

Report from SMHI's monitoring cruise with R/V Svea



Survey period: 2024-02-06 till 2024-02-13

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

Cooperation partners: Swedish University of Agricultural Sciences (SLU),
Swedish Maritime Administration (SMA)

SUMMARY

During the expedition, as part of the Swedish pelagic monitoring program, the Skagerrak, the Kattegat, the Sound and the Baltic Proper were visited. In the Baltic Proper extra stations were visited for the mapping of winter nutrients.

The temperature in the surface water was normal to slightly above normal and ranged from 2–3 °C in the Baltic Sea to 3–6 °C in the Skagerrak and Kattegat.

In Skagerrak, the concentration of dissolved inorganic nutrients had increased in the surface water and were normal for the month. Similarly, in Kattegat, nutrient levels were normal, but the concentration of DIN (dissolved inorganic nitrogen) had increased since January, while silicate had decreased and phosphate levels remained roughly the same. In the Baltic Proper, the concentration of nutrients had increased at most stations since January. The concentration of DIN was normal, and silicate was above normal throughout the Baltic Proper. The concentration of phosphate was normal in the Arkona, Bornholm, and Western Gotland Basins and above normal in the Eastern Gotland Basin and northern Baltic Proper.

The oxygen situation was good at all stations in Skagerrak, Kattegat, and the Sound; no oxygen deficiency was noted.

In the Arkona Basin, the oxygen situation was good in the bottom water, and the oxygen concentration had increased slightly since January. The inflow that occurred at the end of December 2023 could now be seen on its way through the Bornholm Basin; at stations BY4 and Hanö Bay, the oxygen concentration had decreased since January, but at BY5, there was instead a significant increase in oxygen in the bottom water compared to January. At BY5, the oxygen concentration just above the bottom was just below the oxygen deficiency limit (<4 ml/l), but above that, there was still a layer of acute oxygen deficiency (<2 ml/l). In the Eastern Gotland Basin there were anoxic conditions, hydrogen sulphide was measured from 70 m, with acute oxygen deficiency from 60 m. In the northern Baltic Proper, there were anoxic conditions from 90 m and acute oxygen deficiency from 80 m. In the Western Gotland Basin, the depth levels for anoxic conditions and acute oxygen deficiency varied from 125 and 90 m at BY31 to 70 and 60 m at BY38, respectively.

SMHI's next regular expedition with R/V Svea is scheduled for March 8th to 13th, starting in Kalmar and ending in Lysekil.

RESULT

The expedition was carried out on board the R/V Svea, starting in Lysekil on February 6th and ending in Västervik on February 13th. The weather during the expedition was cloudy with initially light winds from varying directions, increasing winds from the east for a couple of days in the southern and eastern Baltic Sea. The air temperature ranged between -2 and +2 °C throughout the week.

Almost all planned stations were sampled, 44 out of the planned 46 stations. Four additional stations with CTD measurements were conducted around Bornholm to record the inflow that occurred in December 2023. The annual winter nutrient mapping in the Baltic Proper was carried out.

Svea's underway profiling instrument, MVP, was operated at a couple of transects in the southern Baltic Sea and one station in the Western Gotland Basin. Additionally, the Ferrybox system and ADCP were continuously operated throughout the expedition.

The MVP system that was lost in the Kattegat in December was recovered during this expedition.

This report is based on data that has undergone initial quality control and is compared to monthly means from the period 1991 - 2020. When additional quality control has been performed, certain values may change. Values in the report have been rounded and can differ a bit from values published in the data base. Data from this cruise are published as soon as possible on the data host's website, this usually takes place within a week after the cruise has ended. Some analyses are made after the cruise and are published later.

Data can be downloaded here:

<https://www.smhi.se/en/services/open-data/national-archive-for-oceanographic-data/download-data-1.153150>

Skagerrak

The temperature in the surface water was normal to slightly above normal for the season, ranging from 4 to 6 °C. The salinity in the surface water varied between 31–33 psu and was normal along the Å-transect, slightly above normal closer to the coast at Släggö, and also at station P2. At stations Å17 to Å15, the surface was well mixed down to 30–40 metres where the thermocline and halocline coincided. Closer to the coast, this stratification occurred nearer to the surface, around 5–10 metres, and at P2, there was a stratification at 5 metres followed by a well-mixed layer down to 20 metres. At Å17, furthest out in the Å-transect, the temperature increased down to 100 metres, below which there was a layer of colder water that then became warmer again at 200 metres.

Stations Å17 and Å15 were not sampled in January, but at the other stations in Skagerrak, the concentration of dissolved inorganic nutrients in surface water had increased in February compared to the previous sampling occasion. DIN (dissolved inorganic nitrogen) ranged from 6.2–15.2 µmol/l, phosphate from 0.6–0.7 µmol/l, and silicate from 4.6–12.2 µmol/l. The lowest concentrations were measured in the outer parts of the Å-transect and higher concentrations closer to the coast. The concentrations were normal for the month except at station P2, where they were above normal.

The oxygen situation was good at all stations in Skagerrak, with normal values for the season, ranging between 5.8–6.9 ml/l.

Chlorophyll fluorescence is a measure of plankton activity measured with a sensor mounted on the CTD¹. No strong chlorophyll fluorescence peaks were measured, but some activity was noted at all stations in the well-mixed surface layer.

Kattegat and the Sound

The temperature in the surface water had increased slightly since January and was around 3–4 °C. At Fladen and Anholt E, it was slightly above normal for the season. The salinity in the surface water was above normal, increasing from 26.6 psu at Anholt E to 30.2 psu at Fladen. In the Sound, the salinity was normal, 16.5 psu. The thermocline and halocline coincided around 20–30 metres. At the coastal station N14 Falkenberg, there was also shallower stratification at 5 metres.

The concentration of inorganic nutrients in the surface water was within normal range in the Kattegat. In the Sound, DIN and silicate were above normal. DIN levels had increased since January and were between 6.6 and 8.3 µmol/l. Silicate levels had decreased (8.7–15.1 µmol/l), and phosphate levels were approximately the same (0.6 µmol/l).

Oxygen levels in the bottom water of the Kattegat were normal for the season, around 6 ml/l at all stations.

Chlorophyll fluorescence was higher in the surface water in the Kattegat compared to Skagerrak, with the highest levels at N14 Falkenberg and Anholt E. At Anholt E, there was also a chlorophyll fluorescence peak around 12 metres.

¹ The CTD is a profiling measuring instrument and stands for Conductivity, Temperature, Depth. SMHI's CTD is also equipped with sensors that measure oxygen and fluorescence, among other parameters.

The Baltic Proper

The temperature in the surface layer was normal for the month at all stations in the Baltic Proper, ranging between 2 and 3.5 °C. It was coldest in the Western Gotland Basin. The salinity in the surface layer varied from a minimum of 6.8 psu in the Western Gotland Basin to a maximum of 8.2 psu in the Arkona Basin. Salinity was above normal in the Eastern Gotland Basin and in the northern Baltic Proper. In other parts, it varied from below normal to above normal at different stations. In the Arkona Basin, the water was well-mixed down to 25 metres where the thermocline and halocline coincided. In the Bornholm Basin, the well-mixed surface layer extended down to 40–50 metres, in the Eastern and Western Gotland Basins 50–60 metres.

At most stations, the concentration of nutrients had increased in the surface water since January. The concentration of dissolved inorganic nitrogen was normal in the surface layer, ranging around 2.9–4.9 µmol/l. The concentration of phosphate was normal in the Arkona, Bornholm, and Western Gotland Basins and above normal in the Eastern Gotland Basin and northern Baltic Proper. Phosphate concentrations varied around 0.66–0.86 µmol/l. The concentration of silicate was above normal throughout the Baltic Proper, 16–20 µmol/l.

In the Arkona Basin, the oxygen situation was good in the bottom water, and the oxygen concentration had increased slightly since January. The inflow that occurred at the end of December 2023 could now be seen on its way through the Bornholm Basin; at stations BY4 and Hanö Bay, the oxygen concentration had decreased since January, but at BY5, there was instead a significant increase in oxygen in the bottom water compared to January. At BY5, the oxygen concentration just above the bottom was just below the oxygen deficiency limit (<4 ml/l), but above that, there was still a layer of acute oxygen deficiency (<2 ml/l). In the Eastern Gotland Basin, there was anoxic conditions, and hydrogen sulphide was measured from 70 metres, with acute oxygen deficiency from 60 metres. In the northern Baltic Proper, there was anoxic conditions from 90 metres and acute oxygen deficiency from 80 metres. In the Western Gotland Basin, the depth levels for anoxic conditions and acute oxygen deficiency varied from 125 and 90 metres respectively at BY31 to 70 and 60 metres at BY38.

More information about the algal situation can be found in the Algaware-report for December:
<https://www.smhi.se/publikationer/publikationer/algrapporter> (Only available in Swedish).

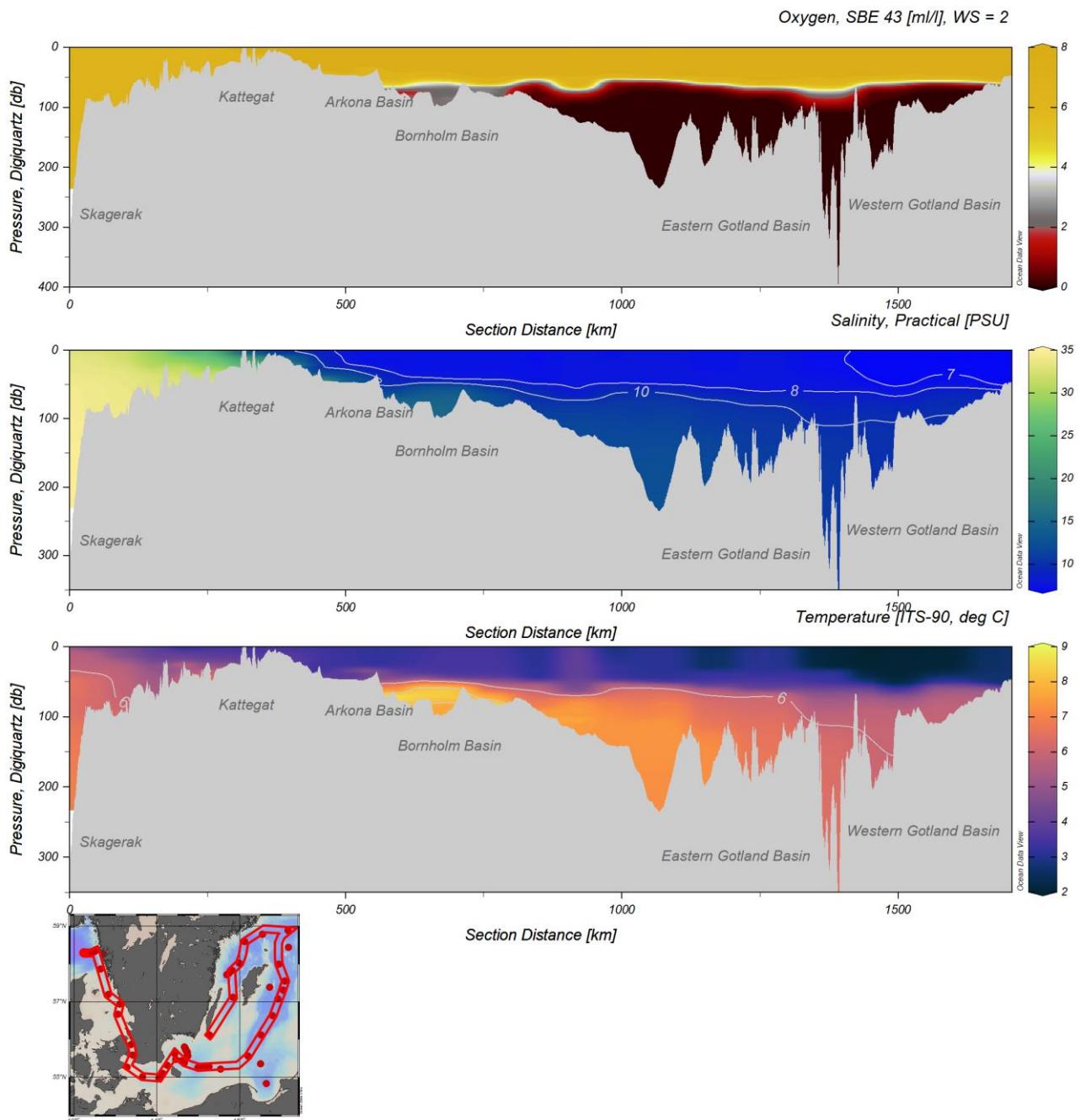


Figure 1. Transect showing oxygen concentration, salinity and temperature measured with CTD, and MVP, stretching from Skagerrak through Kattegat and the Sound, into the Baltic Proper.

SMHI marine monitoring February 2024
DIN in the surface water (0-10 m)

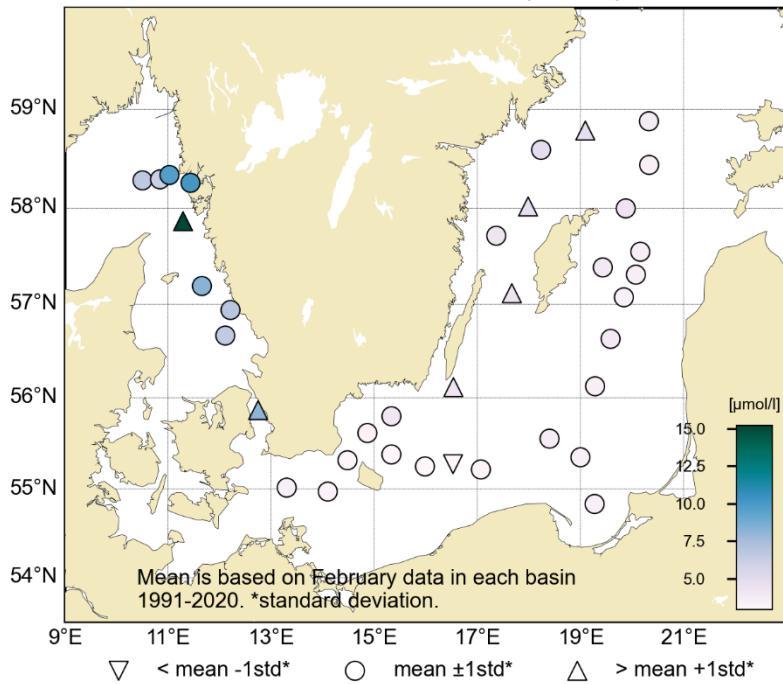


Figure 2. Concentration ($\mu\text{mol/l}$) of dissolved inorganic nitrogen (DIN) in the surface water (0-10m). Mean is based on data from the month within each basin during the years 1991 – 2020.

SMHI marine monitoring February 2024
Phosphate in the surface water (0-10 m)

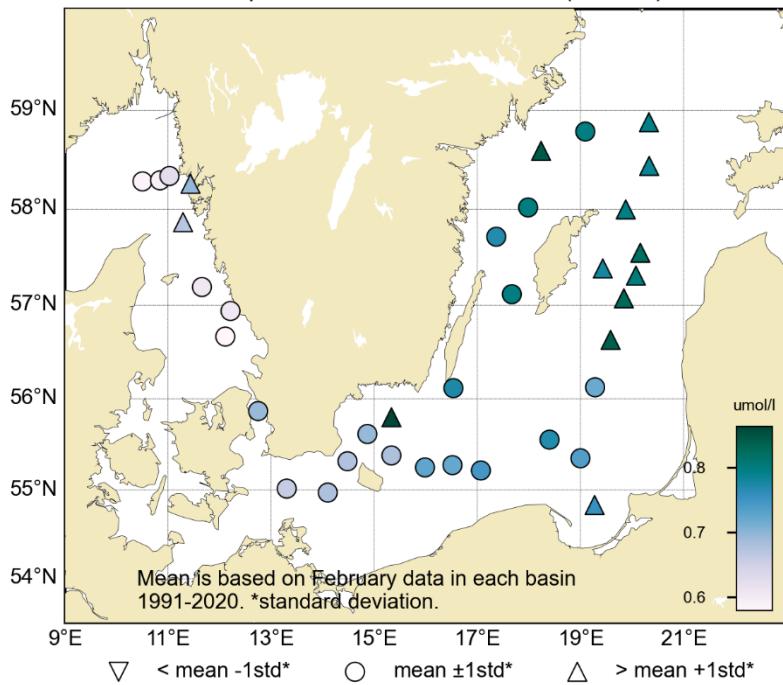


Figure 3. Concentration ($\mu\text{mol/l}$) of phosphate in the surface water (0-10m). Mean is based on data from the month within each basin during the years 1991 – 2020.

SMHI marine monitoring February 2024
Silicate in the surface water (0-10 m)

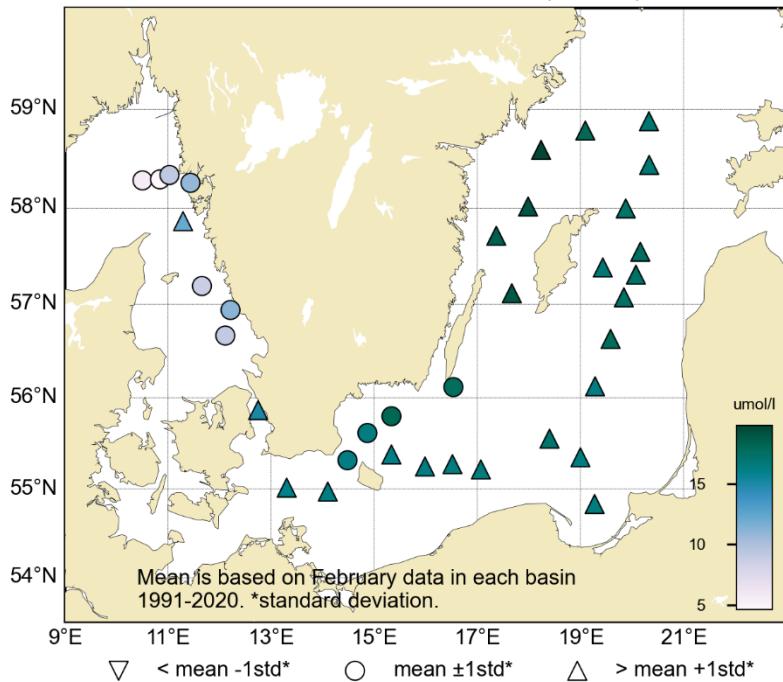


Figure 4. Concentration ($\mu\text{mol/l}$) of silicate in the surface water (0-10m). Mean is based on data from the month within each basin during the years 1991 – 2020.

Bottom water oxygen concentration (ml/l)

Ship: R/V Svea
Date: 20240206-20240213
Series: 0118-0161

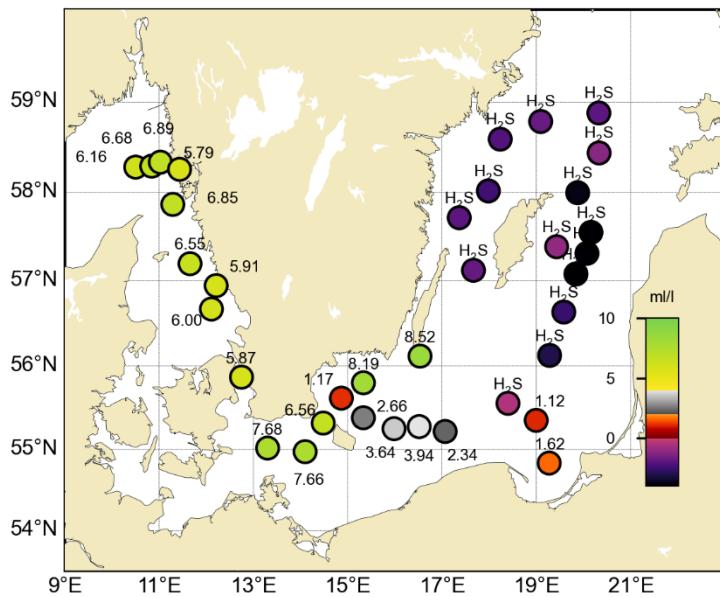


Figure 5. Dissolved oxygen concentration in ml/l in the bottom water, approximately 1 metre above the seabed. Note that the values have not been compared to statistics in the same way as in figures 2–6, that's why only circles are shown.

SMHI marine monitoring February 2024
Temperature (CTD) in the surface water (0-10 m)

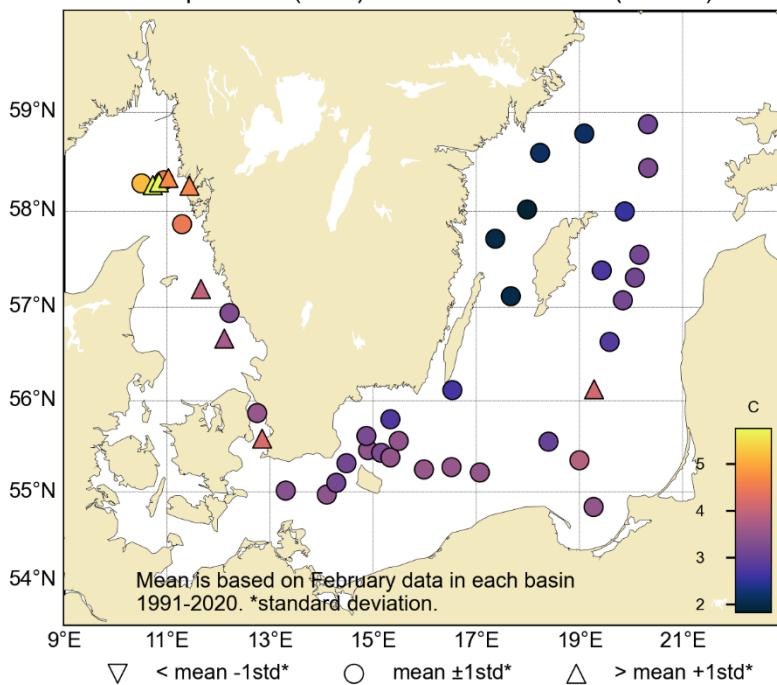


Figure 6. Temperature in the surface water (0-10m). Mean is based on data from the month within each basin during the years 1991 – 2020.

SMHI marine monitoring February 2024
Salinity (CTD) in the surface water (0-10 m)

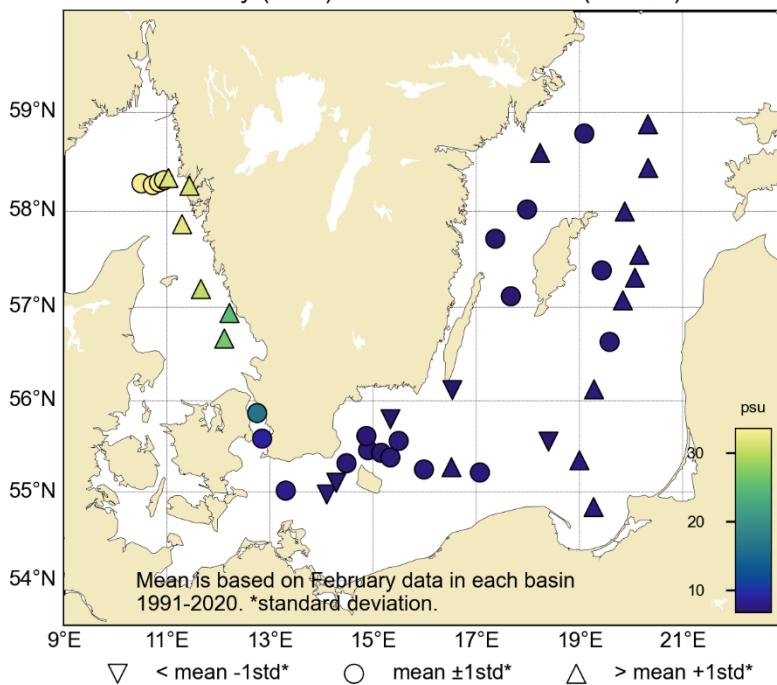


Figure 7. Salinity in the surface water (0-10m). Mean is based on data from the month within each basin during the years 1991 – 2020.

PARTICIPANTS

Name	Role	From
Sara Johansson	Cruise leader, Marine chemist	SMHI
Ann-Turi Skjevik	Marin biologist	SMHI
Sari Sipilä	Chemist	SMHI
Daniel Bergman Sjöstrand	Marine technician	SMHI
Monica Linder	Chemist	SMHI

APPENDICES

- Track chart
- Table over stations, analysed parameters and number of sampling depths
- Monthly average surface water plots for regular monitoring stations
- Vertical profiles for regular monitoring stations



SMHIs provtagningsstationer

- Högfrekvent, 24 ggr/år
- Frekvent, 12 ggr/år
- Lågfrekvent kartering, 1 g/år
- ◆ Havsboj
- ▲ Bottenvärtsystem

Å17 Å15 Å13 Lysekil
Å16 Å14 SLÄGGÖ

FLADEN

N14 FALKENBERG

ANHOLT E

W LANDSKRONA

HANÖBUKTEN

BY1 BY2

Gävle

Västervik

Kalmar

REF M1V1

BY39

BY5

BY4

BCS III-10

HUVUDSKÄRSBOJEN

BY31

BY29

BY32

BY20

BY15

BY10

Date: 2024-02-16
Time: 13:31

Ship: 77SE
Year: 2024

Date: 2024-02-16
Time: 13:31

Ship: 77SE
Year: 2024

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 C	Air temp °C	Air vel hPa	WCWI	CZPP	No elac	No hohp	T de	T btl	S e	S a	P x	D x	H t	P t	P r	N o	N o	N t	N t	A h	A o	A o	A r	A n	A n	A n	S u	H c
0153	04	BPEX25	BAS...	BY19	5733.03	02009.66	20240212	0500	161	07	12	1.0	1003	9990	---	15	15	-	x	-	x	x	x	x	x	x	x	x	x	x	-	-	x						
0154	04	BPEX26	BAS...	BY20	FÅRÖDJ	5759.88	01952.70	20240212	0915	198	11	16	0.3	1004	2840	x---	17	17	-	x	-	x	x	x	x	x	x	x	x	-	-	-	-						
0155	04	BPNX27	BAS...	BY21		5826.51	02019.96	20240212	1340	122	09	15	-05	1005	2840	---	14	14	-	x	x	-	x	x	x	x	x	x	x	-	-	-	-						
0156	04	BPNX35	BAS...	BY29	/ LL19	5852.91	02019.67	20240212	1715	177	09	18	0.2	1006	9950	x-x-	16	16	-	x	-	x	x	x	x	x	x	x	-	-	-	-							
0157	04	BPNX36	BAS...	BY30		5847.32	01905.64	20240212	2140	186	08	12	0.5	1006	9950	---	16	16	-	x	-	x	x	x	x	x	x	x	-	-	-	-							
0158	04	BPNX37	BAS...	BY31	LANDSORTSBJ	5835.64	01814.16	20240213	0230	451	09	9	1.1	1006	9990	xxx-	23	23	-	x	x	x	x	x	x	x	x	x	x	-	-	-	-						
0159	04	BPWX38	BAS...	BY32	NORRKÖPINGSDJ	5801.09	01759.06	20240213	0710	203	10	2	1.5	1006	2840	x--	17	17	-	x	-	x	x	x	x	x	x	x	-	-	-	-							
0160	04	BPNX42	BAS...	BY36		5742.99	01722.02	20240213	1145	141	11	30	10	-0.1	1008	7840	x-x	15	15	x	x	-	x	x	x	x	x	x	x	x	-	-	-	-					
0161	04	BPNX45	BAS...	BY38	KARLSÖDJ	5707.01	01740.11	20240213	1640	110	27	9	1.8	1013	9990	x-x-	14	14	x	x	-	x	x	x	x	x	x	x	-	x	x	-	-						

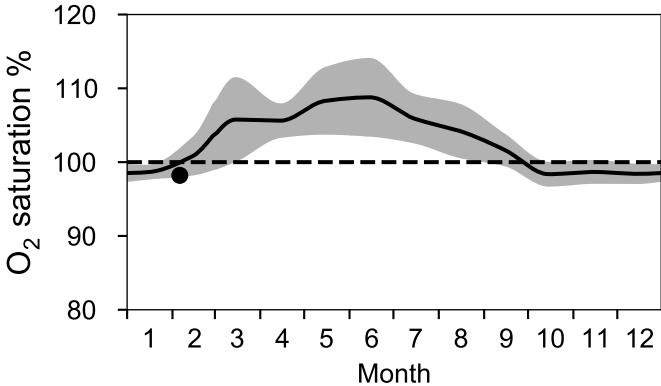
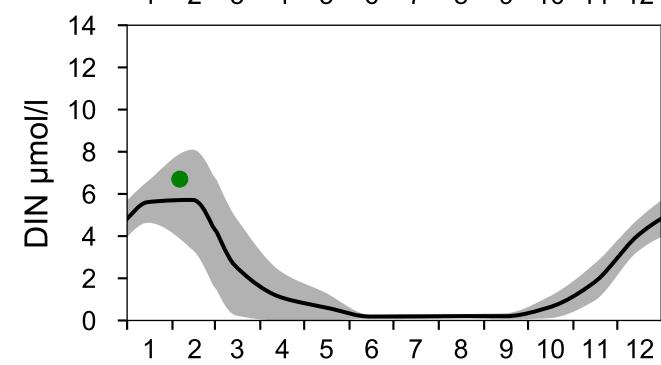
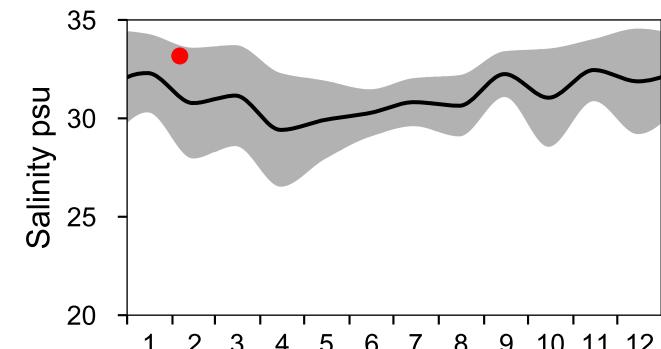
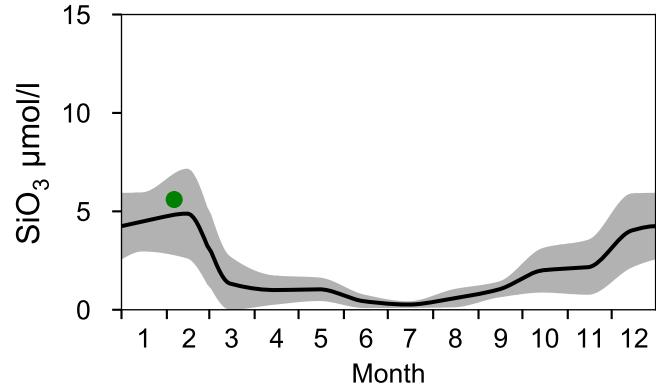
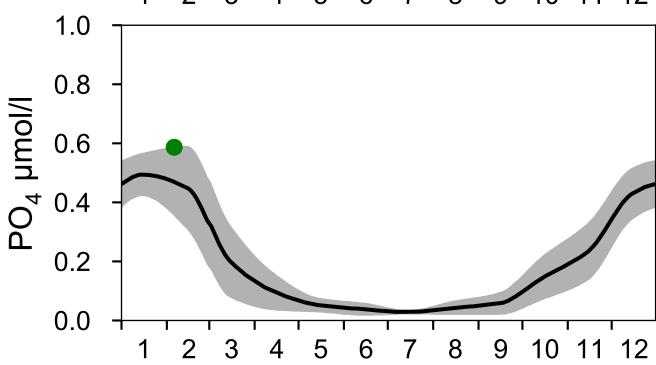
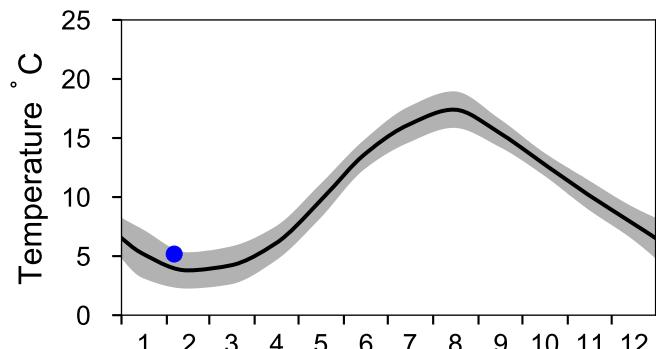
STATION Å17 SURFACE WATER (0-10 m)

Annual Cycles

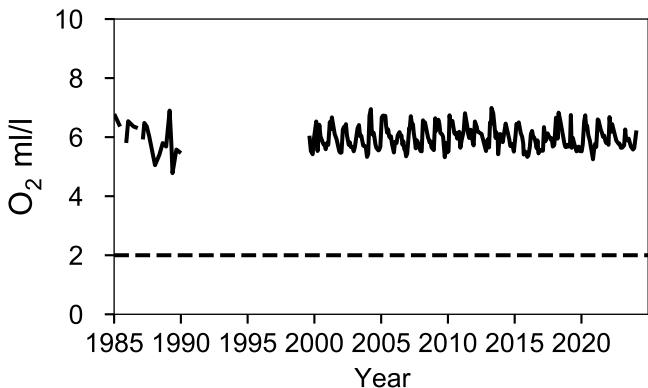
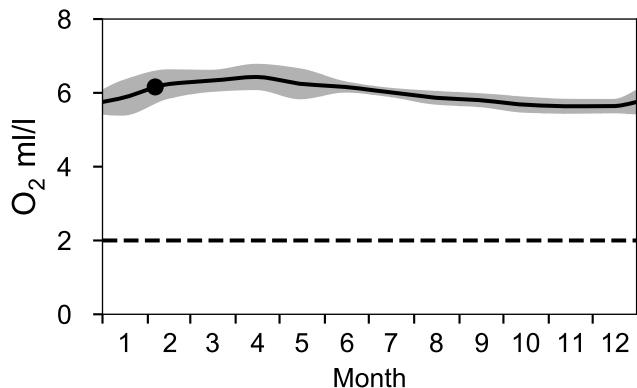
— Mean 1991-2020

St.Dev.

● 2024

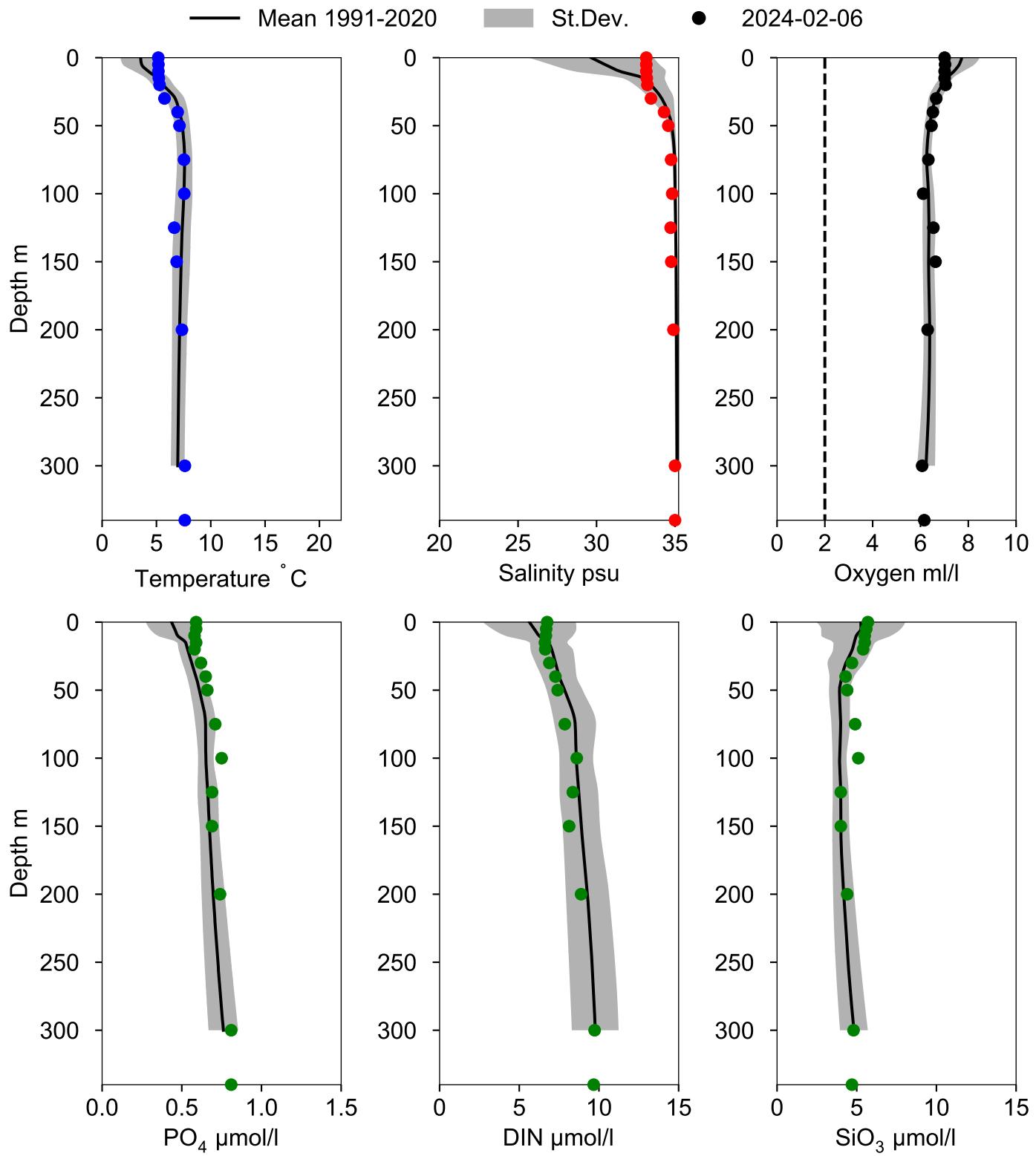


OXYGEN IN BOTTOM WATER (depth \geq 300 m)



Vertical profiles Å17

February



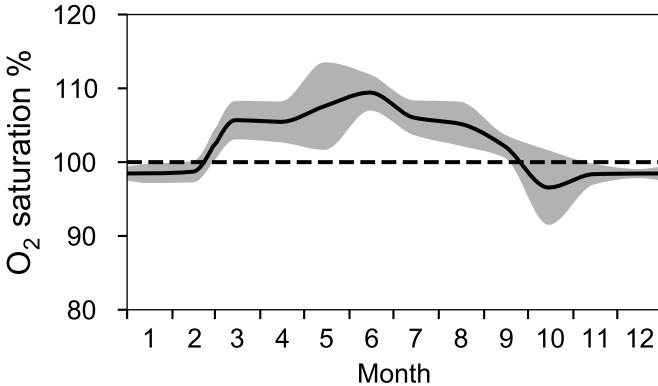
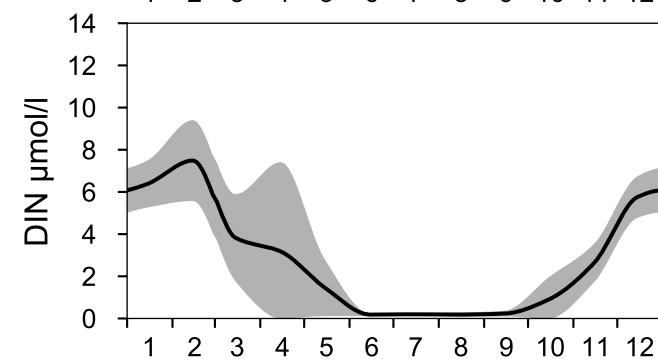
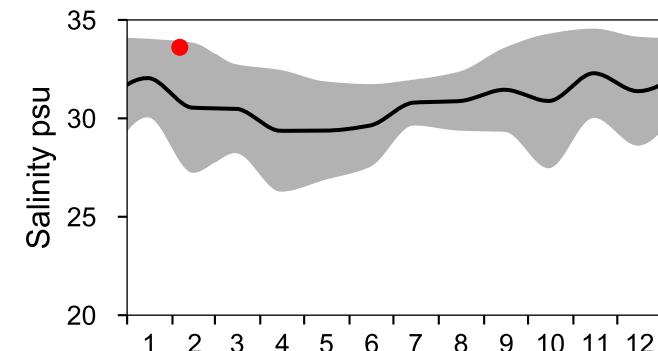
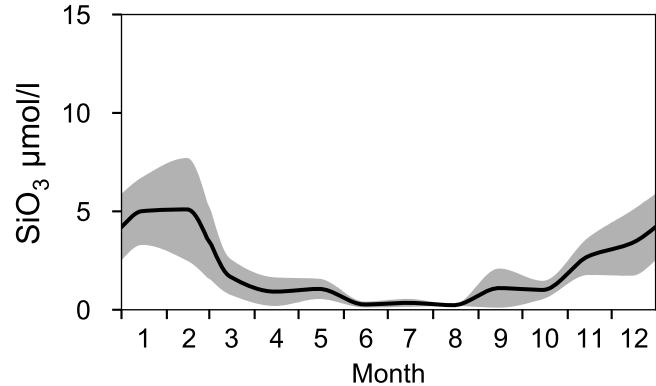
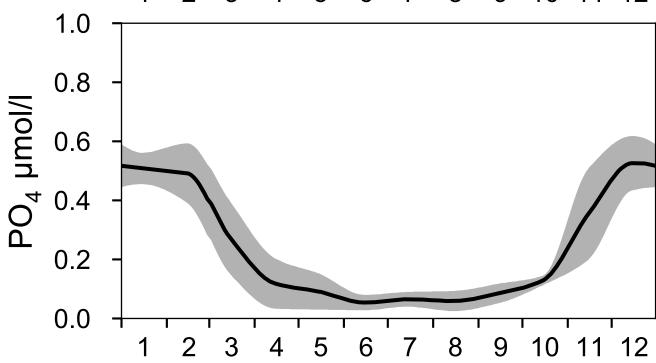
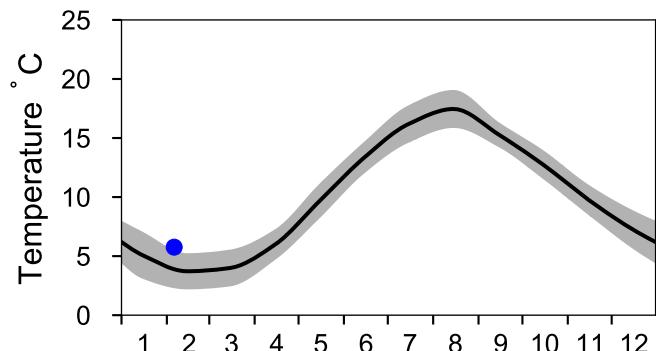
STATION Å16 SURFACE WATER (0-10 m)

Annual Cycles

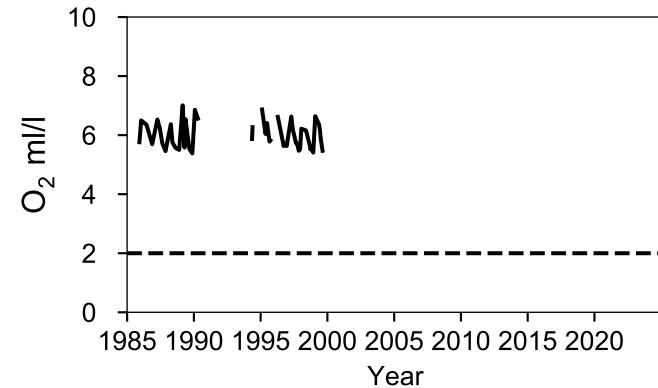
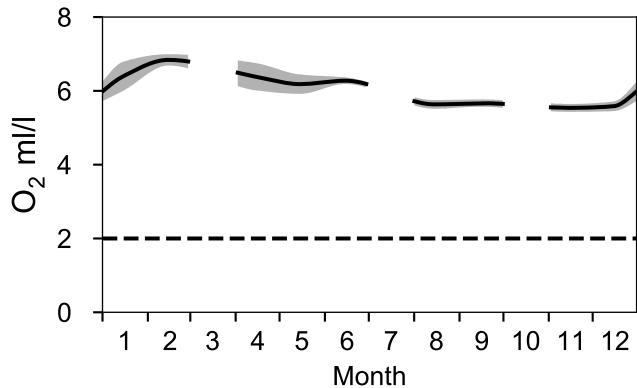
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St.Dev.

● 2024

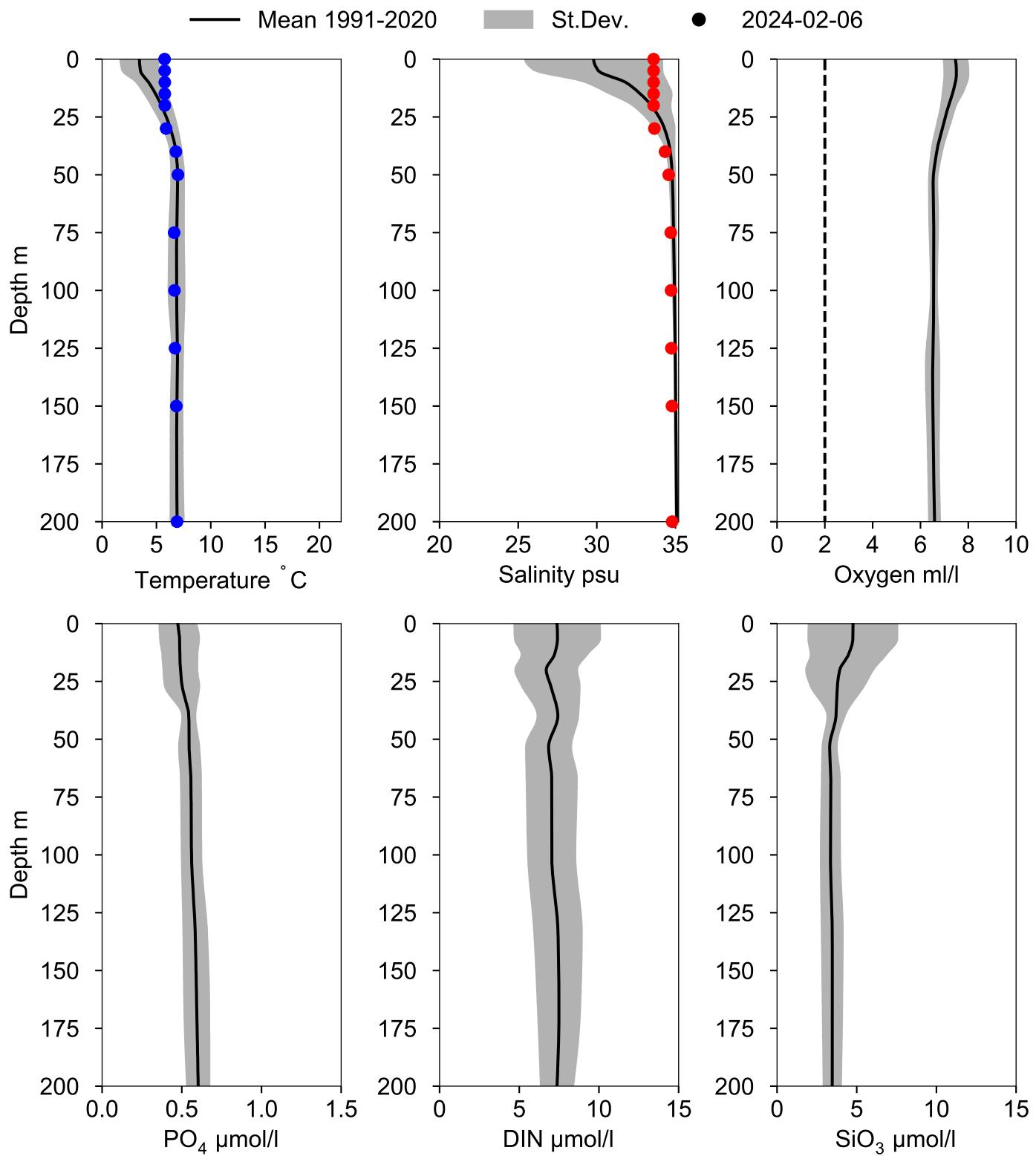


OXYGEN IN BOTTOM WATER (depth \geq 193 m)



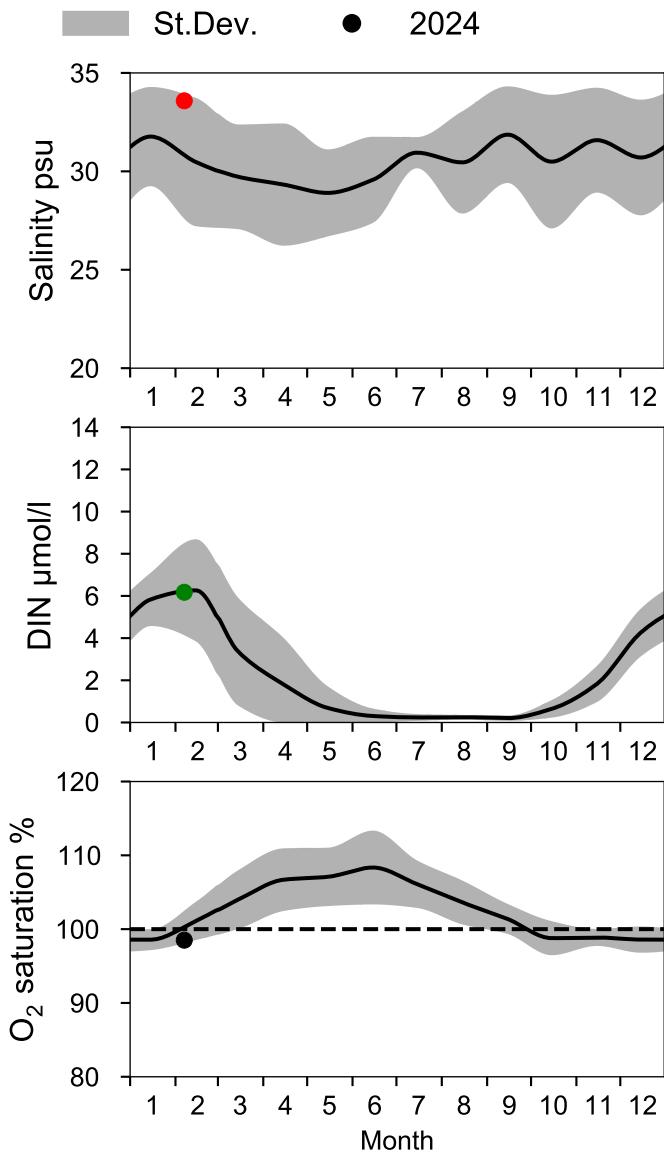
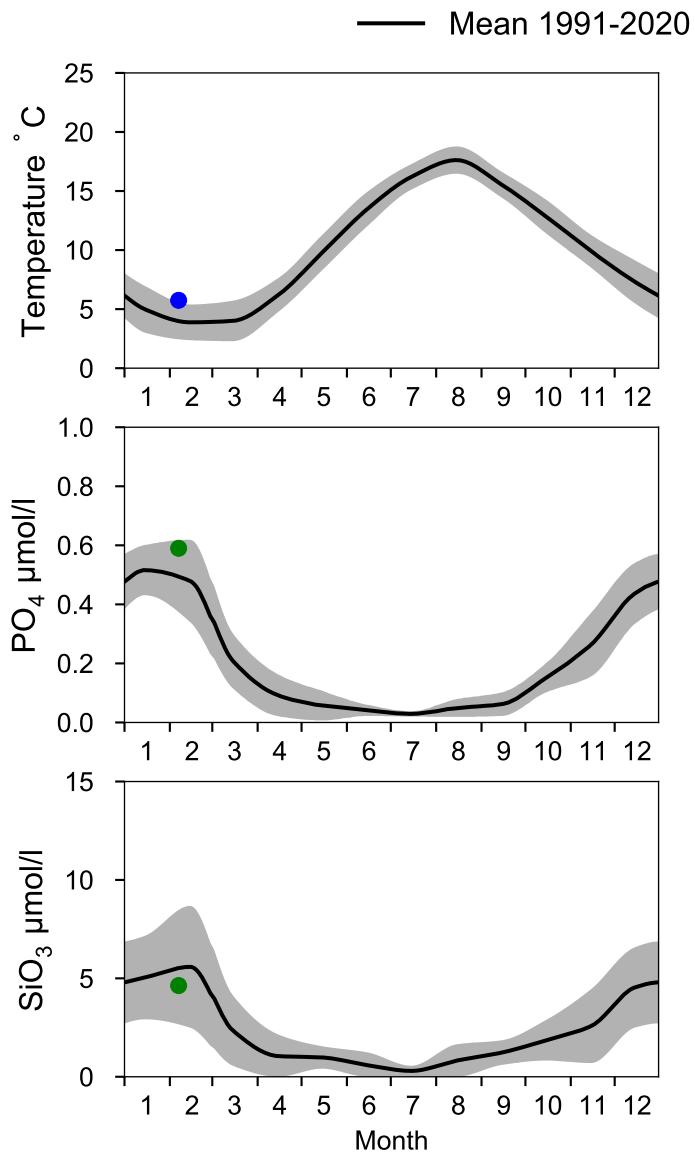
Vertical profiles Å16

February

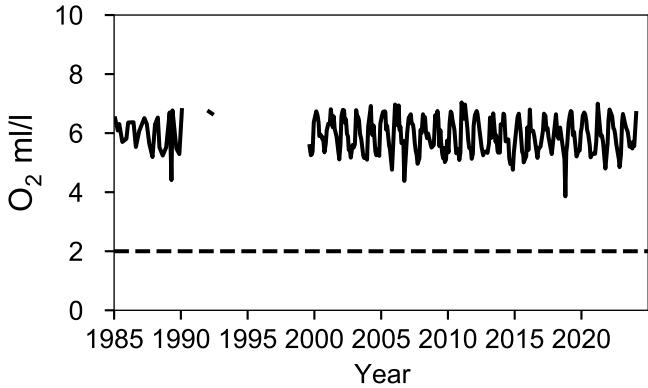
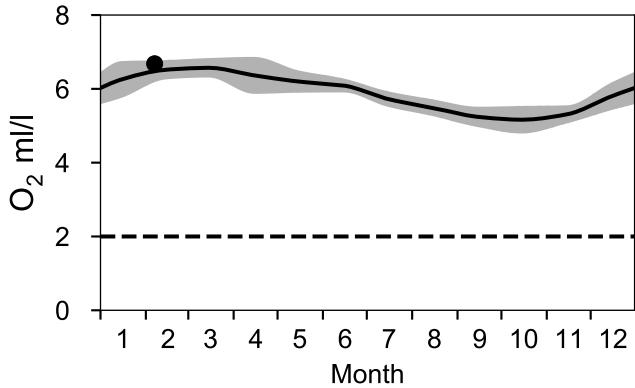


STATION Å15 SURFACE WATER (0-10 m)

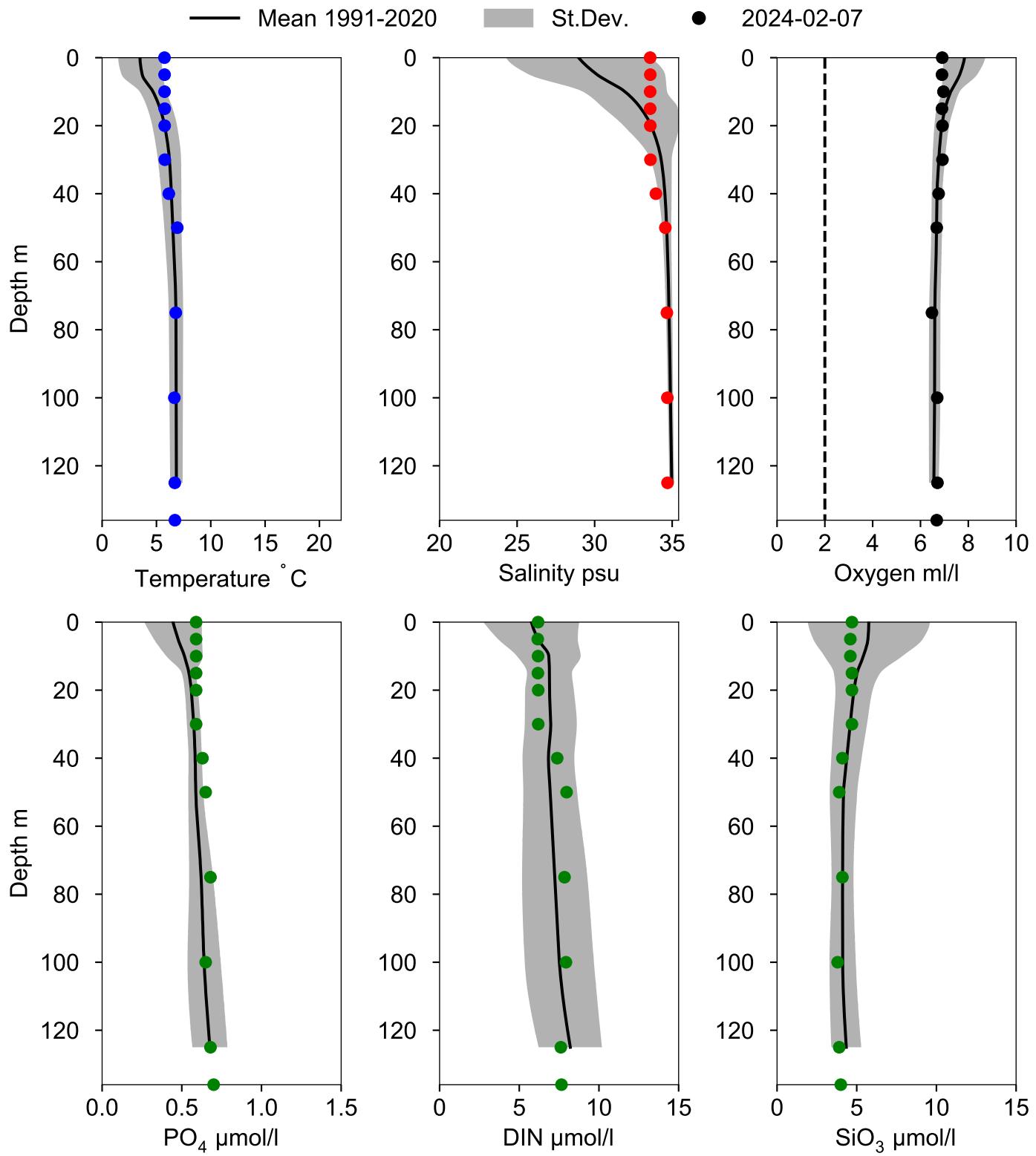
Annual Cycles



OXYGEN IN BOTTOM WATER (depth >= 125 m)



Vertical profiles Å15 February



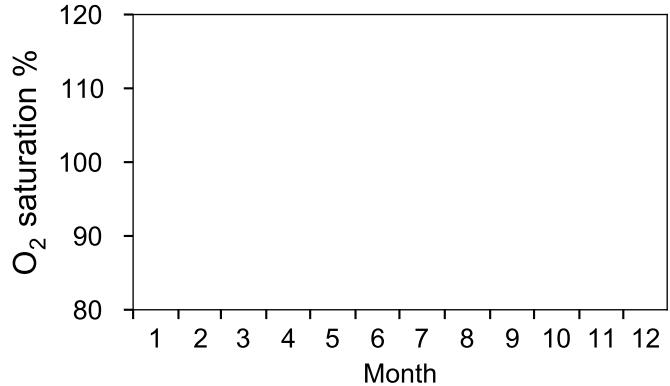
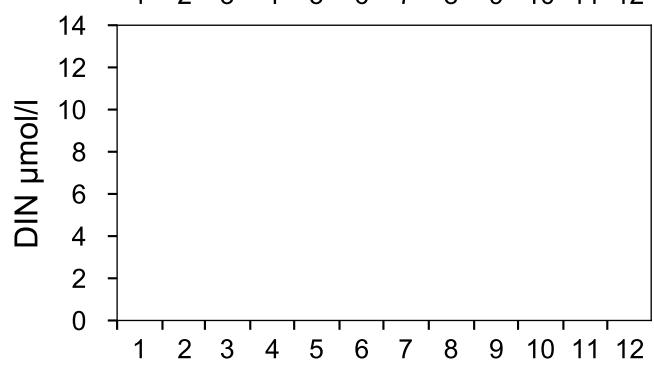
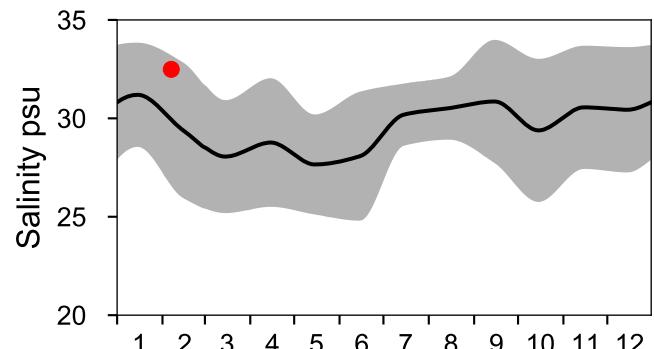
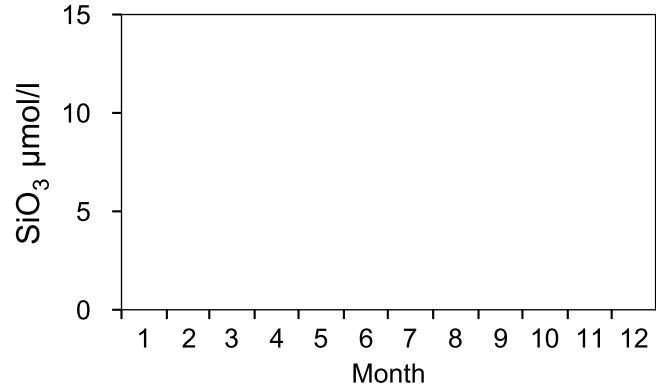
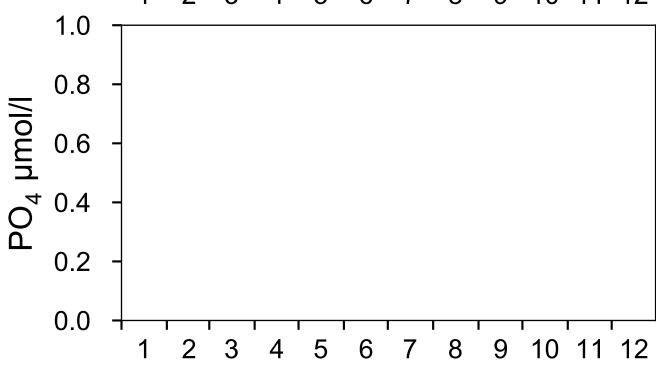
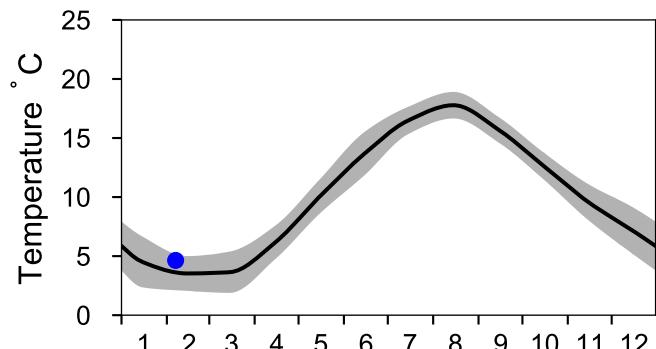
STATION Å14 SURFACE WATER (0-10 m)

Annual Cycles

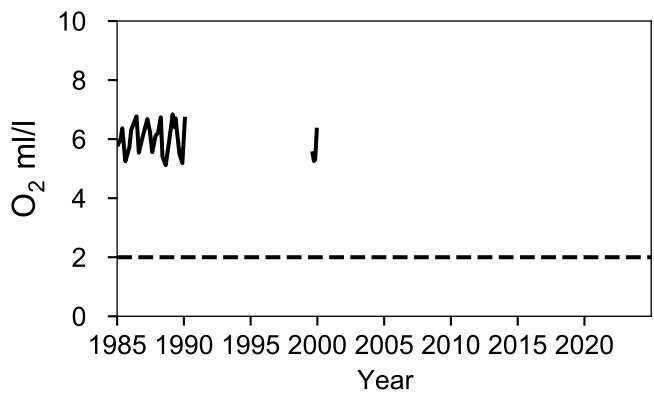
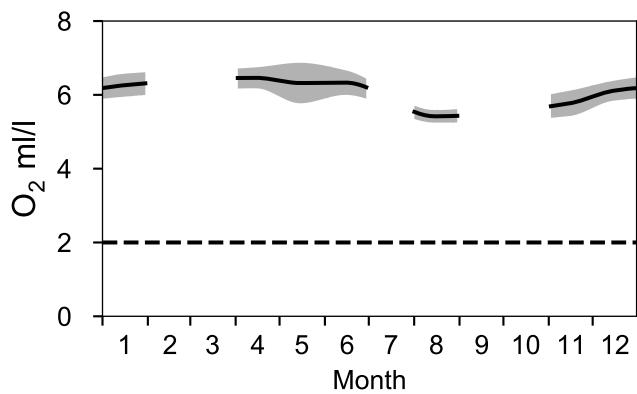
— Mean 1991-2020

St.Dev.

● 2024

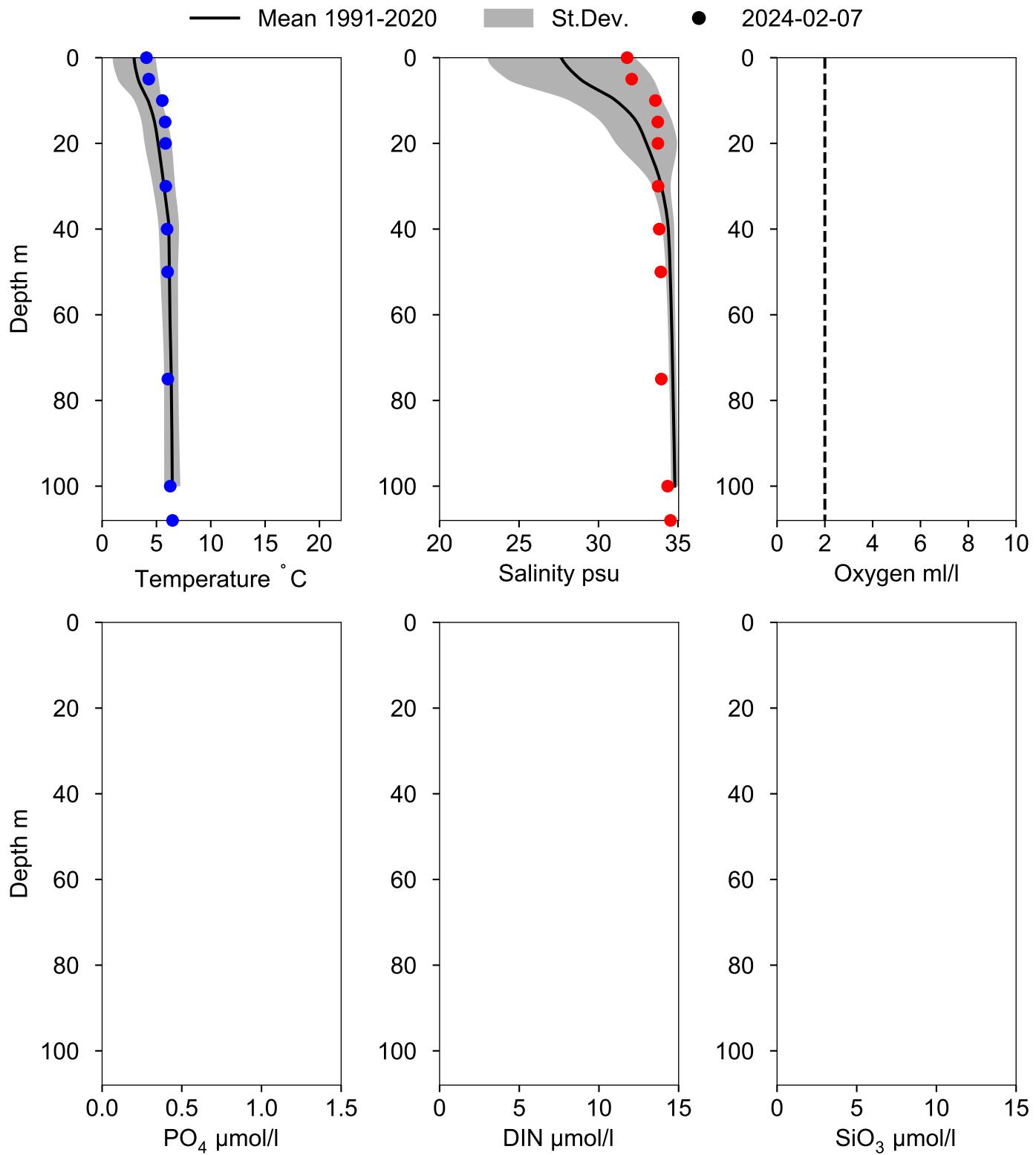


OXYGEN IN BOTTOM WATER (depth $\geq 100 \text{ m}$)



Vertical profiles Å14

February



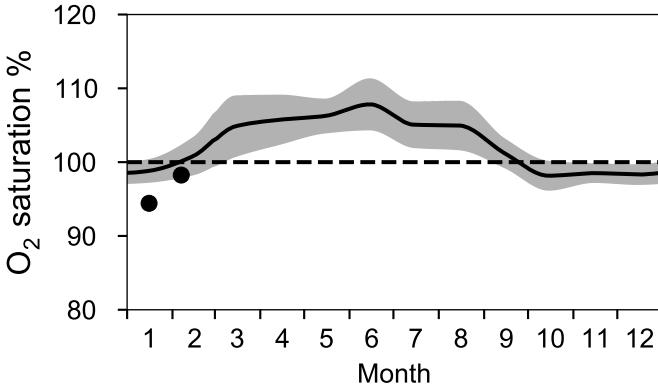
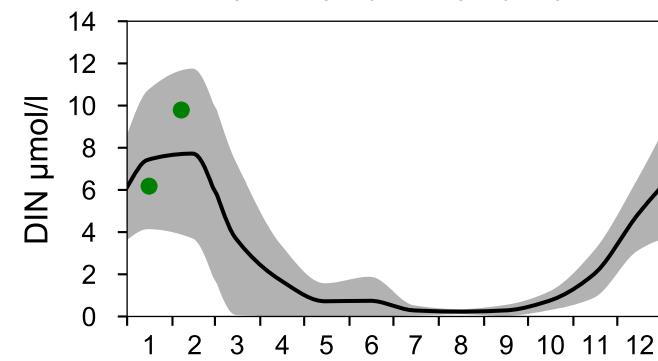
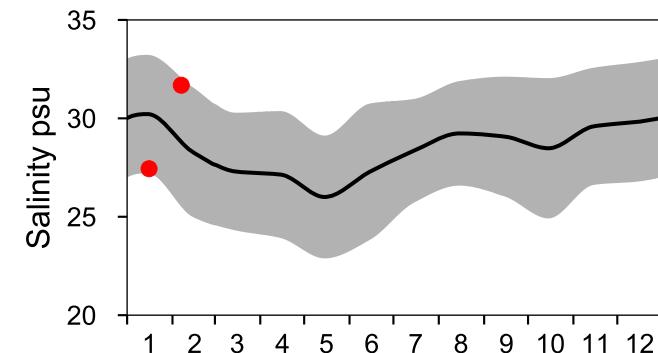
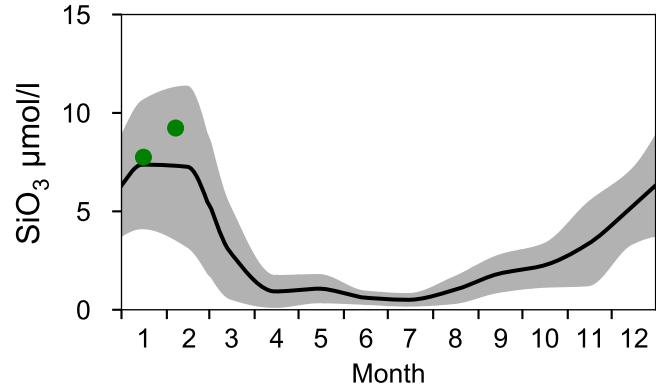
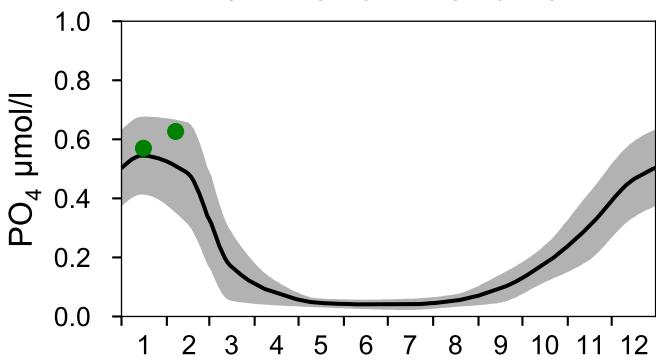
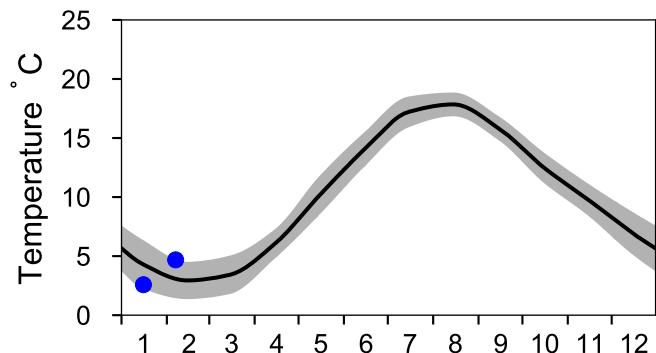
STATION Å13 SURFACE WATER (0-10 m)

Annual Cycles

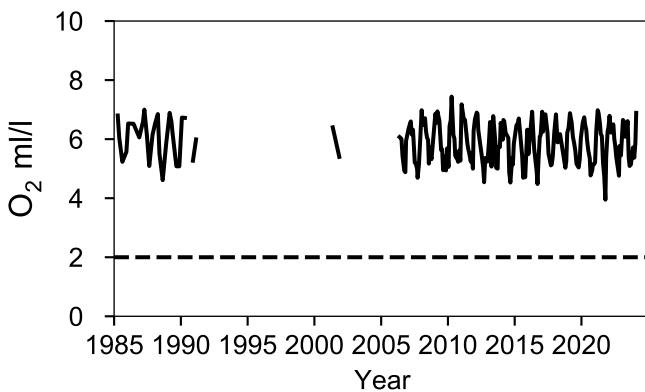
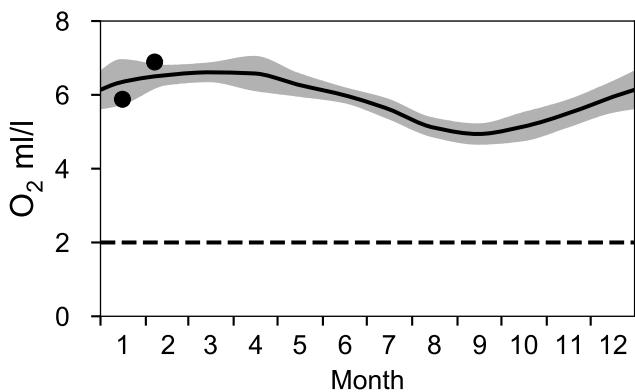
— Mean 1991-2020

St.Dev.

● 2024

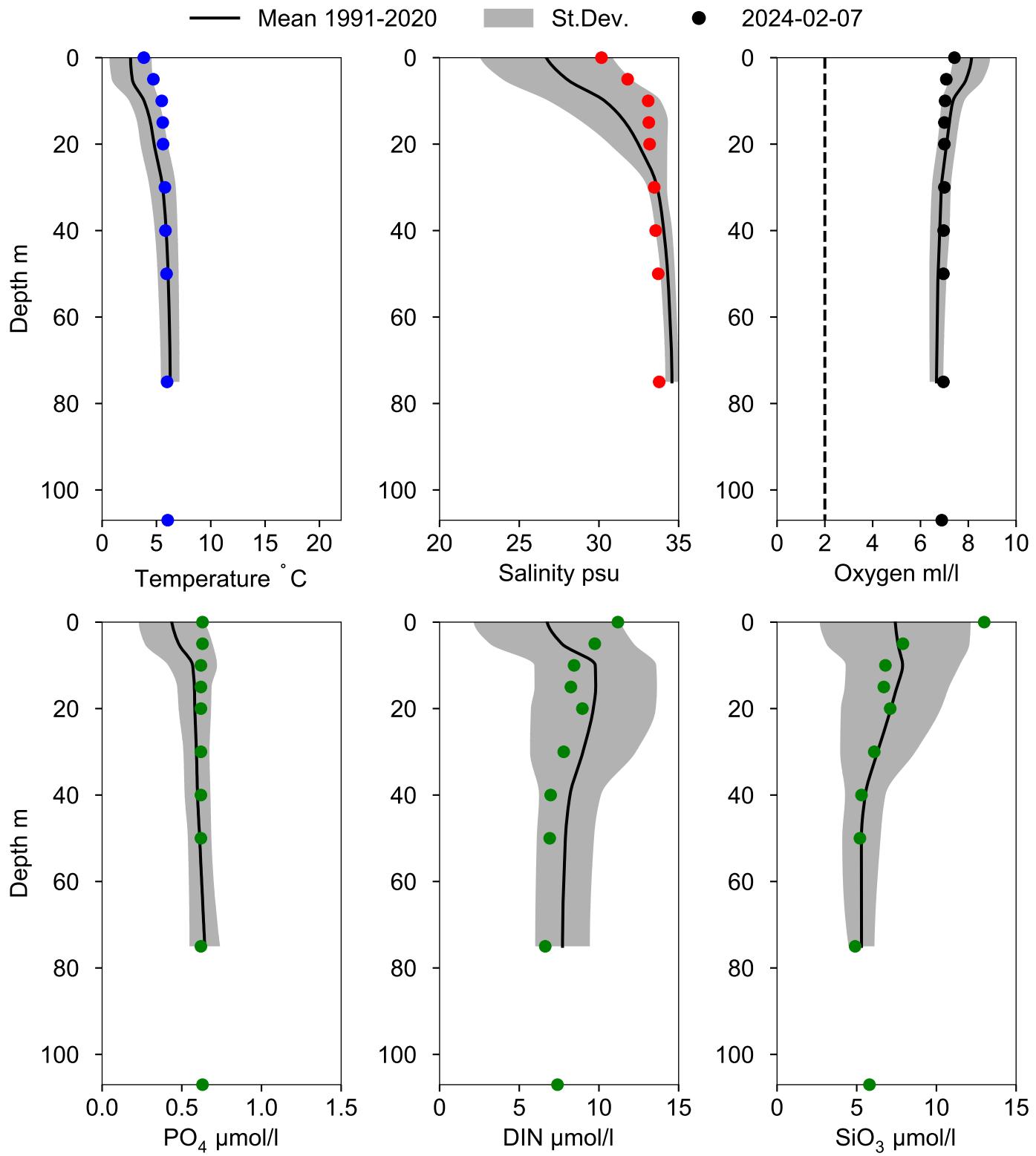


OXYGEN IN BOTTOM WATER (depth \geq 82 m)



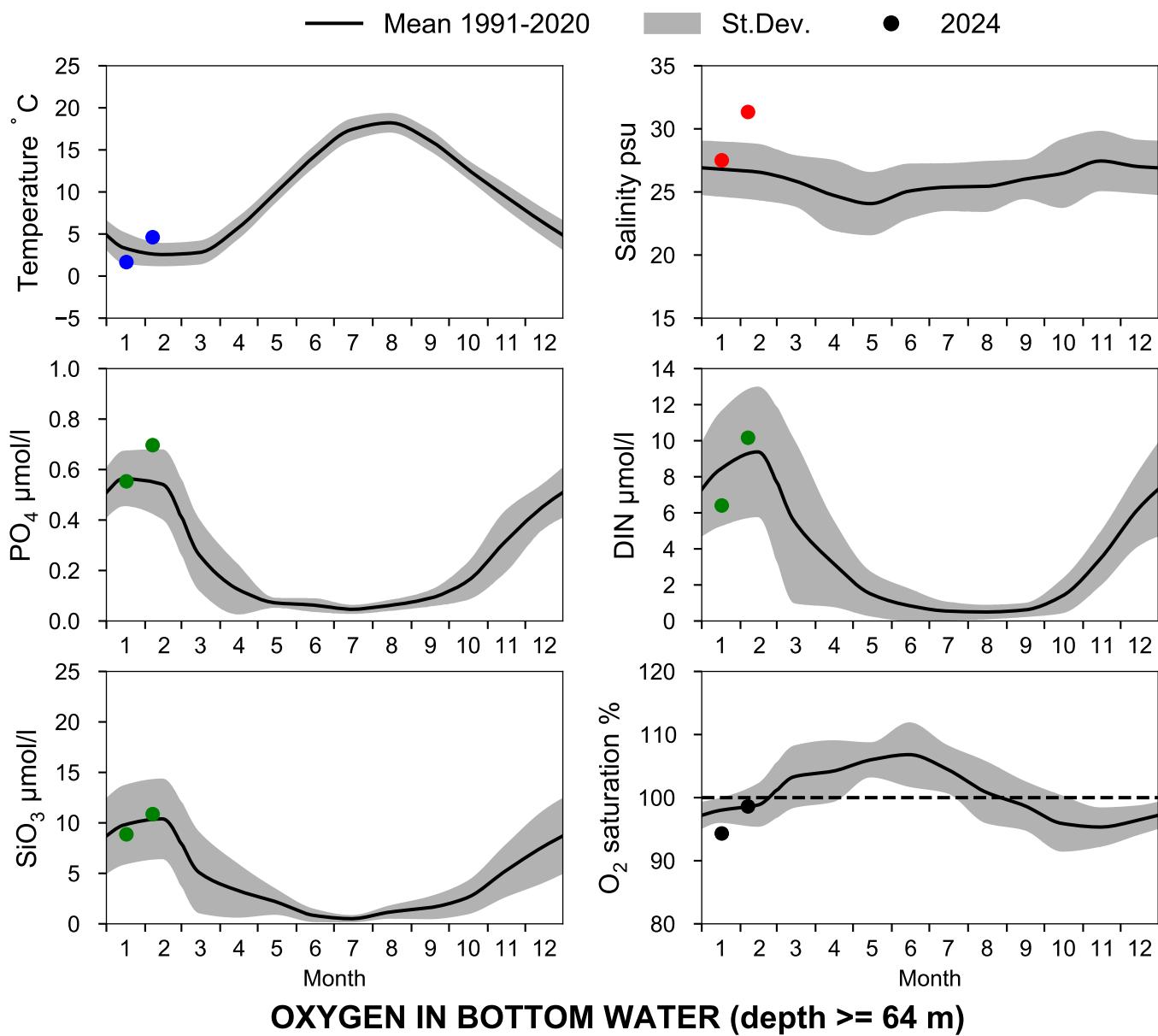
Vertical profiles Å13

February

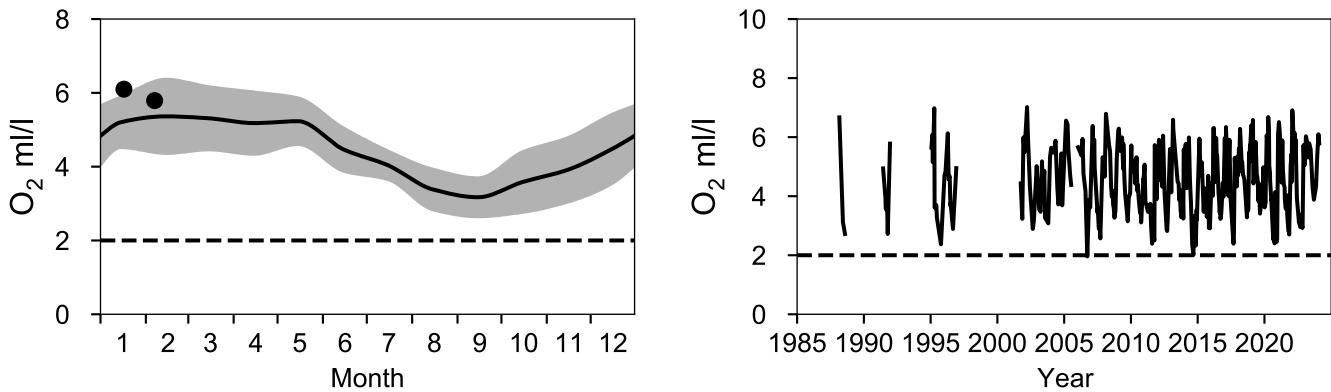


STATION SLÄGGÖ SURFACE WATER (0-10 m)

Annual Cycles

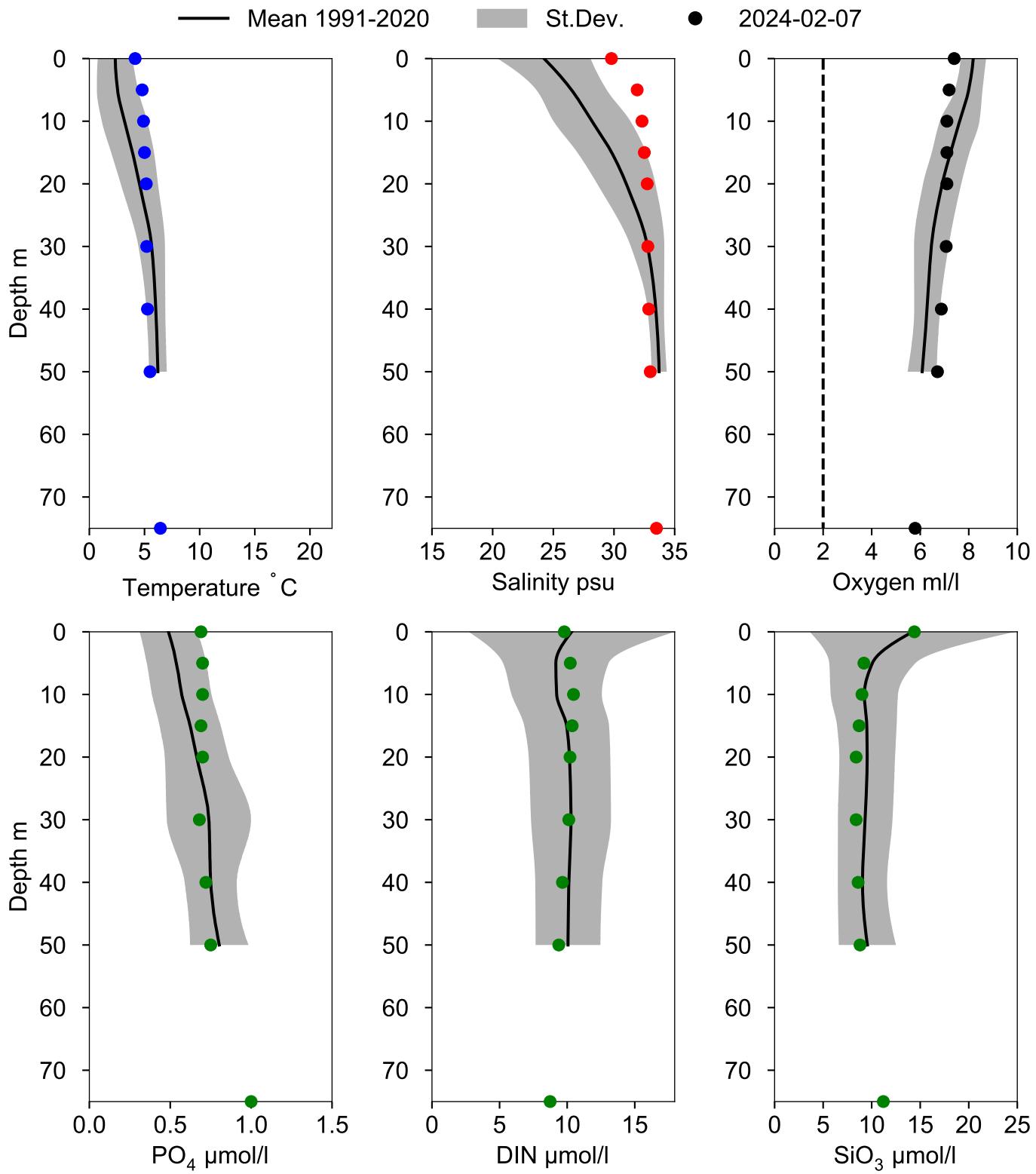


OXYGEN IN BOTTOM WATER (depth >= 64 m)



Vertical profiles SLÄGGÖ

February



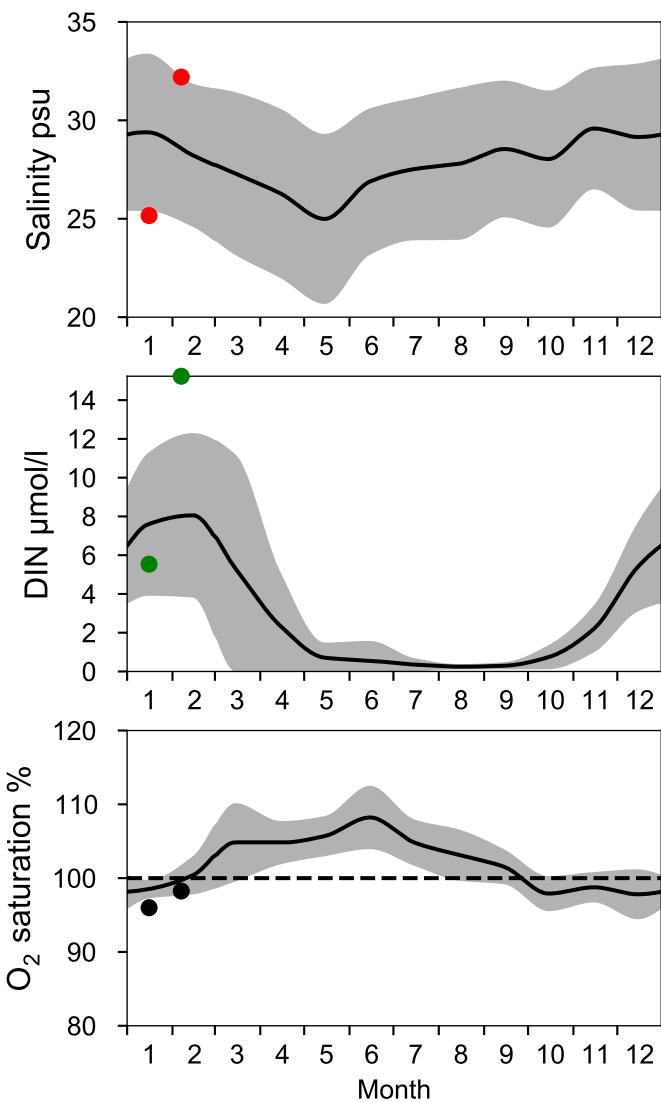
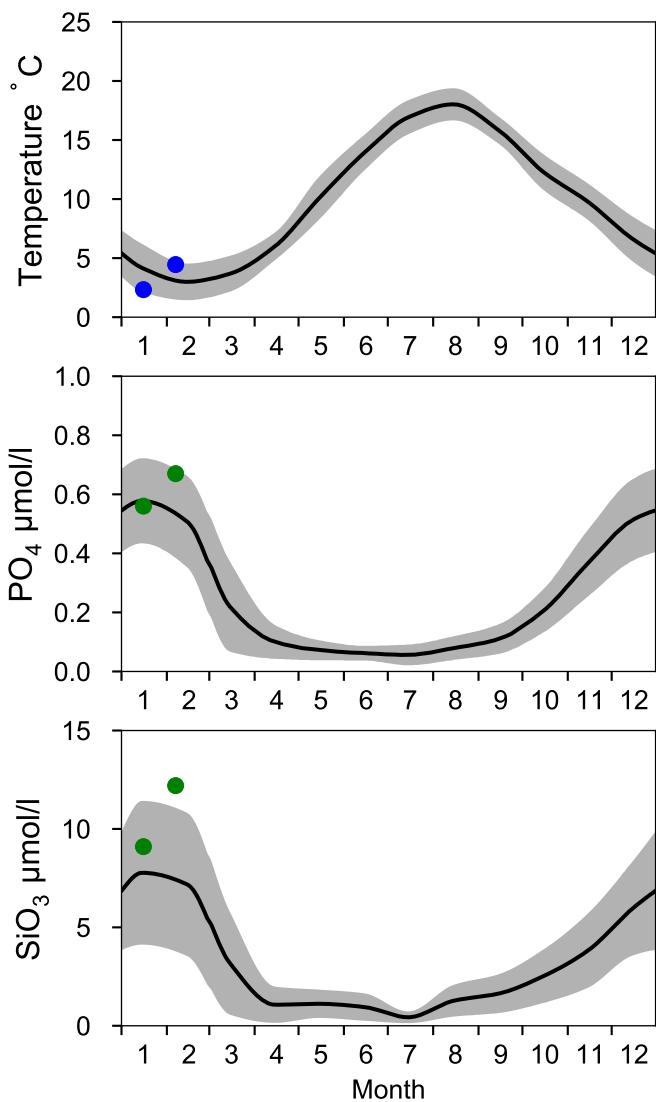
STATION P2 SURFACE WATER (0-10 m)

Annual Cycles

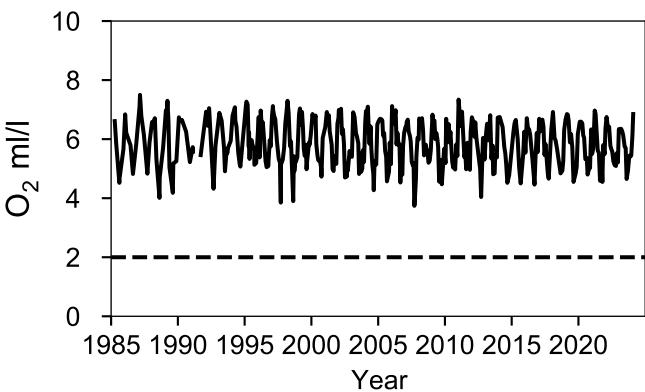
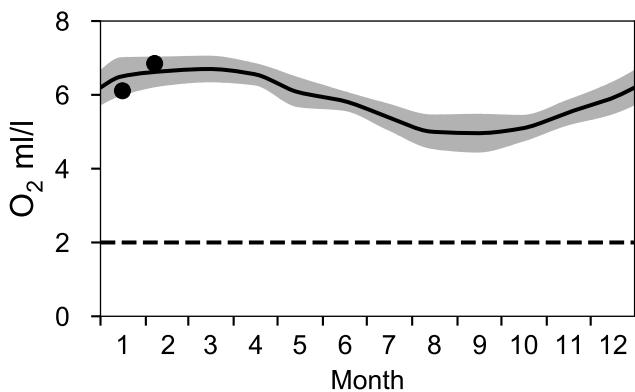
— Mean 1991-2020

St.Dev.

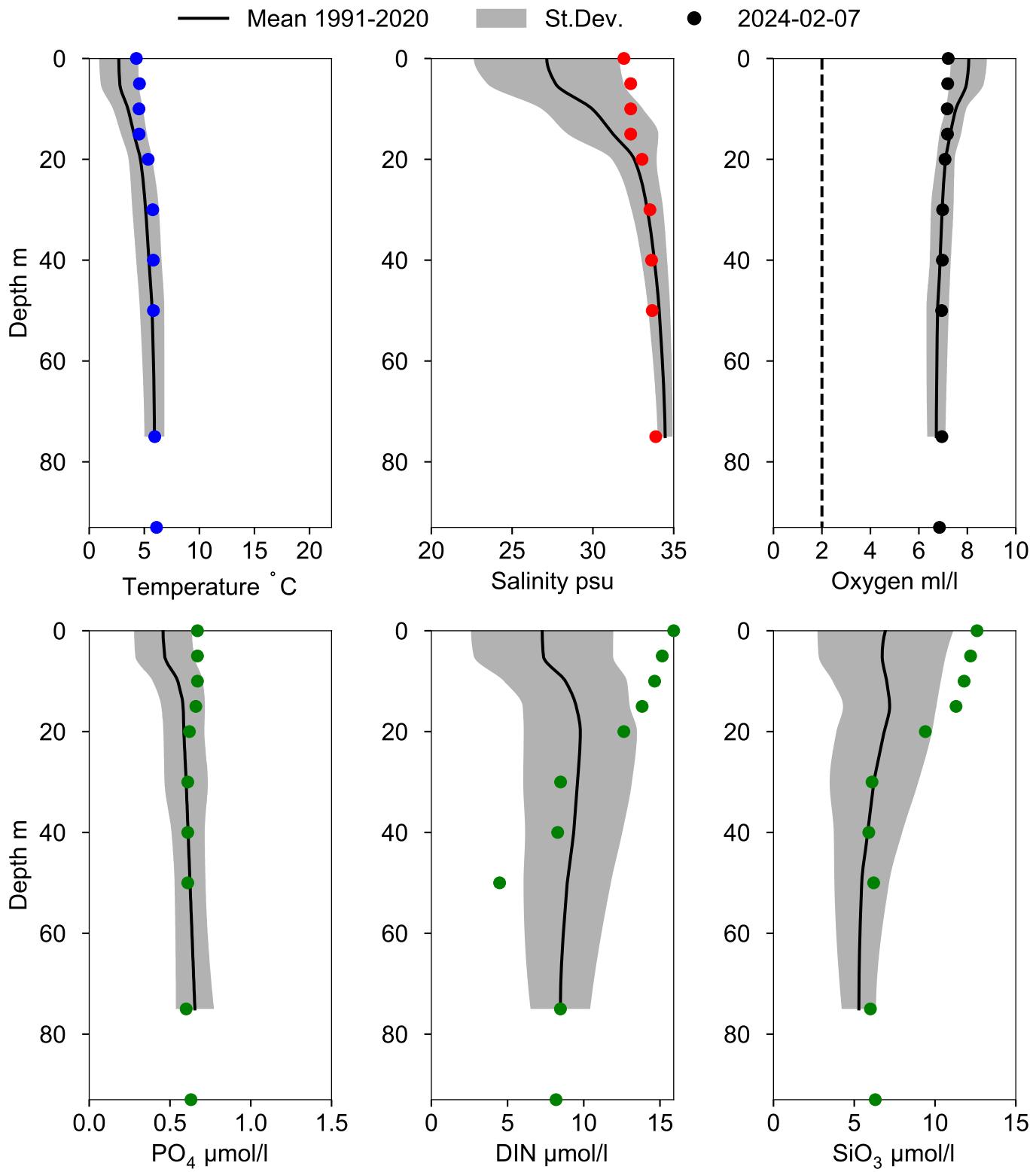
● 2024



OXYGEN IN BOTTOM WATER (depth $\geq 75 \text{ m}$)

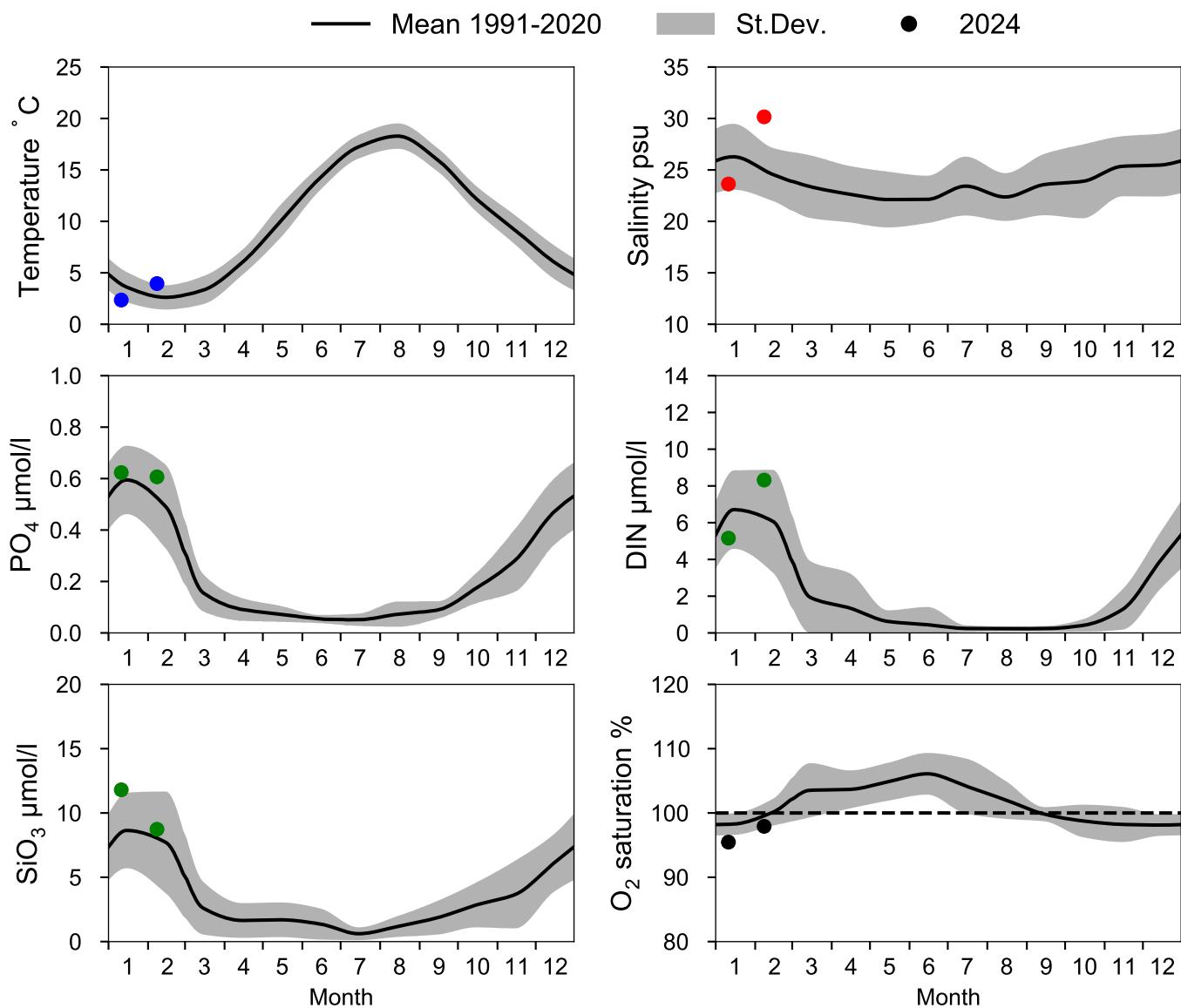


Vertical profiles P2 February

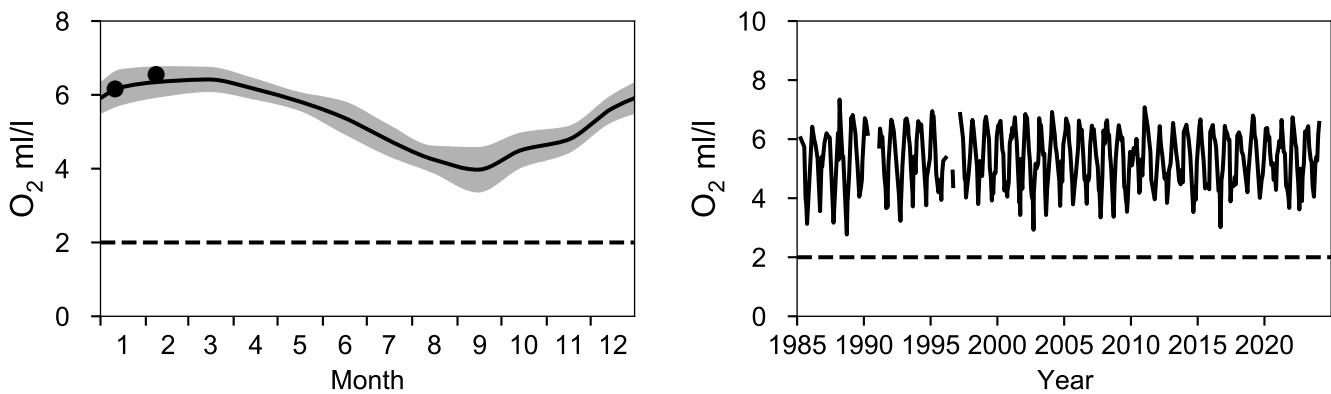


STATION FLADEN SURFACE WATER (0-10 m)

Annual Cycles

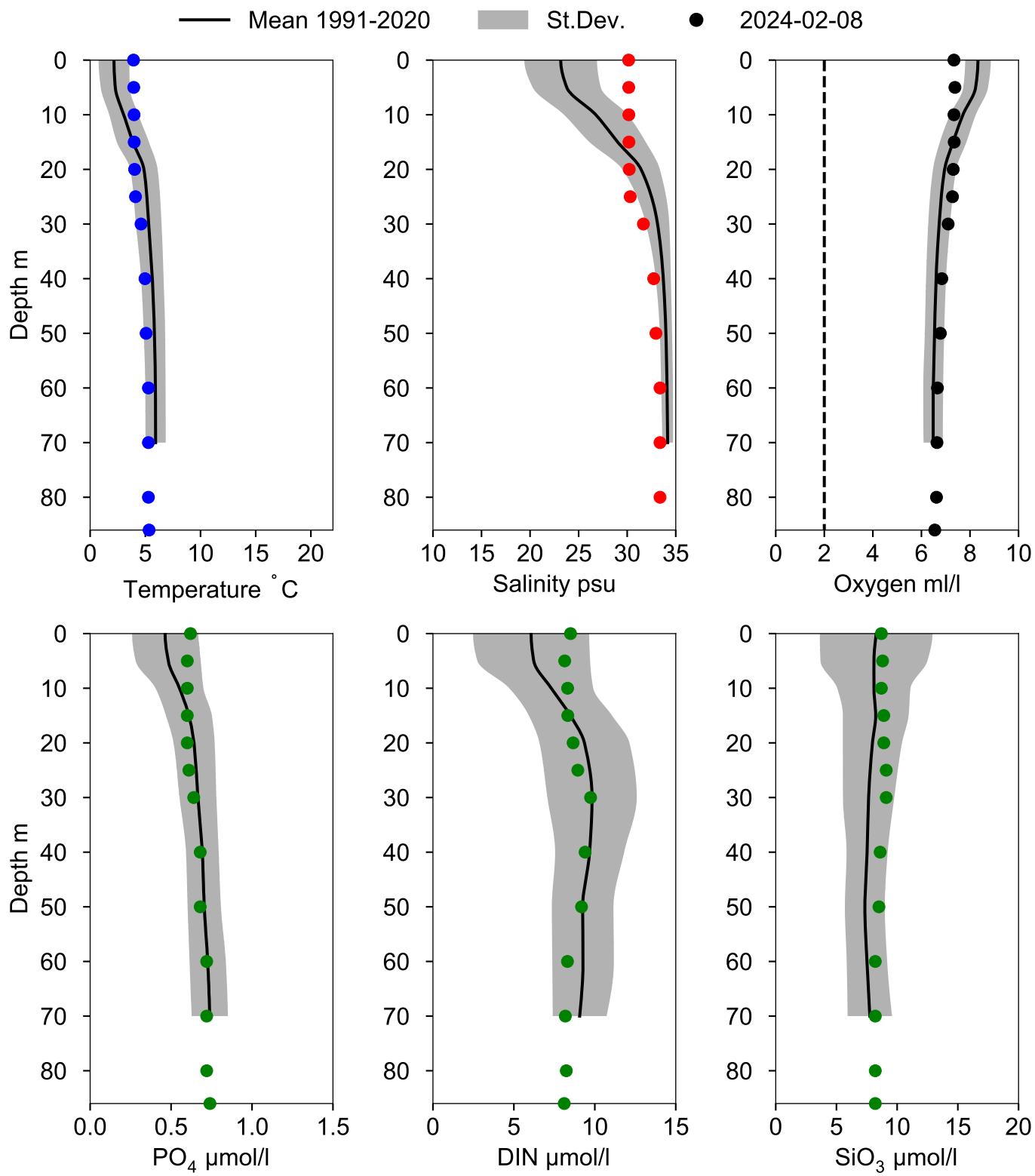


OXYGEN IN BOTTOM WATER (depth >= 74 m)



Vertical profiles FLADEN

February



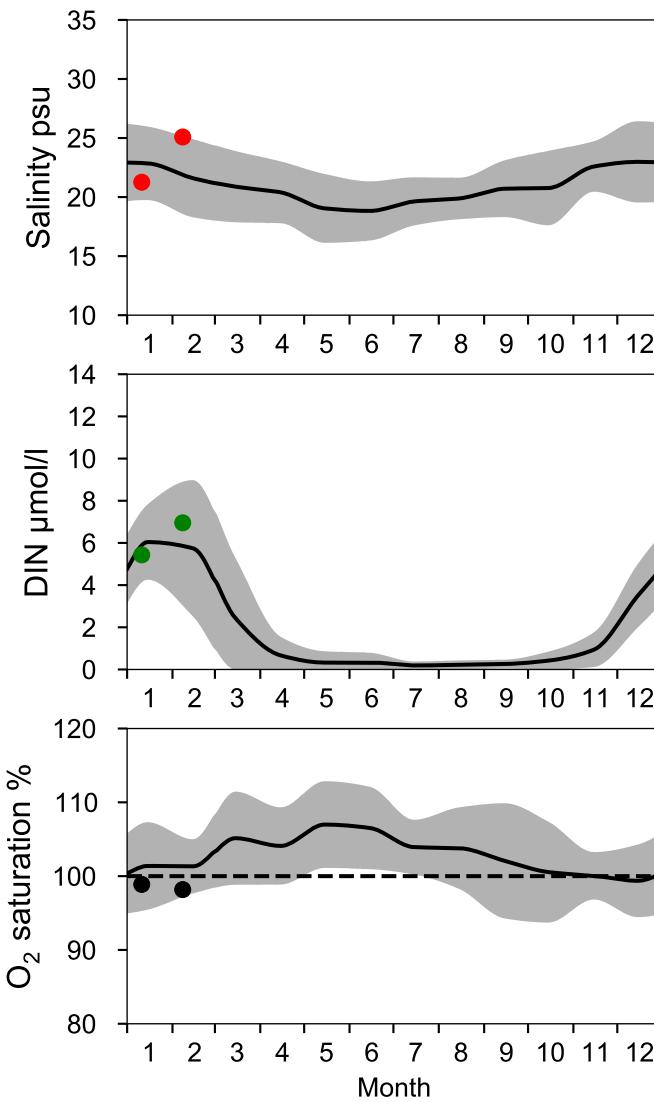
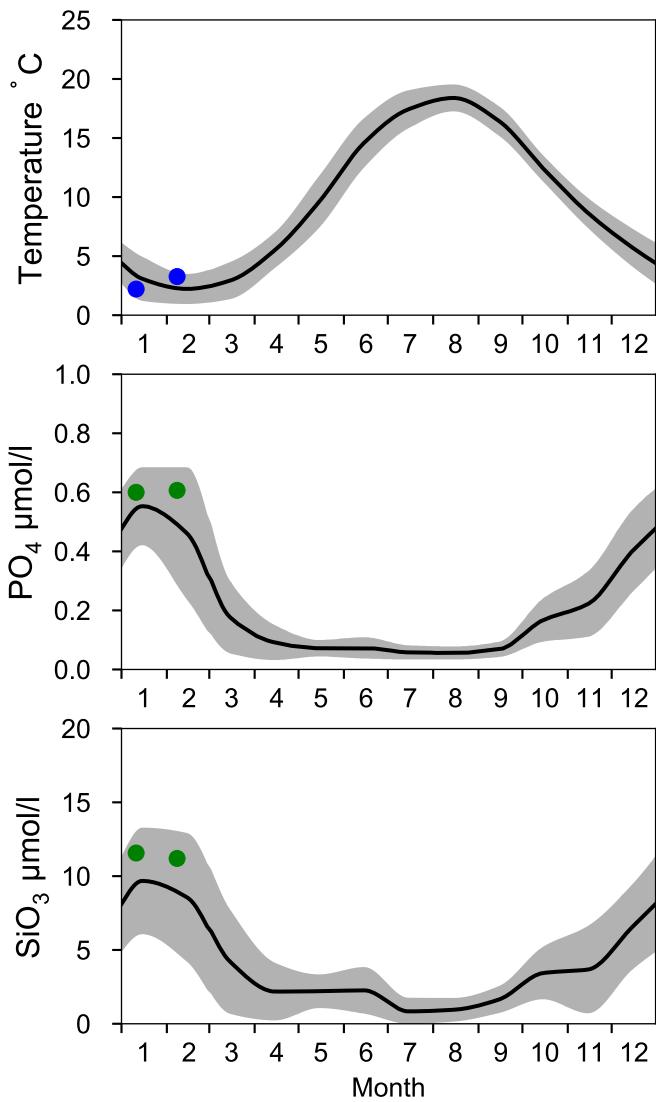
STATION N14 FALKENBERG SURFACE WATER (0-10 m)

Annual Cycles

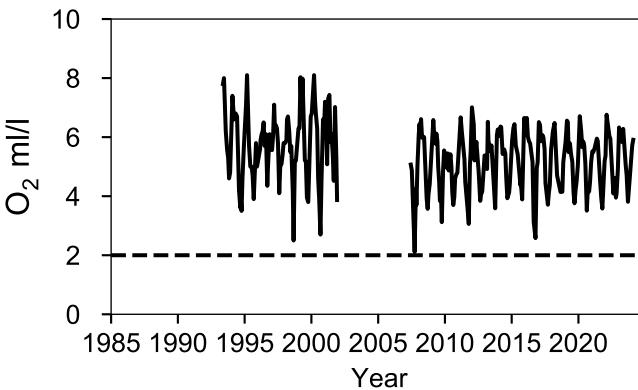
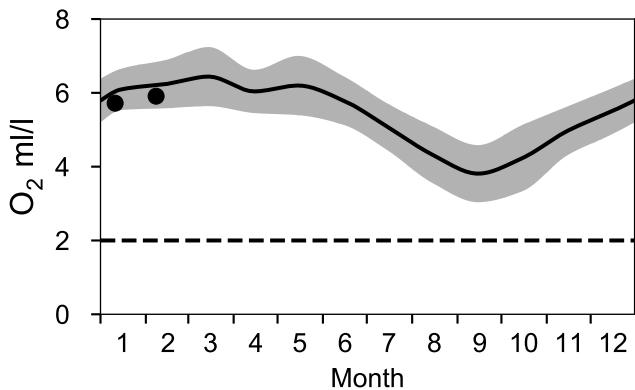
— Mean 1991-2020

St.Dev.

● 2024

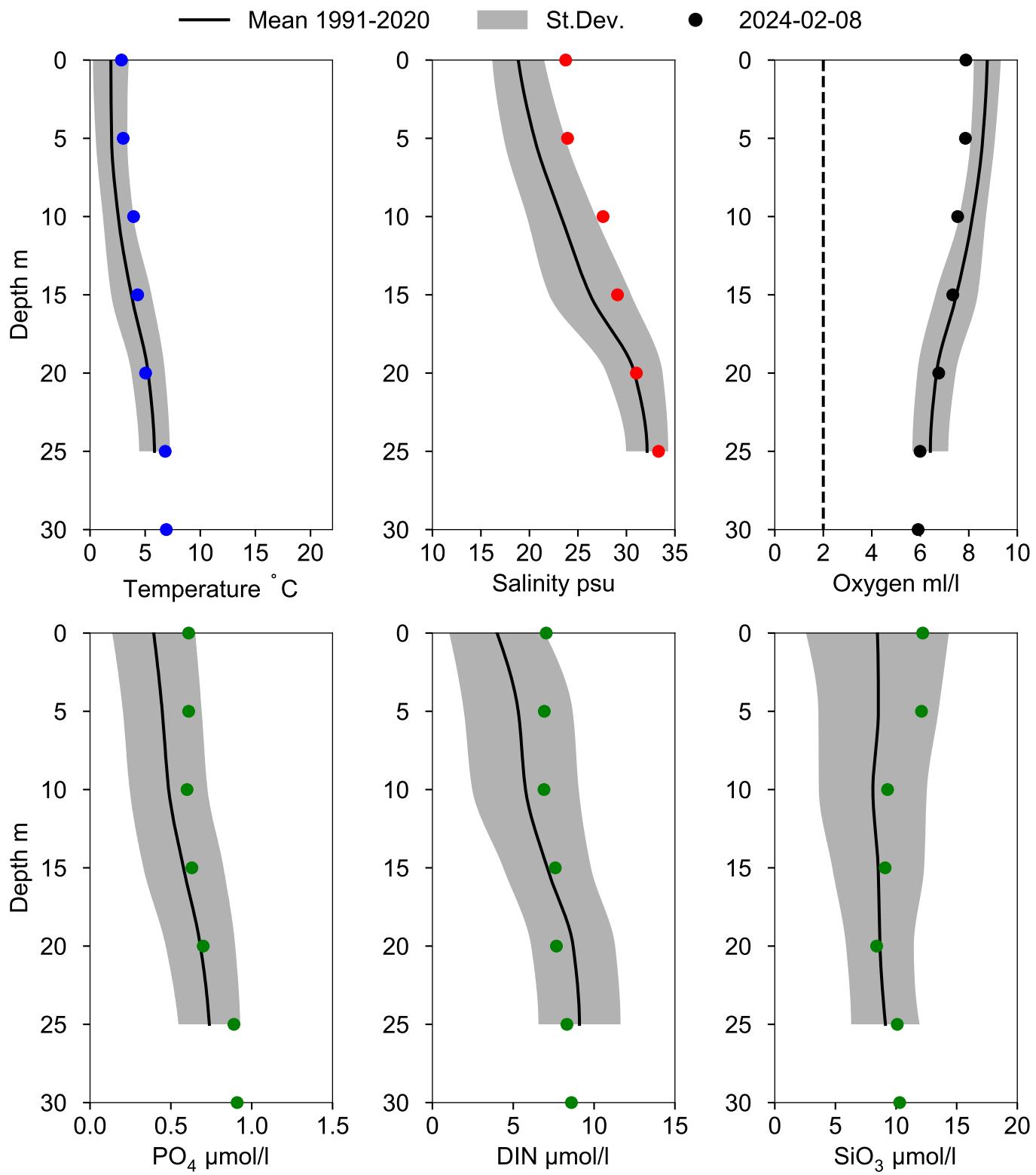


OXYGEN IN BOTTOM WATER (depth $\geq 25 \text{ m}$)



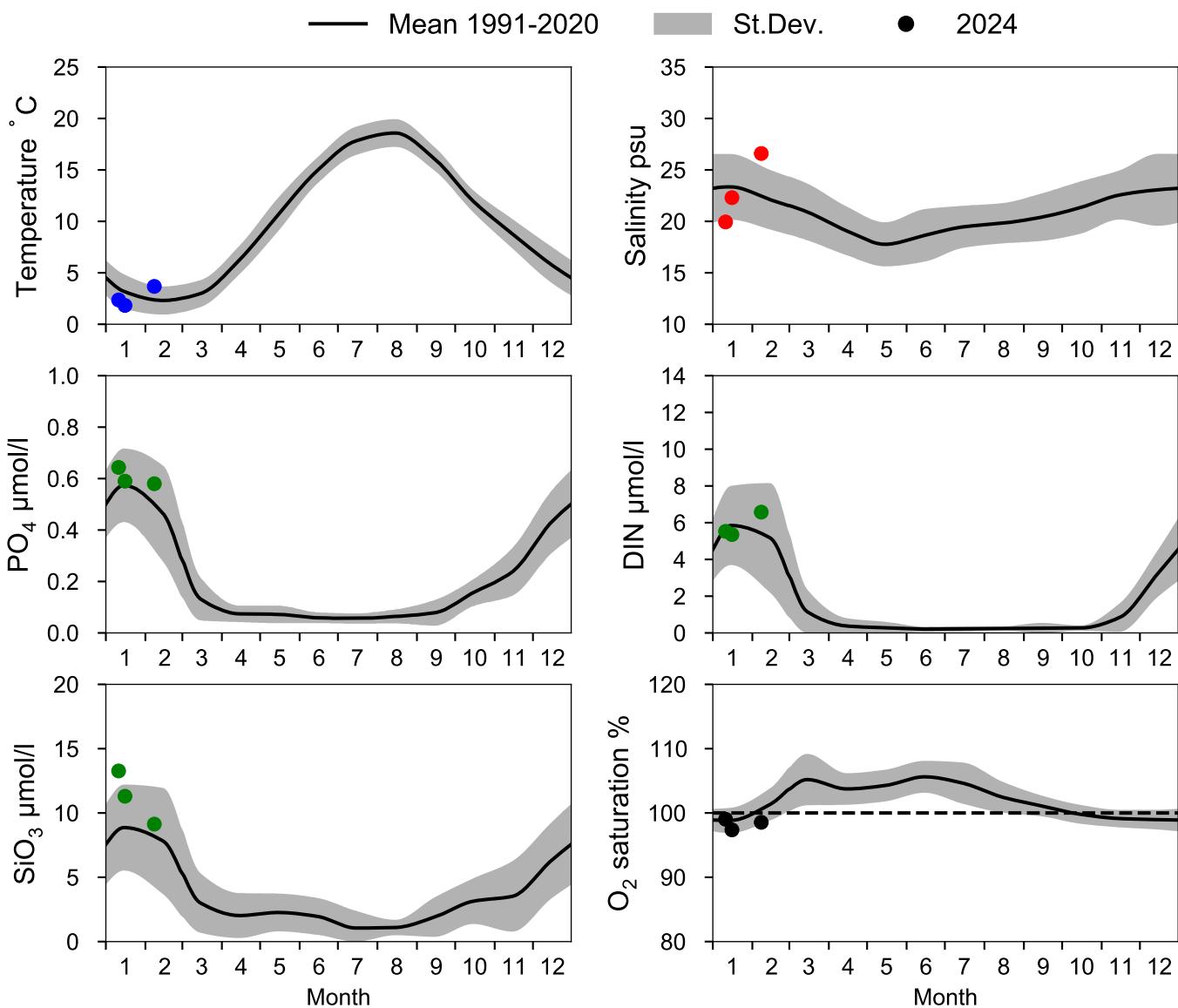
Vertical profiles N14 FALKENBERG

February

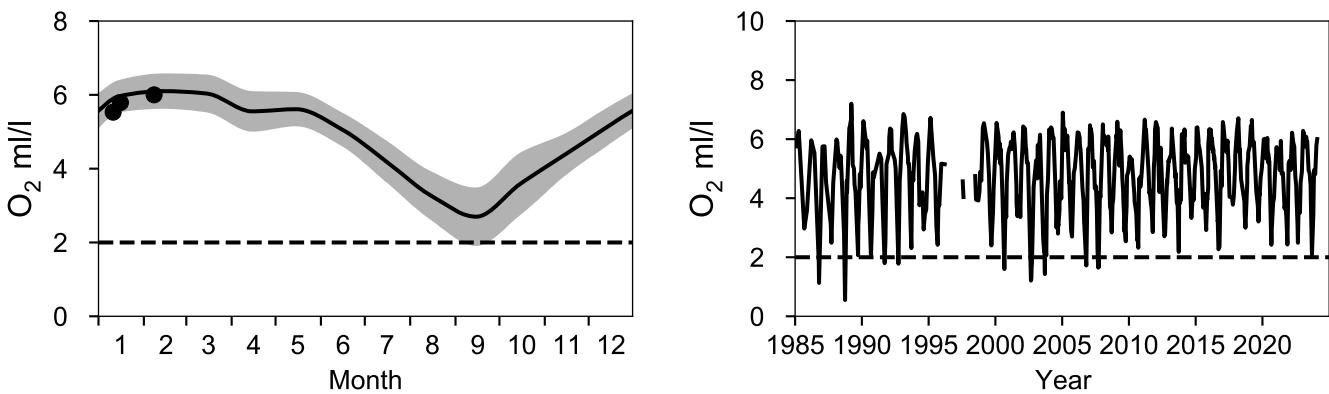


STATION ANHOLT E SURFACE WATER (0-10 m)

Annual Cycles

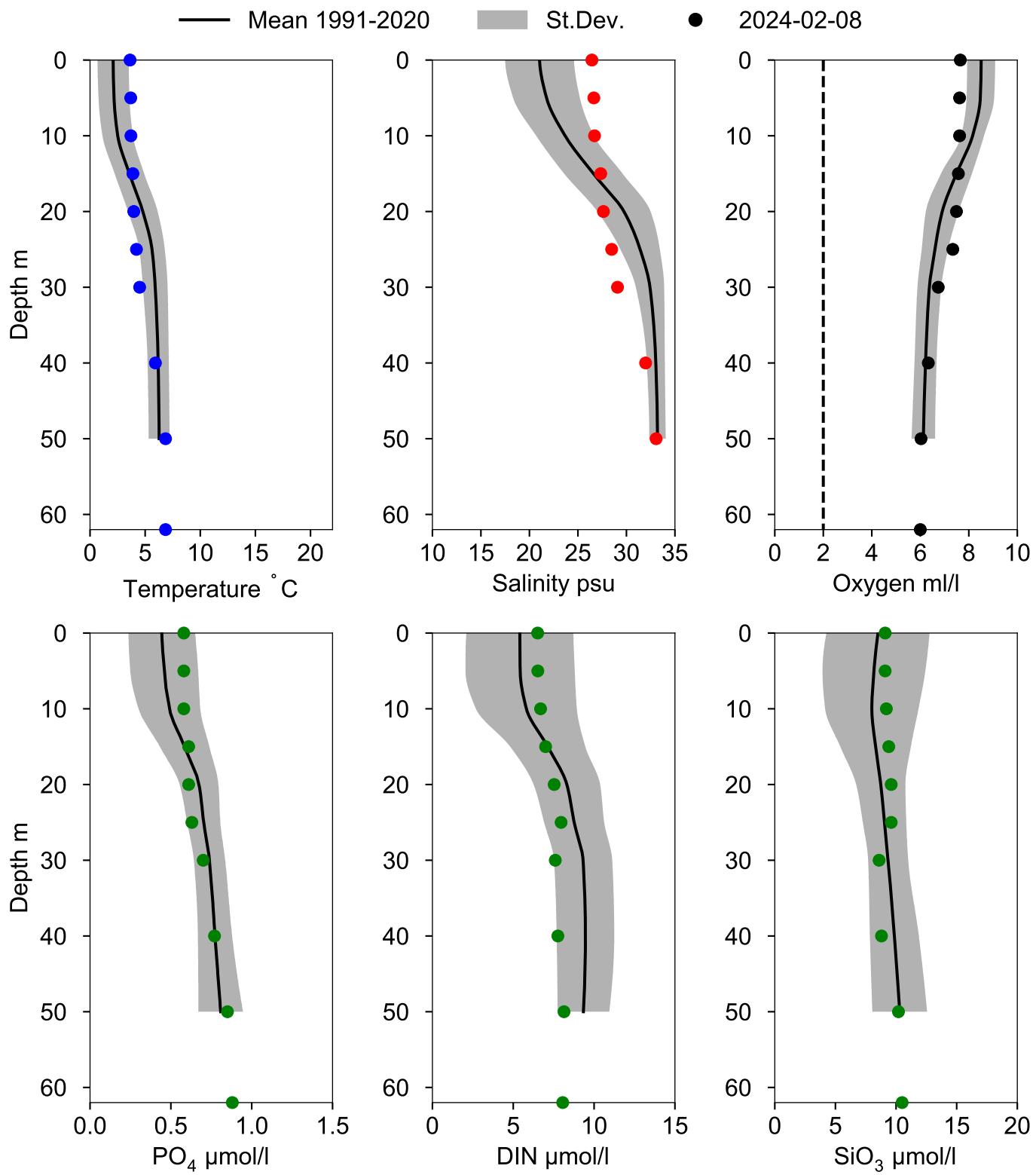


OXYGEN IN BOTTOM WATER (depth >= 52 m)



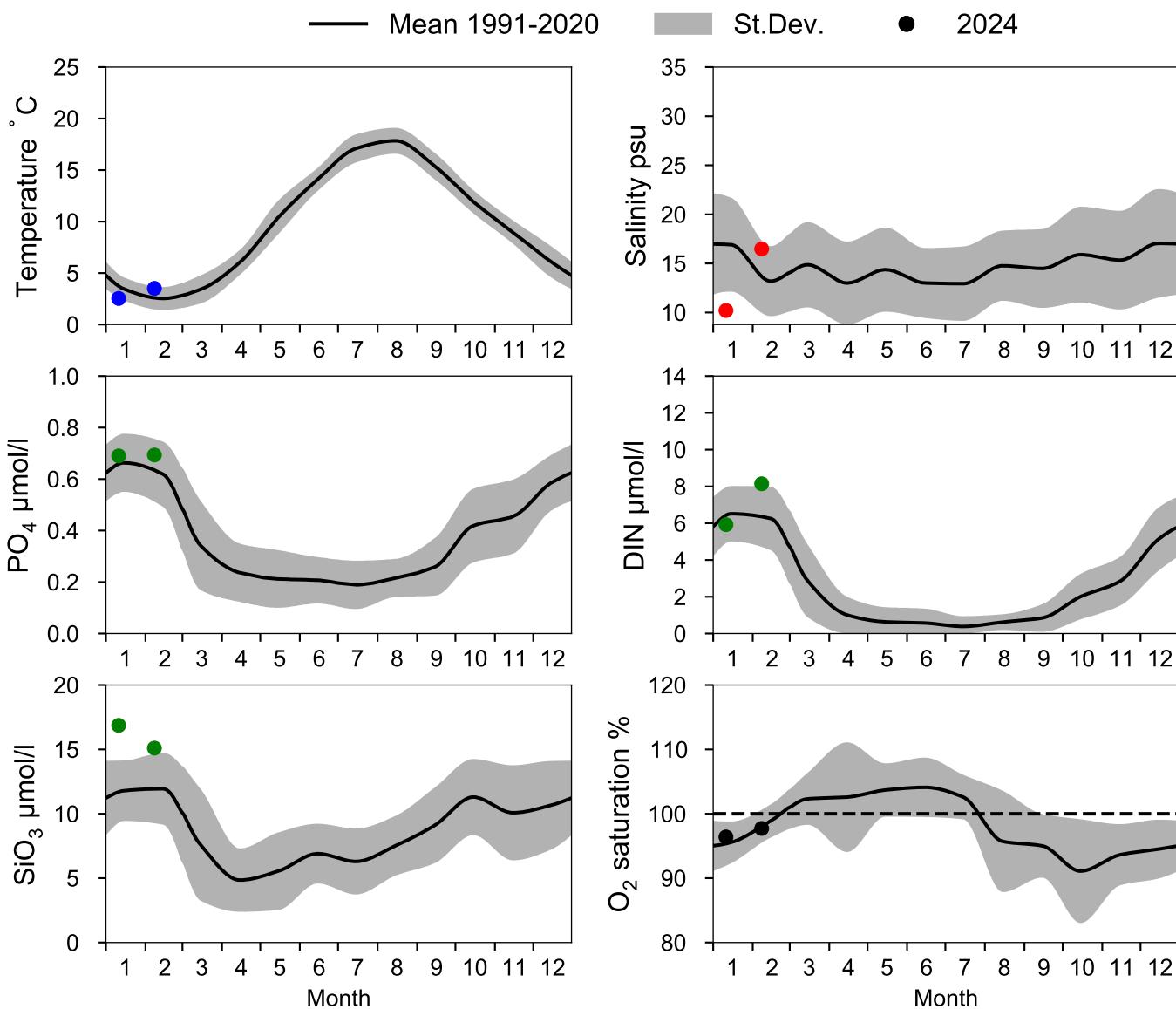
Vertical profiles ANHOLT E

February

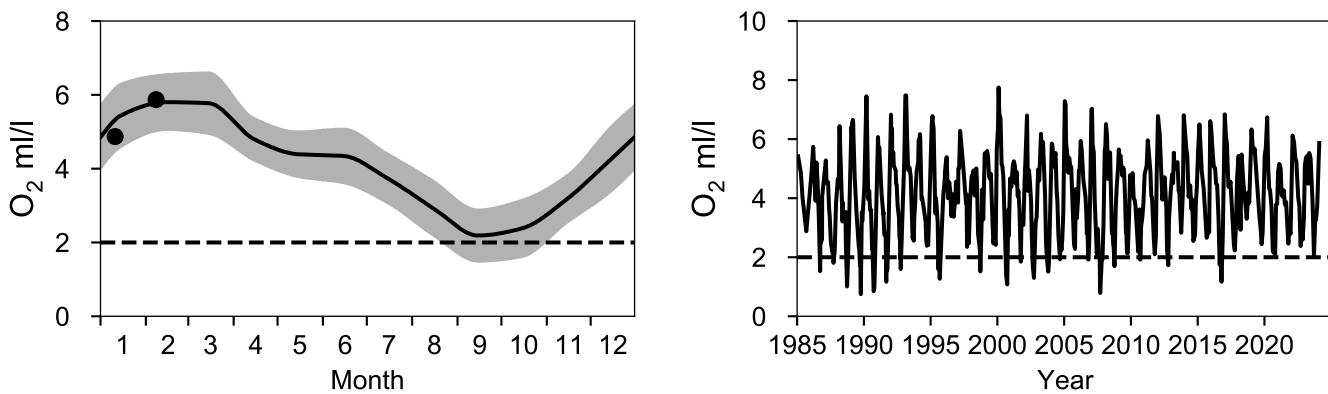


STATION W LANDSKRONA SURFACE WATER (0-10 m)

Annual Cycles

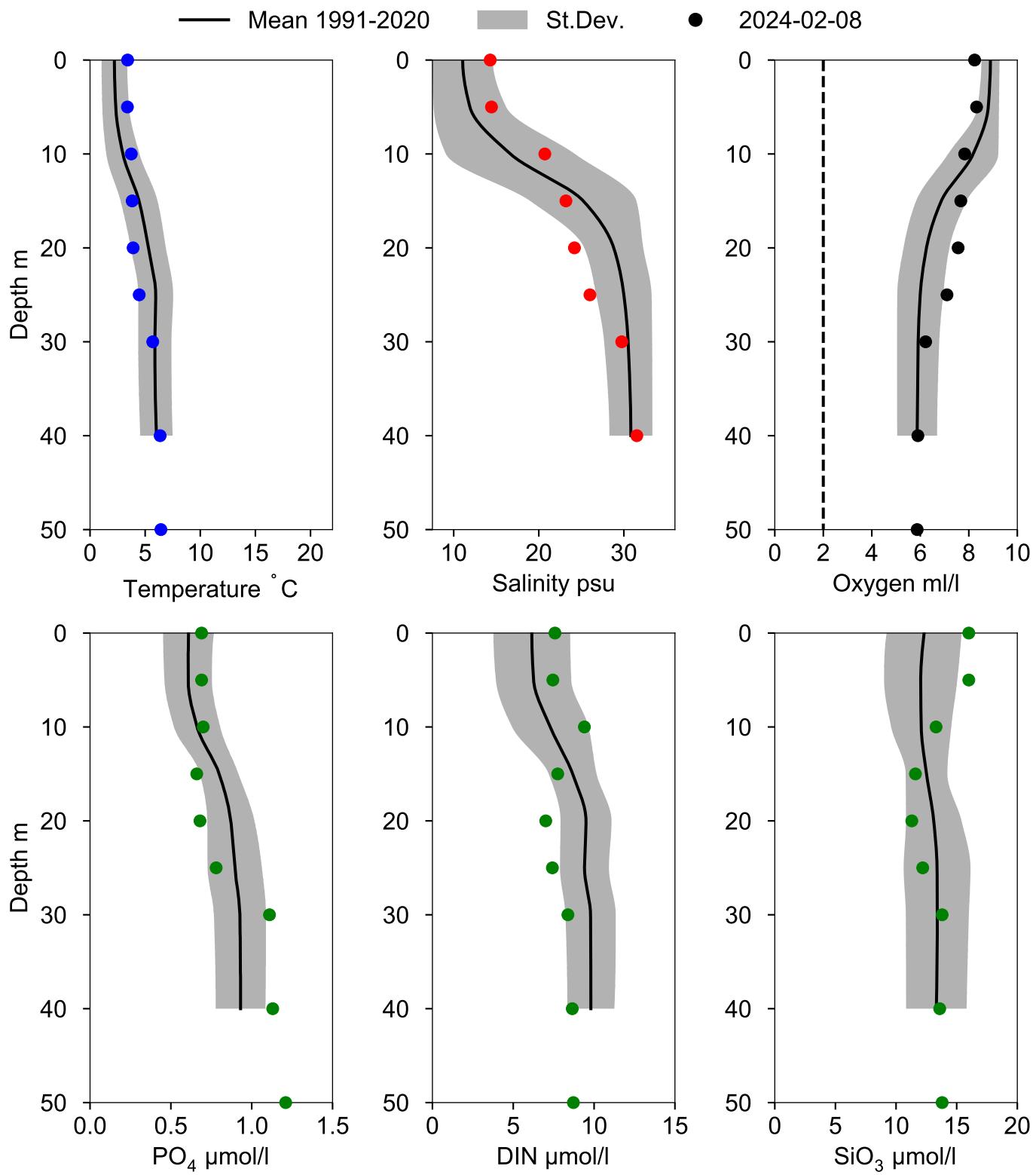


OXYGEN IN BOTTOM WATER (depth $\geq 40 \text{ m}$)



Vertical profiles W LANDSKRONA

February



STATION FLINTEN 7 SURFACE WATER (0-10 m)

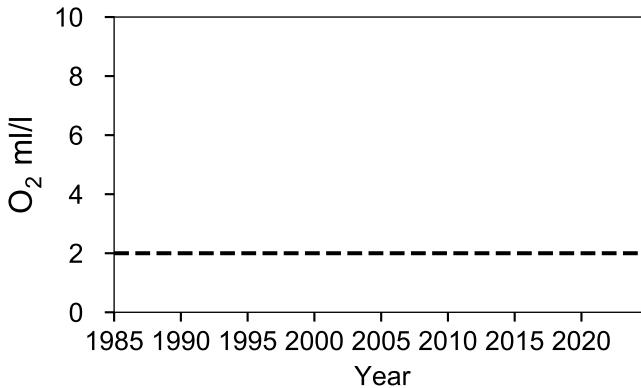
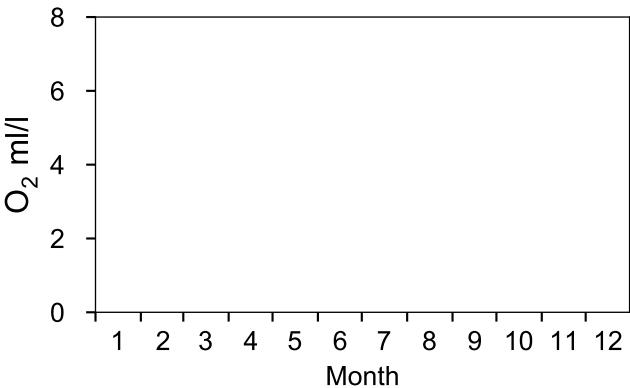
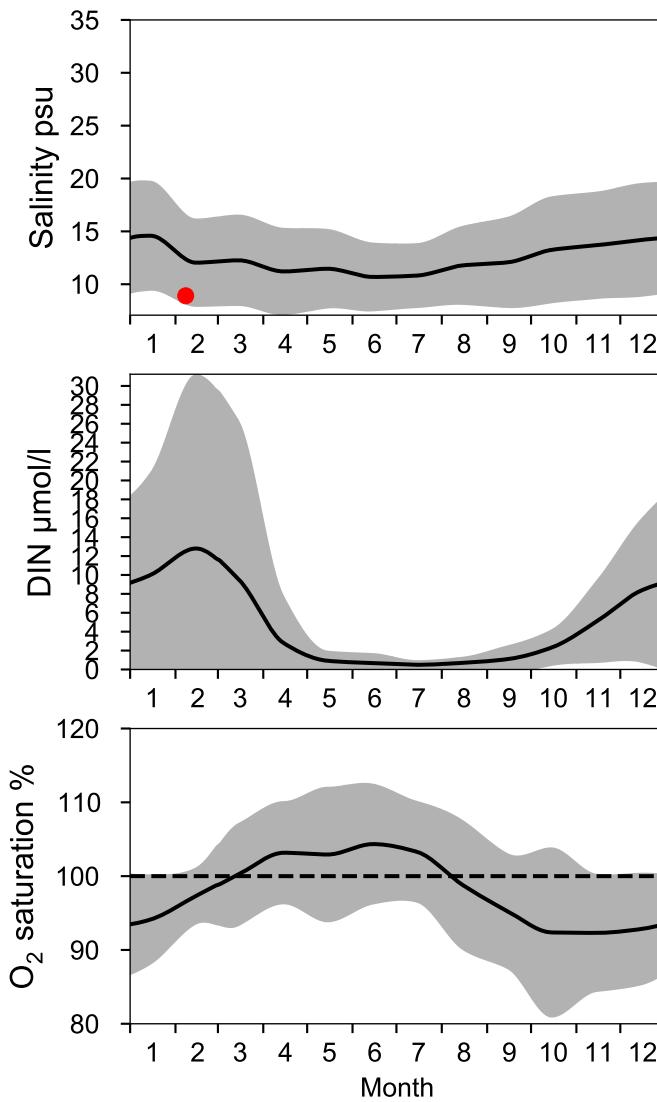
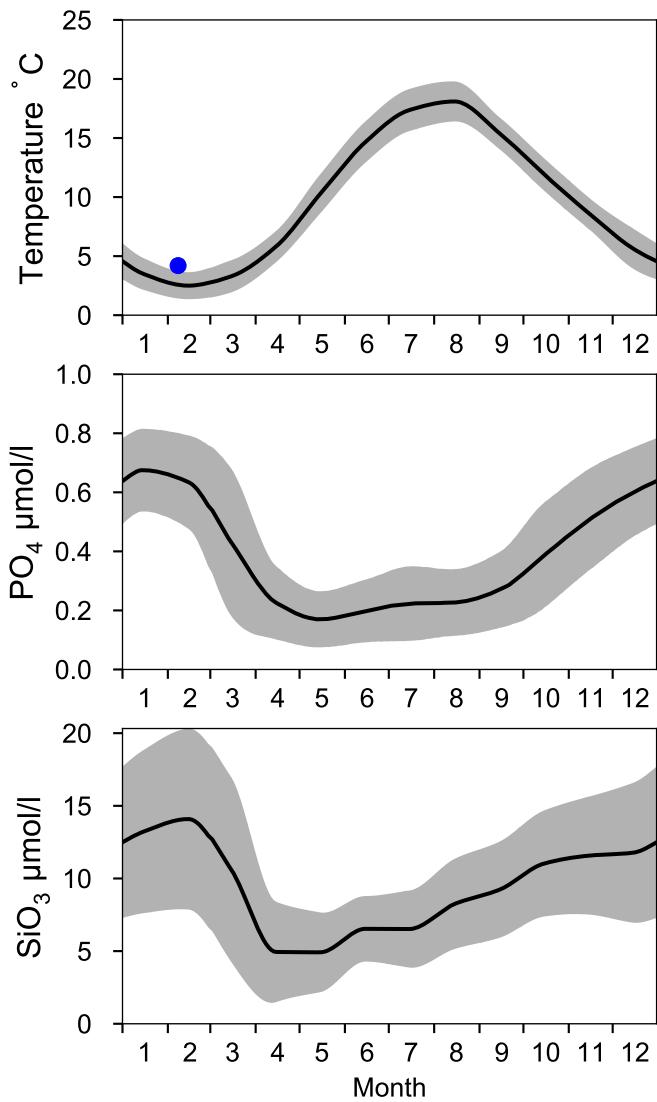
Annual Cycles

Statistics based on data from: Öresund

— Mean 1991-2020

St.Dev.

● 2024



Vertical profiles FLINTEN 7

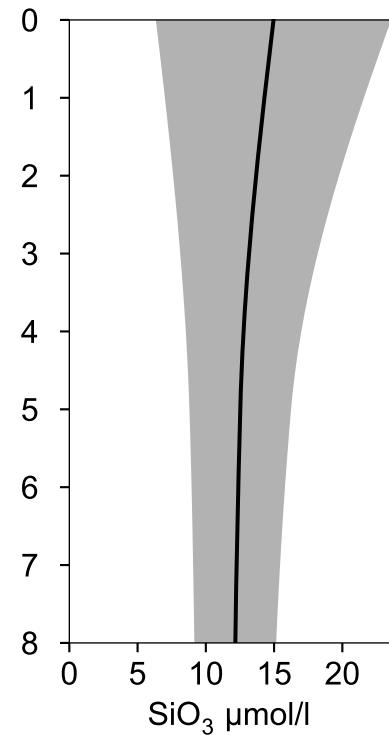
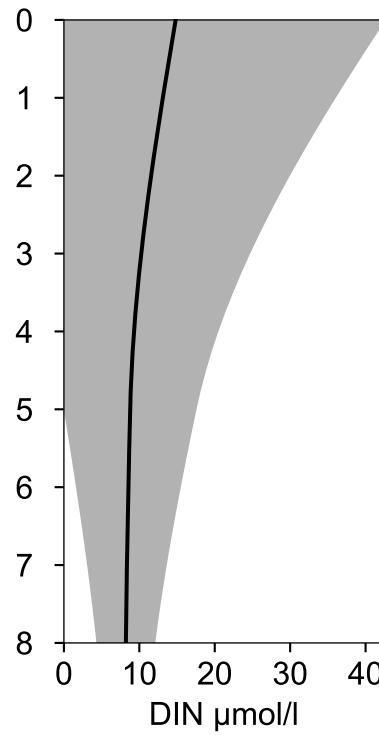
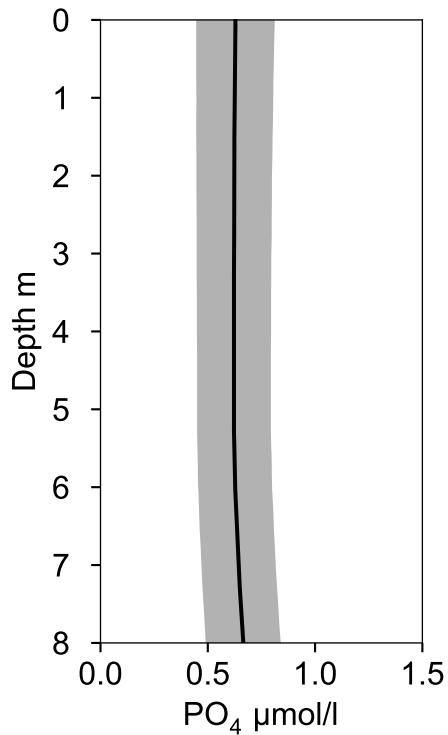
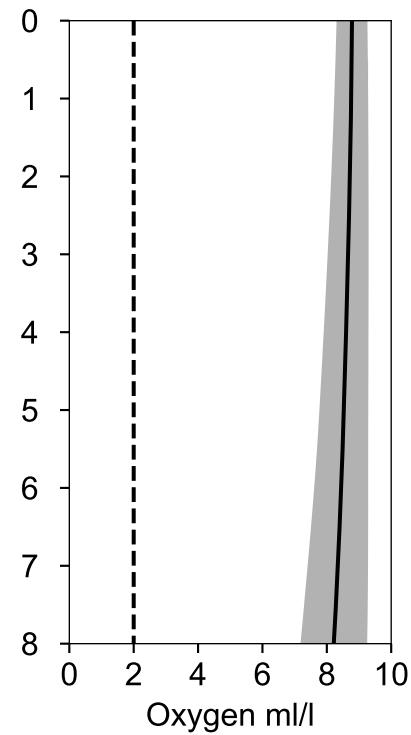
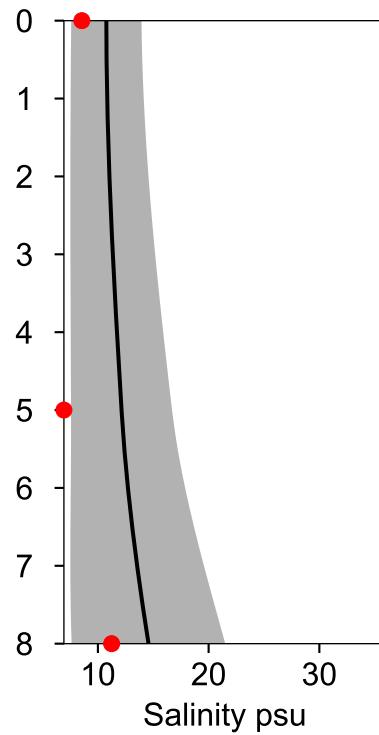
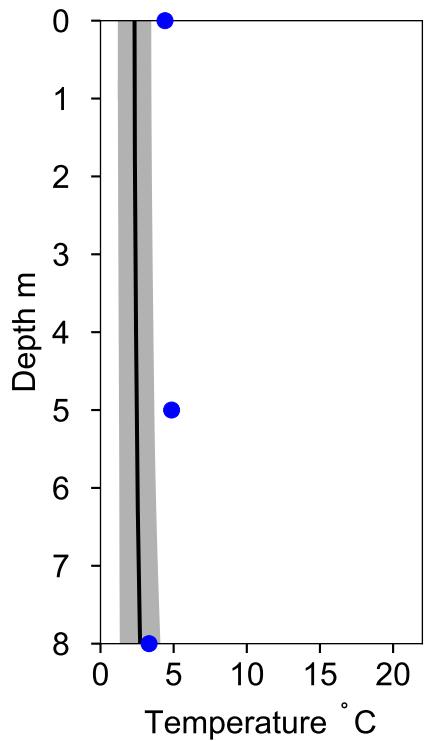
February

Statistics based on data from: Öresund

— Mean 1991-2020

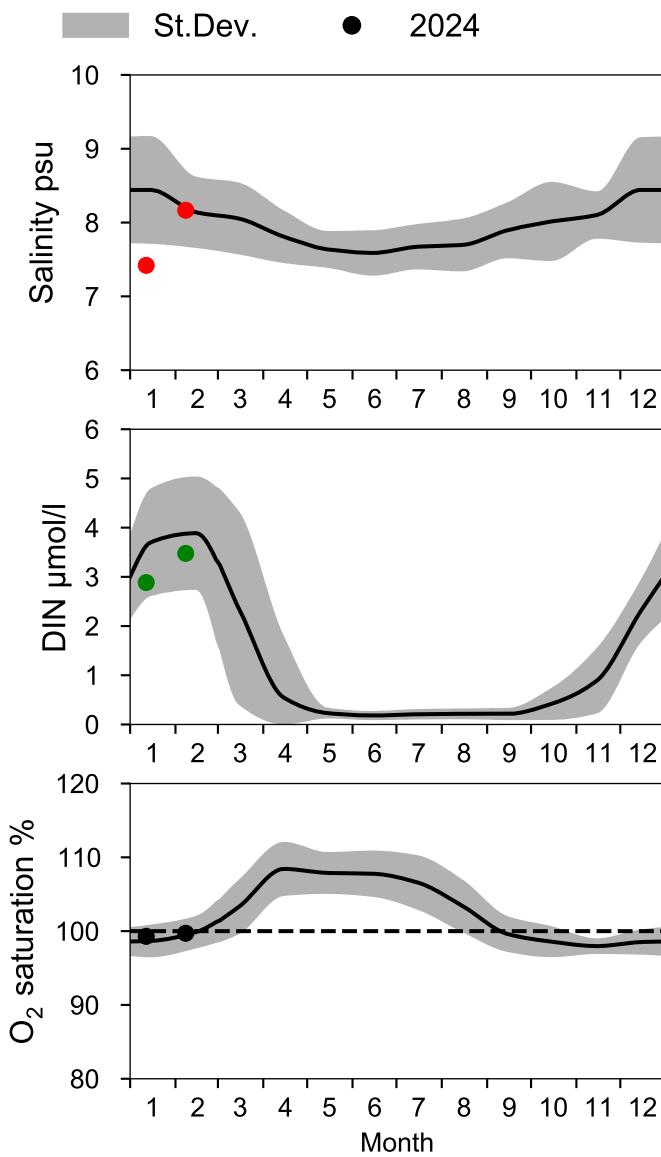
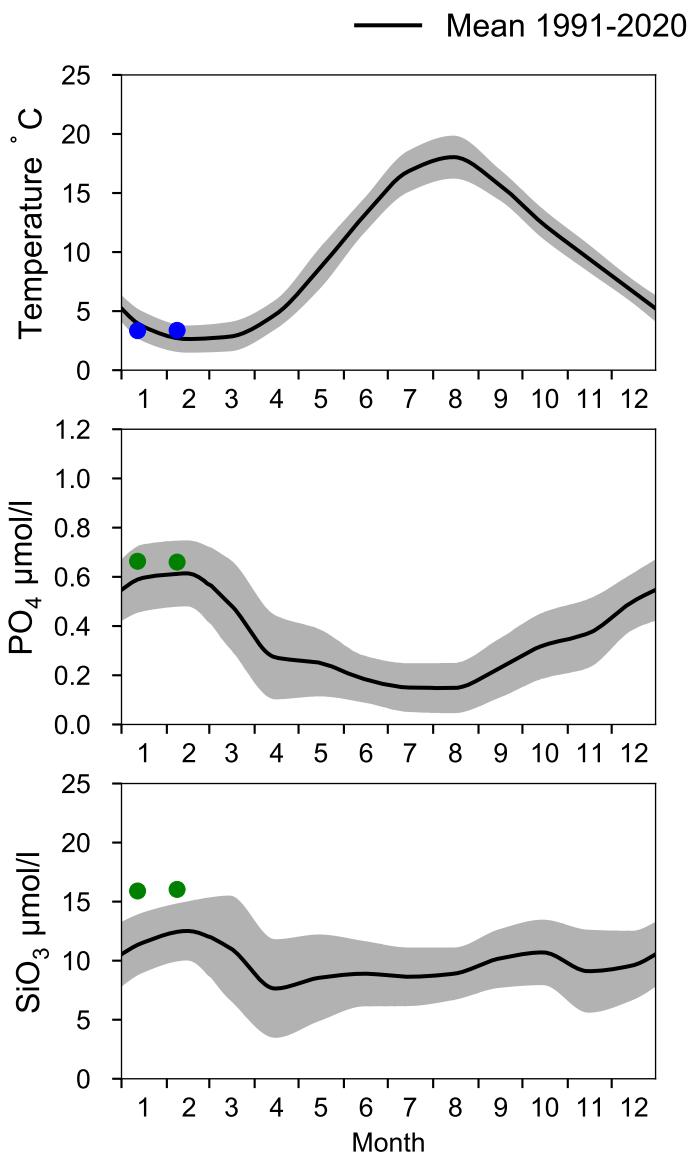
■ St.Dev.

● 2024-02-08

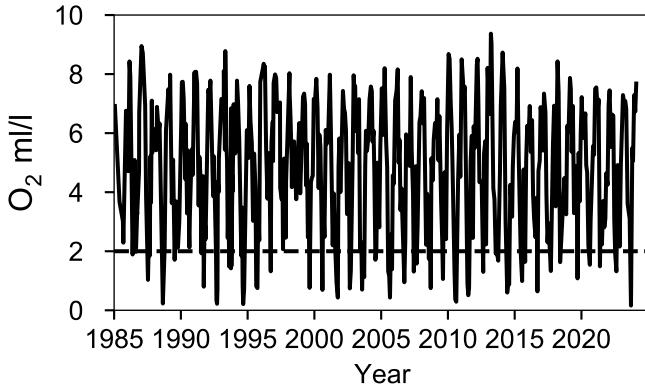
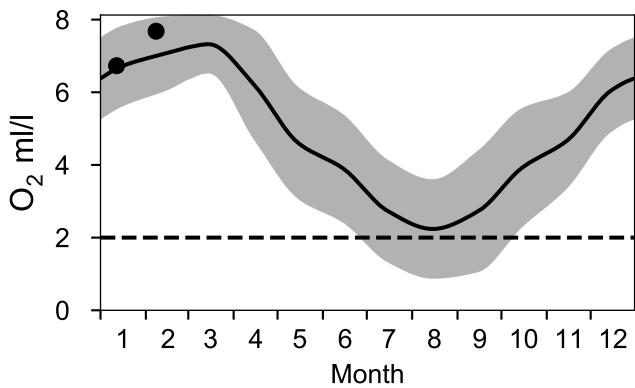


STATION BY1 SURFACE WATER (0-10 m)

Annual Cycles

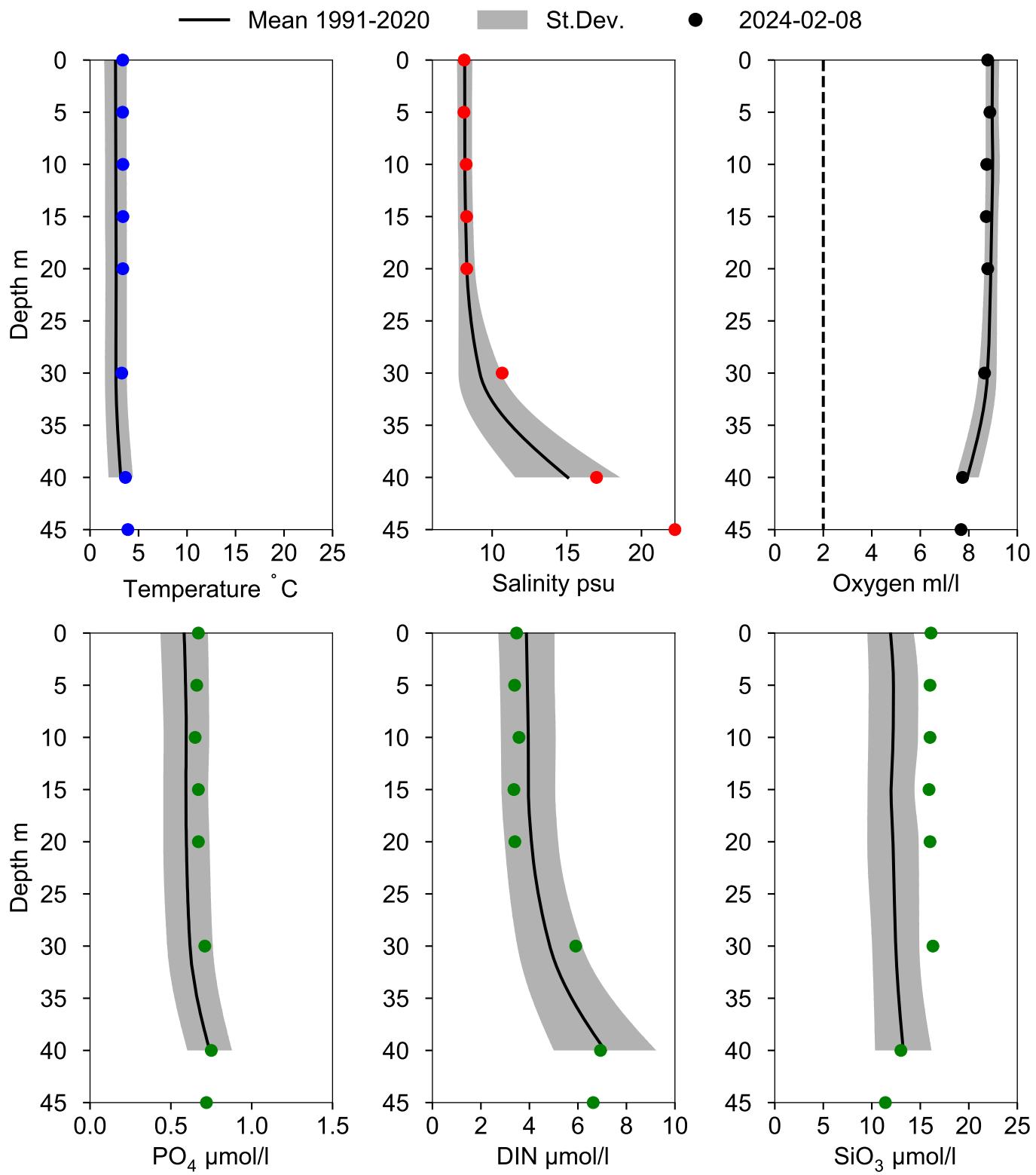


OXYGEN IN BOTTOM WATER (depth >= 39 m)



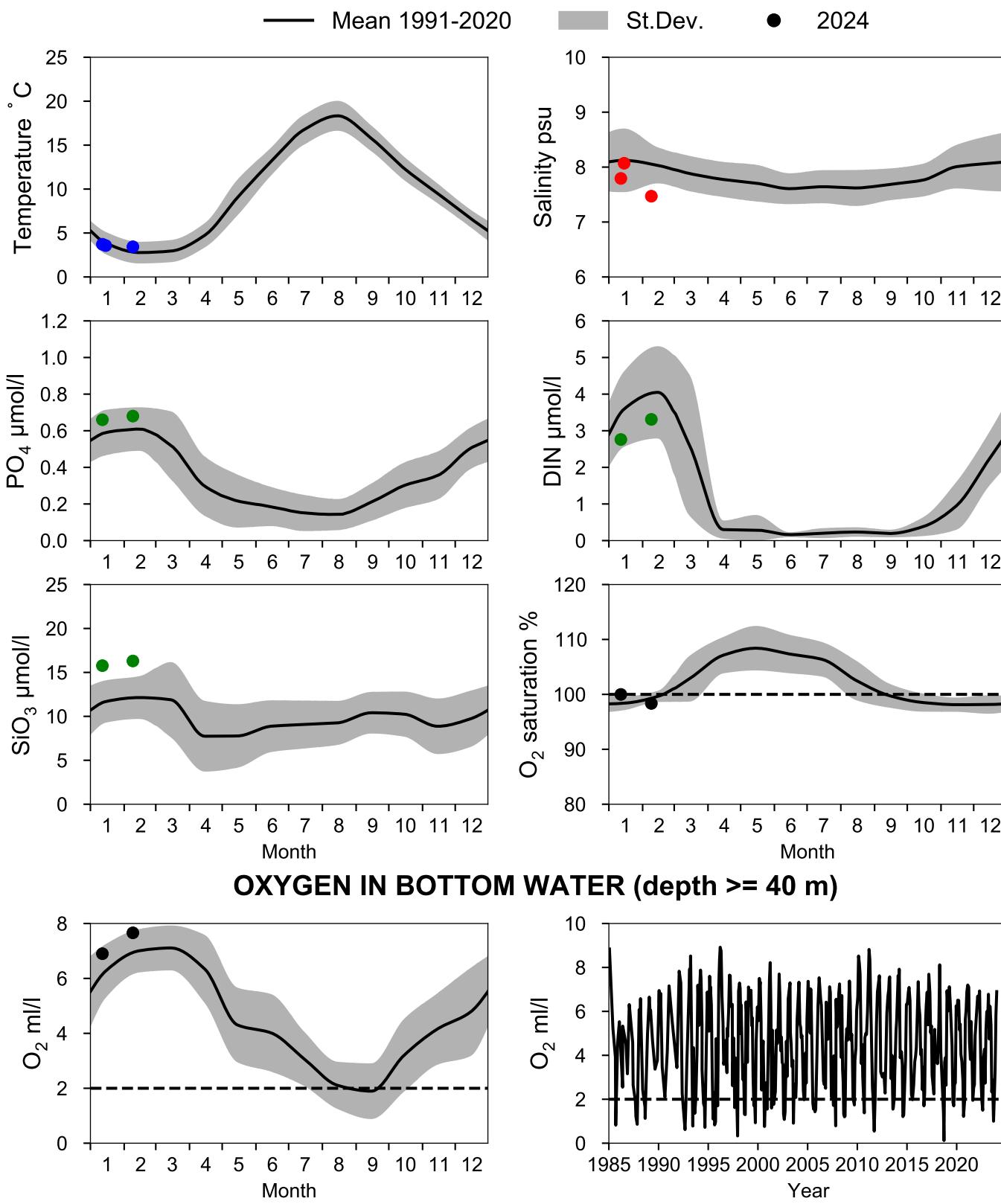
Vertical profiles BY1

February



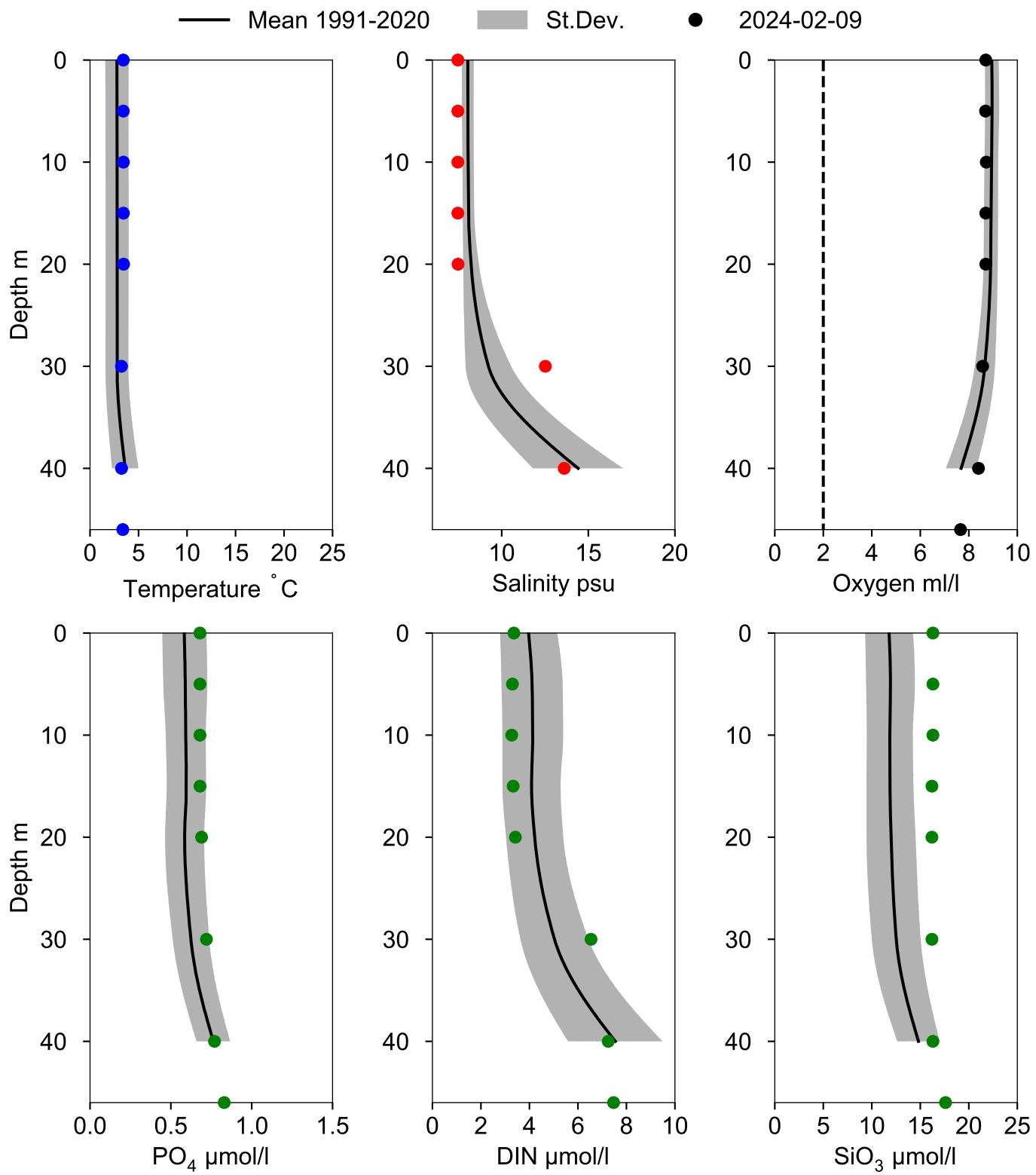
STATION BY2 ARKONA SURFACE WATER (0-10 m)

Annual Cycles



Vertical profiles BY2 ARKONA

February



STATION INFLOW 1 SURFACE WATER (0-10 m)

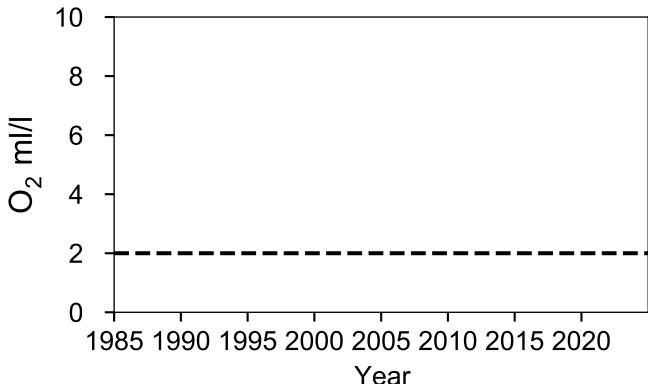
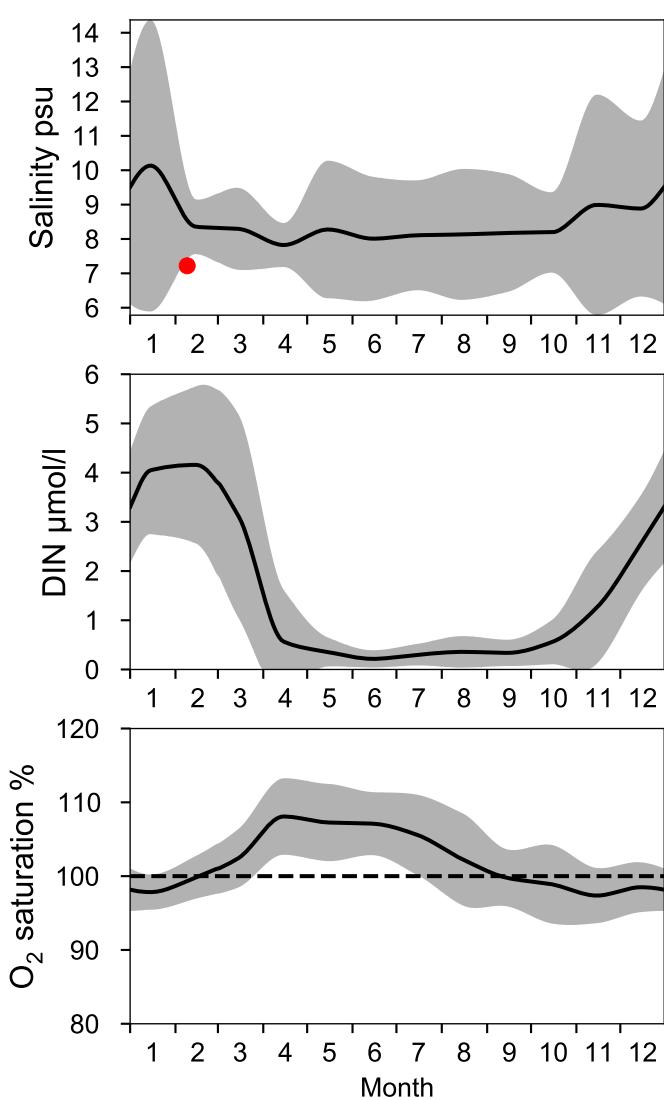
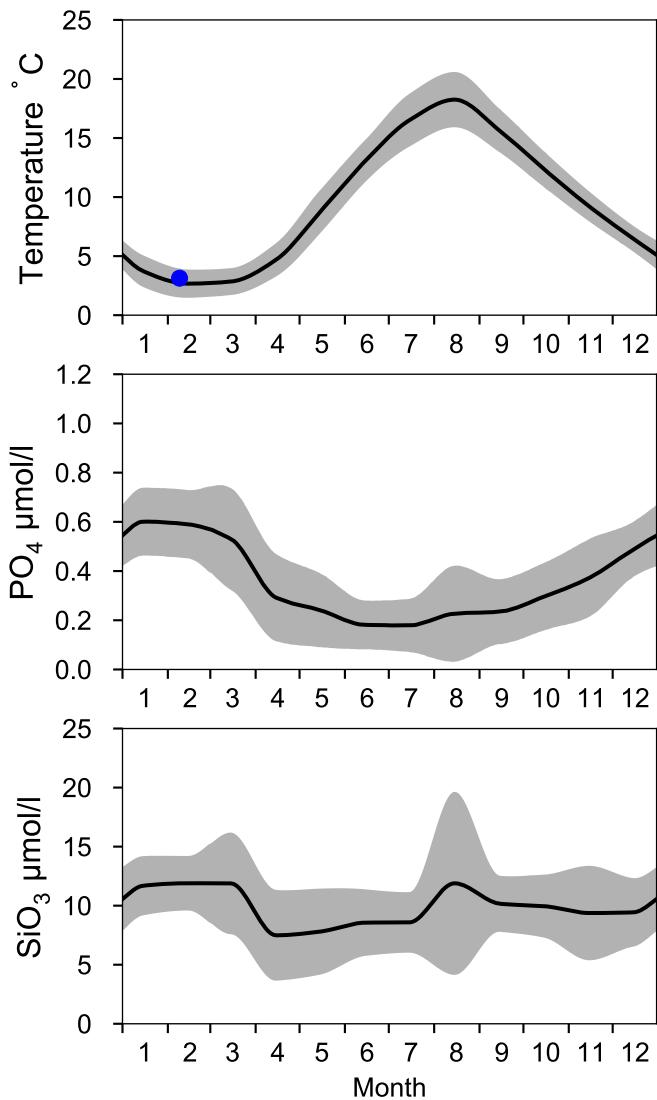
Annual Cycles

Statistics based on data from: Arkonahavet

— Mean 1991-2020

■ St.Dev.

● 2024



Vertical profiles INFLOW 1

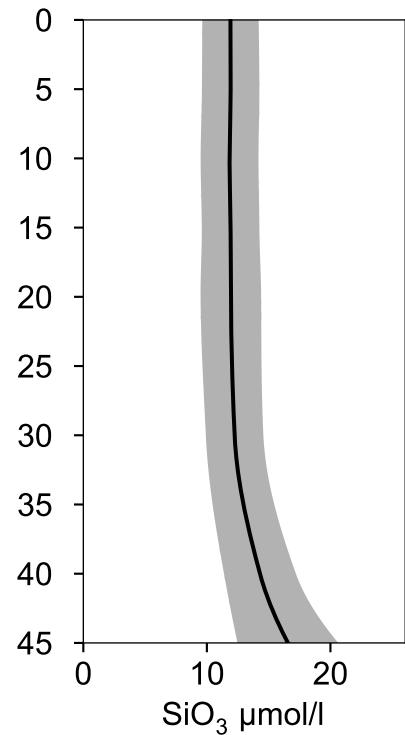
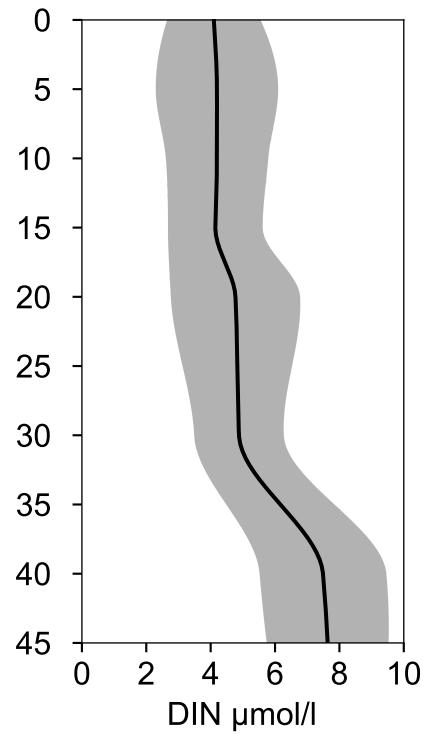
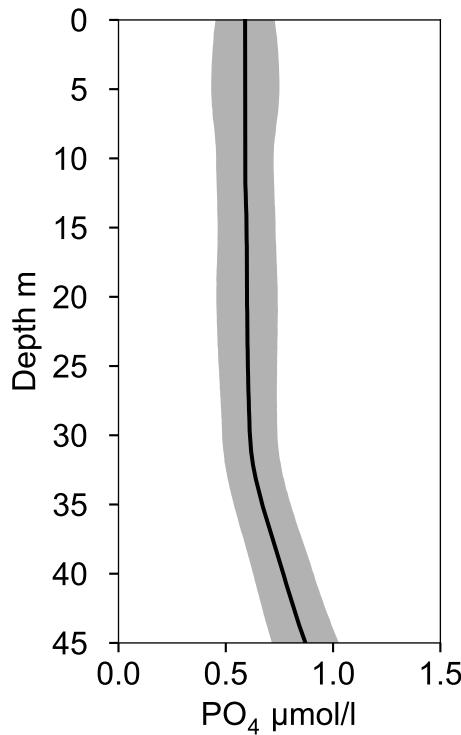
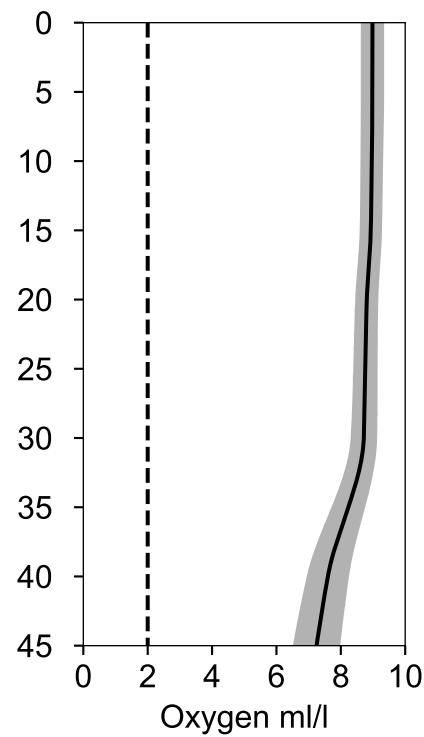
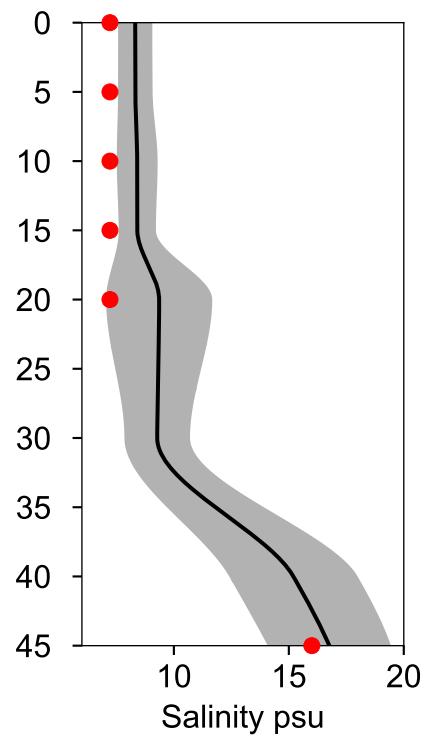
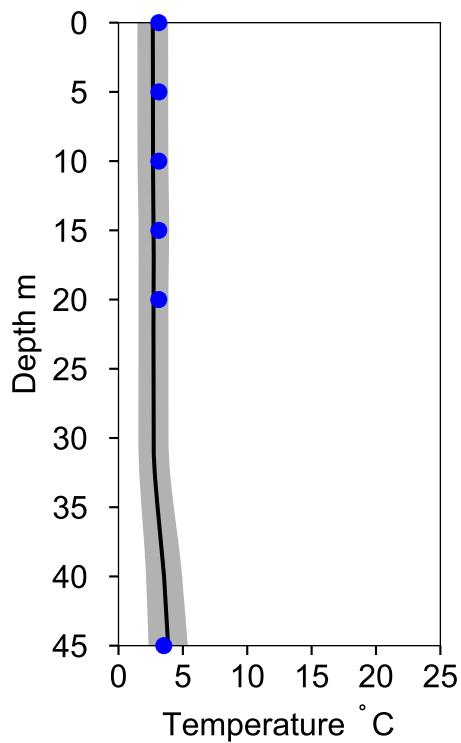
February

Statistics based on data from: Arkonahavet

— Mean 1991-2020

■ St.Dev.

● 2024-02-09



STATION BY3 HAMRARNE SUND SURFACE WATER (0-10 m)

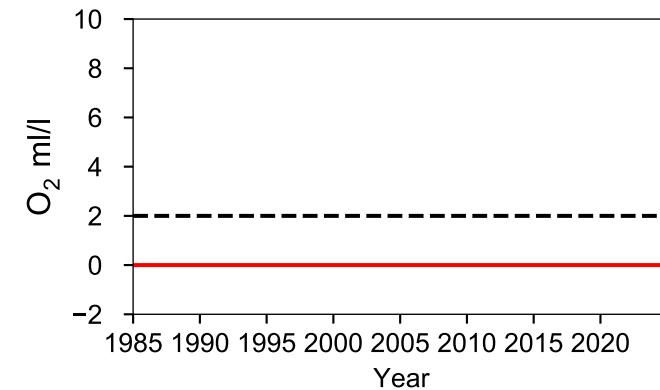
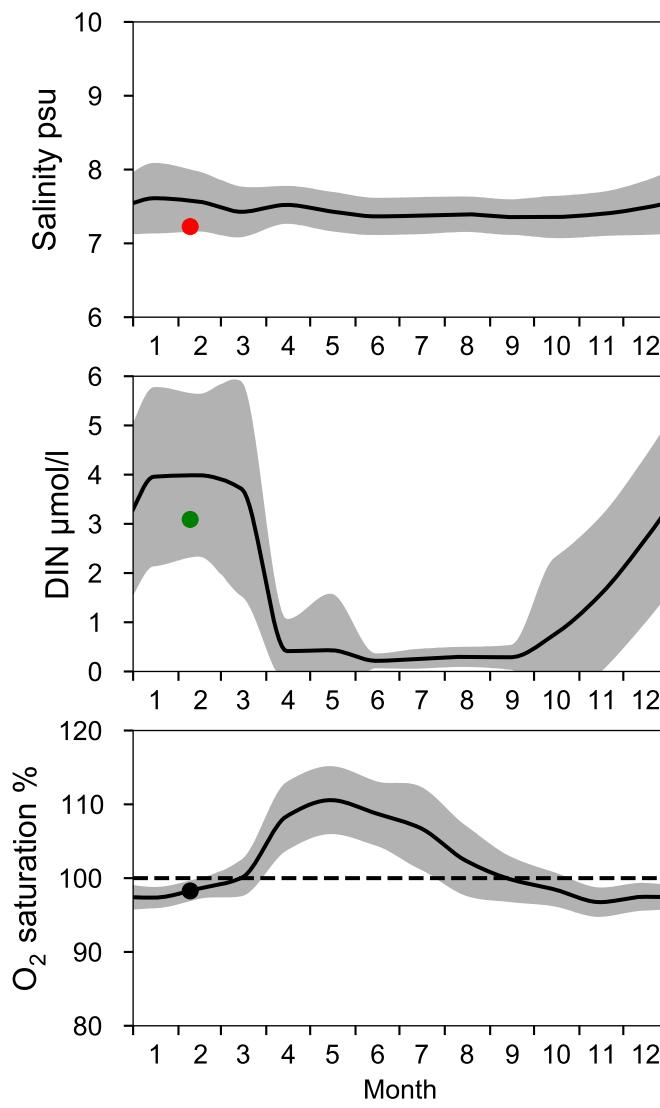
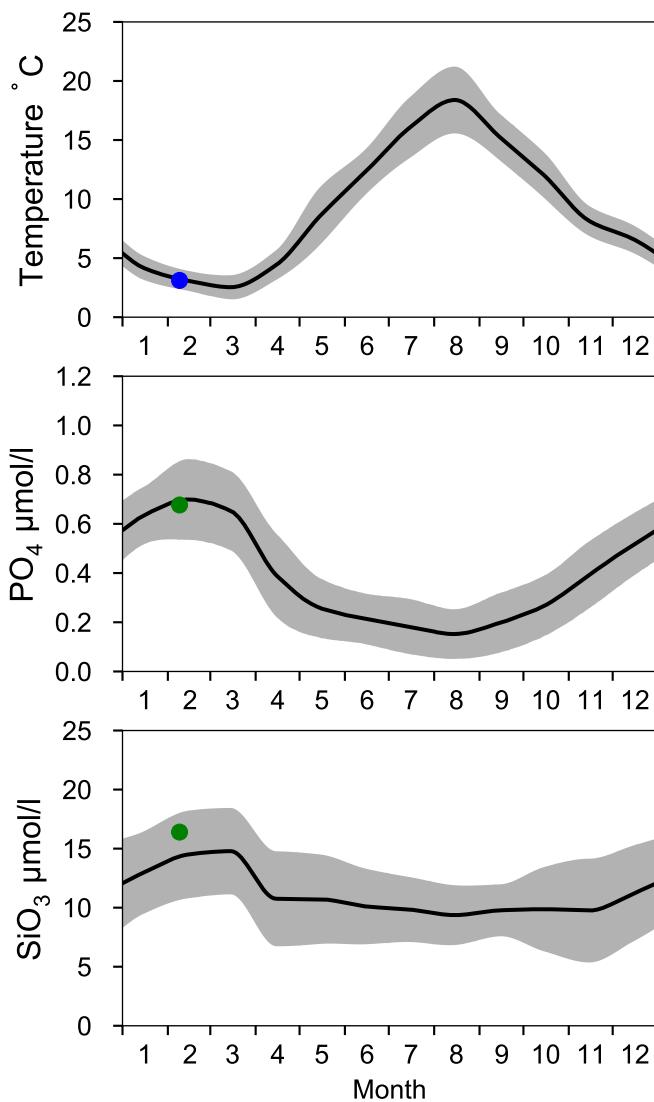
Annual Cycles

Statistics based on data from: Bornholmshavet

— Mean 1991-2020

St.Dev.

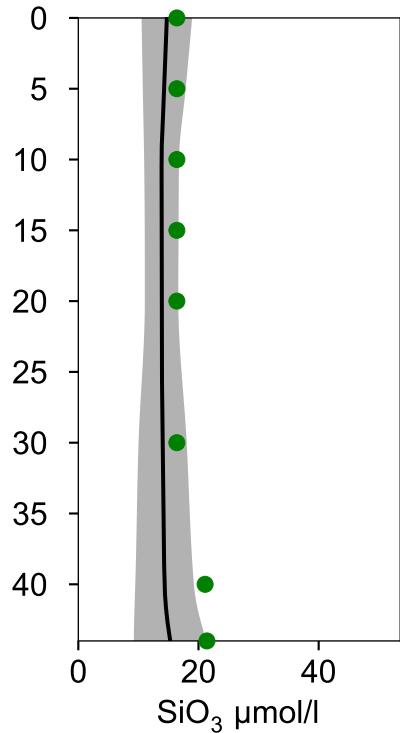
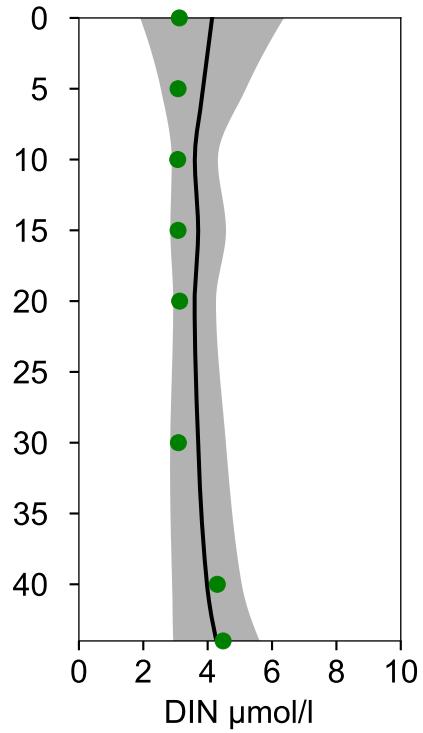
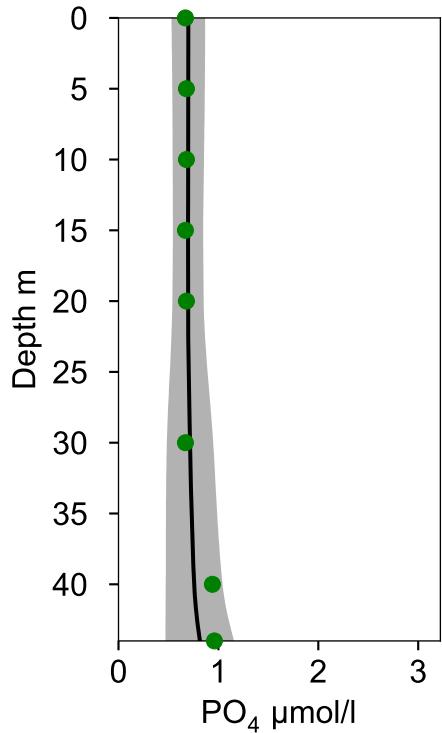
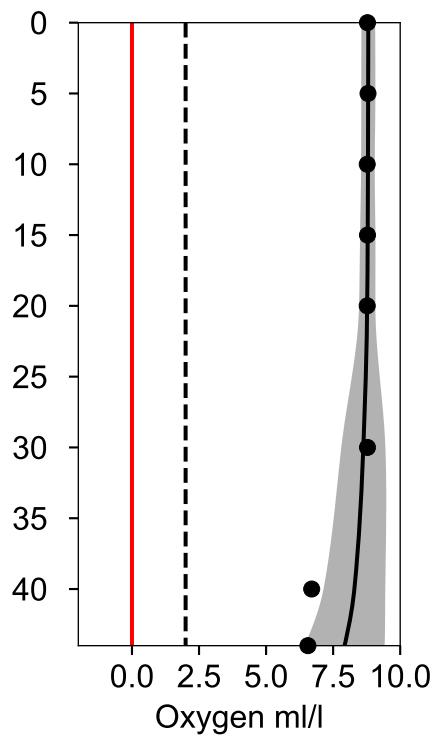
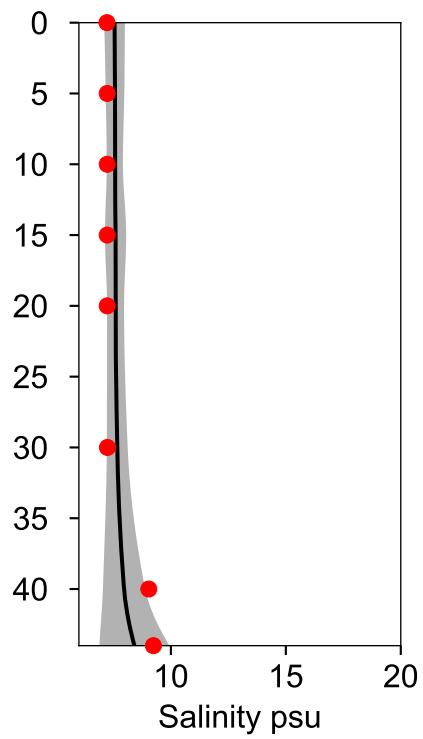
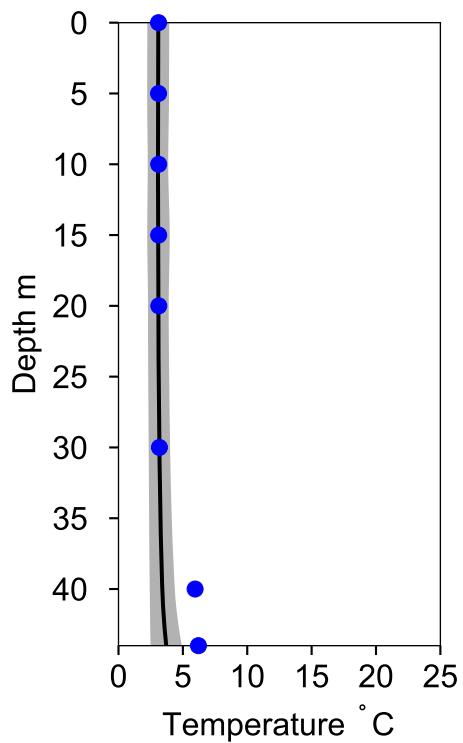
● 2024



Vertical profiles BY3 HAMRARNE SUND February

Statistics based on data from: Bornholmshavet

— Mean 1991-2020 ■ St.Dev. ● 2024-02-09



STATION INFLOW 3 SURFACE WATER (0-10 m)

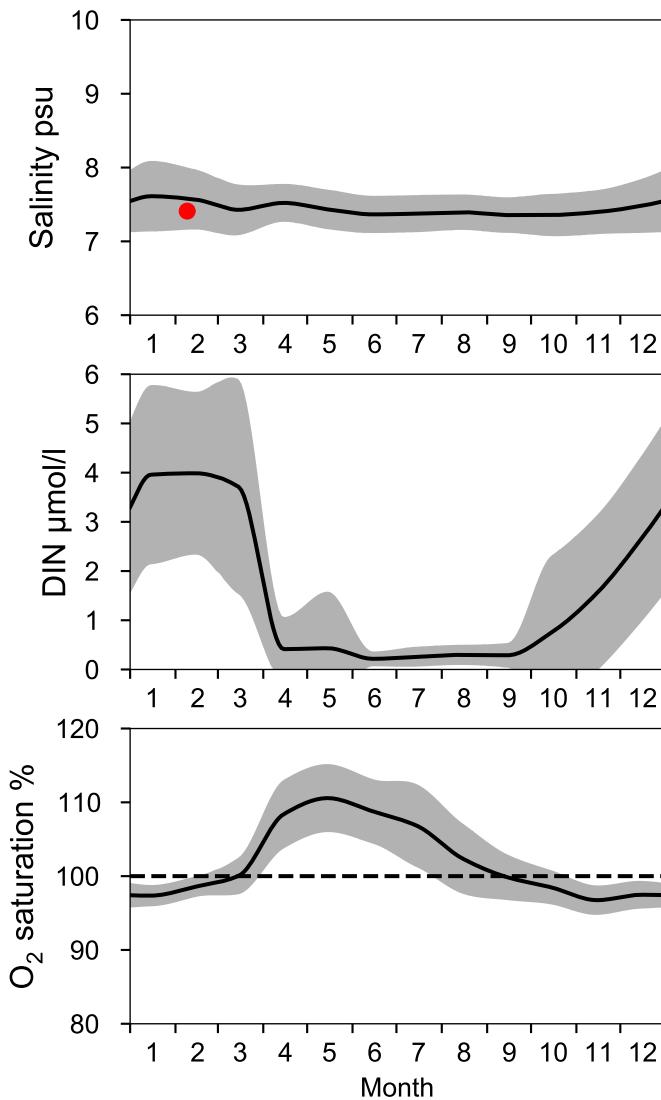
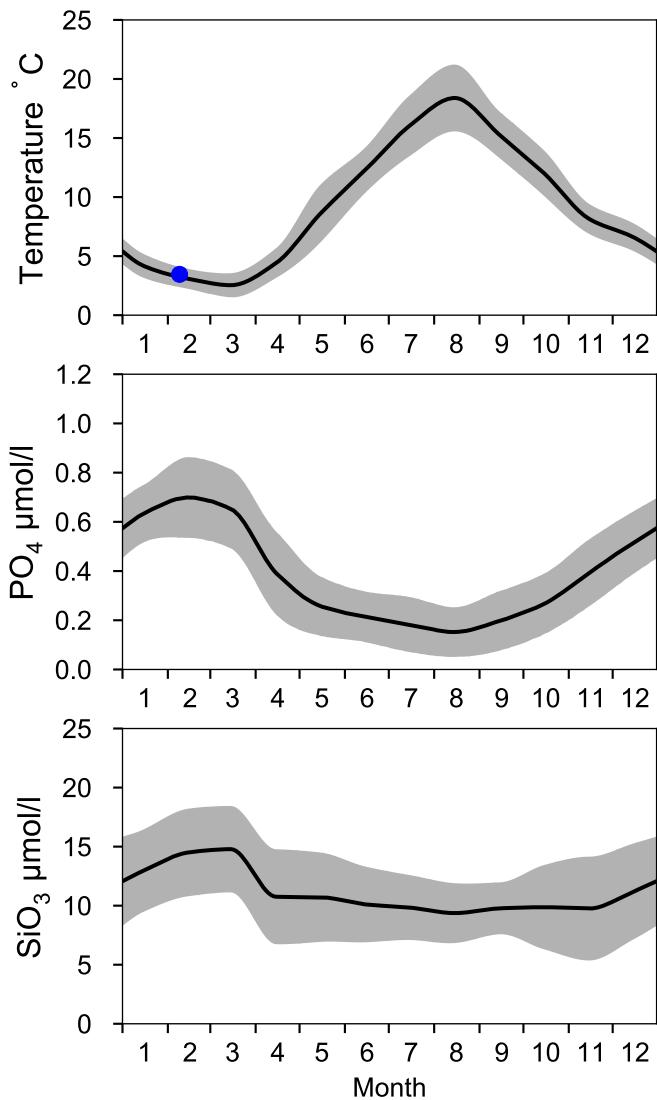
Annual Cycles

Statistics based on data from: Bornholmshavet

— Mean 1991-2020

St.Dev.

● 2024



Vertical profiles INFLOW 3

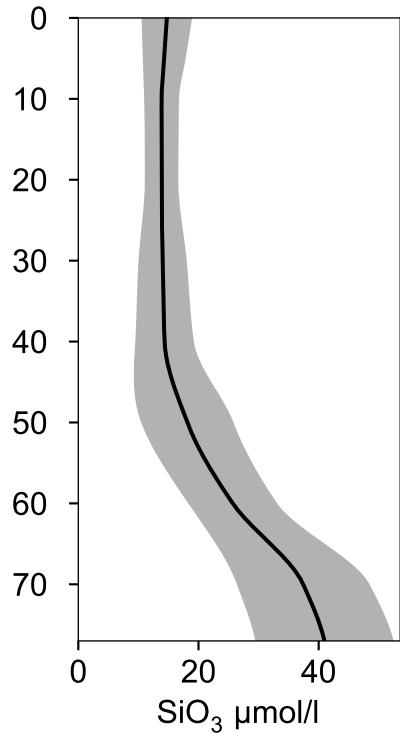
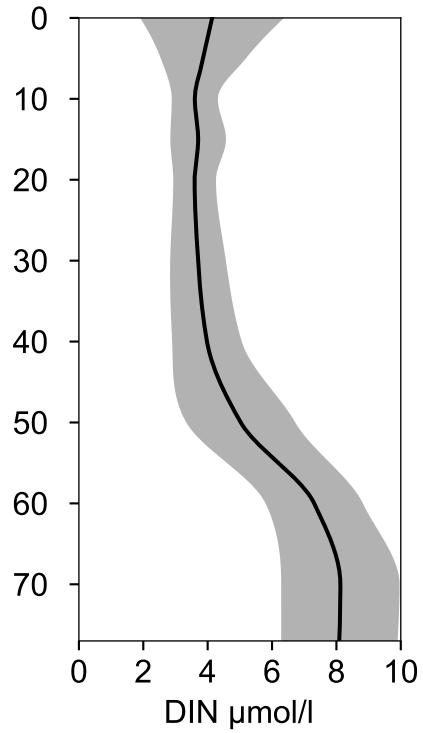
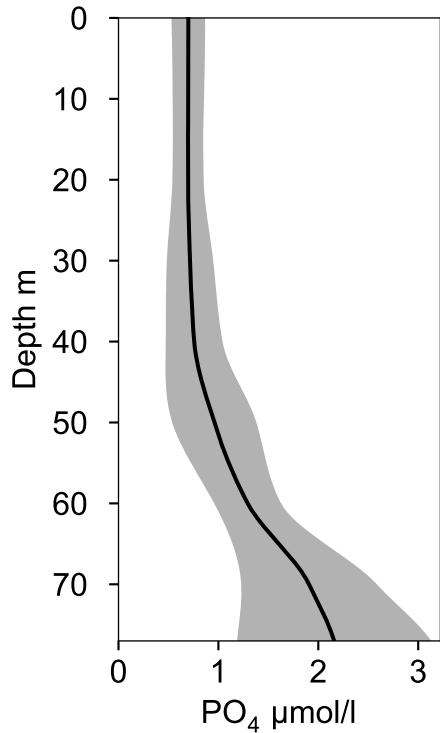
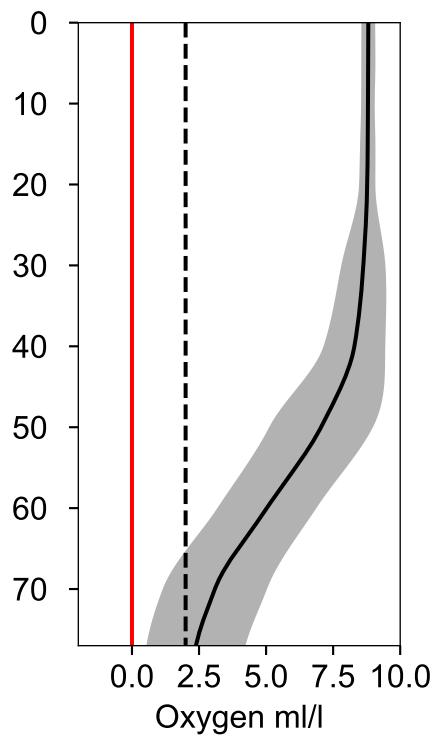
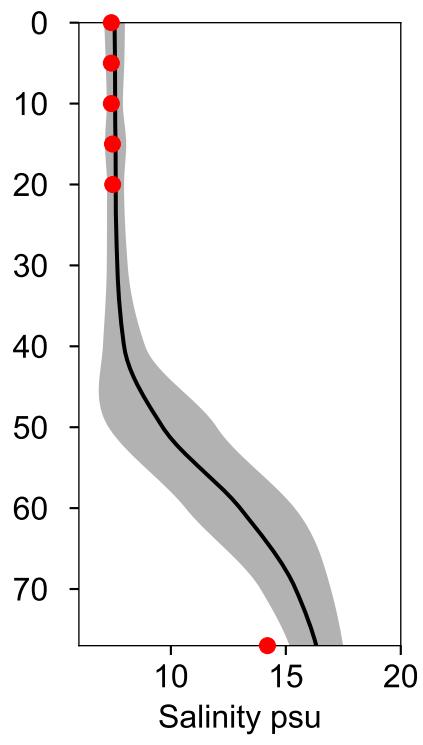
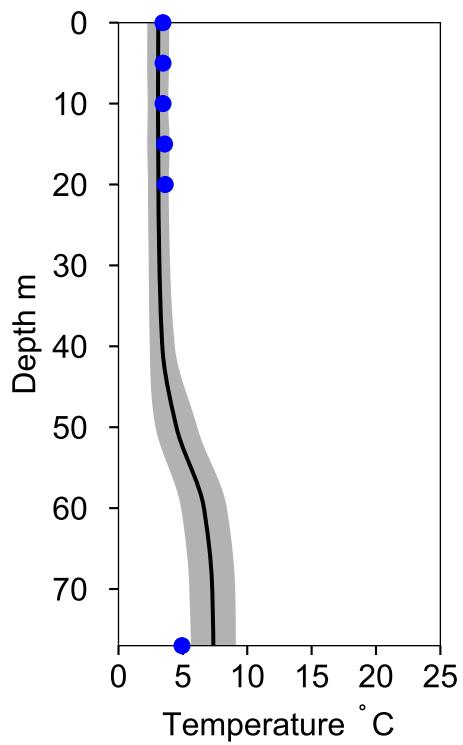
February

Statistics based on data from: Bornholmshavet

— Mean 1991-2020

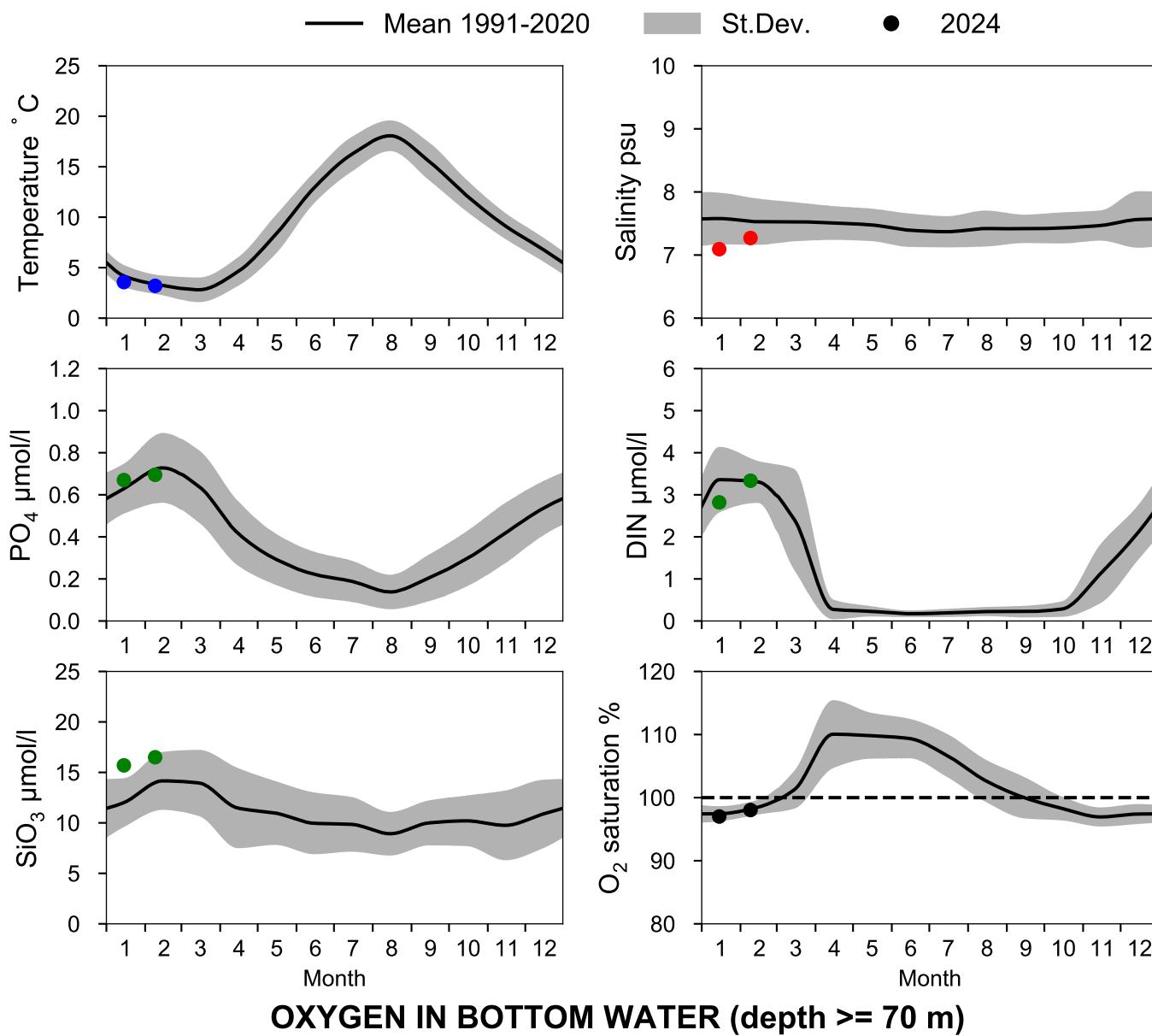
■ St.Dev.

● 2024-02-09

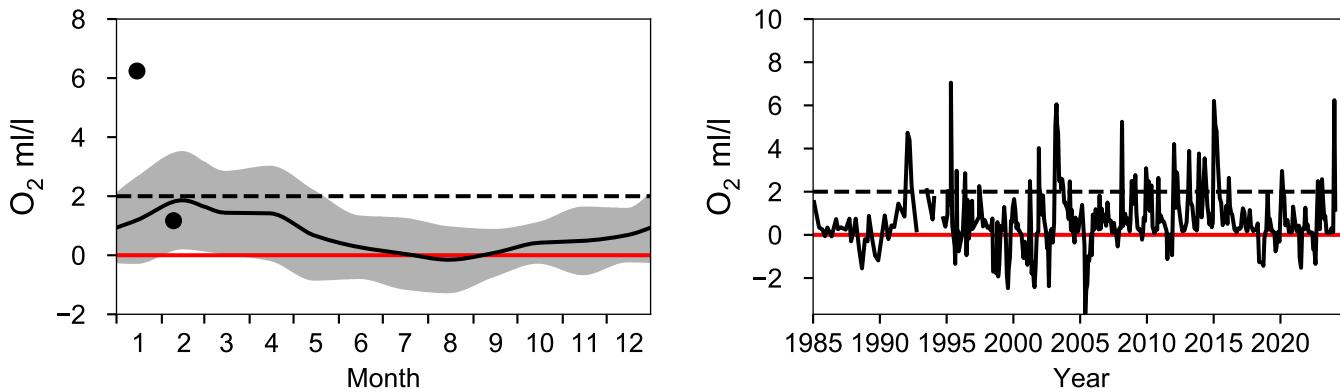


STATION HANÖBUKTEN SURFACE WATER (0-10 m)

Annual Cycles

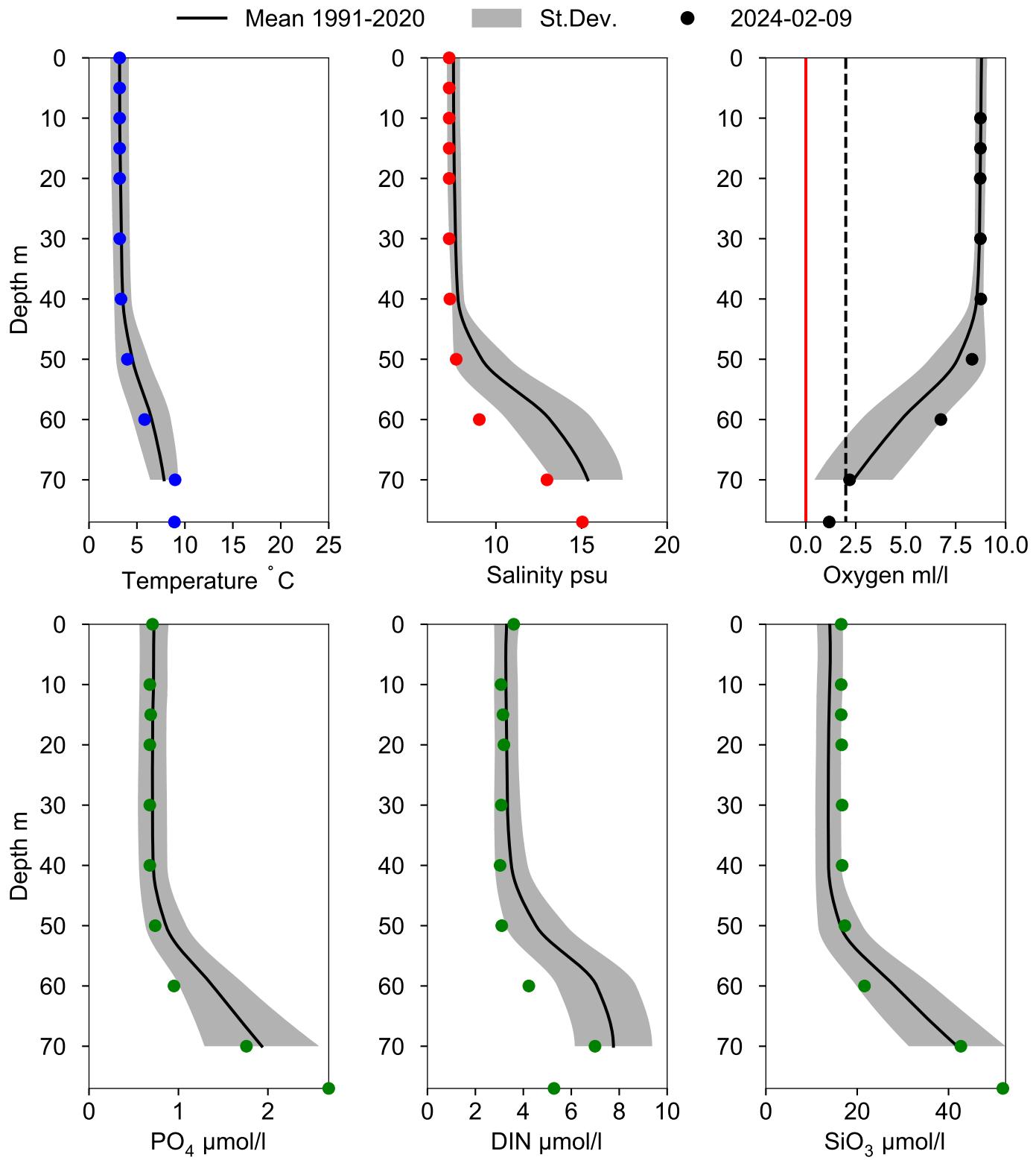


OXYGEN IN BOTTOM WATER (depth >= 70 m)



Vertical profiles HANÖBUKTEN

February



STATION INFLOW-4 SURFACE WATER (0-10 m)

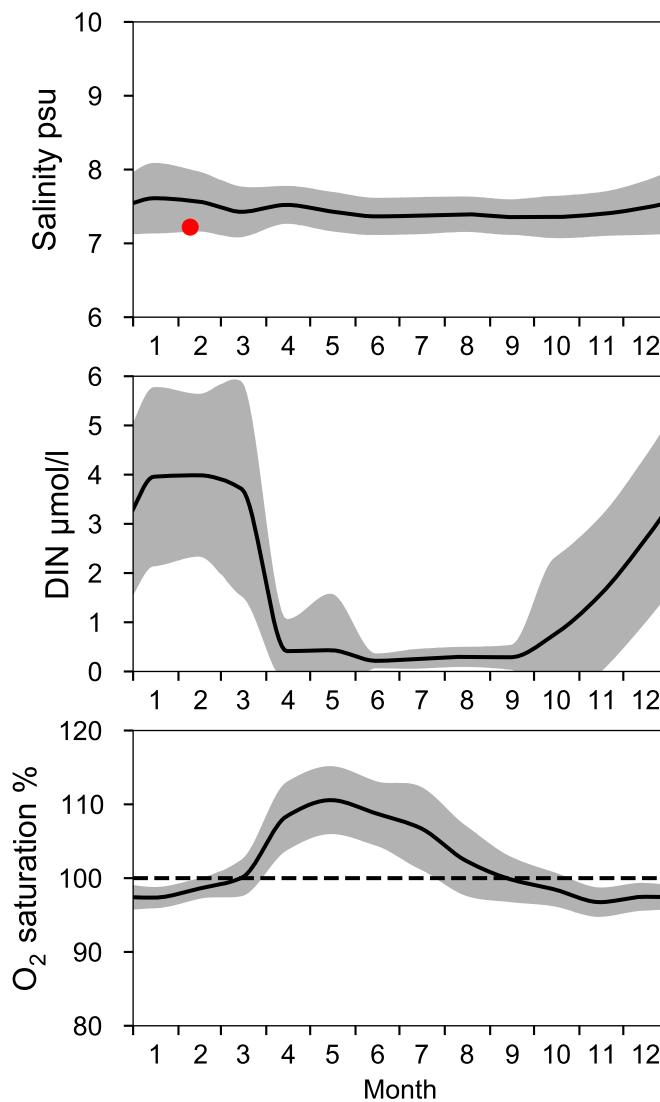
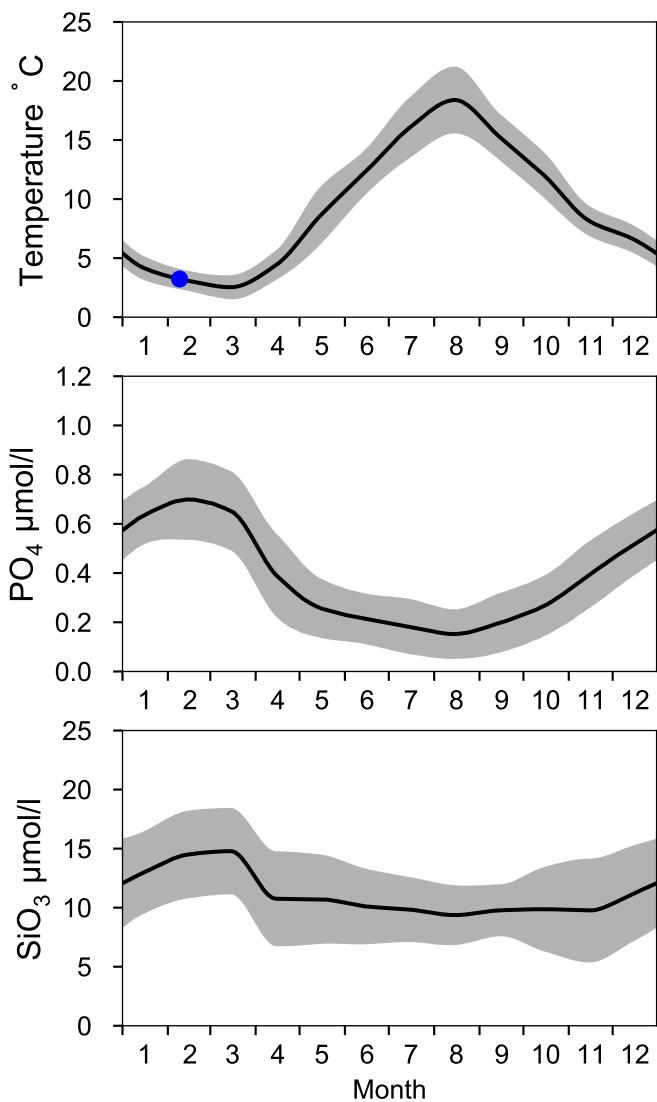
Annual Cycles

Statistics based on data from: Bornholmshavet

— Mean 1991-2020

St.Dev.

● 2024

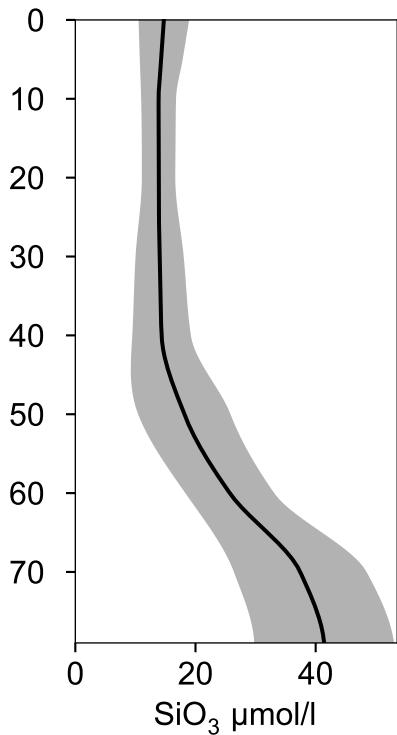
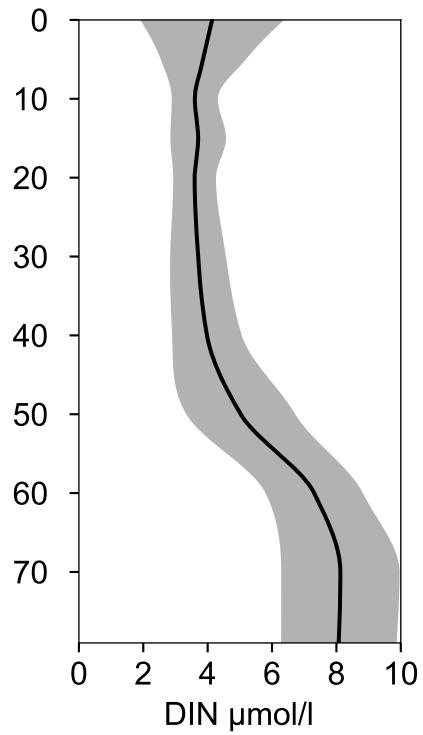
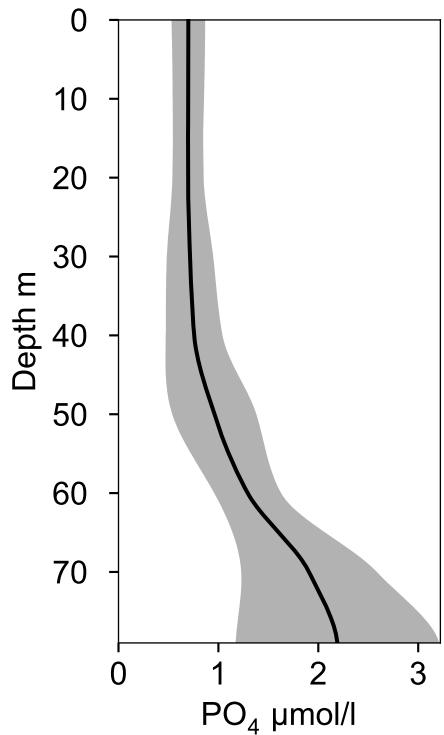
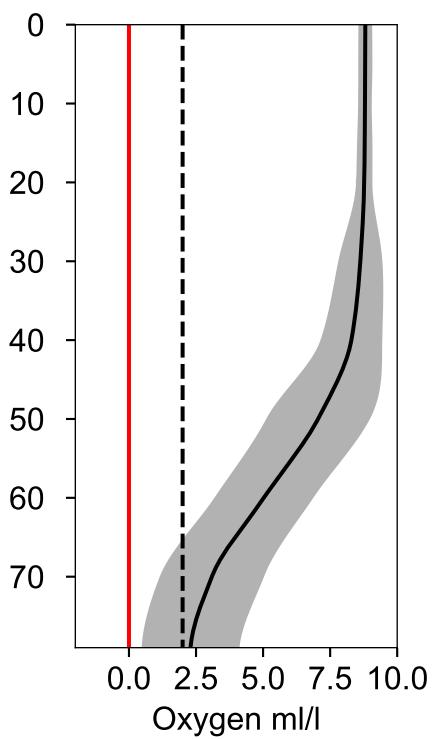
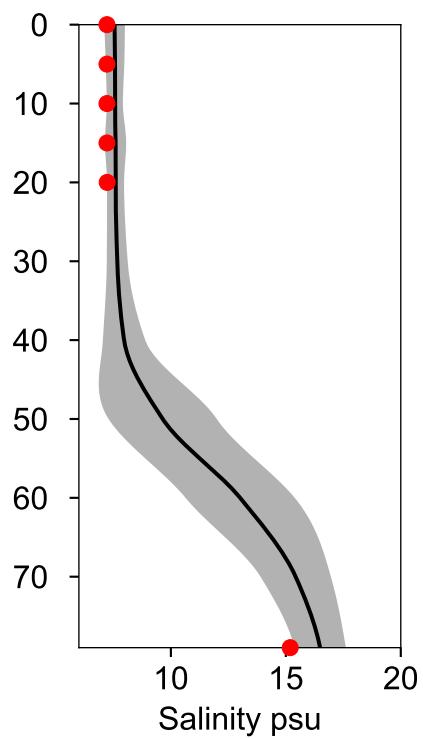
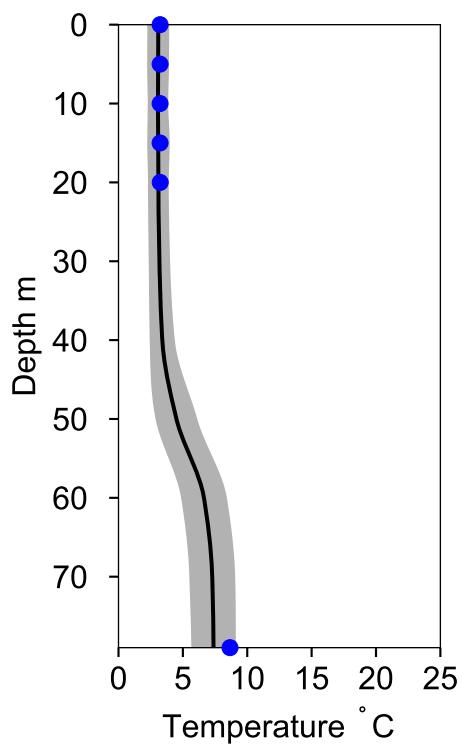


Vertical profiles INFLOW-4

February

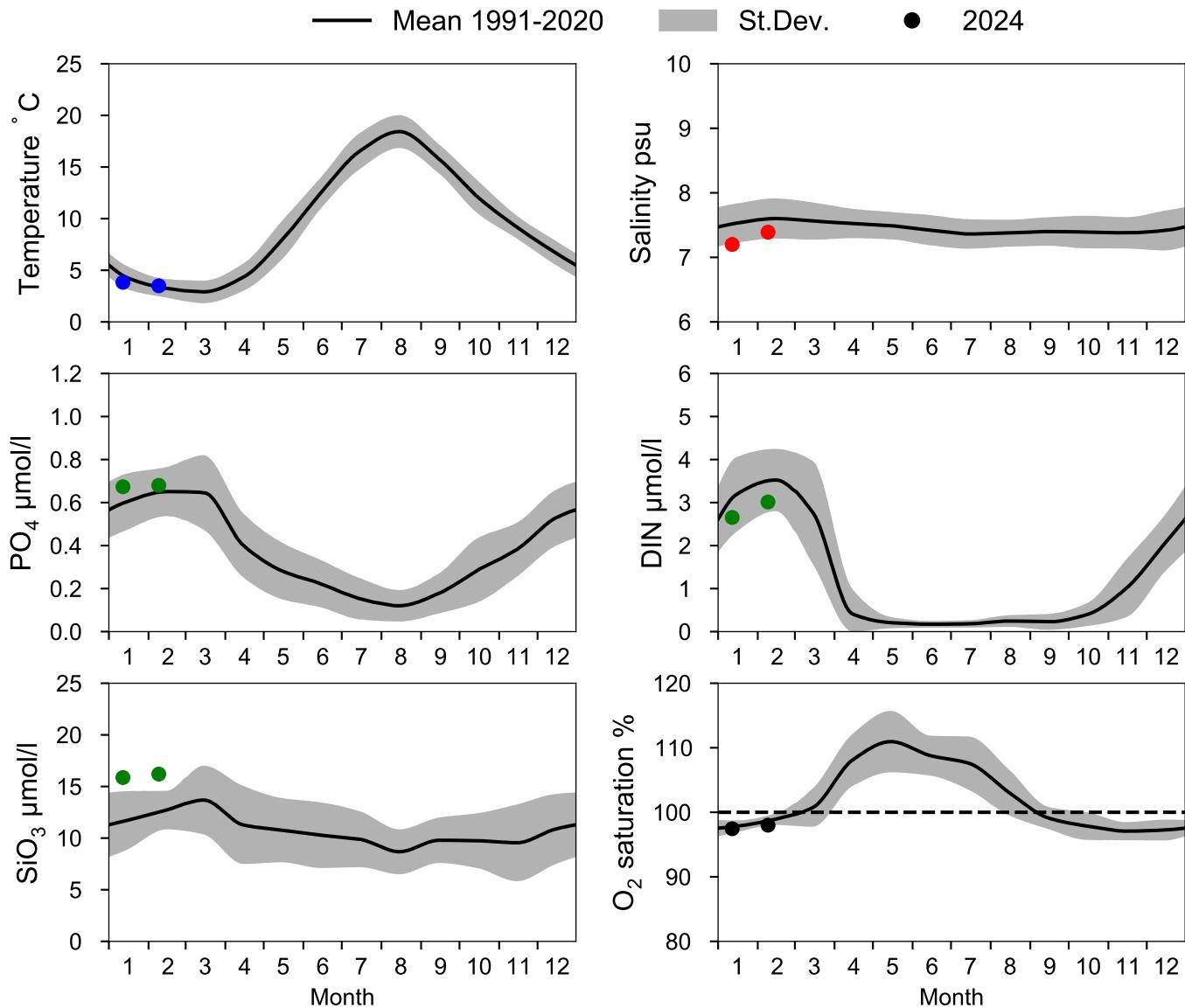
Statistics based on data from: Bornholmshavet

— Mean 1991-2020 ■ St.Dev. ● 2024-02-09

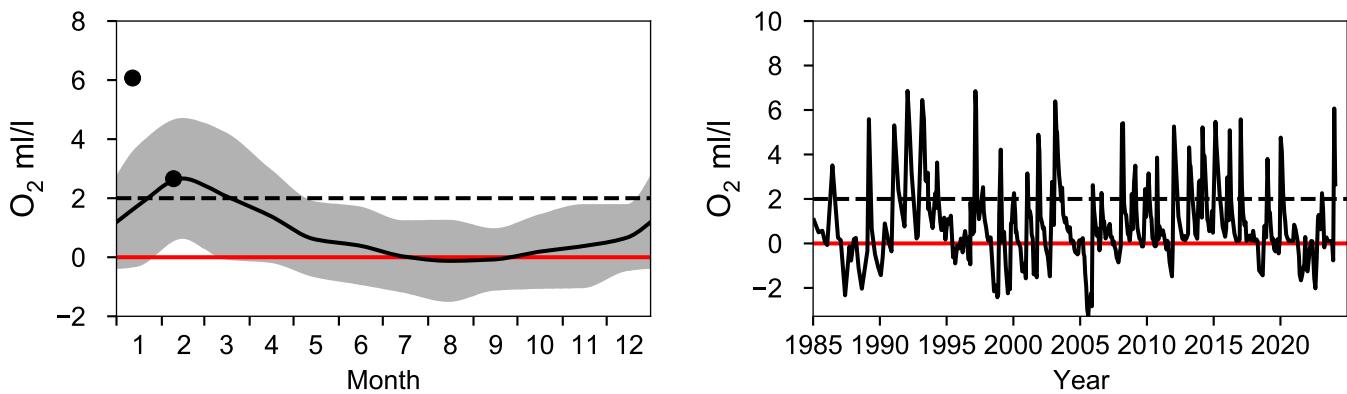


STATION BY4 CHRISTIANSÖ SURFACE WATER (0-10 m)

Annual Cycles

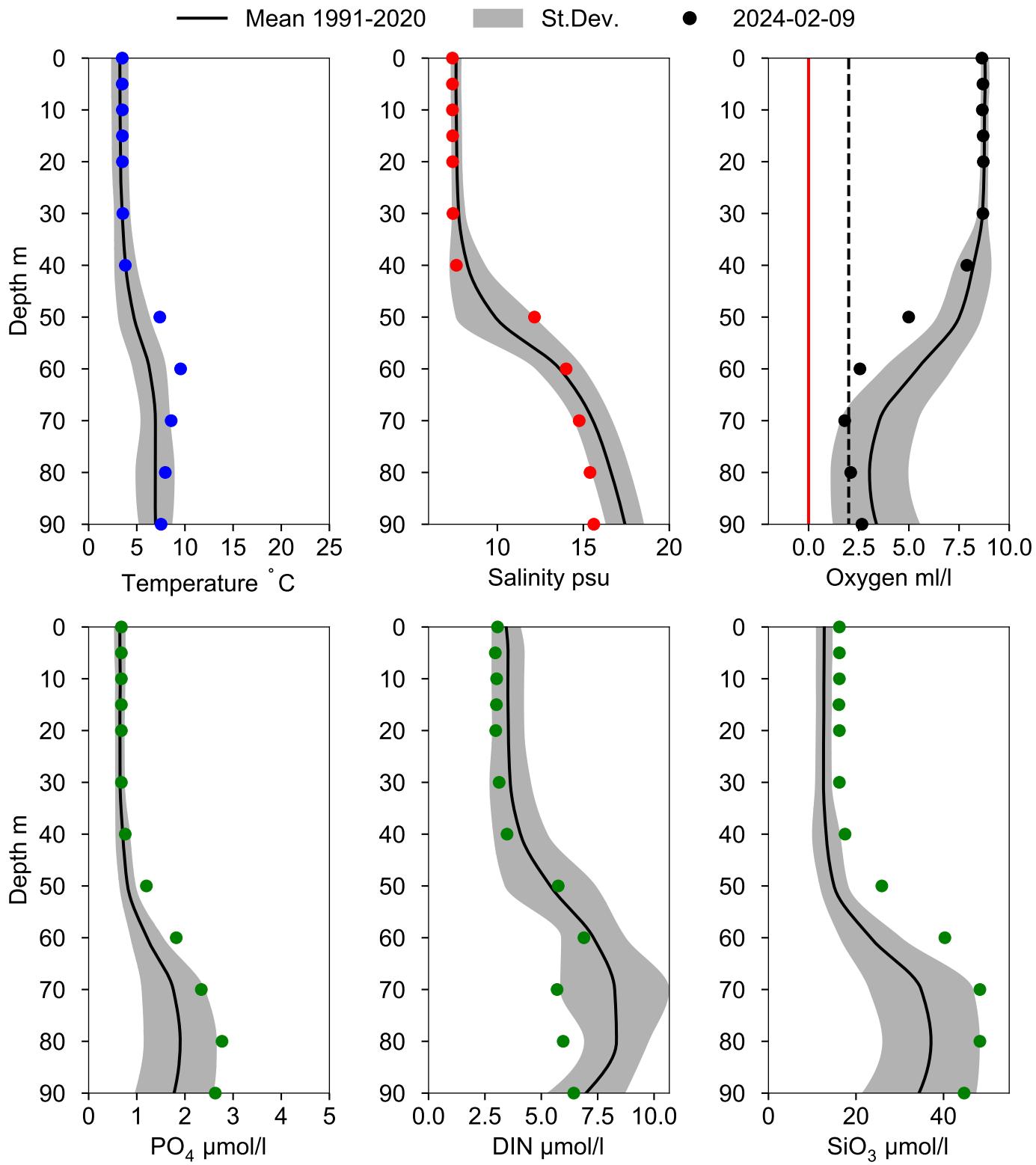


OXYGEN IN BOTTOM WATER (depth >= 80 m)



Vertical profiles BY4 CHRISTIANSÖ

February



STATION INFLOW 5 SURFACE WATER (0-10 m)

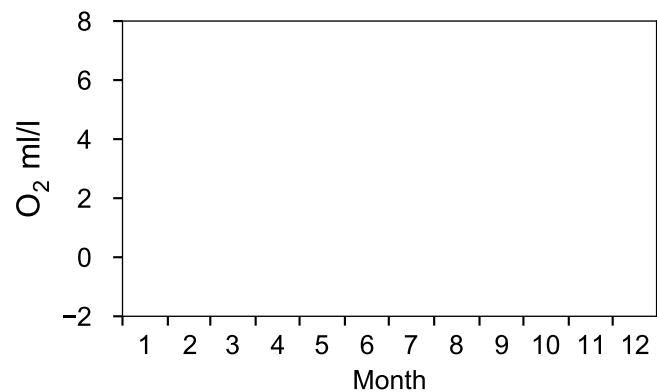
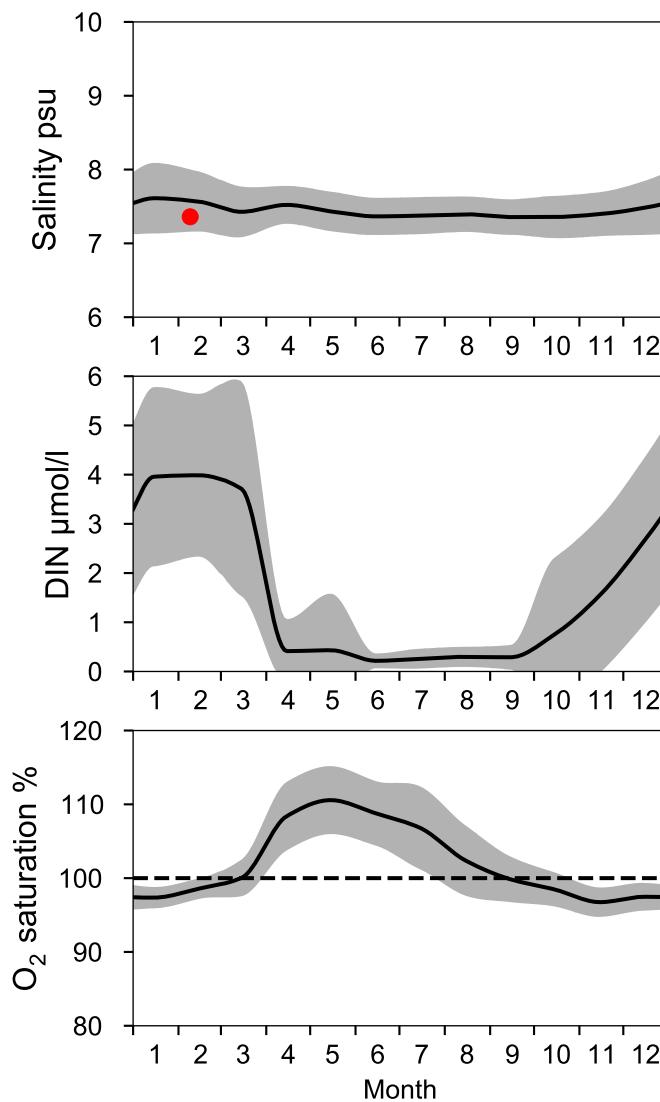
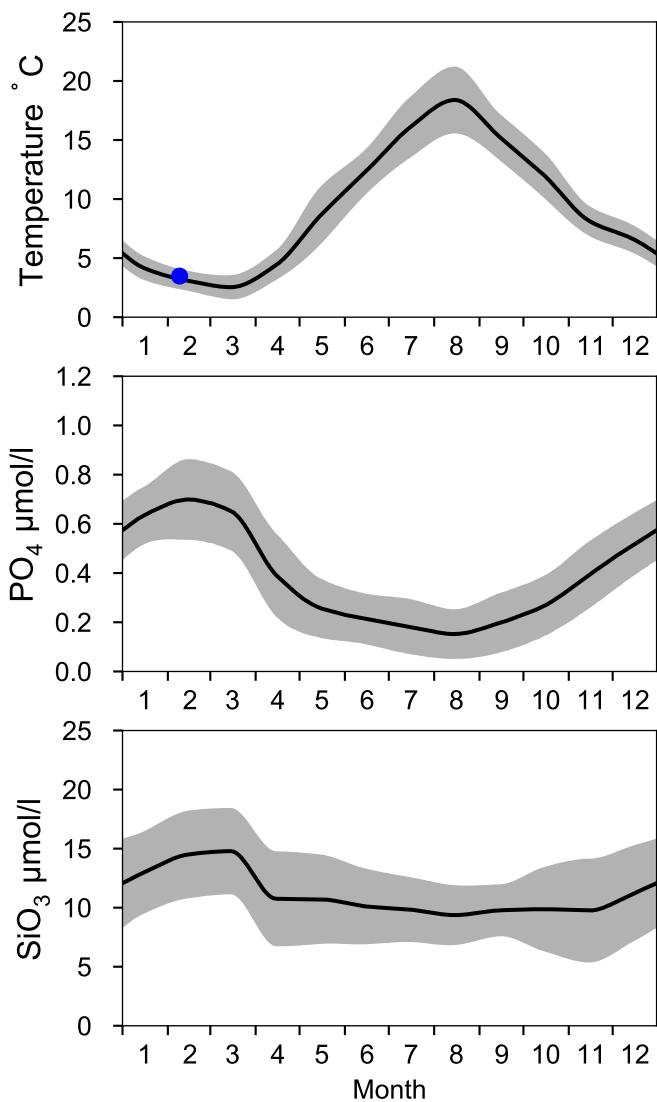
Annual Cycles

Statistics based on data from: Bornholmshavet

— Mean 1991-2020

St.Dev.

● 2024

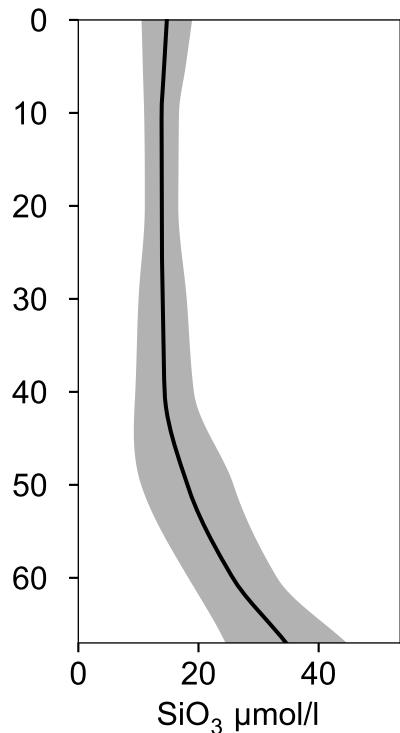
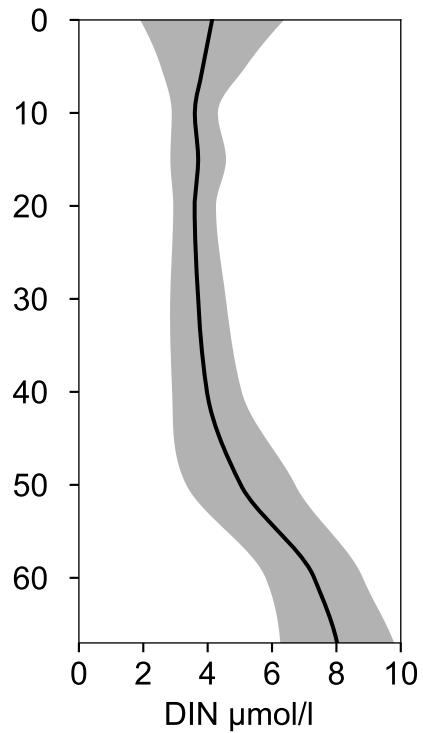
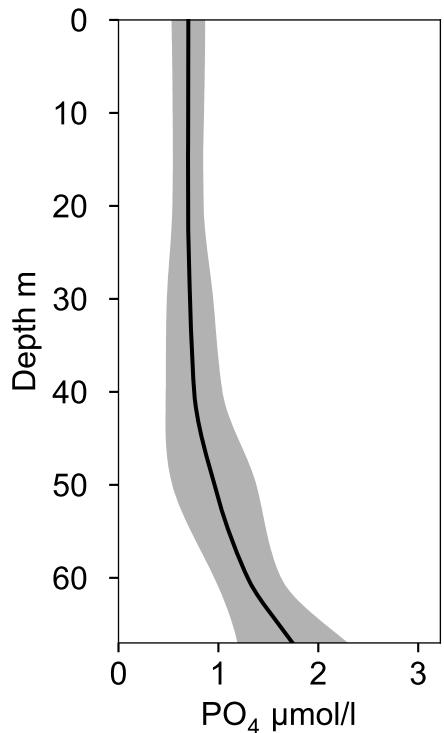
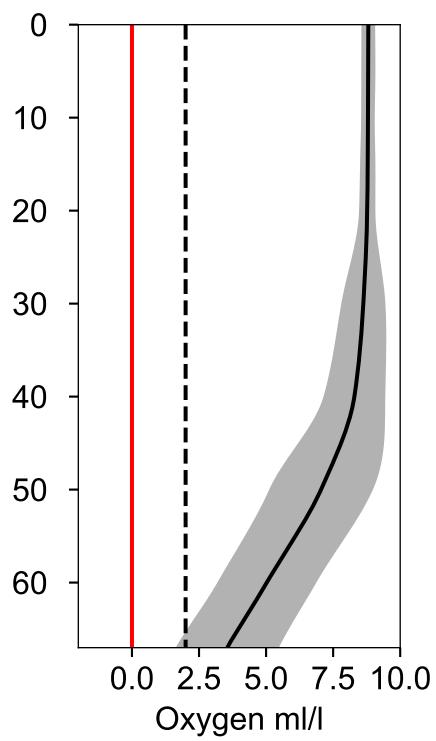
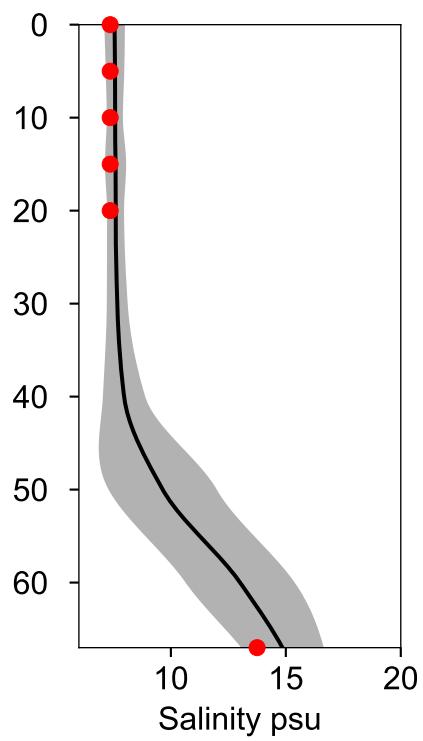
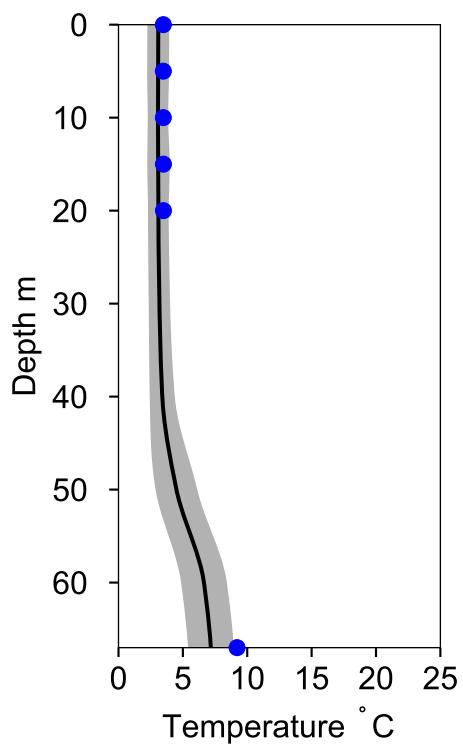


Vertical profiles INFLOW 5

February

Statistics based on data from: Bornholmshavet

— Mean 1991-2020 ■ St.Dev. ● 2024-02-09



STATION HANÖBUKTEN-KBV SURFACE WATER (0-10 m)

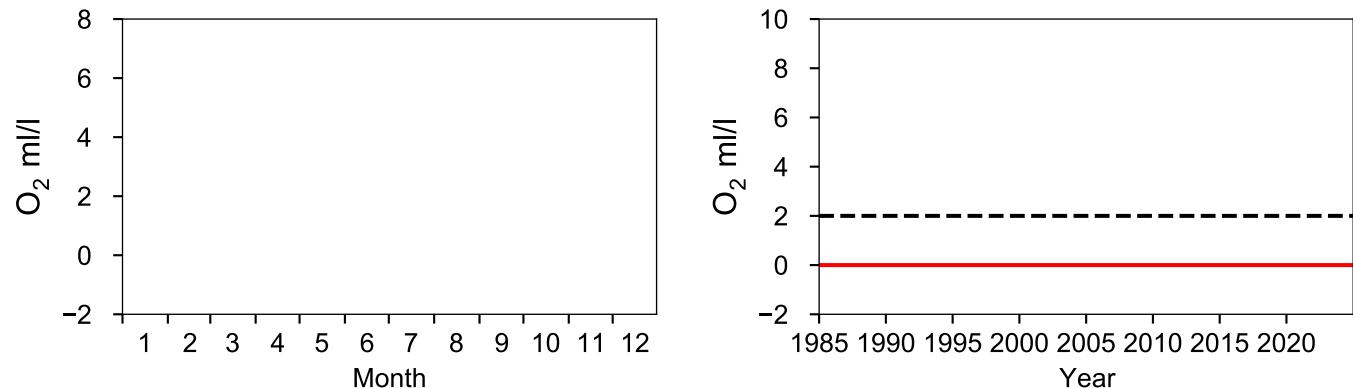
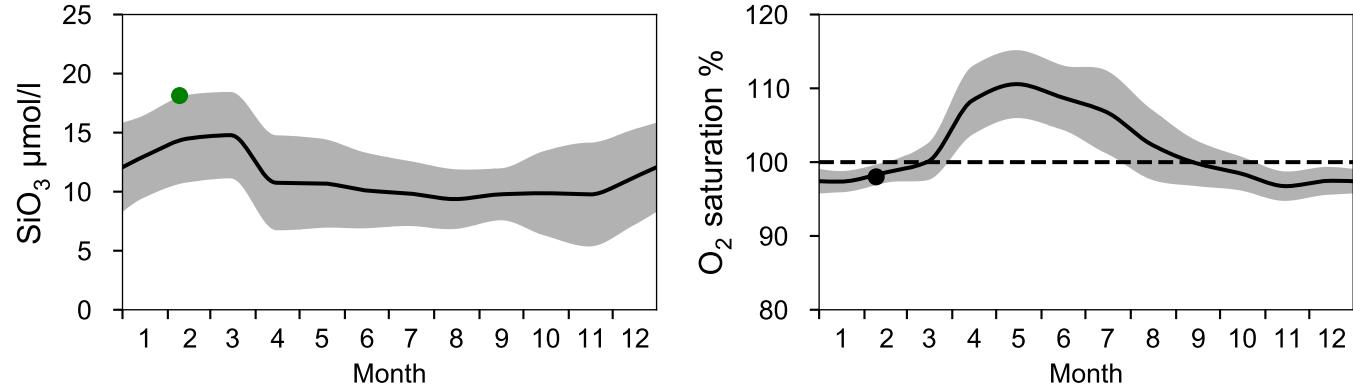
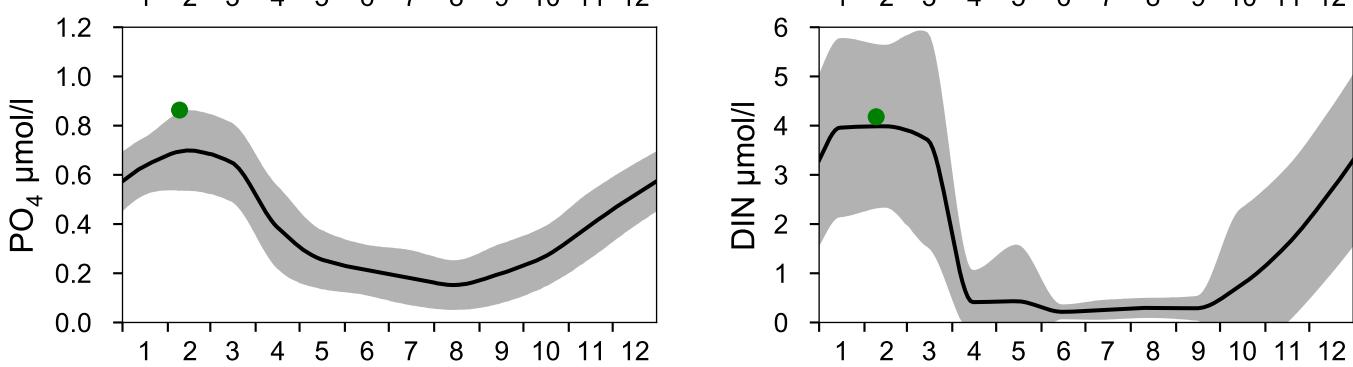
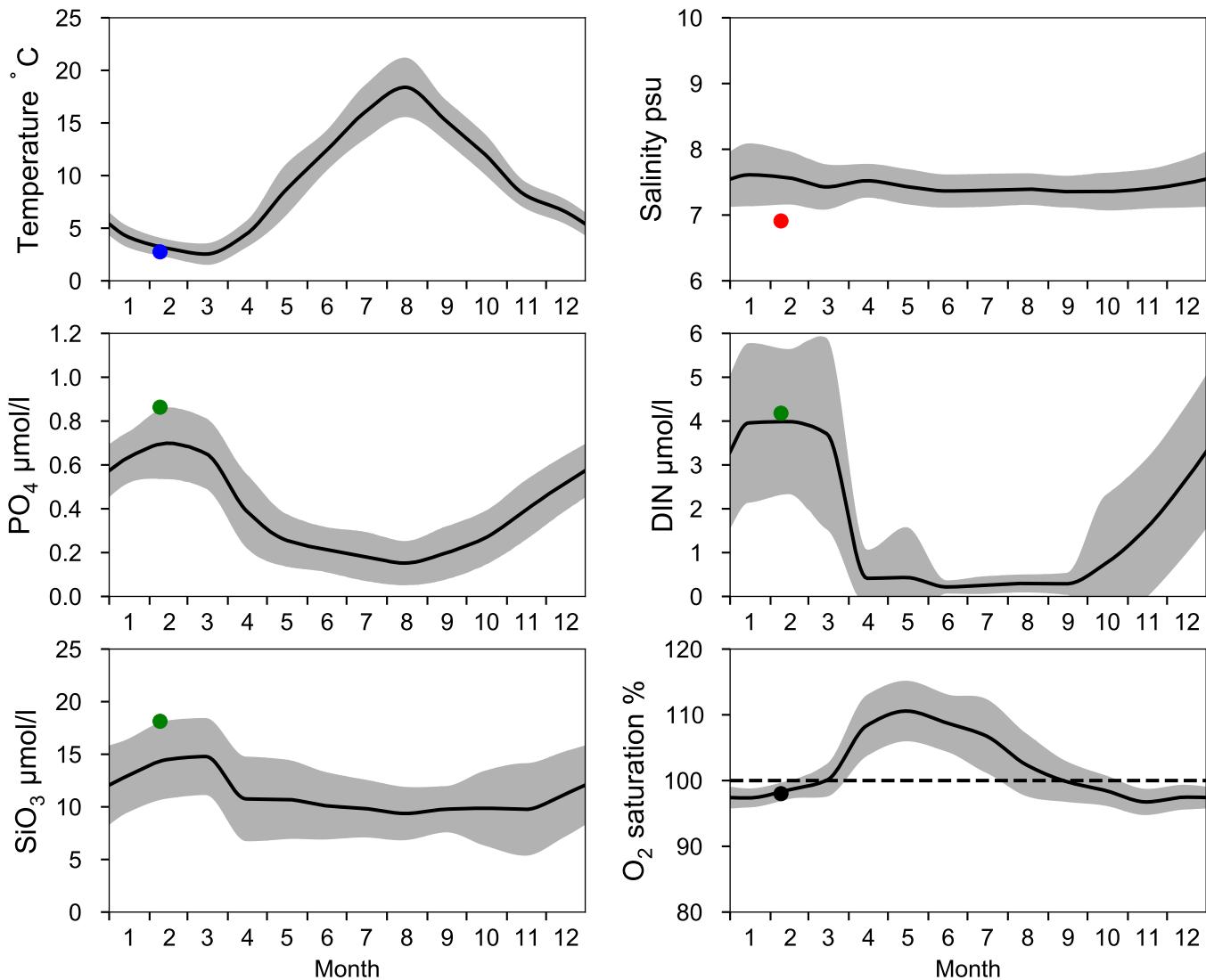
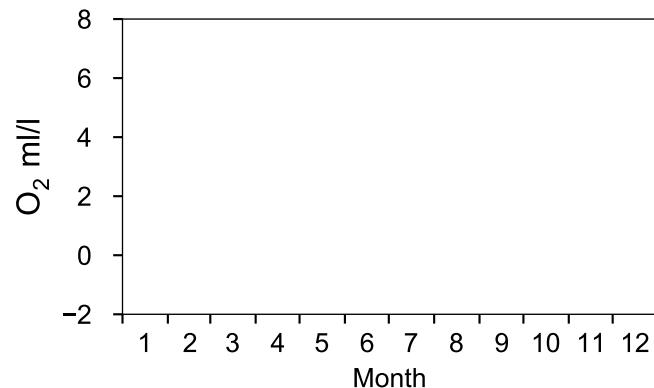
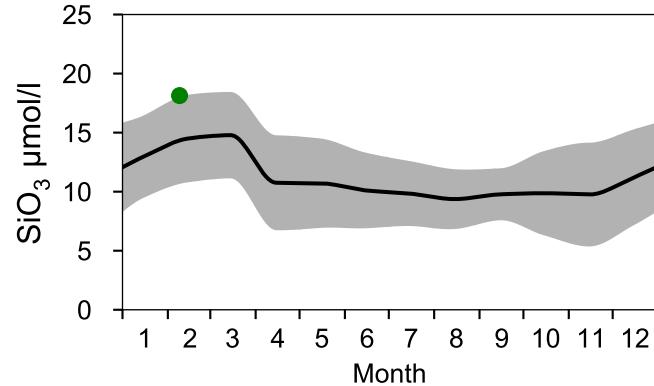
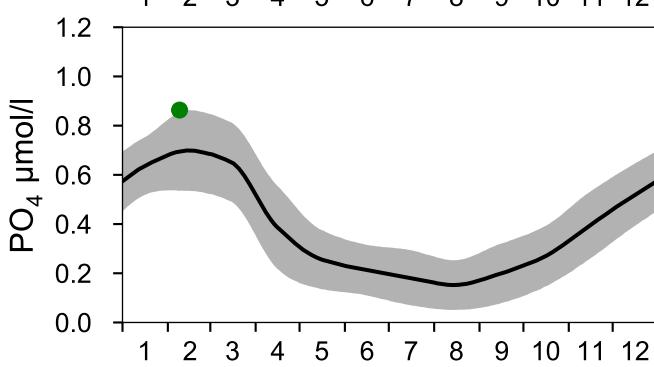
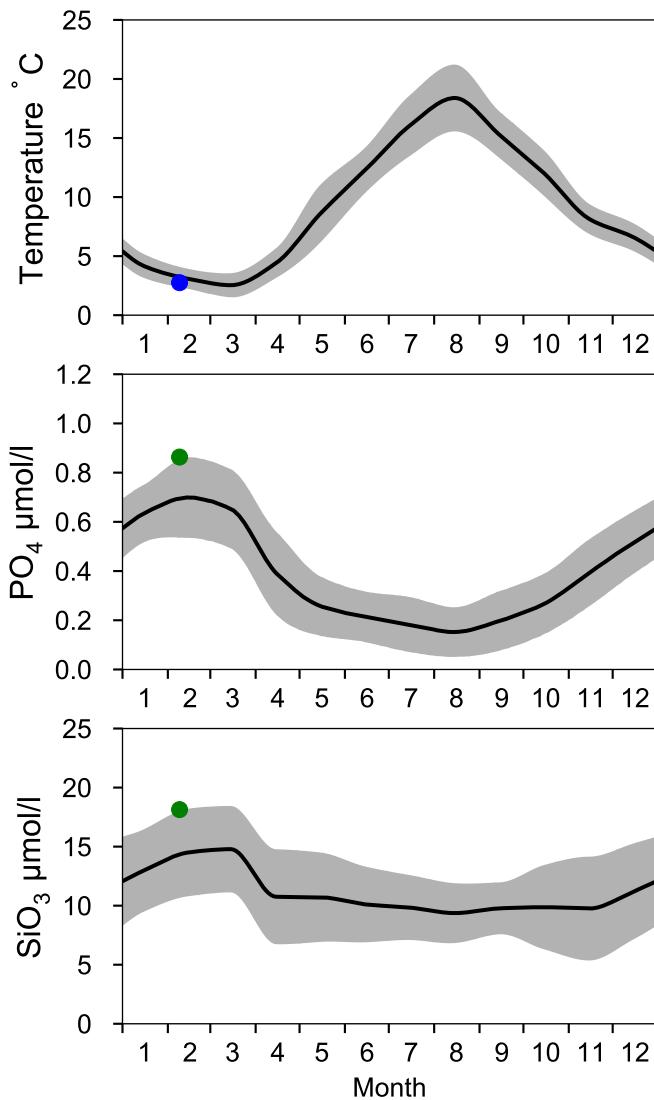
Annual Cycles

Statistics based on data from: Bornholmshavet

— Mean 1991-2020

St.Dev.

● 2024

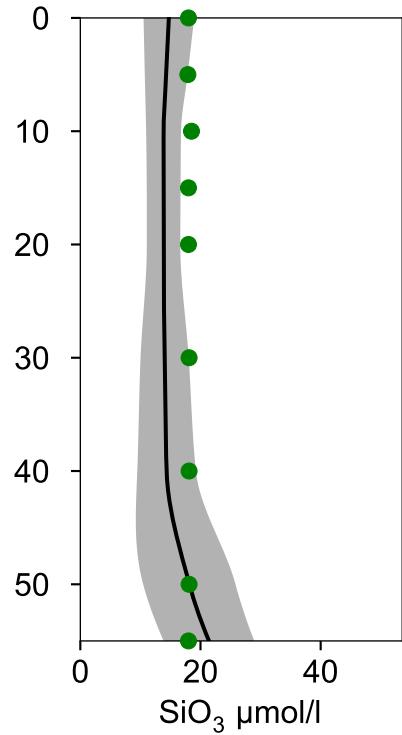
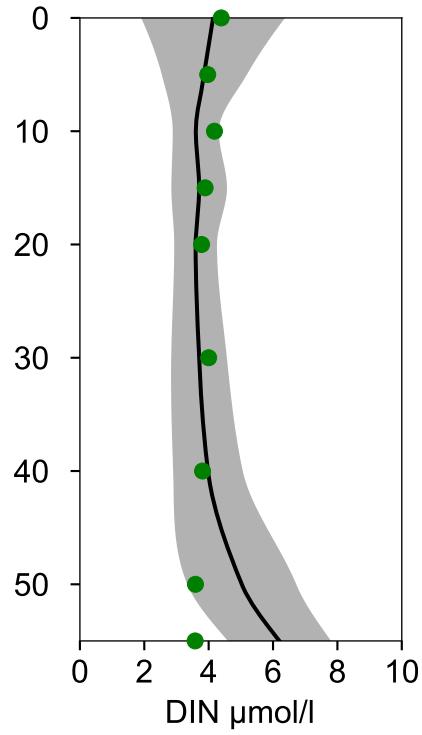
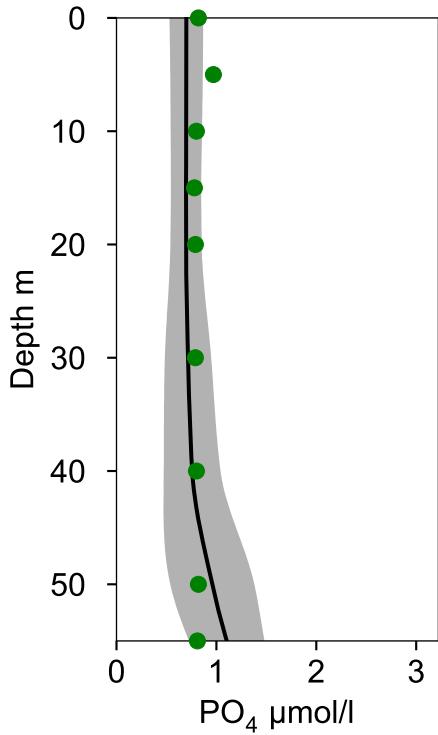
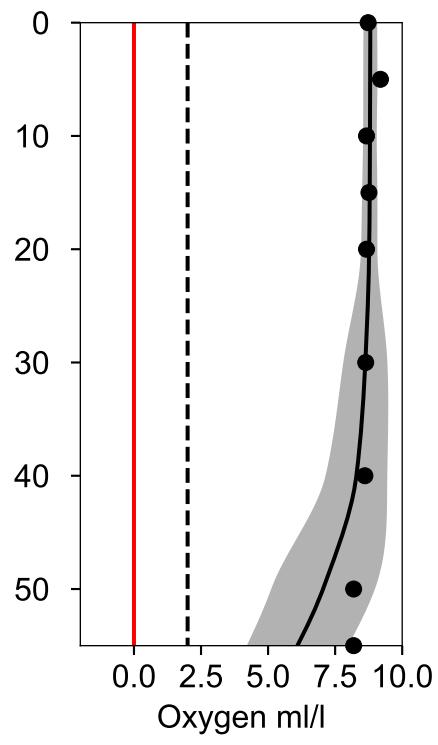
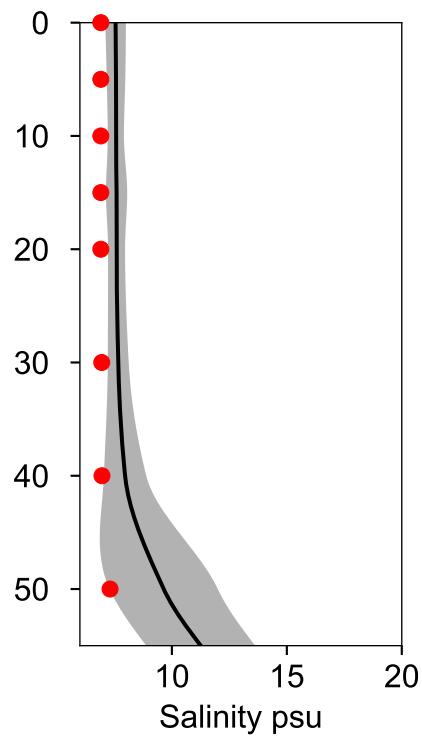
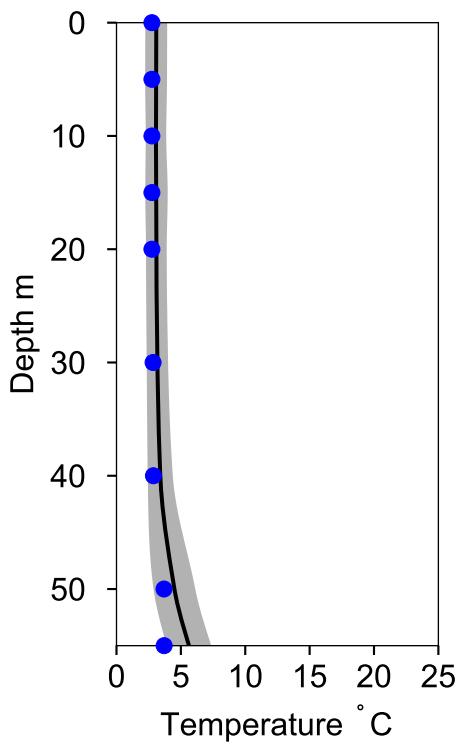


Vertical profiles HANÖBUKTEN-KBV

February

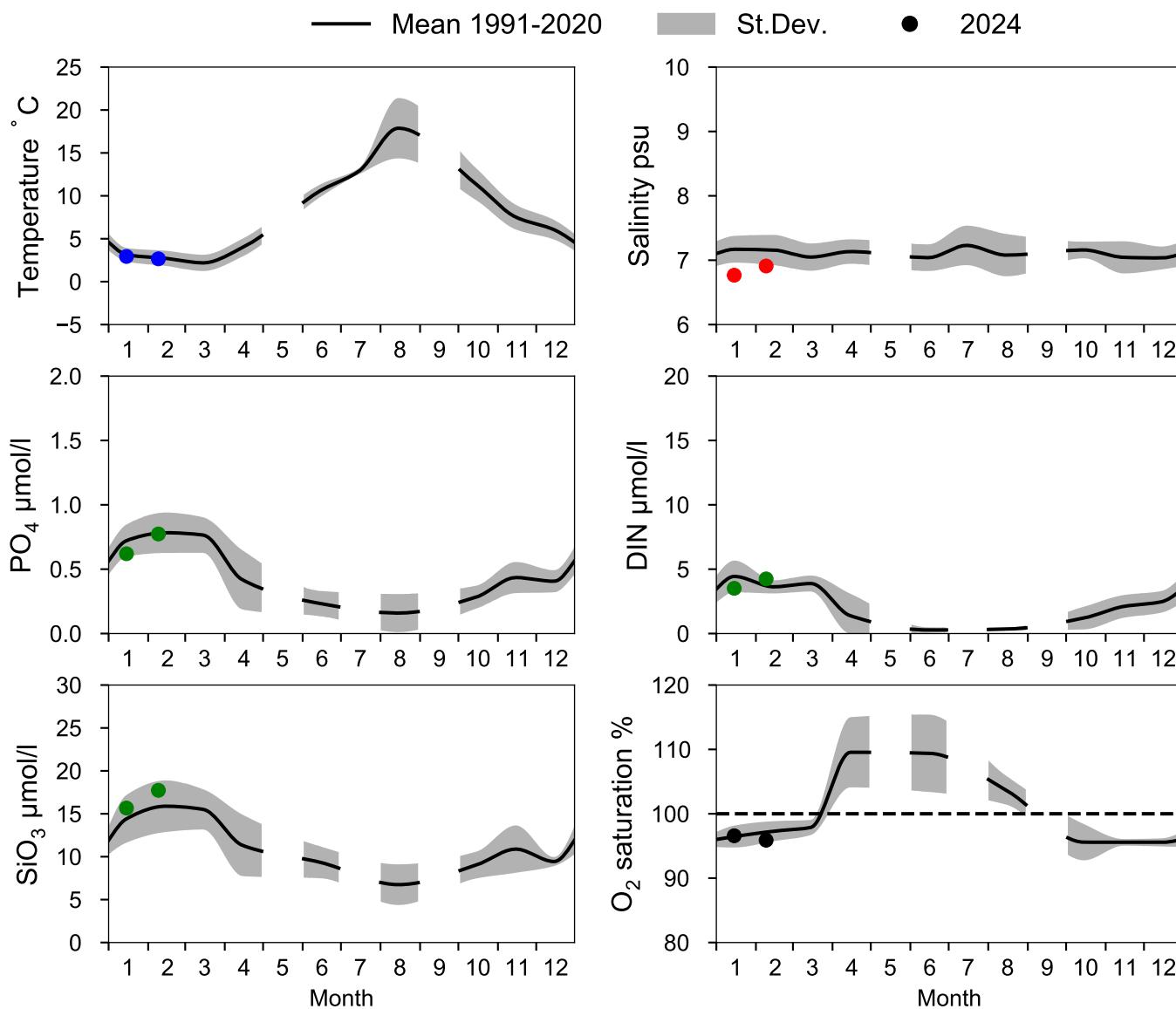
Statistics based on data from: Bornholmshavet

— Mean 1991-2020 ■ St.Dev. ● 2024-02-09

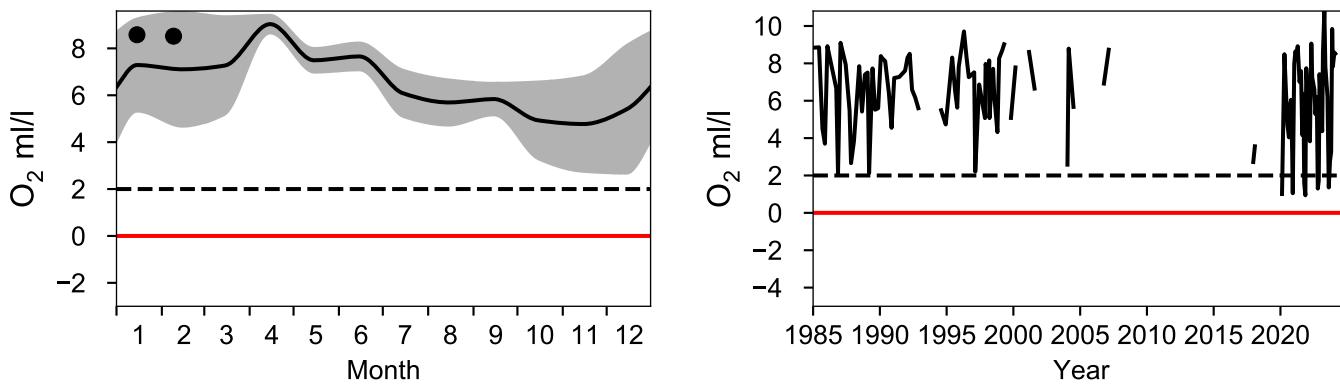


STATION BY39 ÖLANDS S UDDE SURFACE WATER (0-10 m)

Annual Cycles

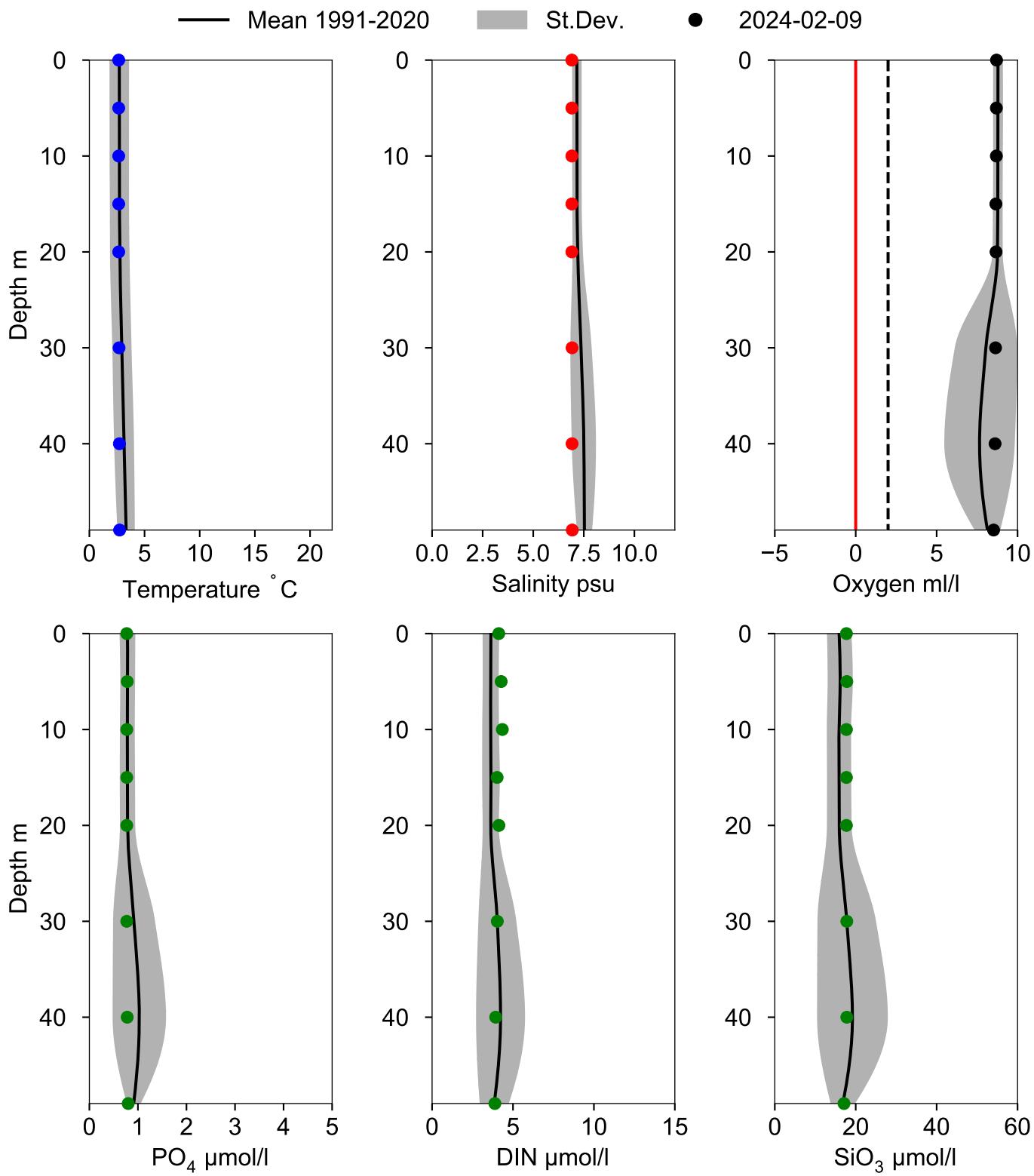


OXYGEN IN BOTTOM WATER (depth >= 40 m)



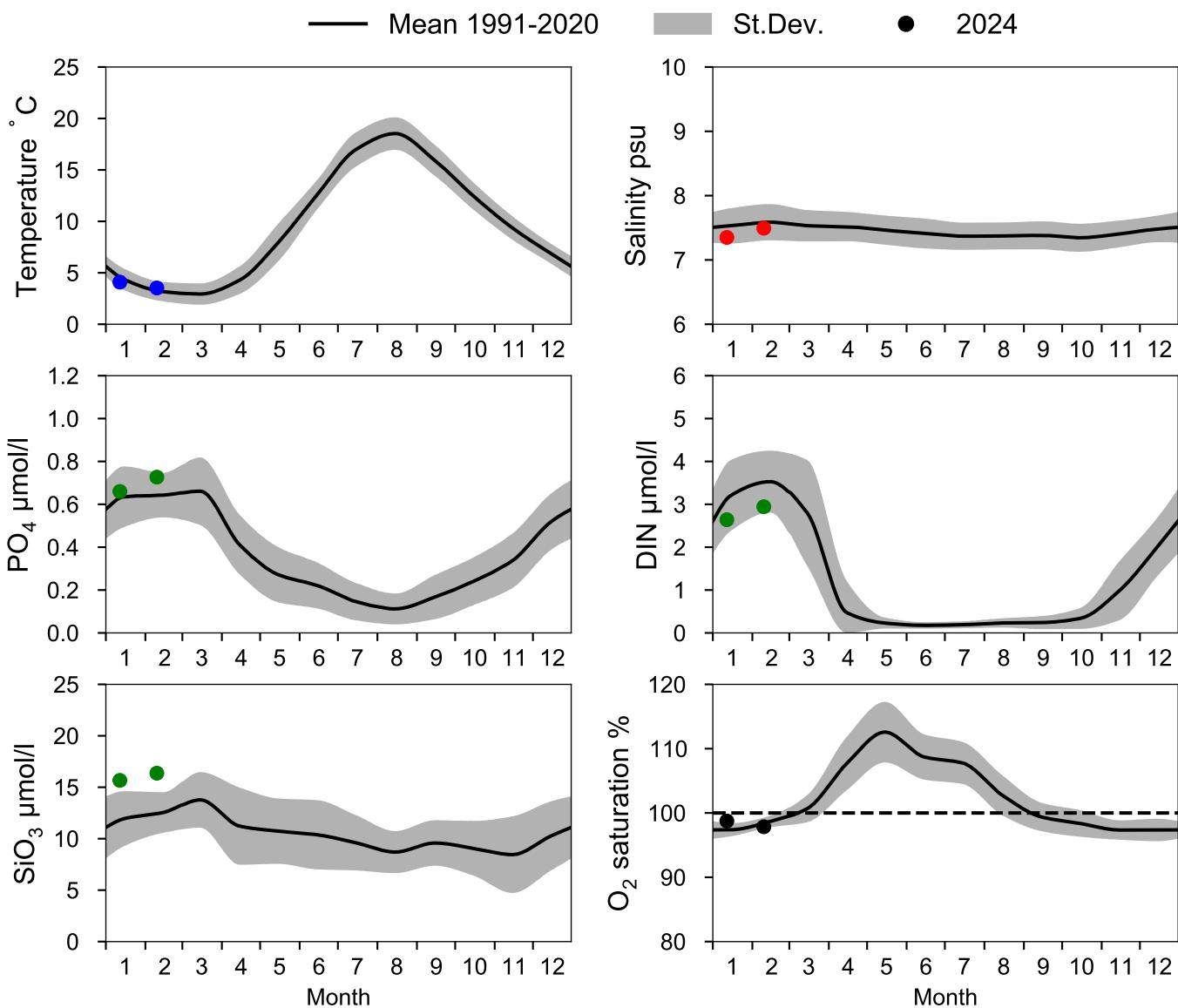
Vertical profiles BY39 ÖLANDS S UDDE

February

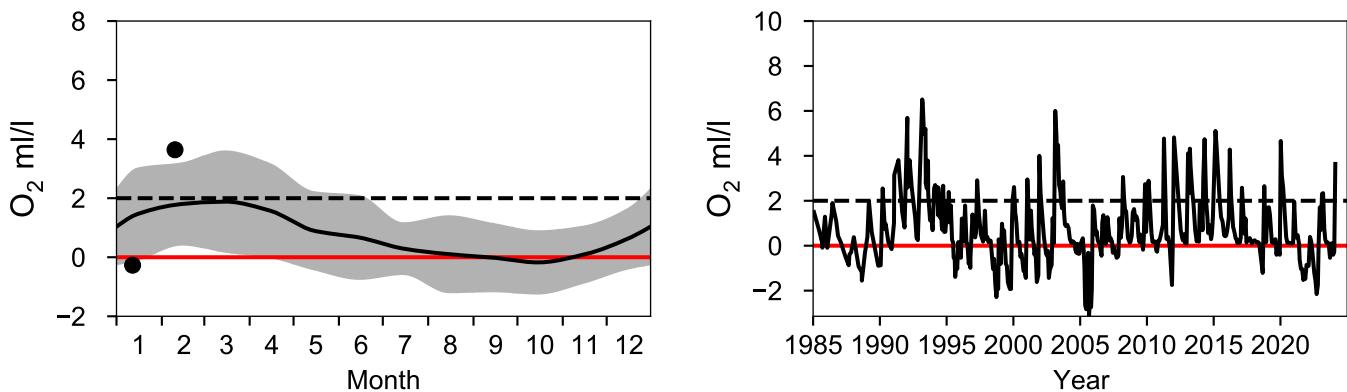


STATION BY5 BORNHOLMSDJ SURFACE WATER (0-10 m)

Annual Cycles

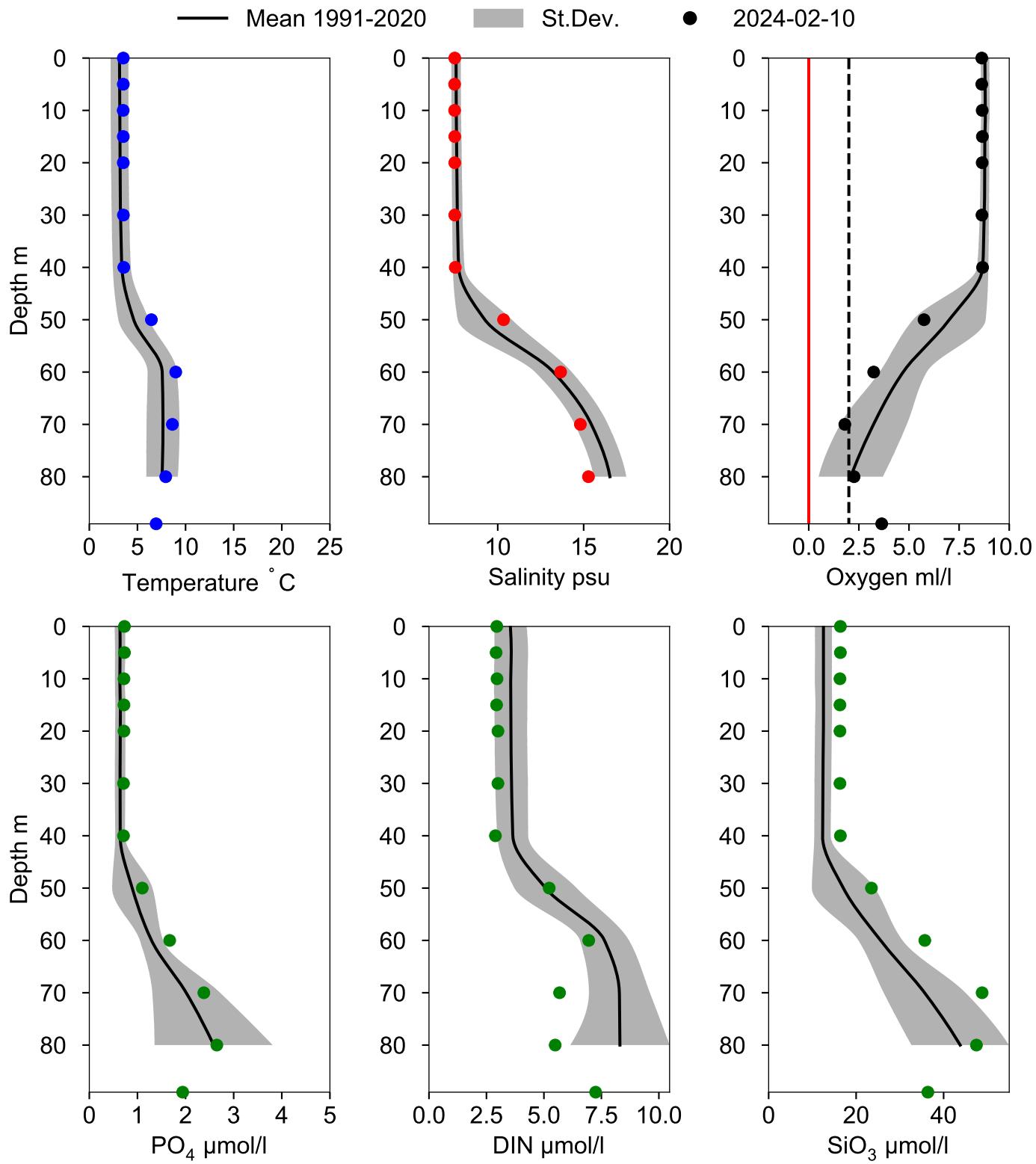


OXYGEN IN BOTTOM WATER (depth >= 80 m)



Vertical profiles BY5 BORNHOLMSDJ

February



STATION STOLPE TRÖSKEL SURFACE WATER (0-10 m)

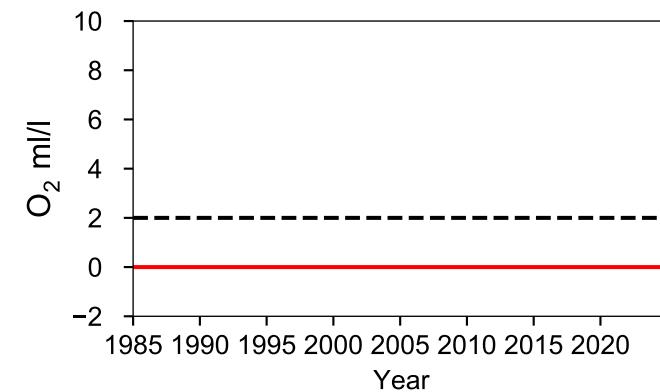
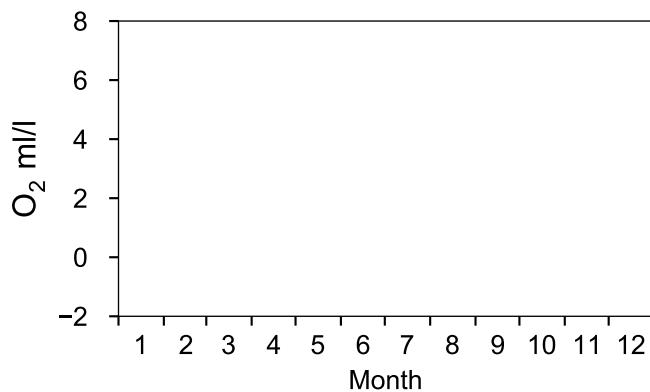
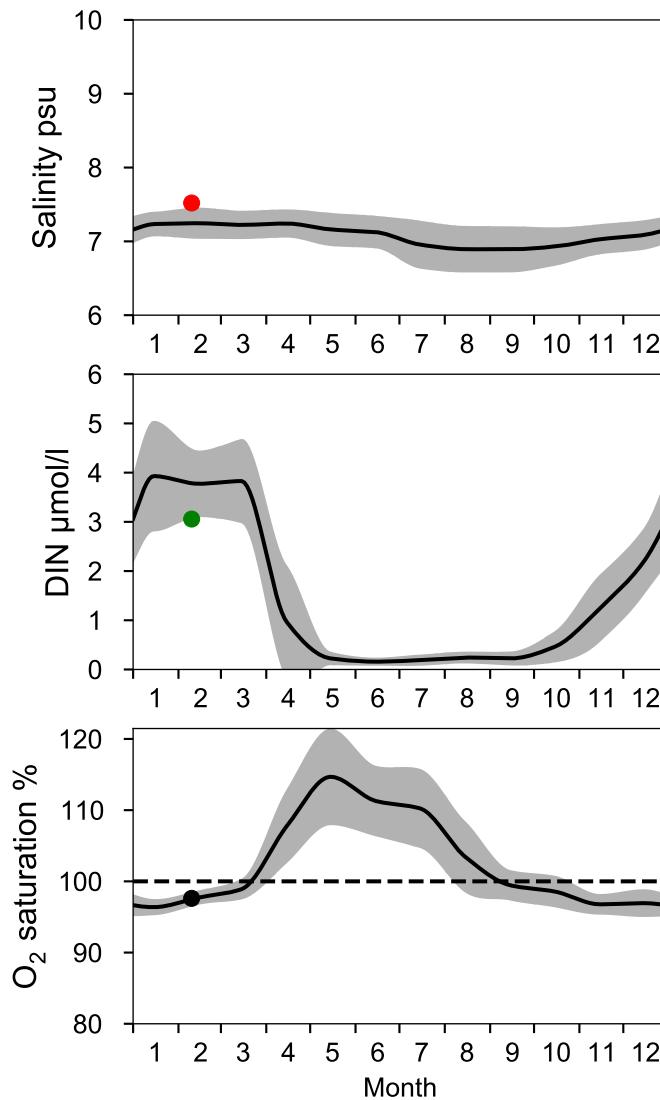
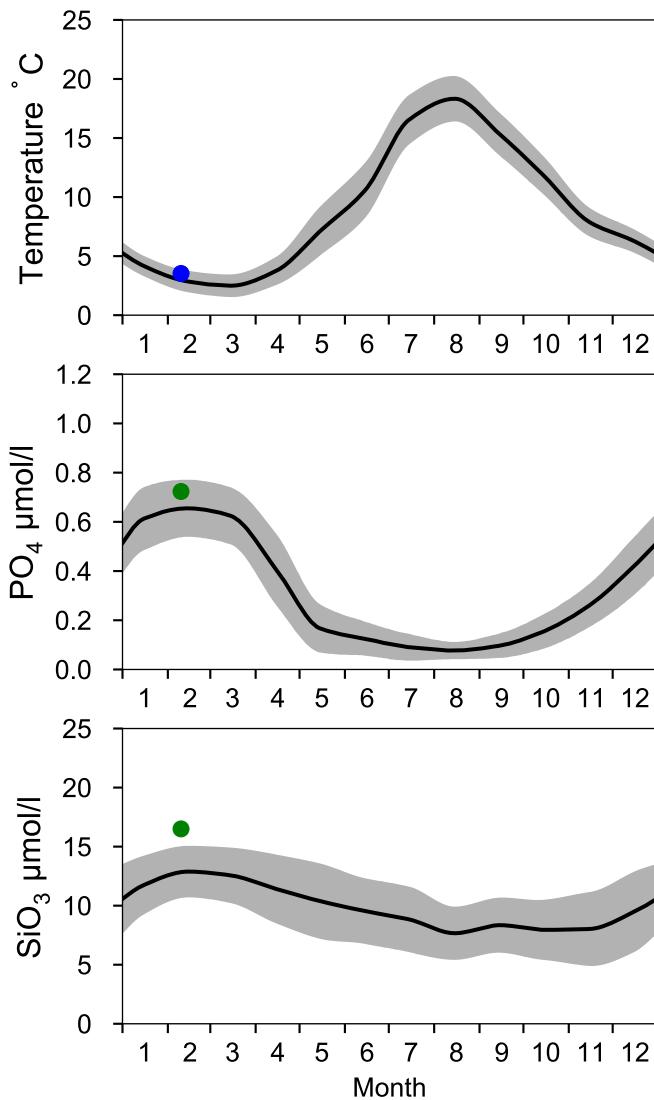
Annual Cycles

Statistics based on data from: Östra Gotlandshavet

— Mean 1991-2020

St.Dev.

● 2024

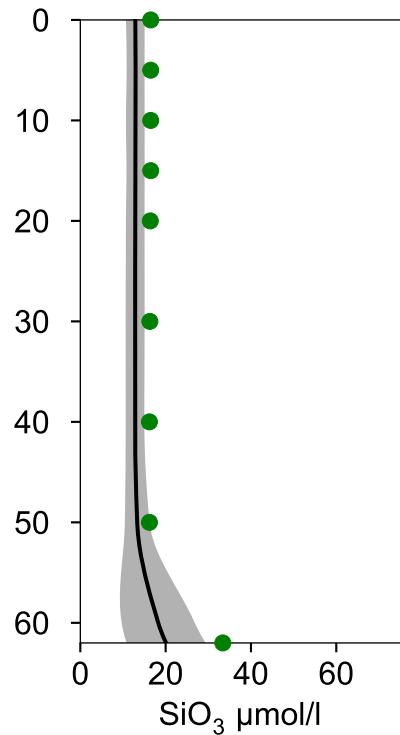
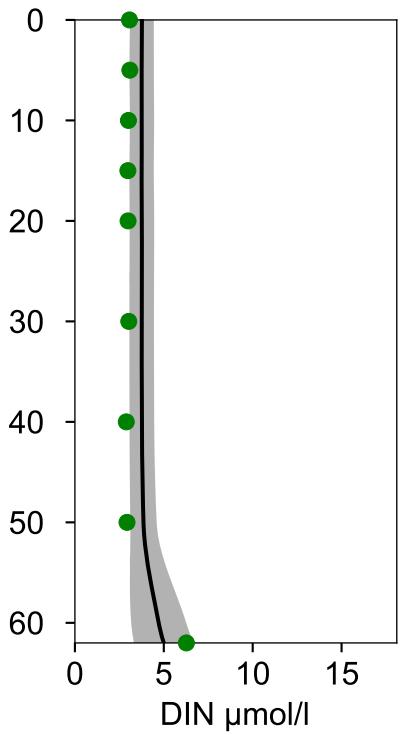
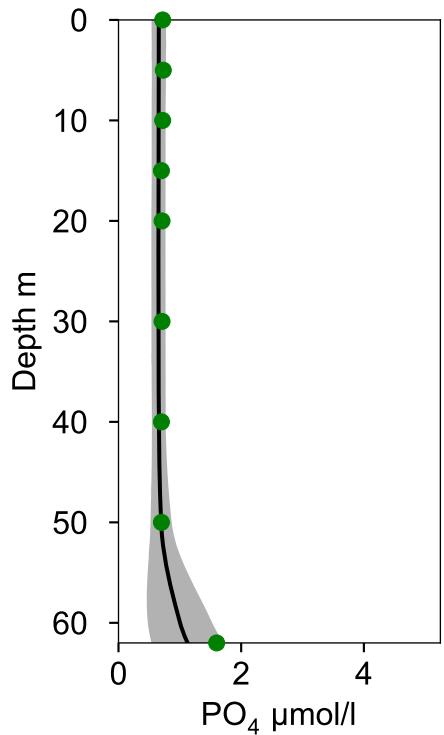
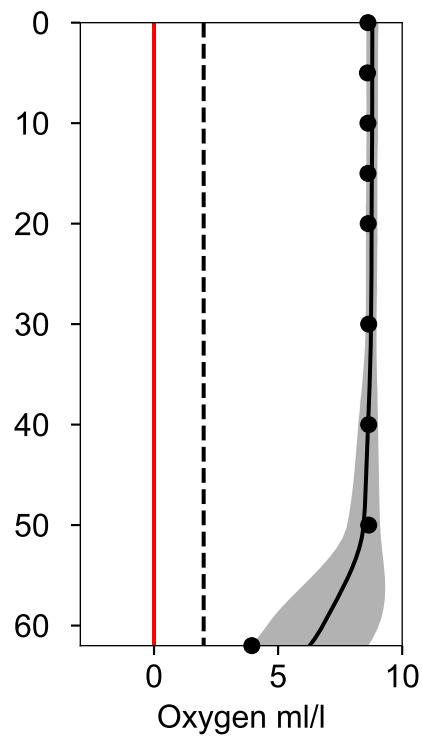
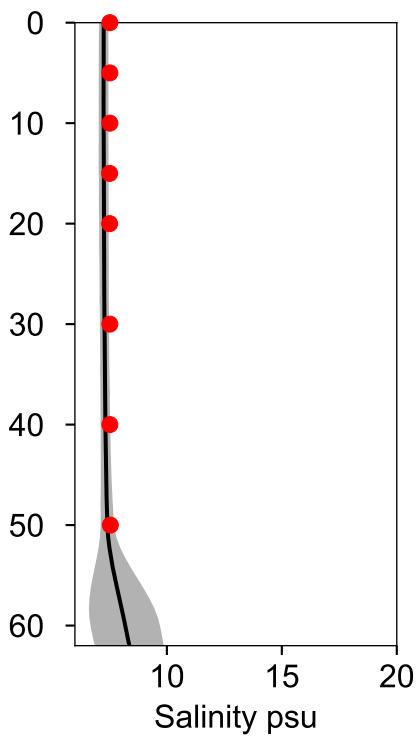
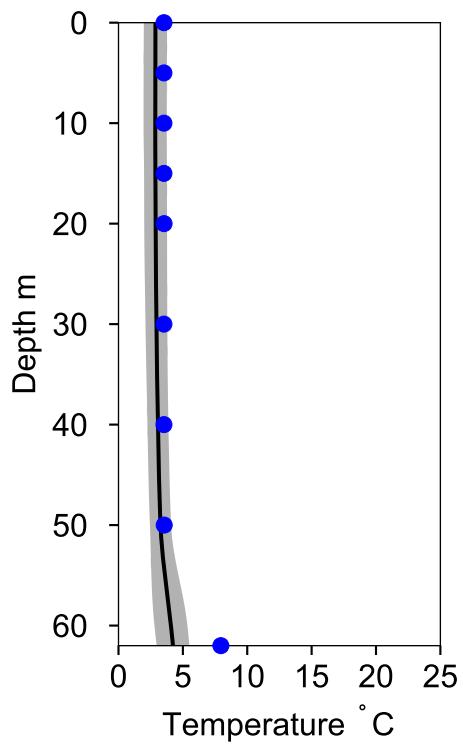


Vertical profiles STOLPE TRÖSKEL

February

Statistics based on data from: Östra Gotlandshavet

— Mean 1991-2020 ■ St.Dev. ● 2024-02-10



STATION BY7 STOLPE RÄNNA SURFACE WATER (0-10 m)

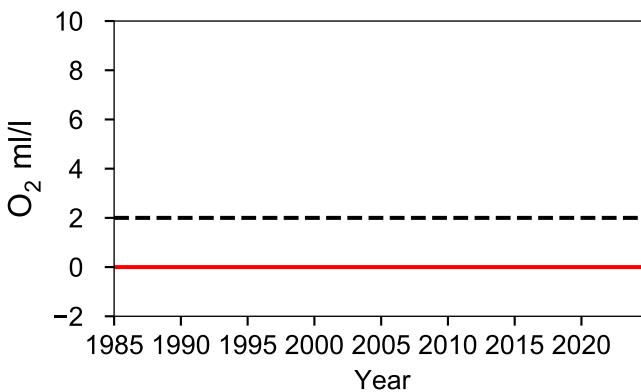
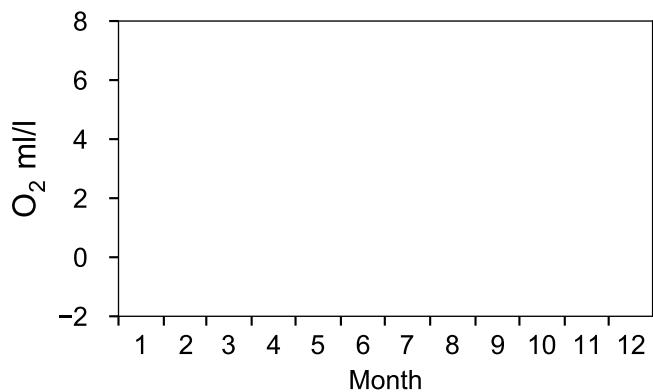
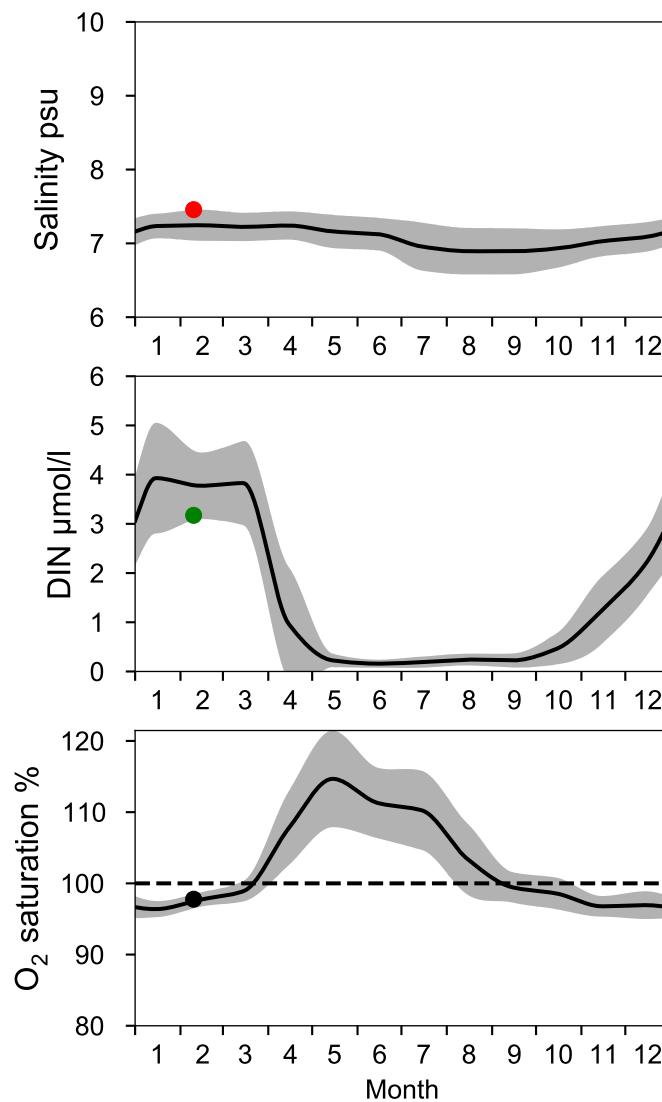
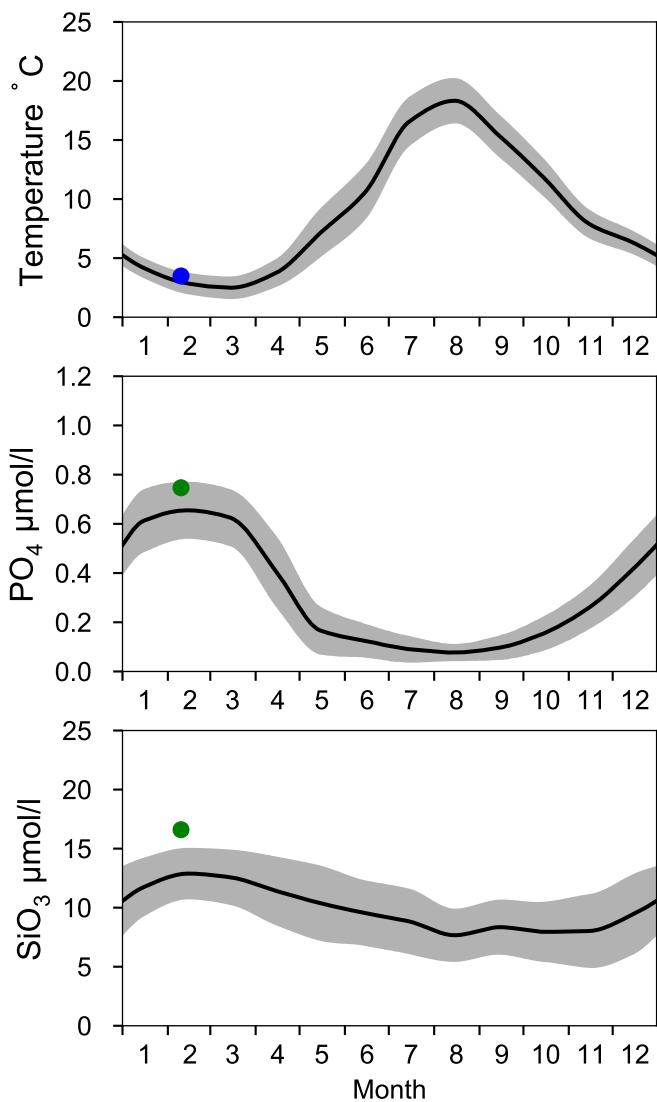
Annual Cycles

Statistics based on data from: Östra Gotlandshavet

— Mean 1991-2020

St.Dev.

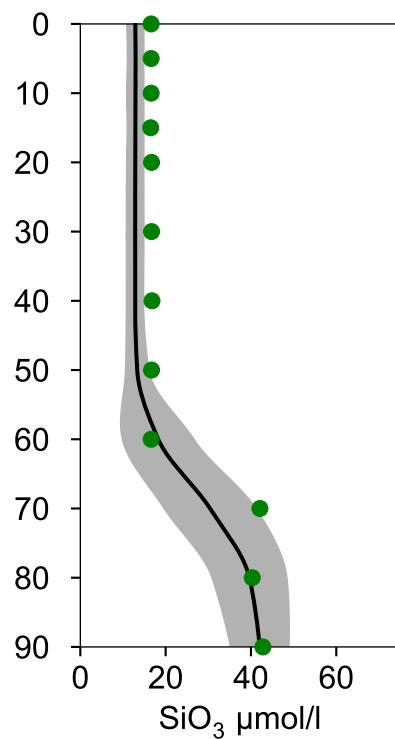
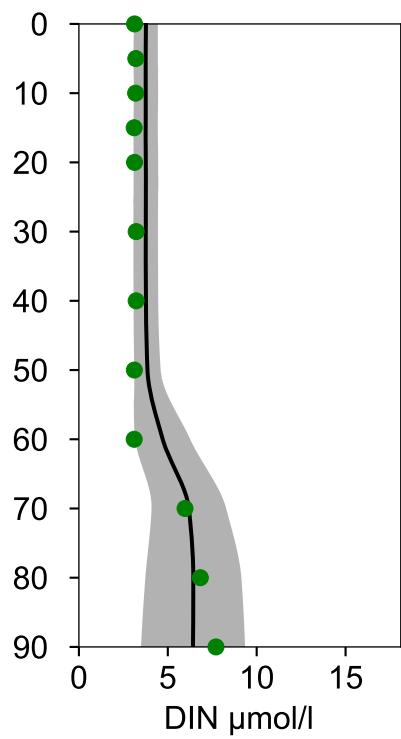
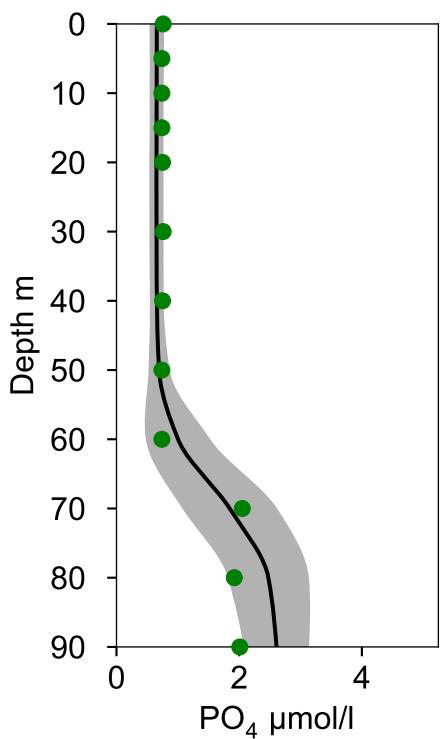
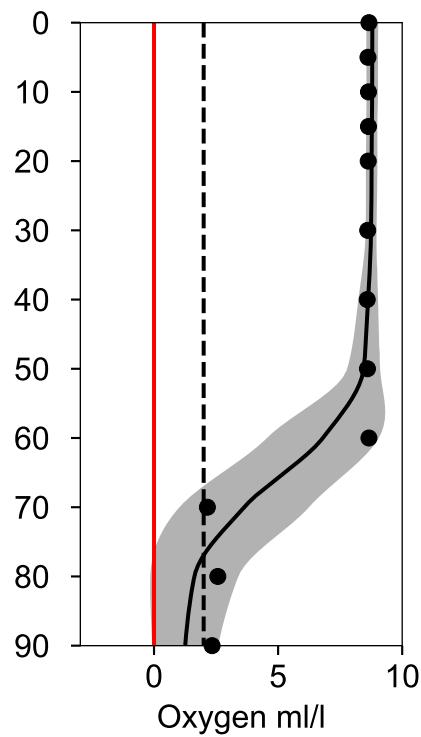
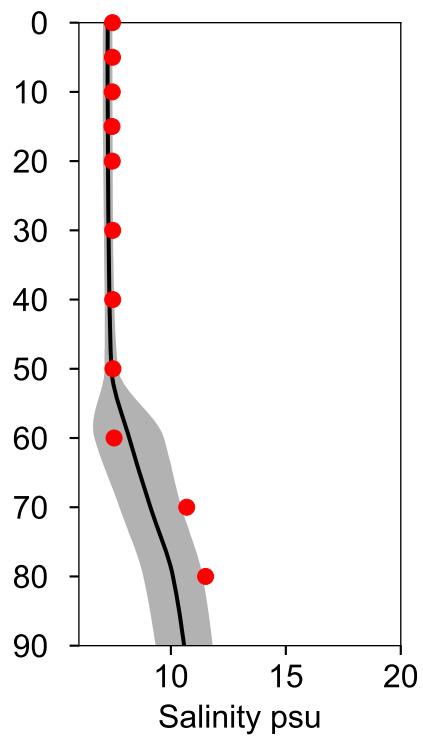
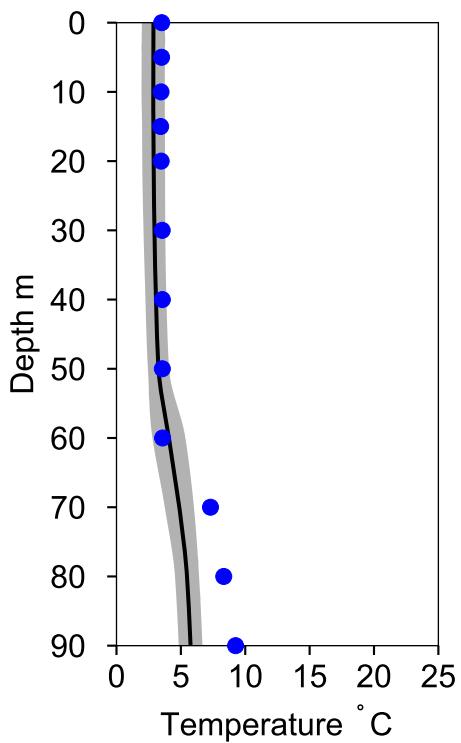
● 2024



Vertical profiles BY7 STOLPE RÄNNA February

Statistics based on data from: Östra Gotlandshavet

— Mean 1991-2020 ■ St.Dev. ● 2024-02-10



STATION PL-P1 SURFACE WATER (0-10 m)

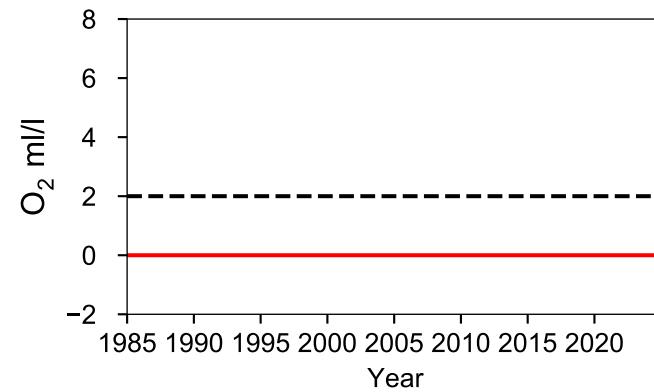
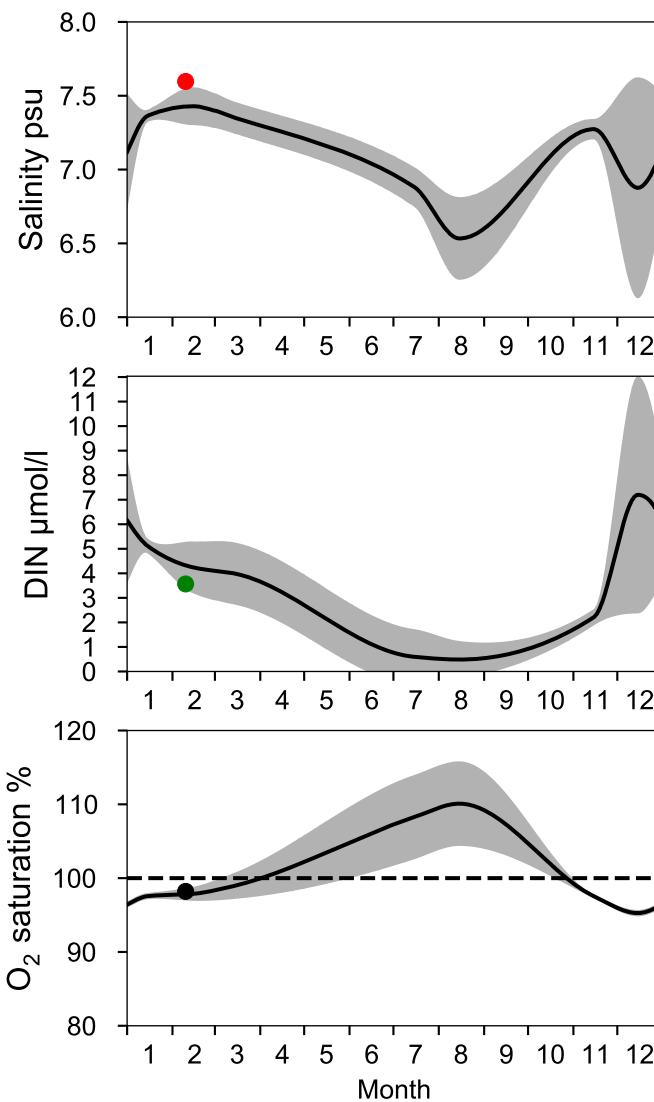
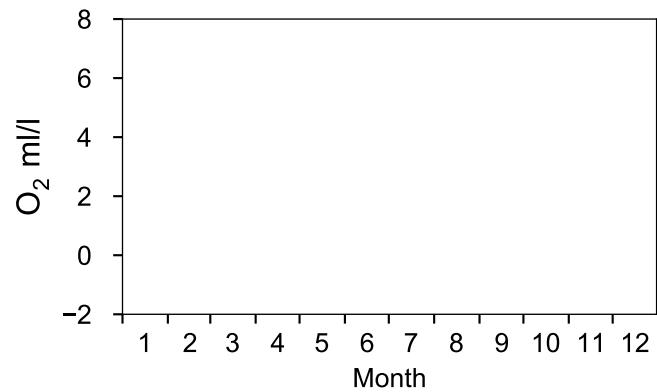
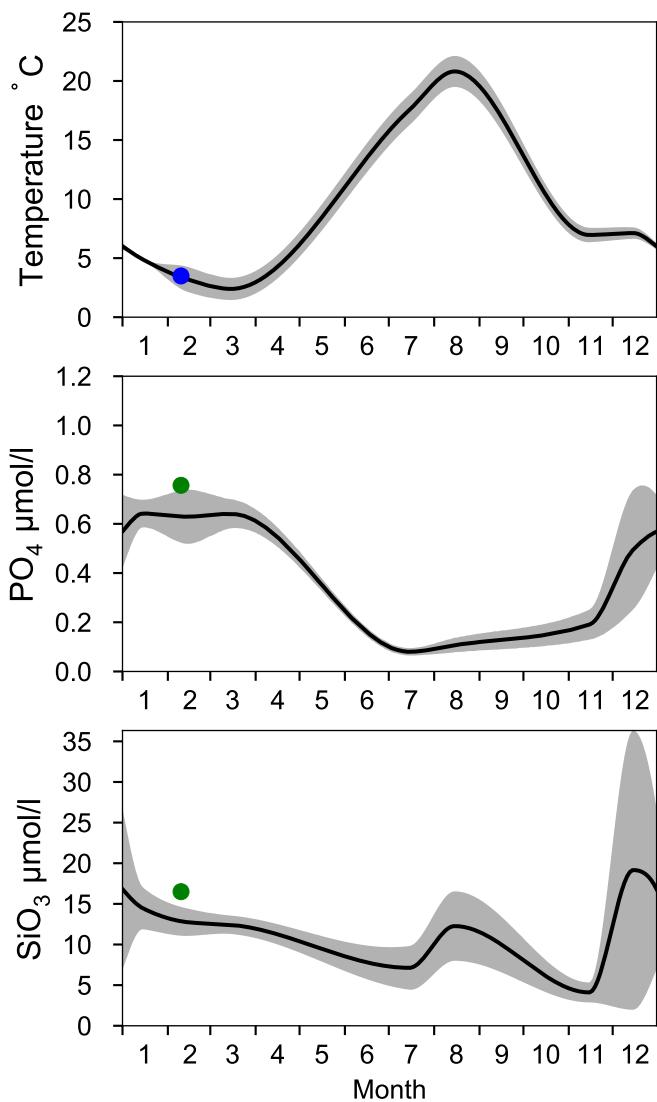
Annual Cycles

Statistics based on data from: Gdanskbuken

— Mean 1991-2020

St.Dev.

● 2024

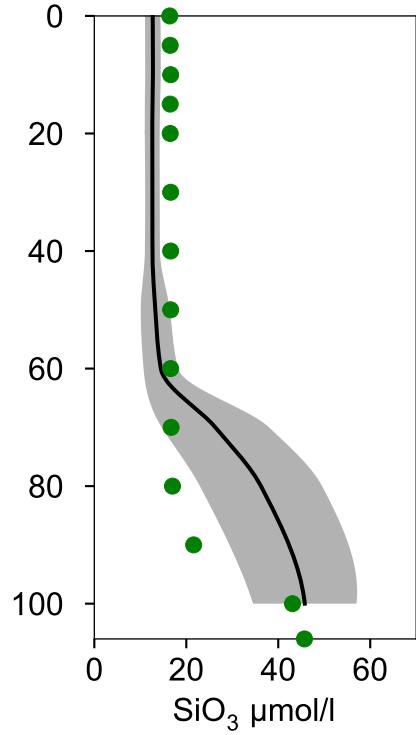
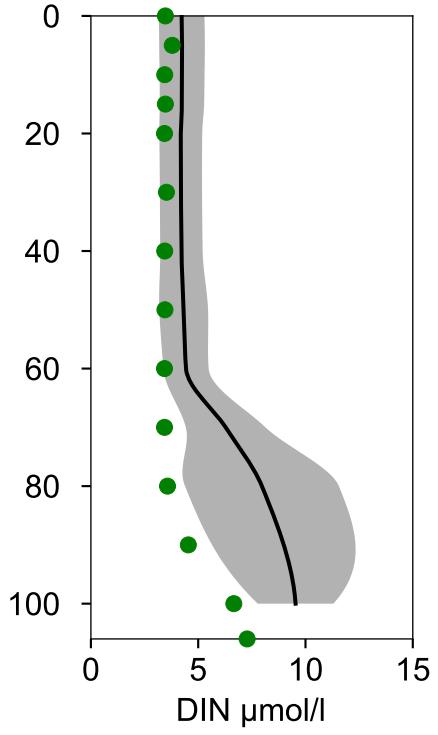
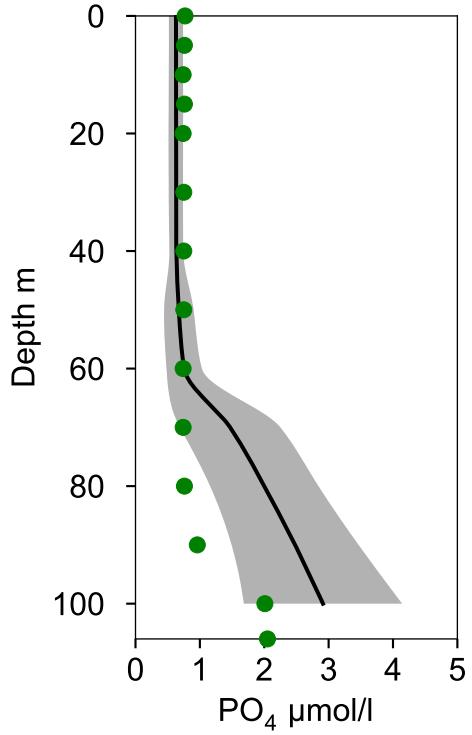
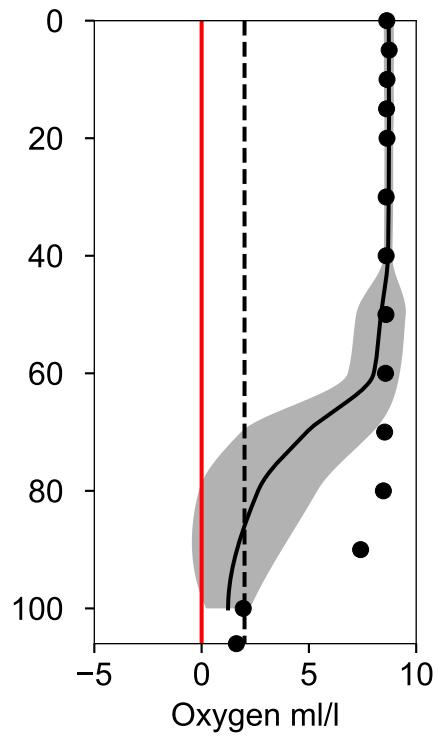
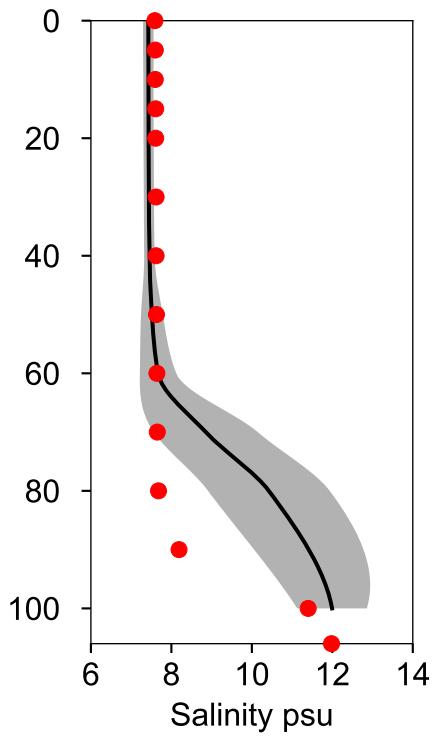
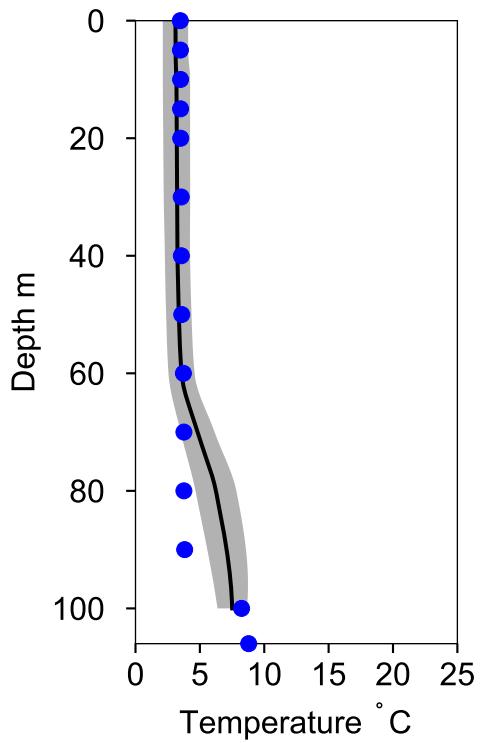


Vertical profiles PL-P1

February

Statistics based on data from: Gdanskbuken

— Mean 1991-2020 ■ St.Dev. ● 2024-02-10



STATION PL-P63 SURFACE WATER (0-10 m)

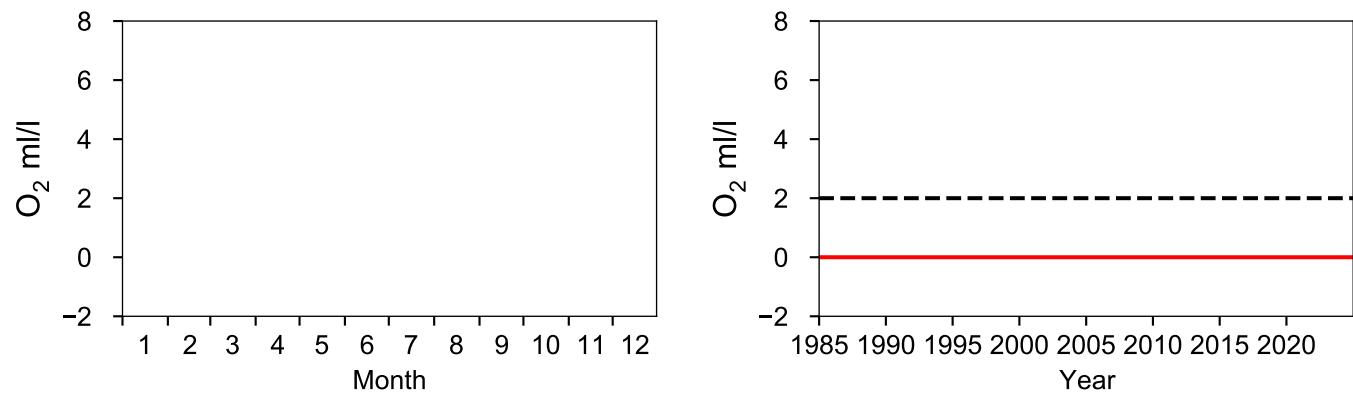
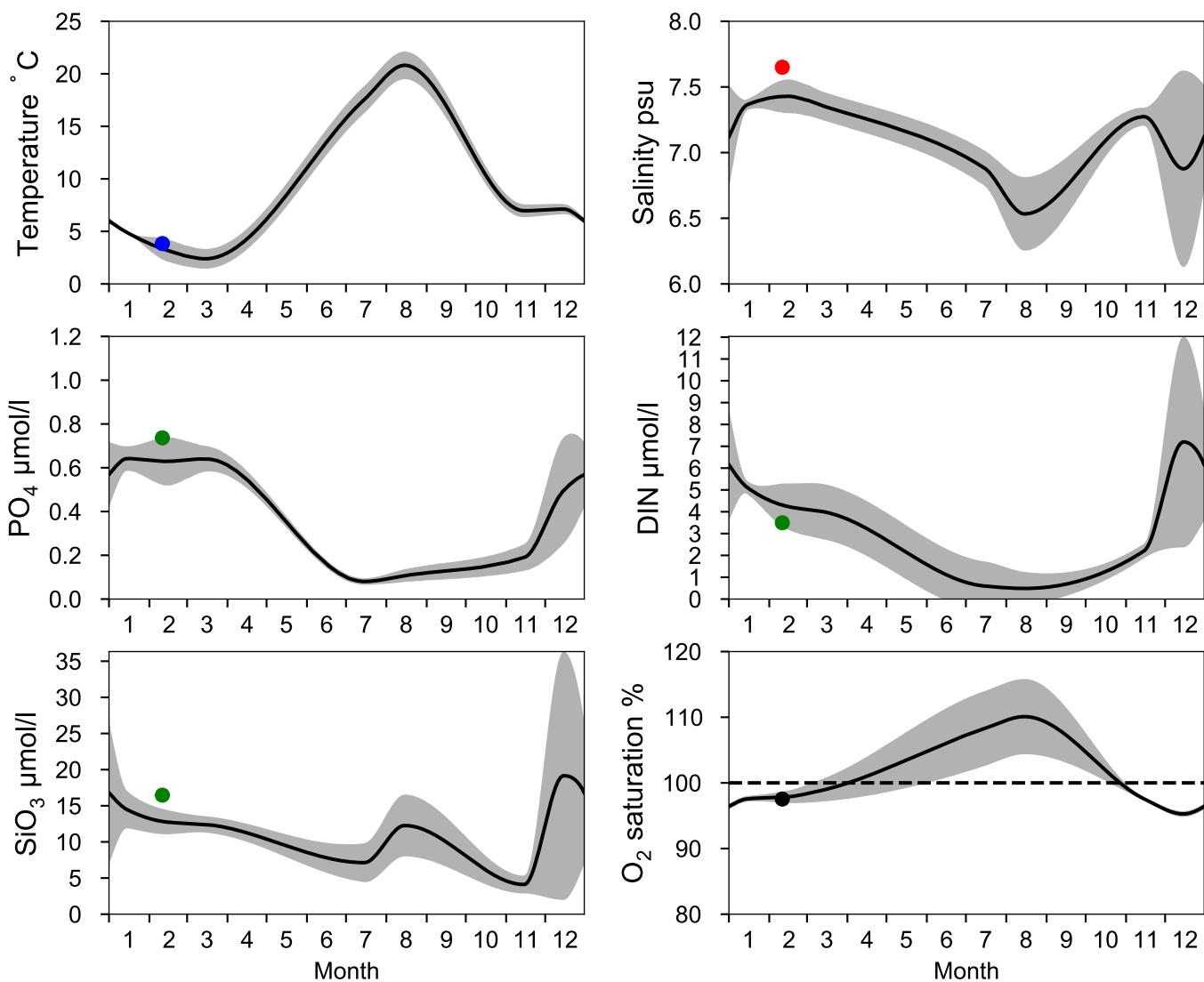
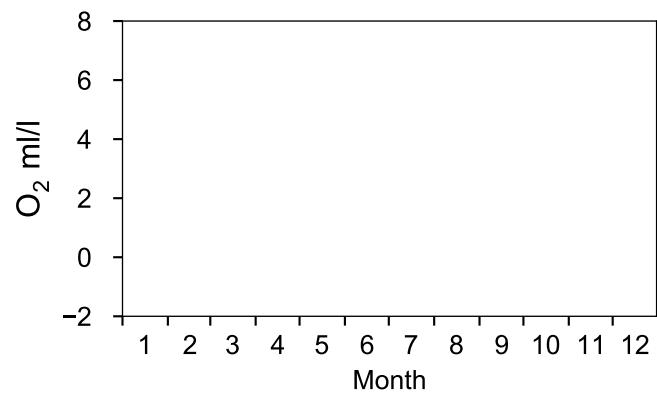
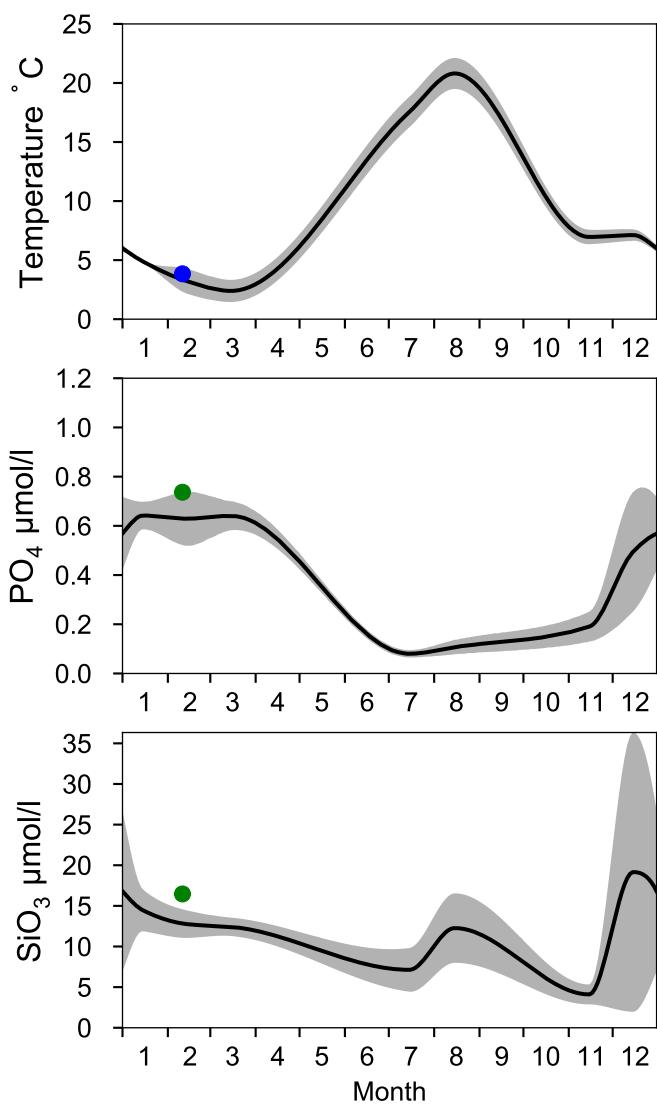
Annual Cycles

Statistics based on data from: Gdanskbuken

— Mean 1991-2020

St.Dev.

● 2024

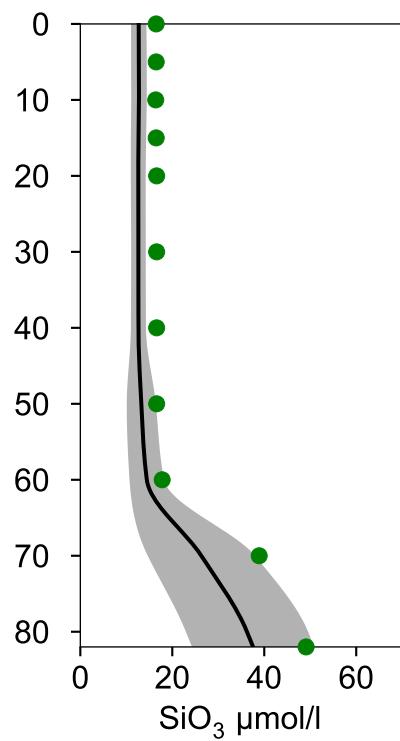
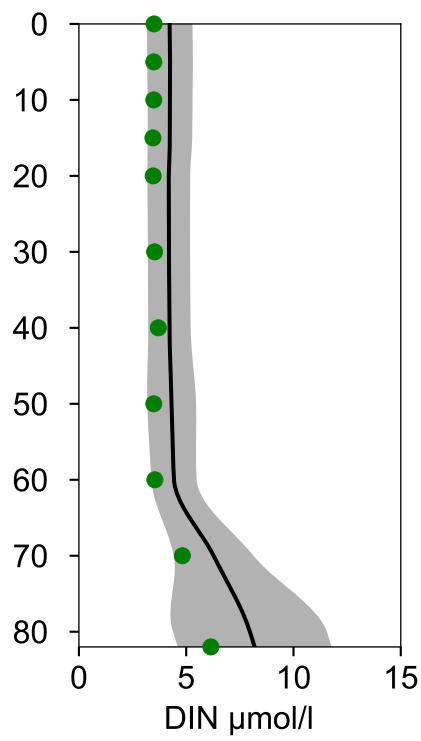
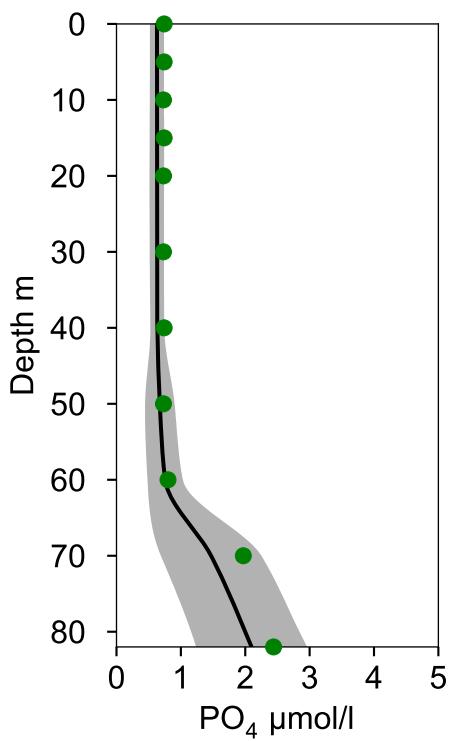
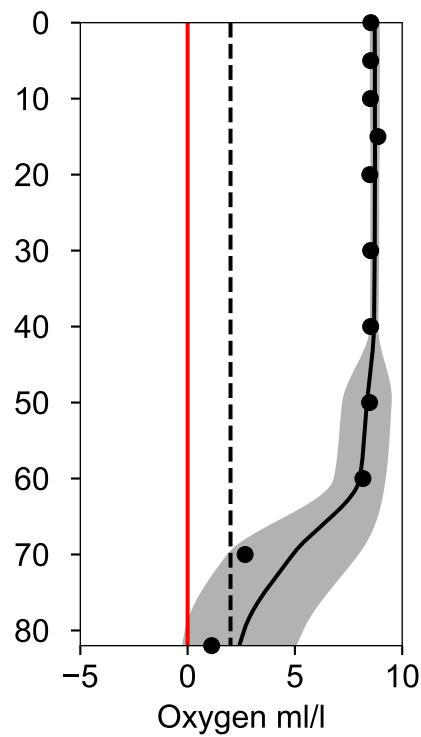
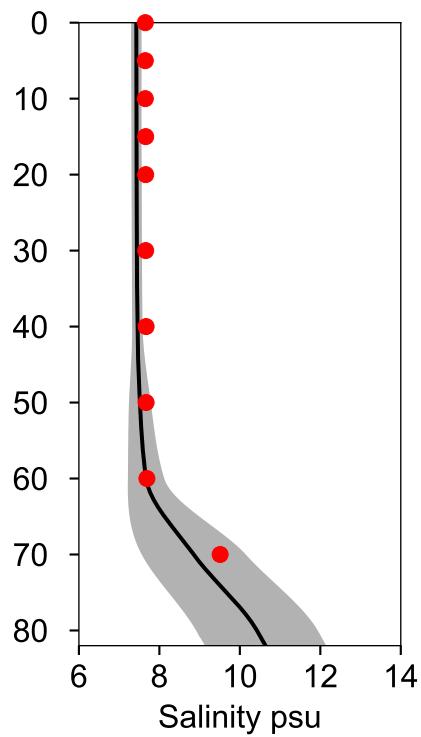
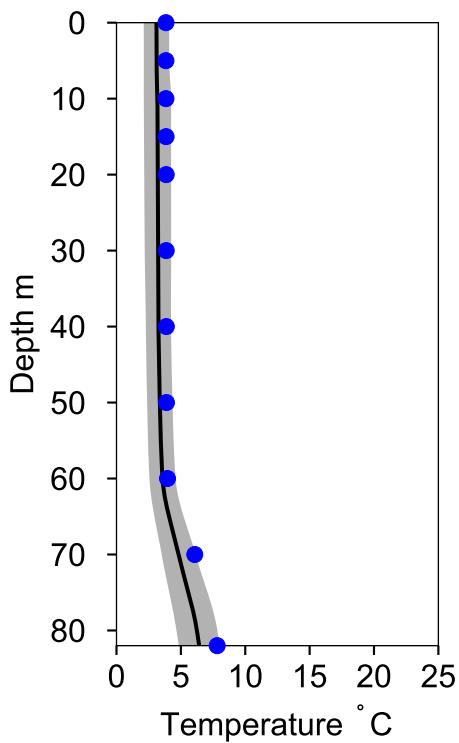


Vertical profiles PL-P63

February

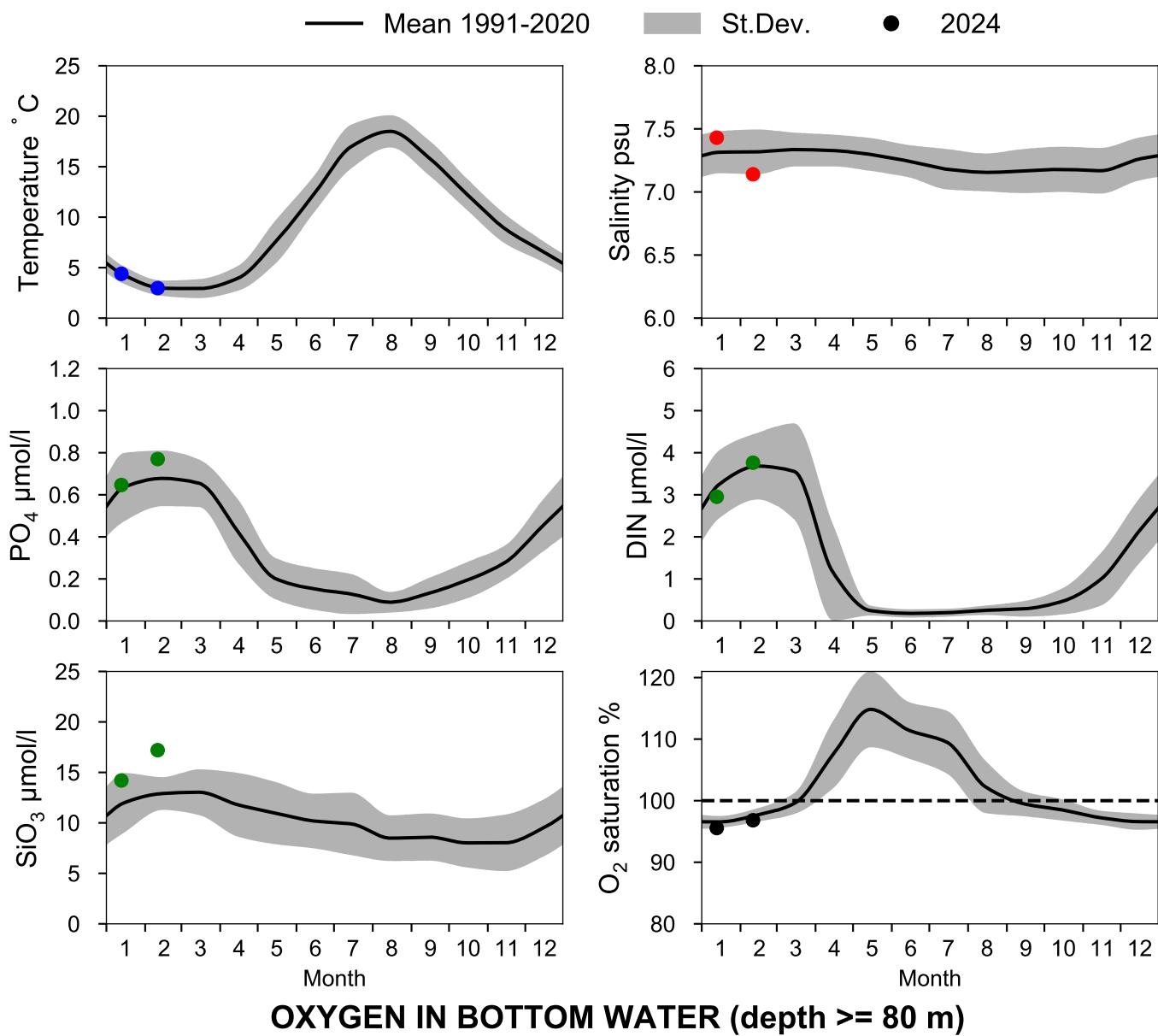
Statistics based on data from: Gdanskbuken

— Mean 1991-2020 ■ St.Dev. ● 2024-02-11

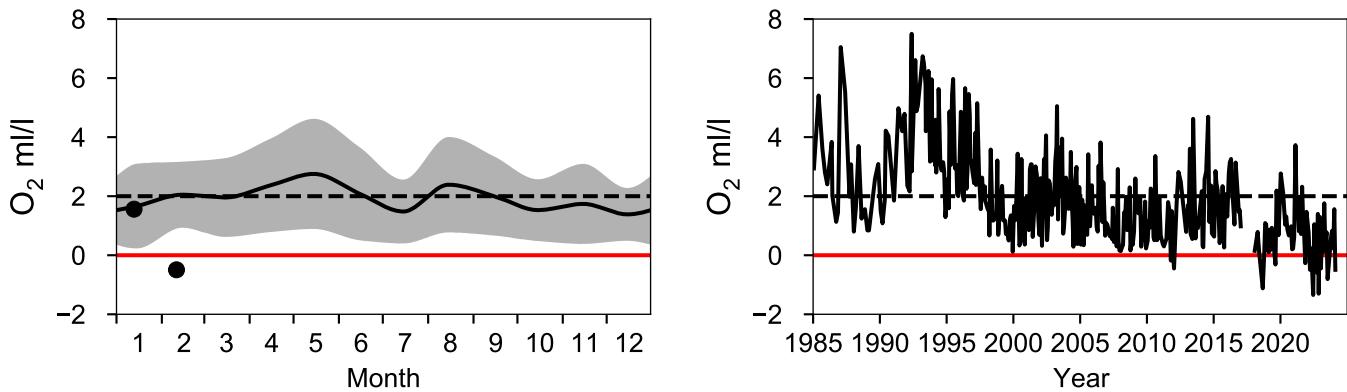


STATION BCS III-10 SURFACE WATER (0-10 m)

Annual Cycles

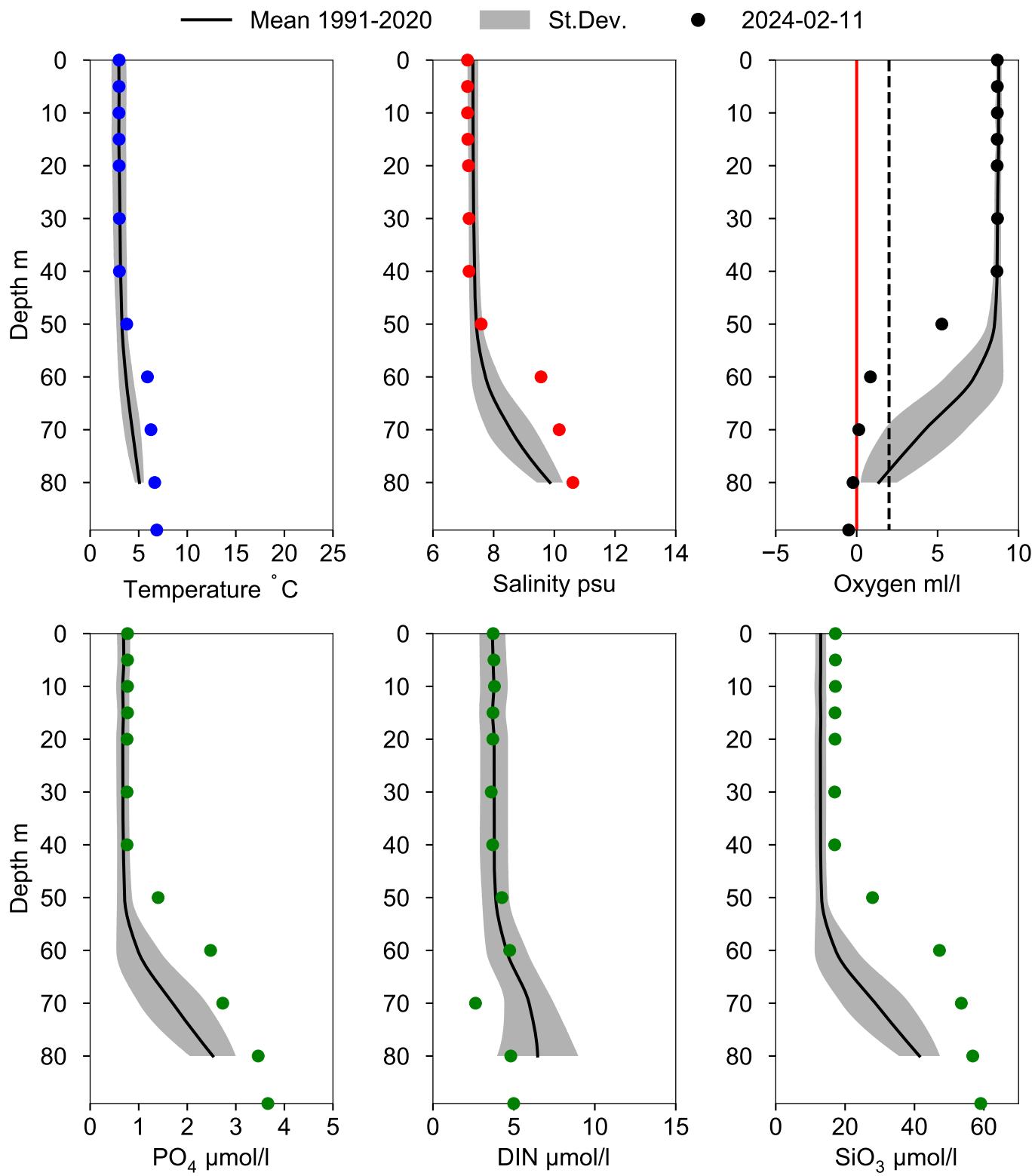


OXYGEN IN BOTTOM WATER (depth >= 80 m)



Vertical profiles BCS III-10

February



STATION BY9 KLAIPEDA SURFACE WATER (0-10 m)

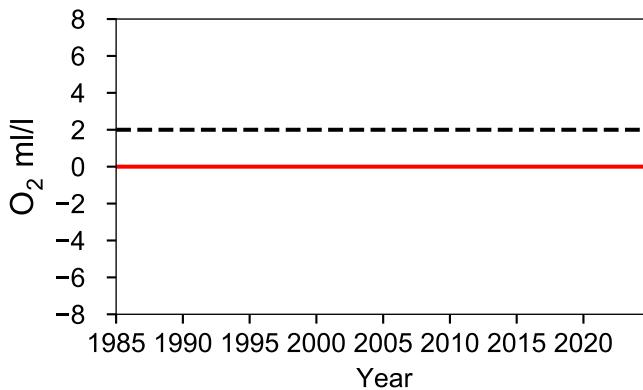
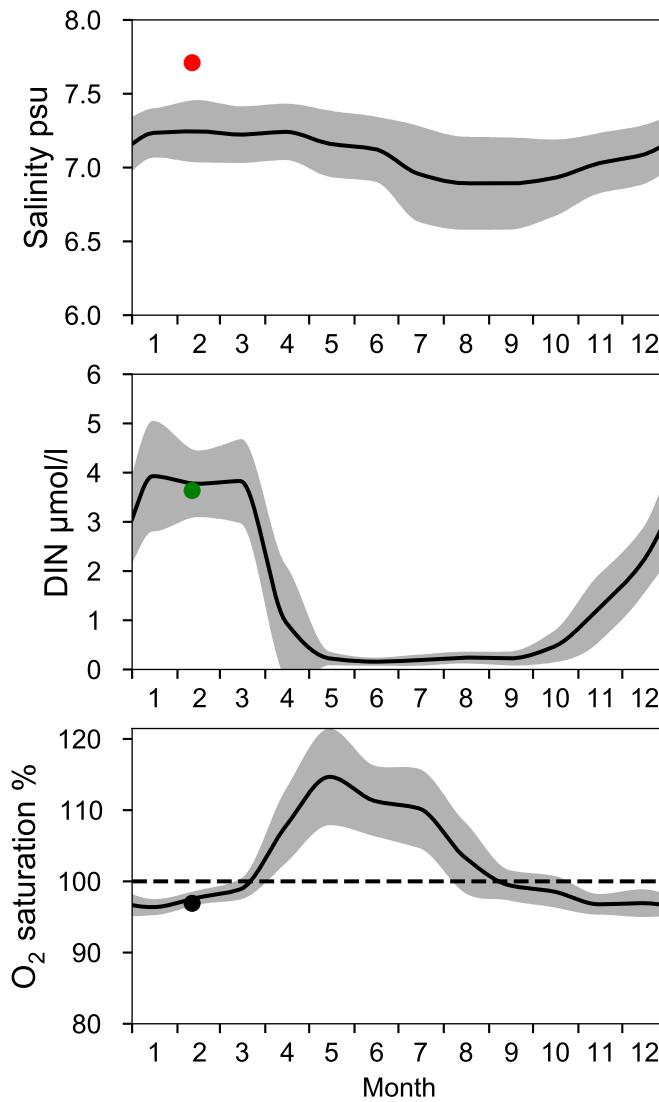
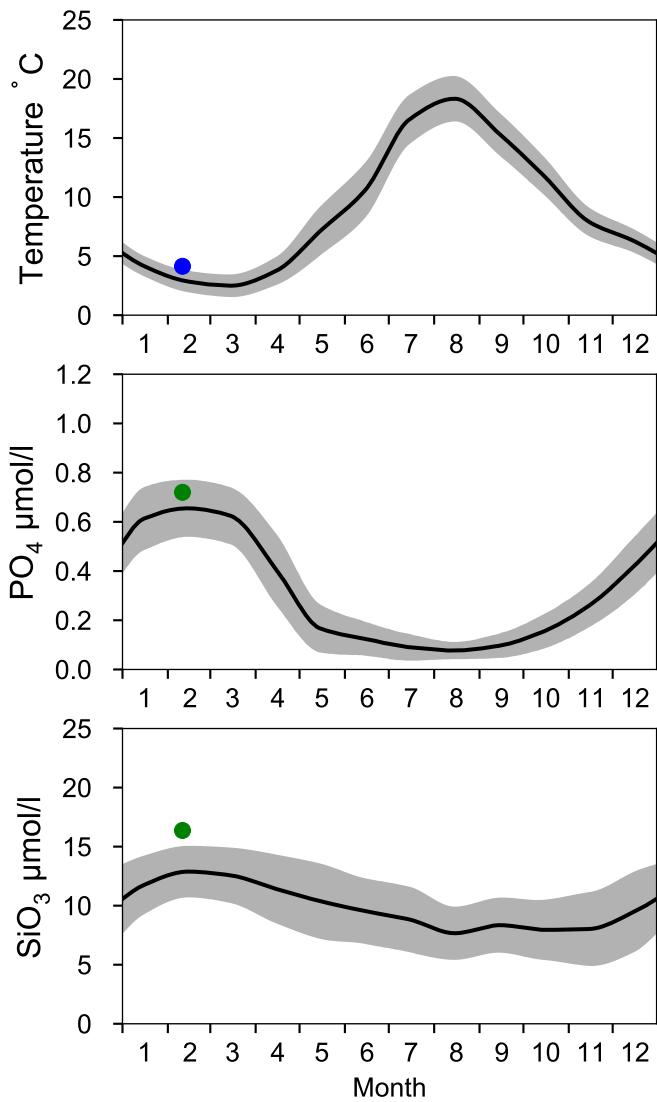
Annual Cycles

Statistics based on data from: Östra Gotlandshavet

— Mean 1991-2020

St.Dev.

● 2024

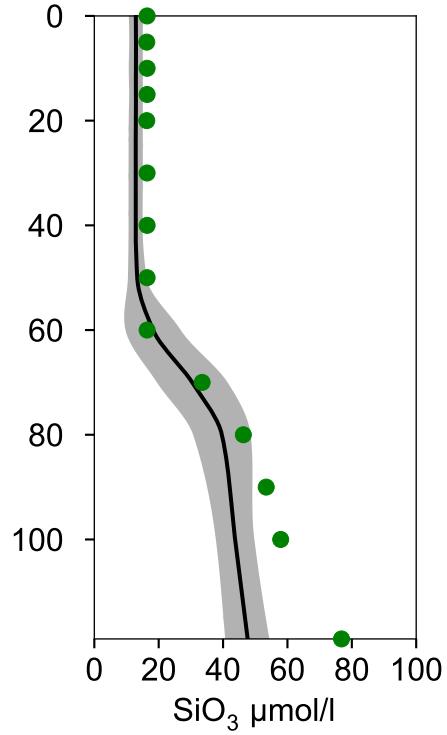
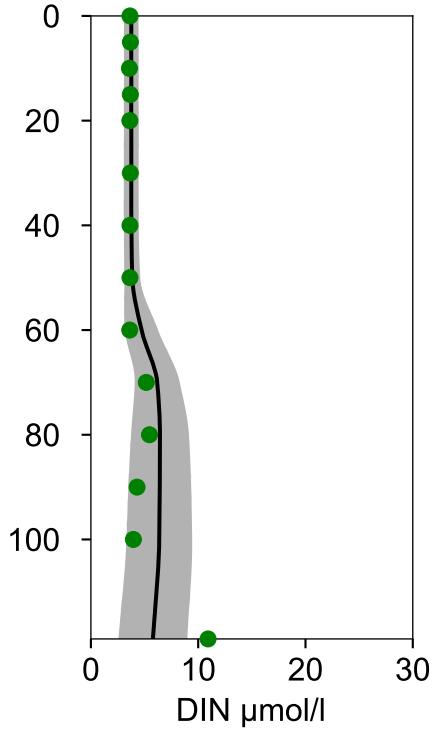
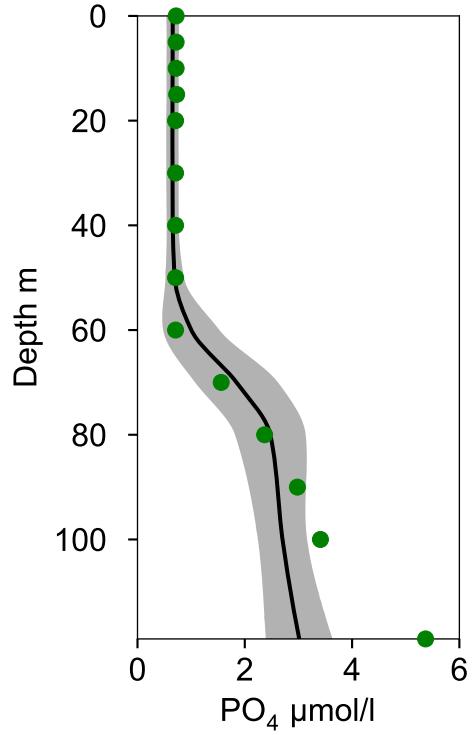
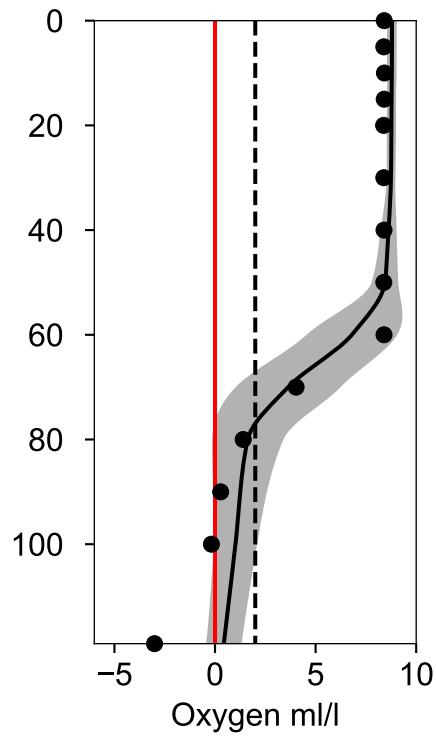
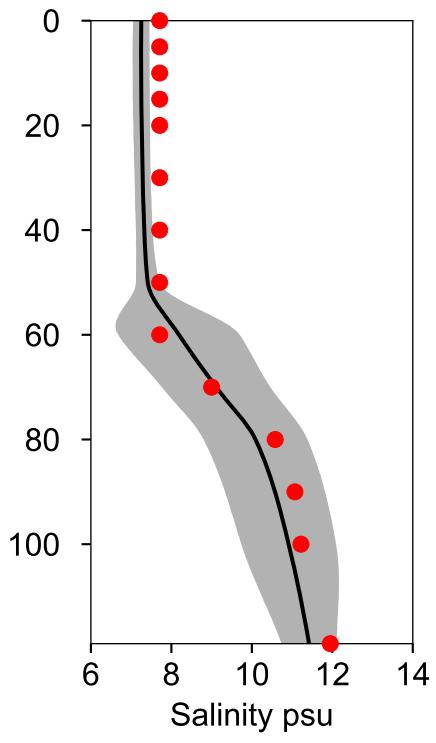
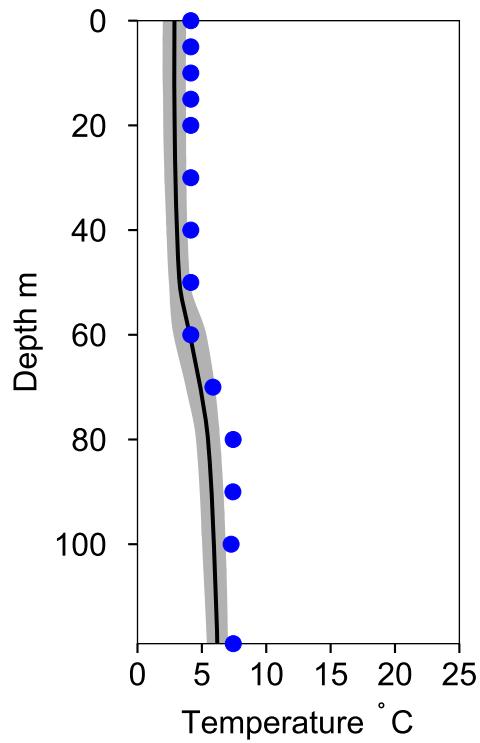


Vertical profiles BY9 KLAIPEDA

February

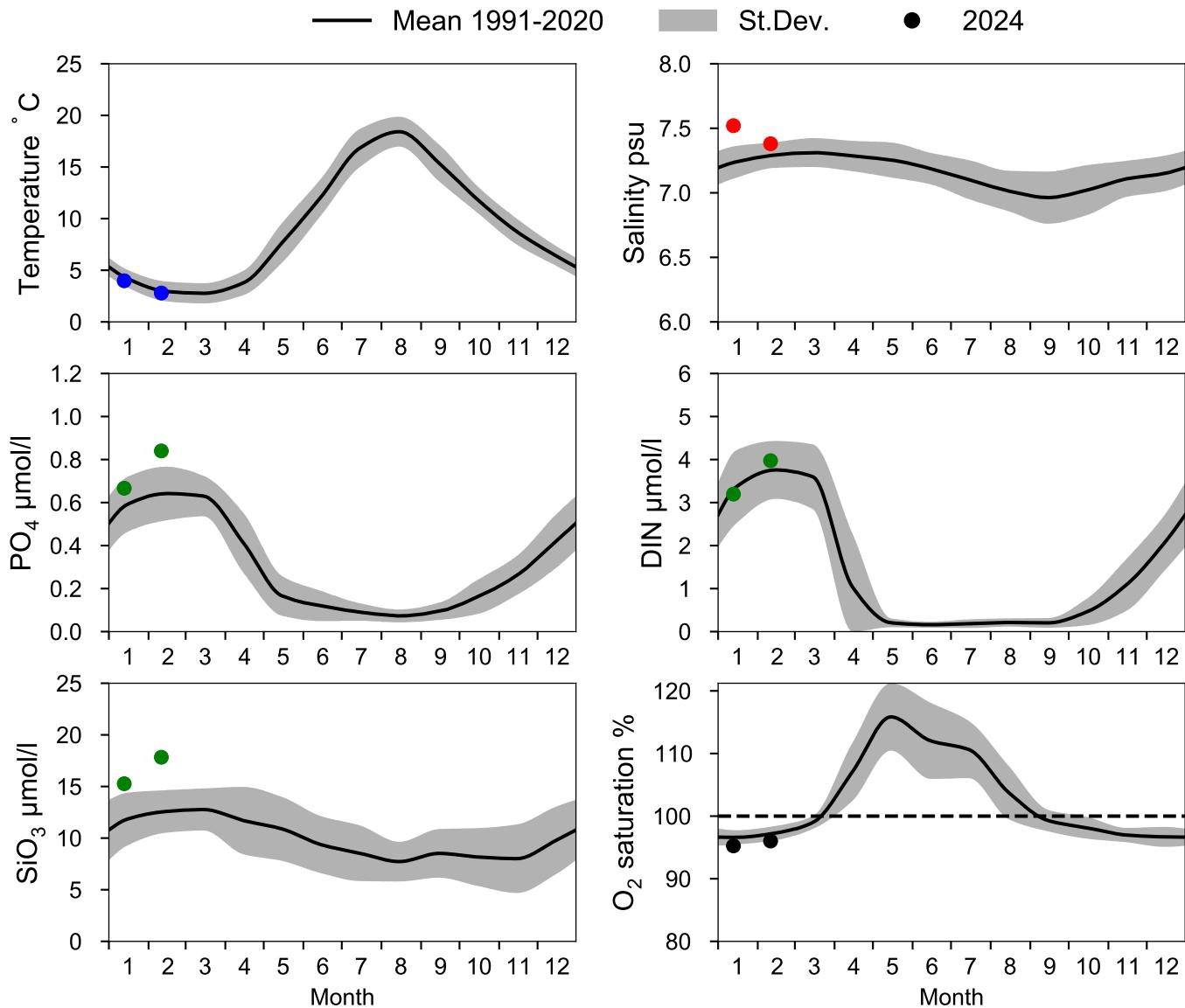
Statistics based on data from: Östra Gotlandshavet

— Mean 1991-2020 ■ St.Dev. ● 2024-02-11

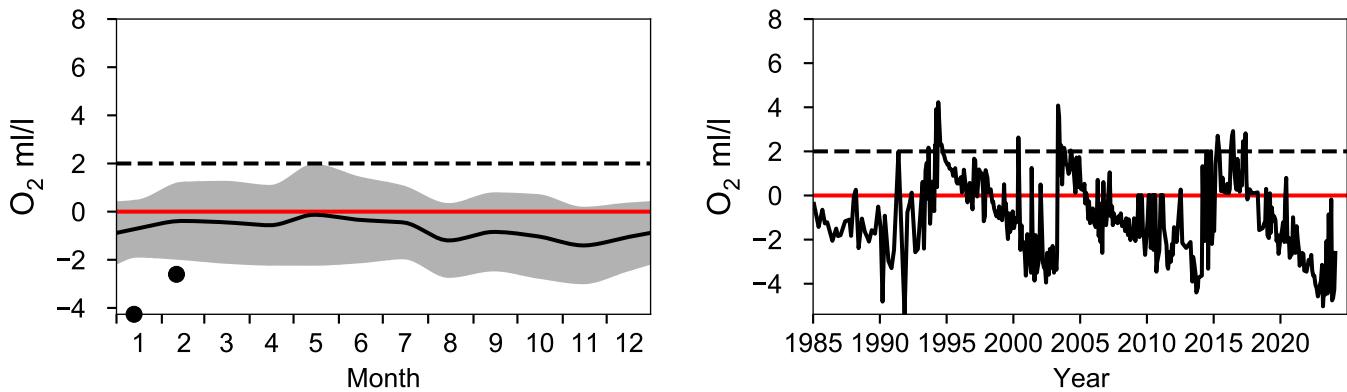


STATION BY10 SURFACE WATER (0-10 m)

Annual Cycles

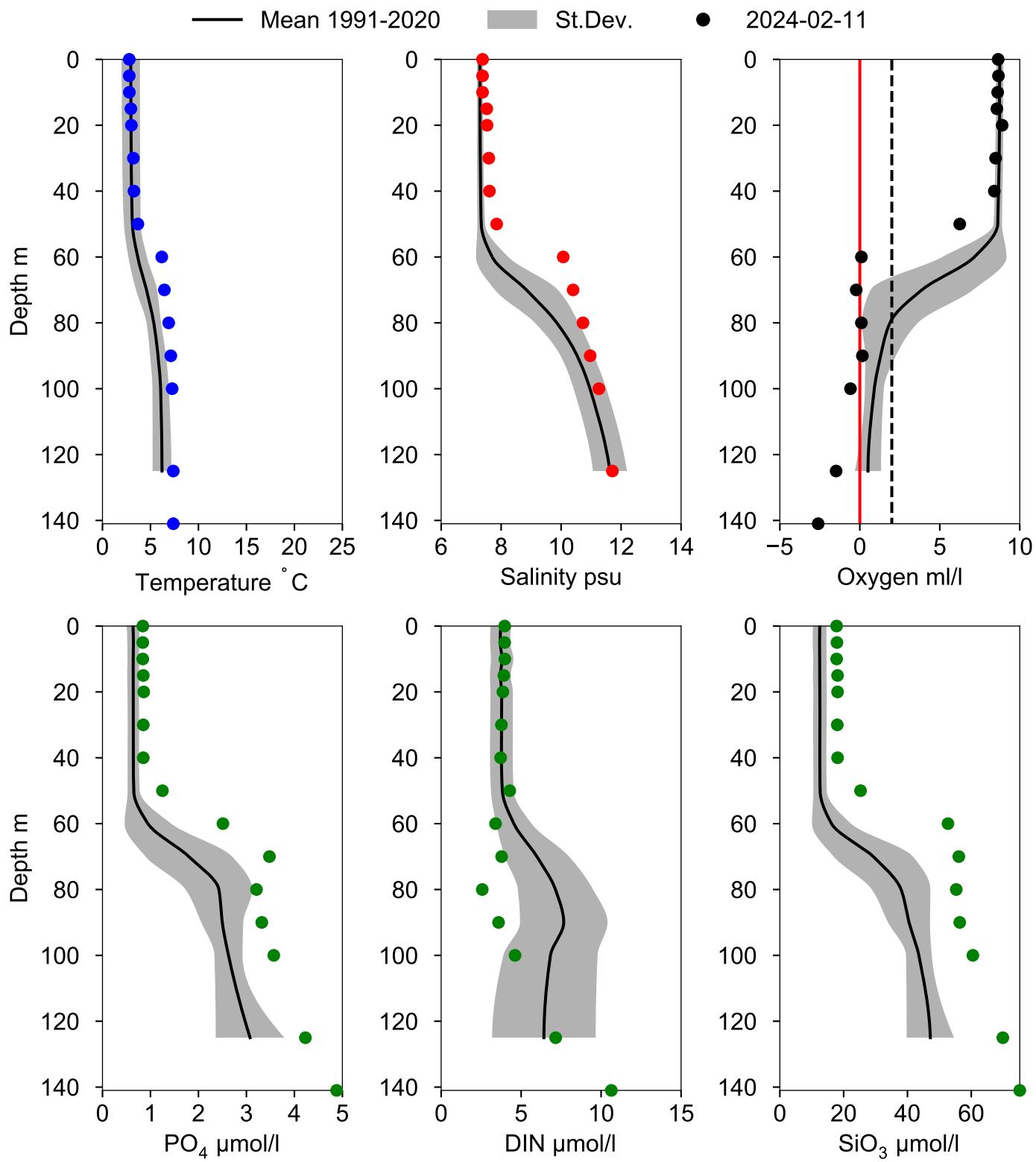


OXYGEN IN BOTTOM WATER (depth >= 125 m)



Vertical profiles BY10

February



STATION BY11 SURFACE WATER (0-10 m)

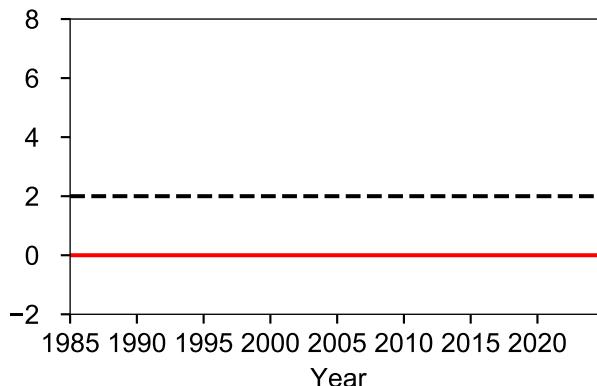
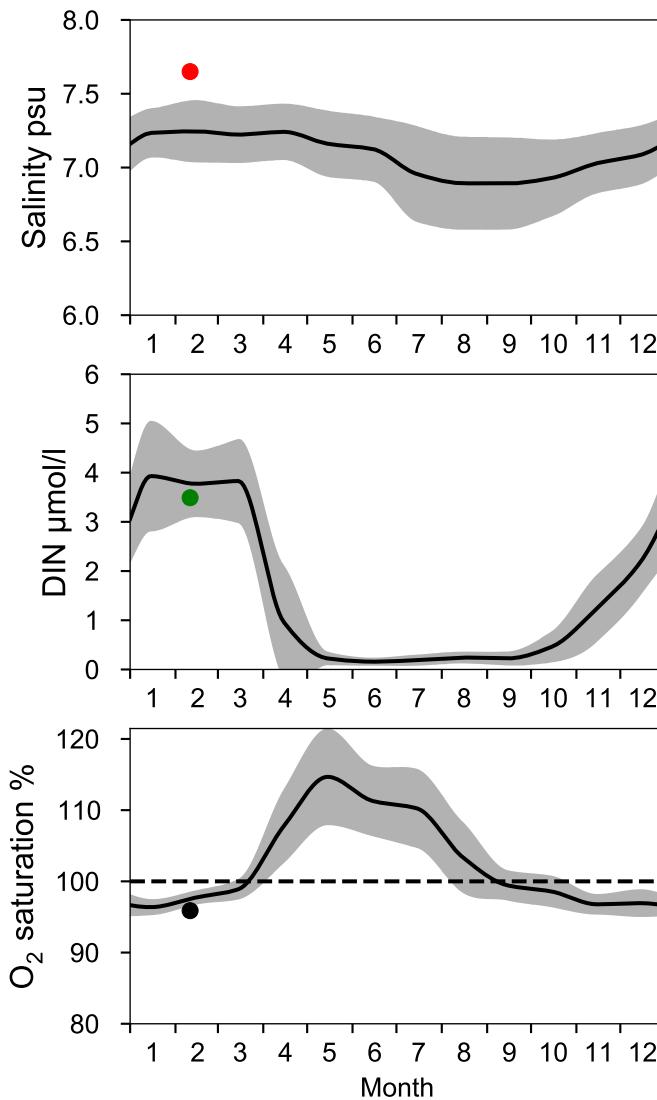
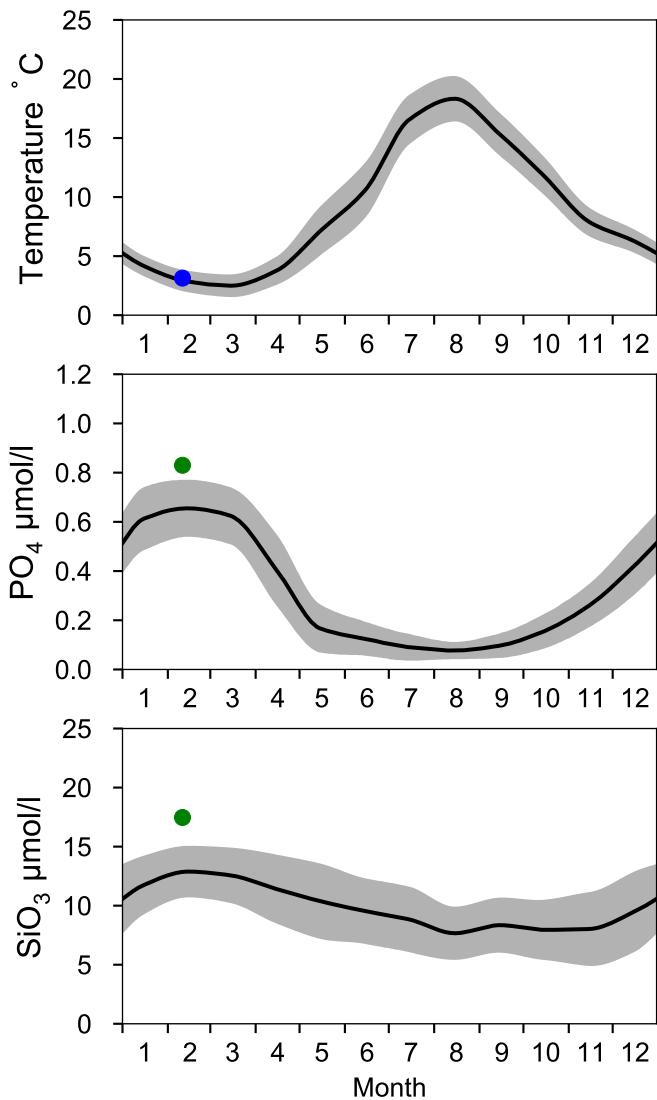
Annual Cycles

Statistics based on data from: Östra Gotlandshavet

— Mean 1991-2020

St.Dev.

● 2024



Vertical profiles BY11

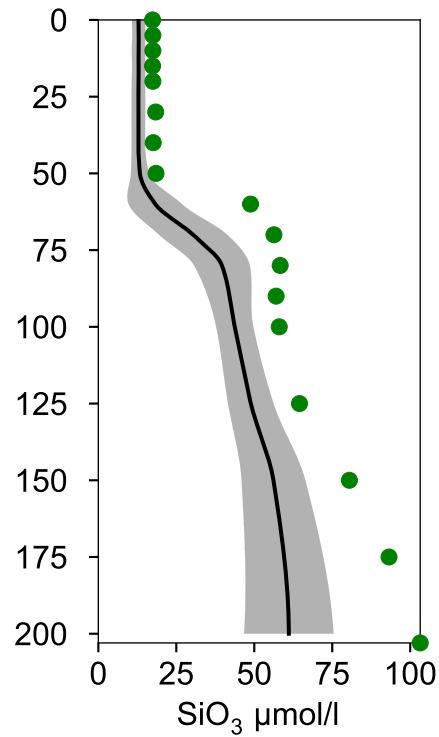
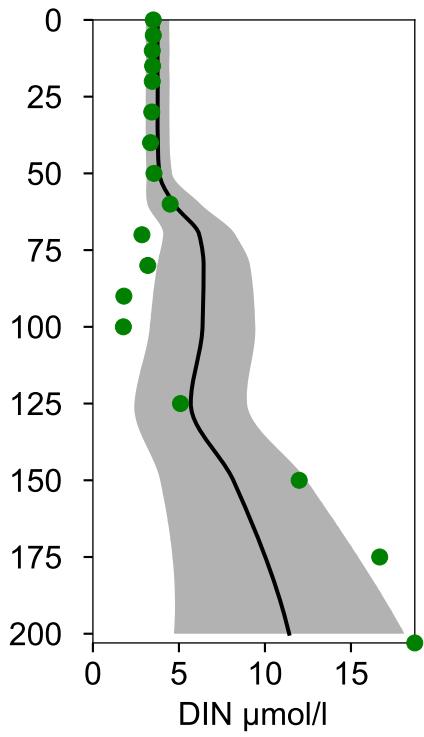
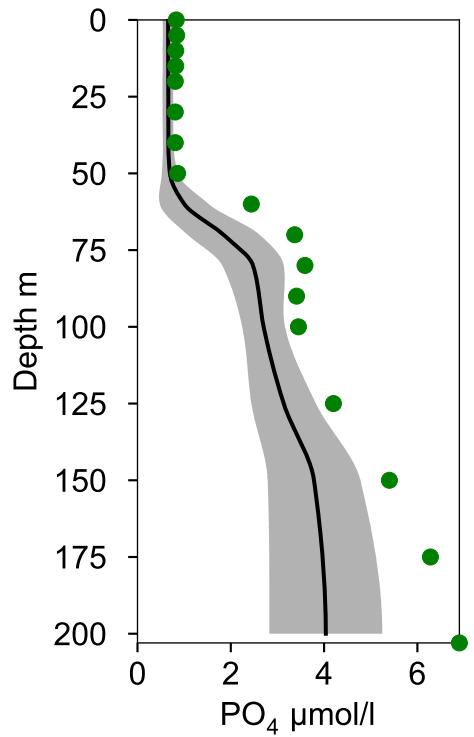
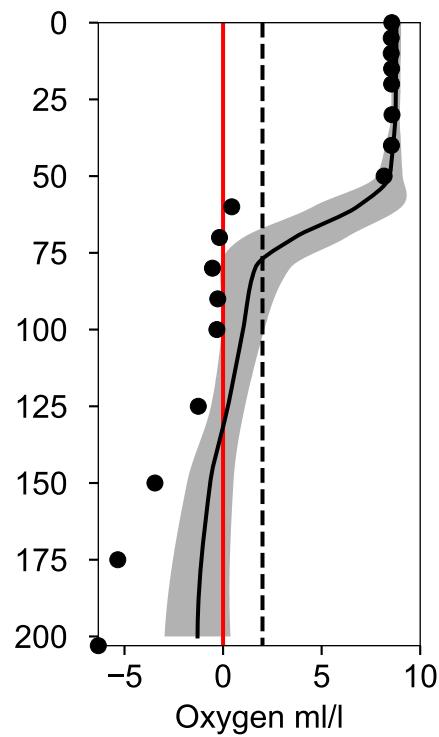
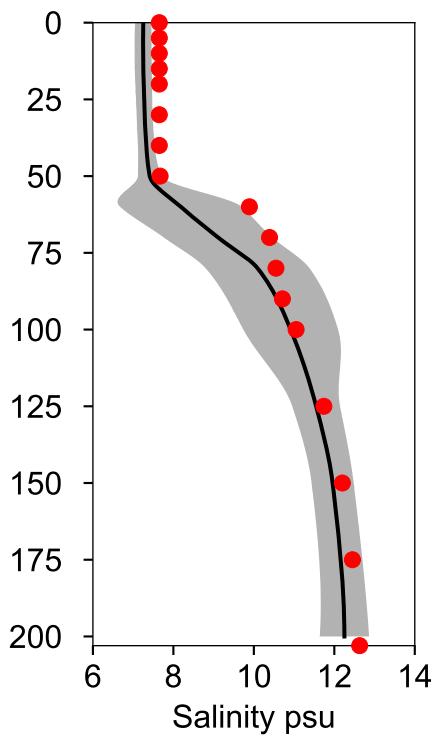
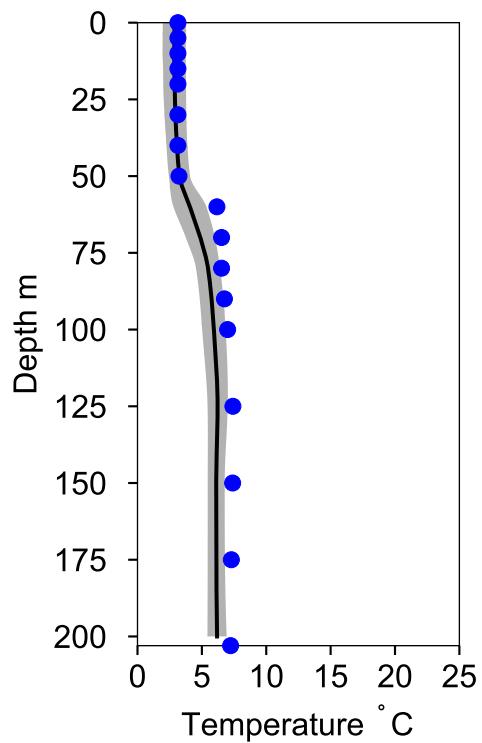
February

Statistics based on data from: Östra Gotlandshavet

— Mean 1991-2020

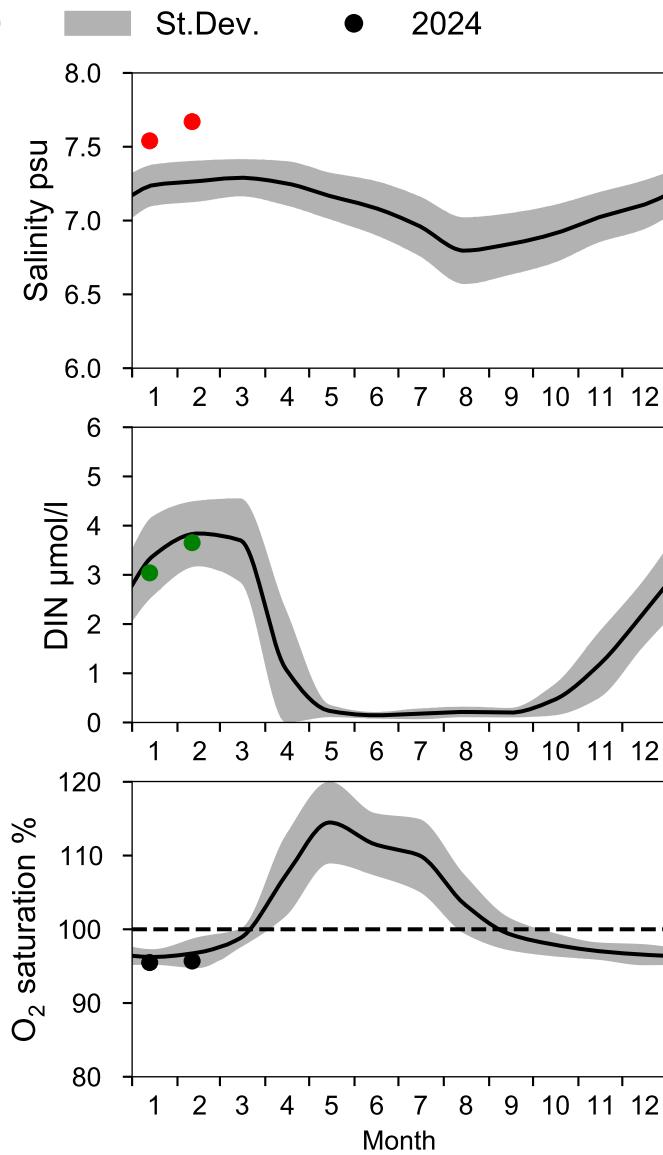
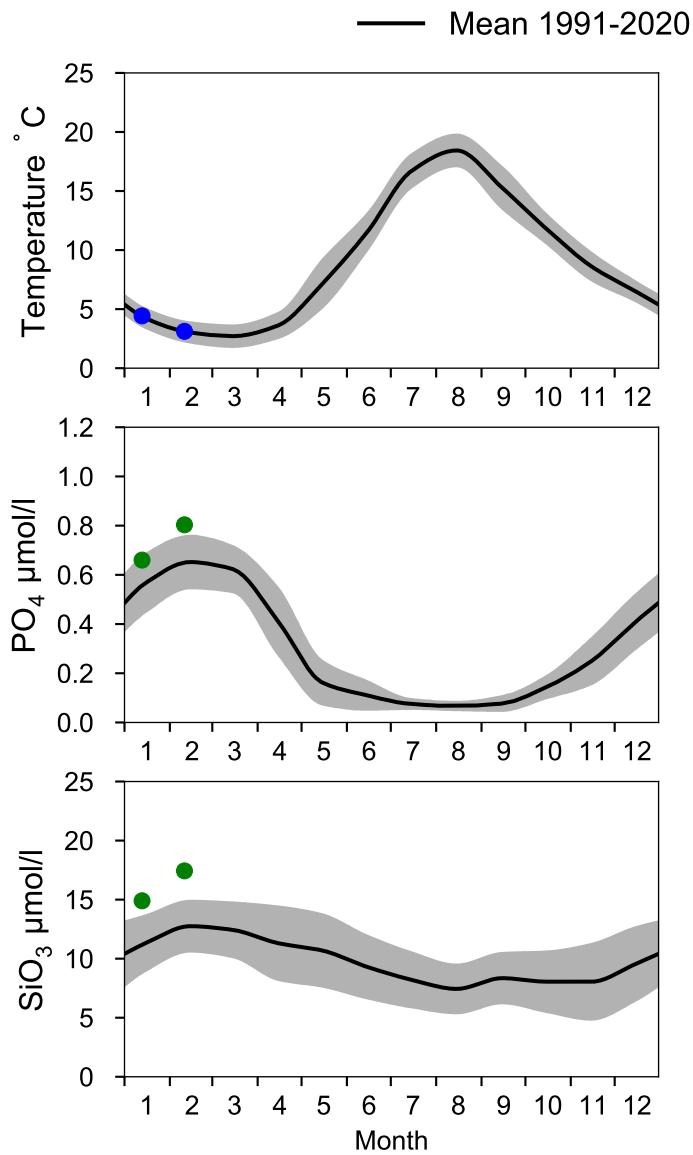
■ St.Dev.

● 2024-02-11

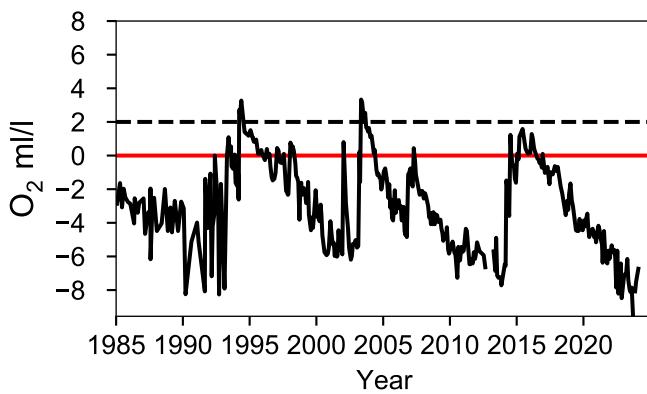
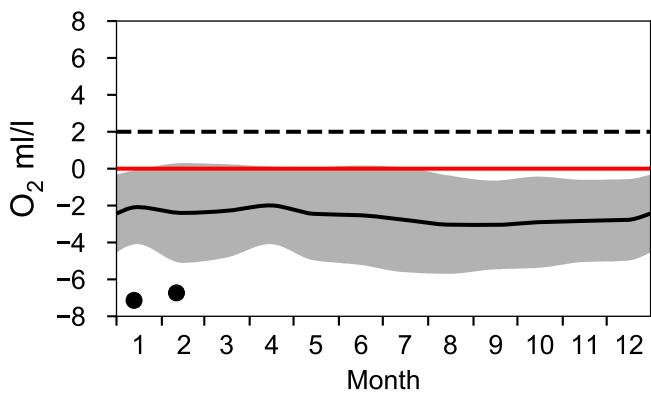


STATION BY15 GOTLANDSDJ SURFACE WATER (0-10 m)

Annual Cycles

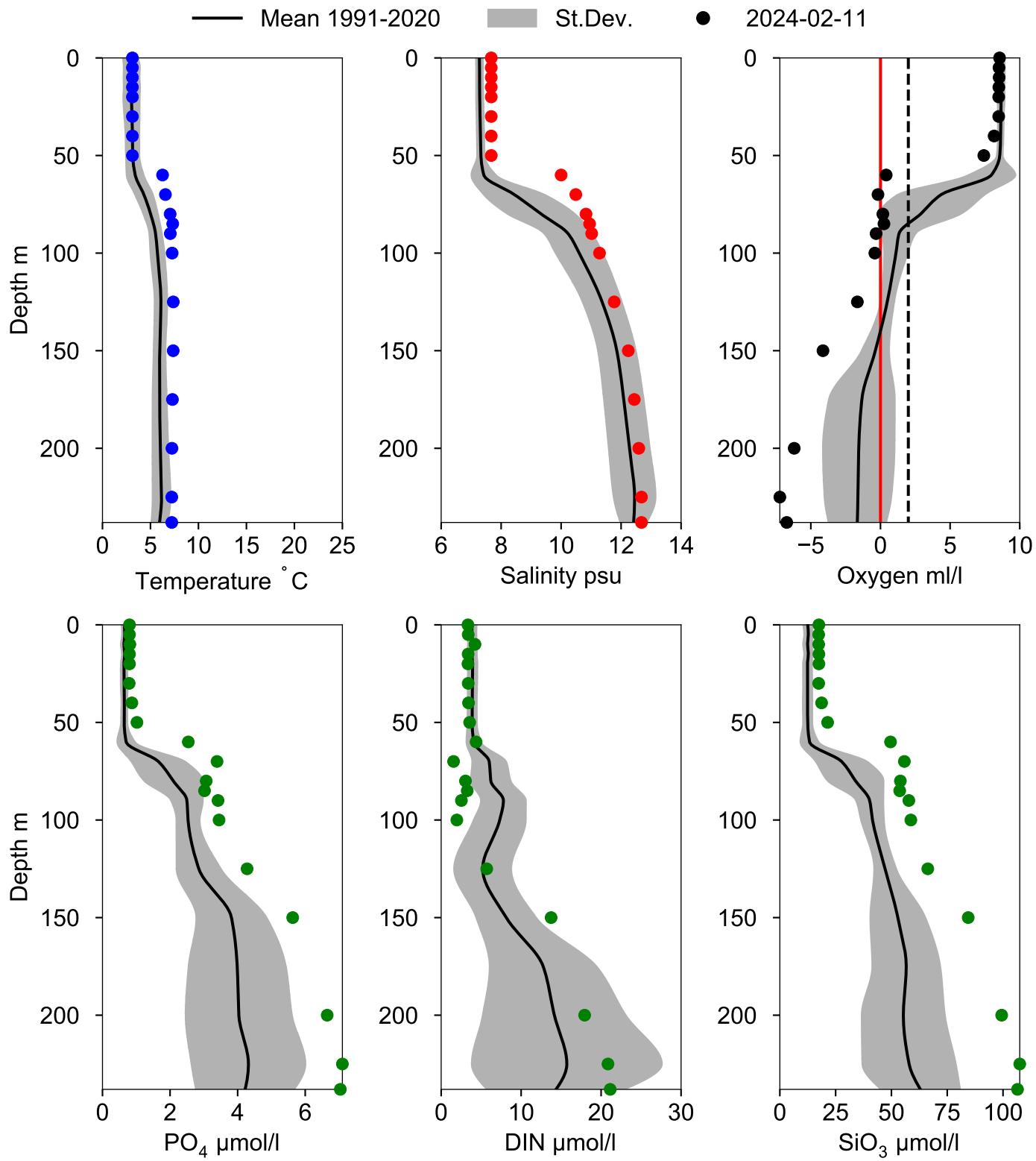


OXYGEN IN BOTTOM WATER (depth >= 225 m)



Vertical profiles BY15 GOTLANDSDJ

February



STATION BY13 SURFACE WATER (0-10 m)

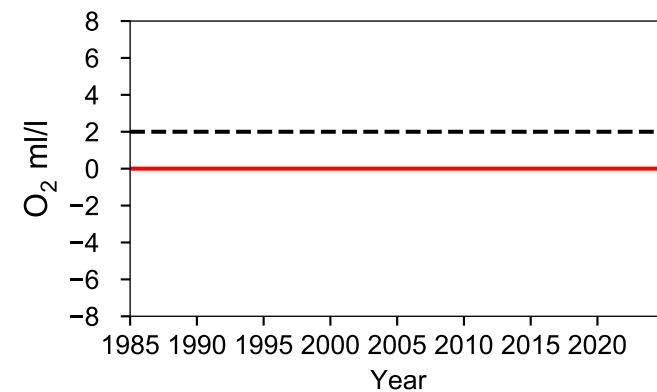
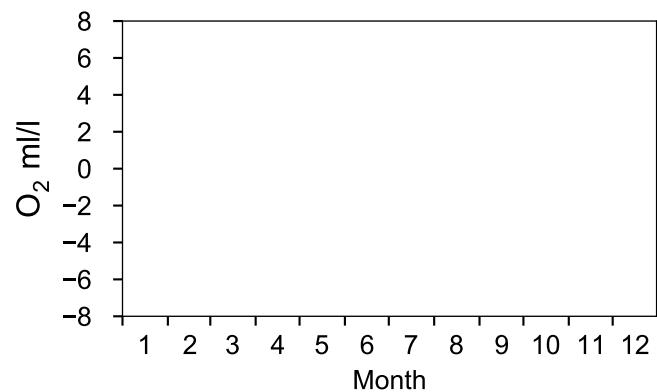
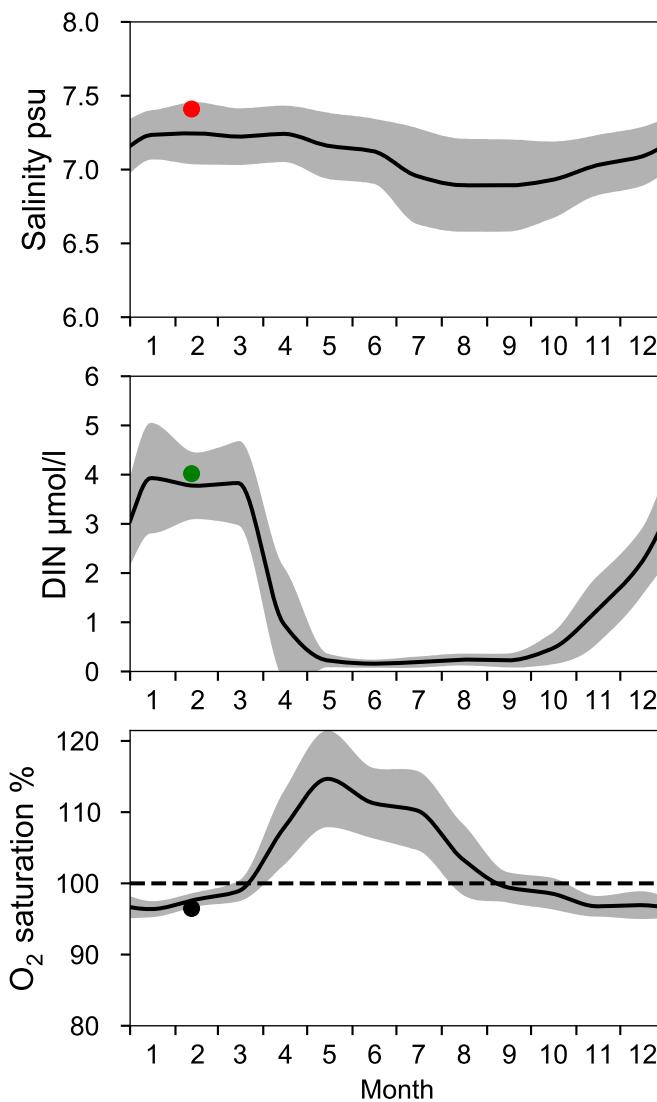
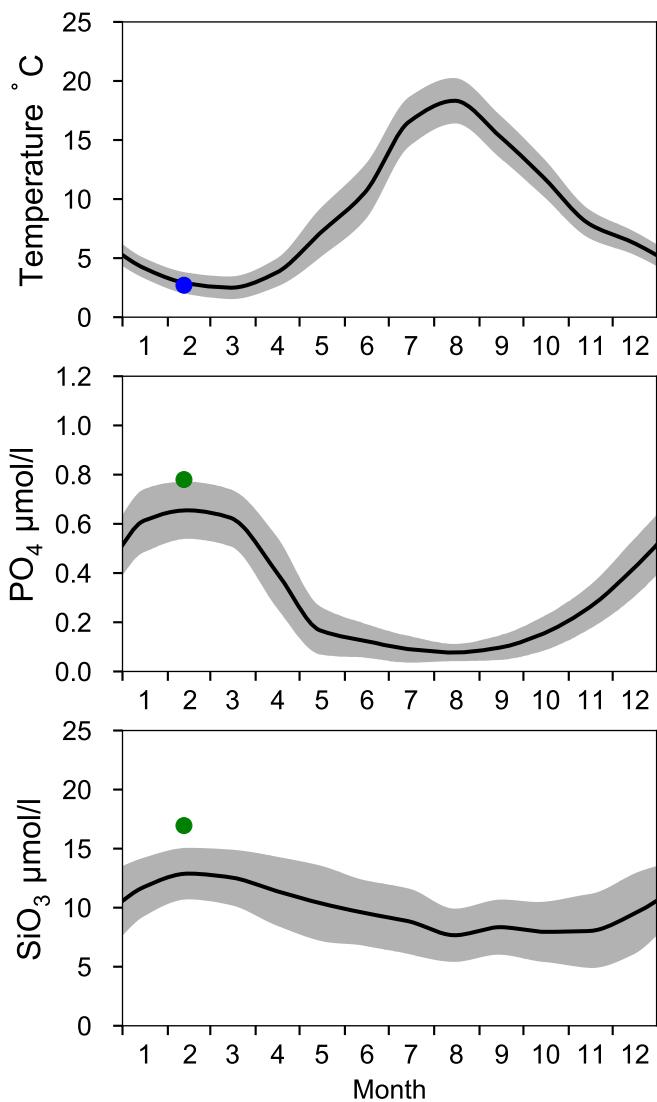
Annual Cycles

Statistics based on data from: Östra Gotlandshavet

— Mean 1991-2020

St.Dev.

● 2024

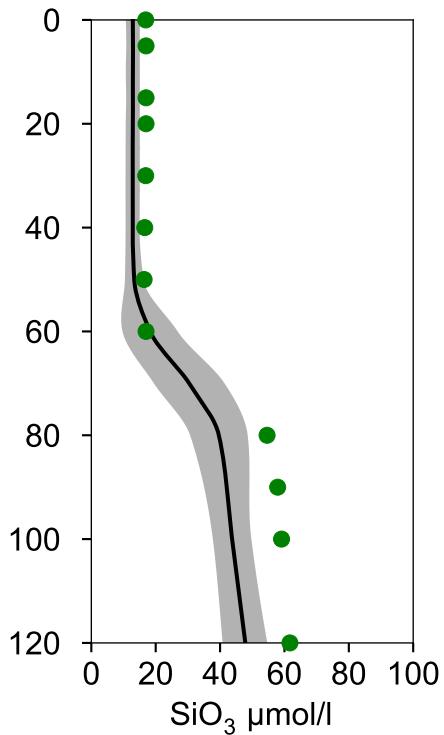
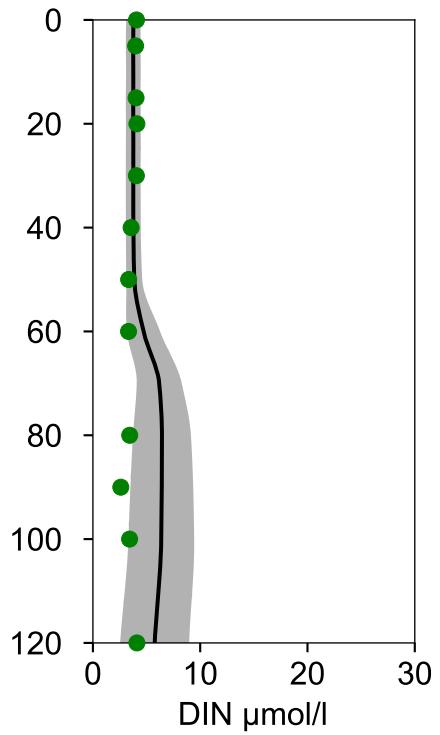
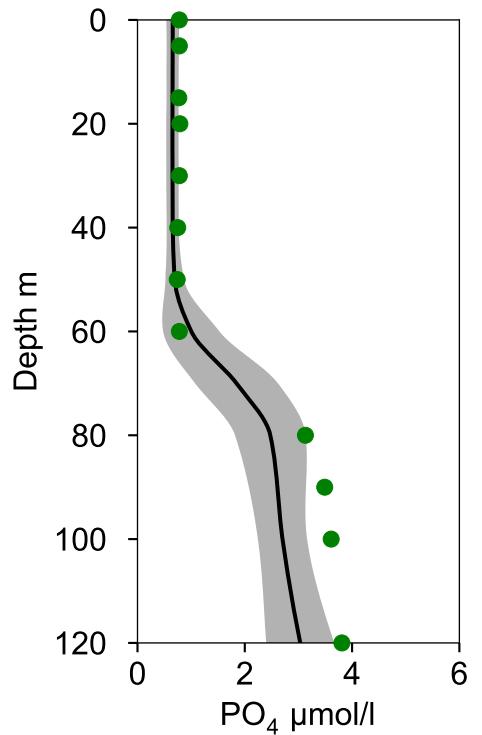
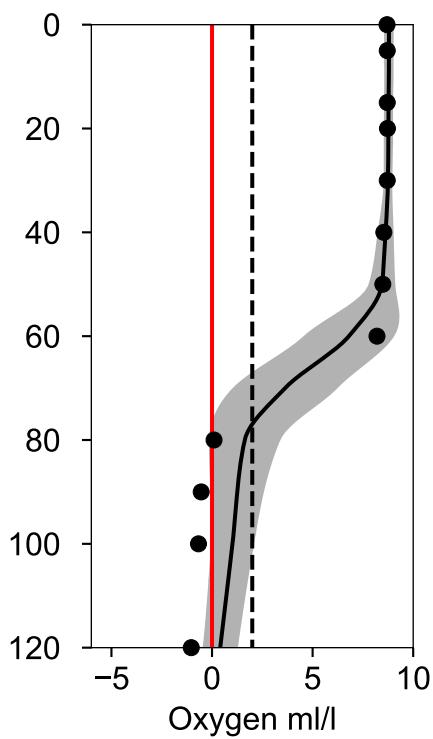
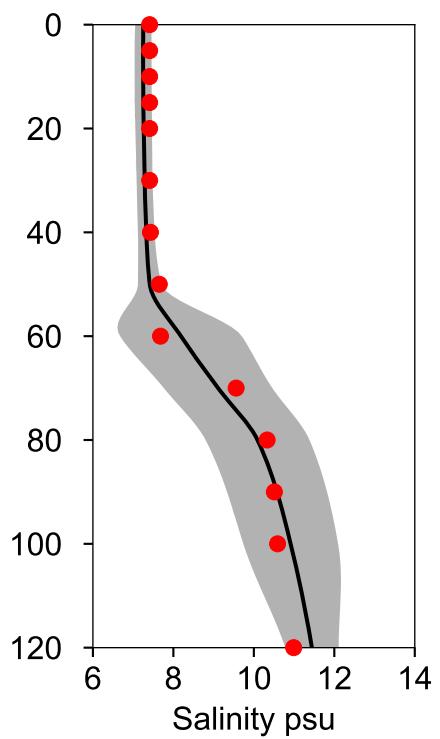
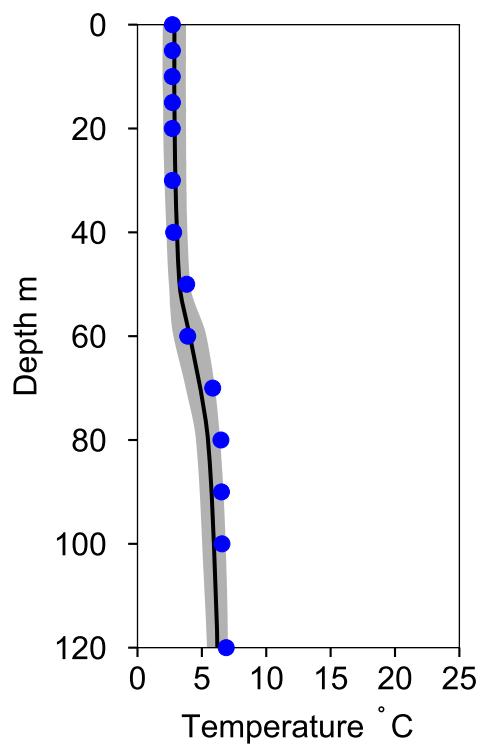


Vertical profiles BY13

February

Statistics based on data from: Östra Gotlandshavet

— Mean 1991-2020 ■ St.Dev. ● 2024-02-12



STATION BY19 SURFACE WATER (0-10 m)

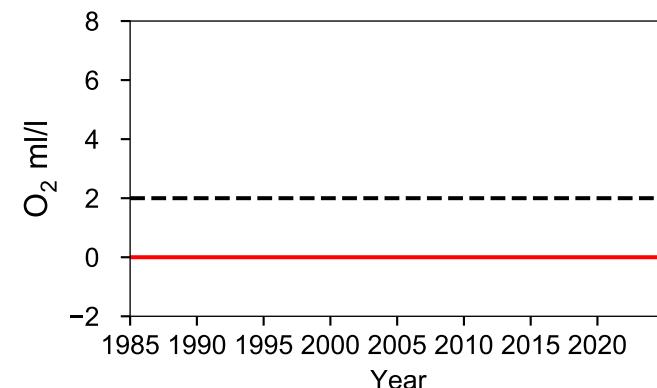
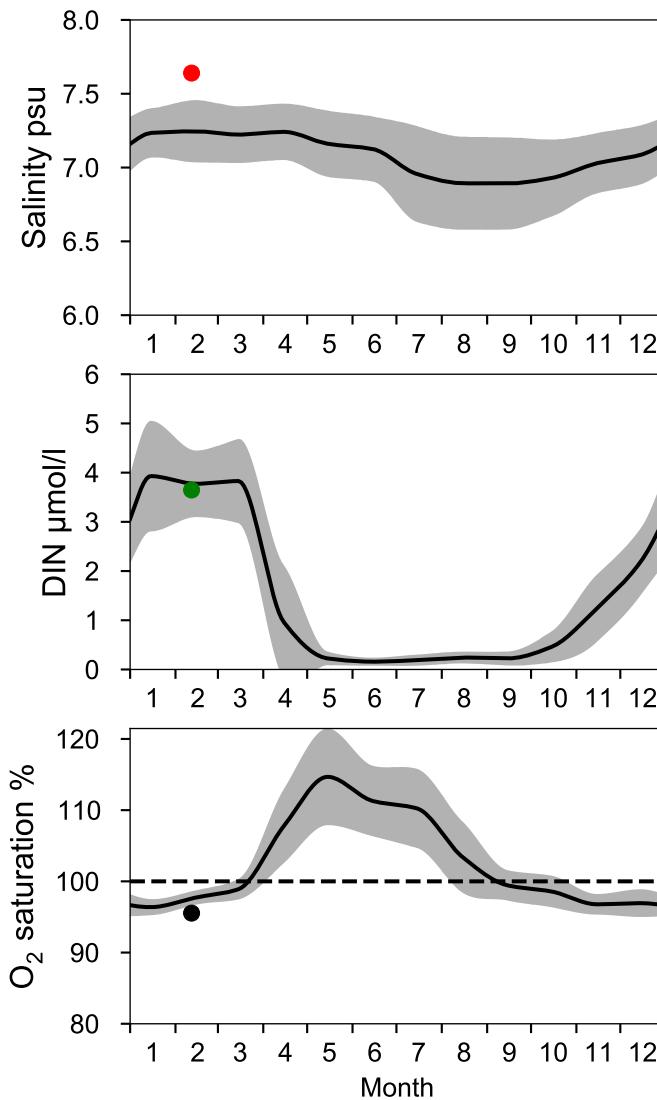
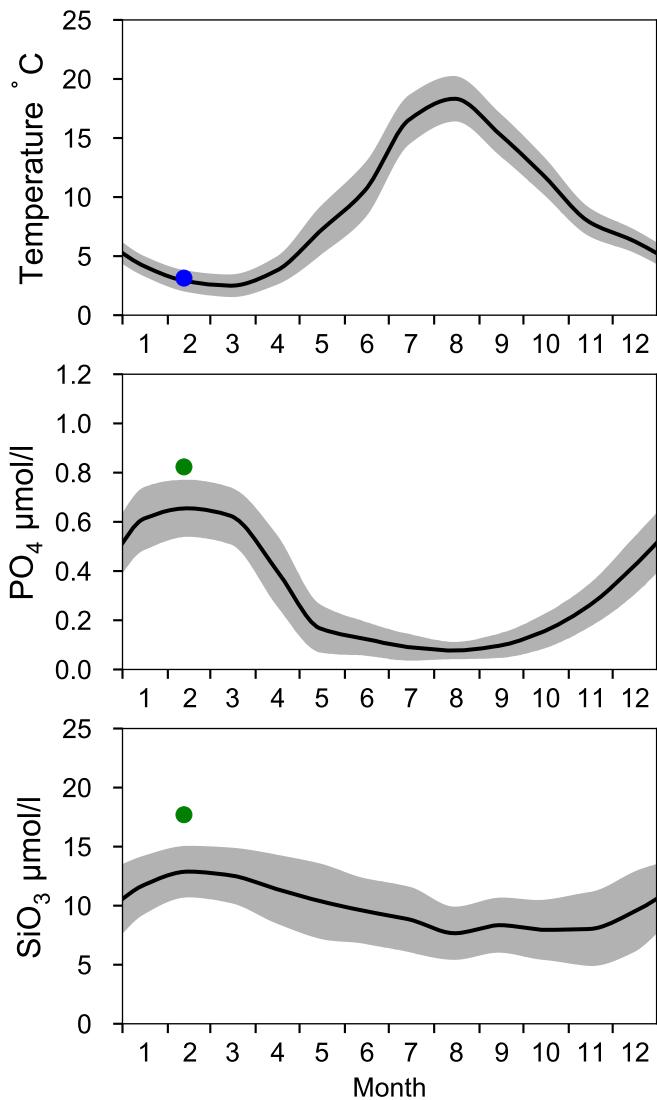
Annual Cycles

Statistics based on data from: Östra Gotlandshavet

— Mean 1991-2020

St.Dev.

● 2024

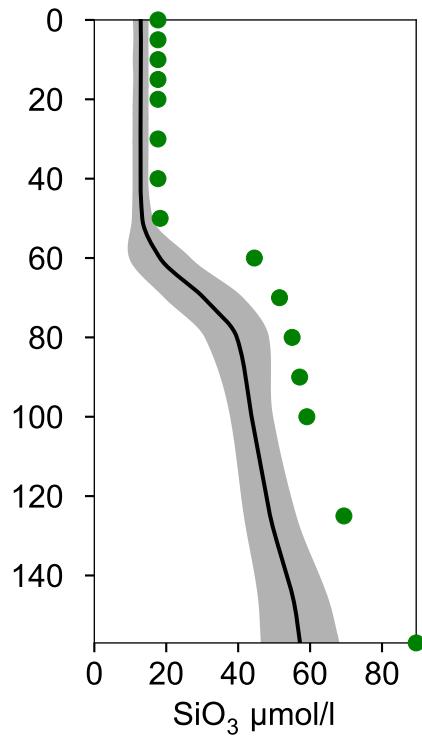
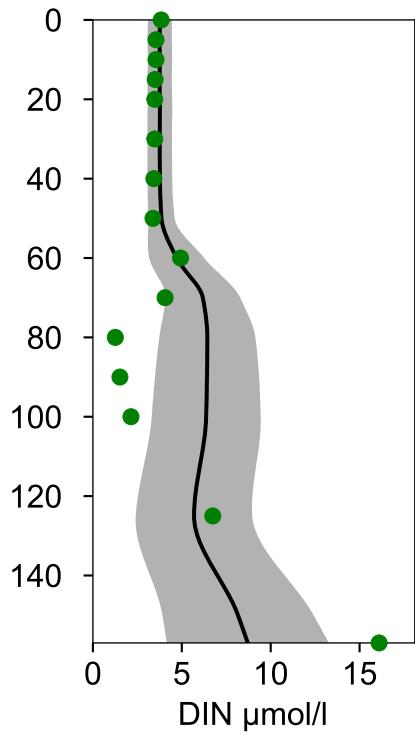
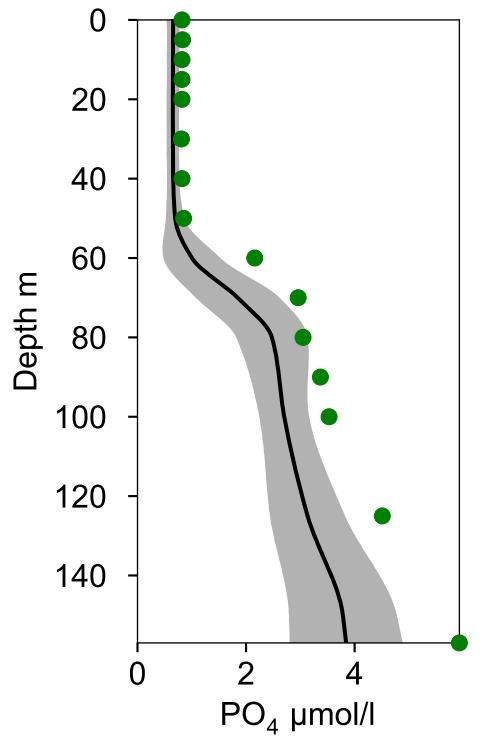
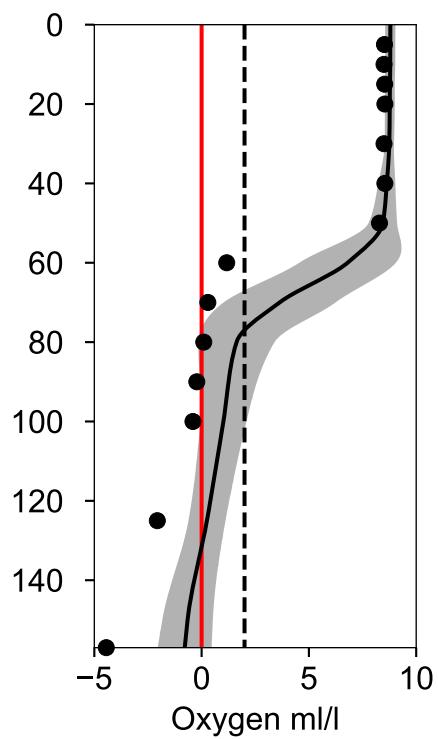
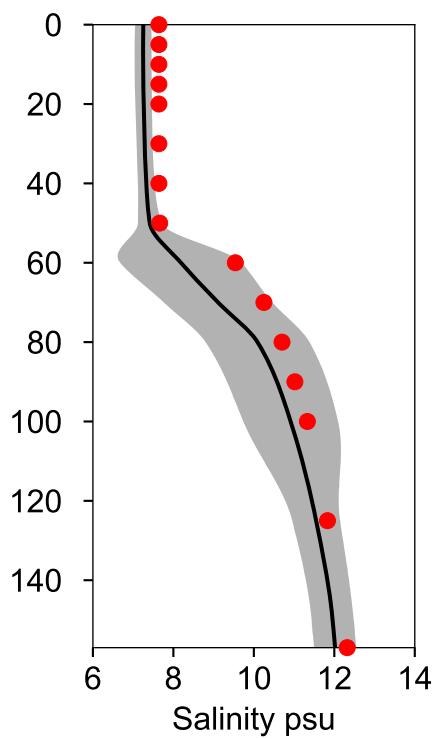
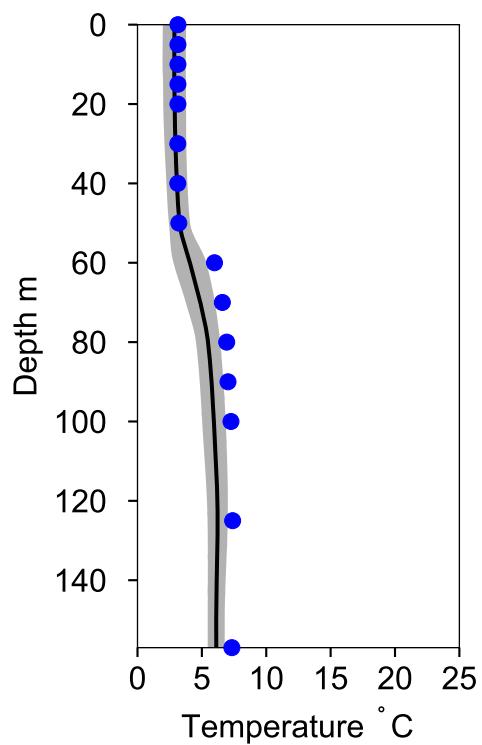


Vertical profiles BY19

February

Statistics based on data from: Östra Gotlandshavet

— Mean 1991-2020 ■ St.Dev. ● 2024-02-12



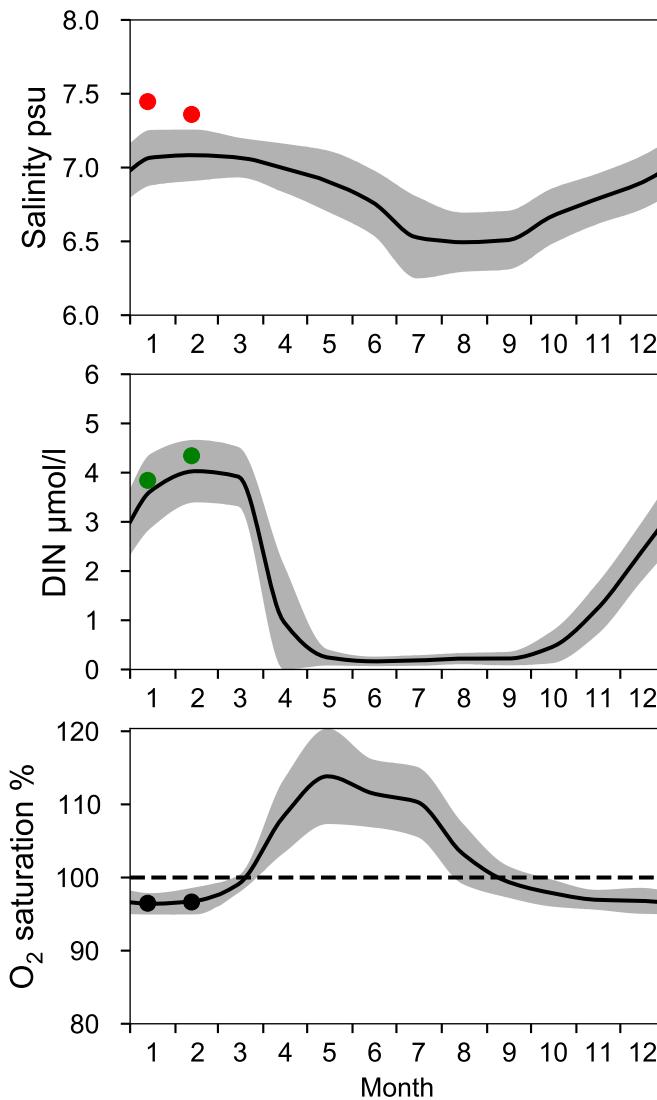
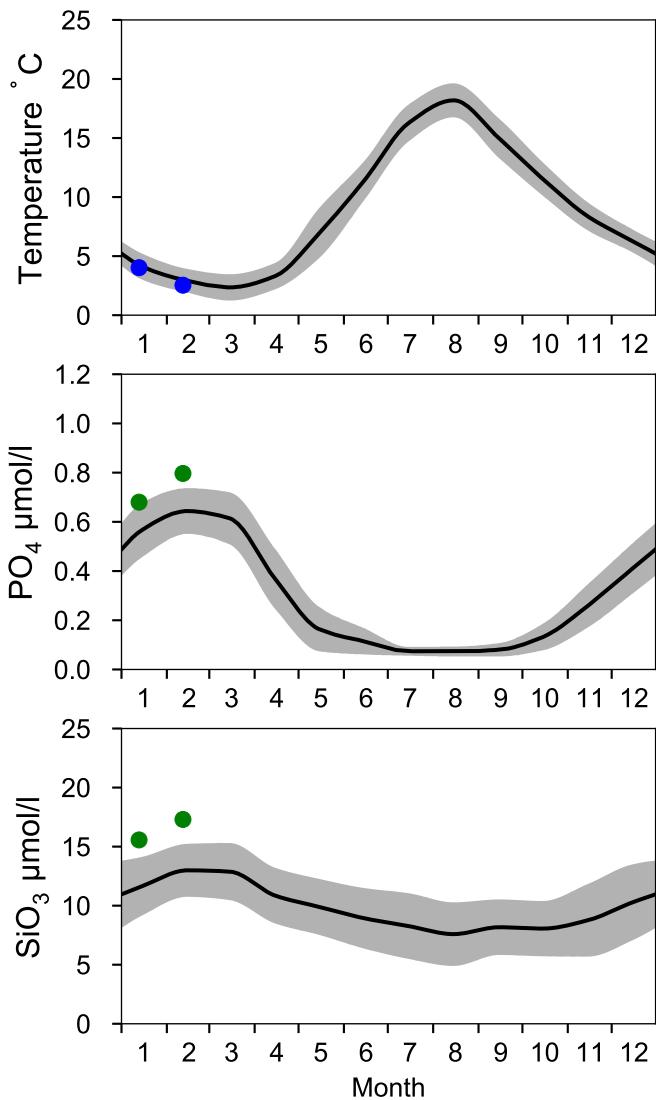
STATION BY20 FÄRÖDJ SURFACE WATER (0-10 m)

Annual Cycles

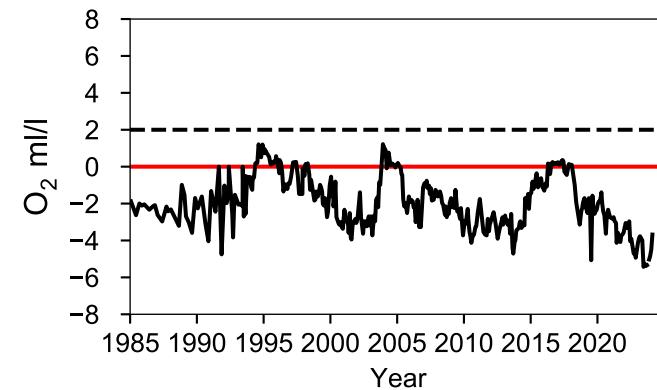
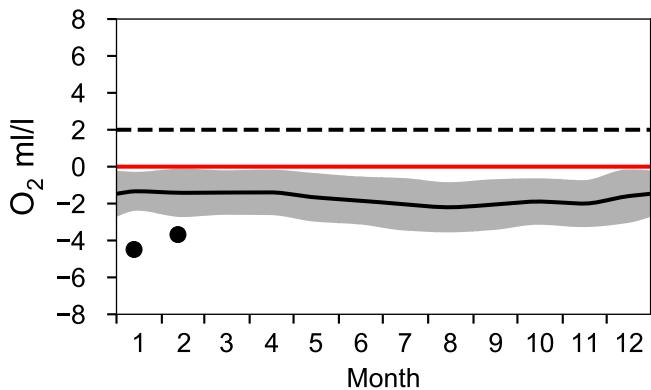
— Mean 1991-2020

St.Dev.

● 2024

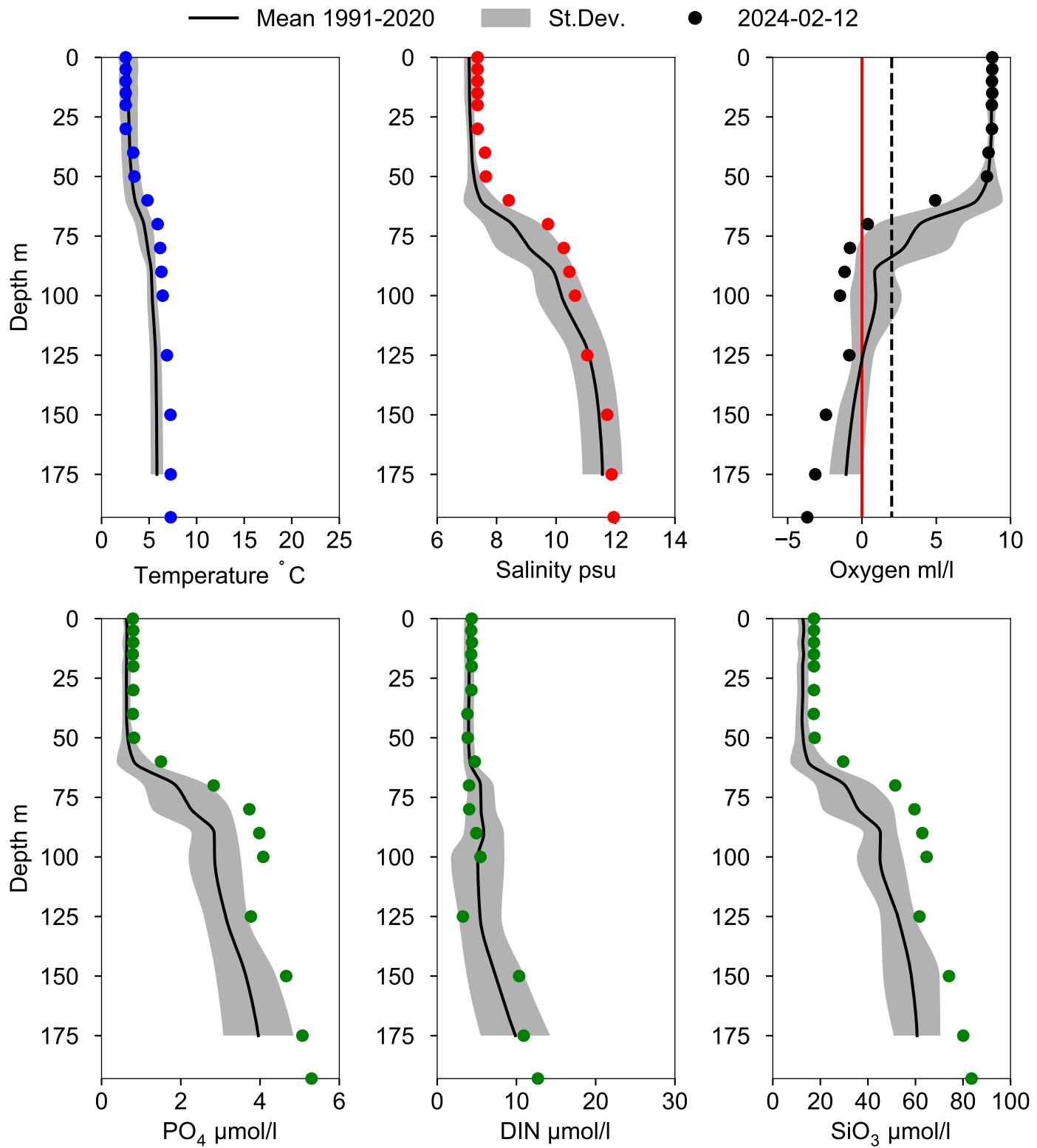


OXYGEN IN BOTTOM WATER (depth $\geq 175 \text{ m}$)



Vertical profiles BY20 FÅRÖDJ

February



STATION BY21 SURFACE WATER (0-10 m)

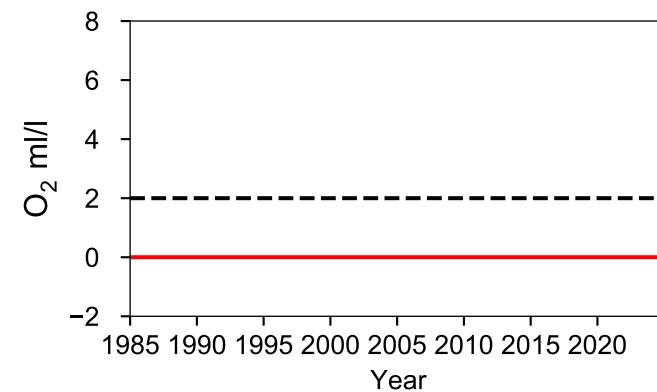
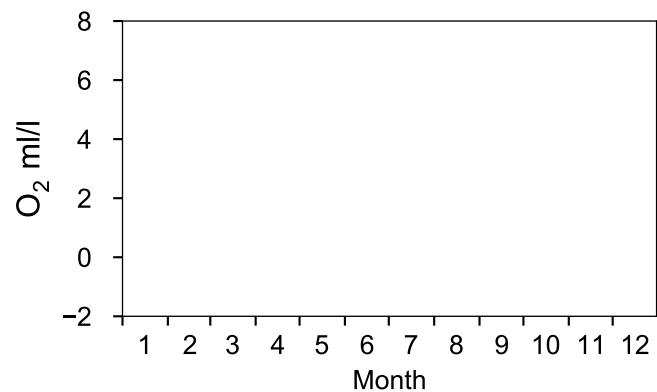
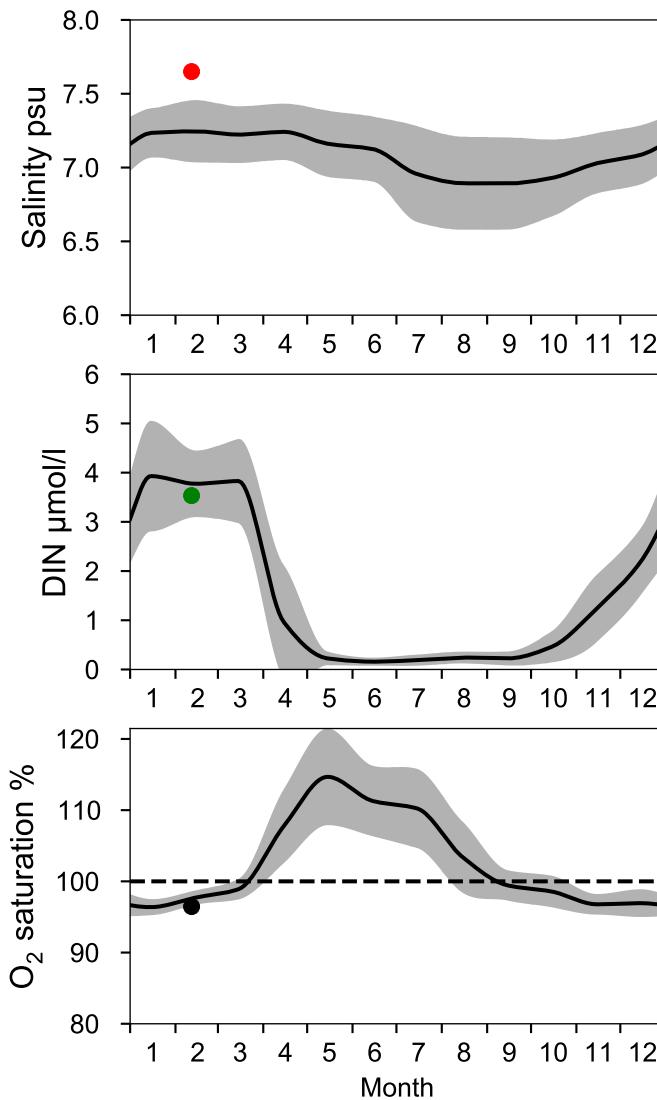
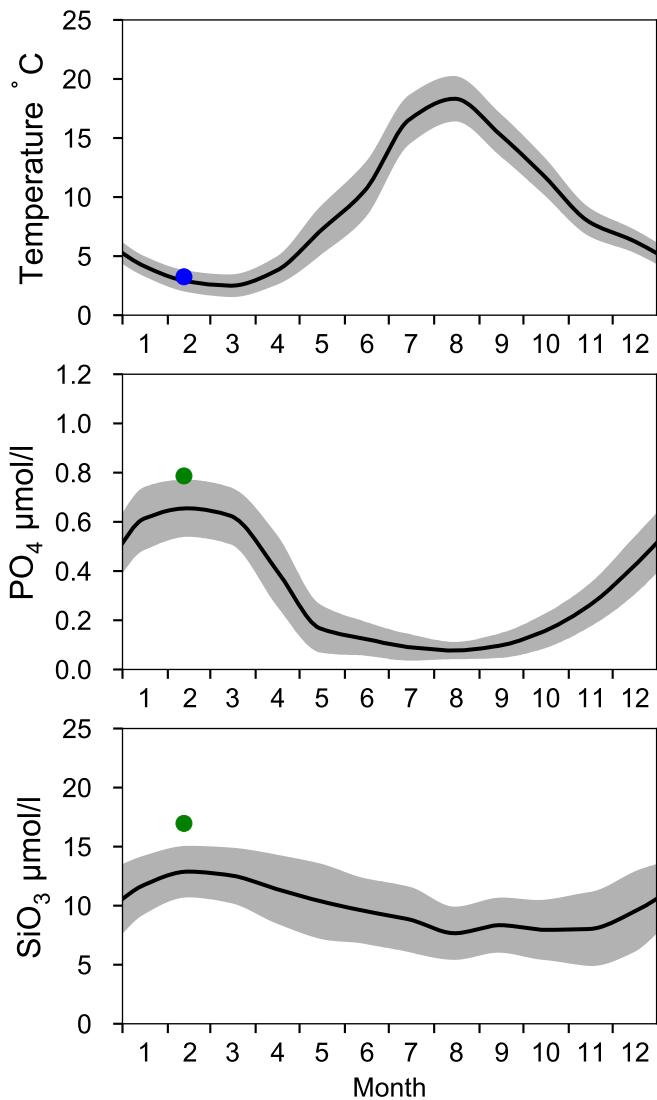
Annual Cycles

Statistics based on data from: Östra Gotlandshavet

— Mean 1991-2020

St.Dev.

● 2024

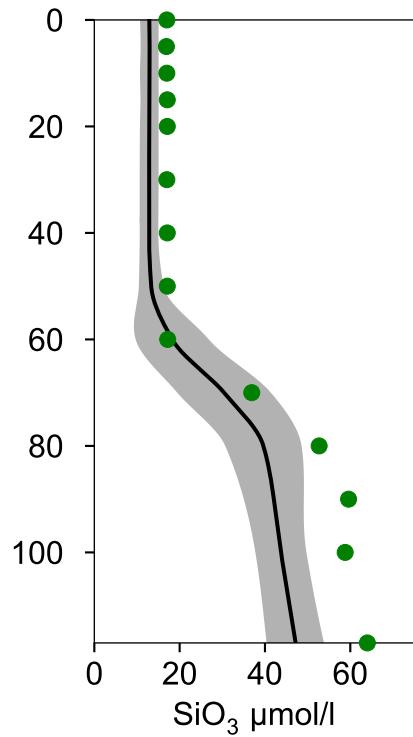
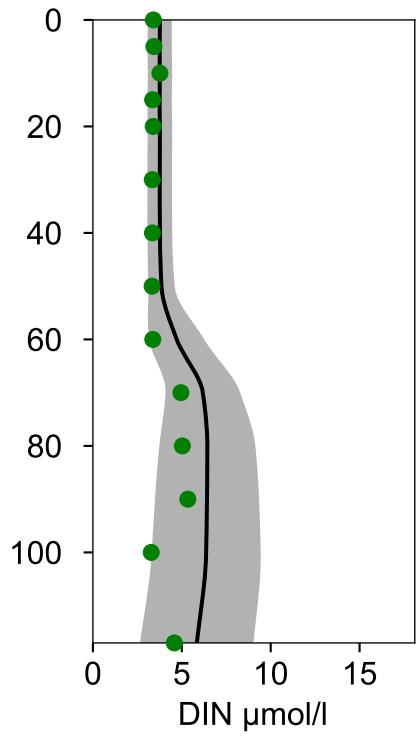
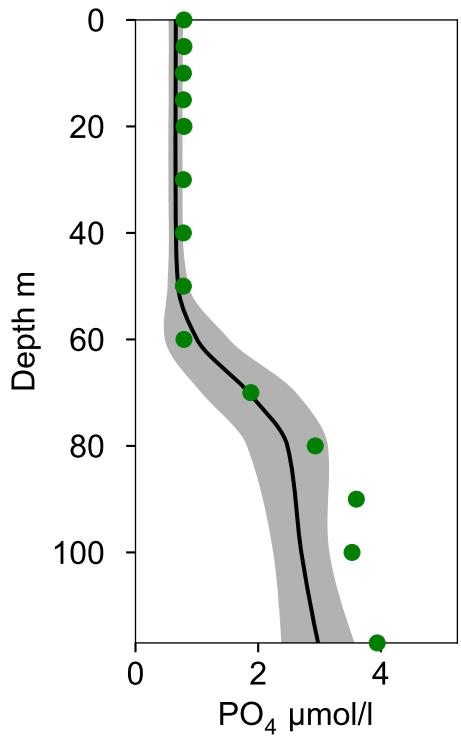
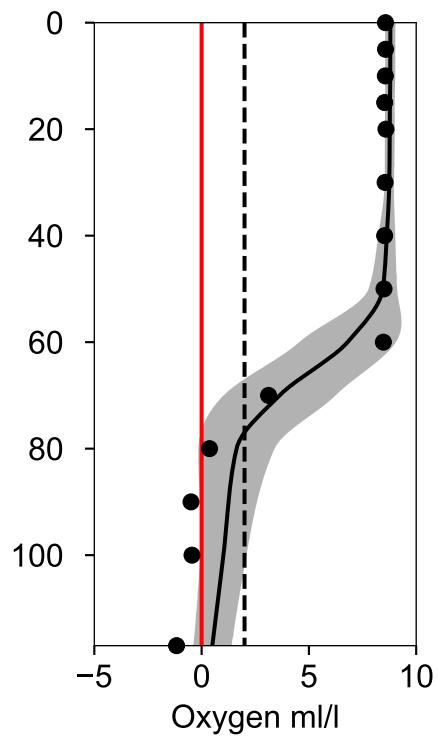
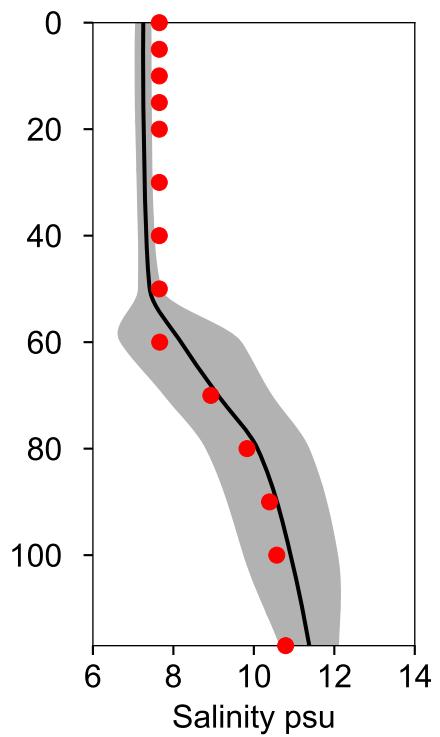
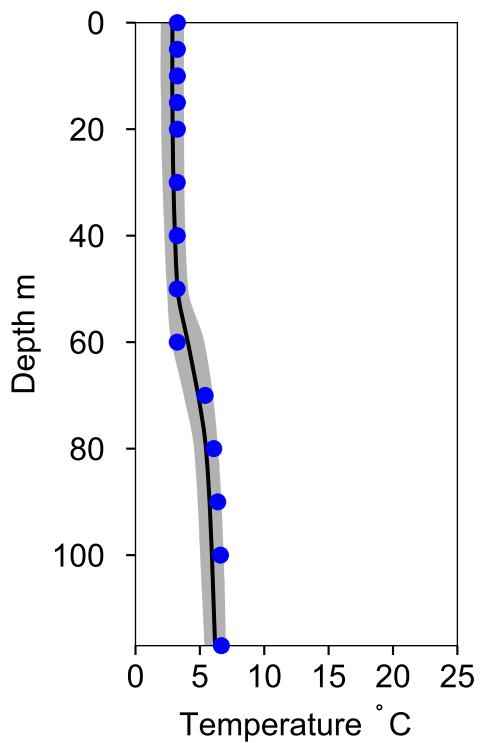


Vertical profiles BY21

February

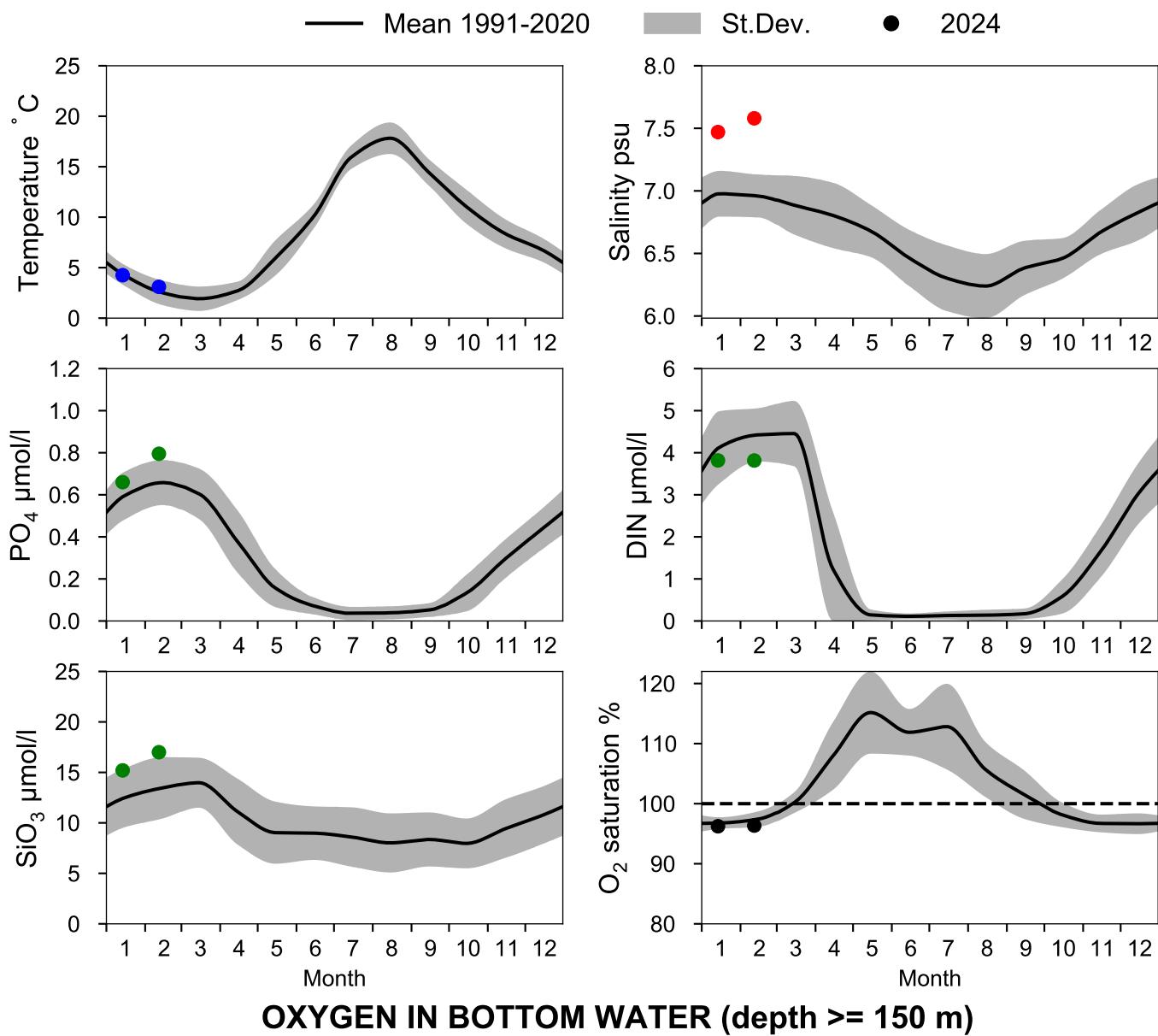
Statistics based on data from: Östra Gotlandshavet

— Mean 1991-2020 ■ St.Dev. ● 2024-02-12

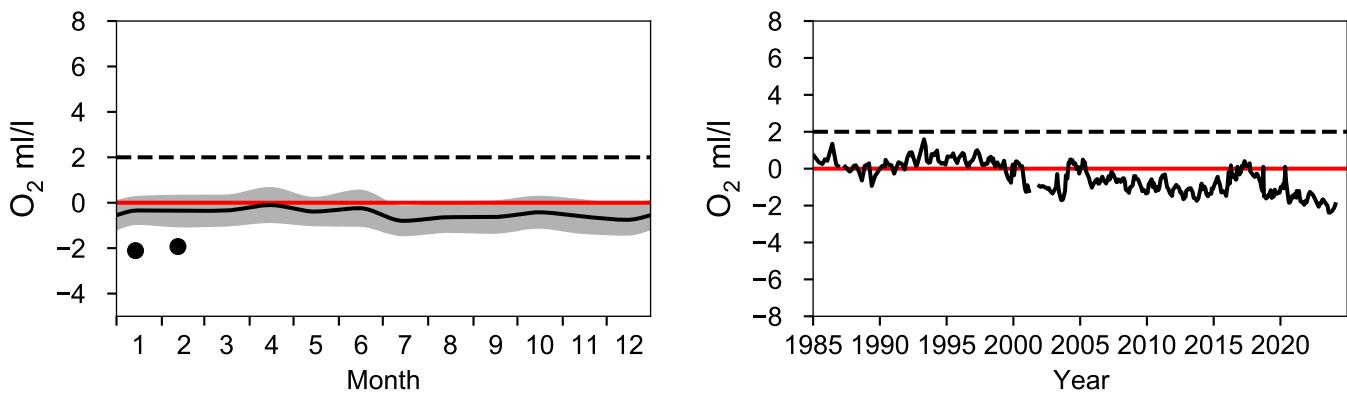


STATION BY29 / LL19 SURFACE WATER (0-10 m)

Annual Cycles

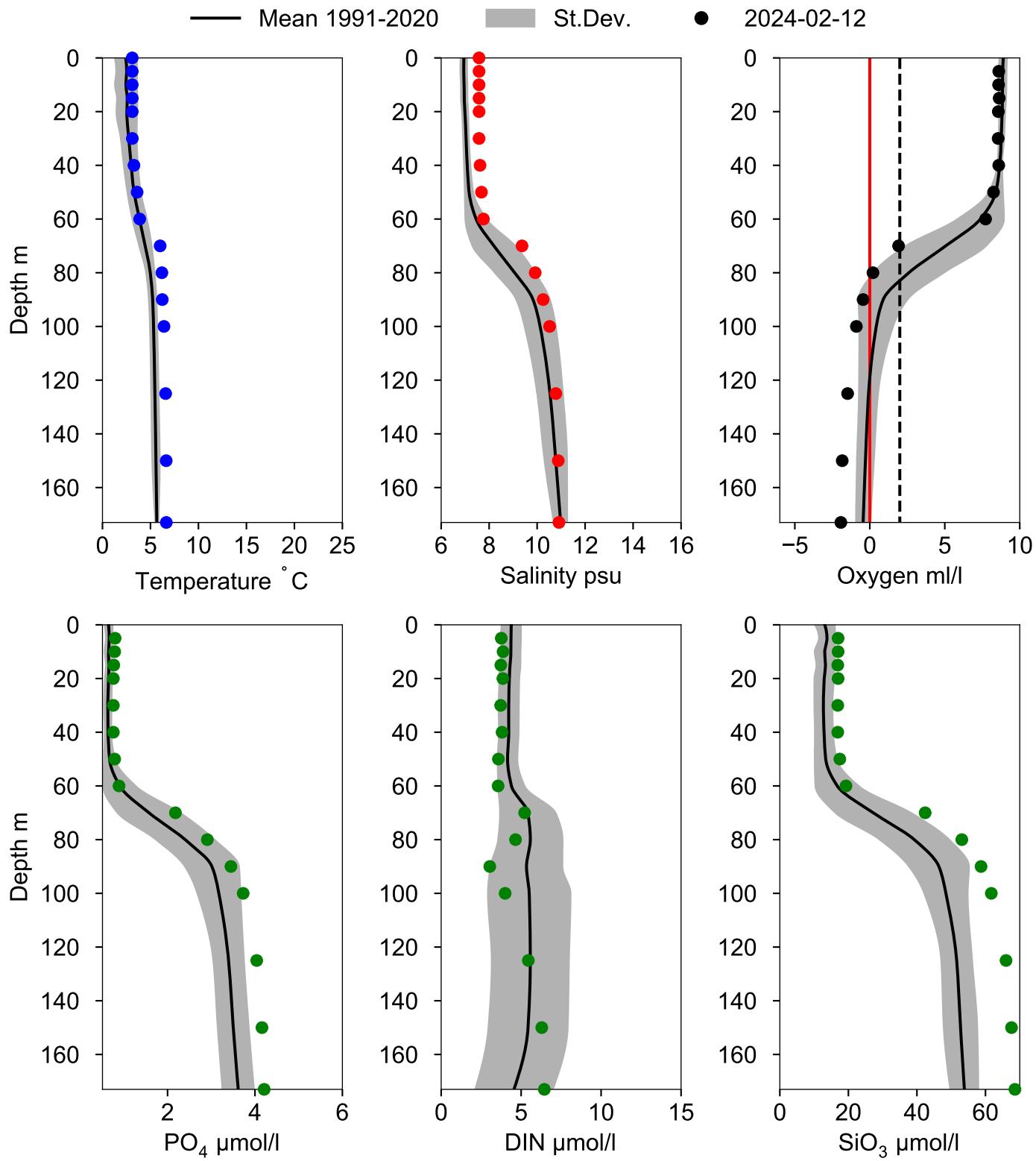


OXYGEN IN BOTTOM WATER (depth >= 150 m)



Vertical profiles BY29 / LL19

February



STATION BY30 SURFACE WATER (0-10 m)

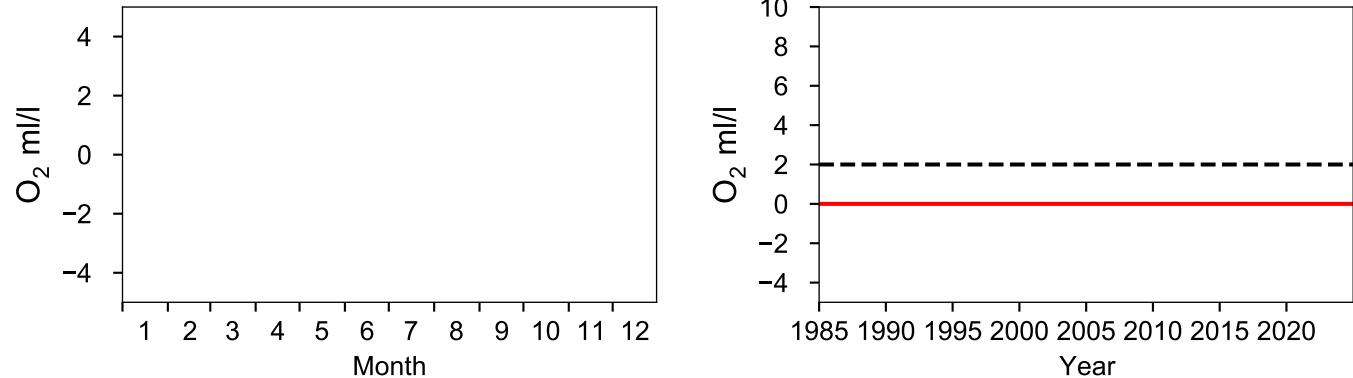
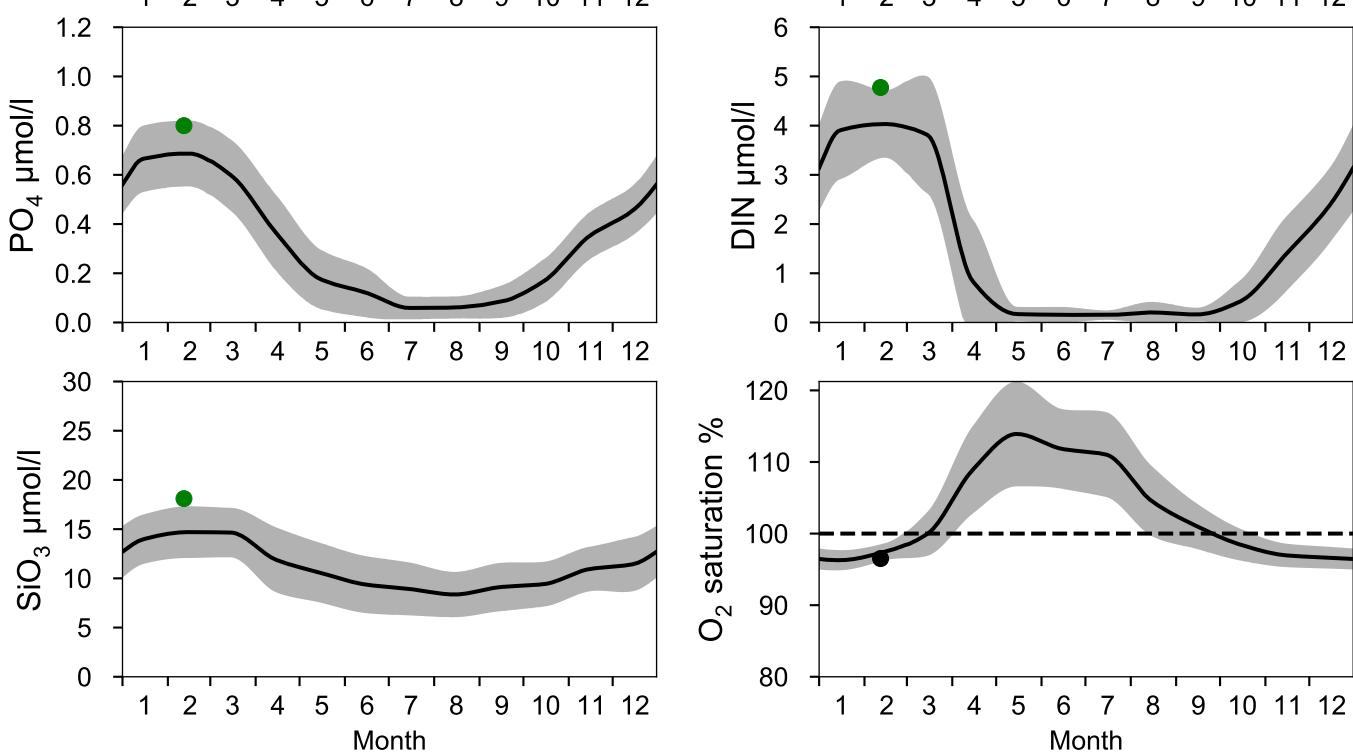
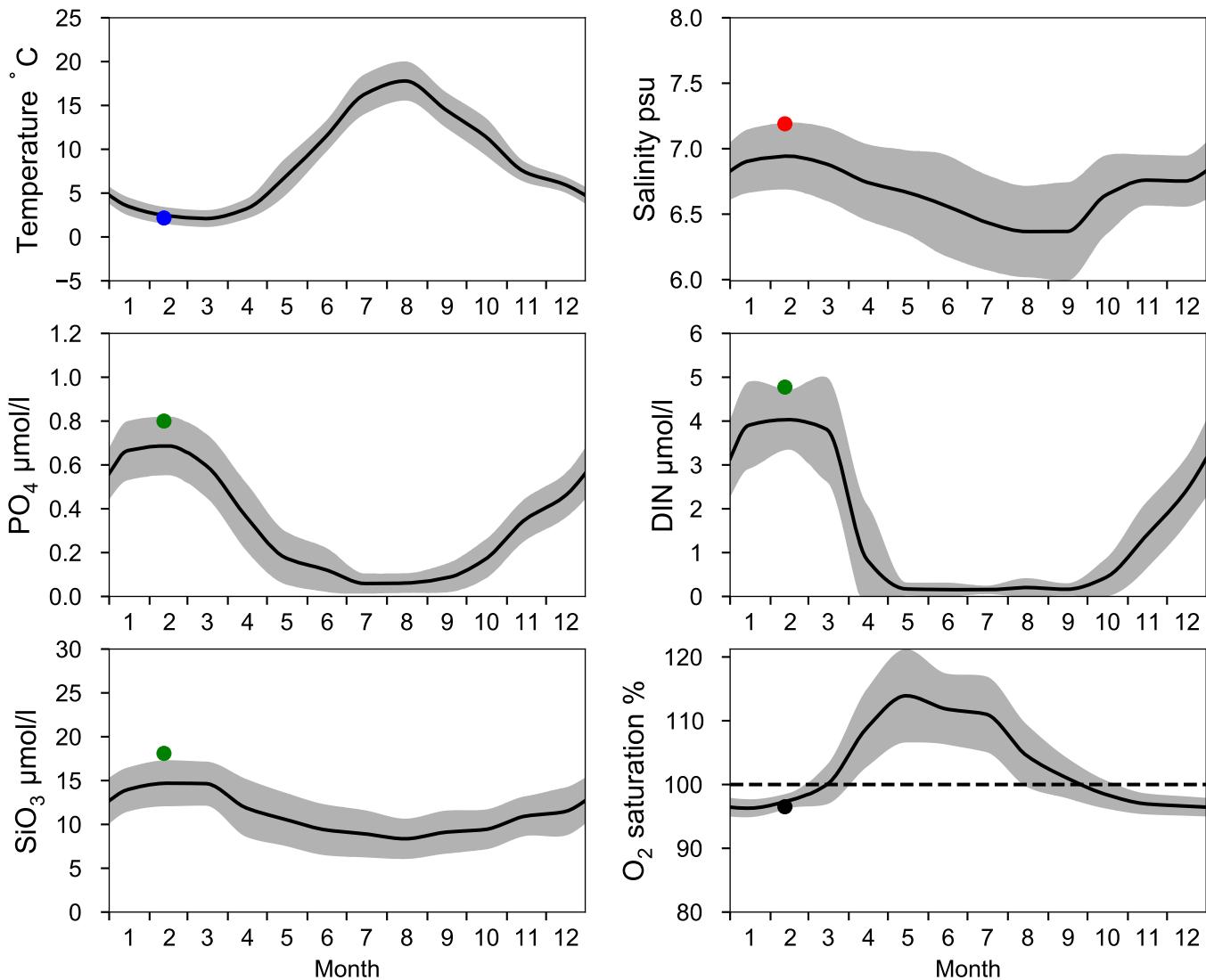
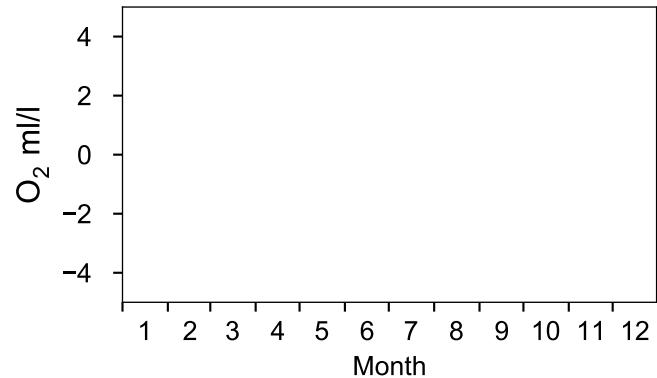
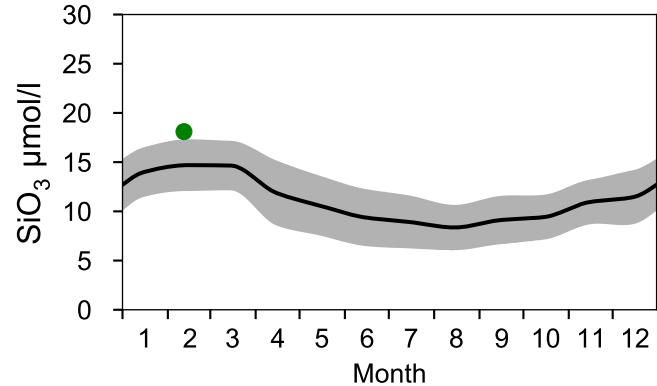
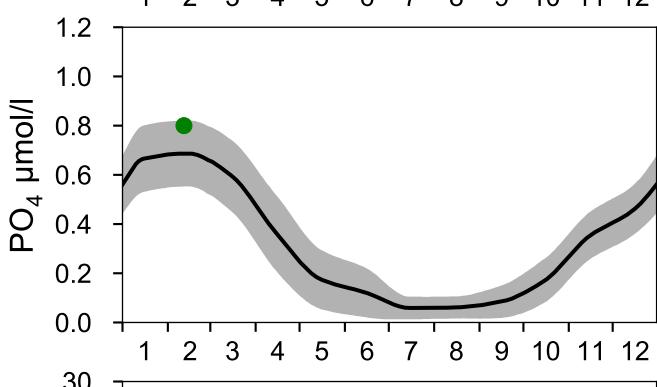
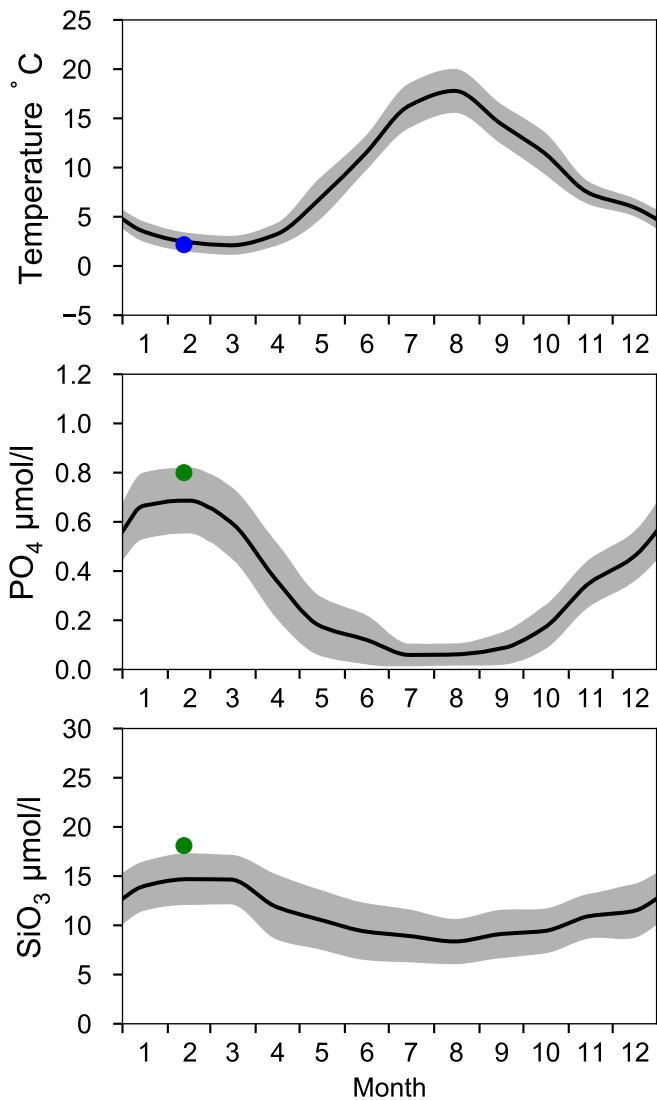
Annual Cycles

Statistics based on data from: Västra Gotlandshavet

— Mean 1991-2020

St.Dev.

● 2024

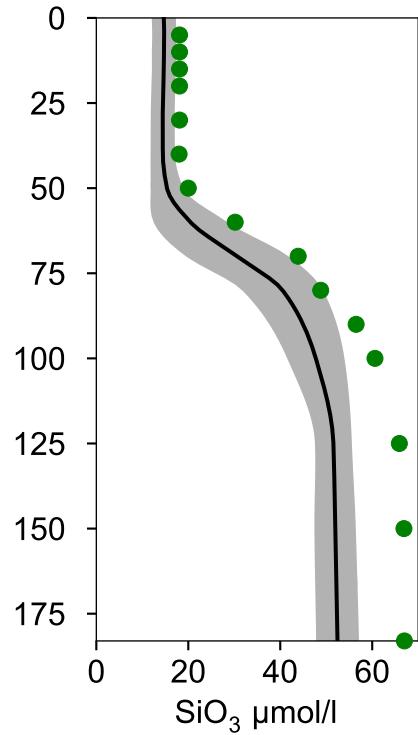
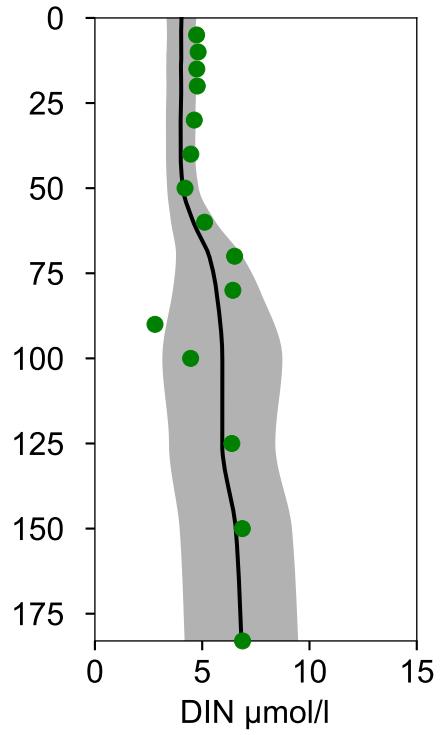
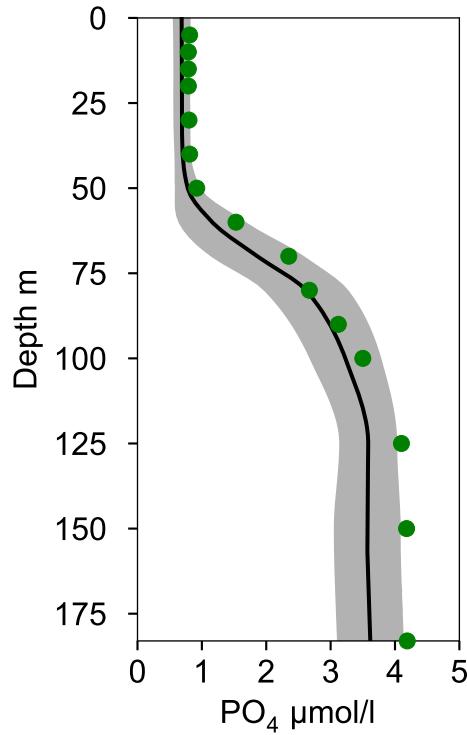
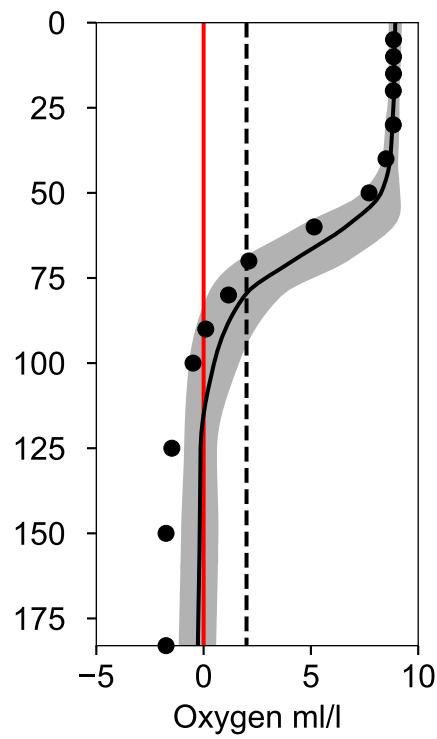
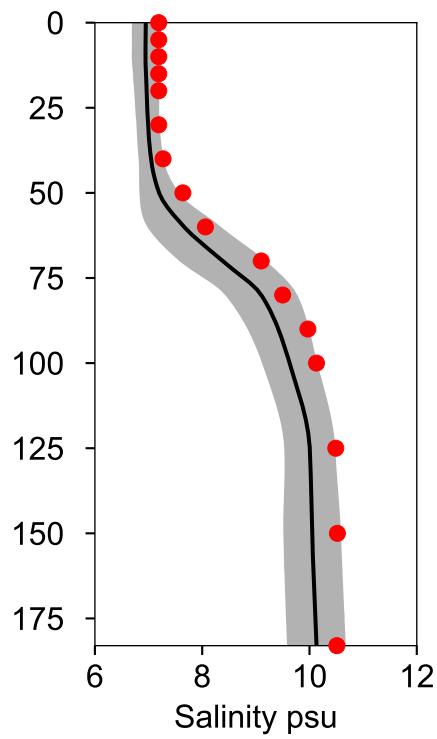
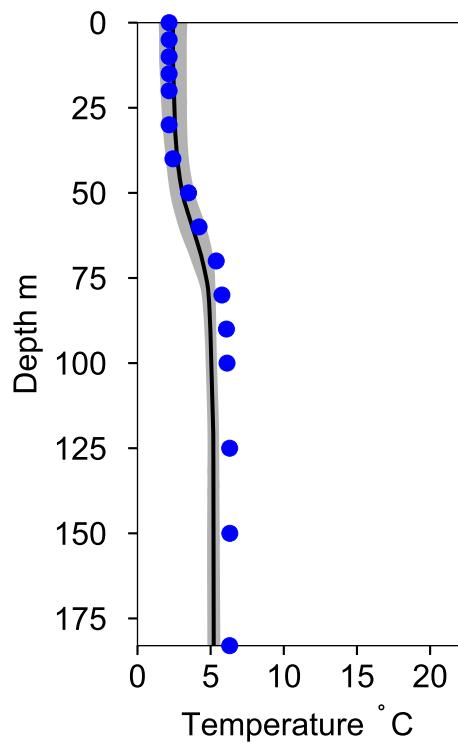


Vertical profiles BY30

February

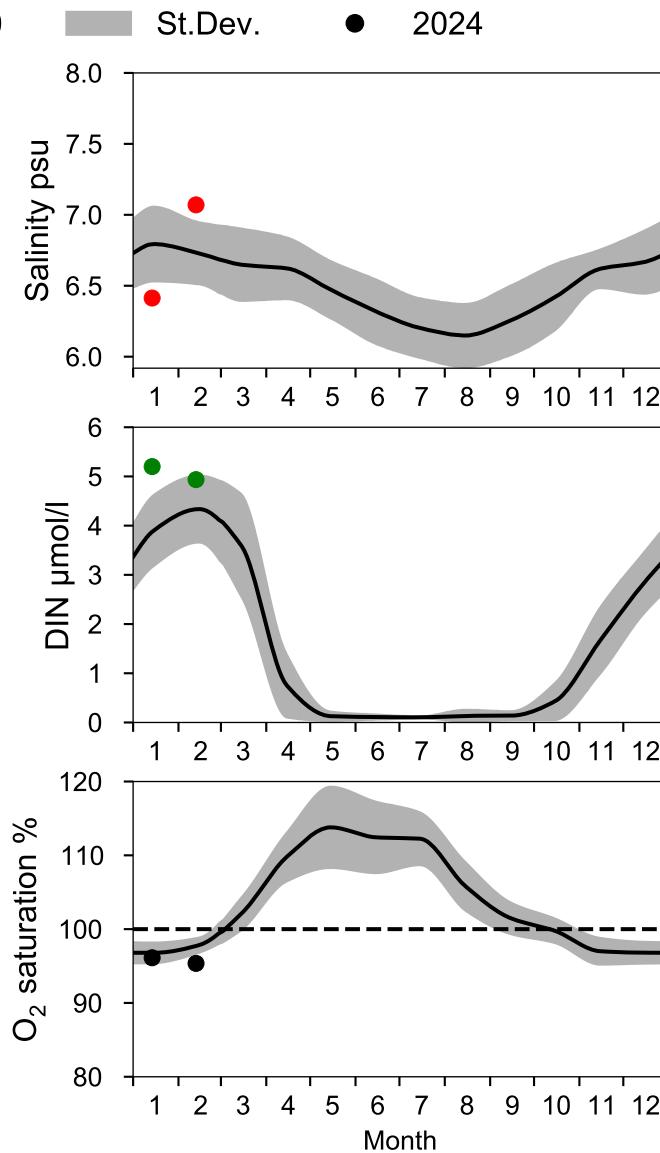
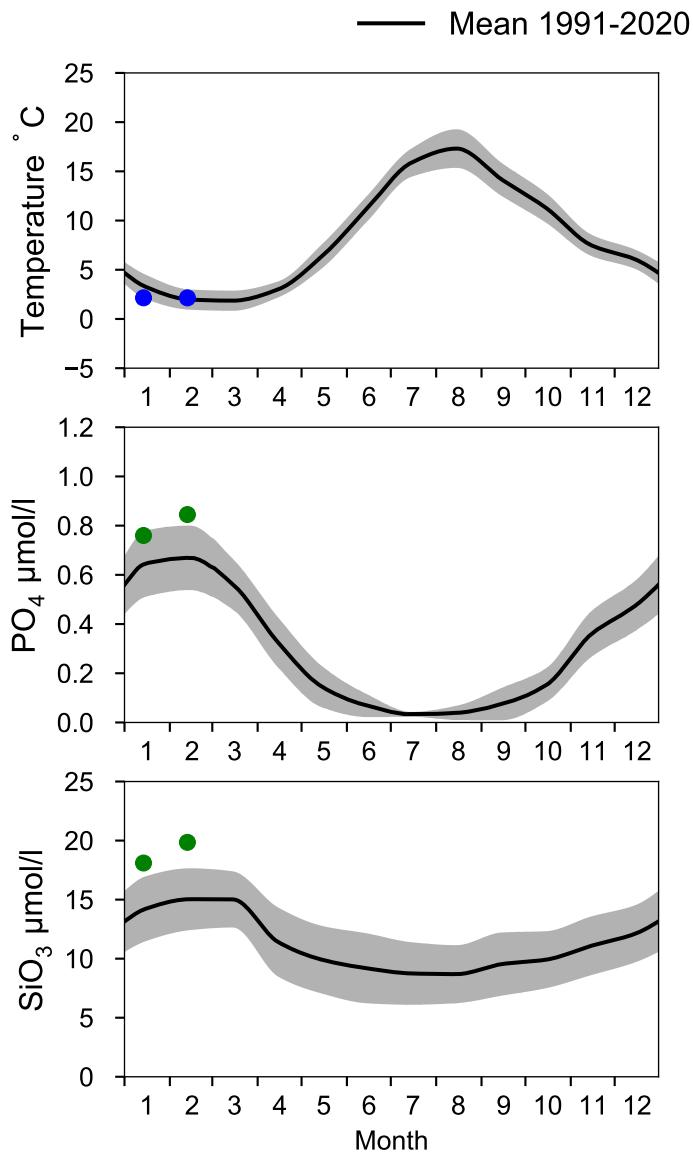
Statistics based on data from: Västra Gotlandshavet

— Mean 1991-2020 ■ St.Dev. ● 2024-02-12

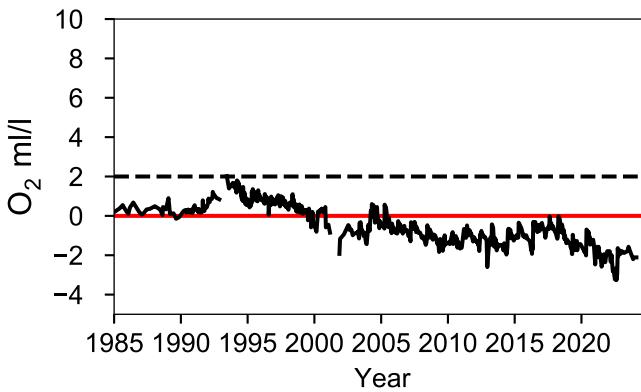
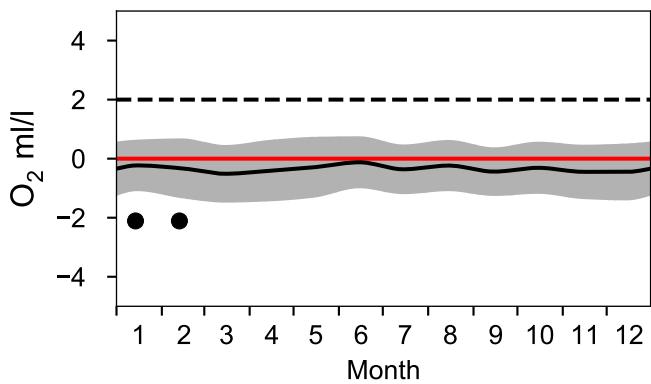


STATION BY31 LANDSORTSJD SURFACE WATER (0-10 m)

Annual Cycles

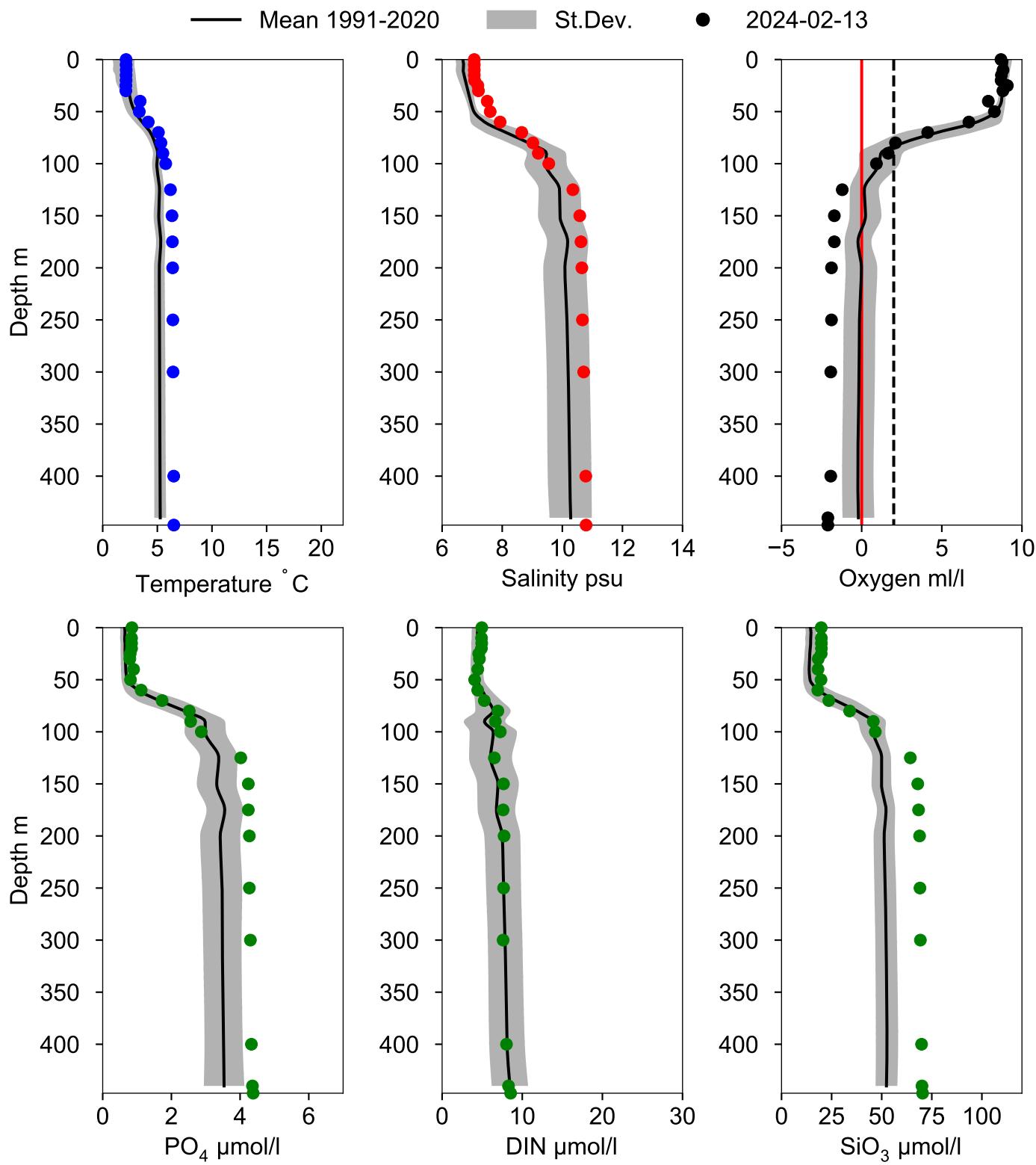


OXYGEN IN BOTTOM WATER (depth >= 419 m)



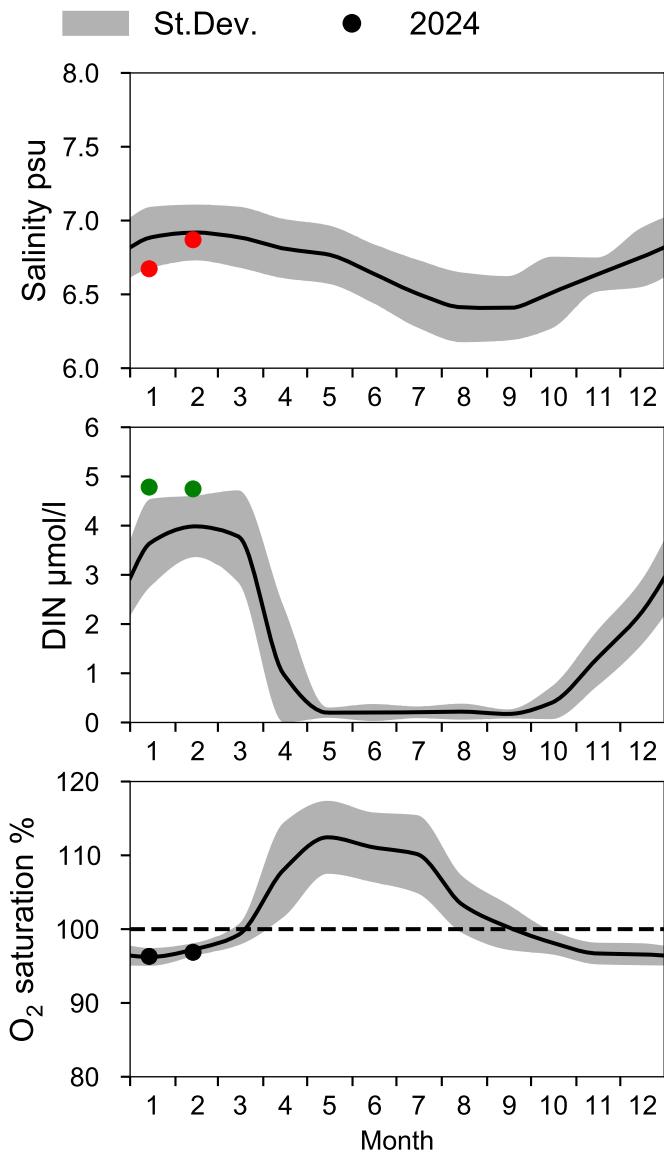
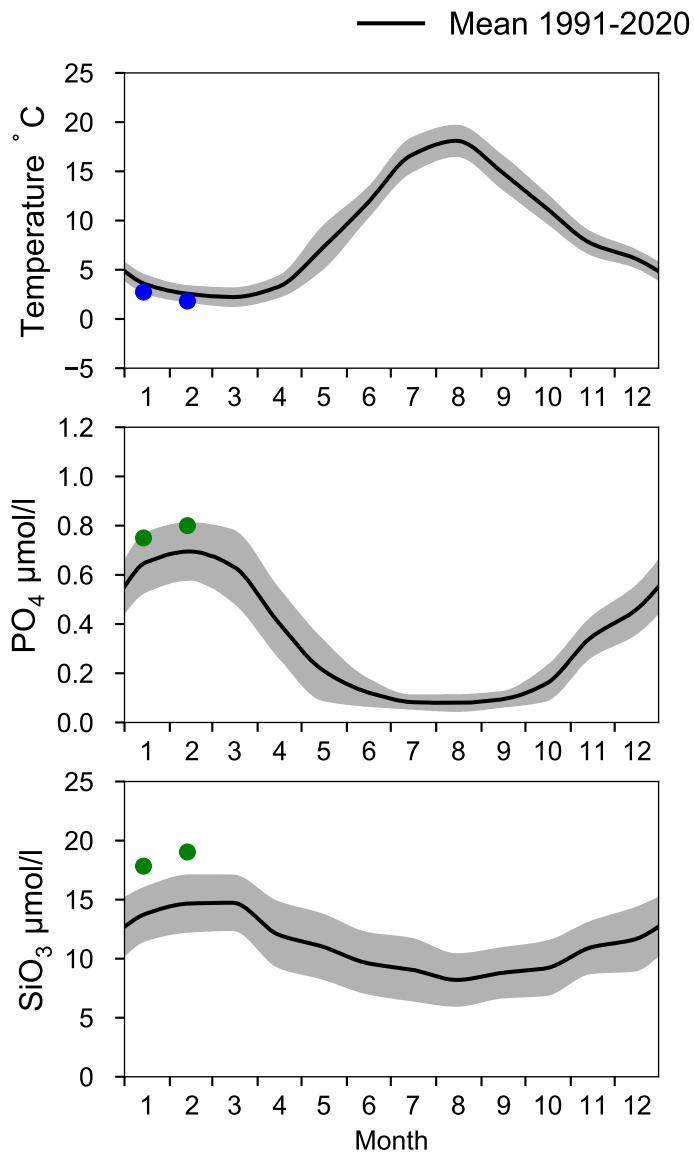
Vertical profiles BY31 LANDSORTSDJ

February

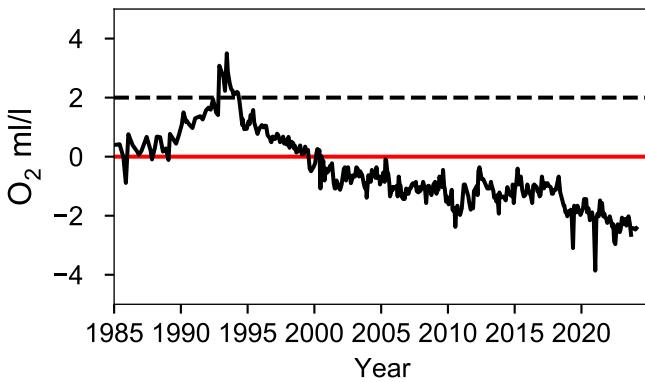
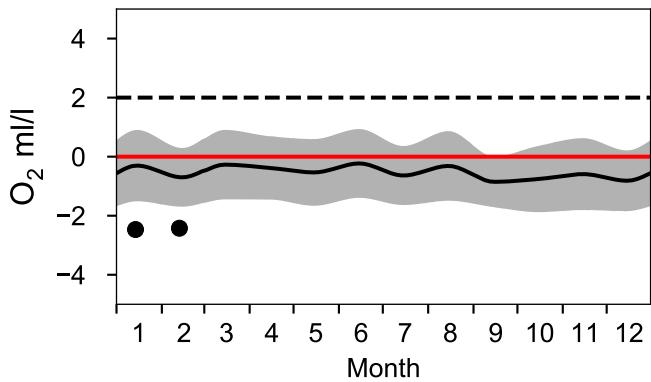


STATION BY32 NORRKÖPINGSJD SURFACE WATER (0-10 m)

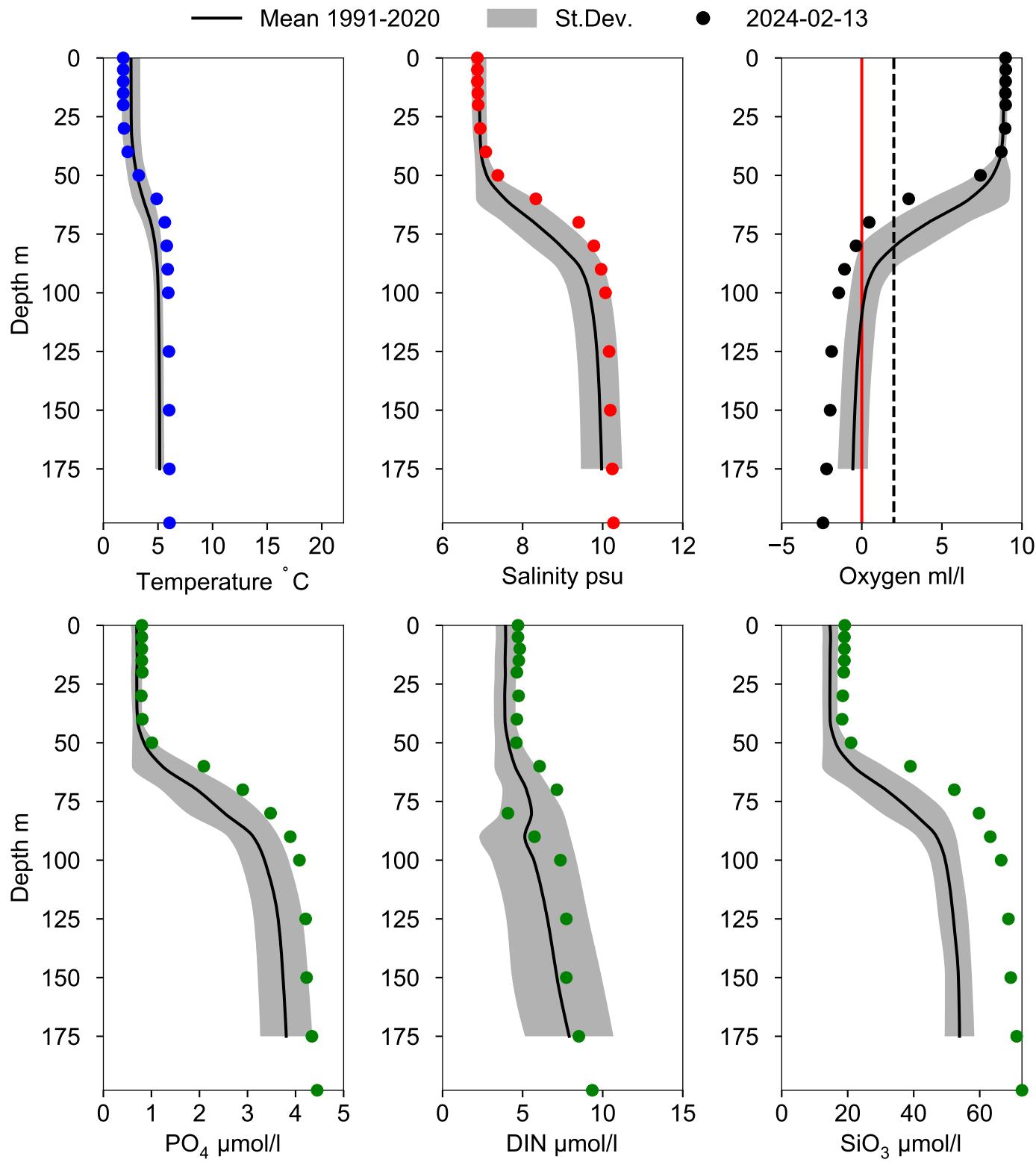
Annual Cycles



OXYGEN IN BOTTOM WATER (depth >= 175 m)



Vertical profiles BY32 NORRKÖPINGSJÖ February



STATION BY36 SURFACE WATER (0-10 m)

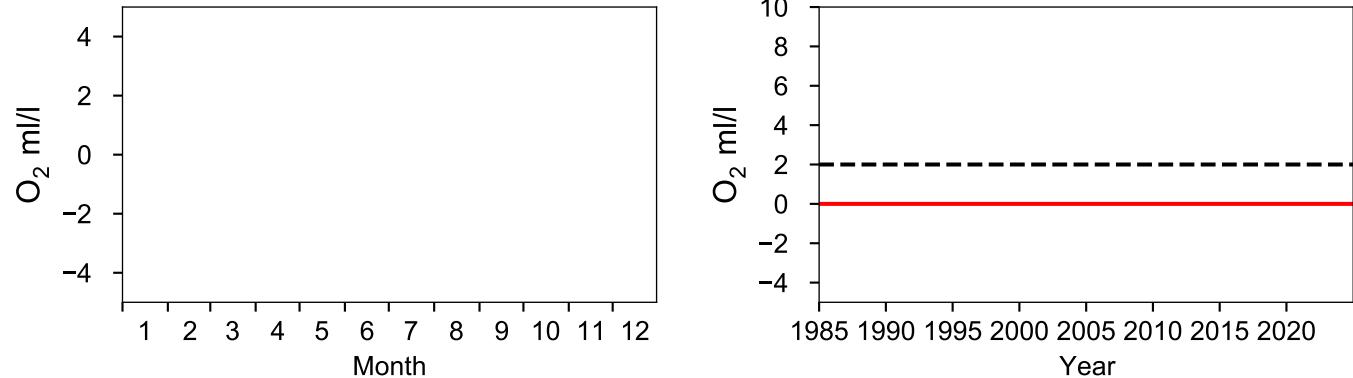
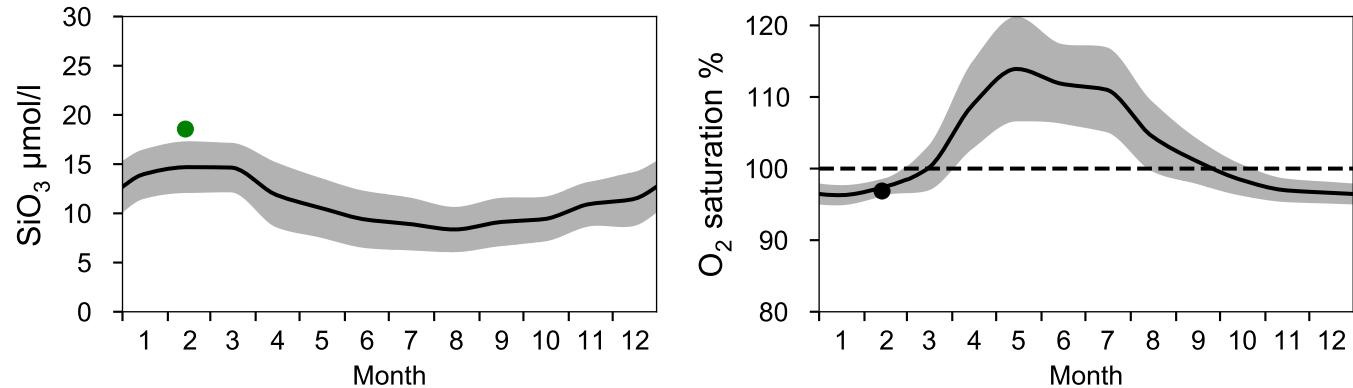
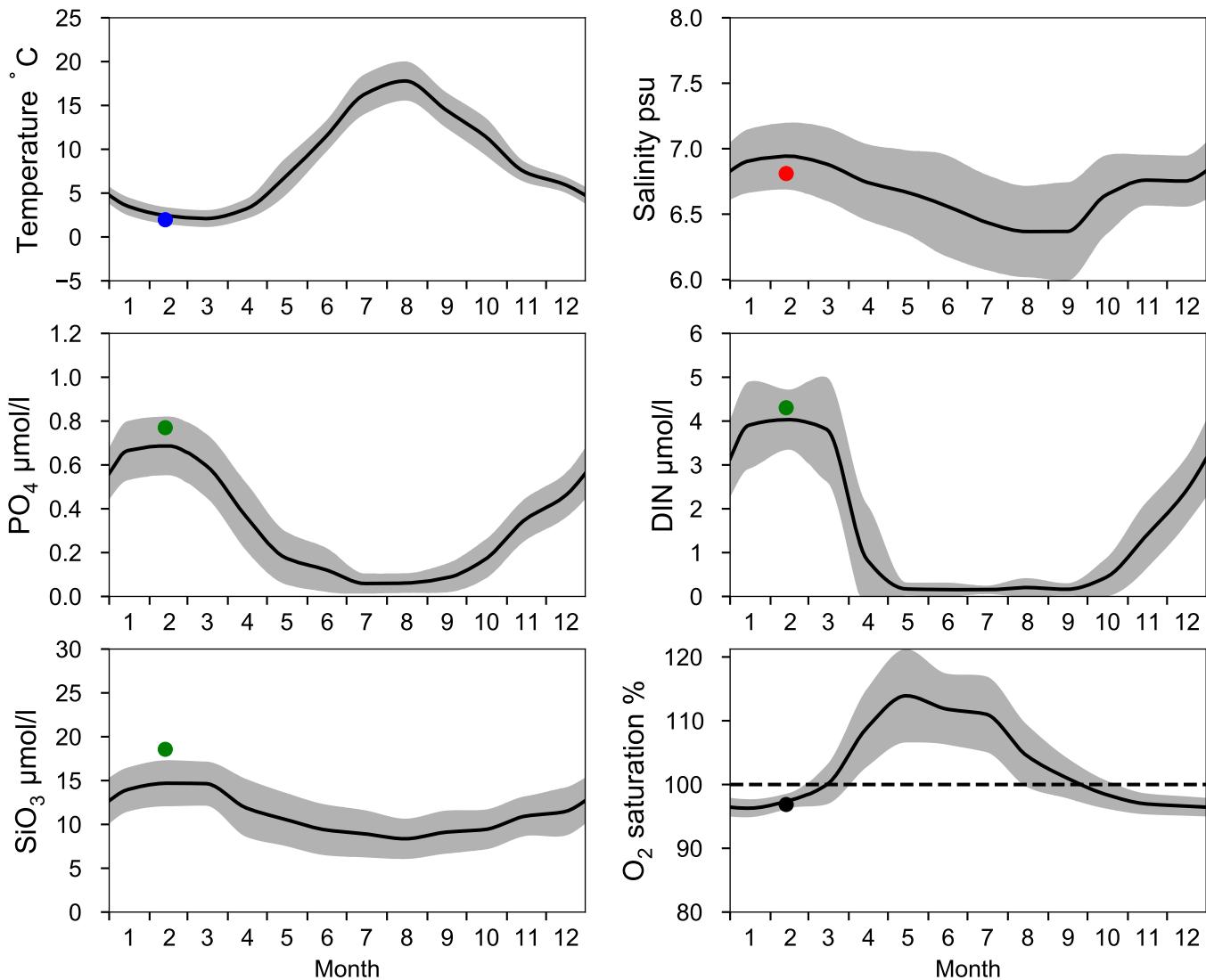
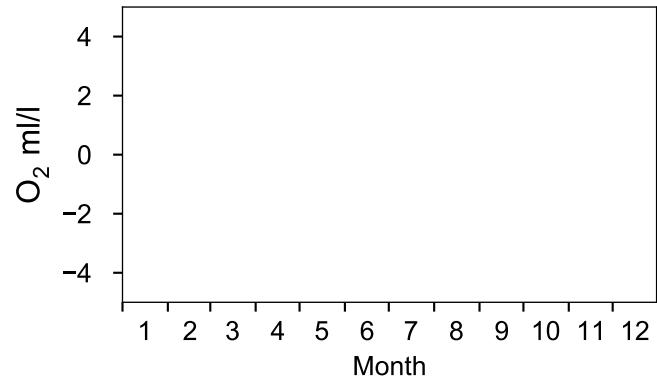
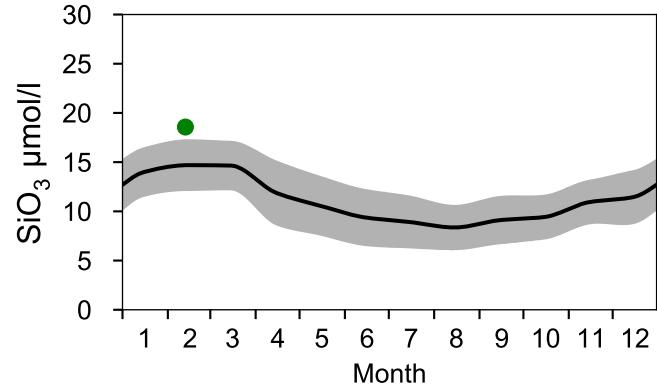
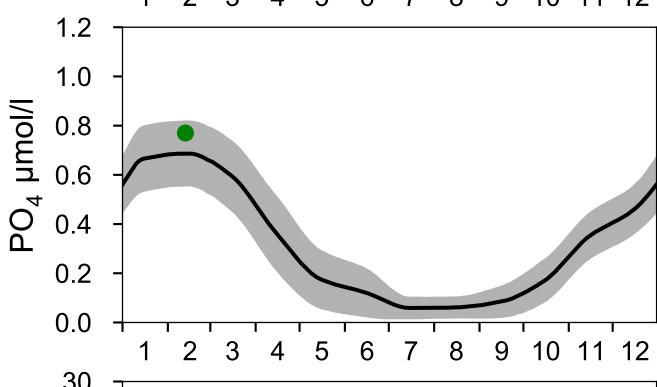
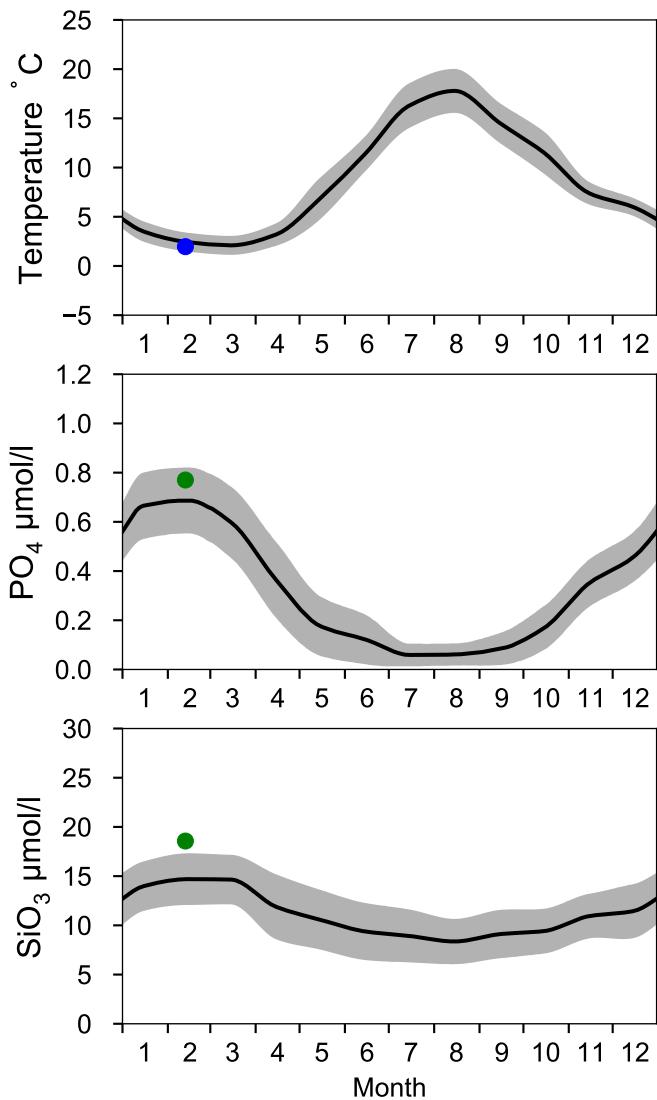
Annual Cycles

Statistics based on data from: Västra Gotlandshavet

— Mean 1991-2020

St.Dev.

● 2024

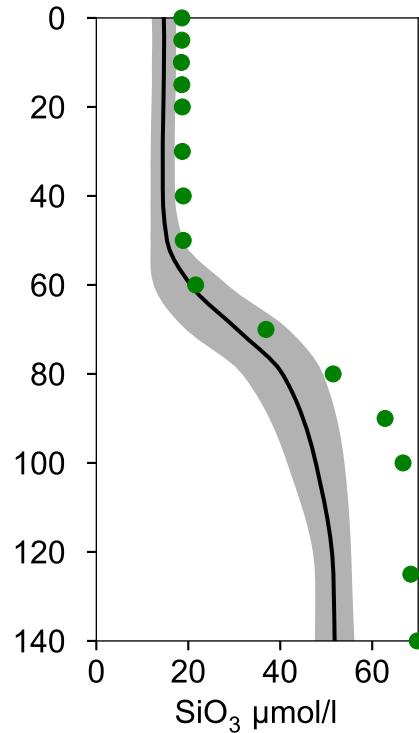
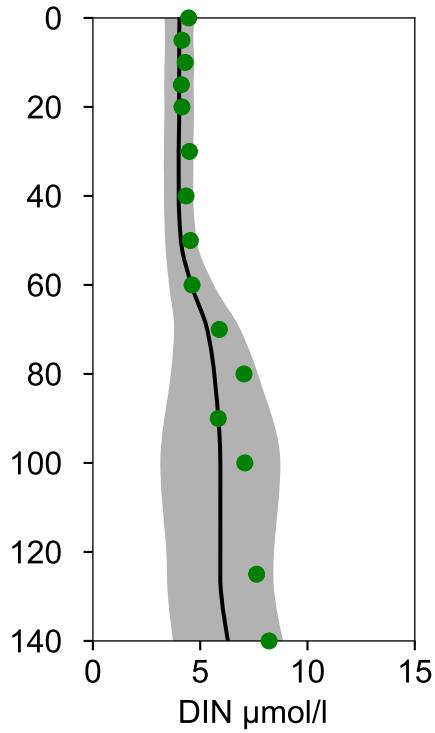
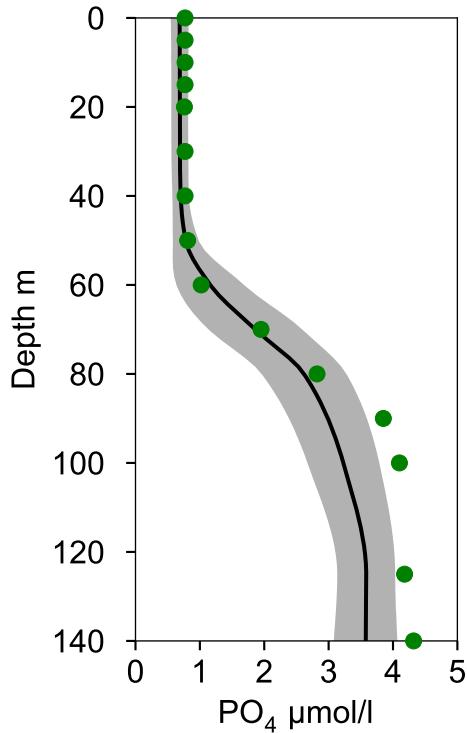
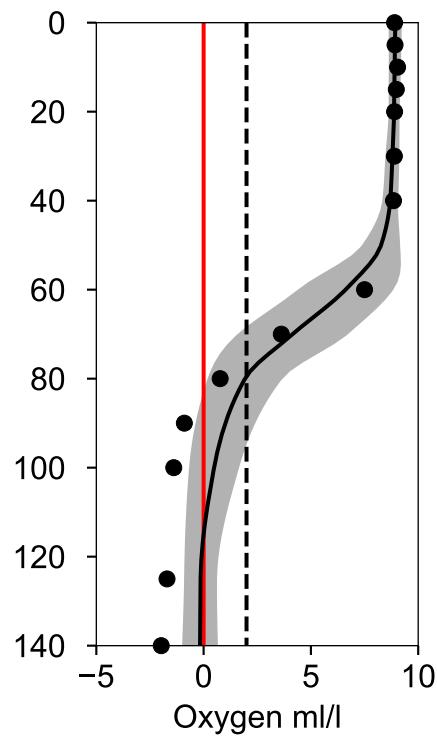
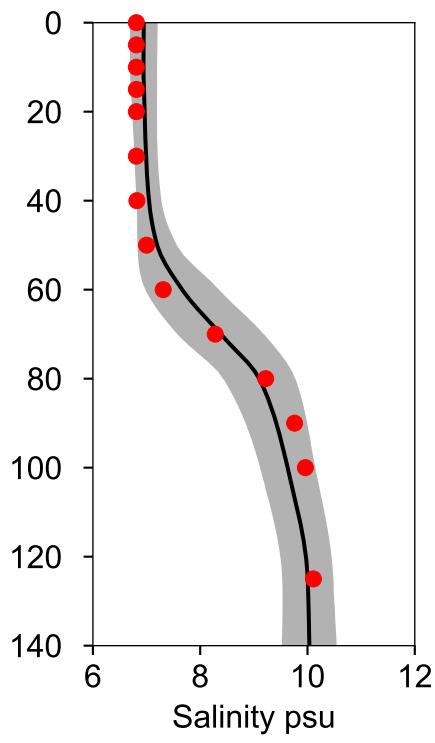
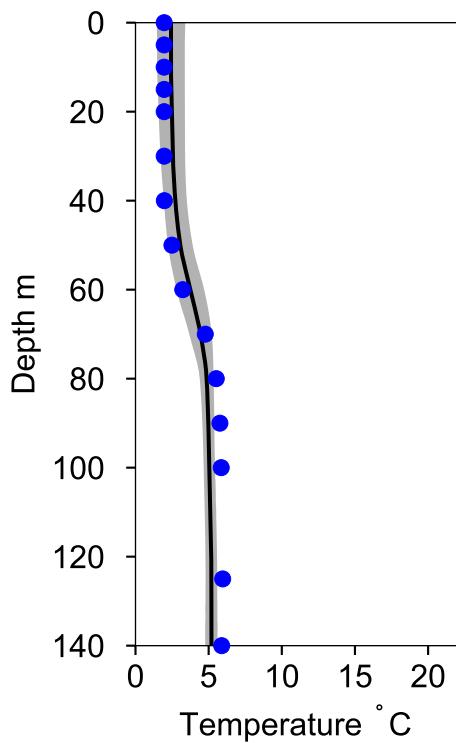


Vertical profiles BY36

February

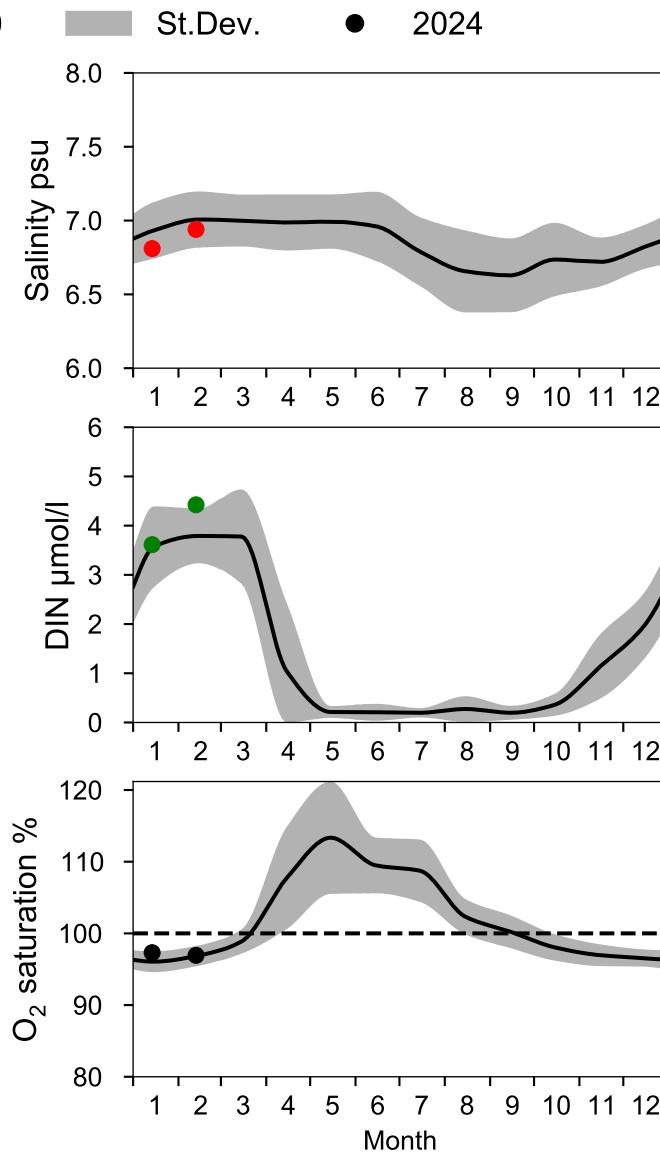
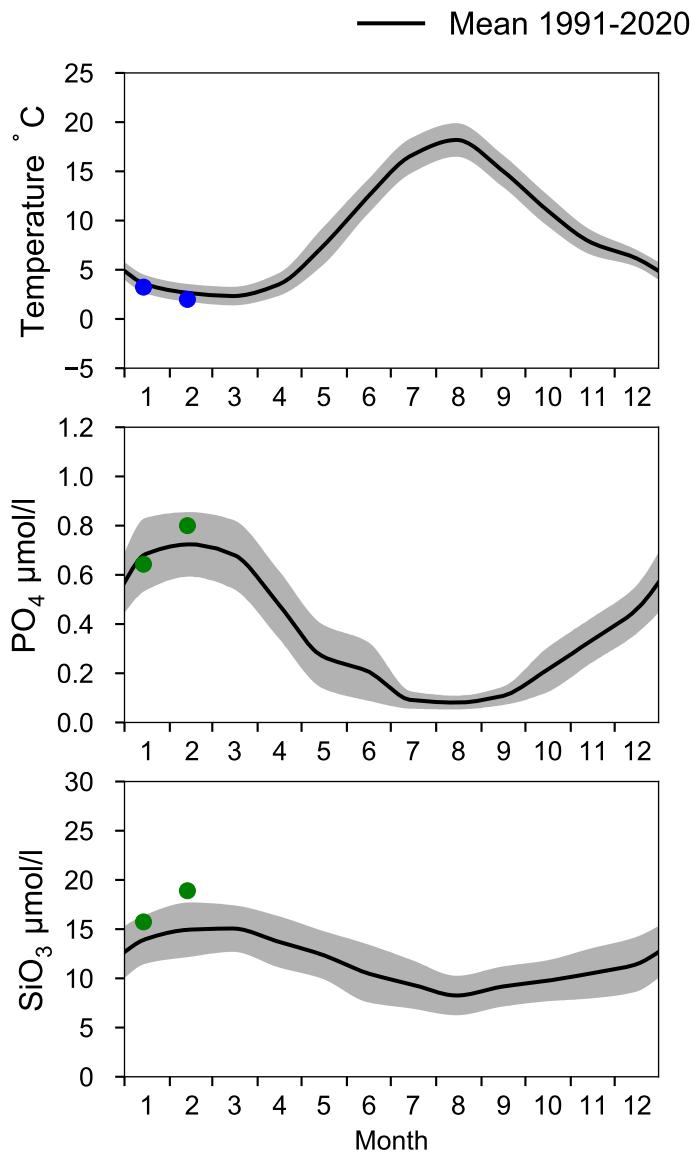
Statistics based on data from: Västra Gotlandshavet

— Mean 1991-2020 ■ St.Dev. ● 2024-02-13

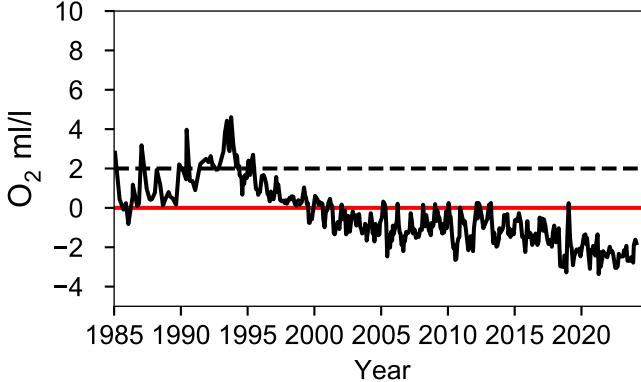
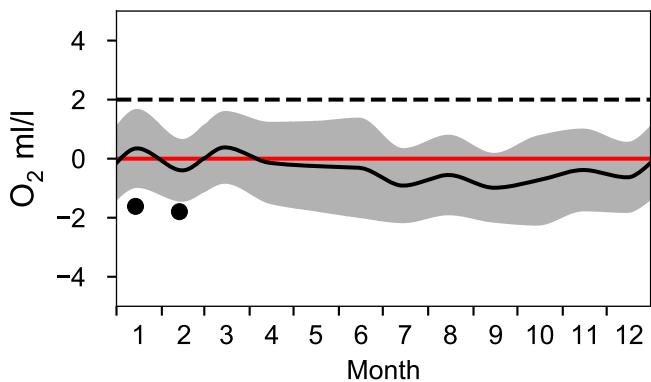


STATION BY38 KARLSÖDJ SURFACE WATER (0-10 m)

Annual Cycles



OXYGEN IN BOTTOM WATER (depth >= 100 m)



Vertical profiles BY38 KARLSÖDJ

February

