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

Report from the SMHI monitoring cruise with R/V Aranda

Survey period: 2016-02-15 - 2016-02-23
Survey area: Skagerrak, Kattegat, the Sound and the Baltic Proper
Principal: SMHI and the Swedish Agency for Marine and Water Management

SUMMARY

The expedition was part of the Swedish marine monitoring programme and covered the Skagerrak, the Kattegat, the Sound and the Baltic Proper. Mapping of winter nutrients were performed in the Baltic Proper.
Data presented in this report has been subject to preliminary quality control procedures only.

The temperature in the surface water was above normal in the Baltic Proper. The concentrations of nutrients were generally normal for the season in Skagerrak and Kattegat. In the Baltic Proper the concentration of phosphate was elevated in the whole area except for the western parts. The silicate was also elevated except in the south were it showed concentrations below normal.
The effect of the inflow in December 2014 could not be detected further north than the station BY20 in the northern part of the Eastern Gotland Basin. At the station Gotland Deep BY15, oxygen was again present in the bottom water. In the Western and Northern Gotland Basins the oxygen situation remains very serious as anoxic conditions occurred at depths exceeding 70-100 meters. Hydrogen sulphide was observed at the sampling point in the Gulf of Gdansk which has not happened since 2008.
The fluorescence measurement showed a beginning spring bloom in the center and the south of Skagerrak and the northern part of the Kattegatt

The next monitoring cruise is scheduled to start on 15 March.

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SMHI

PRELIMINARY RESULTS

The cruise was operated aboard the Finnish research vessel Aranda. It commenced in Helsinki on February the 7th and ended in the same port on February the 23rd. The winds during the expedition were mainly weak except in the Skagerrak were the wind reached strong gale force and 2 sampling points has to be excluded. Air temperatures ranged between -1 and +4 ° C. In the Baltic Proper the winter pool of nutrients was mapped.

The Skagerrak

The temperature of the surface water was normal for the season and varied between 2.4 and 5.4°C, lowest near the coast. The salinity in the surface layer was normal to above normal for the season and varied between 26.5 and 34.1 psu. The stratification, both the thermocline and the halocline, was found at depth between 10 and 25 meters.
The nutrients in the surface showed typical values for the season, except for silicate which showed concentrations above normal in the southern part. In the surface water the concentration of phosphate was about 0.5 µmol/, inorganic nitrogen (nitrite + nitrate) between 6.2 and 11.2 µmol/l, while silicate varied from 5.2 to 10.2 µmol/l.
The lowest oxygen concentrations, 4.0 ml/l, were found in the bottom water at Släggö in the mouth of the Gullmarn Fjord. Fluorescence measurements showed biological activity in the surface layer in the southern and western parts of the area. For more details on species composition see the separate algal report, AlgaAware.

The Kattegat and the Sound

The temperature in the surface water was normal for the season and varied between 2.3 and 3.0 °C. The surface salinity was generally lower than normal except for the north part where it was normal and ranged from 17.8 to 25.3 psu. In the Sound the salinity was around 10 psu, which is lower than normal. A strong stratification in the Sound was found at 14 meters. The other parts had the stratification at 20 meters depth.
The concentrations in the surface water were normal to slightly above normal for the season. The phosphate concentration was ranged from 0.5 – 0.7 µmol/l, inorganic nitrogen from 4.6 – 6.1 µmol/l and silicate varied between 7.9 to 10.6 µmol/l.
The oxygen situation in the deep water was good at all sampling points. The lowest concentrations was found in the Sound, 5.5 ml/l. The plankton activity showed a beginning spring bloom in the north part of the investigated area.

The Baltic Proper

The temperature of the surface layer was still above normal in the whole Baltic Proper and varied from 3.0 to 4.5°C. Surface salinity was elevated in the Arcona Basin, the Bornholm Basin and the Hanö Bight. In the north part of Eastern Gotland Basin it was slightly lower than normal and the other parts were it normal. The halocline and thermocline coincided and were found a 40 – 60 meters depth in the Western Gotland Basin, at 60 – 90 meters depth in the Eastern and Northern Gotland Basin, while found at shallower depth in the southern parts.
Phosphate concentrations in the surface water were still above normal except for the Western Gotland Basin where it was normal for the season, ranged from 0.6-1.1 µmol/l. The concentrations of inorganic nitrogen (nitrite + nitrate) were normal and varied between 2.6 and 4.7 µmol/l. The silicate concentration was still below normal in the southern parts, while elevated above normal in the remaining parts of the Baltic Proper. The concentrations ranged from 9.0 to 17.2 µmol/l.
In the whole investigated area acute hypoxia (<2 ml/l) occurred at depths exceeding 60-90 metres. At BY15 no hydrogen sulphide was measured this time but at depths ranging from 80 to 225 meters

depth the oxygen concentrations were low, < 1 ml/l. Hence, the effects of the inflow in December 2014 could not be detected further north than BY20 in the Eastern Gotland Basin.
In the Western and Northern Gotland Basin the oxygen situation continues to be extremely bad. In the Western Gotland Basin completely oxygen-free conditions (anoxia) were found from depth exceeding 90 – 100 meters and the Northern Gotland Basin had anoxic conditions from 90 meters depth. Hydrogen sulphide was observed at the sampling point in the Gulf of Gdansk which has not happened since 2008.

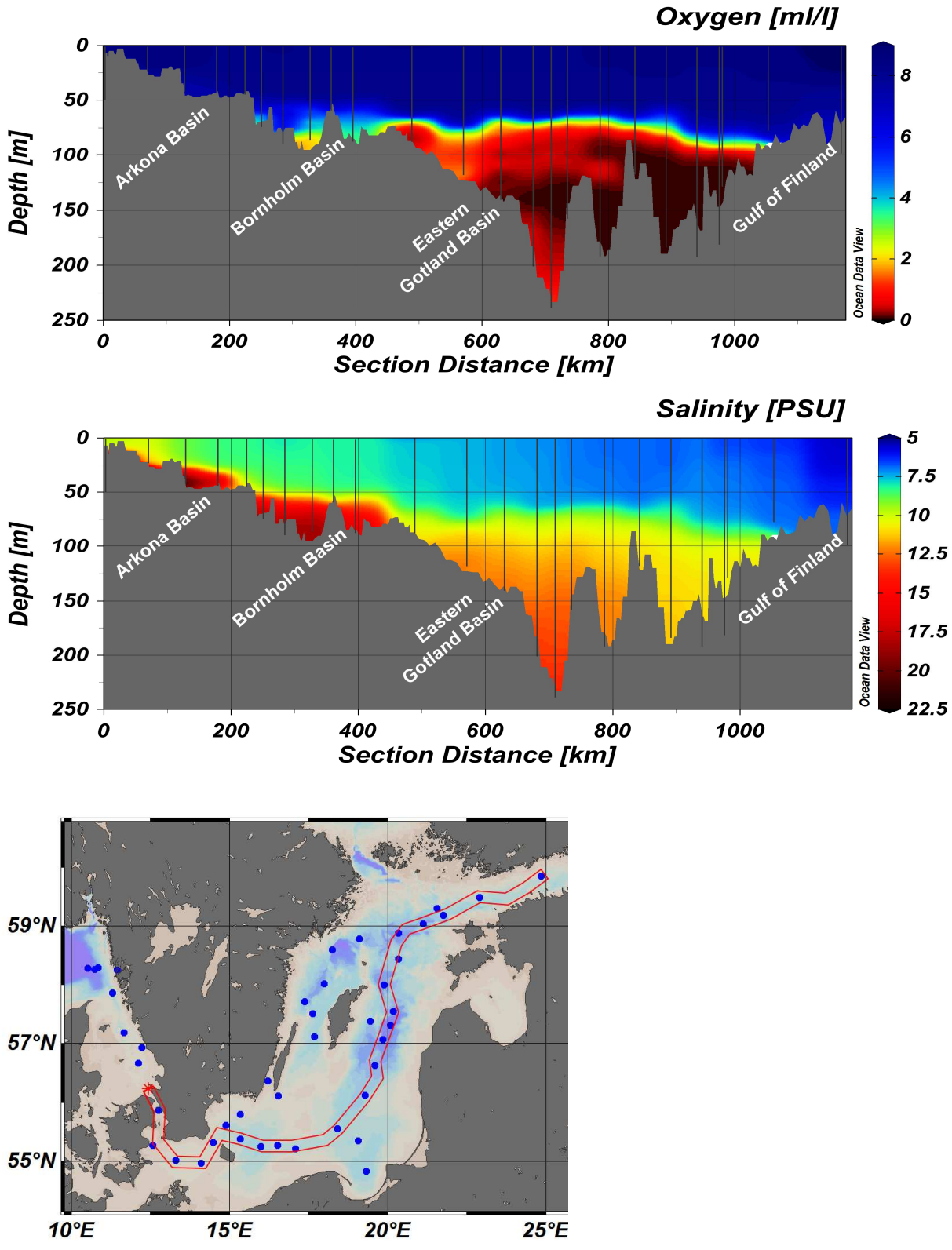

Figure 1. Transect showing the oxygen and salinity from the Sound to the Gulf of Finland.

PARTICIPANTS

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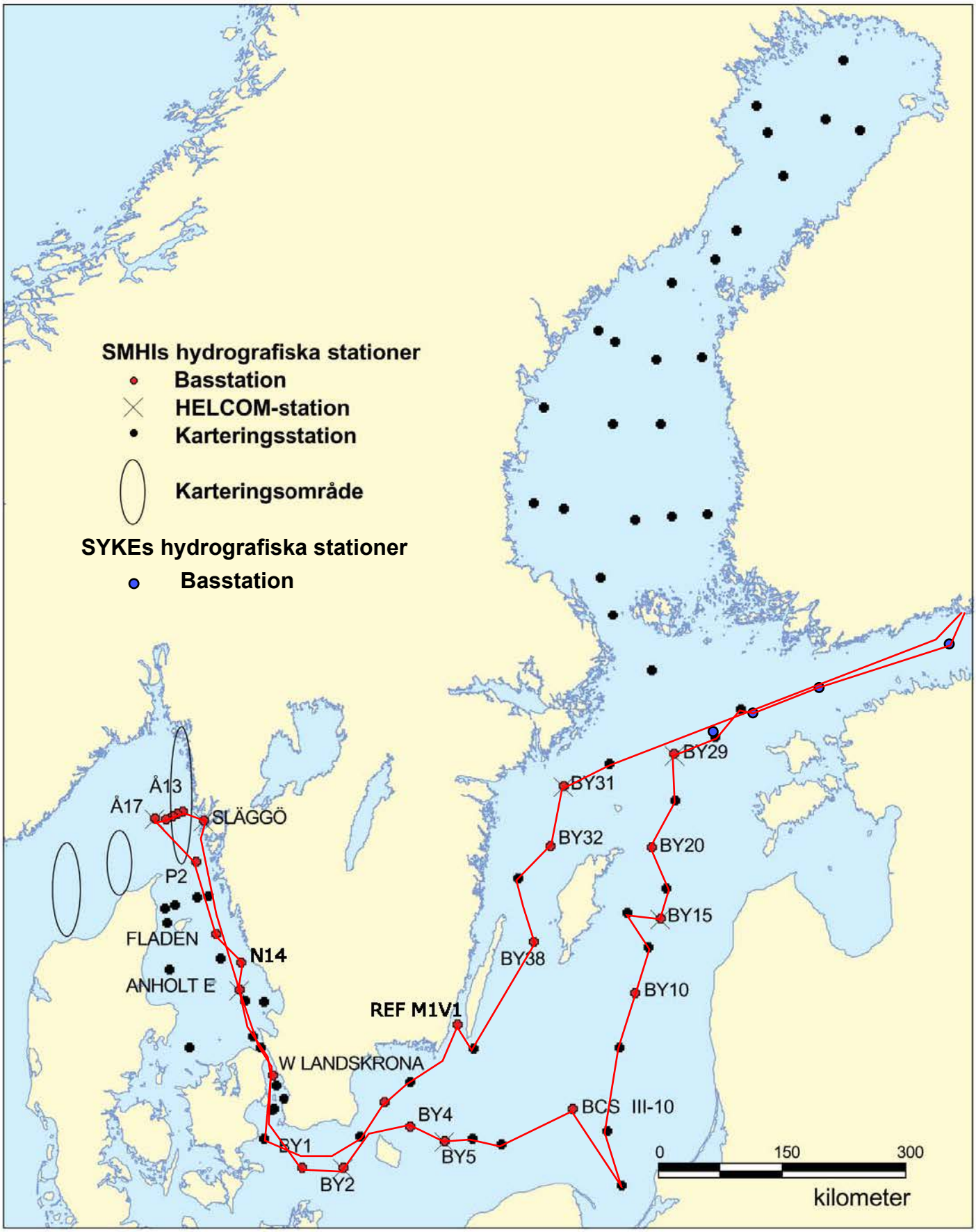
APPENDICES

- Track chart
- Table over stations, parameters and sampling depths
- Map showing bottom oxygen concentrations
- Monthly average surface water plots for selected stations
- Vertical profiles for selected stations

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



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	Ctd	PPCPZZT	No de	Temp	Salin	Ph	Oxyg	H2S	Po4P	TotP	No2N	No3N	No4N	TotN	Alkal	SiO3	Humus	Ligni	PON	POC	TOC	Comm
0098	GFXX29EXT	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	BPNX00EXT	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	BPWX00EXT	LL15	N5911.00	E2144.81	20160215	2320	132		35	8	-0.4	1021	9999	x	-------	15	x	x	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0101	BPNX33BAS	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	BPNX34BAS	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	BPNX35BAS	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	-	-	-	-	-	-
0104	BPNX27BAS	BY21	N5826.5	E2020	20160216	1030	123		32	5	3.6	1030	1330	x	-------	14	x	x	-	x	x	x	x	x	x	x	x	-	x	-	-	-	-	-	x
0105	BPEX26BAS	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	BPEX25BAS	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	BPEX21BAS	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	BPEX19BAS	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	BPEX14BAS	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	BPEX13BAS	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	-	-	-	-	-	-
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0112	BPSE70BAS	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	BPSG71BAS	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	BPSE11BAS	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	BPSE09BAS	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	BPSE08BAS	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	BPSB07BAS	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	BPSB06BAS	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	-	-	-	-	-	-
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0120	BPSA02BAS	BY1	N5500	E1318	20160218	2345	46		17	2	2.5	1017	9990	x	--x----	8	x	x	-	x	-	x	x	x	x	x	x	-	x	-	-	-	-	-	-
0121	SOCX39BAS	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	KAEX29BAS	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	-	-	-	-	-
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0125	SKEX23BAS	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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0132	BPSA04BAS	BY3 HAMRARNE SUND	N5517.5	E1424	20160221	1300	47		26	10	4.7	999	2740	x	-------	8	x	x	-	x	-	x	x	x	x	x	x	-	x	-	-	-	-	-	-
0133	BPSH05BAS	HANÖBUKTEN	N5537	E1452	20160221	1520	80		23	10	4.7	997	2830	x	--x----	11	x	x	-	x	-	x	x	x	x	x	x	-	x	-	-	-	-	-	x
0134	BPSH51BAS	HANÖBUKTEN-KBV	N5548.0	E1520.0	20160221	1750	55		22	10	4.3	995	9990	x	-------	9	x	x	-	x	-	x	x	x	x	x	x	-	x	-	-	-	-	-	x
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0137	BPWX45BAS	BY38 KARLSÖDJ	N5707	E1740	20160222	0745	110		27	9	2.3	987	2730	x	--x----	14	x	x	-	x	x	x	x	x	x	x	x	-	x	-	-	-	-	-	-
0138	BPWX00EXT	VÅGBOJ KNOLLS GRUND	N5730.99	E1736.96	20160222	1215	88		26	9	3.4	987	1630	x	-------	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x
0139	BPWX42BAS	BY36	N5743	E1722	20160222	1350	142		27	5	3.6	988	1630	x	-------	15	x	x	-	x	x	x	x	x	x	x	x	-	x	-	-	-	-	-	-
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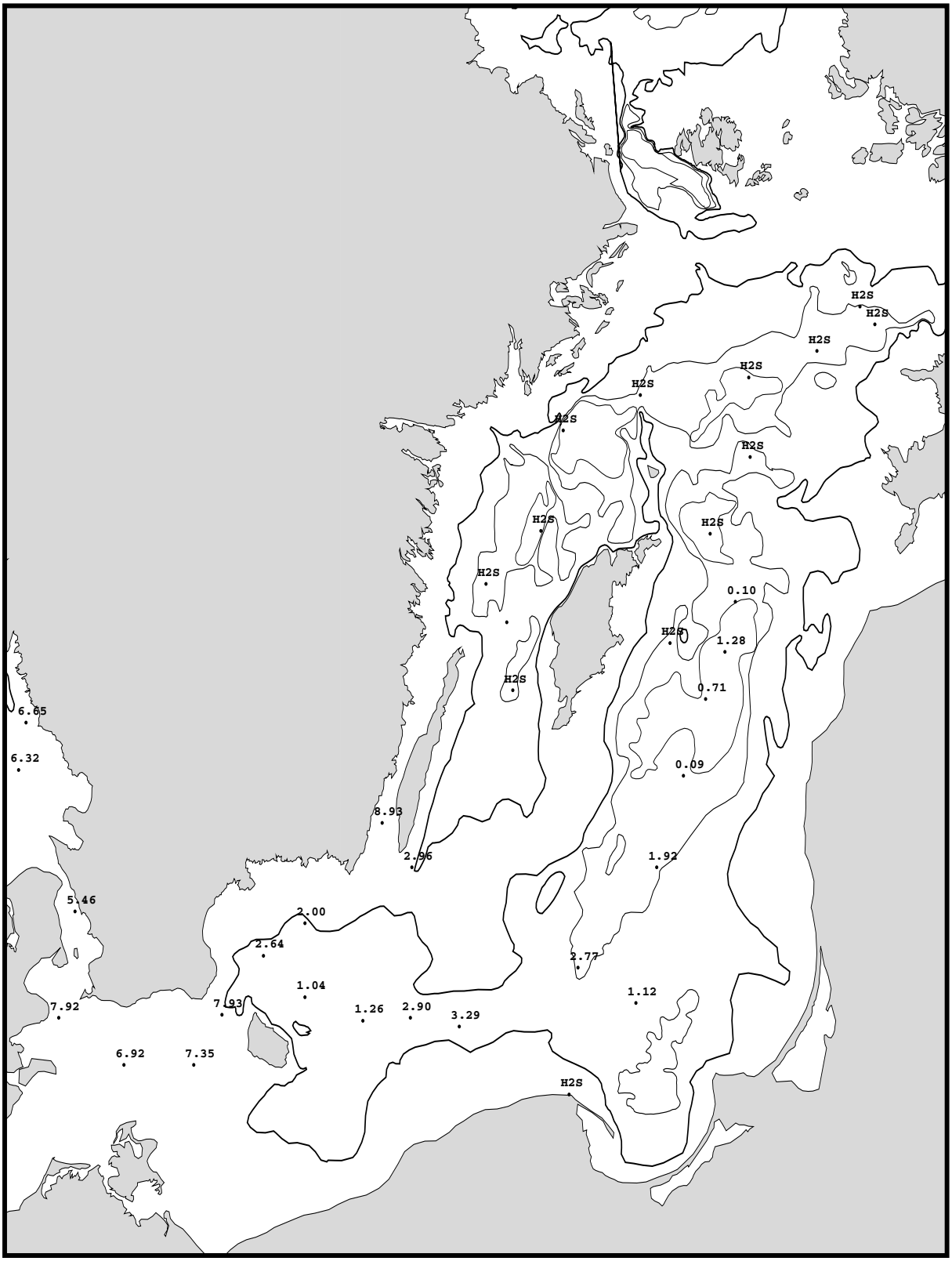
0141	BPNX37BAS	BY31 LANDSORTSDJ	N5835	E1814	20160222	2040	440		26	3	2.5	989	9990	x	--xxx--	23	x	x	x	x	x	x	x	x	x	x	x	x	x	-	-	-	-	-	-
0142	BPNX36BAS	BY30	N5847	E1906	20160223	0140	181		34	2	2.2	989	9990	x	-------	16	x	x	-	x	x	x	x	x	x	x	x	-	x	-	-	-	-	-	-

Bottom water oxygen concentration (ml/l)

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

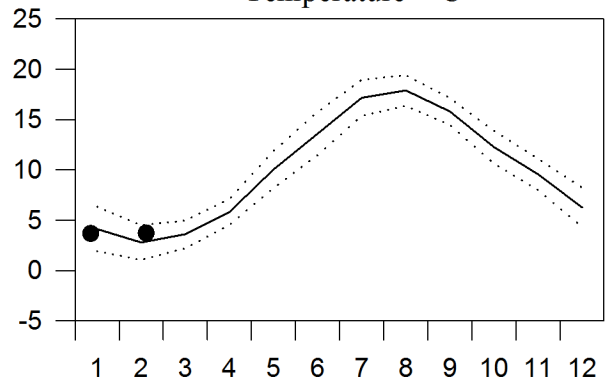


STATION P2 SURFACE WATER

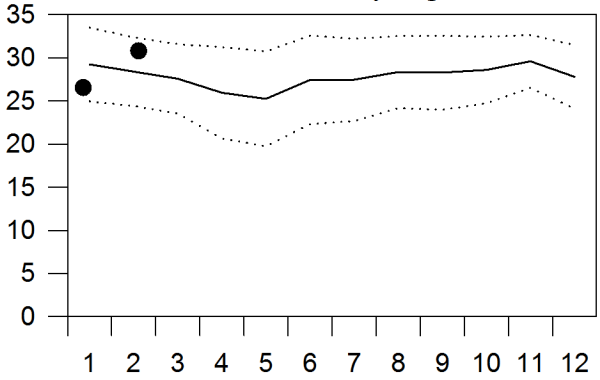
Annual Cycles

Mean 1996-2010 ····· St.Dev. ● 2016

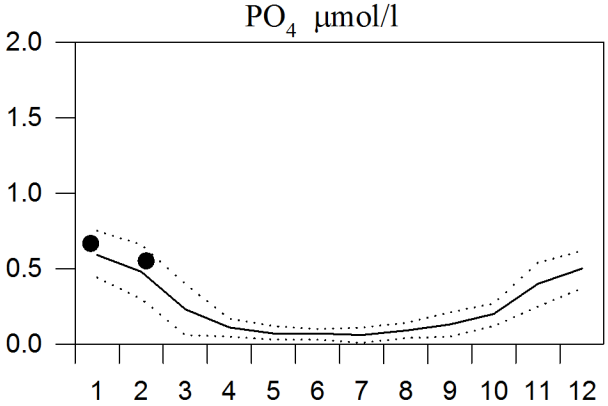
Temperature °C



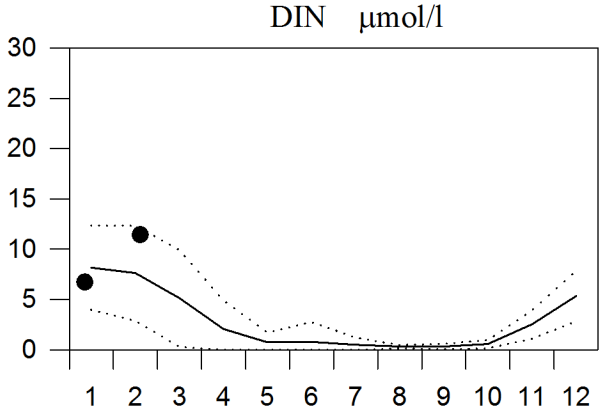
Salinity psu



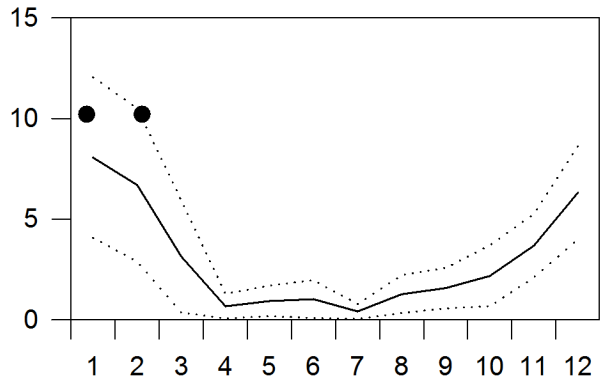
PO_4 µmol/l



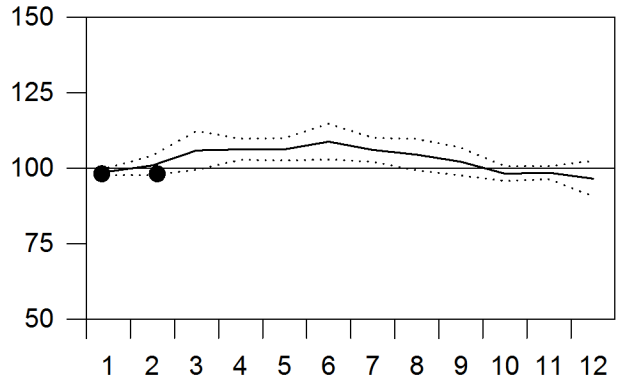
DIN µmol/l



SiO_3 µmol/l

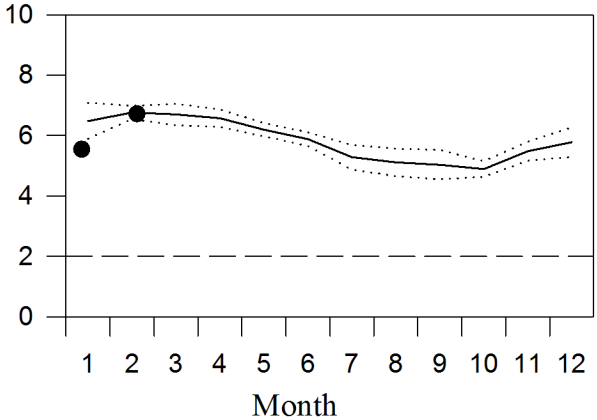


O_2 saturation %

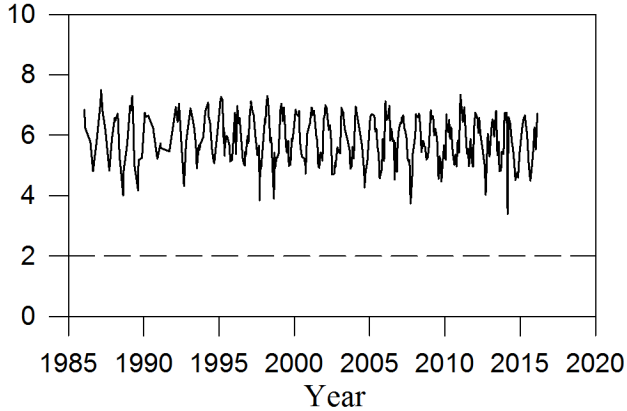


OXYGEN IN BOTTOM WATER (depth >75m)

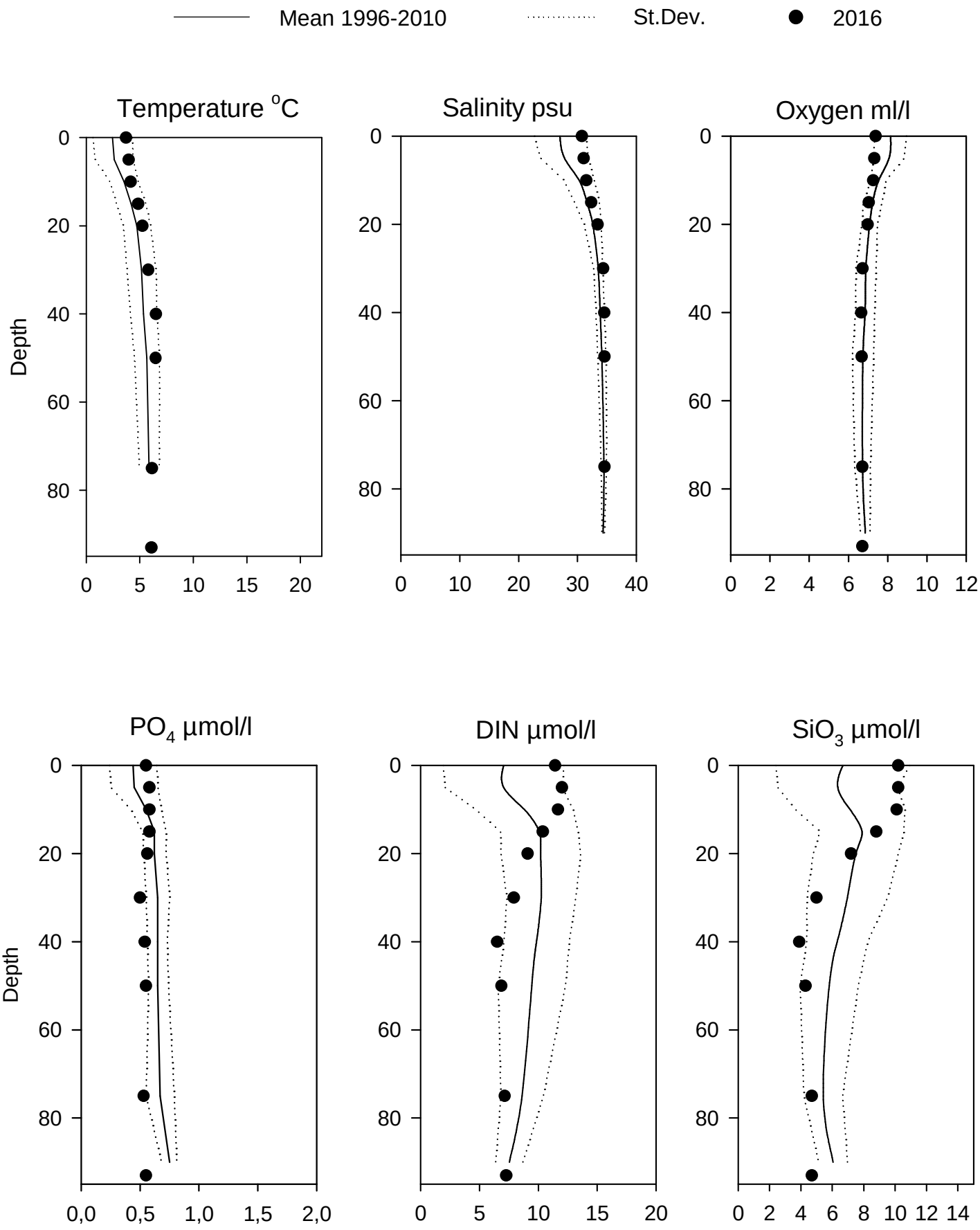
O_2 ml/l



O_2 ml/l



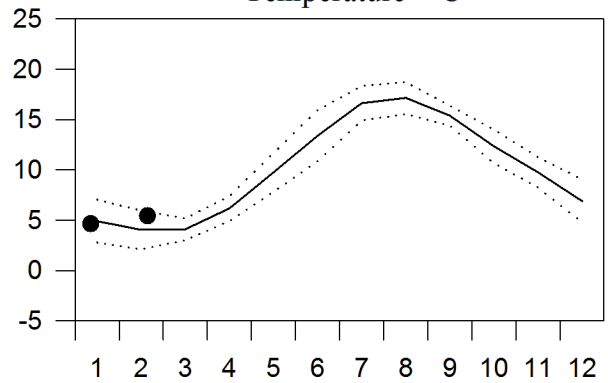
Vertical profiles P2 February



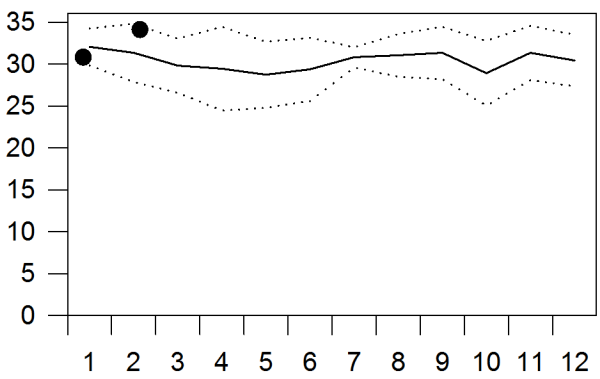
STATION Å15 SURFACE WATER

Annual Cycles

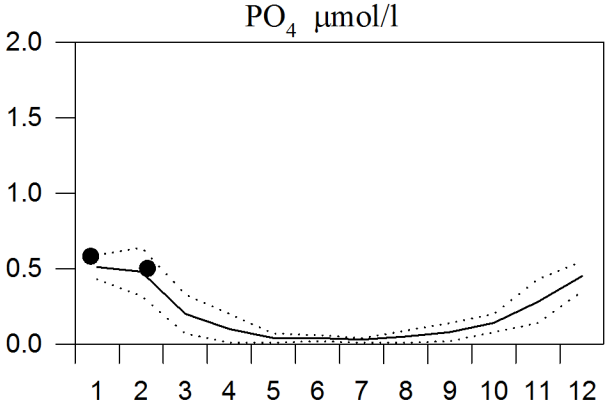
Temperature °C



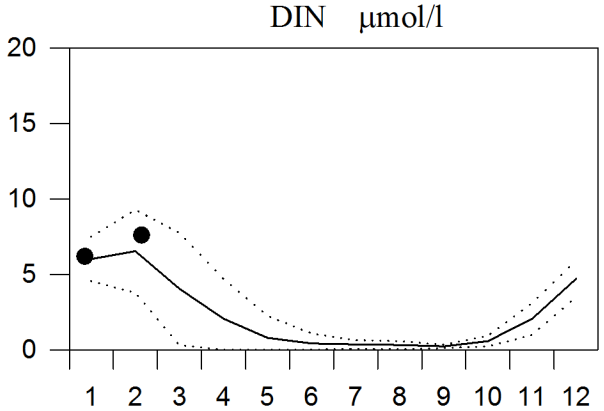
Salinity psu



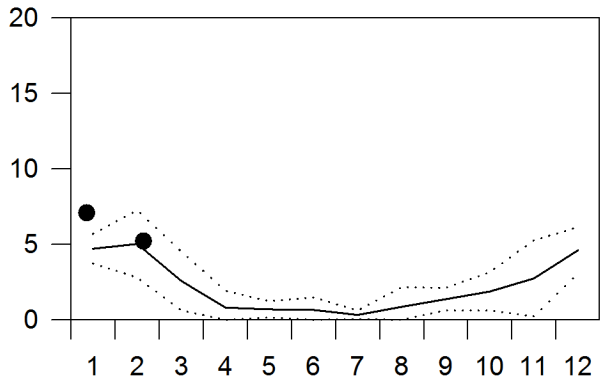
PO_4 µmol/l



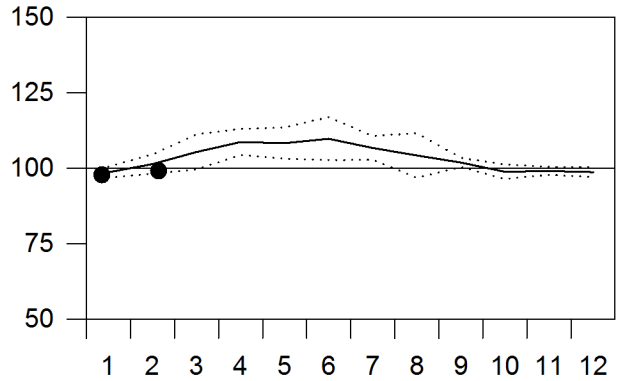
DIN µmol/l



SiO_3 µmol/l

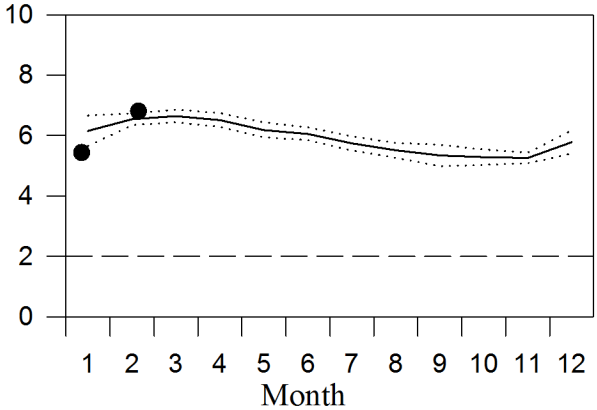


O_2 saturation %

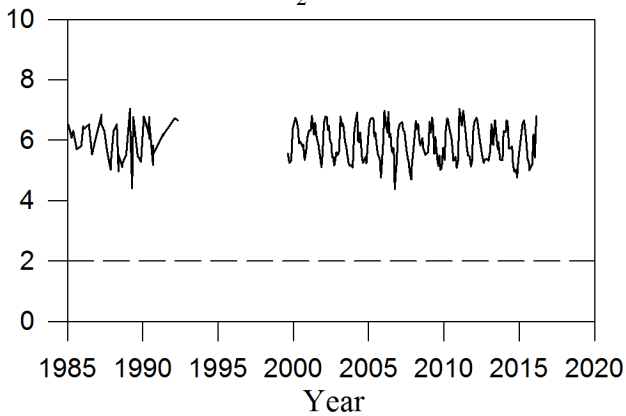


OXYGEN IN BOTTOM WATER (depth >=125m)

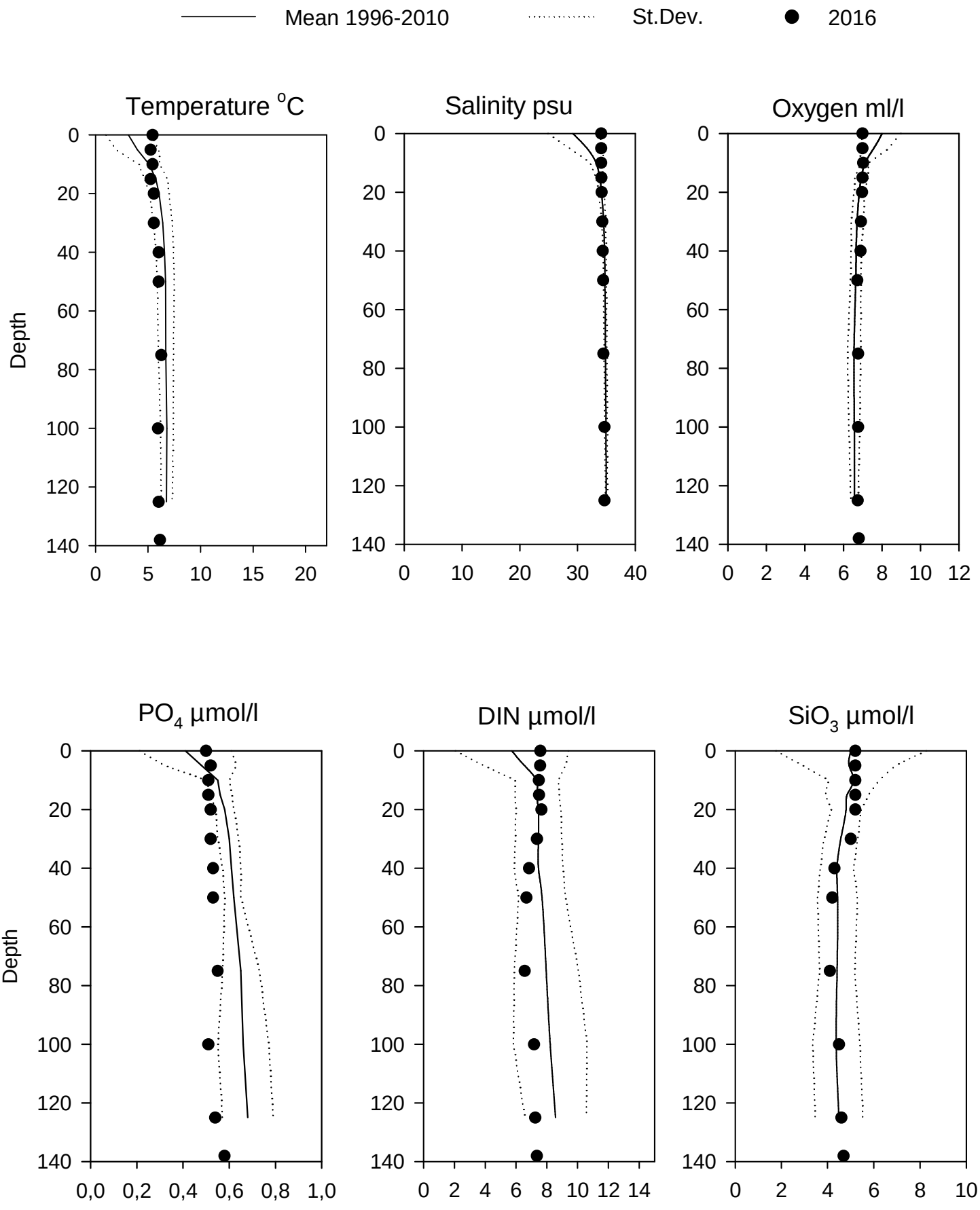
O_2 ml/l



O_2 ml/l



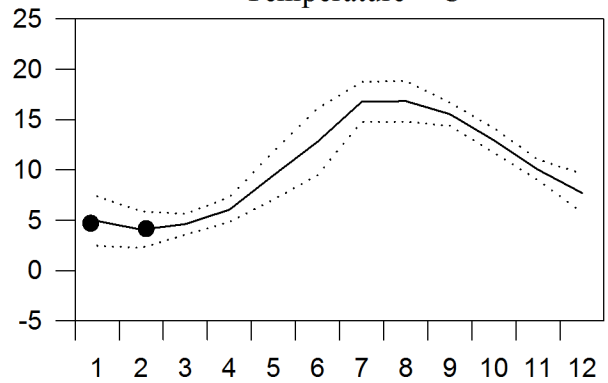
Vertical profiles Å15 February



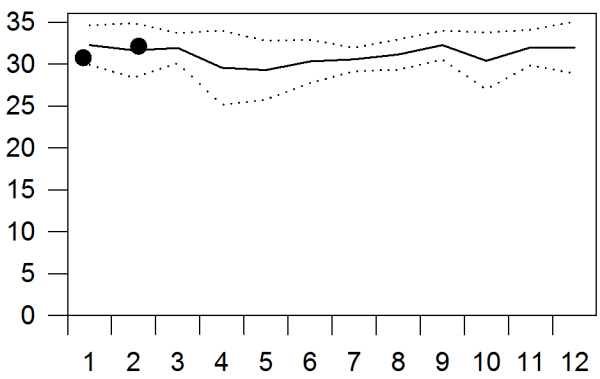
STATION Å17 SURFACE WATER

Annual Cycles

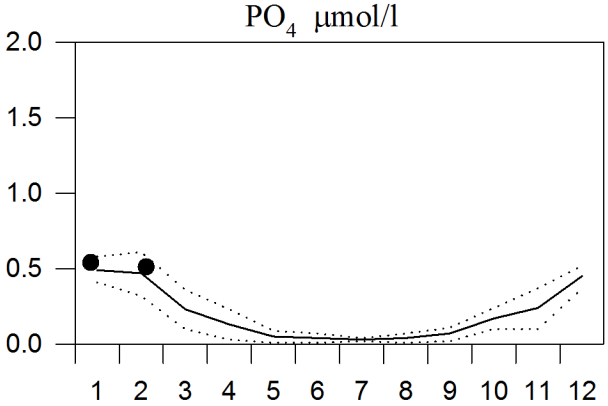
Temperature °C



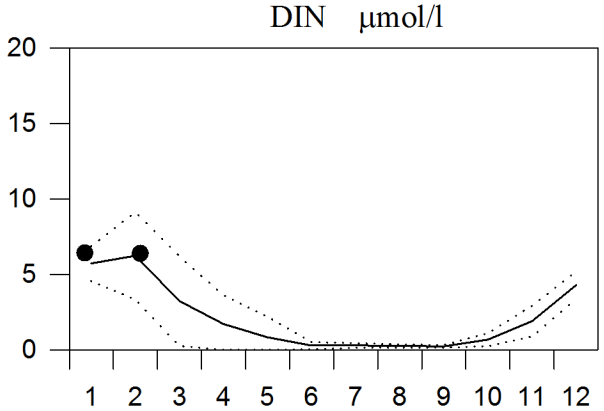
Salinity psu



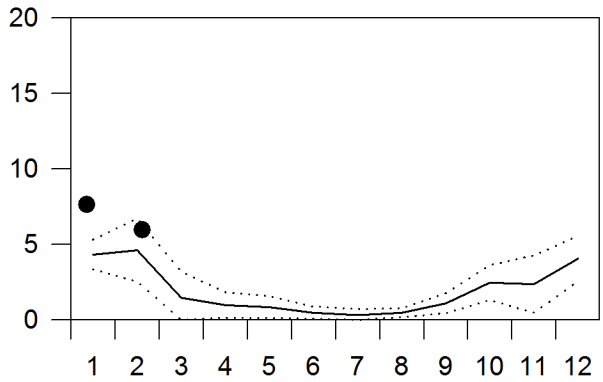
PO_4 µmol/l



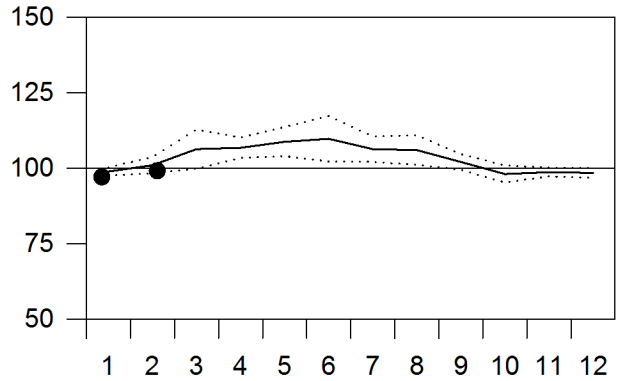
DIN µmol/l



SiO_3 µmol/l

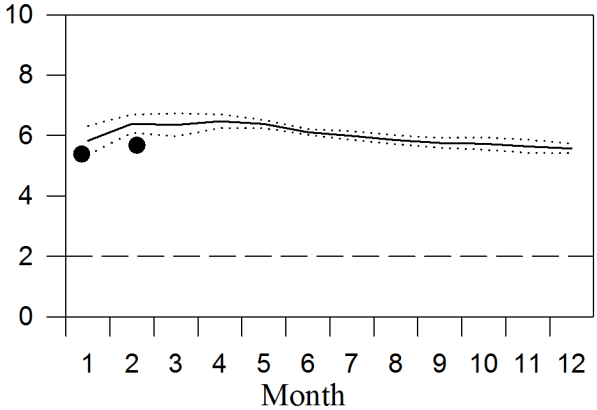


O_2 saturation %

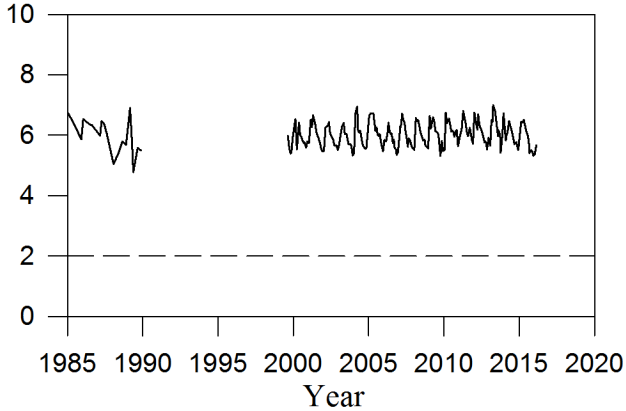


OXYGEN IN BOTTOM WATER (depth = 300m)

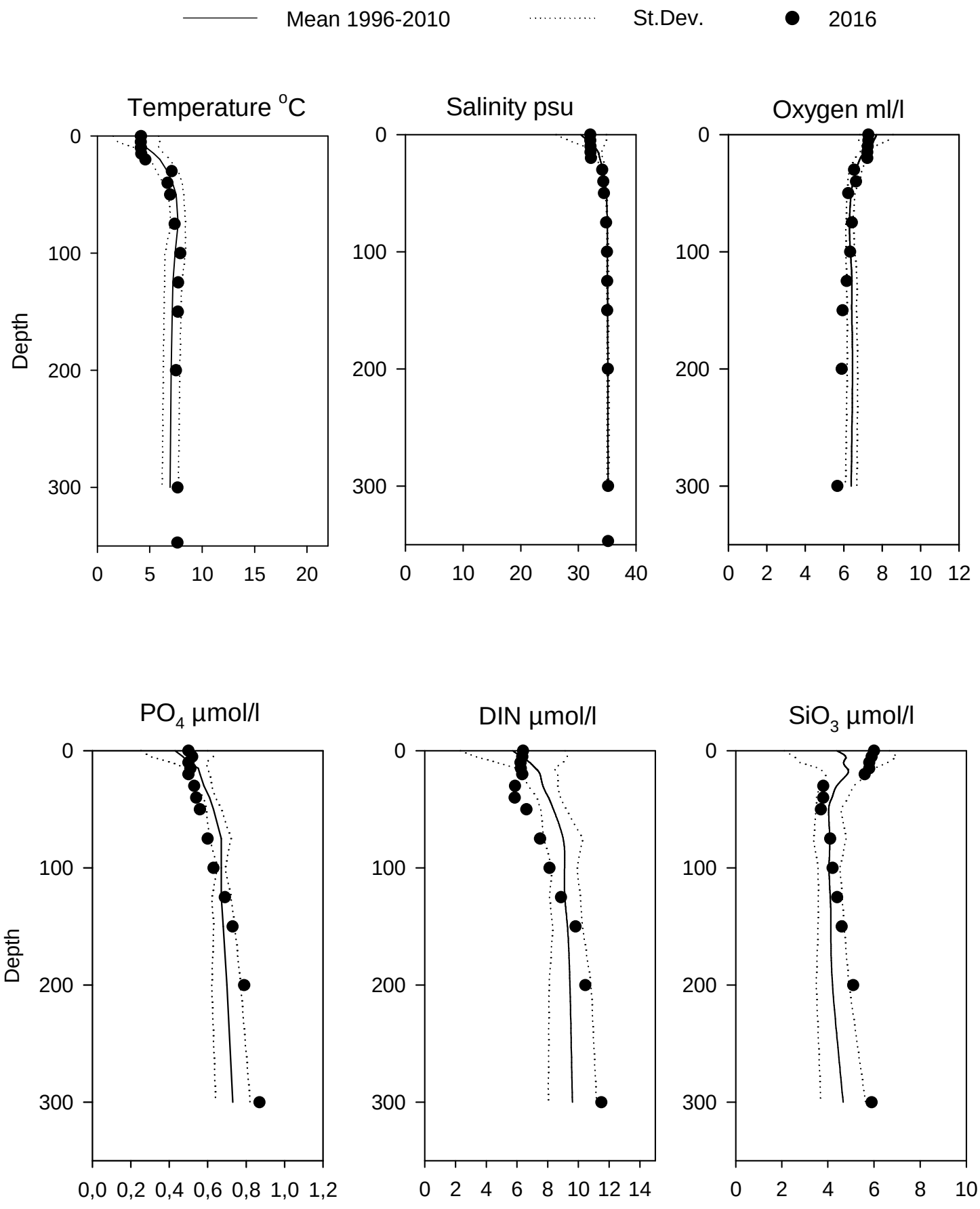
O_2 ml/l



O_2 ml/l



Vertical profiles Å17 February

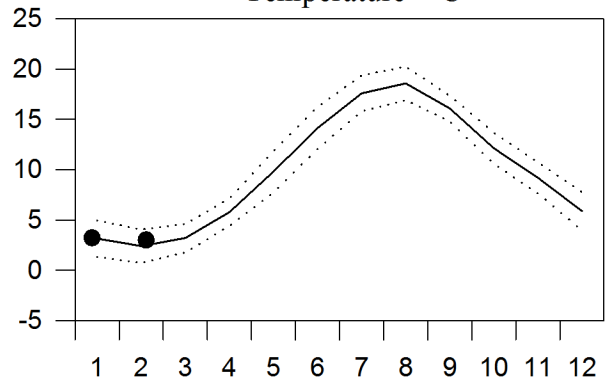


STATION FLADEN SURFACE WATER

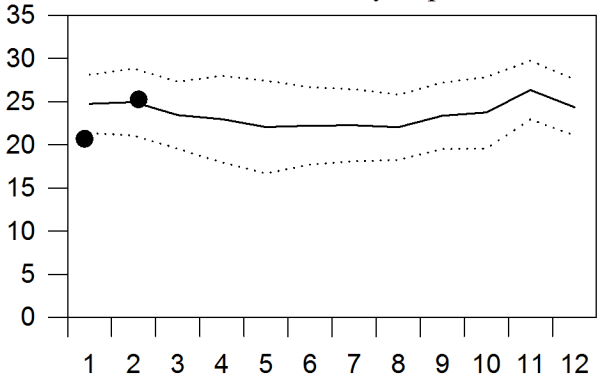
Annual Cycles

Mean 1996-2010 ····· St.Dev. ● 2016

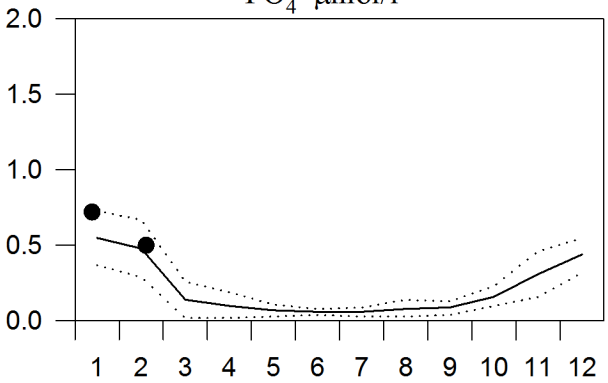
Temperature °C



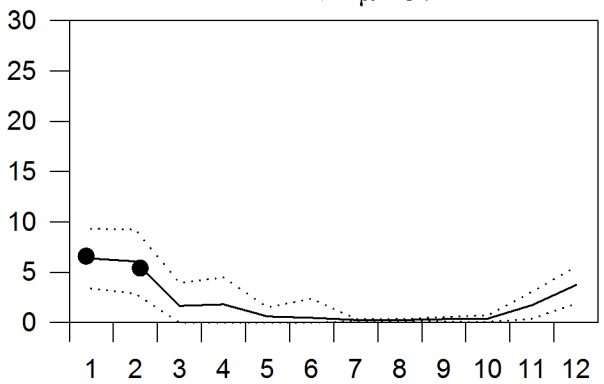
Salinity psu



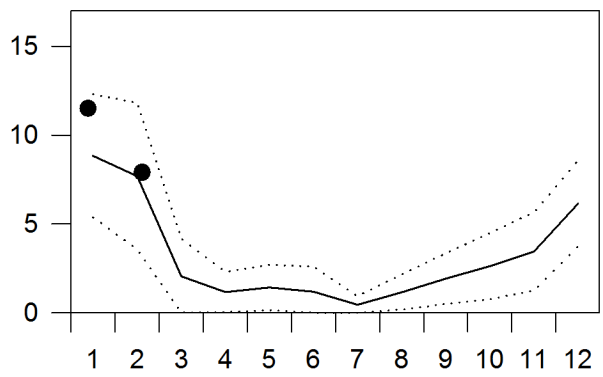
PO_4 µmol/l



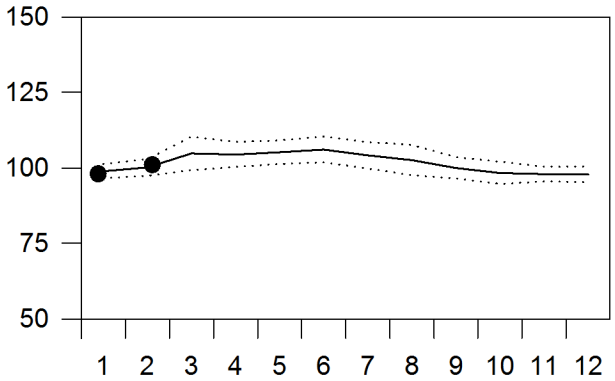
DIN µmol/l



SiO_3 µmol/l

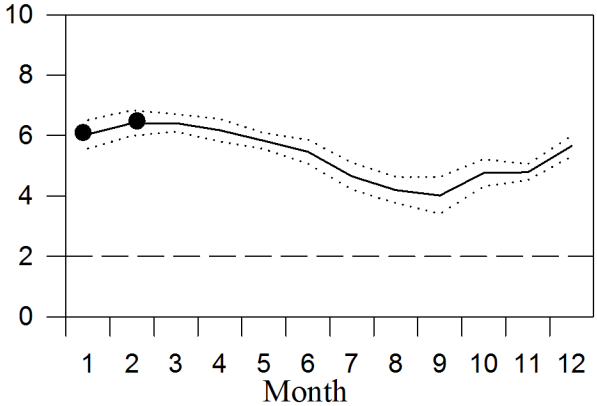


O_2 saturation %

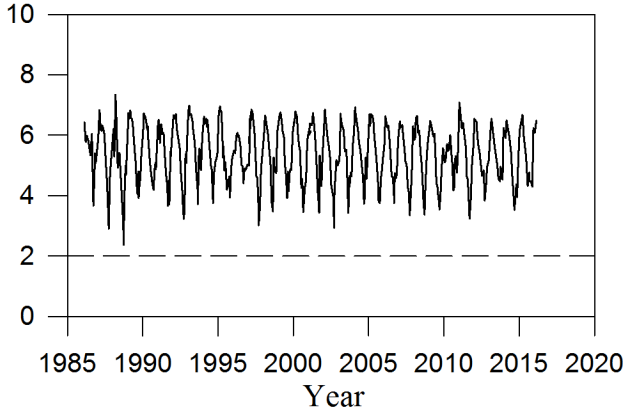


OXYGEN IN BOTTOM WATER (depth > 70m)

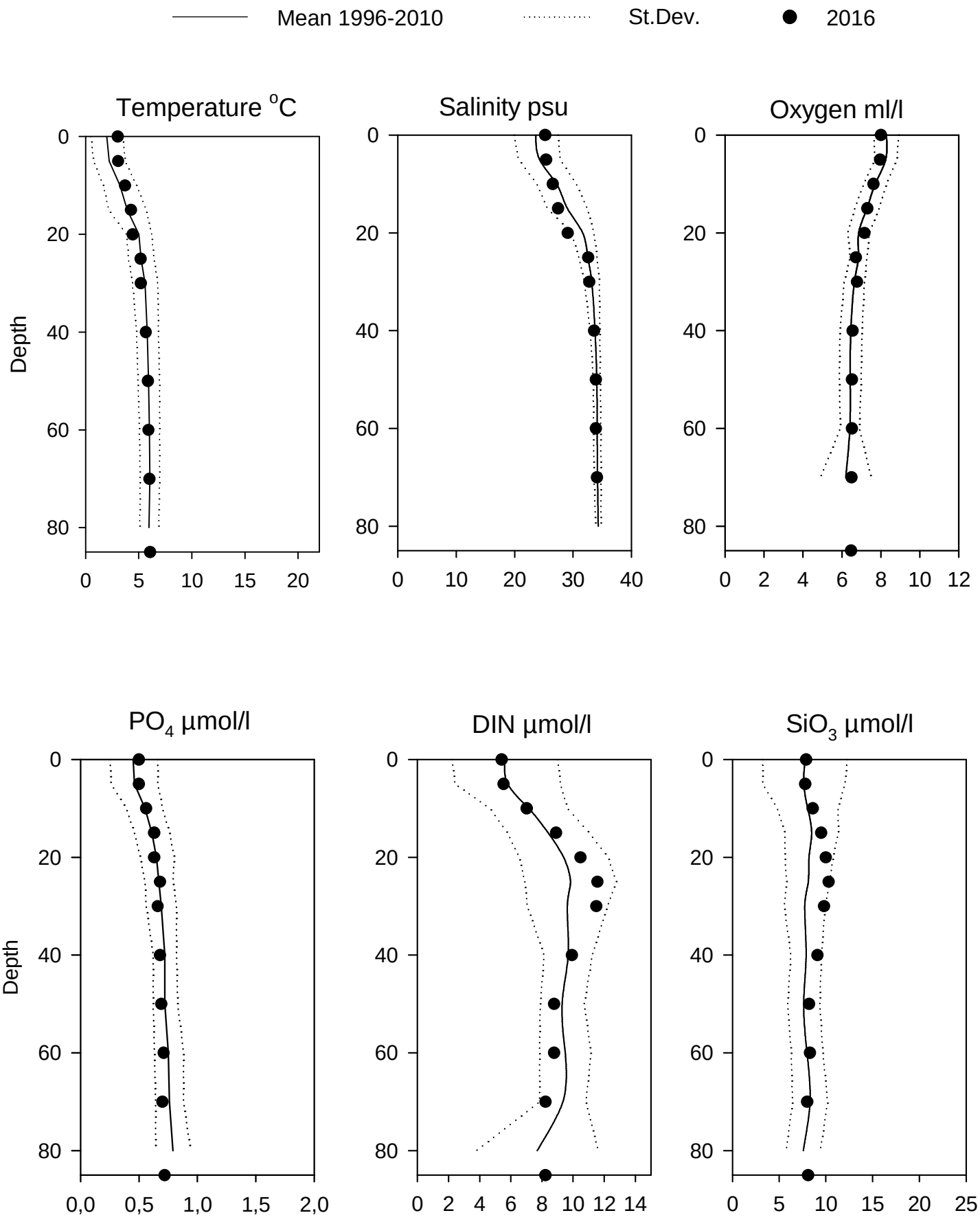
O_2 ml/l



O_2 ml/l



Vertical profiles Fladen February

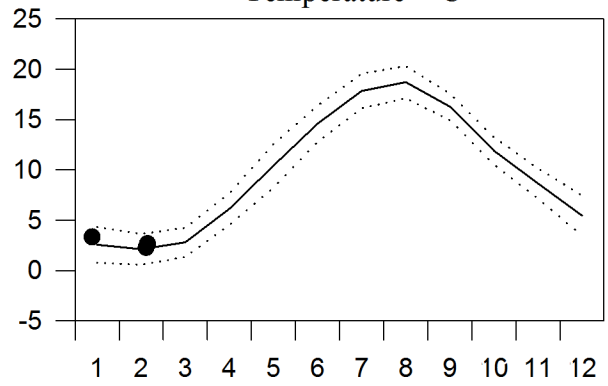


STATION ANHOLT E SURFACE WATER

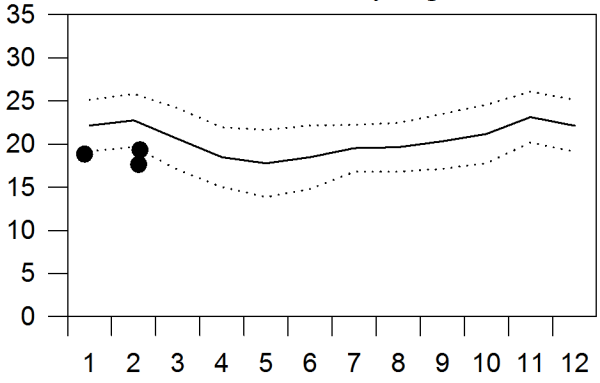
Annual Cycles

Mean 1996-2010 ····· St.Dev. ● 2016

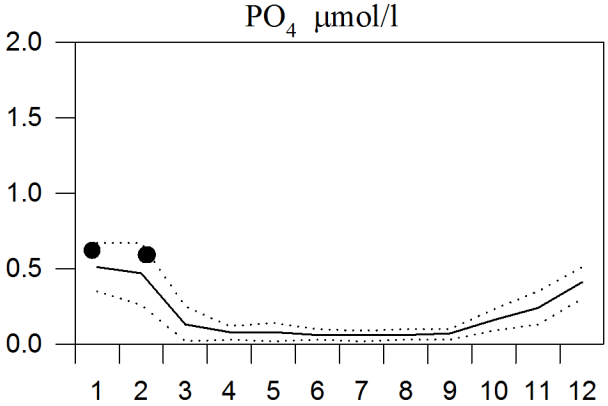
Temperature °C



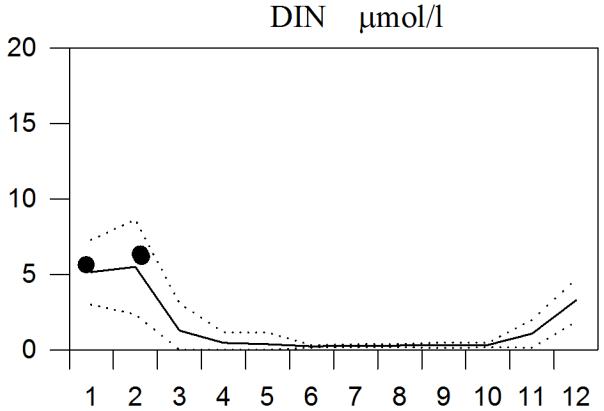
Salinity psu



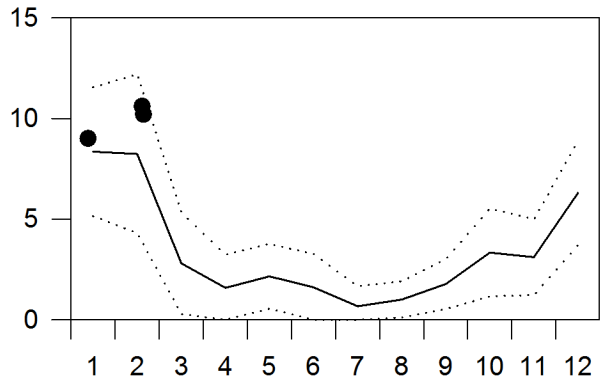
PO_4 µmol/l



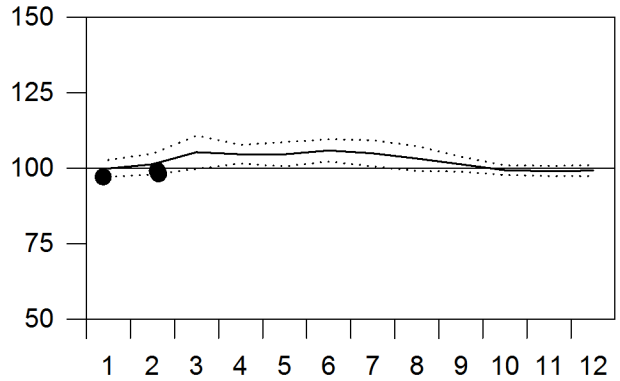
DIN µmol/l



SiO_3 µmol/l

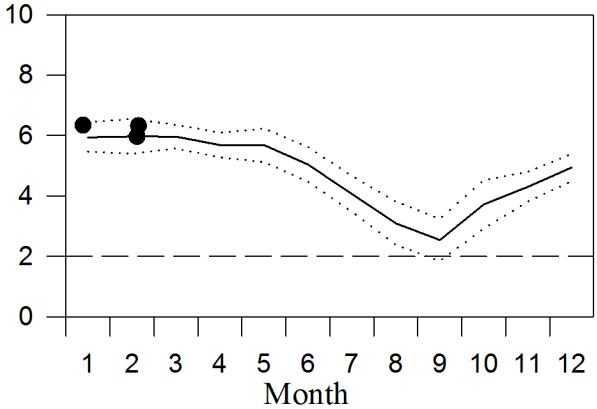


O_2 saturation %

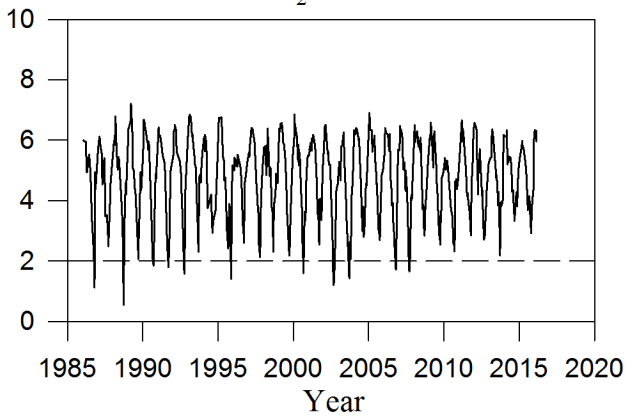


OXYGEN IN BOTTOM WATER (depth > 50m)

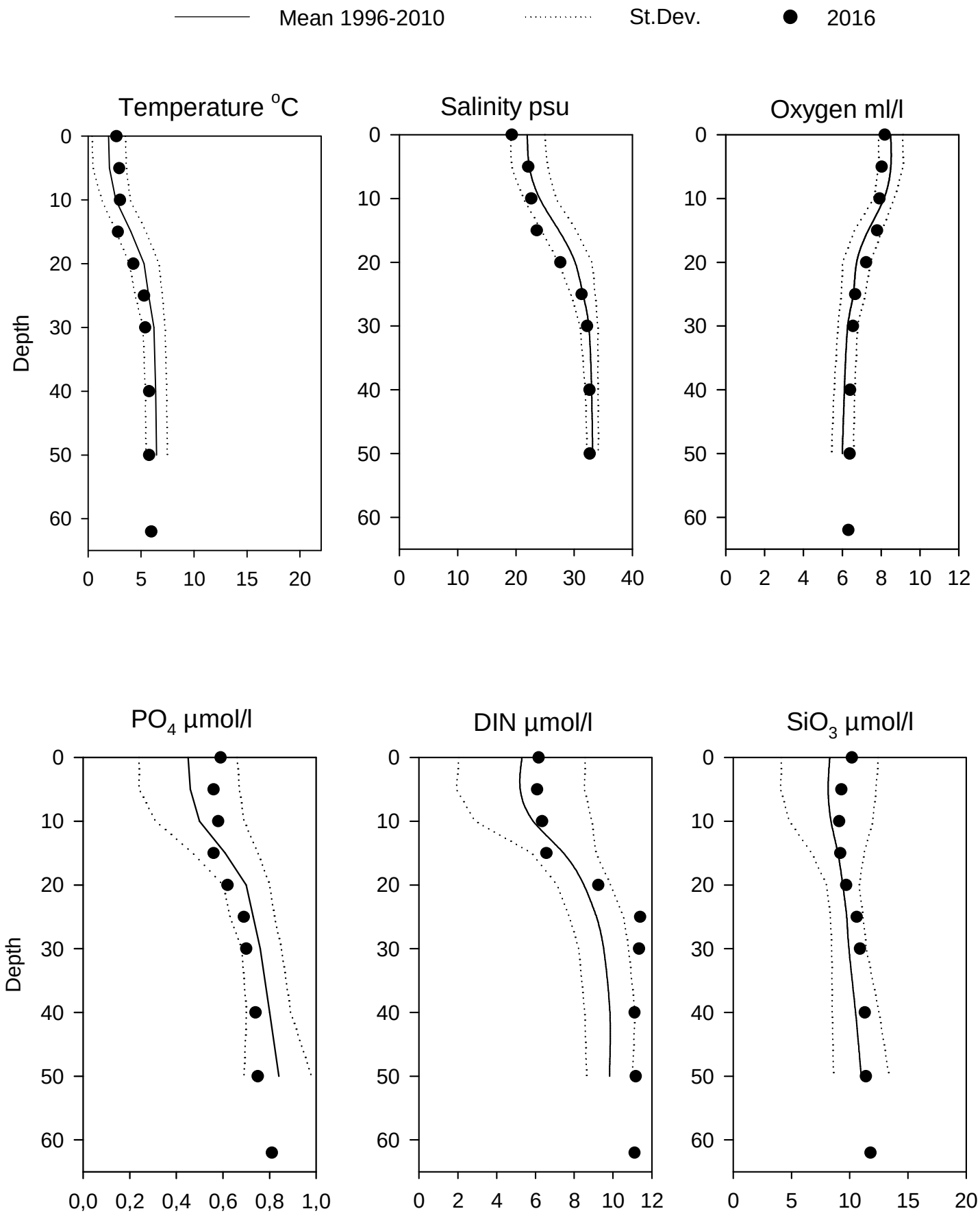
O_2 ml/l



O_2 ml/l



Vertical profiles Anholt E February

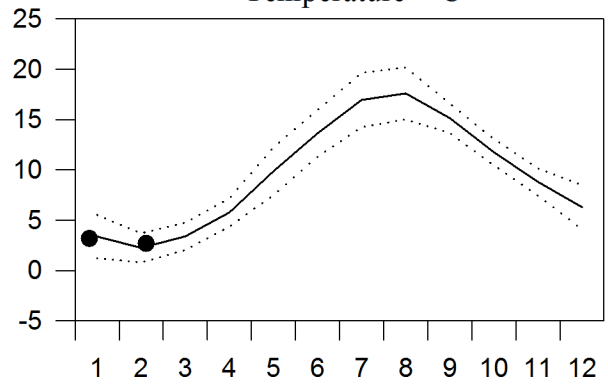


STATION W LANDSKRONA SURFACE WATER

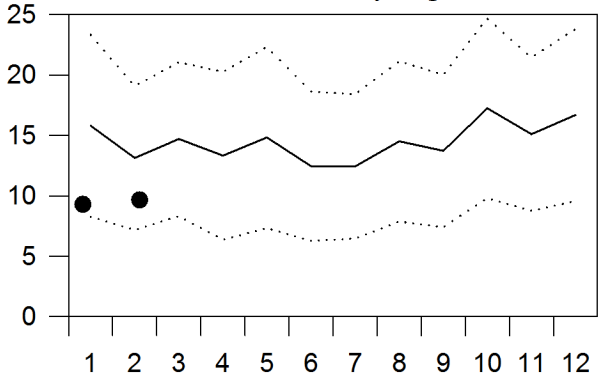
Annual Cycles

Mean 1996-2010 ····· St.Dev. ● 2016

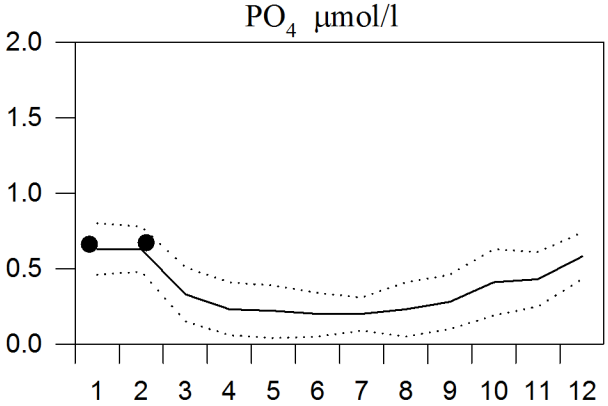
Temperature °C



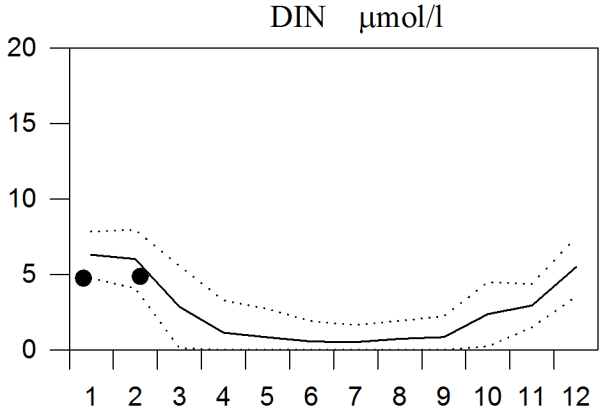
Salinity psu



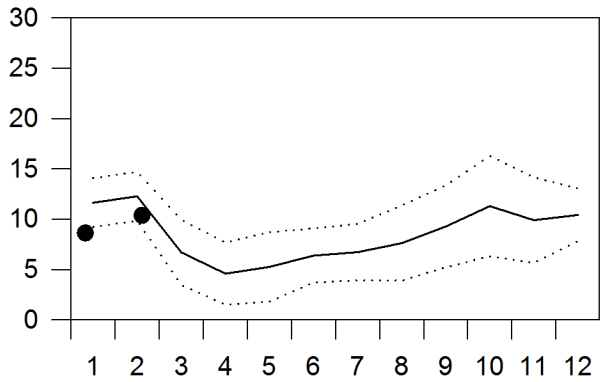
PO_4 µmol/l



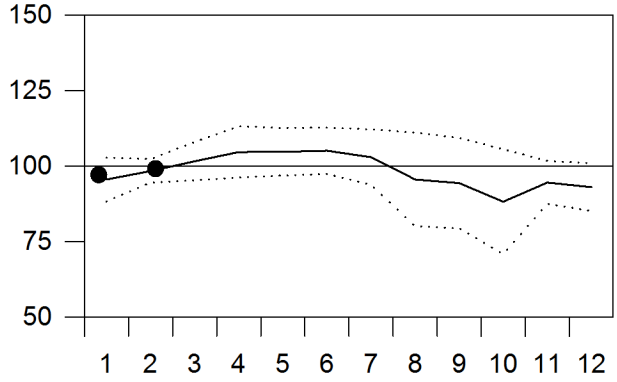
DIN µmol/l



SiO_3 µmol/l

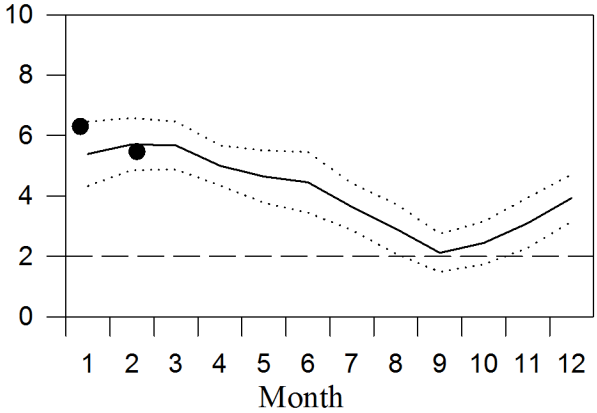


O_2 saturation %

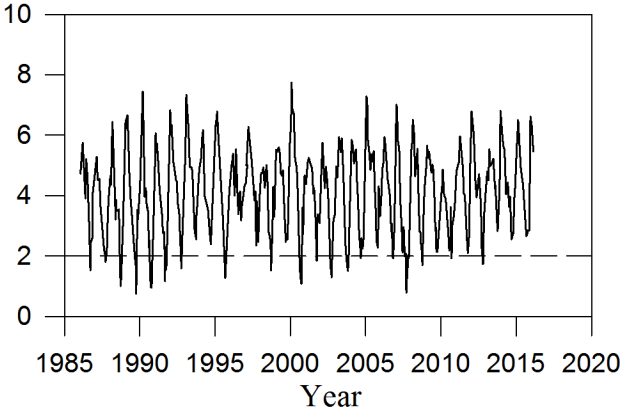


OXYGEN IN BOTTOM WATER (depth >40m)

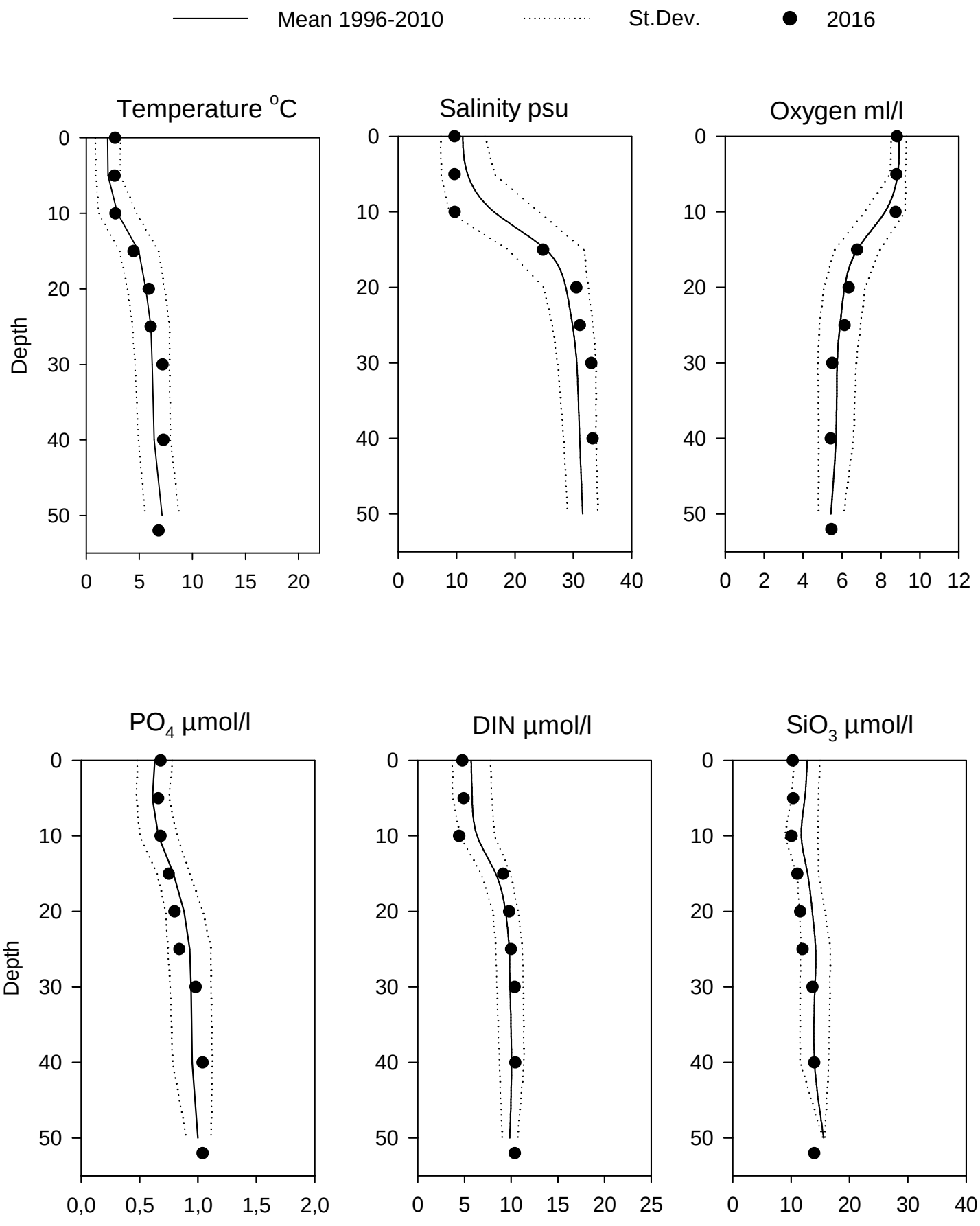
O_2 ml/l



O_2 ml/l



Vertical profiles W Landskrona Febuary

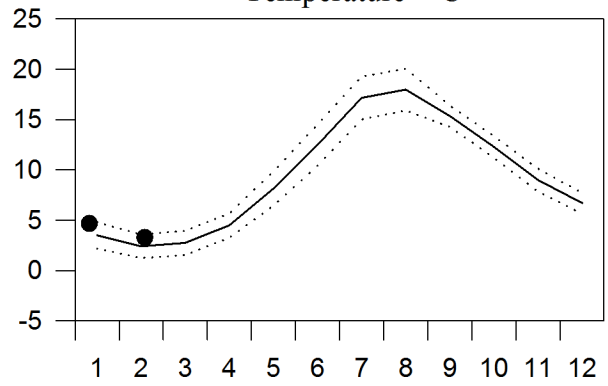


STATION BY1 SURFACE WATER

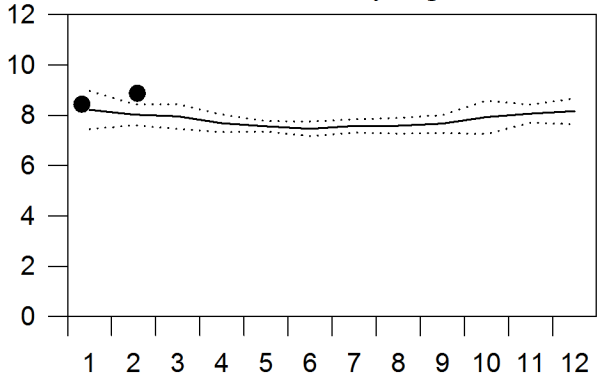
Annual Cycles

Mean 1996-2010 ····· St.Dev. ● 2016

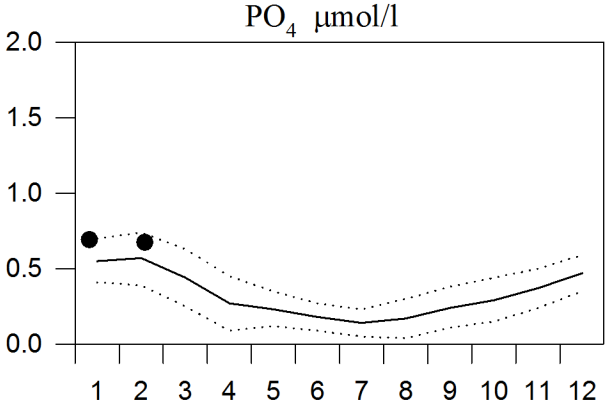
Temperature °C



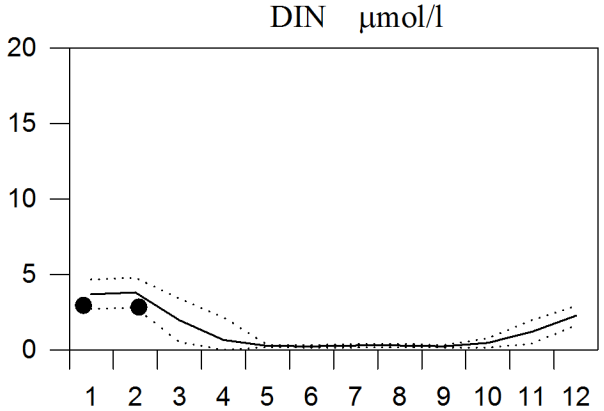
Salinity psu



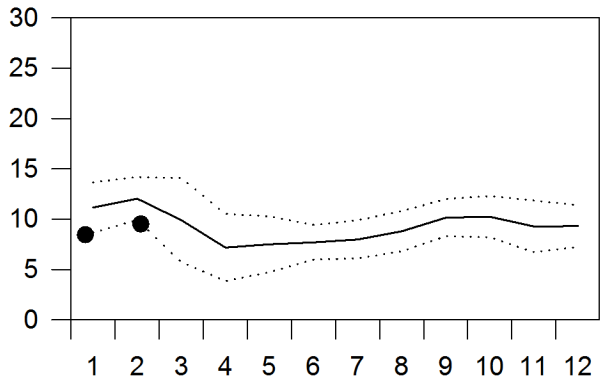
PO_4 µmol/l



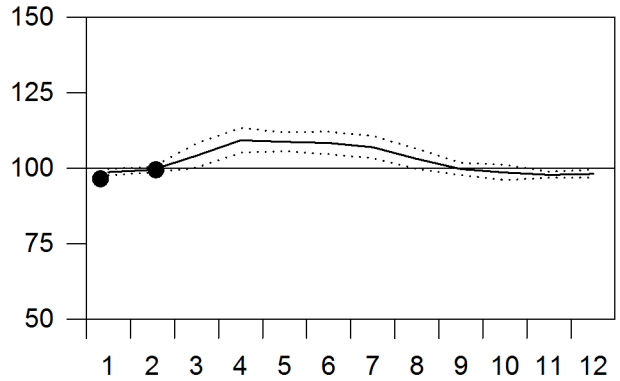
DIN µmol/l



SiO_3 µmol/l

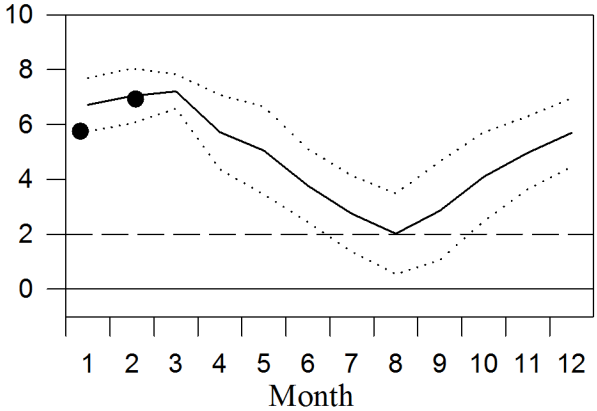


O_2 saturation %

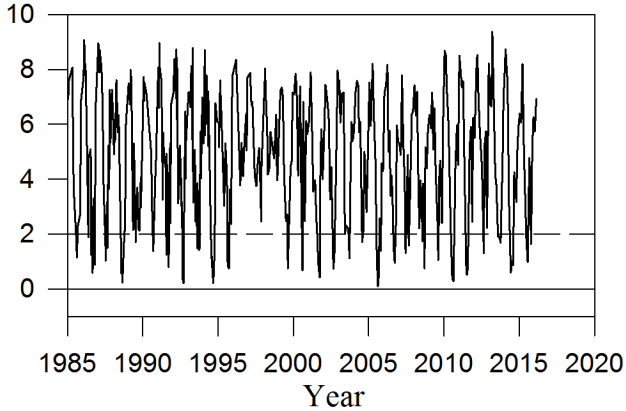


OXYGEN IN BOTTOM WATER (depth >40m)

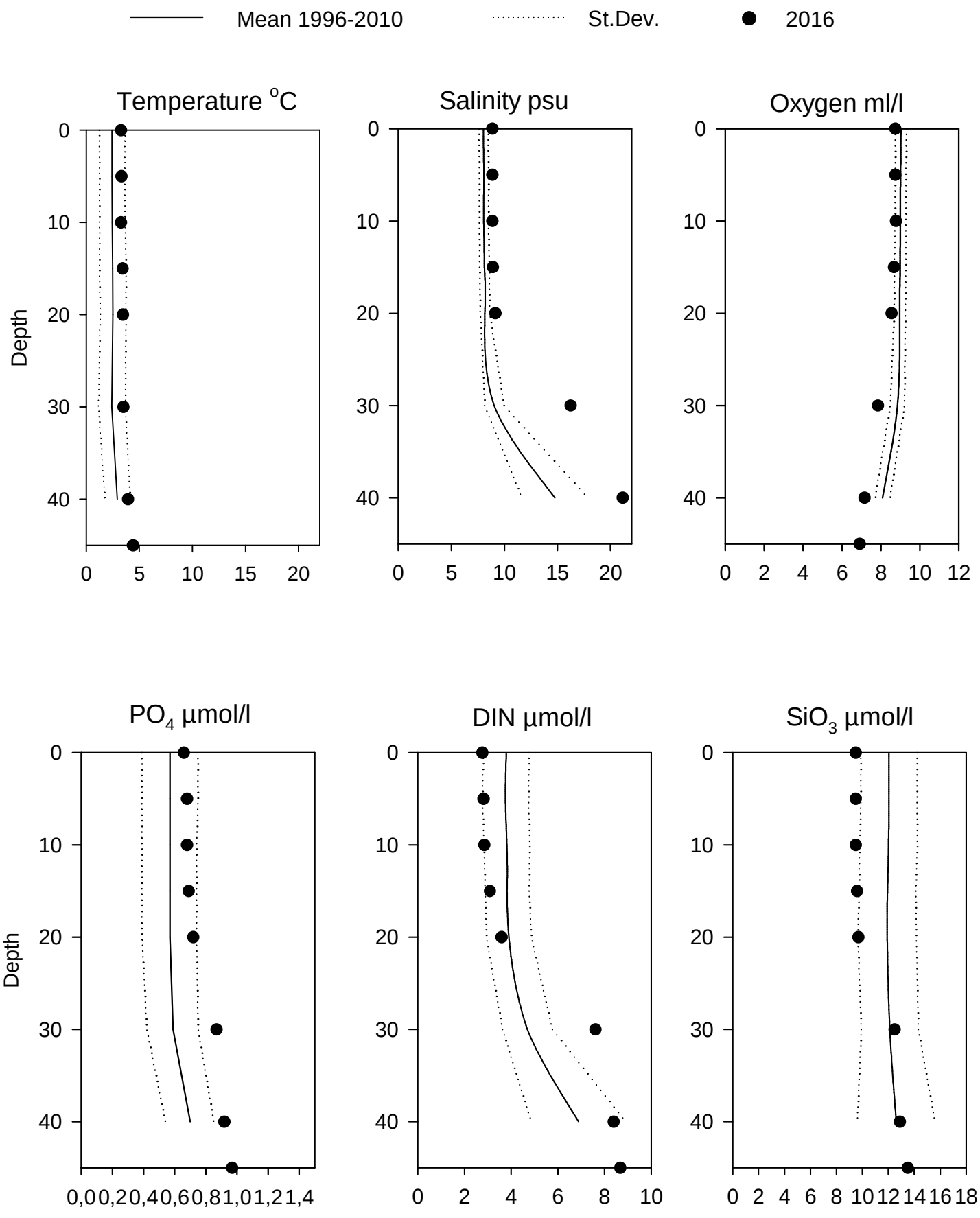
O_2 ml/l



O_2 ml/l



Vertical profiles BY1 February

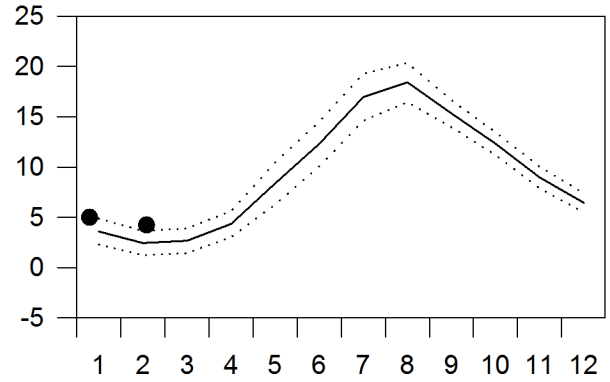


STATION BY2 SURFACE WATER

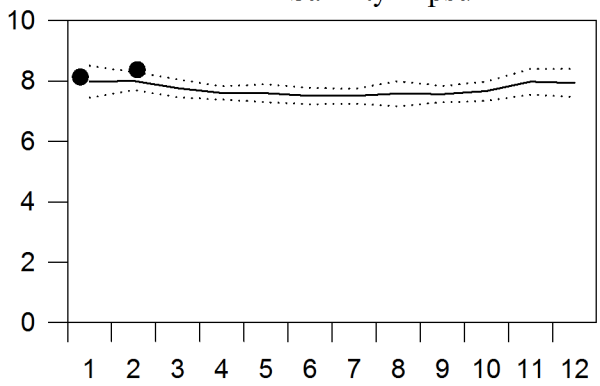
Annual Cycles

Mean 1996-2010 ····· St.Dev. ● 2016

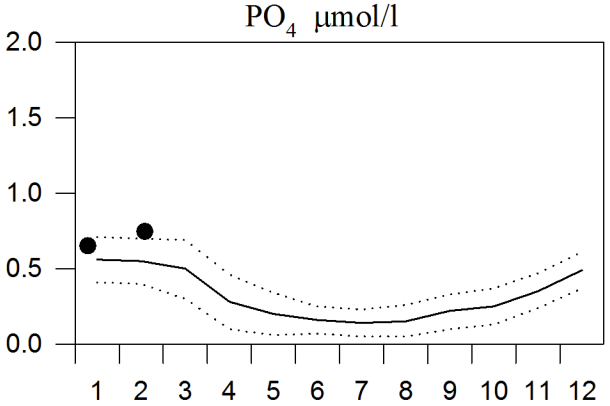
Temperature °C



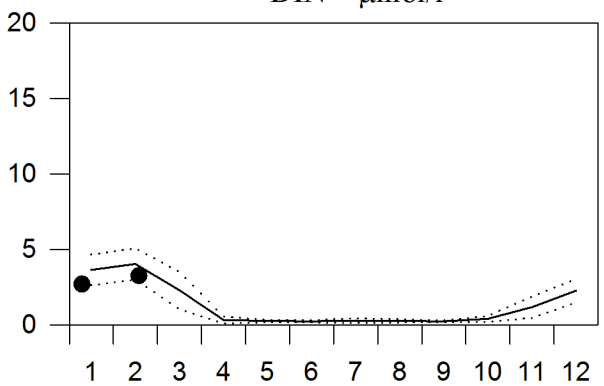
Salinity psu



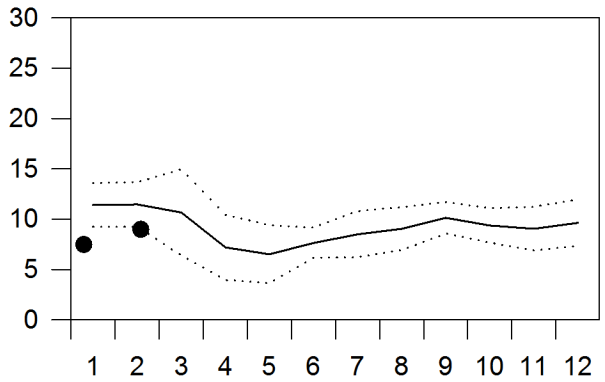
PO_4 µmol/l



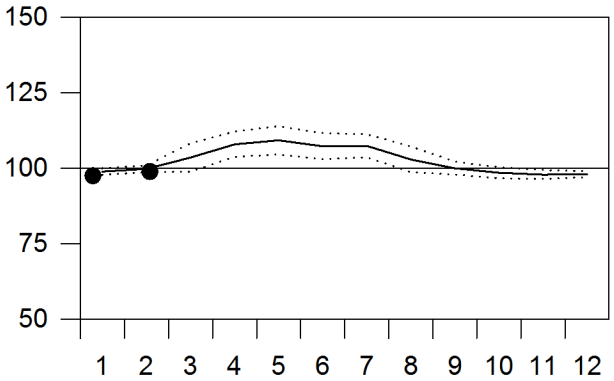
DIN µmol/l



SiO_3 µmol/l

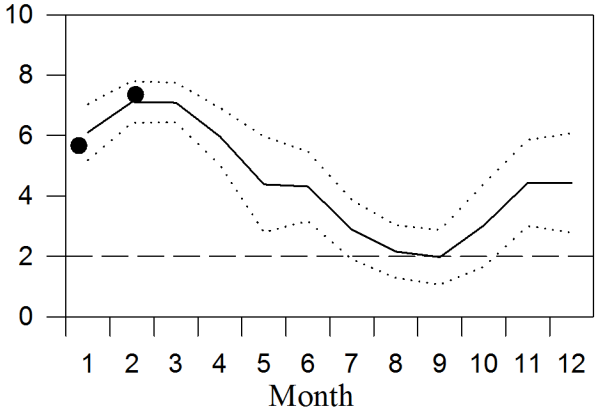


O_2 saturation %

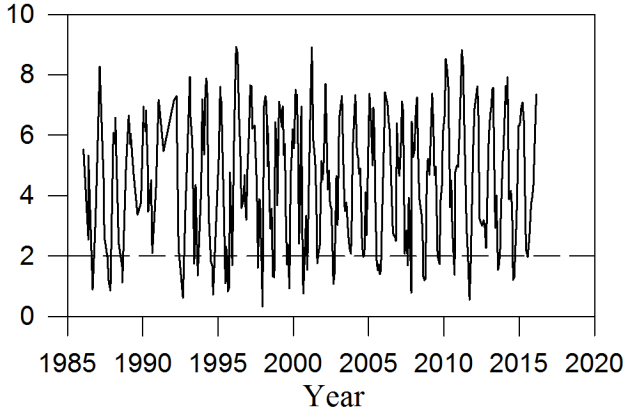


OXYGEN IN BOTTOM WATER (depth >40m)

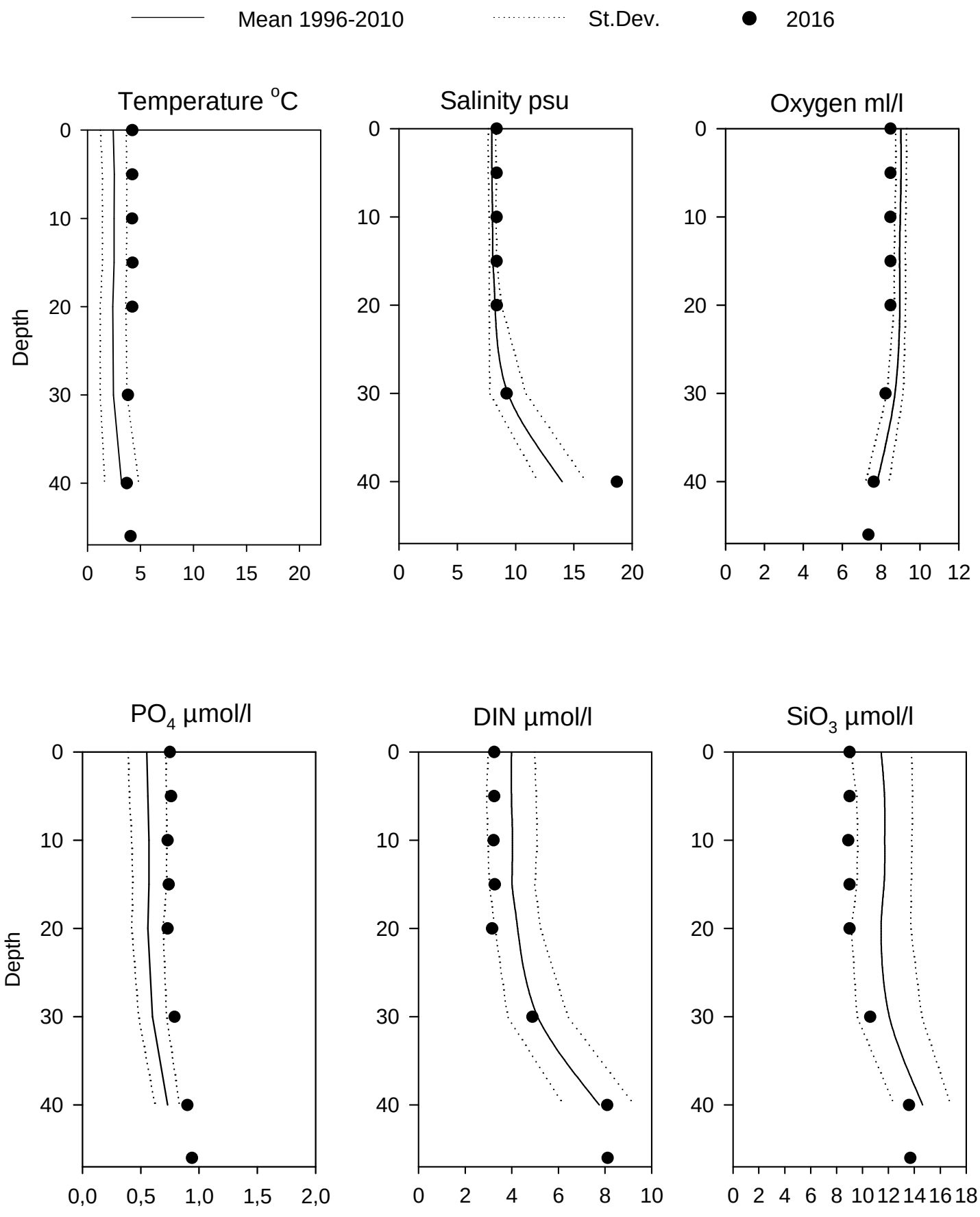
O_2 ml/l



O_2 ml/l



Vertical profiles BY2 February

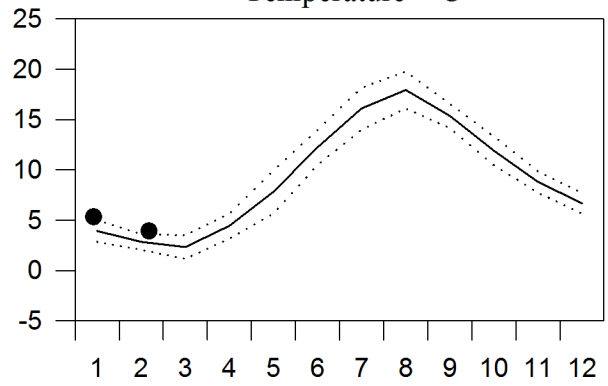


STATION HANÖBUKTEN SURFACE WATER

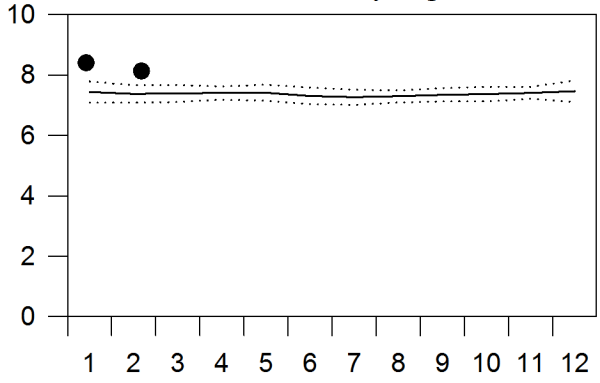
Annual Cycles

Mean 1996-2010 ····· St.Dev. ● 2016

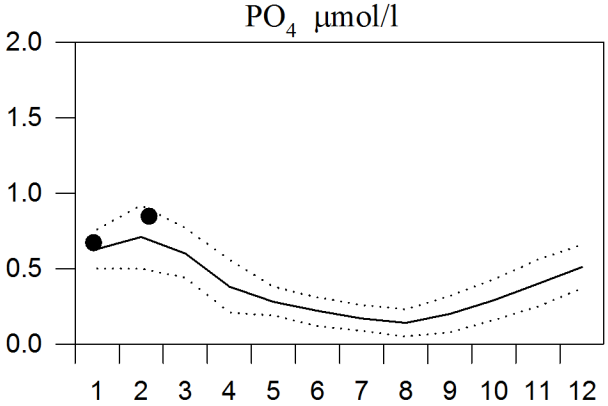
Temperature °C



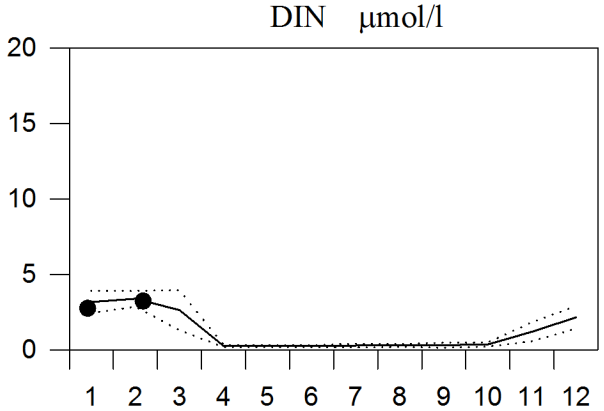
Salinity psu



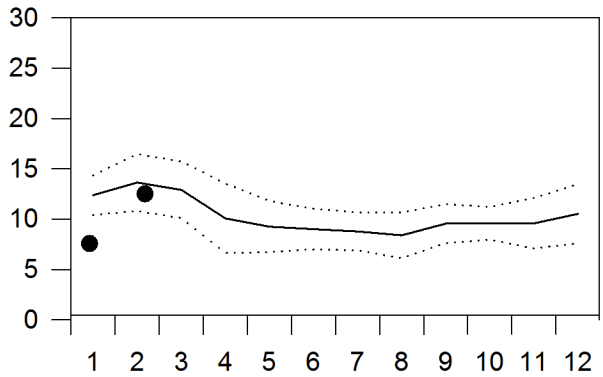
PO_4 µmol/l



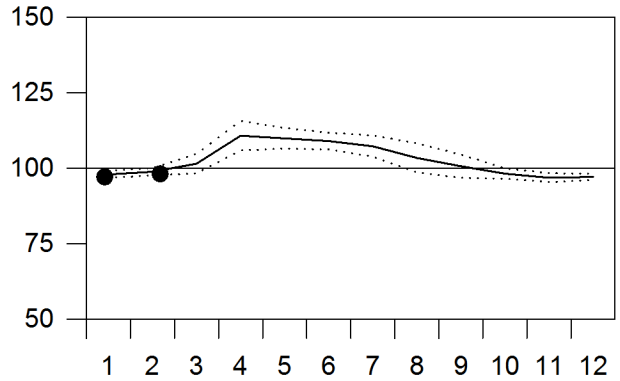
DIN µmol/l



SiO_3 µmol/l

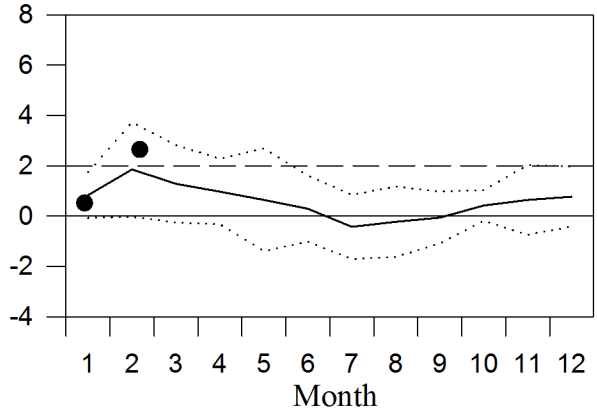


O_2 saturation %

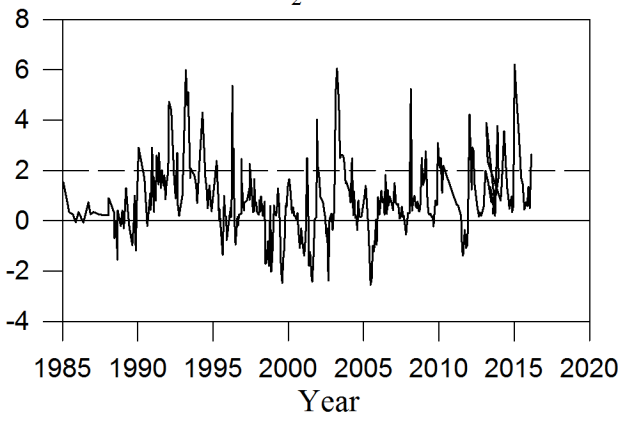


OXYGEN IN BOTTOM WATER (depth > 70m)

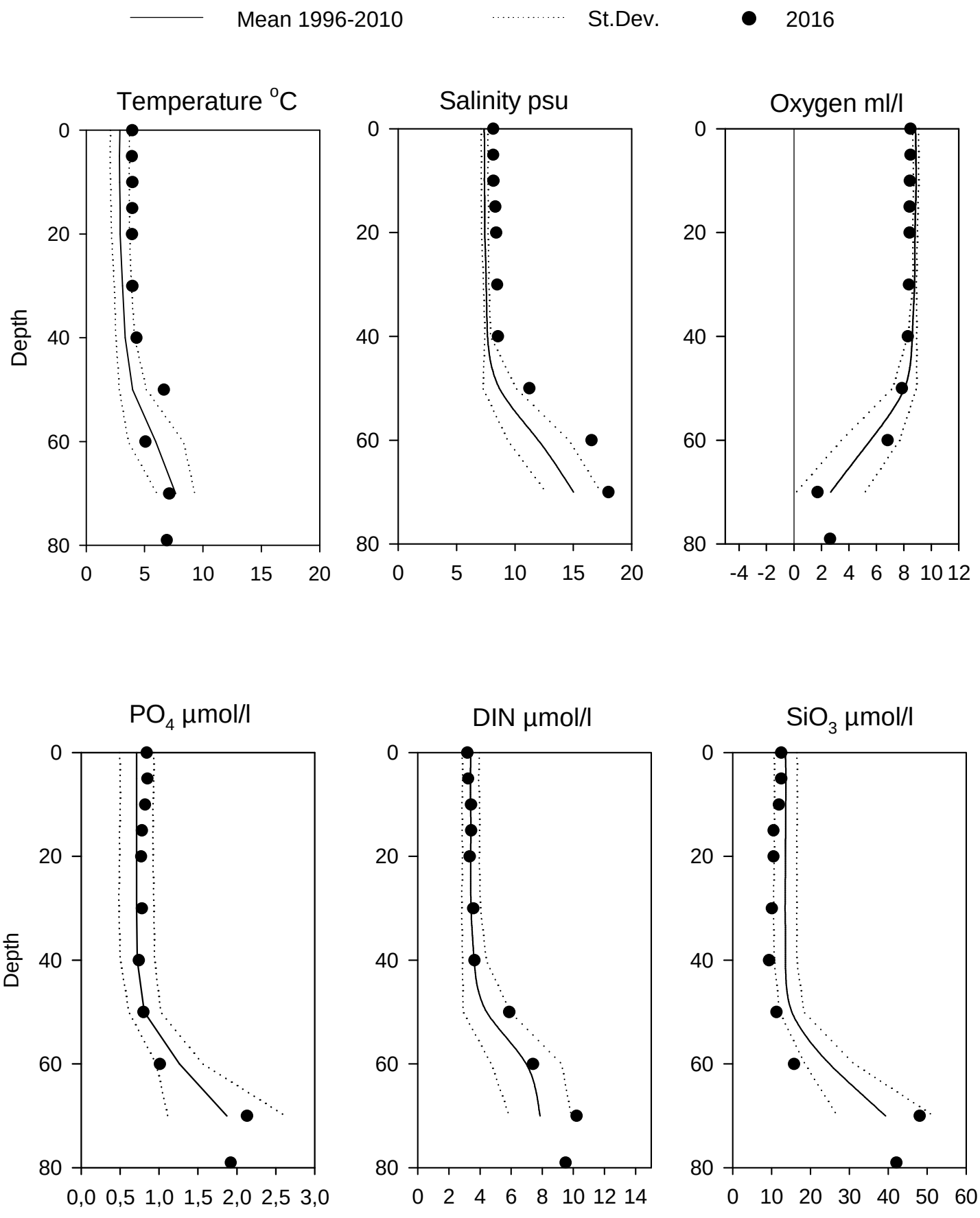
O_2 ml/l



O_2 ml/l



Vertical profiles Hanöbukten February

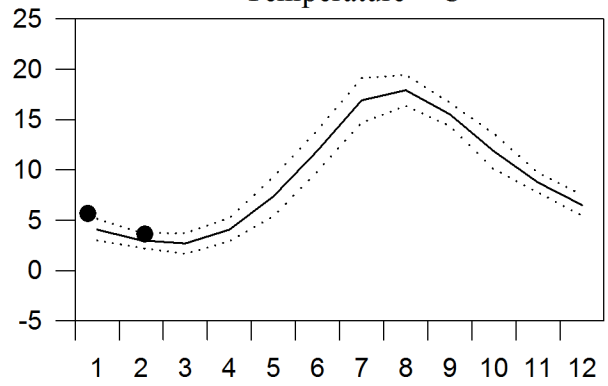


STATION BY4 SURFACE WATER

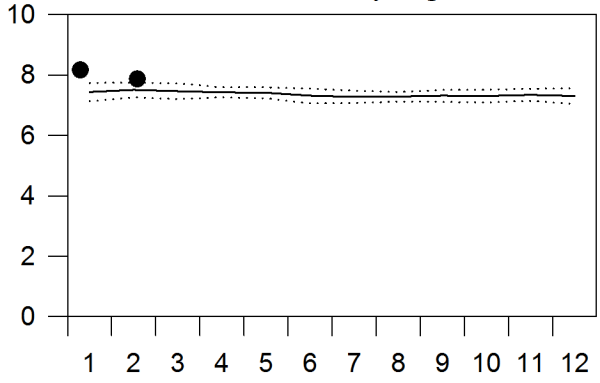
Annual Cycles

Mean 1996-2010 ····· St.Dev. ● 2016

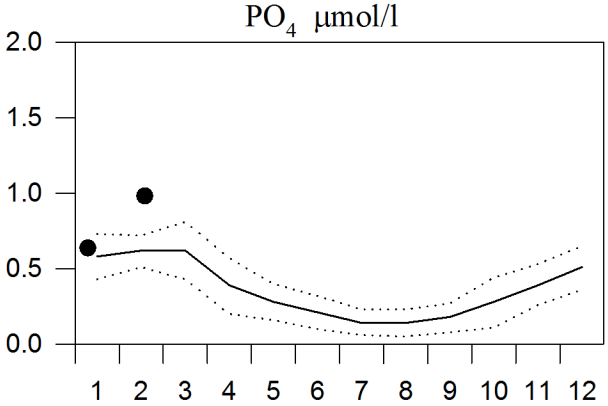
Temperature °C



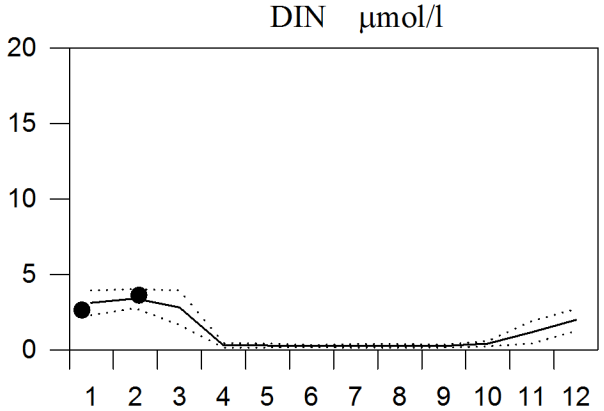
Salinity psu



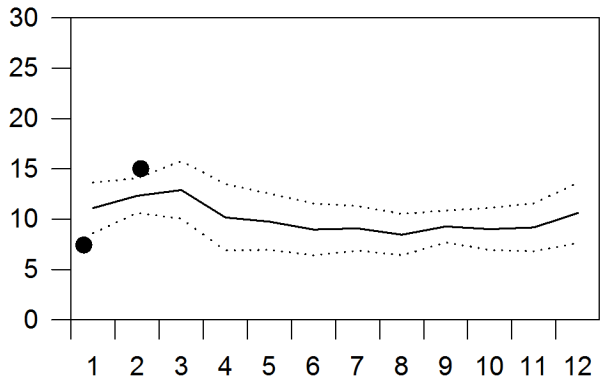
PO_4 µmol/l



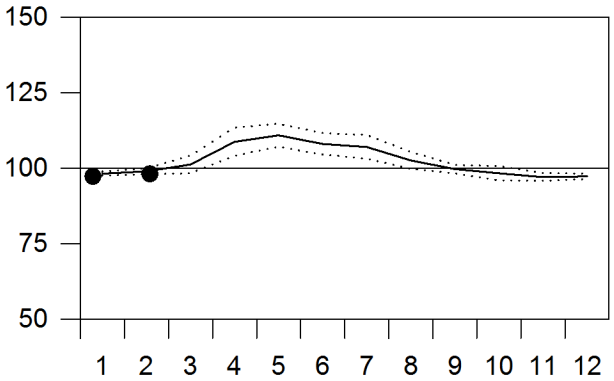
DIN µmol/l



SiO_3 µmol/l

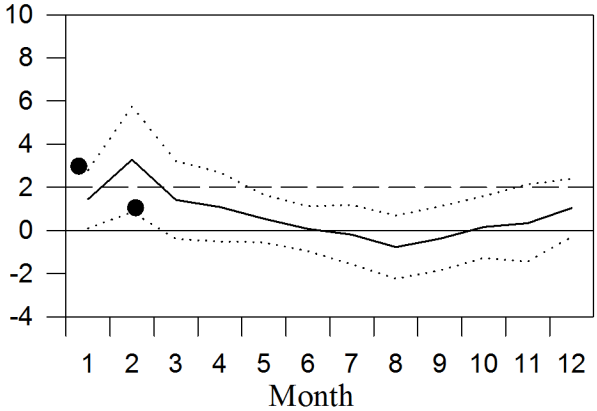


O_2 saturation %

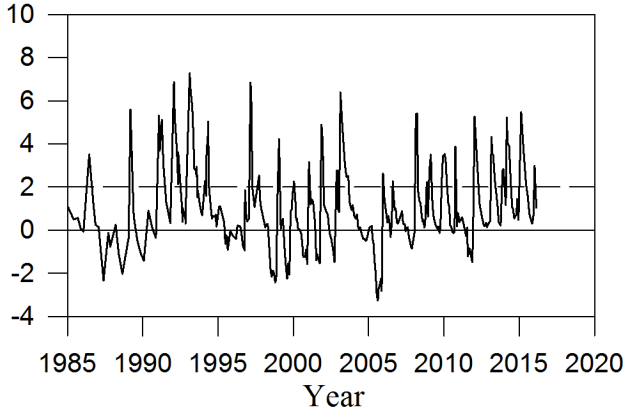


OXYGEN IN BOTTOM WATER (depth >80m)

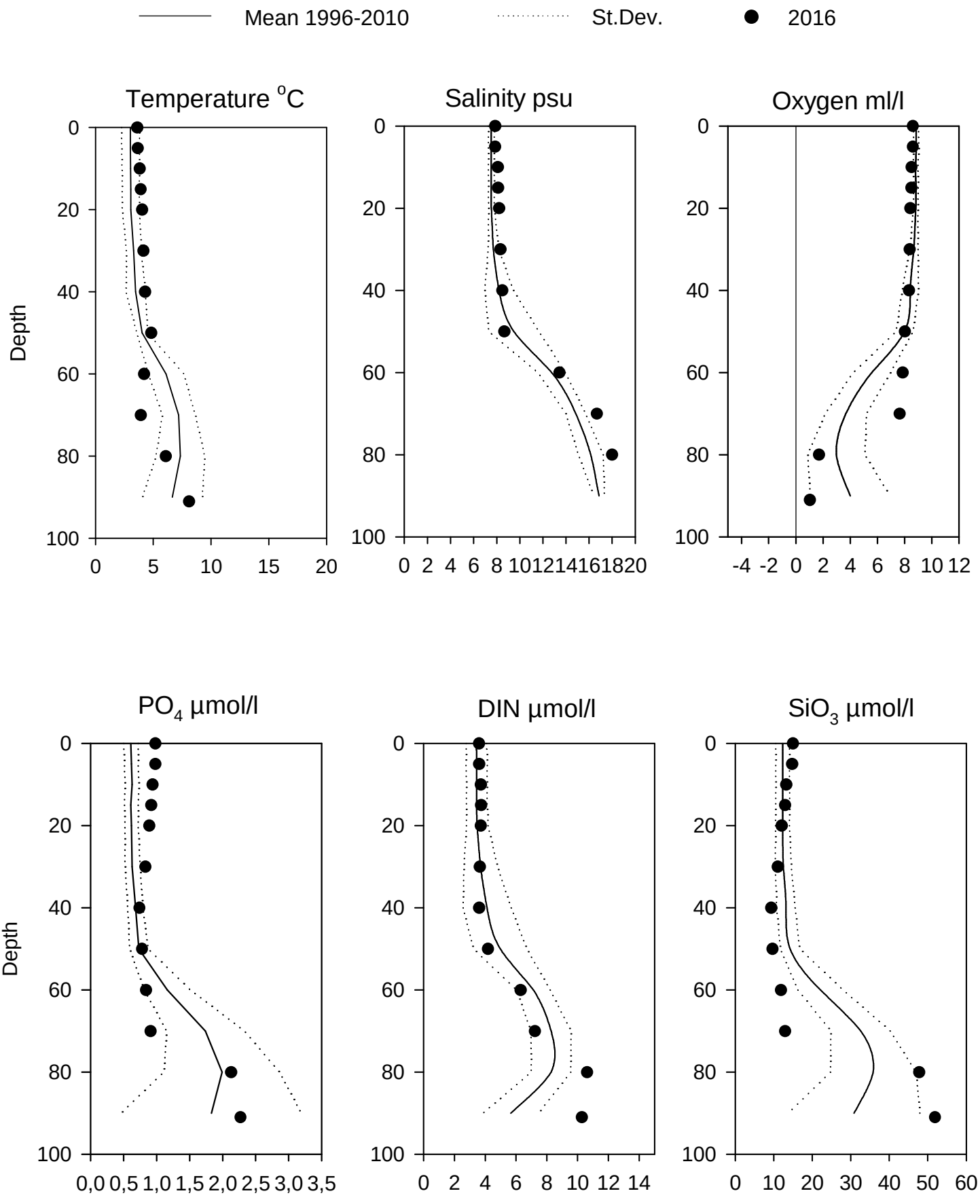
O_2 ml/l



O_2 ml/l



Vertical profiles BY4 February

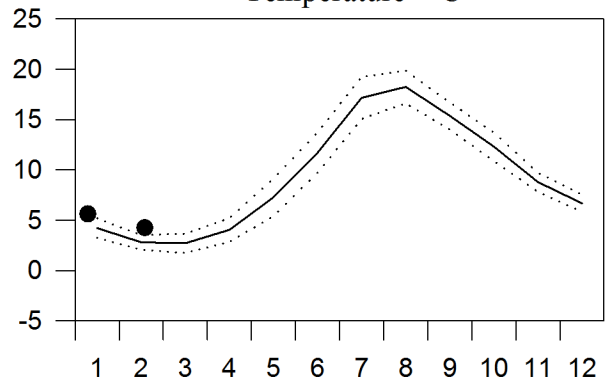


STATION BY5 SURFACE WATER

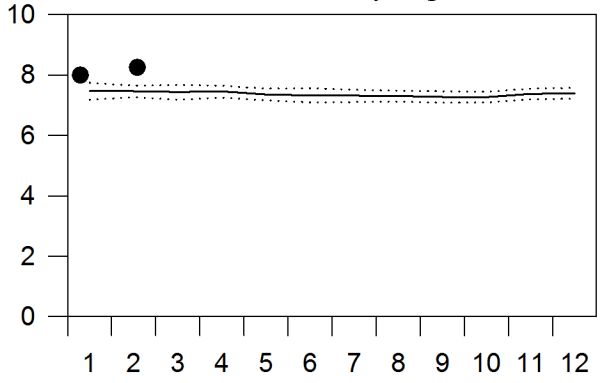
Annual Cycles

Mean 1996-2010 ····· St.Dev. ● 2016

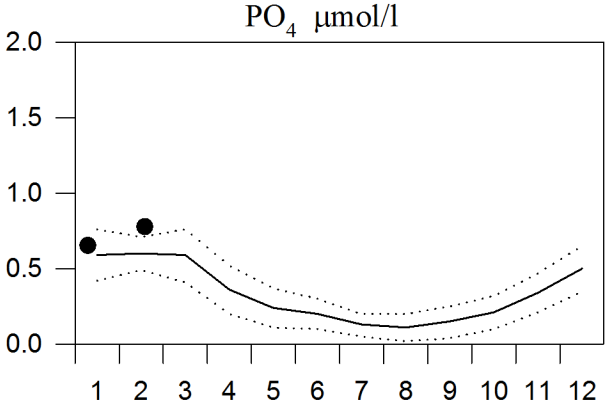
Temperature °C



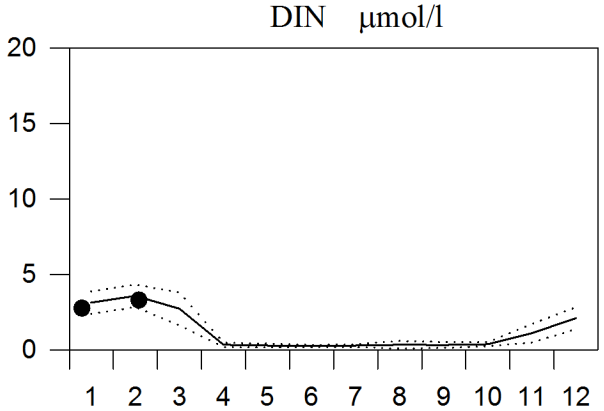
Salinity psu



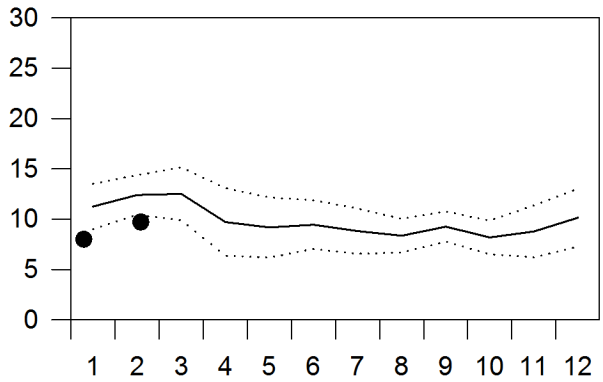
PO_4 µmol/l



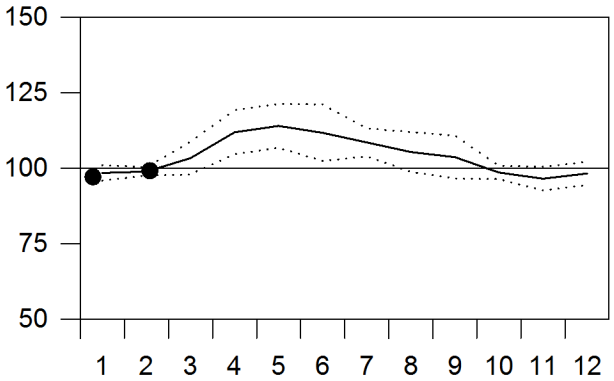
DIN µmol/l



SiO_3 µmol/l

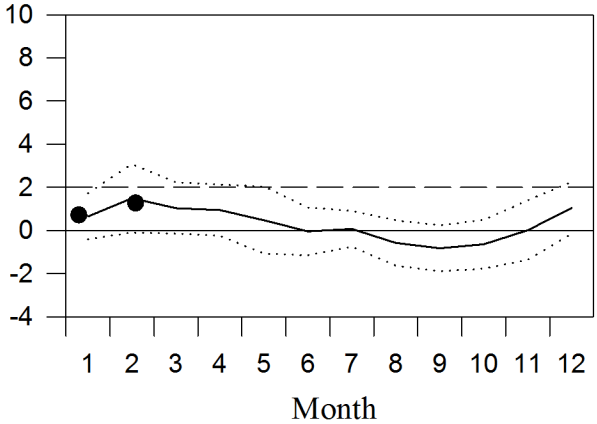


O_2 saturation %

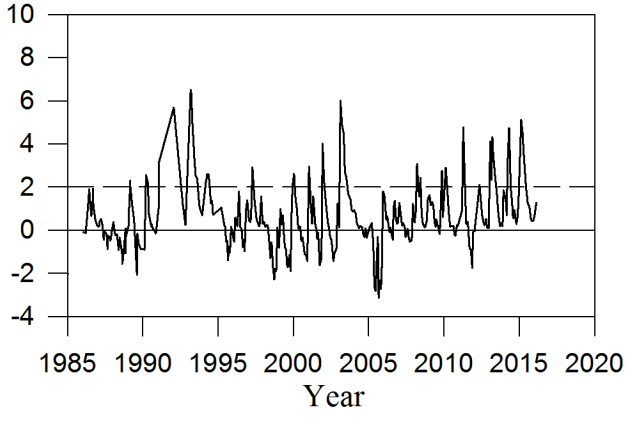


OXYGEN IN BOTTOM WATER (depth >80m)

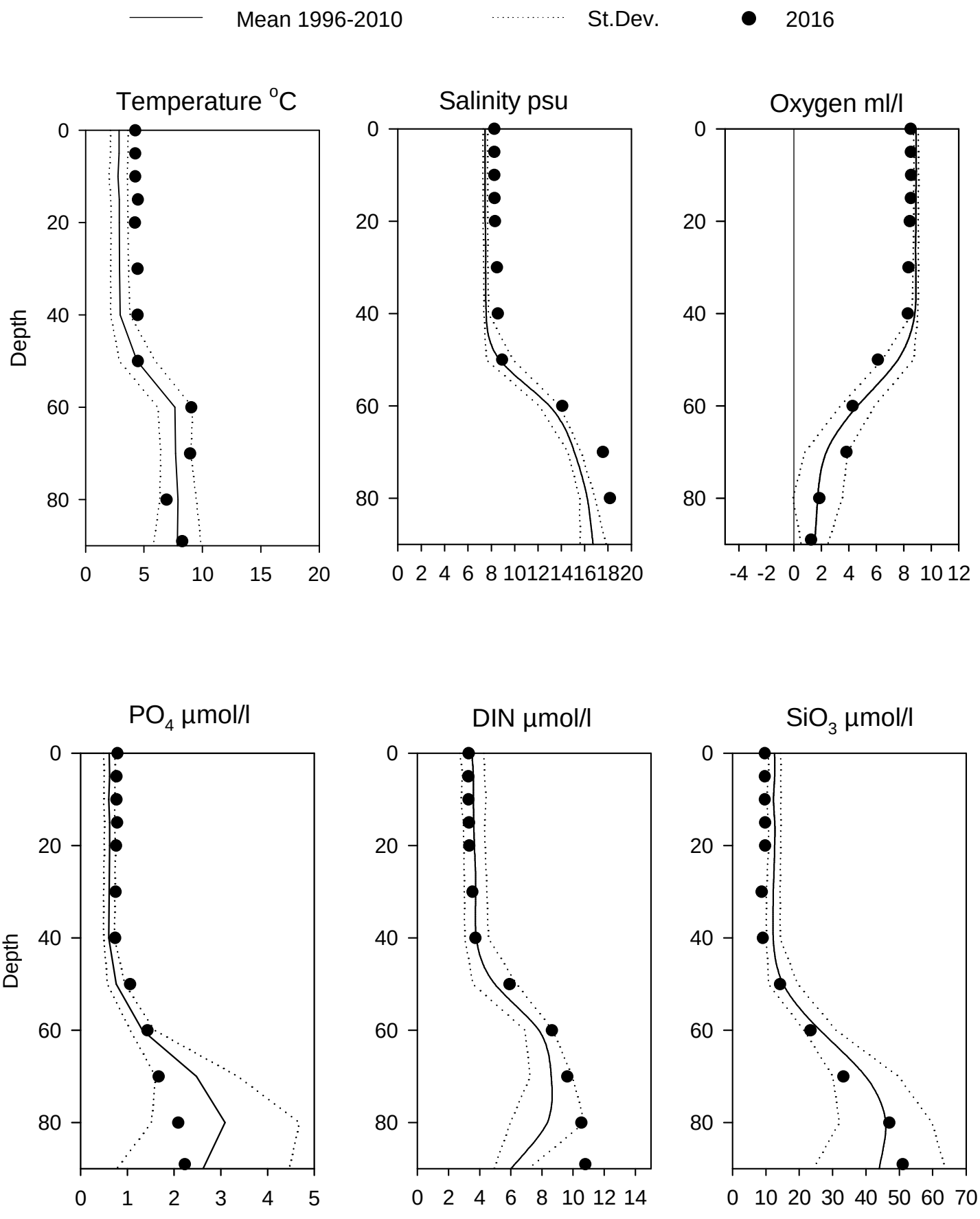
O_2 ml/l



O_2 ml/l



Vertical profiles BY5 February

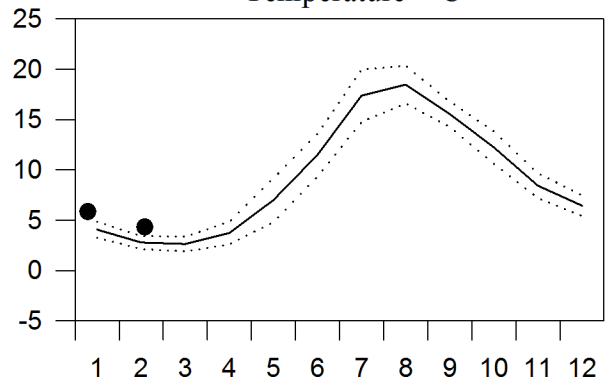


STATION BCS III-10 SURFACE WATER

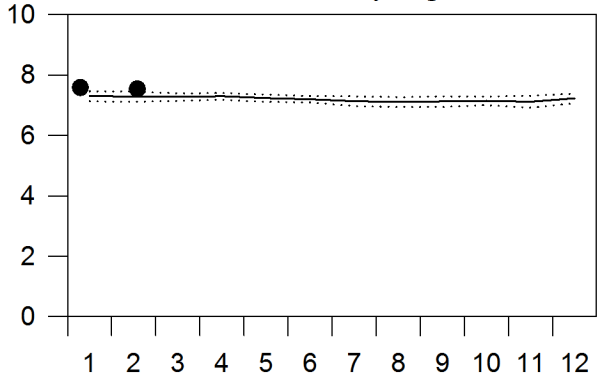
Annual Cycles

Mean 1996-2010 ····· St.Dev. ● 2016

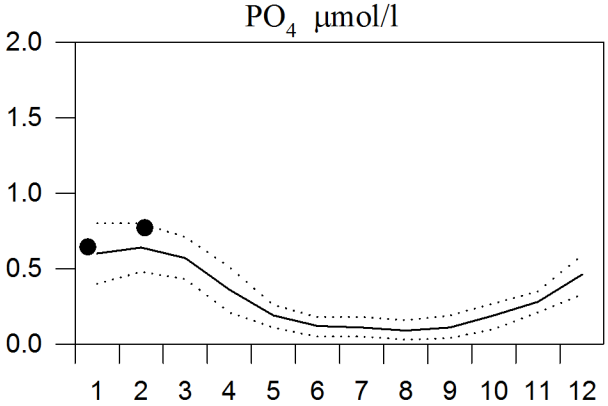
Temperature °C



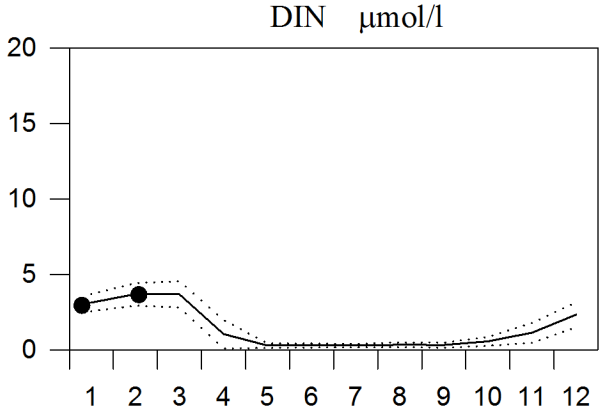
Salinity psu



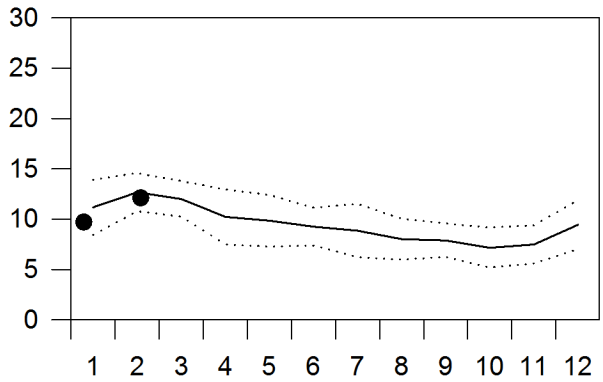
PO_4 µmol/l



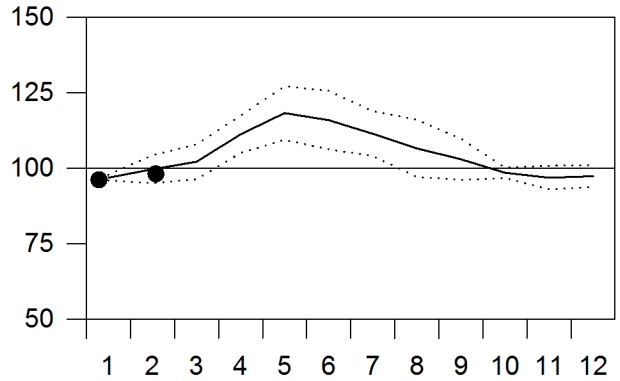
DIN µmol/l



SiO_3 µmol/l

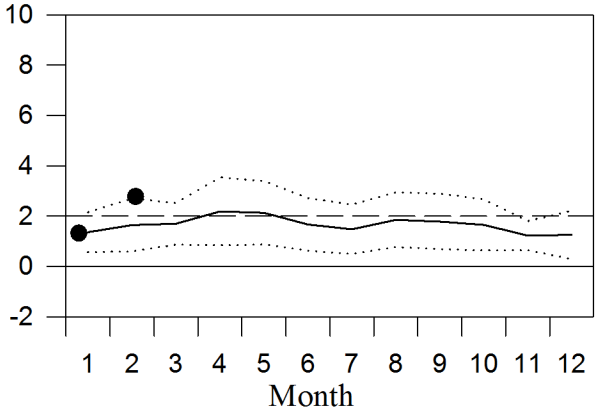


O_2 saturation %

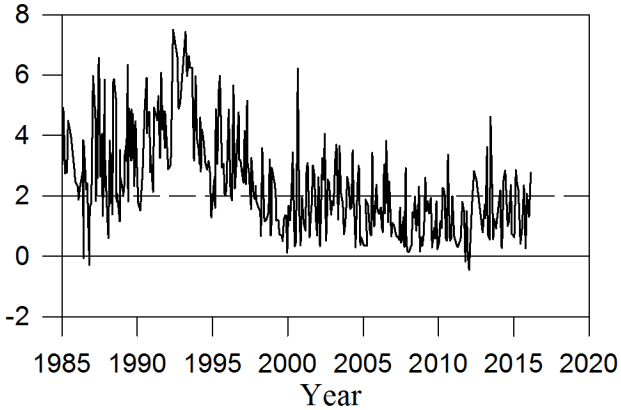


OXYGEN IN BOTTOM WATER (depth > 80m)

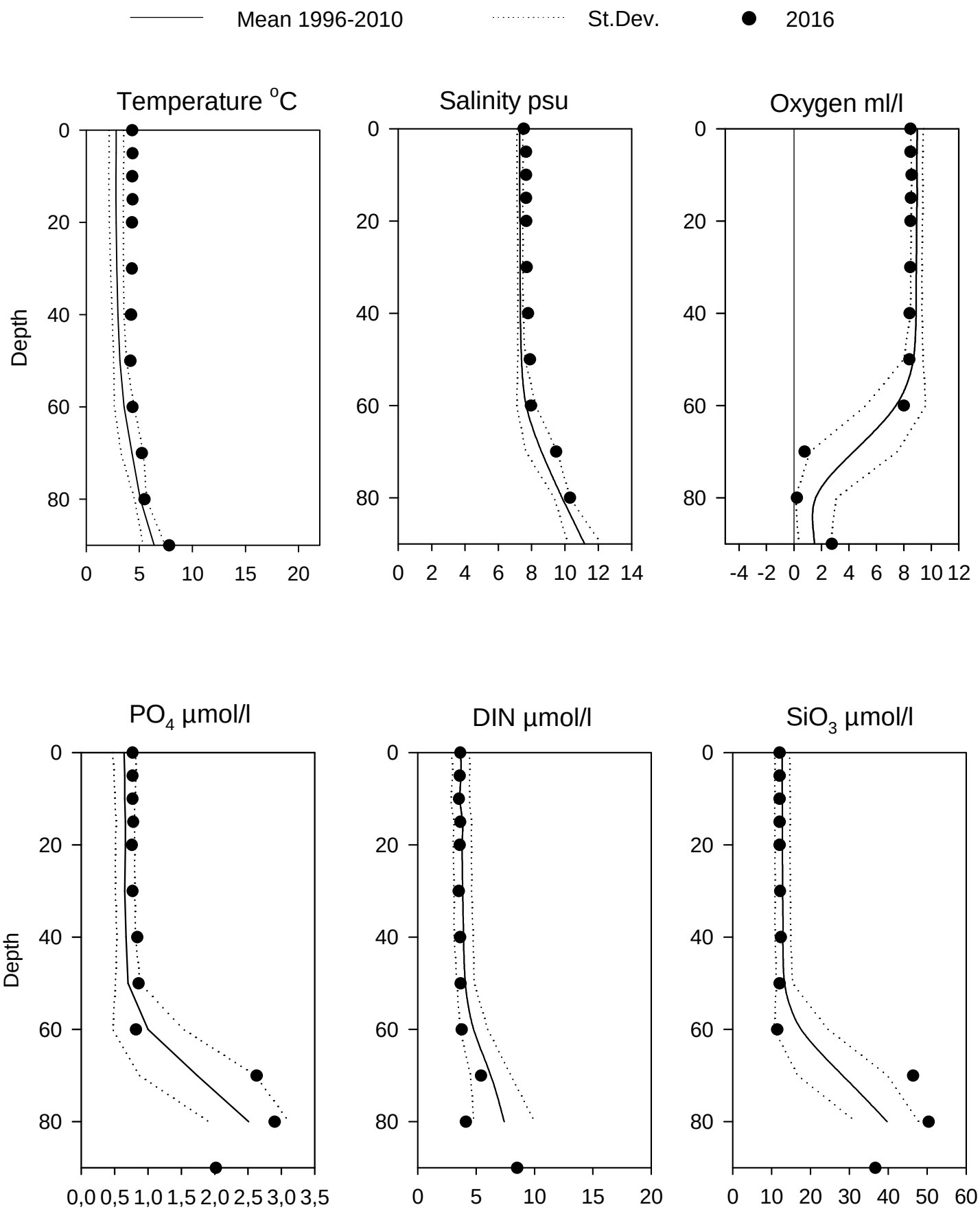
O_2 ml/l



O_2 ml/l



Vertical profiles BCS III-10 February

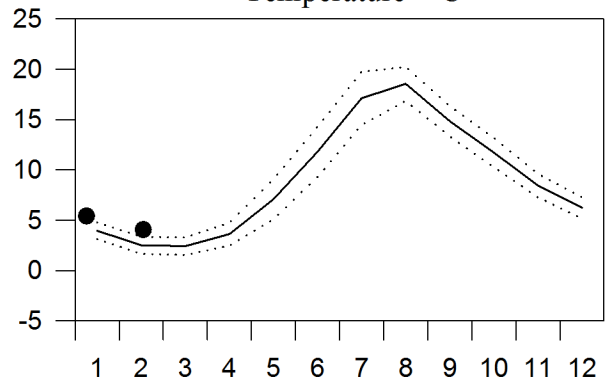


STATION BY10 SURFACE WATER

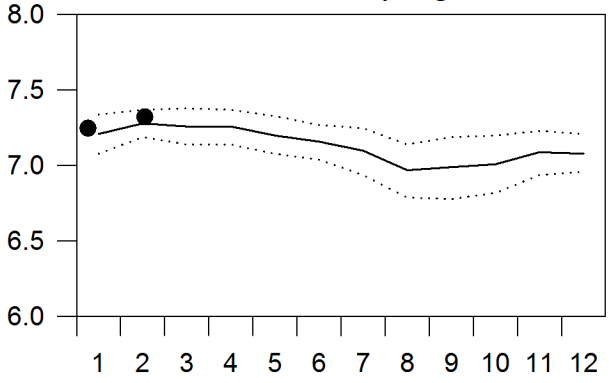
Annual Cycles

Mean 1996-2010 ····· St.Dev. ● 2016

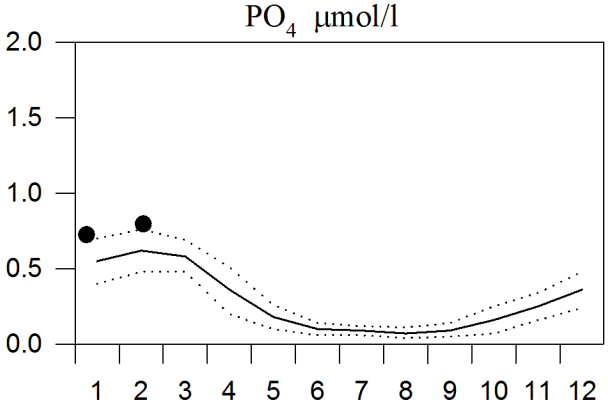
Temperature °C



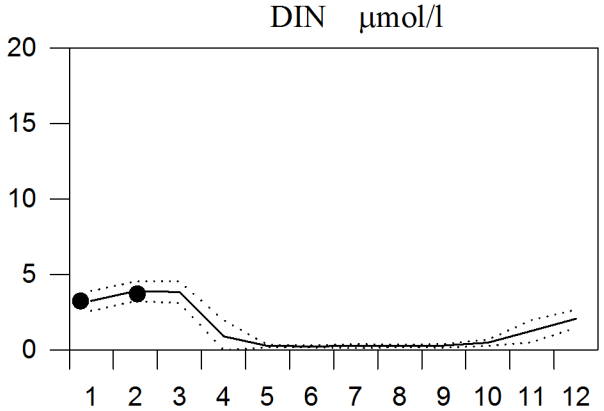
Salinity psu



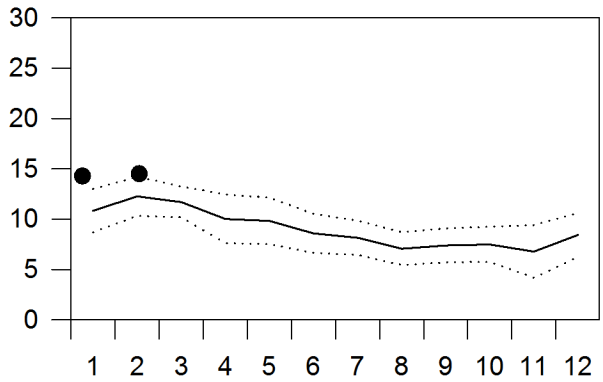
PO_4 µmol/l



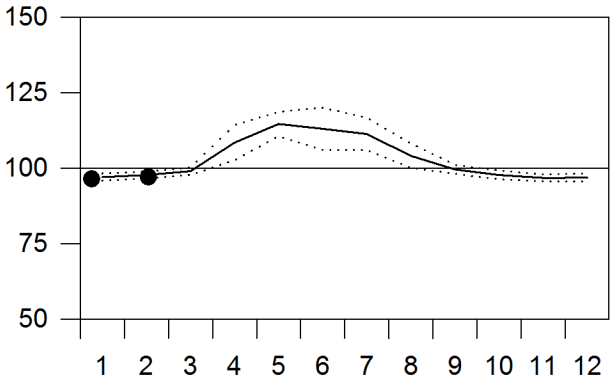
DIN µmol/l



SiO_3 µmol/l

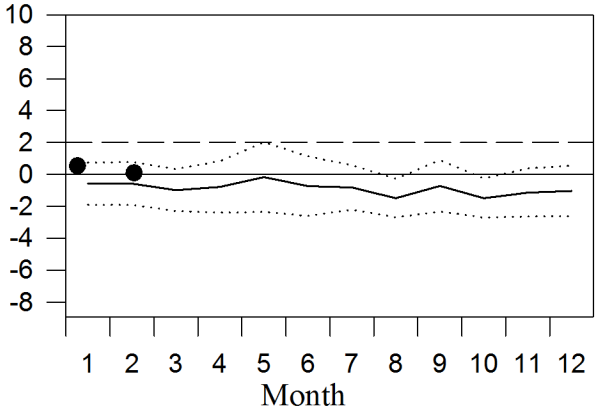


O_2 saturation %

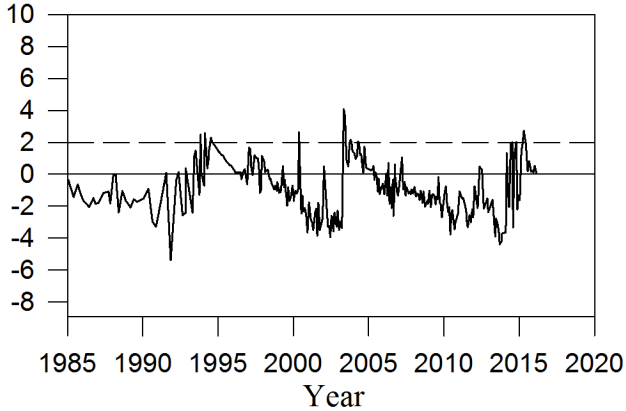


OXYGEN IN BOTTOM WATER (depth >125m)

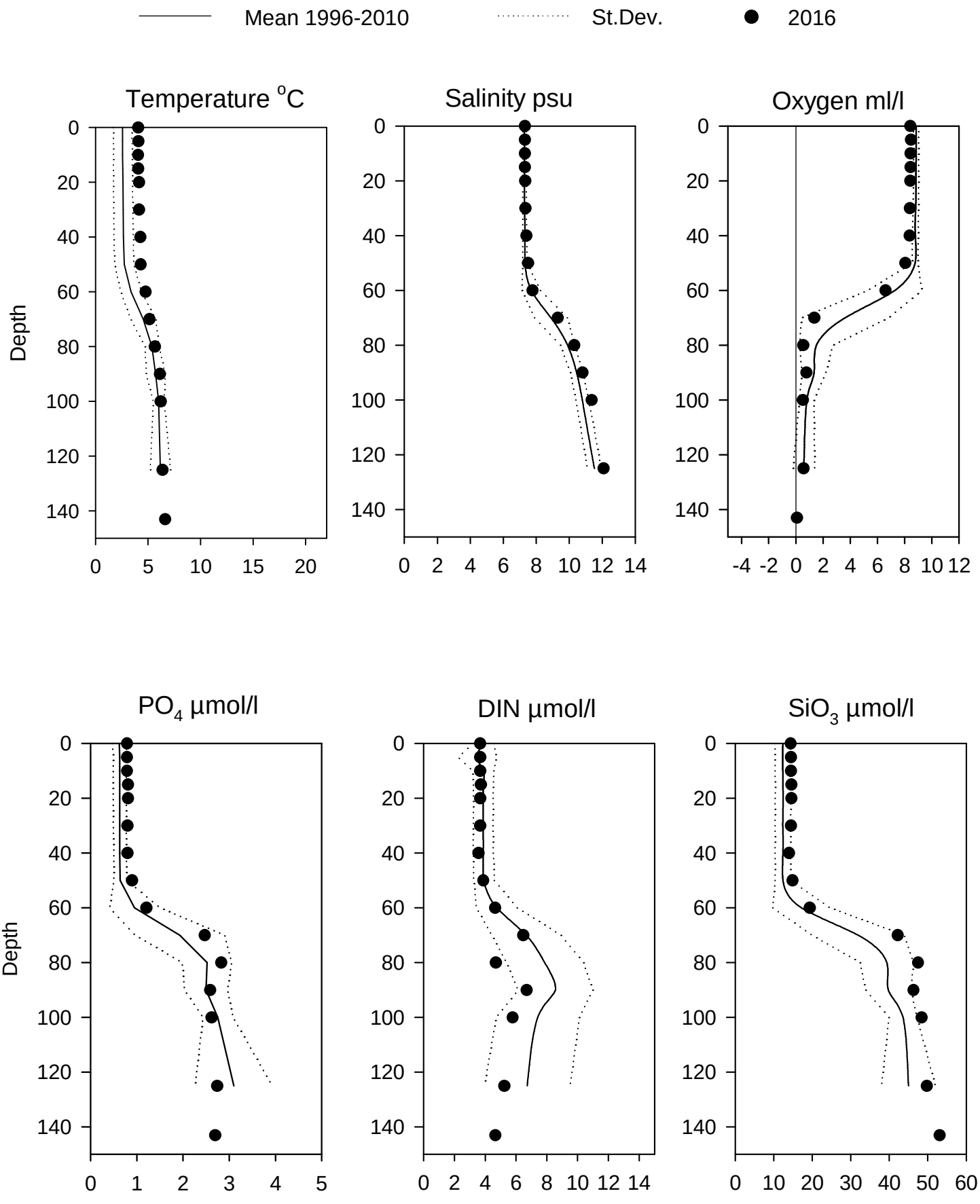
O_2 ml/l



O_2 ml/l



Vertical profiles BY10 February

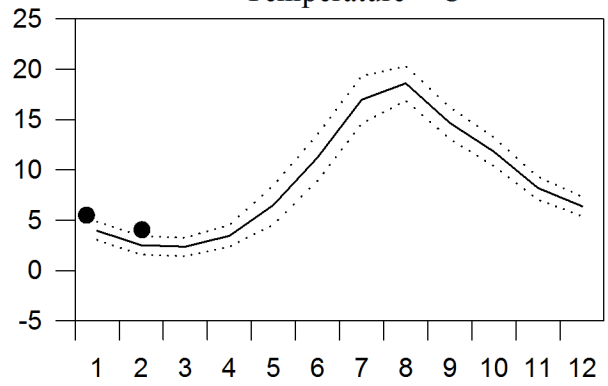


STATION BY15 SURFACE WATER

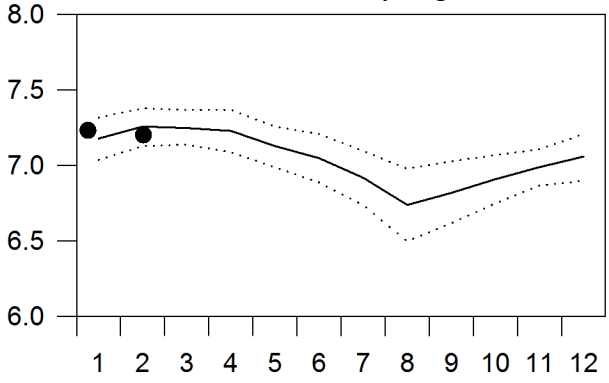
Annual Cycles

Mean 1996-2010 ····· St.Dev. ● 2016

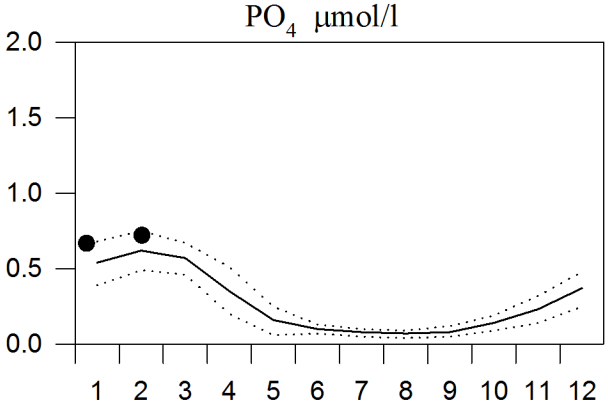
Temperature °C



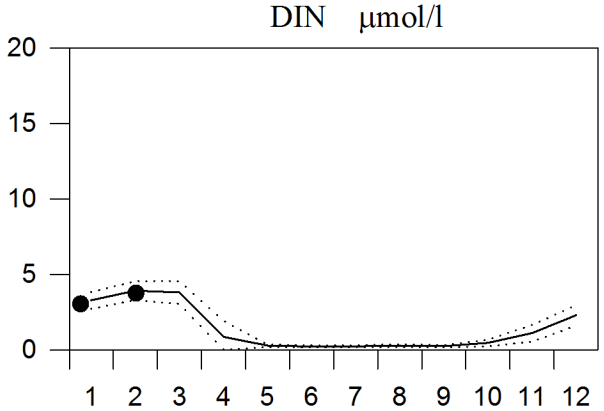
Salinity psu



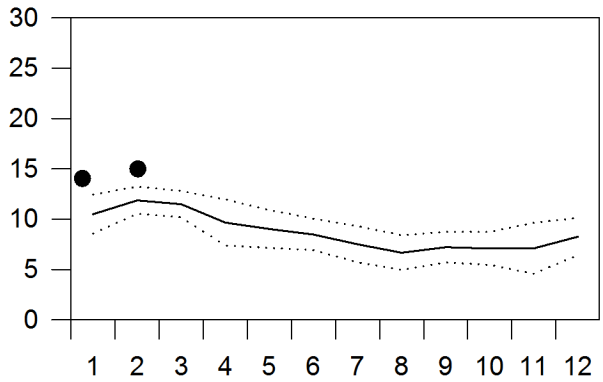
PO_4 µmol/l



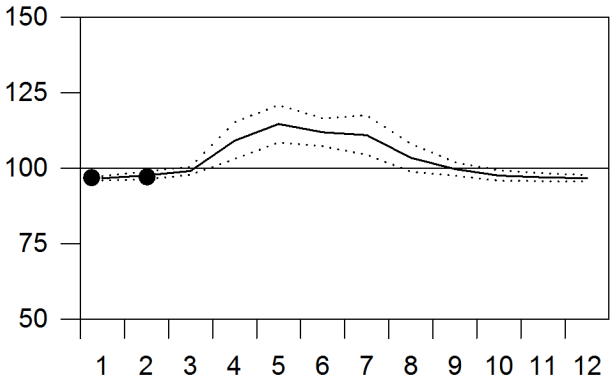
DIN µmol/l



SiO_3 µmol/l

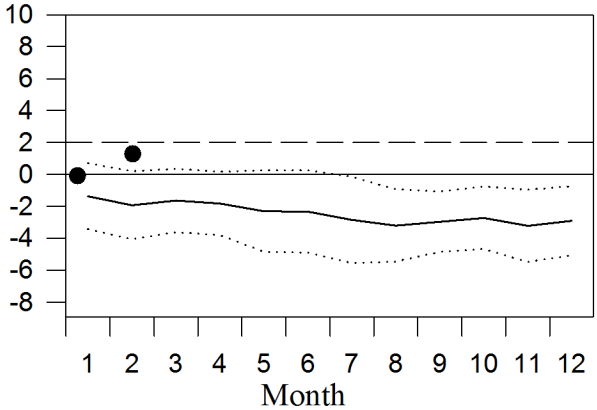


O_2 saturation %

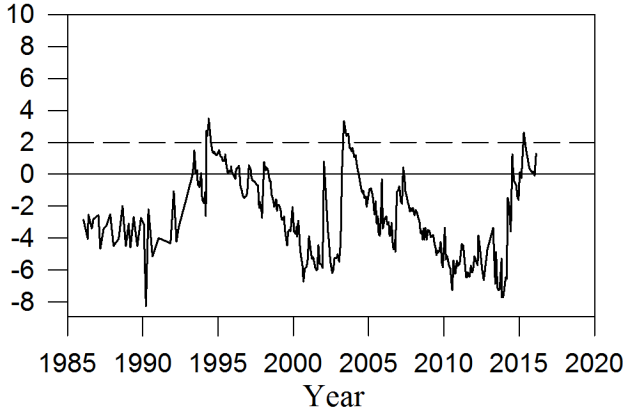


OXYGEN IN BOTTOM WATER (depth >225m)

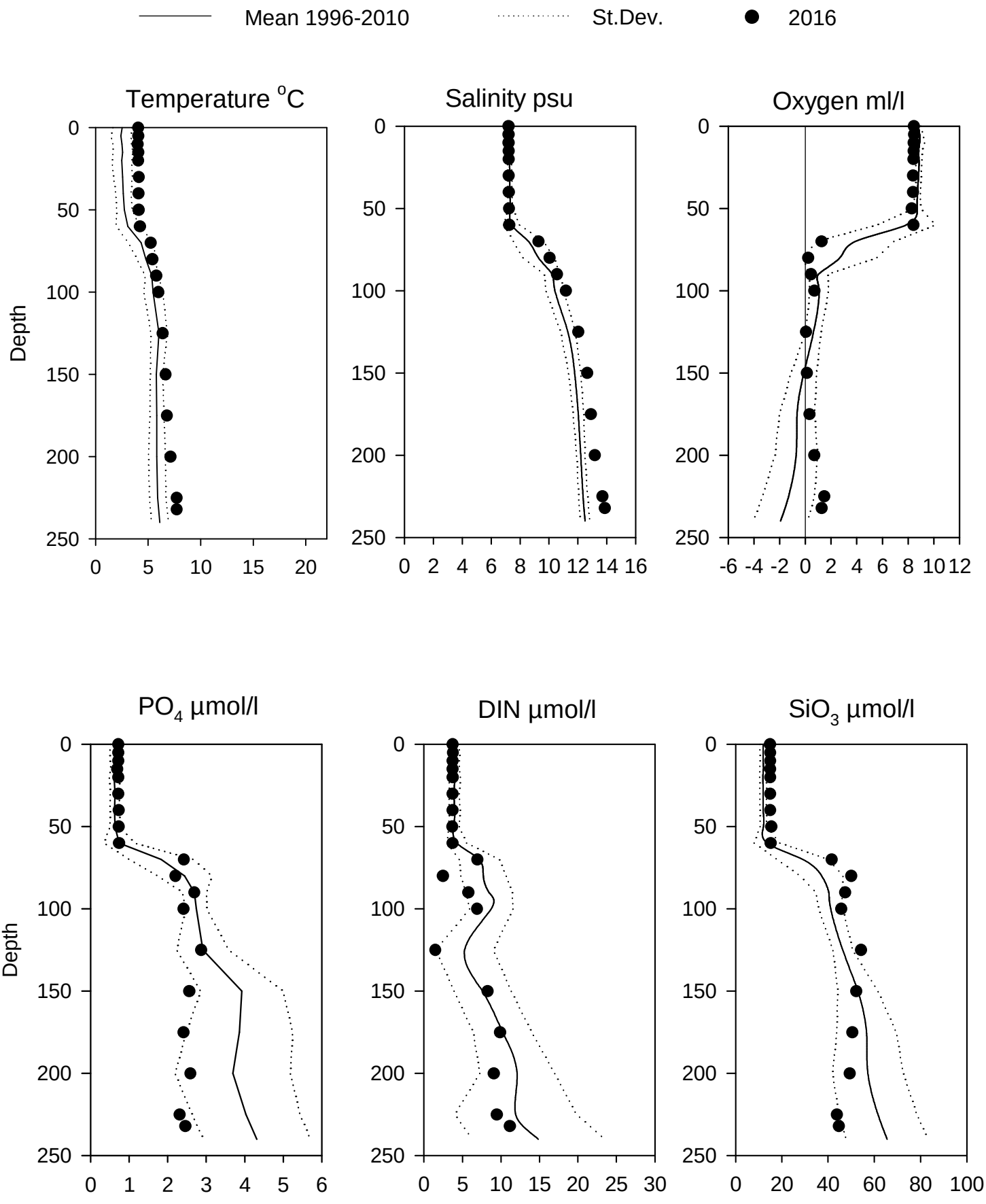
O_2 ml/l



O_2 ml/l



Vertical profiles BY15 February

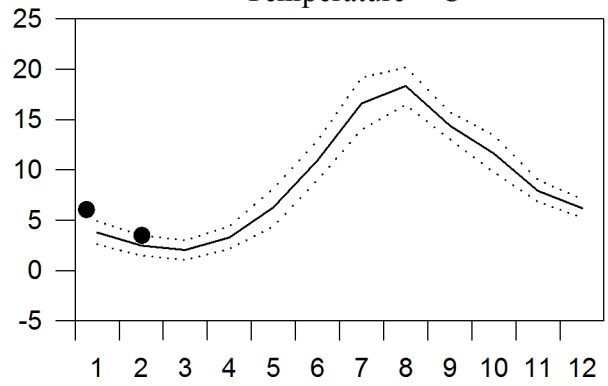


STATION BY20 SURFACE WATER

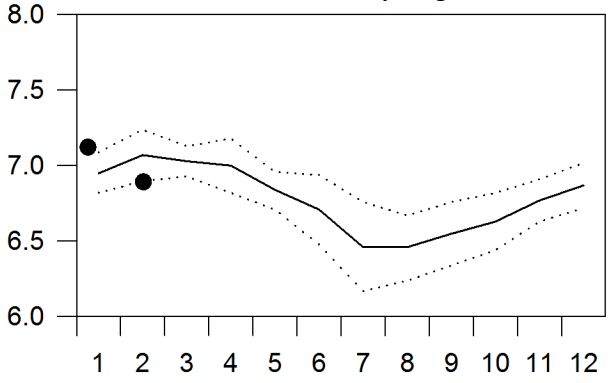
Annual Cycles

Mean 1996-2010 ····· St.Dev. ● 2016

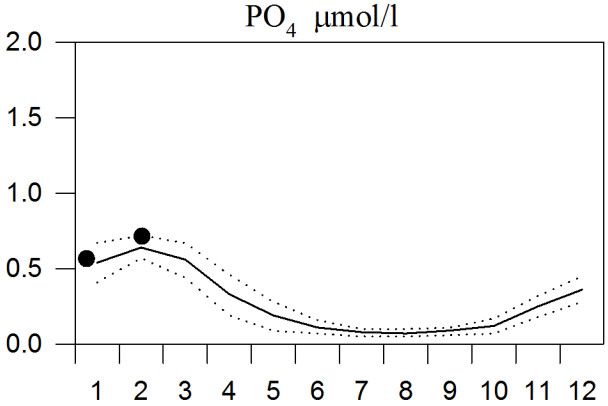
Temperature °C



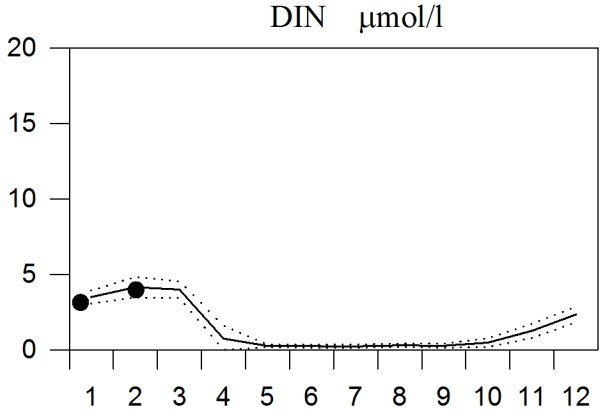
Salinity psu



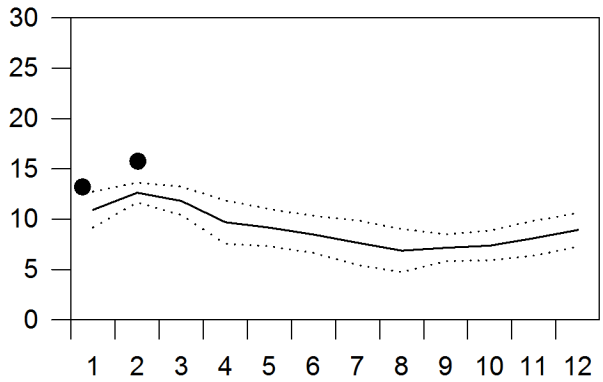
PO_4 µmol/l



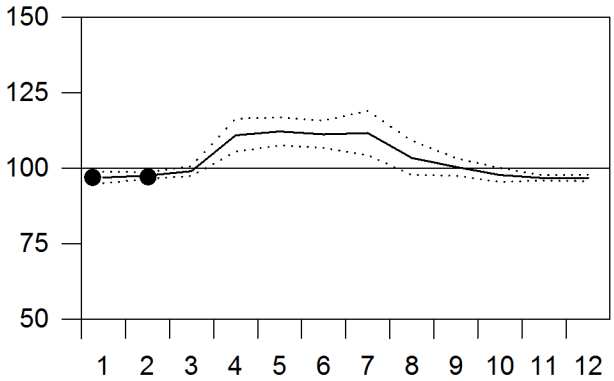
DIN µmol/l



SiO_3 µmol/l

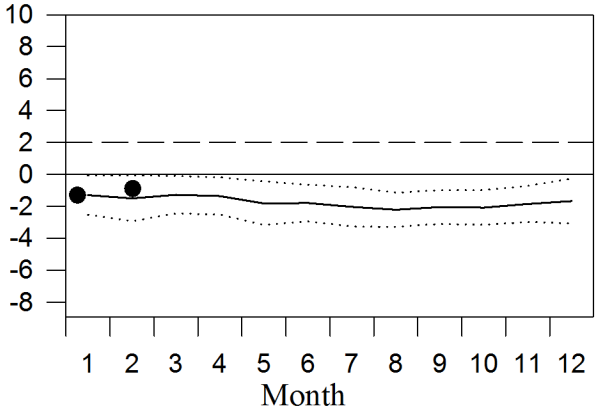


O_2 saturation %

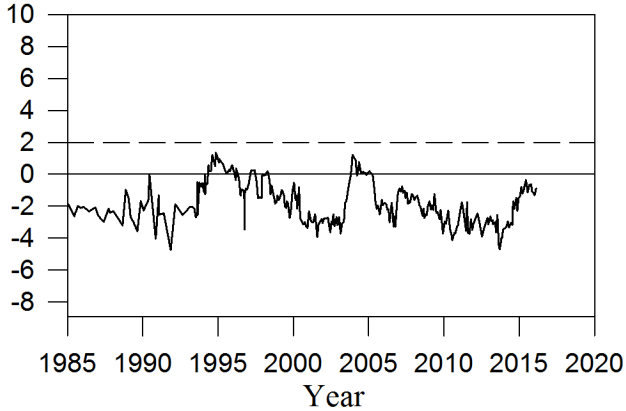


OXYGEN IN BOTTOM WATER (depth >175m)

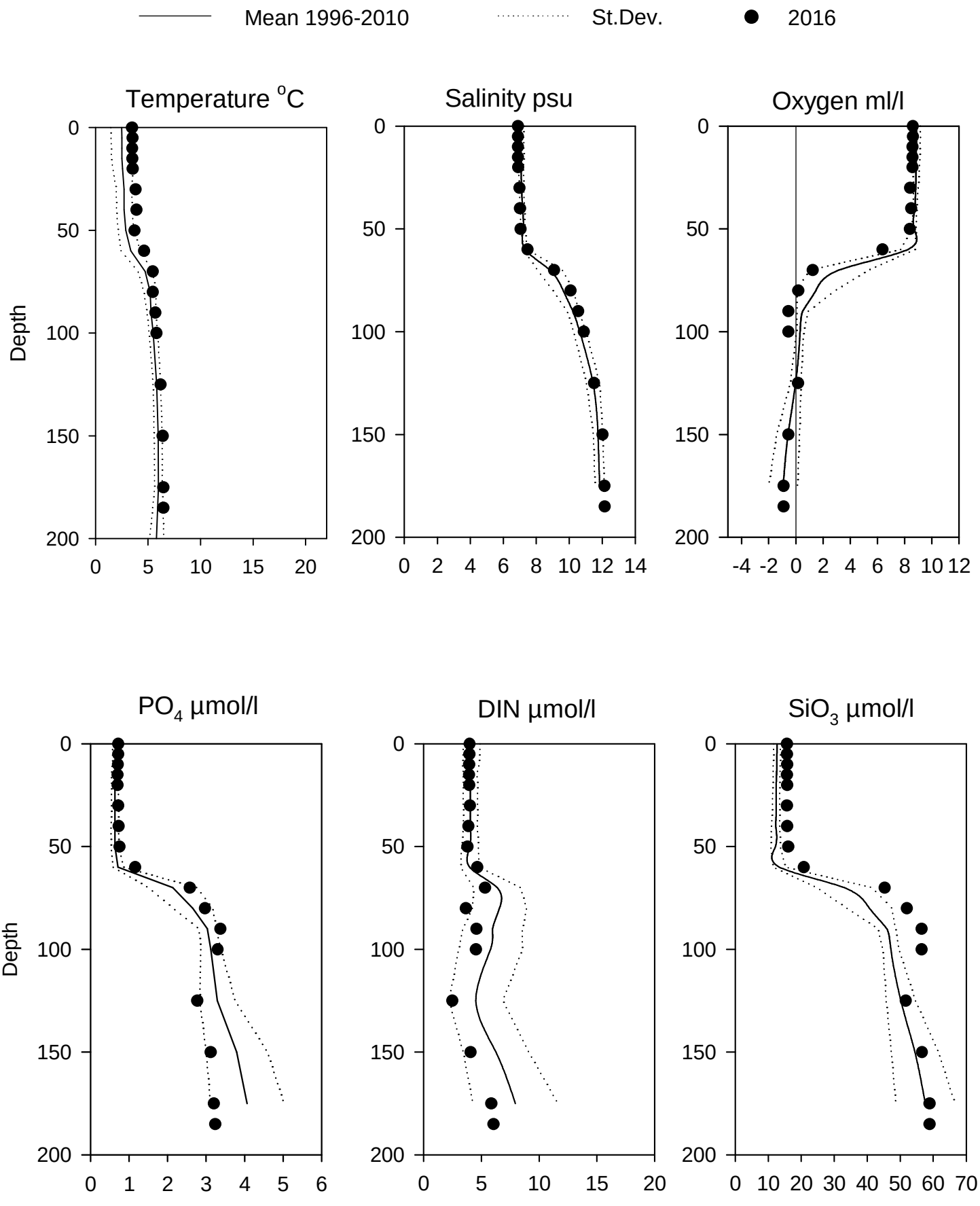
O_2 ml/l



O_2 ml/l



Vertical profiles BY20 February

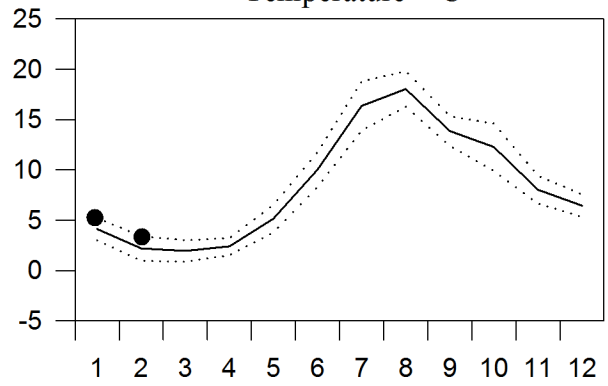


STATION BY29 SURFACE WATER

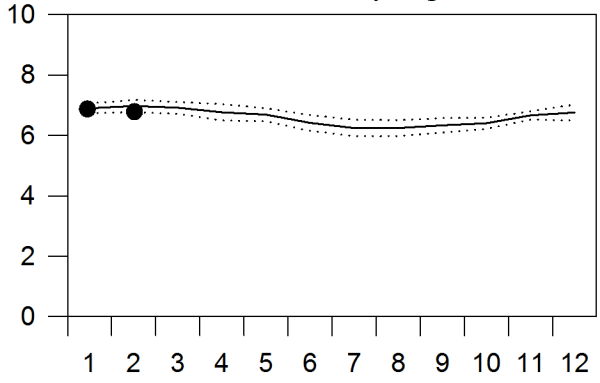
Annual Cycles

Mean 1996-2010 ····· St.Dev. ● 2016

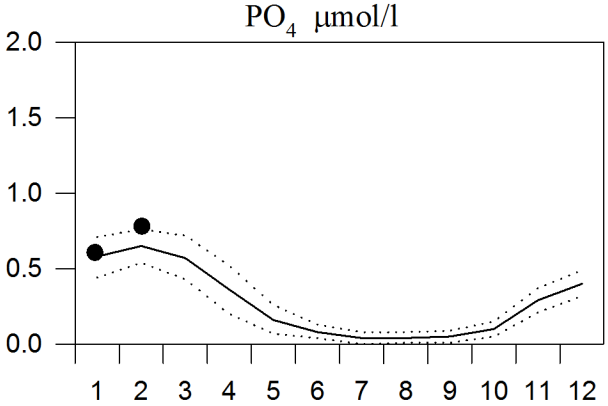
Temperature °C



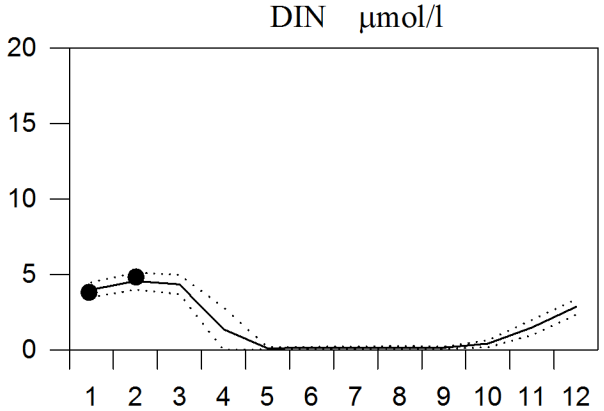
Salinity psu



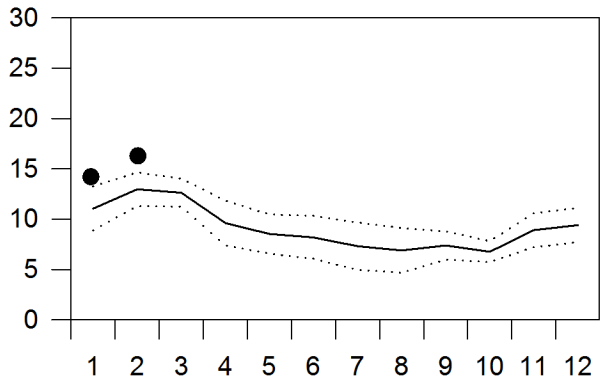
PO_4 µmol/l



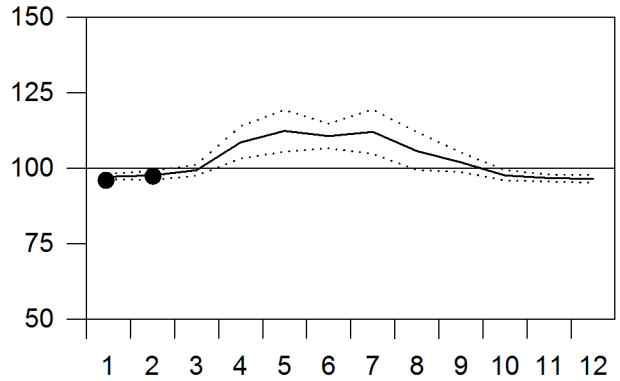
DIN µmol/l



SiO_3 µmol/l

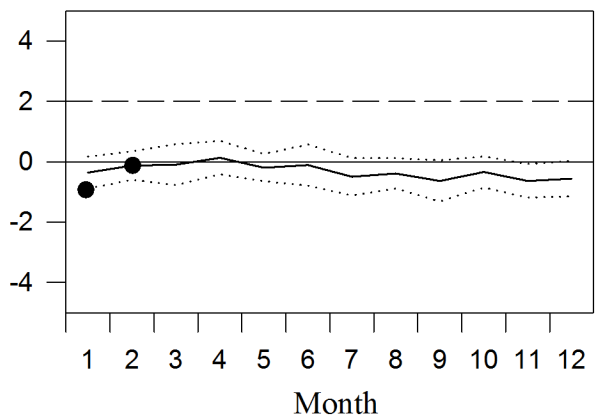


O_2 saturation %

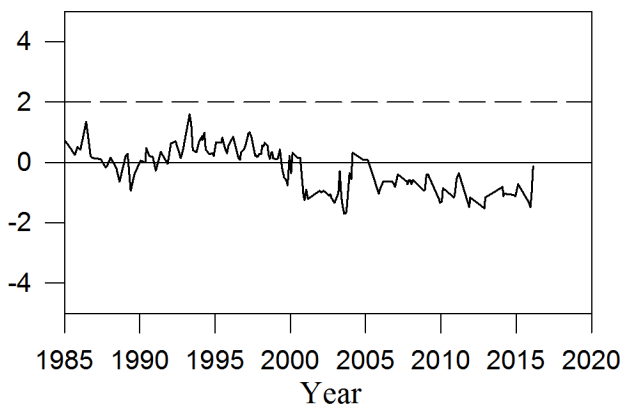


OXYGEN IN BOTTOM WATER (>=150m)

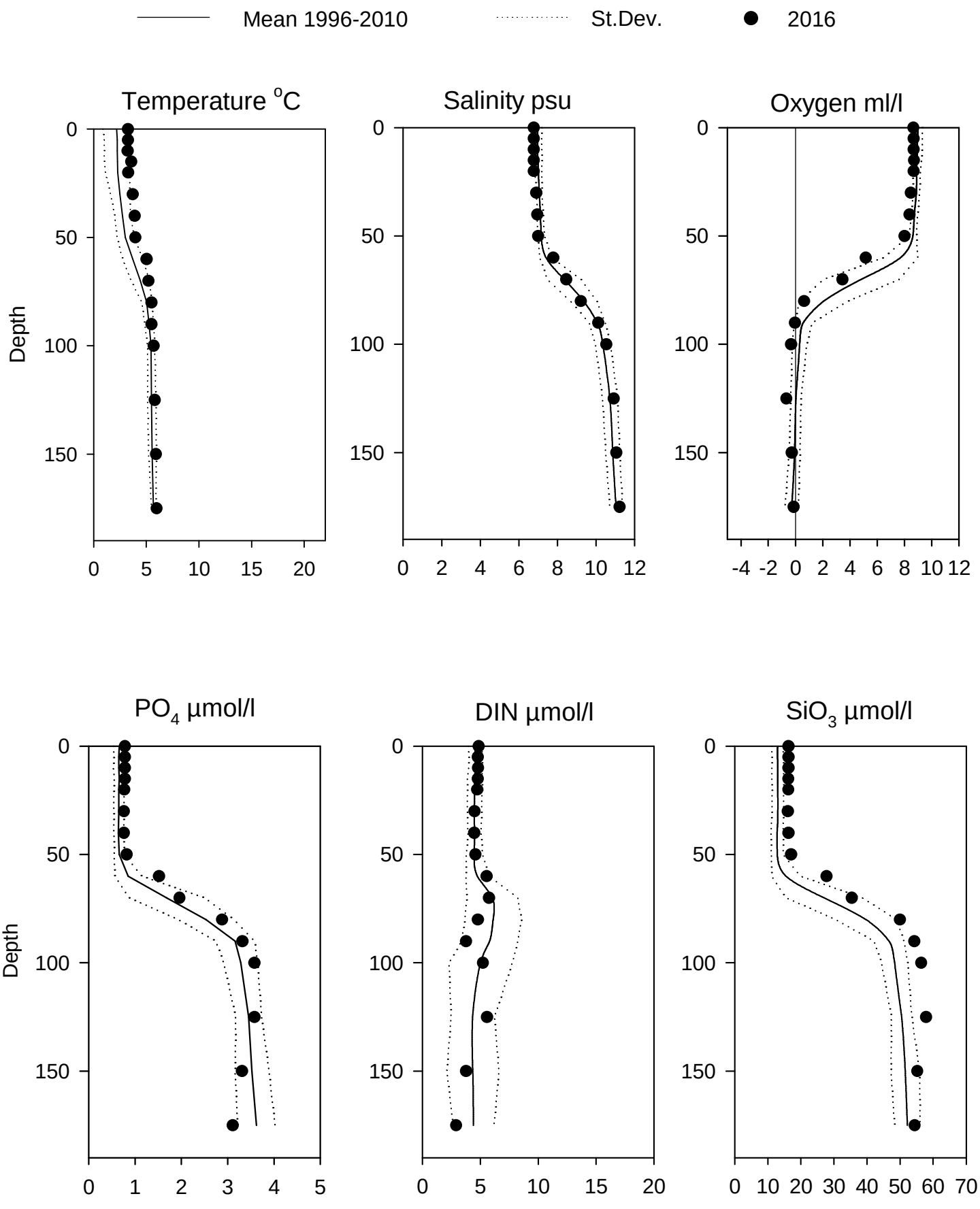
O_2 ml/l



O_2 ml/l



Vertical profiles BY29 February

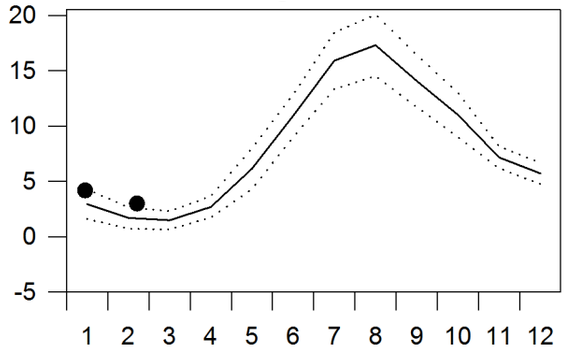


STATION BY31 SURFACE WATER

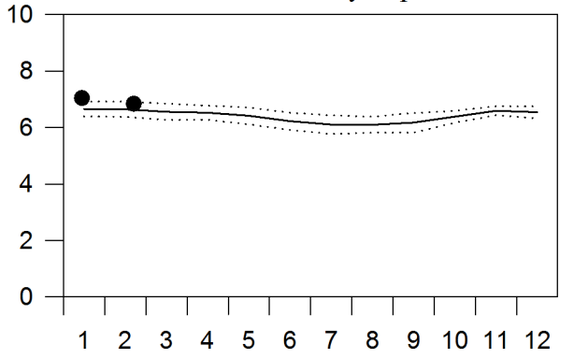
Annual Cycles

Mean 1996-2010 ····· St.Dev. ● 2016

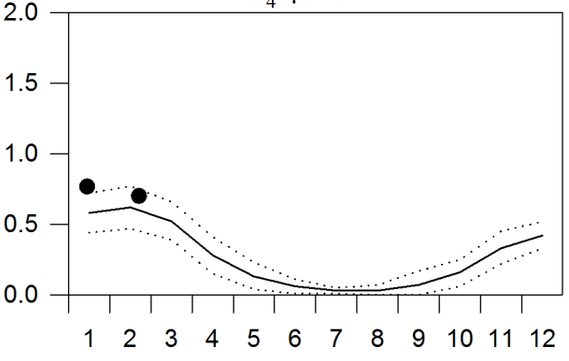
Temperature °C



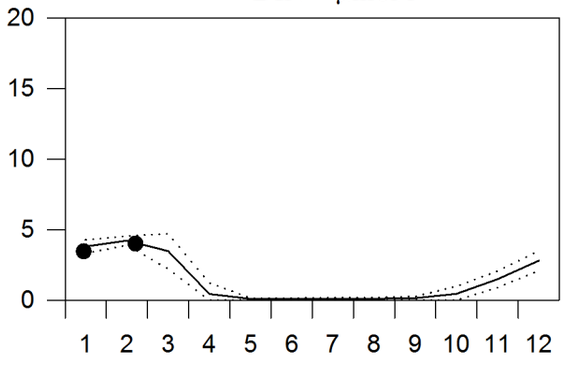
Salinity psu



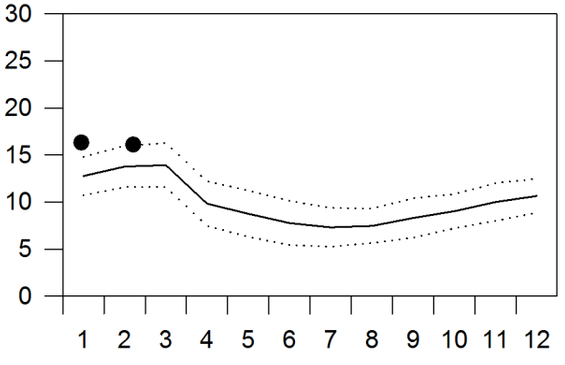
PO_4 µmol/l



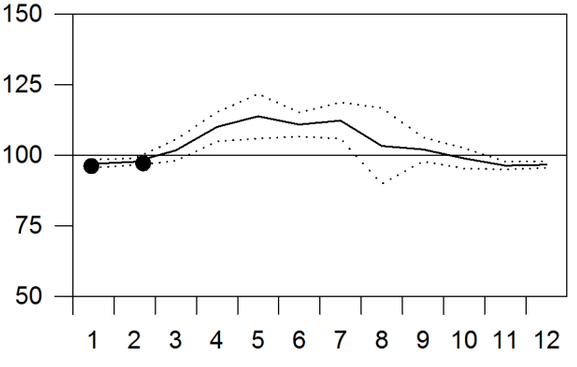
DIN µmol/l



SiO_3 µmol/l

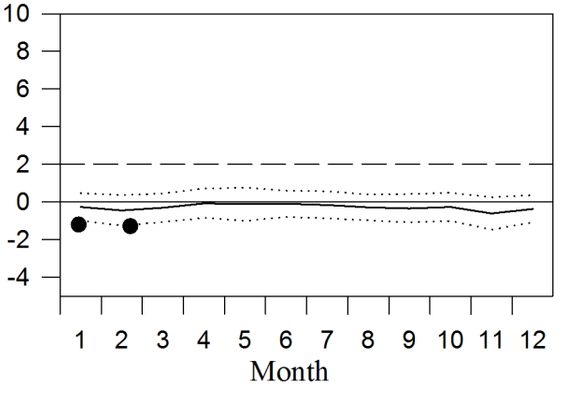


O_2 saturation %

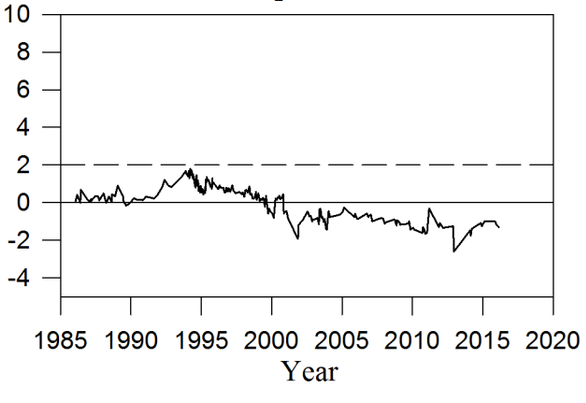


OXYGEN IN BOTTOM WATER (depth = 440m)

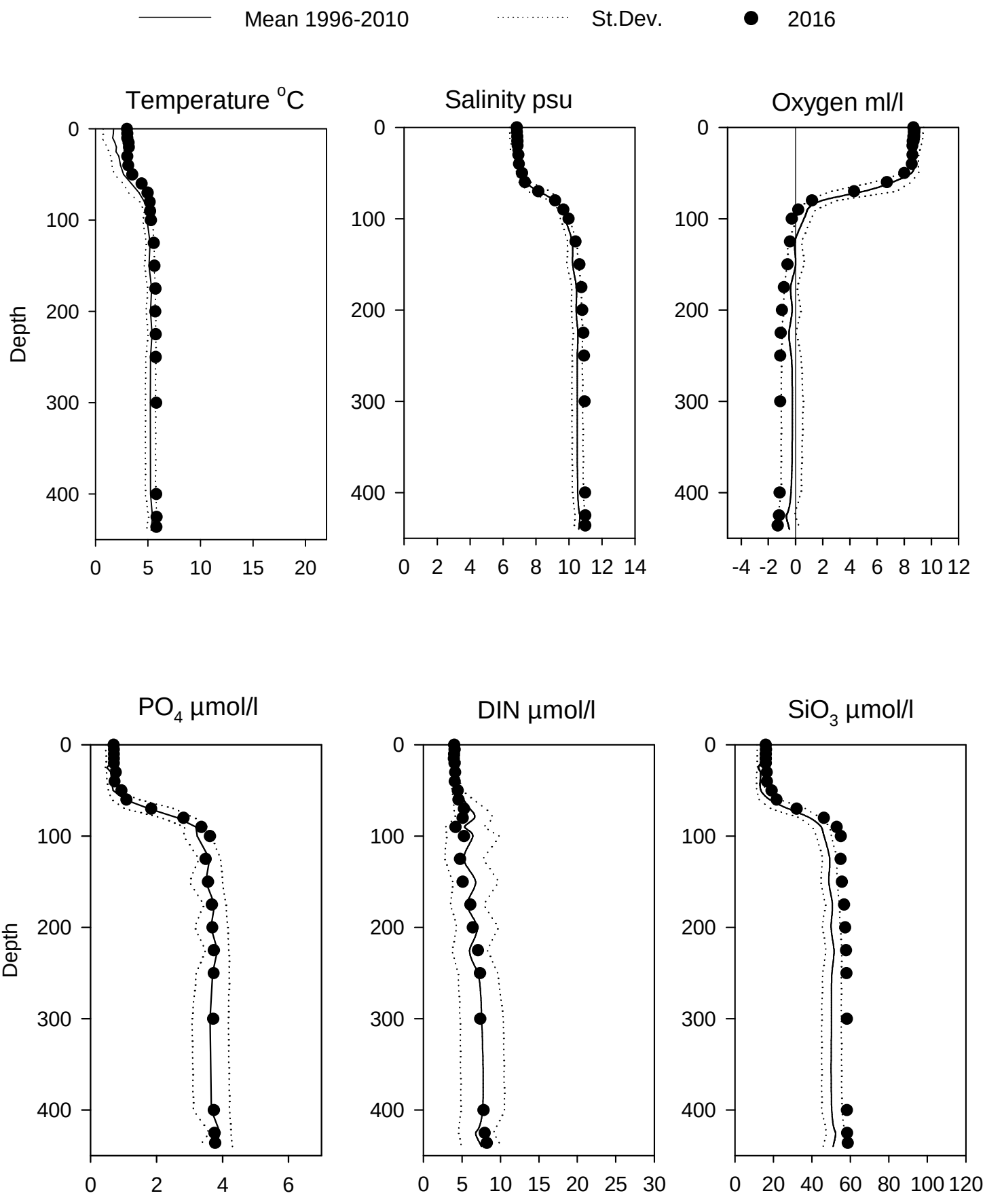
O_2 ml/l



O_2 ml/l



Vertical profiles BY31 February

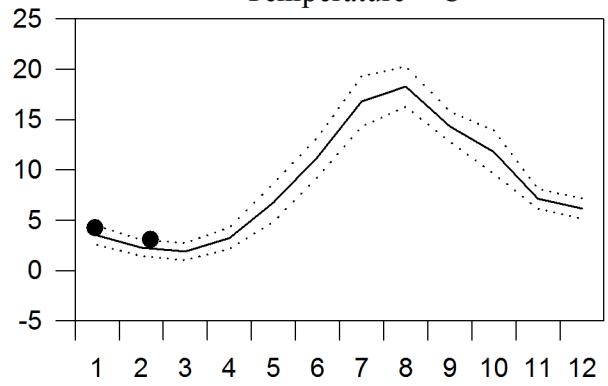


STATION BY32 SURFACE WATER

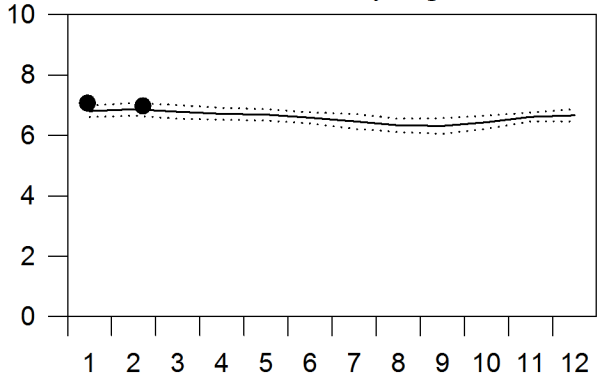
Annual Cycles

Mean 1996-2010 ····· St.Dev. ● 2016

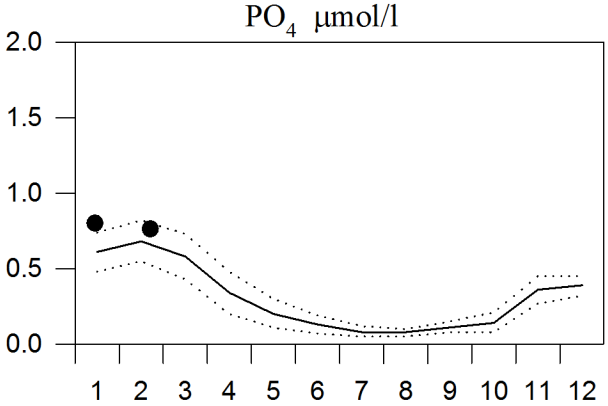
Temperature °C



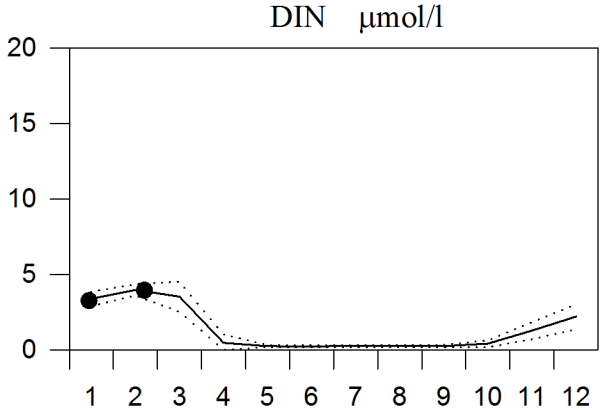
Salinity psu



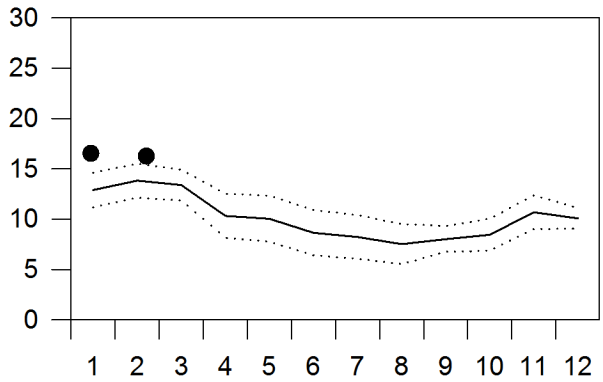
PO_4 µmol/l



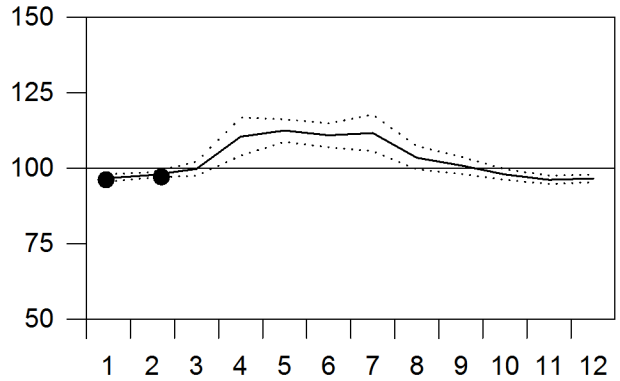
DIN µmol/l



SiO_3 µmol/l

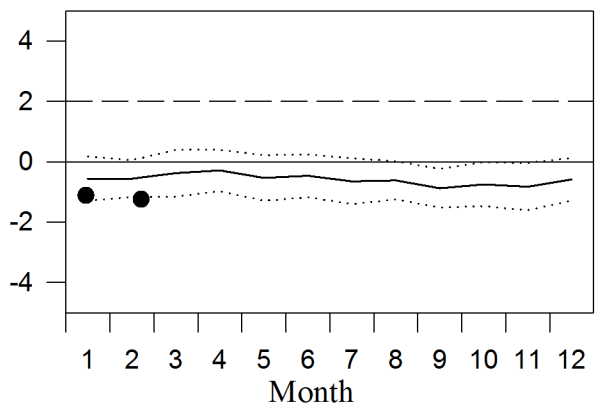


O_2 saturation %

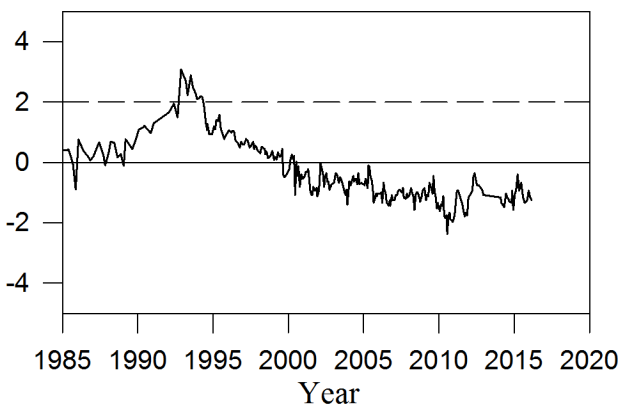


OXYGEN IN BOTTOM WATER (depth > 175m)

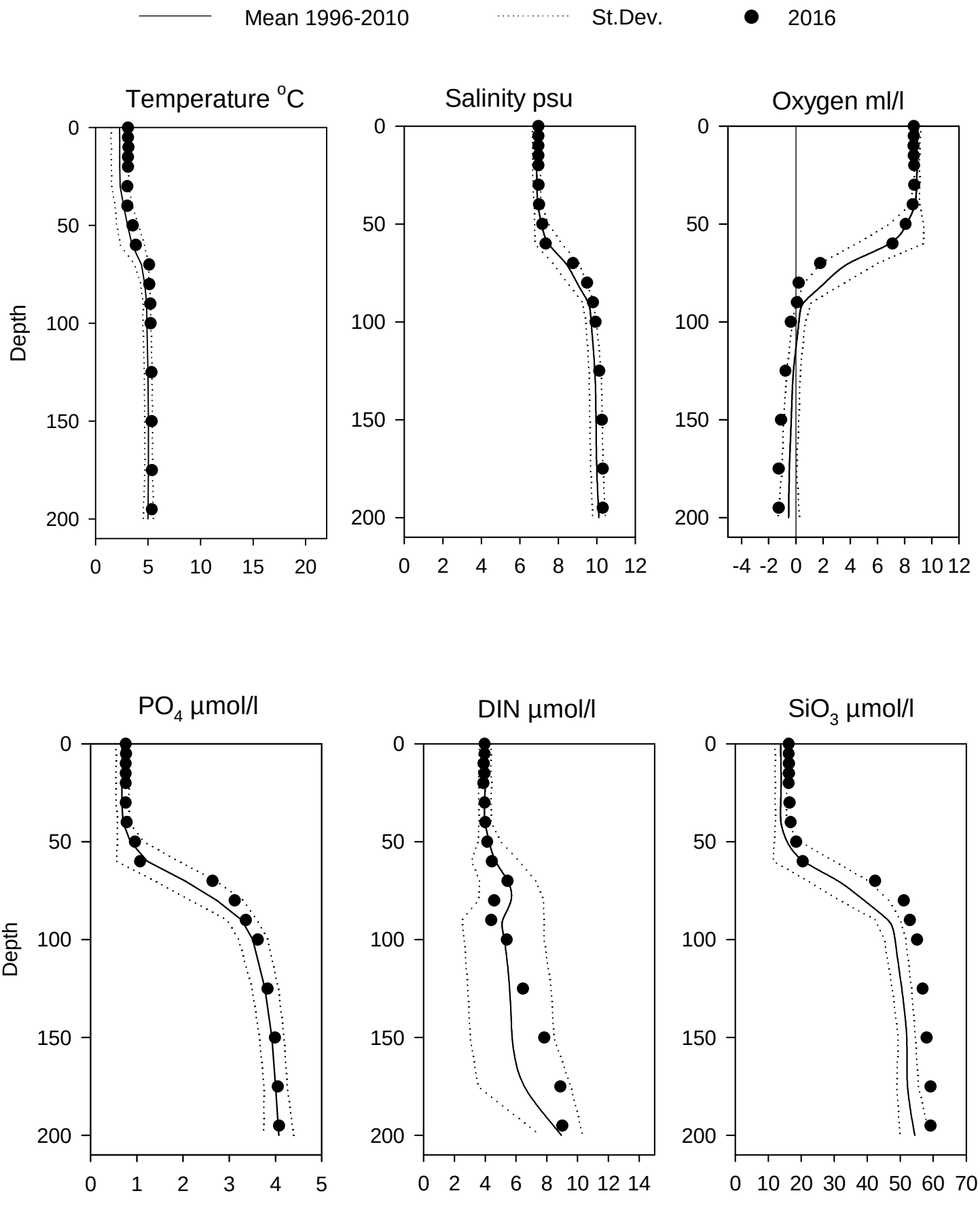
O_2 ml/l



O_2 ml/l



Vertical profiles BY32 February

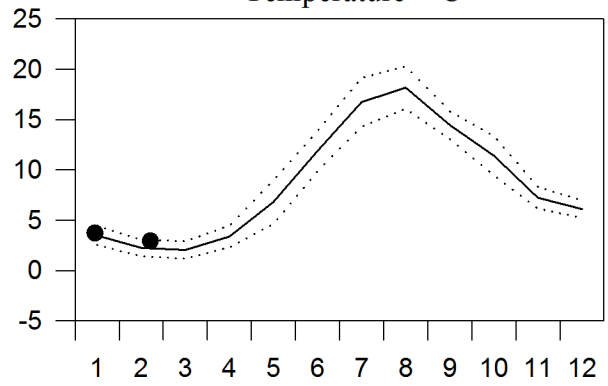


STATION BY38 SURFACE WATER

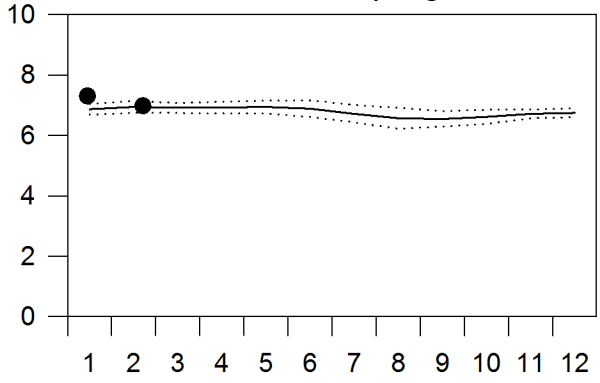
Annual Cycles

Mean 1996-2010 ····· St.Dev. ● 2016

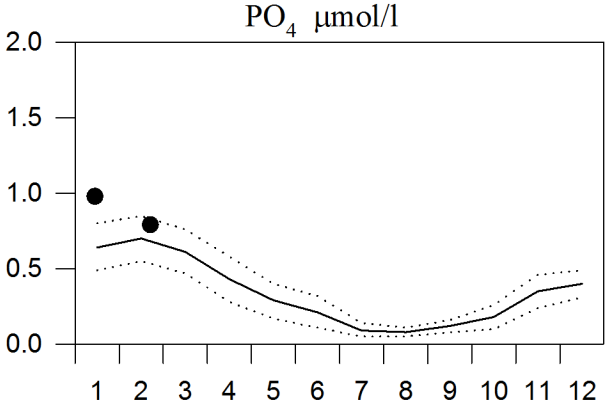
Temperature °C



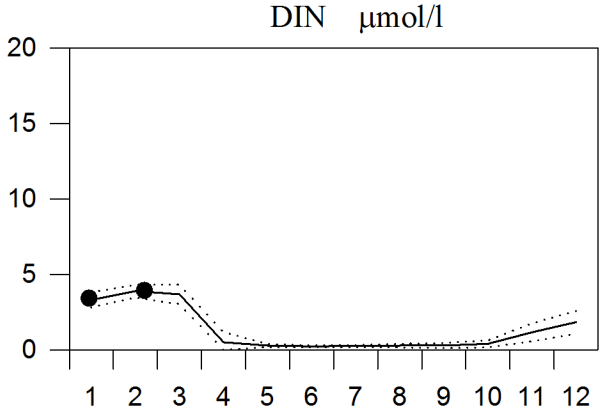
Salinity psu



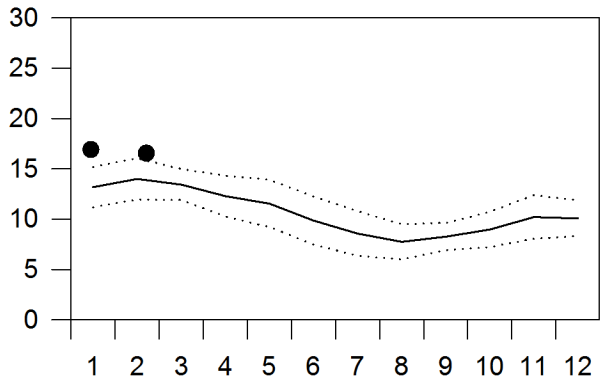
PO_4 µmol/l



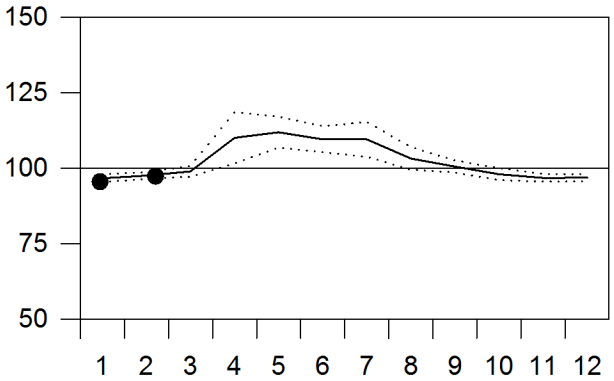
DIN µmol/l



SiO_3 µmol/l

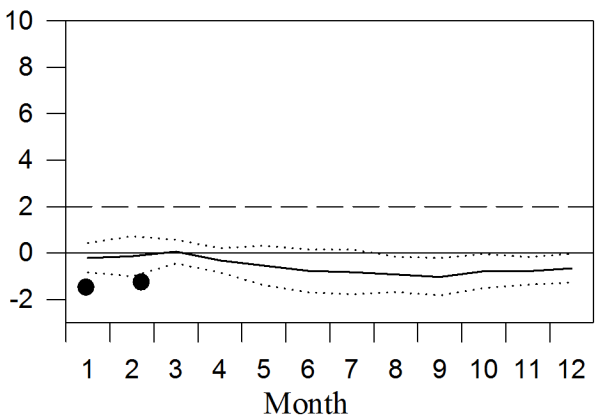


O_2 saturation %

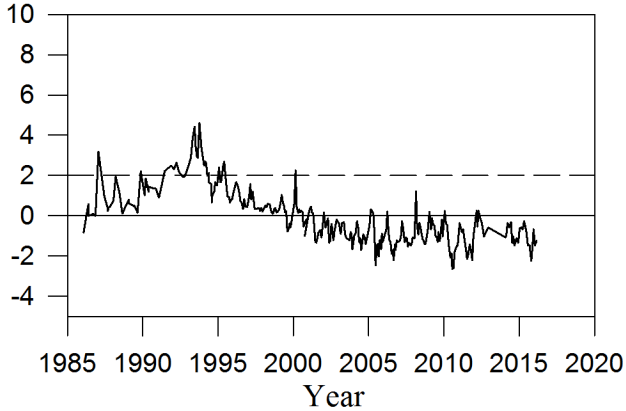


OXYGEN IN BOTTOM WATER (> 100m)

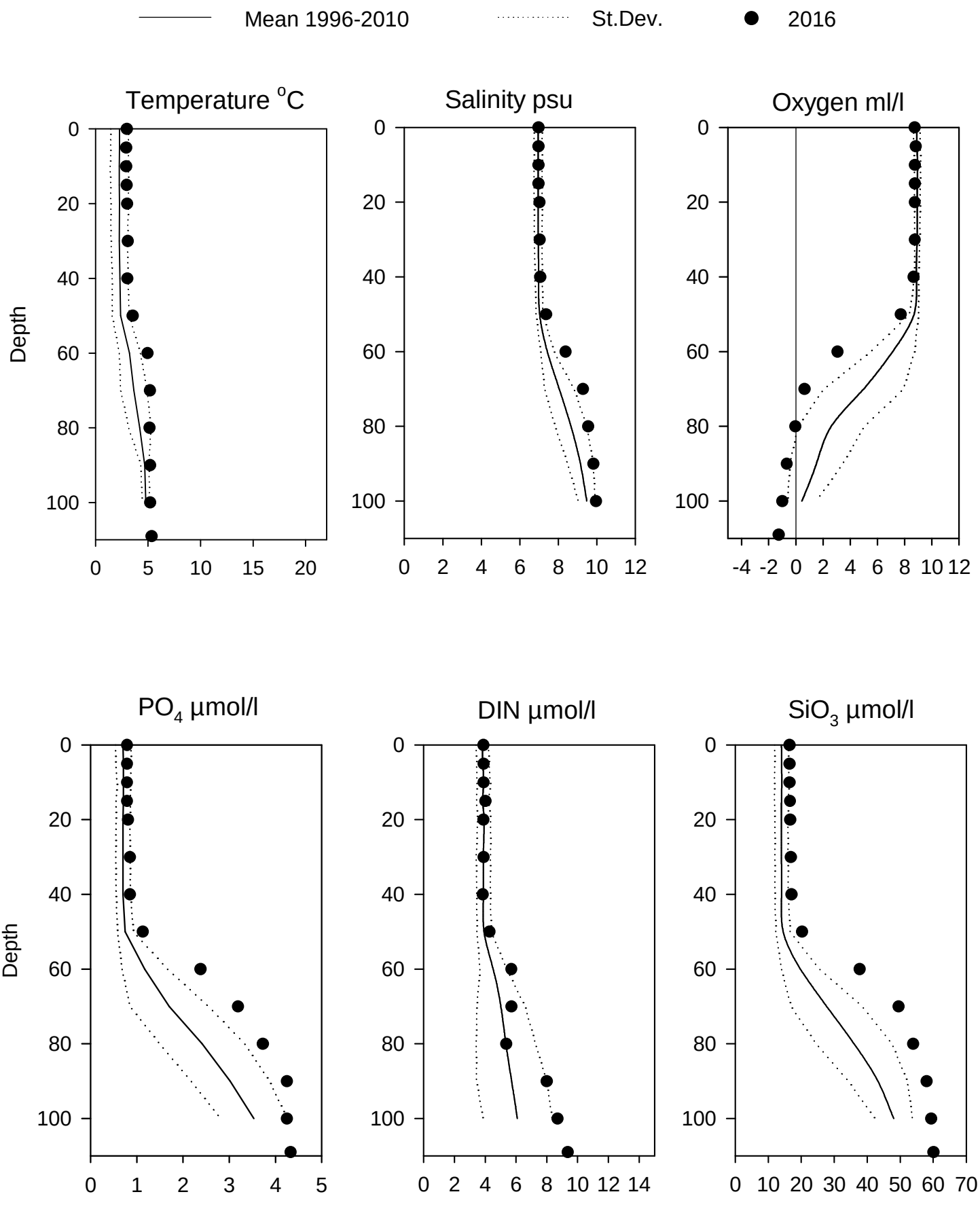
O_2 ml/l



O_2 ml/l



Vertical profiles BY38 February

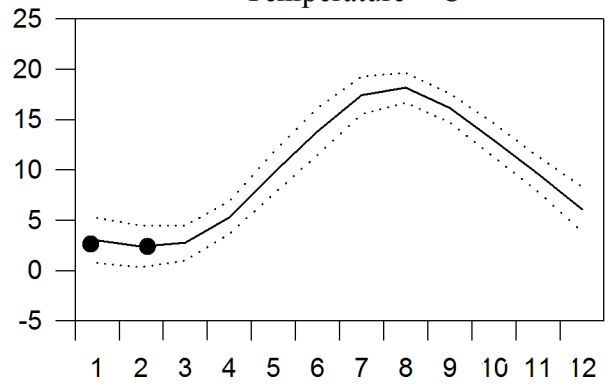


STATION SLÄGGÖ SURFACE WATER

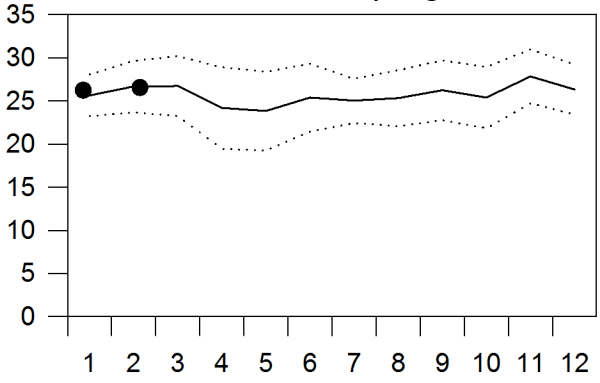
Annual Cycles

Mean 1996-2010 ····· St.Dev. ● 2016

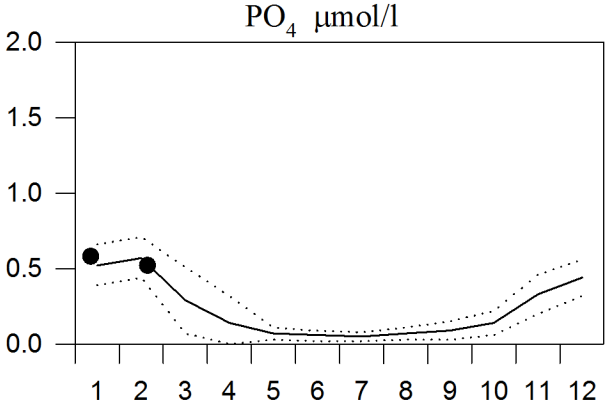
Temperature °C



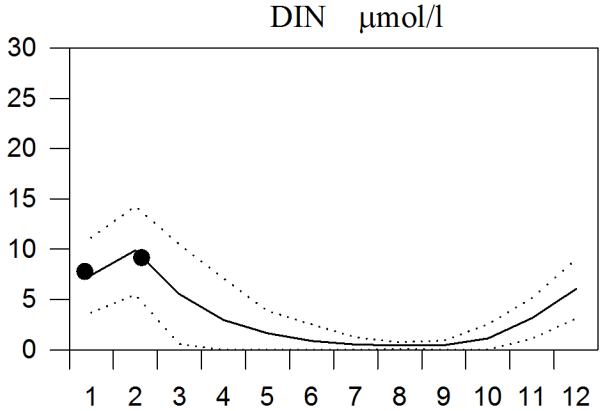
Salinity psu



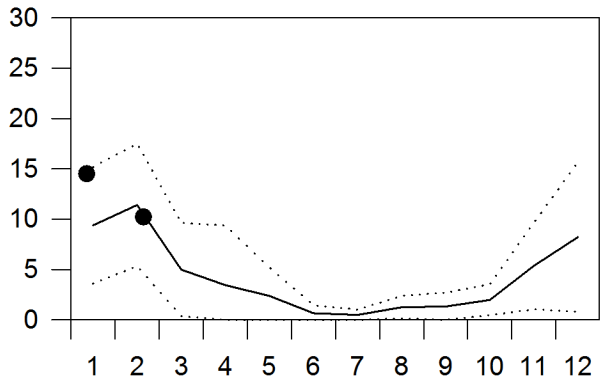
PO_4 µmol/l



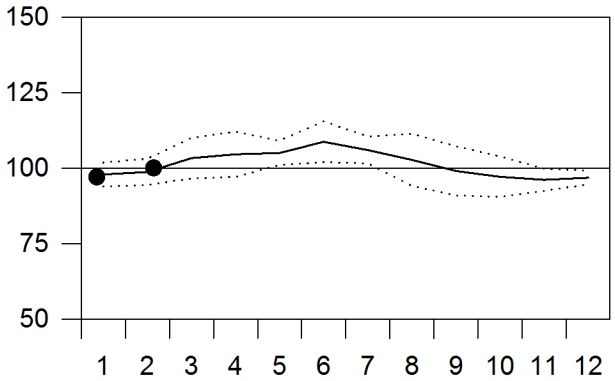
DIN µmol/l



SiO_3 µmol/l

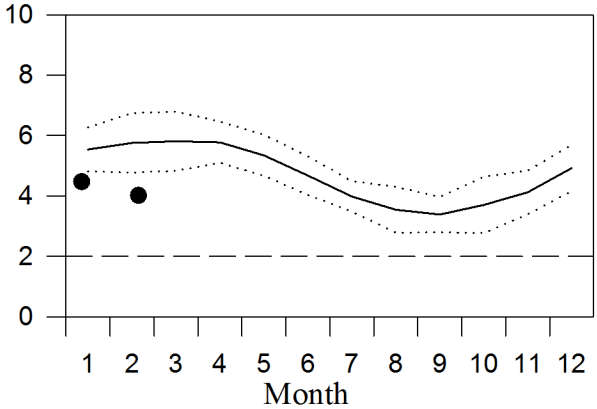


O_2 saturation %

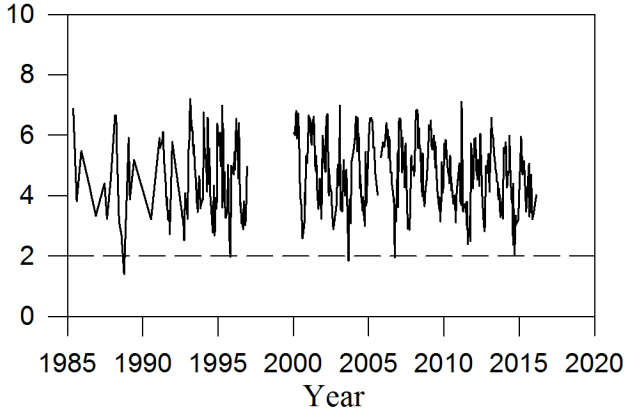


OXYGEN IN BOTTOM WATER (depth >50m)

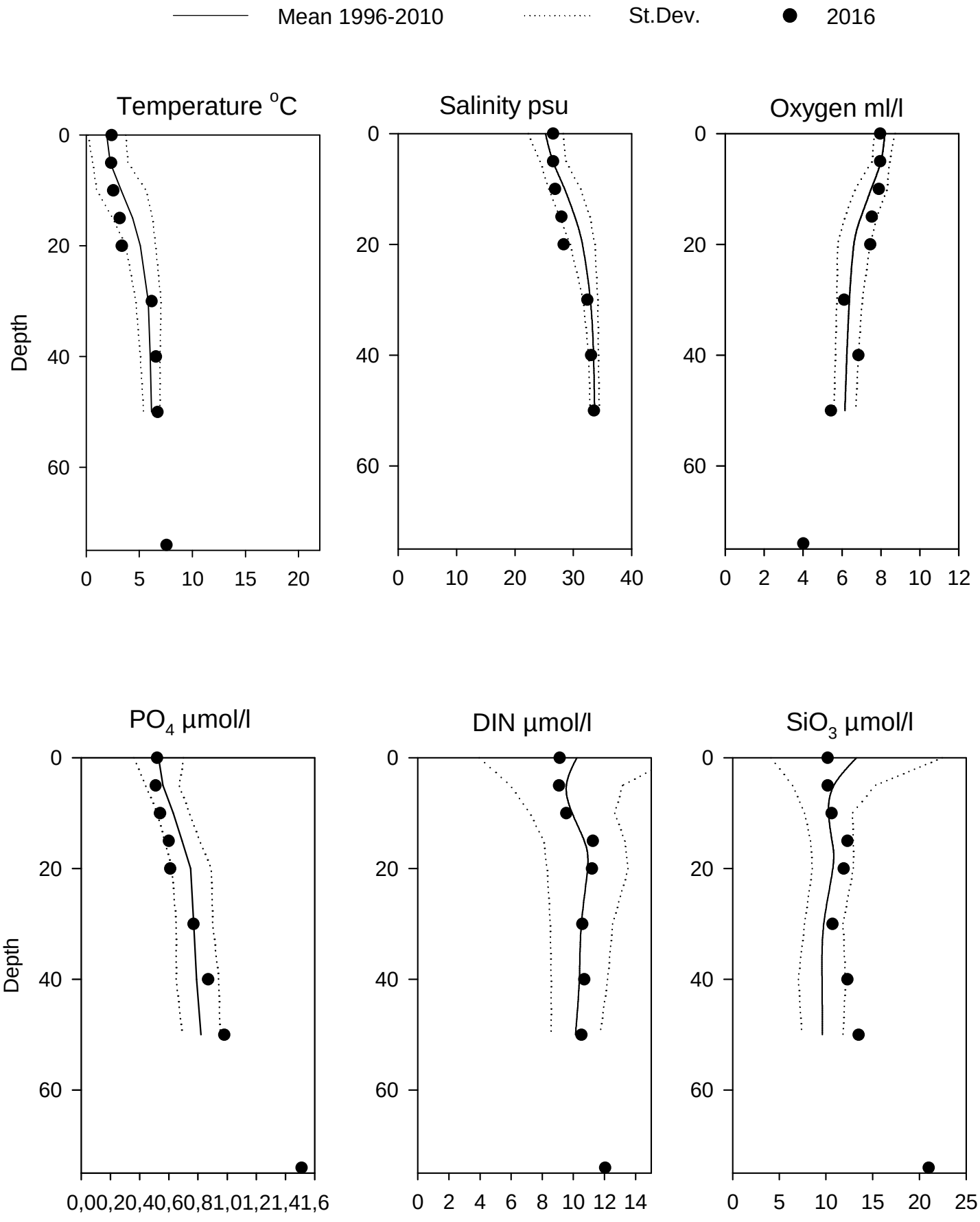
O_2 ml/l



O_2 ml/l

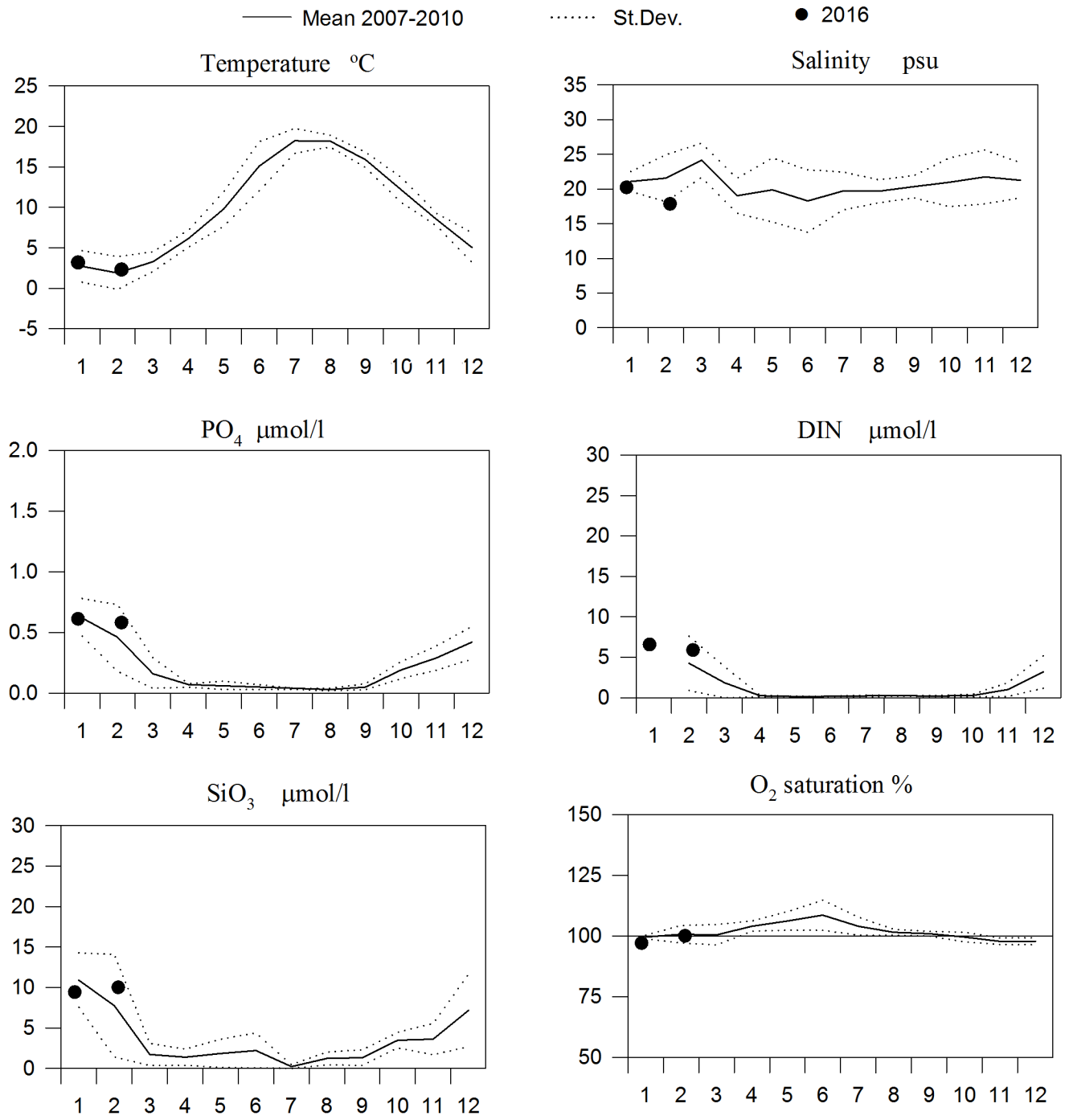


Vertical profiles Släggö February

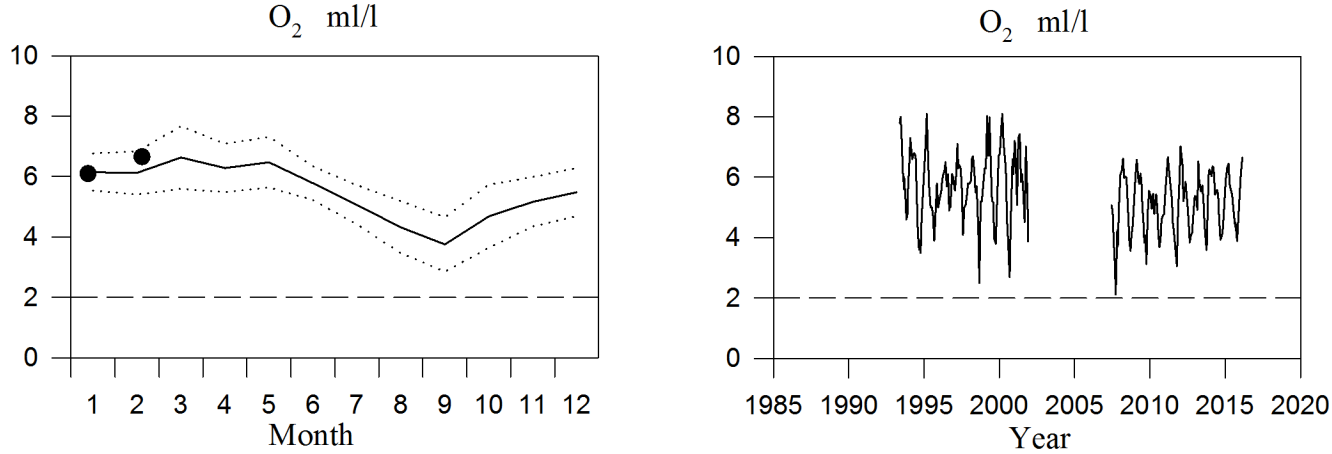


STATION N14 Falkenberg SURFACE WATER

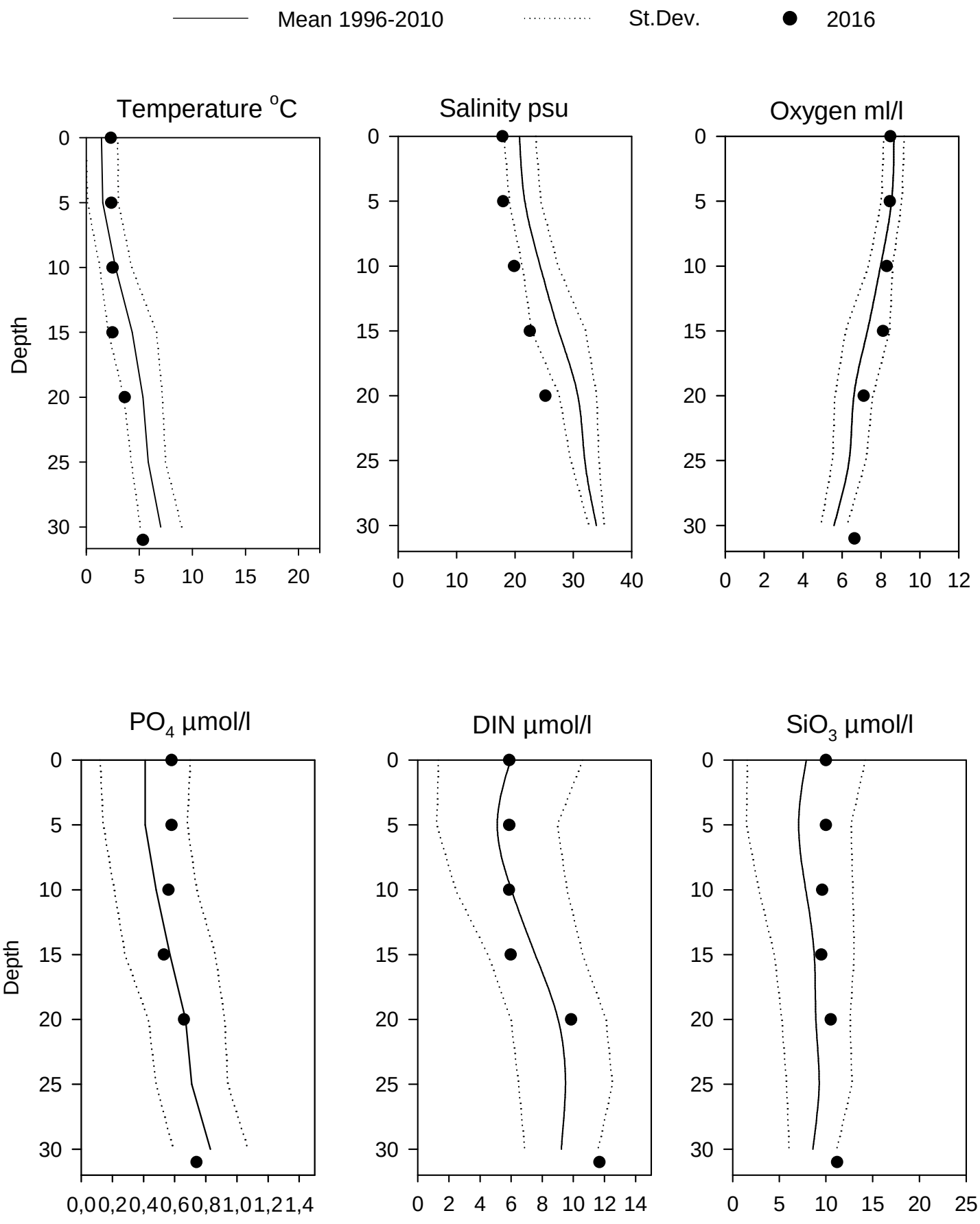
Annual Cycles



OXYGEN IN BOTTOM WATER (depth > 25m)



Vertical profiles N14 Falkenberg February

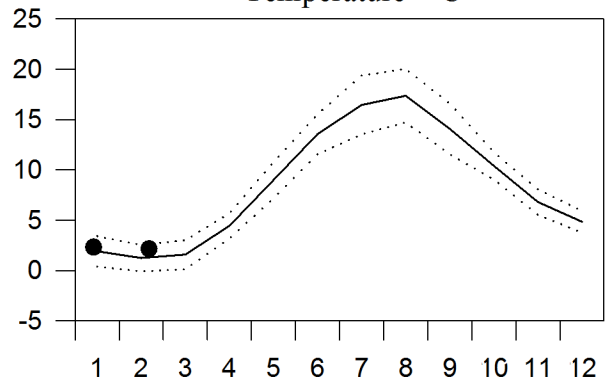


STATION REF M1V1 SURFACE WATER

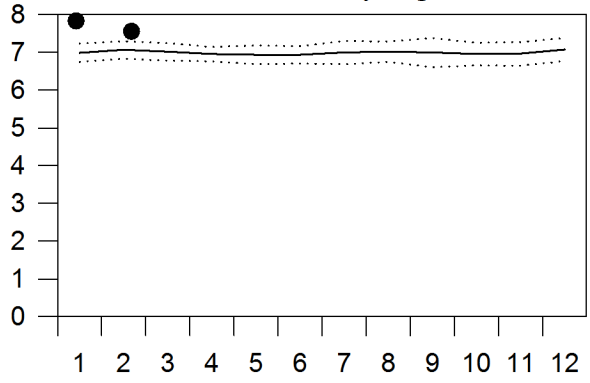
Annual Cycles

Mean 1996-2010 ····· St.Dev. ● 2016

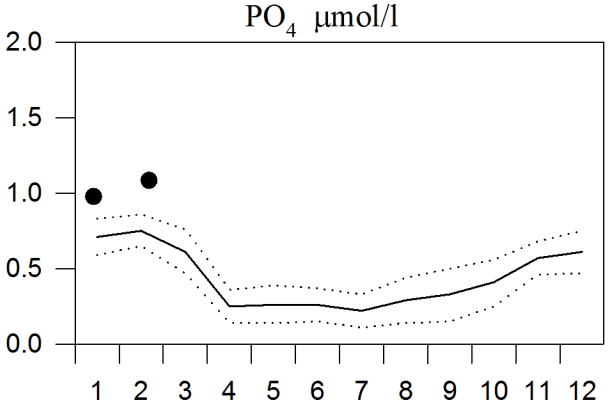
Temperature °C



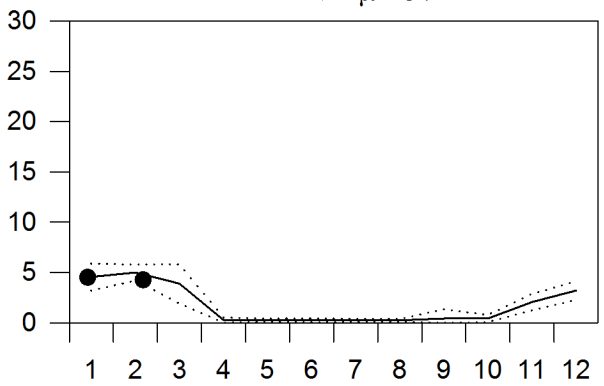
Salinity psu



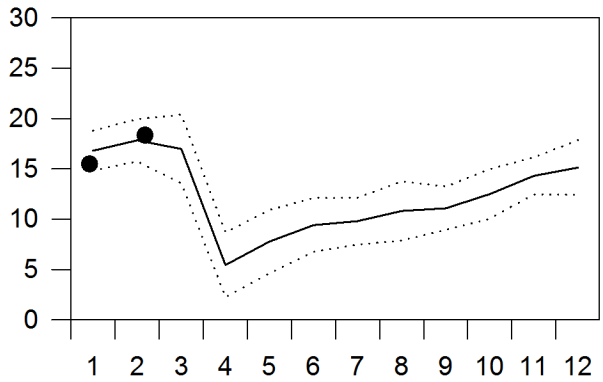
PO_4 µmol/l



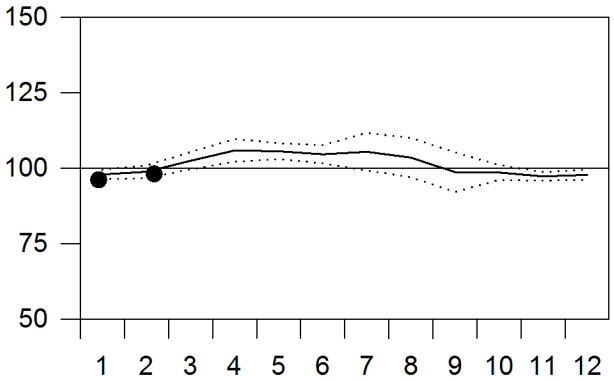
DIN µmol/l



SiO_3 µmol/l

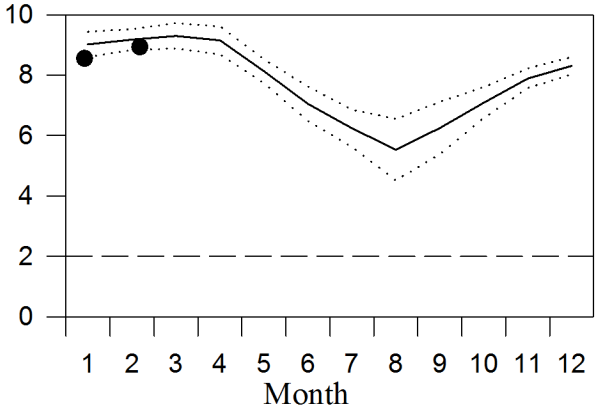


O_2 saturation %

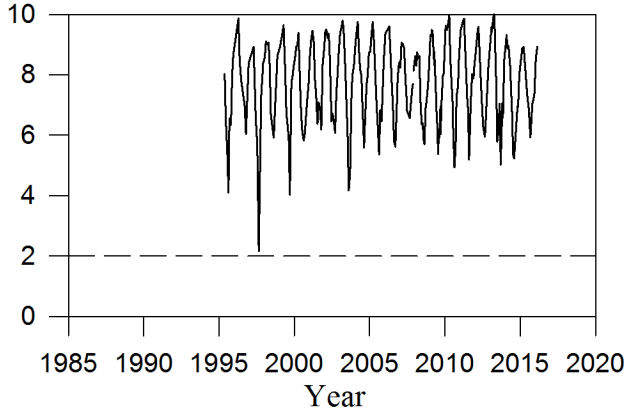


OXYGEN IN BOTTOM WATER (depth >15m)

O_2 ml/l



O_2 ml/l



Vertical profiles Ref M1V1 February