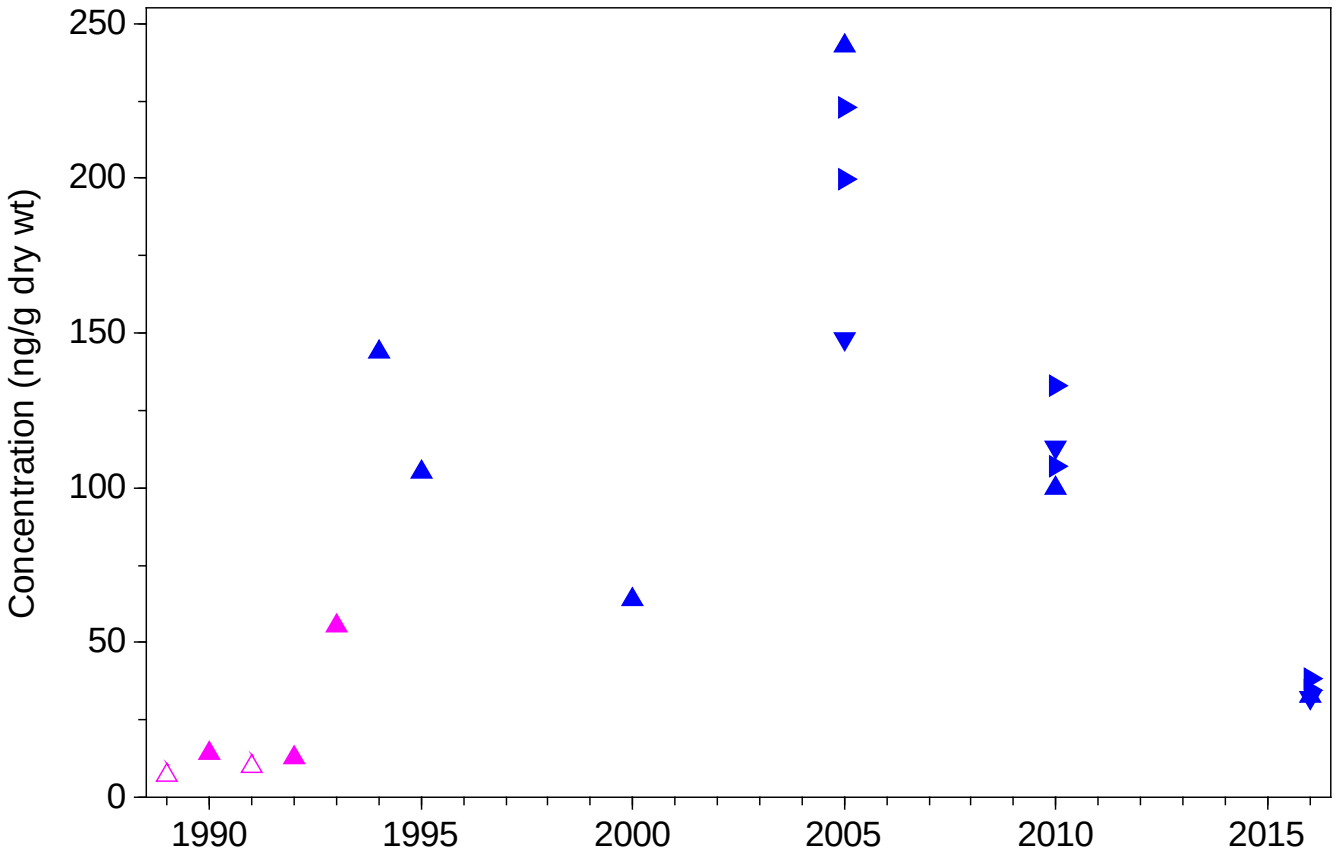
Anthracene, Station 21



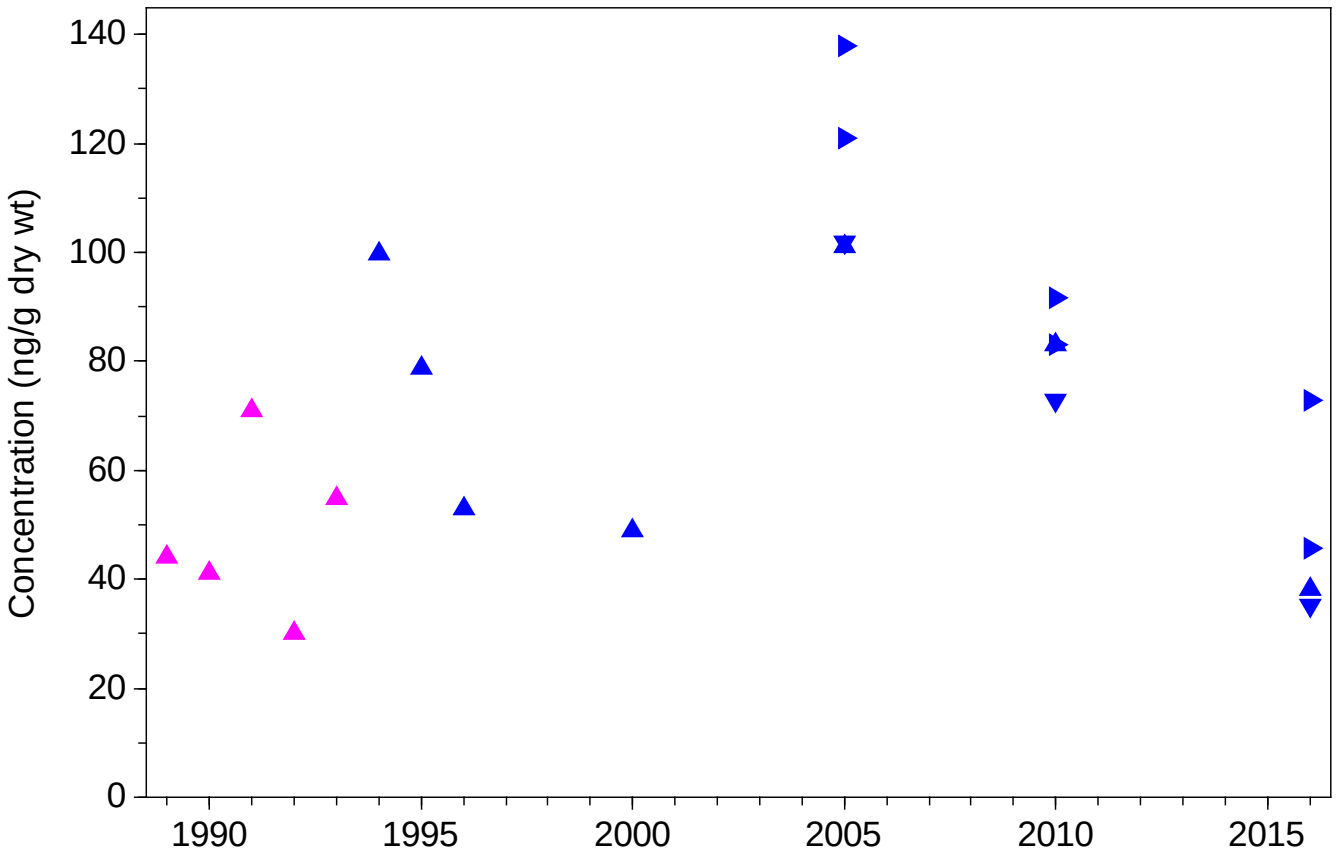
Fluorene, Station 21



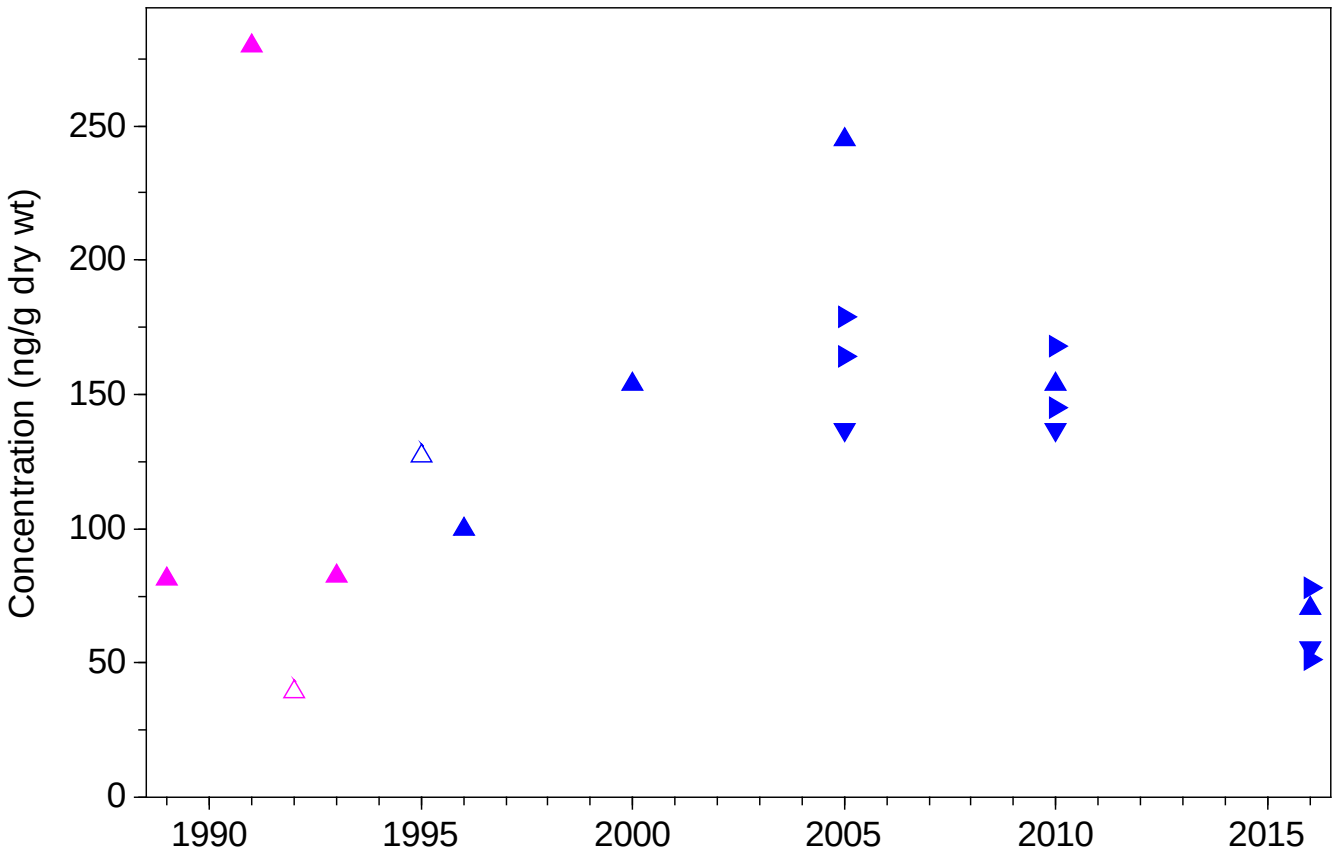
Naphthalene, Station 21



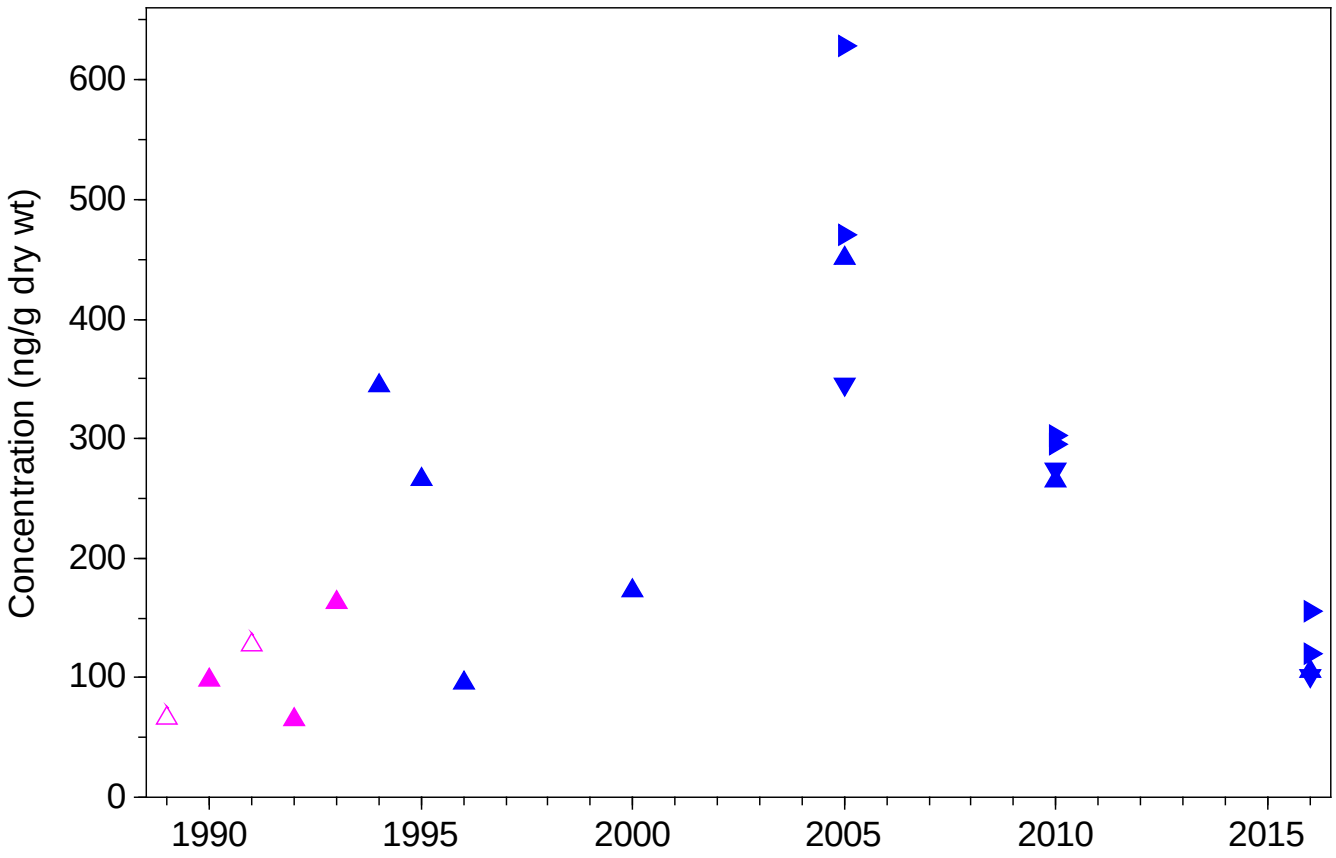
Phenanthrene, Station 21



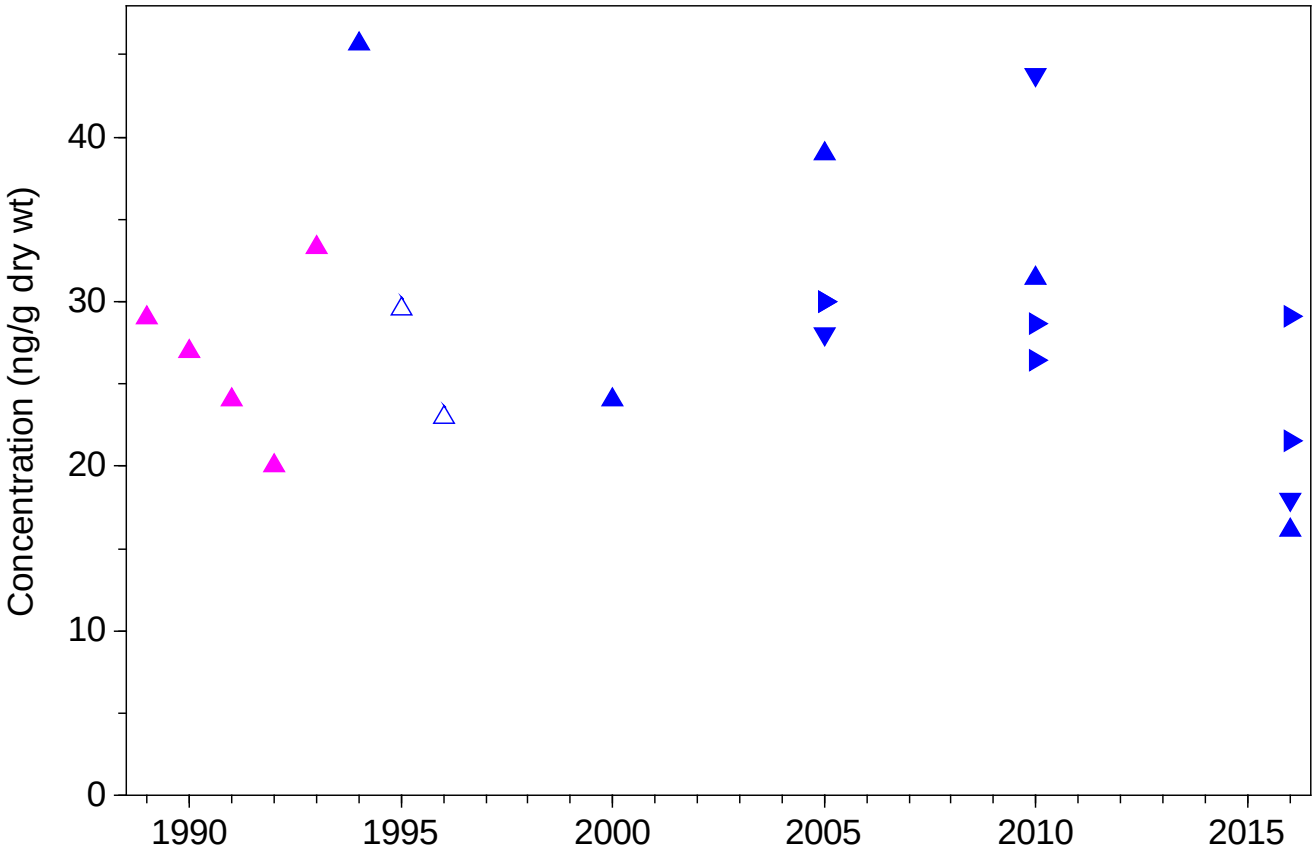
Retene, Station 21



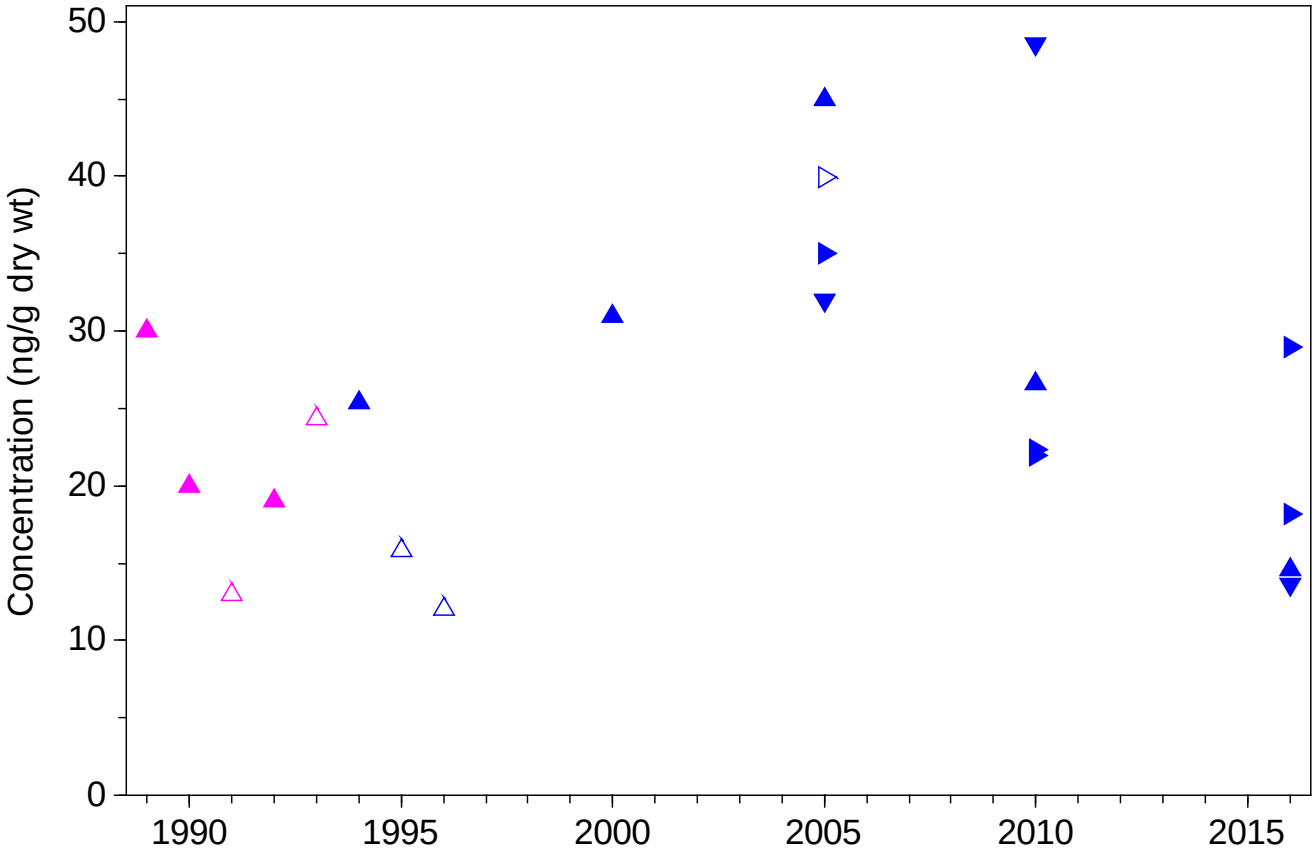
Total LPAH (sum of 6 compounds), Station 21



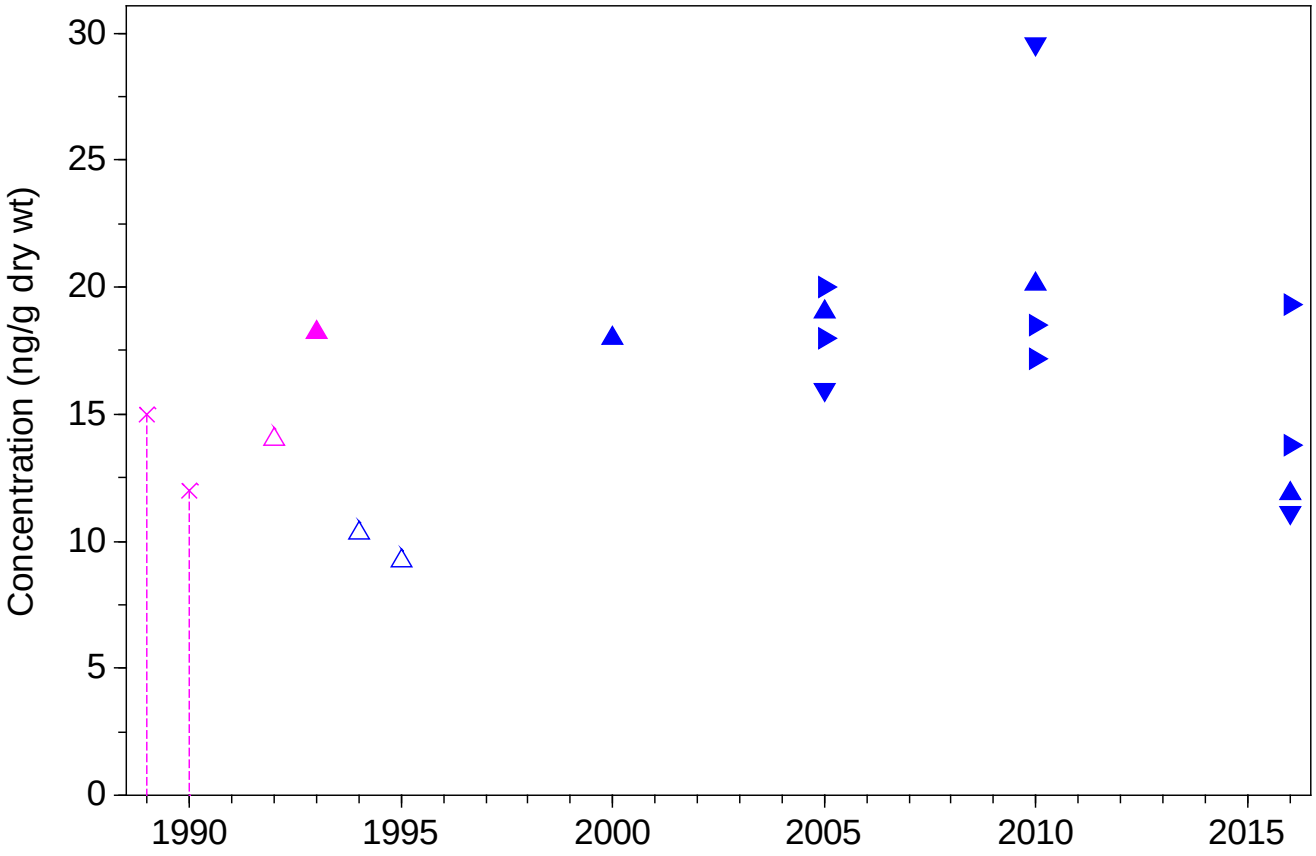
Benzo(a)anthracene, Station 21



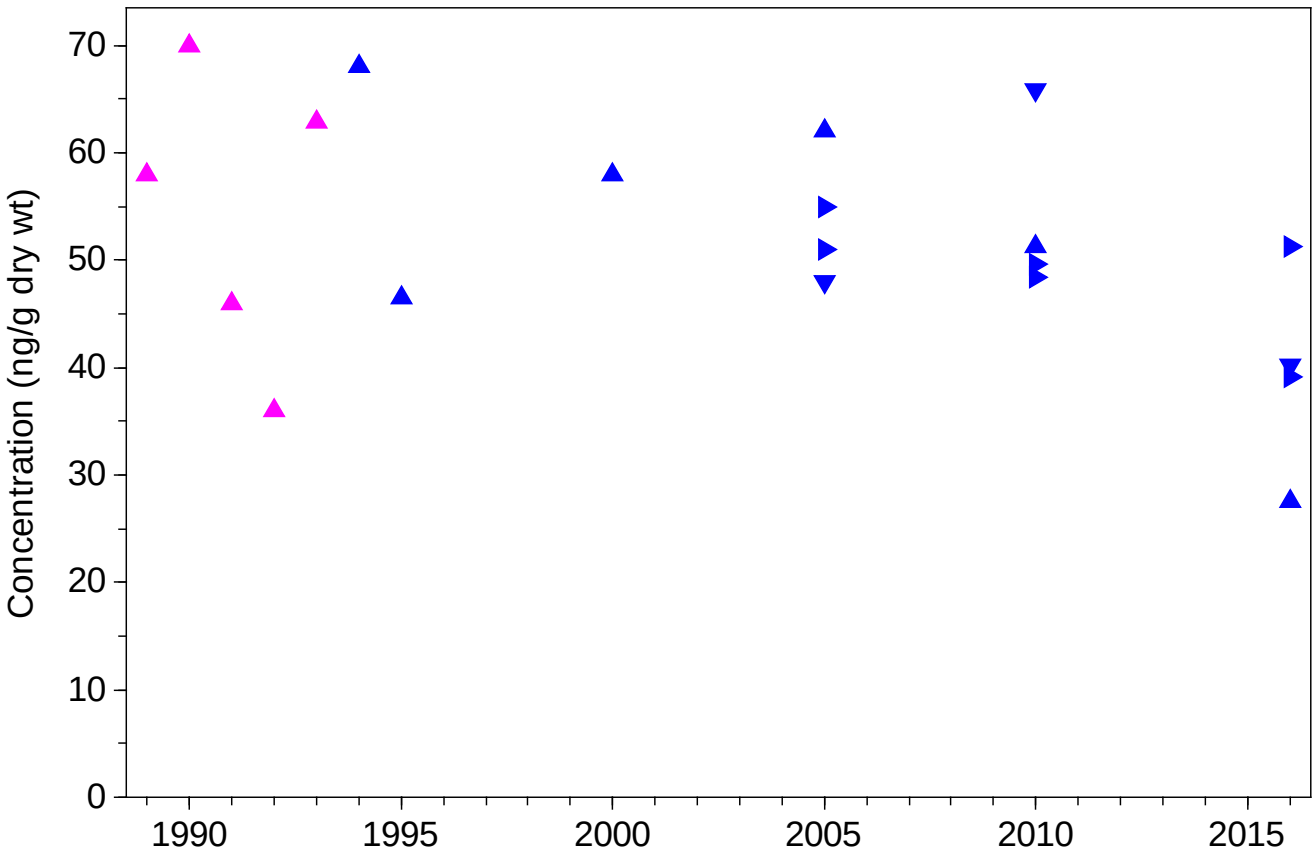
Benzo(a)pyrene, Station 21



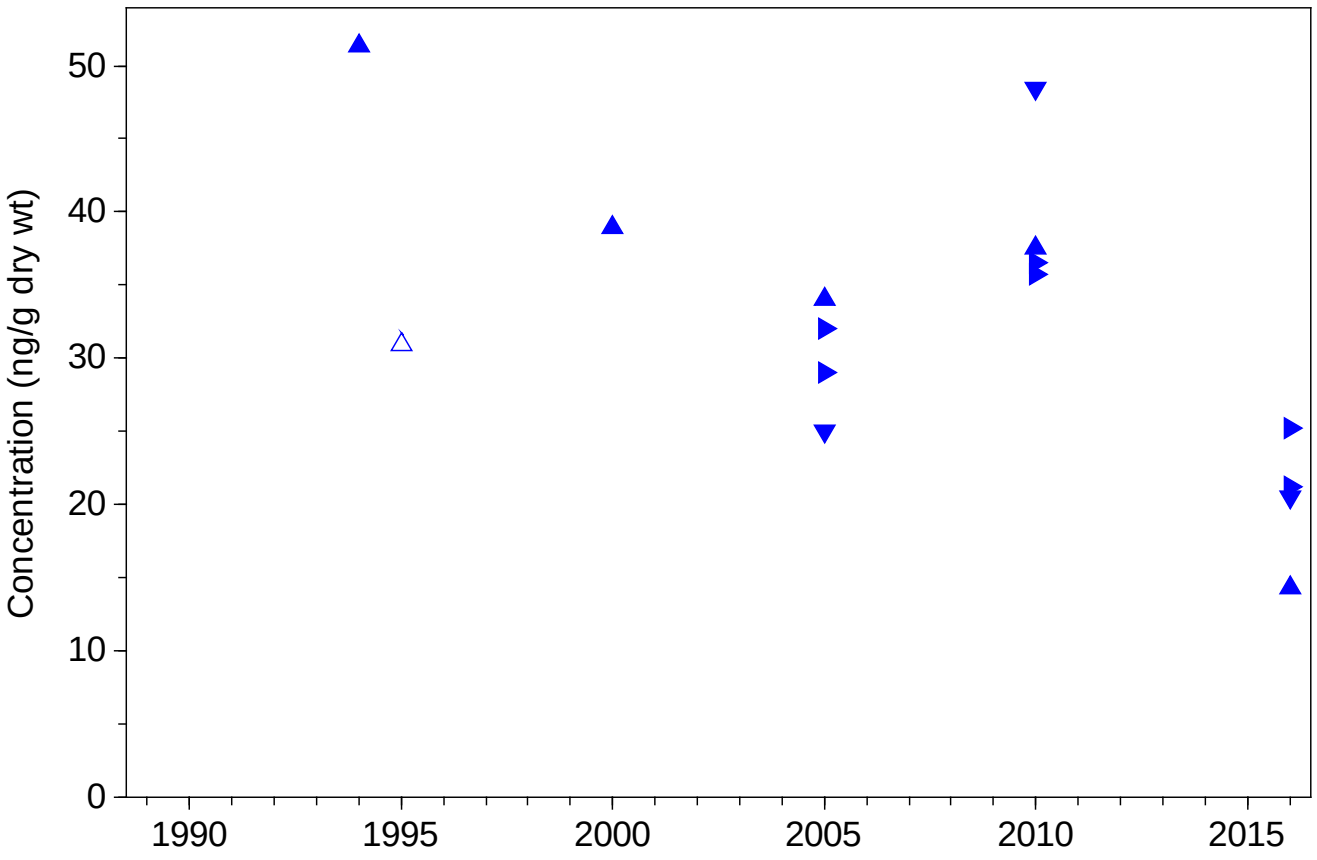
Benzo(g,h,i)perylene, Station 21



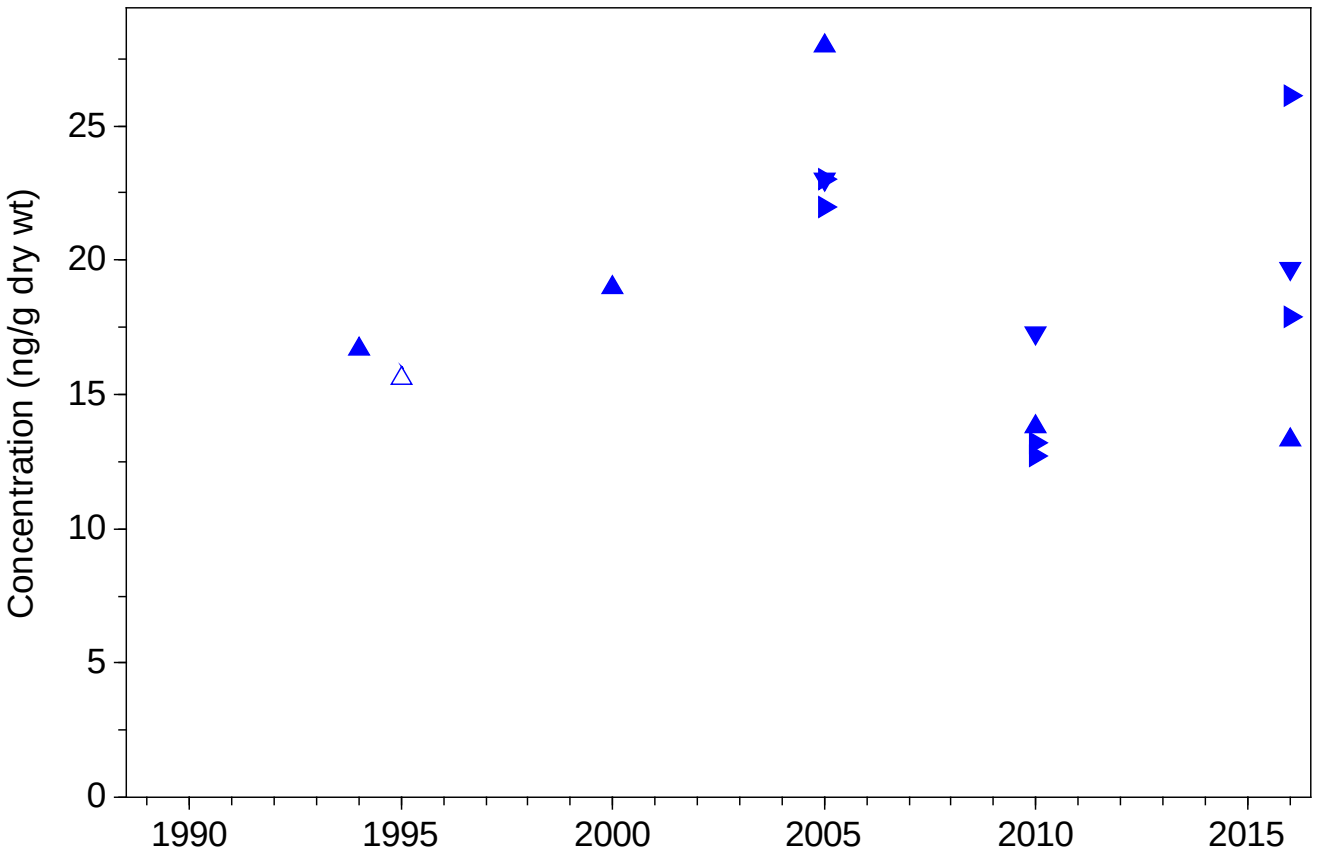
Total Benzofluoranthenes, Station 21

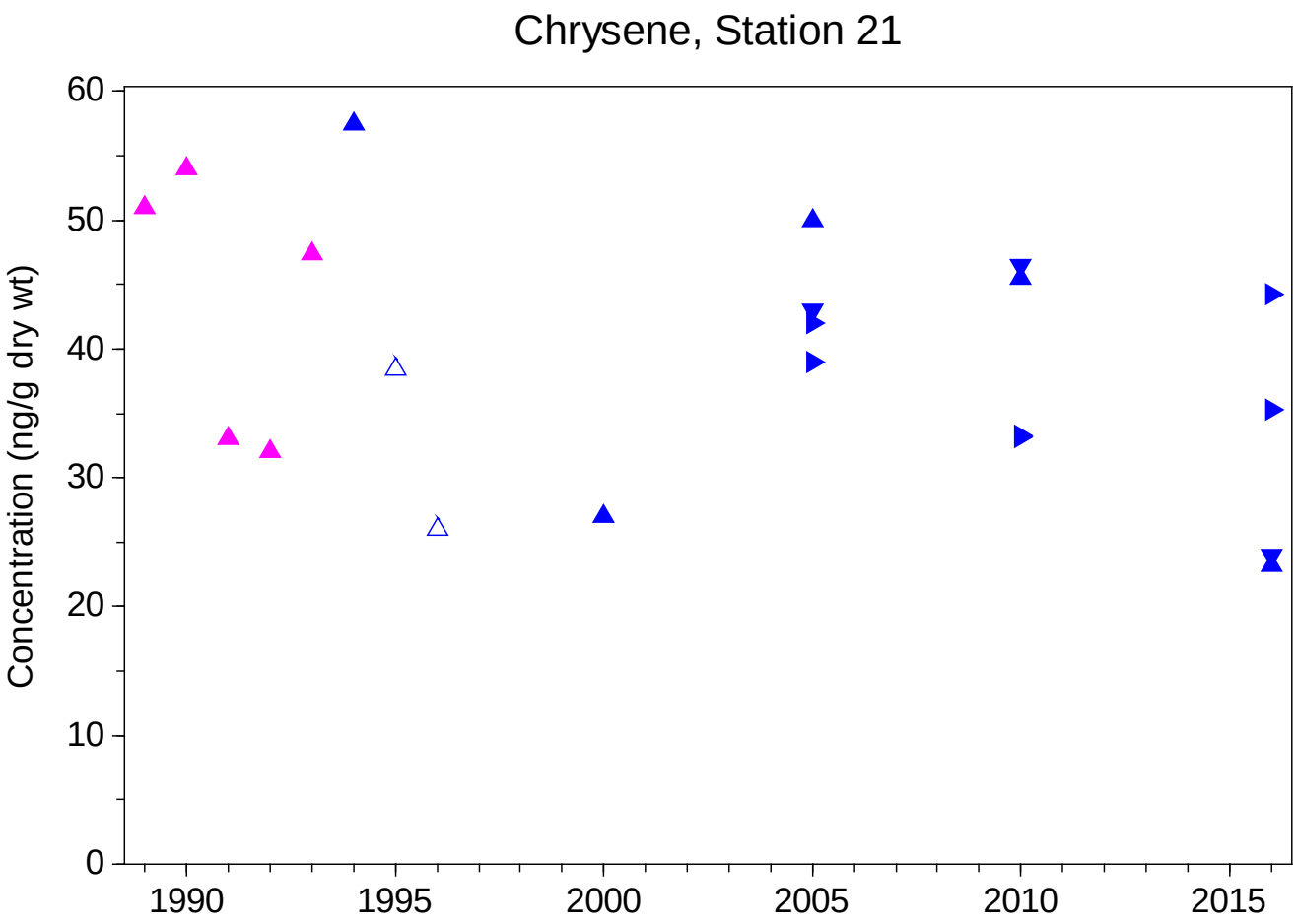


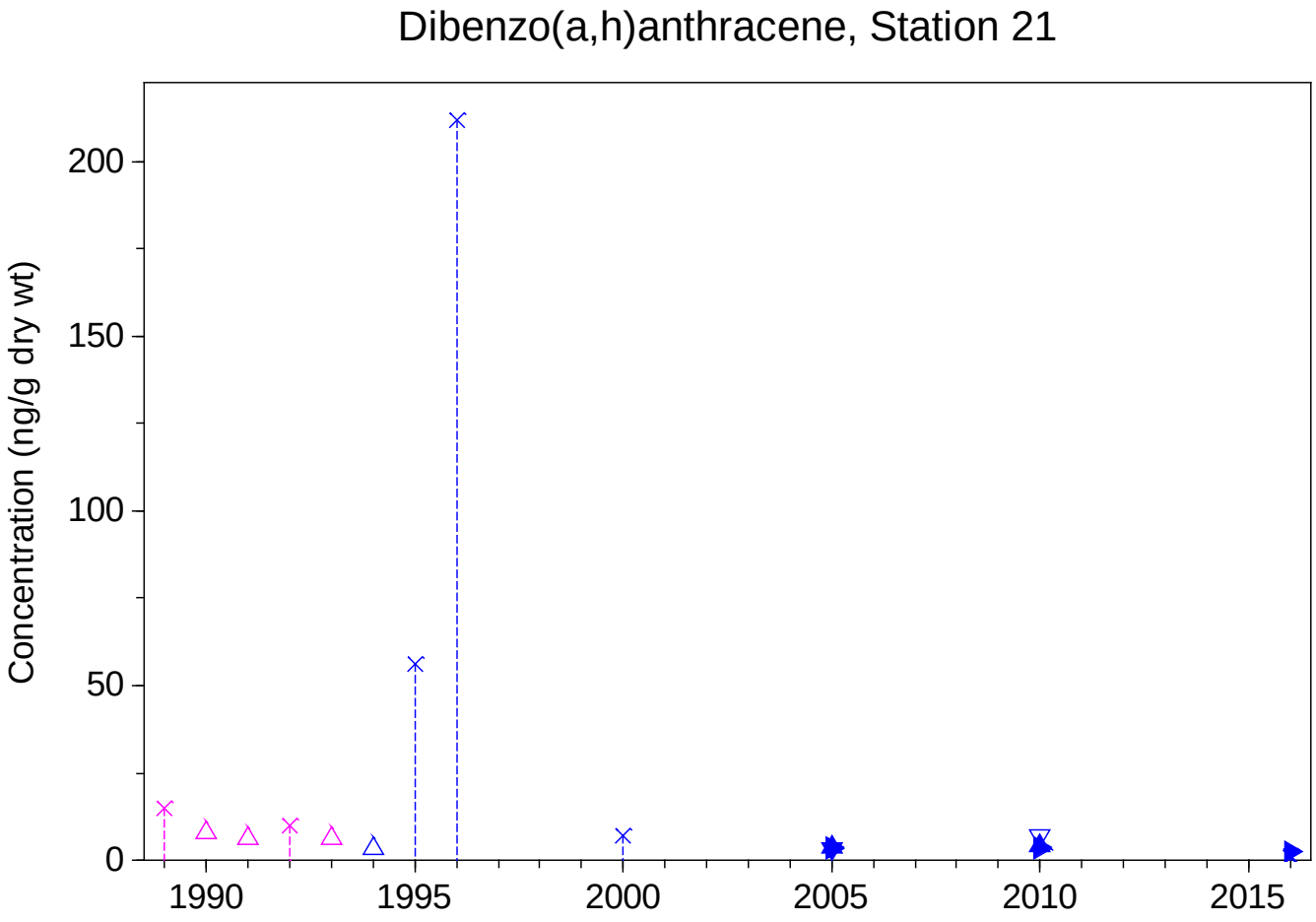
Benzo(b)fluoranthene, Station 21



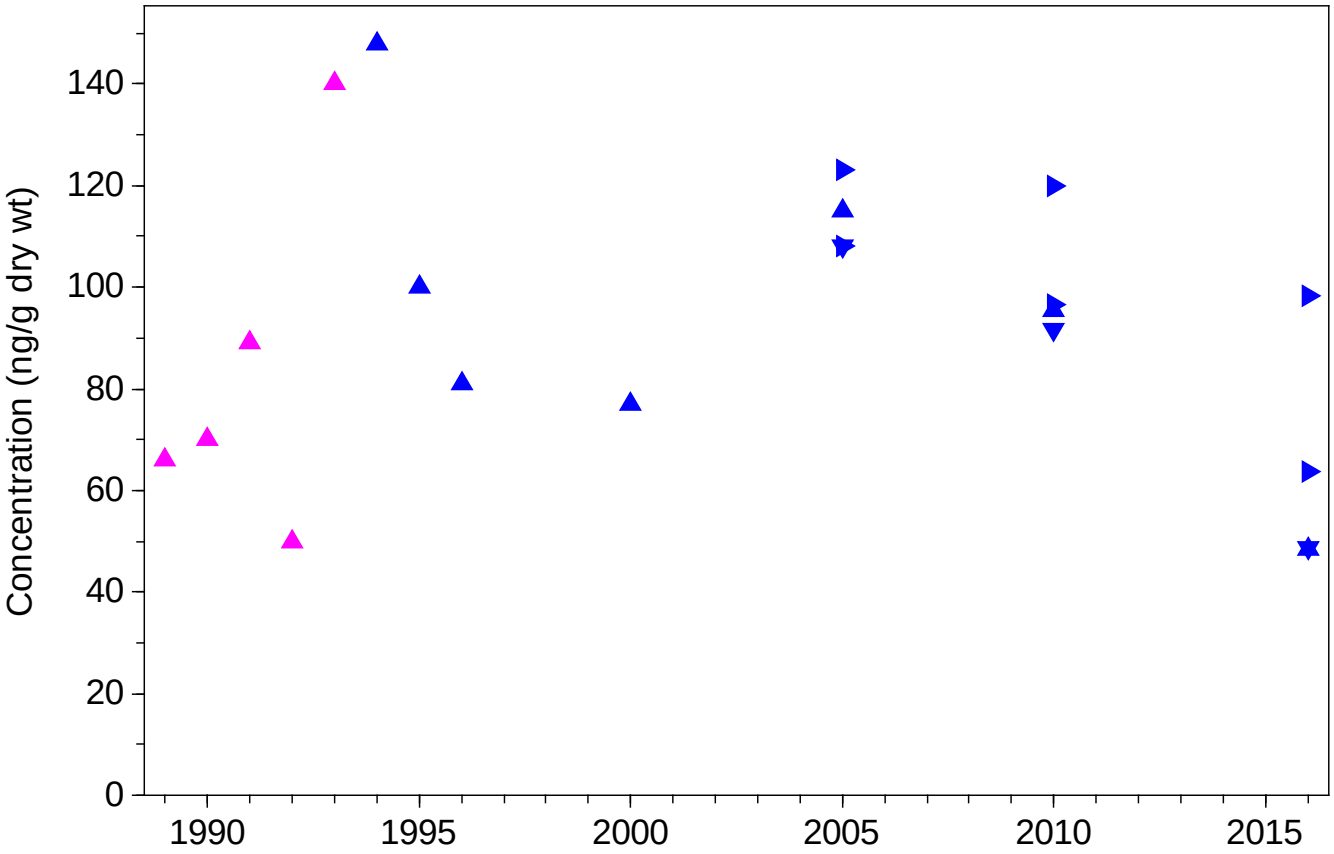
Benzo(k)fluoranthene, Station 21



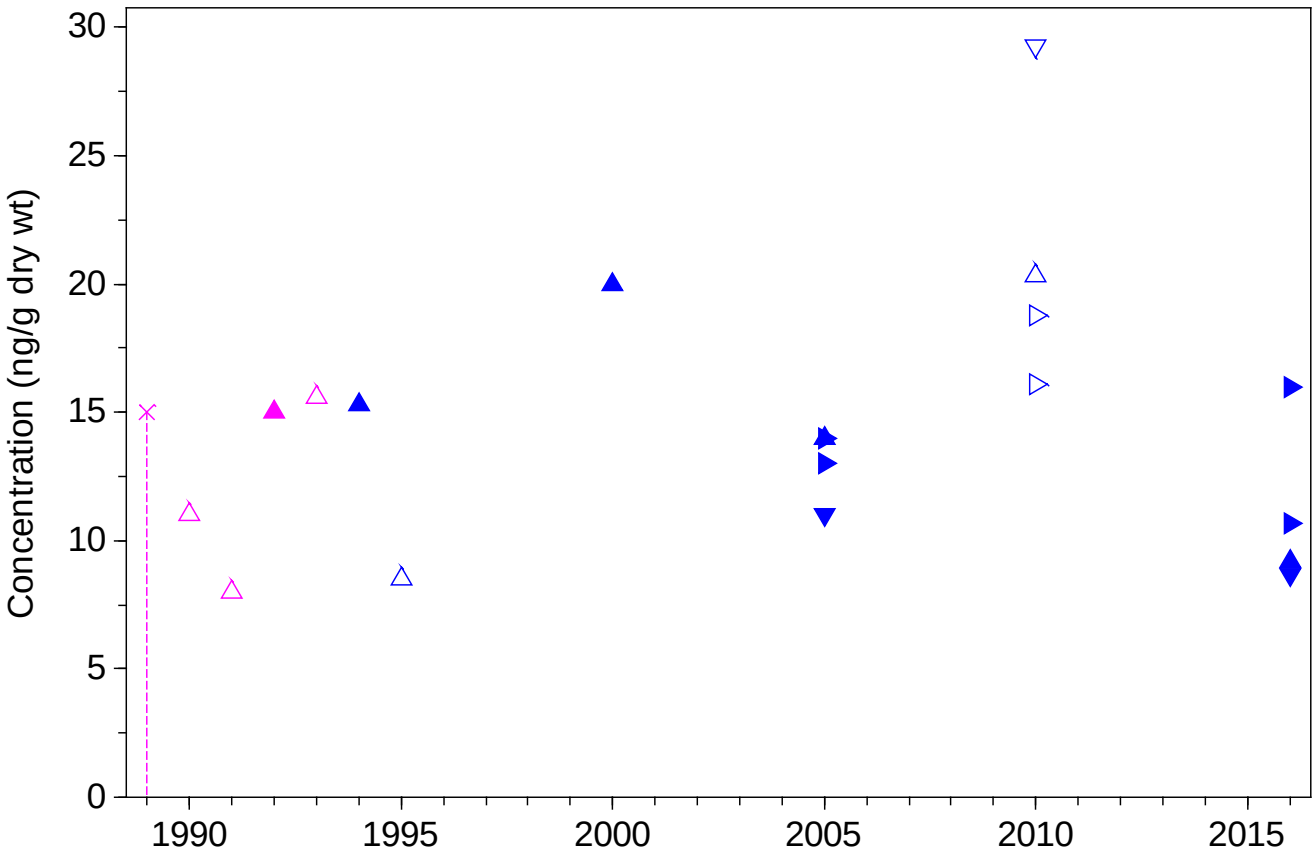

Chrysene, Station 21
Concentration (ng/g dry wt)
0
10
20
30
40
50
60
1990
1995
2000
2005
2010
2015


Dibenzo(a,h)anthracene, Station 21
Concentration (ng/g dry wt)
0
50
100
150
200
1990
1995
2000
2005
2010
2015

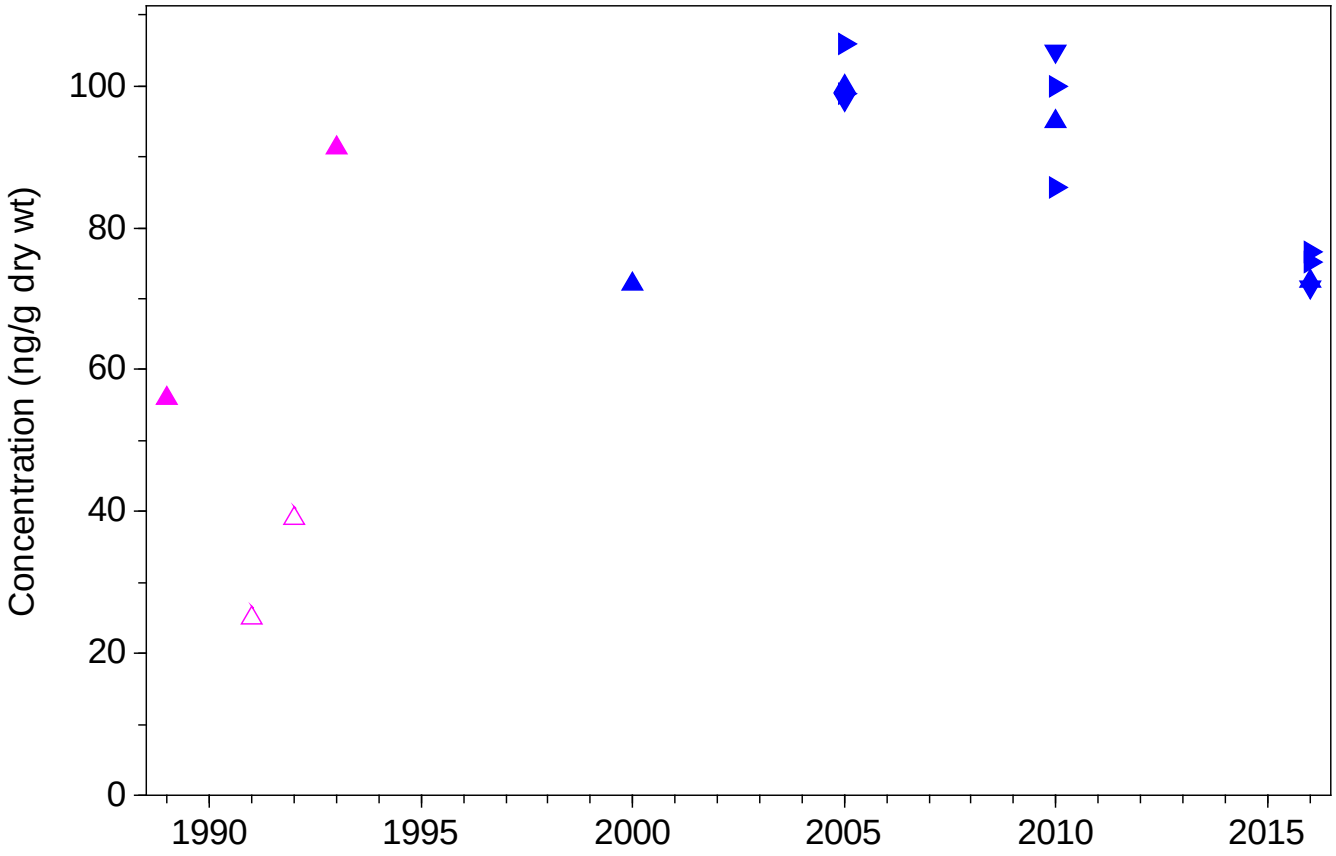
Fluoranthene, Station 21



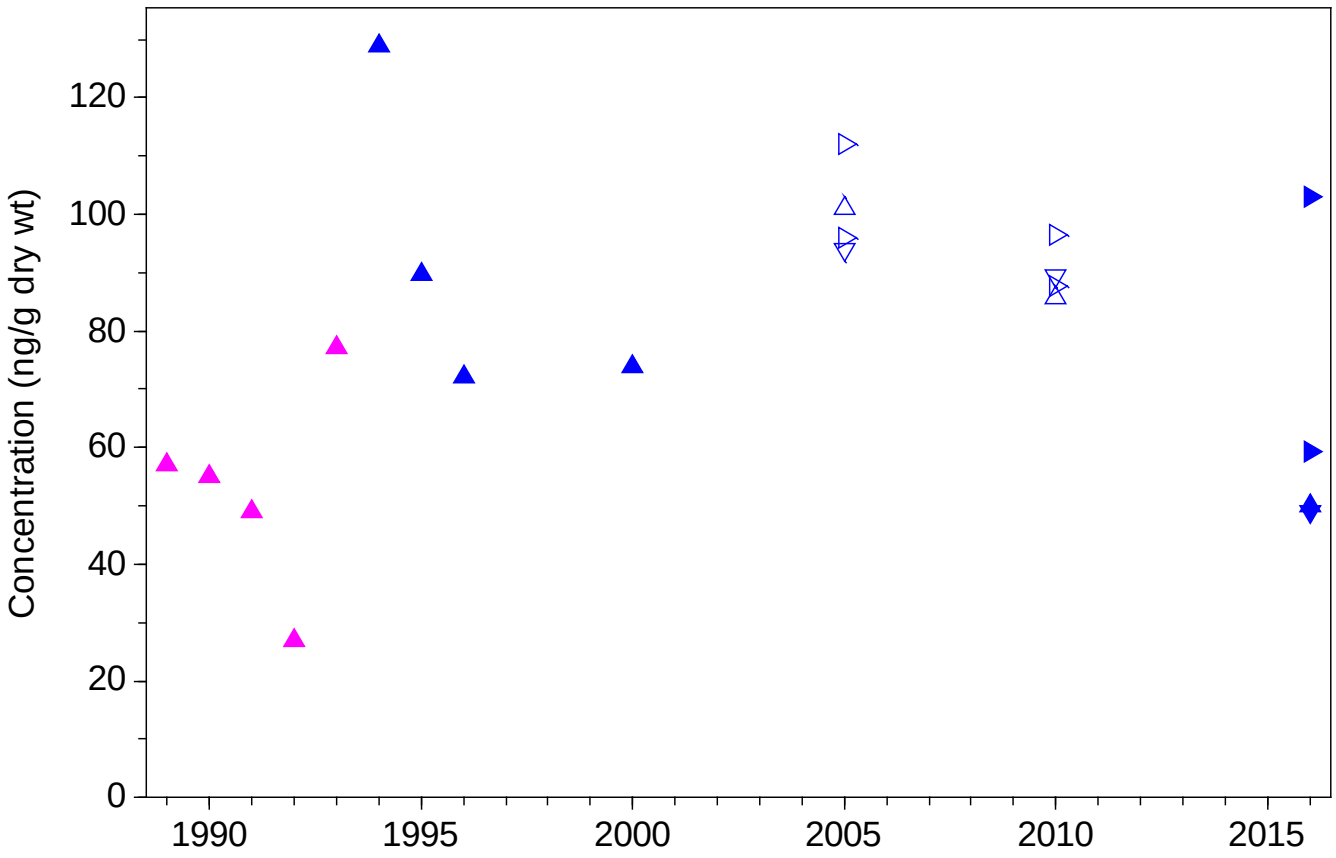
Indeno(1,2,3-c,d)pyrene, Station 21

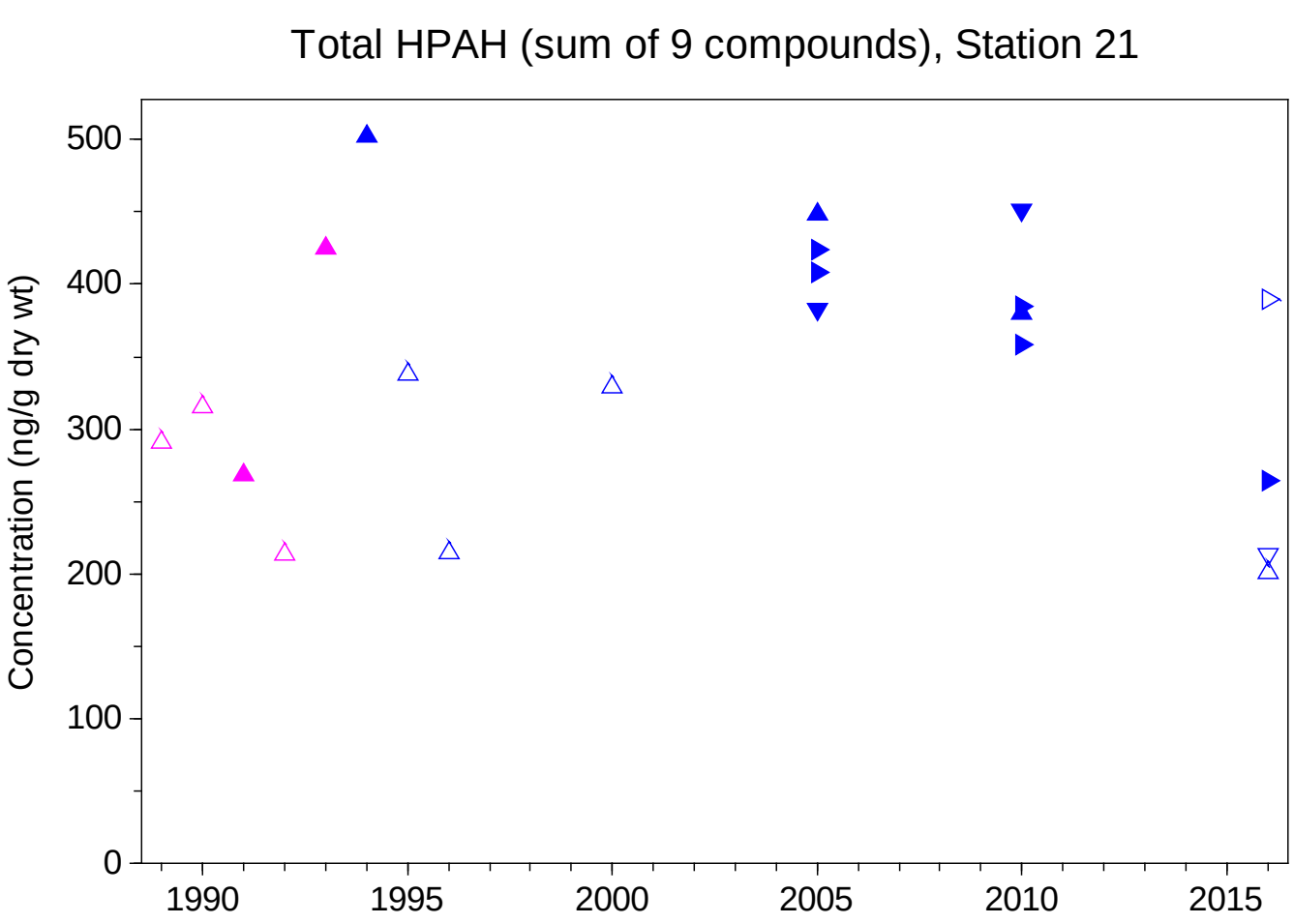


Perylene, Station 21



Pyrene, Station 21





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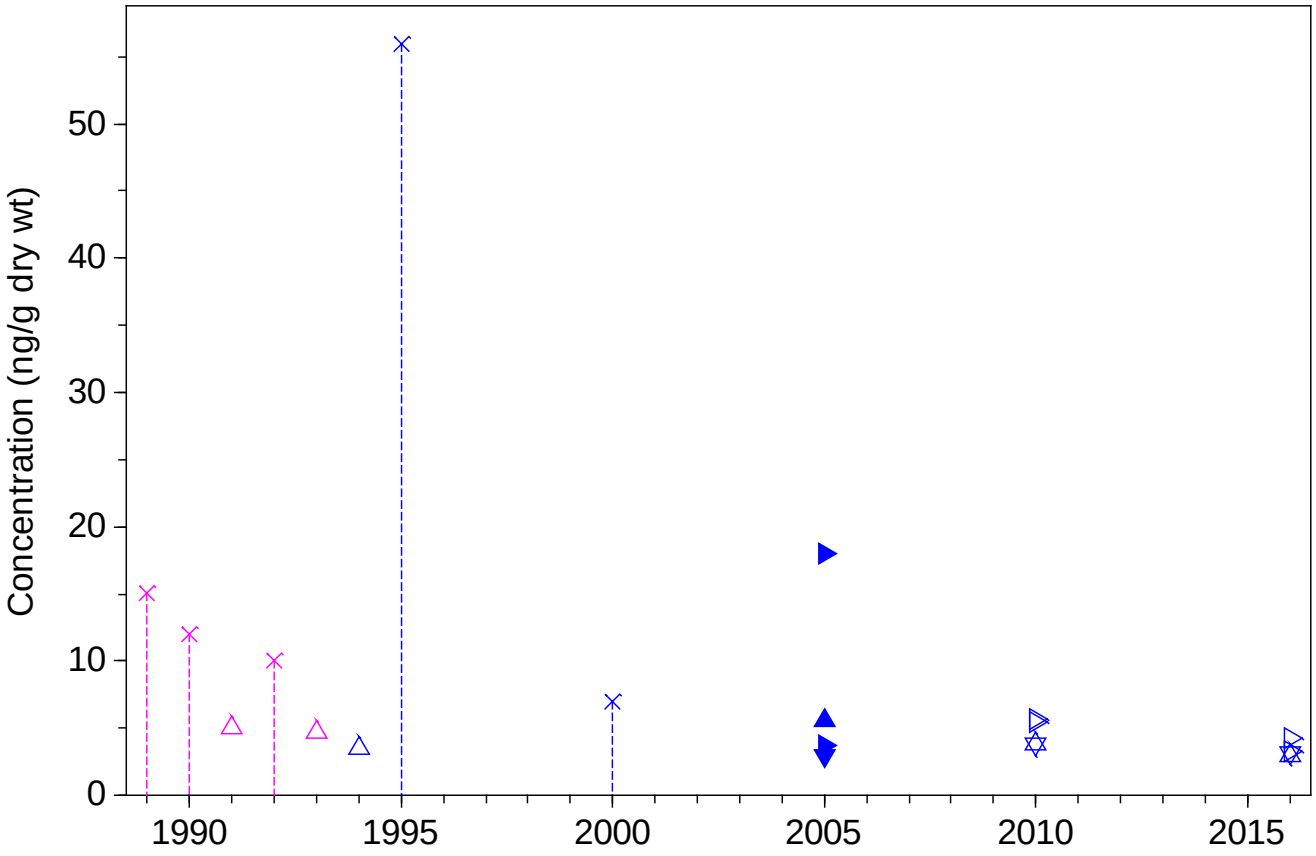
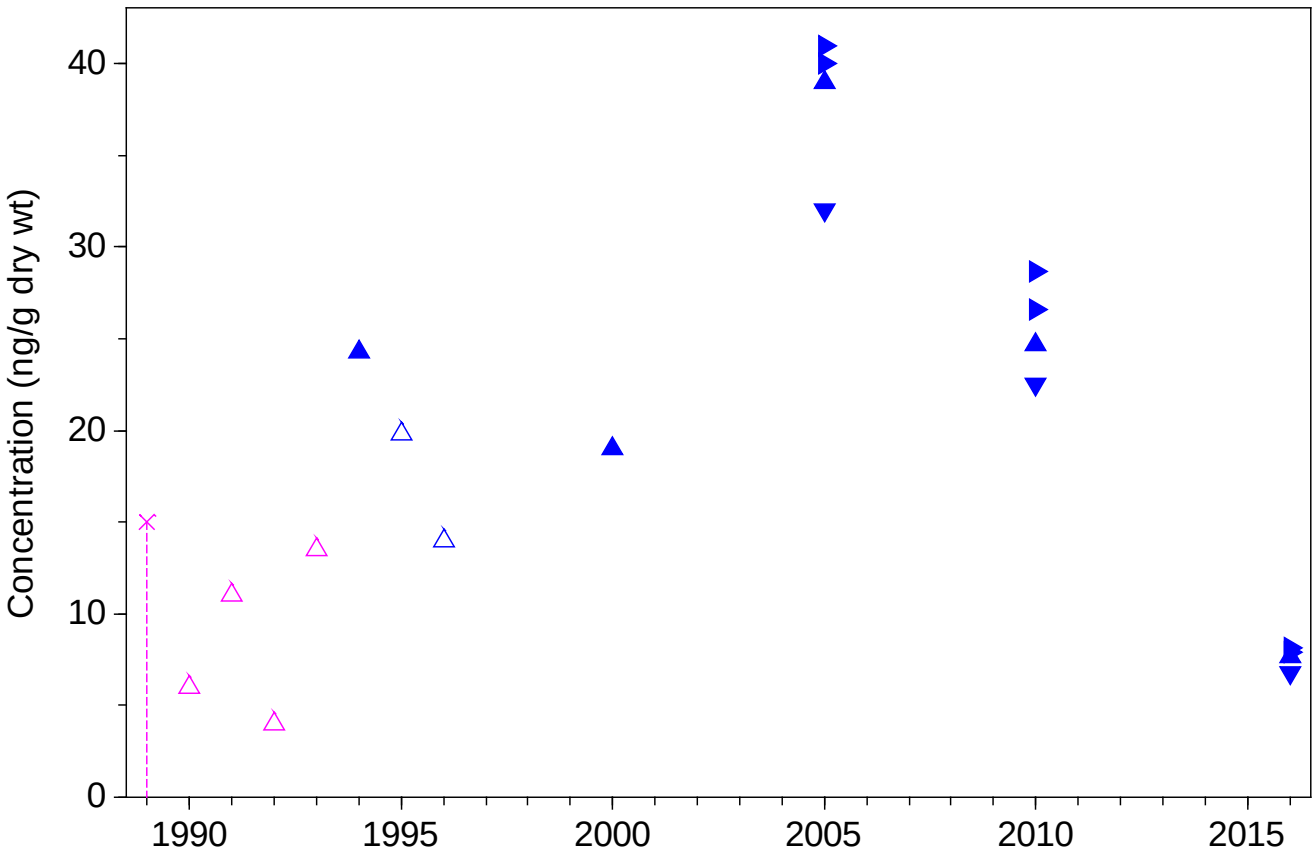
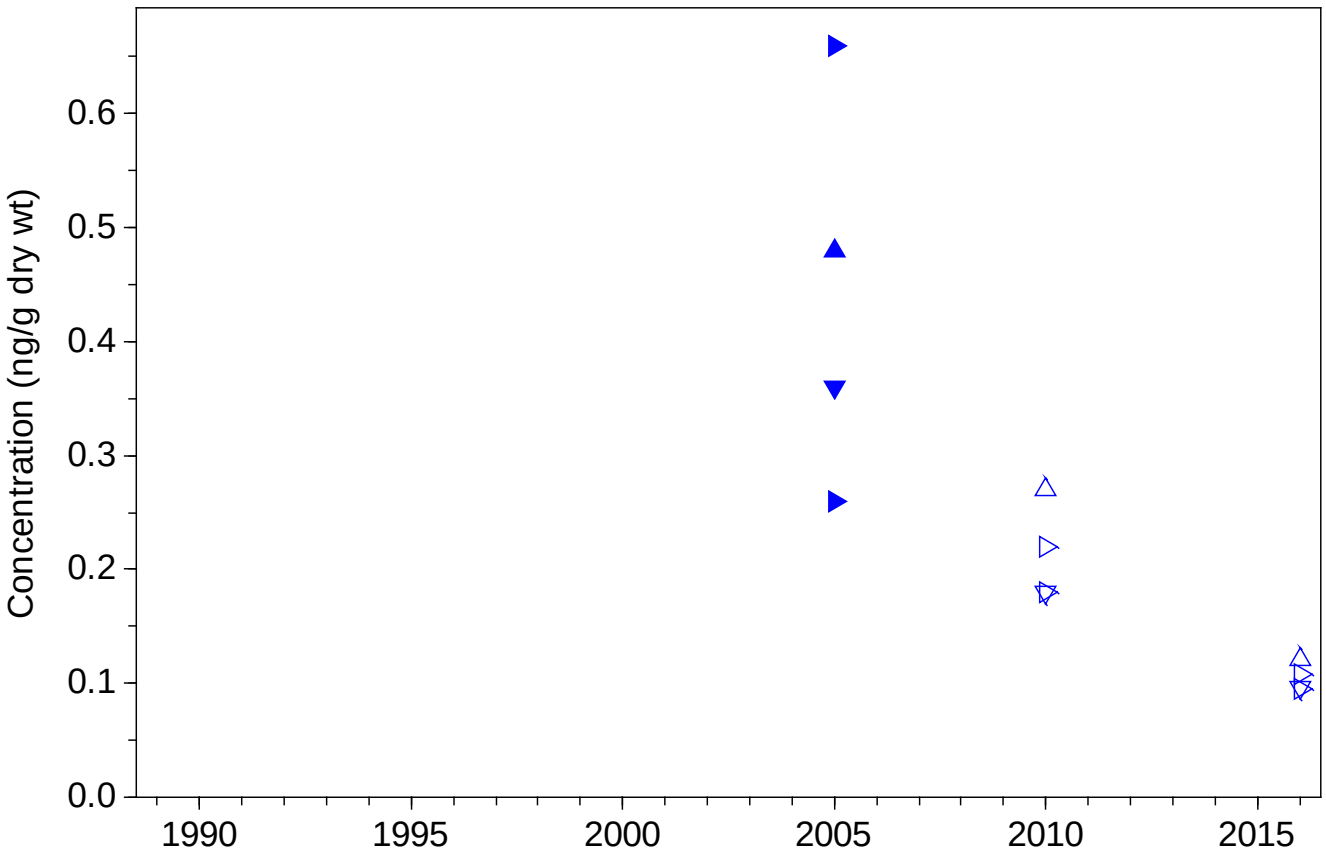
Carbazole, Station 21



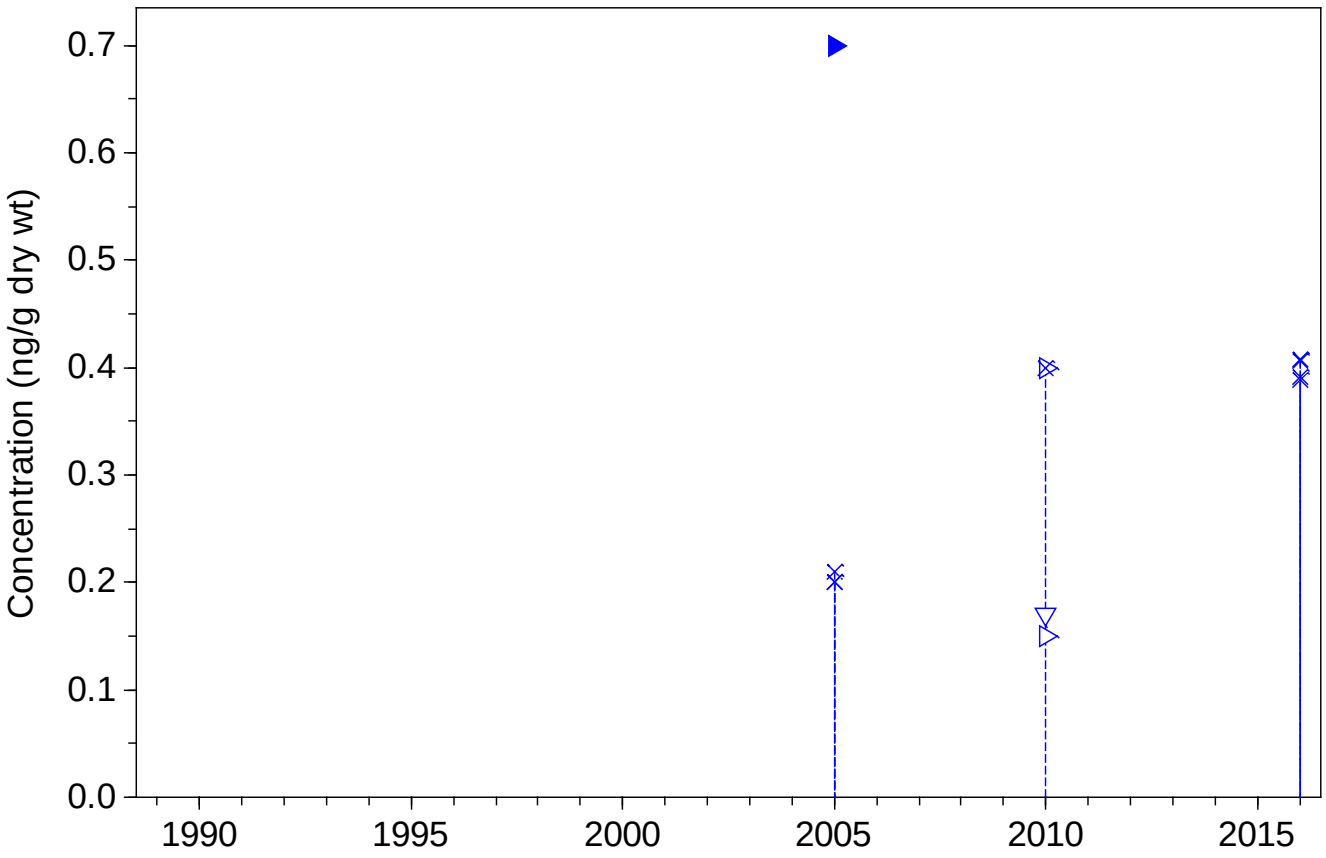
Dibenzofuran, Station 21



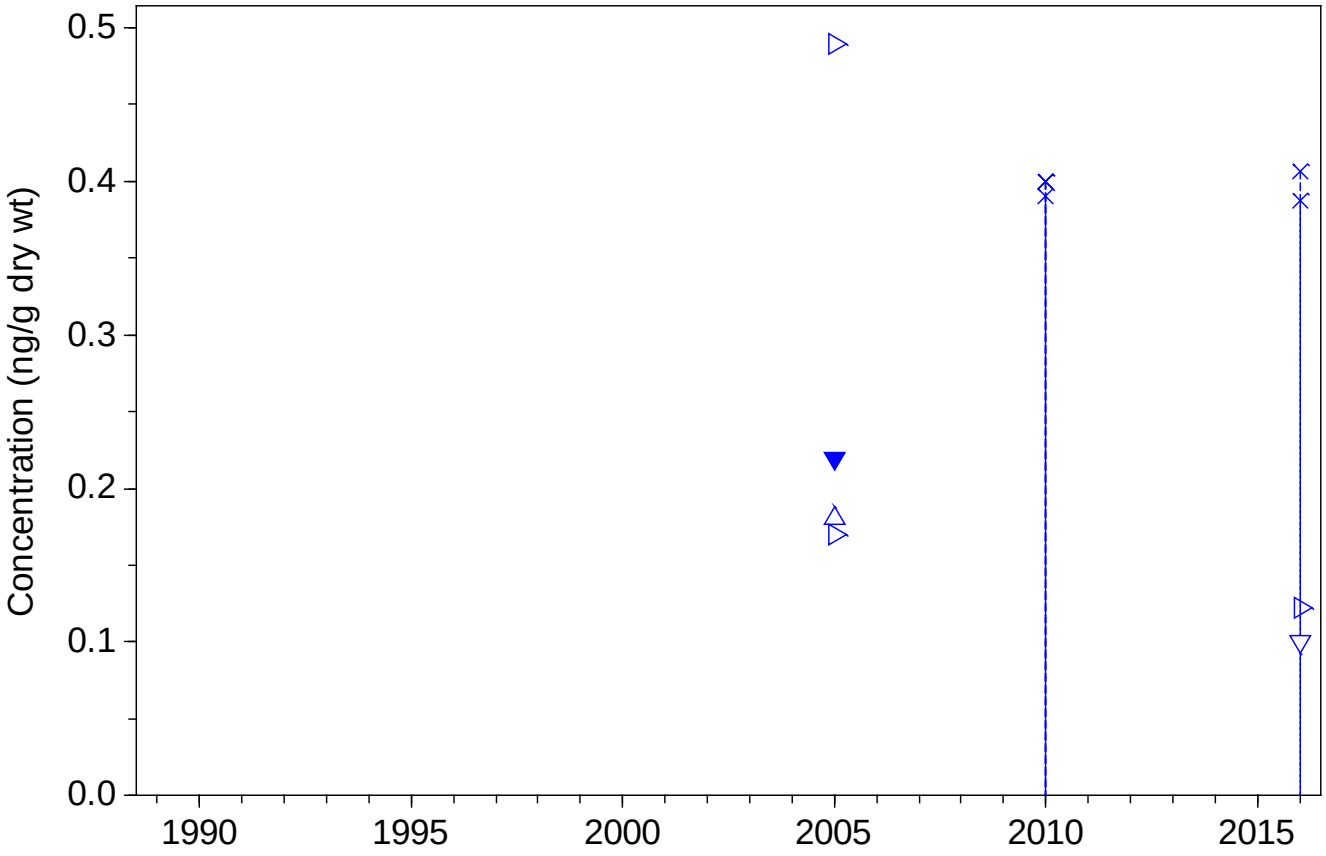
PBDE-47, Station 21



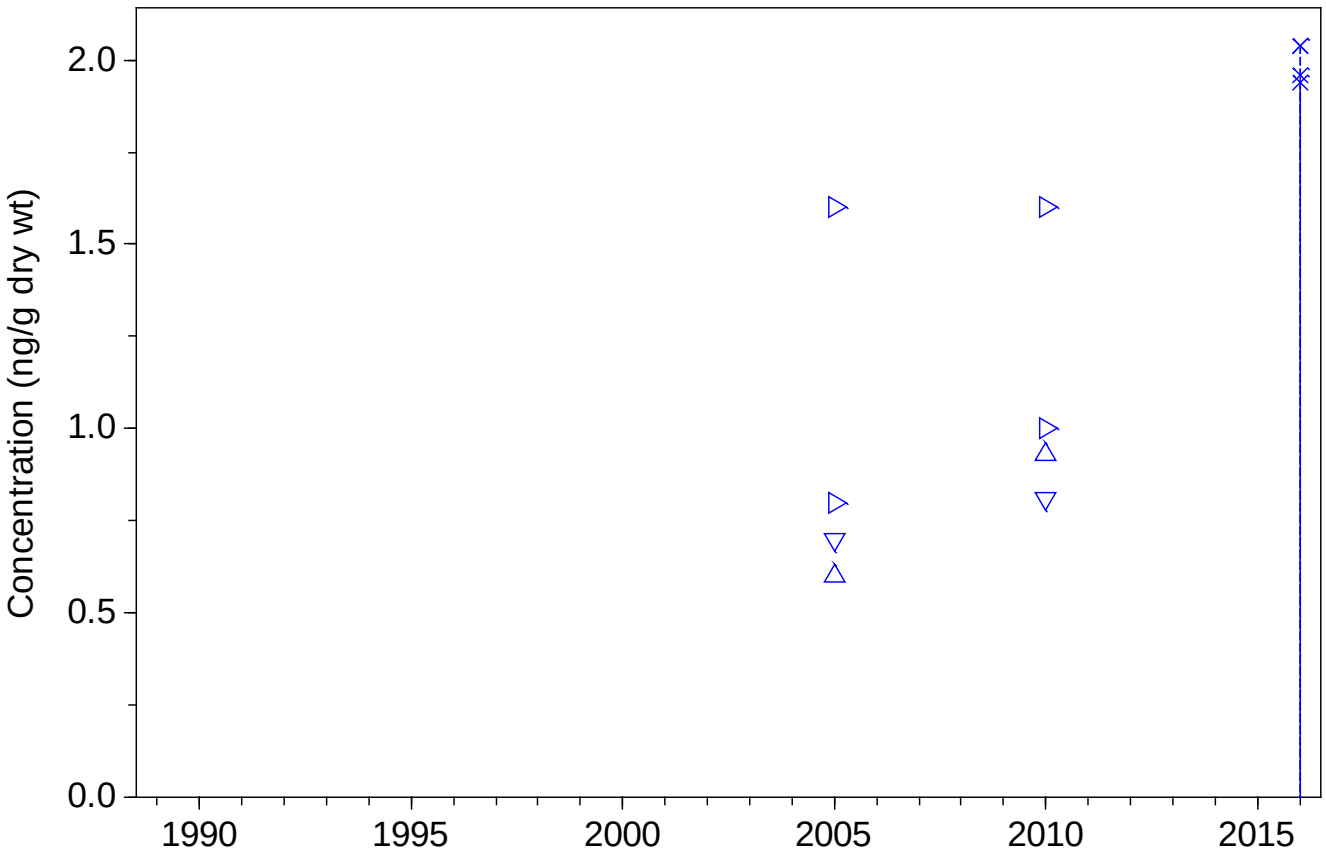
PBDE-49, Station 21



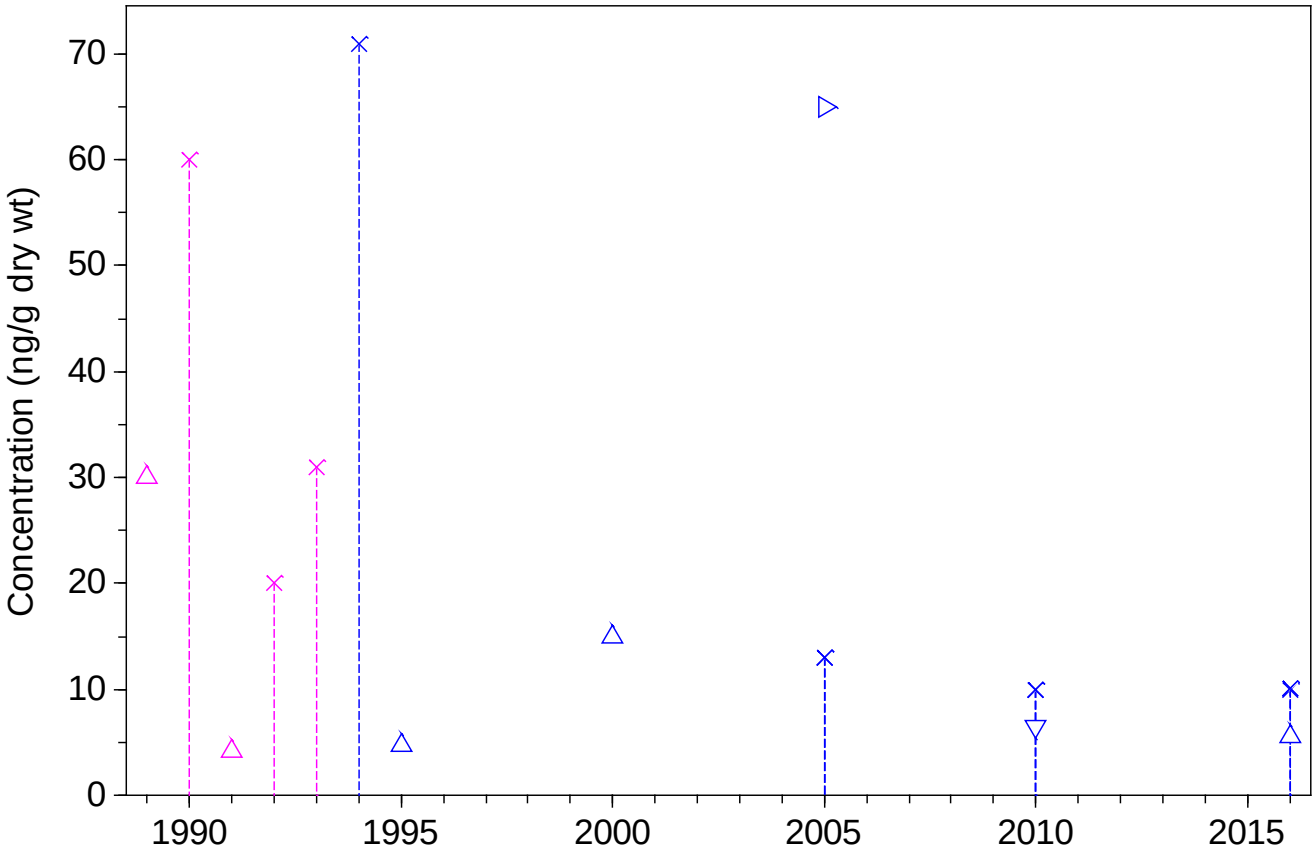
PBDE-99, Station 21



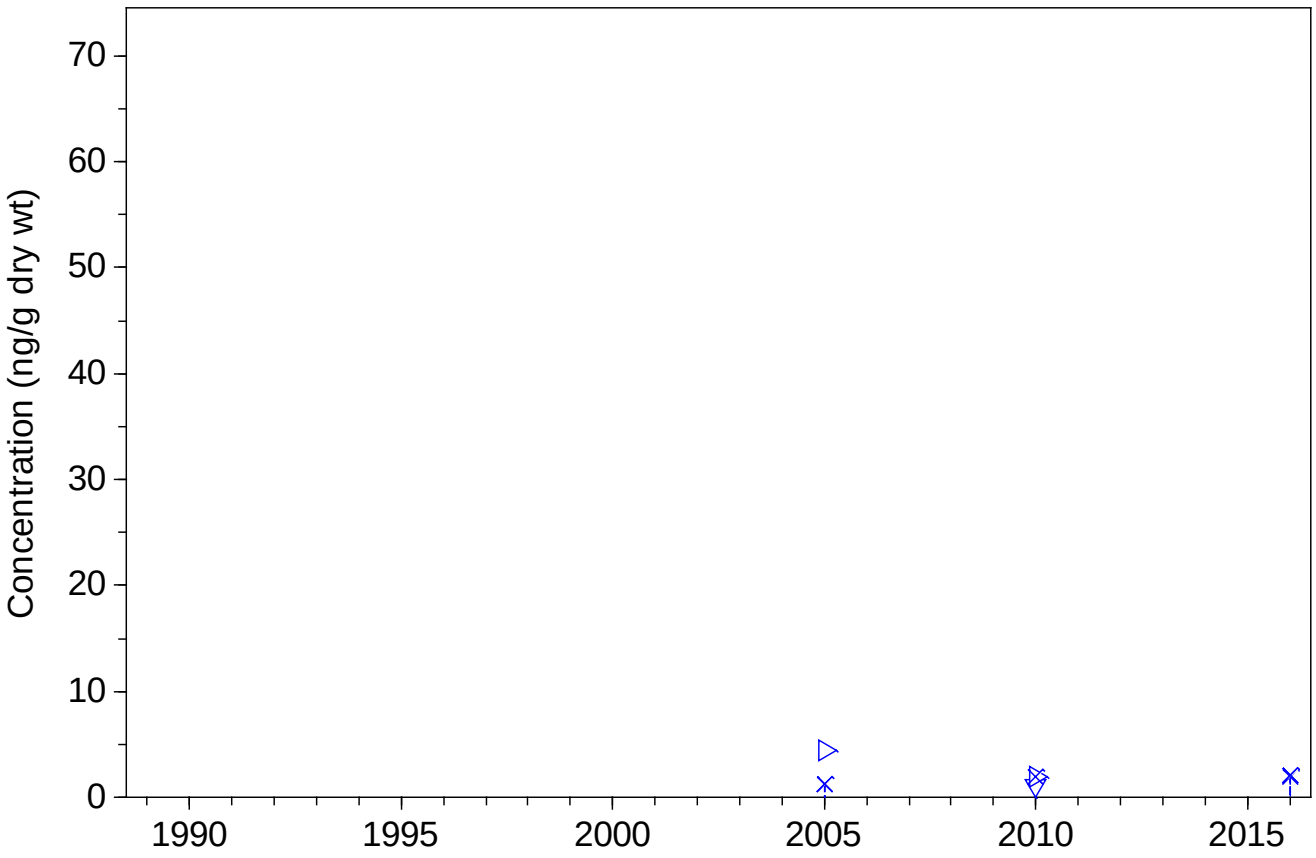
PBDE-209, Station 21



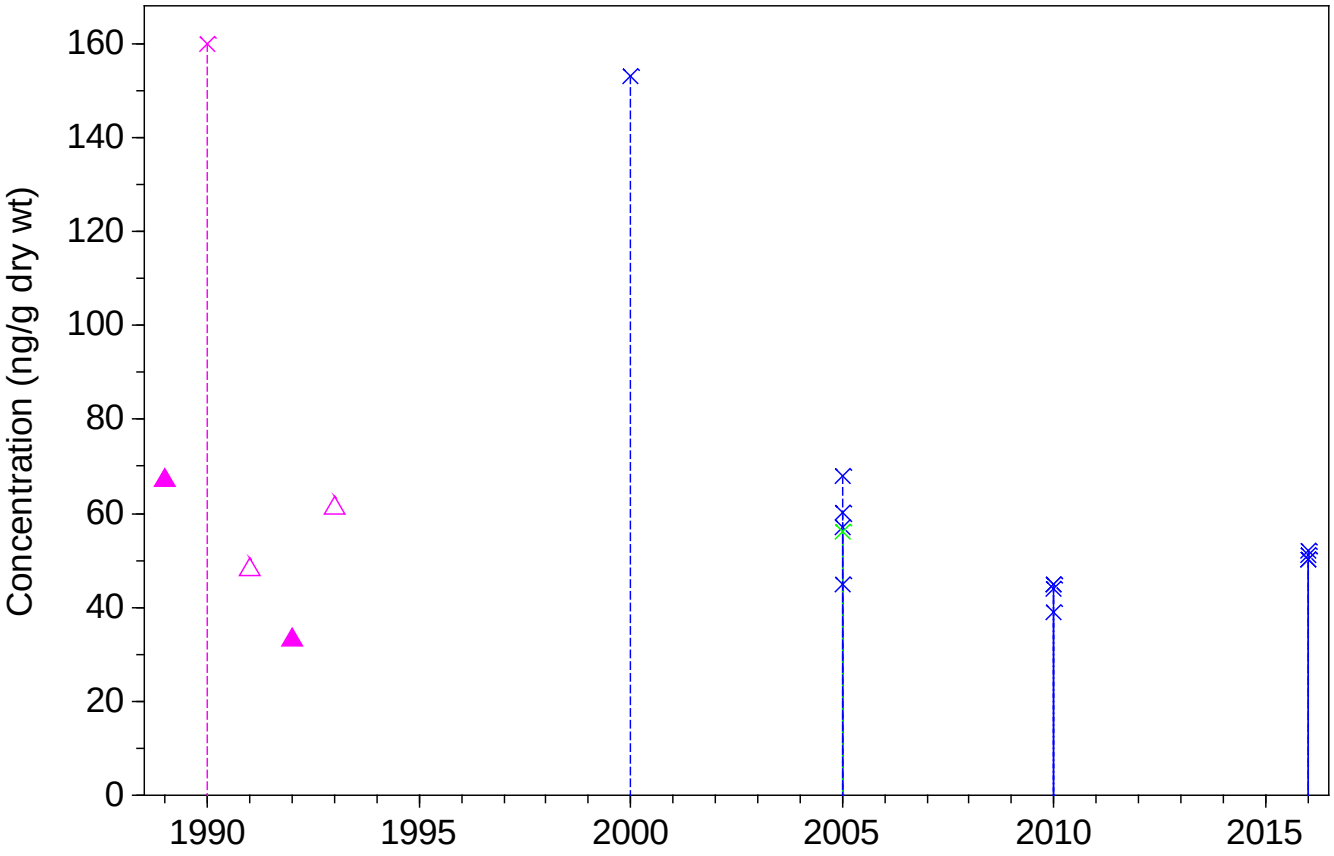
Total Aroclors, Station 21



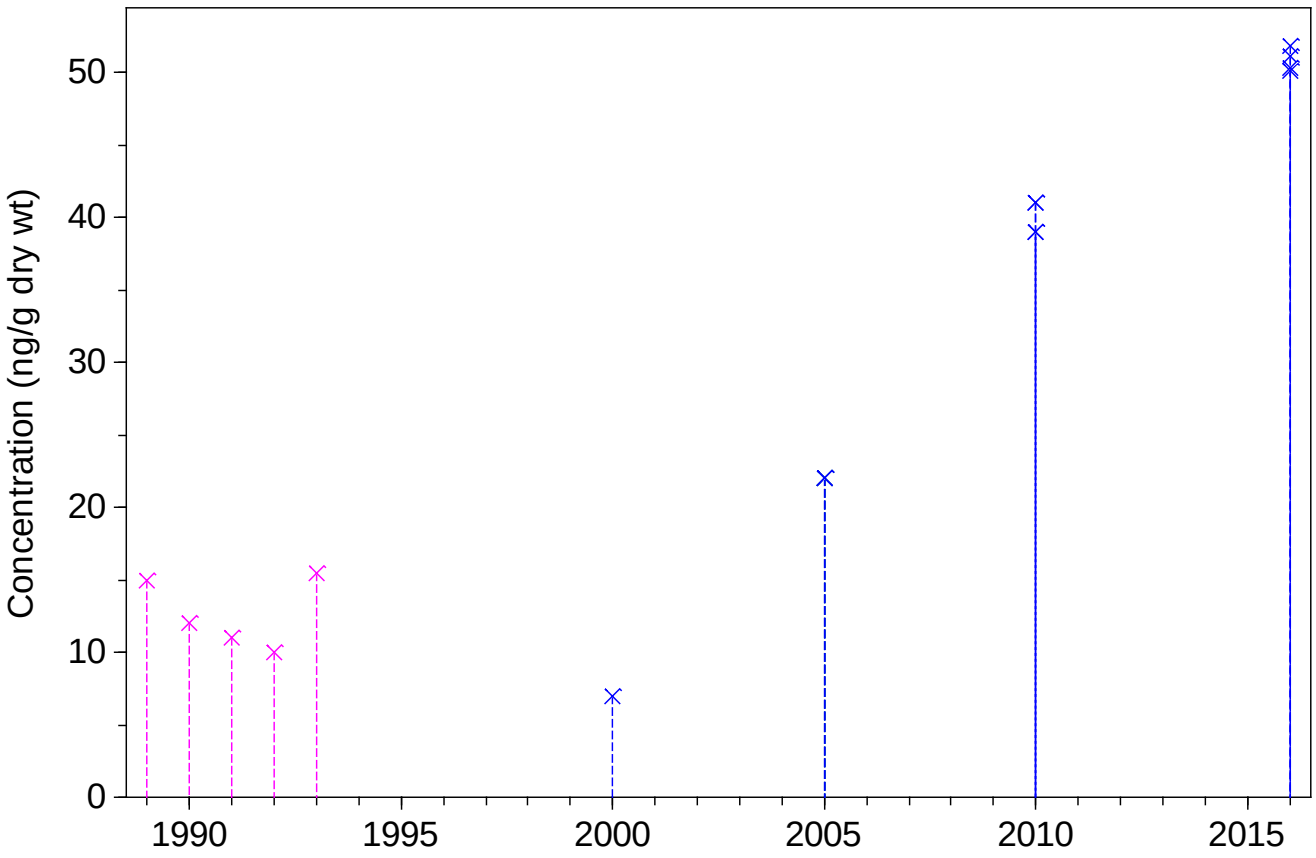
Total PCB Congeners x 2, Station 21



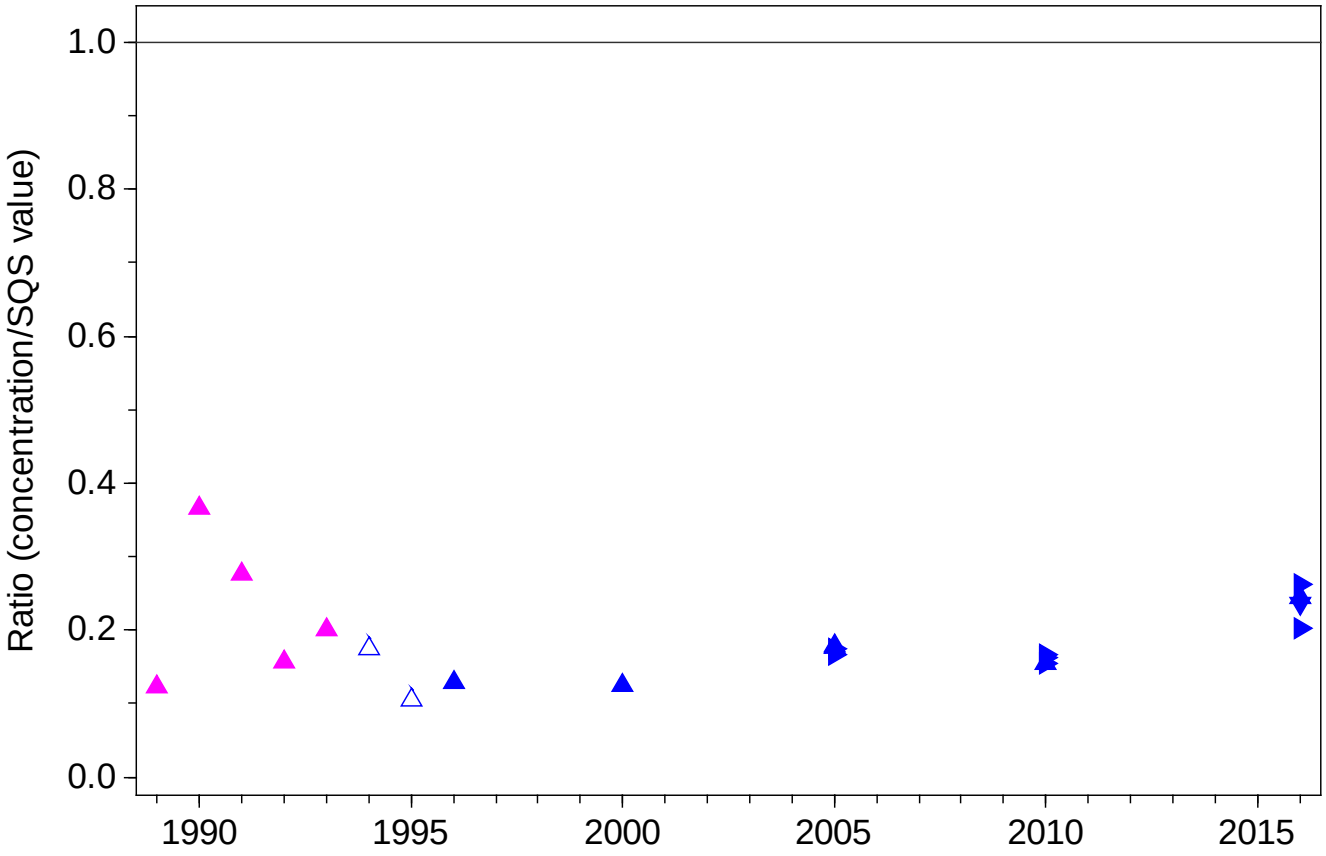
Bis(2-ethylhexyl)phthalate, Station 21



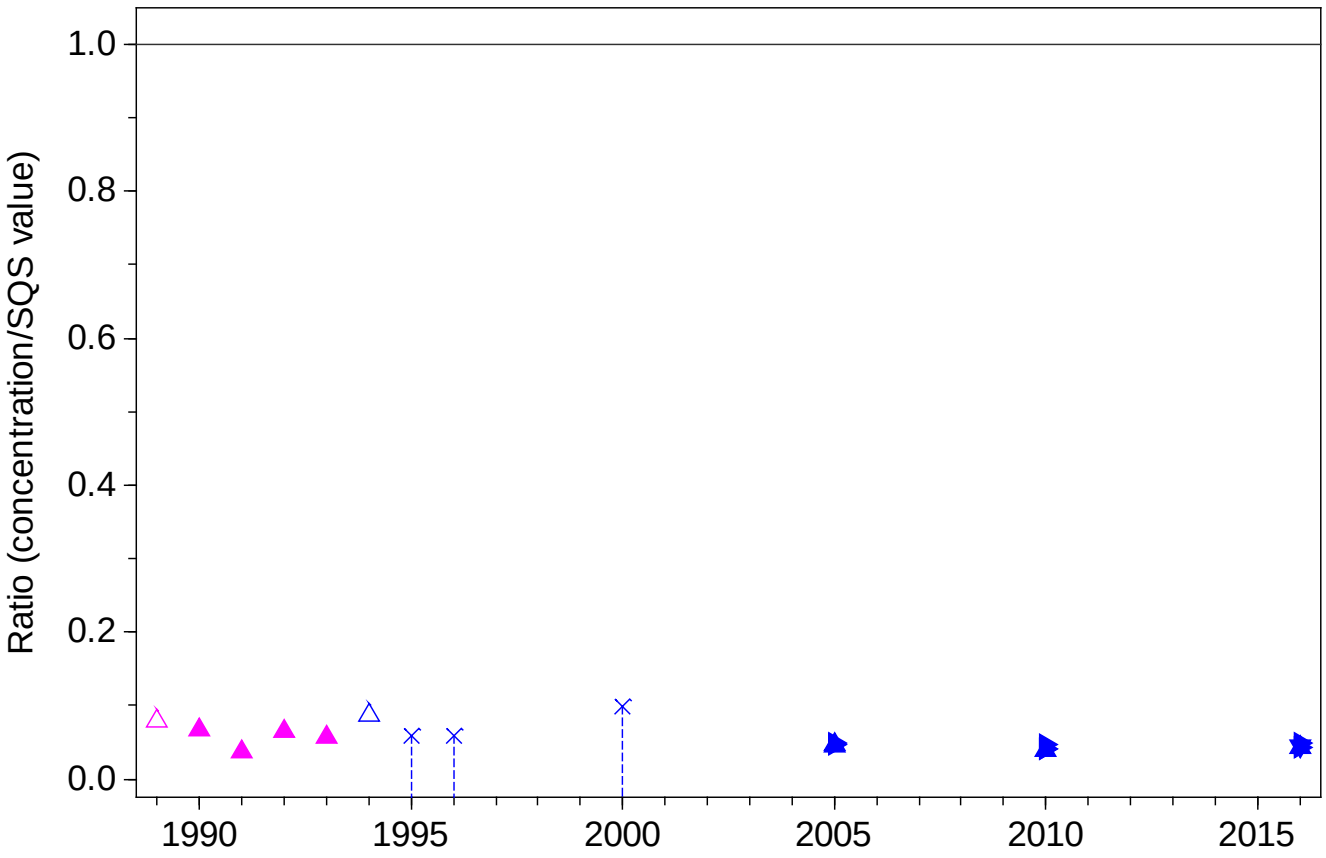
Butylbenzylphthalate, Station 21



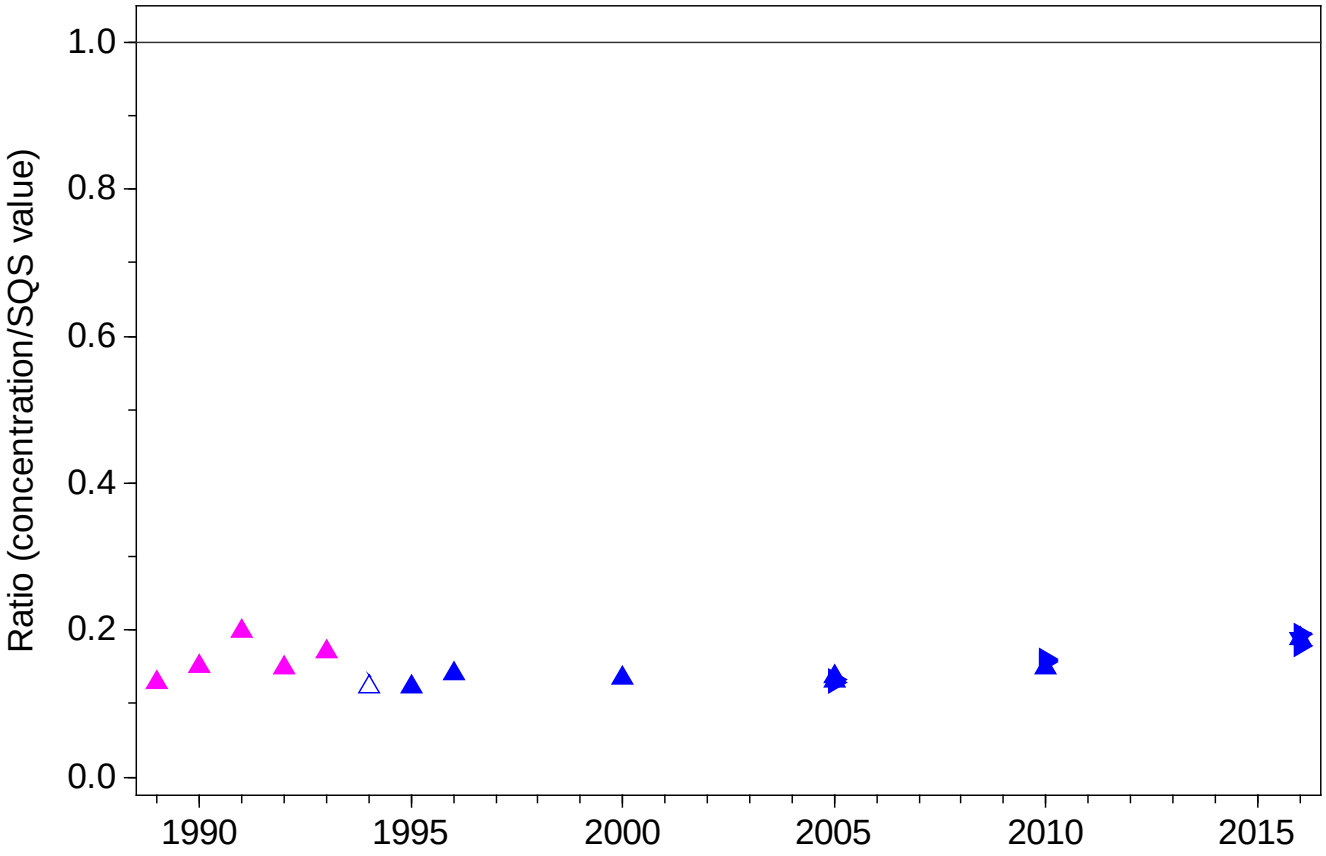
SQS quotient, Arsenic, Station 21



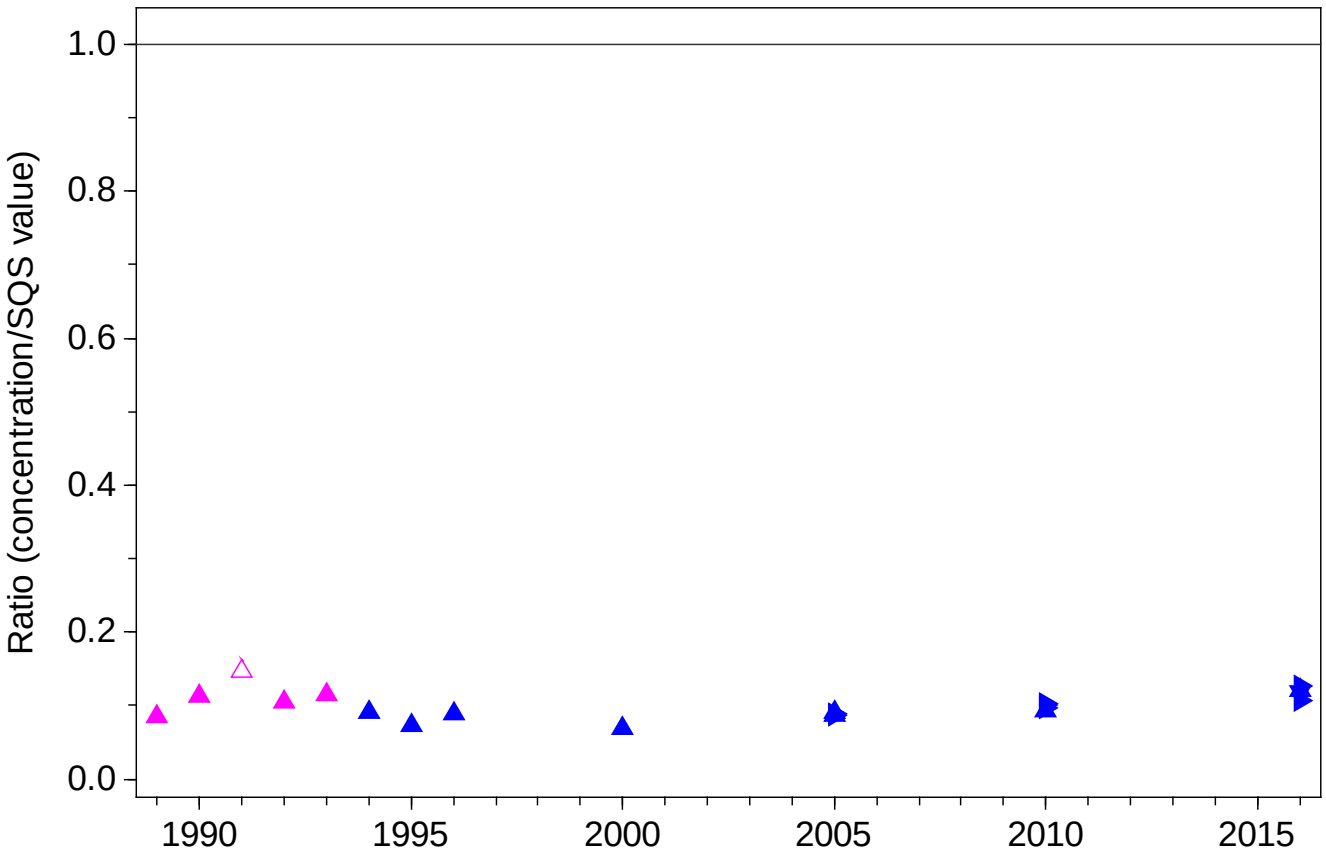
SQS quotient, Cadmium, Station 21



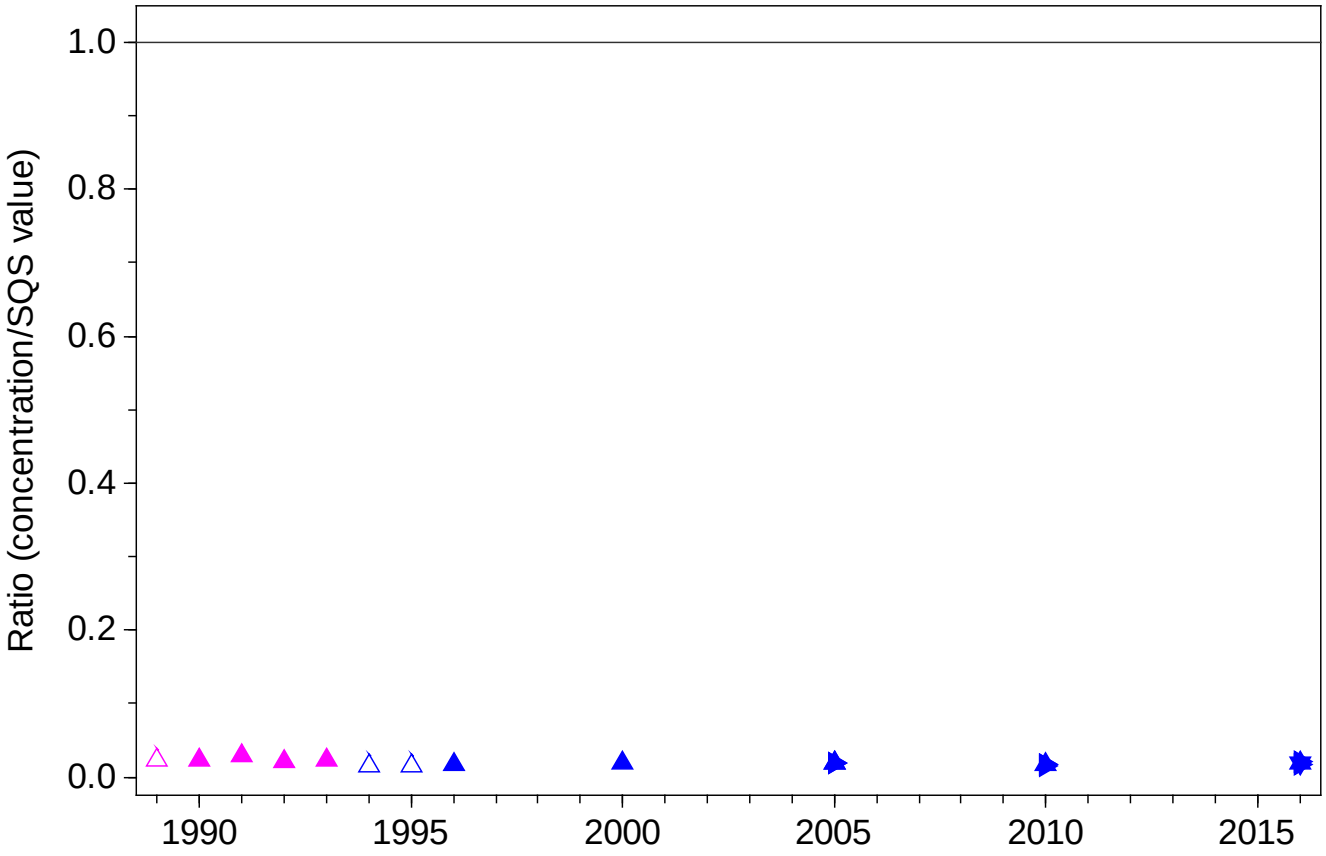
SQS quotient, Chromium, Station 21



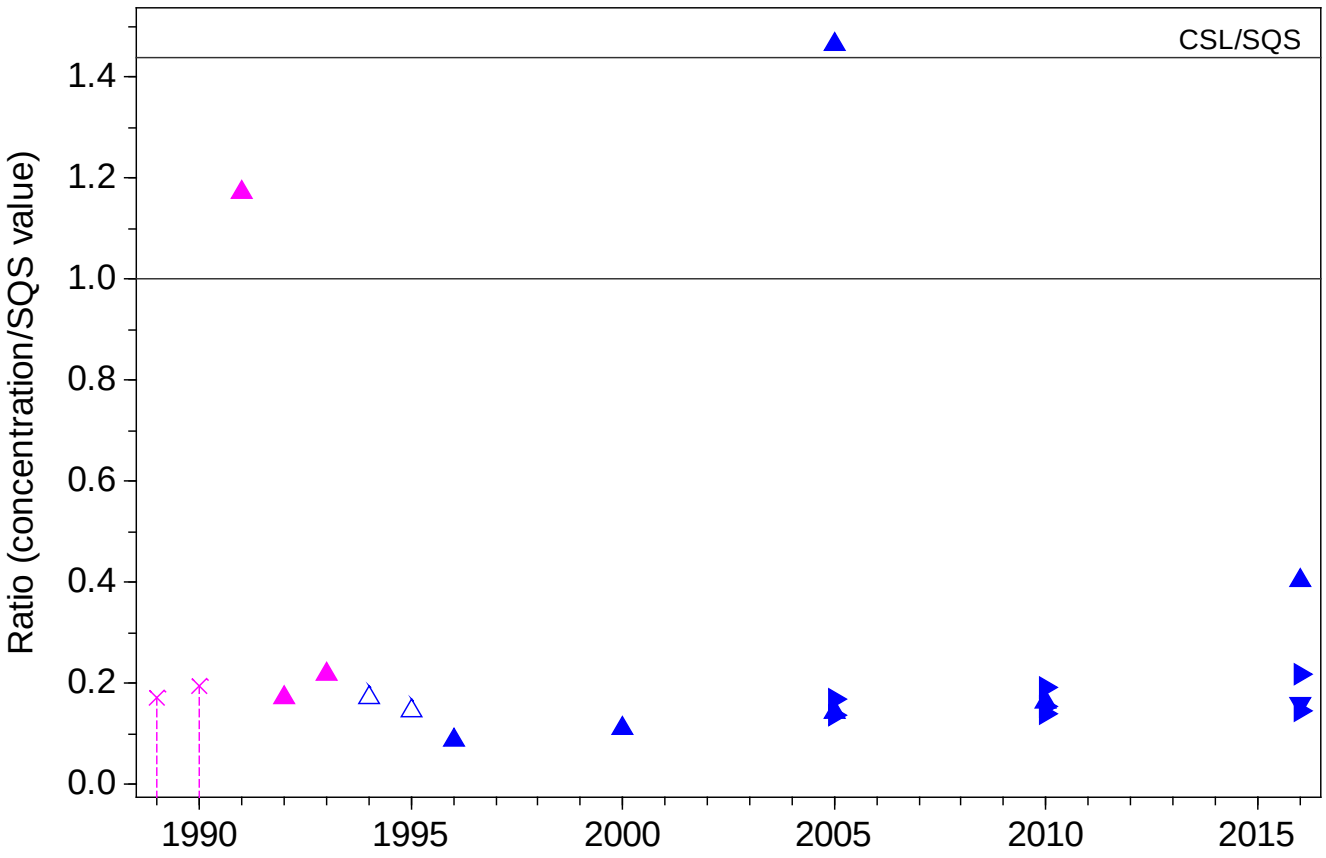
SQS quotient, Copper, Station 21



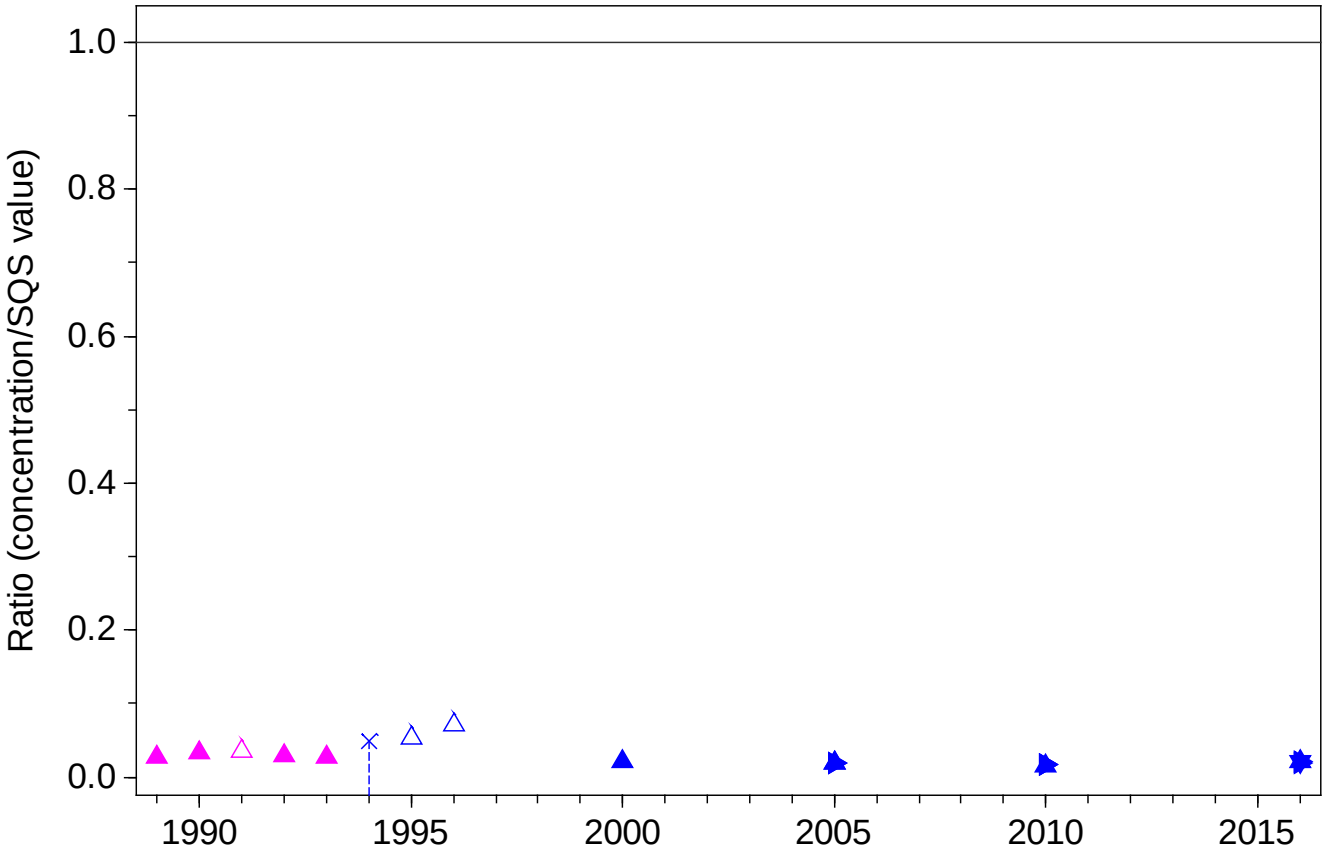
SQS quotient, Lead, Station 21



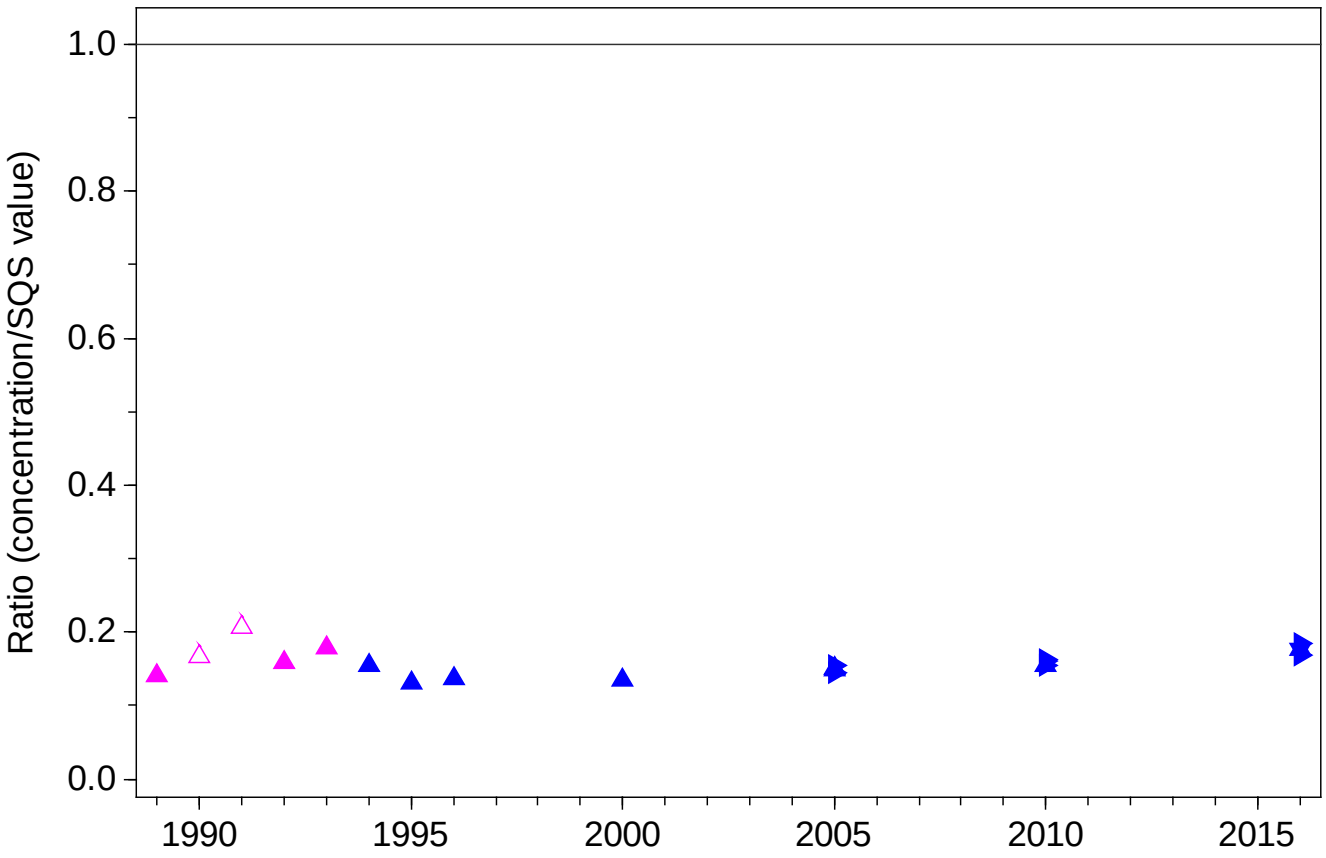
SQS quotient, Mercury, Station 21



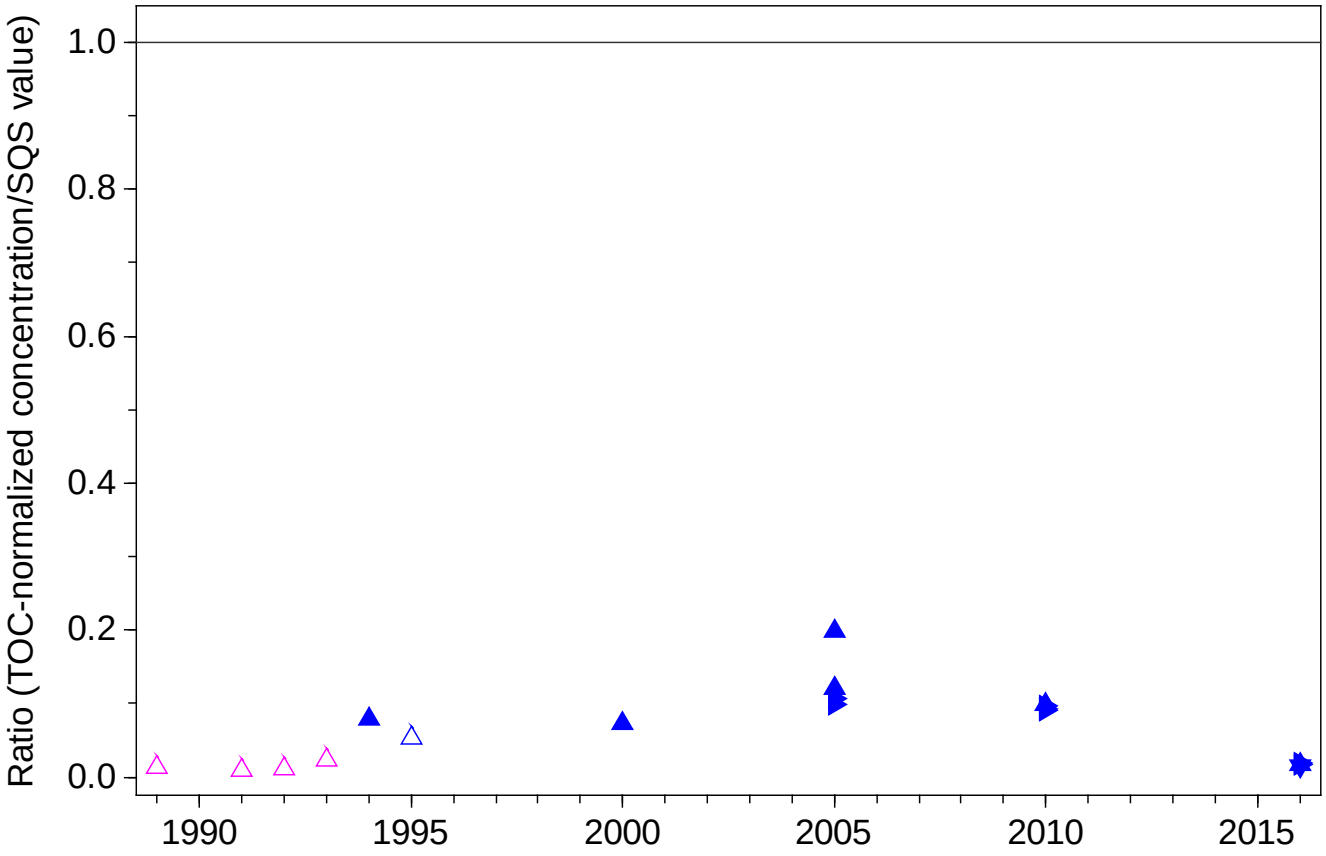
SQS quotient, Silver, Station 21



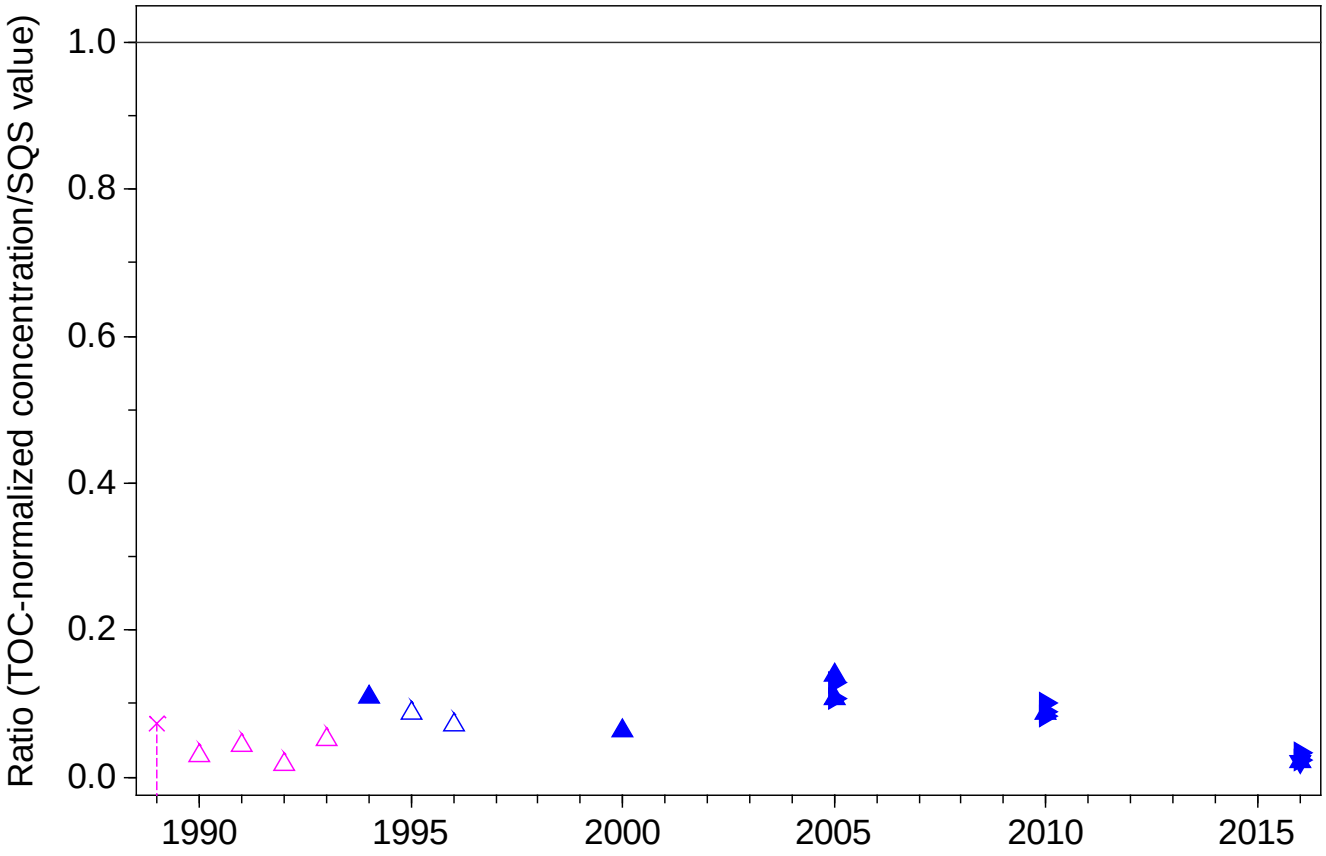
SQS quotient, Zinc, Station 21



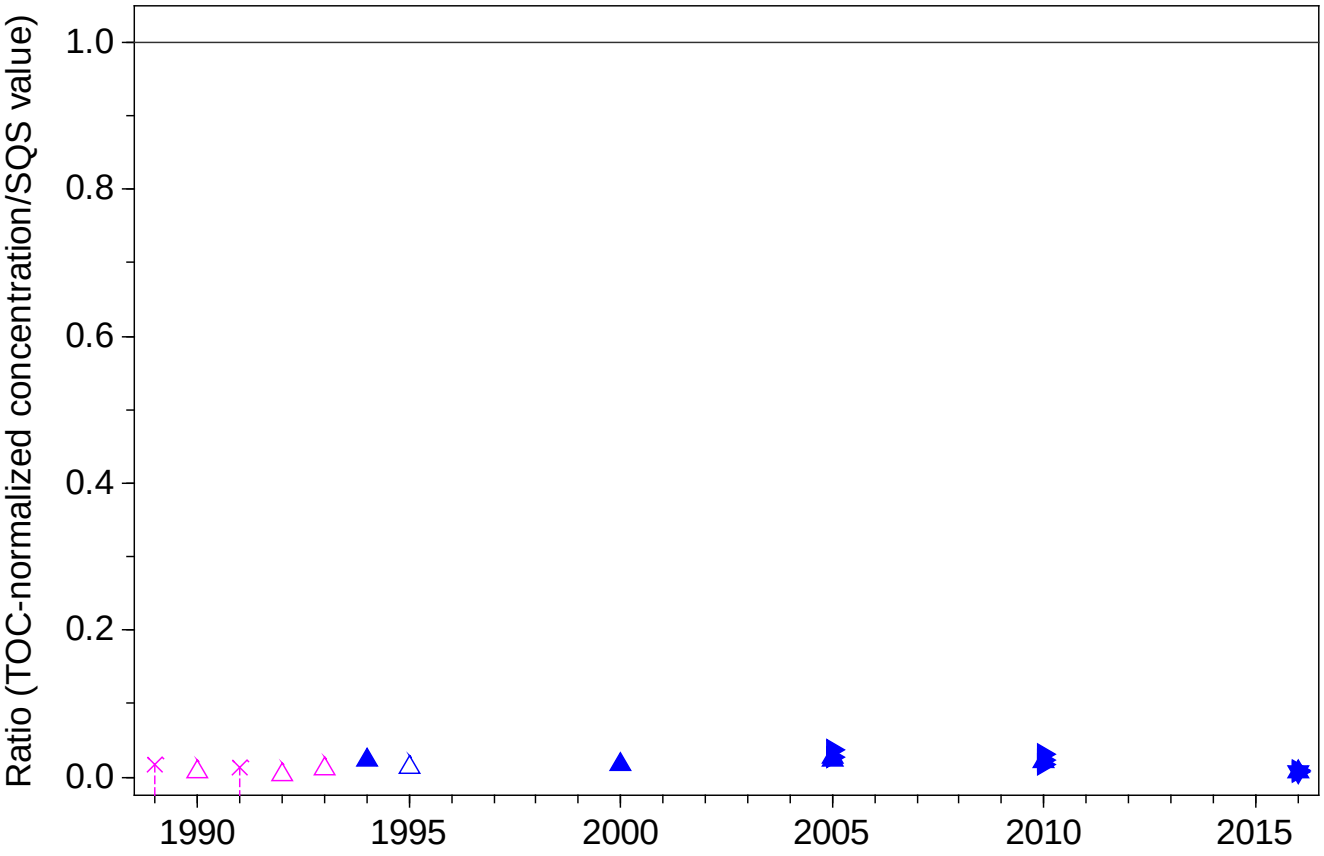
SQS quotient, 2-Methylnaphthalene, Station 21



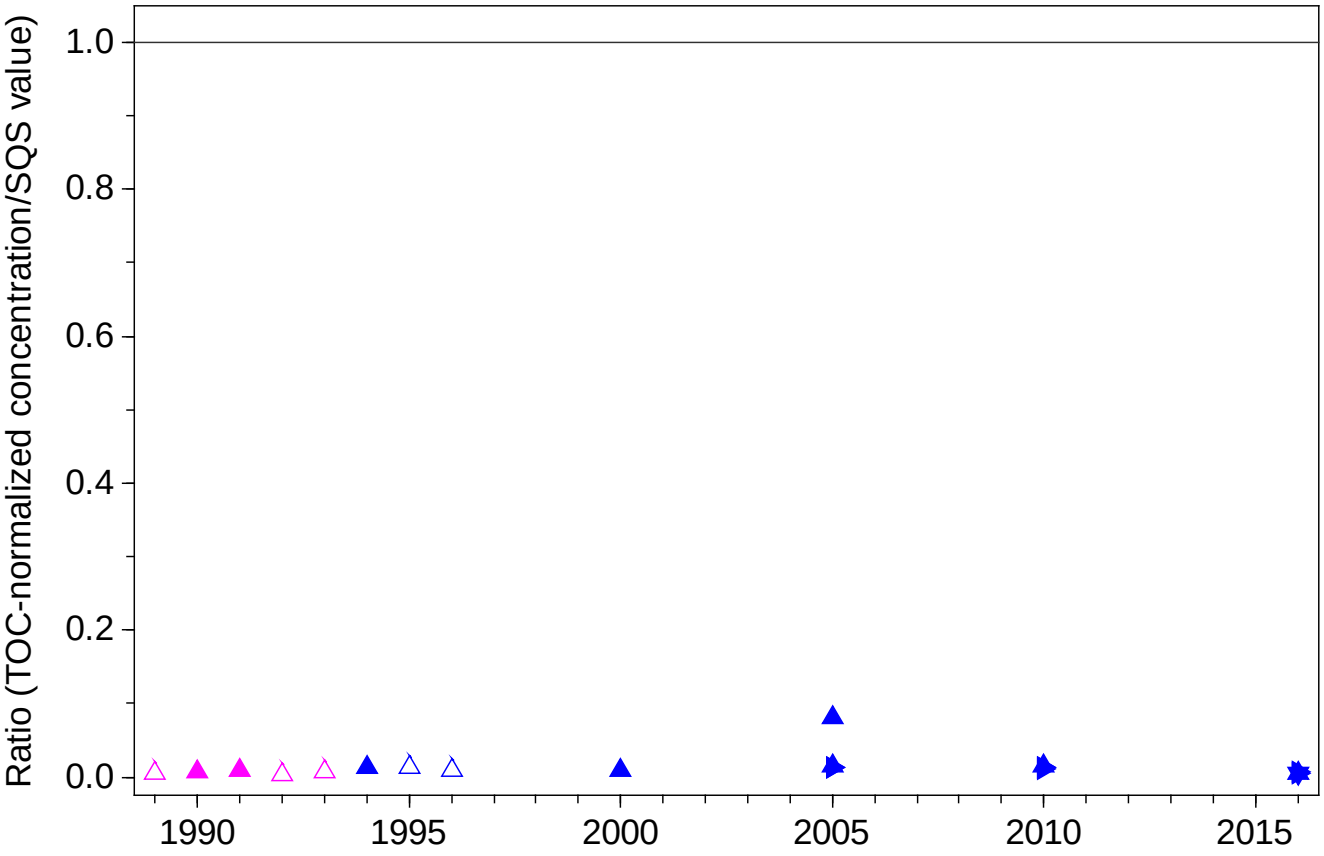
SQS quotient, Acenaphthene, Station 21



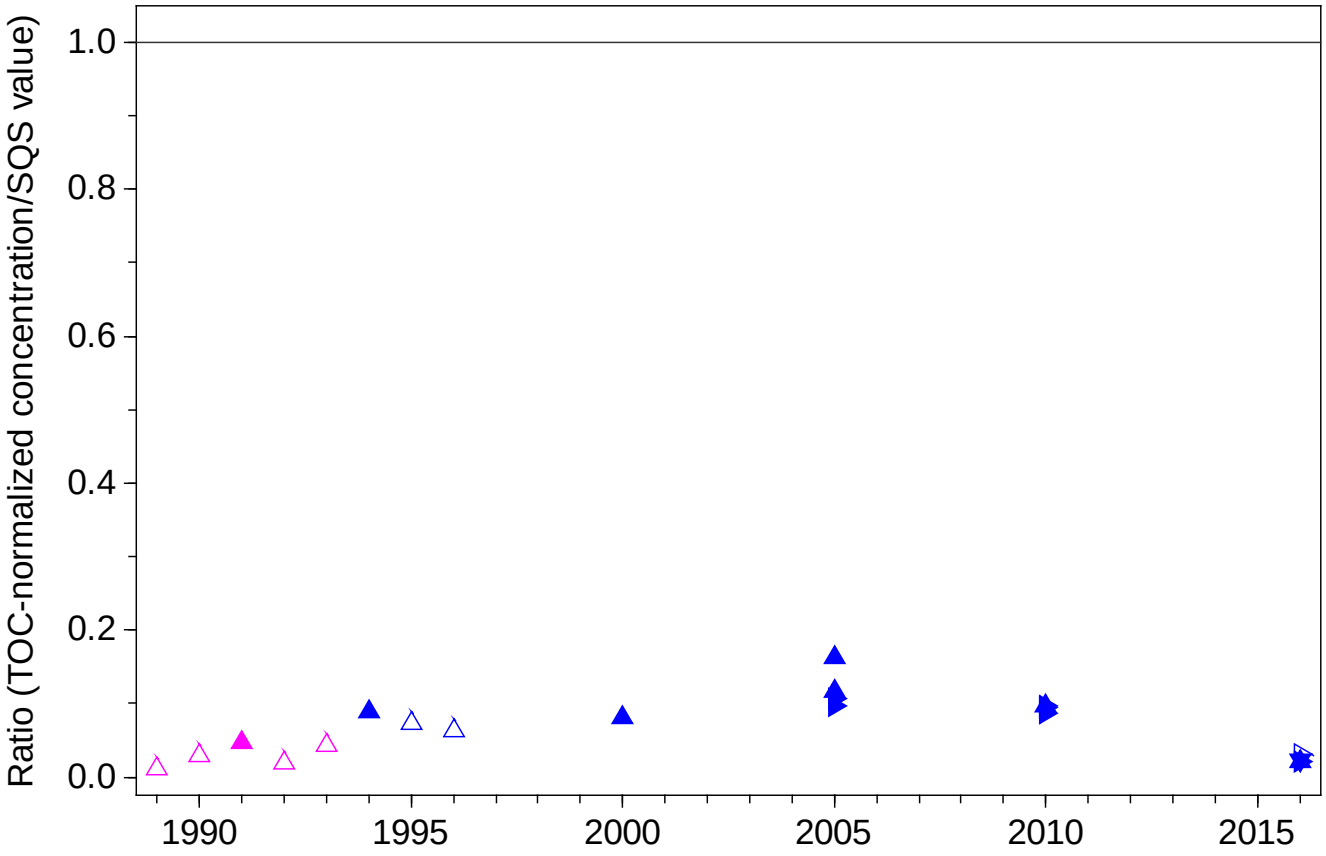
SQS quotient, Acenaphthylene, Station 21



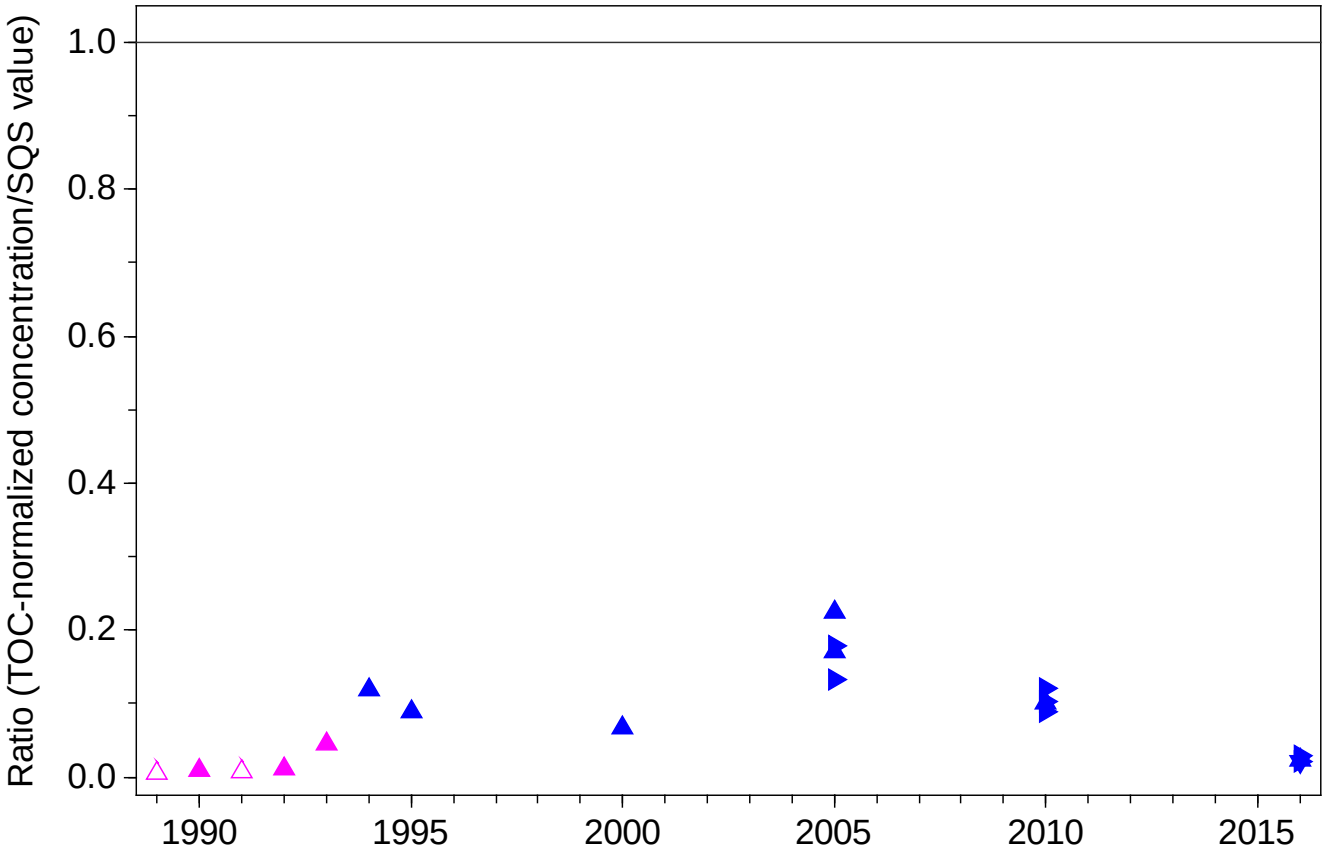
SQS quotient, Anthracene, Station 21



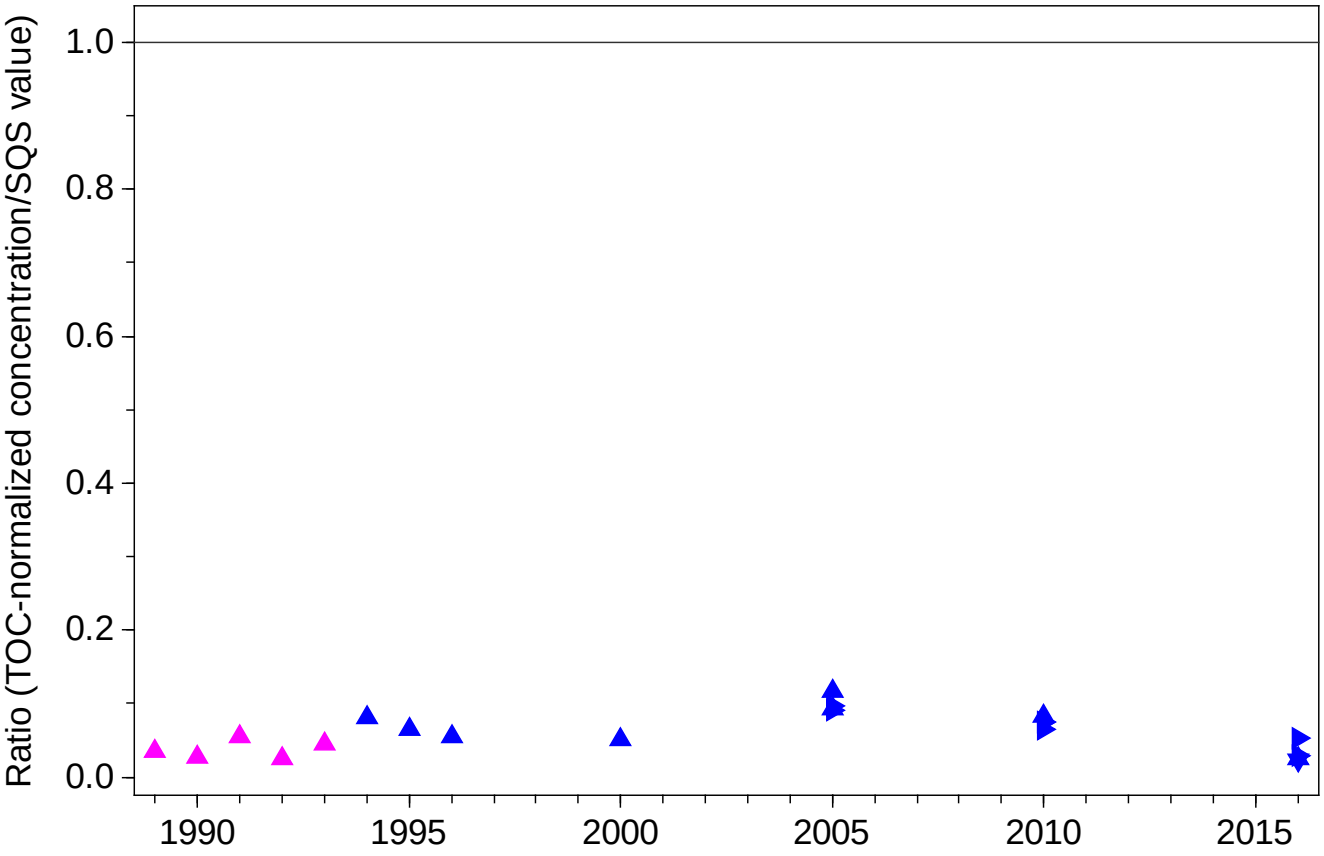
SQS quotient, Fluorene, Station 21



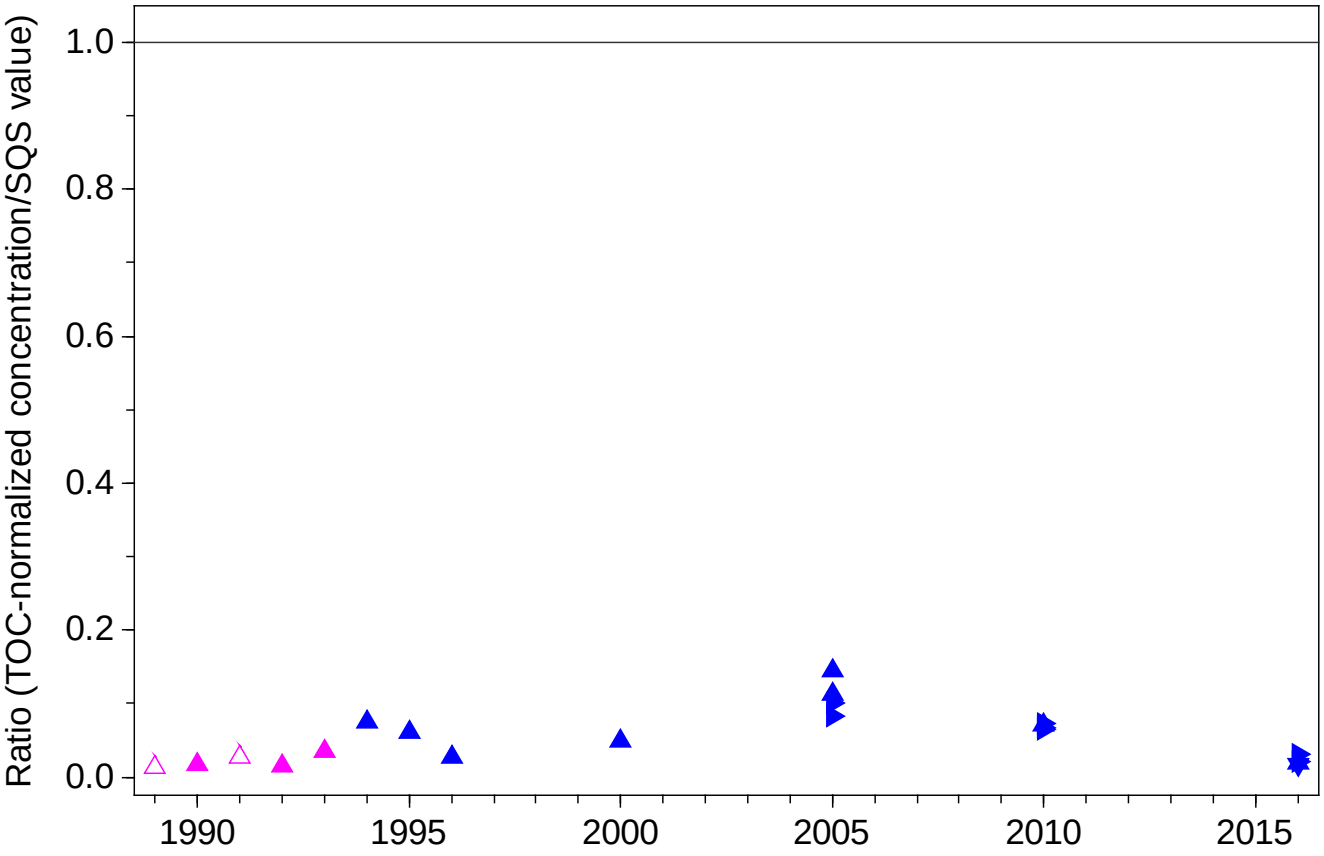
SQS quotient, Naphthalene, Station 21



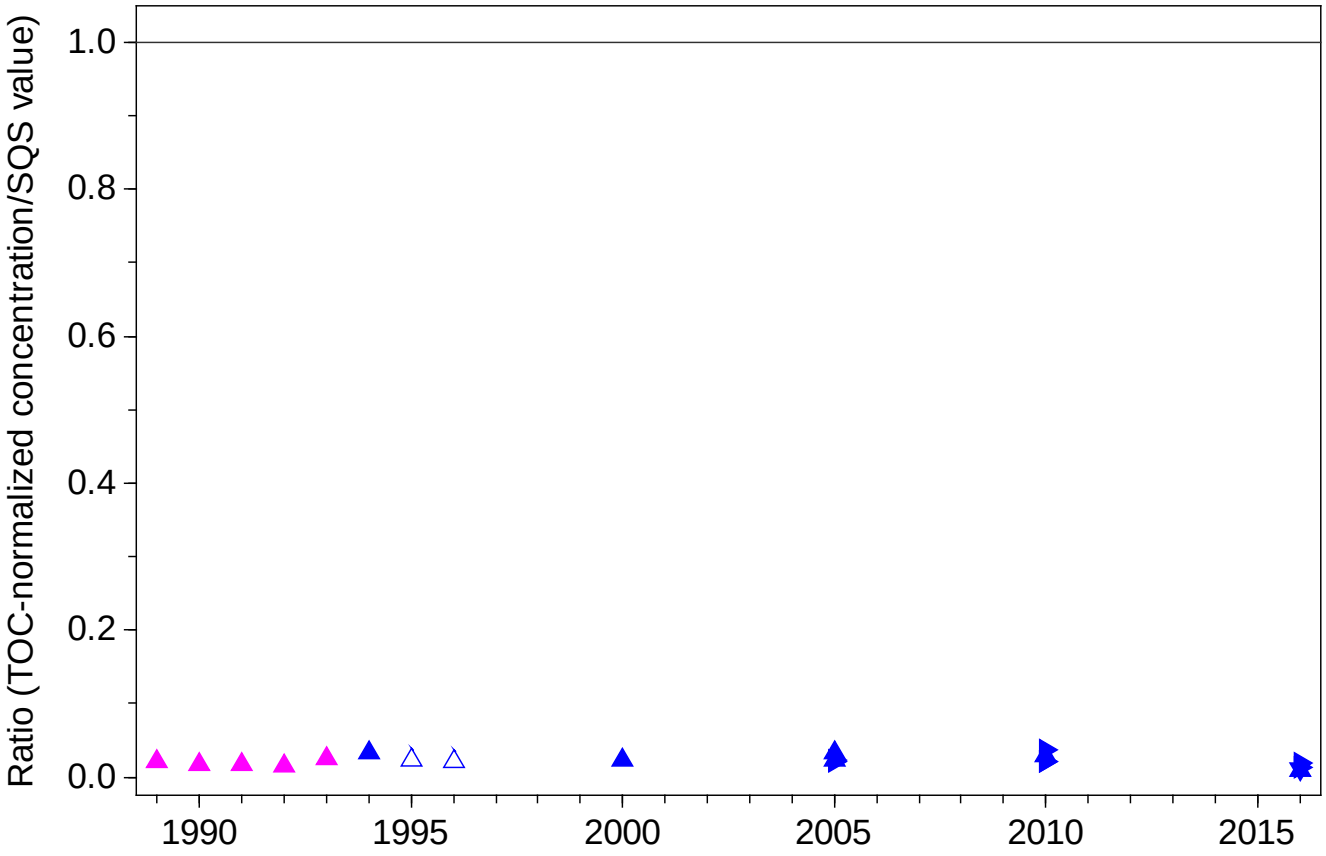
SQS quotient, Phenanthrene, Station 21



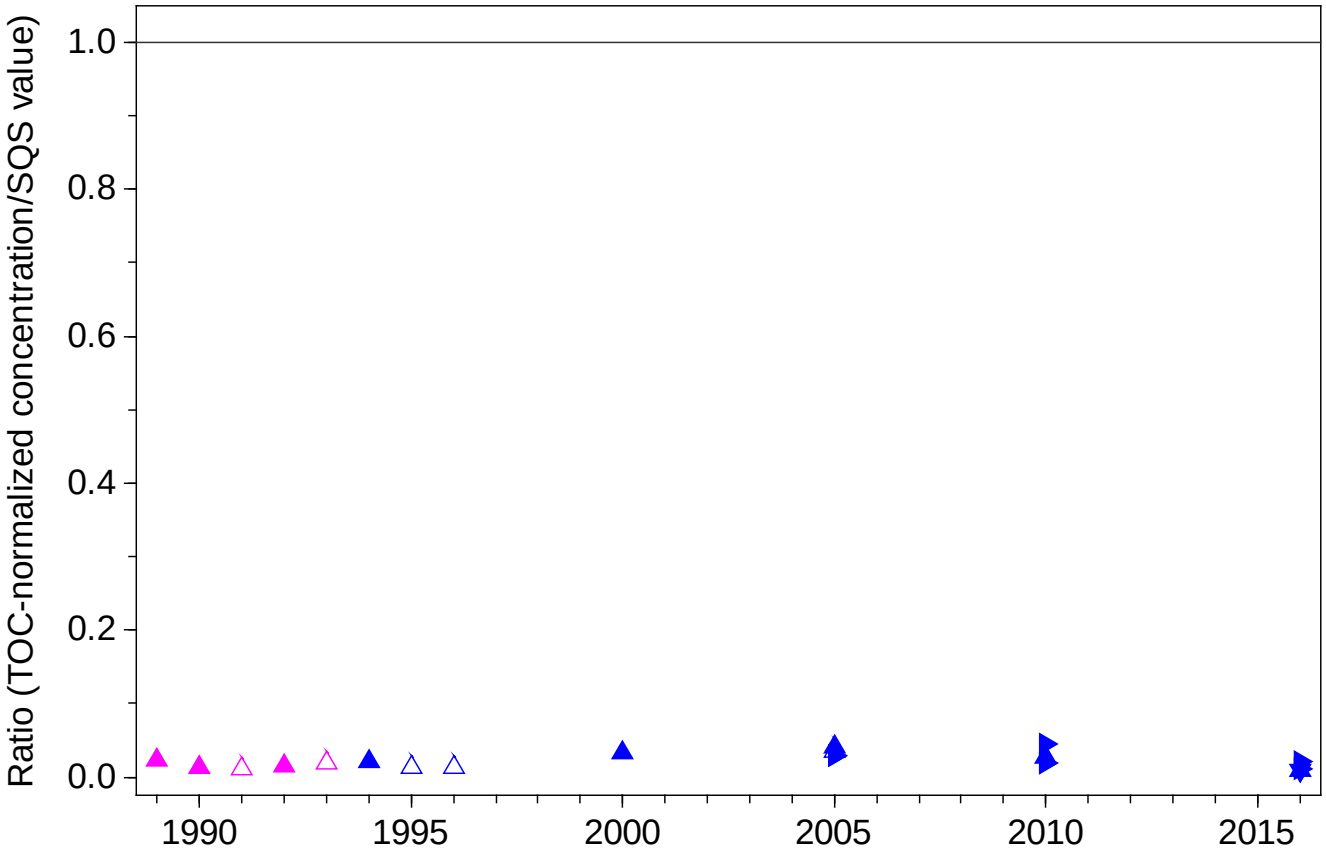
SQS quotient, Total LPAH, Station 21



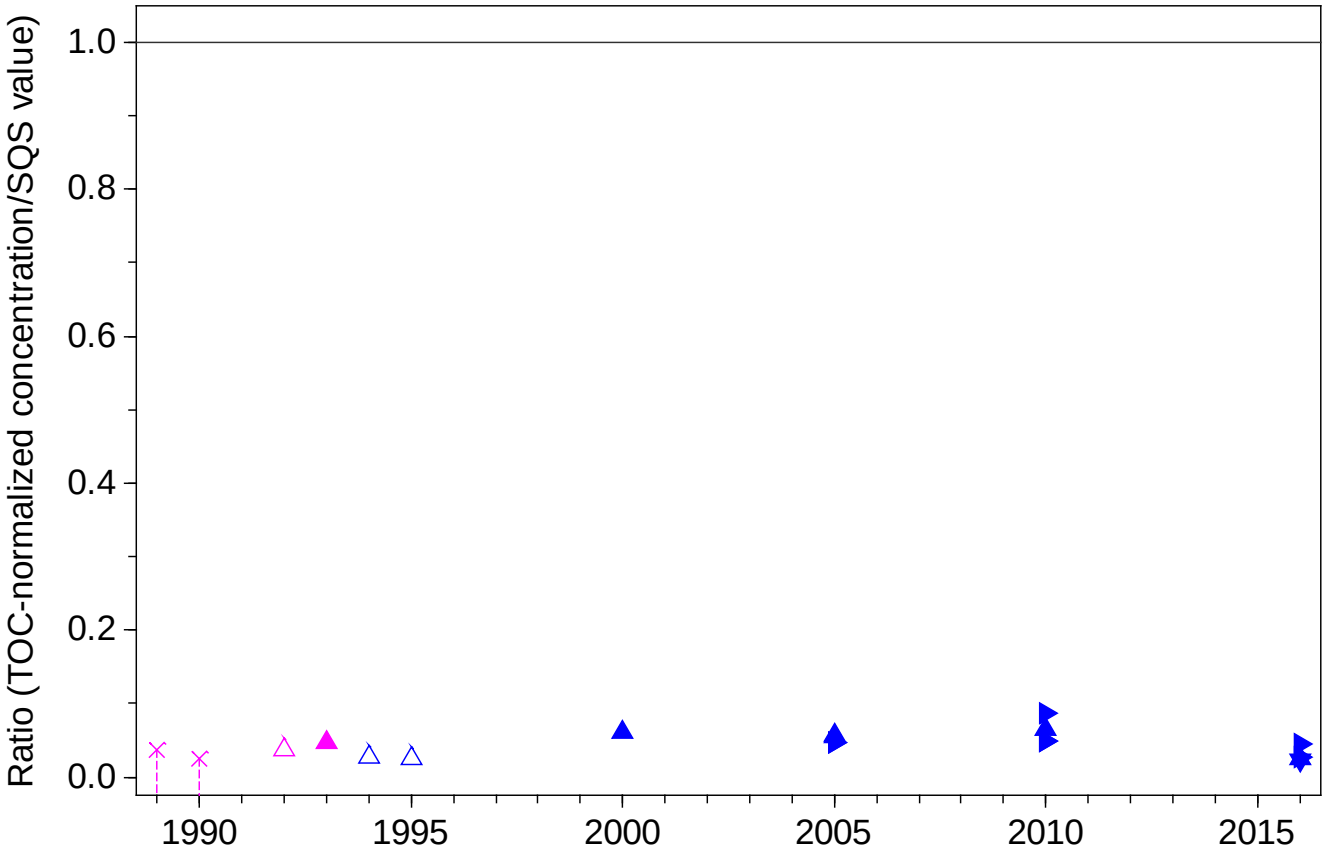
SQS quotient, Benzo(a)anthracene, Station 21



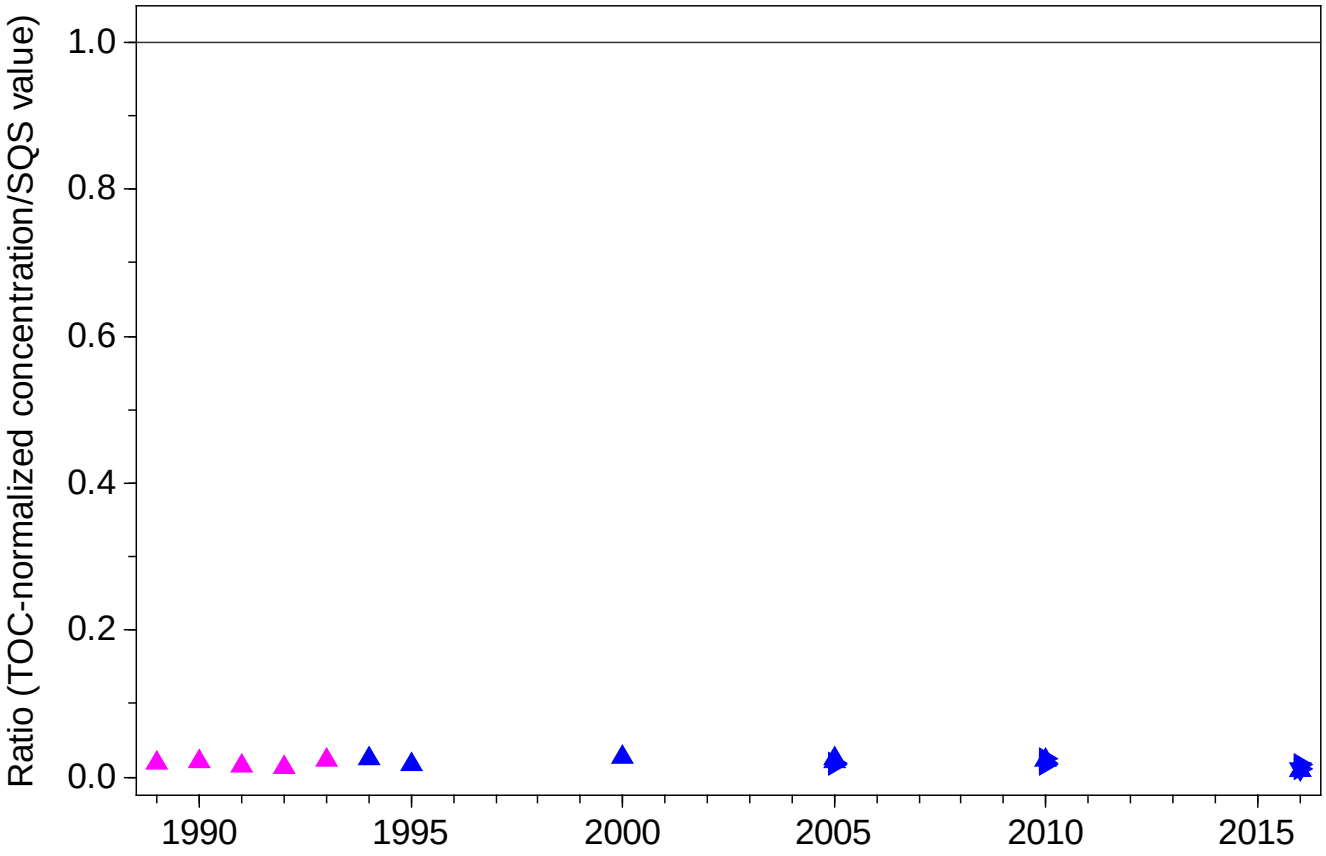
SQS quotient, Benzo(a)pyrene, Station 21



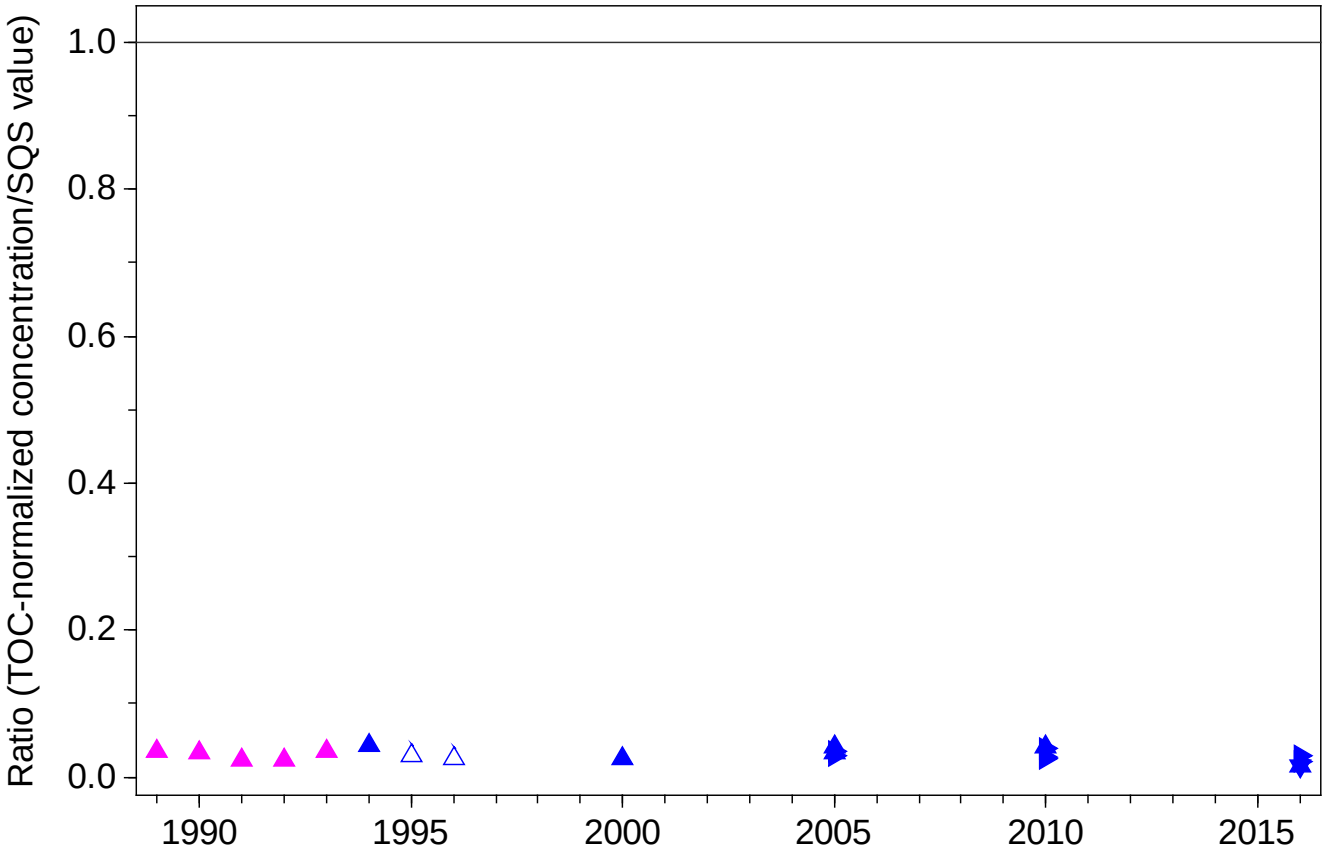
SQS quotient, Benzo(g,h,i)perylene, Station 21



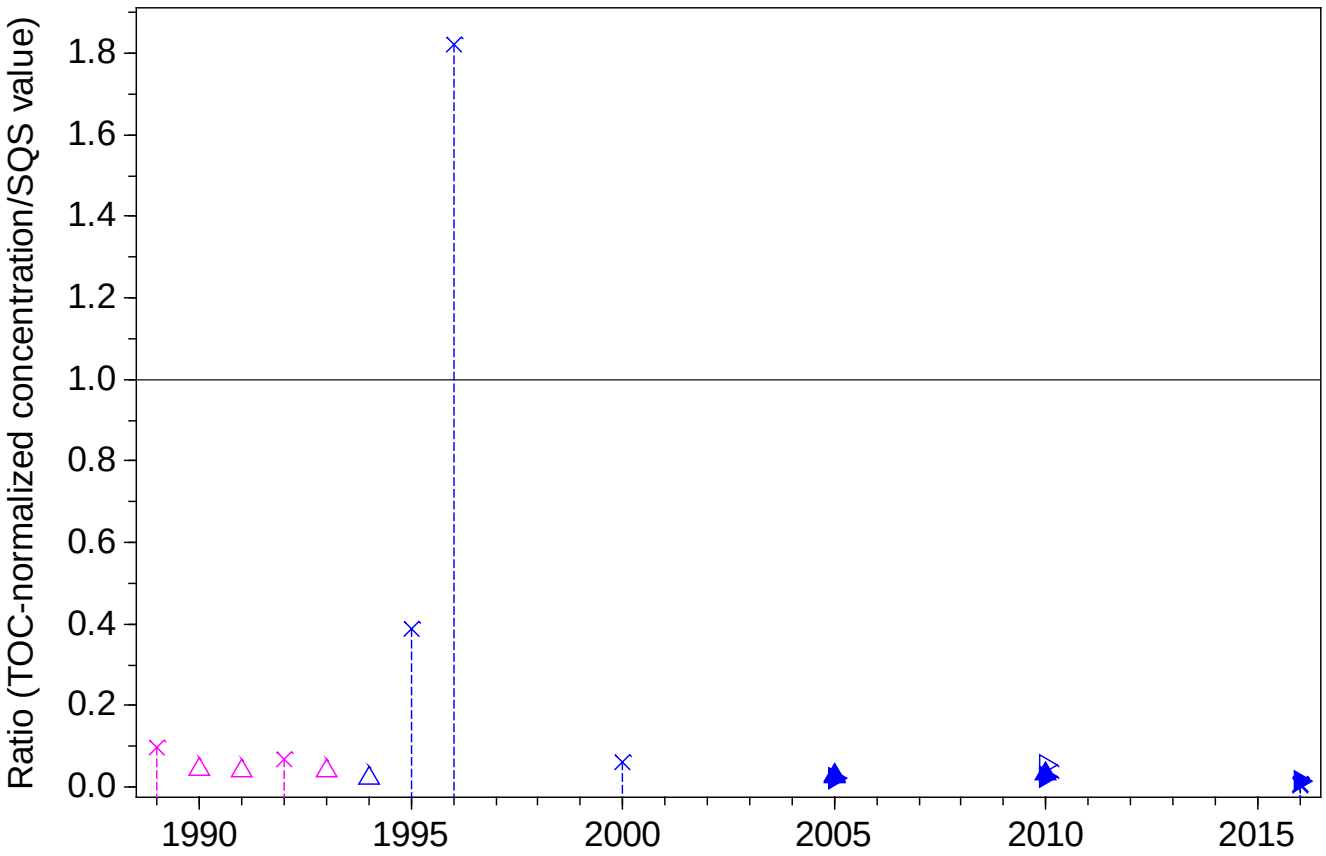
SQS quotient, Total Benzofluoranthenes, Station 21



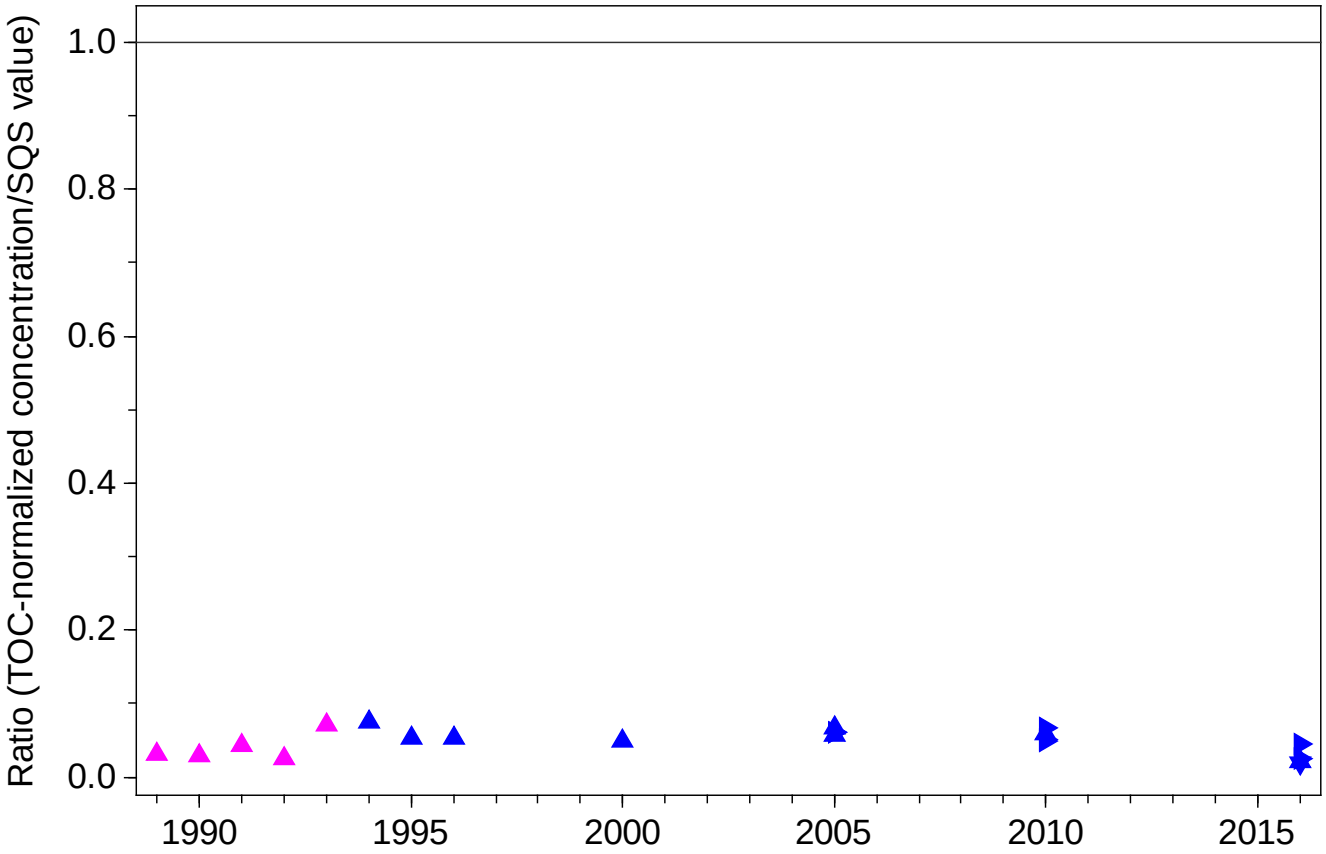
SQS quotient, Chrysene, Station 21



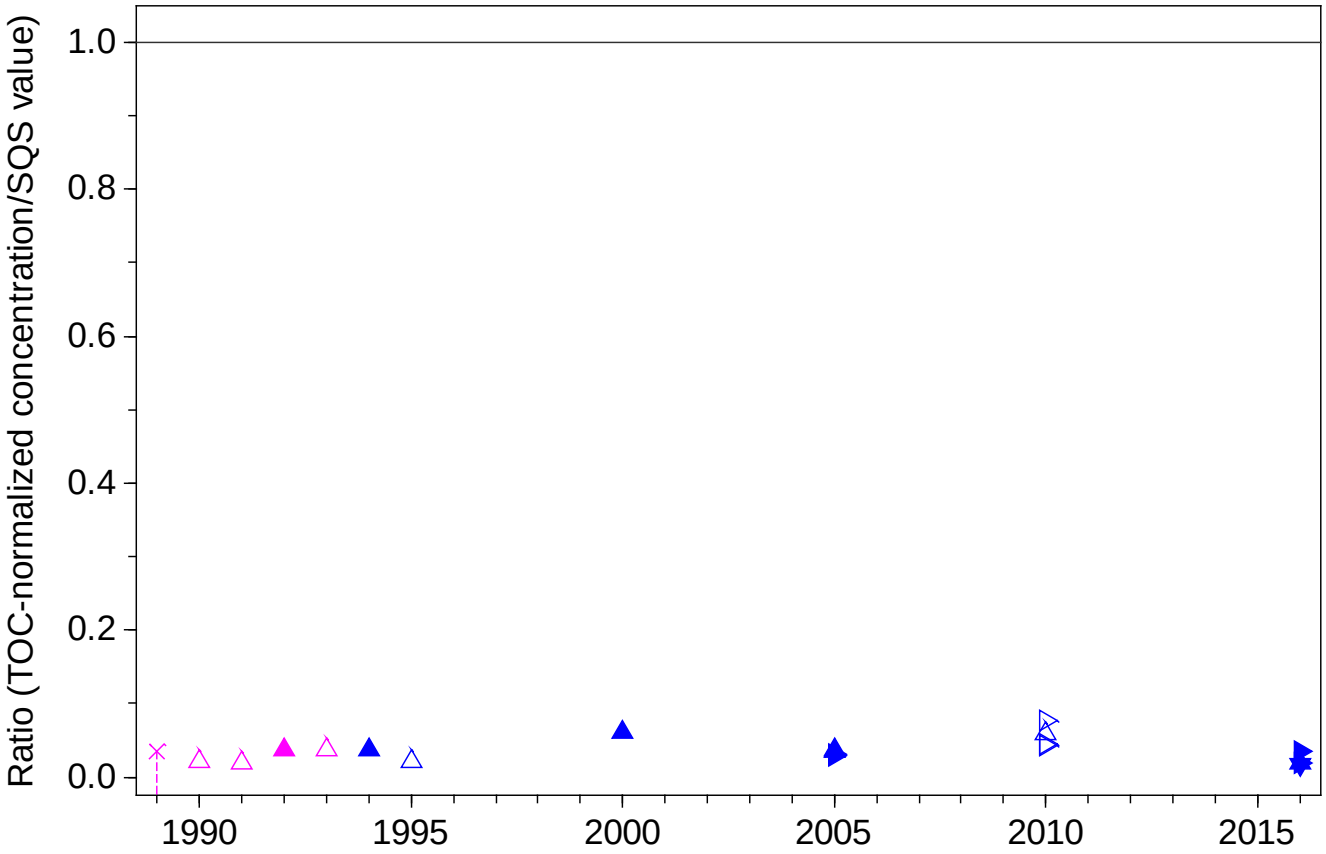
SQS quotient, Dibenzo(a,h)anthracene, Station 21



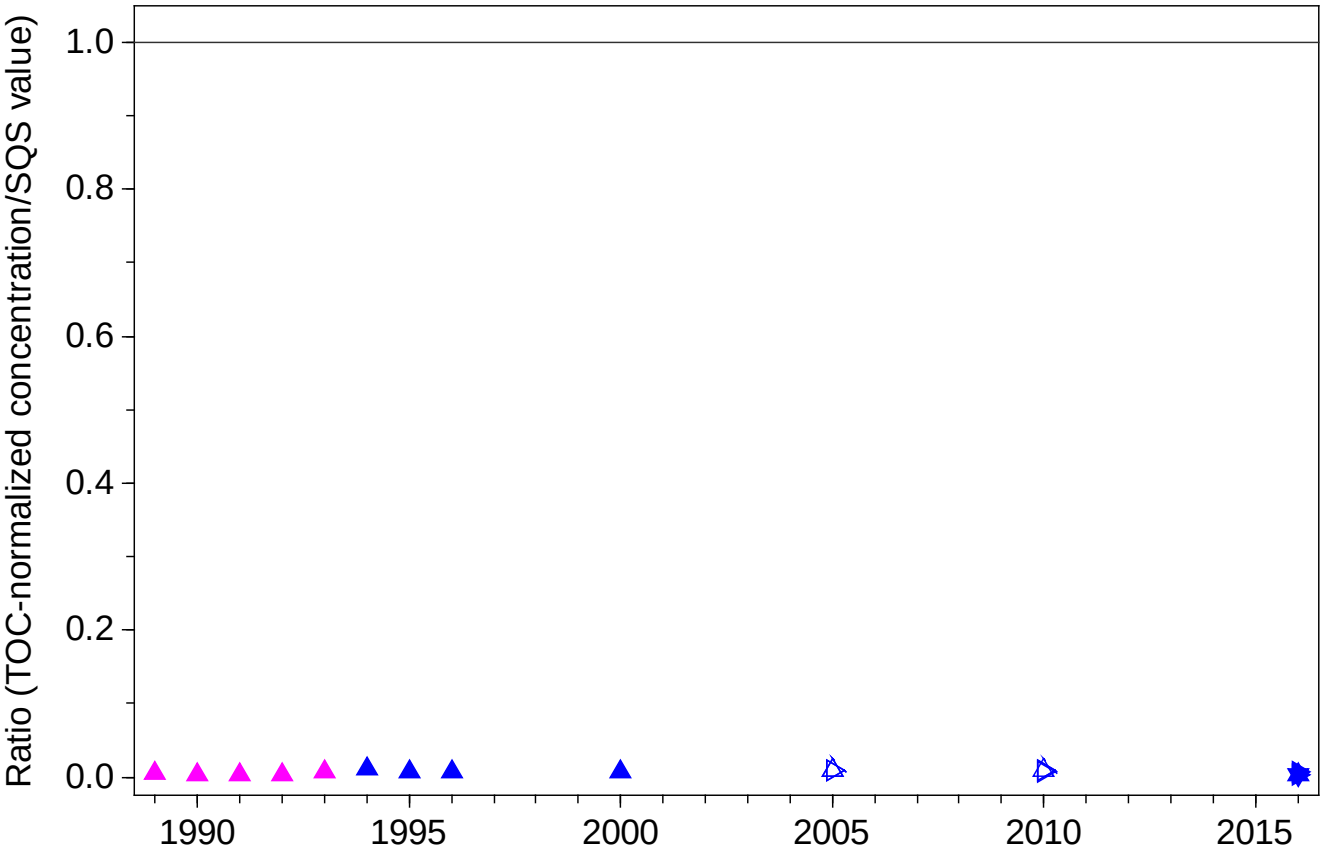
SQS quotient, Fluoranthene, Station 21



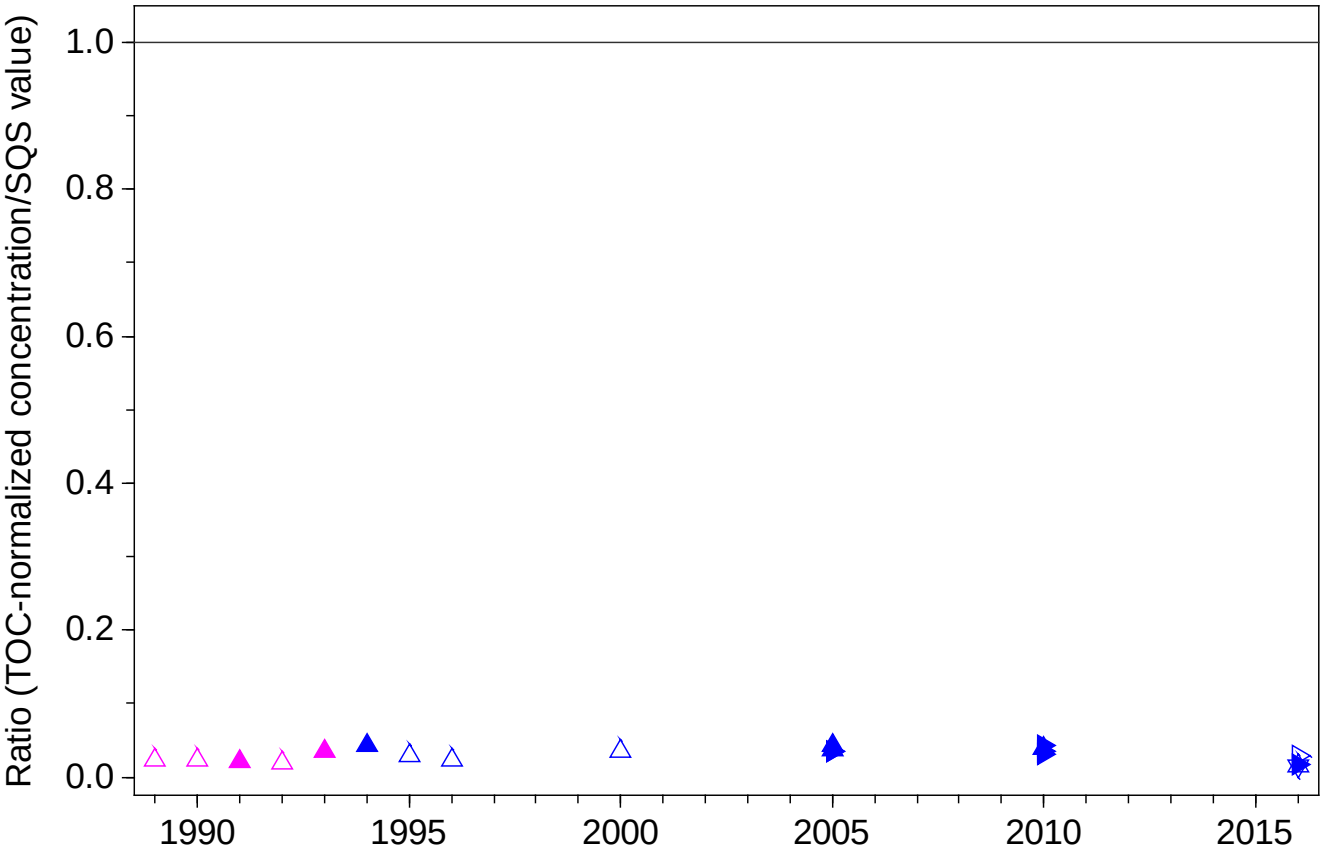
SQS quotient, Indeno(1,2,3-c,d)pyrene, Station 21



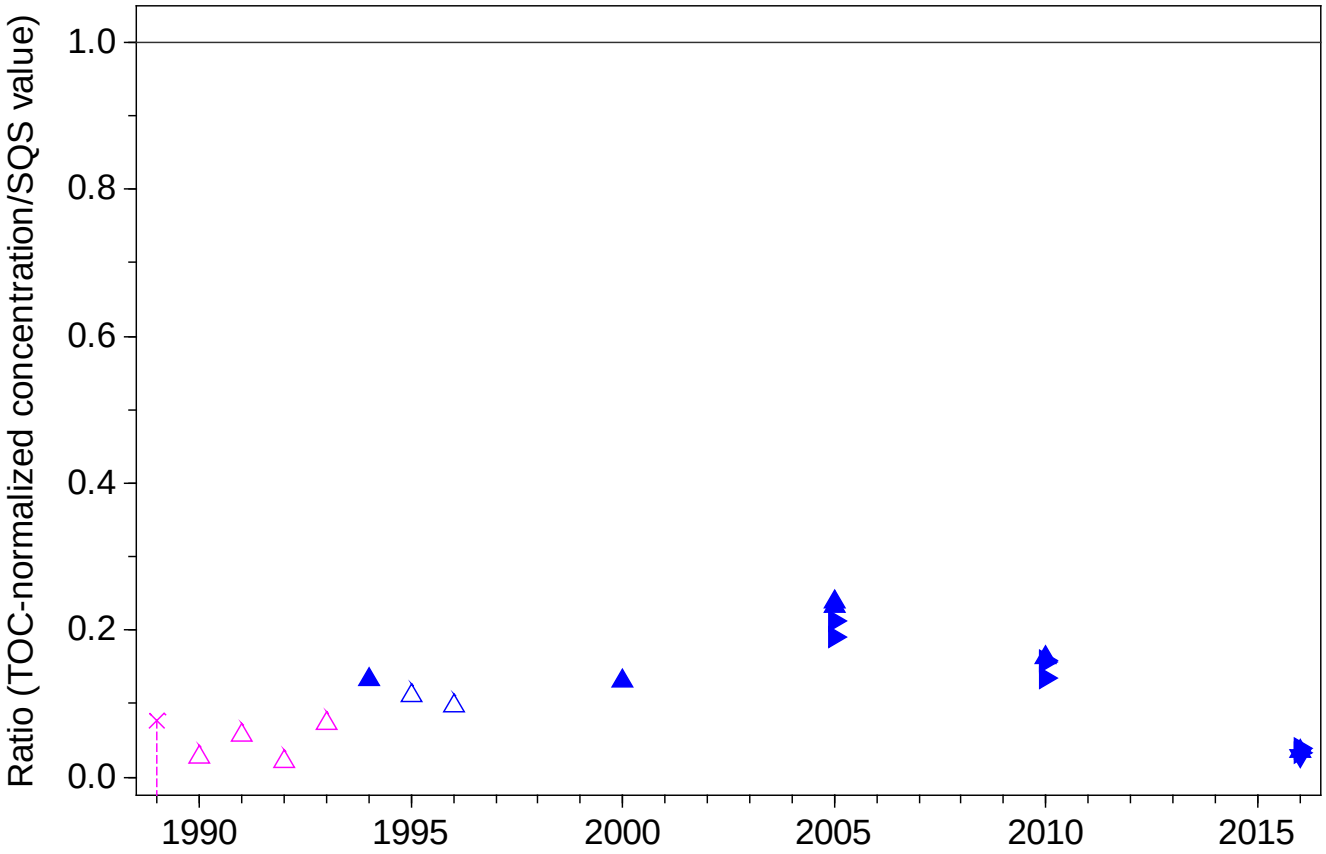
SQS quotient, Pyrene, Station 21



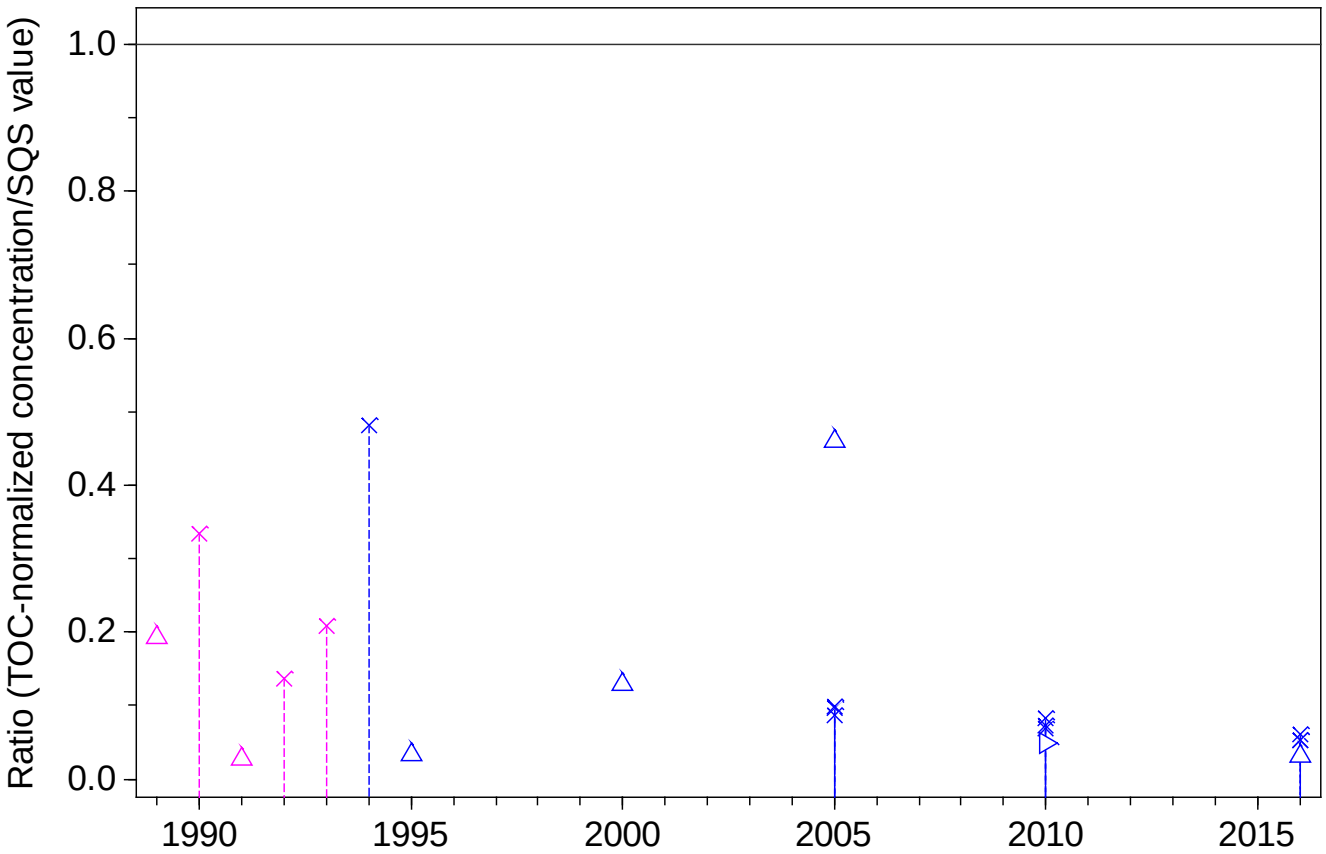
SQS quotient, Total HPAH, Station 21



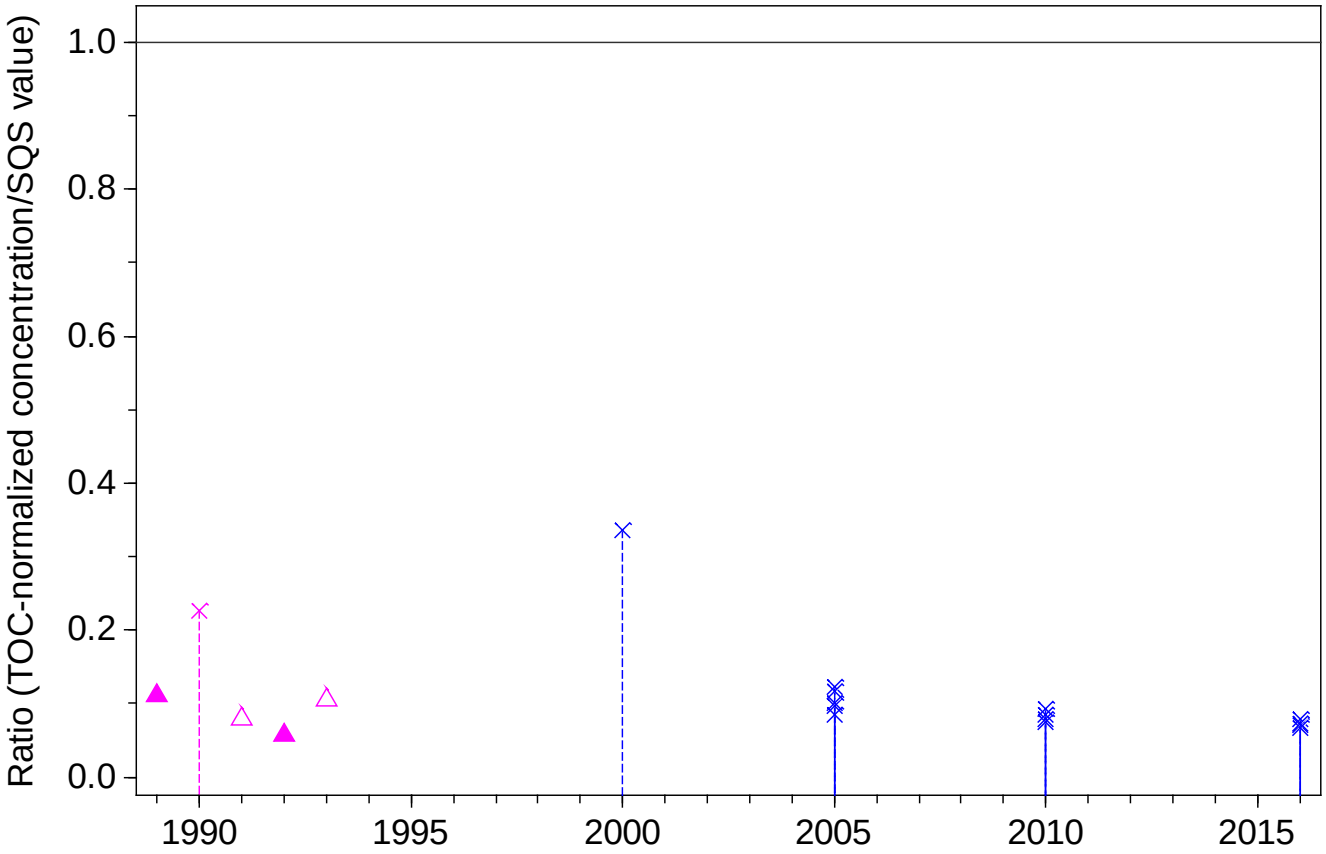
SQS quotient, Dibenzofuran, Station 21



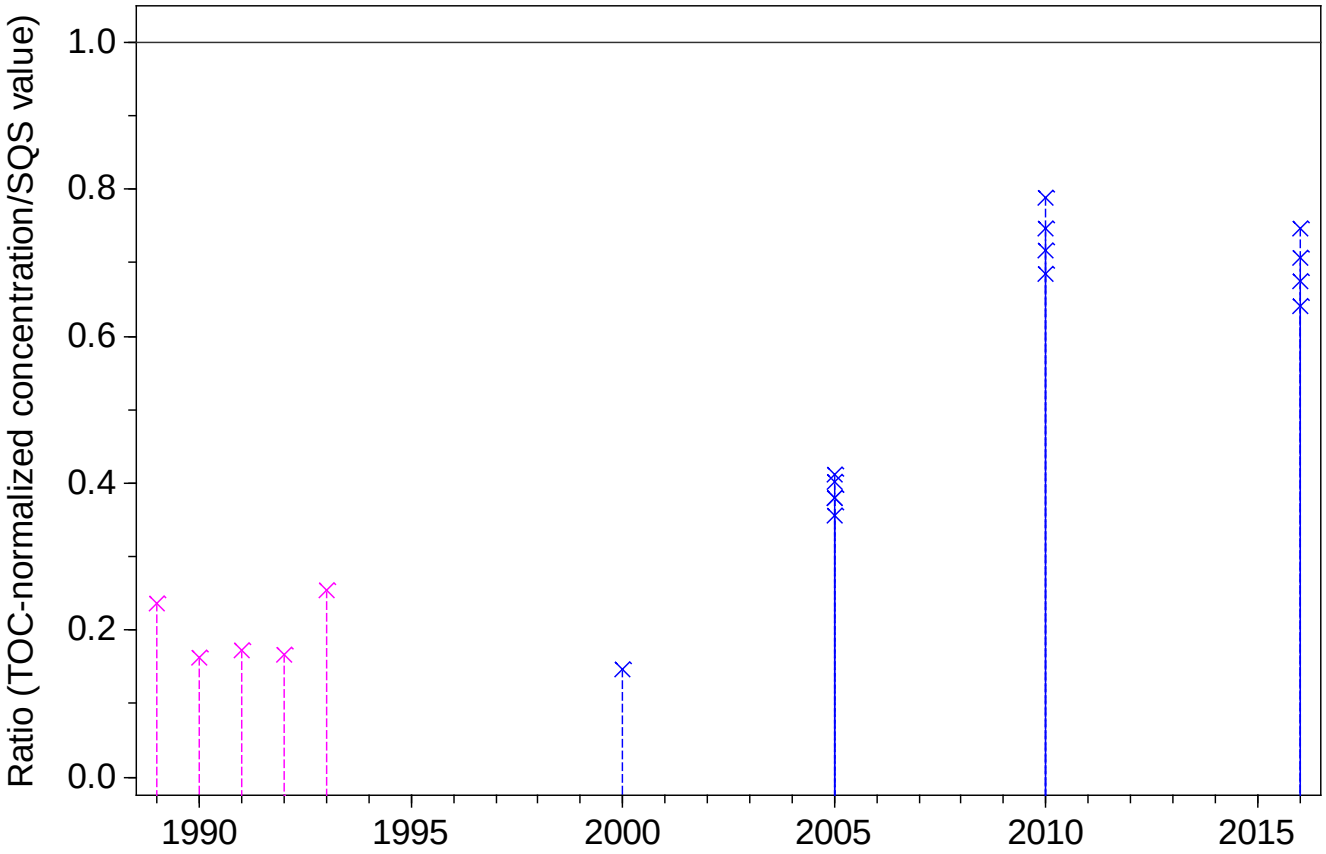
SQS quotient, Total Aroclors, Station 21



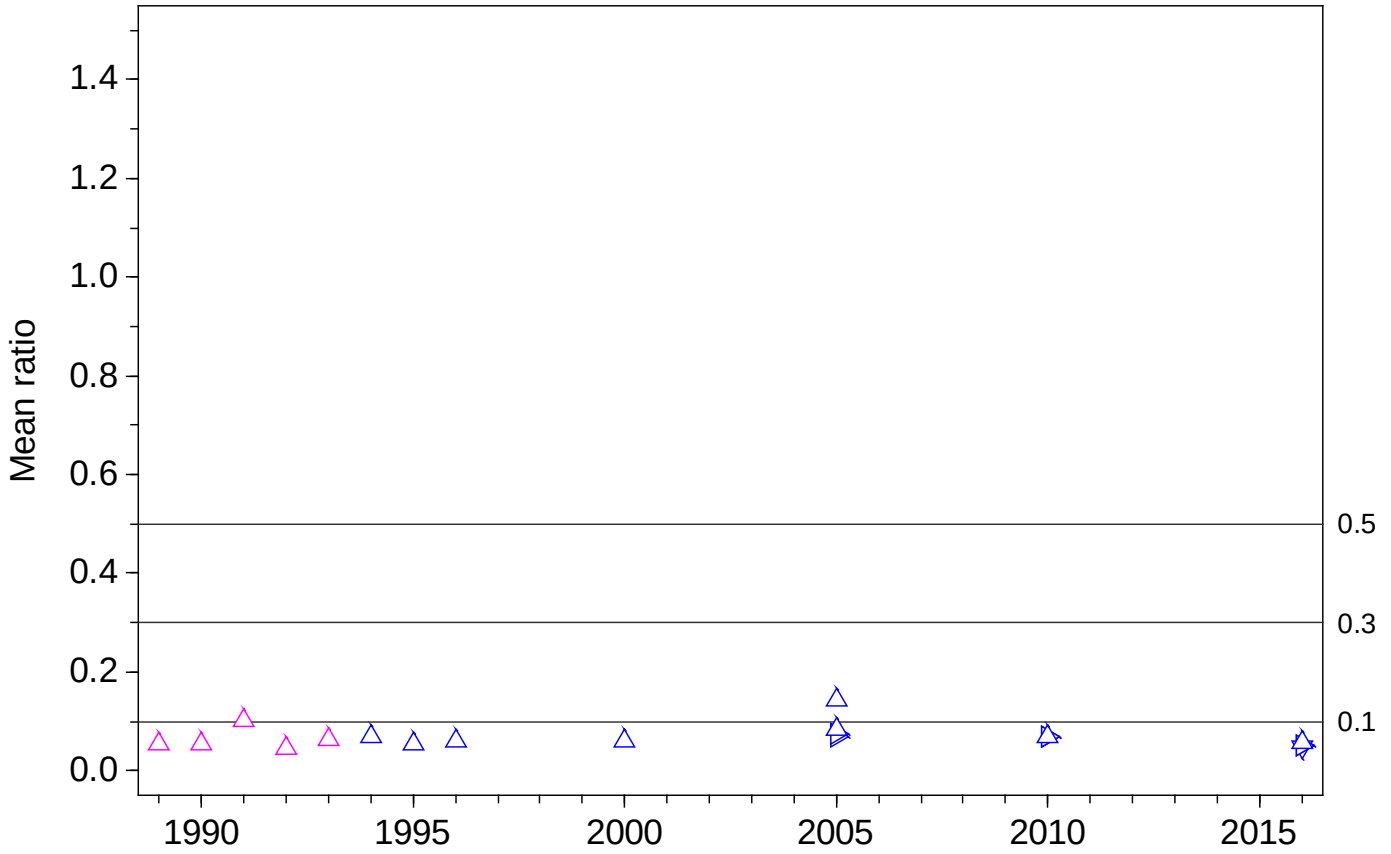
SQS quotient, Bis(2-ethylhexyl)phthalate, Station 21



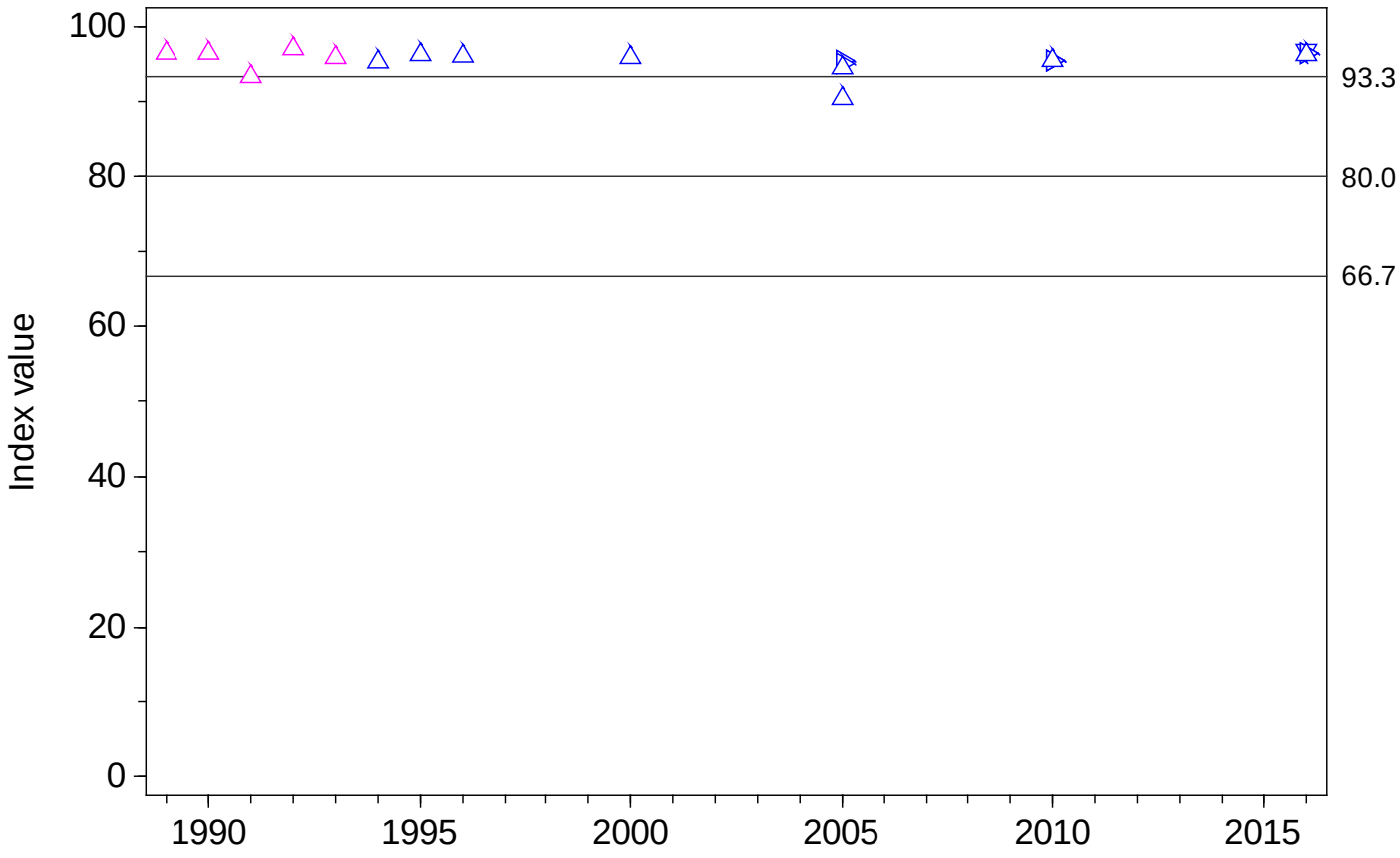
SQS quotient, Butylbenzylphthalate, Station 21



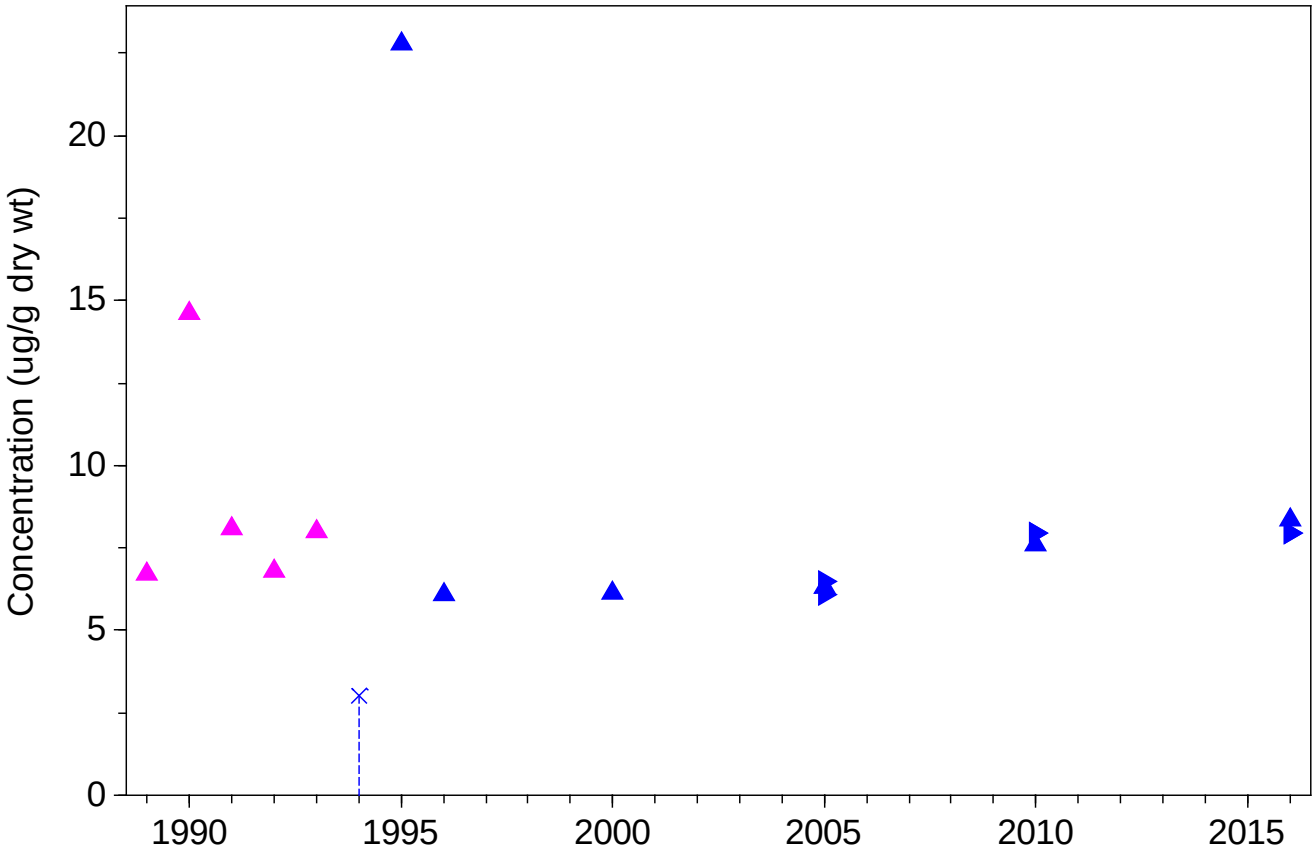
Mean SQS quotient, SCI SQS (no PAH totals), Station 21



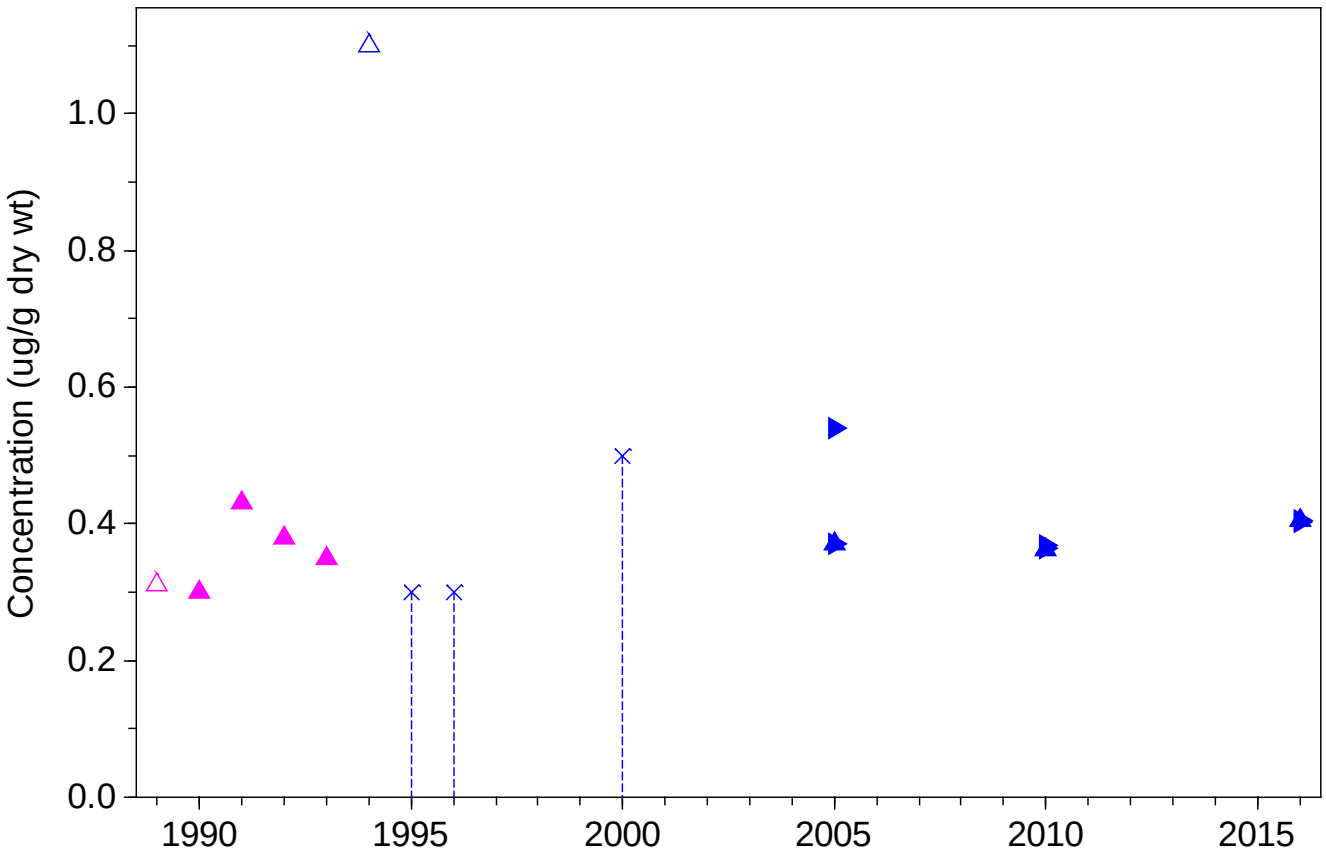
Sediment Chemistry Index, Station 21

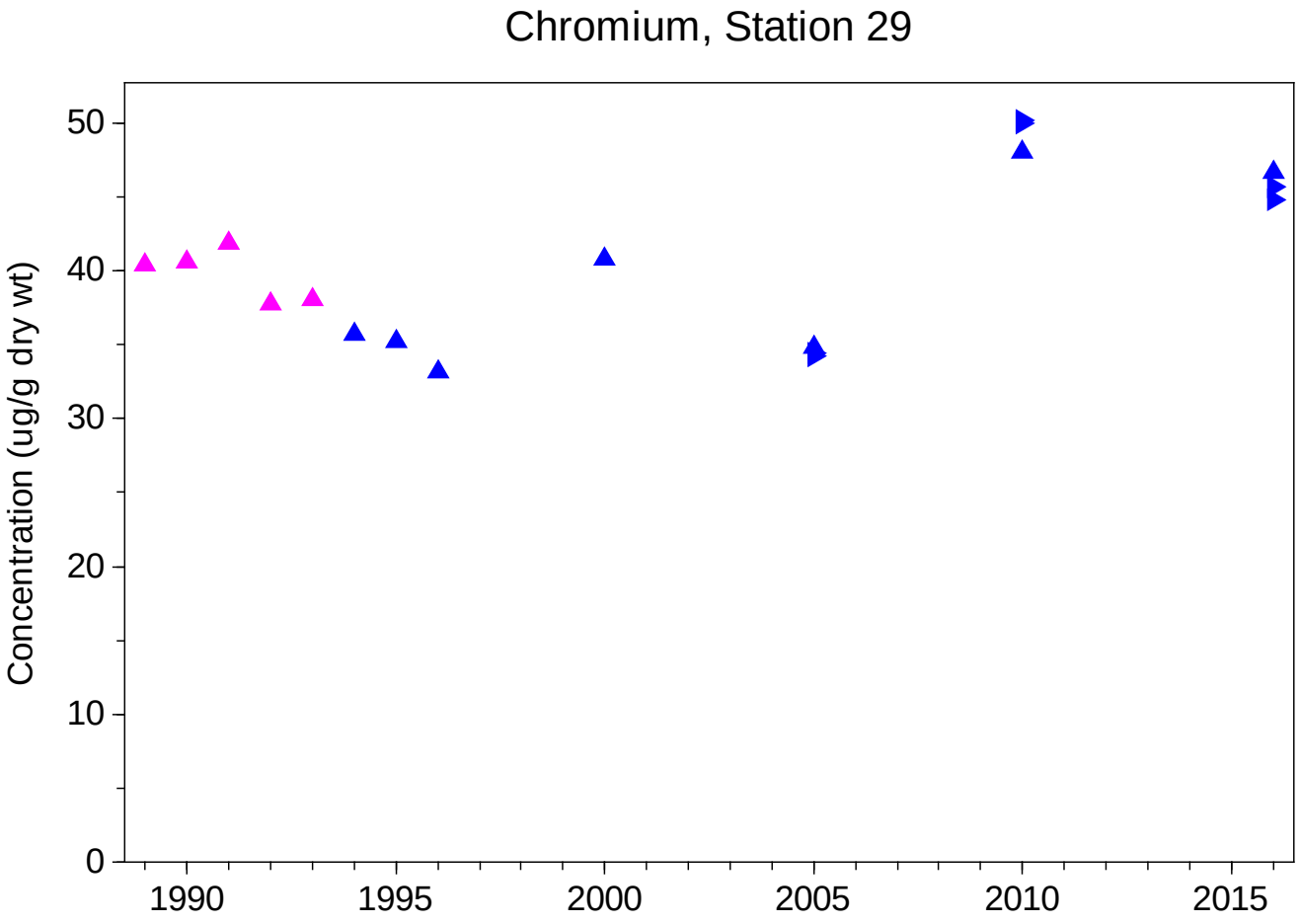


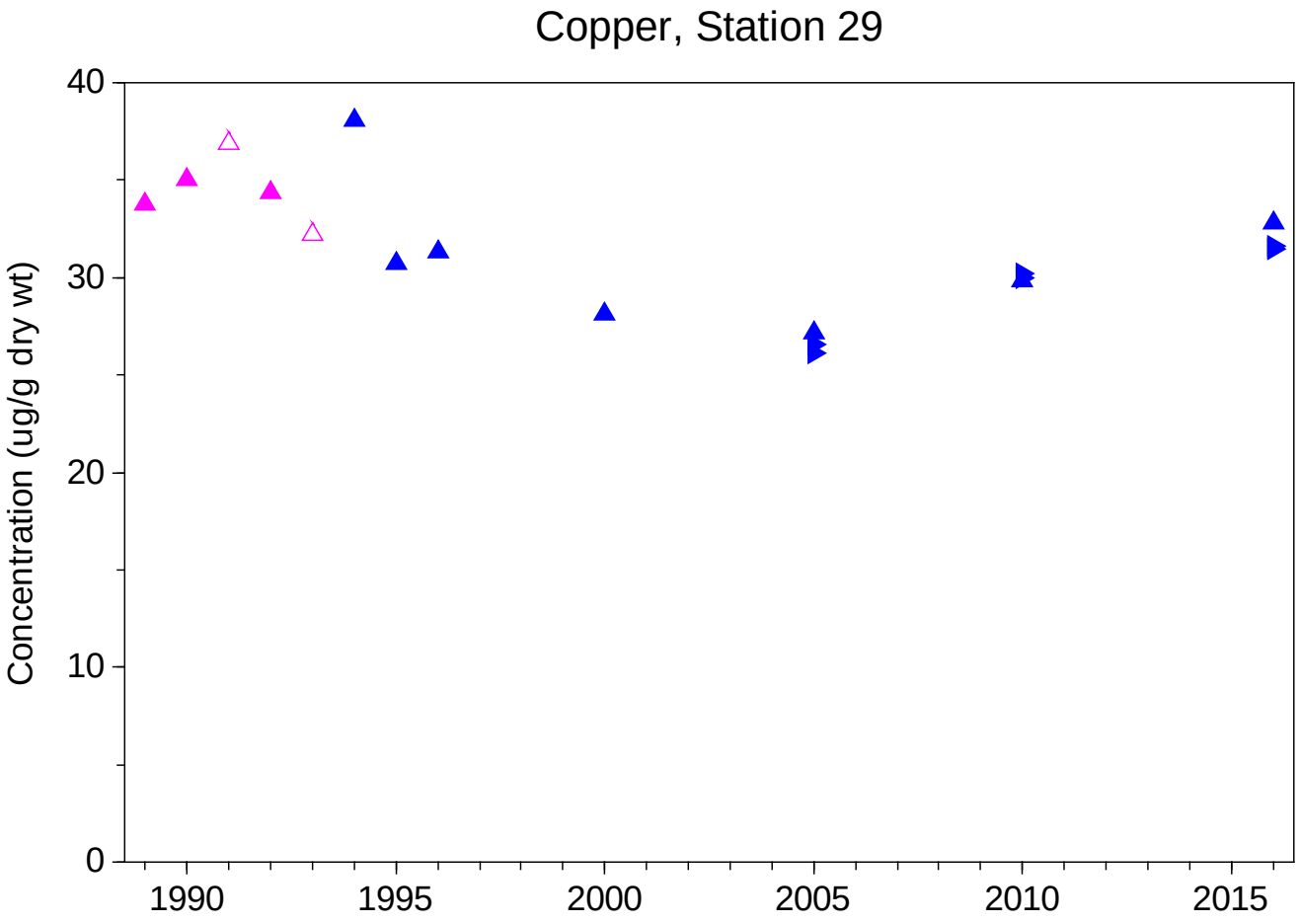
Arsenic, Station 29



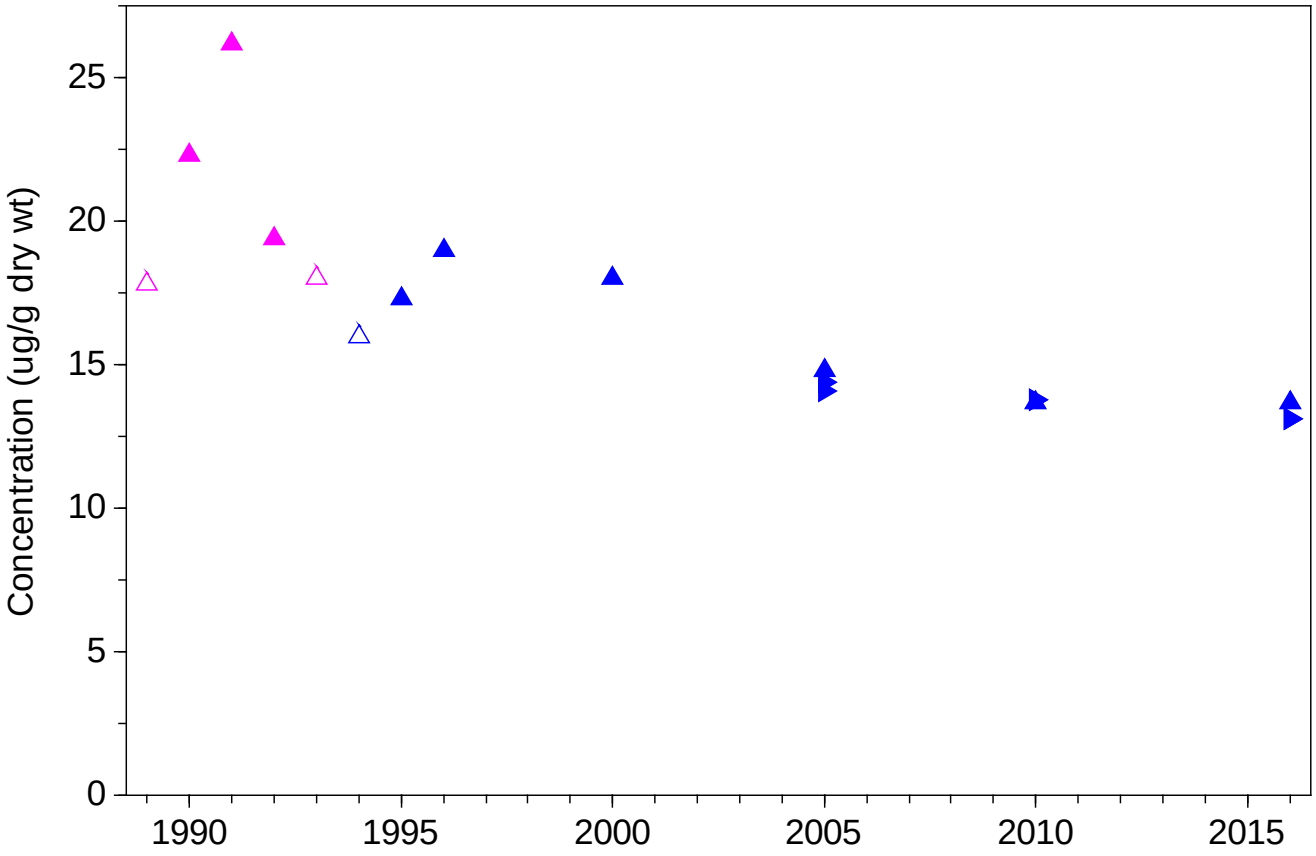
Cadmium, Station 29



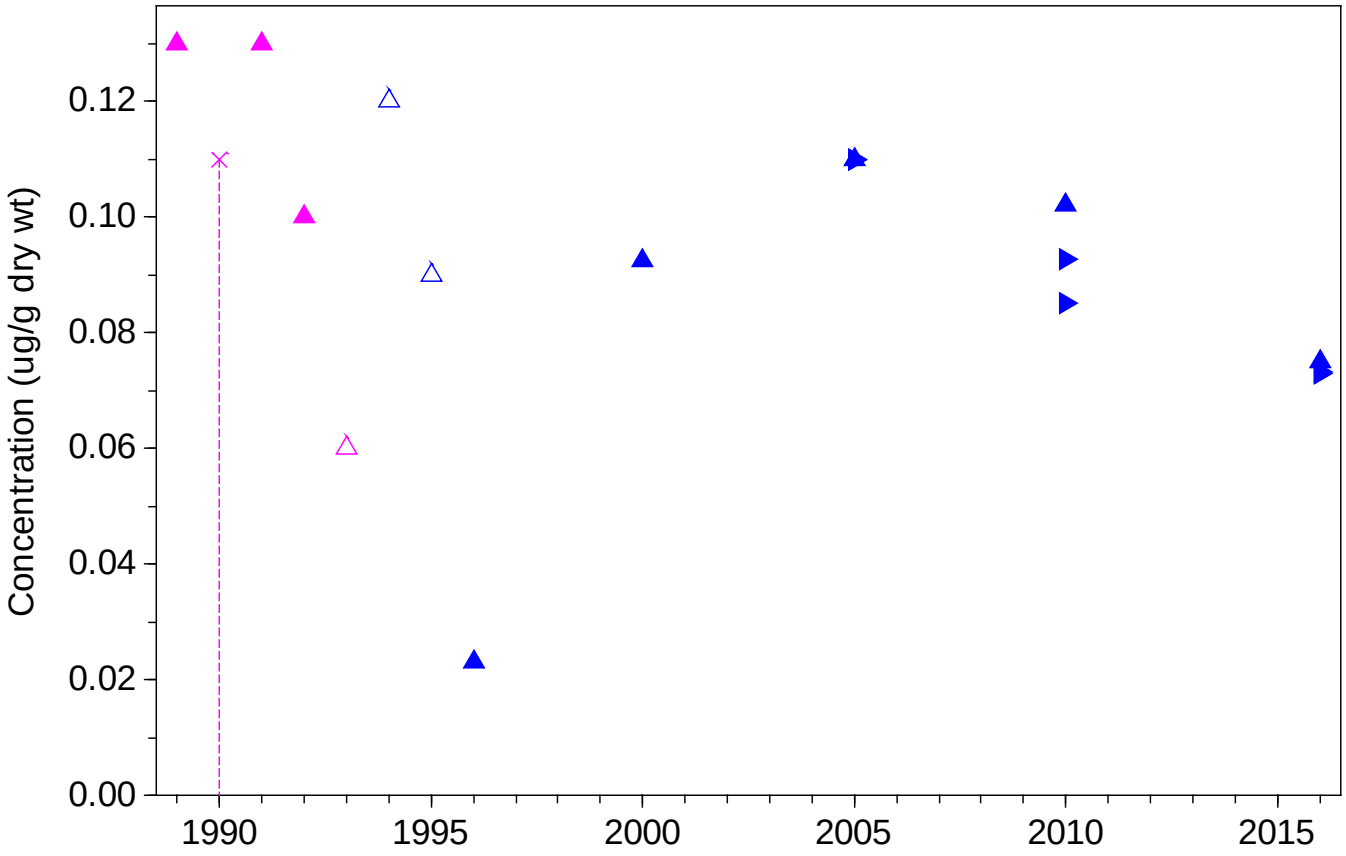

Chromium, Station 29
Concentration (ug/g dry wt)
0
10
20
30
40
50
1990
1995
2000
2005
2010
2015


Copper, Station 29
Concentration (ug/g dry wt)
0
10
20
30
40
1990
1995
2000
2005
2010
2015

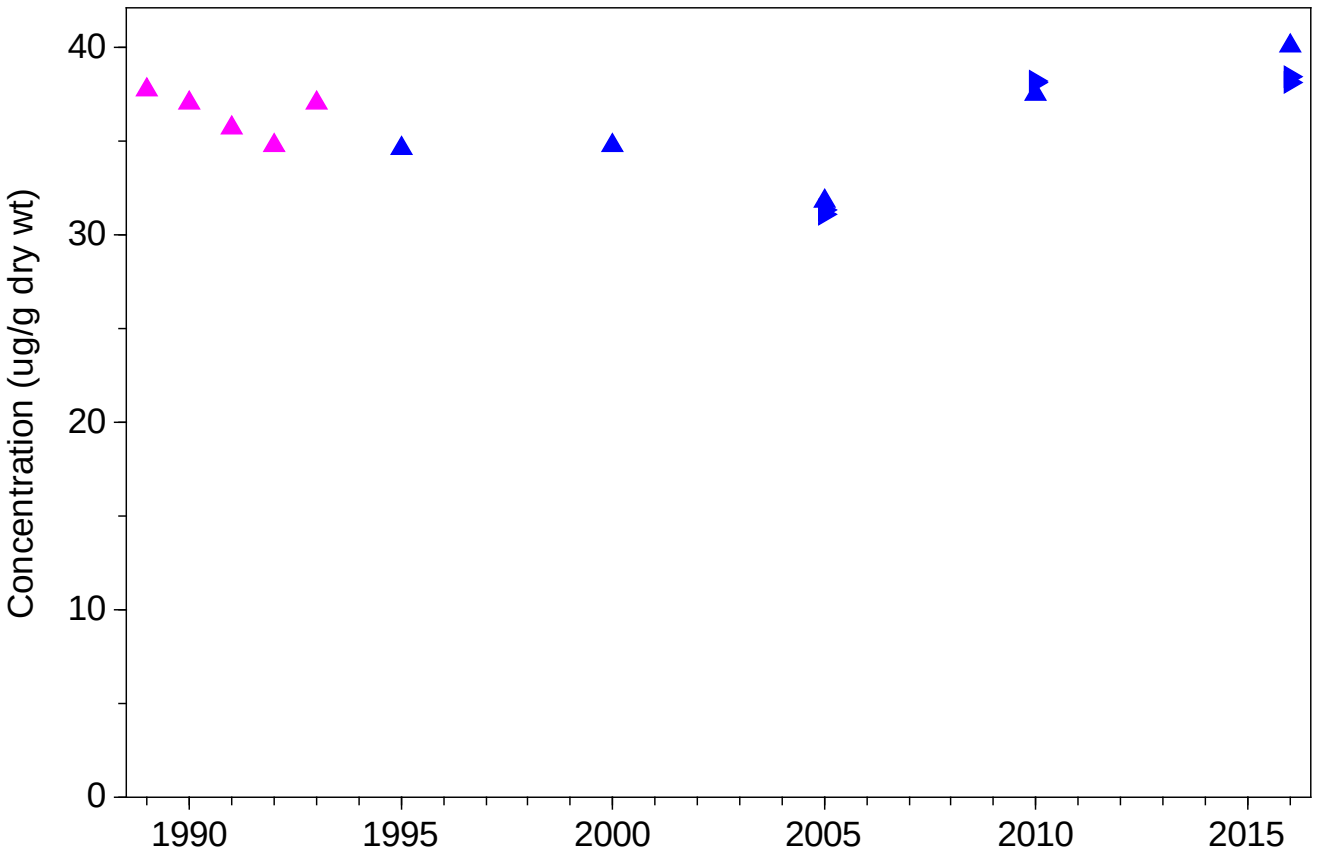
Lead, Station 29



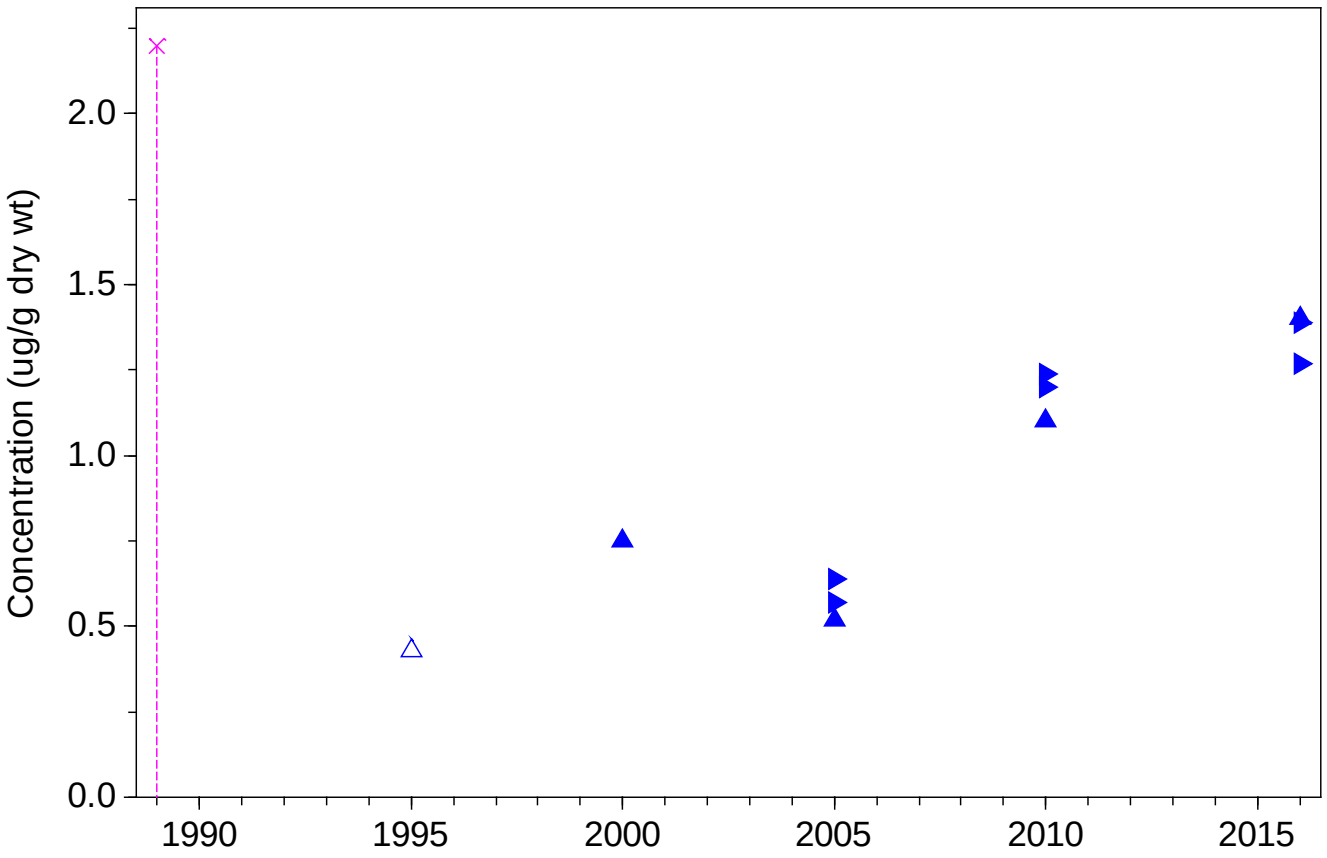
Mercury, Station 29



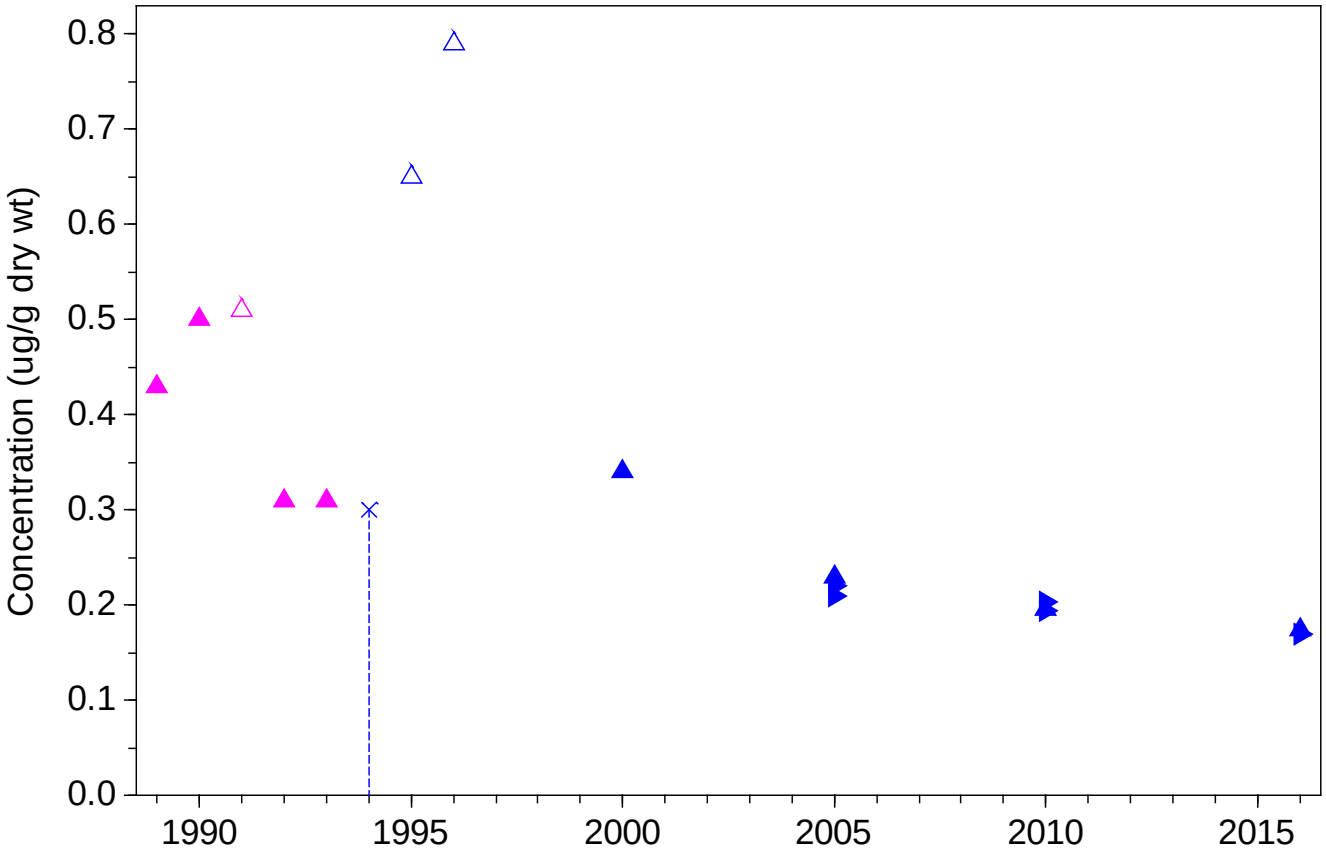
Nickel, Station 29



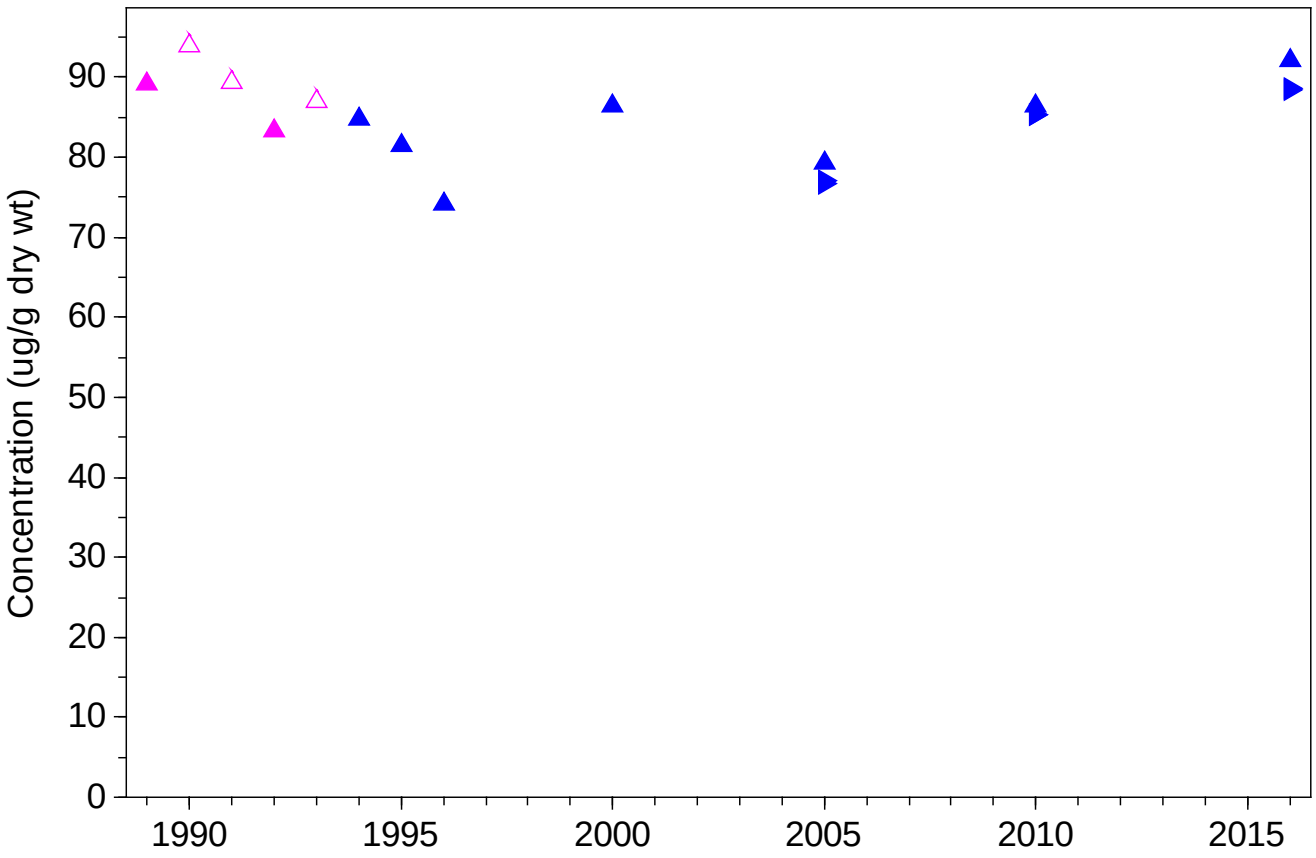
Selenium, Station 29



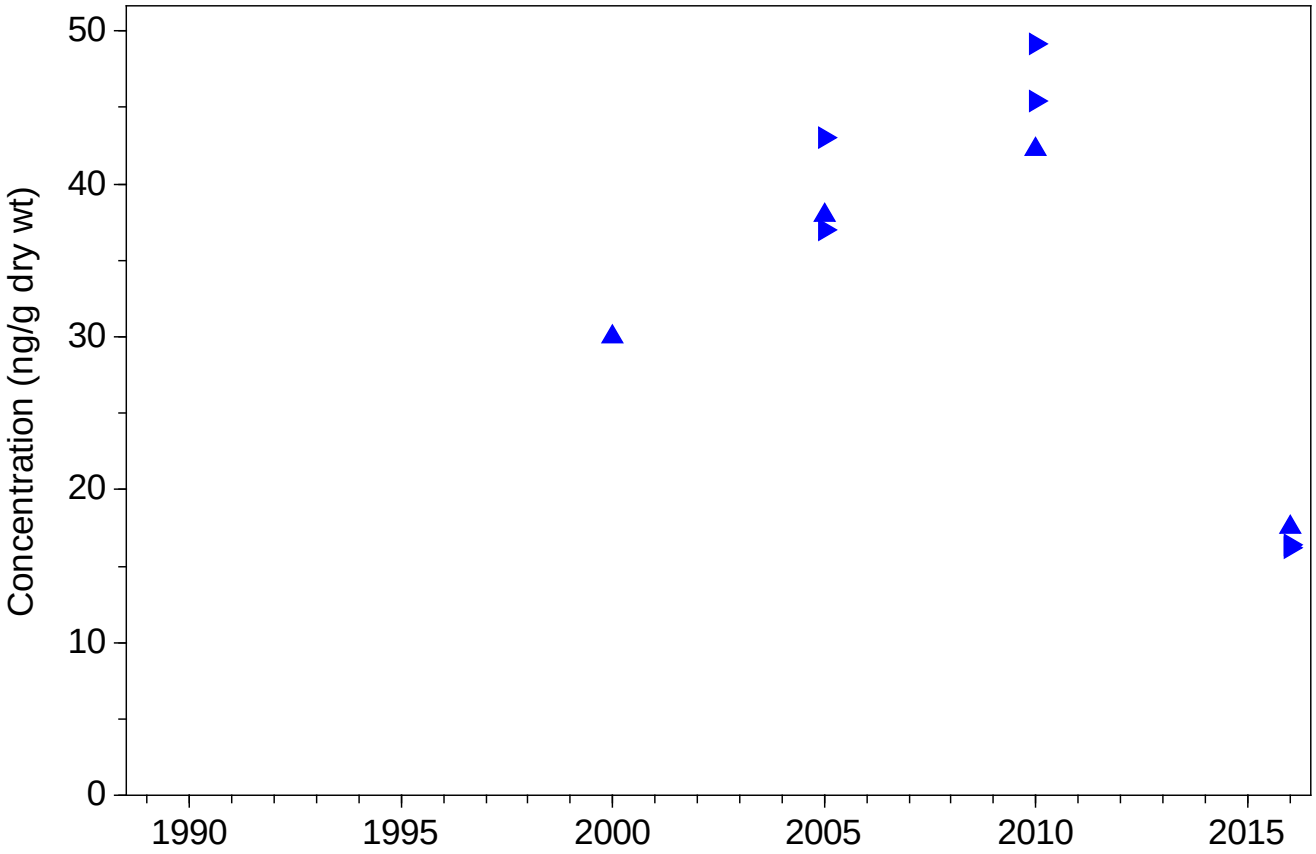
Silver, Station 29



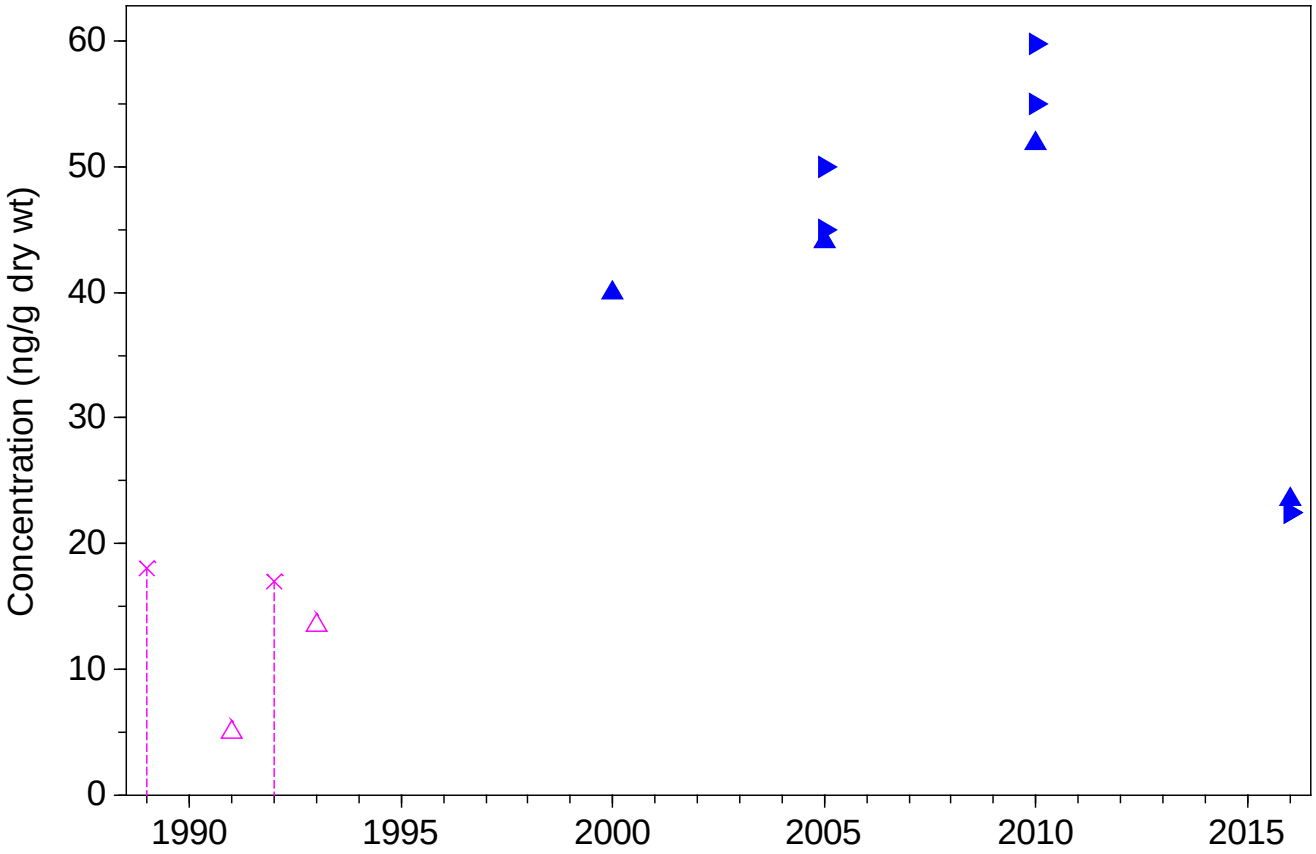
Zinc, Station 29



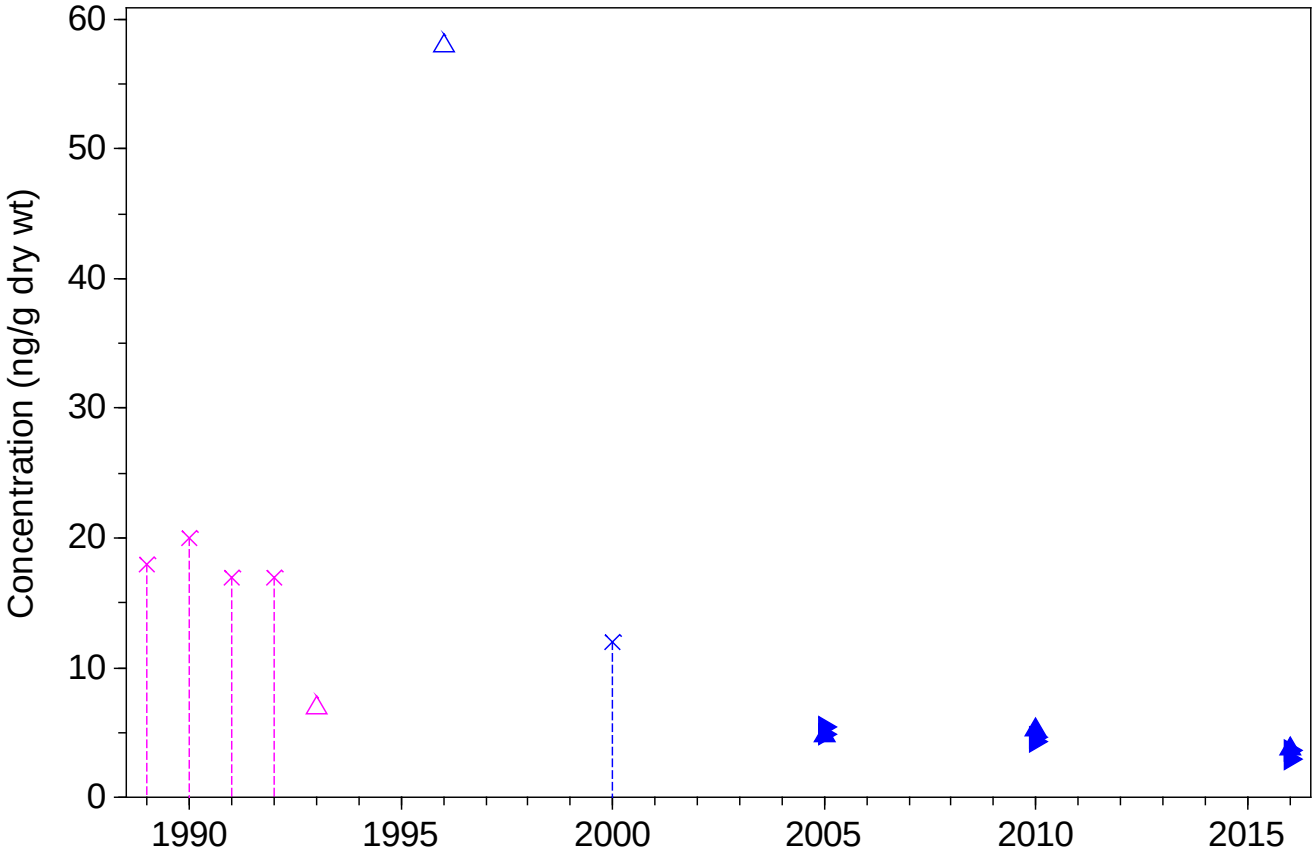
1-Methylnaphthalene, Station 29



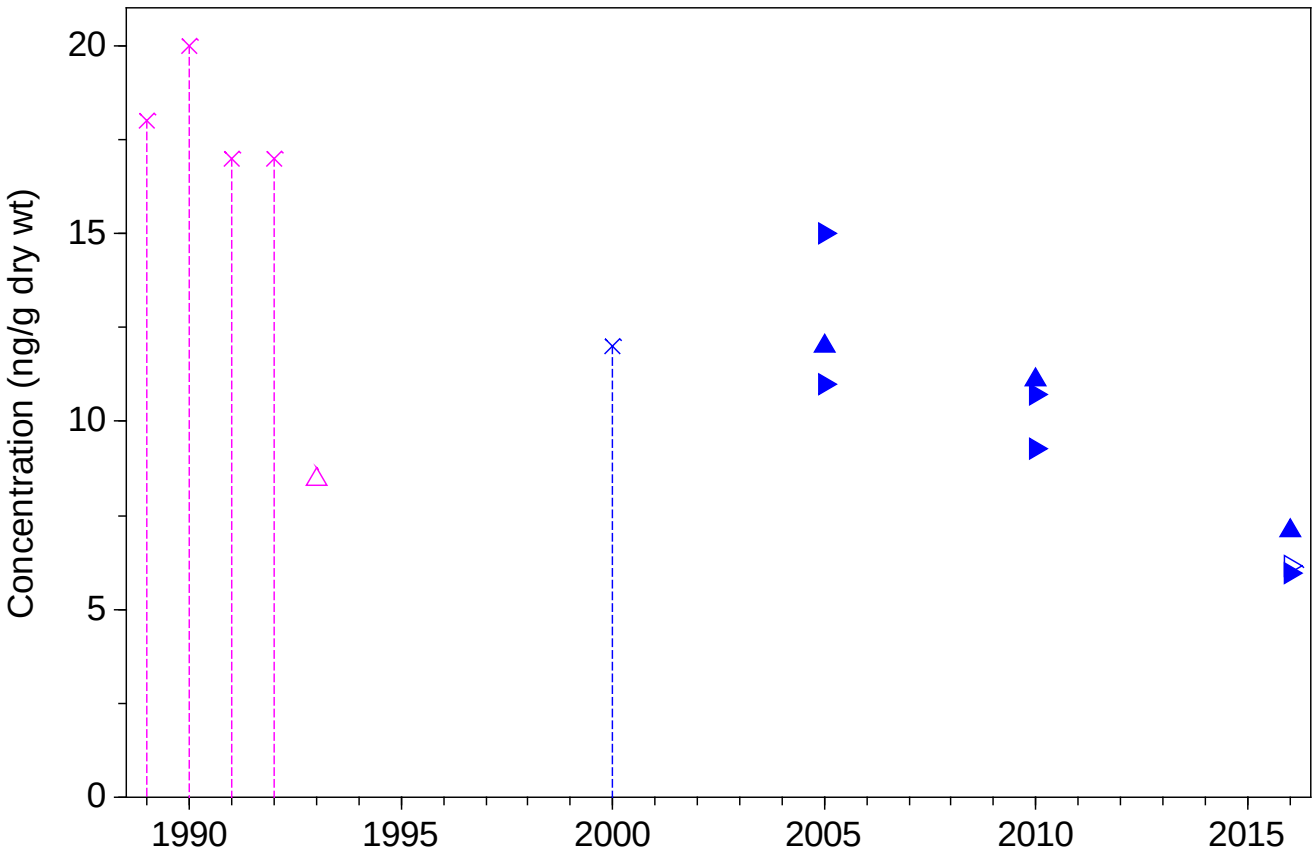
2-Methylnaphthalene, Station 29



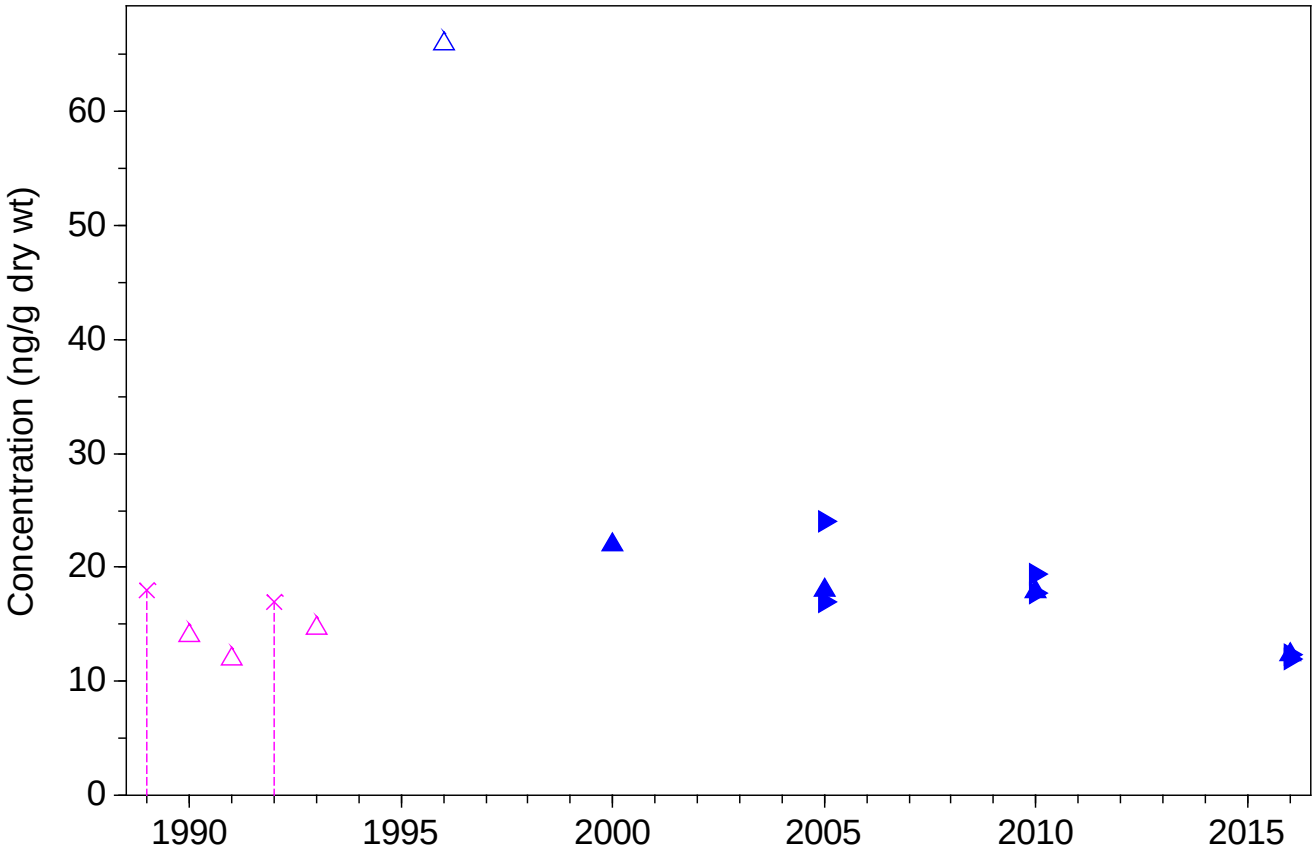
Acenaphthene, Station 29



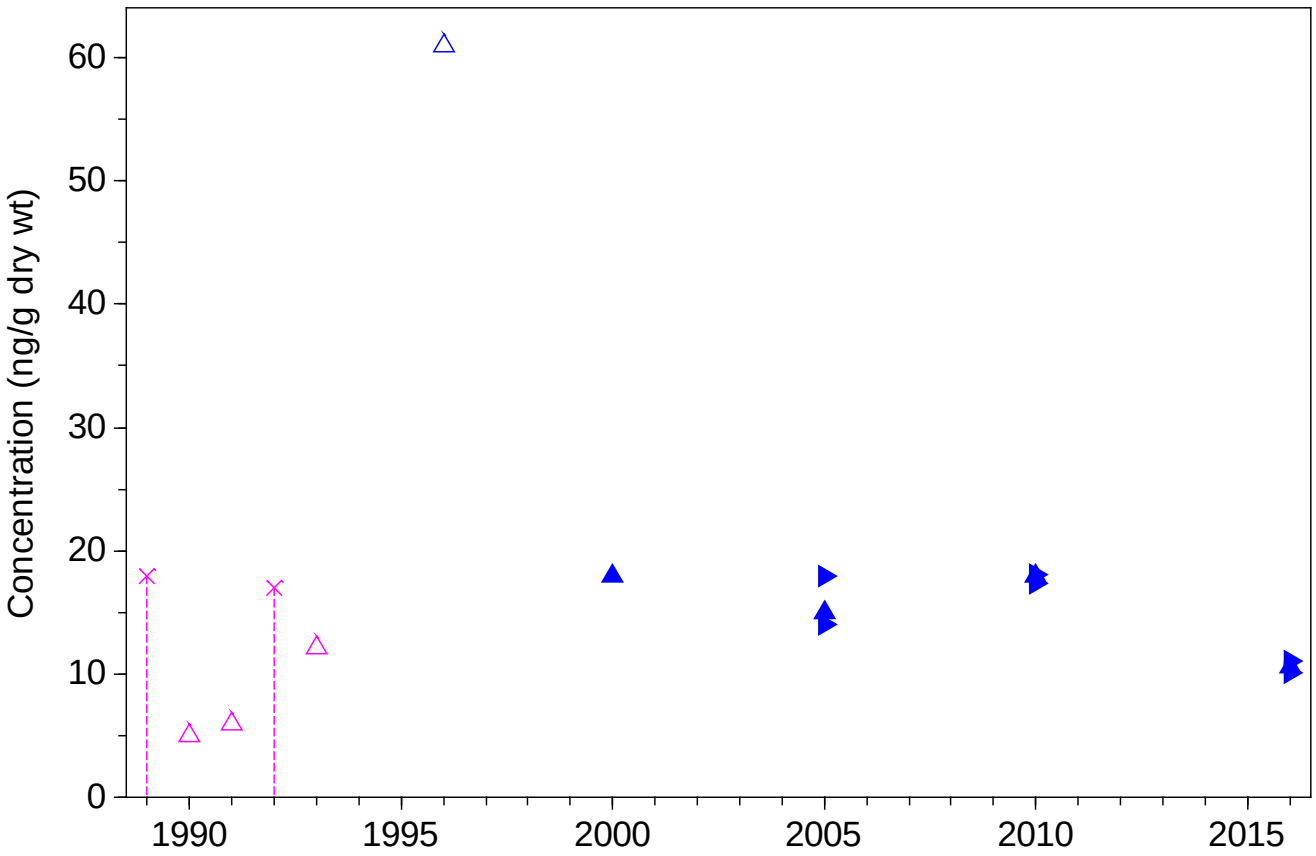
Acenaphthylene, Station 29



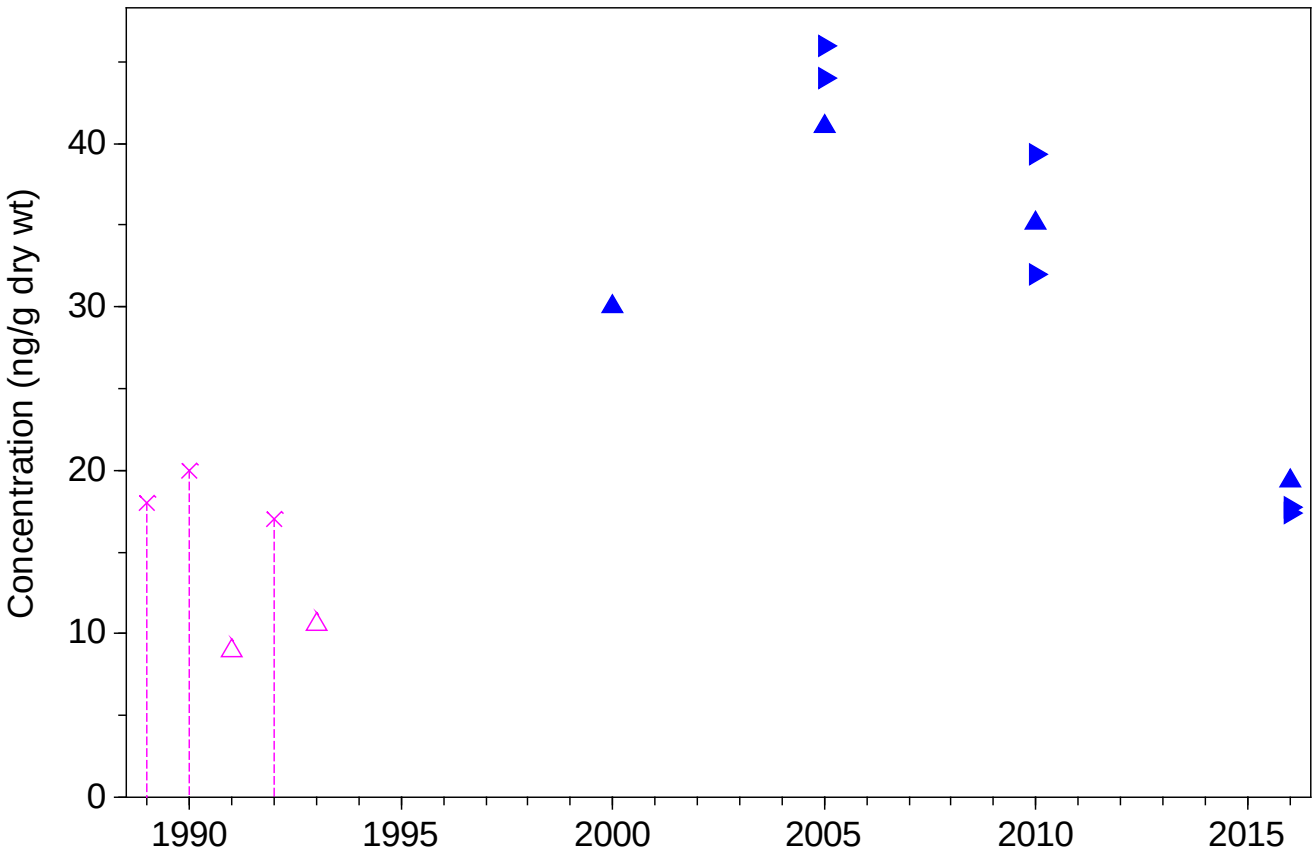
Anthracene, Station 29



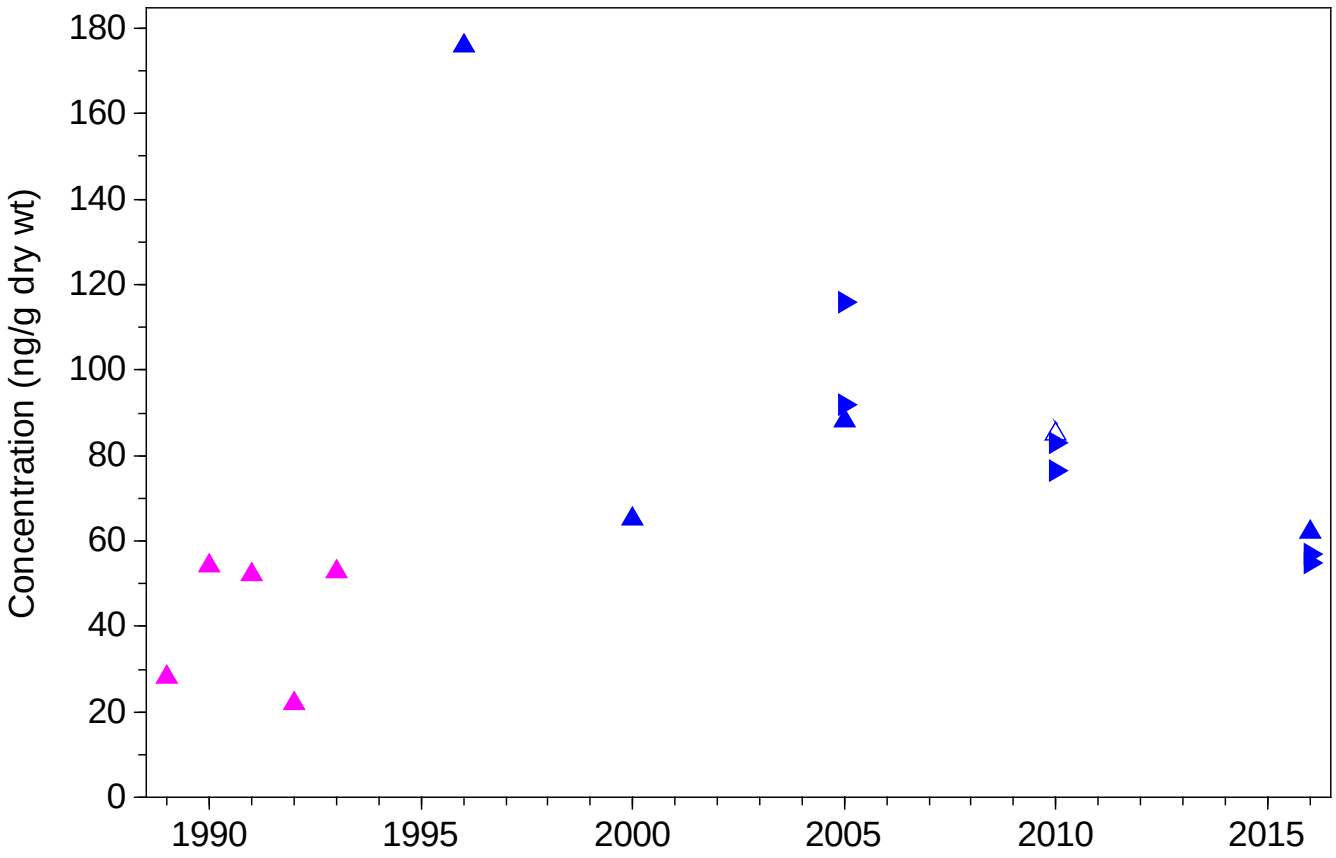
Fluorene, Station 29



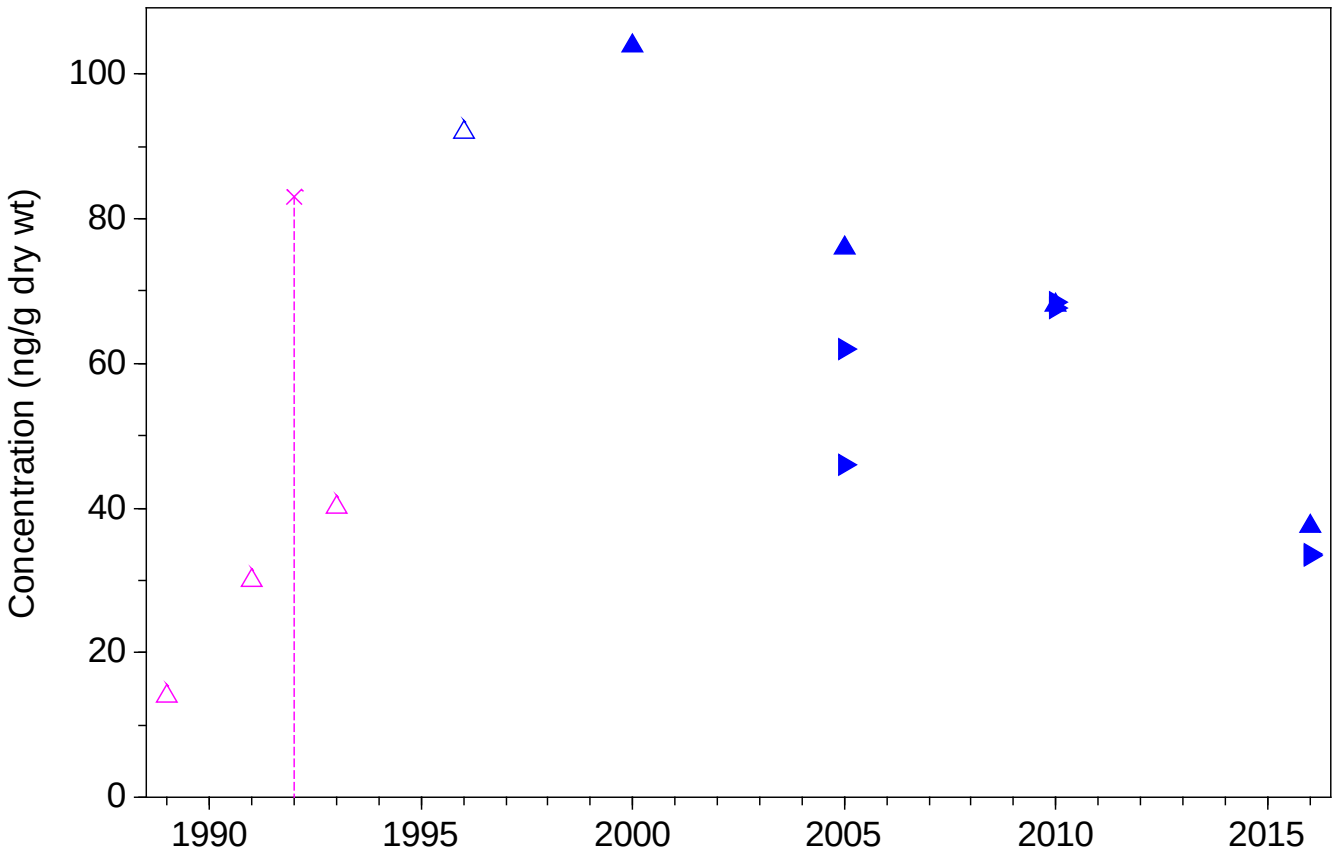
Naphthalene, Station 29



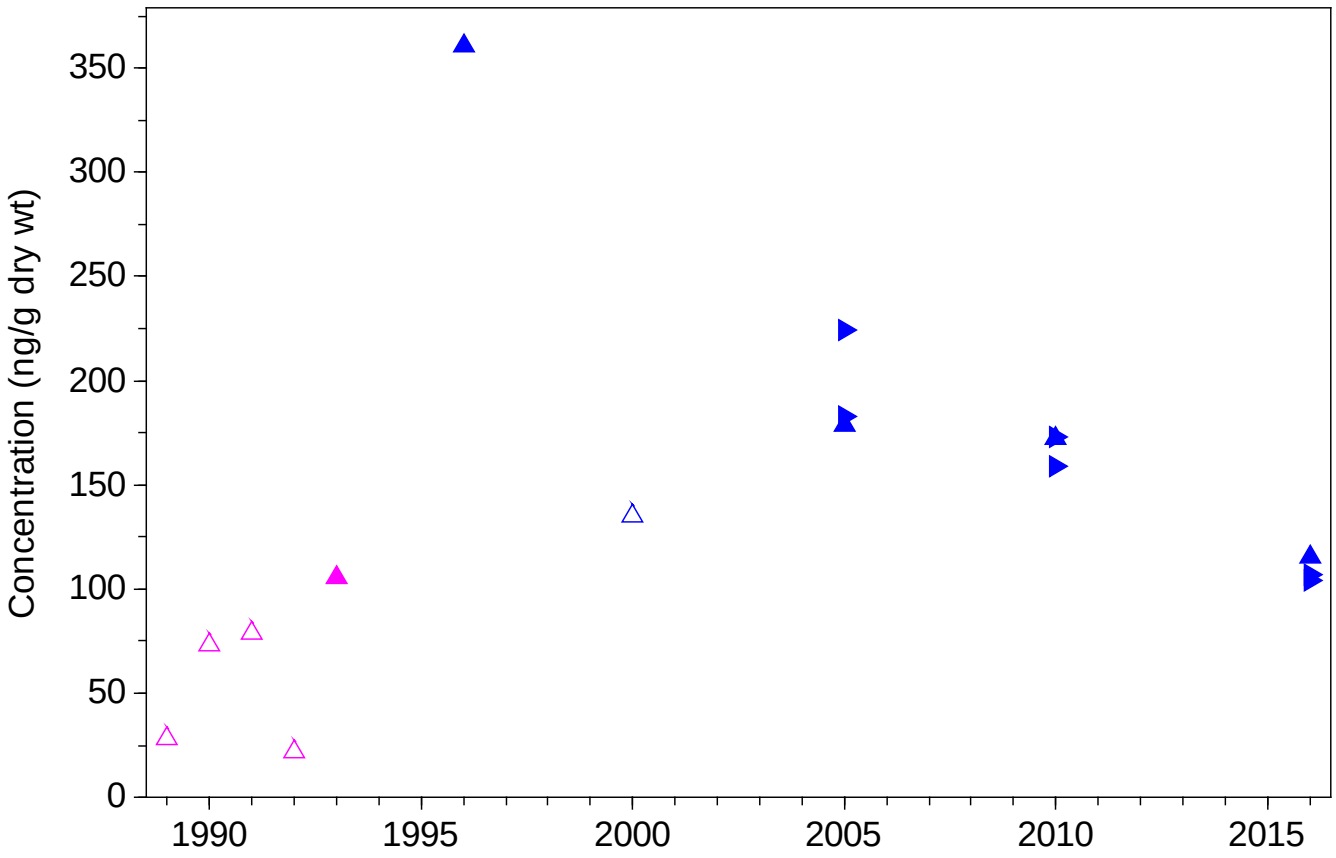
Phenanthrene, Station 29



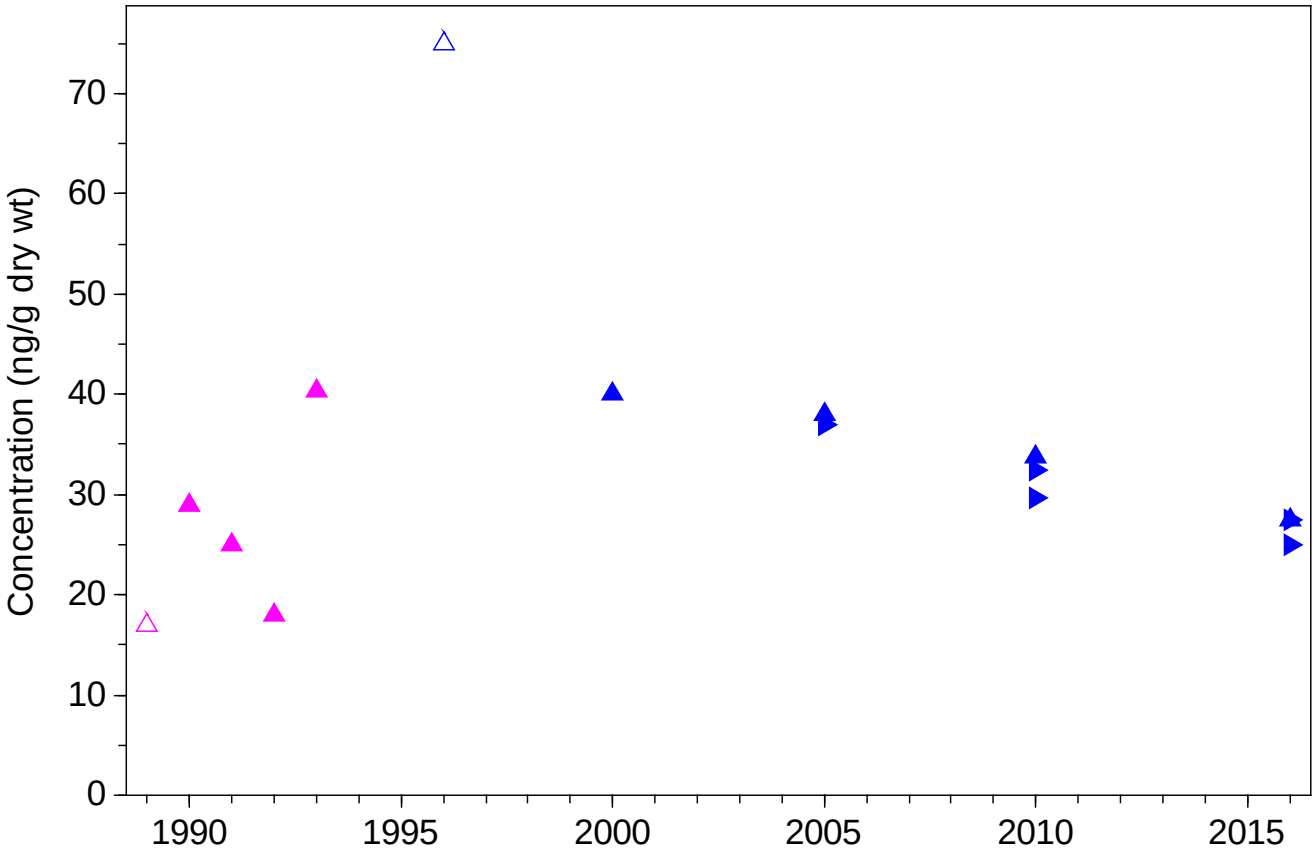
Retene, Station 29



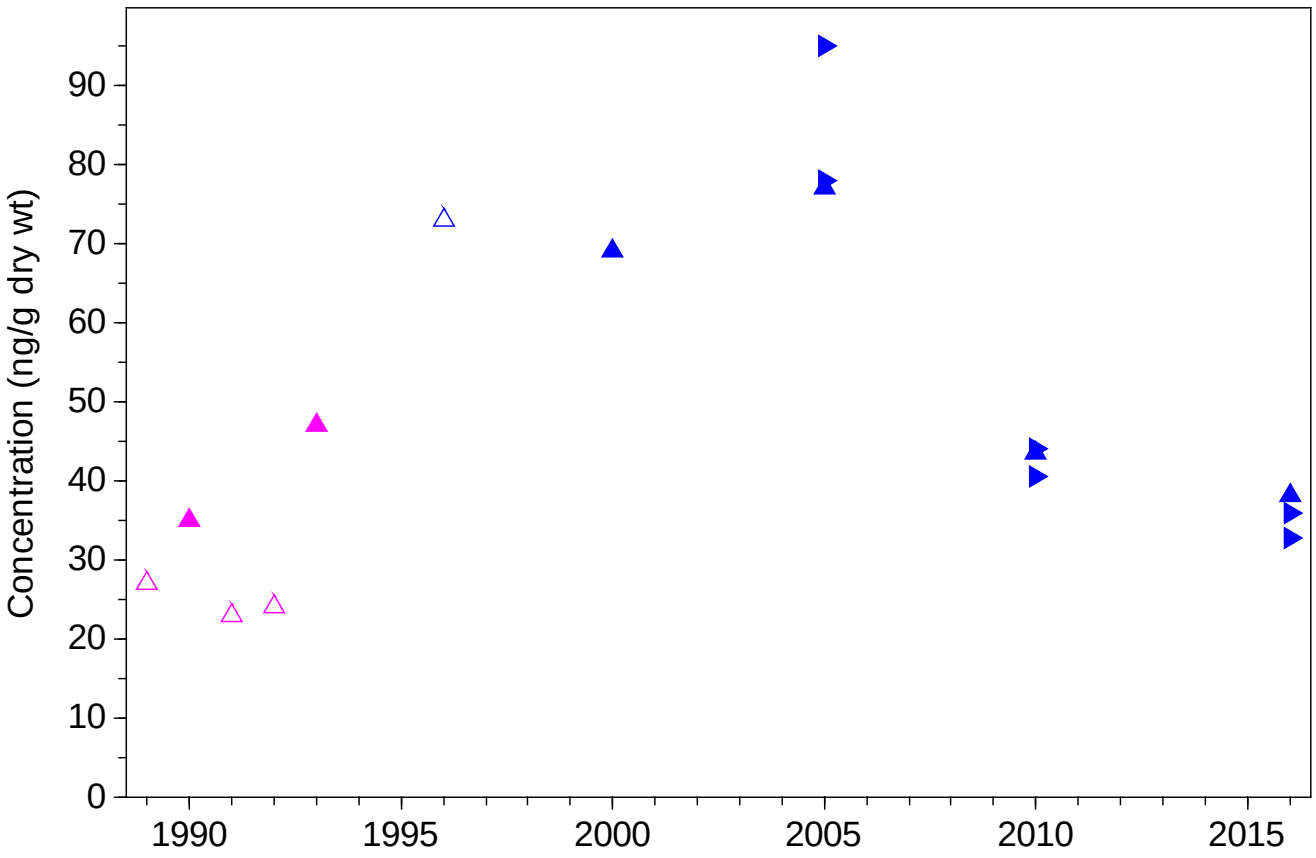
Total LPAH (sum of 6 compounds), Station 29



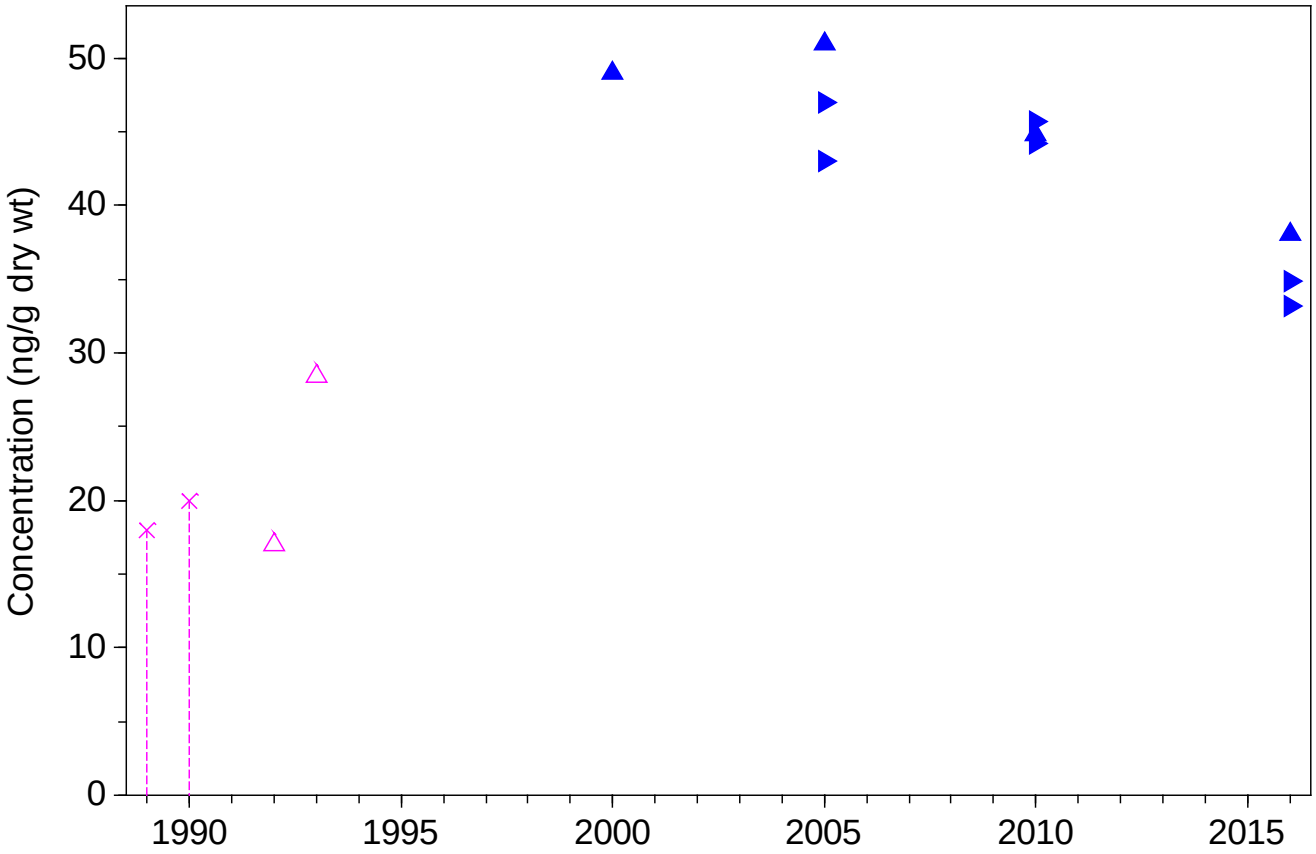
Benzo(a)anthracene, Station 29



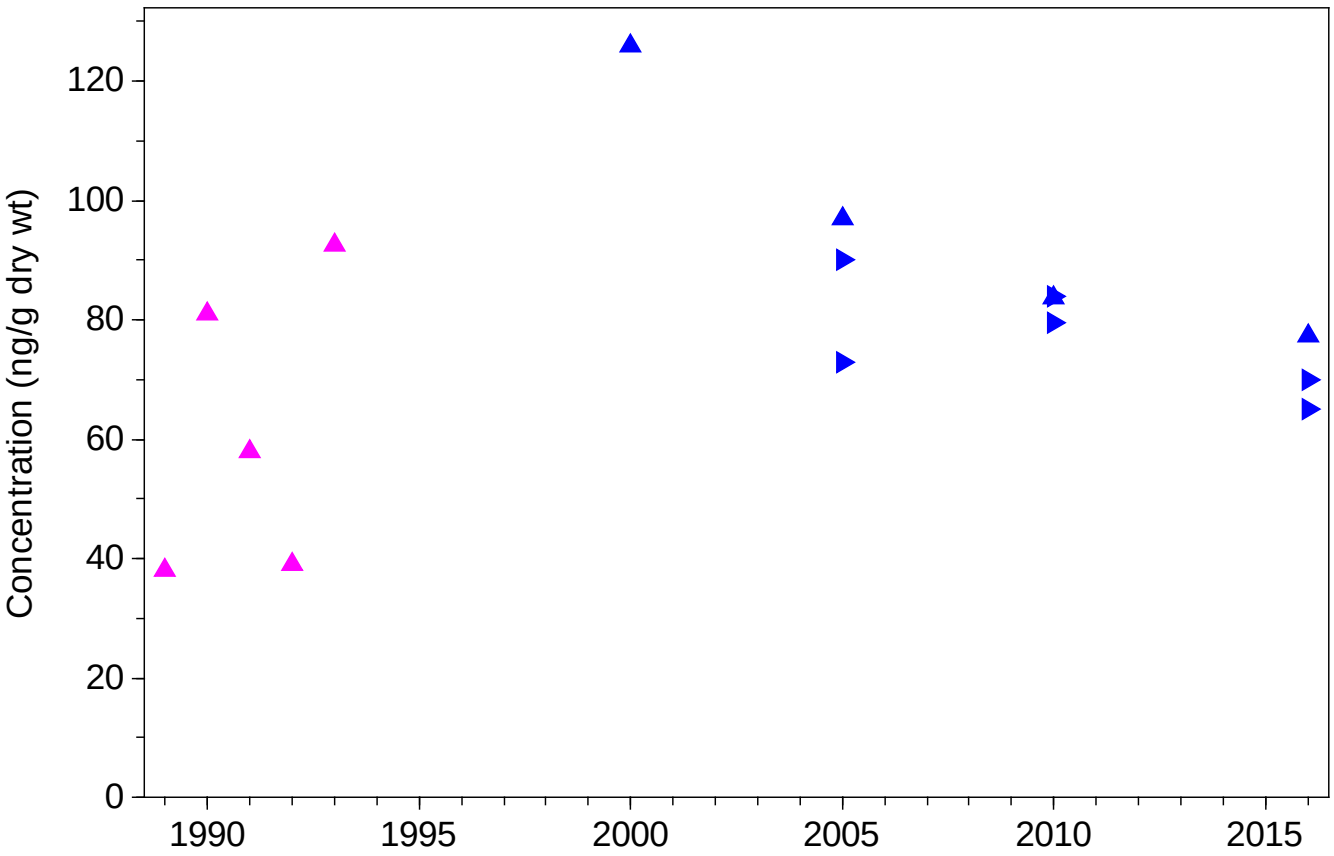
Benzo(a)pyrene, Station 29



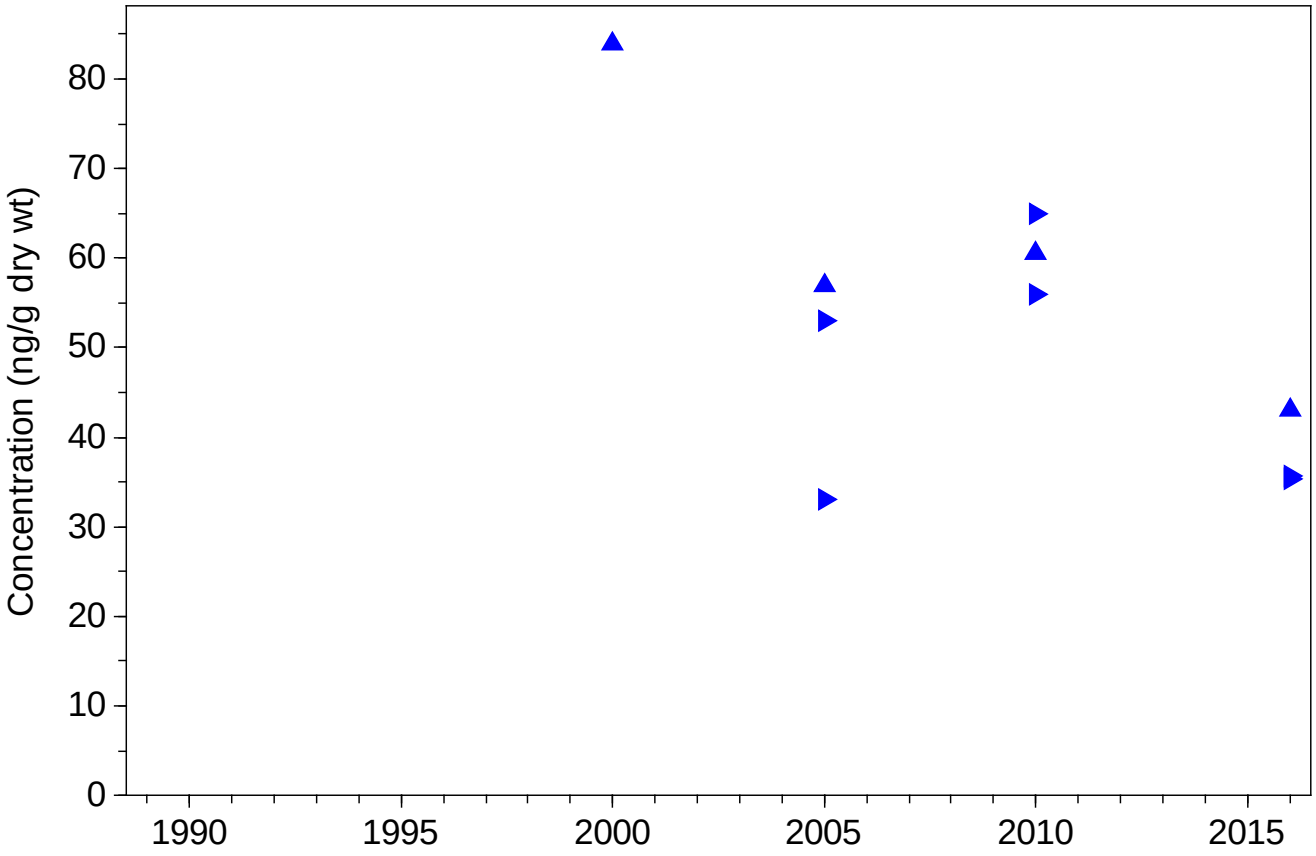
Benzo(g,h,i)perylene, Station 29



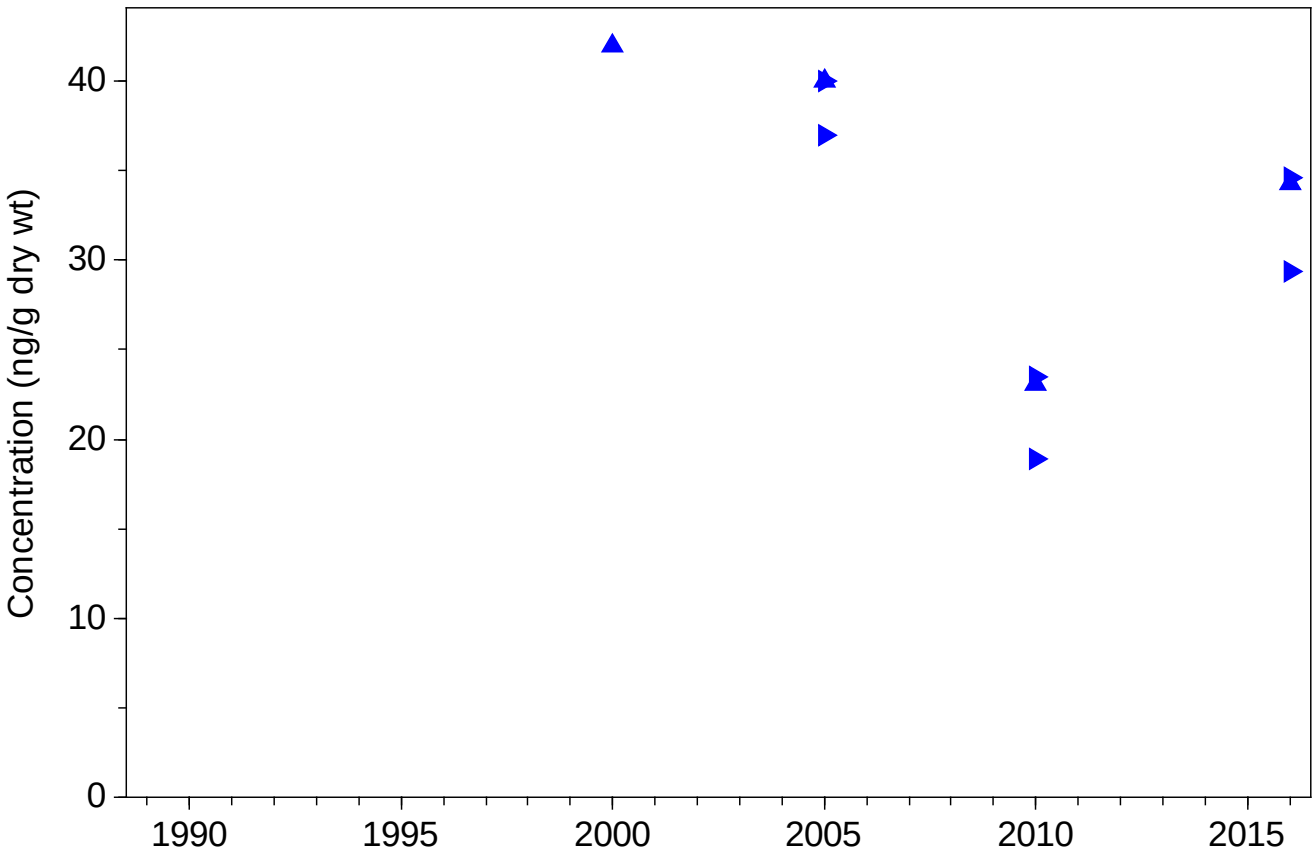
Total Benzofluoranthenes, Station 29



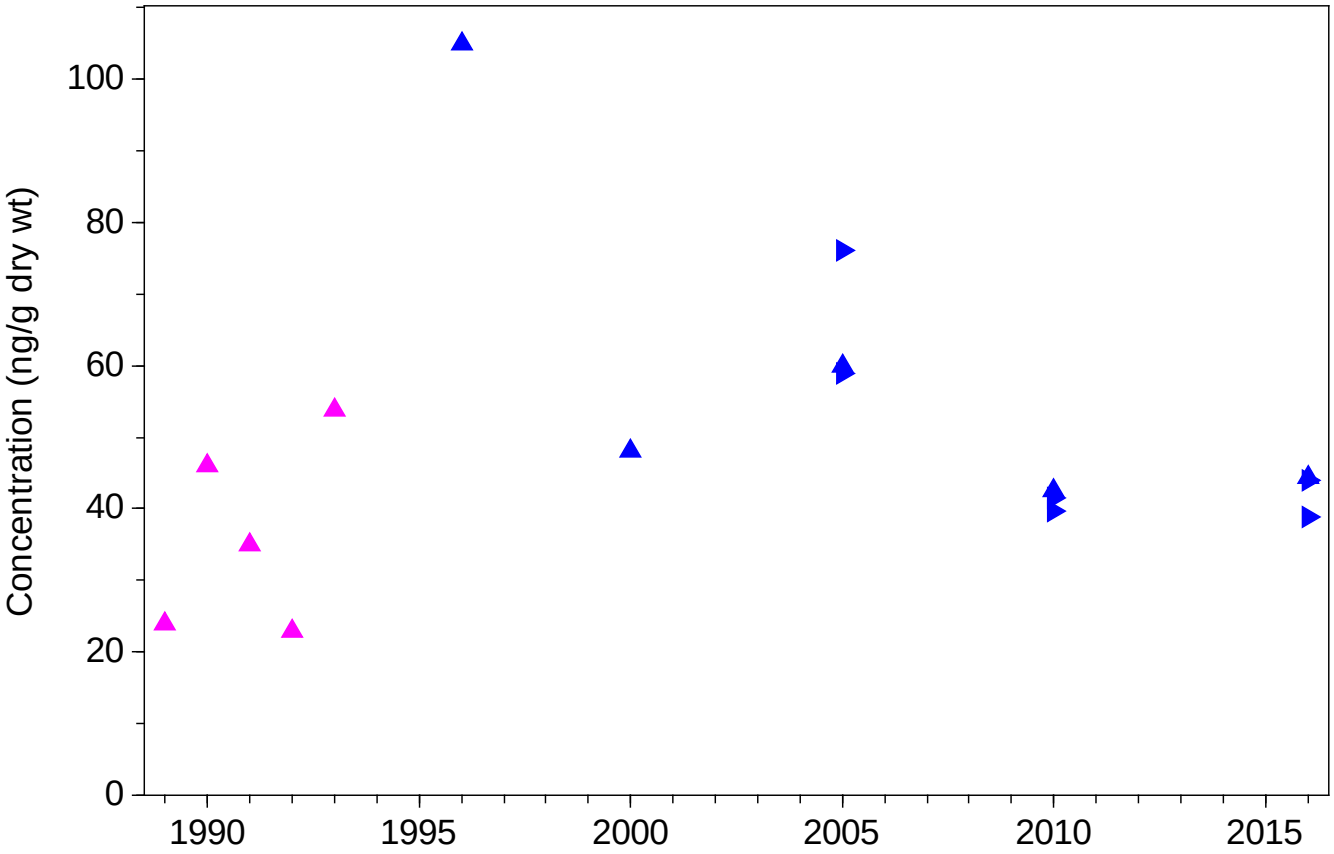
Benzo(b)fluoranthene, Station 29



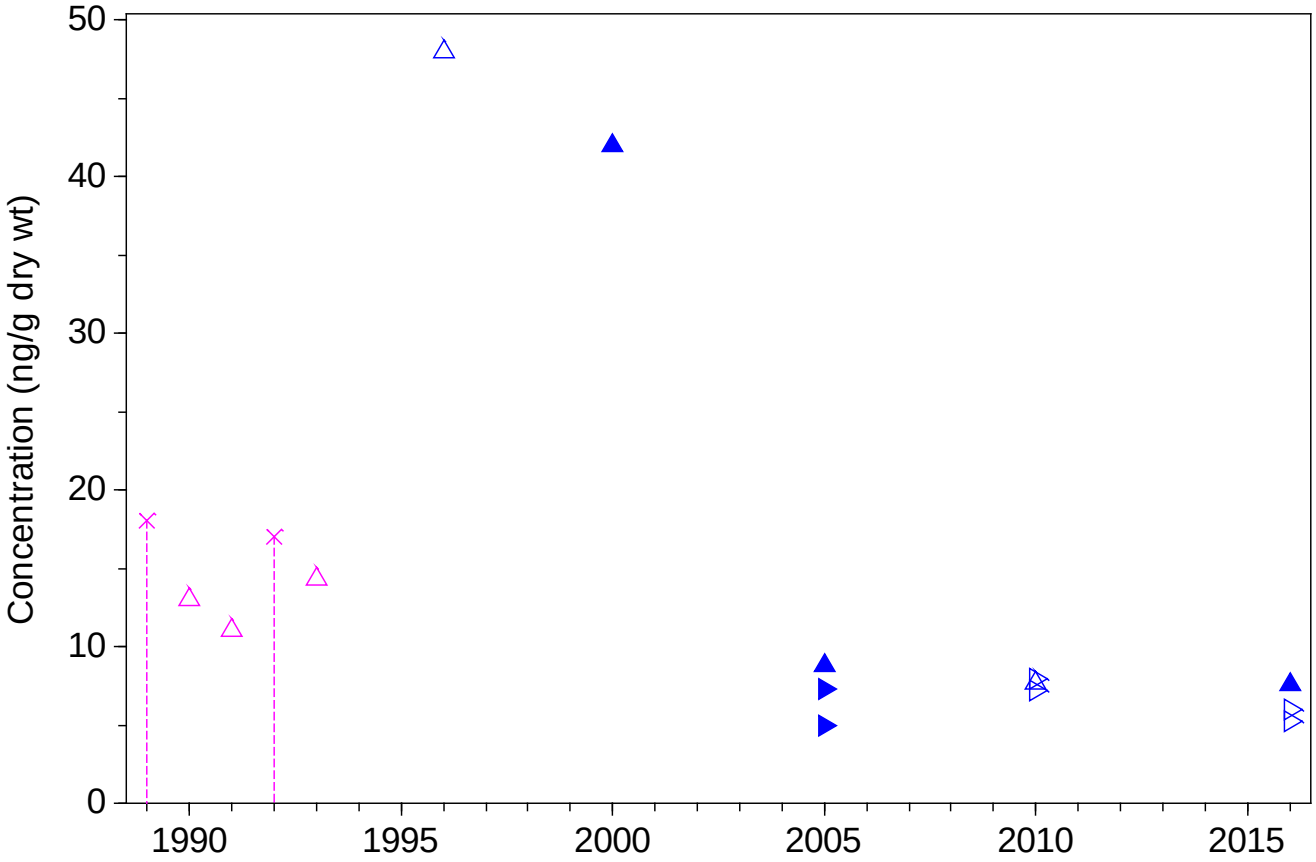
Benzo(k)fluoranthene, Station 29



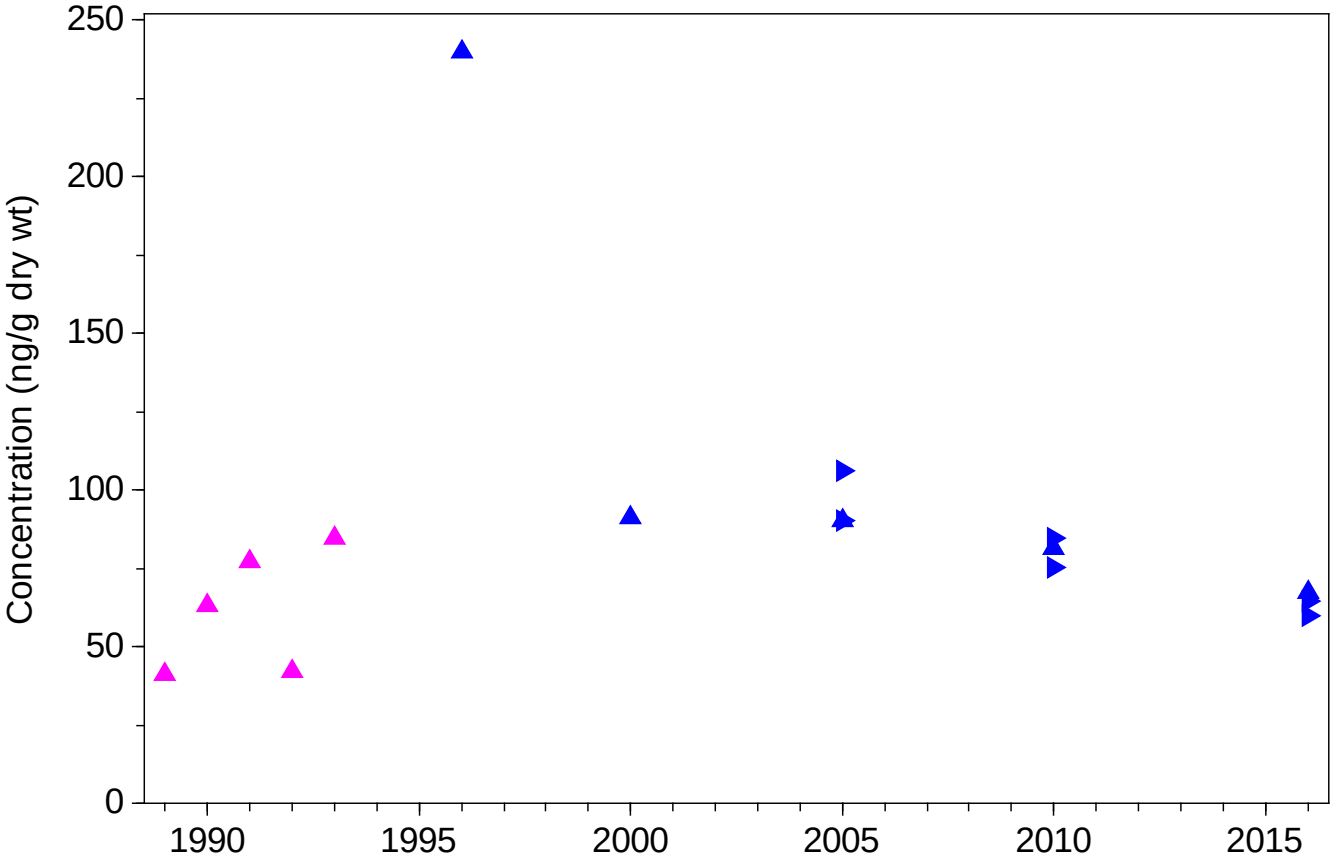
Chrysene, Station 29



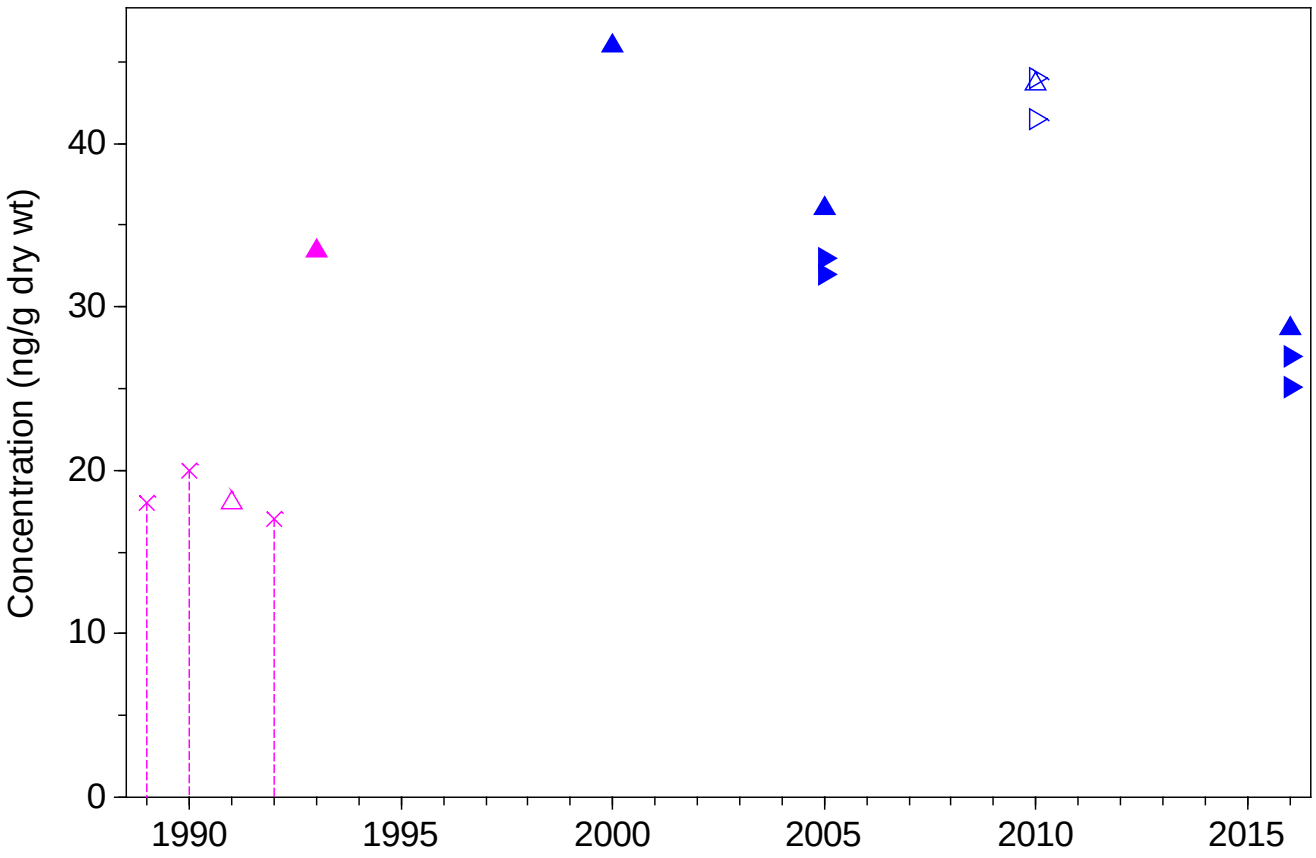
Dibenzo(a,h)anthracene, Station 29



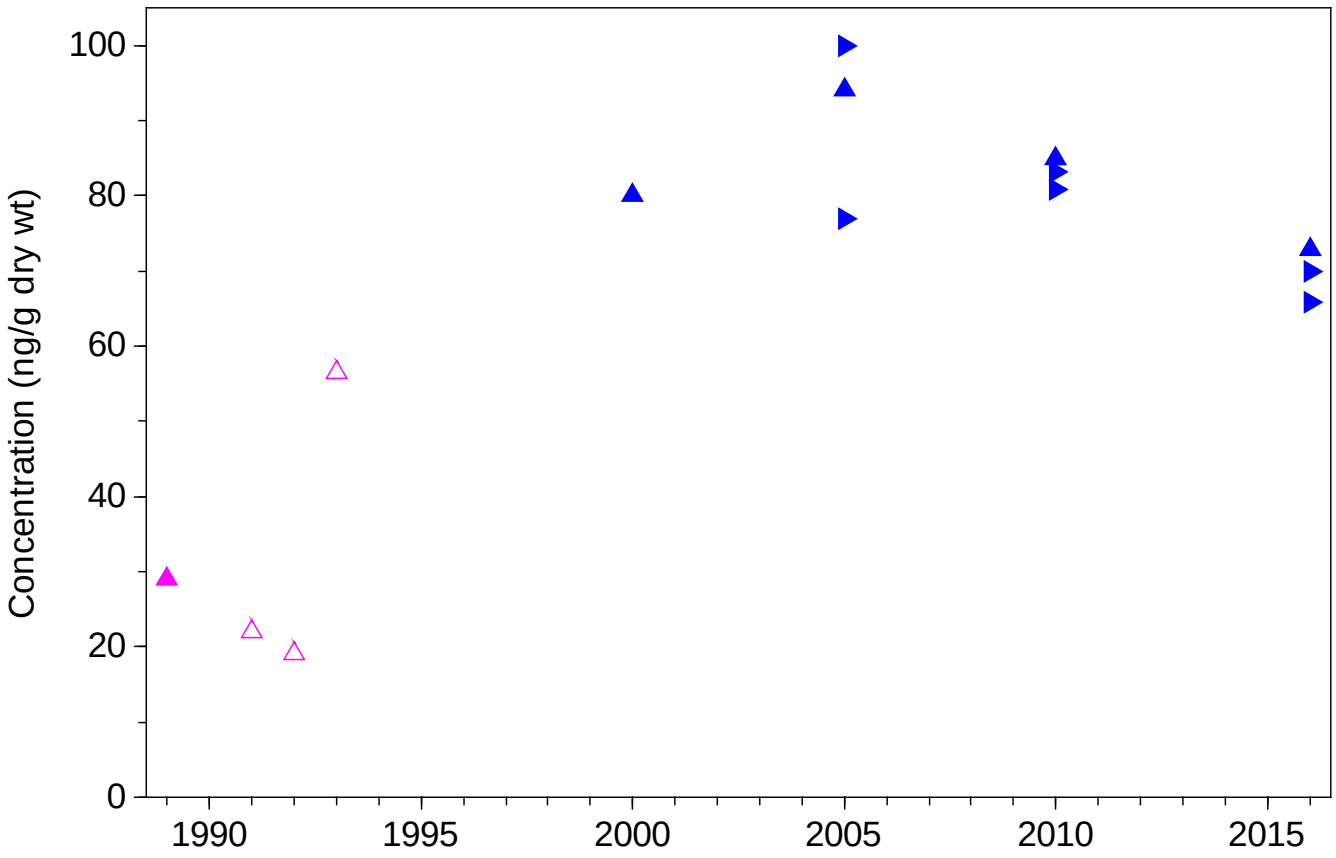
Fluoranthene, Station 29



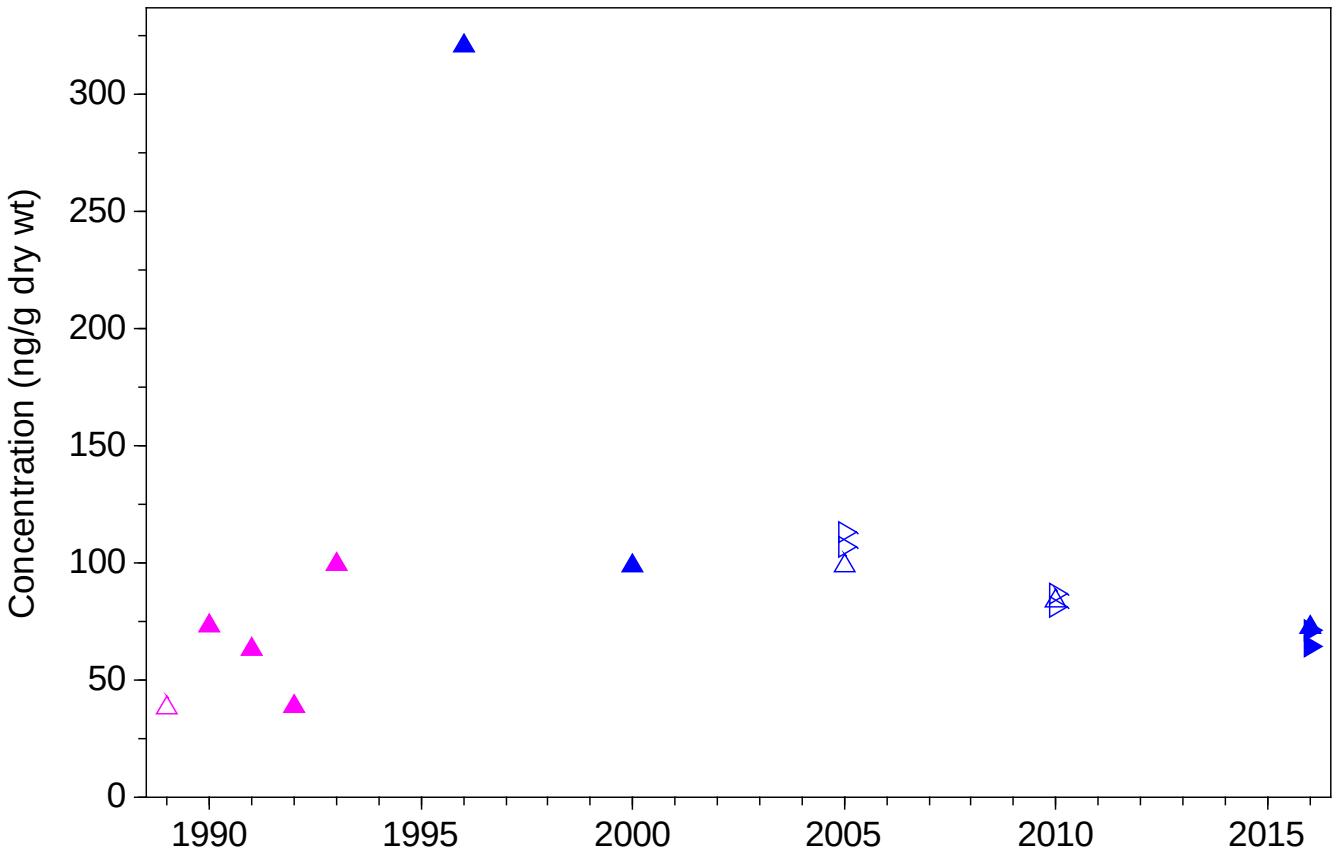
Indeno(1,2,3-c,d)pyrene, Station 29

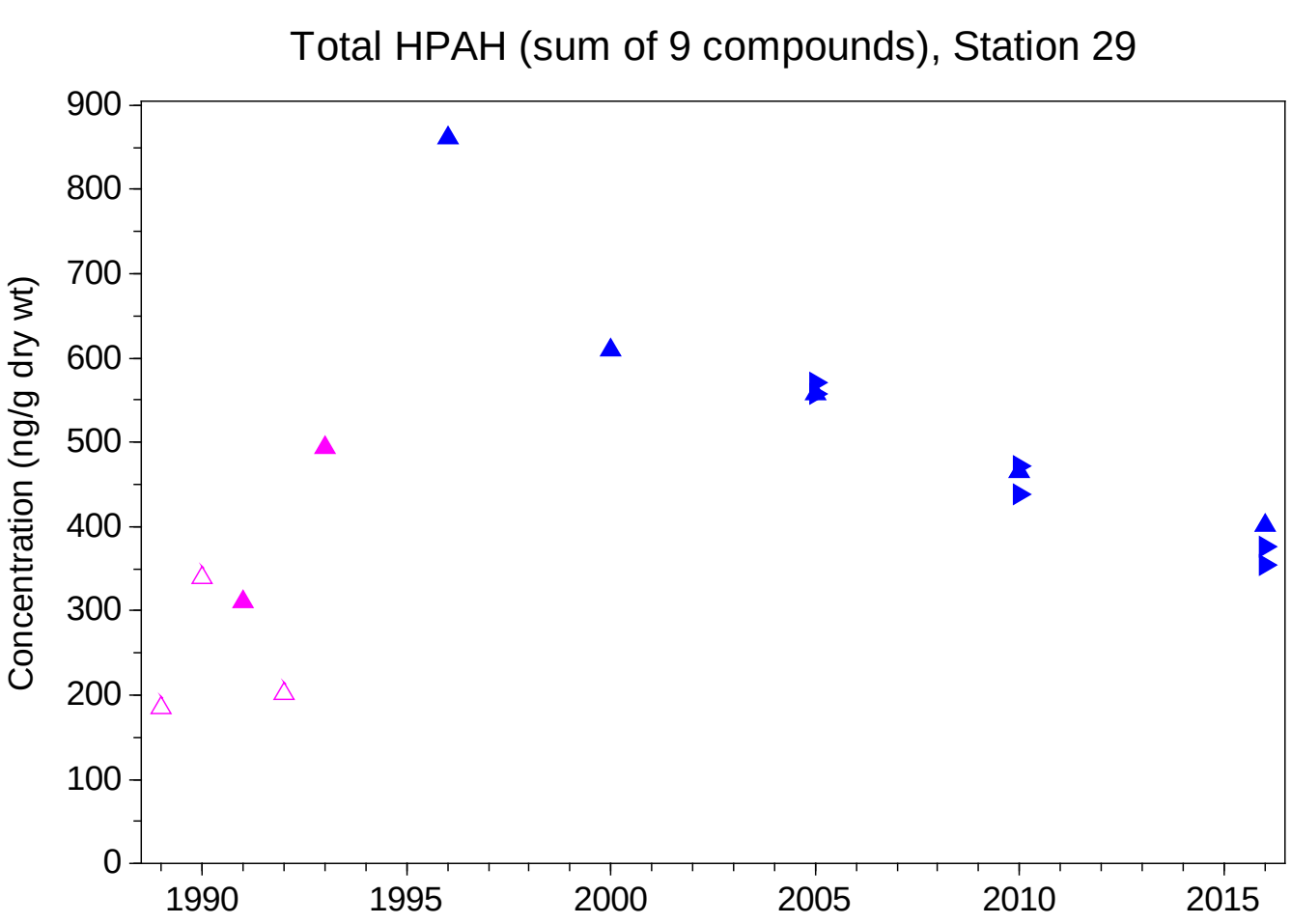


Perylene, Station 29



Pyrene, Station 29





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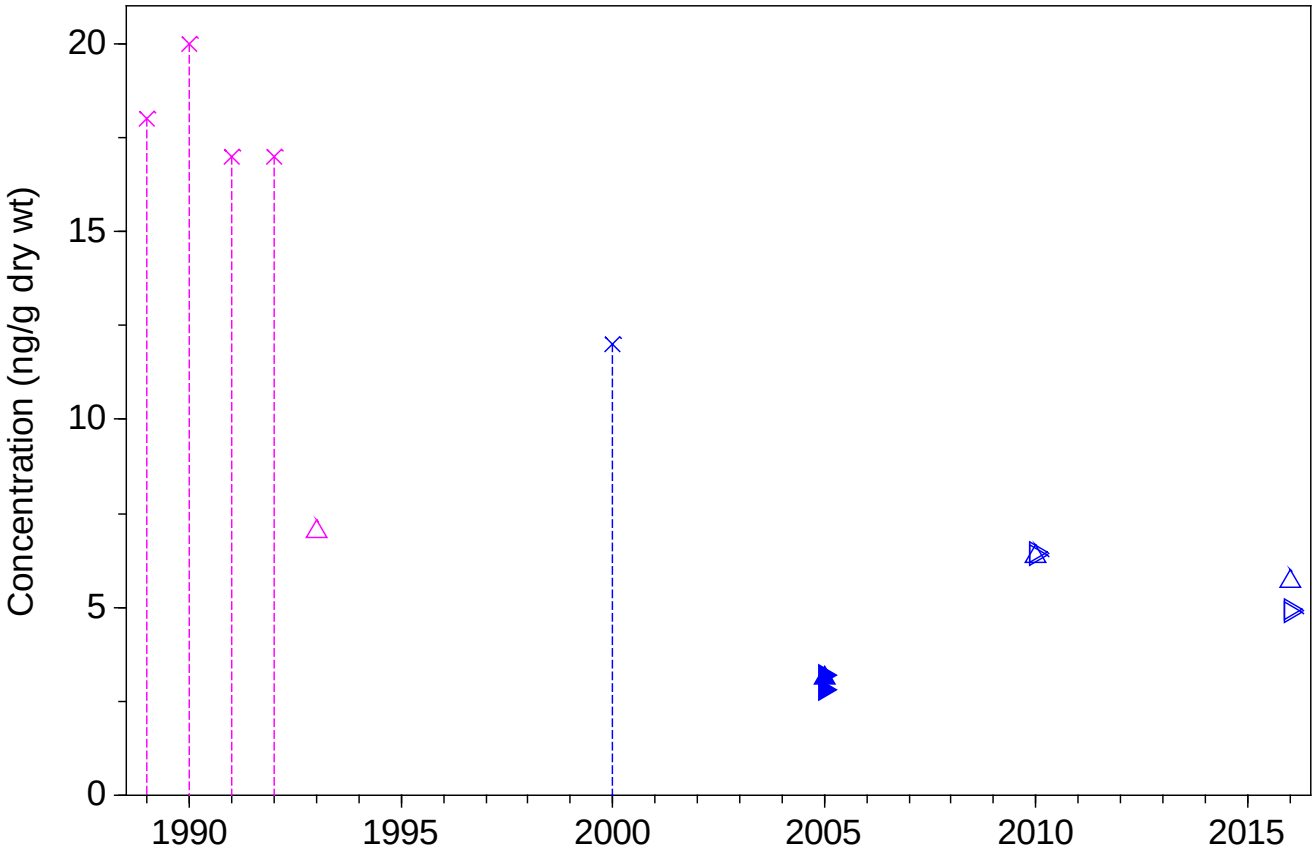
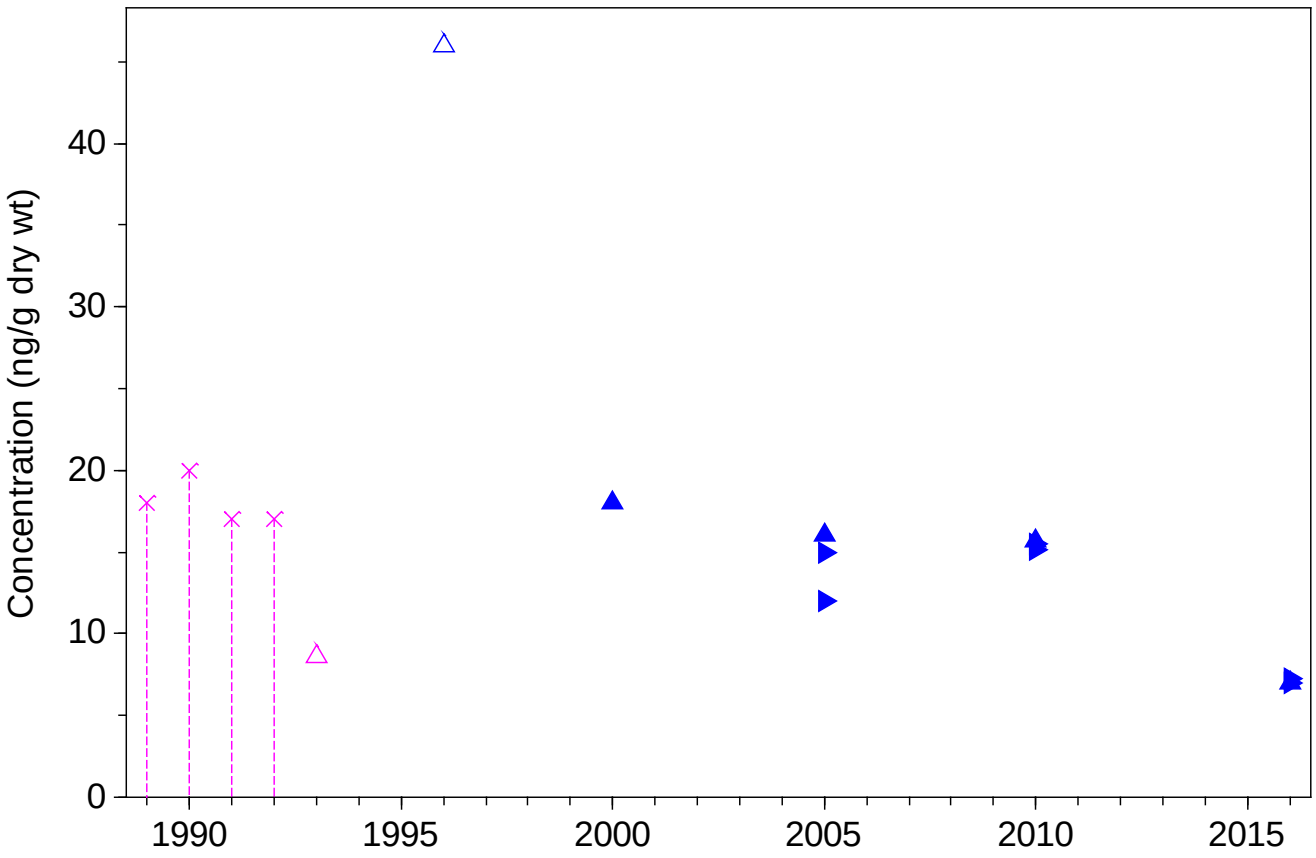
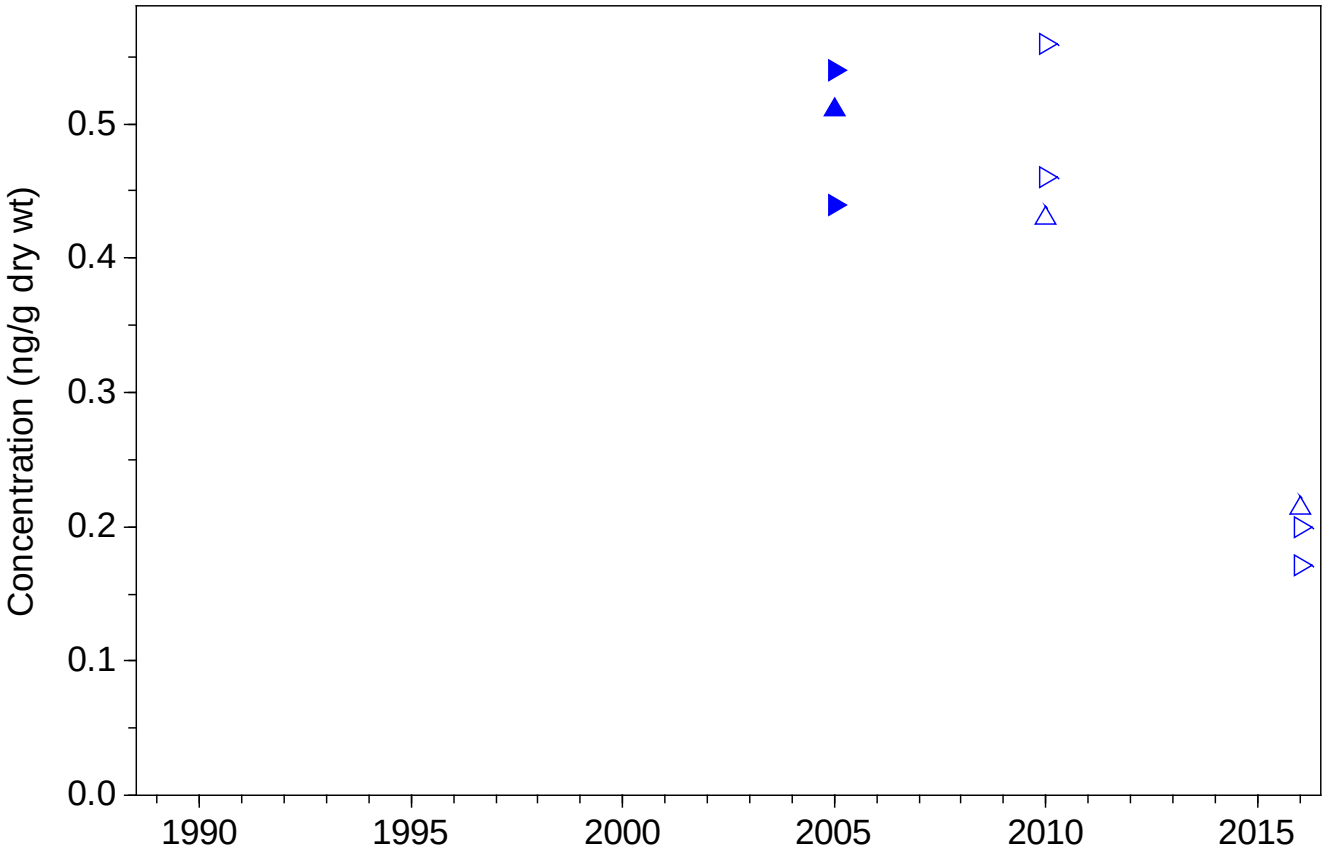
Carbazole, Station 29



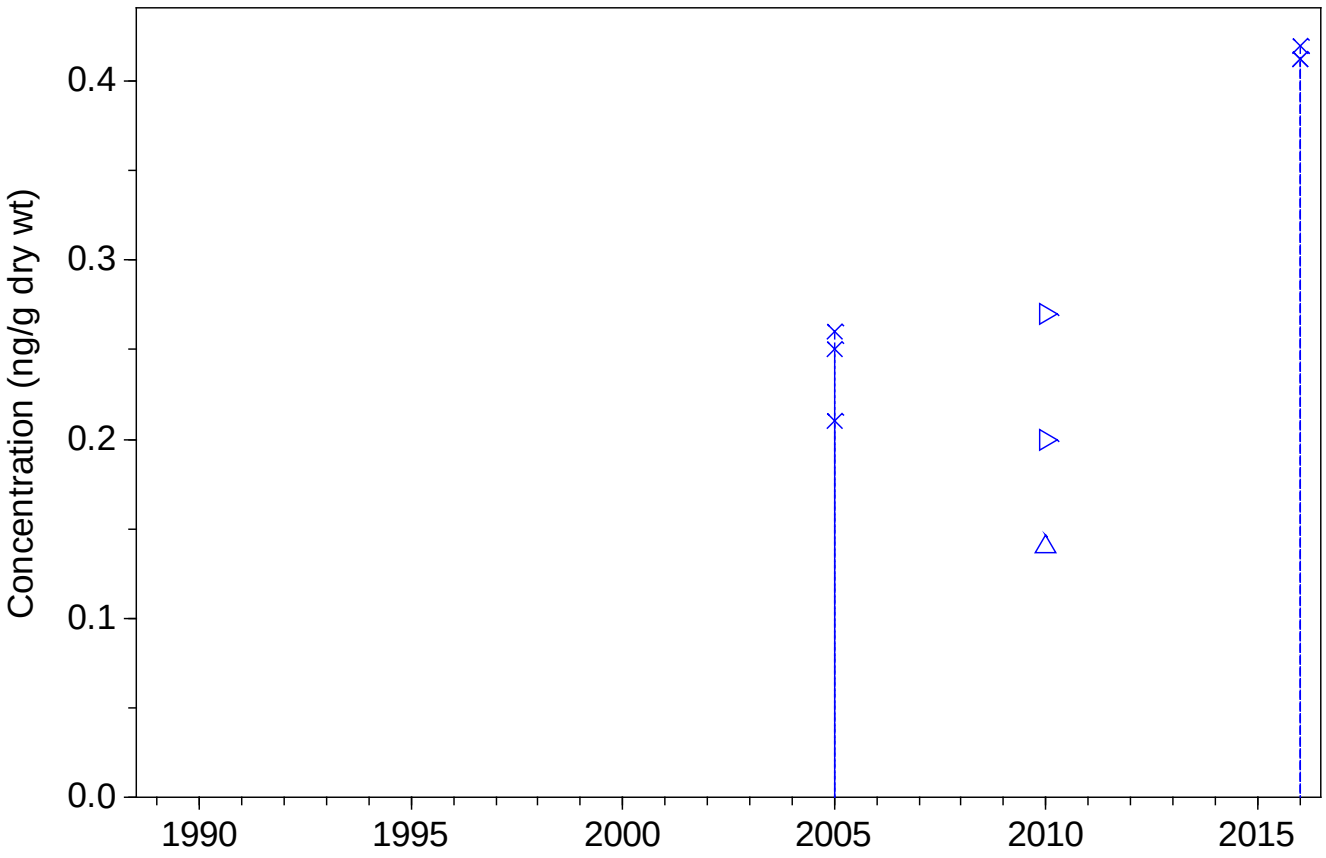
Dibenzofuran, Station 29



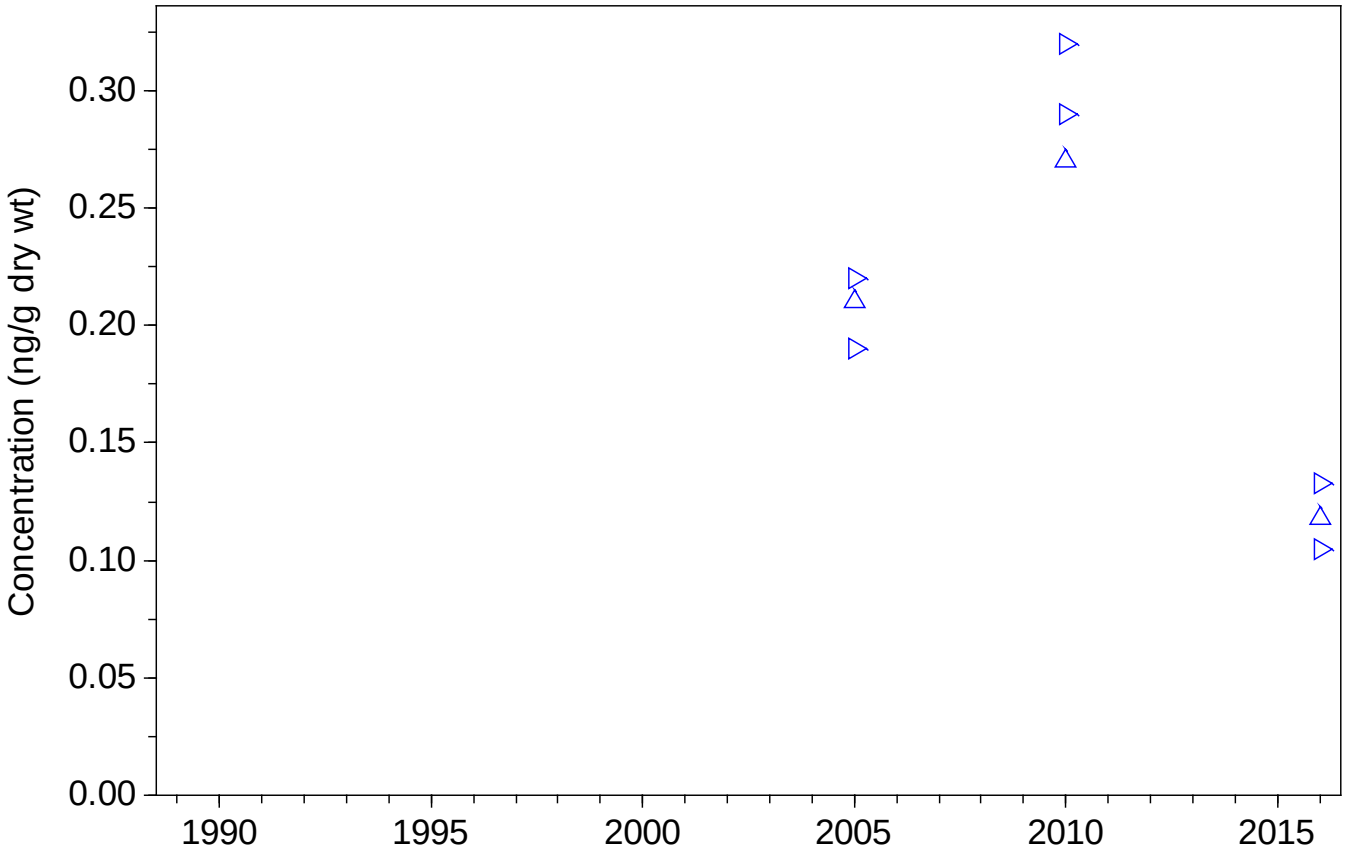
PBDE-47, Station 29



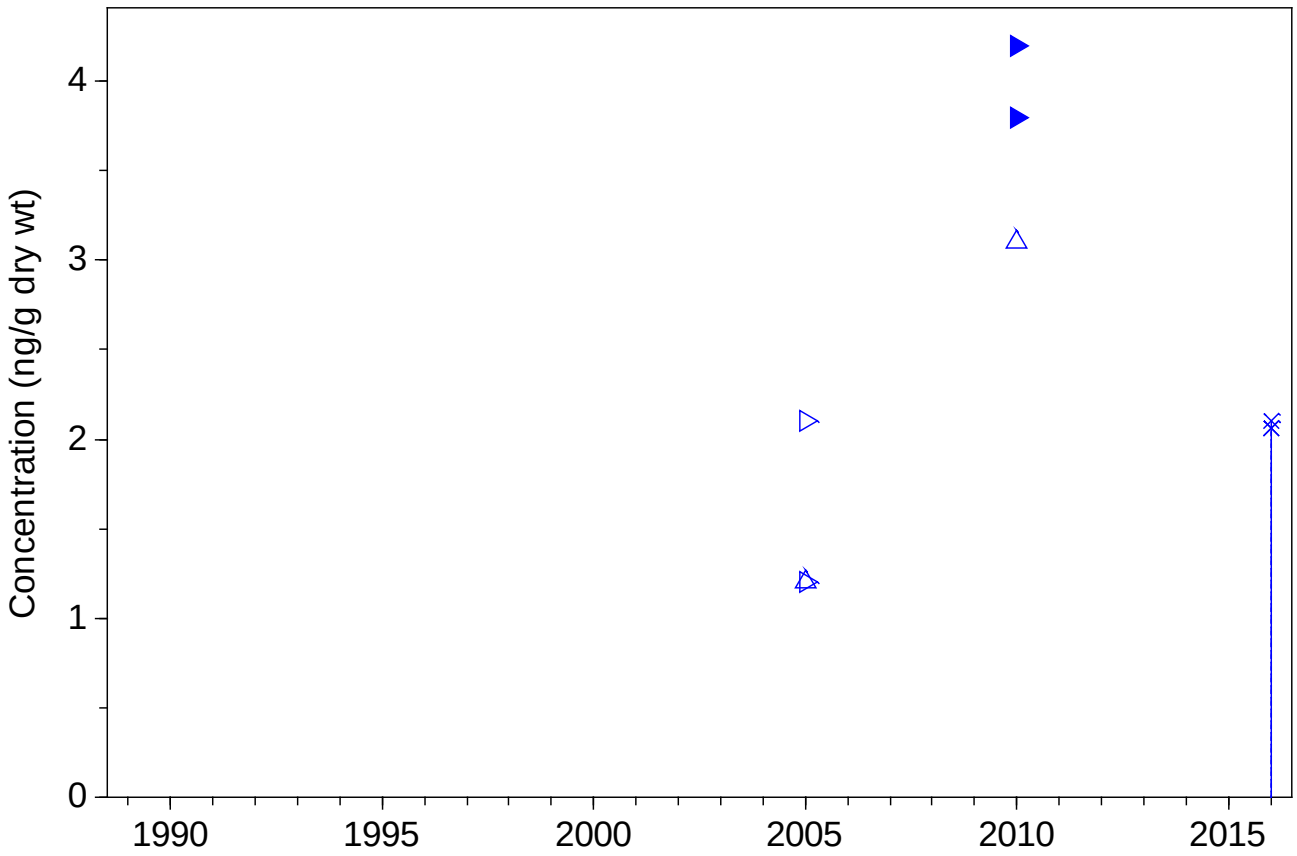
PBDE-49, Station 29



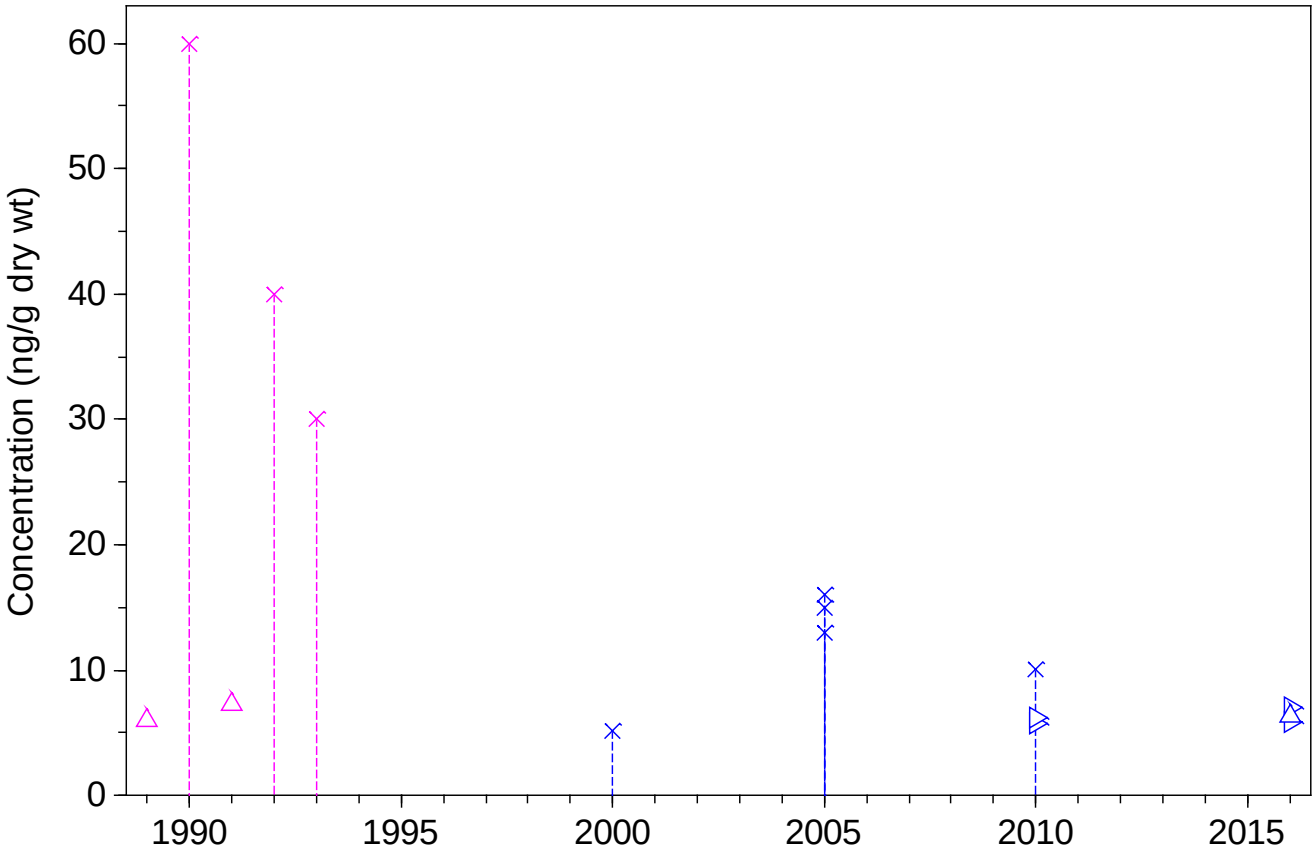
PBDE-99, Station 29



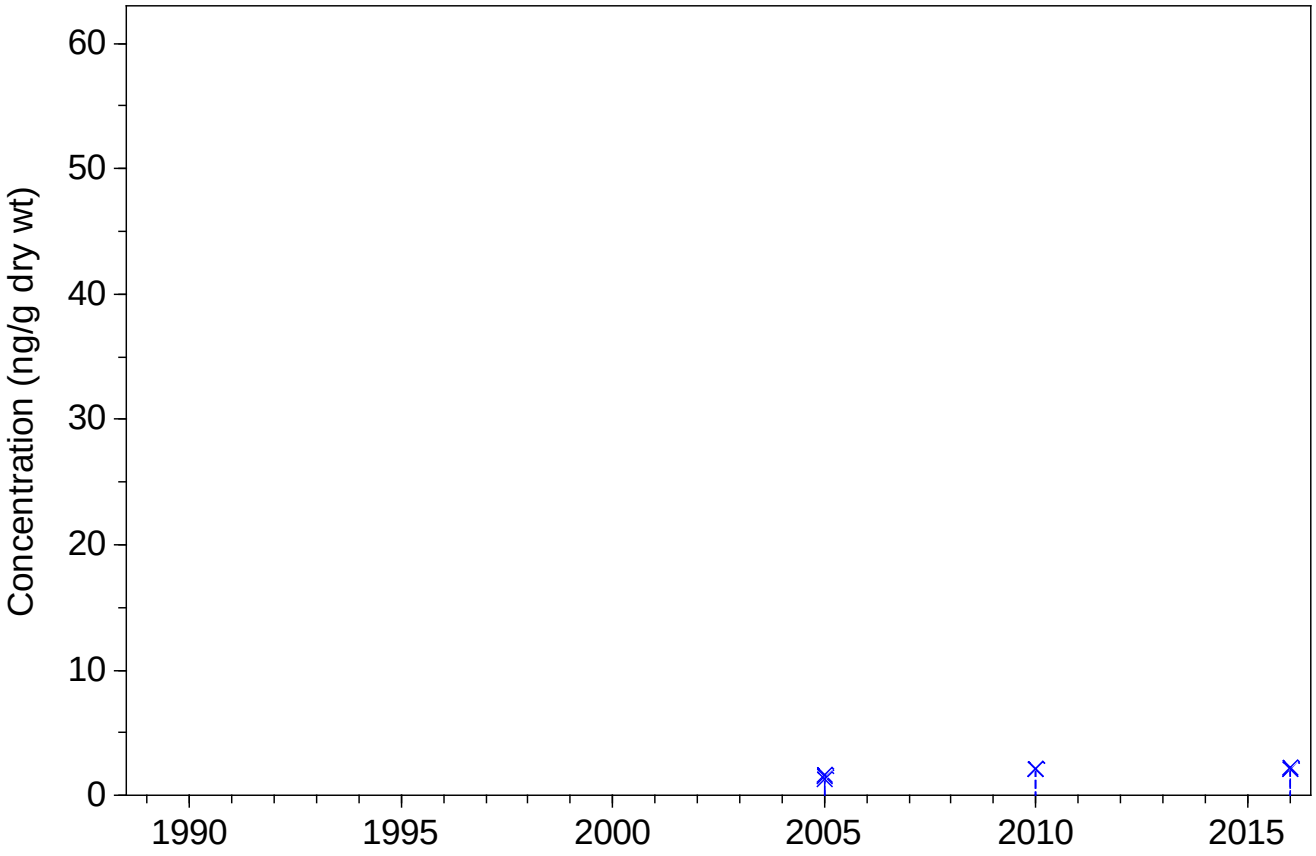
PBDE-209, Station 29



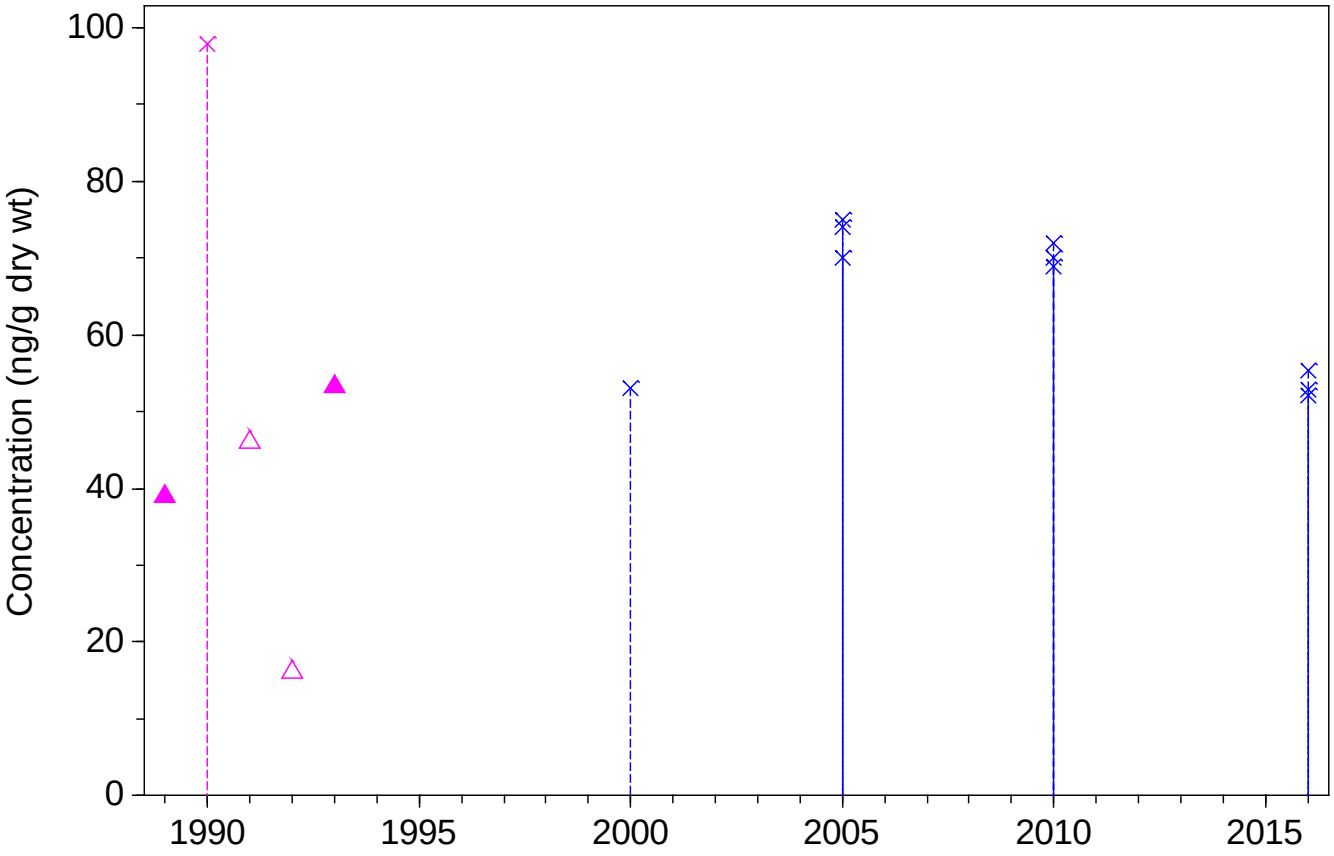
Total Aroclors, Station 29



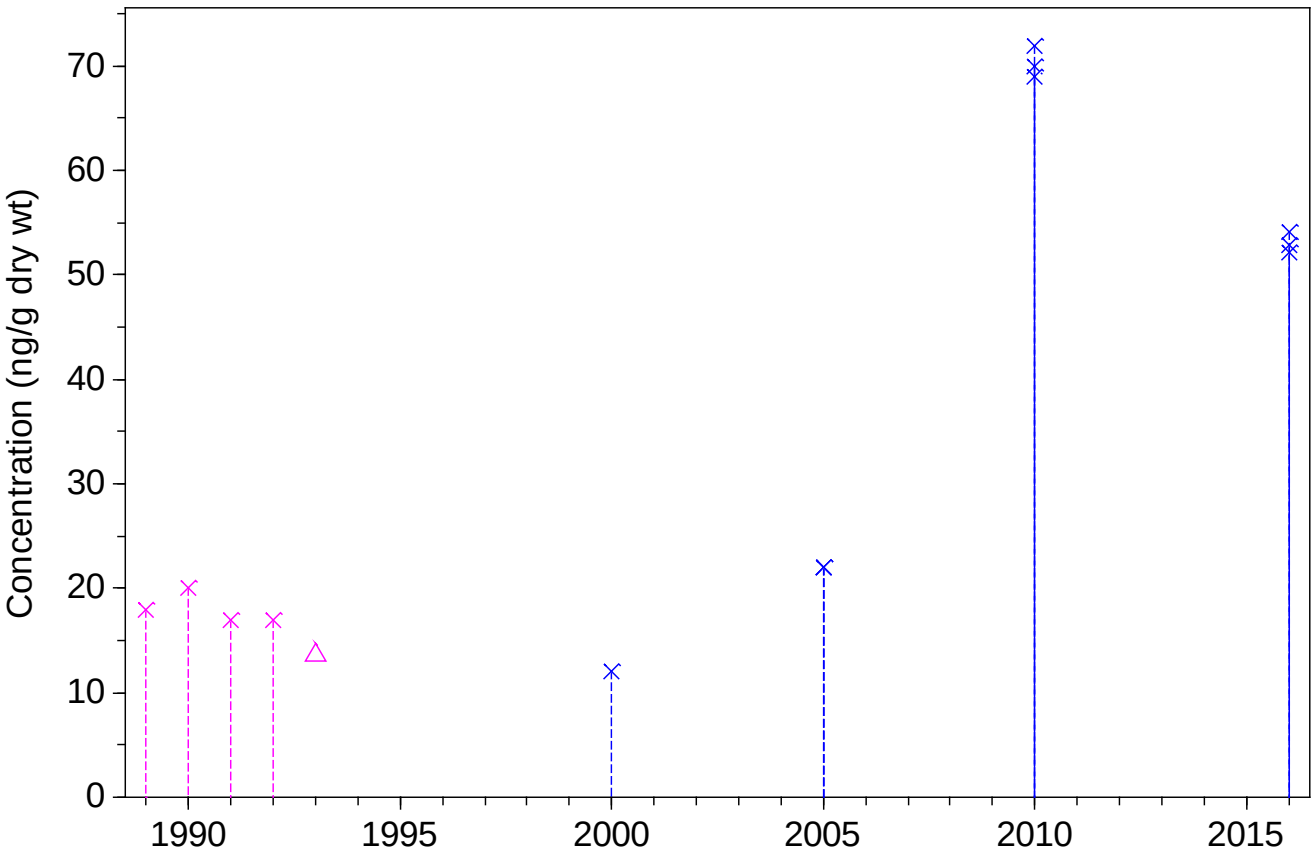
Total PCB Congeners x 2, Station 29



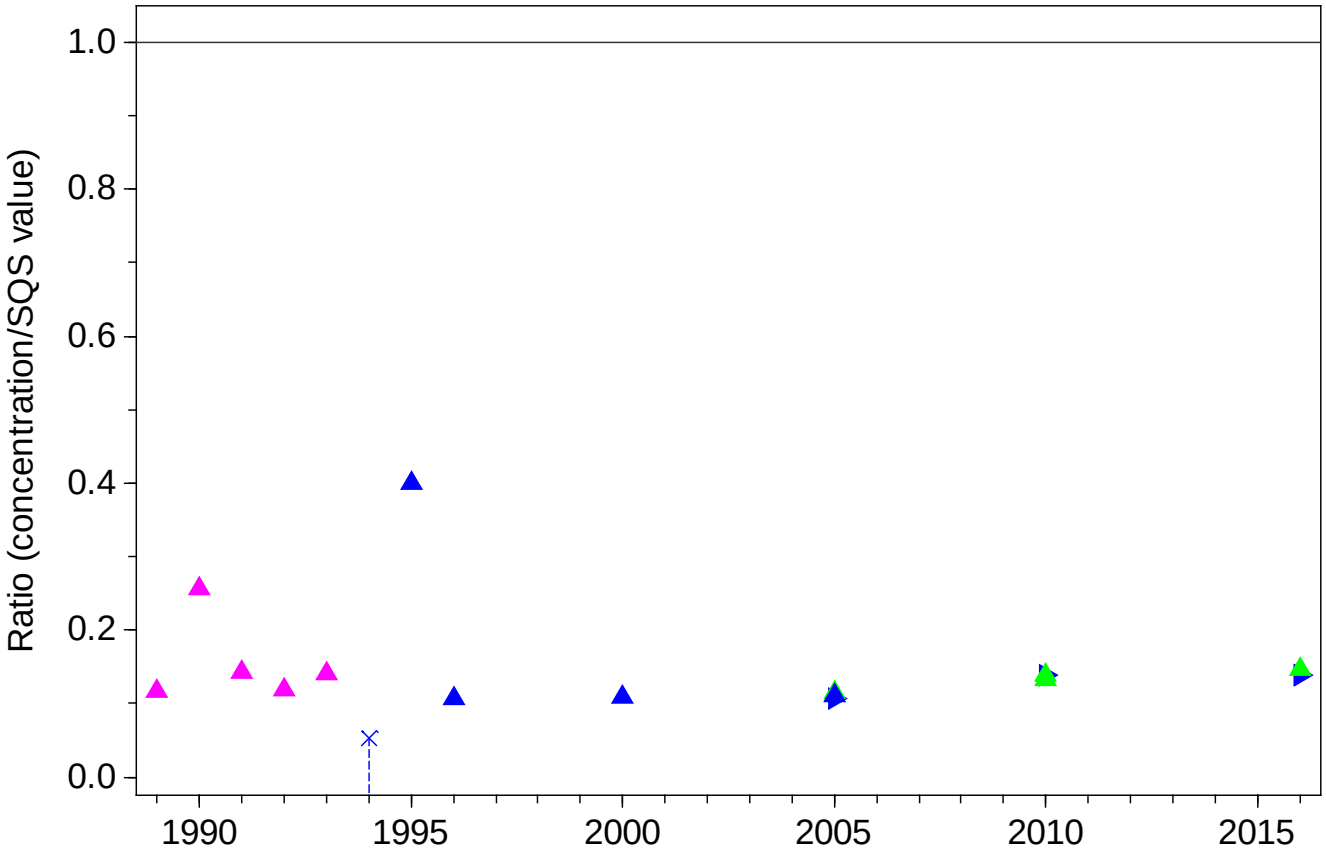
Bis(2-ethylhexyl)phthalate, Station 29



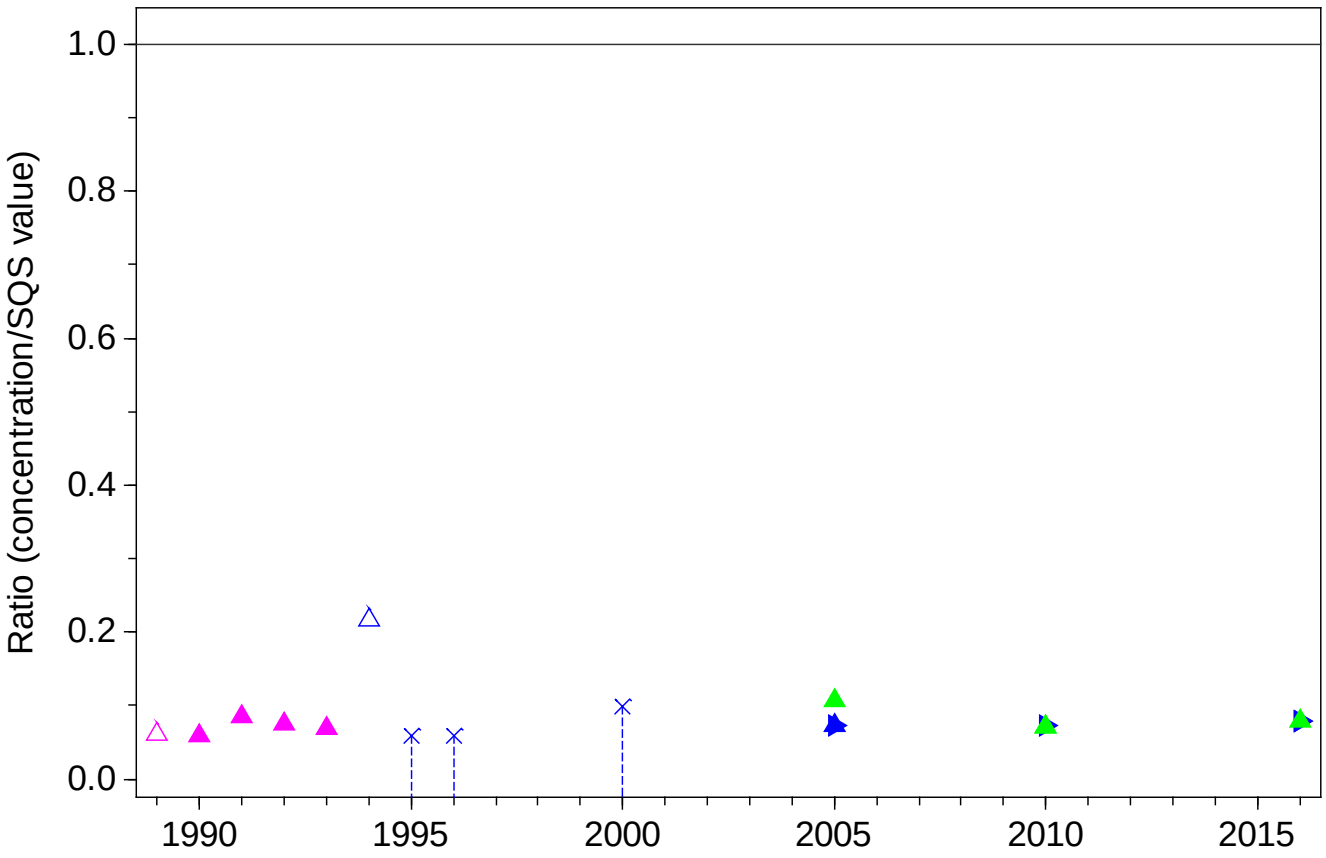
Butylbenzylphthalate, Station 29



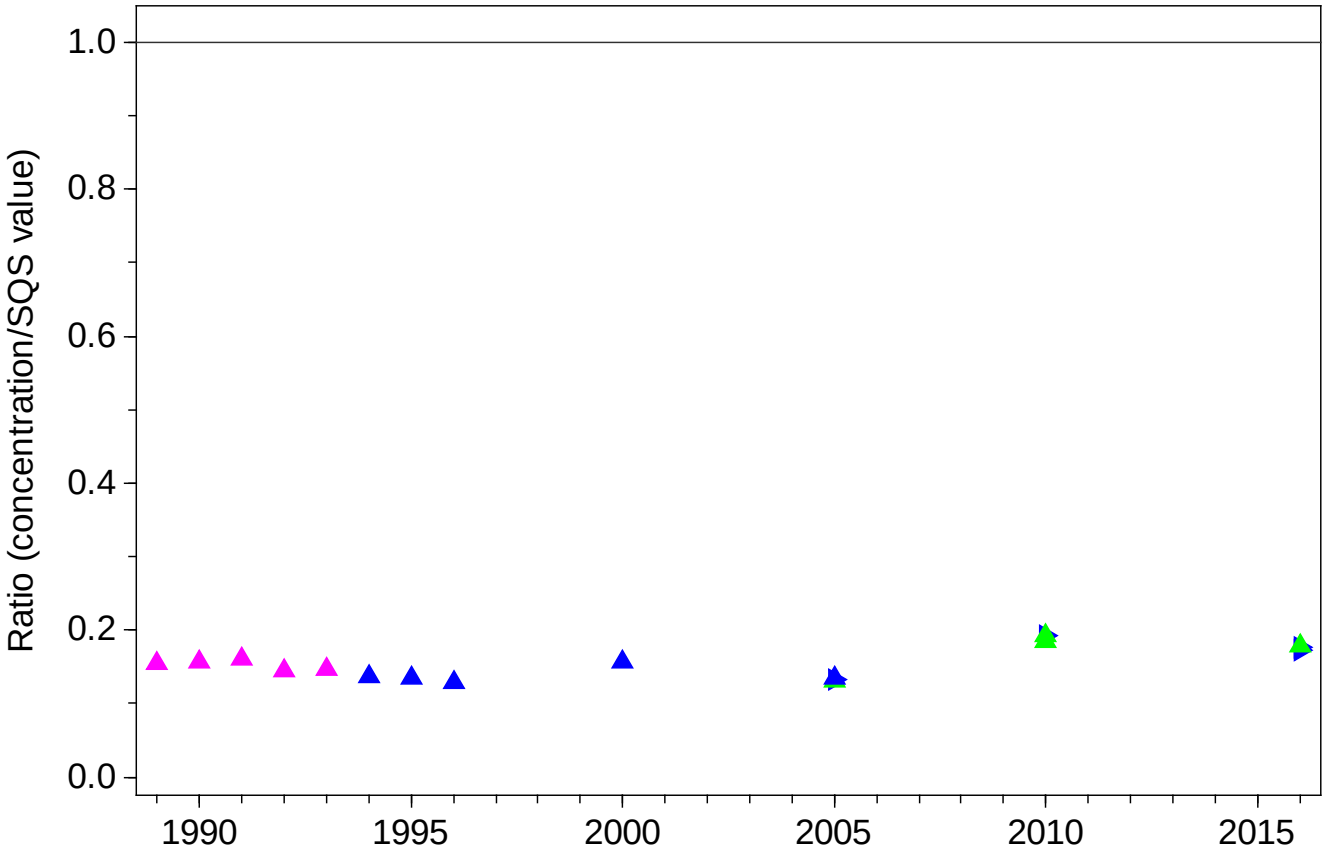
SQS quotient, Arsenic, Station 29



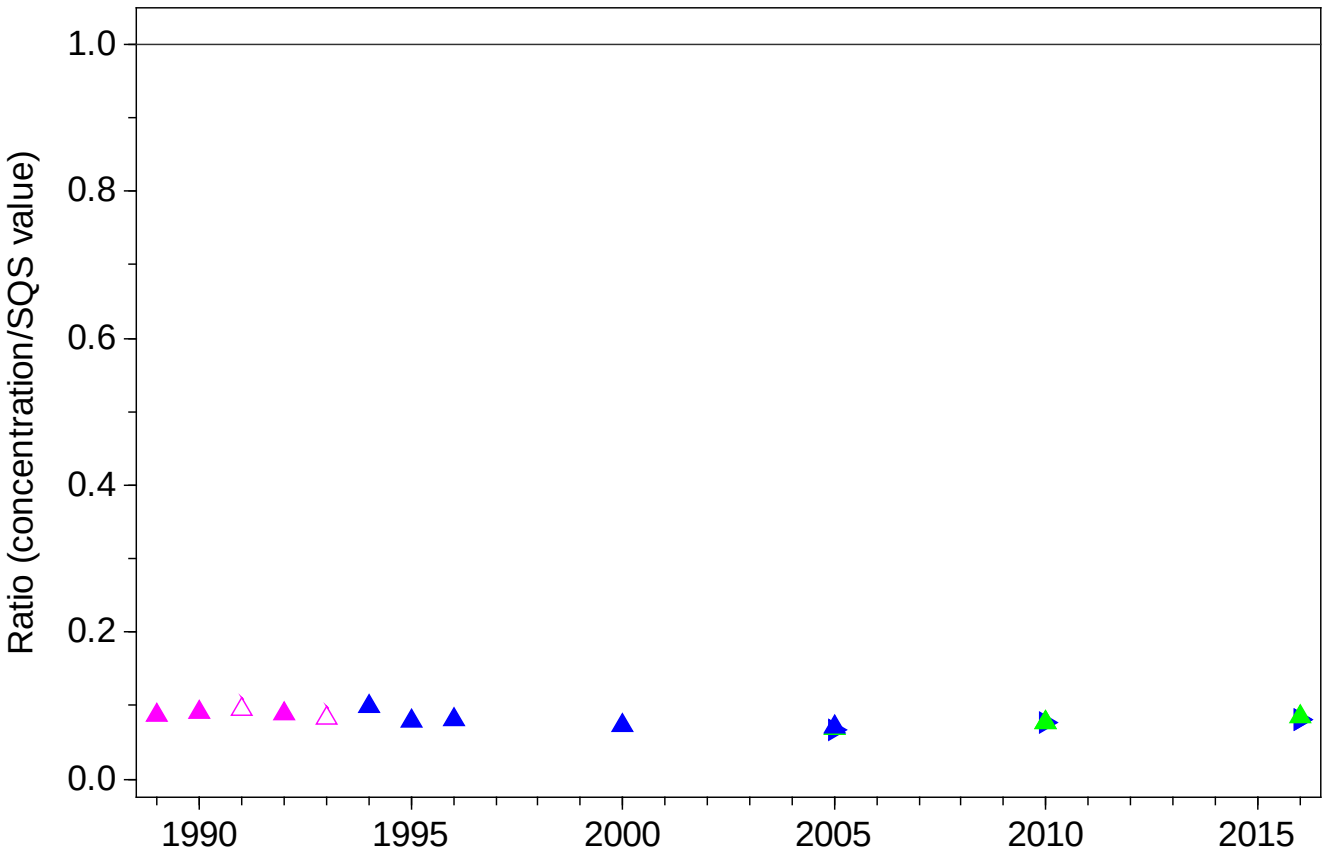
SQS quotient, Cadmium, Station 29



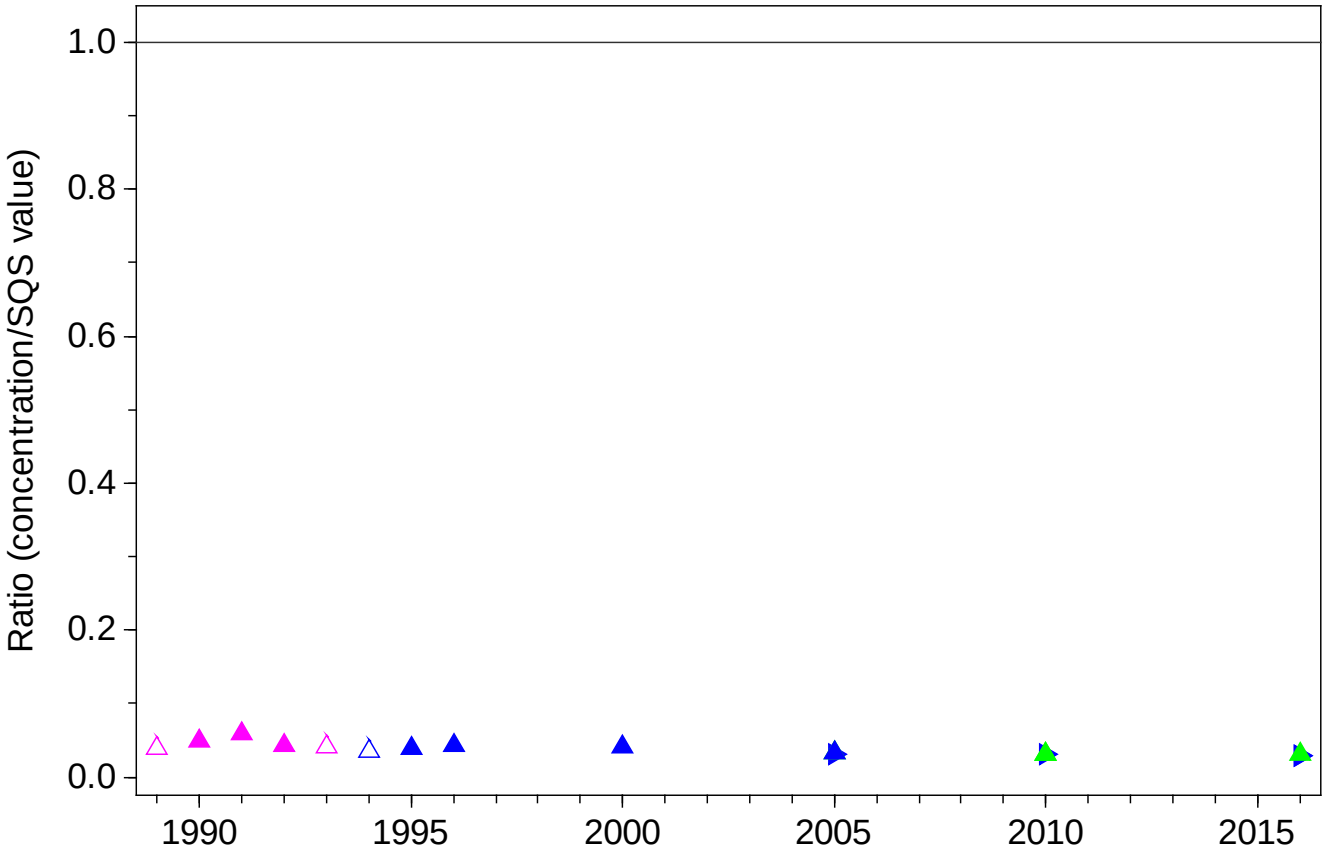
SQS quotient, Chromium, Station 29



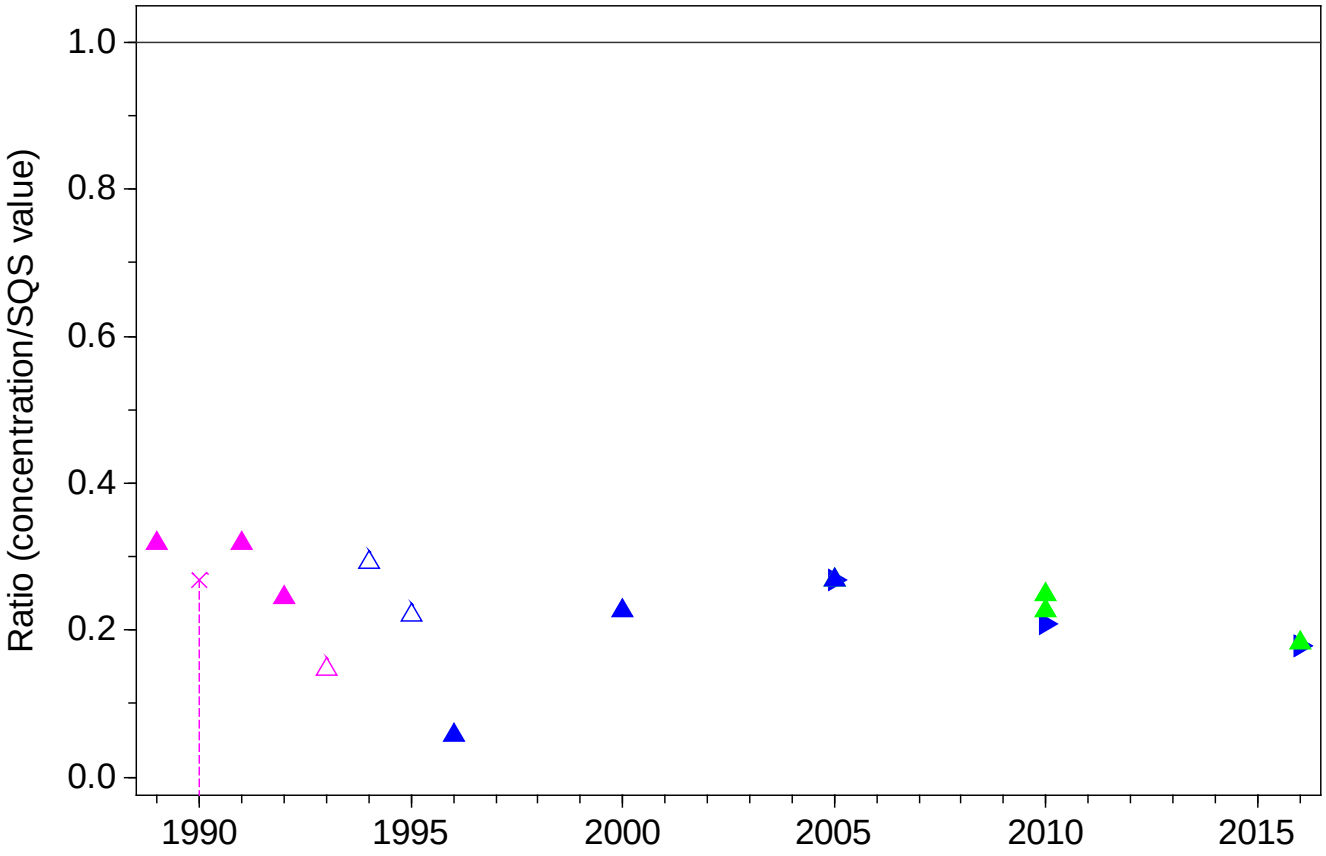
SQS quotient, Copper, Station 29



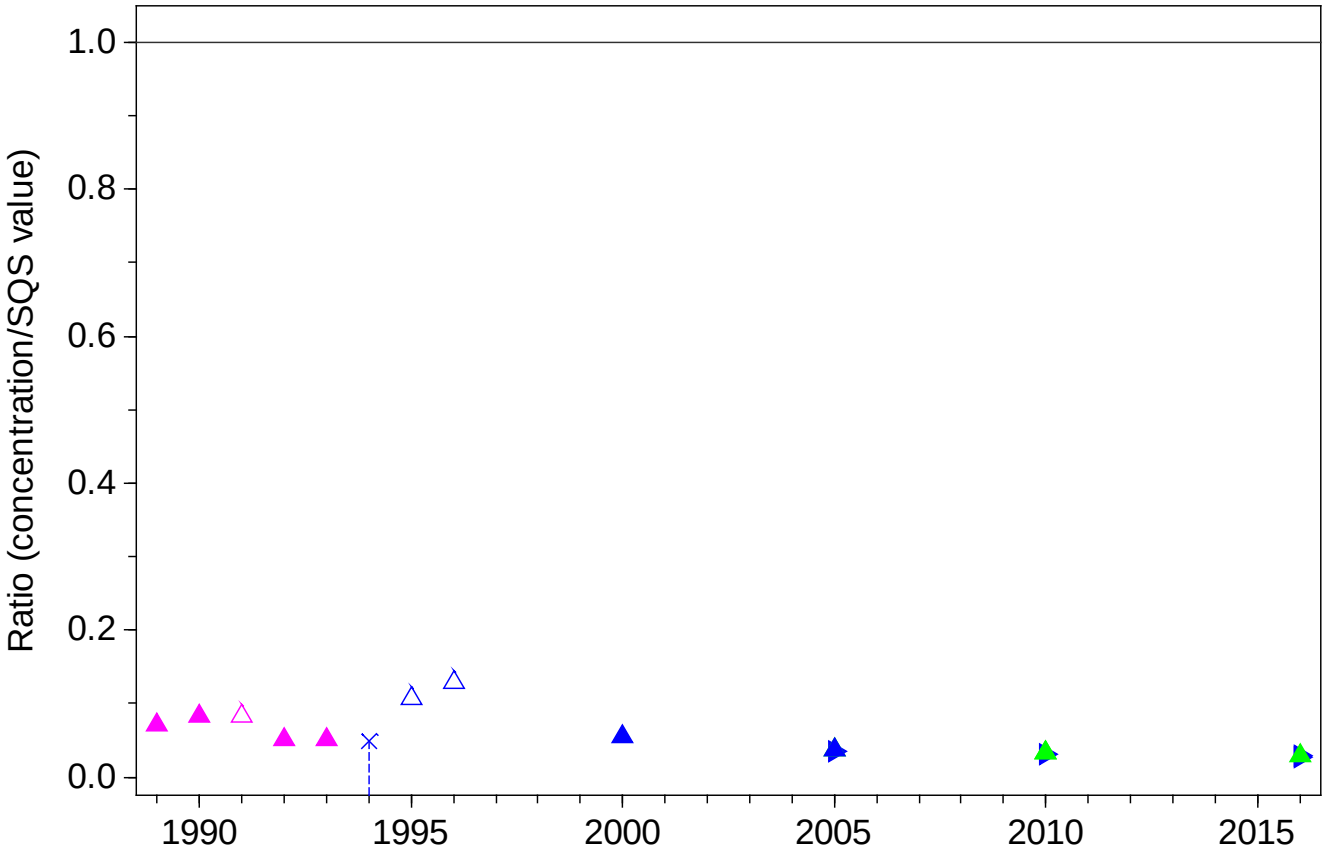
SQS quotient, Lead, Station 29



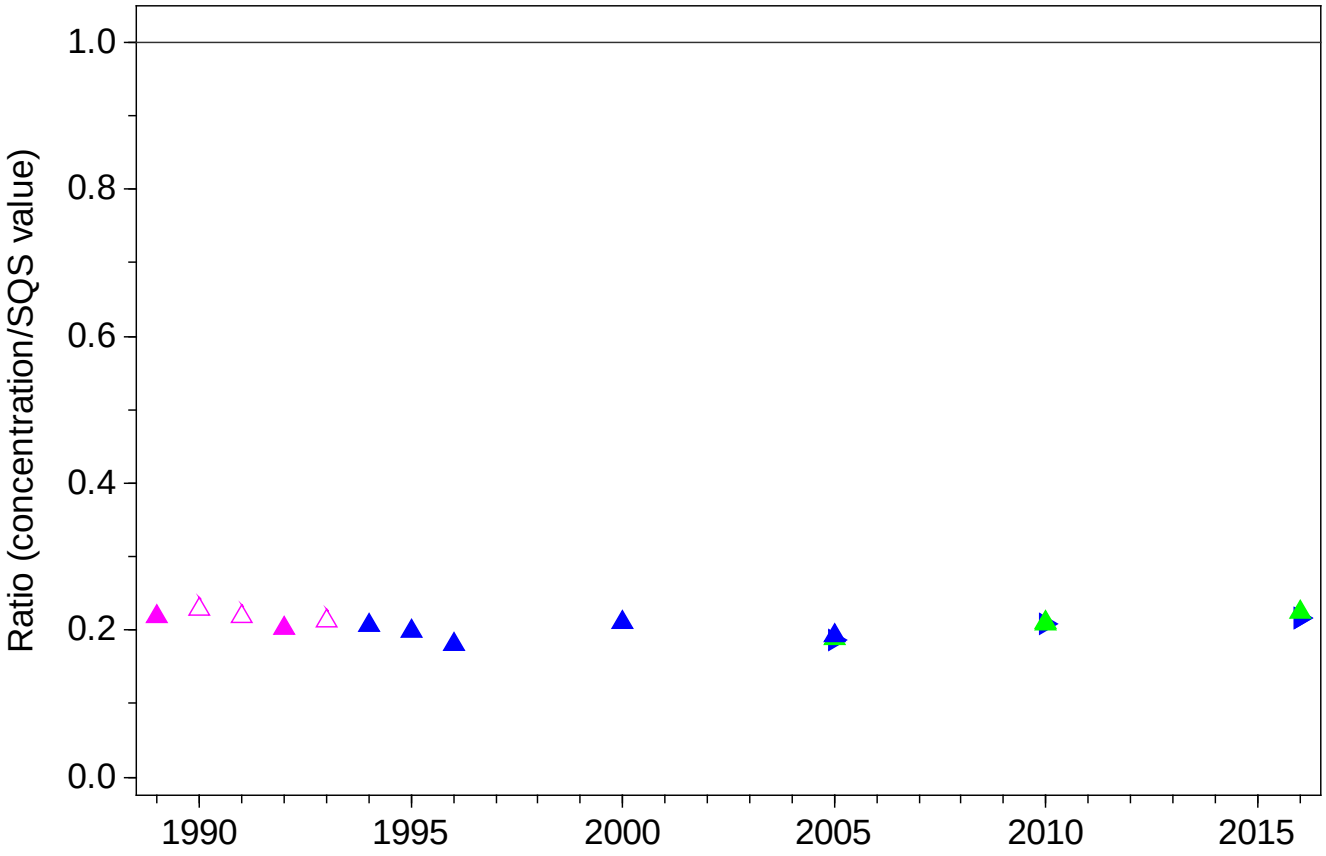
SQS quotient, Mercury, Station 29



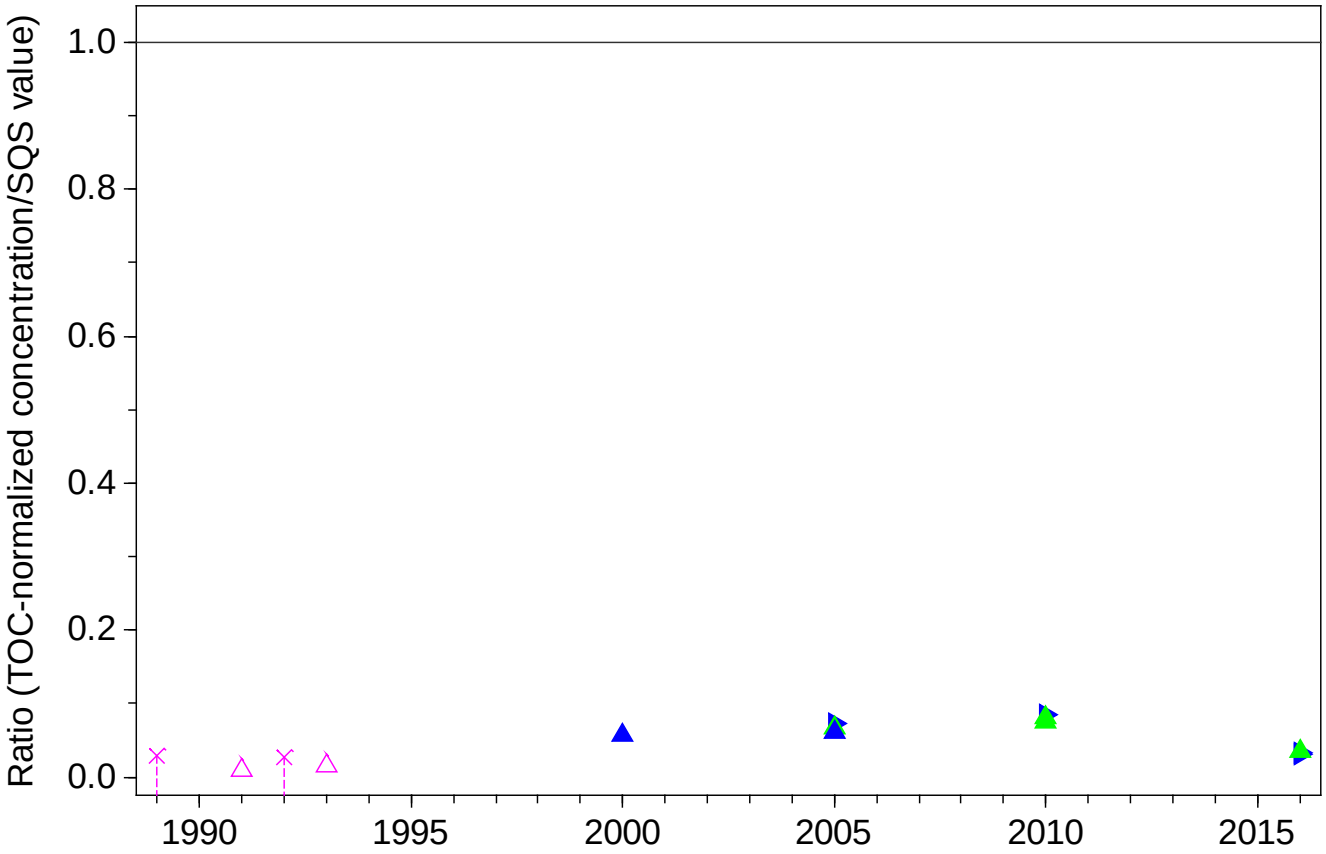
SQS quotient, Silver, Station 29



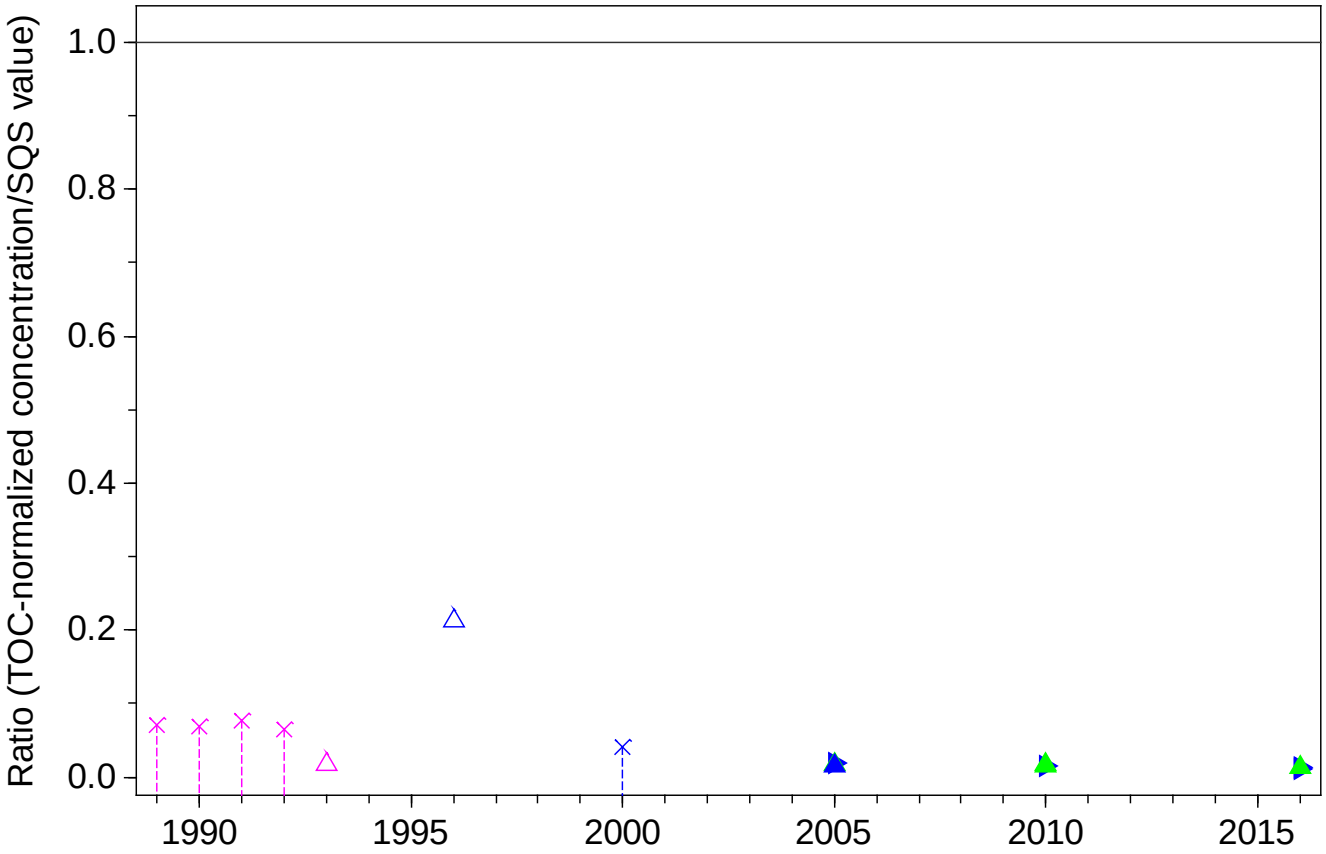
SQS quotient, Zinc, Station 29



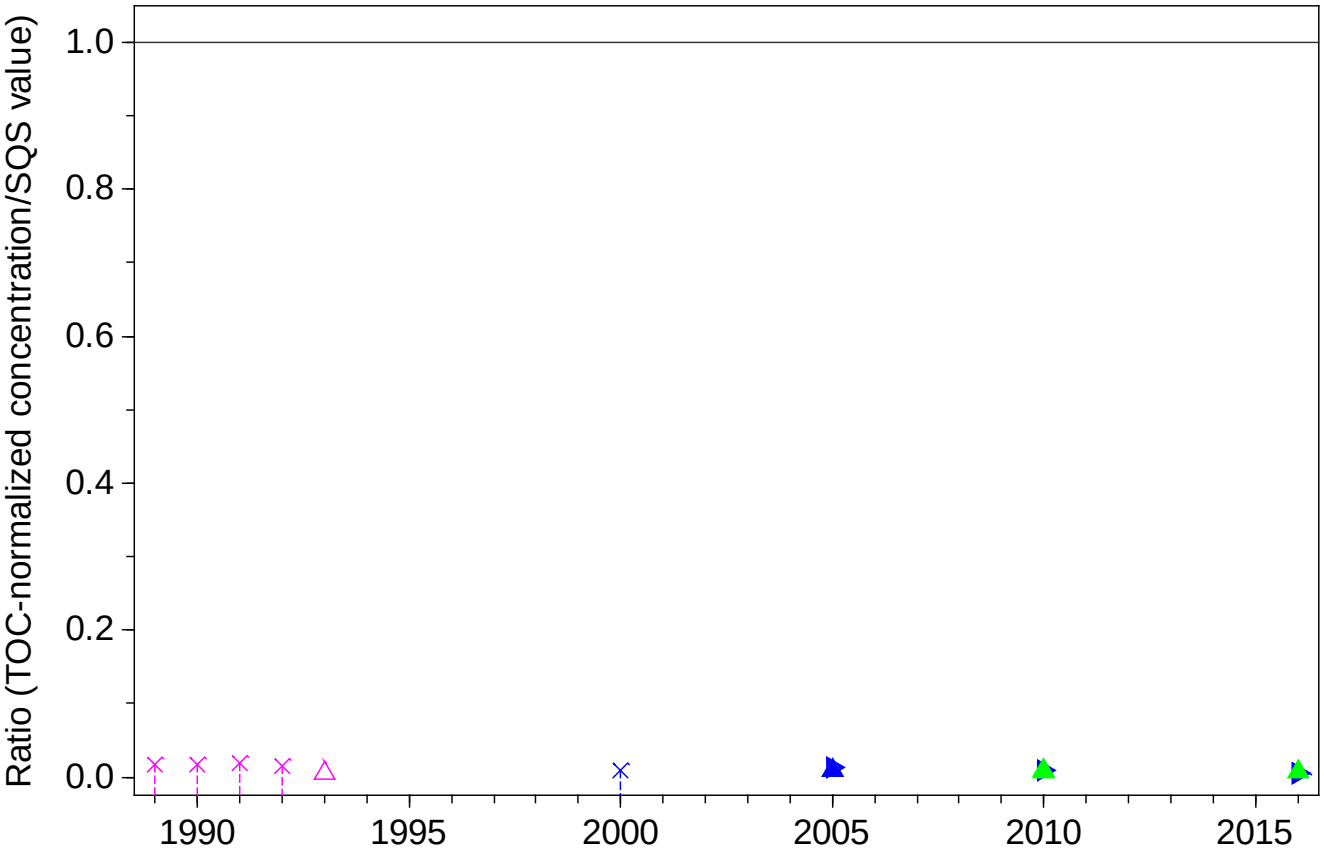
SQS quotient, 2-Methylnaphthalene, Station 29



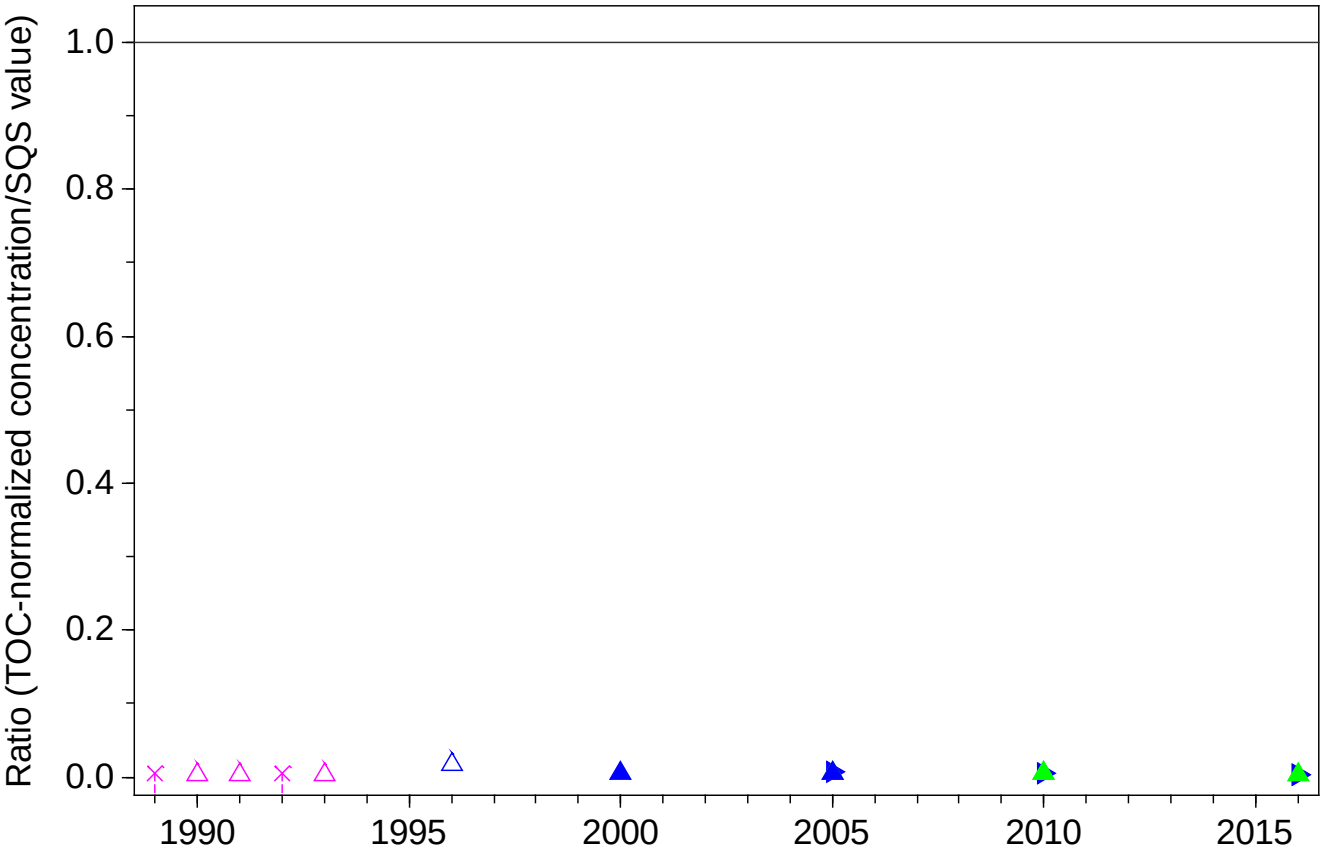
SQS quotient, Acenaphthene, Station 29



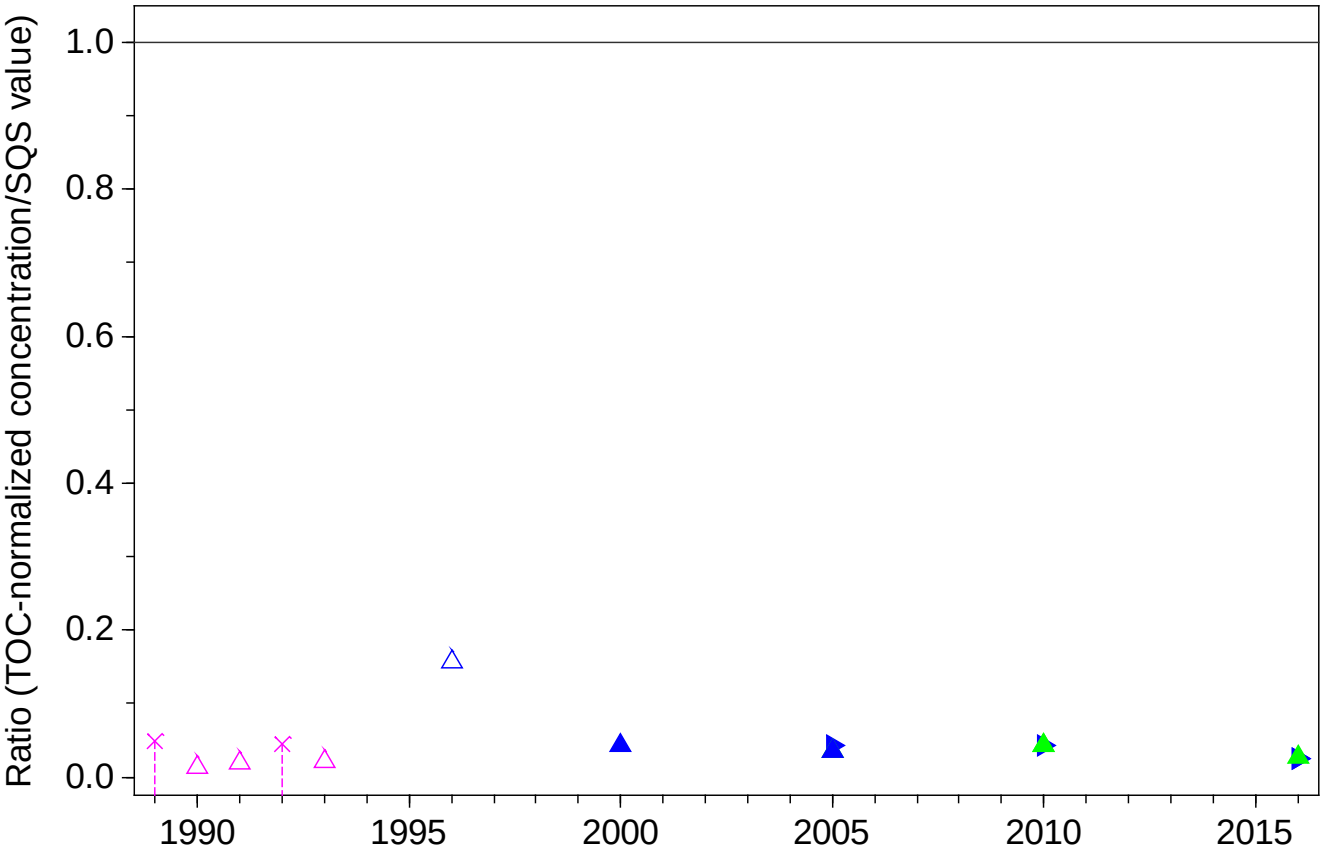
SQS quotient, Acenaphthylene, Station 29



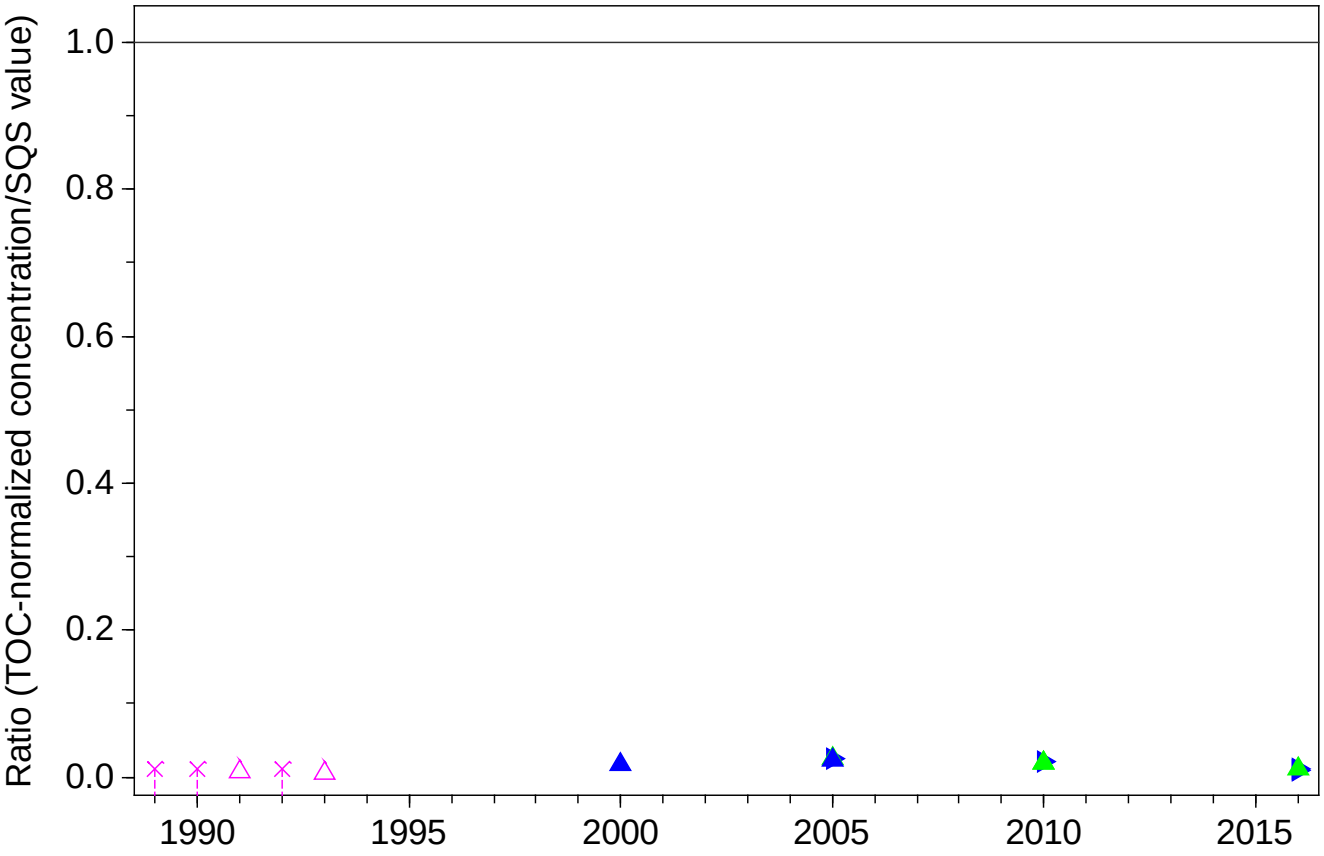
SQS quotient, Anthracene, Station 29



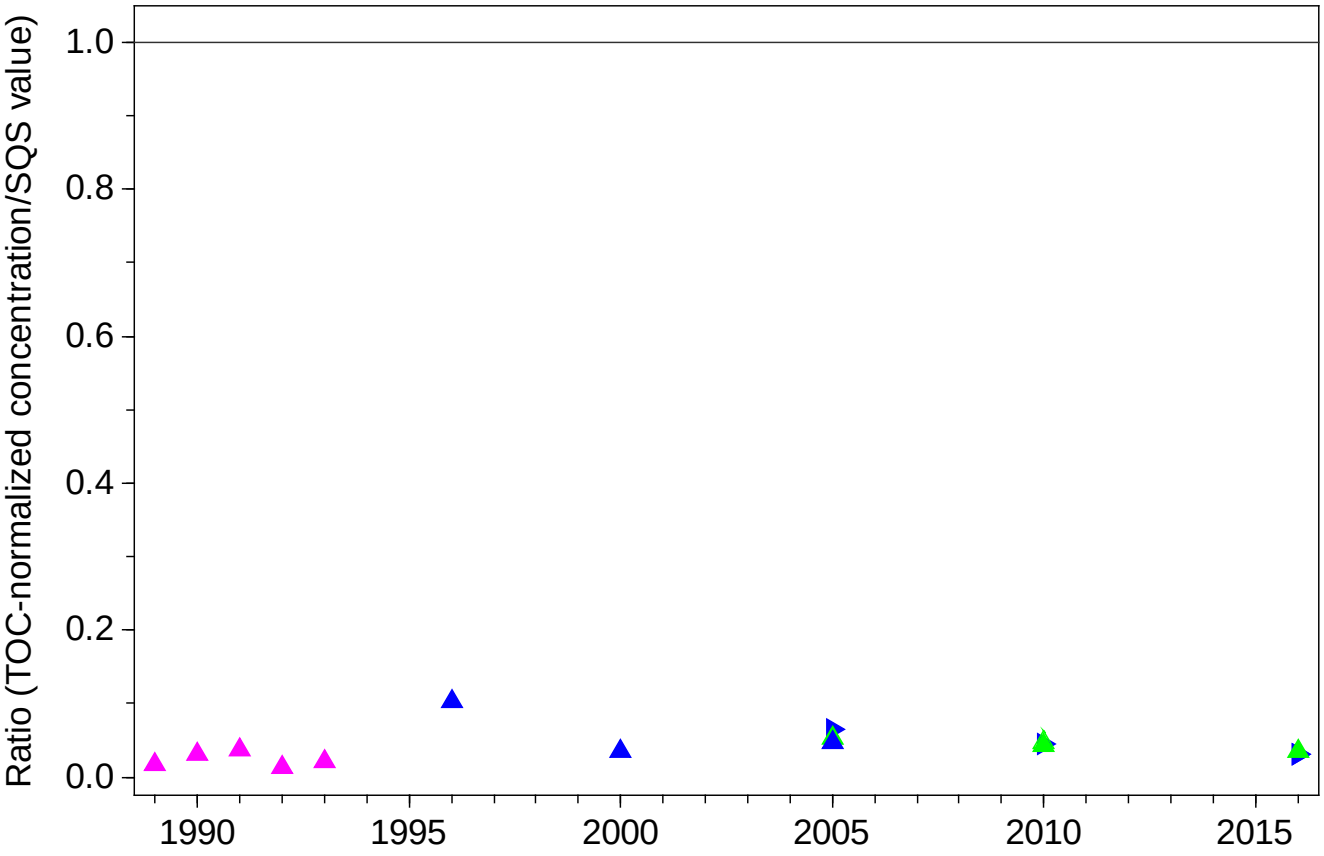
SQS quotient, Fluorene, Station 29



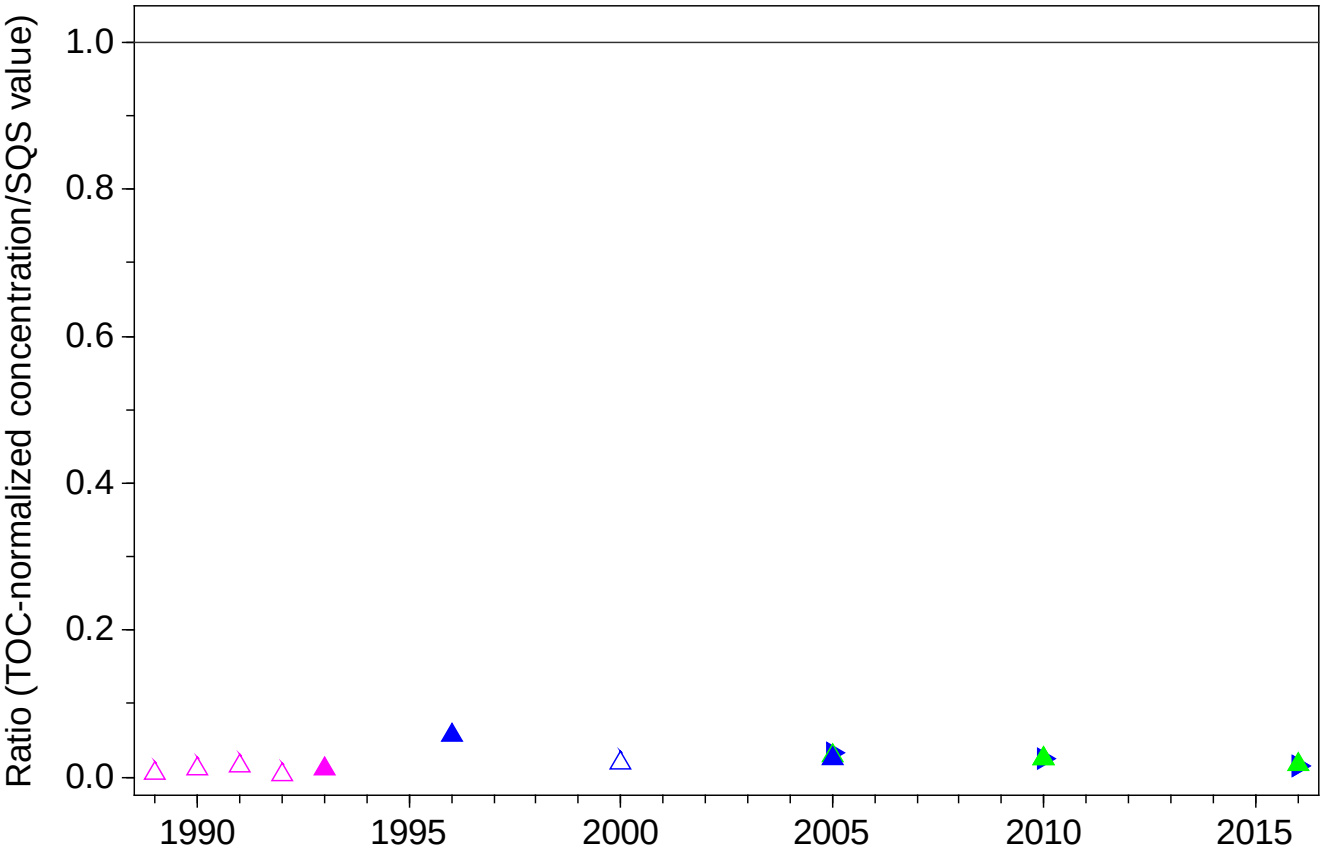
SQS quotient, Naphthalene, Station 29



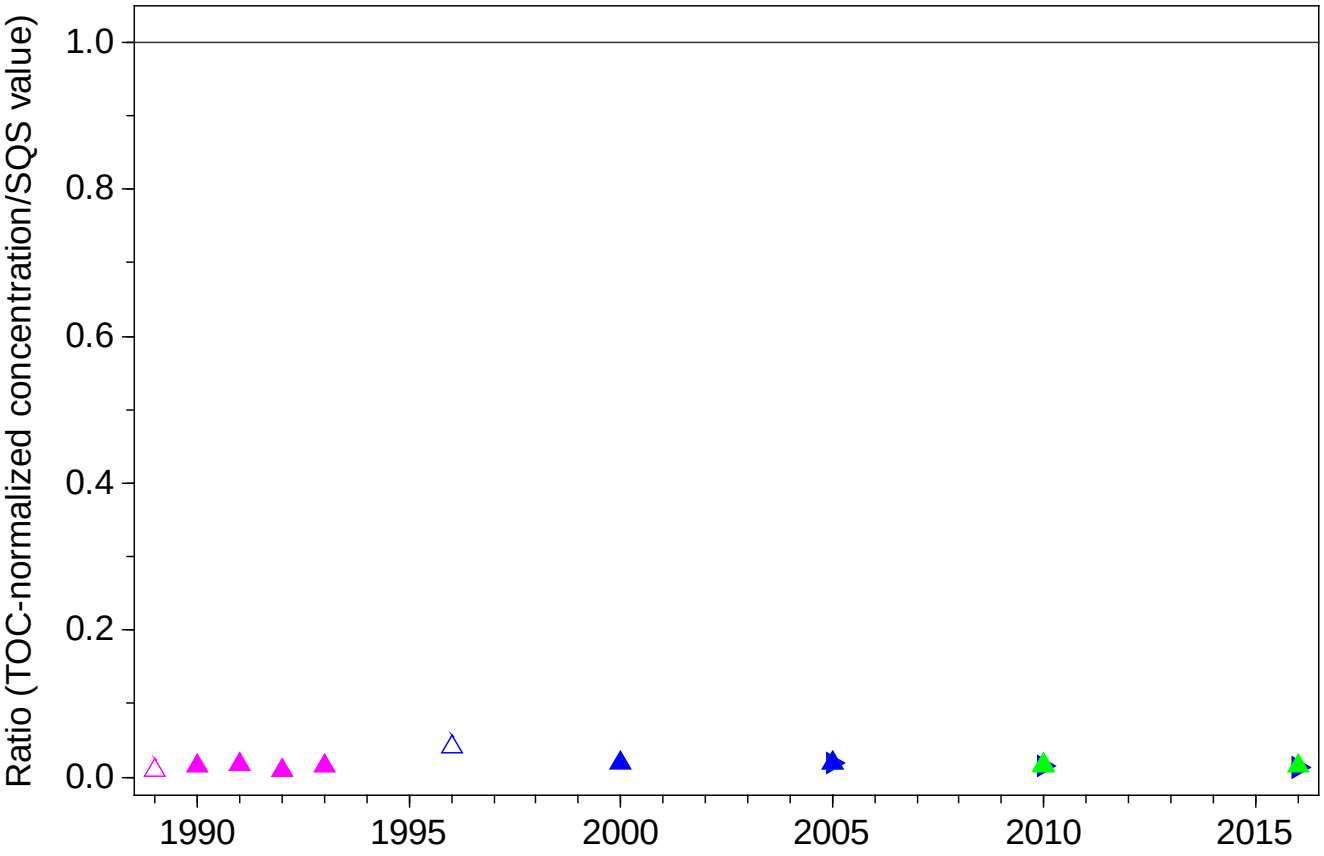
SQS quotient, Phenanthrene, Station 29



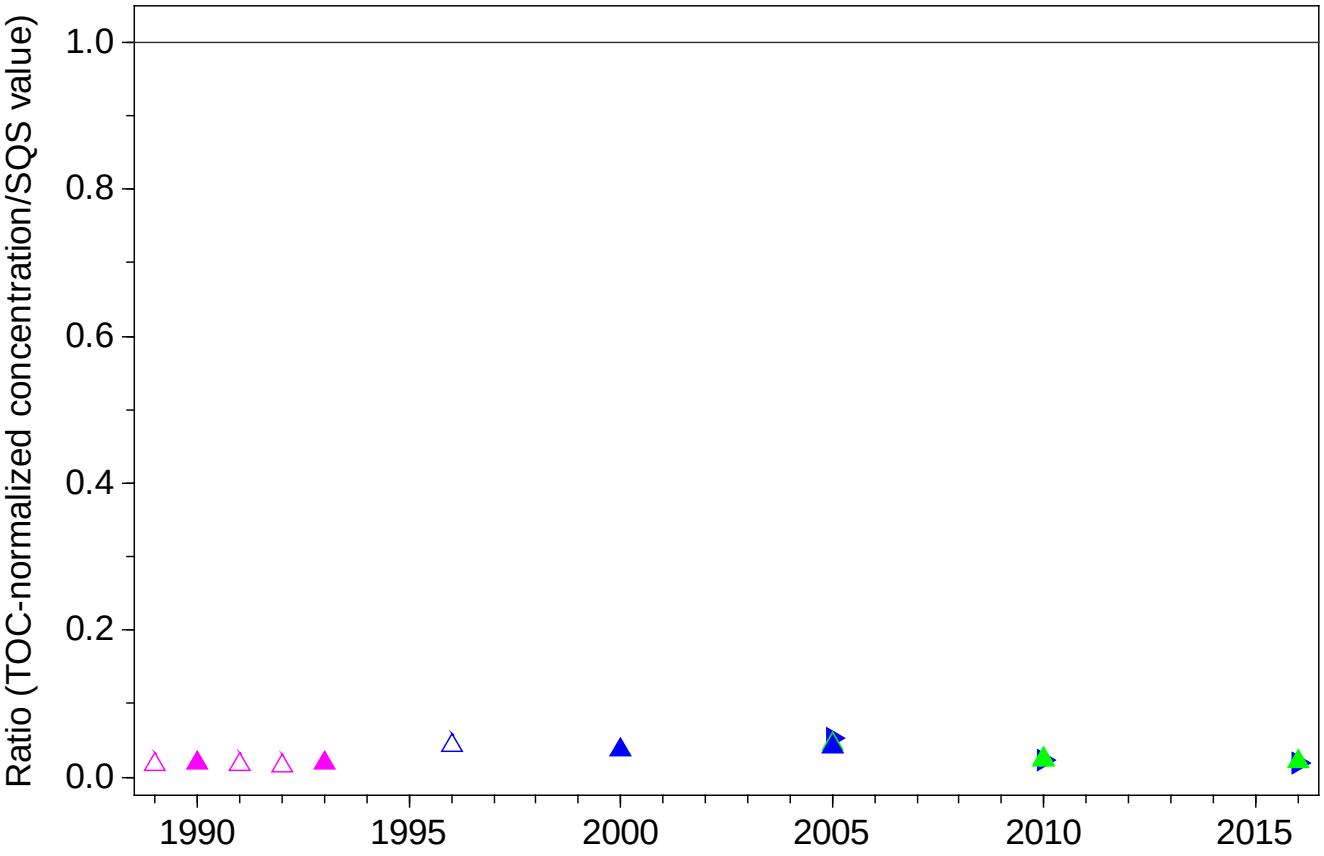
SQS quotient, Total LPAH, Station 29



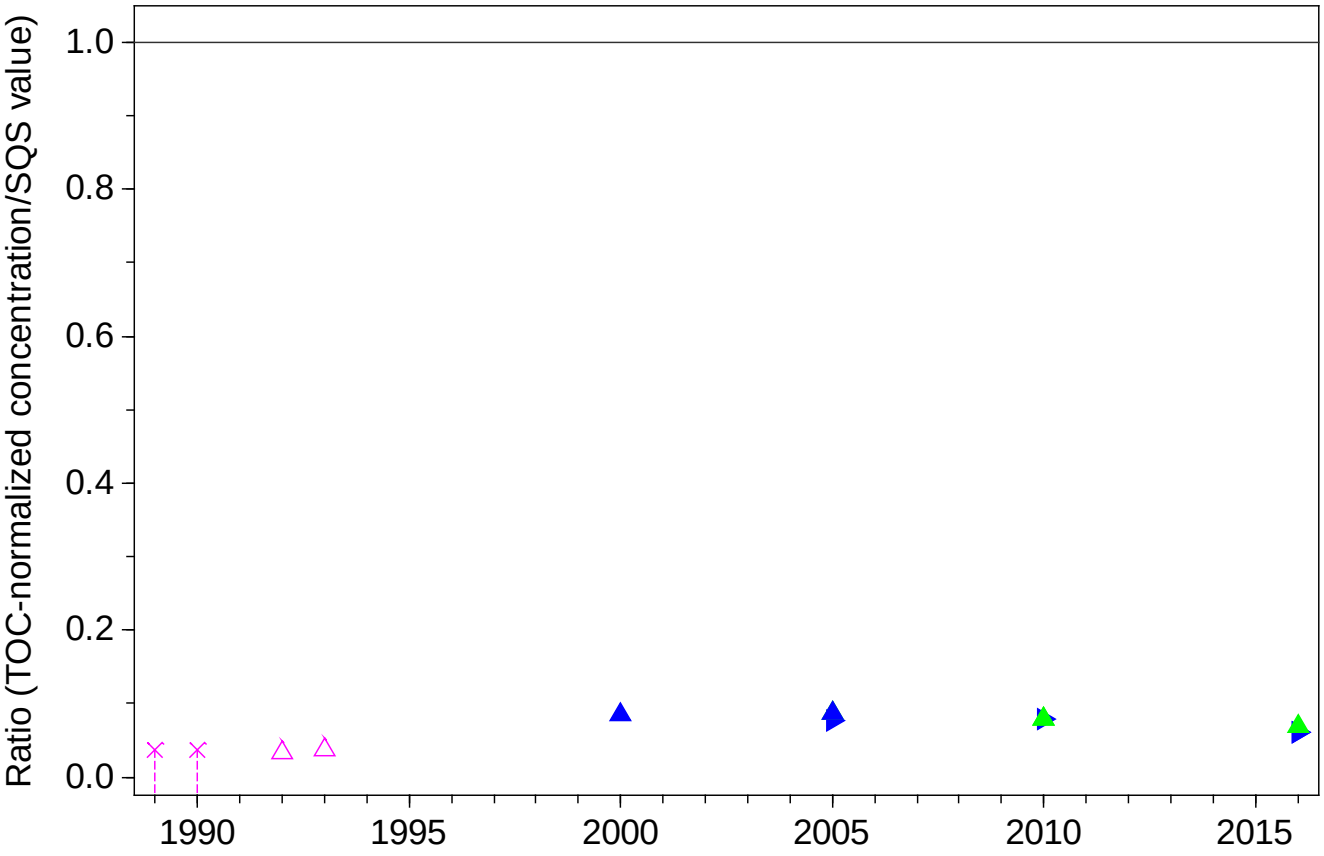
SQS quotient, Benzo(a)anthracene, Station 29



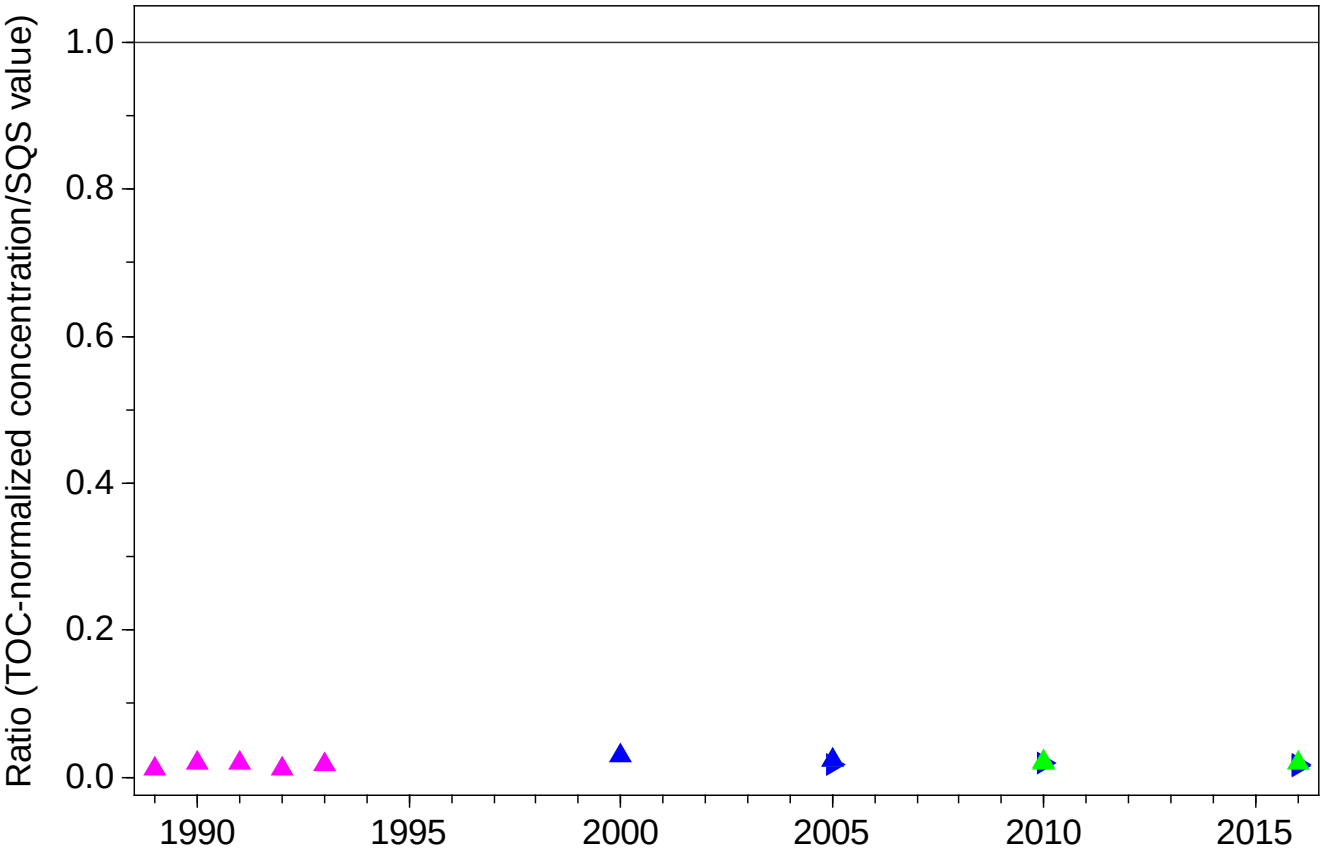
SQS quotient, Benzo(a)pyrene, Station 29



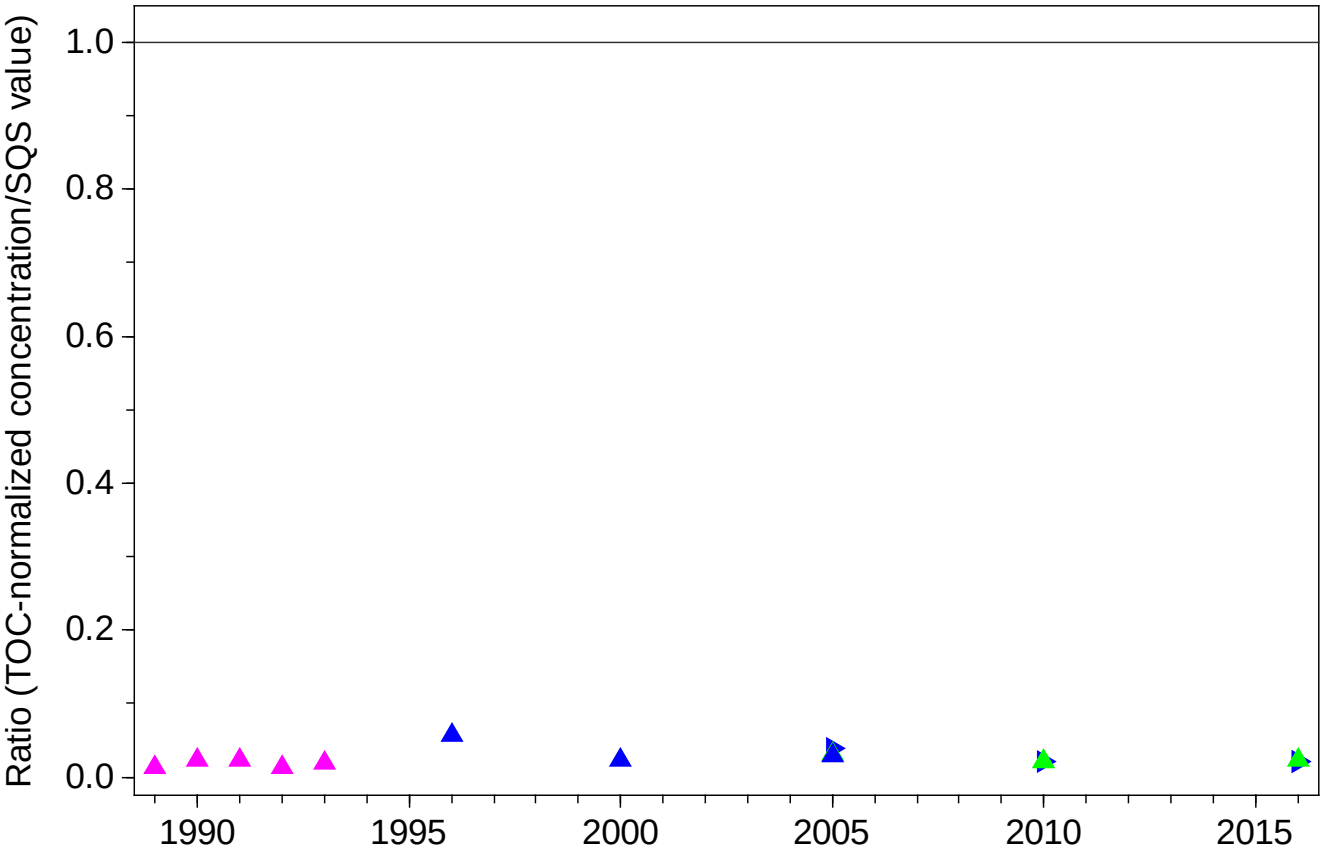
SQS quotient, Benzo(g,h,i)perylene, Station 29



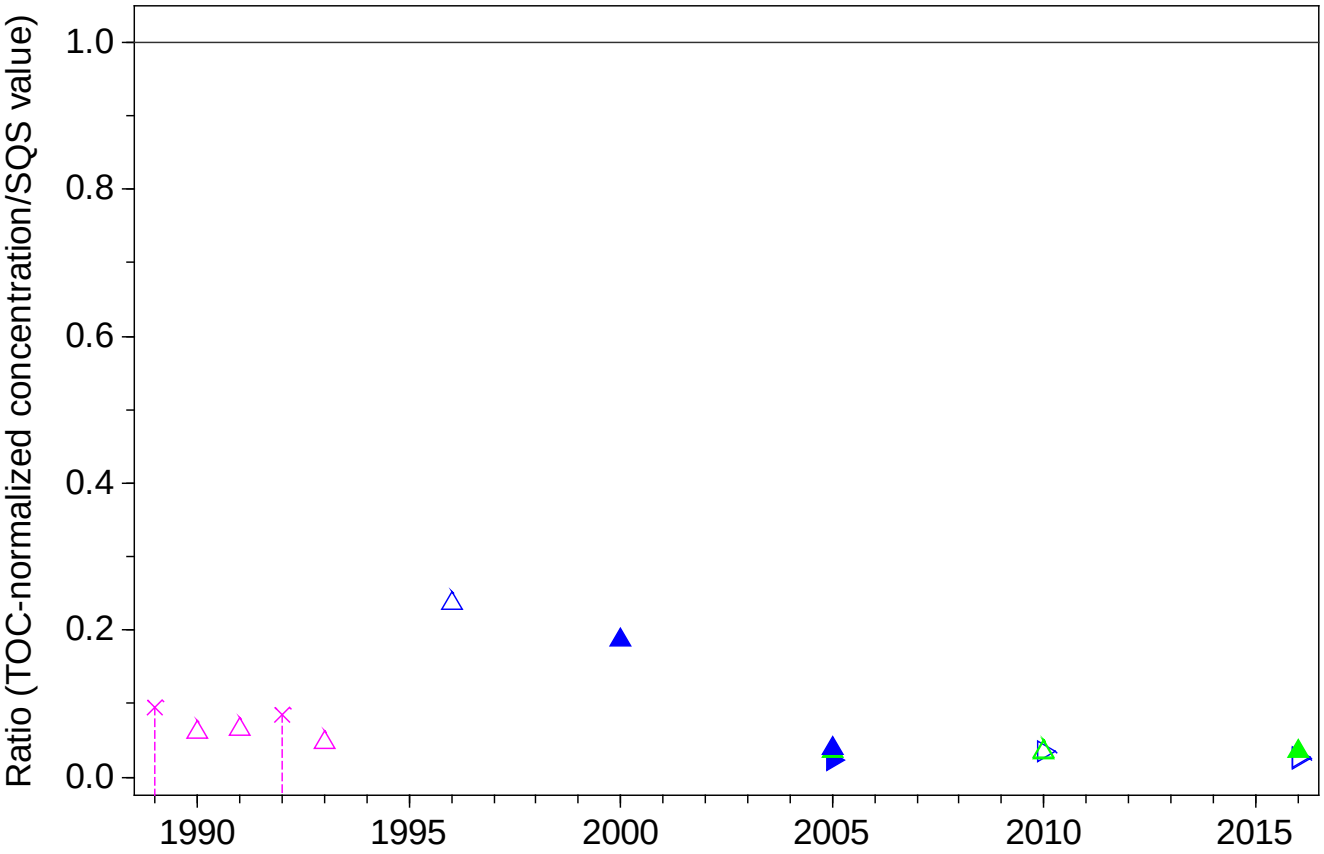
SQS quotient, Total Benzofluoranthenes, Station 29



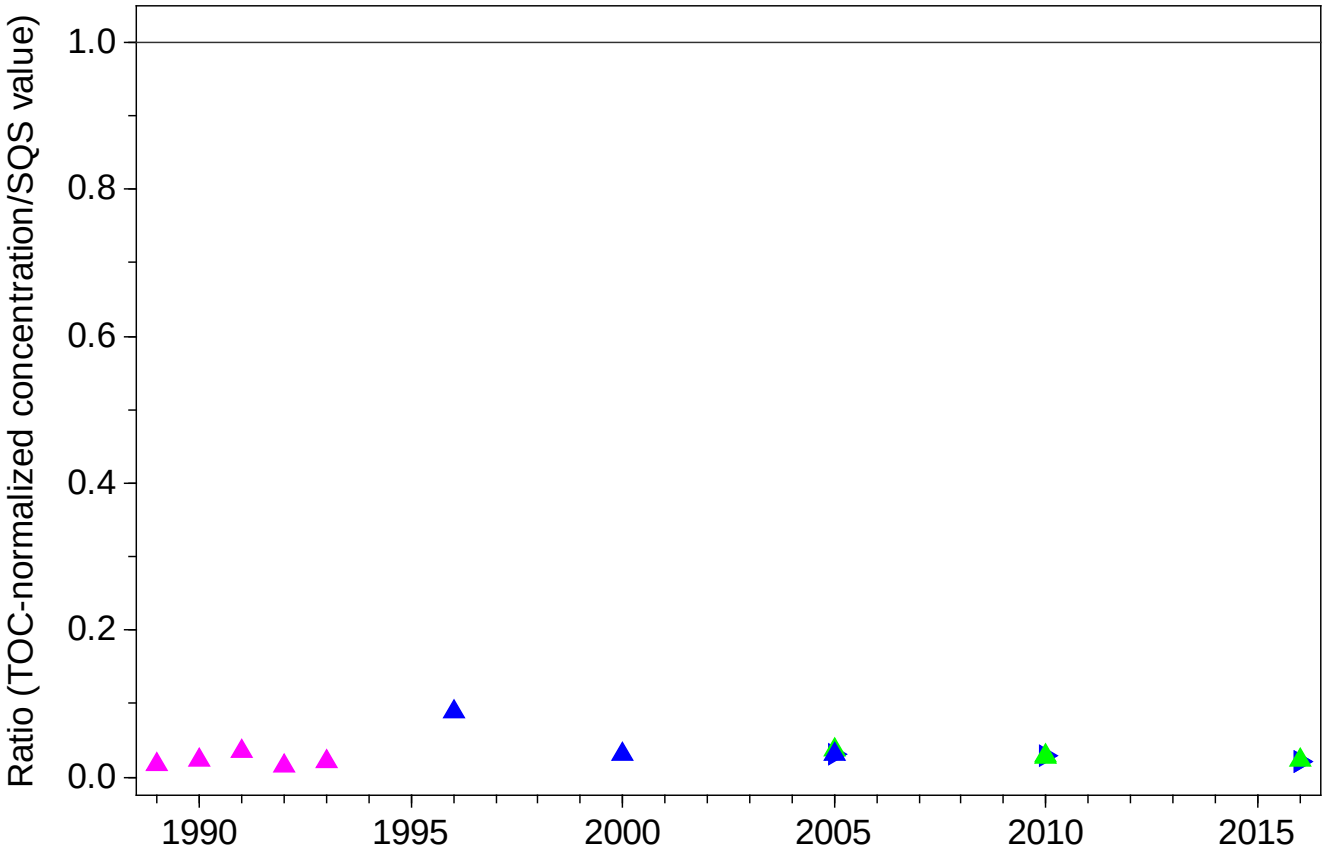
SQS quotient, Chrysene, Station 29



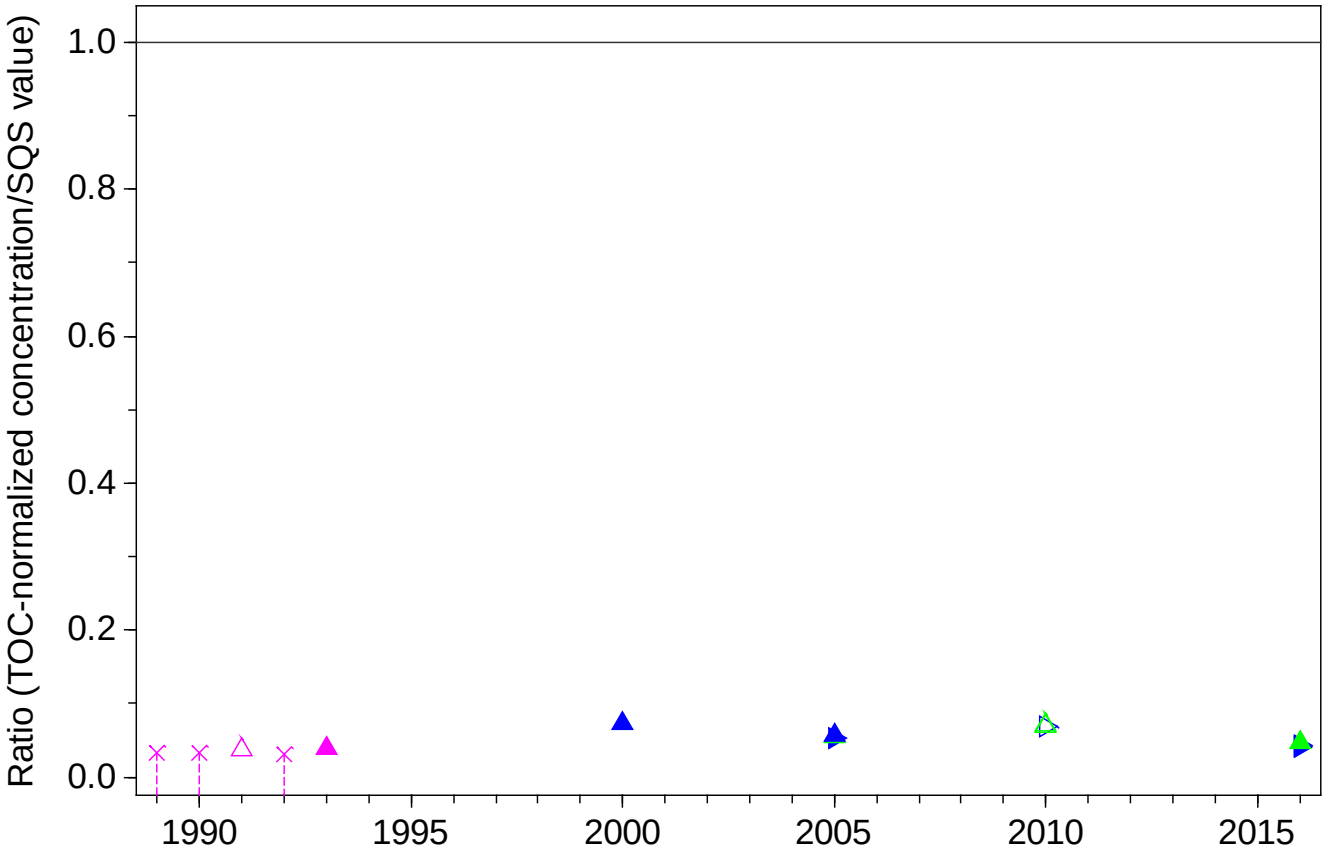
SQS quotient, Dibenzo(a,h)anthracene, Station 29



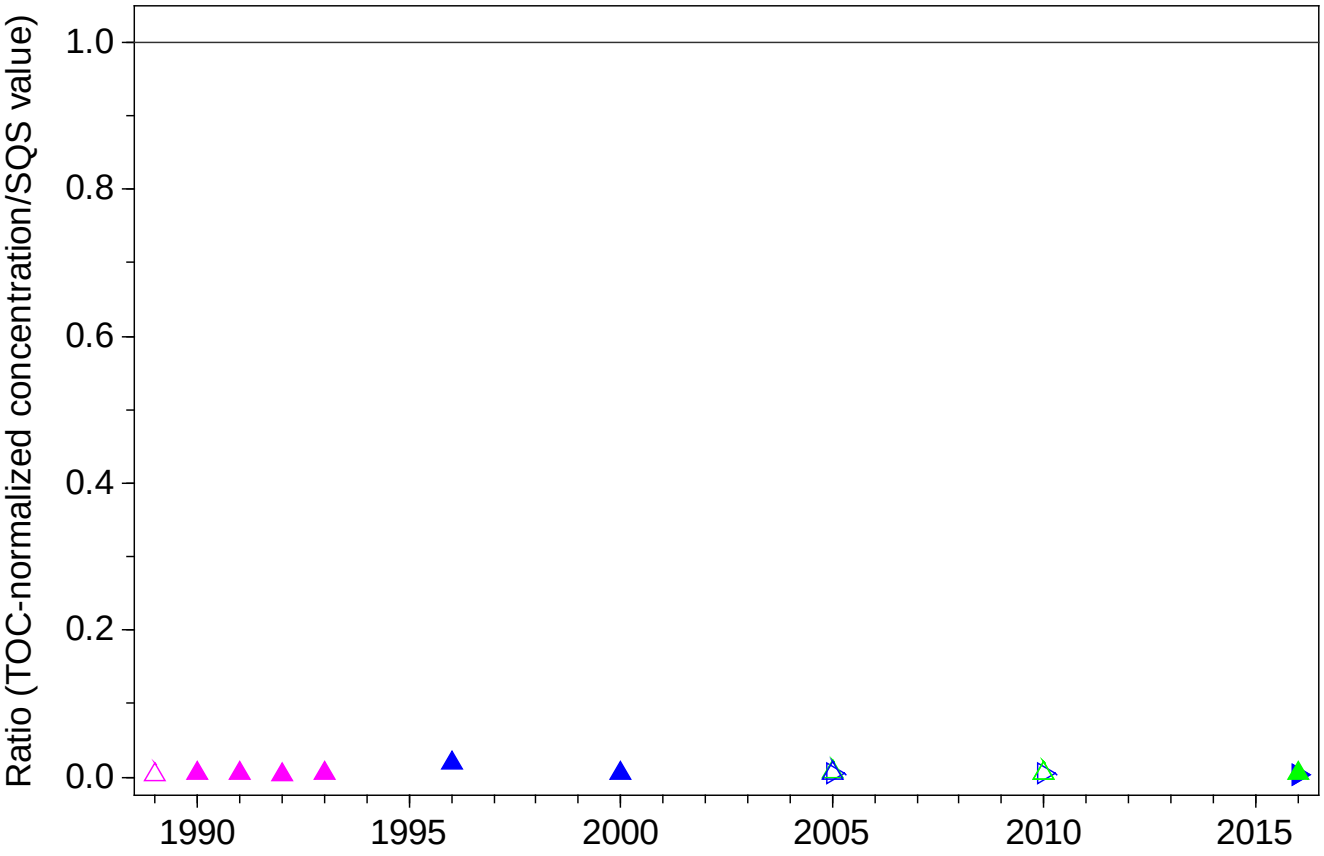
SQS quotient, Fluoranthene, Station 29



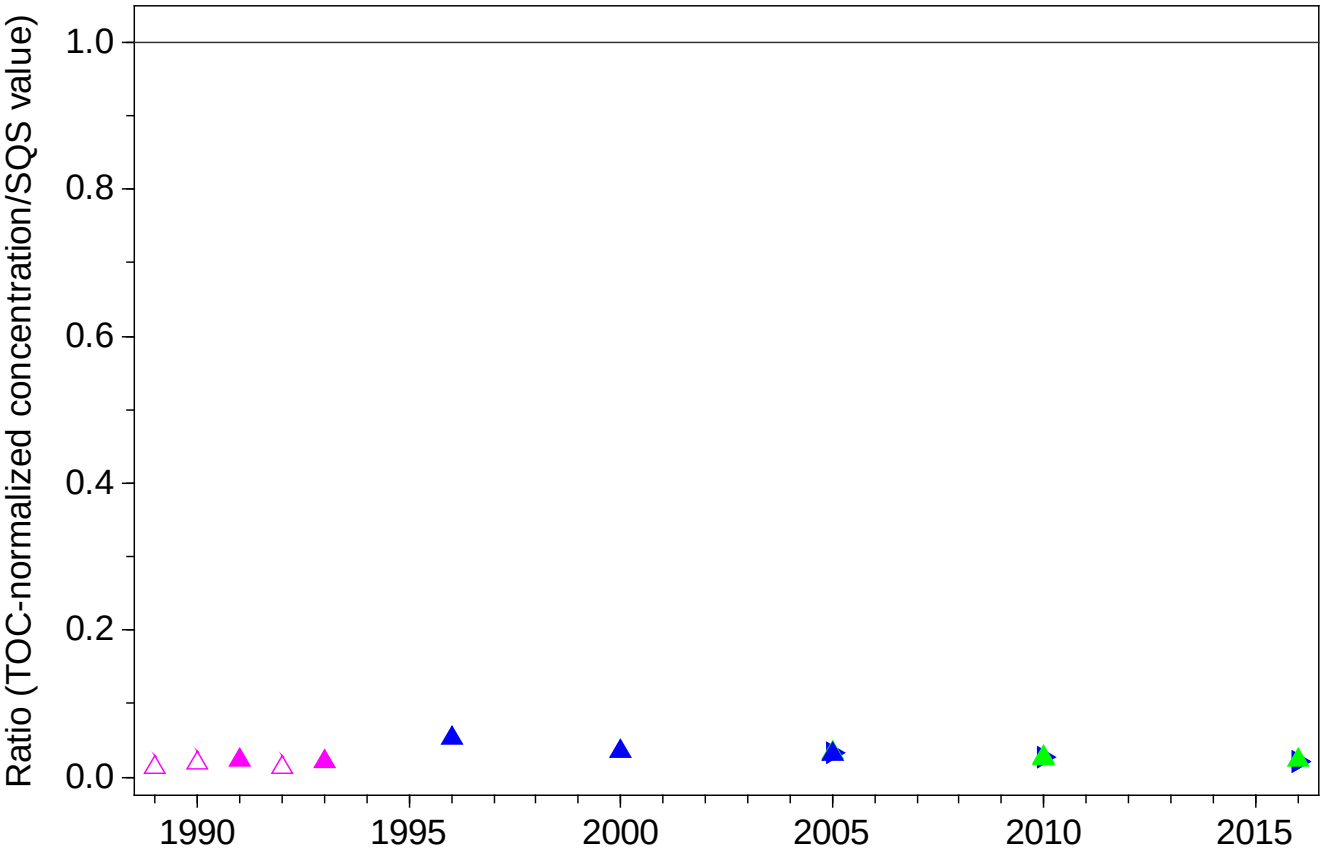
SQS quotient, Indeno(1,2,3-c,d)pyrene, Station 29



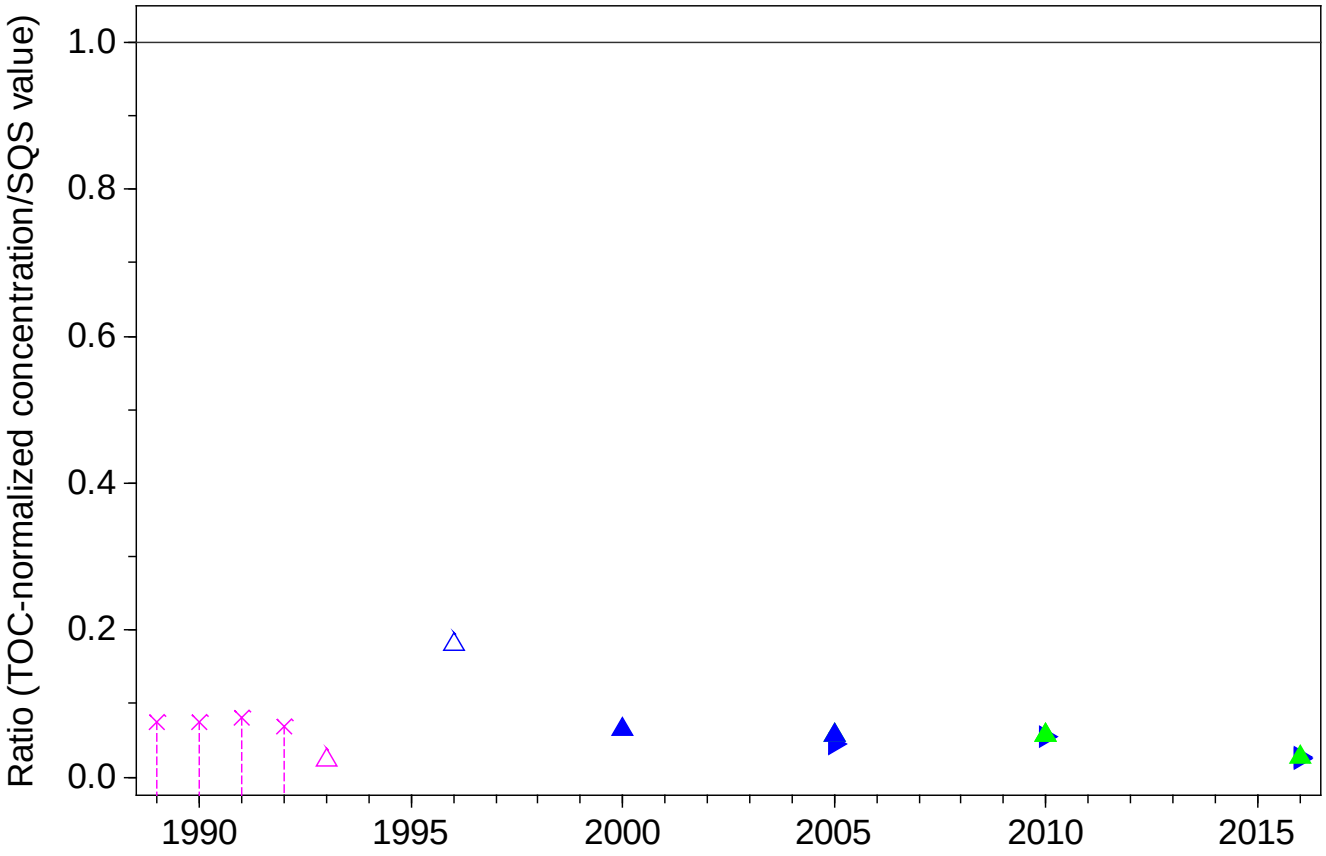
SQS quotient, Pyrene, Station 29



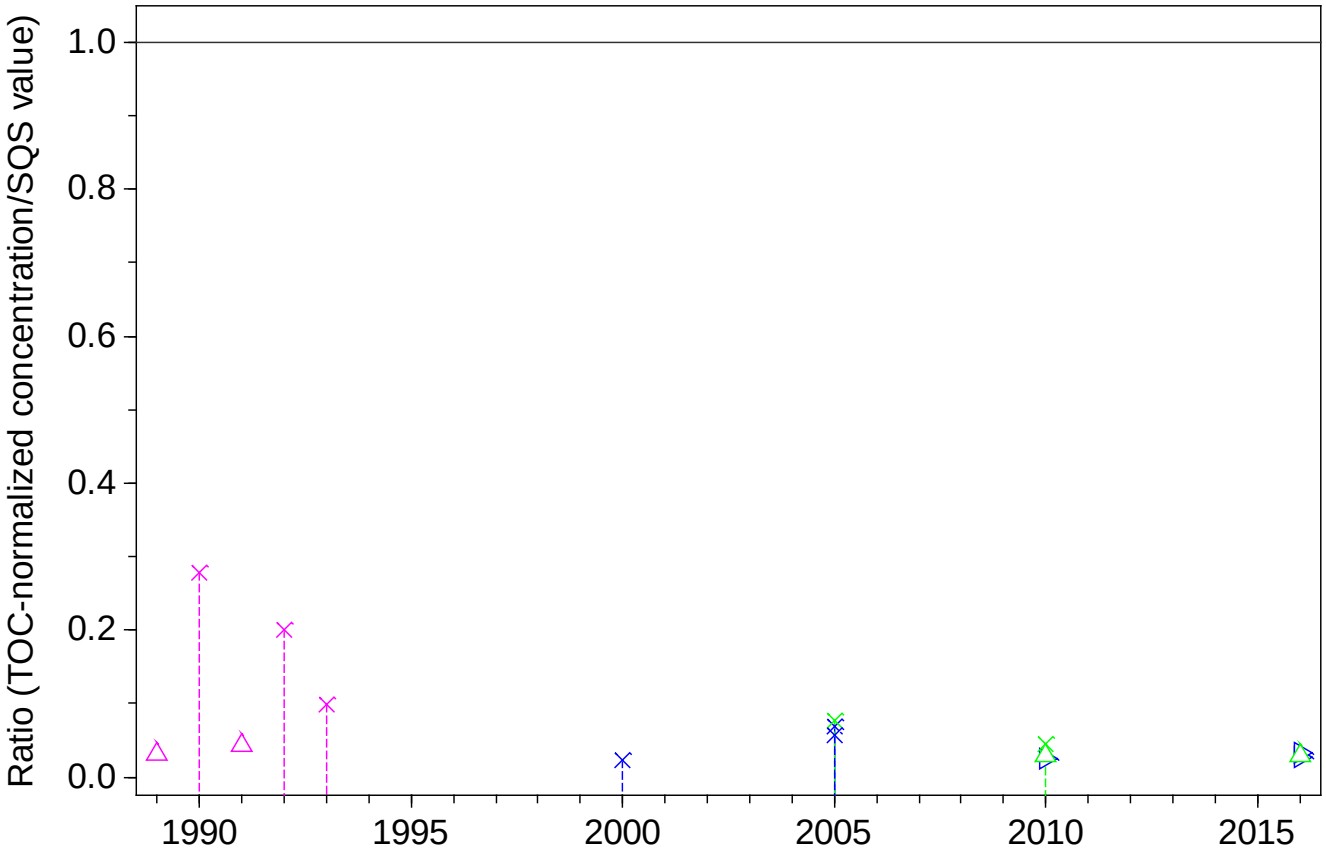
SQS quotient, Total HPAH, Station 29



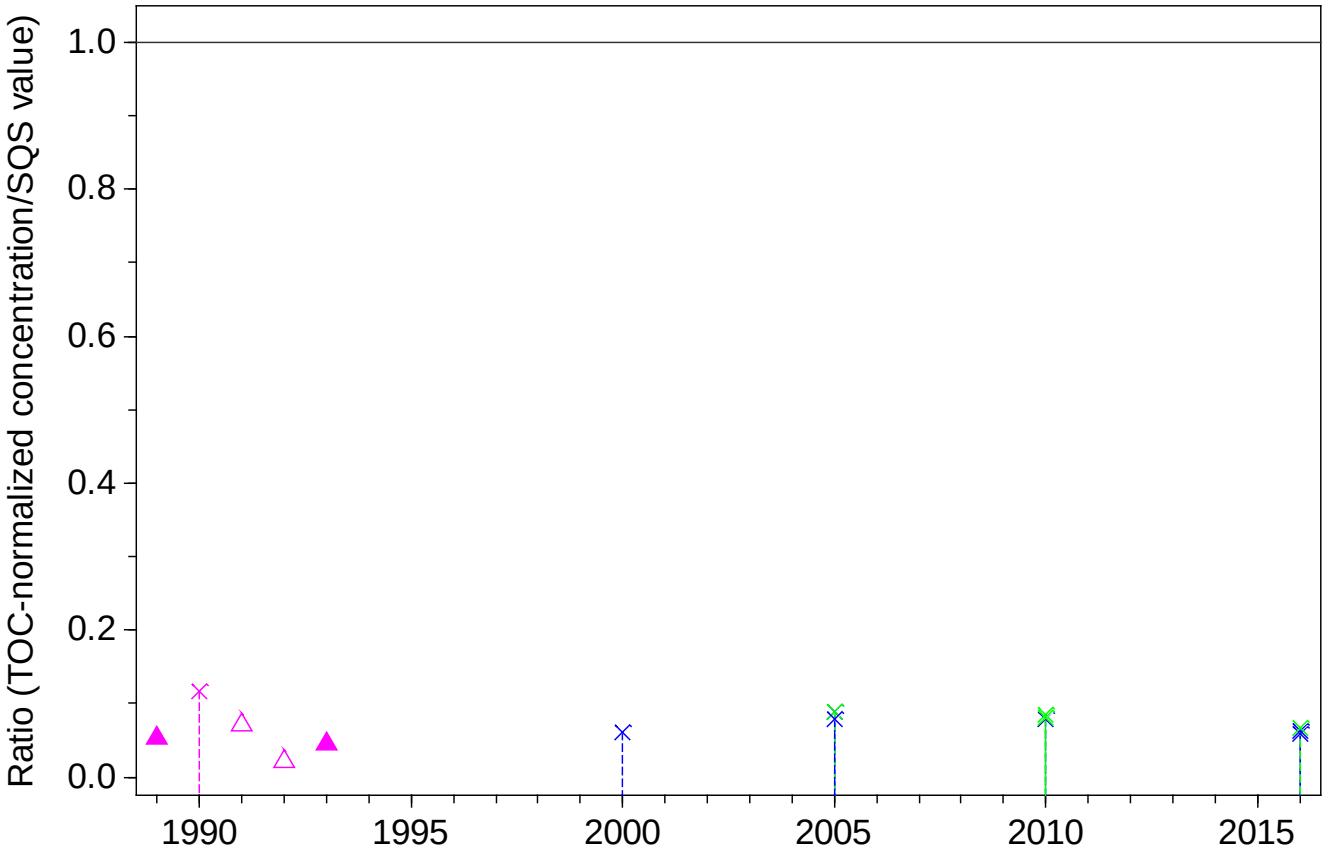
SQS quotient, Dibenzofuran, Station 29



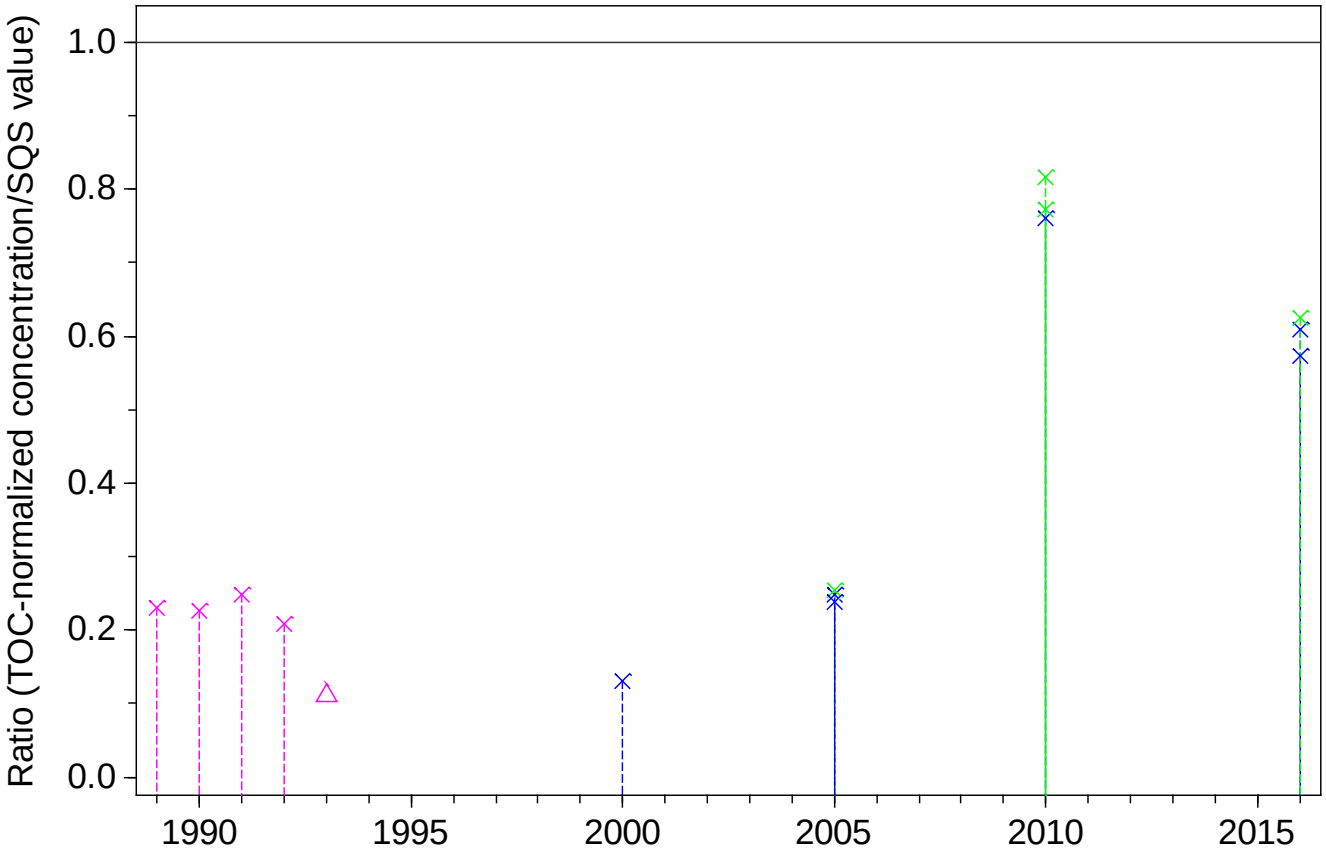
SQS quotient, Total Aroclors, Station 29



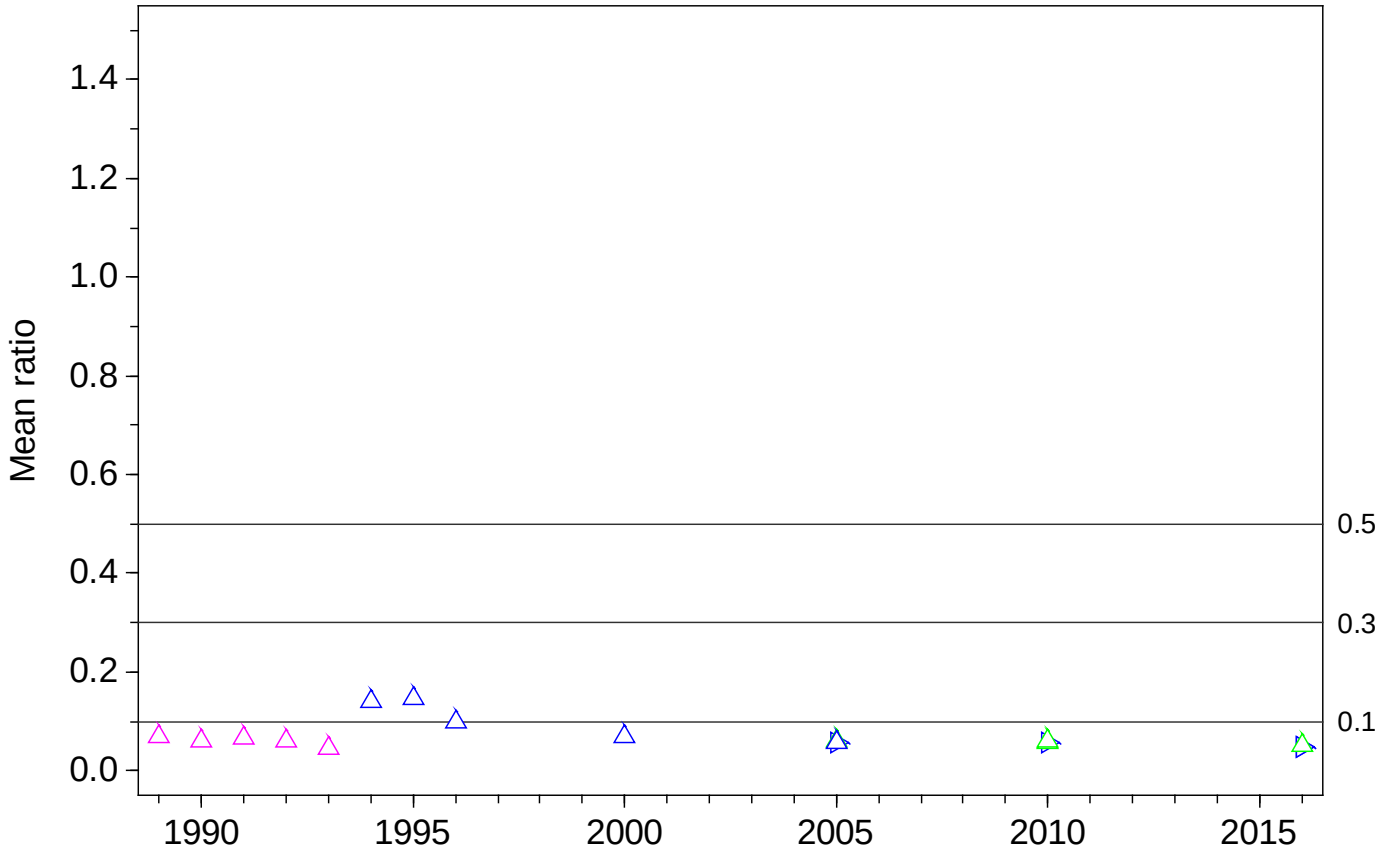
SQS quotient, Bis(2-ethylhexyl)phthalate, Station 29



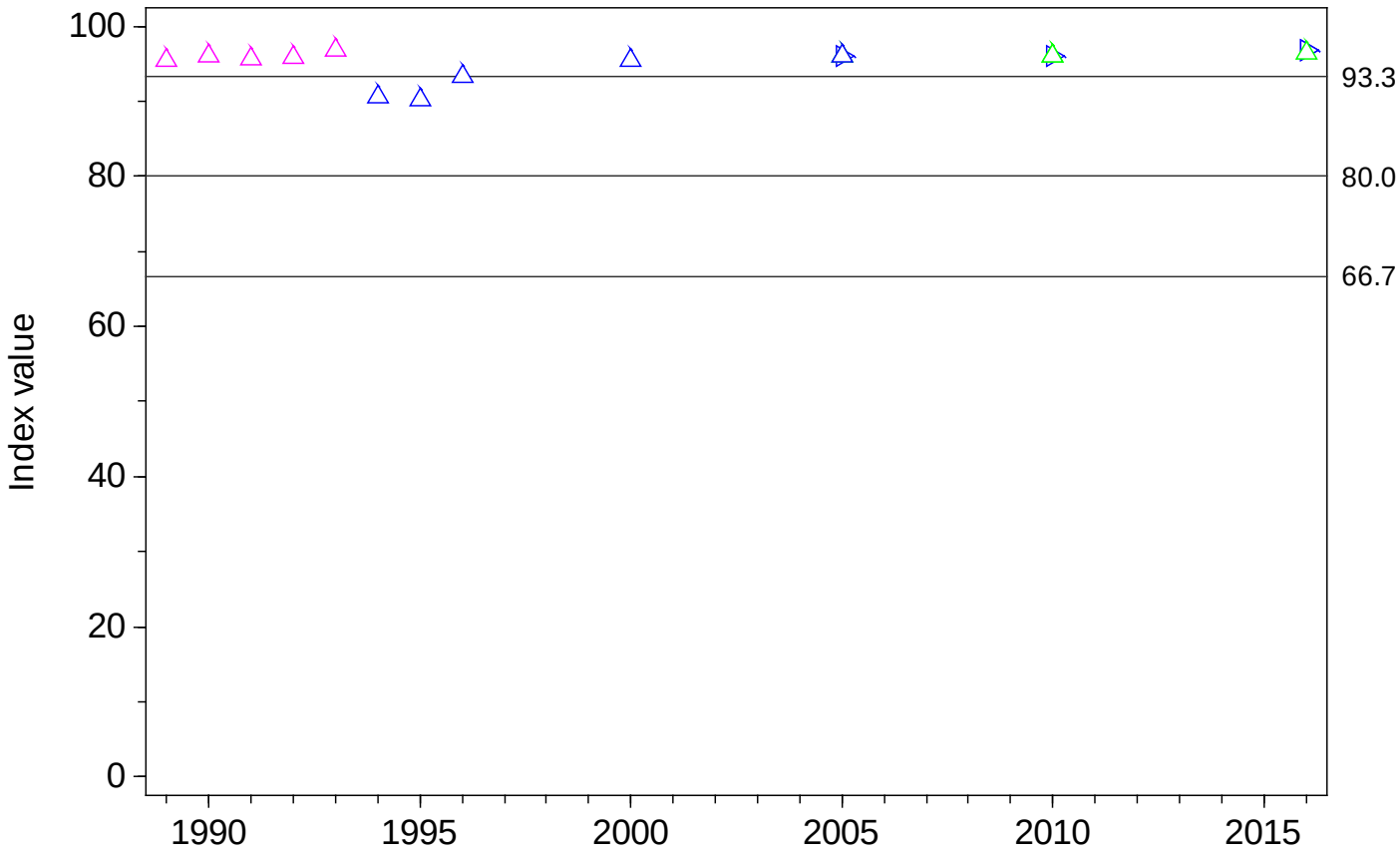
SQS quotient, Butylbenzylphthalate, Station 29



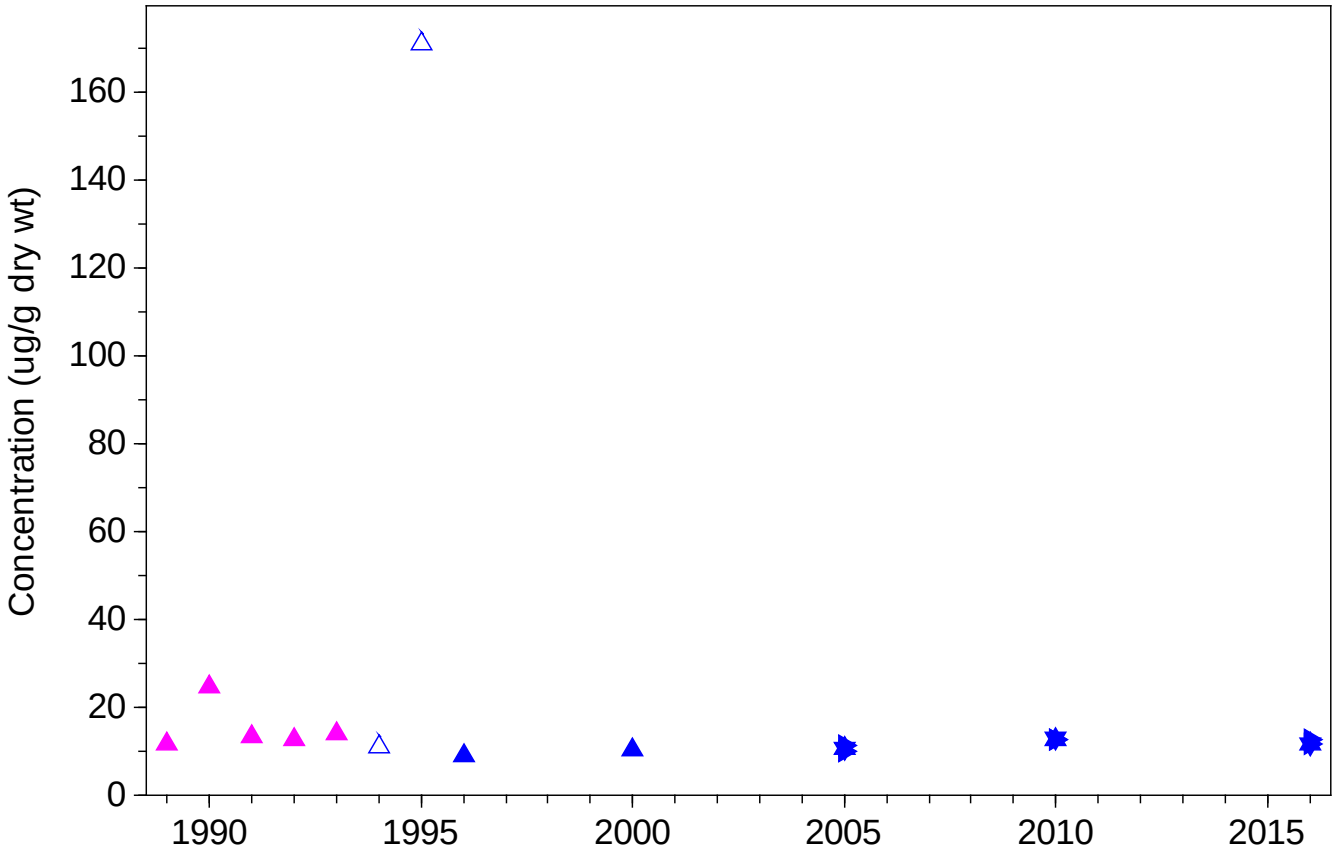
Mean SQS quotient, SCI SQS (no PAH totals), Station 29



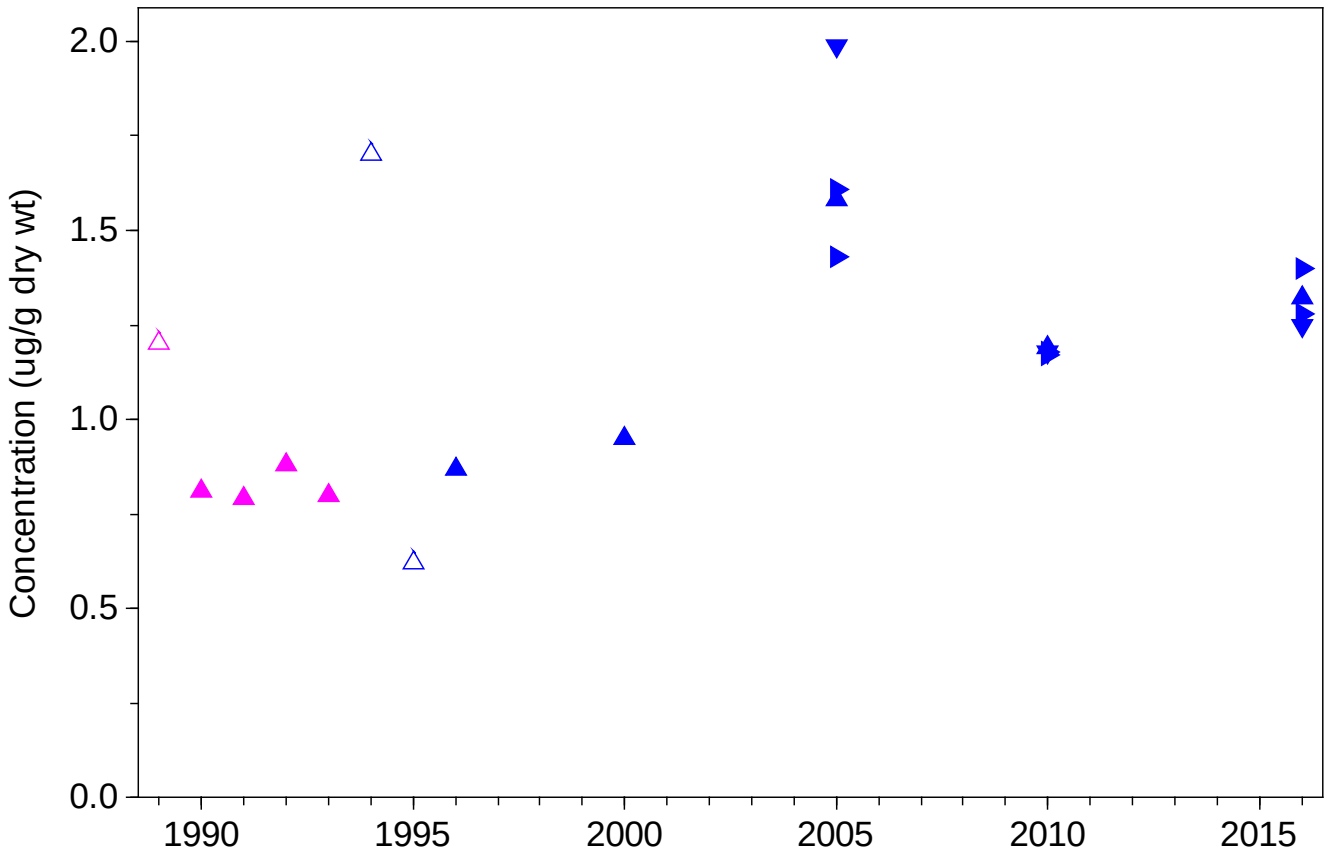
Sediment Chemistry Index, Station 29



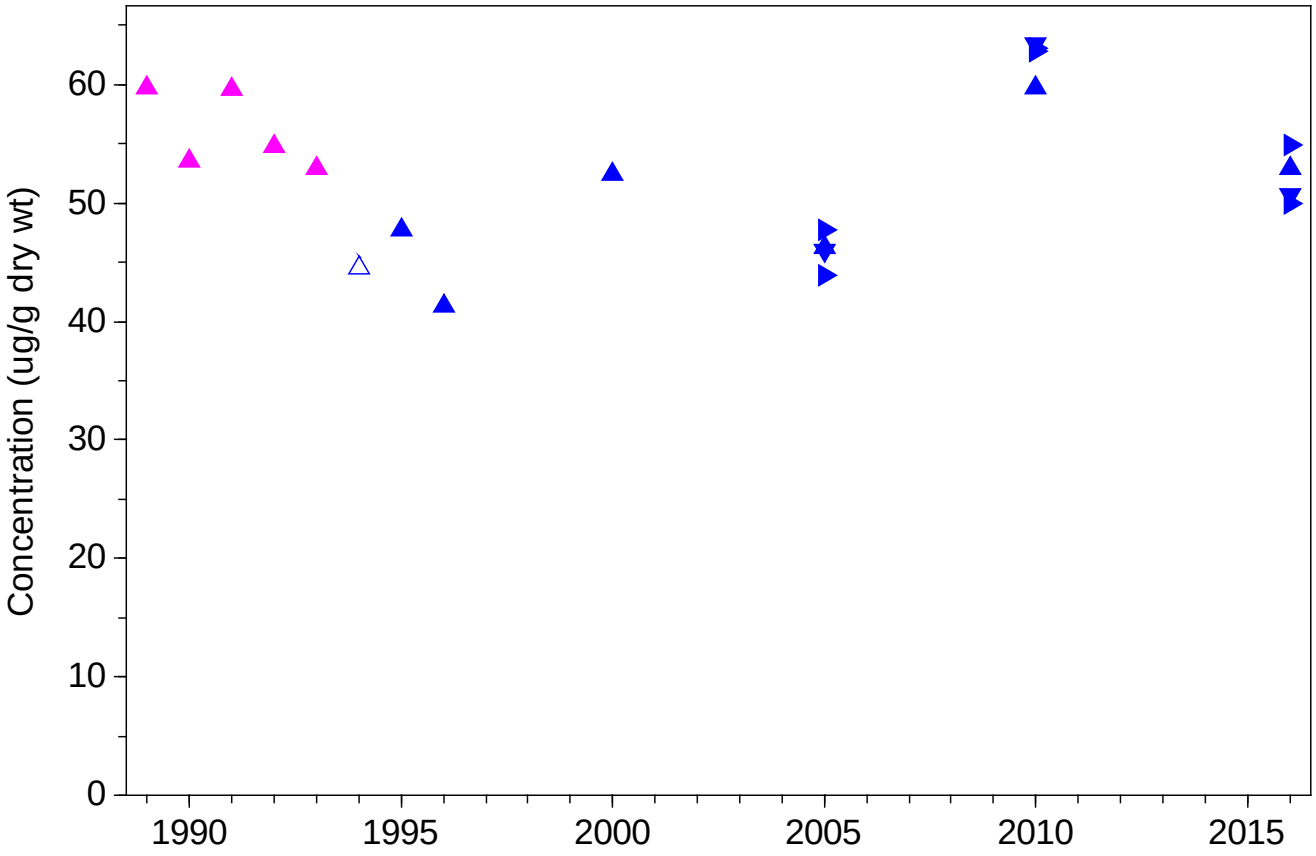
Arsenic, Station 34



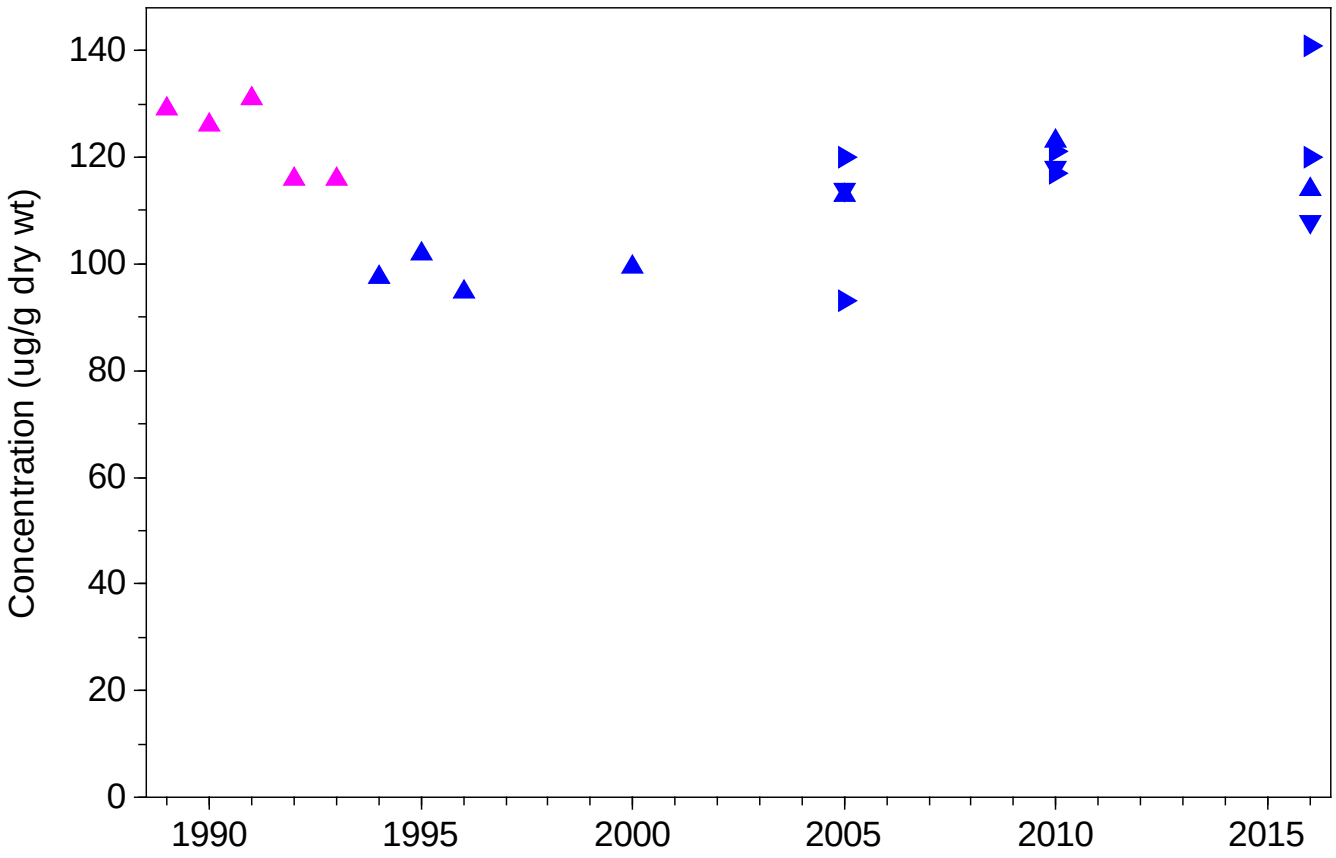
Cadmium, Station 34



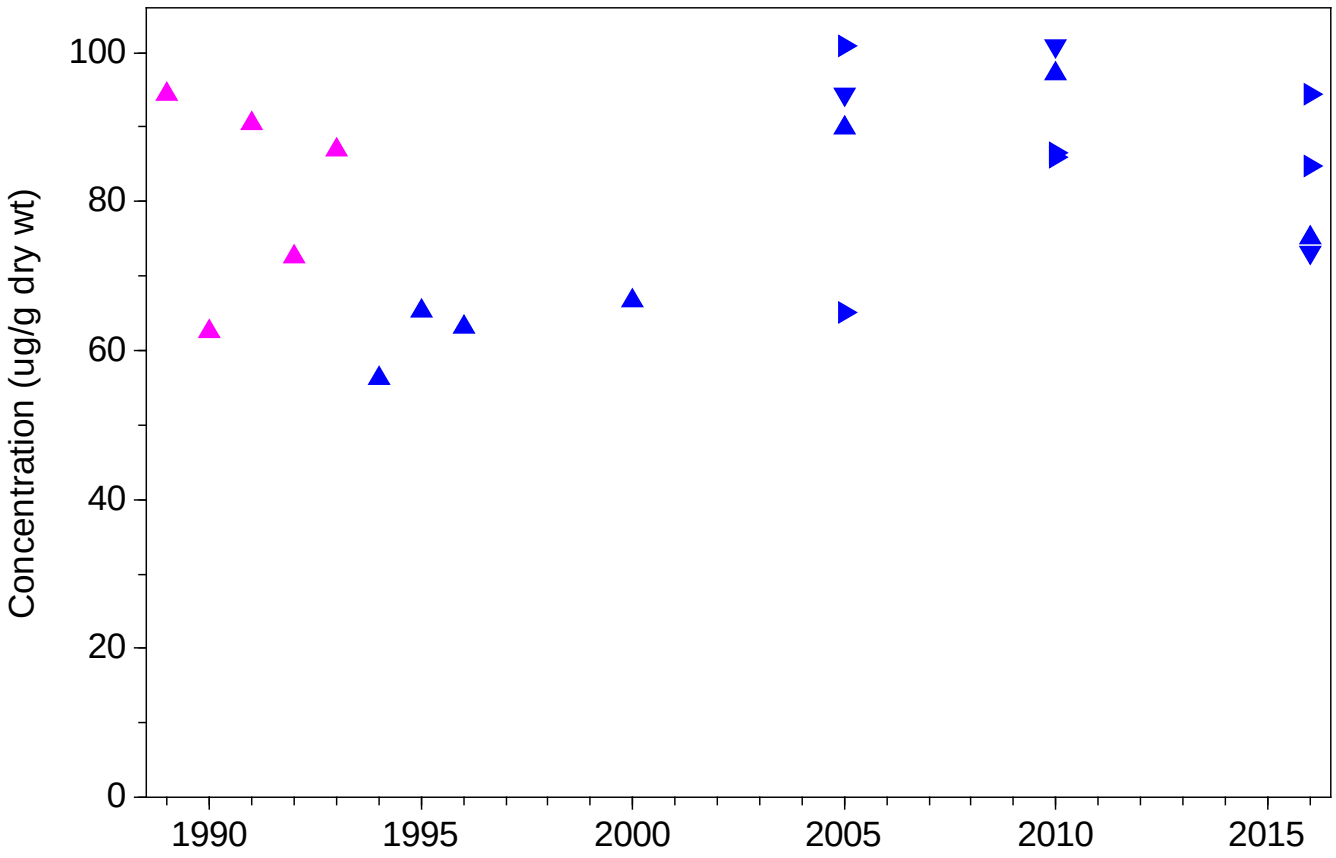
Chromium, Station 34



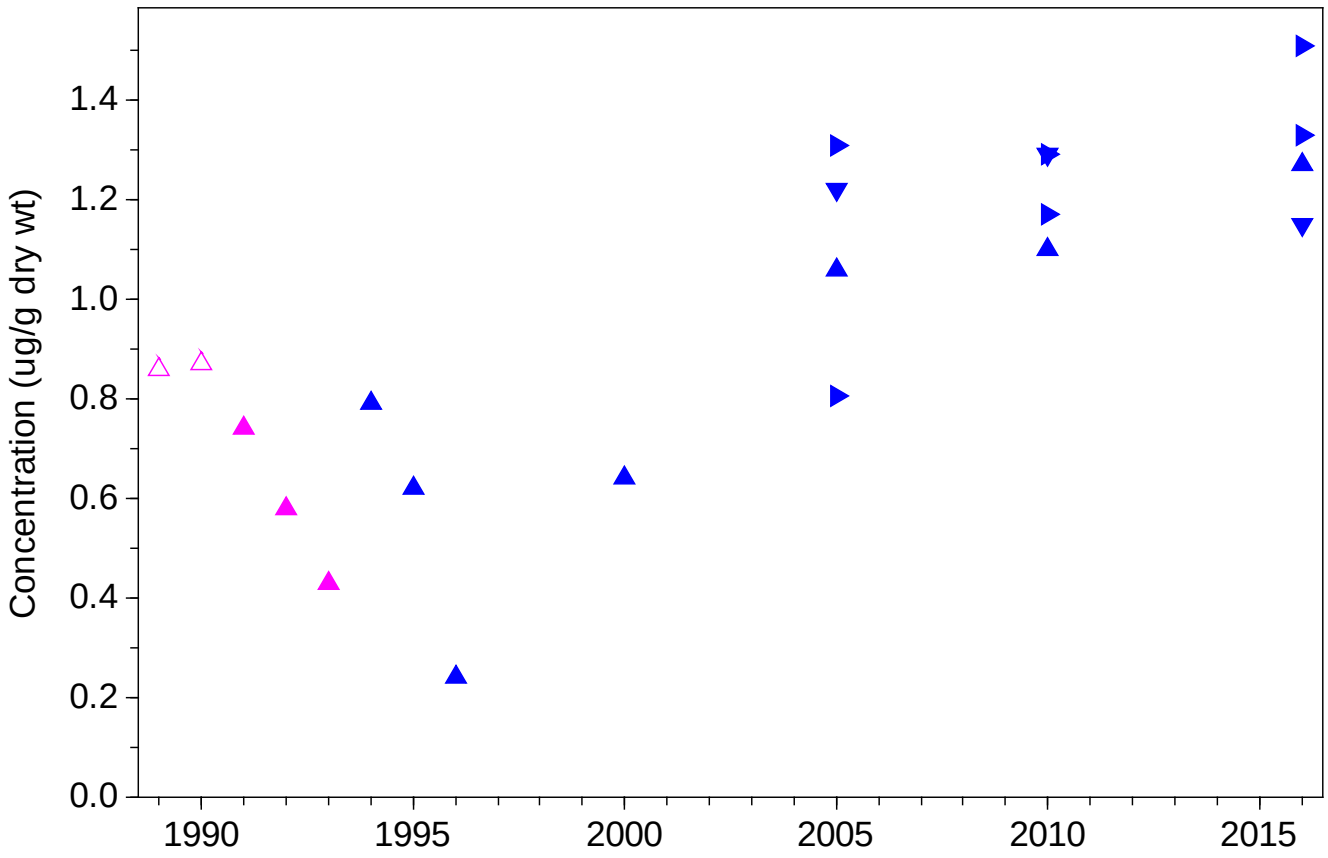
Copper, Station 34



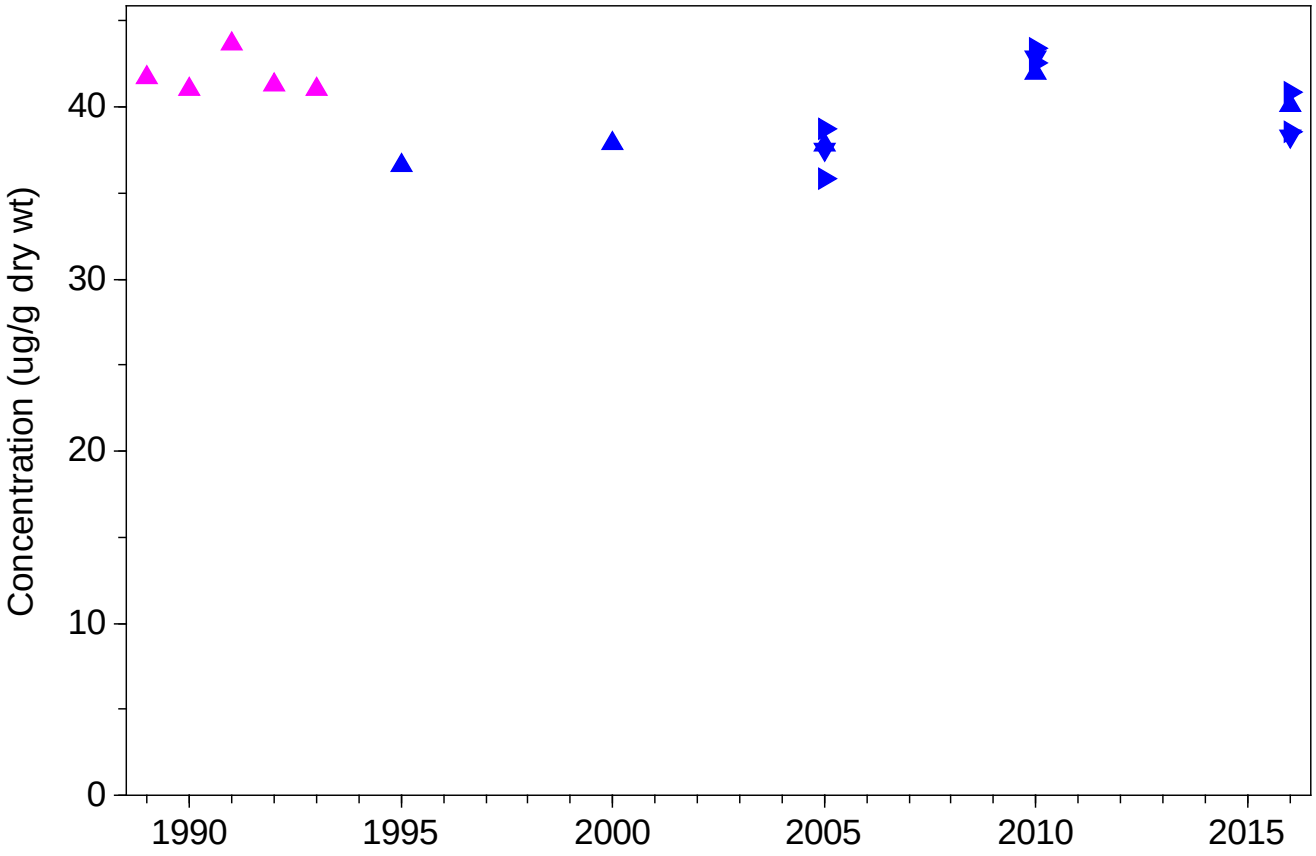
Lead, Station 34



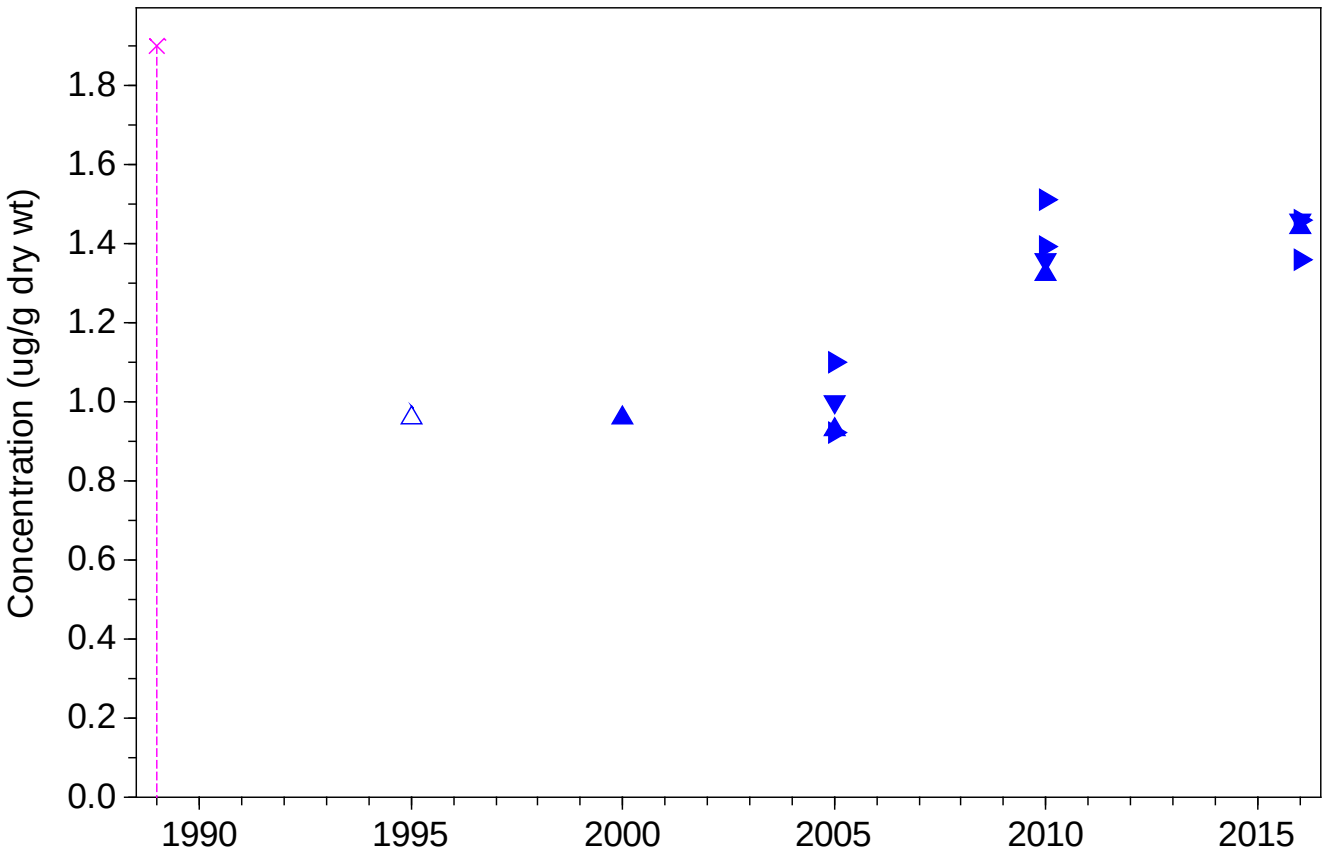
Mercury, Station 34



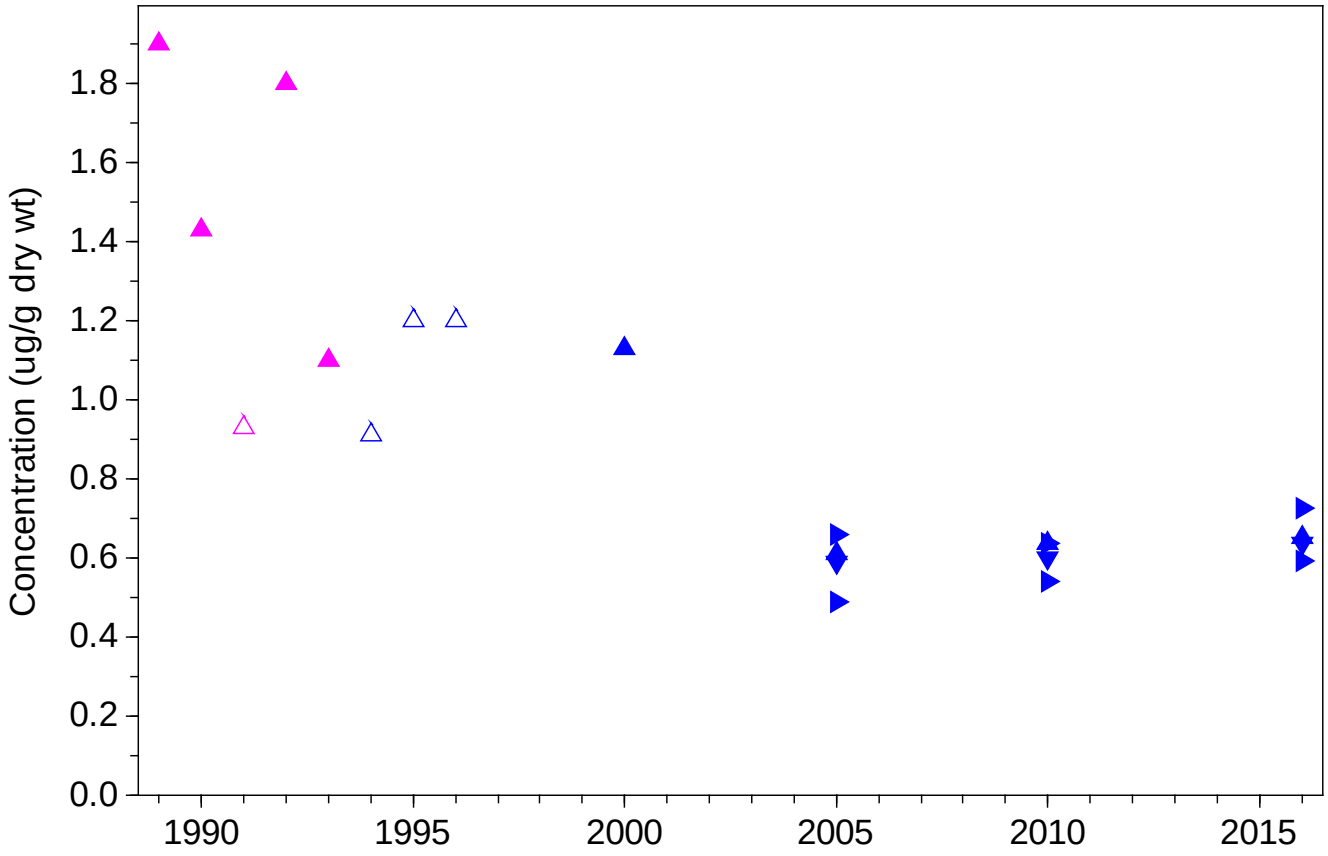
Nickel, Station 34



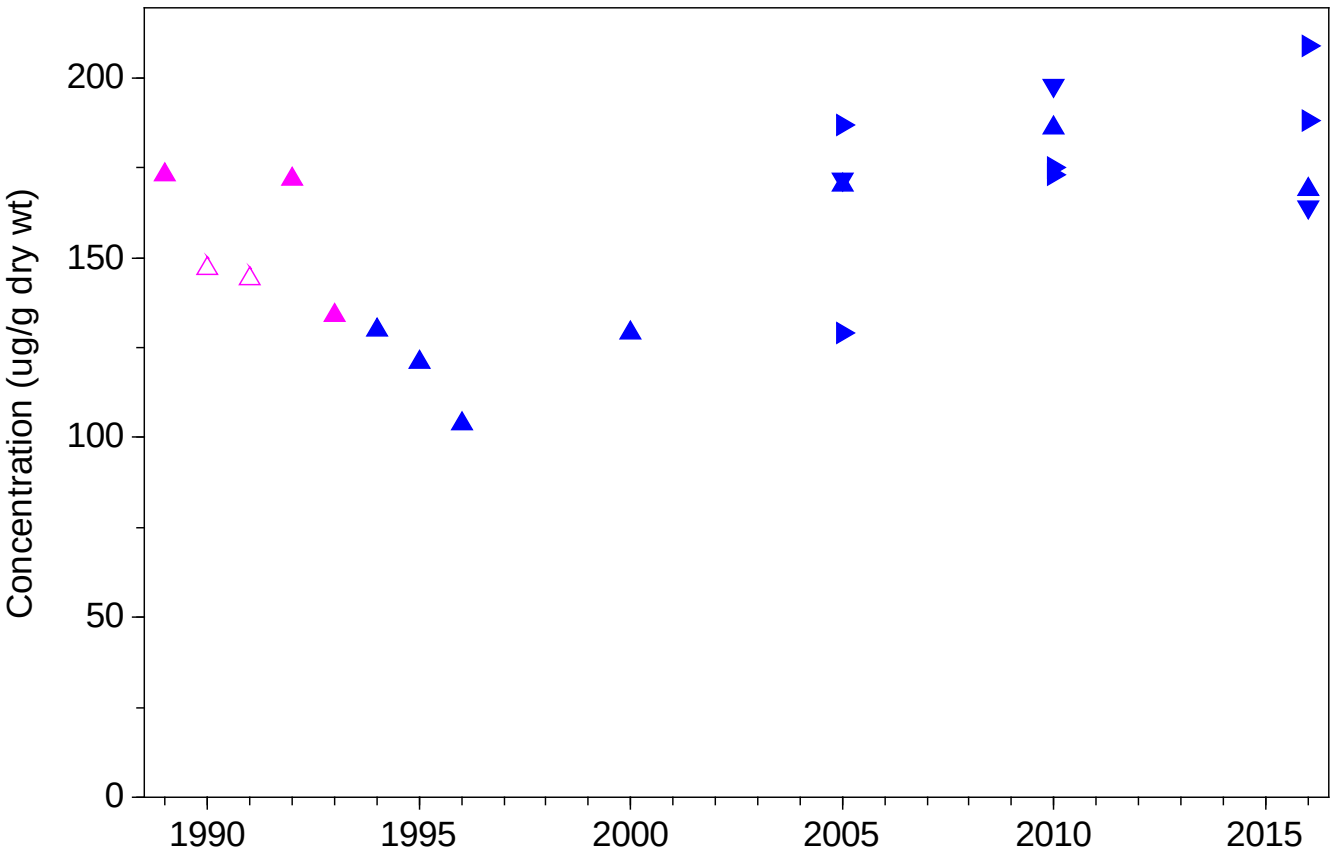
Selenium, Station 34



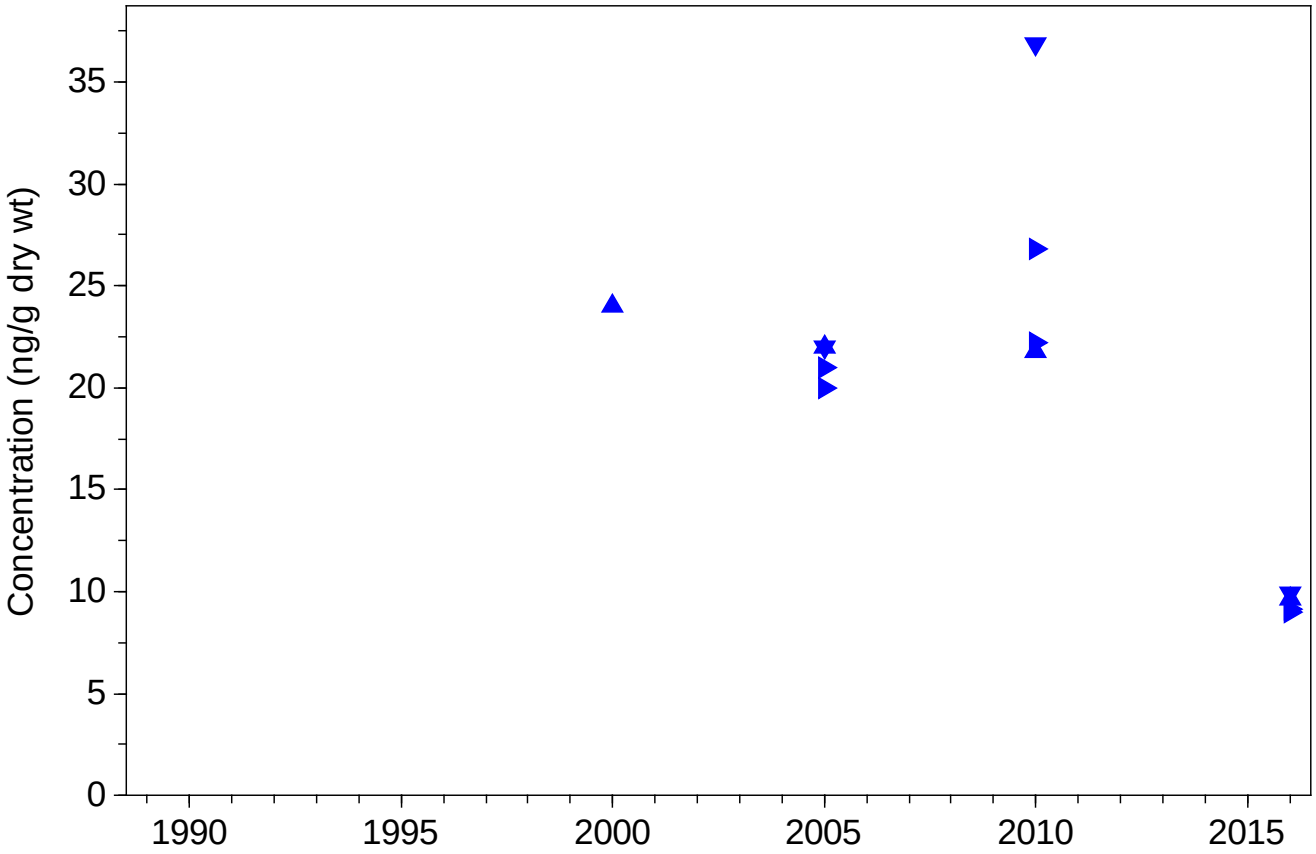
Silver, Station 34



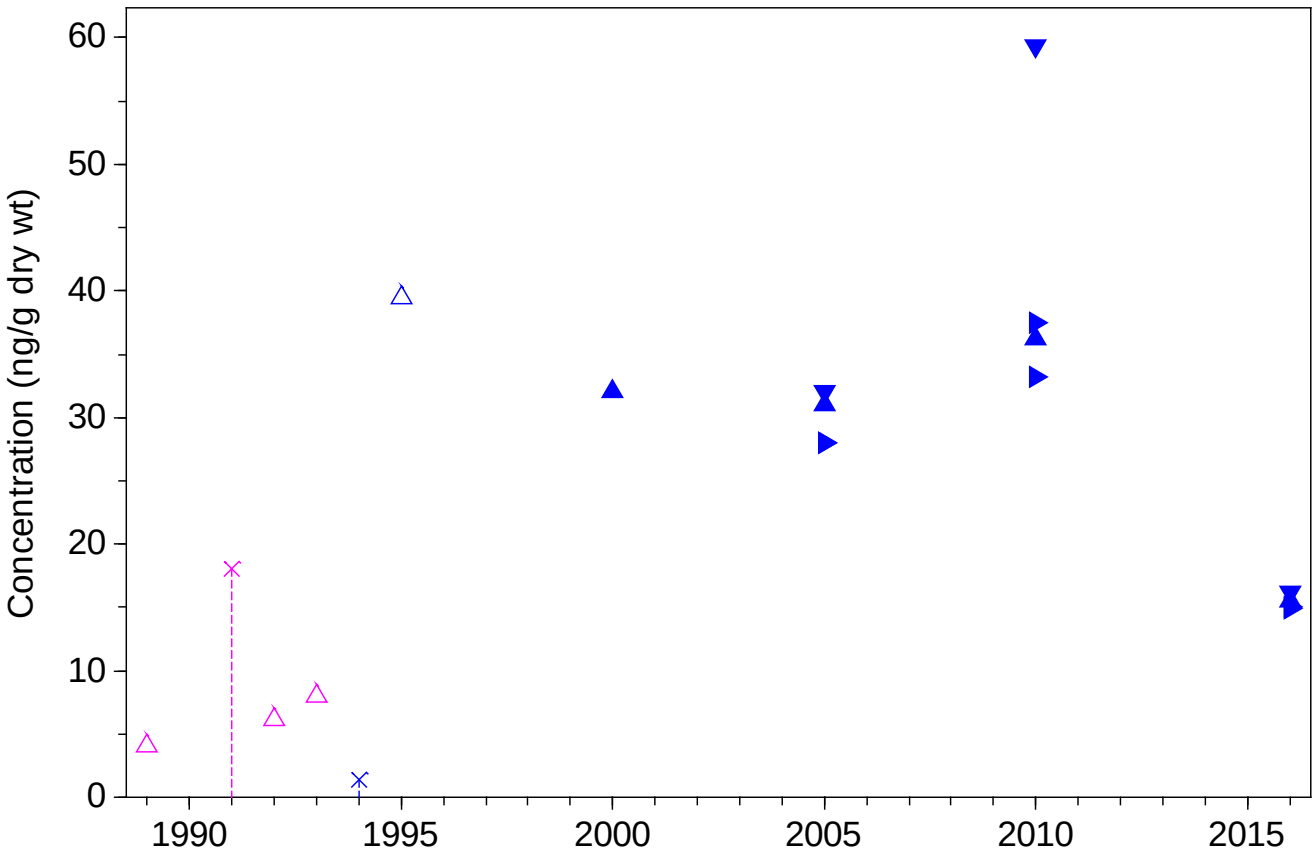
Zinc, Station 34



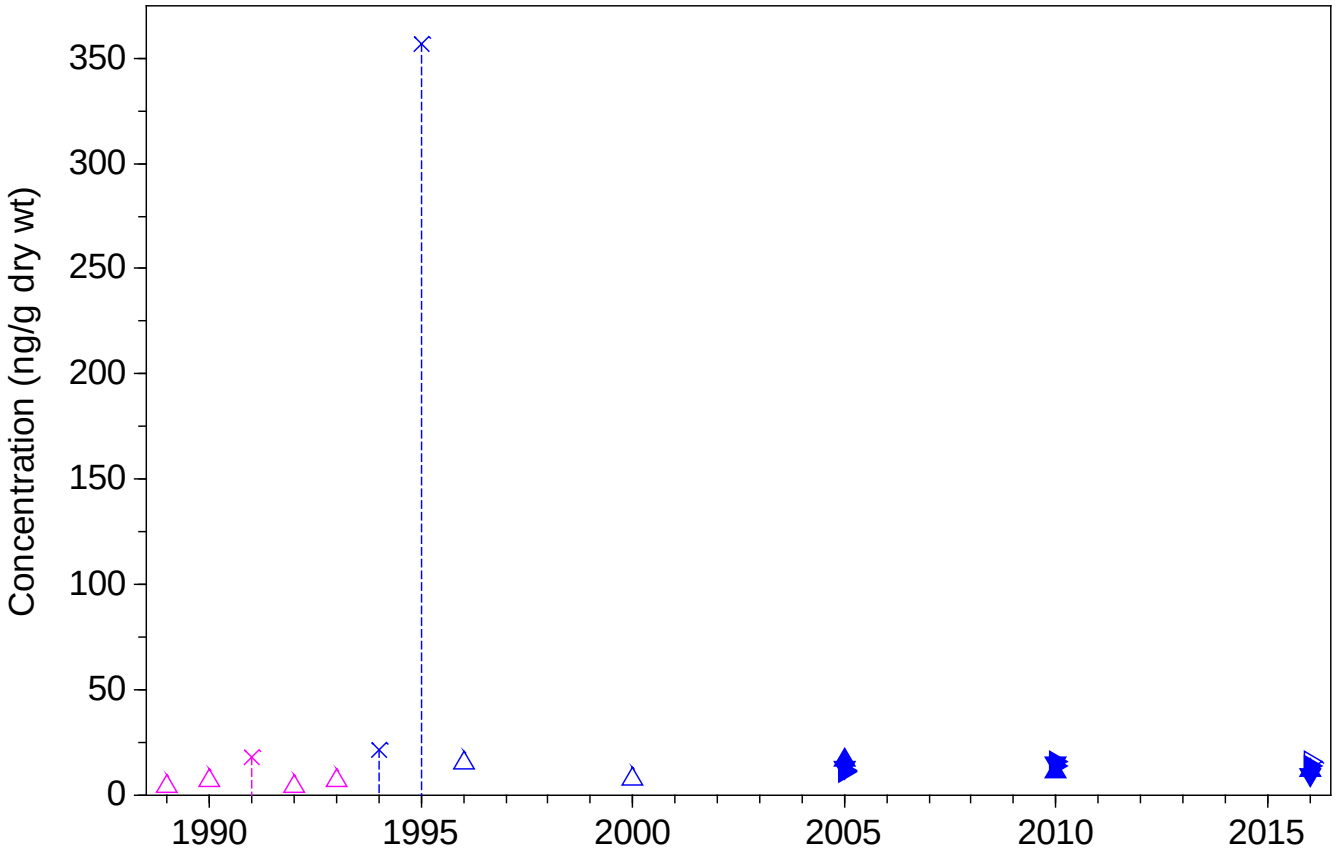
1-Methylnaphthalene, Station 34



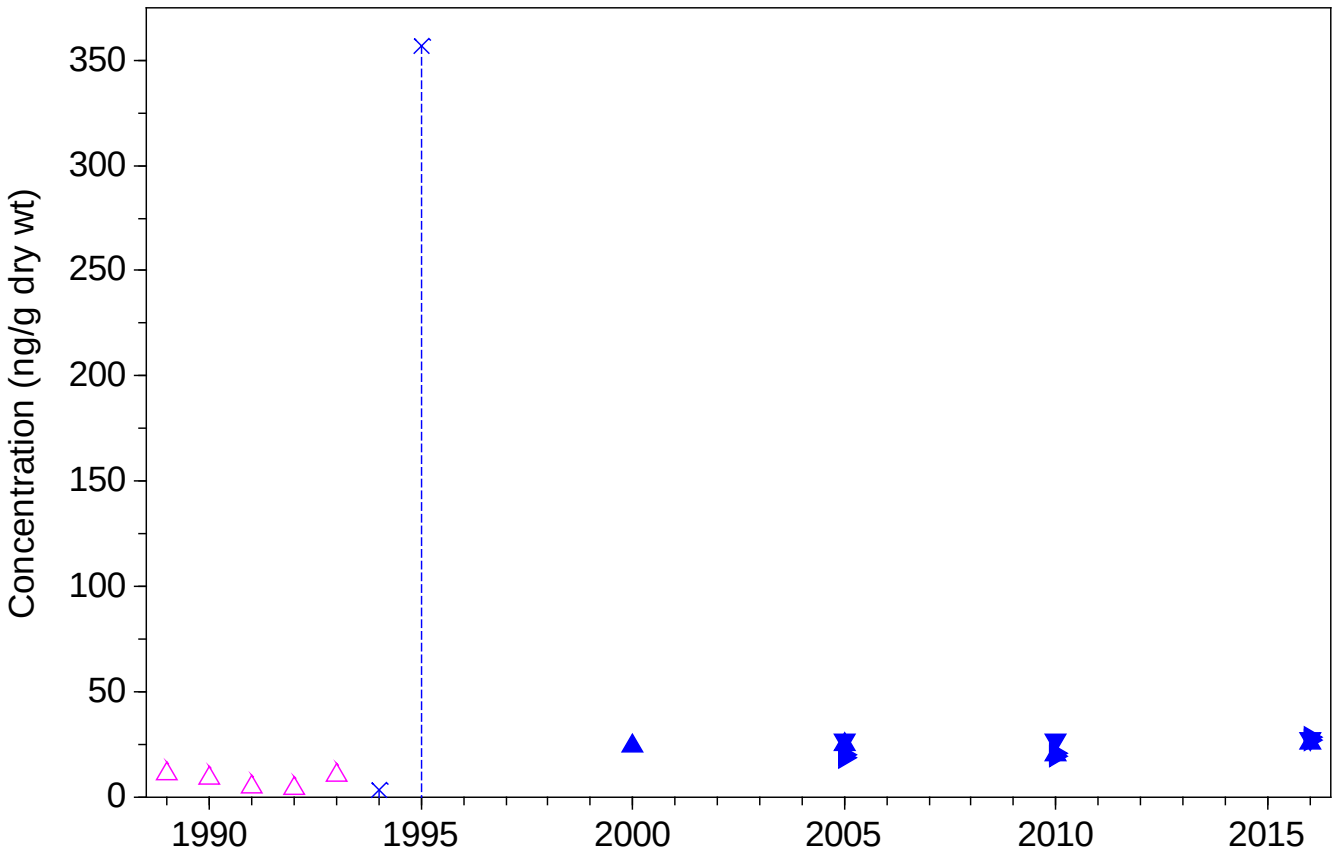
2-Methylnaphthalene, Station 34



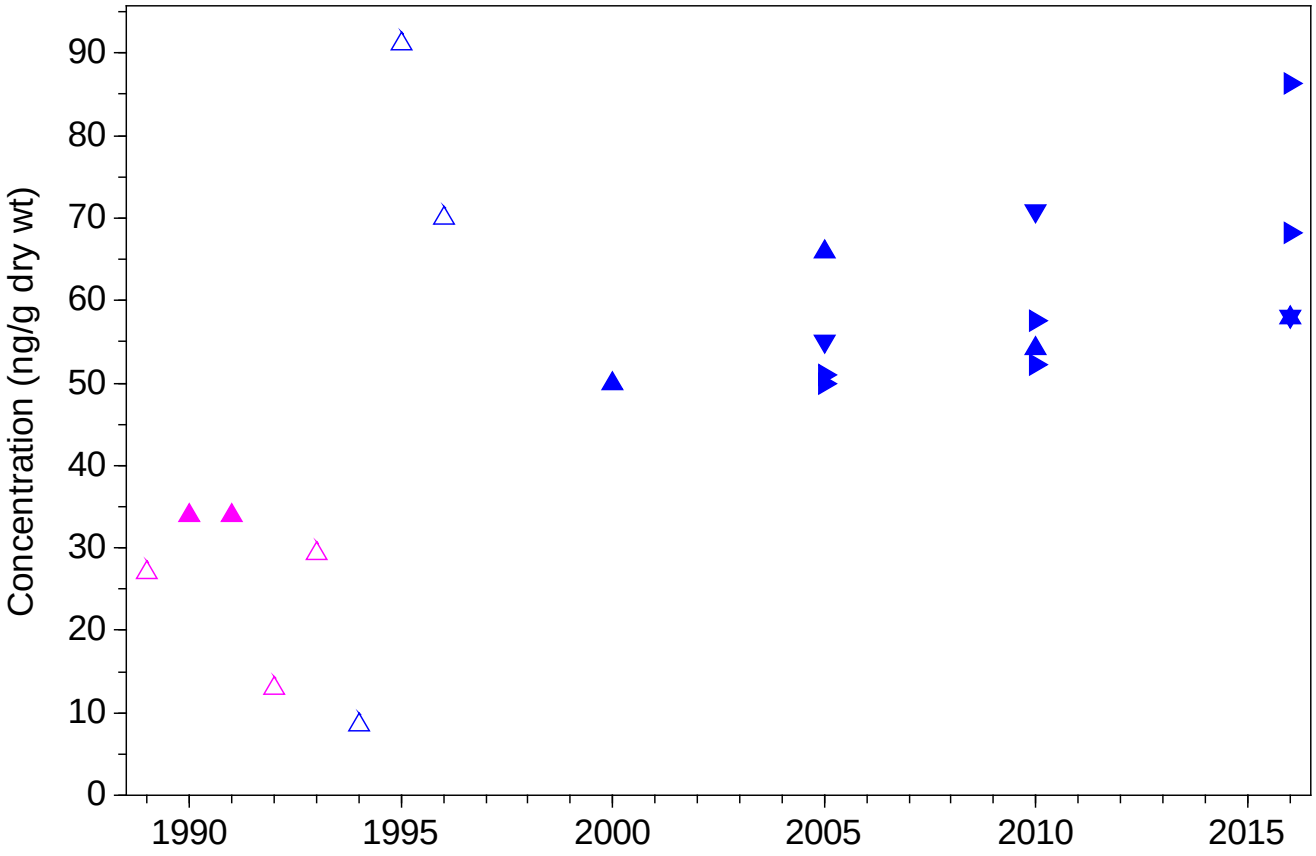
Acenaphthene, Station 34



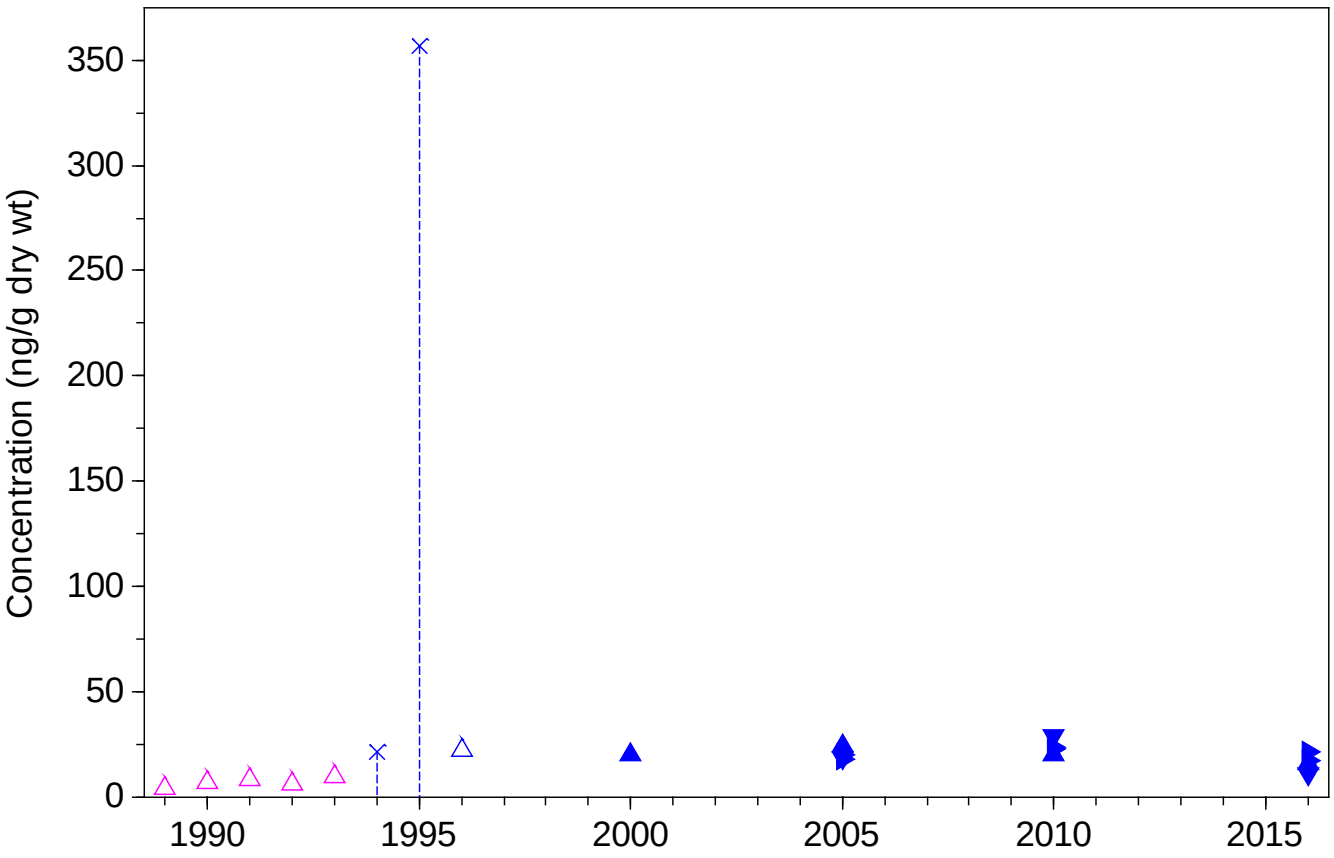
Acenaphthylene, Station 34



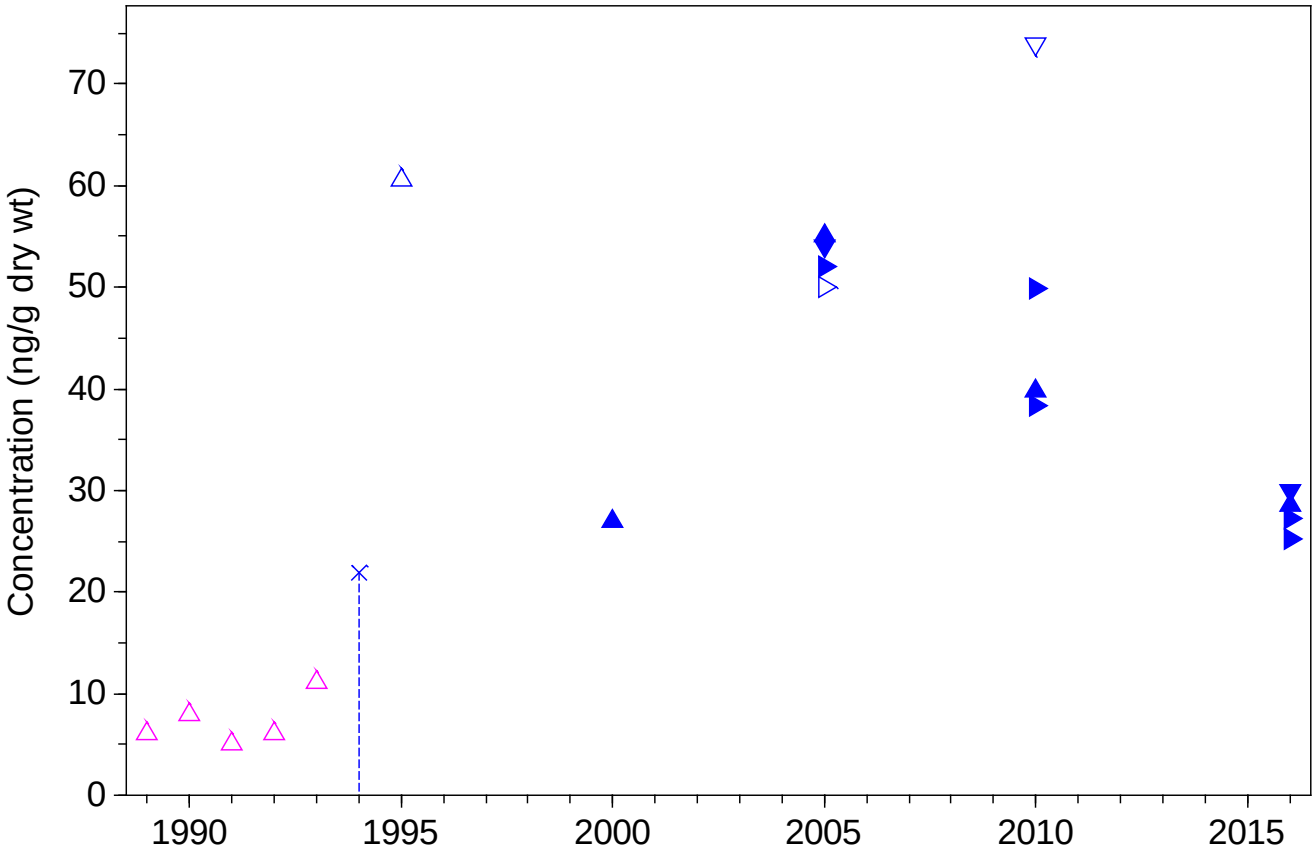
Anthracene, Station 34



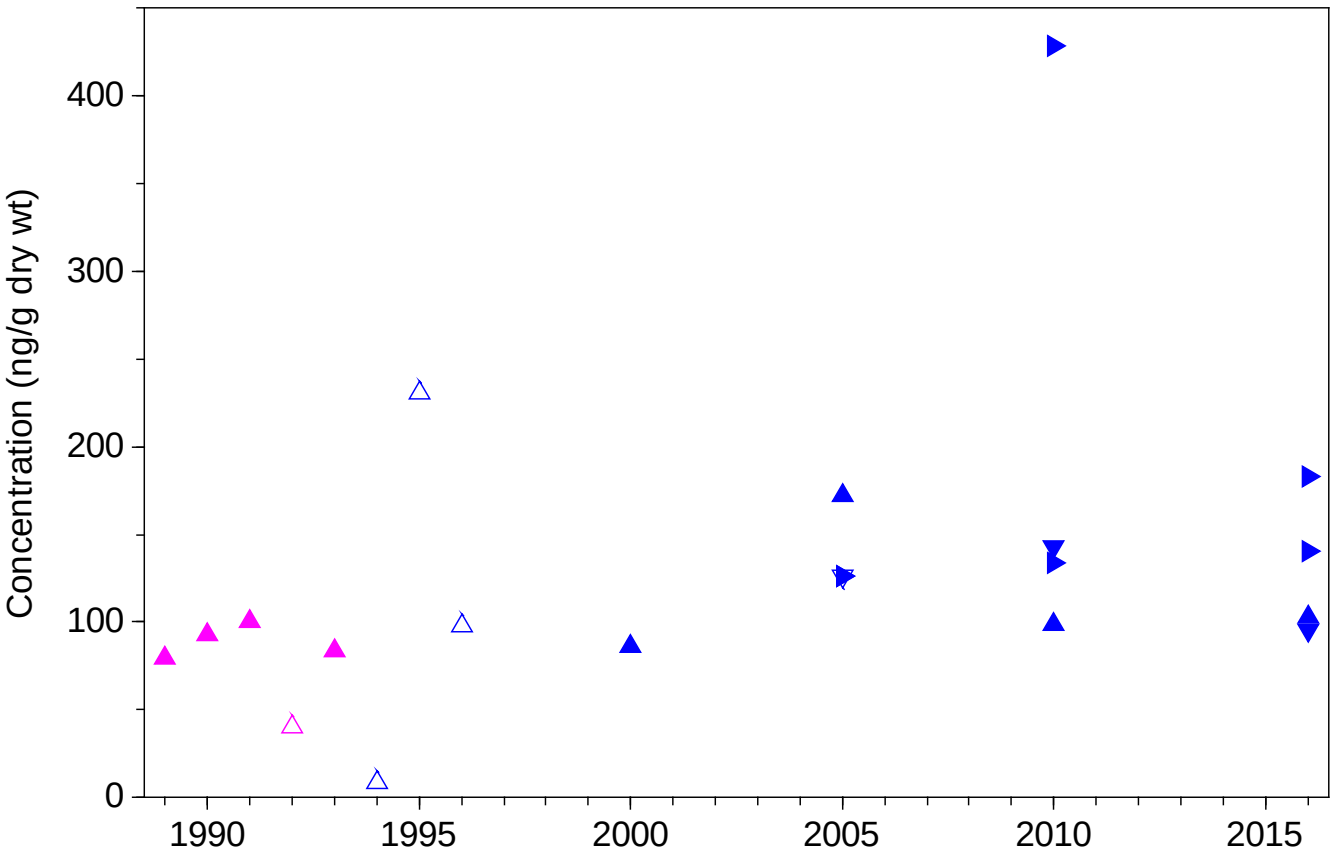
Fluorene, Station 34



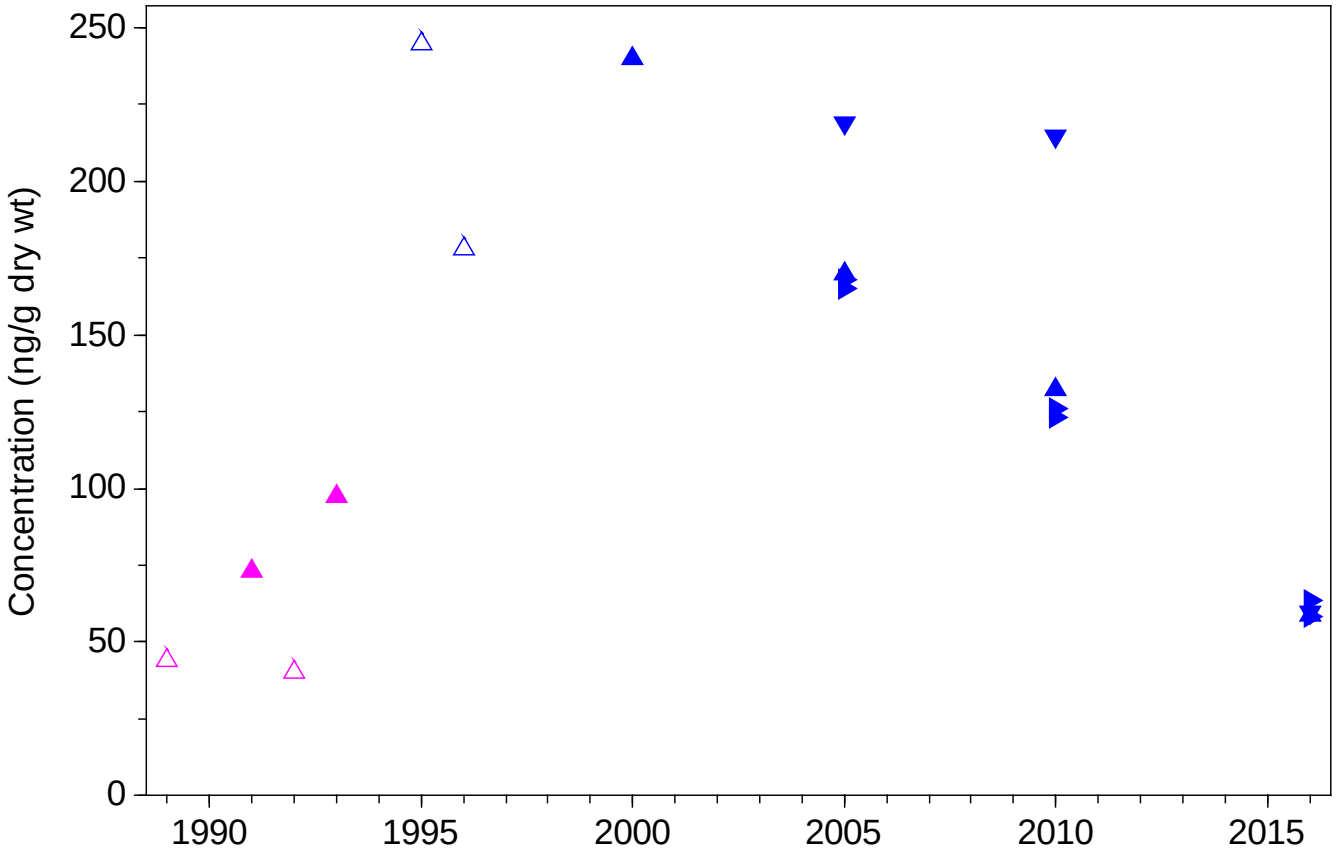
Naphthalene, Station 34



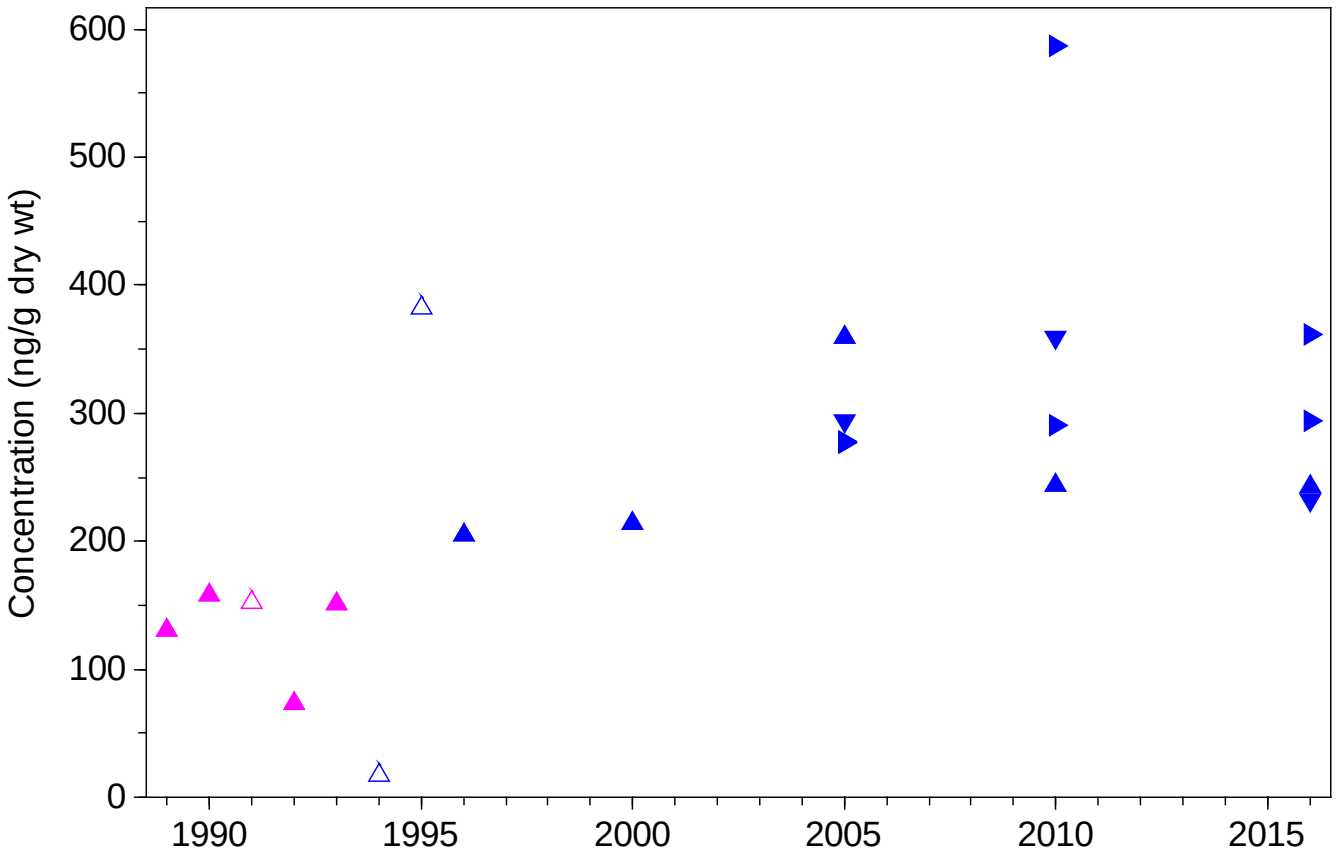
Phenanthrene, Station 34



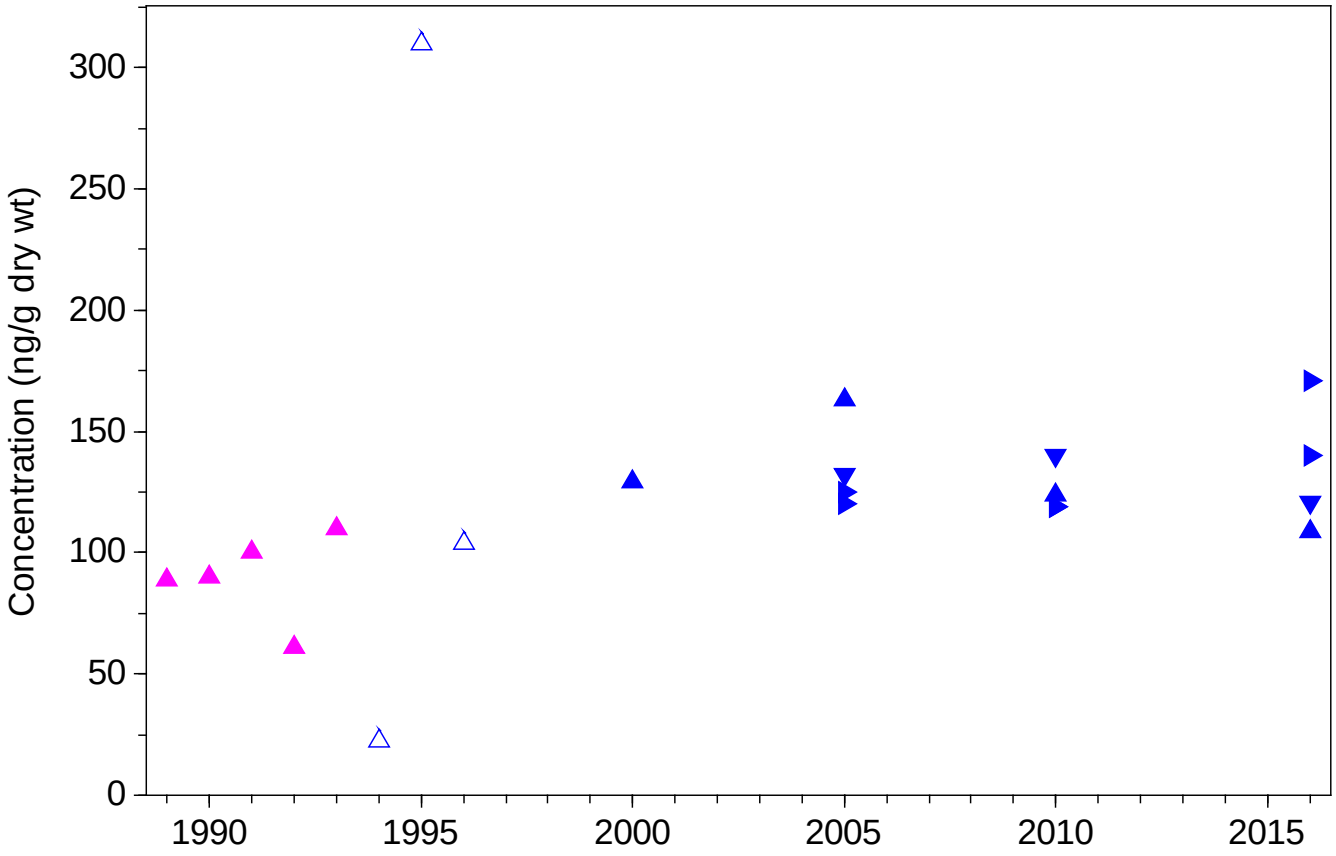
Retene, Station 34



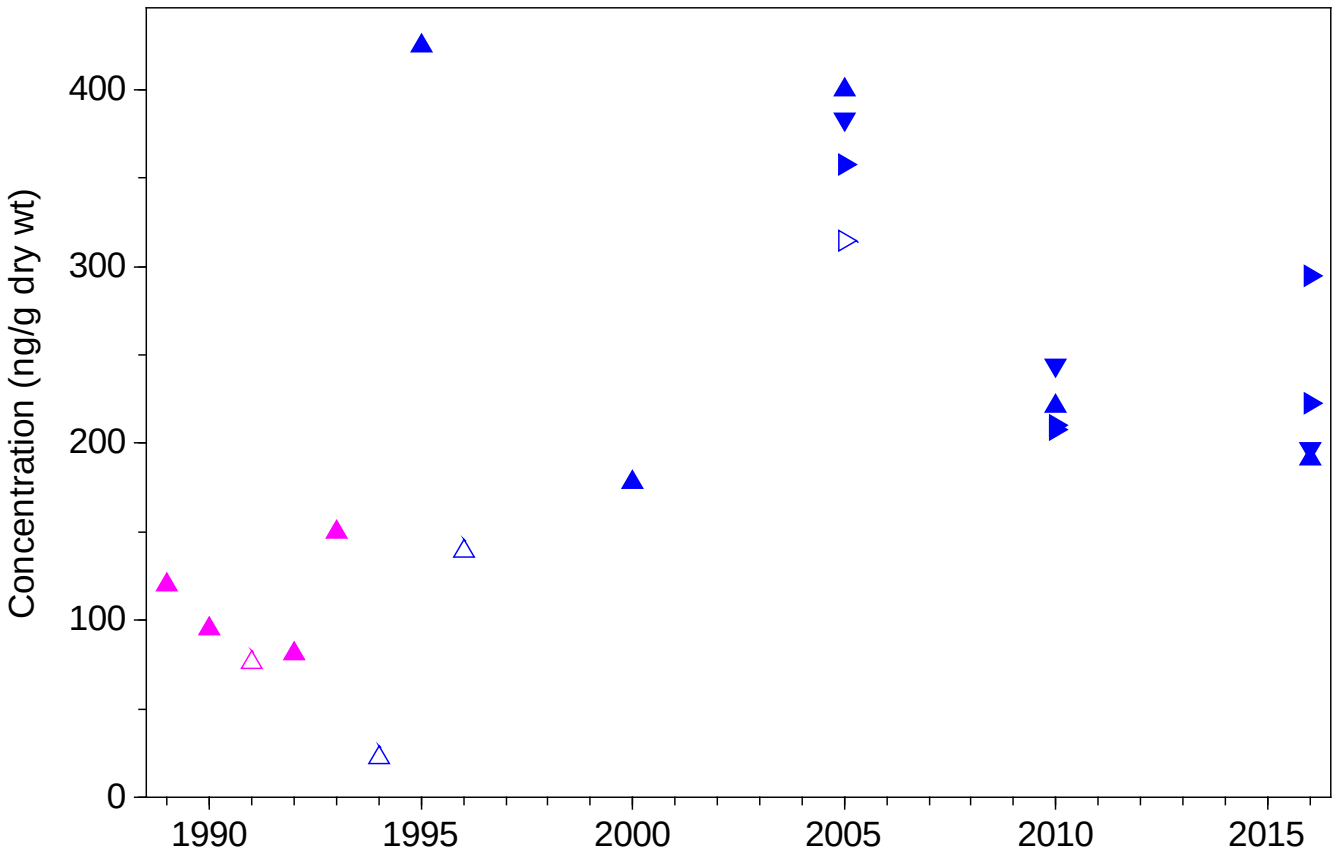
Total LPAH (sum of 6 compounds), Station 34



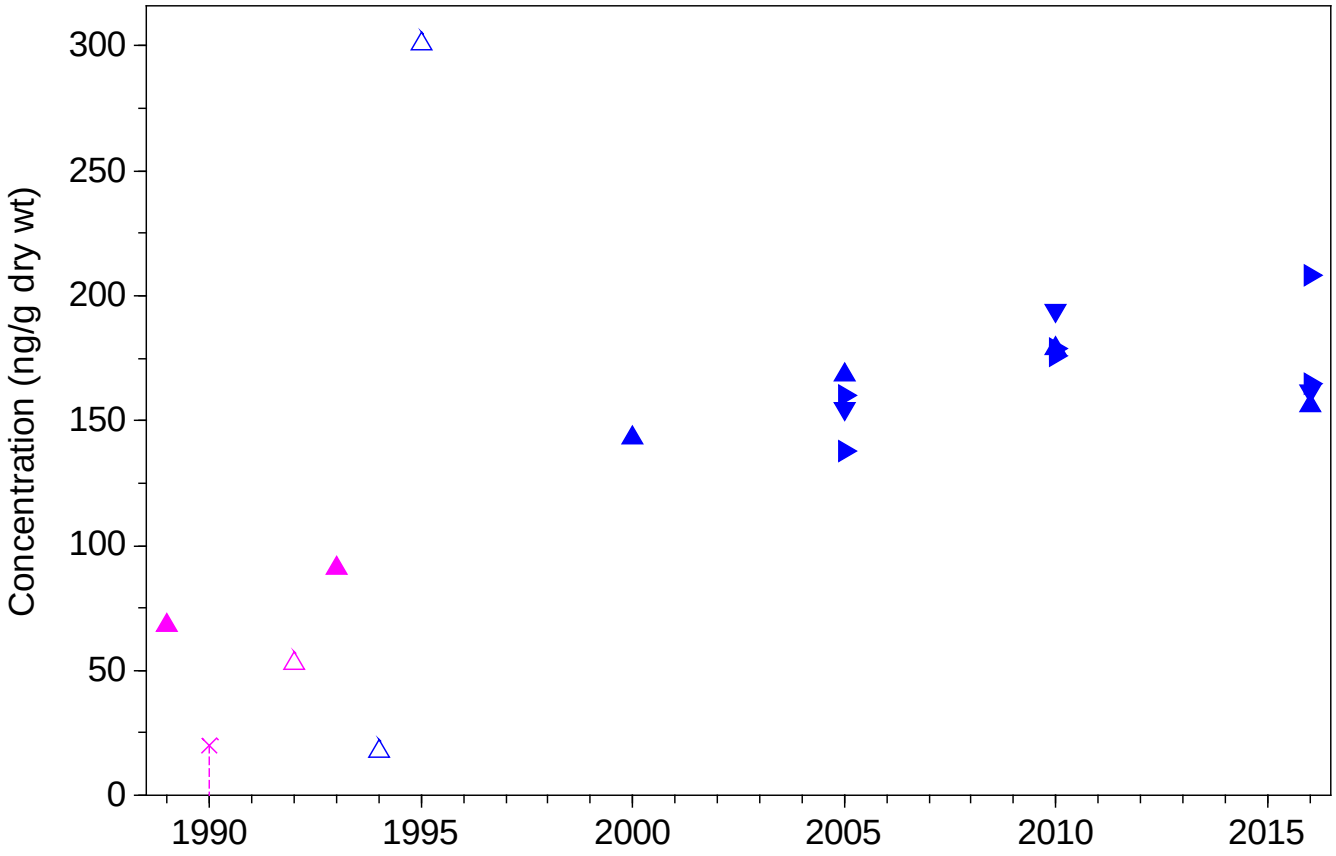
Benzo(a)anthracene, Station 34



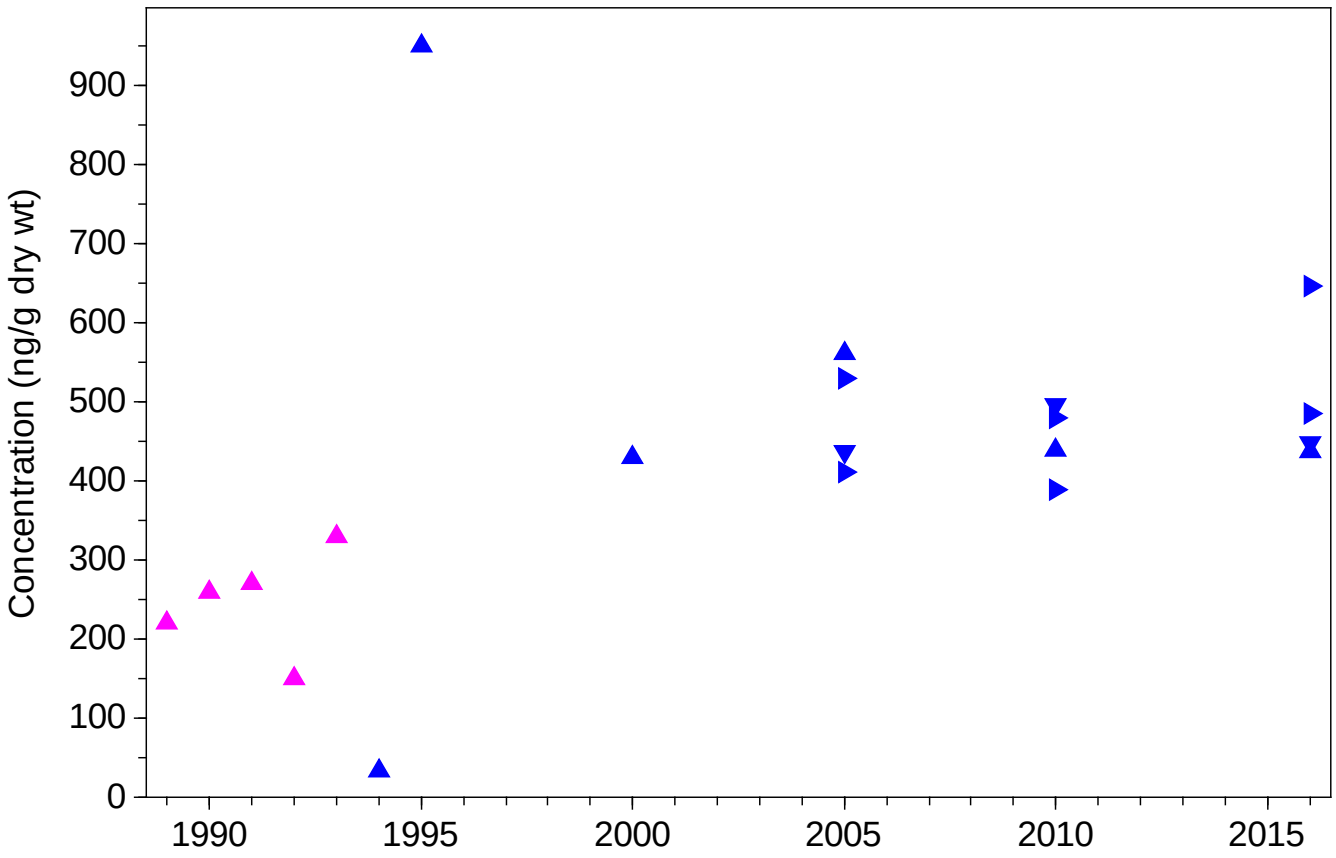
Benzo(a)pyrene, Station 34



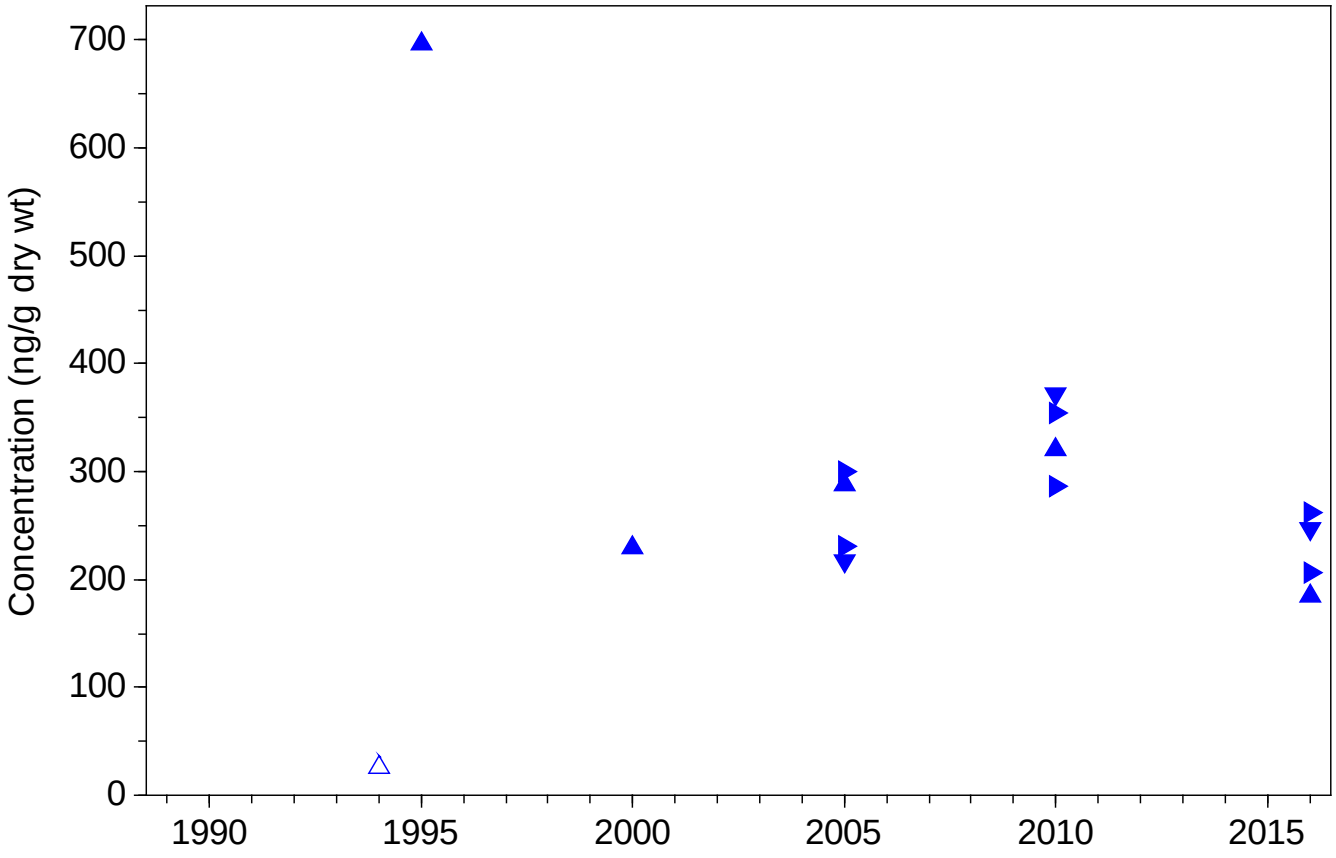
Benzo(g,h,i)perylene, Station 34



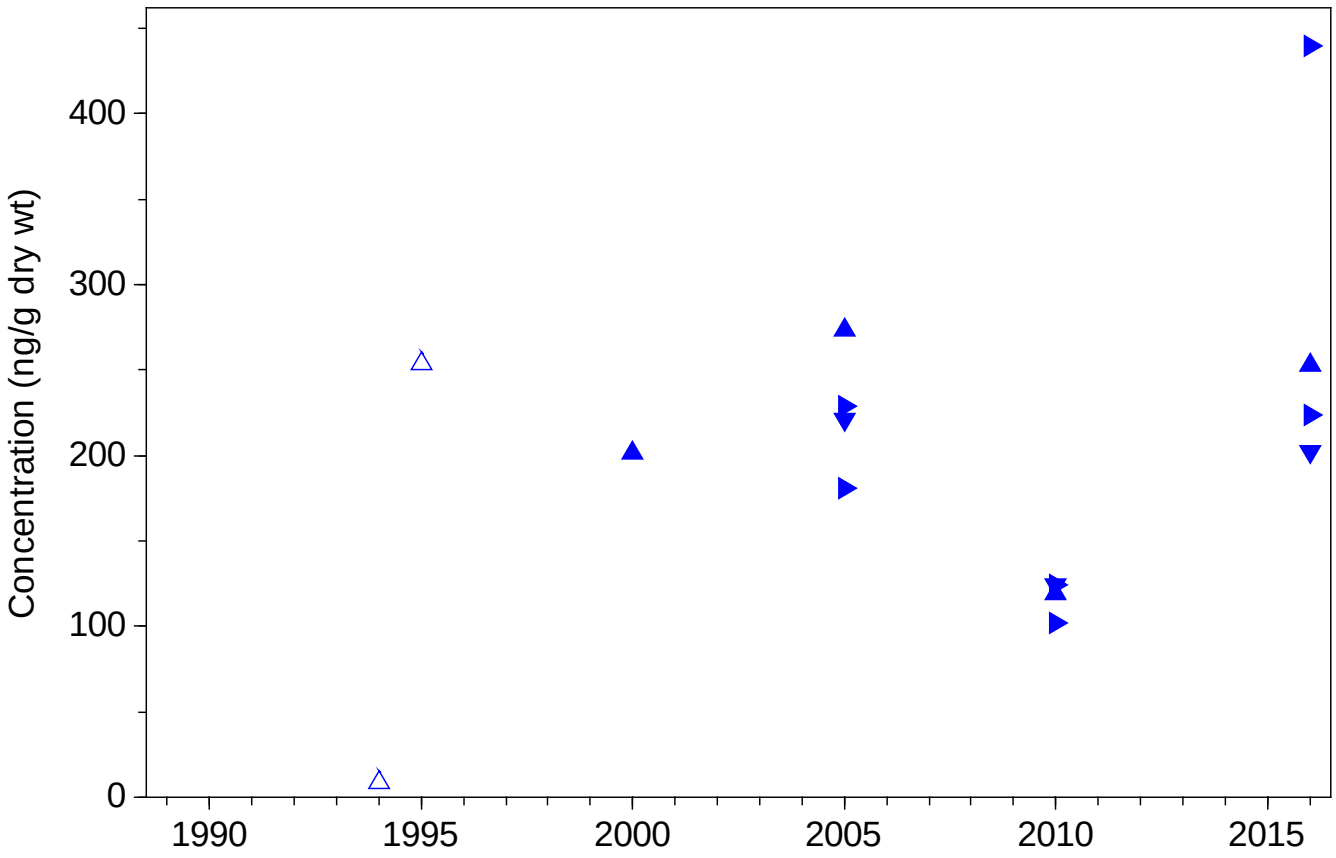
Total Benzofluoranthenes, Station 34



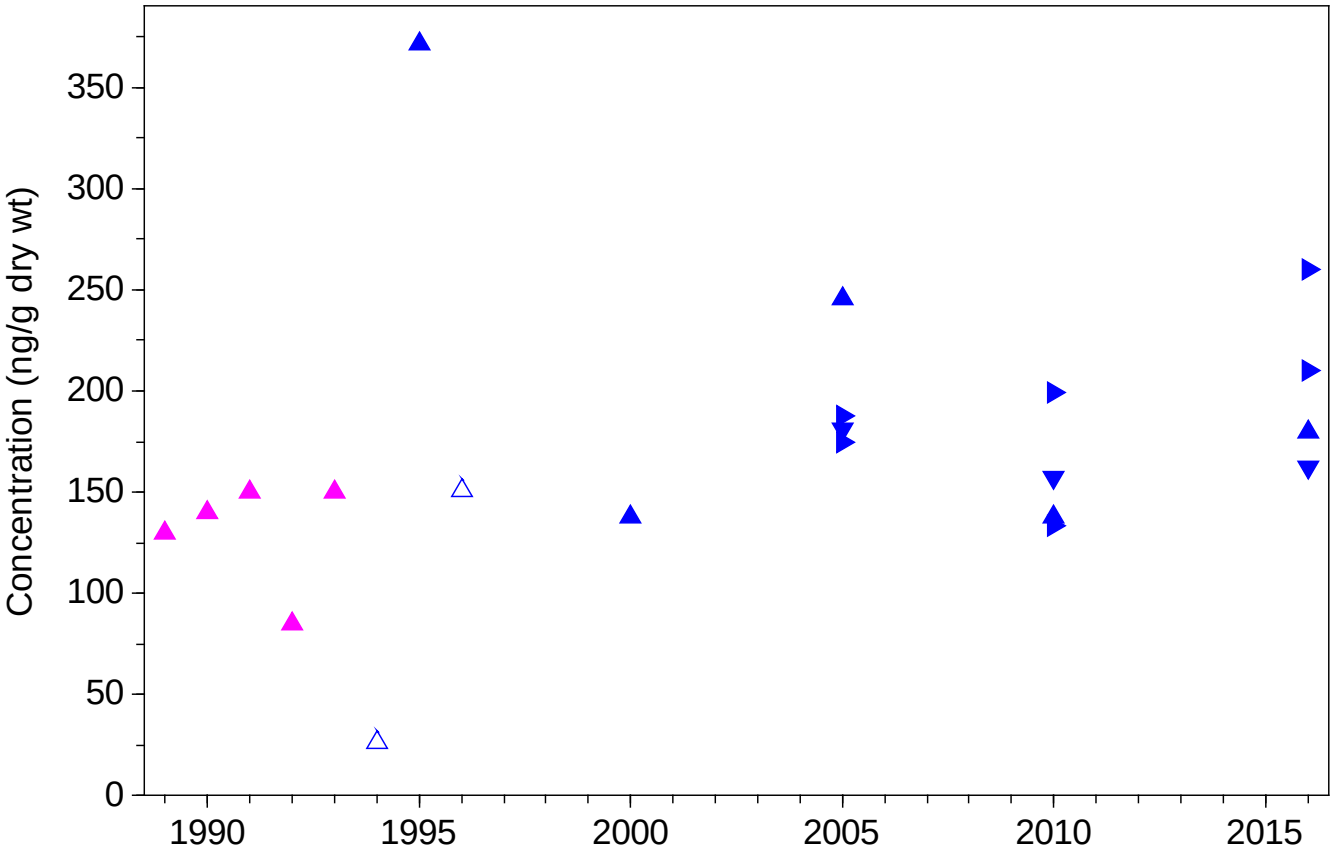
Benzo(b)fluoranthene, Station 34



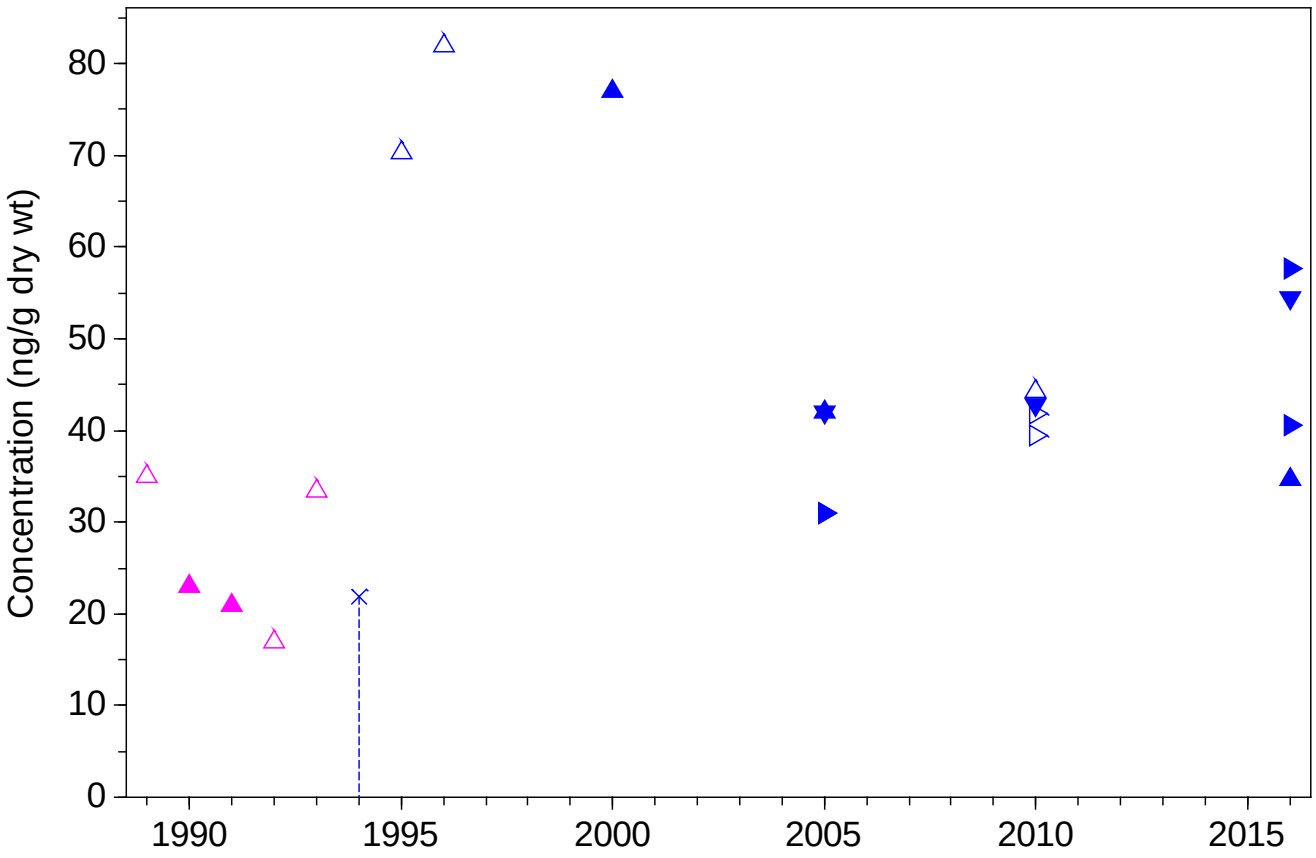
Benzo(k)fluoranthene, Station 34



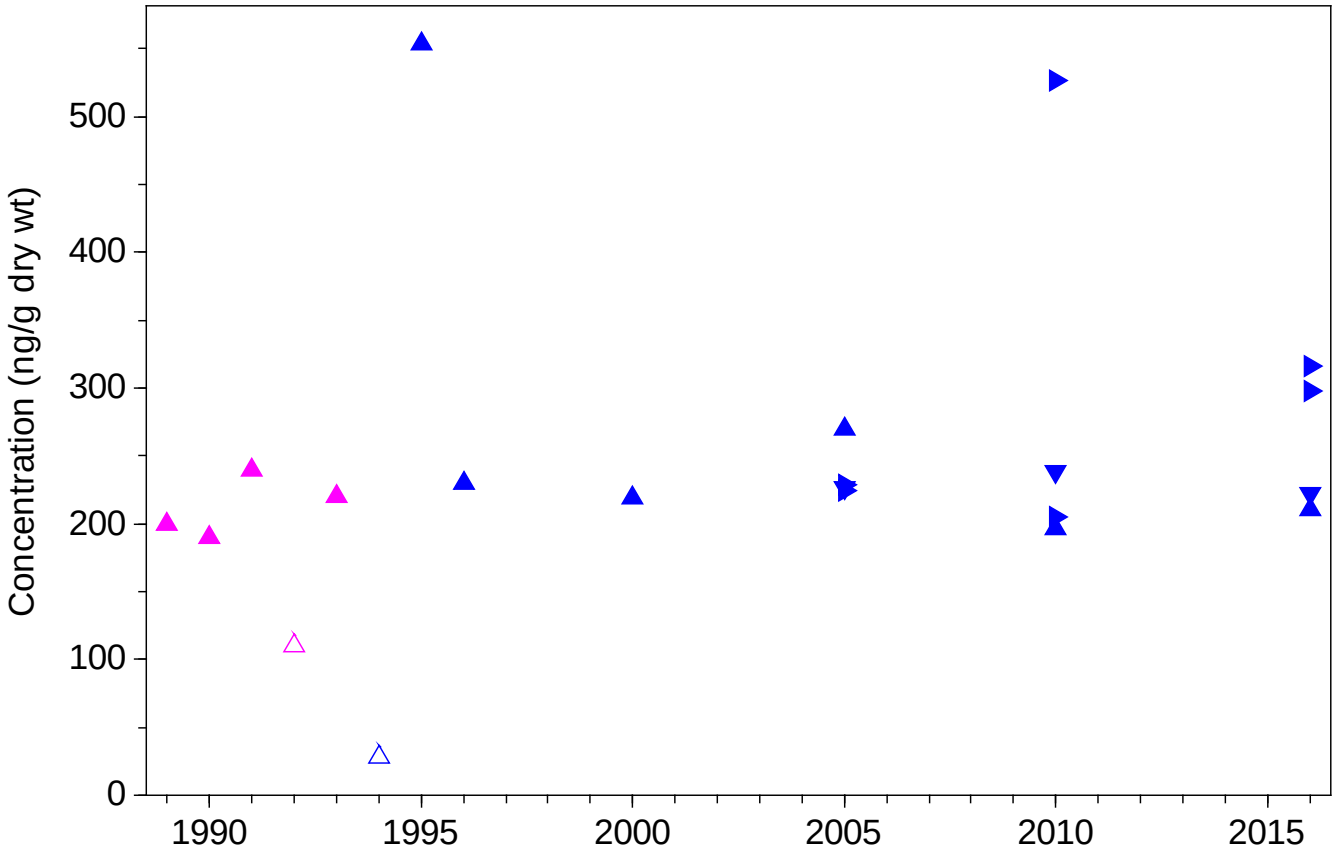
Chrysene, Station 34



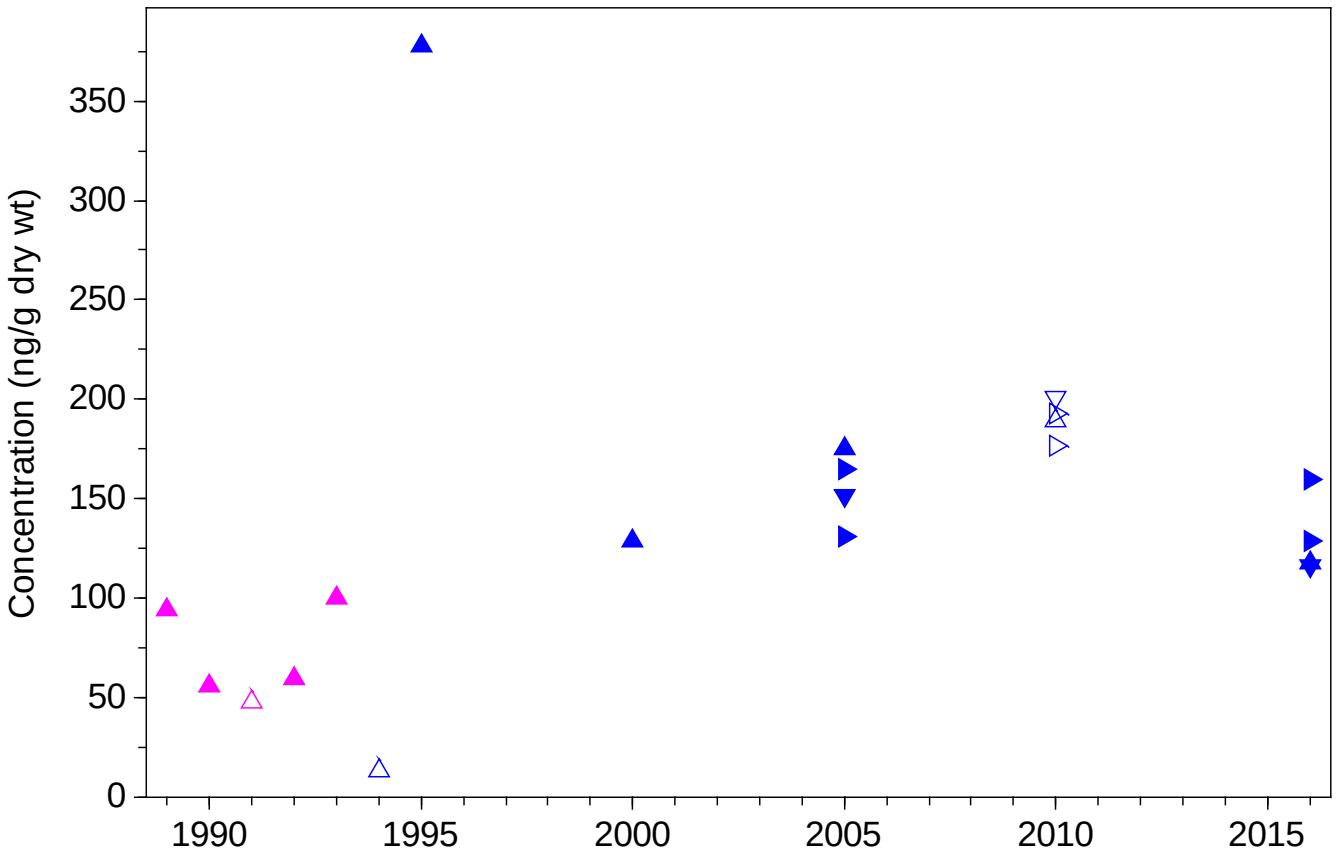
Dibenzo(a,h)anthracene, Station 34



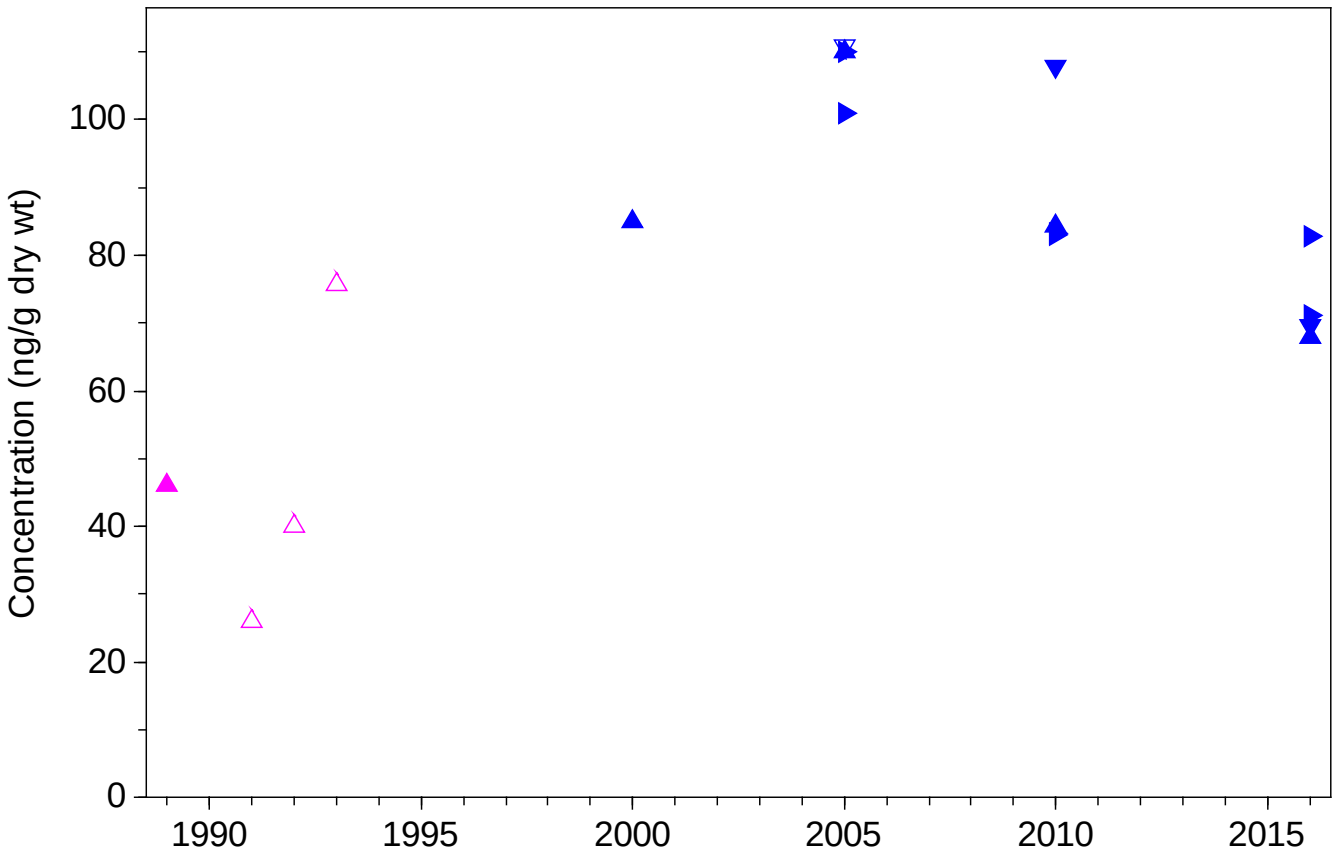
Fluoranthene, Station 34



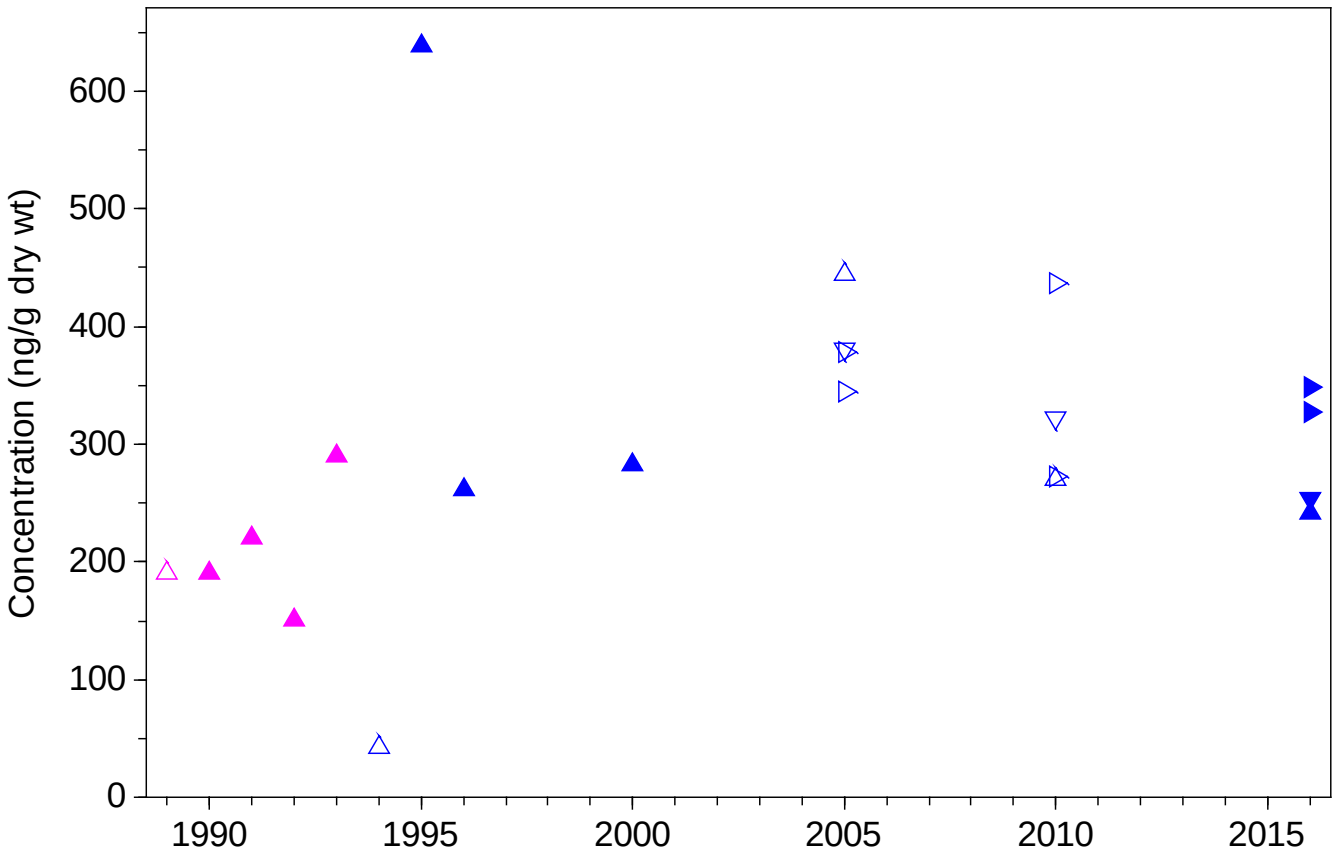
Indeno(1,2,3-c,d)pyrene, Station 34

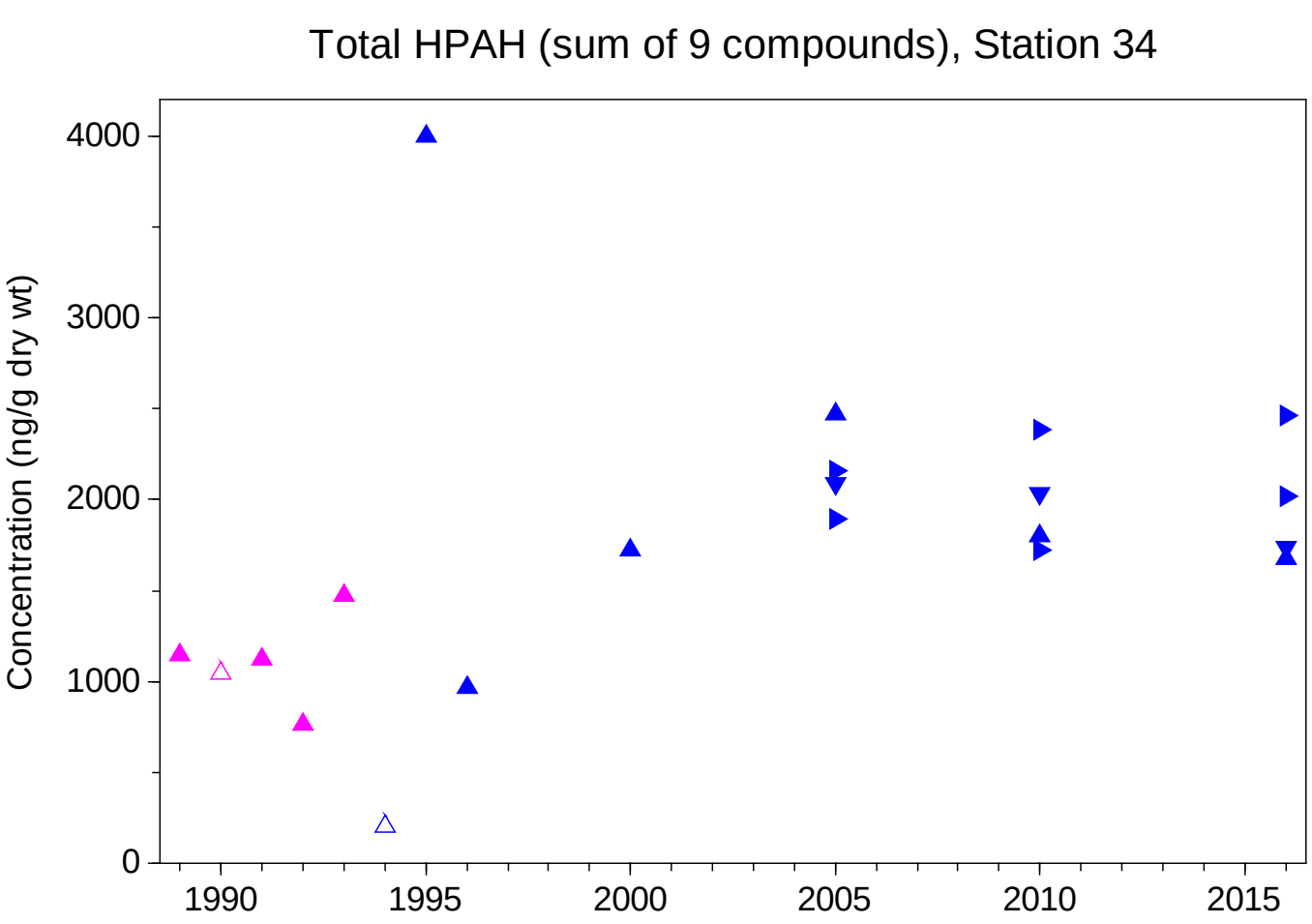


Perylene, Station 34



Pyrene, Station 34





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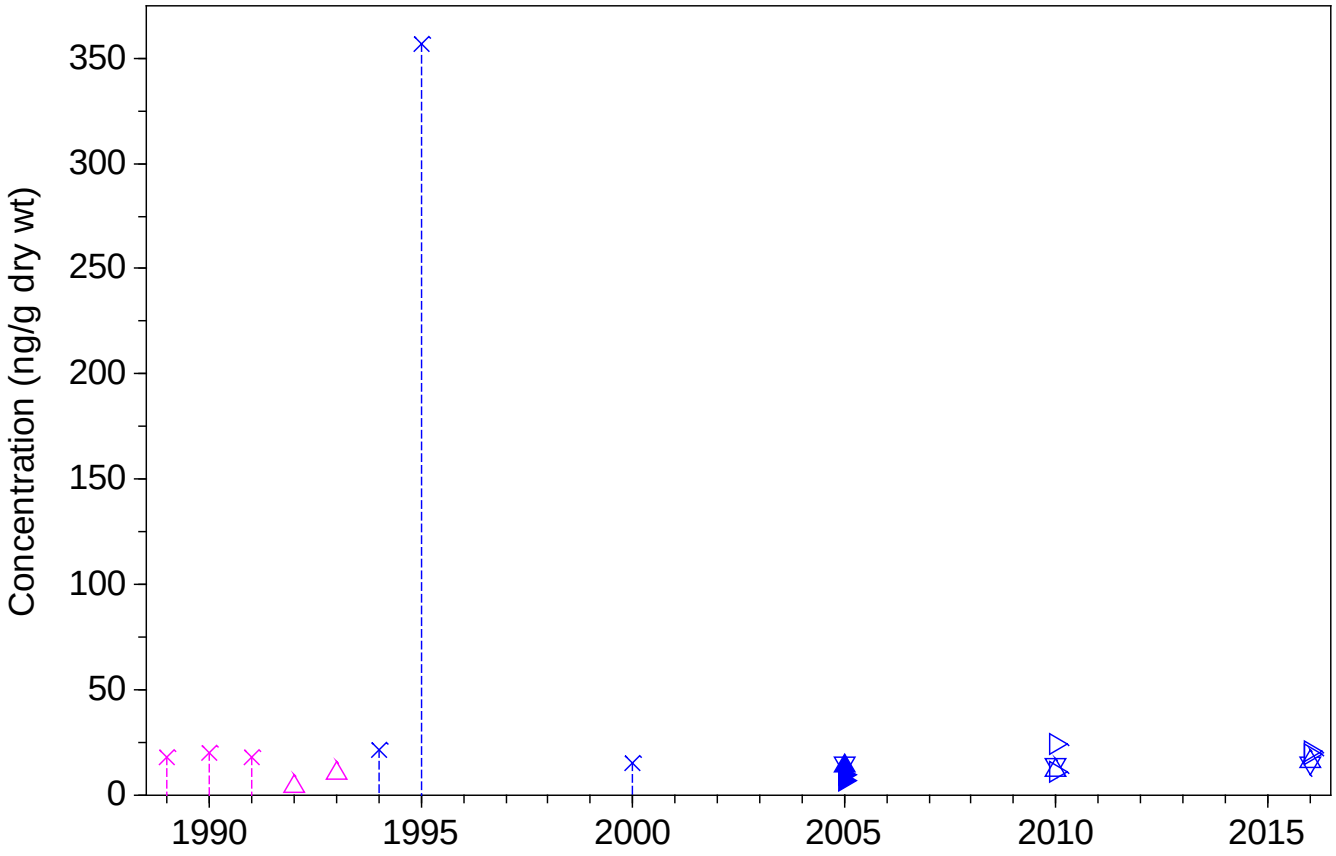
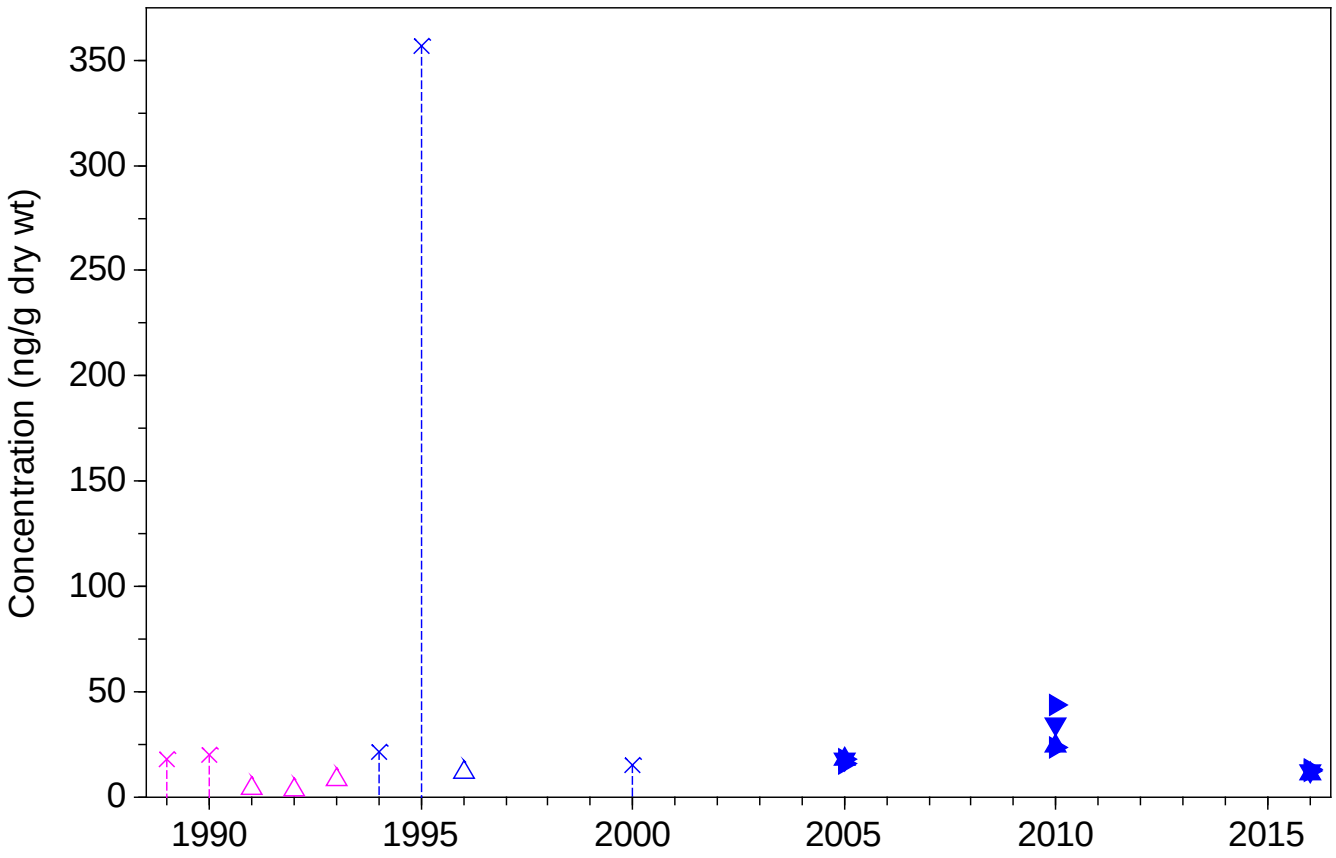
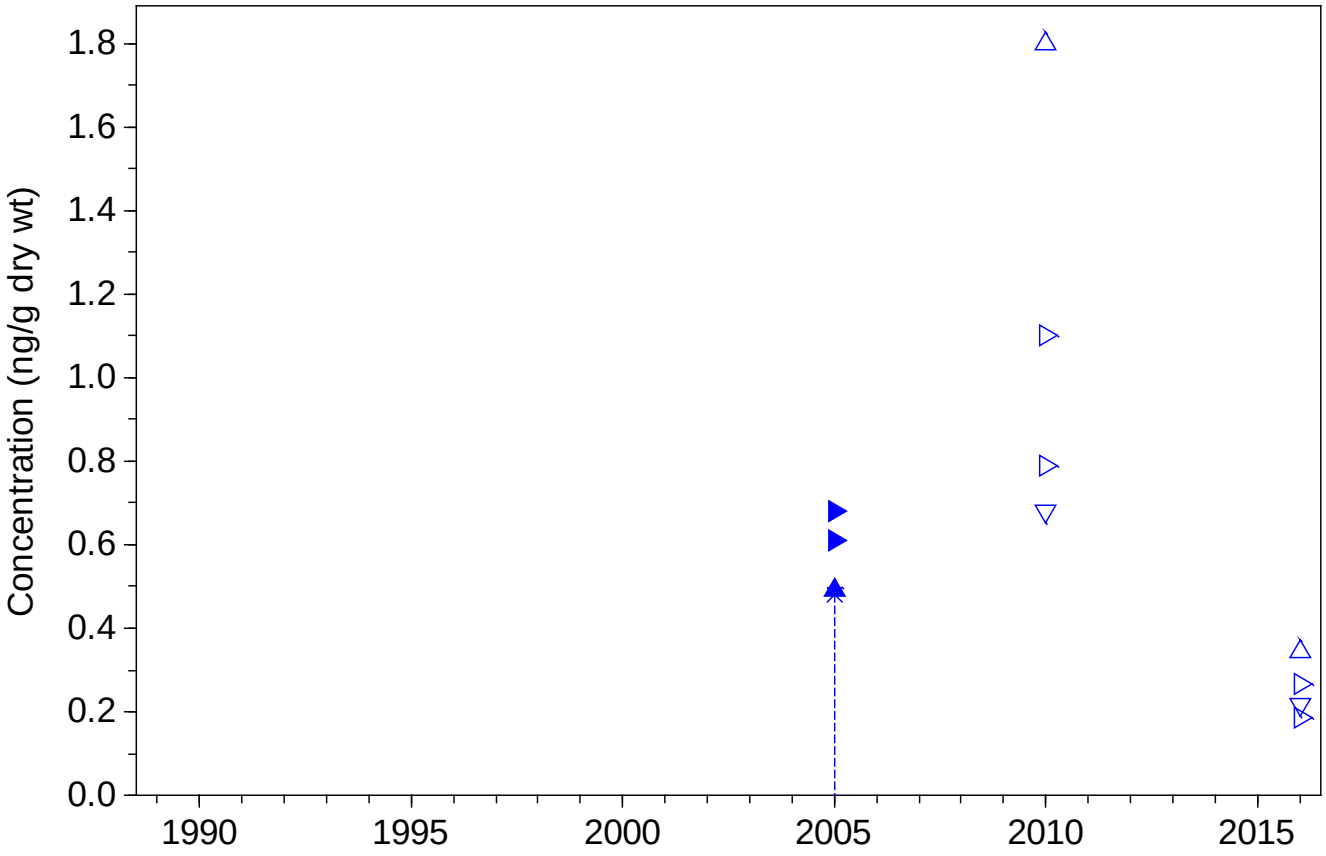
Carbazole, Station 34



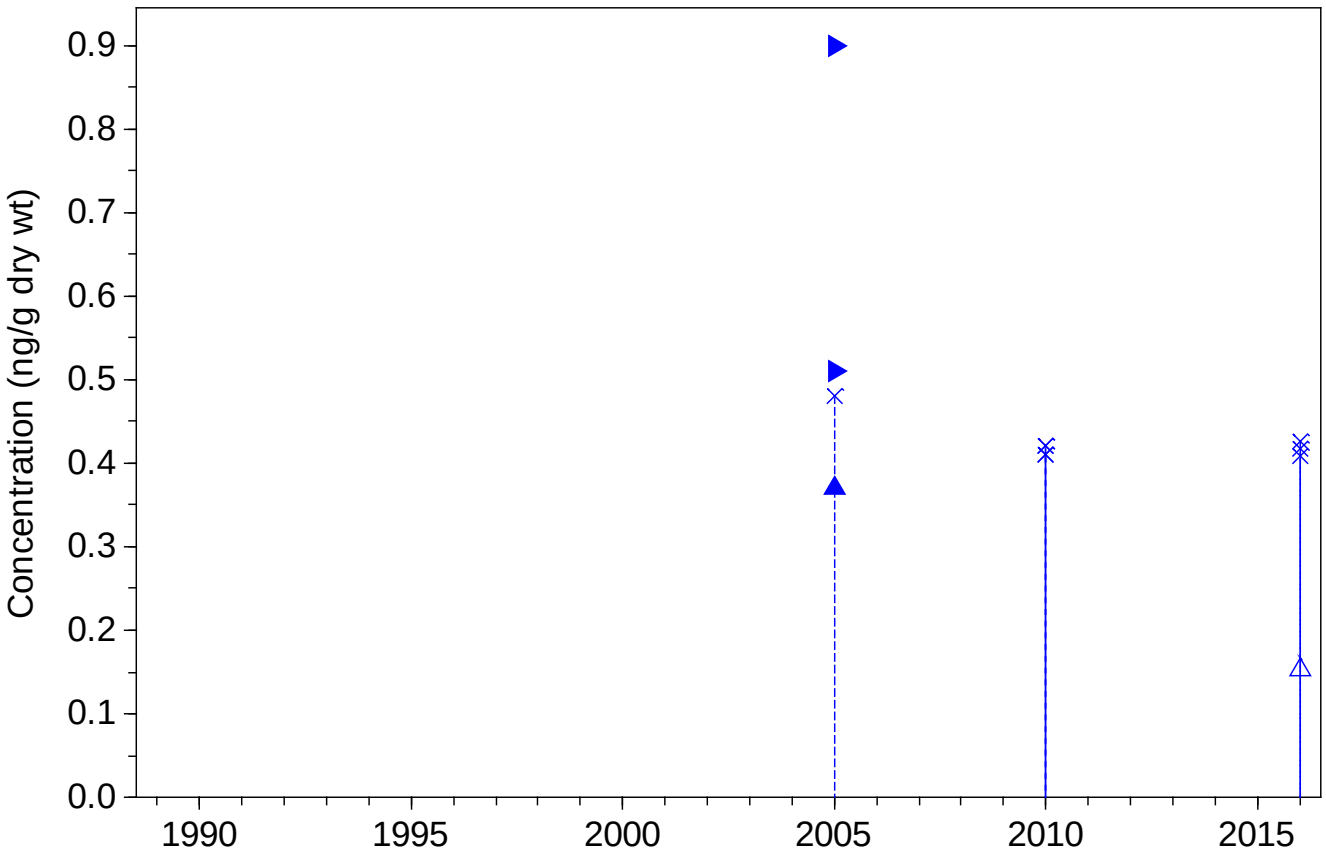
Dibenzofuran, Station 34



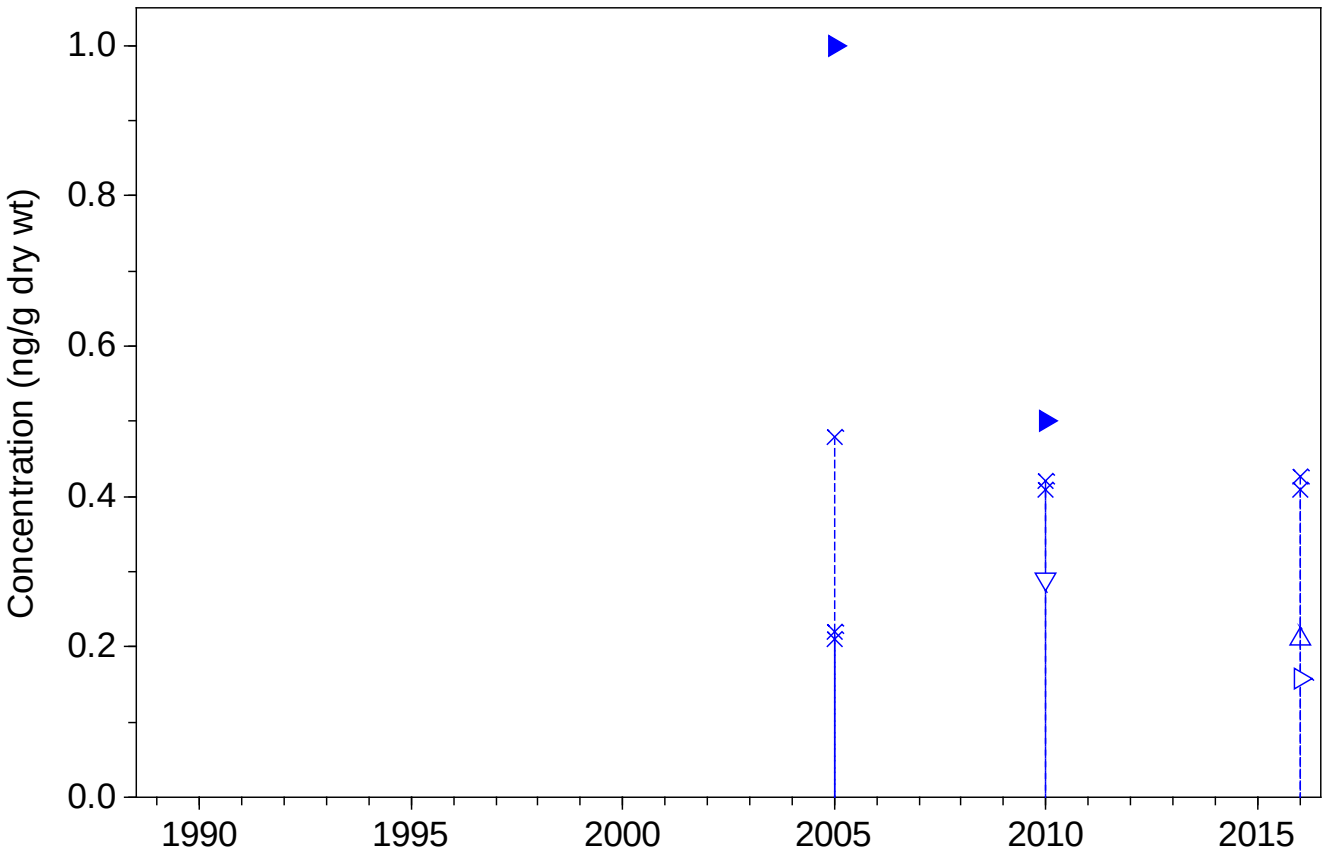
PBDE-47, Station 34



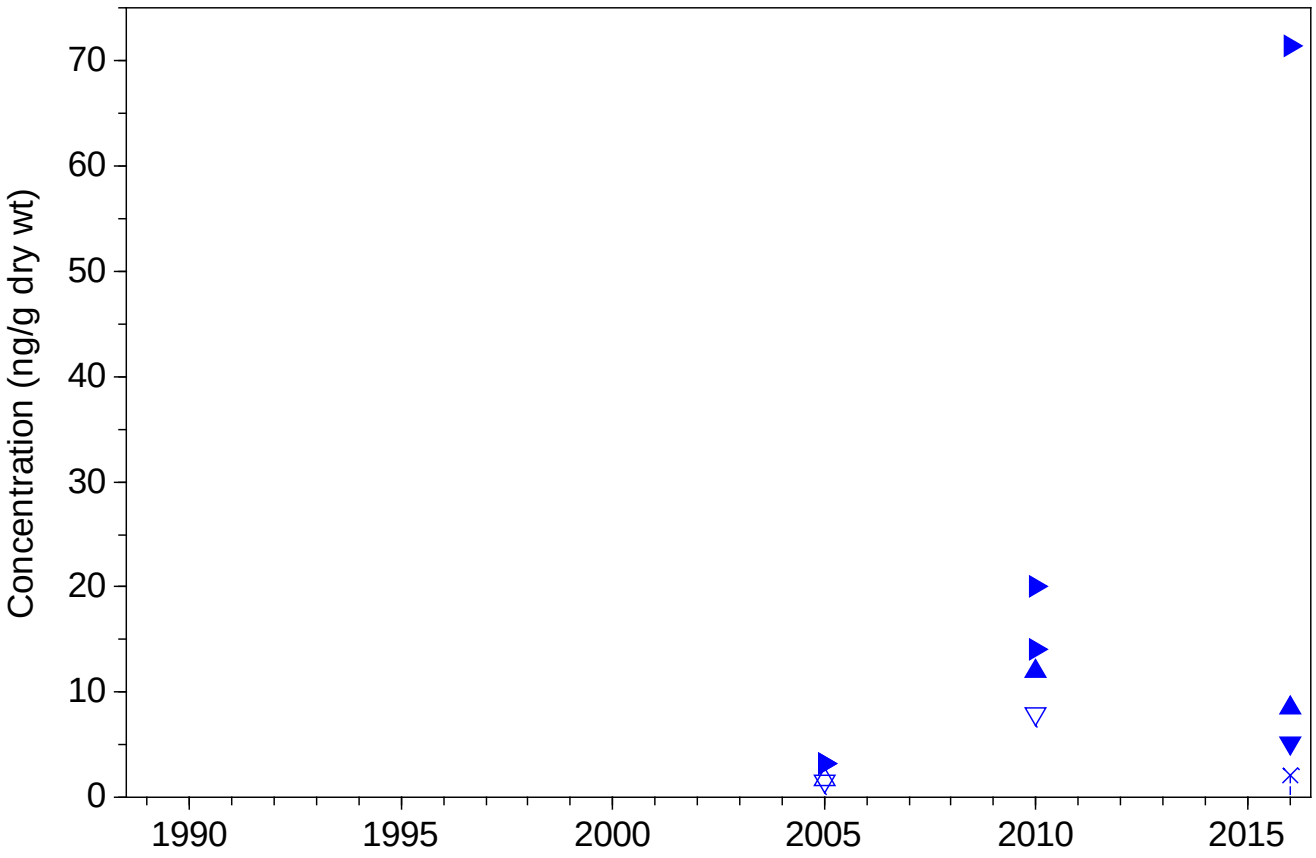
PBDE-49, Station 34



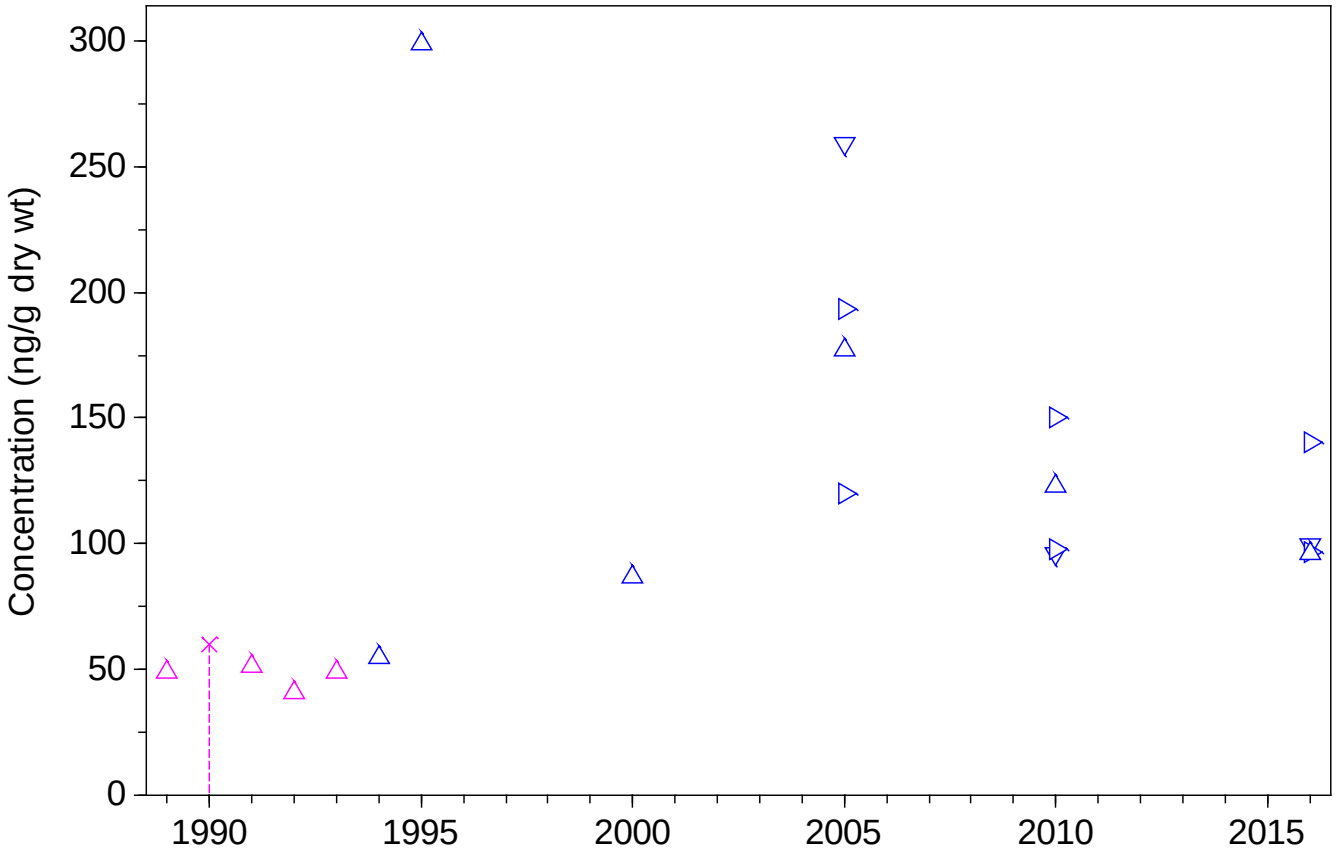
PBDE-99, Station 34



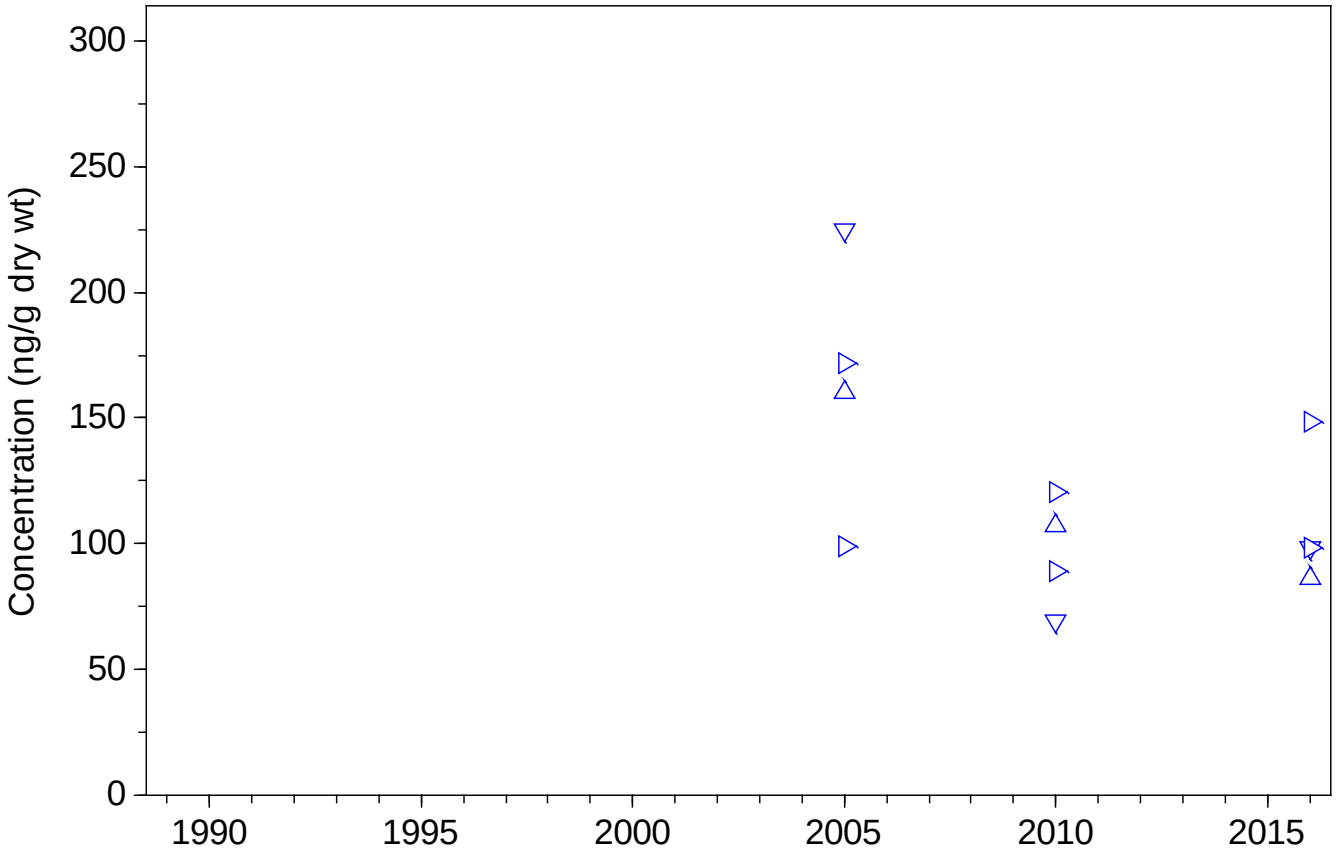
PBDE-209, Station 34



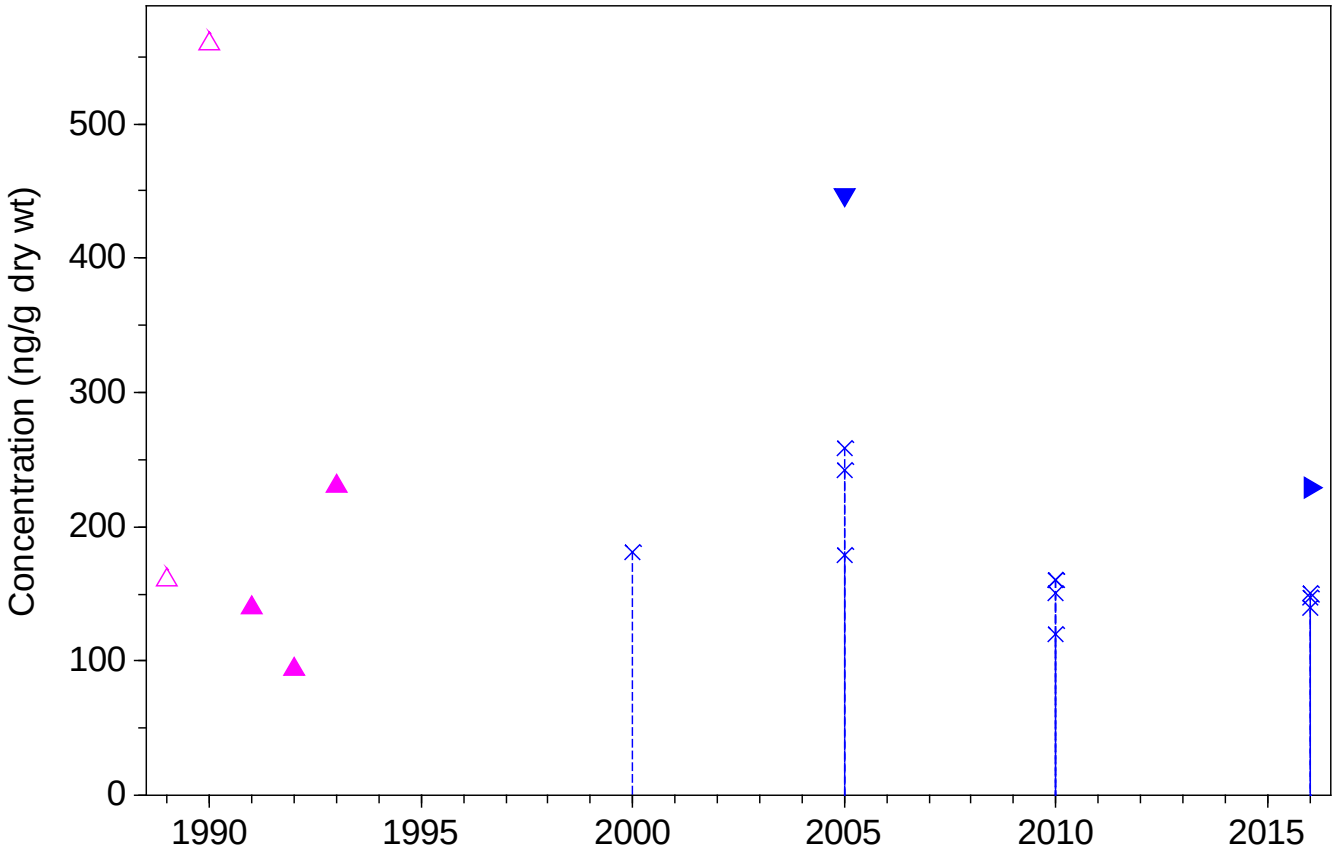
Total Aroclors, Station 34



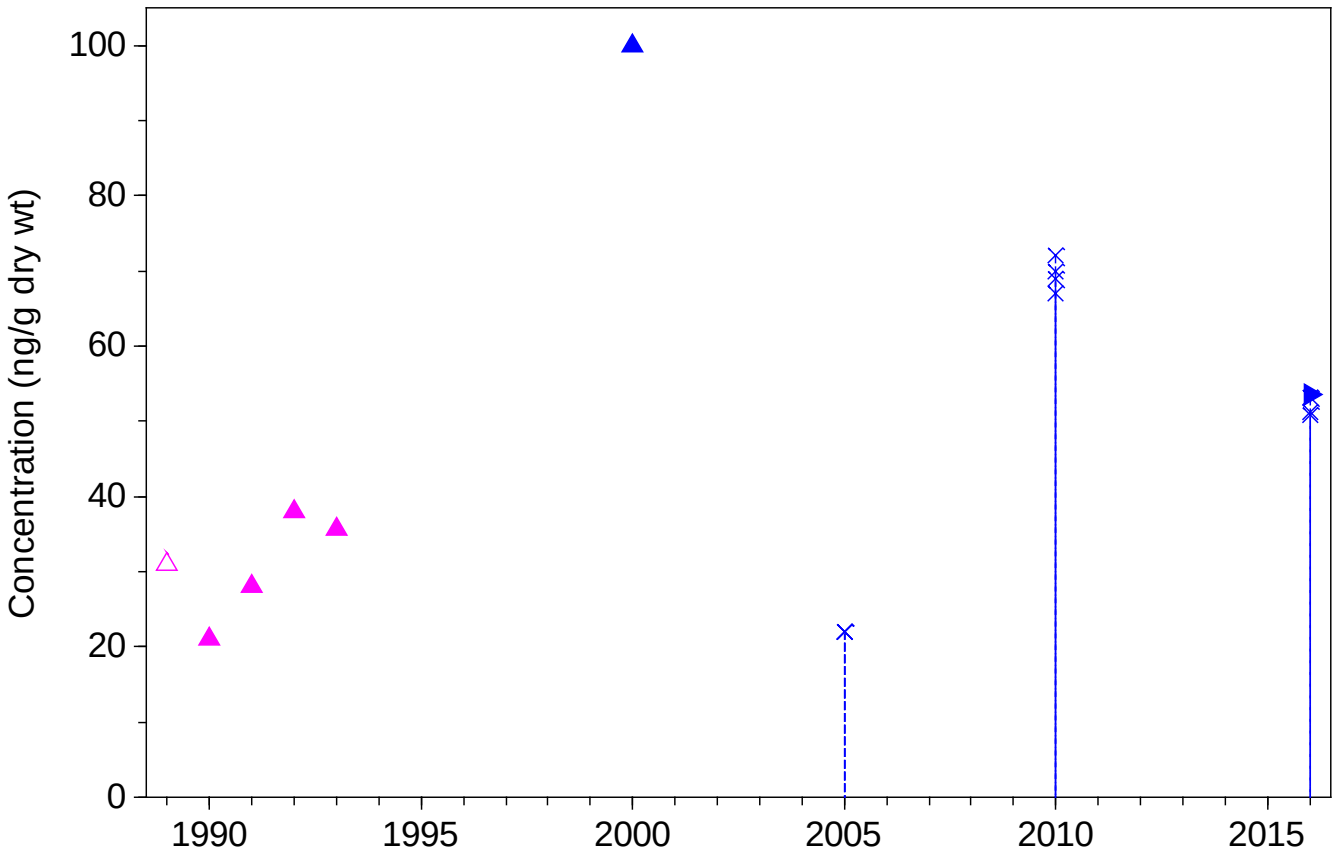
Total PCB Congeners x 2, Station 34



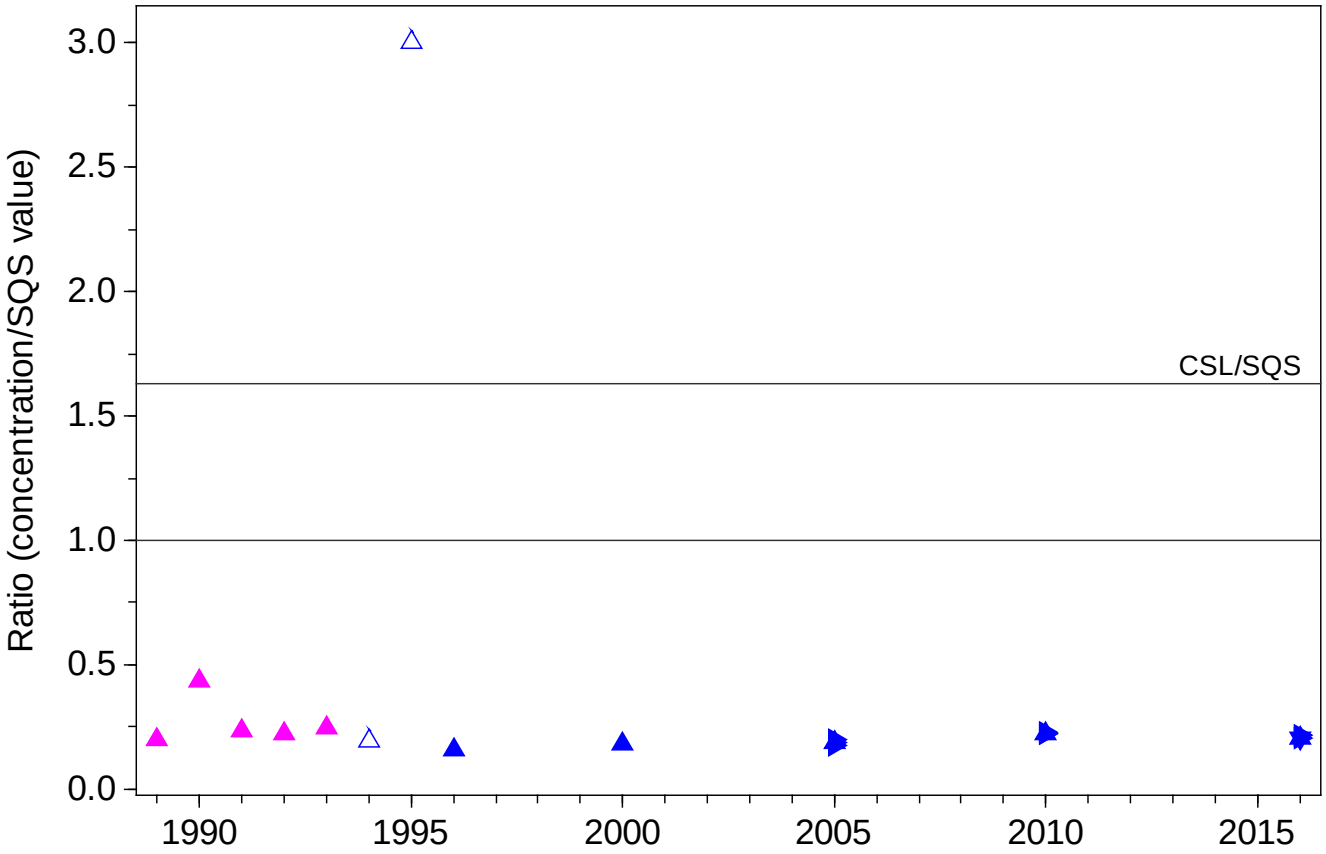
Bis(2-ethylhexyl)phthalate, Station 34



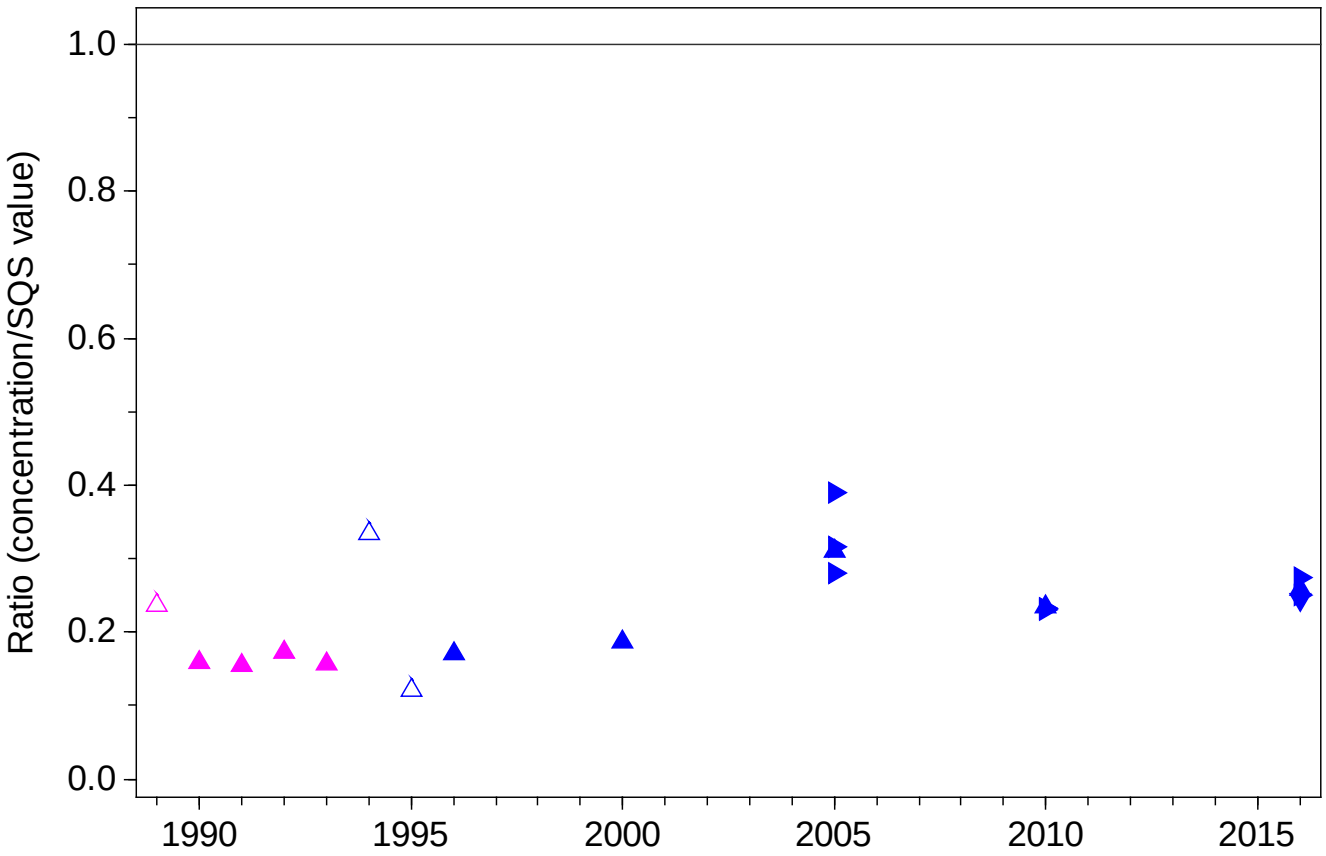
Butylbenzylphthalate, Station 34



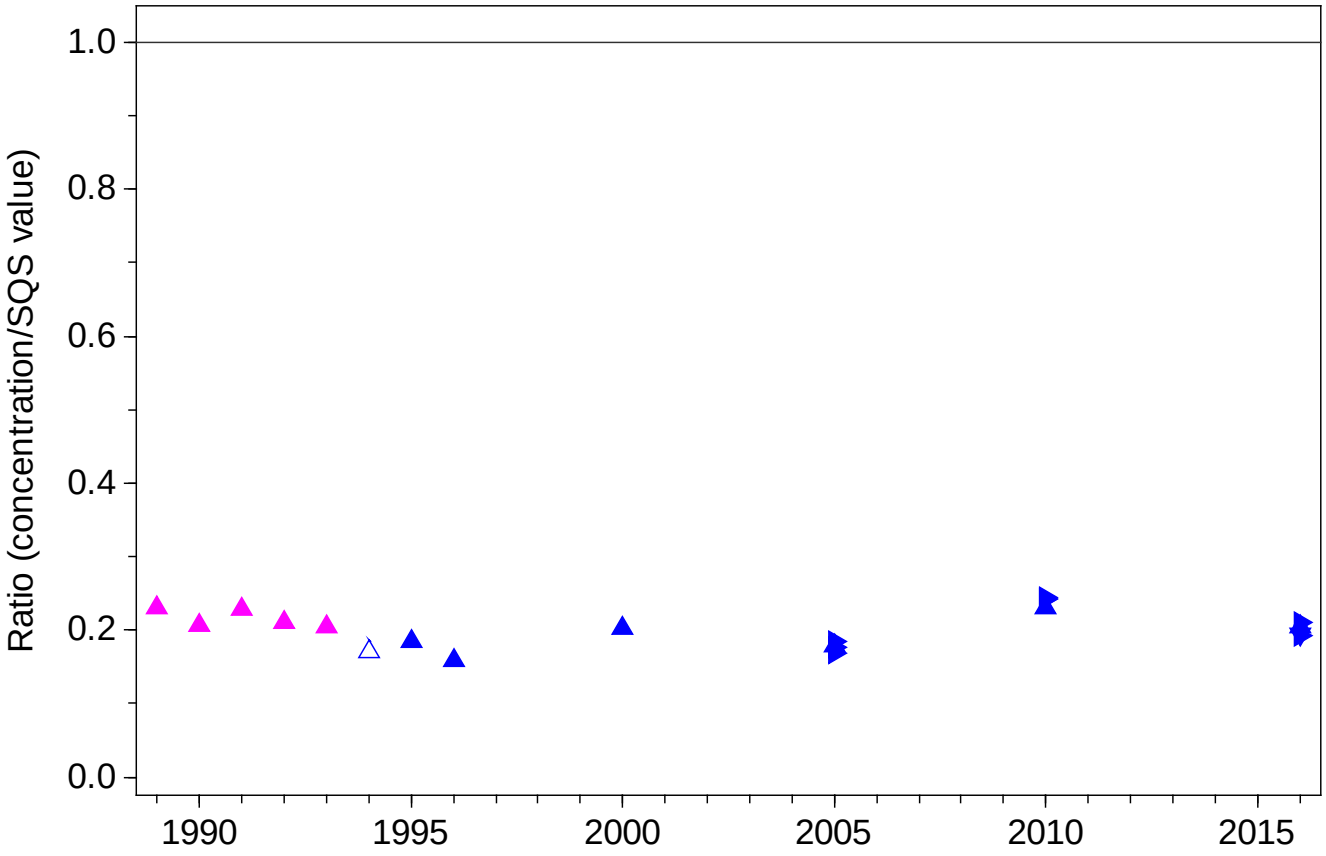
SQS quotient, Arsenic, Station 34



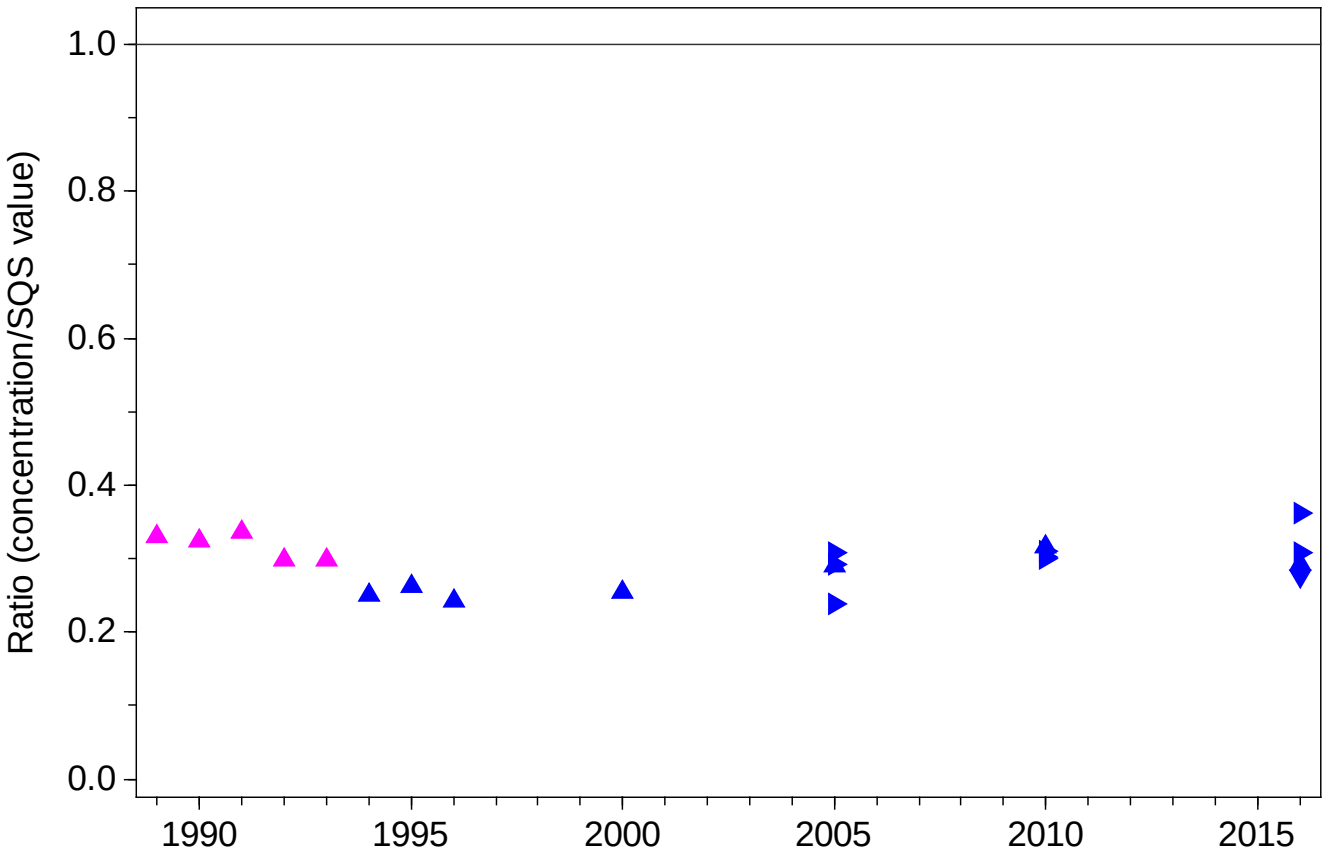
SQS quotient, Cadmium, Station 34



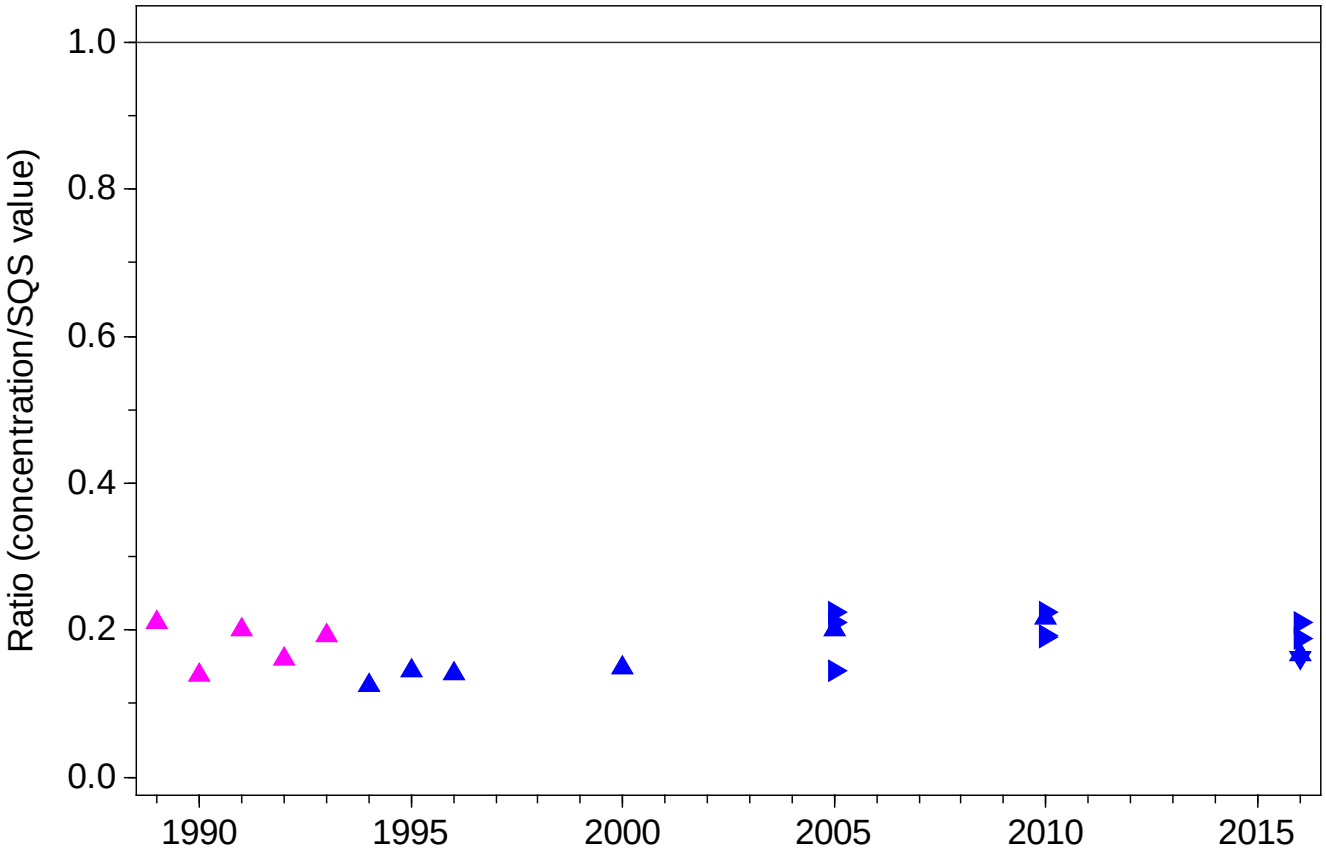
SQS quotient, Chromium, Station 34



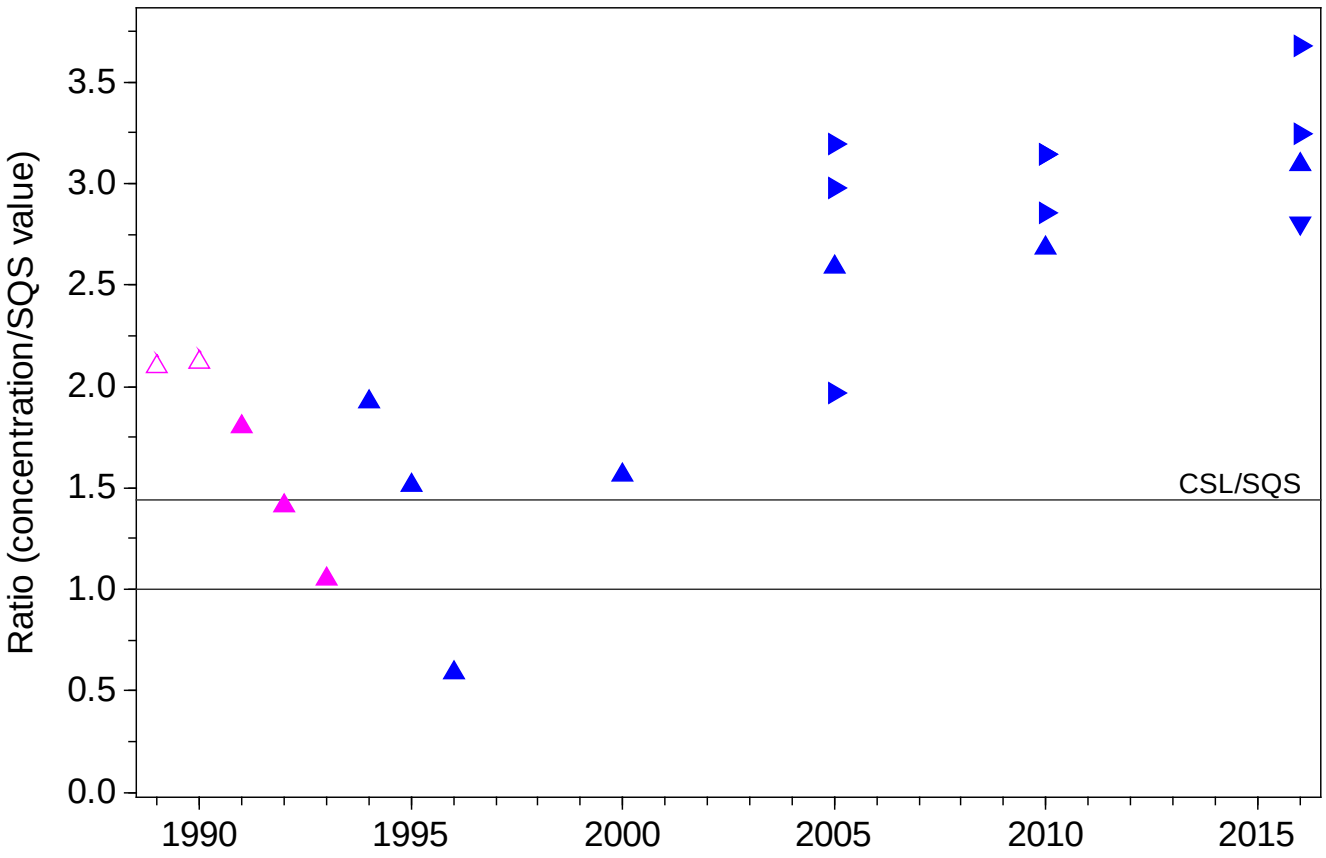
SQS quotient, Copper, Station 34



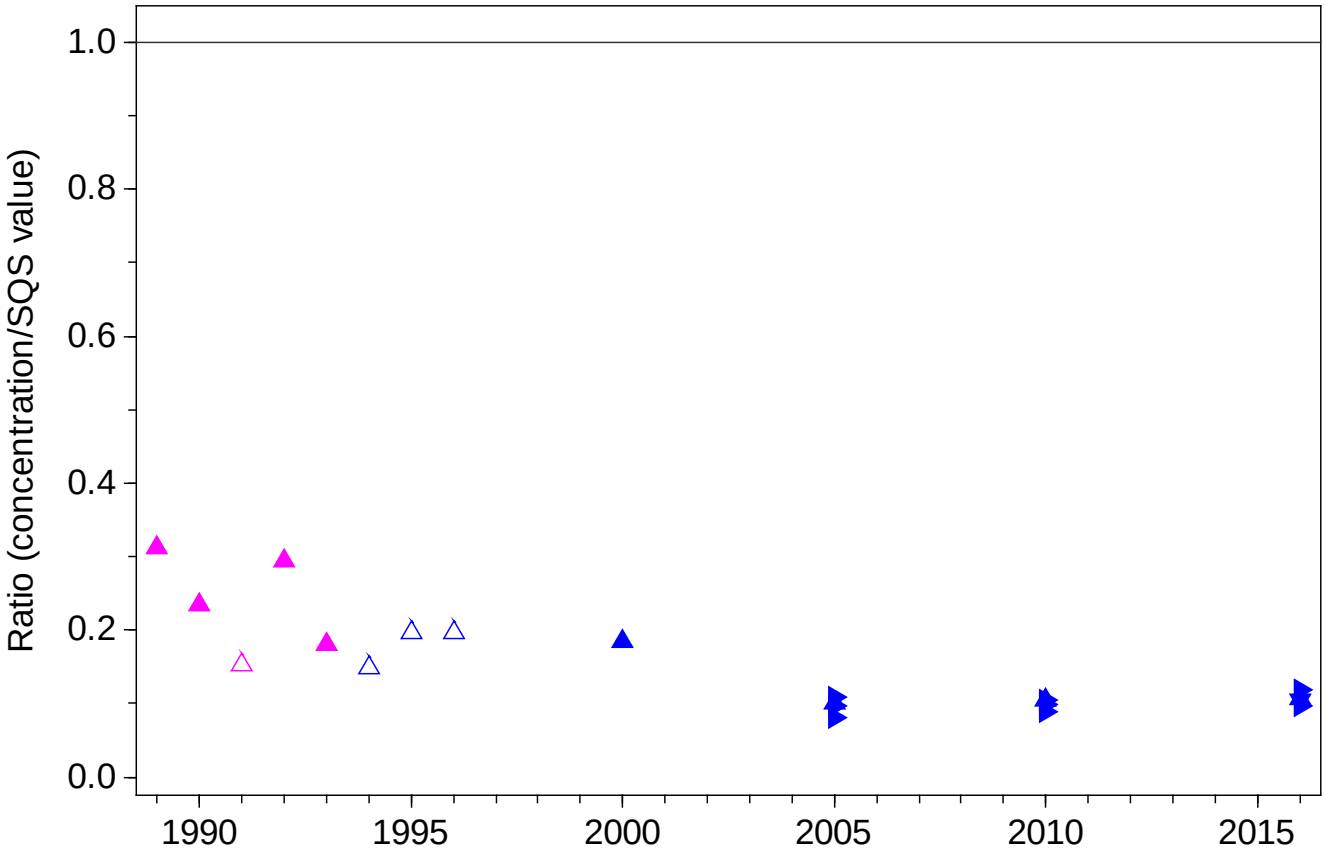
SQS quotient, Lead, Station 34



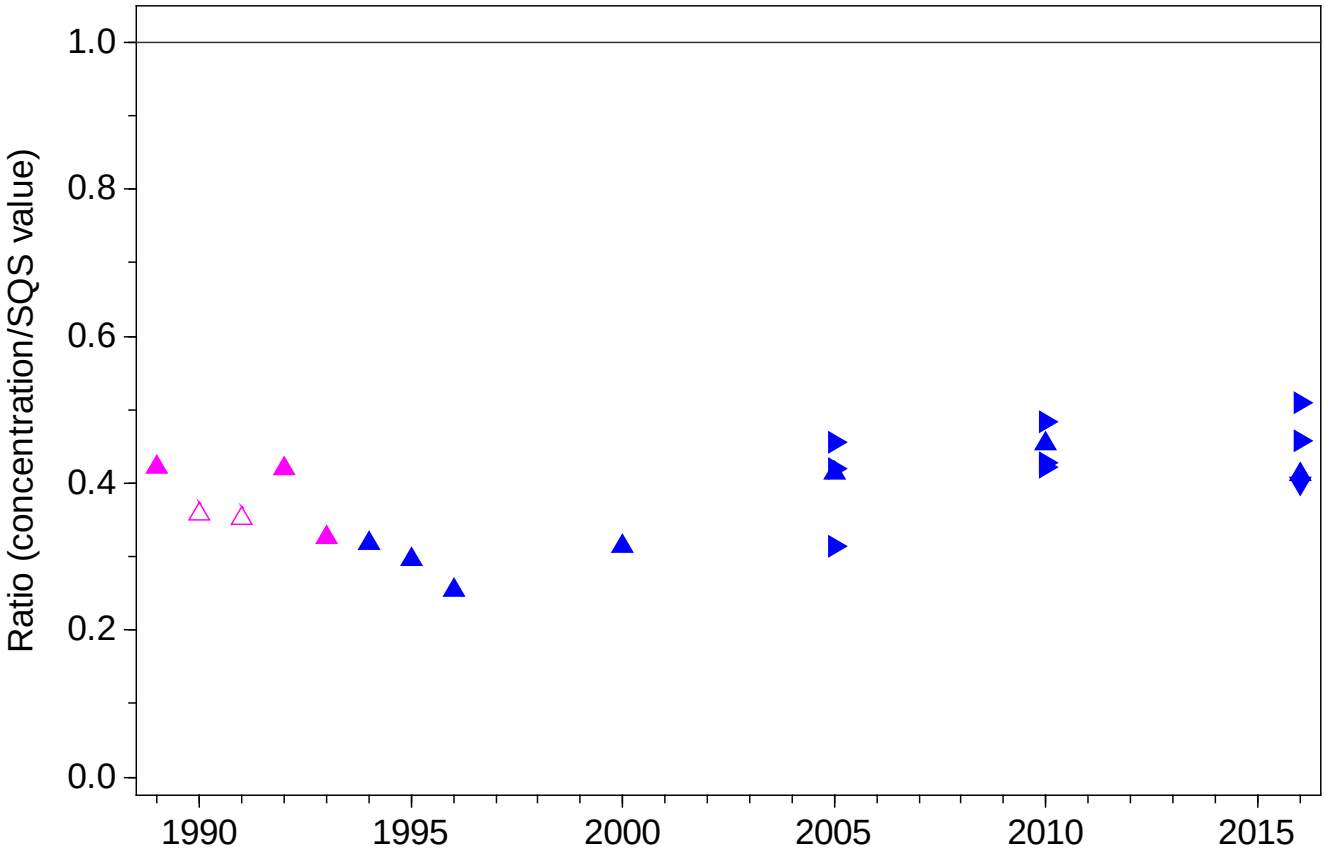
SQS quotient, Mercury, Station 34



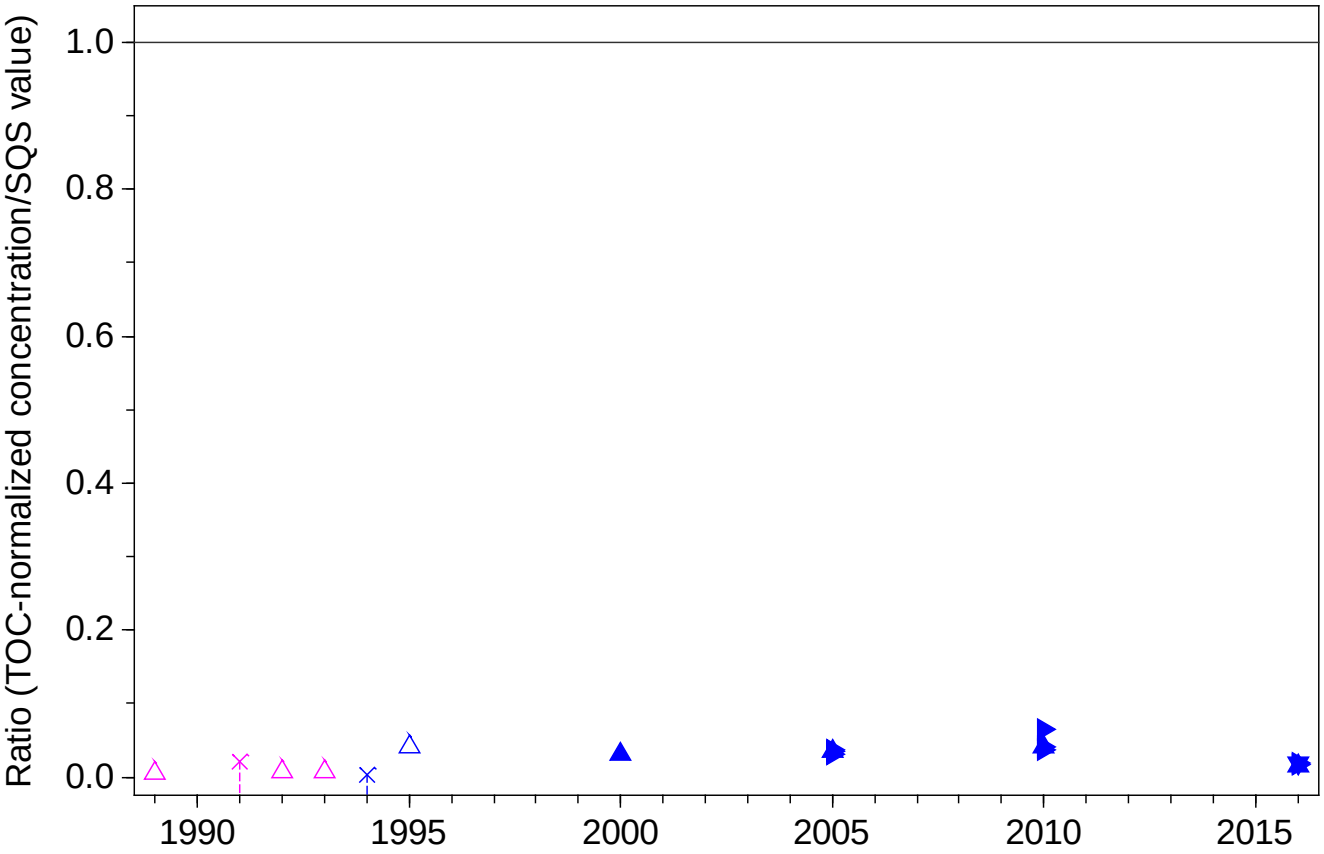
SQS quotient, Silver, Station 34



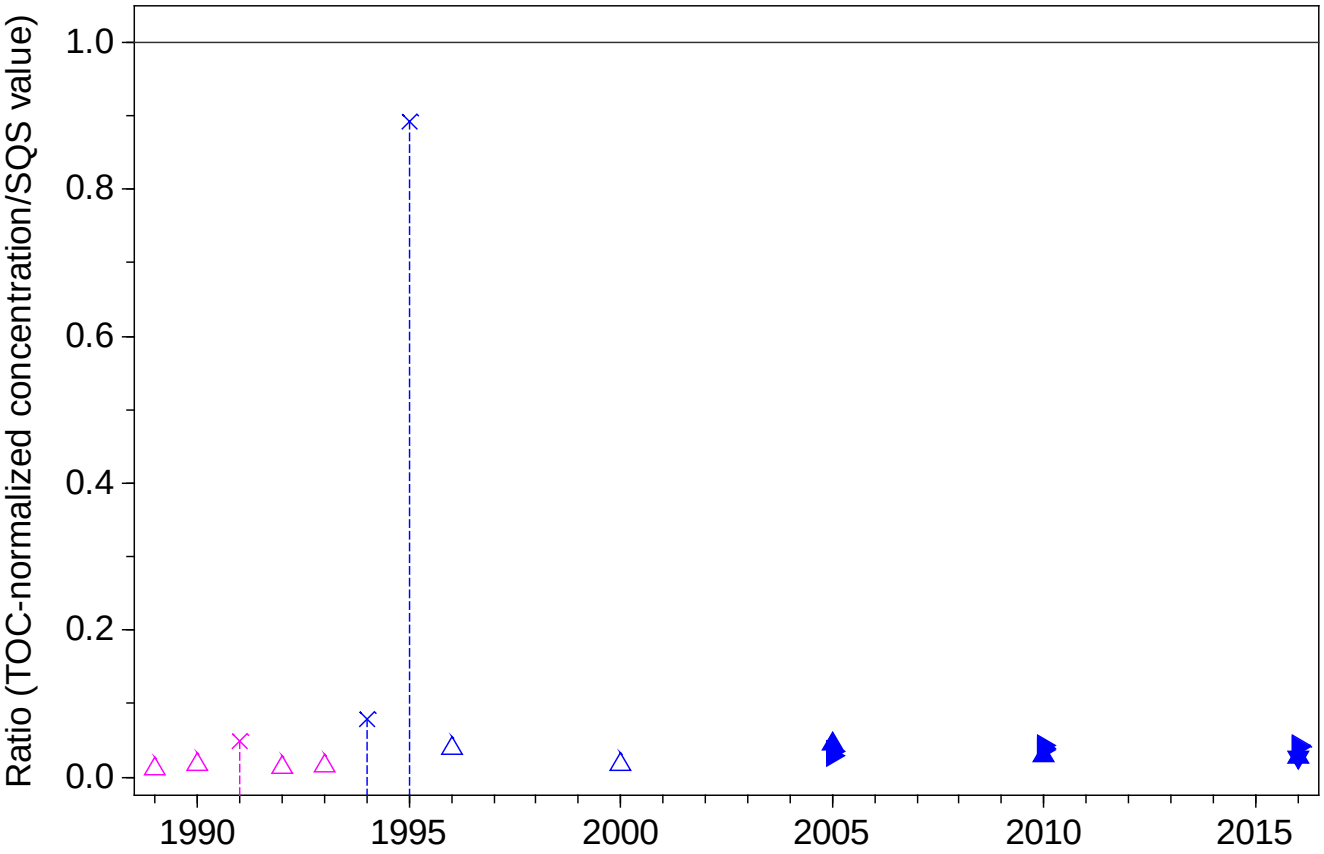
SQS quotient, Zinc, Station 34



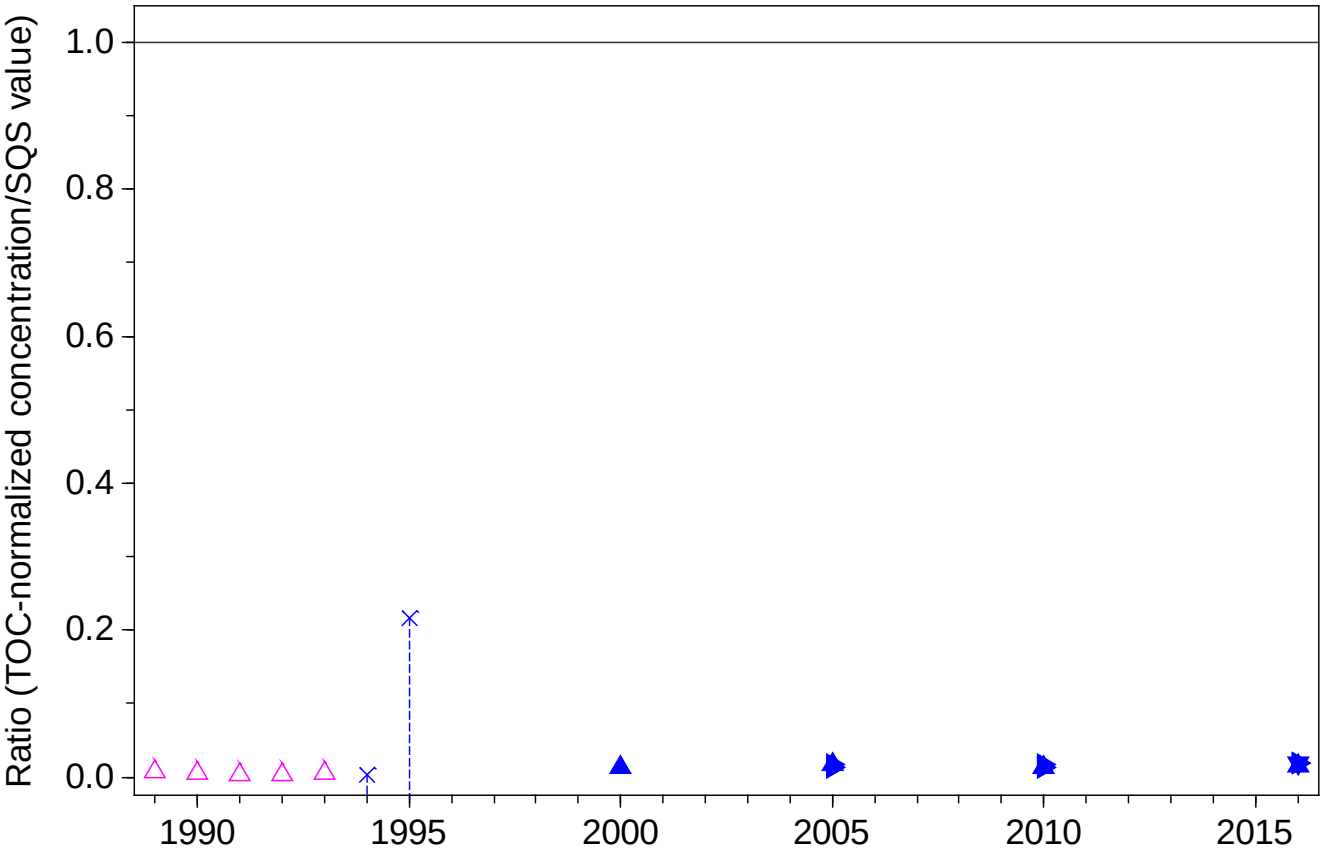
SQS quotient, 2-Methylnaphthalene, Station 34



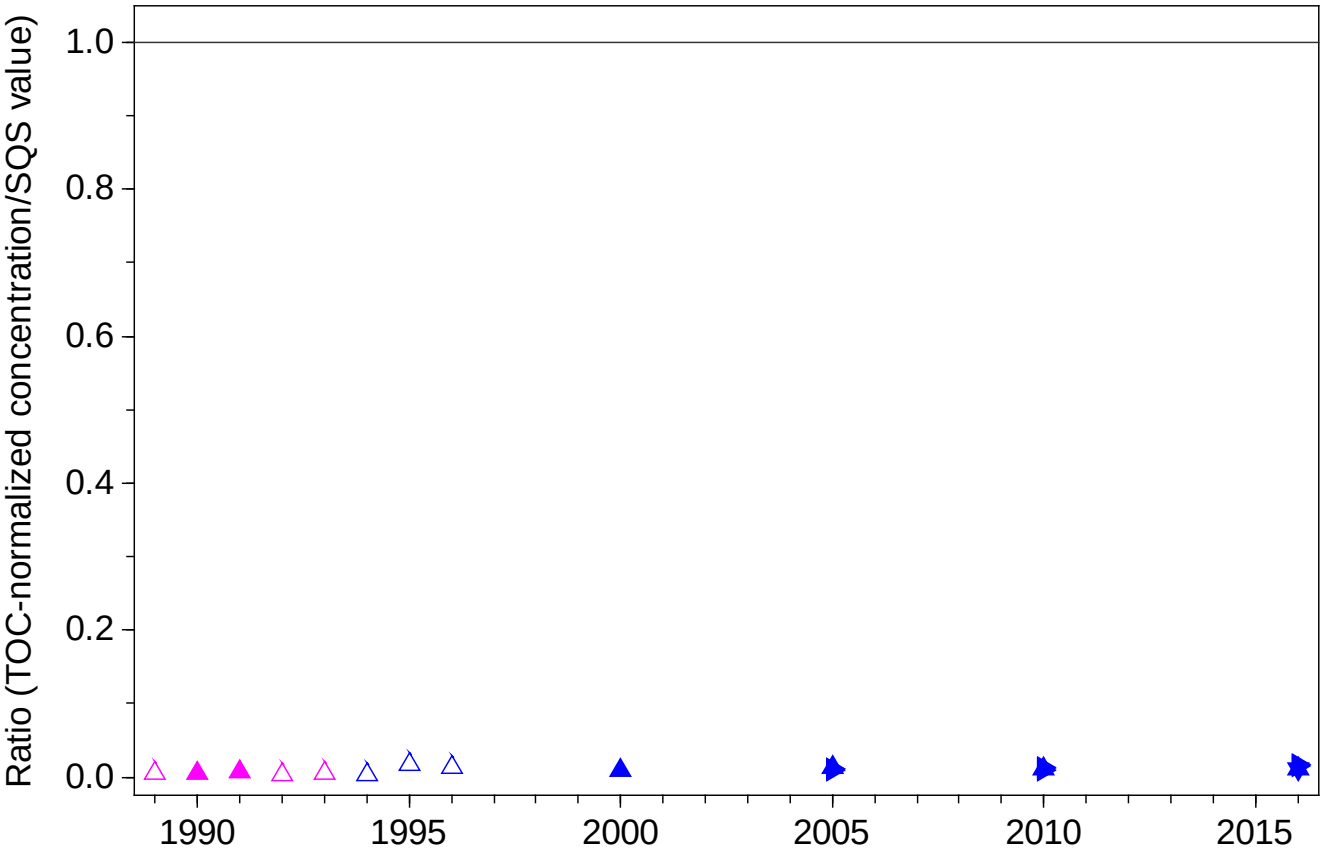
SQS quotient, Acenaphthene, Station 34



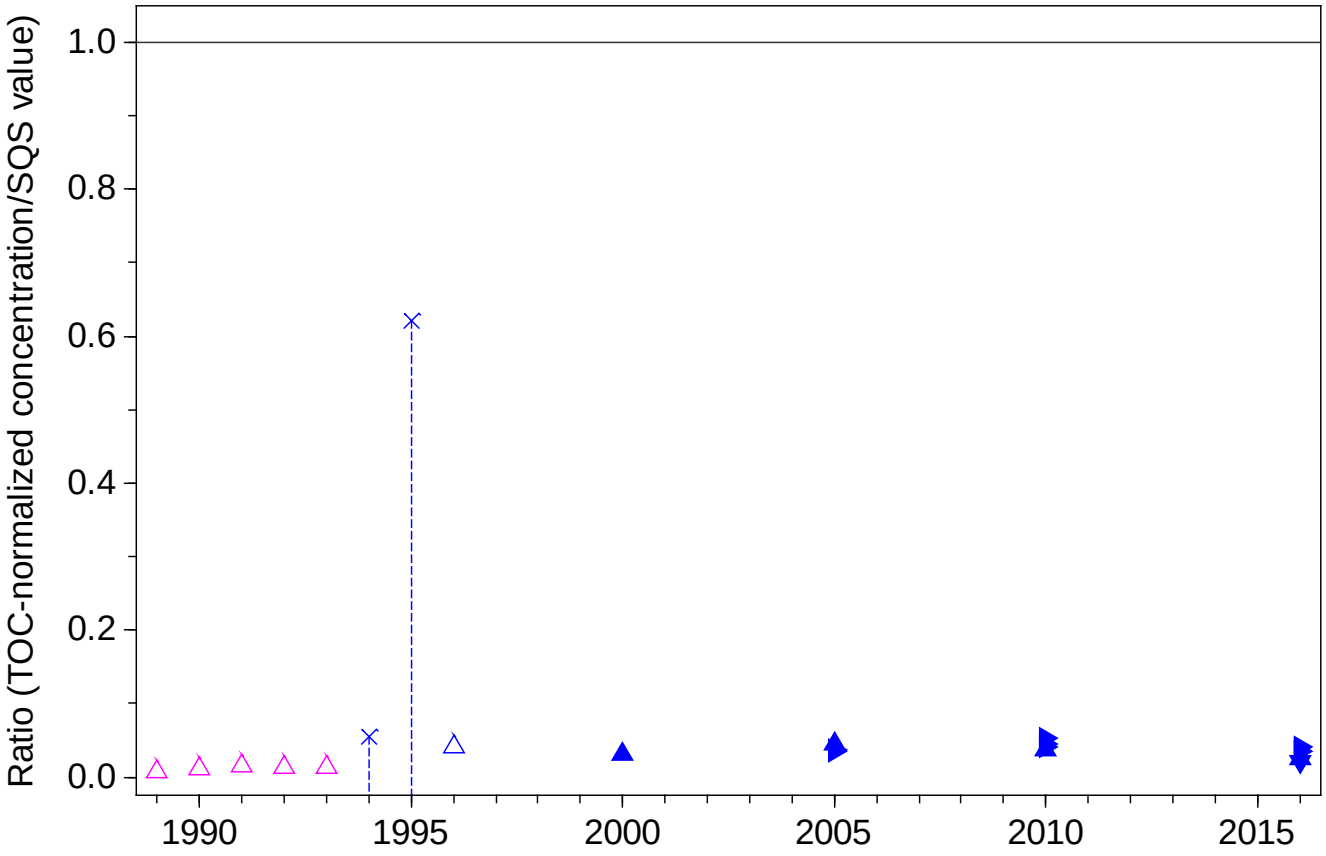
SQS quotient, Acenaphthylene, Station 34



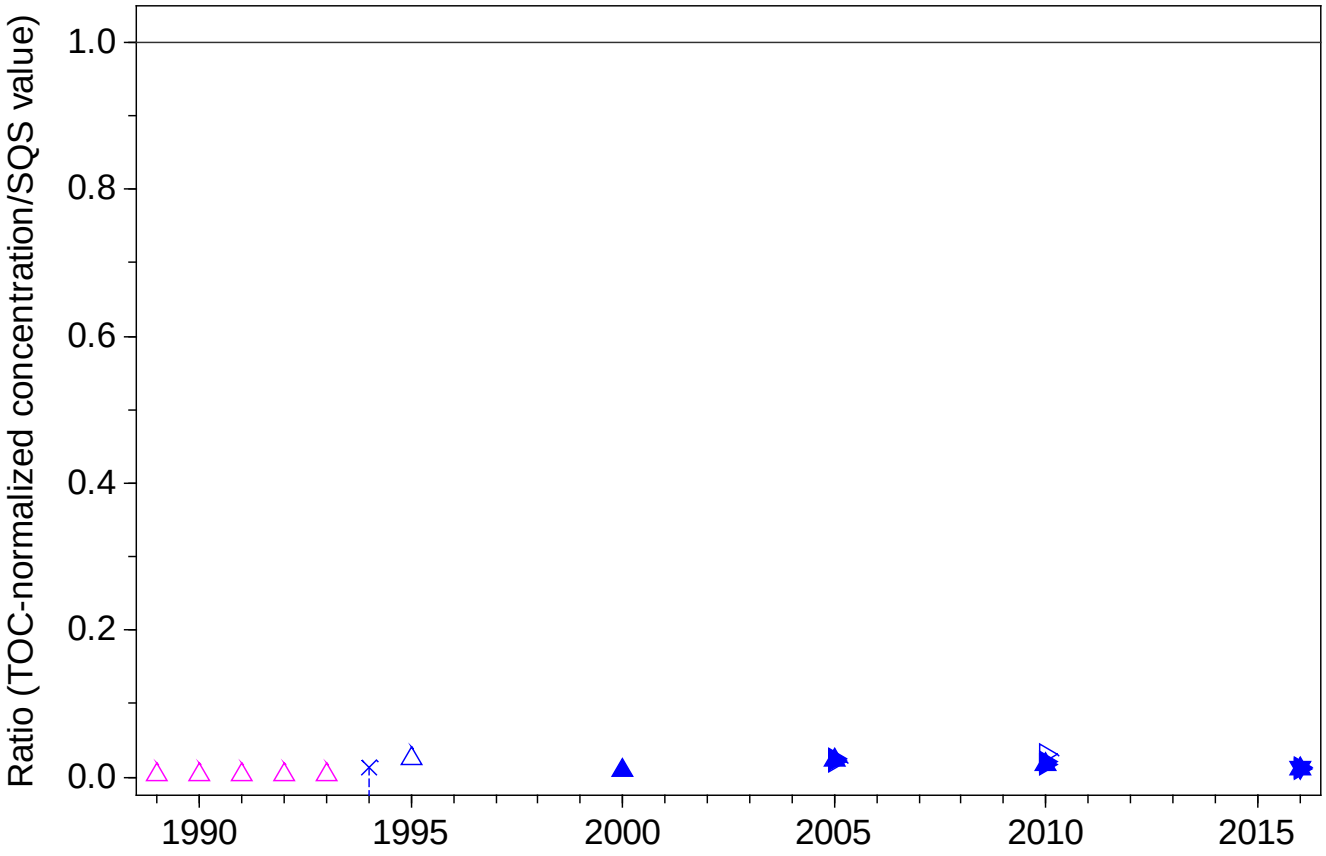
SQS quotient, Anthracene, Station 34



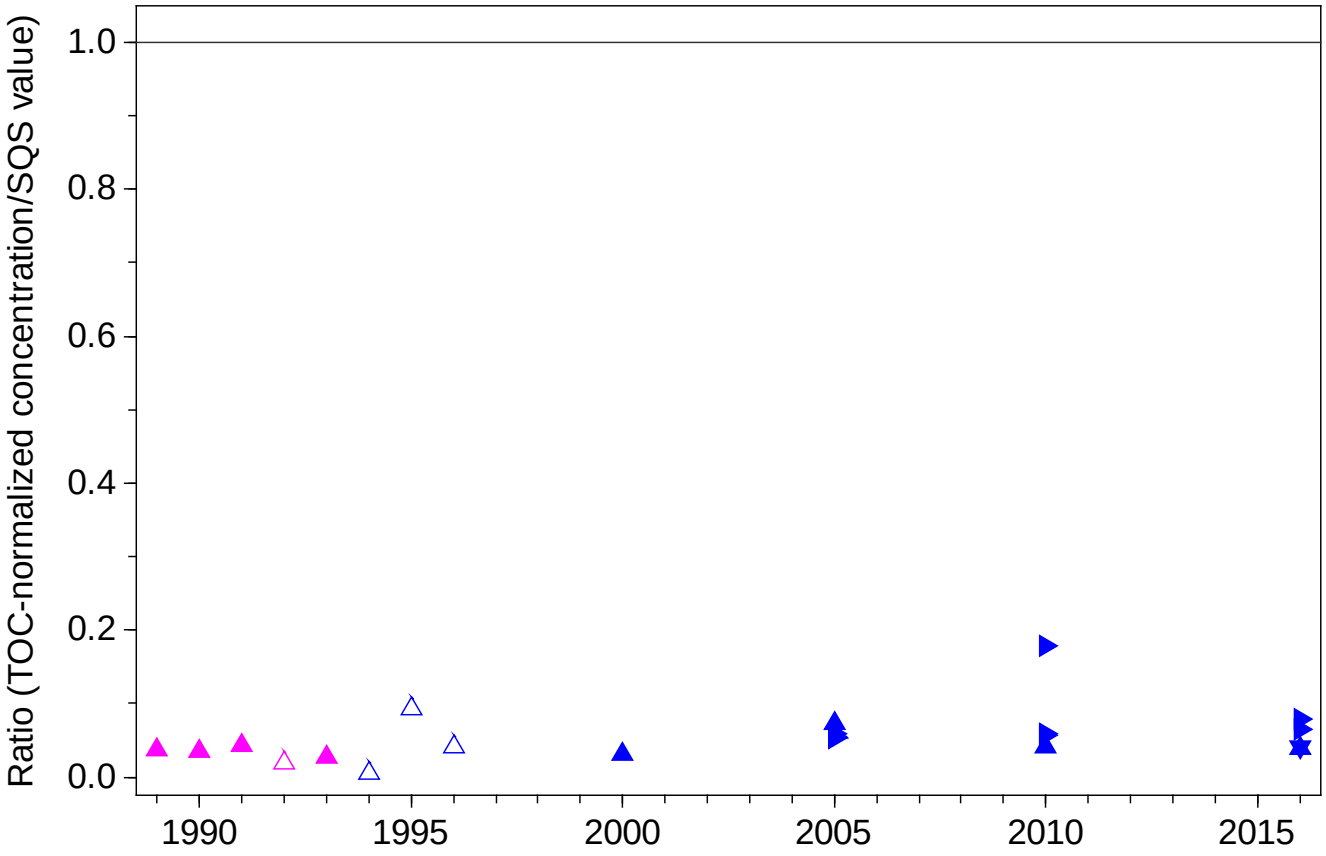
SQS quotient, Fluorene, Station 34



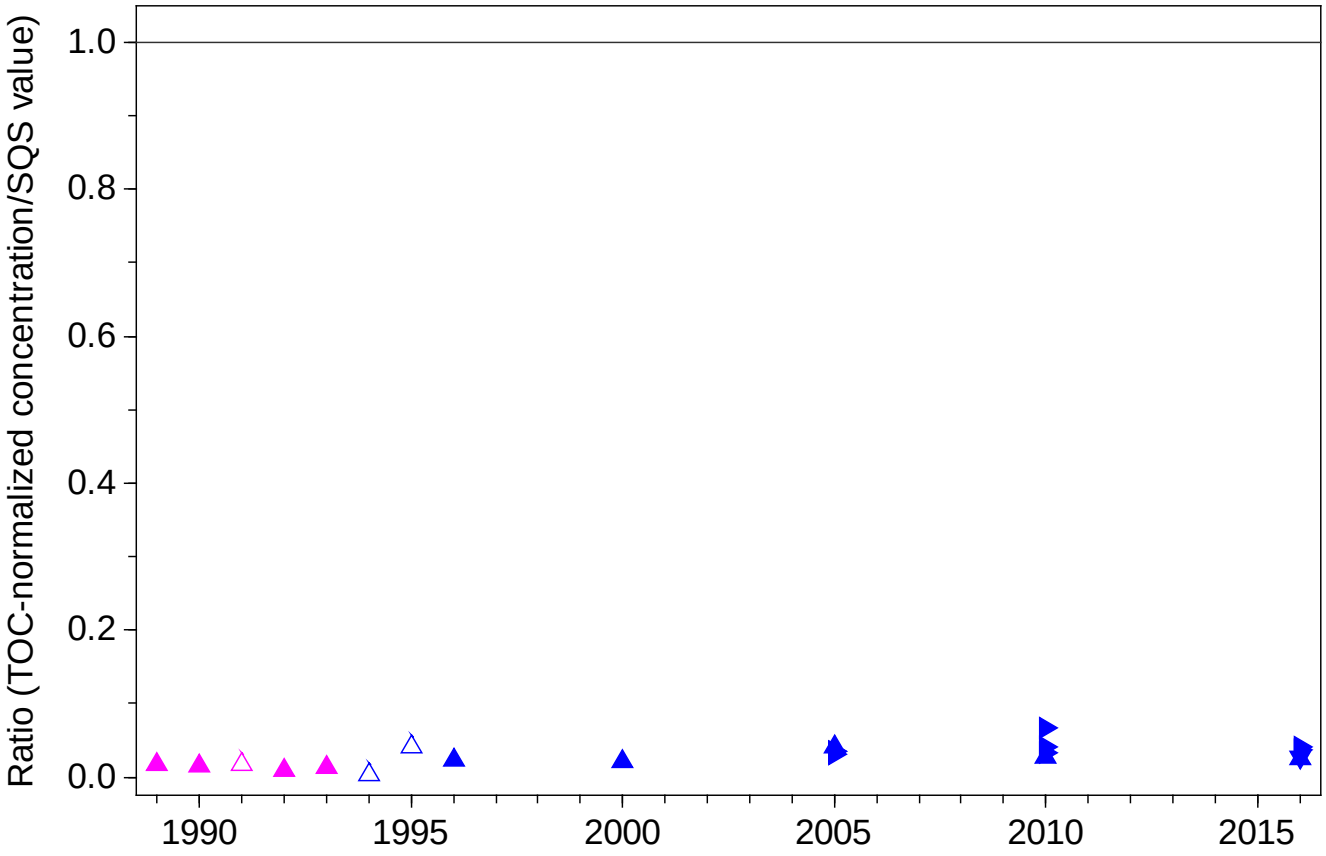
SQS quotient, Naphthalene, Station 34



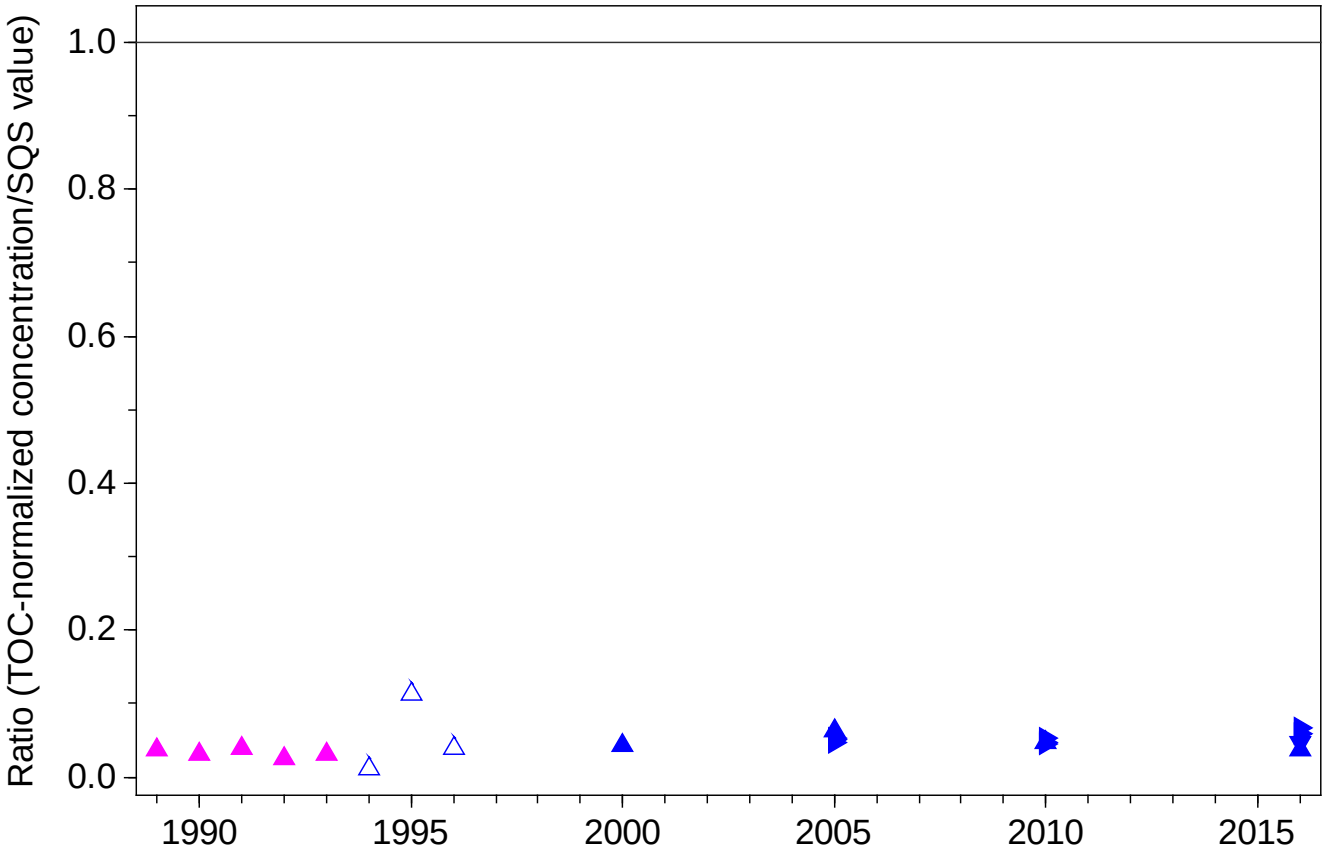
SQS quotient, Phenanthrene, Station 34



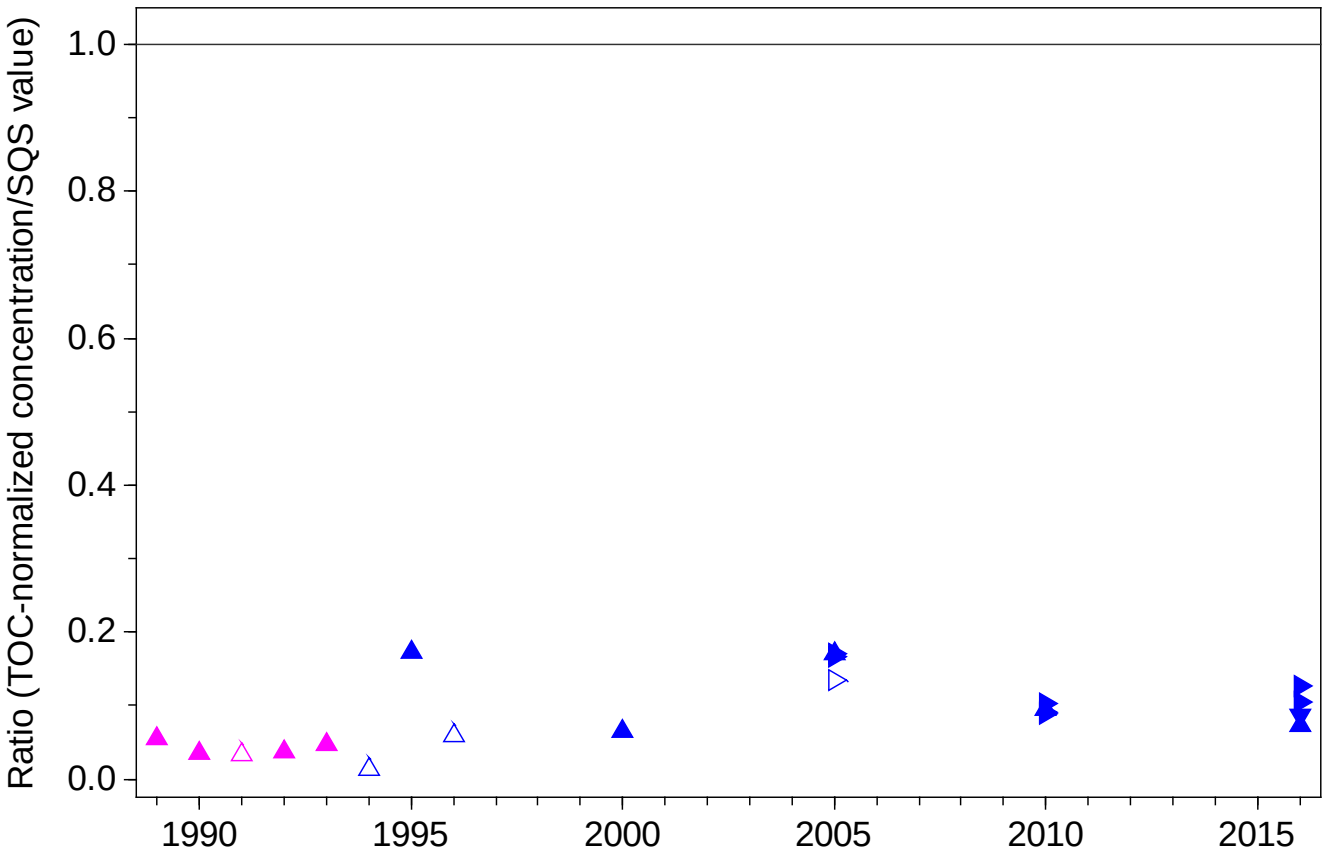
SQS quotient, Total LPAH, Station 34



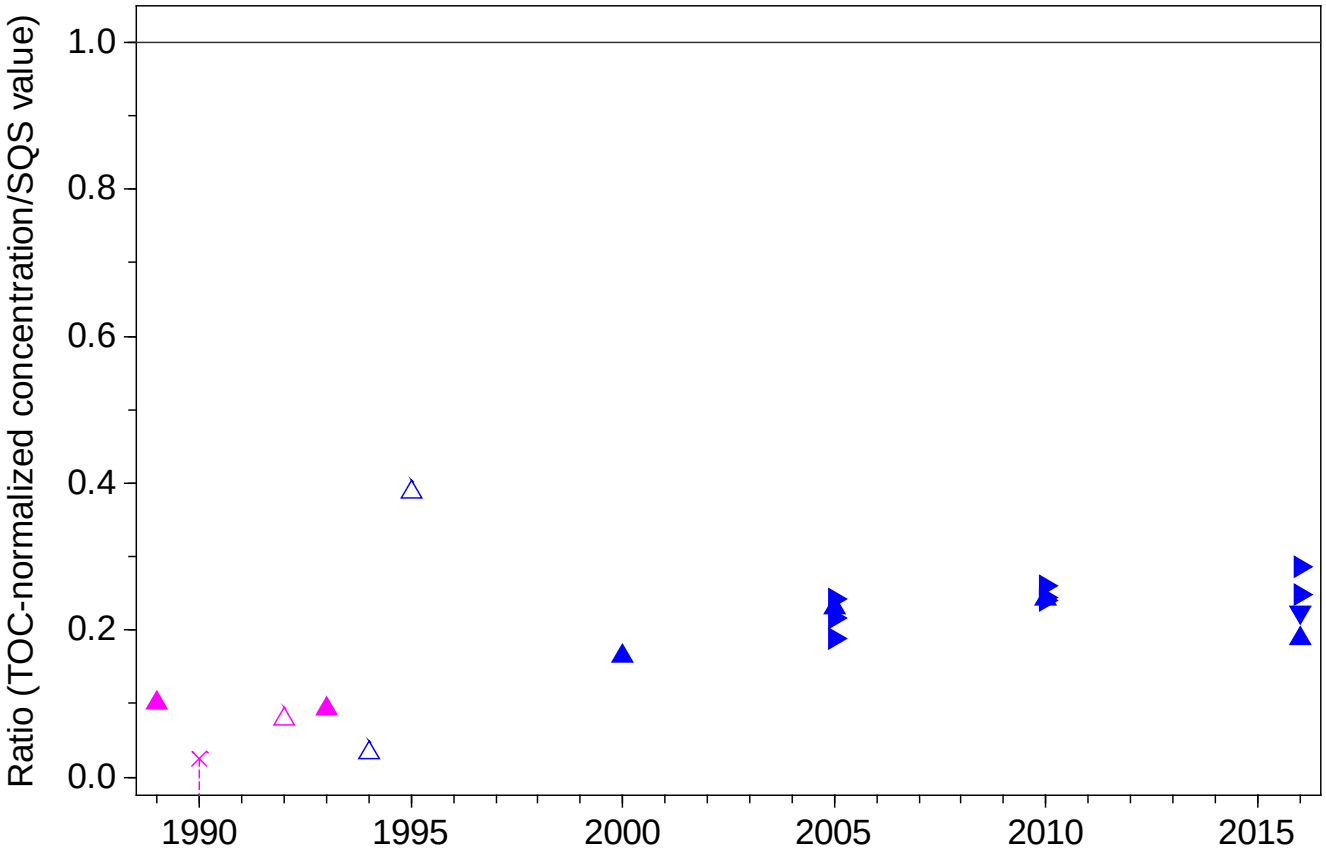
SQS quotient, Benzo(a)anthracene, Station 34



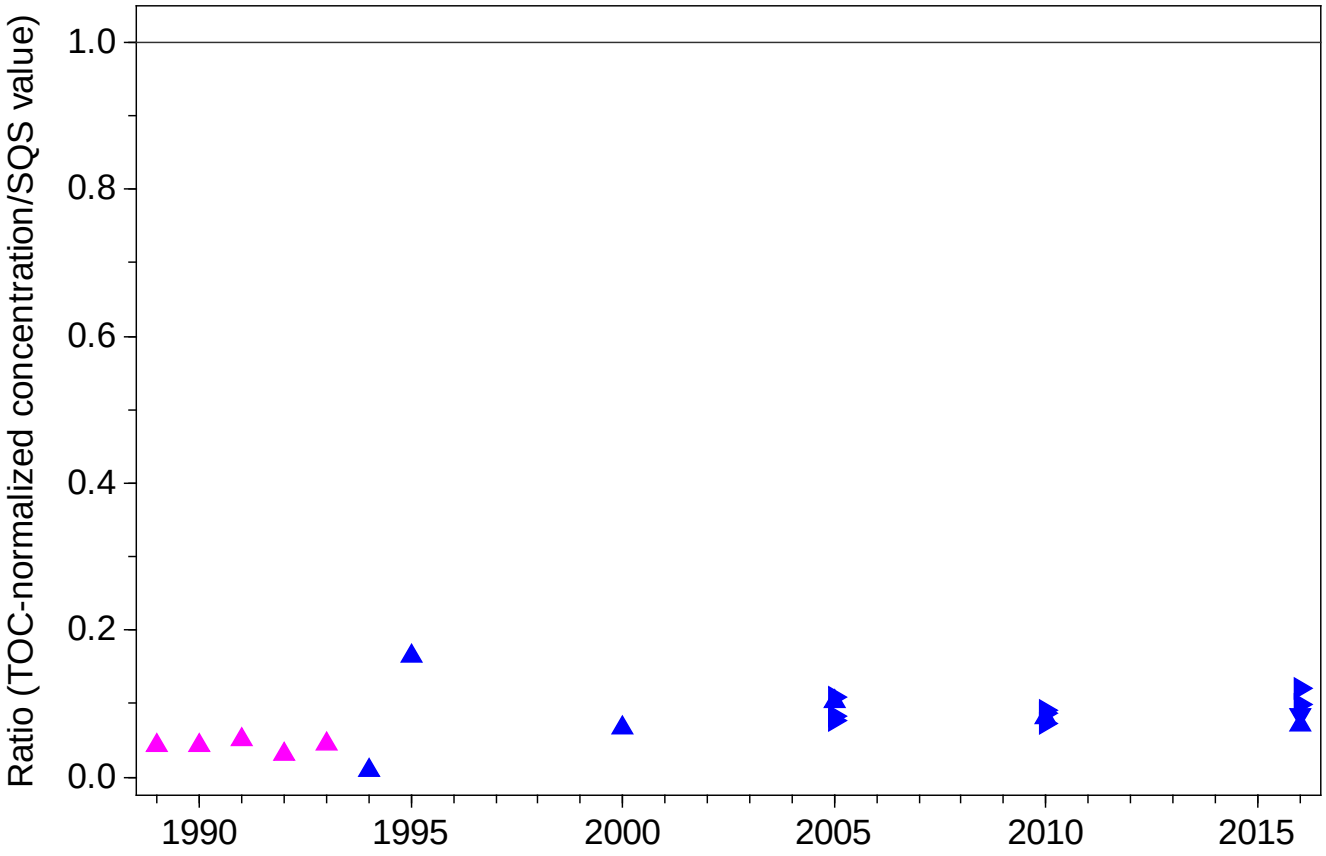
SQS quotient, Benzo(a)pyrene, Station 34



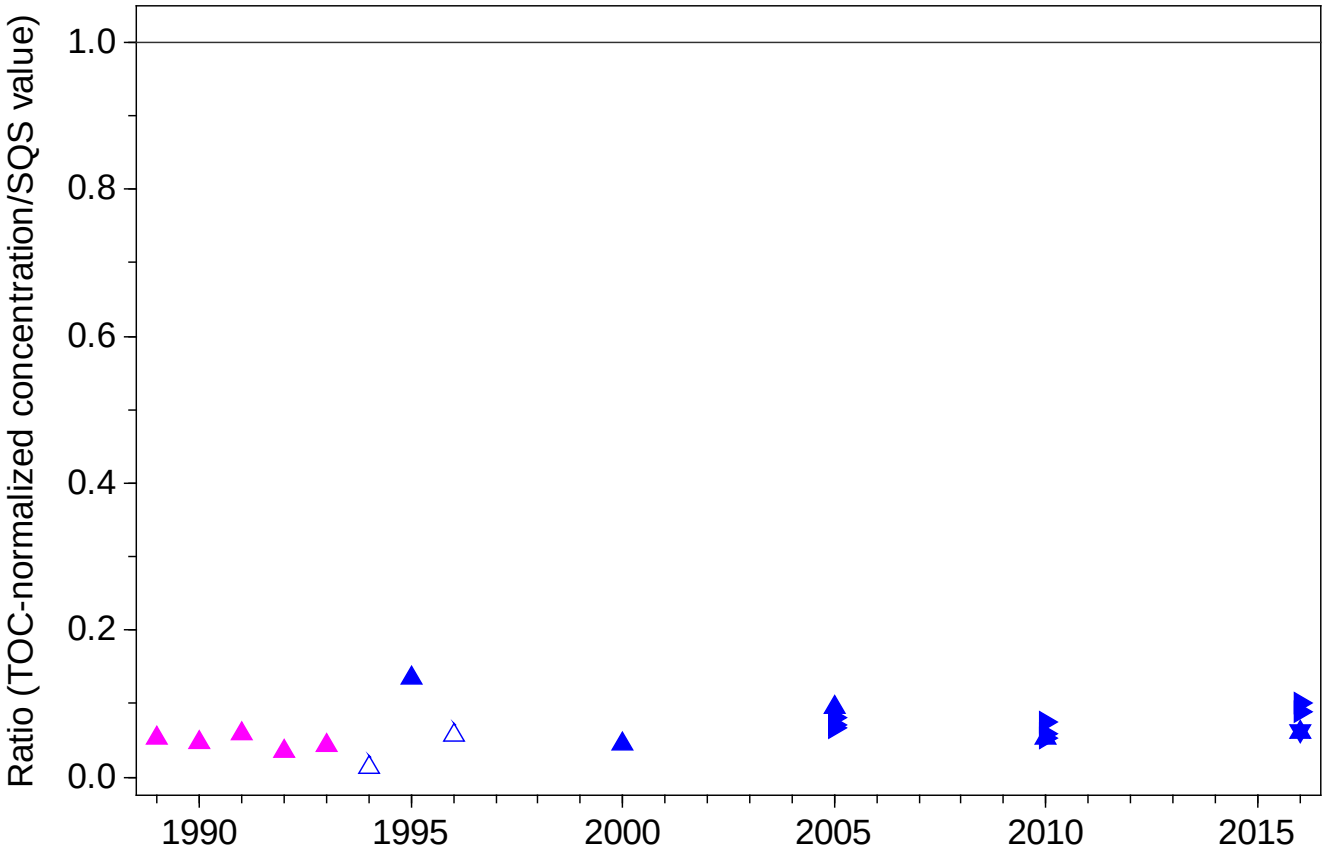
SQS quotient, Benzo(g,h,i)perylene, Station 34



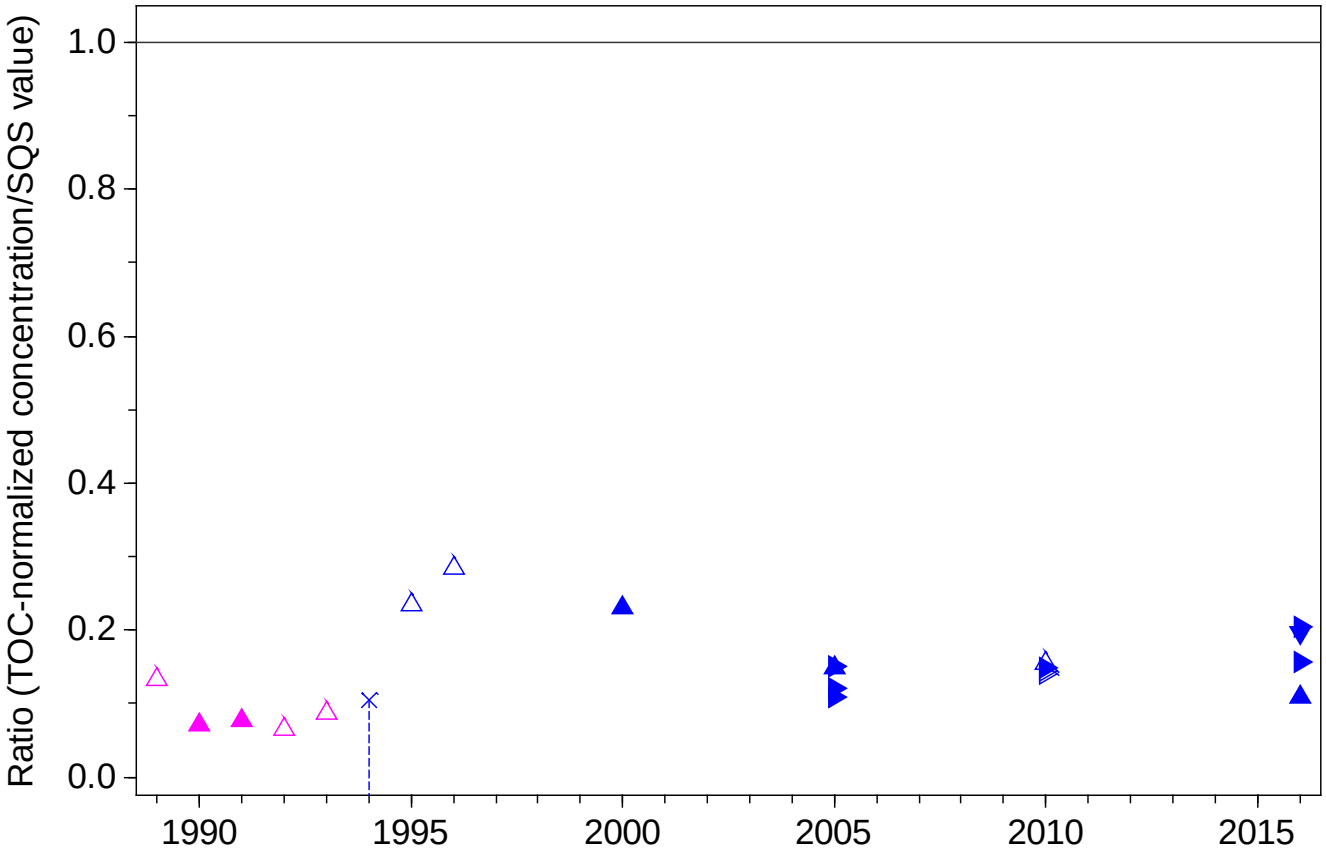
SQS quotient, Total Benzofluoranthenes, Station 34



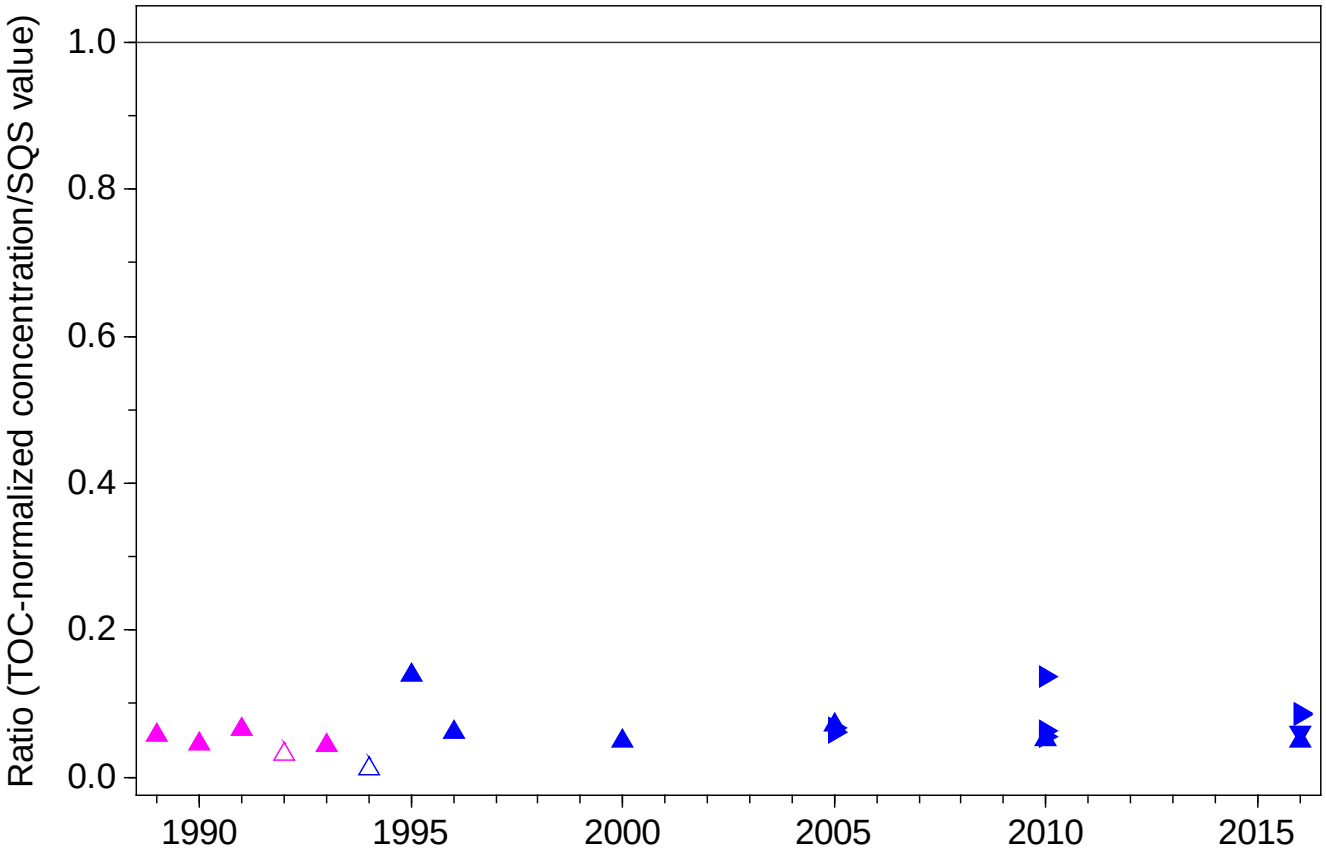
SQS quotient, Chrysene, Station 34



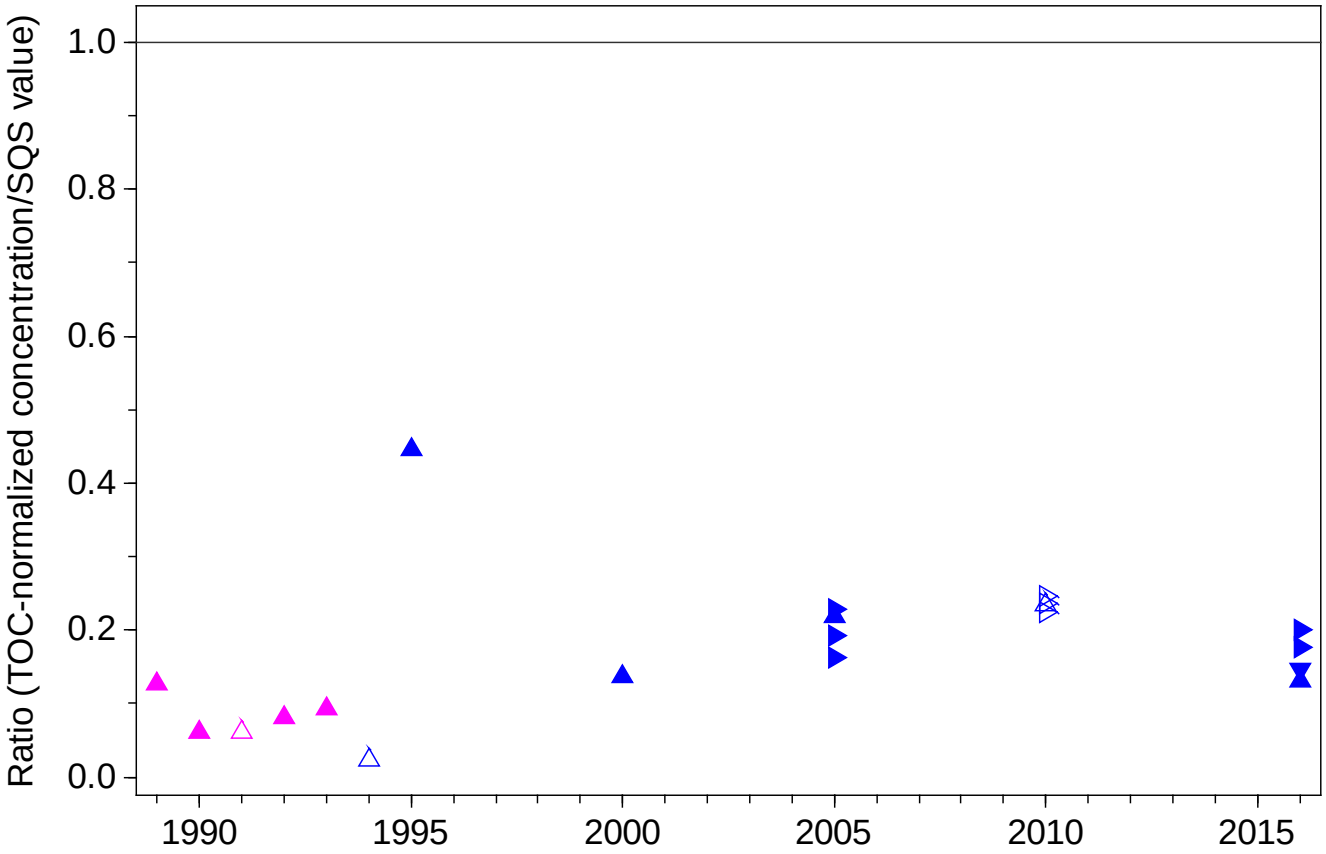
SQS quotient, Dibenzo(a,h)anthracene, Station 34



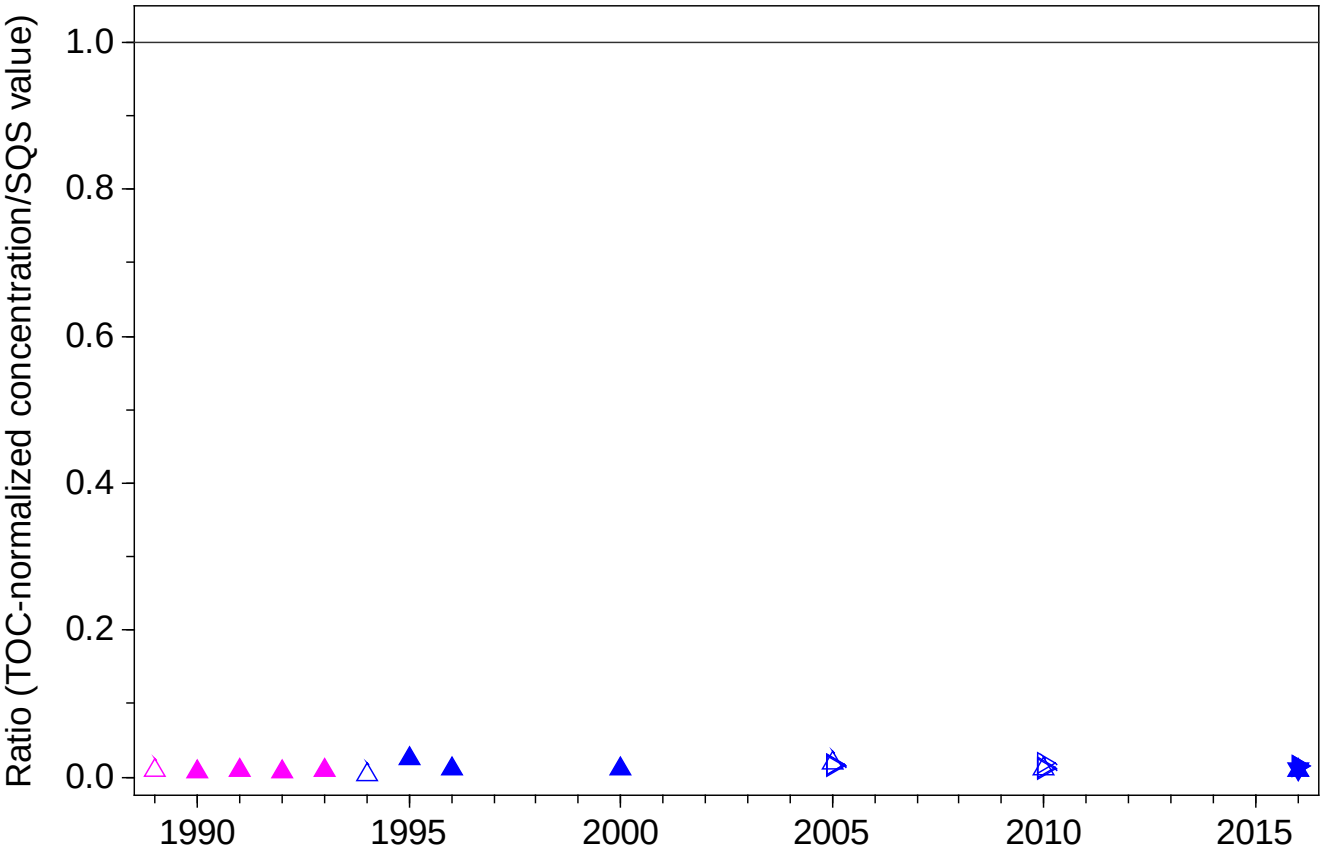
SQS quotient, Fluoranthene, Station 34



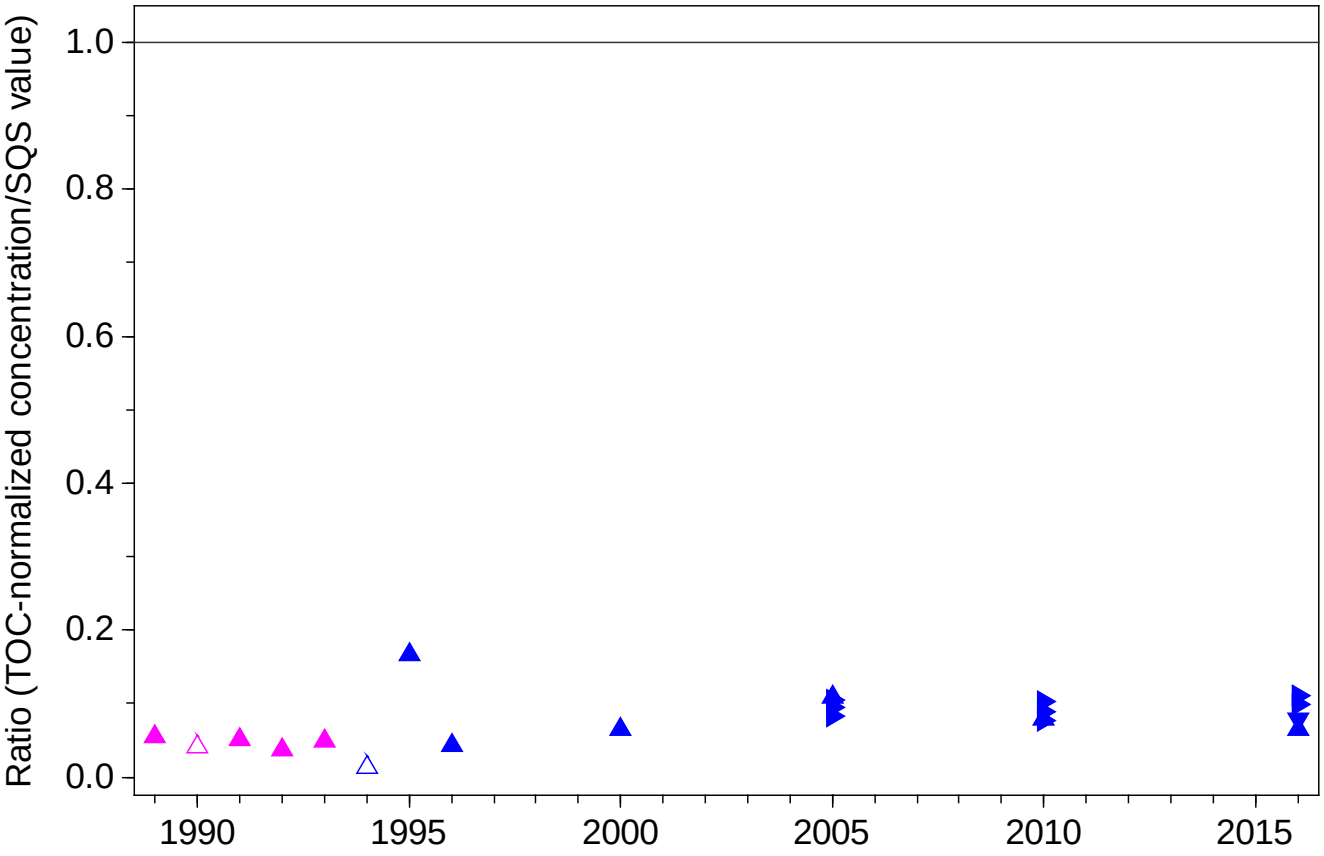
SQS quotient, Indeno(1,2,3-c,d)pyrene, Station 34



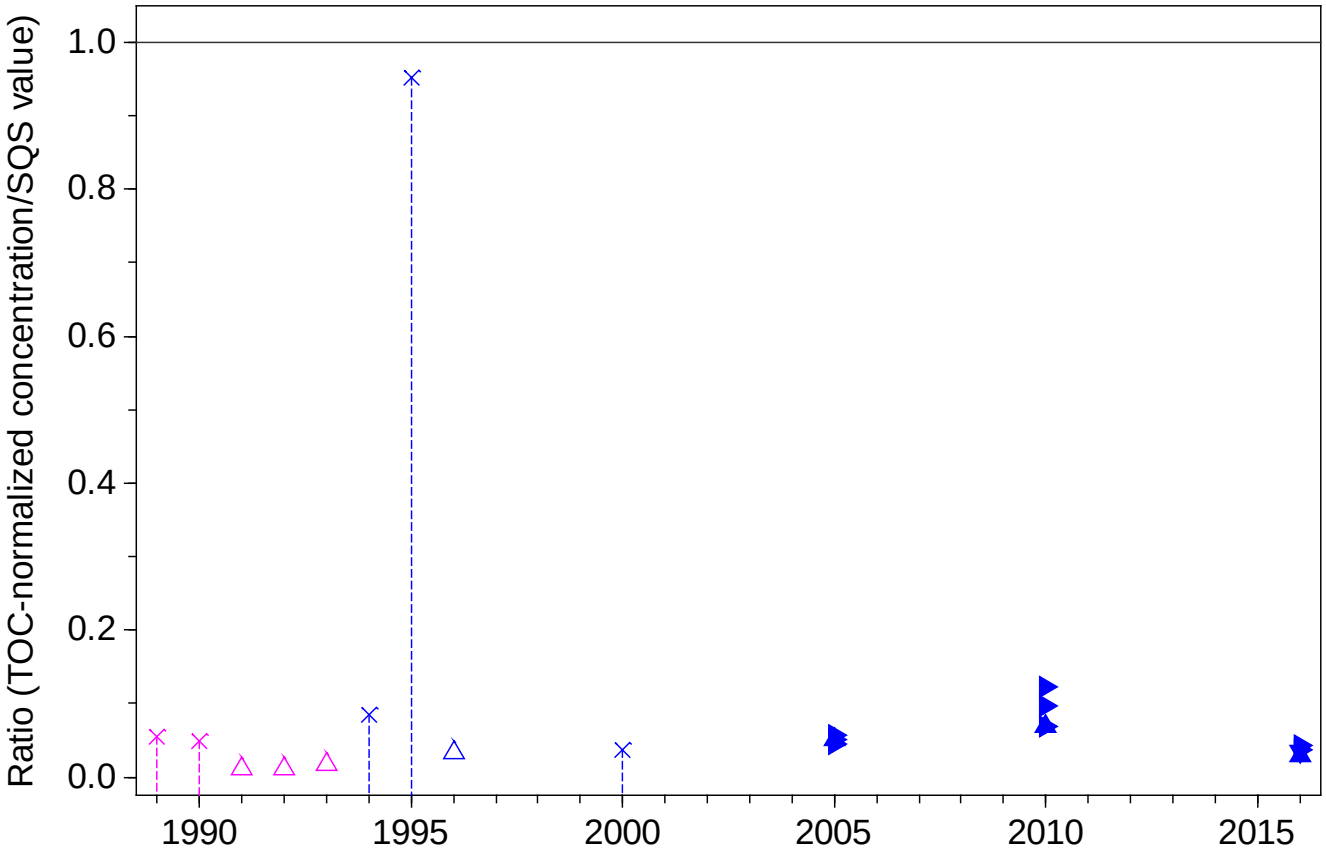
SQS quotient, Pyrene, Station 34



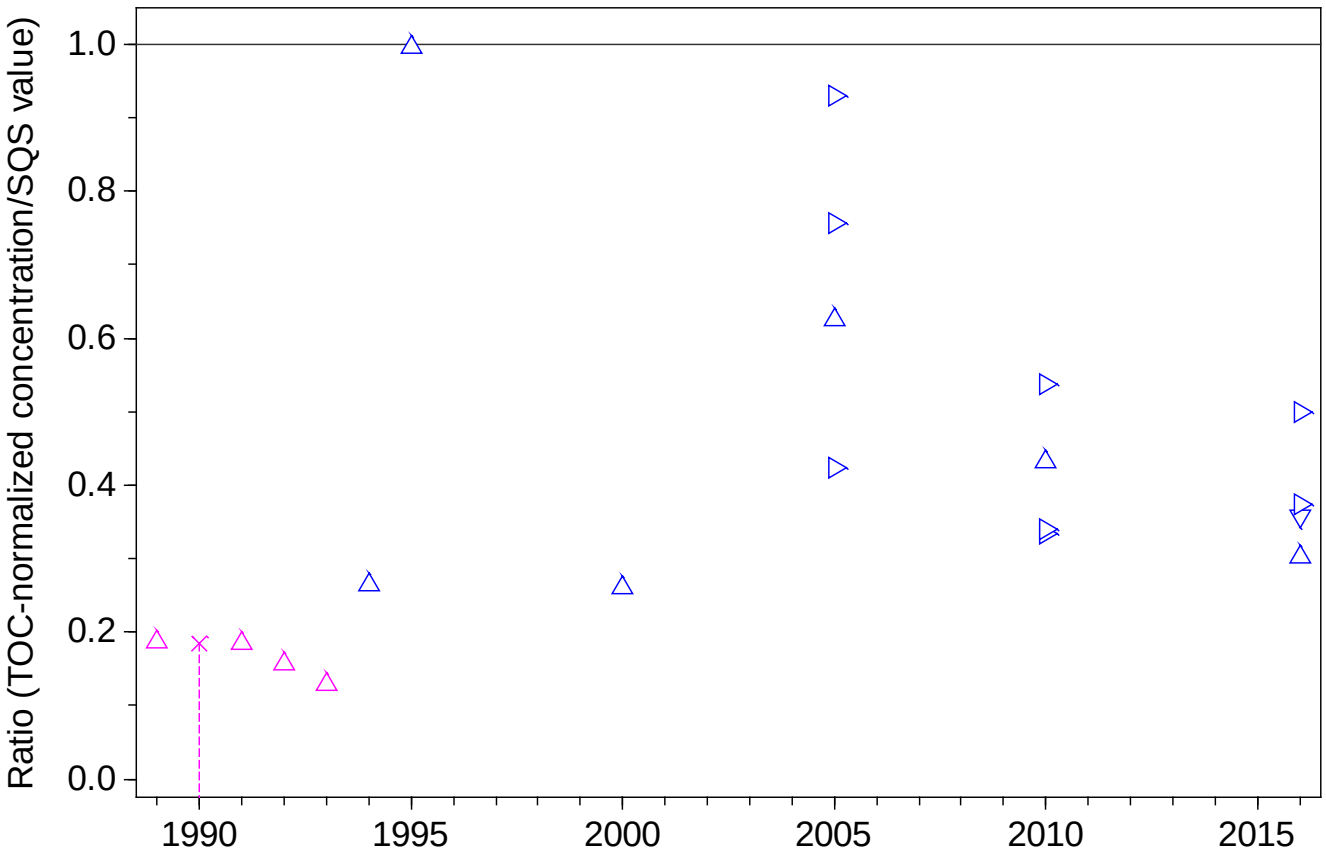
SQS quotient, Total HPAH, Station 34



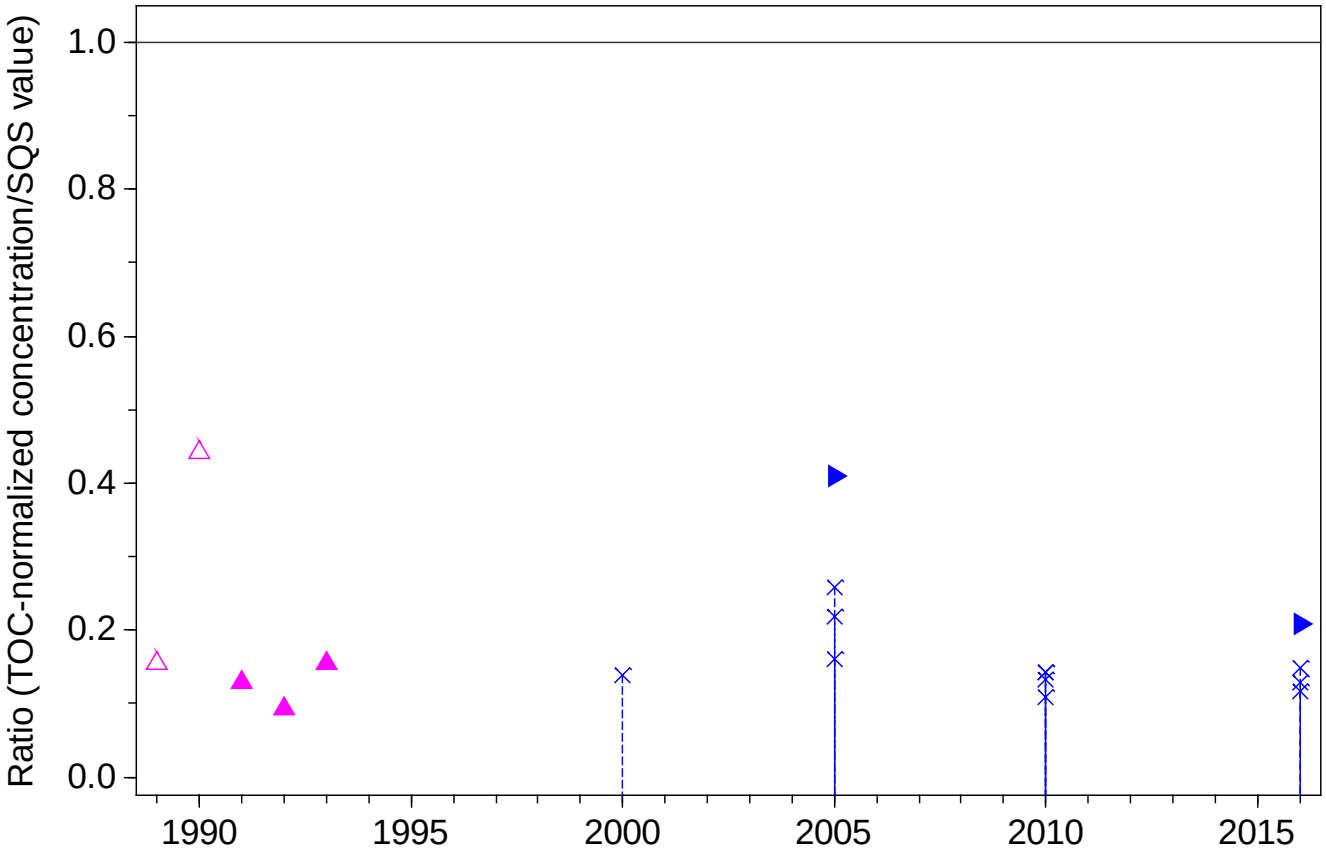
SQS quotient, Dibenzofuran, Station 34



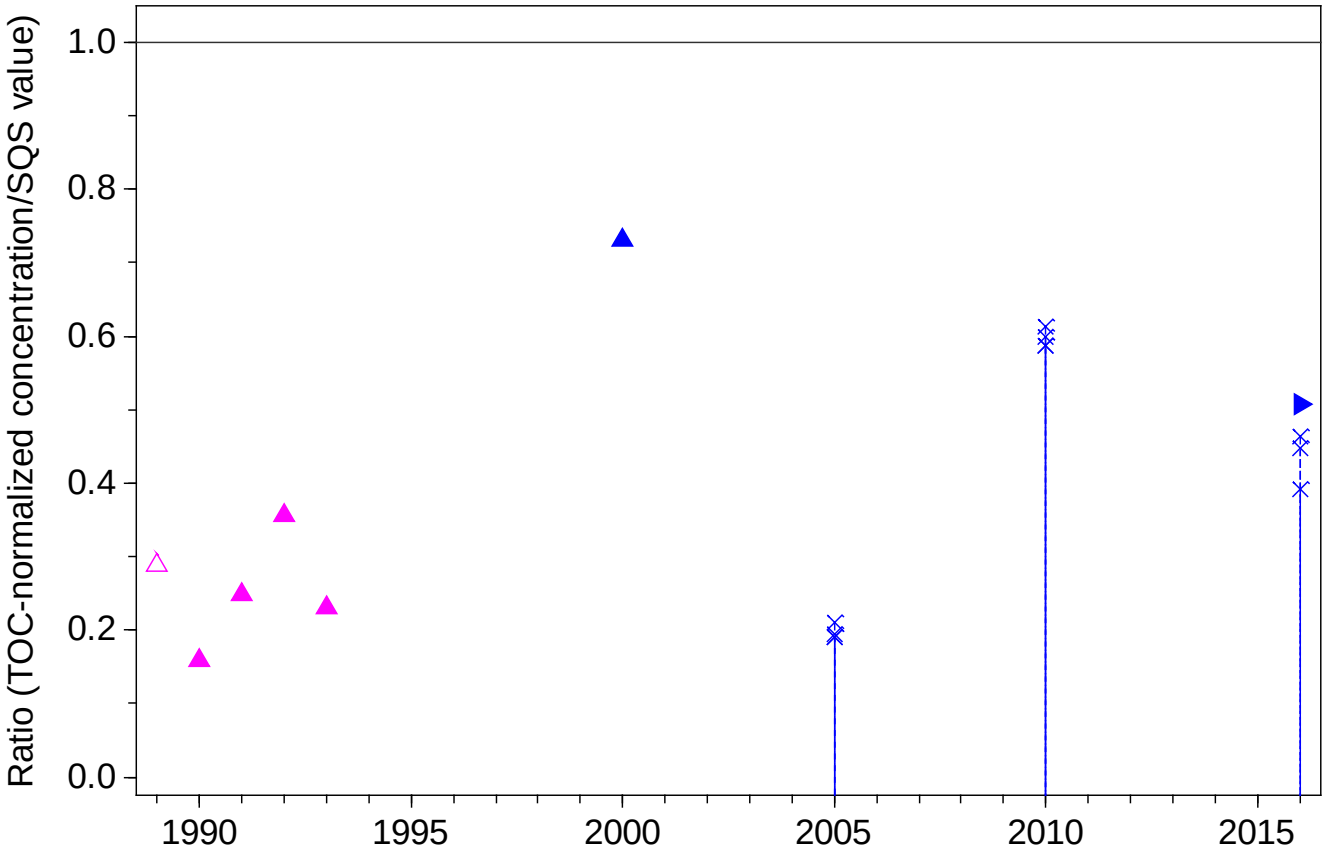
SQS quotient, Total Aroclors, Station 34



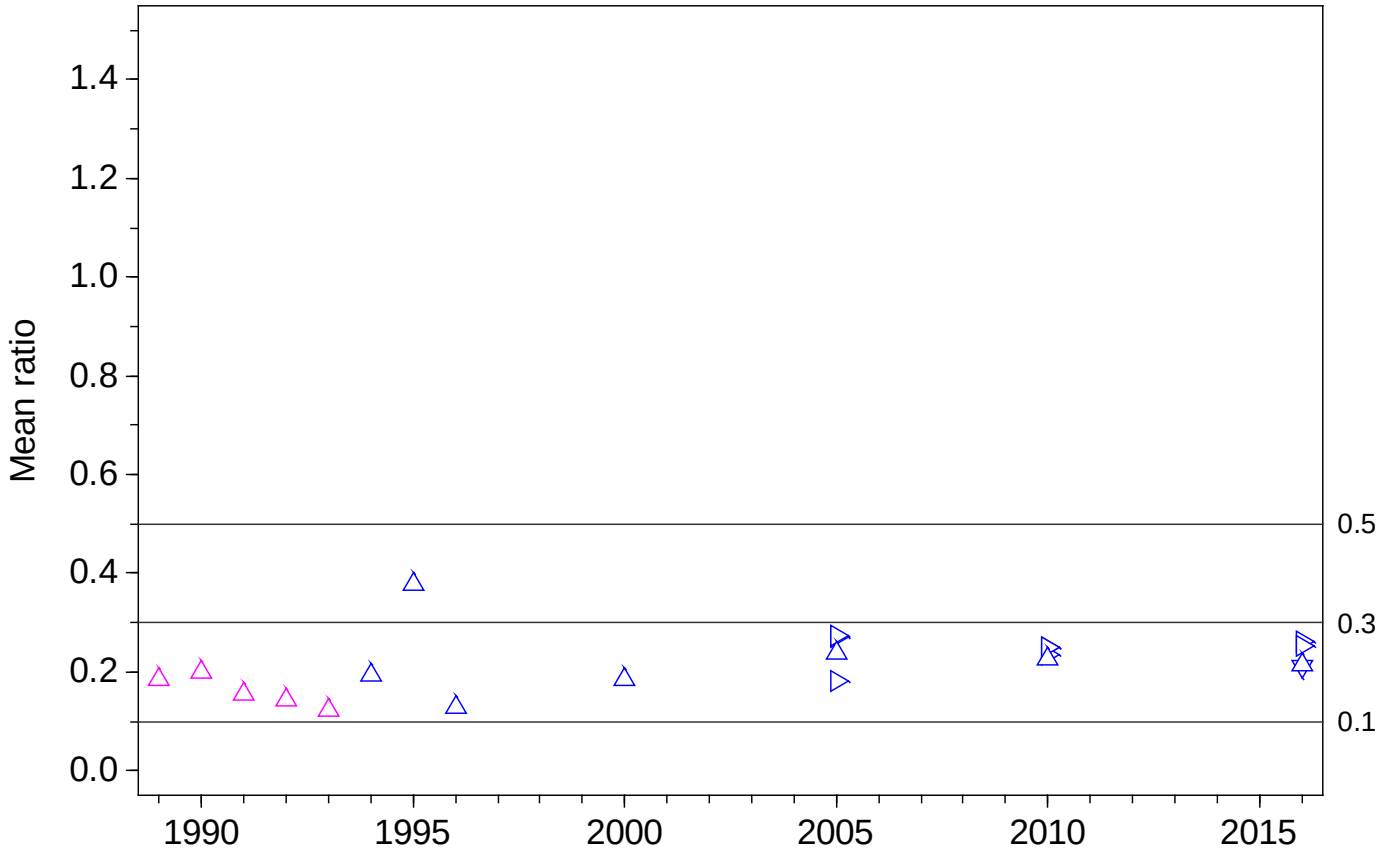
SQS quotient, Bis(2-ethylhexyl)phthalate, Station 34



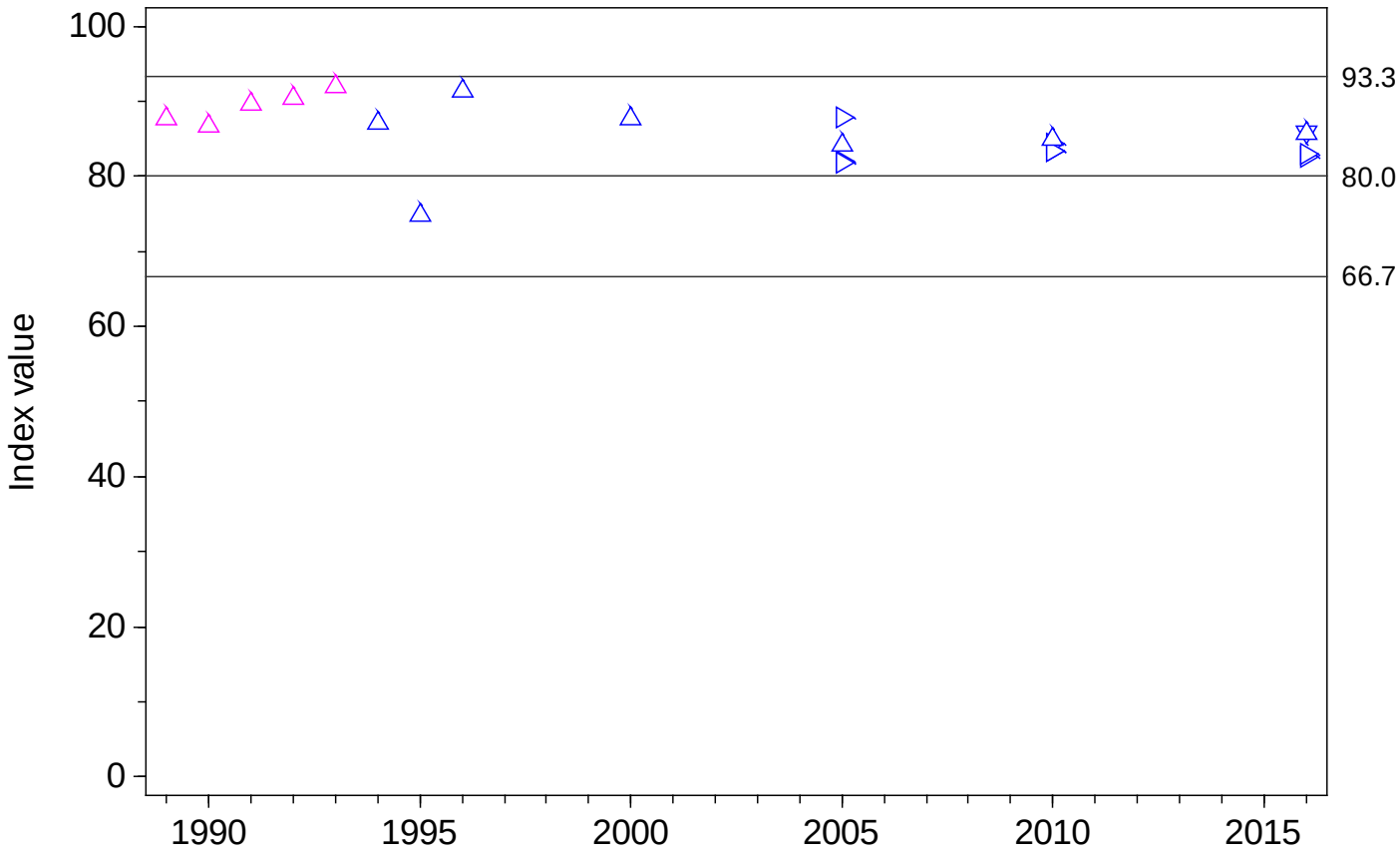
SQS quotient, Butylbenzylphthalate, Station 34



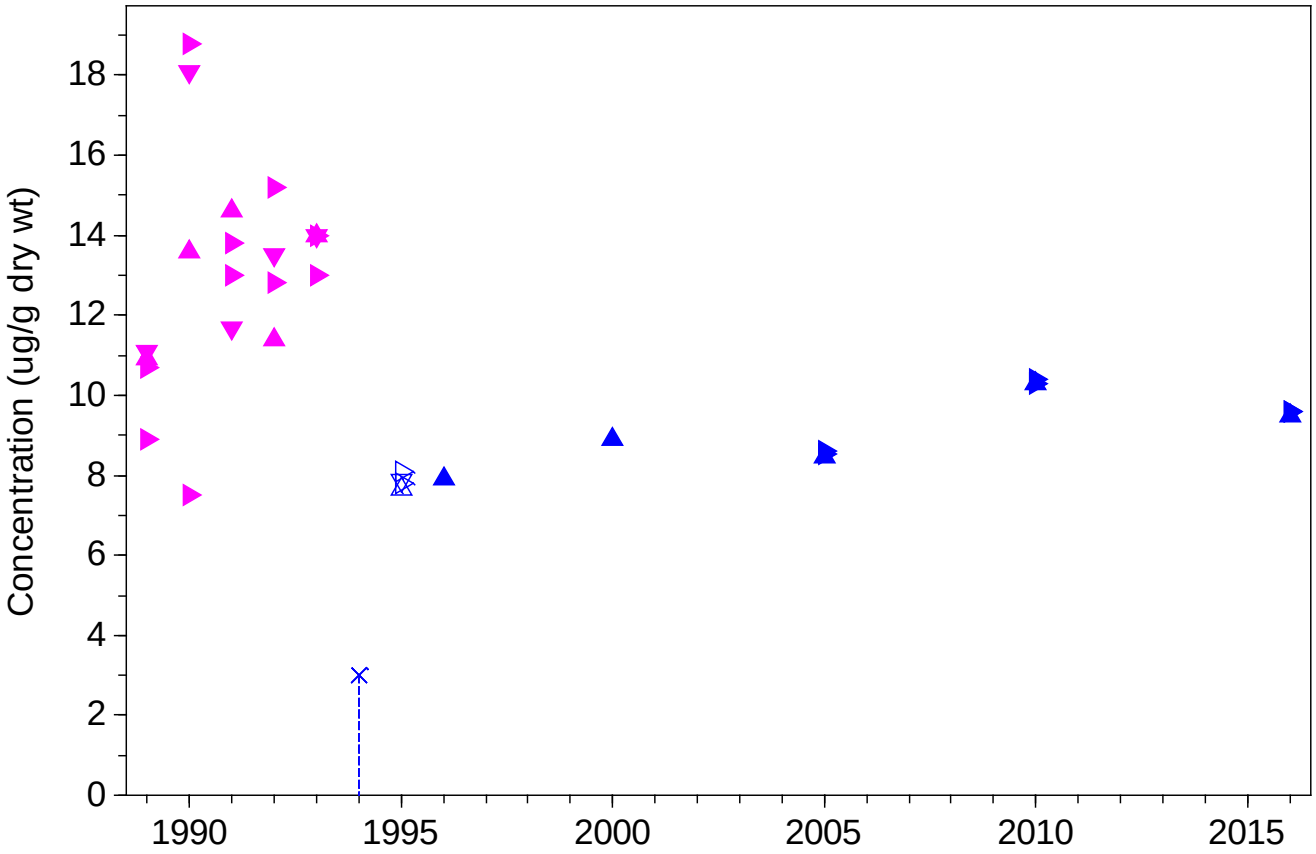
Mean SQS quotient, SCI SQS (no PAH totals), Station 34



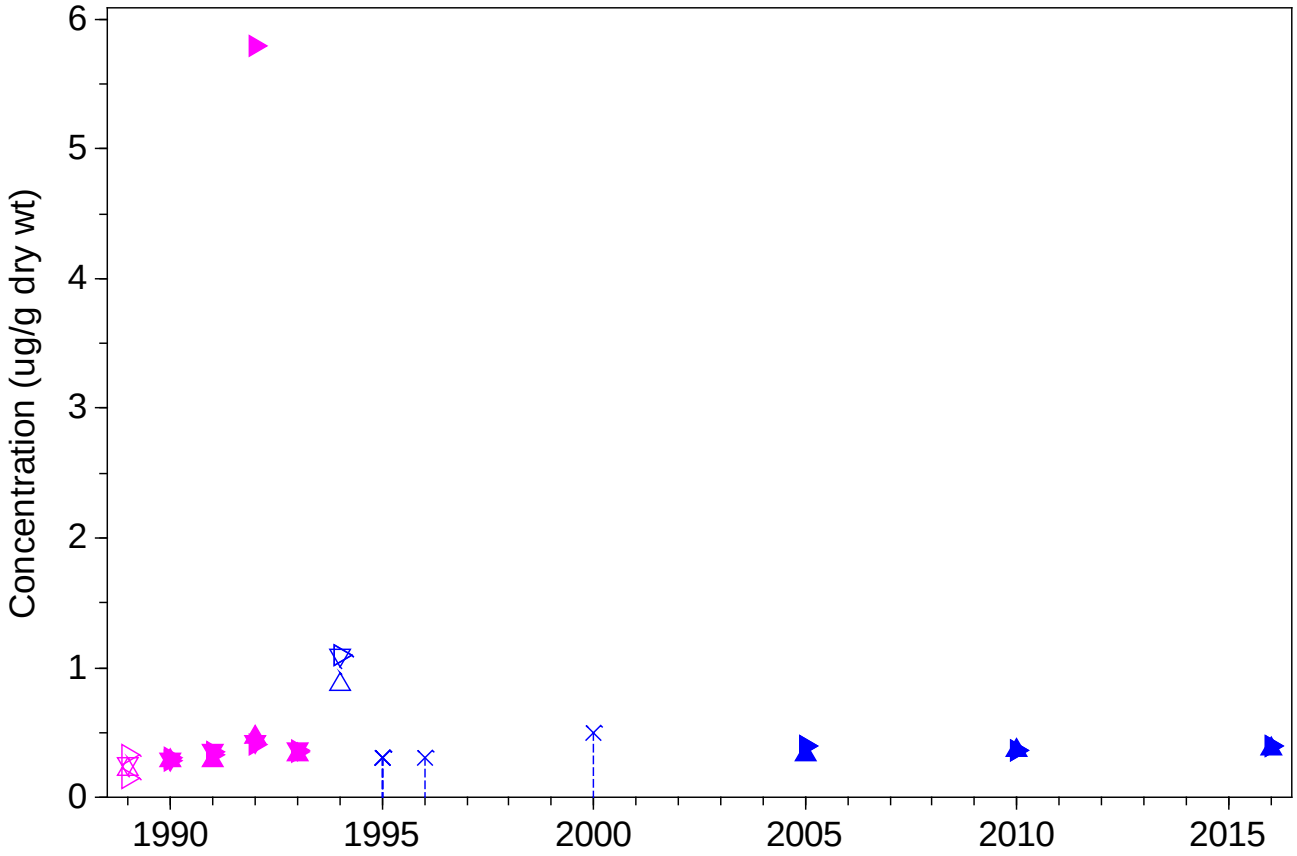
Sediment Chemistry Index, Station 34



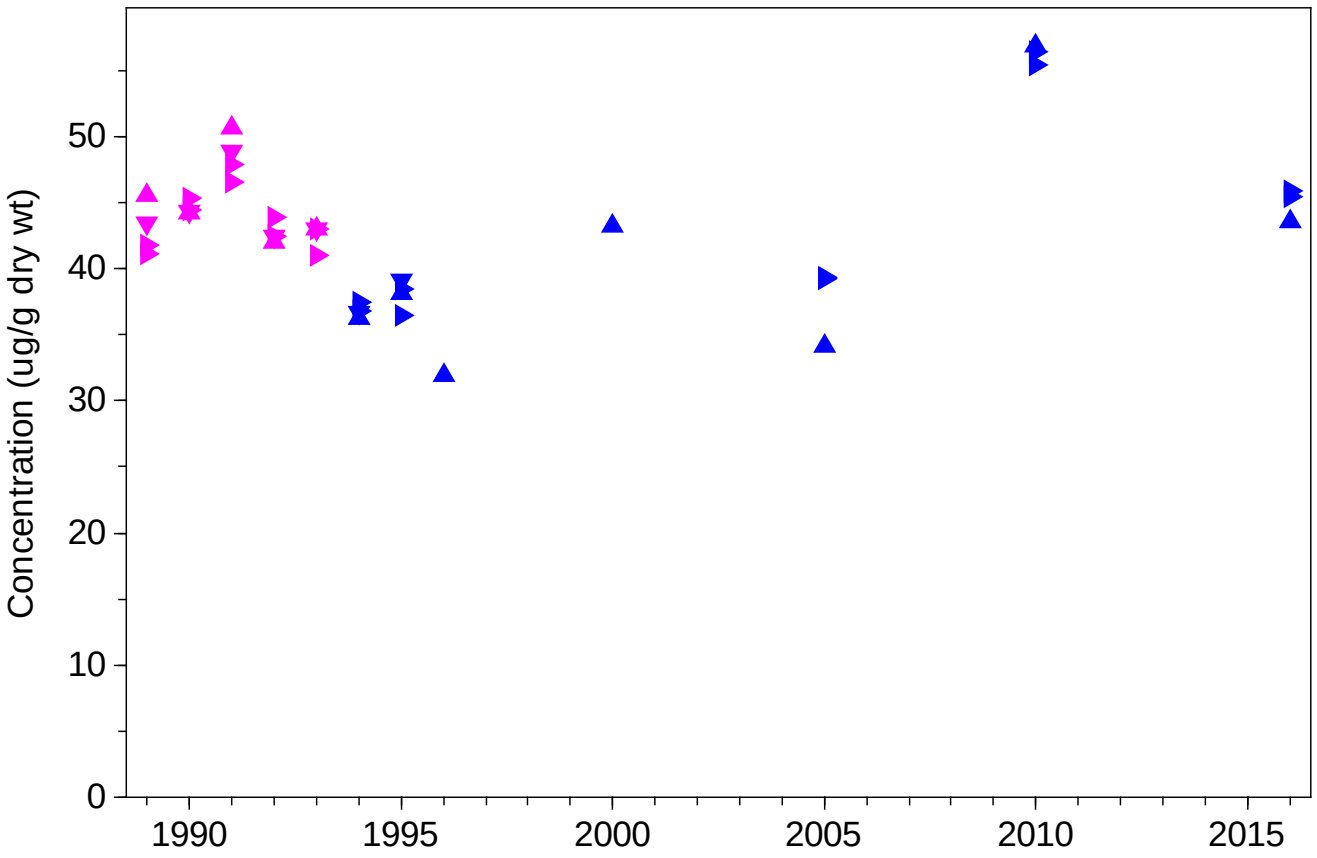
Arsenic, Station 38



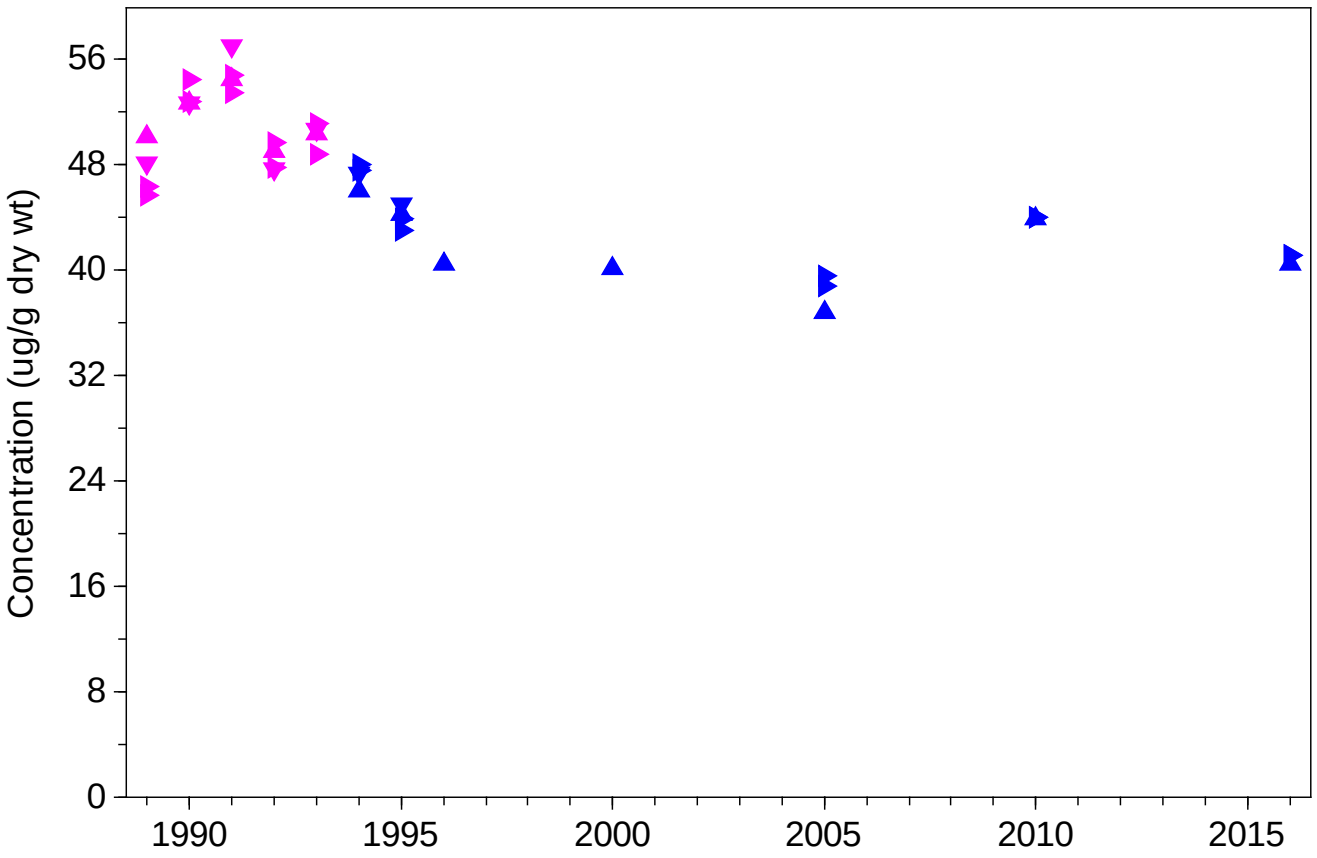
Cadmium, Station 38



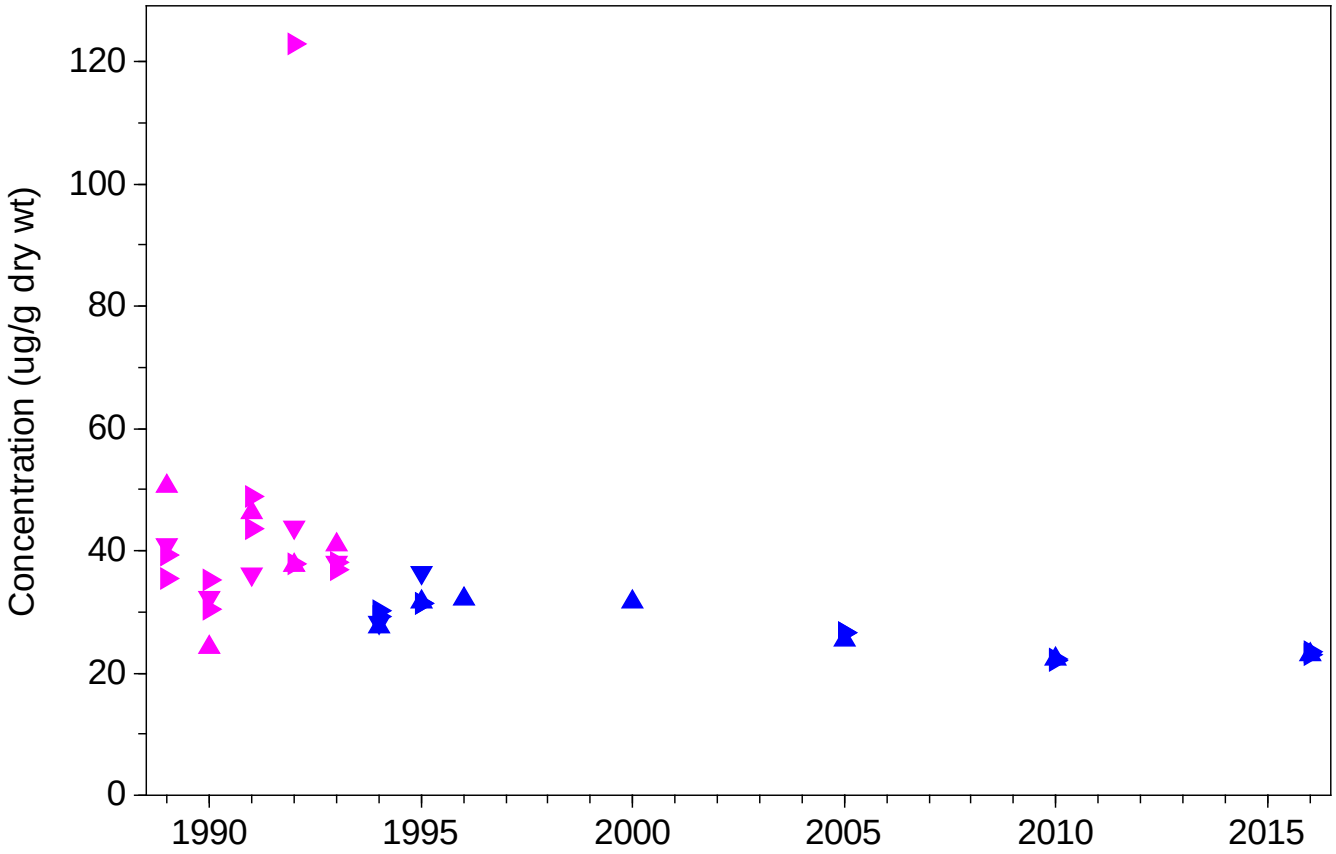
Chromium, Station 38



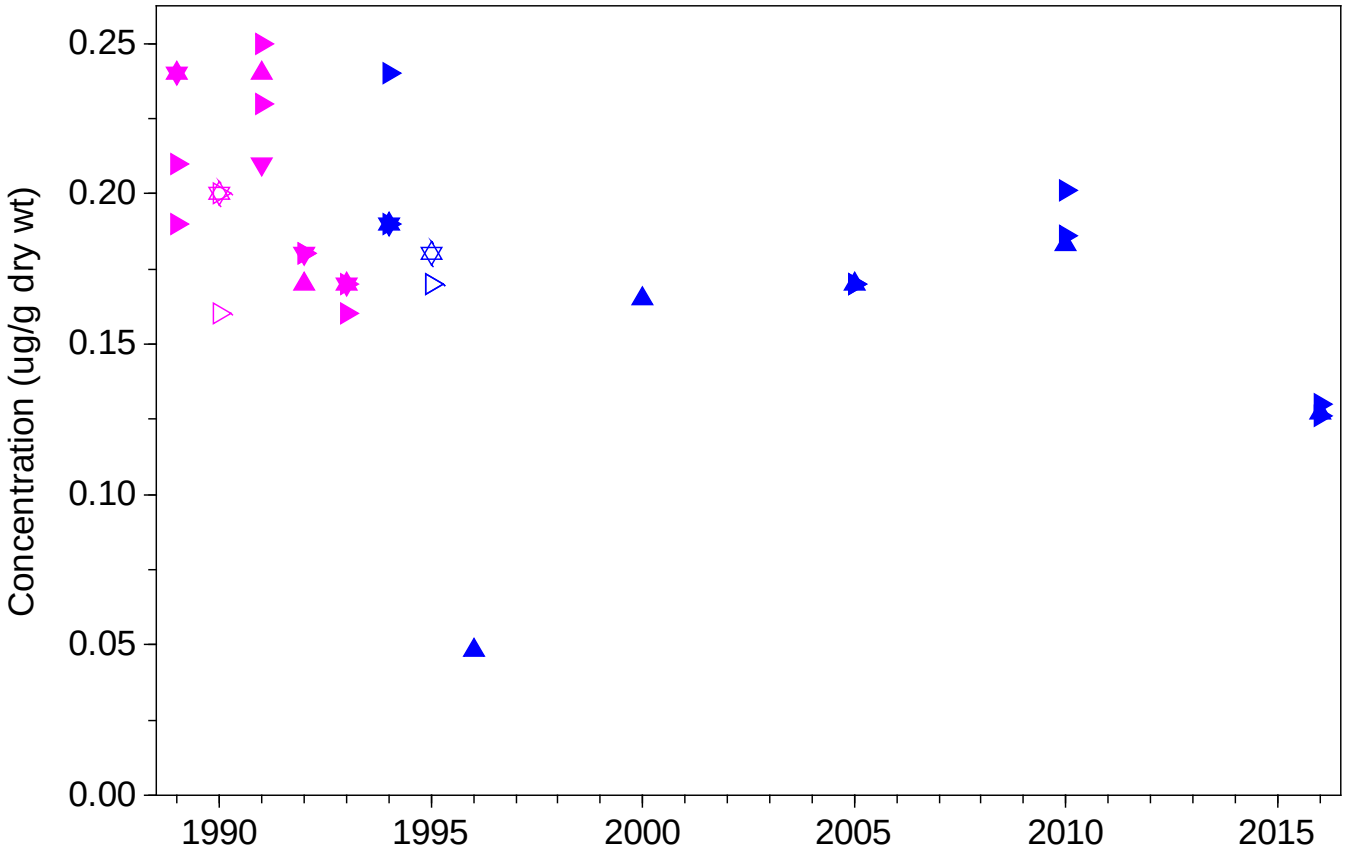
Copper, Station 38



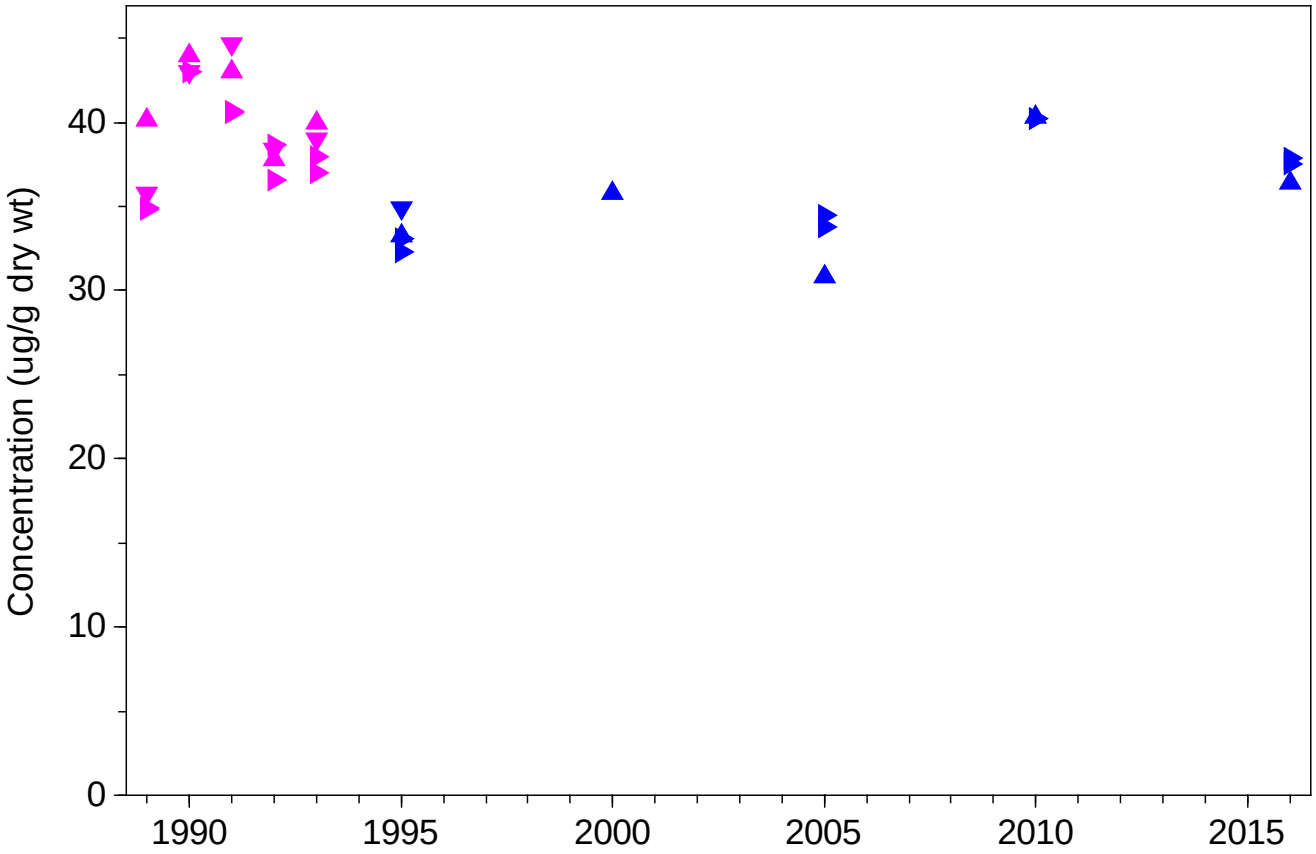
Lead, Station 38



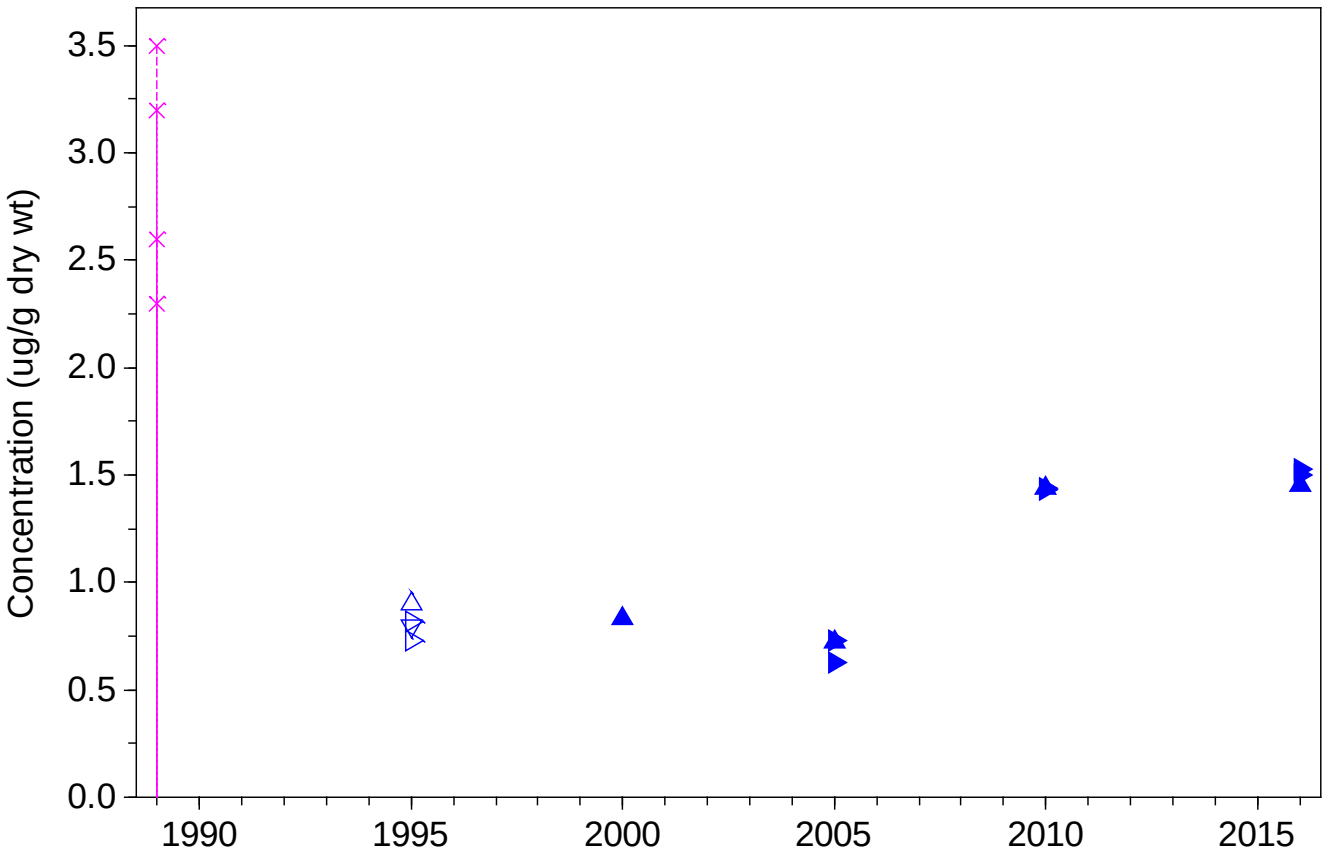
Mercury, Station 38



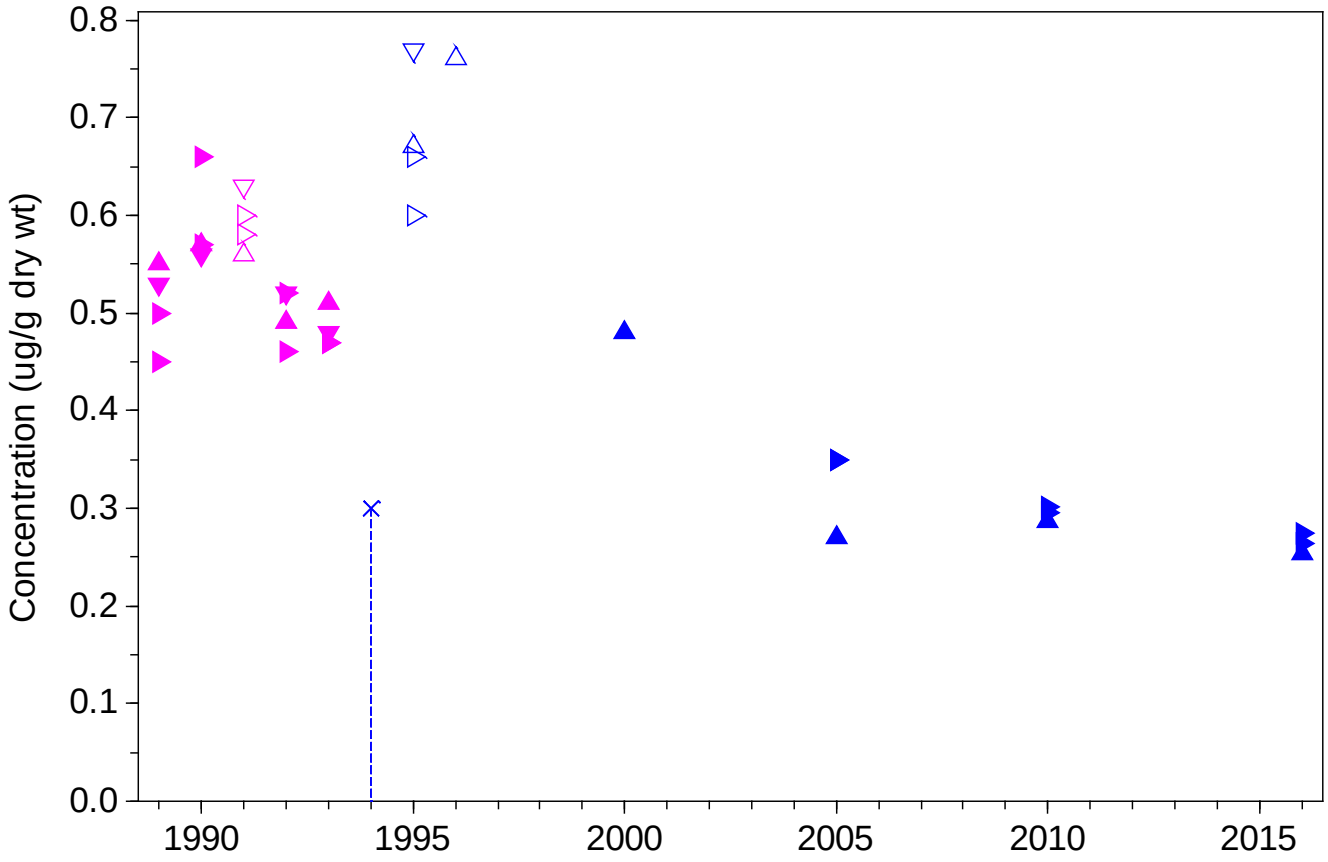
Nickel, Station 38



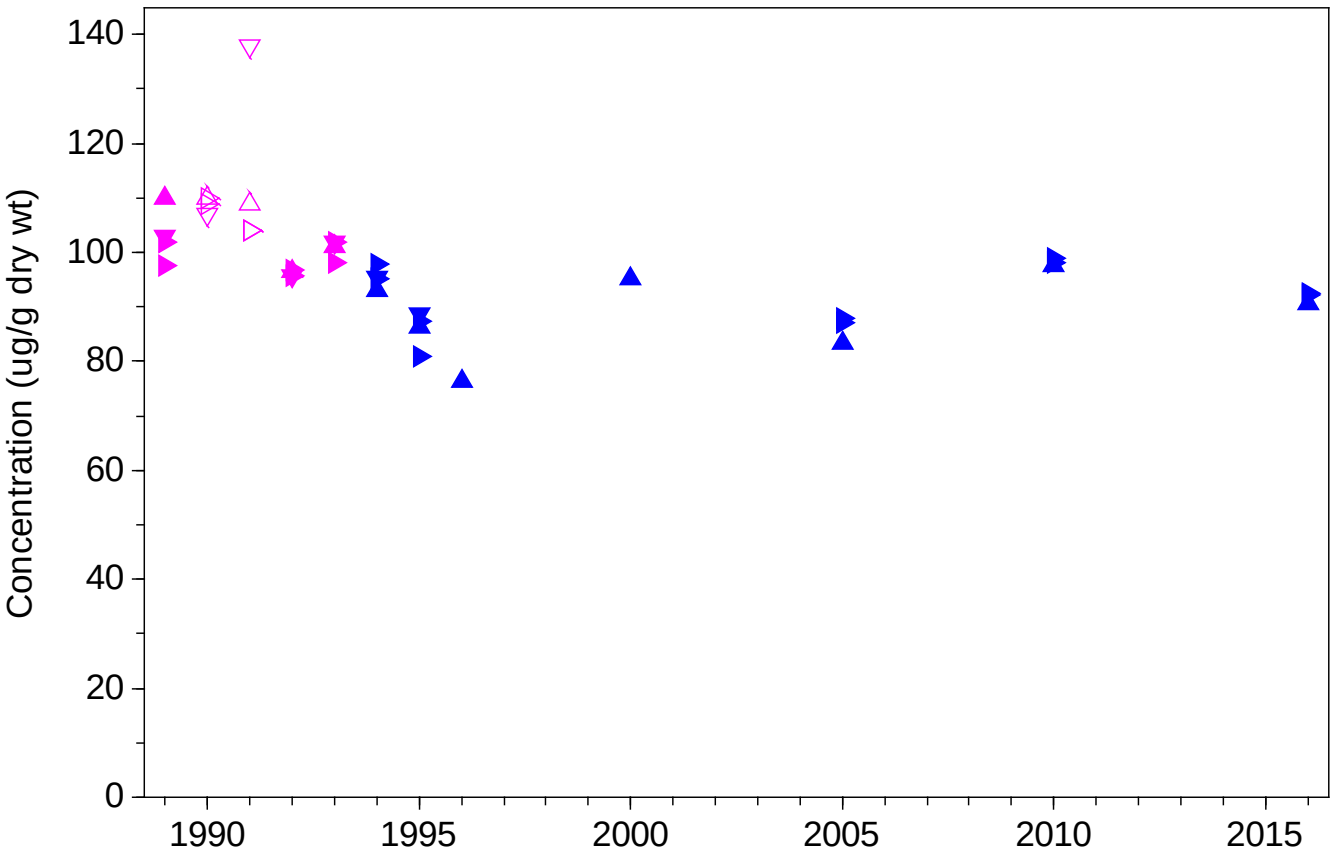
Selenium, Station 38



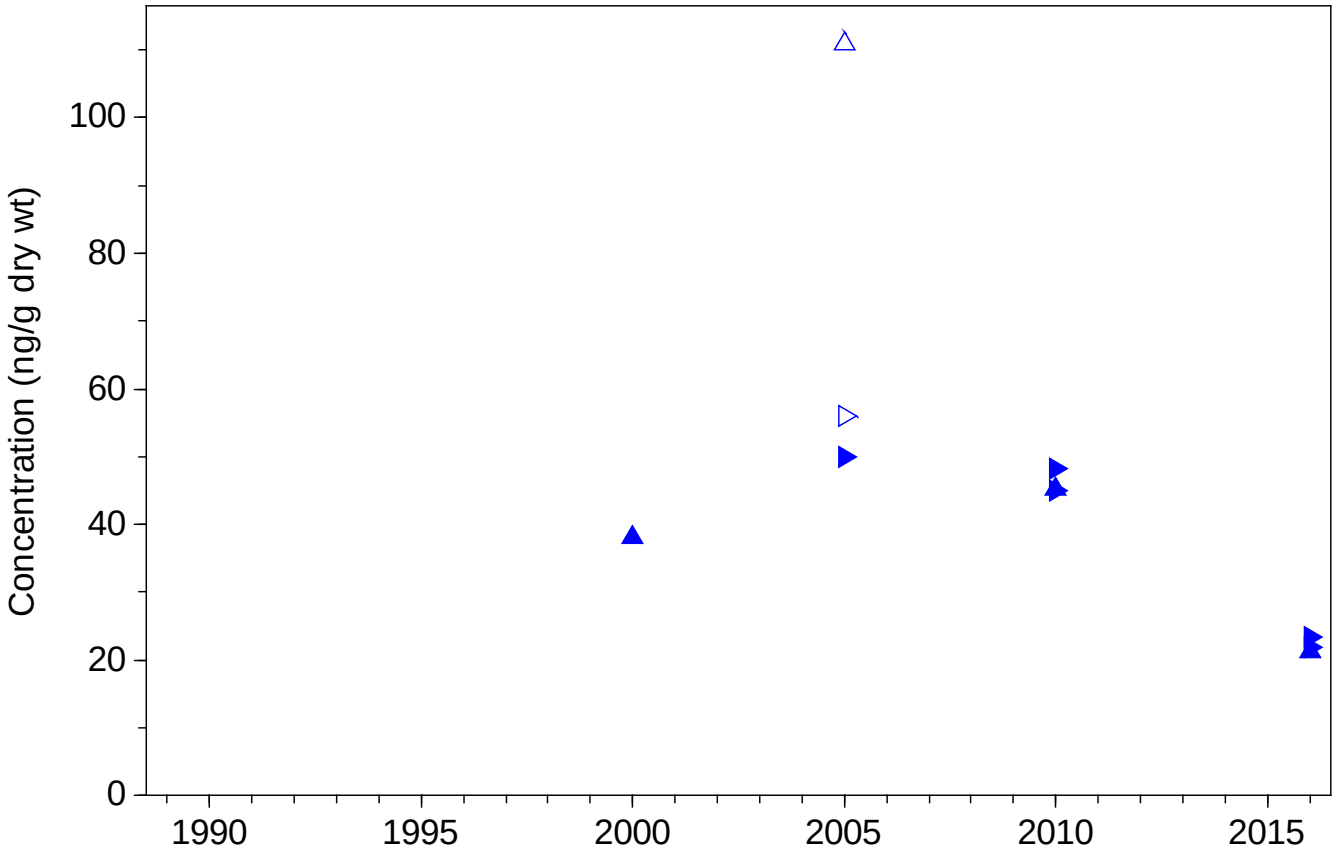
Silver, Station 38



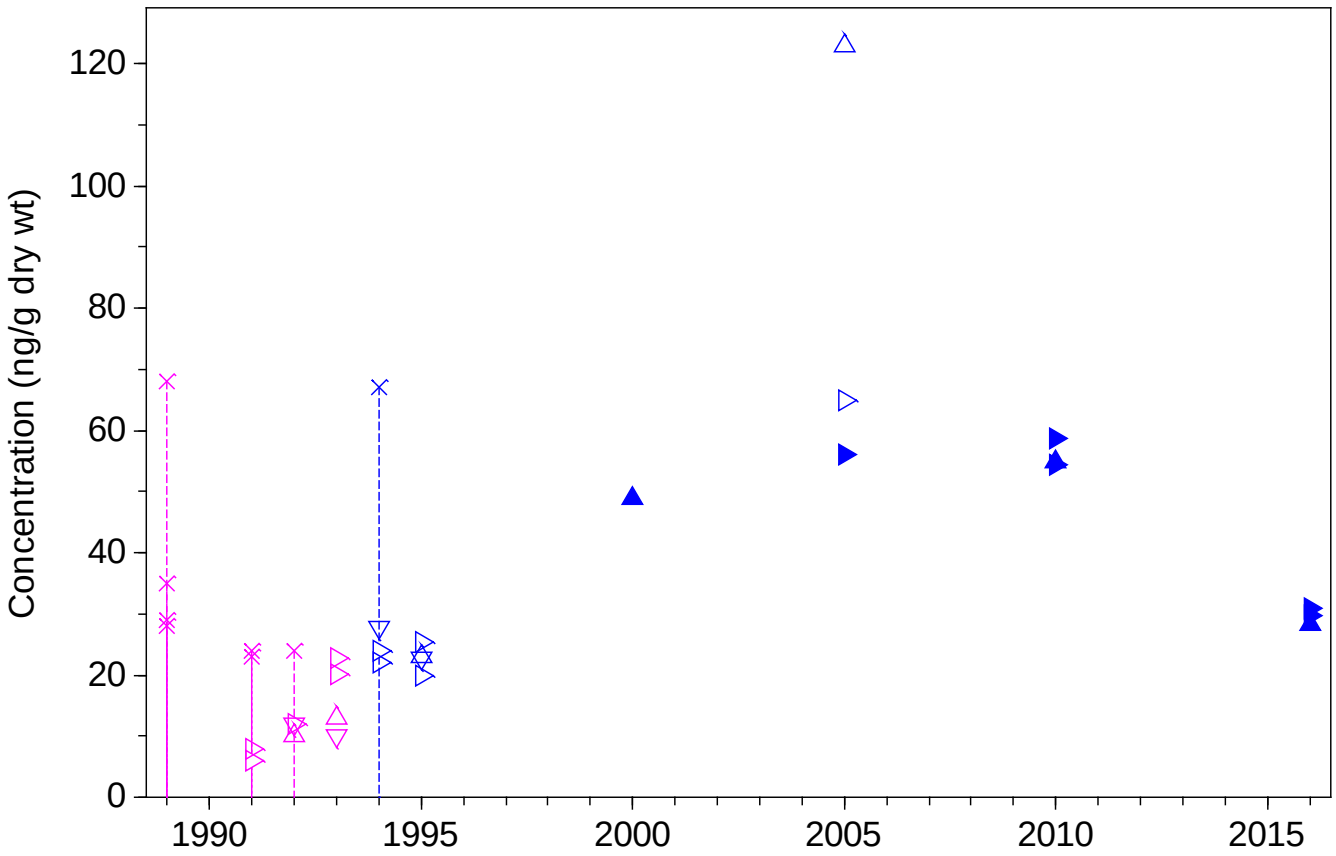
Zinc, Station 38



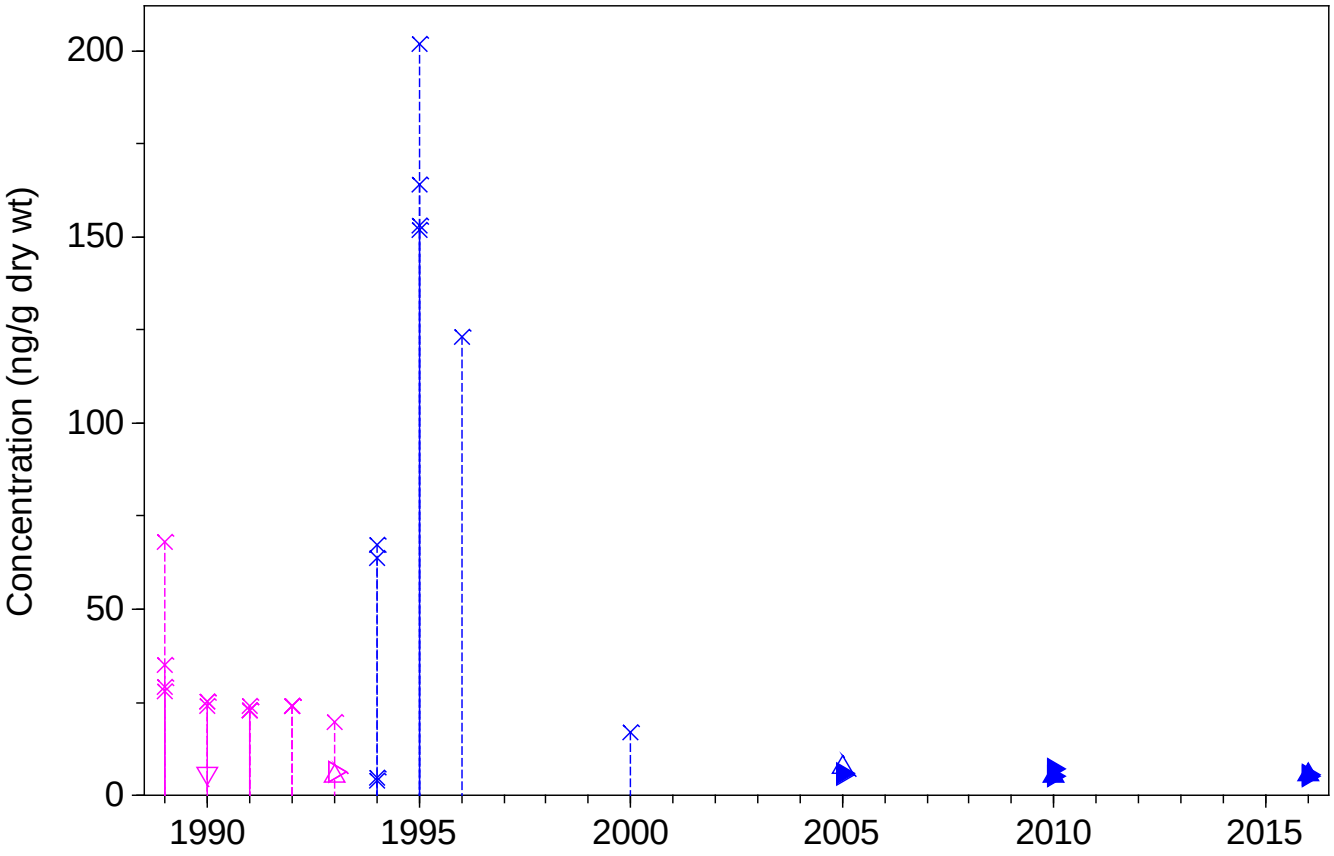
1-Methylnaphthalene, Station 38



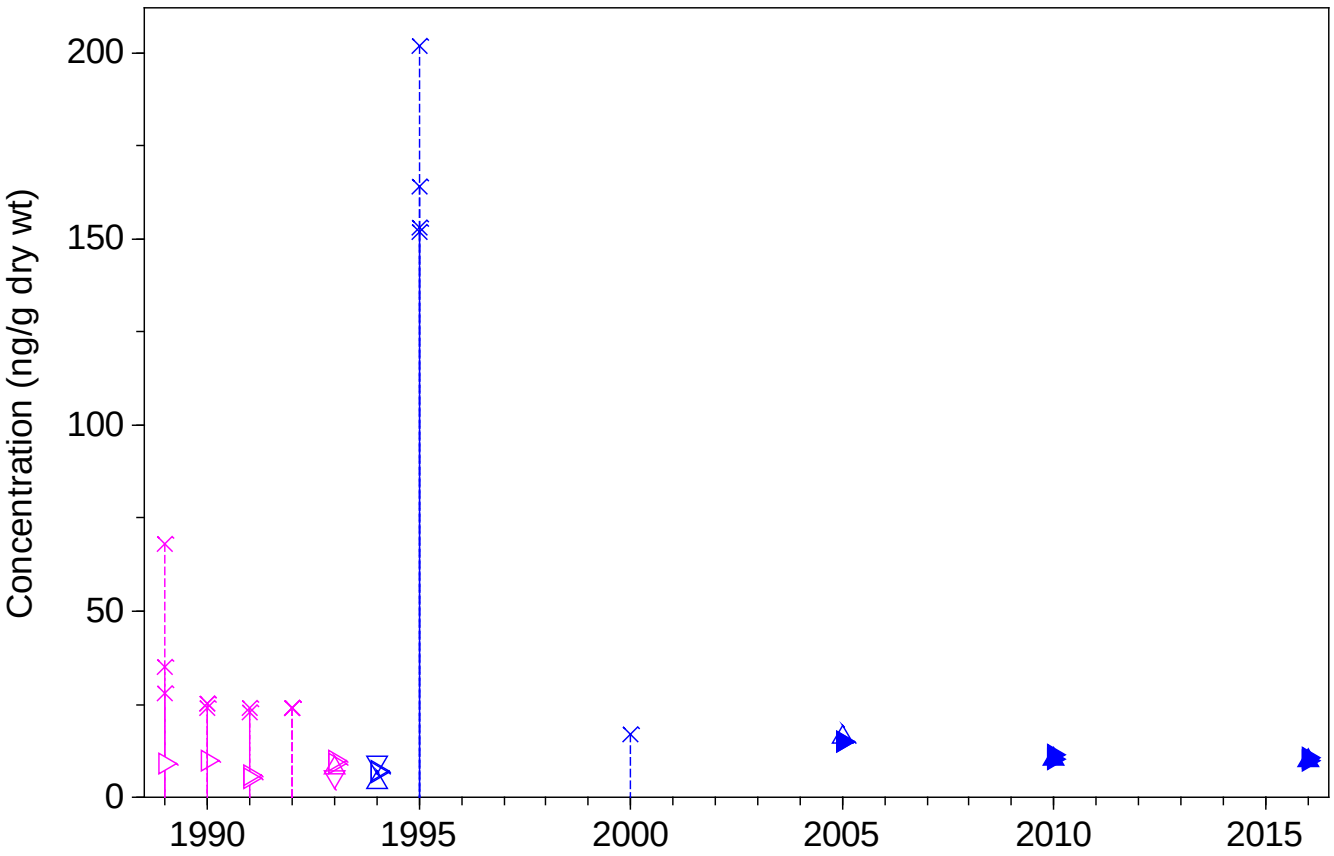
2-Methylnaphthalene, Station 38



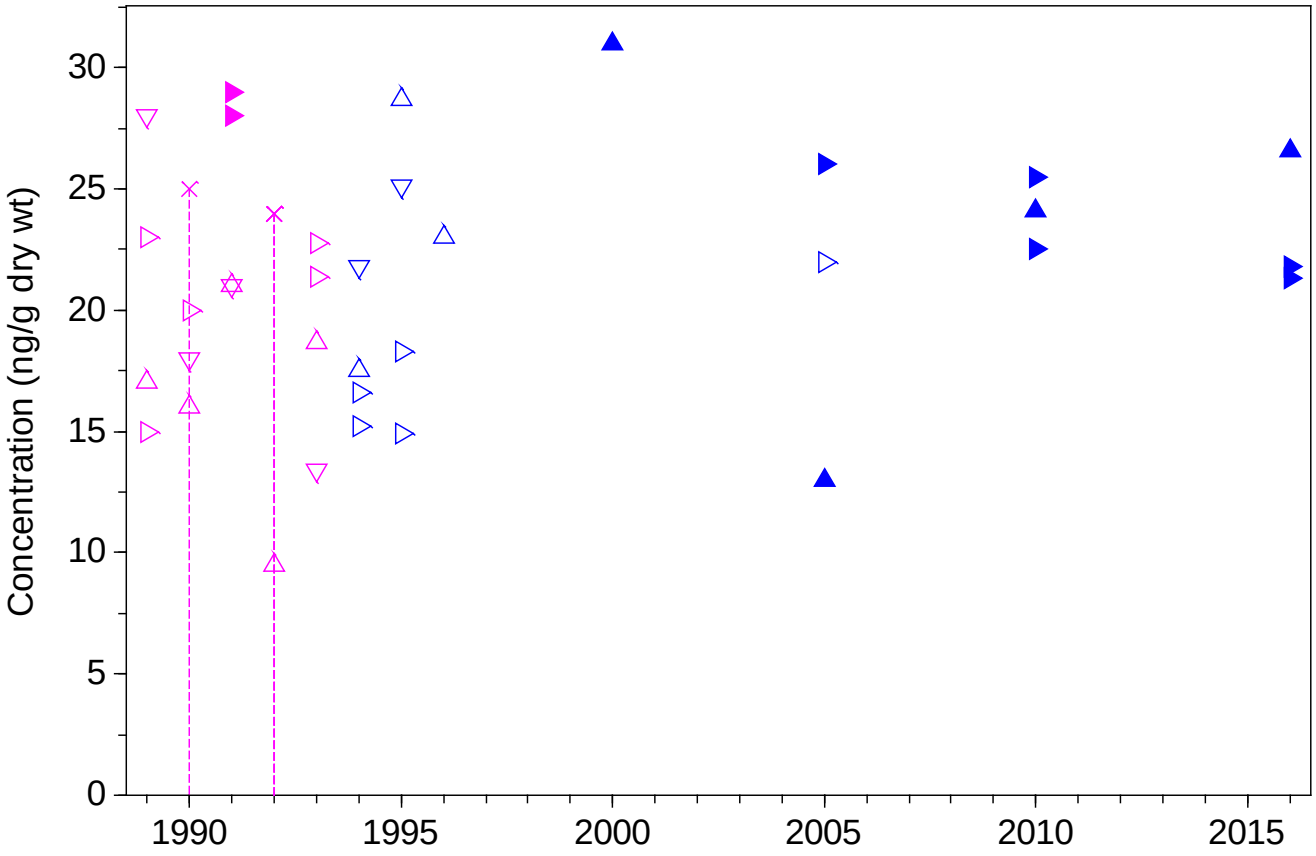
Acenaphthene, Station 38



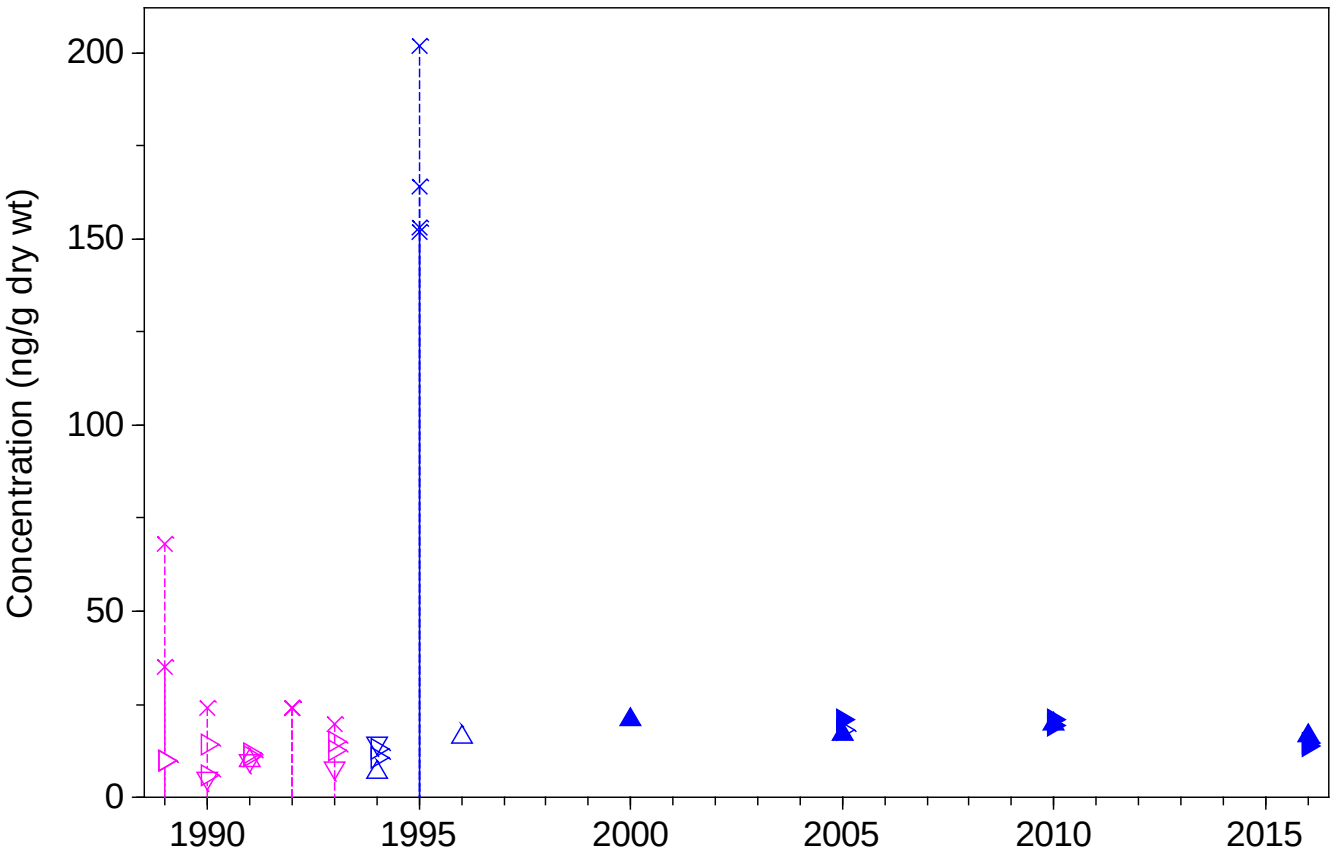
Acenaphthylene, Station 38



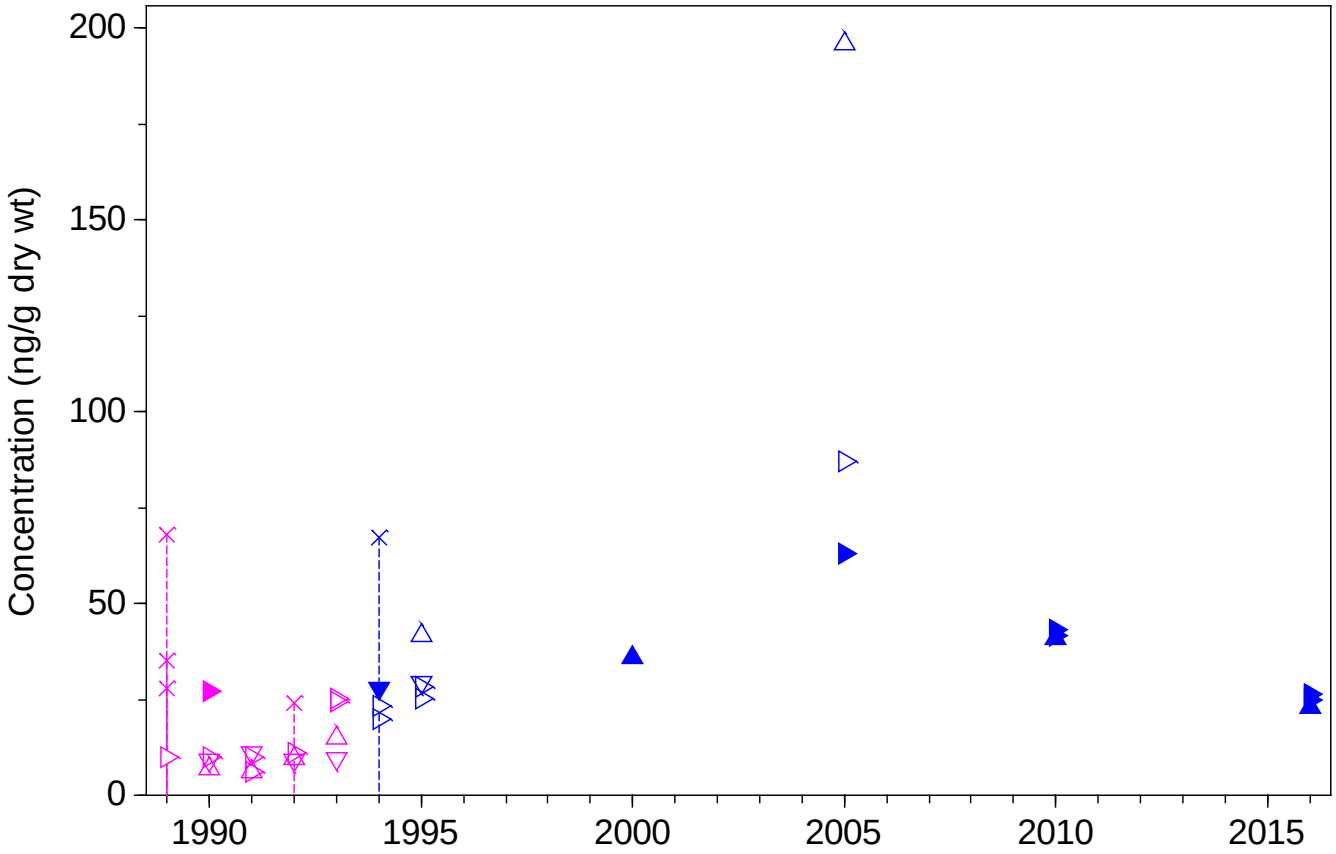
Anthracene, Station 38



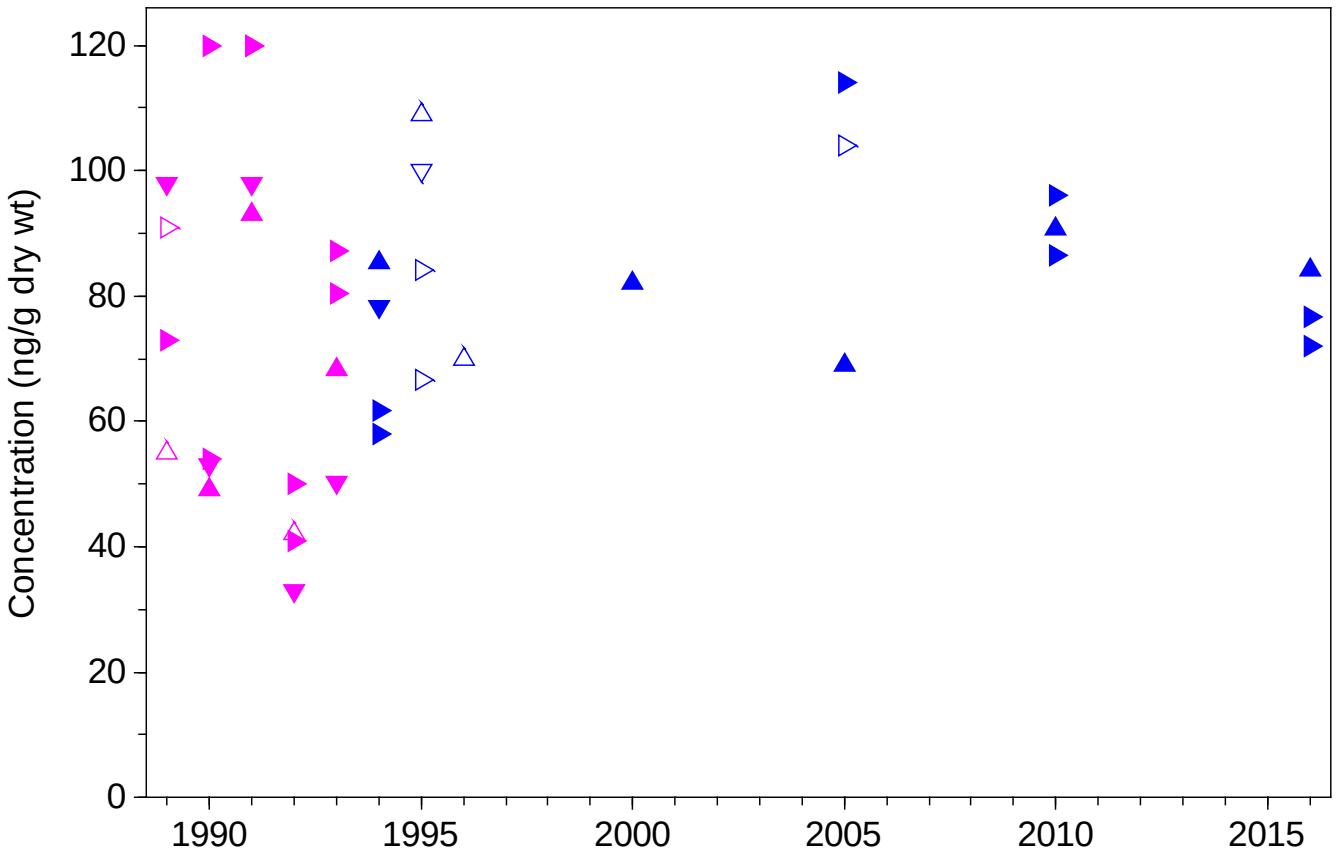
Fluorene, Station 38



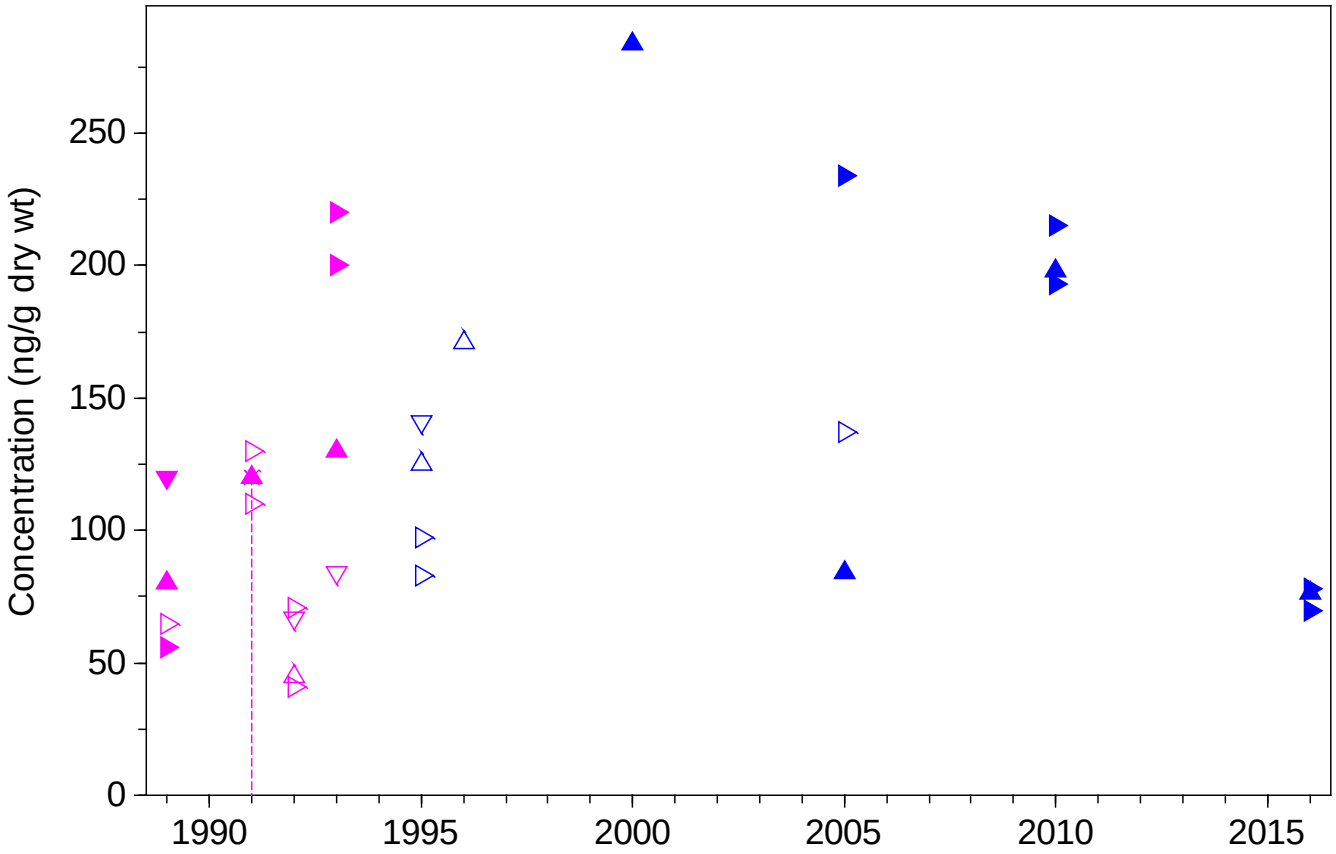
Naphthalene, Station 38



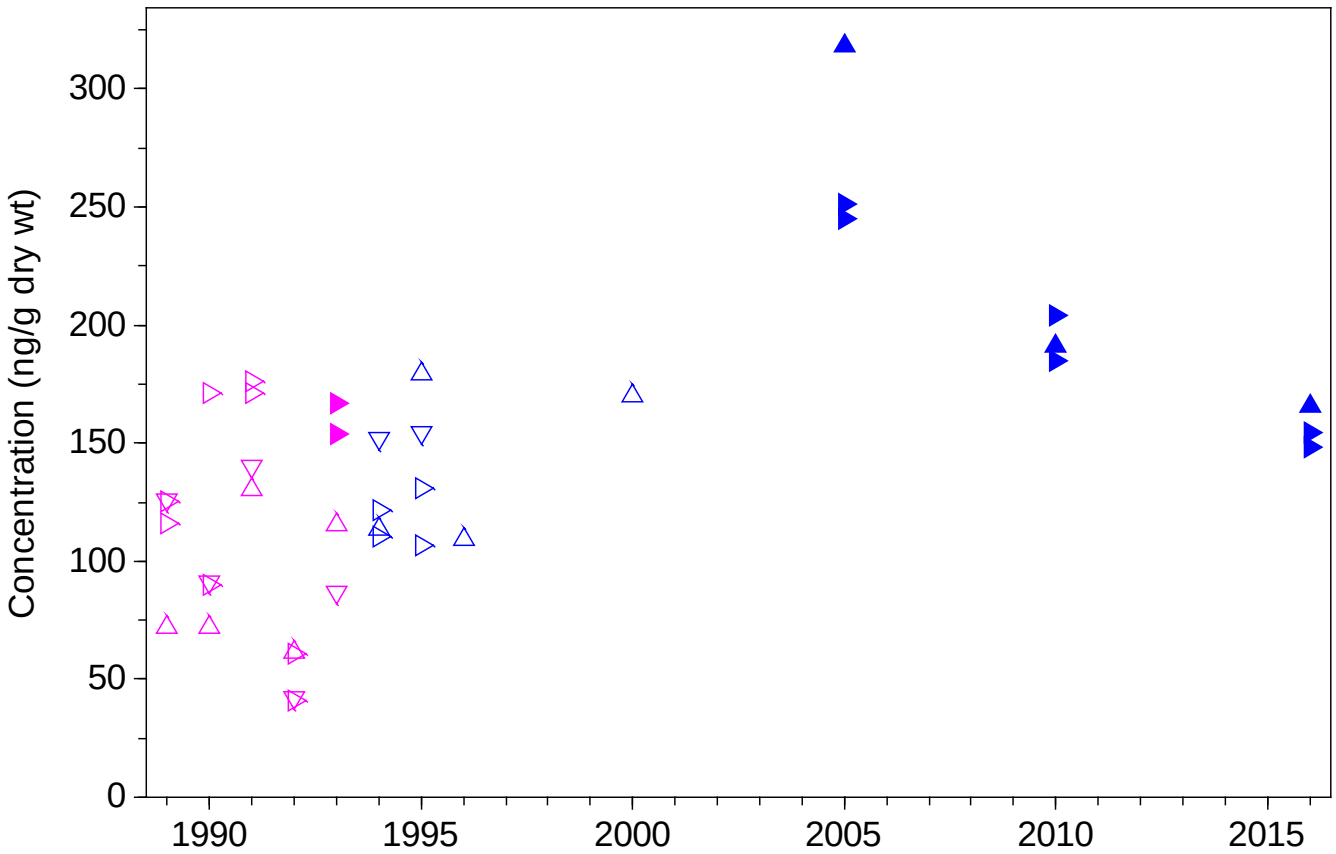
Phenanthrene, Station 38



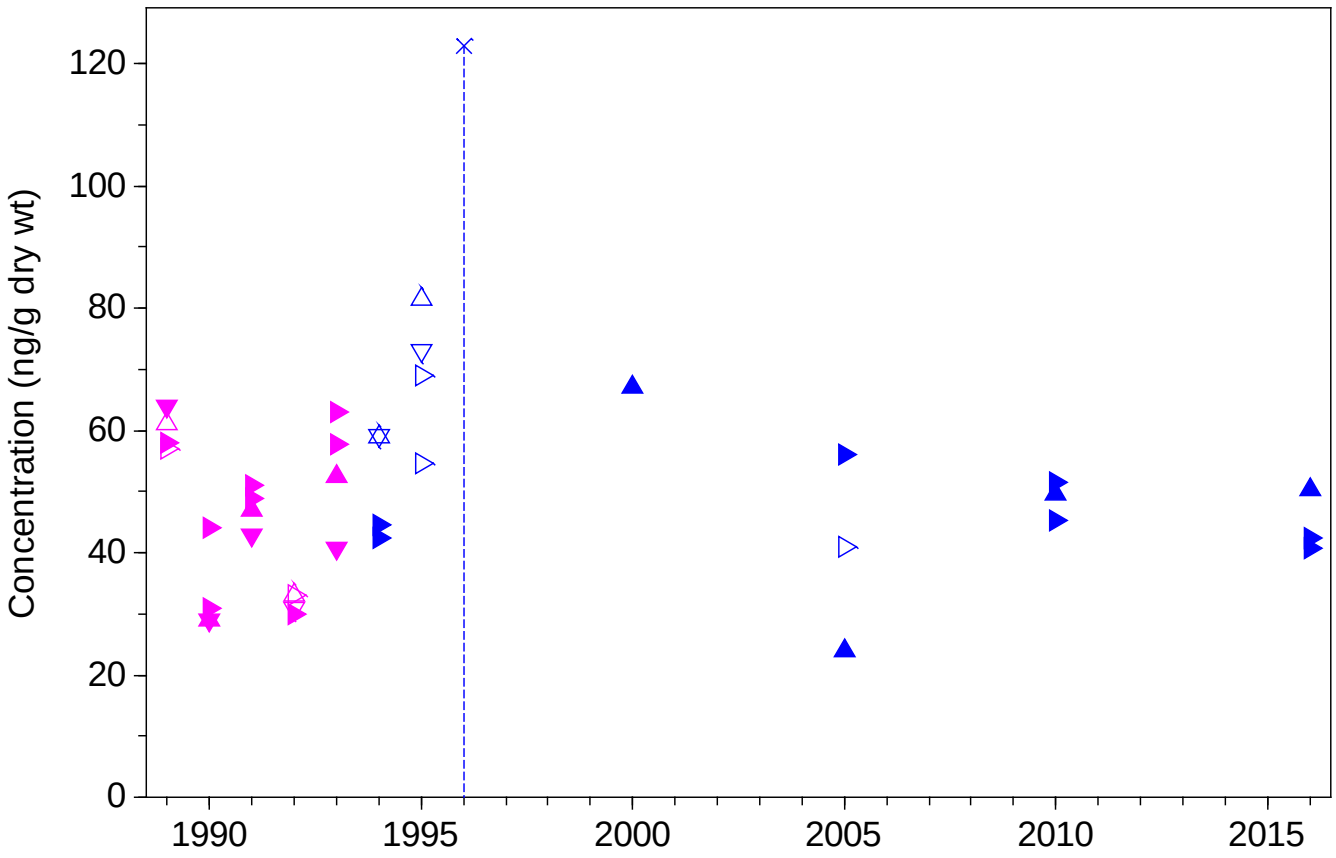
Retene, Station 38



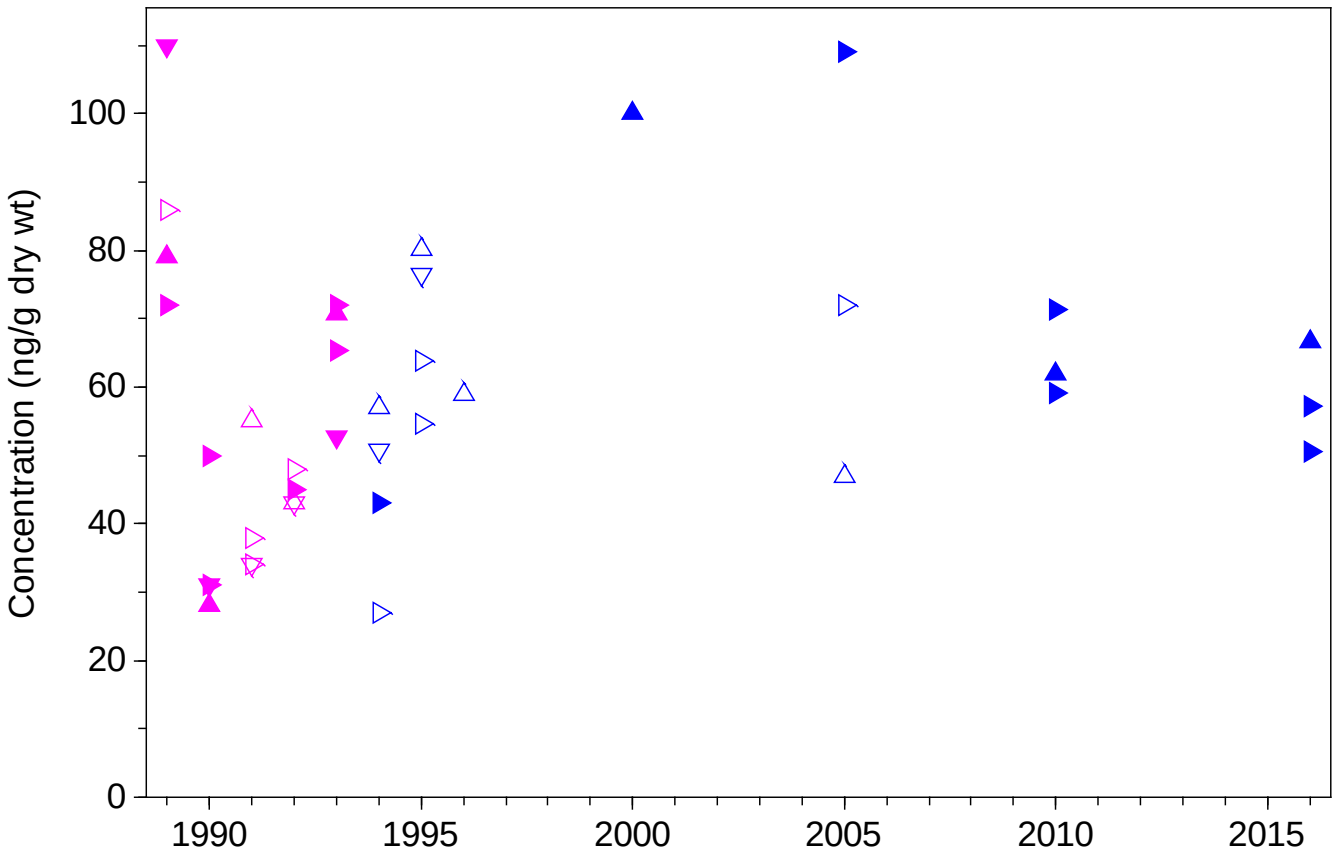
Total LPAH (sum of 6 compounds), Station 38



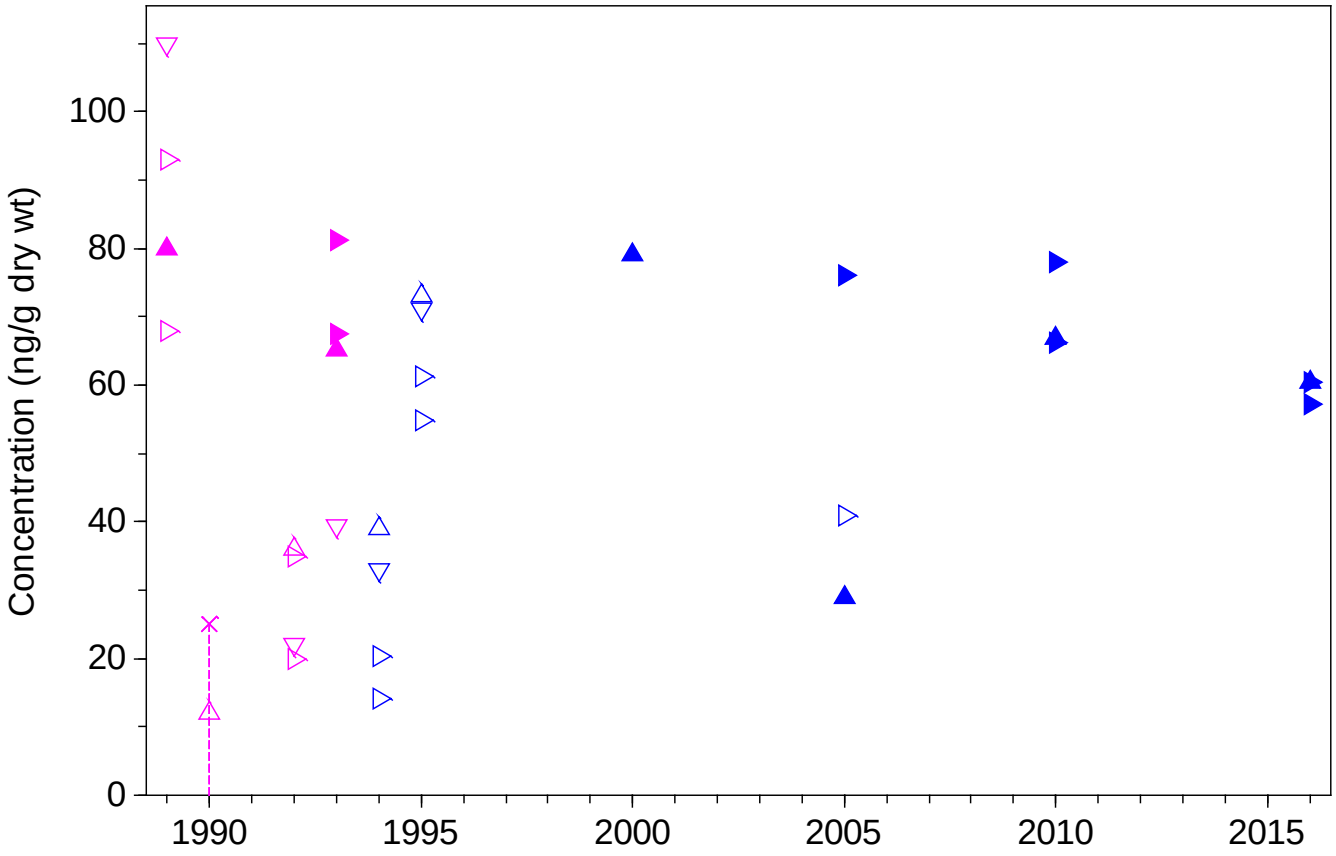
Benzo(a)anthracene, Station 38



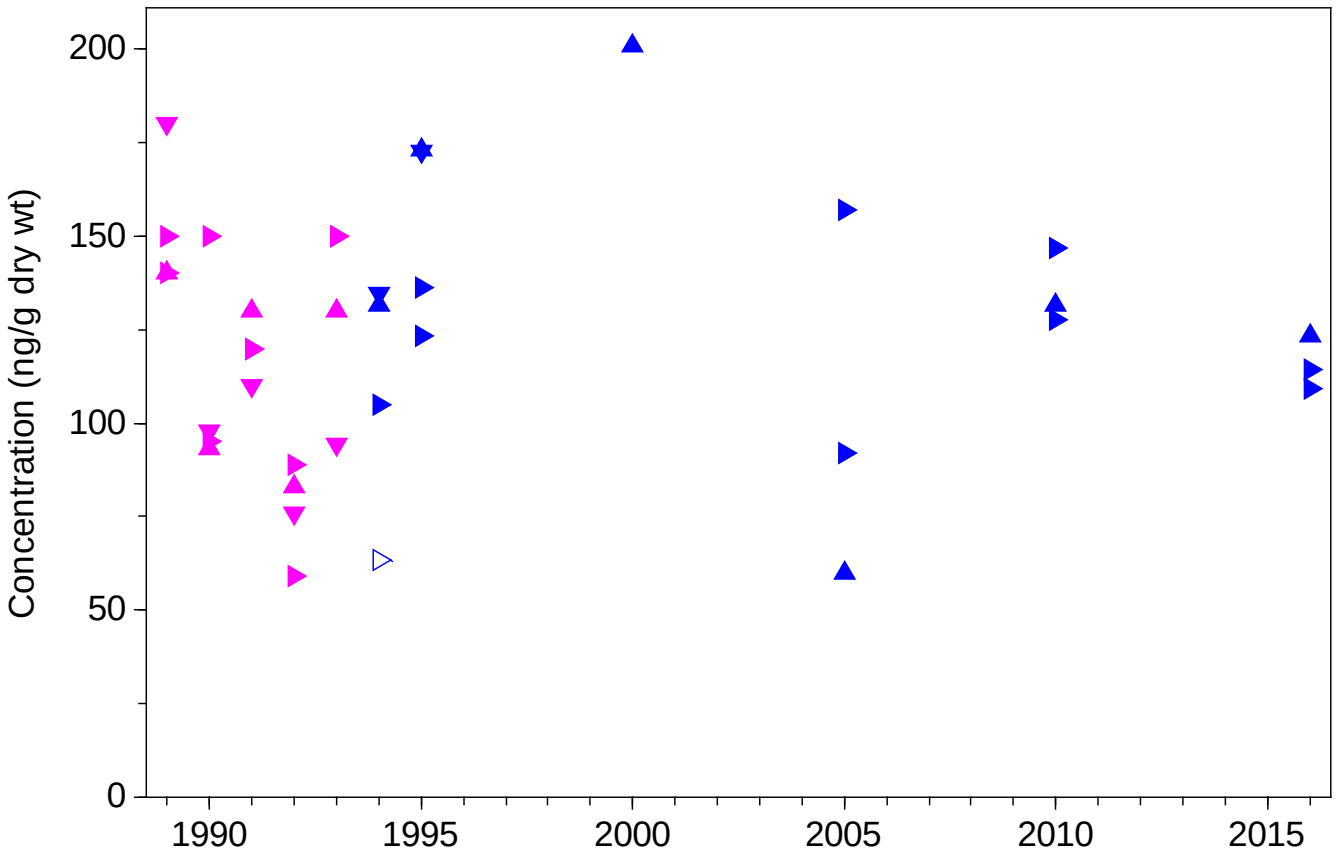
Benzo(a)pyrene, Station 38



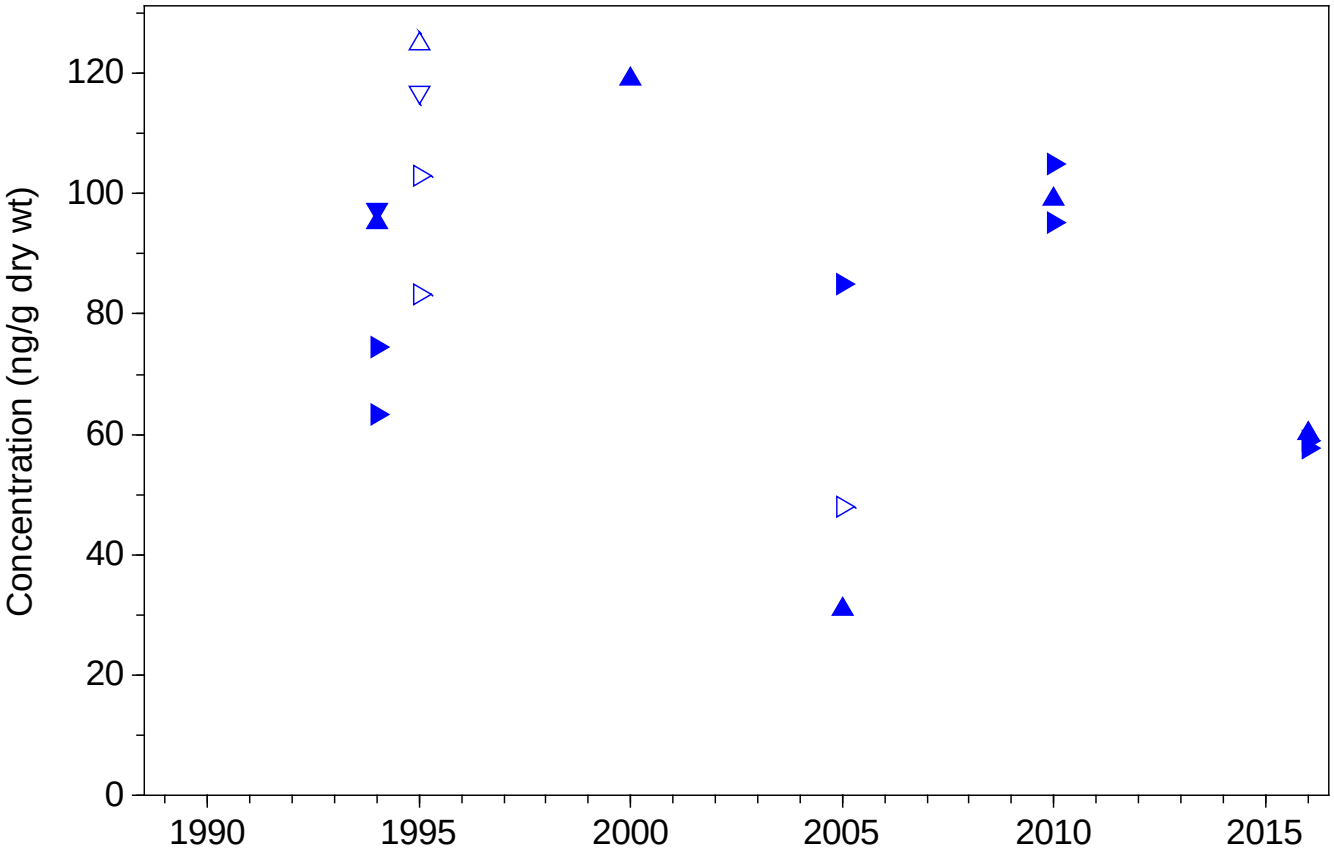
Benzo(g,h,i)perylene, Station 38



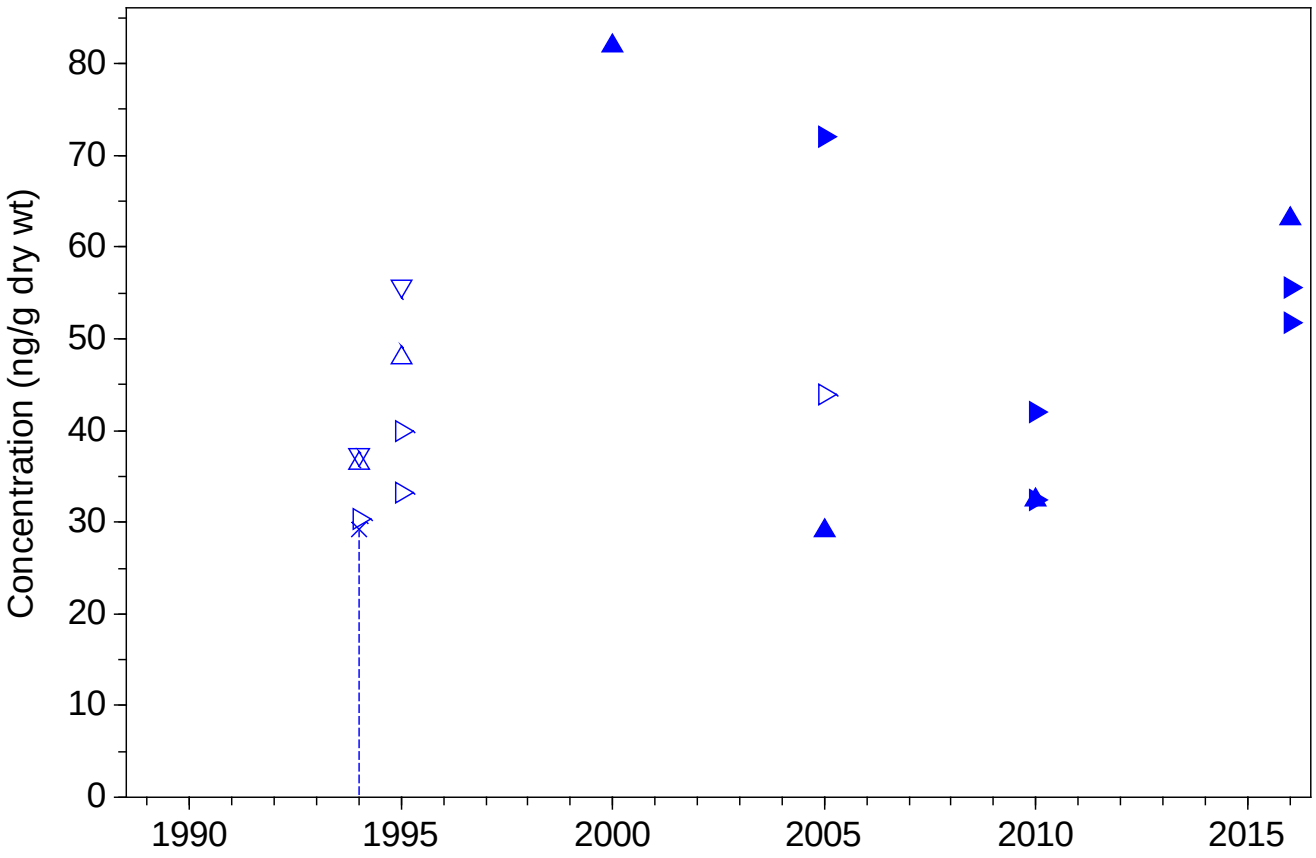
Total Benzofluoranthenes, Station 38



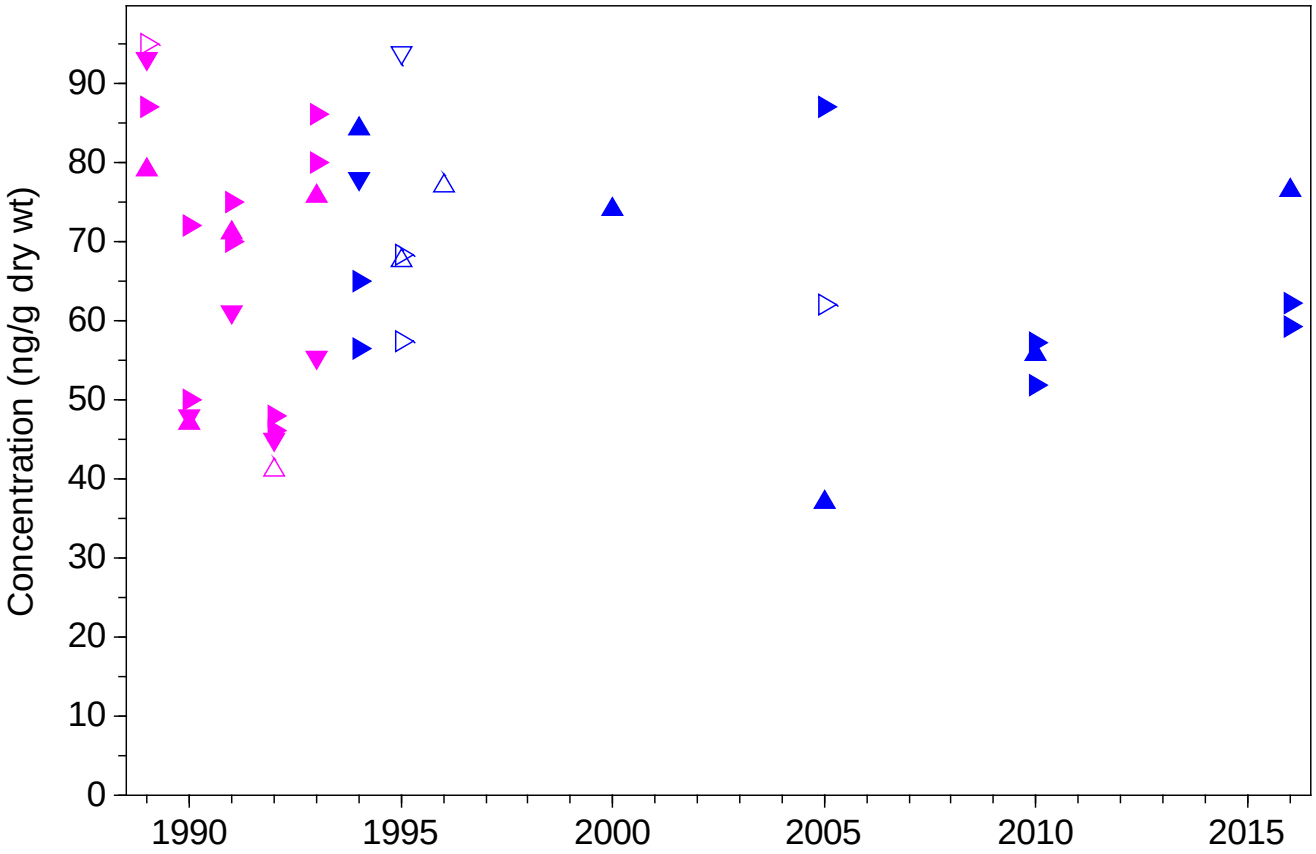
Benzo(b)fluoranthene, Station 38



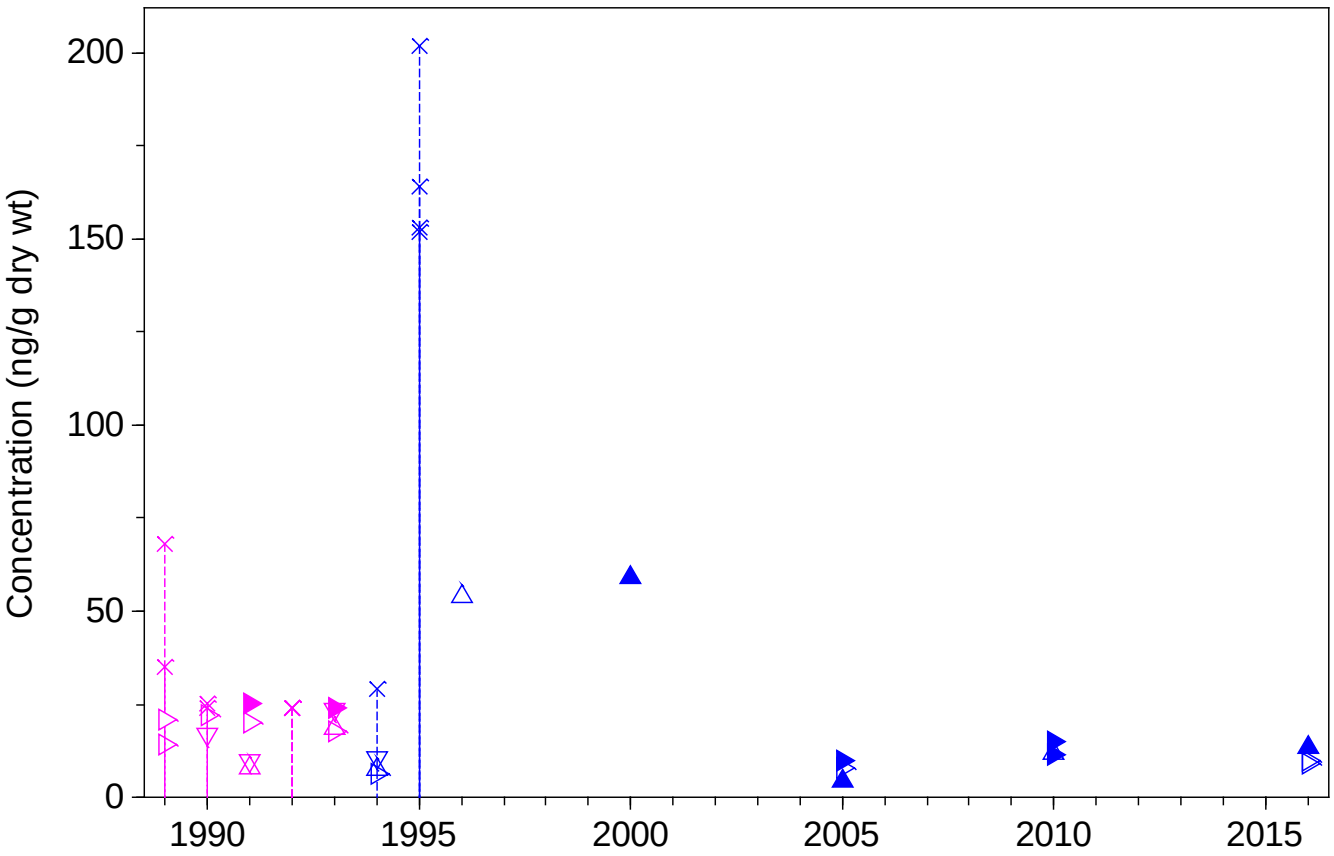
Benzo(k)fluoranthene, Station 38



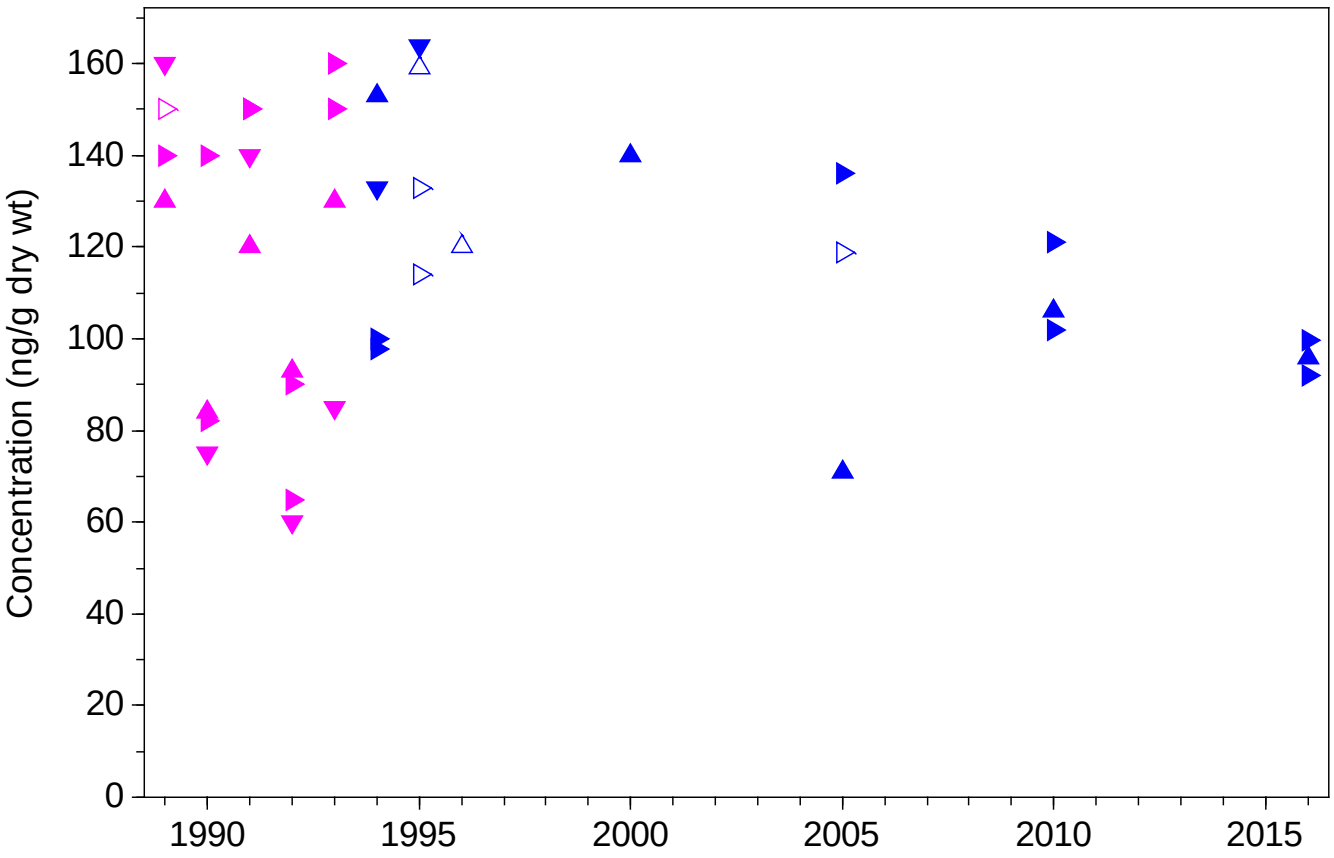
Chrysene, Station 38



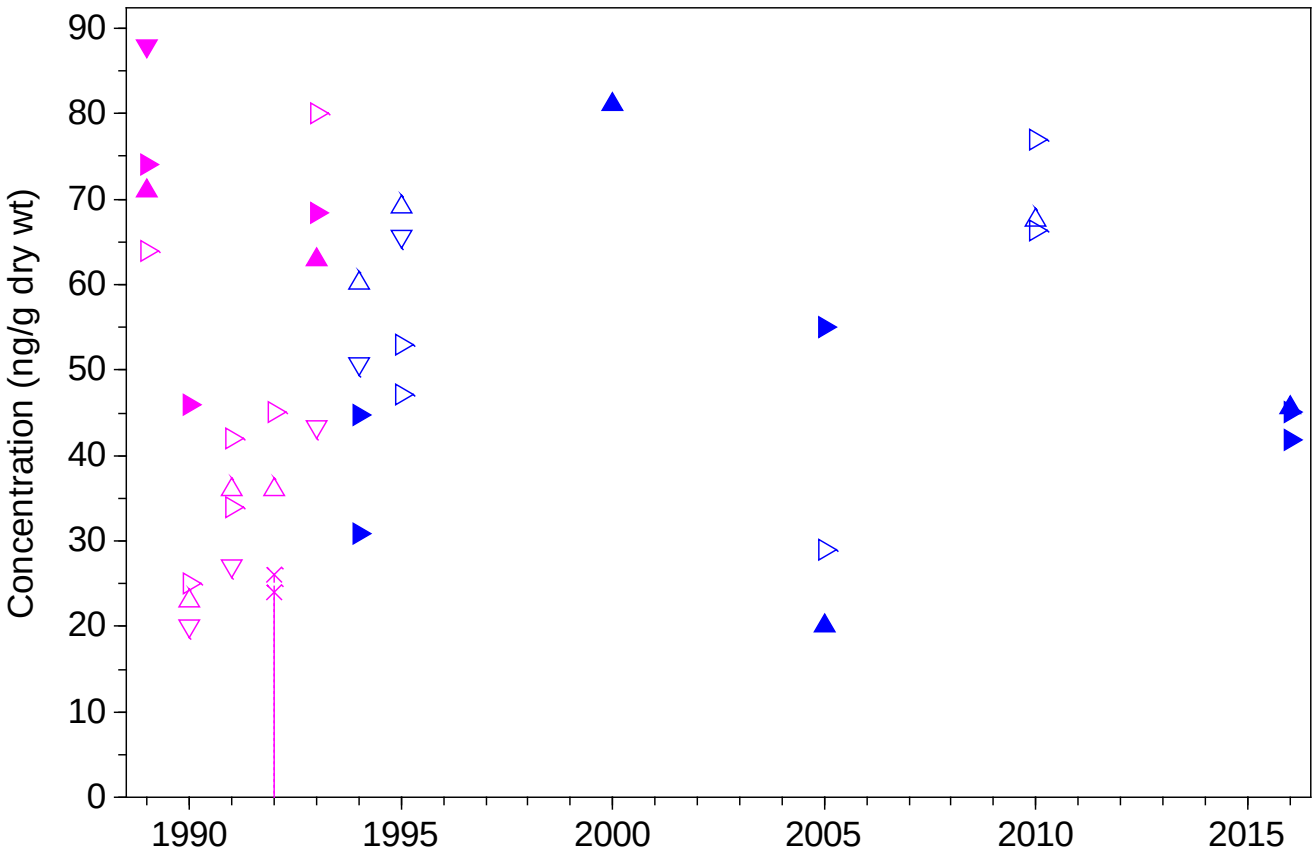
Dibenzo(a,h)anthracene, Station 38



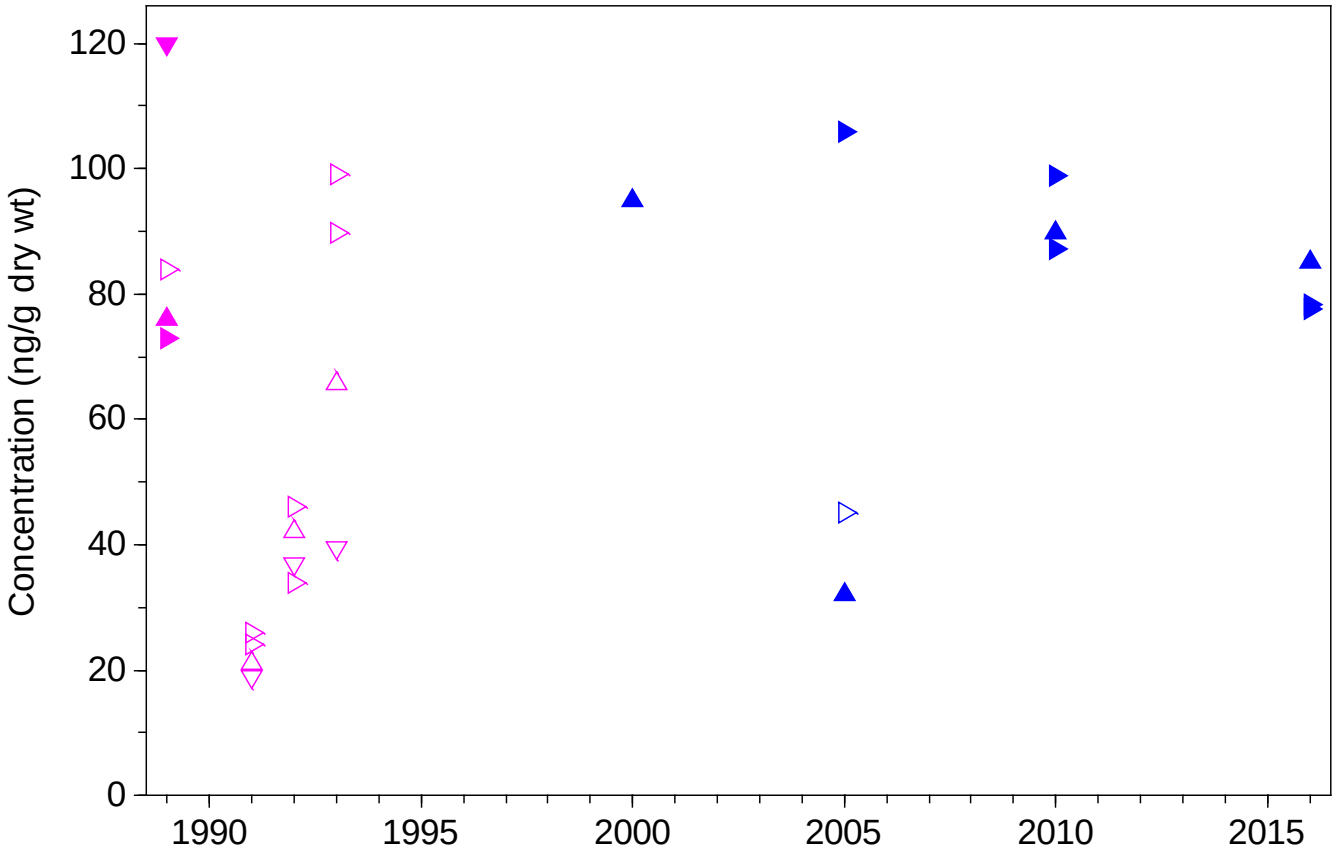
Fluoranthene, Station 38



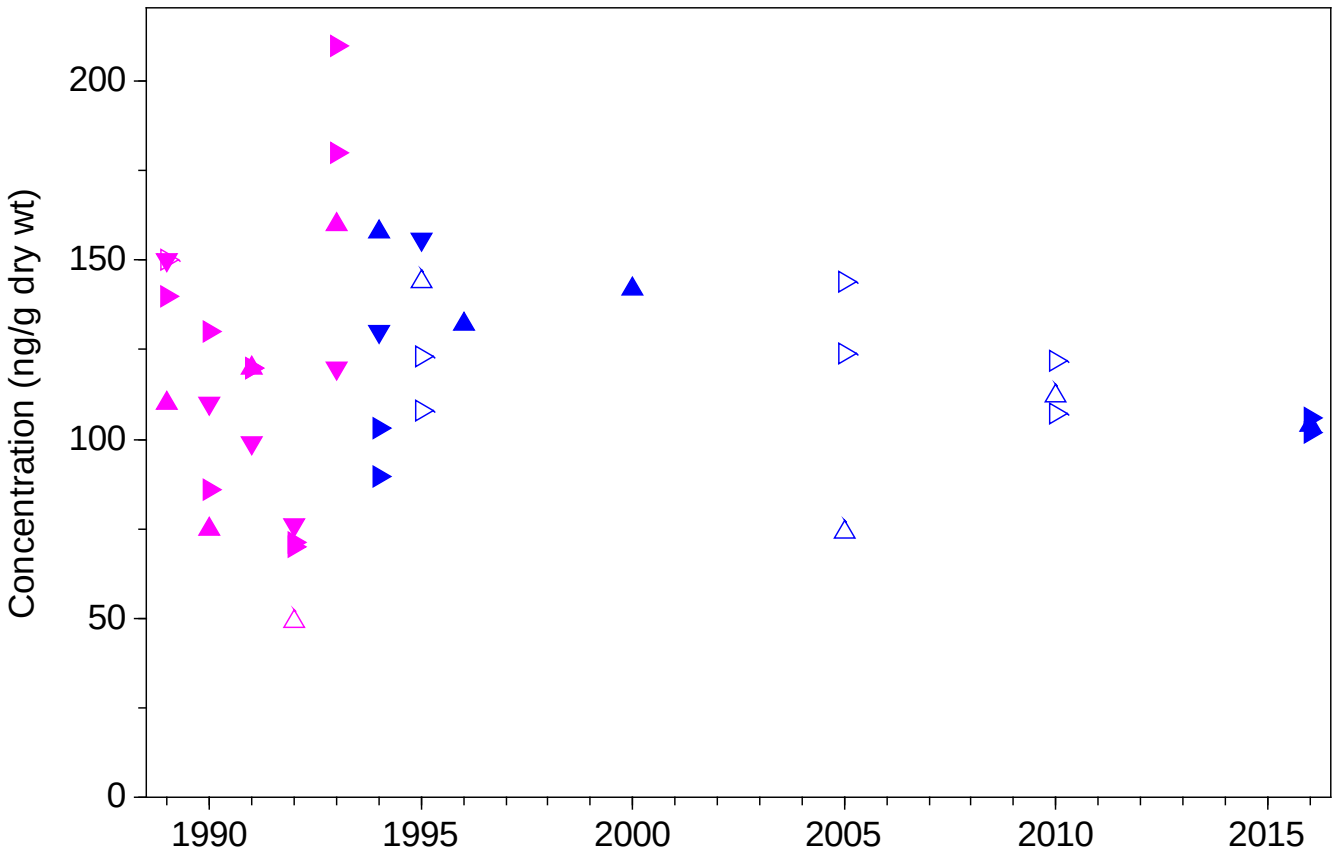
Indeno(1,2,3-c,d)pyrene, Station 38

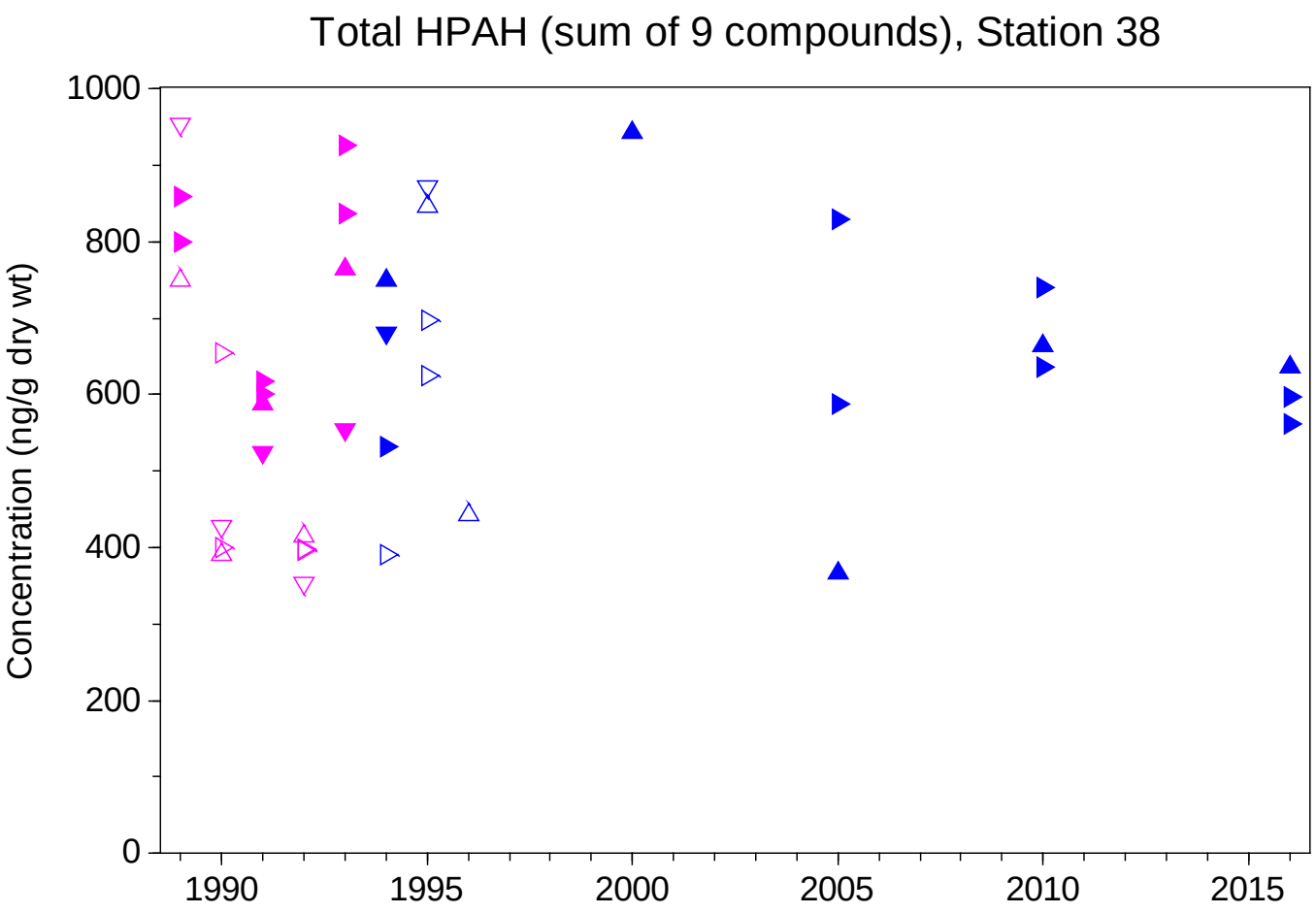


Perylene, Station 38



Pyrene, Station 38





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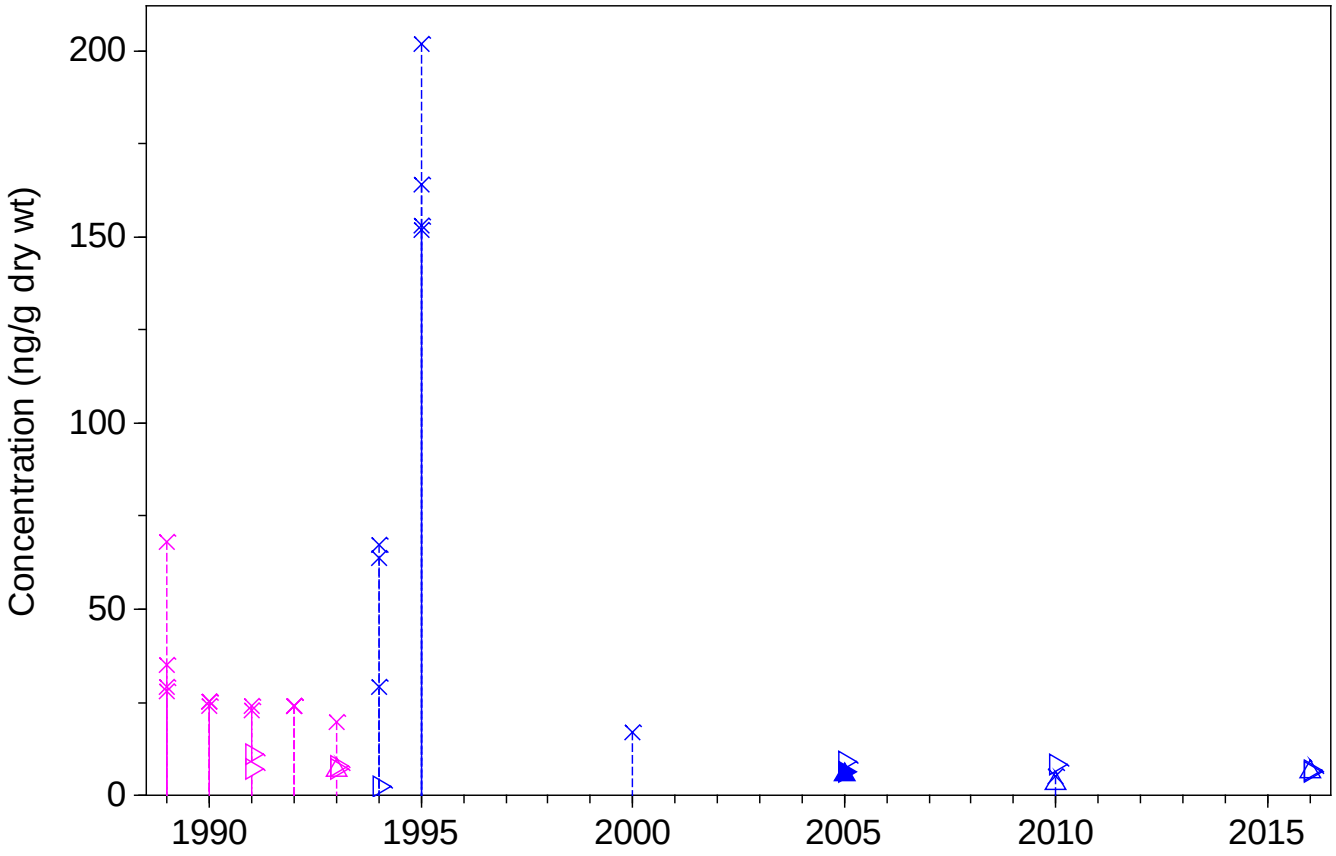
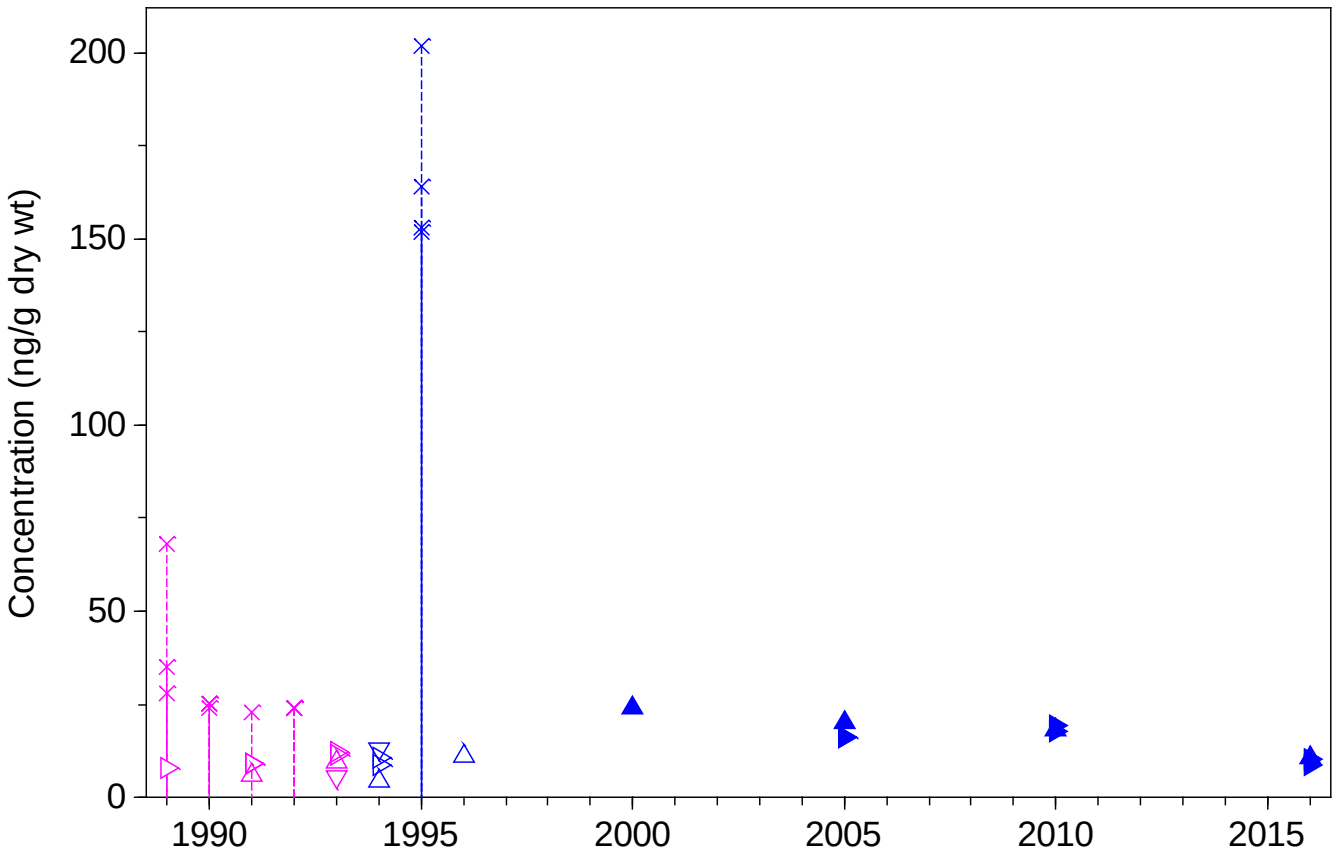
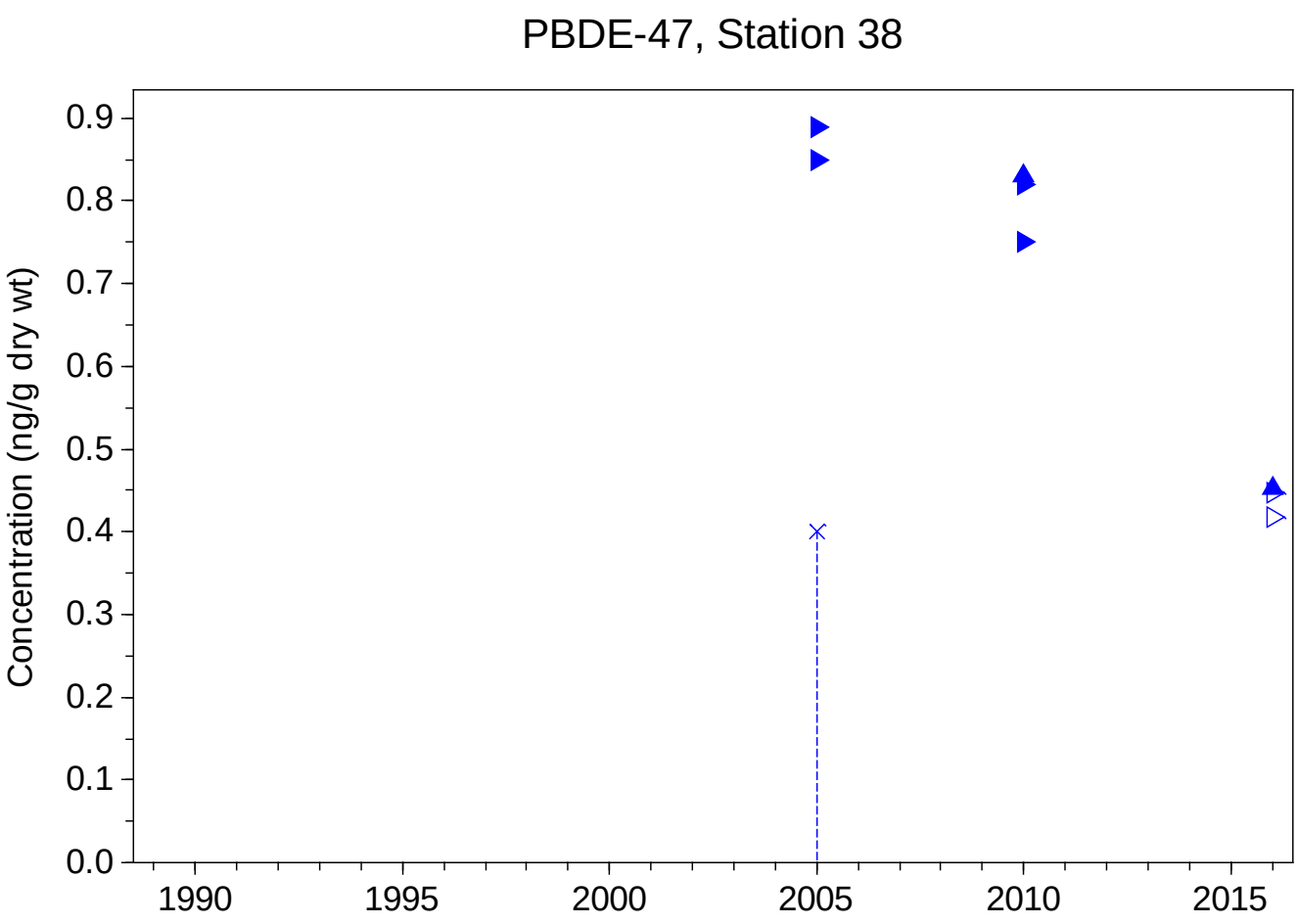
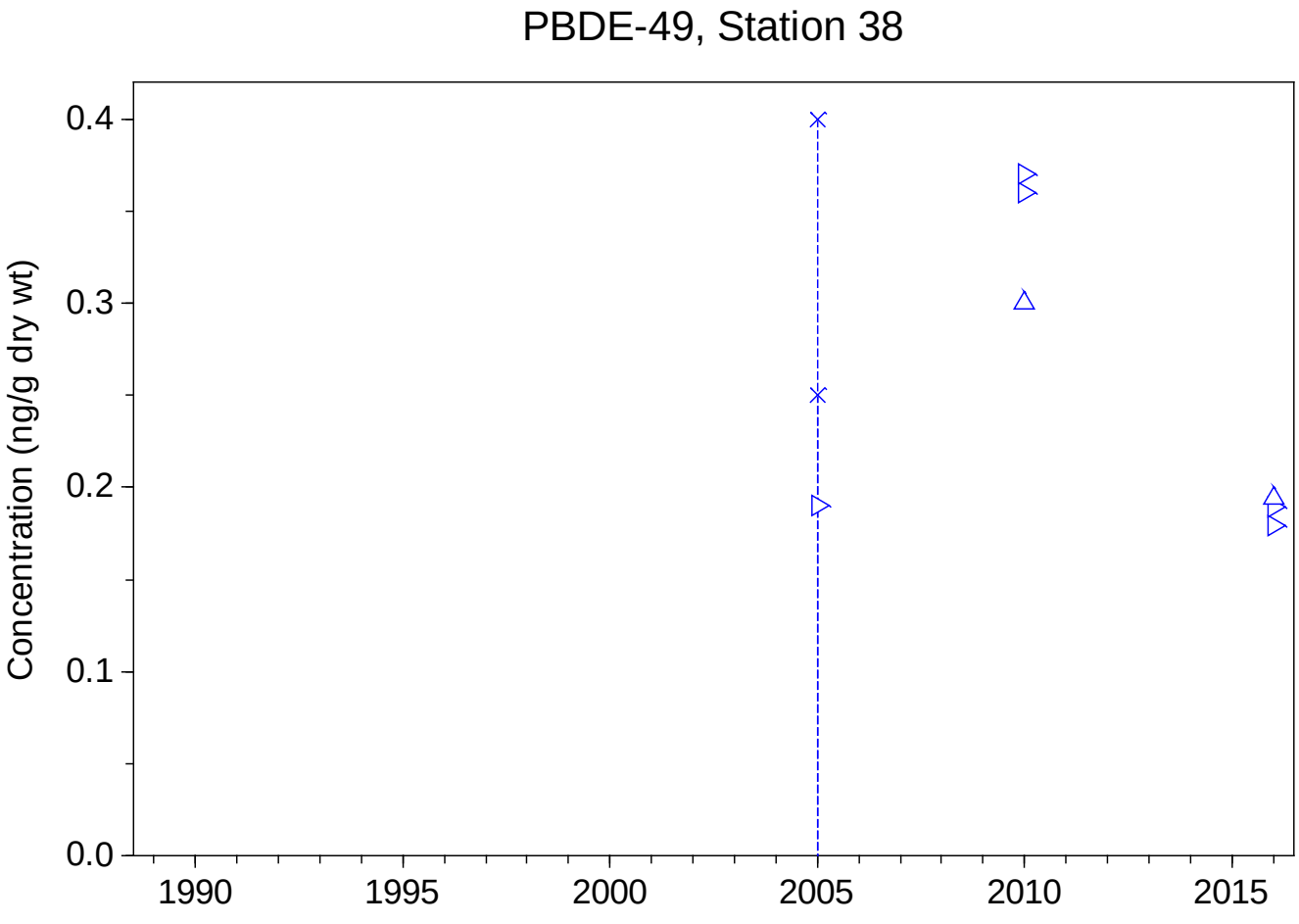
Carbazole, Station 38



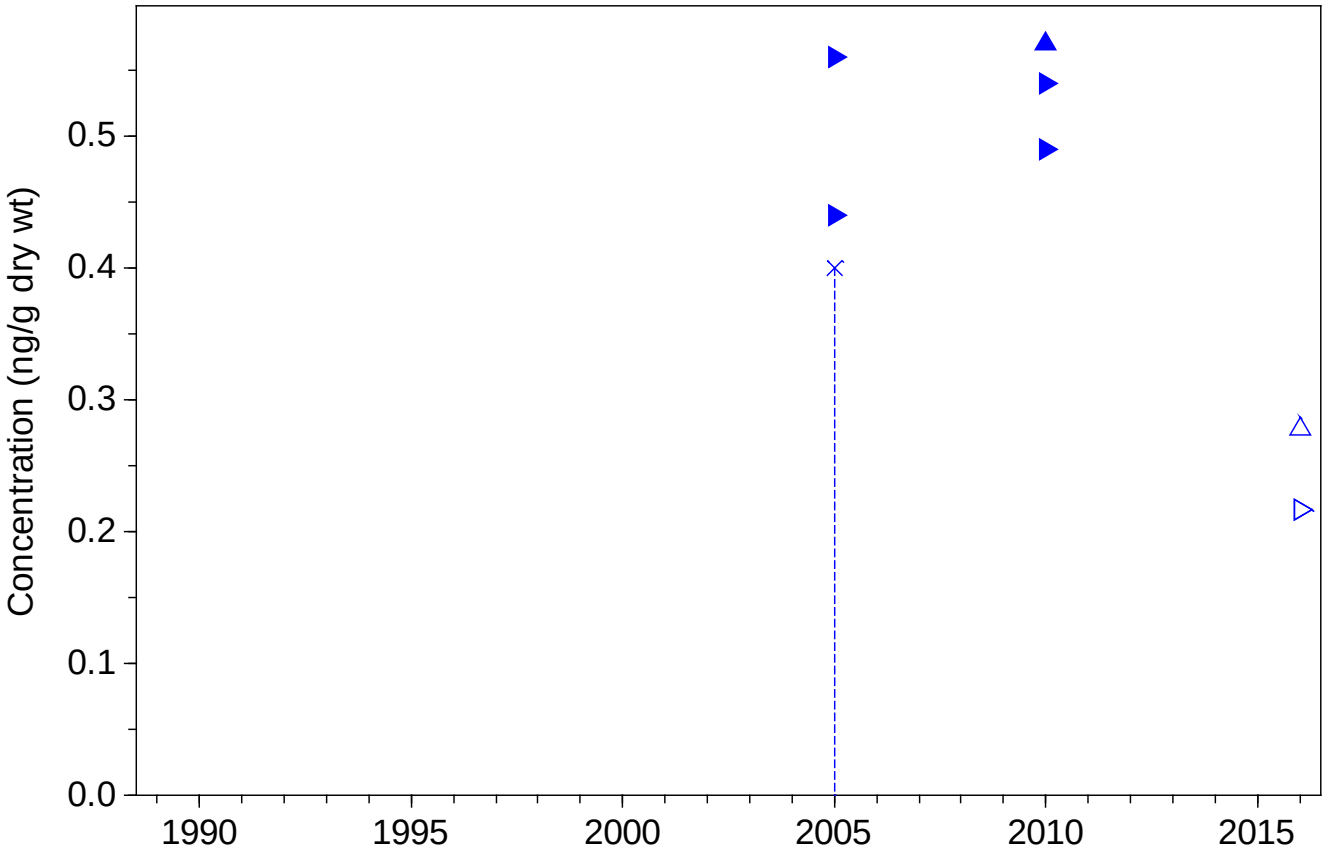
Dibenzofuran, Station 38



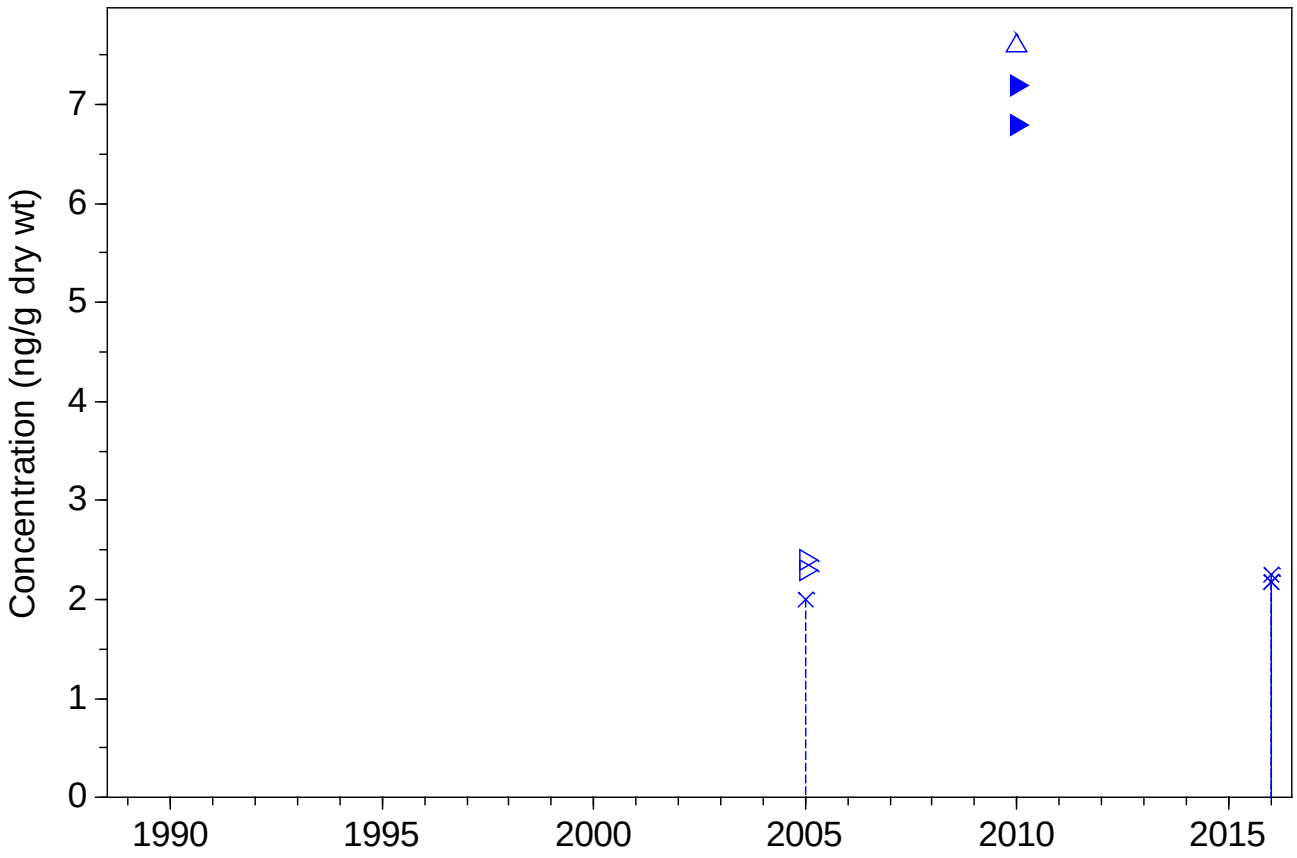

PBDE-47, Station 38
Concentration (ng/g dry wt)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1990
1995
2000
2005
2010
2015


PBDE-49, Station 38
Concentration (ng/g dry wt)
0.0
0.1
0.2
0.3
0.4
1990
1995
2000
2005
2010
2015

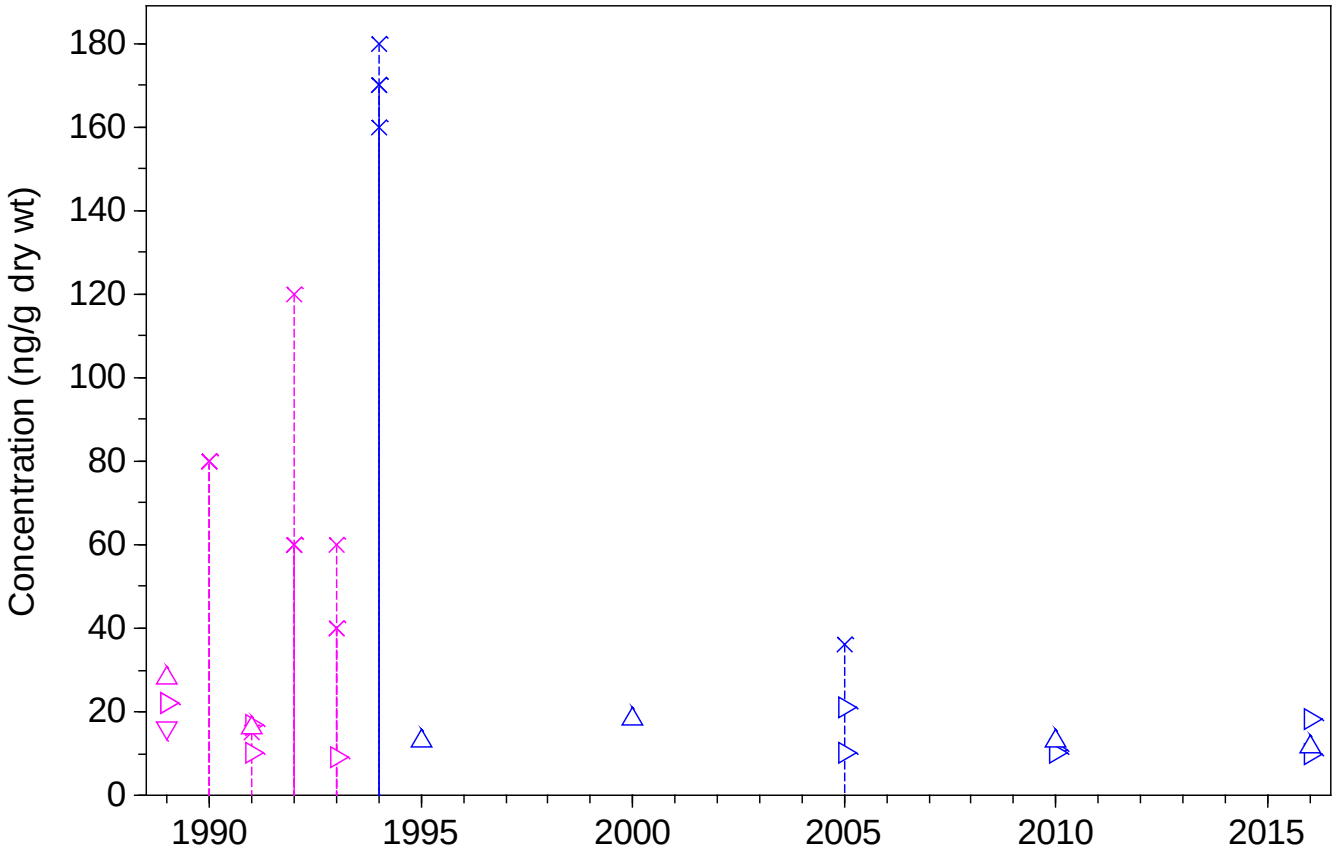
PBDE-99, Station 38



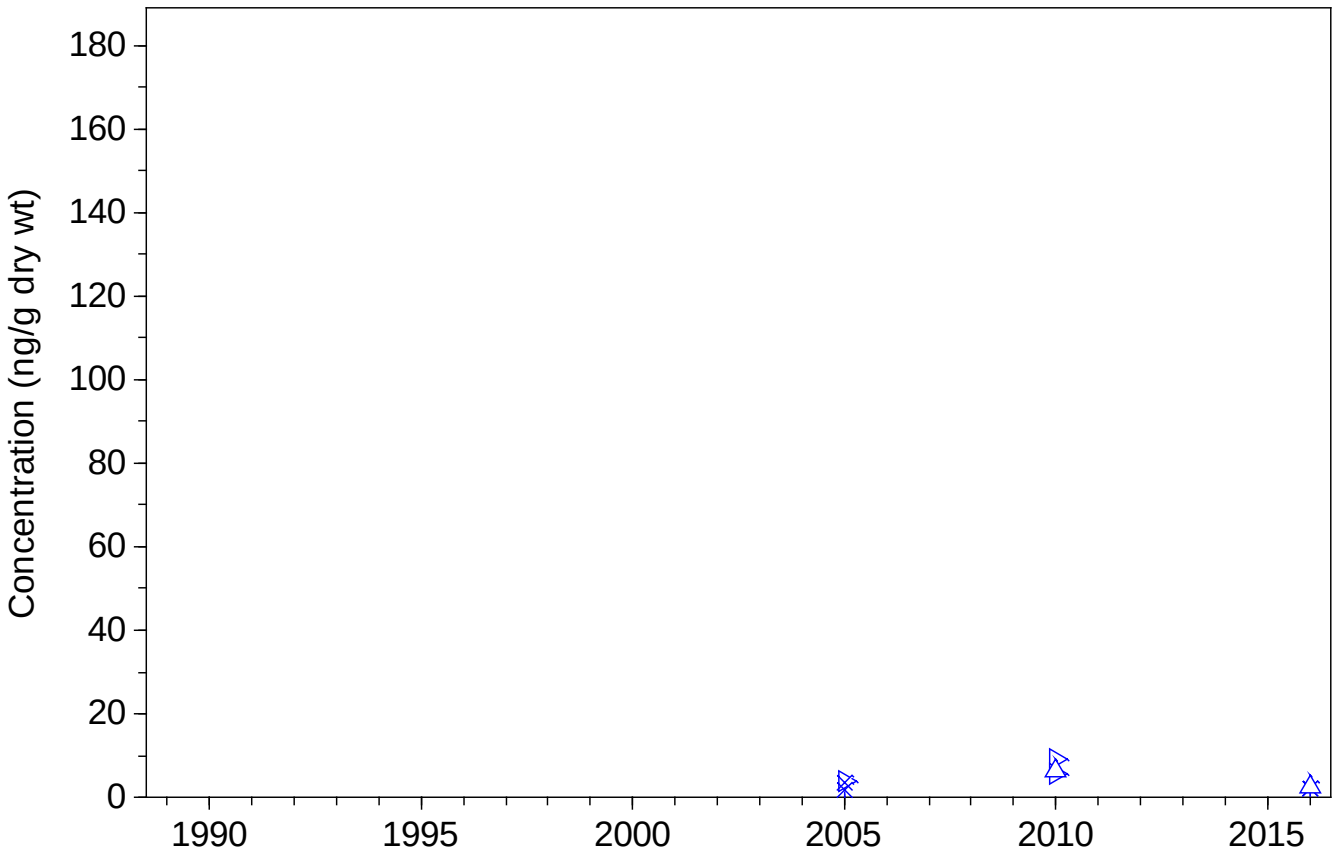
PBDE-209, Station 38



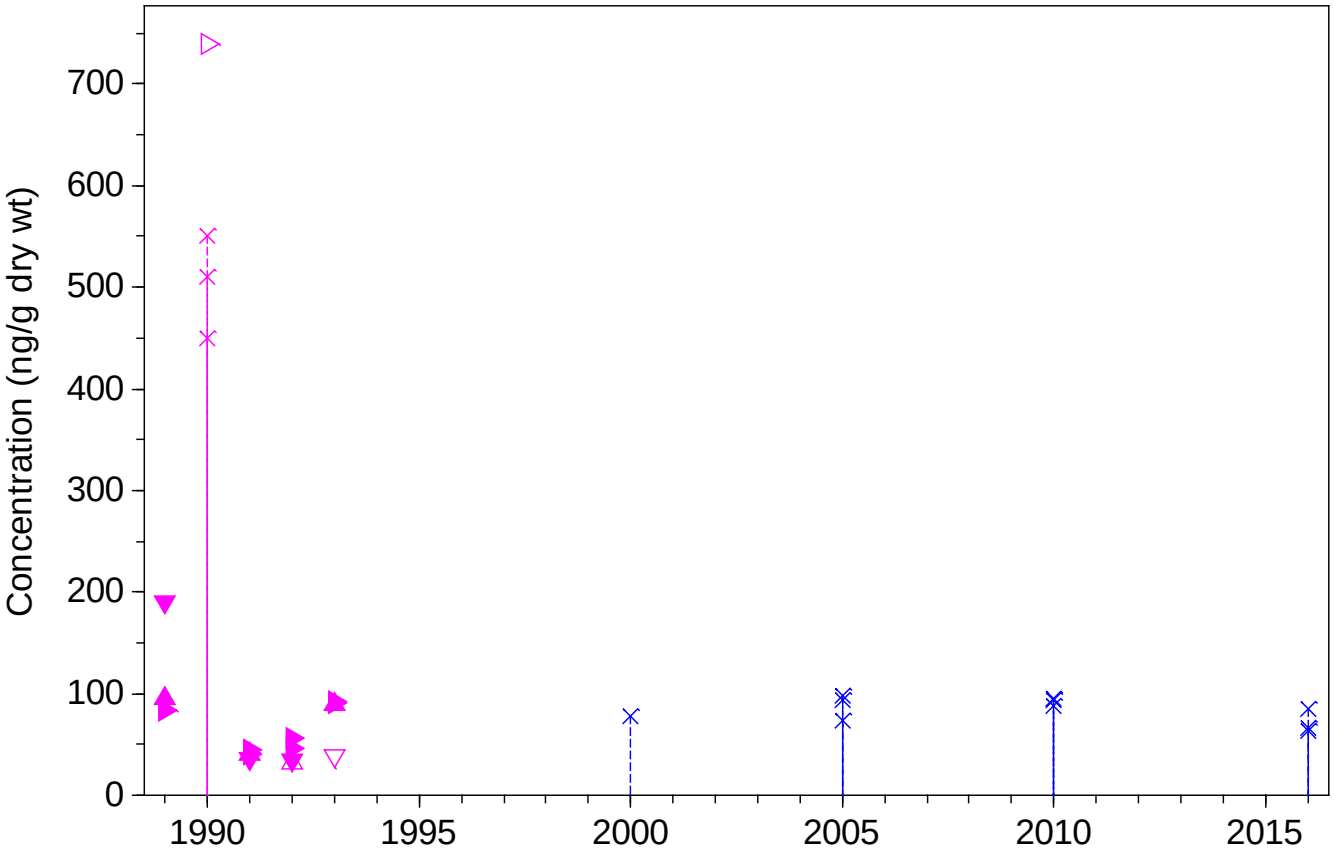
Total Aroclors, Station 38



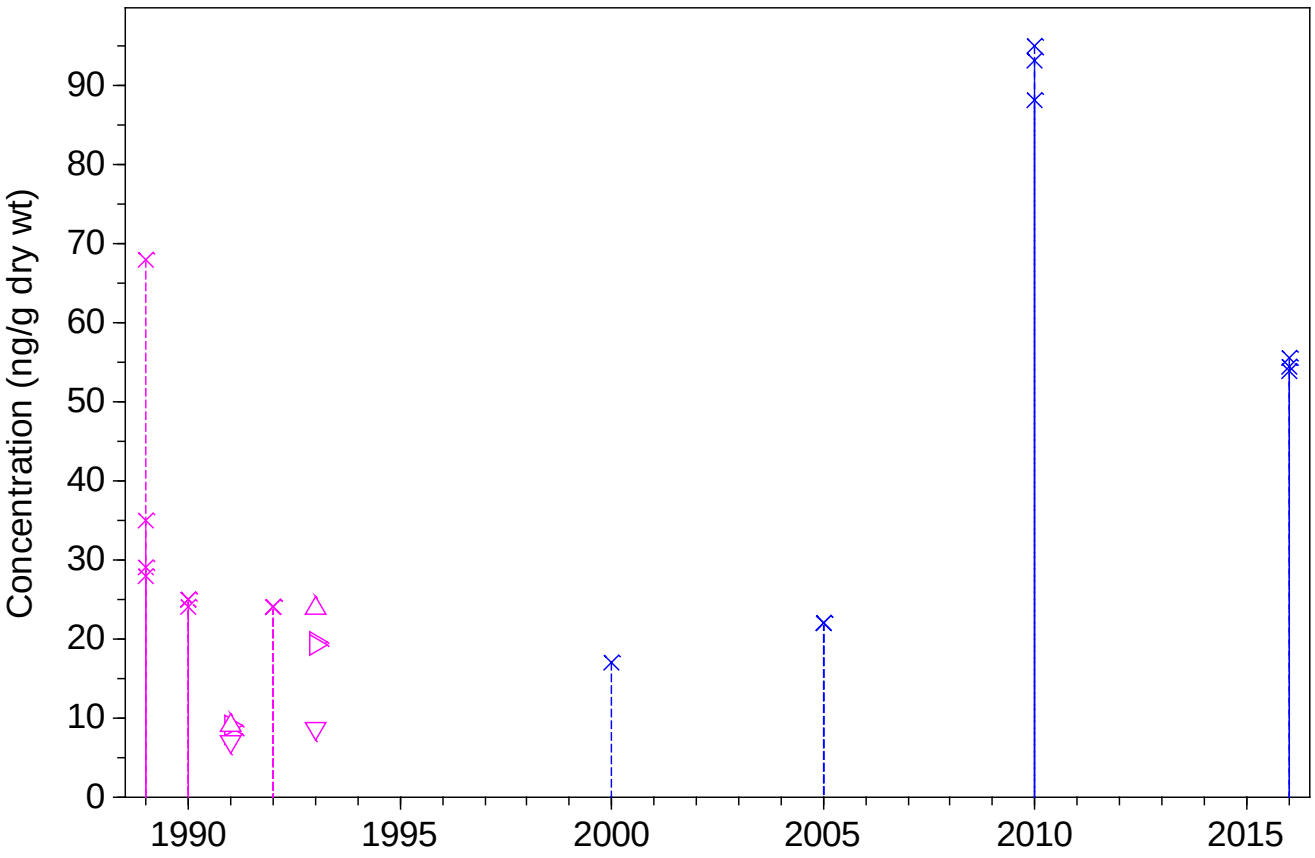
Total PCB Congeners x 2, Station 38



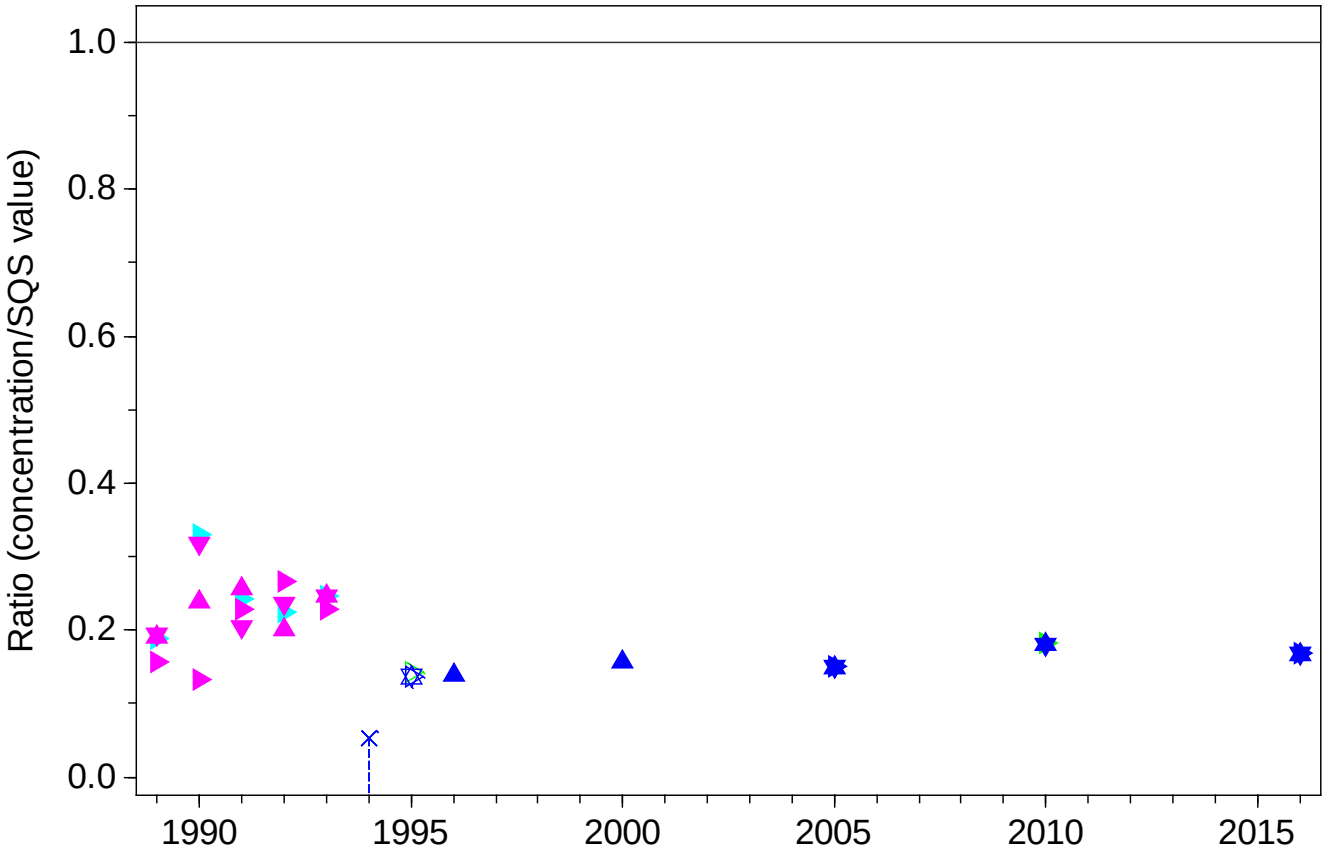
Bis(2-ethylhexyl)phthalate, Station 38



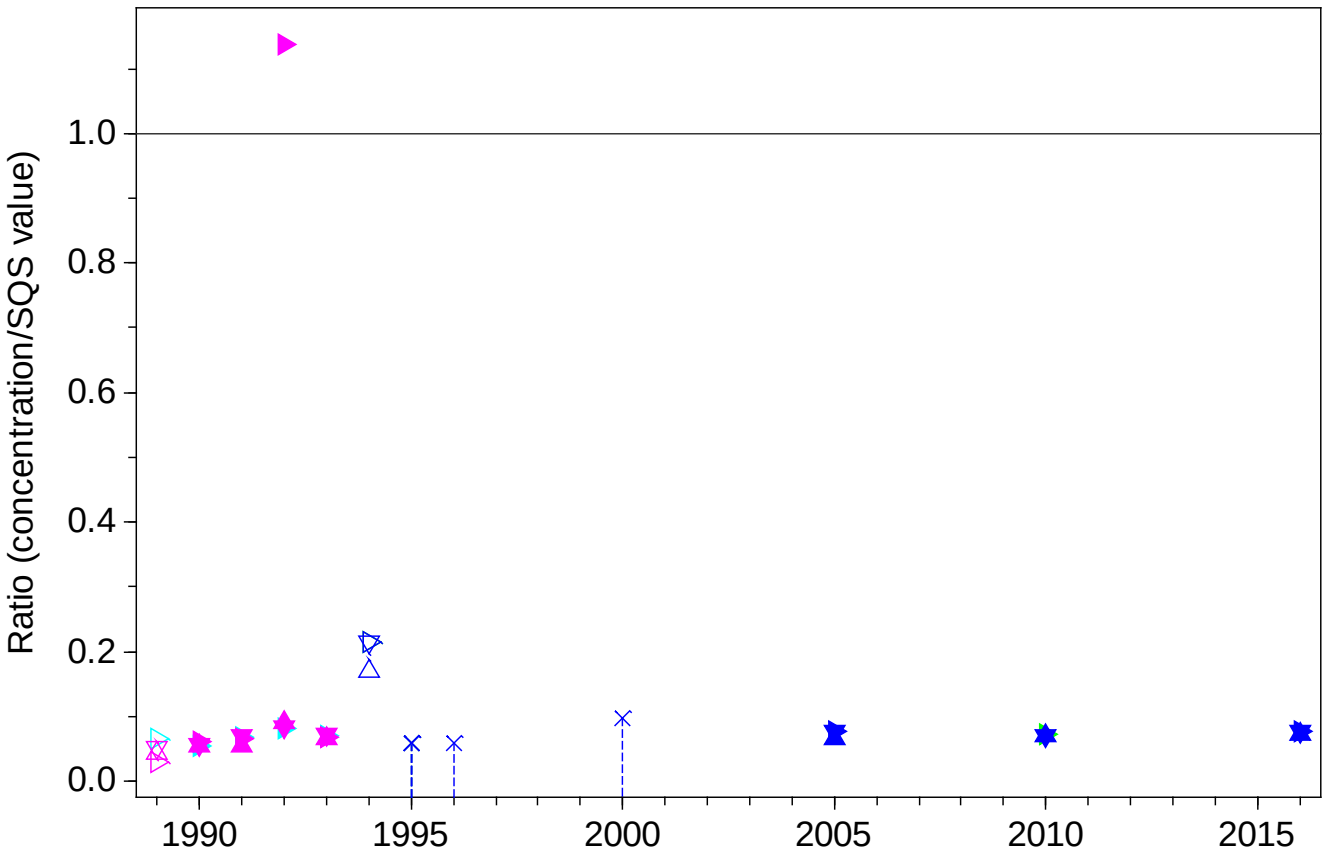
Butylbenzylphthalate, Station 38



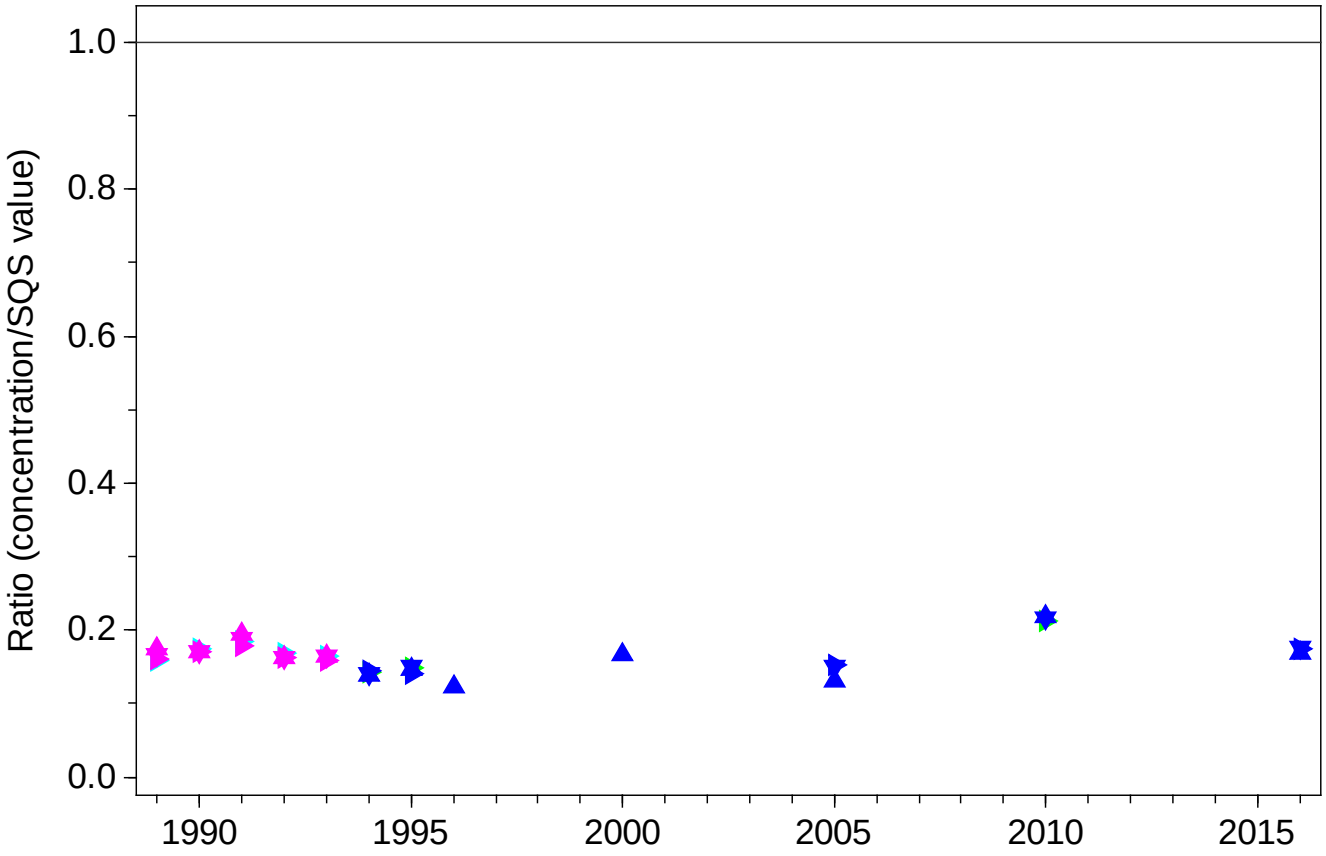
SQS quotient, Arsenic, Station 38



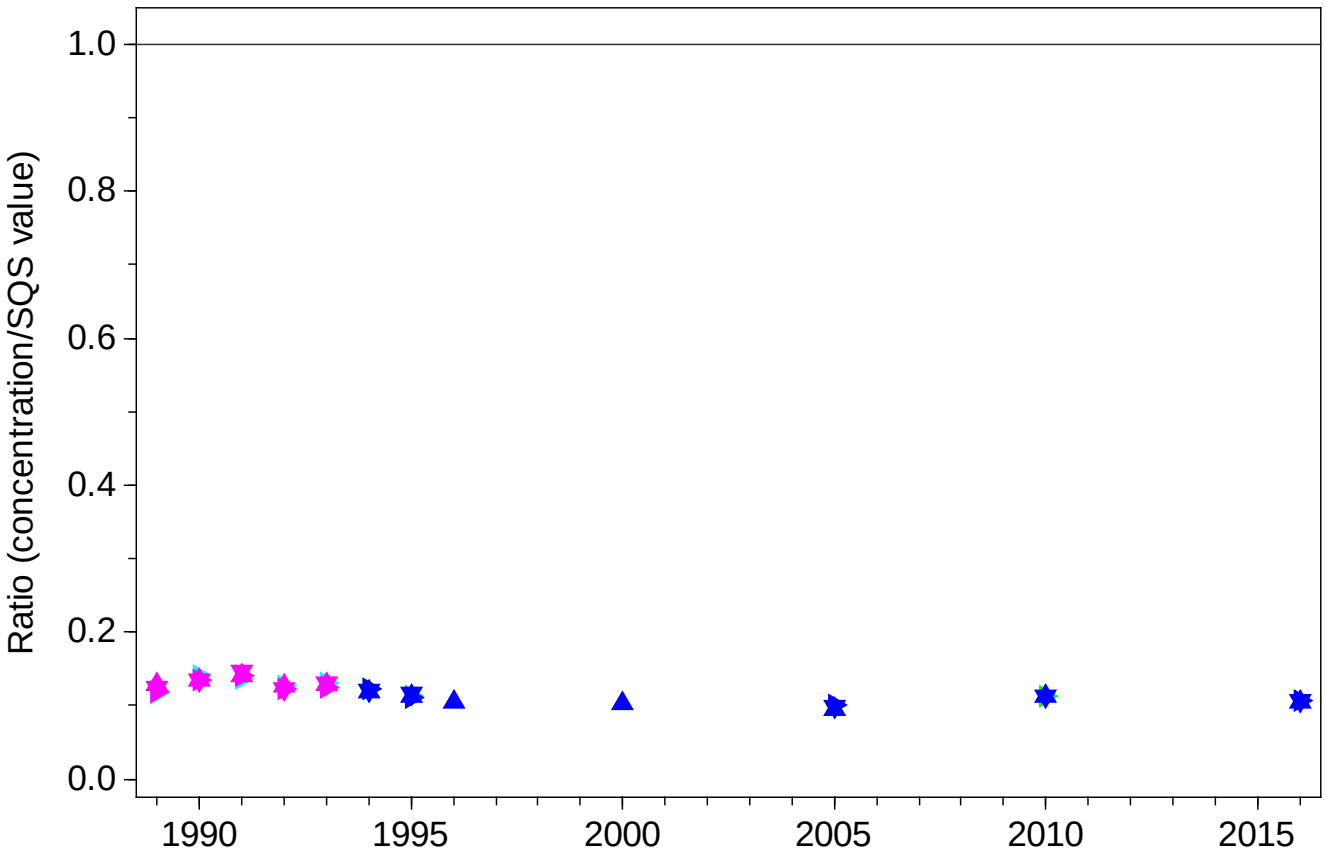
SQS quotient, Cadmium, Station 38



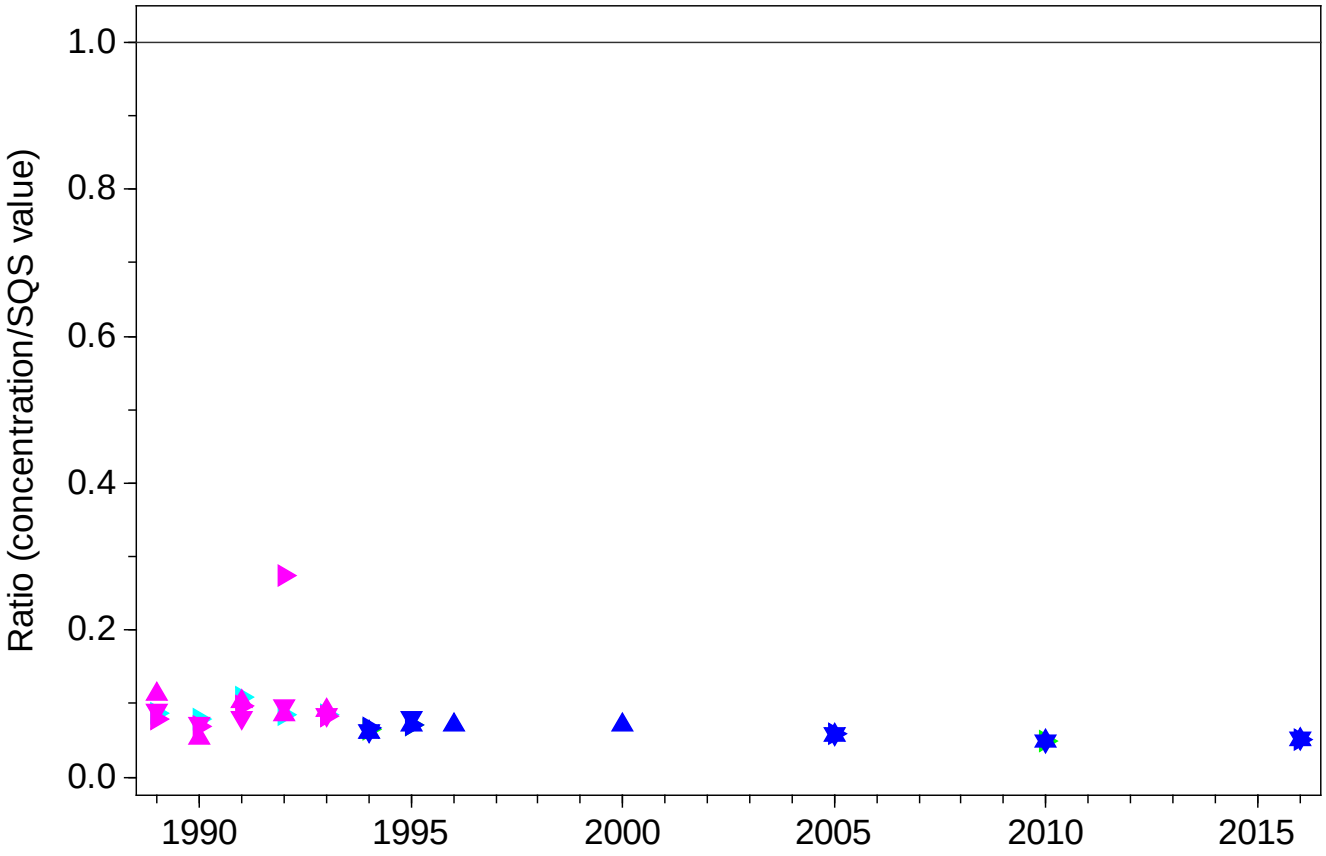
SQS quotient, Chromium, Station 38



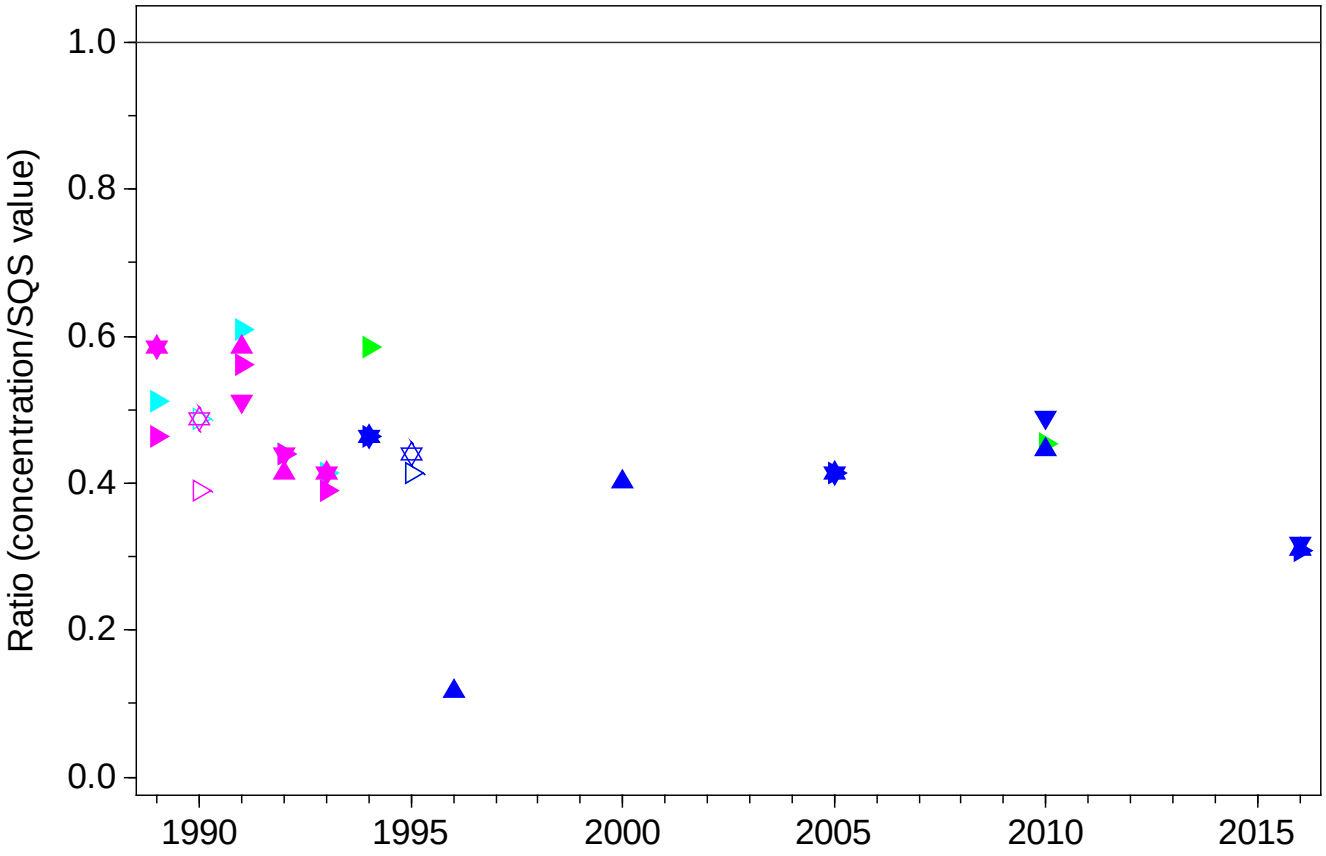
SQS quotient, Copper, Station 38



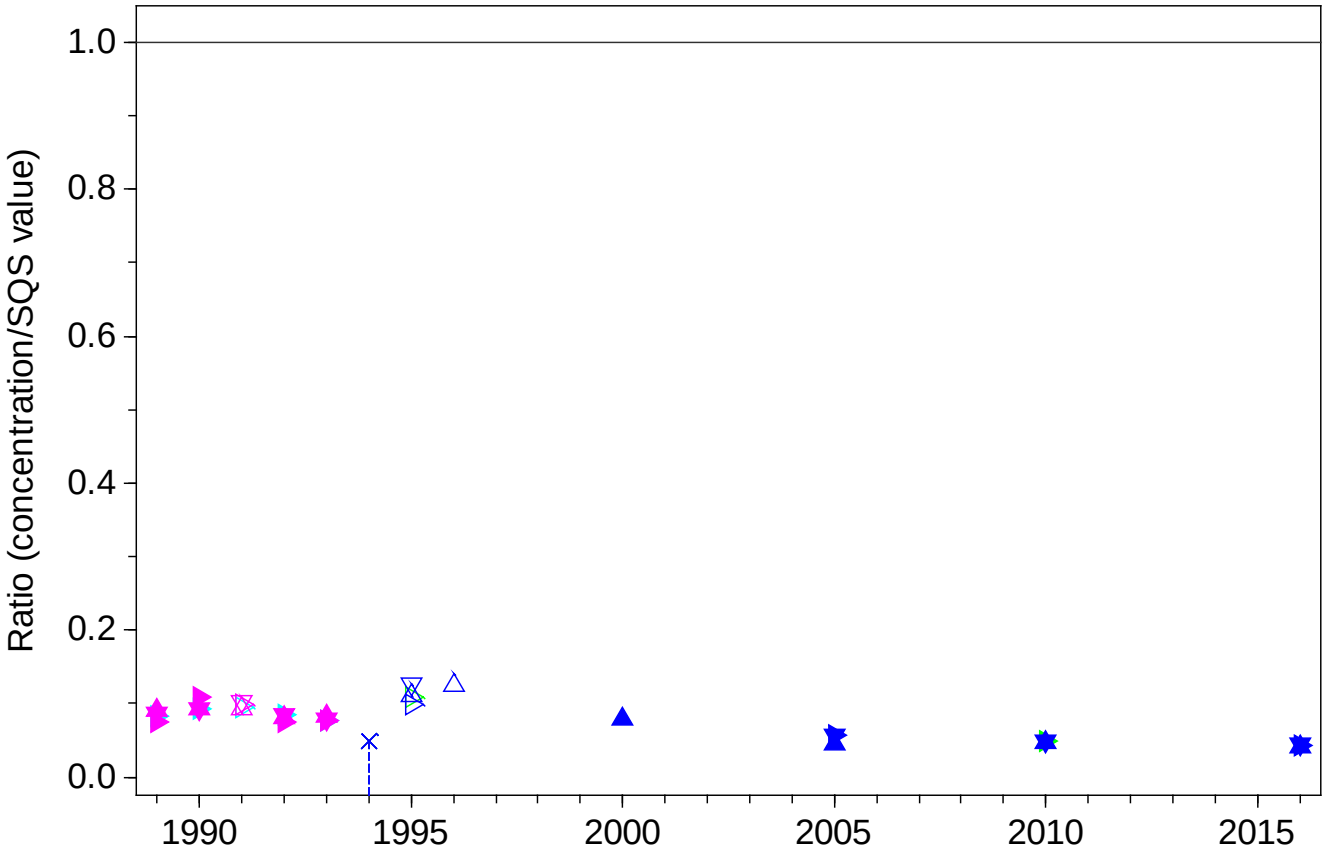
SQS quotient, Lead, Station 38



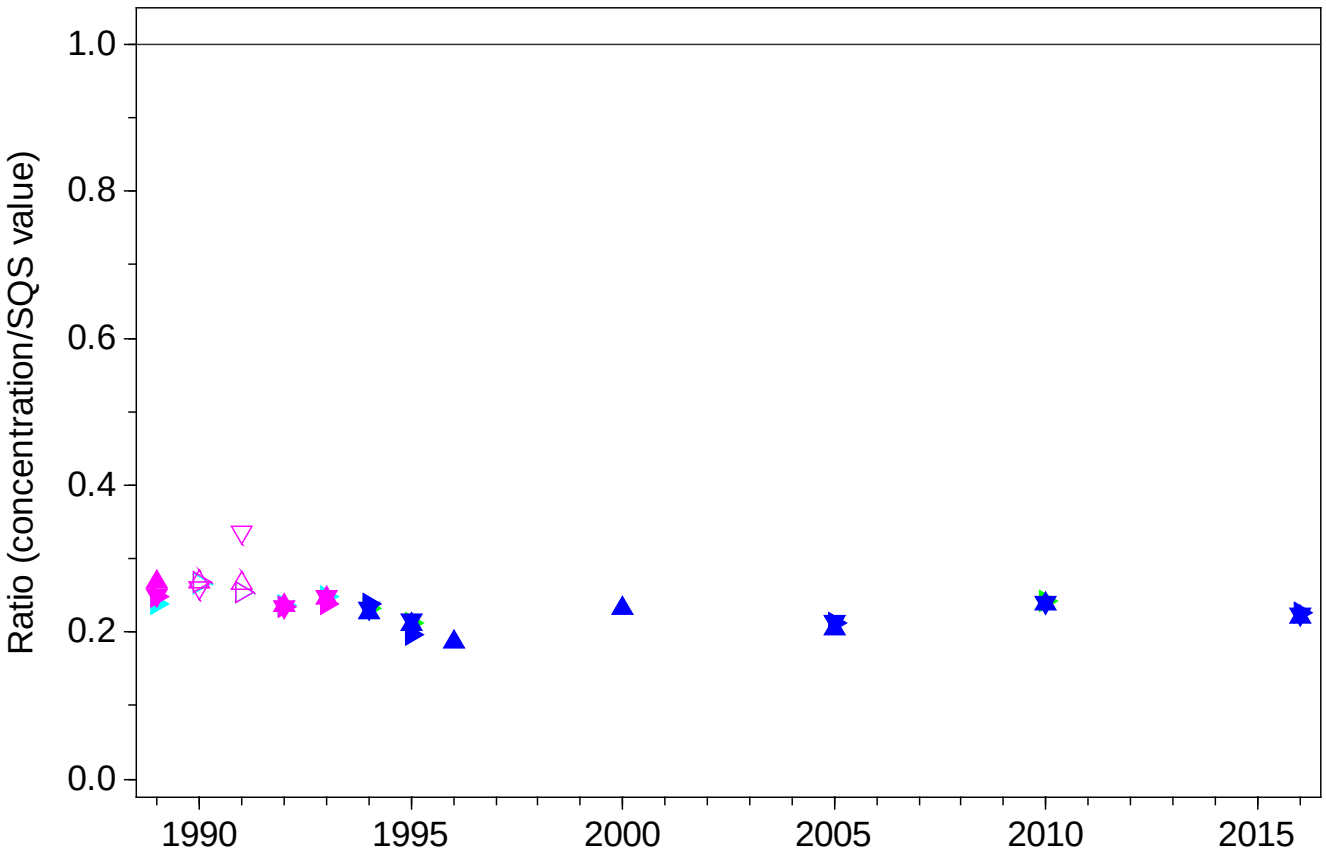
SQS quotient, Mercury, Station 38



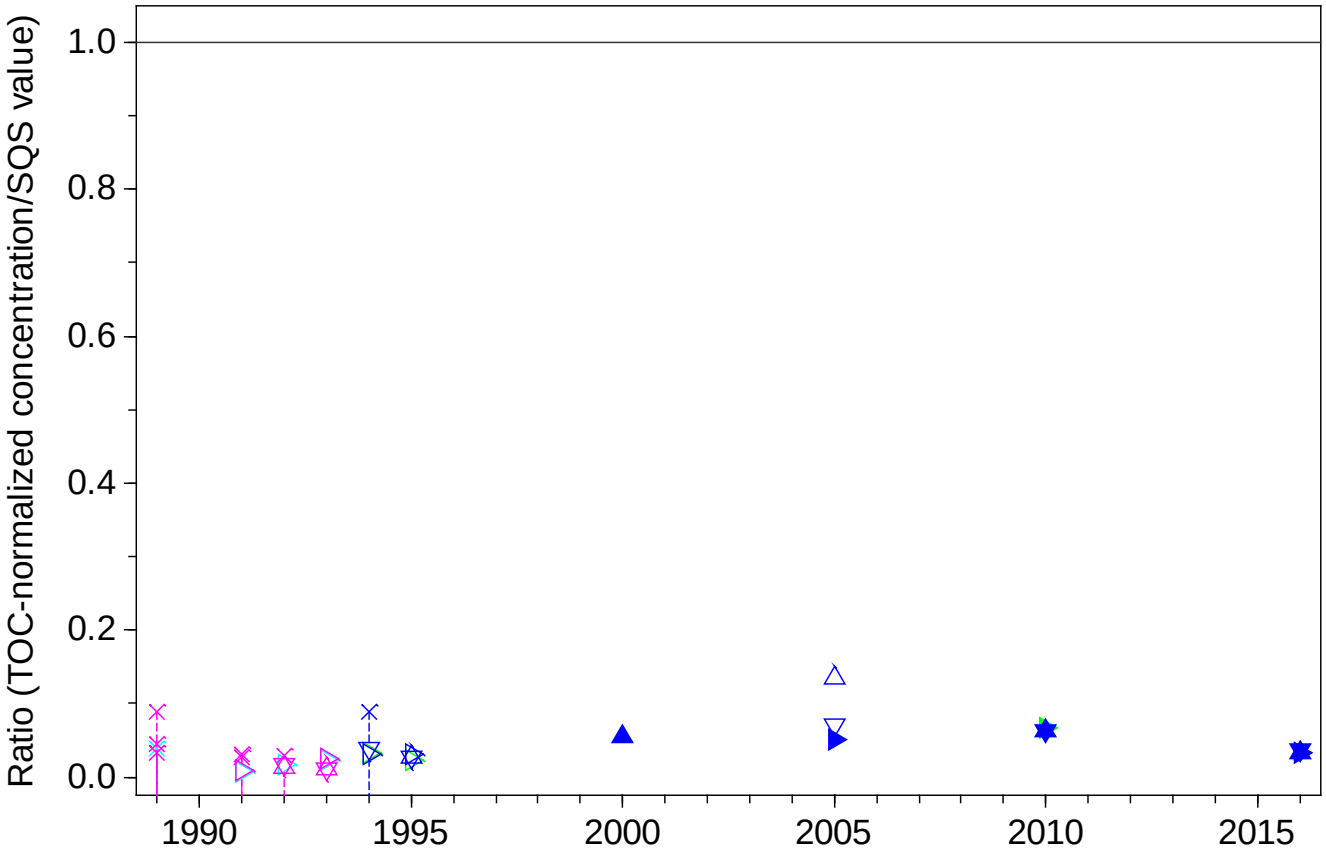
SQS quotient, Silver, Station 38



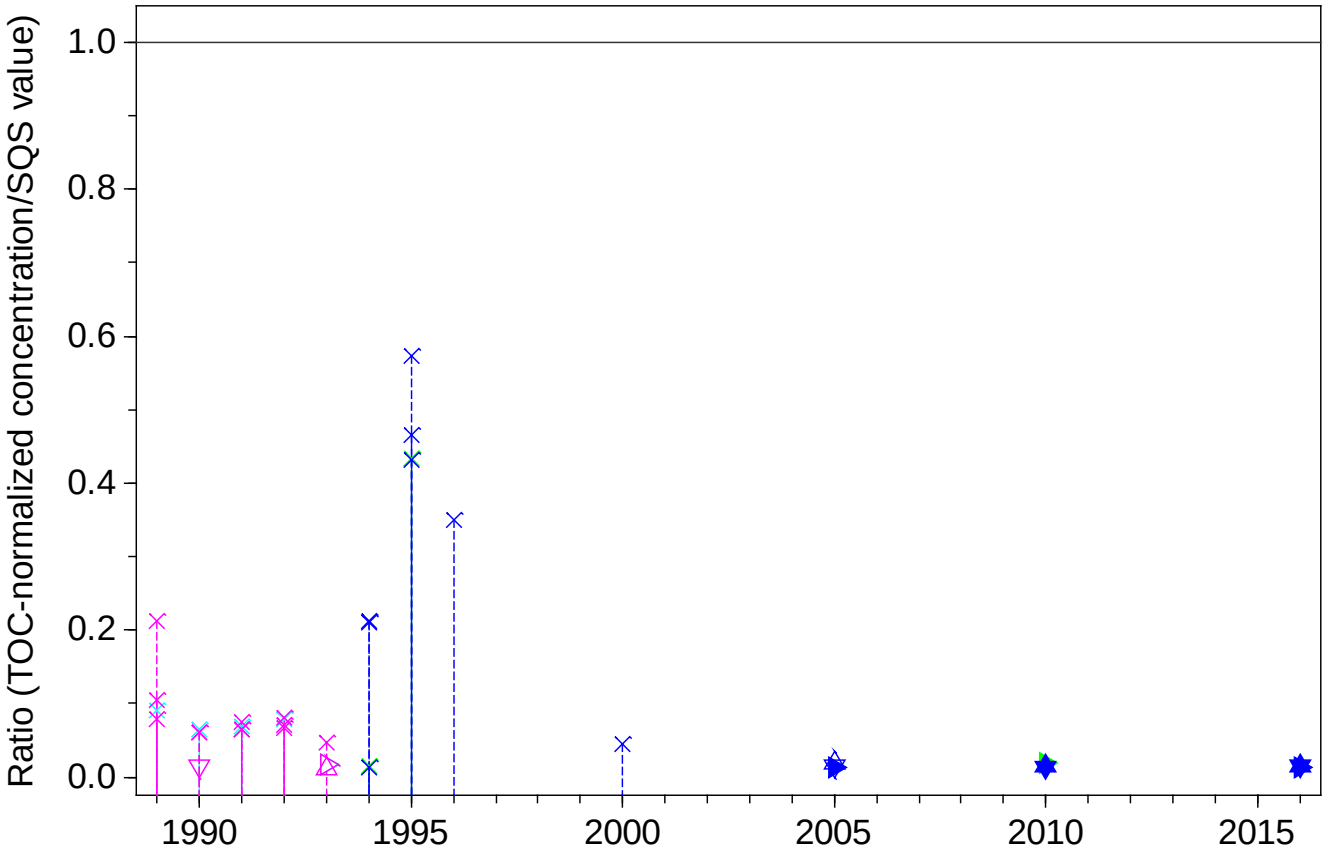
SQS quotient, Zinc, Station 38



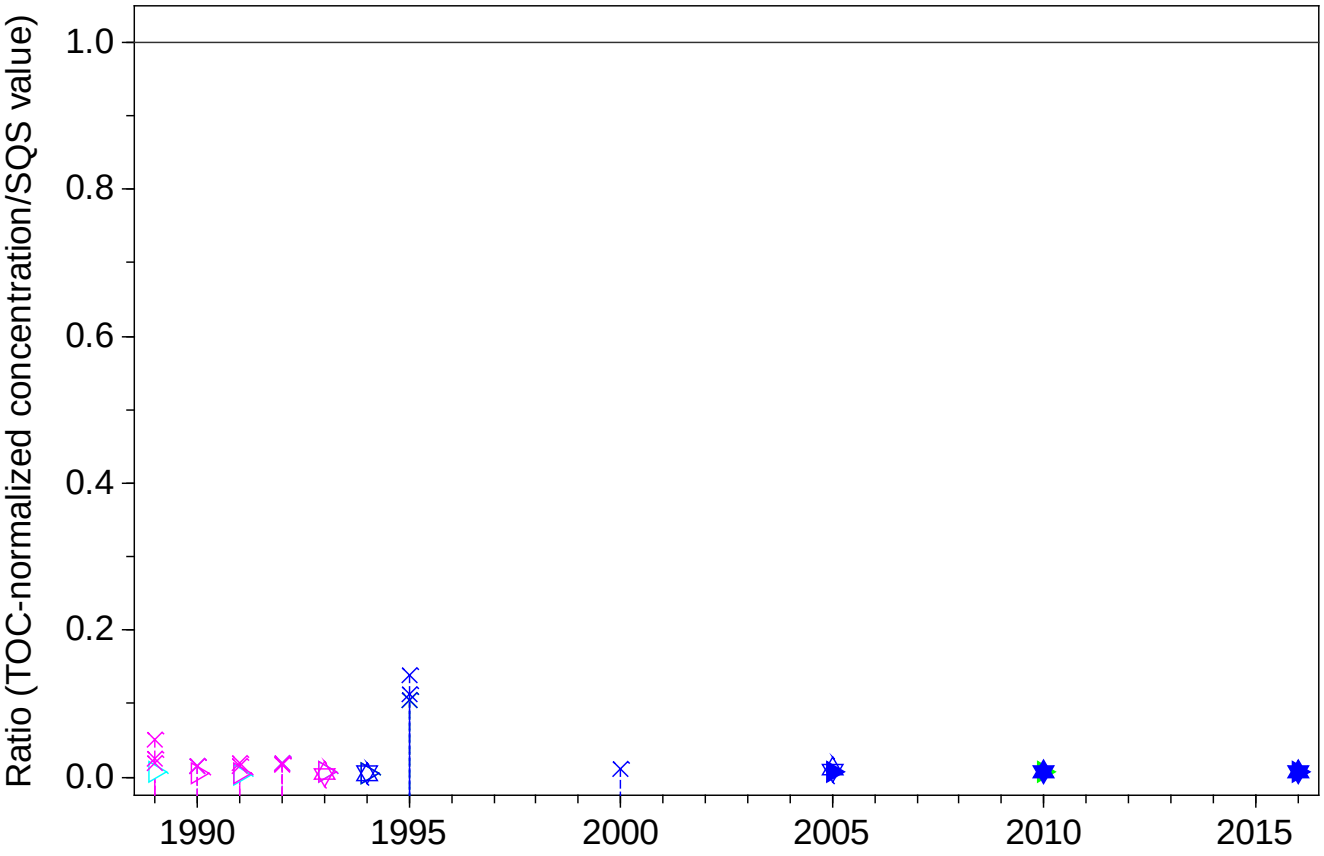
SQS quotient, 2-Methylnaphthalene, Station 38



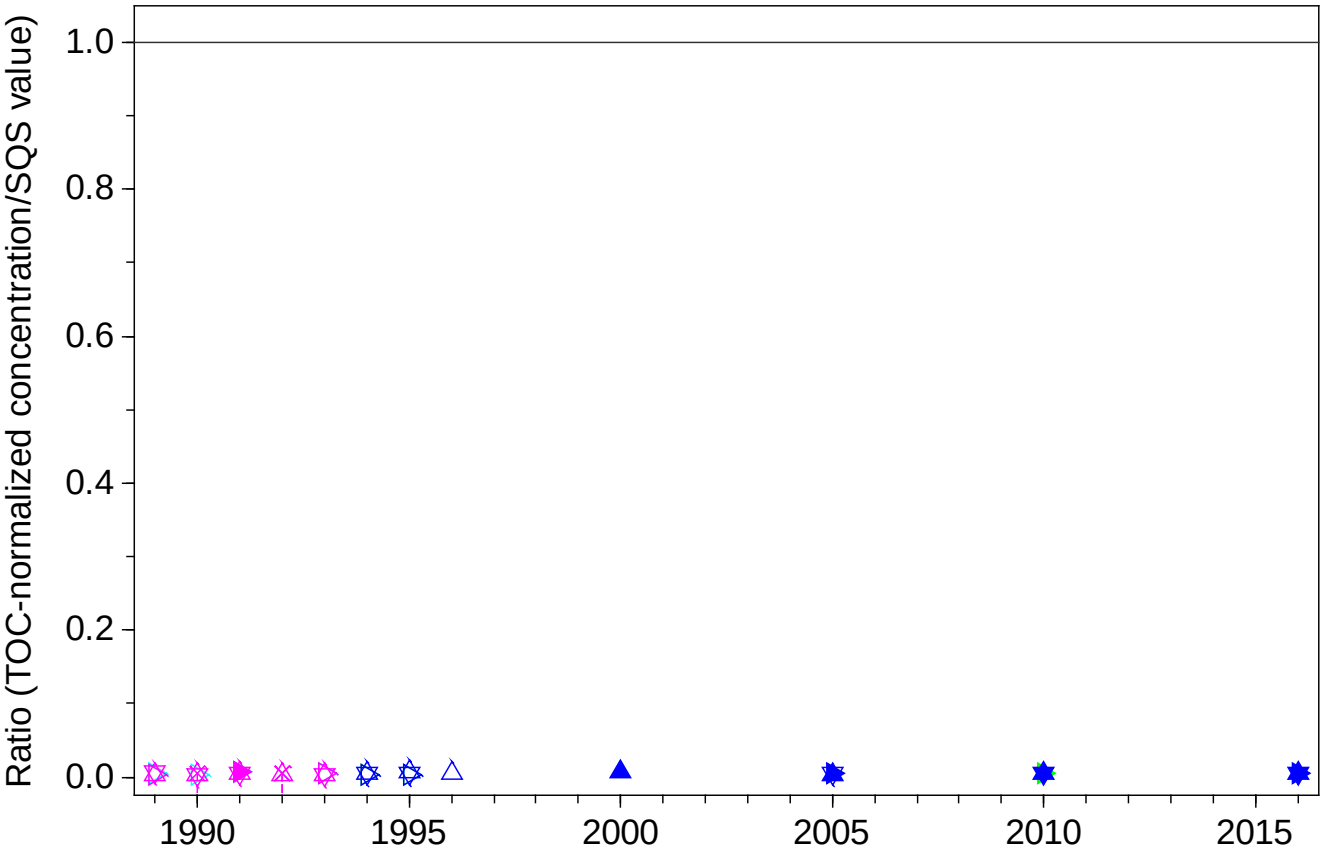
SQS quotient, Acenaphthene, Station 38



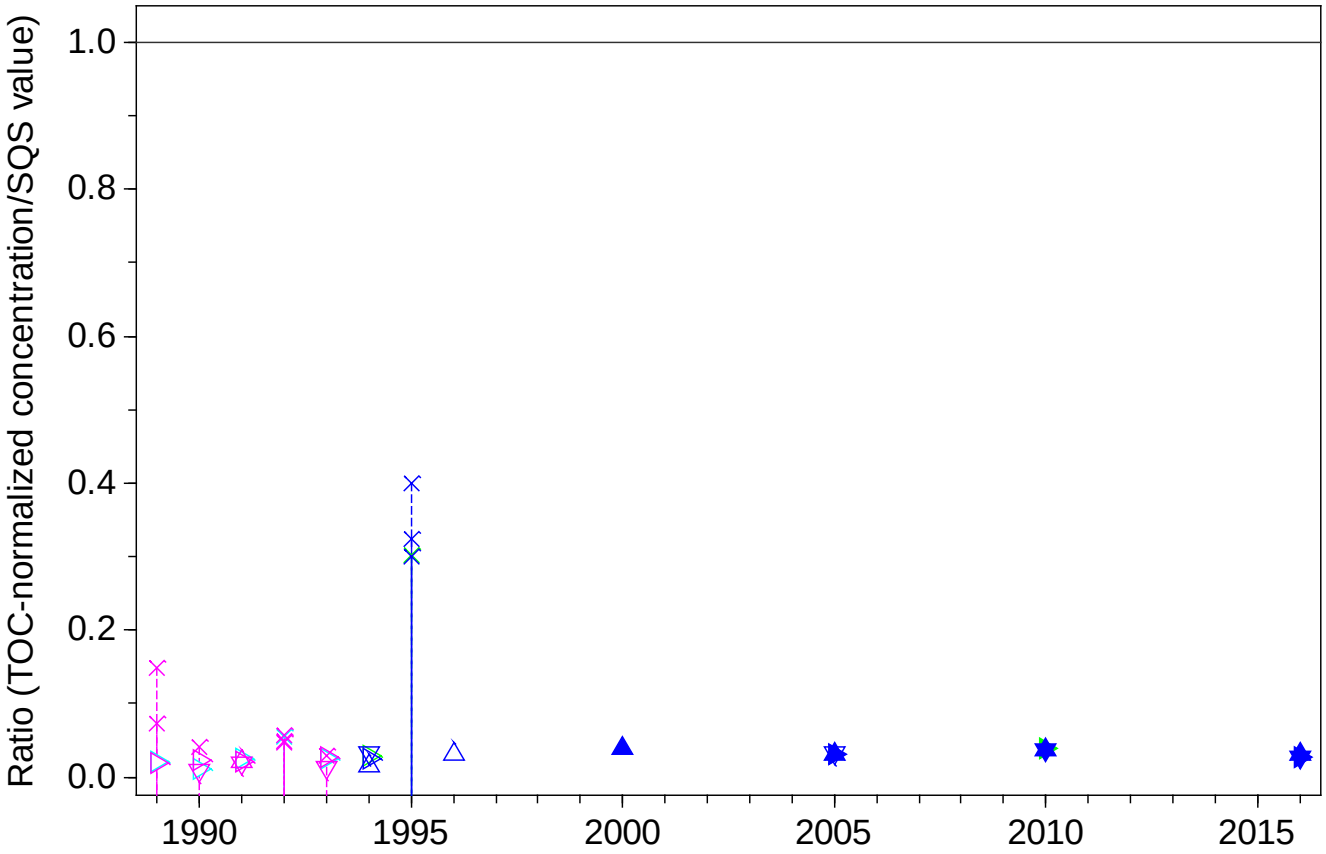
SQS quotient, Acenaphthylene, Station 38



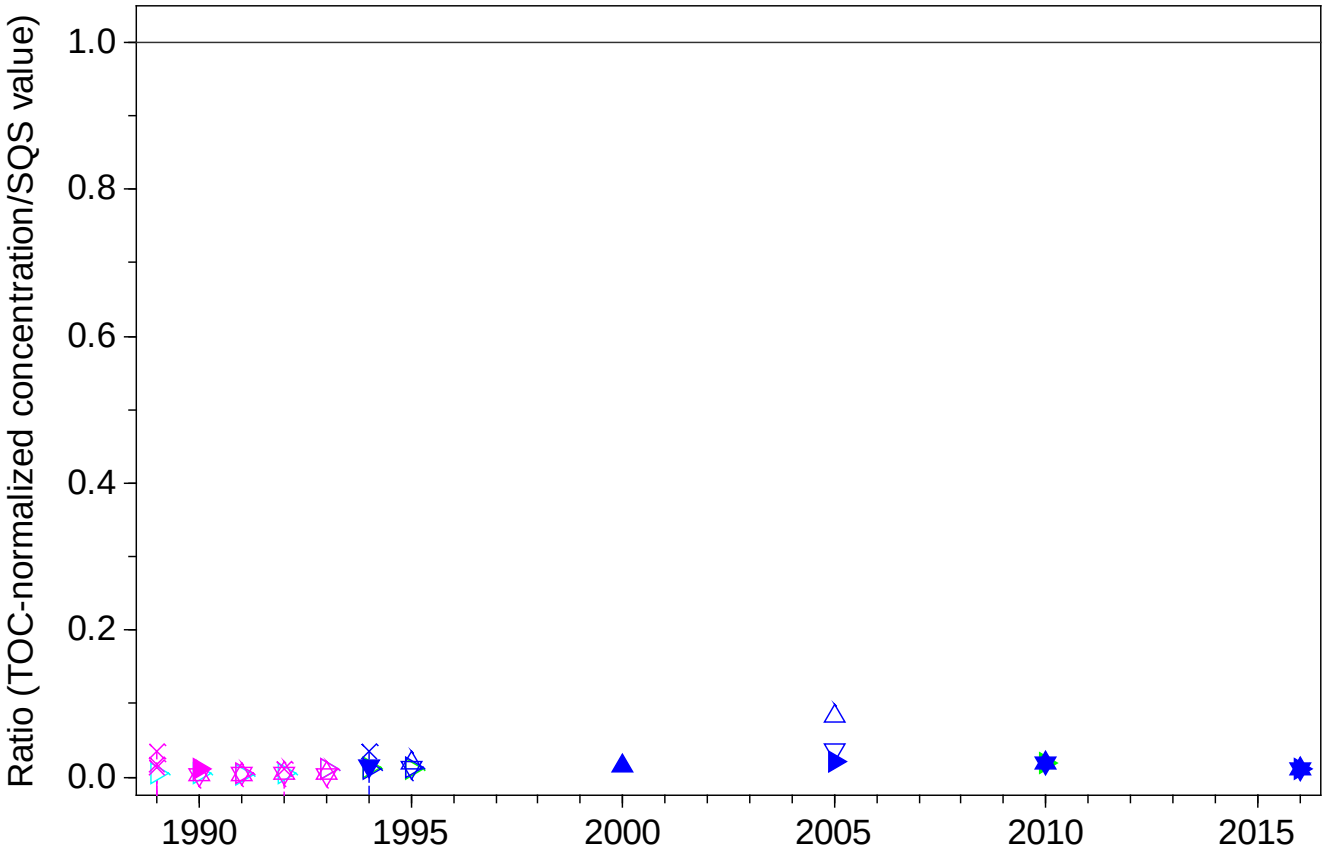
SQS quotient, Anthracene, Station 38



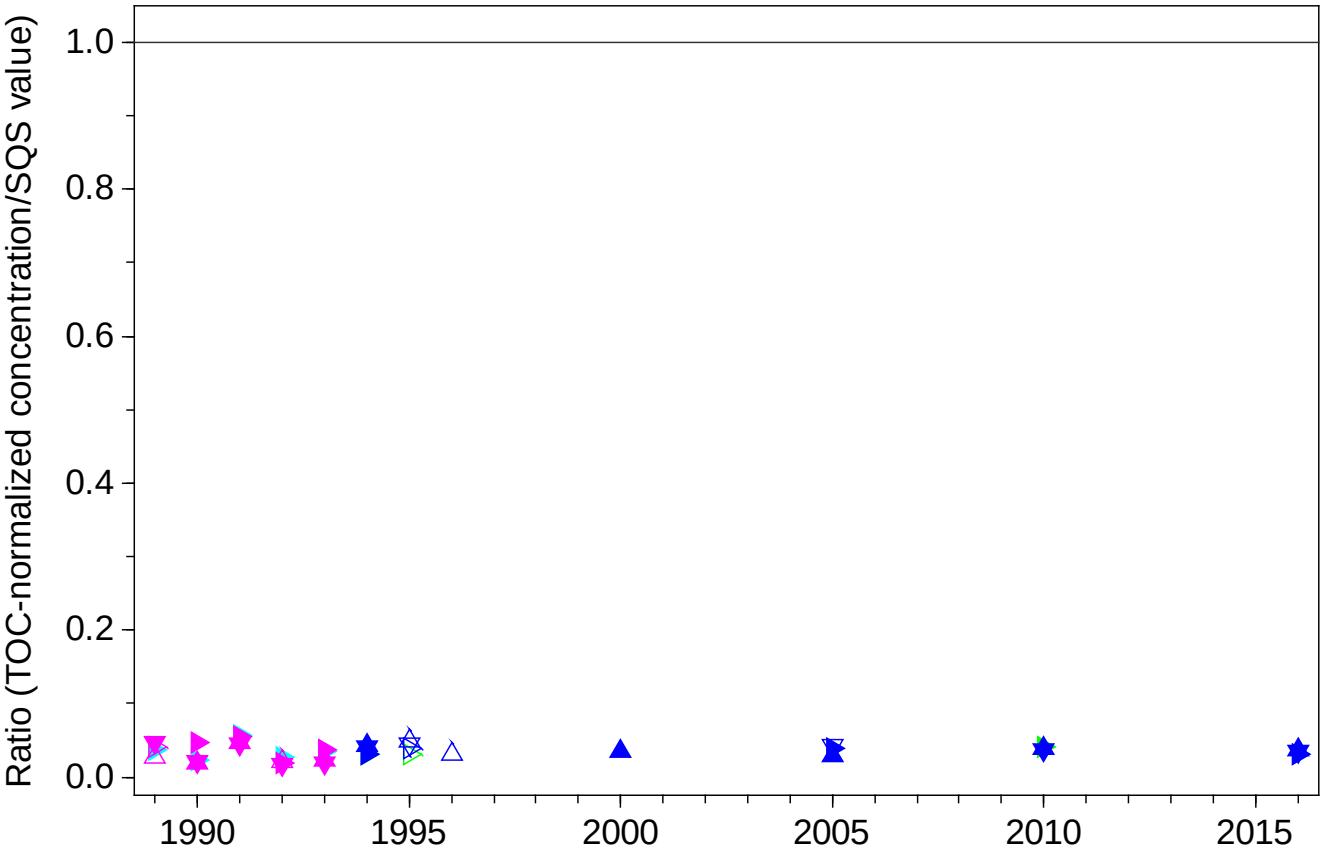
SQS quotient, Fluorene, Station 38



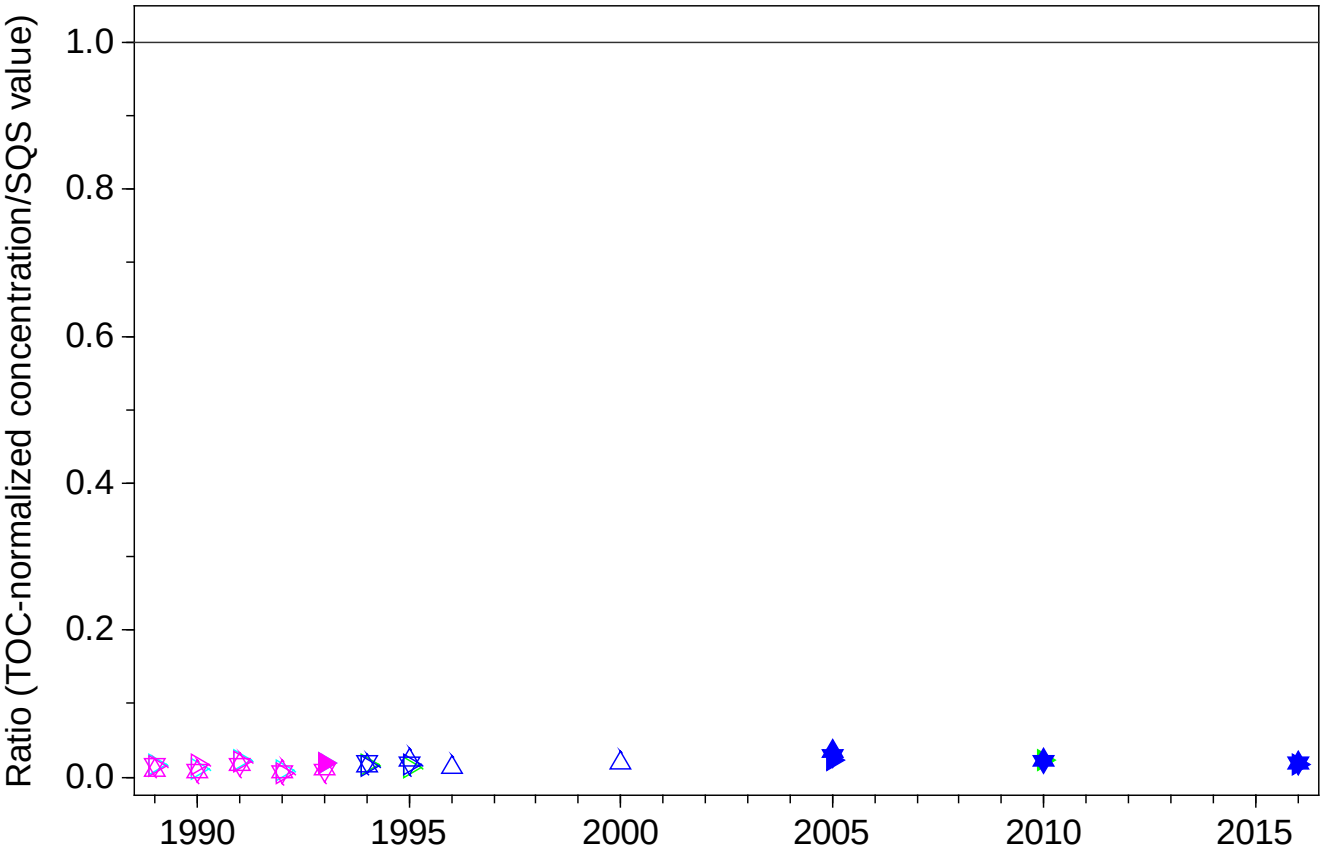
SQS quotient, Naphthalene, Station 38



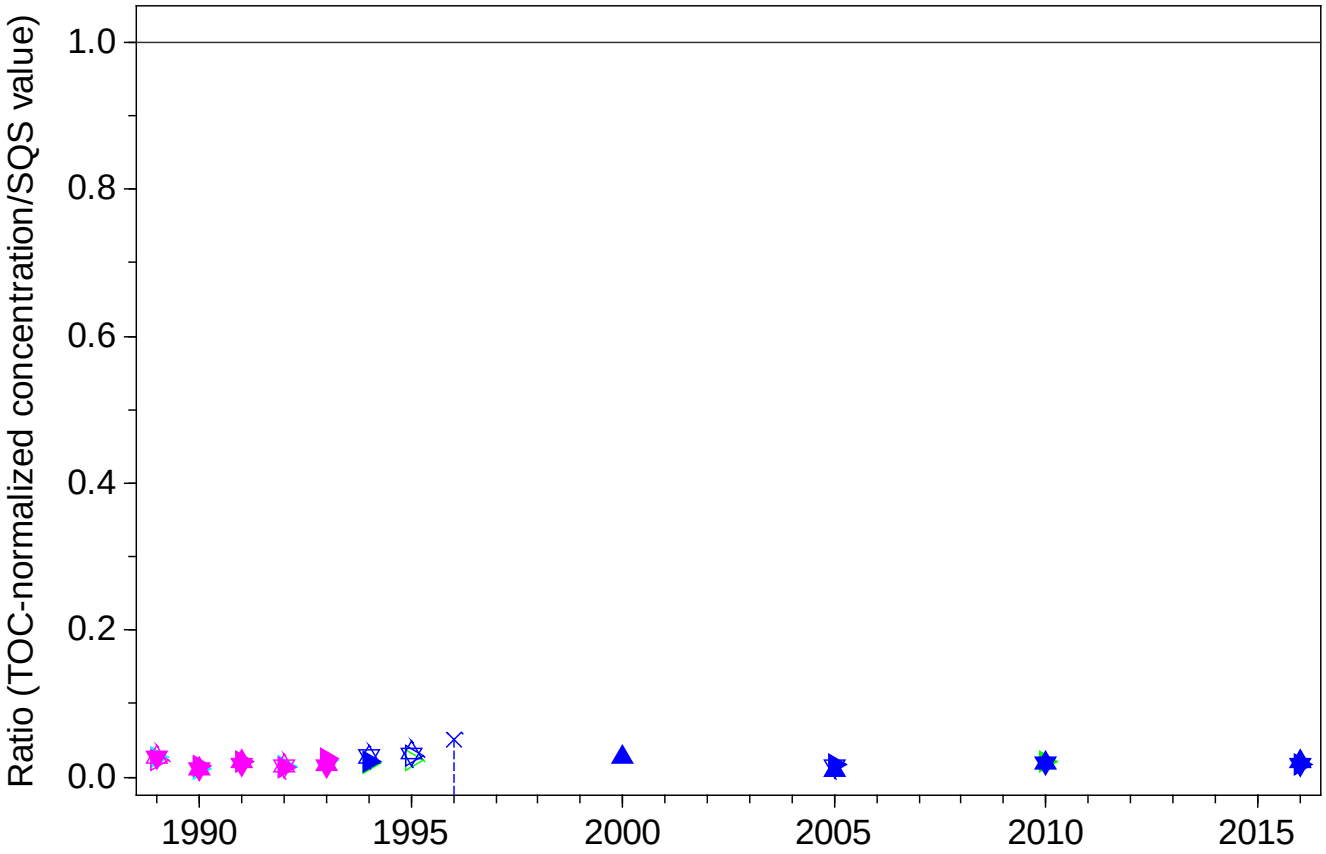
SQS quotient, Phenanthrene, Station 38



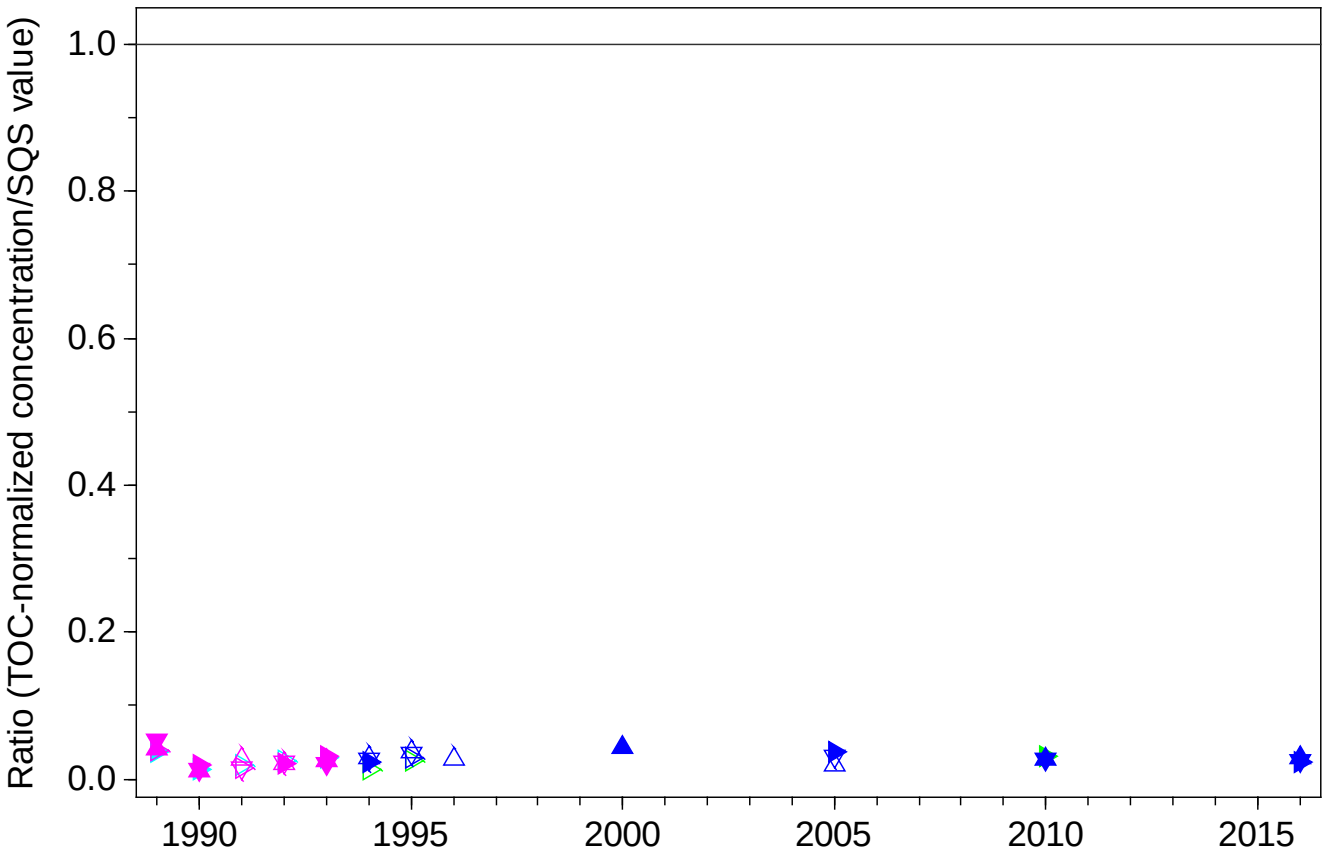
SQS quotient, Total LPAH, Station 38



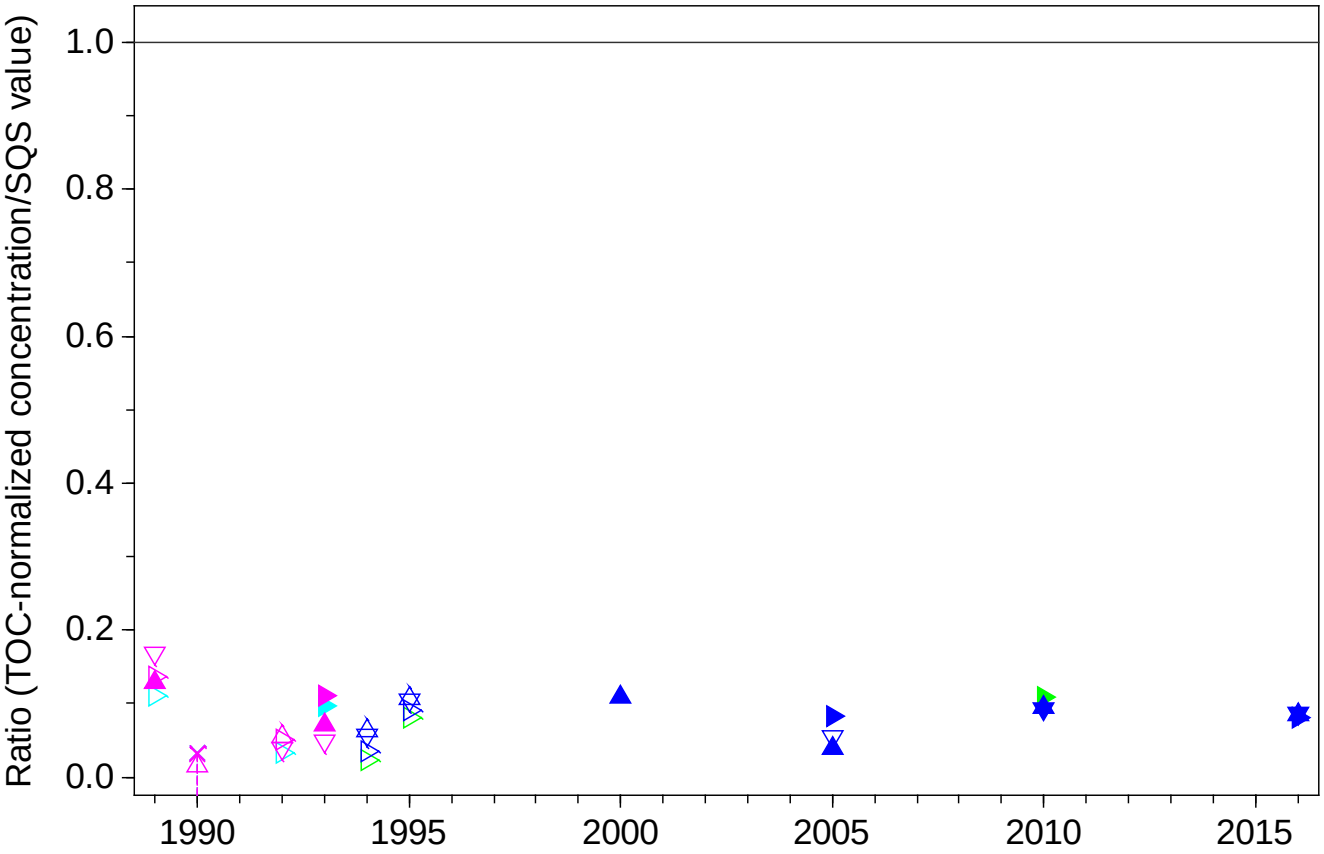
SQS quotient, Benzo(a)anthracene, Station 38



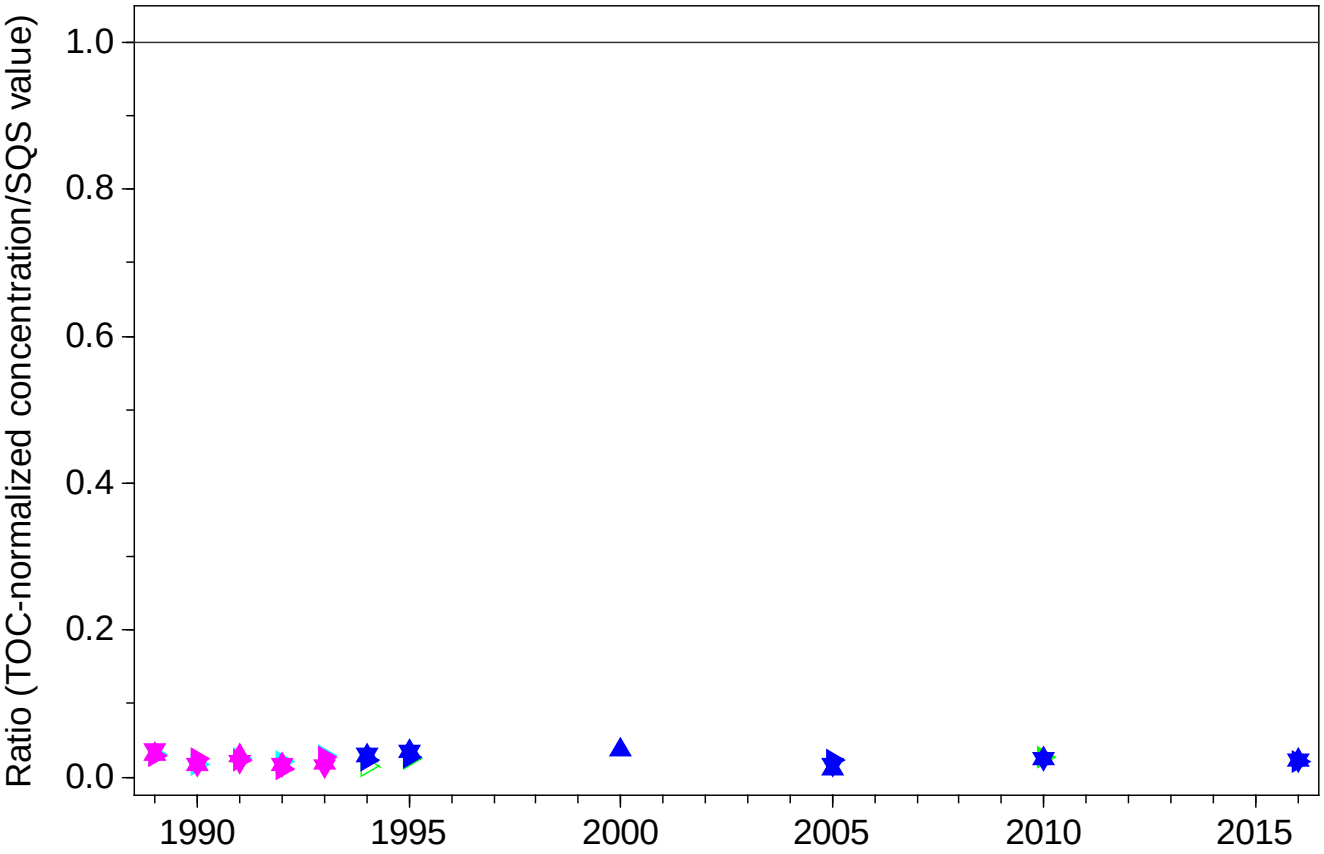
SQS quotient, Benzo(a)pyrene, Station 38



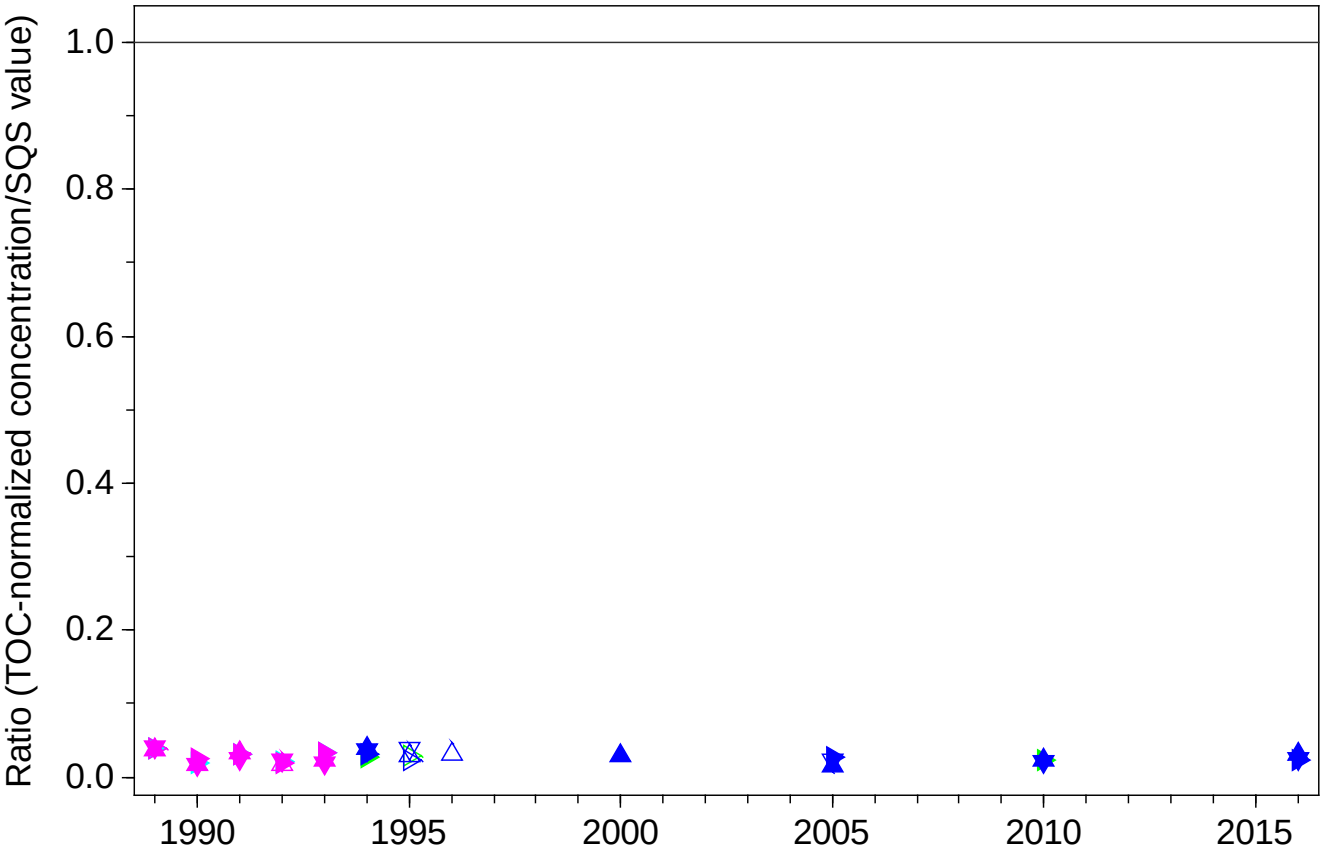
SQS quotient, Benzo(g,h,i)perylene, Station 38



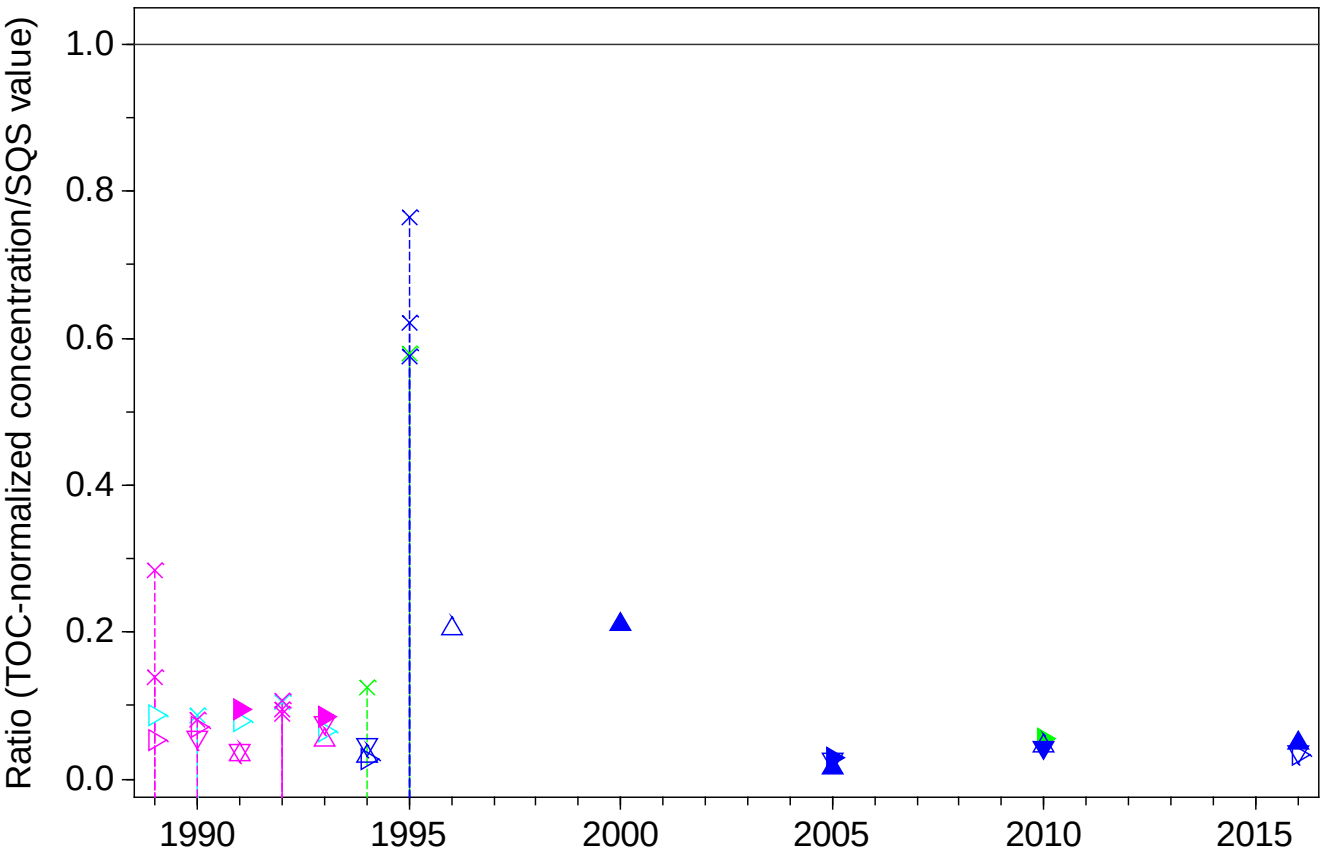
SQS quotient, Total Benzofluoranthenes, Station 38



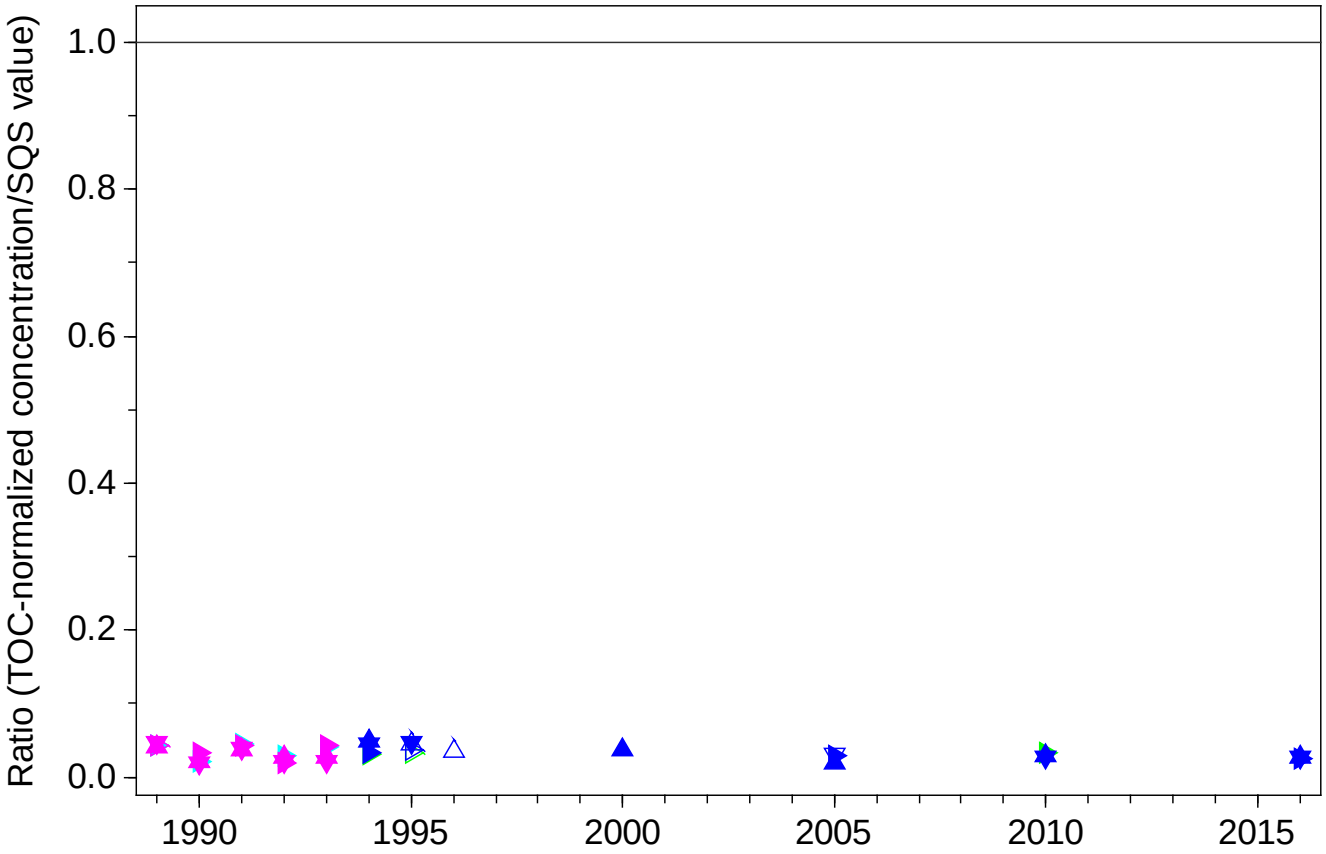
SQS quotient, Chrysene, Station 38



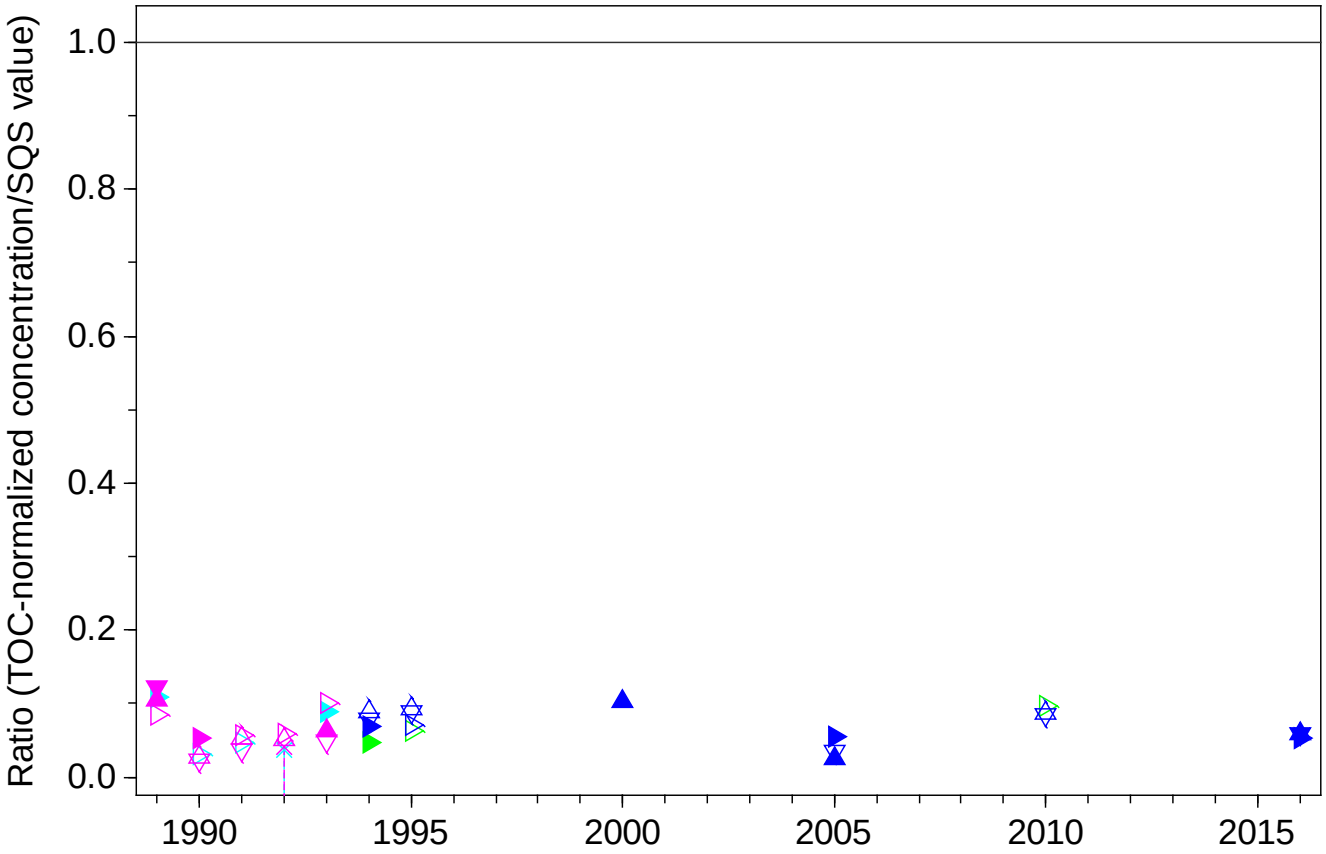
SQS quotient, Dibenzo(a,h)anthracene, Station 38



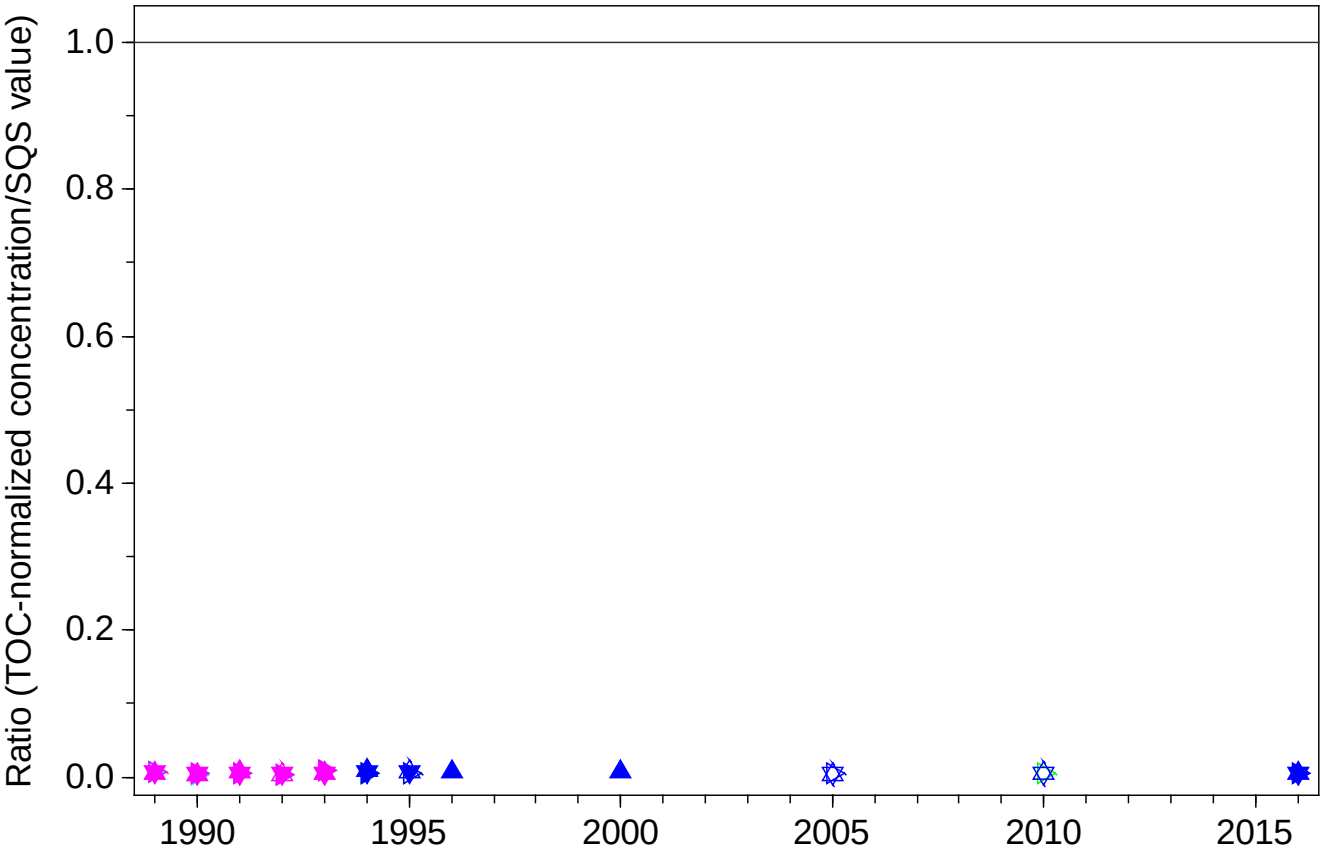
SQS quotient, Fluoranthene, Station 38



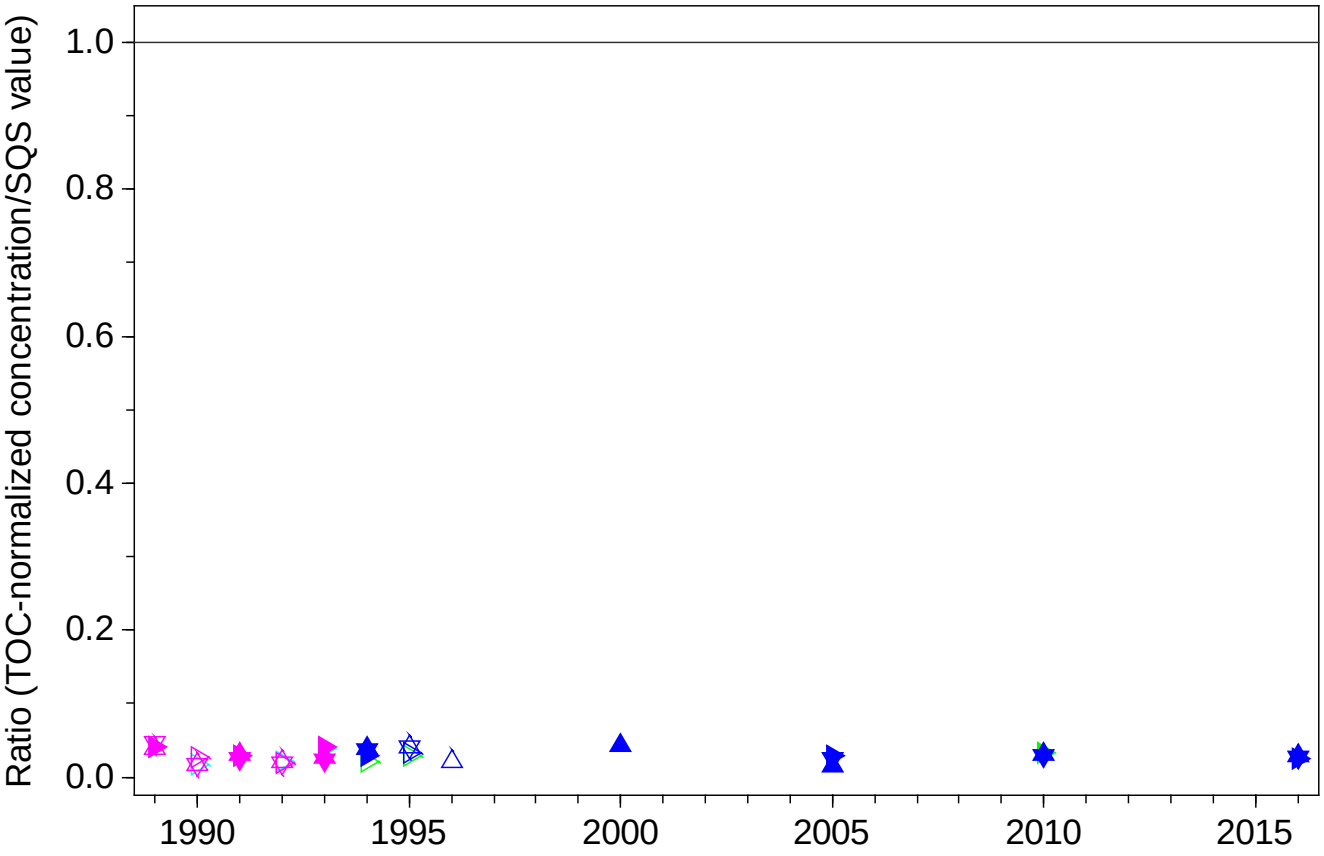
SQS quotient, Indeno(1,2,3-c,d)pyrene, Station 38



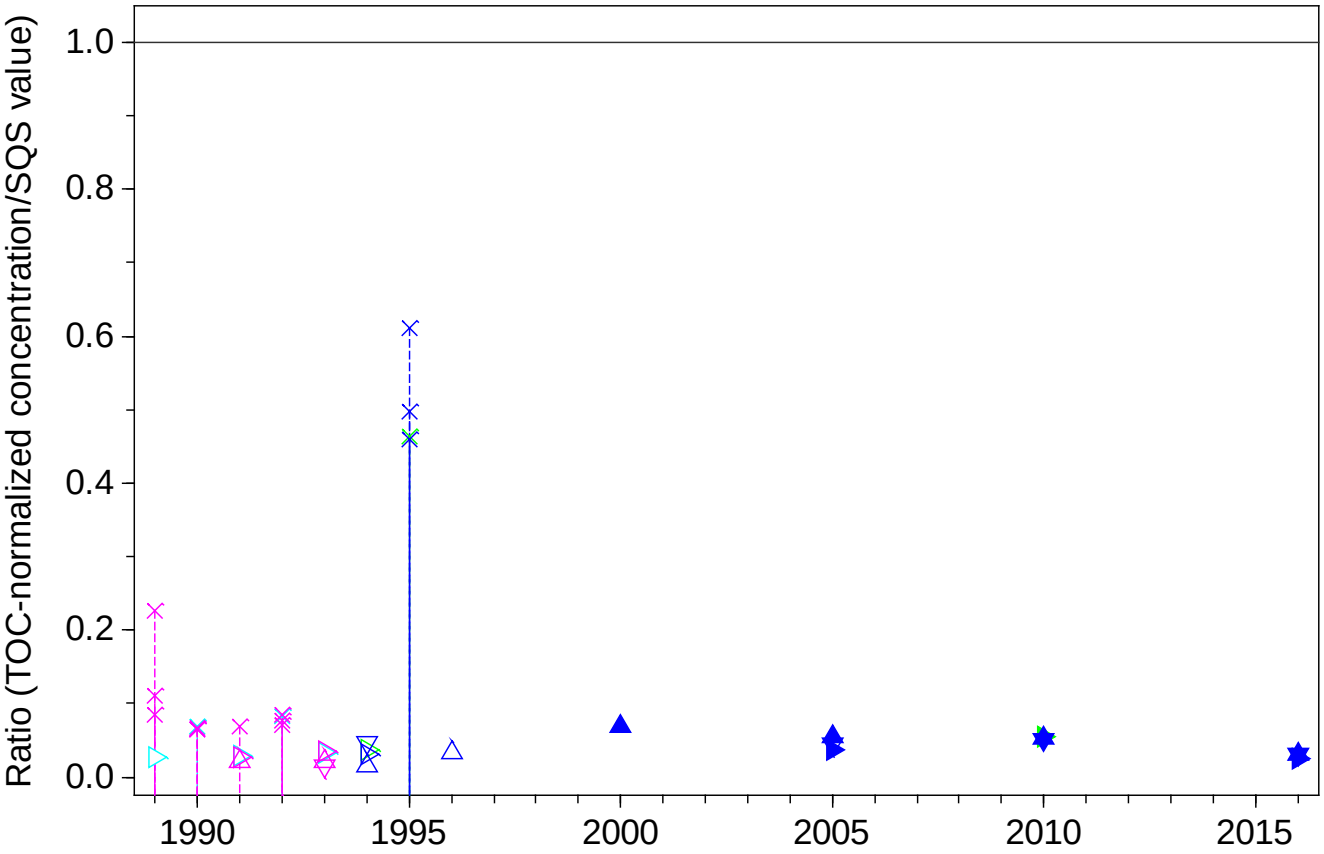
SQS quotient, Pyrene, Station 38



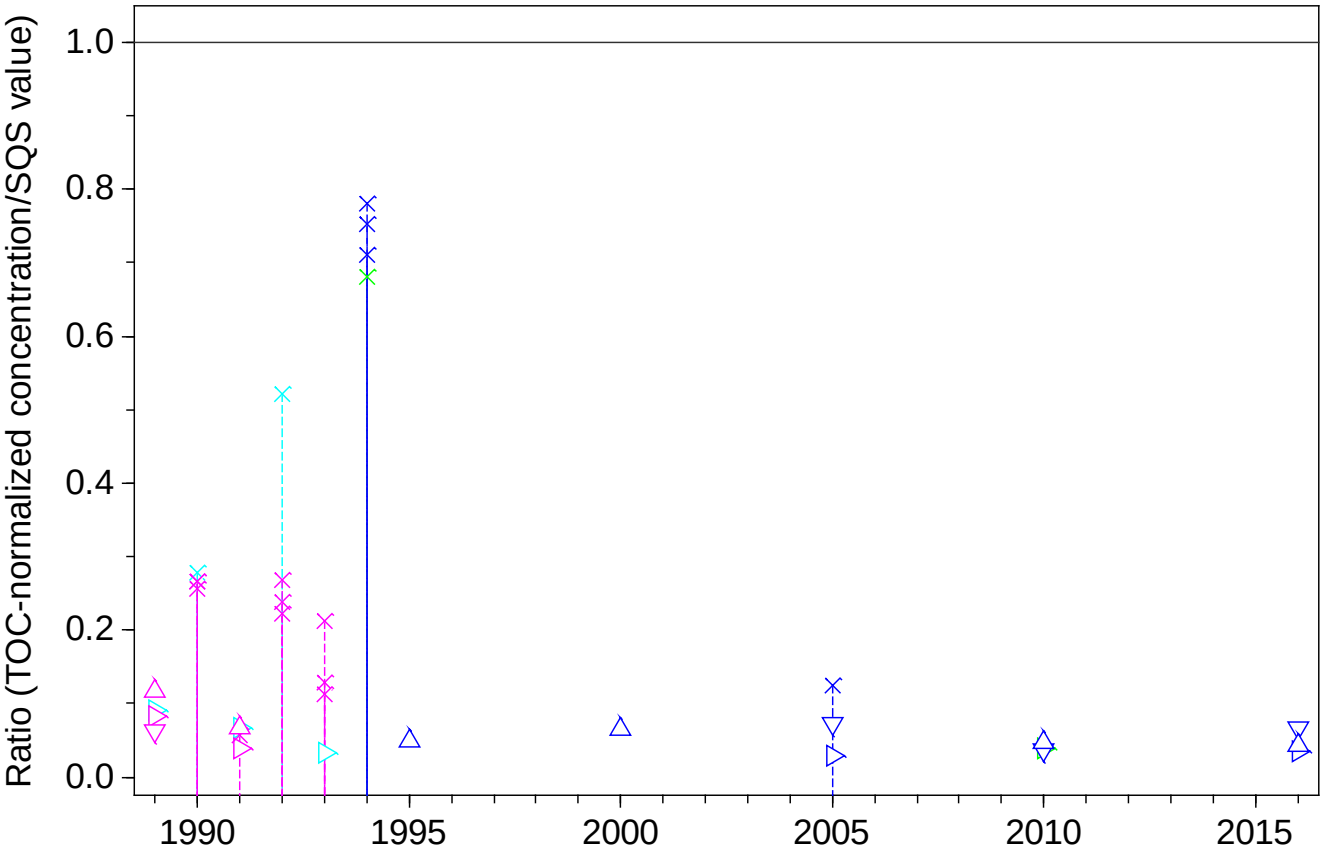
SQS quotient, Total HPAH, Station 38



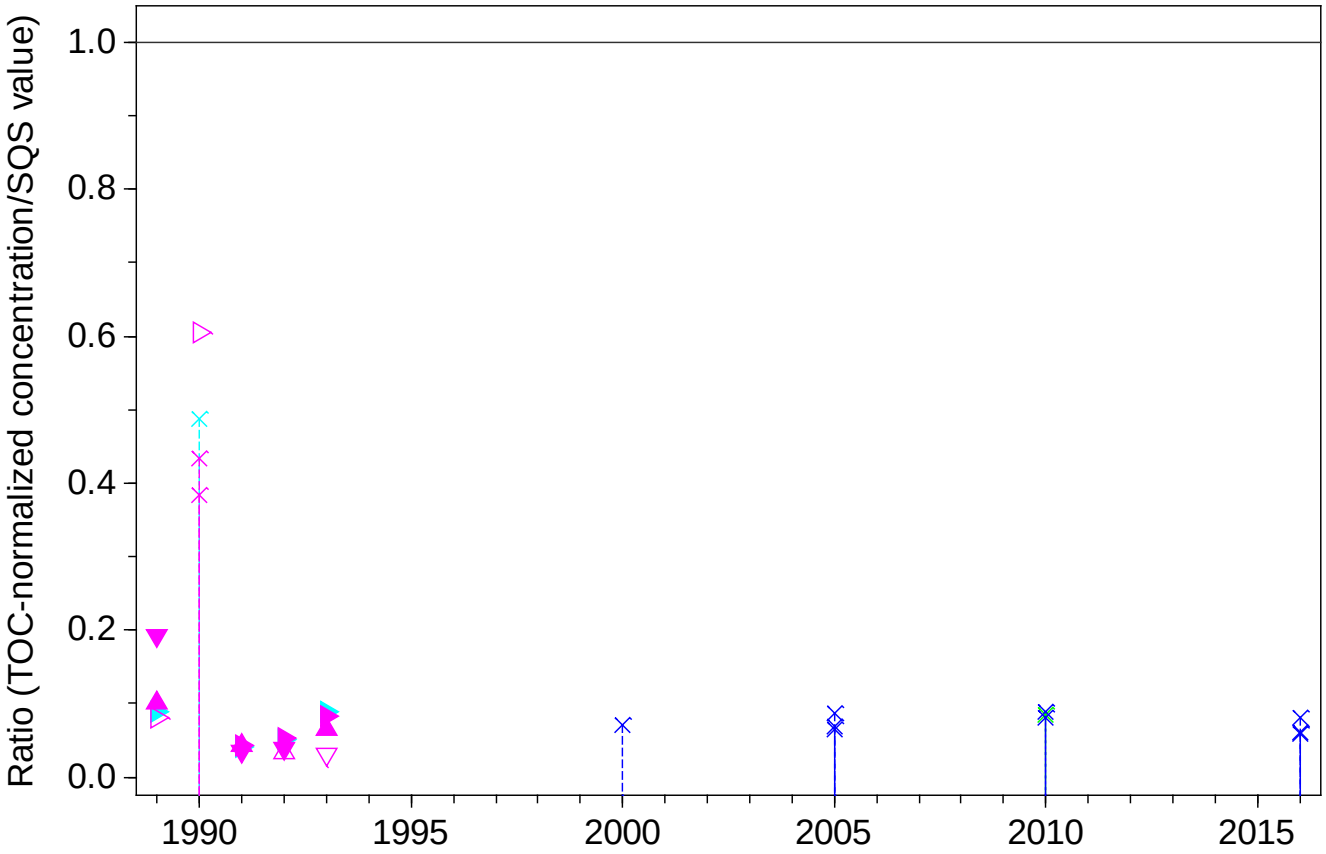
SQS quotient, Dibenzofuran, Station 38



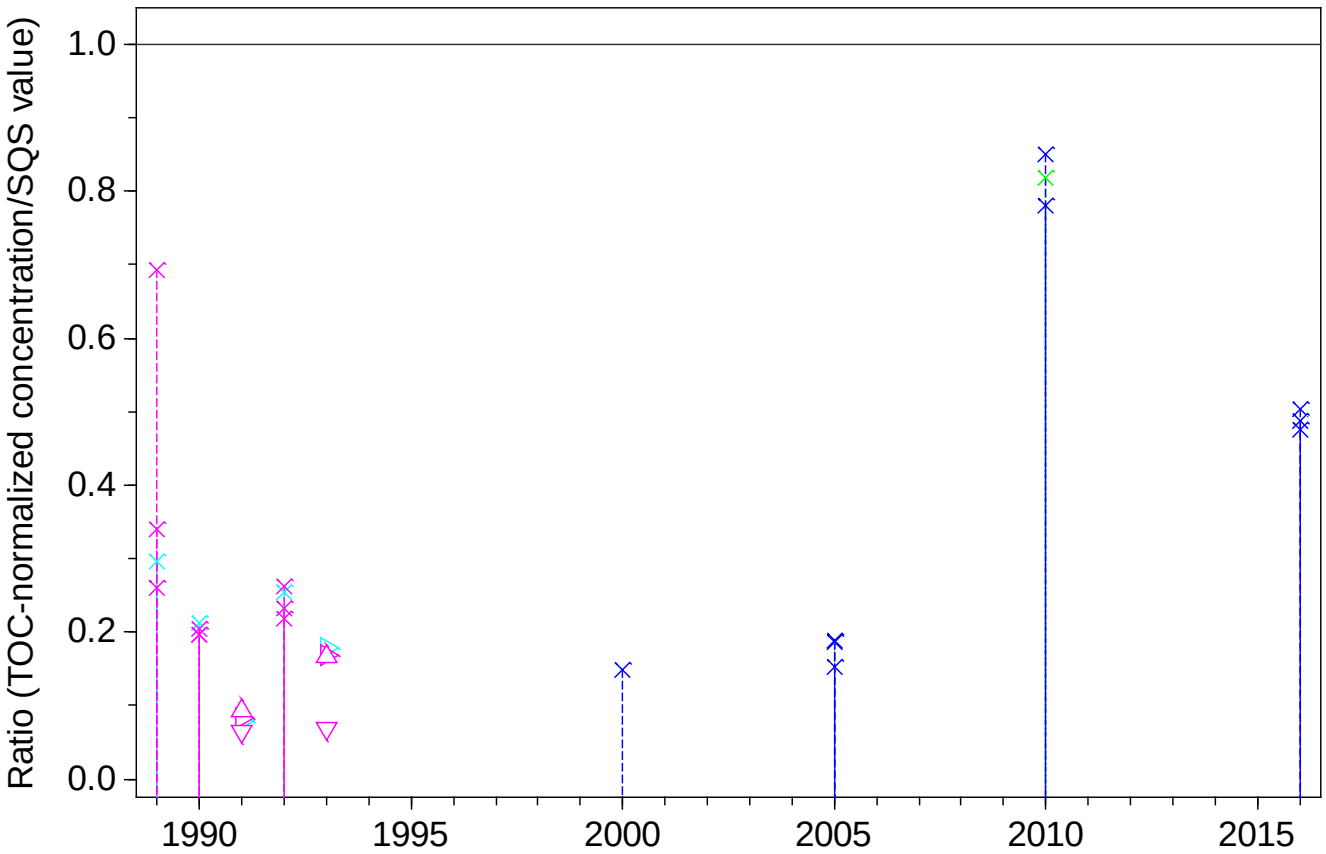
SQS quotient, Total Aroclors, Station 38



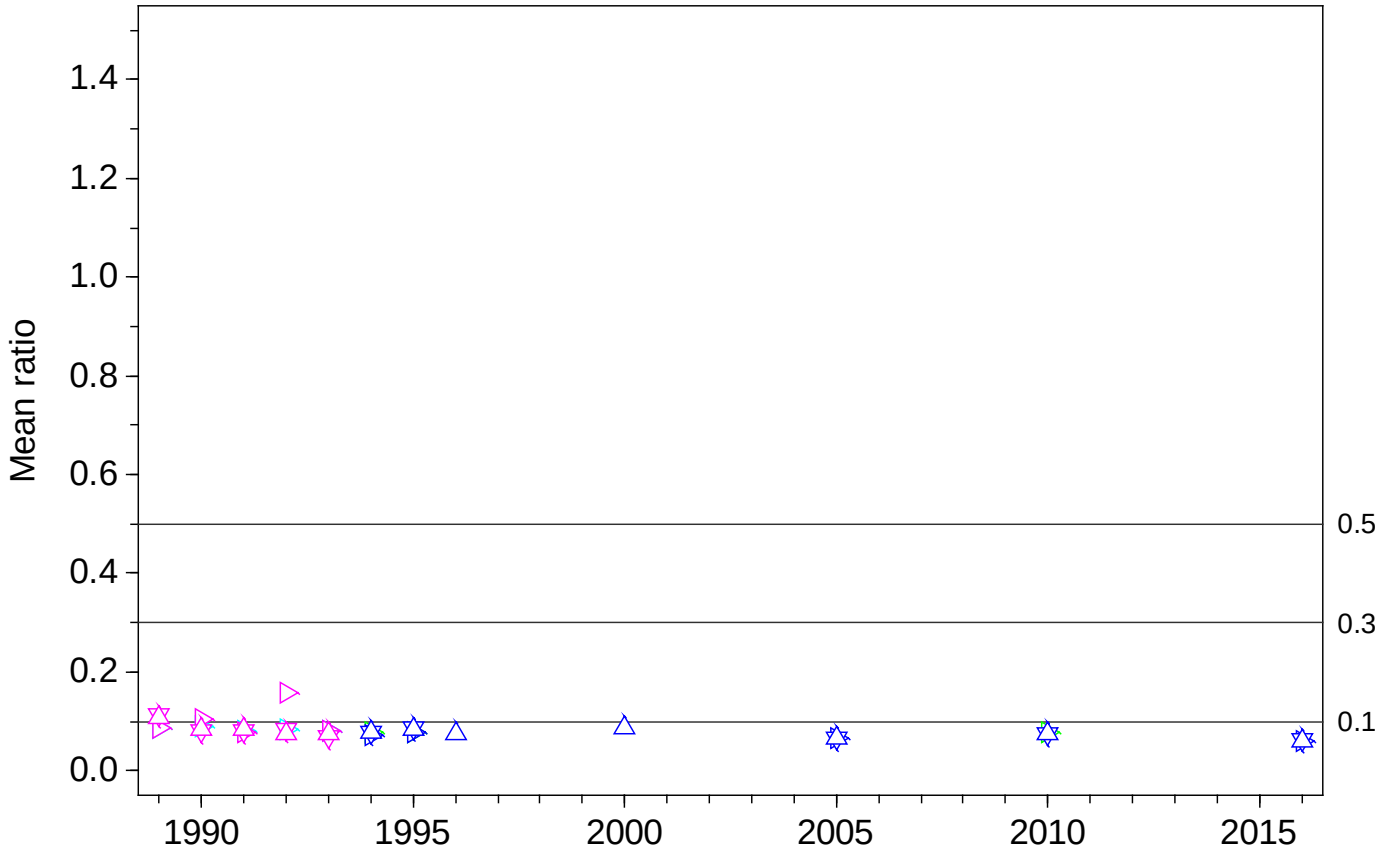
SQS quotient, Bis(2-ethylhexyl)phthalate, Station 38



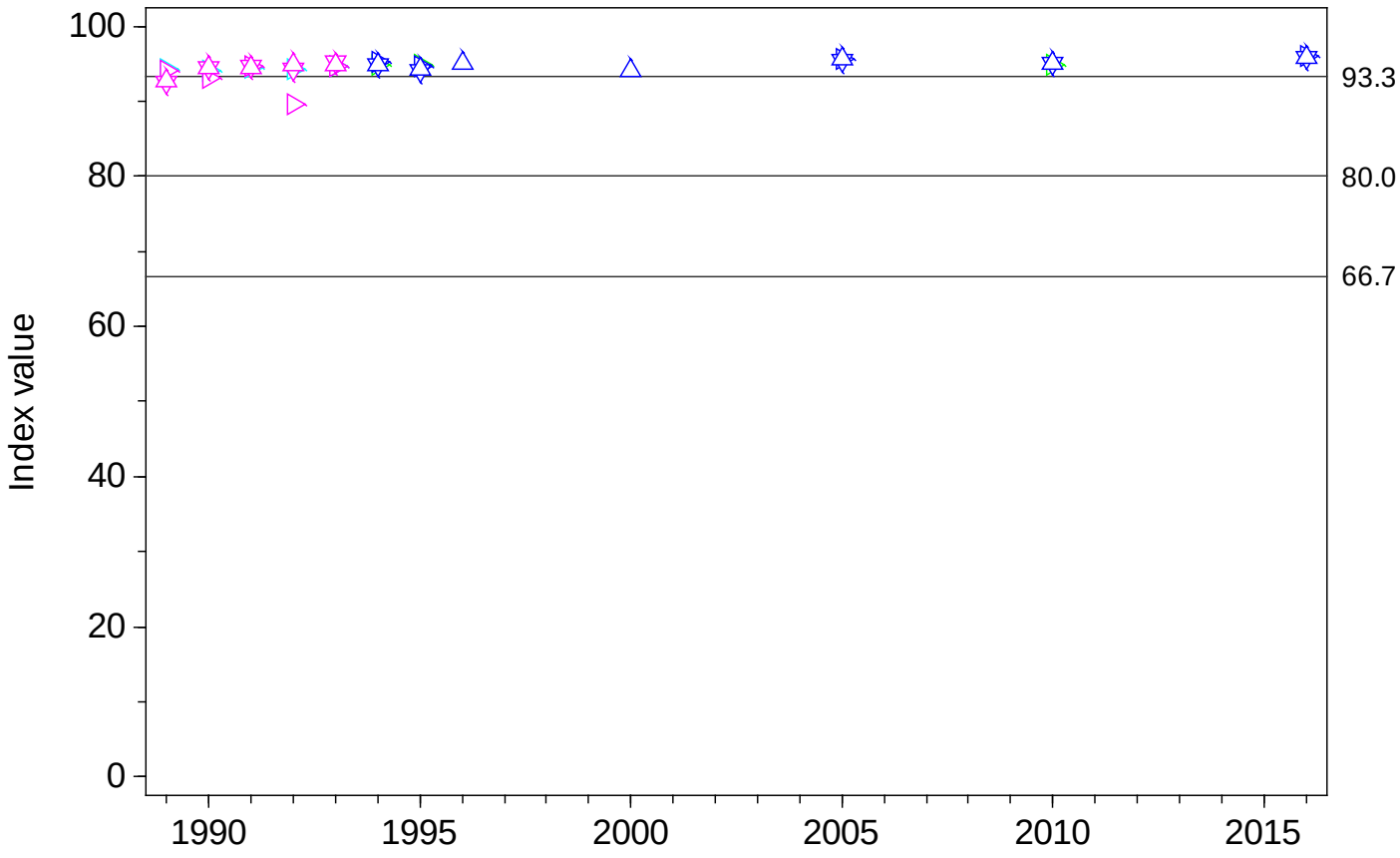
SQS quotient, Butylbenzylphthalate, Station 38



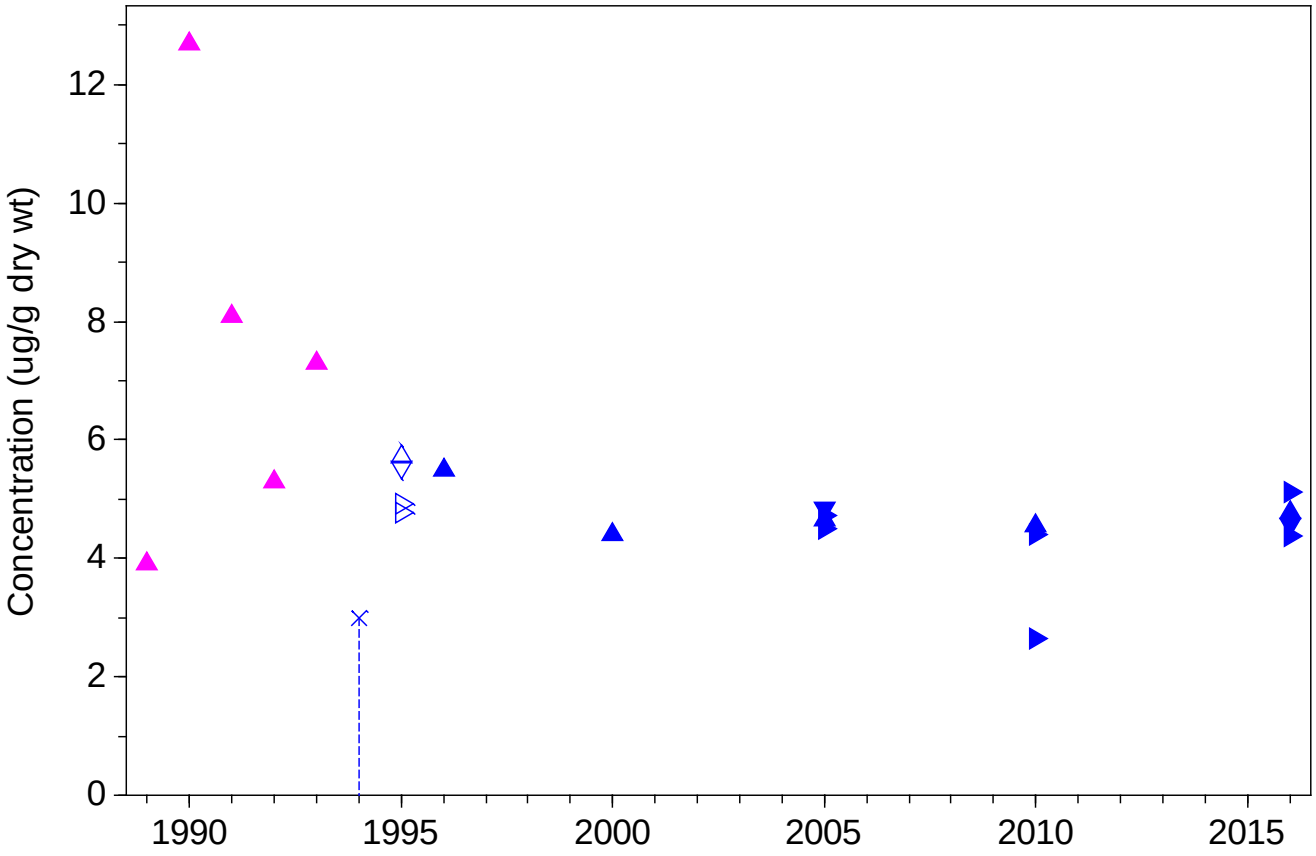
Mean SQS quotient, SCI SQS (no PAH totals), Station 38



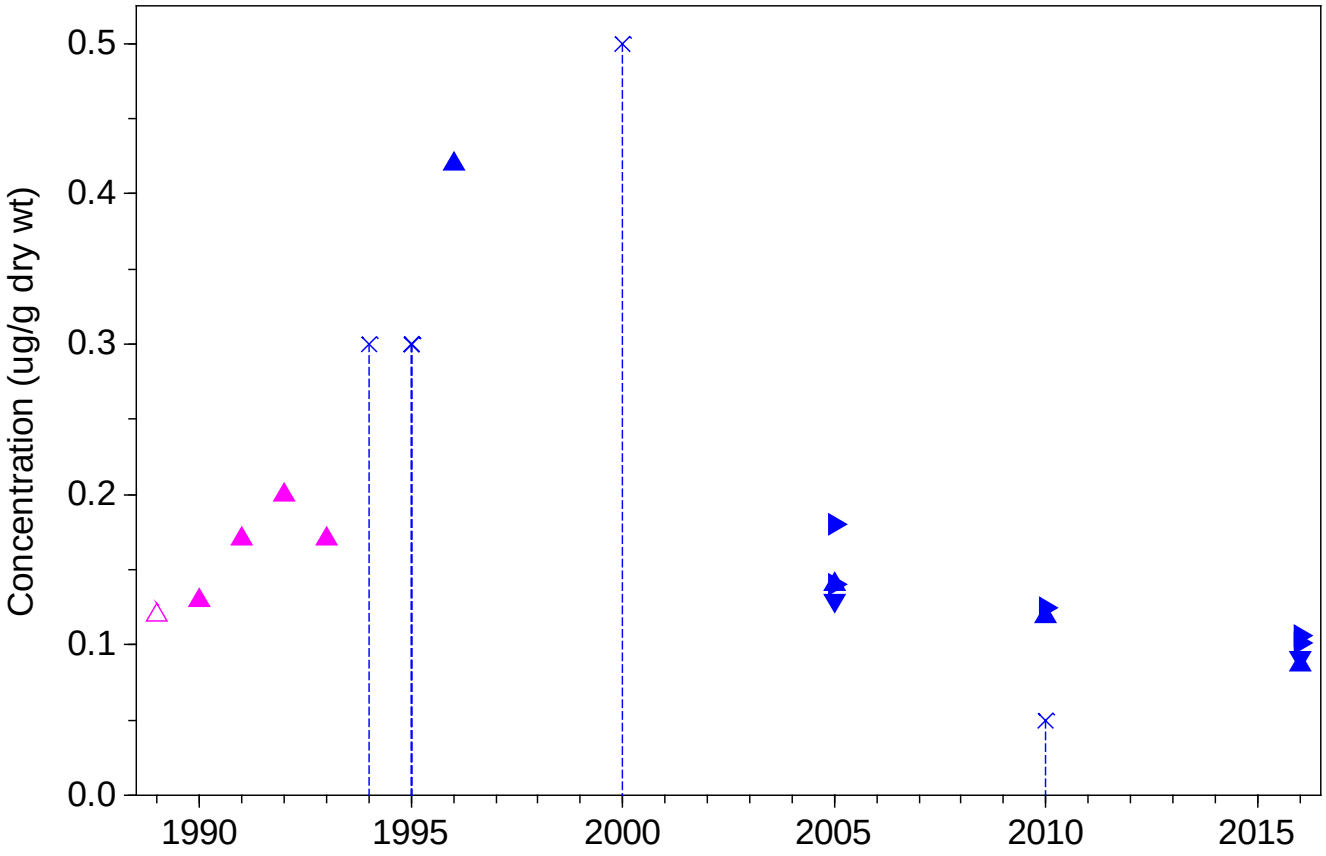
Sediment Chemistry Index, Station 38



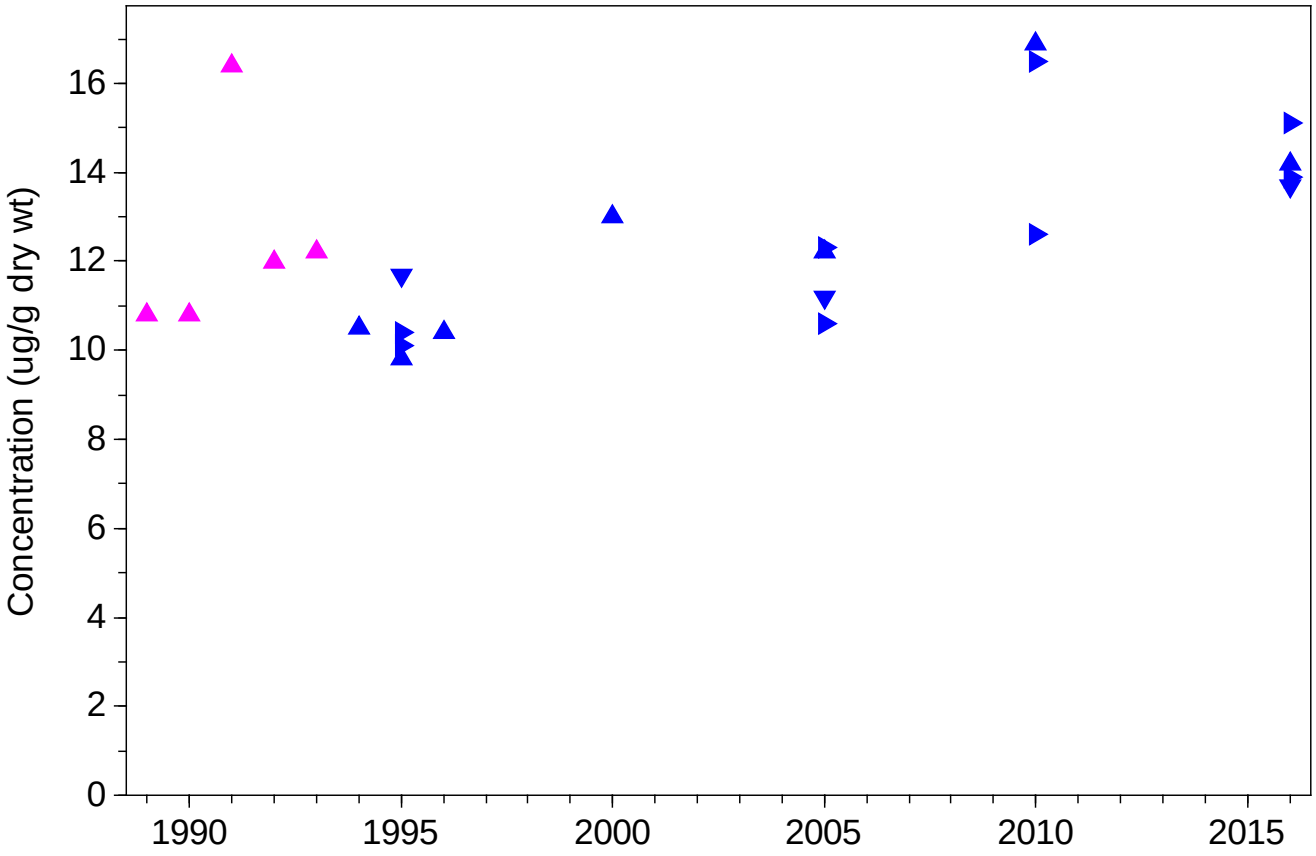
Arsenic, Station 40



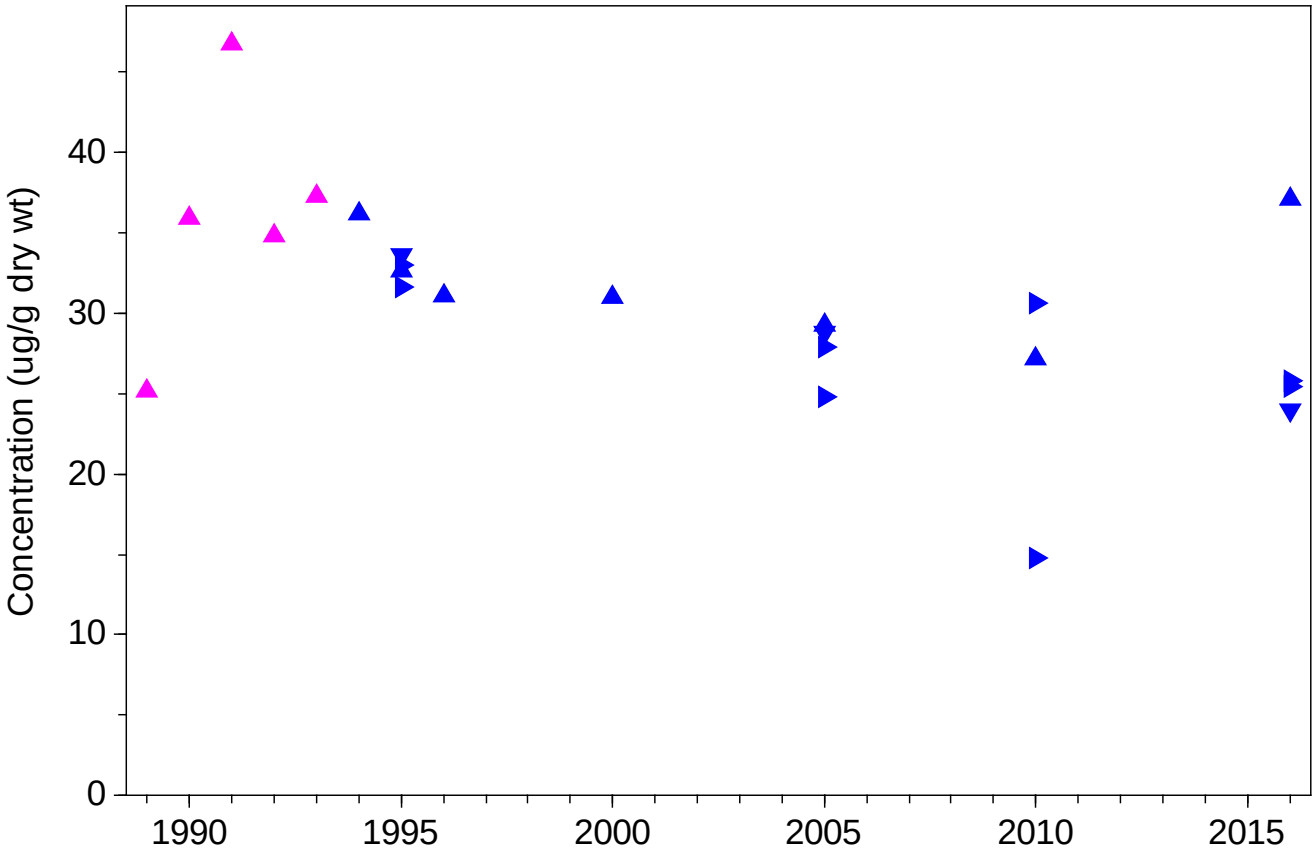
Cadmium, Station 40

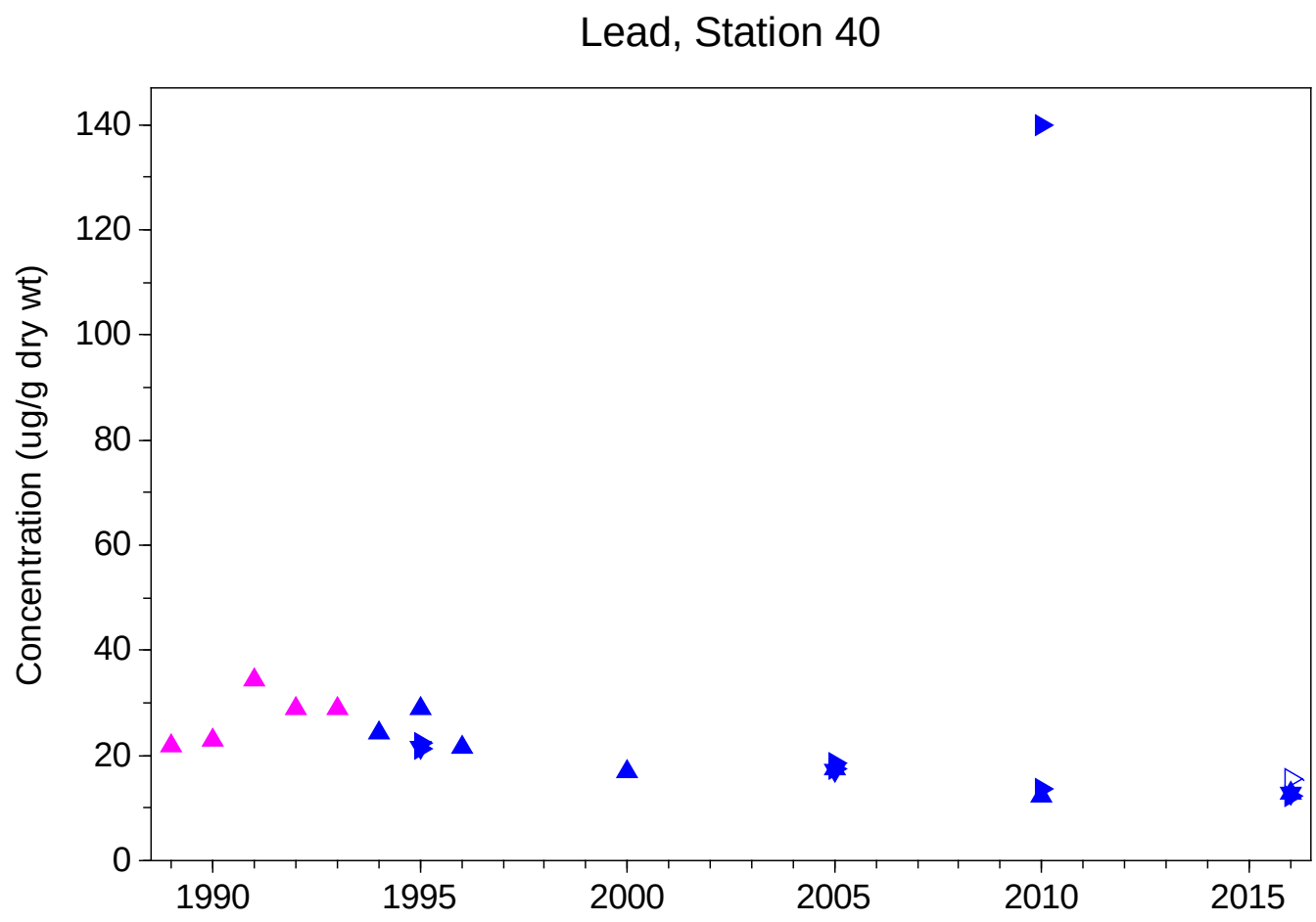


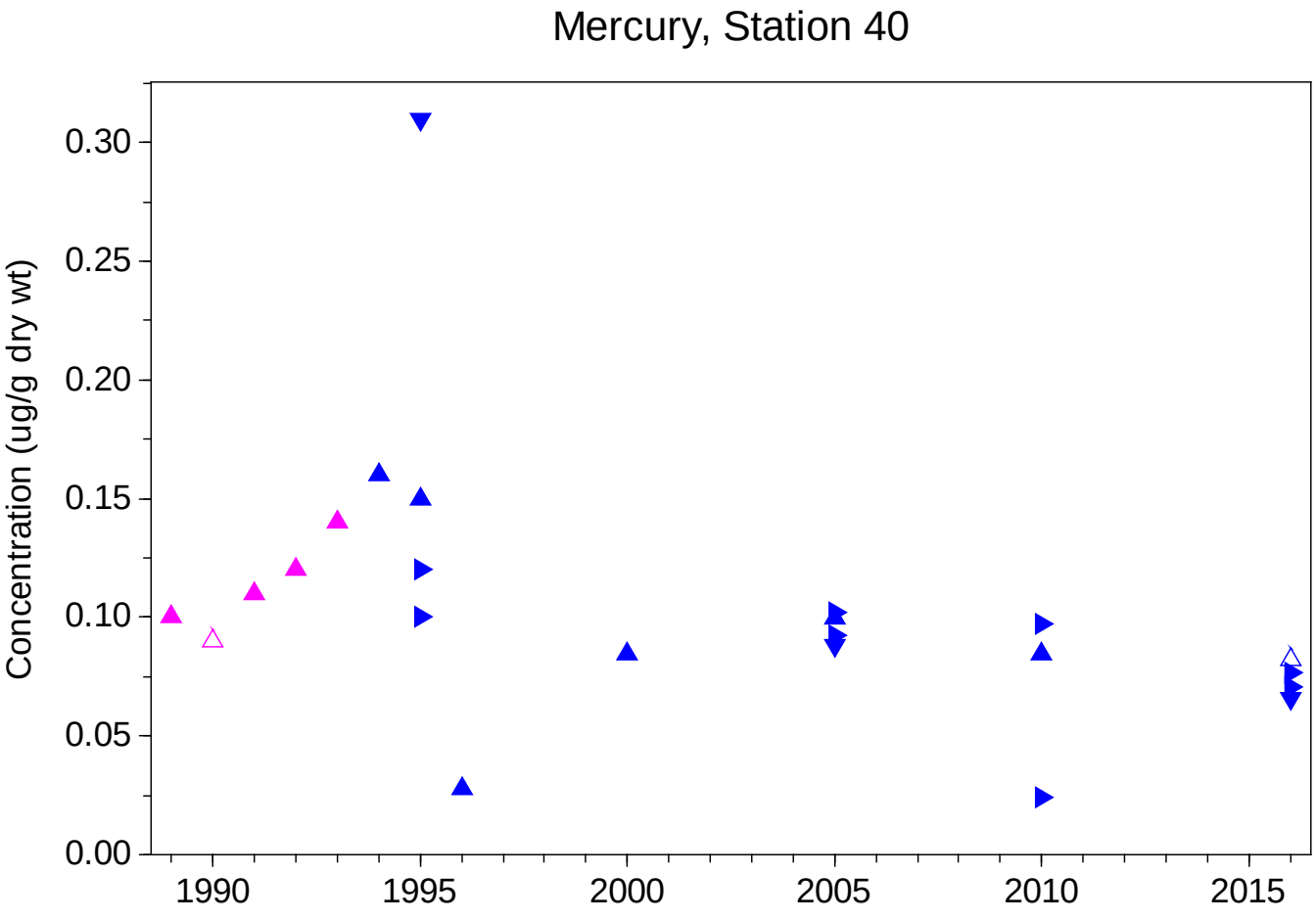
Chromium, Station 40



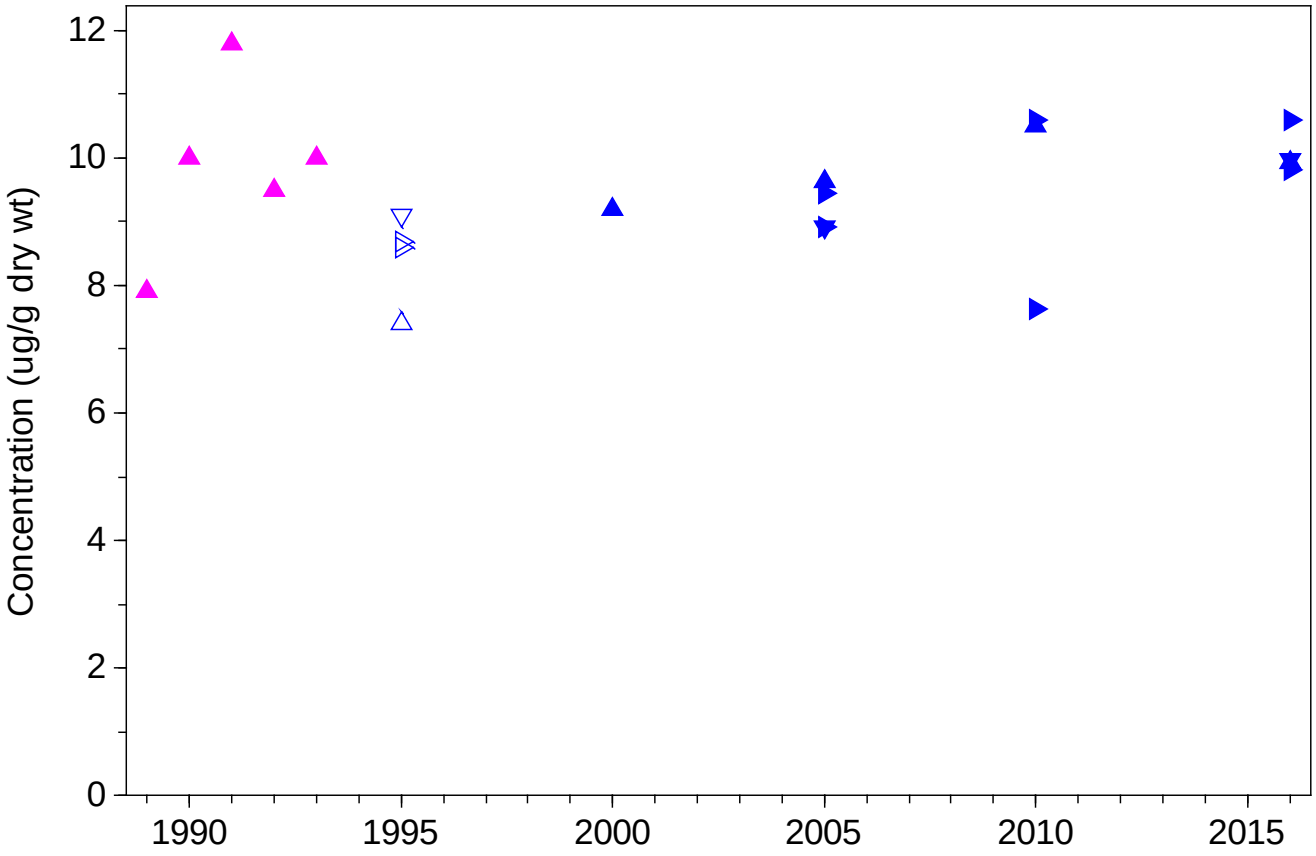
Copper, Station 40



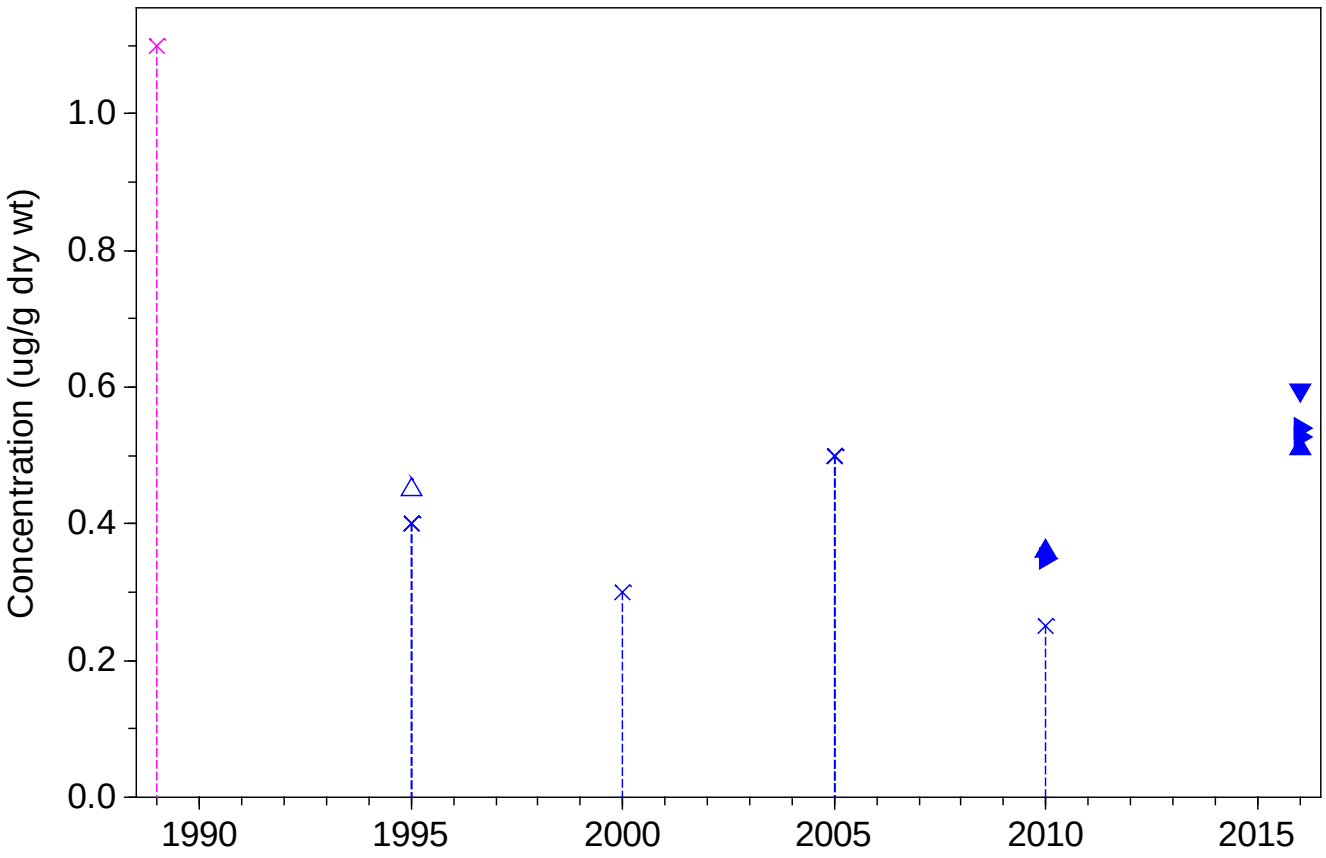

Lead, Station 40
Concentration (ug/g dry wt)
0
20
40
60
80
100
120
140
1990
1995
2000
2005
2010
2015


Mercury, Station 40
Concentration (ug/g dry wt)
0.00
0.05
0.10
0.15
0.20
0.25
0.30
1990
1995
2000
2005
2010
2015

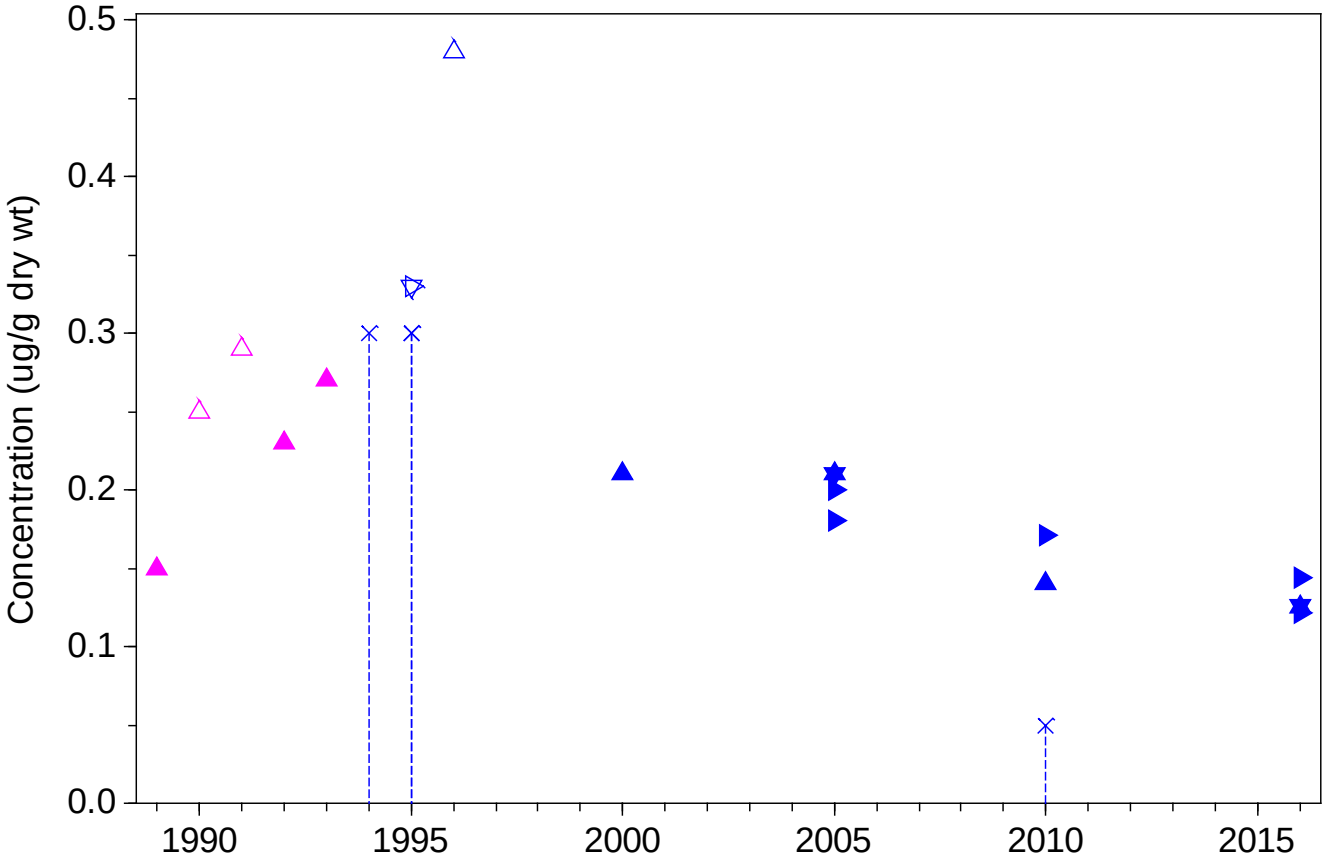
Nickel, Station 40



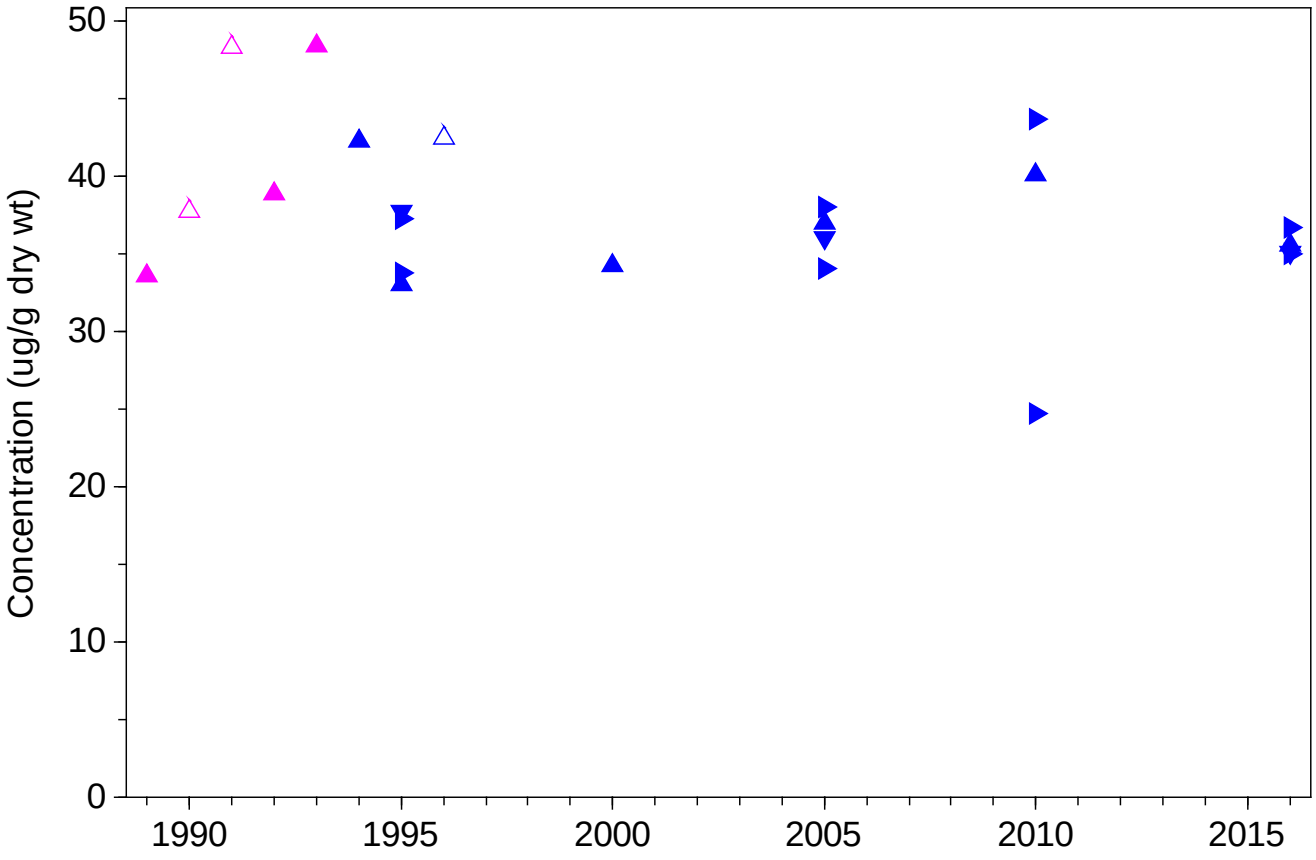
Selenium, Station 40



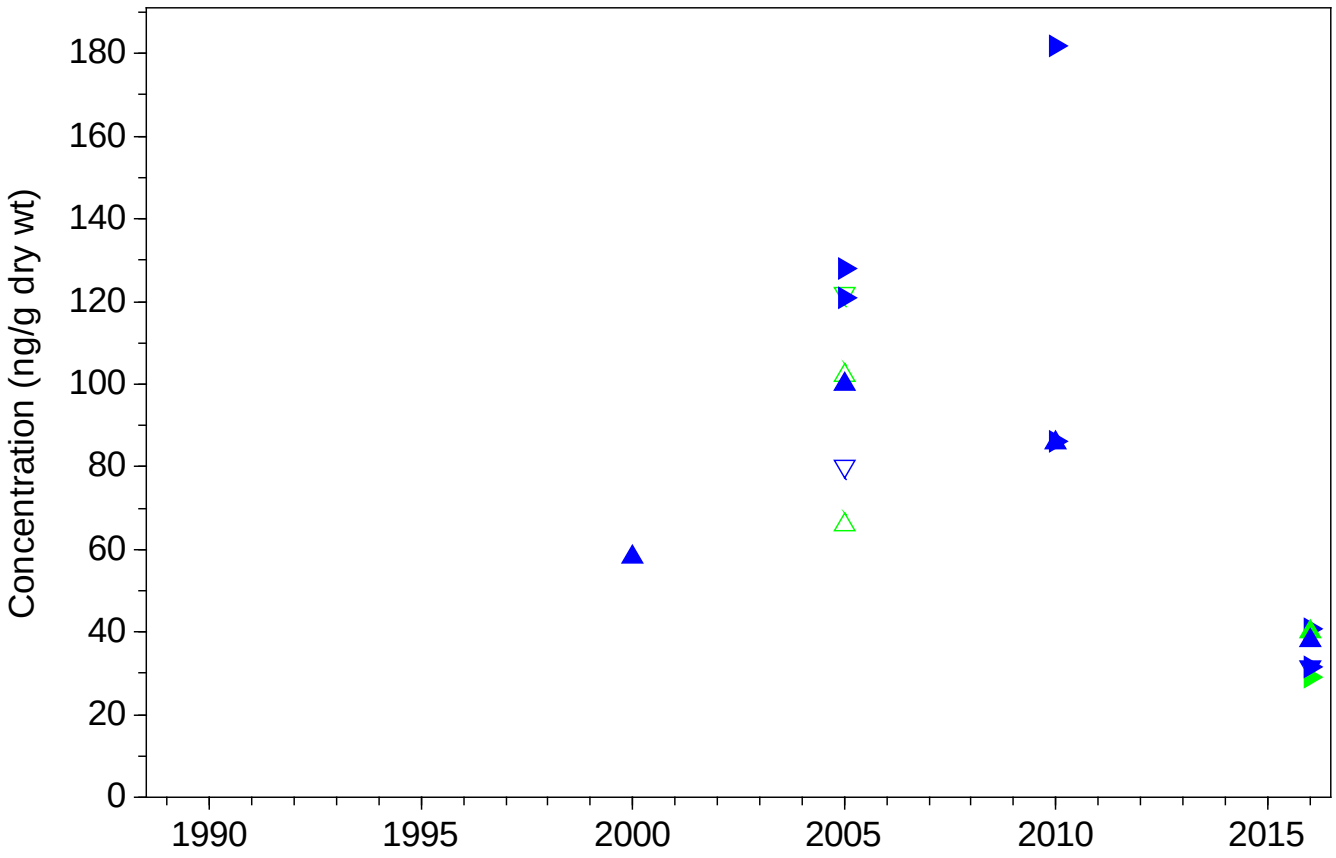
Silver, Station 40



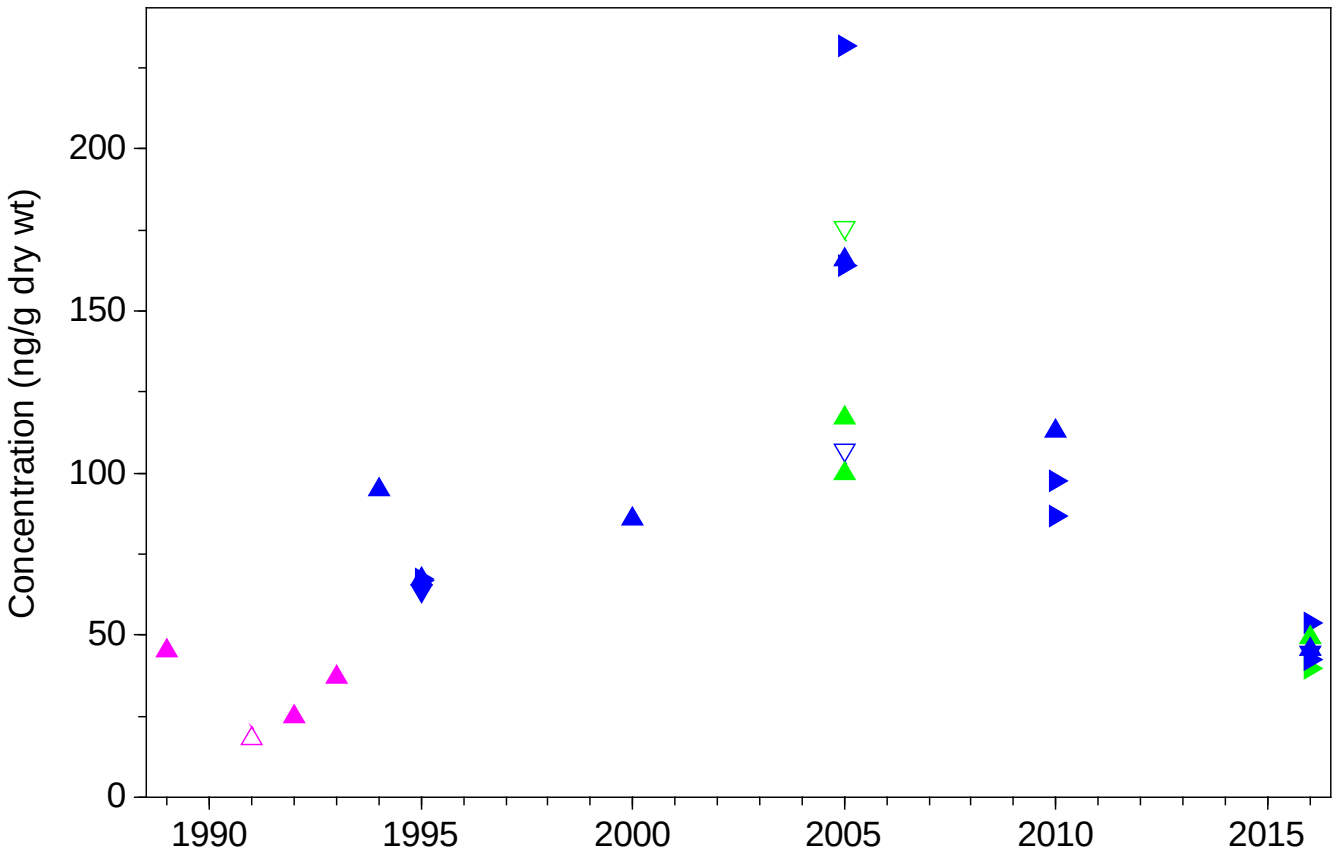
Zinc, Station 40



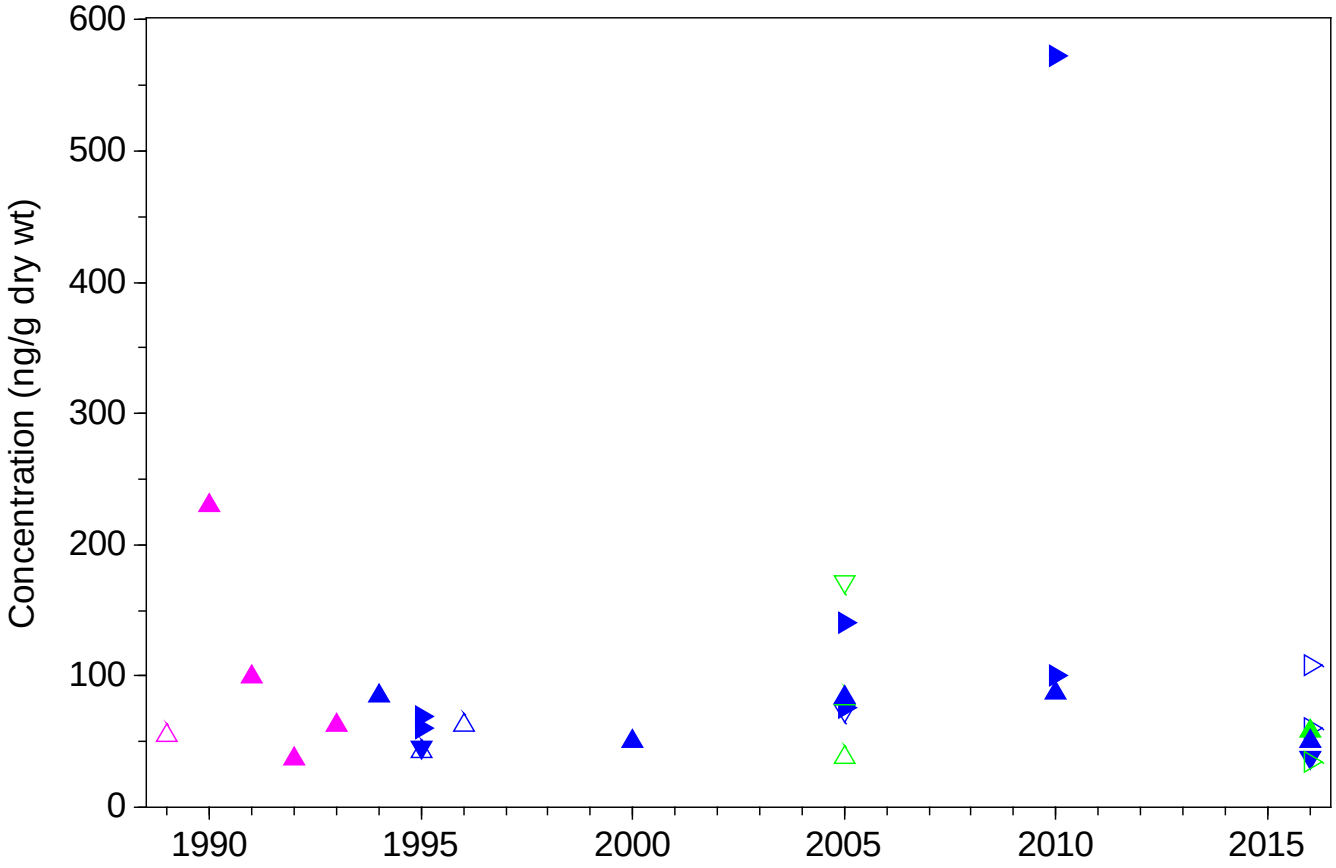
1-Methylnaphthalene, Station 40



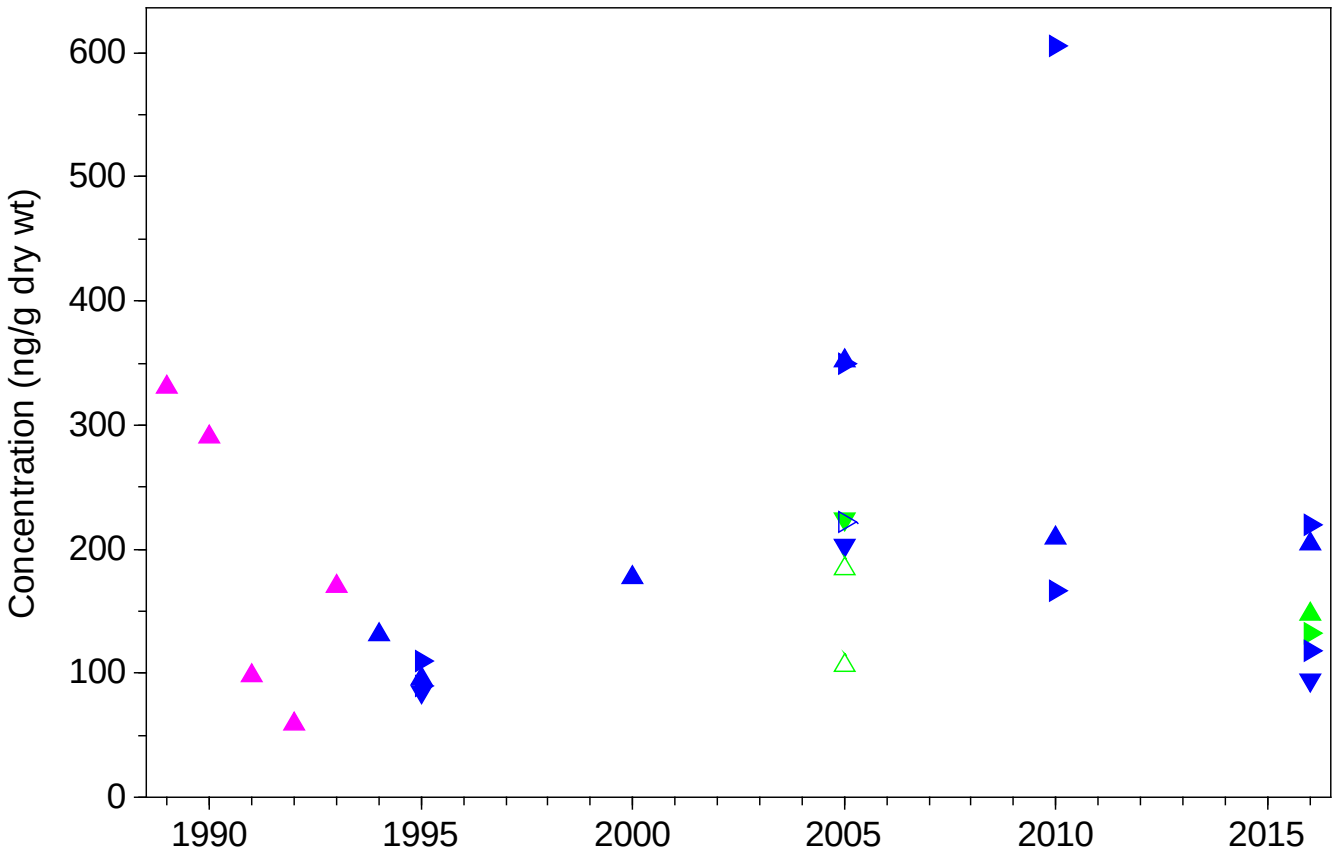
2-Methylnaphthalene, Station 40



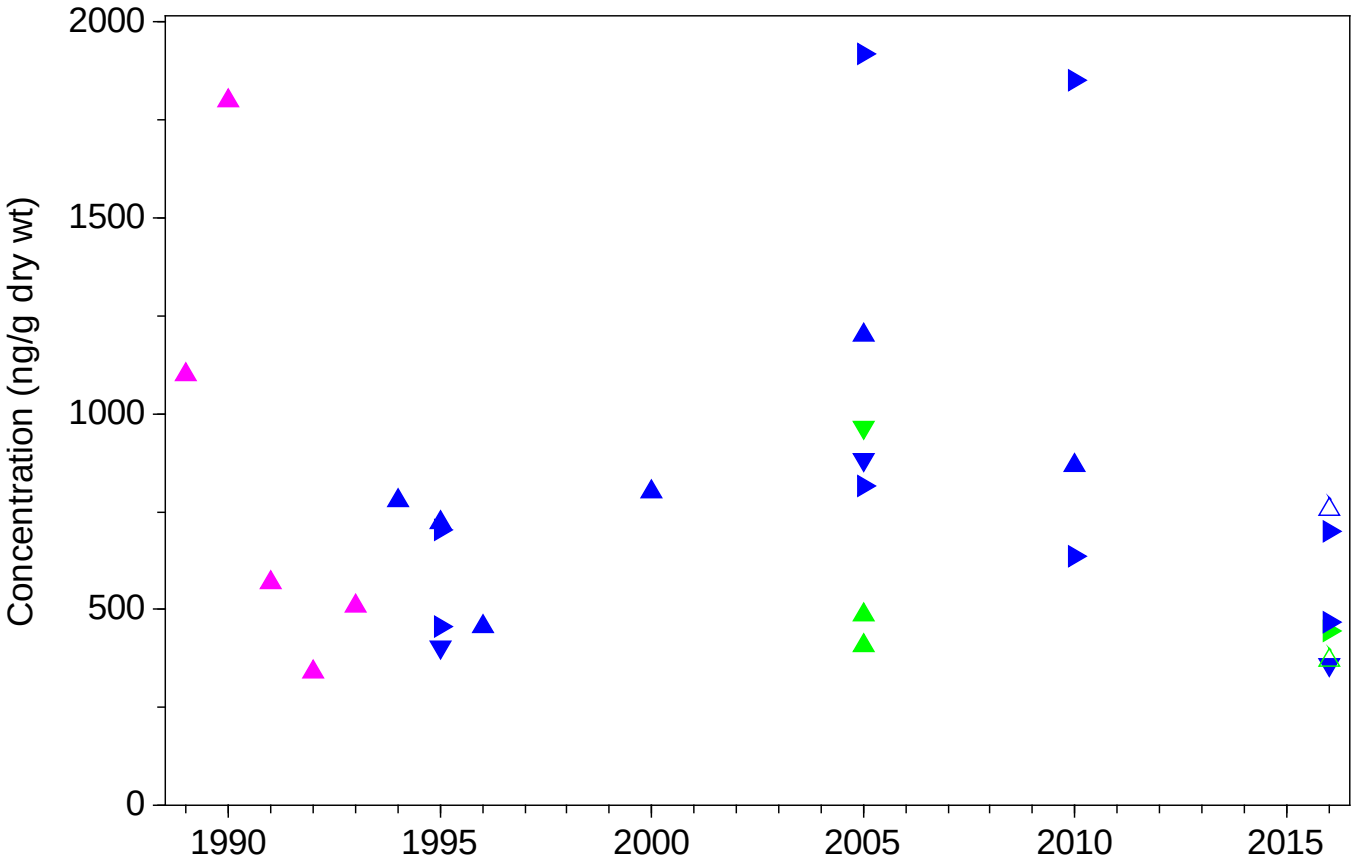
Acenaphthene, Station 40



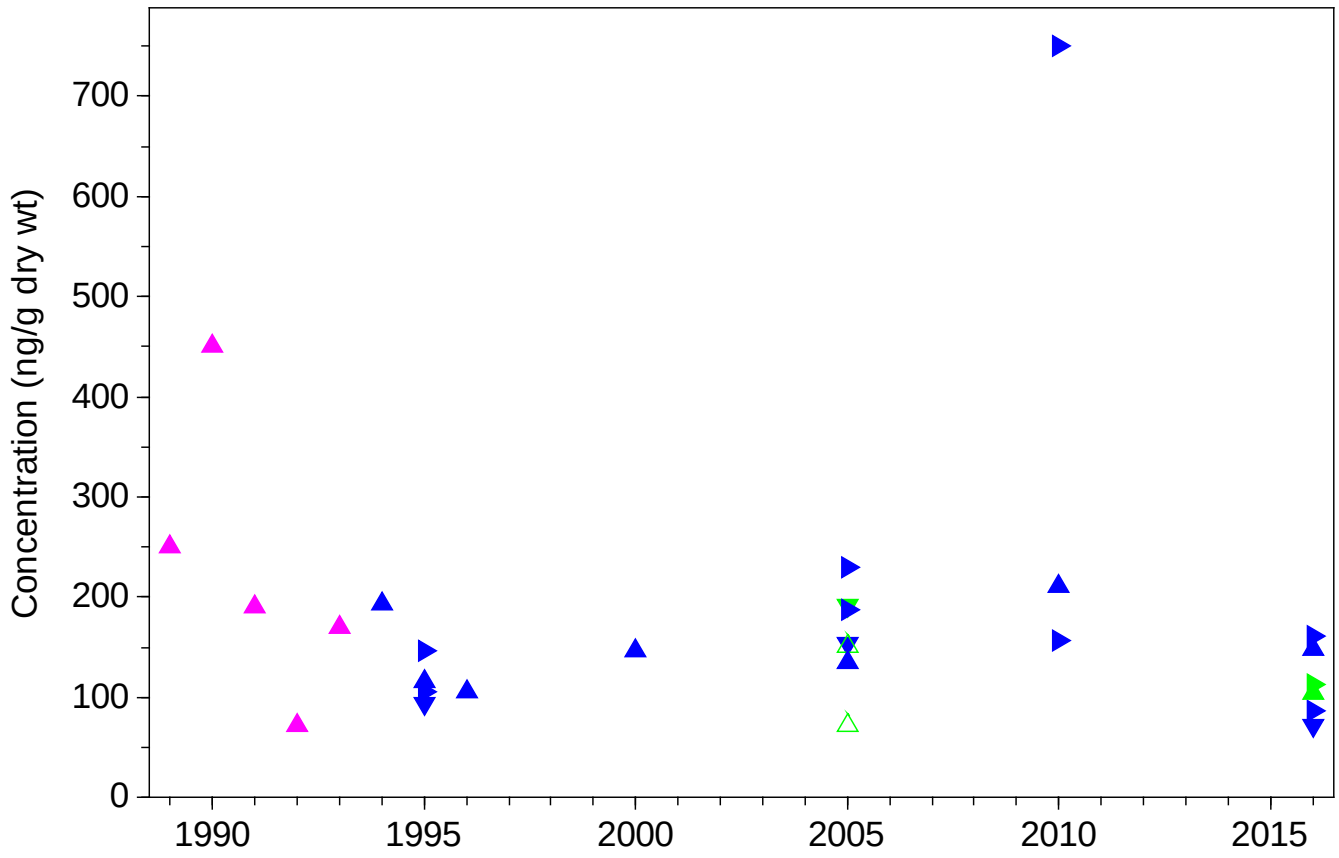
Acenaphthylene, Station 40



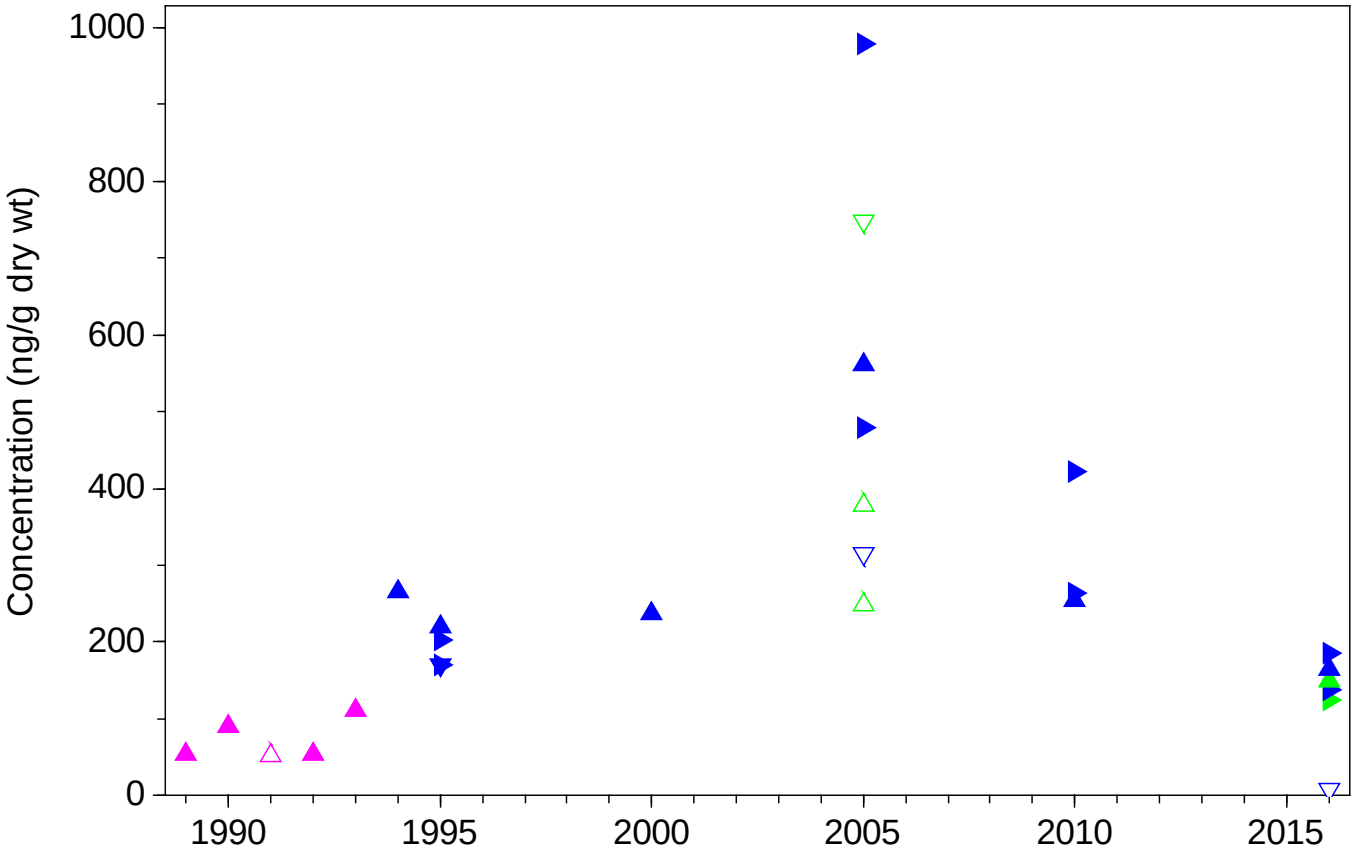
Anthracene, Station 40



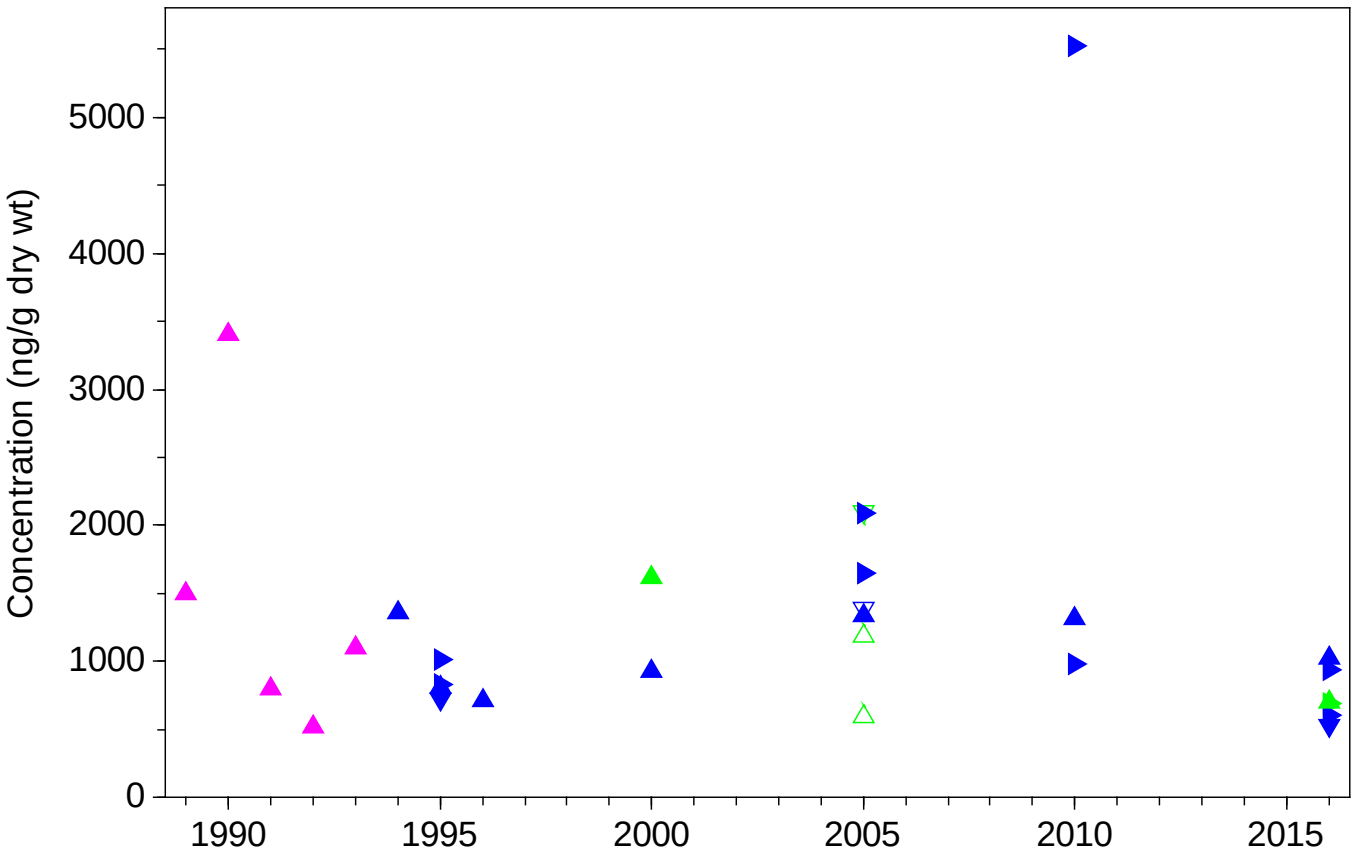
Fluorene, Station 40



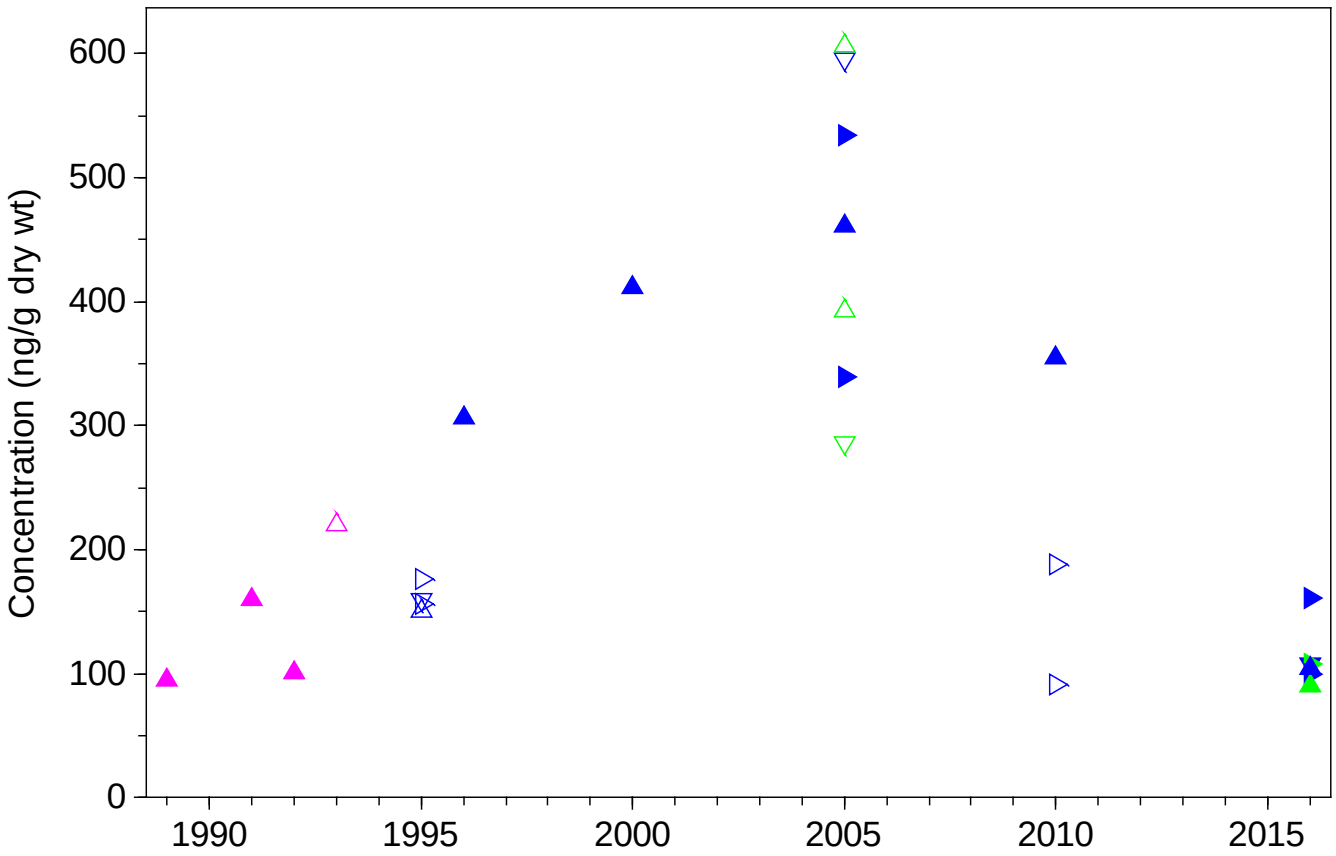
Naphthalene, Station 40



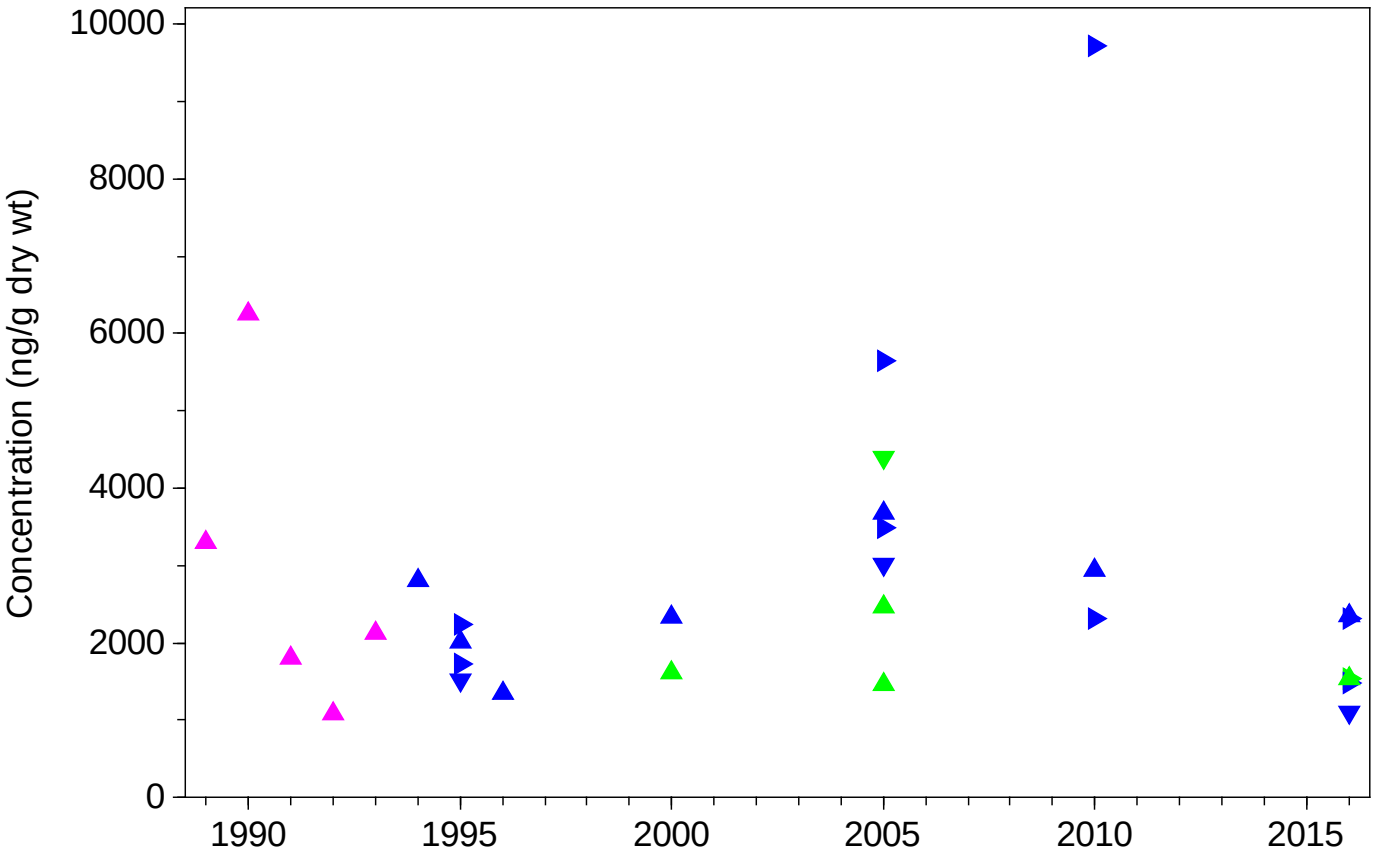
Phenanthrene, Station 40



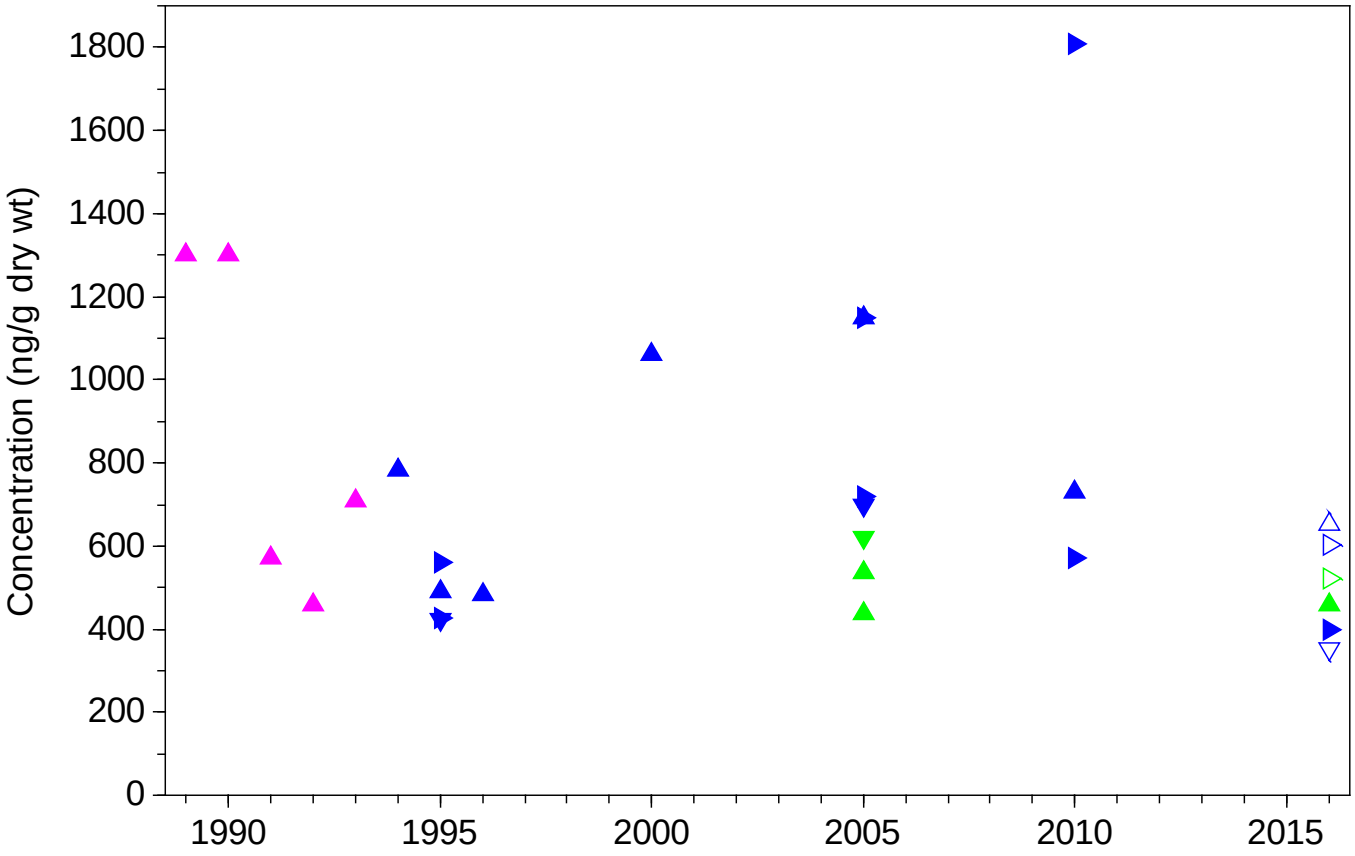
Retene, Station 40



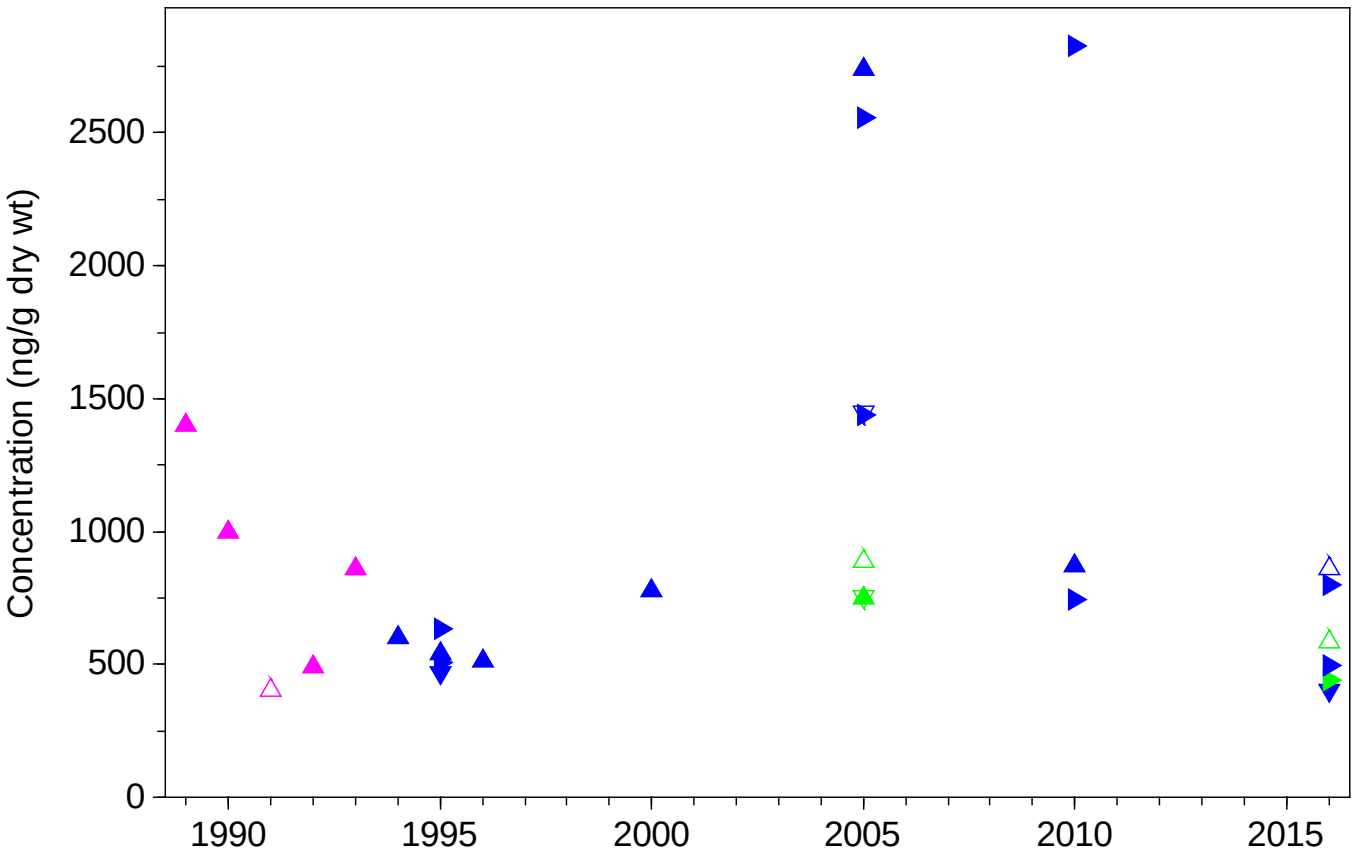
Total LPAH (sum of 6 compounds), Station 40



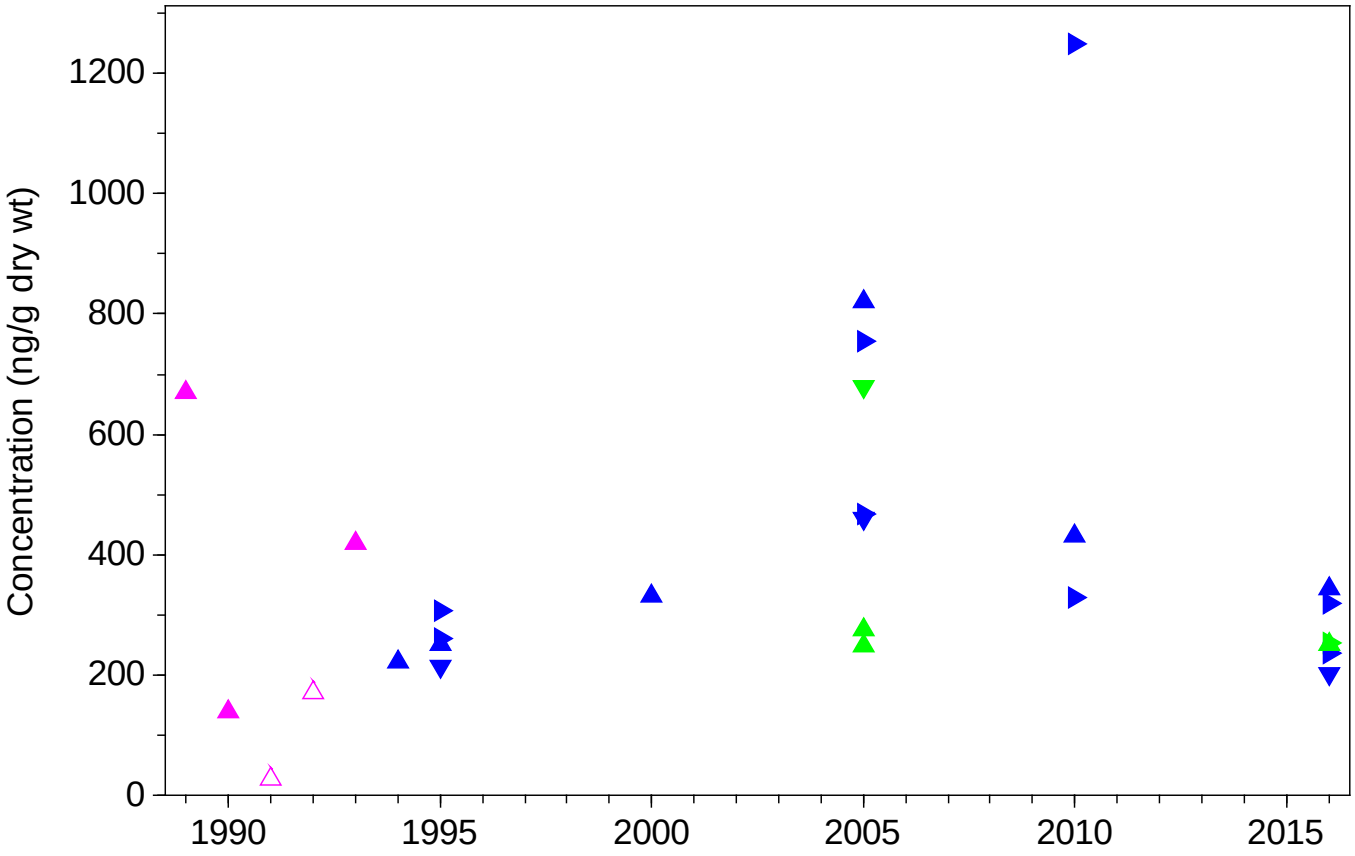
Benzo(a)anthracene, Station 40



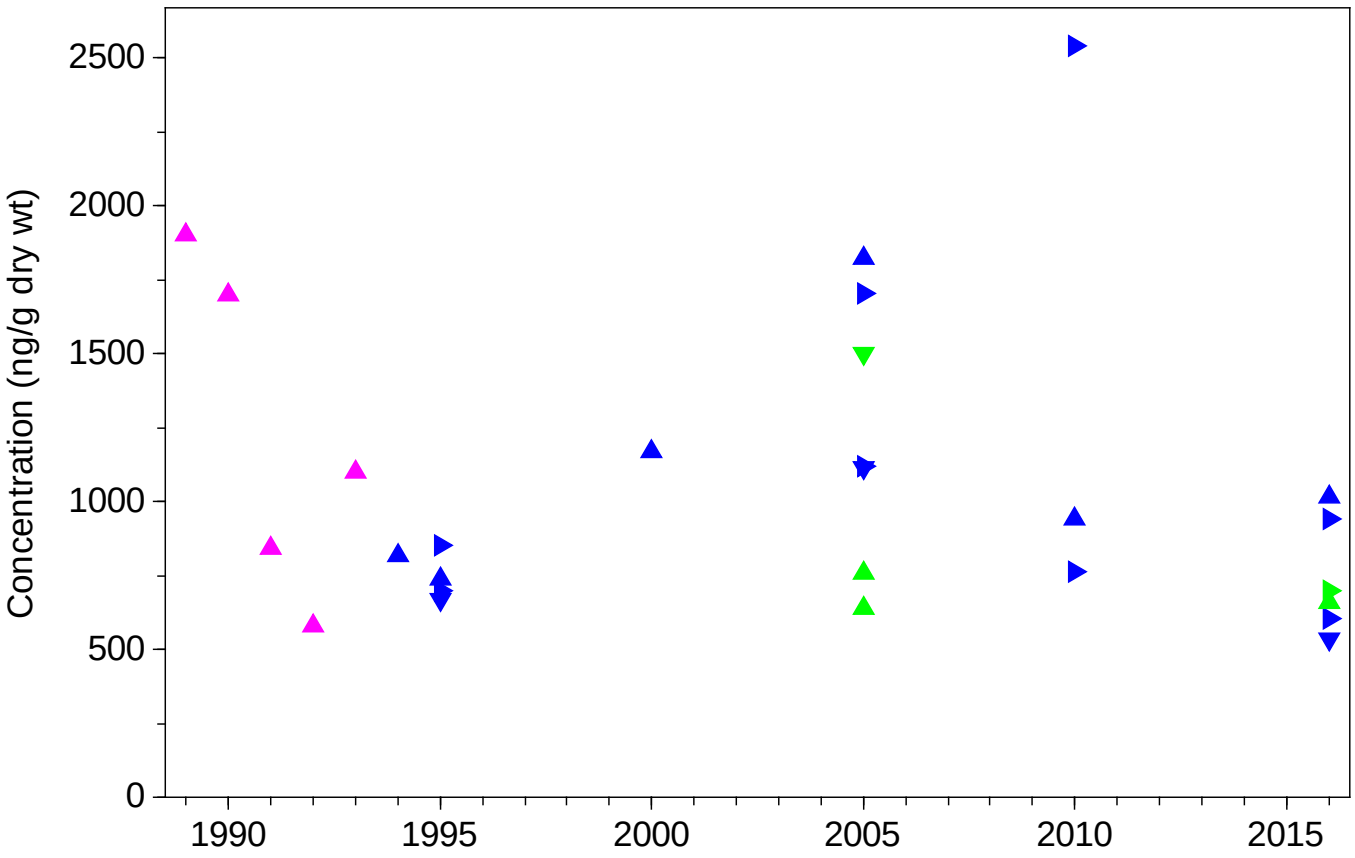
Benzo(a)pyrene, Station 40



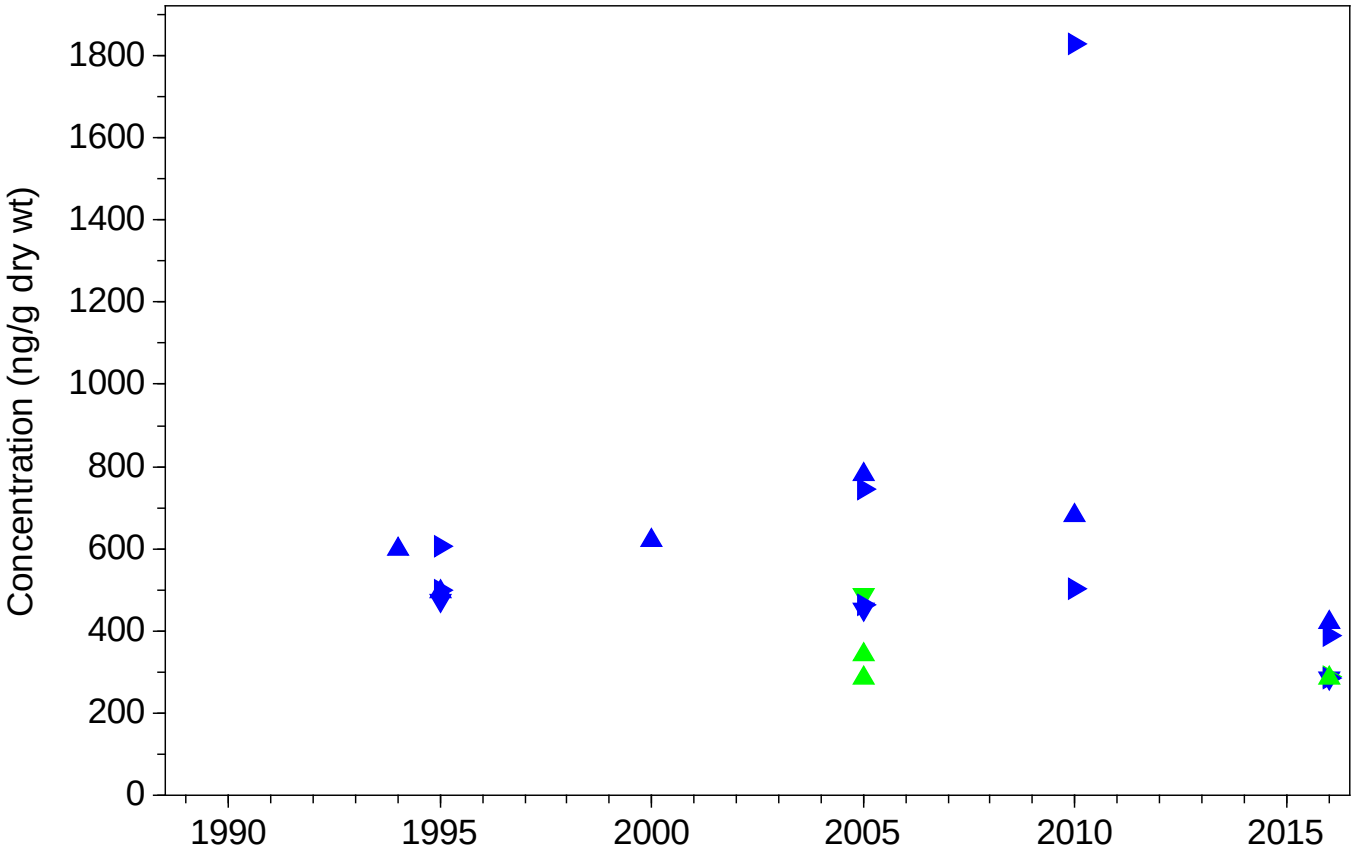
Benzo(g,h,i)perylene, Station 40



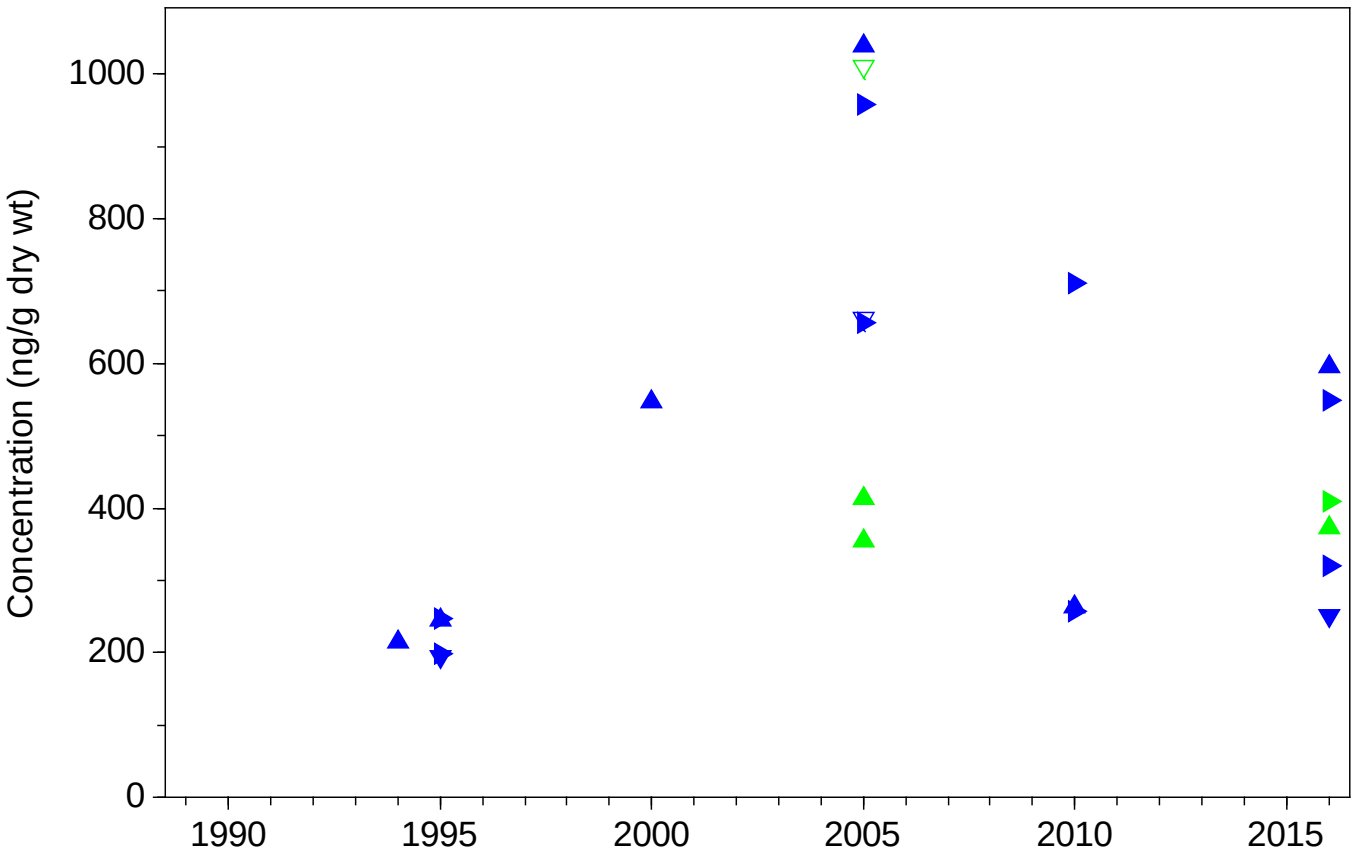
Total Benzofluoranthenes, Station 40



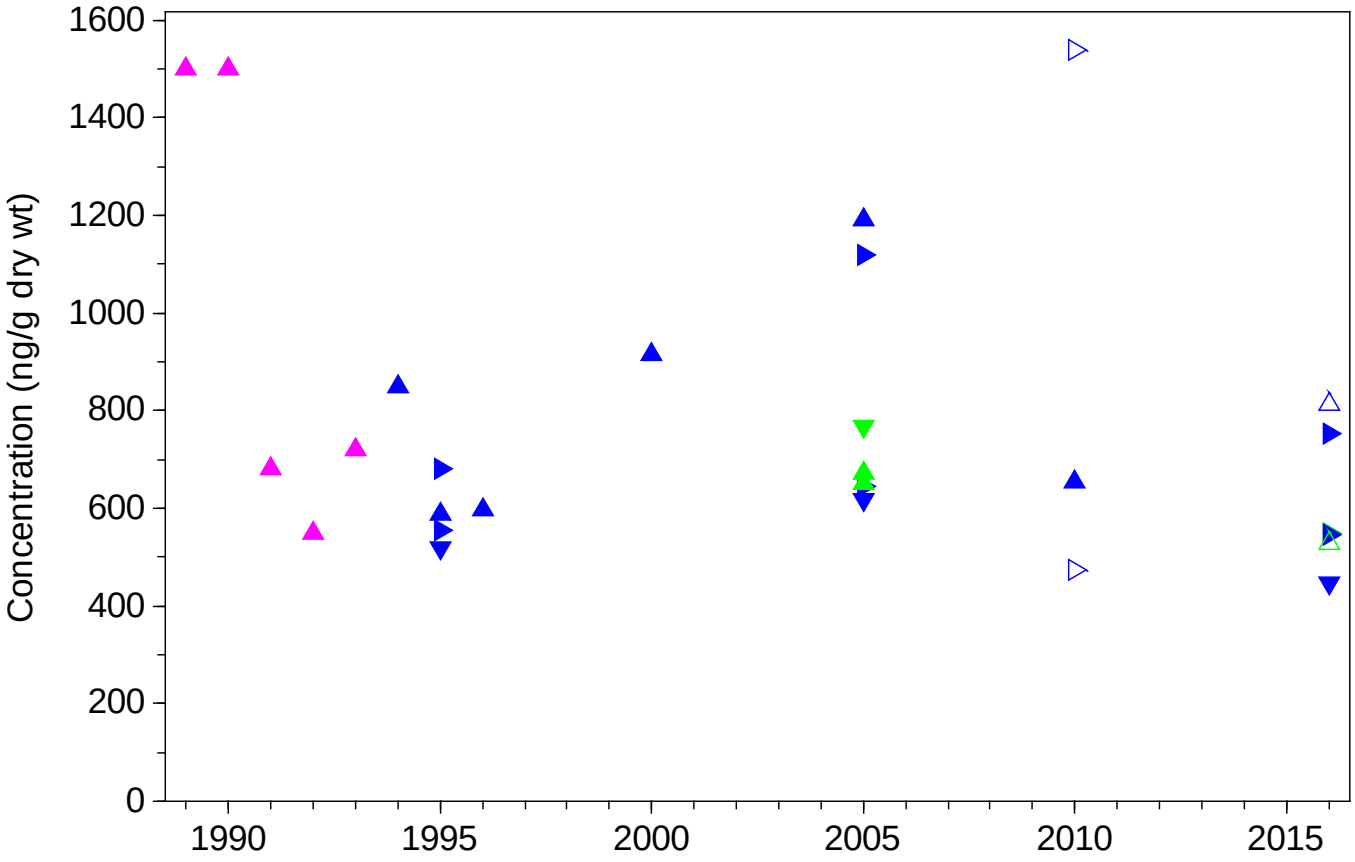
Benzo(b)fluoranthene, Station 40



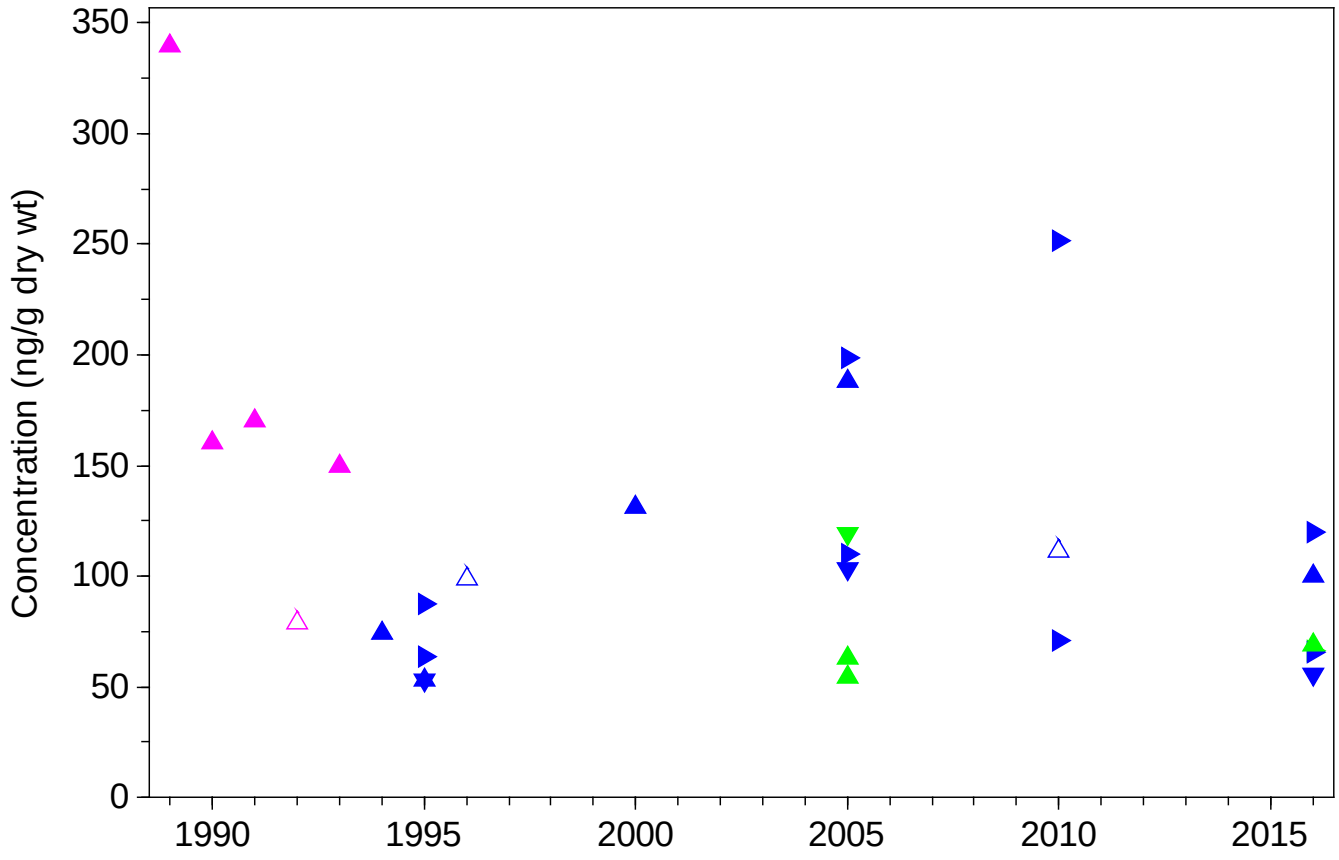
Benzo(k)fluoranthene, Station 40



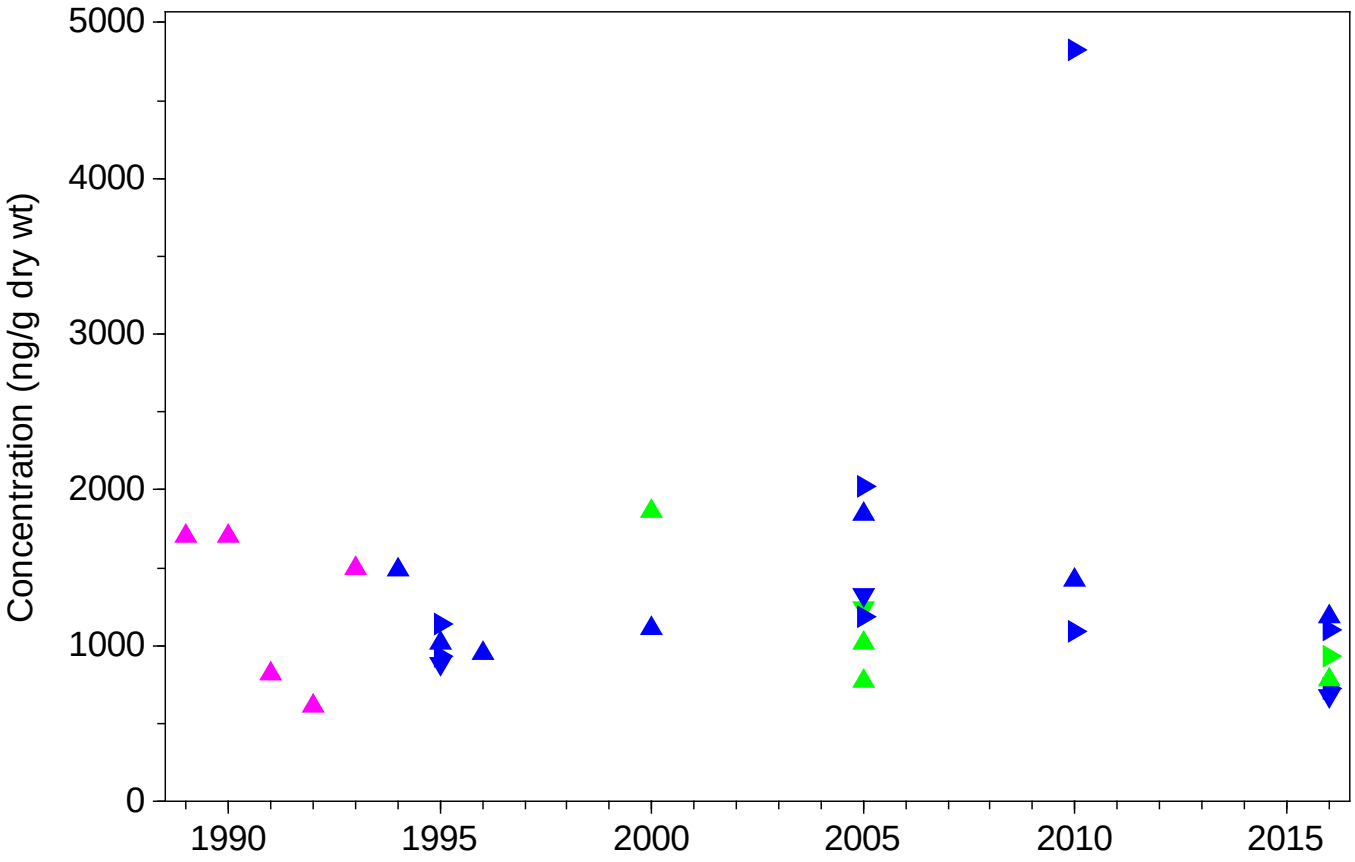
Chrysene, Station 40



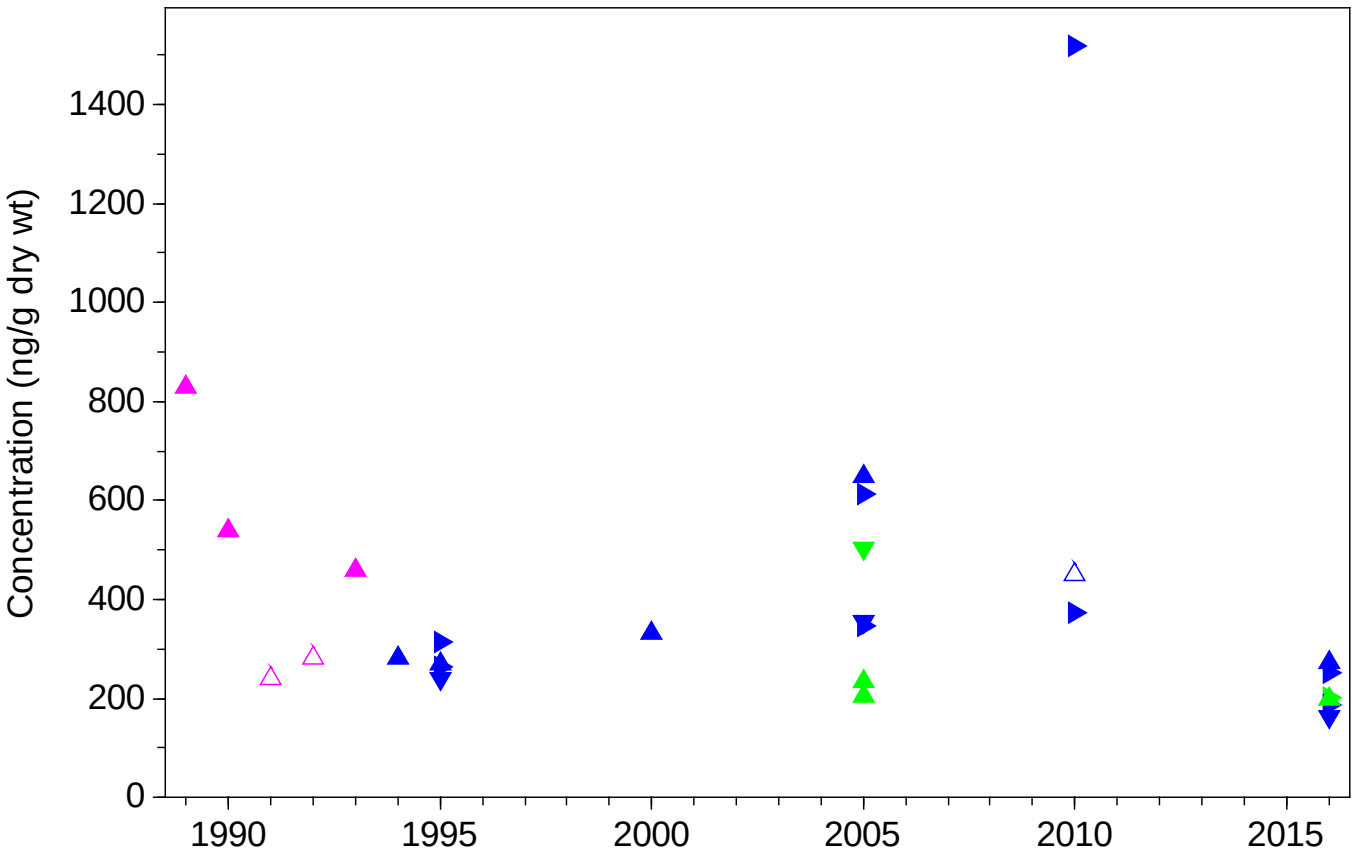
Dibenzo(a,h)anthracene, Station 40



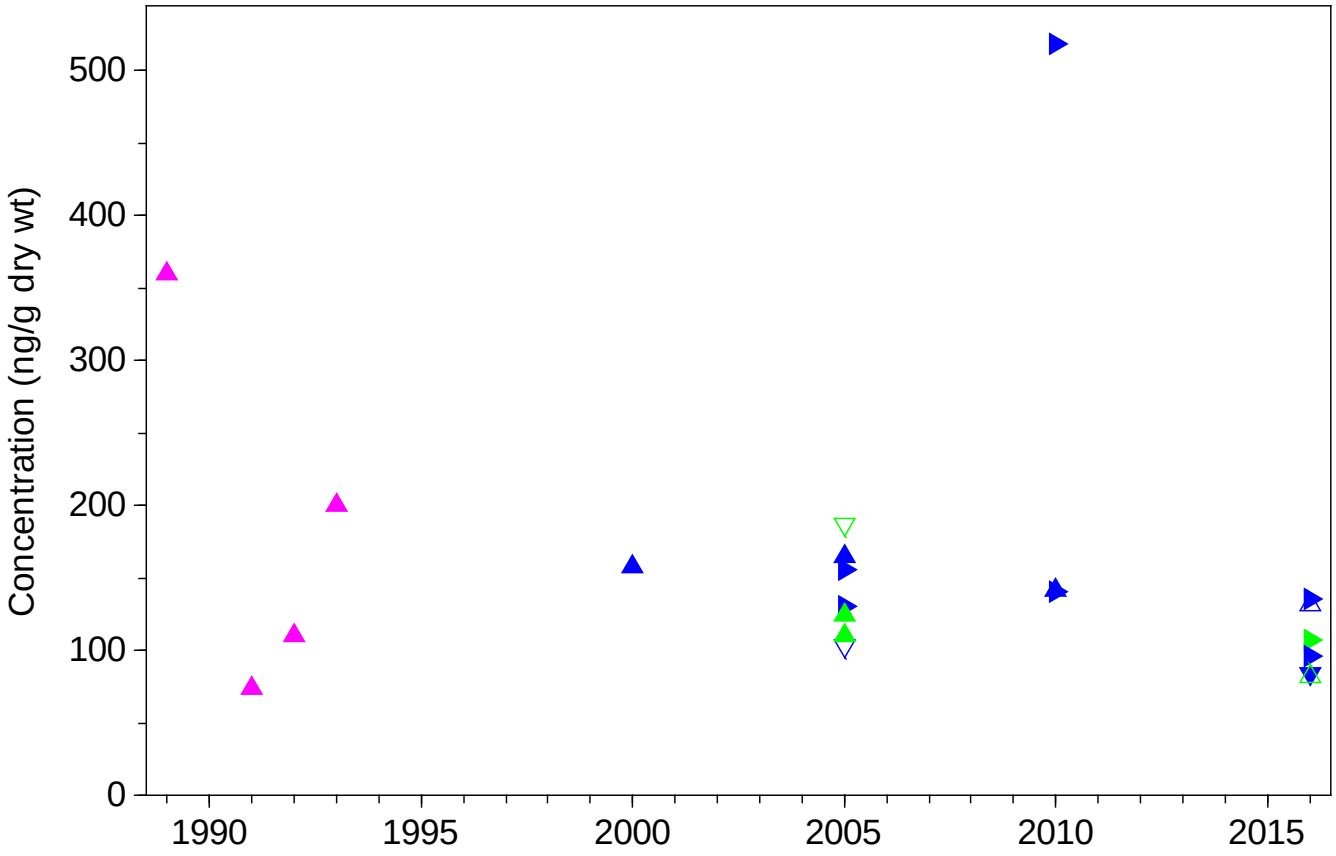
Fluoranthene, Station 40



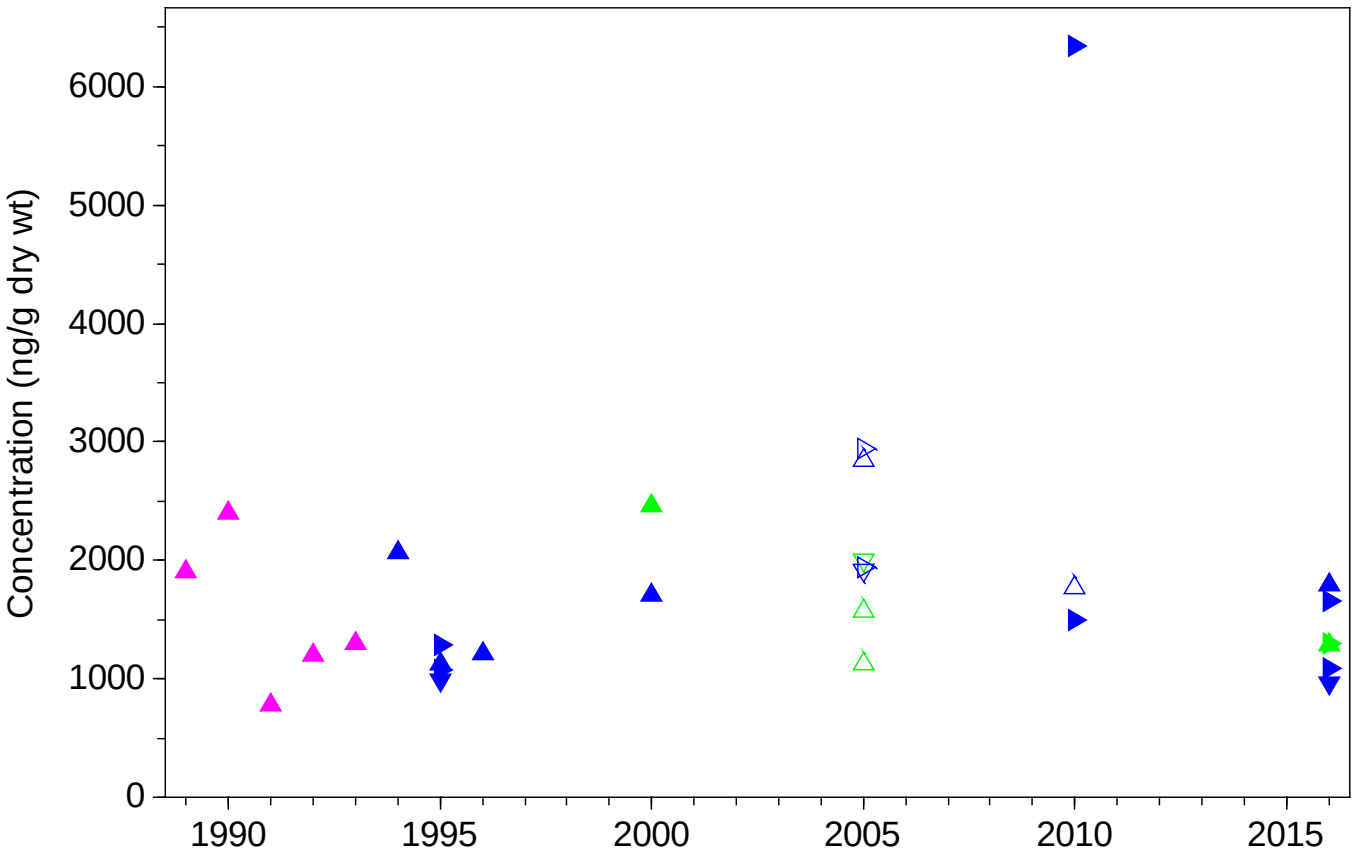
Indeno(1,2,3-c,d)pyrene, Station 40



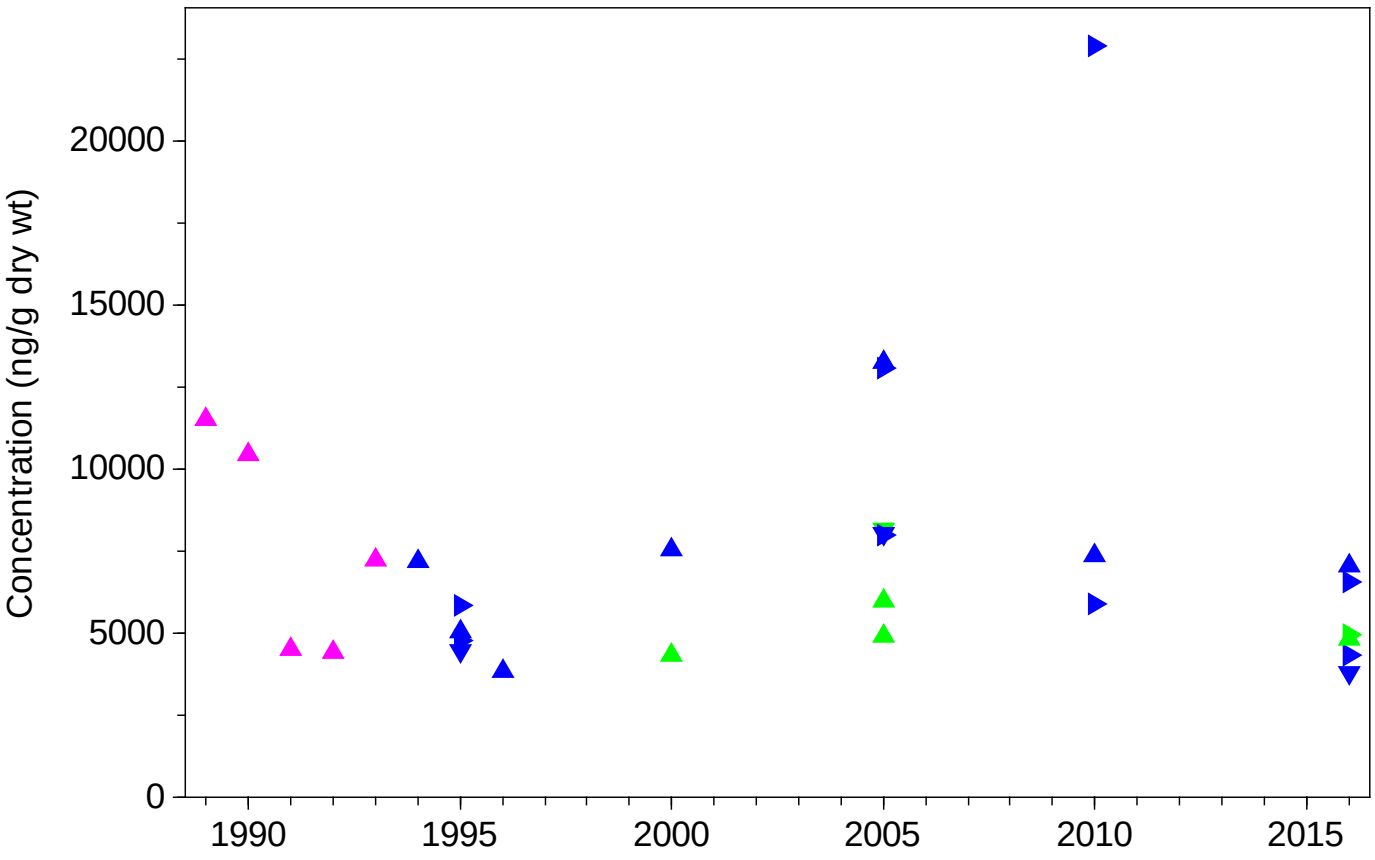
Perylene, Station 40



Pyrene, Station 40



Total HPAH (sum of 9 compounds), Station 40



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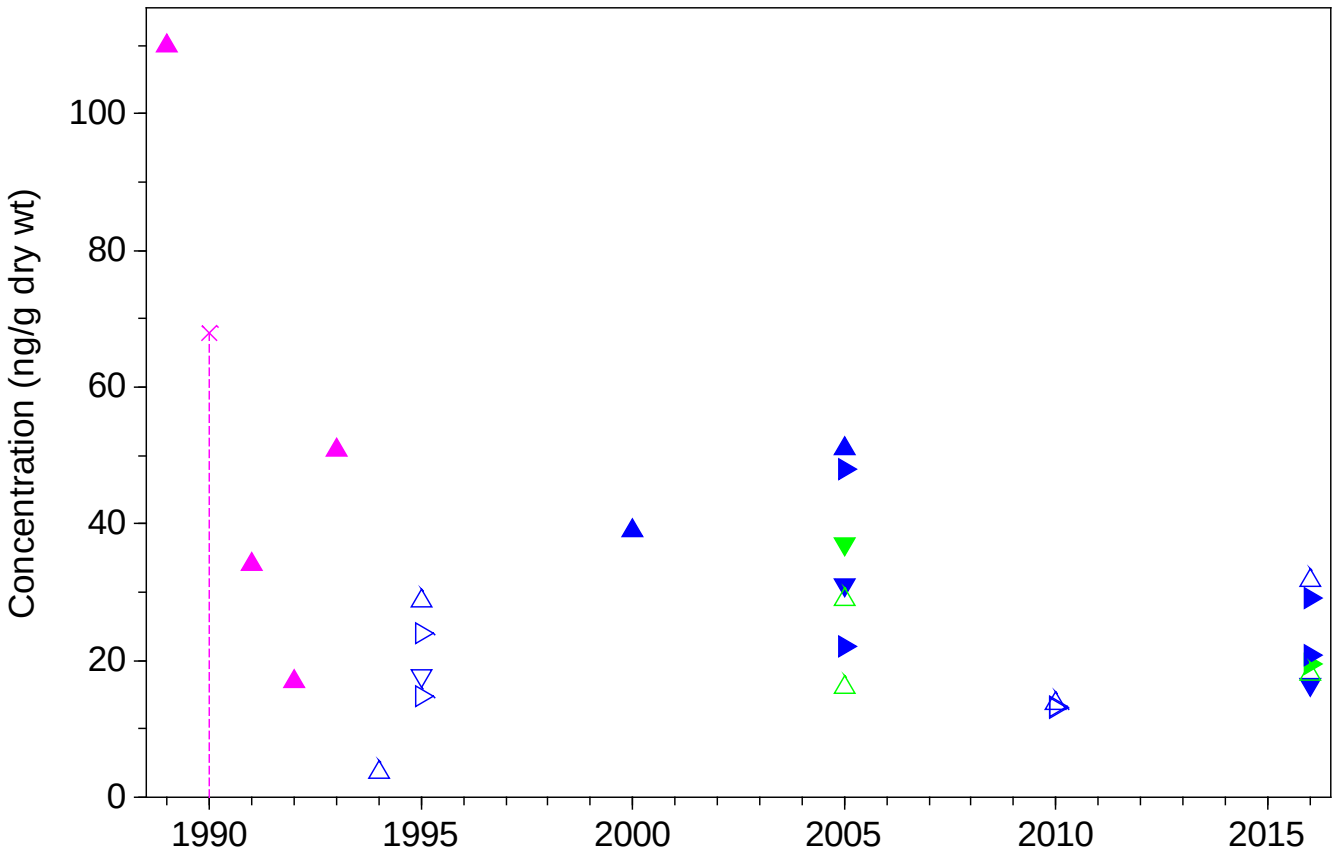
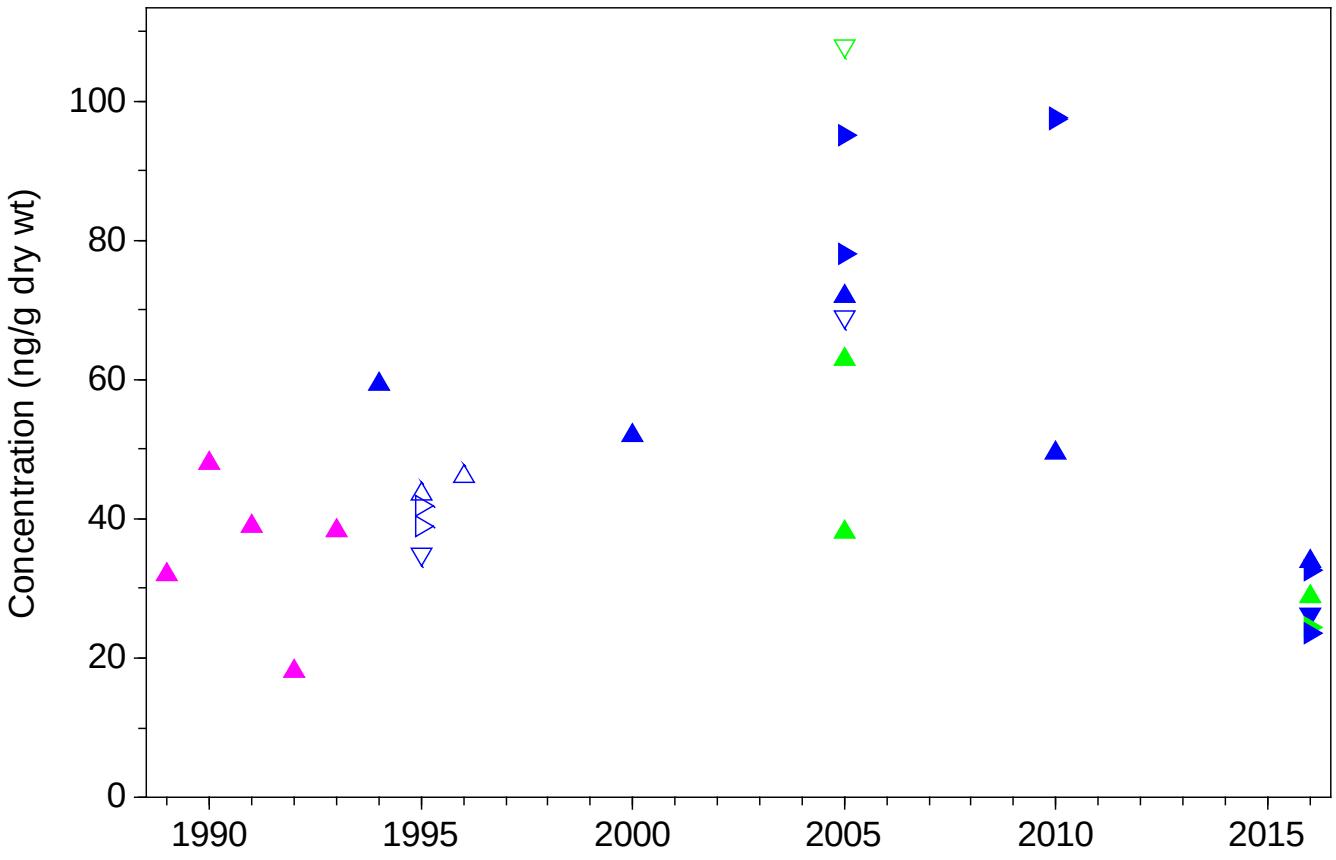
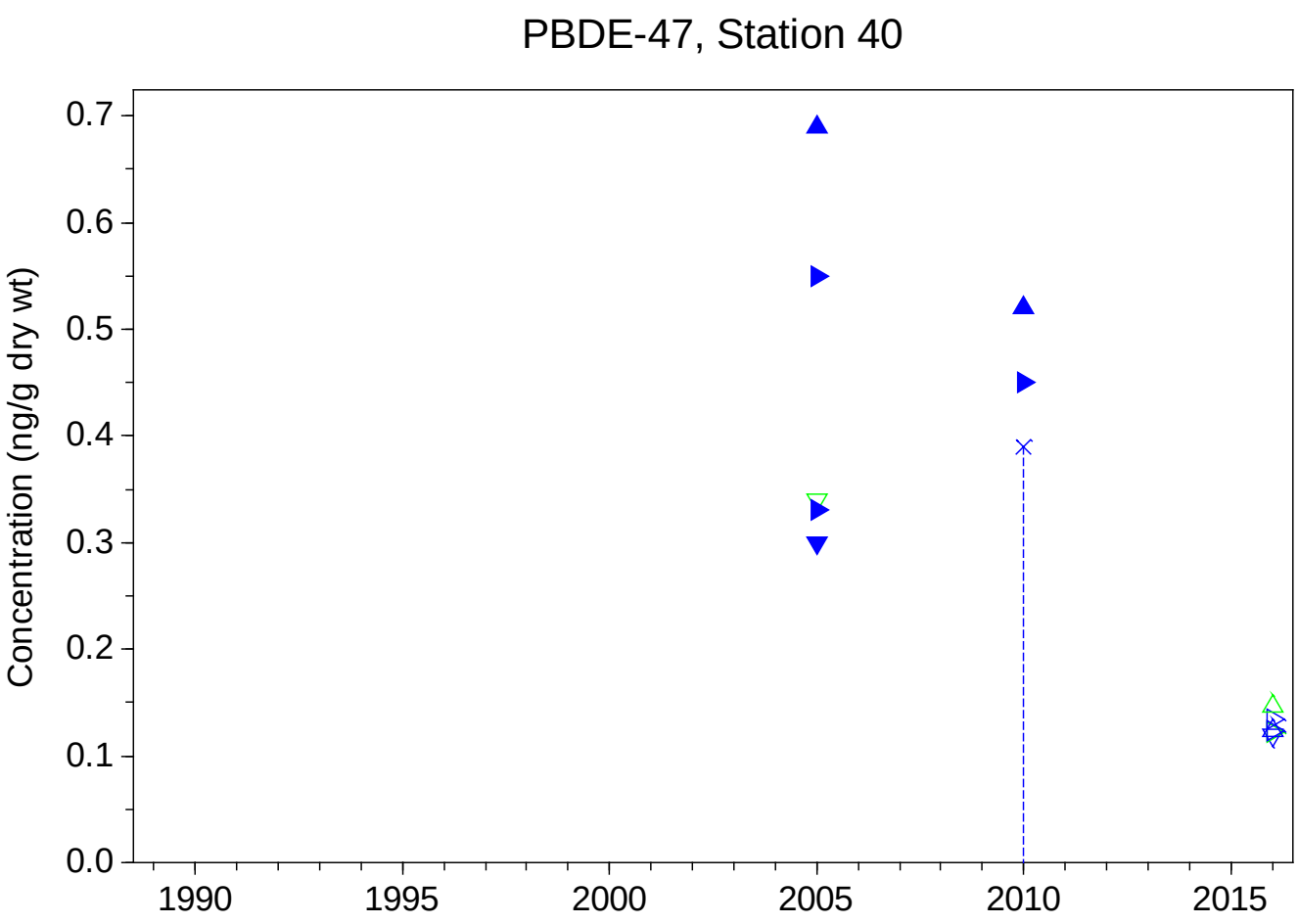
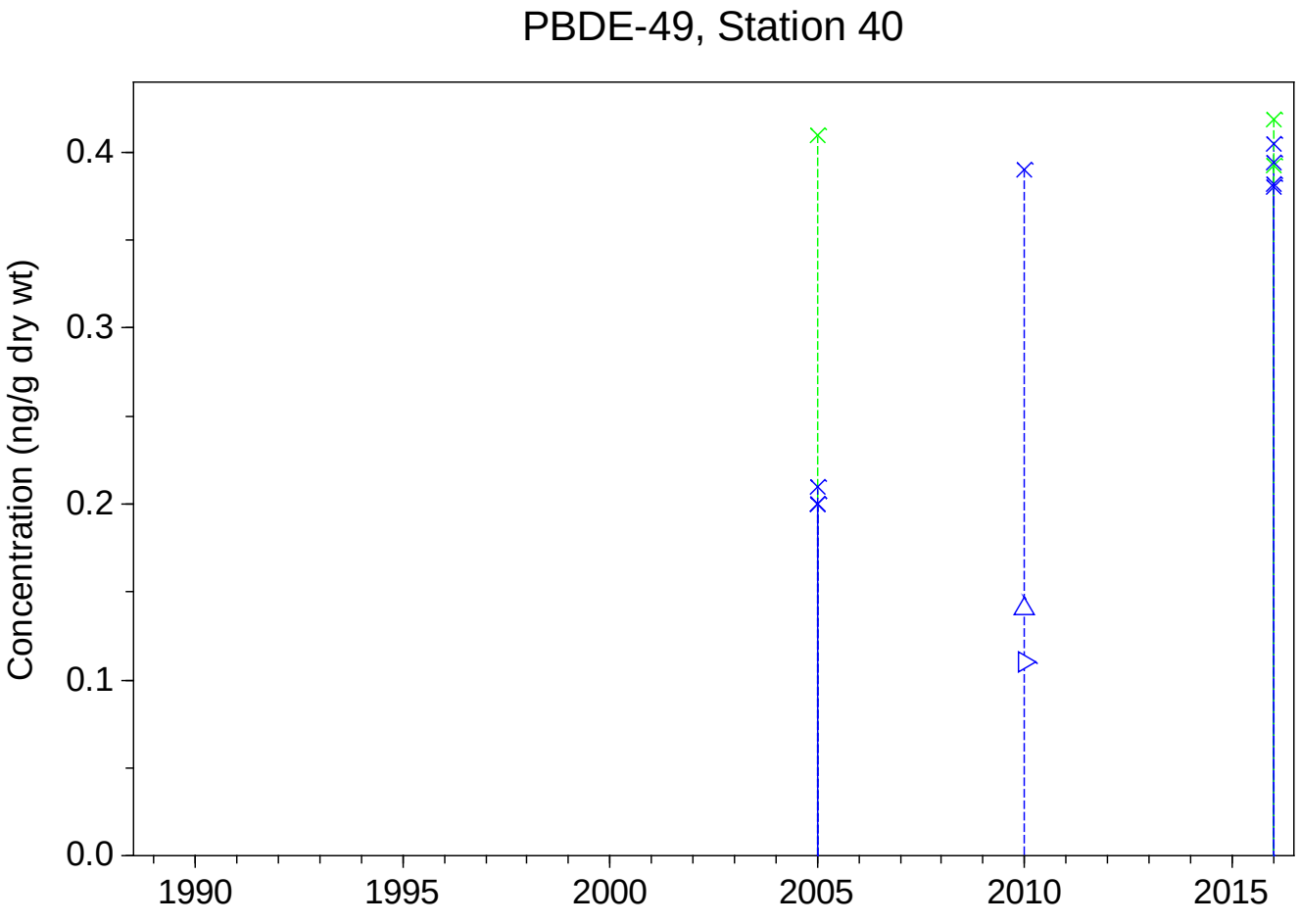
Carbazole, Station 40



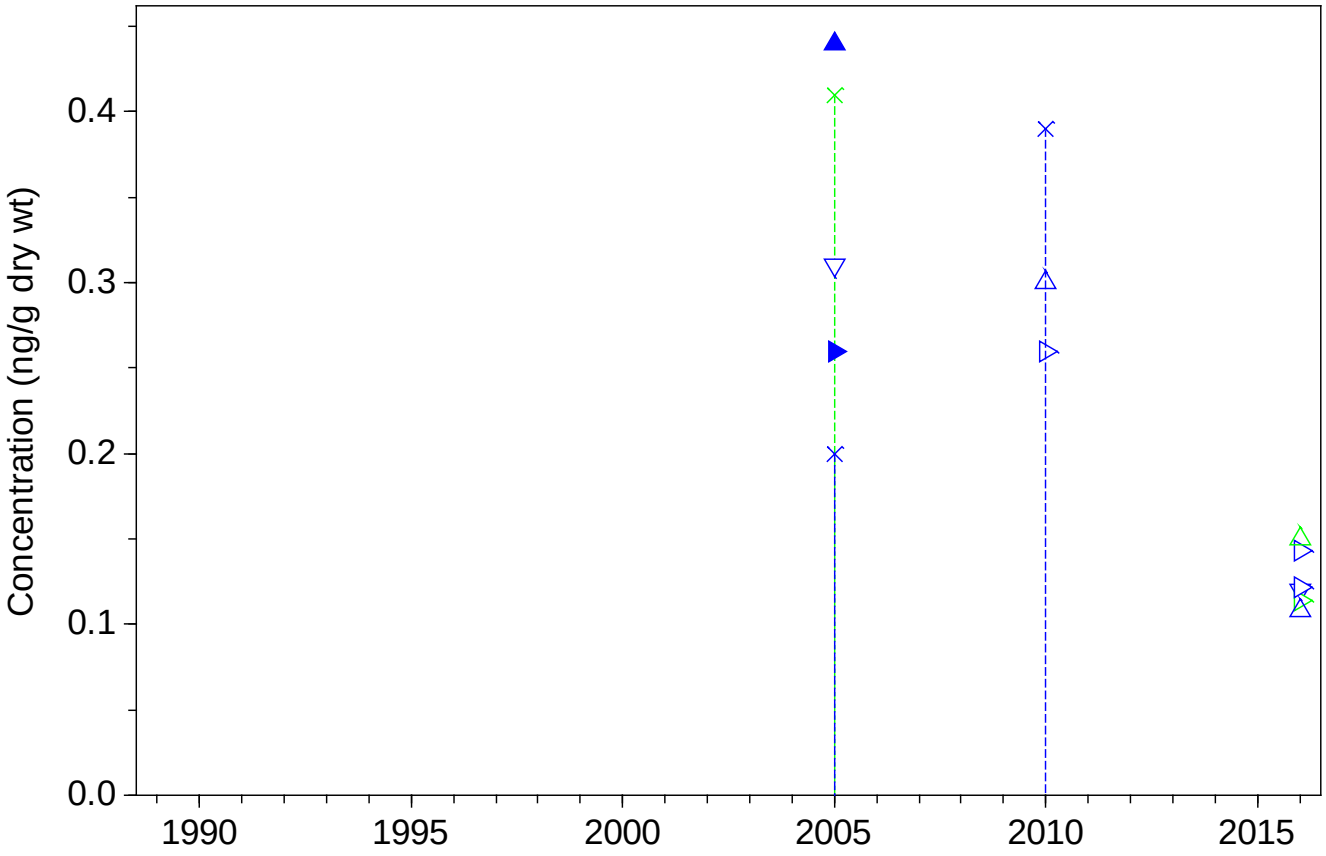
Dibenzofuran, Station 40



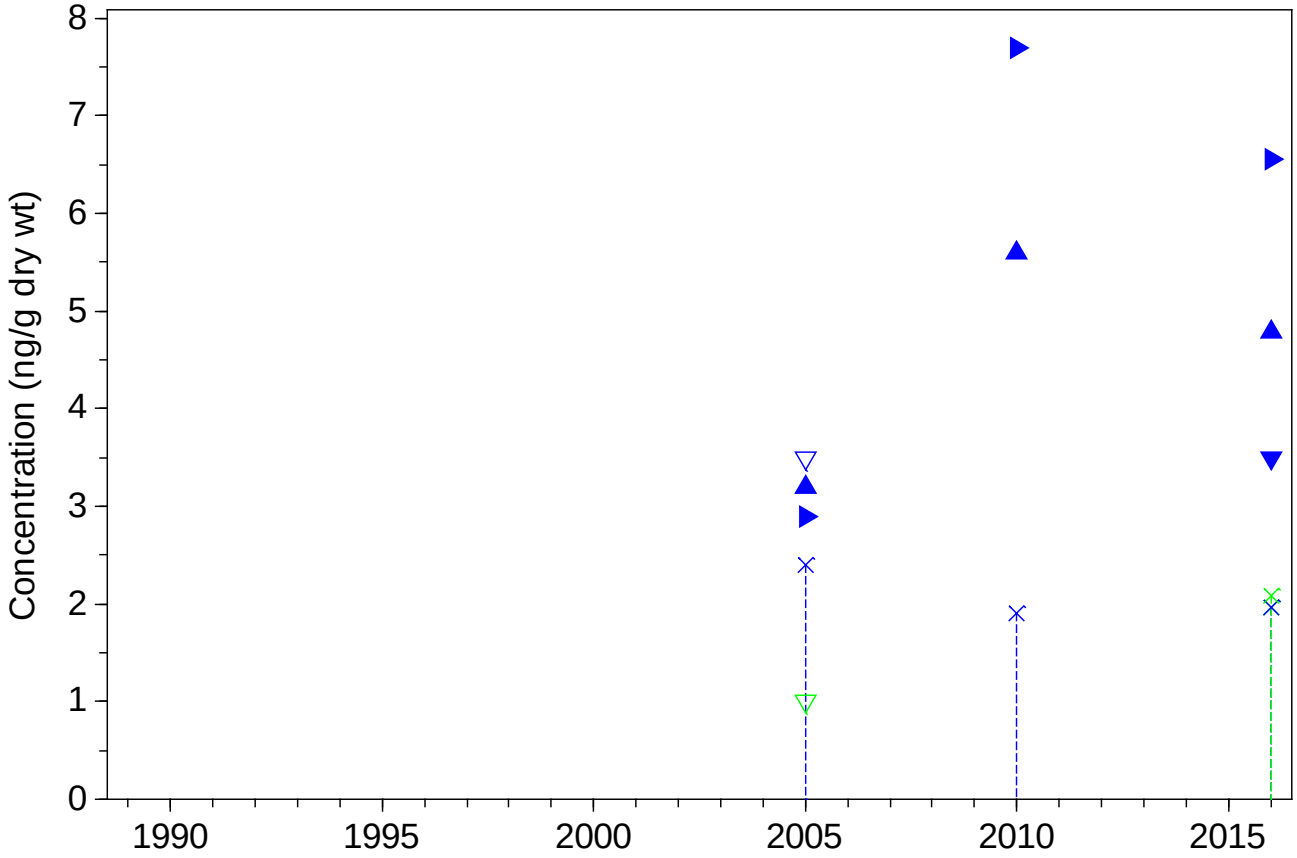

PBDE-47, Station 40
Concentration (ng/g dry wt)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
1990
1995
2000
2005
2010
2015


PBDE-49, Station 40
Concentration (ng/g dry wt)
0.0
0.1
0.2
0.3
0.4
1990
1995
2000
2005
2010
2015

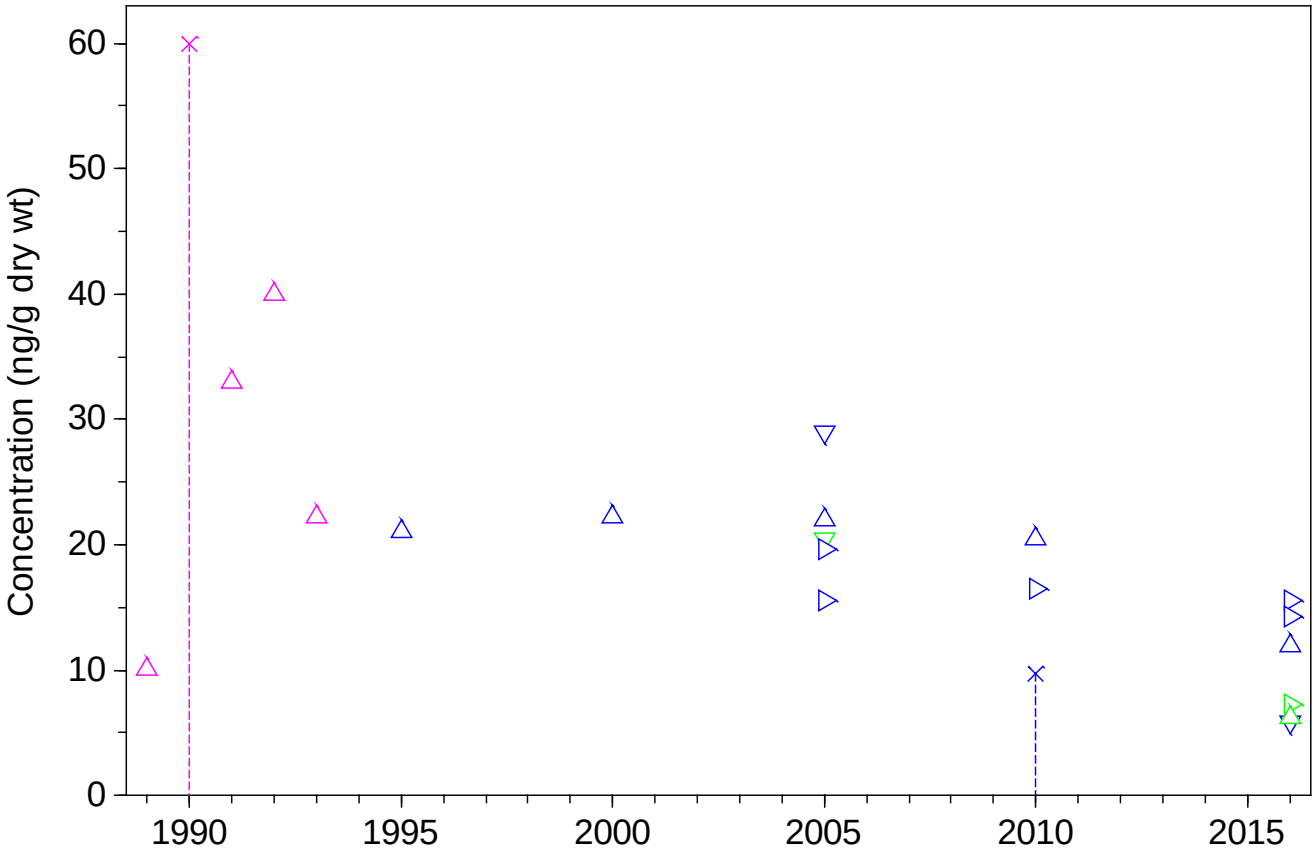
PBDE-99, Station 40



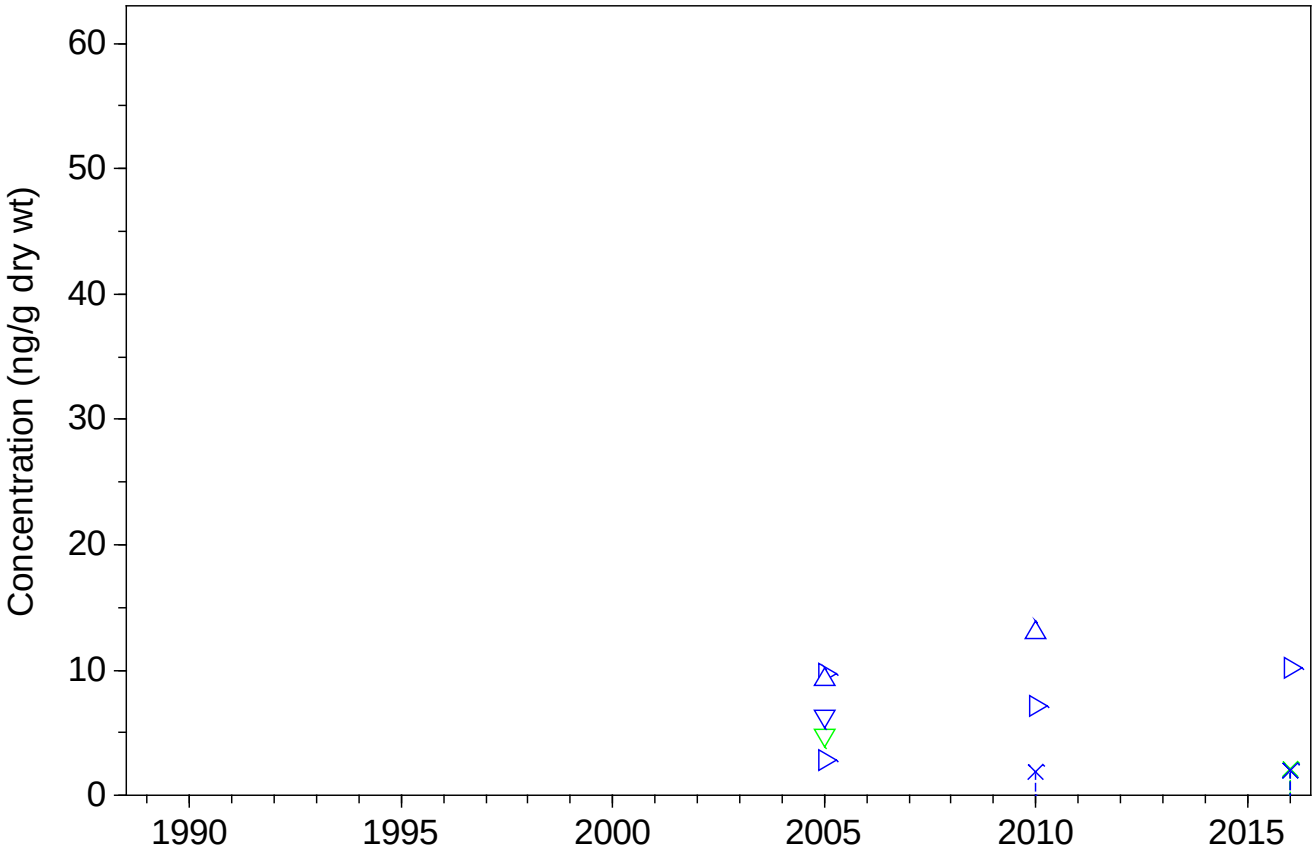
PBDE-209, Station 40



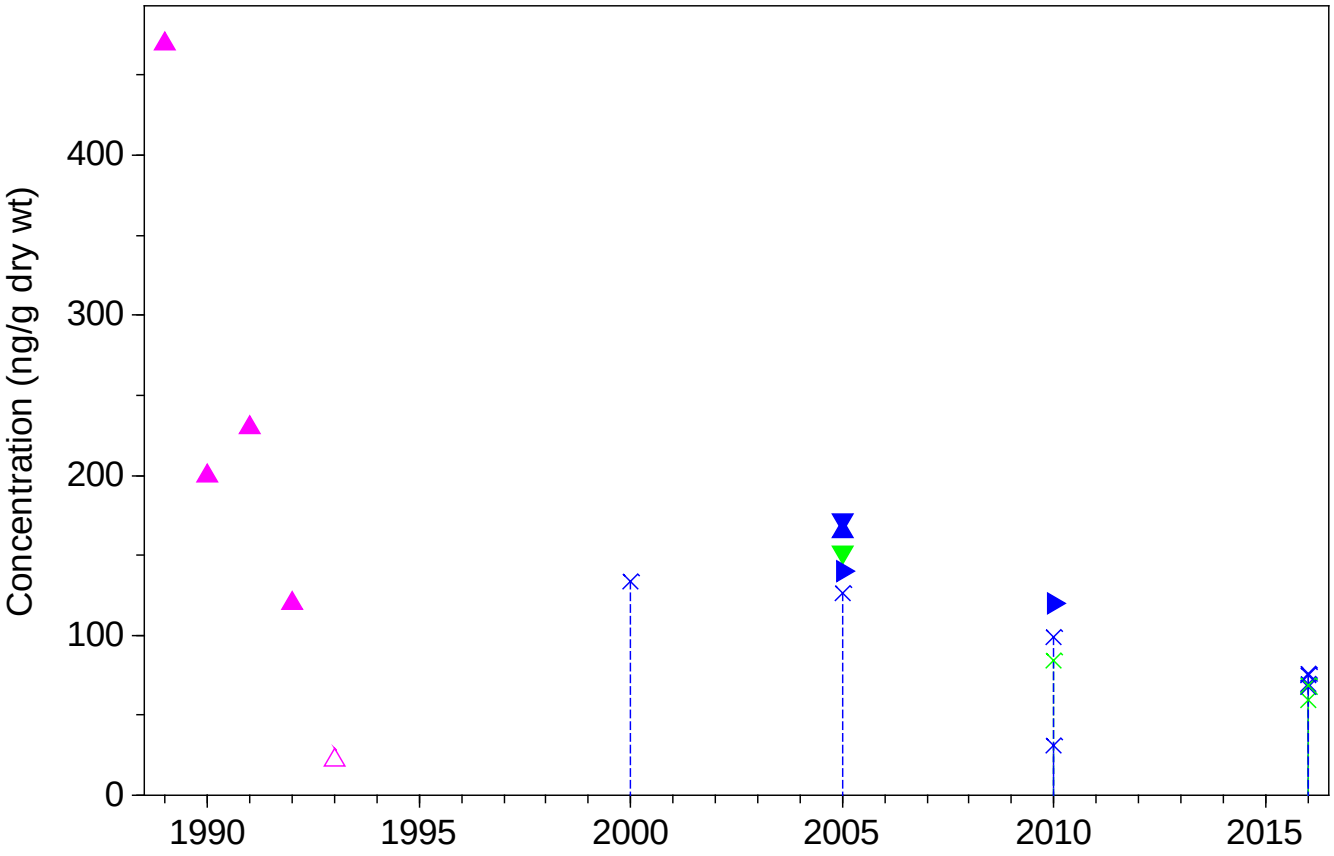
Total Aroclors, Station 40



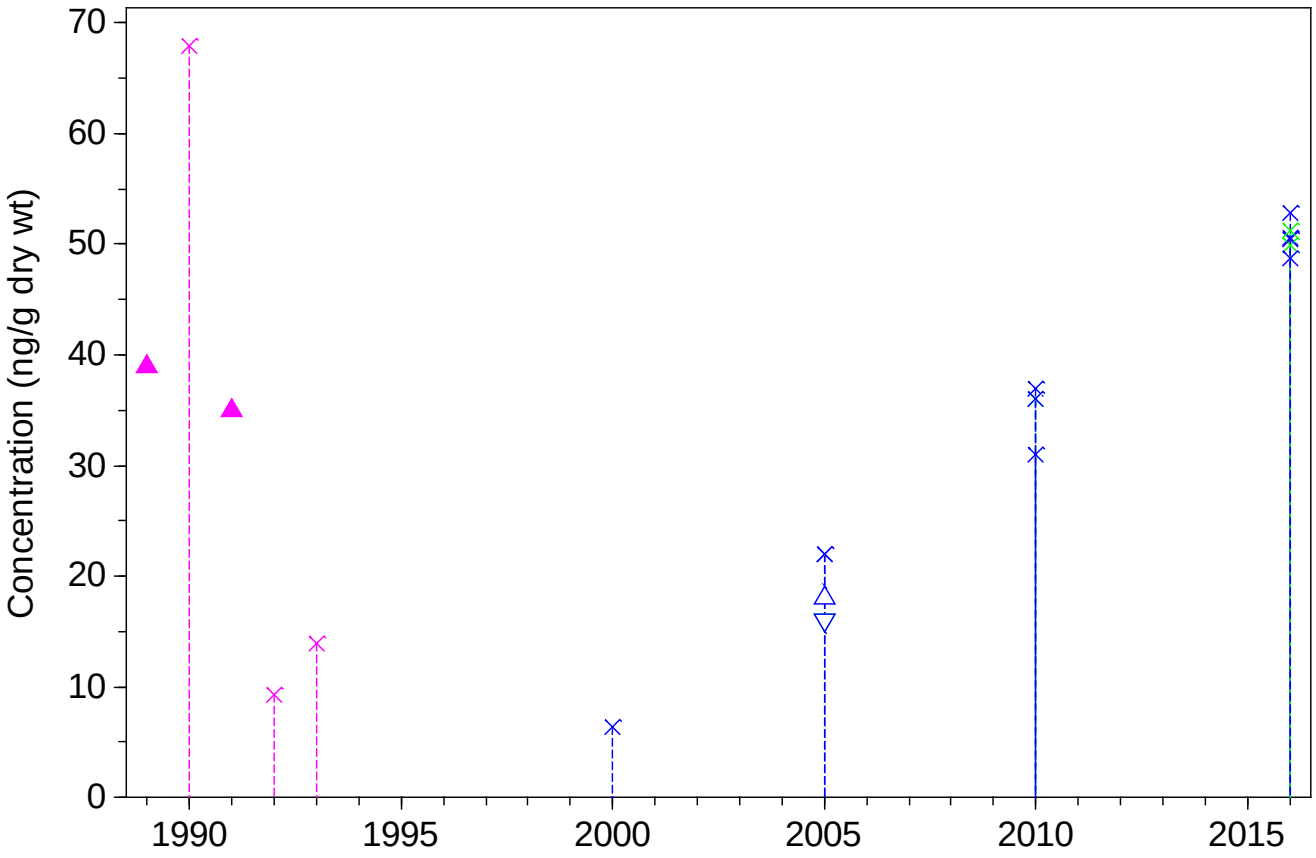
Total PCB Congeners x 2, Station 40



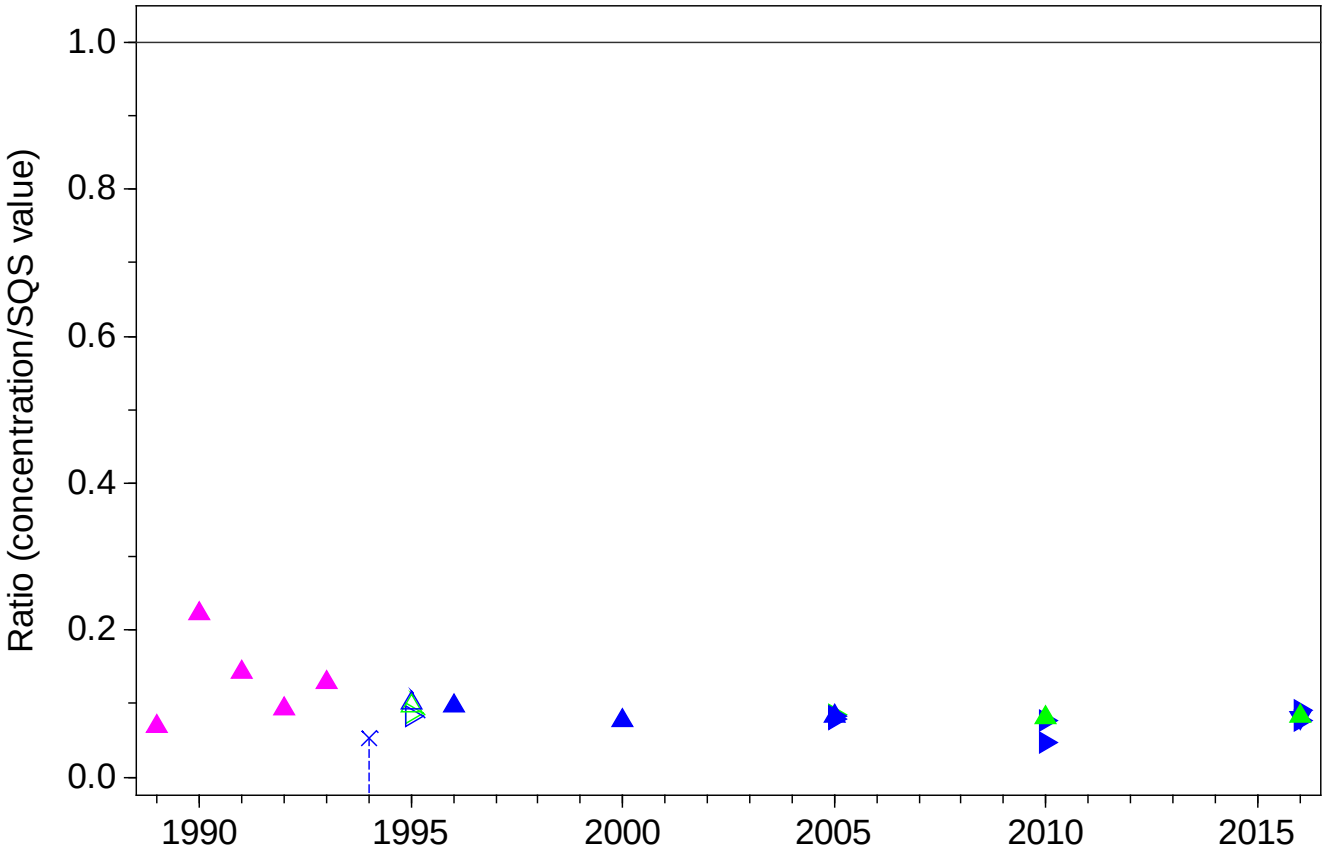
Bis(2-ethylhexyl)phthalate, Station 40



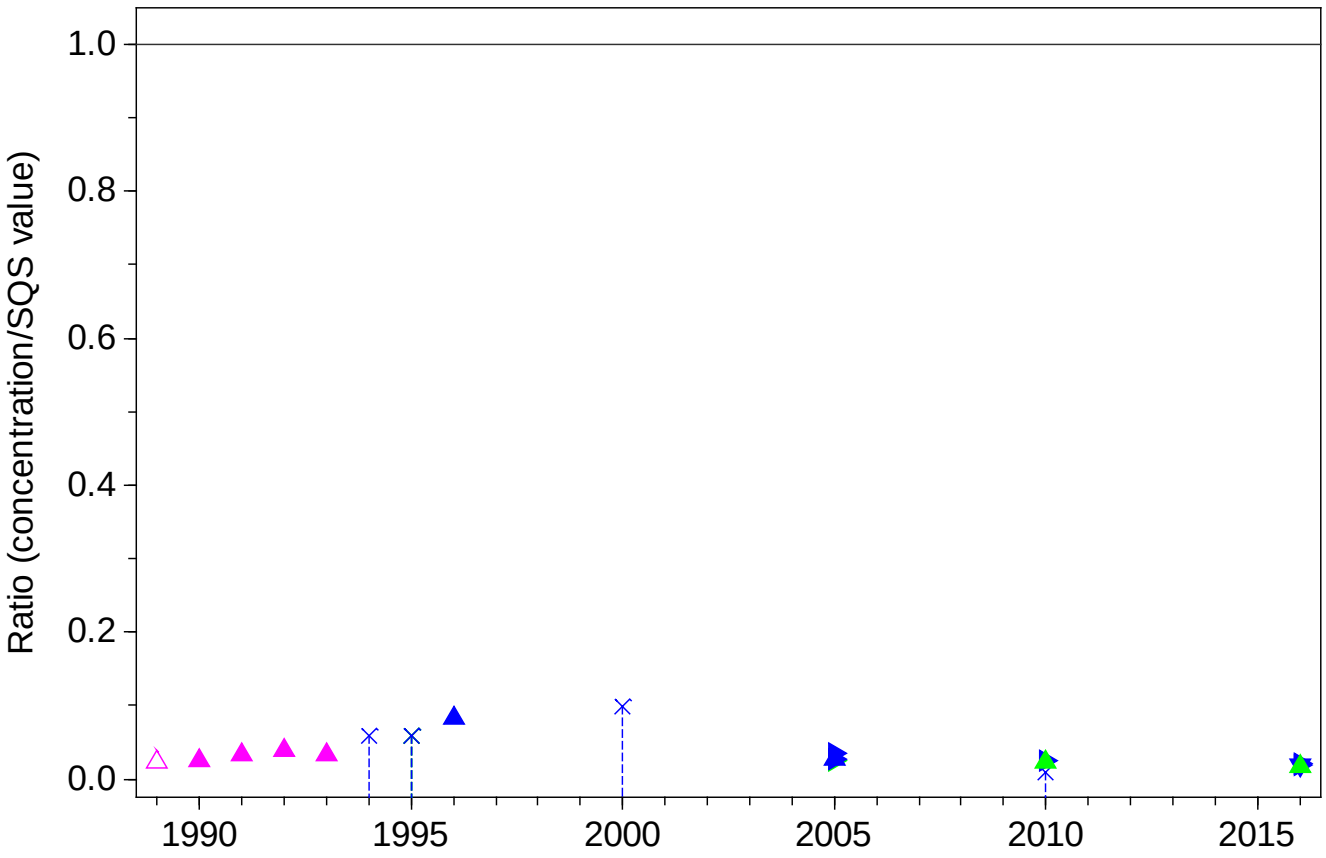
Butylbenzylphthalate, Station 40



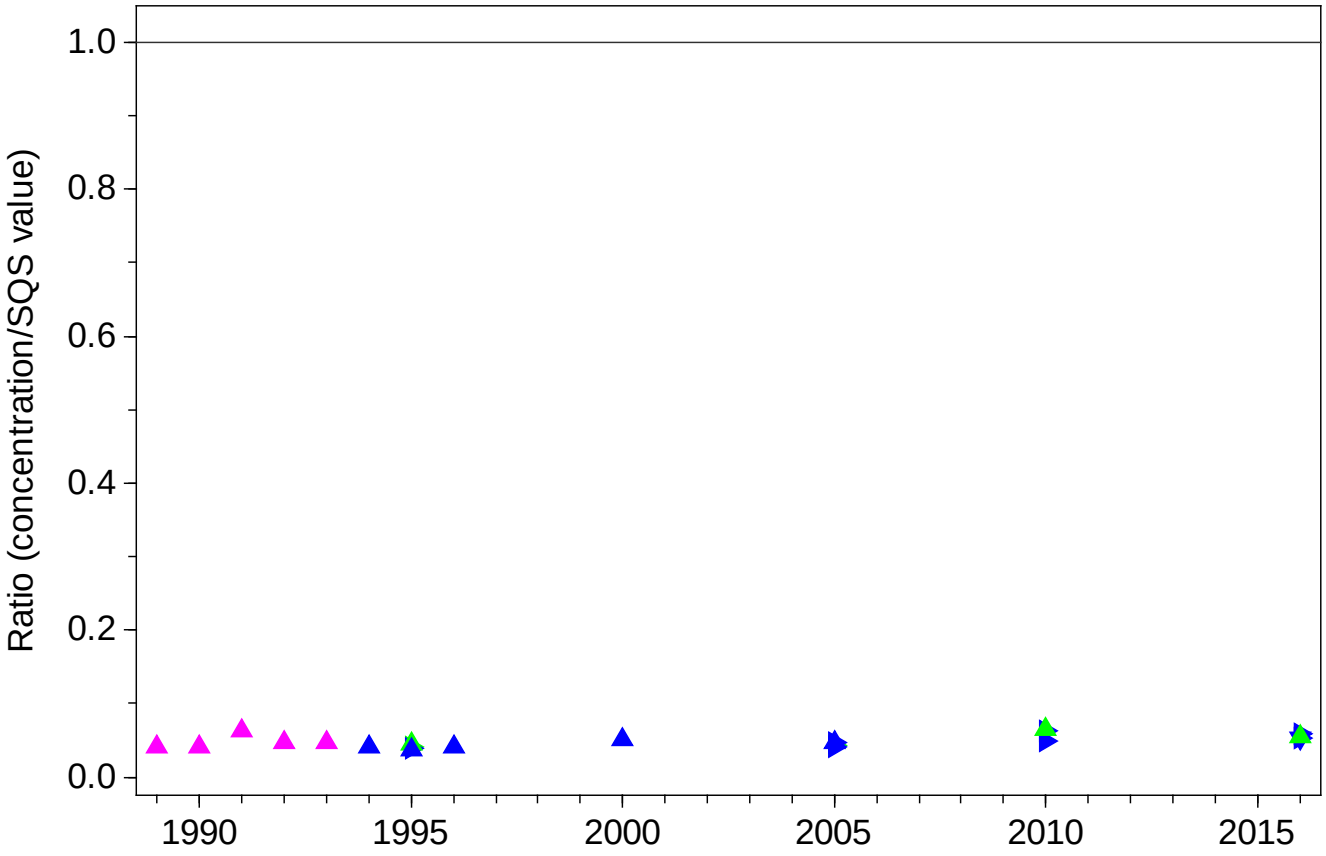
SQS quotient, Arsenic, Station 40



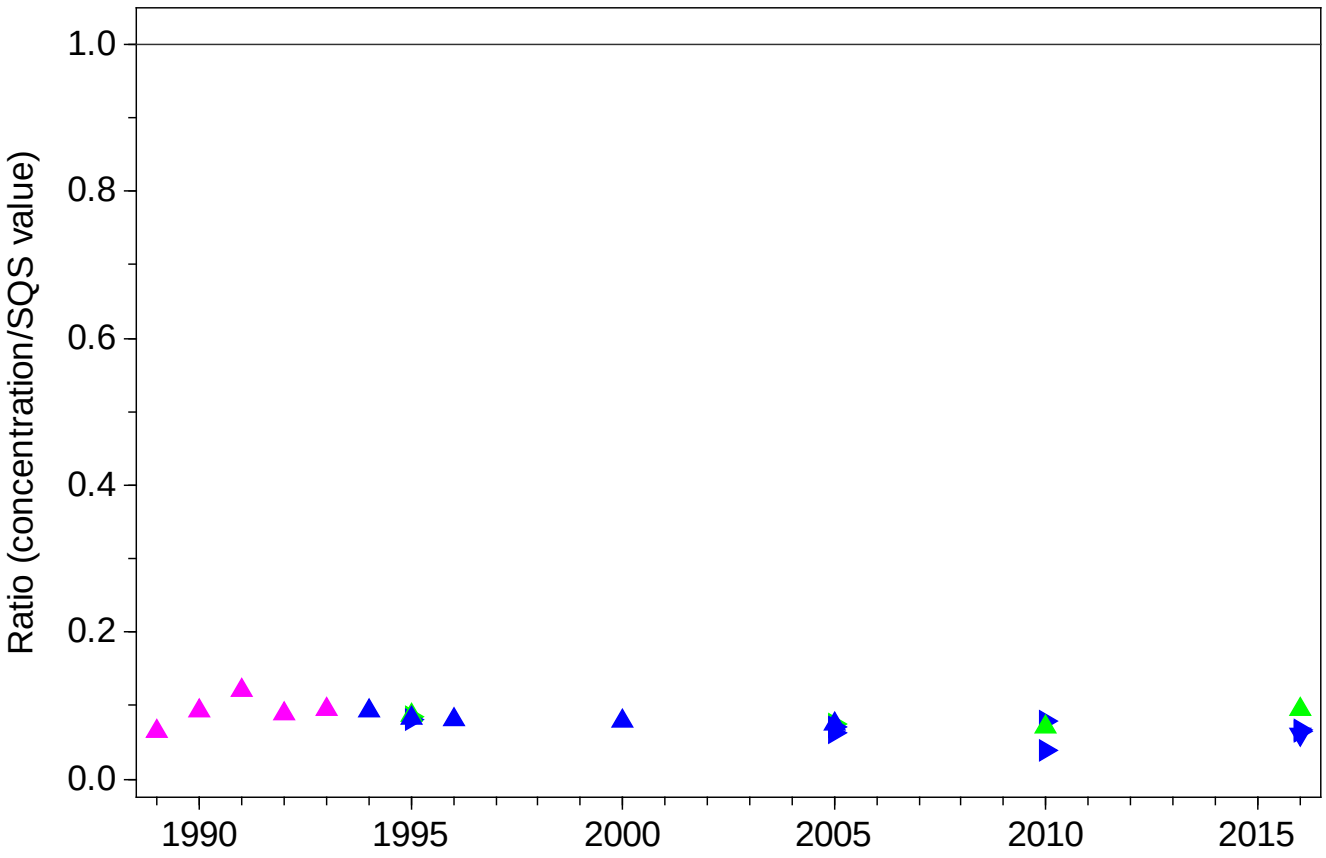
SQS quotient, Cadmium, Station 40



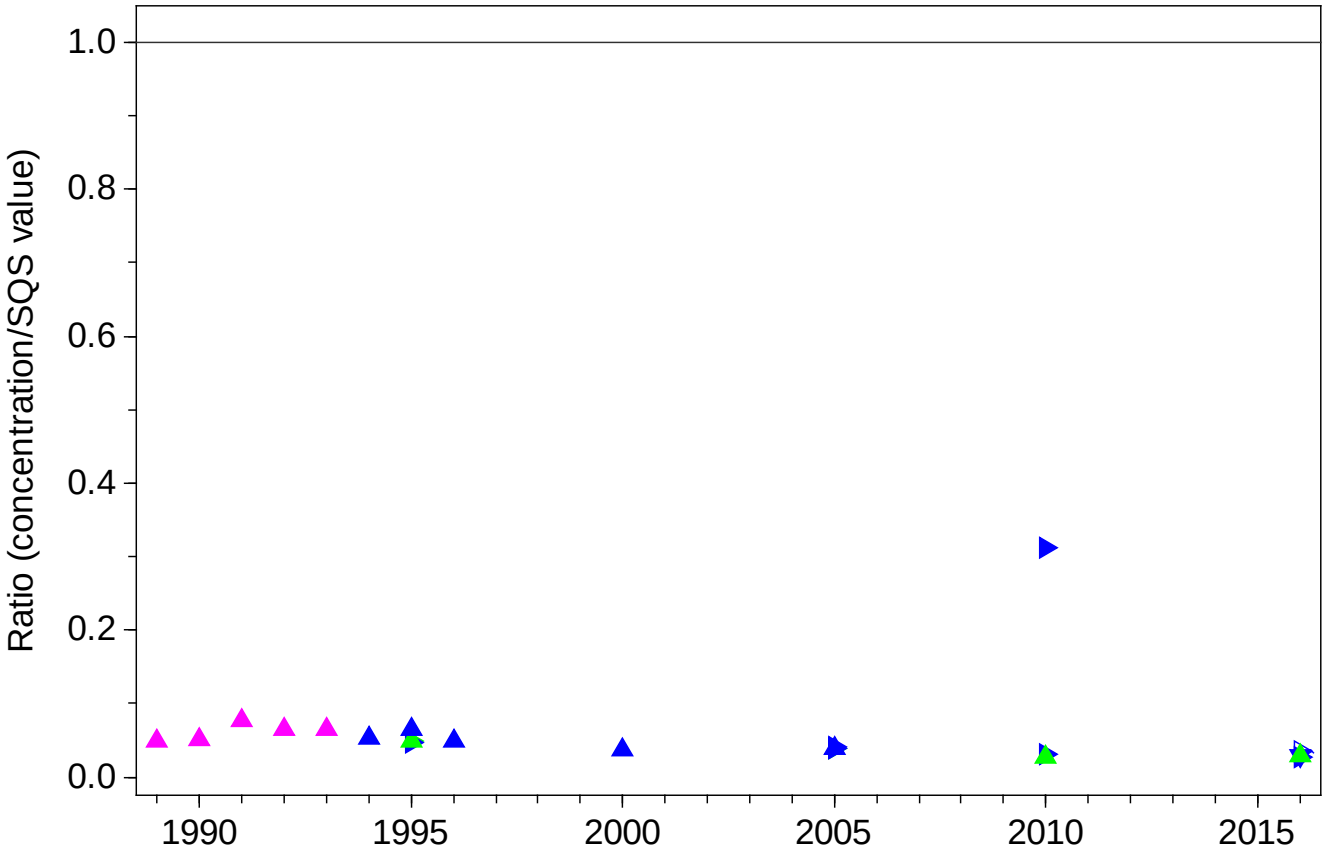
SQS quotient, Chromium, Station 40



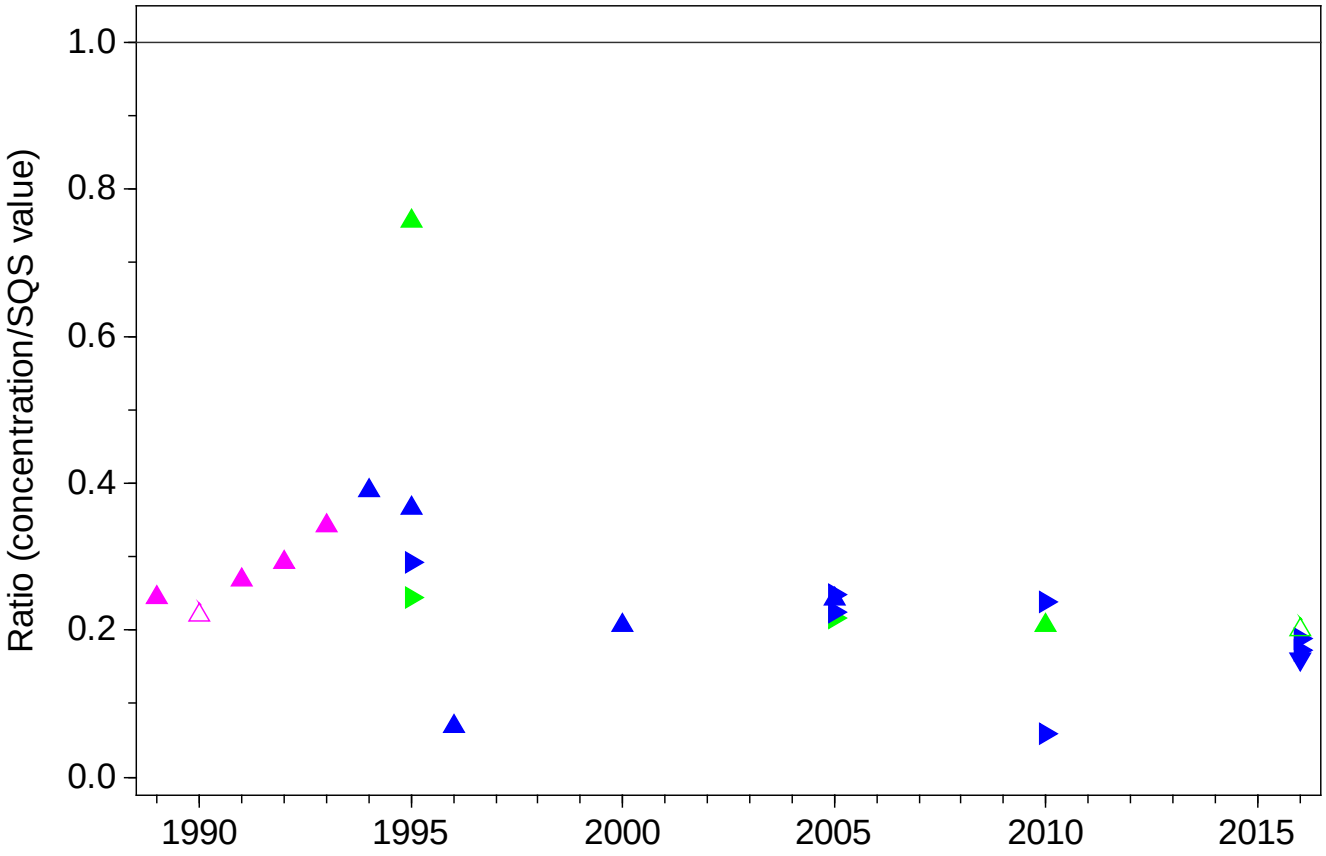
SQS quotient, Copper, Station 40



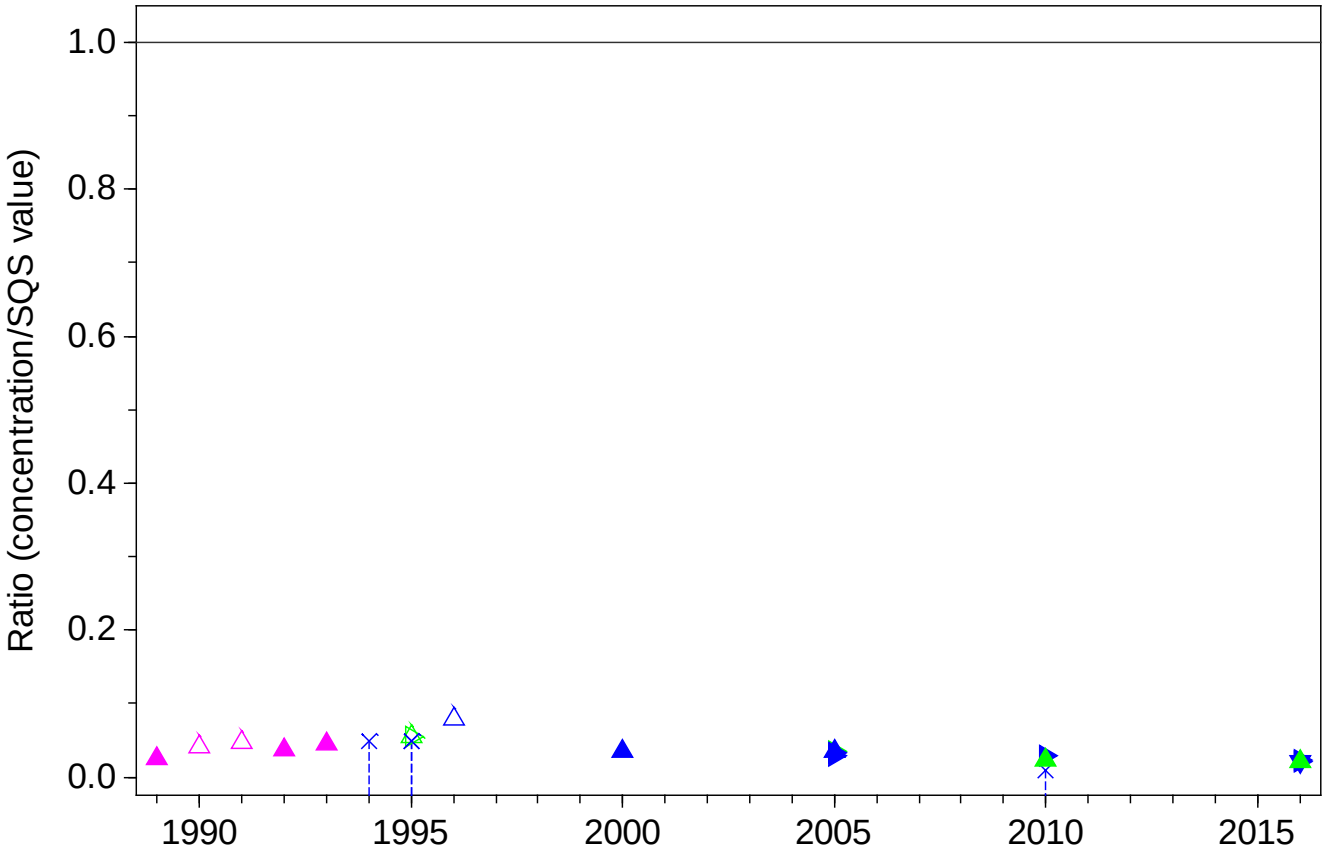
SQS quotient, Lead, Station 40



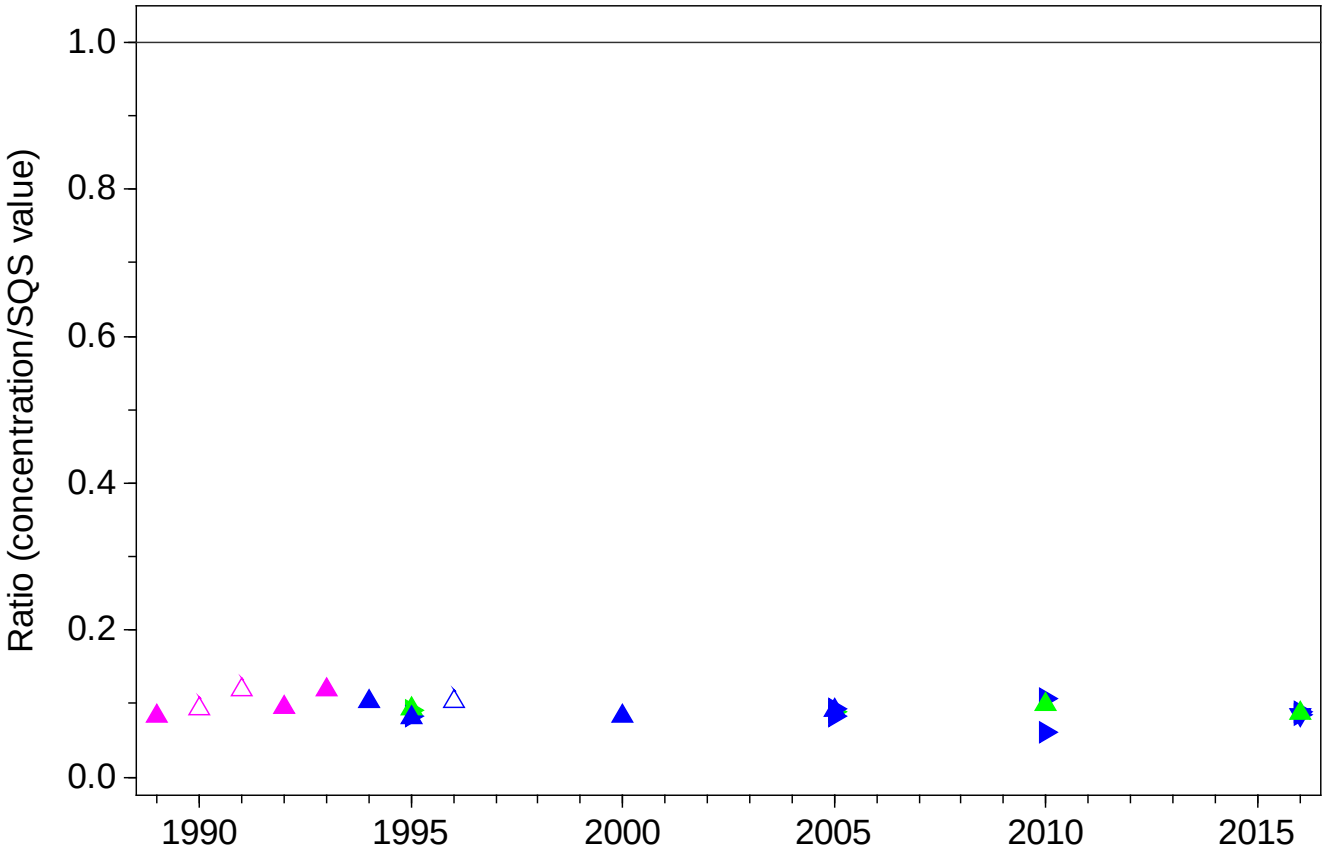
SQS quotient, Mercury, Station 40



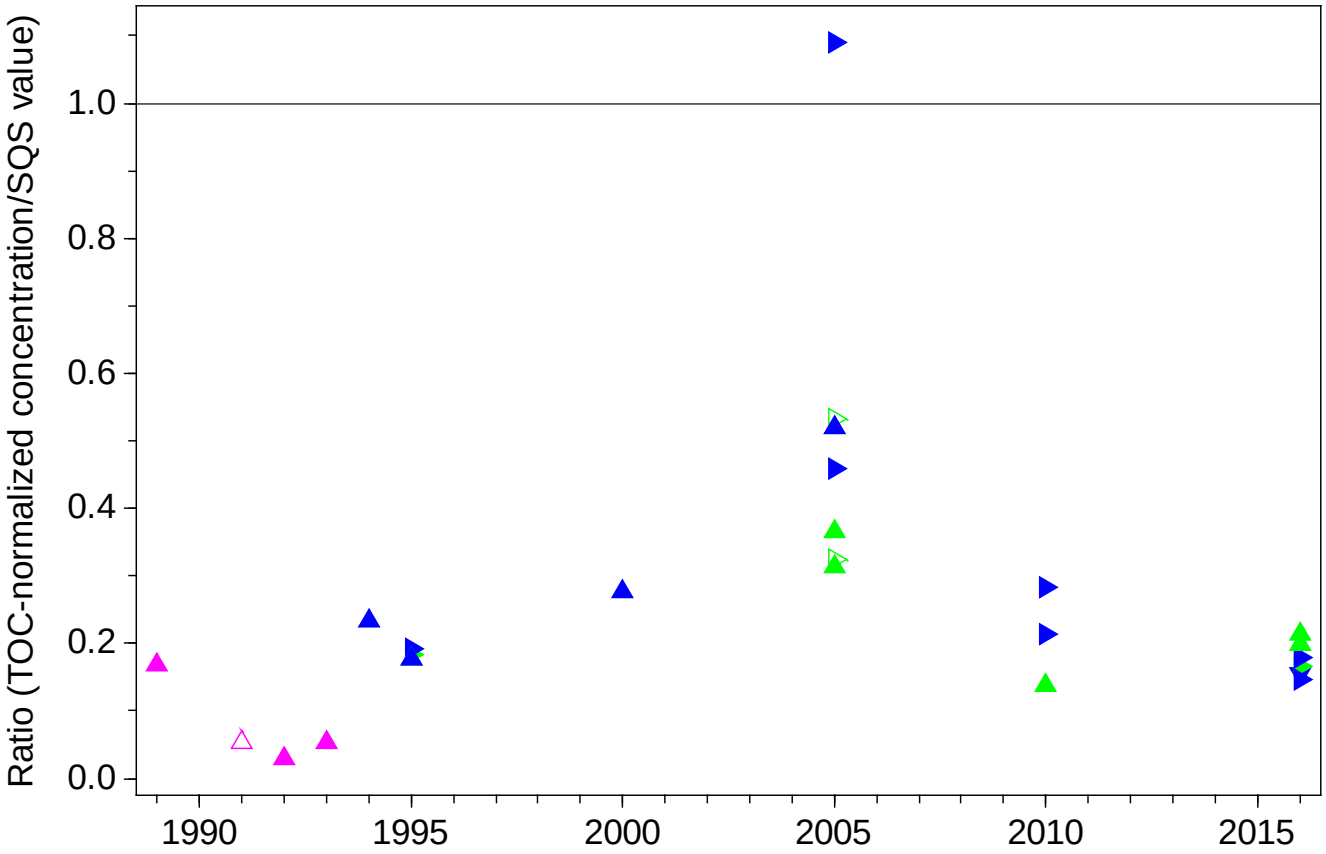
SQS quotient, Silver, Station 40



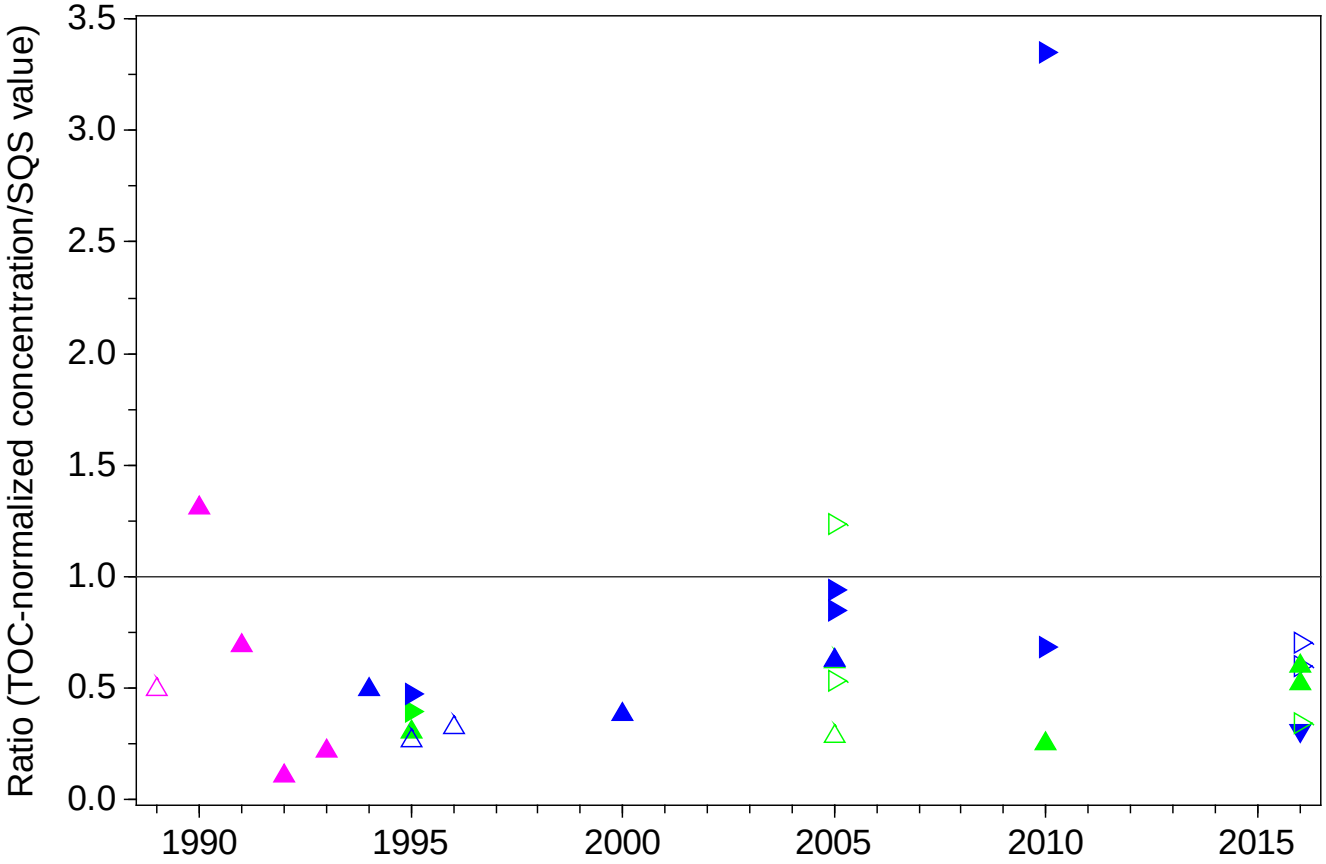
SQS quotient, Zinc, Station 40



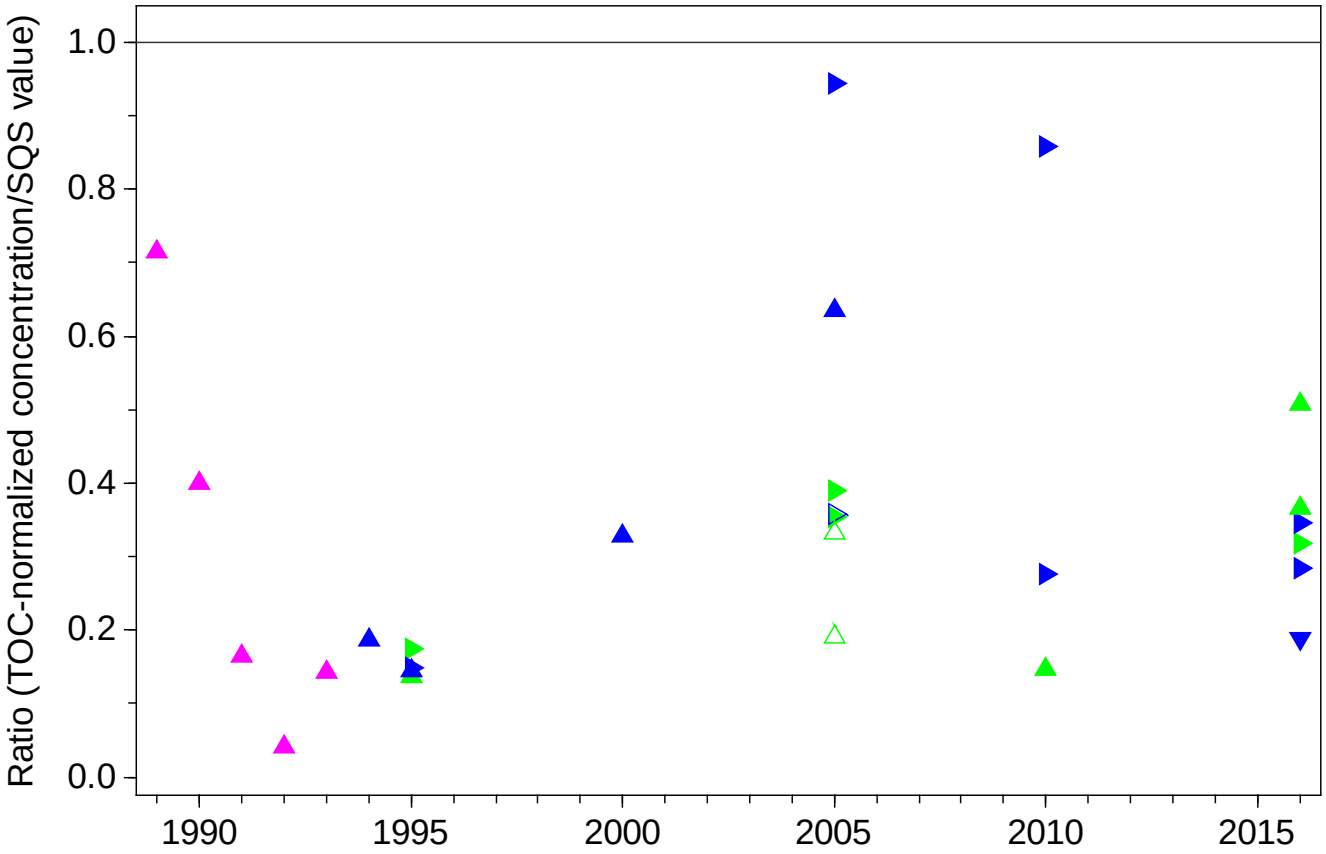
SQS quotient, 2-Methylnaphthalene, Station 40



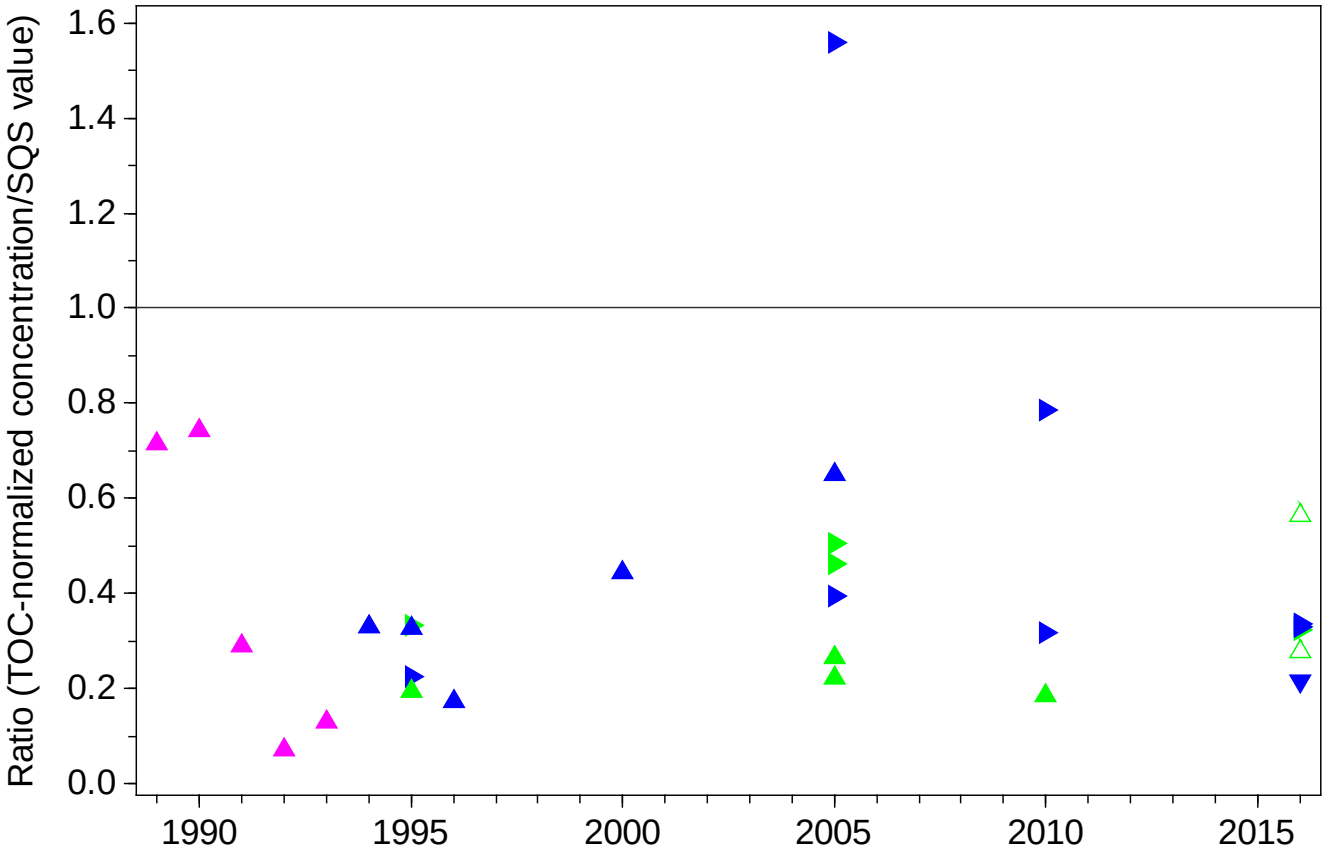
SQS quotient, Acenaphthene, Station 40



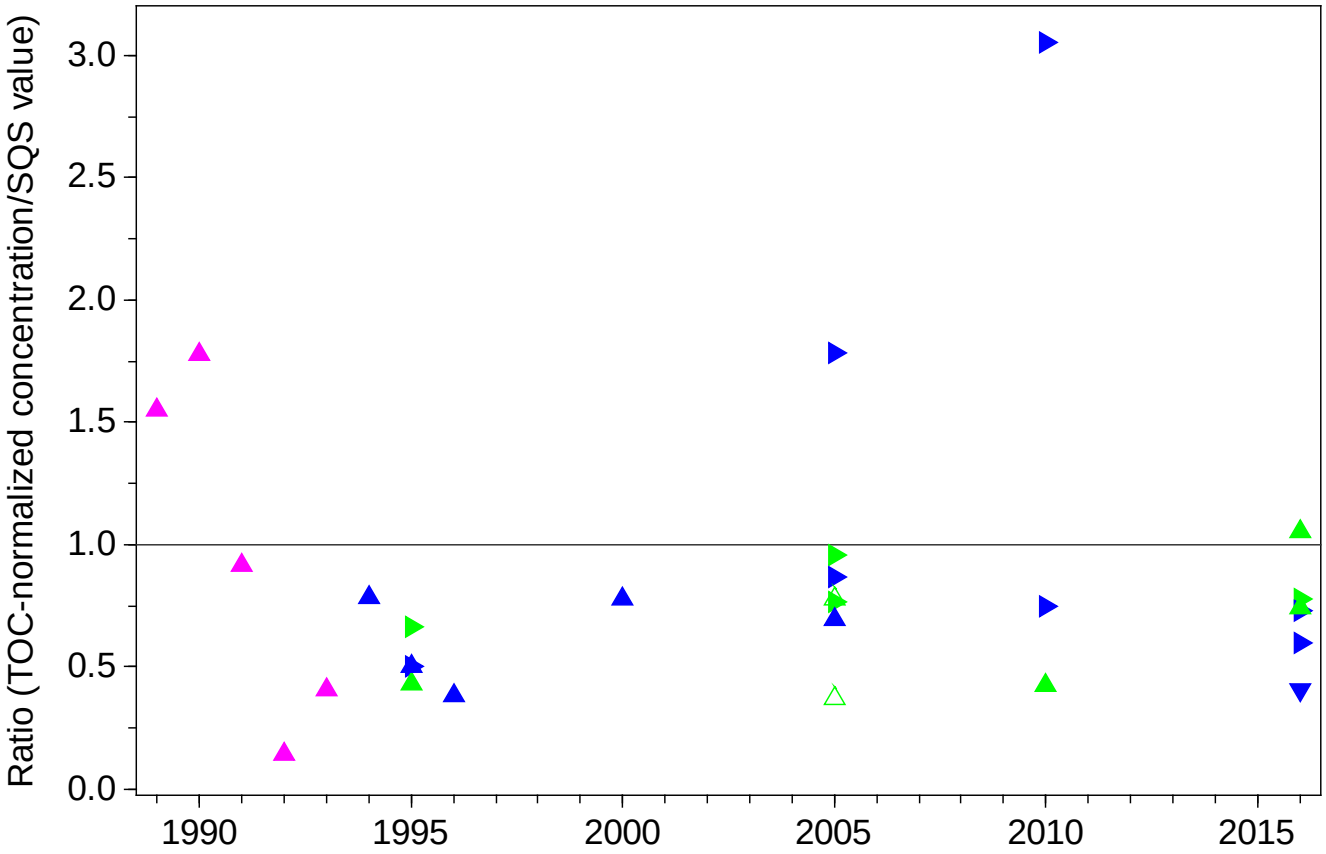
SQS quotient, Acenaphthylene, Station 40



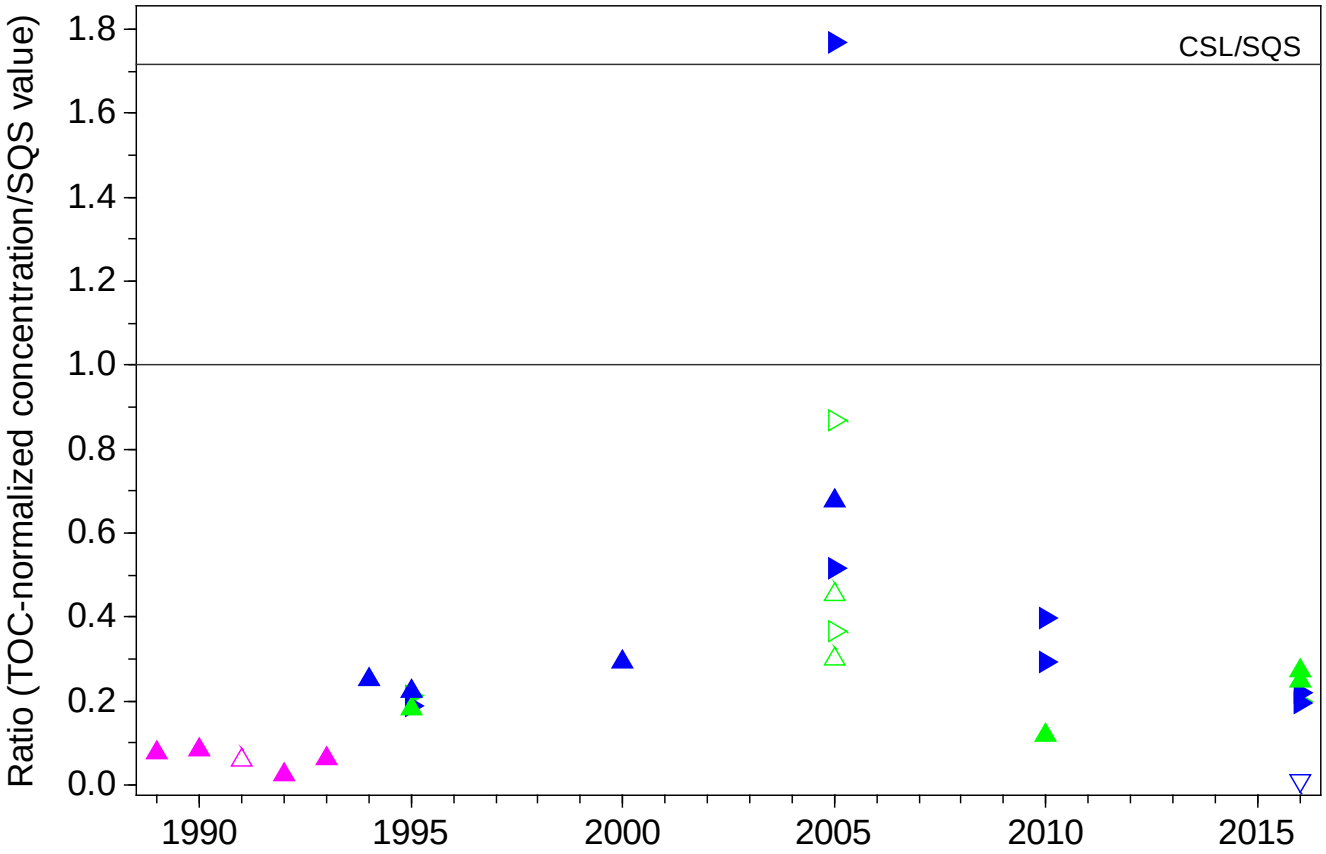
SQS quotient, Anthracene, Station 40



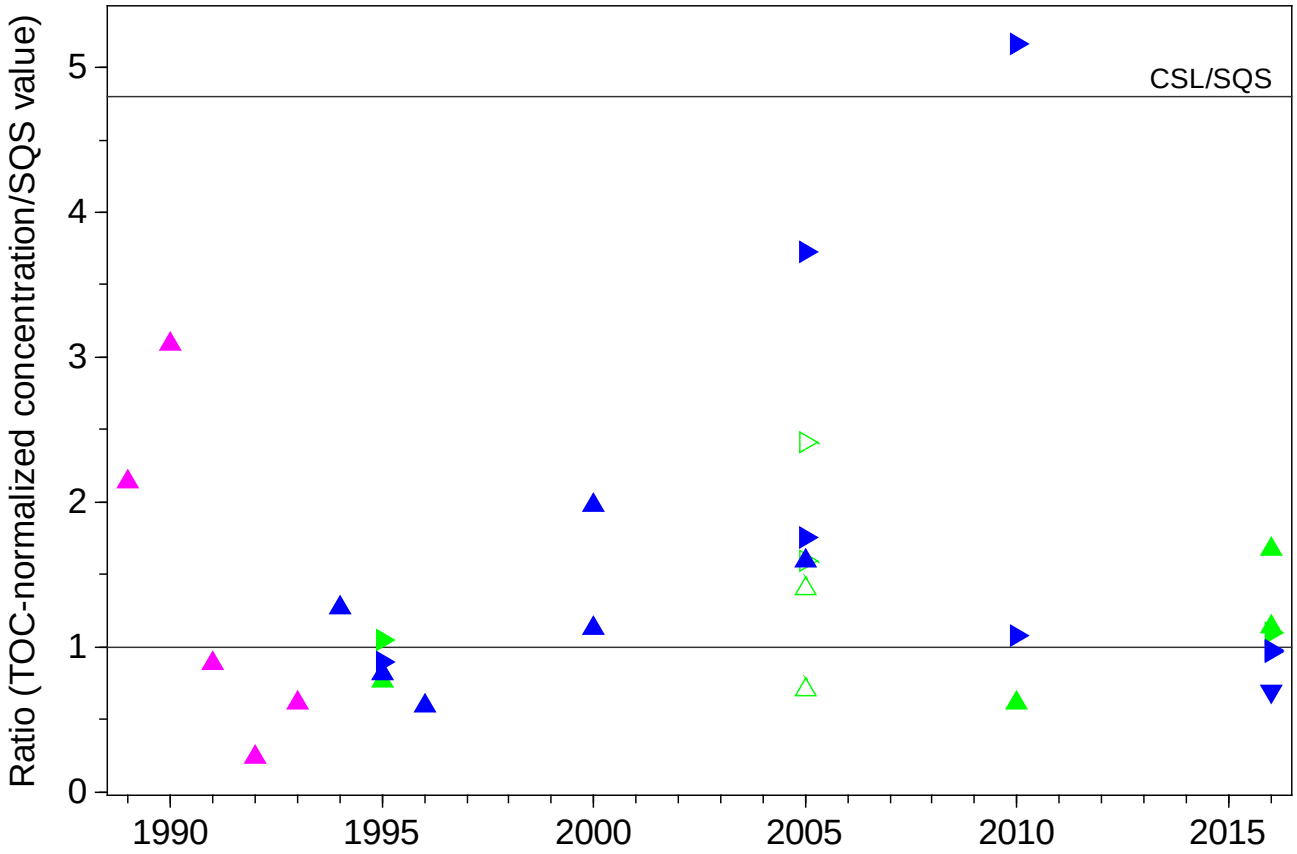
SQS quotient, Fluorene, Station 40



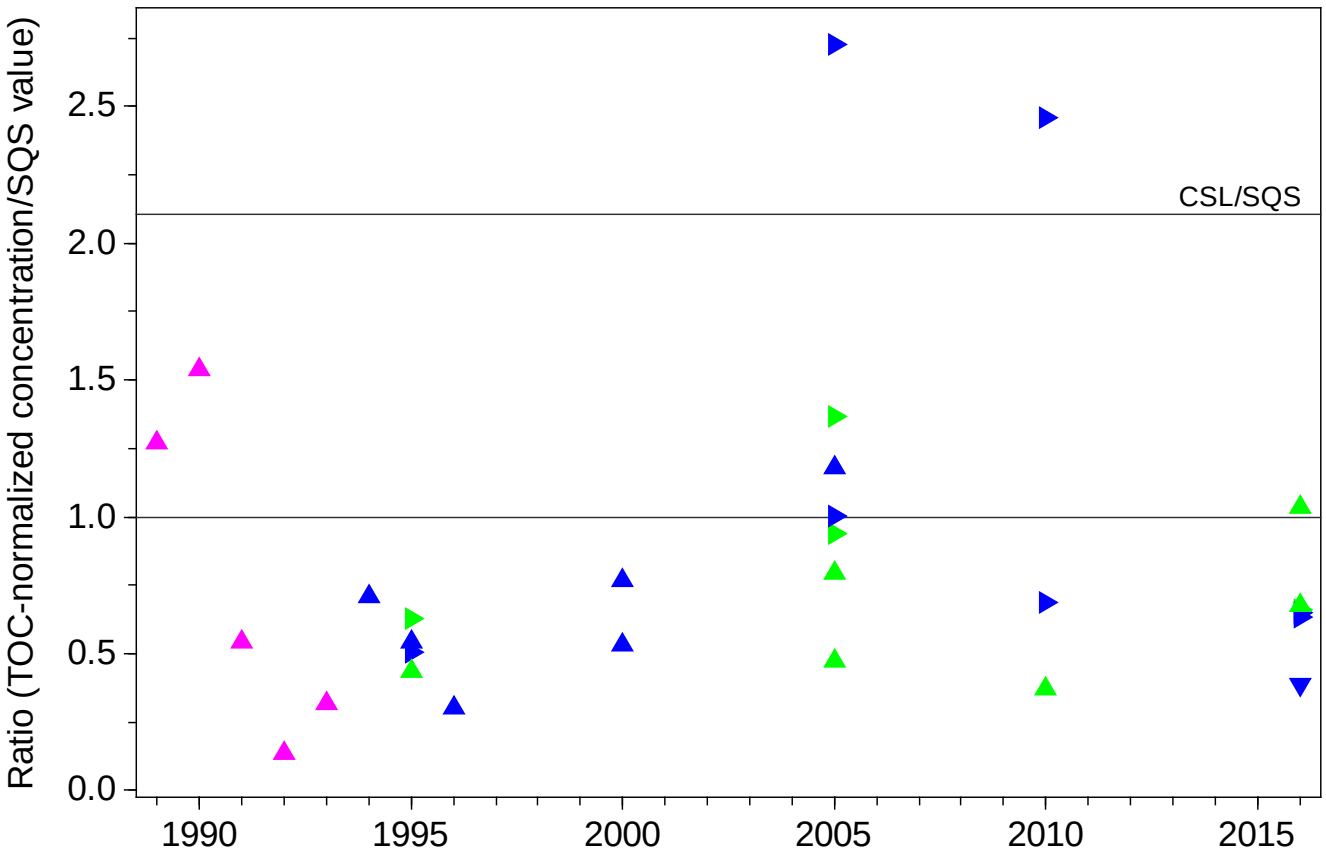
SQS quotient, Naphthalene, Station 40



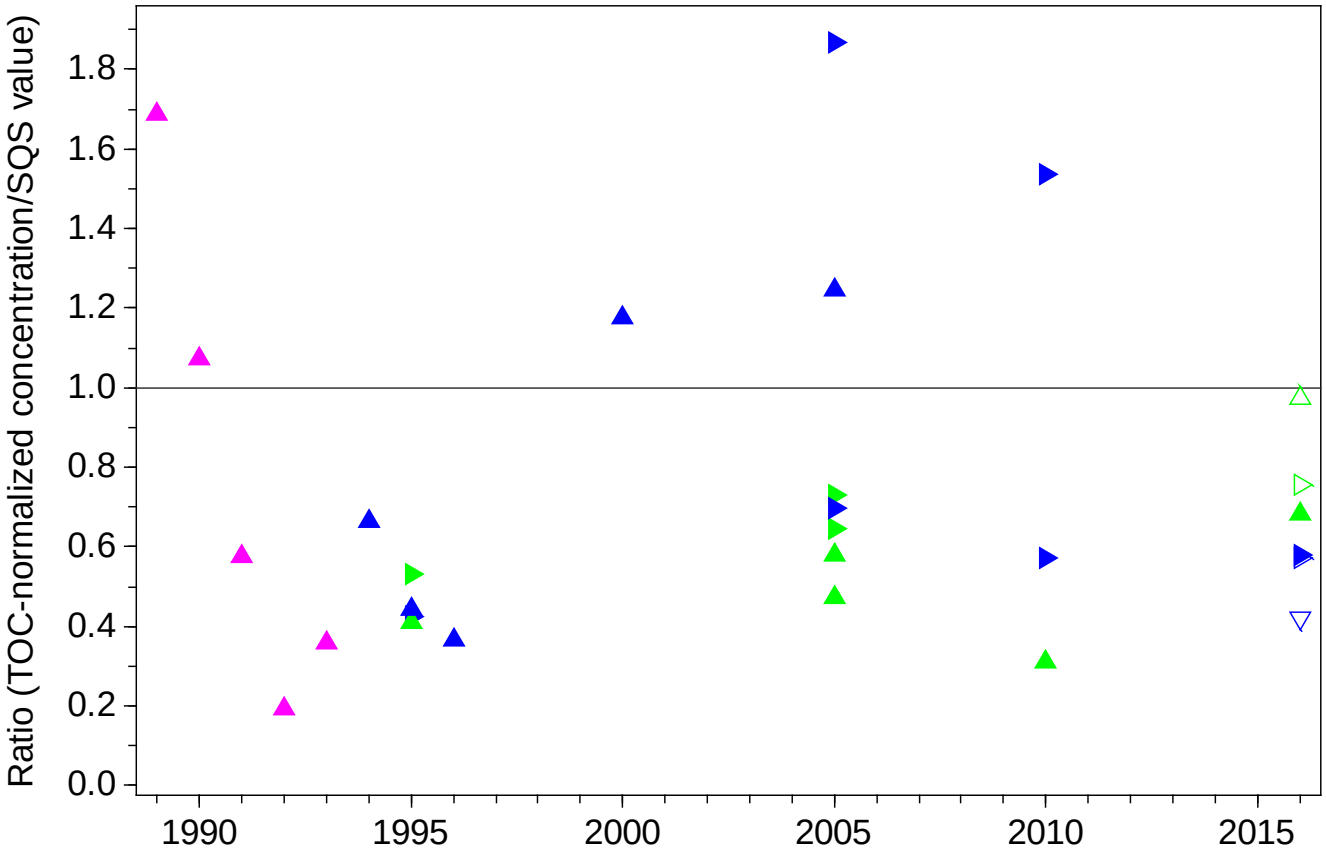
SQS quotient, Phenanthrene, Station 40



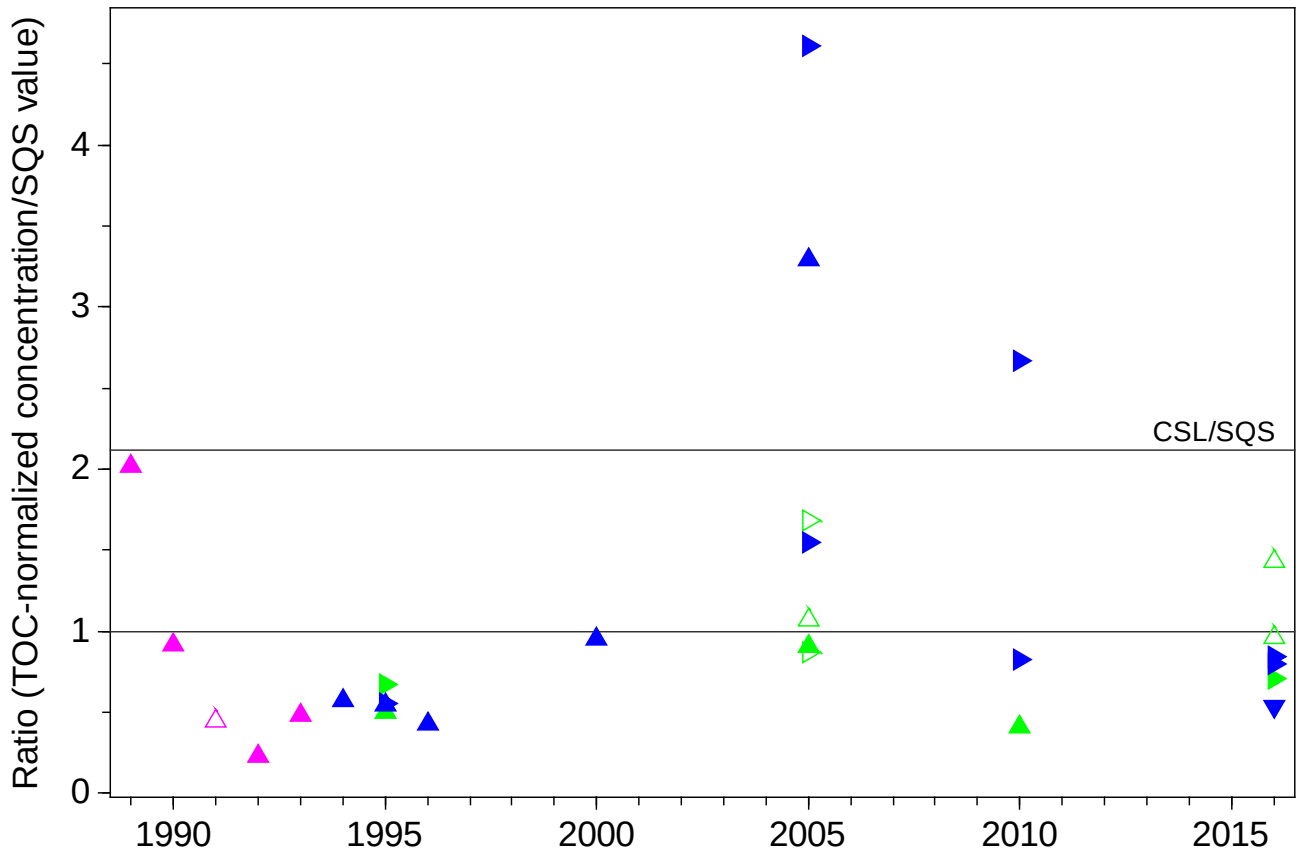
SQS quotient, Total LPAH, Station 40



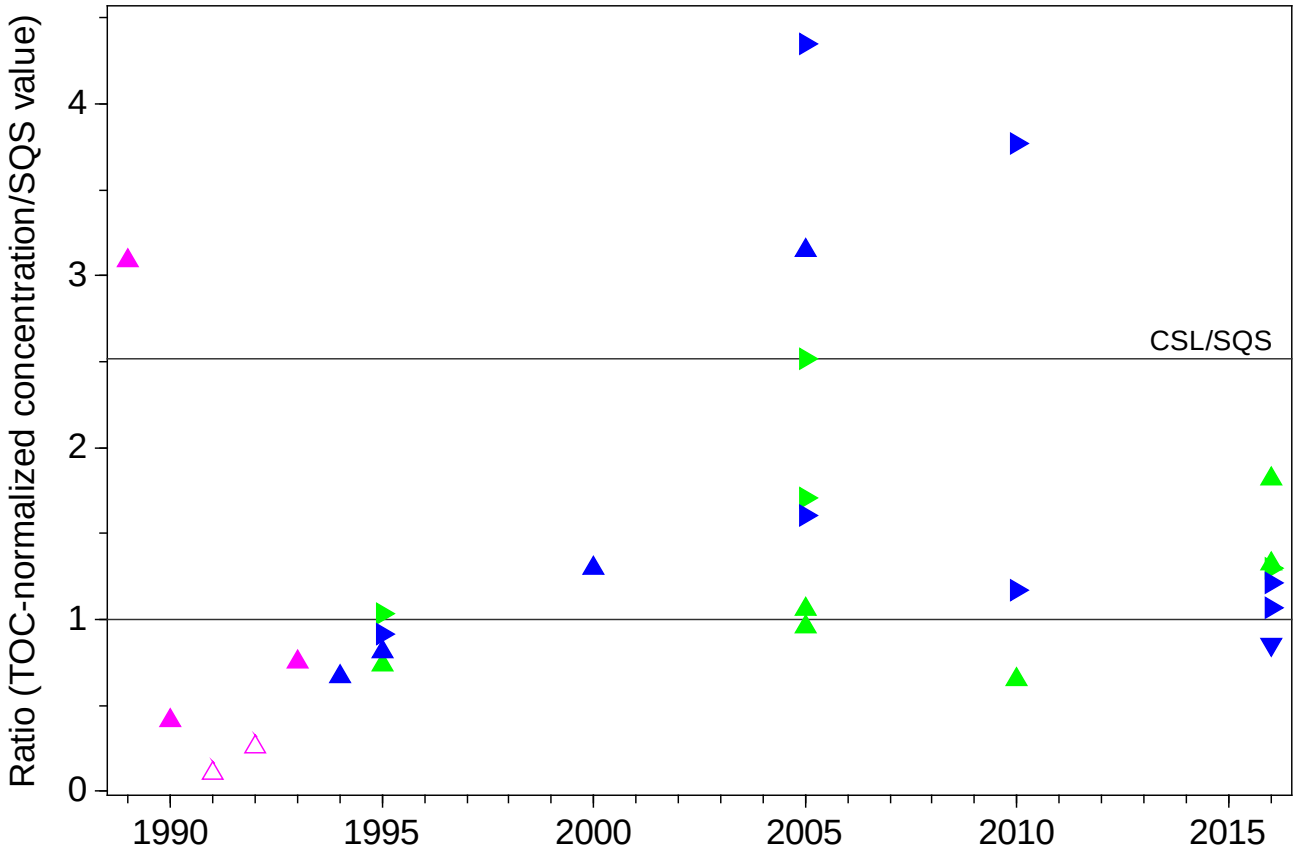
SQS quotient, Benzo(a)anthracene, Station 40



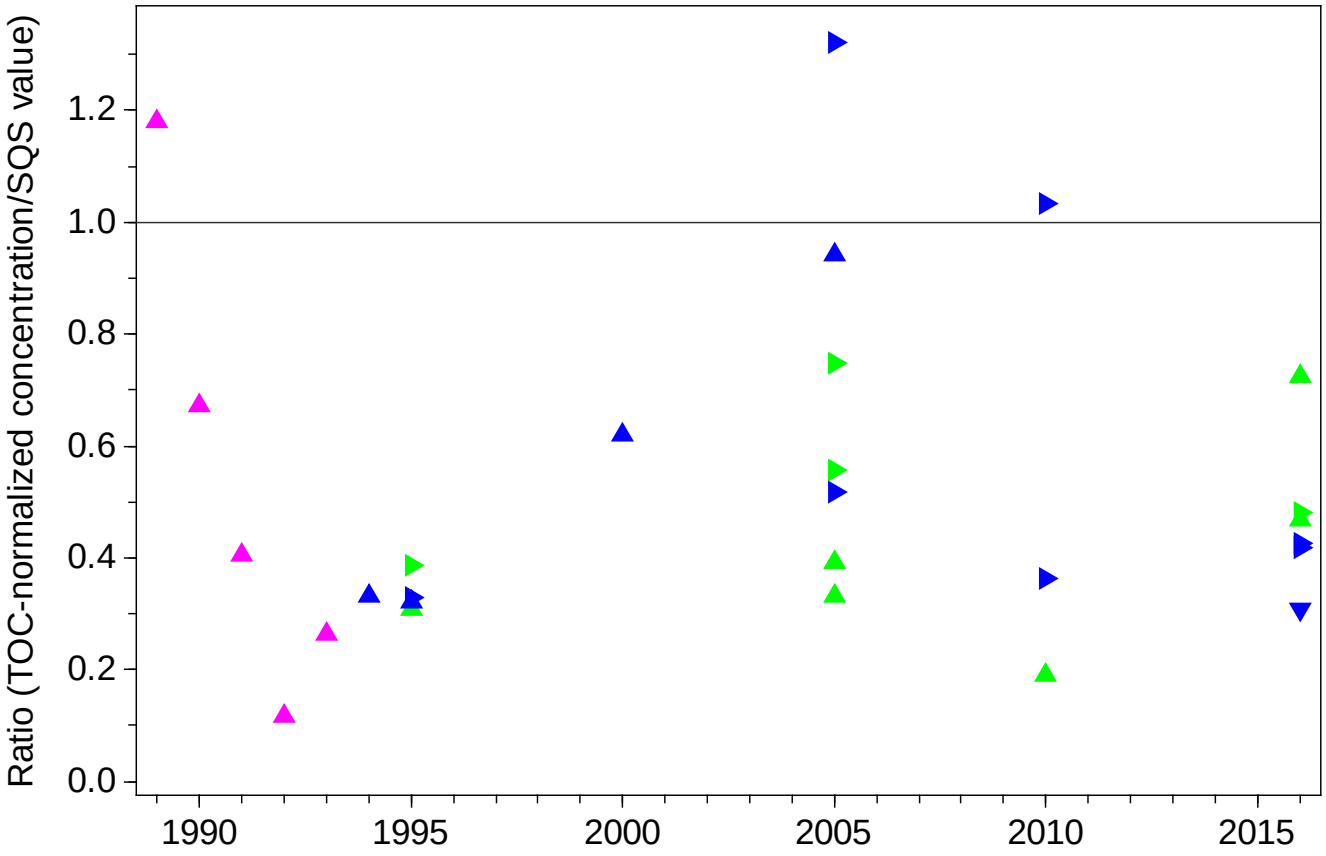
SQS quotient, Benzo(a)pyrene, Station 40



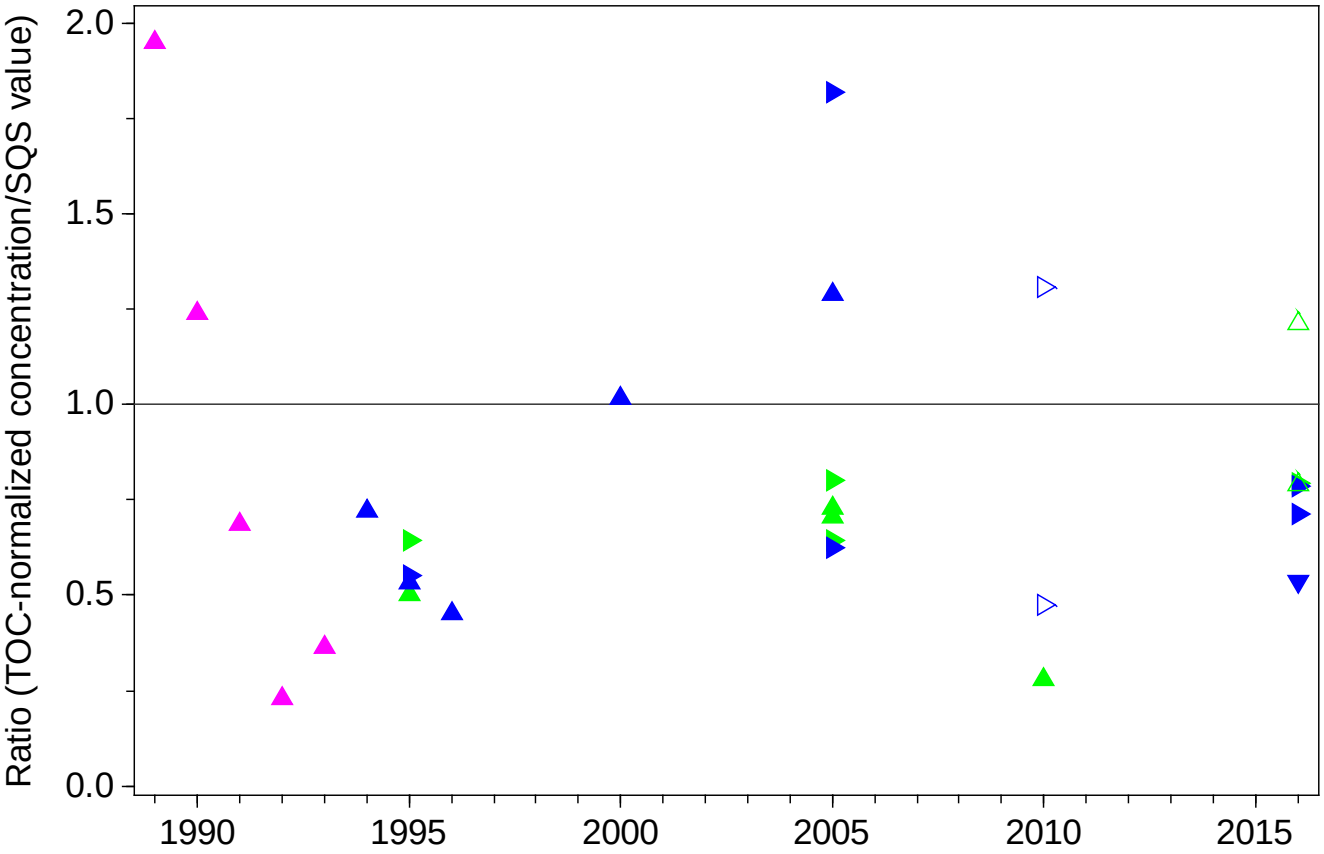
SQS quotient, Benzo(g,h,i)perylene, Station 40



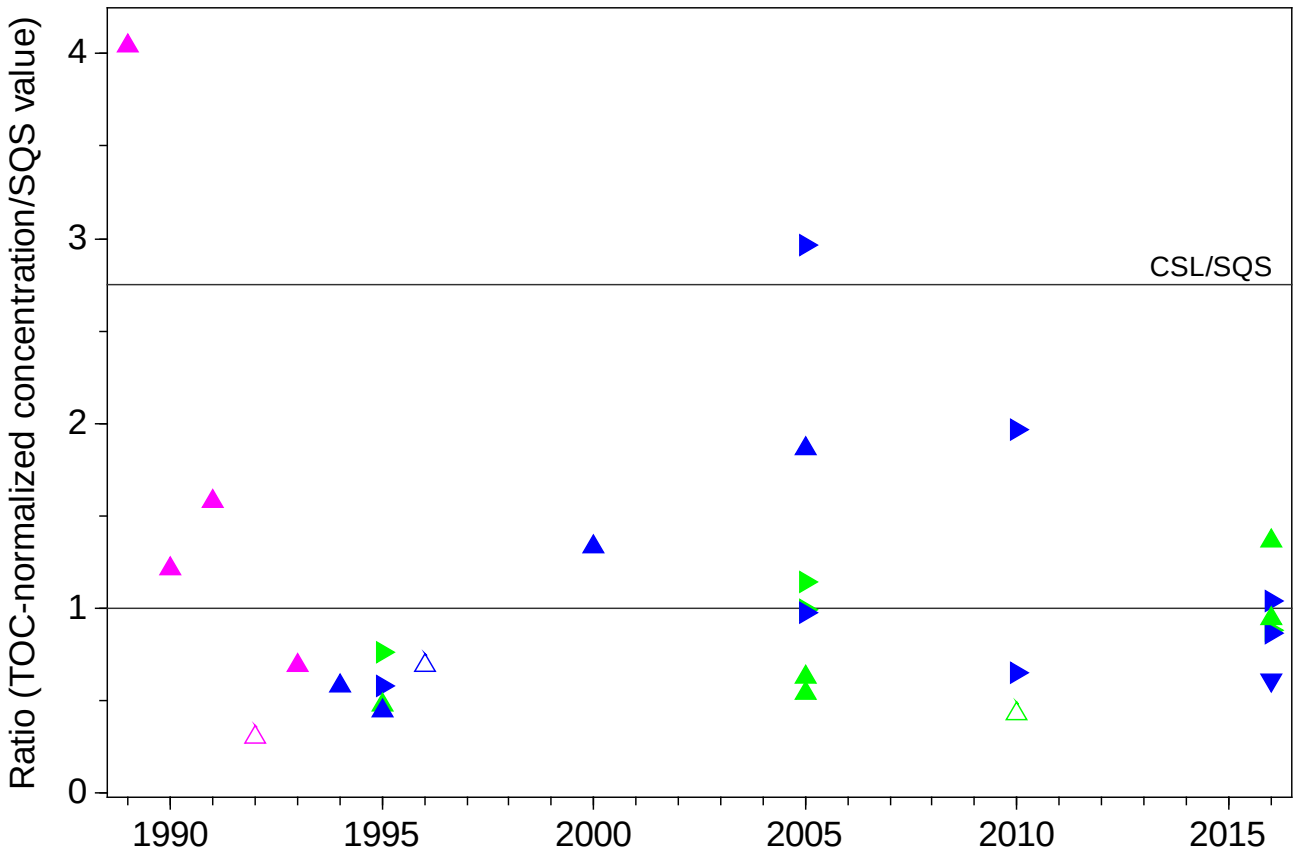
SQS quotient, Total Benzofluoranthenes, Station 40



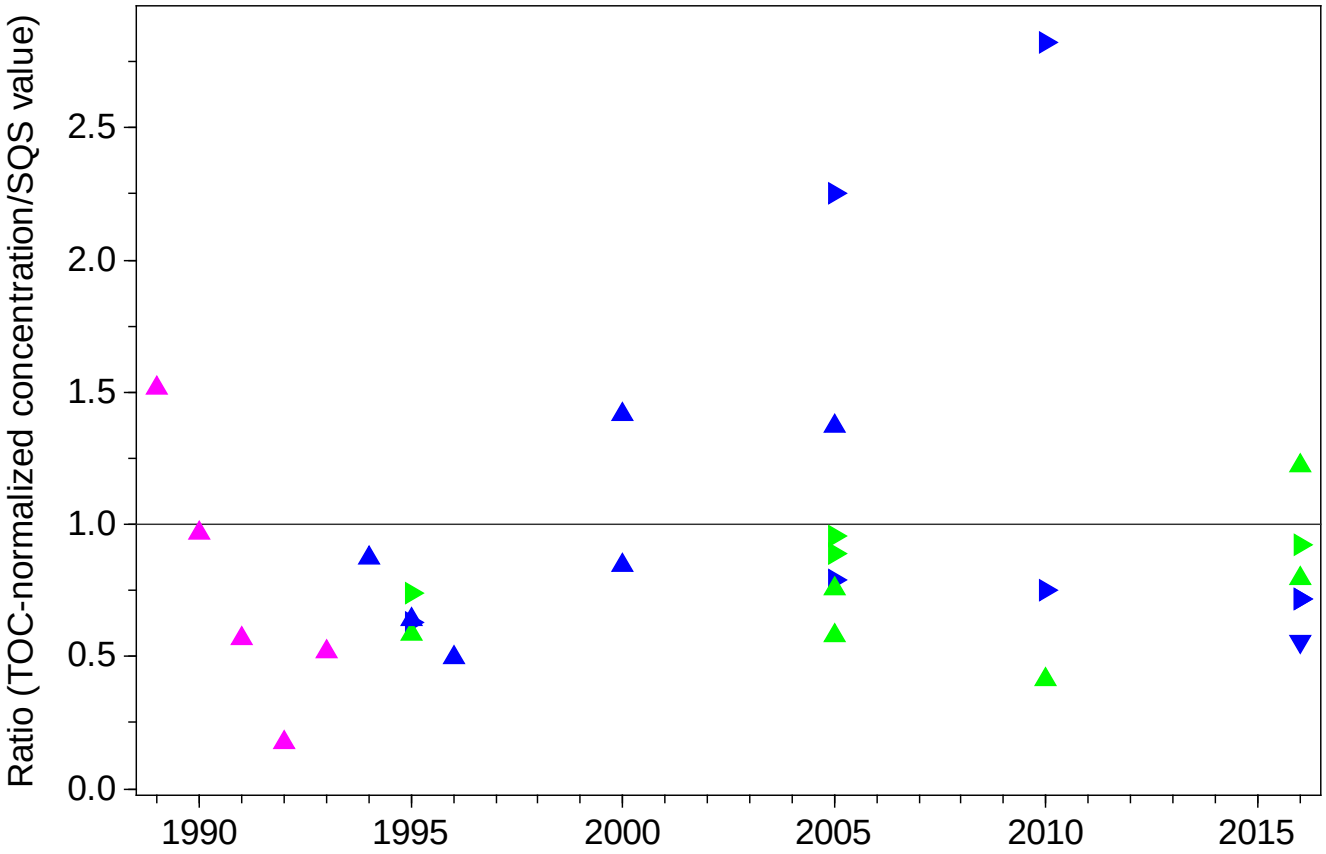
SQS quotient, Chrysene, Station 40



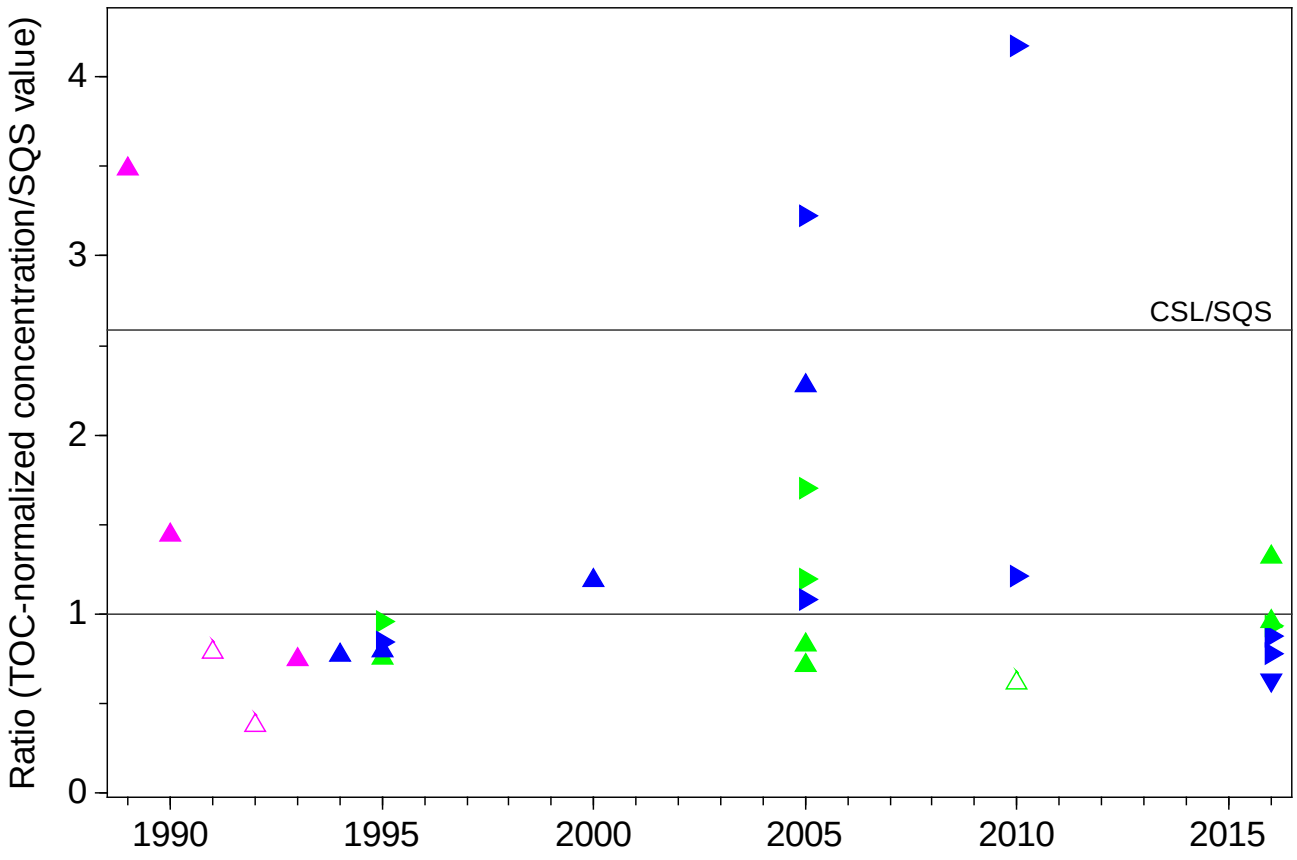
SQS quotient, Dibenzo(a,h)anthracene, Station 40



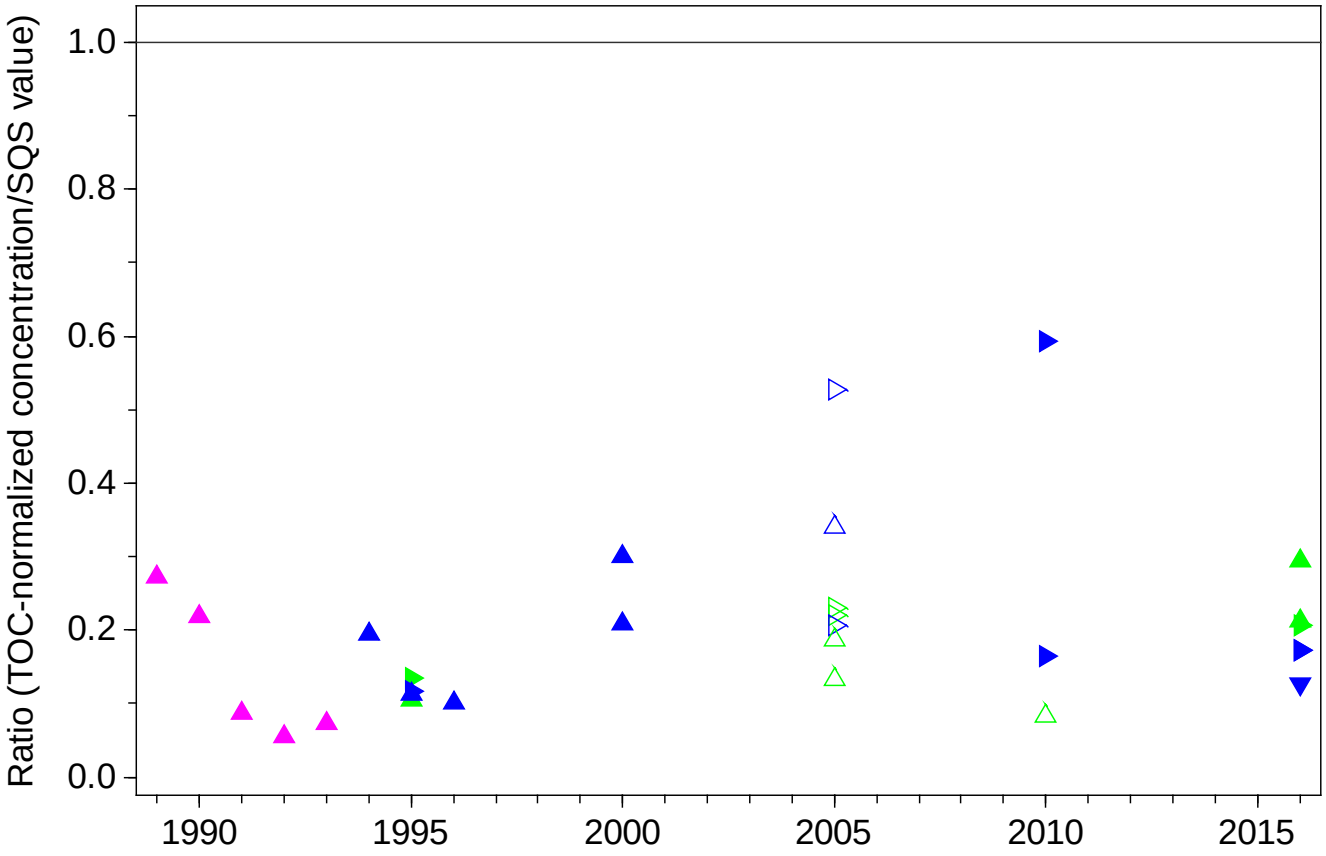
SQS quotient, Fluoranthene, Station 40



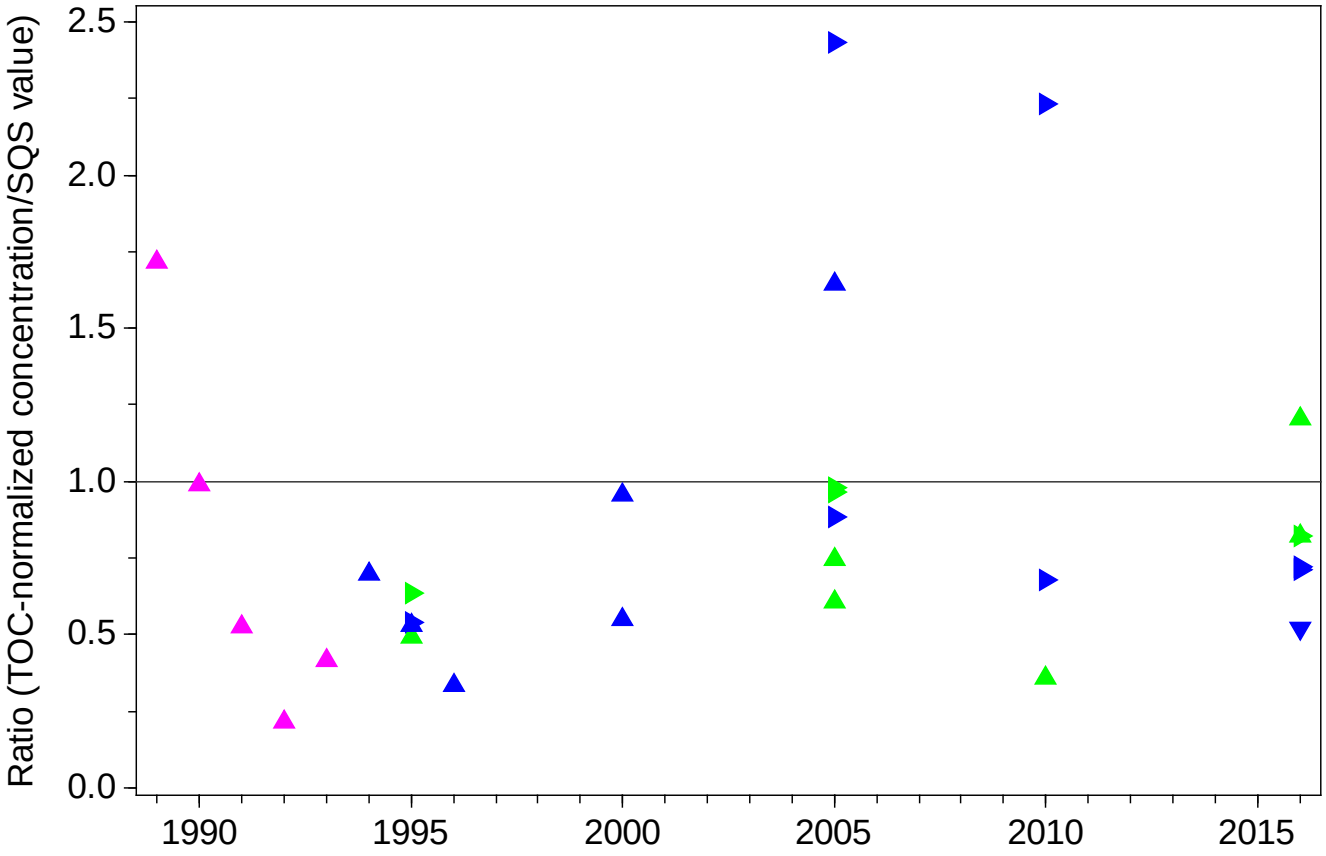
SQS quotient, Indeno(1,2,3-c,d)pyrene, Station 40



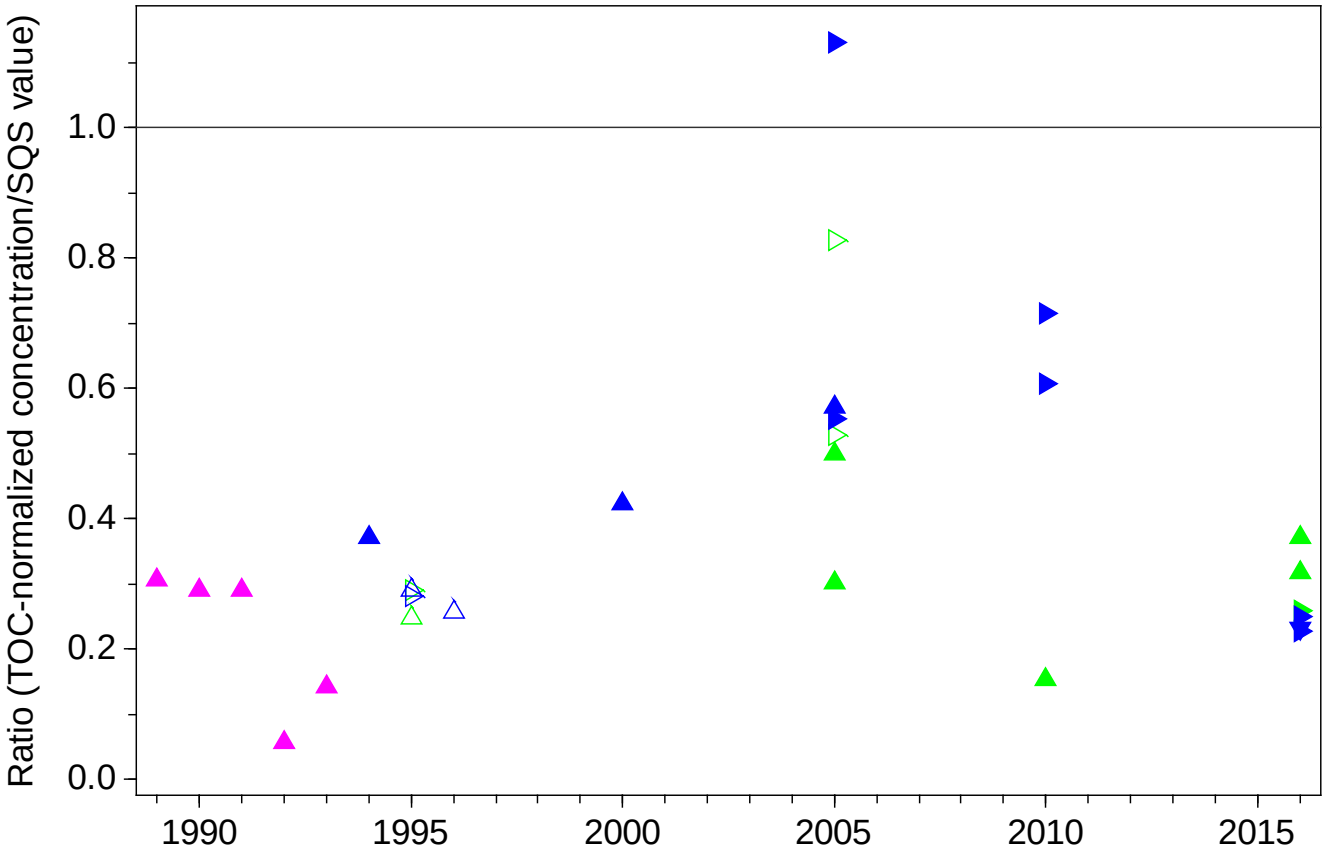
SQS quotient, Pyrene, Station 40



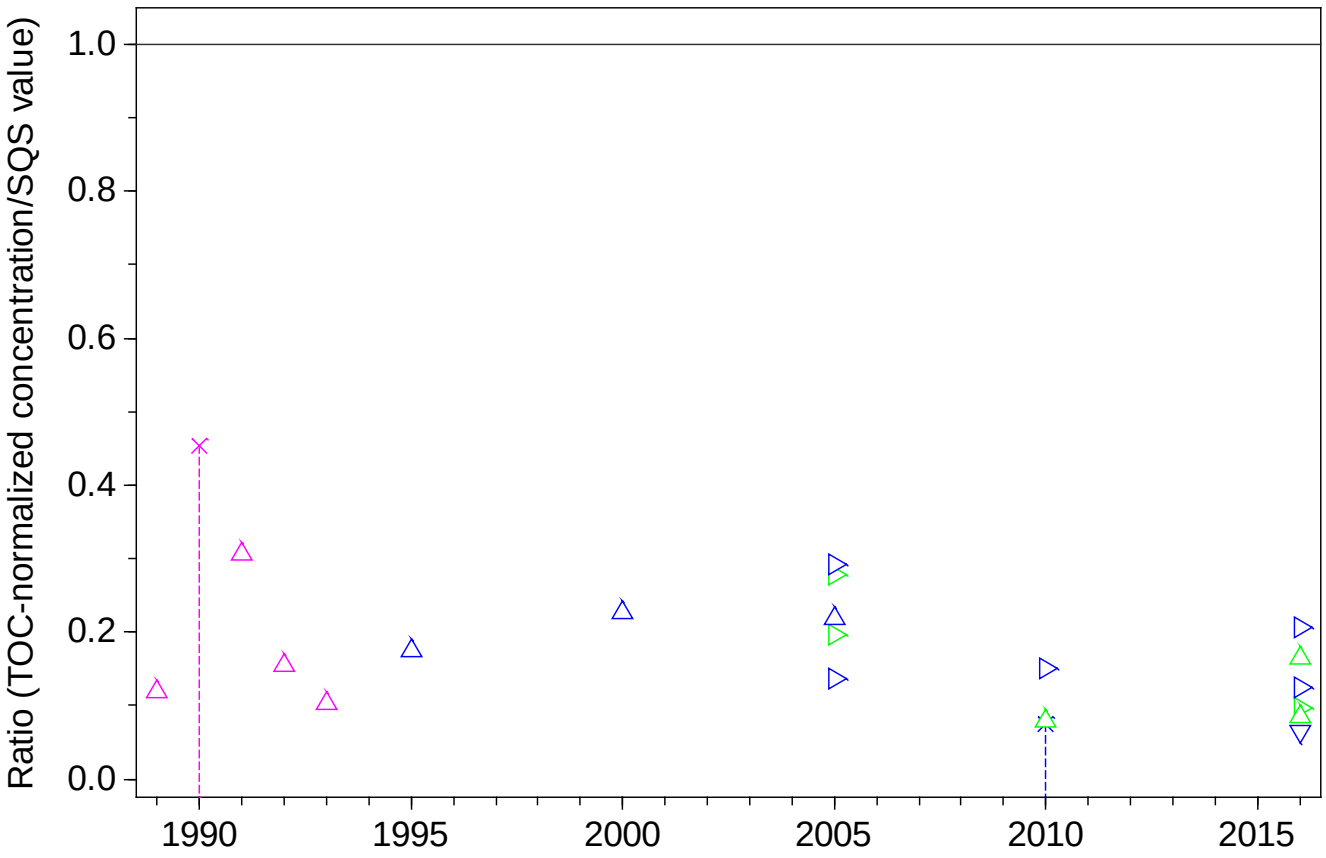
SQS quotient, Total HPAH, Station 40



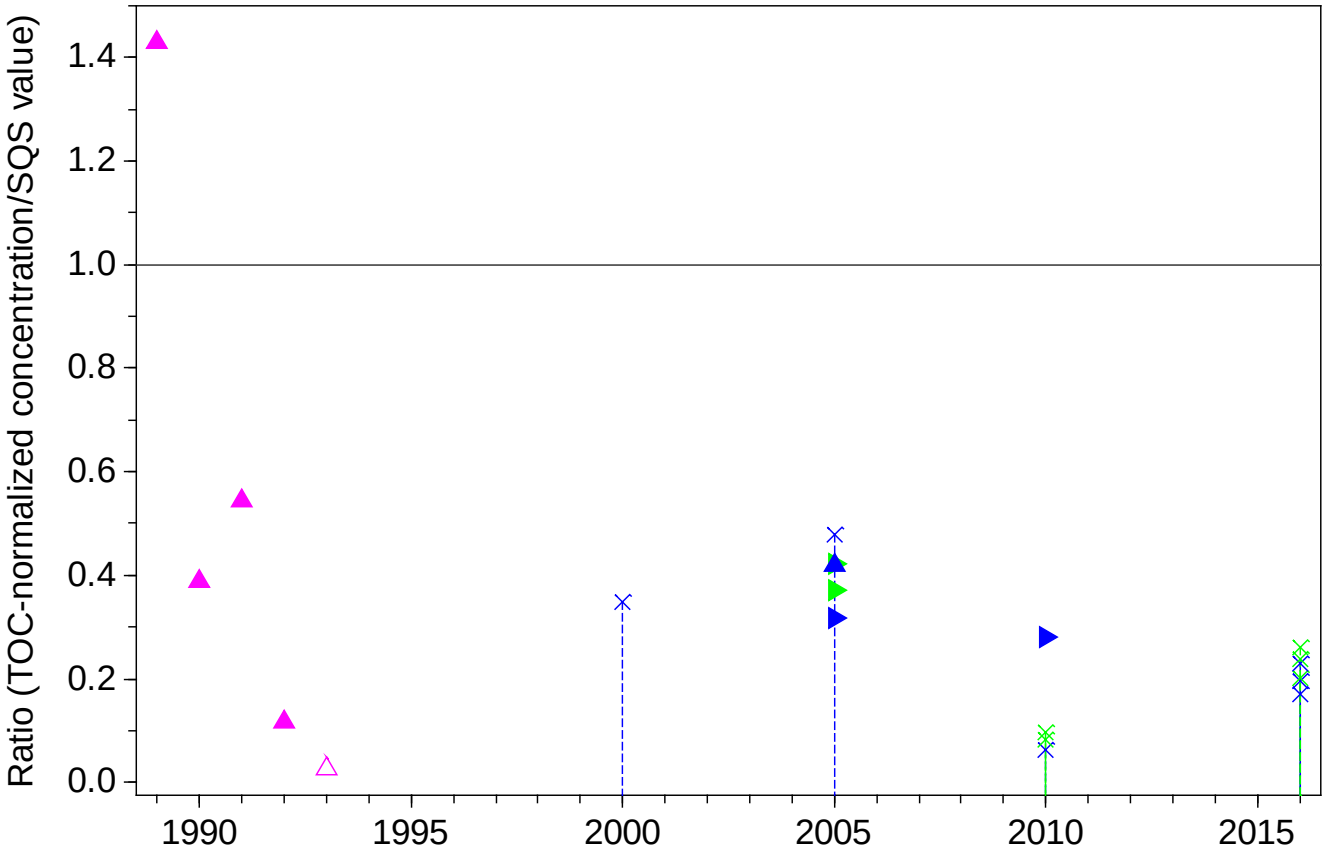
SQS quotient, Dibenzofuran, Station 40



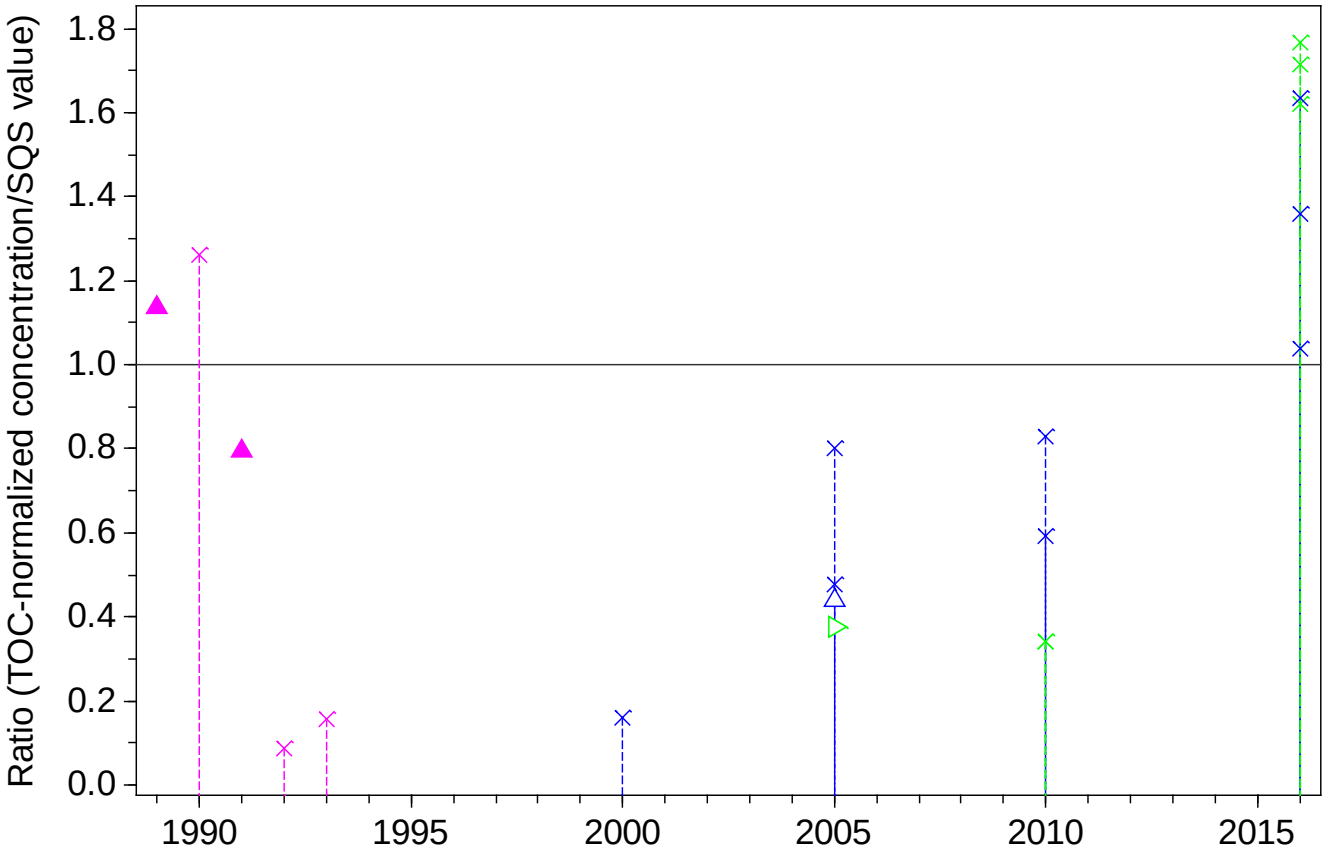
SQS quotient, Total Aroclors, Station 40



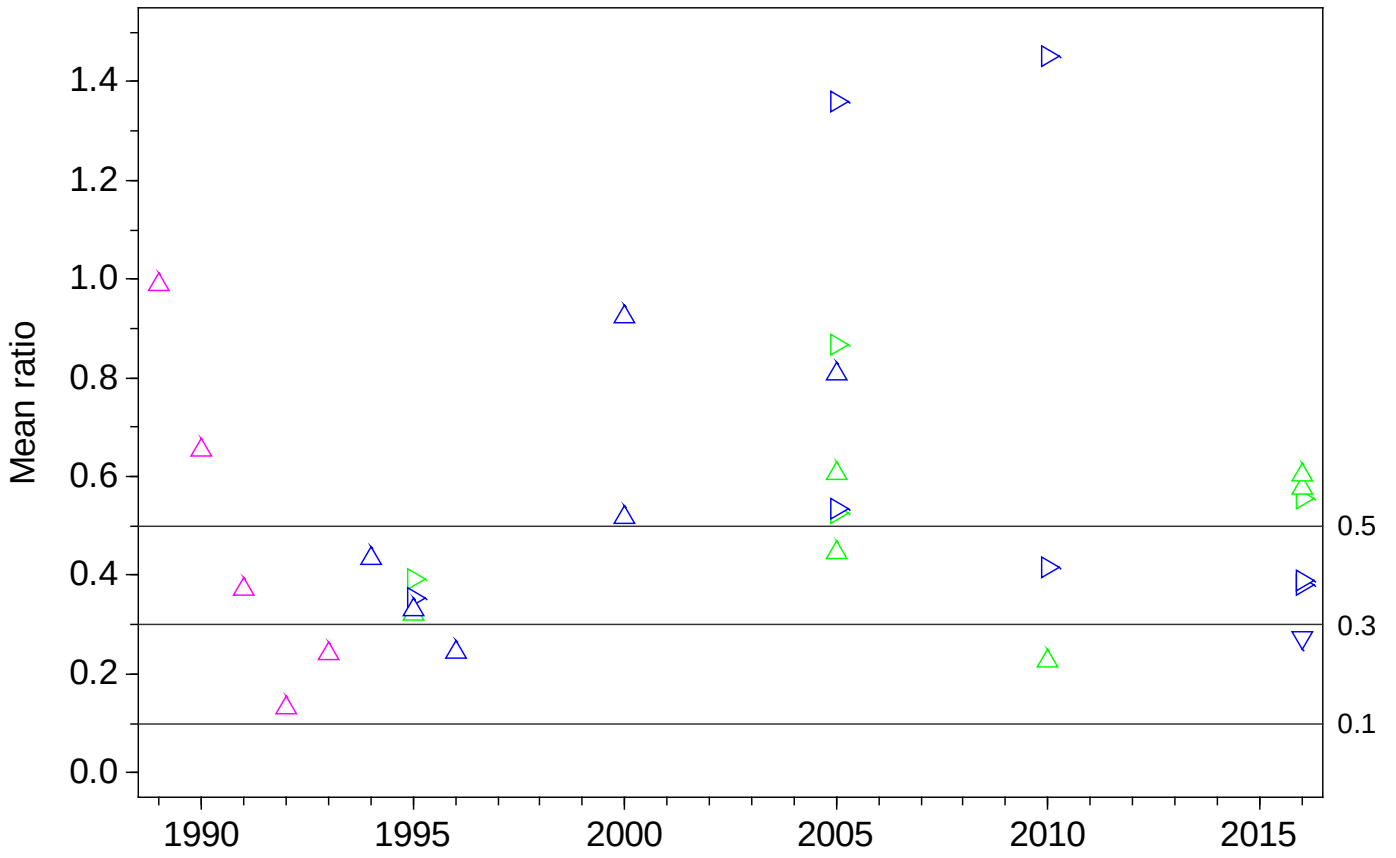
SQS quotient, Bis(2-ethylhexyl)phthalate, Station 40



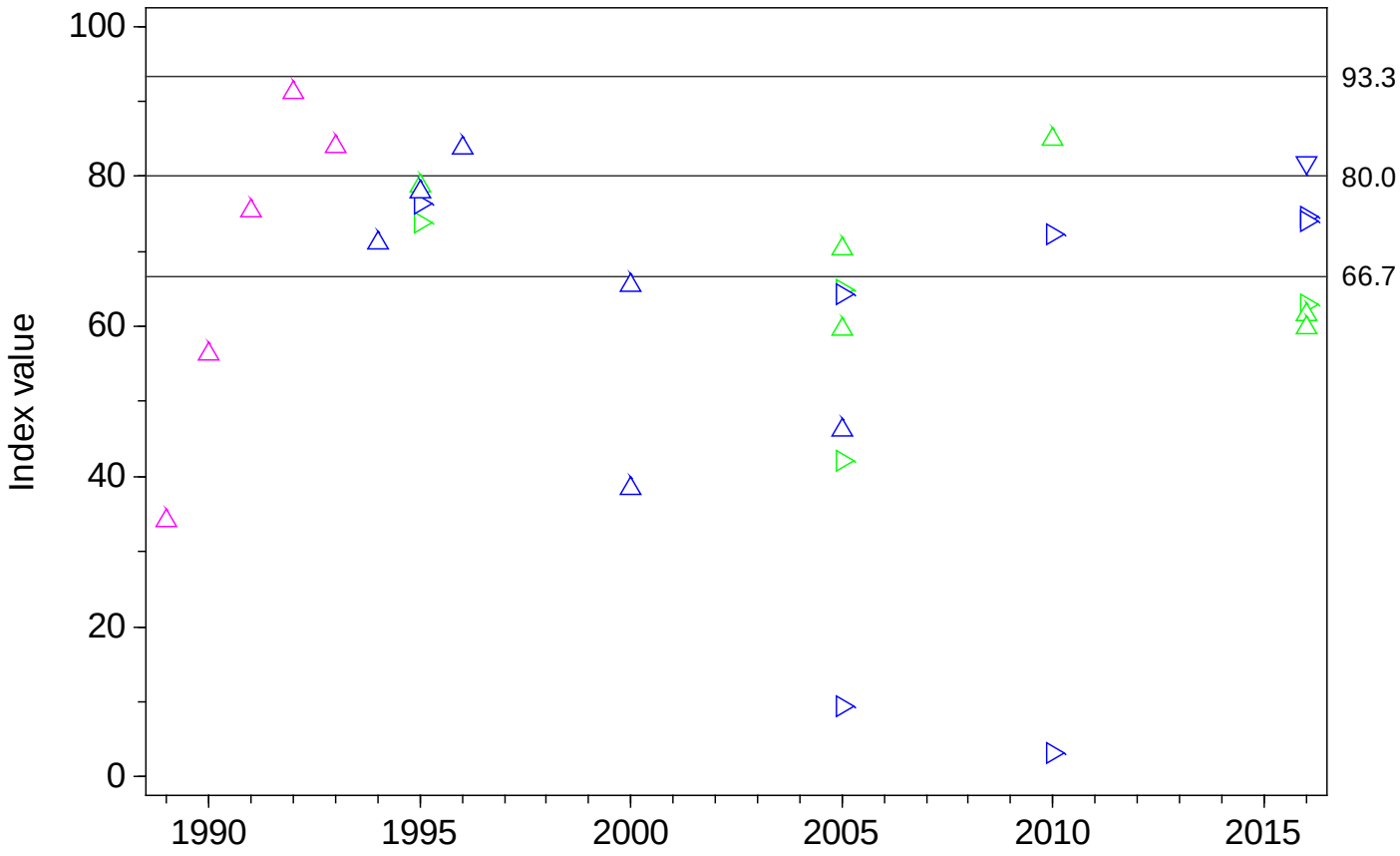
SQS quotient, Butylbenzylphthalate, Station 40



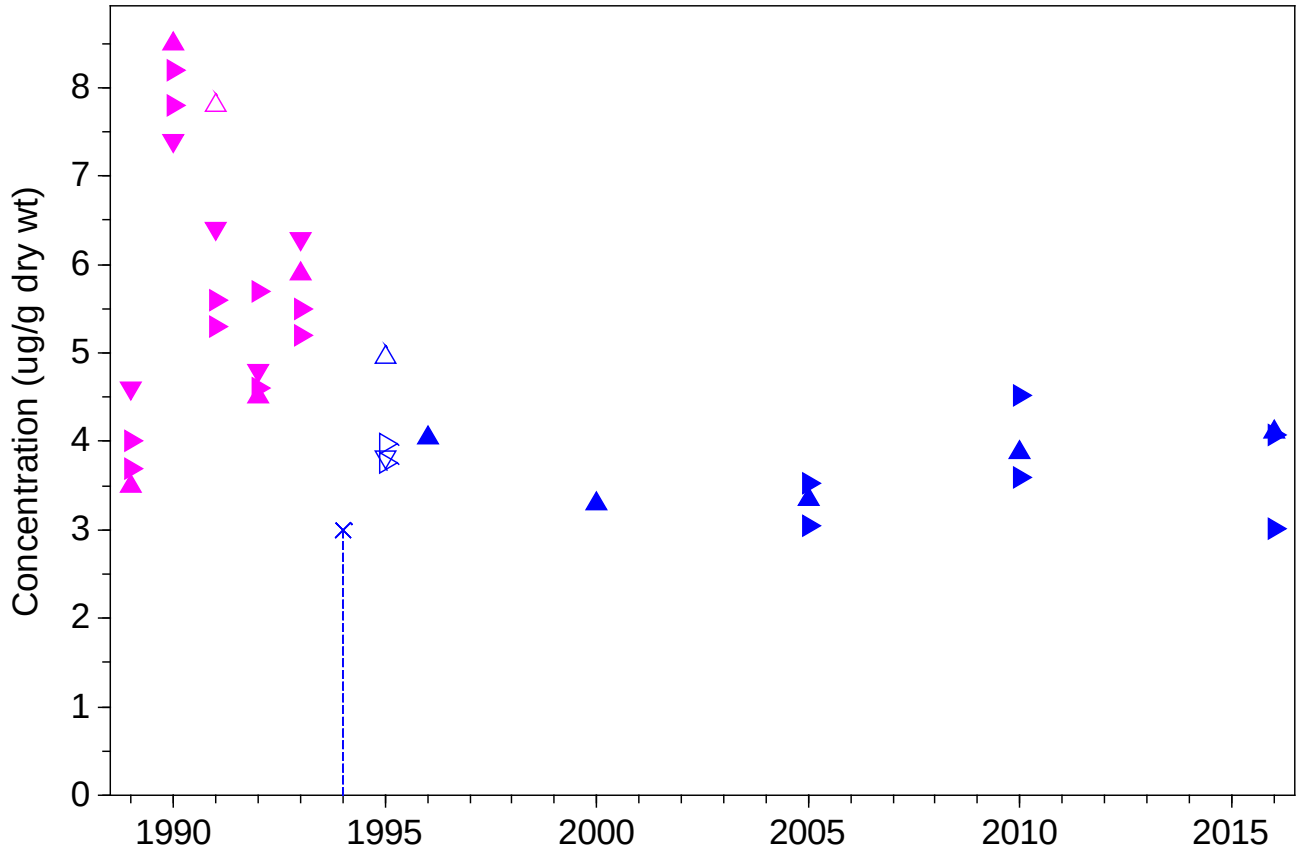
Mean SQS quotient, SCI SQS (no PAH totals), Station 40



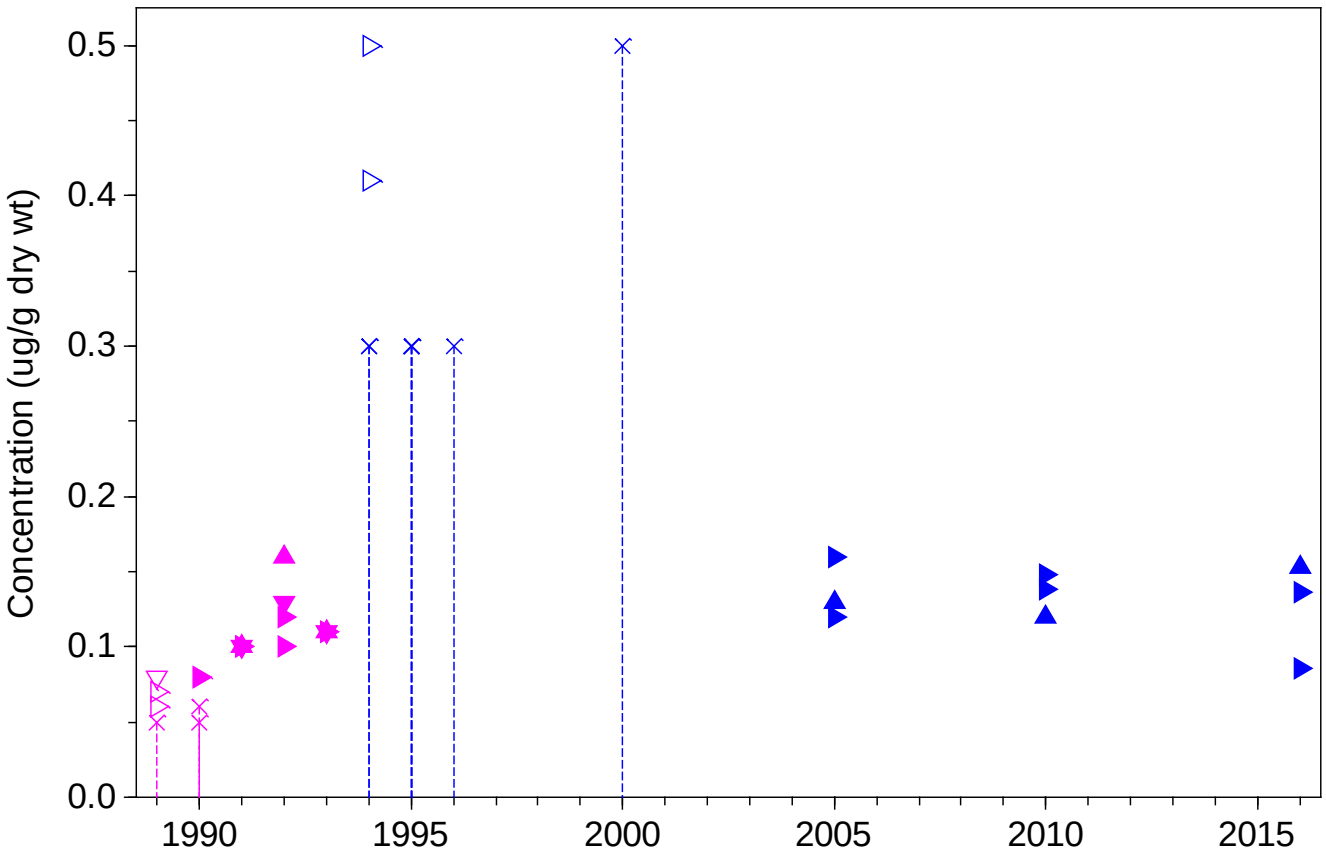
Sediment Chemistry Index, Station 40



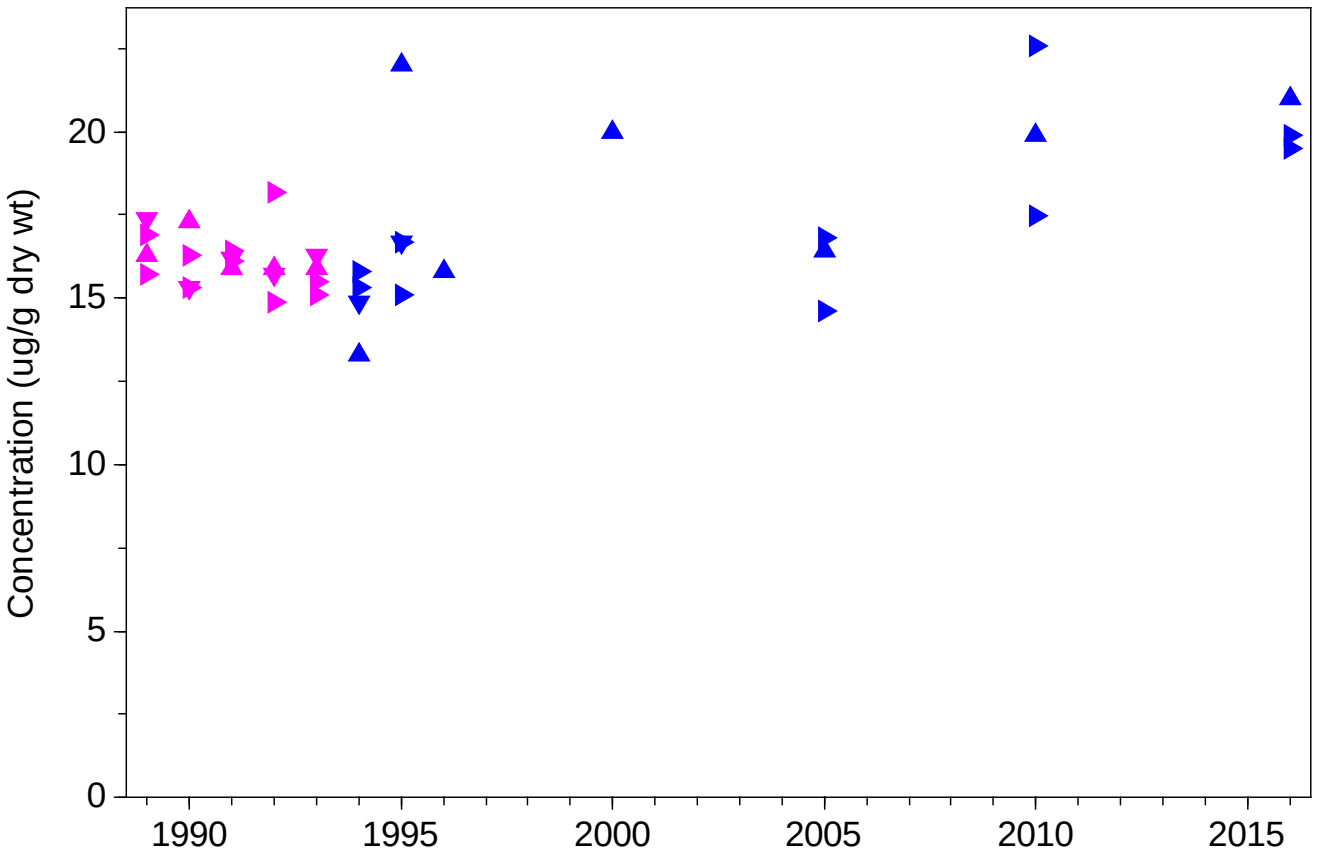
Arsenic, Station 44



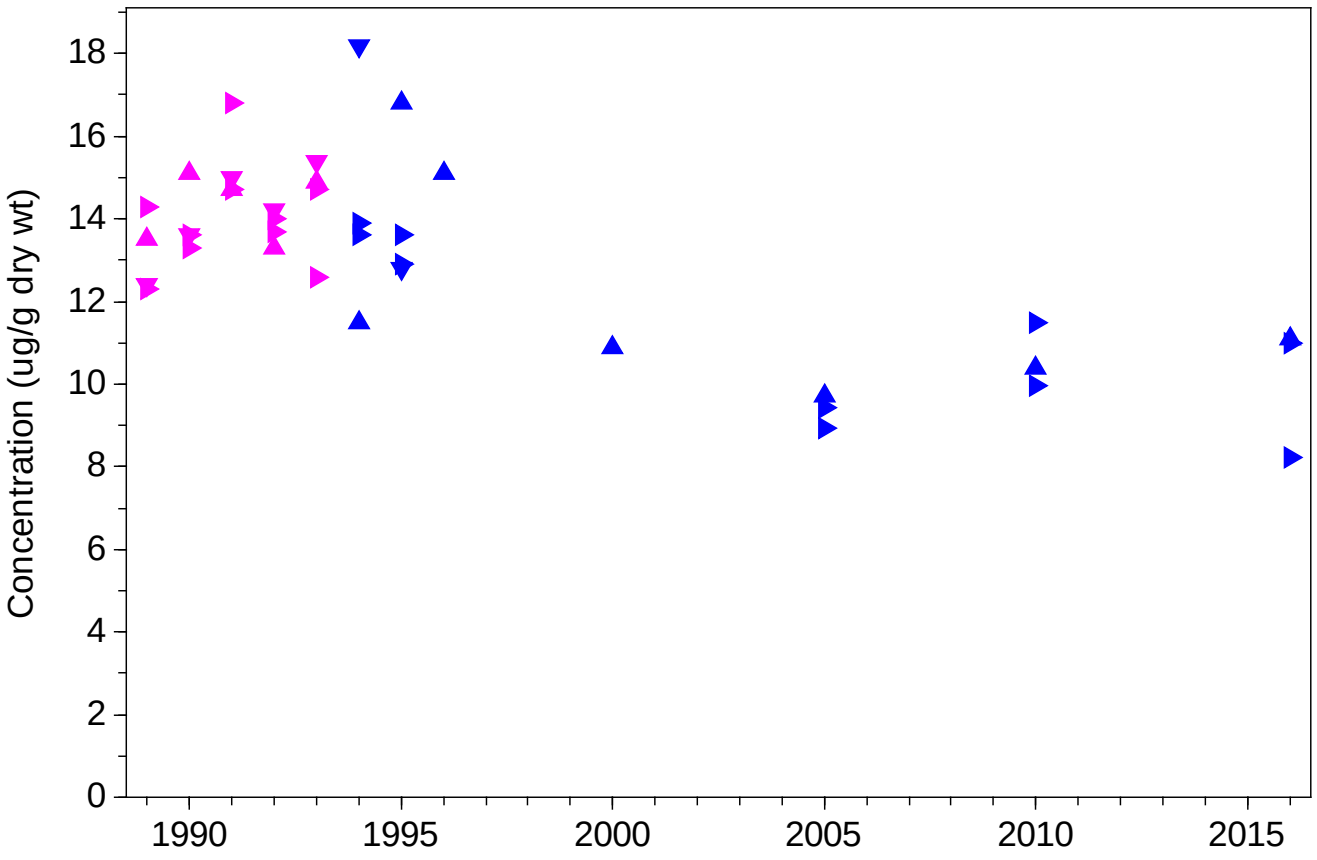
Cadmium, Station 44



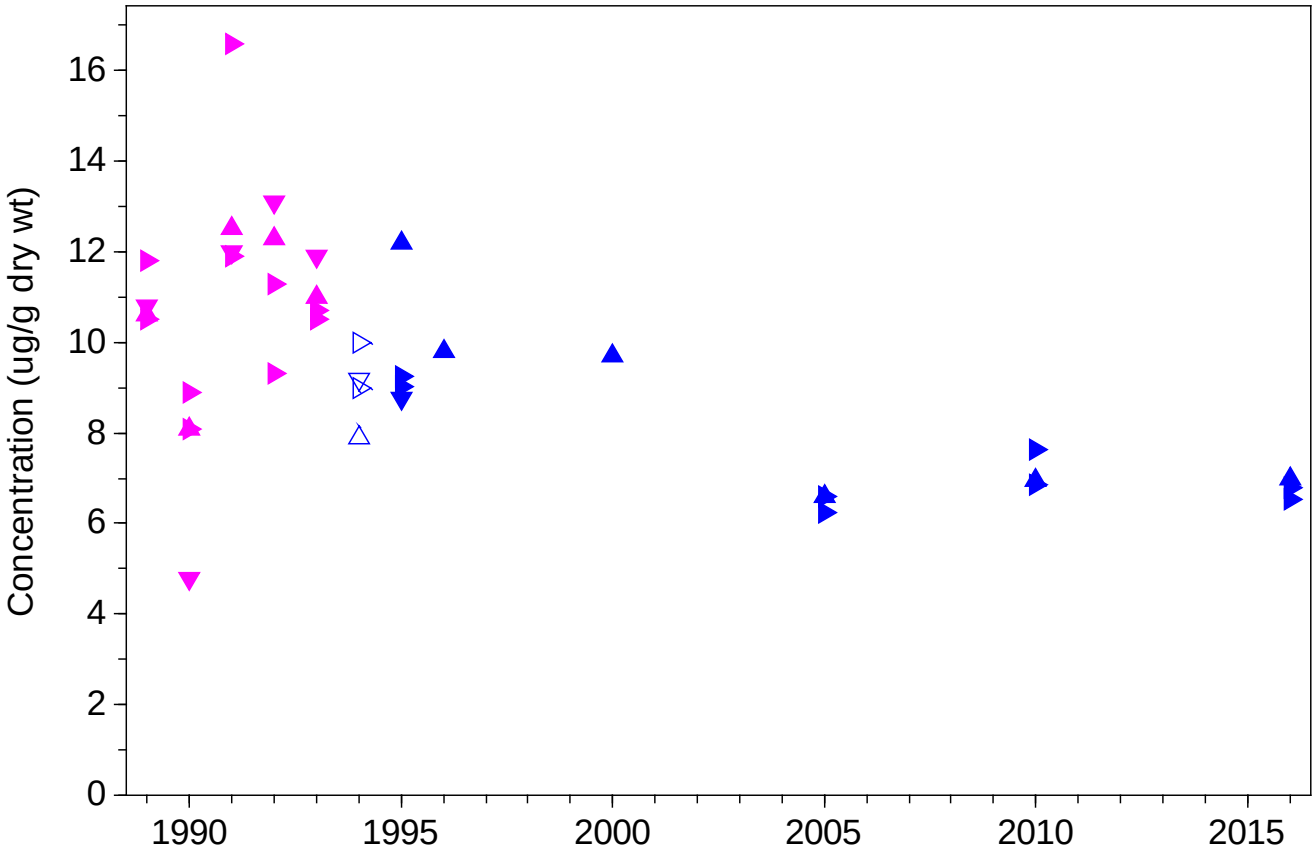
Chromium, Station 44



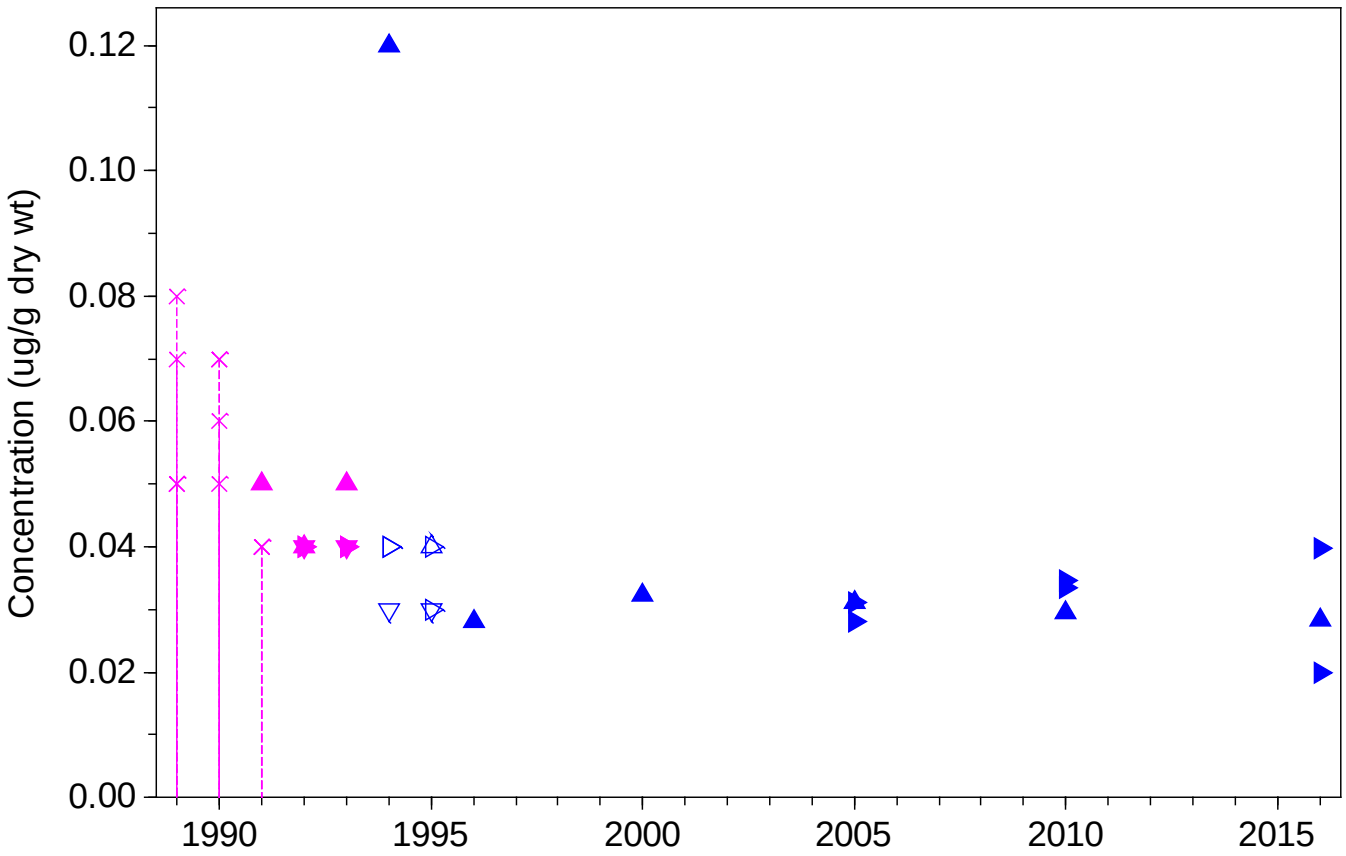
Copper, Station 44



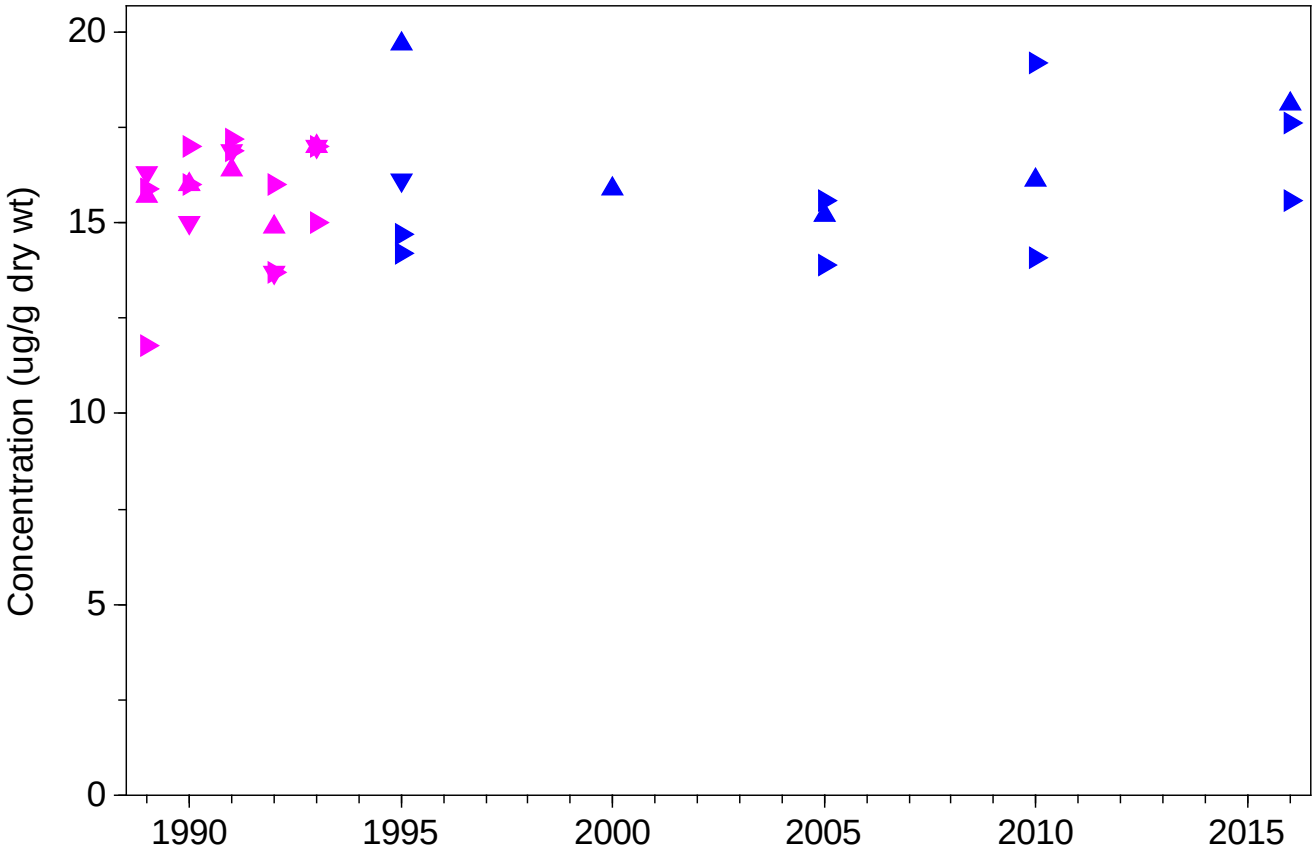
Lead, Station 44



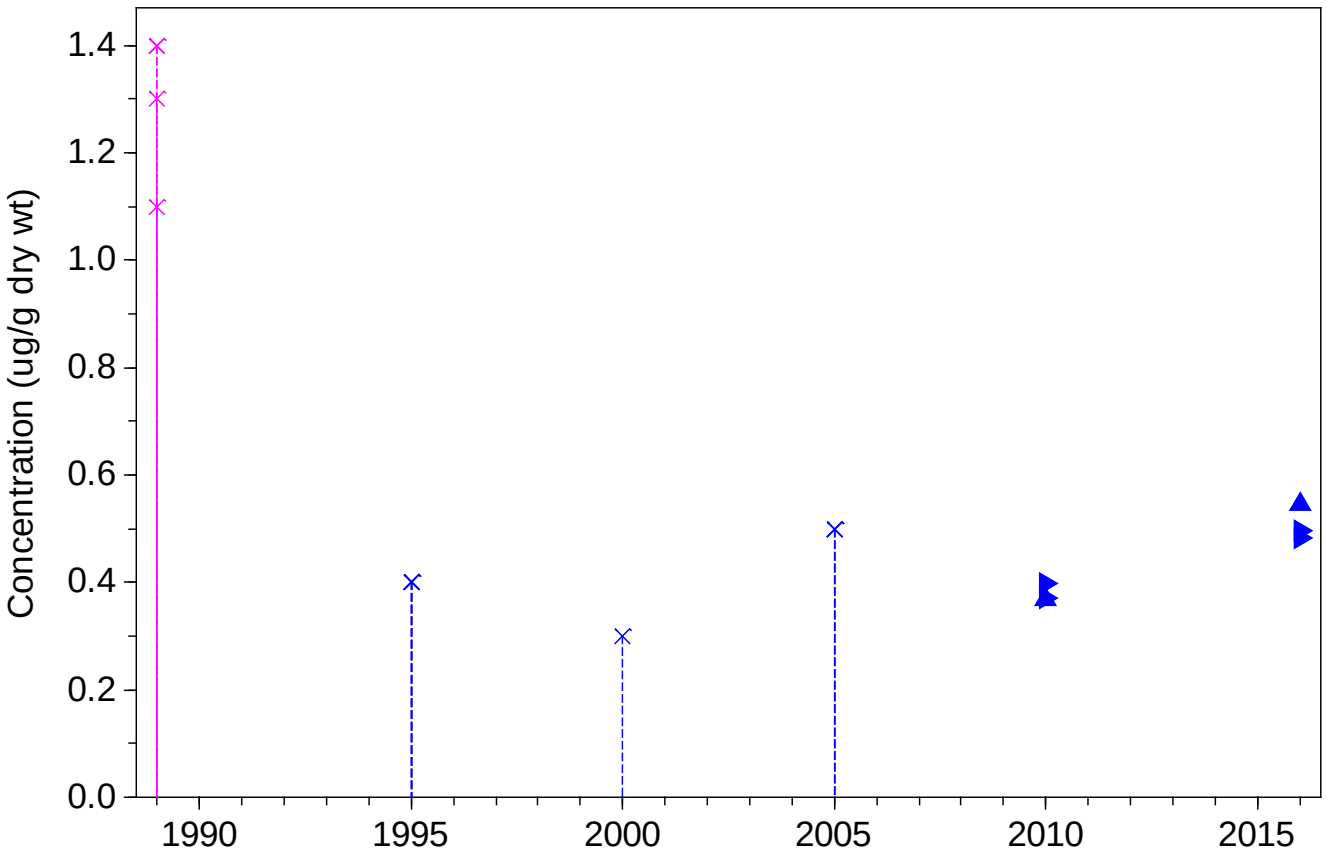
Mercury, Station 44



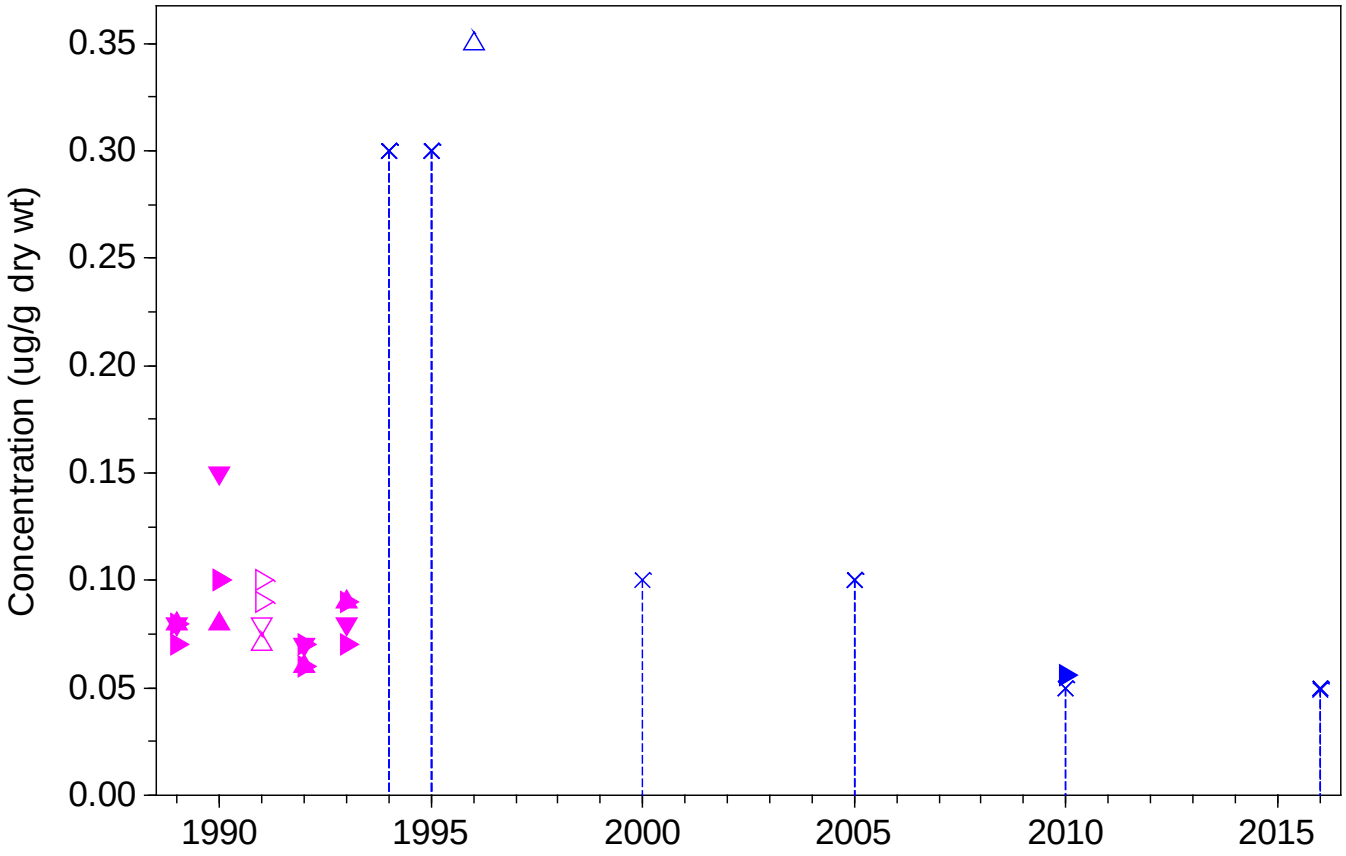
Nickel, Station 44



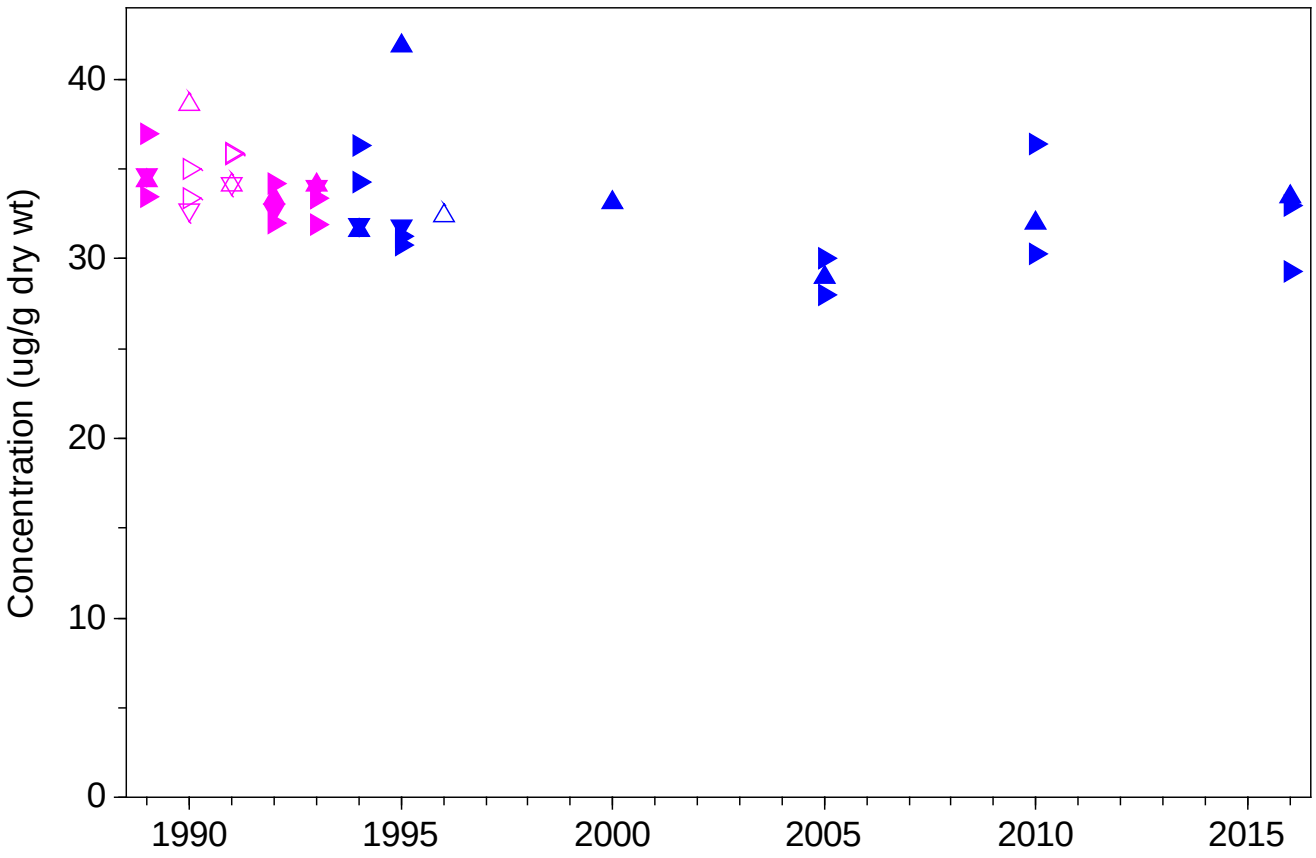
Selenium, Station 44



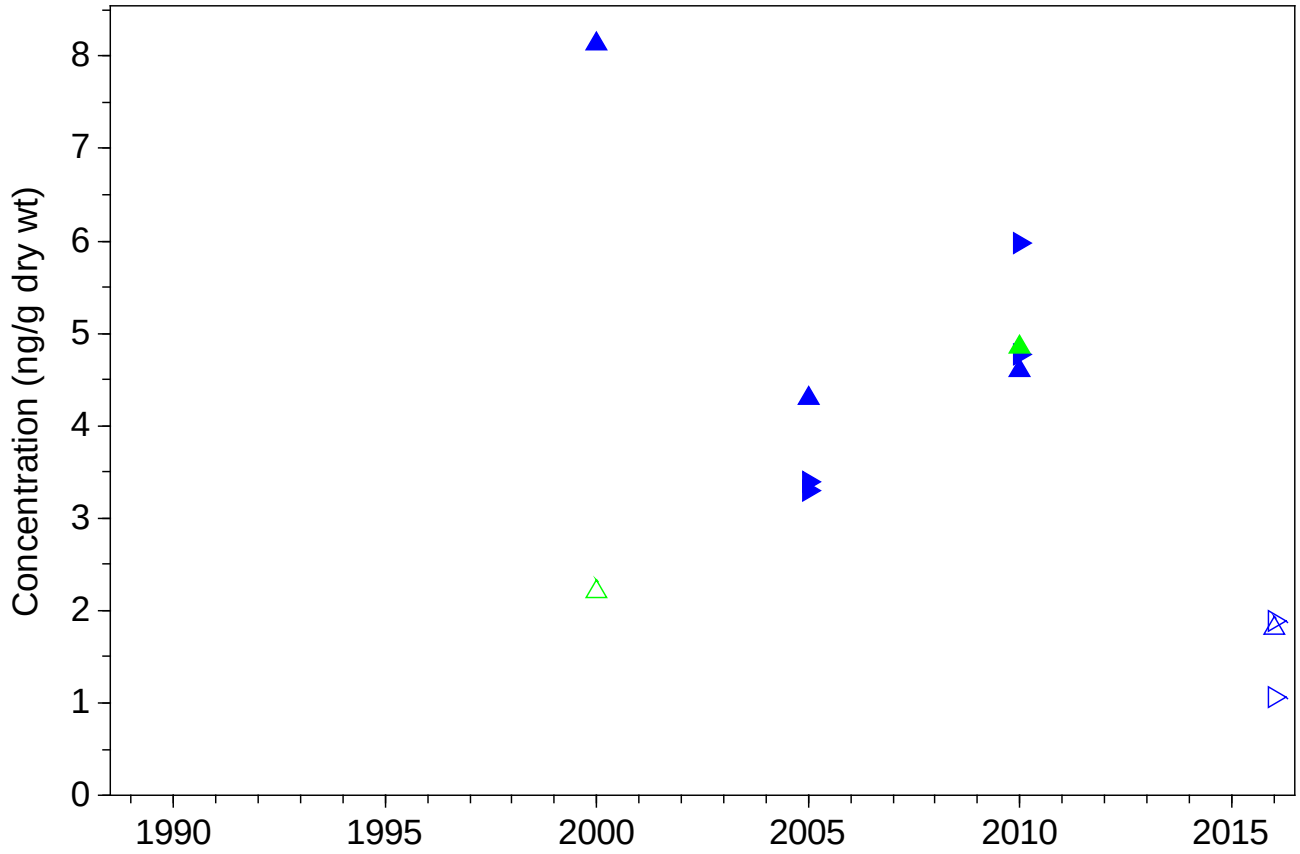
Silver, Station 44



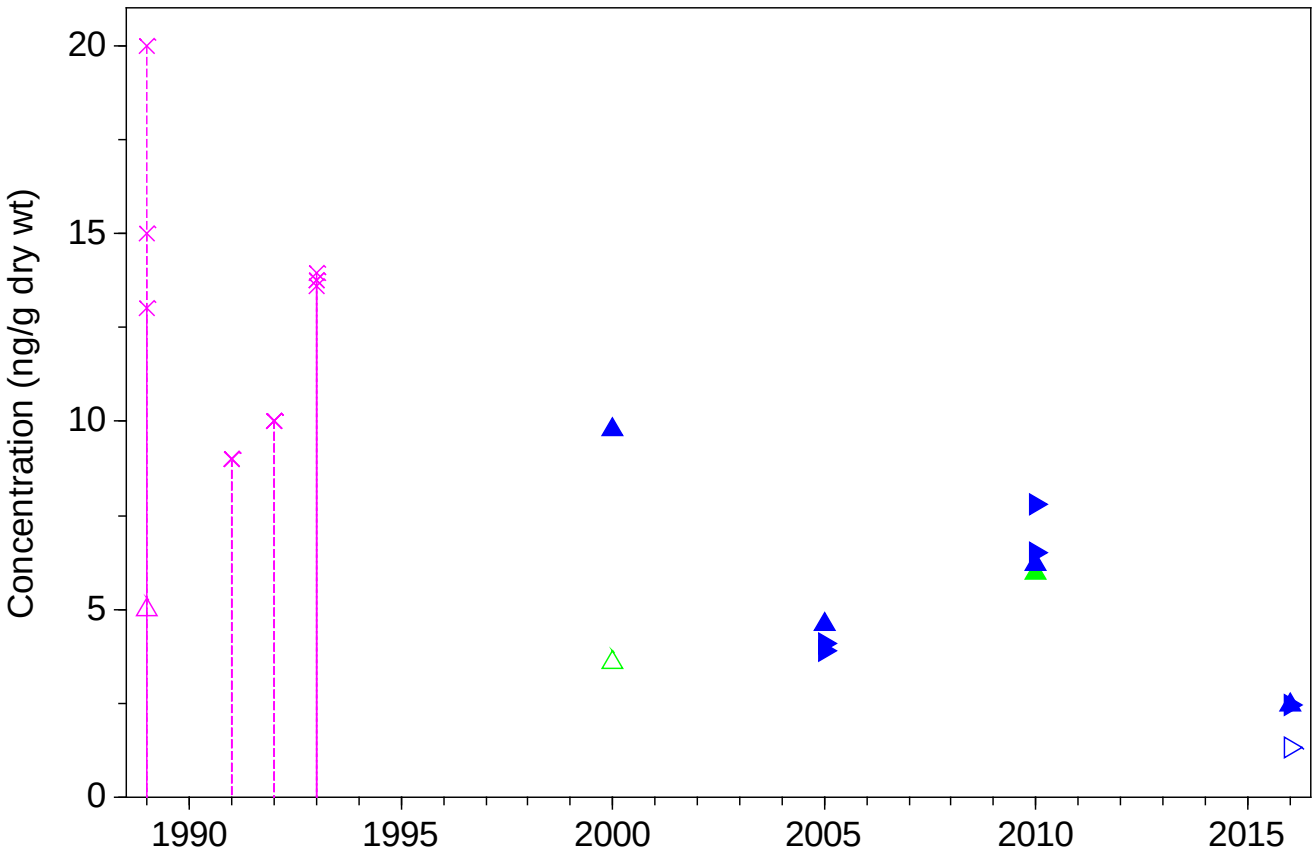
Zinc, Station 44



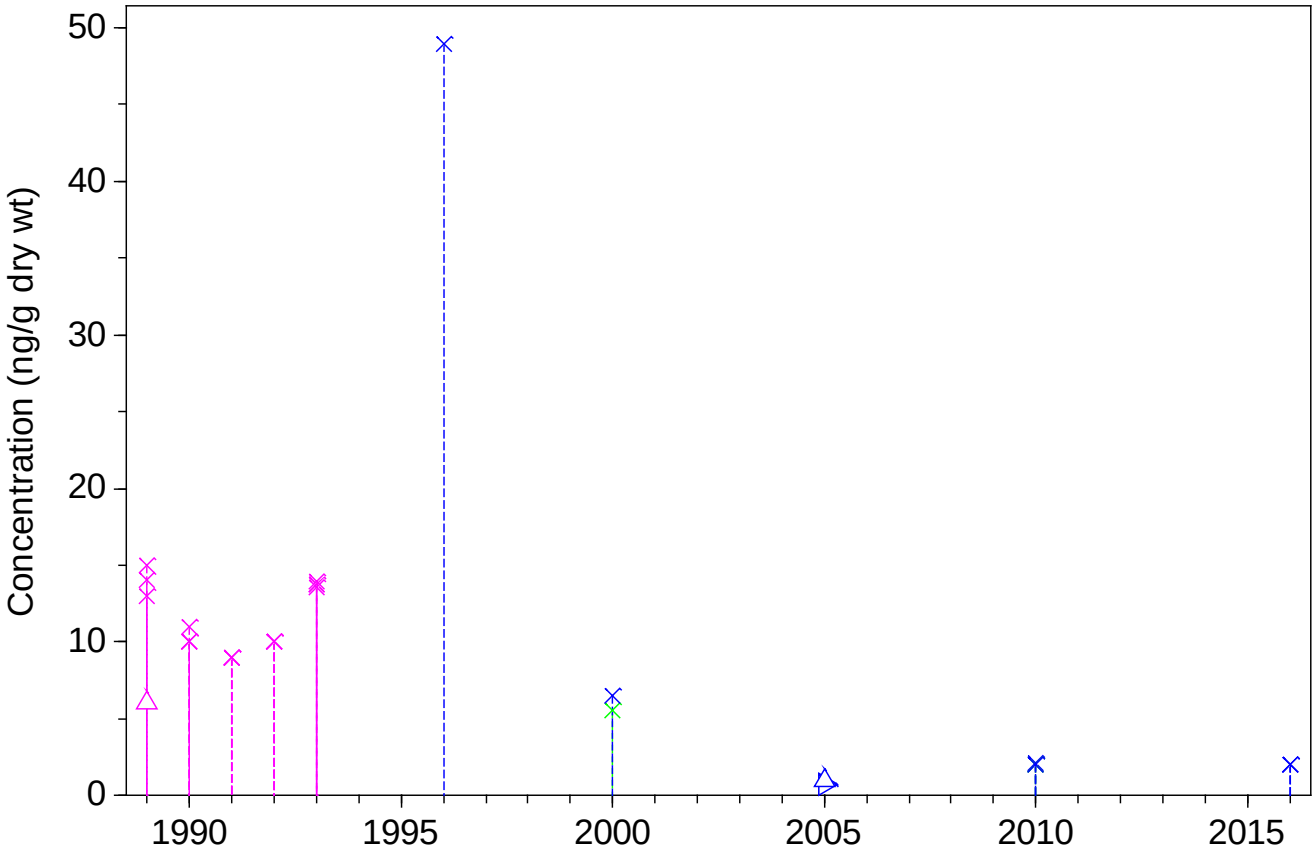
1-Methylnaphthalene, Station 44



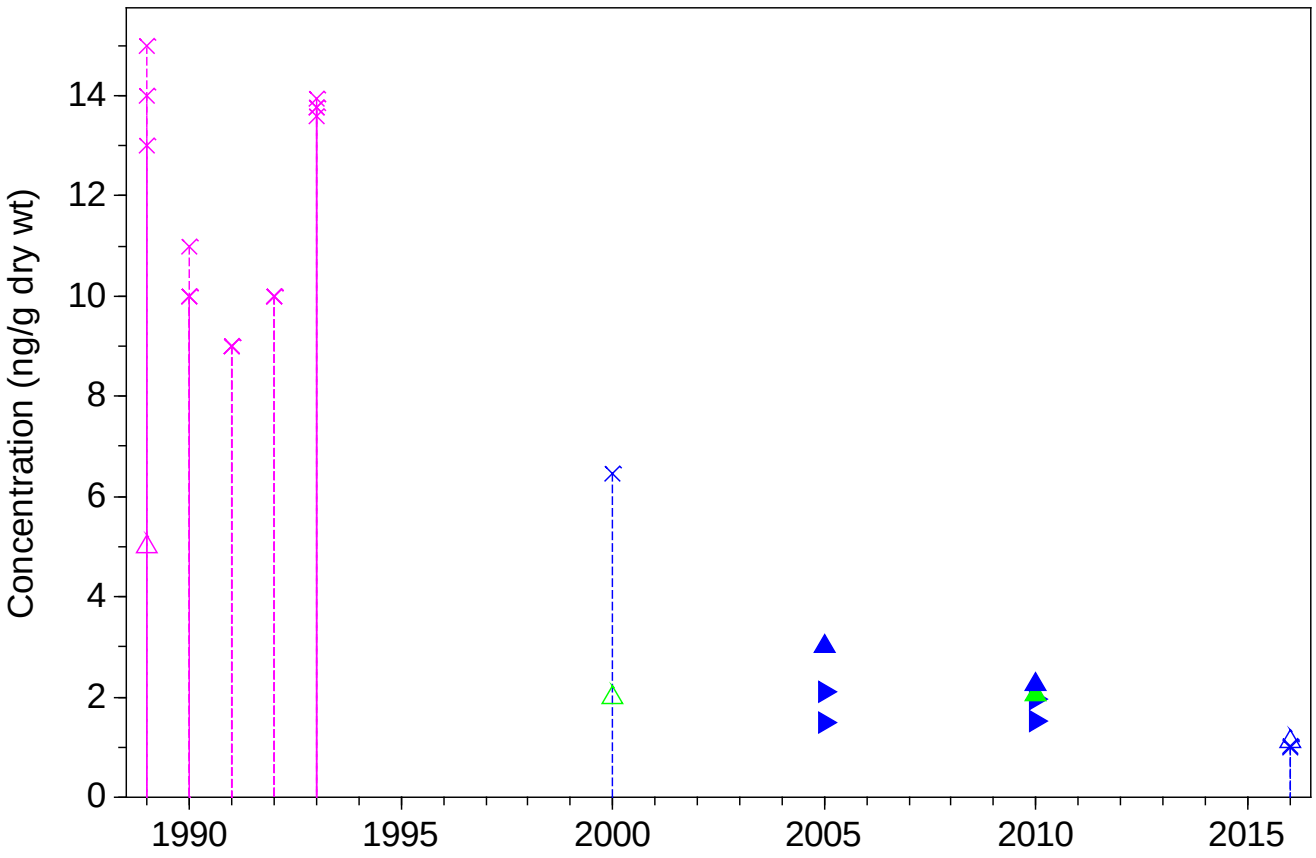
2-Methylnaphthalene, Station 44



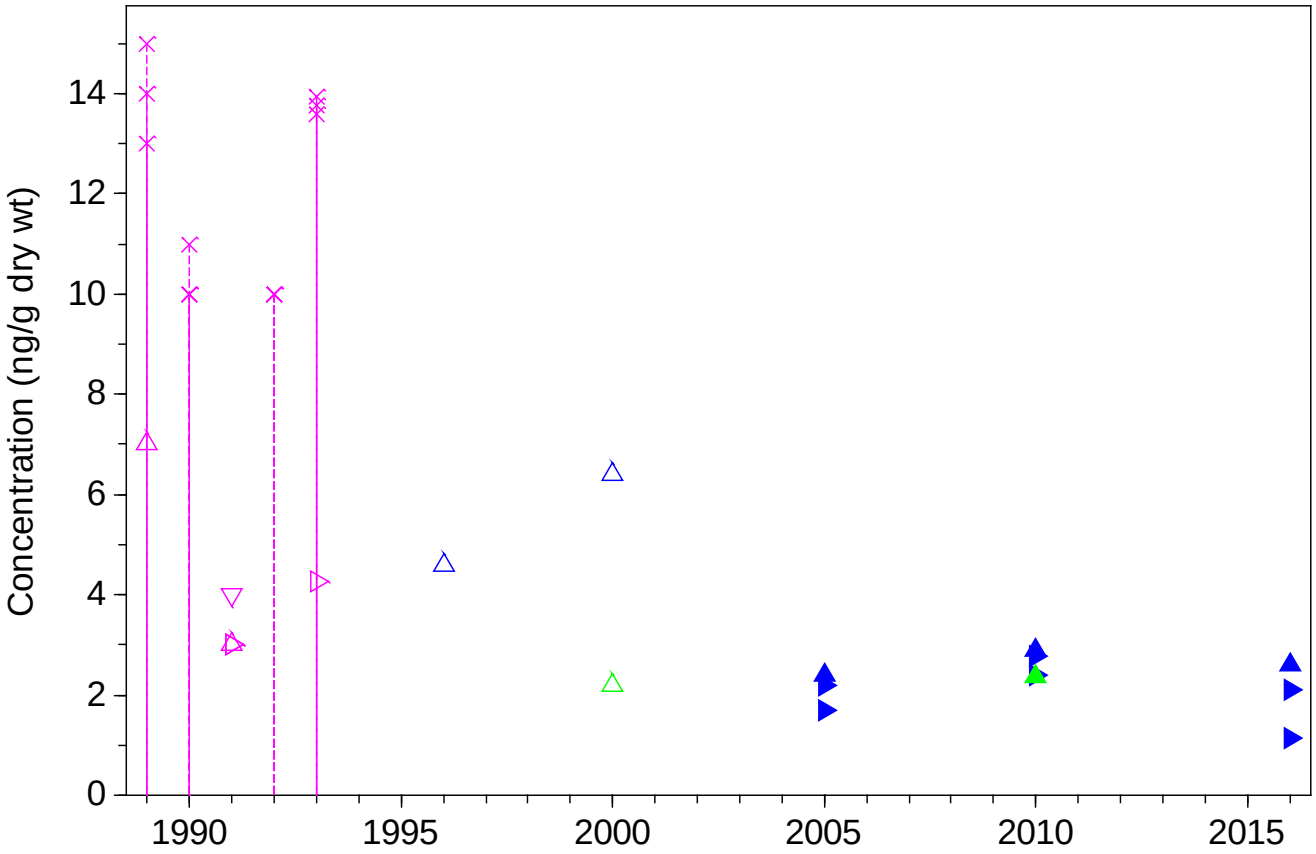
Acenaphthene, Station 44



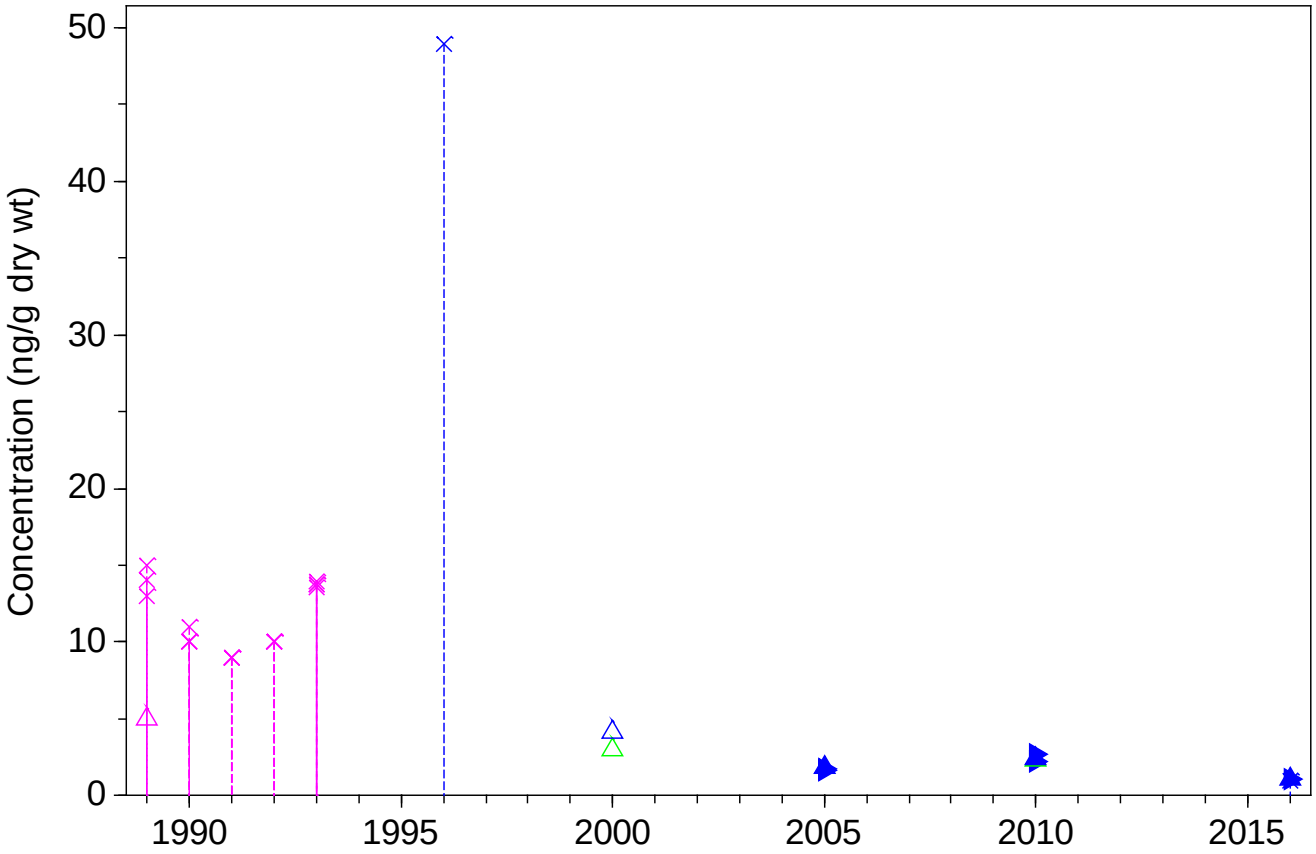
Acenaphthylene, Station 44



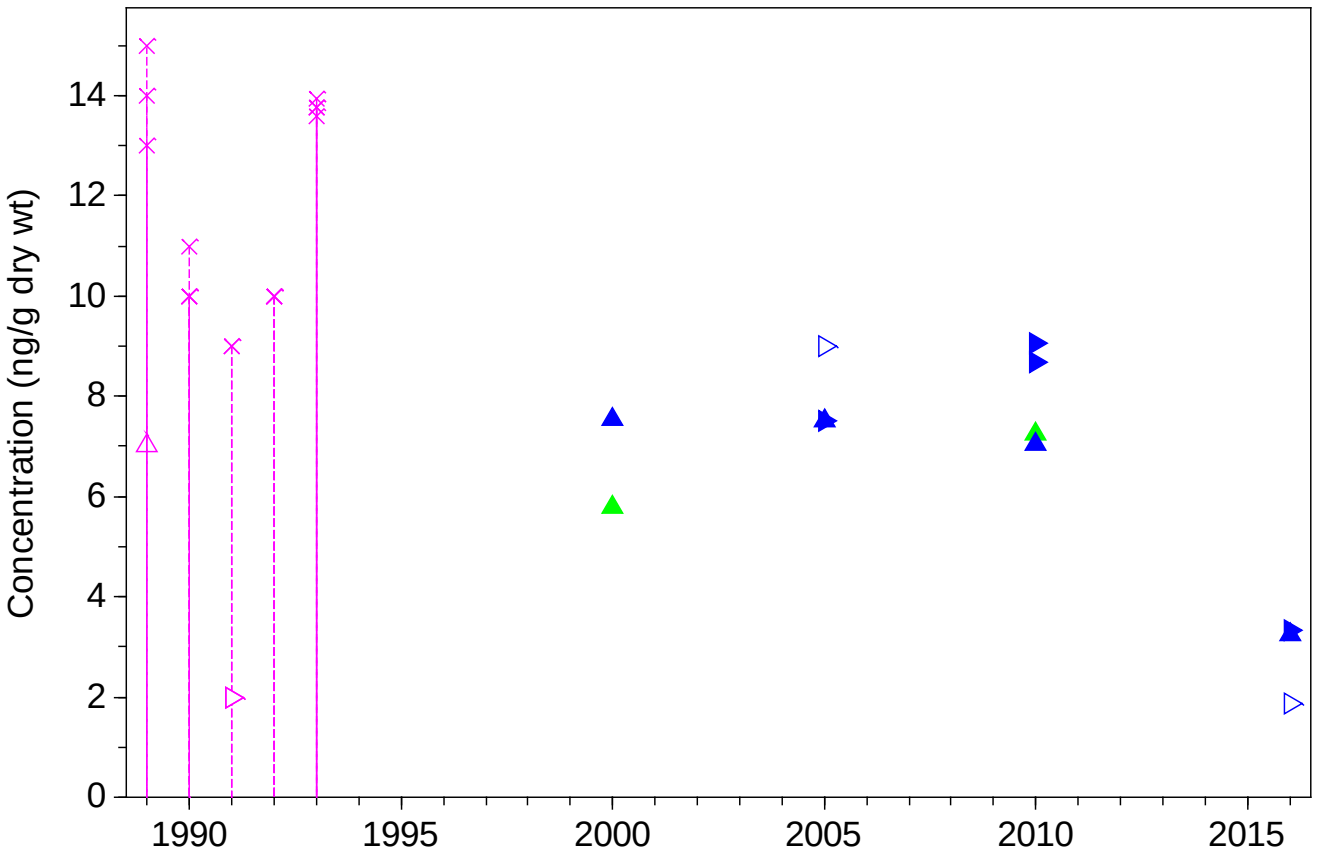
Anthracene, Station 44



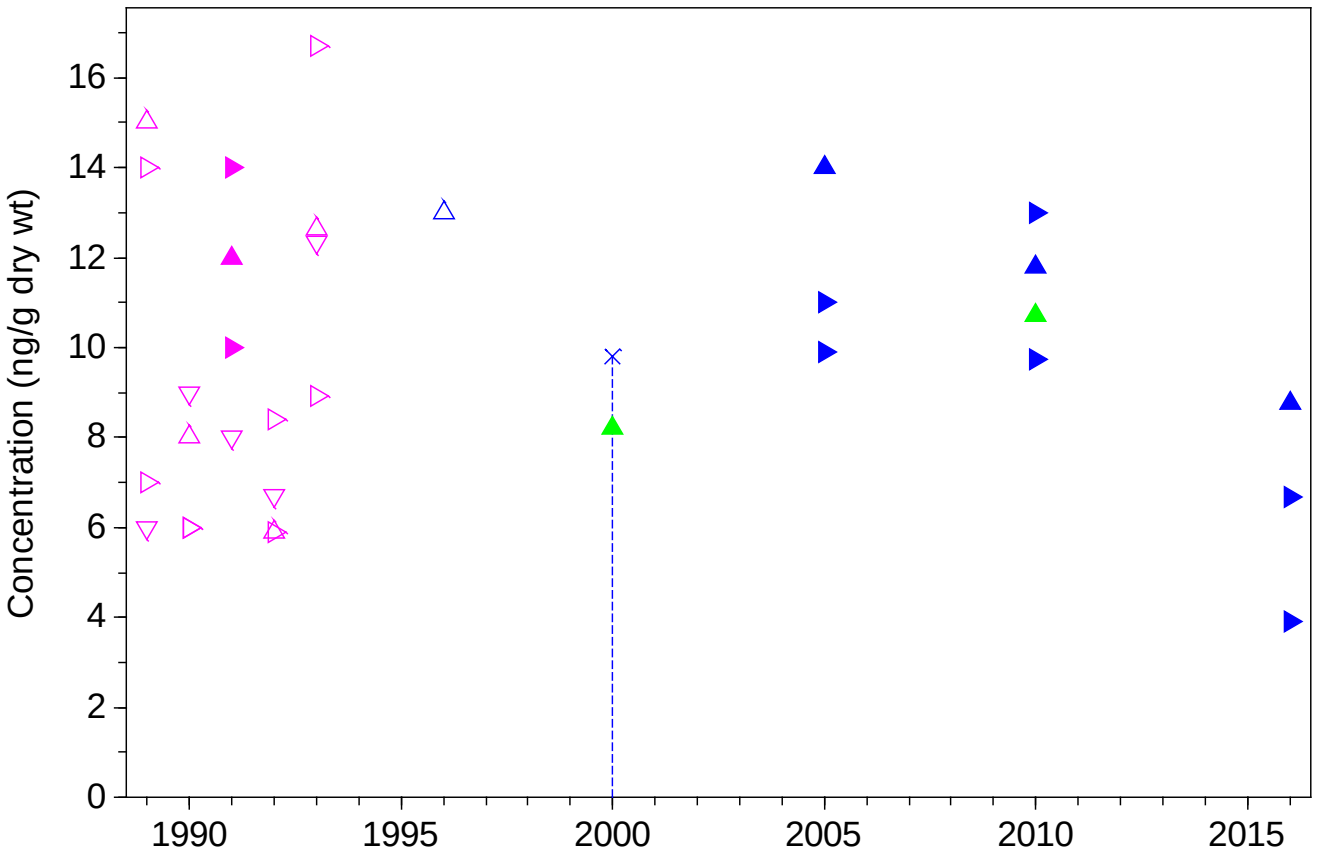
Fluorene, Station 44



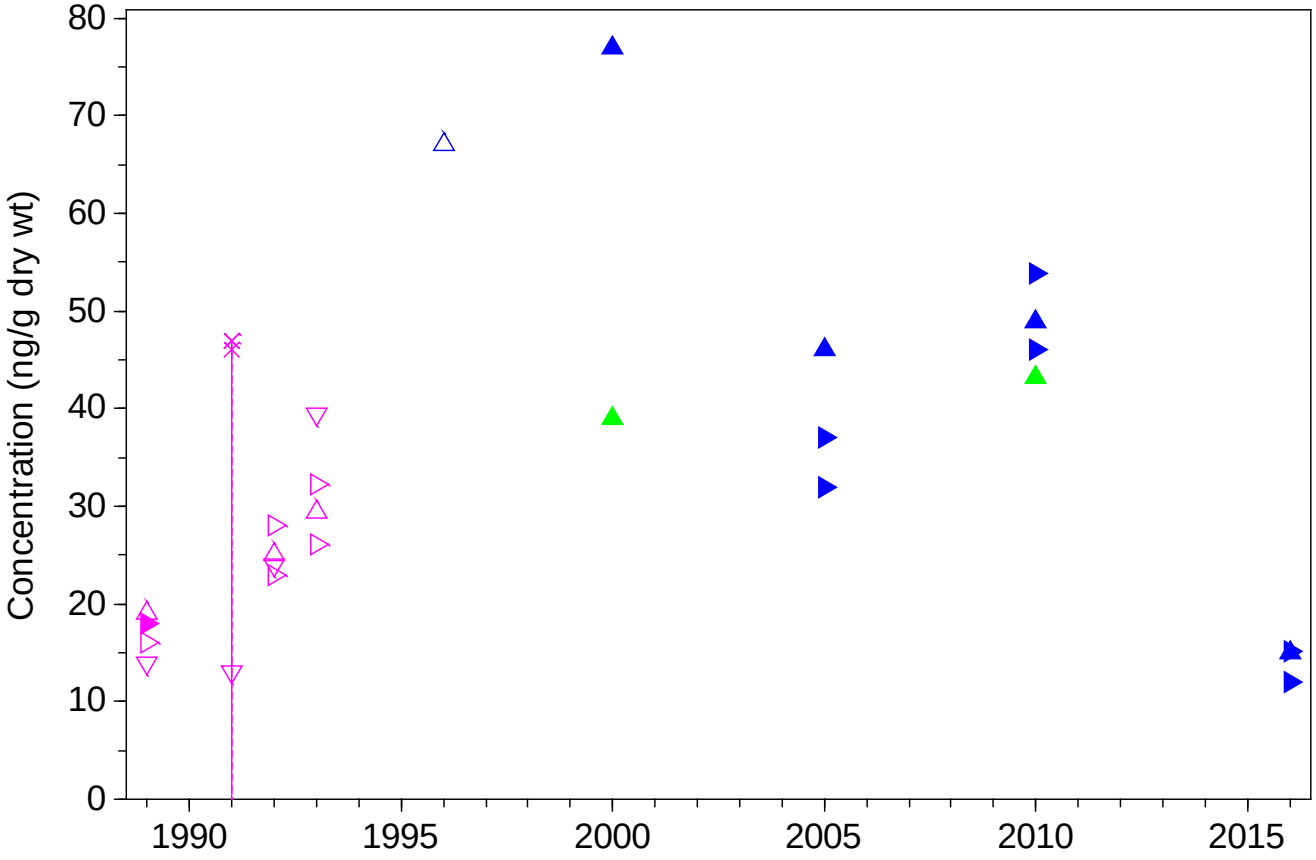
Naphthalene, Station 44



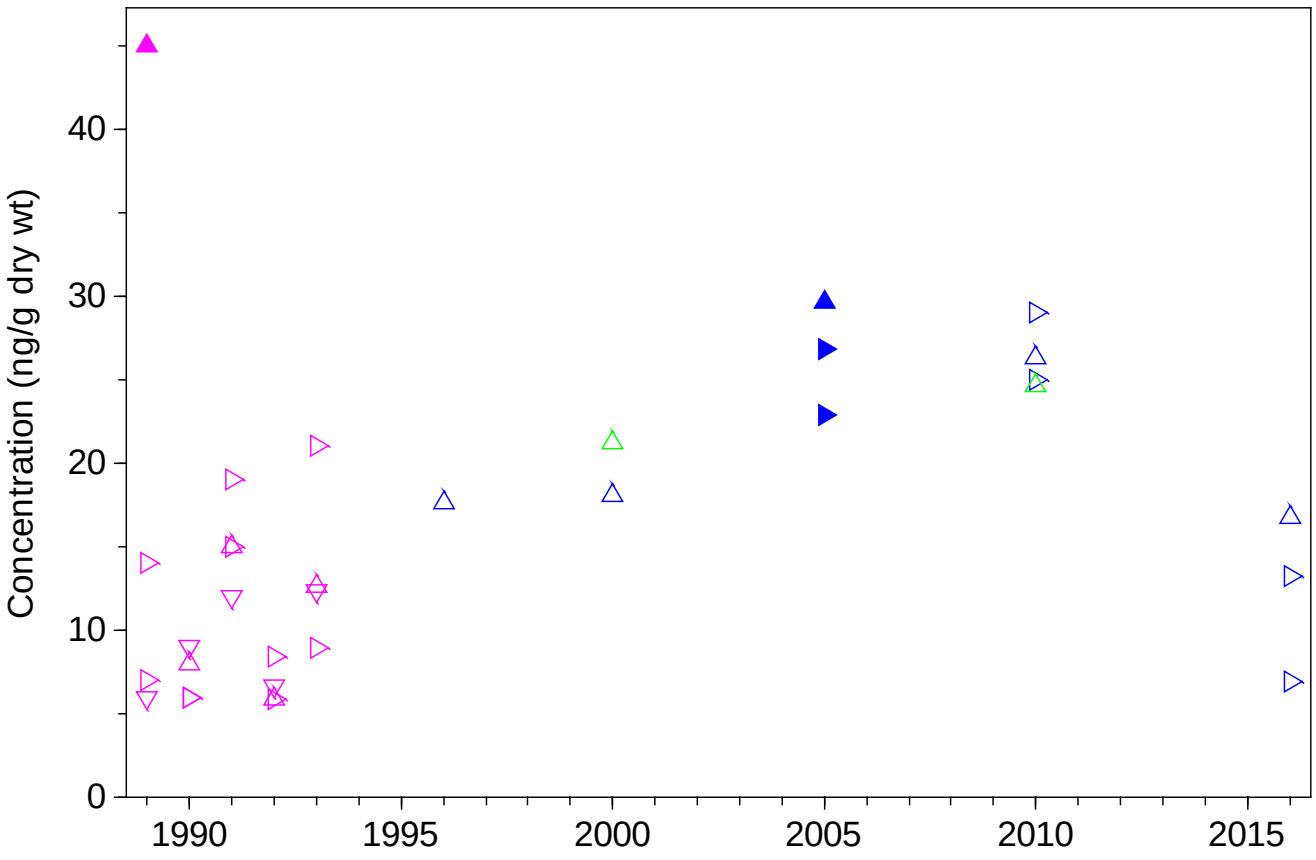
Phenanthrene, Station 44



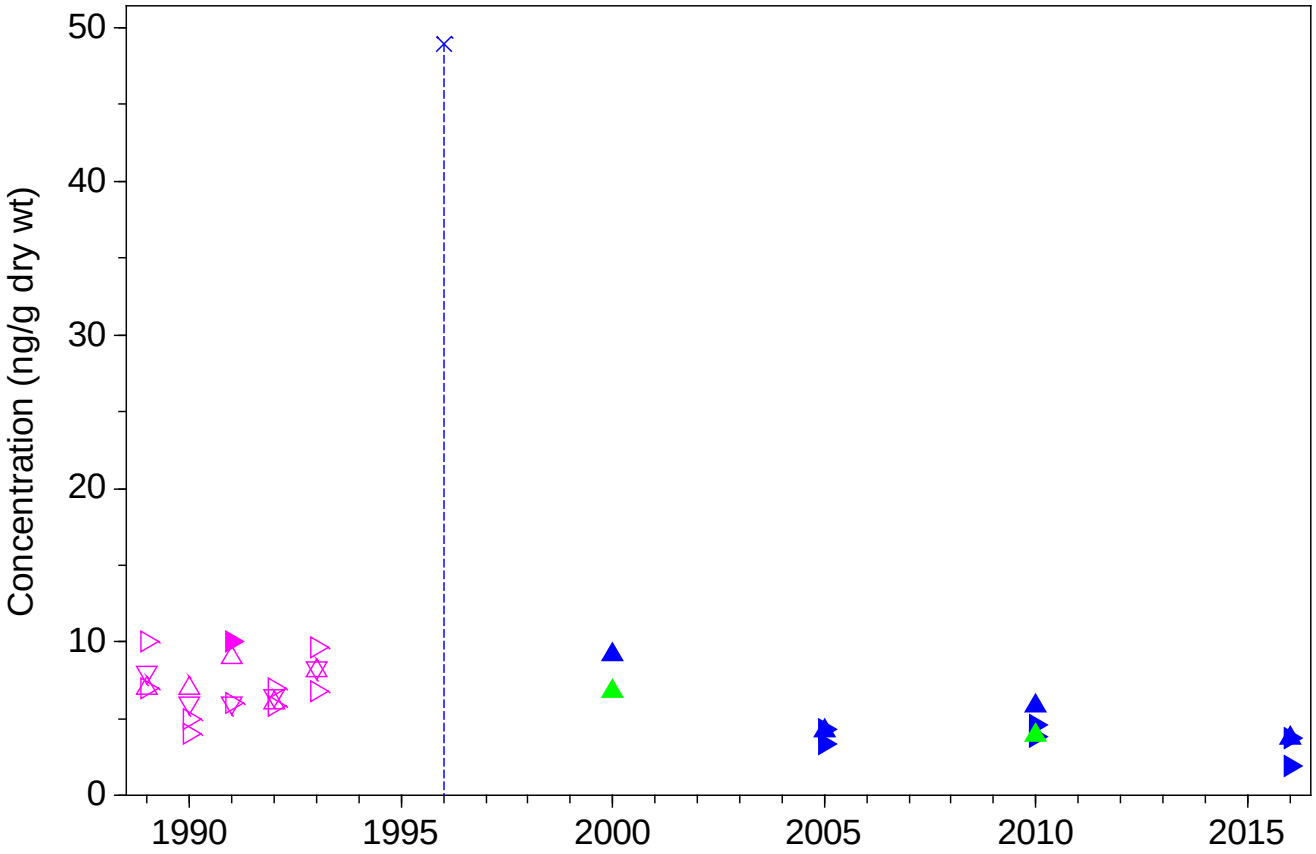
Retene, Station 44



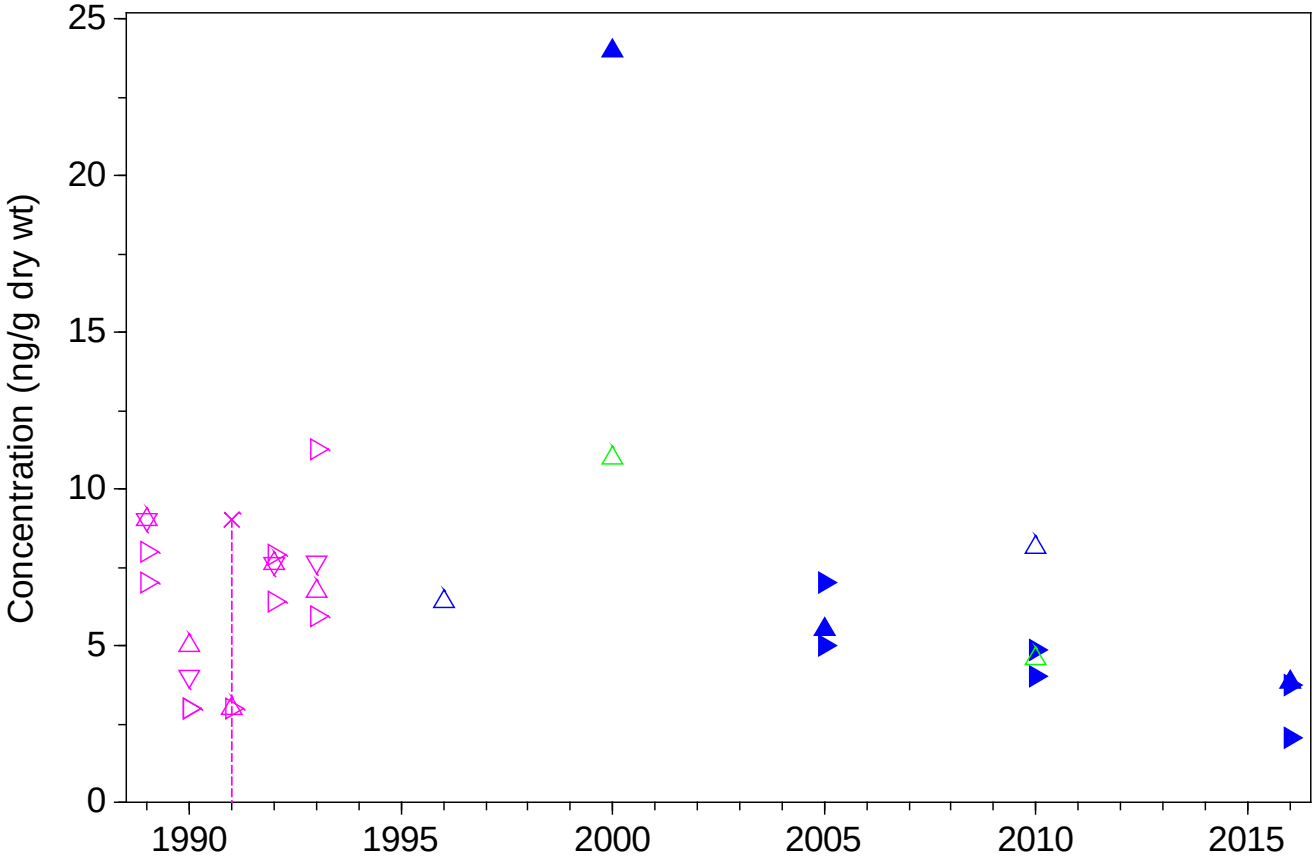
Total LPAH (sum of 6 compounds), Station 44



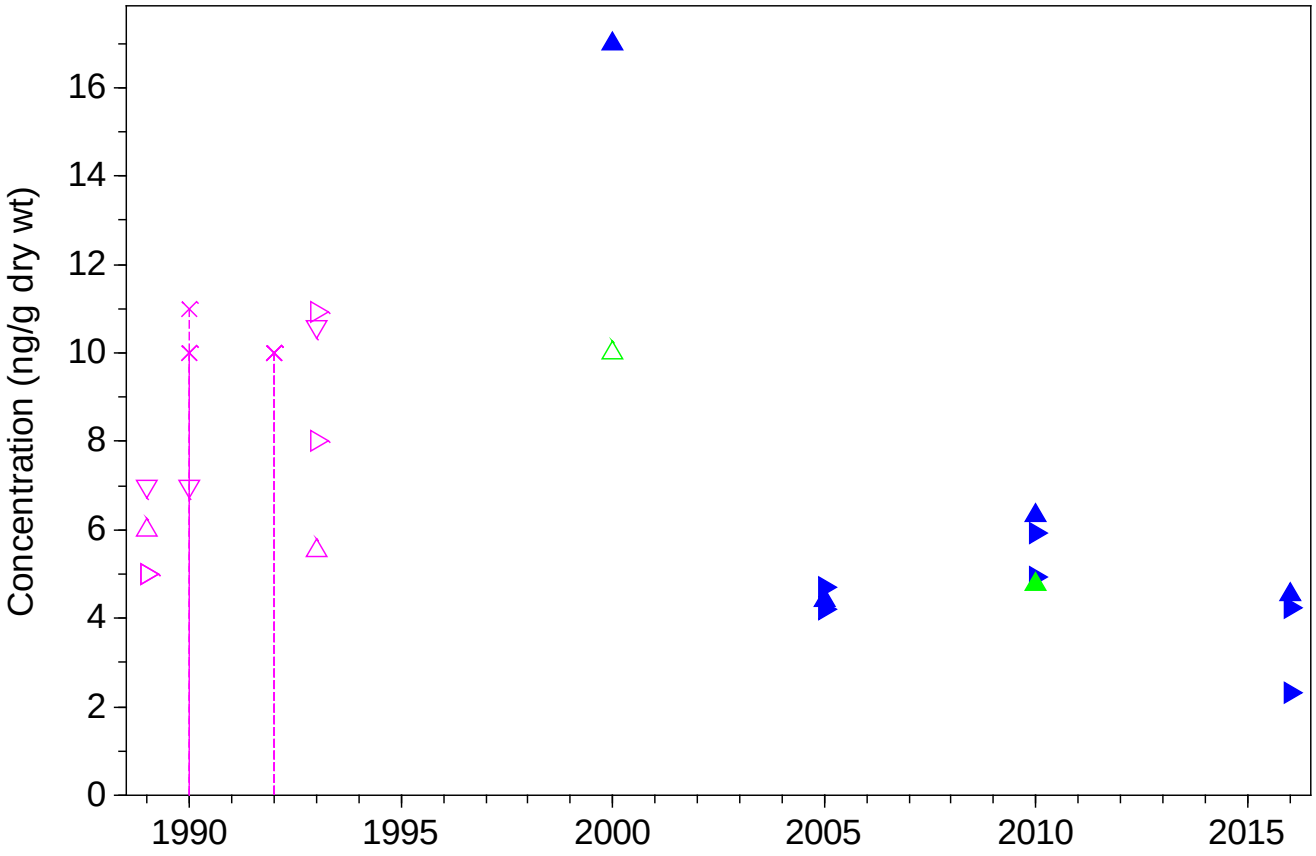
Benzo(a)anthracene, Station 44



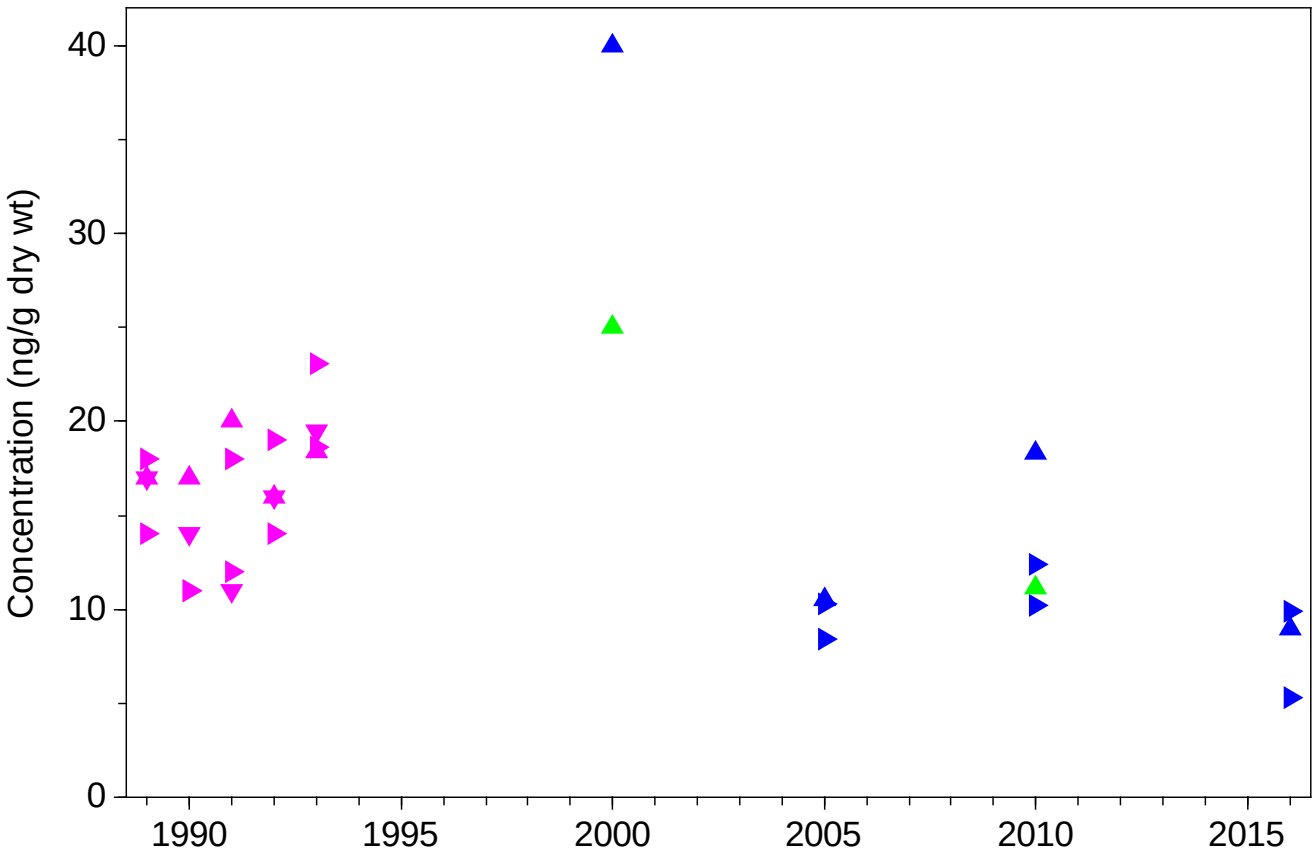
Benzo(a)pyrene, Station 44



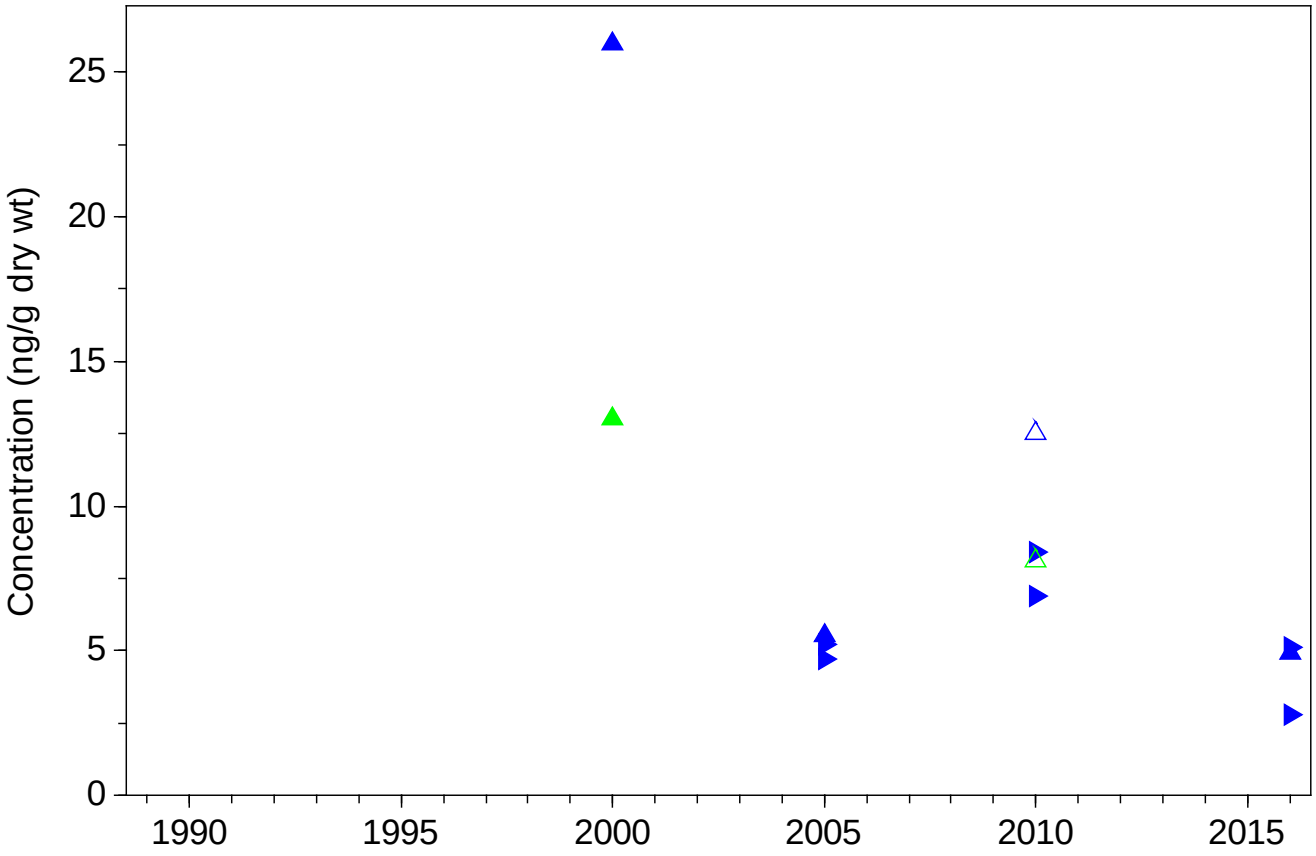
Benzo(g,h,i)perylene, Station 44



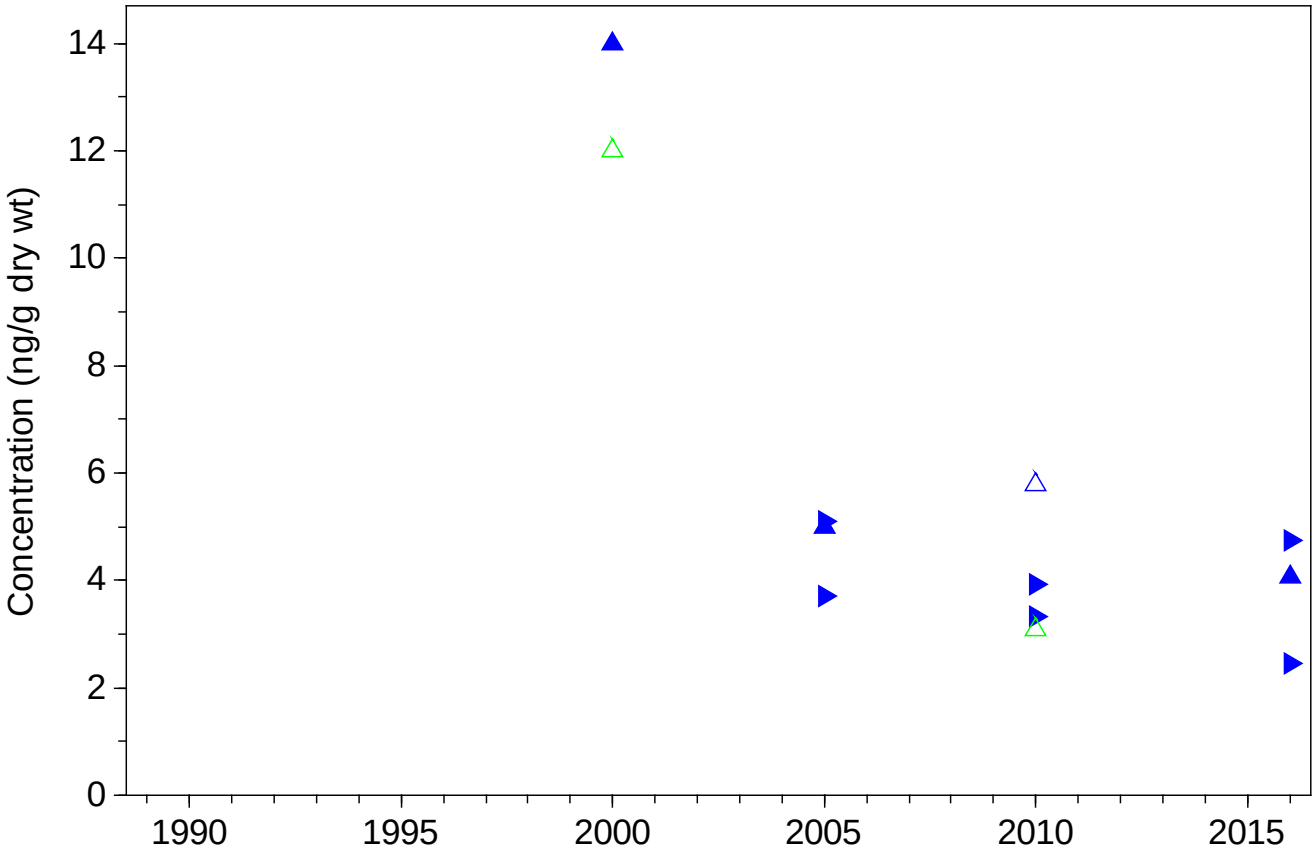
Total Benzofluoranthenes, Station 44



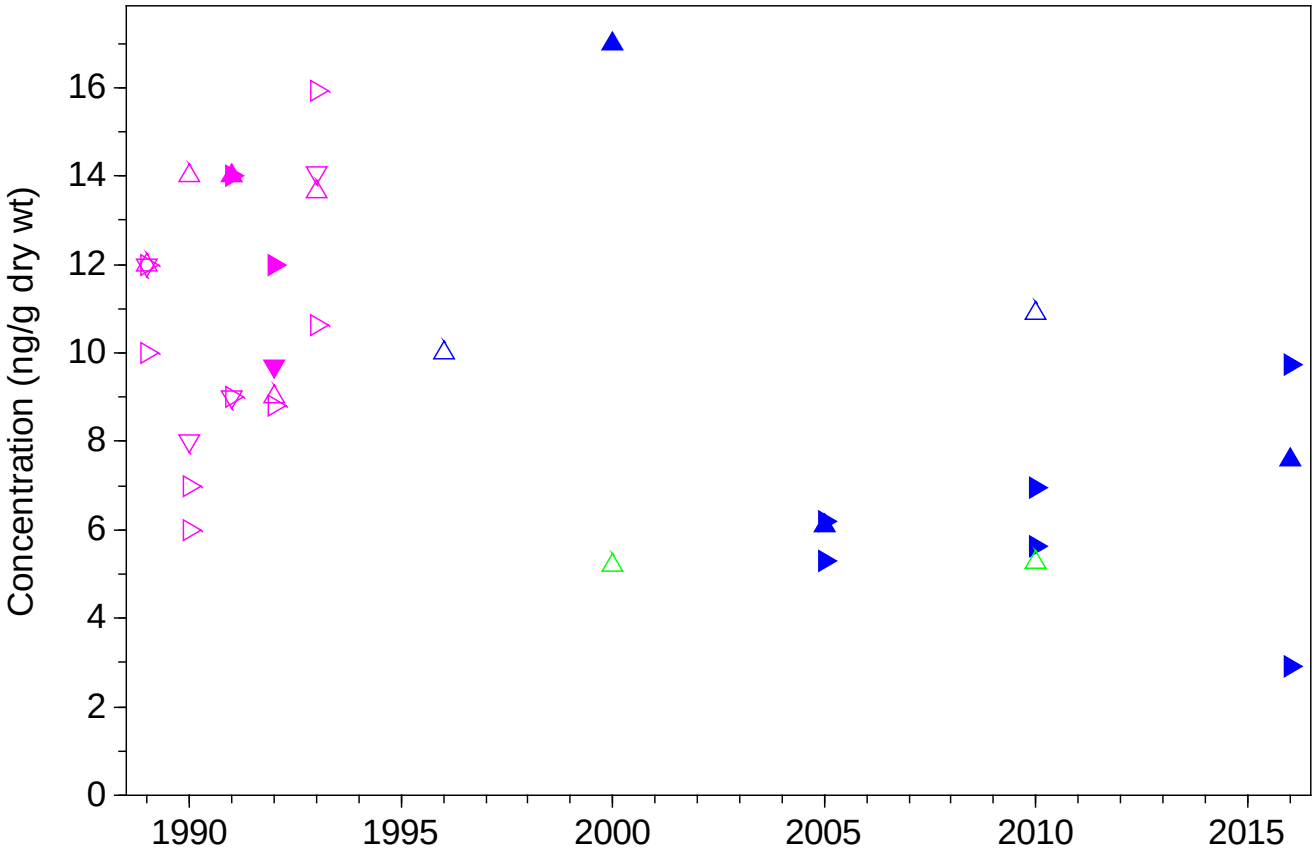
Benzo(b)fluoranthene, Station 44



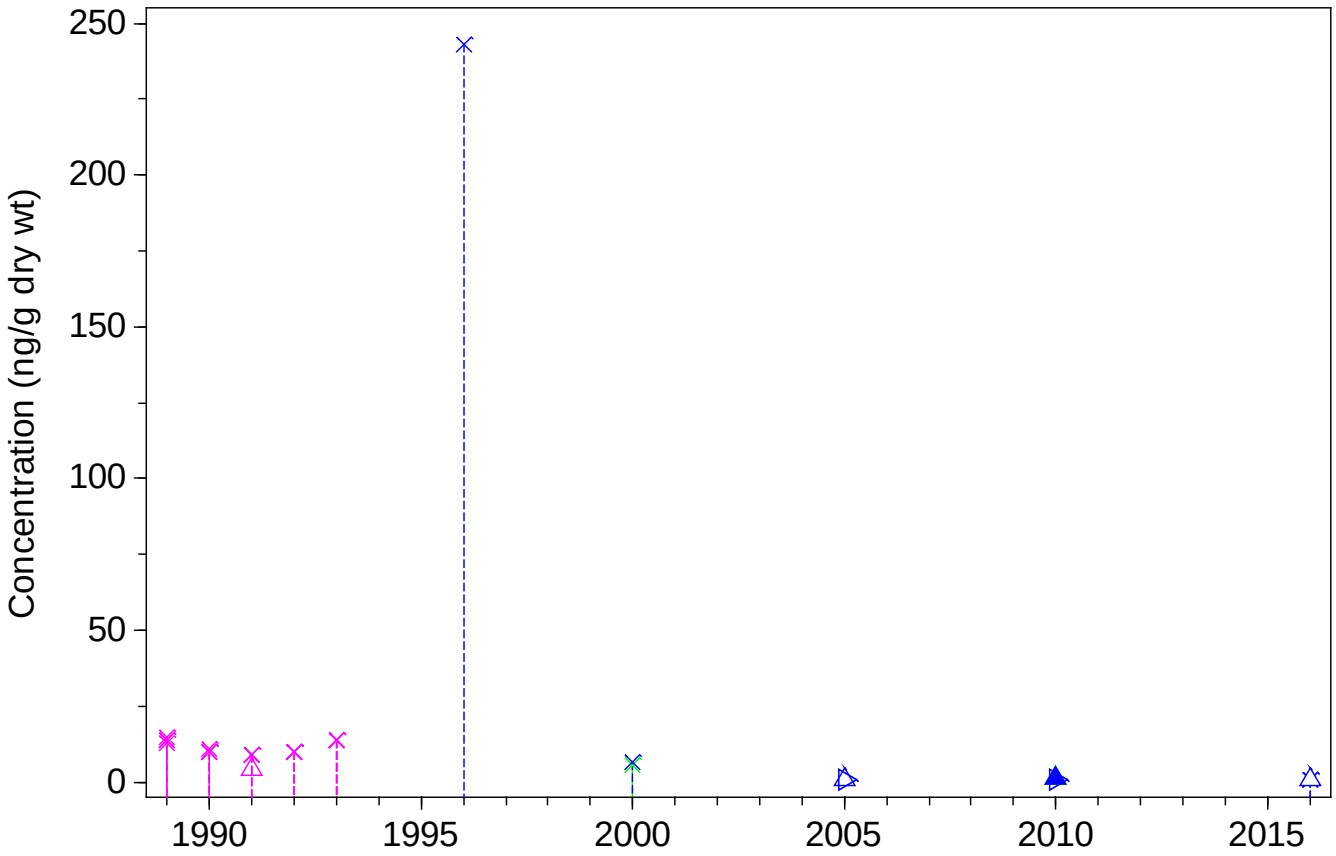
Benzo(k)fluoranthene, Station 44



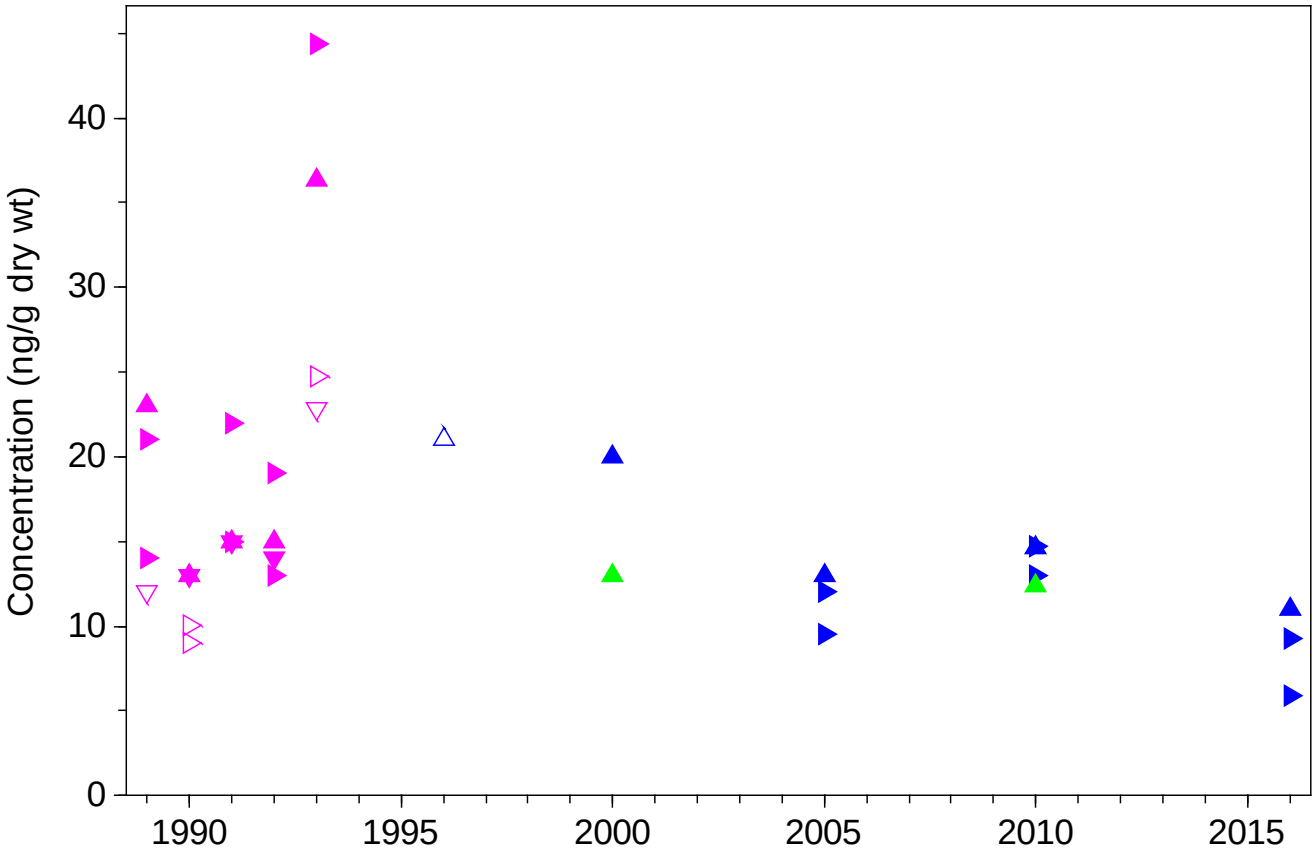
Chrysene, Station 44



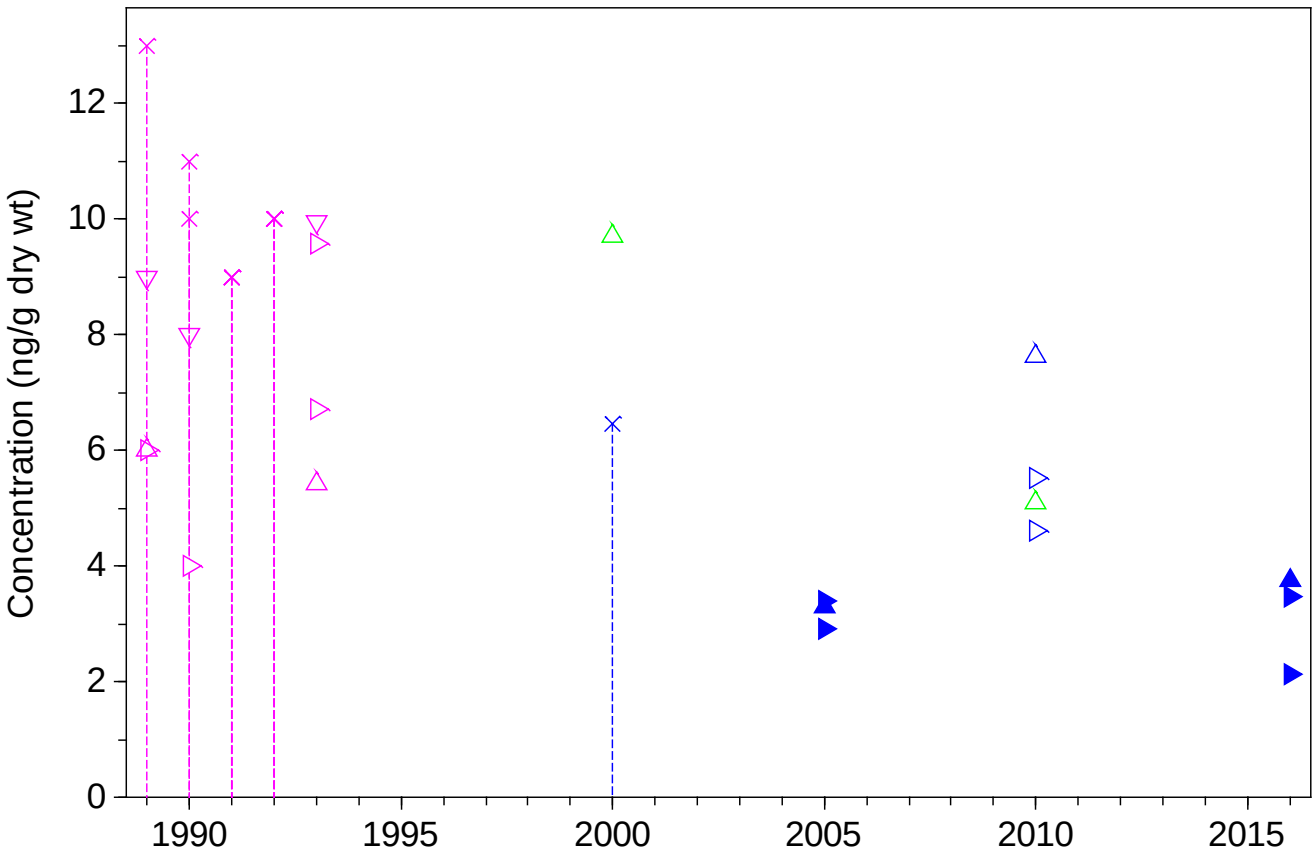
Dibenzo(a,h)anthracene, Station 44



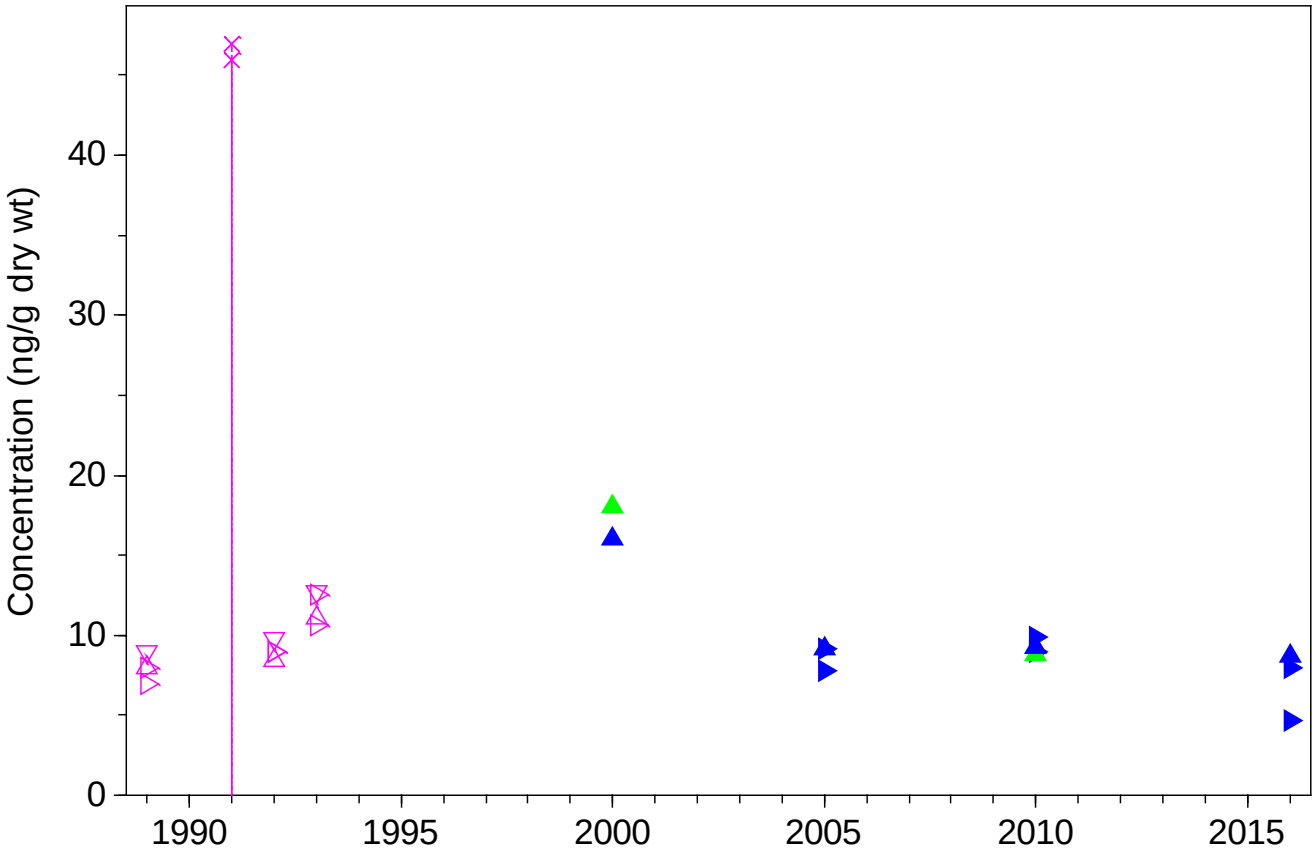
Fluoranthene, Station 44



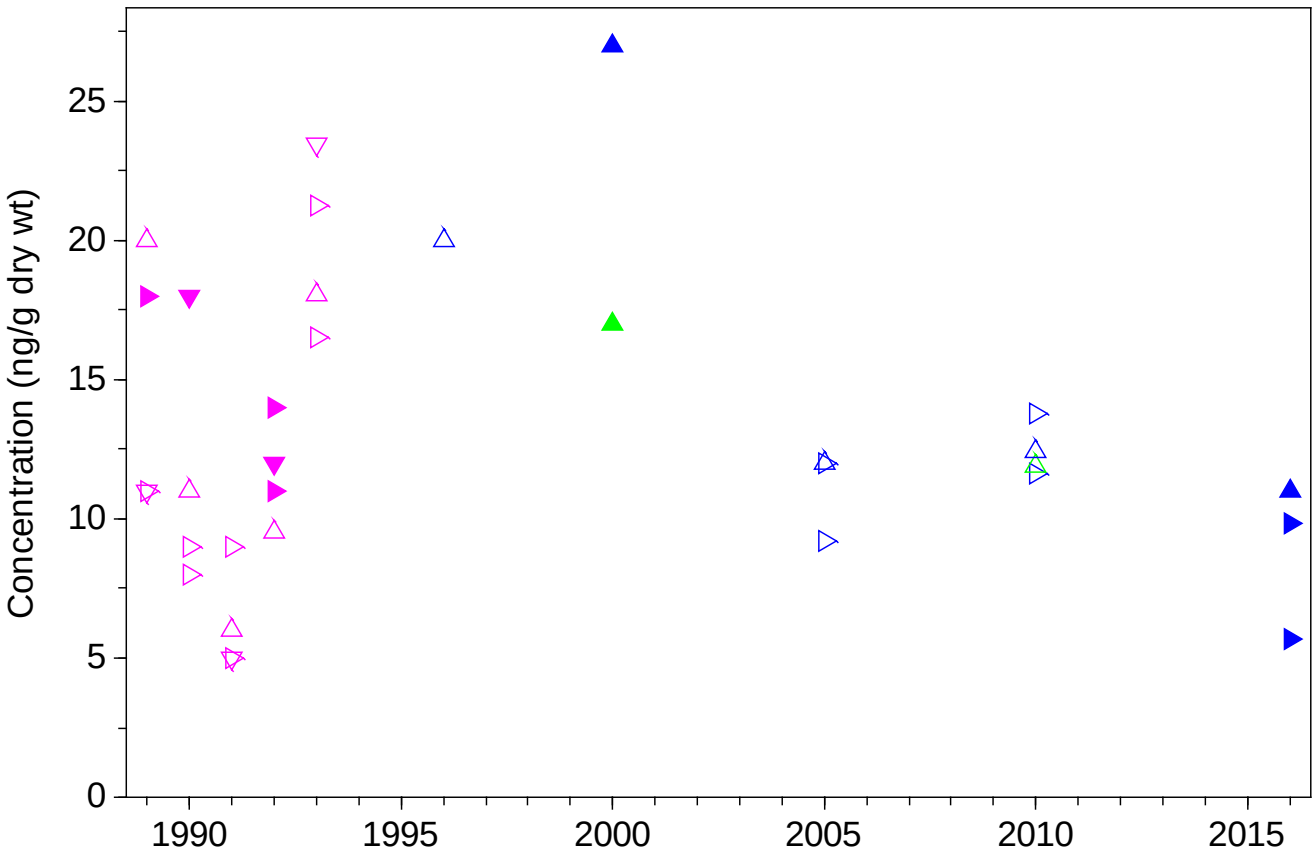
Indeno(1,2,3-c,d)pyrene, Station 44

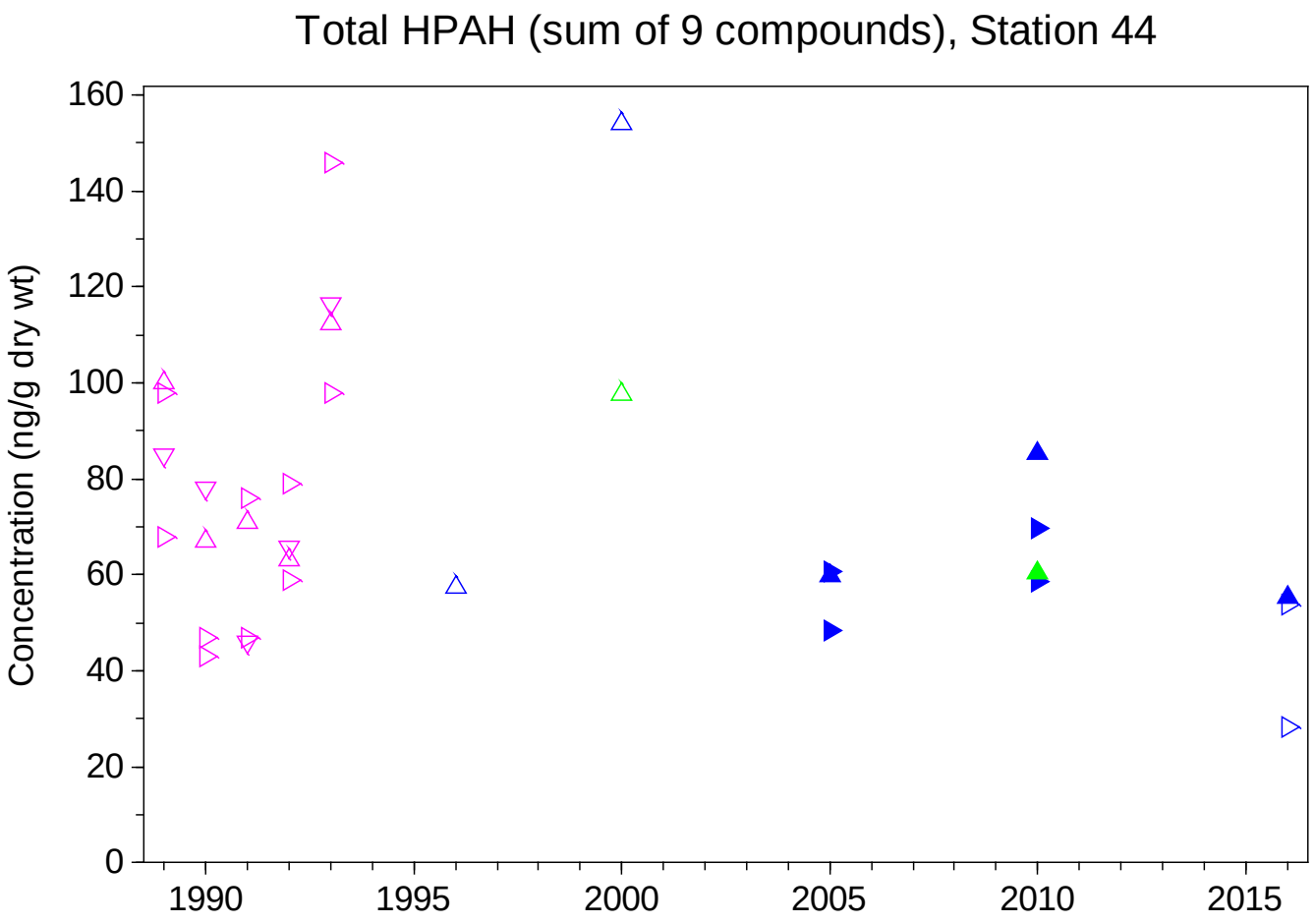


Perylene, Station 44



Pyrene, Station 44





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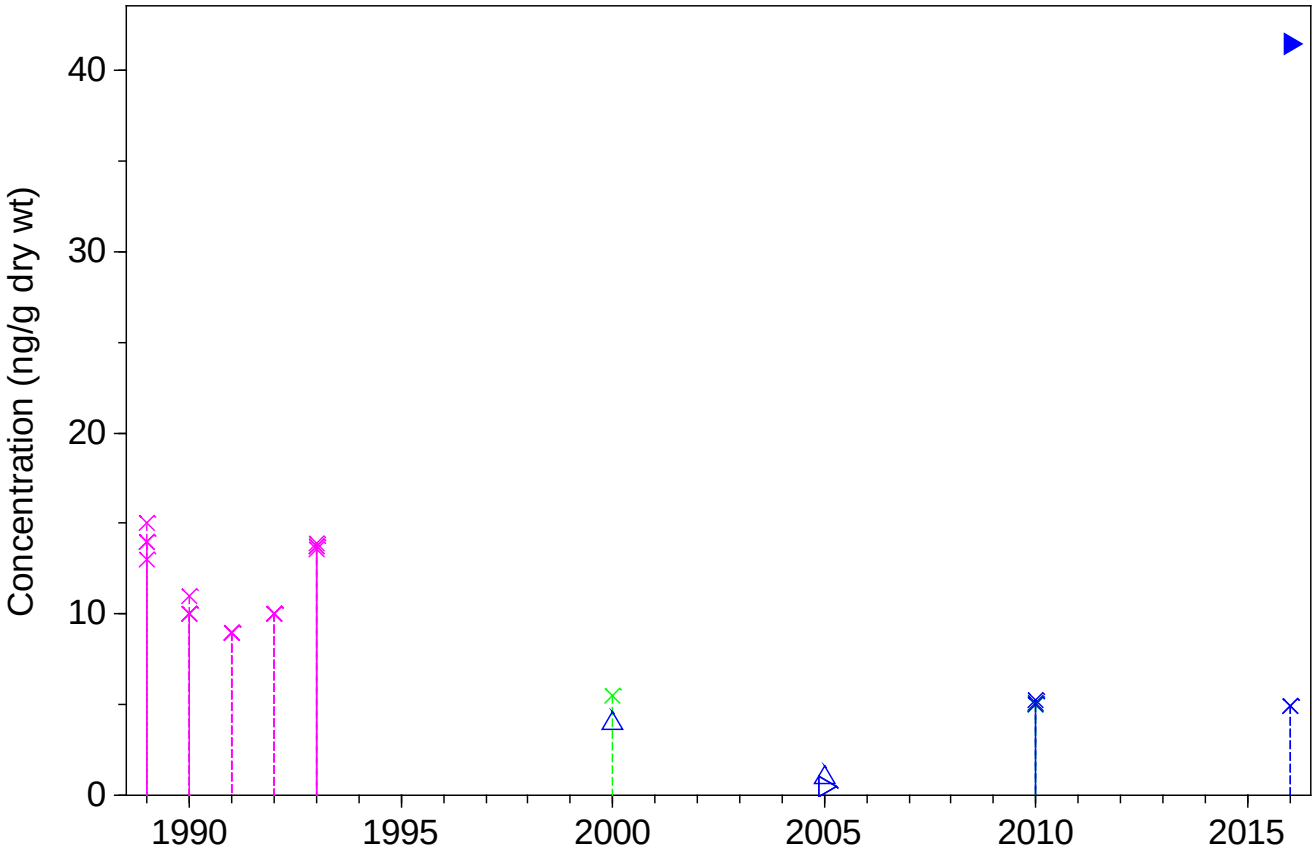
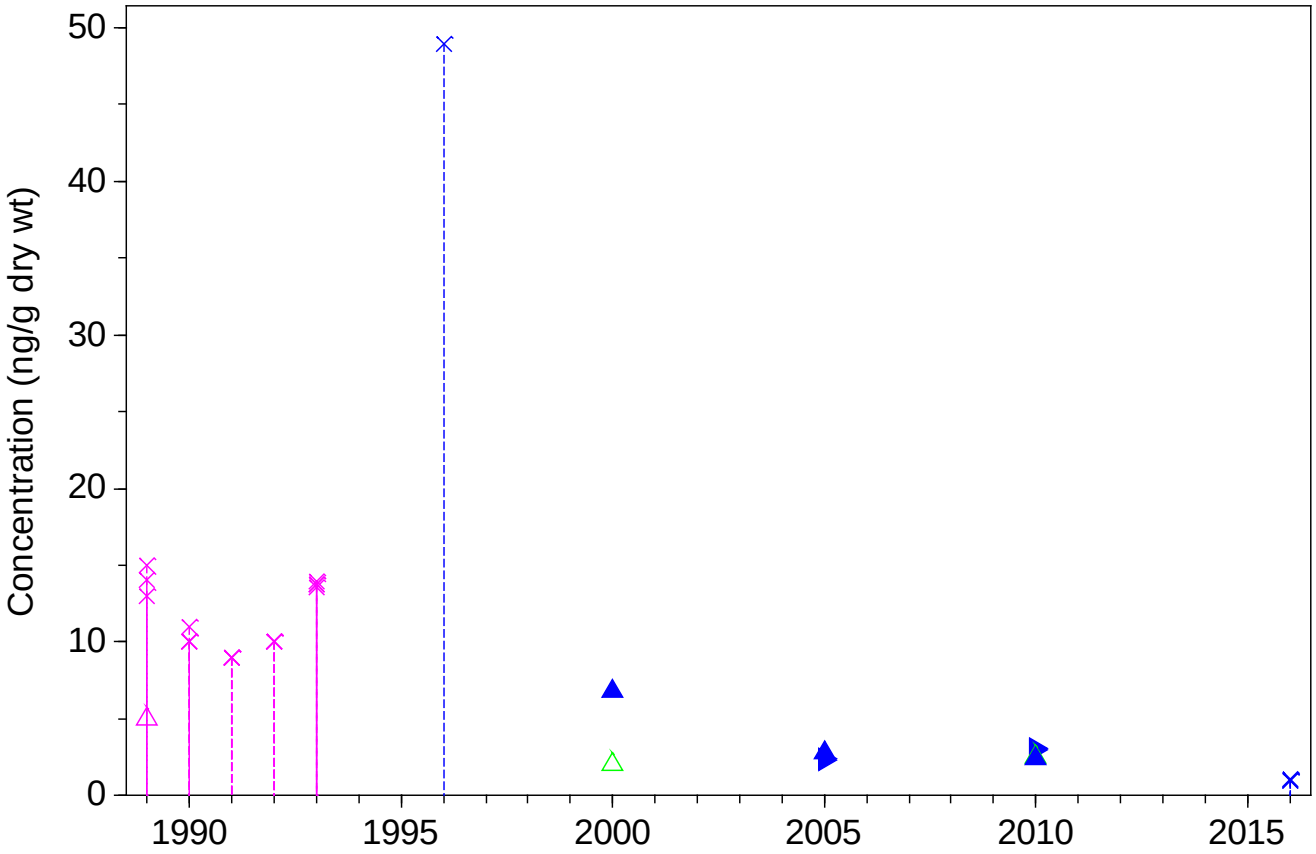
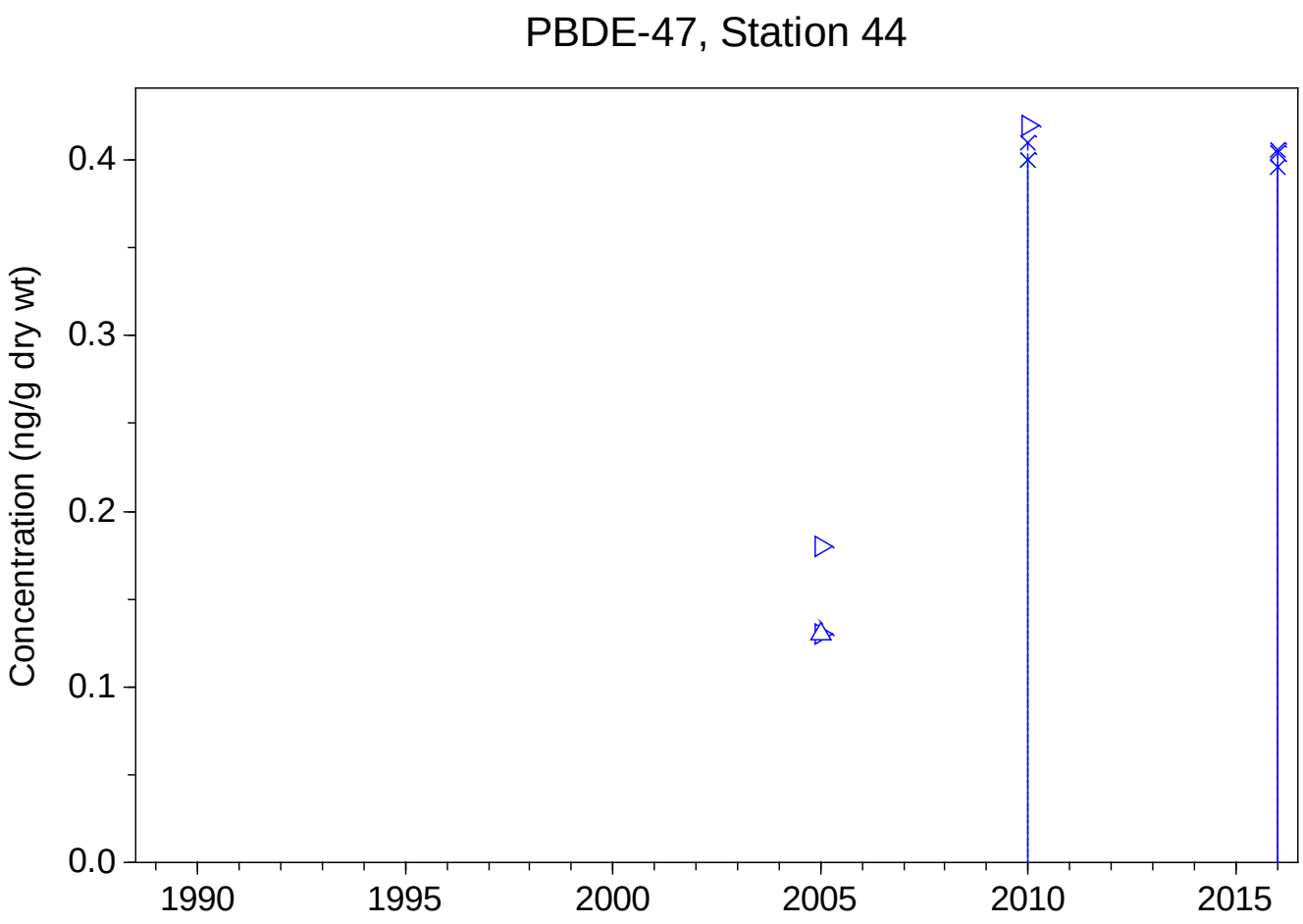
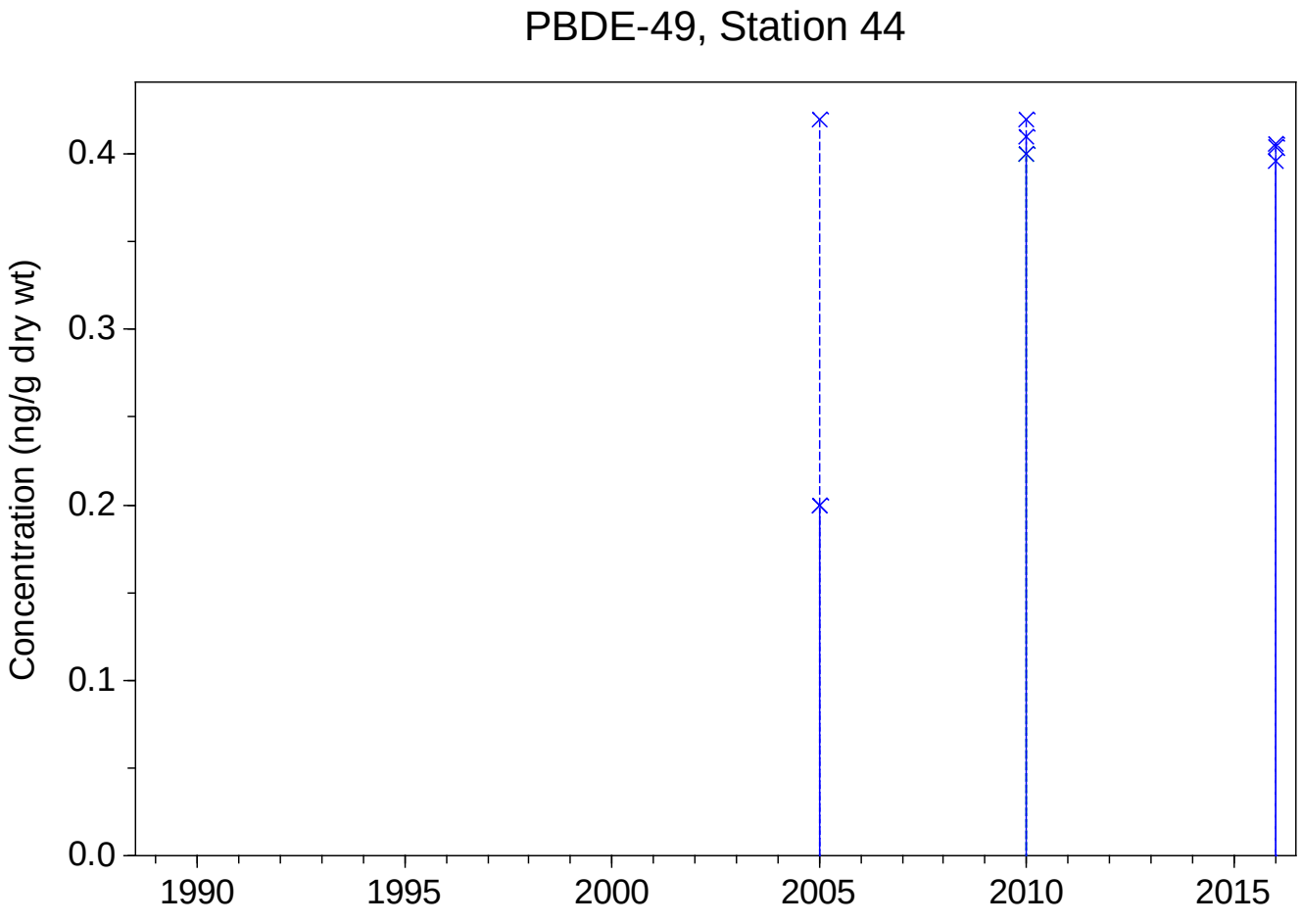
Carbazole, Station 44

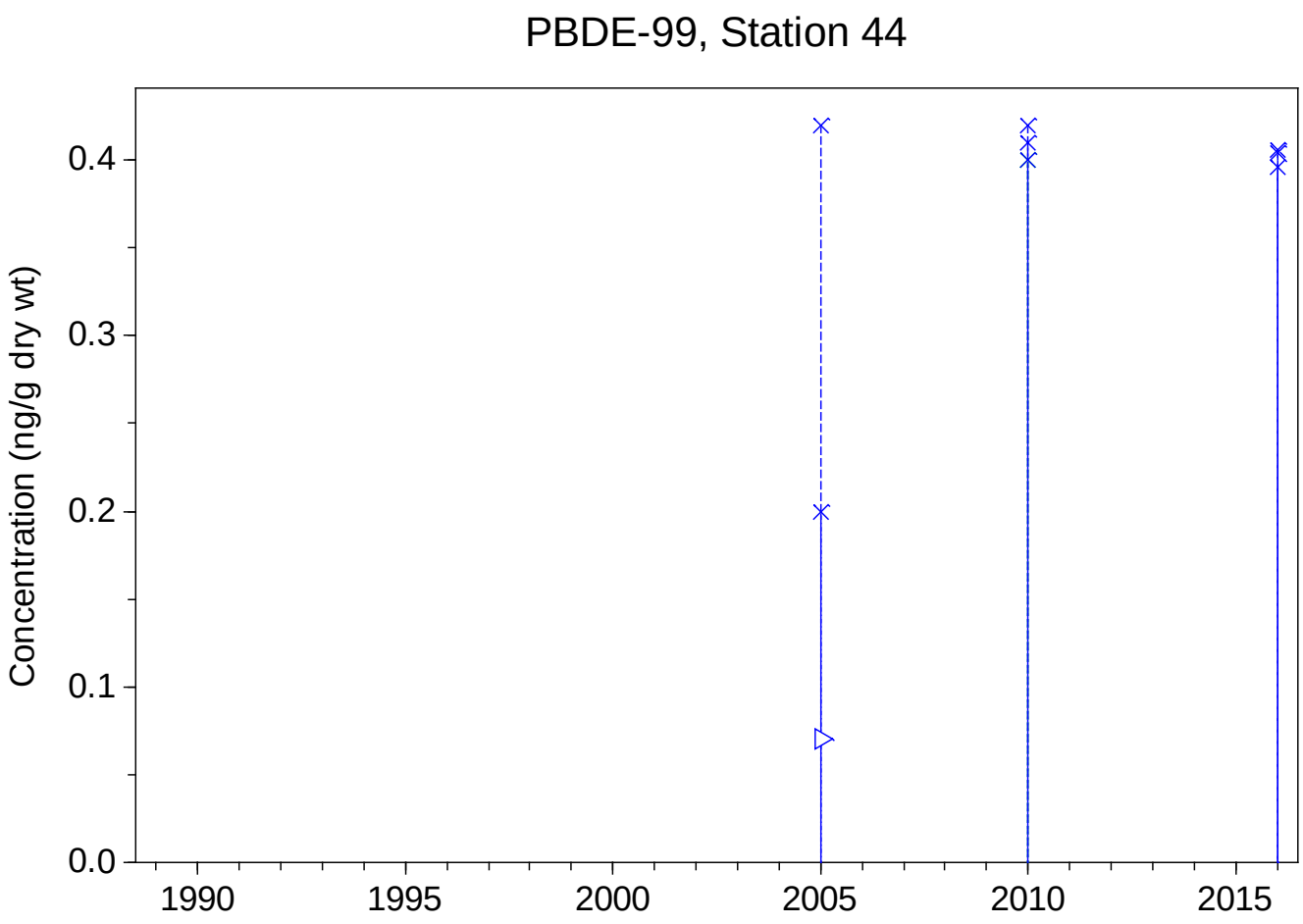


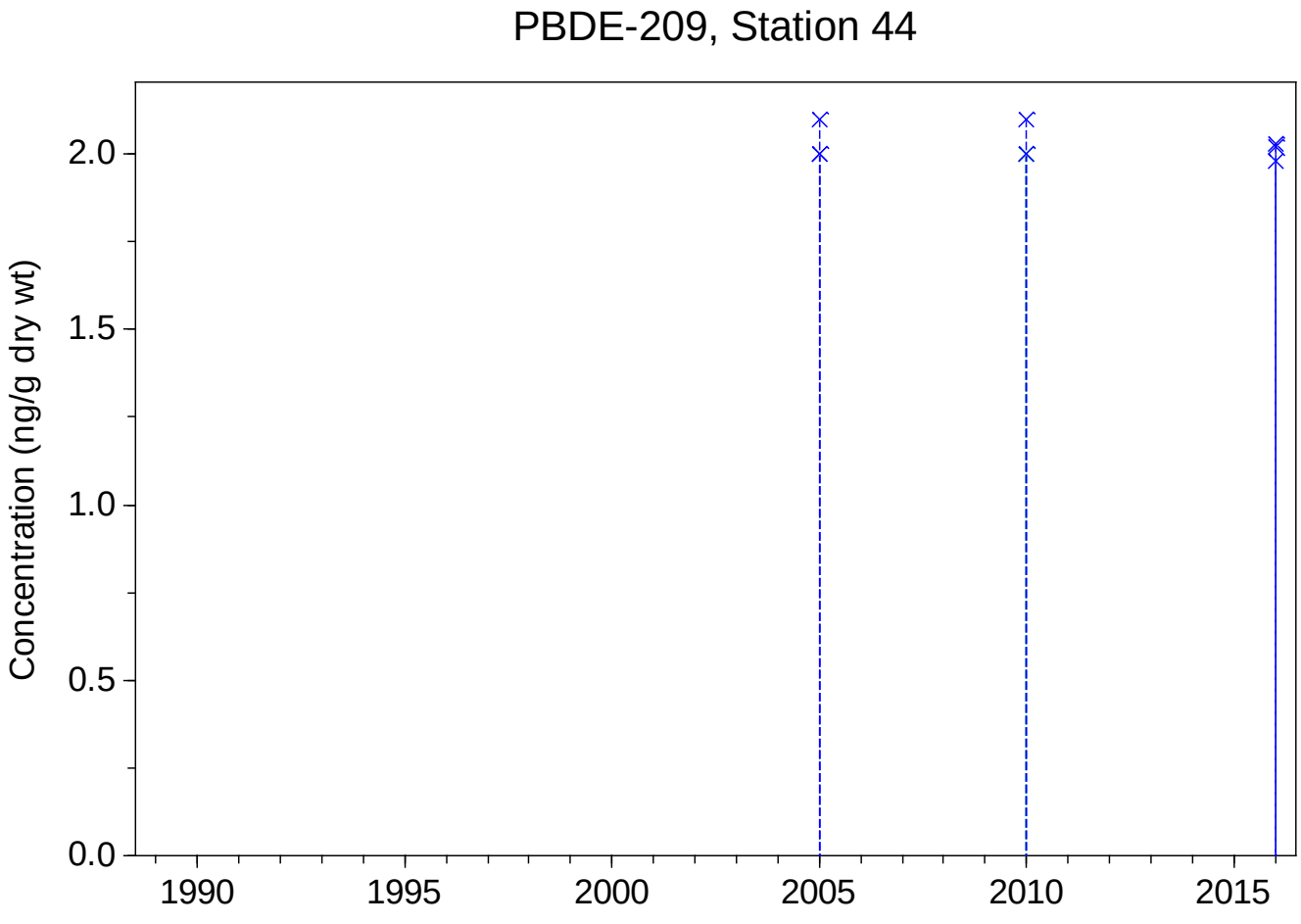
Dibenzofuran, Station 44



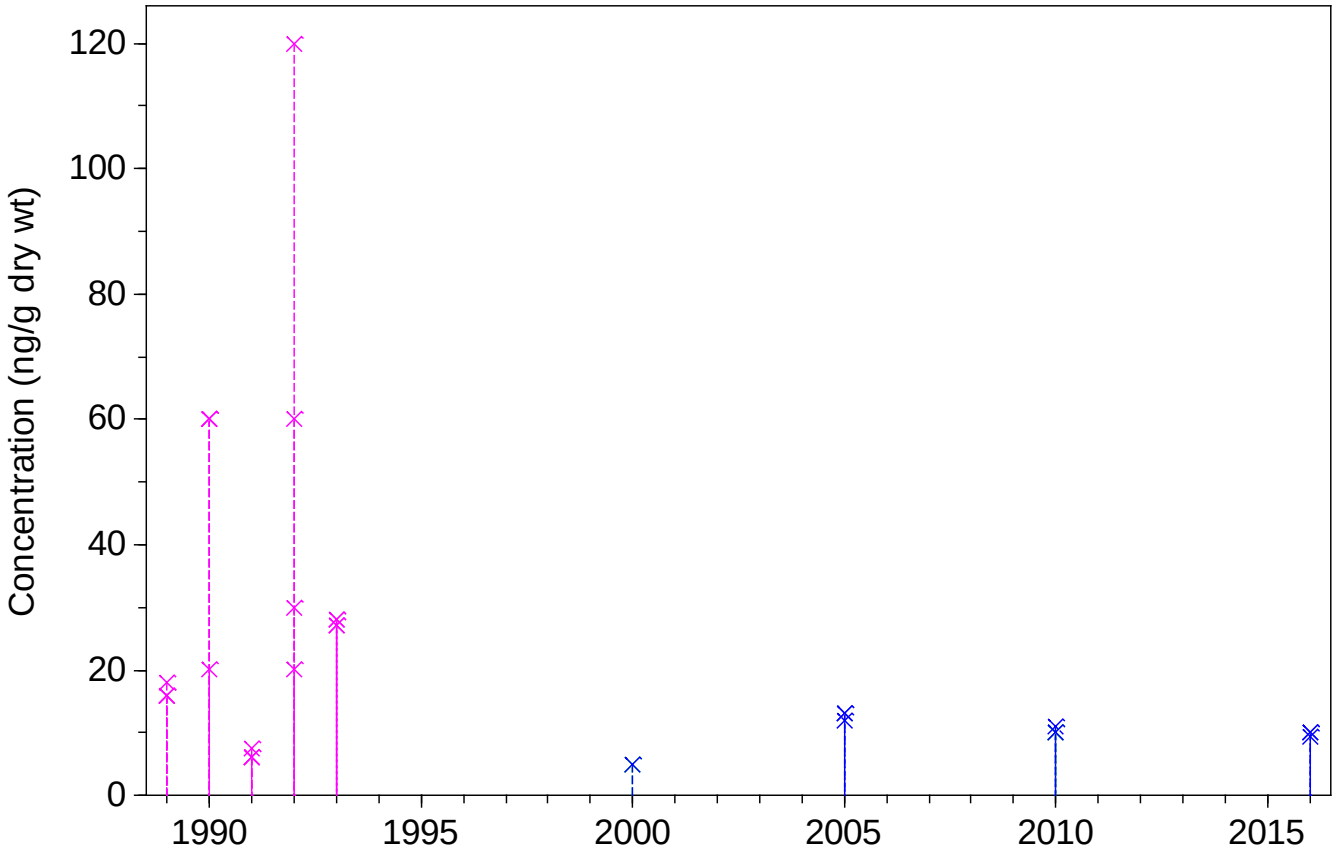

PBDE-47, Station 44
Concentration (ng/g dry wt)
0.0
0.1
0.2
0.3
0.4
1990
1995
2000
2005
2010
2015


PBDE-49, Station 44
Concentration (ng/g dry wt)
0.0
0.1
0.2
0.3
0.4
1990
1995
2000
2005
2010
2015

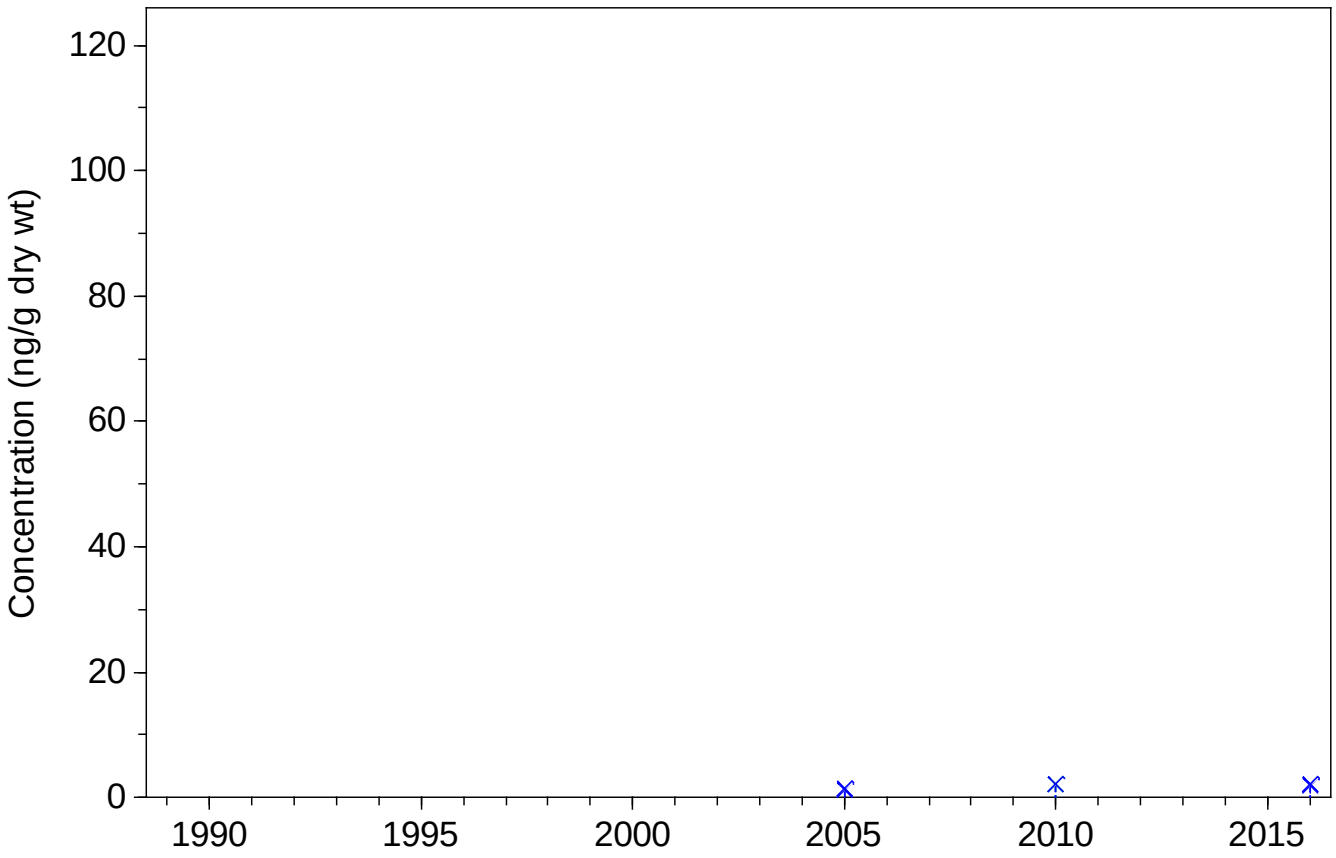

PBDE-99, Station 44
Concentration (ng/g dry wt)
0.0
0.1
0.2
0.3
0.4
1990
1995
2000
2005
2010
2015


PBDE-209, Station 44
Concentration (ng/g dry wt)
0.0
0.5
1.0
1.5
2.0
1990
1995
2000
2005
2010
2015

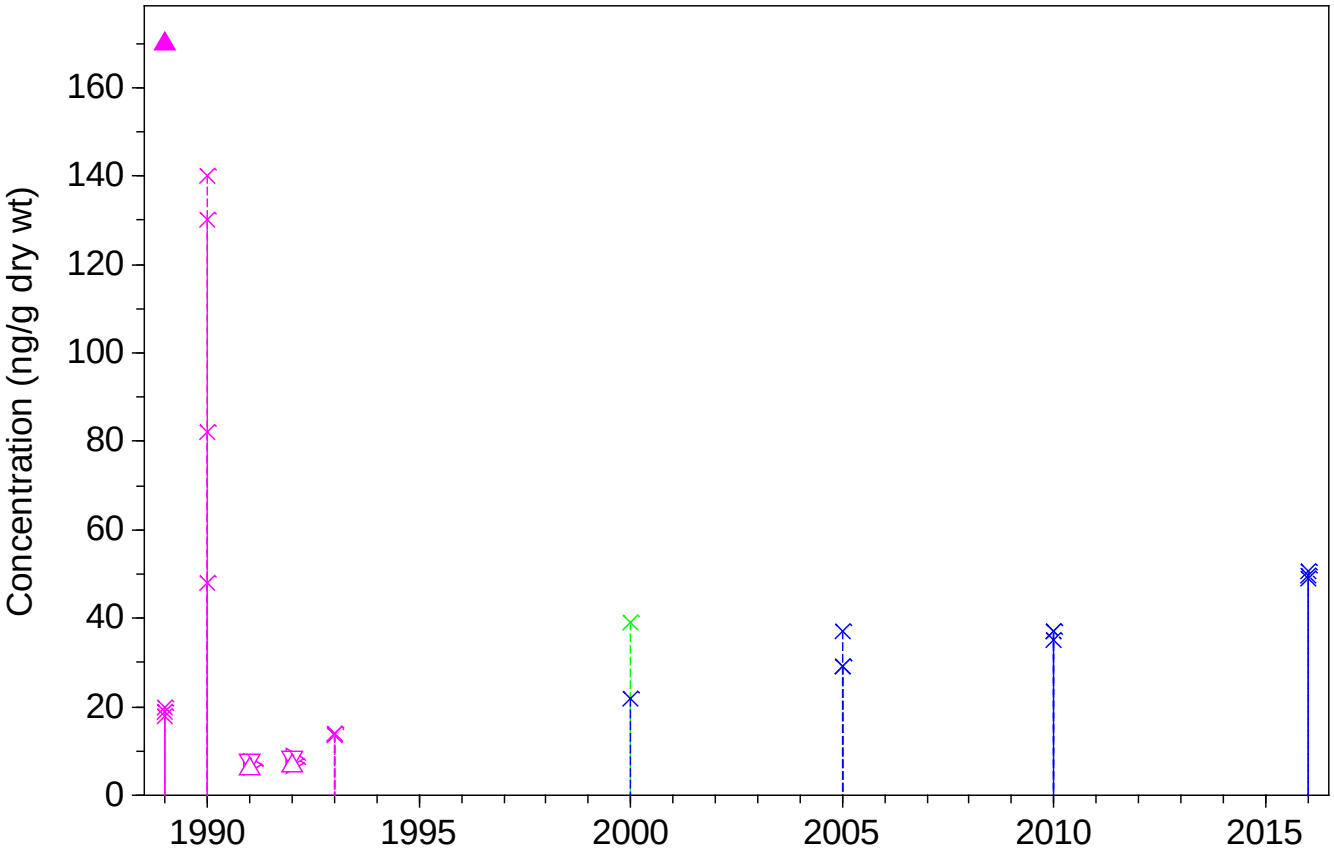
Total Aroclors, Station 44



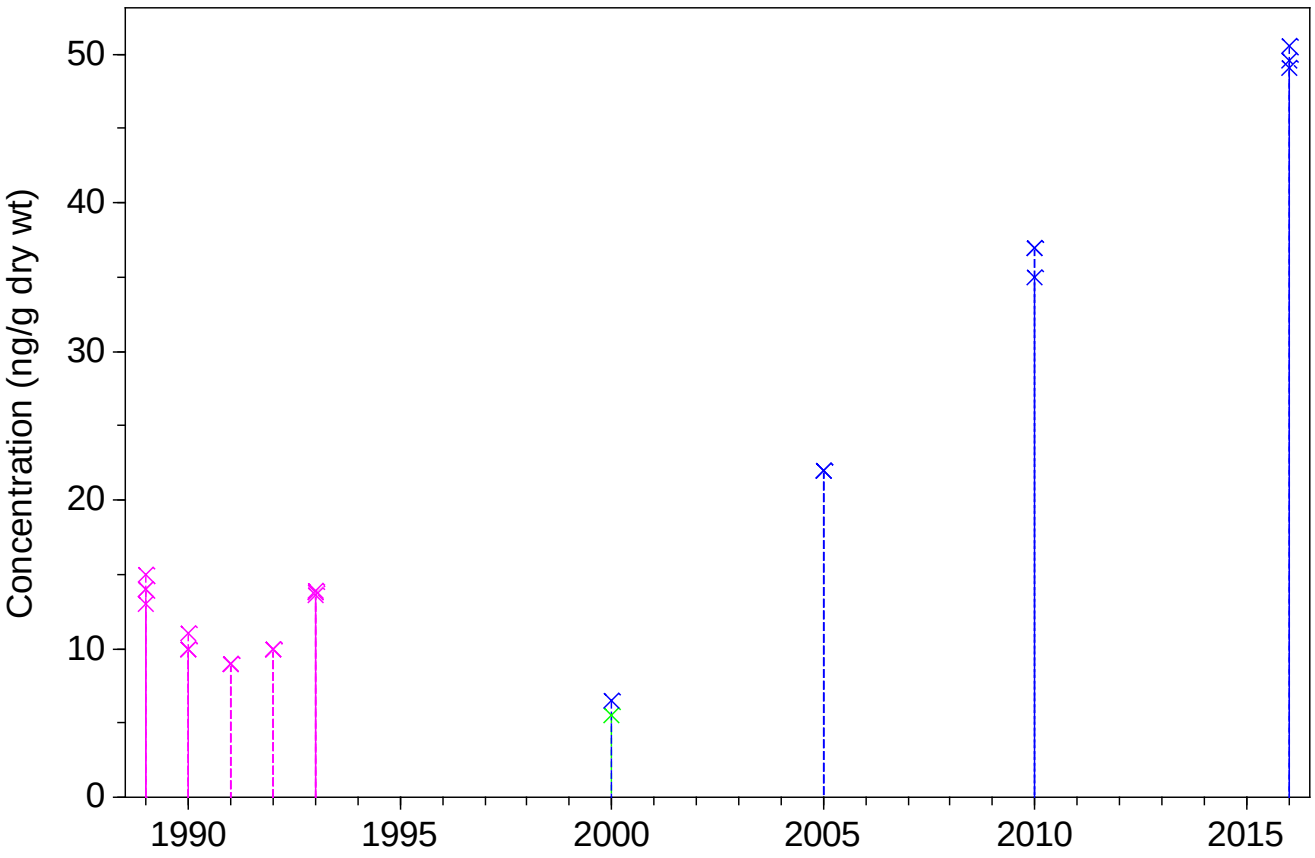
Total PCB Congeners x 2, Station 44



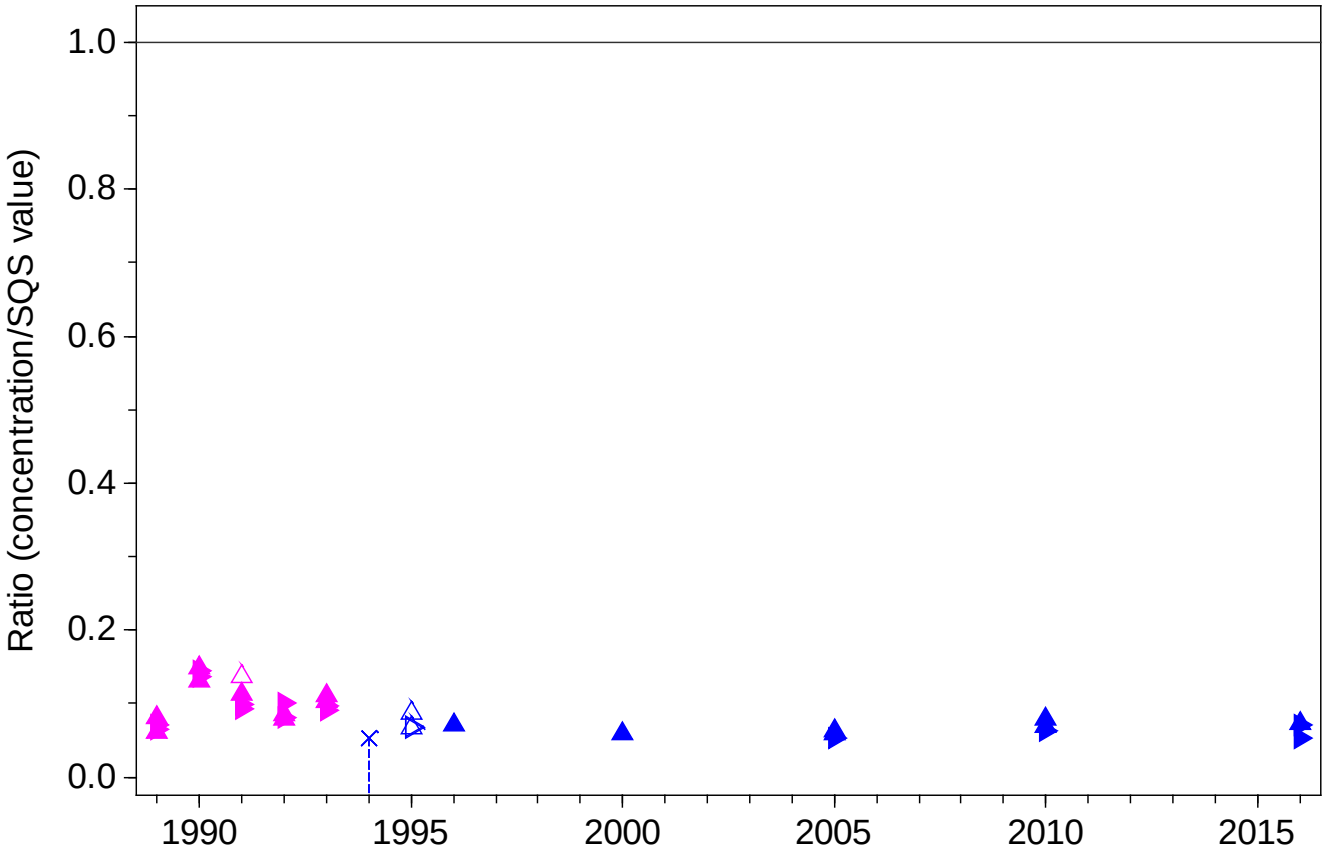
Bis(2-ethylhexyl)phthalate, Station 44



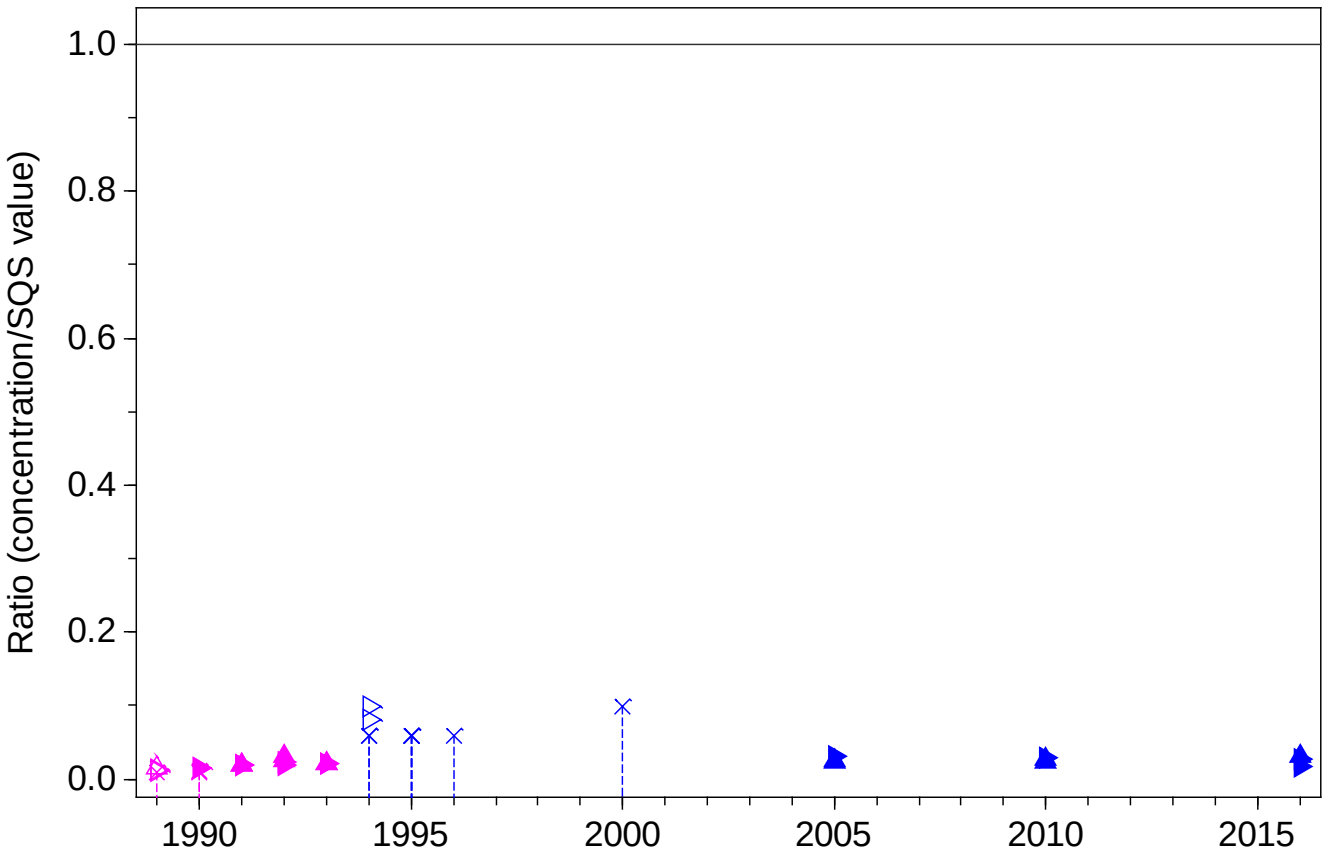
Butylbenzylphthalate, Station 44



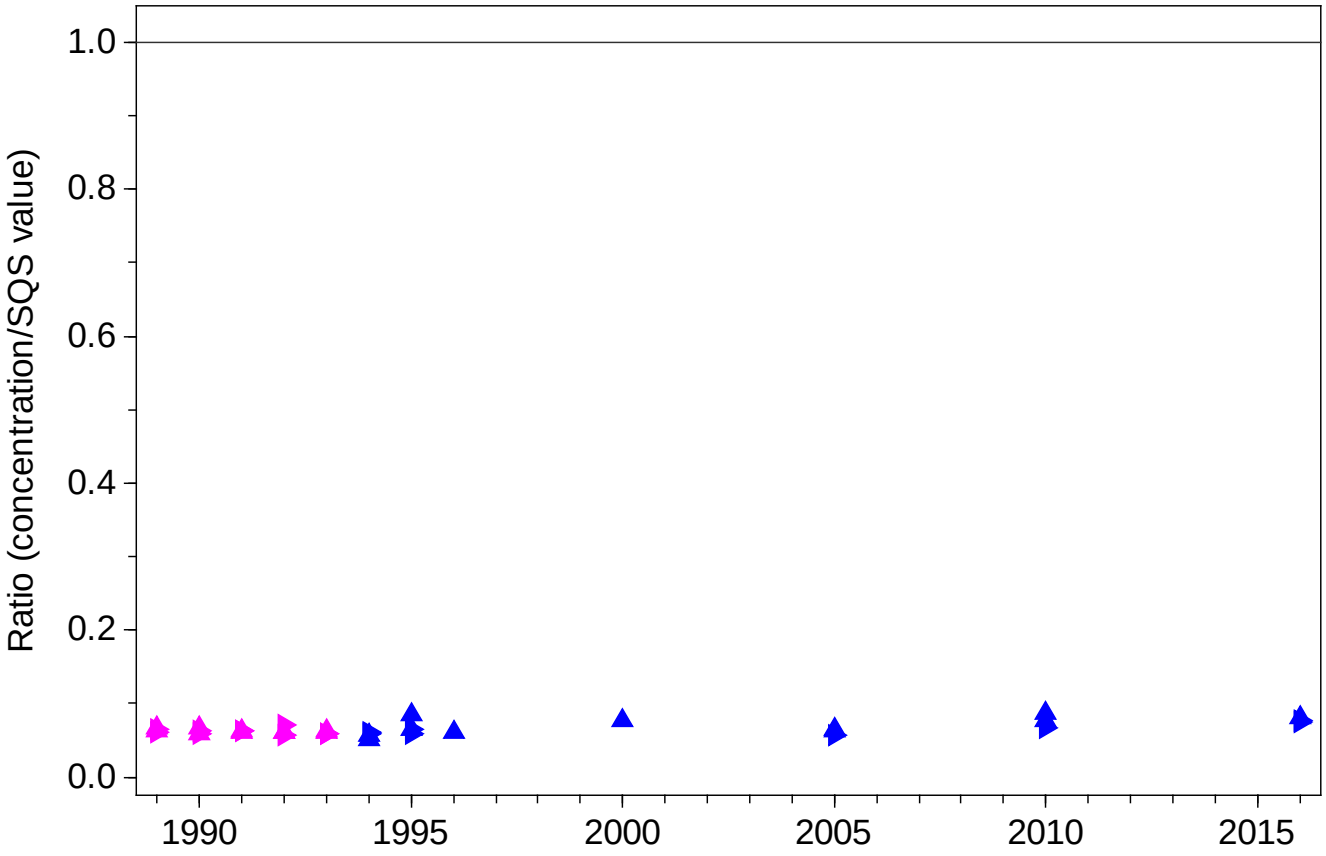
SQS quotient, Arsenic, Station 44



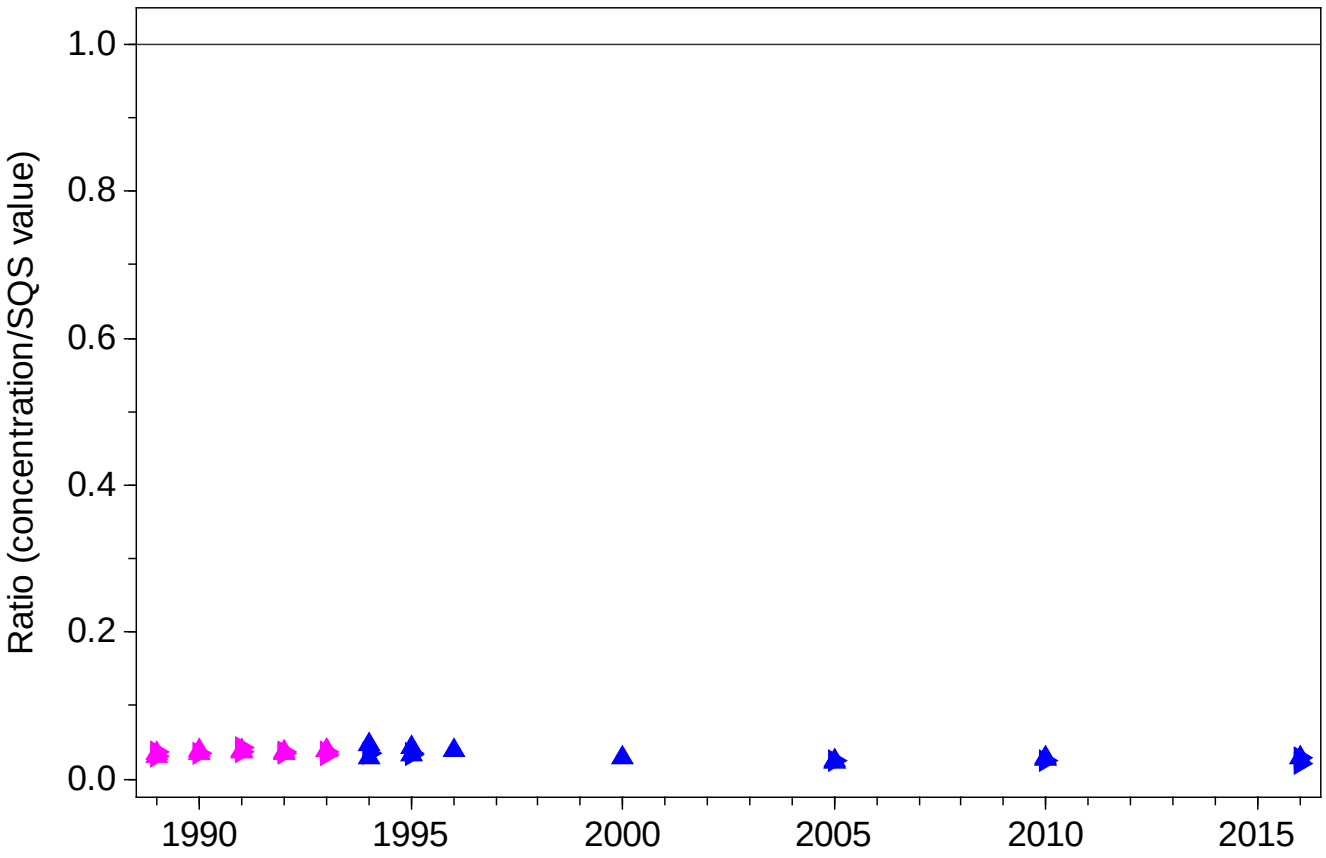
SQS quotient, Cadmium, Station 44



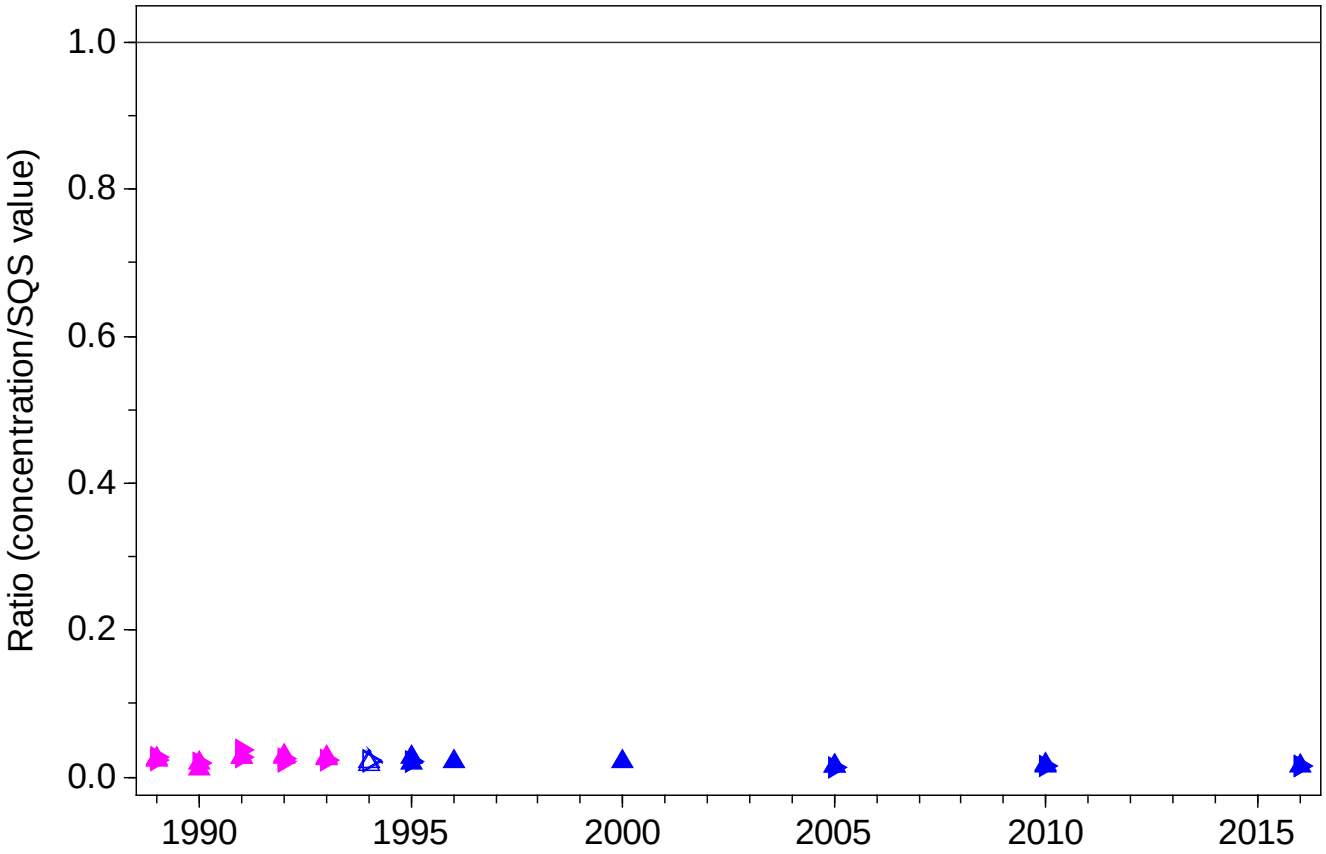
SQS quotient, Chromium, Station 44



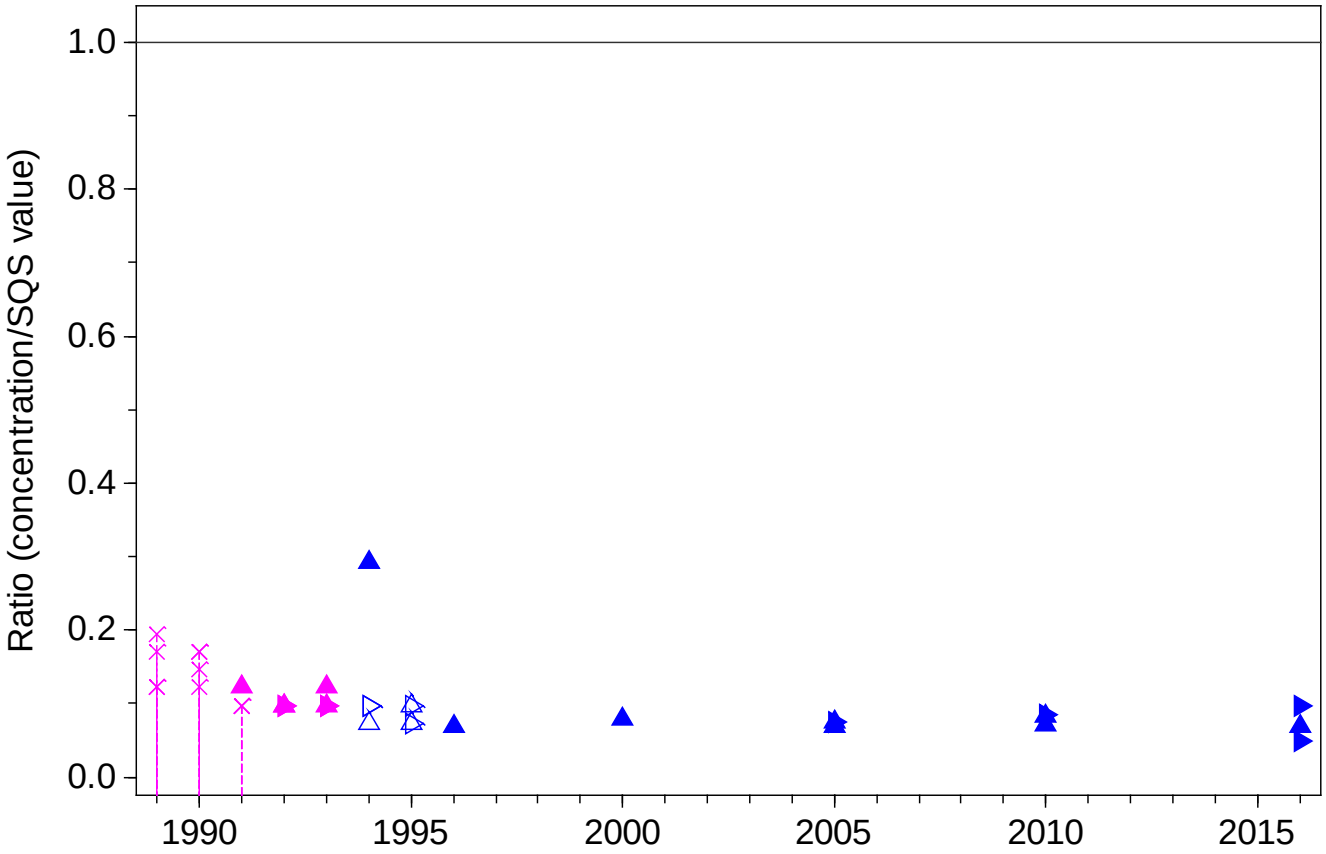
SQS quotient, Copper, Station 44



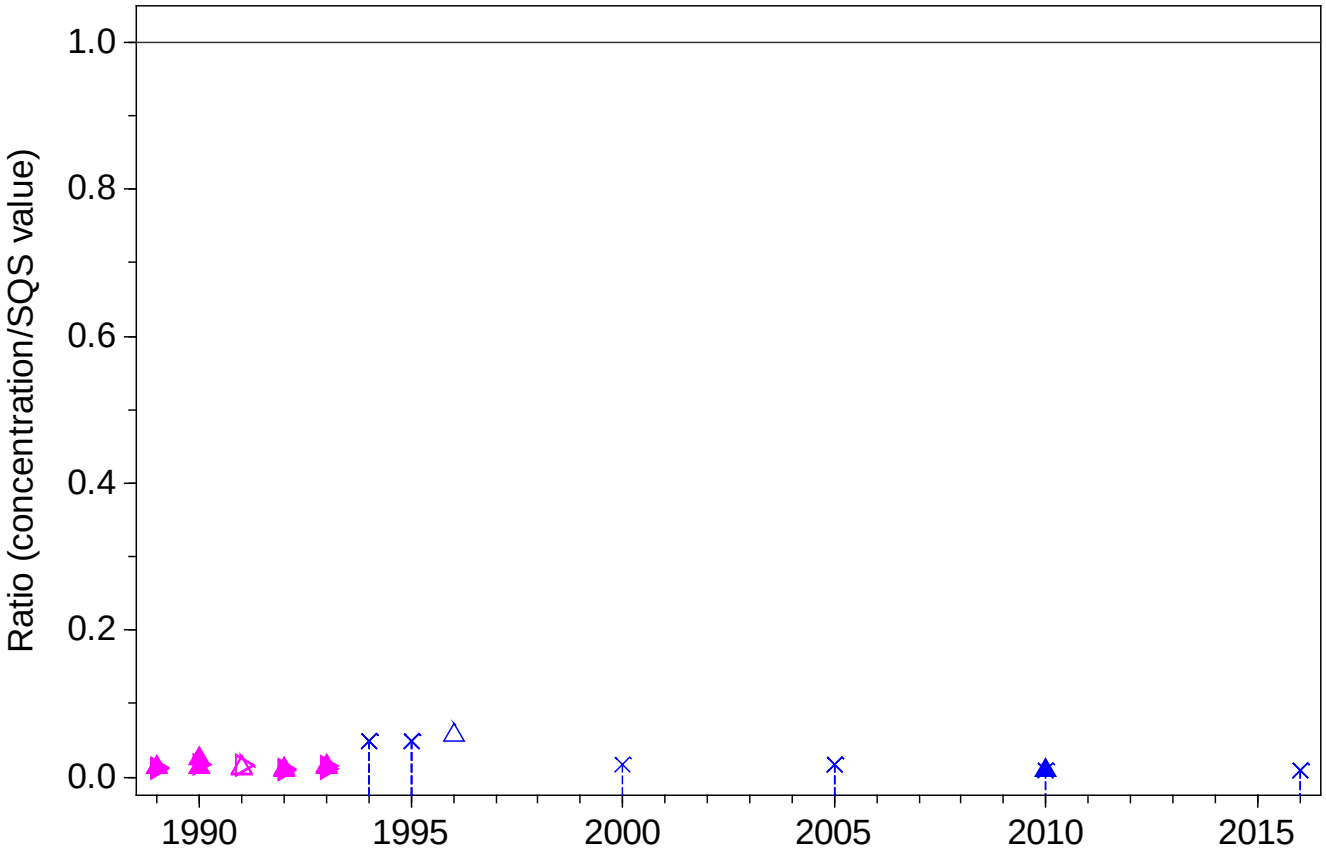
SQS quotient, Lead, Station 44



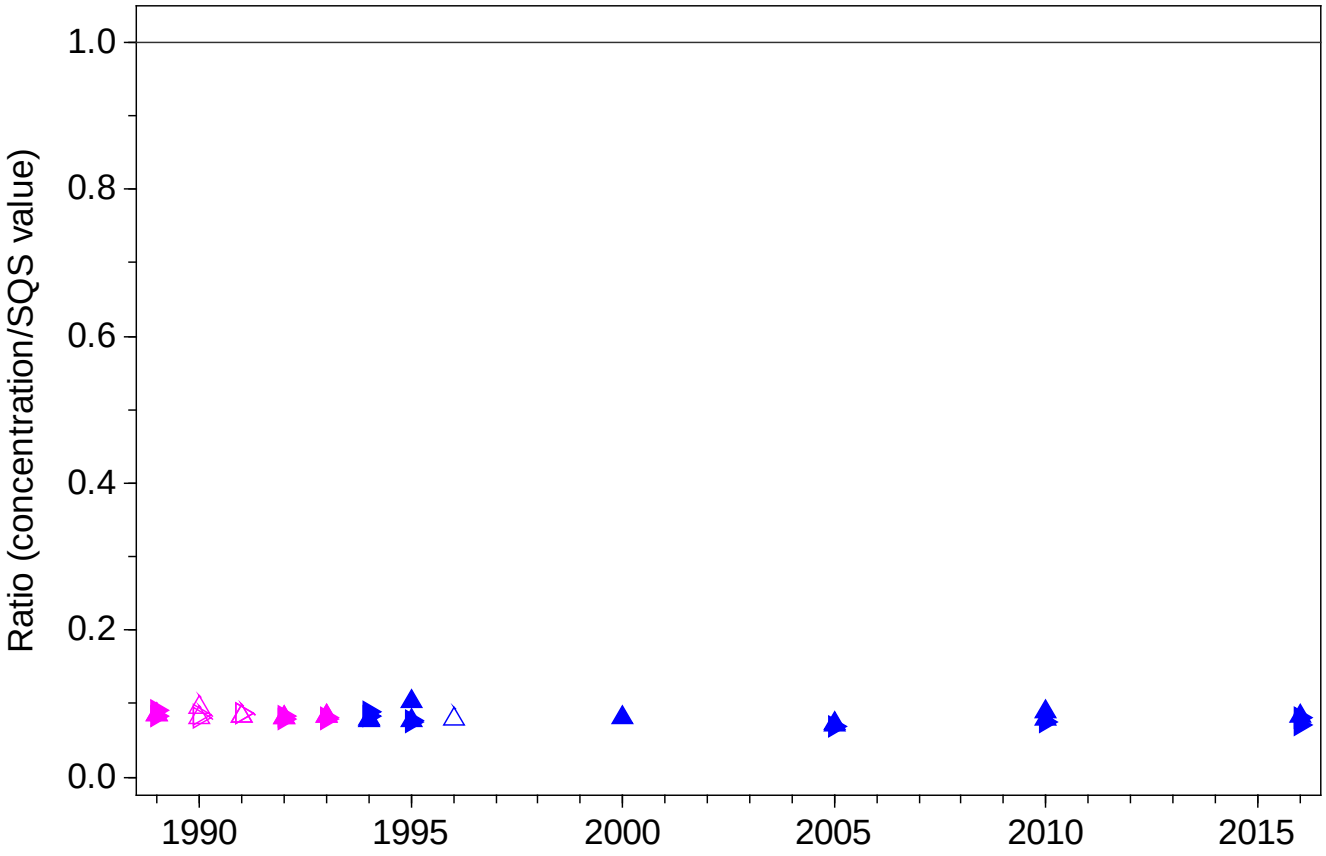
SQS quotient, Mercury, Station 44



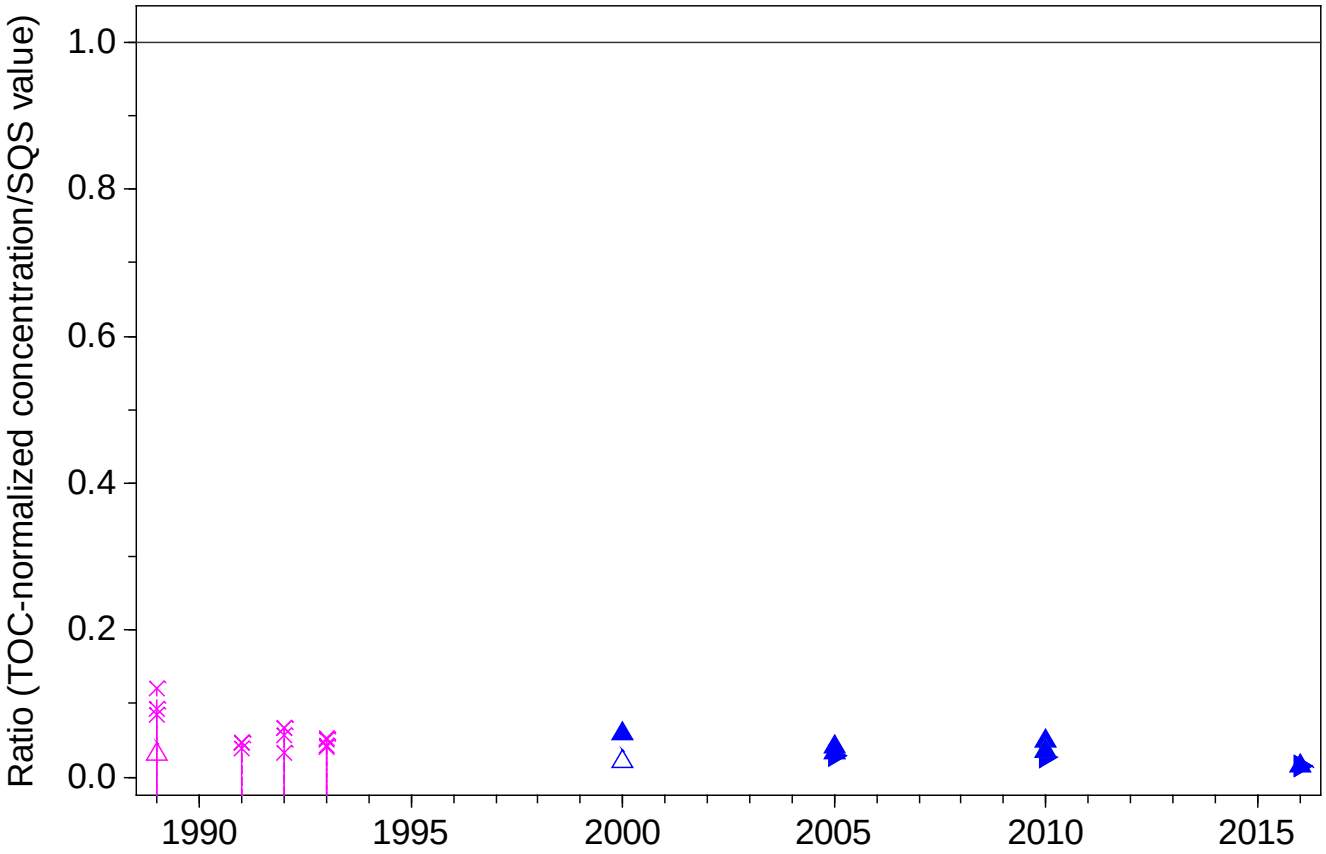
SQS quotient, Silver, Station 44



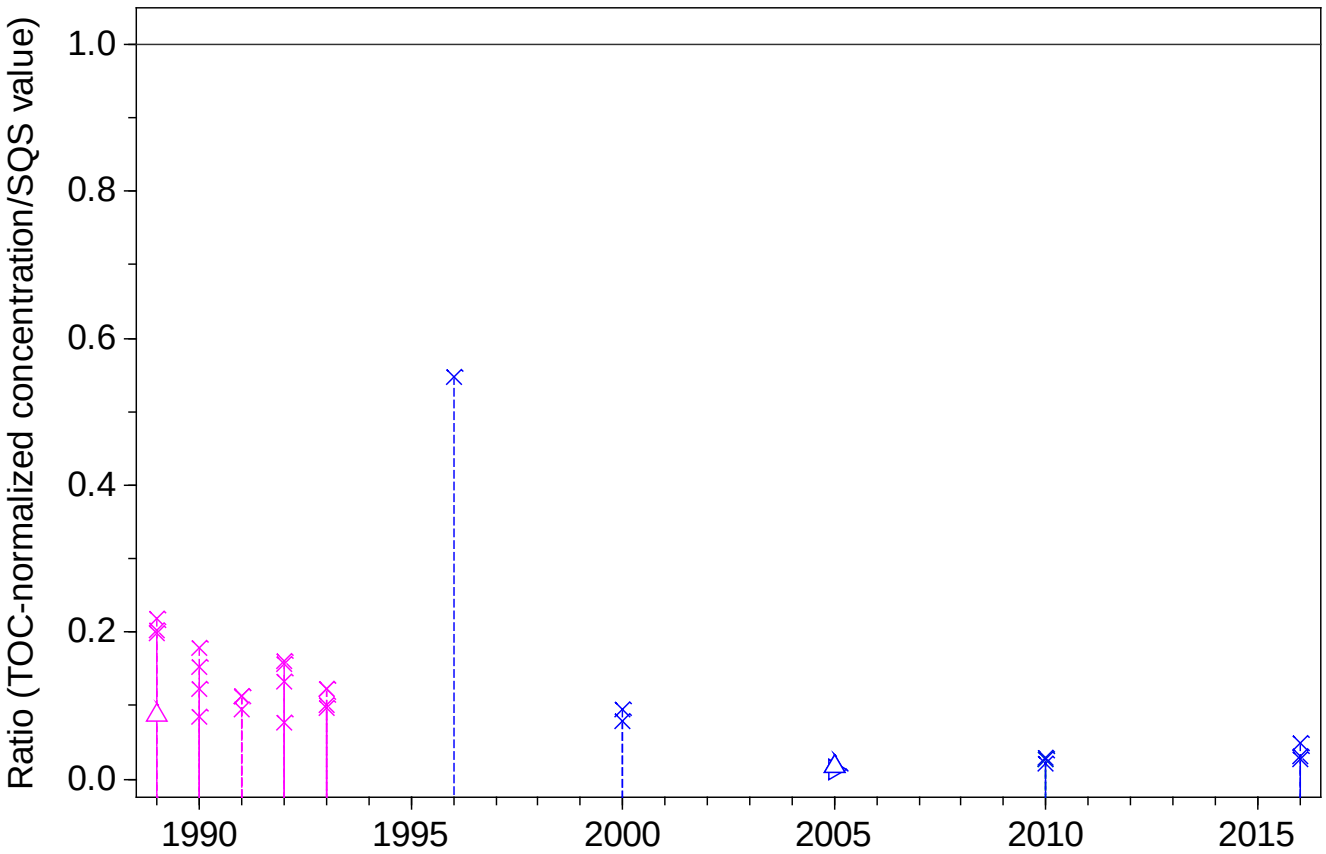
SQS quotient, Zinc, Station 44



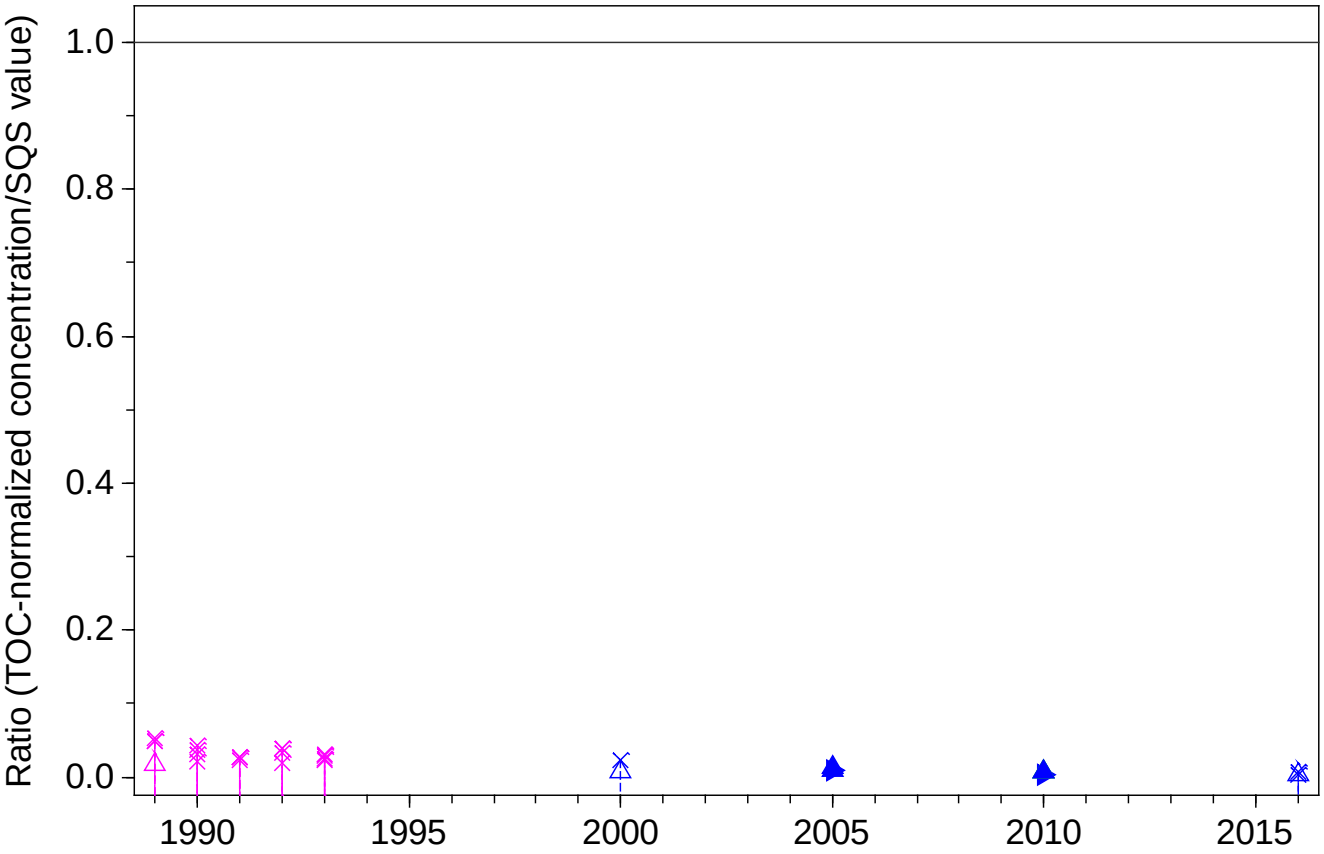
SQS quotient, 2-Methylnaphthalene, Station 44



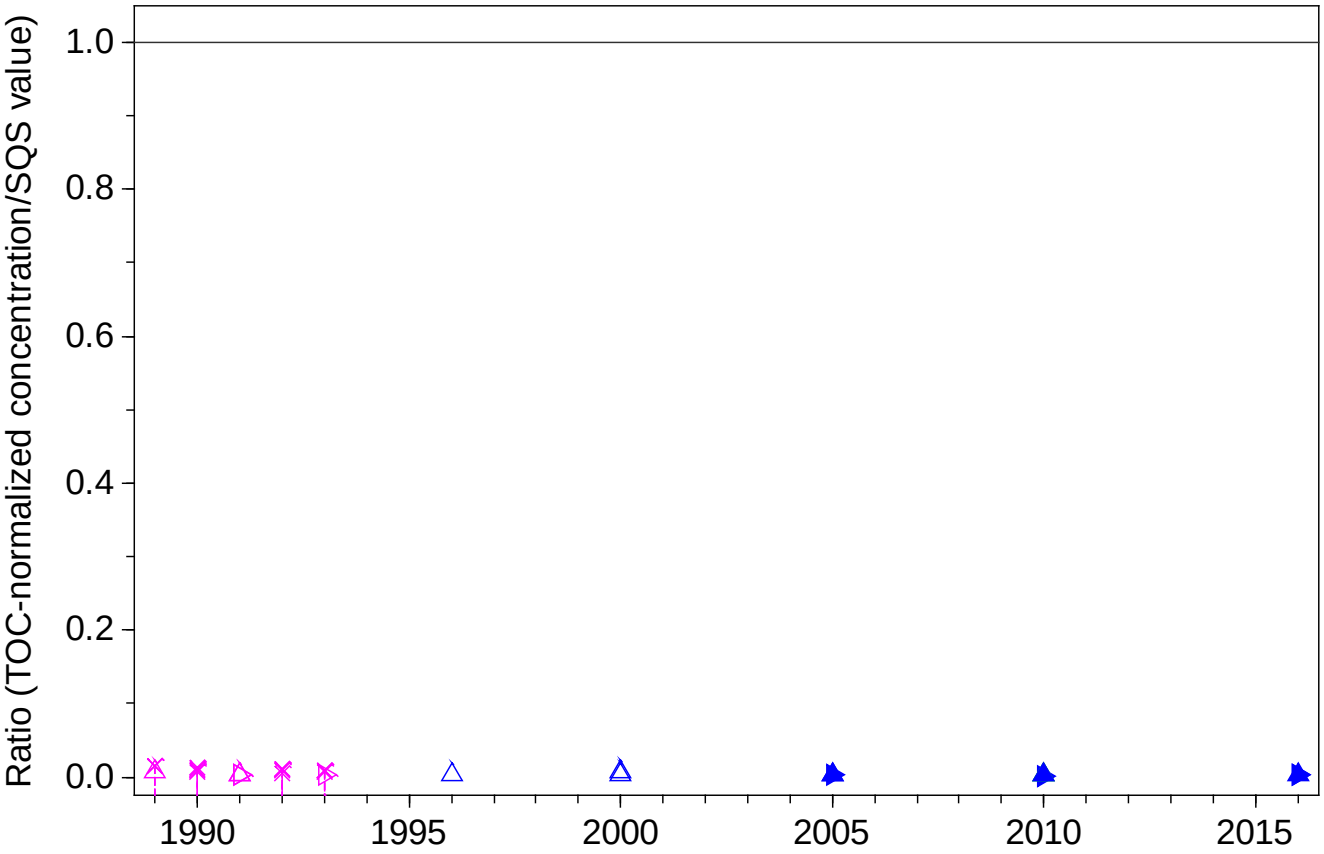
SQS quotient, Acenaphthene, Station 44



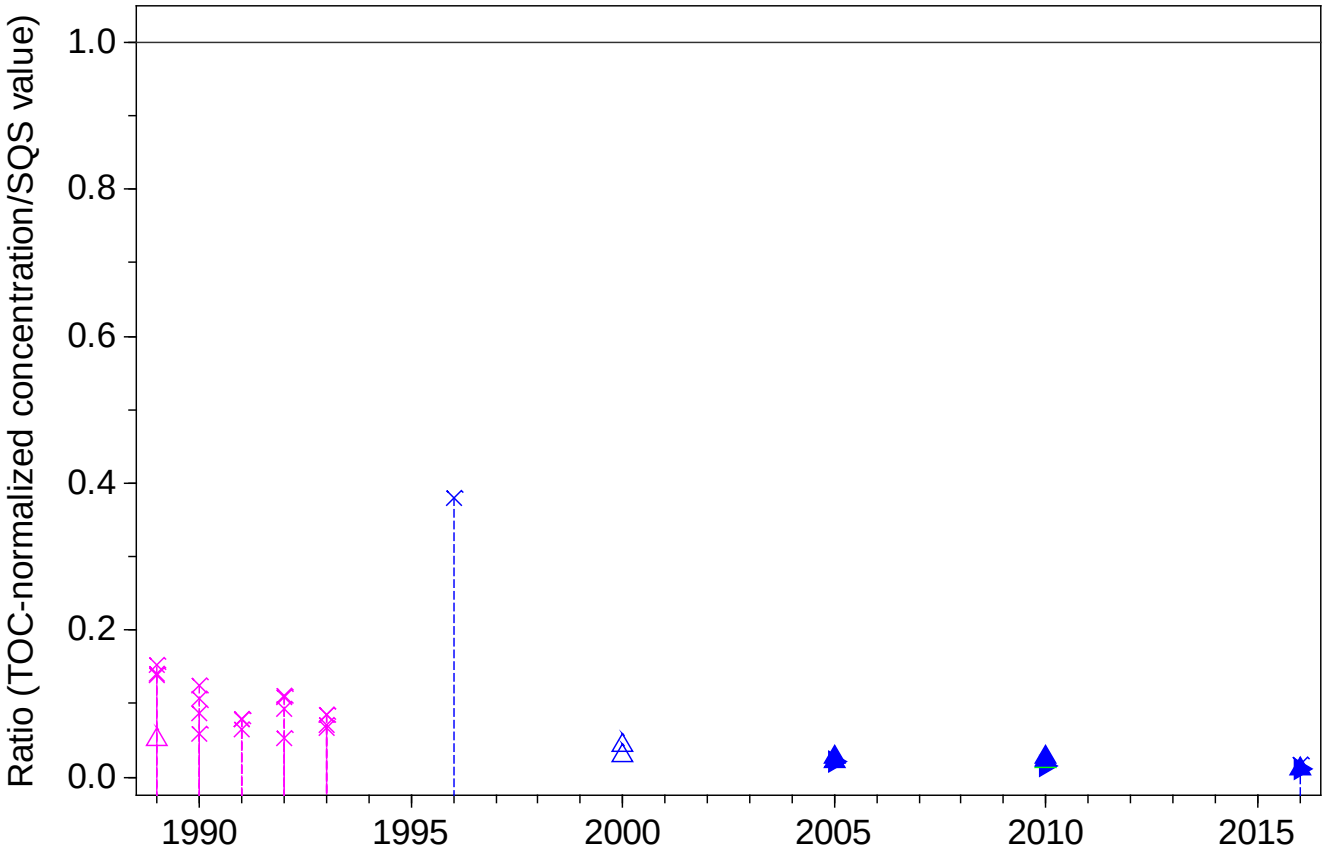
SQS quotient, Acenaphthylene, Station 44



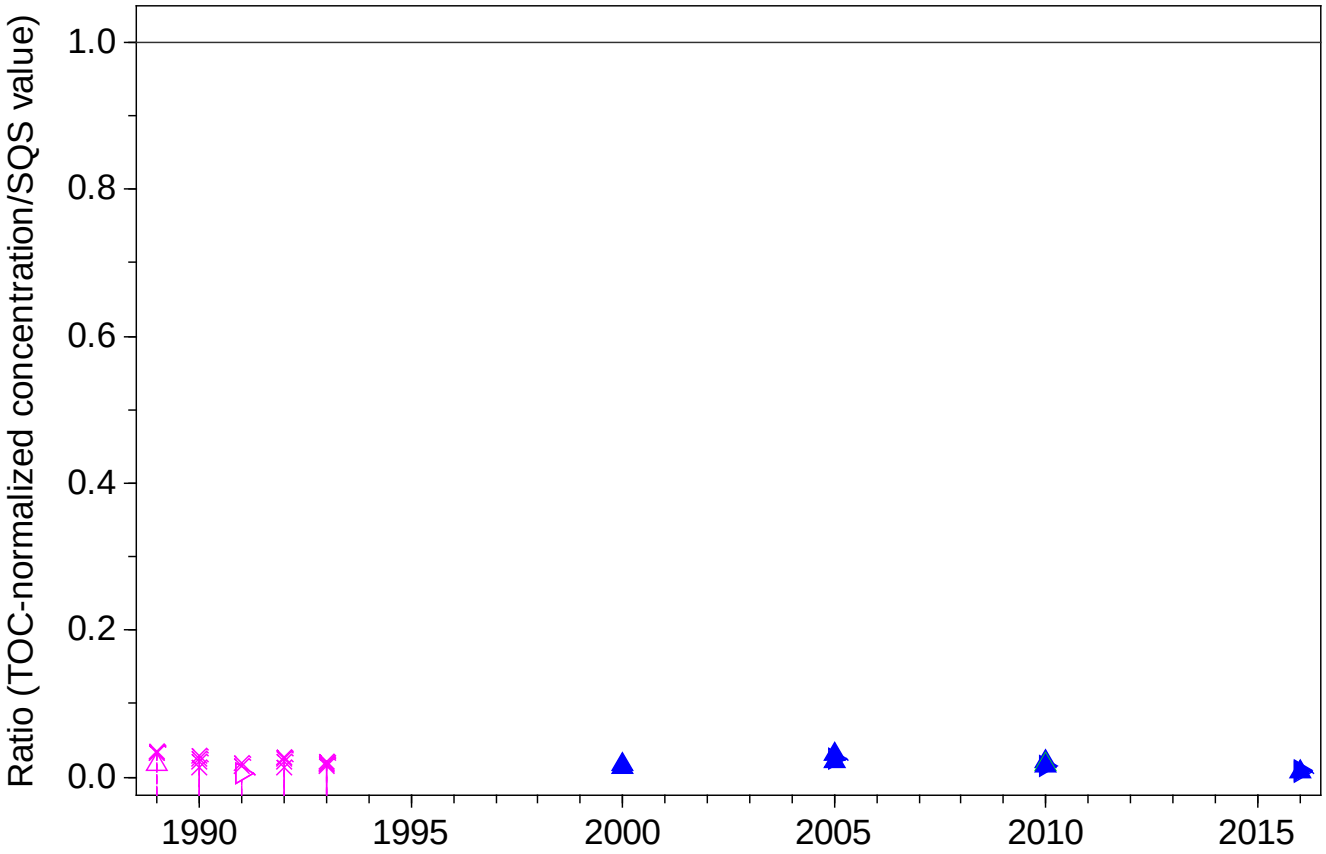
SQS quotient, Anthracene, Station 44



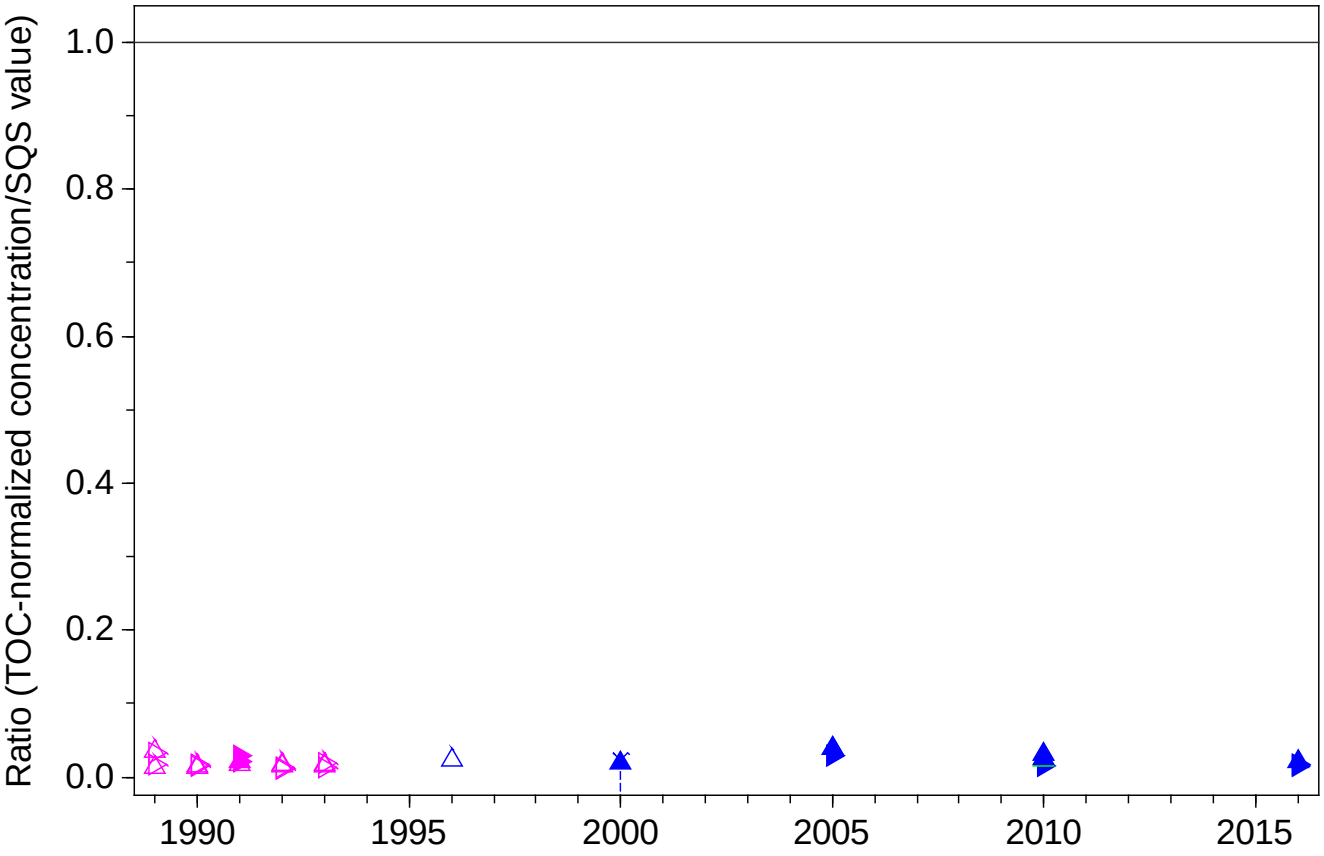
SQS quotient, Fluorene, Station 44



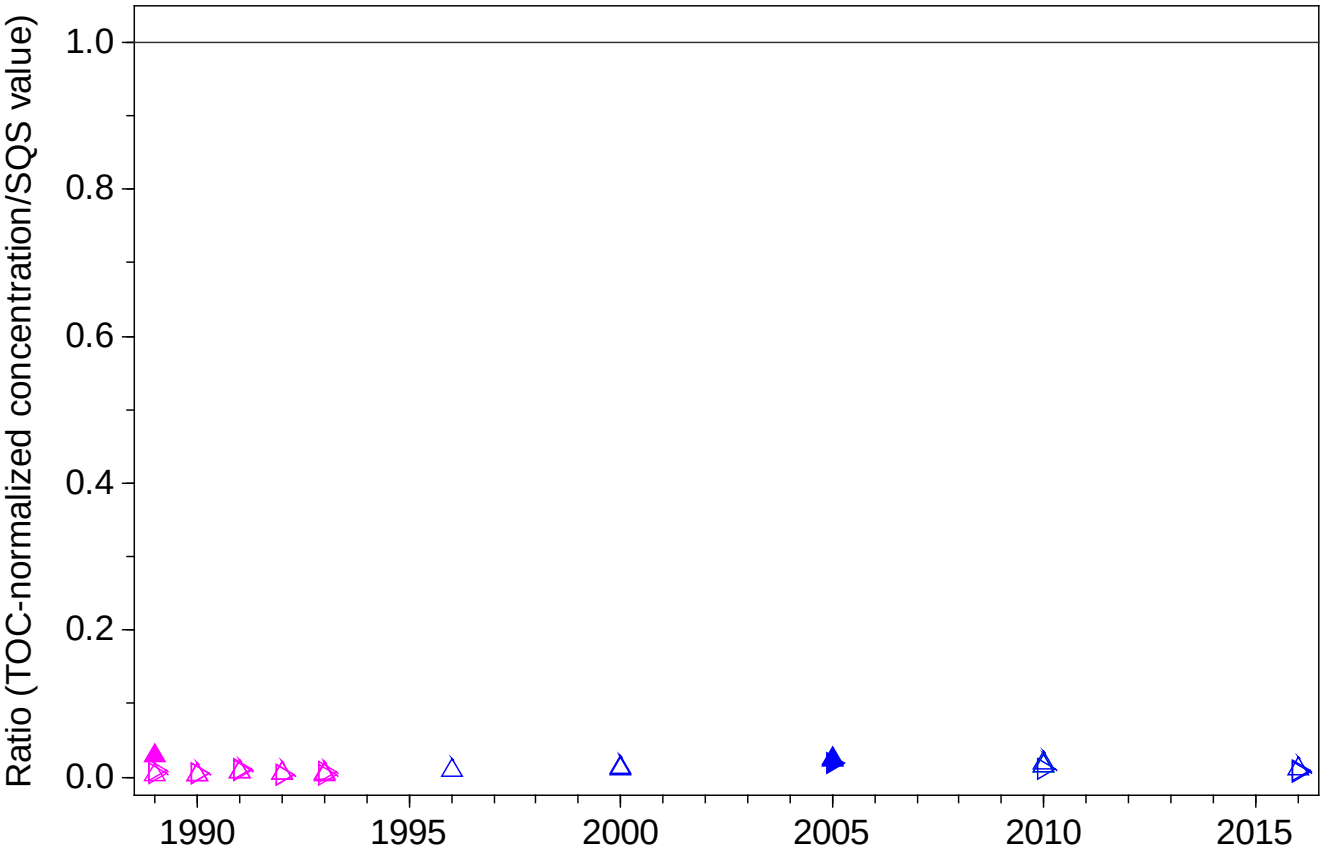
SQS quotient, Naphthalene, Station 44



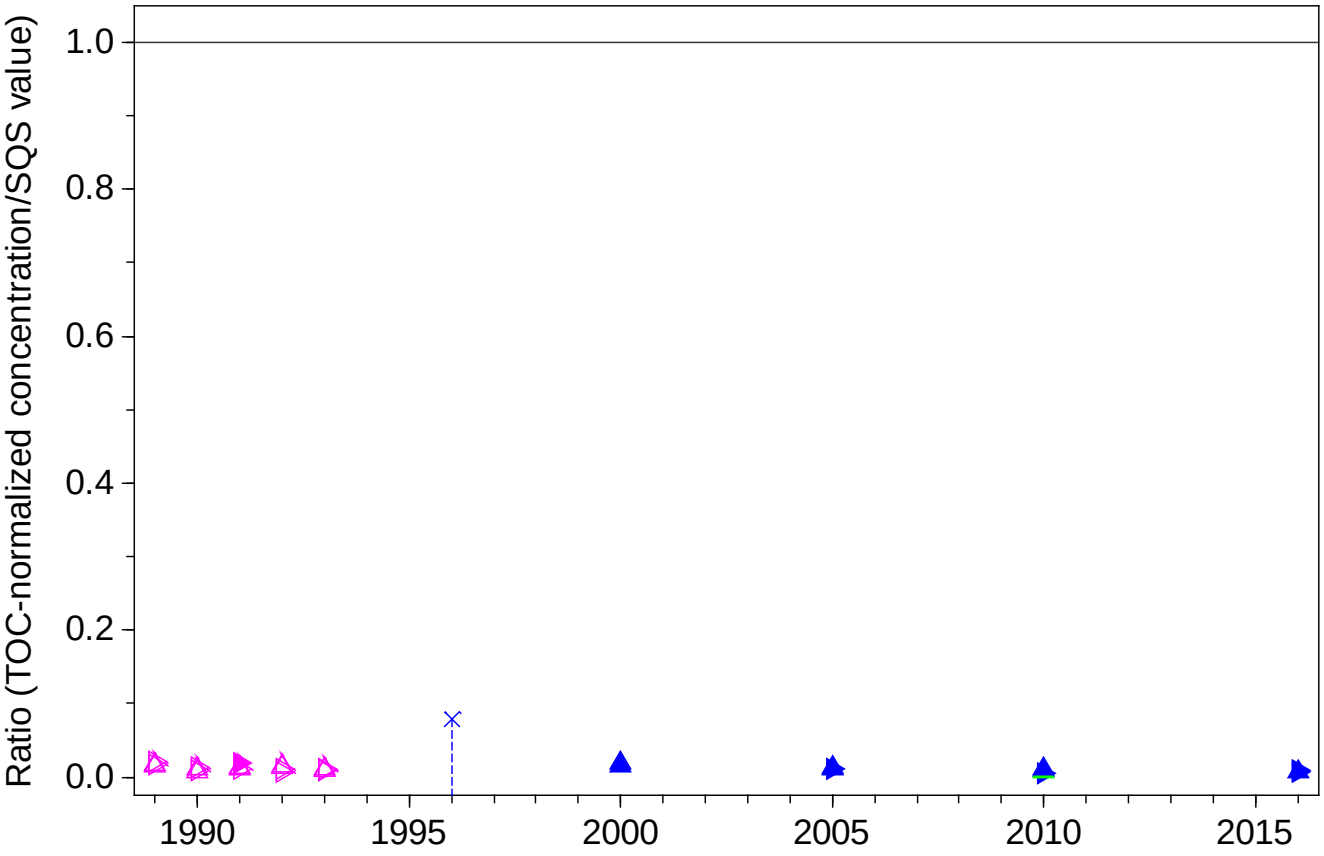
SQS quotient, Phenanthrene, Station 44



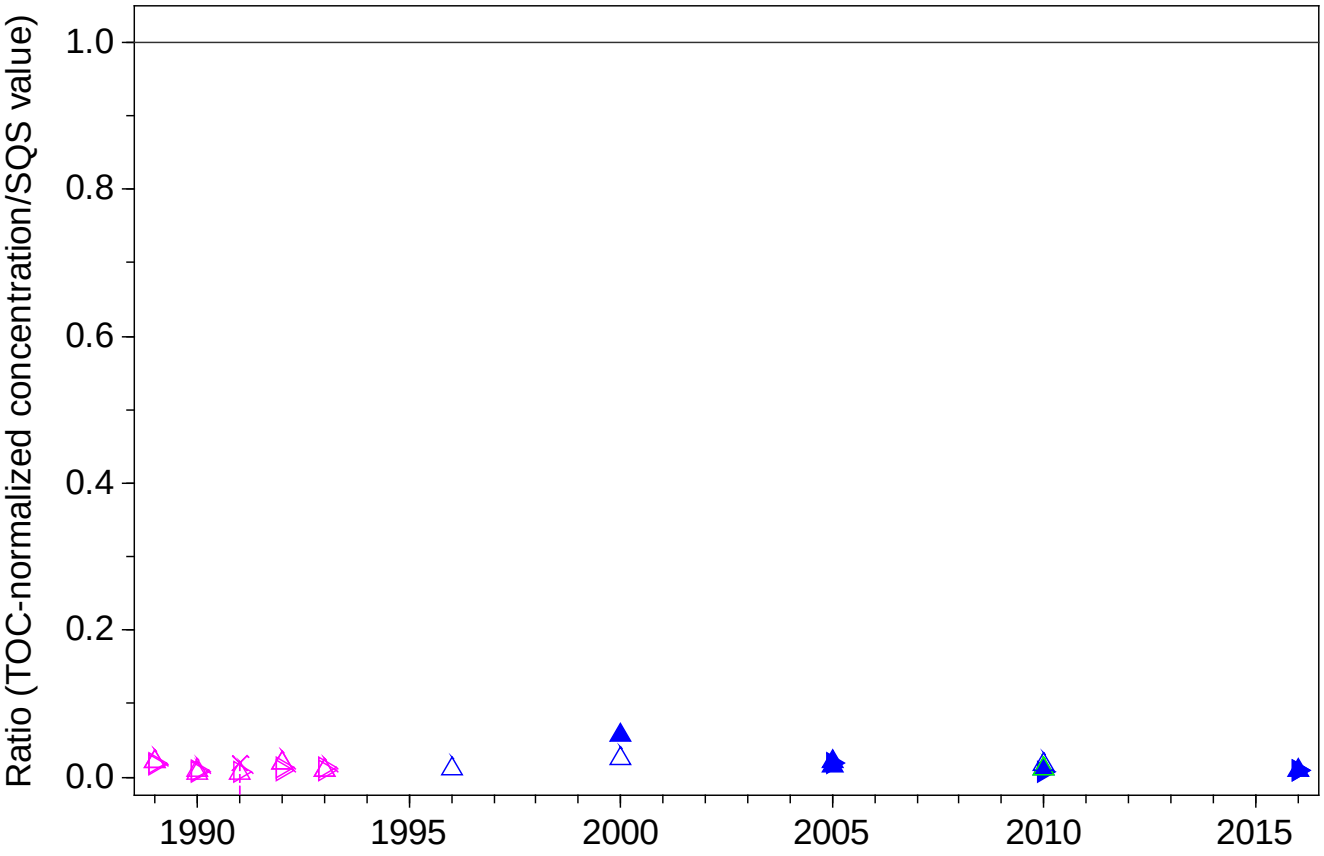
SQS quotient, Total LPAH, Station 44



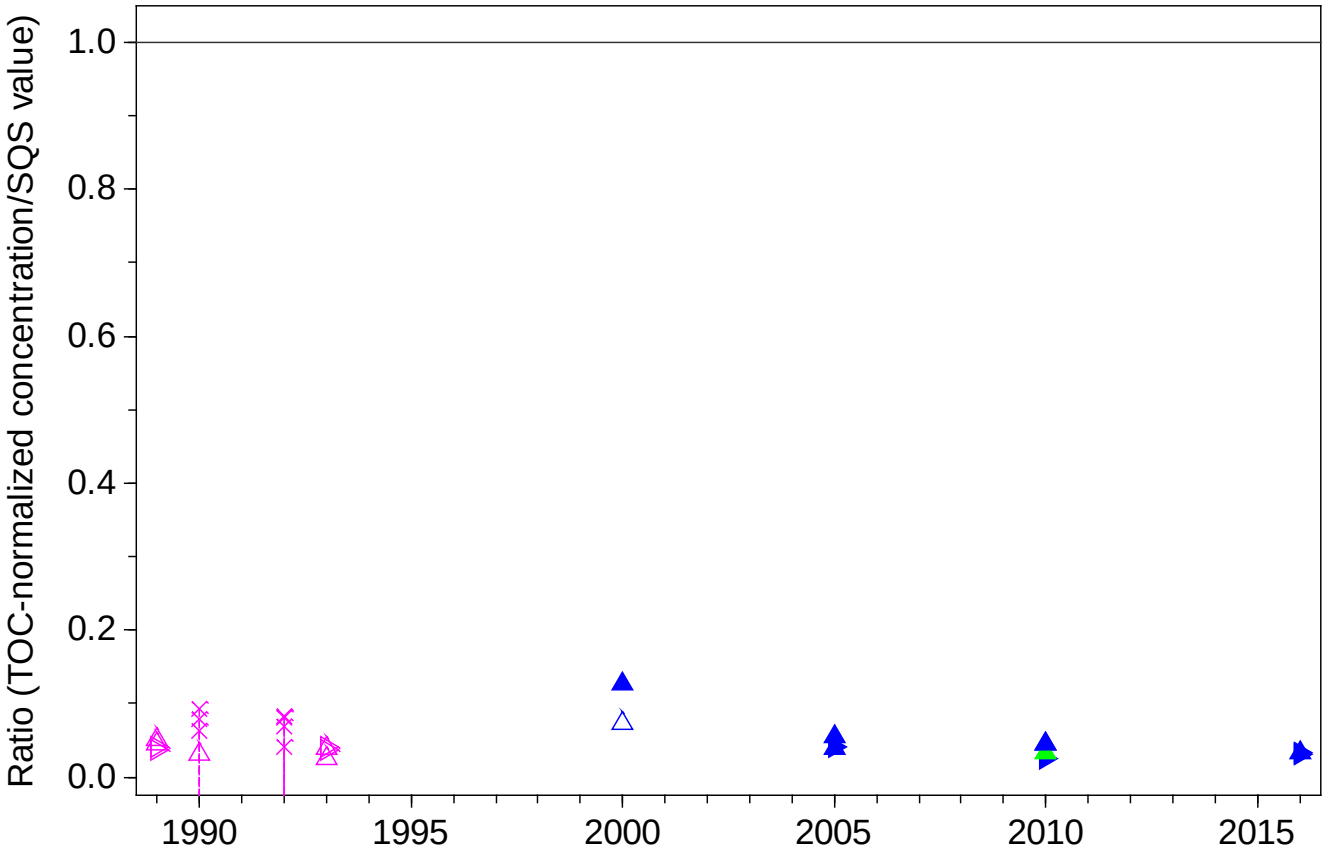
SQS quotient, Benzo(a)anthracene, Station 44



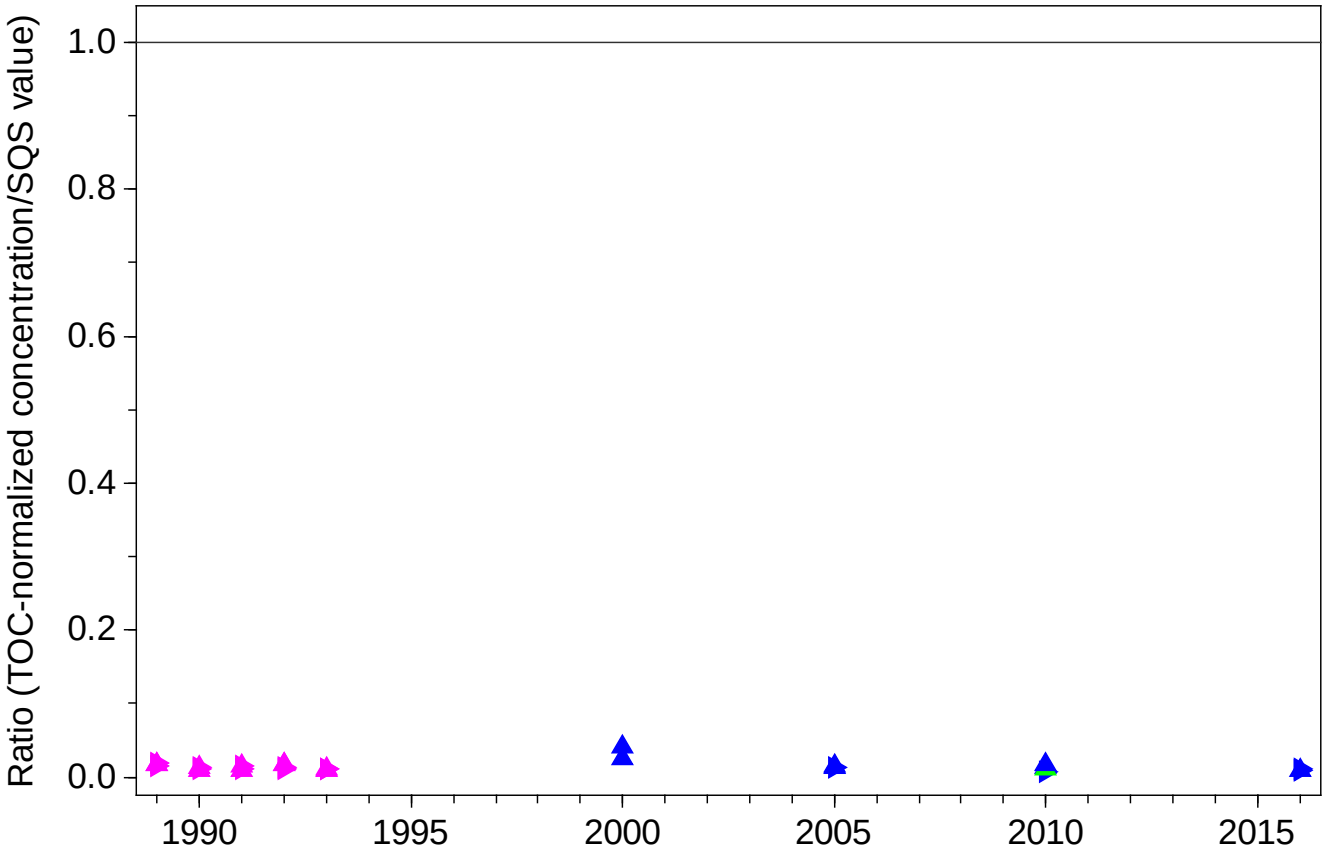
SQS quotient, Benzo(a)pyrene, Station 44



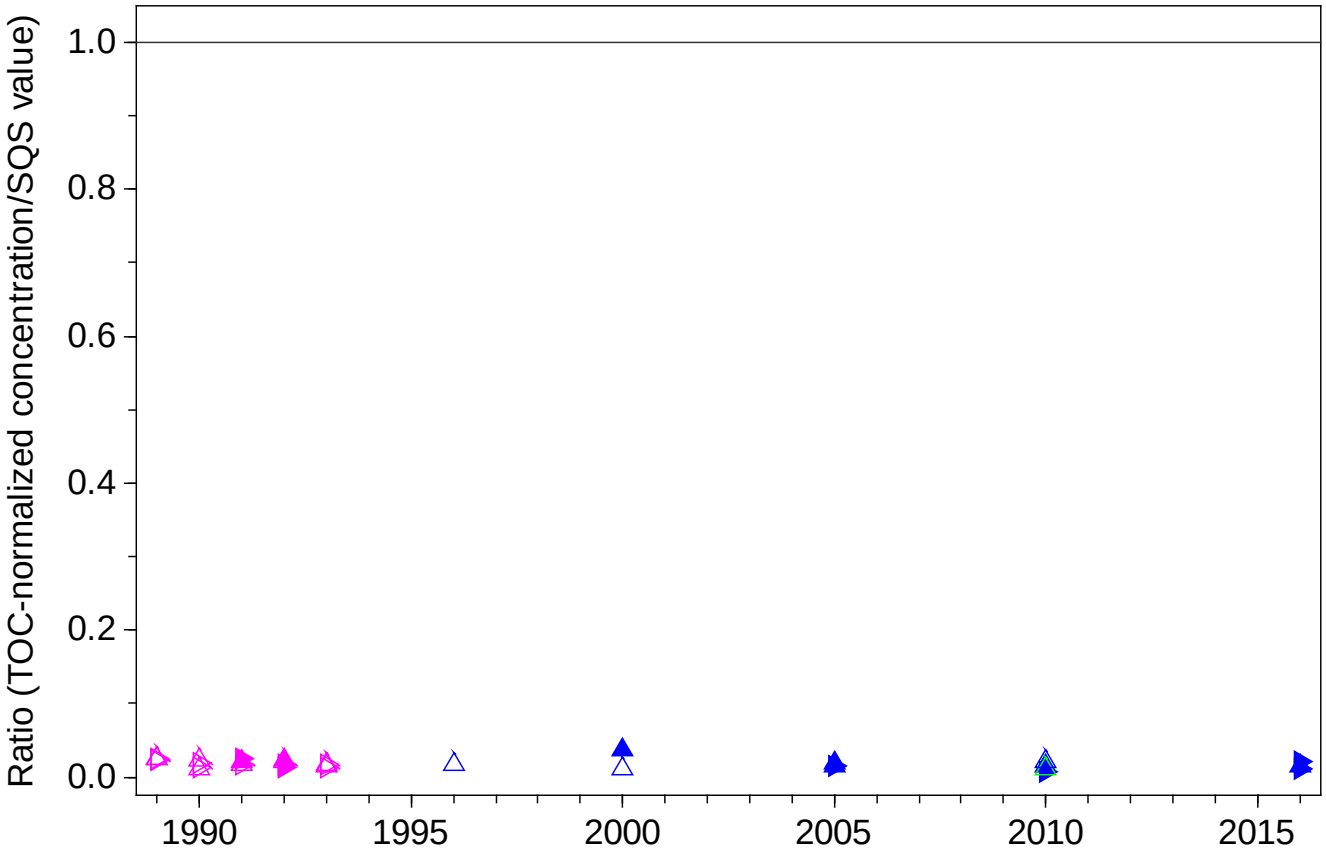
SQS quotient, Benzo(g,h,i)perylene, Station 44



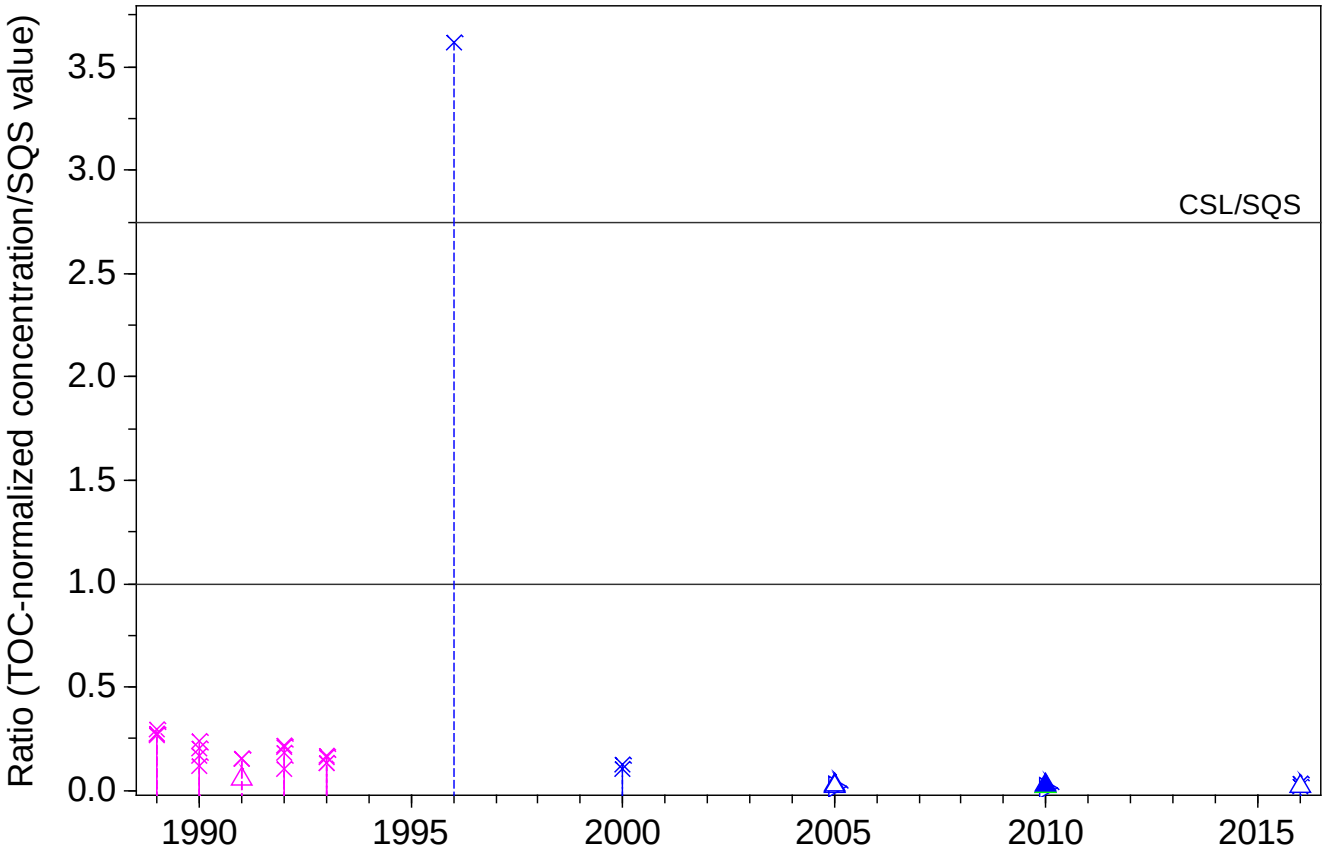
SQS quotient, Total Benzofluoranthenes, Station 44



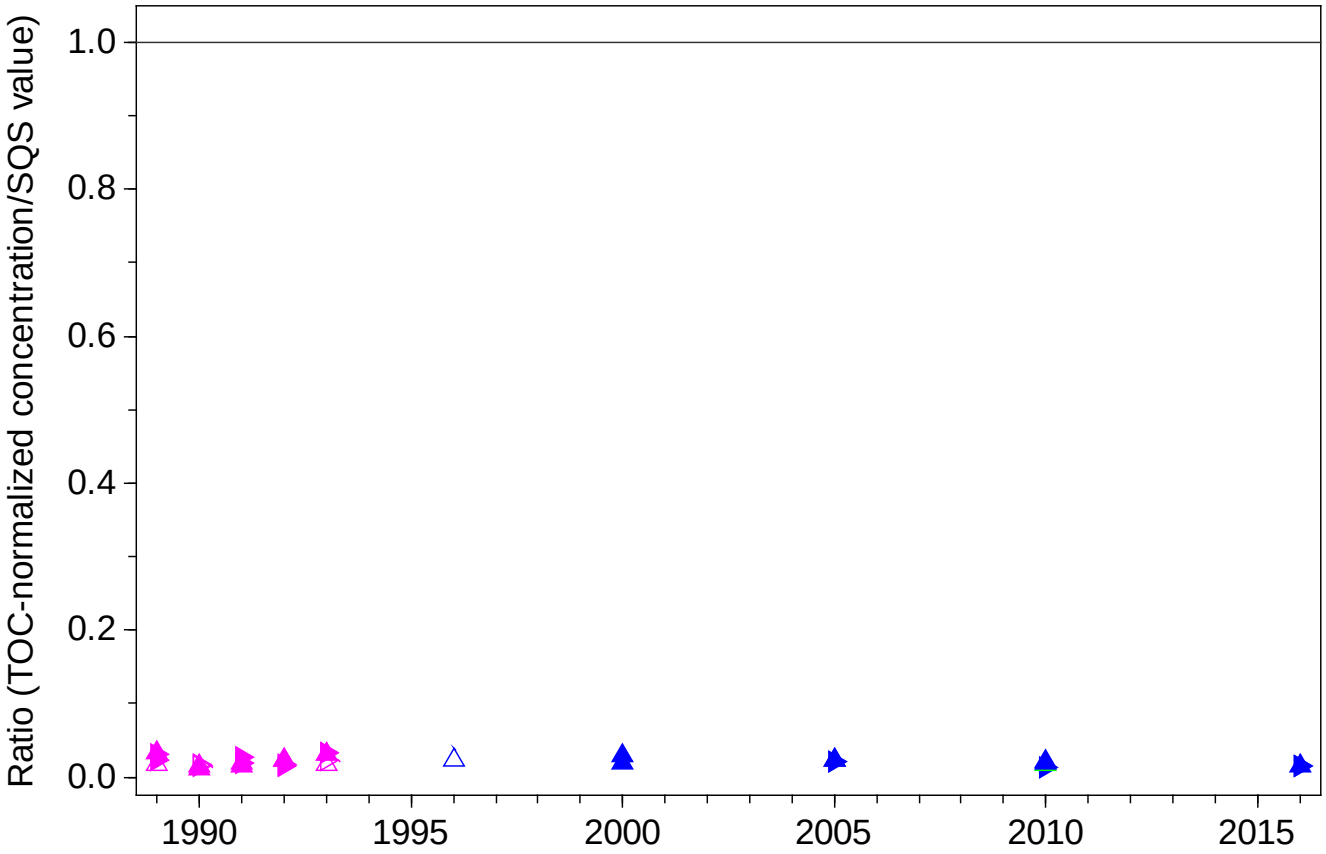
SQS quotient, Chrysene, Station 44



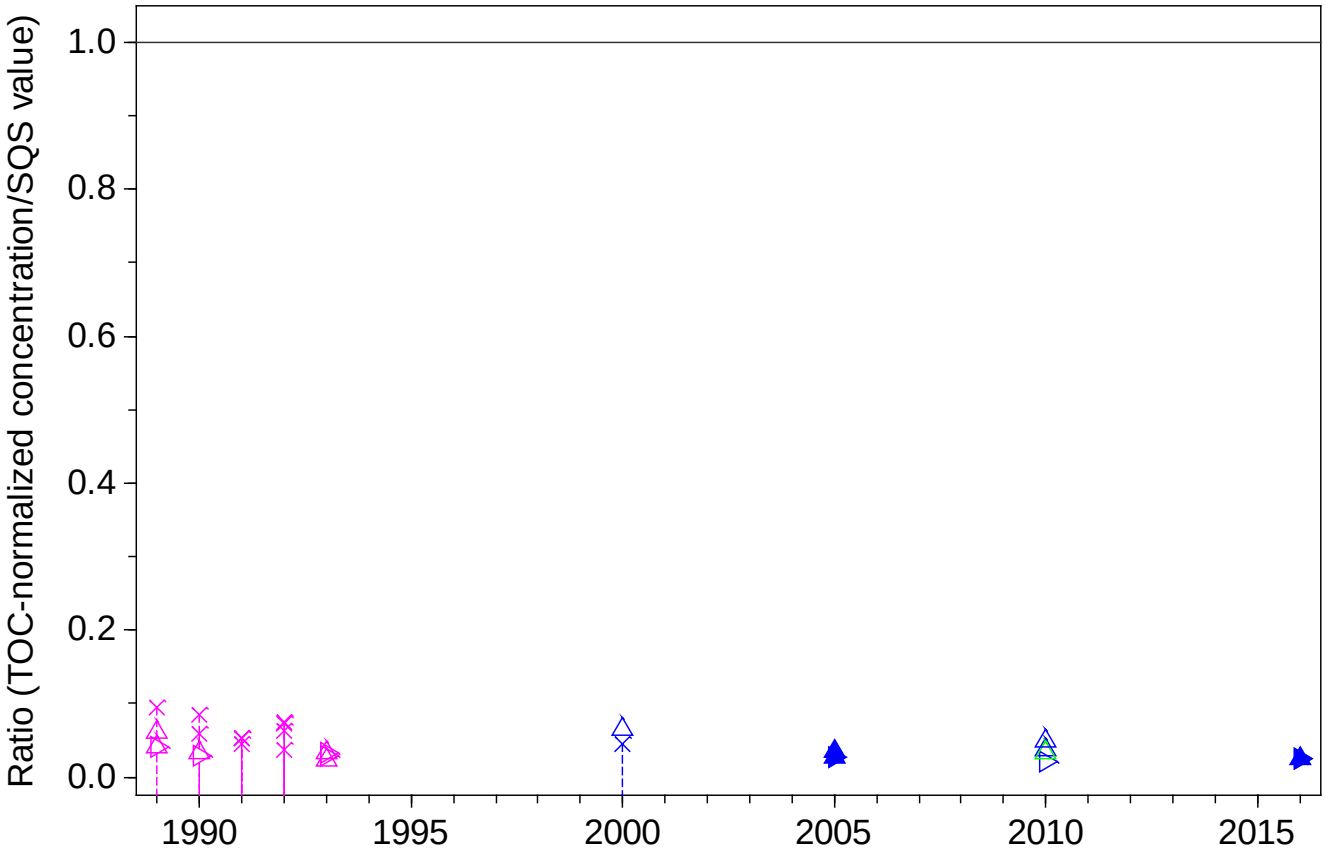
SQS quotient, Dibenzo(a,h)anthracene, Station 44



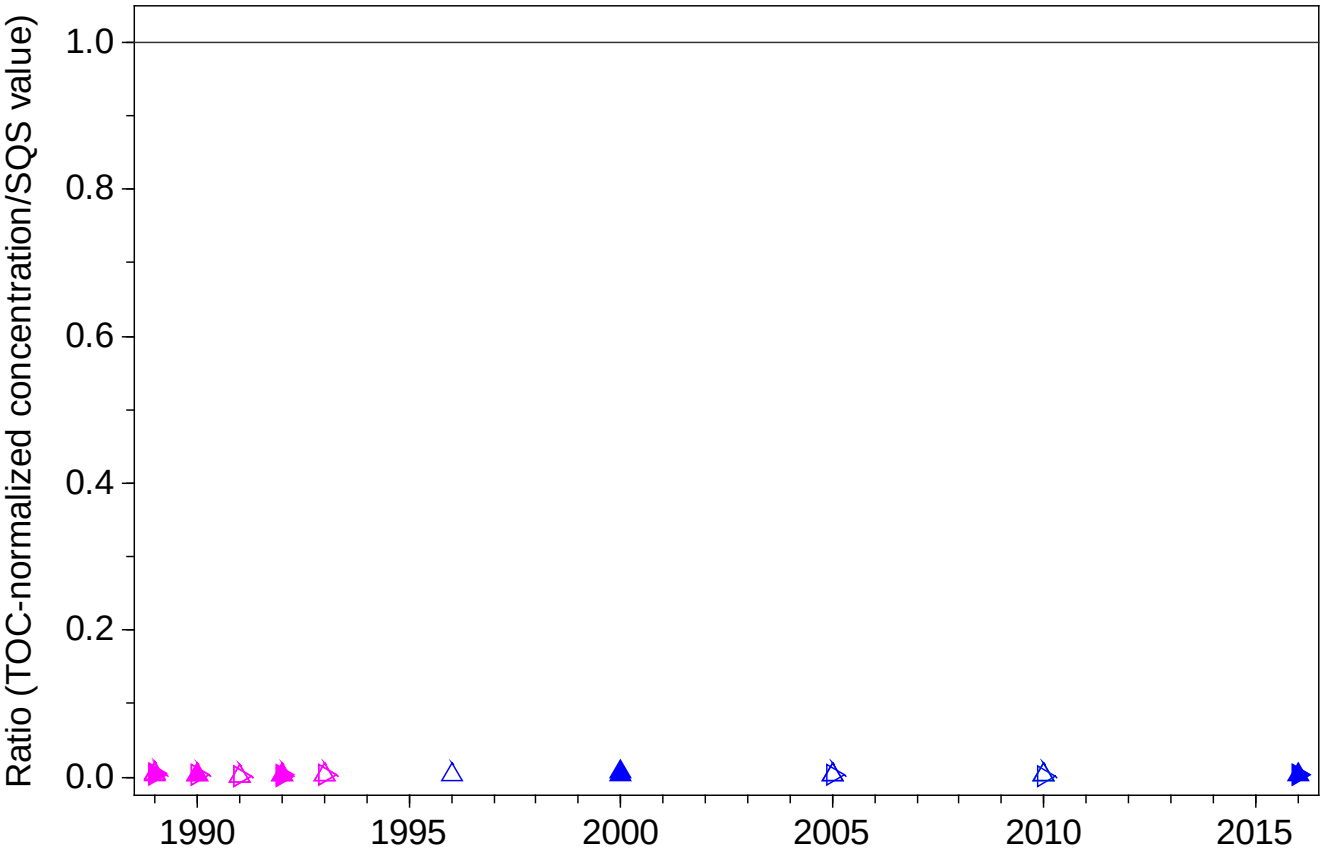
SQS quotient, Fluoranthene, Station 44



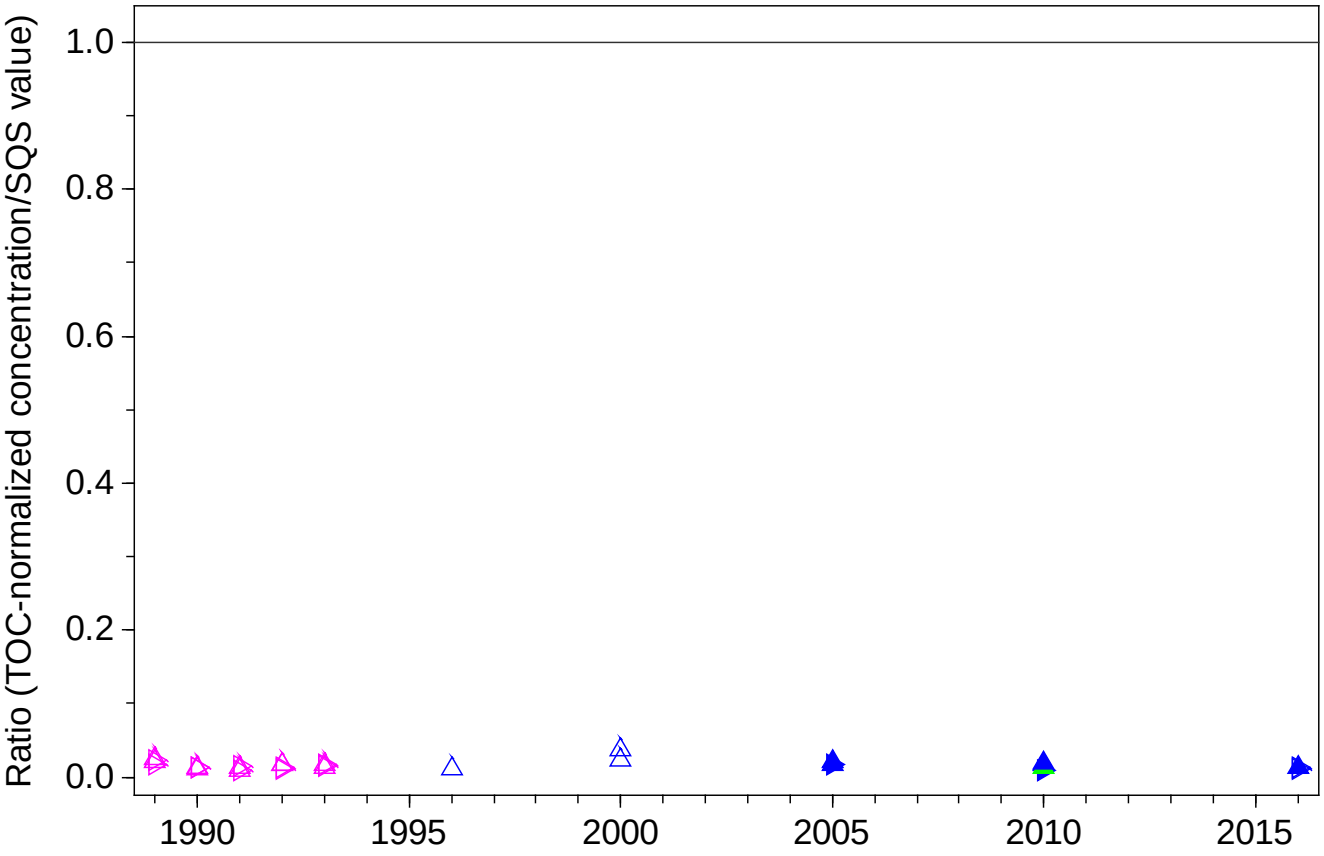
SQS quotient, Indeno(1,2,3-c,d)pyrene, Station 44



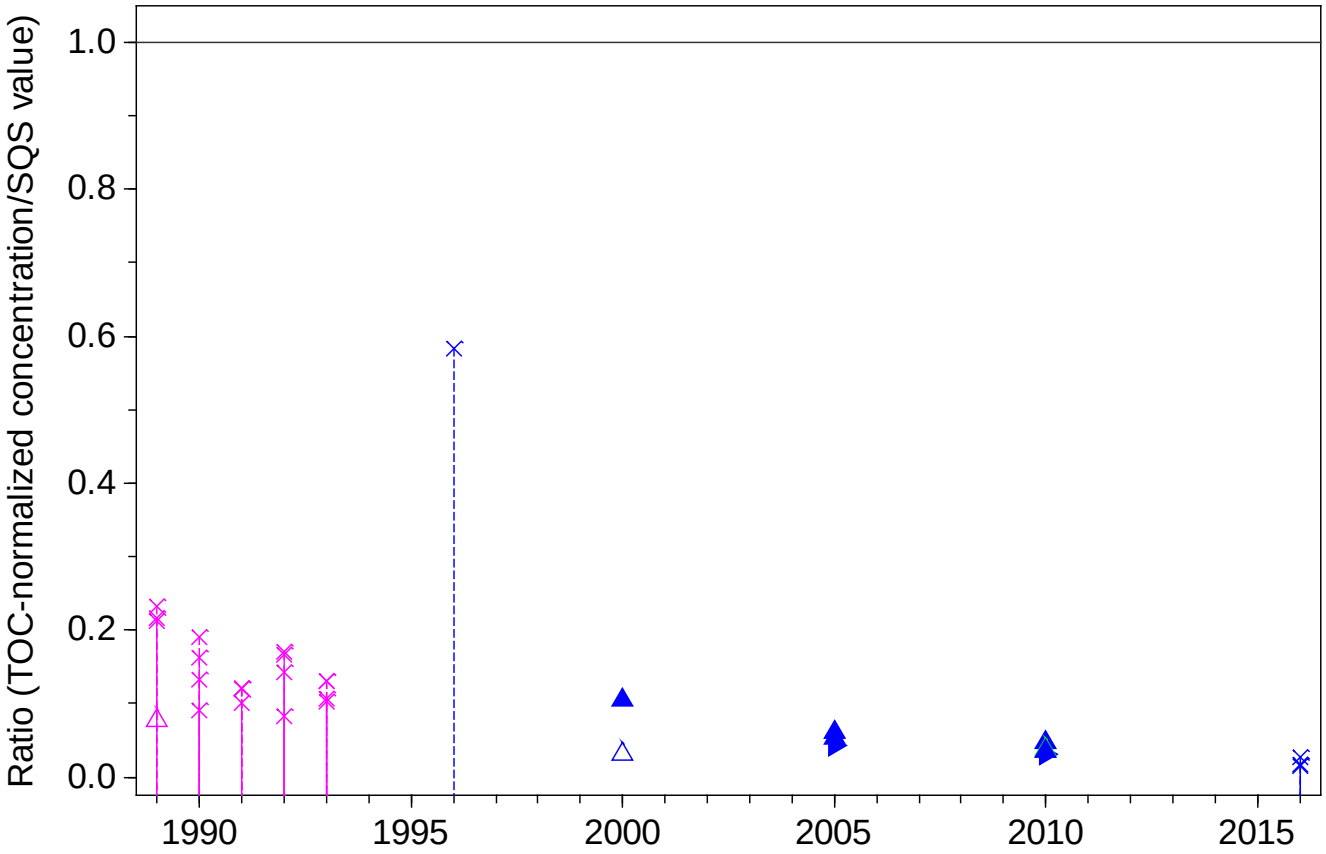
SQS quotient, Pyrene, Station 44



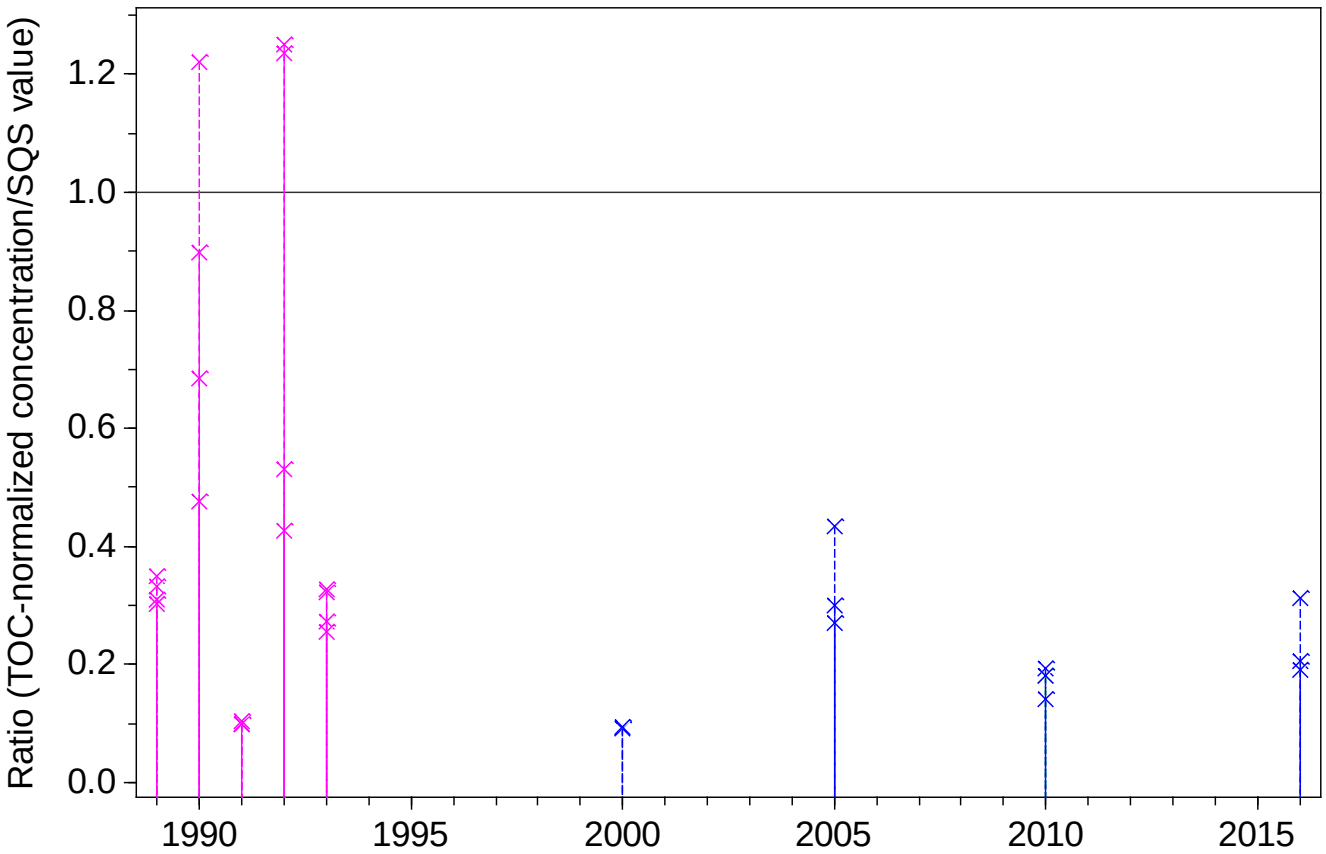
SQS quotient, Total HPAH, Station 44



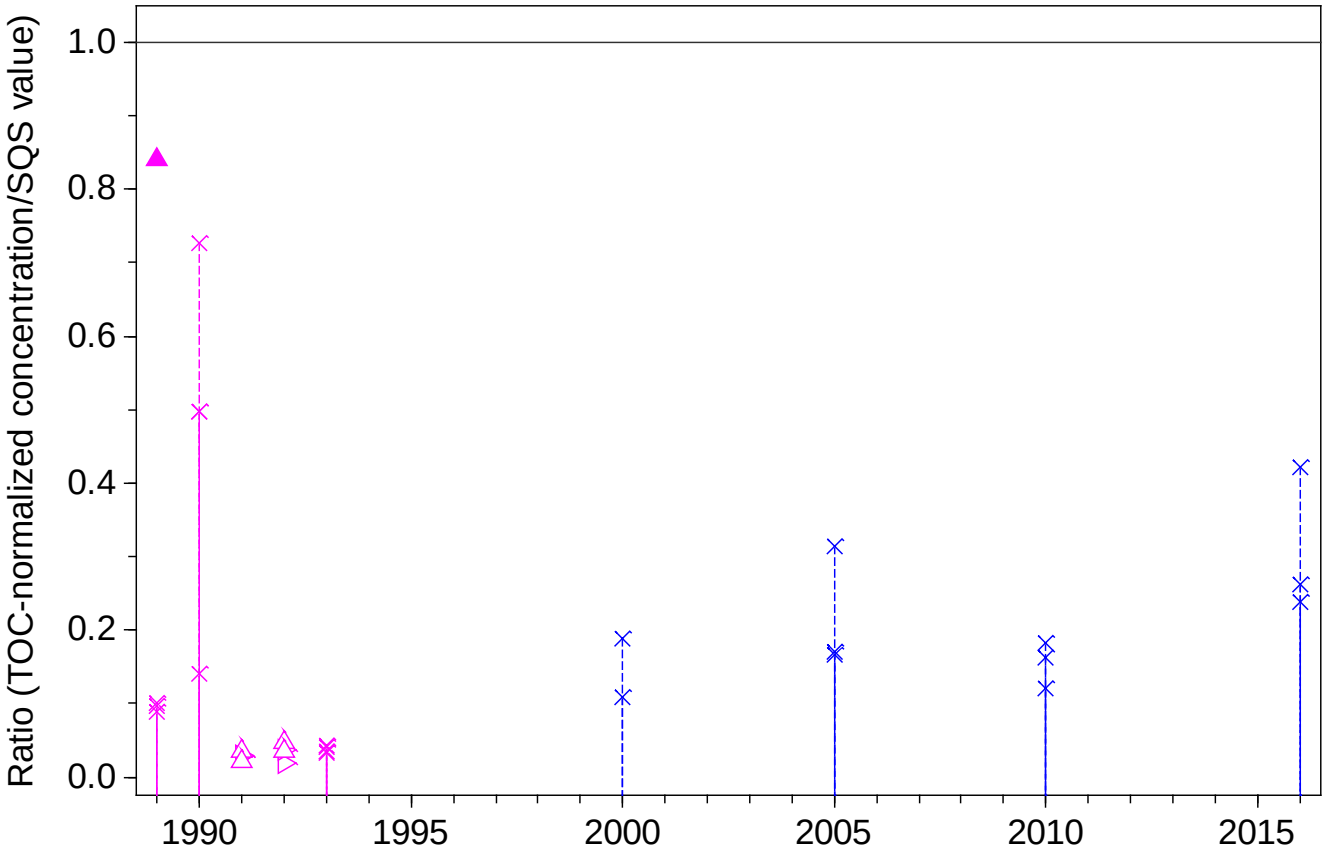
SQS quotient, Dibenzofuran, Station 44



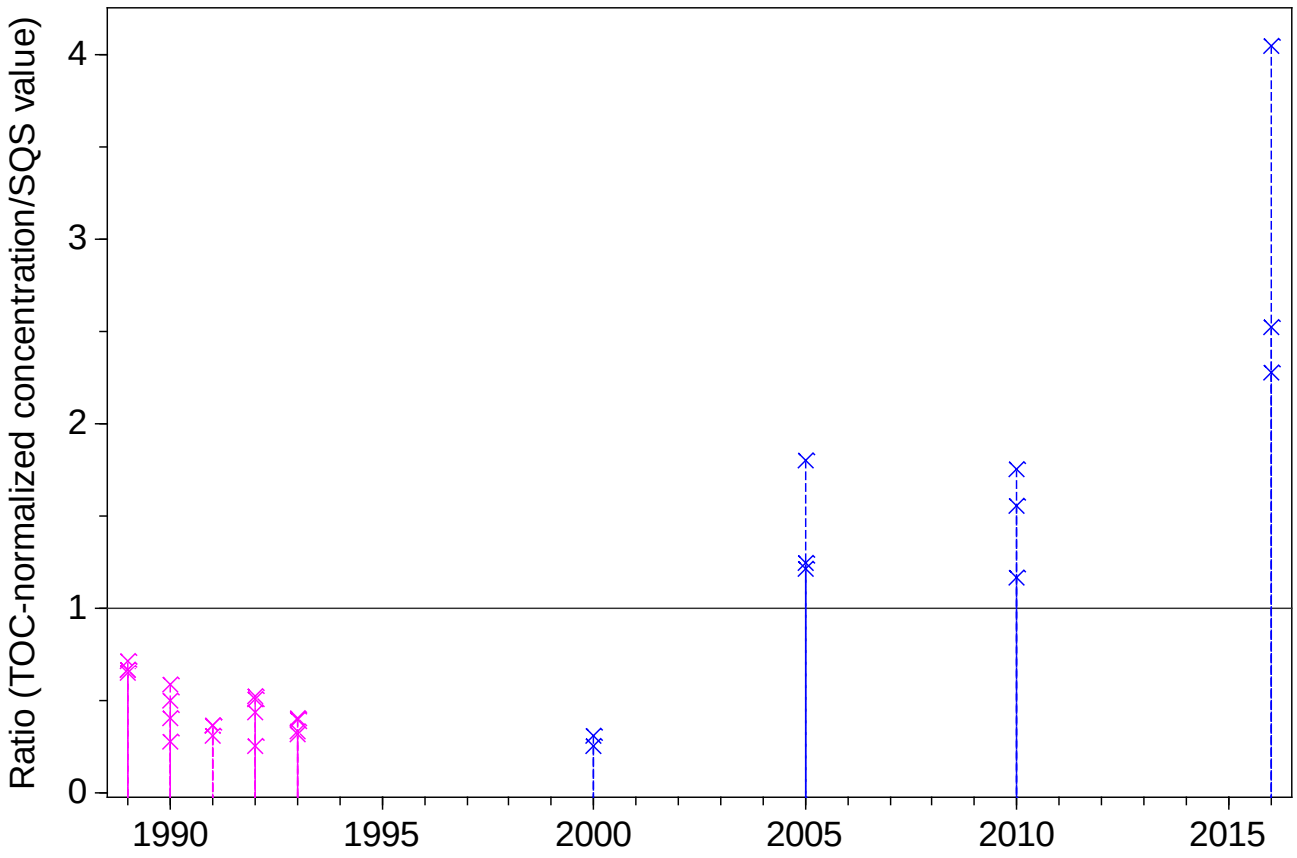
SQS quotient, Total Aroclors, Station 44



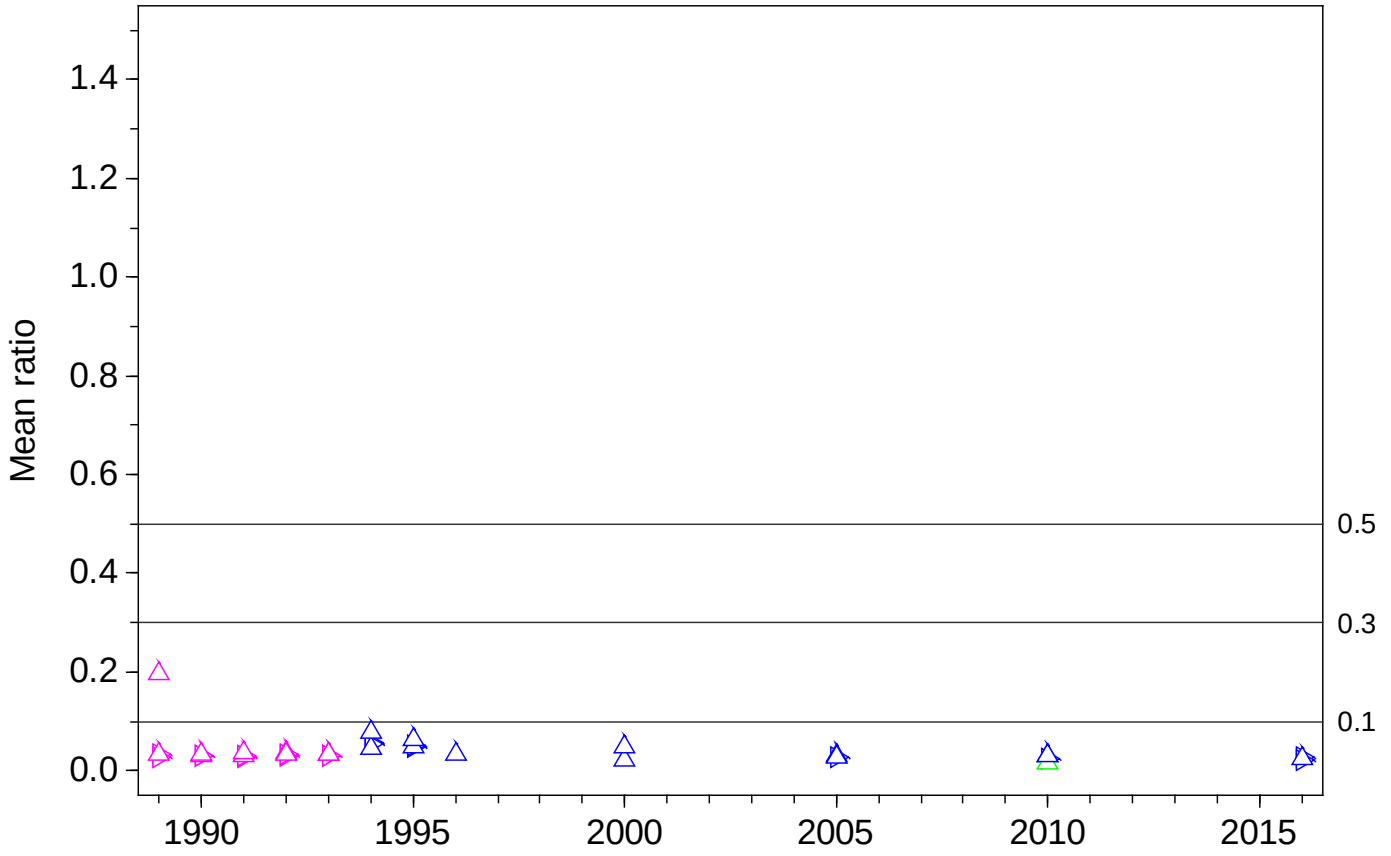
SQS quotient, Bis(2-ethylhexyl)phthalate, Station 44



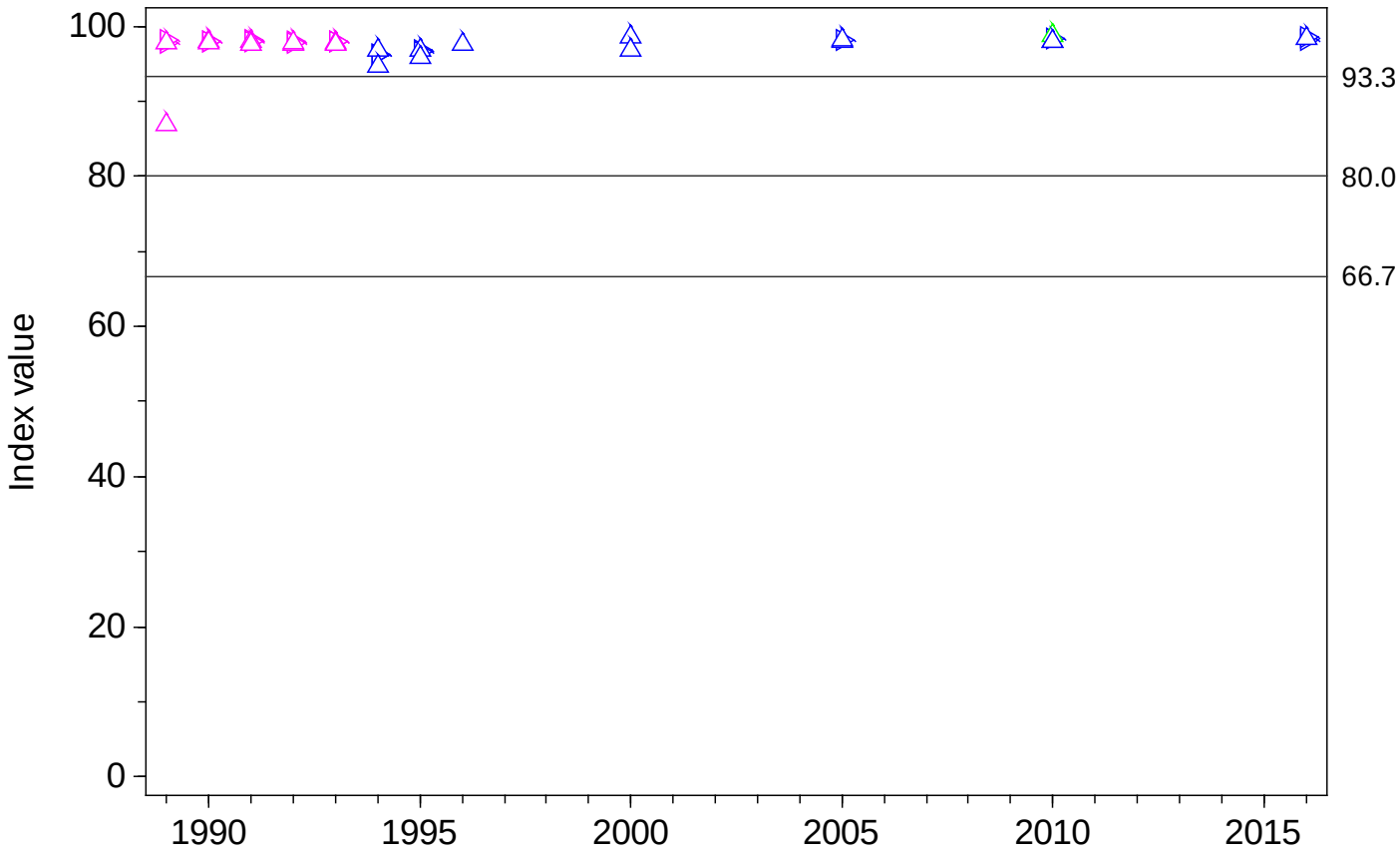
SQS quotient, Butylbenzylphthalate, Station 44



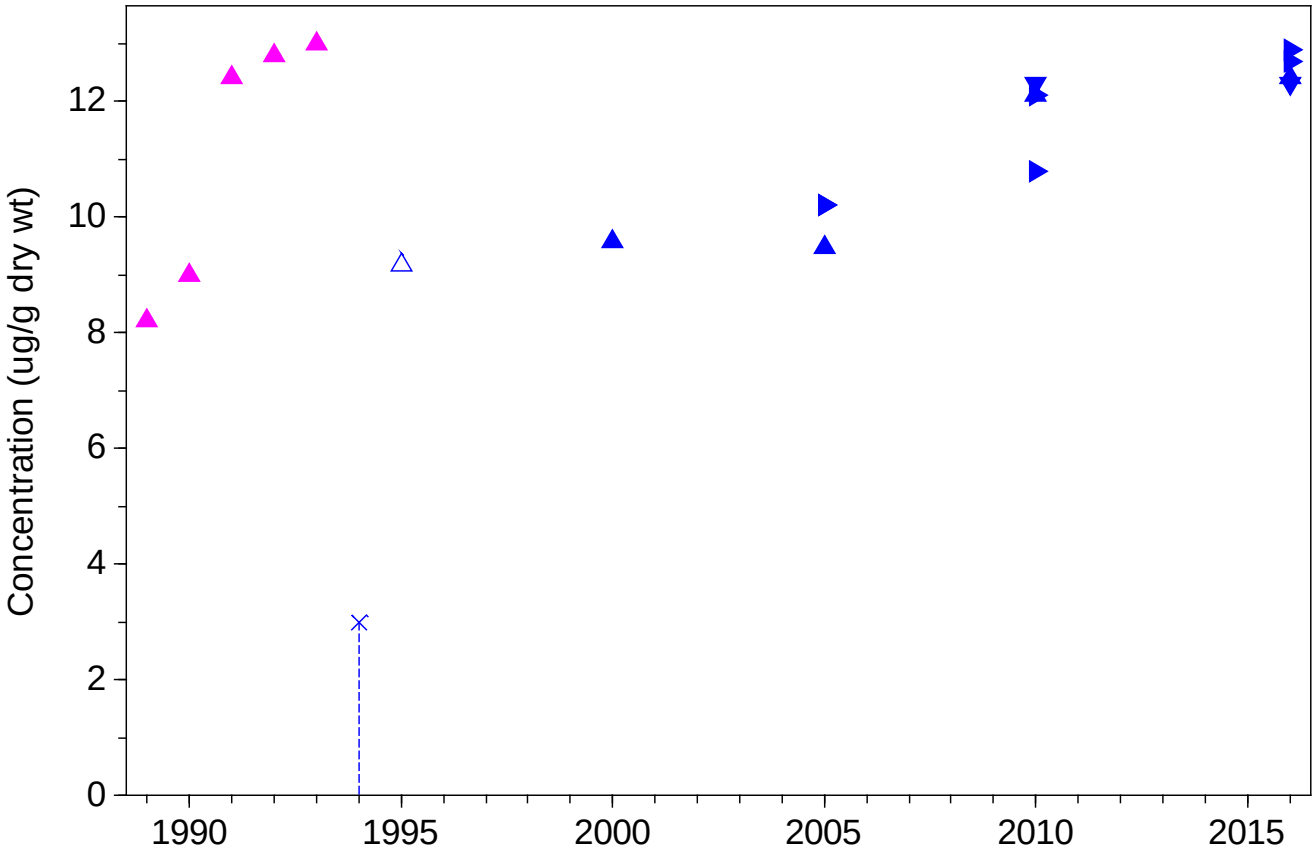
Mean SQS quotient, SCI SQS (no PAH totals), Station 44



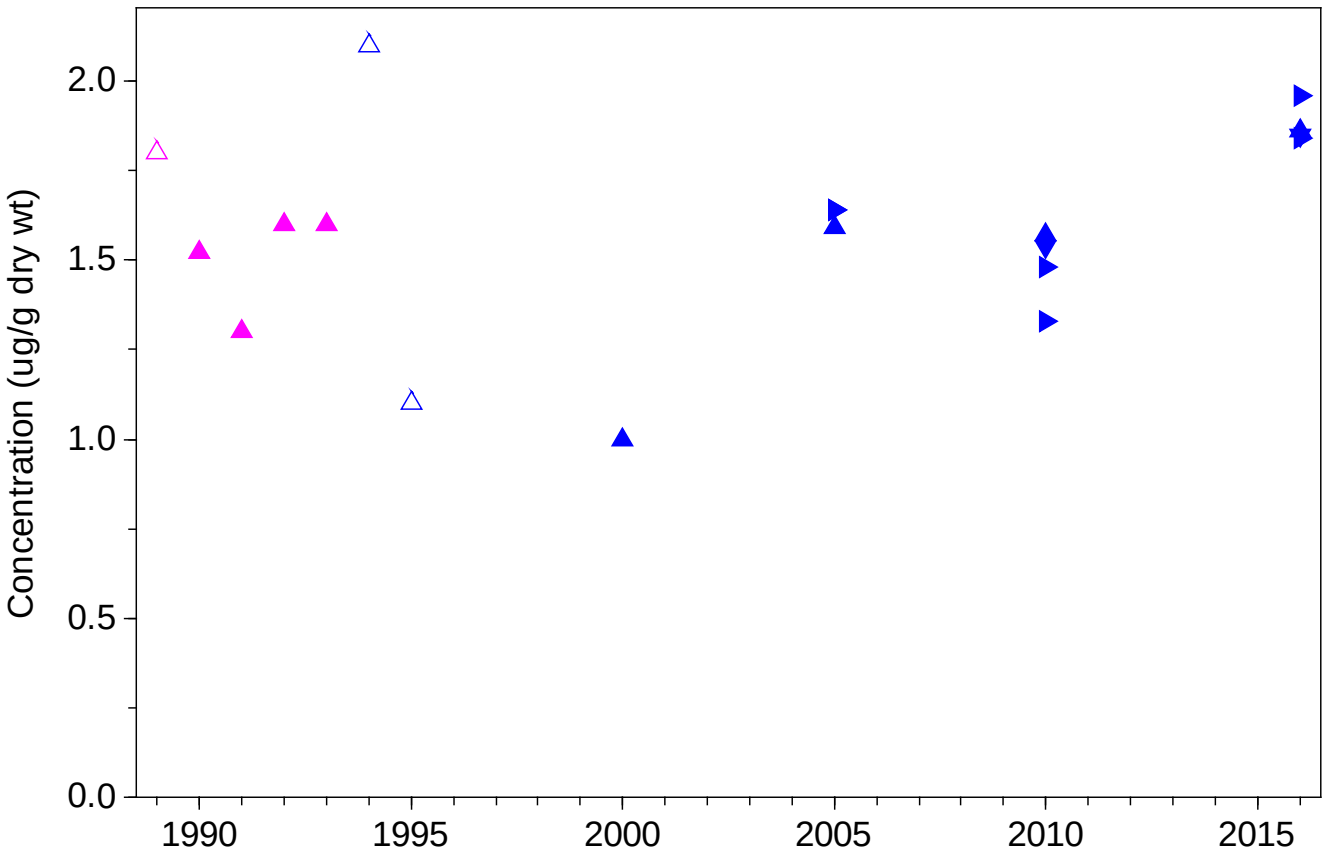
Sediment Chemistry Index, Station 44



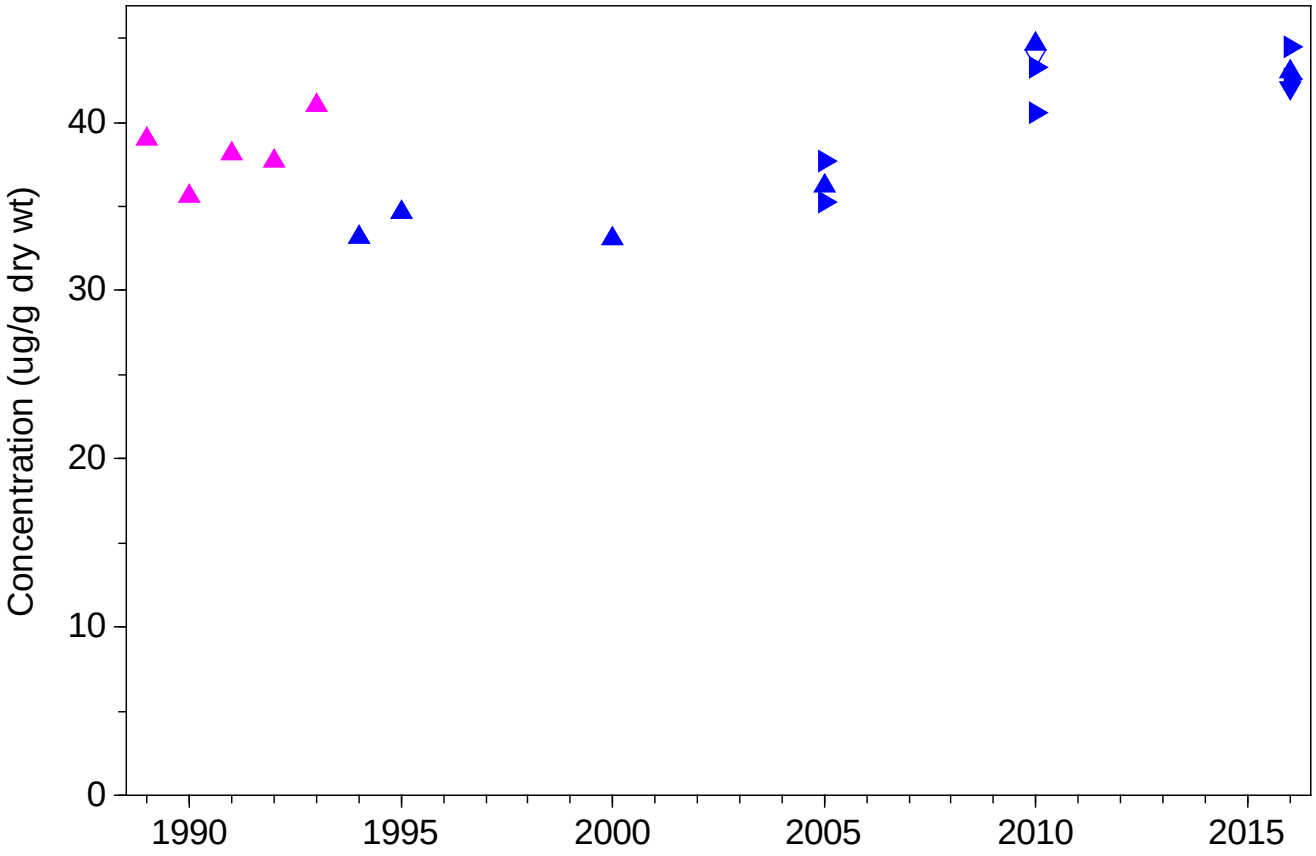
Arsenic, Station 49



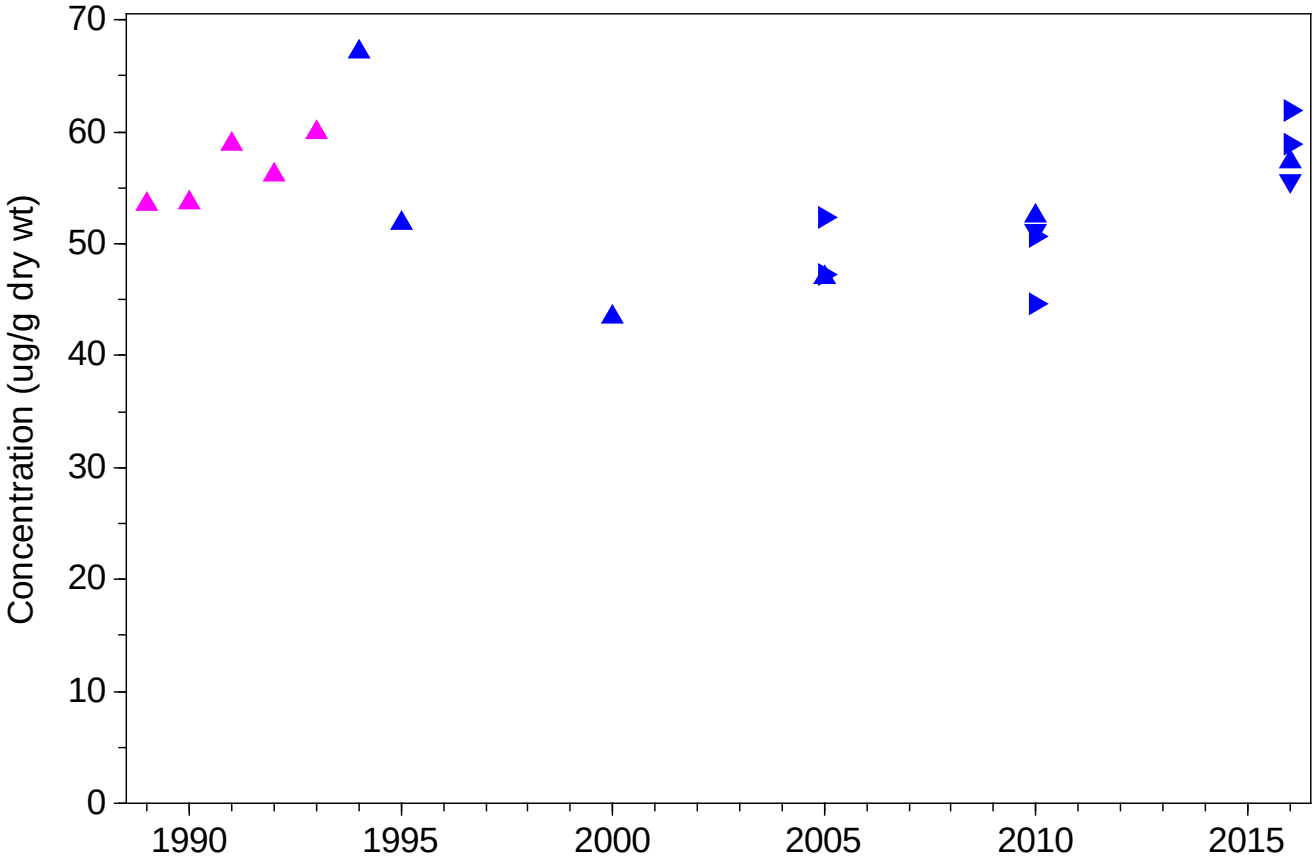
Cadmium, Station 49



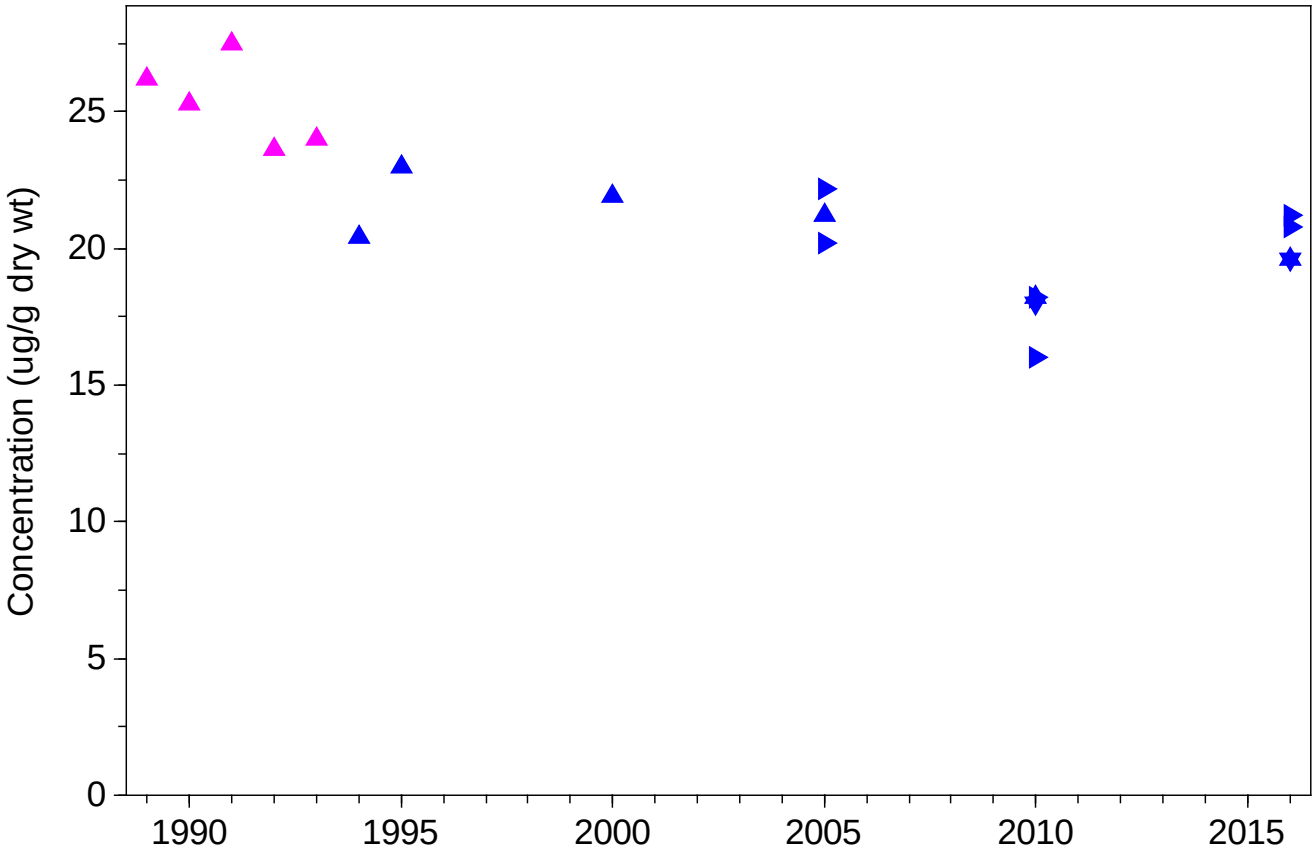
Chromium, Station 49



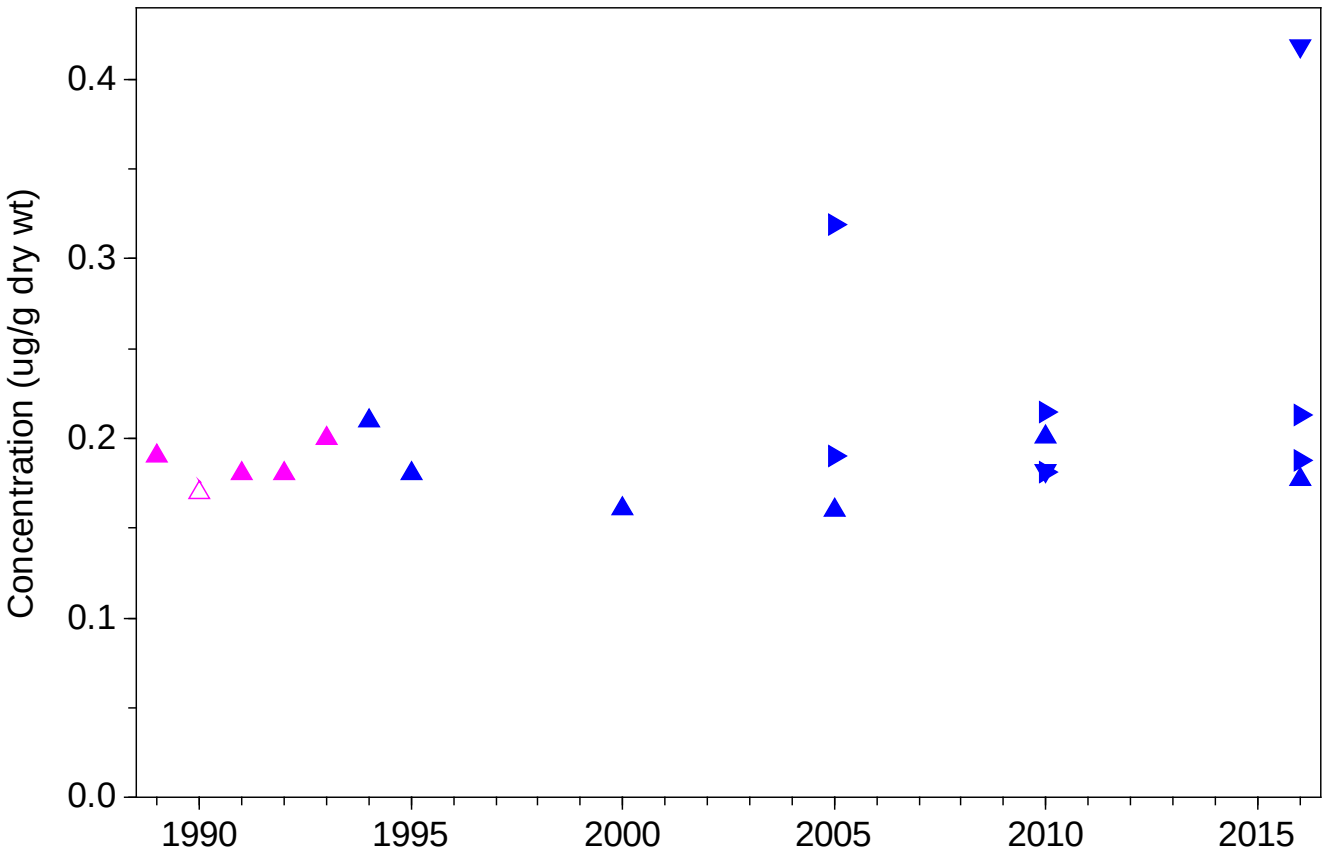
Copper, Station 49



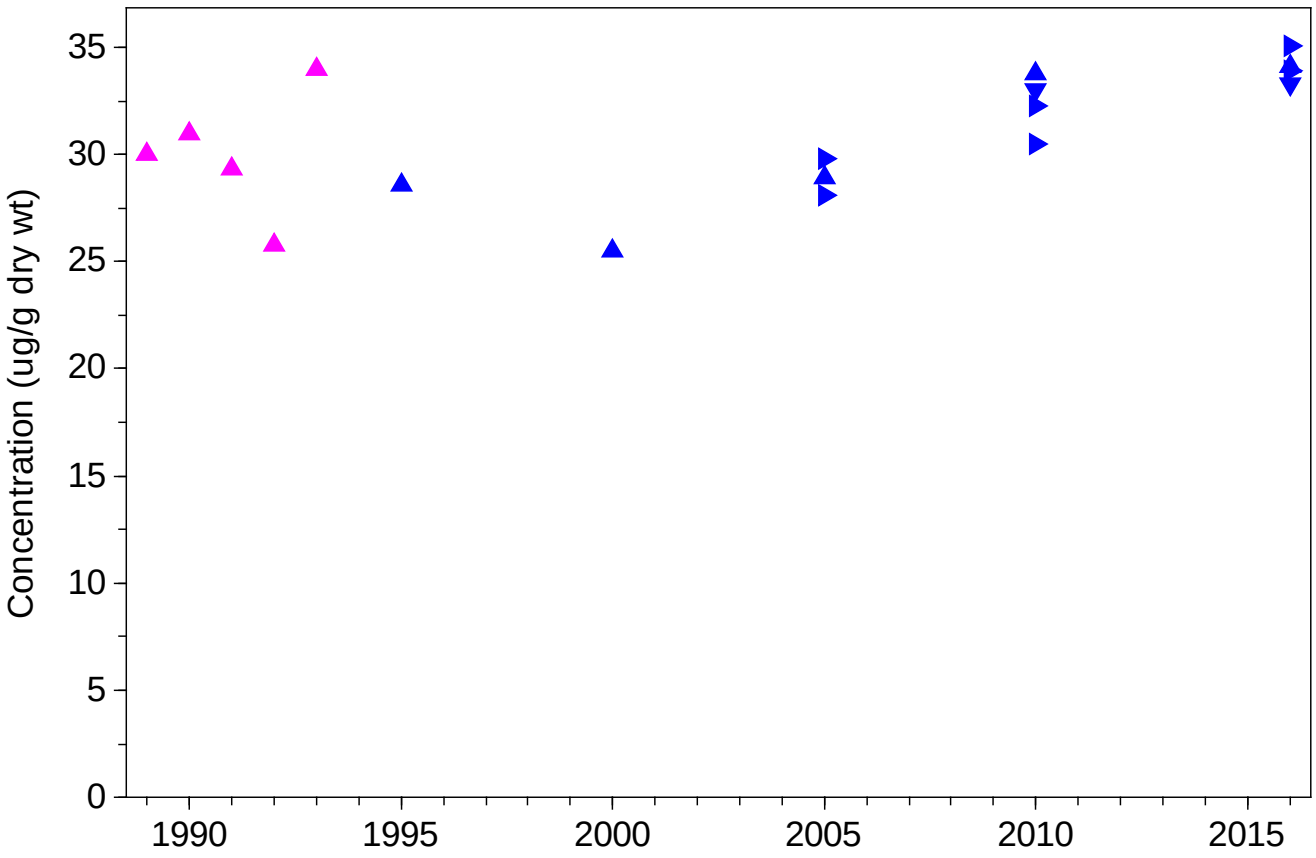
Lead, Station 49



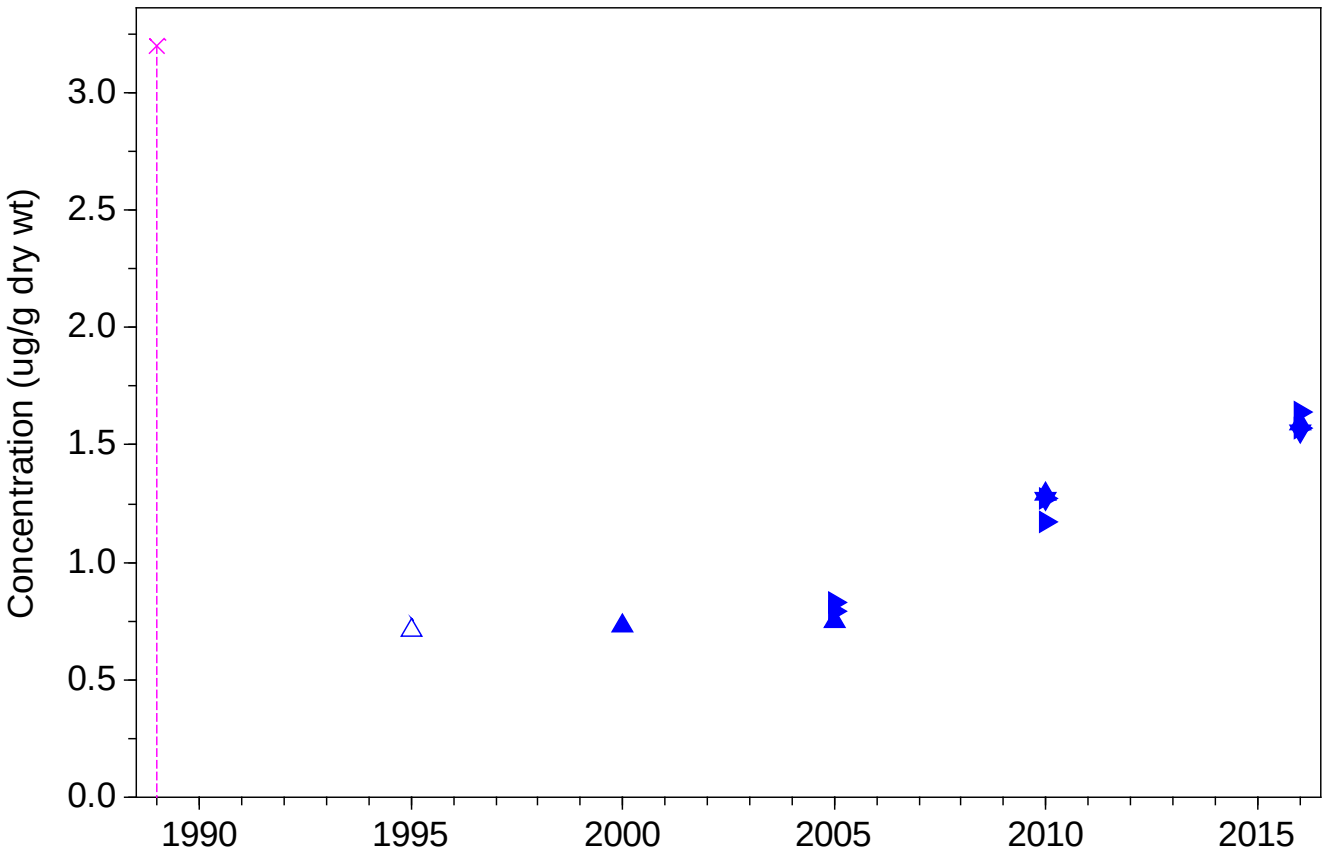
Mercury, Station 49



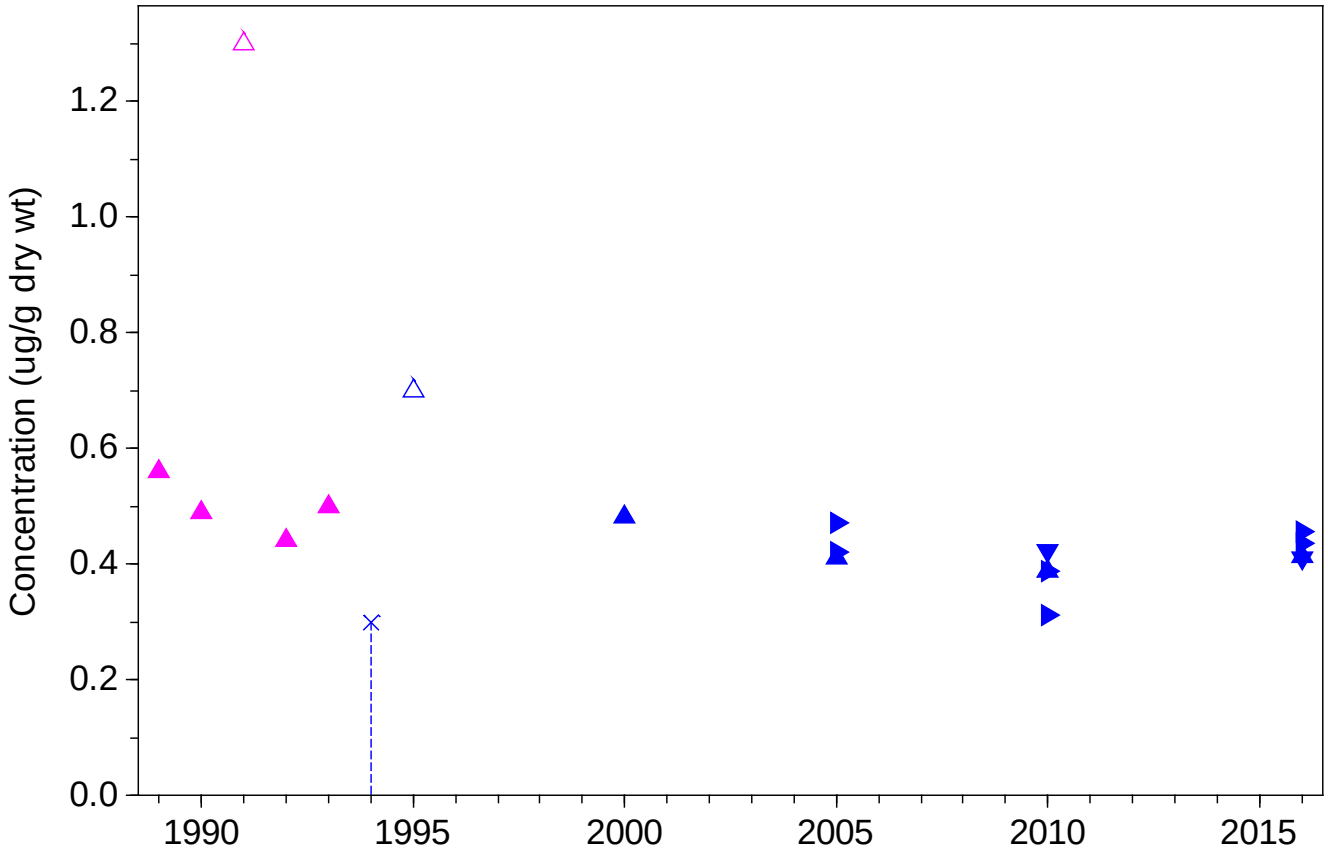
Nickel, Station 49



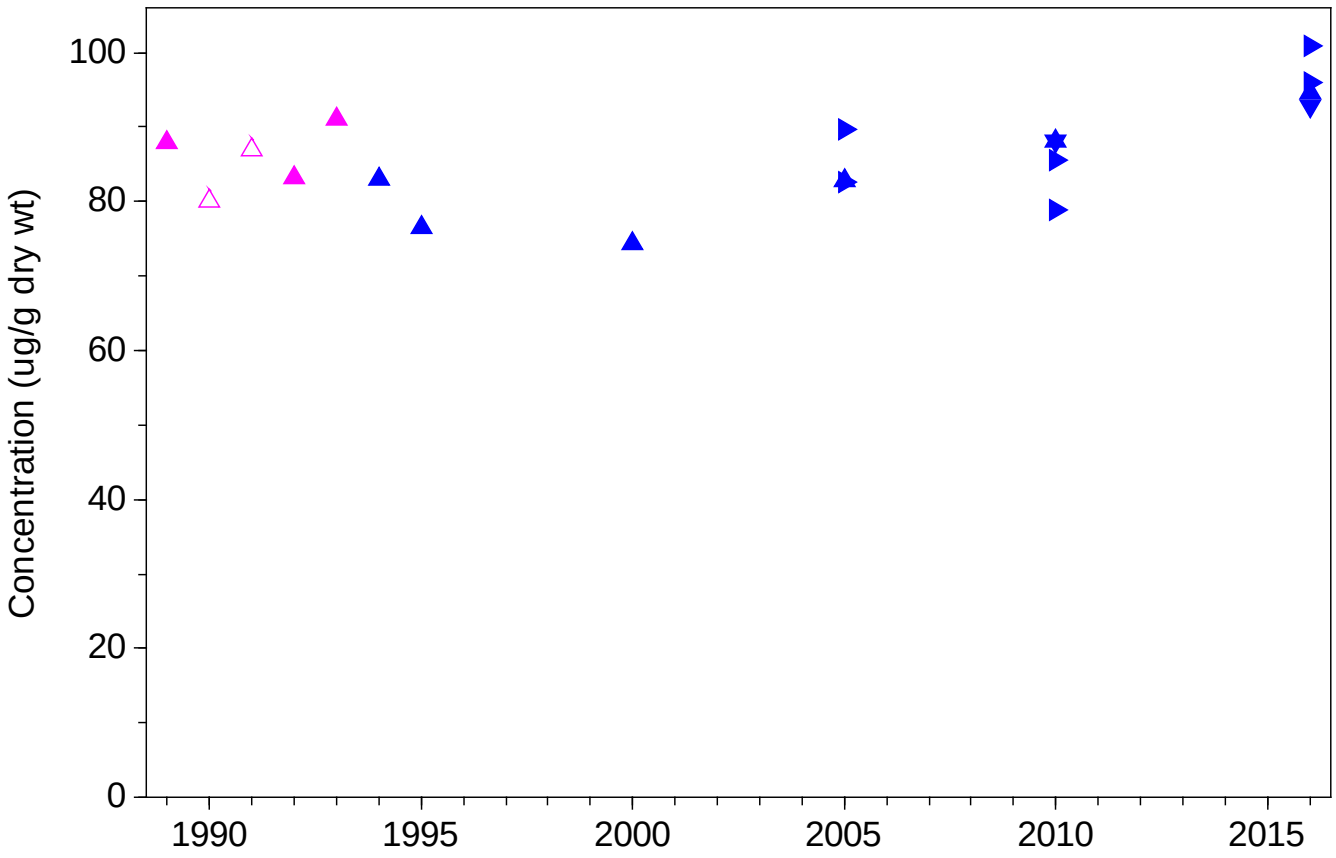
Selenium, Station 49



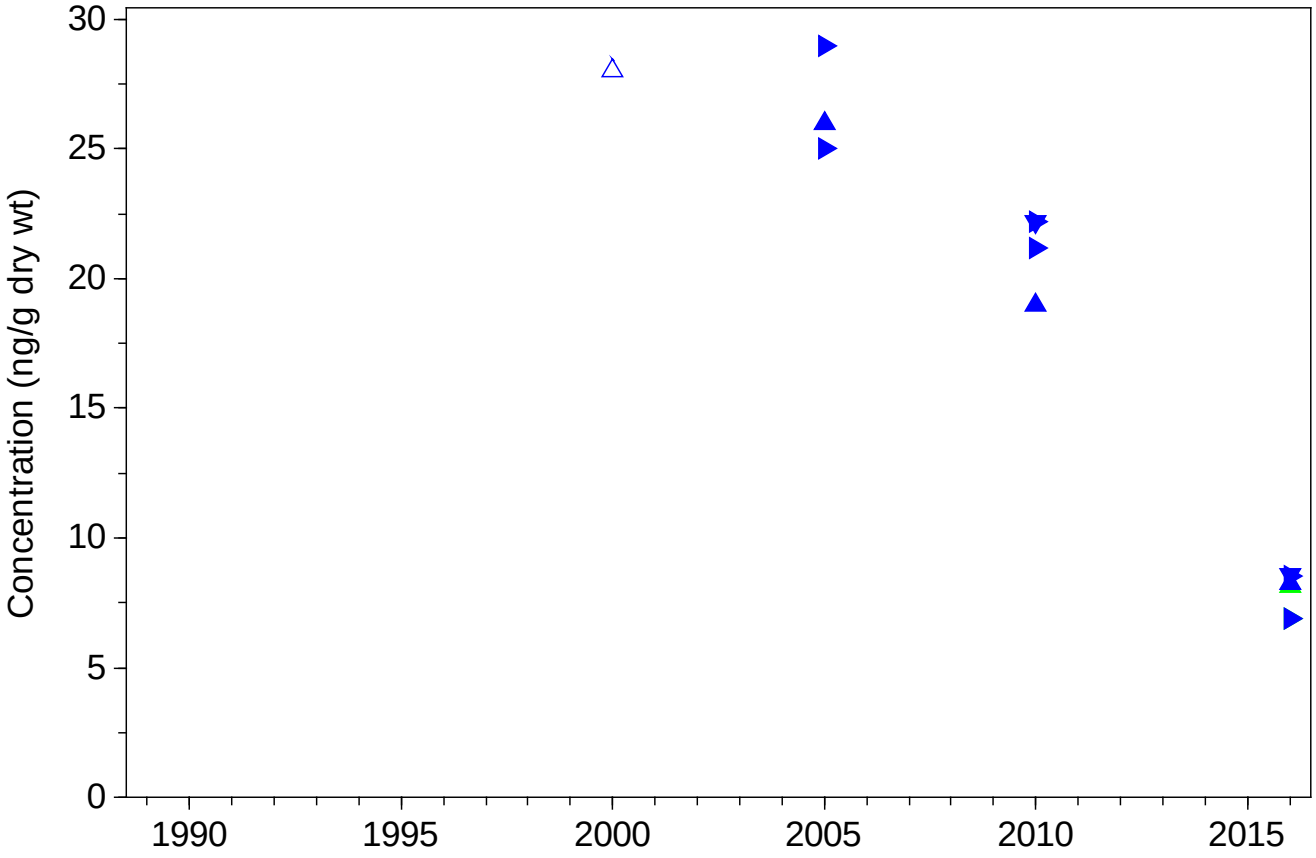
Silver, Station 49



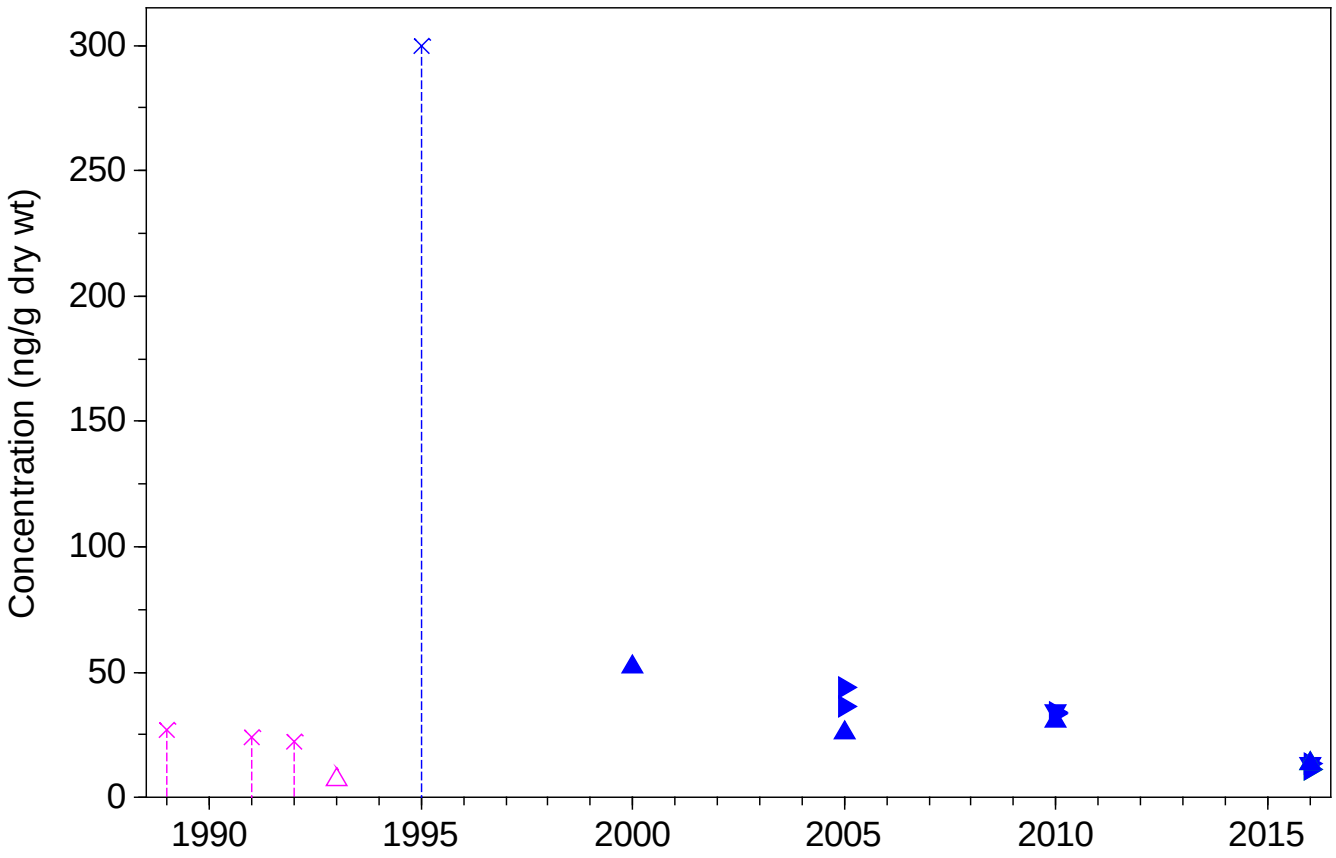
Zinc, Station 49



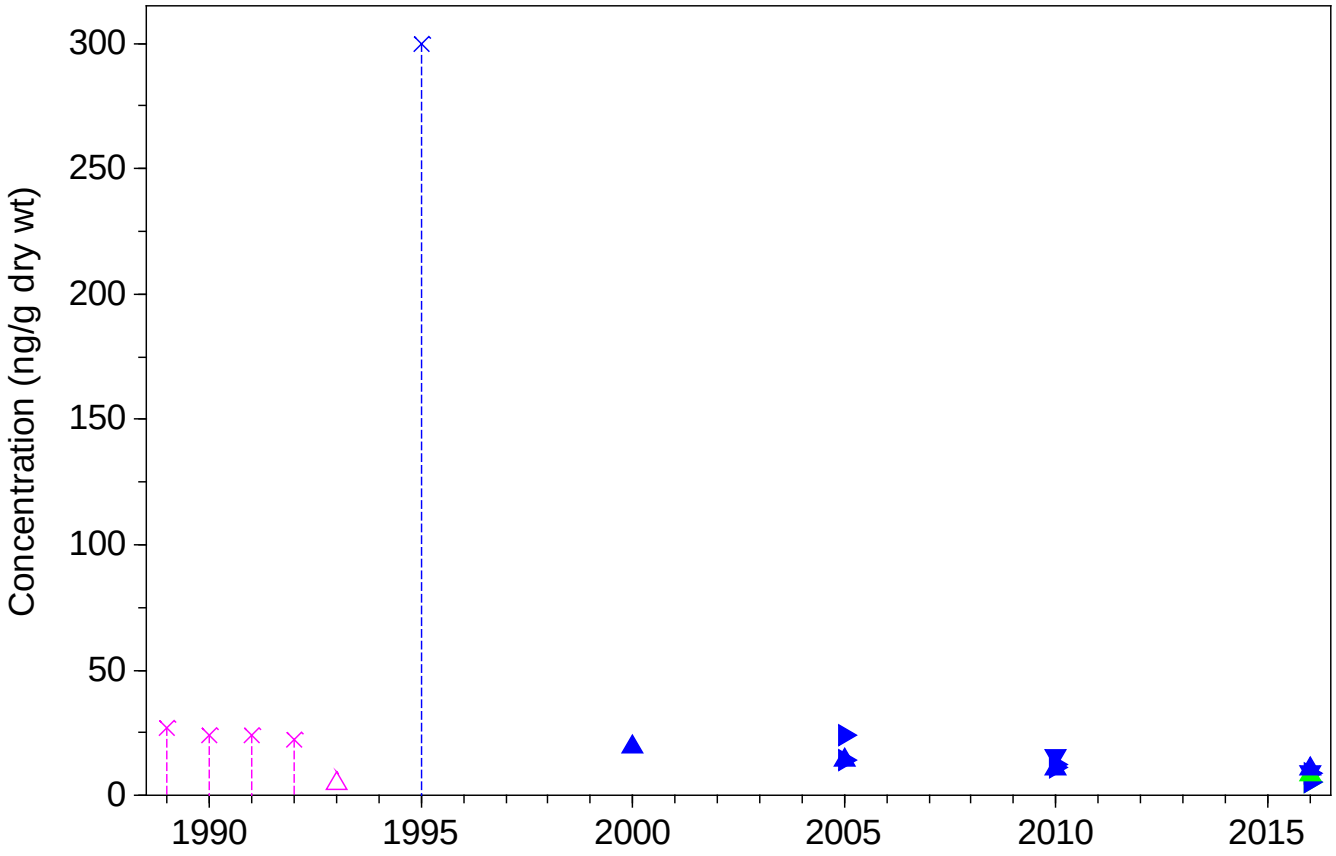
1-Methylnaphthalene, Station 49



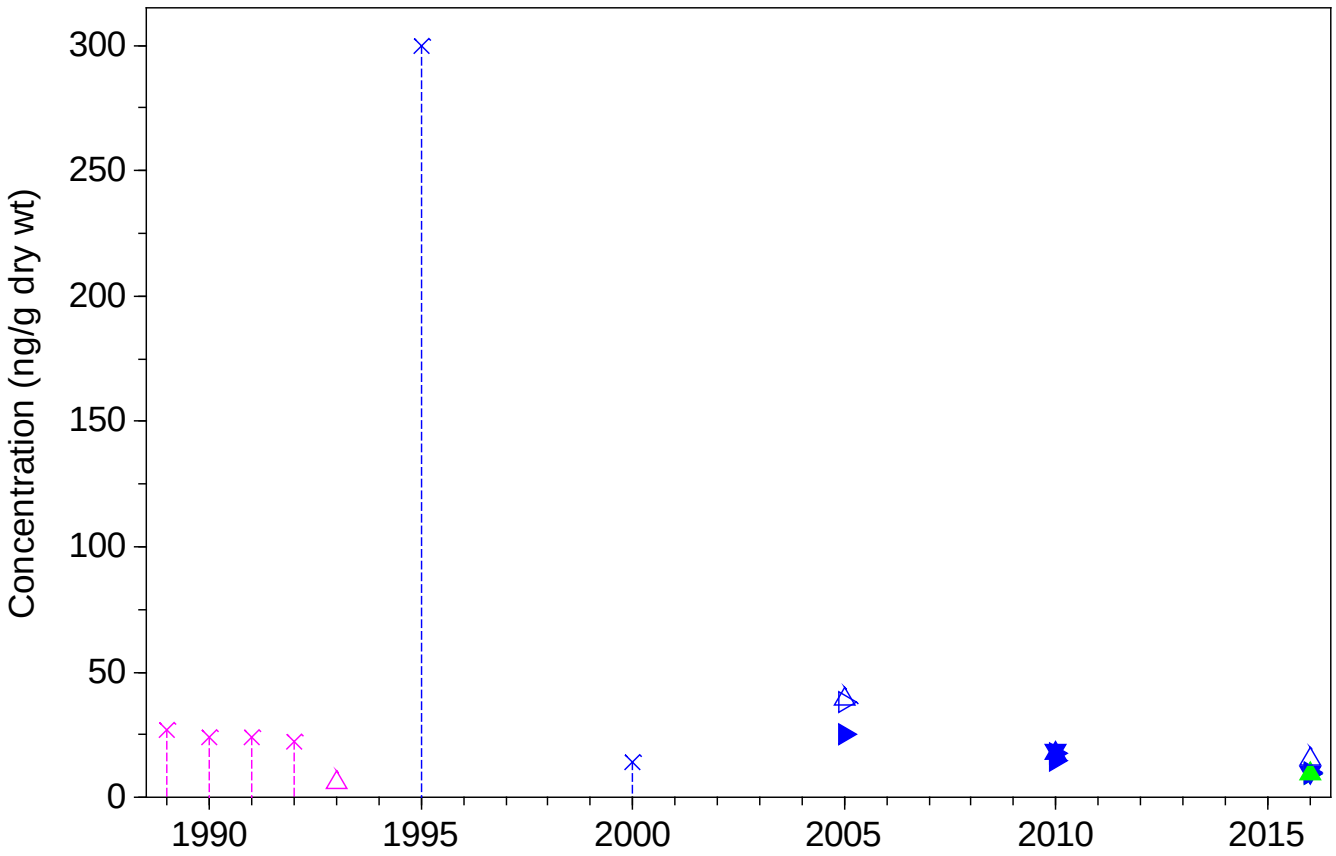
2-Methylnaphthalene, Station 49



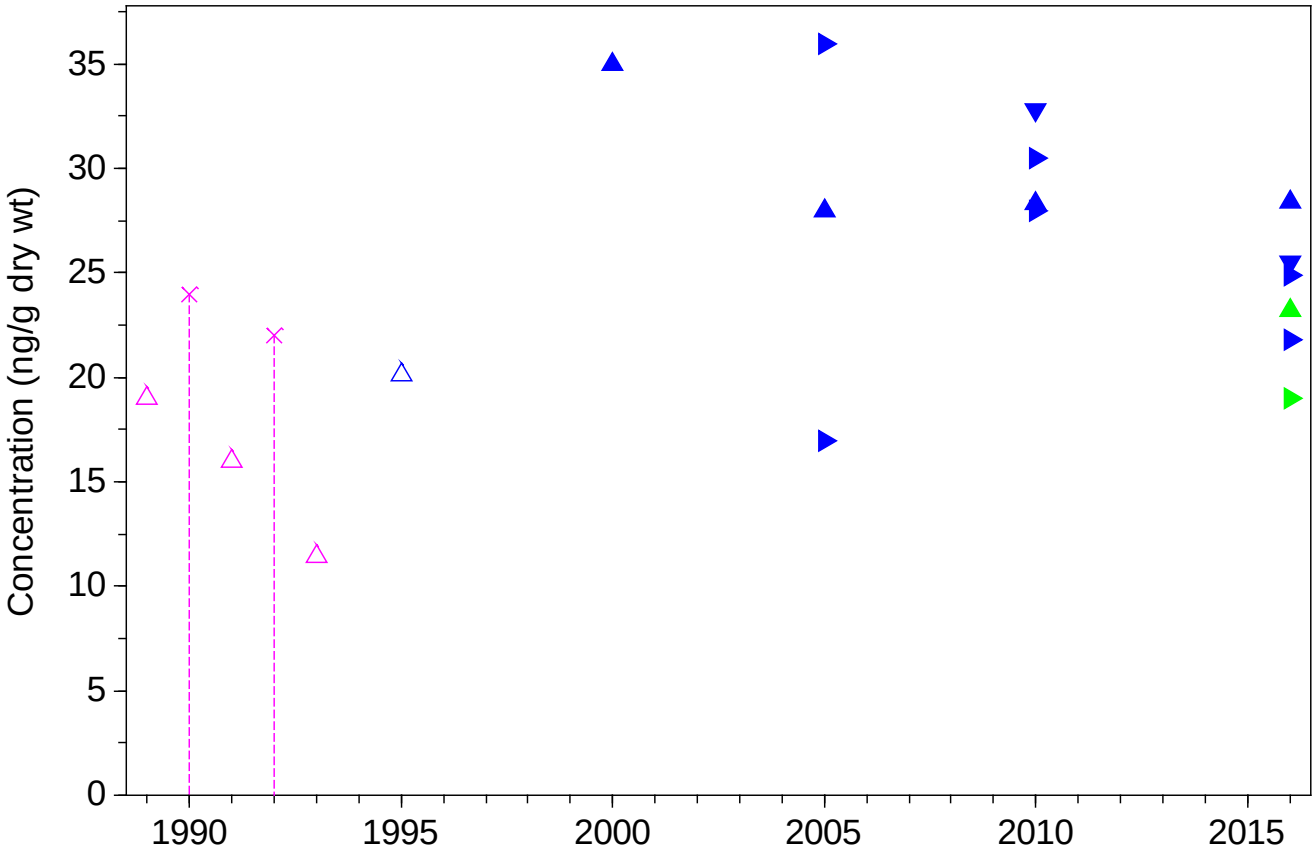
Acenaphthene, Station 49



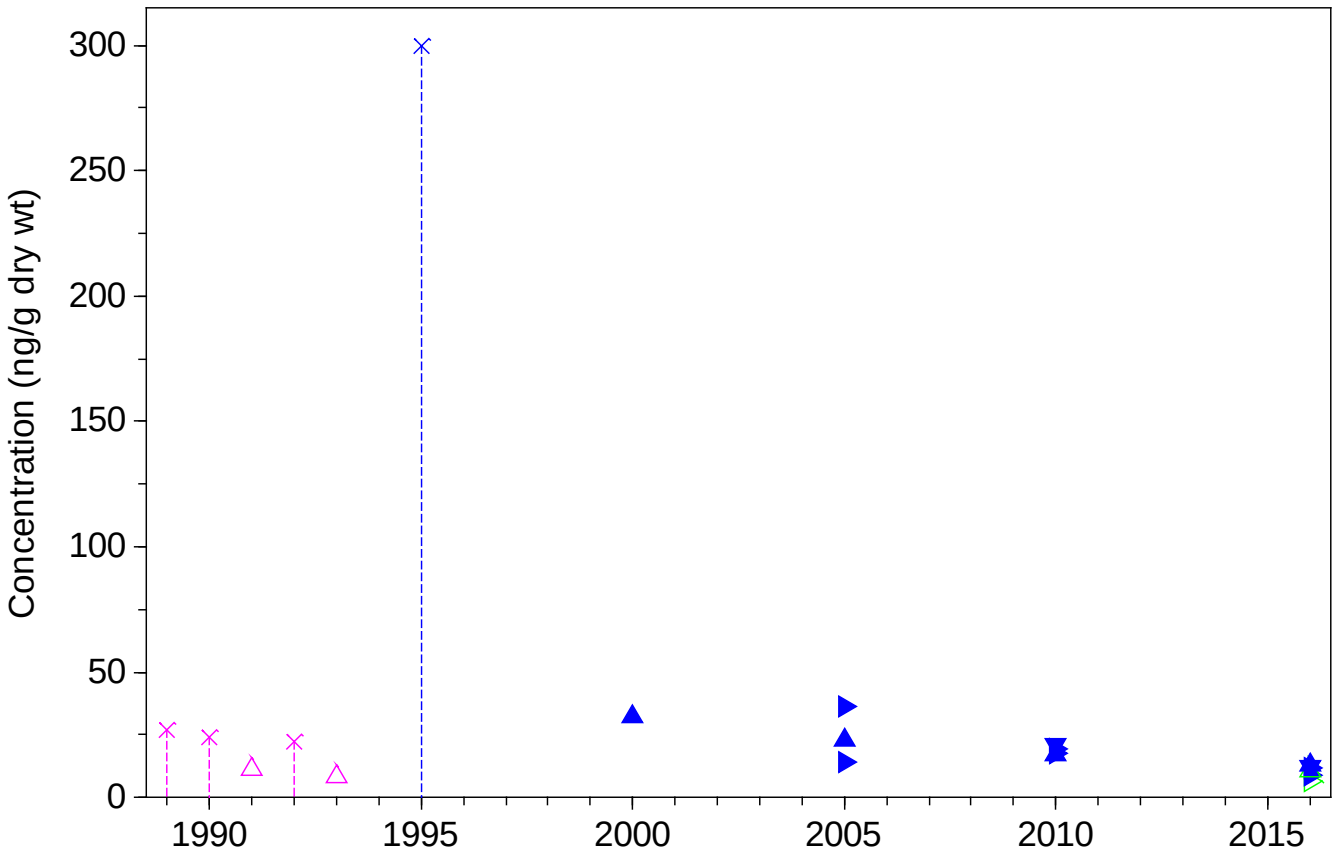
Acenaphthylene, Station 49



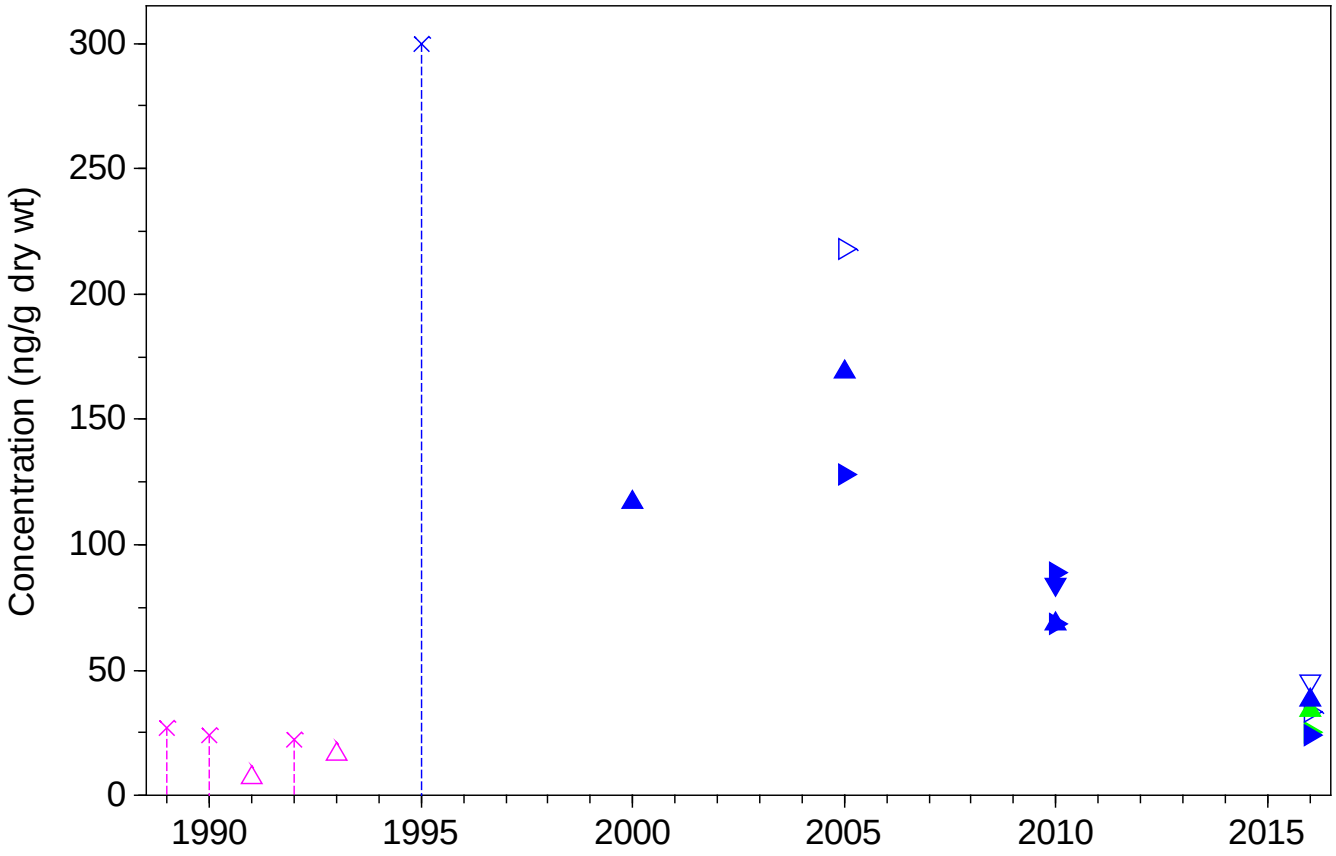
Anthracene, Station 49



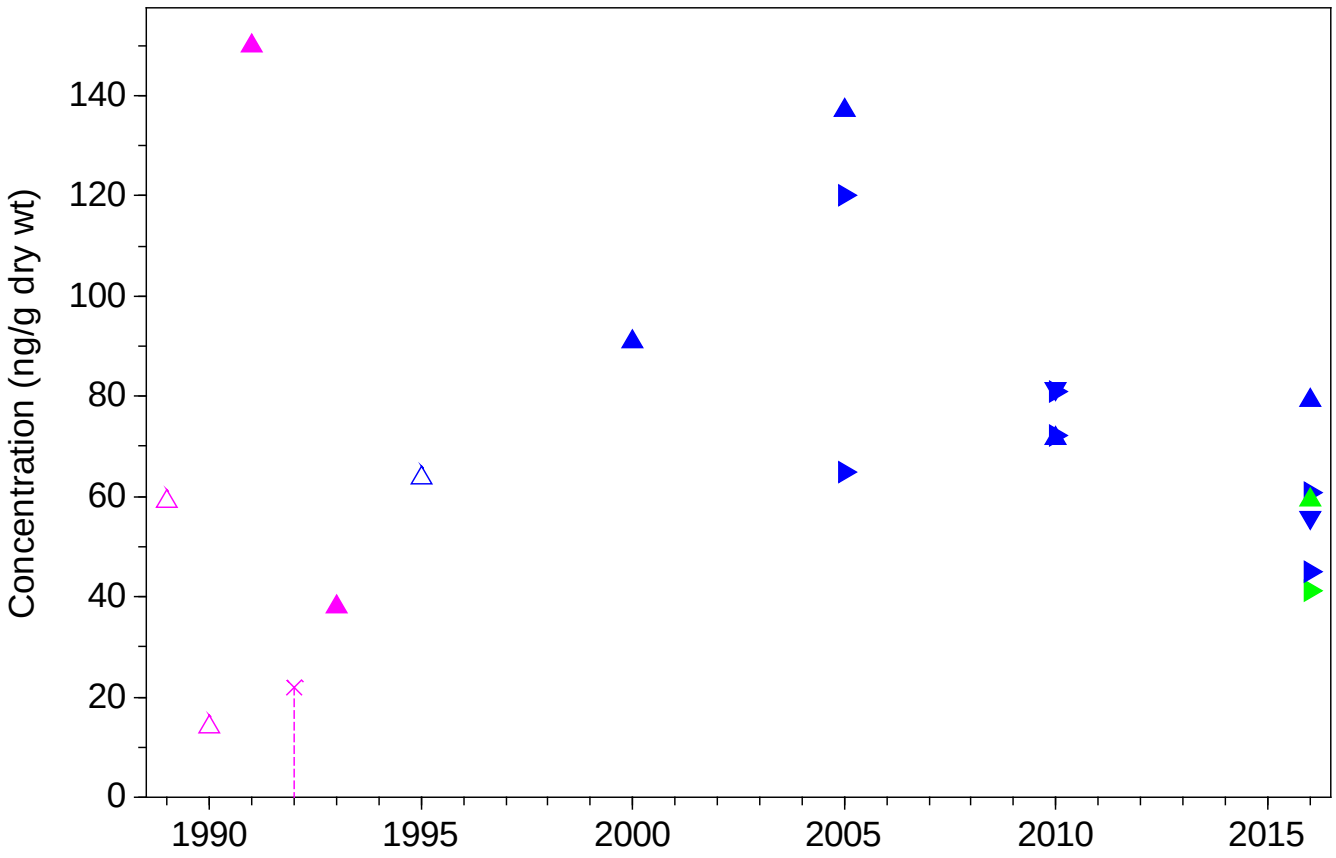
Fluorene, Station 49



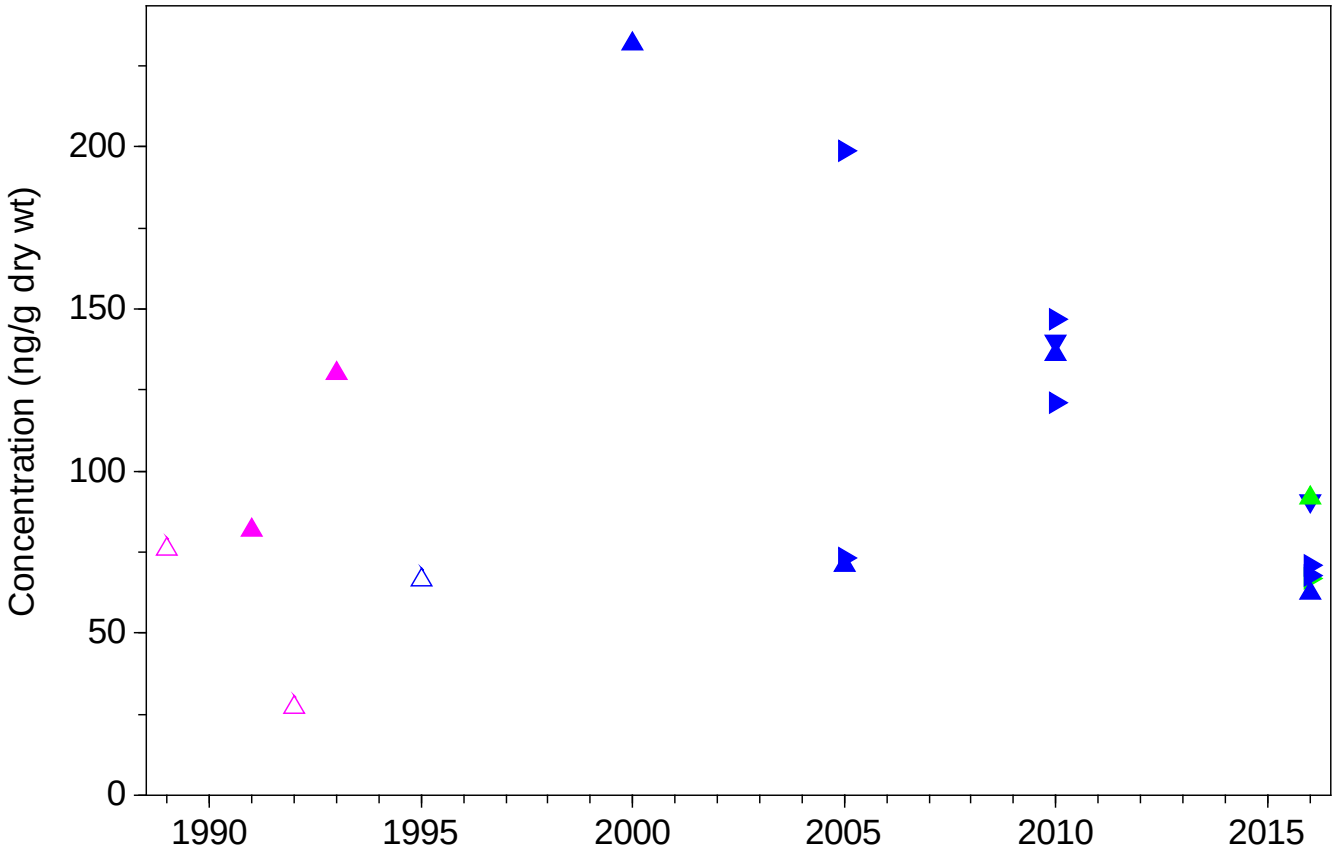
Naphthalene, Station 49



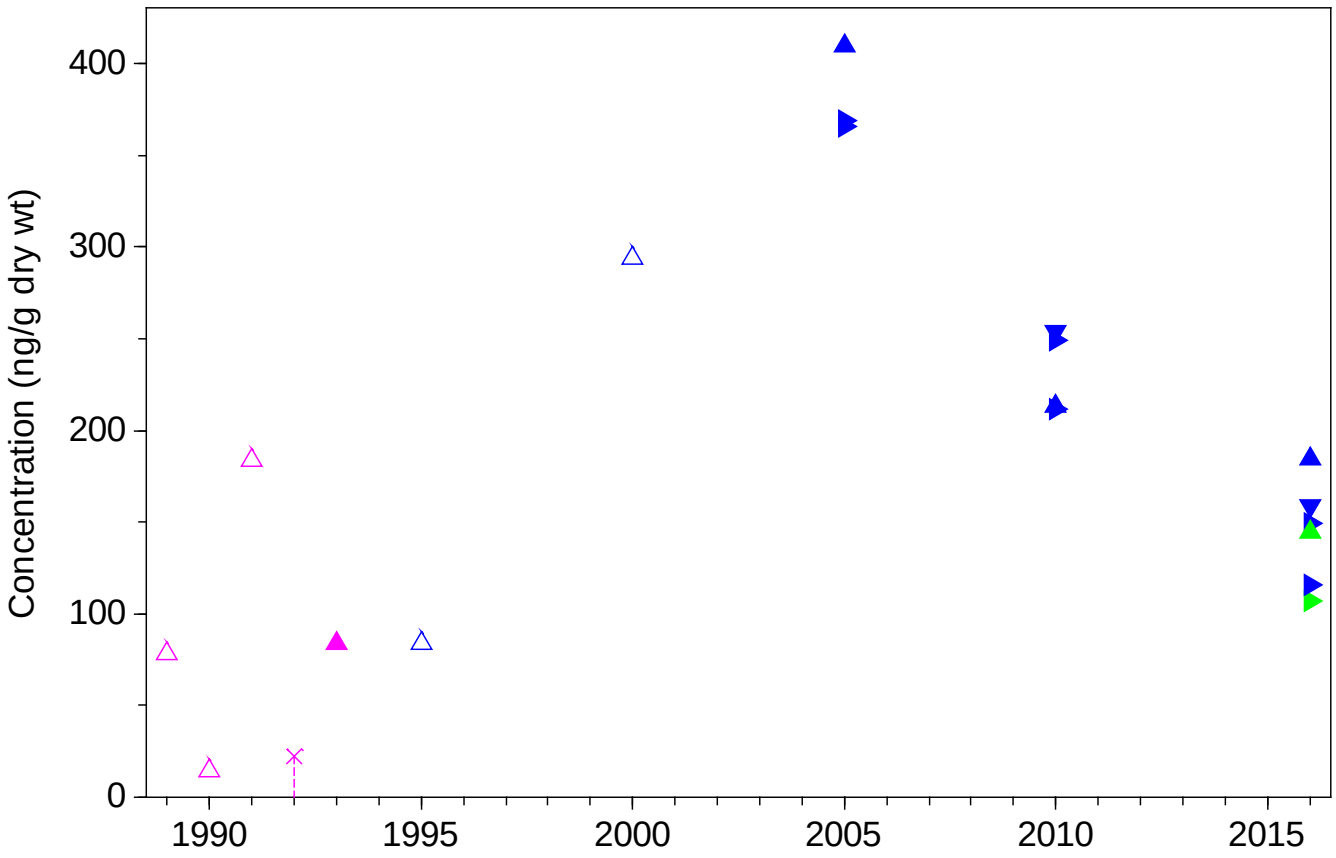
Phenanthrene, Station 49



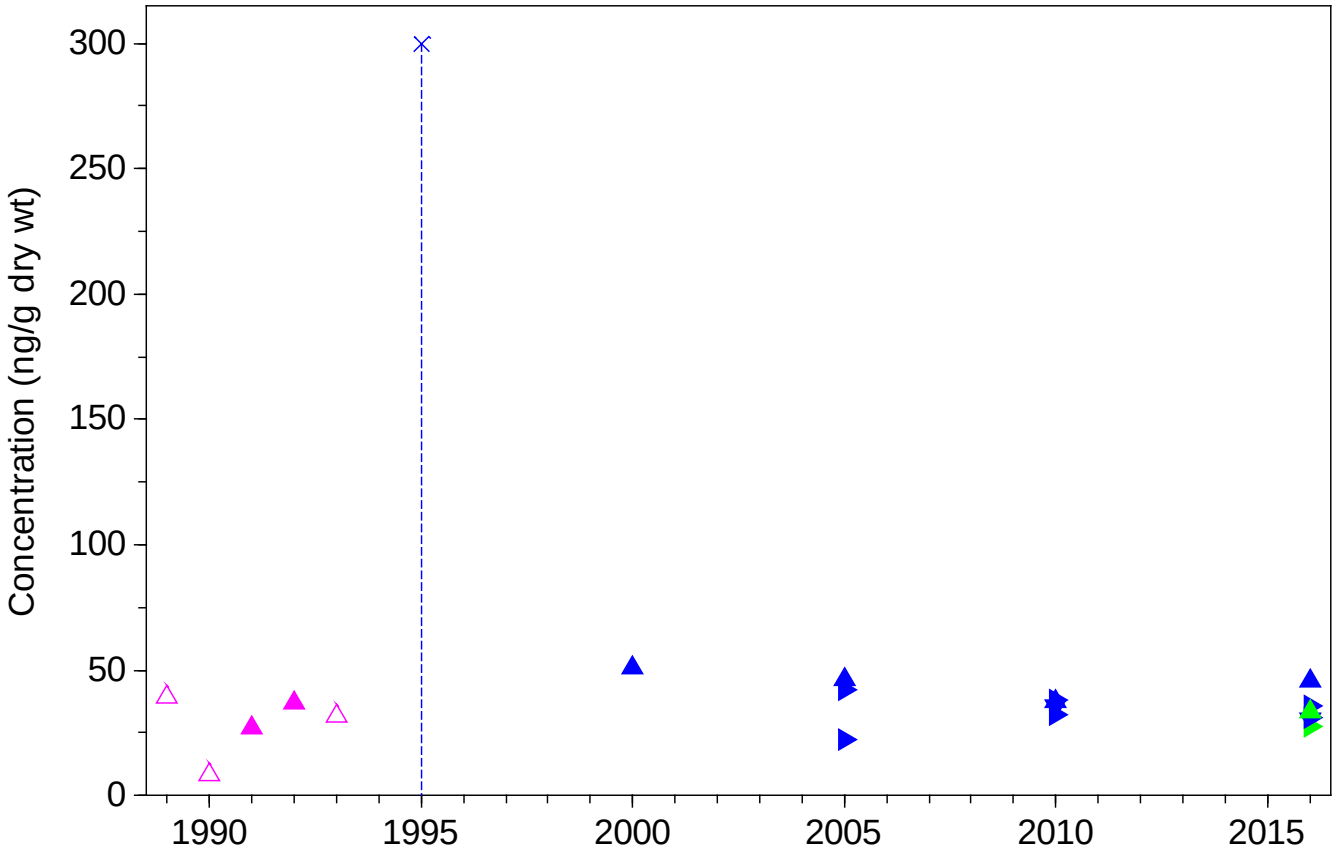
Retene, Station 49



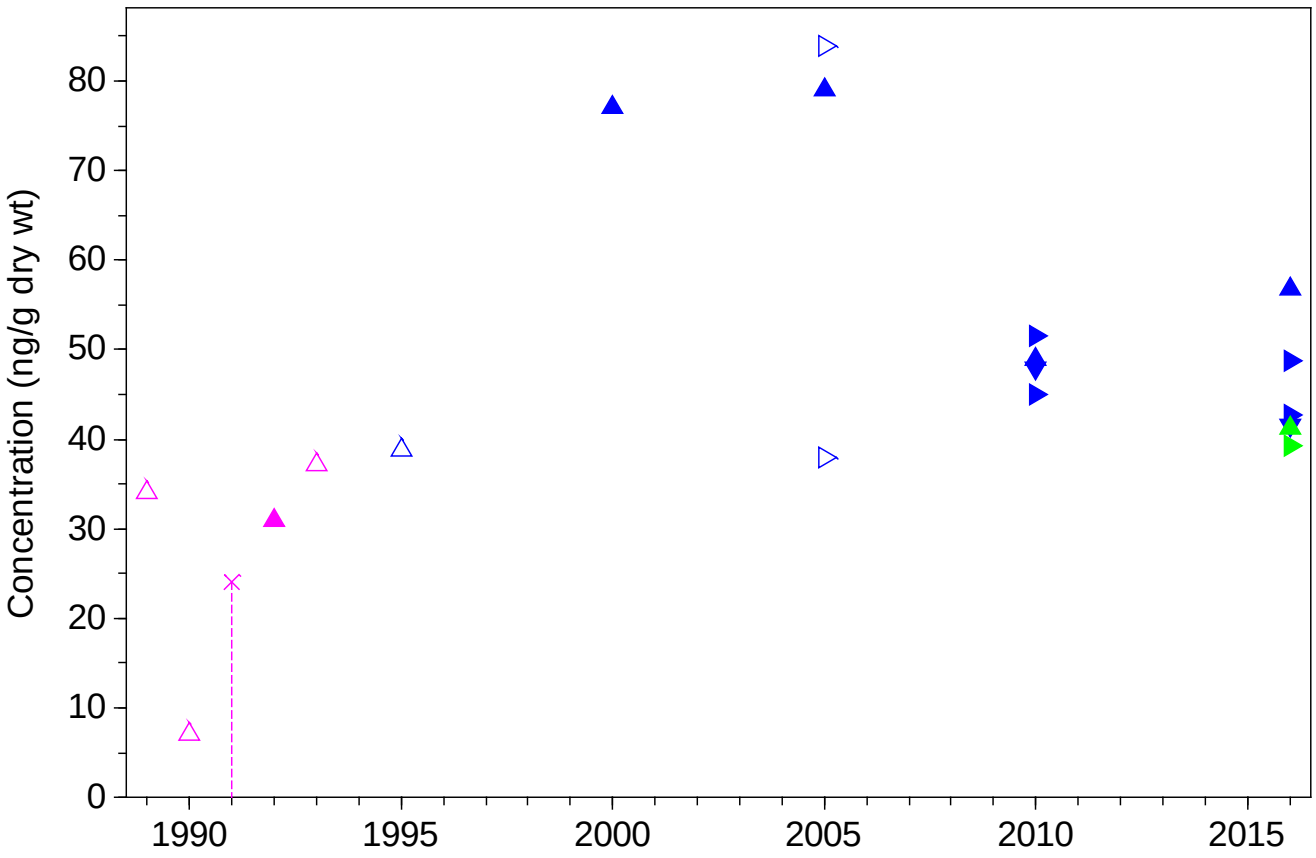
Total LPAH (sum of 6 compounds), Station 49



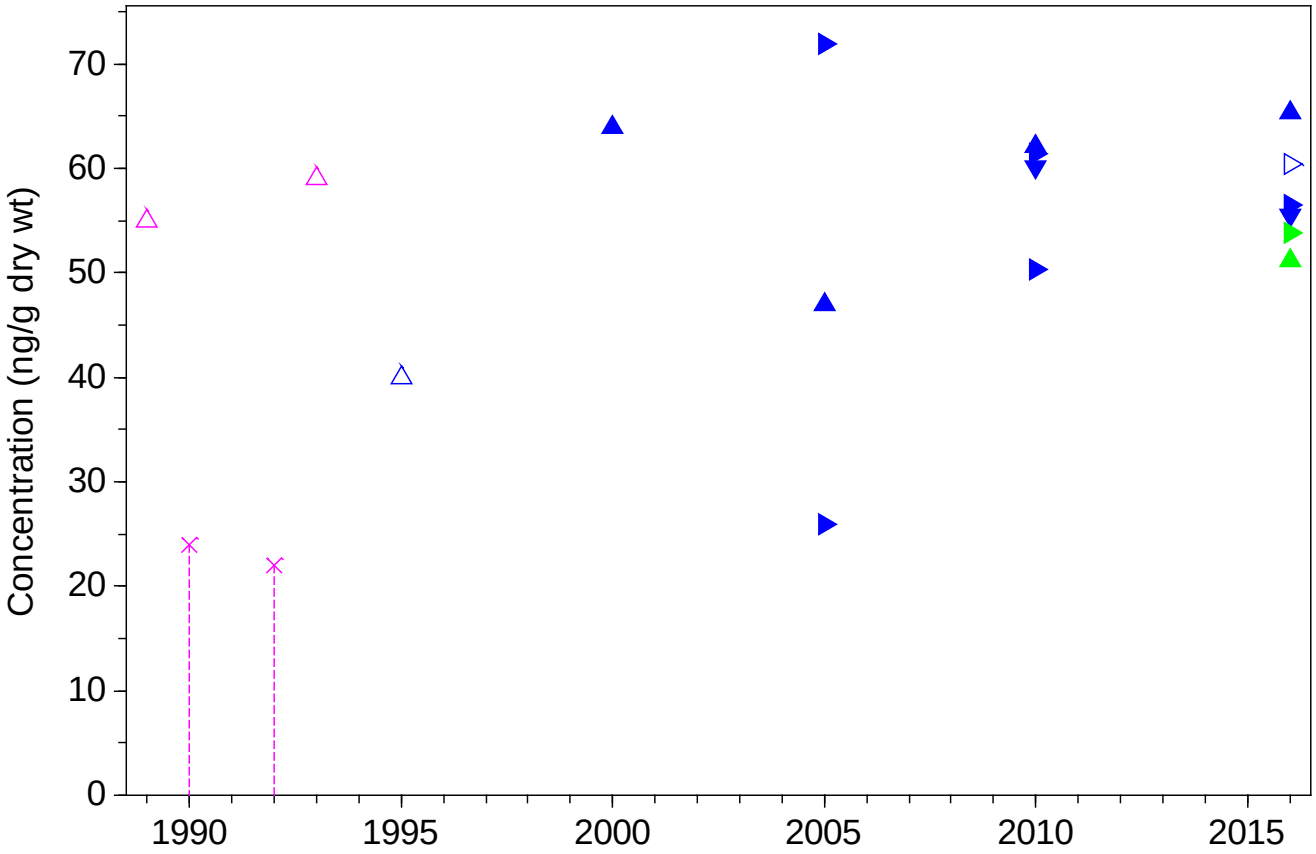
Benzo(a)anthracene, Station 49



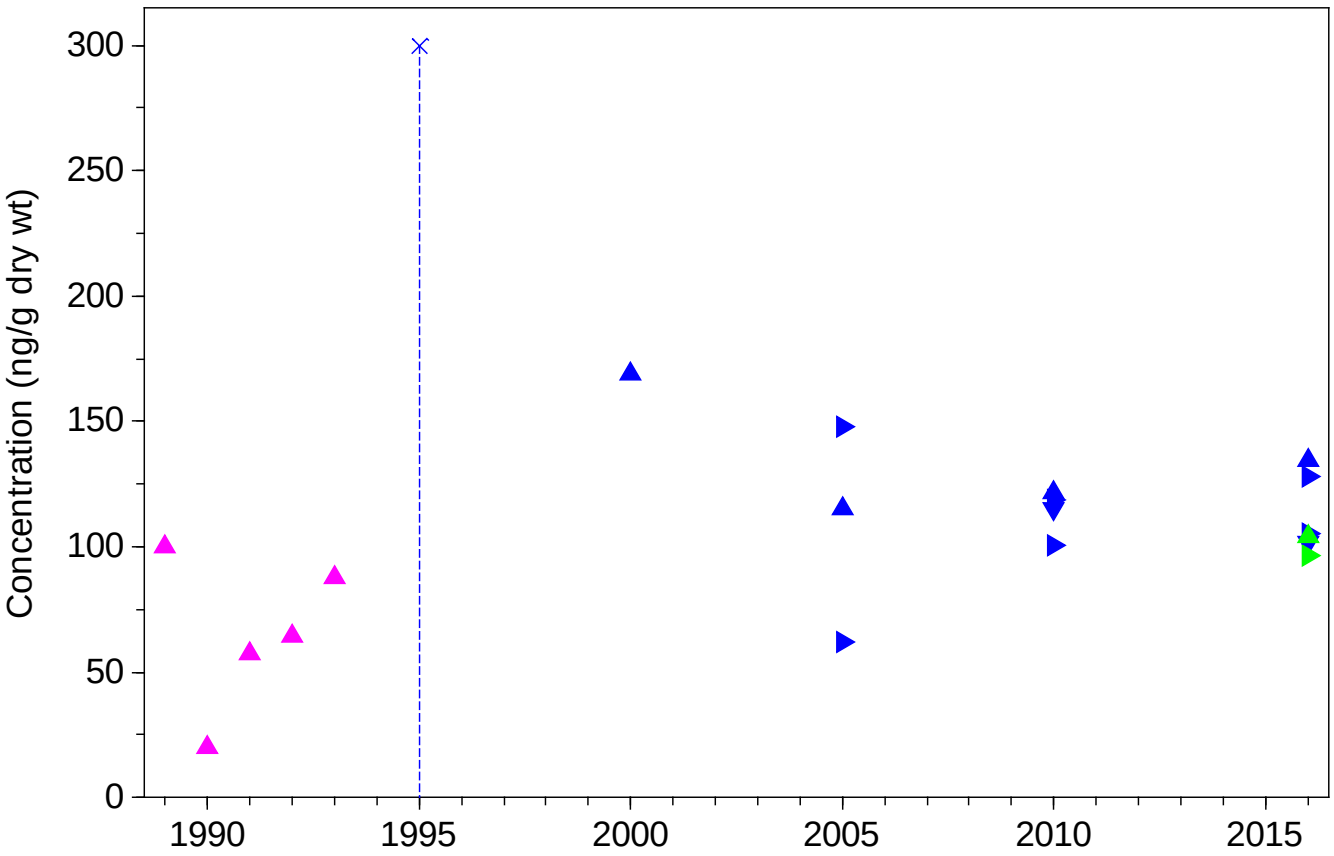
Benzo(a)pyrene, Station 49



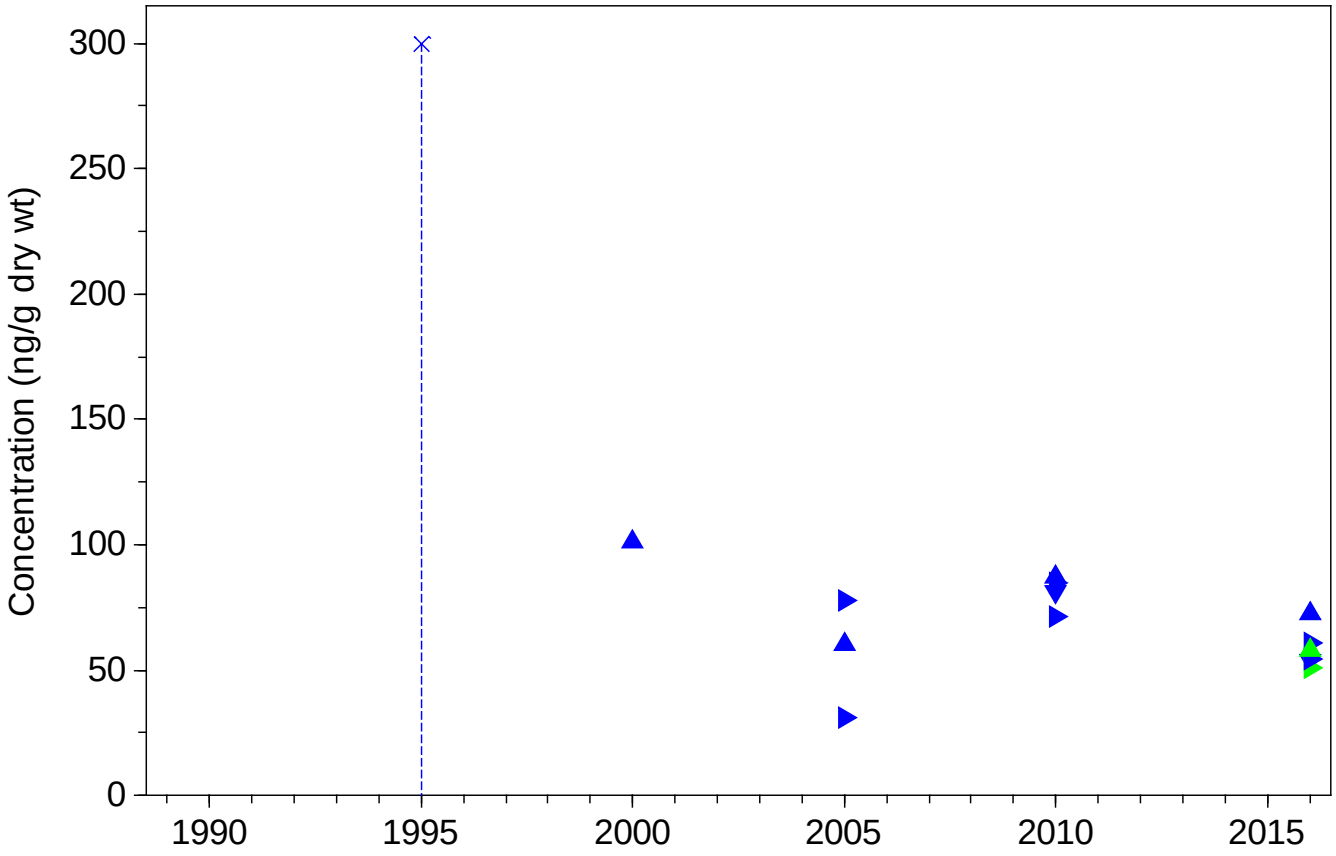
Benzo(g,h,i)perylene, Station 49



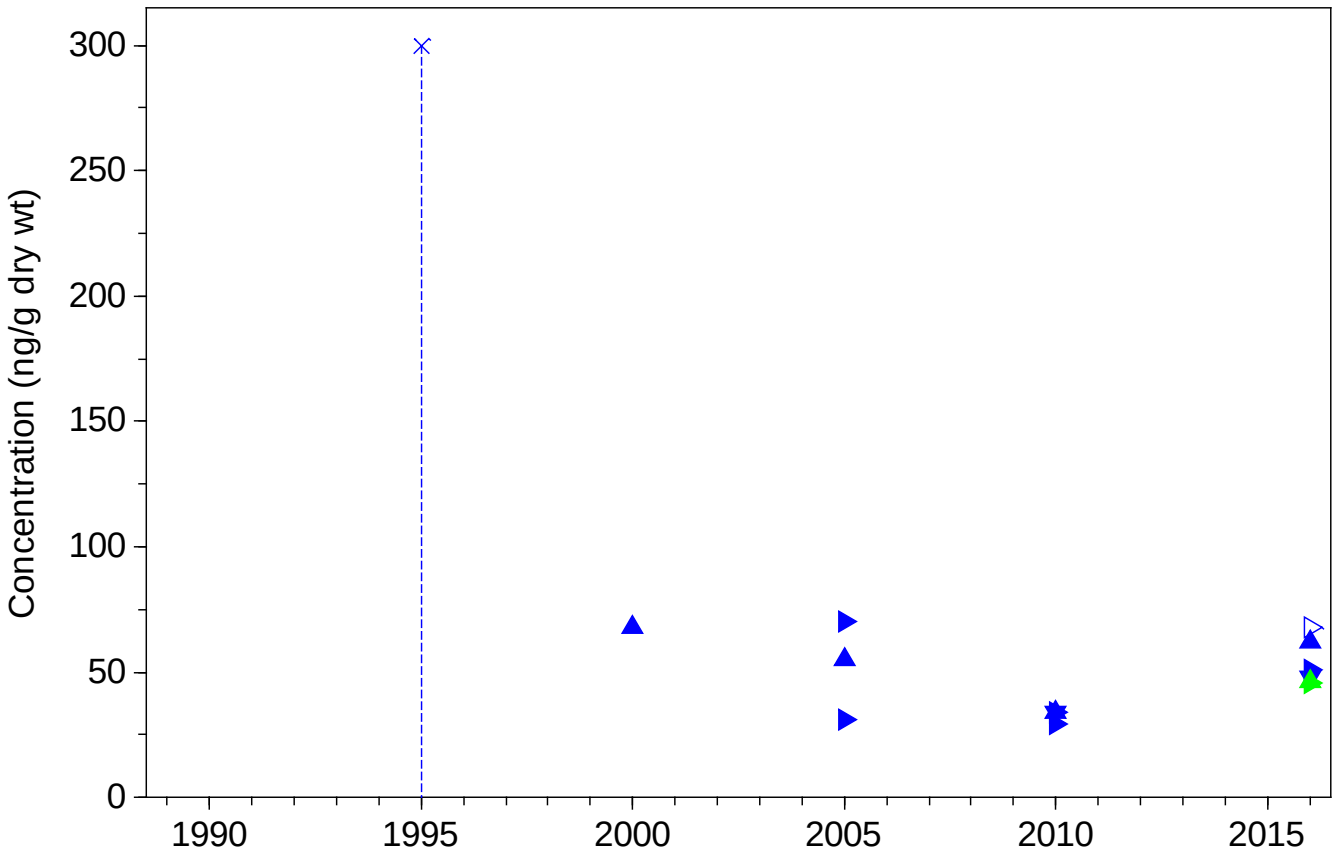
Total Benzofluoranthenes, Station 49



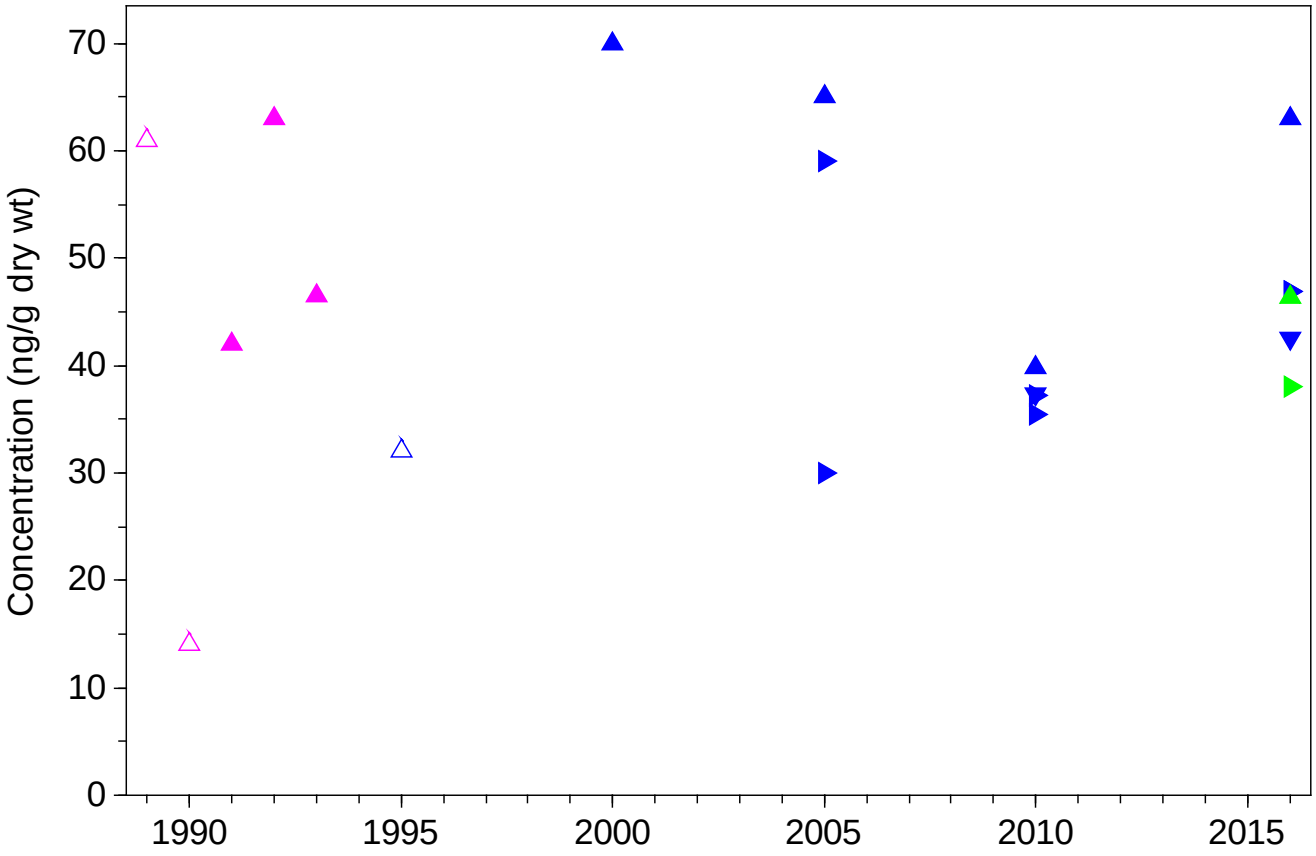
Benzo(b)fluoranthene, Station 49



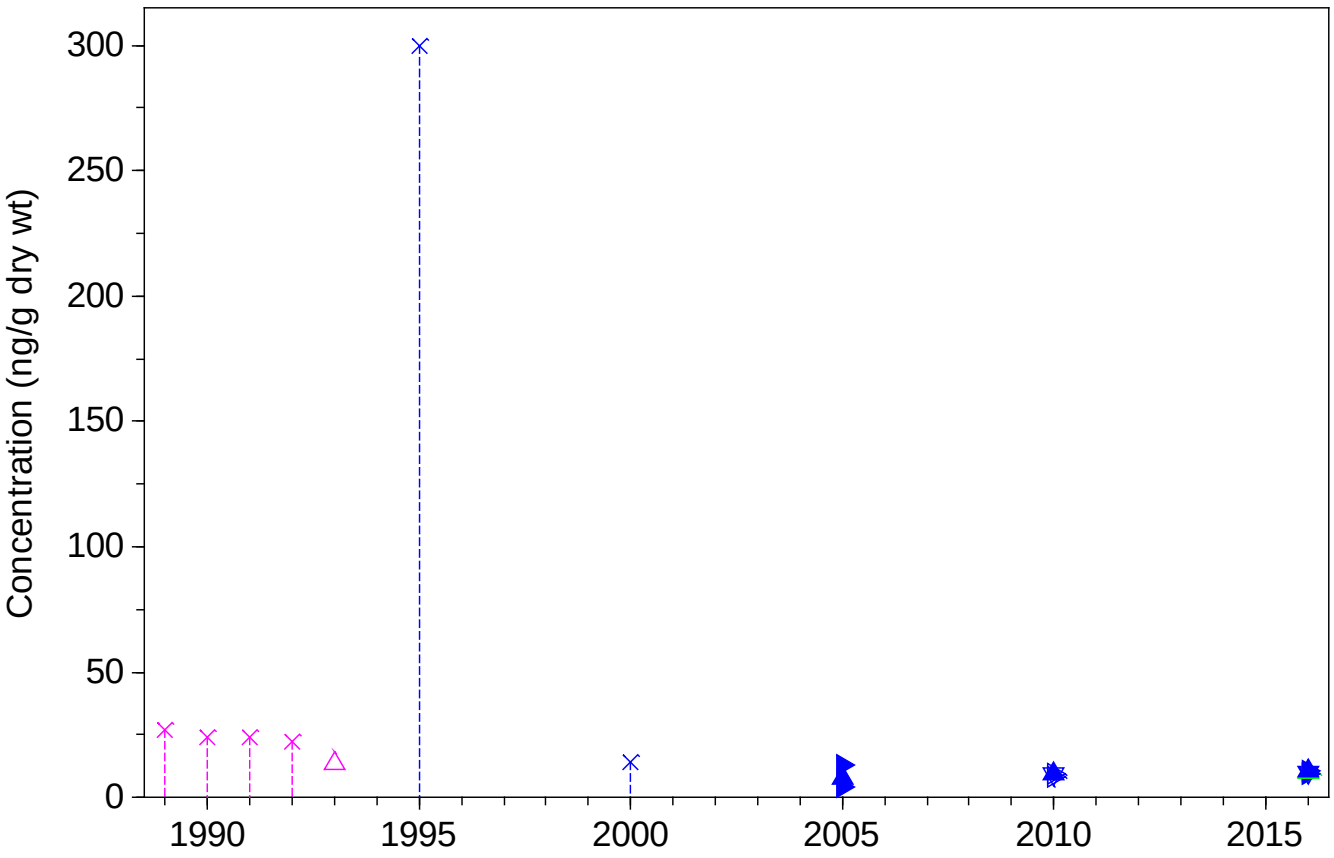
Benzo(k)fluoranthene, Station 49



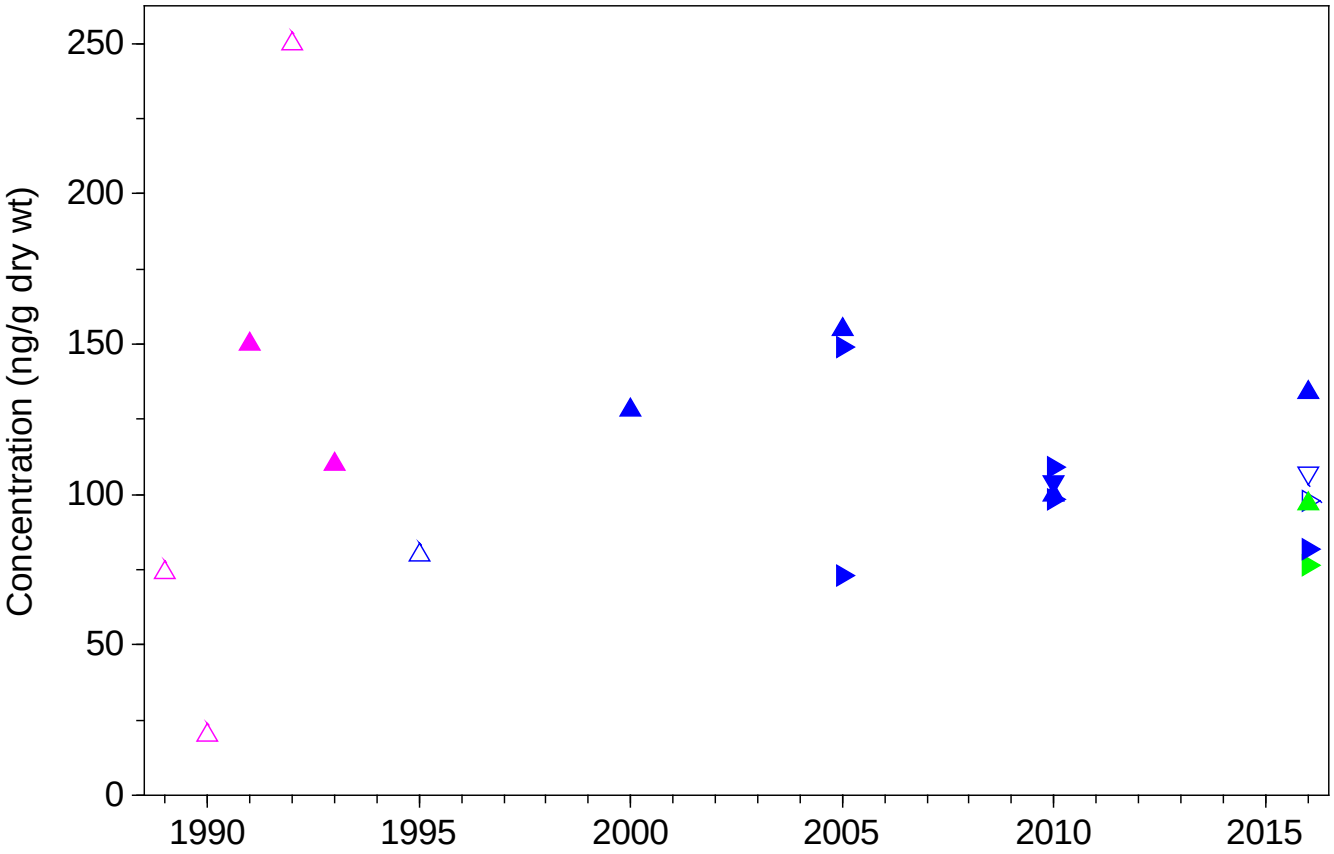
Chrysene, Station 49



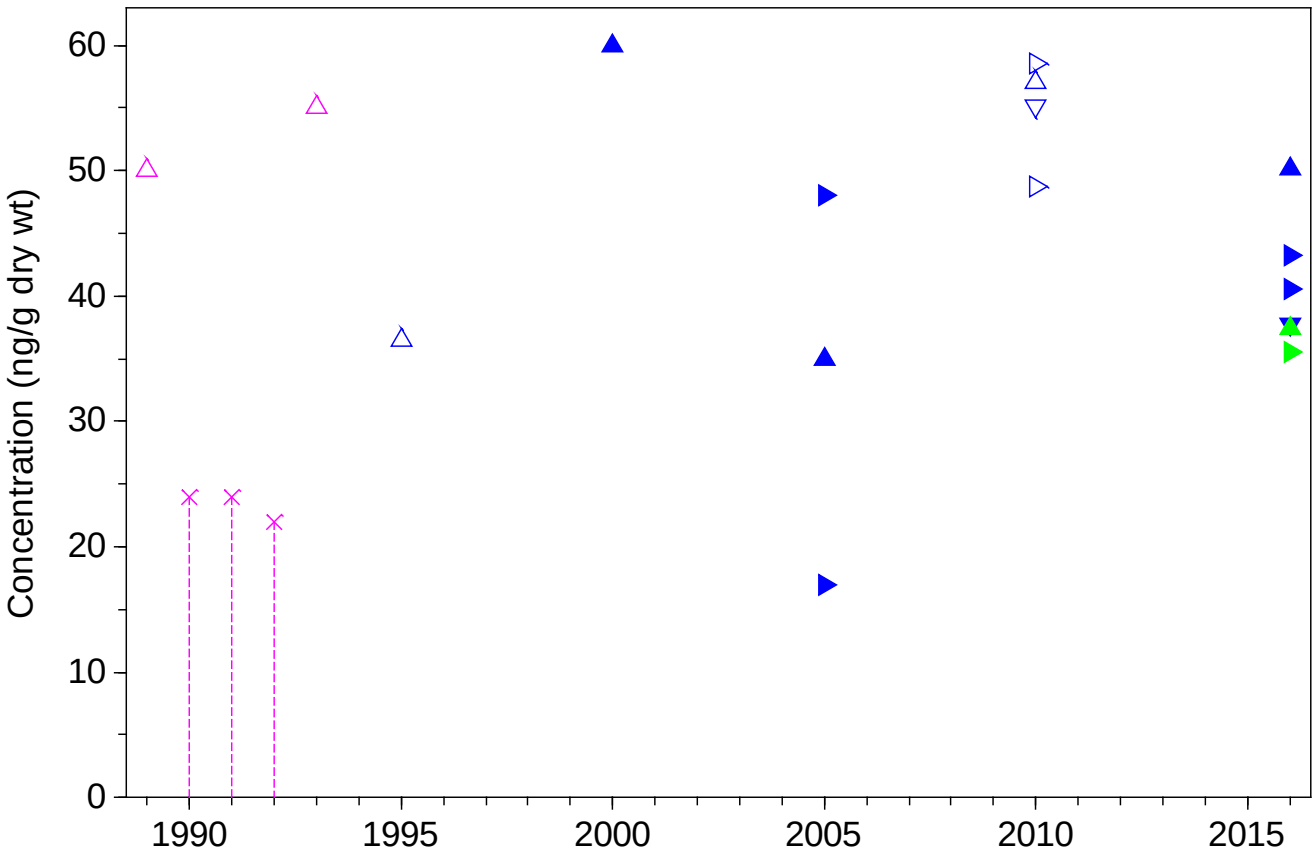
Dibenzo(a,h)anthracene, Station 49



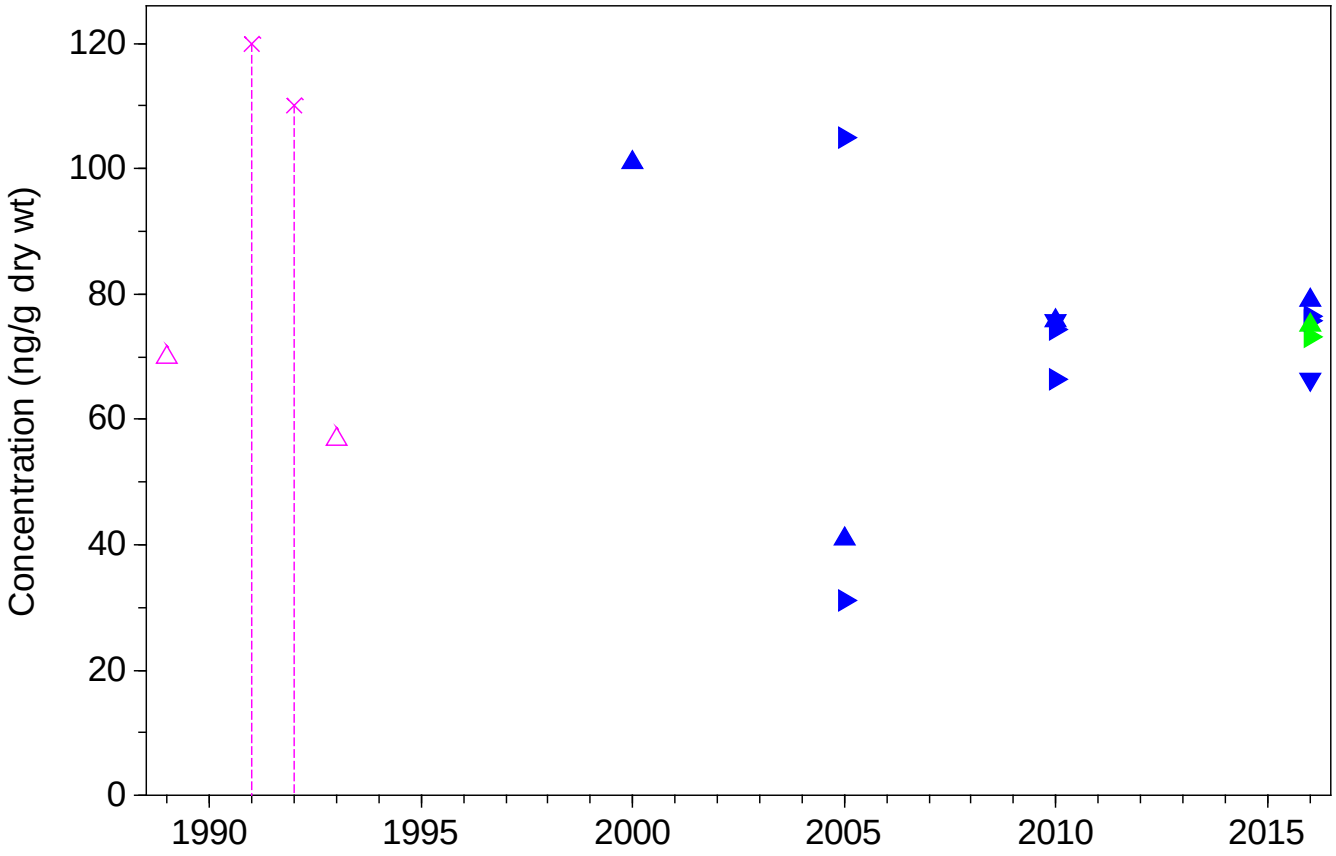
Fluoranthene, Station 49



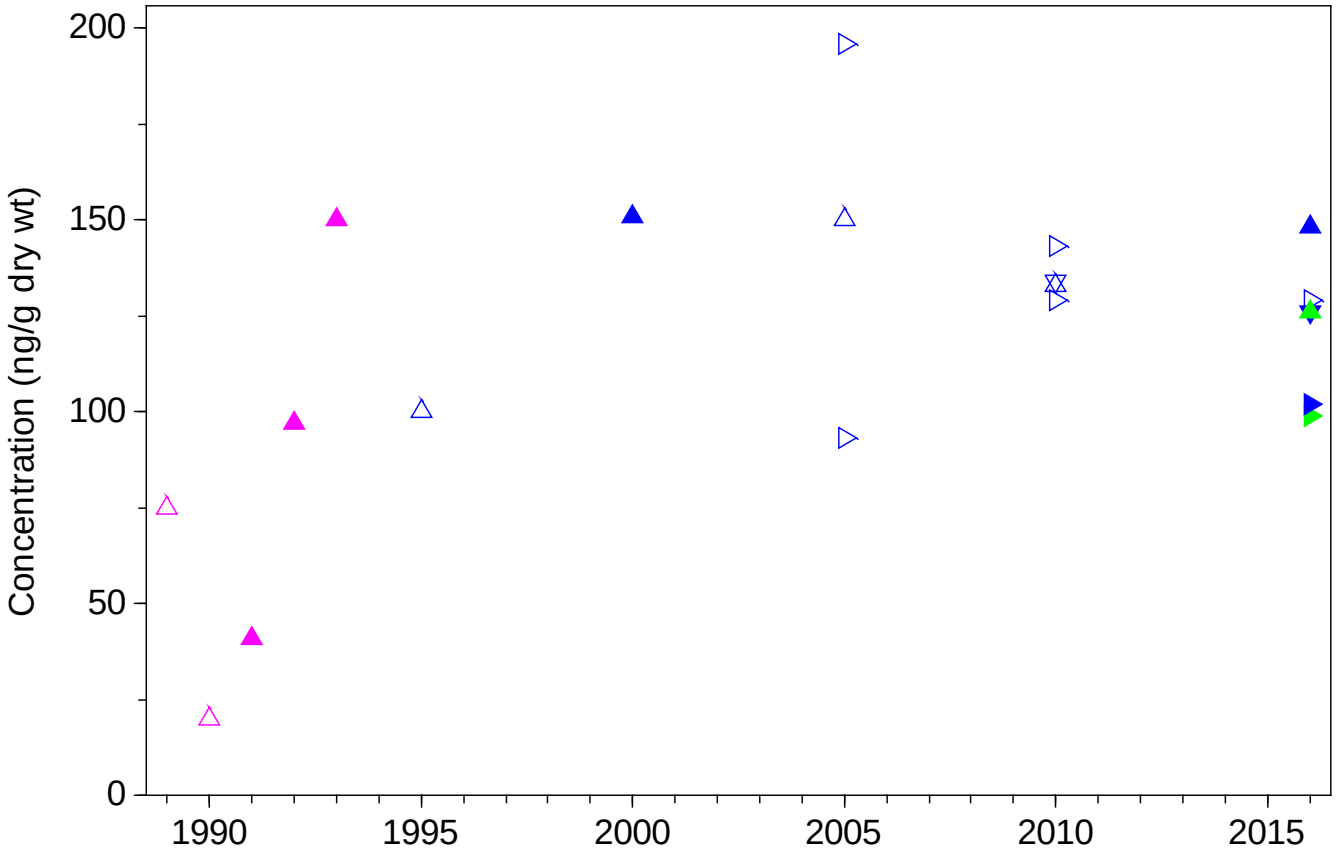
Indeno(1,2,3-c,d)pyrene, Station 49



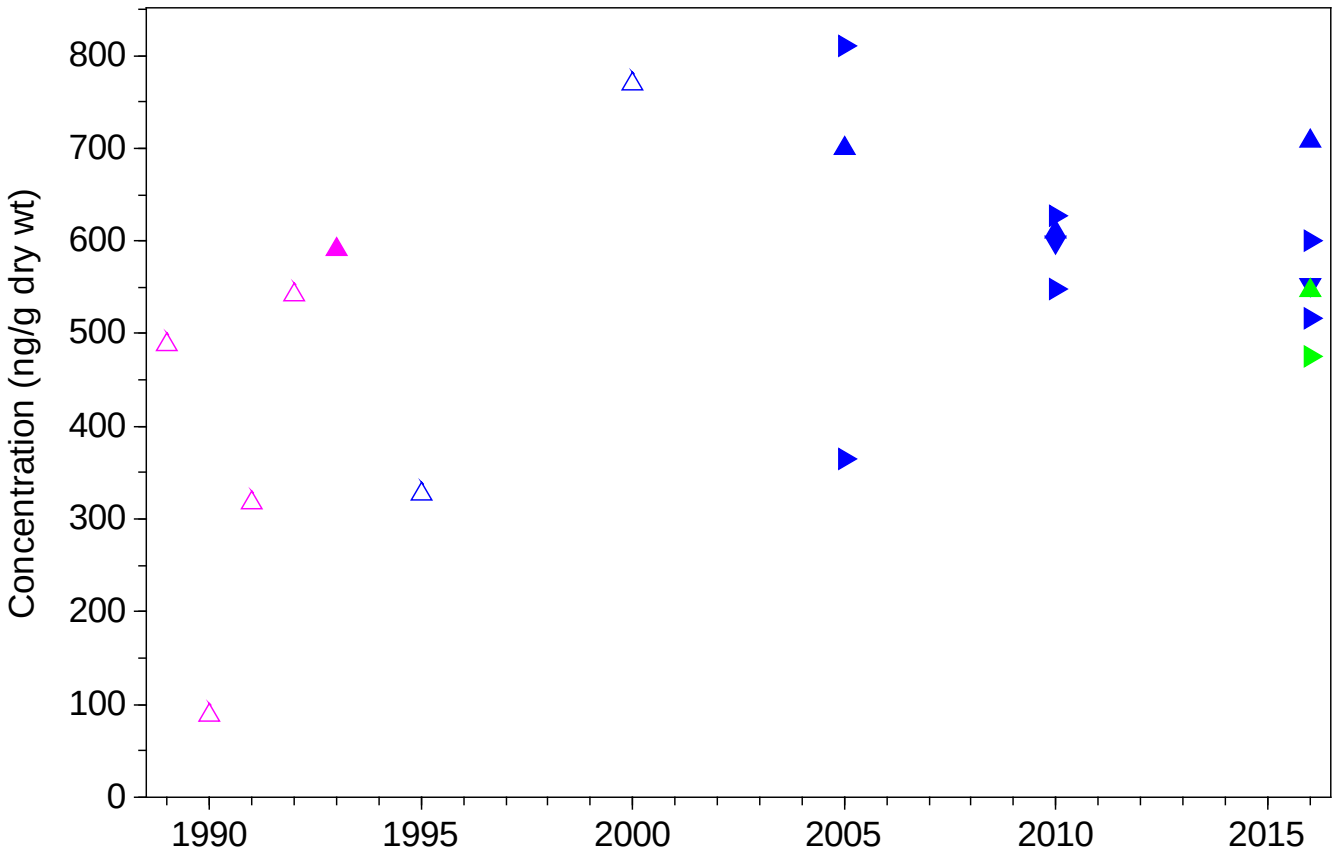
Perylene, Station 49



Pyrene, Station 49



Total HPAH (sum of 9 compounds), Station 49



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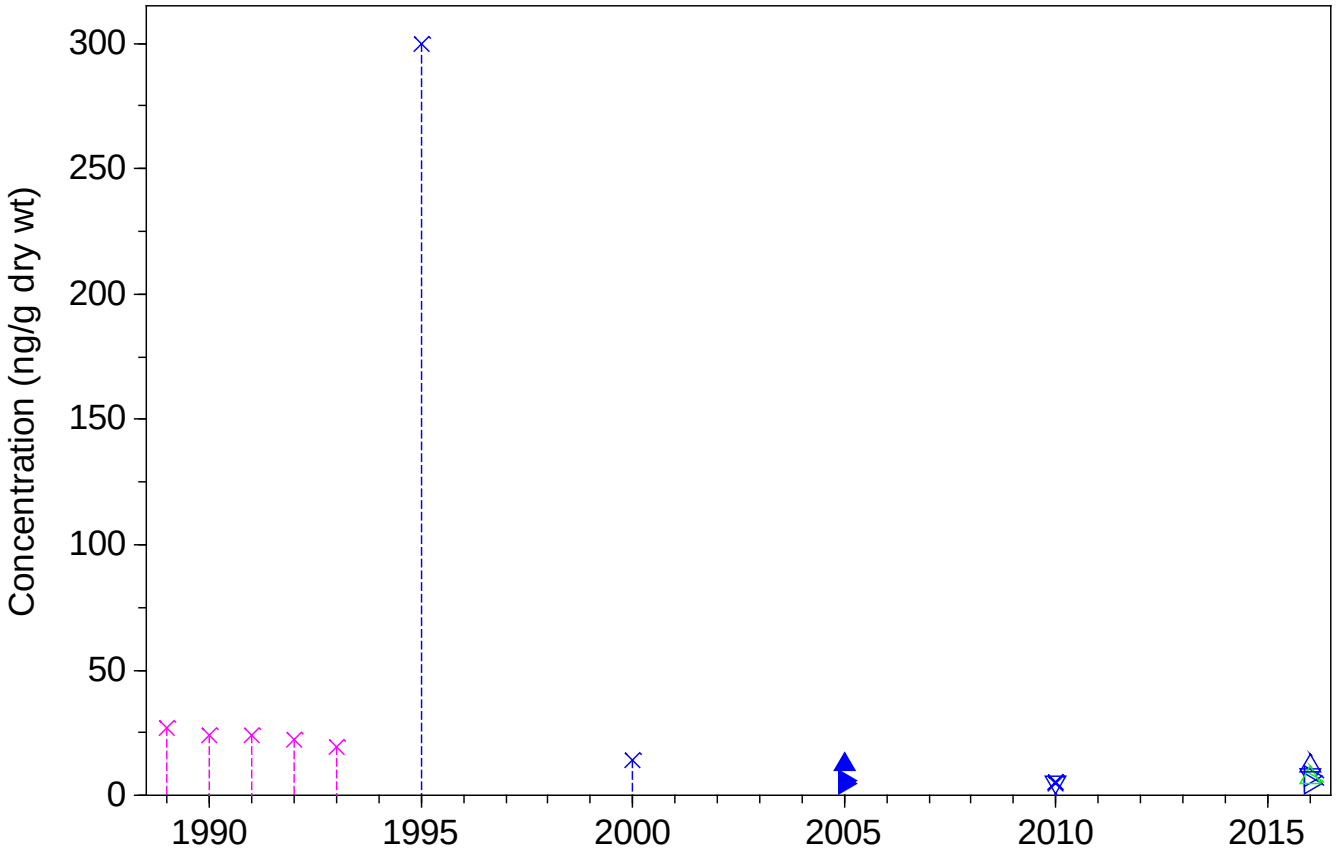
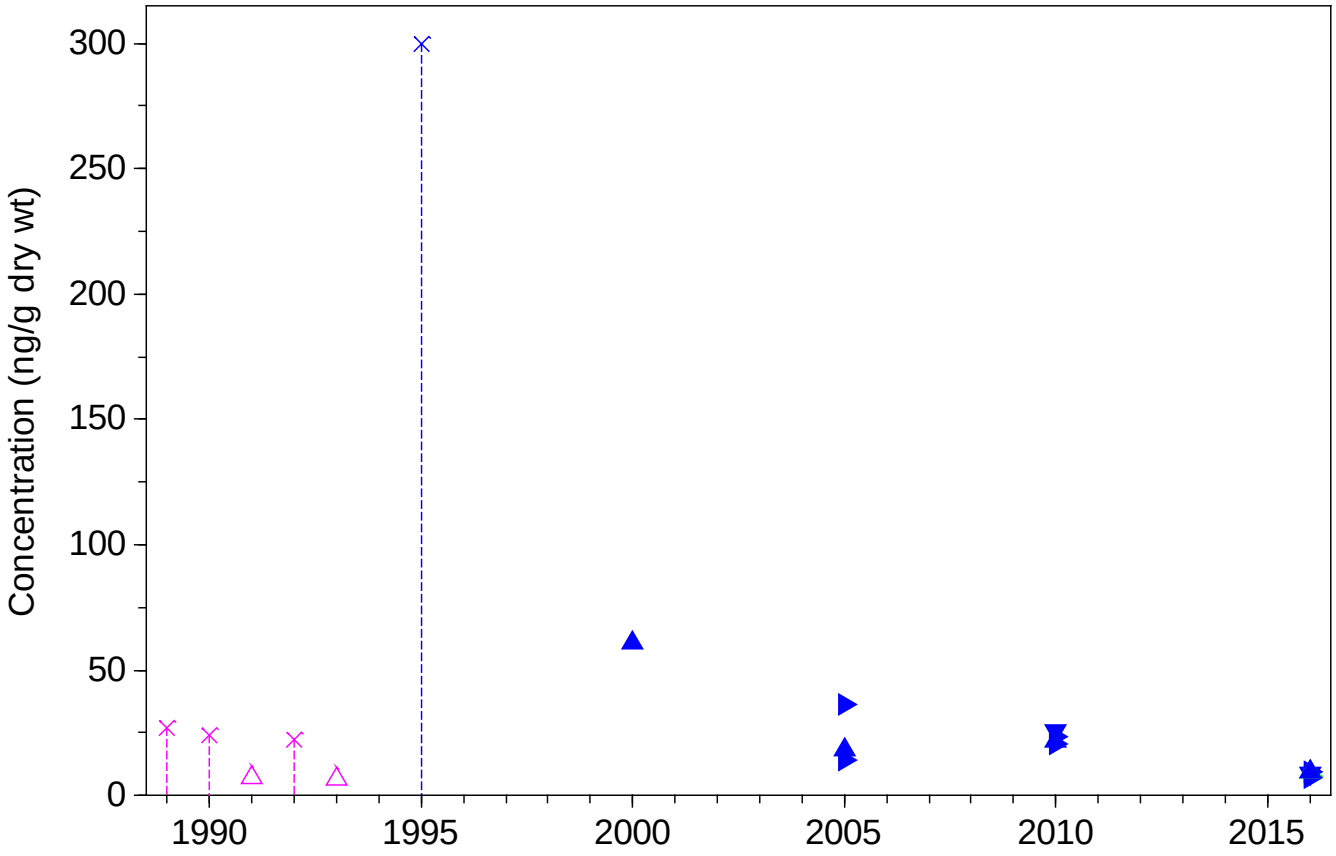
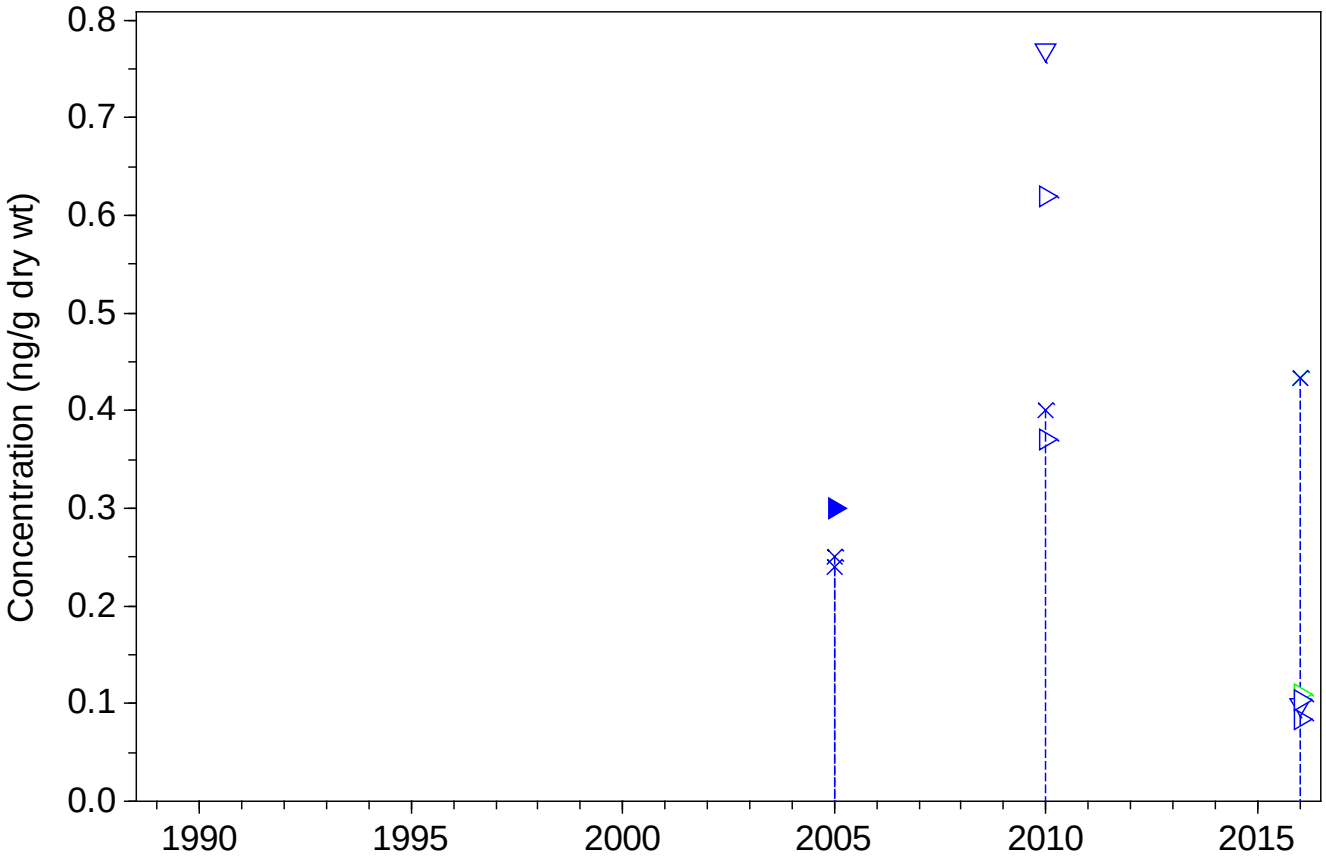
Carbazole, Station 49



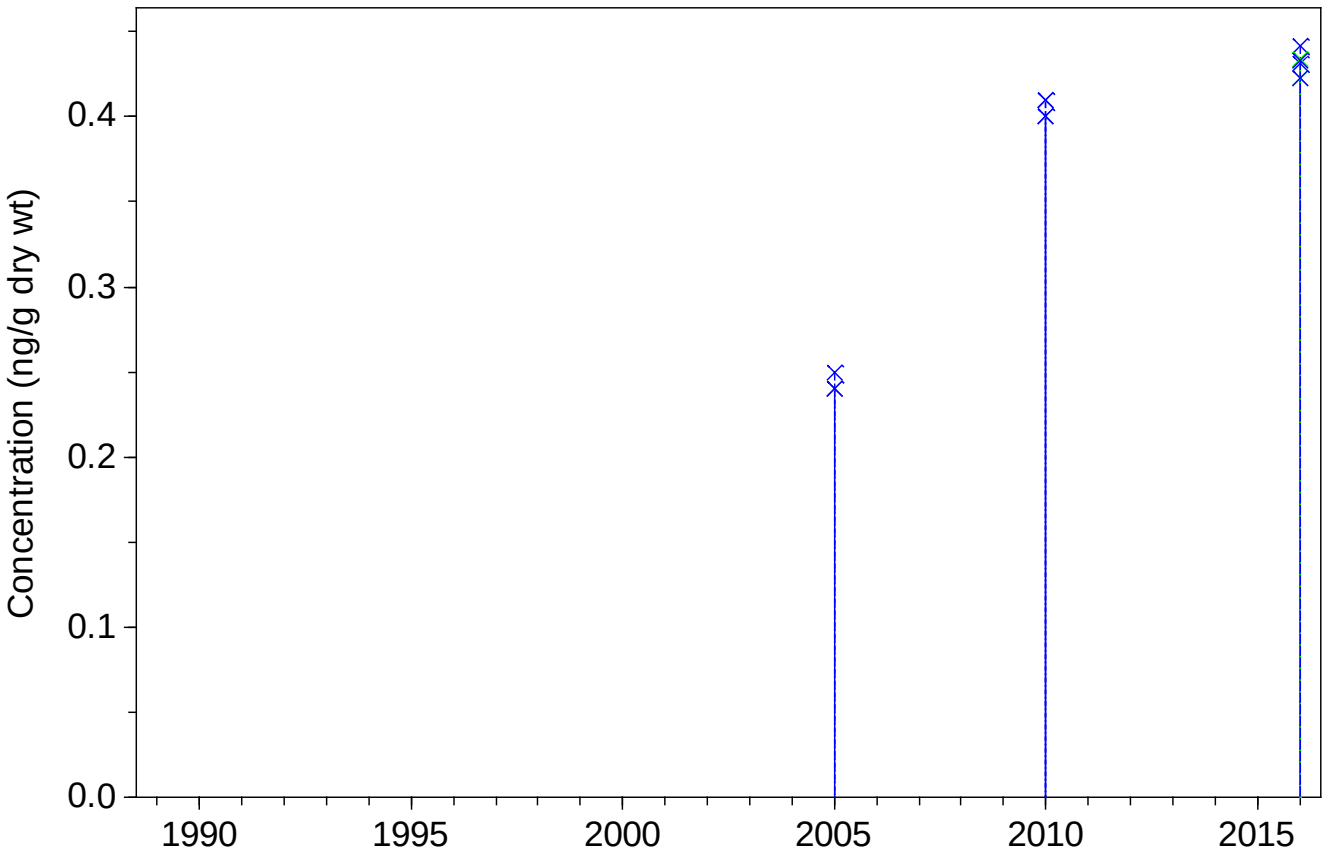
Dibenzofuran, Station 49



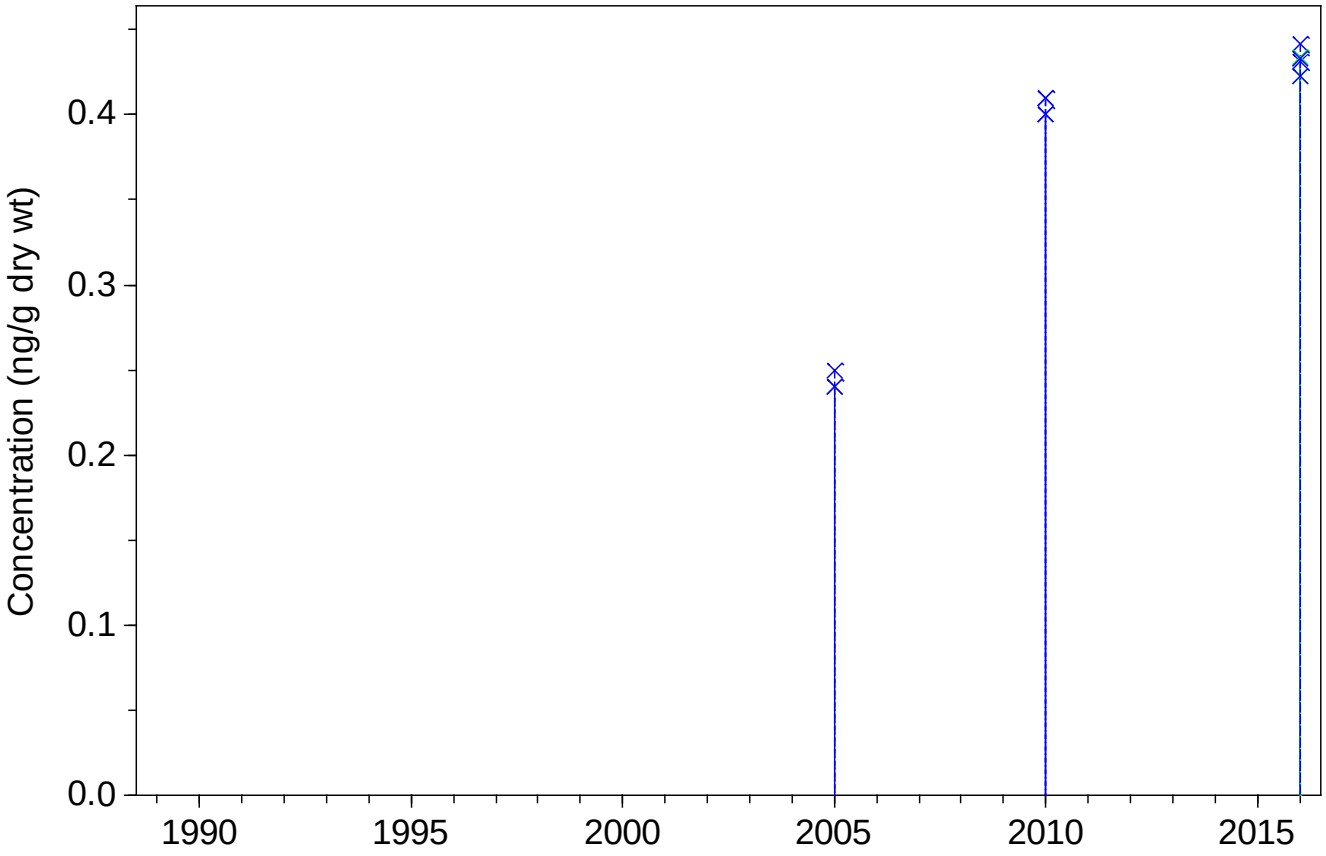
PBDE-47, Station 49



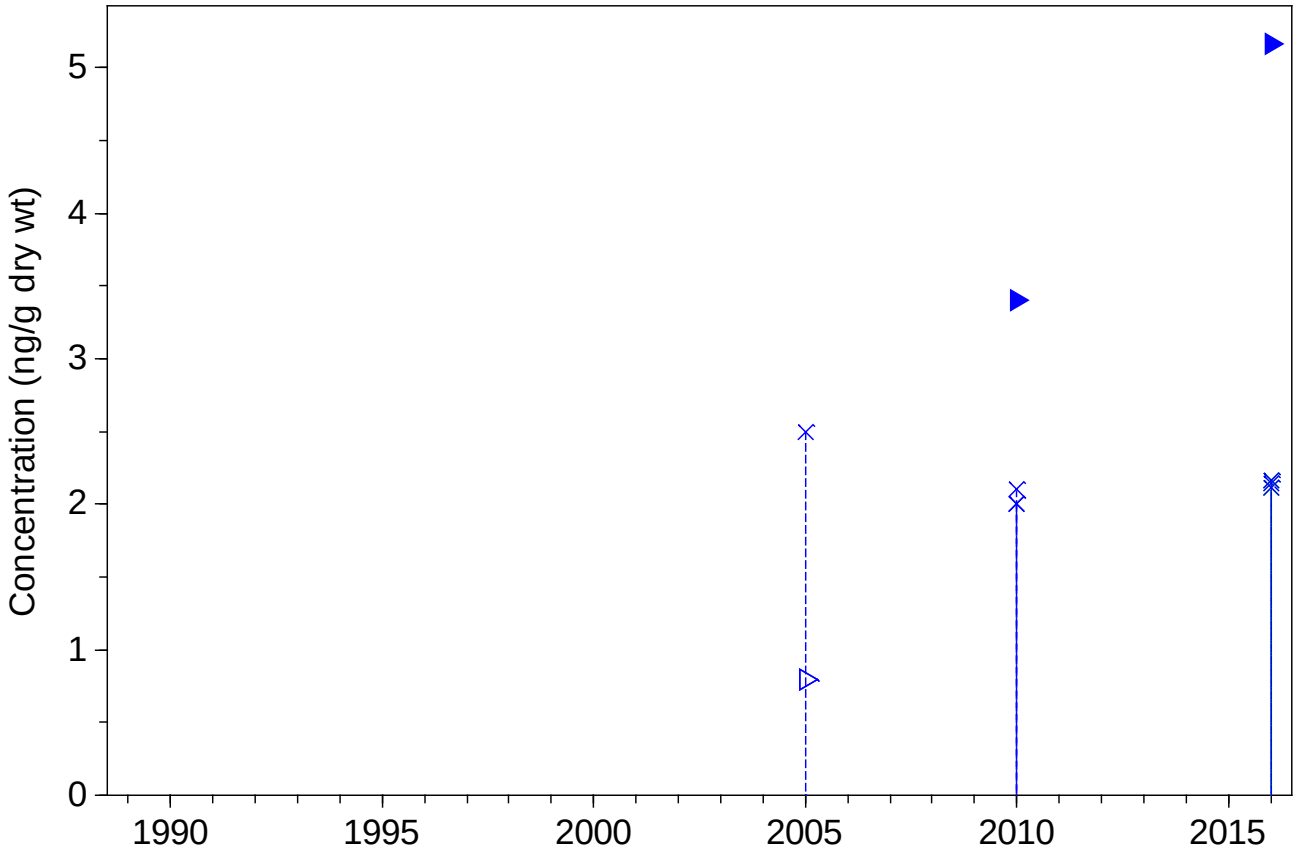
PBDE-49, Station 49



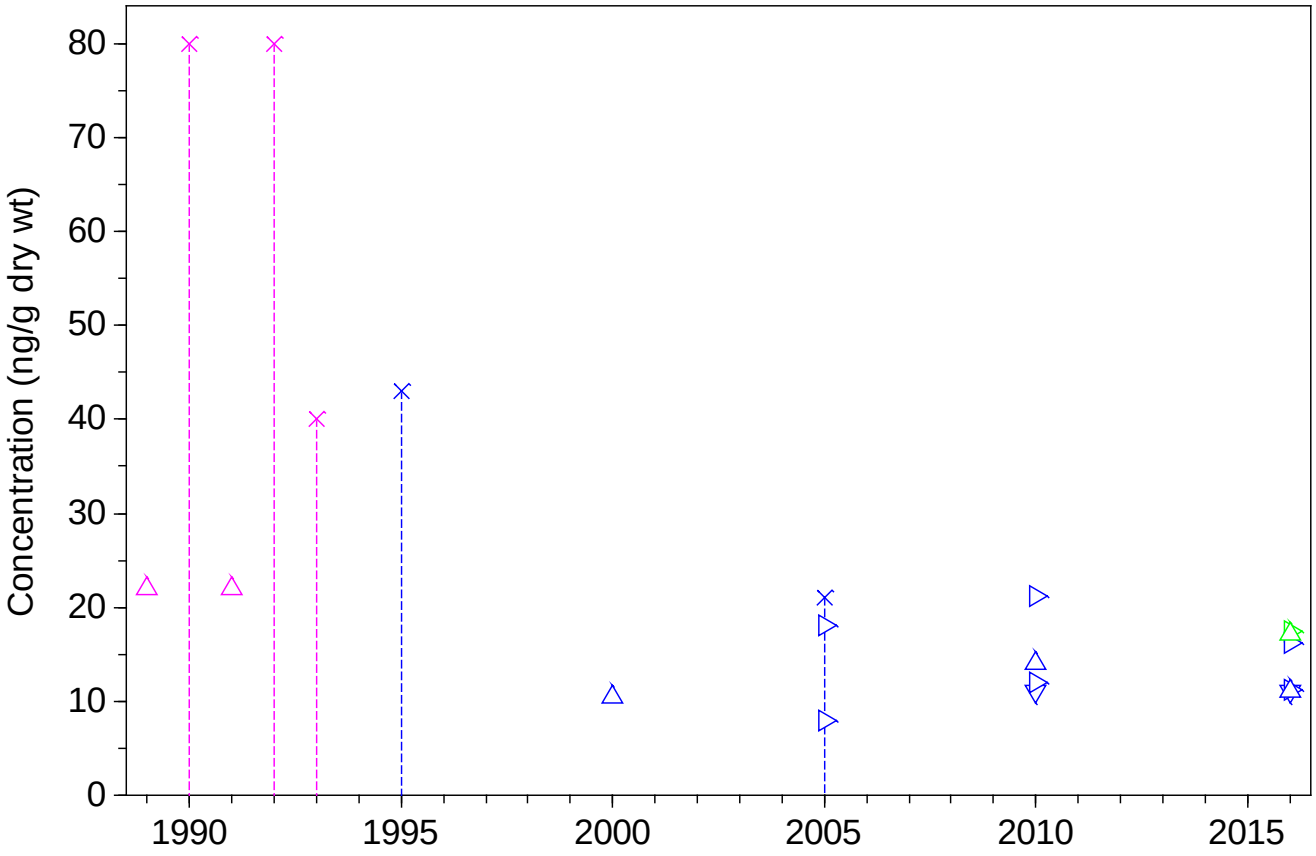
PBDE-99, Station 49



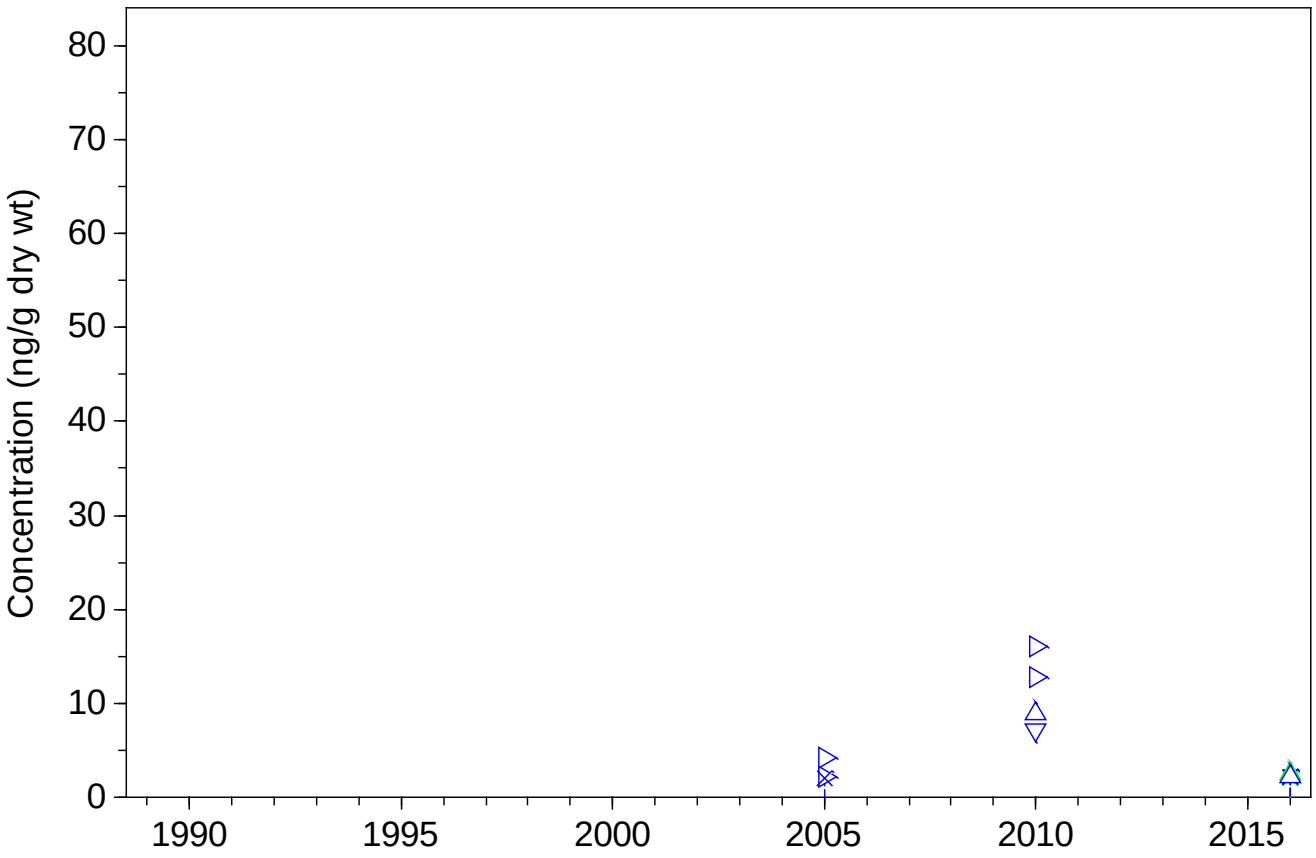
PBDE-209, Station 49



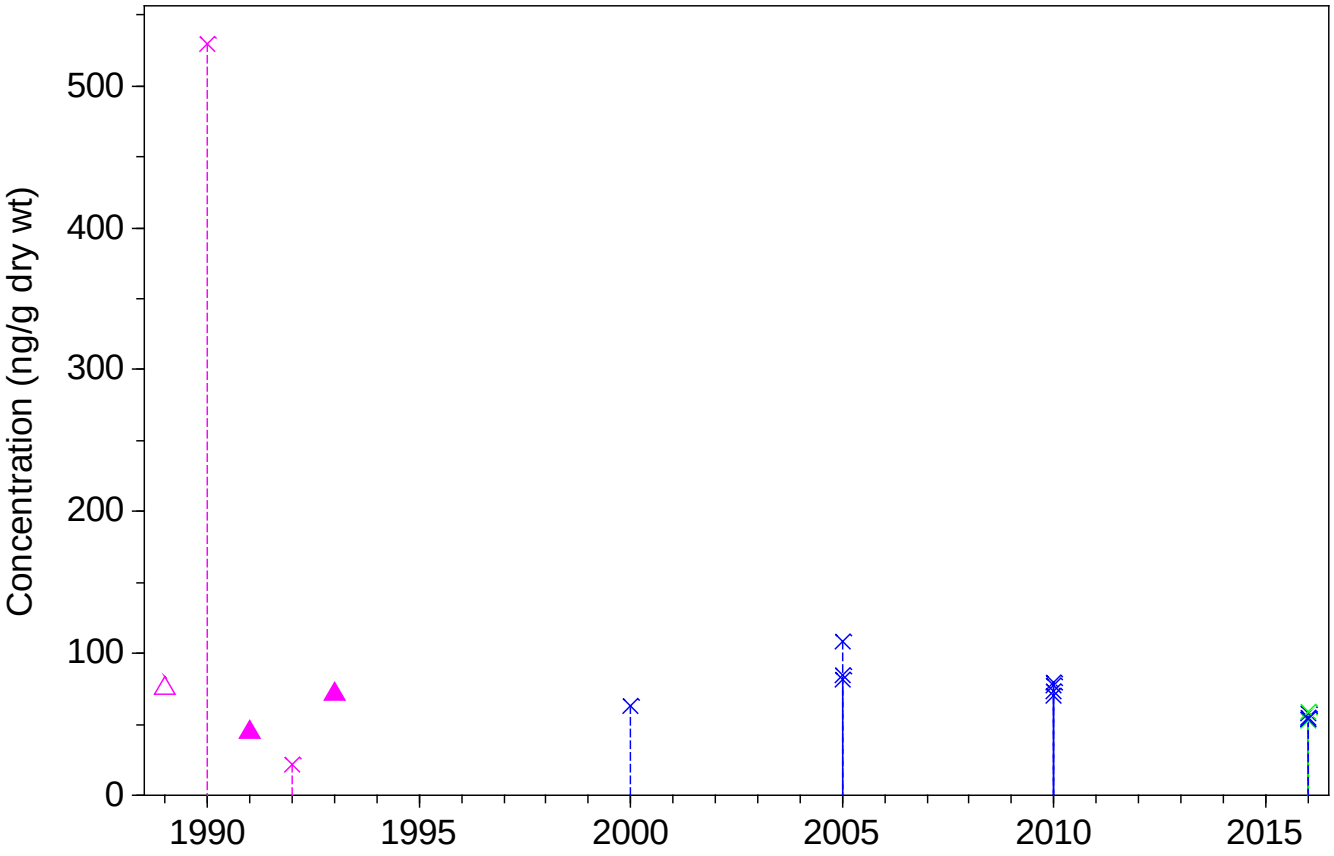
Total Aroclors, Station 49



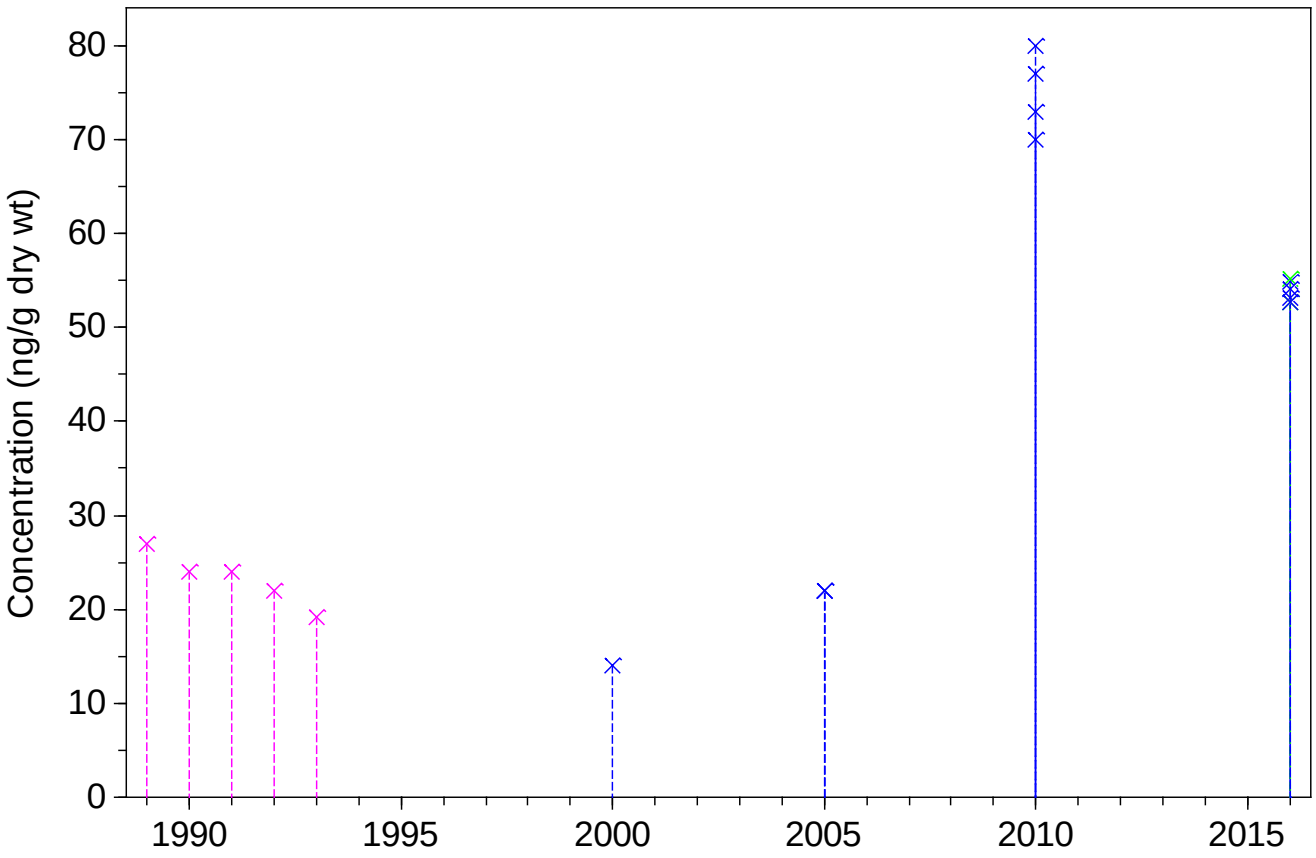
Total PCB Congeners x 2, Station 49



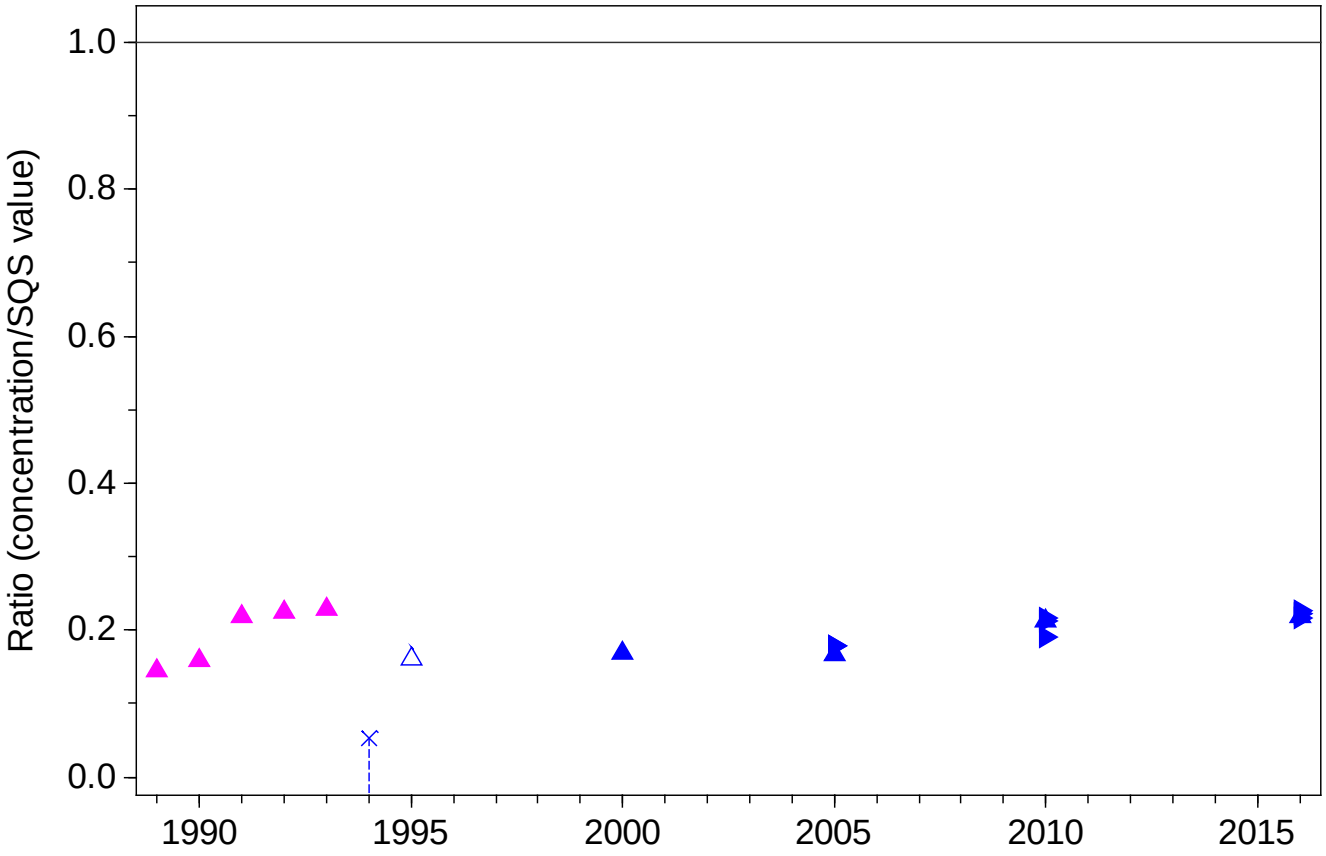
Bis(2-ethylhexyl)phthalate, Station 49



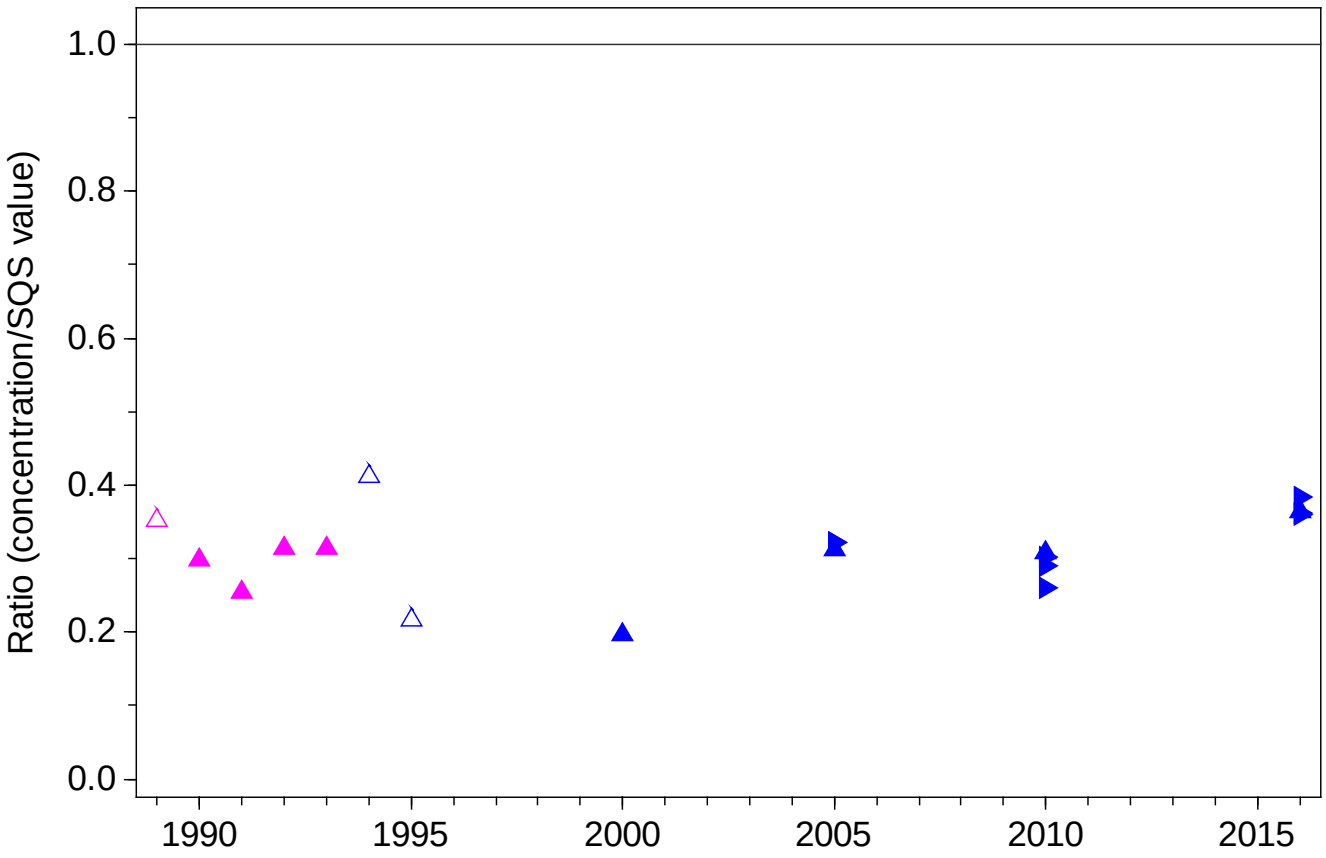
Butylbenzylphthalate, Station 49



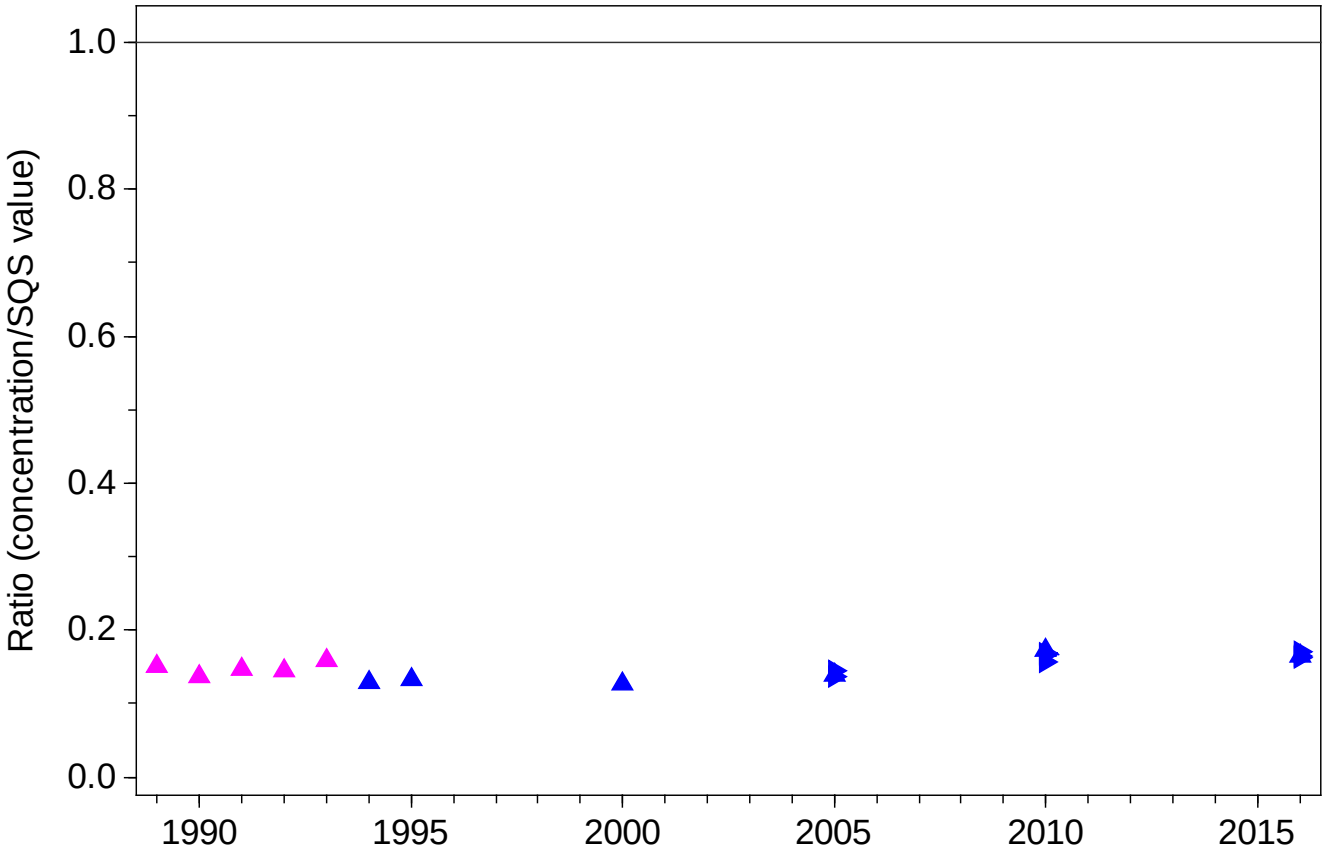
SQS quotient, Arsenic, Station 49



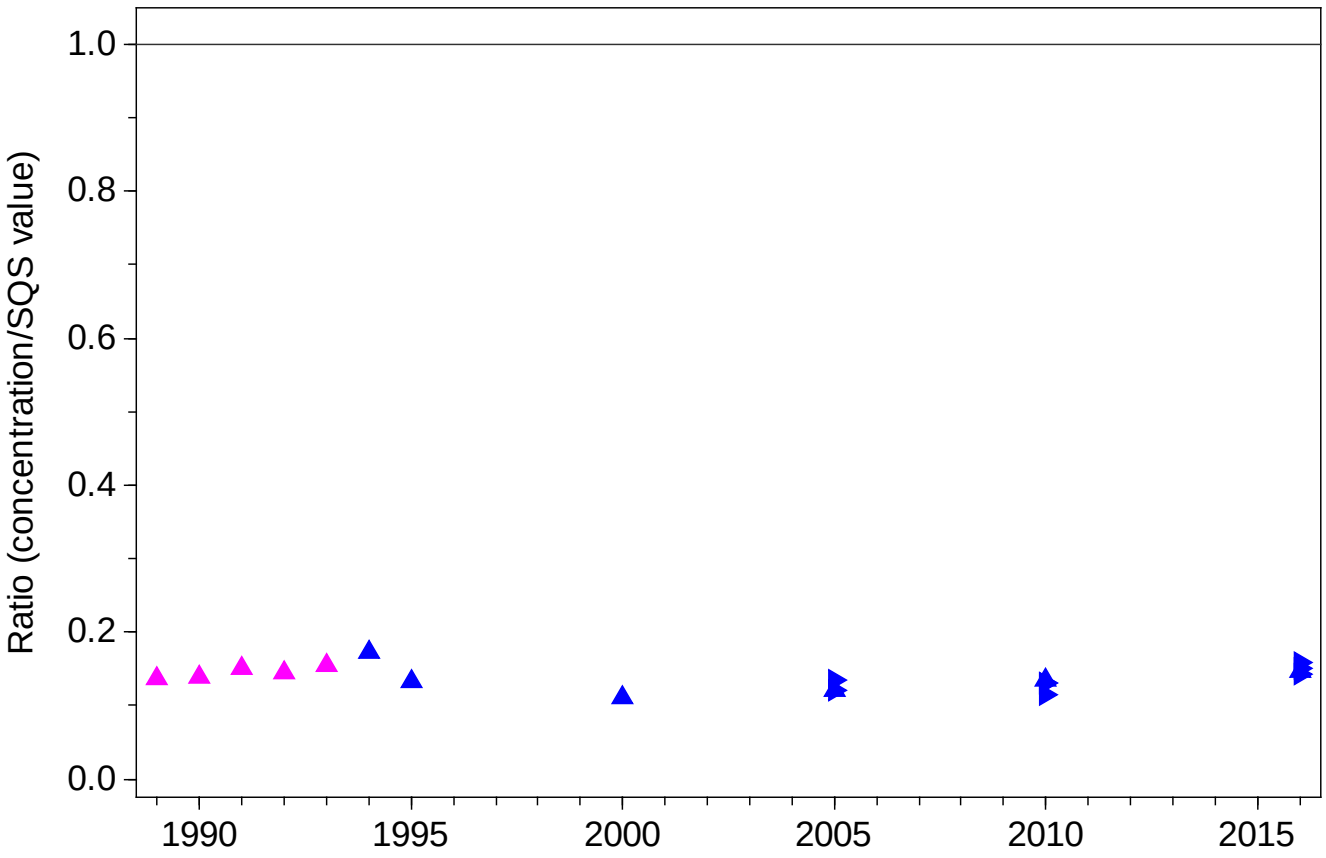
SQS quotient, Cadmium, Station 49



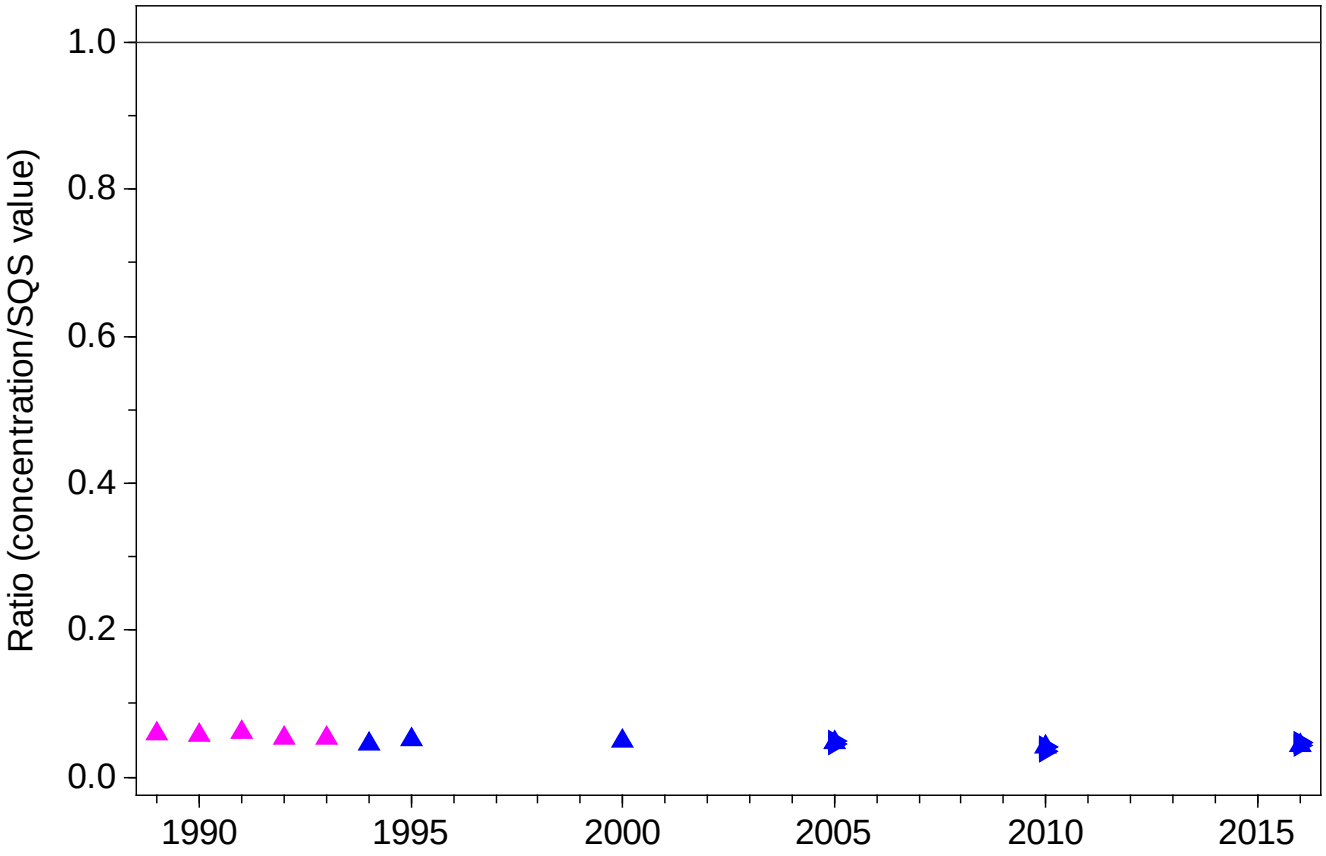
SQS quotient, Chromium, Station 49



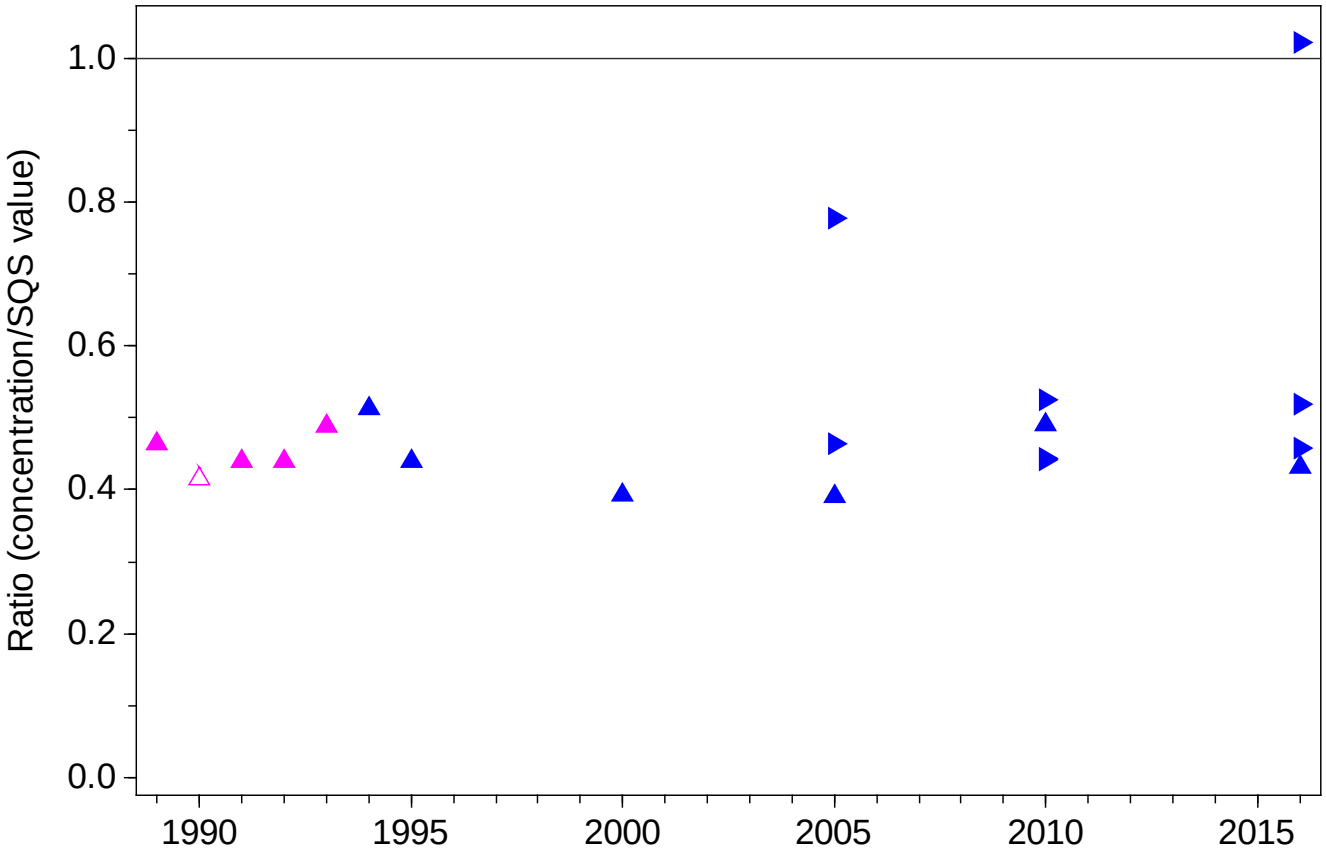
SQS quotient, Copper, Station 49



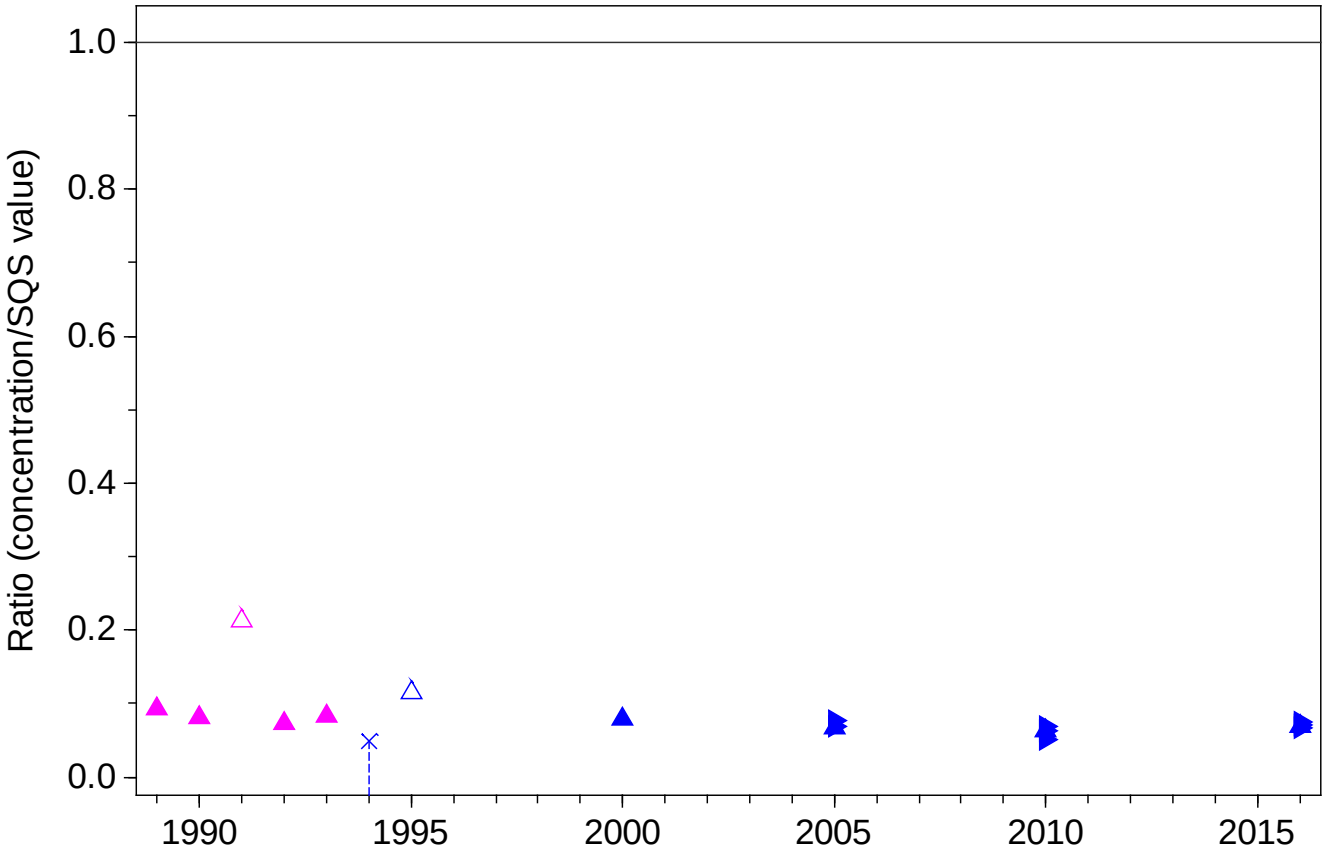
SQS quotient, Lead, Station 49



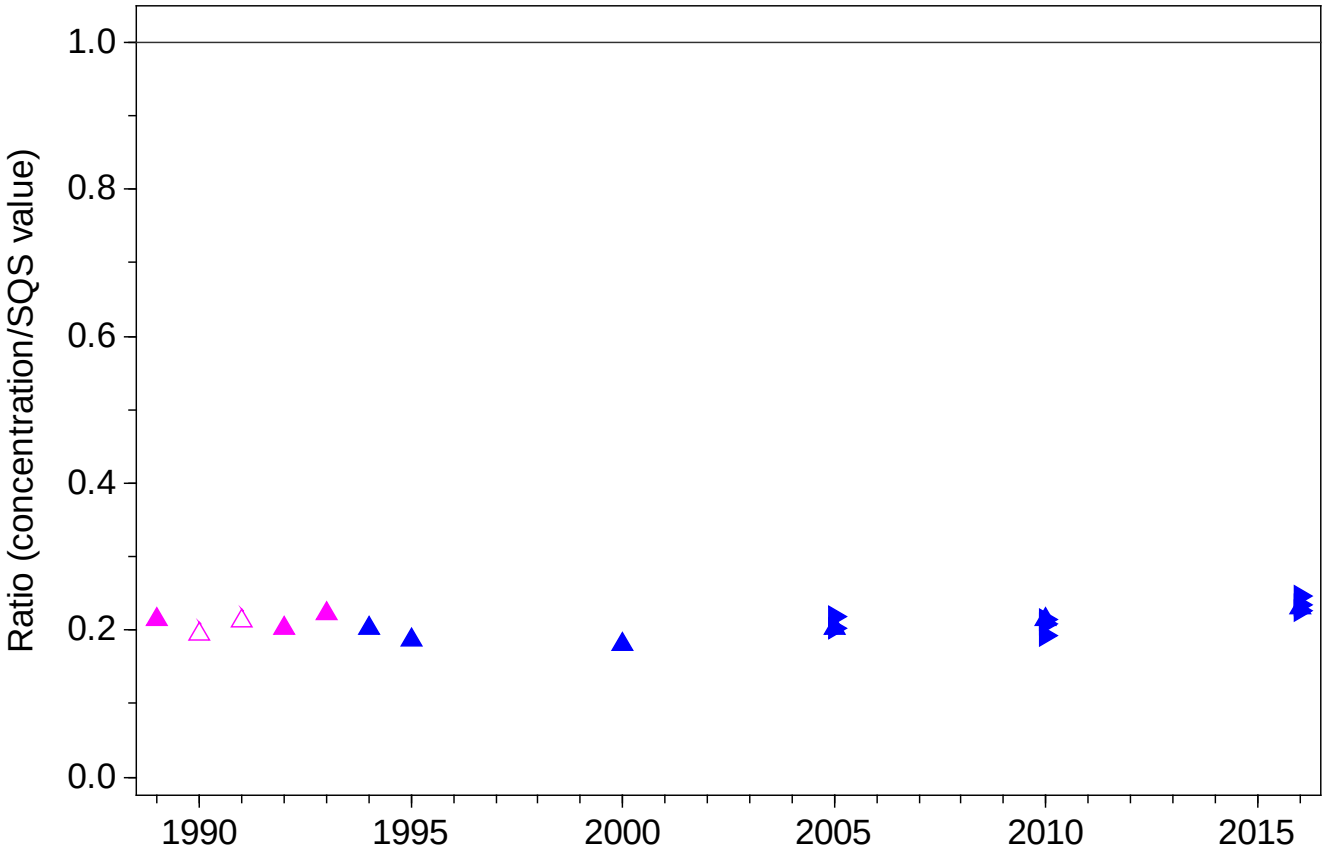
SQS quotient, Mercury, Station 49



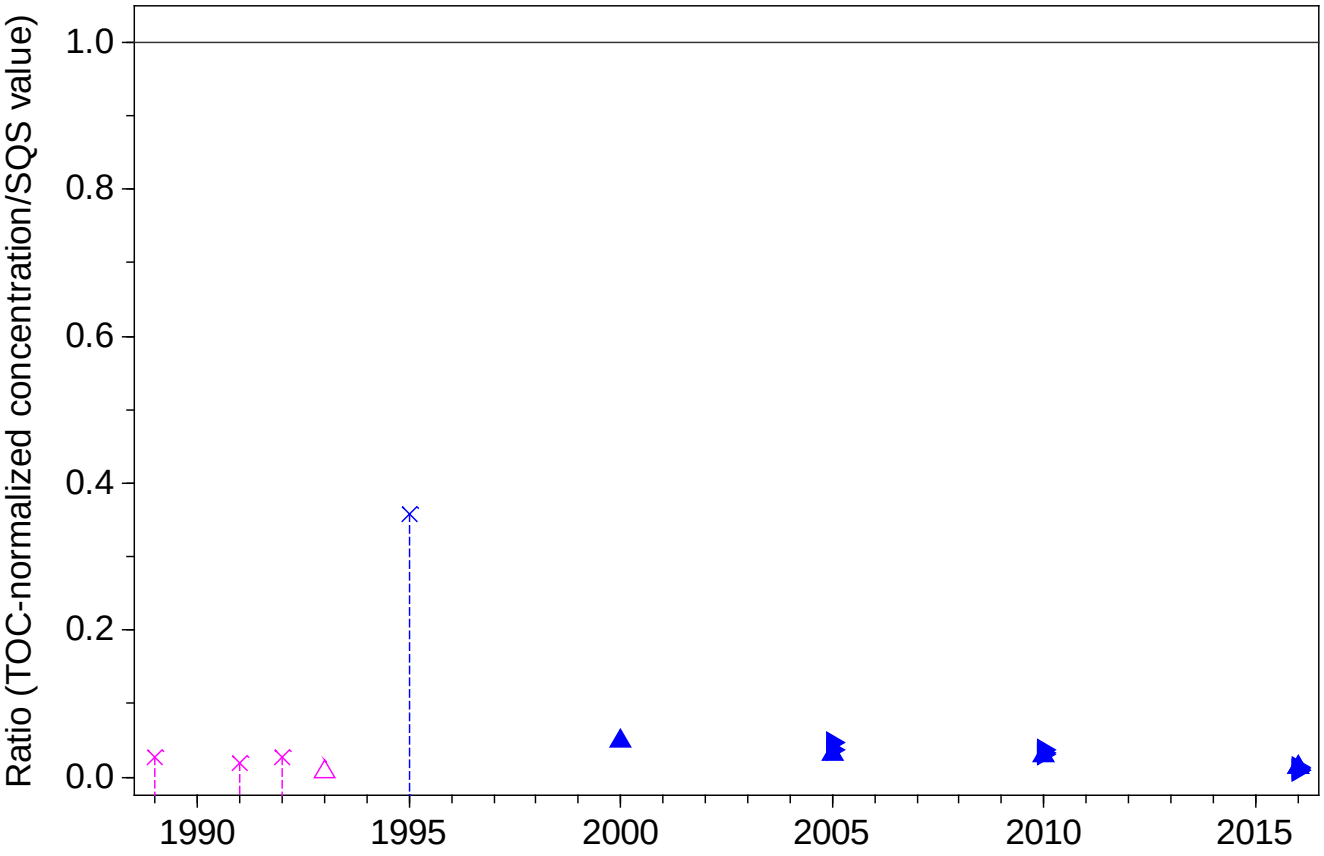
SQS quotient, Silver, Station 49



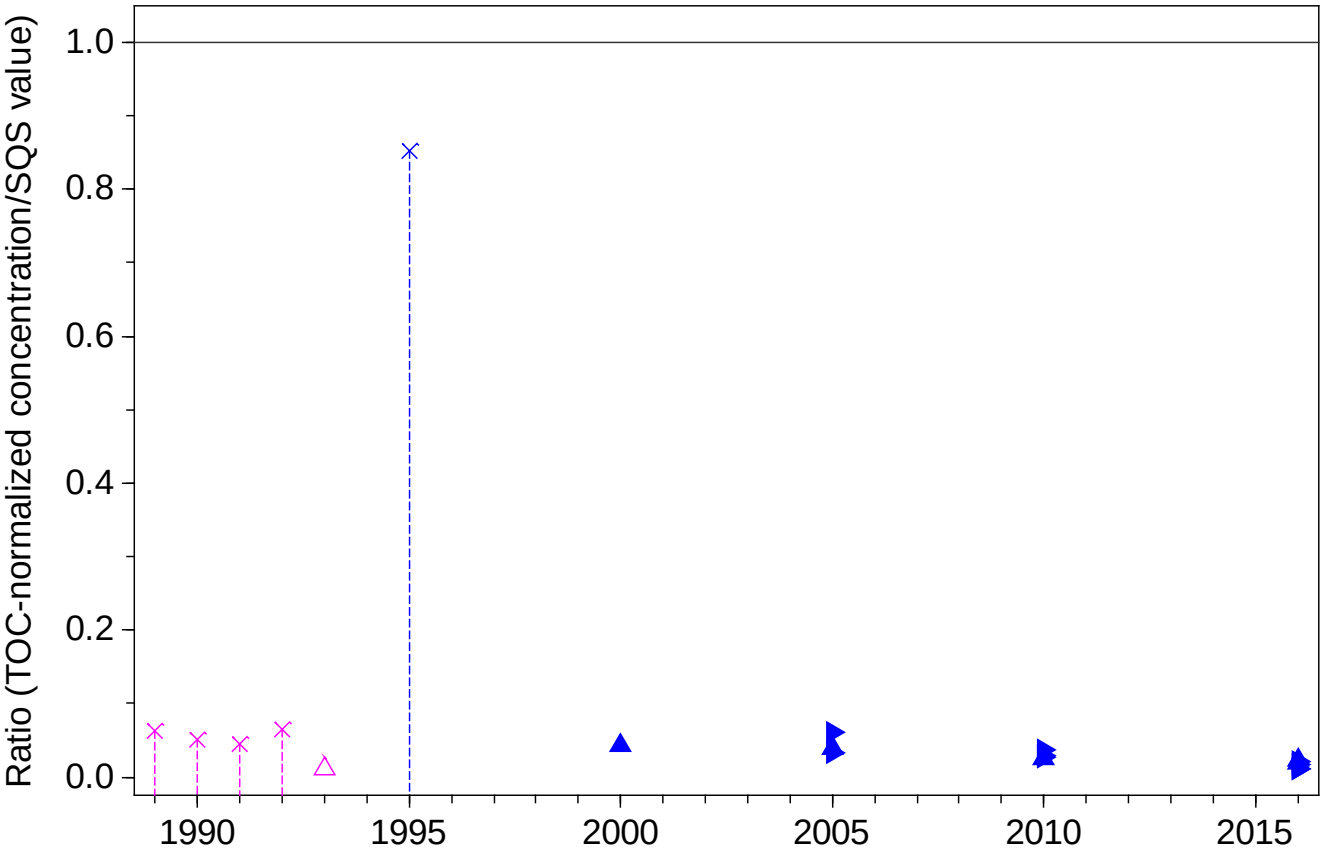
SQS quotient, Zinc, Station 49



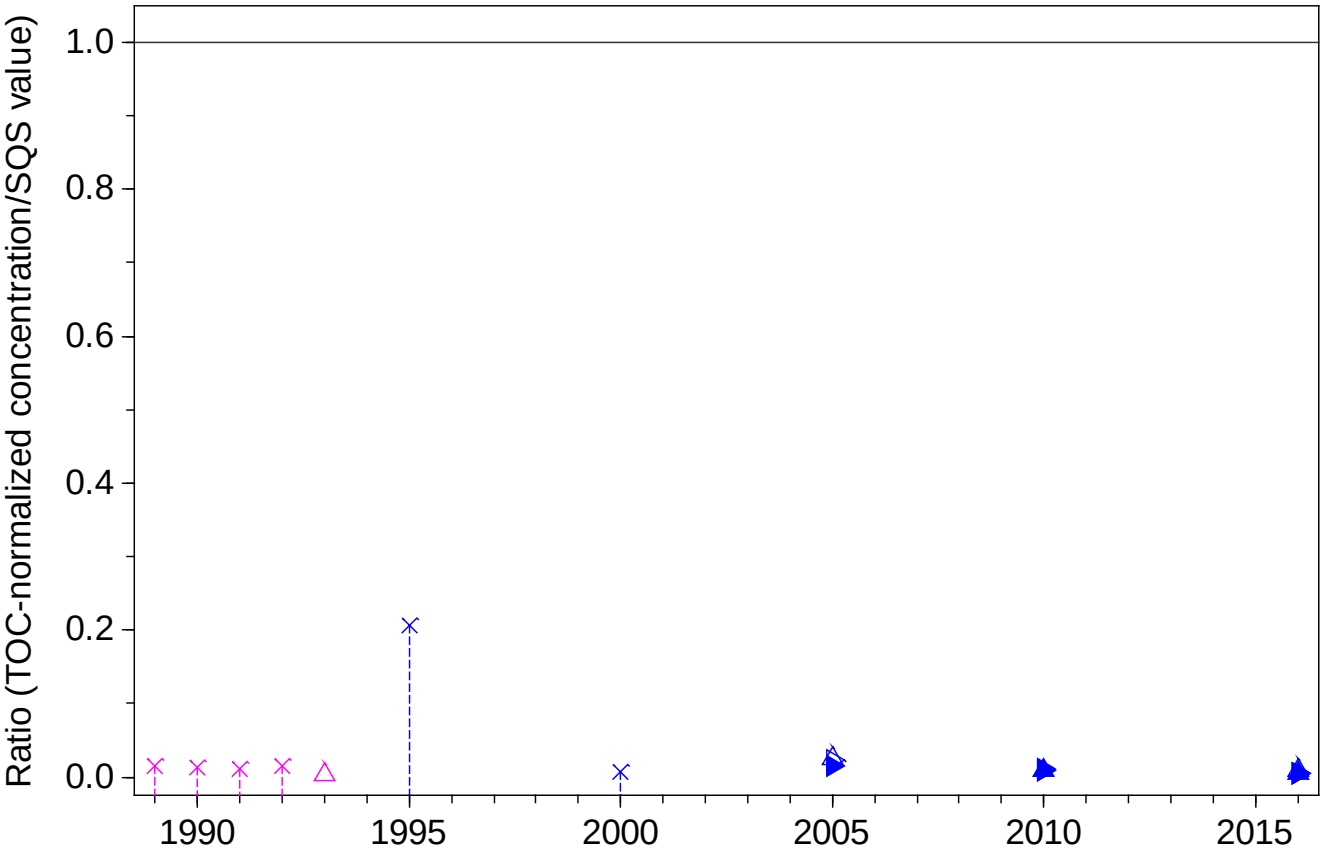
SQS quotient, 2-Methylnaphthalene, Station 49



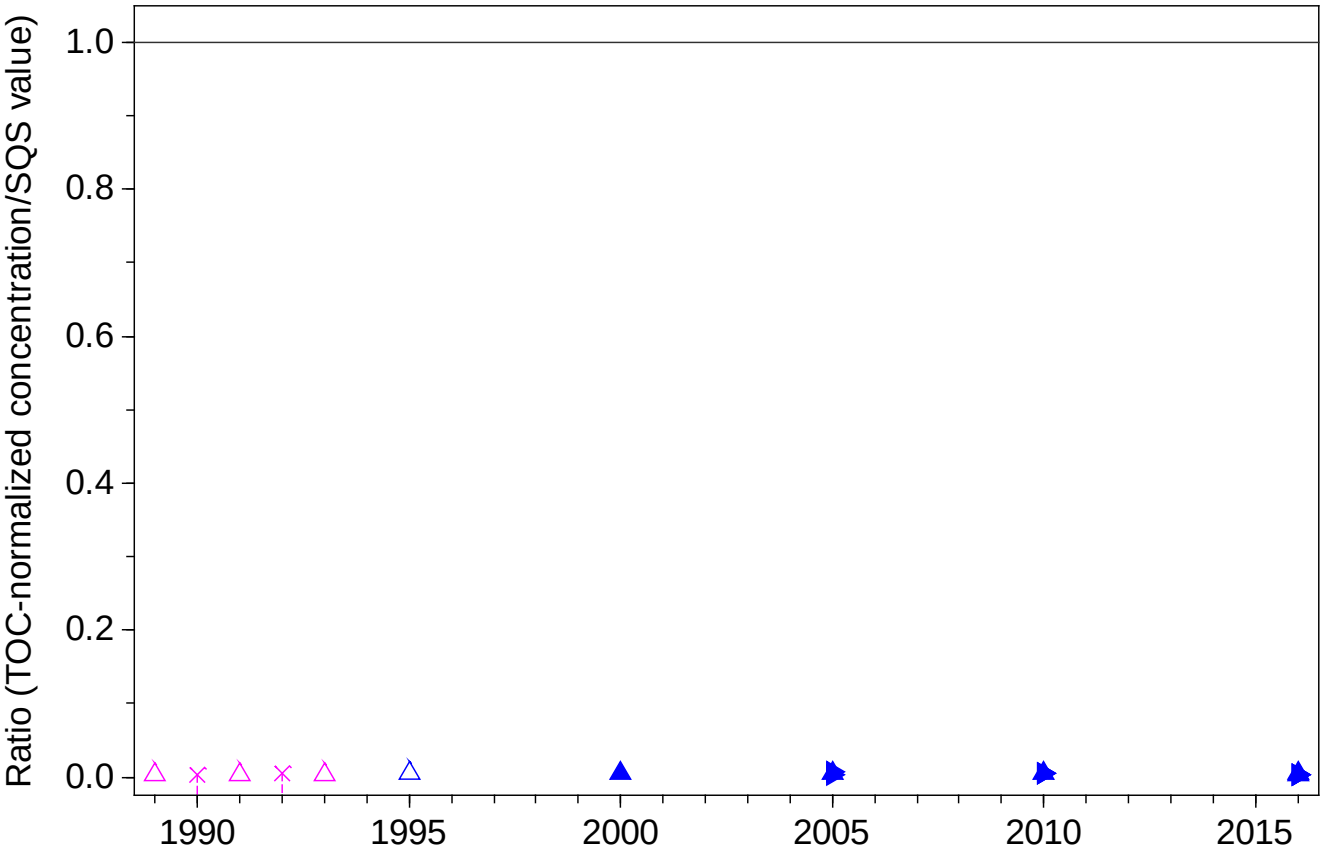
SQS quotient, Acenaphthene, Station 49



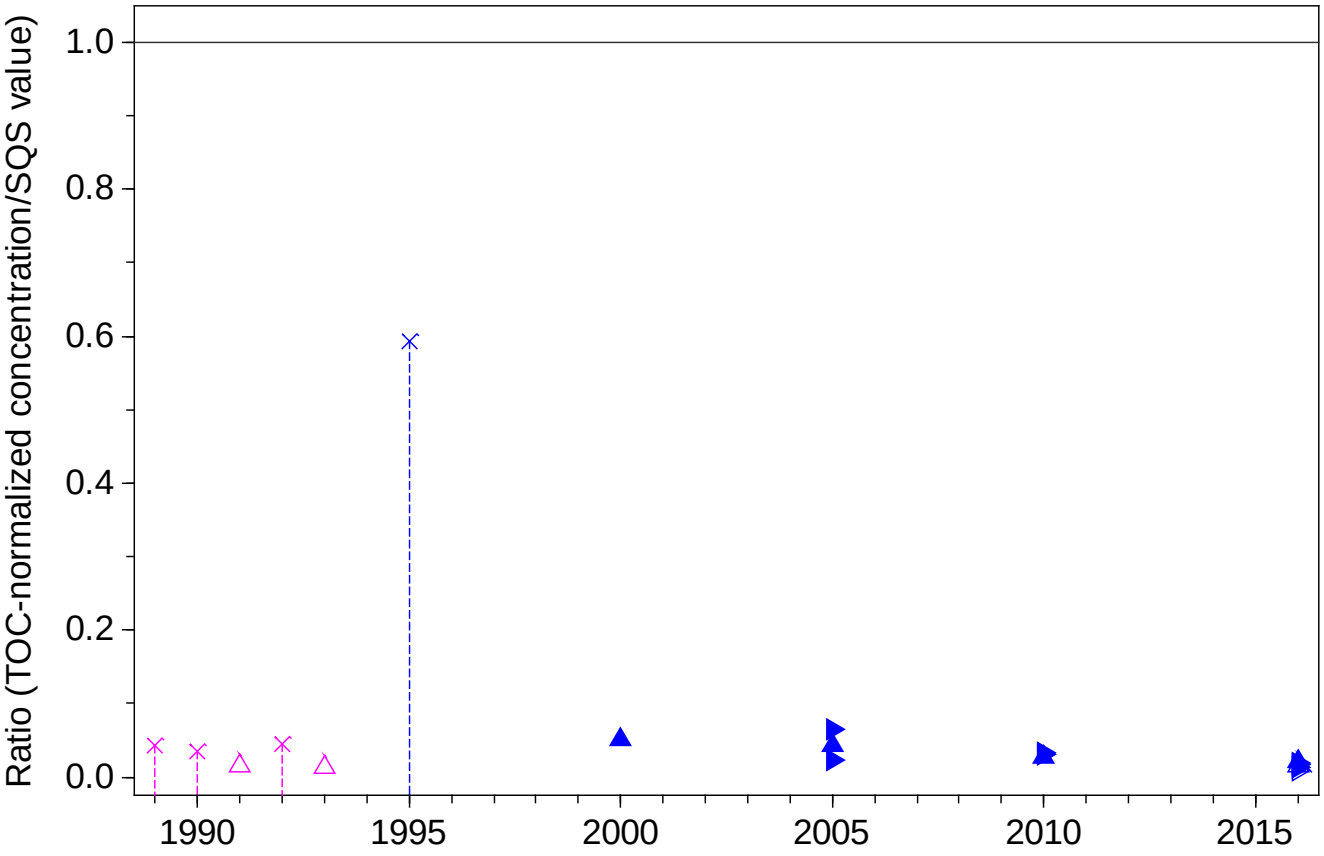
SQS quotient, Acenaphthylene, Station 49



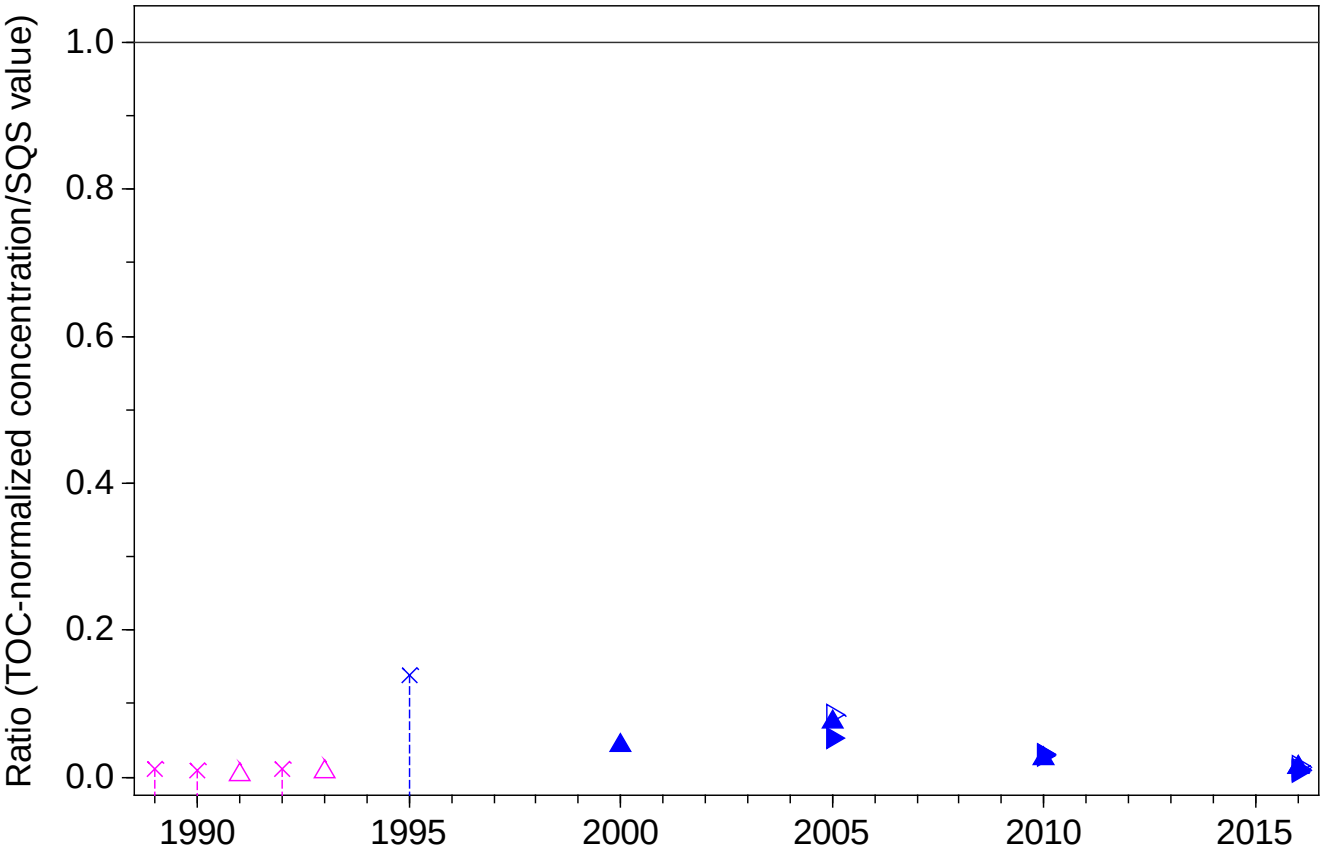
SQS quotient, Anthracene, Station 49



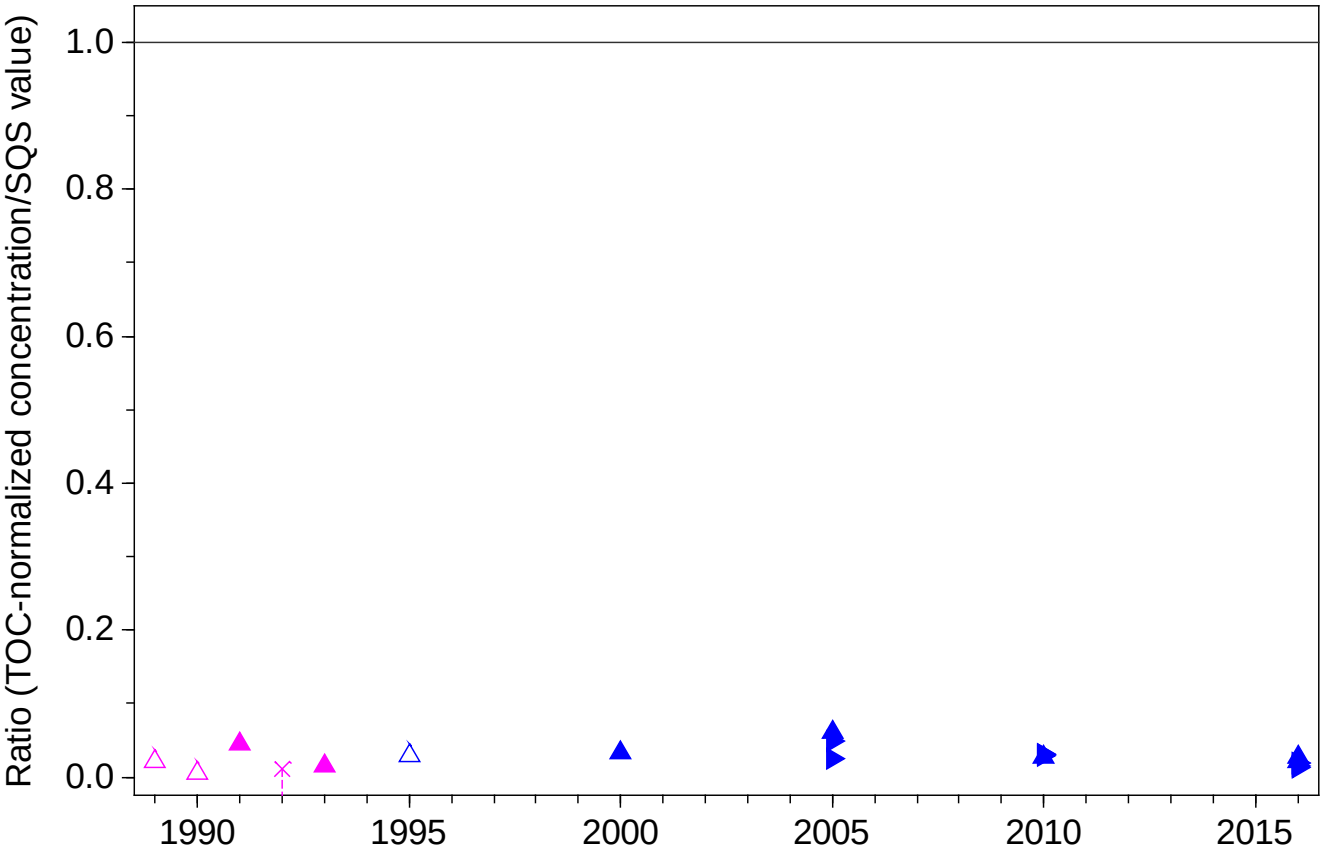
SQS quotient, Fluorene, Station 49



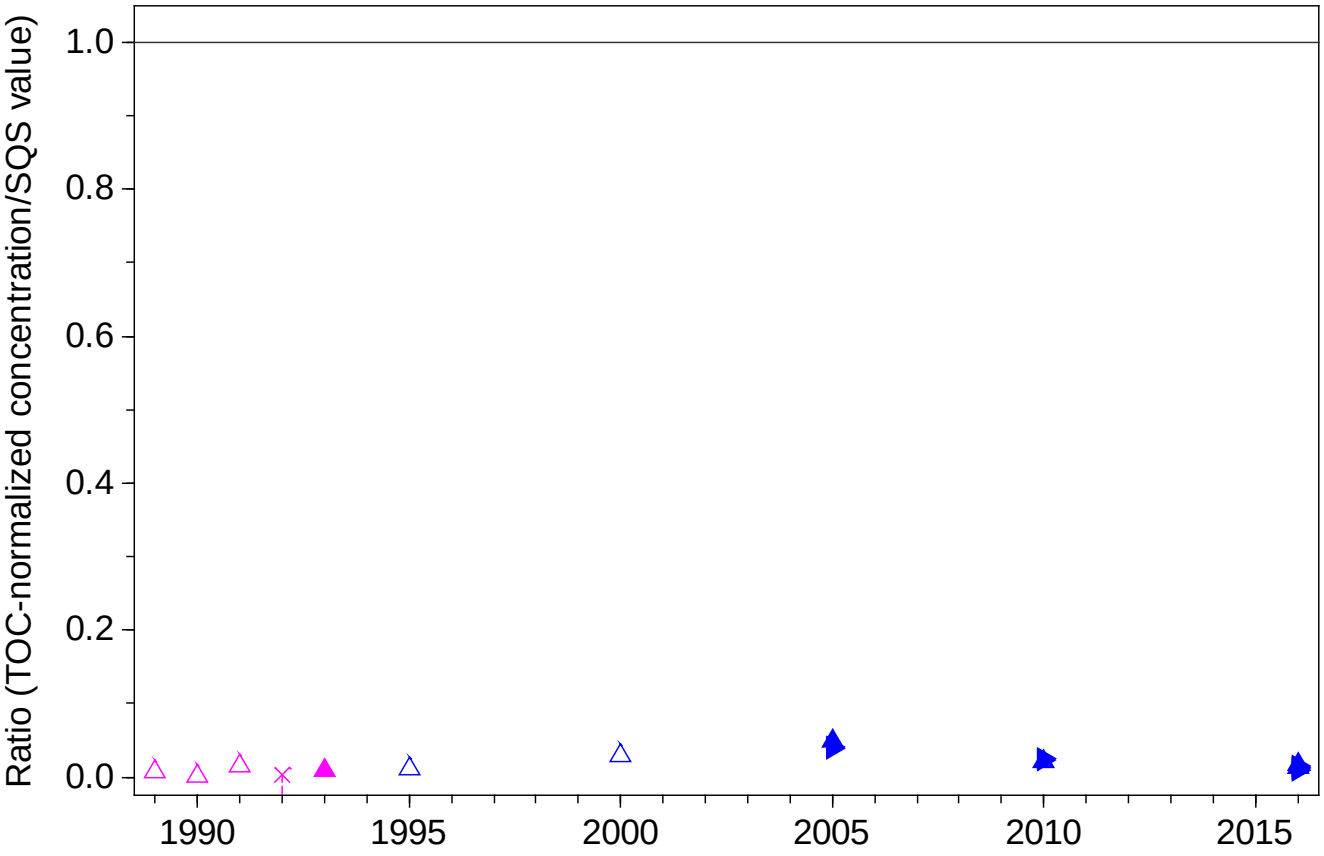
SQS quotient, Naphthalene, Station 49



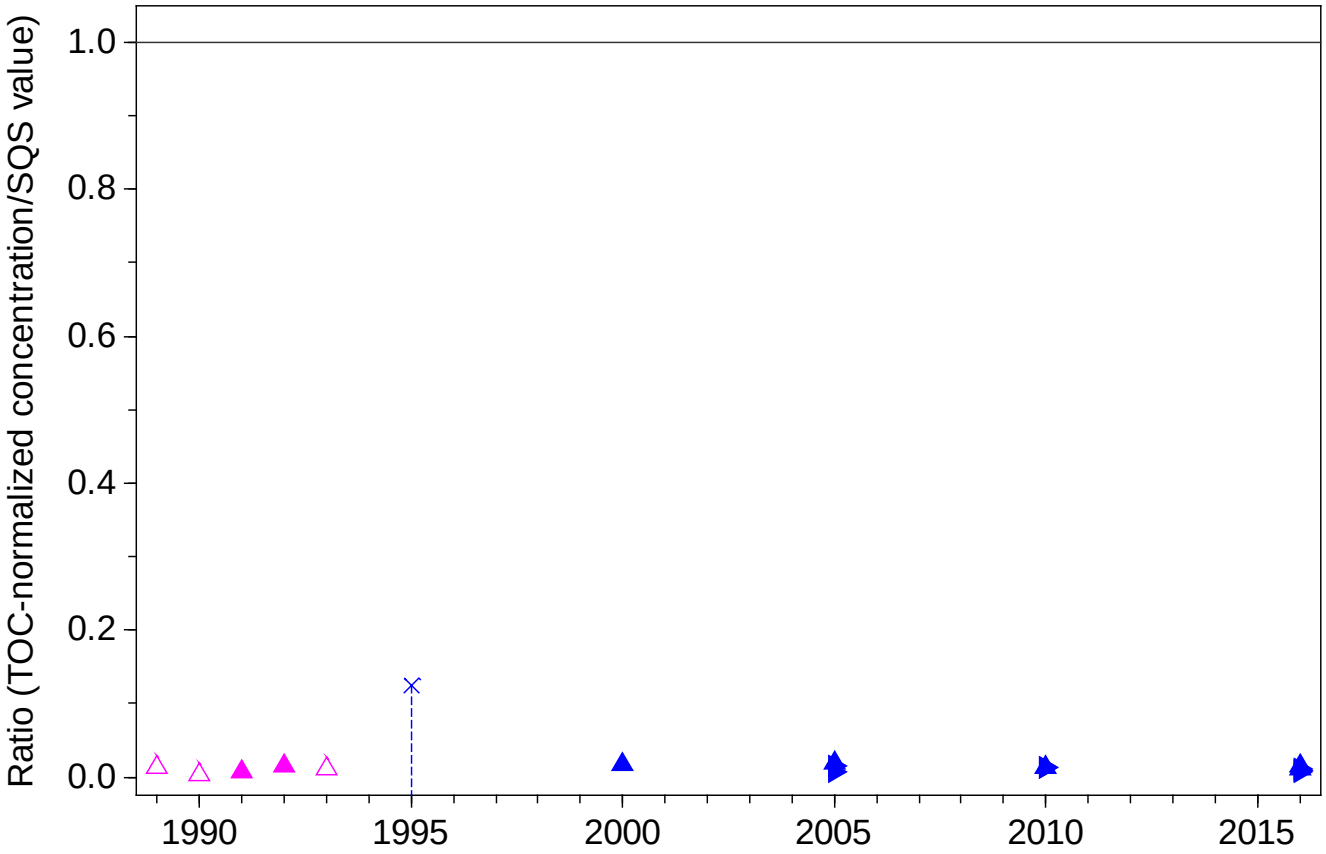
SQS quotient, Phenanthrene, Station 49



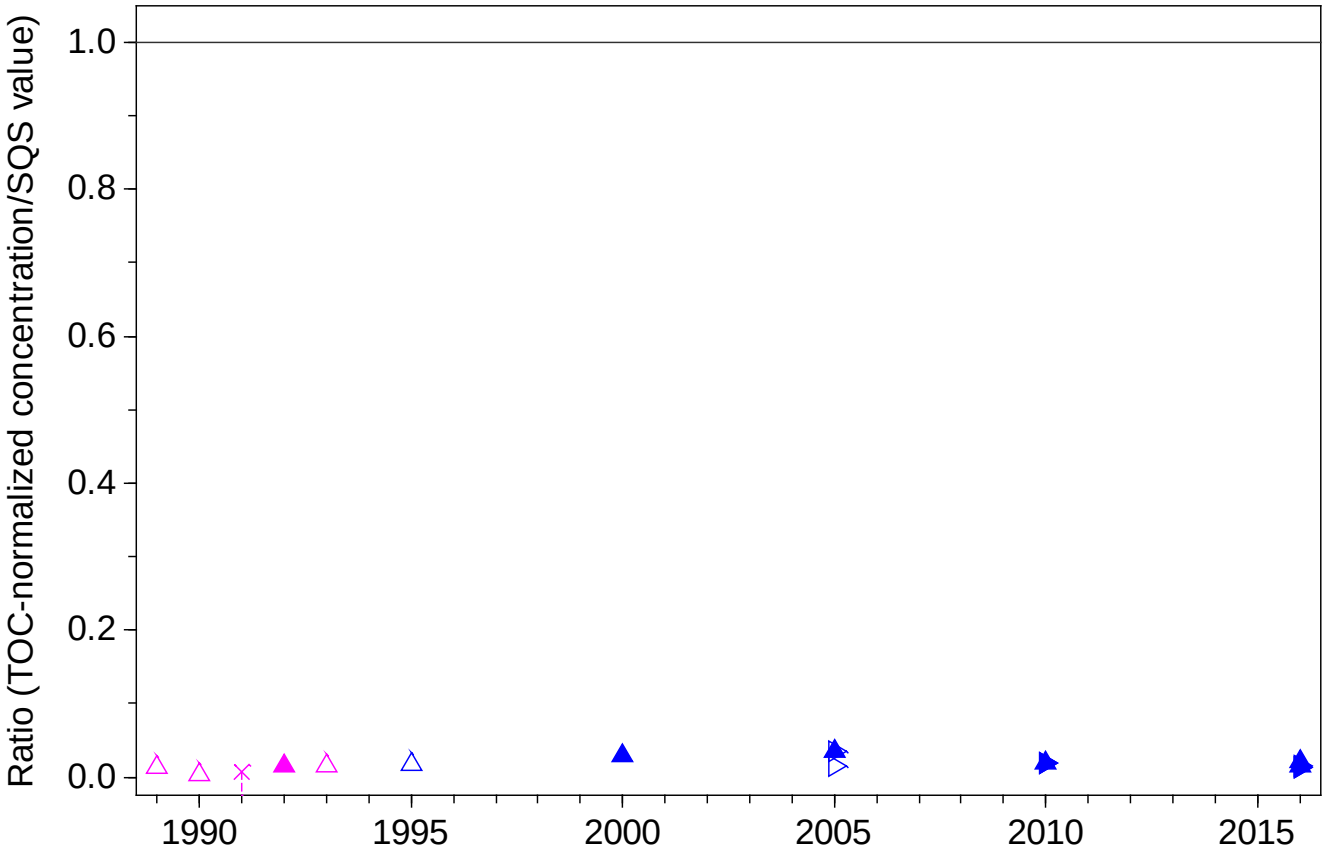
SQS quotient, Total LPAH, Station 49



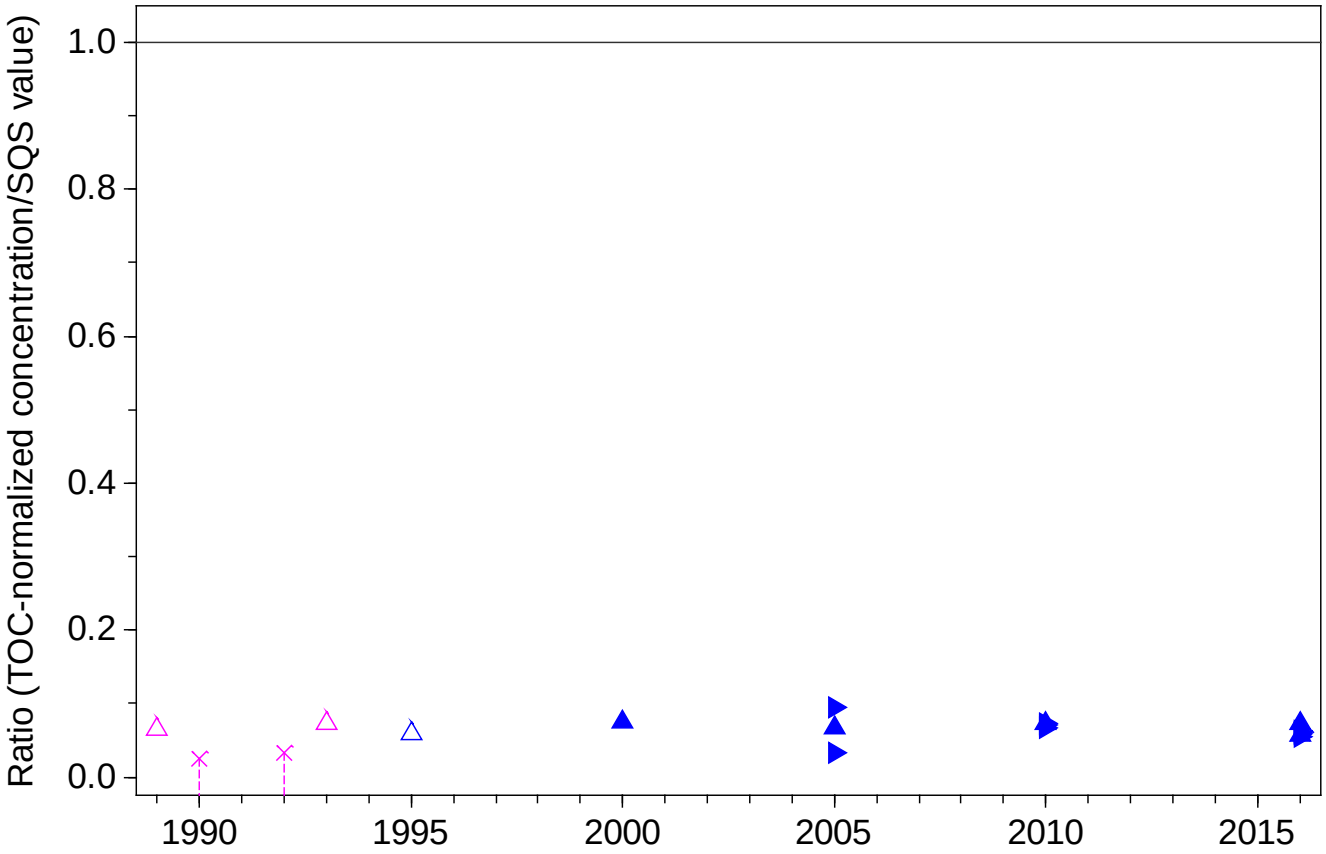
SQS quotient, Benzo(a)anthracene, Station 49



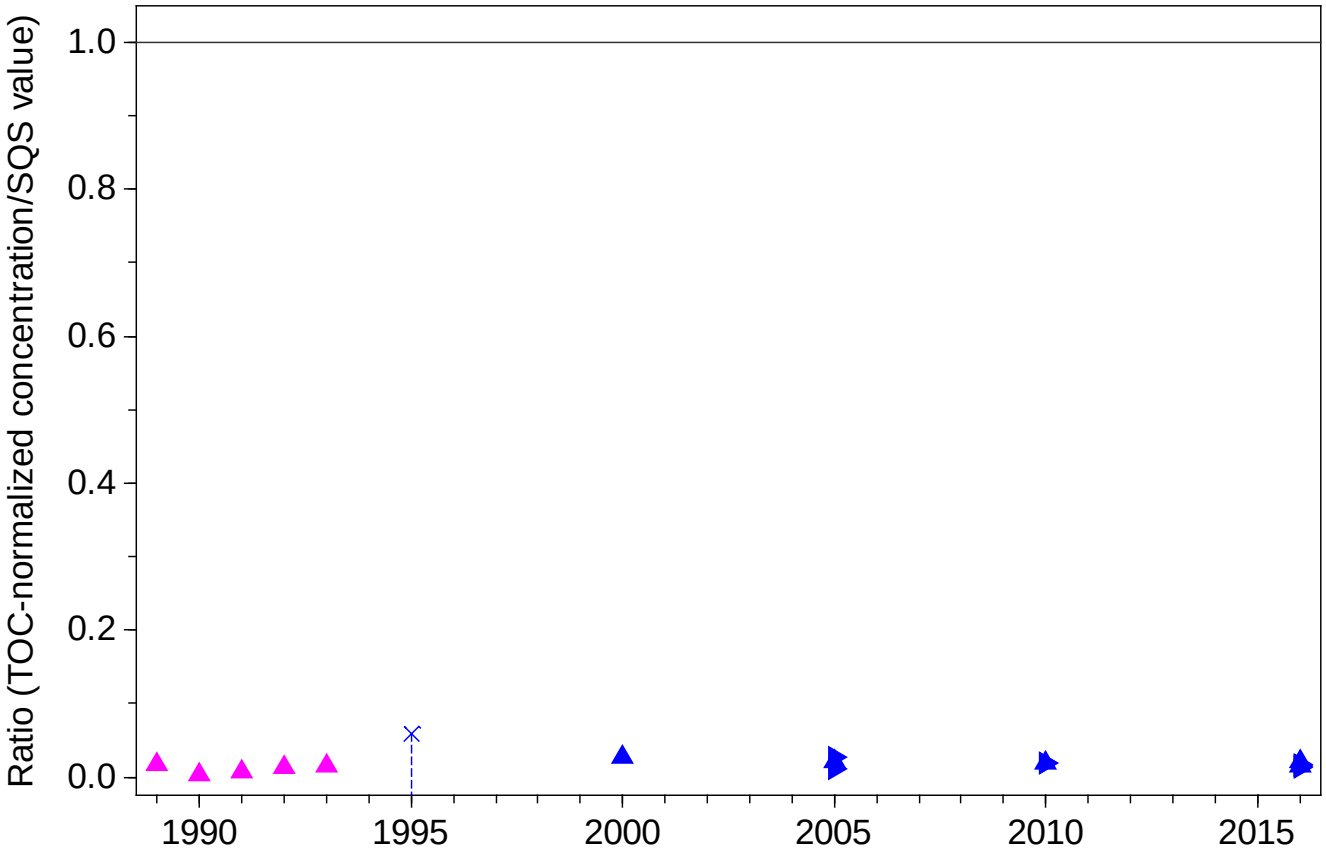
SQS quotient, Benzo(a)pyrene, Station 49



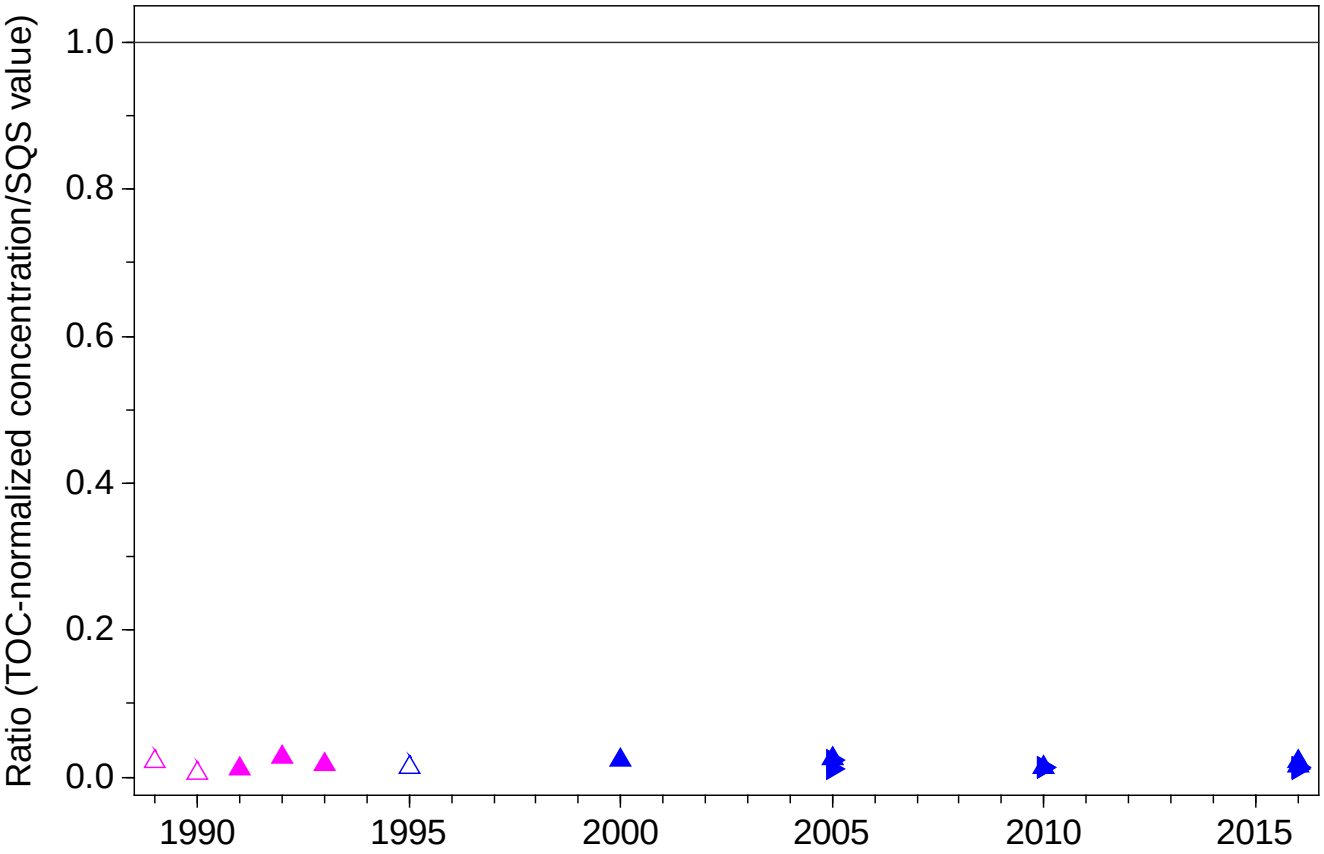
SQS quotient, Benzo(g,h,i)perylene, Station 49



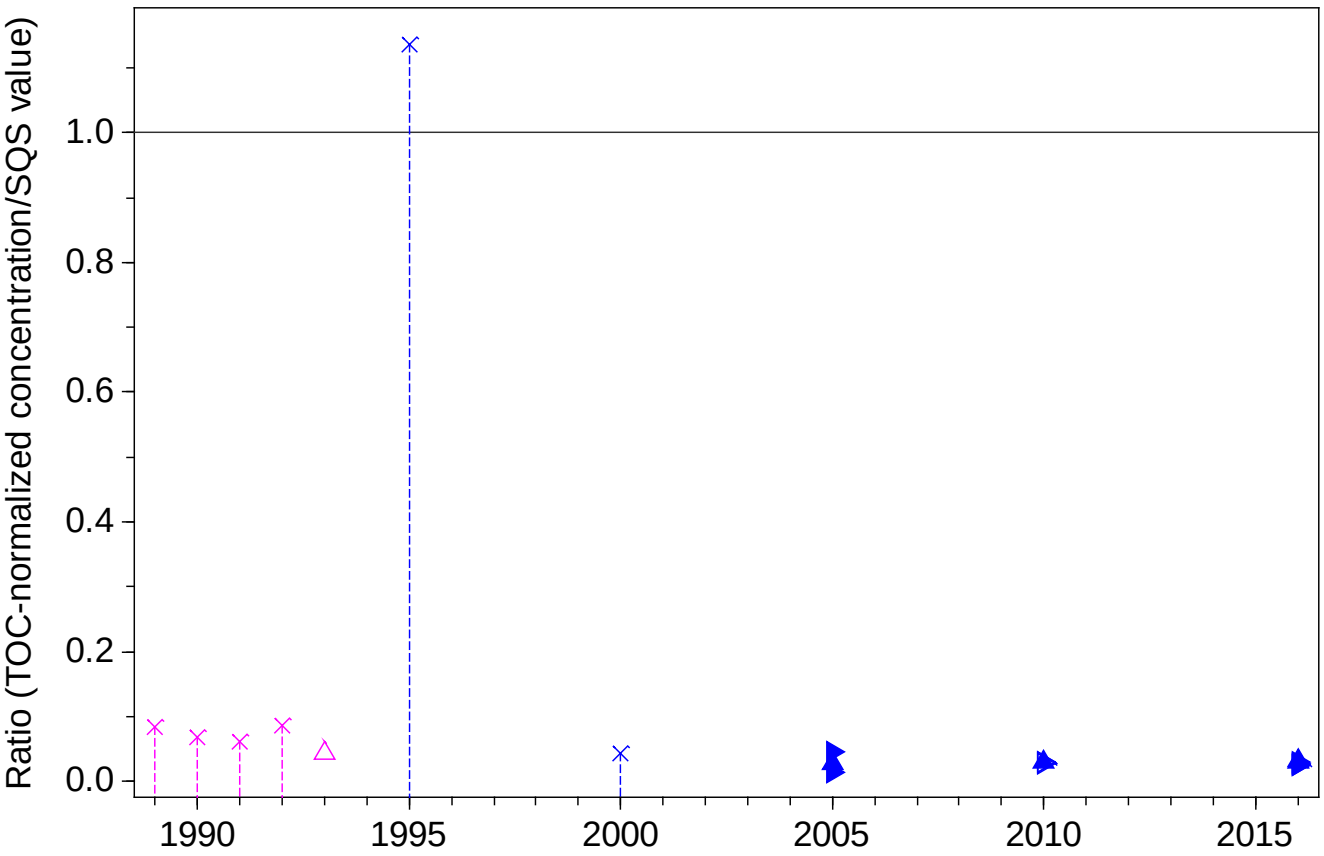
SQS quotient, Total Benzofluoranthenes, Station 49



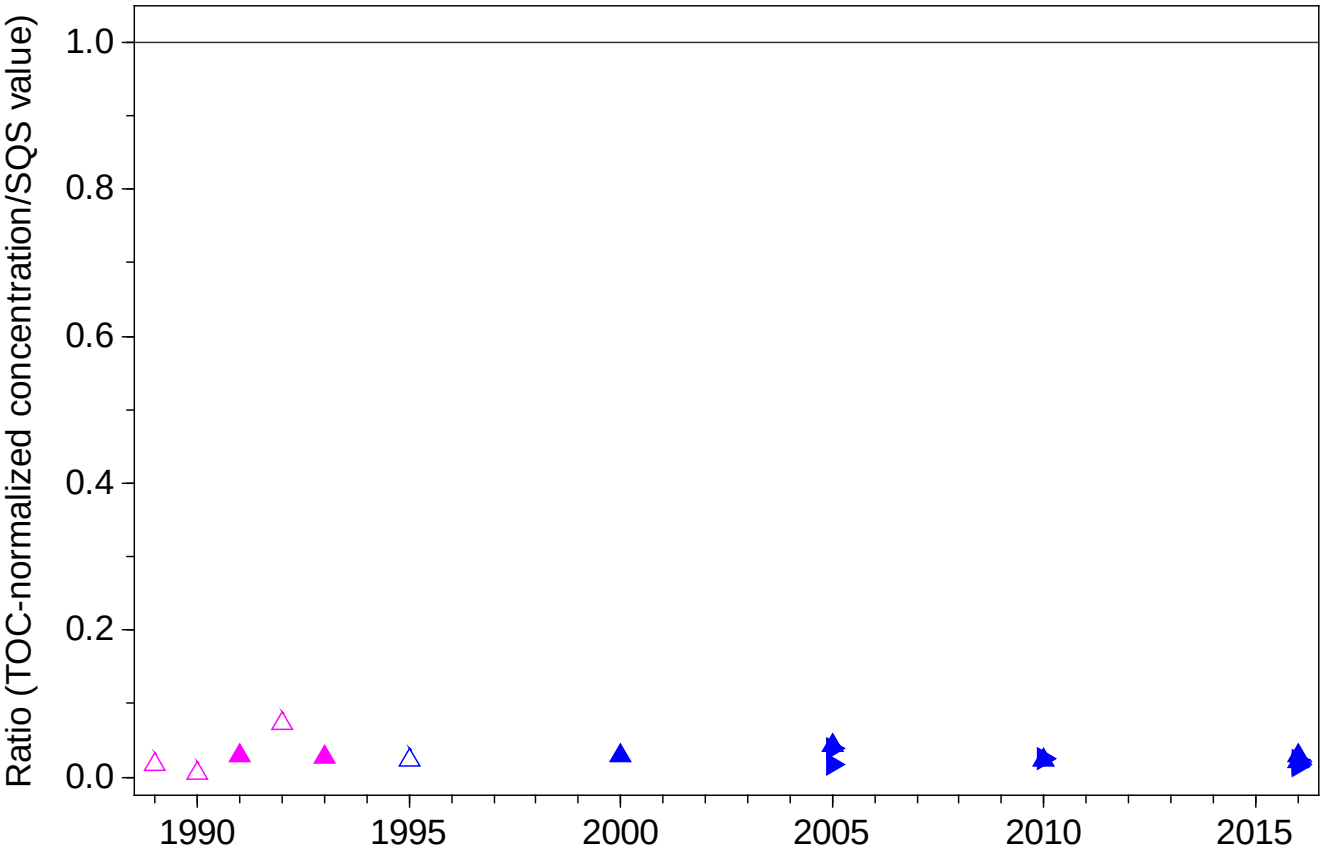
SQS quotient, Chrysene, Station 49



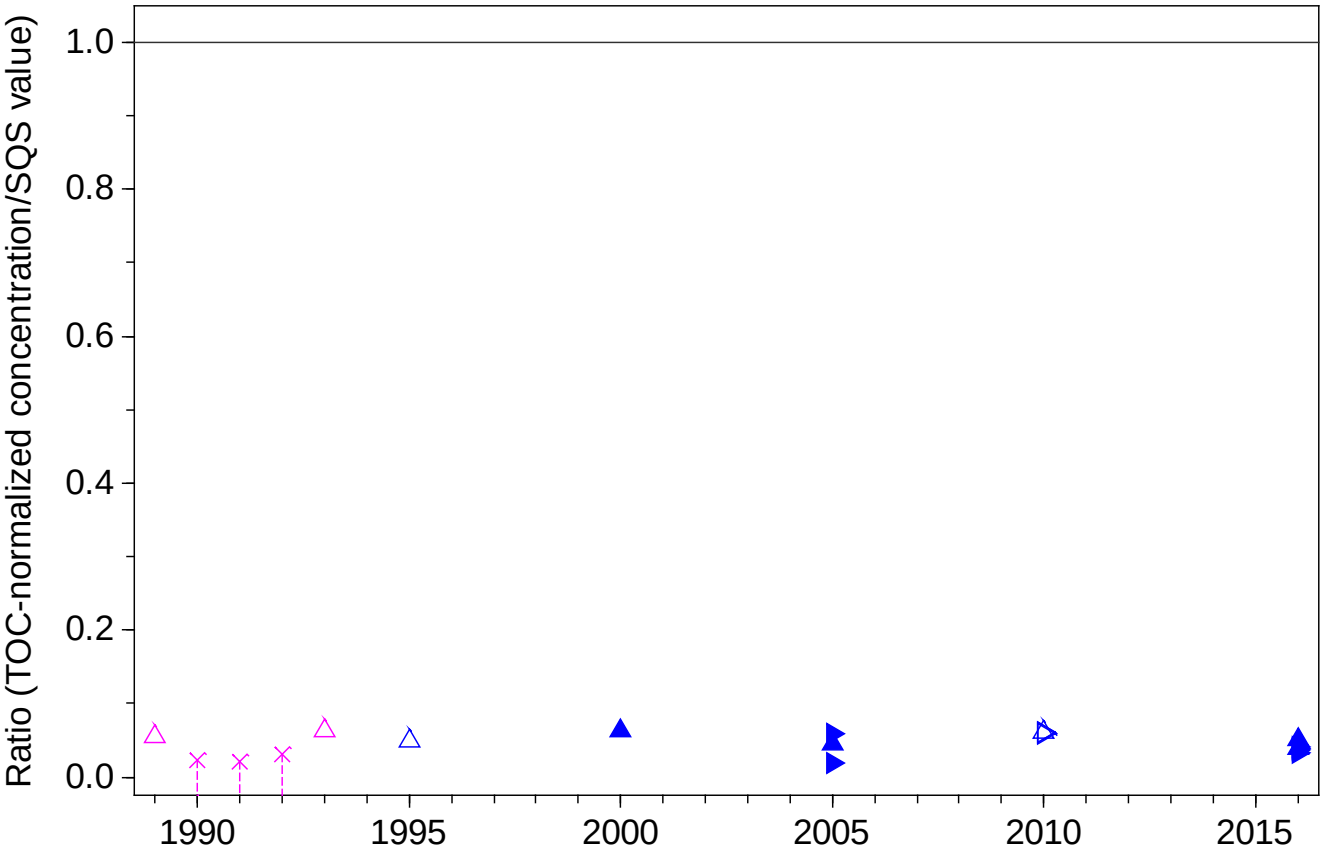
SQS quotient, Dibenzo(a,h)anthracene, Station 49



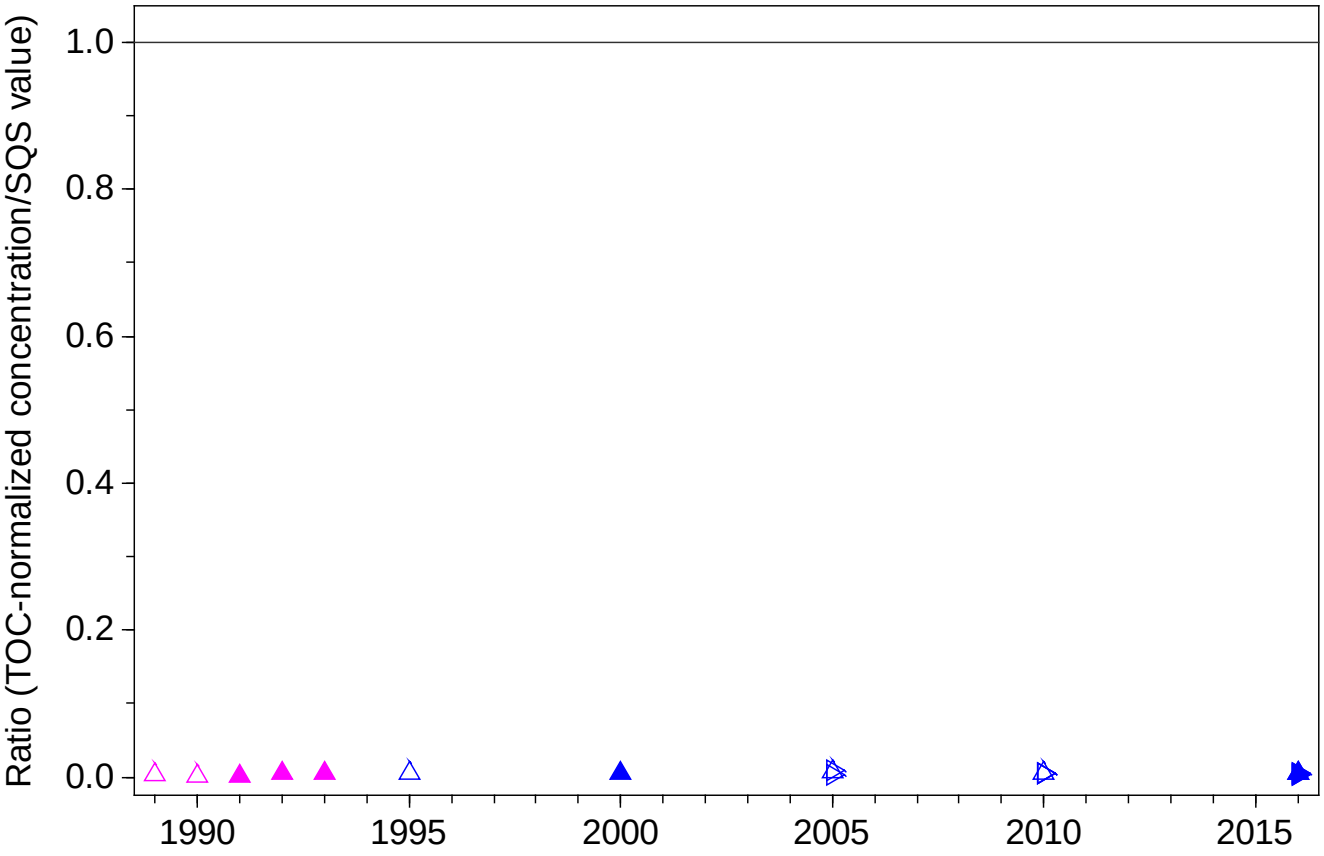
SQS quotient, Fluoranthene, Station 49



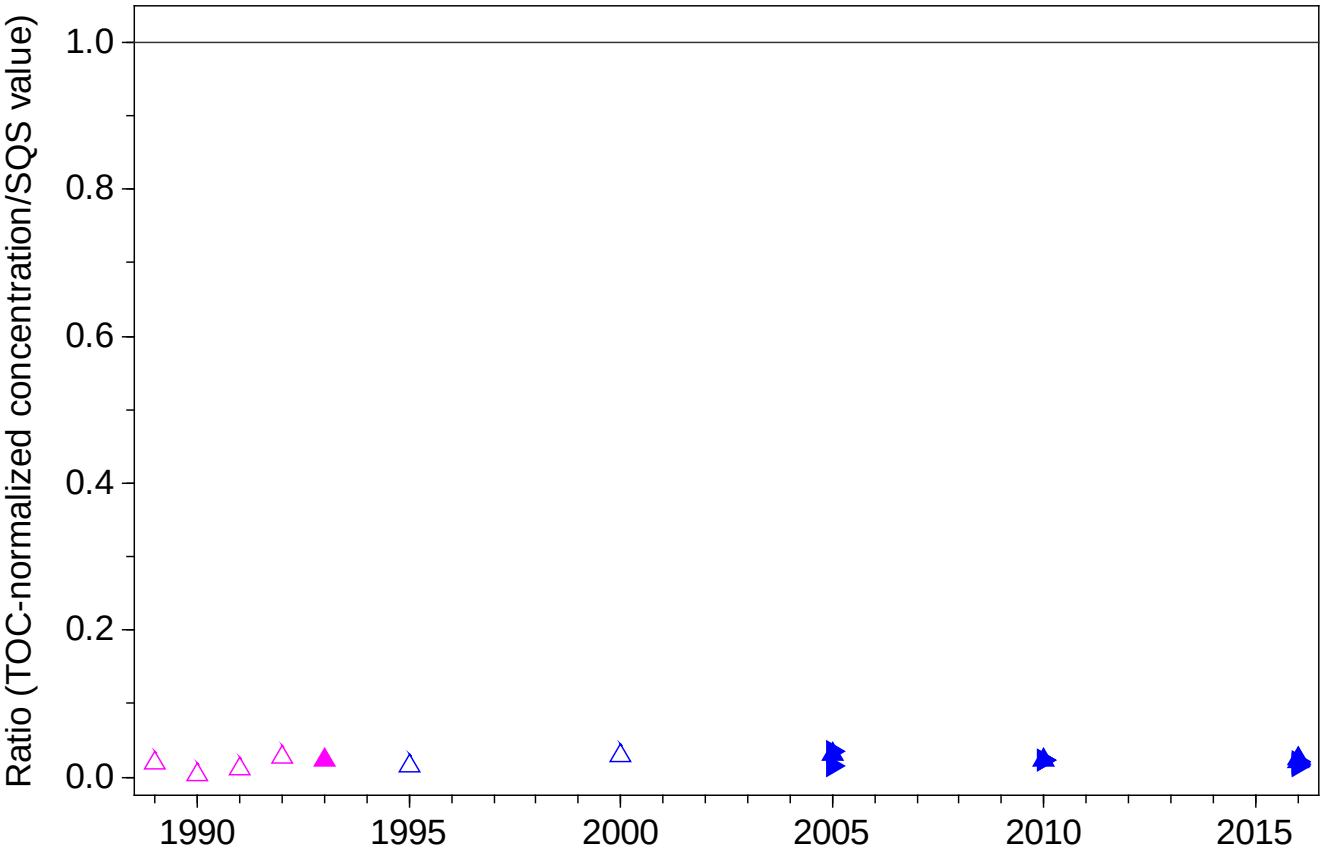
SQS quotient, Indeno(1,2,3-c,d)pyrene, Station 49



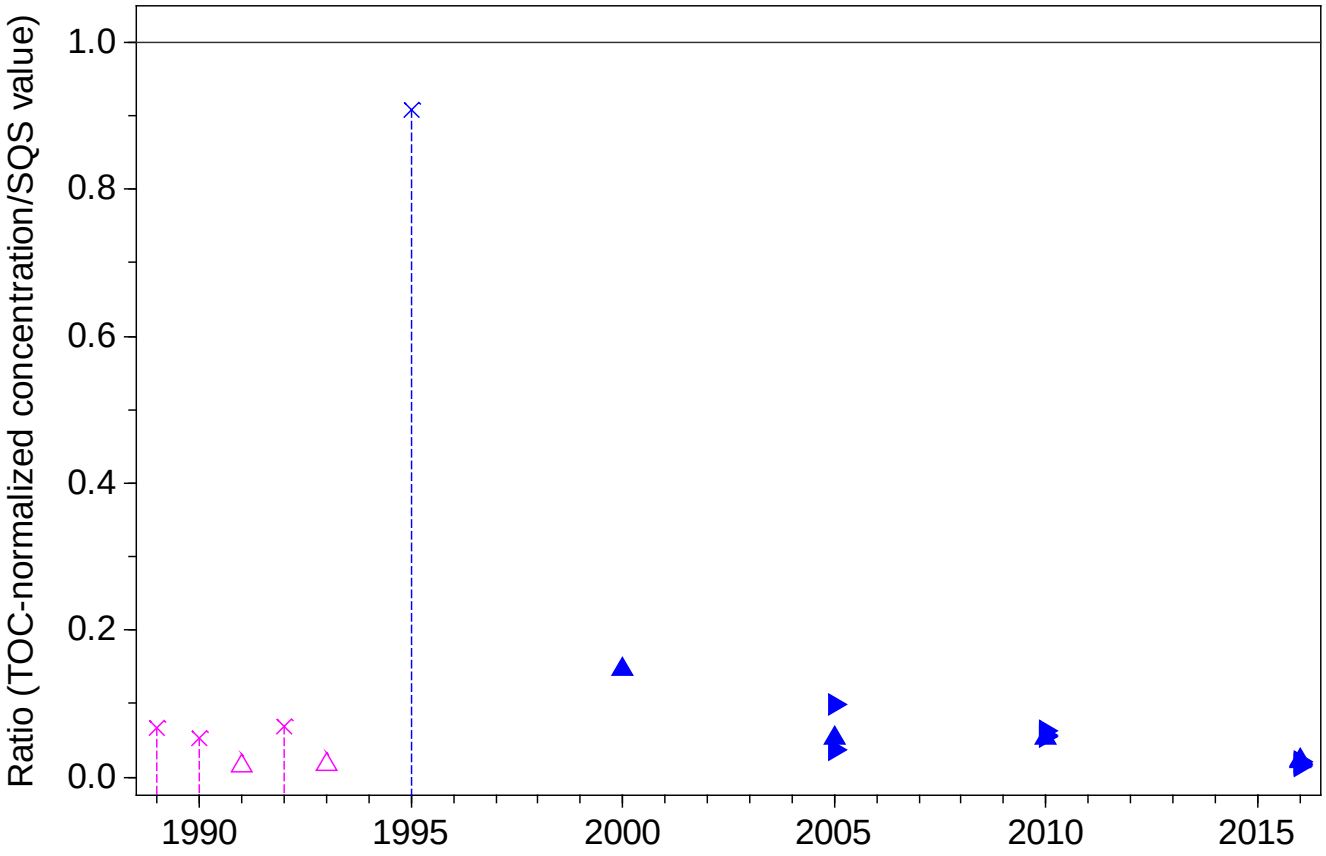
SQS quotient, Pyrene, Station 49



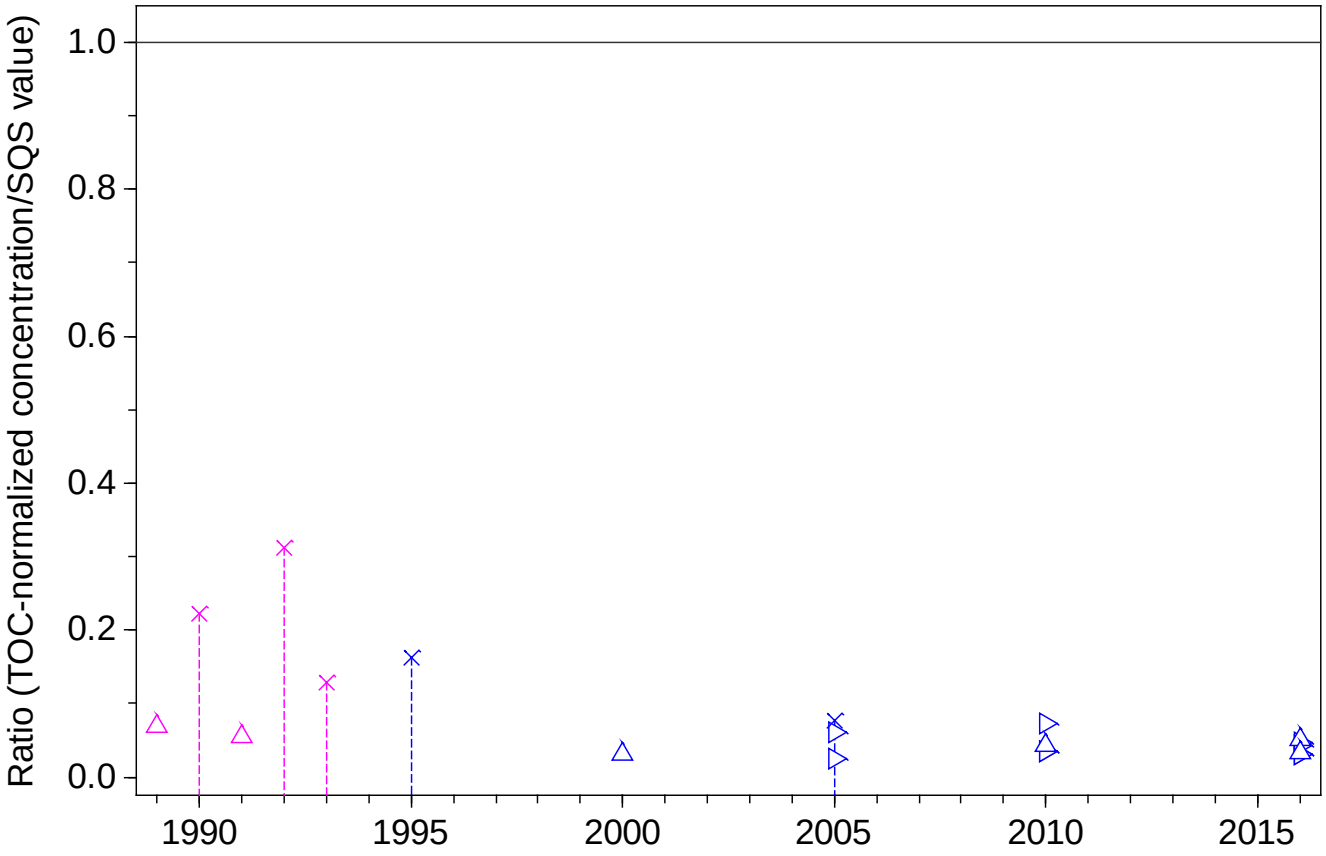
SQS quotient, Total HPAH, Station 49



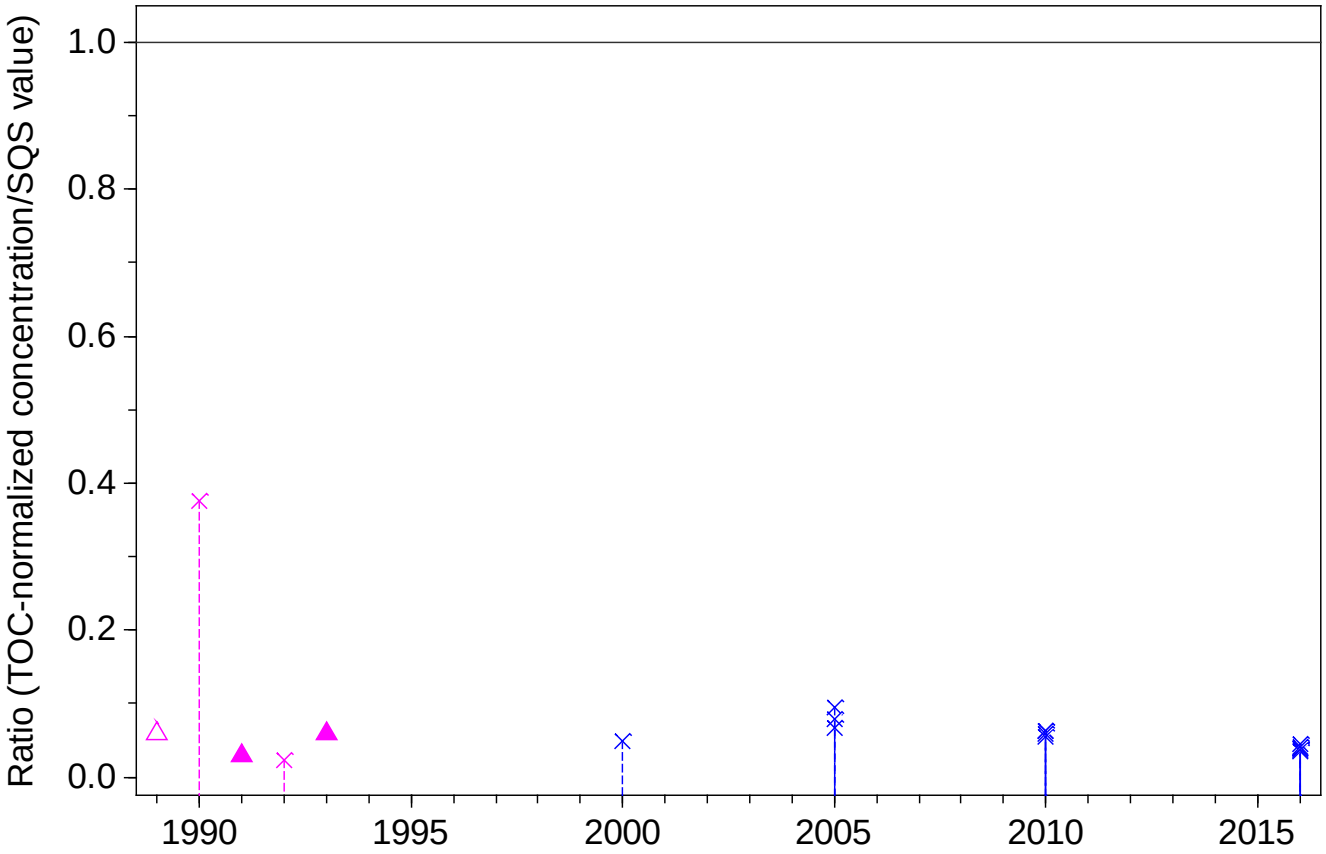
SQS quotient, Dibenzofuran, Station 49



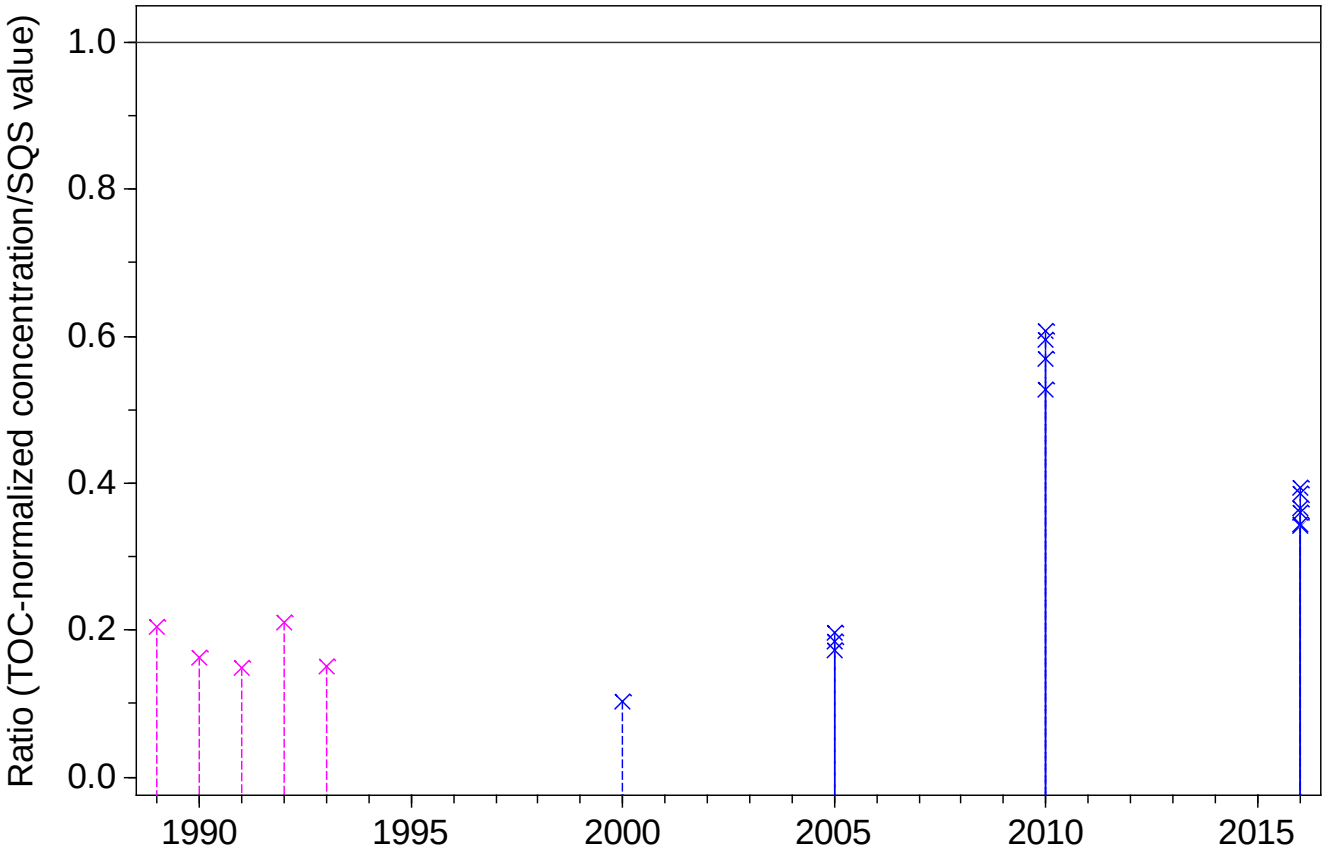
SQS quotient, Total Aroclors, Station 49



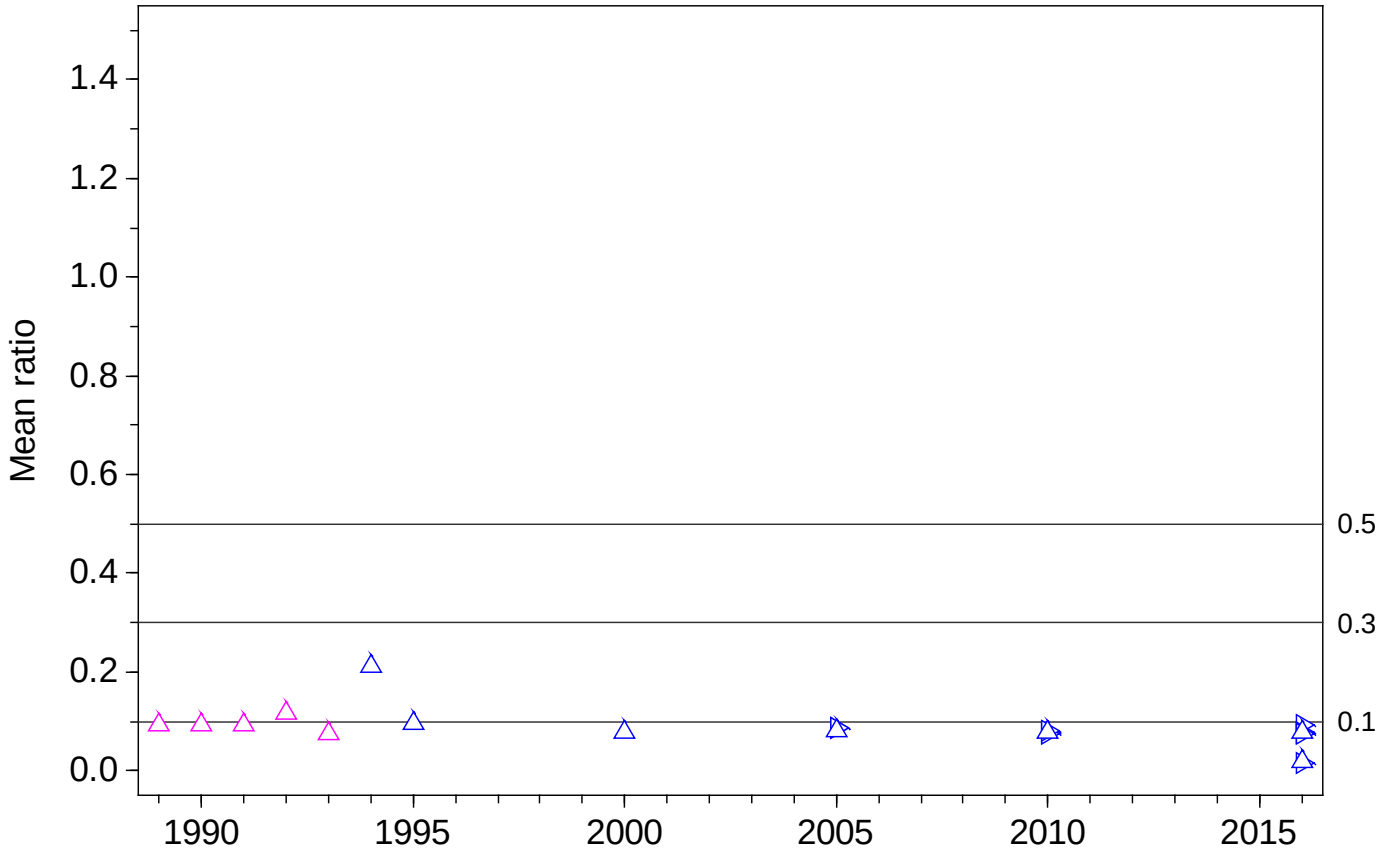
SQS quotient, Bis(2-ethylhexyl)phthalate, Station 49



SQS quotient, Butylbenzylphthalate, Station 49



Mean SQS quotient, SCI SQS (no PAH totals), Station 49



Sediment Chemistry Index, Station 49