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Oceanografiska Laboratoriet

2016-02-29
Dnr: S/Gbg-2016-020

Rapport från SMHIs utsjöexpedition med R/V Aranda

Expeditionens varaktighet: 2016-02-15 - 2016-02-23
Undersökningsområde: Skagerrak, Kattegatt, Öresund, Egentliga Östersjön och Finska viken
Uppdragsgivare: SMHI samt Havs- och Vattenmyndigheten

SAMMANFATTNING

Under expeditionen, vilken ingick i det svenska havsövervakningsprogrammet, besöktes Skagerrak, Kattegatt, Öresund och egentliga Östersjön. I egentliga Östersjön genomfördes kartering av vinterhalter av näringsämnen. Denna rapport är baserad på preliminära, endast delvis kvalitetskontrollerade data.

Temperaturen i den övre vattenmassan låg över det normala i hela egentliga Östersjön. Halterna av närsalter i ytvattnet var generellt normala för årstiden i Västerhavet. I Östersjön uppvisade fosfat halter över det normala utom i de västra delarna. Silikatkoncentrationerna var förhöjda i hela området utom i södra delen där de låg klart under medel för årstiden.
Effekten av det stora inflödet under december 2014 kunde fortfarande inte följas längre norrut än till stationen BY20 i östra Gotlandsbassängen. Gotlandsdjupet BY15 var åter syresatt i bottenvattnet. I västra samt norra Gotlandsbassängen var syresituationen fortsatt mycket allvarlig då helt syrefria förhållanden uppmättes från djup överstigande 70-100 meters djup. Det uppmättes även svavelväte på provtagningspunkten i Gdanskbukten vilket inte registrerats där sedan 2008.
Enligt fluorescensmätningar har vårblomningen börjat i centrala och södra Skagerrak samt norra delen av Kattegatt.

Nästa ordinarie expedition är planerad starta 15:e mars.

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PRELIMINÄRA RESULTAT

Expeditionen genomfördes ombord det finska forskningsfartyget Aranda och startade i Helsingfors den 15:e februari samt avslutades i samma hamn den 23:e. Vindarna under expeditionen var huvudsakligen svaga utom i Skagerrak där det blåste upp till stormstyrka och 2 stationer fick strykas. Lufttemperaturen varierade mellan -1 och +4°C. I Östersjön genomfördes kartering av vintertillståndet av närsalter.

Skagerrak

Temperaturen i ytvattnet var normal för årstiden och varierade mellan 2,4 och 5,4 °C, lägst vid kusten. Salthalten i ytlagret var normal till något över normal, mellan 26,5 och 34,1 psu. Salt- och temperatursprångskikten sammanföll och fanns på mellan 10 och 25 meters djup.
Närsalthalterna uppvisade typiska koncentrationer för årstiden förutom silikat där koncentrationen var något över det normala i södra delarna. I ytvattnet låg halterna av fosfat på ca 0,5 µmol/l, oorganiskt kväve (nitrit + nitrat) mellan 6,2 och 11,2 µmol/l medan silikat varierade från 5,2 till 10,2 µmol/l. De lägsta syrehalterna i bottenvattnet uppmättes vid Släggö i Gullmarsfjordens mynning, 4,0 ml/l. Fluorescensmätningarna visade något ökad biologisk aktivitet i ytlagret i de södra och västra delarna av mätområdet. För mer detaljer rörande algsituationen se separat rapport AlgAware.

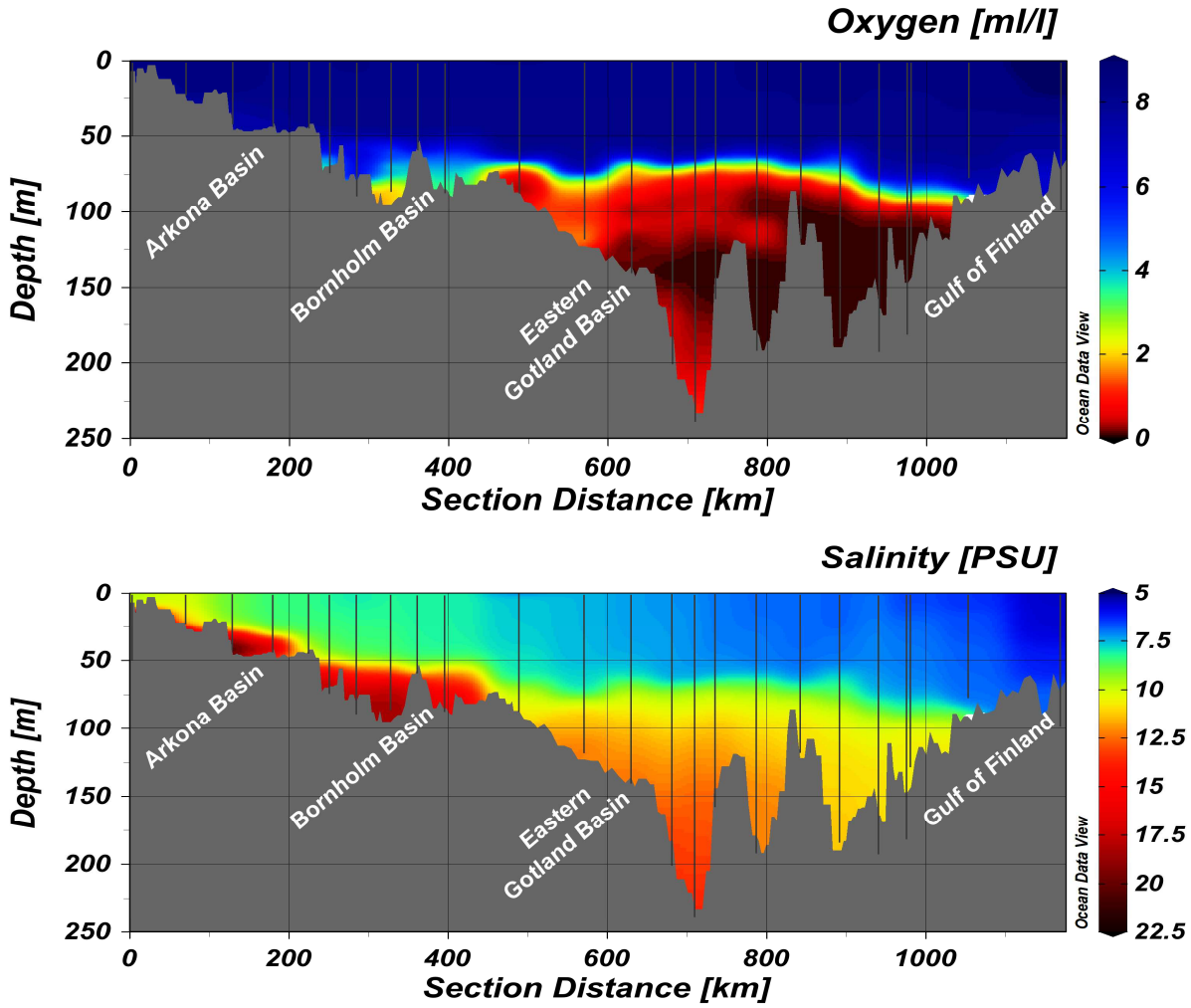
Kattegatt och Öresund

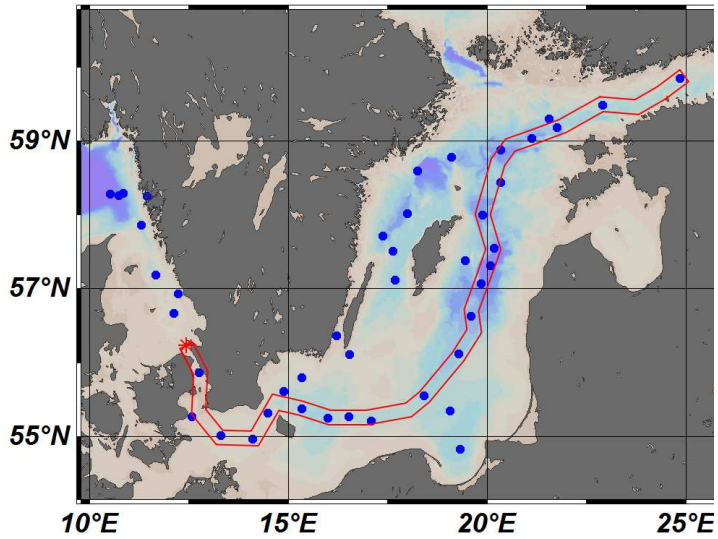
Temperaturen i ytvattnet var normal för årstiden och varierade mellan 2,3 och 3,0°C. Salthalten i ytlagret var lägre än normalt förutom i norra delen där den var normal, mellan 17,8 och 25,3. I Öresund var salthalten omkring 10 psu vilket är lägre än normalt. Öresund hade en starkt pyknoklin vid ca 14 meter medan den i övriga delarna återfanns vid ca 20 meter.
Halterna av närsalter i ytvattnet var normala till något förhöjda för årstiden. Fosfatkoncentrationerna låg mellan 0,5 och 0,7 µmol/l. Summa nitrit+nitrat i intervallet 4,6 – 6,1 µmol/l och silikat mellan 7,9 och 10,6 µmol/l.
Syreförhållandena i djupvattnet var goda vid samtliga stationer, lägst halt uppmättes i Öresund, 5,5 ml/l. Fluorescensmätningarna visade en början till vårblomning i norra delen av området.

Egentliga Östersjön

Temperaturen i vattenmassan över språngskiktet var fortfarande något högre än normalt i hela området och varierade från 3,0 till 4,5°C. Ytsalthalten var något förhöjd i Hanöbukten, Bornholmsbassängen samt Arkonabassängen, i norra delen av östra Gotlandsbassängen något lägre än normalt och i övriga områden normal. Haloklin och termoklin sammanföll och återfanns på 40-60 meters djup i västra- och på 60-90 meters djup i östra- och norra Gotlandsbassängen, medan de låg något grundare i de södra delarna.
Fosfathalterna i ytvattnet låg fortfarande över det normala förutom i västra Gotlandsbassängen där den var normal för årstiden Koncentrationerna låg mellan 0,6 och 1,1 µmol/l. Halterna av nitrit+nitrat var normala i hela det undersökta området och varierade från 2,6 till 4,7 µmol/l. Precis som vid förra besöket i januari var koncentrationen av silikat lägre än normalt i de södra delarna medan de var förhöjda i övriga områden. Halterna varierade mellan 9,0 och 17,2 µmol/l.
I hela det undersökta området observerades akut syrebrist (< 2 ml/l) på djup överstigande 60-90 meter. Vid Gotlandsdjupet BY15 uppmättes inget svavelväte i bottenvattnet den här gången men mycket låga syrehalter (<1 ml/l) uppmättes mellan 80 och 200 meter. Inflödet i december 2014 syns fortfarande inte längre norrut än BY20 i östra Gotlandsbassängen.

I västra samt norra Gotlandsbassängen var syresituationen fortfarande mycket allvarlig. I västra Gotlandsbassängen återfanns helt syrefria förhållanden, då svavelväte bildas, från 90-100 meter och den norra delen hade helt syrefria förhållanden från 90 meters djup.
Svavelväte mättes vid den polska stationen PL-P1 i Gdanskbukten, vilken inte har uppmäts vid en karteringsexpedition sedan 2008





Figur 1. Snitt som visar syre- och salthalt genom Egentliga Östersjön från Öresund till Finska viken.

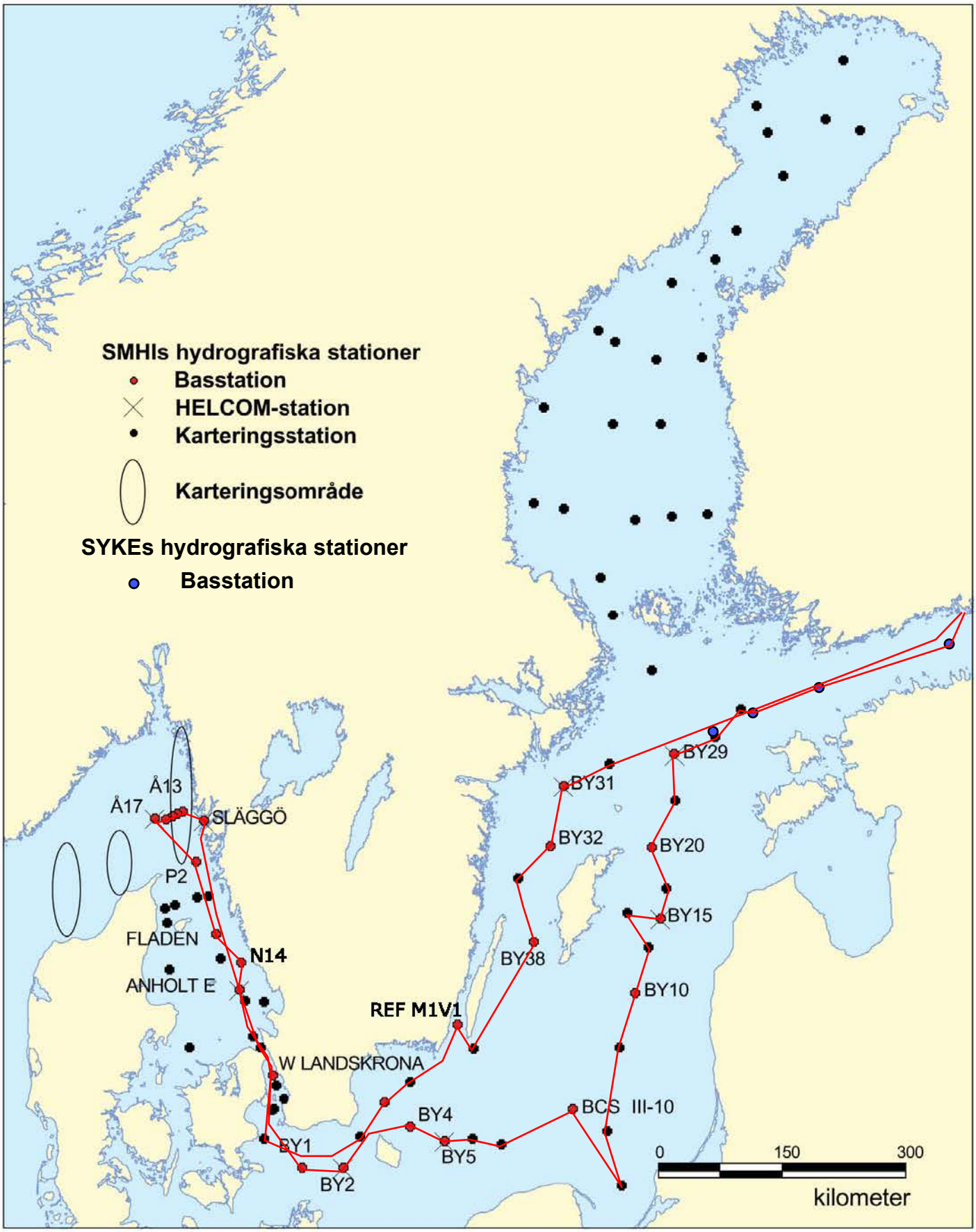
DELTAGARE

Namn		Från
Anna-Kerstin Thell	Expeditionsledare	SMHI
Örjan Bäck		SMHI
Johan Kronsell		SMHI
Jenny Lycken		SMHI
Sari Sipilä		SMHI

BILAGOR

- Färdkarta
- Tabell över stationer, antal parametrar och provtagningsdjup
- Karta över syrehalter i bottenvattnet
- Vertikalprofiler för basstationer
- Månadsmedelvärdesplottar för ytvatten

TRACKCHART
Country: Sweden
Ship: R/V ARANDA
Date: 20160215-20160223
Series: 0098-0142



SMHI   ***** Hydrographic   Ship: 01-Aranda   ******   Date: 2016-02-23
Ocean enh   ***** series   Year: 2016   ******   Time: 17:29

Ser no	Stat code	Proj	Station	Lat	Lon	Date yyyymmdd	Time hhmm utc	Bottom depth m	Secchi depth m	Wind di	Wind ve	Air temp C	Air pres hPa	WCSI elec aoae tu hd	Ctd	PPCPZZT Hrhhoor Cilyooa motPBw PrP l	No de	Temp	Salin	Ph	Oxyg	H2S	Po4P	TotP	No2N	No3N	Nh4N	TotN	Alkal	SiO3	Humus	Lignin	POC	PON	TOC	Comm
0098	GFXX29	EXT	BY23/LL7	N5950.79	E2450.27	20160215	1300	102		29	3	1.1	1009	2820	x	--x----	13	x	x	-	x	-	x	x	x	x	x	x	-	x	-	-	-	-	-	x
0099	BPNX00	EXT	LL12	N5929.01	E2253.81	20160215	1900	84		34	8	-1.0	1016	9999	x	--x----	11	x	x	-	x	-	x	x	x	x	x	x	-	x	-	-	-	-	-	x
0100	BPWX00	EXT	LL15	N5911.00	E2144.81	20160215	2320	132		35	8	-0.4	1021	9999	x	-------	15	x	x	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0101	BPNX33	BAS	BY27	N5917.8	E2134	20160216	0035	182		34	6	-0.5	1022	9999	x	-------	16	x	x	-	x	x	x	x	x	x	x	x	-	x	-	-	-	-	-	-
0102	BPNX34	BAS	BY28	N5902	E2105	20160216	0325	192		33	6	0.0	1023	9999	x	-------	17	x	x	-	x	x	x	x	x	x	x	x	-	x	-	-	-	-	-	-
0103	BPNX35	BAS	BY29	N5853	E2019	20160216	0700	183		31	6	-0.4	1027	1530	x	--x----	16	x	x	-	x	x	x	x	x	x	x	x	-	x	-	-	-	-	-	-
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0105	BPEX26	BAS	BY20 FÅRÖDJ	N5800	E1953	20160216	1410	193	15	31	6	1.1	1033	1130	x	-xx----	17	x	x	-	x	x	x	x	x	x	x	x	-	x	-	-	-	-	-	x
0106	BPEX25	BAS	BY19	N5737	E2010	20160216	1720	156		28	4	1.5	1035	9999	x	-------	15	x	x	-	x	-	x	x	x	x	x	x	-	x	-	-	-	-	-	-
0107	BPEX21	BAS	BY15 GOTLANDSDJ	N5720	E2003	20160216	1940	237		27	6	1.5	1036	9999	x	--xxx--	19	x	x	x	x	x	x	x	x	x	x	x	x	x	x	-	-	-	-	x
0108	BPEX19	BAS	BY13	N5723.5	E1926	20160217	0000	122		26	7	2.1	1036	9990	x	-------	14	x	x	-	x	x	x	x	x	x	x	x	-	x	-	-	-	-	-	-
0109	BPEX14	BAS	BY11	N5704	E1950	20160217	0250	201		24	9	2.3	1037	9990	x	-------	17	x	x	-	x	x	x	x	x	x	x	x	-	x	-	-	-	-	-	-
0110	BPEX13	BAS	BY10	N5638	E1935	20160217	0615	144		22	8	1.8	1036	1130	x	--x----	15	x	x	-	x	-	x	x	x	x	x	x	-	x	-	-	-	-	-	-
0111	BPSE12	BAS	BY9 KLAIPEDA	N5607.5	E1917	20160217	1000	121		20	8	1.6	1036	1530	x	-------	14	x	x	-	x	-	x	x	x	x	x	x	-	x	-	-	-	-	-	-
0112	BPSE70	BAS	PL-P63	N5521	E1903	20160217	1505	84		11	14	1.8	1030	1140	x	-------	11	x	x	-	x	-	x	x	x	x	x	x	-	x	-	-	-	-	-	x
0113	BPSG71	BAS	PL-P1	N5450	E1818.93	20160217	1920	108		11	14	2.1	1024	9990	x	-------	14	x	x	-	x	x	x	x	x	x	x	x	-	x	-	-	-	-	-	x
0114	BPSE11	BAS	BCS III-10	N5533.3	E1824	20160218	0030	91		16	13	2.8	1017	9999	x	--x----	12	x	x	-	x	-	x	x	x	x	x	x	-	x	-	-	-	-	-	-
0115	BPSE09	BAS	BY7 STOLPE RÄNNA	N5513	E1704	20160218	0620	91		20	11	3.6	1014	2840	x	-------	12	x	x	-	x	-	x	x	x	x	x	x	-	x	-	-	-	-	-	-
0116	BPSE08	BAS	STOLPE TRÖSKEL	N5516.5	E1631	20160218	0910	64		23	11	2.9	1015	2850	x	-------	9	x	x	-	x	-	x	x	x	x	x	x	-	x	-	-	-	-	-	-
0117	BPSB07	BAS	BY5 BORNHOLMSDJ	N5515	E1559	20160218	1125	90	12	24	9	4.3	1016	2840	x	-xxxx--	12	x	x	x	x	-	x	x	x	x	x	x	x	x	x	-	-	-	-	-
0118	BPSB06	BAS	BY4 CHRISTIANSÖ	N5523	E1520	20160218	1430	92		22	7	2.1	1016	2830	x	--x----	12	x	x	-	x	-	x	x	x	x	x	x	-	x	-	-	-	-	-	-
0119	BPSA03	BAS	BY2 ARKONA	N5500	E1405	20160218	2040	47		23	4	2.3	1017	9999	x	--xxx--	8	x	x	-	x	-	x	x	x	x	x	x	-	x	x	-	-	-	-	-
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0121	SOCX39	BAS	W LANDSKRONA	N5552.0	E1245.0	20160219	0600	53		12	4	0.5	1016	4920	x	--x----	9	x	x	-	x	-	x	x	x	x	x	x	-	x	-	-	-	-	-	-
0122	KAEX29	BAS	ANHOLT E	N5640.0	E1207.0	20160219	1045	63	10	18	6	0.5	1016	4930	x	-xxxx--	10	x	x	x	x	-	x	x	x	x	x	x	x	x	x	-	-	-	-	-
0123	KANX50	BAS	N14 FALKENBERG	N5656.40	E1212.70	20160219	1300	32		20	7	0.9	1016	4930	x	-xxx---	6	x	x	x	x	-	x	x	x	x	x	x	x	x	-	-	-	-	-	x
0124	KANX25	BAS	FLADEN	N5711.5	E1140	20160219	1530	86		19	8	2.1	1014	4930	x	--x----	12	x	x	-	x	-	x	x	x	x	x	x	-	x	-	-	-	-	-	-
0125	SKEX23	BAS	P2	N5752	E1118	20160219	1940	94		19	11	1.1	1012	9990	x	--x----	10	x	x	-	x	-	x	x	x	x	x	x	-	x	-	-	-	-	-	-
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0127	SKEX17	BAS	Å16	N5816	E1043.5	20160220	0110	203		18	17	3.0	1006	9999	x	-------	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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0131	BPSA01	BAS	441 STEVNS KLINT	N5516.3	E1234.5	20160221	0640	25		26	8	4.2	998	1230	x	-------	6	x	x	-	x	-	x	x	x	x	x	x	-	x	-	-	-	-	-	-
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0136	BPSE49	BAS	BY39 ÖLANDS S UDDE	N5607	E1632	20160222	0100	52		23	7	3.4	989	6990	x	-------	8	x	x	-	x	-	x	x	x	x	x	x	-	x	-	-	-	-	-	-
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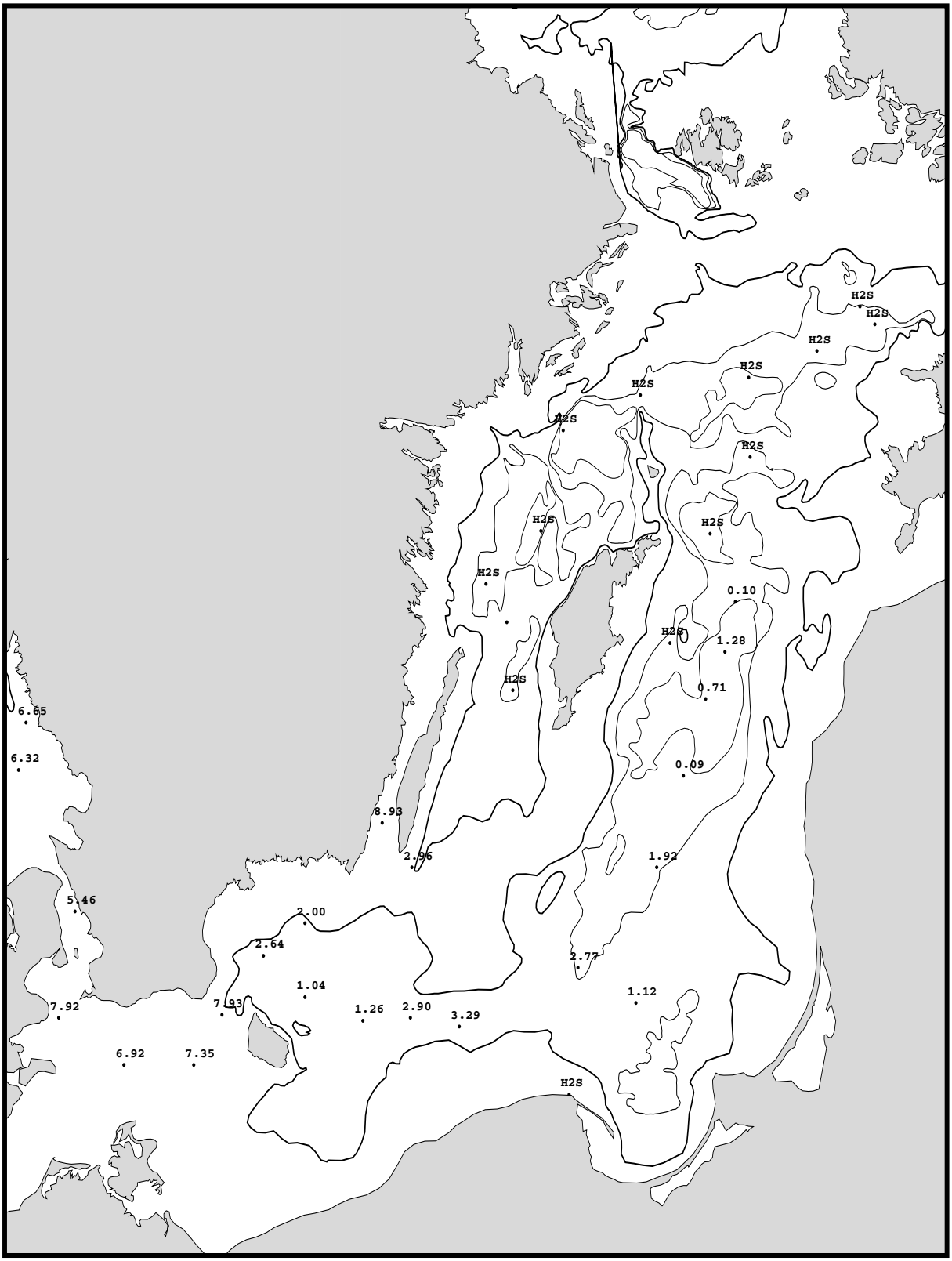
0141	BPNX37	BAS	BY31 LANDSORTSDJ	N5835	E1814	20160222	2040	440		26	3	2.5	989	9990	x	--xxx--	23	x	x	x	x	x	x	x	x	x	x	x	x	x	-	-	-	-	-	-
0142	BPNX36	BAS	BY30	N5847	E1906	20160223	0140	181		34	2	2.2	989	9990	x	-------	16	x	x	-	x	x	x	x	x	x	x	x	-	x	-	-	-	-	-	-

Bottom water oxygen concentration (ml/l)

Country: Finland
Ship : Aranda
Date : 20160215-20160223
Series : 0098-0142

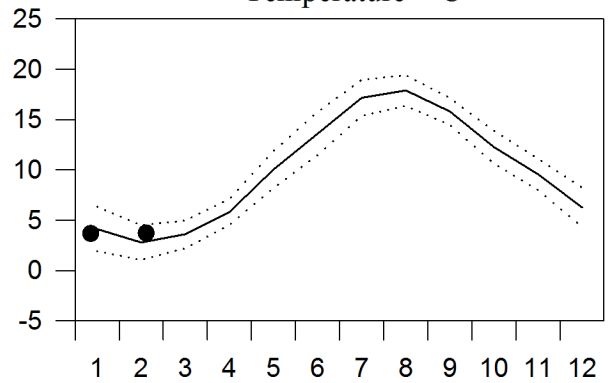


STATION P2 SURFACE WATER

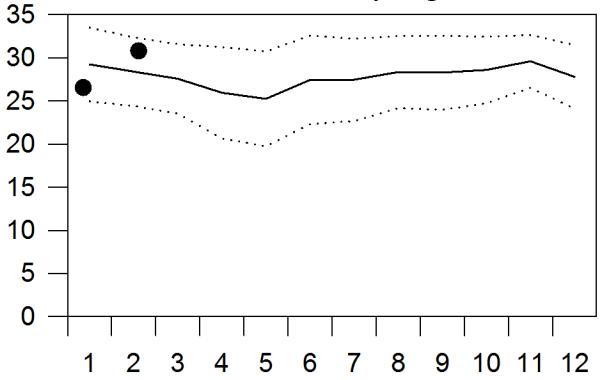
Annual Cycles

Mean 1996-2010 ····· St.Dev. ● 2016

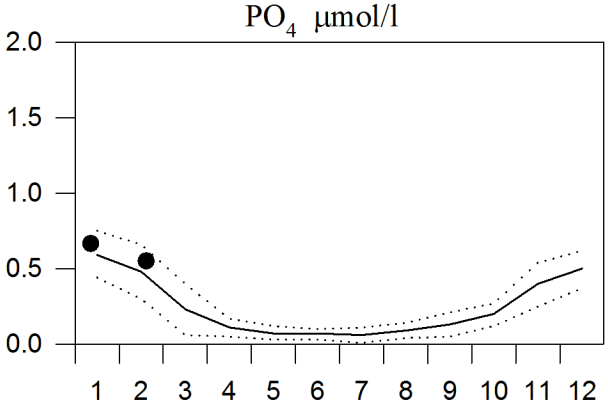
Temperature °C



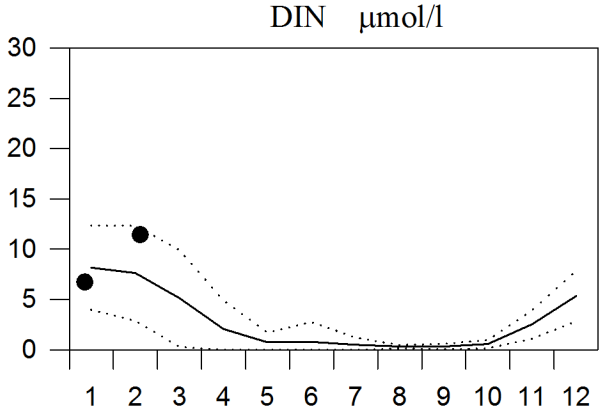
Salinity psu



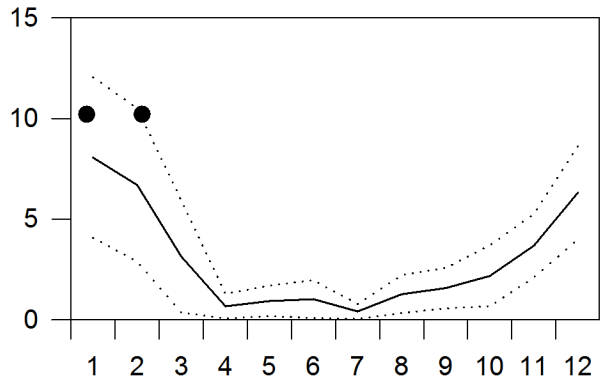
PO_4 µmol/l



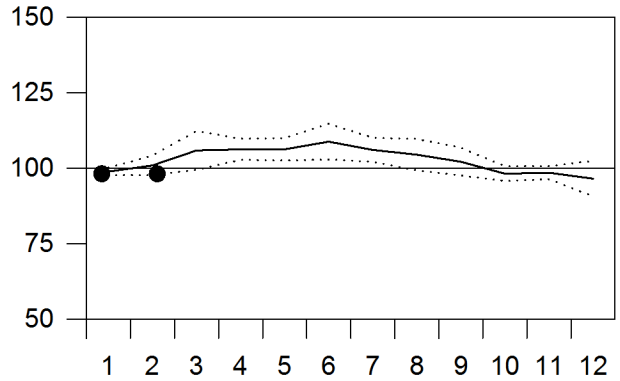
DIN µmol/l



SiO_3 µmol/l

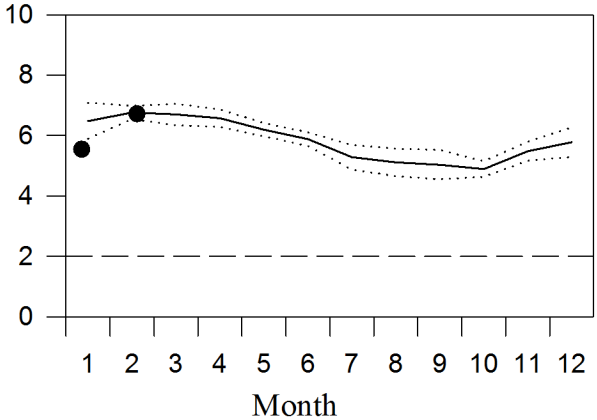


O_2 saturation %

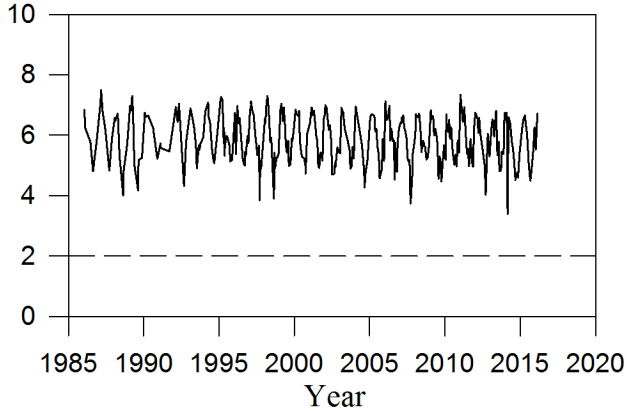


OXYGEN IN BOTTOM WATER (depth >75m)

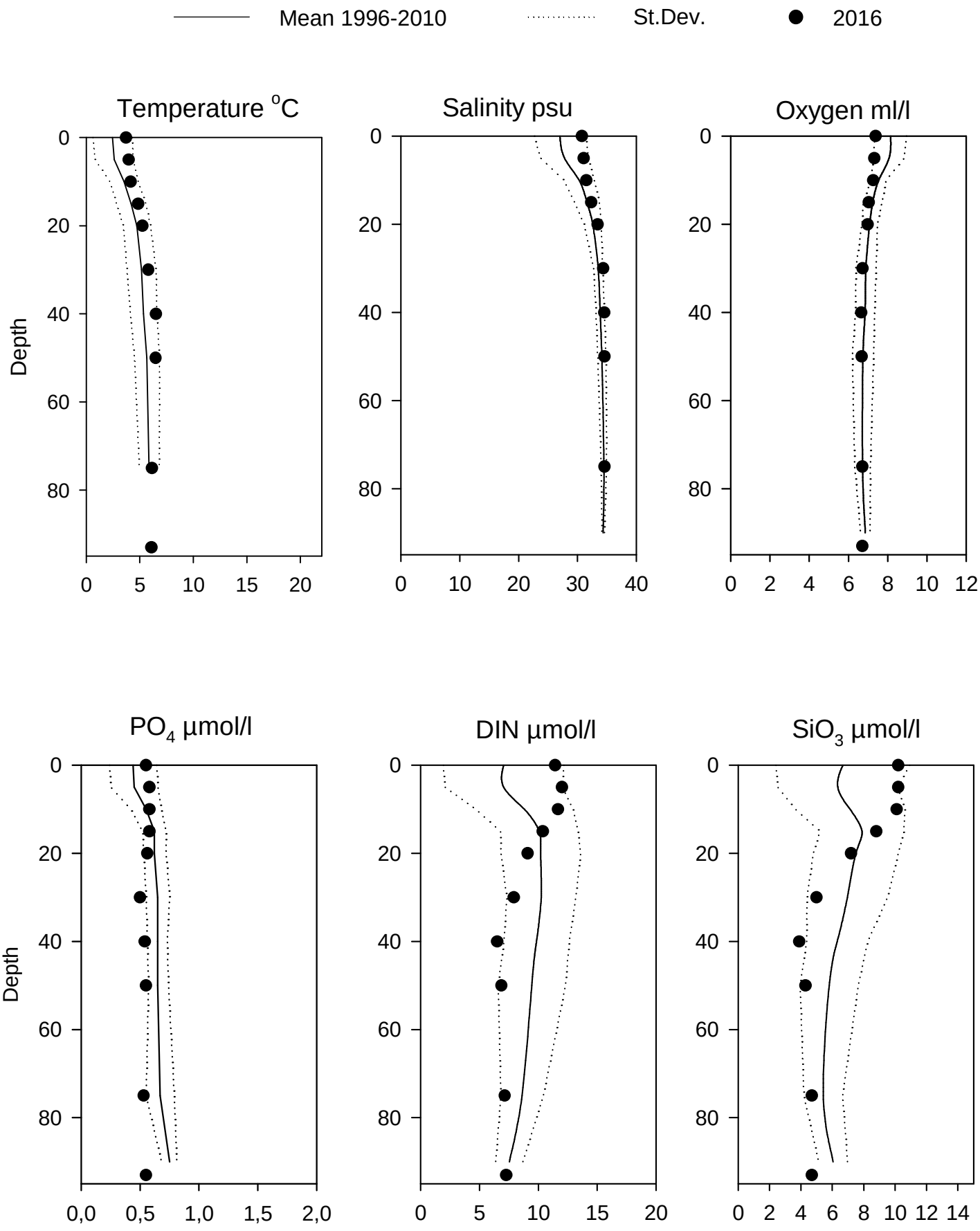
O_2 ml/l



O_2 ml/l



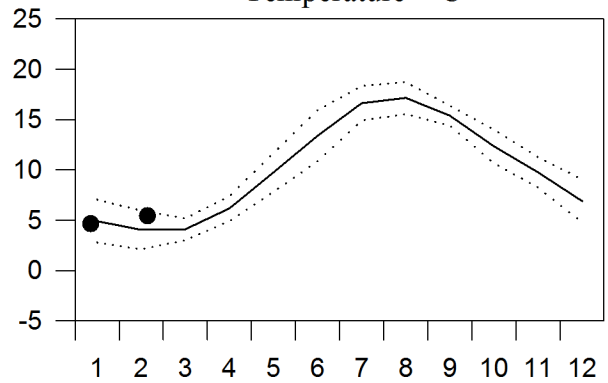
Vertical profiles P2 February



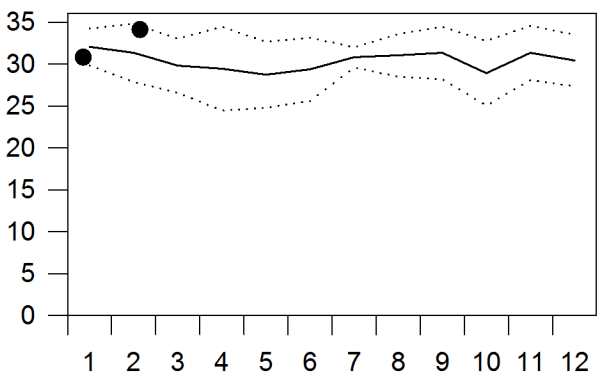
STATION Å15 SURFACE WATER

Annual Cycles

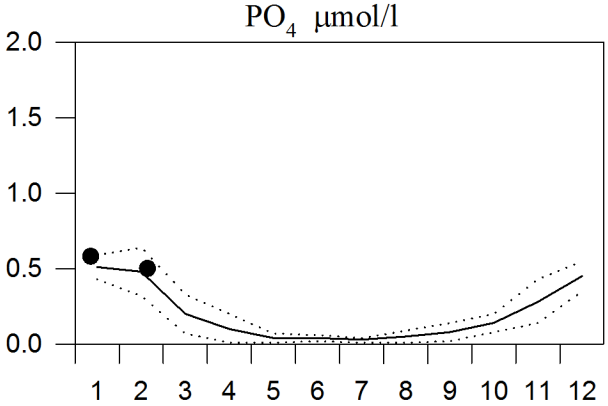
Temperature °C



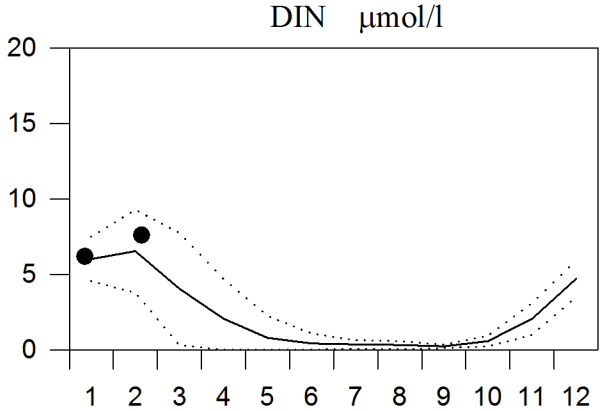
Salinity psu



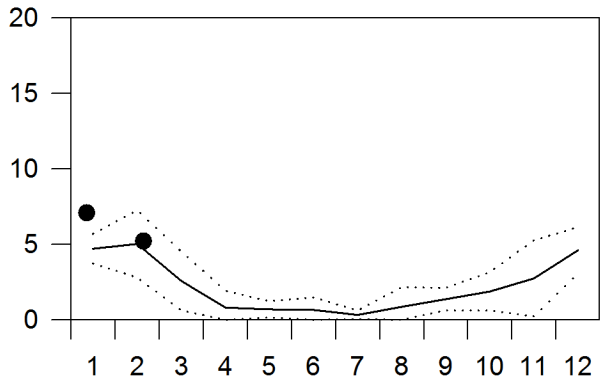
PO_4 µmol/l



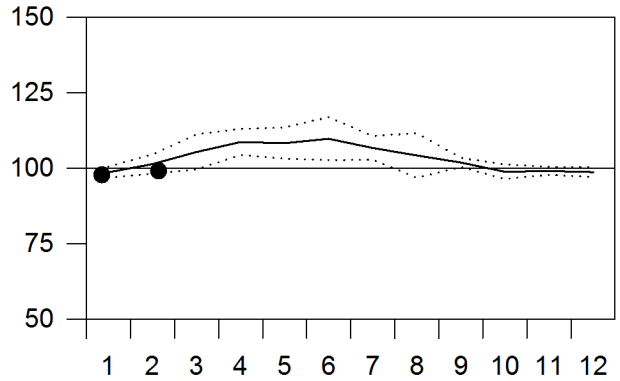
DIN µmol/l



SiO_3 µmol/l

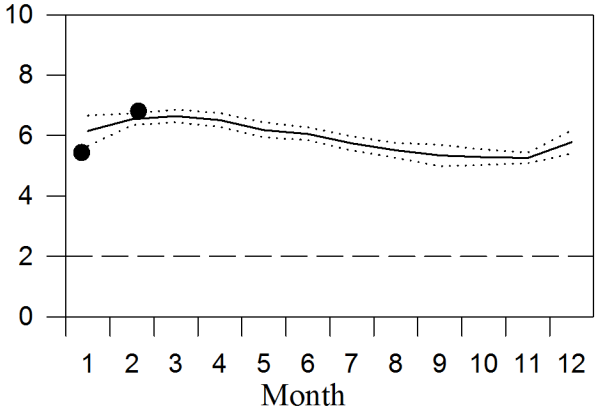


O_2 saturation %

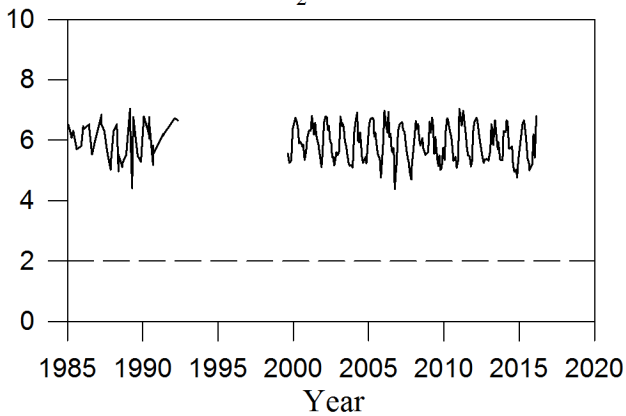


OXYGEN IN BOTTOM WATER (depth >=125m)

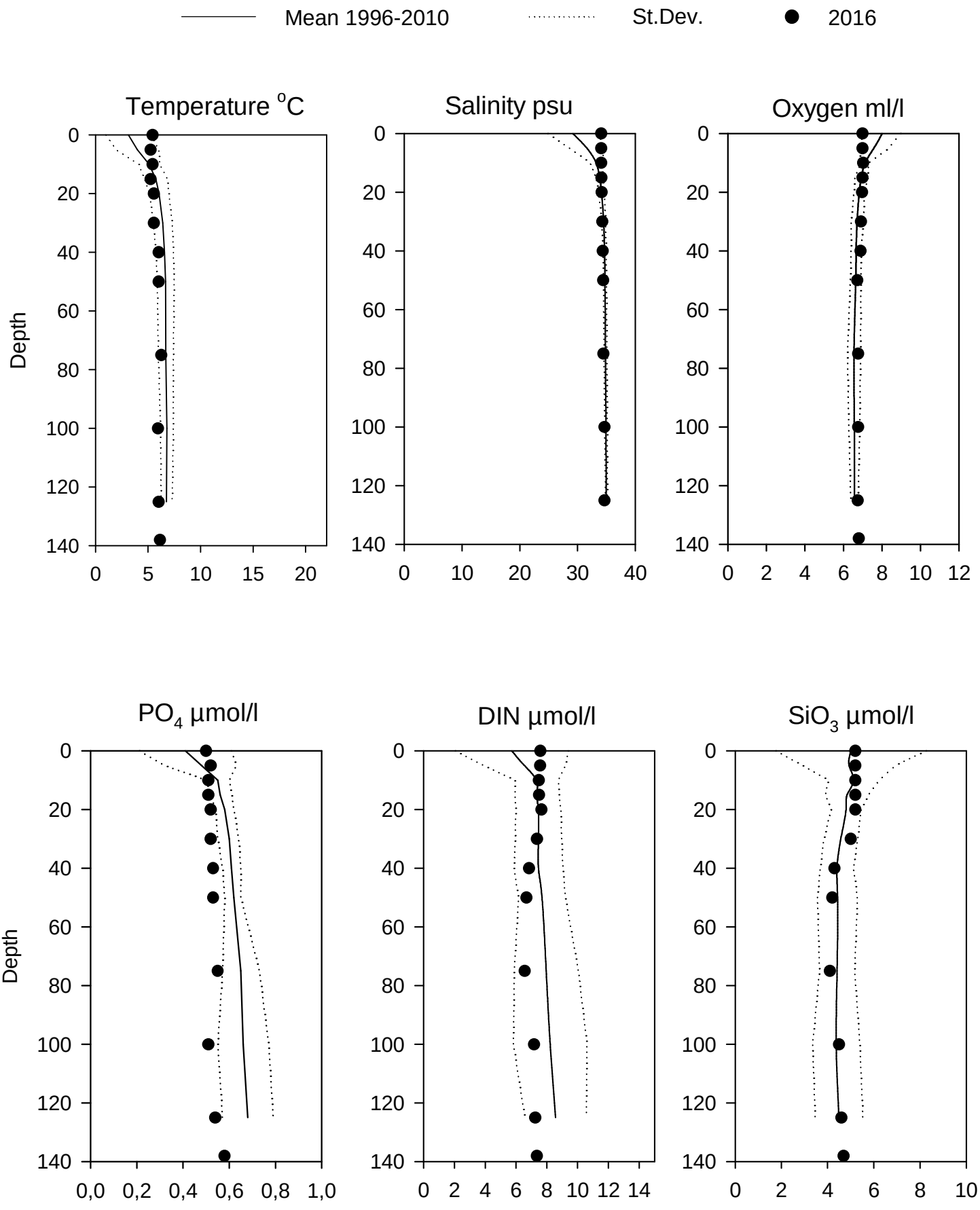
O_2 ml/l



O_2 ml/l



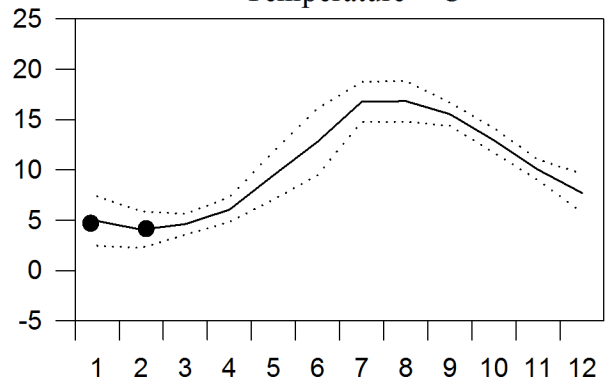
Vertical profiles Å15 February



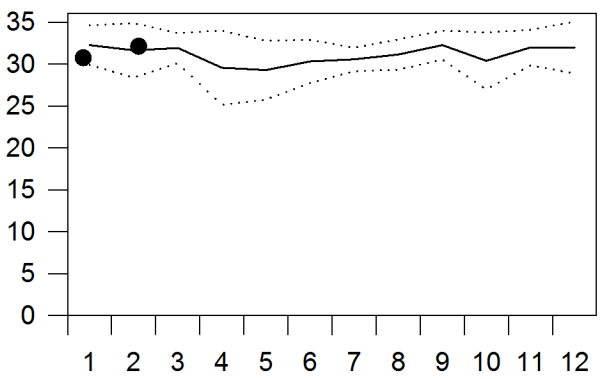
STATION Å17 SURFACE WATER

Annual Cycles

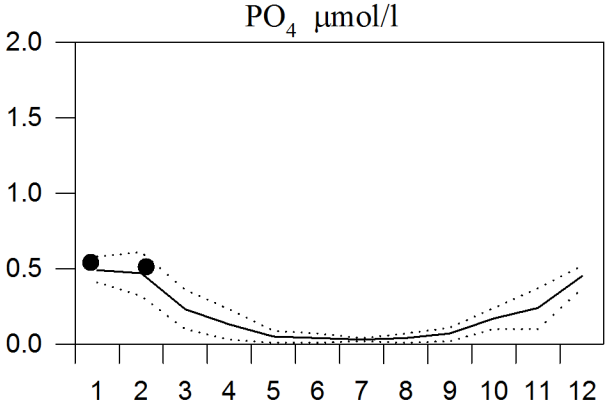
Temperature °C



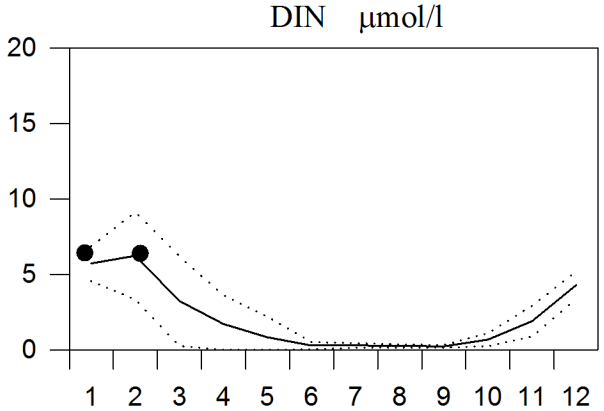
Salinity psu



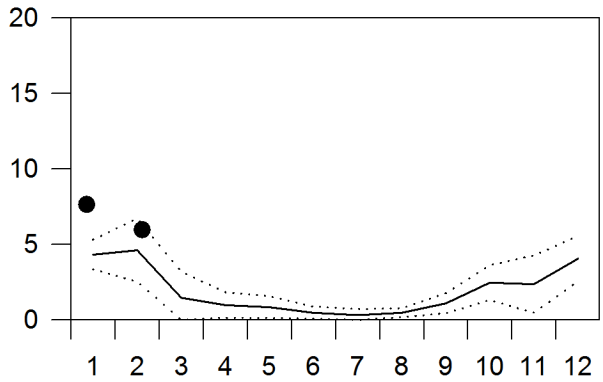
PO_4 µmol/l



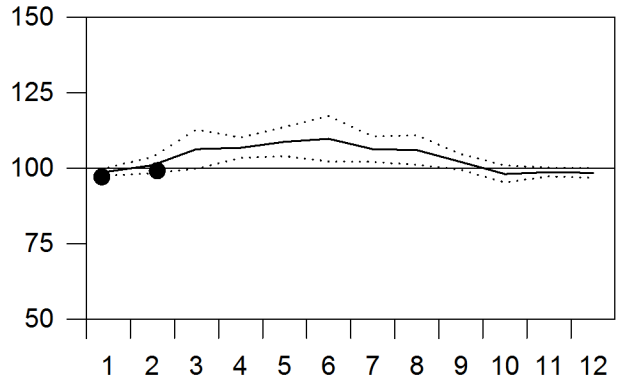
DIN µmol/l



SiO_3 µmol/l

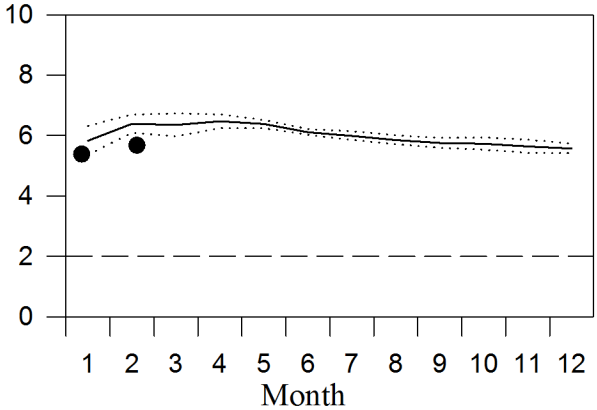


O_2 saturation %

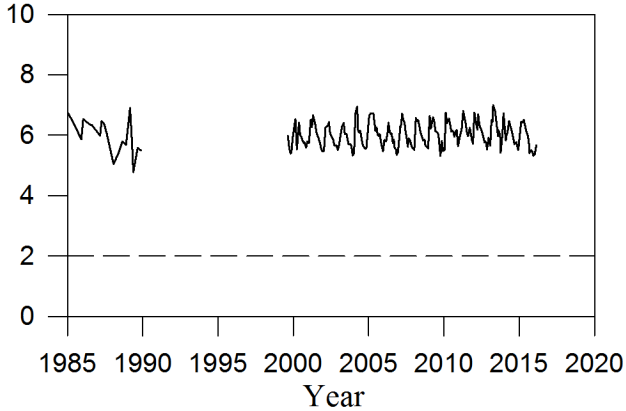


OXYGEN IN BOTTOM WATER (depth = 300m)

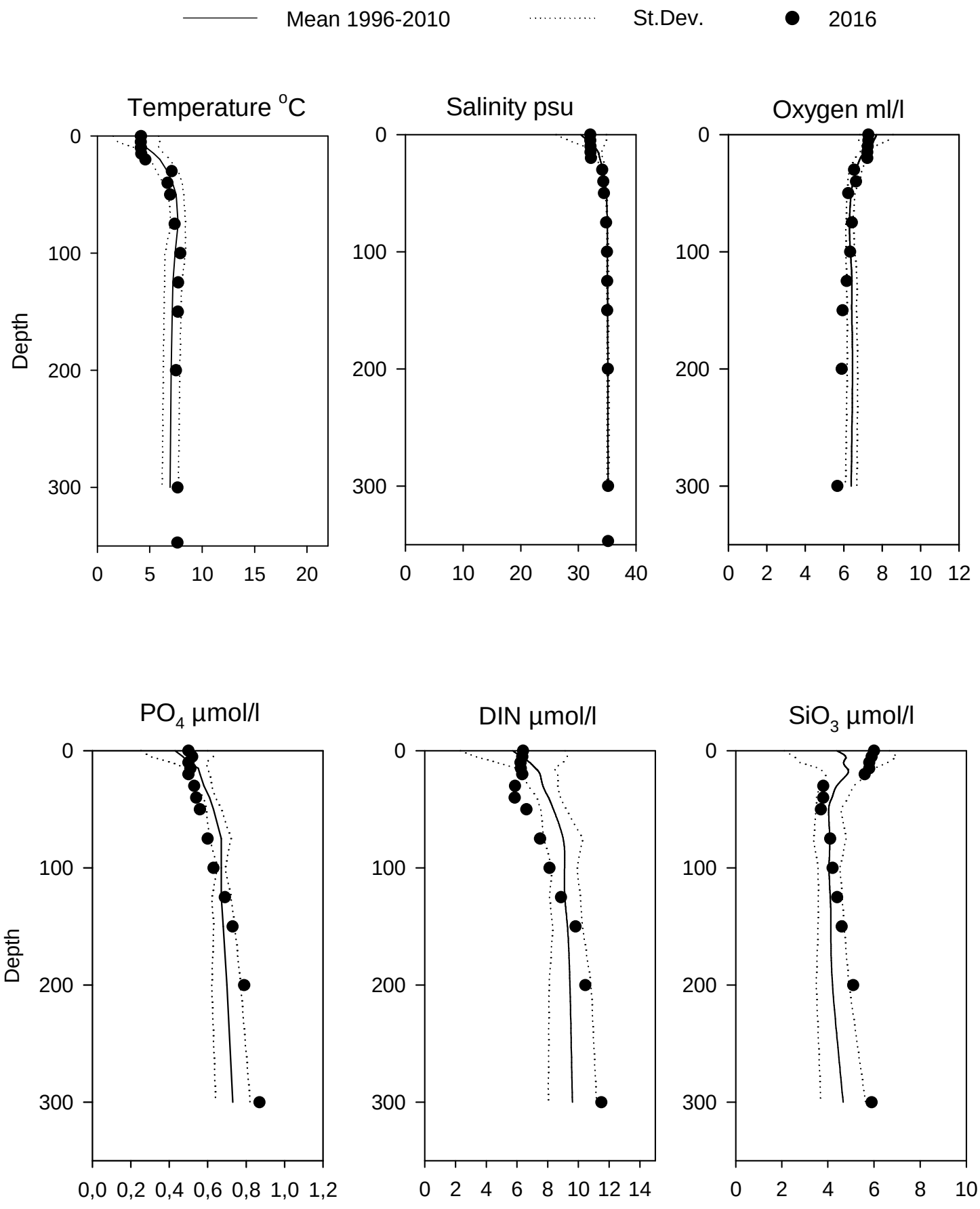
O_2 ml/l



O_2 ml/l



Vertical profiles Å17 February

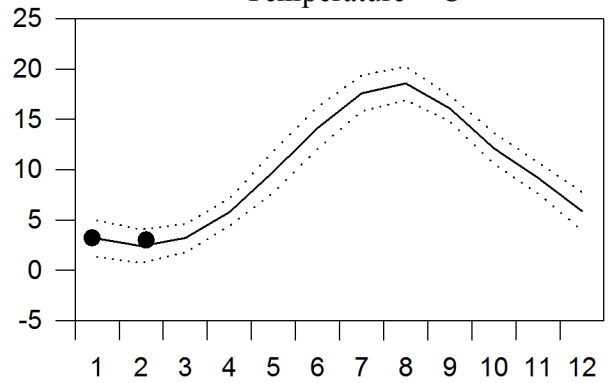


STATION FLADEN SURFACE WATER

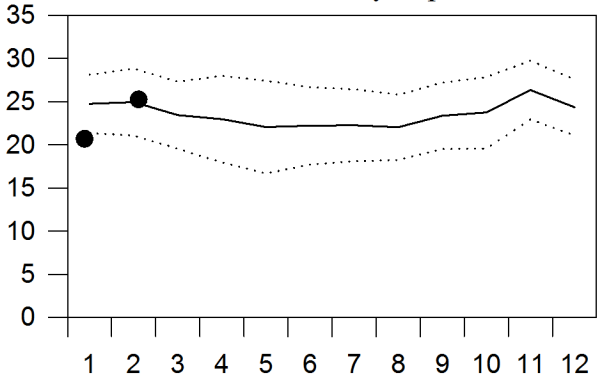
Annual Cycles

Mean 1996-2010 ····· St.Dev. ● 2016

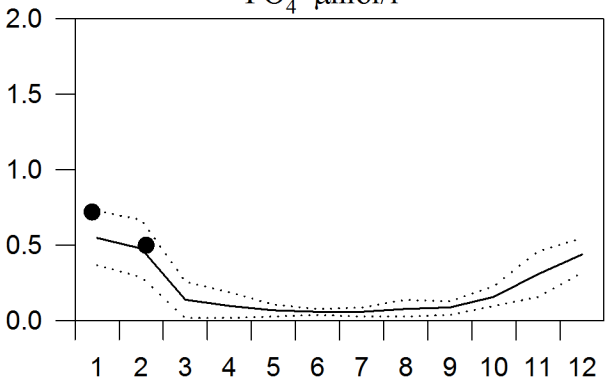
Temperature °C



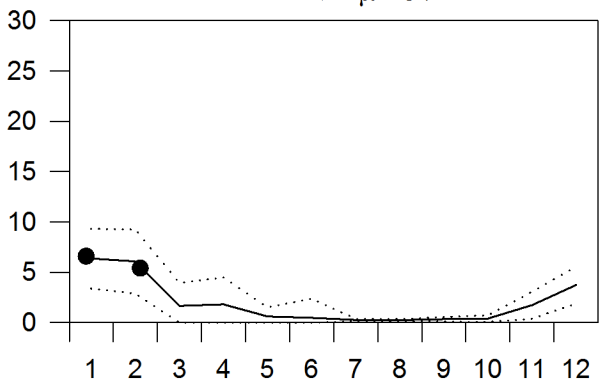
Salinity psu



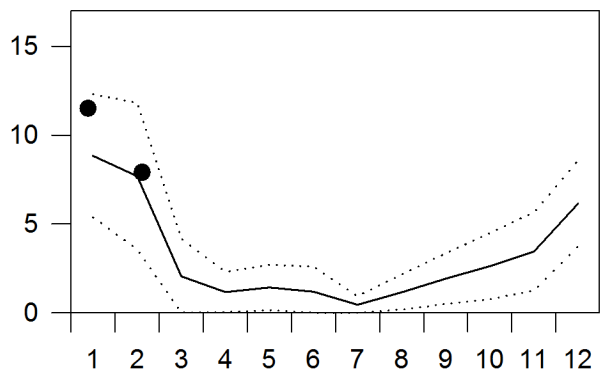
PO_4 µmol/l



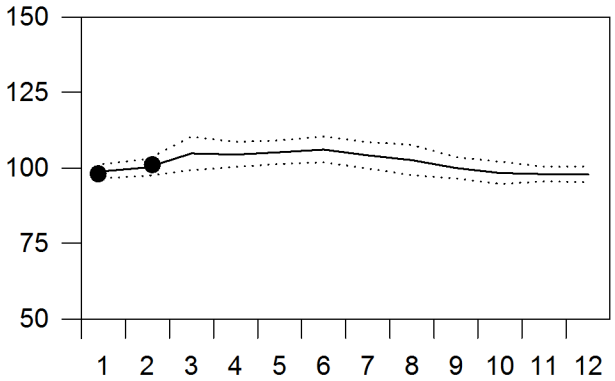
DIN µmol/l



SiO_3 µmol/l

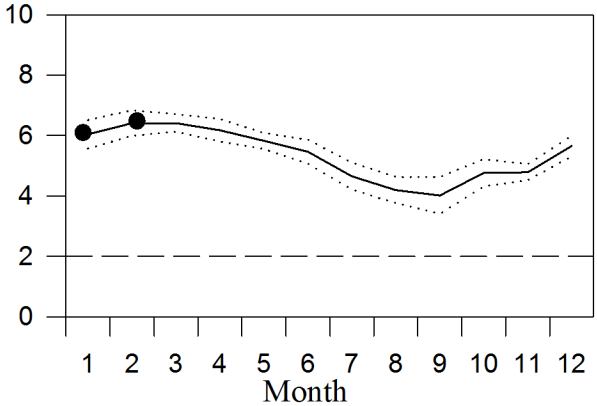


O_2 saturation %

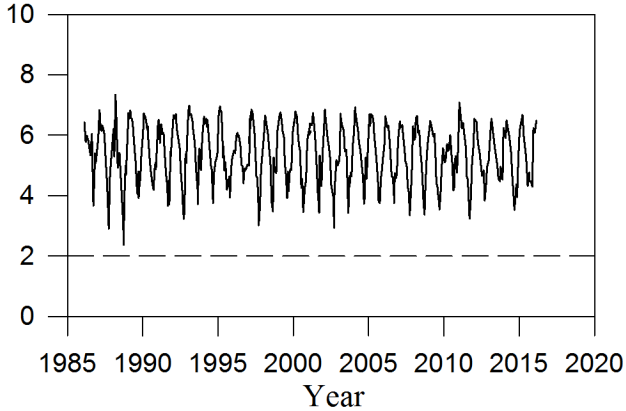


OXYGEN IN BOTTOM WATER (depth > 70m)

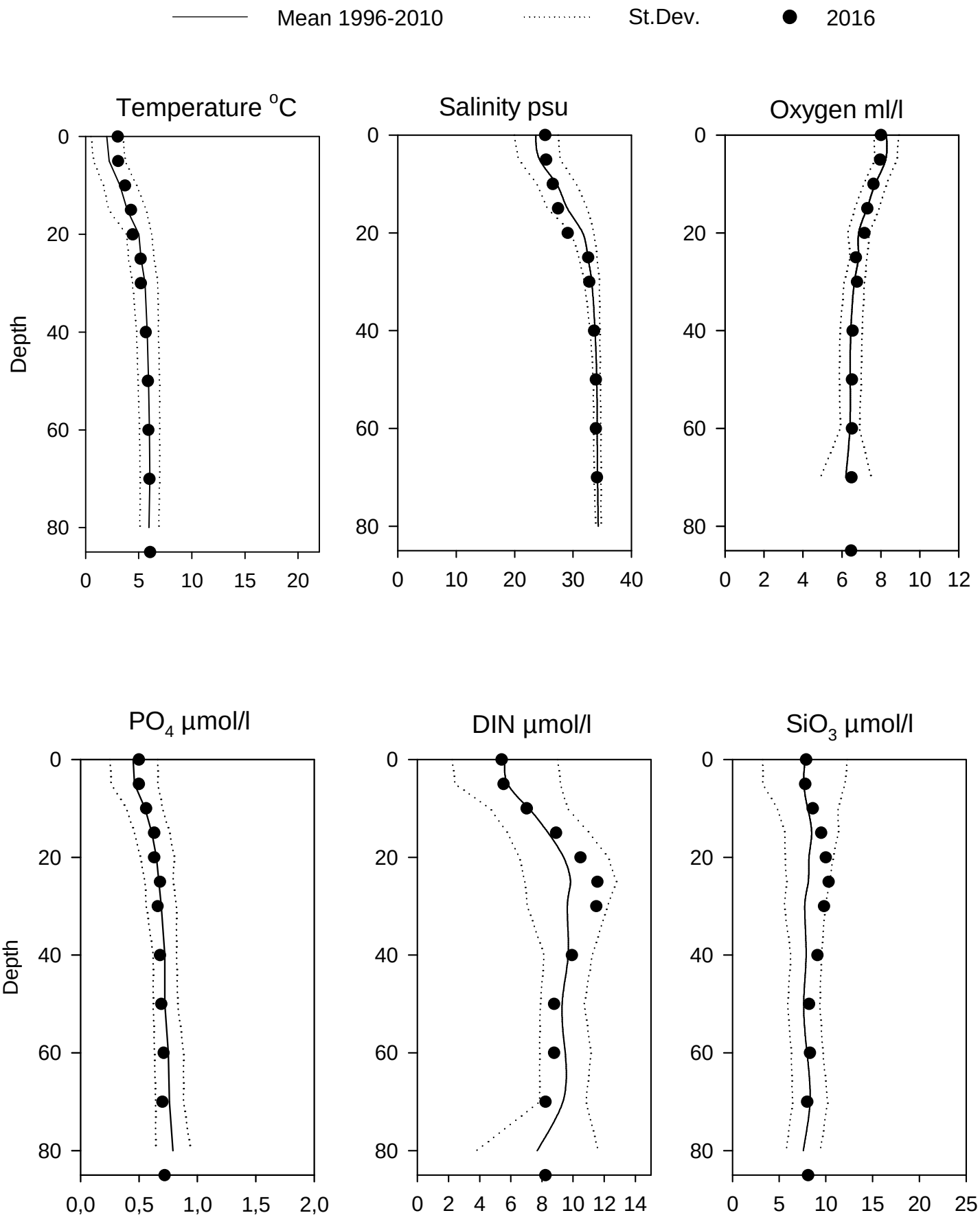
O_2 ml/l



O_2 ml/l



Vertical profiles Fladen February

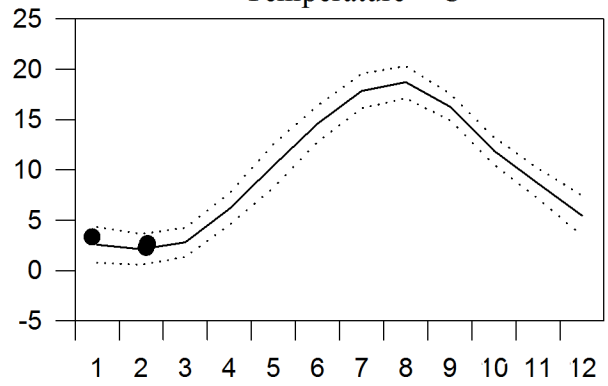


STATION ANHOLT E SURFACE WATER

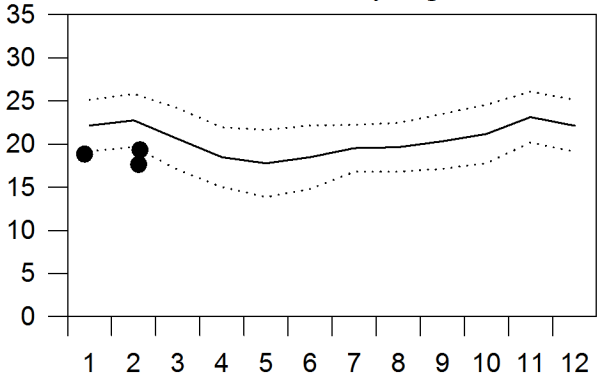
Annual Cycles

Mean 1996-2010 ····· St.Dev. ● 2016

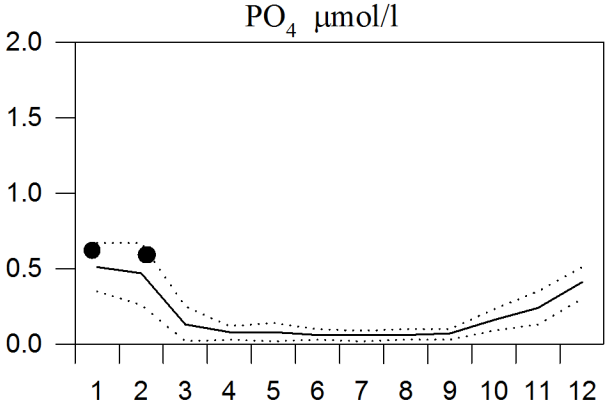
Temperature °C



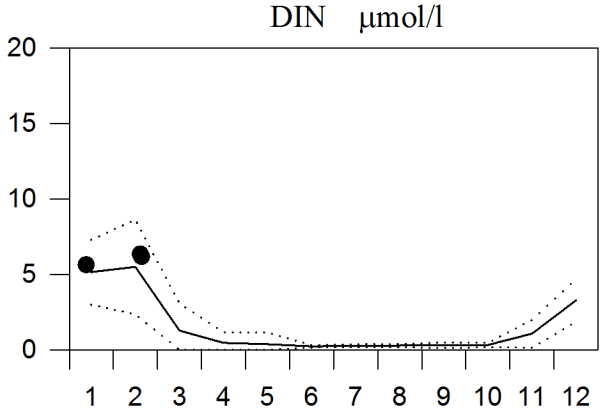
Salinity psu



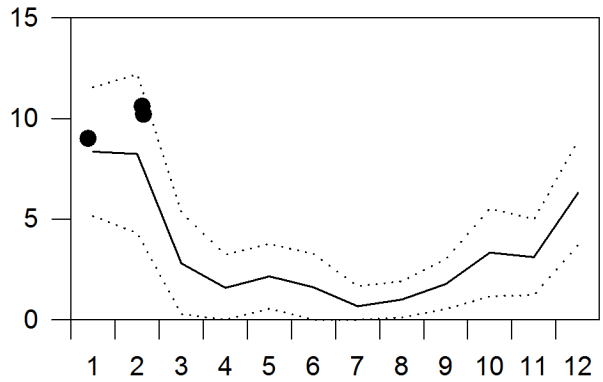
PO_4 µmol/l



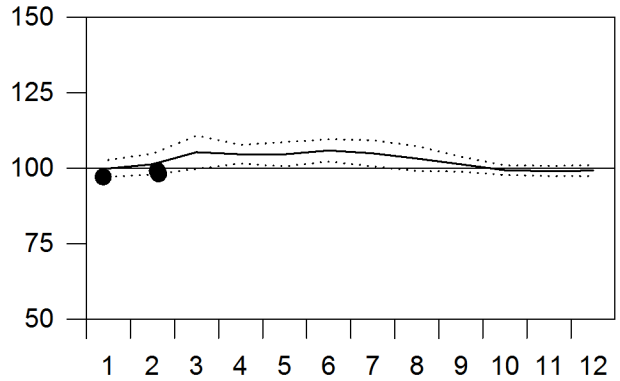
DIN µmol/l



SiO_3 µmol/l

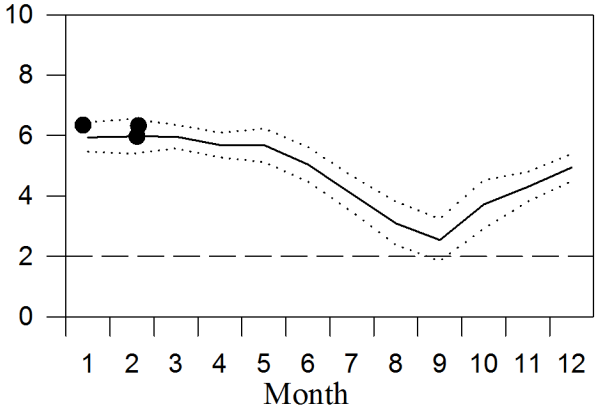


O_2 saturation %

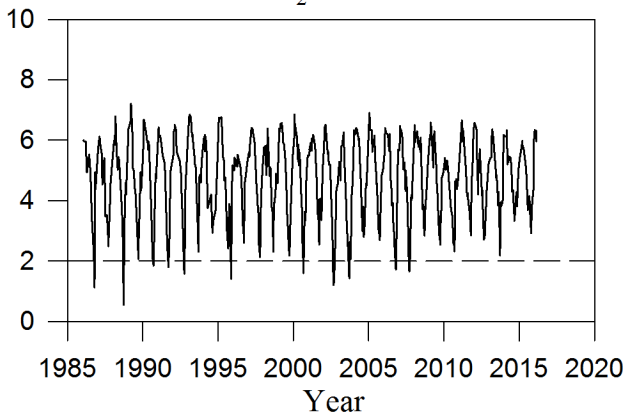


OXYGEN IN BOTTOM WATER (depth > 50m)

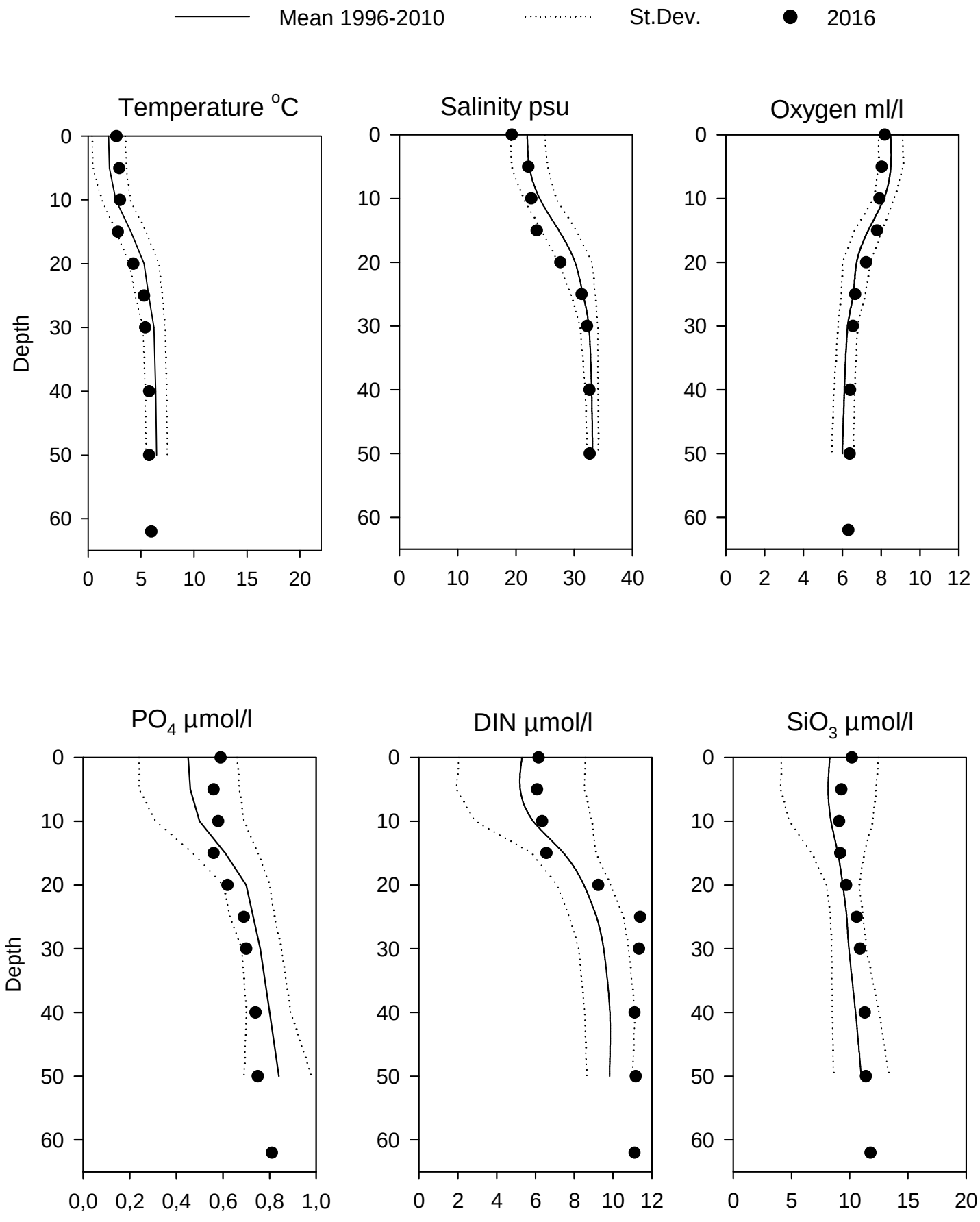
O_2 ml/l



O_2 ml/l



Vertical profiles Anholt E February

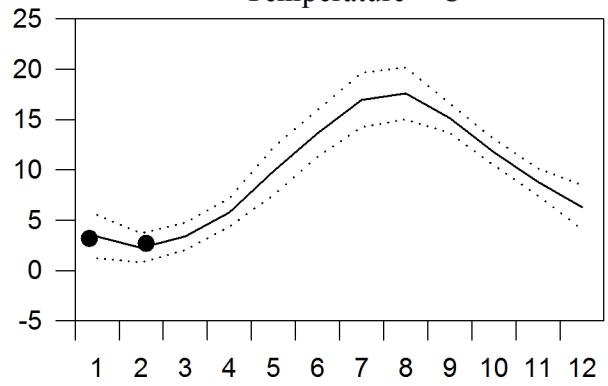


STATION W LANDSKRONA SURFACE WATER

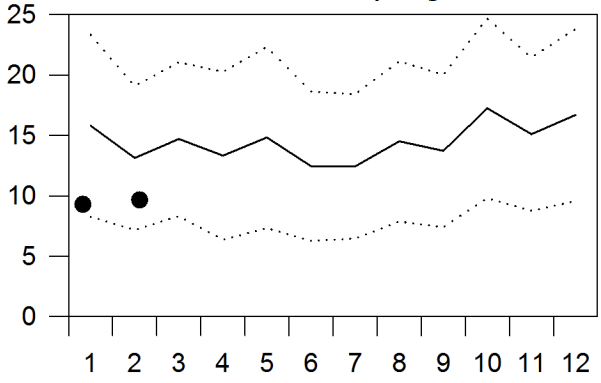
Annual Cycles

Mean 1996-2010 ····· St.Dev. ● 2016

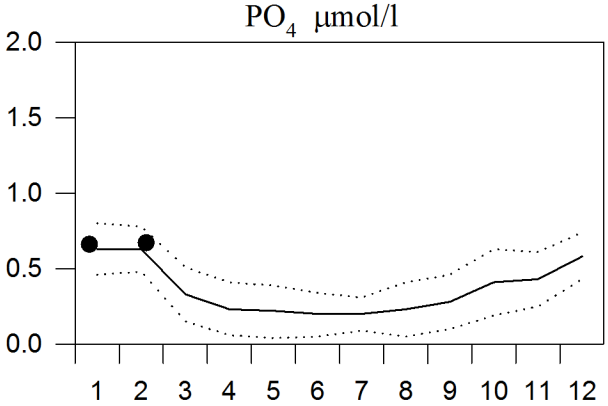
Temperature °C



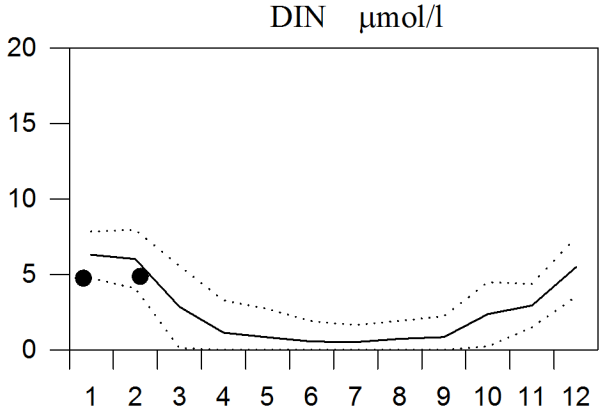
Salinity psu



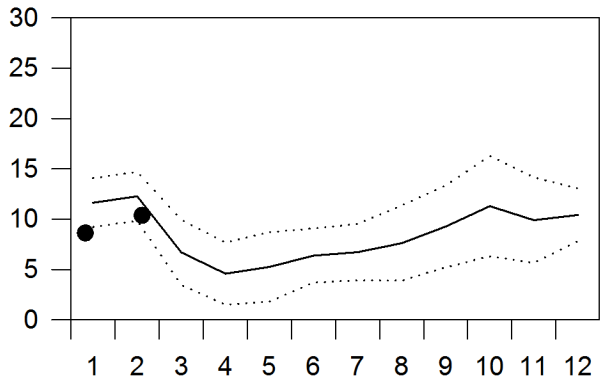
PO_4 µmol/l



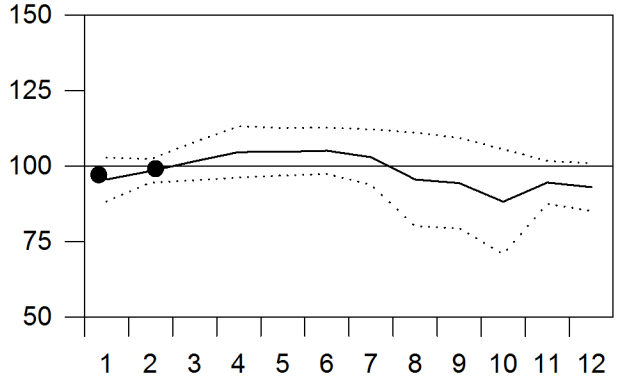
DIN µmol/l



SiO_3 µmol/l

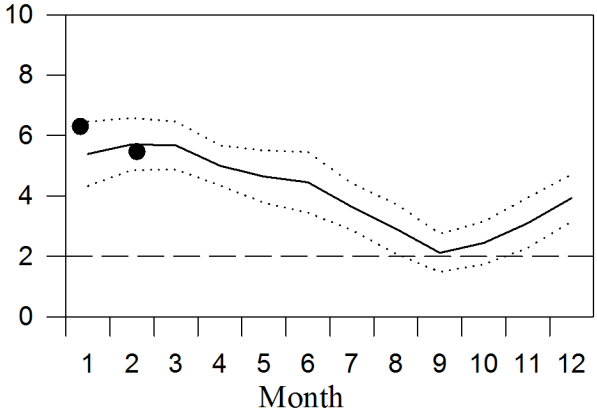


O_2 saturation %

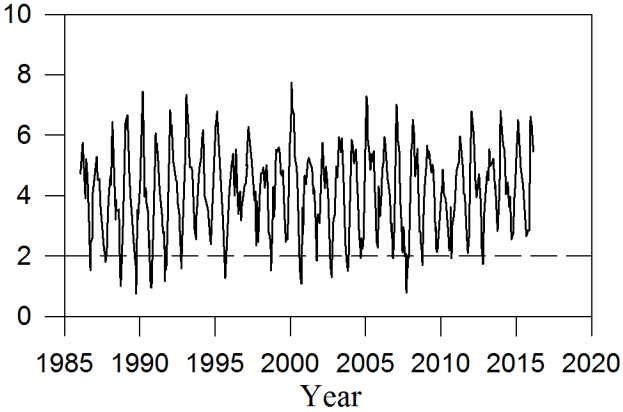


OXYGEN IN BOTTOM WATER (depth >40m)

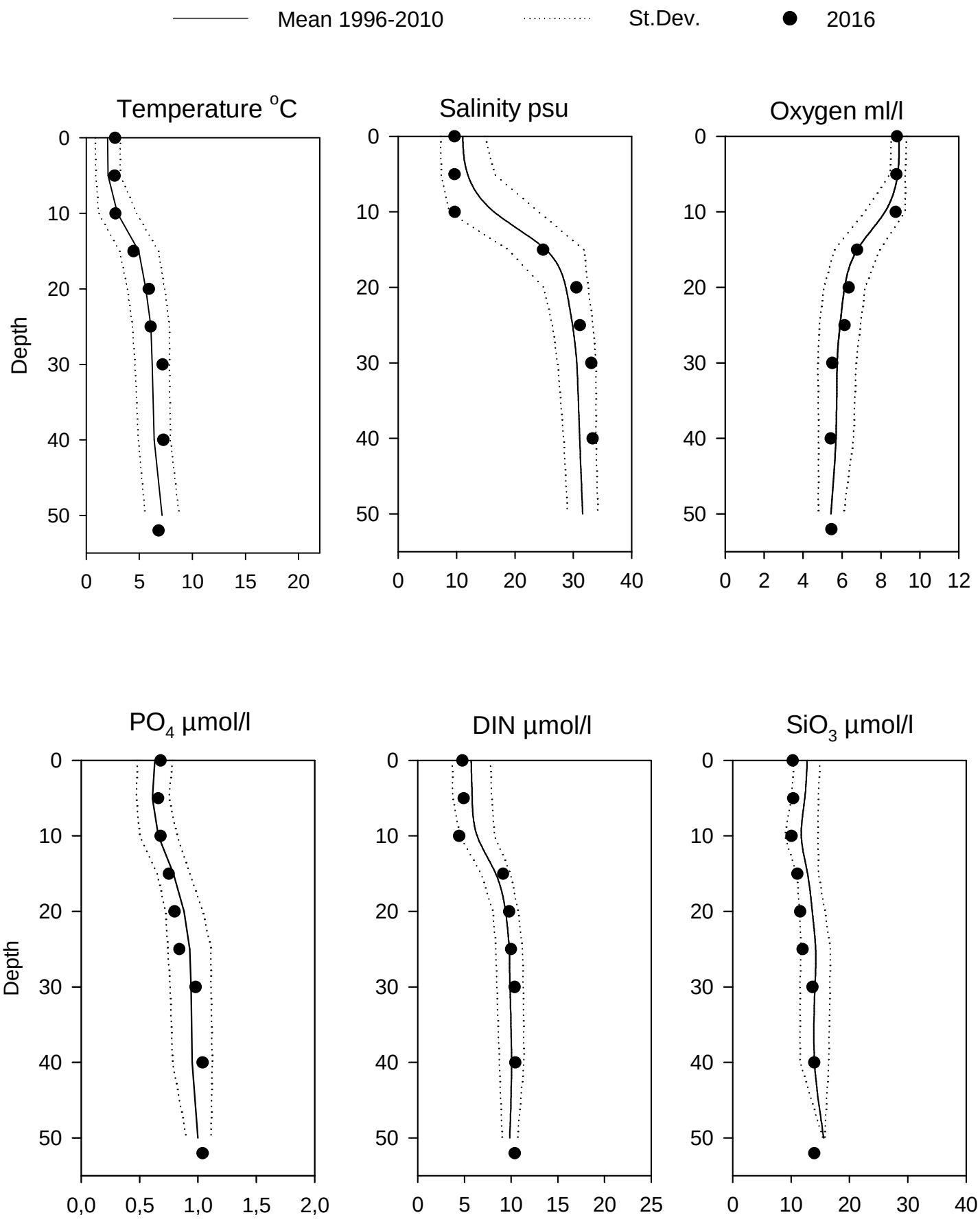
O_2 ml/l



O_2 ml/l



Vertical profiles W Landskrona Febuary

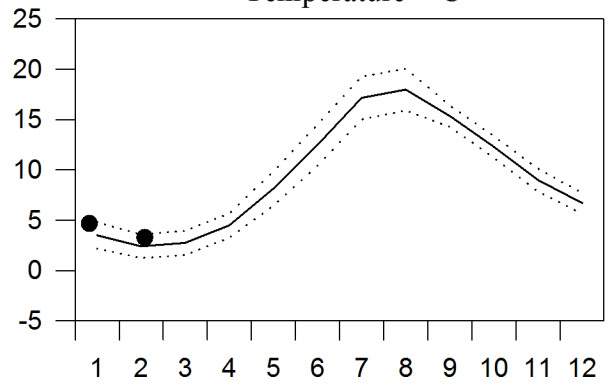


STATION BY1 SURFACE WATER

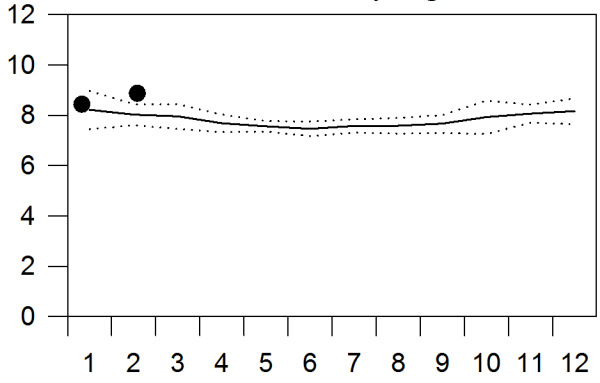
Annual Cycles

Mean 1996-2010 ····· St.Dev. ● 2016

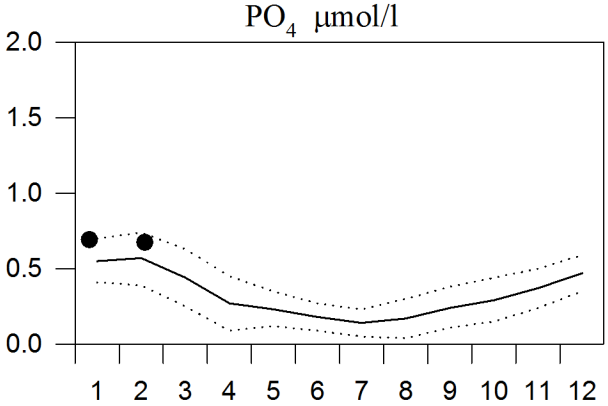
Temperature °C



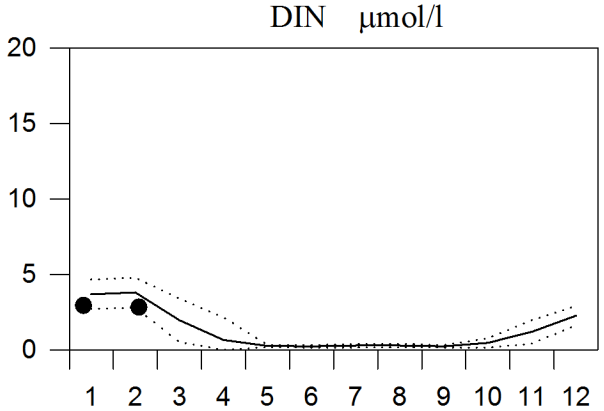
Salinity psu



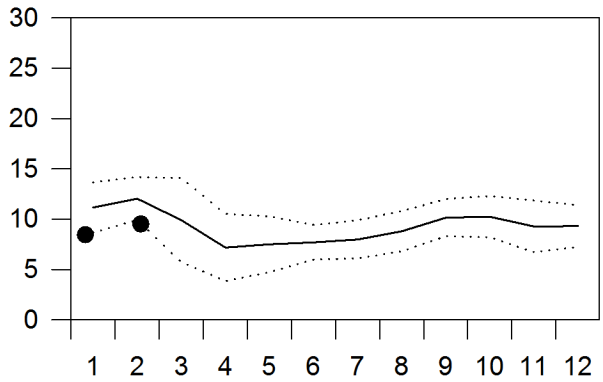
PO_4 µmol/l



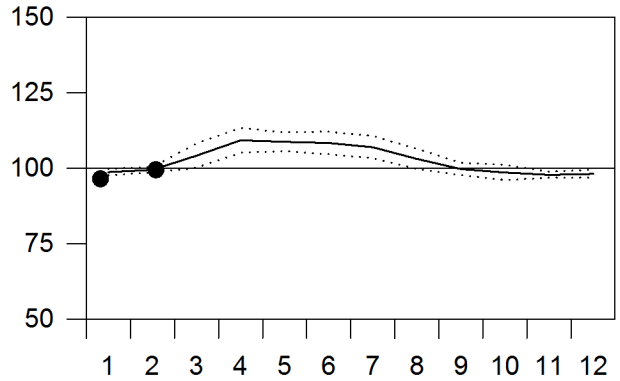
DIN µmol/l



SiO_3 µmol/l

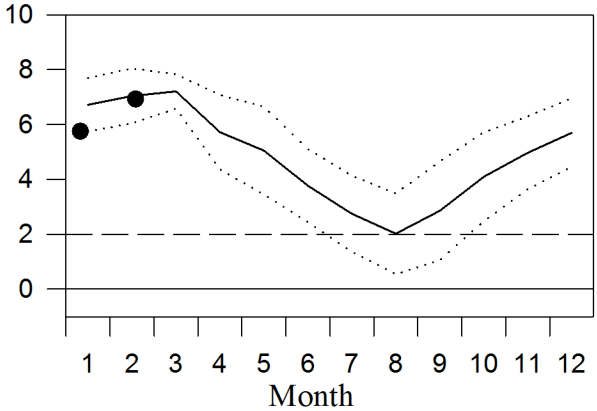


O_2 saturation %

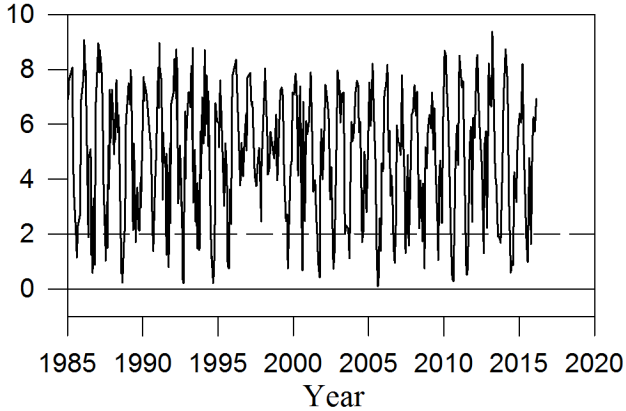


OXYGEN IN BOTTOM WATER (depth >40m)

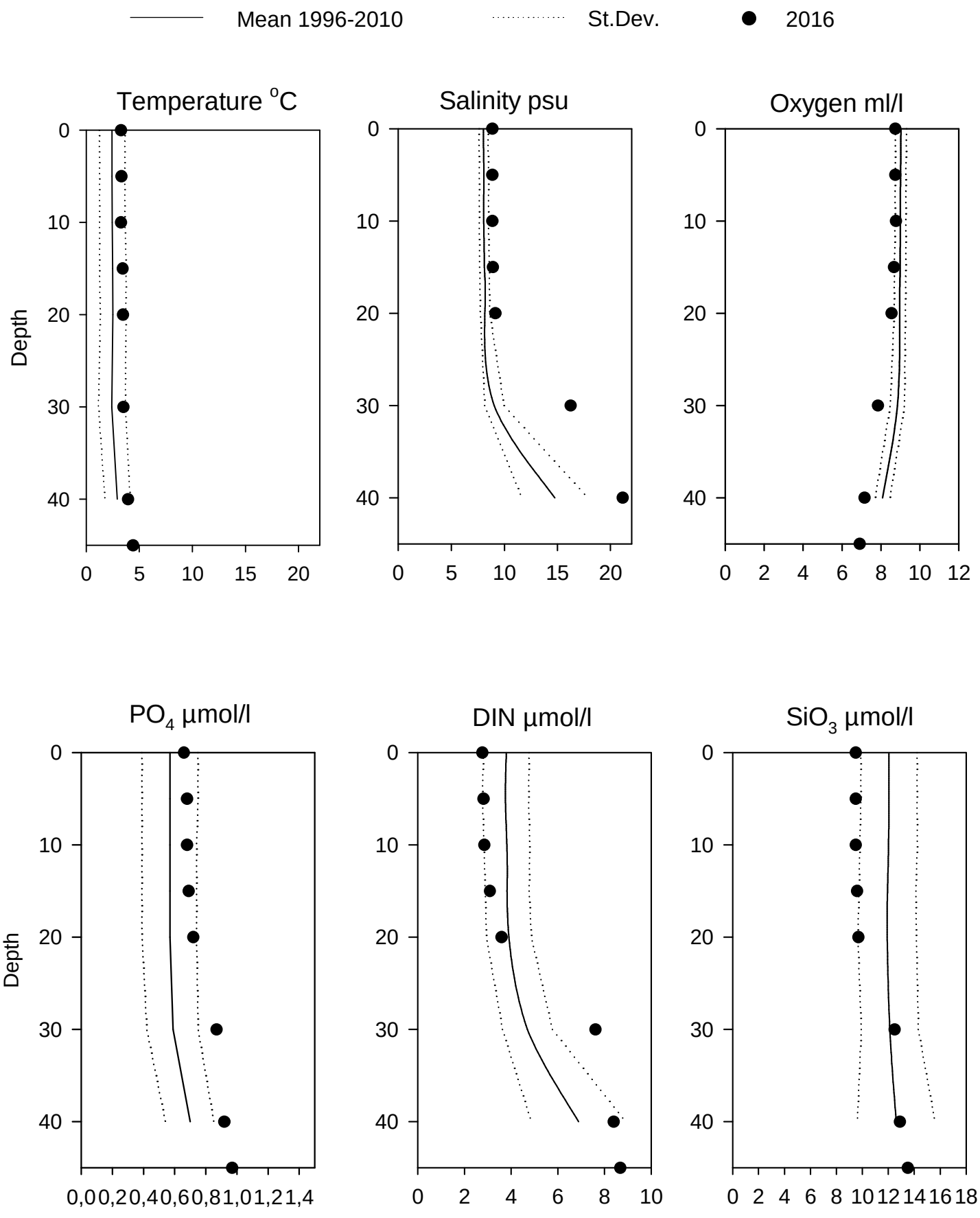
O_2 ml/l



O_2 ml/l



Vertical profiles BY1 February

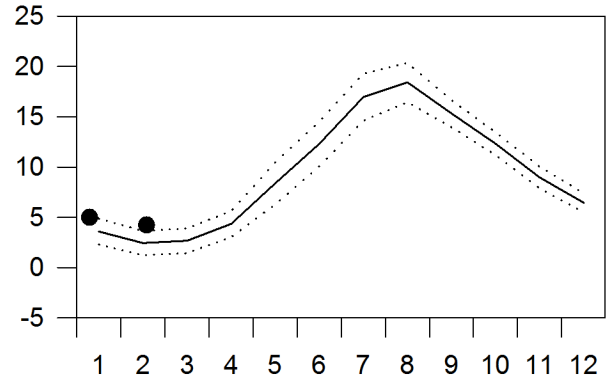


STATION BY2 SURFACE WATER

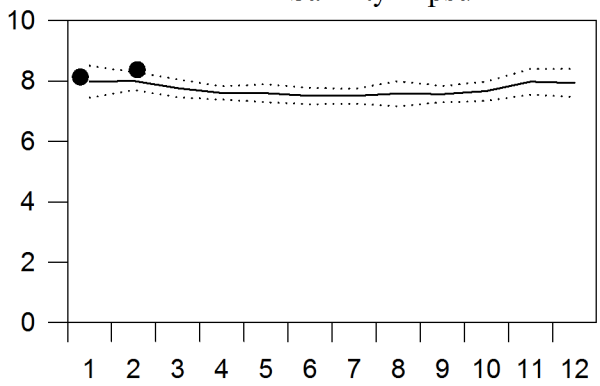
Annual Cycles

Mean 1996-2010 ····· St.Dev. ● 2016

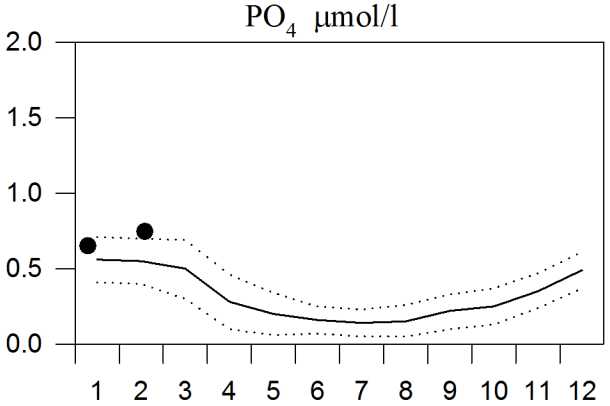
Temperature °C



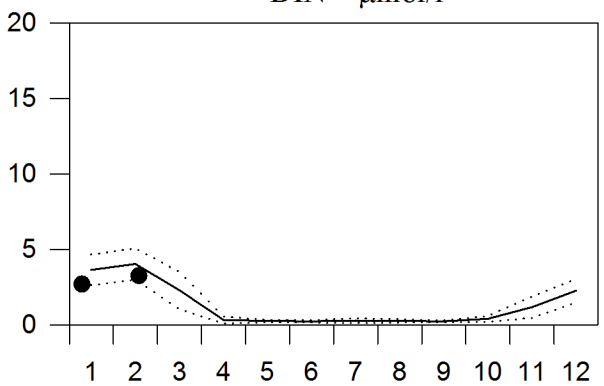
Salinity psu



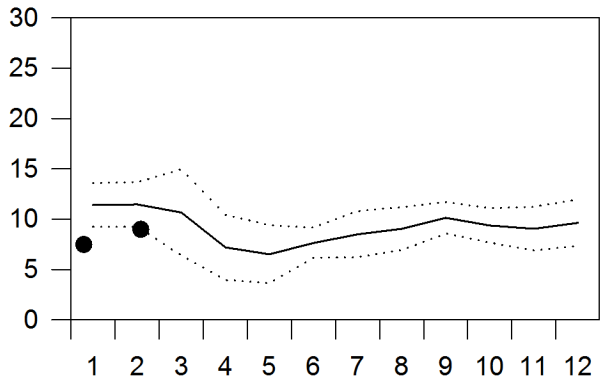
PO_4 µmol/l



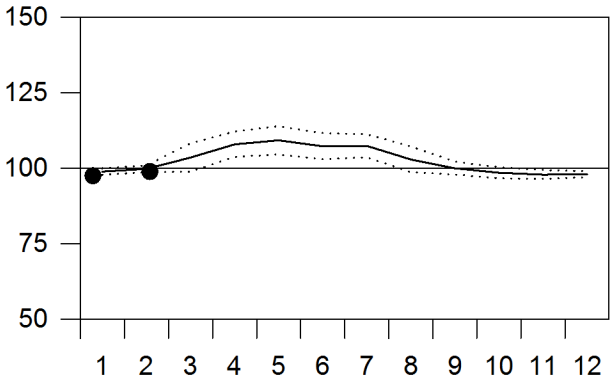
DIN µmol/l



SiO_3 µmol/l

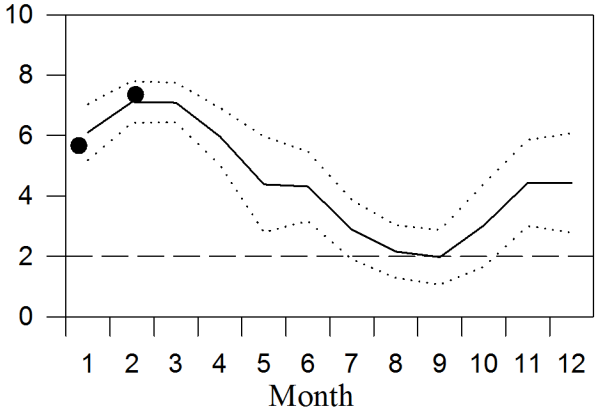


O_2 saturation %

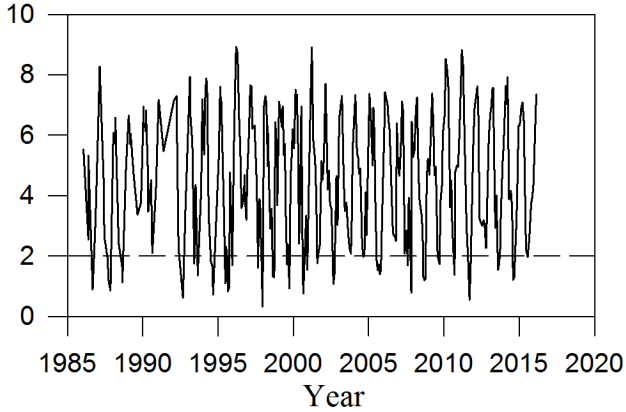


OXYGEN IN BOTTOM WATER (depth >40m)

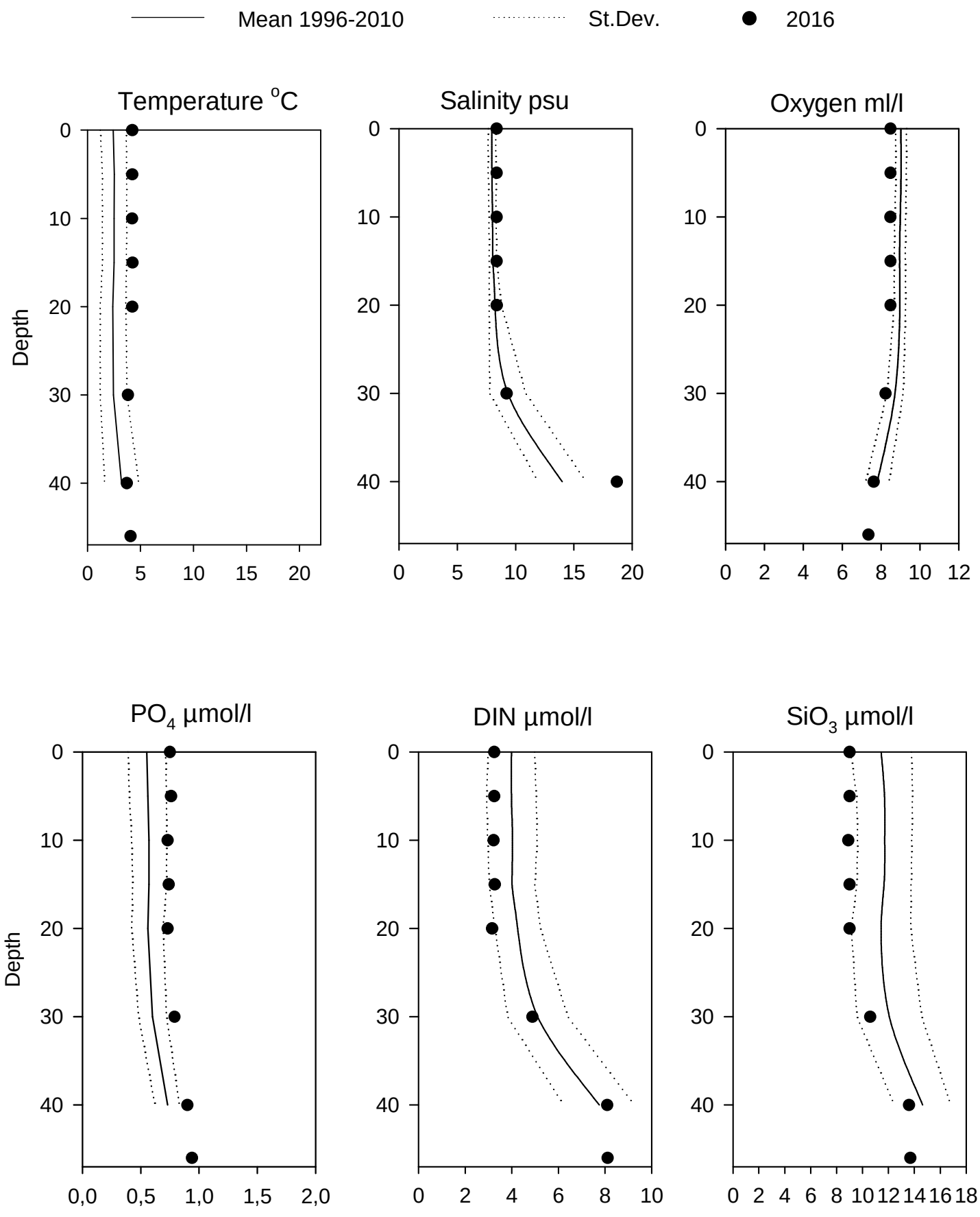
O_2 ml/l



O_2 ml/l



Vertical profiles BY2 February

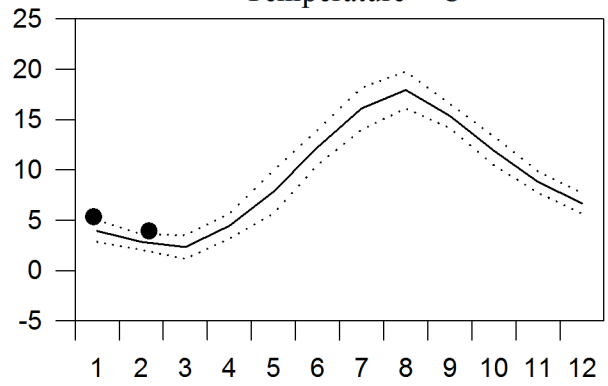


STATION HANÖBUKTEN SURFACE WATER

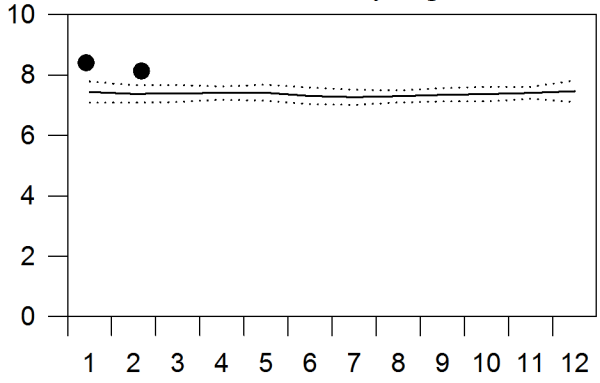
Annual Cycles

Mean 1996-2010 ····· St.Dev. ● 2016

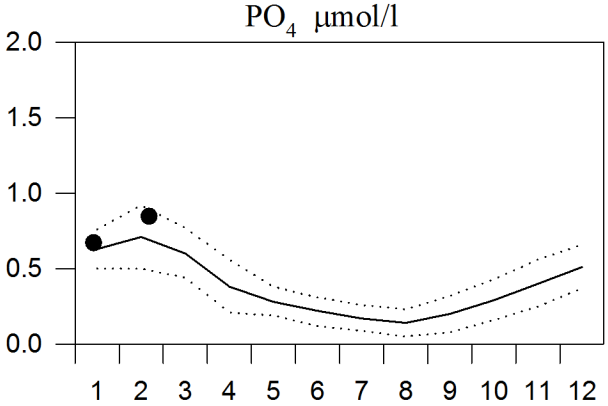
Temperature °C



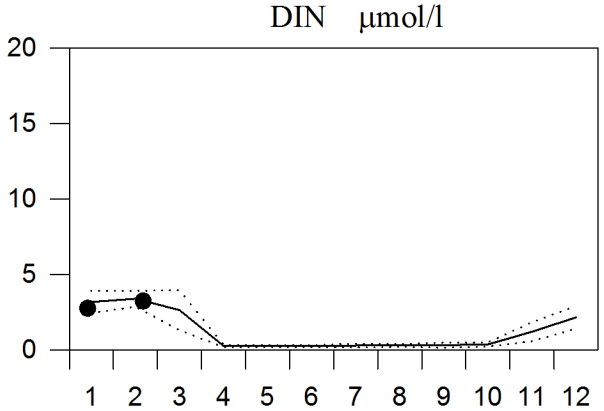
Salinity psu



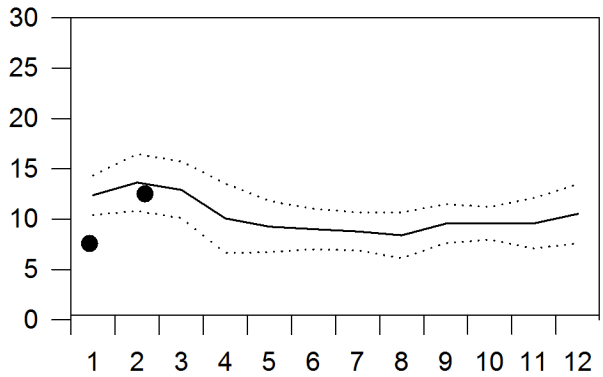
PO_4 µmol/l



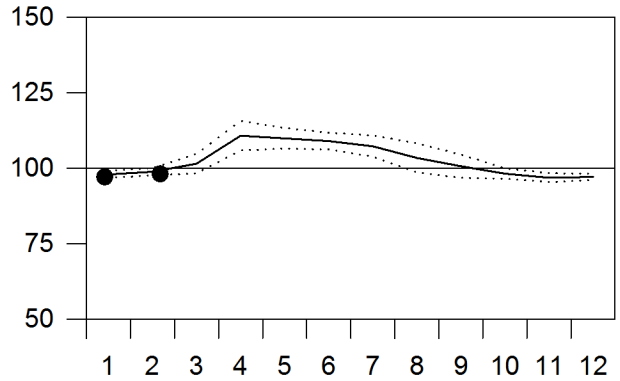
DIN µmol/l



SiO_3 µmol/l

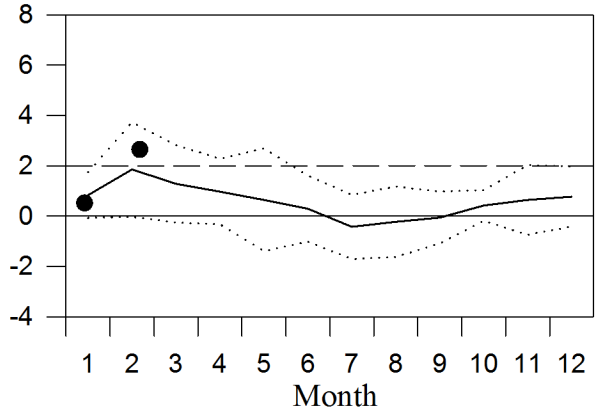


O_2 saturation %

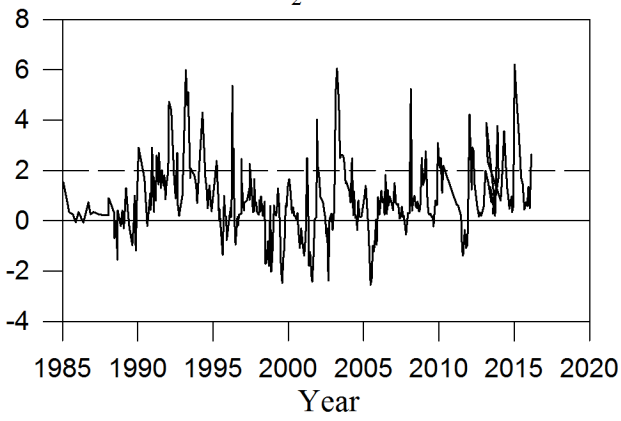


OXYGEN IN BOTTOM WATER (depth > 70m)

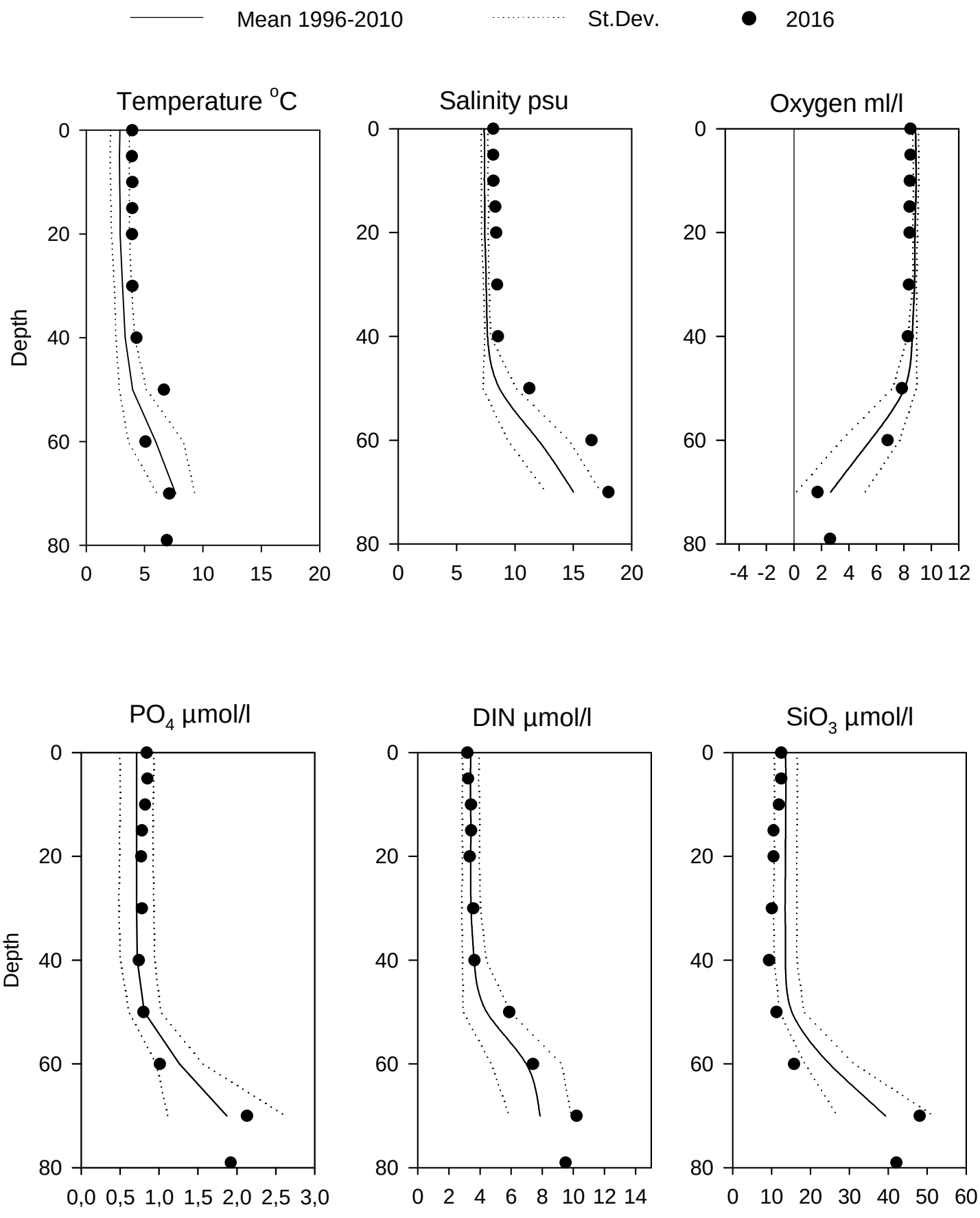
O_2 ml/l



O_2 ml/l



Vertical profiles Hanöbukten February

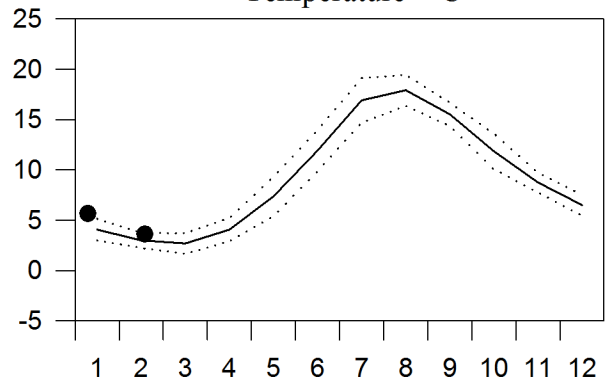


STATION BY4 SURFACE WATER

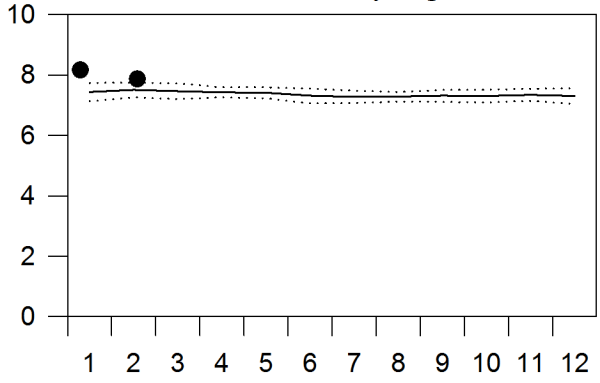
Annual Cycles

Mean 1996-2010 ····· St.Dev. ● 2016

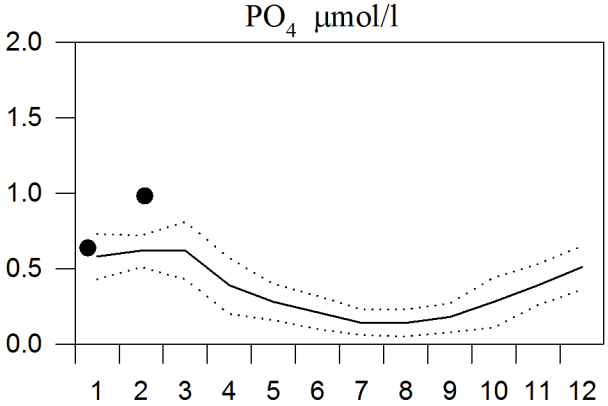
Temperature °C



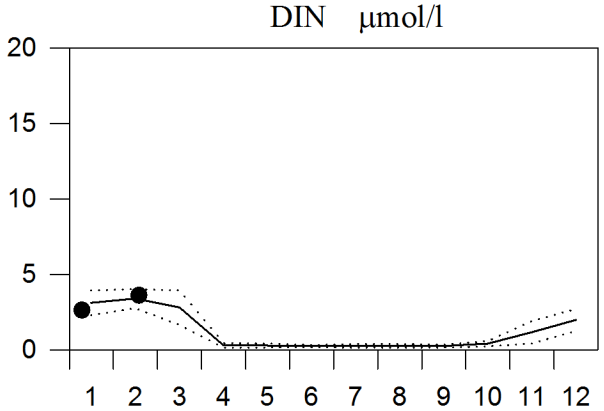
Salinity psu



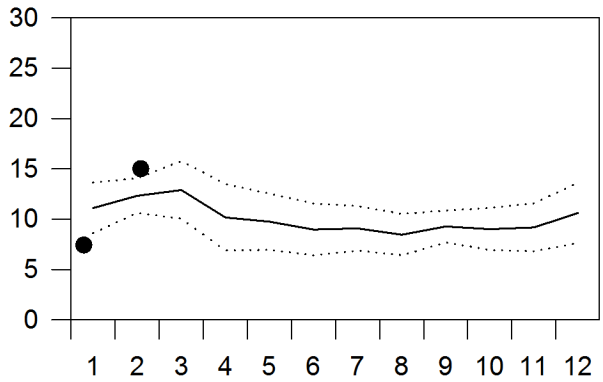
PO_4 µmol/l



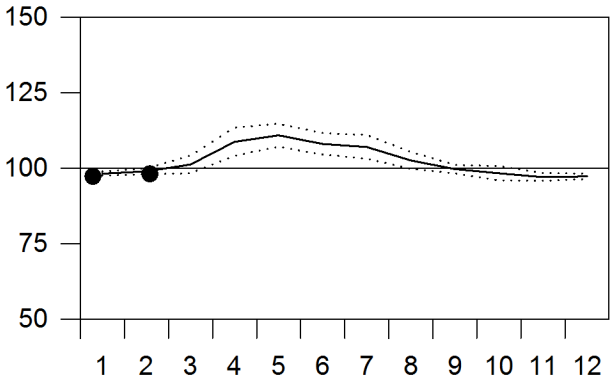
DIN µmol/l



SiO_3 µmol/l

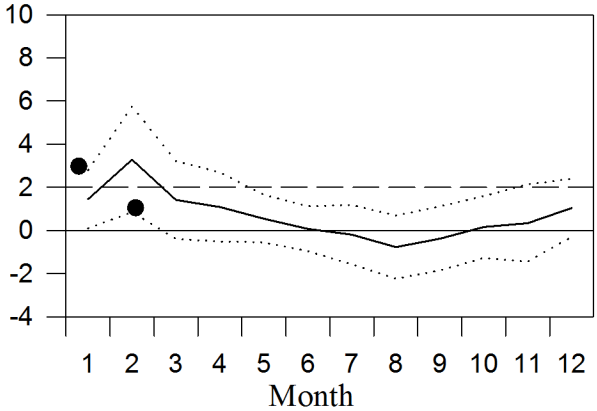


O_2 saturation %

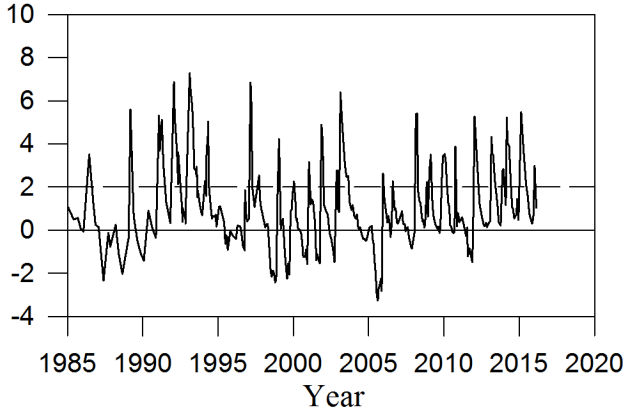


OXYGEN IN BOTTOM WATER (depth >80m)

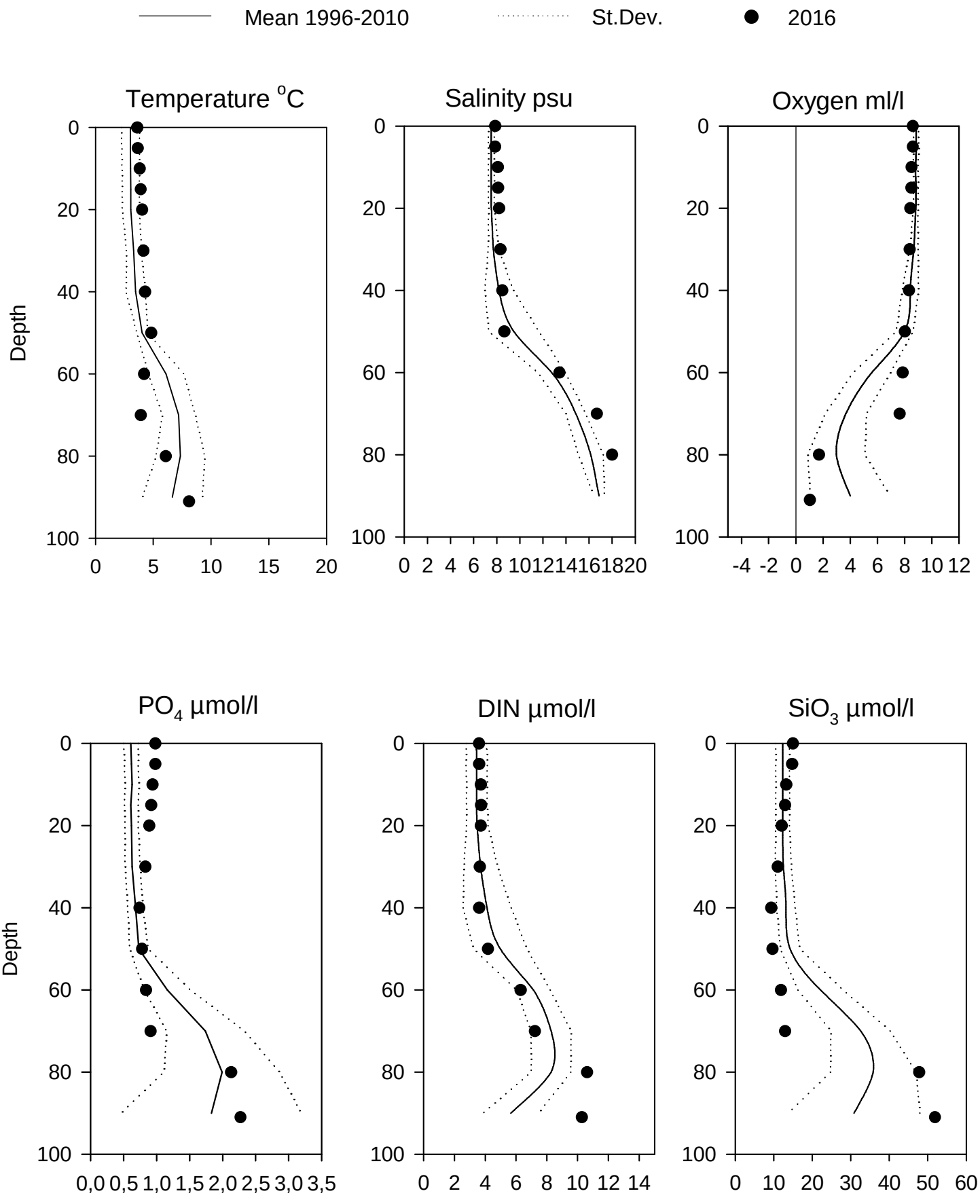
O_2 ml/l



O_2 ml/l



Vertical profiles BY4 February

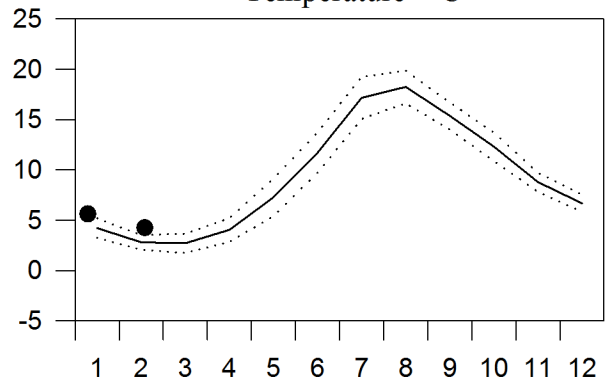


STATION BY5 SURFACE WATER

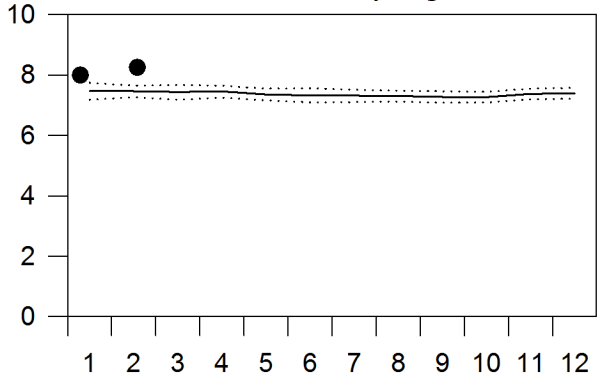
Annual Cycles

Mean 1996-2010 ····· St.Dev. ● 2016

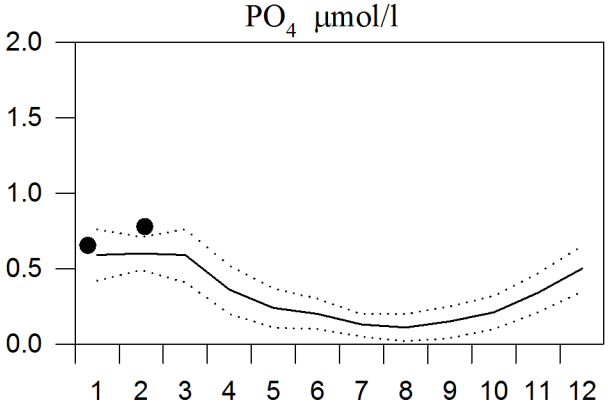
Temperature °C



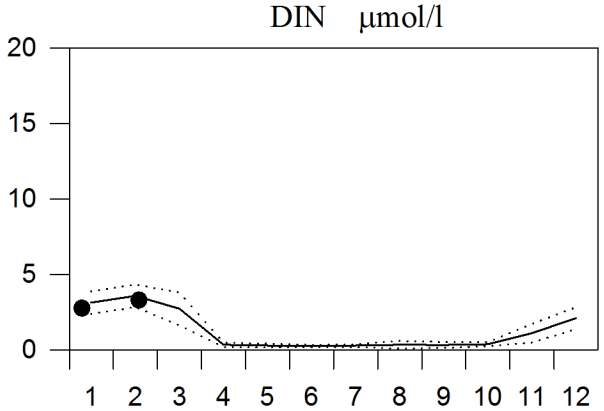
Salinity psu



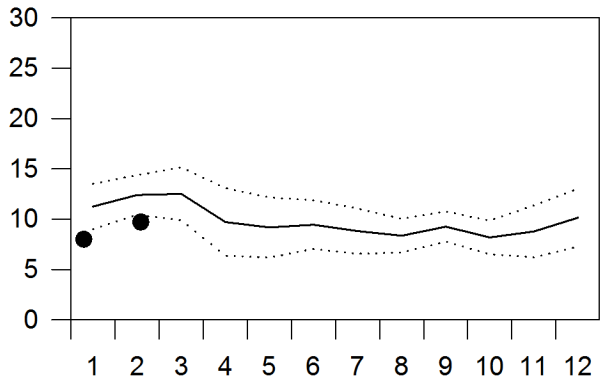
PO_4 µmol/l



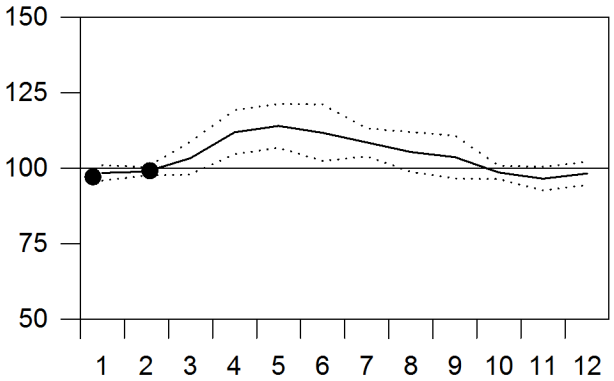
DIN µmol/l



SiO_3 µmol/l

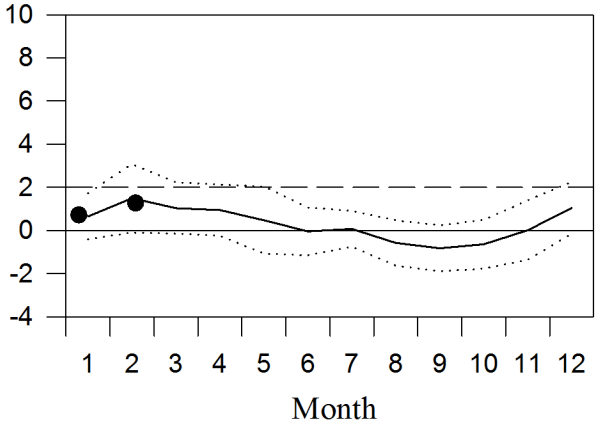


O_2 saturation %

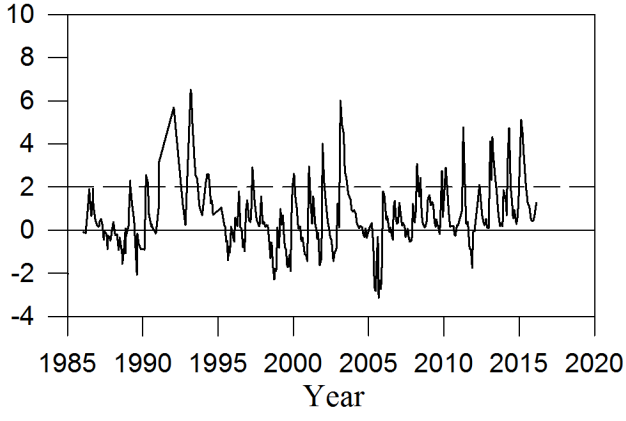


OXYGEN IN BOTTOM WATER (depth >80m)

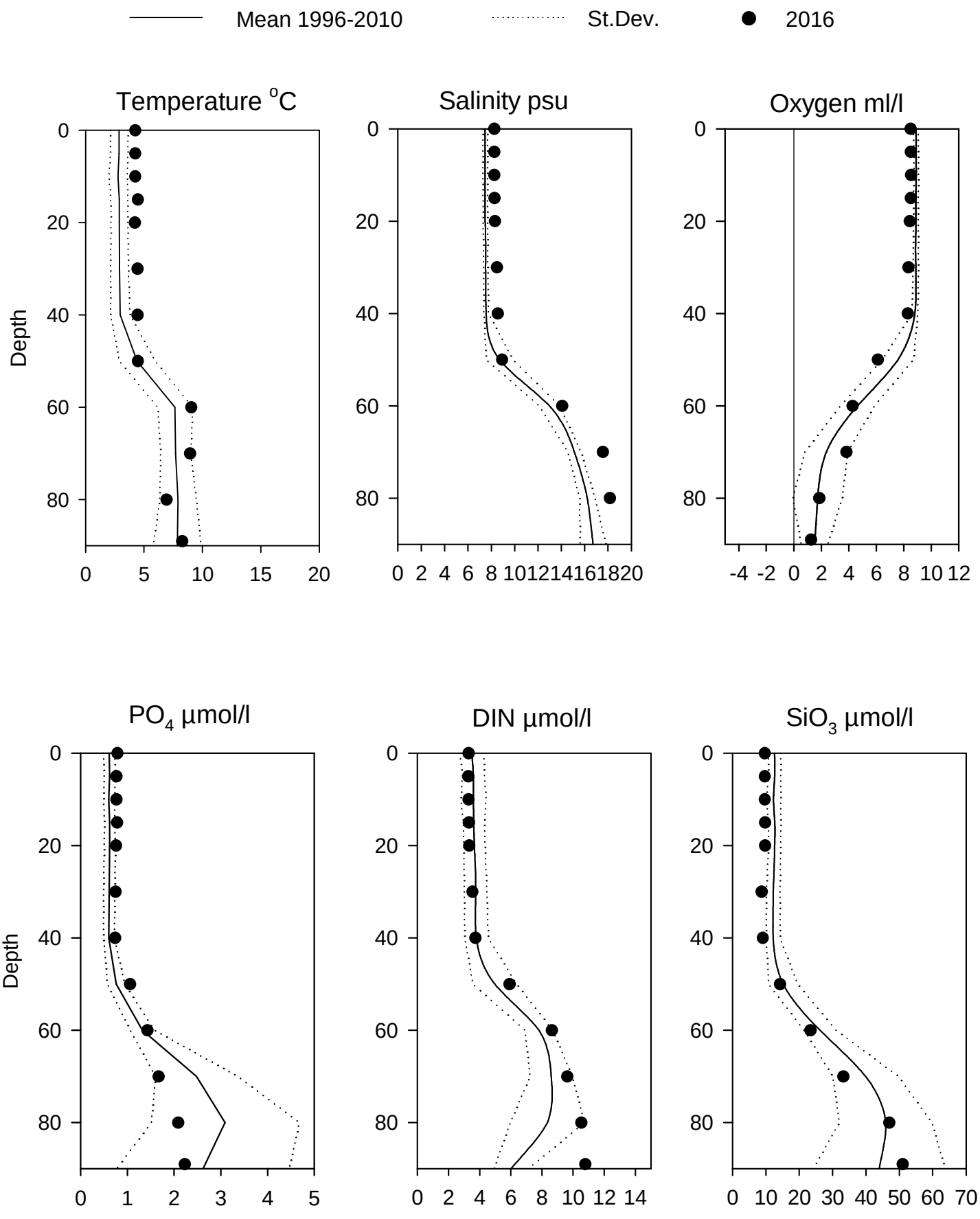
O_2 ml/l



O_2 ml/l



Vertical profiles BY5 February

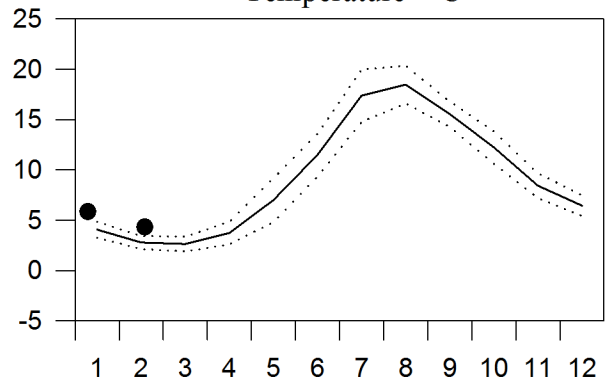


STATION BCS III-10 SURFACE WATER

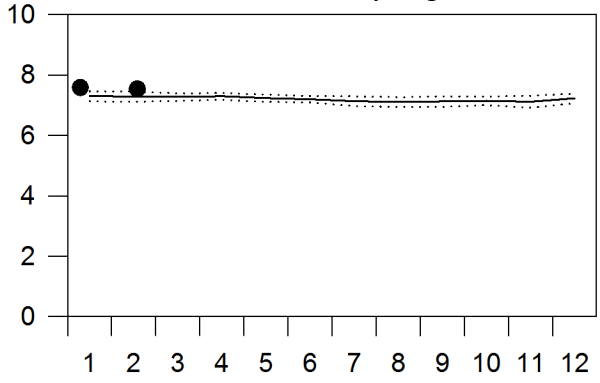
Annual Cycles

Mean 1996-2010 ····· St.Dev. ● 2016

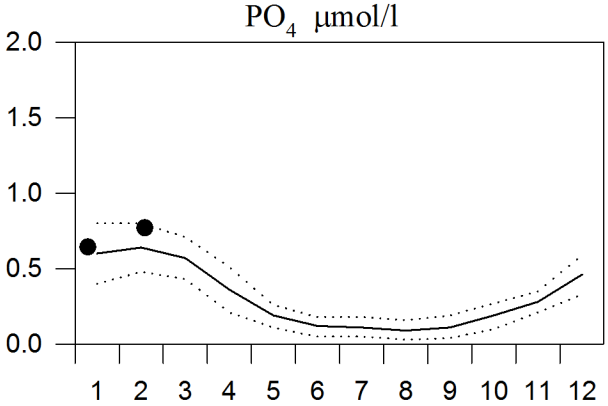
Temperature °C



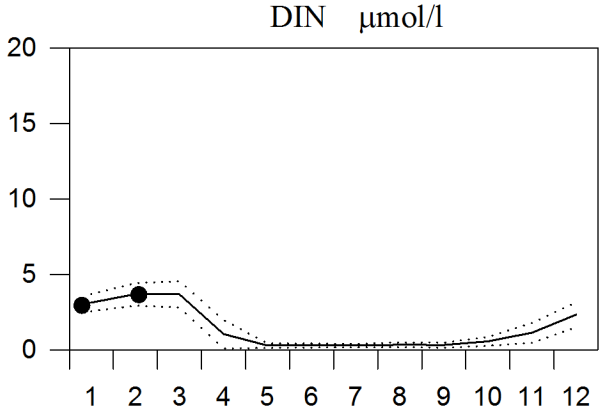
Salinity psu



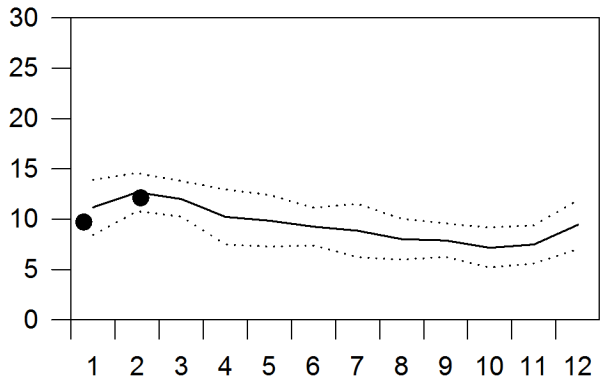
PO_4 µmol/l



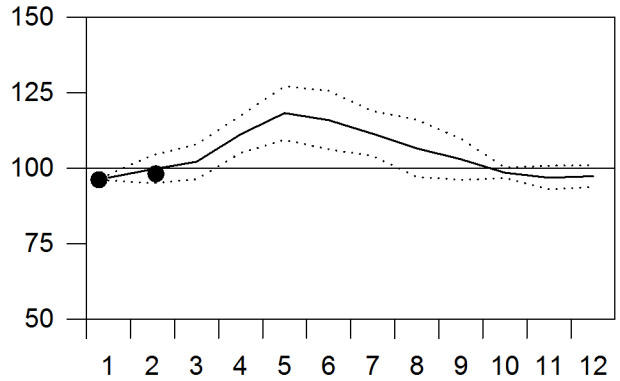
DIN µmol/l



SiO_3 µmol/l

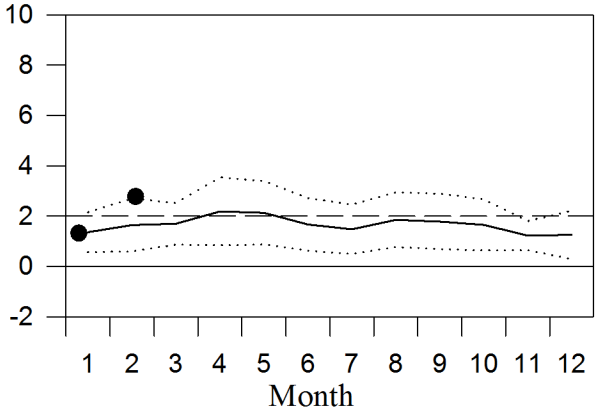


O_2 saturation %

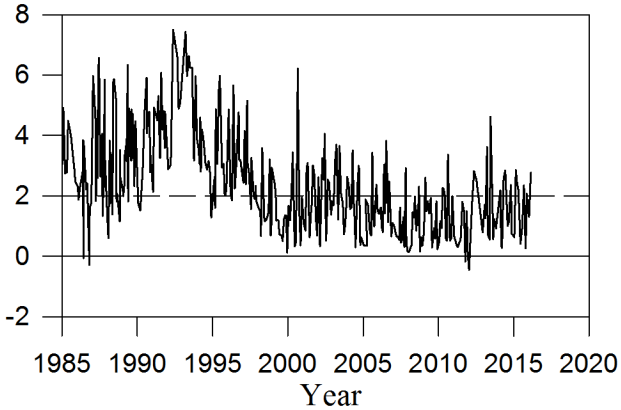


OXYGEN IN BOTTOM WATER (depth > 80m)

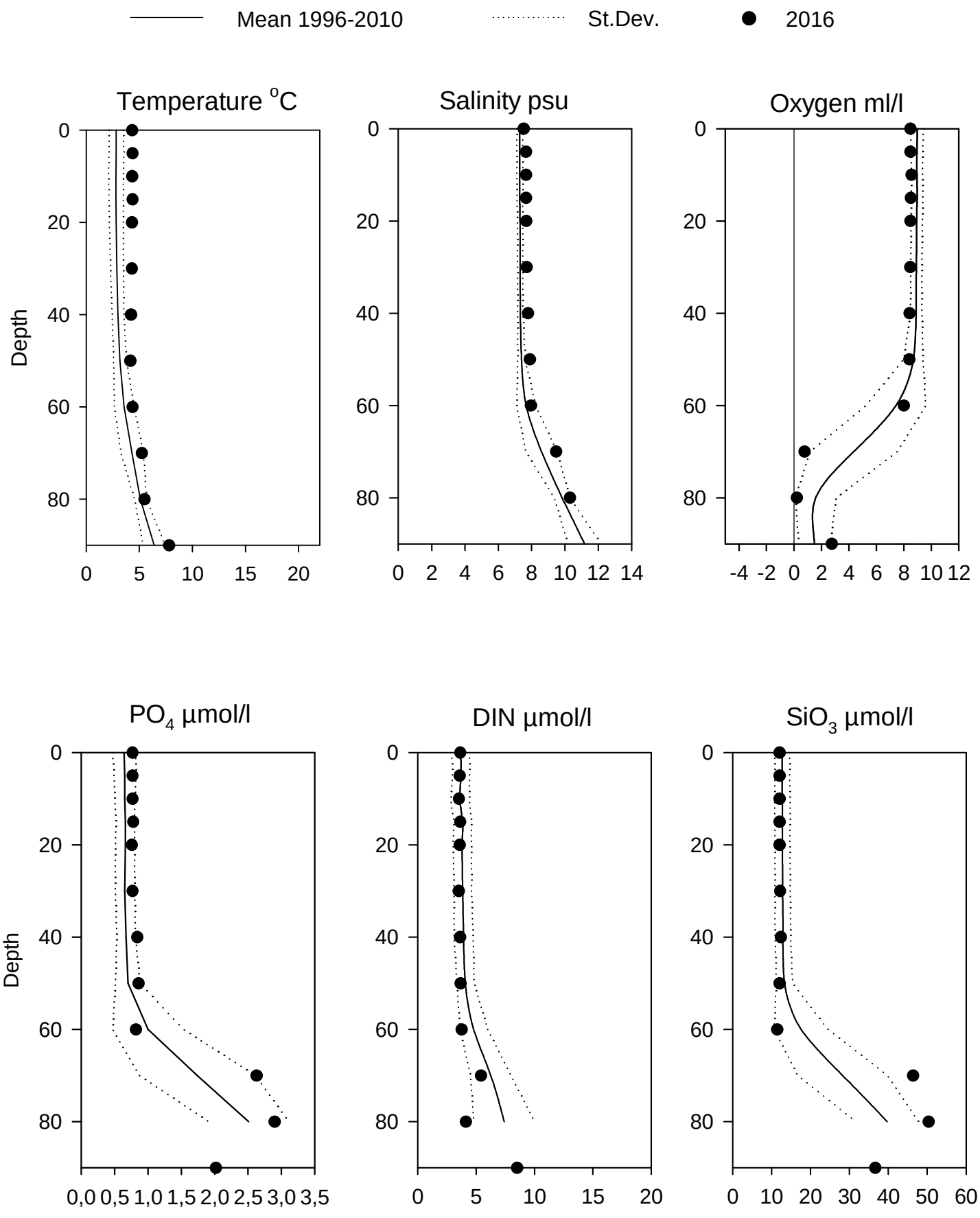
O_2 ml/l



O_2 ml/l



Vertical profiles BCS III-10 February

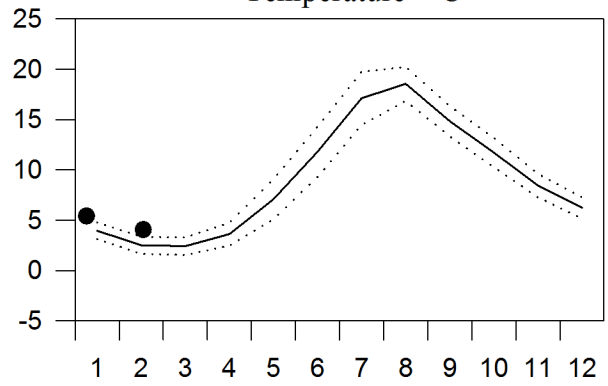


STATION BY10 SURFACE WATER

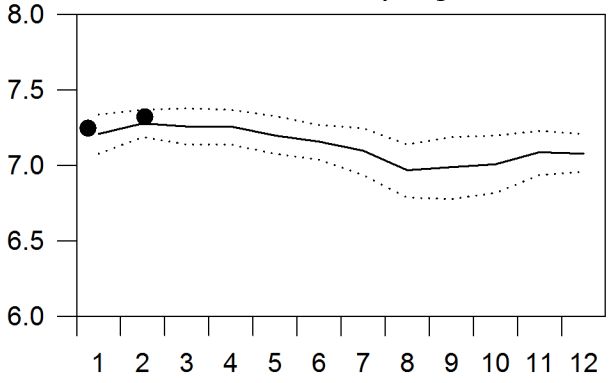
Annual Cycles

Mean 1996-2010 ····· St.Dev. ● 2016

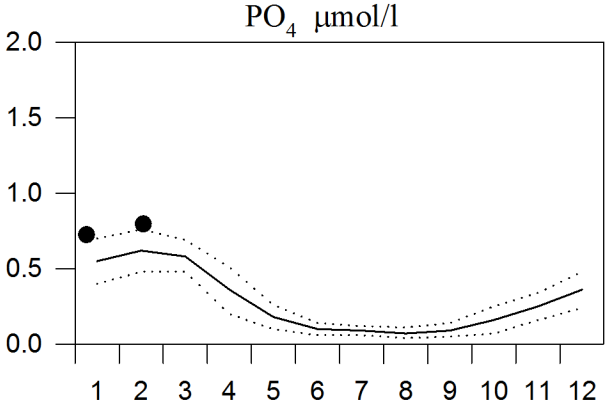
Temperature °C



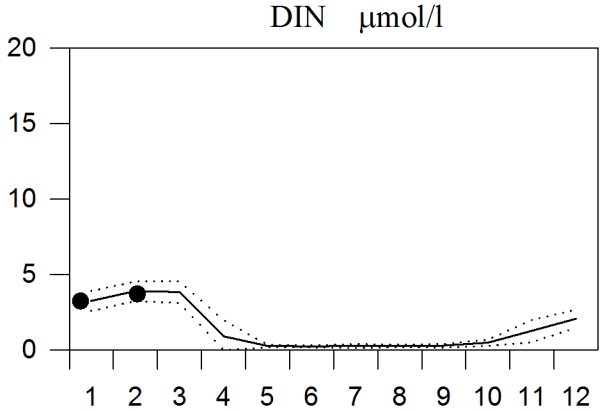
Salinity psu



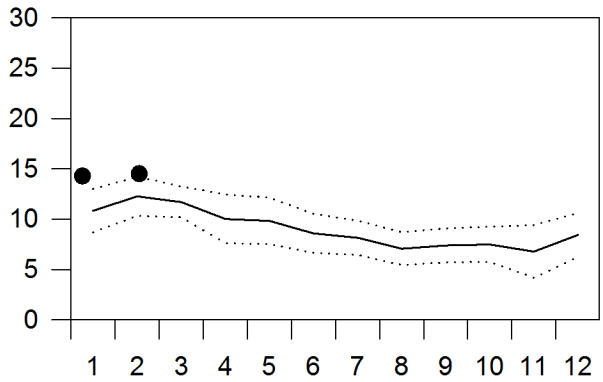
PO_4 µmol/l



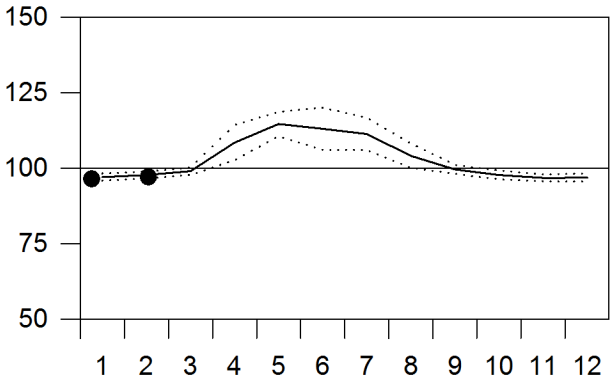
DIN µmol/l



SiO_3 µmol/l

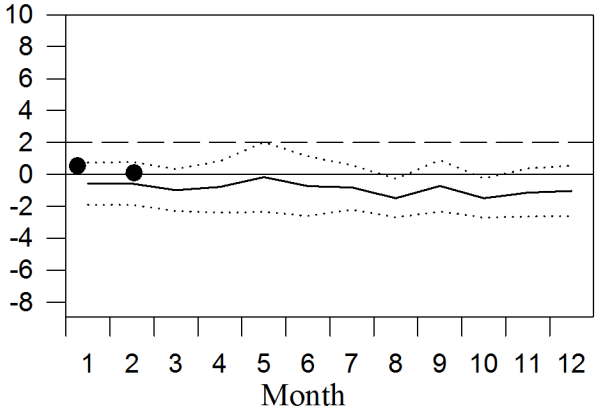


O_2 saturation %

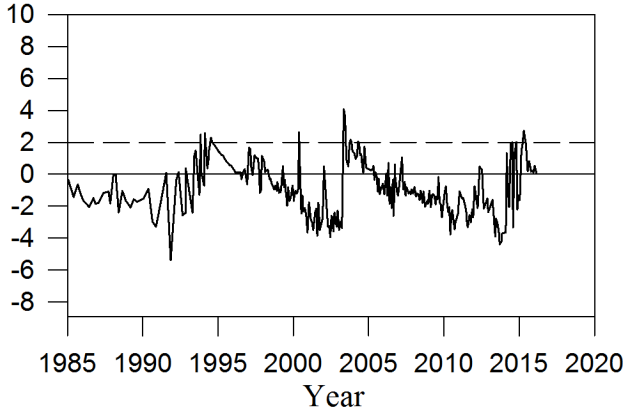


OXYGEN IN BOTTOM WATER (depth >125m)

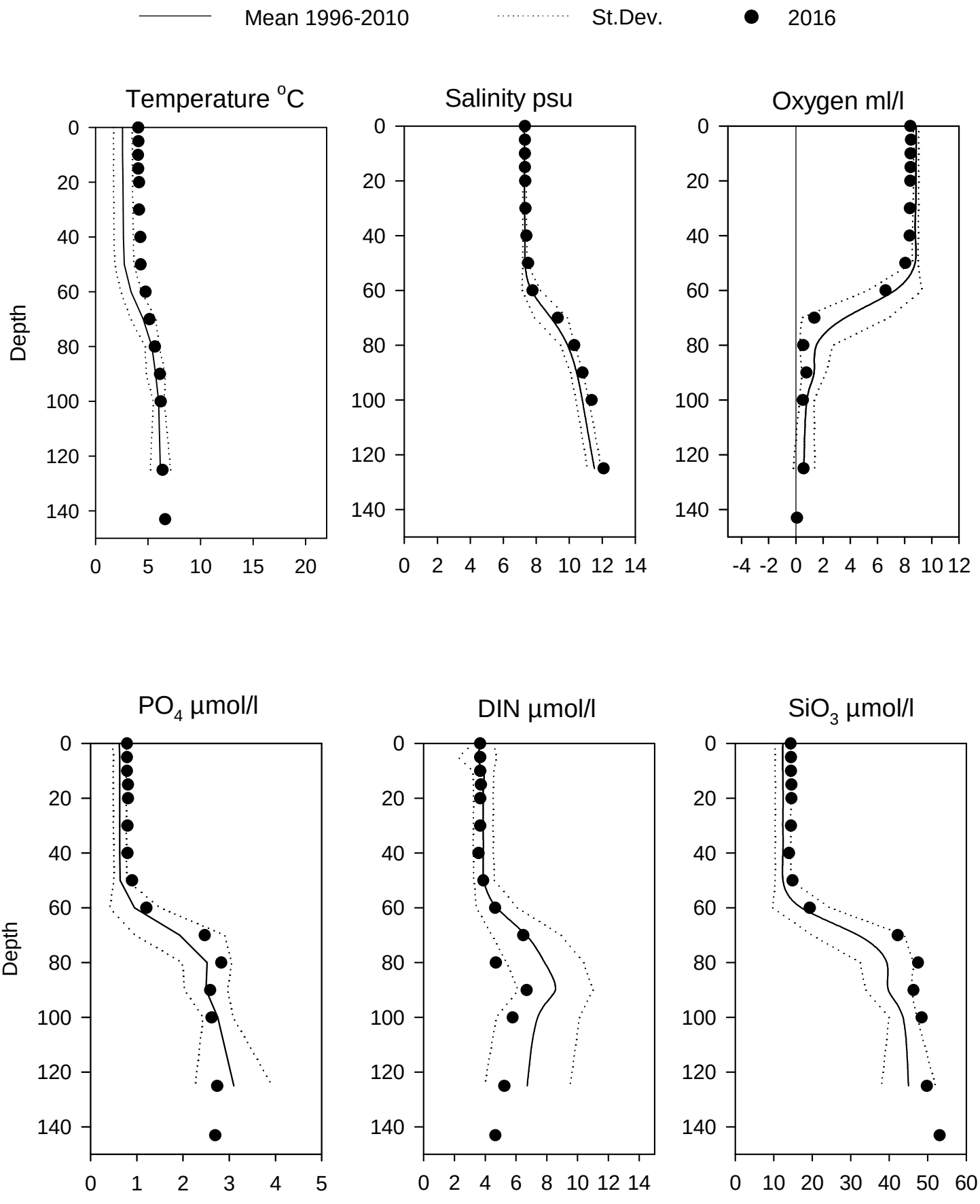
O_2 ml/l



O_2 ml/l



Vertical profiles BY10 February

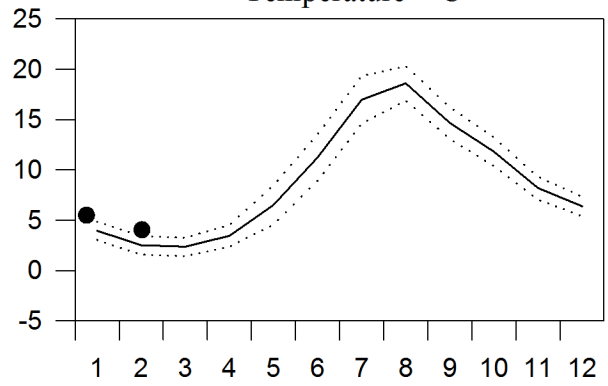


STATION BY15 SURFACE WATER

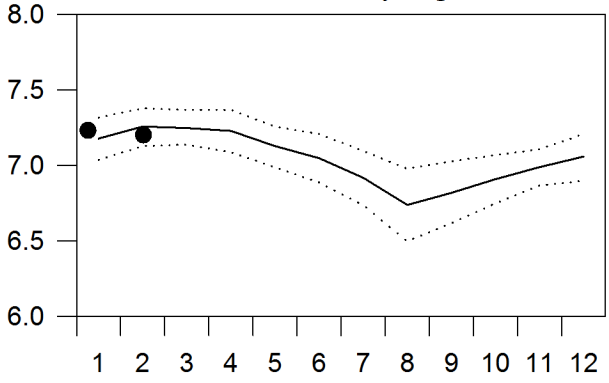
Annual Cycles

Mean 1996-2010 ····· St.Dev. ● 2016

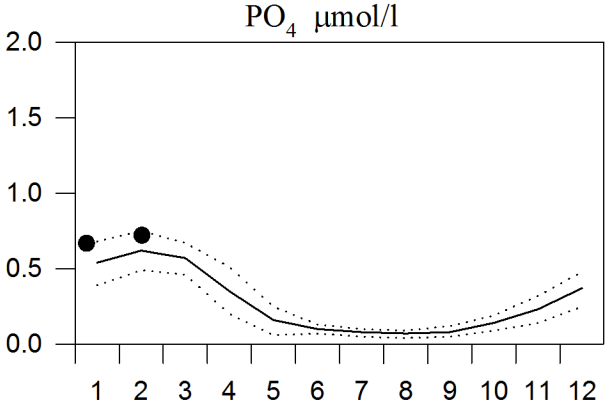
Temperature °C



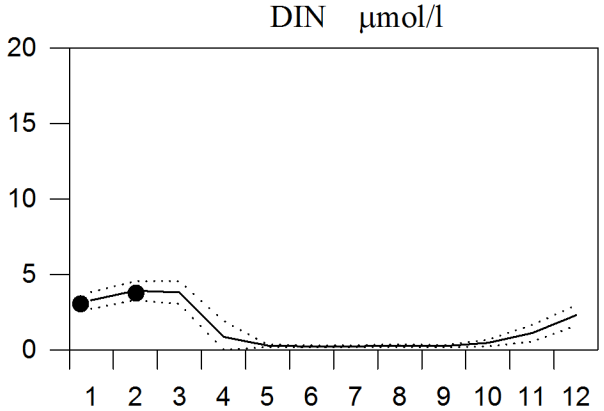
Salinity psu



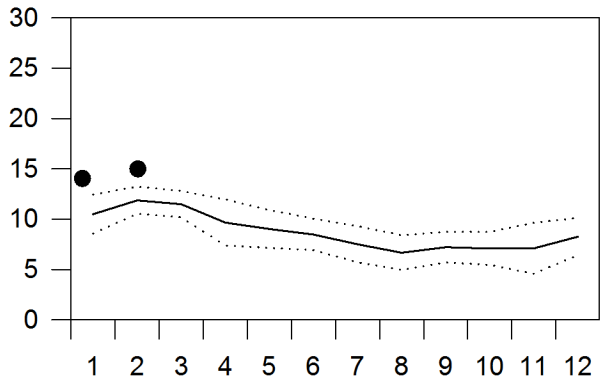
PO_4 µmol/l



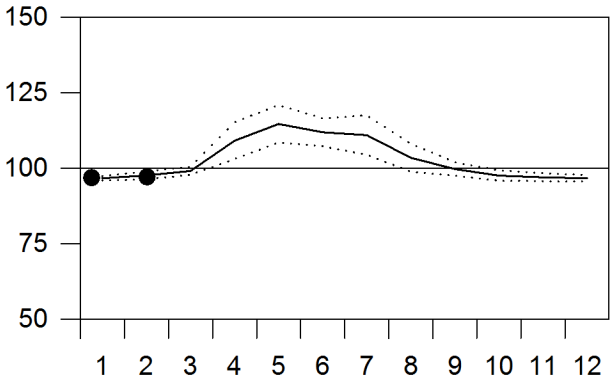
DIN µmol/l



SiO_3 µmol/l

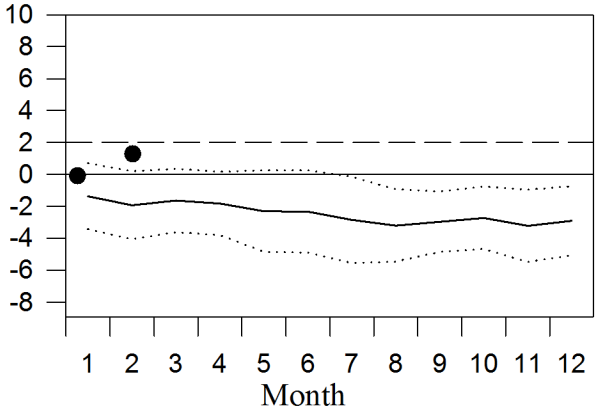


O_2 saturation %

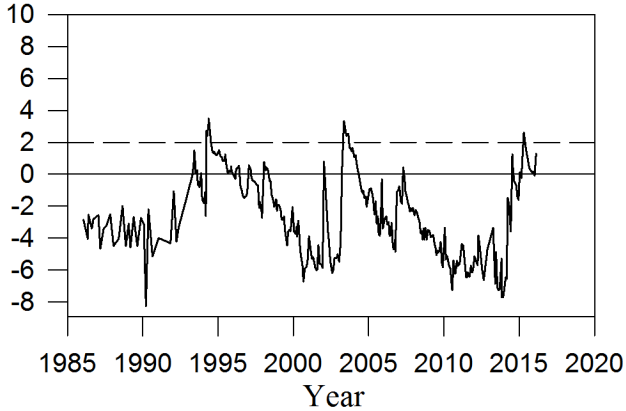


OXYGEN IN BOTTOM WATER (depth >225m)

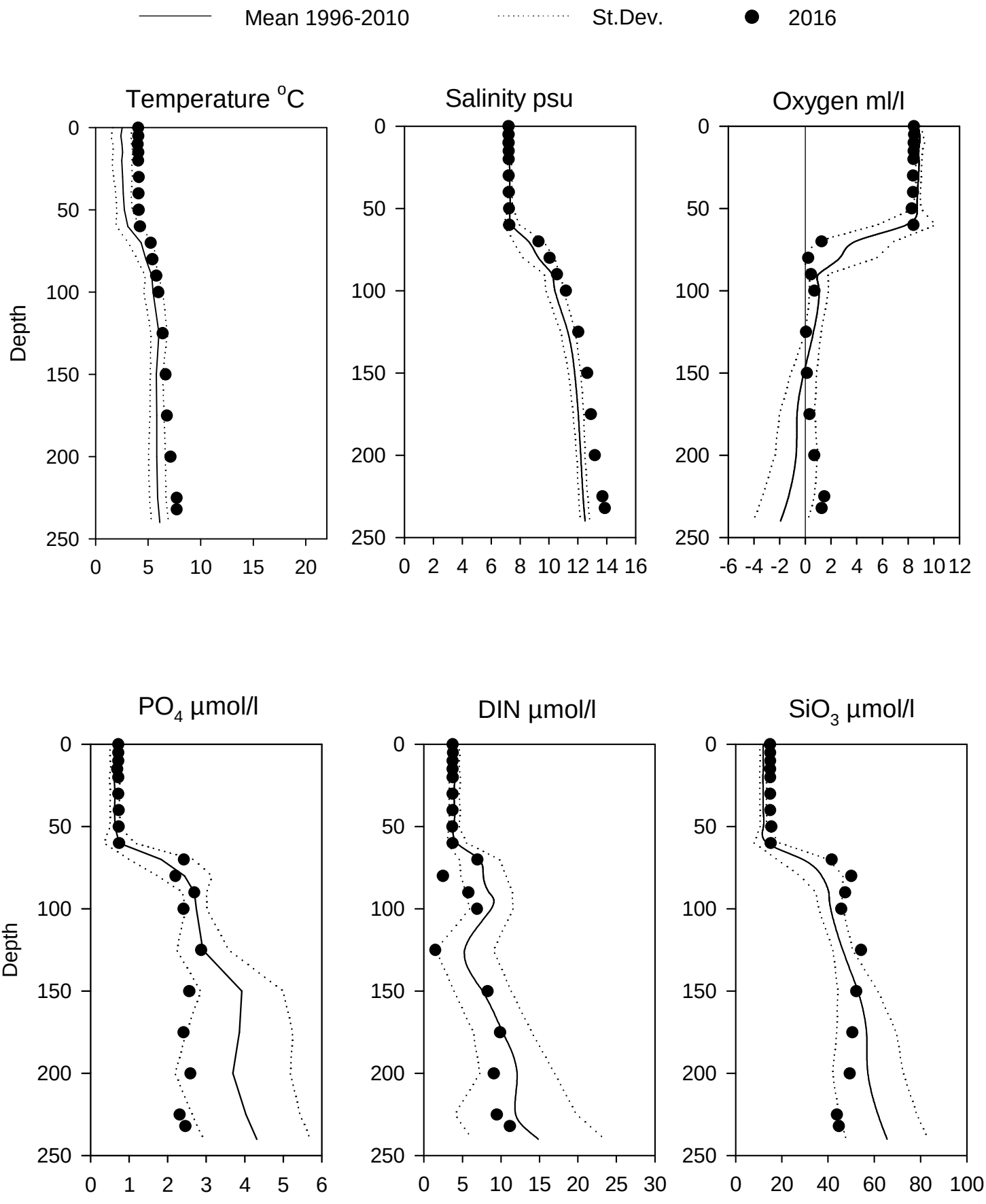
O_2 ml/l



O_2 ml/l



Vertical profiles BY15 February

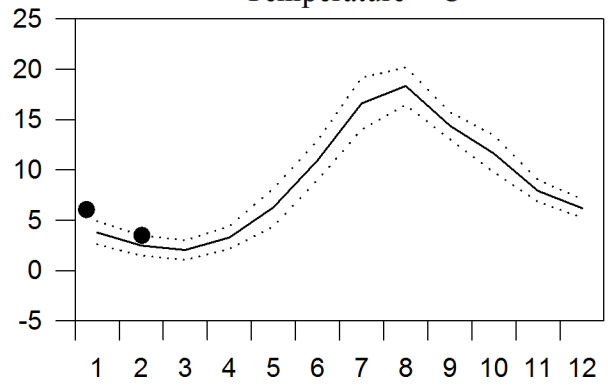


STATION BY20 SURFACE WATER

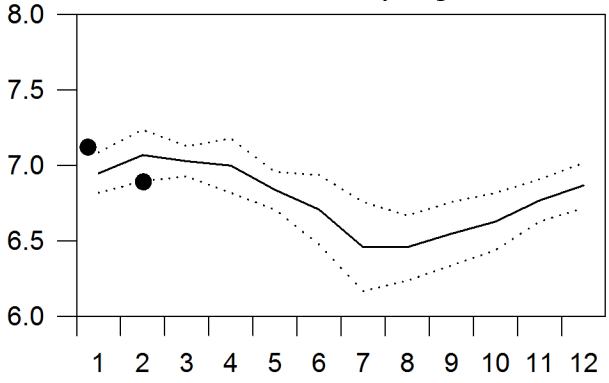
Annual Cycles

Mean 1996-2010 ····· St.Dev. ● 2016

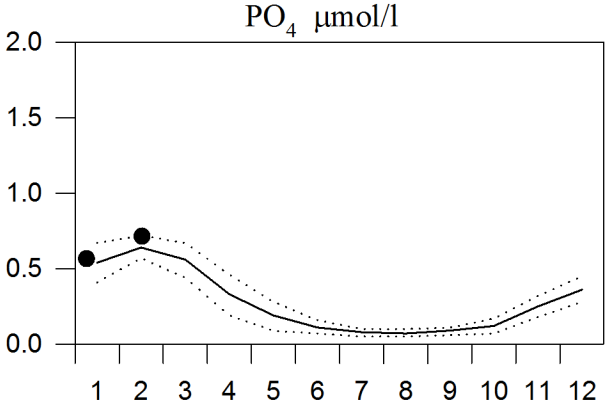
Temperature °C



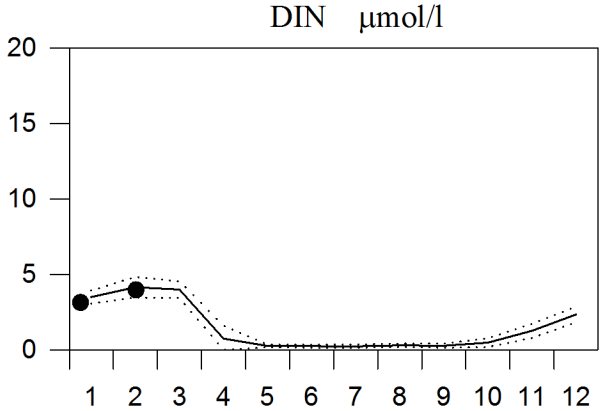
Salinity psu



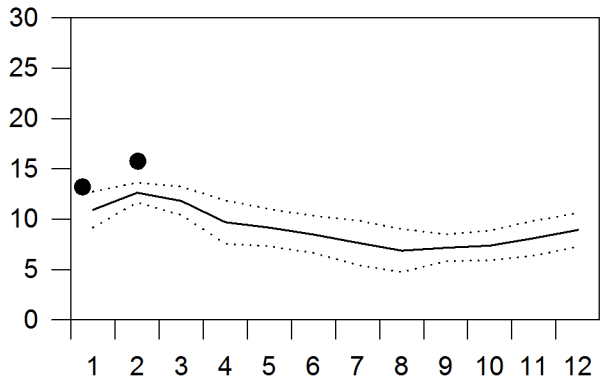
PO_4 µmol/l



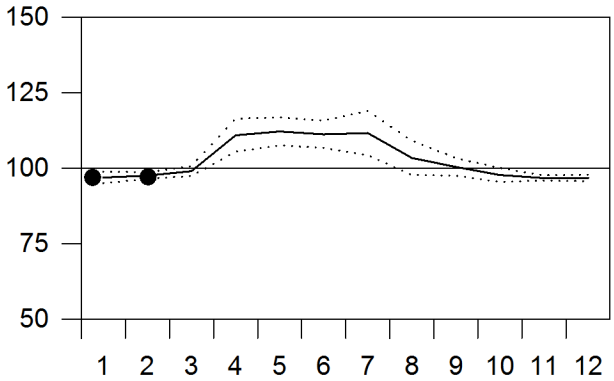
DIN µmol/l



SiO_3 µmol/l

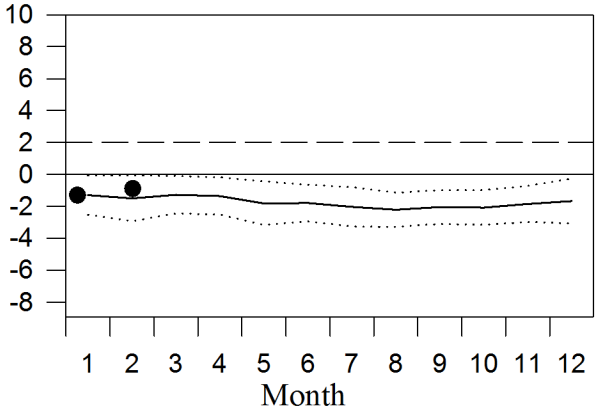


O_2 saturation %

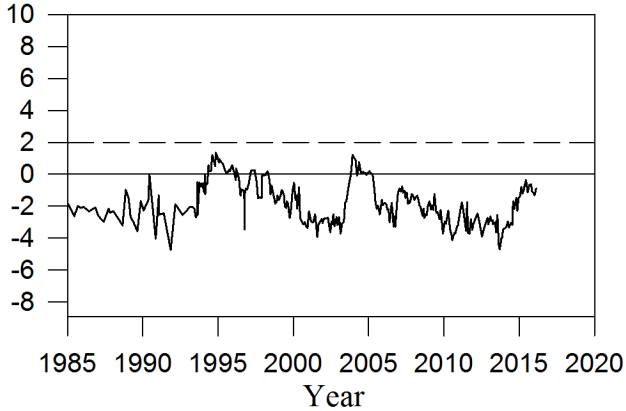


OXYGEN IN BOTTOM WATER (depth >175m)

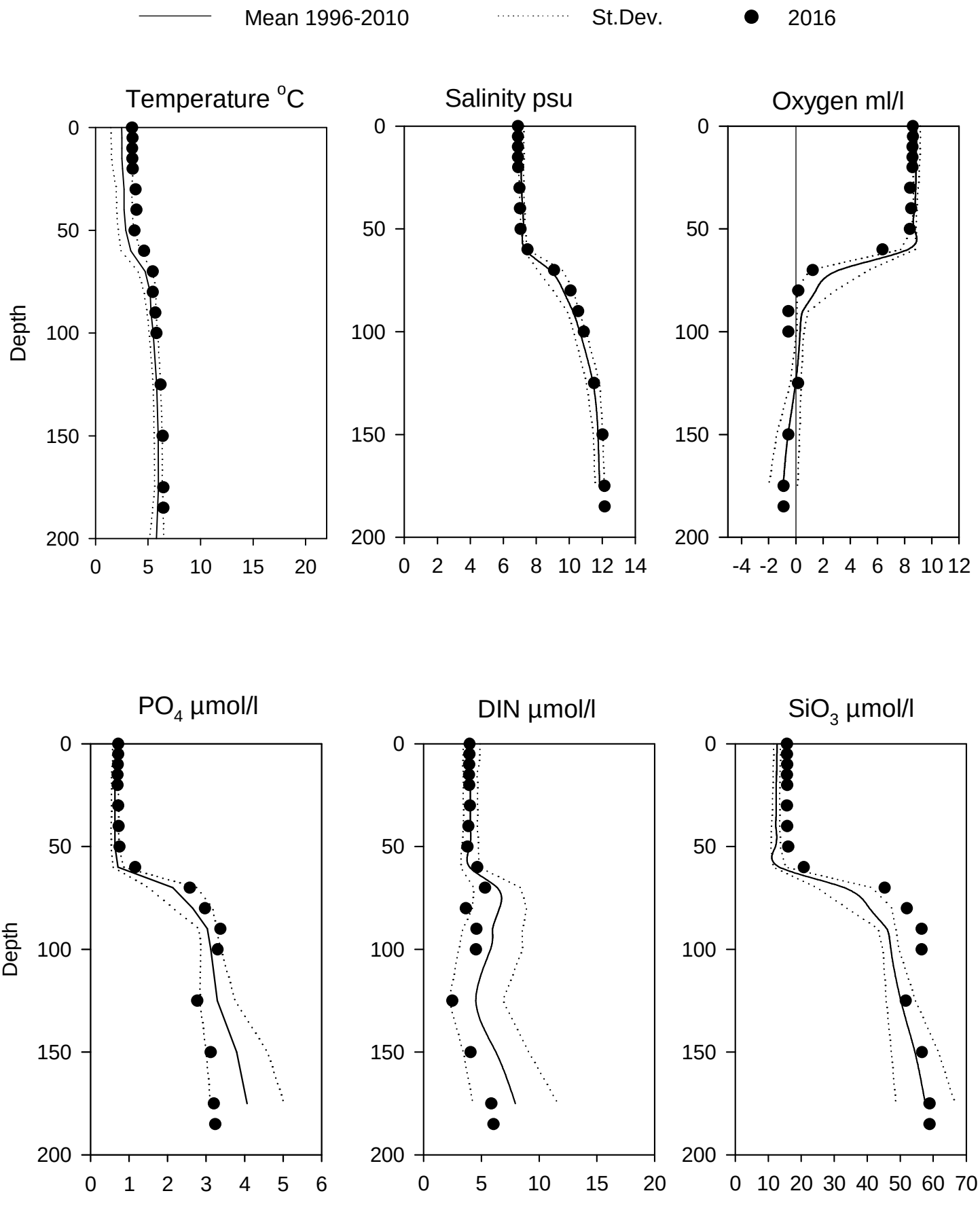
O_2 ml/l



O_2 ml/l



Vertical profiles BY20 February

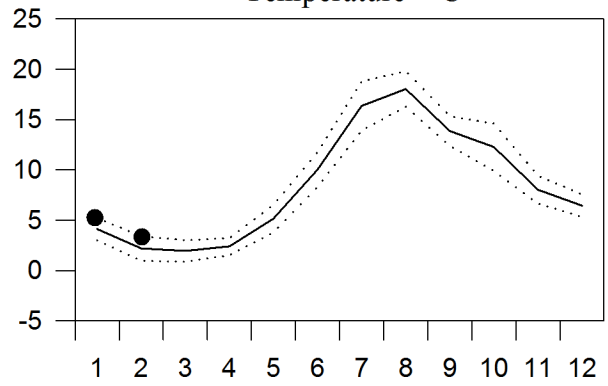


STATION BY29 SURFACE WATER

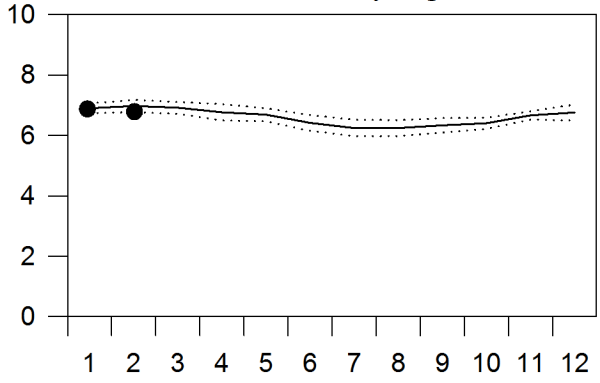
Annual Cycles

Mean 1996-2010 ····· St.Dev. ● 2016

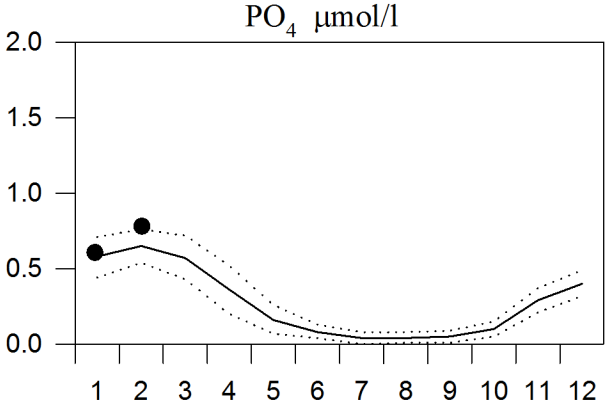
Temperature °C



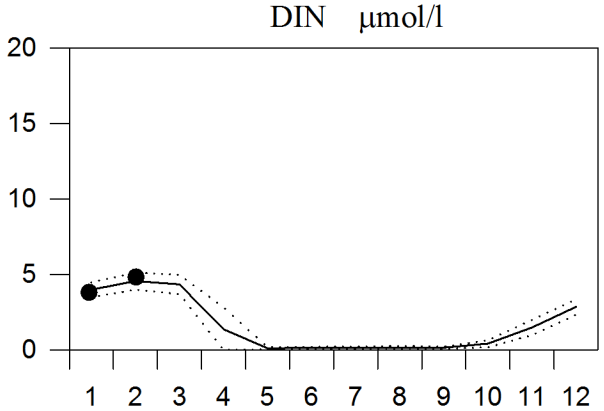
Salinity psu



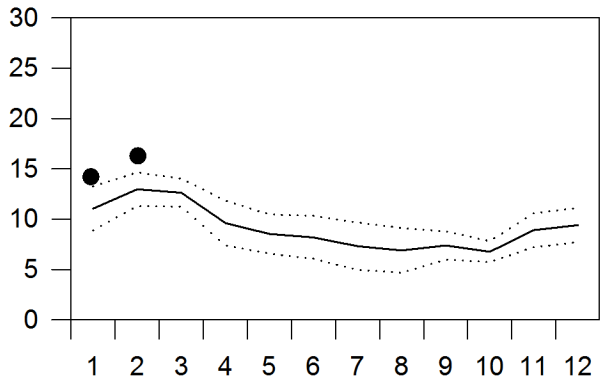
PO_4 µmol/l



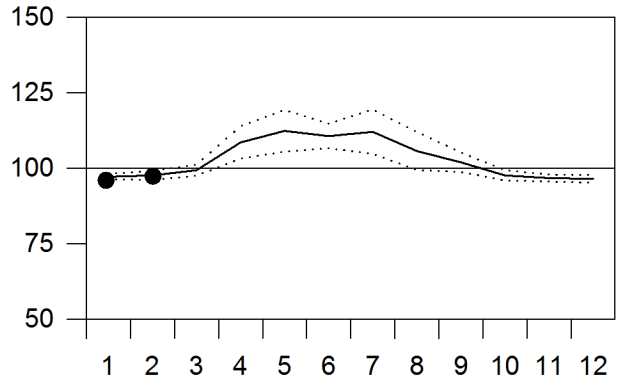
DIN µmol/l



SiO_3 µmol/l

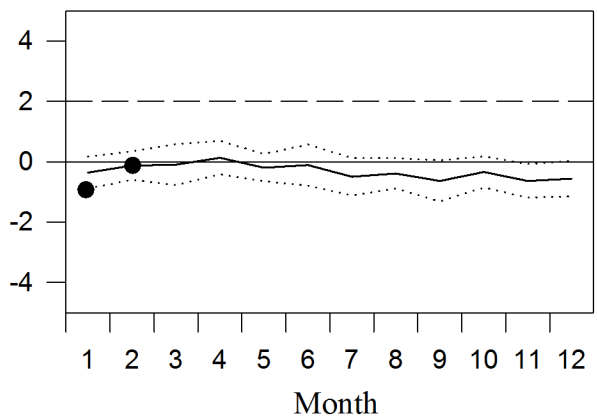


O_2 saturation %

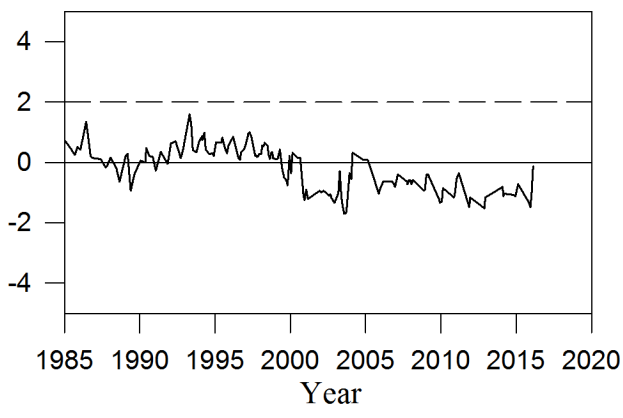


OXYGEN IN BOTTOM WATER (>=150m)

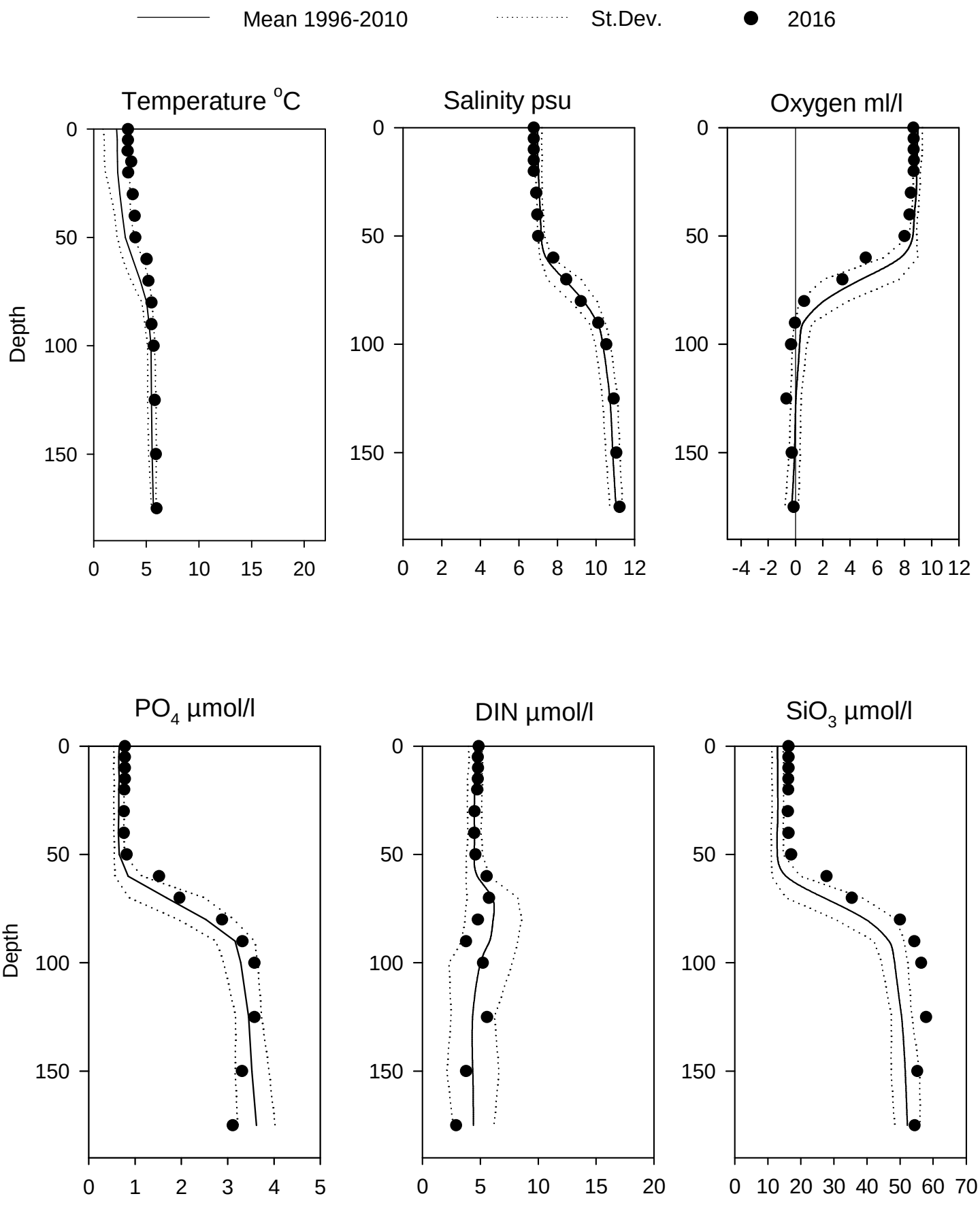
O_2 ml/l



O_2 ml/l



Vertical profiles BY29 February

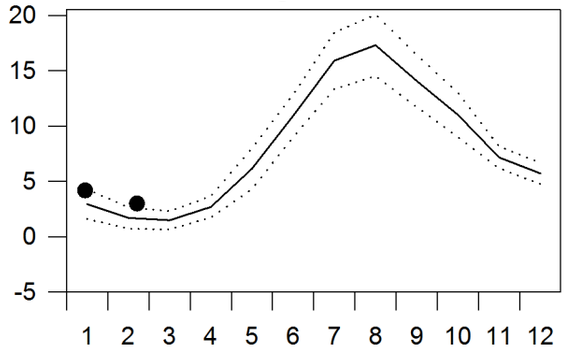


STATION BY31 SURFACE WATER

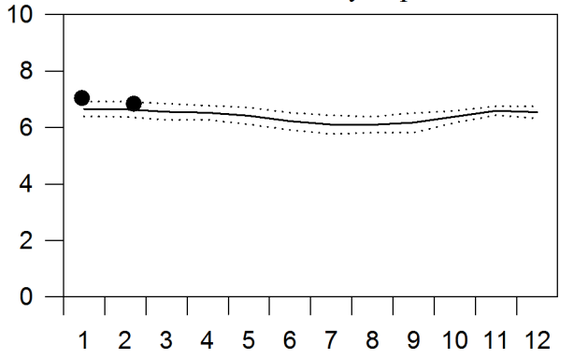
Annual Cycles

Mean 1996-2010 ····· St.Dev. ● 2016

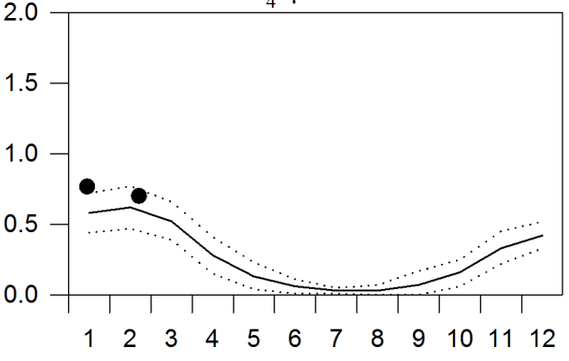
Temperature °C



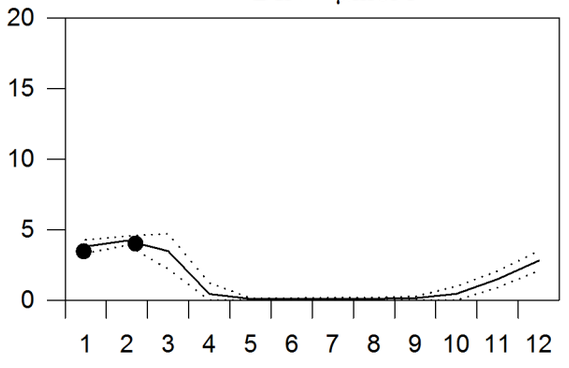
Salinity psu



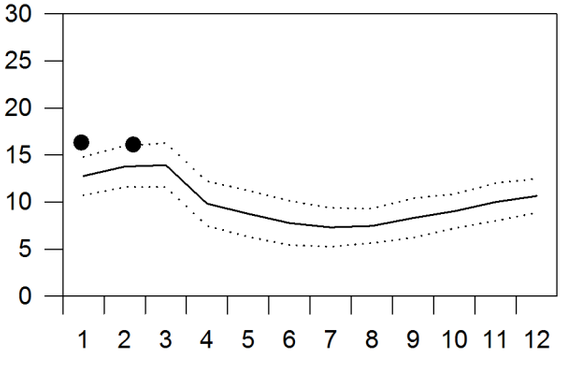
PO_4 µmol/l



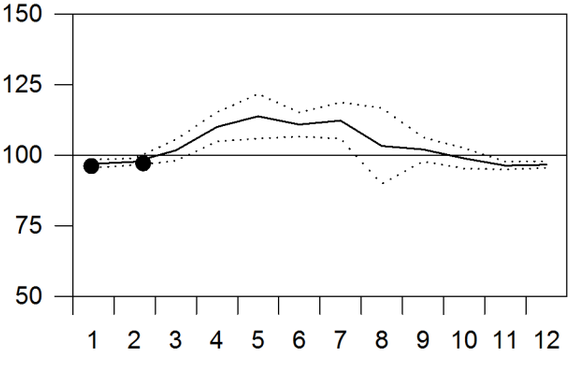
DIN µmol/l



SiO_3 µmol/l

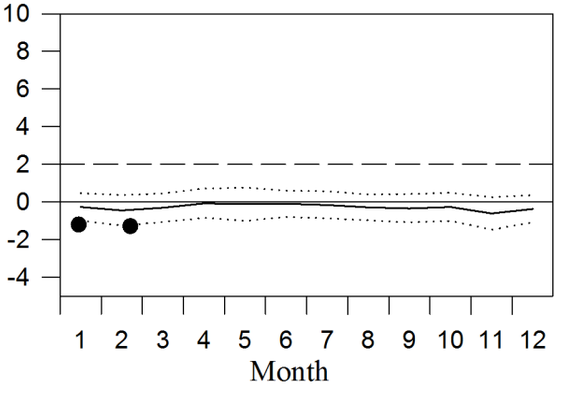


O_2 saturation %

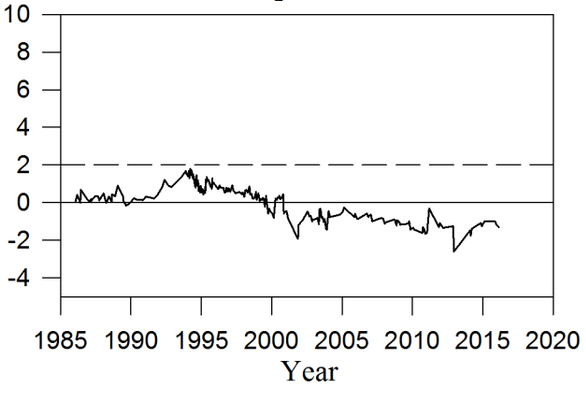


OXYGEN IN BOTTOM WATER (depth = 440m)

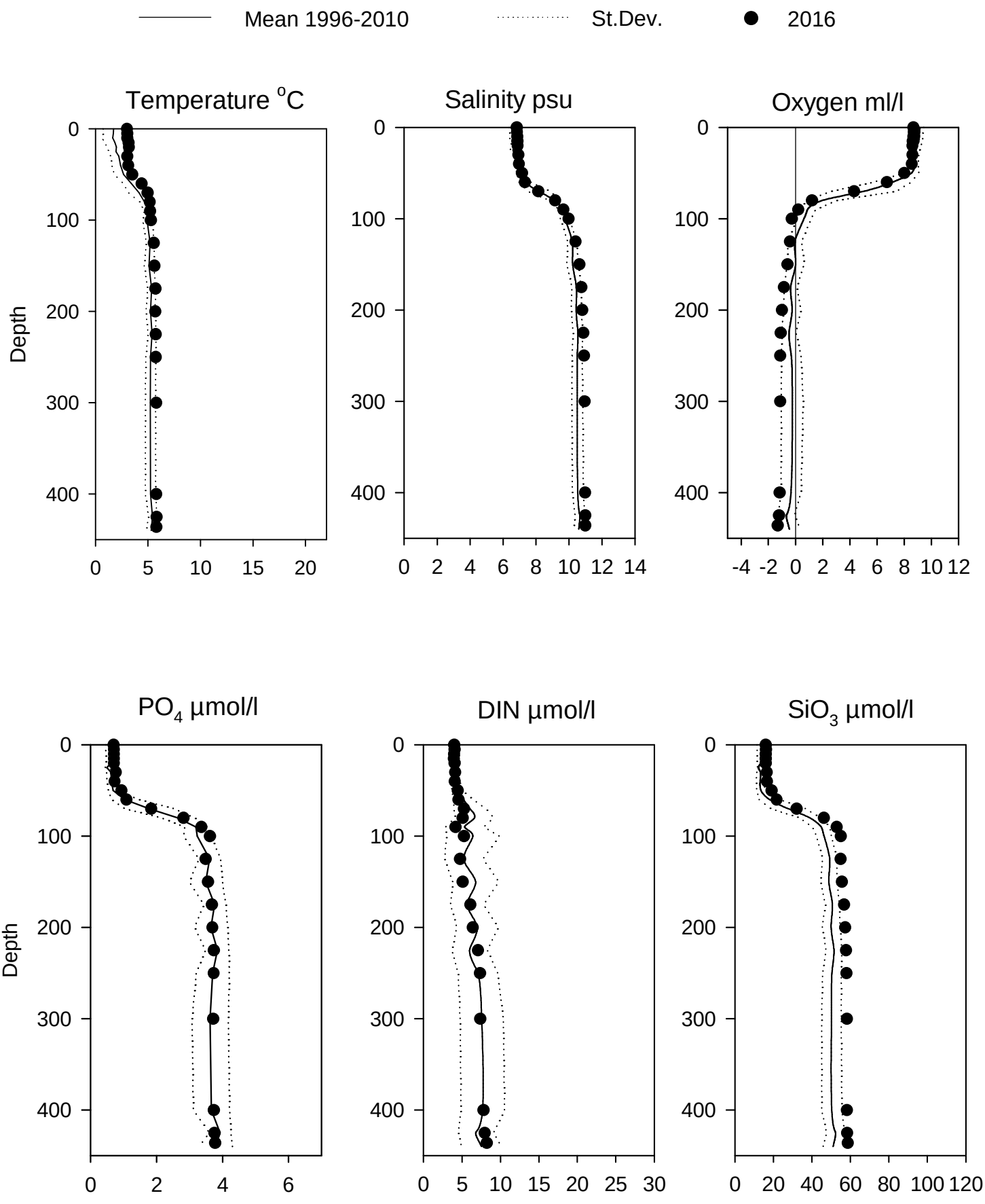
O_2 ml/l



O_2 ml/l



Vertical profiles BY31 February

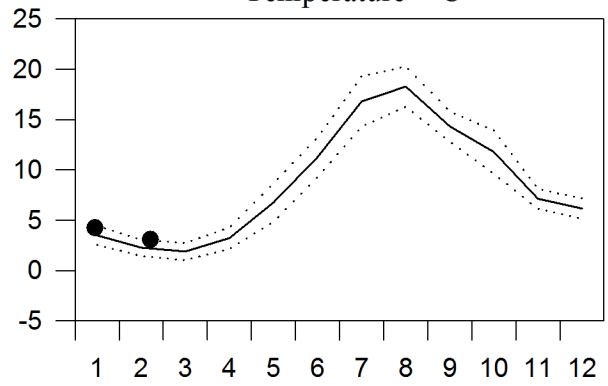


STATION BY32 SURFACE WATER

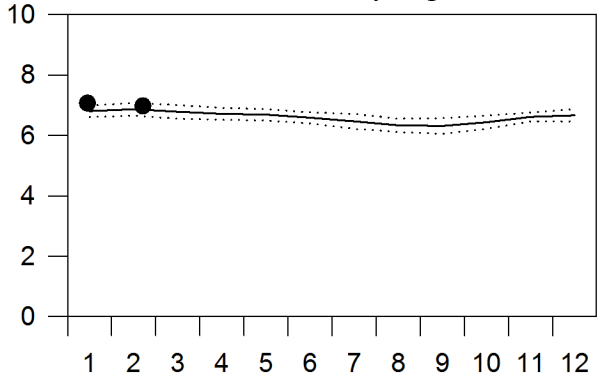
Annual Cycles

Mean 1996-2010 ····· St.Dev. ● 2016

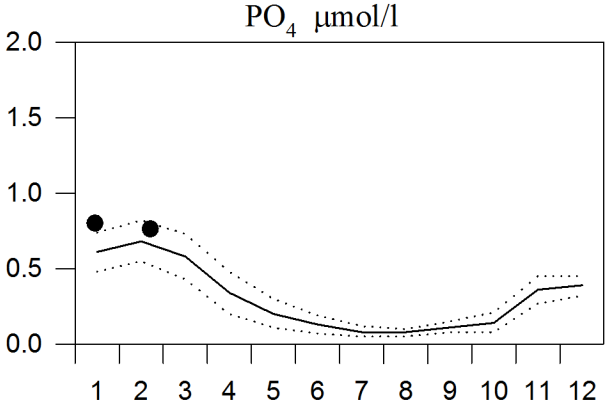
Temperature °C



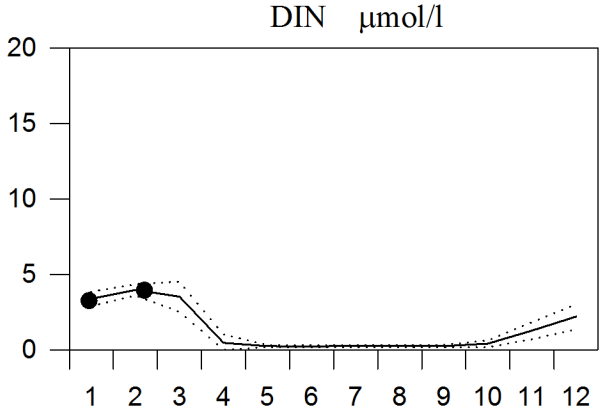
Salinity psu



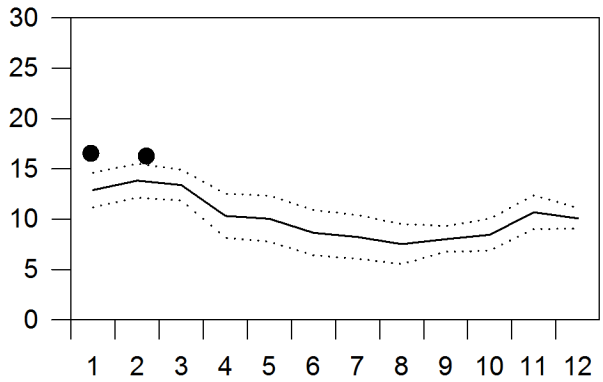
PO_4 µmol/l



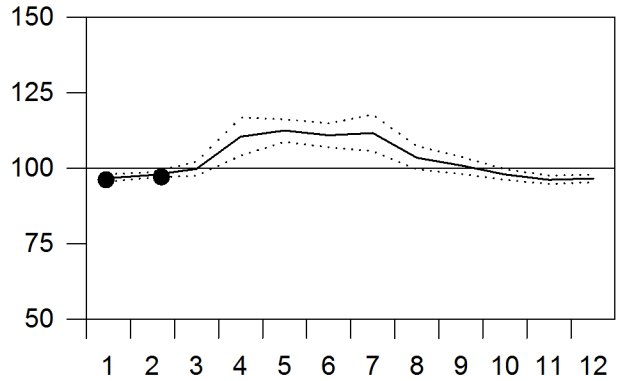
DIN µmol/l



SiO_3 µmol/l

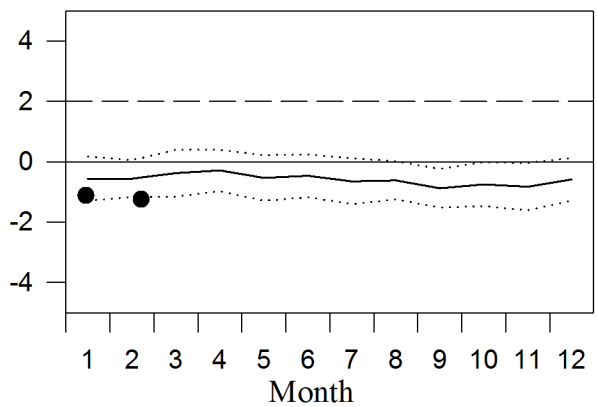


O_2 saturation %

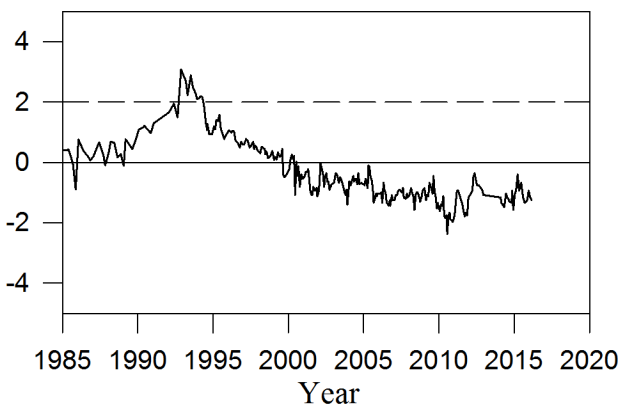


OXYGEN IN BOTTOM WATER (depth > 175m)

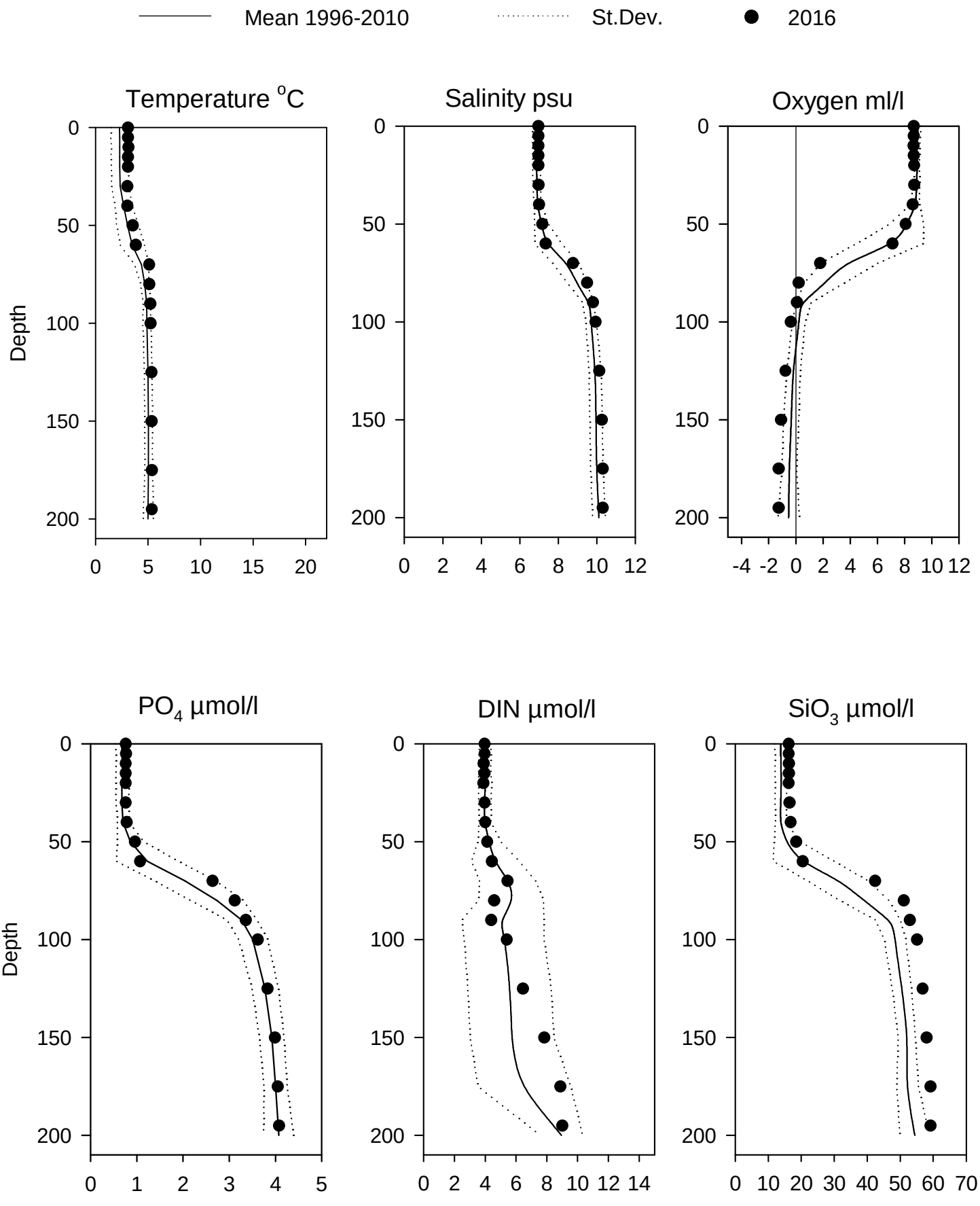
O_2 ml/l



O_2 ml/l



Vertical profiles BY32 February

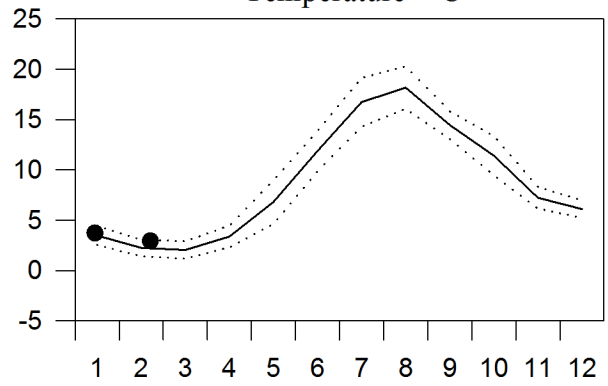


STATION BY38 SURFACE WATER

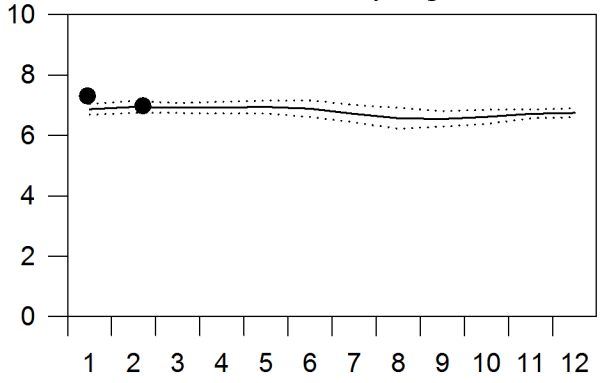
Annual Cycles

Mean 1996-2010 ····· St.Dev. ● 2016

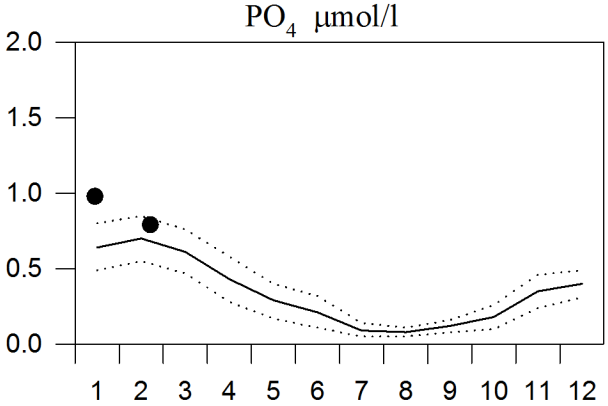
Temperature °C



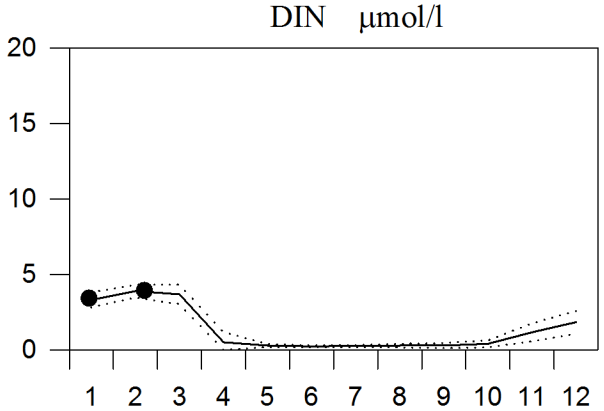
Salinity psu



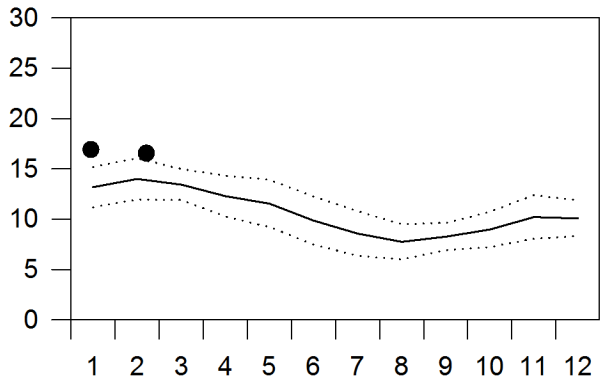
PO_4 µmol/l



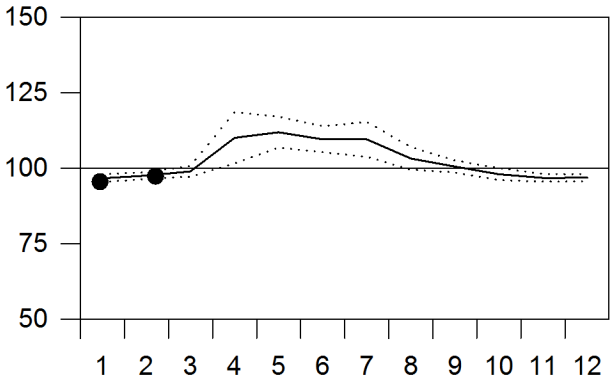
DIN µmol/l



SiO_3 µmol/l

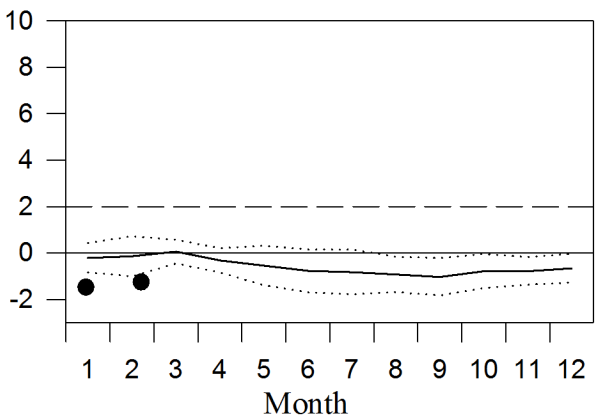


O_2 saturation %

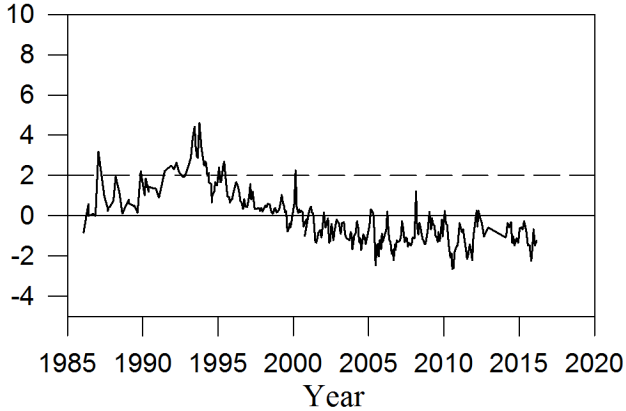


OXYGEN IN BOTTOM WATER (> 100m)

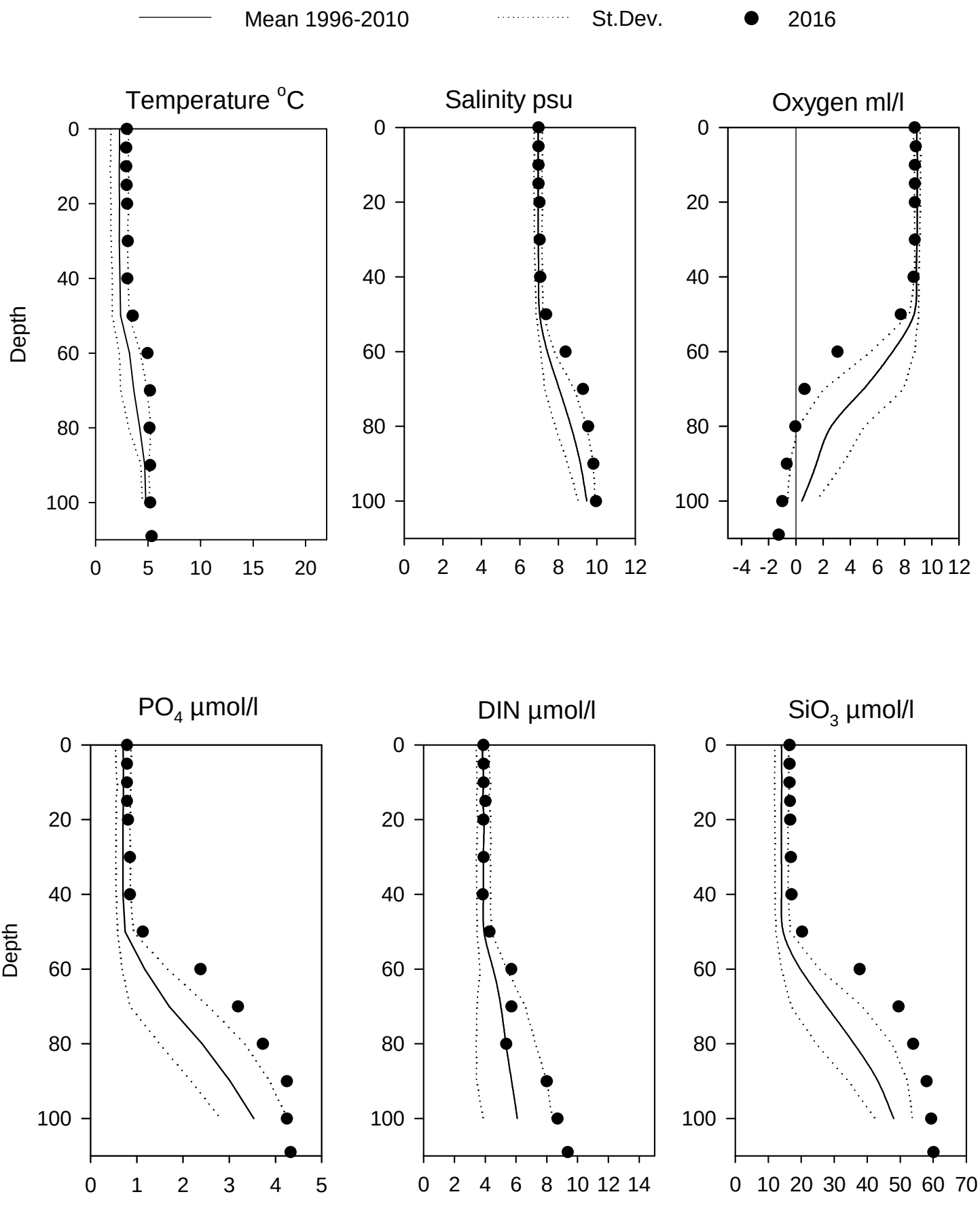
O_2 ml/l



O_2 ml/l



Vertical profiles BY38 February

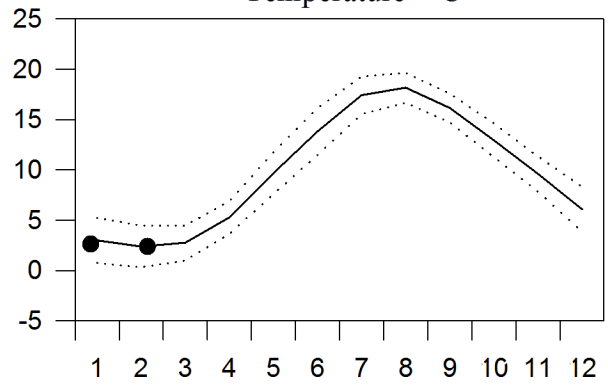


STATION SLÄGGÖ SURFACE WATER

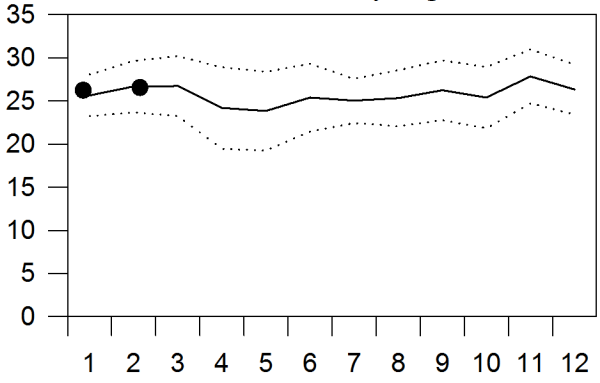
Annual Cycles

Mean 1996-2010 ····· St.Dev. ● 2016

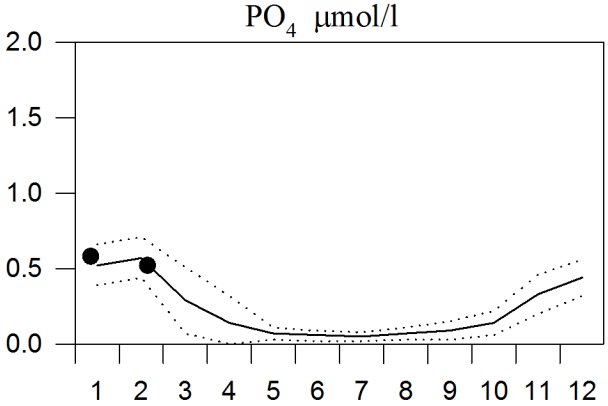
Temperature °C



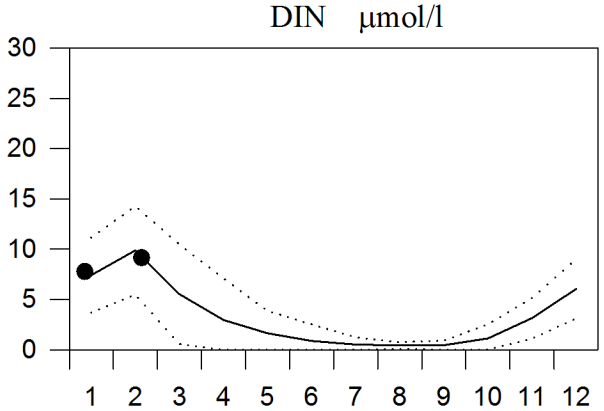
Salinity psu



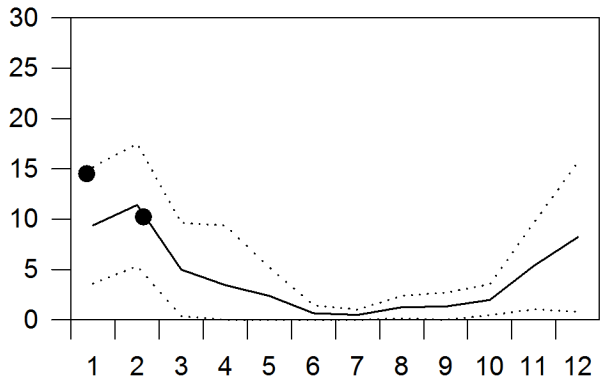
PO_4 µmol/l



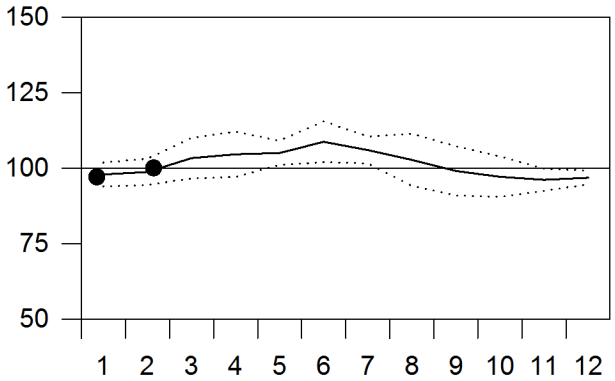
DIN µmol/l



SiO_3 µmol/l

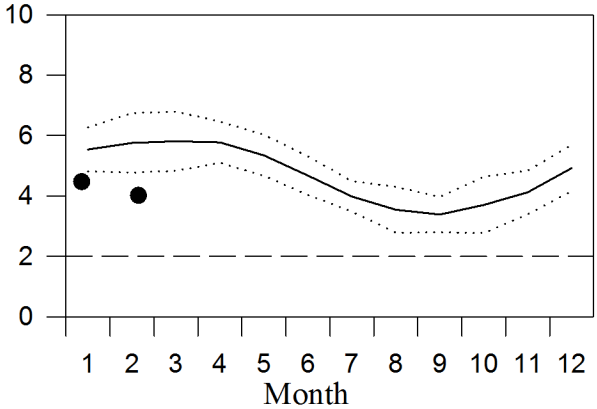


O_2 saturation %

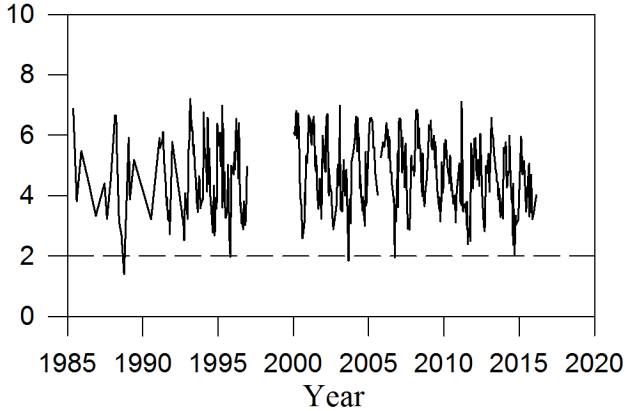


OXYGEN IN BOTTOM WATER (depth >50m)

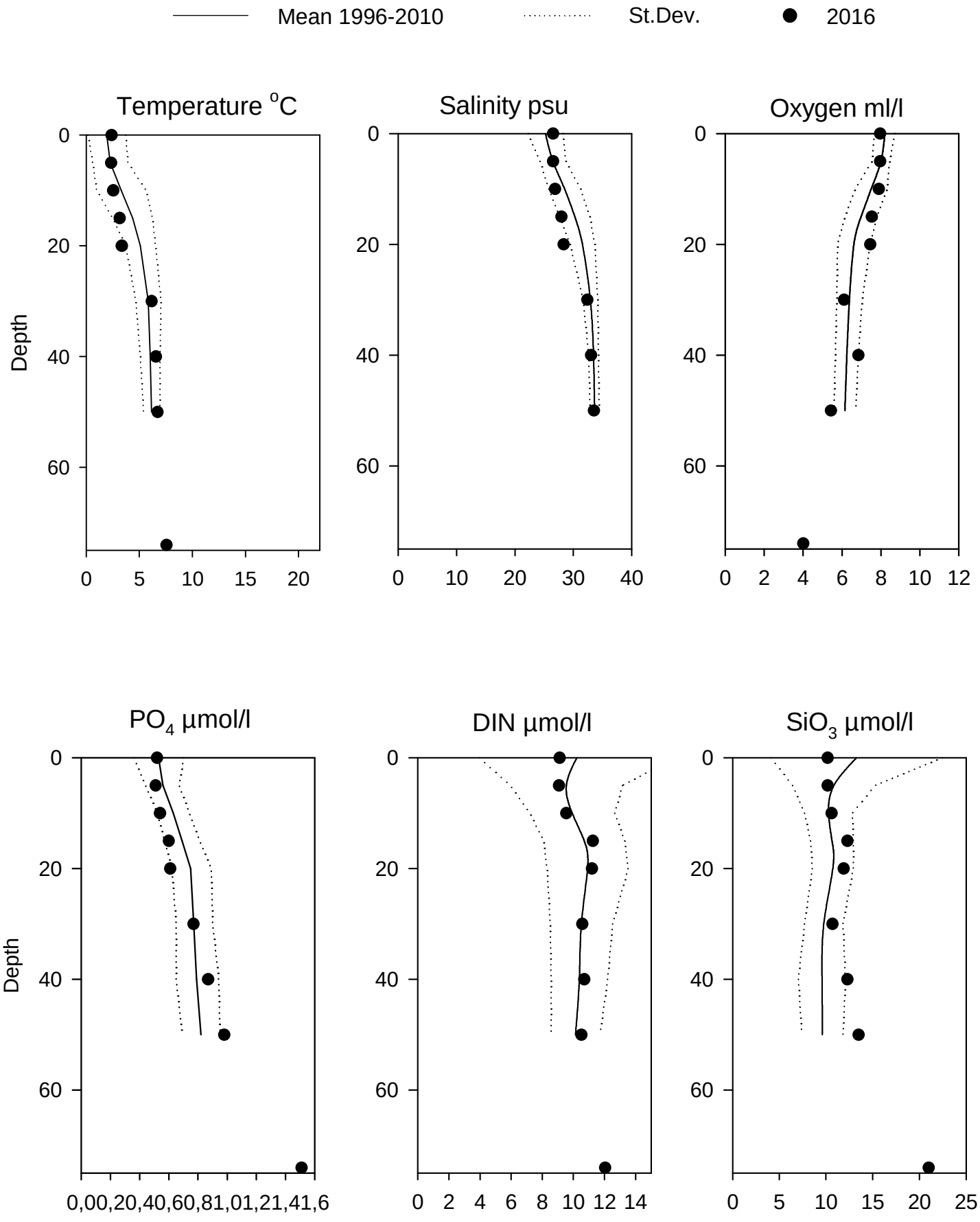
O_2 ml/l



O_2 ml/l

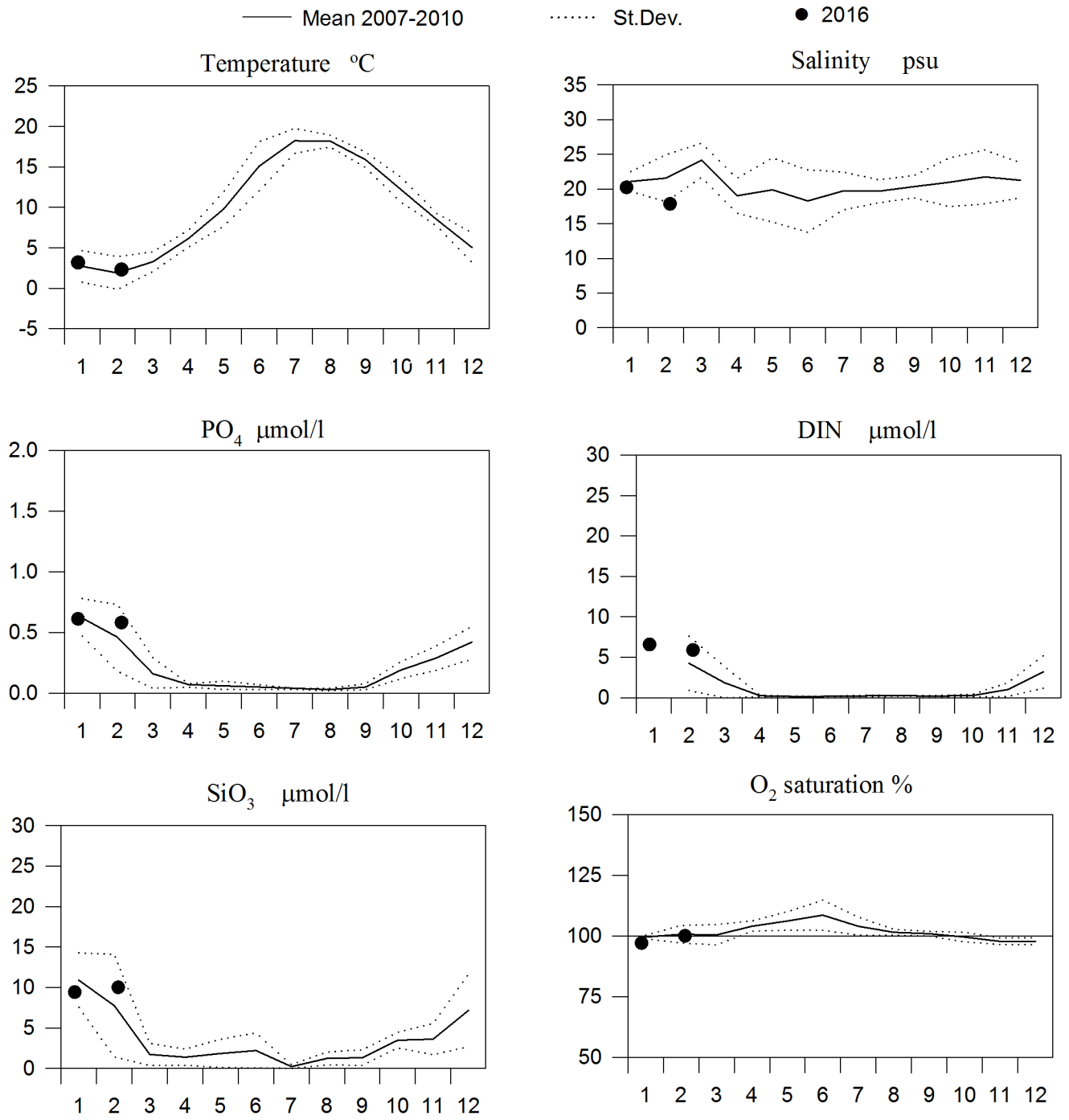


Vertical profiles Släggö February

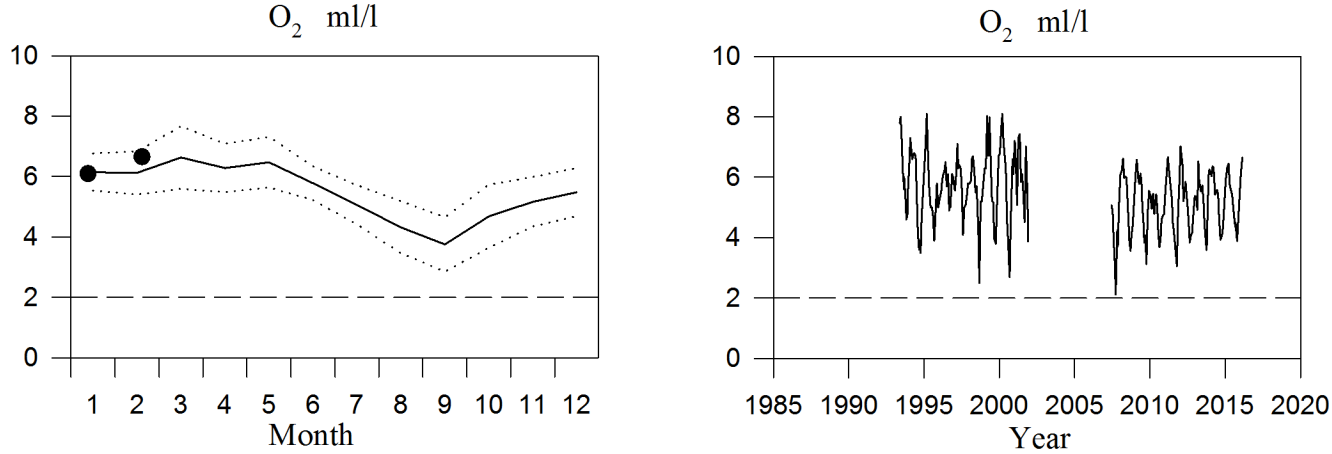


STATION N14 Falkenberg SURFACE WATER

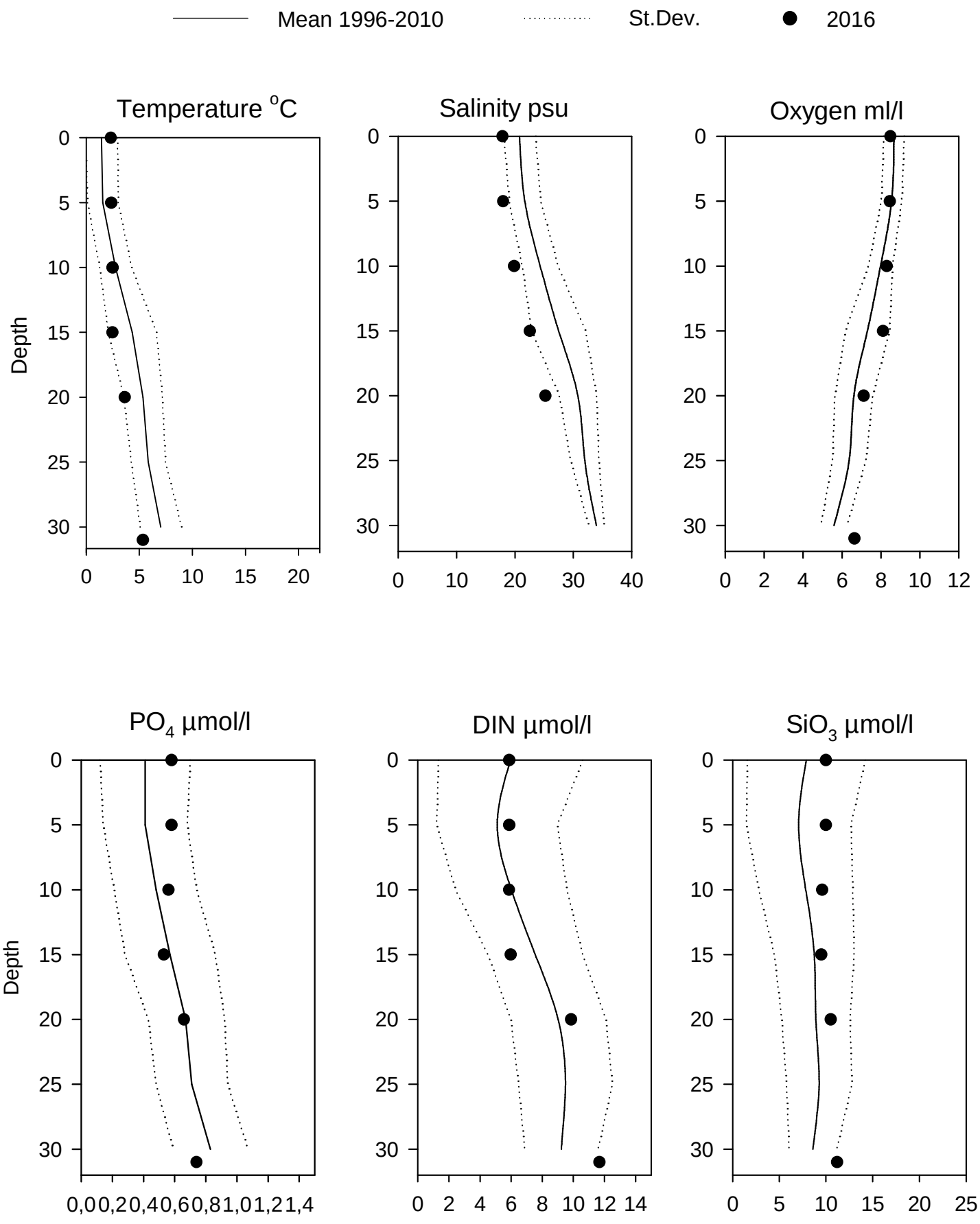
Annual Cycles



OXYGEN IN BOTTOM WATER (depth > 25m)



Vertical profiles N14 Falkenberg February

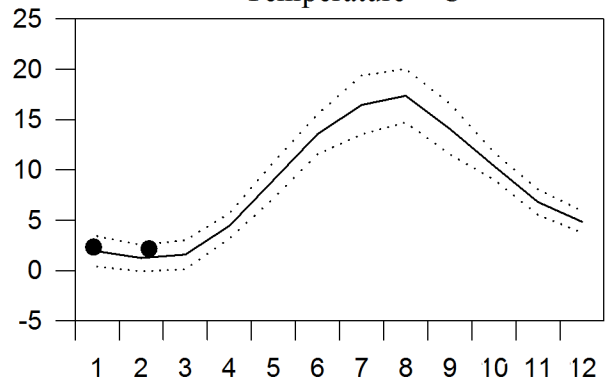


STATION REF M1V1 SURFACE WATER

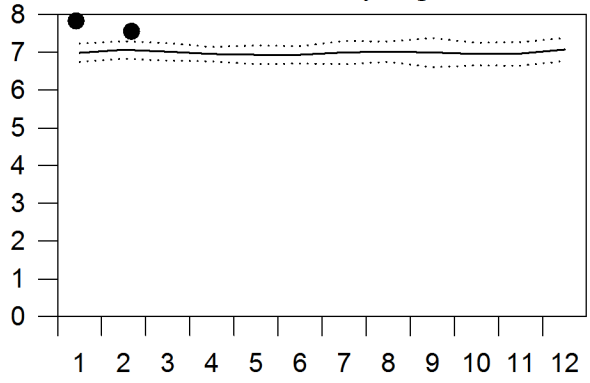
Annual Cycles

Mean 1996-2010 ····· St.Dev. ● 2016

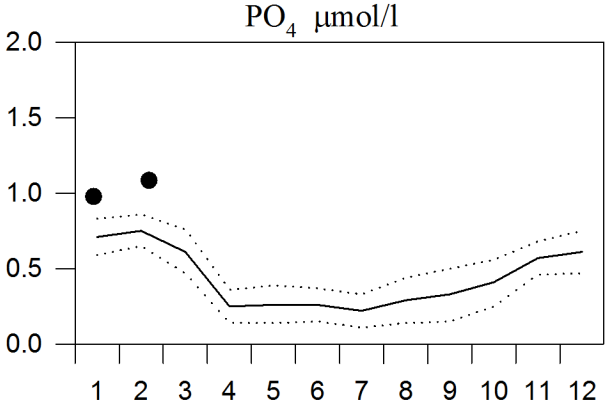
Temperature °C



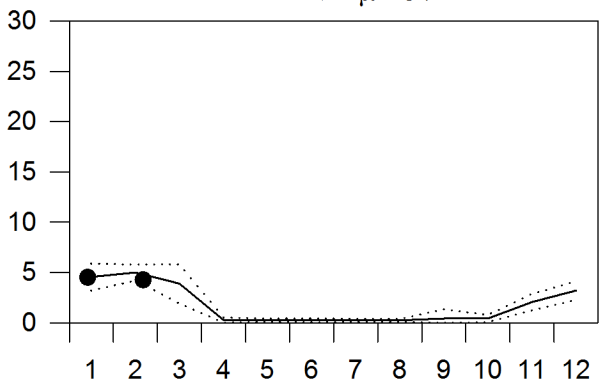
Salinity psu



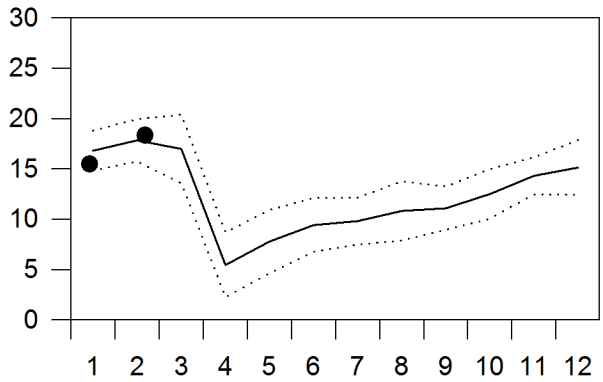
PO_4 µmol/l



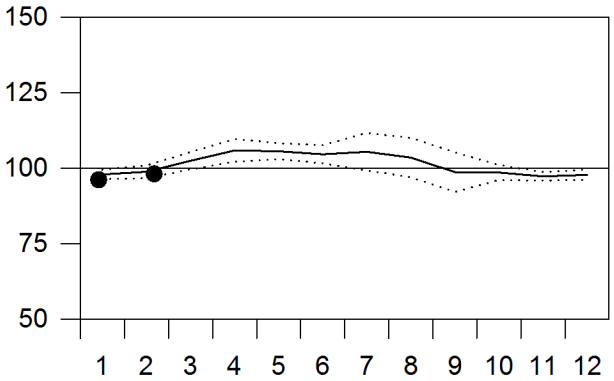
DIN µmol/l



SiO_3 µmol/l

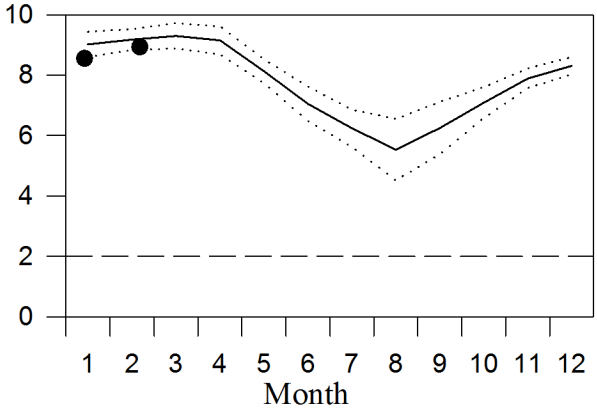


O_2 saturation %

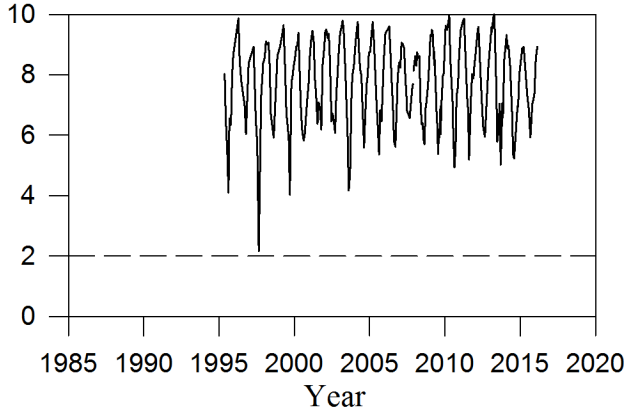


OXYGEN IN BOTTOM WATER (depth >15m)

O_2 ml/l



O_2 ml/l



Vertical profiles Ref M1V1 February