

Report from the SMHI monitoring cruise with R/V Svea

Survey period:

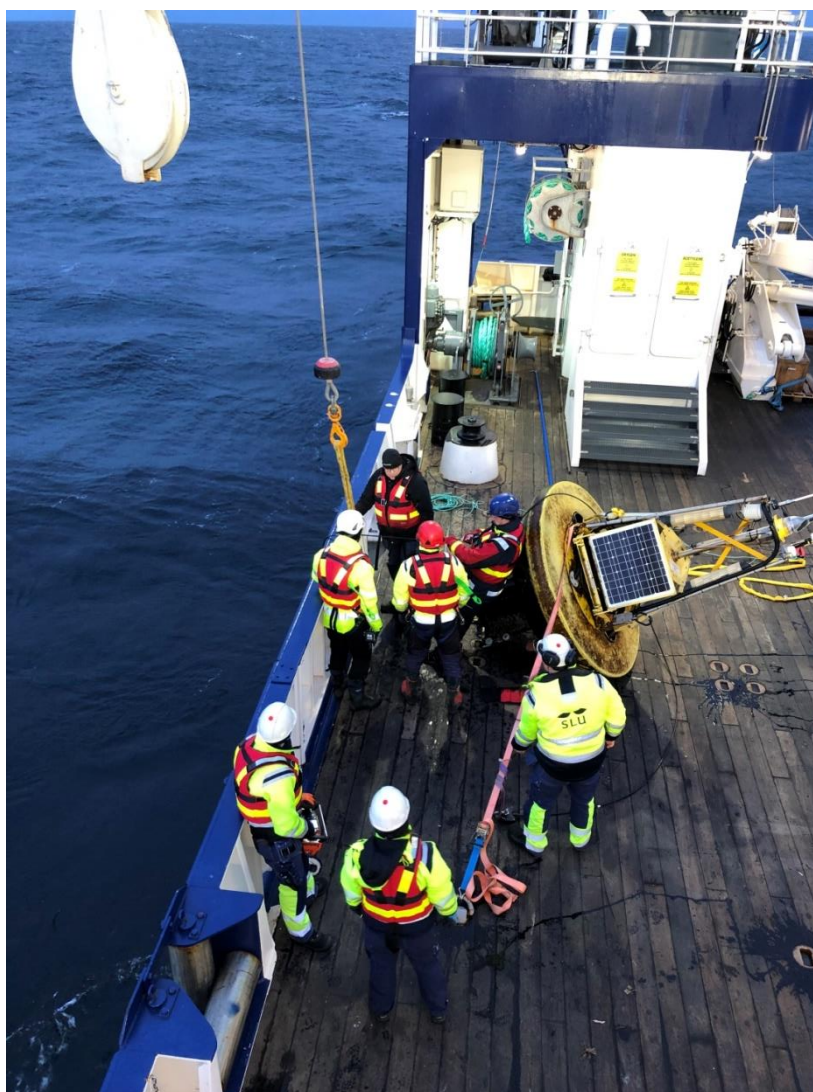
2020-02-06 - 2020-02-14

Principal:

Swedish Meteorological and Hydrological Institute (SMHI),
Swedish Agency for Marine and Water Management (SwAM)

Cooperation partners:

Swedish University of Agricultural Sciences (SLU)



SUMMARY

During the expedition, which is part of the Swedish national marine monitoring programme, the Skagerrak, the Kattegat, the Sound and the Baltic Proper were visited. Extra stations were sampled in the Baltic Proper for winter nutrient mapping. The winds were very hard during parts of the cruise and some stations could therefore not be sampled.

The surface water temperature varied between 5-6 °C which is about 2-3 °C above normal for the season. Due to the unusually warm surface water, the concentration of oxygen in the surface water was lower than normal in all sea areas, as warm water dissolves less oxygen than cold. In the Skagerrak there was a halocline at 30-40 m, in the Kattegat at 5-10 m and in the Baltic Proper of 50-80 m. The salinity in the surface water was higher than normal at all stations in the Skagerrak and at several stations in both the Kattegat and the Baltic Proper.

The mapping of nutrients in the Southern Baltic Proper showed that the concentration of phosphate and inorganic nitrogen in the surface water were normal, with the exception of some stations in the southern Baltic Proper where they were slightly below normal. Silicate levels were above normal in all areas except Arkona. The levels in the deep water were also normal for the season, except in the Western Gotland Basin, where the concentration of dissolved inorganic nitrogen (~12 µmol/l) and silicate (~60 µmol/l) were significantly higher than normal below the halocline at 60 m.

The oxygen conditions in the bottom water in Arkona and the Bornholm Basin were good. Oxygen in the Bornholm Basin had decreased slightly since January, when the inflow that occurred in December had oxygenated the bottom water. Instead, oxygen deficiency was now found around 50 m at station BY5 as a result of the earlier bottom water being lifted higher in the water column. The oxygen concentration under the halocline decreased further into the Baltic Proper. In the Stolpe channel and the Eastern Gotland Basin and the Northern Baltic Proper, it was oxygen free from 70-80 m and in the Western Gotland Basin from 60 m. A layer with low oxygen levels was found between 80-125 m at BY15 but the levels were now lower than before, <0.5 ml/l. At the two stations in the Gulf of Gdansk, it was oxygen free from depth exceeding 80 m. At station BY39 Ölands Södra udde oxygen deficiency was observed already from 30 m depth.

Next expedition is planned to 12-18 of March with R/V Svea

Front page: Ocean buoy at deck after retrieval at Huvudskär.

RESULTS

The cruise was performed with the Swedish research vessel Svea and started in Lysekil on February 6th 2020 and ended in the same harbour on February 14th.

The weather during the cruise was mostly windy as the remnants of the storm Ciaran passed Sweden. Stations BCS-III 10 and BY9 Klaipeda in the south-eastern Baltic Proper had to be cancelled due to bad weather and another station (BY13) were cancelled due to subsequent lack of time. During the cruise, an ocean buoy that had been torn off its anchorage at Huvudskär was tracked and retrieved. In connection with the search for the buoy's anchorage, parts of the anchorage became entangled in one of the ship's azimuths (a type of propeller) and the expedition was temporarily interrupted with a port stop in Oxelösund and check of the azimuth before the expedition could continue. Because of this delay, the stations BY30, BY31, BY36, RefM1VI, Hanö Bay KBV and second visit to Anholt E were cancelled.

In total, 36 of the planned 44 stations were sampled, at two of the sampled stations, only samples for nutrients from 5 m depth were taken from the Ferrybox system.

During the cruise, extra sampling of DNA for barcoding was performed as part of work on development of the Swedish monitoring programme and eDNA (environmental DNA) was sampled for researchers at the University of Turku.

In addition to the regular sampling program, Svea's instruments for measuring profiles during transit were also tested; the "Moving Vessel Profiler". The instrument was operated between stations when the weather allowed and the results show that the measurements can be a good complement to the regular program and give a picture of variation in between stations. Work remains on setting up data flow, quality review and determination of the accuracy of the measurements from the sensors on the instrument. About 500 profiles were collected over four transects; Skagerak Å-transect, Kattegat Fladen-the Sound, southern Baltic Proper BY1-PLP1, Western Gotland Basin BY32-Hanö Bight.

Normally, no biological samples have been analyzed at the time of writing this report, but within 2 weeks after the cruise there will be an algae report for the current month where more information on phytoplankton is available: <https://www.smhi.se/publikationer/publikationer/algrapporter>.

This report is based on data that have passed a first quality control. When data are published at the national oceanographic data centre some values might have changed after further quality controls have been performed. Data from this cruise will be published as soon as possible at the data center's webpage, normally within a week after the cruise.

Data can be downloaded here: <http://www.smhi.se/klimatdata/oceanografi/havsmiljodata> (only available in Swedish).

The Skagerrak

The temperature in the surface water was about 6 °C, which is warmer than normal. The salinity in the surface water was also higher than normal at several stations. A halocline was found at all stations and deepened from 10 m at the coastal stations to about 30-40 m at the westernmost stations further out in the Skagerrak. Below 40 m, the water was well mixed with salinity around 35 and temperature around 7.5 °C.

Nutrient levels were normal in the surface water, about 0.5 $\mu\text{mol/l}$ phosphate, 7-8 $\mu\text{mol/l}$ dissolved inorganic nitrogen nearest the coast and 5-6 $\mu\text{mol/l}$ in the open sea, 7-8 $\mu\text{mol/l}$ silicate closest to the coast and 3-4 $\mu\text{mol/l}$ the open sea. Below the halocline at station Å15, the levels of silicate were lower than normal ($\sim 3 \mu\text{mol/l}$) and at station Å13 the levels of inorganic dissolved nitrogen were lower than normal ($\sim 5 \mu\text{mol/l}$).

At the coastal station Släggö, the oxygen concentration was close to 4 ml/l near the bottom, which is unusually low but not considered as oxygen deficiency, otherwise the oxygen concentration was slightly lower than normal in the surface water because of the unusually warm surface water in cold).

No peaks in chlorophyll fluorescence were noted.

The Kattegat and the Sound

The surface water temperature was about 5 °C which is higher than normal. The salinity in the surface water was around 25 in the Kattegat and 12 in the Sound. In the Kattegat there was a halocline that varied from 5 m at the northern stations to 10 m at the station Anholt E and 15 m in the Sound. At the station Anholt E there was also a deeper halocline around 25 m. In the Kattegat the salinity below the halocline was about 33 and in the Sound the salinity below the halocline was about 29 which was normal for the season. The temperature below the halocline was about 7 °C.

Phosphate levels in the surface water were normal throughout the Kattegat and the Sound and ranged between 0.5-0.6 $\mu\text{mol/l}$, highest in the Sound. Dissolved inorganic nitrogen levels were also normal but varied more than phosphate levels with concentrations between 4-7 $\mu\text{mol/l}$. The levels of silicate were normal in both Kattegat and the Sound and were between 5-7 $\mu\text{mol/l}$ in the Kattegat and about 14 $\mu\text{mol/l}$ in the Sound.

There was no oxygen deficiency at any of the stations, the lowest oxygen concentrations were found at the stations W Landskrona and Anholt E where the concentration in the deep water was just over 5 ml/l.

No peaks in chlorophyll fluorescence were noted.

The Baltic Proper

As in the Skagerrak and the Kattegat, the temperature was above normal throughout the entire Baltic Proper, about 5 °C. In Arkona and Bornholm the temperature was about 5 °C from the surface to the bottom, which means that the temperature was above normal down to the halocline, which was at 50 m in the Bornholm basin. The salinity in the surface water was above normal in Arkona, in the Western Gotland Basin and the northern parts of the Eastern Gotland Basin. The salinity in the surface water varied from 7 in the northern Baltic Proper to 9 in Arkona. The depth of the halocline increased from 50 m in the Bornholm Basin, 60 m in the Eastern Gotland Basin to 70 m in the Northern South Baltic Sea and the stations outside the Gulf of Finland and then decreased again to about 50 m in the Western Gotland Basin.

In the Western Gotland Basin it was anoxic from about 60 m and in the Northern Baltic Sea and in the Eastern Gotland Basin anoxia was found from depths exceeding 70-80 m. At station BY15, the low concentration of oxygen around 100 m that existed throughout 2019 had further decreased and were now $< 0.5 \text{ ml/l}$. At station BY5 in the Bornholm Basin, the inflow, which occurred at the beginning of December, had oxygenated the bottom water in January. Since then the concentration

of oxygen at the bottom had dropped slightly and was now 3.13 ml/l. The water with low oxygen content, which was previously at the bottom, was now found at about 50 m depth; here the oxygen concentration was only 0.83 ml/l and the temperature near 12 °C. Phosphate and silicate were also significantly higher in this water than in the rest of the profile. In the Hanö Bight there was no oxygen deficiency, but there were unusually high levels of phosphate in the bottom water.

The levels of nutrients in the deep water were normal throughout the Eastern Gotland Basin and in the Northern Baltic Proper. In the Western Gotland Basin, on the other hand, the levels of dissolved inorganic nitrogen (~12 µmol/l) and silicate (~60 µmol/l) were significantly higher than normal below the halocline at 60 m, here there were also unusually high levels of hydrogen sulphide (30-40 µmol/l). Phosphate was slightly higher than normal just below the halocline but followed approximately the 15-year average from 80 m to the bottom. Also at station BY39, the levels of silicate and phosphate were relatively high in the bottom water as there was a lack hypoxia of oxygen already from 30 m depth.

The levels of dissolved inorganic nitrogen and phosphorus in the surface water were normal in most of the Baltic Proper, at some stations slightly lower than normal. In contrast, the levels of silicate in the surface water were higher than normal in all areas except Arkona. Phosphate concentrations were normal except in the Gulf of Gdansk and in the Northern Baltic Proper, where the concentration in the surface water was lower than normal, about 0.6 µmol/l compared to about 0.7 µmol/l in the remaining part of the Eastern Gotland Basin and the Northern Baltic Proper. Phosphate levels were lowest in Arkona (~0.55 µmol/l) and increased through the Baltic Sea with highest levels in the Western Gotland Basin (~0.75 µmol/l). The highest concentration of phosphate was found at the mapping station BY39 at the southern tip of Öland, which is a coastal station. The levels of dissolved inorganic nitrogen varied in a similar way to phosphate, lowest in Arkona (~2.7 µmol/l) and increasing into the Baltic Proper, but unlike phosphate, the levels of dissolved inorganic nitrogen were highest in the Northern Baltic Proper (~4.5 µmol/l) and about the same in the Eastern and Western Gotland Basin (~3.4 µmol/l). Also the levels of silicate increased from Arkona (~13 µmol/l) into the Baltic Proper and the levels were higher than normal in all basins except Arkona. The highest concentration was found at the coastal station BY39 (~20 µmol/l).

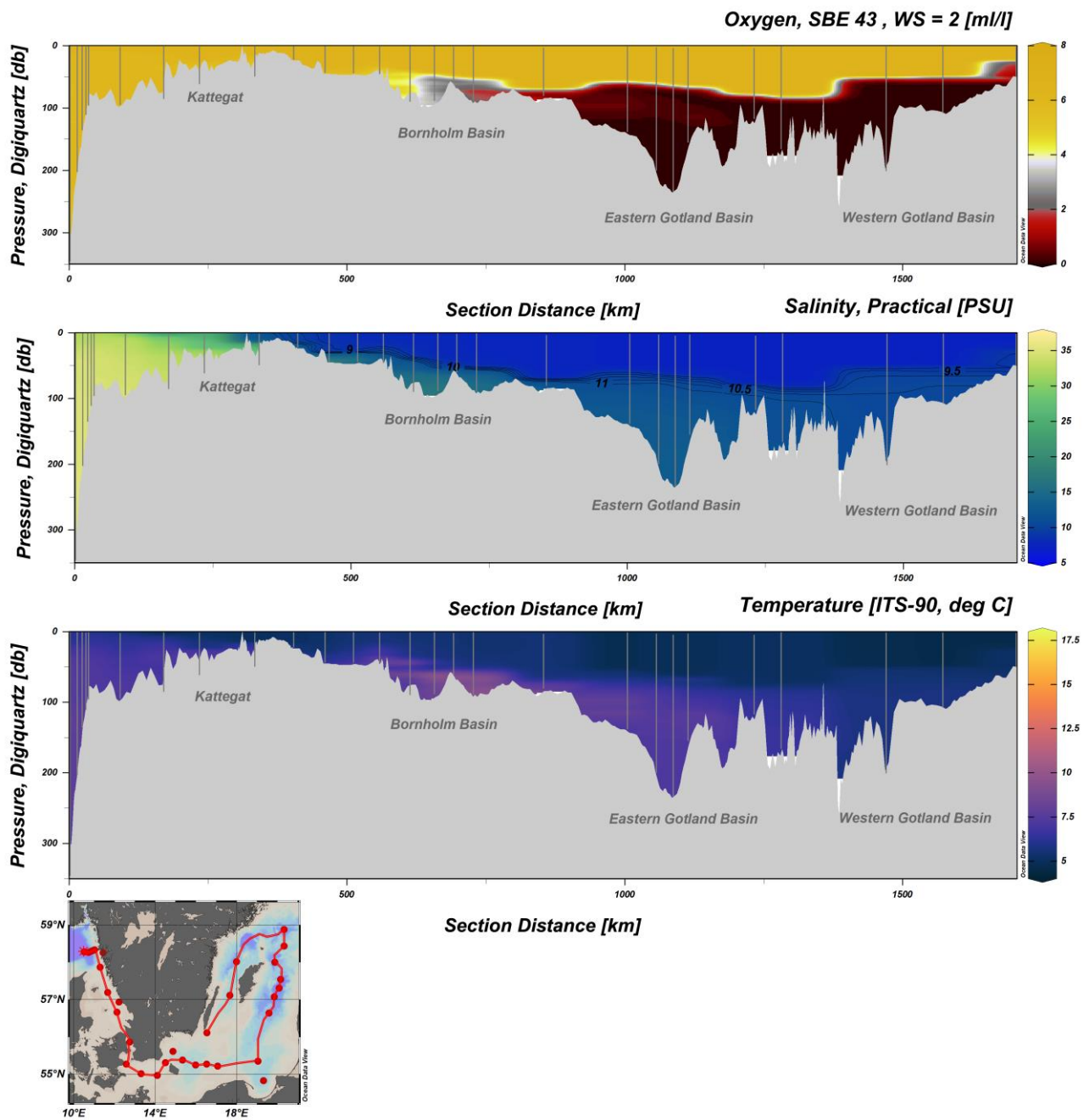


Figure 1. Transect showing dissolved oxygen, salinity and temperature from the Sound, through the Baltic Proper, to the Western Gotland Basin.

PARTICIPANTS

Name	From
Lena Viktorsson Chief Scientist	SMHI
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Sara Johansson	SMHI
Madeleine Nilsson	SMHI
Daniel Bergman-Sjöstrand	SMHI
Raul Salas	SMHI

APPENDICES

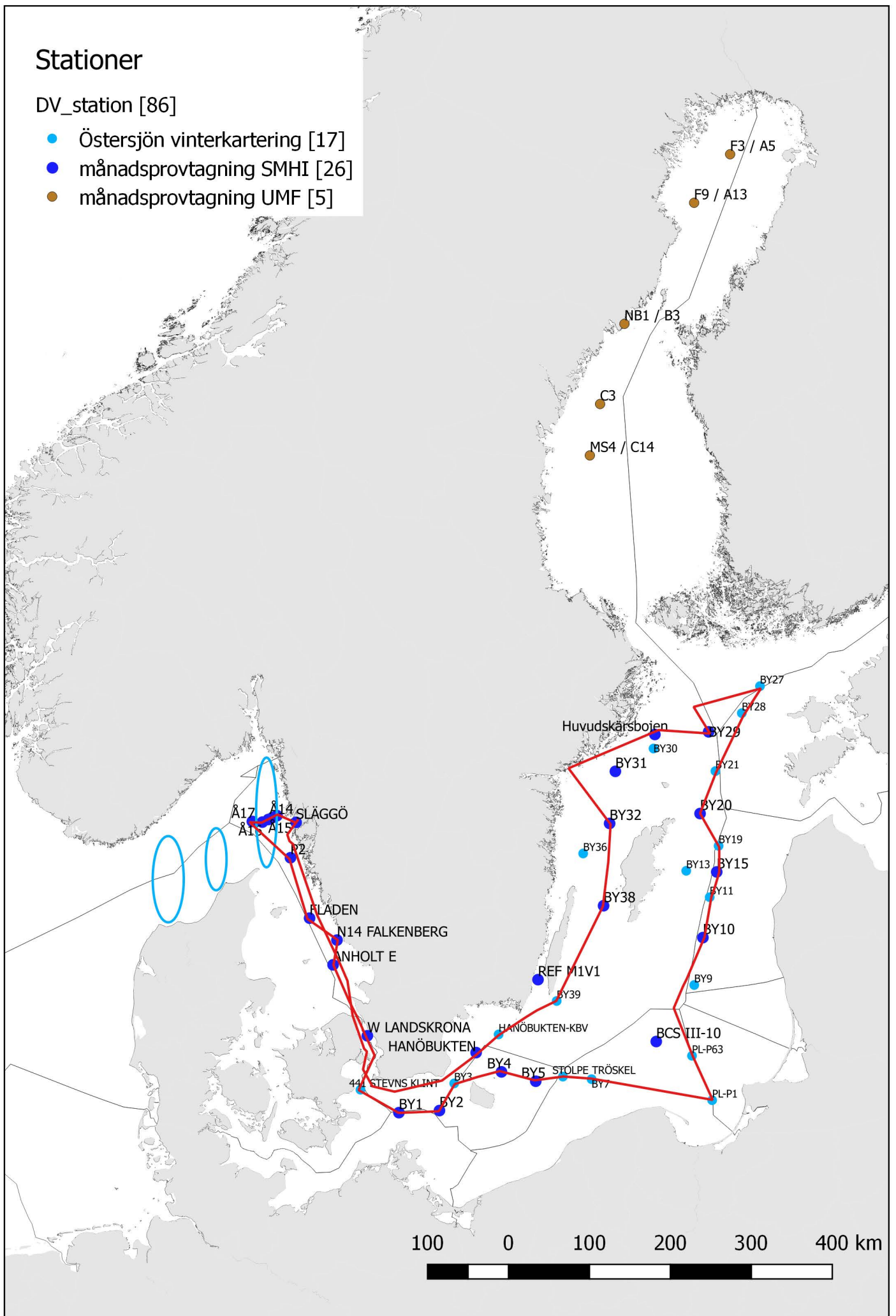
- Track chart
- Table over stations, sampled parameters and number of sampling depths
- Map showing bottom oxygen concentrations and surface salinity, temperature and nutrient concentrations
- Vertical profiles for regular monitoring stations
- Monthly average surface water plots for regular monitoring stations



Stationer

DV_station [86]

- Östersjön vinterkartering [17]
- månadsprovtagning SMHI [26]
- månadsprovtagning UMF [5]



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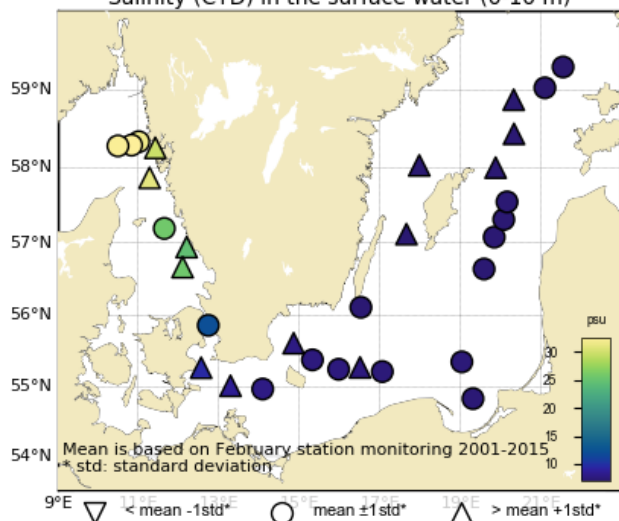
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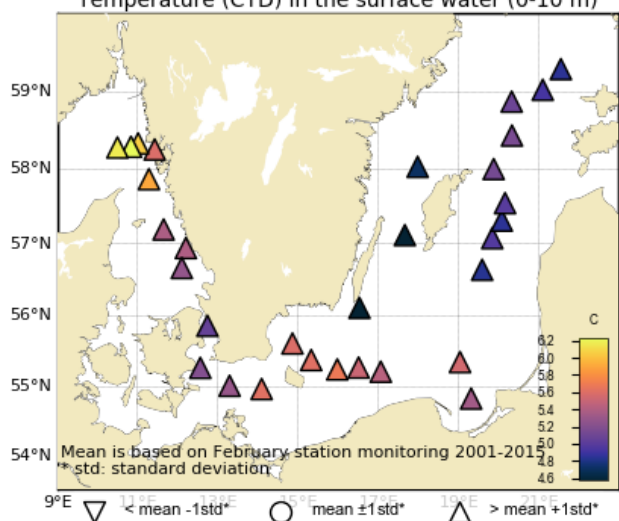
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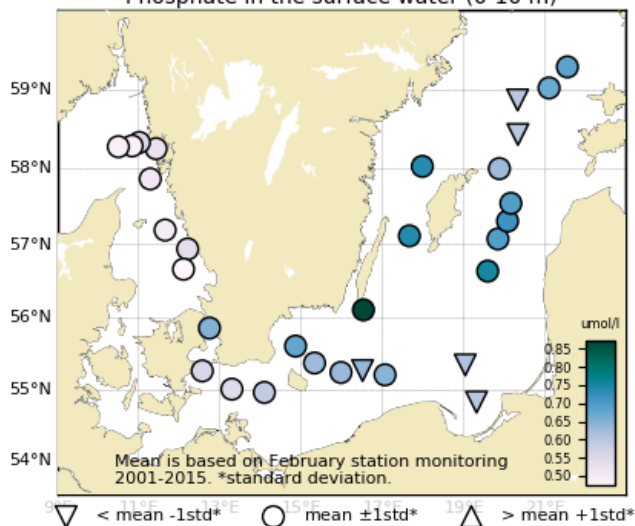
SMHI marine monitoring February 2020
Salinity (CTD) in the surface water (0-10 m)



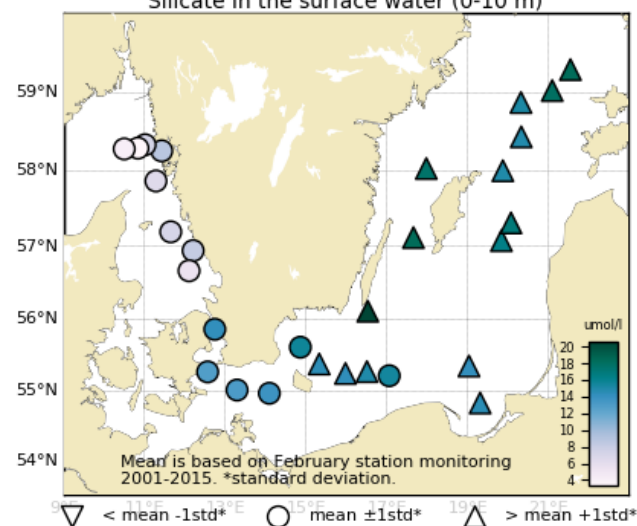
SMHI marine monitoring February 2020
Temperature (CTD) in the surface water (0-10 m)



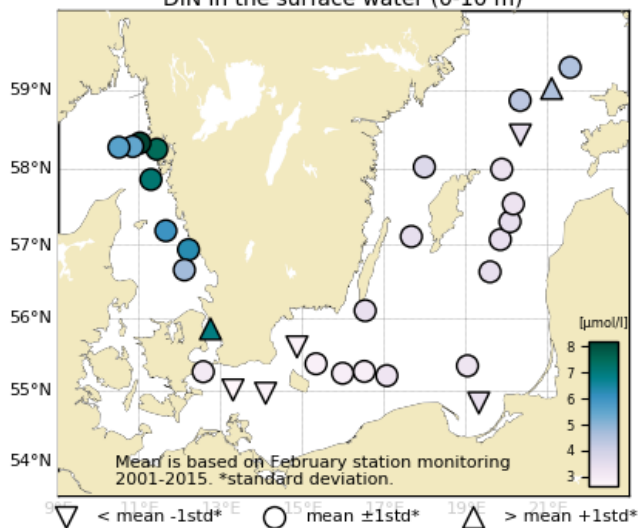
SMHI marine monitoring February 2020
Phosphate in the surface water (0-10 m)



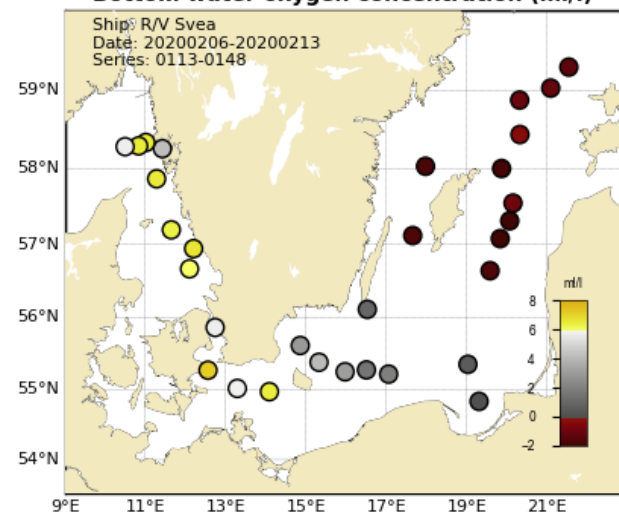
SMHI marine monitoring February 2020
Silicate in the surface water (0-10 m)



SMHI marine monitoring February 2020
DIN in the surface water (0-10 m)



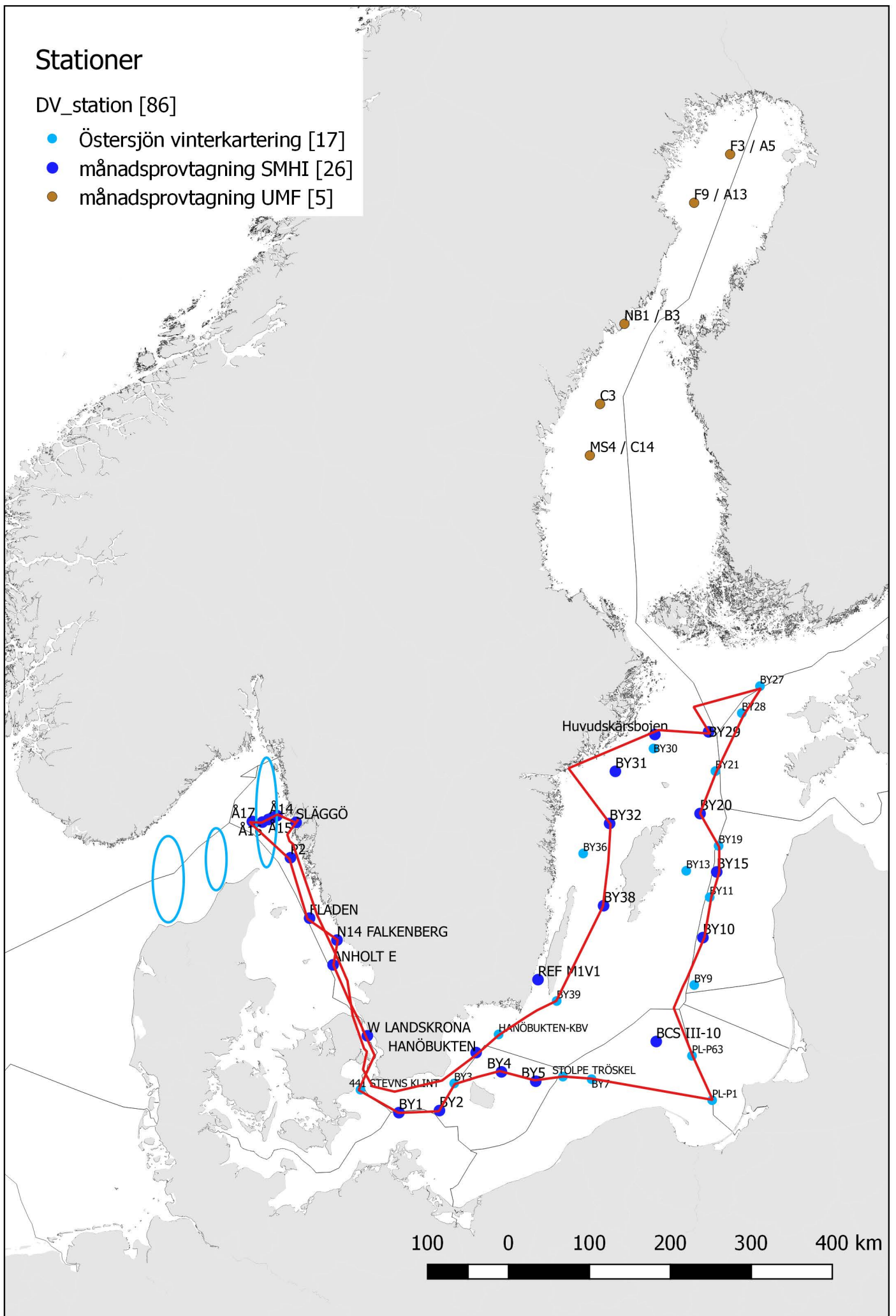
Bottom water oxygen concentration (ml/l)



Stationer

DV_station [86]

- Östersjön vinterkartering [17]
- månadsprovtagning SMHI [26]
- månadsprovtagning UMF [5]



Date: 2020-03-04
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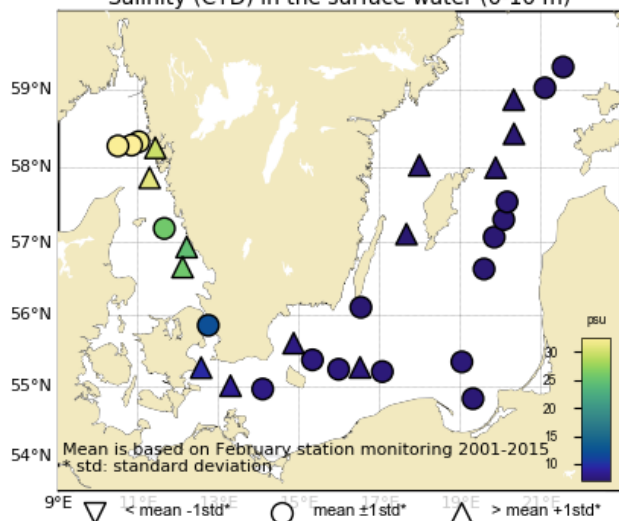
Ship: SE
Year: 2020

Ser no	Cru no	Stat code	Proj	Stat name	Lat	Lon	Start date yyyymmdd	Start time hhmm	Bottom depth m	Secchi depth m	Wind dir vel	Air temp C	Air pres hPa	WCWI elac	CZPP hohp loy tueo hdsb o p	No de	No btl	T e	T e	S a	S a	P h	P h	D o	D o	H 2	H 2	P h	P h	N t	N t	N t	N t	N t	N t	A m	A m	S t	S t	H c	H c	C o	C o									
																			m	m	l	l	x	x	s	s	o	o	r	r	r	r	r	r	o	o	k	k	o	o	m	m	m	m	m	m	m	m				
																			p	p	t	t	y	y	s	s	t	t	i	i	a	a	z	z	n	n	t	t	y	y	3	3	u	u	n	n	n	n				
																			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
																			b	b	c	b	c	b	c	b	c	b	c	b	c	b	c	b	c	b	c	b	c	b	c	b	c	b	c	b	c	b	c			
																			t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t			
																			l	d	l	d	l	d	l	d	l	d	l	d	l	d	l	d	l	d	l	d	l	d	l	d	l	d	l	d	l	d	l	d		
0113	3	FIBG27	BAS...	SLÄGGÖ	5815.58	01126.08	20200206	1440	78	5	28 4	6.7	1018	2720	xx--	9			x	x	-	x	-	x	x	-	x	-	x	x	x	x	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
0114	3	SKEX14	BAS...	Å13	5820.37	01101.32	20200206	1440	98	5	26 7	7.0	1018	1530	x---	10			x	x	-	x	-	x	x	-	x	-	x	x	x	x	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
0115	3	SKEX15	BAS...	Å14	5819.11	01056.81	20200206	1630	111		25 7	7.0	1019	1230	----	11			-	x	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
0116	3	SKEX16	BAS...	Å15	5817.70	01050.64	20200206	1703	138		27 6	7.2	1020	9999	x---	12			x	x	-	x	-	x	x	-	x	-	x	x	x	x	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
0117	3	SKEX17	BAS...	Å16	5816.03	01043.46	20200206	1945	203		30 4	7.3	1022	9999	----	14			-	x	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
0118	3	SKEX18	BAS...	Å17	5817.11	01030.38	20200206	2140	345		32 3	7.5	1023	9990	xx--	15			-	x	-	x	x	x	-	x	-	x	x	x	x	-	-	x	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
0119	3	SKEX23	BAS...	P2	5752.02	01117.49	20200207	0320	94		09 6	4.3	1025	9990	x---	10			x	x	-	x	-	x	x	-	x	-	x	x	x	x	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
0120	3	KANX25	BAS...	FLADEN	5711.56	01139.44	20200207	0811	85	6	17 6	2.6	1026	4820	x---	12			x	x	-	x	-	x	x	-	x	-	x	x	x	x	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
0121	3	KANX50	BAS...	N14 FALKENBERG	5656.44	01212.69	20200207	1250	31	5	14 7	3.9	1027	4820	xx--	7			x	x	-	x	x	x	-	x	-	x	x	x	x	-	-	x	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
0122	3	KAEX29	BAS...	ANHOLT E	5640.11	01206.63	20200207	1545	62	7	17 7	3.6	1026	2820	xx--	10			x	x	-	x	x	x	-	x	-	x	x	x	x	-	-	x	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
0123	3	SOCX39	BAS...	W LANDSKRONA	5552.00	01244.90	20200207	2255	50		16 8	4.6	1023	9990	x---	9			x	x	-	x	x	-	x	-	x	x	x	x	-	-	x	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0124	3	BPSA01	BAS...	441 STEVNS KLINT	5516.33	01234.28	20200208	0315	25		17 8	5.1	1021	9999	----	6			x	x	-	x	x	-	x	-	x	x	x	x	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
0125	3	BPSA02	BAS...	BY1	5500.97	01318.00	20200208	0800	46		14 8	4.8	1020	1130	x---	8			x	x	-	x	-	x	x	-	x	-	x	x	x	x	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
0126	3	BPSA03	BAS...	BY2 ARKONA	5458.20	01405.95	20200208	1110	47	9	17 9	4.7	1019	1330	xx--	8			x	x	-	x	x	-	x	-	x	x	x	x	-	-	x	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
0127	3	BPSA00	BAS...	BY3 HAMRARNE SUND	5518.77	01429.85	20200208	1455	47	10	17 9	5.2	1018	1230	----	8			x	x	-	x	x	-	x	-	x	x	x	x	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0128	3	BPSB06	BAS...	BY4 CHRISTIANSÖ	5522.99	01520.02	20200208	1743	91		18 8	5.7	1017	9999	x---	12			x	x	-	x	x	-	x	-	x	x	x	x	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
0129	3	BPSB07	BAS...	BY5 BORNHOLMSDJ	5515.02	01559.02	20200208	2100	91		19 11	5.7	1016	9999	xx--	12			x	x	-	x	x	x	-	x	-	x	x	x	x	-	-	x	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
0130	3	BPSE08	BAS...	STOLPE TRÖSKEL	5516.58	01630.90	20200209	0200	64		18 10	5.5	1014	9990	----	10			x	x	-	x	x	-	x	-	x	x	x	x	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
0131	3	BPSE09	BAS...	BY7 STOLPE RÄNNA	5513.05	01704.05	20200209	0520	91		19 11	5.2	1013	9990	----	12			x	x	-	x	x	-	x	-	x	x	x	x	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
0132	3	BPSG71	BAS...	PL-P1	5449.97	01919.11	20200209	1245	107		16 10	4.9	1007	1130	----	14			x	x	-	x	x	-	x	-	x	x	x	x	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
0133	3	BPSE70	BAS...	PL-P63	5521.28	01902.48	20200209	1820	82		17 22	6.3	993	9990	----	11			x	x	-	x	x	-	x	-	x	x	x	x	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0134	3	BPEX13	BAS...	BY10	5638.59	01935.59	20200210	0617	139		19 15	5.9	970	6850	x---	15			x	x	-	x	x	x	-	x	-	x	x	x	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0135	3	BPEX14	BAS...	BY11	5704.50	01950.69	20200210	1215	206		21 17	6.0	968	1650	----	17			-	x	-	x	-	x	x	-	x	-	x	x	x	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
0136	3	BPEX21	BAS...	BY15 GOTLANDSDJ	5718.74	02004.91	20200210	1405	240		20 16	5.9	967	2750	xx--	24			-	x	-	x	x	x	-	x	-	x	x	x	x	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
0137	3	BPEX25	BAS...	BY19	5732.85	02009.81	20200210	1658	160		21 15	5.7	969	9990	----	15			-	x	-	x	-	x	x	-	x	-	x	x	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0138	3	BPEX26	BAS...	BY20 FÄRÖDJ	5800.07	01952.81	20200210	1945	199		25 13	5.7	969	9990	x---	17			-	x	-	x	-	x	x	-	x	-	x	x	x	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
0139	3	BPNX27	BAS...	BY21	5826.52	02020.15	20200211	0046	123		23 15	5.2	970	9990	----	14			x	x	-	x	x	x	-	x	-	x	x	x	x	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0140	3	BPNX34	BAS...	BY28	5902.08	02106.16	20200211	0600	206		23 13	4.5	971	9990	----	17			-	x	-	x	-	x	x	-	x	-	x	x	x	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
0141	3	BPNX33	BAS...	BY27	5917.98	02133.25	20200211	0930	181		23 12	4.3	972	1540	----	16			-	x	-	x	-	x	x	-	x	-	x	x	x	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
0142	3	BPNX35	BAS...	BY29 / LL19	5852.94	02019.73	20200211	1915	167		21 12	4.6	976	9990	x---	16			-	x	-	x	-	x	x	-	x	-	x	x	x	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
0143	3	BPNX00	BAS...		5858.23	01915.03	20200212	0731	0						----	1			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
0144	3	BPWX38	BAS...	BY32 NORRKÖPINGSDJ	5801.83	01759.14	20200213	0155	203		24 12	4.2	991	9990	x---	18			-	x	-	x	-	x	x	-	x	-	x	x	x	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
0145	3	BPWX45	BAS...	BY38 KARLSÖDJ	5706.96	01740.02	20200213	0817	110	10	24 6	3.3	999	1230	x---	15			x	x	-	x	-	x	x	-	x	-	x	x	x	-	-	x	-	-	-	-	-	-	-											

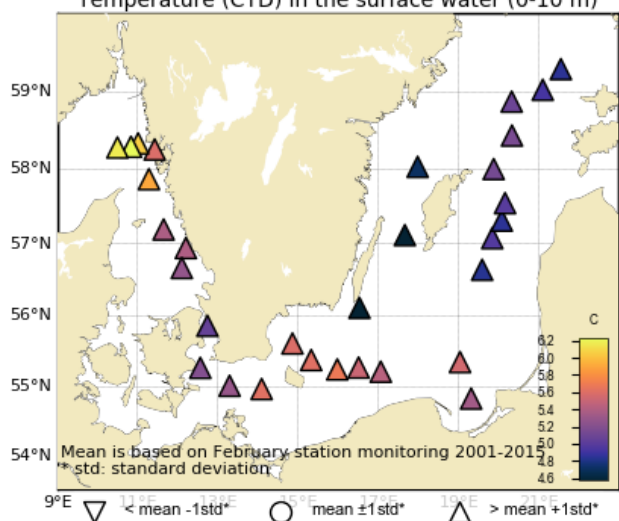
Ship: SE
Year: 2020

Ser no	Cru no	Stat code	Proj	Stat name	Lat	Lon	Start date yyyymmdd	Start time hhmm	Bottom depth m	Secchi depth m	Wind dir vel	Air temp C	Air pres hPa	WCWI aove	CZPP loy	No de	No btl	T e	T e	S a	P h	D o	D o	H 2	P h	P t	N t	N t	N t	A m	A t	S l	H i	C u	C o		
														tueo	apt			m	m	l	l	x	x	s	o	o	r	r	r	o	k	o	m	m	m	m	
														hdsb	o			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
															p			b	c	b	c	b	c									s	-	-	-		
																		t	t	t	t	t	t									i	v	s	-		
																		l	d	l	d	l	d										i	a	-		
																																s	m	-	-	-	
																																i	p	-	-	-	
																																t	-	-	-	-	
0148	3	BPSH05	BAS...	HANÖBUKTEN	5537.04	01452.01	20200213	2220	80		13 5	5.0	1005	9990	x---	12		-	x	-	x	-	x	x	-	x	-	x	x	x	x	-	-	x	-	-	x

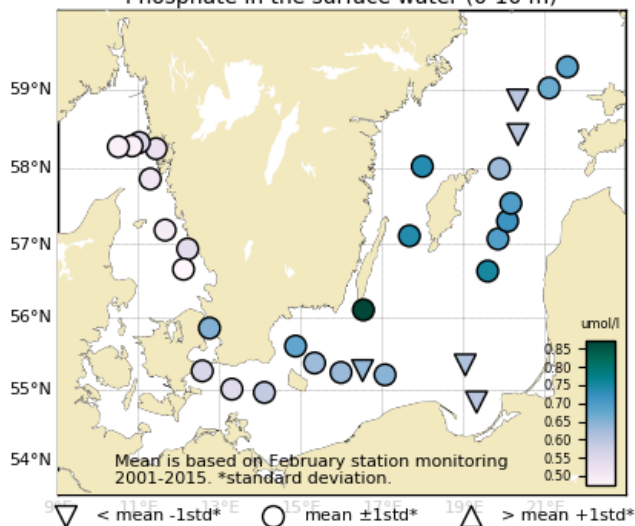
SMHI marine monitoring February 2020
Salinity (CTD) in the surface water (0-10 m)



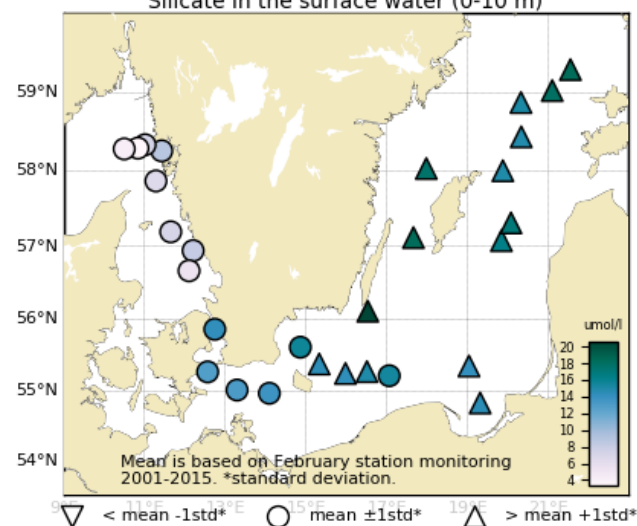
SMHI marine monitoring February 2020
Temperature (CTD) in the surface water (0-10 m)



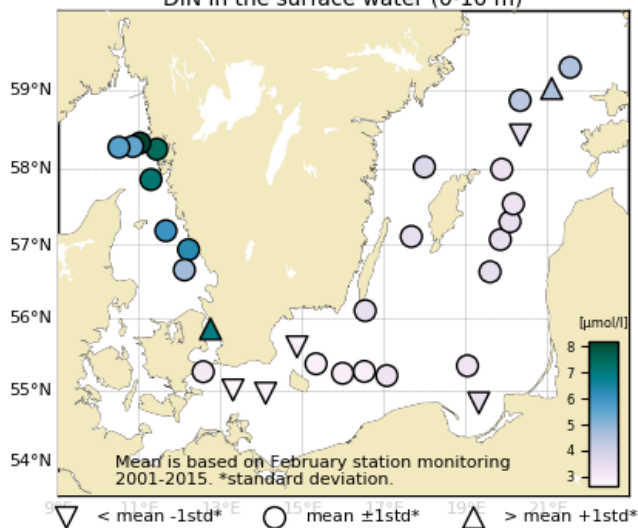
SMHI marine monitoring February 2020
Phosphate in the surface water (0-10 m)



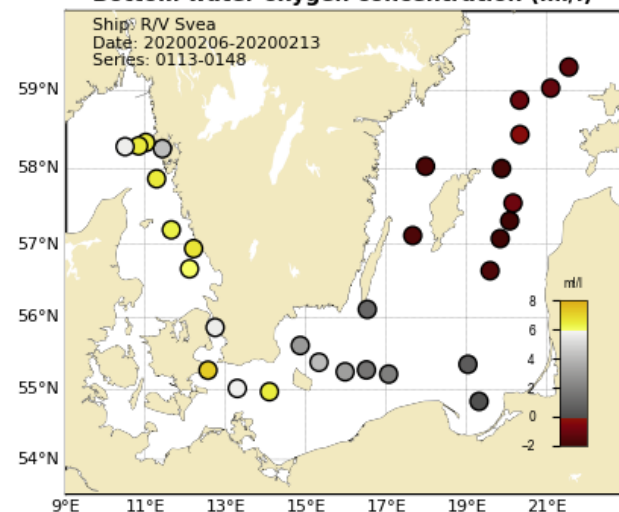
SMHI marine monitoring February 2020
Silicate in the surface water (0-10 m)



SMHI marine monitoring February 2020
DIN in the surface water (0-10 m)



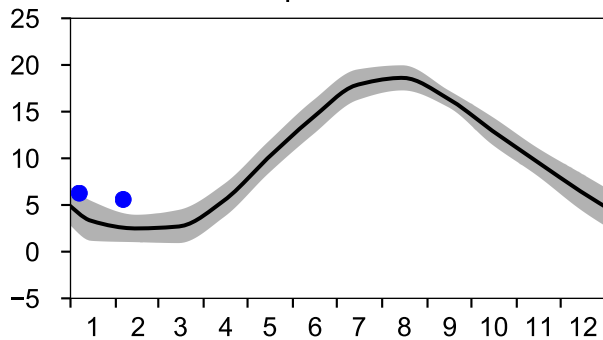
Bottom water oxygen concentration (ml/l)



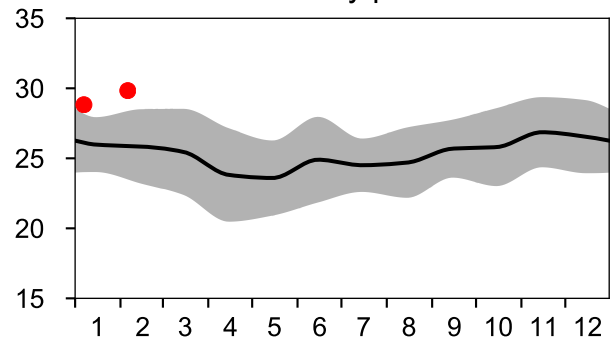
STATION SLÄGGÖ SURFACE WATER (0-10 m)

Annual Cycles

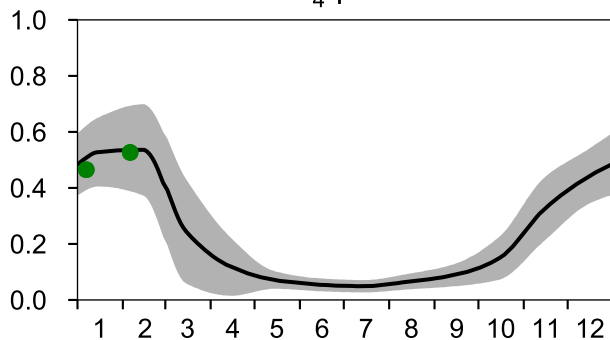
— Mean 2001-2015
Temperature °C



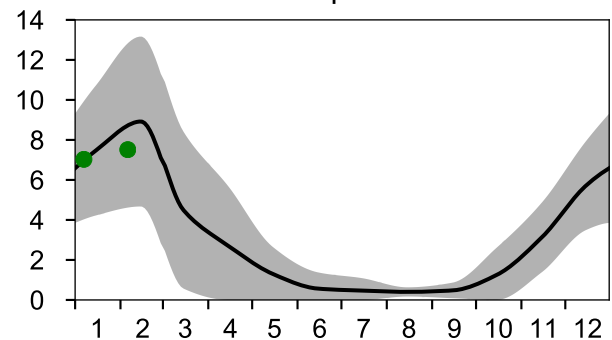
— St.Dev. • 2020
Salinity psu



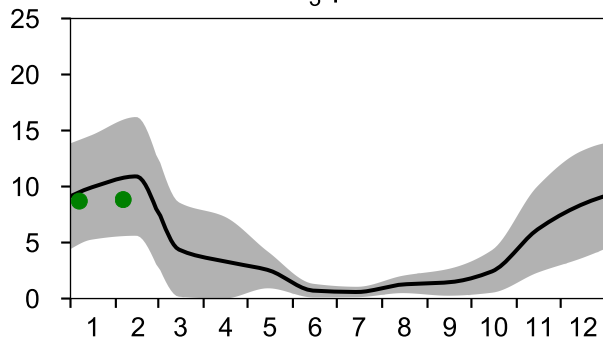
PO₄ µmol/l



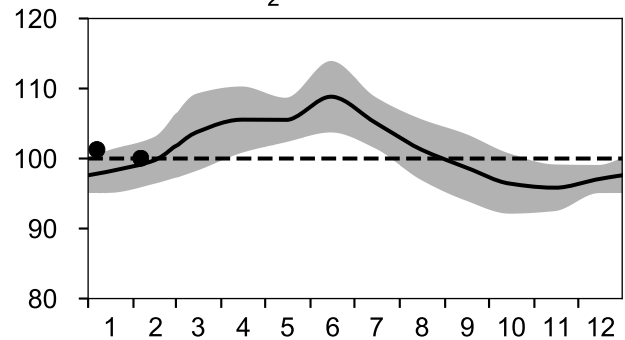
DIN µmol/l



SiO₃ µmol/l

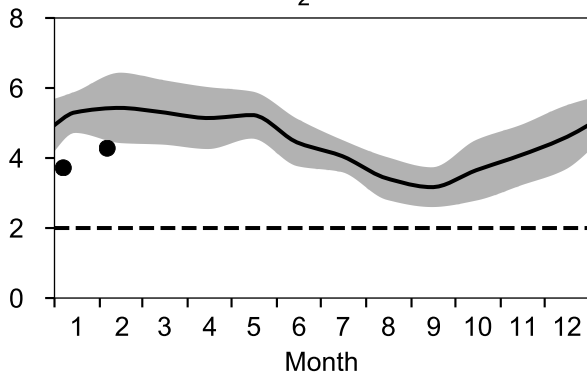


O₂ saturation %

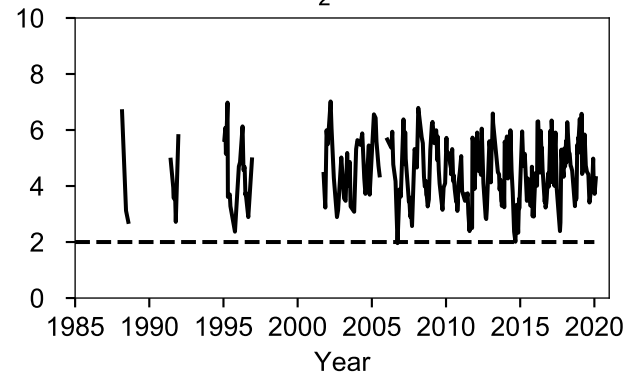


OXYGEN IN BOTTOM WATER (depth >= 64 m)

O₂ ml/l



O₂ ml/l

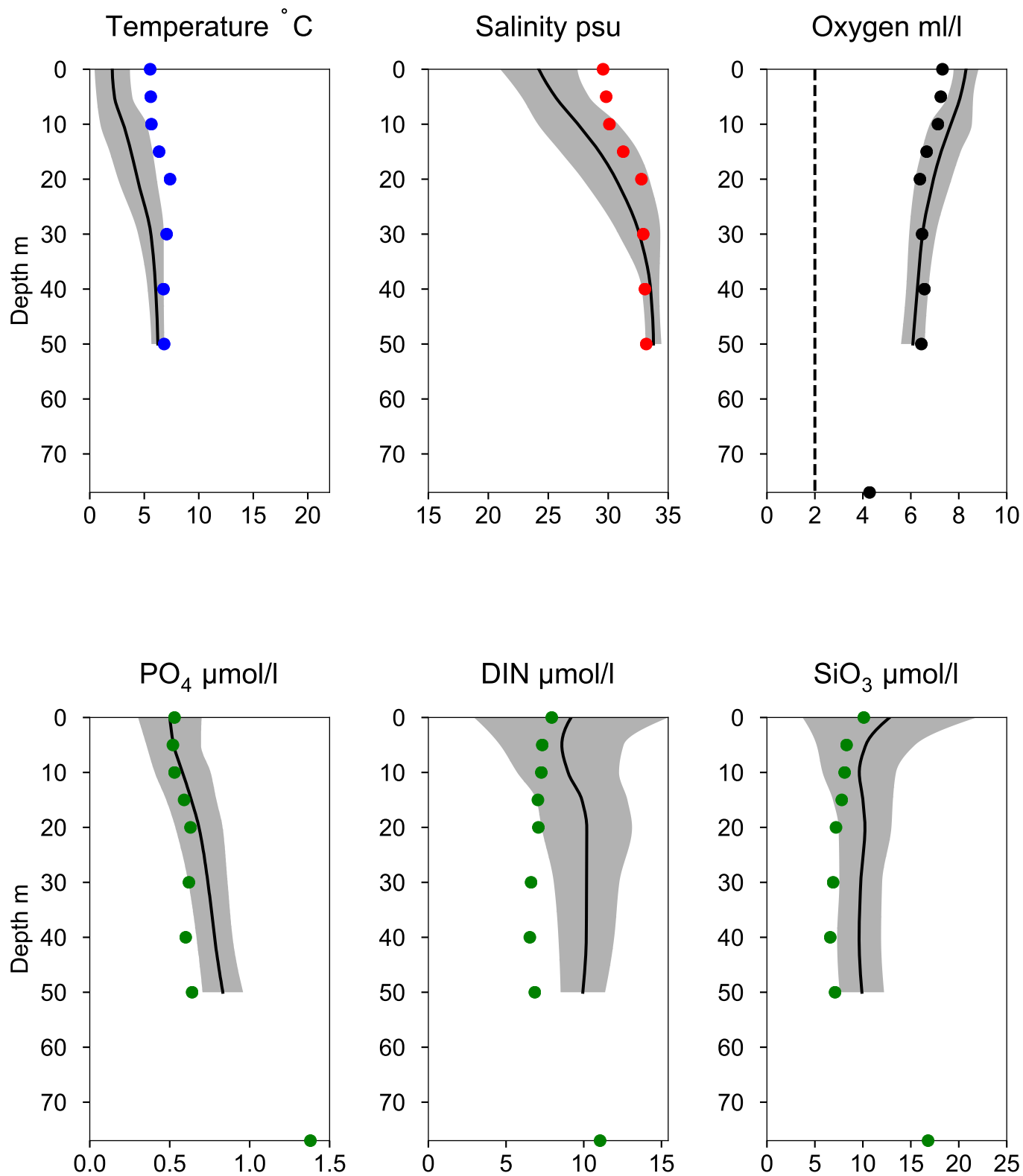


Vertical profiles SLÄGGÖ February

— Mean 2001-2015

■ St.Dev.

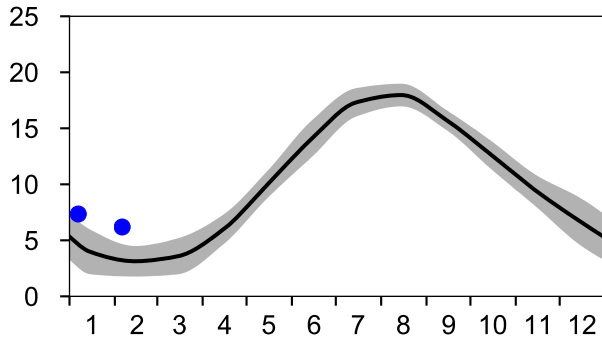
● 2020-02-06



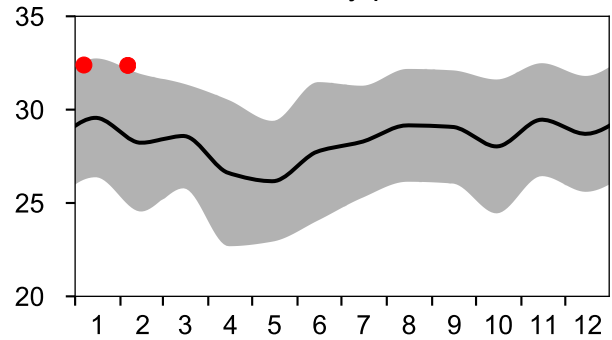
STATION Å13 SURFACE WATER (0-10 m)

Annual Cycles

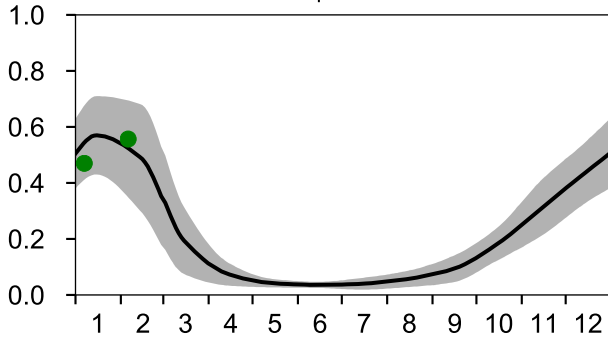
— Mean 2001-2015
Temperature °C



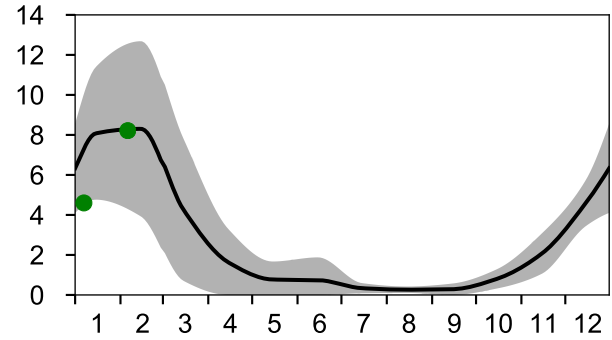
— St.Dev. • 2020
Salinity psu



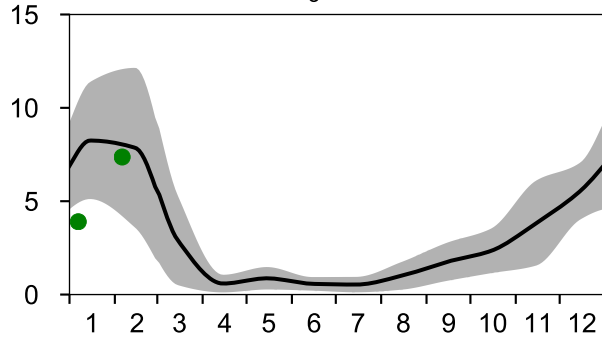
PO₄ µmol/l



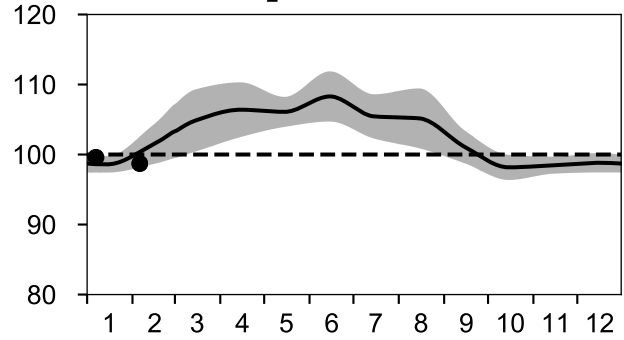
DIN µmol/l



SiO₃ µmol/l

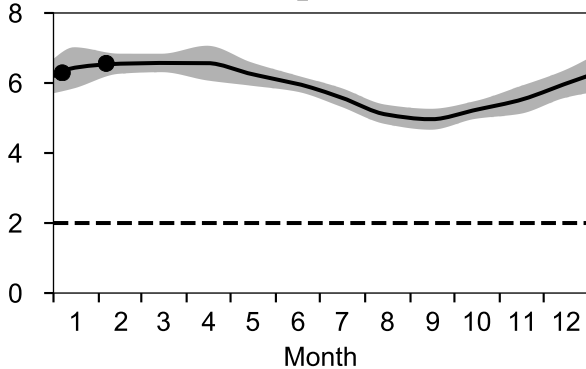


O₂ saturation %

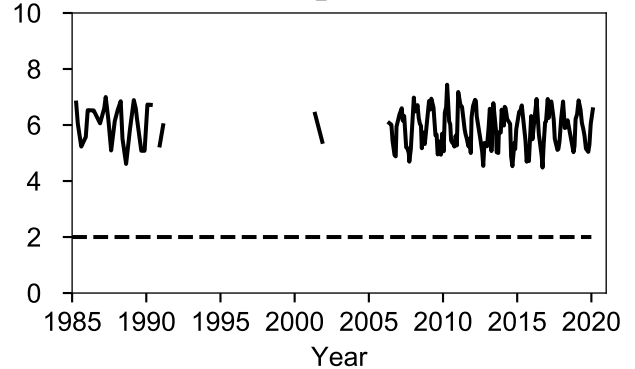


OXYGEN IN BOTTOM WATER (depth >= 80 m)

O₂ ml/l

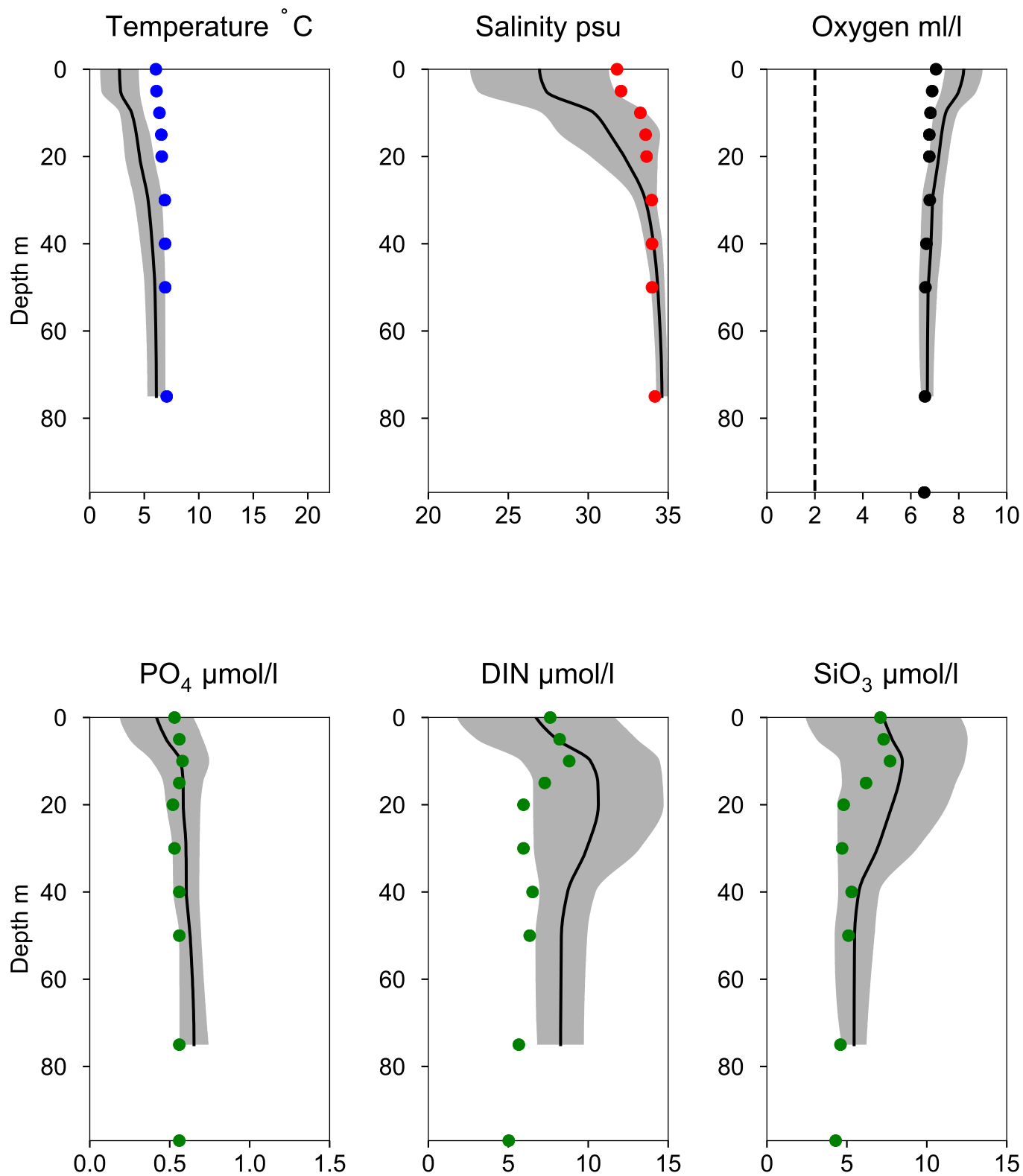


O₂ ml/l



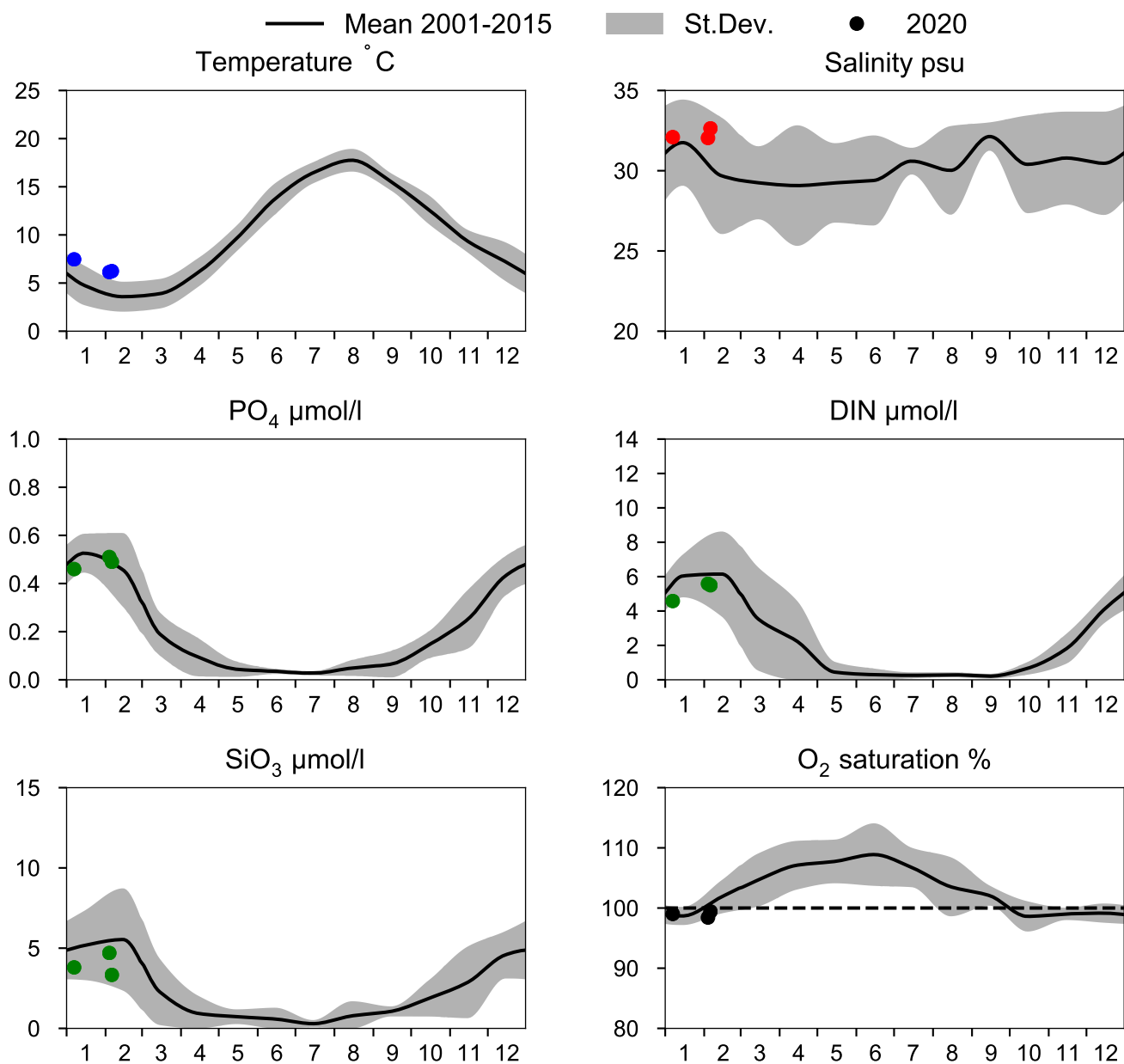
Vertical profiles Å13 February

— Mean 2001-2015 St.Dev. • 2020-02-06

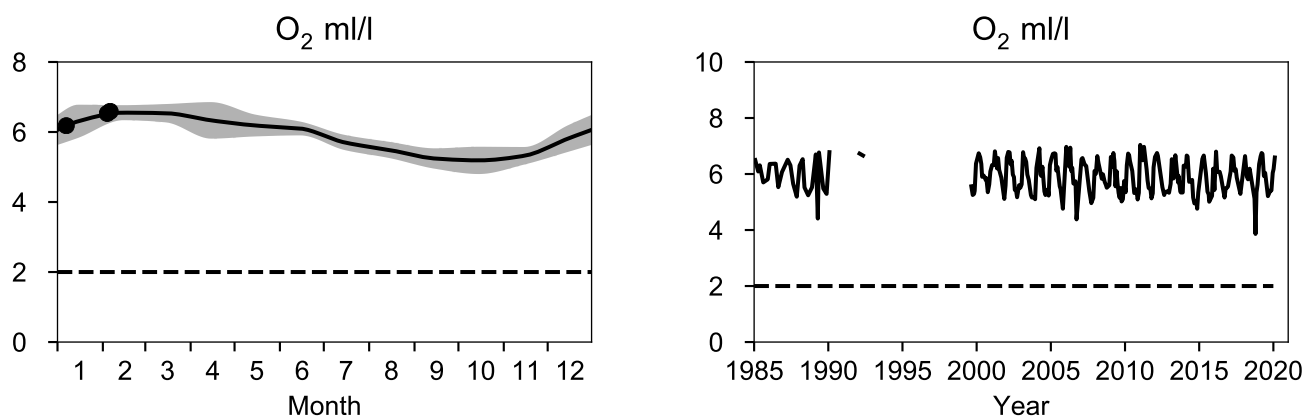


STATION Å15 SURFACE WATER (0-10 m)

Annual Cycles



OXYGEN IN BOTTOM WATER (depth >= 125 m)

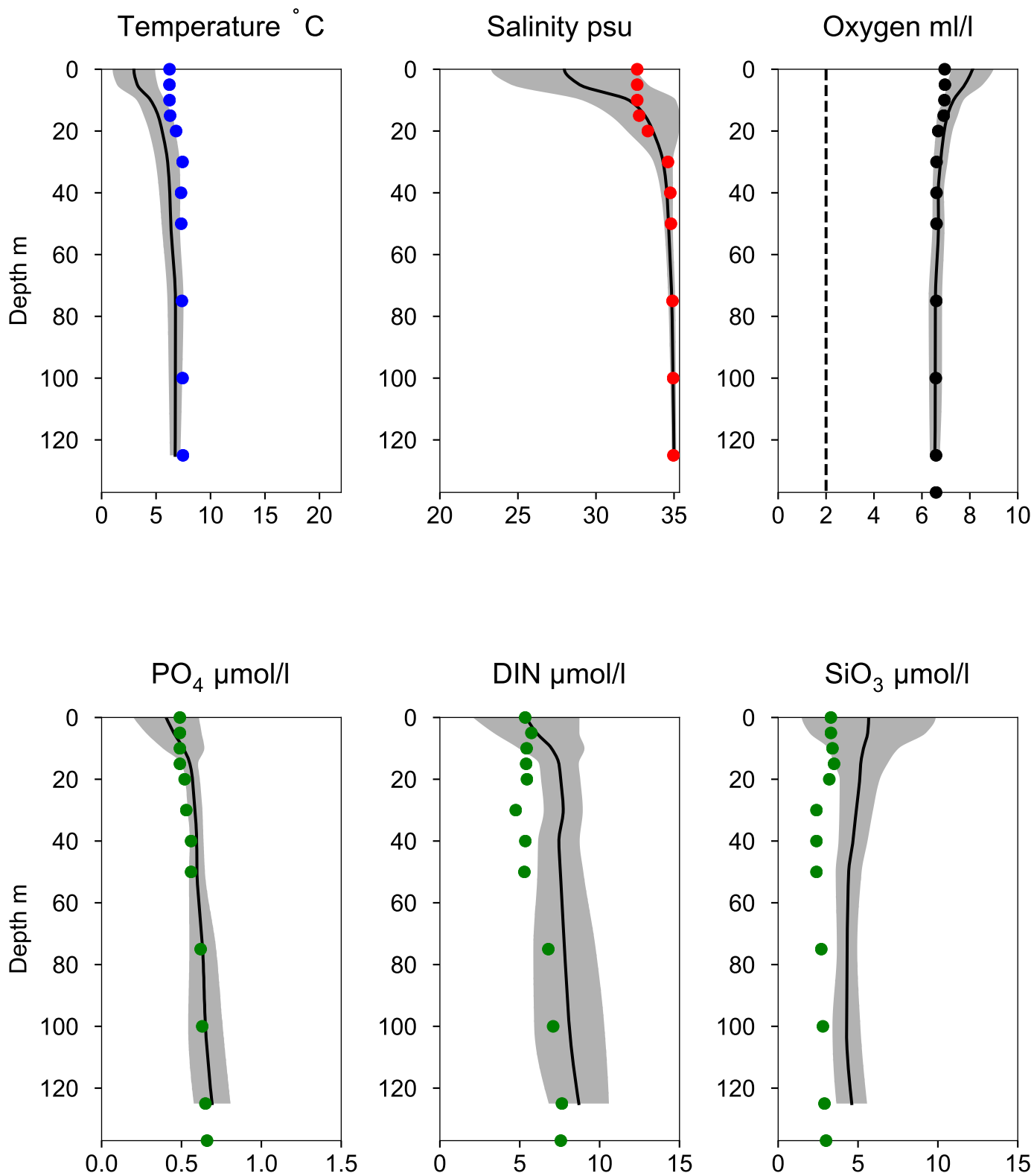


Vertical profiles Å15 February

— Mean 2001-2015

■ St.Dev.

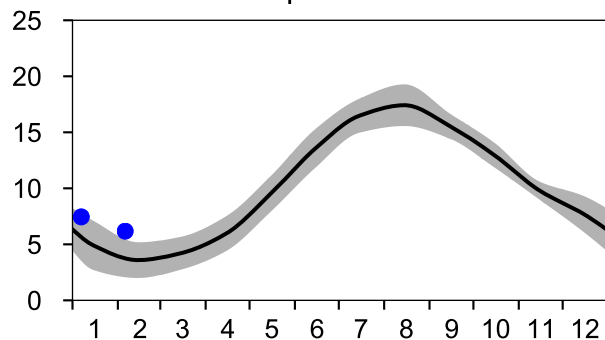
● 2020-02-06



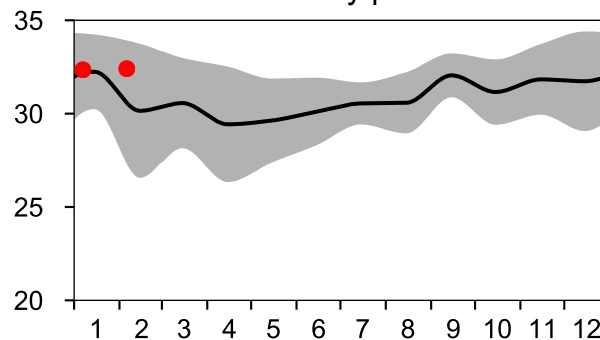
STATION Å17 SURFACE WATER (0-10 m)

Annual Cycles

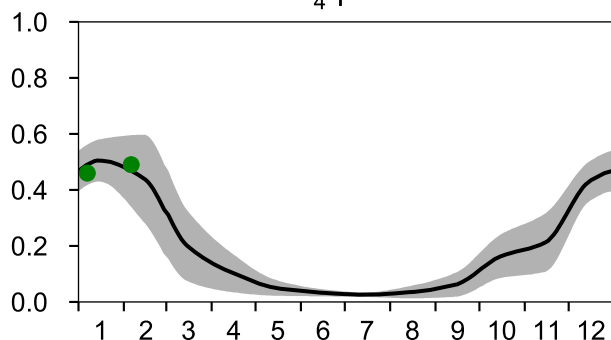
— Mean 2001-2015
Temperature °C



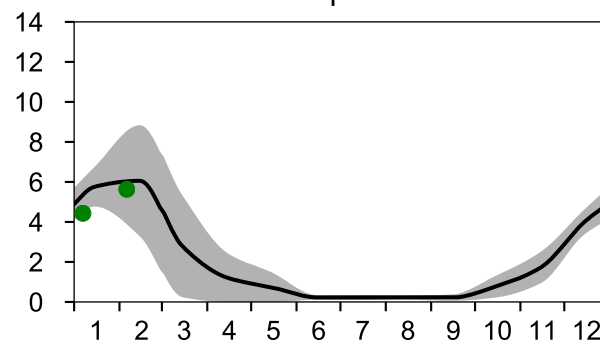
— St.Dev. • 2020
Salinity psu



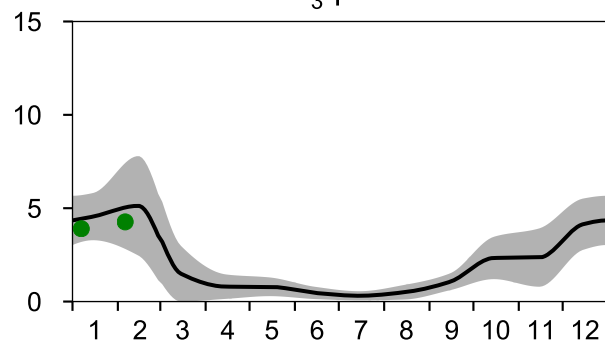
PO₄ µmol/l



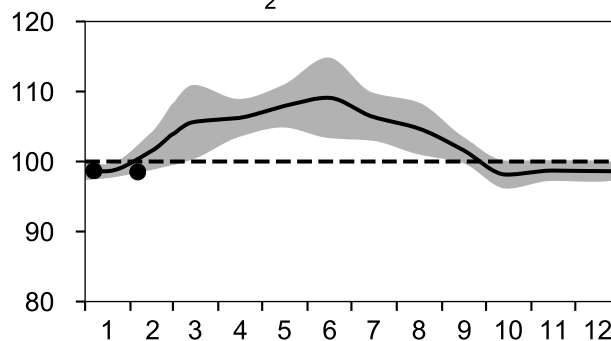
DIN µmol/l



SiO₃ µmol/l

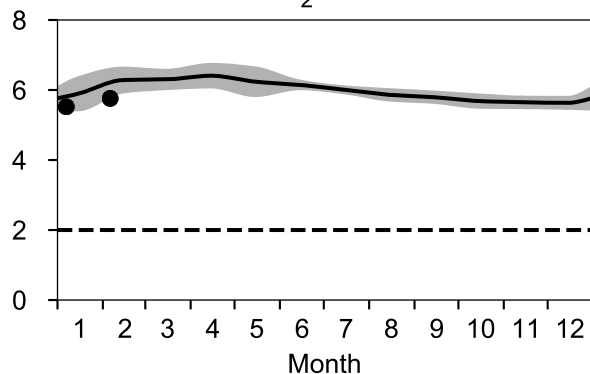


O₂ saturation %

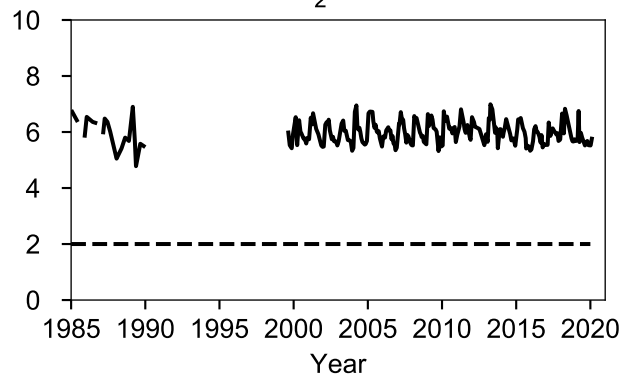


OXYGEN IN BOTTOM WATER (depth >= 300 m)

O₂ ml/l



O₂ ml/l

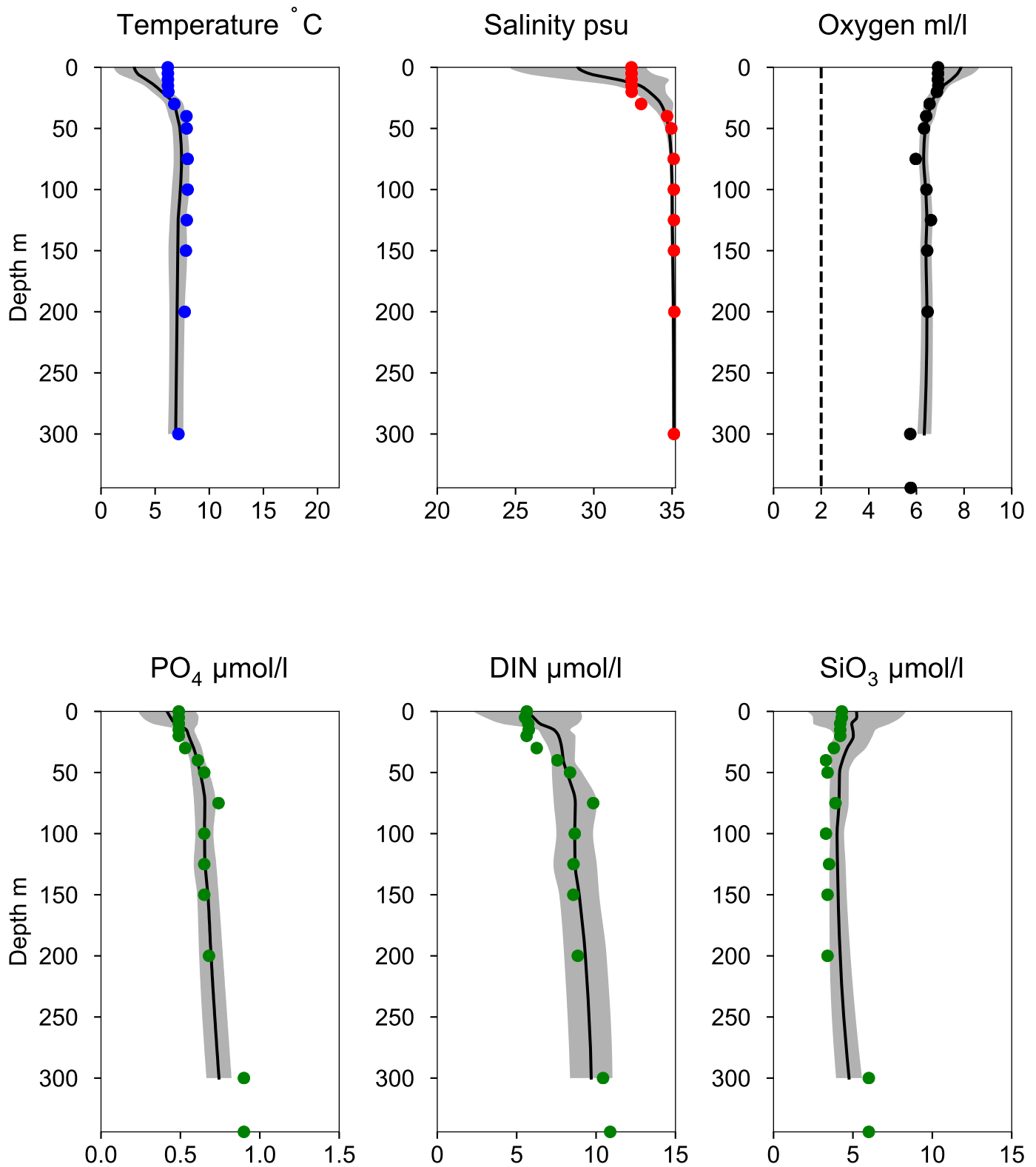


Vertical profiles Å17 February

— Mean 2001-2015

■ St.Dev.

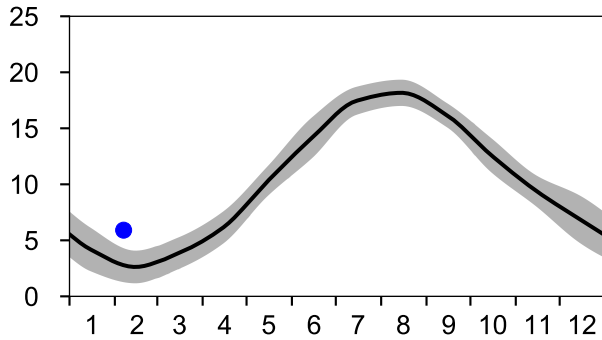
● 2020-02-06



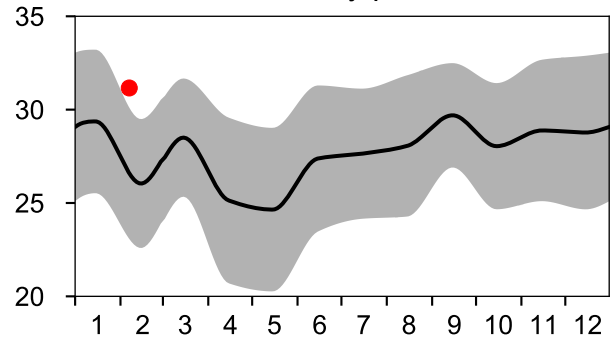
STATION P2 SURFACE WATER (0-10 m)

Annual Cycles

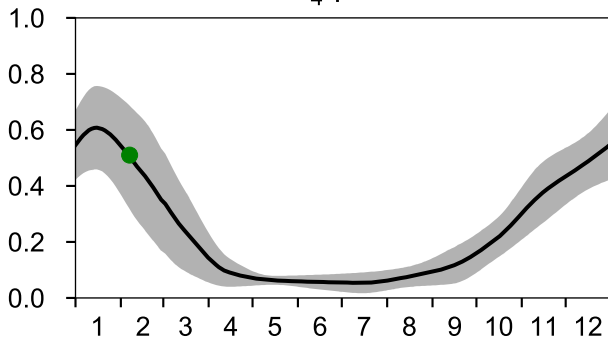
— Mean 2001-2015
Temperature °C



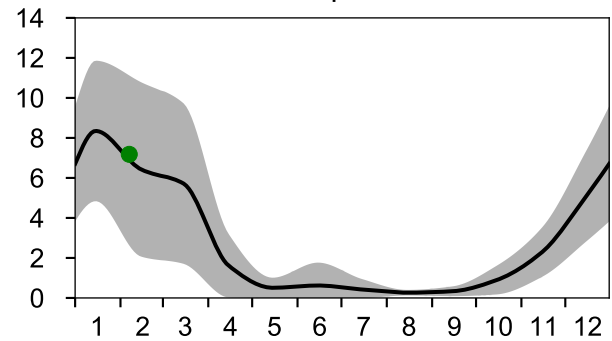
St.Dev. ● 2020
Salinity psu



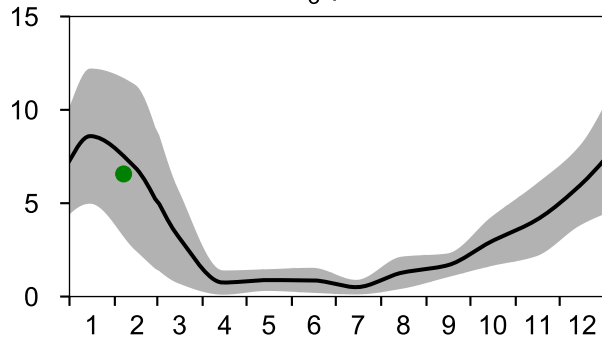
PO₄ μmol/l



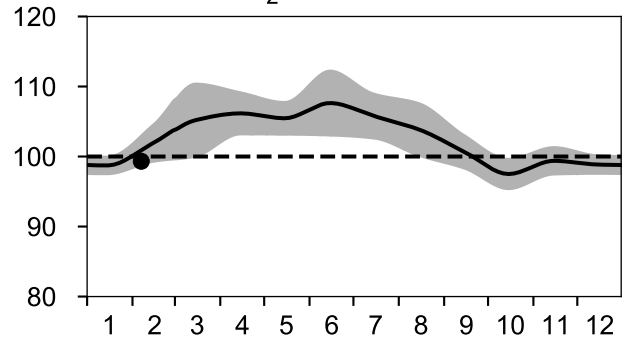
DIN μmol/l



SiO₃ μmol/l

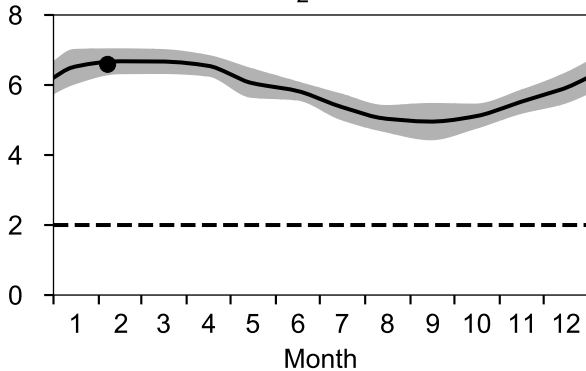


O₂ saturation %

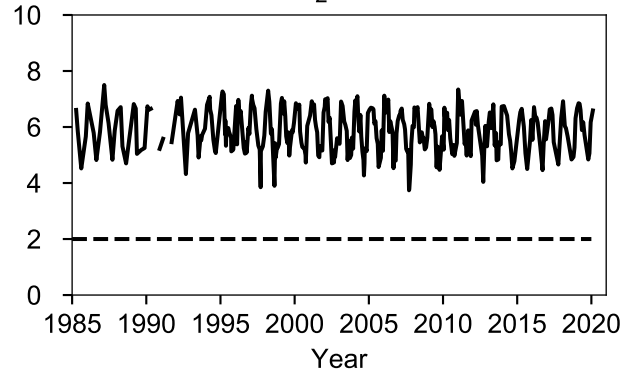


OXYGEN IN BOTTOM WATER (depth >= 75 m)

O₂ ml/l



O₂ ml/l

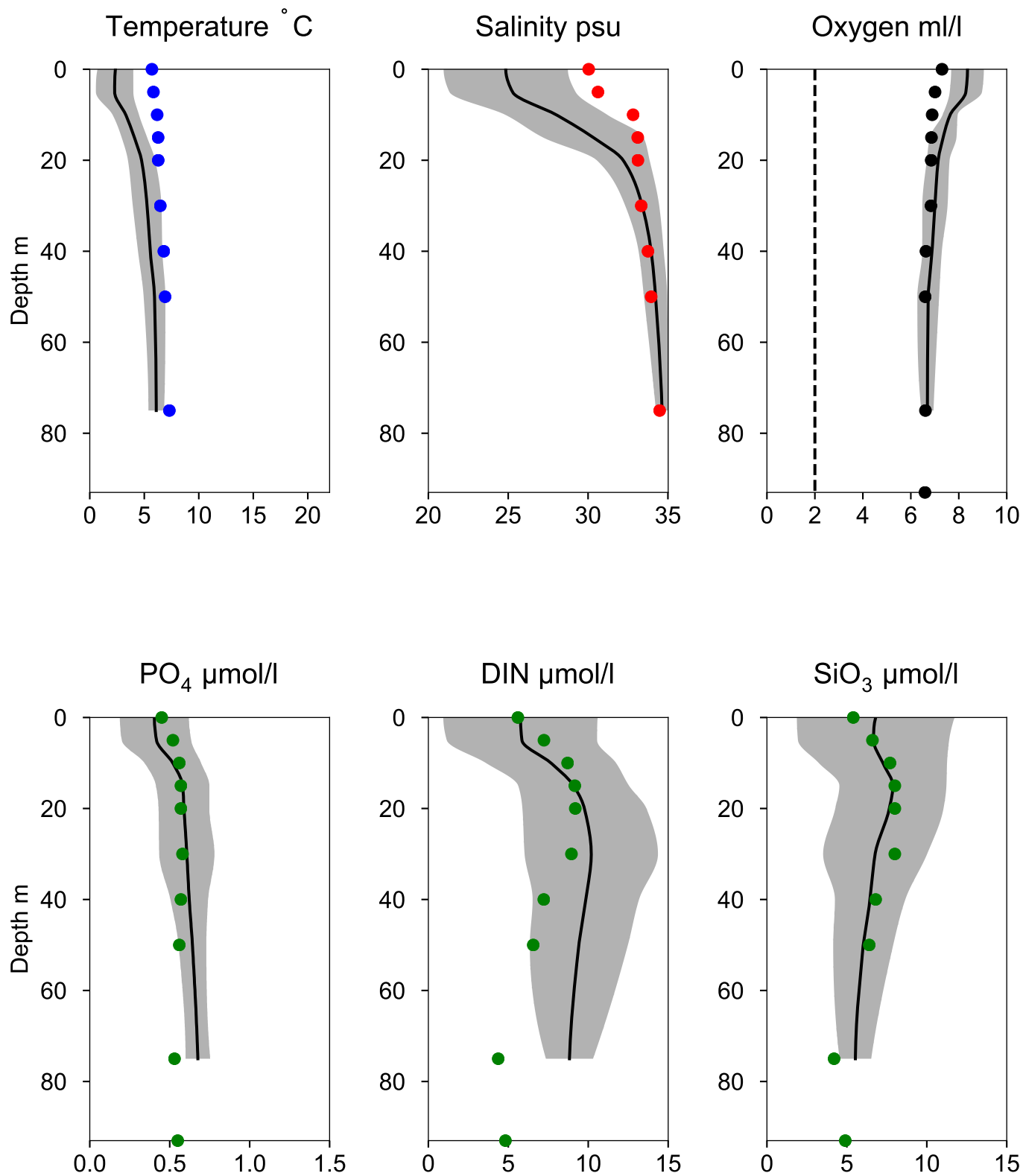


Vertical profiles P2 February

— Mean 2001-2015

■ St.Dev.

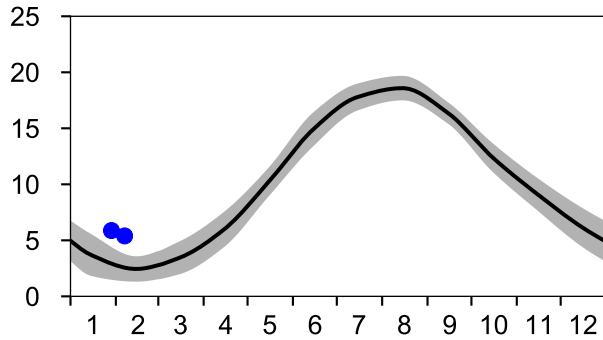
● 2020-02-07



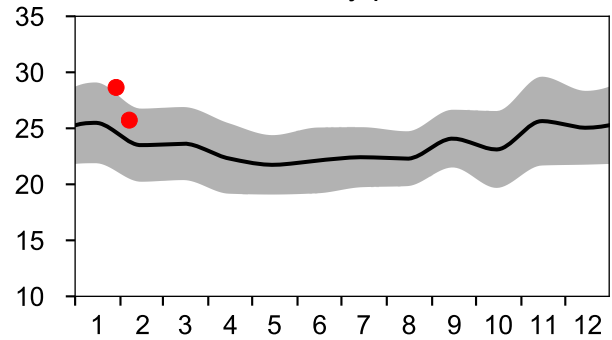
STATION FLADEN SURFACE WATER (0-10 m)

Annual Cycles

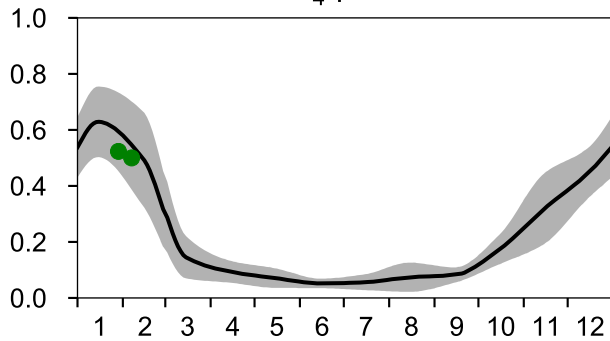
— Mean 2001-2015
Temperature °C



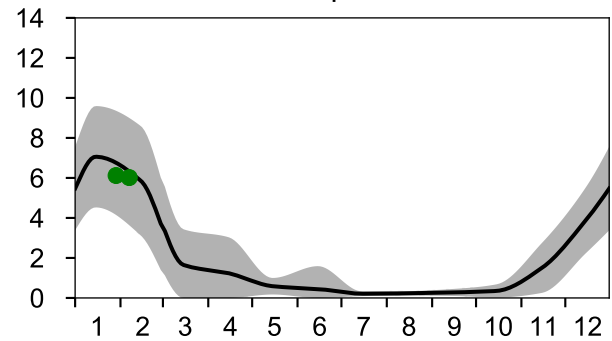
■ St.Dev. ● 2020
Salinity psu



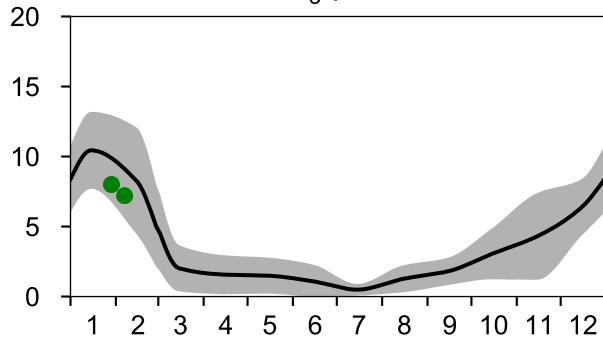
PO₄ µmol/l



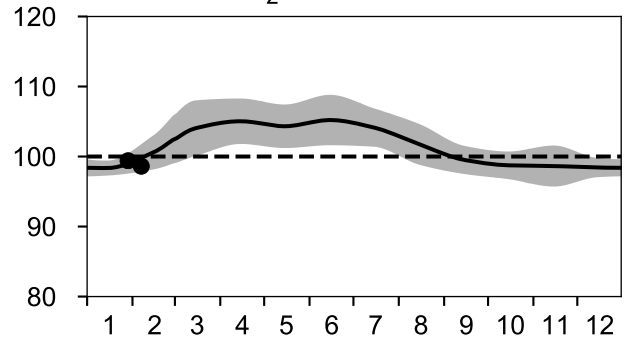
DIN µmol/l



SiO₃ µmol/l

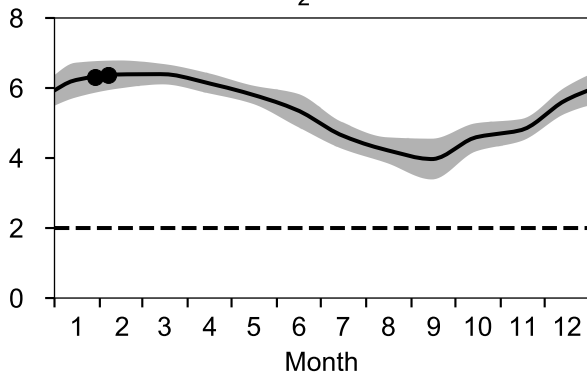


O₂ saturation %

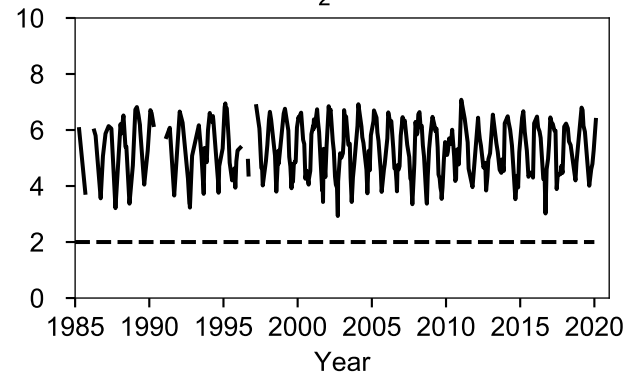


OXYGEN IN BOTTOM WATER (depth >= 74 m)

O₂ ml/l



O₂ ml/l

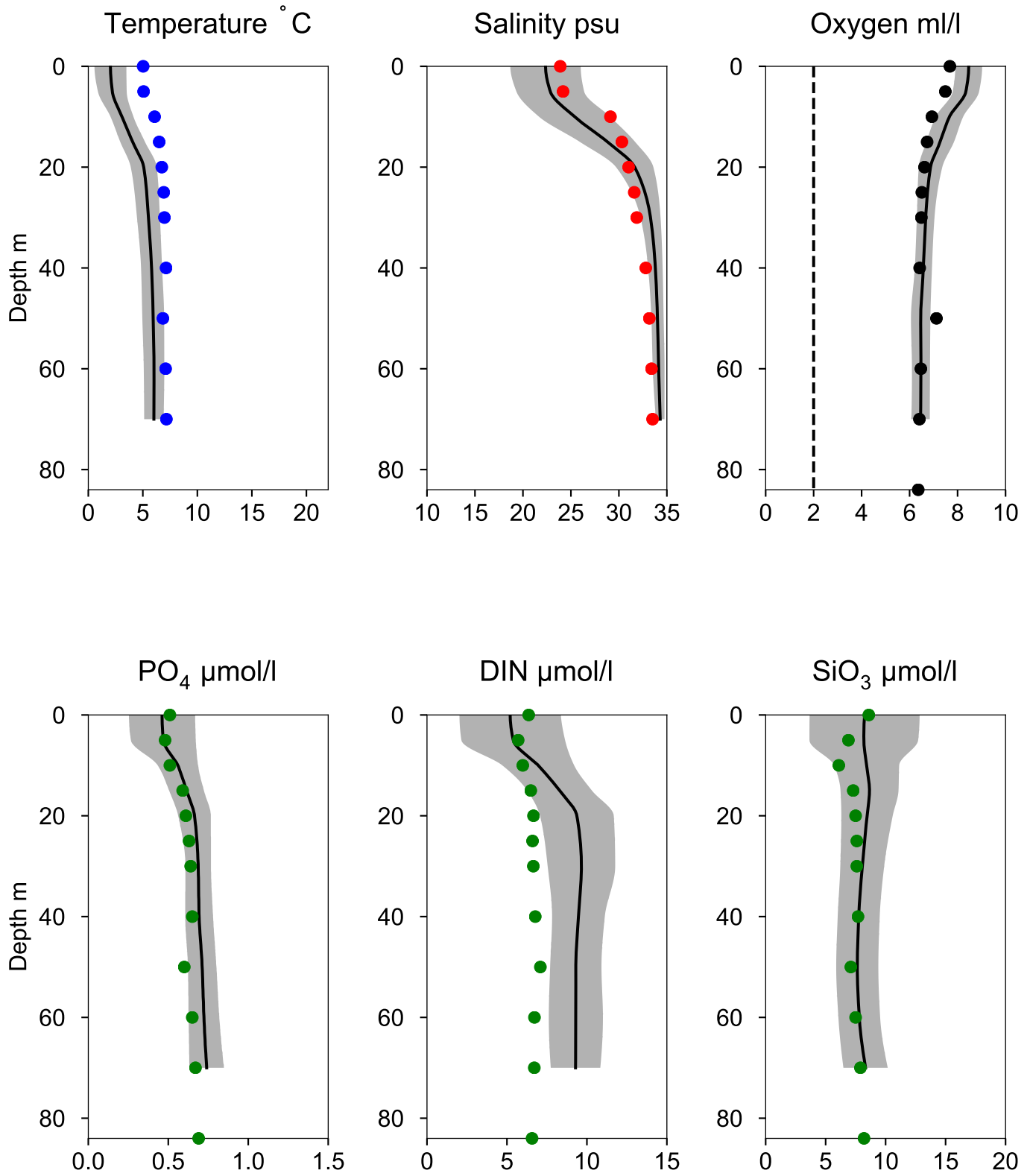


Vertical profiles FLADEN February

— Mean 2001-2015

■ St.Dev.

● 2020-02-07



STATION N14 FALKENBERG SURFACE WATER (0-10 m)

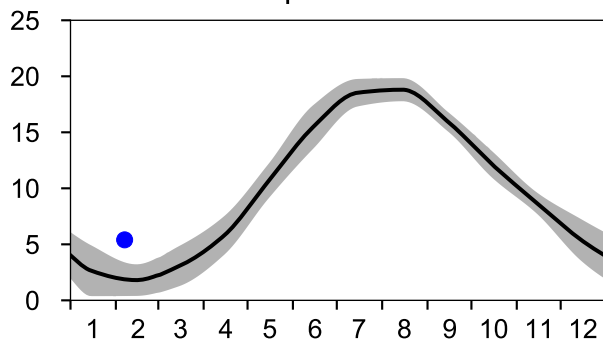
Annual Cycles

— Mean 2001-2015

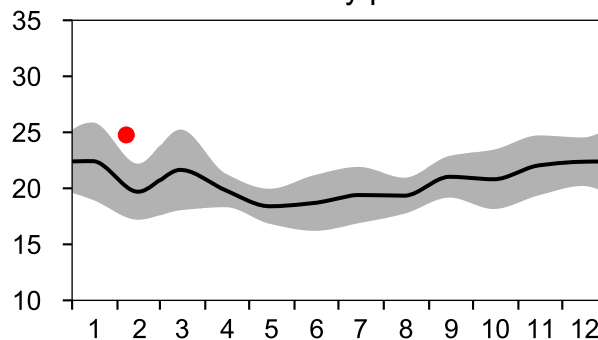
■ St.Dev.

● 2020

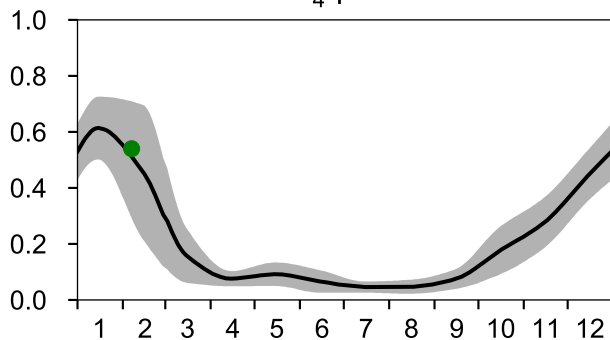
Temperature °C



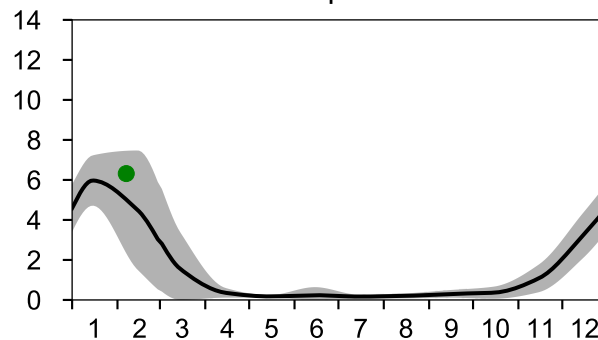
Salinity psu



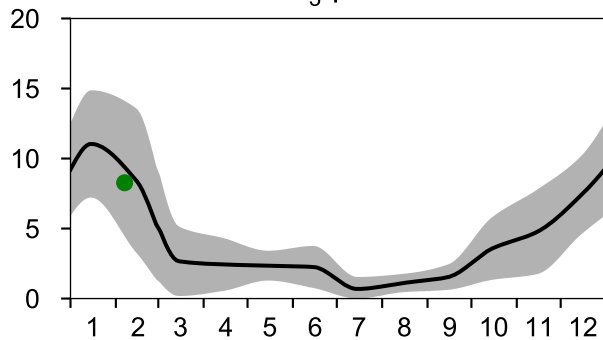
PO₄ µmol/l



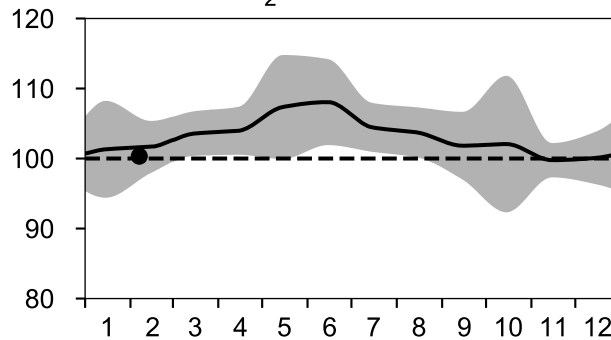
DIN µmol/l



SiO₃ µmol/l

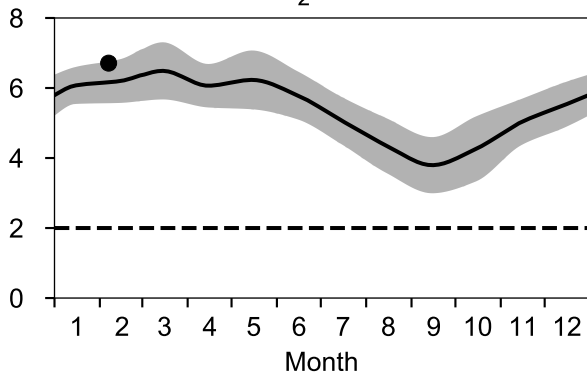


O₂ saturation %

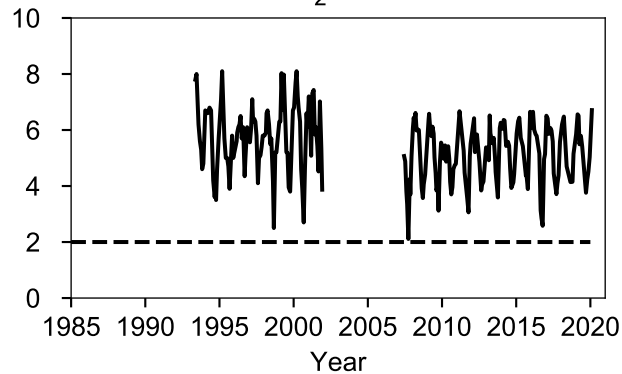


OXYGEN IN BOTTOM WATER (depth >= 20 m)

O₂ ml/l



O₂ ml/l

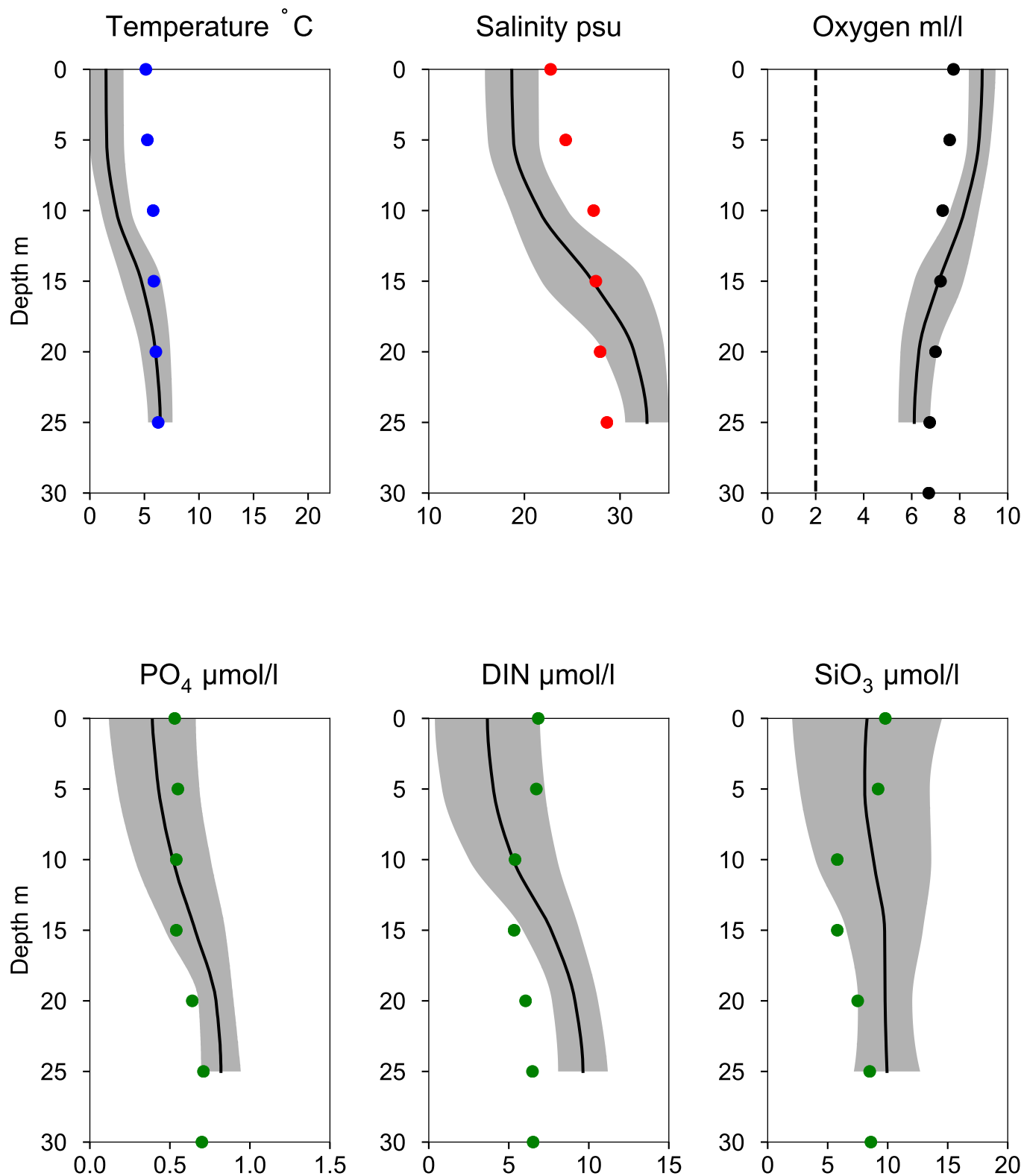


Vertical profiles N14 FALKENBERG February

— Mean 2001-2015

■ St.Dev.

● 2020-02-07



STATION ANHOLT E SURFACE WATER (0-10 m)

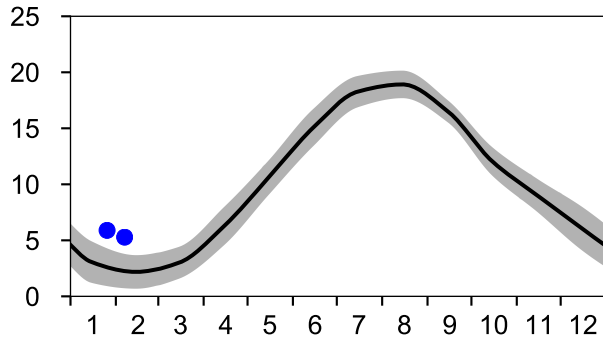
Annual Cycles

— Mean 2001-2015

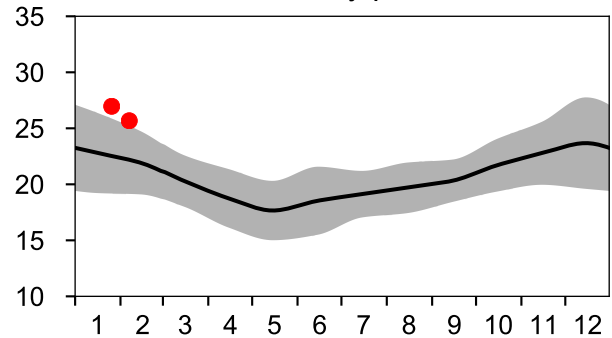
■ St.Dev.

● 2020

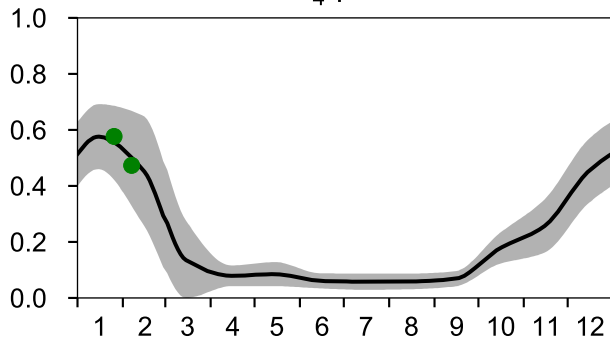
Temperature °C



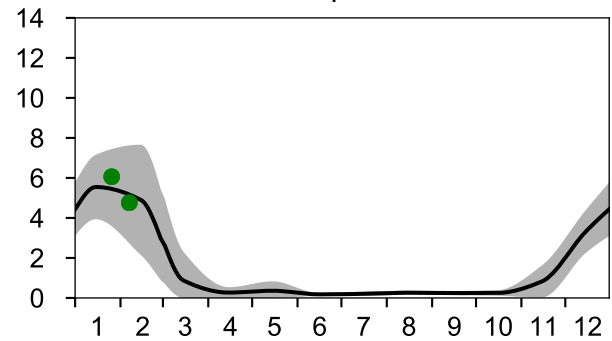
Salinity psu



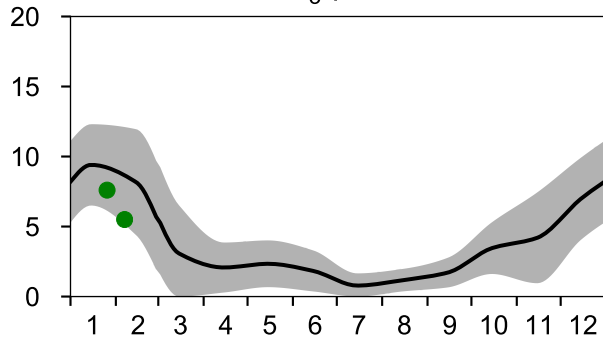
PO₄ µmol/l



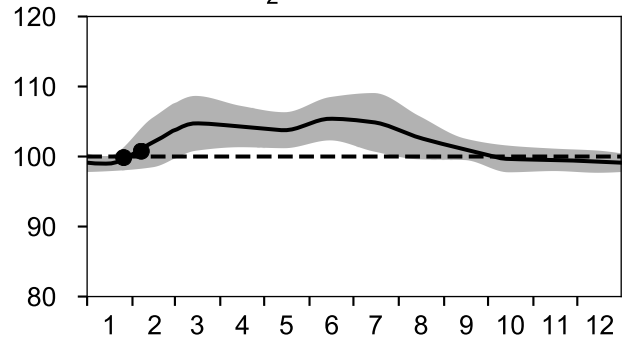
DIN µmol/l



SiO₃ µmol/l

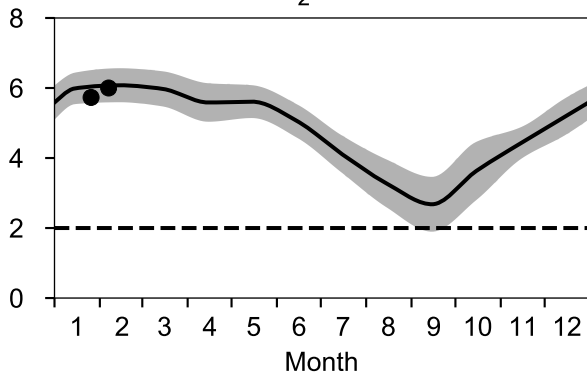


O₂ saturation %

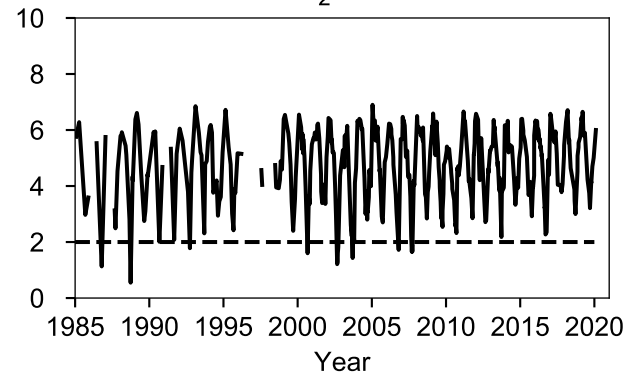


OXYGEN IN BOTTOM WATER (depth >= 52 m)

O₂ ml/l

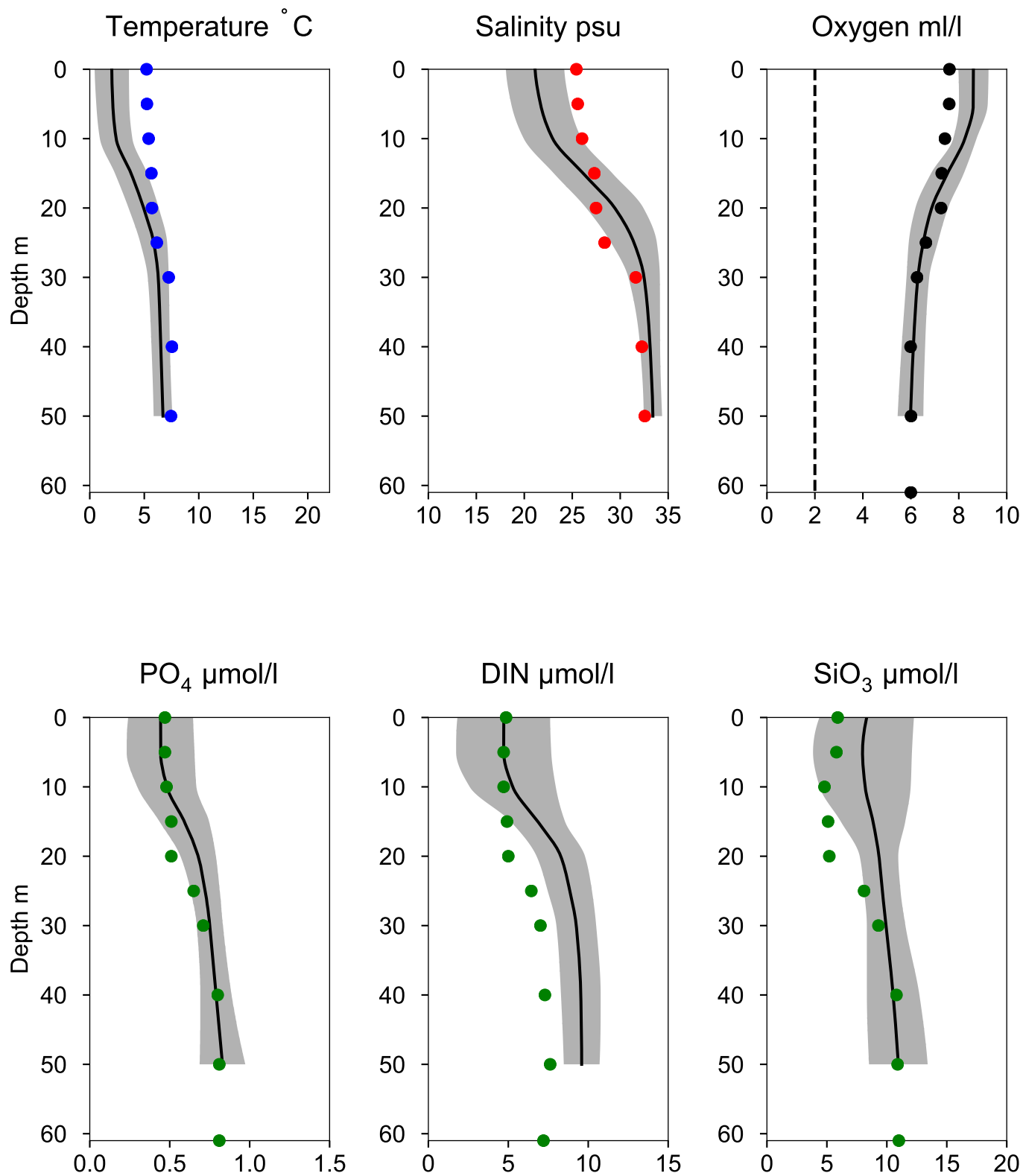


O₂ ml/l



Vertical profiles ANHOLT E February

— Mean 2001-2015 St.Dev. • 2020-02-07



STATION W LANDSKRONA SURFACE WATER (0-10 m)

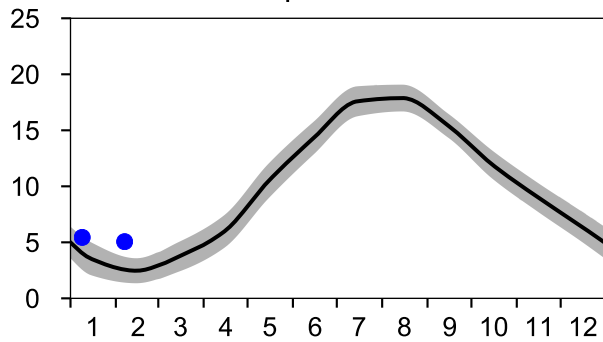
Annual Cycles

— Mean 2001-2015

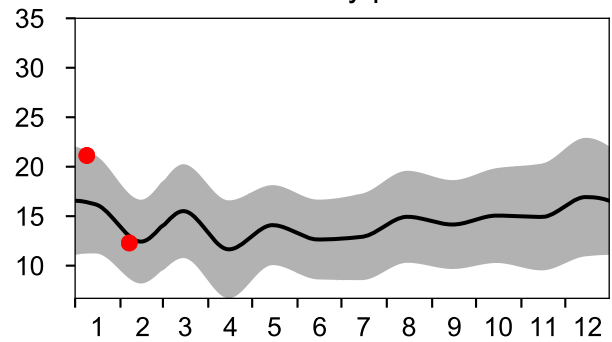
■ St.Dev.

● 2020

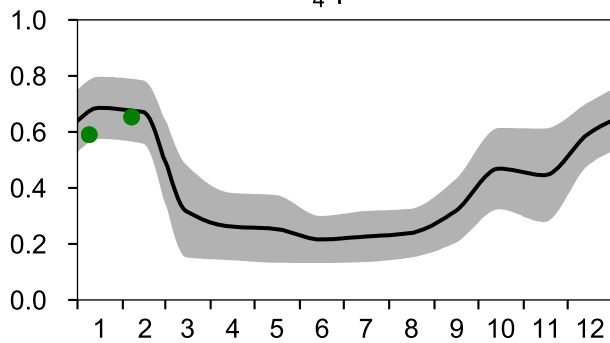
Temperature °C



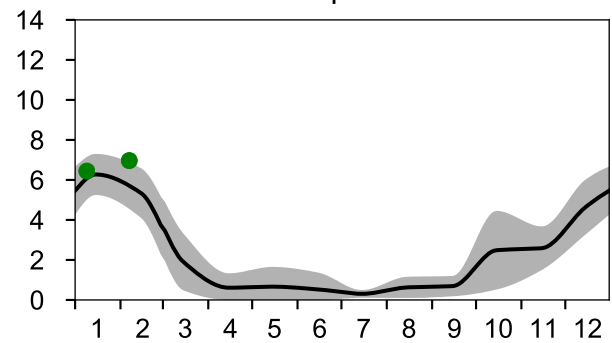
Salinity psu



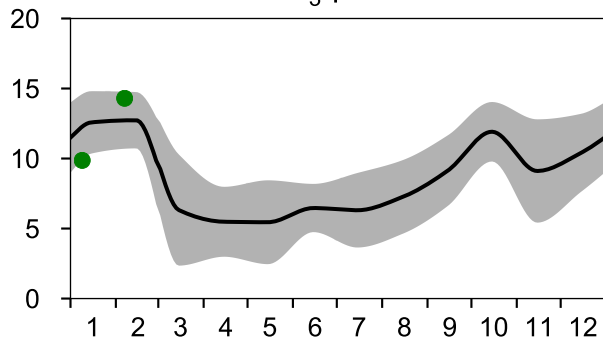
PO₄ µmol/l



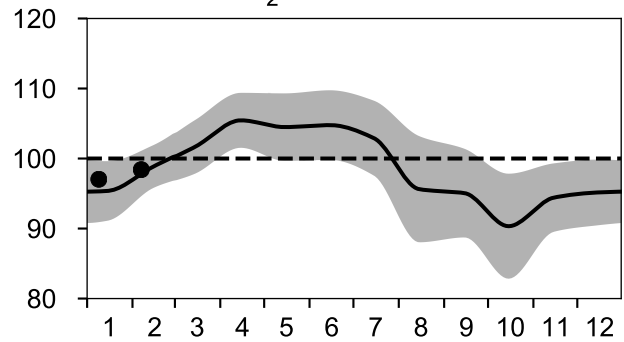
DIN µmol/l



SiO₃ µmol/l

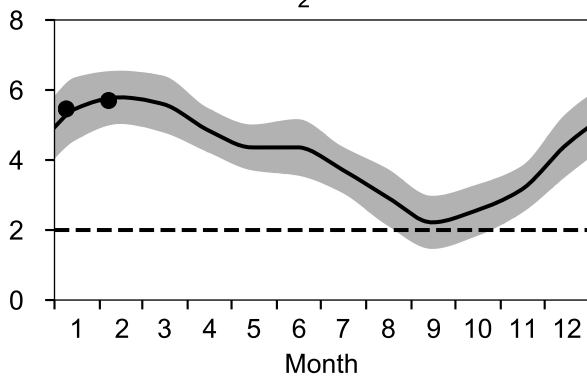


O₂ saturation %

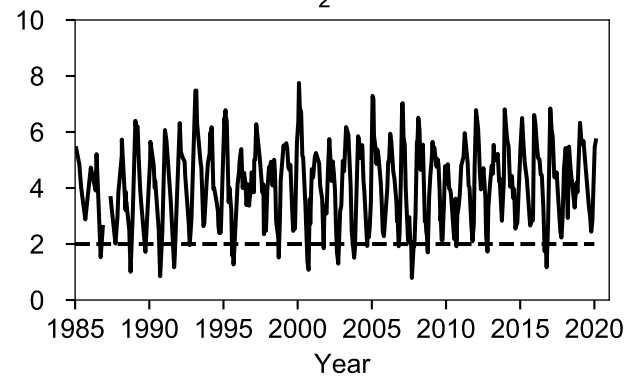


OXYGEN IN BOTTOM WATER (depth >= 40 m)

O₂ ml/l

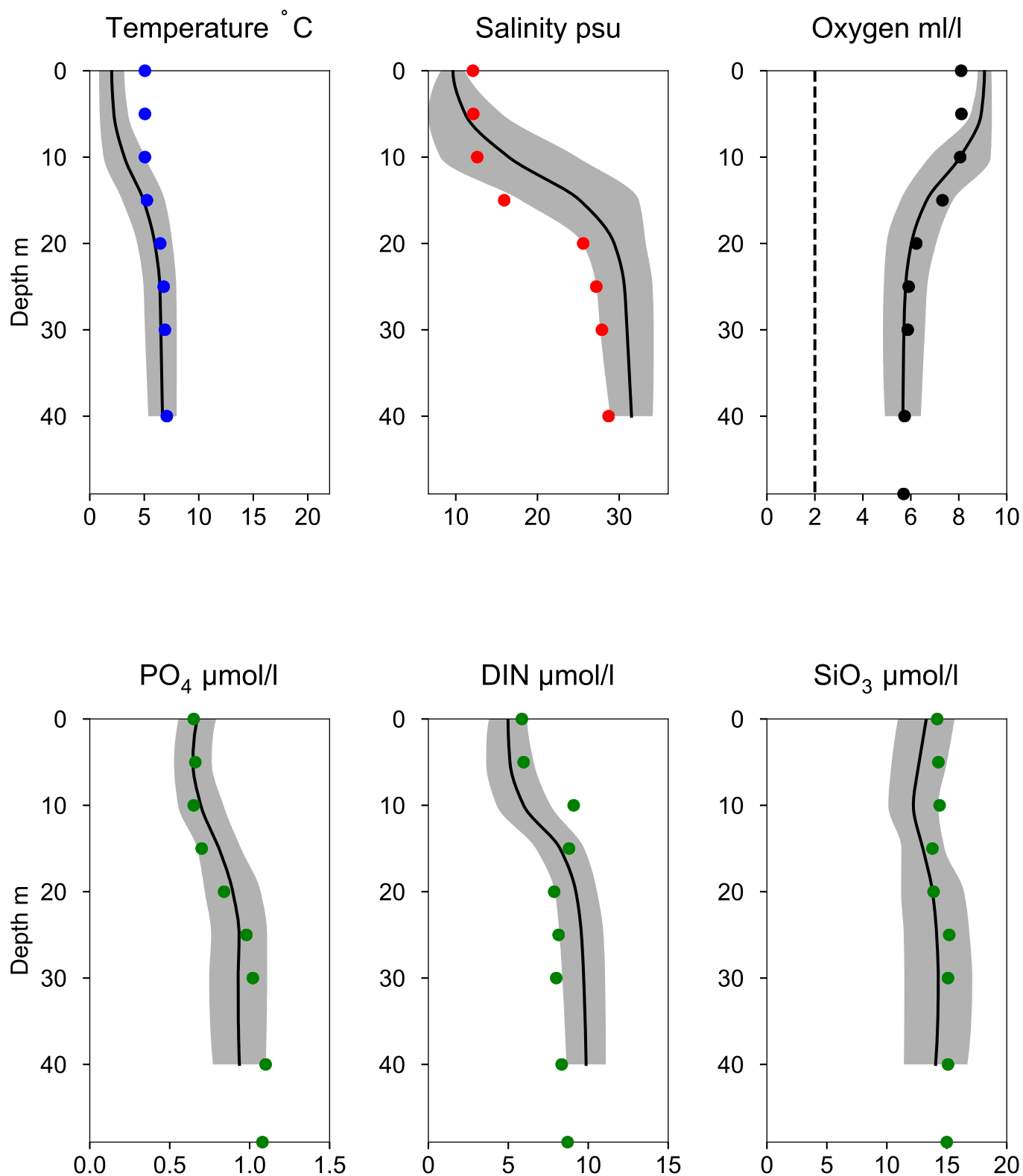


O₂ ml/l



Vertical profiles W LANDSKRONA February

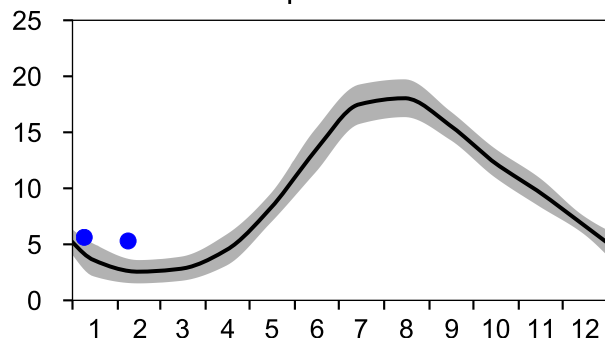
— Mean 2001-2015 St.Dev. • 2020-02-07



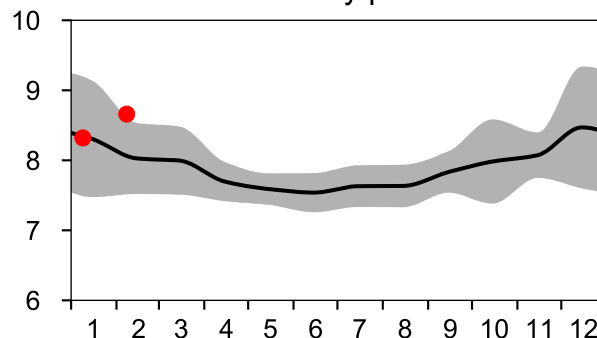
STATION BY1 SURFACE WATER (0-10 m)

Annual Cycles

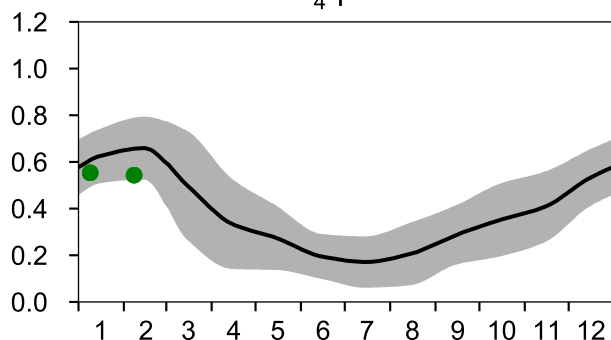
— Mean 2001-2015
Temperature °C



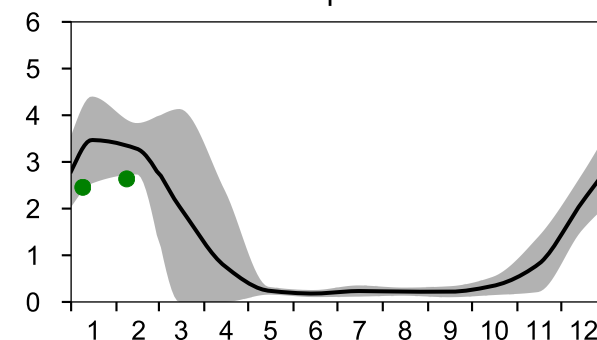
St.Dev. ● 2020
Salinity psu



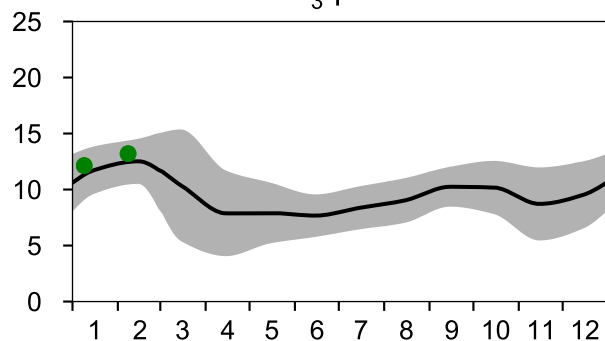
PO₄ µmol/l



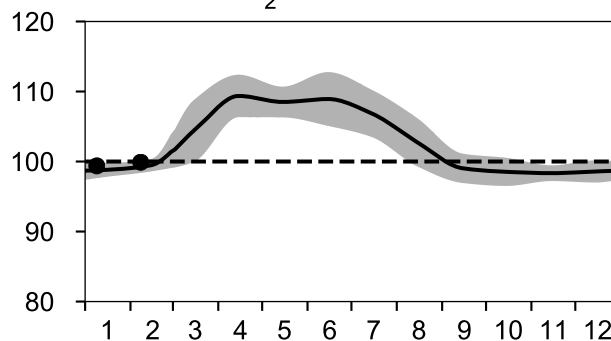
DIN µmol/l



SiO₃ µmol/l

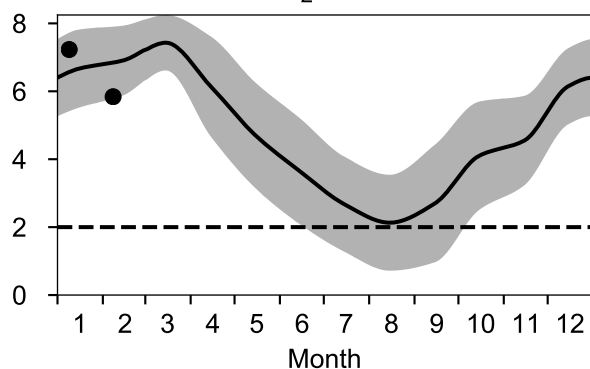


O₂ saturation %

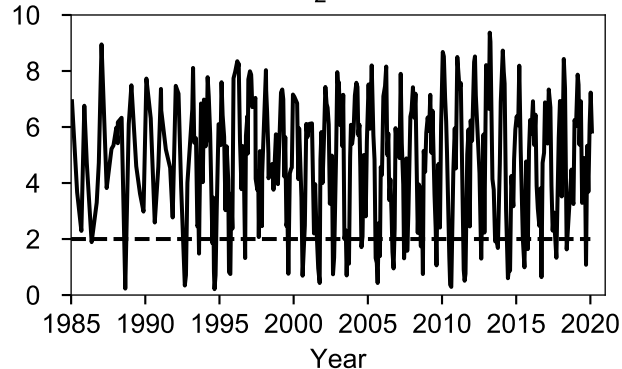


OXYGEN IN BOTTOM WATER (depth >= 40 m)

O₂ ml/l

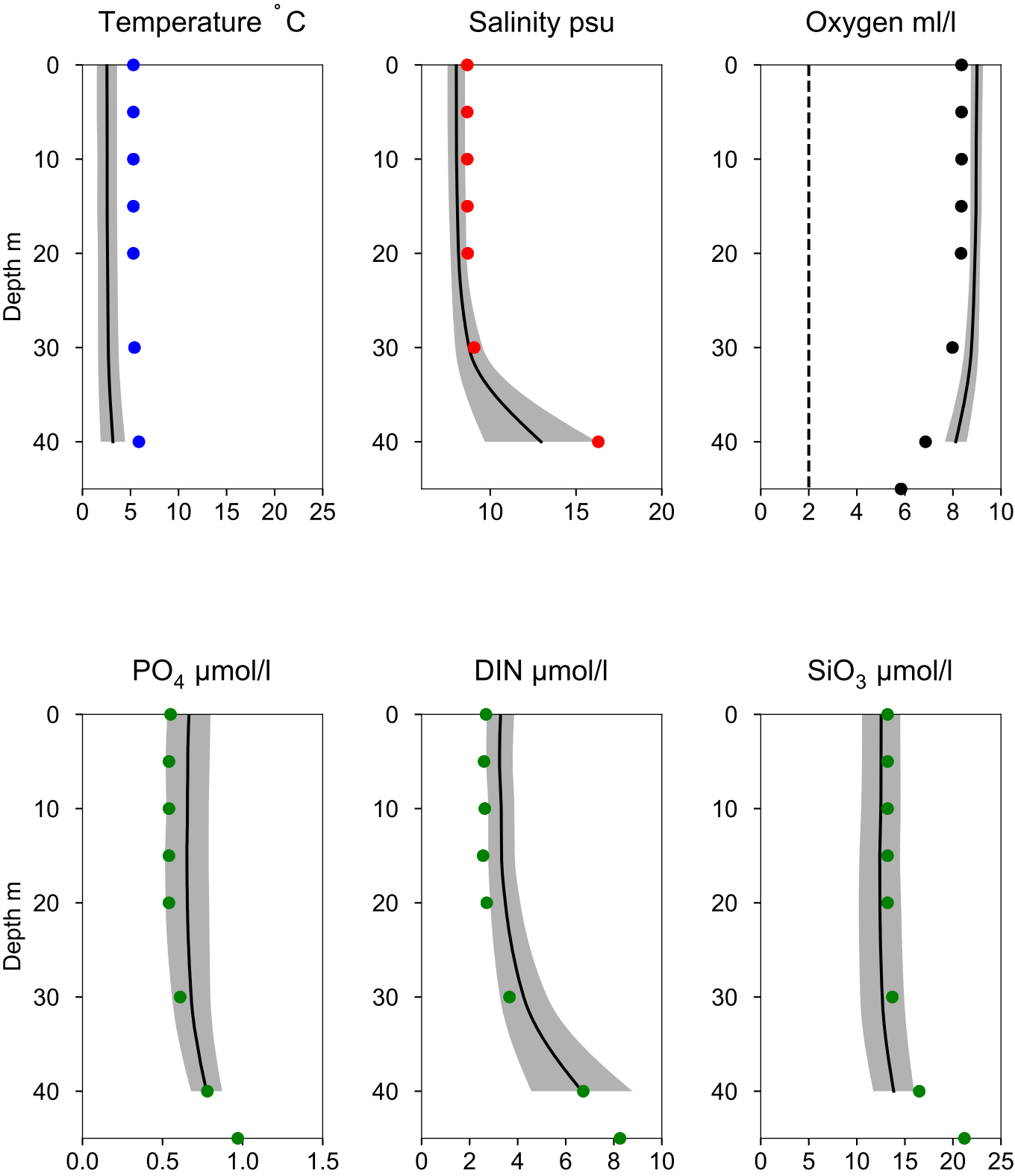


O₂ ml/l



Vertical profiles BY1
February

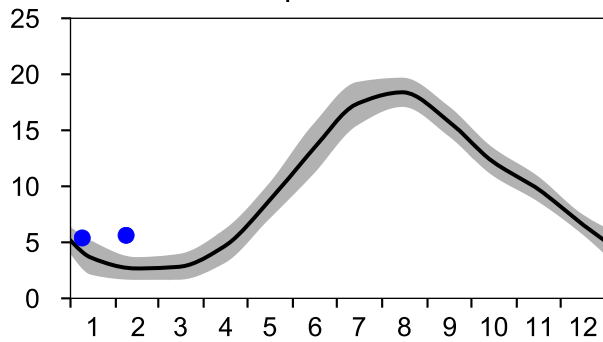
— Mean 2001-2015 St.Dev. • 2020-02-08



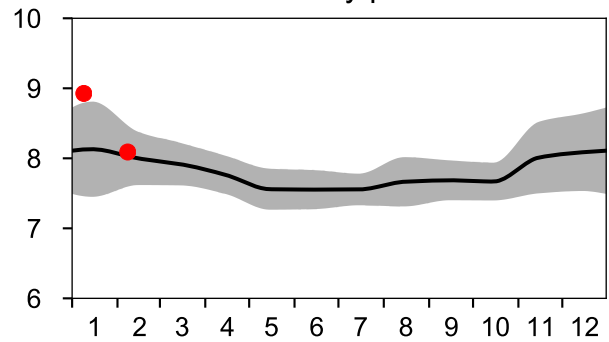
STATION BY2 ARKONA SURFACE WATER (0-10 m)

Annual Cycles

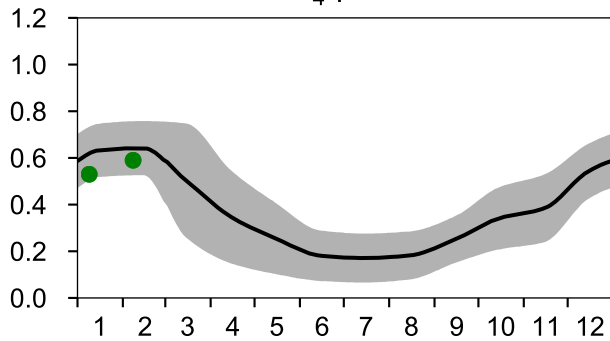
— Mean 2001-2015
Temperature °C



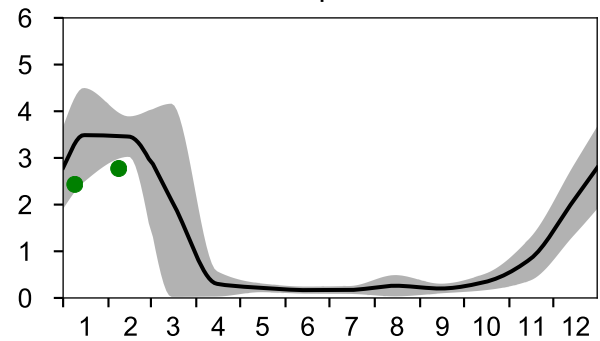
— St.Dev. • 2020
Salinity psu



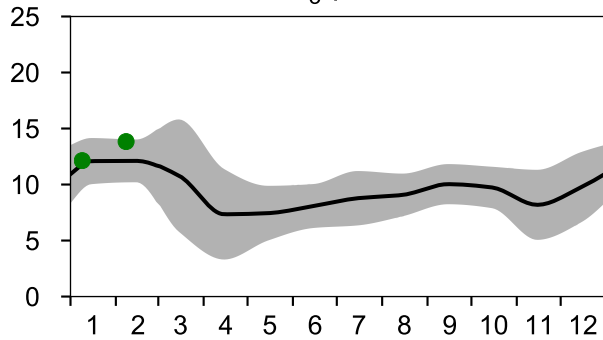
PO₄ µmol/l



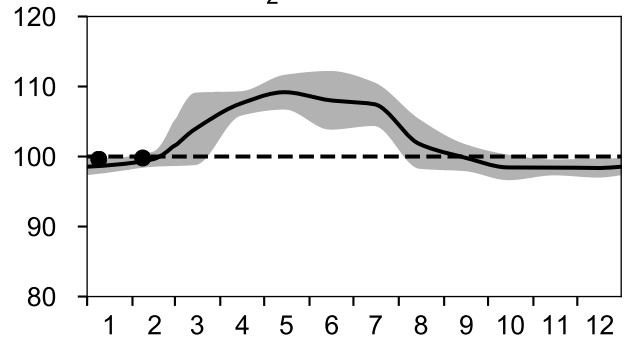
DIN µmol/l



SiO₃ µmol/l

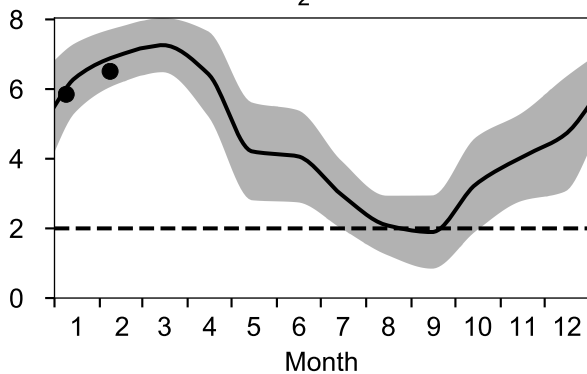


O₂ saturation %

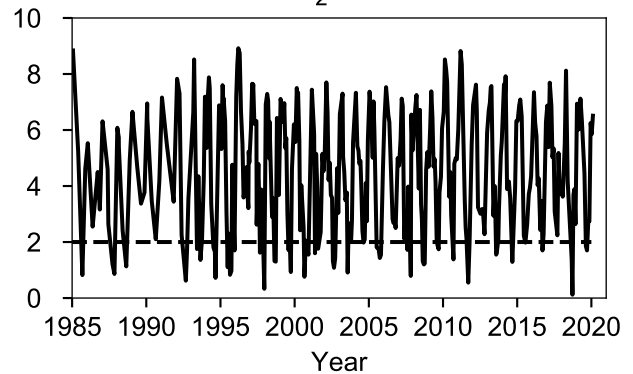


OXYGEN IN BOTTOM WATER (depth >= 40 m)

O₂ ml/l

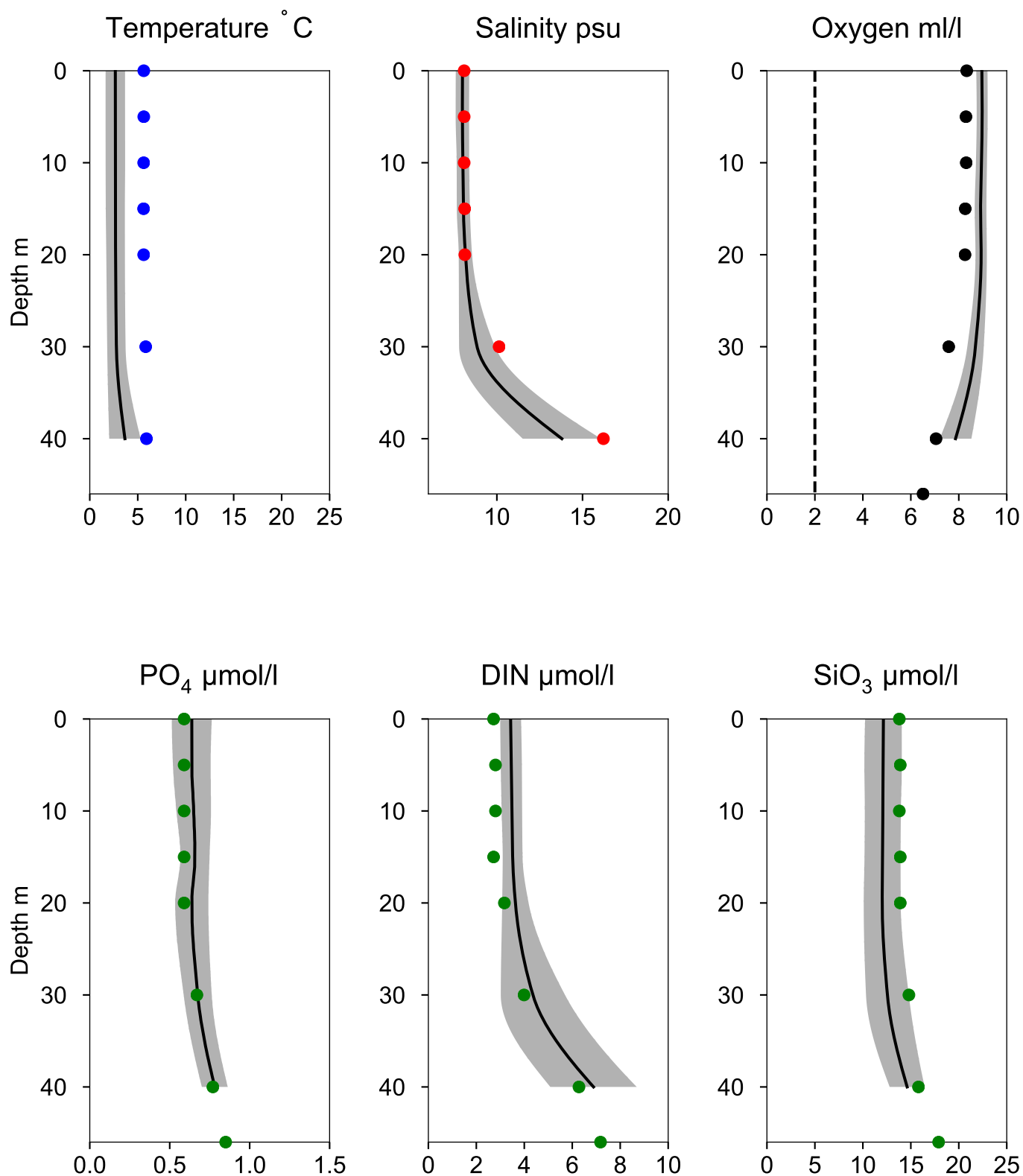


O₂ ml/l



Vertical profiles BY2 ARKONA February

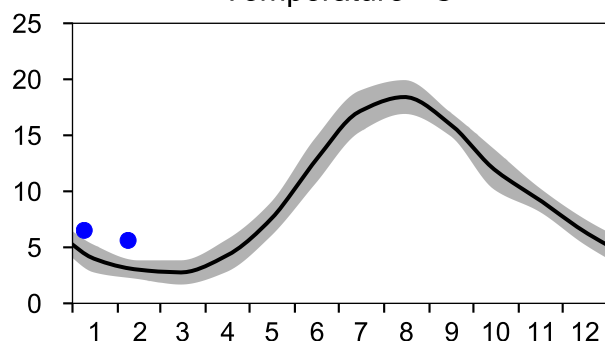
— Mean 2001-2015 St.Dev. • 2020-02-08



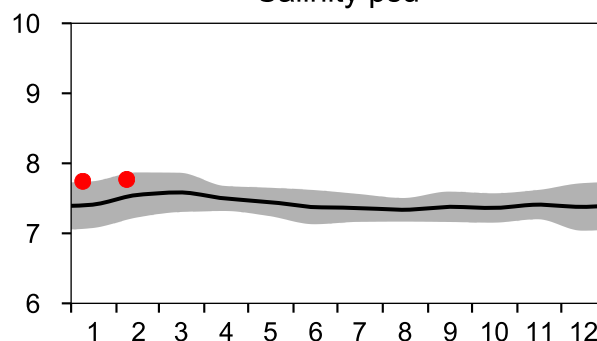
STATION BY4 CHRISTIANSÖ SURFACE WATER (0-10 m)

Annual Cycles

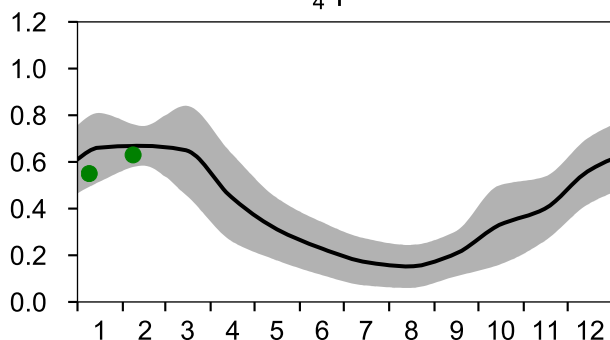
— Mean 2001-2015
Temperature °C



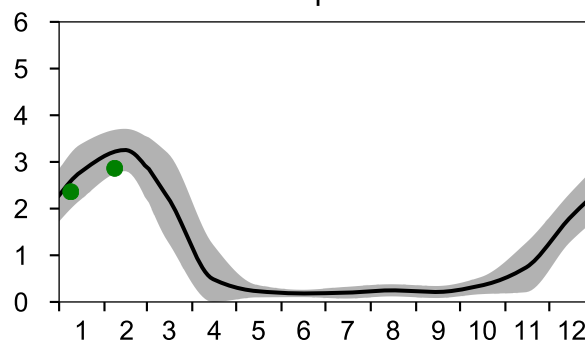
St.Dev. • 2020
Salinity psu



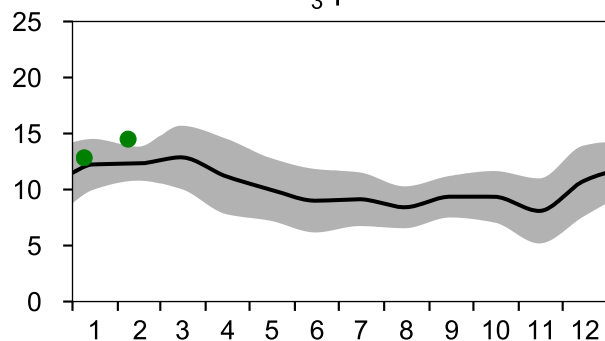
PO₄ µmol/l



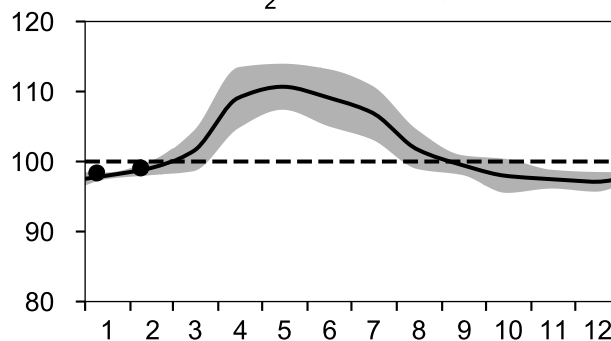
DIN µmol/l



SiO₃ µmol/l

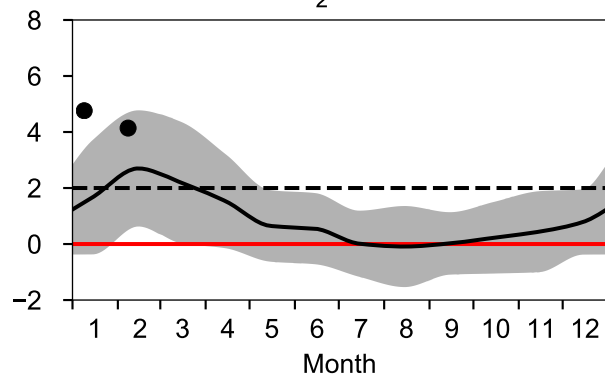


O₂ saturation %

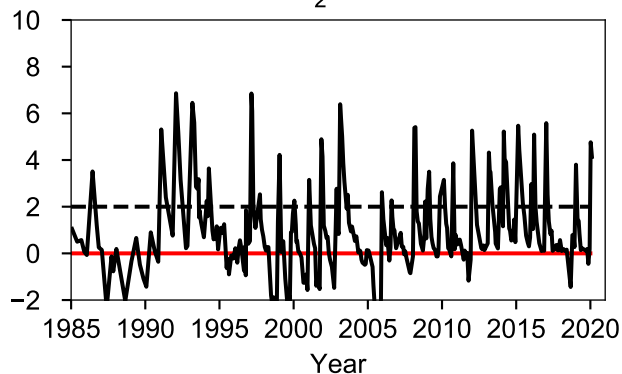


OXYGEN IN BOTTOM WATER (depth >= 80 m)

O₂ ml/l



O₂ ml/l

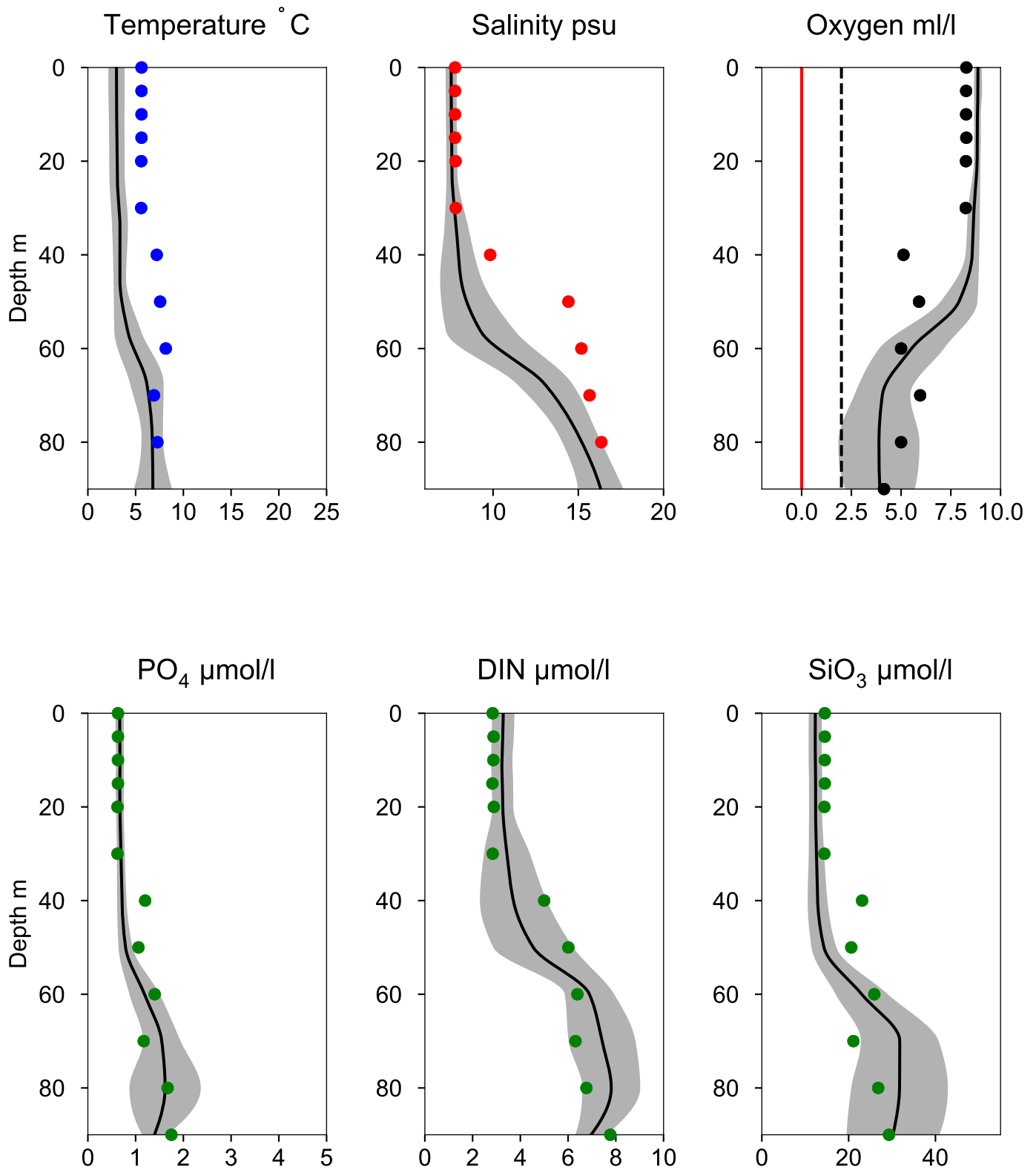


Vertical profiles BY4 CHRISTIANSÖ February

— Mean 2001-2015

■ St.Dev.

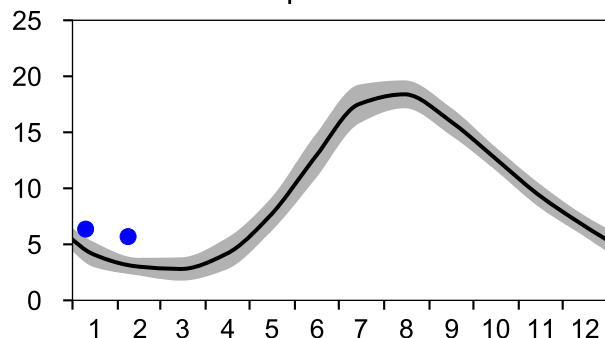
● 2020-02-08



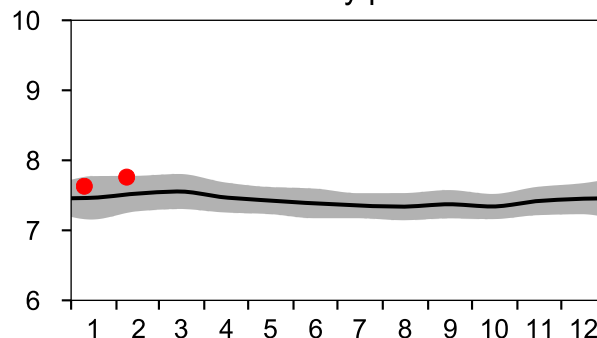
STATION BY5 BORNHOLMSDJ SURFACE WATER (0-10 m)

Annual Cycles

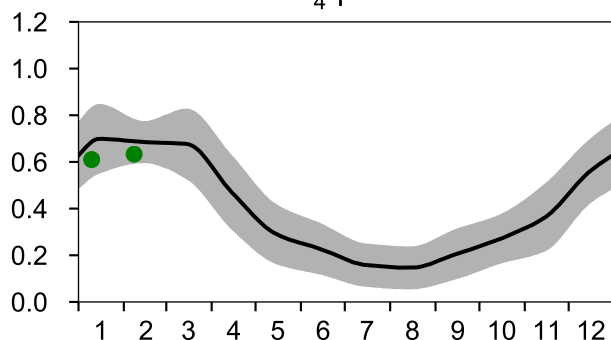
— Mean 2001-2015
Temperature °C



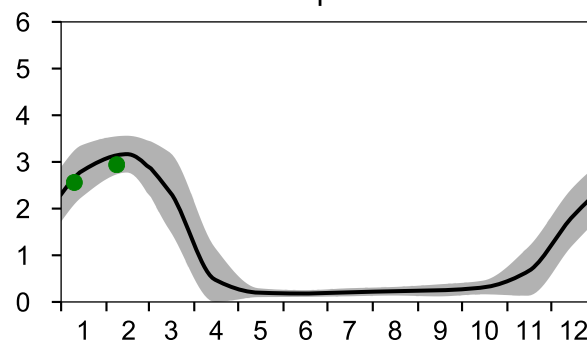
— St.Dev. • 2020
Salinity psu



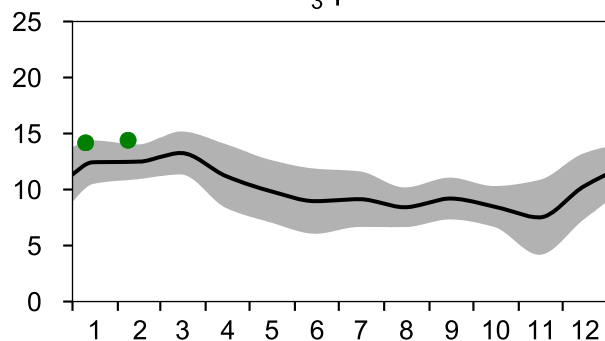
PO₄ µmol/l



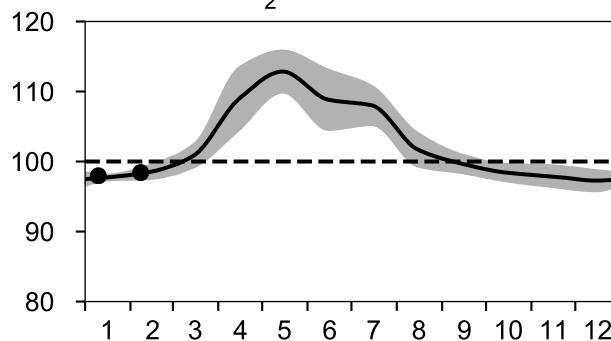
DIN µmol/l



SiO₃ µmol/l

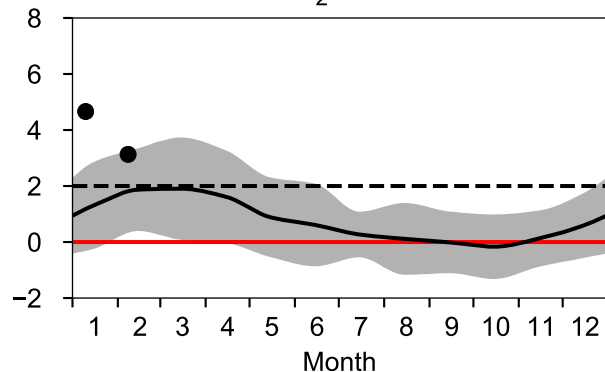


O₂ saturation %

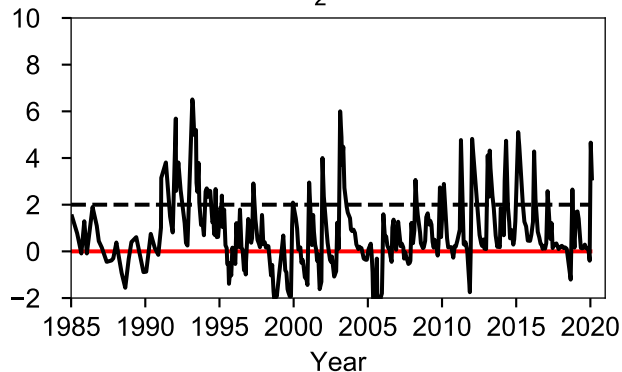


OXYGEN IN BOTTOM WATER (depth >= 80 m)

O₂ ml/l

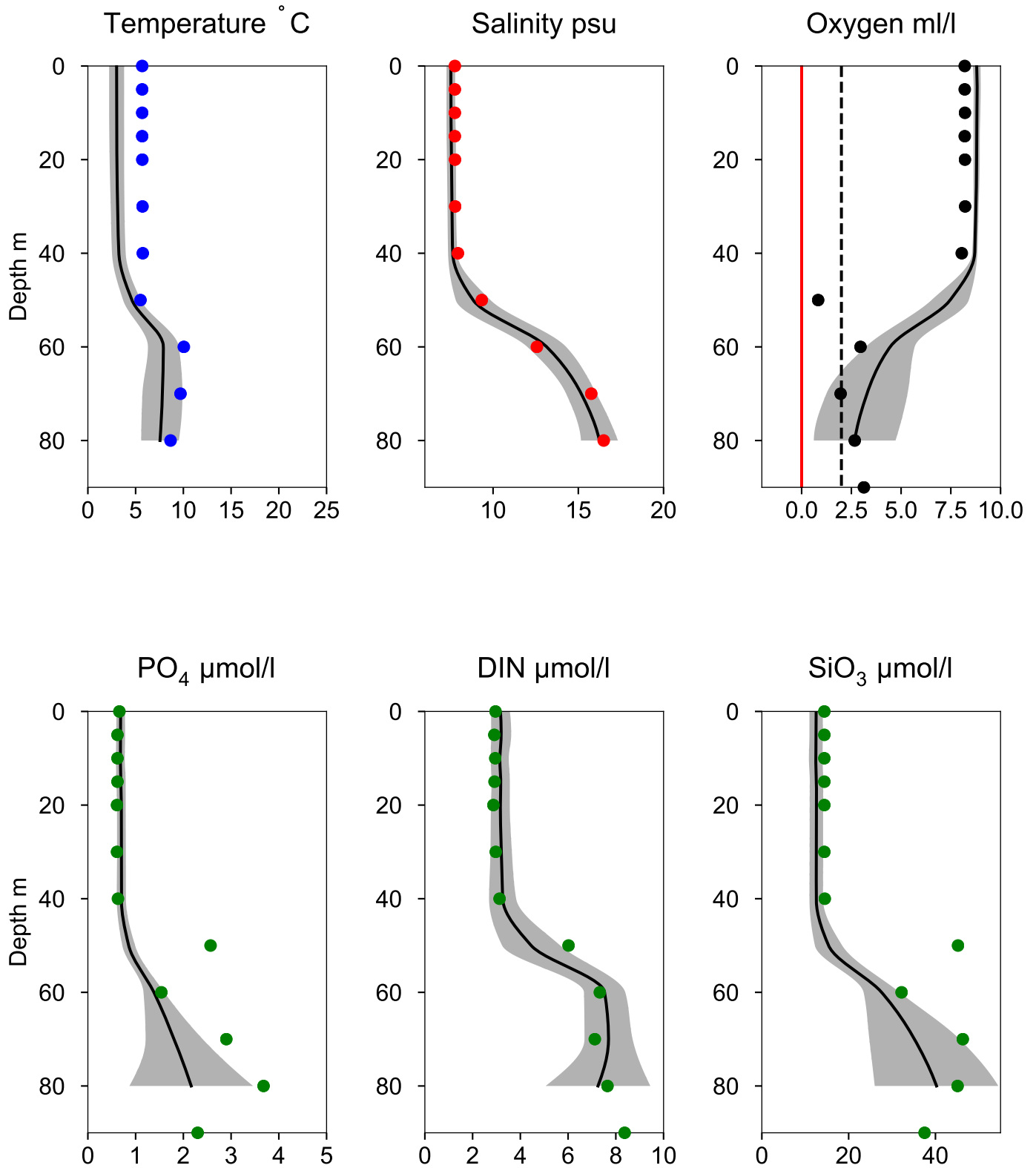


O₂ ml/l



Vertical profiles BY5 BORNHOLMSDJ February

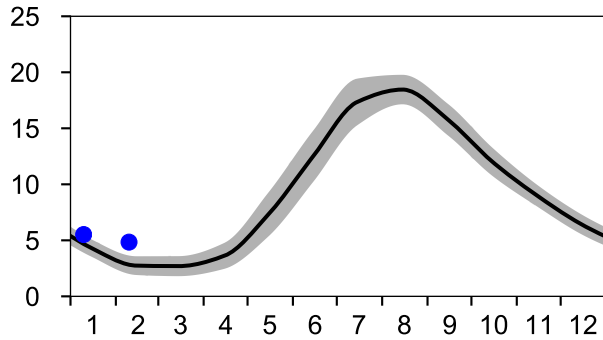
— Mean 2001-2015 St.Dev. • 2020-02-08



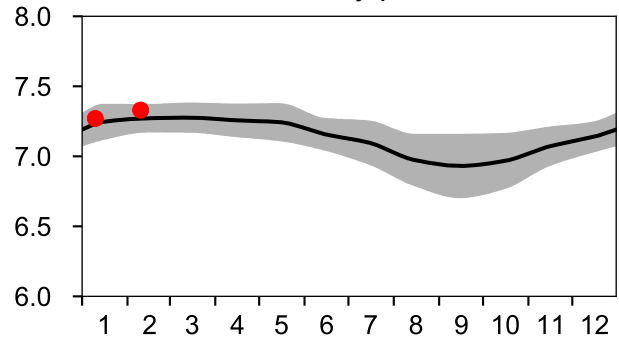
STATION BY10 SURFACE WATER (0-10 m)

Annual Cycles

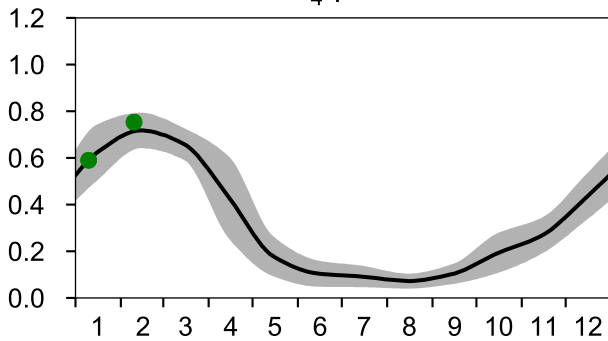
— Mean 2001-2015
Temperature °C



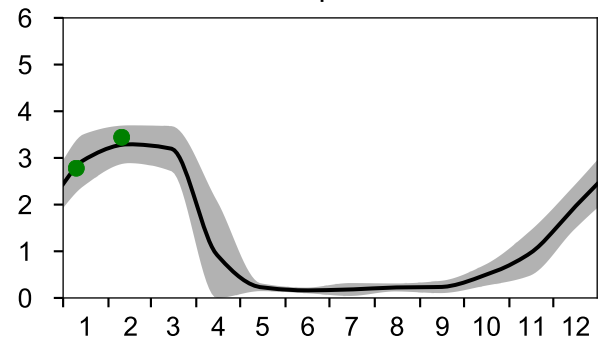
St.Dev. • 2020
Salinity psu



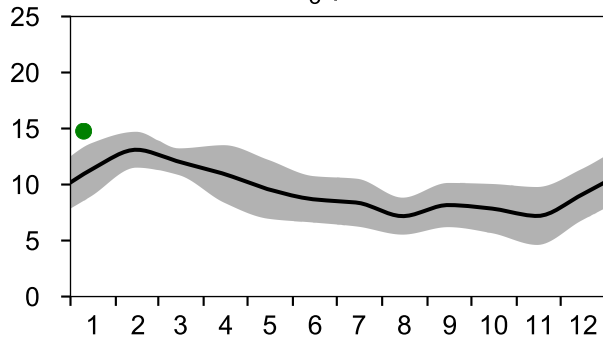
PO₄ µmol/l



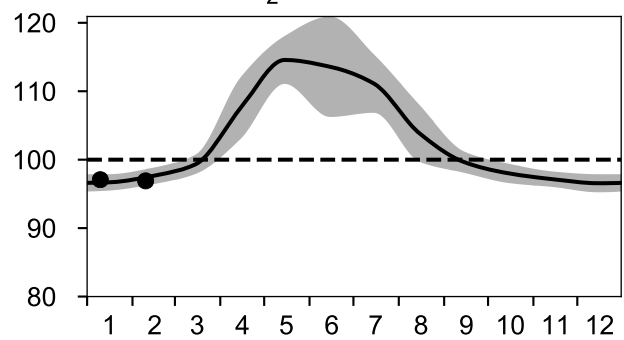
DIN µmol/l



SiO₃ µmol/l

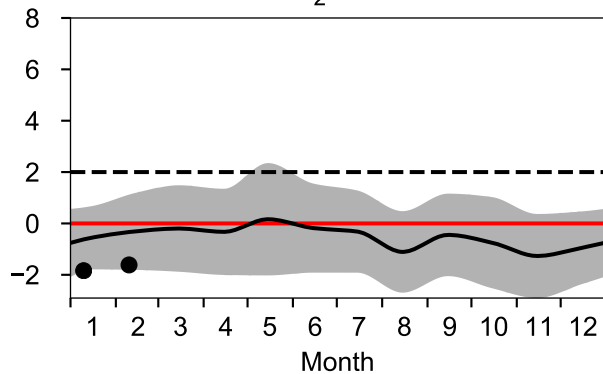


O₂ saturation %

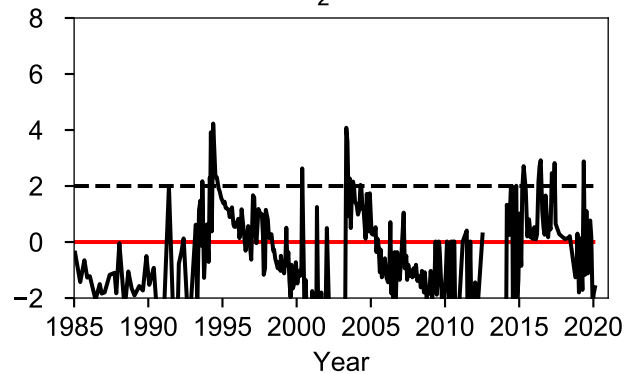


OXYGEN IN BOTTOM WATER (depth >= 125 m)

O₂ ml/l

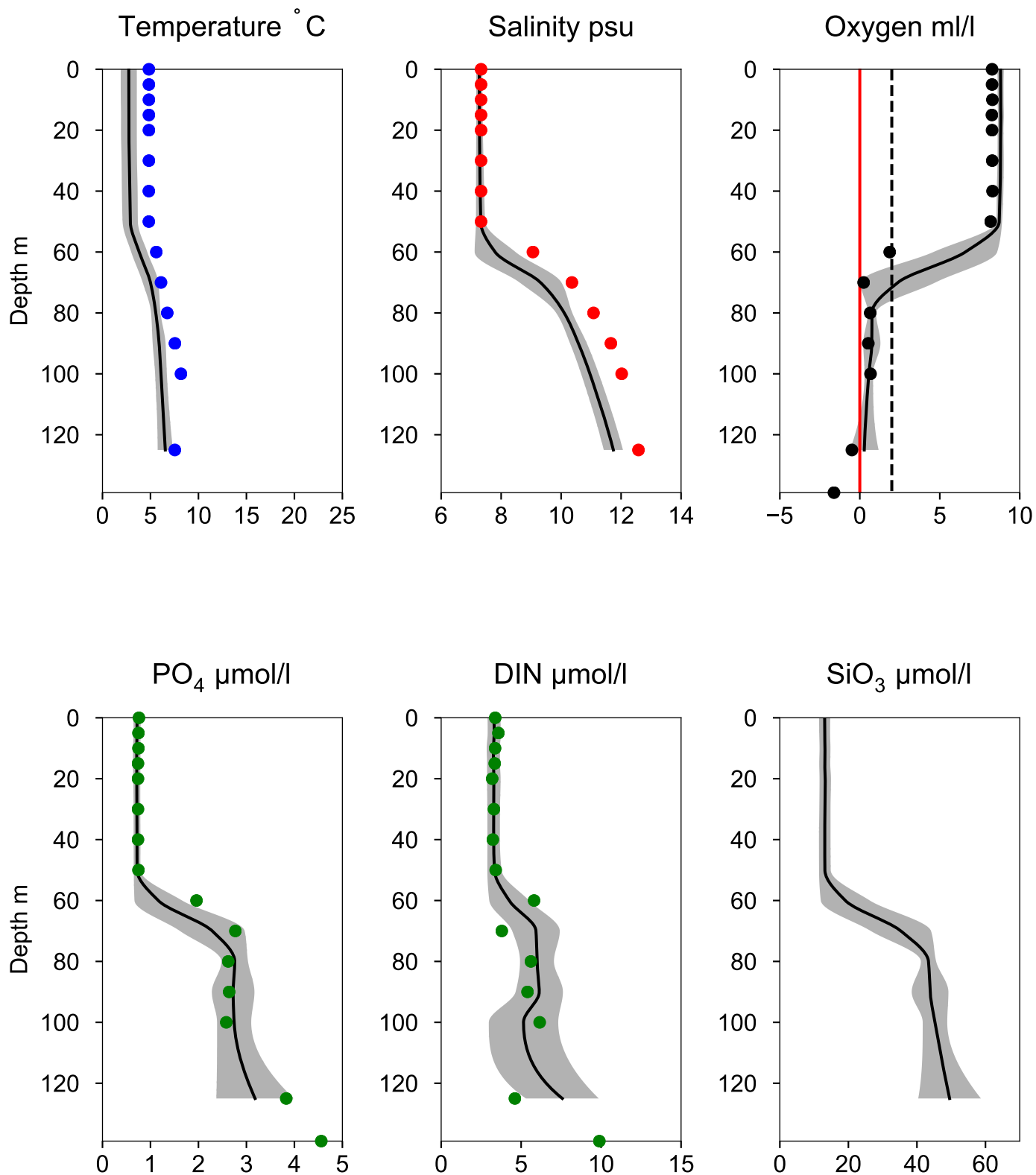


O₂ ml/l



Vertical profiles BY10 February

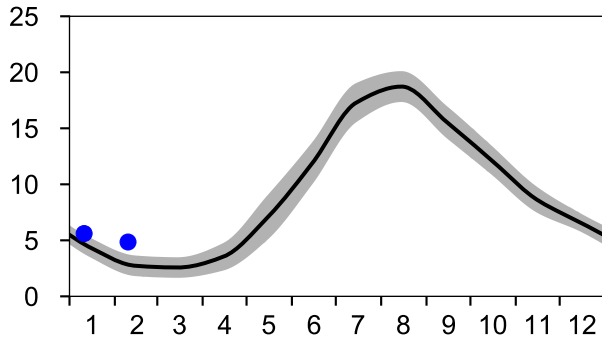
— Mean 2001-2015 St.Dev. • 2020-02-10



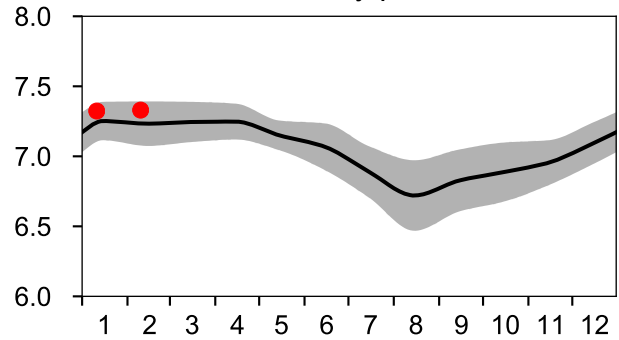
STATION BY15 GOTLANDSDJ SURFACE WATER (0-10 m)

Annual Cycles

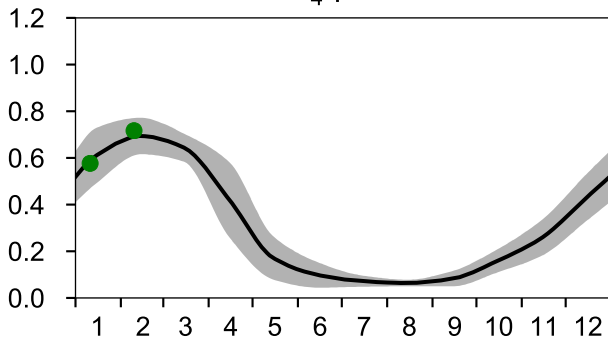
— Mean 2001-2015
Temperature °C



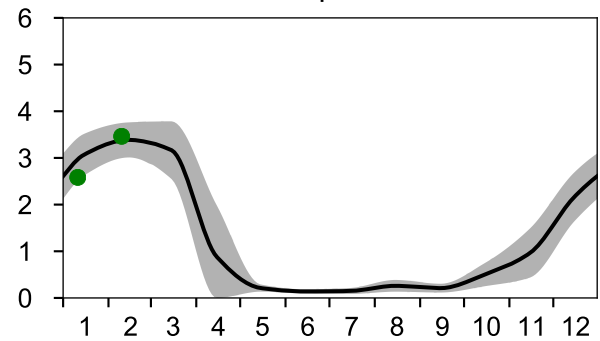
— St.Dev. • 2020
Salinity psu



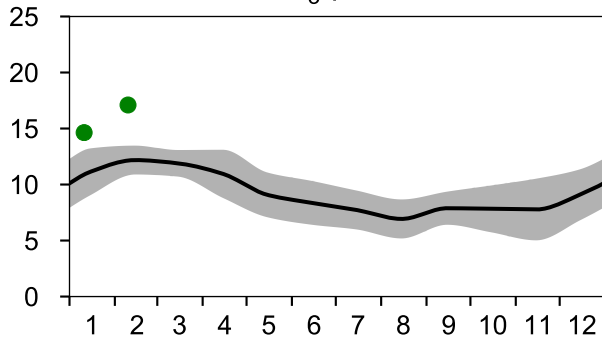
PO₄ µmol/l



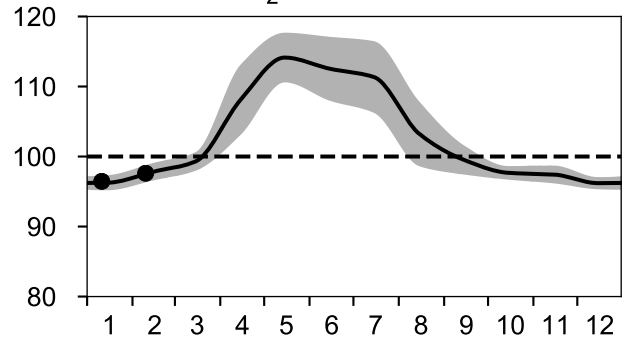
DIN µmol/l



SiO₃ µmol/l

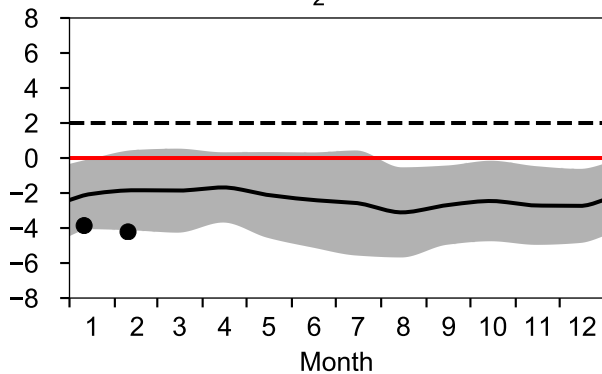


O₂ saturation %

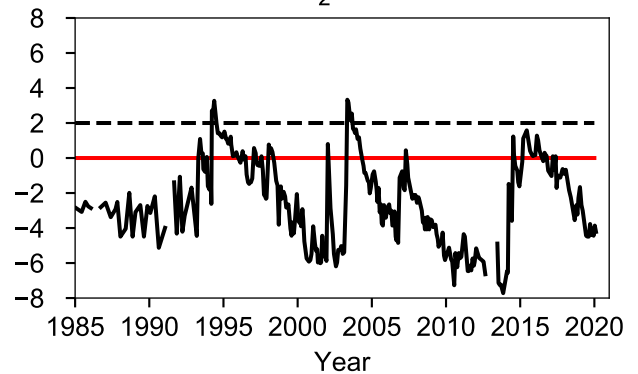


OXYGEN IN BOTTOM WATER (depth >= 225 m)

O₂ ml/l

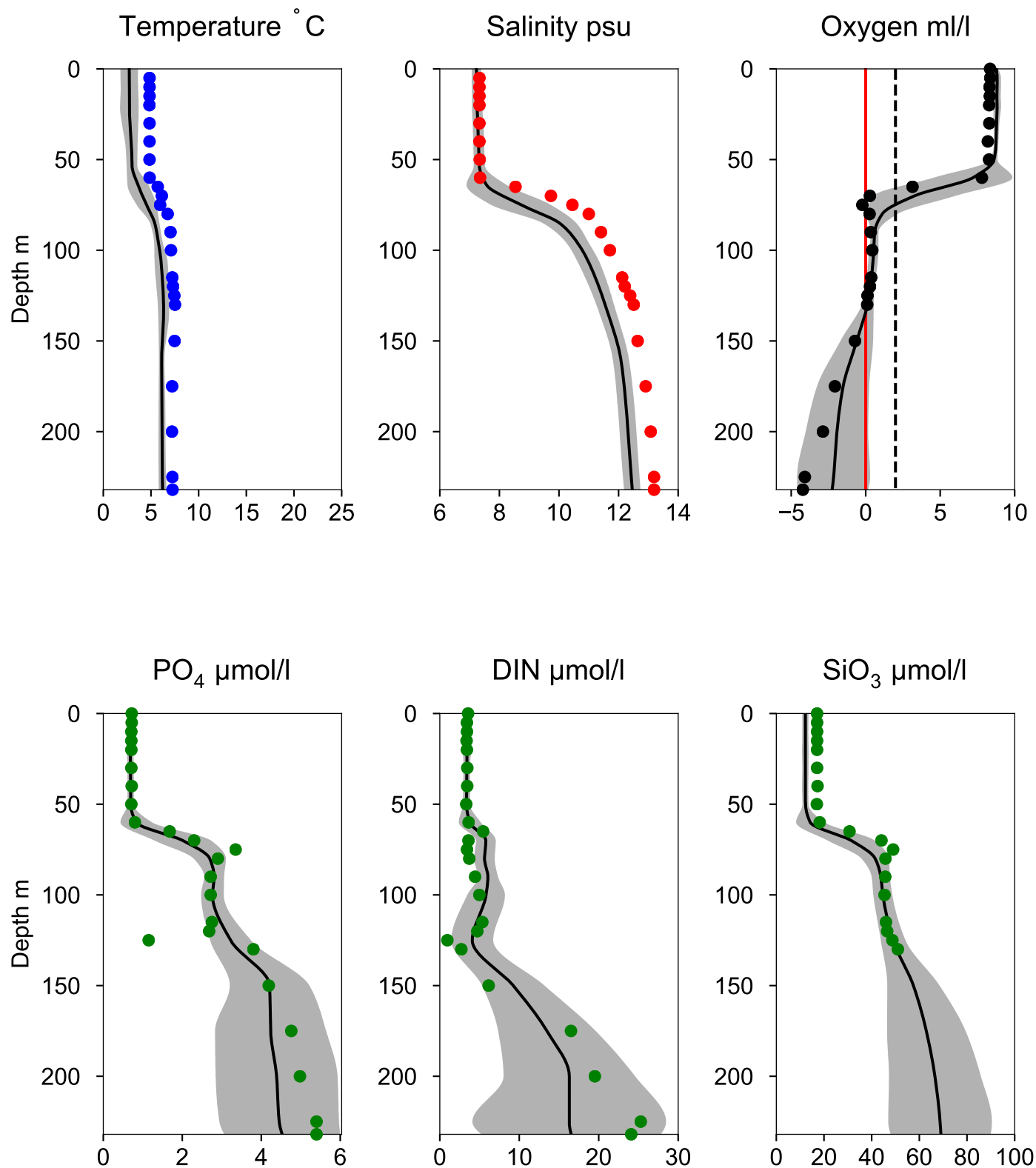


O₂ ml/l



Vertical profiles BY15 GOTLANDSDJ February

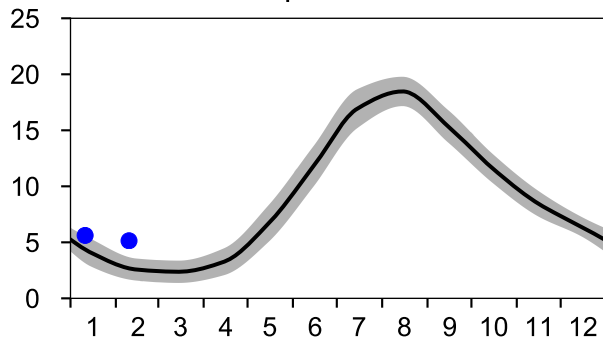
— Mean 2001-2015 St.Dev. • 2020-02-10



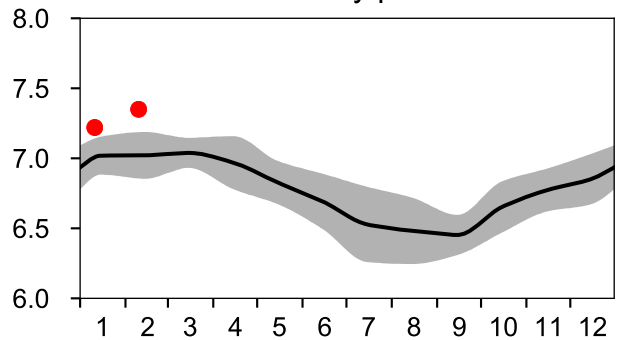
STATION BY20 FÅRÖDJ SURFACE WATER (0-10 m)

Annual Cycles

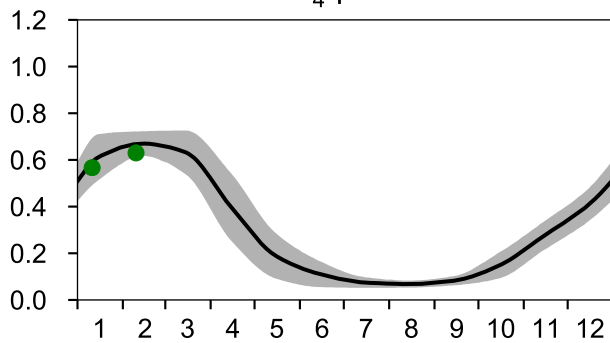
— Mean 2001-2015
Temperature °C



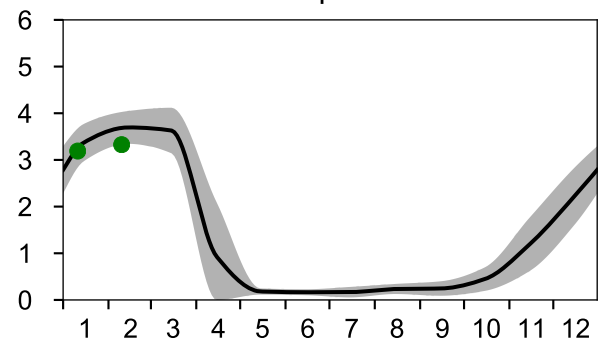
St.Dev. ● 2020
Salinity psu



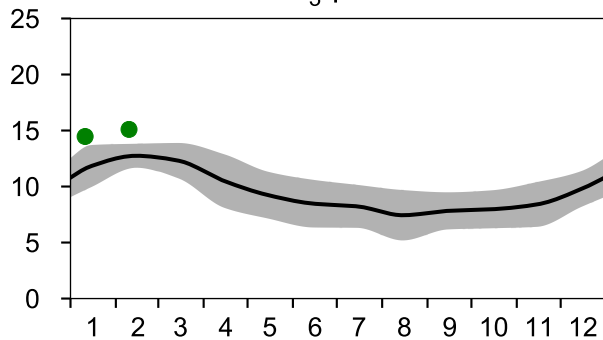
PO₄ µmol/l



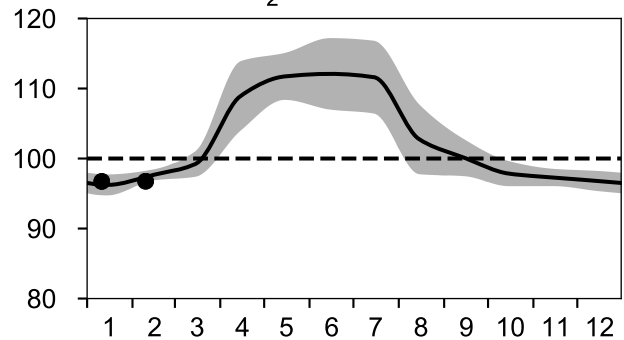
DIN µmol/l



SiO₃ µmol/l

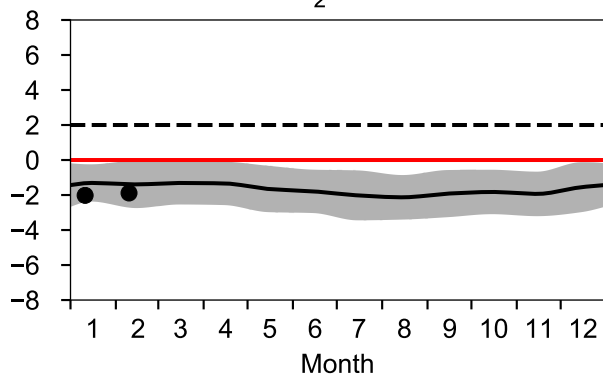


O₂ saturation %

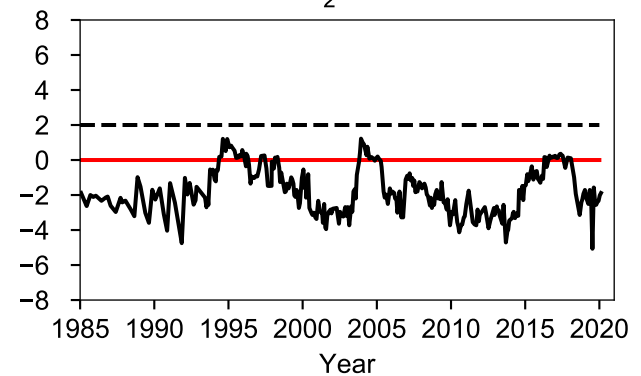


OXYGEN IN BOTTOM WATER (depth >= 175 m)

O₂ ml/l

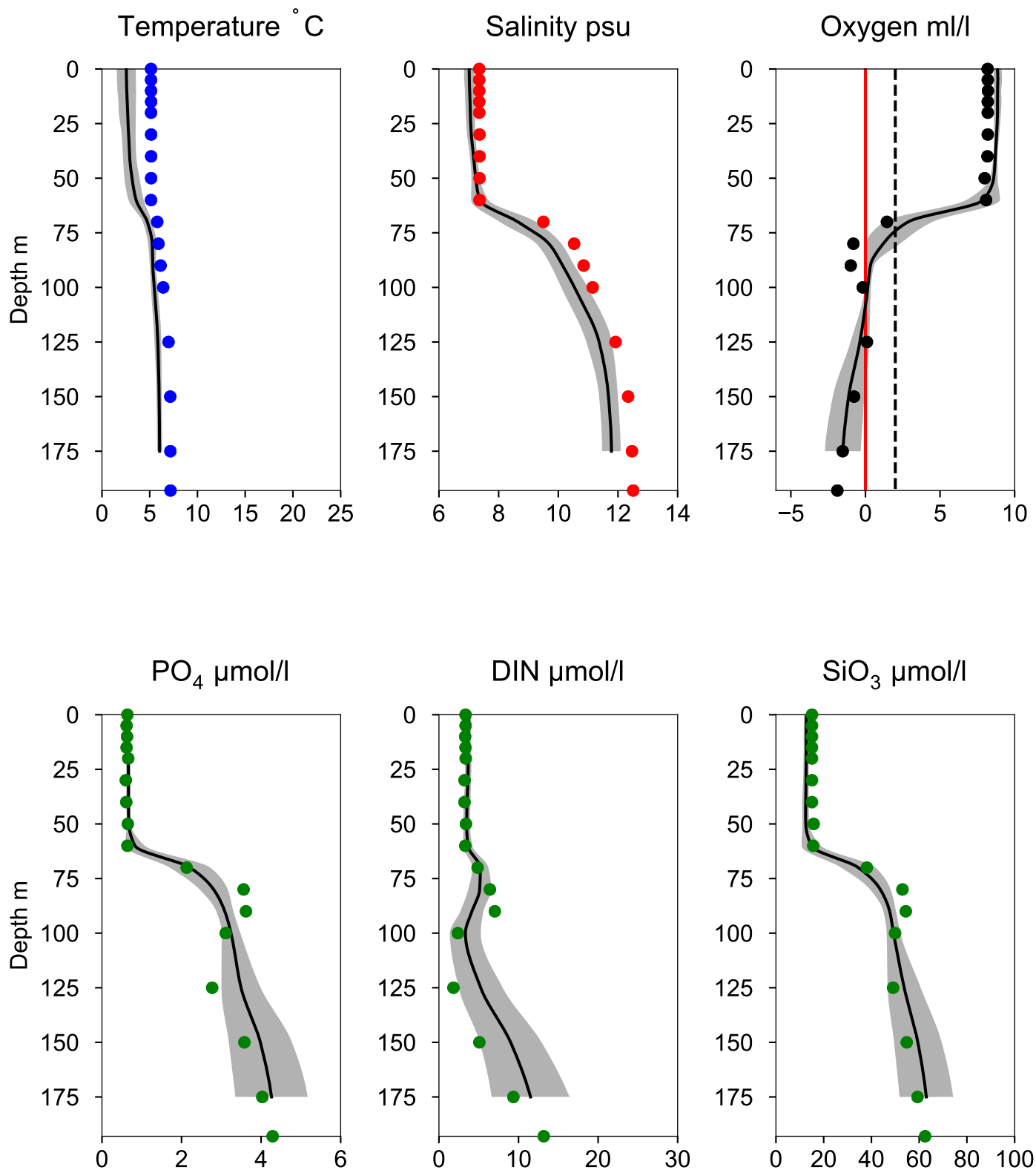


O₂ ml/l



Vertical profiles BY20 FÅRÖDJ February

— Mean 2001-2015 St.Dev. • 2020-02-10



STATION BY29 / LL19 SURFACE WATER (0-10 m)

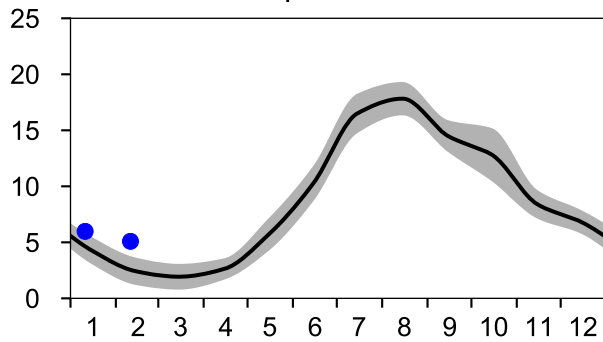
Annual Cycles

— Mean 2001-2015

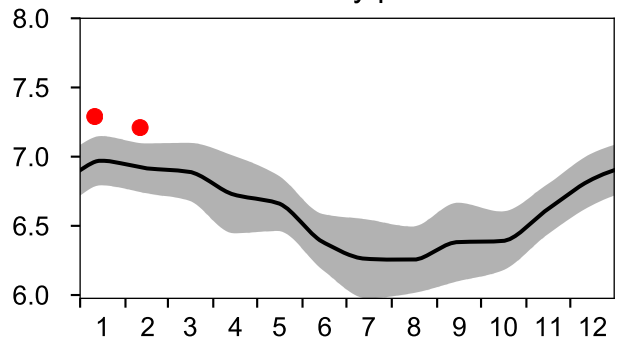
■ St.Dev.

● 2020

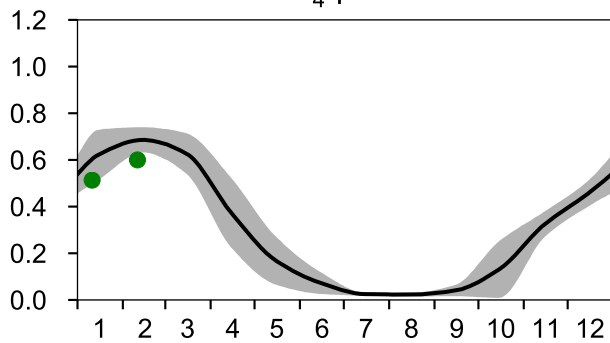
Temperature °C



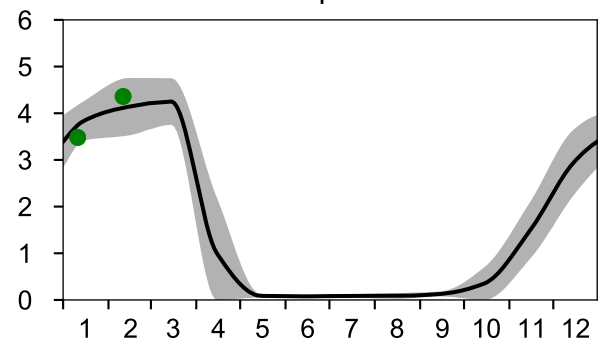
Salinity psu



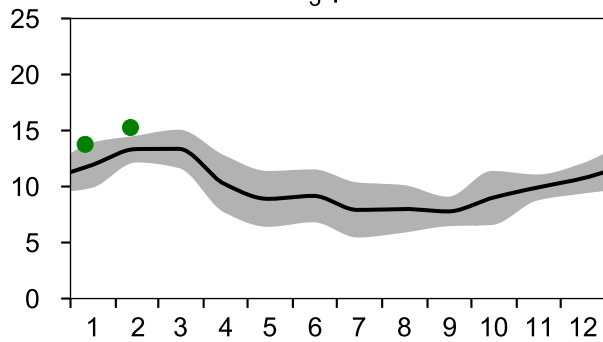
PO₄ µmol/l



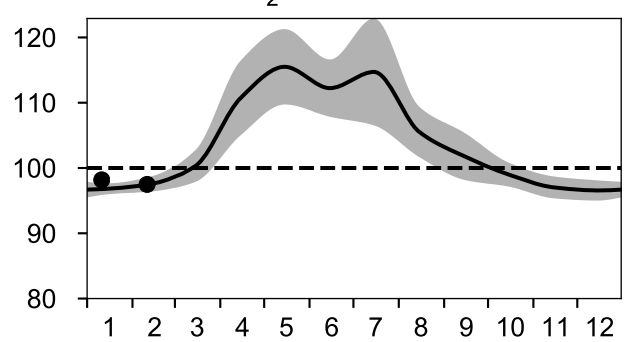
DIN µmol/l



SiO₃ µmol/l

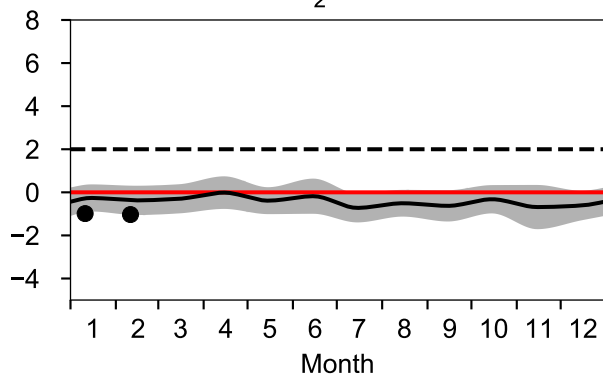


O₂ saturation %

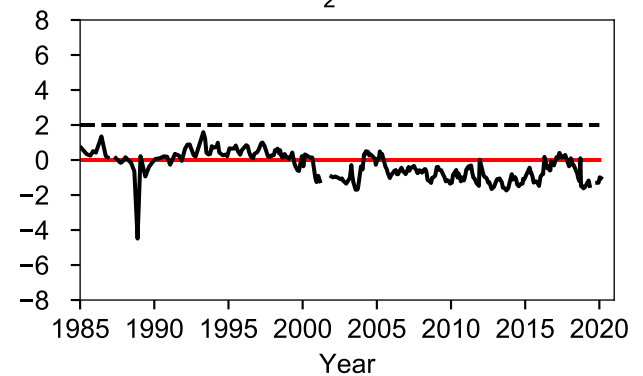


OXYGEN IN BOTTOM WATER (depth >= 150 m)

O₂ ml/l

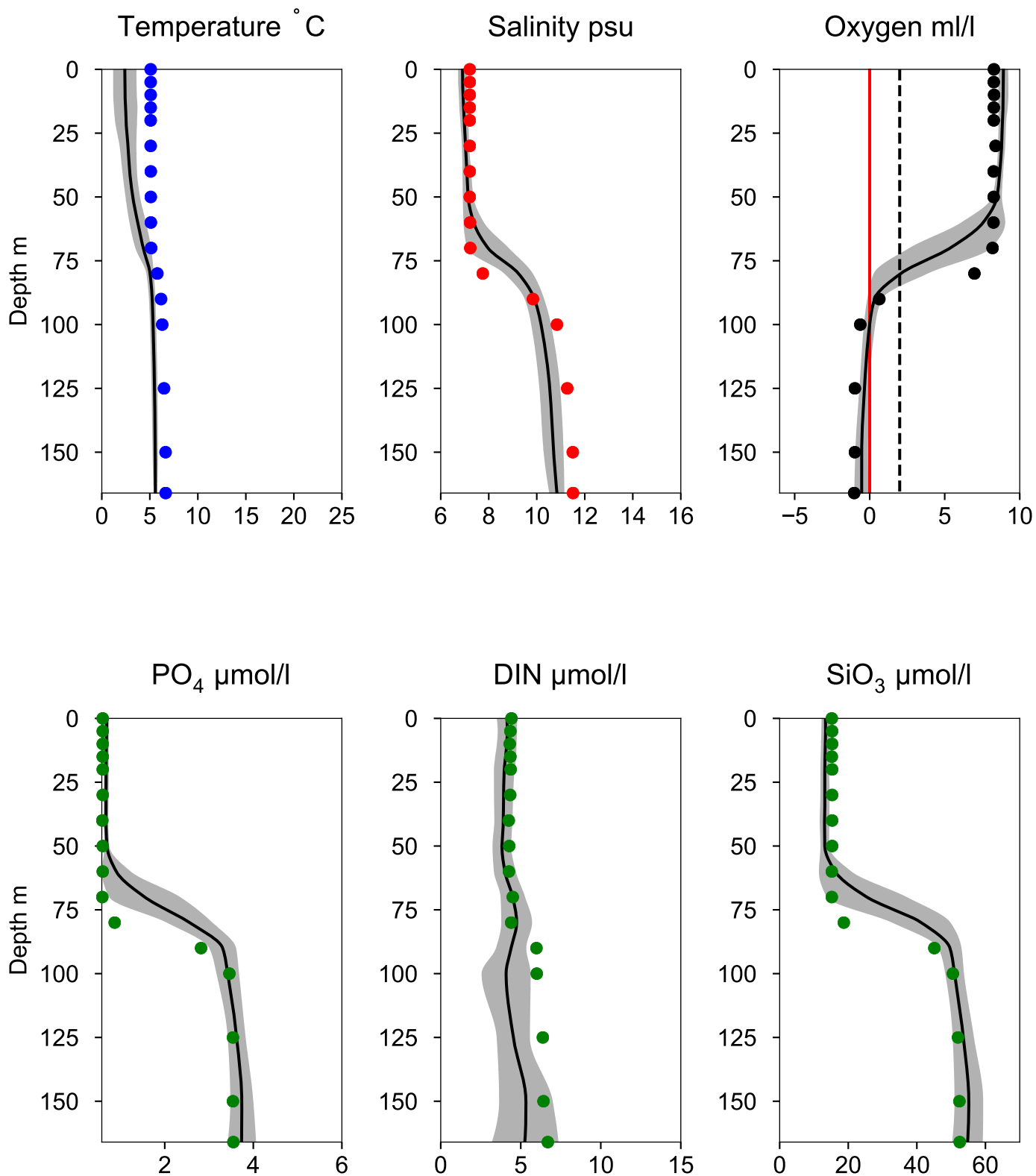


O₂ ml/l



Vertical profiles BY29 / LL19 February

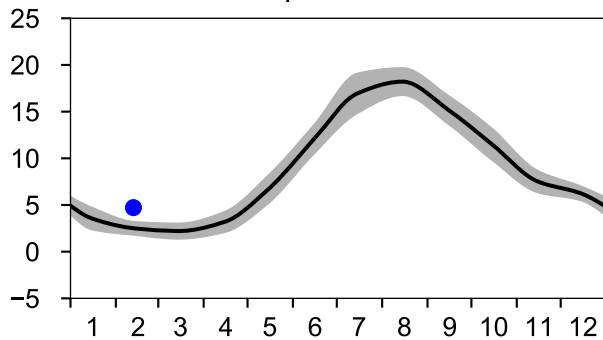
— Mean 2001-2015 St.Dev. • 2020-02-11



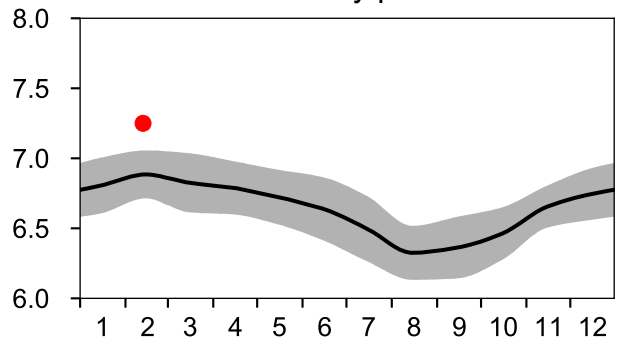
STATION BY32 NORRKÖPINGSDJ SURFACE WATER (0-10 m)

Annual Cycles

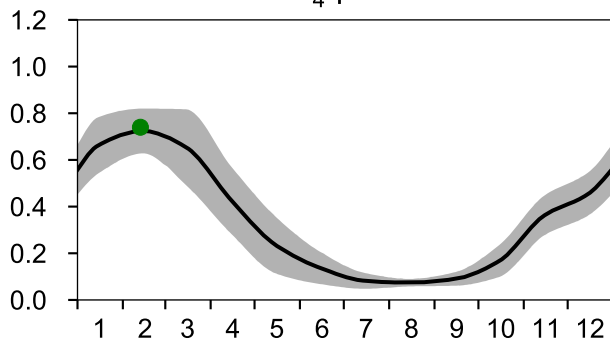
— Mean 2001-2015
Temperature °C



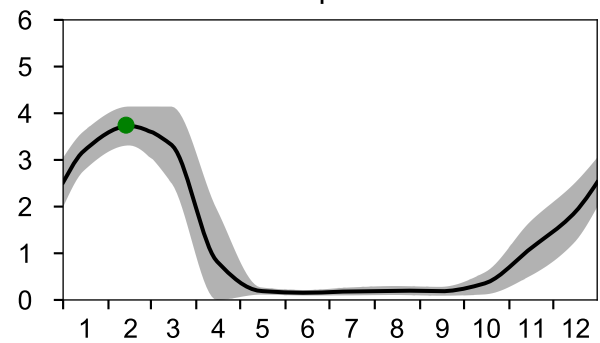
St.Dev. ● 2020
Salinity psu



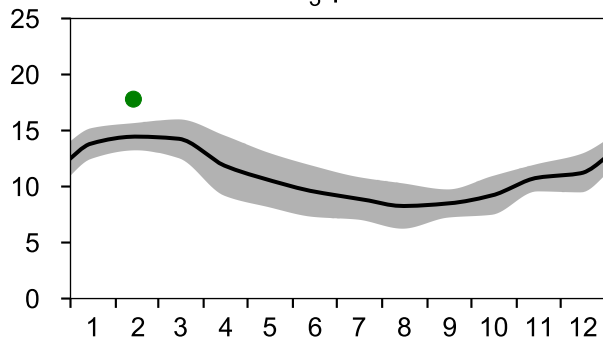
PO₄ µmol/l



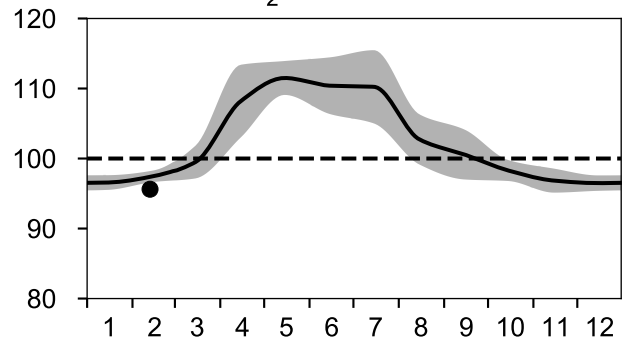
DIN µmol/l



SiO₃ µmol/l

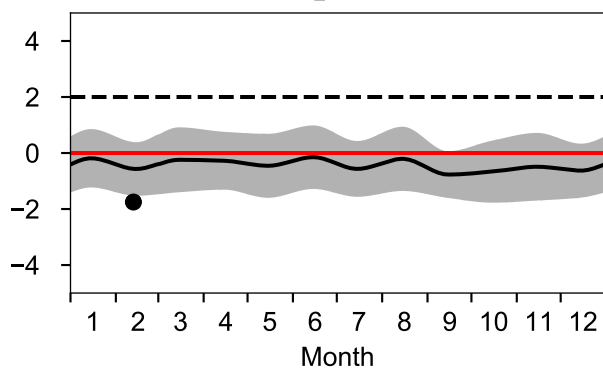


O₂ saturation %

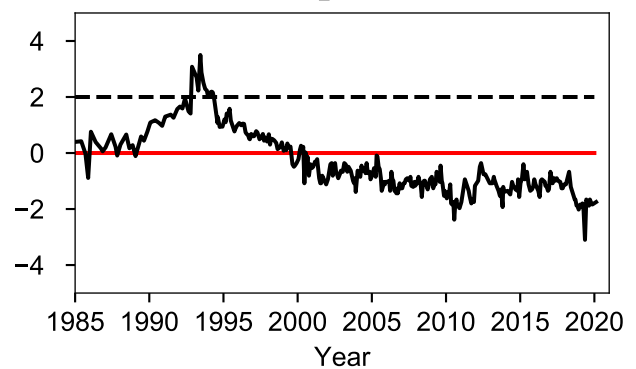


OXYGEN IN BOTTOM WATER (depth >= 175 m)

O₂ ml/l

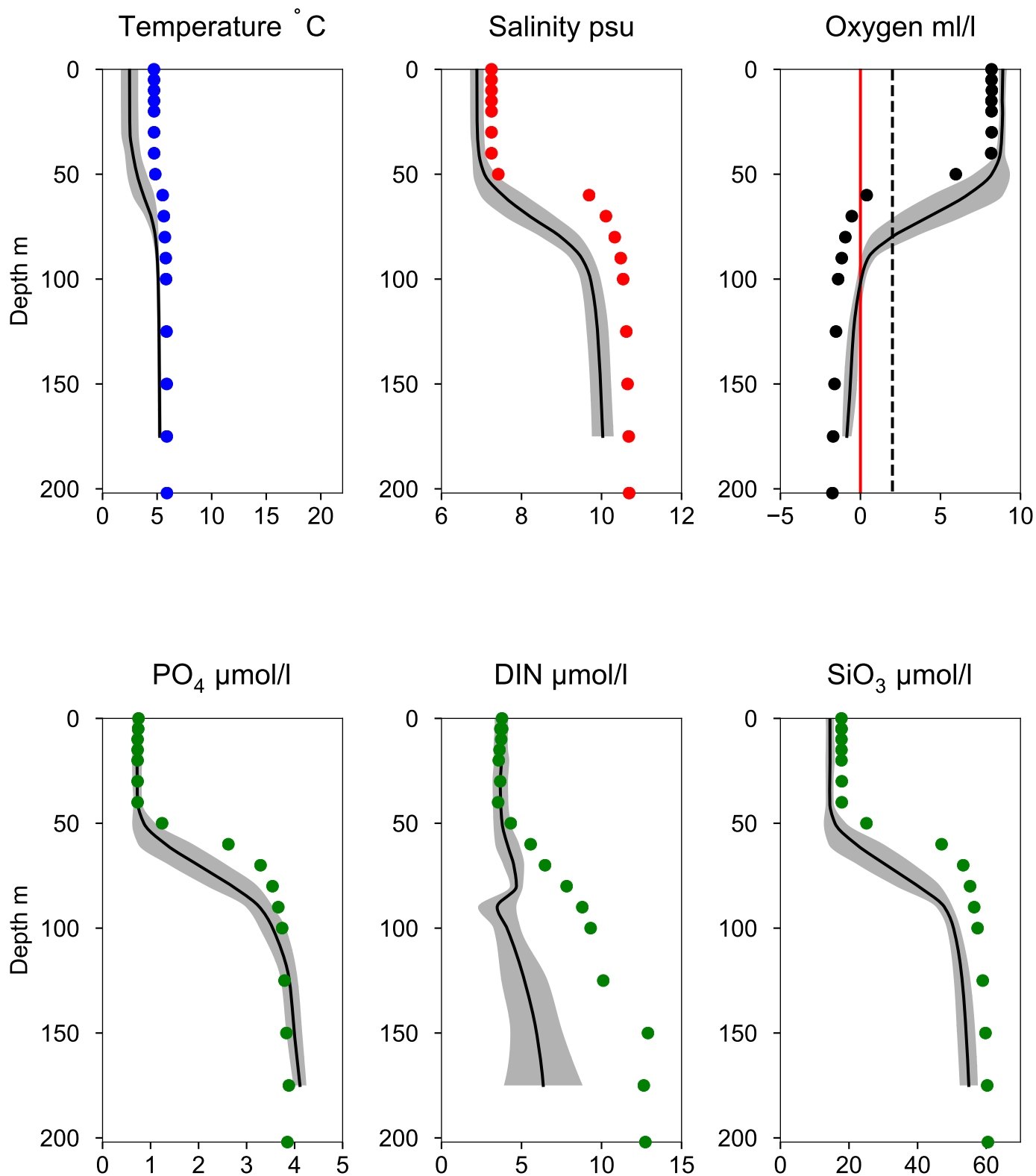


O₂ ml/l



Vertical profiles BY32 NORRKÖPINGSDJ February

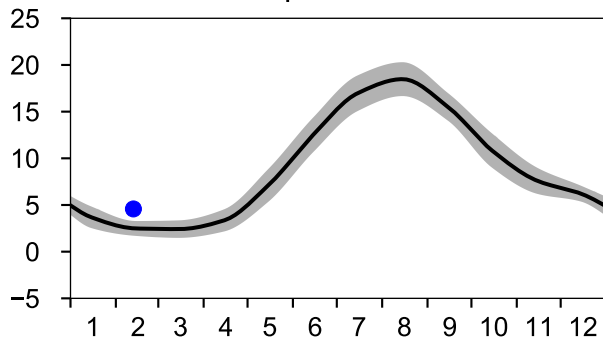
— Mean 2001-2015 St.Dev. • 2020-02-13



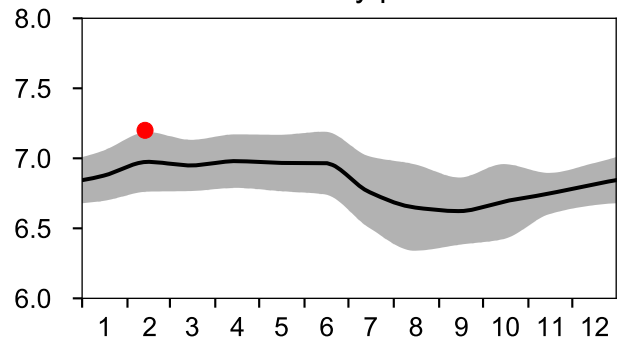
STATION BY38 KARLSÖDJ SURFACE WATER (0-10 m)

Annual Cycles

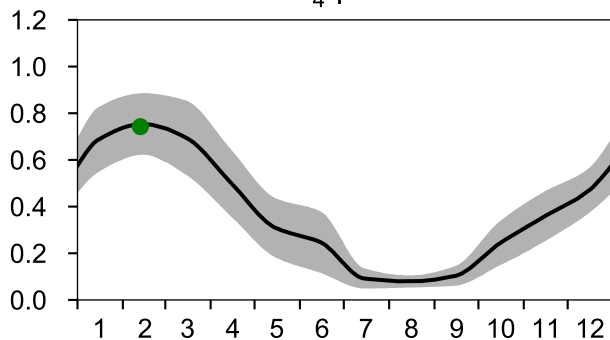
— Mean 2001-2015
Temperature °C



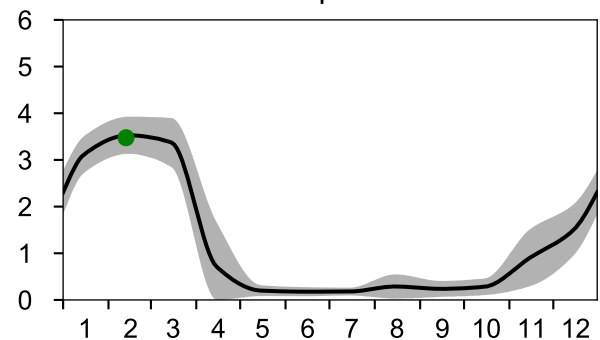
— St.Dev. • 2020
Salinity psu



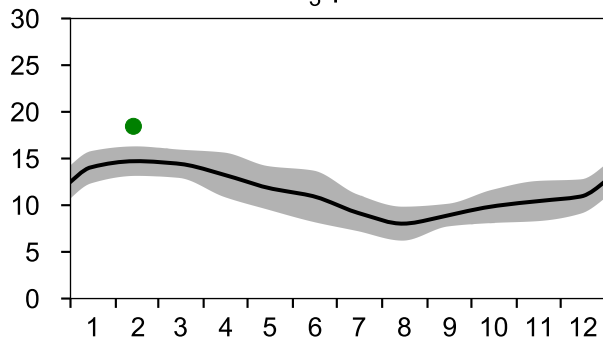
PO₄ µmol/l



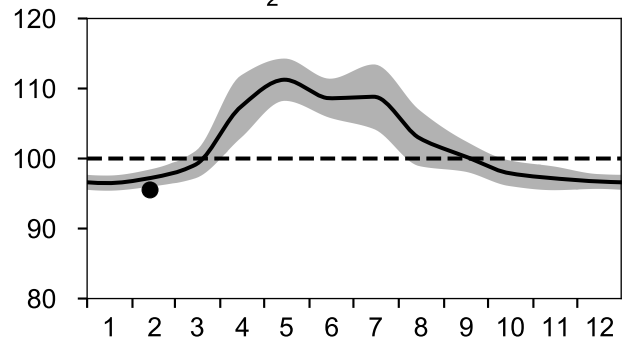
DIN µmol/l



SiO₃ µmol/l

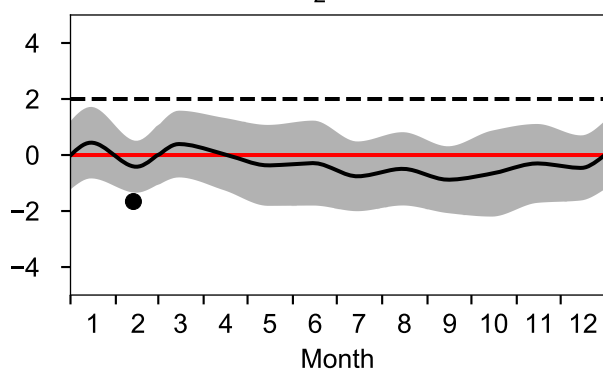


O₂ saturation %

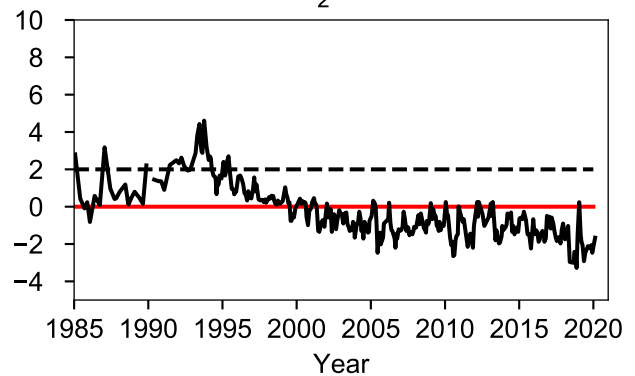


OXYGEN IN BOTTOM WATER (depth >= 100 m)

O₂ ml/l



O₂ ml/l

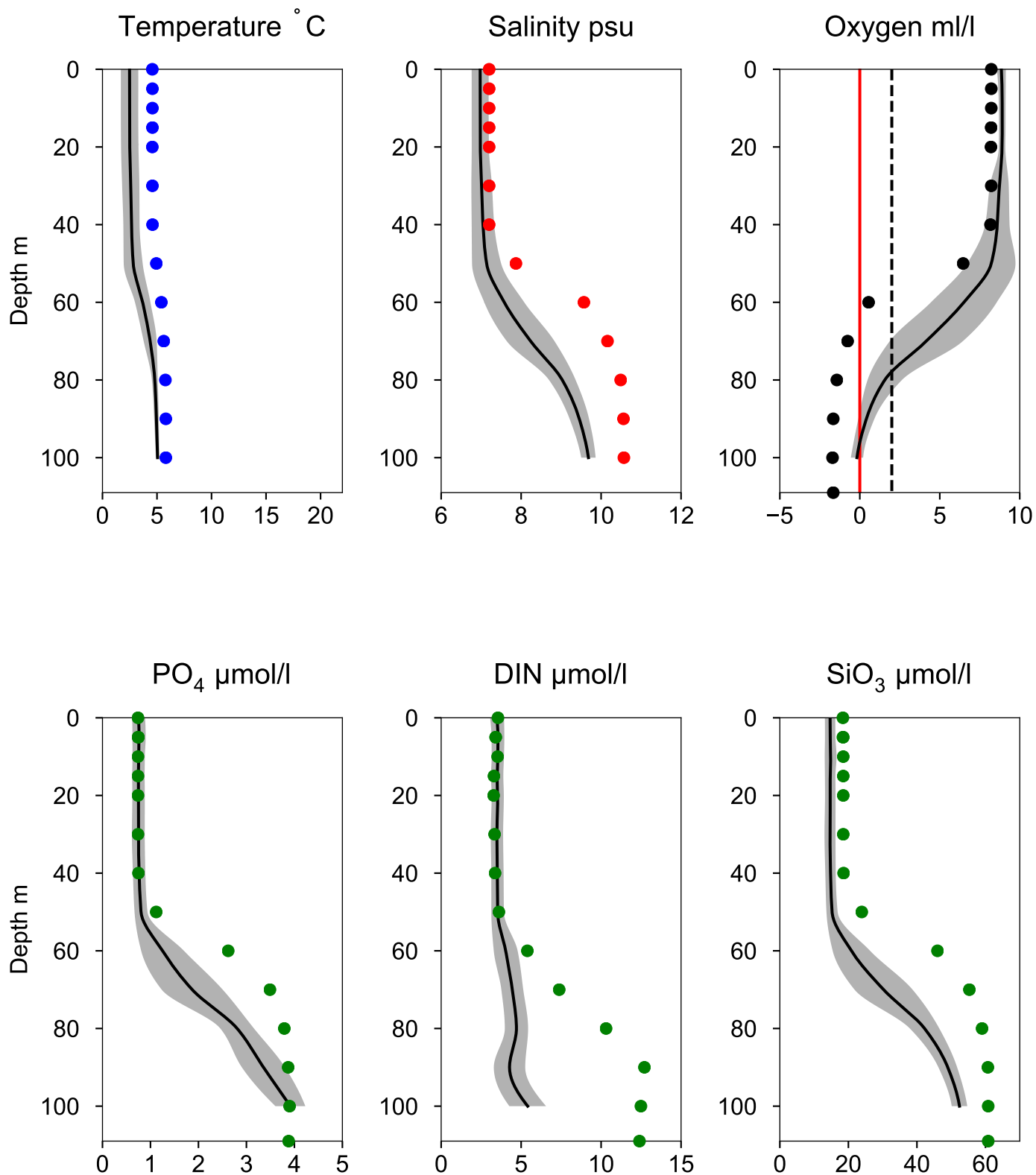


Vertical profiles BY38 KARLSÖDJ February

— Mean 2001-2015

■ St.Dev.

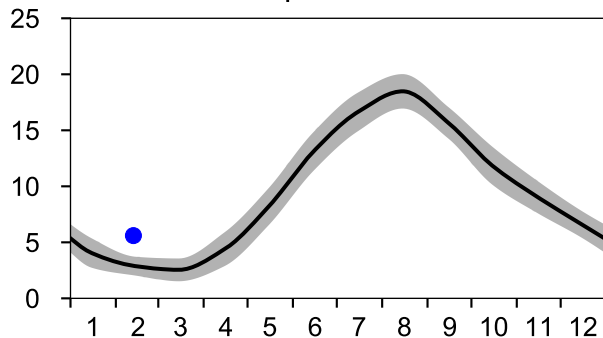
● 2020-02-13



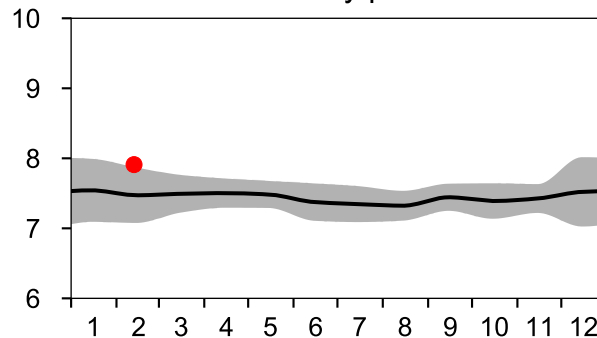
STATION HANÖBUKTEN SURFACE WATER (0-10 m)

Annual Cycles

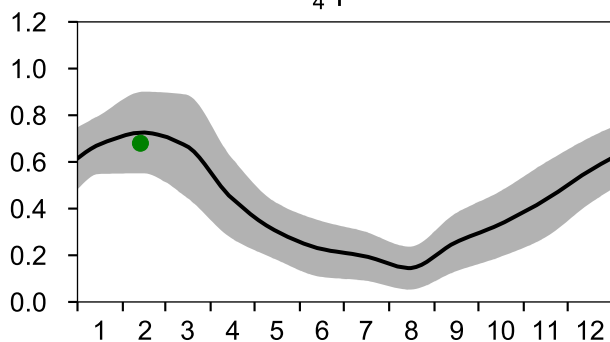
— Mean 2001-2015
Temperature °C



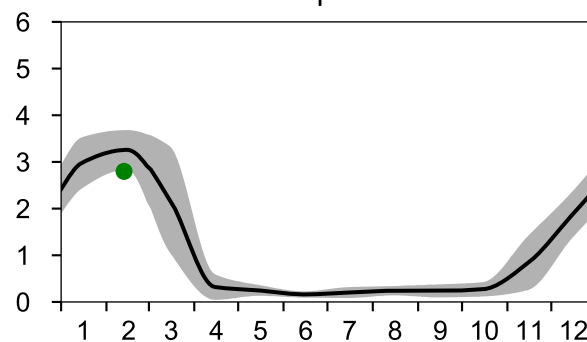
■ St.Dev. ● 2020
Salinity psu



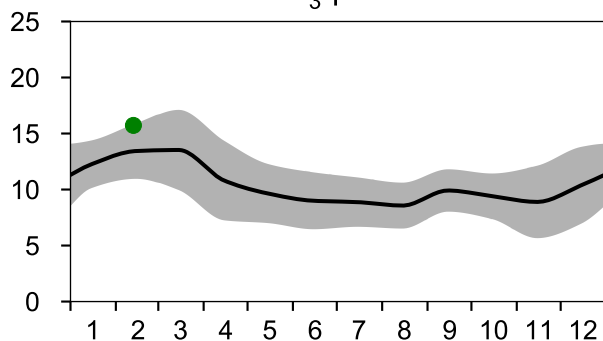
PO₄ µmol/l



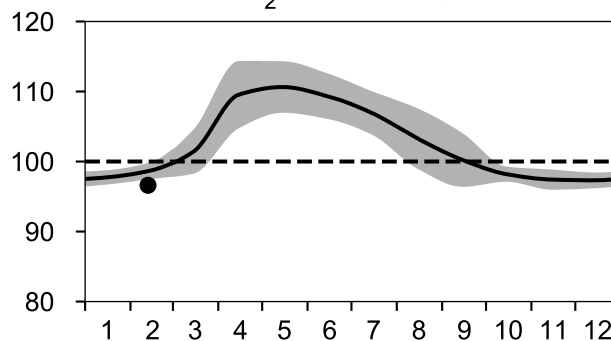
DIN µmol/l



SiO₃ µmol/l

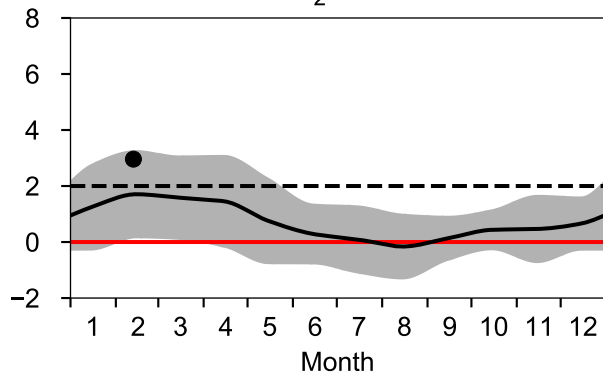


O₂ saturation %

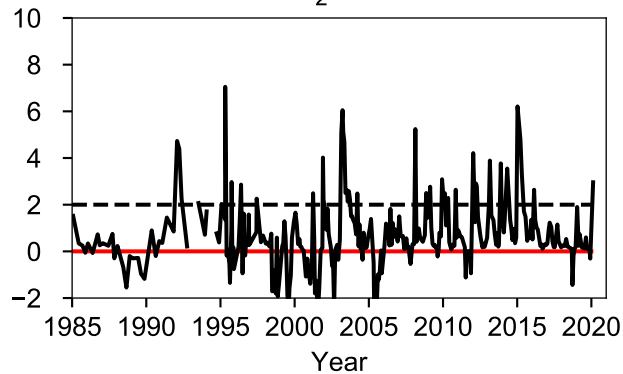


OXYGEN IN BOTTOM WATER (depth >= 70 m)

O₂ ml/l



O₂ ml/l

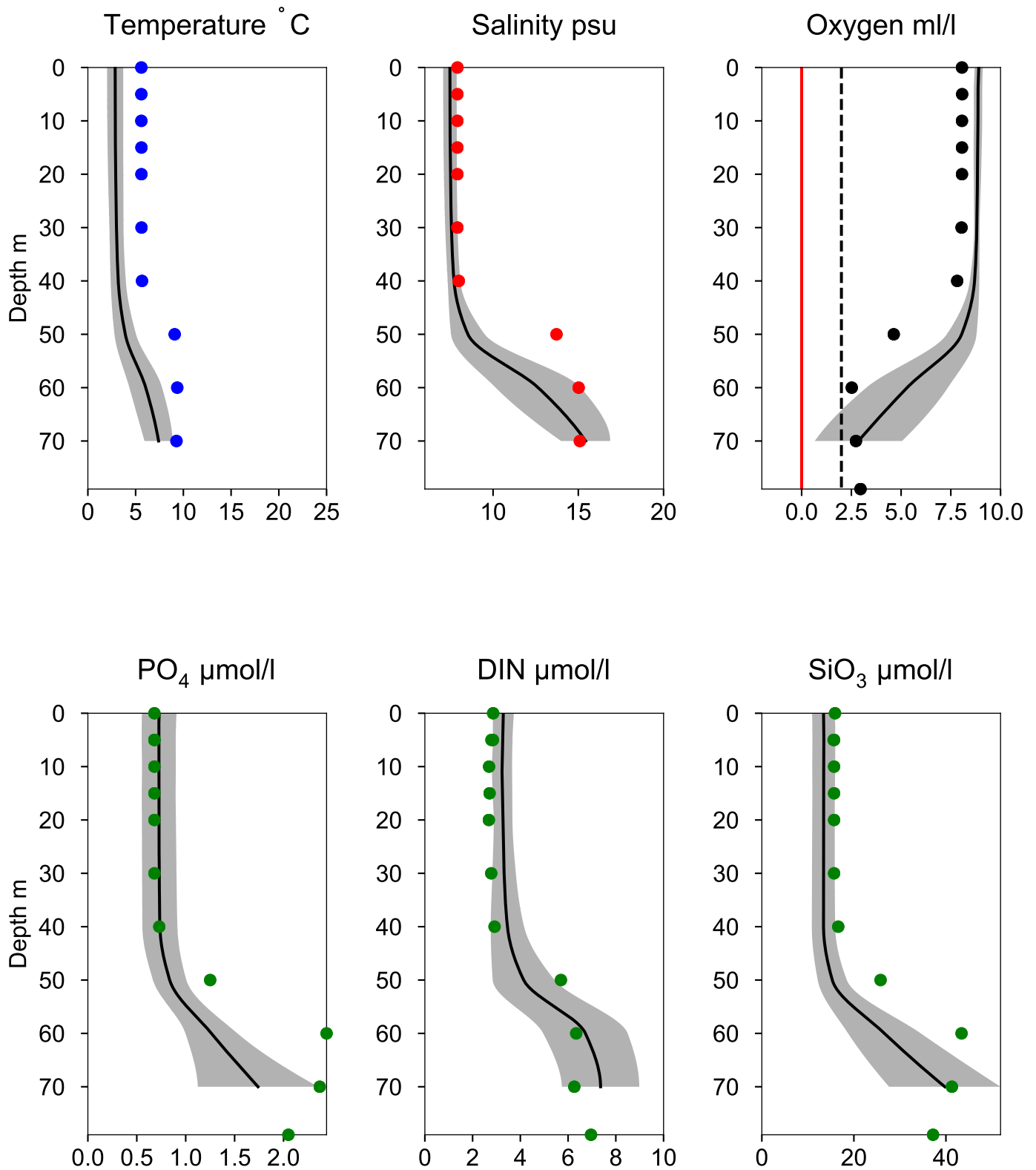


Vertical profiles HANÖBUKTEN February

— Mean 2001-2015

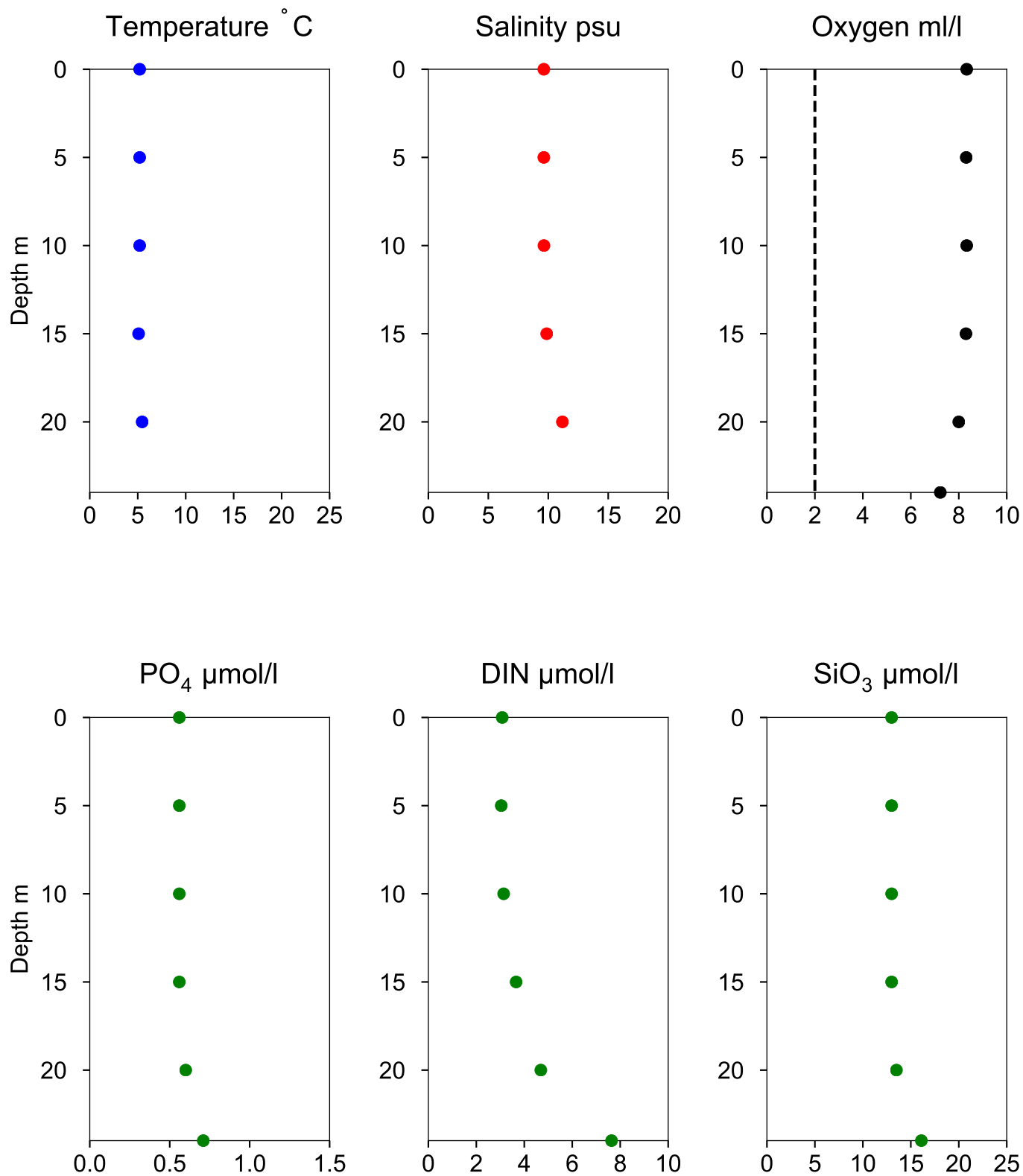
■ St.Dev.

● 2020-02-13



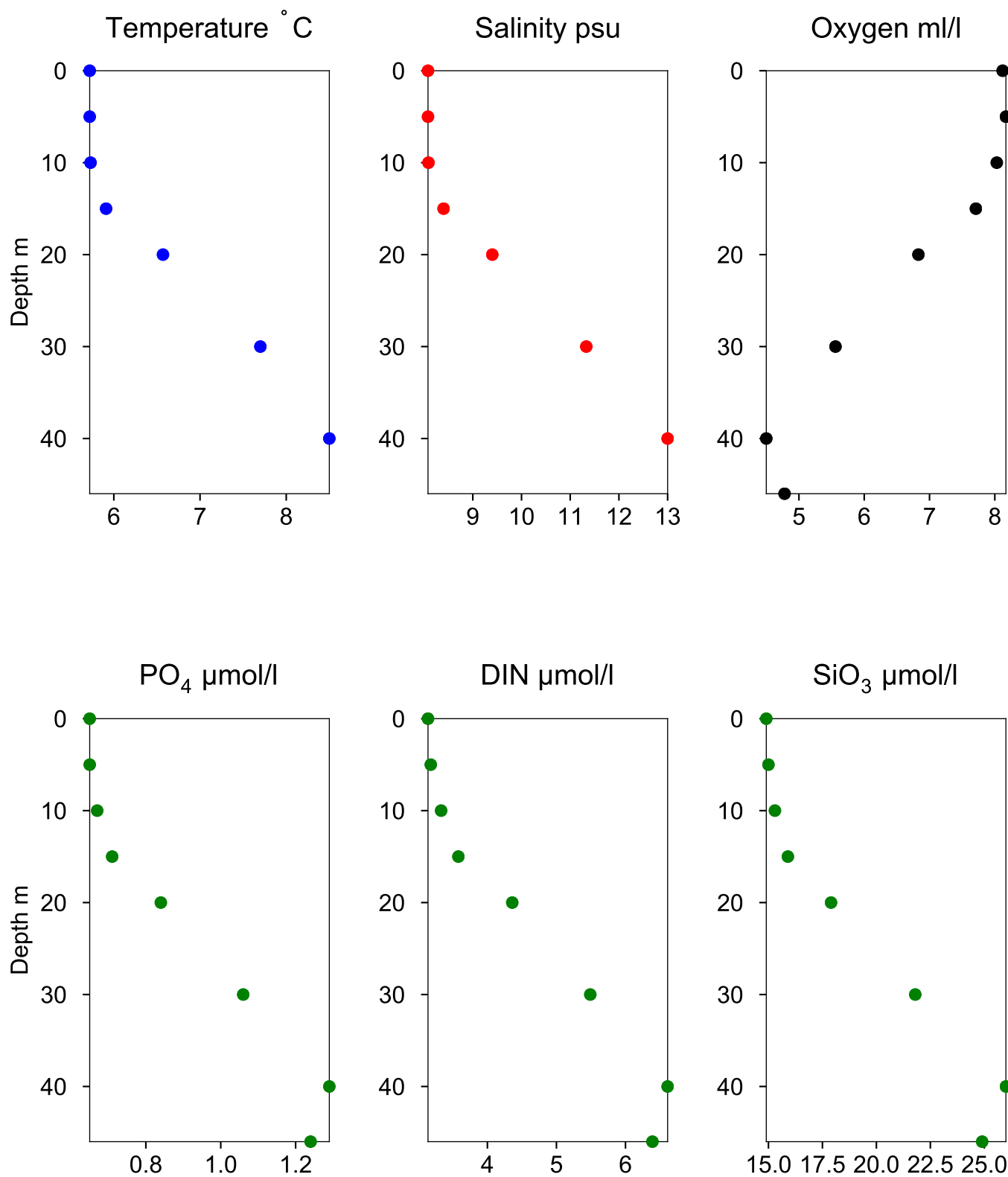
Vertical profiles 441 STEVNS KLINT February

● 2020-02-08



Vertical profiles February

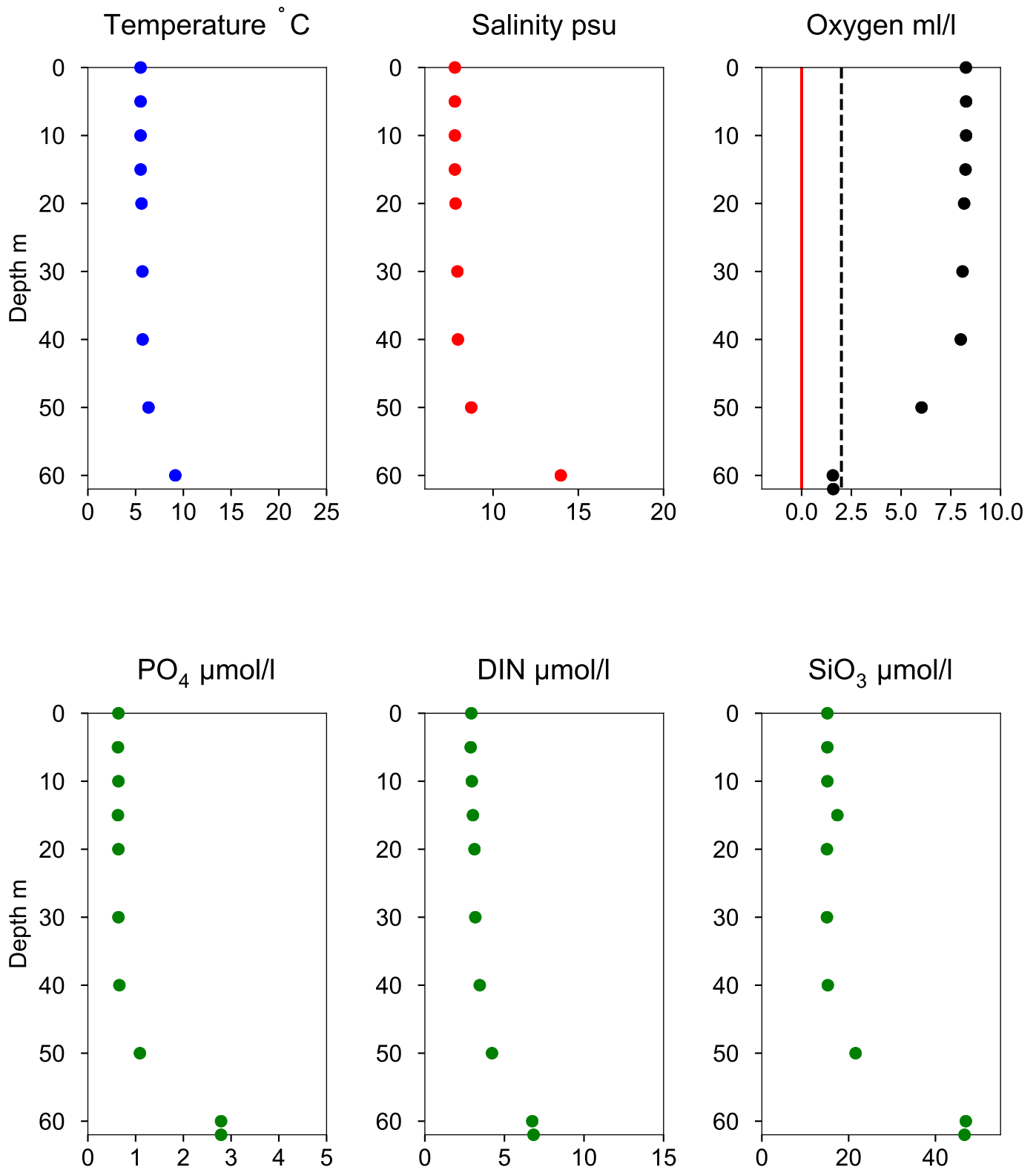
● 2020-02-08



Vertical profiles STOLPE TRÖSKEL

February

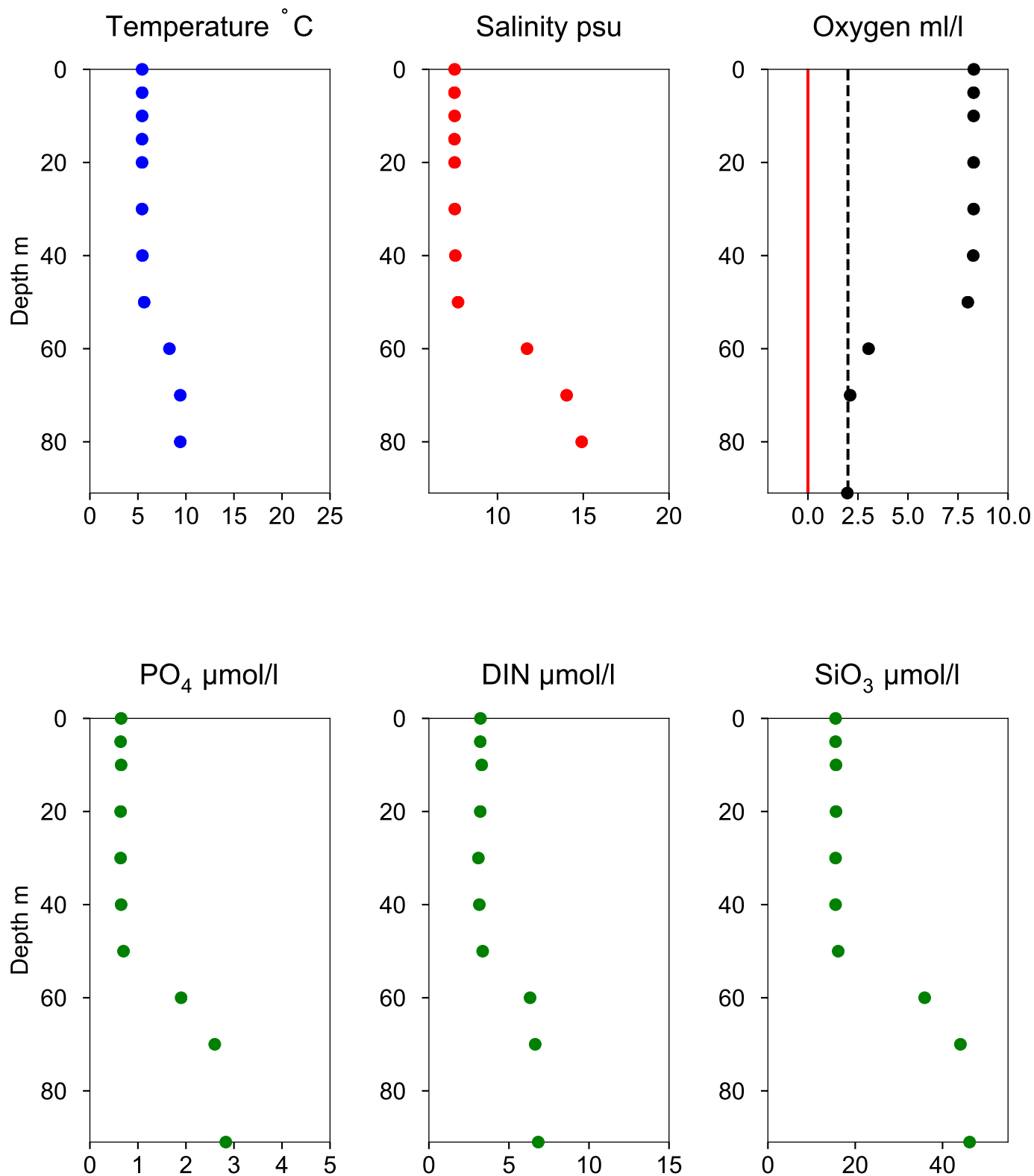
● 2020-02-09



Vertical profiles BY7 STOLPE RÄNNA

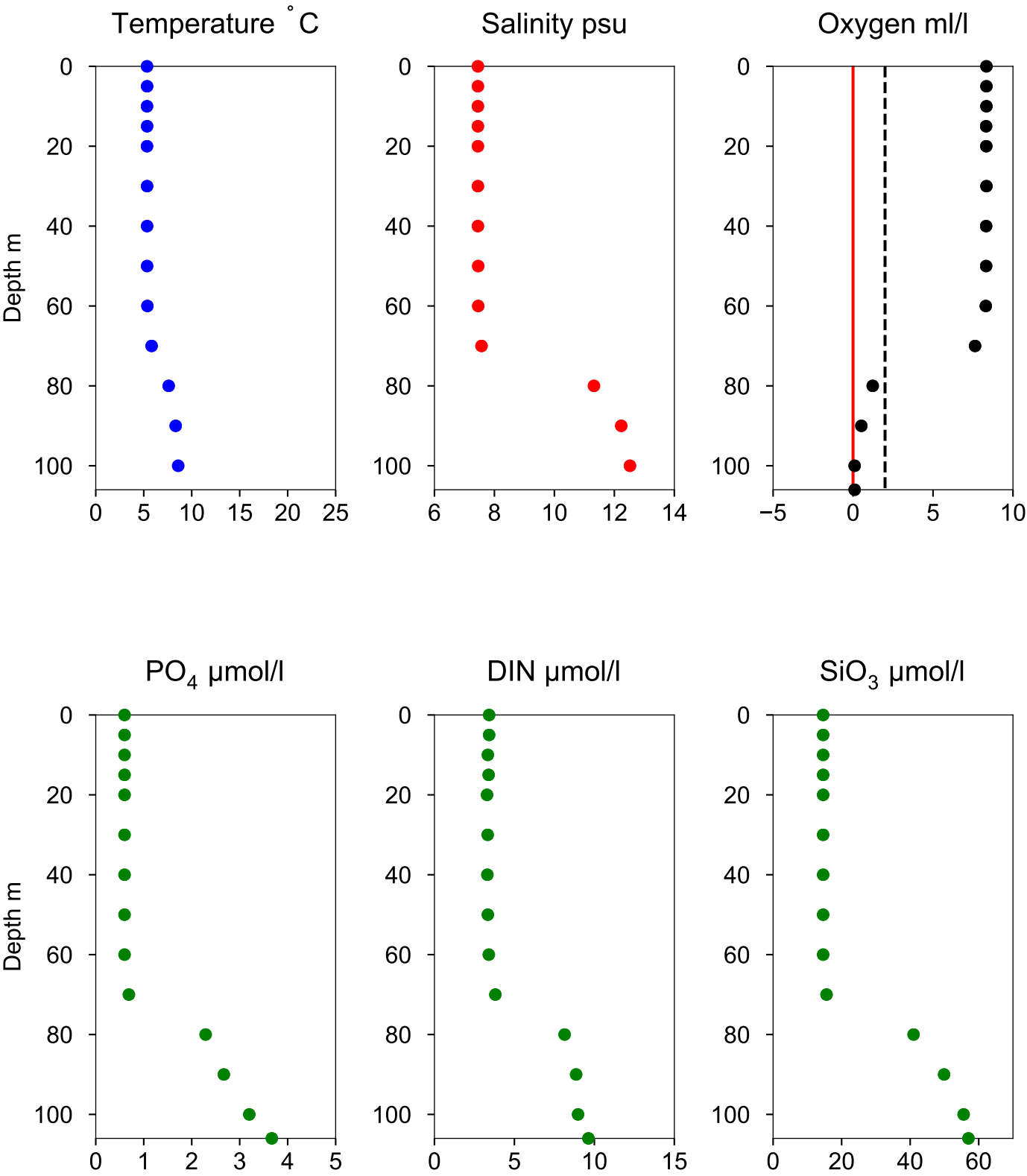
February

● 2020-02-09



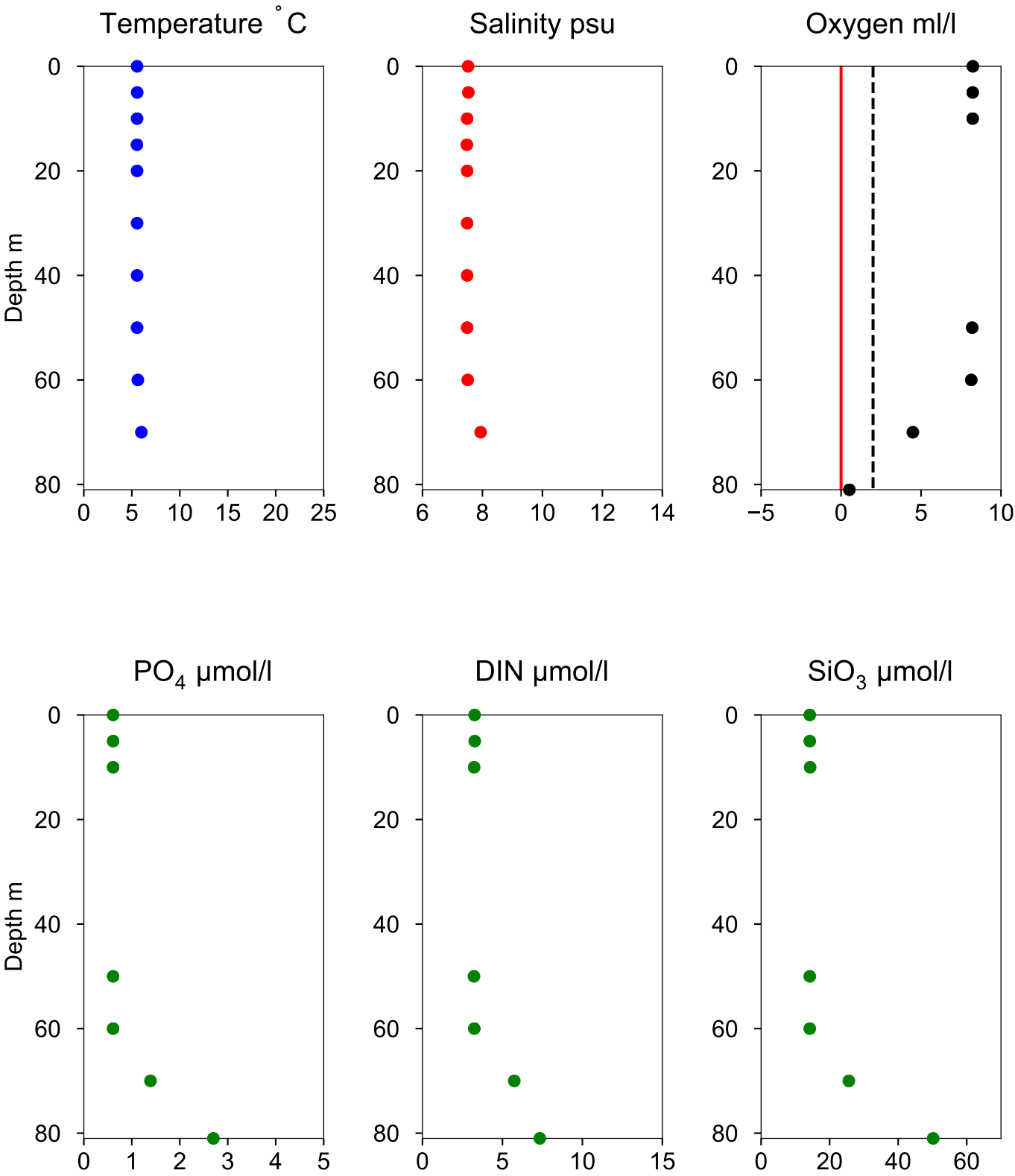
Vertical profiles PL-P1
February

● 2020-02-09



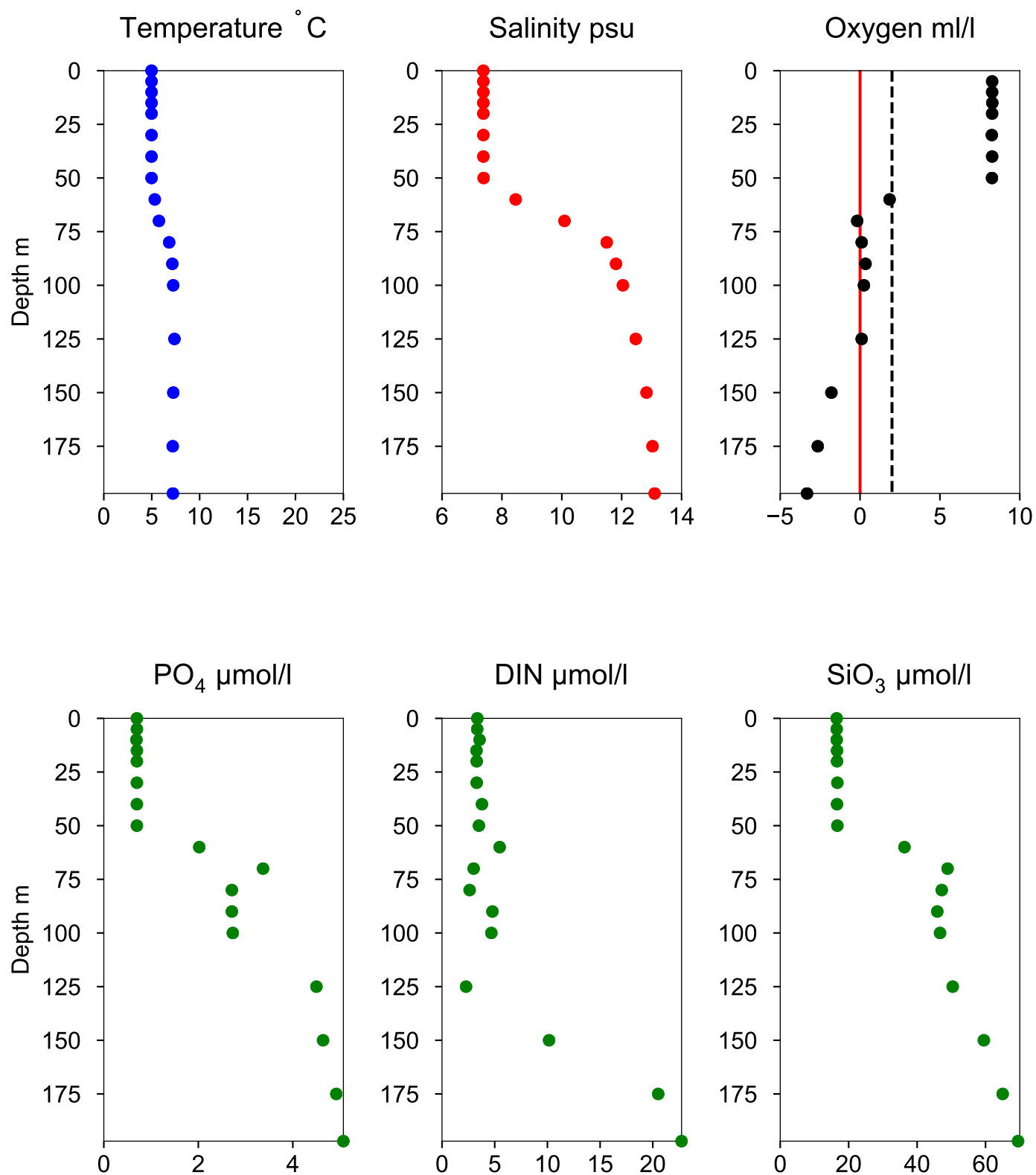
Vertical profiles PL-P63
February

● 2020-02-09



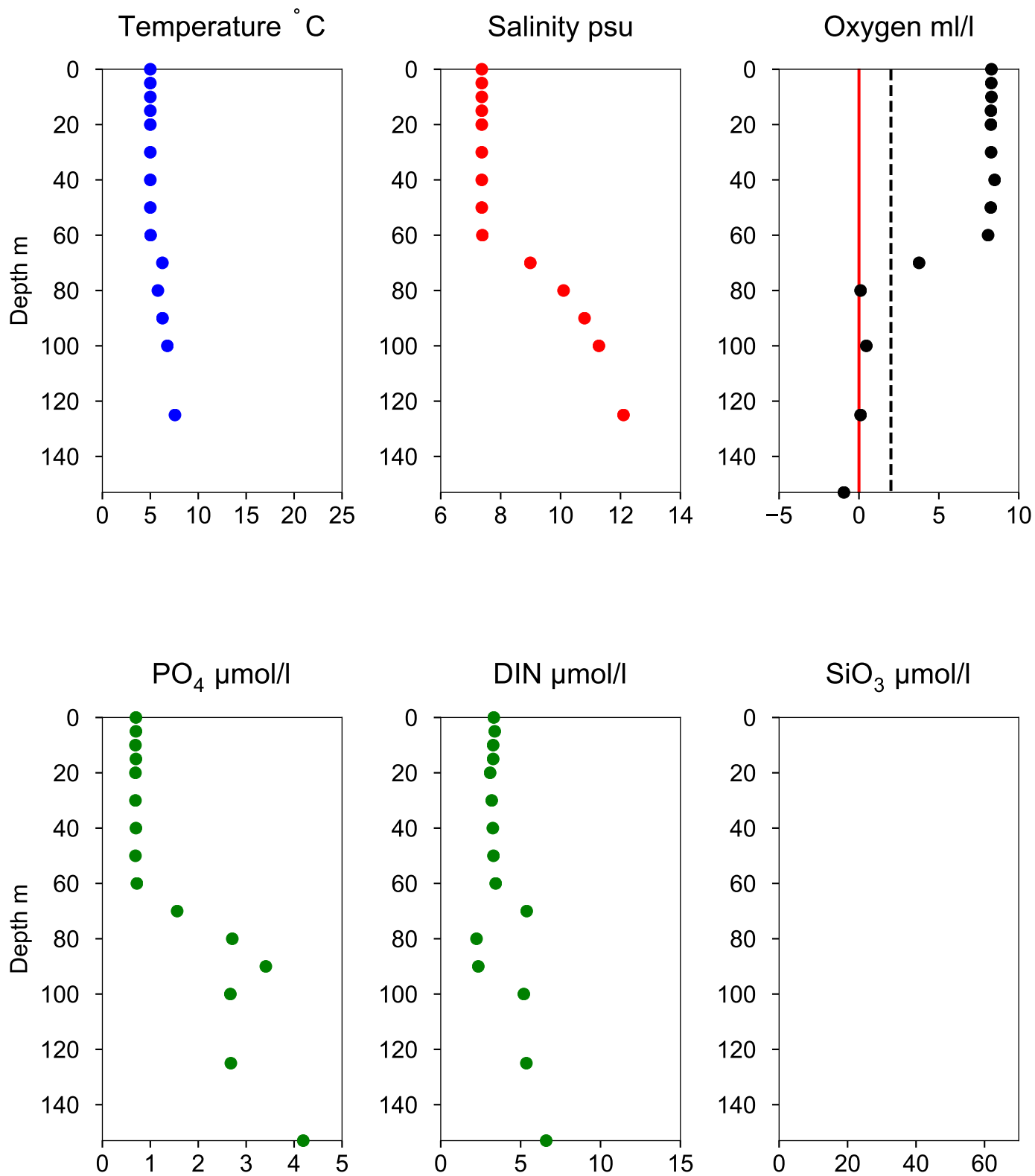
Vertical profiles BY11 February

● 2020-02-10



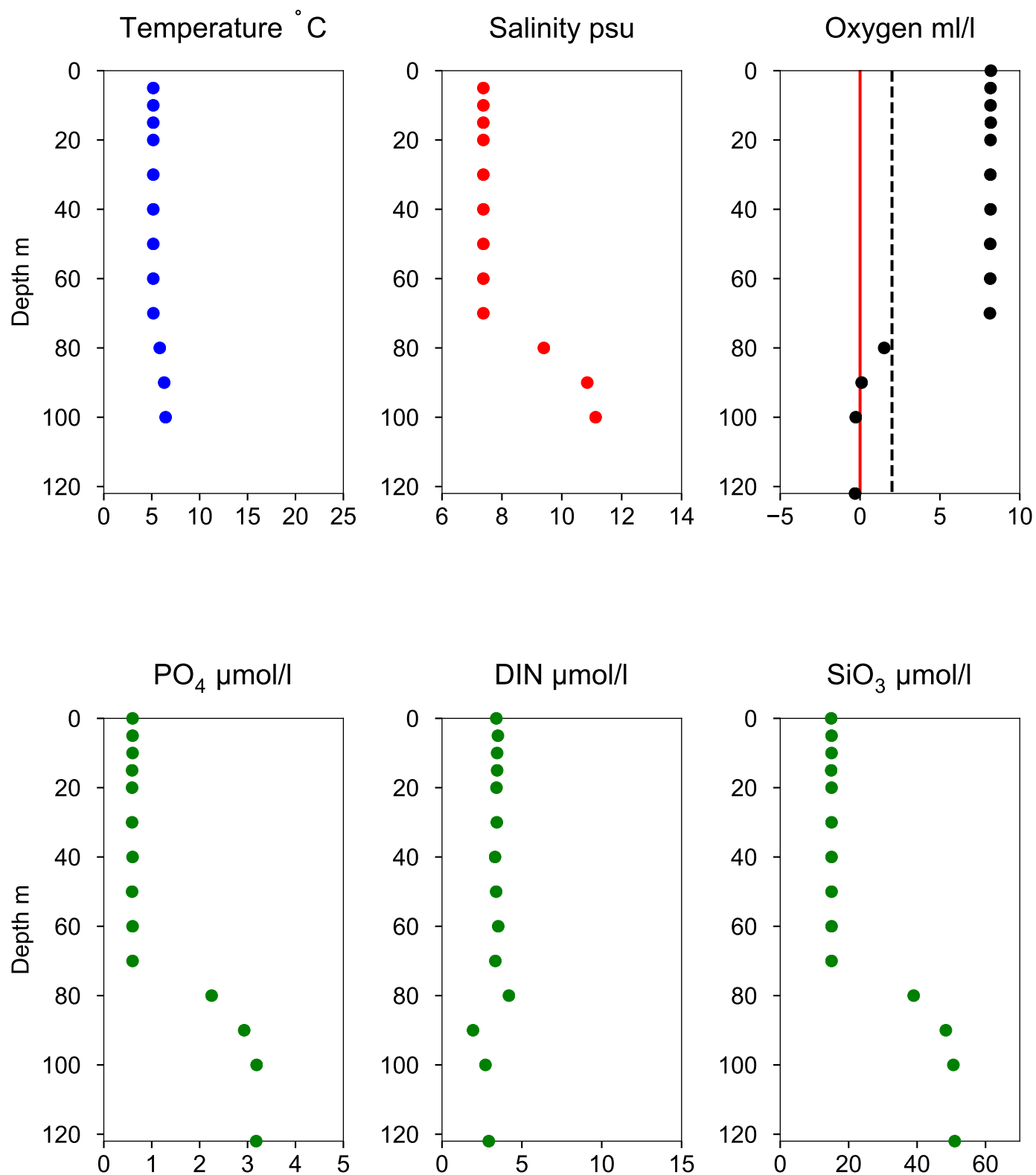
Vertical profiles BY19 February

● 2020-02-10



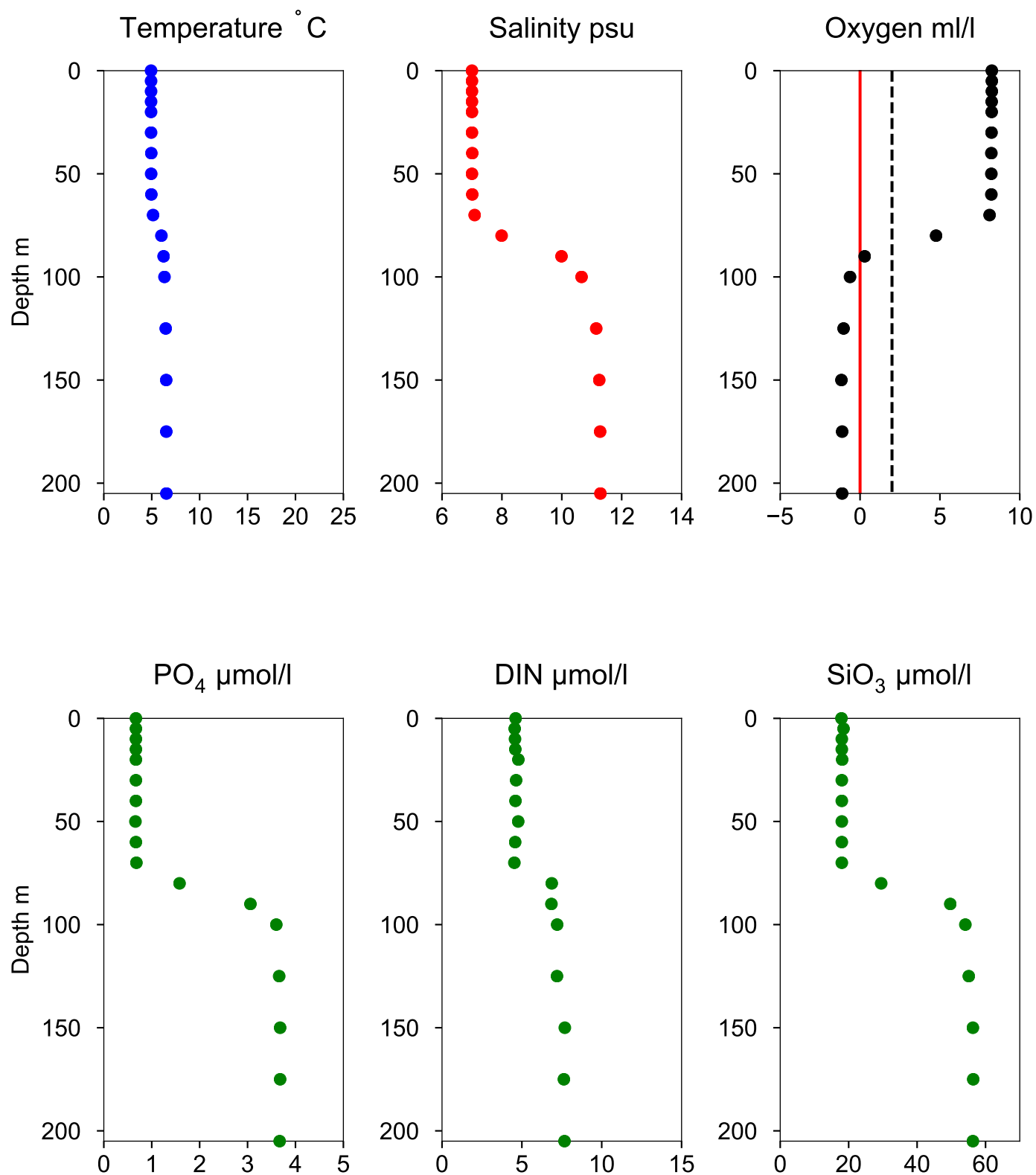
Vertical profiles BY21 February

● 2020-02-11



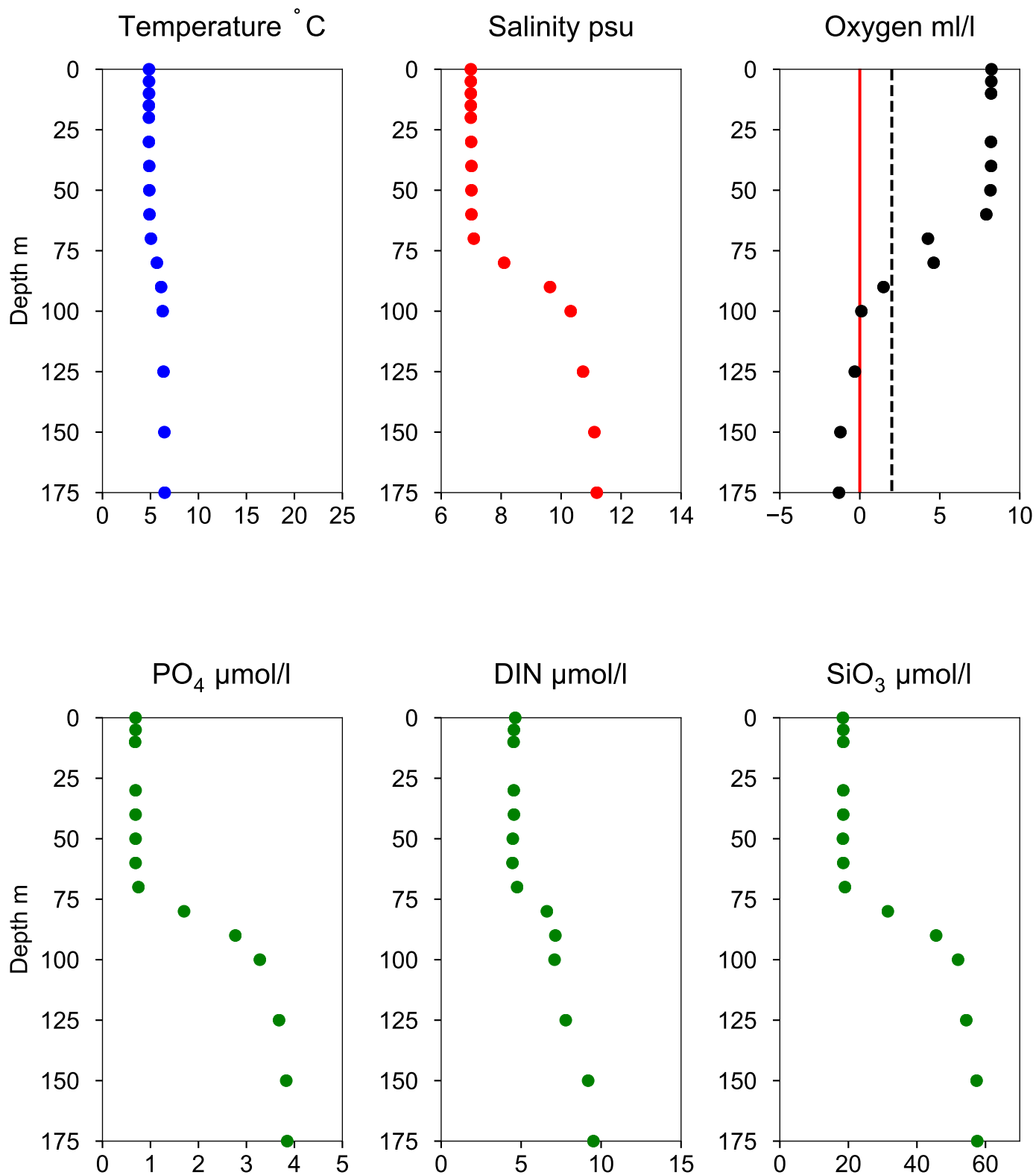
Vertical profiles BY28 February

● 2020-02-11



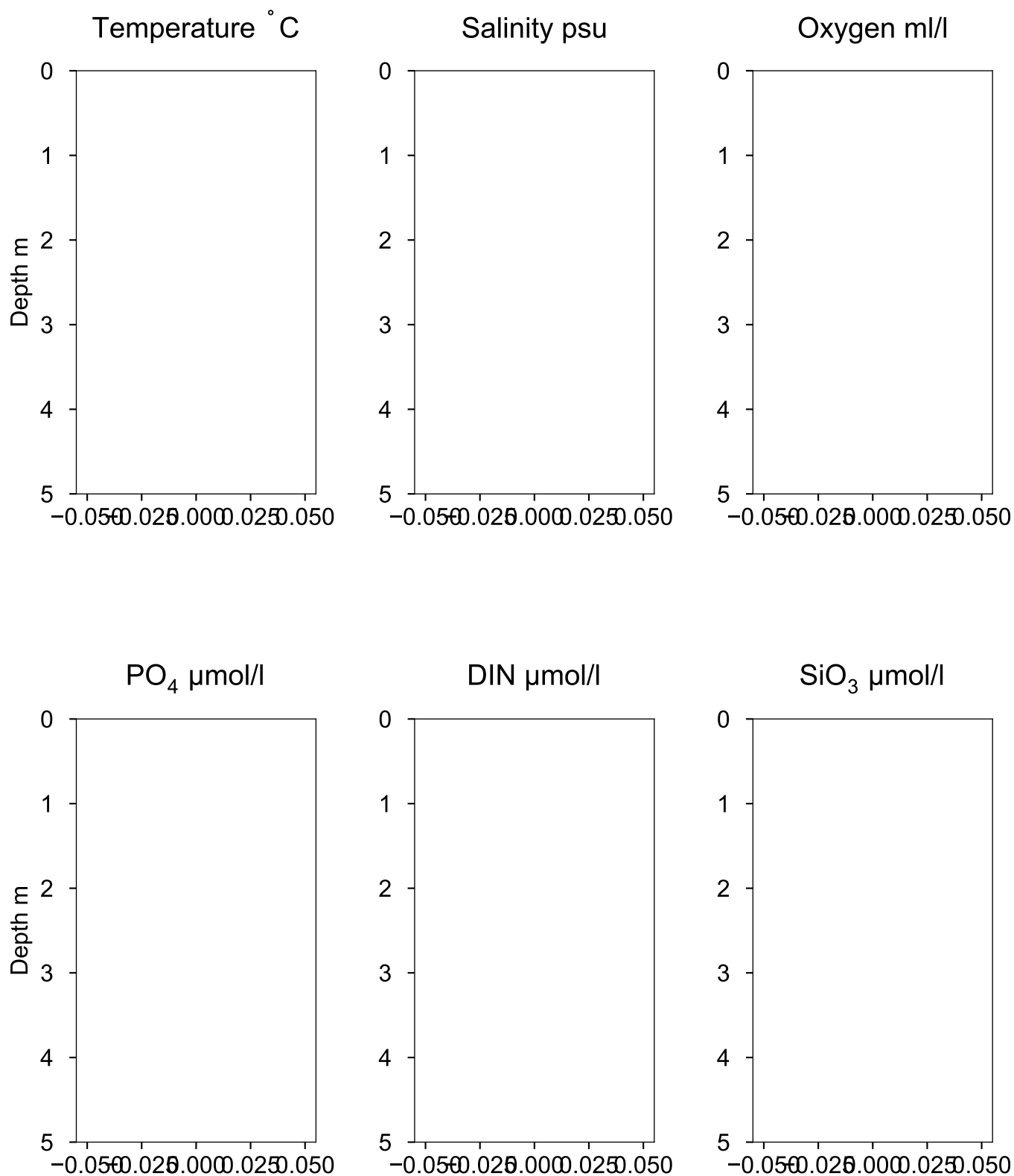
Vertical profiles BY27 February

● 2020-02-11



Vertical profiles February

● 2020-02-12



Vertical profiles BY39 ÖLANDS S UDDE February

● 2020-02-13

