

## Rapport från SMHIs utsjöexpedition med R/V Svea



**Expeditionens varaktighet:** 2024-02-06 till 2024-02-13

**Uppdragsgivare:** Sveriges Meteorologiska och Hydrologiska Institut (SMHI), Havs- och Vattenmyndigheten (HaV)

**Samarbetspartners:** Sveriges Lantbruksuniversitet (SLU), Sjöfartsverket (SjöV)

## SAMMANFATTNING

Under expeditionen, som ingår i det svenska pelagiala övervakningsprogrammet, besöktes Skagerrak, Kattegatt, Öresund och Egentliga Östersjön. I Egentliga Östersjön genomfördes kartering av näringssämnen.

Temperaturen i ytvattnet var normal till något över det normala och varierade från 2–3 °C i Östersjön till 3–6 °C i Västerhavet.

I Skagerrak hade koncentrationen av lösta oorganiska näringssämnen ökat i ytvattnet och de var normala för månaden. Även i Kattegatt var det normala halter av näringssämnen men koncentrationen av DIN (löst oorganiskt kväve) hade ökat sedan januari, silikat hade minskat och fosfathalterna var ungefär de samma. I Egentliga Östersjön hade koncentrationen av näringssämnen ökat vid de flesta stationerna sedan januari. Koncentrationen av DIN var normal medan silikat var över det normala i hela Egentliga Östersjön. Koncentrationen av fosfat var normal i Arkona-, Bornholms- och Västra Gotlandsbassängen och över det normala i Östra Gotlandsbassängen och norra Egentliga Östersjön.

Syresituationen var god vid samtliga stationer i Skagerrak, Kattegatt och Öresund, ingen syrebrist noterades.

I Arkonabassängen var syresituationen god i bottenvattnet och koncentrationen av syre hade ökat något sedan januari. Det inflöde som skedde i slutet av december 2023 kunde nu ses på sin väg genom Bornholmsbassängen, vid stationerna BY4 och Hanöbukten har syrekoncentrationen minskat sedan januari men vid BY5 är det istället en rejäl ökning av syre i bottenvattnet jämfört med januari. Vid BY5 var det nu närmast botten strax under gränsen för syrebrist (<4ml/l) men däröver var det fortfarande ett lager med akut syrebrist (<2 ml/l). I Östra Gotlandsbassängen var det syrefritt och svavelväte uppmättes från 70 m och det var akut syrebrist från 60 m. I norra Egentliga Östersjön var det syrefritt från 90 m och akut syrebrist från 80 m. I Västra Gotlandsbassängen varierade djupnivån för syrefritt och akut syrebrist från 125 respektive 90 m vid BY31 till 70 respektive 60 m vid BY38.

SMHI:s nästa ordinarie expedition med R/V Svea är planerad till 8:e – 13:e mars, med start i Kalmar och avslut i Lysekil.

## RESULTAT

Expeditionen genomfördes ombord på R/V Svea och startade i Lysekil den 6:e februari och avslutades i Västervik på morgonen den 14:e februari. Vädret under expeditionen var mulet med svaga vindar i varierande riktning i början av expeditionen, för att öka till kulingstyrka från ost under ett par dygn i södra och östra Östersjön. Lufttemperaturen låg mellan -2 och +2 °C hela veckan.

Nästan alla planerade stationer provtogs, 44 av de planerade 46 stationerna. Fyra extra stationer med CTD-mätning gjordes runt Bornholm för att registrera inflödet som skedde i december 2023. Den årliga vinterkarteringen av näringssämnen i Egentliga Östersjön genomfördes.

Sveas instrument för att mäta profiler under gång, MVP, kördes vid ett par transekter i södra Östersjön, samt en station i Västra Gotlandsbassängen. Även Ferryboxsystemet och ADCPn kördes kontinuerligt under hela expeditionen.

Det MVP-system som tappades i Kattegatt i december bärgades under den här expeditionen.

Rapporten är baserad på data som genomgått en första kvalitetskontroll och som är jämförd mot månadsmedelvärde för perioden 1991 – 2020. När ytterligare kvalitetsgranskning genomförs kan vissa värden komma att ändras. Värden som anges i rapporten har avrundats till närmaste tiondel och kan därför skilja sig från publicerade värden. Data publiceras så fort som möjligt på datavärdens hemsida, normalt inom ca en vecka efter avslutad expedition. Vissa analyser utförs efter expeditionen och publiceras därför senare.

Data kan laddas ner här:

<https://sharkweb.smhi.se/hamta-data/>

## **Skagerrak**

Temperaturen i ytvattnet var normal till något över det normala och varierade från 4 till 6 °C. Salthalten i ytvattnet varierade mellan 31–33 psu och var normal längs Å-snittet och något över det normala närmare kusten vid Släggö och även vid P2. Vid stationerna Å17 till Å15 var det välblandat ner till 30–40 meter där termoklin och haloklin sammanföll. Närmare kusten låg denna skiktning närmare ytan, kring 5–10 meter, och vid P2 var det ett språngskikt vid 5 meter och sedan välblandat ner till 20 meter. Vid Å17 längst ut i Å-snittet ökade temperaturen ner till 100 meter, därunder var det ett lager med kallare vatten som sedan blev varmare igen vid 200 meter.

Stationerna Å17 och Å15 provtogs inte i januari men vid övriga stationer i Skagerrak hade koncentrationen av lösta oorganiska näringssämnen i ytvattnet ökat nu i februari jämfört med förra mättilfället. DIN (löst oorganiskt kväve) varierade mellan 6,2–15,2 µmol/l, fosfat 0,6–0,7 µmol/l och silikat 4,6–12,2 µmol/l. De lägsta halterna uppmätttes i ytter delarna av Å-snittet och de högre närmare kusten. Halterna var normala för månaden förutom vid stationen P2 där de var över det normala.

Syresituationen var god vid samtliga stationer i Skagerrak, normala värden för årstiden uppmätttes med koncentrationer mellan 5,8–6,9 ml/l.

Klorofyllfluorescens är ett mått på planktonaktivitet som mäts med en sensor monterad på CTDn<sup>1</sup>. Inga kraftiga klorofyllfluorescenstoppar uppmätttes, men vid samtliga stationer noterades viss aktivitet i det välblandade ytlaget.

## **Kattegatt och Öresund**

Temperaturen i ytvattnet hade ökat något sedan januari och var kring 3–4 °C. Vid Fladen och Anholt E var det något över det normala för årstiden. Salthalten i ytvattnet var över det normala och ökade från 26,6 psu vid Anholt E till 30,2 psu vid Fladen. I Öresund var salthalten normal och 16,5 psu. Termoklin och haloklin sammanföll kring 20–30 meter. Vid den kustnära stationen N14 Falkenberg var det även en grundare skiktning vid 5 meter.

Koncentrationen av oorganiska näringssämnen i ytvattnet var inom det normala i Kattegatt. I Öresund var DIN och silikat över det normala. Halterna av DIN hade ökat sedan januari och var mellan 6,6 och 8,3 µmol/l. Halterna av silikat hade minskat (8,7–15,1 µmol/l) och fosfathalterna var ungefärligen de samma (0,6 µmol/l).

Syrehalterna i Kattegatts bottenvatten var normala för årstiden, kring 6 ml/l vid samtliga stationer.

Klorofyllfluorescensen var högre i ytvattnet i Kattegatt jämfört med Skagerrak, högst var den vid N14 Falkenberg och Anholt E. Vid Anholt E noterades även en klorofyllfluorescenstopp kring 12 meter.

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<sup>1</sup> CTD är ett profilerande mätinstrument och står för Conductivity, Temperature, Depth. SMHI:s CTD är även bestyckad med sensorer som mäter syre och fluorescens bland annat.

## Egentliga Östersjön

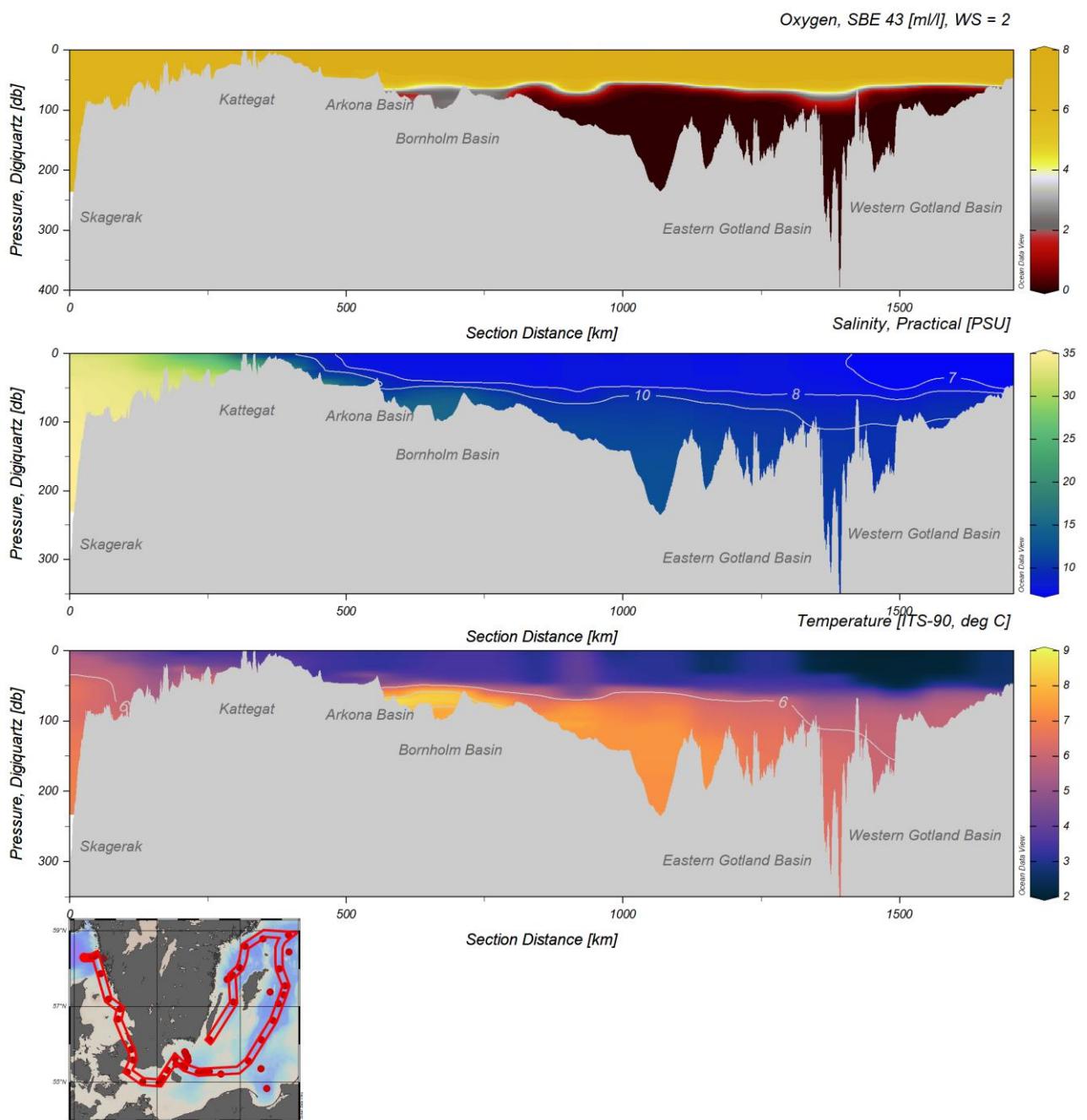
Temperaturen i ytlagret var normal för månaden vid samtliga stationer i Egentliga Östersjön och varierade mellan 2 och 3,5 °C. Kallast var det i Västra Gotlandsbassängen. Salthalten i ytlagret varierade från som lägst 6,8 psu i Västra Gotlandsbassängen till som högst 8,2 psu i Arkonabassängen. Salthalten var över det normala i Östra Gotlandsbassängen och i norra Egentliga Östersjön. I övriga delar varierade den från under normalt till över normalt vid olika stationer. I Arkonabassängen var vattnet välblandat ner till 25 m där termoklin och haloklin sammanföll. I Bornholmsbassängen sträckte sig det välblandade ytlagret ner till 40–50 m, i Östra- och Västra Gotlandsbassängen ner till 50–60 m.

Vid de flesta stationerna hade koncentrationen av näringssämnen ökat i ytvattnet sedan januari. Koncentrationen av löst oorganiskt kväve var normal i ytlagret och varierade kring 2,9–4,9 µmol/l. Koncentrationen av fosfat var normal i Arkona-, Bornholms- och Västra Gotlandsbassängen och över det normala i Östra Gotlandsbassängen och norra Egentliga Östersjön. Fosfathalterna varierade kring 0,66–0,86 µmol/l. Koncentrationen av silikat var över det normala i hela Egentliga Östersjön, 16–20 µmol/l.

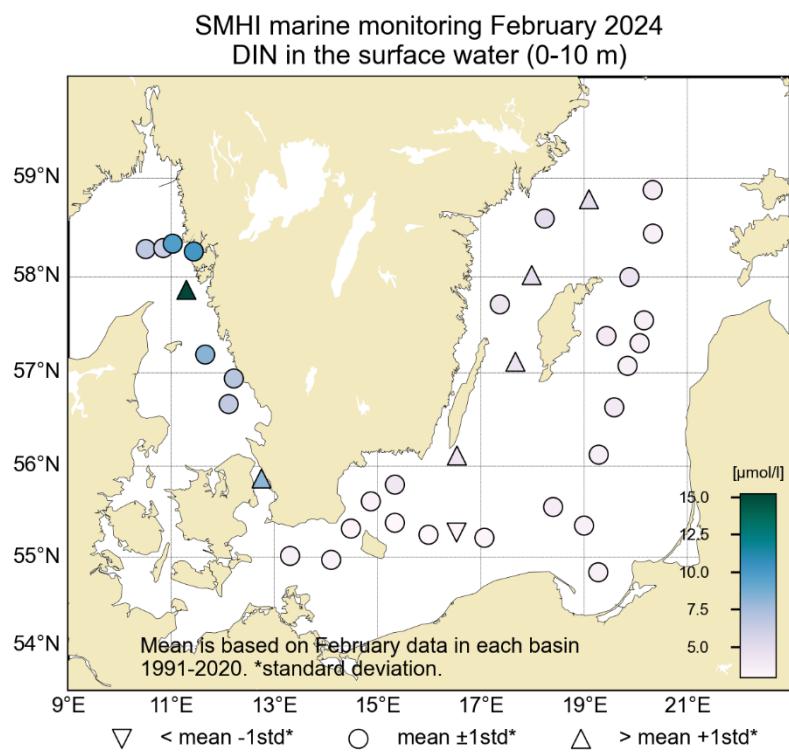
I Arkonabassängen var syresituationen god i bottenvattnet och koncentrationen av syre hade ökat något sedan januari. Det inflöde som skedde i slutet av december 2023 kunde nu ses på sin väg genom Bornholmsbassängen, vid stationerna BY4 och Hanöbukten har syrekonzcentrationen minskat sedan januari men vid BY5 är det istället en rejäl ökning av syre i bottenvattnet jämfört med januari. Vid BY5 var det nu närmast botten strax under gränsen för syrebrist (<4ml/l) men däröver var det fortfarande ett lager med akut syrebrist (<2 ml/l). I Östra Gotlandsbassängen var det syrefritt och svavelväte uppmättes från 70 m och det var akut syrebrist från 60 m. I norra Egentliga Östersjön var det syrefritt från 90 m och akut syrebrist från 80 m. I Västra Gotlandsbassängen varierade djupnivån för syrefritt och akut syrebrist från 125 respektive 90 m vid BY31 till 70 respektive 60 m vid BY38.

Fluorescensmätningar från CTDn visade på planktonaktivitet i ytlagret framförallt i Arkonabassängen och Öresund.

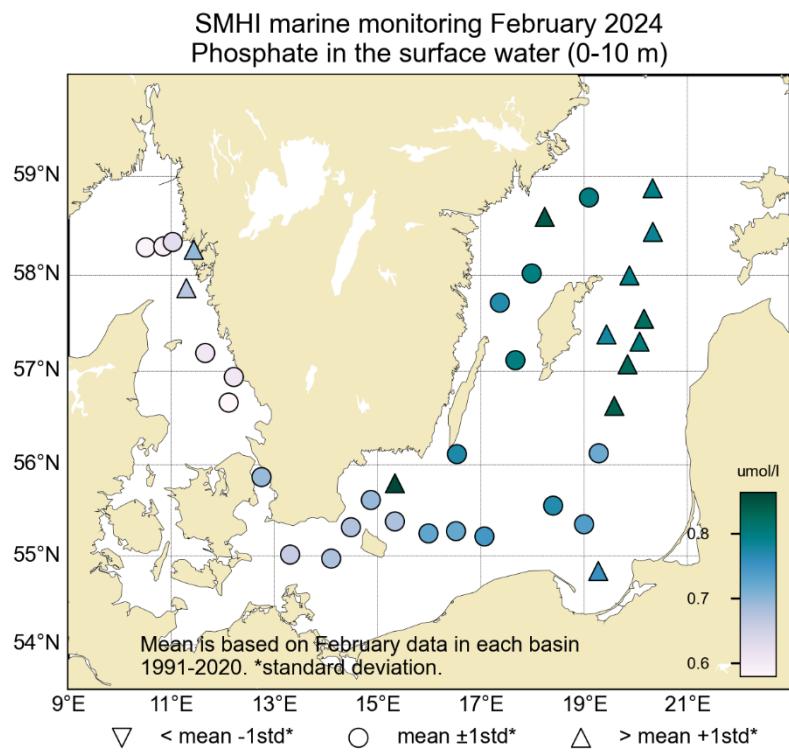
Mer information om algsituationen finns att läsa i Algaware-rapporten för februari:  
<https://www.smhi.se/publikationer/publikationer/algrapporter>.



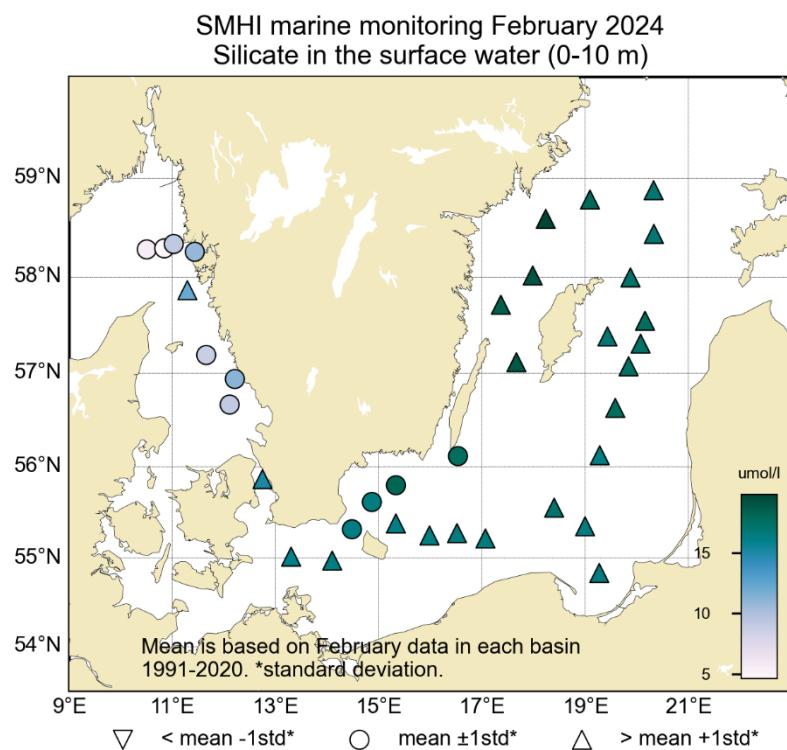
Figur 1. Snitt som visar syrekoncentration, salthalt och temperatur från mätningar med CTD och MVP, från Skagerrak till Östra Gotlandsbassängen och vidare in i Västra Gotlandsbassängen.



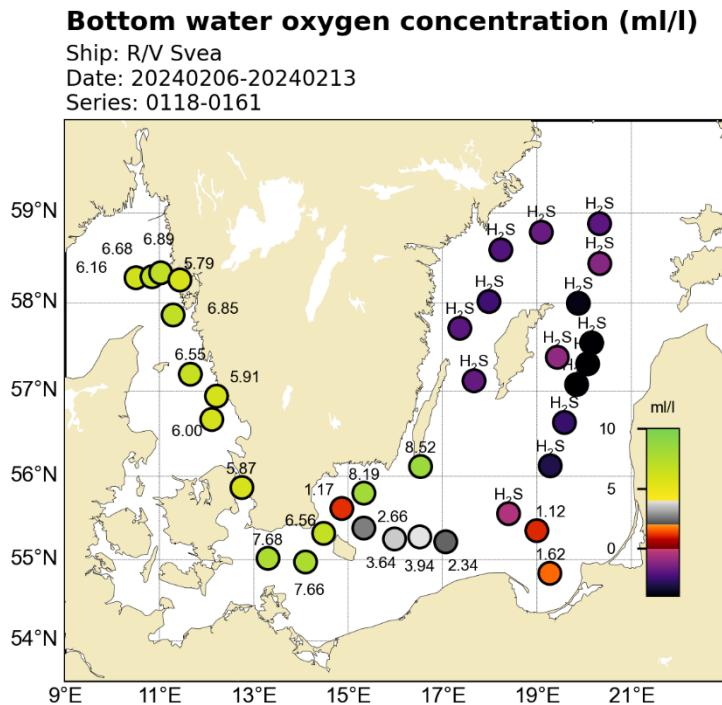
Figur 2. Koncentrationen ( $\mu\text{mol/l}$ ) av oorganiskt kväve i ytvattnet (0-10m).



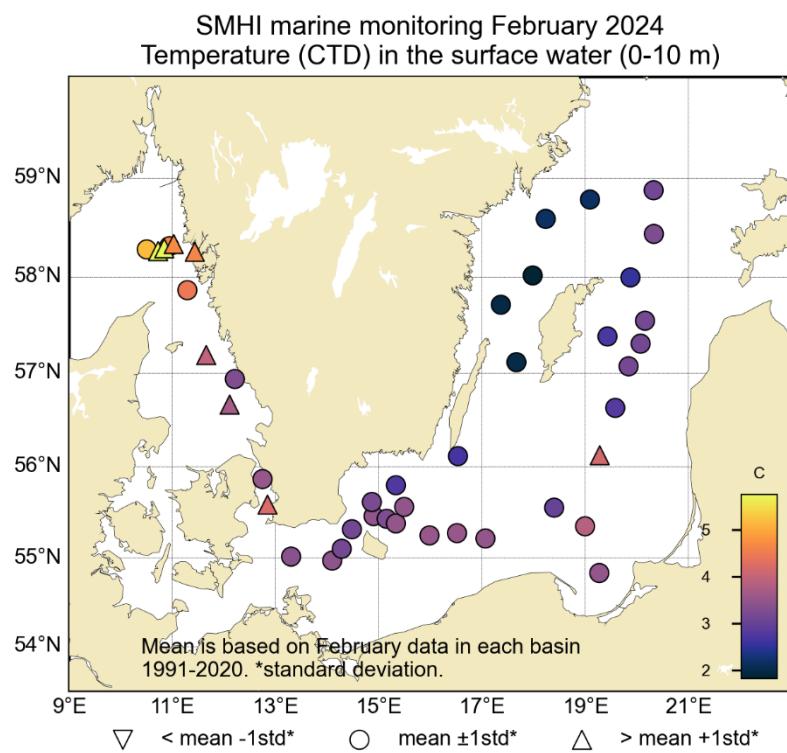
Figur 3. Koncentrationen ( $\mu\text{mol/l}$ ) av fosfat i ytvattnet (0-10m).



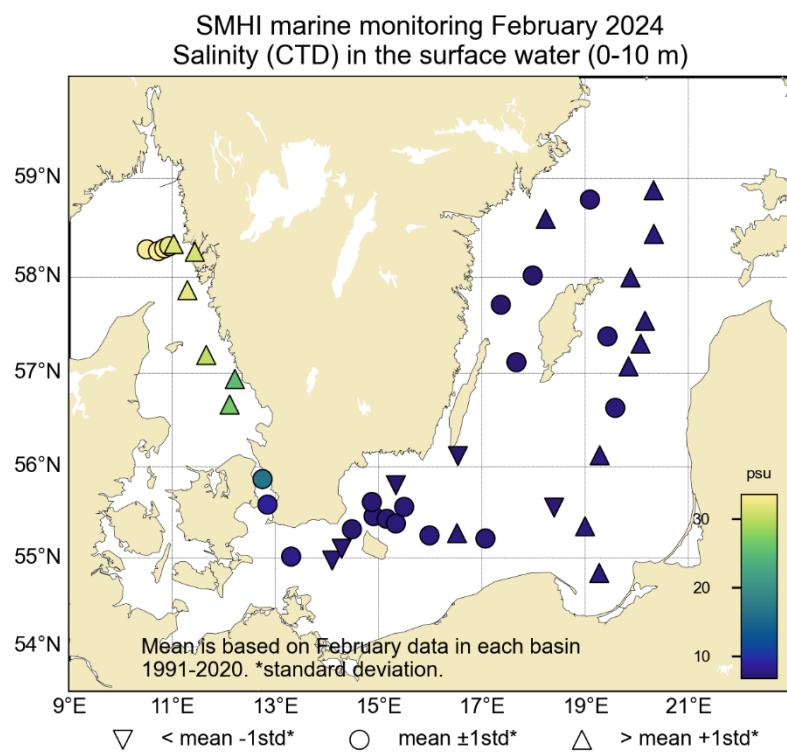
Figur 4. Koncentrationen ( $\mu\text{mol/l}$ ) av silikat i ytvattnet (0-10m).



Figur 5. Syrekoncentrationen (ml/l) i bottenvattnet.



Figur 6. Temperaturen i ytvattnet (0-10m).



Figur 7. Salthalten i ytvattnet (0-10m).

## **DELTAGARE**

<b>Namn</b>	<b>Roll</b>	<b>Från</b>
Sara Johansson	Expeditionsledare, Marin kemist	SMHI
Ann-Turi Skjekvik	Marinbiolog	SMHI
Sari Sipilä	Kemist	SMHI
Daniel Bergman Sjöstrand	Marin tekniker	SMHI
Monica Linder	Kemist	SMHI

## **BILAGOR**

- Färdkarta
- Tabell över stationer, analyserade parametrar och antal provtagningsdjup
- Figurer över månadsmedelvärden
- Vertikalprofiler

**SMHI**

SWEDAC  
ACKREDITERING  
  
Ackred. nr. 1420  
Provning  
ISO/IEC 17025

Havs  
och Vatten  
myndigheten

## 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

BY32

BY20

BY15

BY10

BY38

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

Ship: 77SE  
Year: 2024

Ser no	Cru no	Stat code	Proj name	Lat	Lon	Start date	Start time	Bottom depth	Secchi depth	Wind dir	Air temp	Air pres	WCWI elac	CZPP hohp	No btl	No ee	No aa	No hh	No oo	Tt	Tt	Ss	Ss	Pp	Dd	Hh	Pp	Nn	Nn	Nn	Nn	Aa	Sh	Cc
yyyymmdd	hhmm	m	m	C	hPa	aoe	loy	m	m	ll	xx	so	or	ro	ok	om	mm	tueo	apt	p	p	t	t	y	y	st	ia	az	nt	3	un	n	s	t
0118	04	SKEX18	BAS... Å17	5817.07	01030.27	20240206	2030	344	26	8	-1.1	990	9990	xxx-	15	15	-	x	-	x	x	x	-	x	x	x	x	x	x	x	x	-	-	
0119	04	SKEX17	BAS... Å16	5816.02	01043.47	20240206	2330	202	03	6	-1.9	991	9990	---	13	0	-	x	-	x	-	x	-	x	-	x	-	x	-	x	-	-	-	
0120	04	SKEX16	BAS... Å15	5817.70	01050.66	20240207	0105	137	03	11	-2.1	992	9990	----	12	12	x	x	x	-	x	x	x	x	x	x	x	x	x	-	-	-		
0121	04	SKEX15	BAS... Å14	5818.99	01056.49	20240207	0240	111	02	9	-2.2	993	9990	----	11	0	-	x	-	x	-	x	-	x	-	x	-	x	-	-	-	-		
0122	04	SKEX14	BAS... Å13	5820.36	01101.65	20240207	0430	108	03	8	-2.8	994	9990	----	10	10	x	x	x	-	x	x	x	x	x	x	x	x	-	x	-	-		
0123	04	FIBG27	BAS... SLÄGGÖ	5815.58	01126.13	20240207	1545	76	18	1	-2.1	997	1610	xxx-	9	9	x	x	x	-	x	x	x	x	x	x	x	x	-	x	-	-		
0124	04	SKEX23	BAS... P2	5752.00	01117.50	20240207	1920	94	20	5	0.8	999	9990	----	10	10	x	x	x	-	x	x	x	x	x	x	x	x	-	x	-	-		
0125	04	KANX25	BAS... FLADEN	5711.56	01139.43	20240208	0000	87	20	8	0.1	997	9990	----	13	13	x	x	x	-	x	x	x	x	x	x	x	x	-	x	-	-		
0126	04	KANX50	BAS... N14 FALKENBERG	5656.40	01212.70	20240208	0325	31	29	9	1.6	997	9990	xxx-	7	7	x	x	x	-	x	x	x	x	x	x	x	-	x	-	-			
0127	04	KAEX29	BAS... ANHOLT E	5640.12	01206.67	20240208	0610	63	30	9	1.9	997	1530	xxx-	10	10	x	x	x	x	x	x	x	x	x	x	x	x	-	x	-	-		
0128	04	SOCX39	BAS... W LANDSKRONA	5552.04	01244.89	20240208	1230	51	9	35	8	2.7	1001	1520	----	9	9	x	x	x	-	x	x	x	x	x	x	x	-	x	-	-		
0129	04	SOSX00	EXT... FLINTEN 7	5535.32	01250.68	20240208	1510	9	35	3	3.1	1001	1620	----	3	0	-	x	-	x	-	x	-	x	-	x	-	x	-	-	-	-		
0131	04	BPSA02	BAS... BY1	5500.92	01318.13	20240208	2100	46	18	1	2.7	1001	9990	----	8	8	x	x	x	-	x	x	x	x	x	x	x	-	x	-	-			
0132	04	BPSA03	BAS... BY2 ARKONA	5458.28	01405.92	20240209	0100	47	10	8	1.7	1002	9990	xxx-	8	8	x	x	x	-	x	x	x	x	x	x	x	-	x	-	-			
0133	04	BPSA00	EXT... INFLOW 1	5506.12	01416.98	20240209	0330	47	10	11	1.4	1001	9990	----	6	0	-	x	-	x	-	x	-	x	-	x	-	x	-	-	-	-		
0134	04	BPSA04	BAS... BY3 HAMMARNE SUND	5519.07	01428.86	20240209	0420	47	10	15	1.1	1001	9990	----	8	8	-	x	x	-	x	x	x	x	x	x	x	-	x	-	-			
0135	04	BPSH00	EXT... INFLOW 3	5527.77	01454.03	20240209	0720	81	08	13	1.1	1001	2830	----	6	0	-	x	-	x	-	x	-	x	-	x	-	x	-	-	-			
0136	04	BPSH05	BAS... HANÖBUKTEN	5537.03	01452.02	20240209	0850	80	08	16	0.5	1001	2740	----	11	11	-	x	x	x	-	x	x	x	x	x	x	-	x	-	-			
0137	04	BPSB00	EXT... INFLOW-4	5525.99	01509.24	20240209	1120	80	09	14	1.6	1000	2740	----	6	0	-	x	-	x	-	x	-	x	-	x	-	x	-	-	-			
0138	04	BPSB06	BAS... BY4 CHRISTIANSÖ	5522.92	01519.97	20240209	1305	91	10	09	13	1.6	1000	2740	xxx-	12	12	-	x	x	x	-	x	x	x	x	x	x	-	x	-	-		
0139	04	BPSB00	EXT... INFLOW 5	5533.82	01529.59	20240209	1630	72	09	14	1.9	999	2840	----	6	0	-	x	-	x	-	x	-	x	-	x	-	x	-	-	-			
0140	04	BPSH51	BAS... HANÖBUKTEN-KBV	5548.01	01520.01	20240209	1815	56	16	14	2.0	999	9990	----	9	9	x	x	x	-	x	x	x	x	x	x	x	-	x	-	-			
0141	04	BPSE49	BAS... BY39 ÖLANDS S UDDE	5606.96	01632.12	20240209	2330	51	09	14	2.2	1001	9990	xxx-	8	8	x	x	x	x	-	x	x	x	x	x	x	-	x	-	-			
0142	04	BPSB07	BAS... BY5 BORNHOLMSDJ	5515.00	01559.05	20240210	0720	90	08	12	2.2	997	2840	xxx-	12	12	x	x	x	x	x	-	x	x	x	x	x	x	-	x	-	-		
0143	04	BPSE08	BAS... STOLPE TRÖSKEL	5516.51	01631.03	20240210	1145	63	09	10	2.4	999	9990	----	9	9	x	x	x	-	x	x	x	x	x	x	x	-	x	-	-			
0144	04	BPSE09	BAS... BY7 STOLPE RÄNNA	5512.98	01704.08	20240210	1430	91	11	07	10	2.2	999	2840	----	12	12	x	x	x	-	x	x	x	x	x	x	x	-	x	-	-		
0145	04	BPSG71	BAS... PL-P1	5449.98	01916.47	20240210	2230	107	11	7	2.2	1001	9990	----	14	14	x	x	x	-	x	x	x	x	x	x	x	-	x	-	-			
0146	04	BPSE70	BAS... PL-P63	5521.05	01859.95	20240211	0300	83	10	9	2.2	1001	9990	----	11	11	x	x	x	-	x	x	x	x	x	x	x	-	x	-	-			
0147	04	BPSE11	BAS... BCS III-10	5533.31	01824	20240211	0600	90	10	9	2.3	1001	9990	x-x-	12	12	x	x	x	-	x	x	x	x	x	x	x	-	x	-	-			
0148	04	BPSE12	BAS... BY9 KLAIPEDA	5607.51	01917.00	20240211	1950	120	11	08	9	1.5	1003	4830	----	14	14	x	x	x	-	x	x	x	x	x	x	x	-	x	-	-		
0149	04	BPEX13	BAS... BY10	5638.01	01935.05	20240211	1515	142	09	11	1.4	1003	2830	xxx-	15	15	x	x	x	x	x	x	x	x	x	x	x	-	x	-	-			
0150	04	BPEX14	BAS... BY11	5704.44	01950.55	20240211	1850	206	09	10	1.2	1004	9990	----	17	17	-	x	-	x	x	x	x	x	x	x	x	-	x	-	-			
0151	04	BPEX21	BAS... BY15 GOTLANDSDJ	5718.69	02004.53	20240211	2200	241	09	11	1.1	1005	9990	xxx-	24	24	-	x	x	x	x	x	x	x	x	x	x	x	-	x	-	-		
0152	04	BPEX19	BAS... BY13	5723.21	01925.99	20240212	0110	121	08	12	1.5	1003	9990	----	14	14	x	x	x	-	x	x	x	x	x	x	x	-	x	-	-			

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

Ship: 77SE  
Year: 2024

Ser no	Cru no	Stat code	Proj name	Lat	Lon	Start date yyyyymmdd	Bottom time hhmm	Secchi depth m	Wind dir	Air temp C	Air vel hPa	WCWI pres	CZPP elac	No btl	T ee	S aah	P oo	D 2ht	H tt	P t	N nt	N mt	N tl	N iu	N oo	A z	S nty	H 3un	C nn
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	x x	- x	- -	x			
0154	04	BPEX26	BAS... BY20 FÄRÖDJ	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 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	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	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	x x	x x	x x	- x	- -	-			
0158	04	BPNX37	BAS... BY31 LANDSORTSJ	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 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	x x	x x	x x	- x	- -	-			
0160	04	BPWX42	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 x	x x x	x x x	x x x	x x x	-	-	-		
0161	04	BPWX45	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	x x	x x	- x x x	-	-	-		

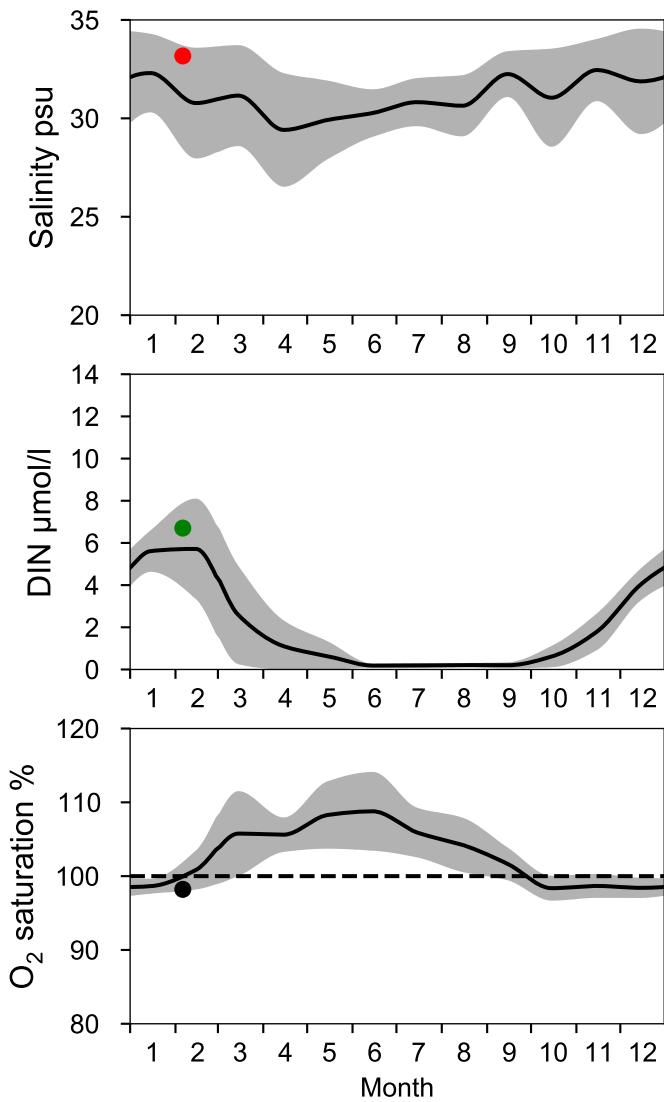
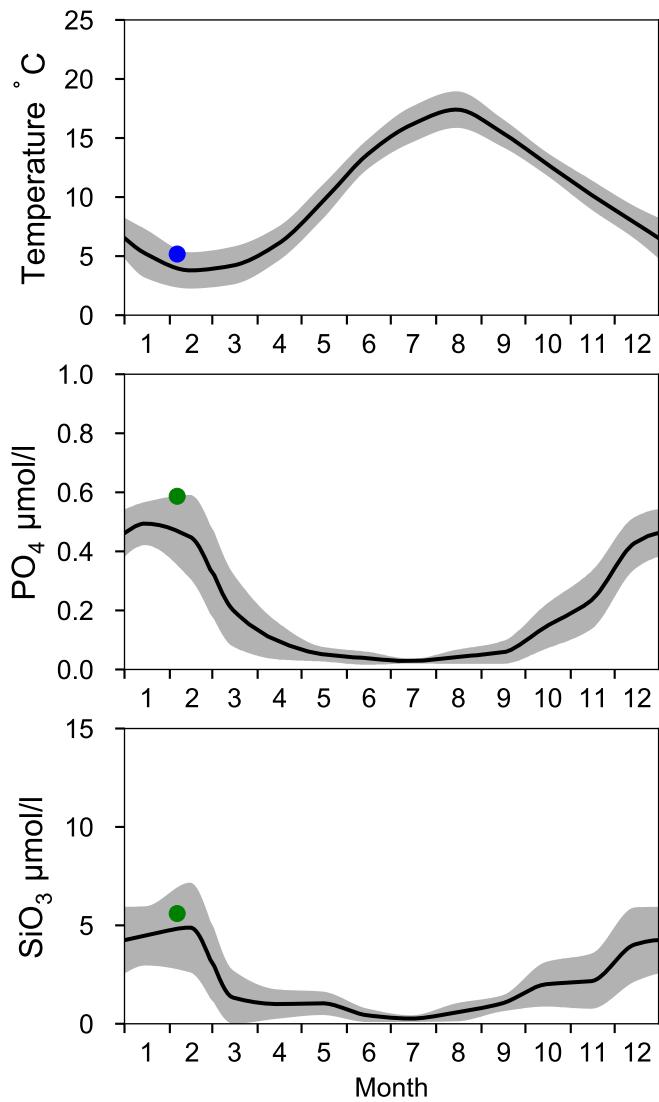
# STATION Å17 SURFACE WATER (0-10 m)

Annual Cycles

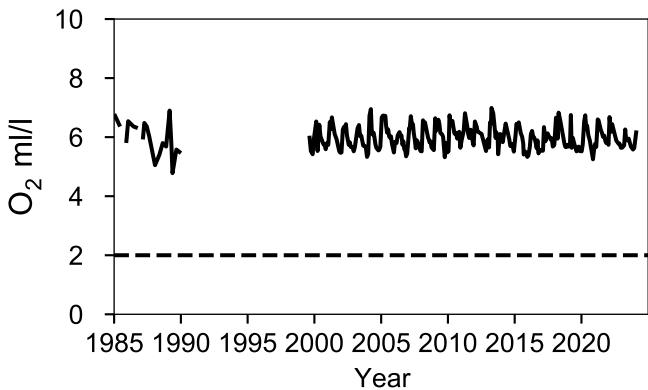
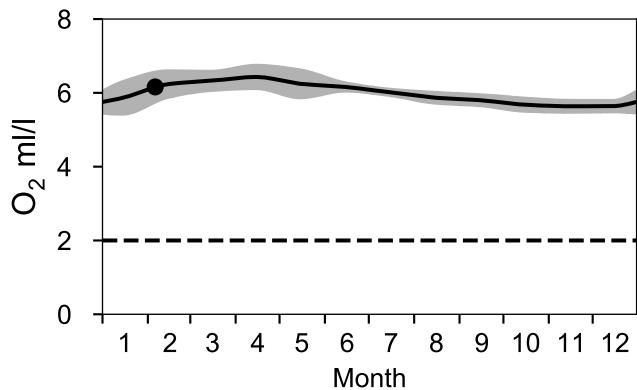
— Mean 1991-2020

St.Dev.

● 2024

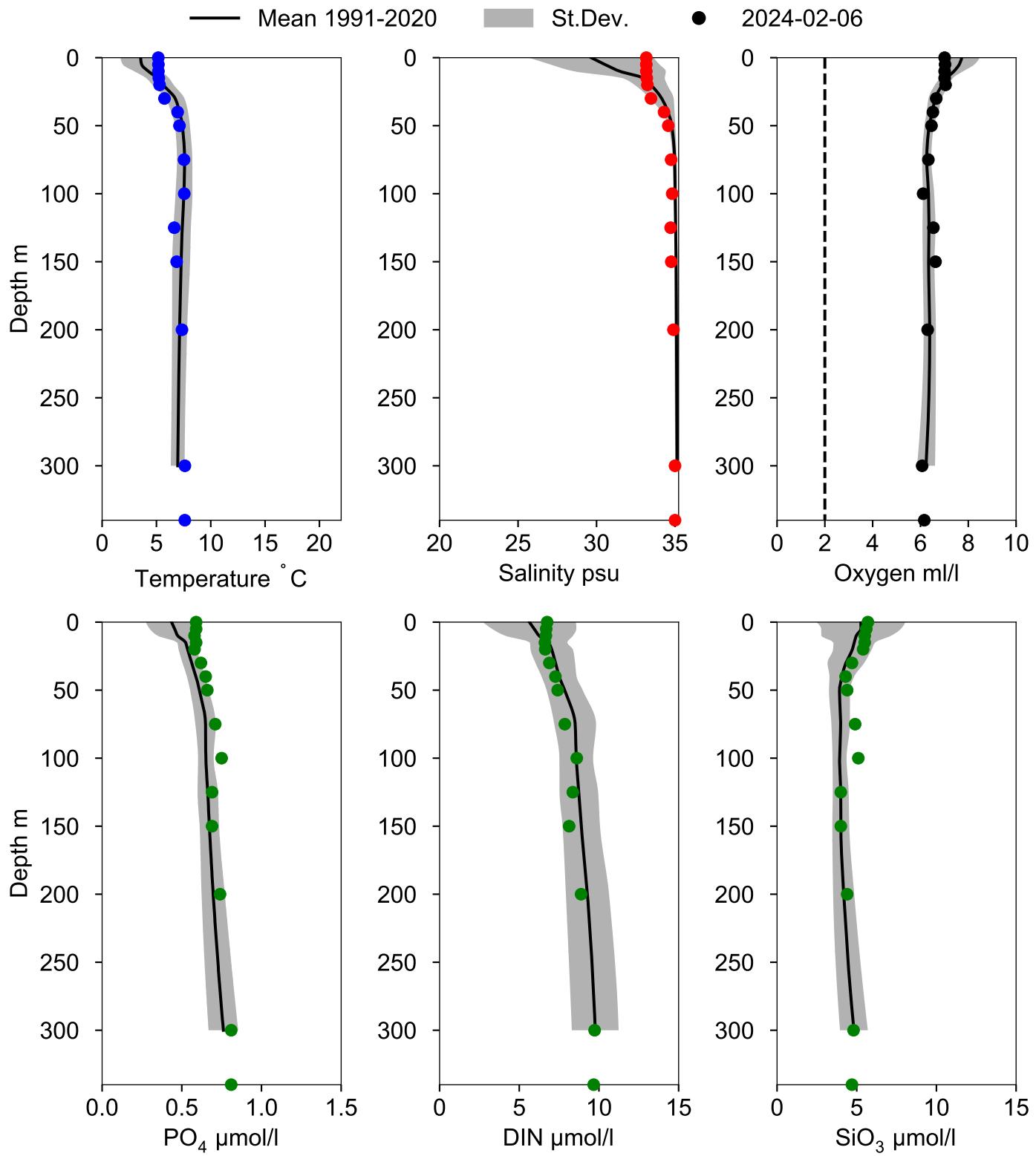


# OXYGEN IN BOTTOM WATER (depth $\geq 300 \text{ m}$ )



# Vertical profiles Å17

## February



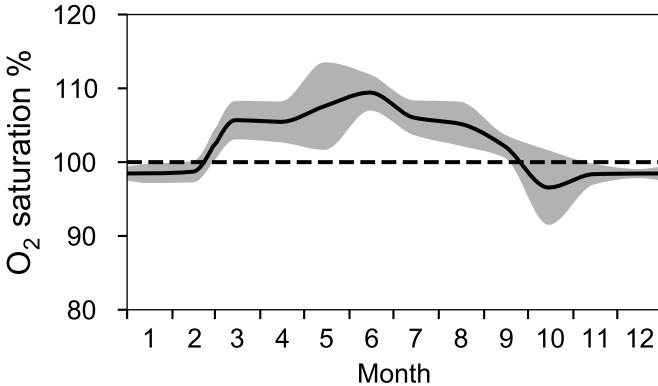
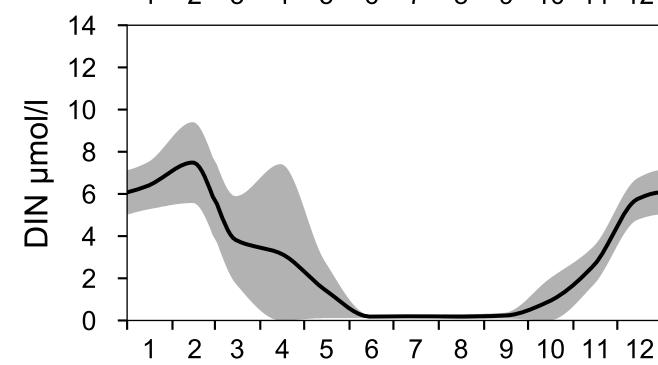
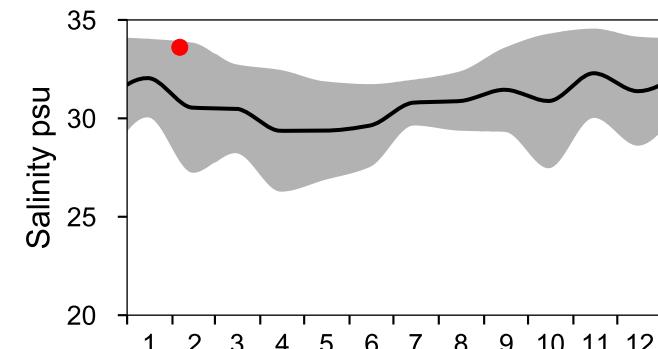
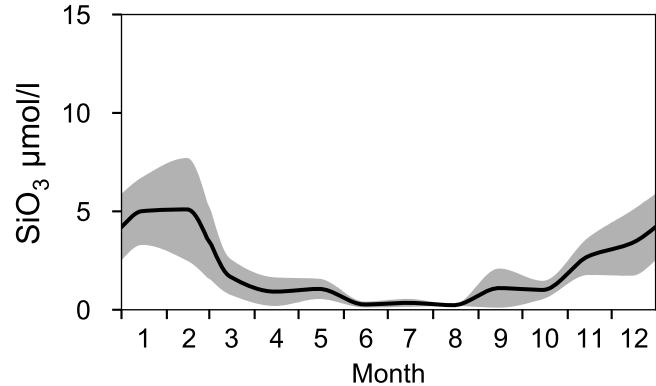
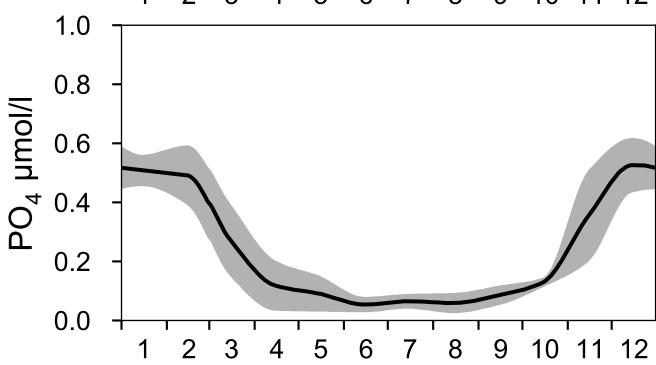
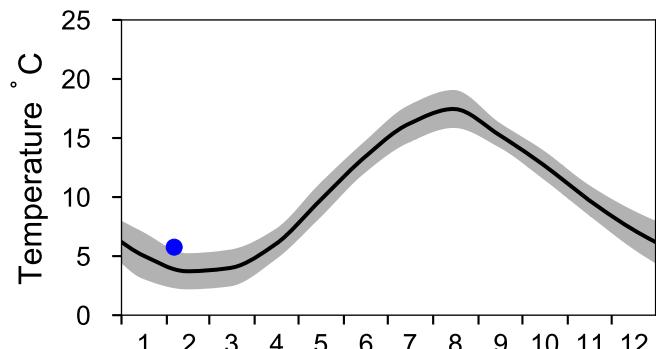
# STATION Å16 SURFACE WATER (0-10 m)

Annual Cycles

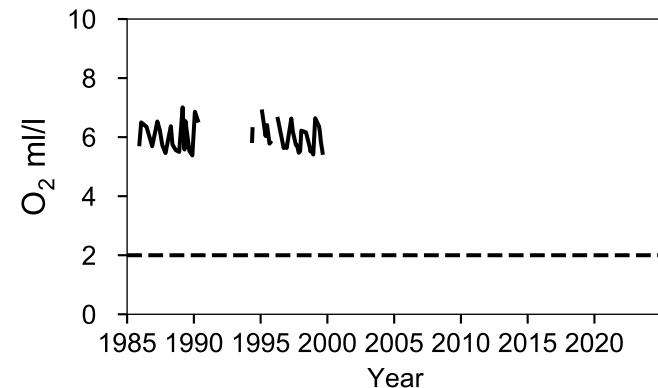
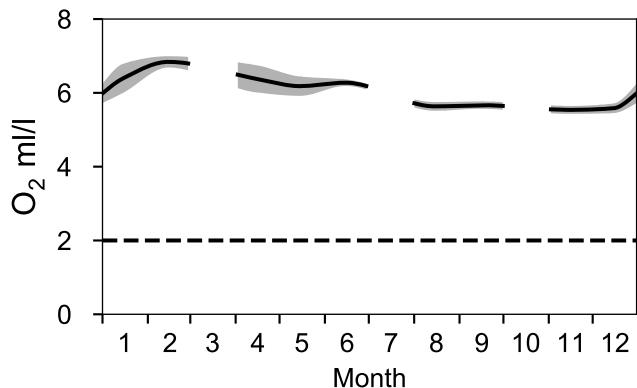
— Mean 1991-2020

St.Dev.

● 2024

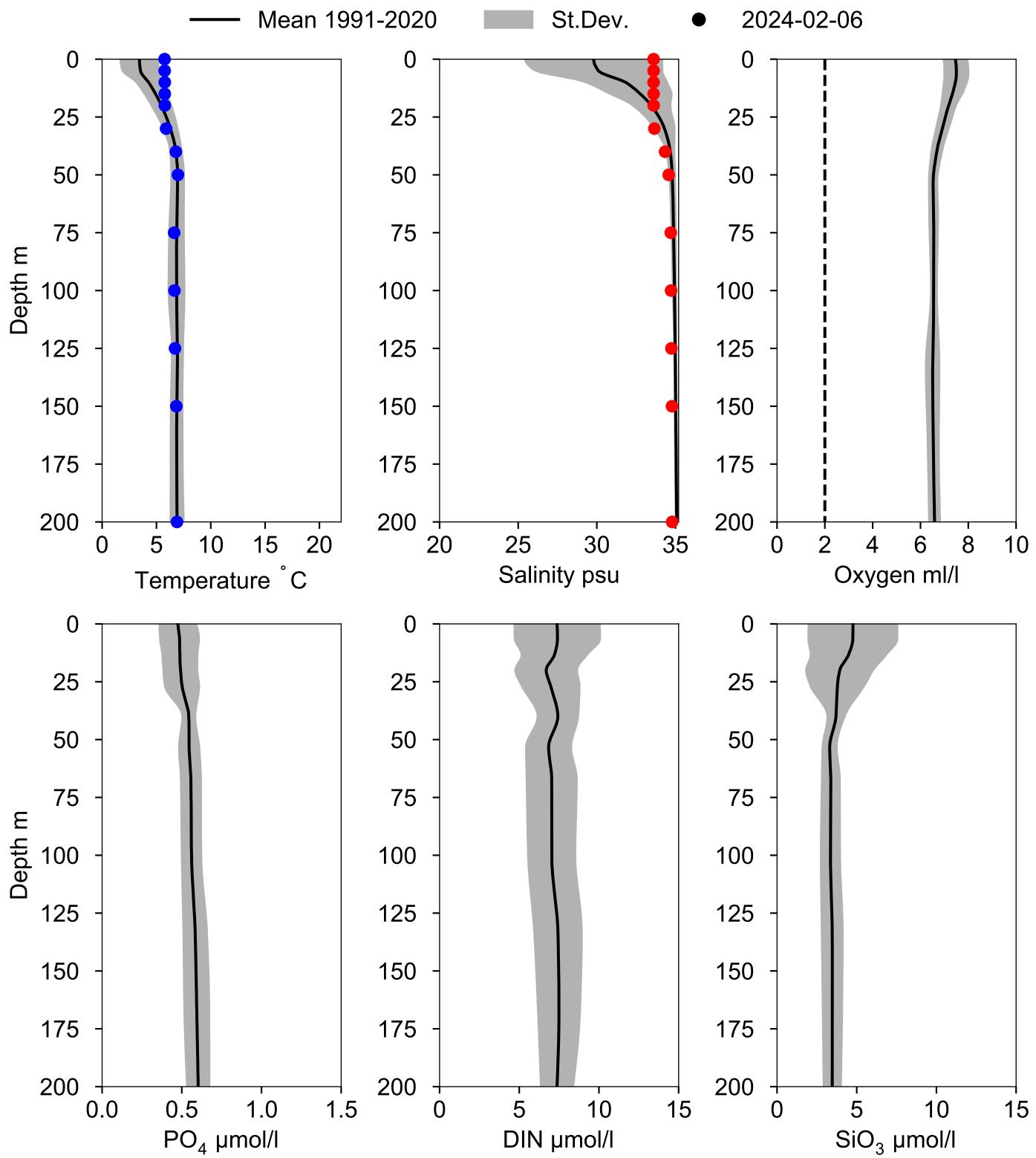


## OXYGEN IN BOTTOM WATER (depth $\geq$ 193 m)



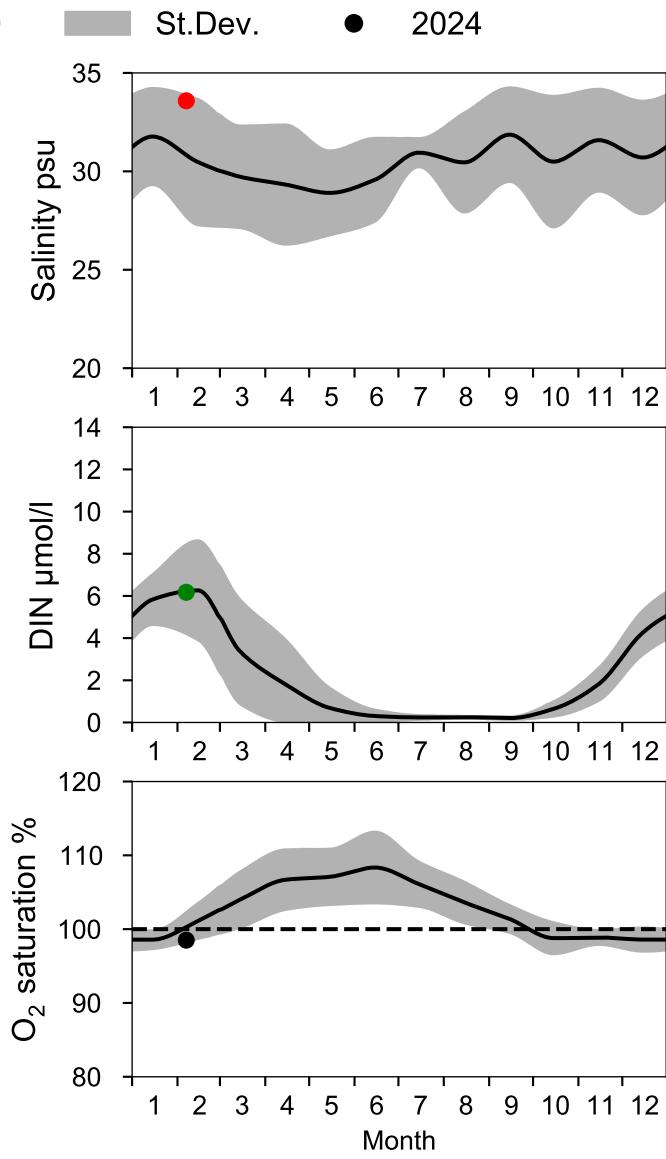
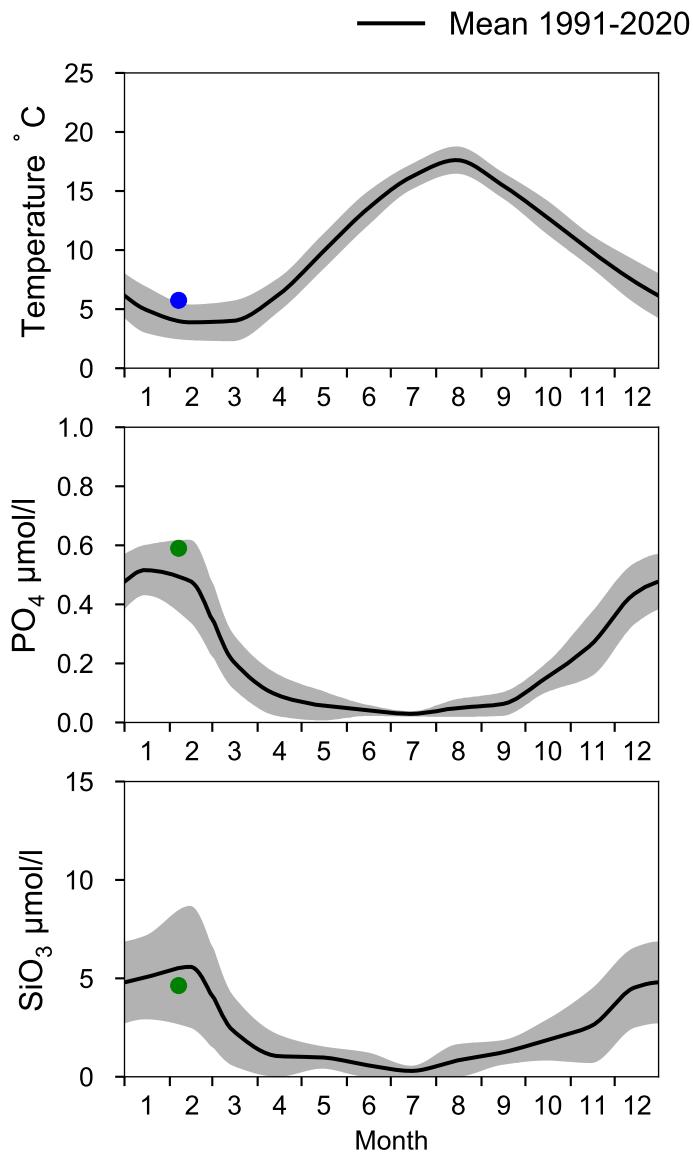
# Vertical profiles Å16

## February

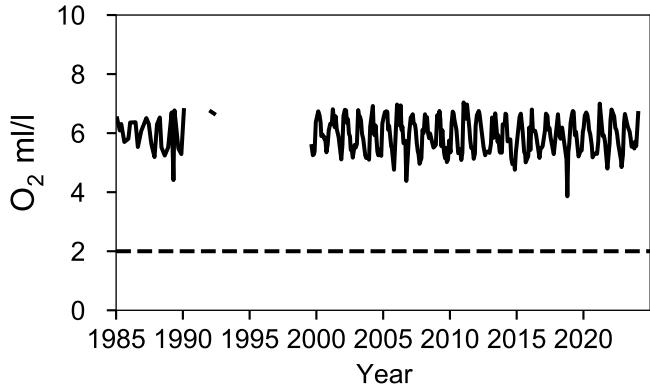
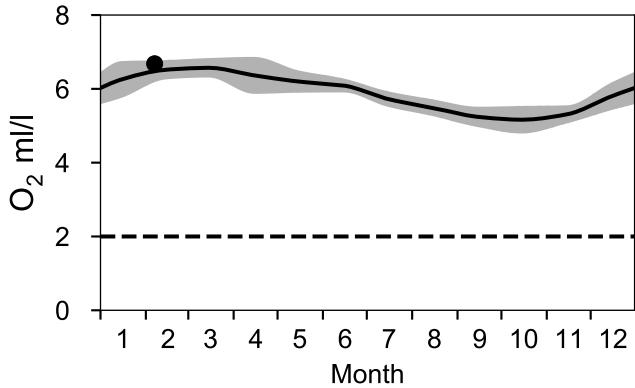


# STATION Å15 SURFACE WATER (0-10 m)

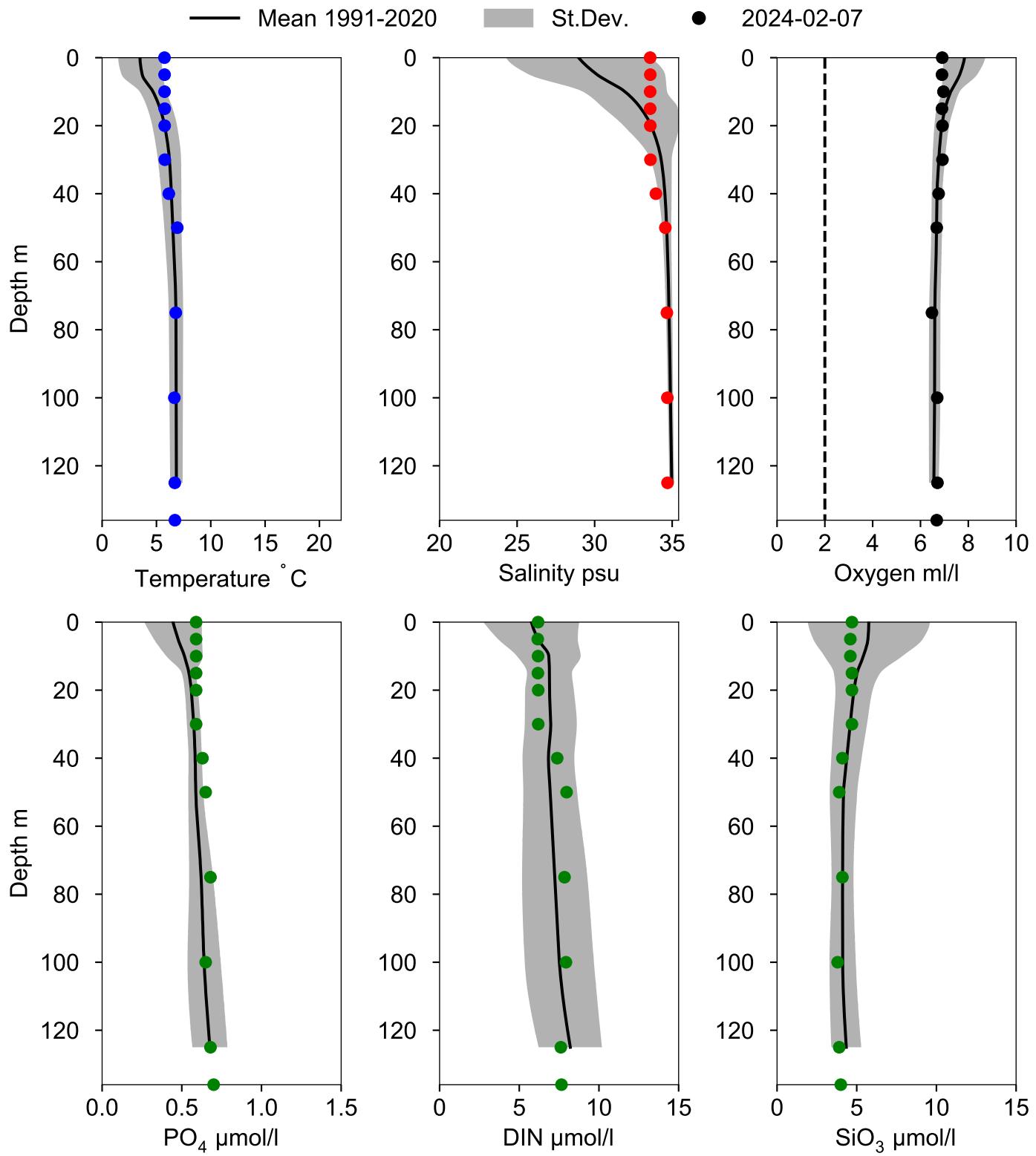
Annual Cycles



## OXYGEN IN BOTTOM WATER (depth >= 125 m)



# Vertical profiles Å15 February



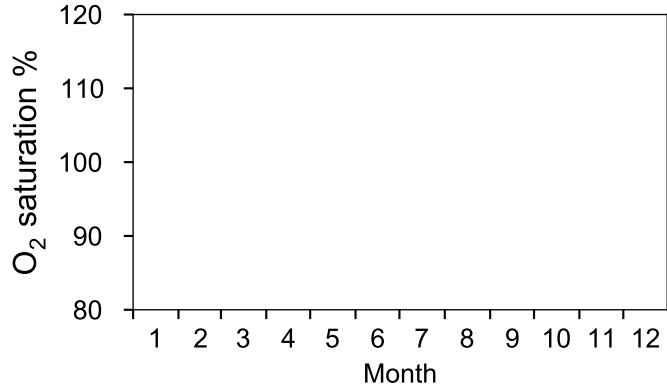
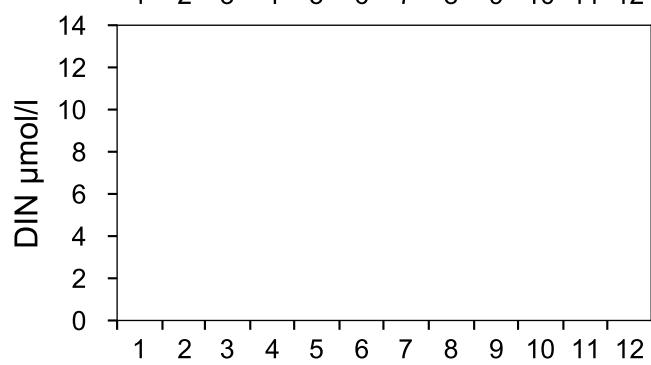
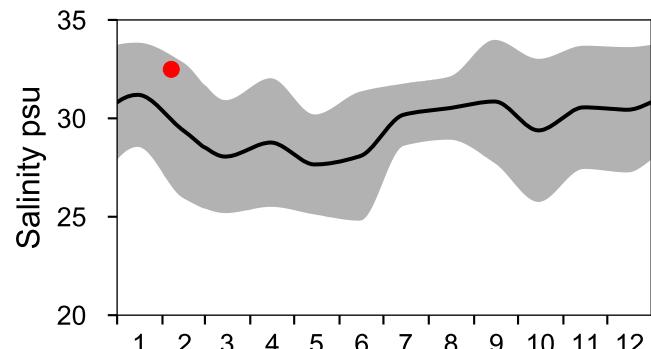
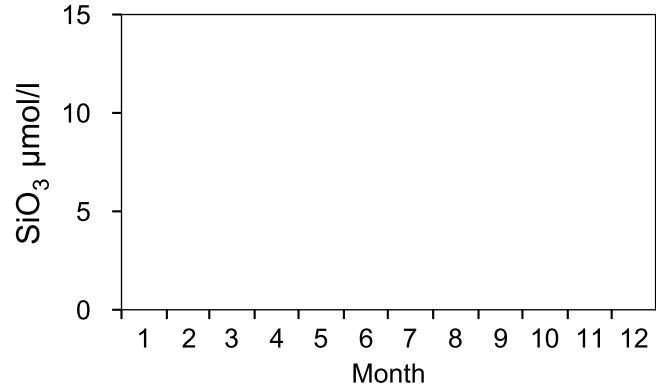
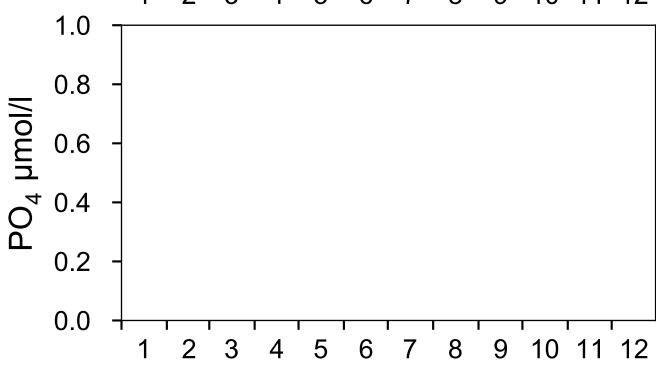
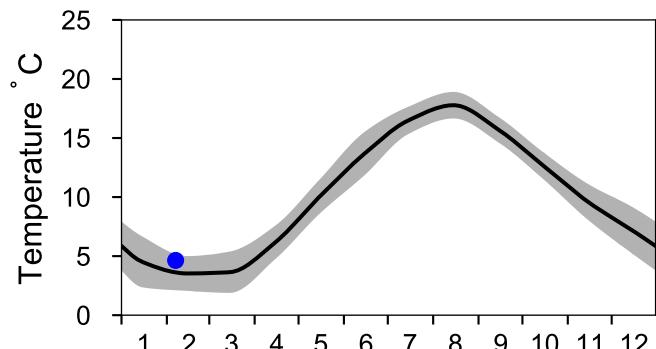
# STATION Å14 SURFACE WATER (0-10 m)

Annual Cycles

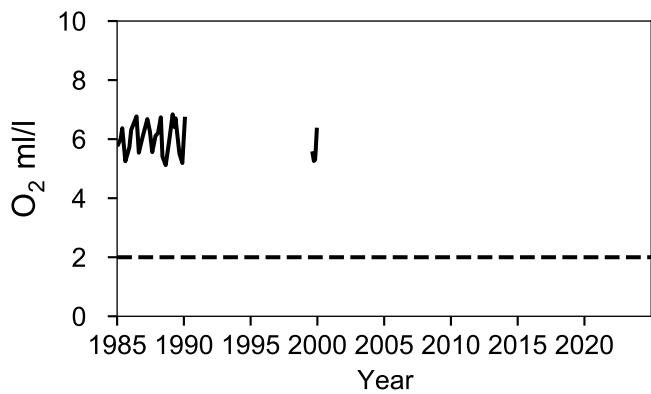
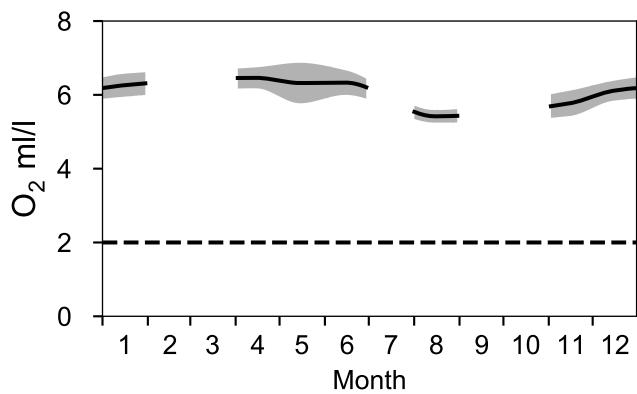
— Mean 1991-2020

St.Dev.

● 2024

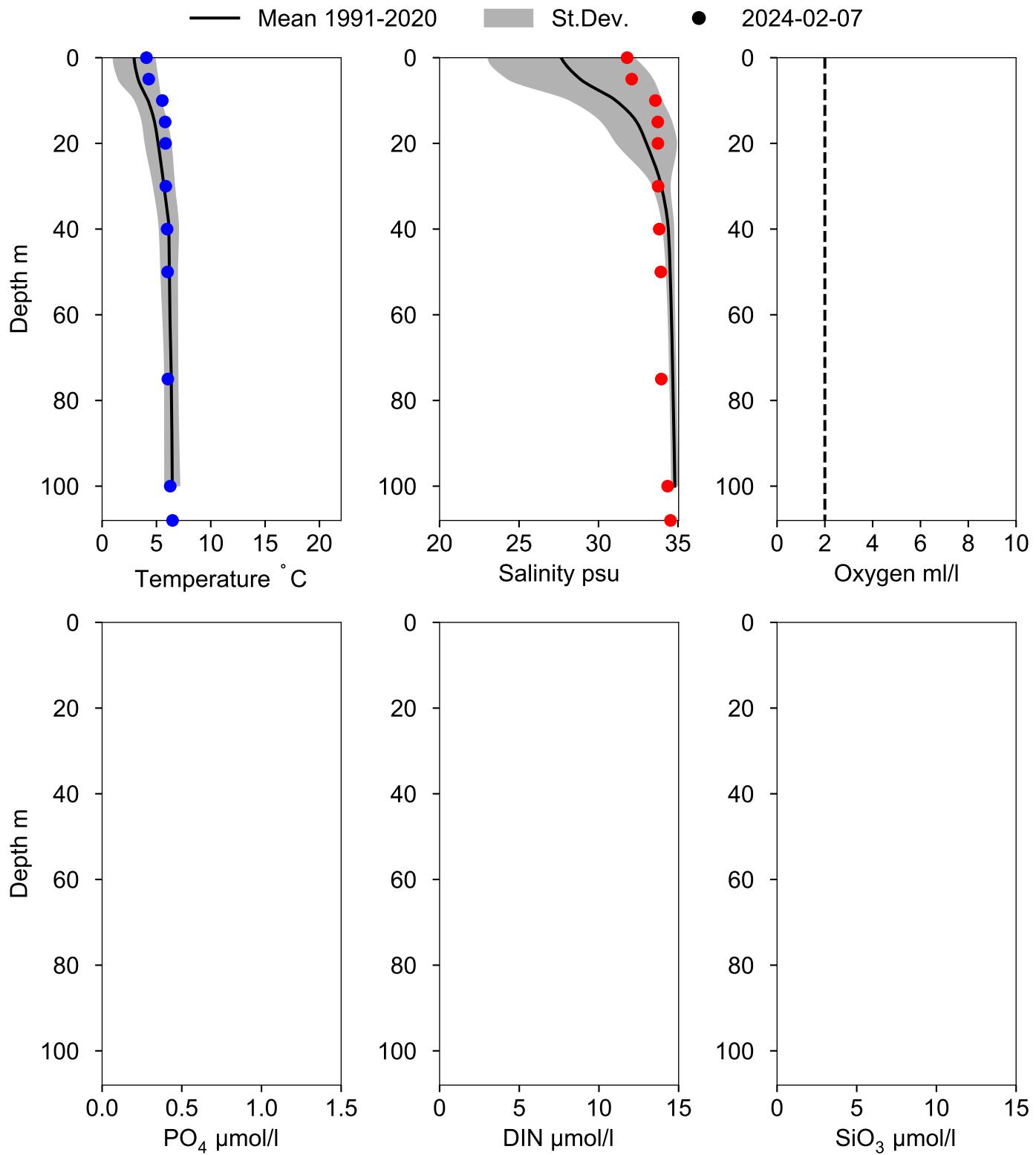


## OXYGEN IN BOTTOM WATER (depth $\geq 100 \text{ m}$ )



# Vertical profiles Å14

## February



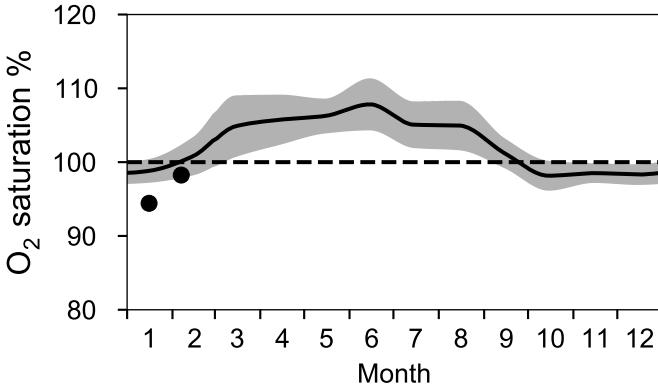
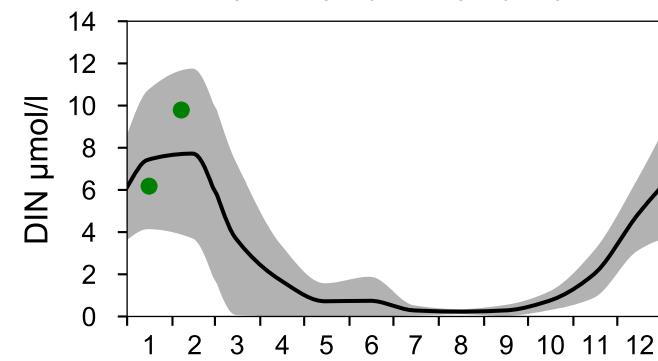
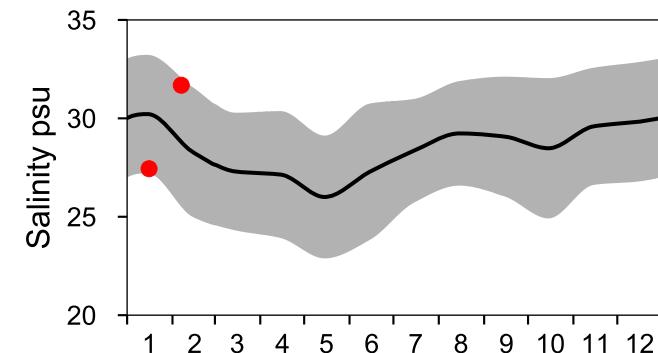
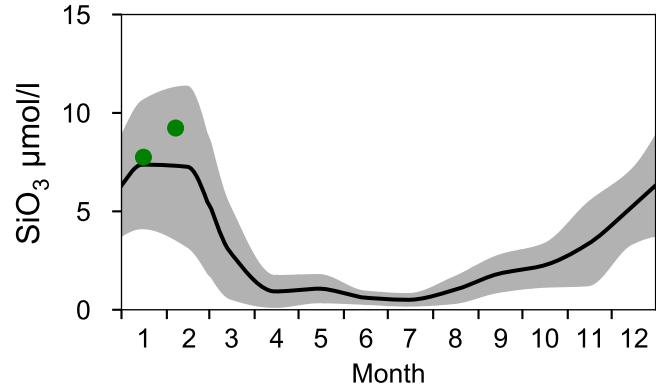
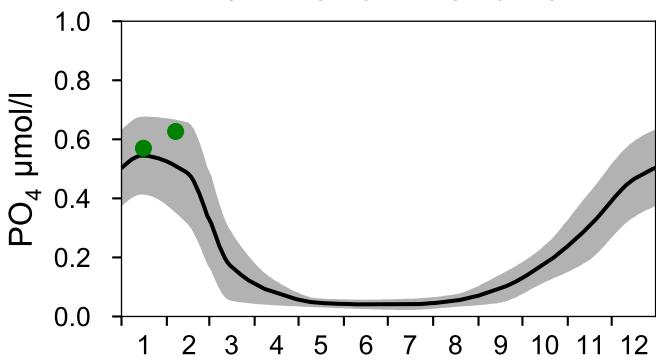
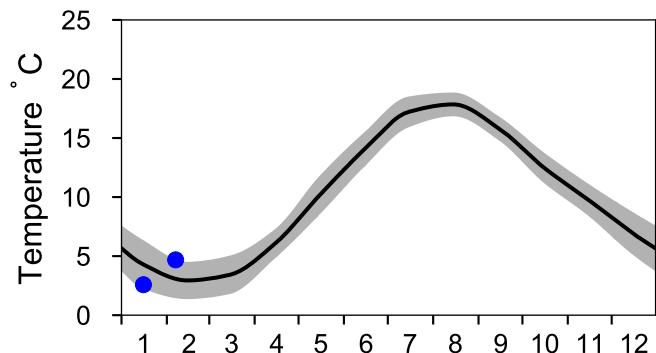
# STATION Å13 SURFACE WATER (0-10 m)

Annual Cycles

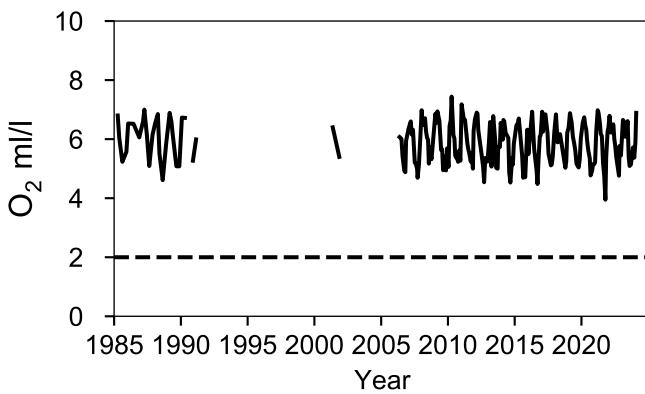
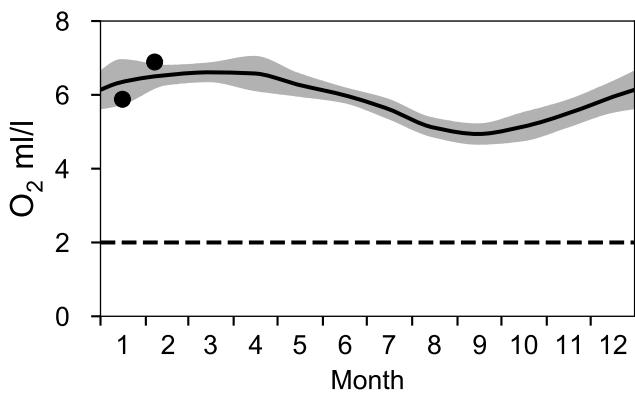
— Mean 1991-2020

St.Dev.

● 2024

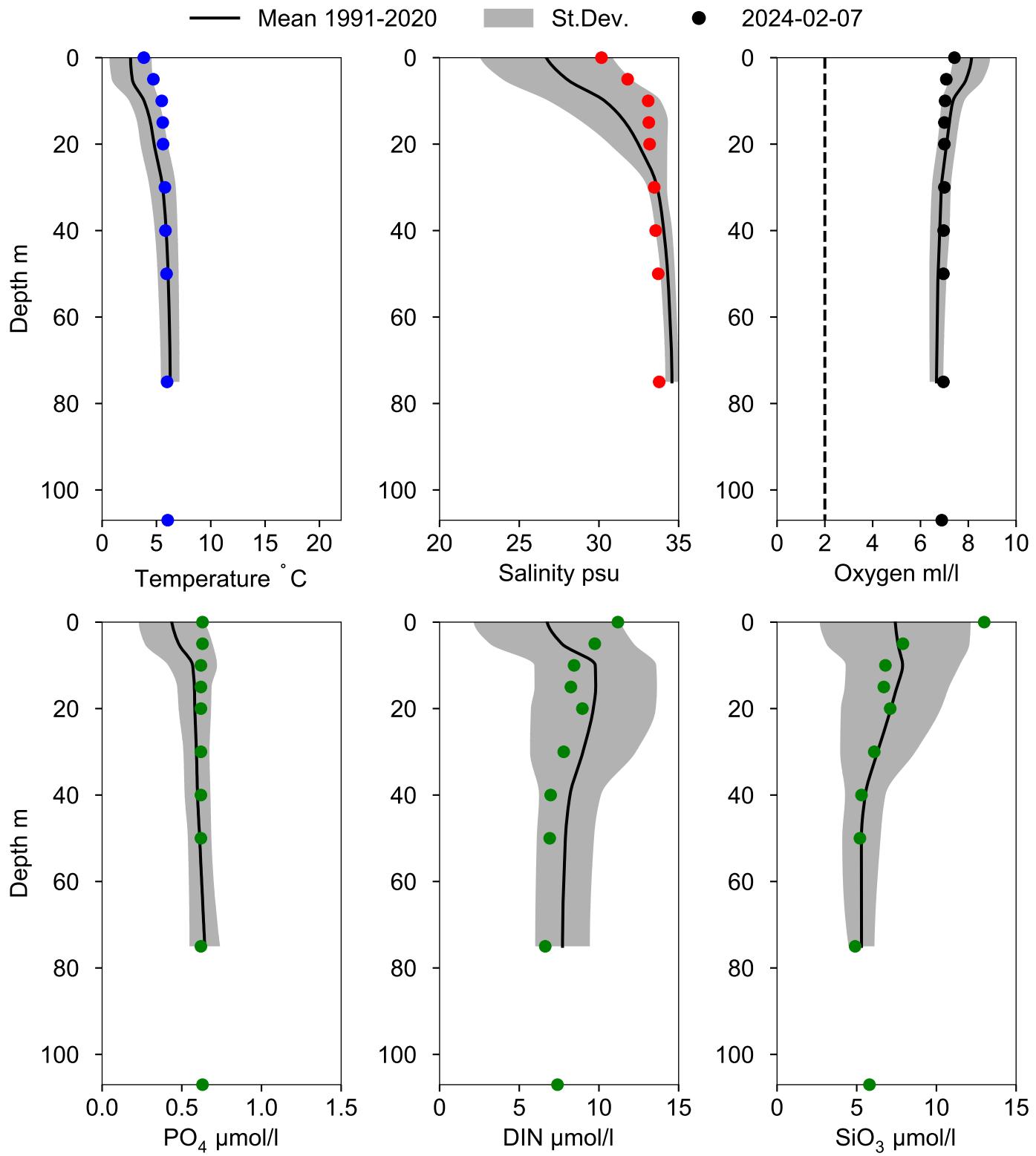


## OXYGEN IN BOTTOM WATER (depth $\geq 82$ m)



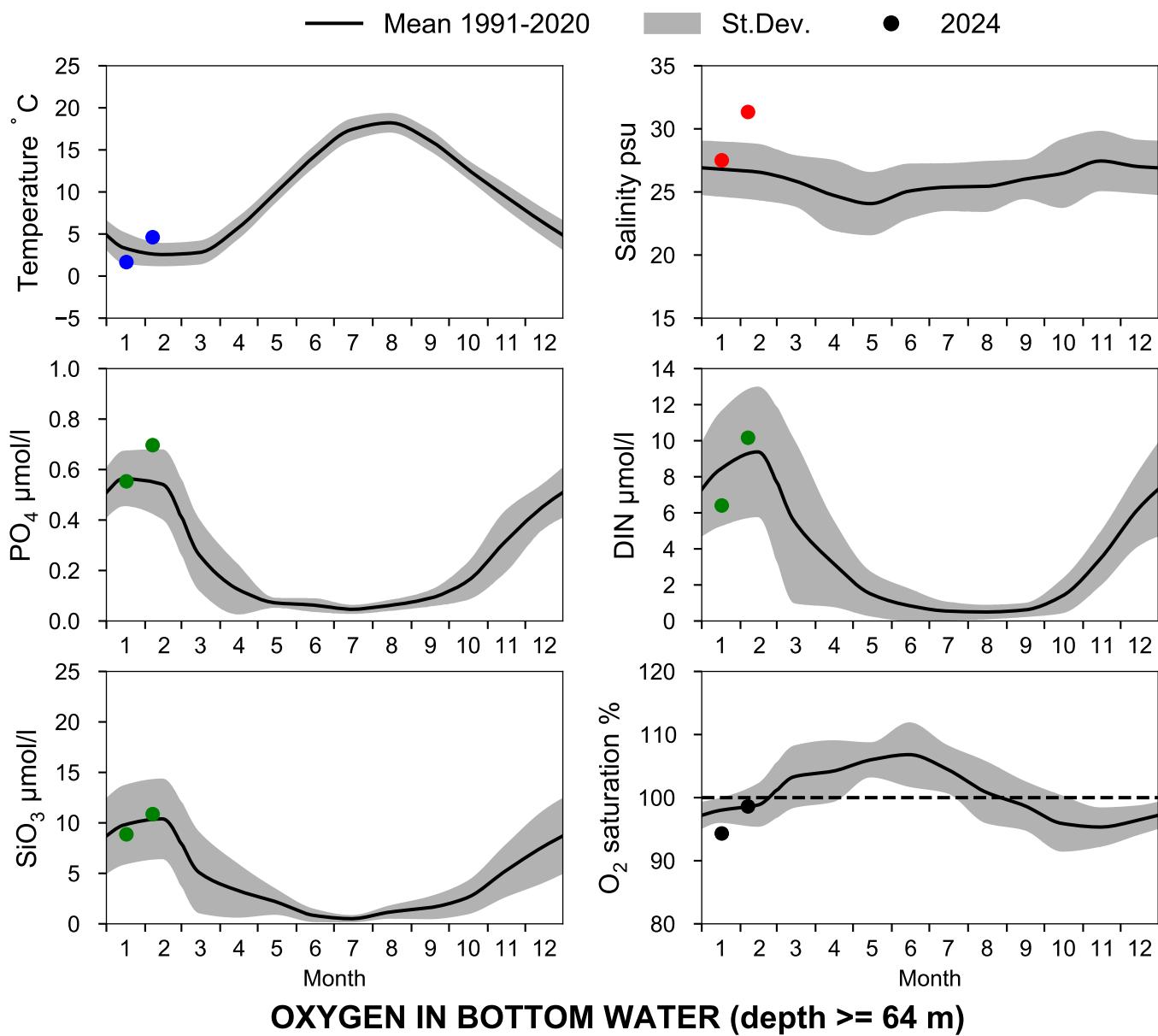
# Vertical profiles Å13

## February

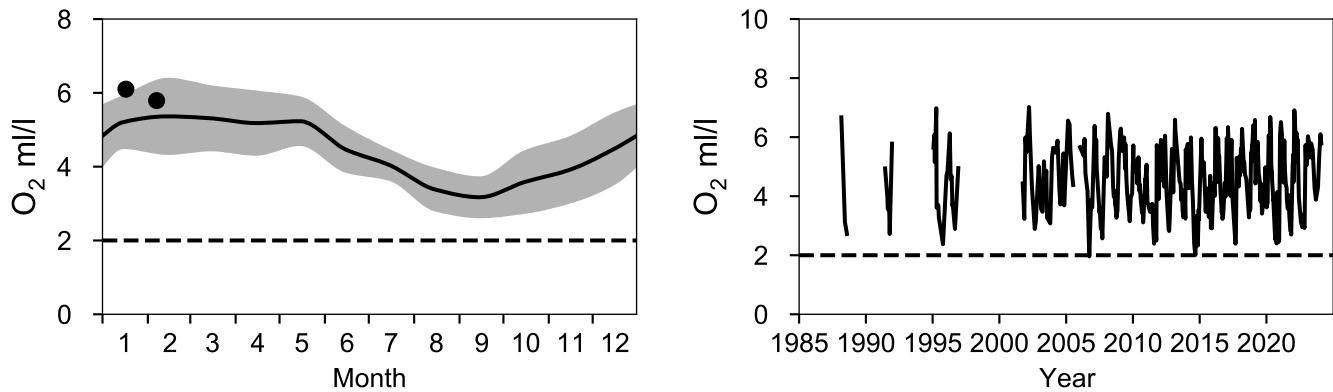


# STATION SLÄGGÖ SURFACE WATER (0-10 m)

Annual Cycles

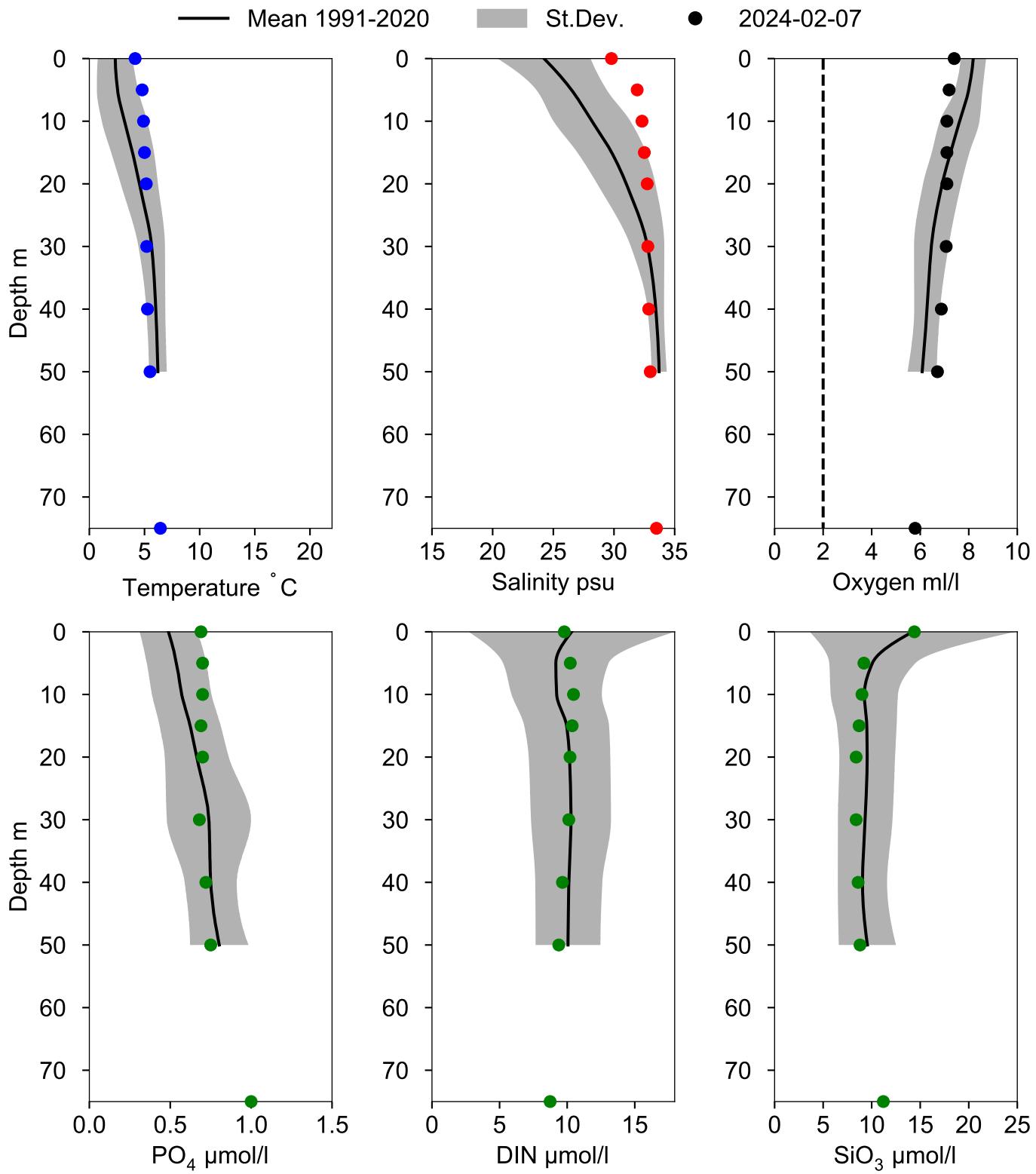


## OXYGEN IN BOTTOM WATER (depth >= 64 m)



# Vertical profiles SLÄGGÖ

## February



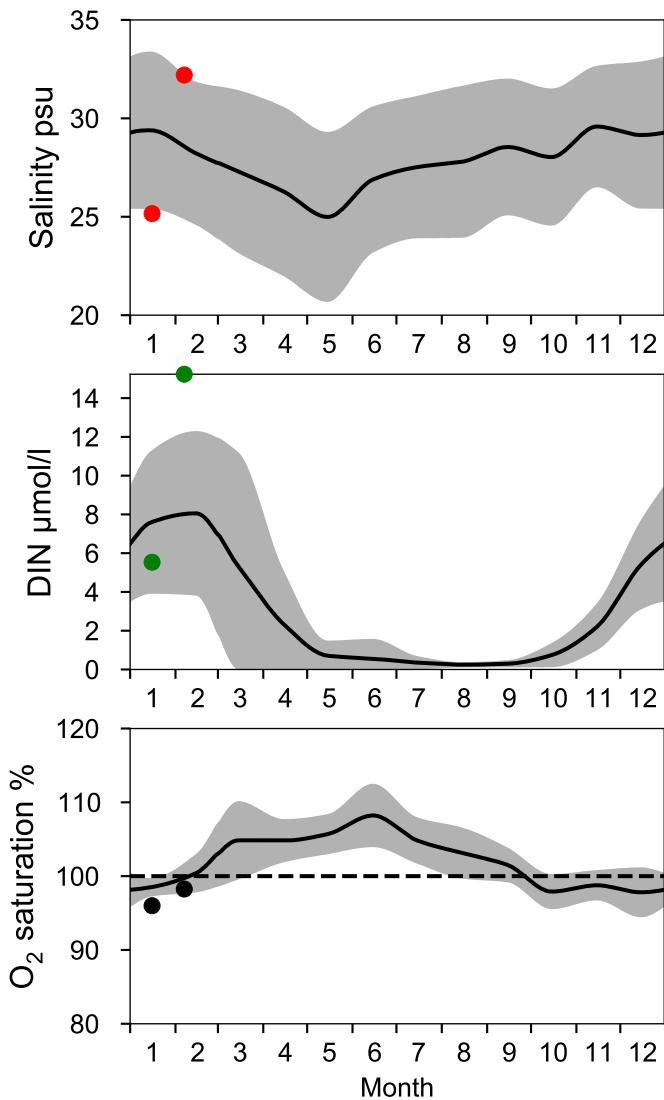
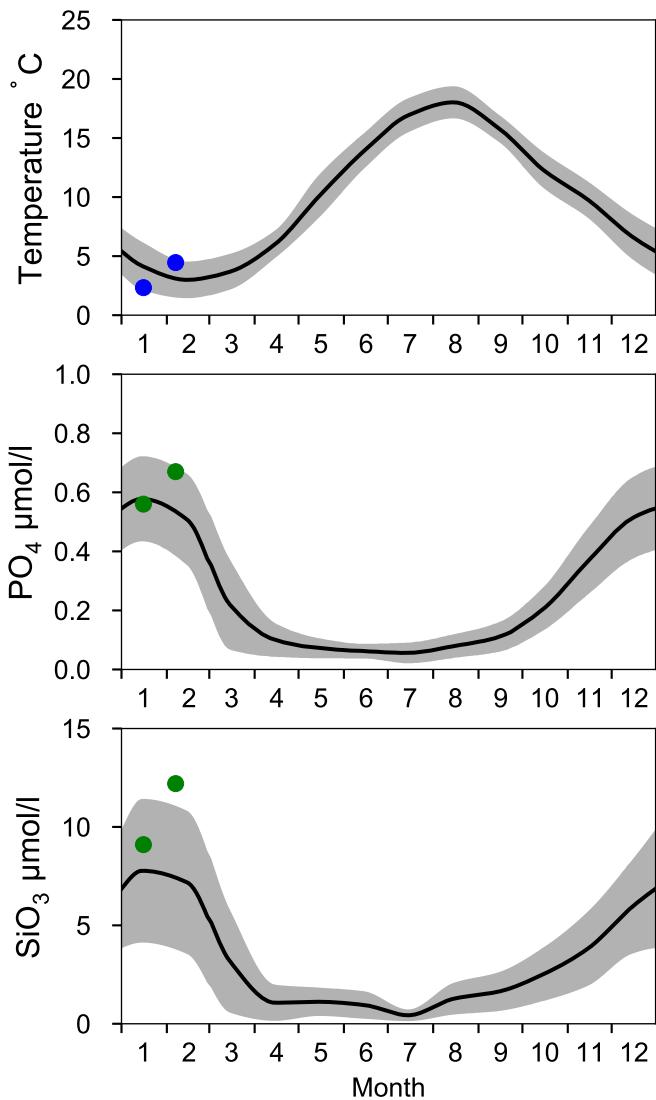
# STATION P2 SURFACE WATER (0-10 m)

Annual Cycles

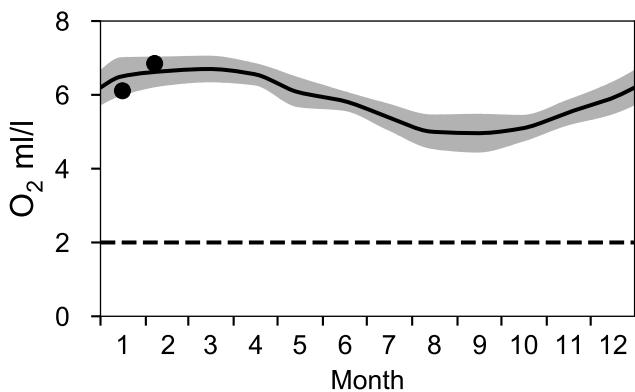
— Mean 1991-2020

St.Dev.

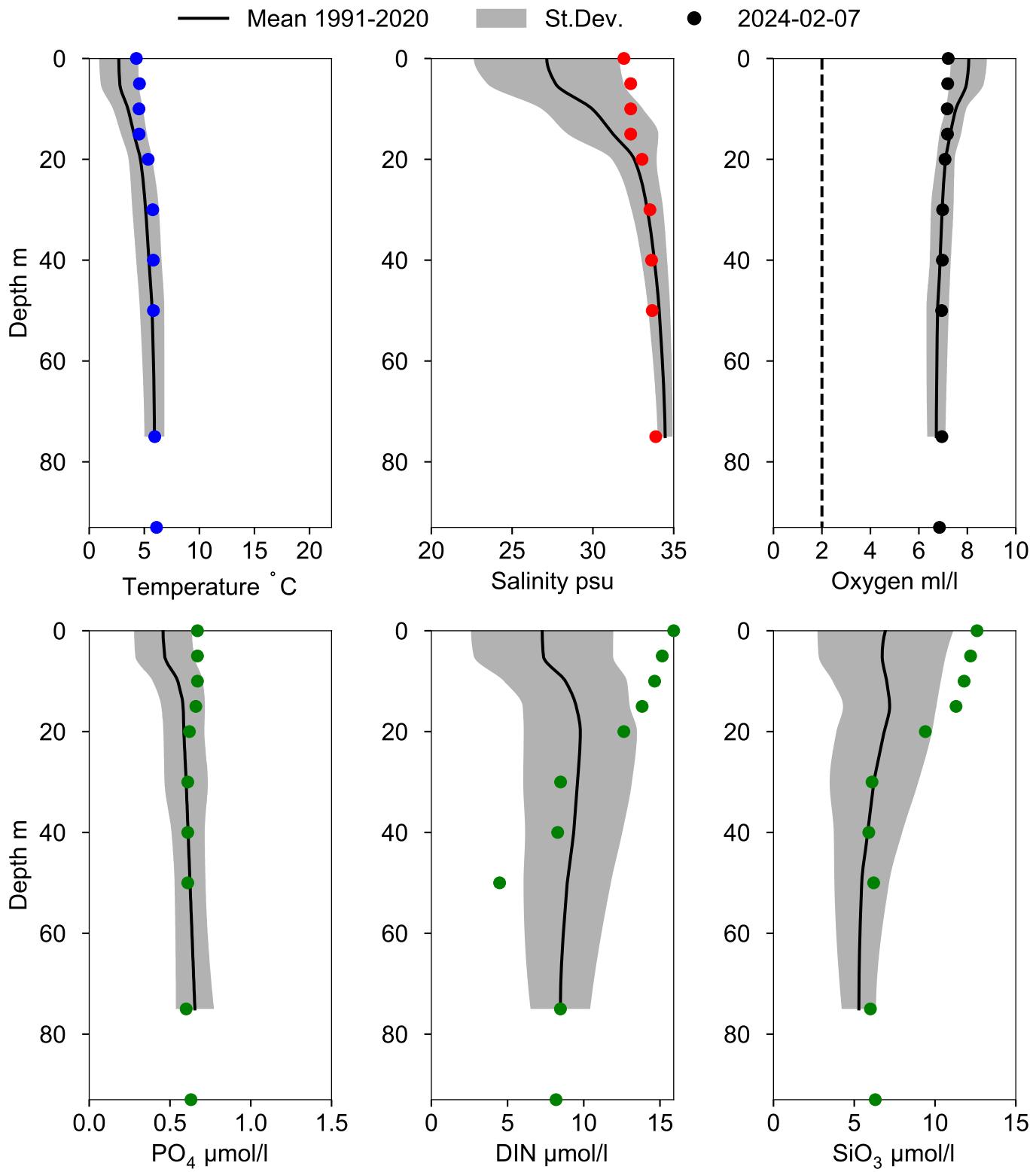
● 2024



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

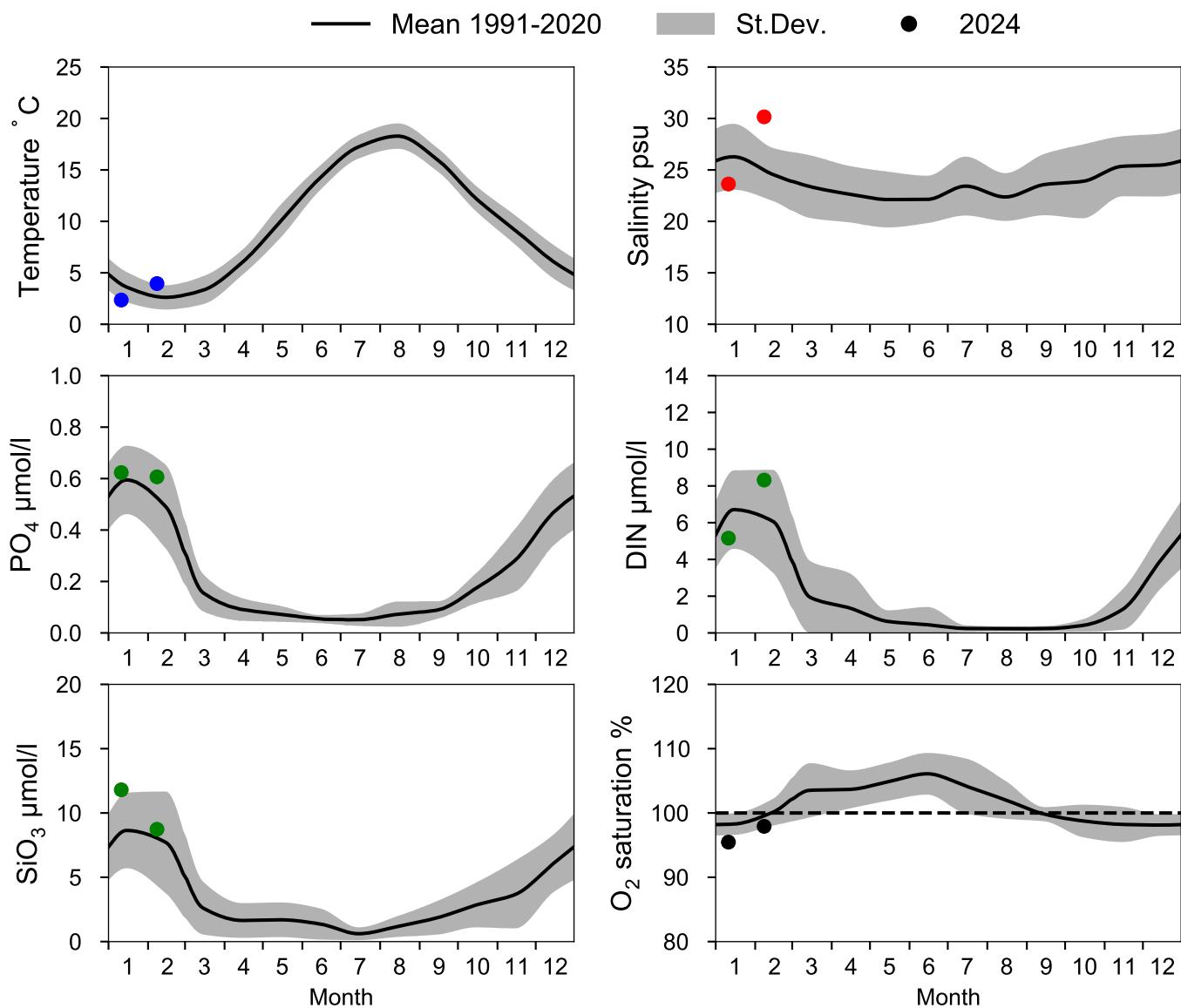


## Vertical profiles P2 February

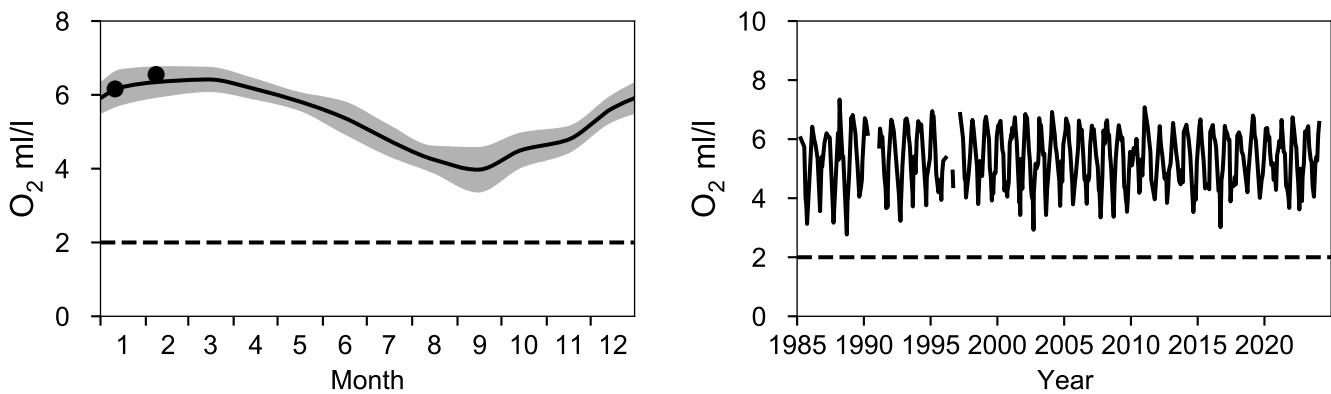


# STATION FLADEN SURFACE WATER (0-10 m)

Annual Cycles

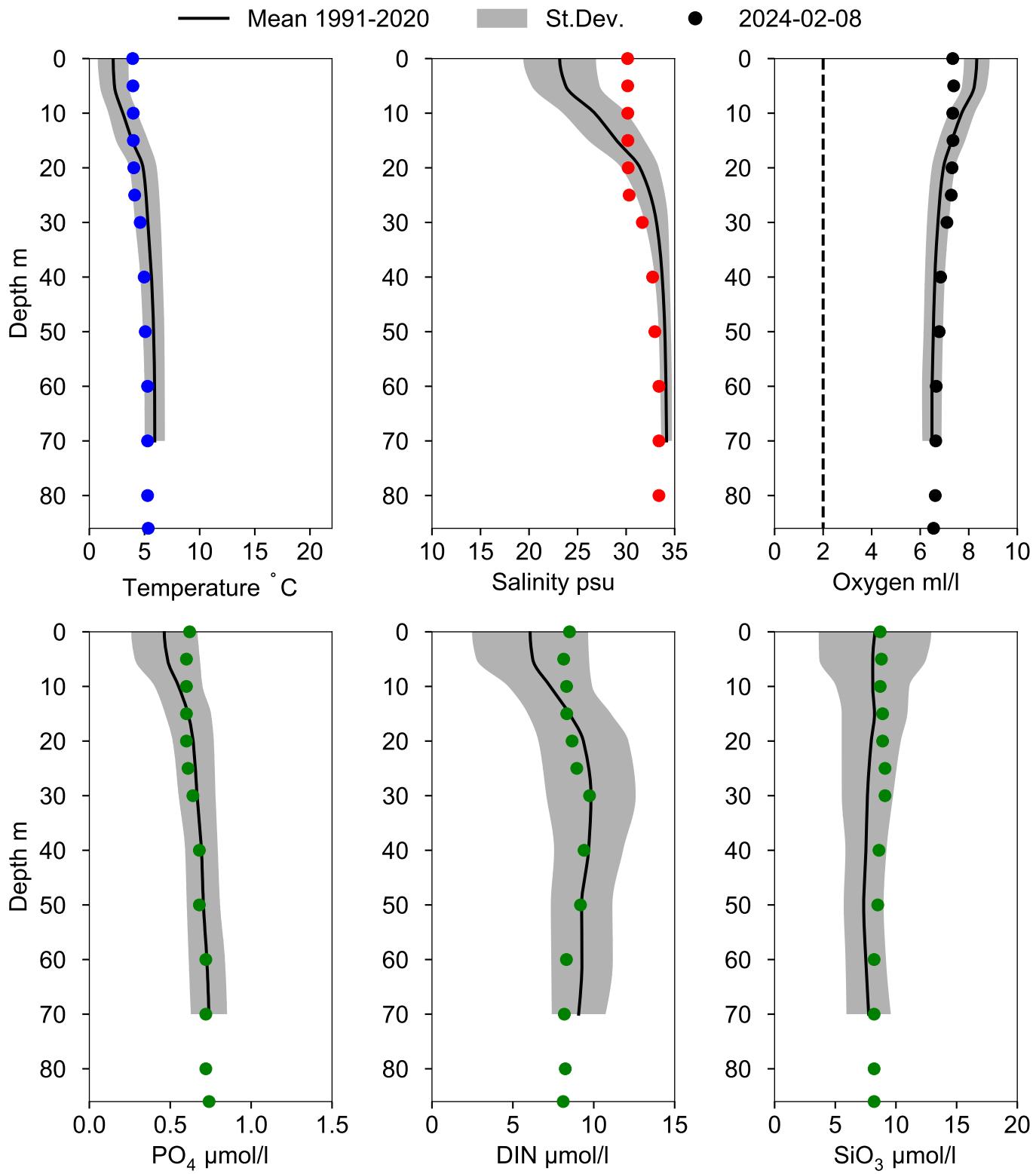


## OXYGEN IN BOTTOM WATER (depth >= 74 m)



# Vertical profiles FLADEN

## February



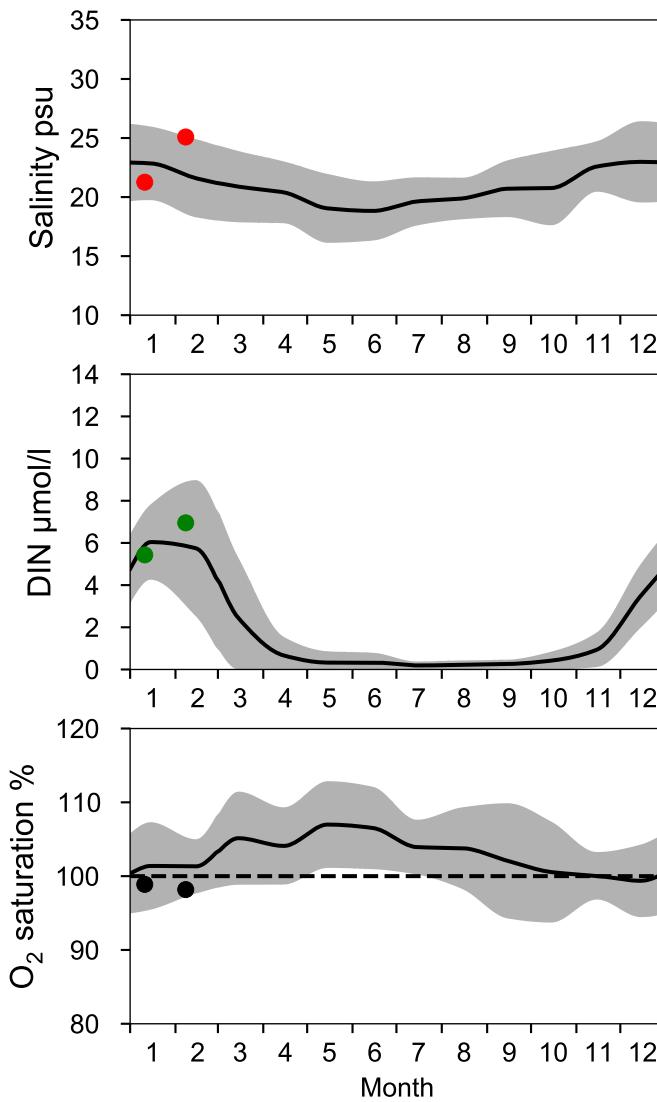
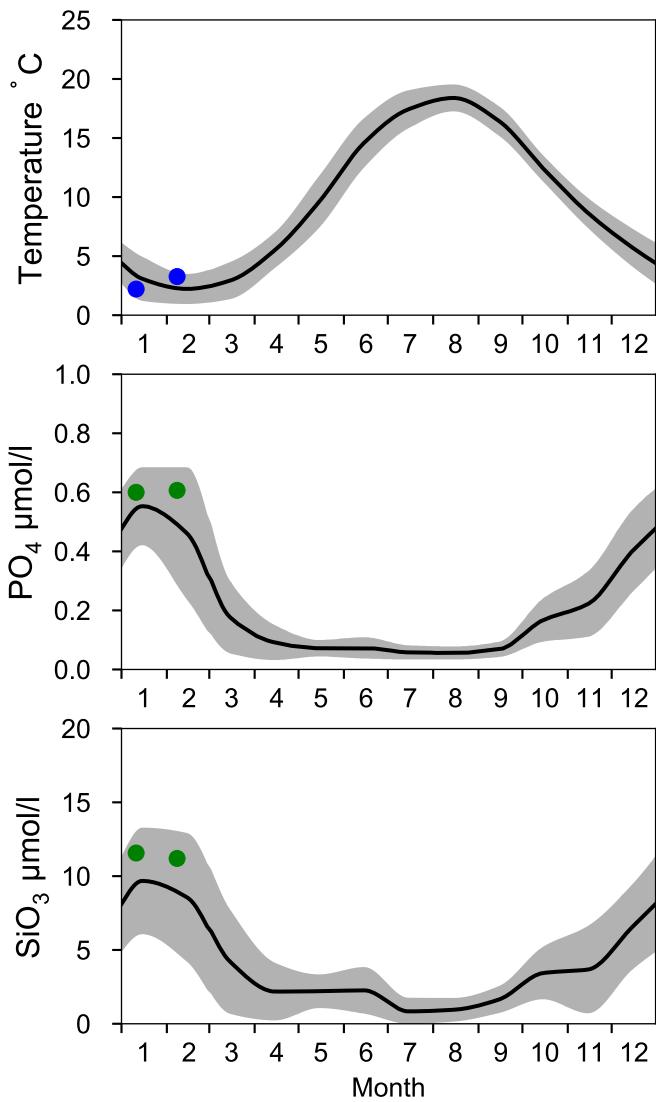
# STATION N14 FALKENBERG SURFACE WATER (0-10 m)

Annual Cycles

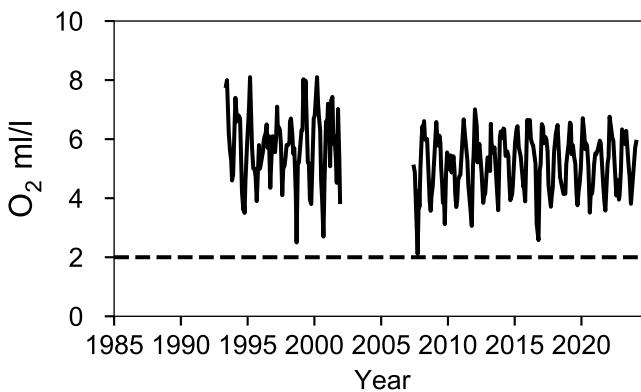
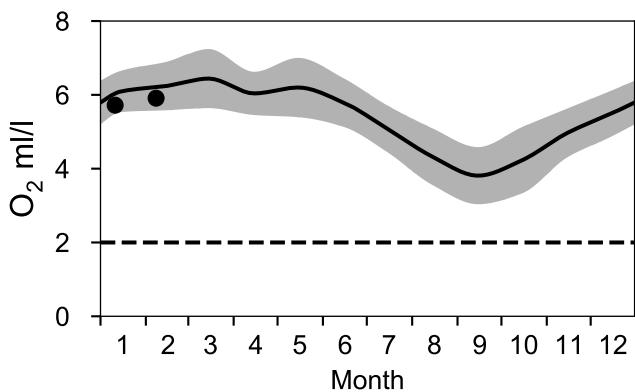
— Mean 1991-2020

St.Dev.

● 2024

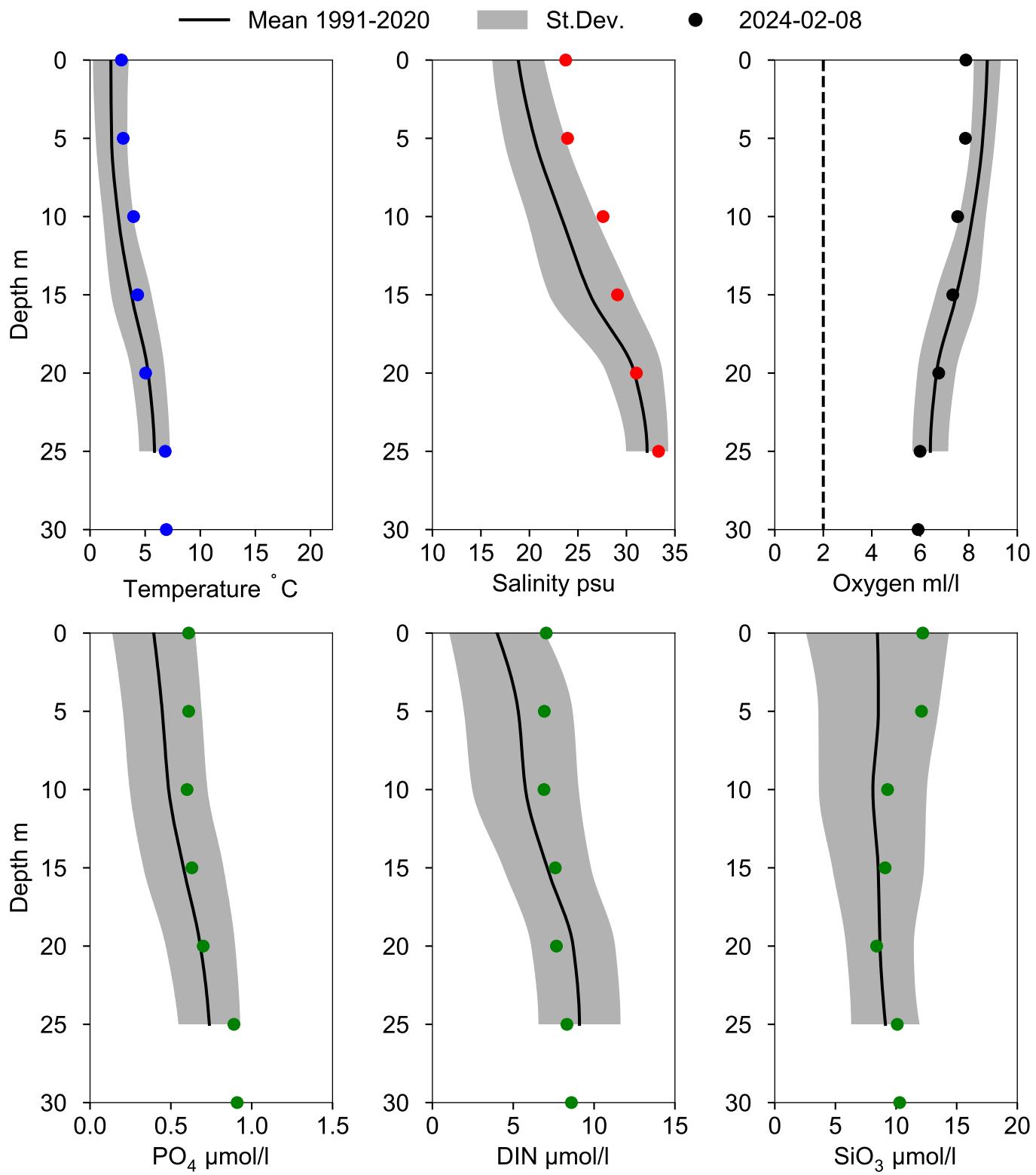


## OXYGEN IN BOTTOM WATER (depth $\geq 25 \text{ m}$ )



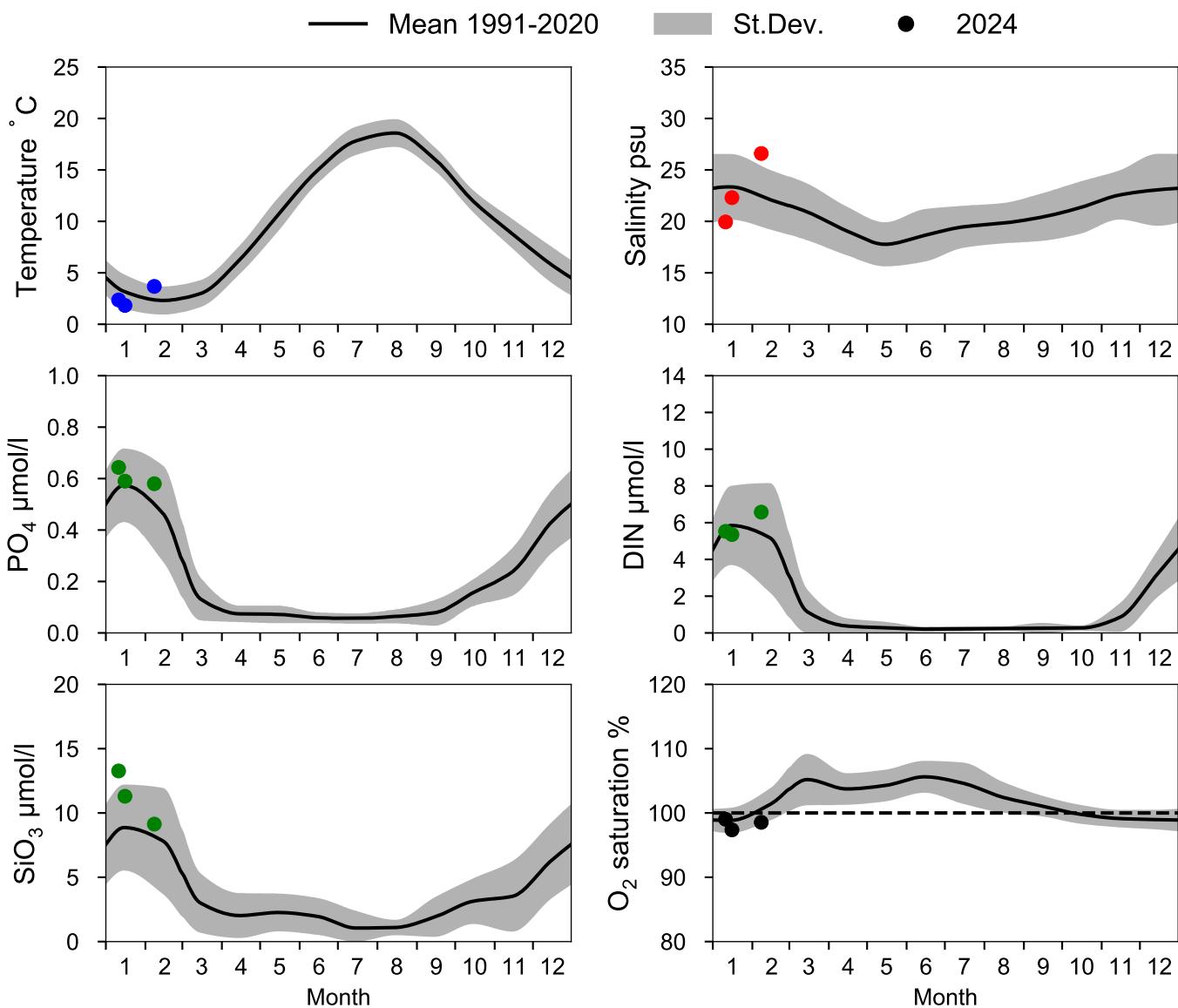
# Vertical profiles N14 FALKENBERG

## February

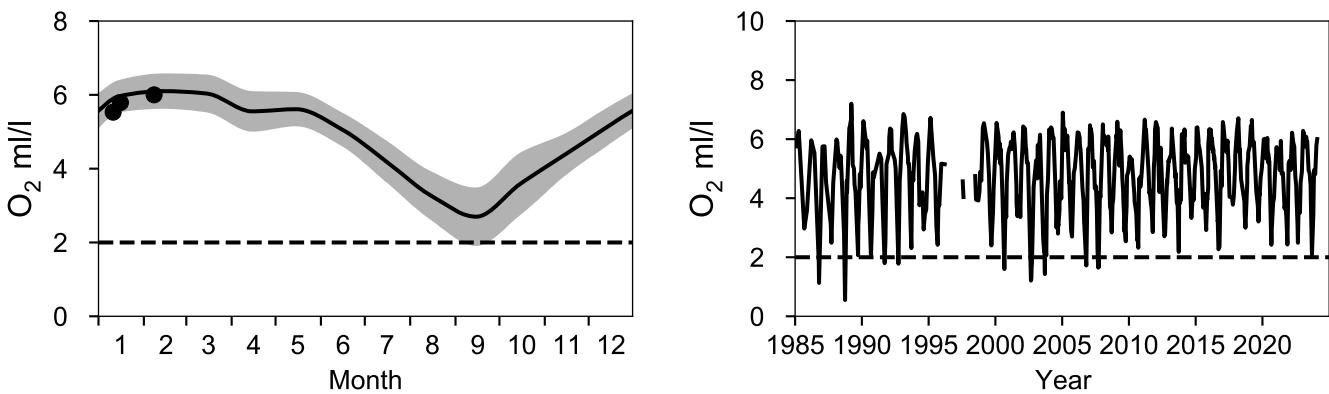


# STATION ANHOLT E SURFACE WATER (0-10 m)

Annual Cycles

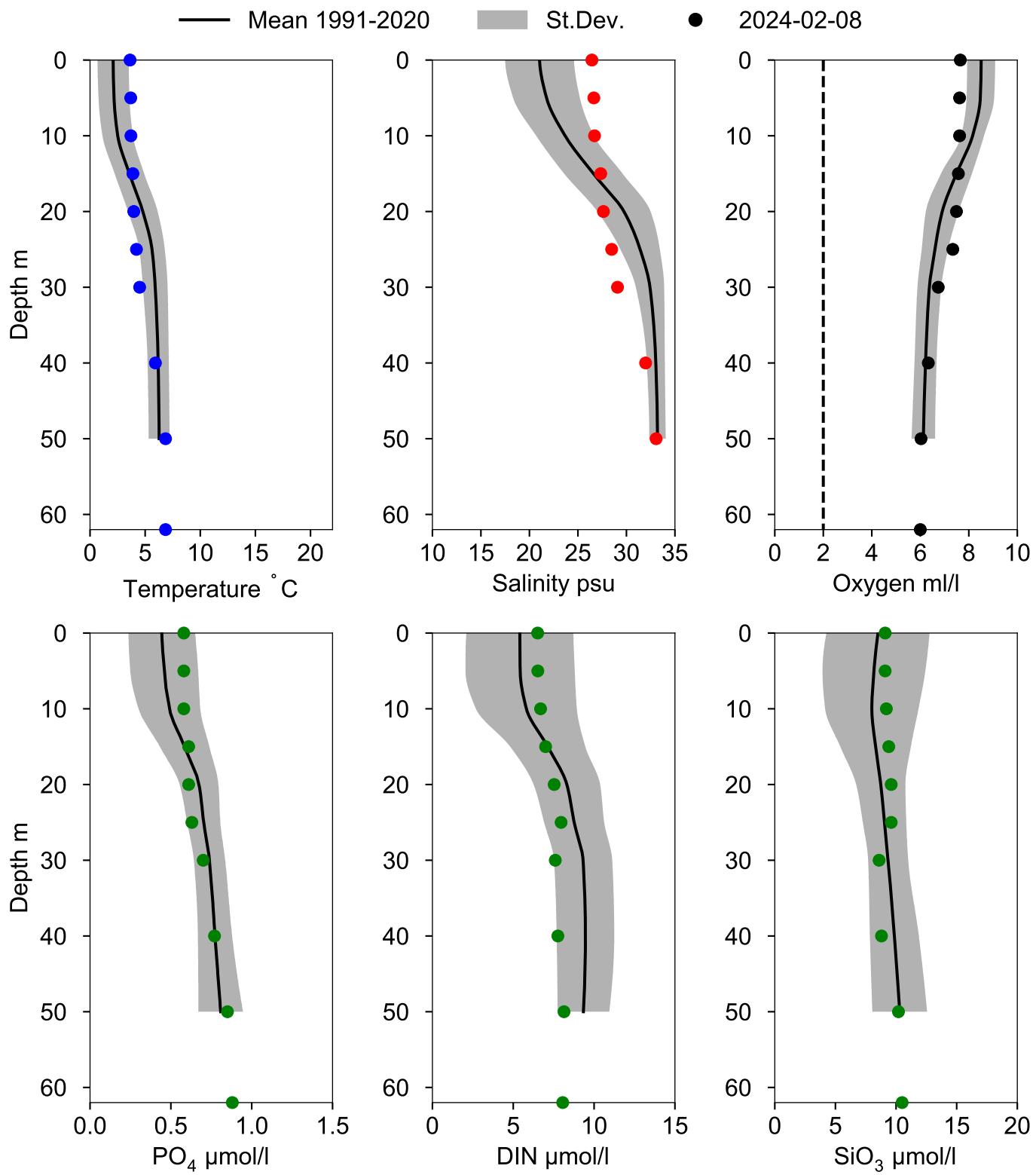


## OXYGEN IN BOTTOM WATER (depth >= 52 m)



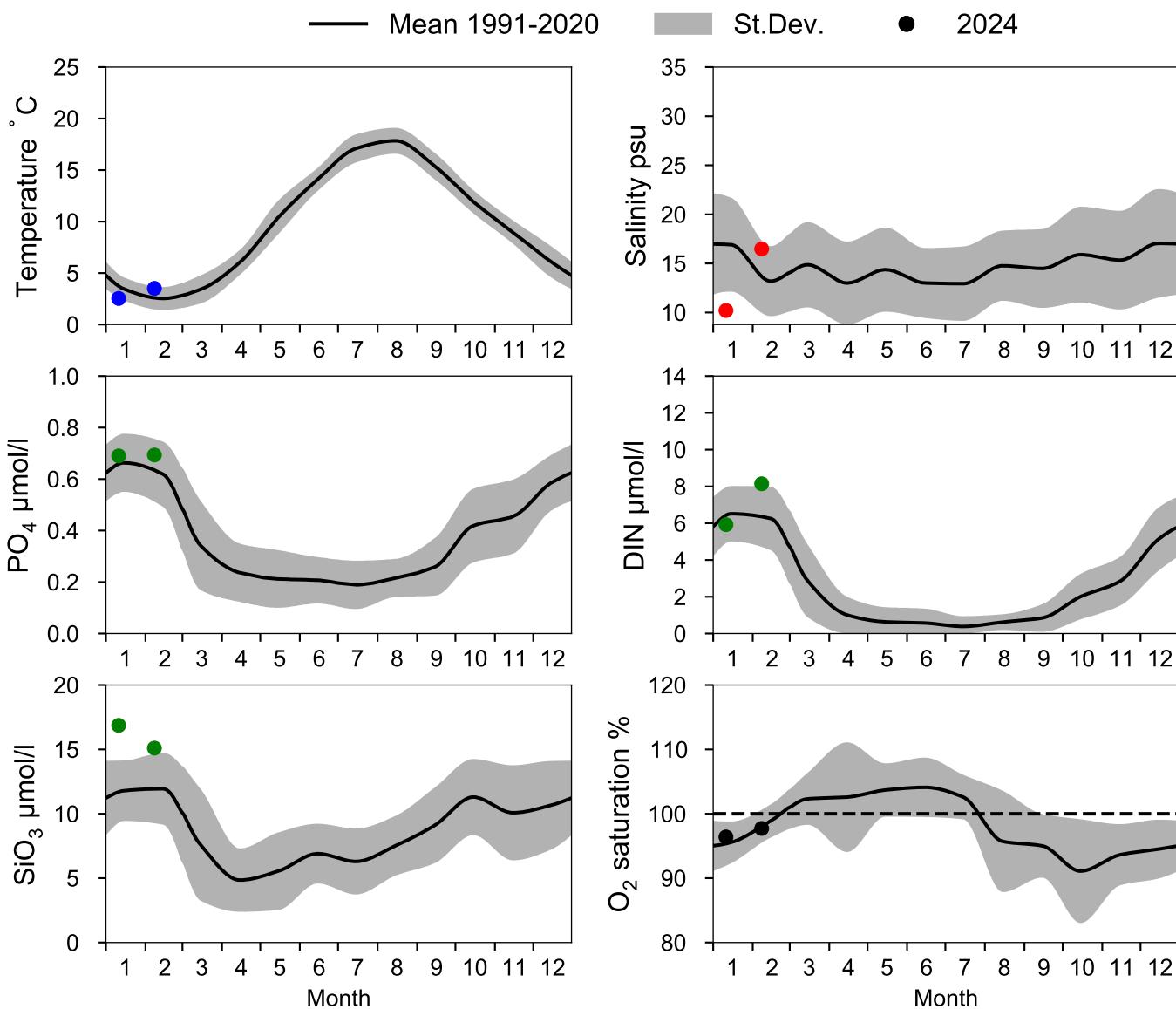
# Vertical profiles ANHOLT E

## February

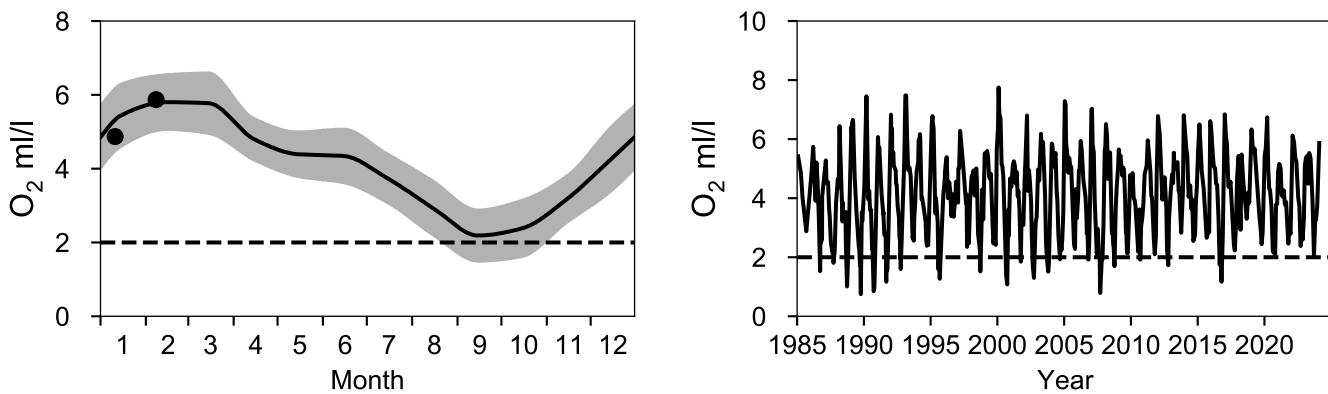


# STATION W LANDSKRONA SURFACE WATER (0-10 m)

Annual Cycles

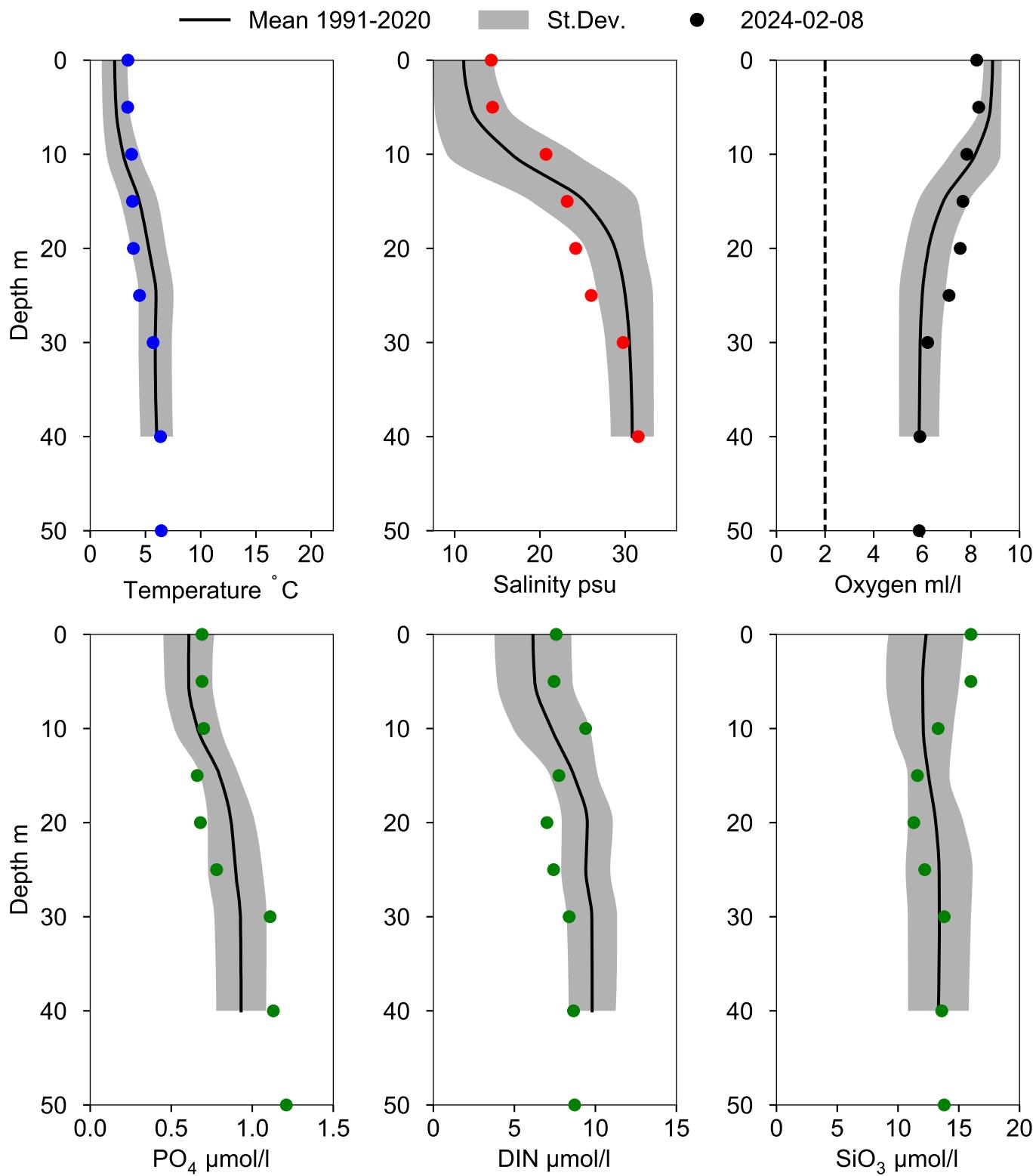


## OXYGEN IN BOTTOM WATER (depth >= 40 m)



# Vertical profiles W LANDSKRONA

## February



# STATION FLINTEN 7 SURFACE WATER (0-10 m)

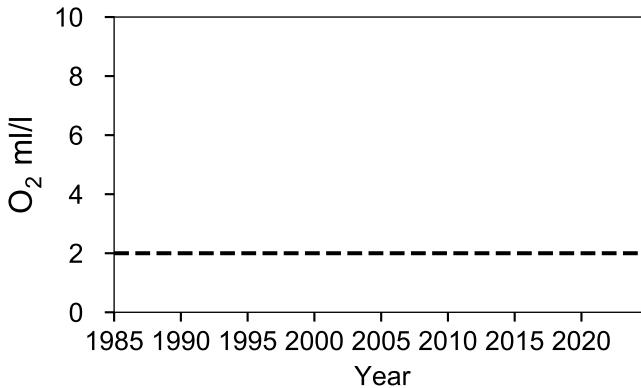
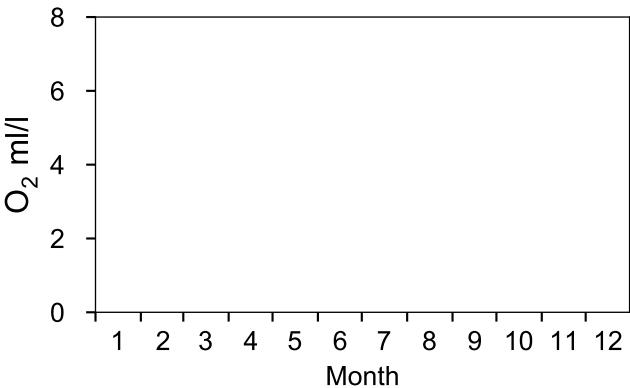
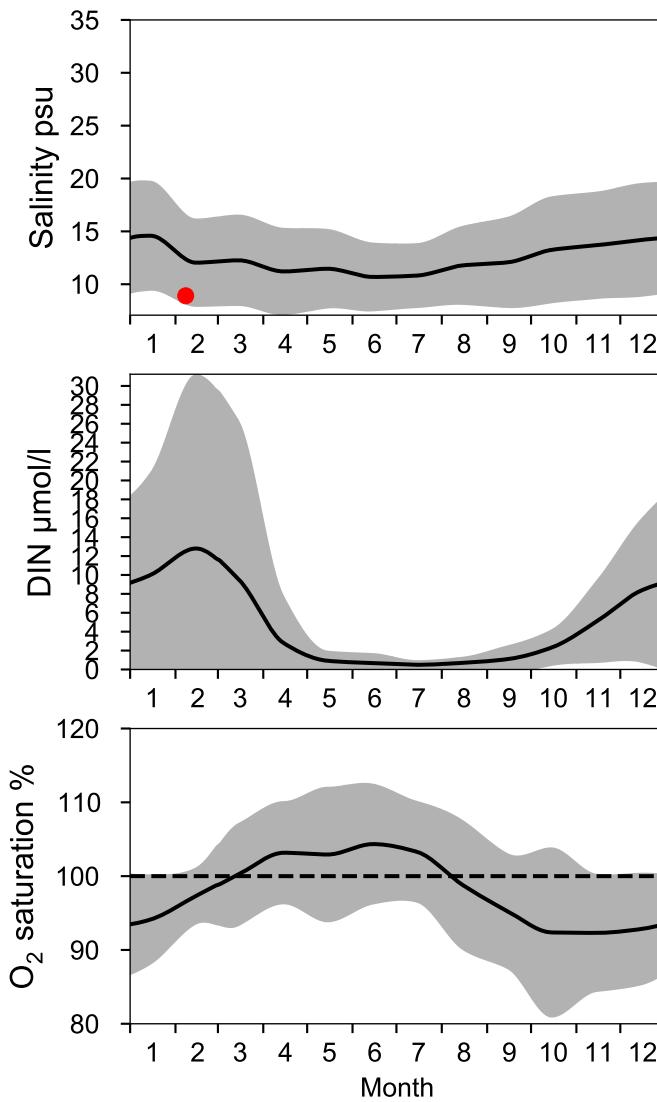
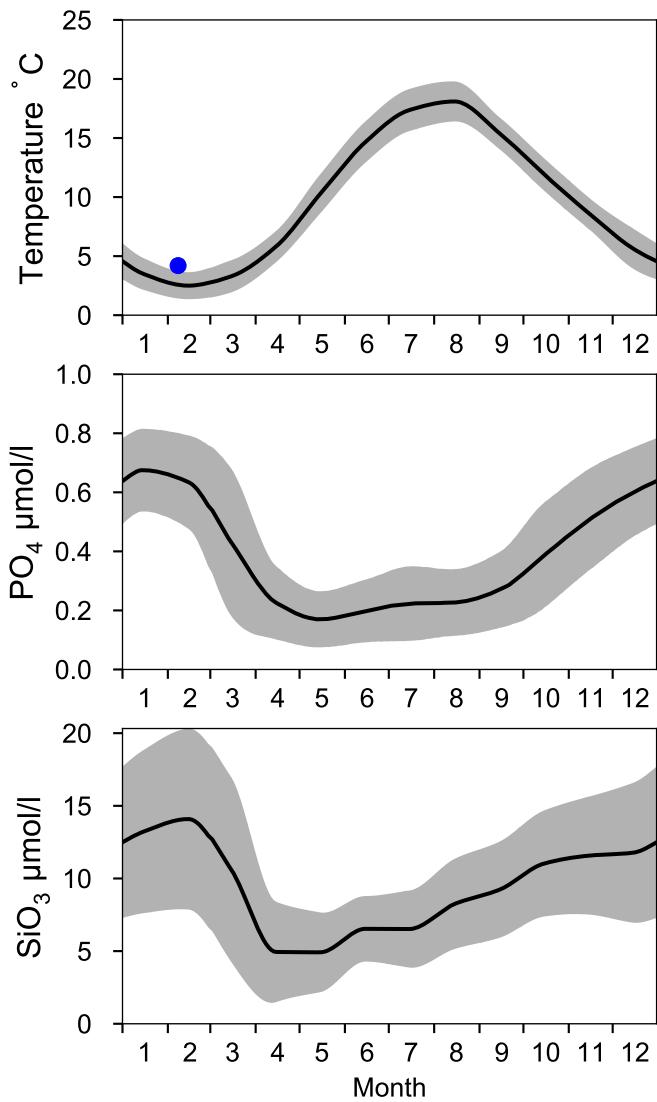
## Annual Cycles

Statistics based on data from: Öresund

— Mean 1991-2020

St.Dev.

● 2024



# Vertical profiles FLINTEN 7

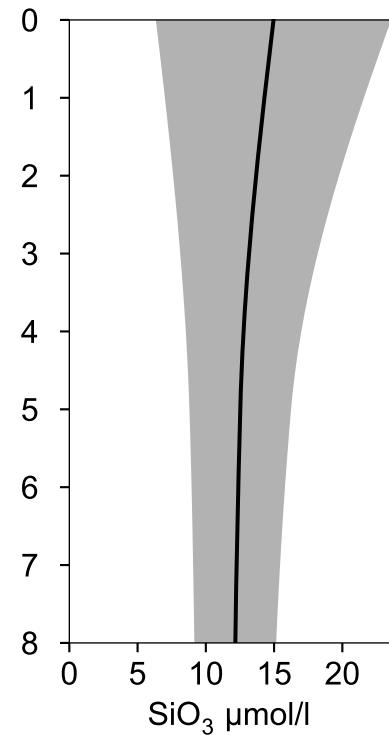
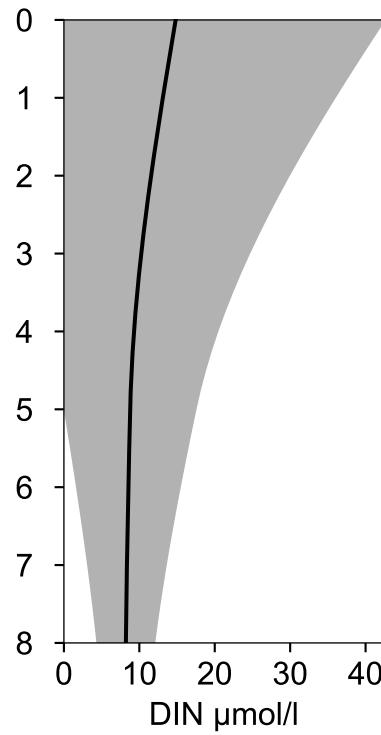
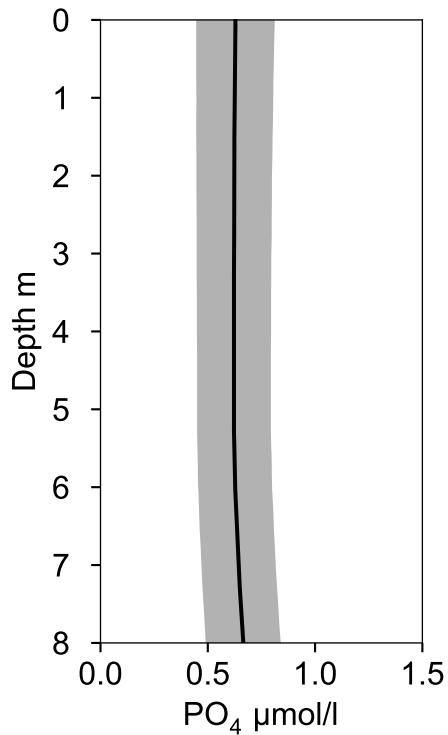
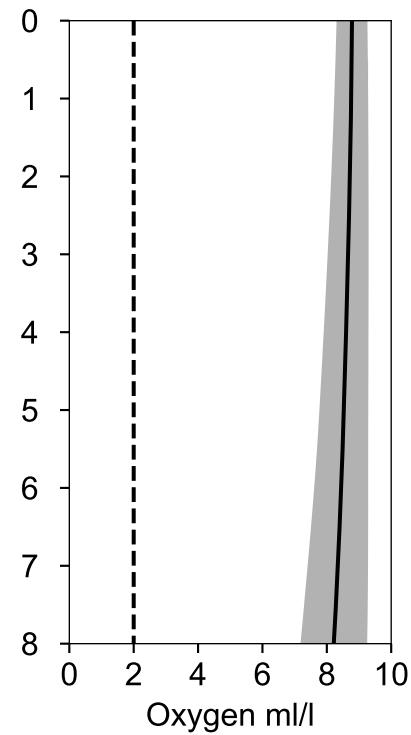
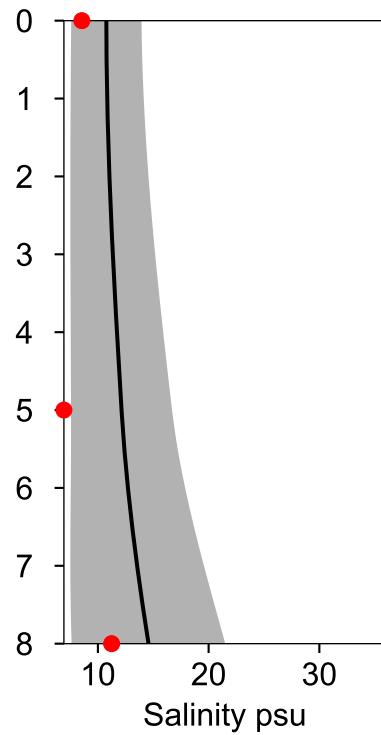
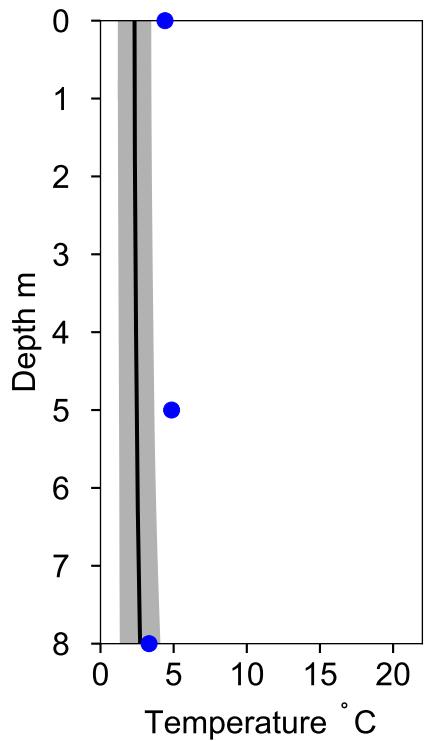
## February

Statistics based on data from: Öresund

— Mean 1991-2020

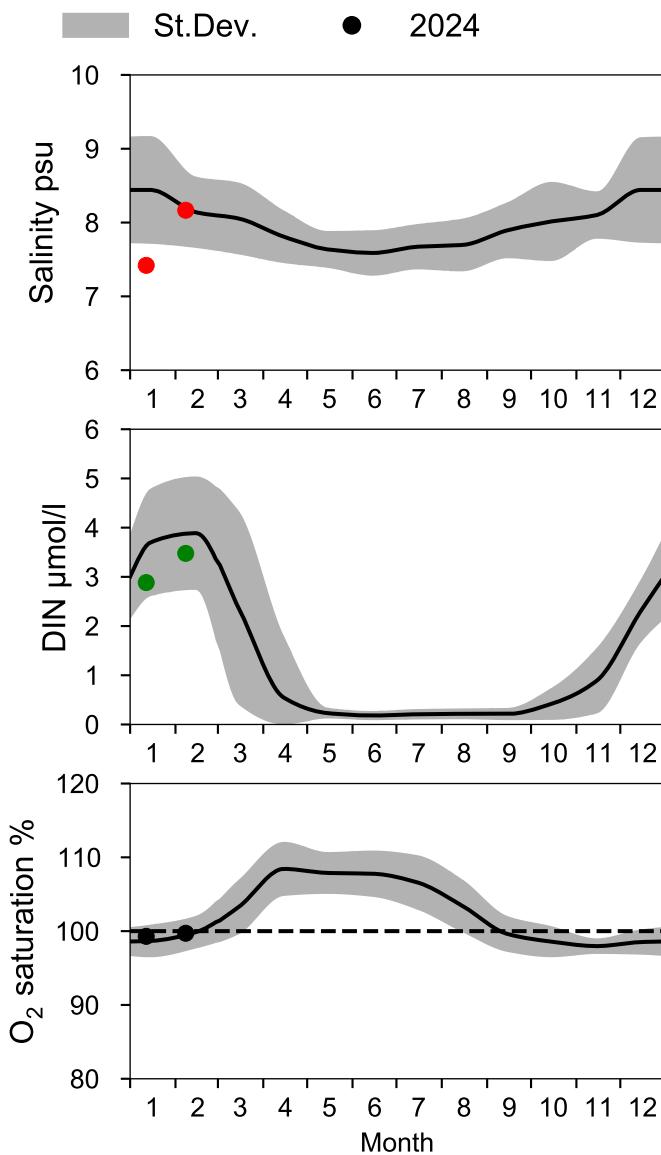
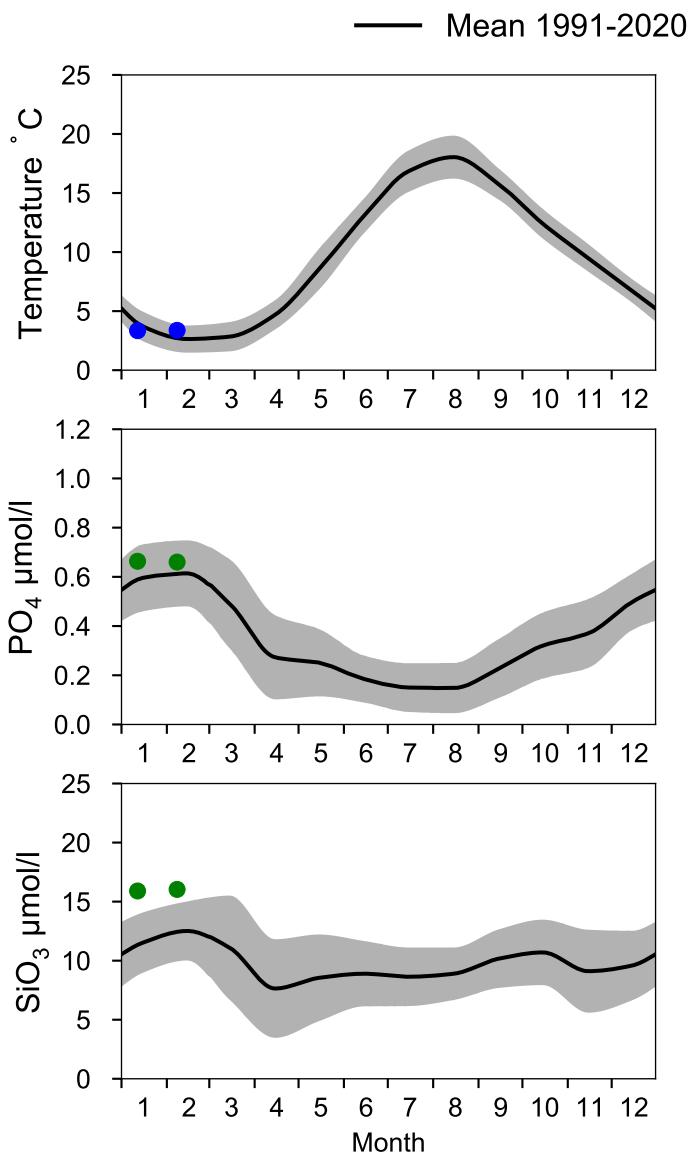
■ St.Dev.

● 2024-02-08

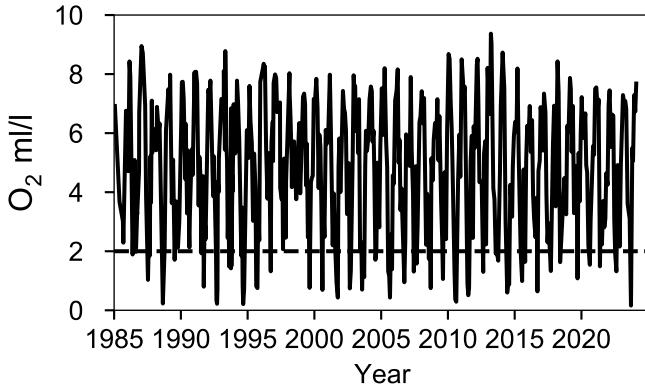
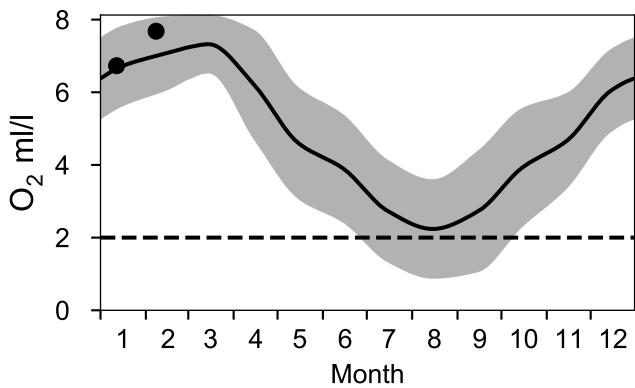


# STATION BY1 SURFACE WATER (0-10 m)

Annual Cycles

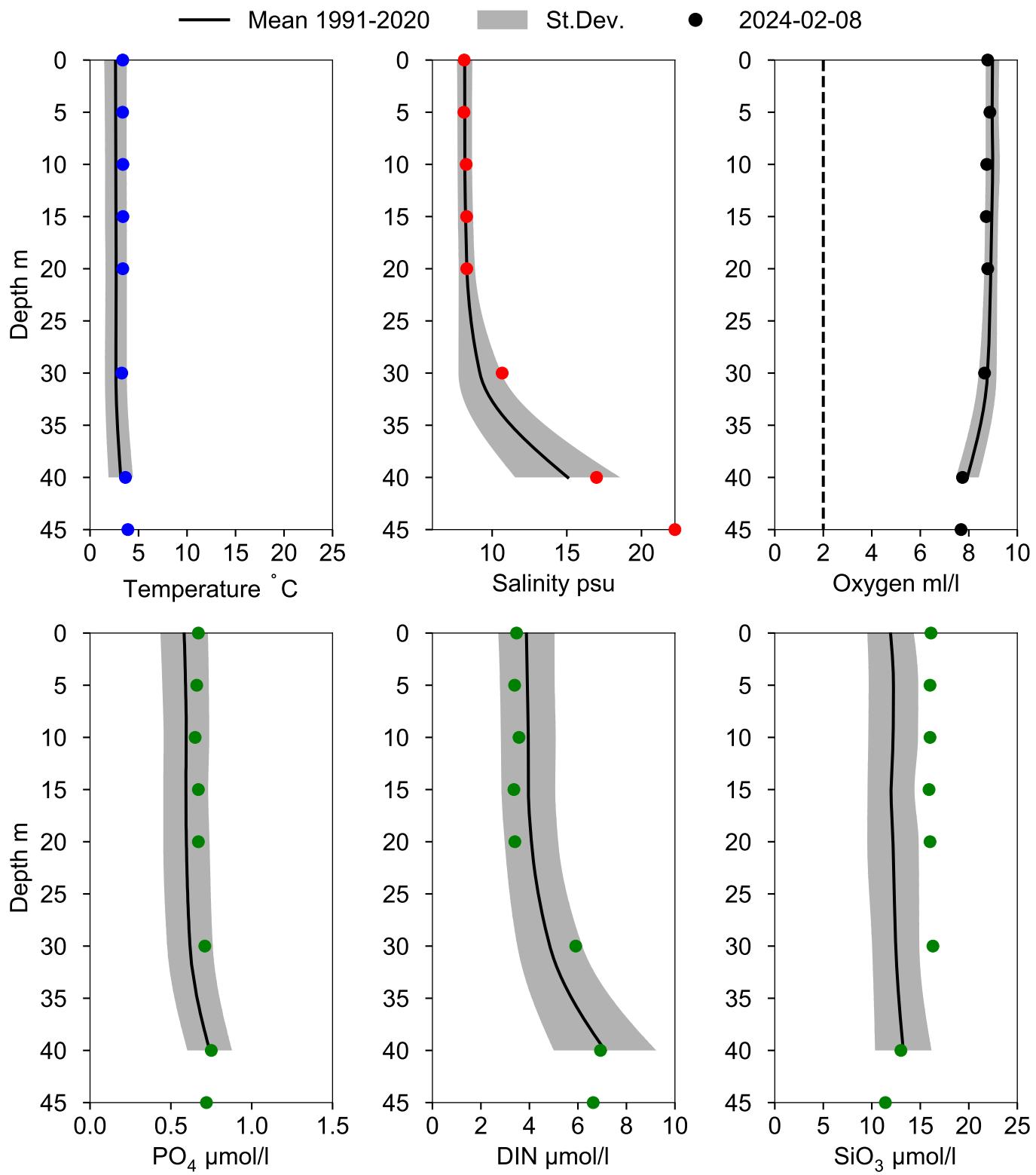


## OXYGEN IN BOTTOM WATER (depth >= 39 m)



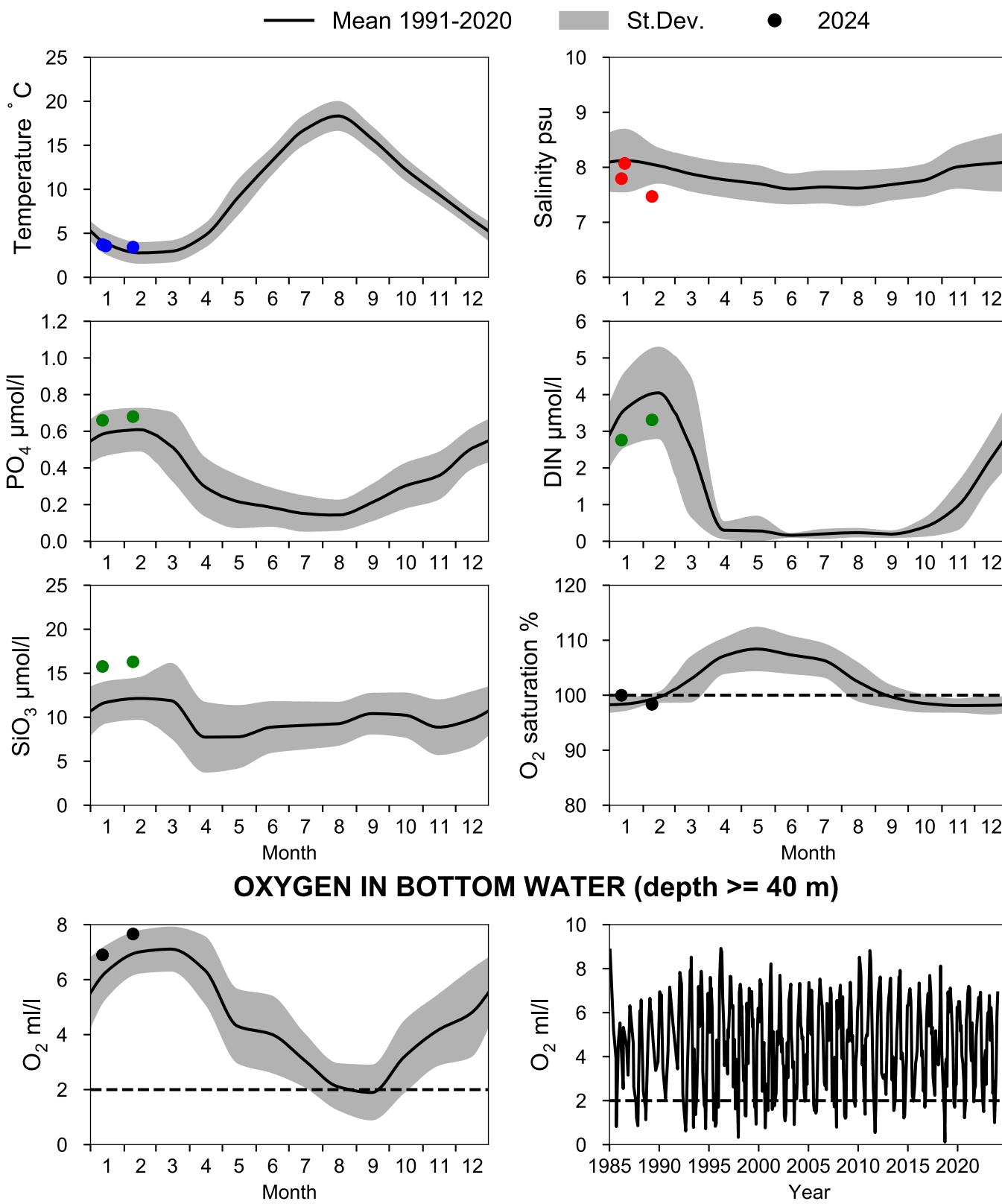
# Vertical profiles BY1

## February

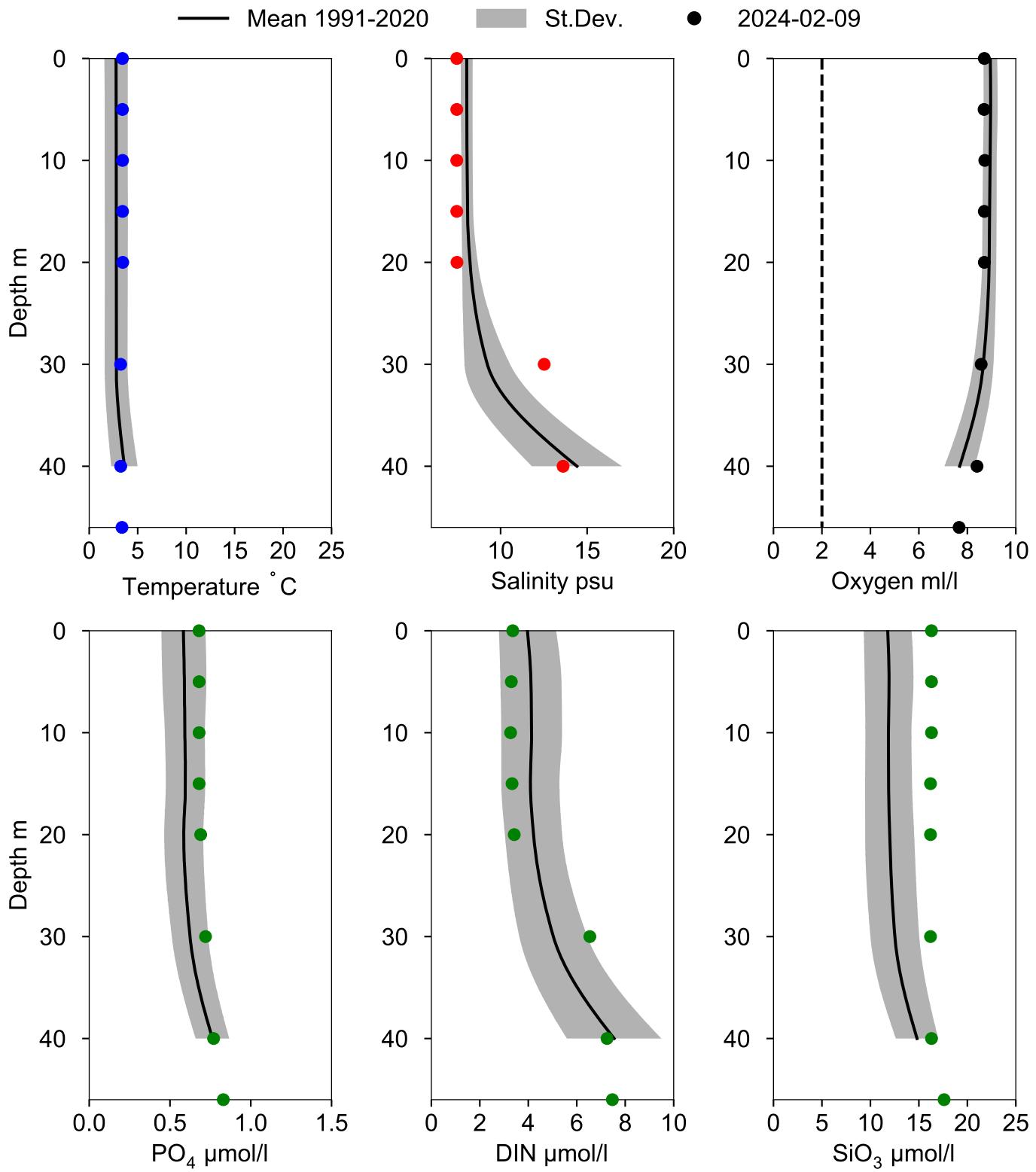


# STATION BY2 ARKONA SURFACE WATER (0-10 m)

Annual Cycles



# Vertical profiles BY2 ARKONA February



# STATION INFLOW 1 SURFACE WATER (0-10 m)

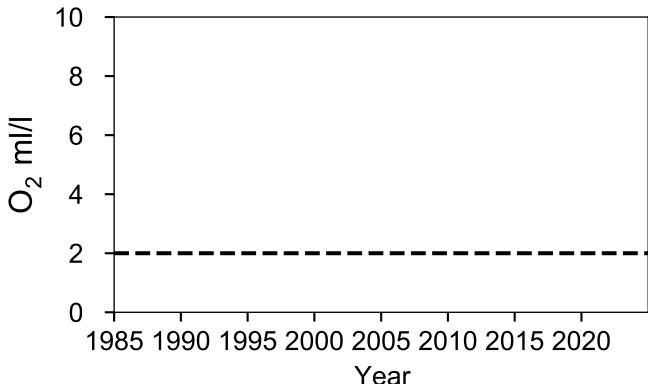
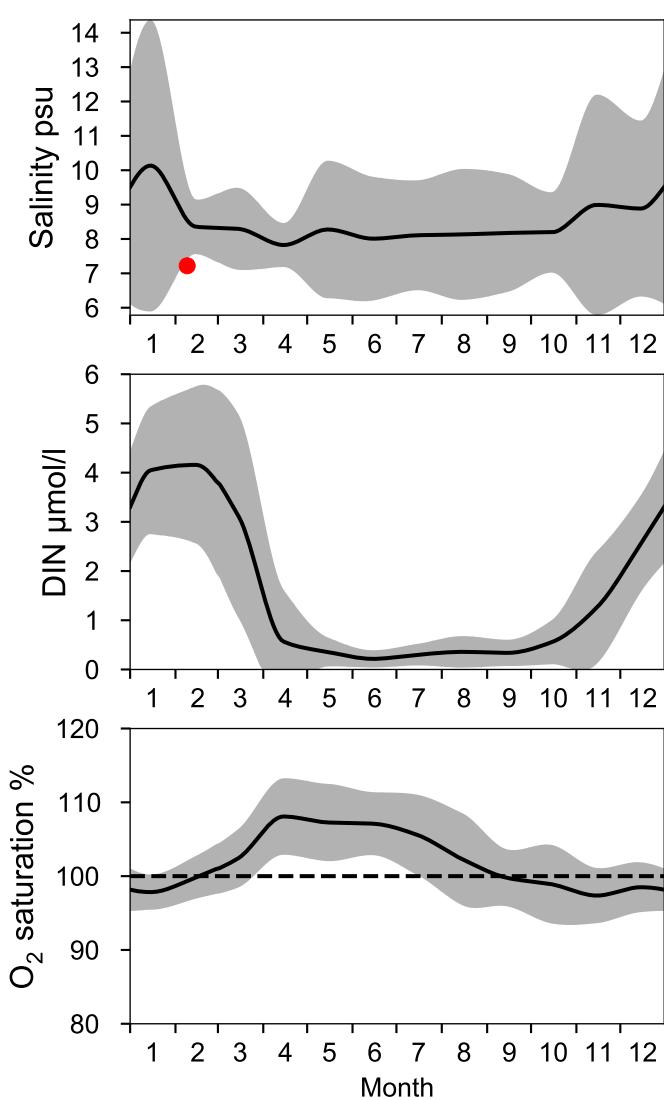
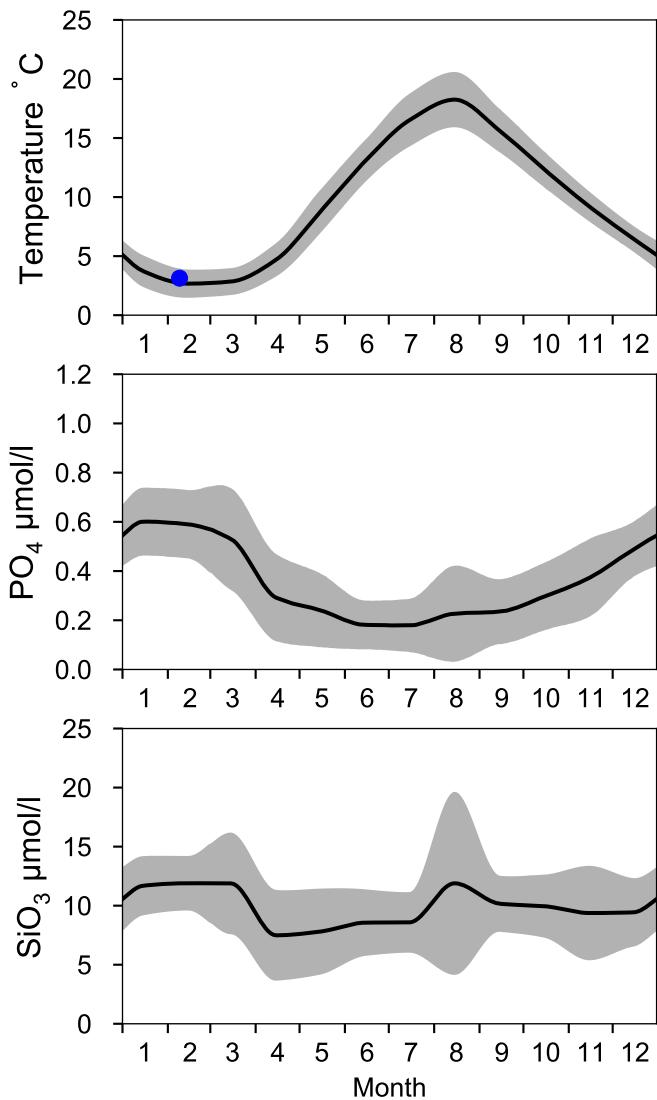
## Annual Cycles

Statistics based on data from: Arkonahavet

— Mean 1991-2020

■ St.Dev.

● 2024



# Vertical profiles INFLOW 1

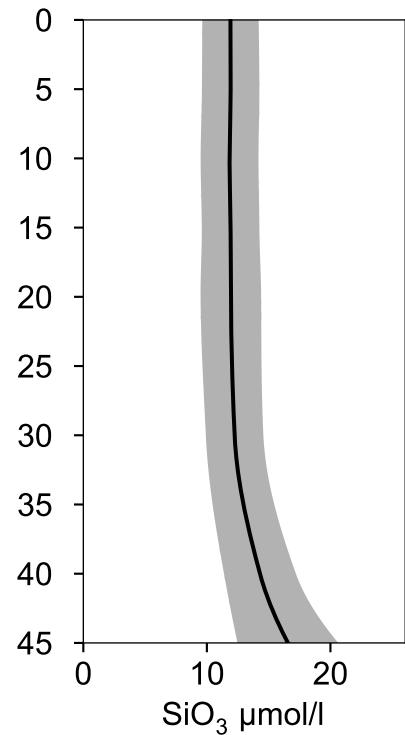
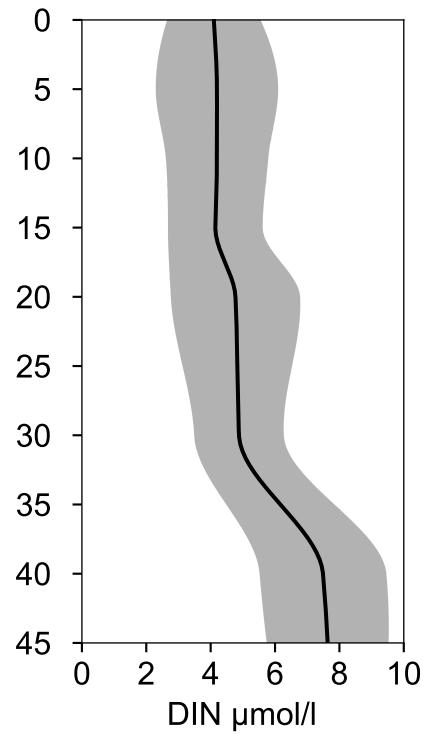
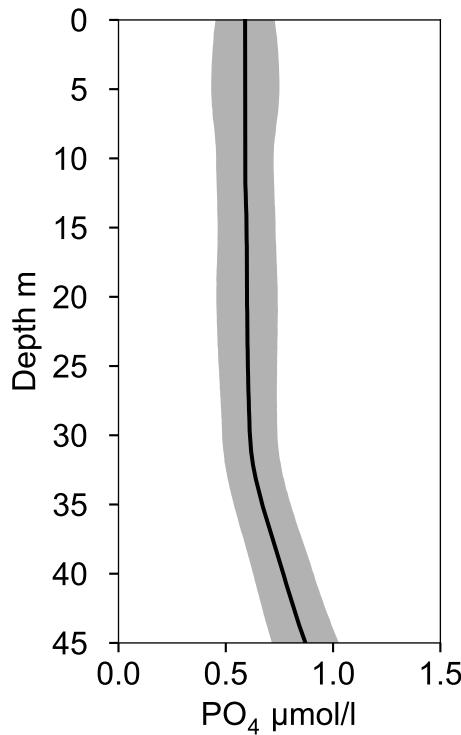
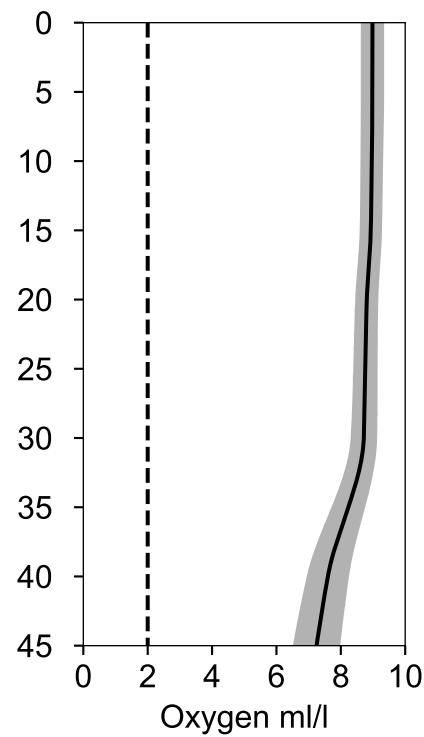
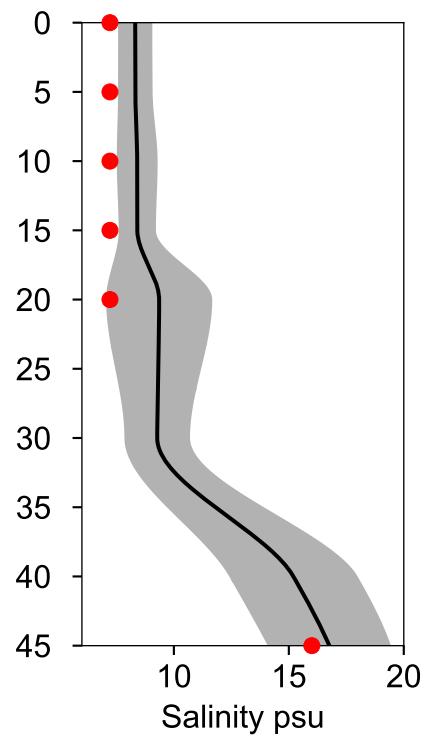
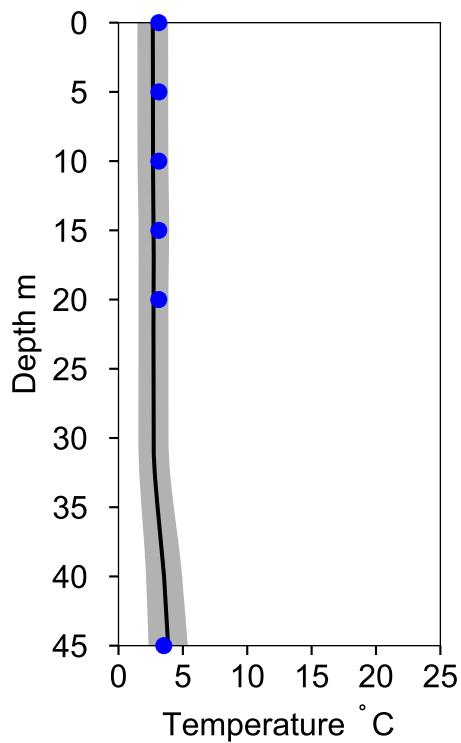
## February

Statistics based on data from: Arkonahavet

— Mean 1991-2020

■ St.Dev.

● 2024-02-09



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

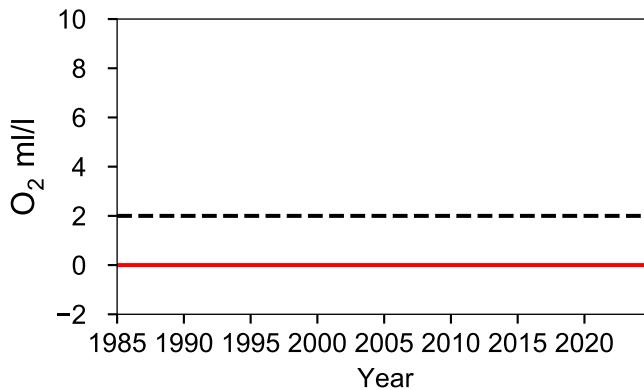
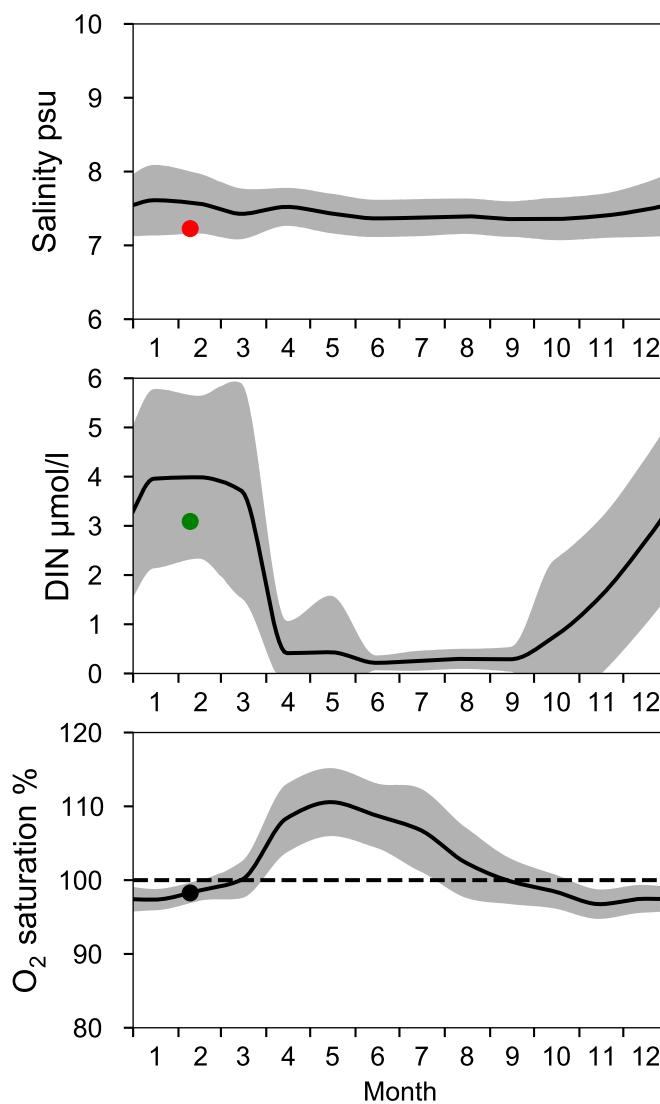
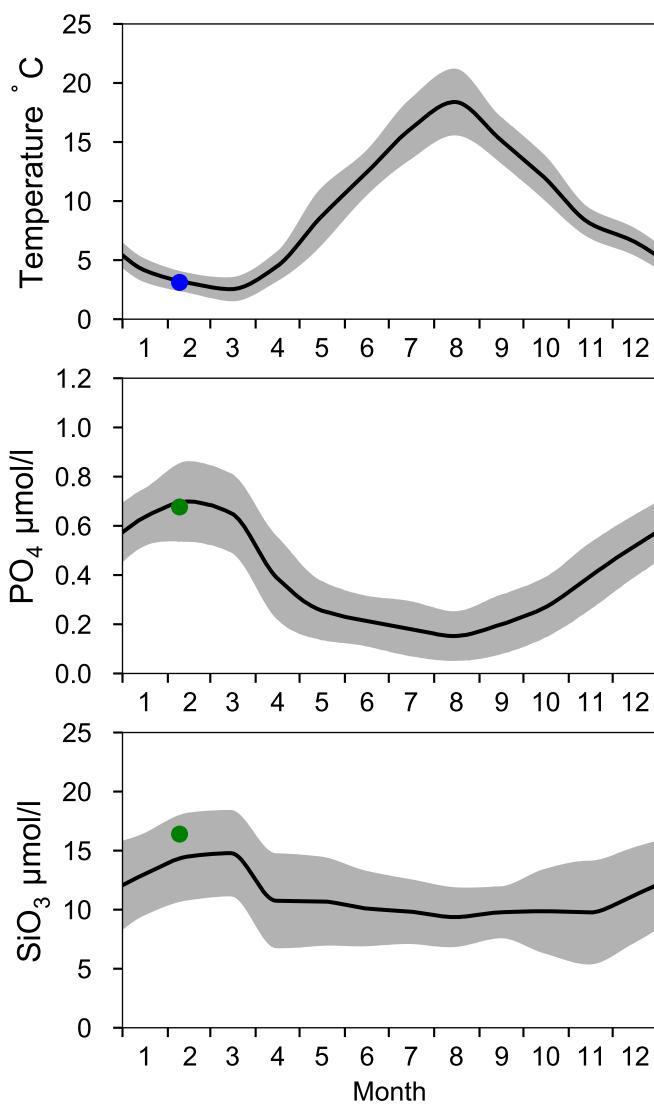
## Annual Cycles

Statistics based on data from: Bornholmshavet

— Mean 1991-2020

St.Dev.

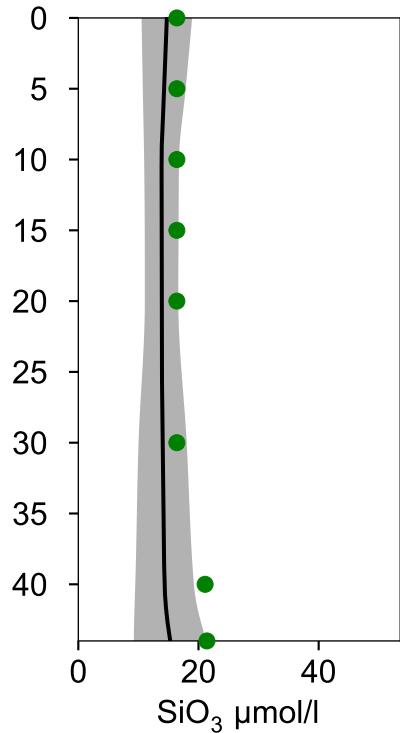
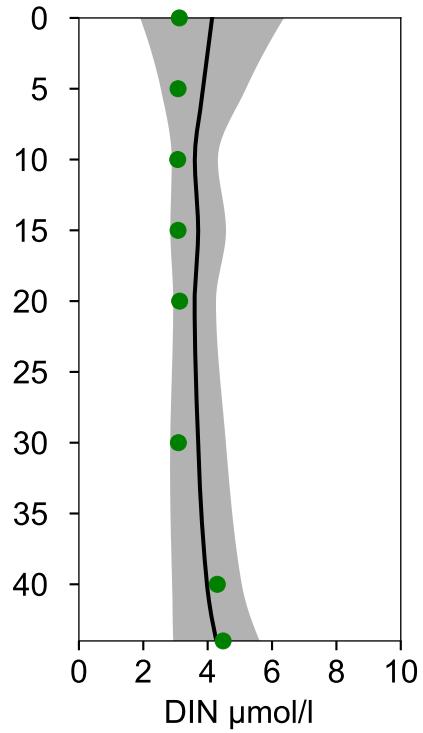
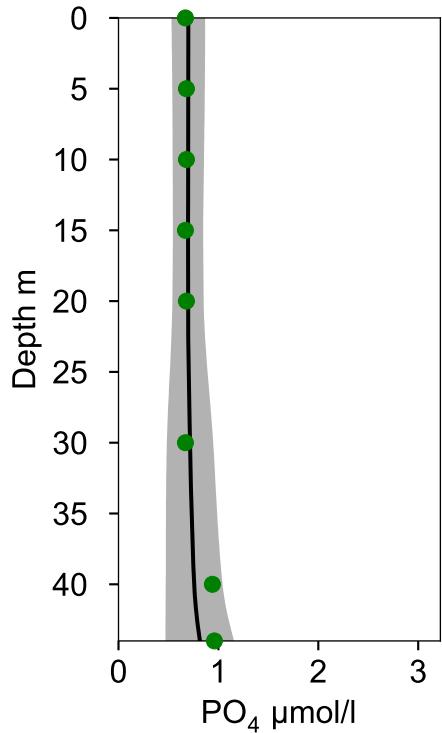
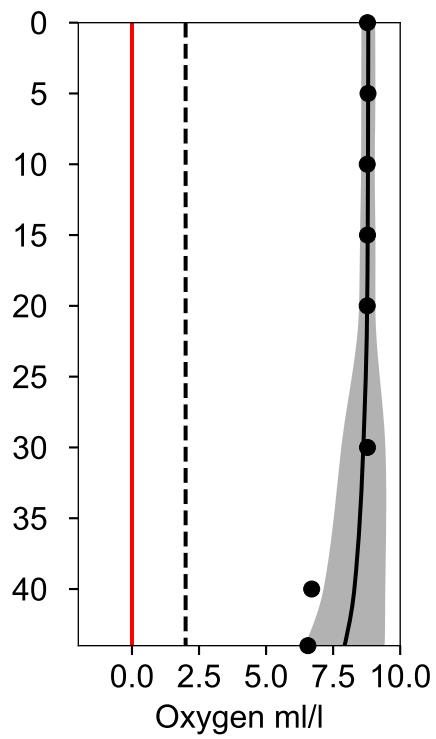
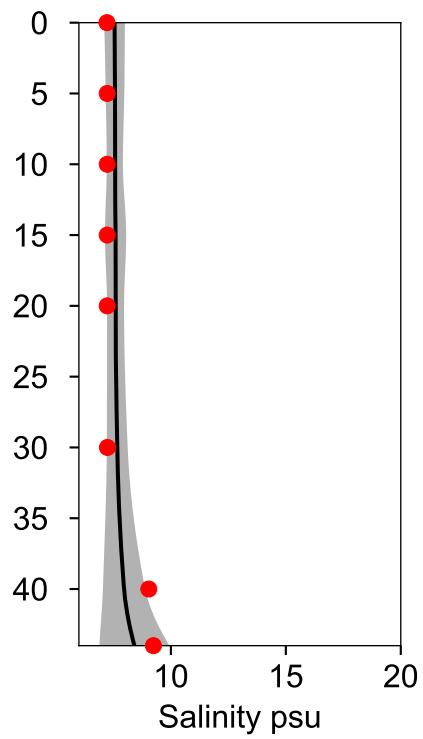
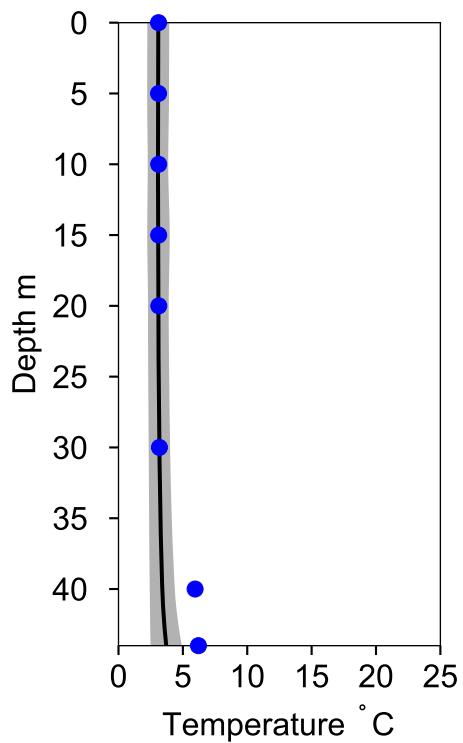
● 2024



# 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)

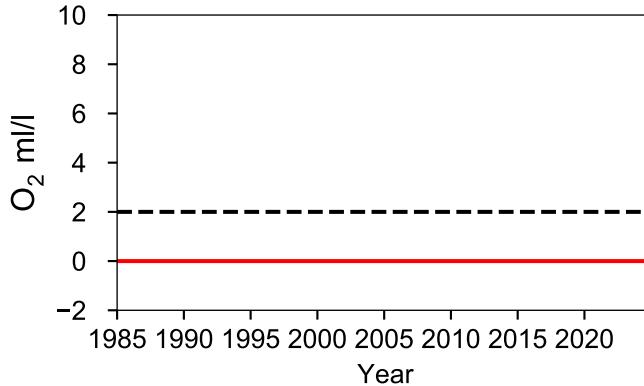
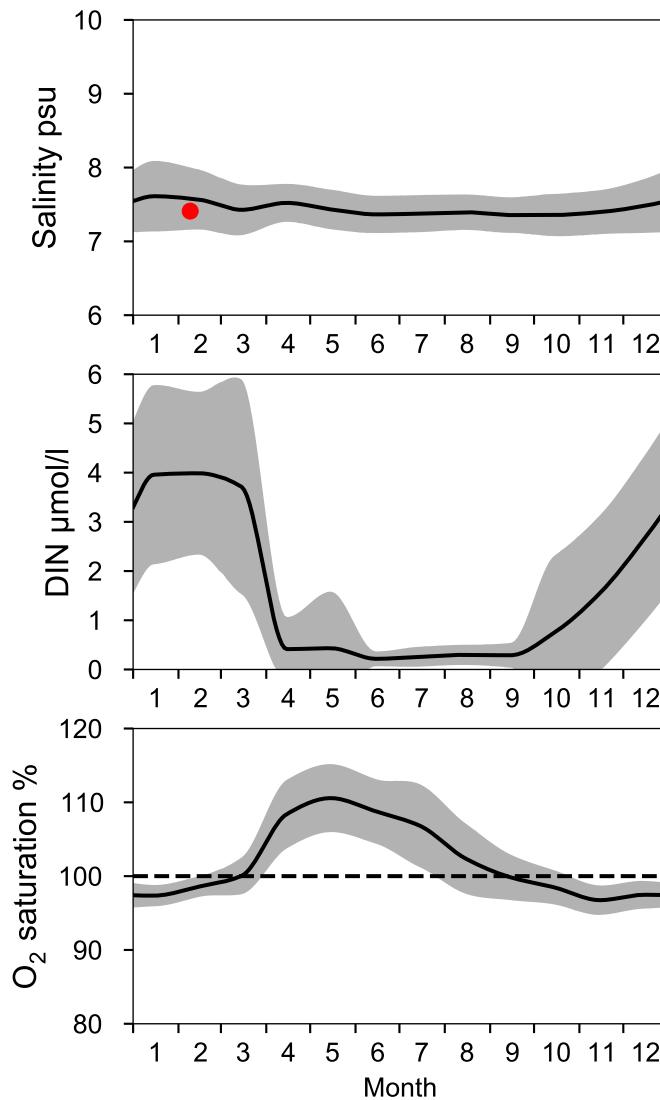
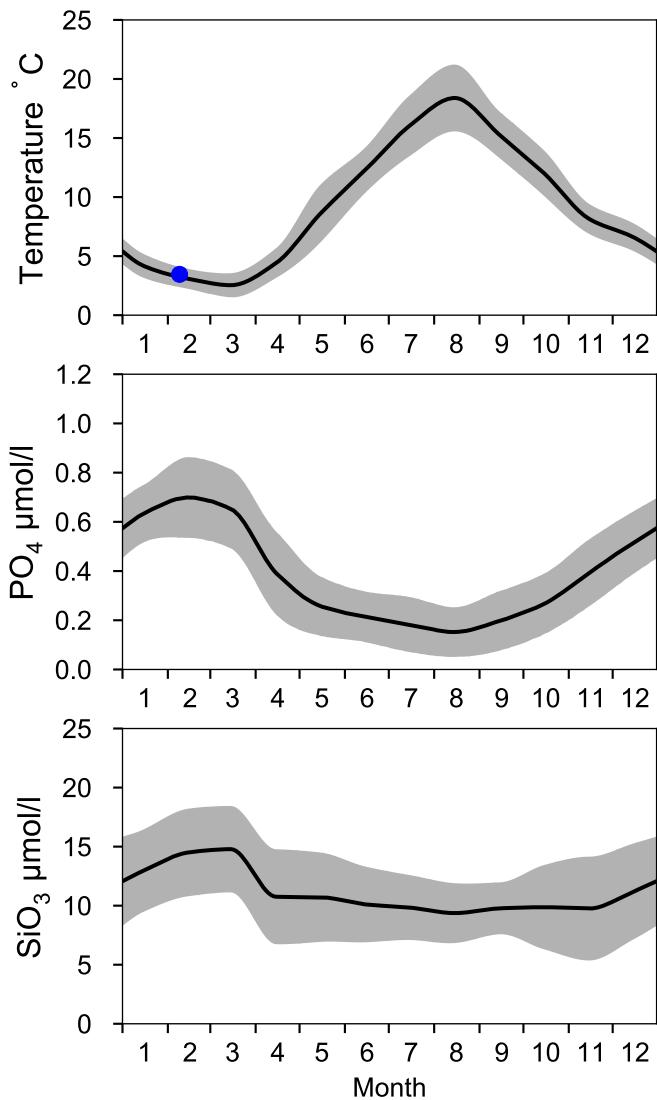
## Annual Cycles

Statistics based on data from: Bornholmshavet

— Mean 1991-2020

St.Dev.

● 2024



# Vertical profiles INFLOW 3

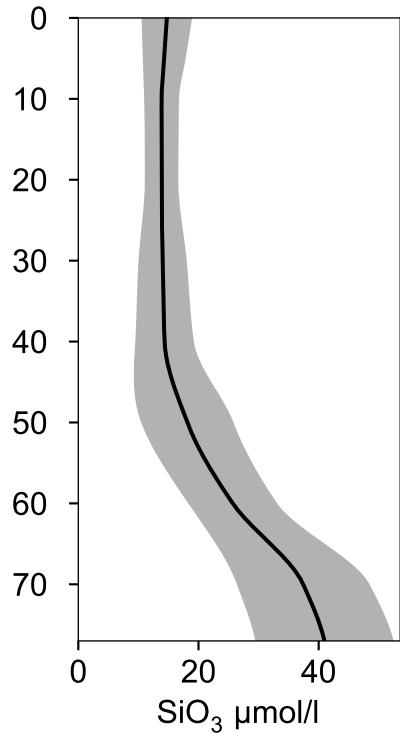
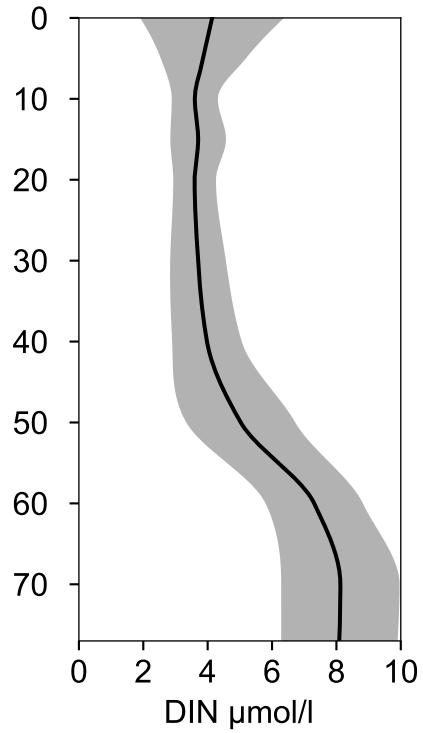
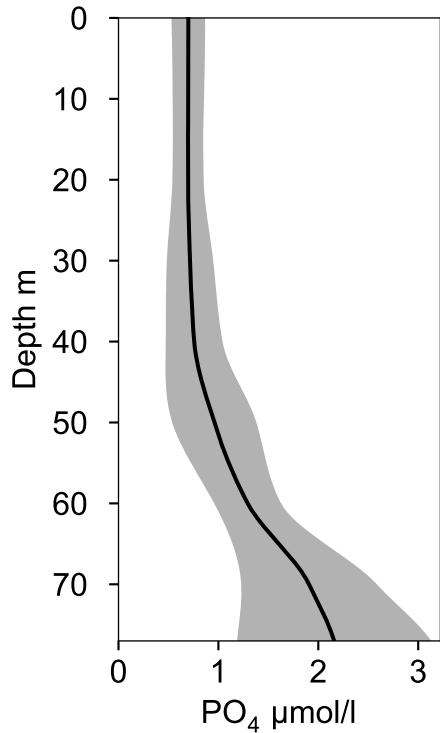
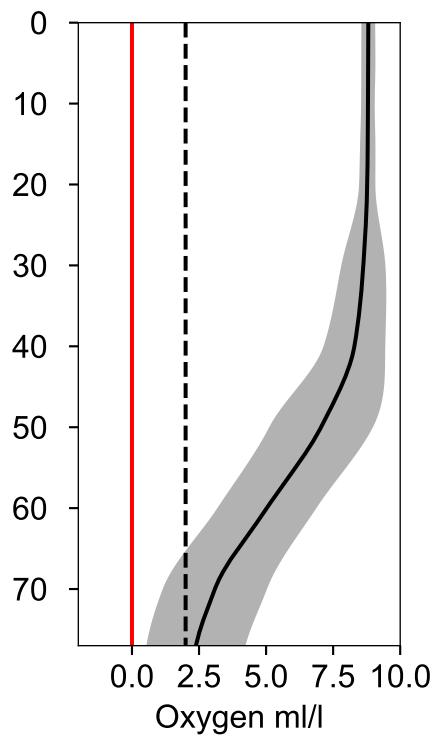
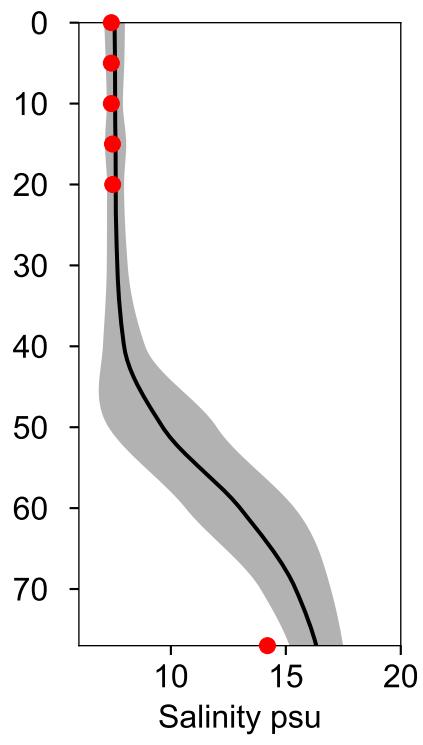
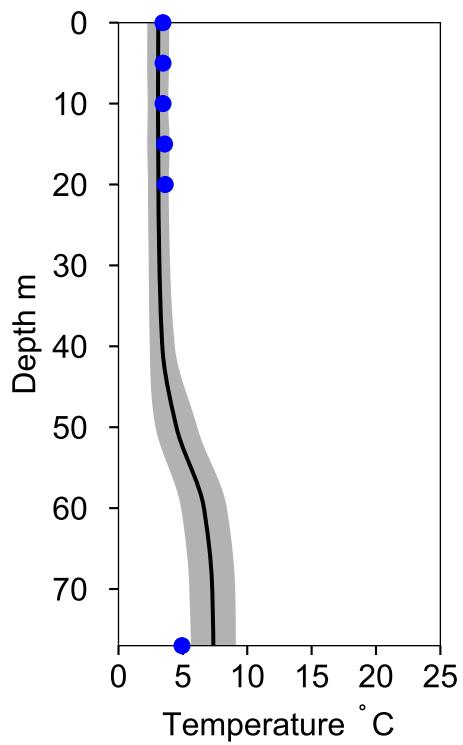
## February

Statistics based on data from: Bornholmshavet

— Mean 1991-2020

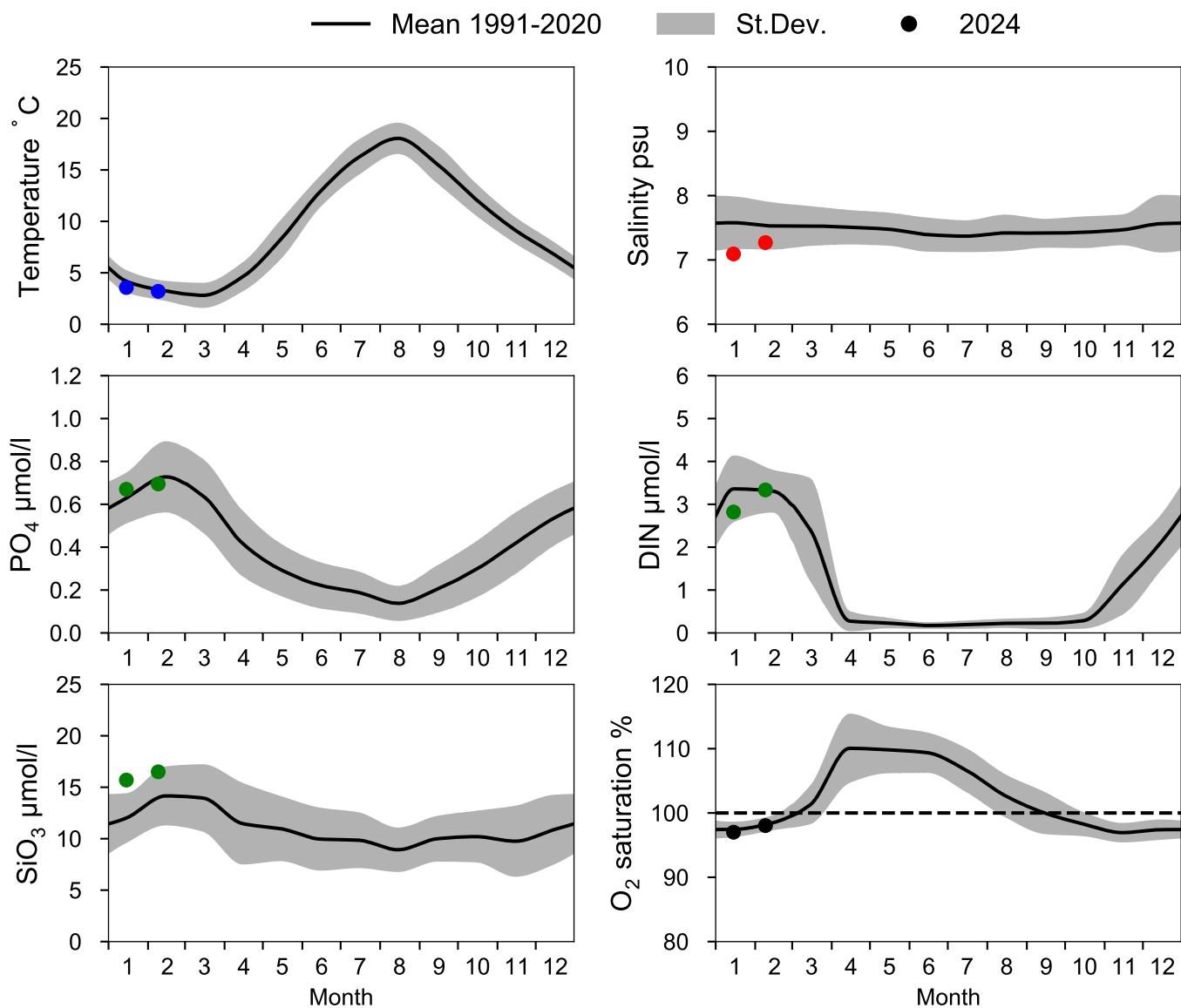
■ St.Dev.

● 2024-02-09

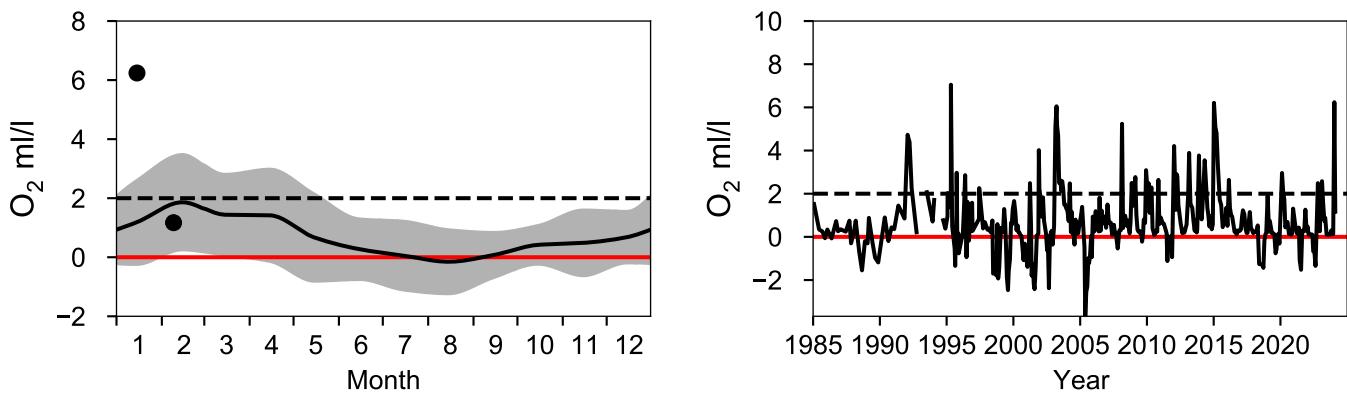


# STATION HANÖBUKTEN SURFACE WATER (0-10 m)

Annual Cycles

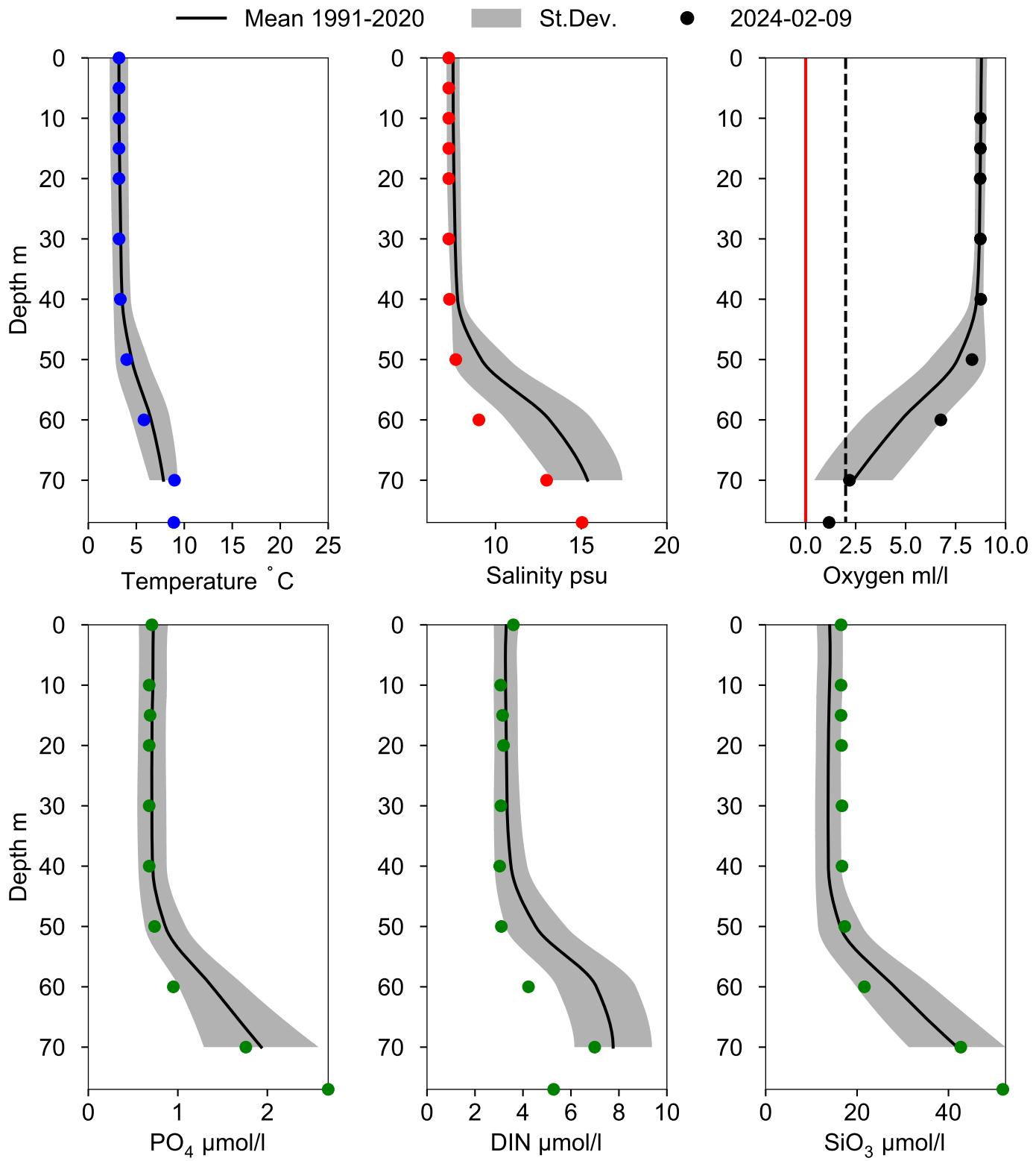


## OXYGEN IN BOTTOM WATER (depth >= 70 m)



# Vertical profiles HANÖBUKTEN

## February



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

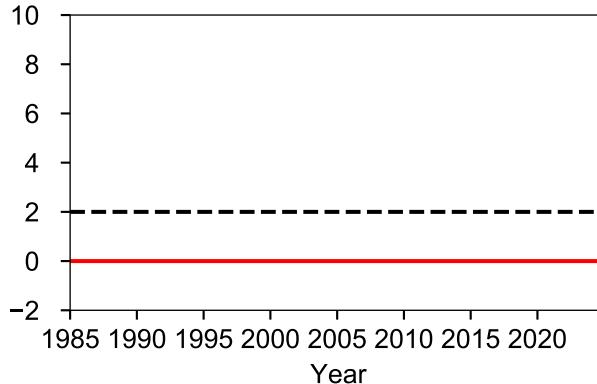
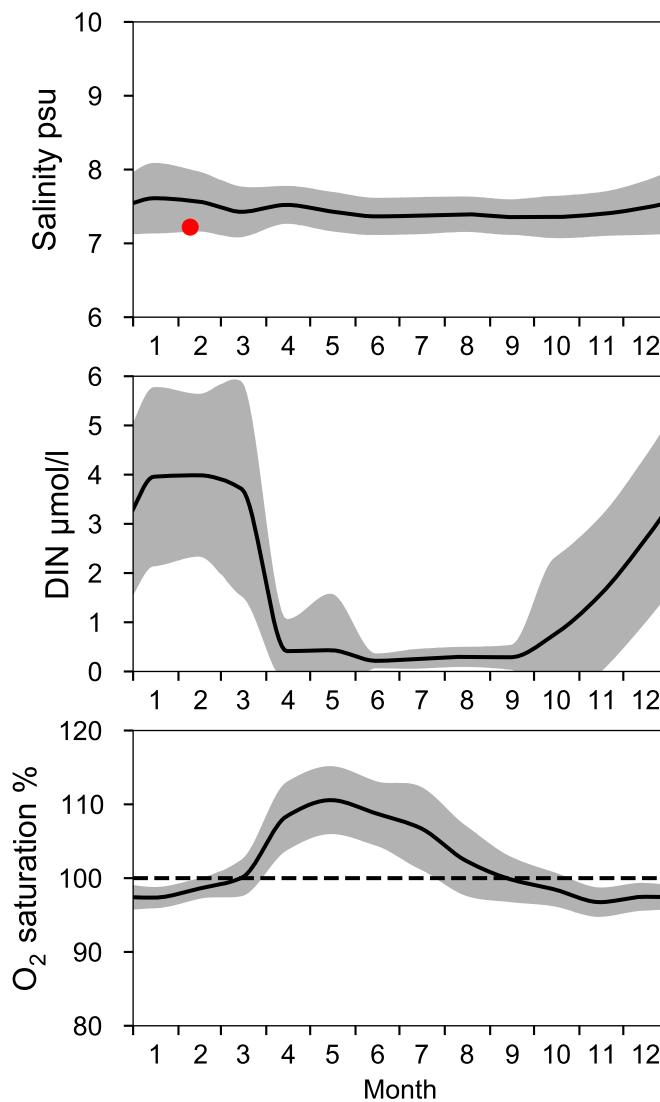
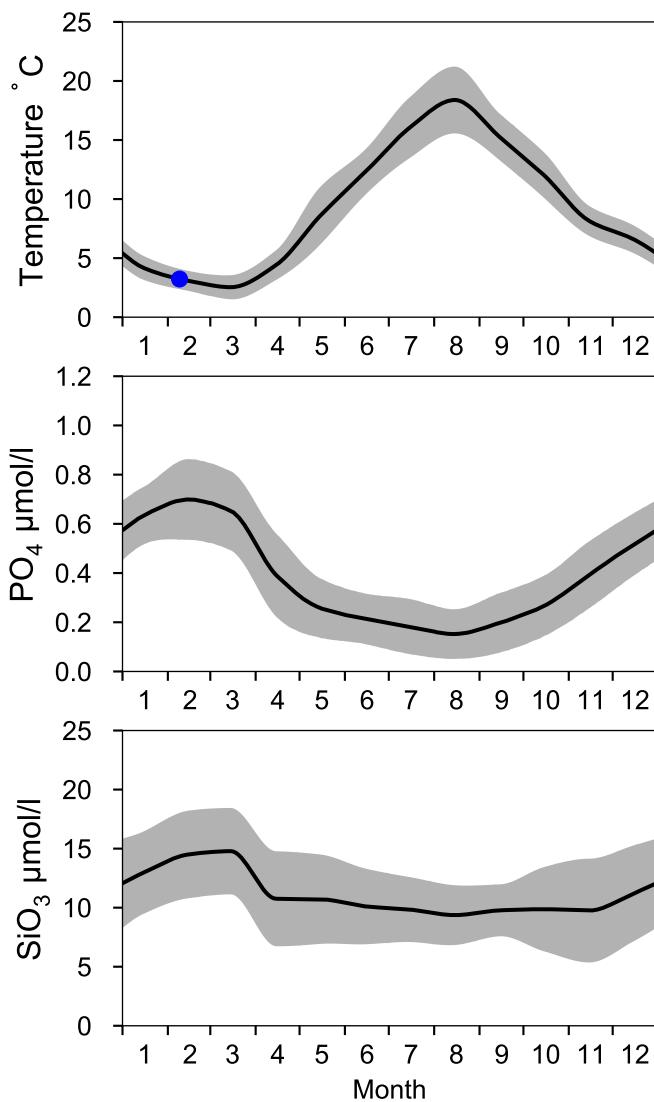
## Annual Cycles

Statistics based on data from: Bornholmshavet

— Mean 1991-2020

St.Dev.

● 2024

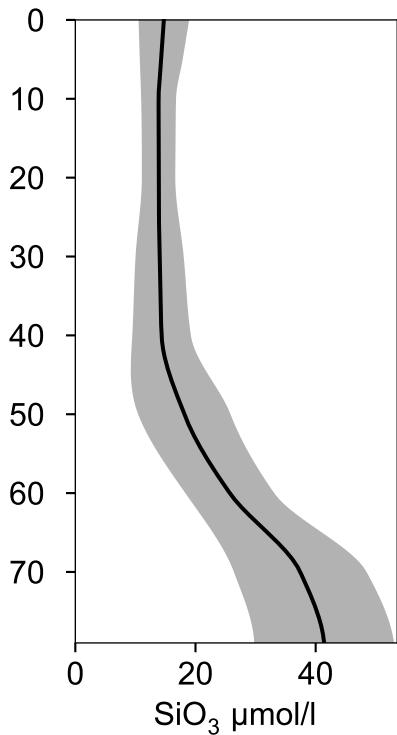
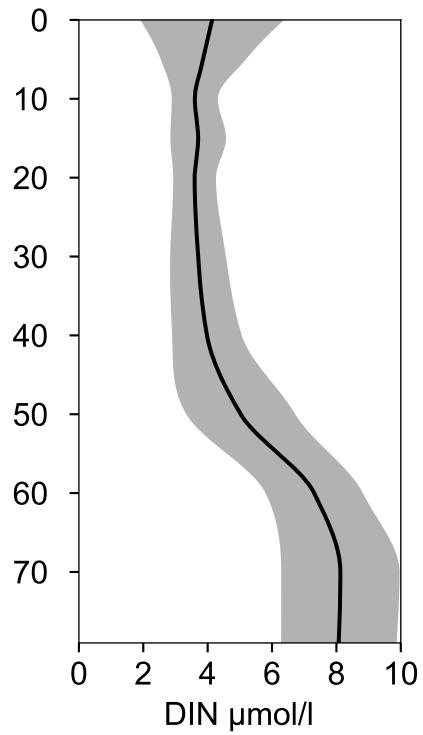
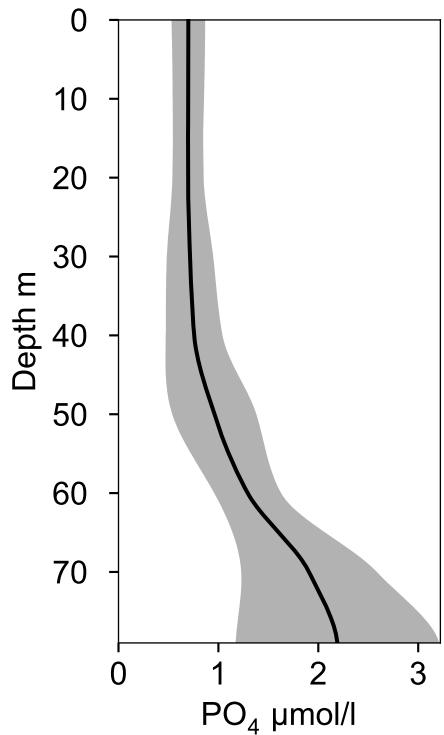
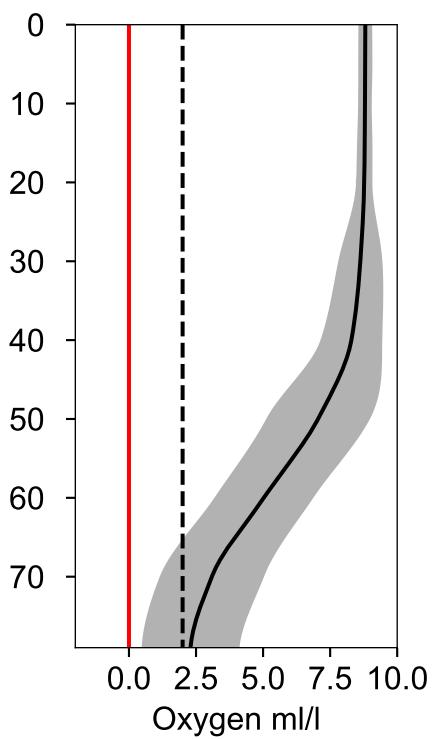
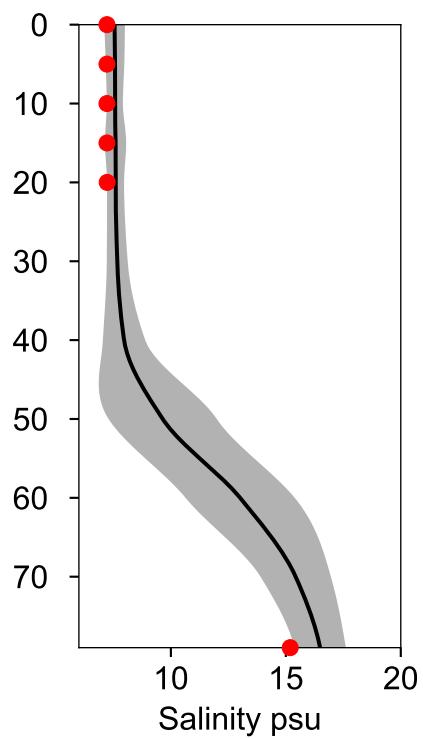
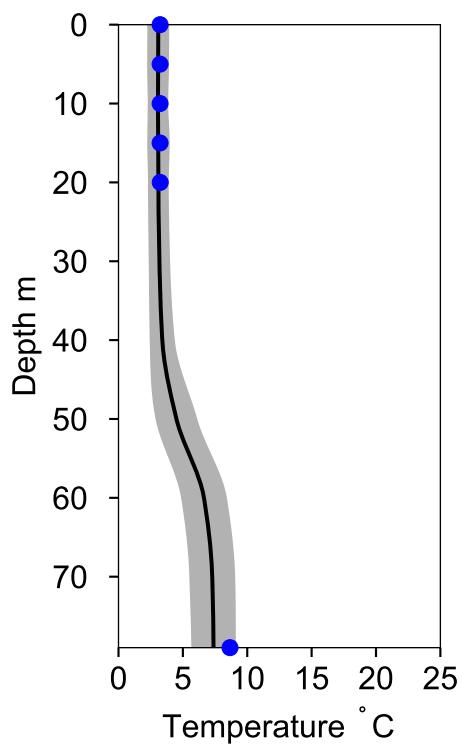


# Vertical profiles INFLOW-4

## February

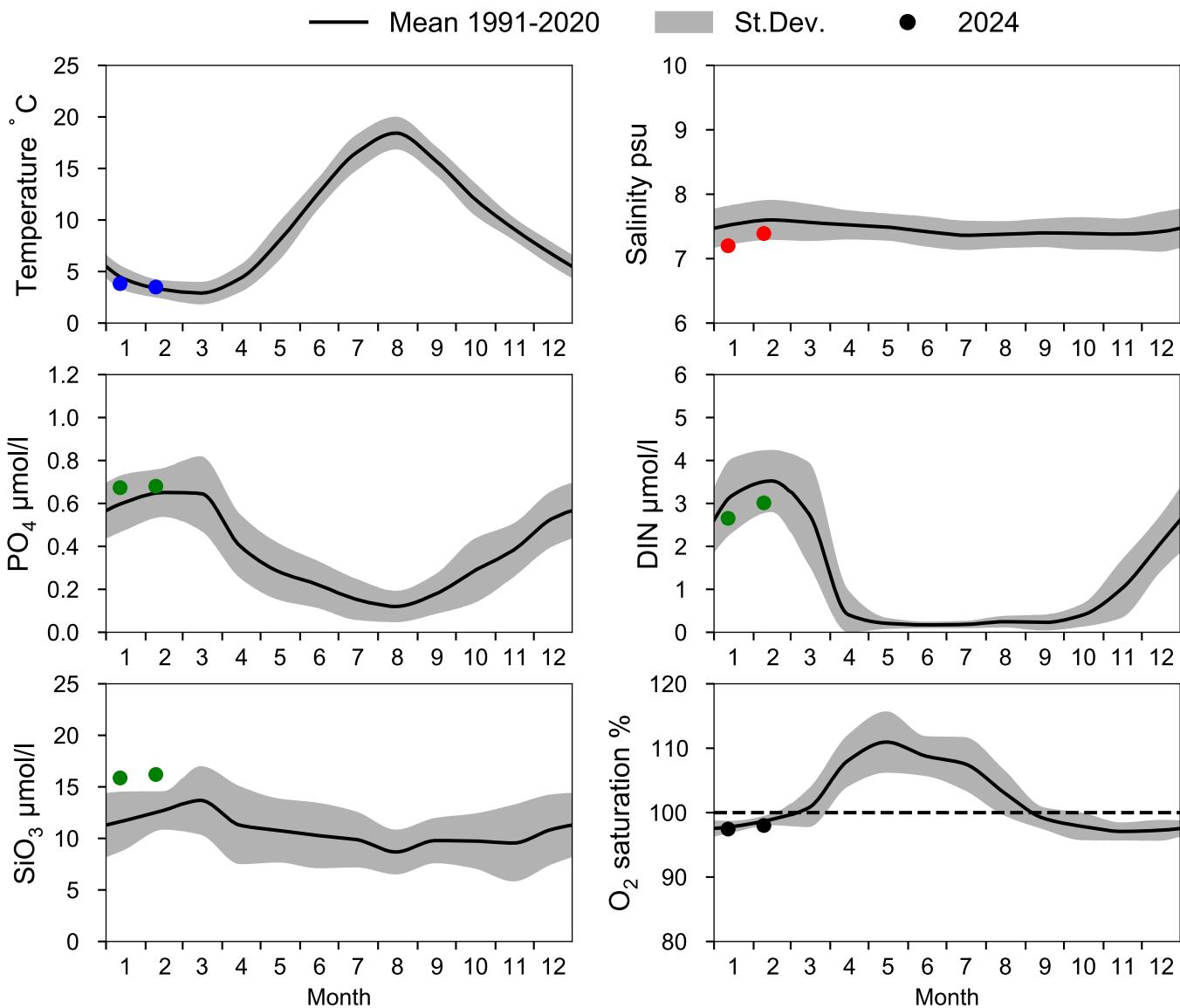
Statistics based on data from: Bornholmshavet

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

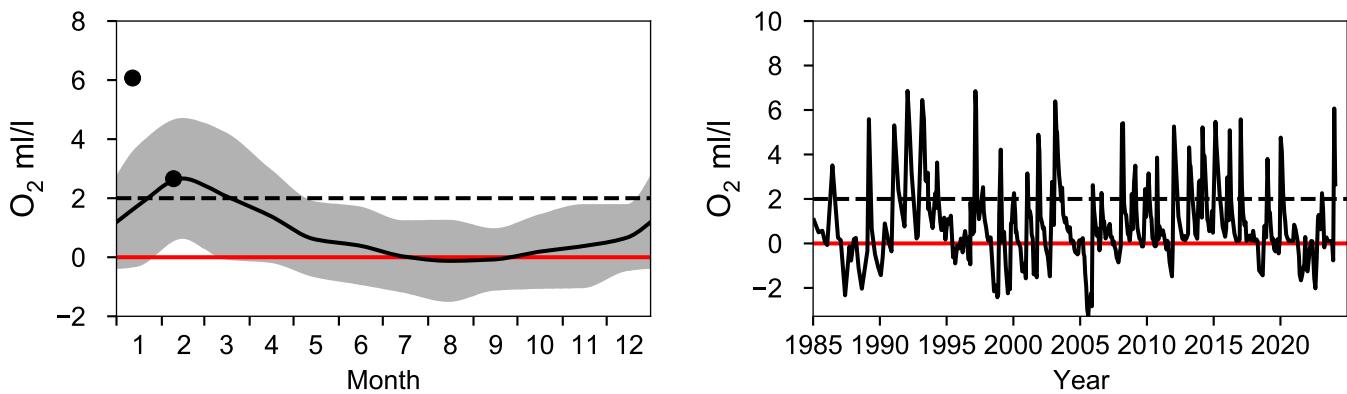


# STATION BY4 CHRISTIANSÖ SURFACE WATER (0-10 m)

Annual Cycles

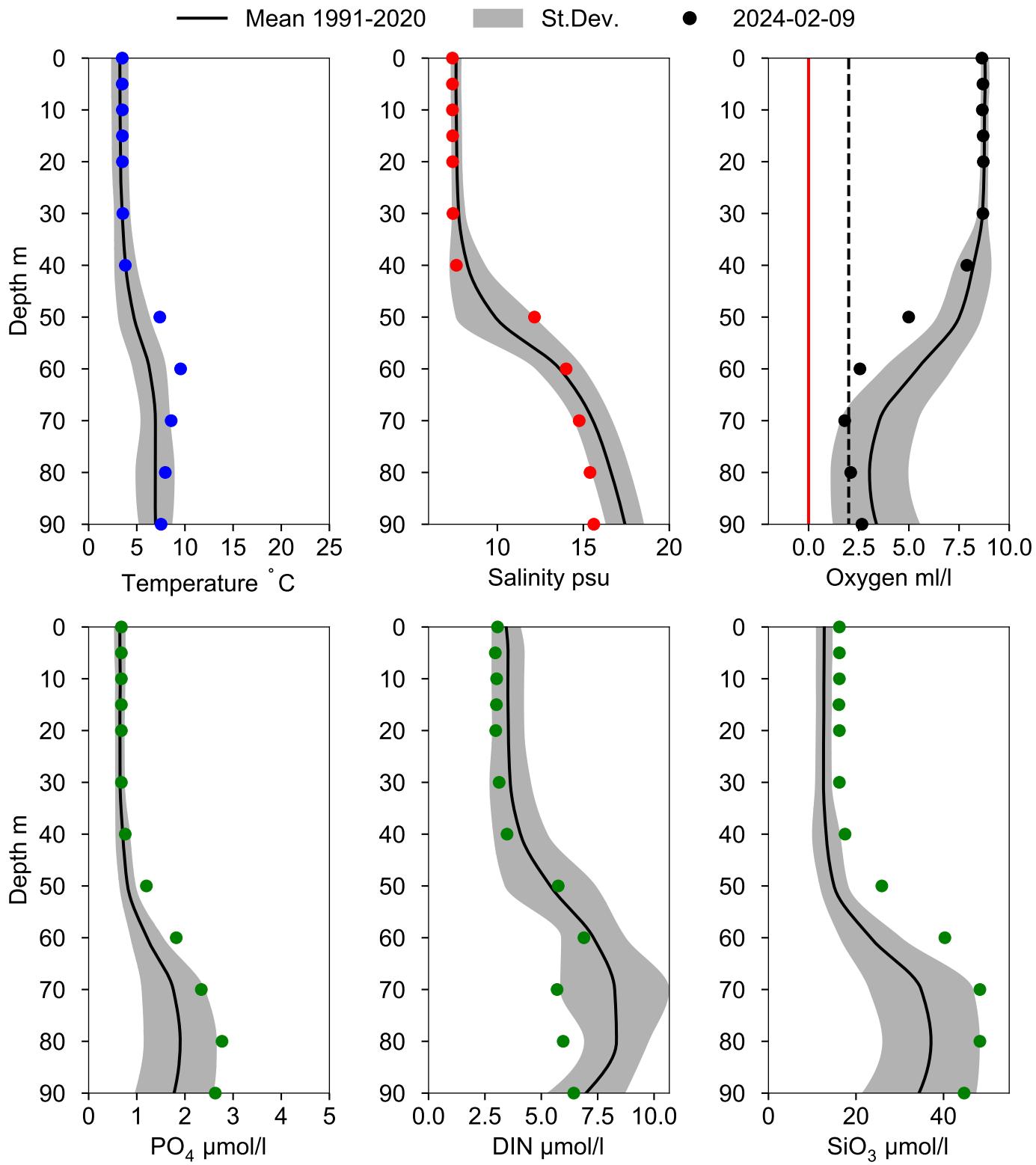


## OXYGEN IN BOTTOM WATER (depth >= 80 m)



# Vertical profiles BY4 CHRISTIANSÖ

## February



# STATION INFLOW 5 SURFACE WATER (0-10 m)

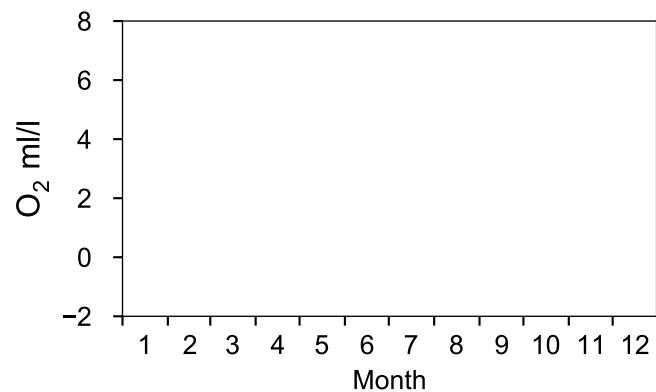
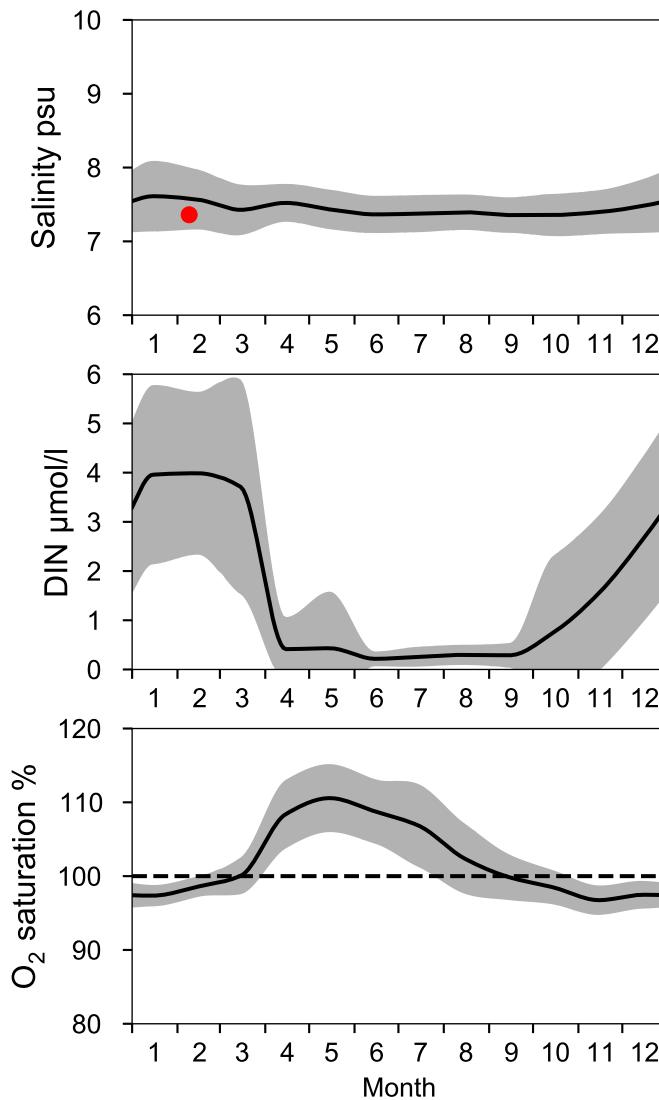
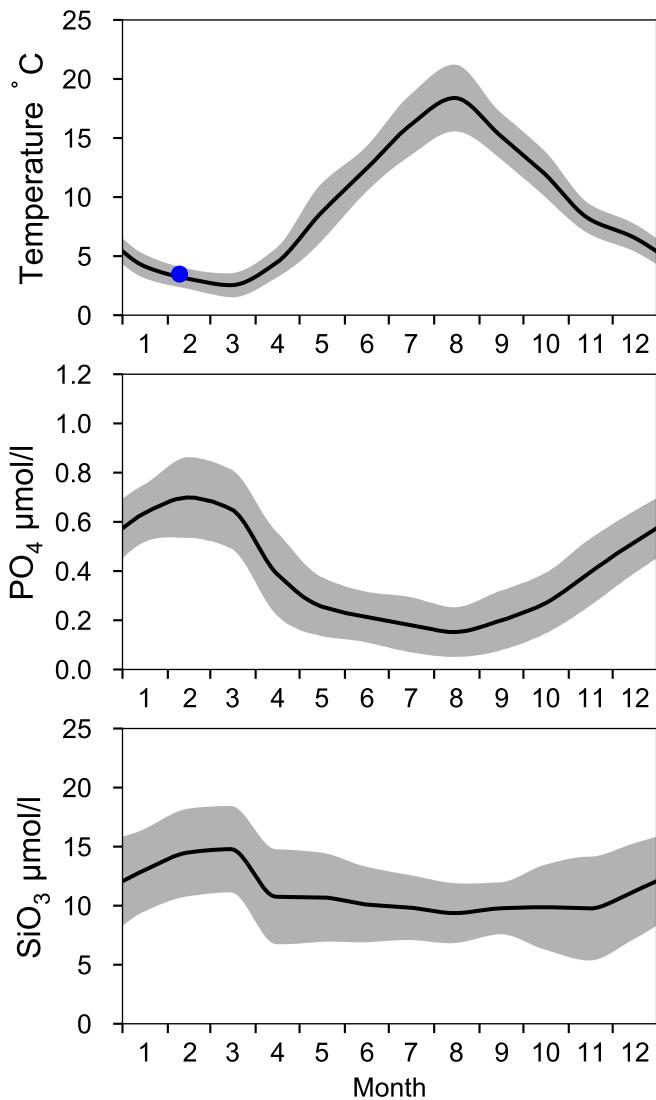
## Annual Cycles

Statistics based on data from: Bornholmshavet

— Mean 1991-2020

St.Dev.

● 2024

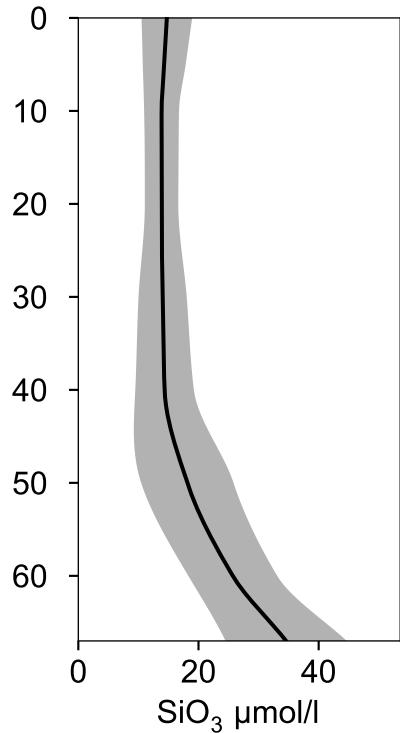
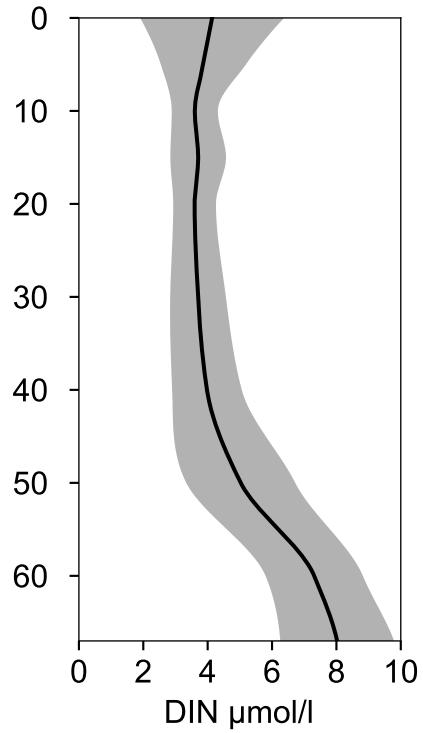
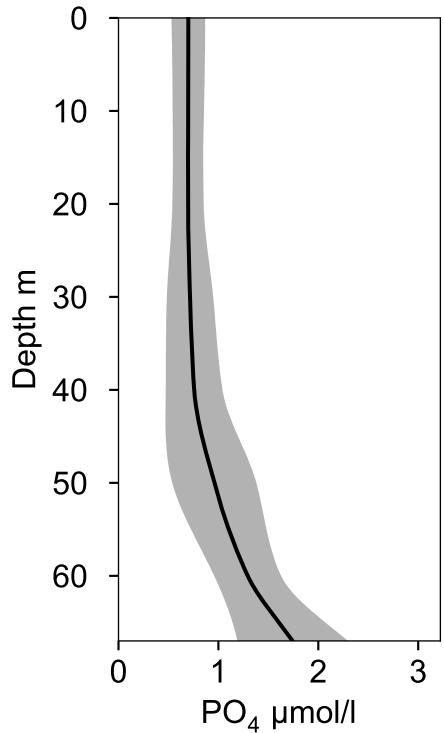
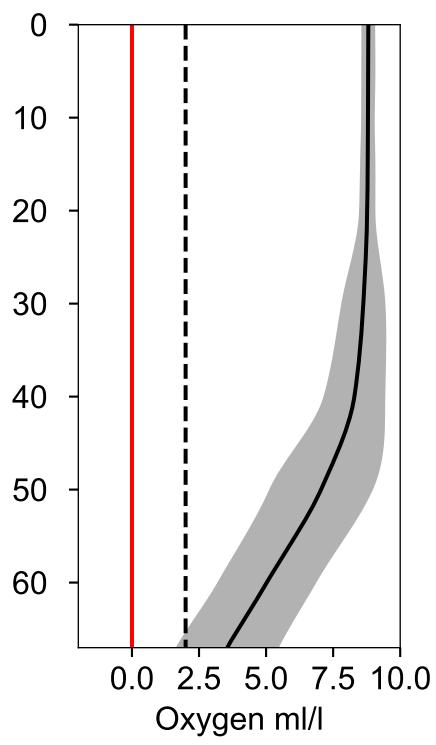
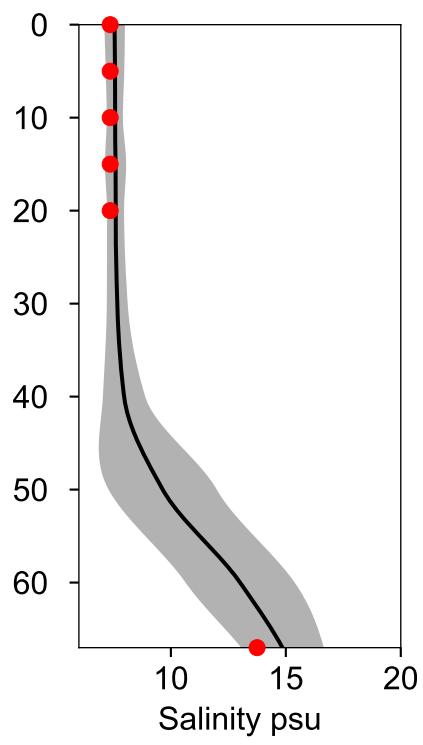
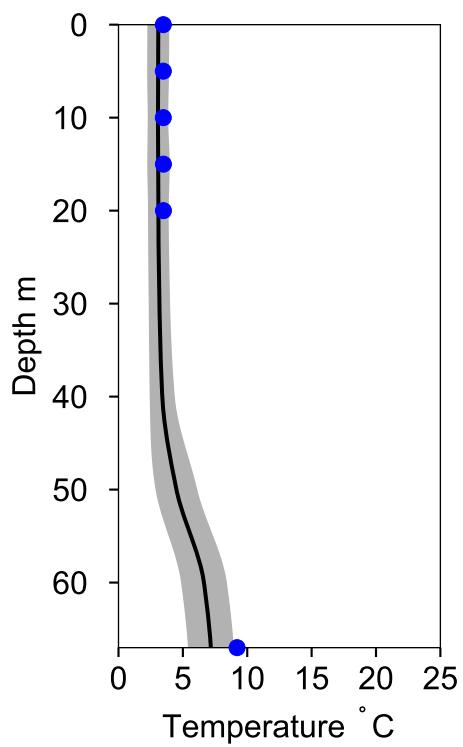


# Vertical profiles INFLOW 5

## February

Statistics based on data from: Bornholmshavet

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



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

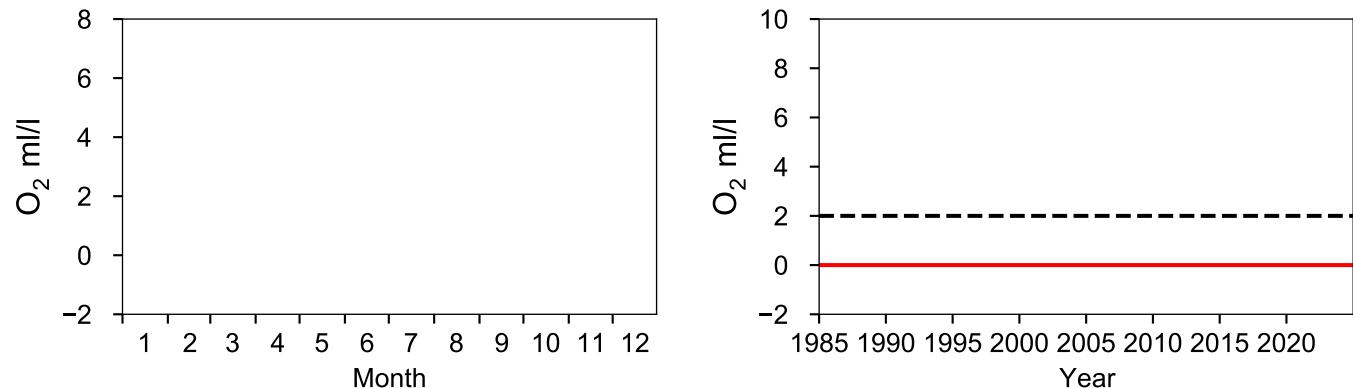
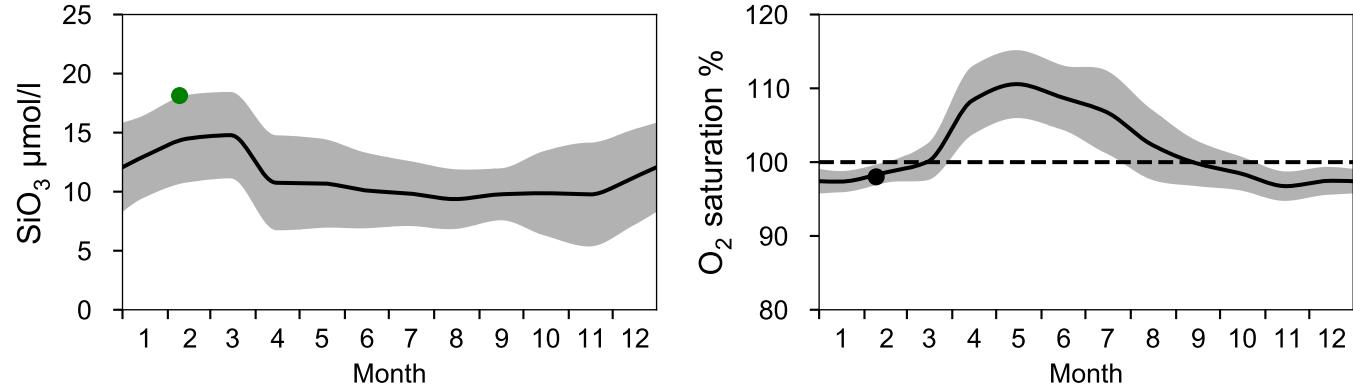
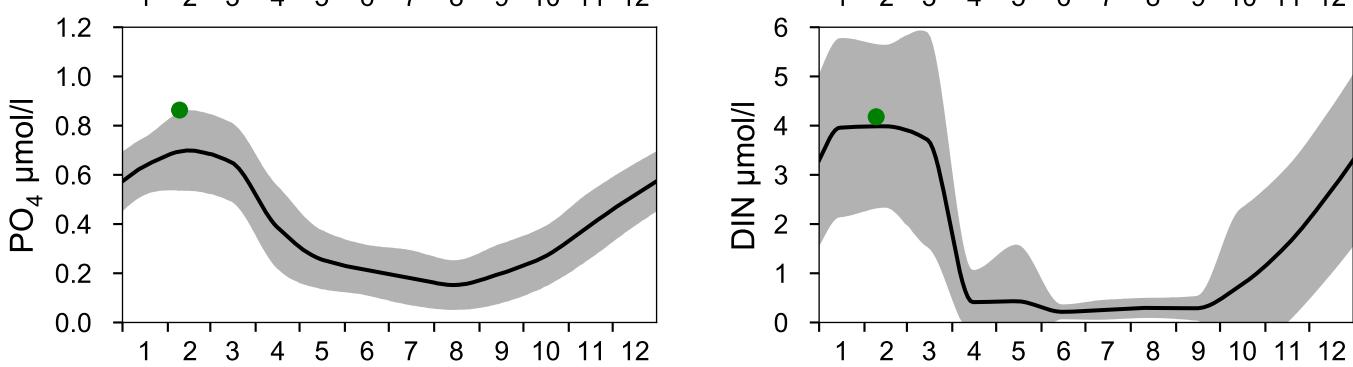
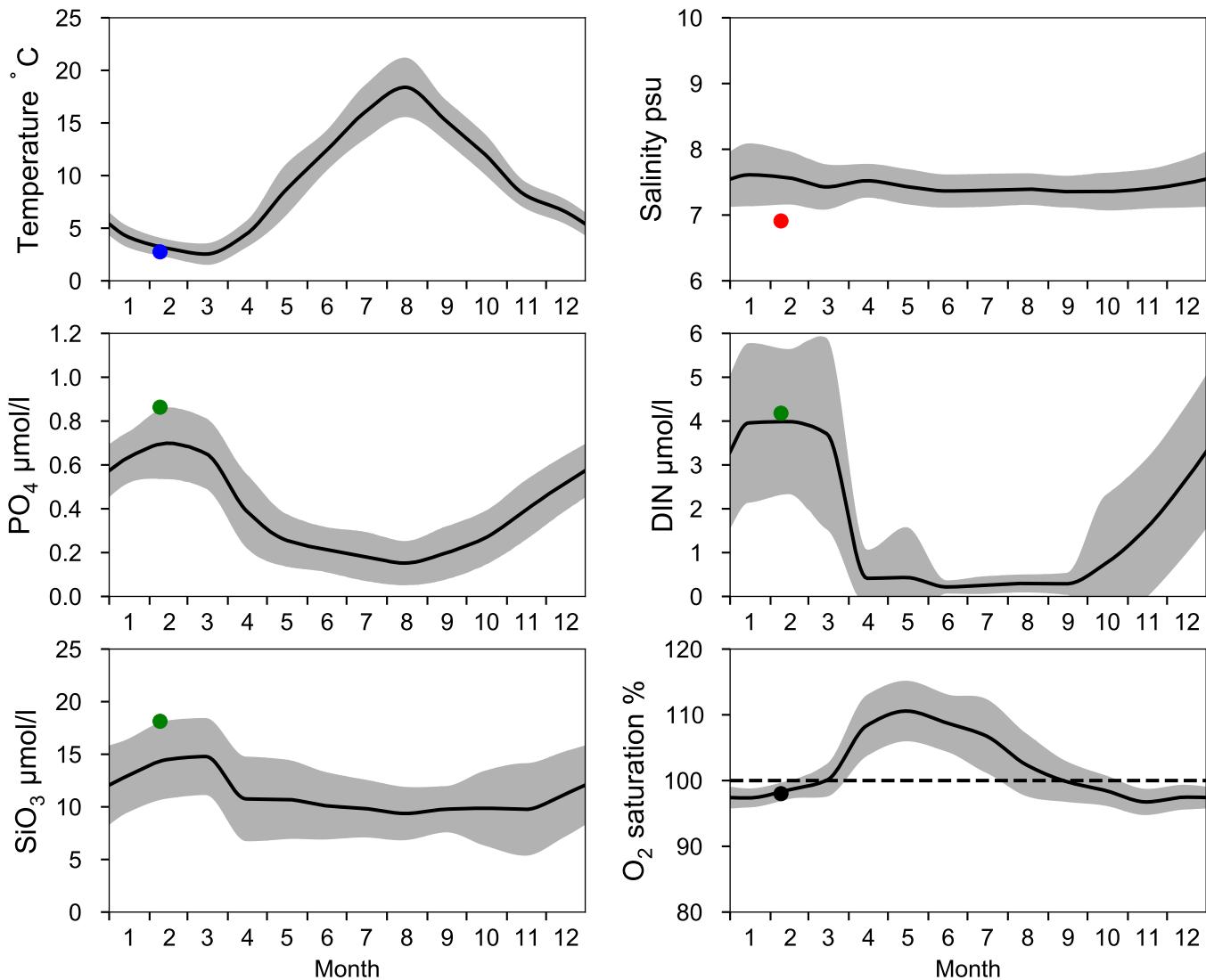
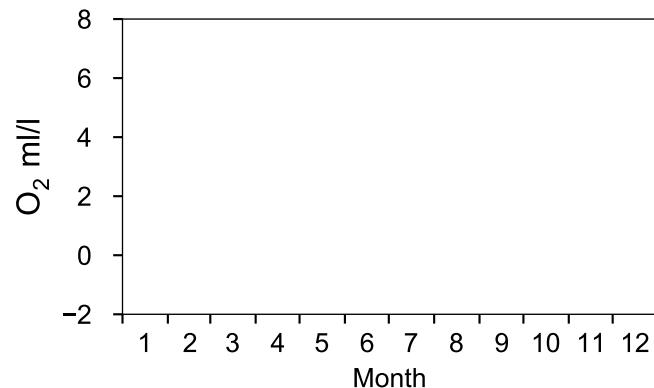
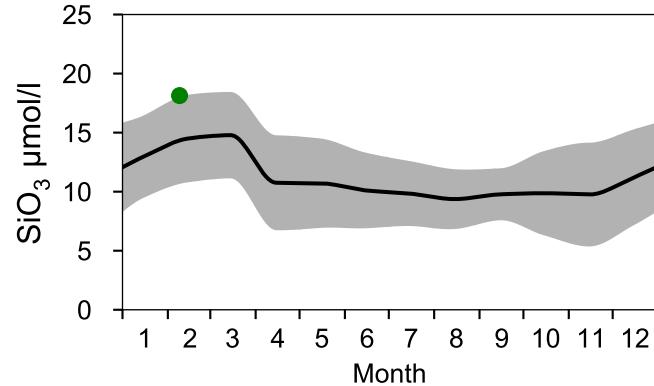
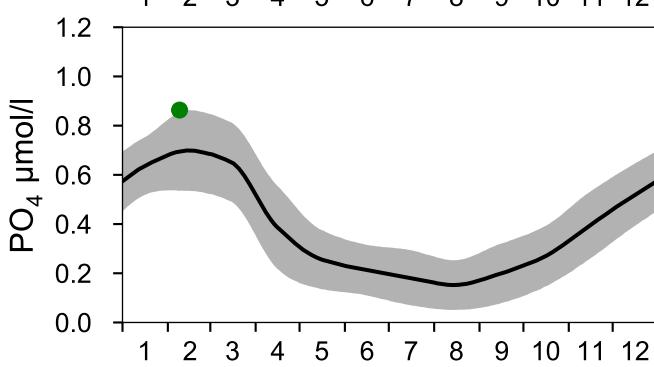
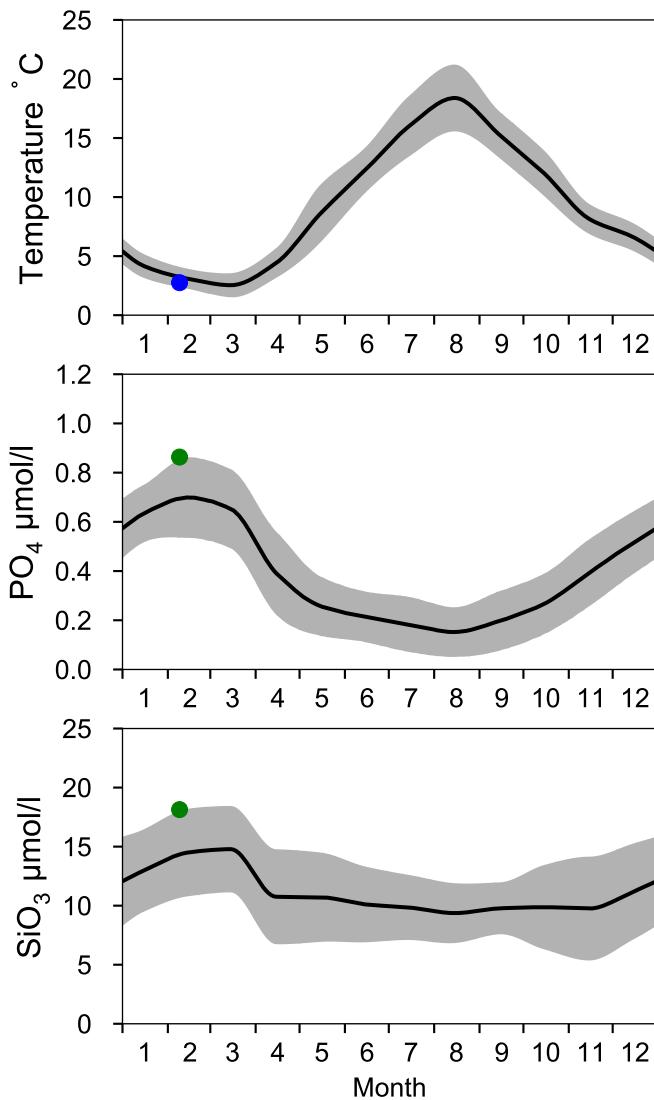
## Annual Cycles

Statistics based on data from: Bornholmshavet

— Mean 1991-2020

St.Dev.

● 2024

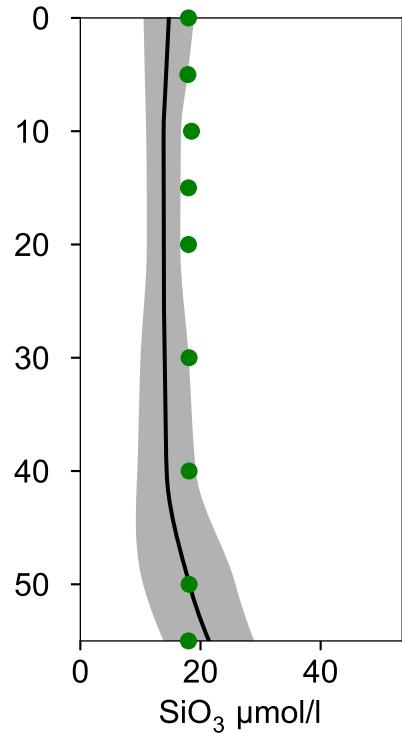
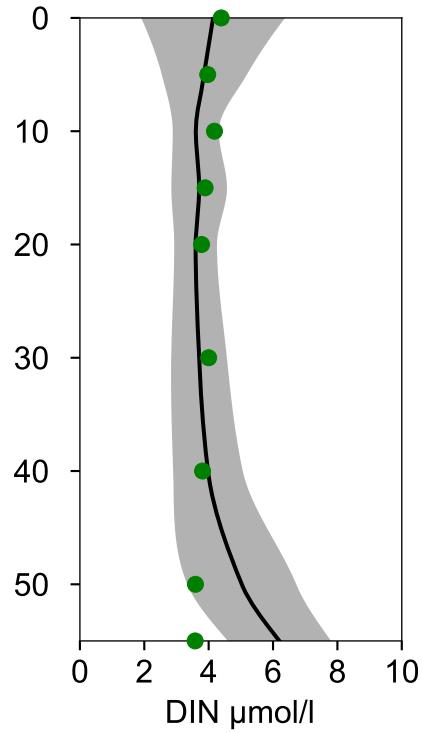
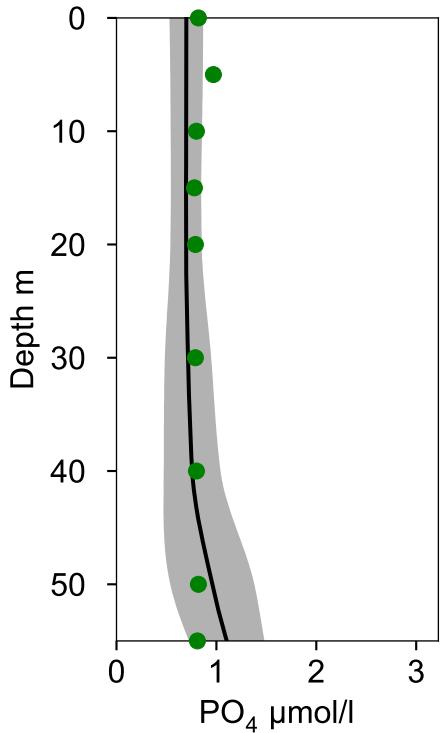
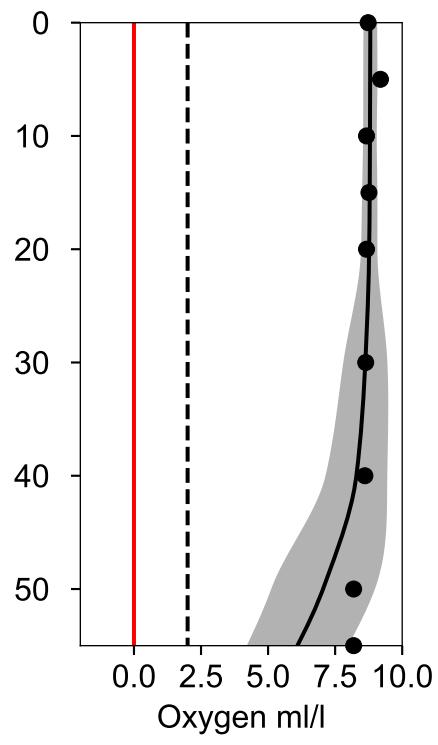
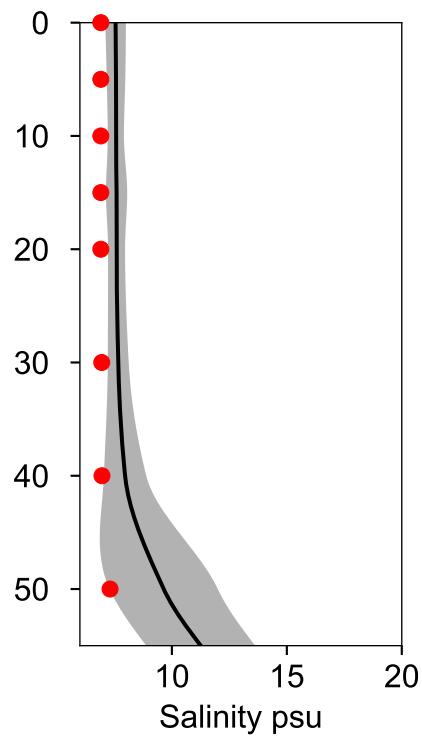
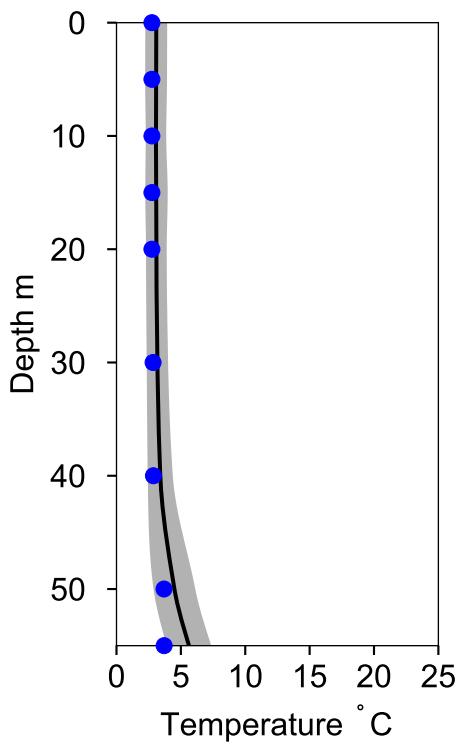


# Vertical profiles HANÖBUKTEN-KBV

## February

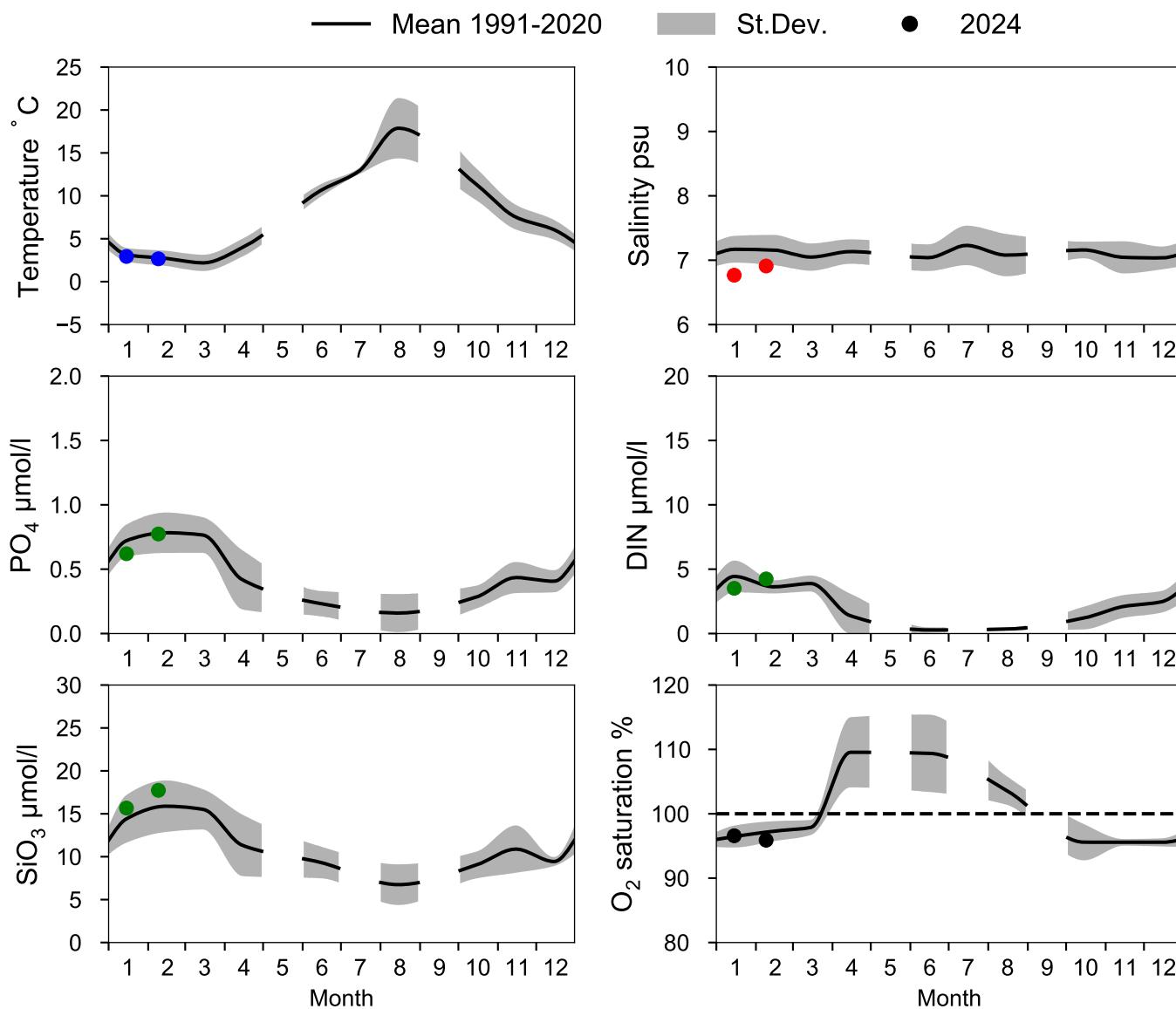
Statistics based on data from: Bornholmshavet

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

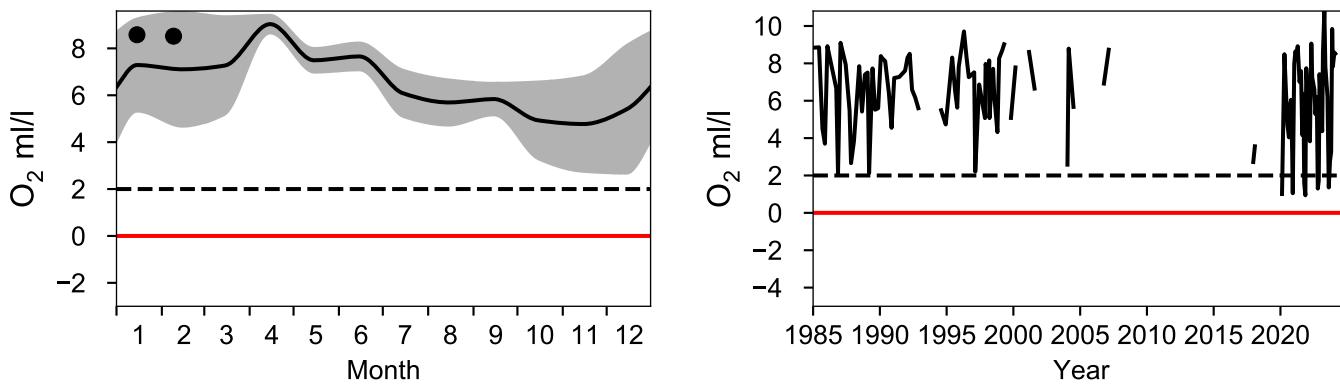


# STATION BY39 ÖLANDS S UDDE SURFACE WATER (0-10 m)

Annual Cycles

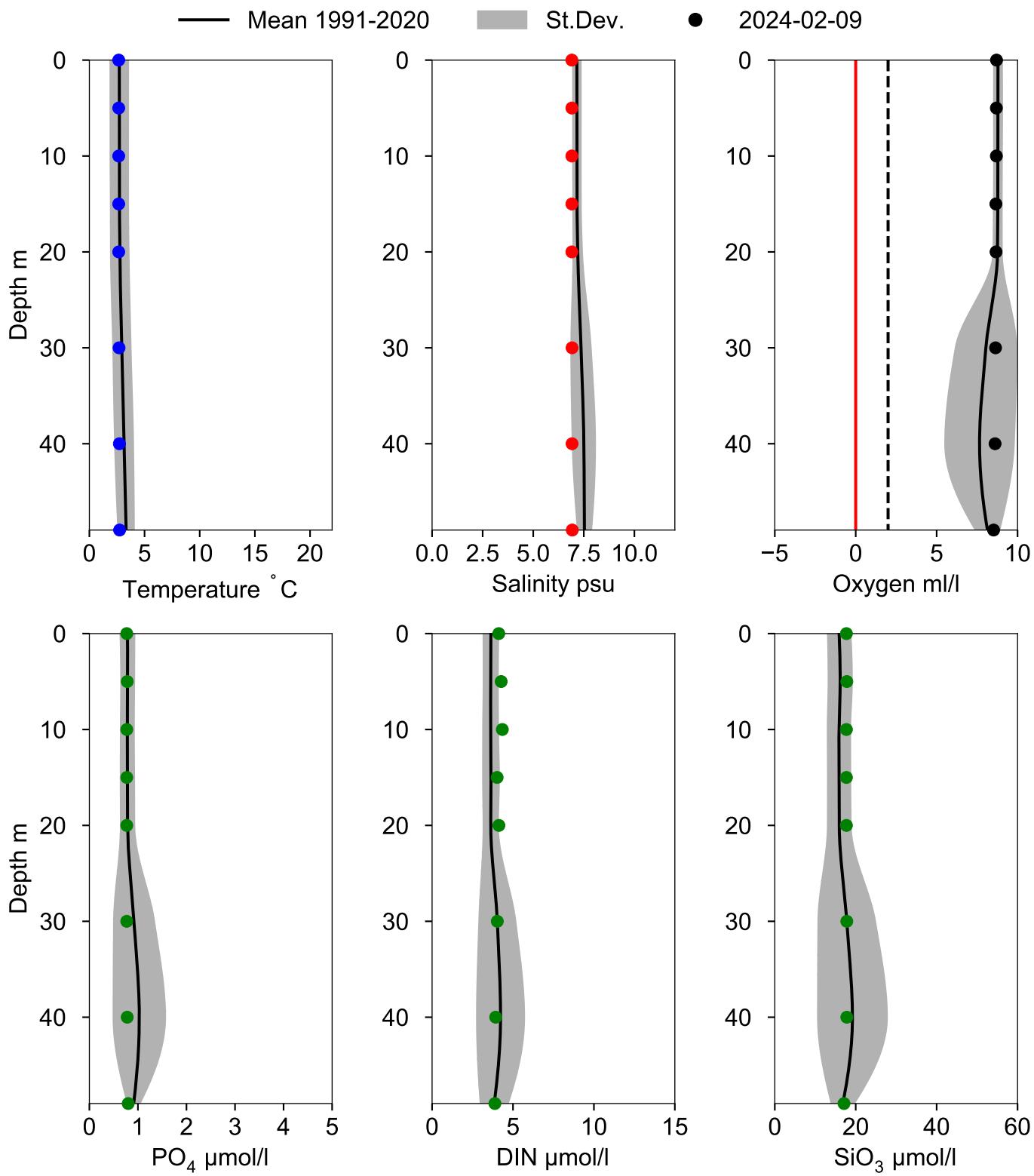


## OXYGEN IN BOTTOM WATER (depth >= 40 m)



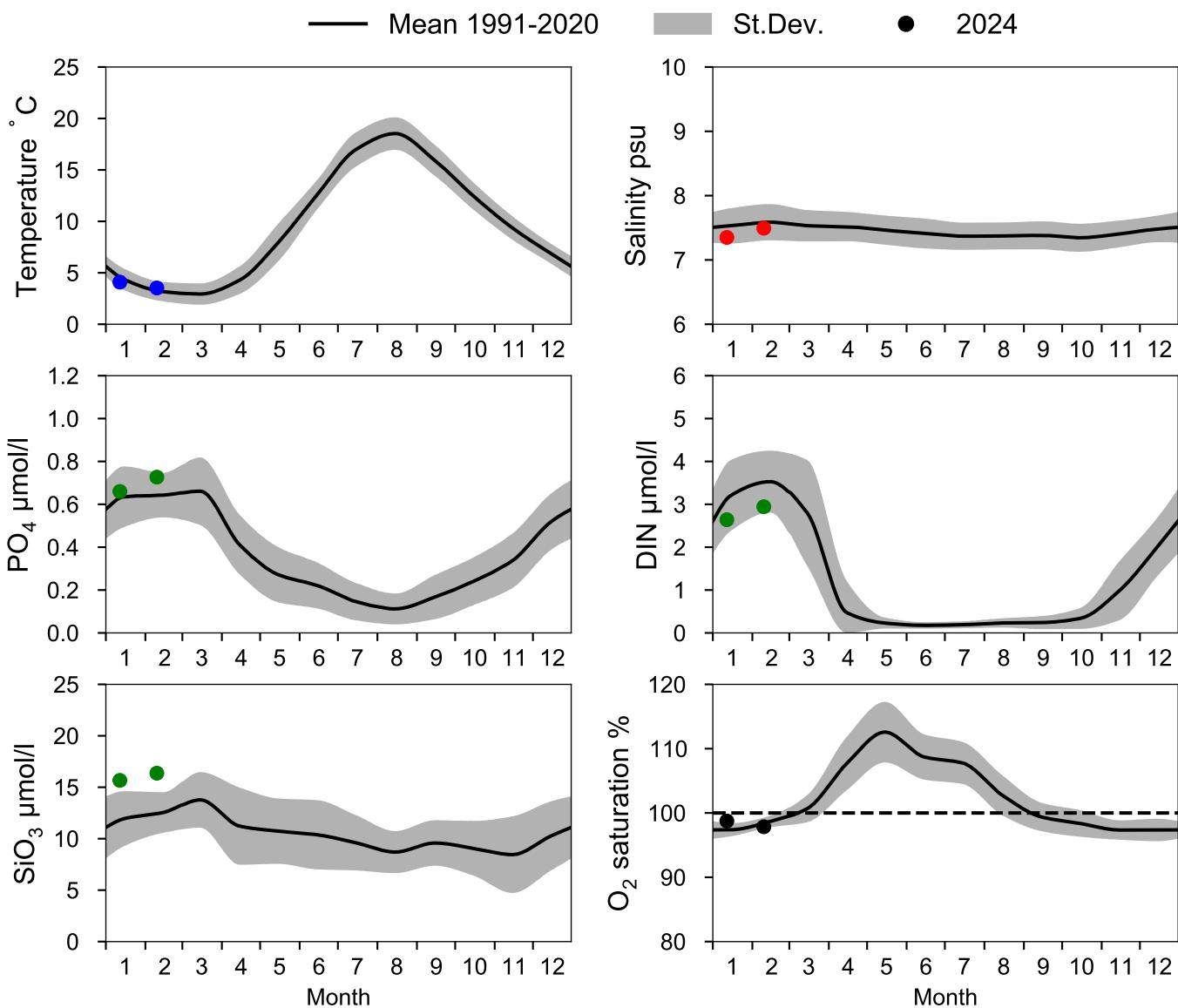
# Vertical profiles BY39 ÖLANDS S UDDE

## February

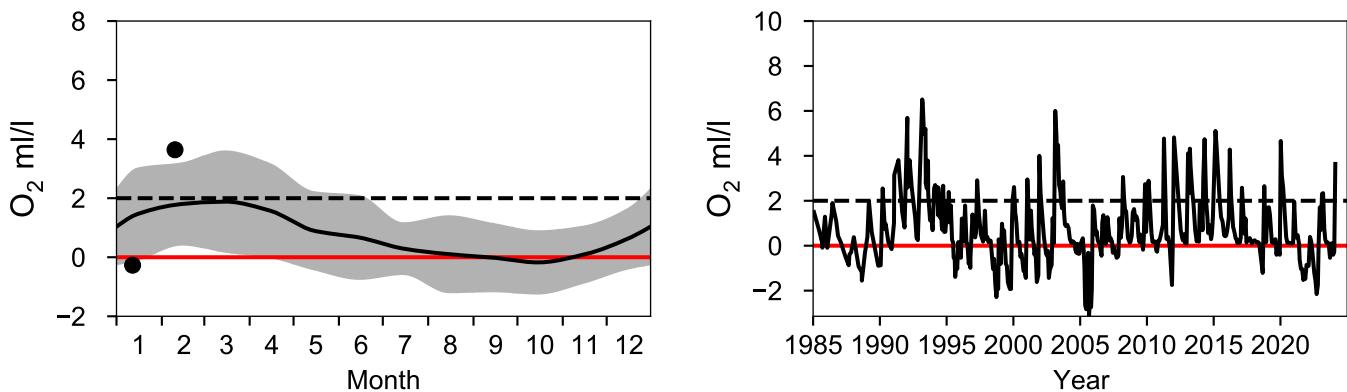


# STATION BY5 BORNHOLMSDJ SURFACE WATER (0-10 m)

Annual Cycles

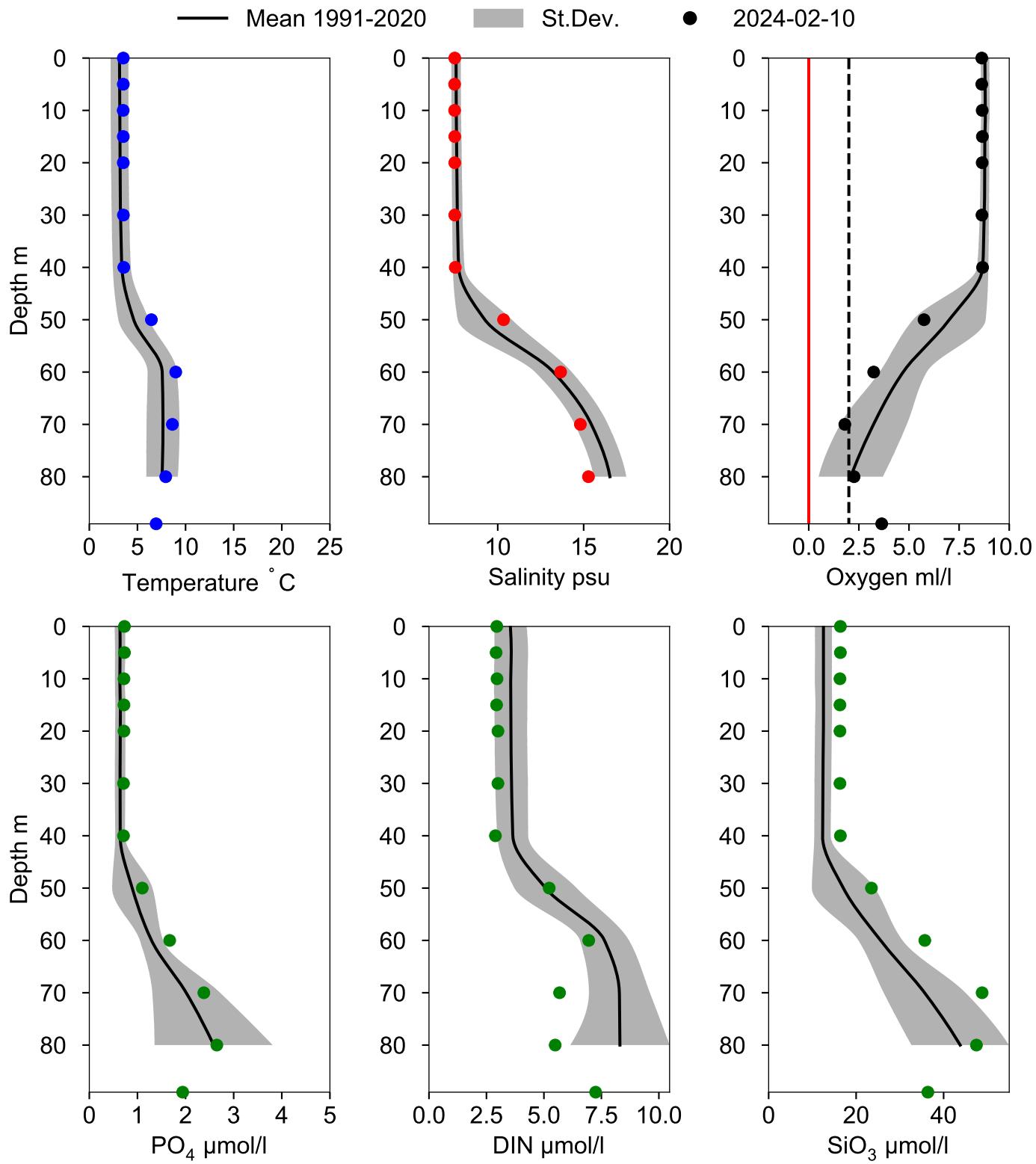


## OXYGEN IN BOTTOM WATER (depth >= 80 m)



# Vertical profiles BY5 BORNHOLMSDJ

## February



# STATION STOLPE TRÖSKEL SURFACE WATER (0-10 m)

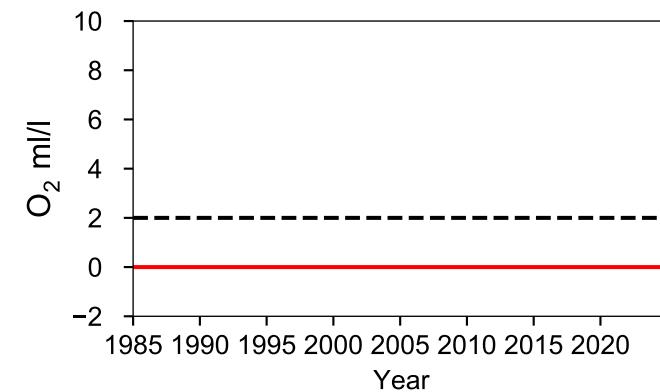
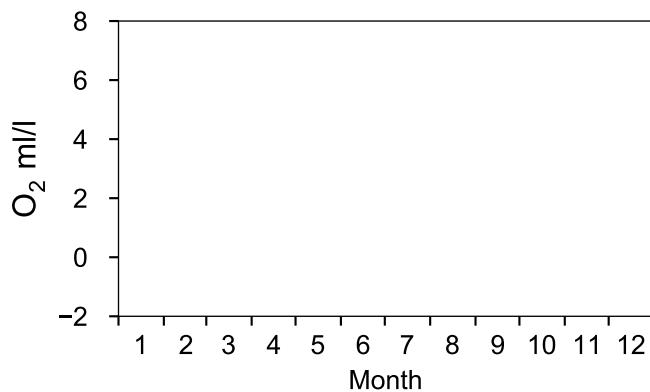
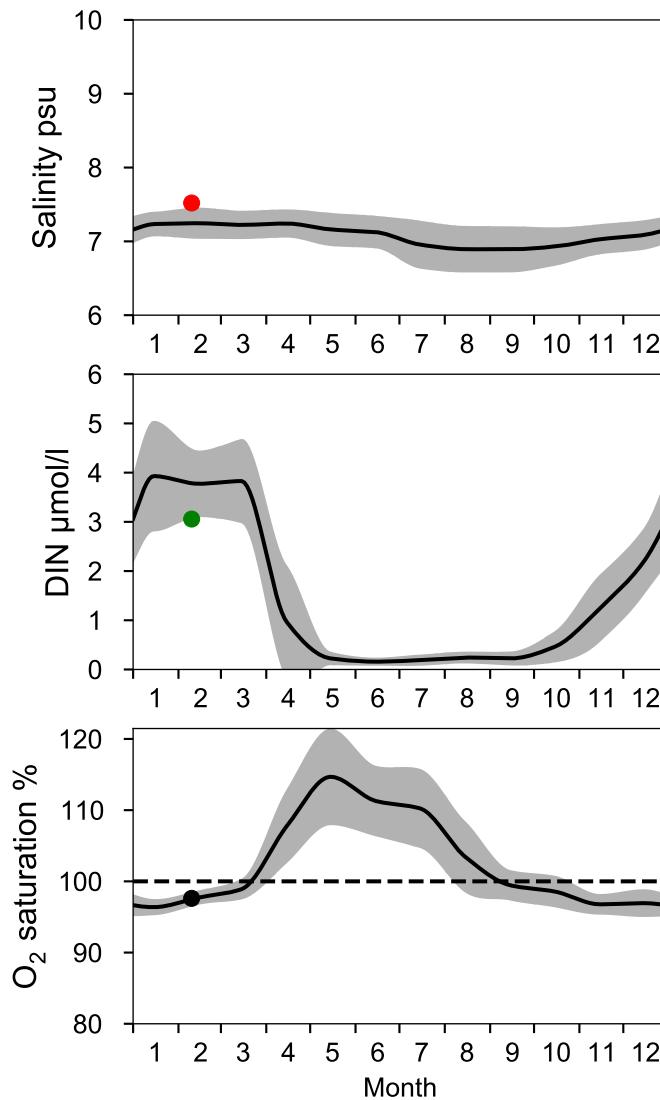
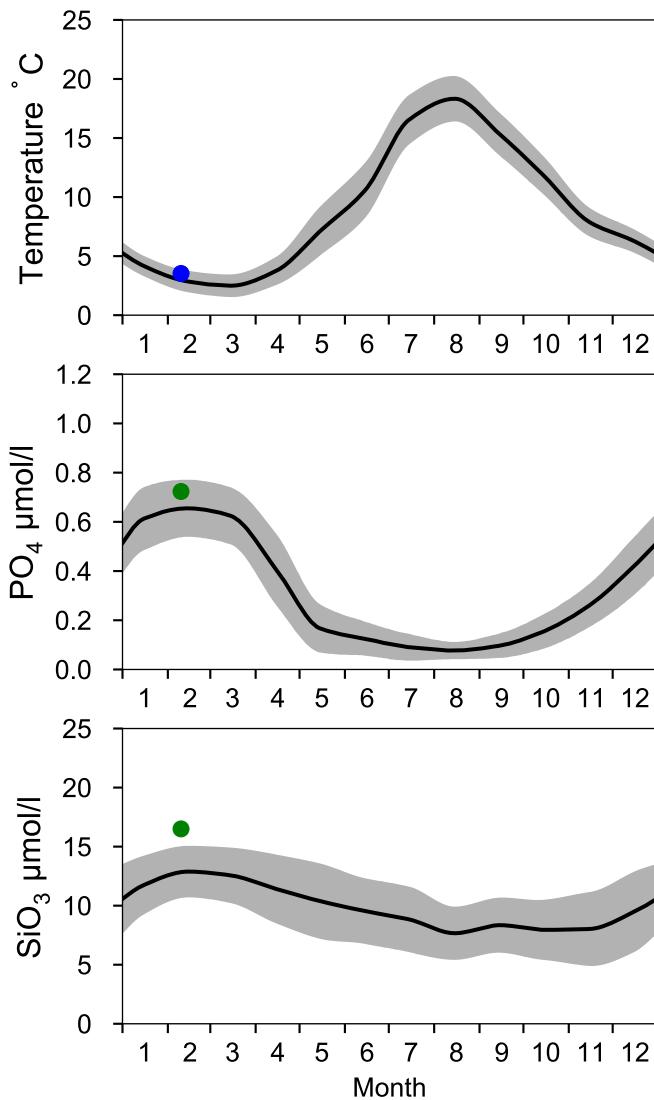
## Annual Cycles

Statistics based on data from: Östra Gotlandshavet

— Mean 1991-2020

St.Dev.

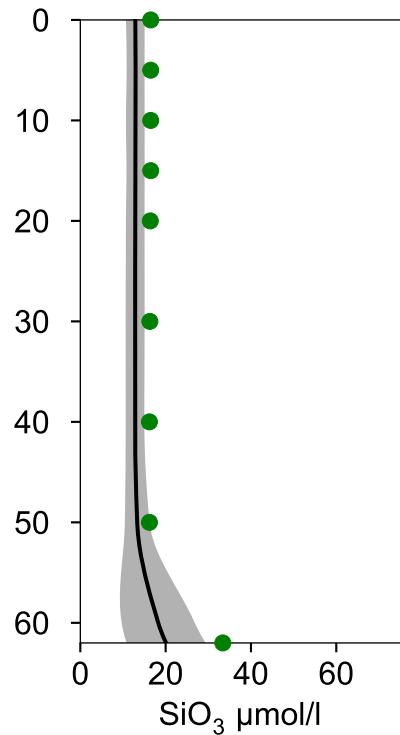
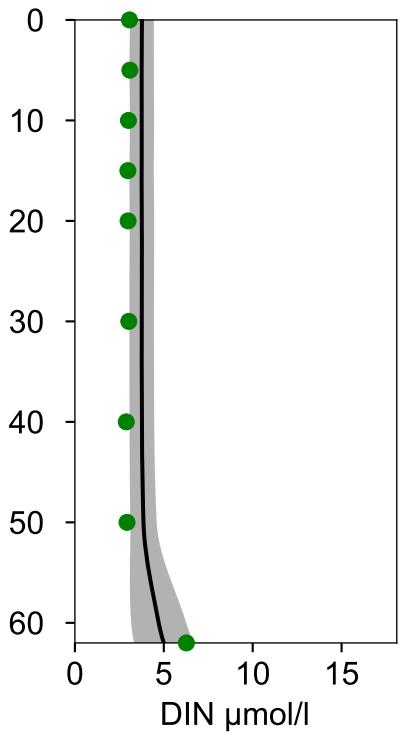
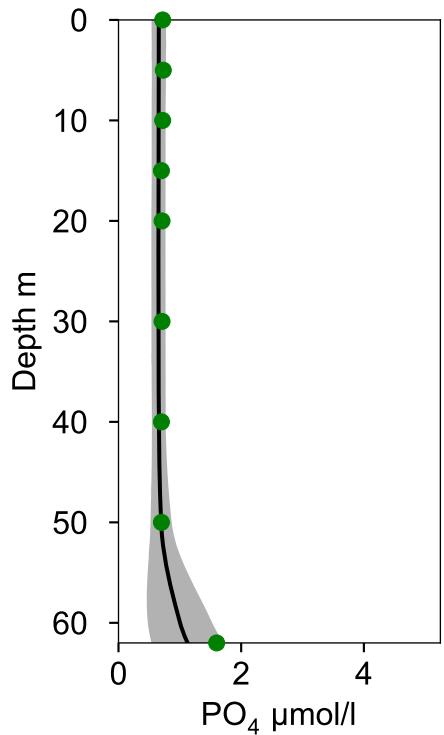
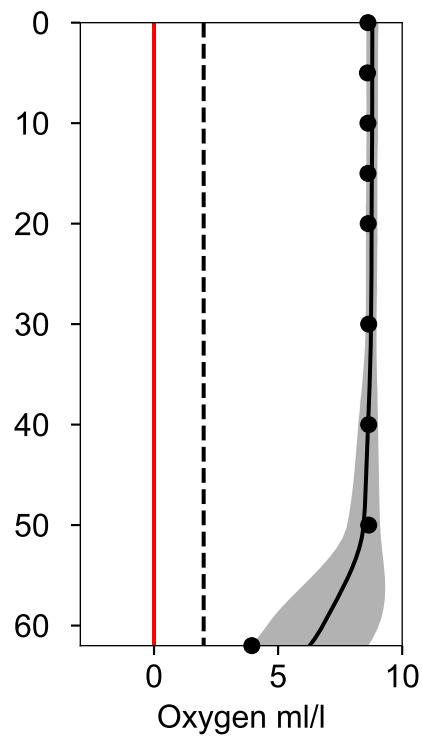
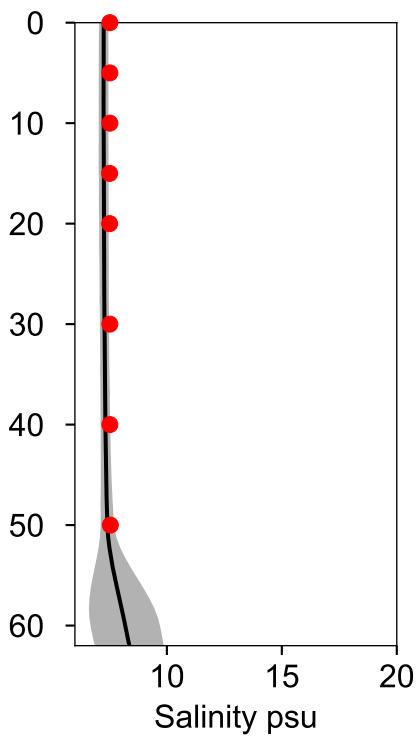
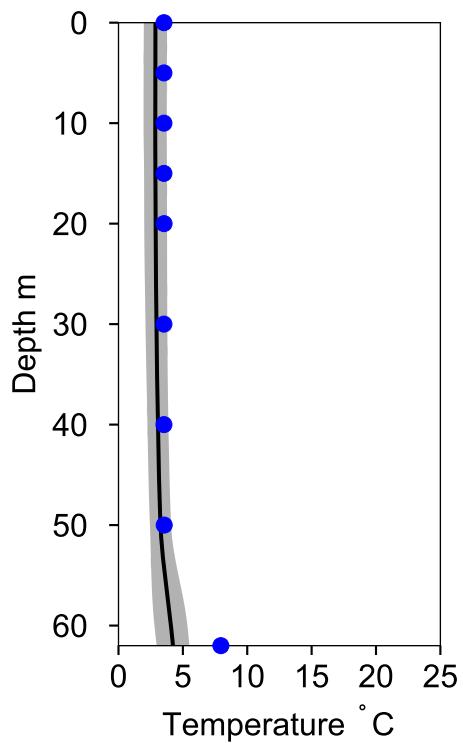
● 2024



# 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)

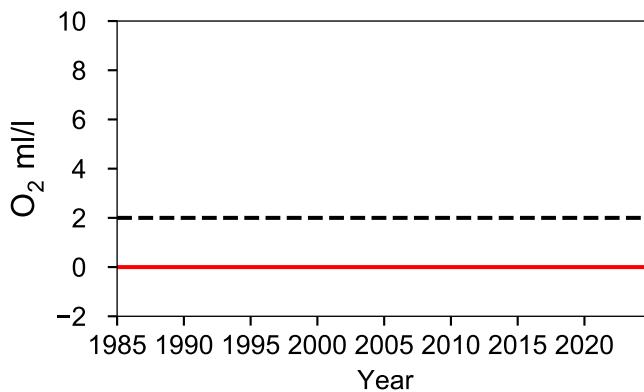
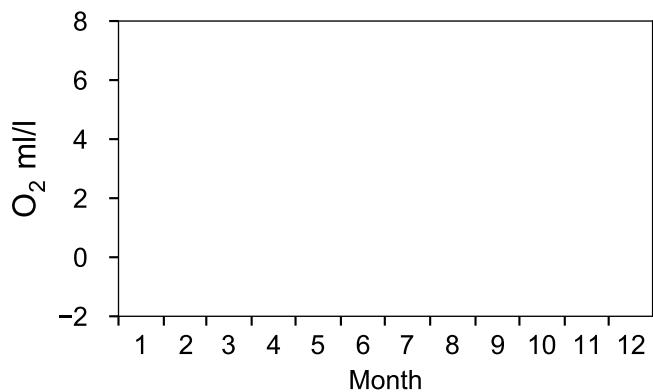
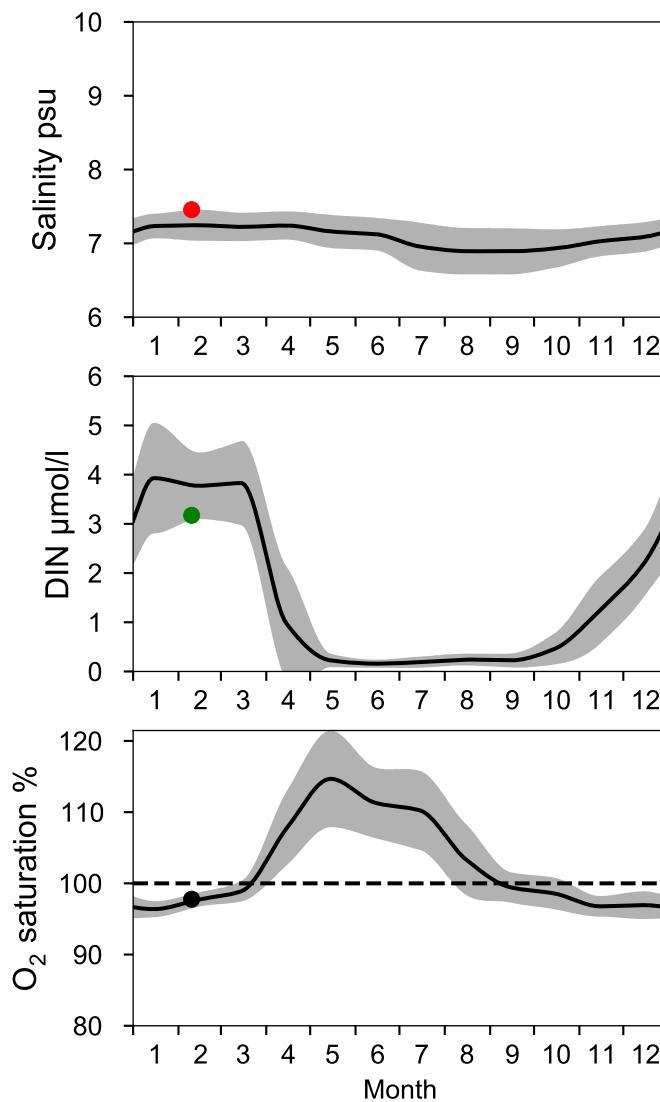
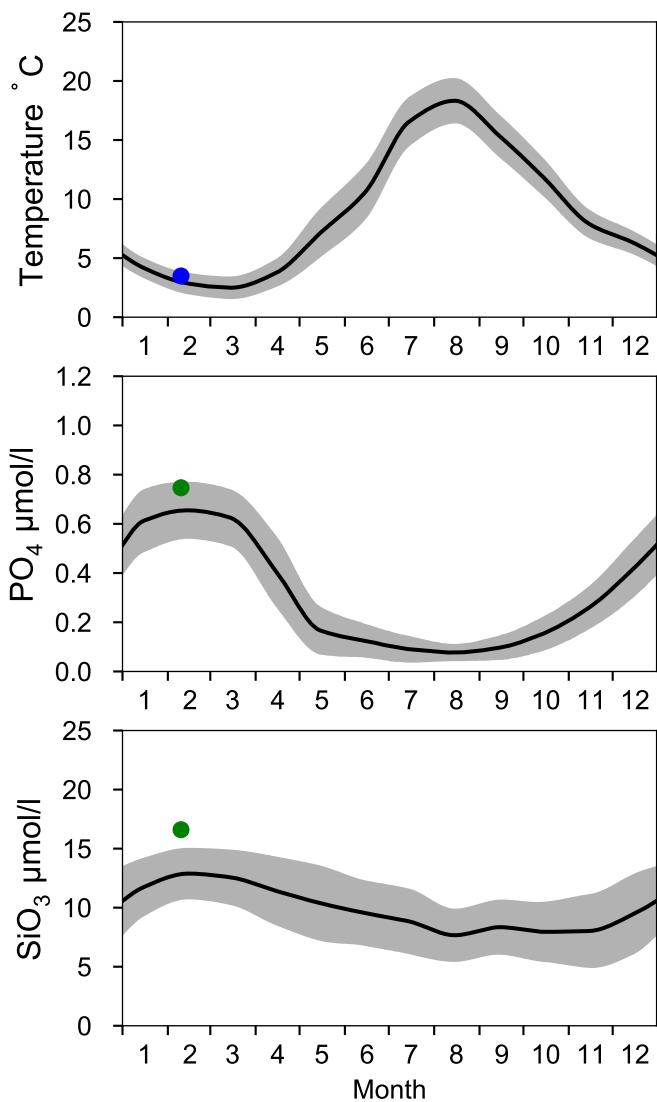
## Annual Cycles

Statistics based on data from: Östra Gotlandshavet

— Mean 1991-2020

St.Dev.

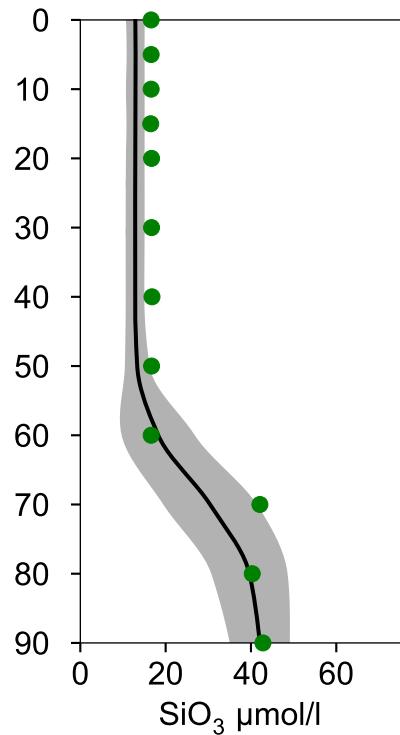
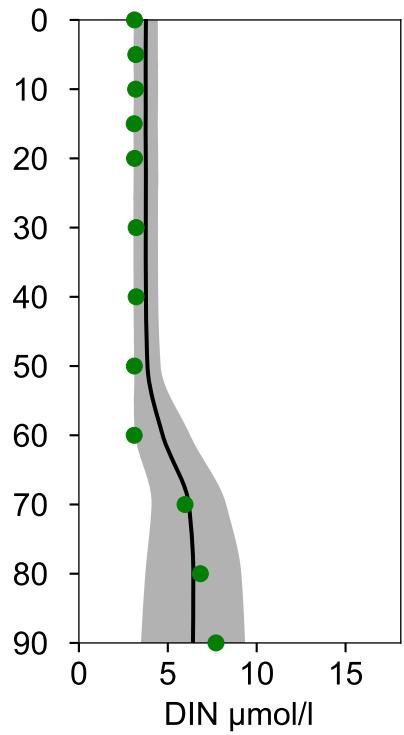
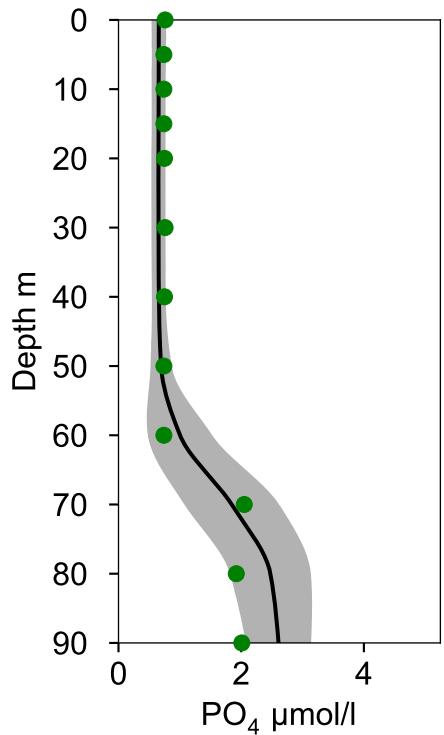
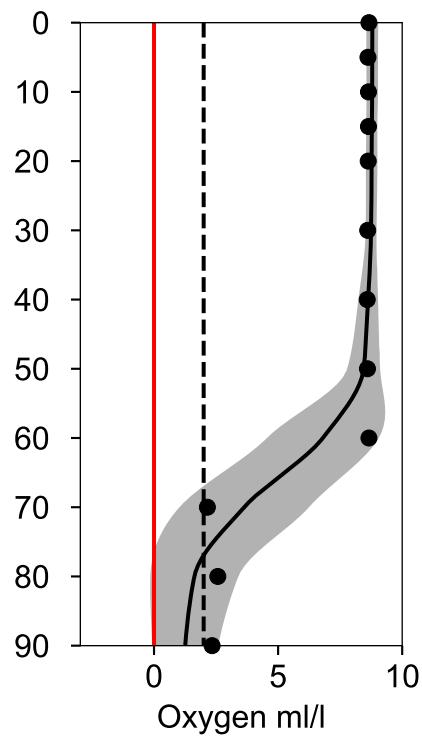
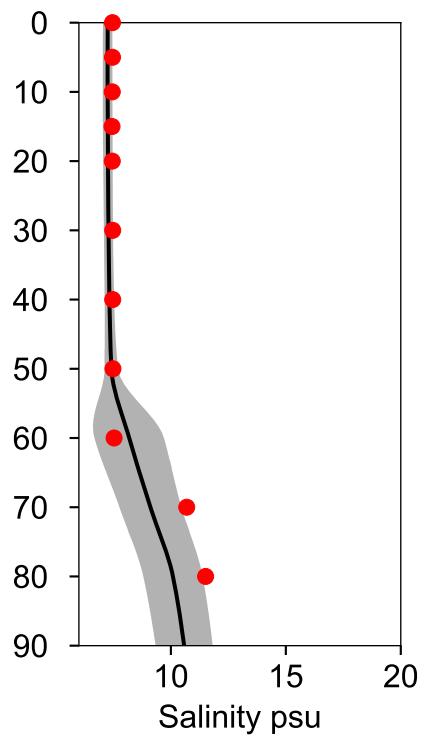
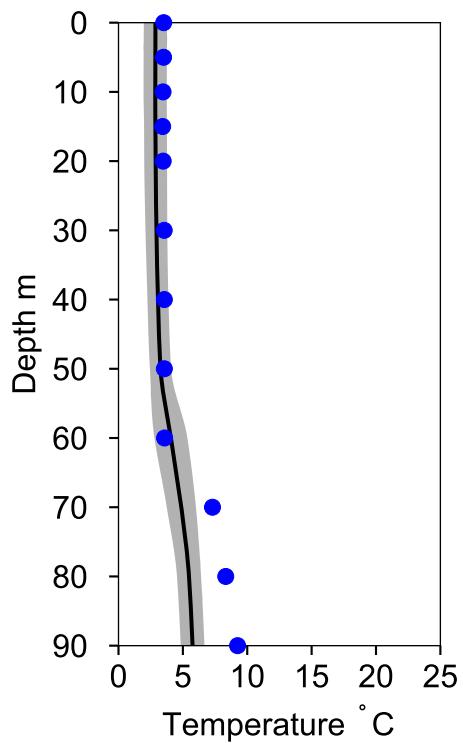
● 2024



# 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)

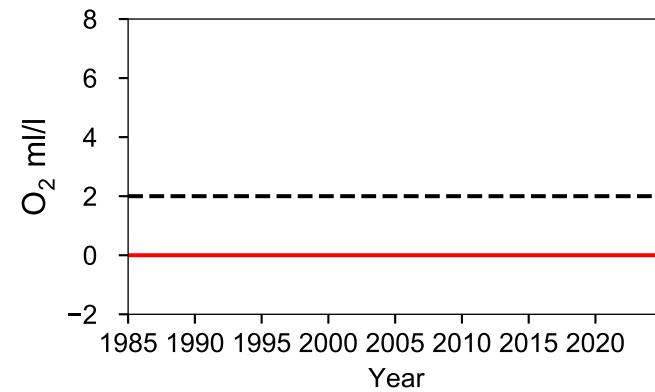
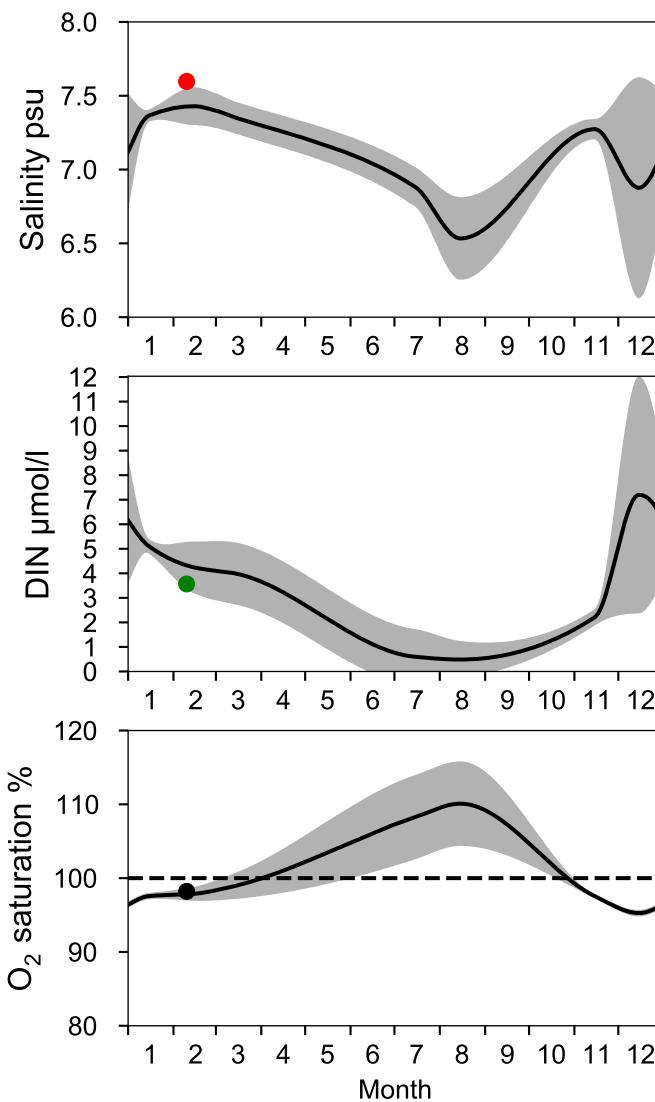
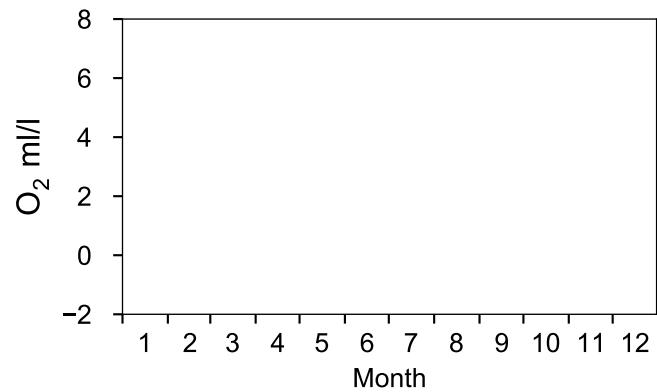
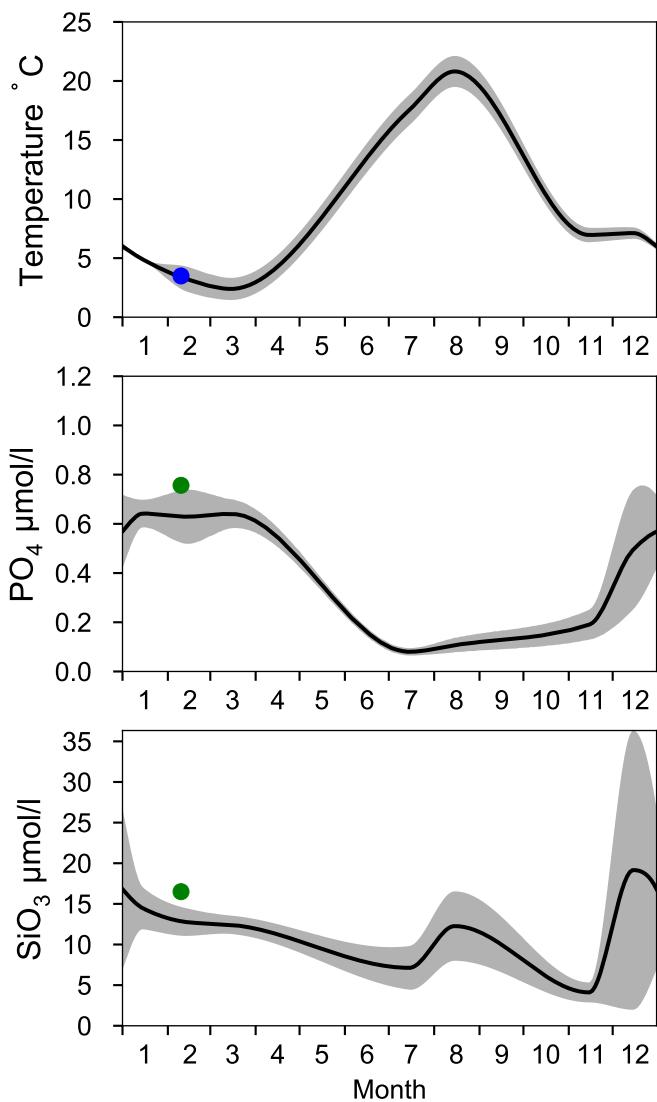
## Annual Cycles

Statistics based on data from: Gdanskbuken

— Mean 1991-2020

St.Dev.

● 2024

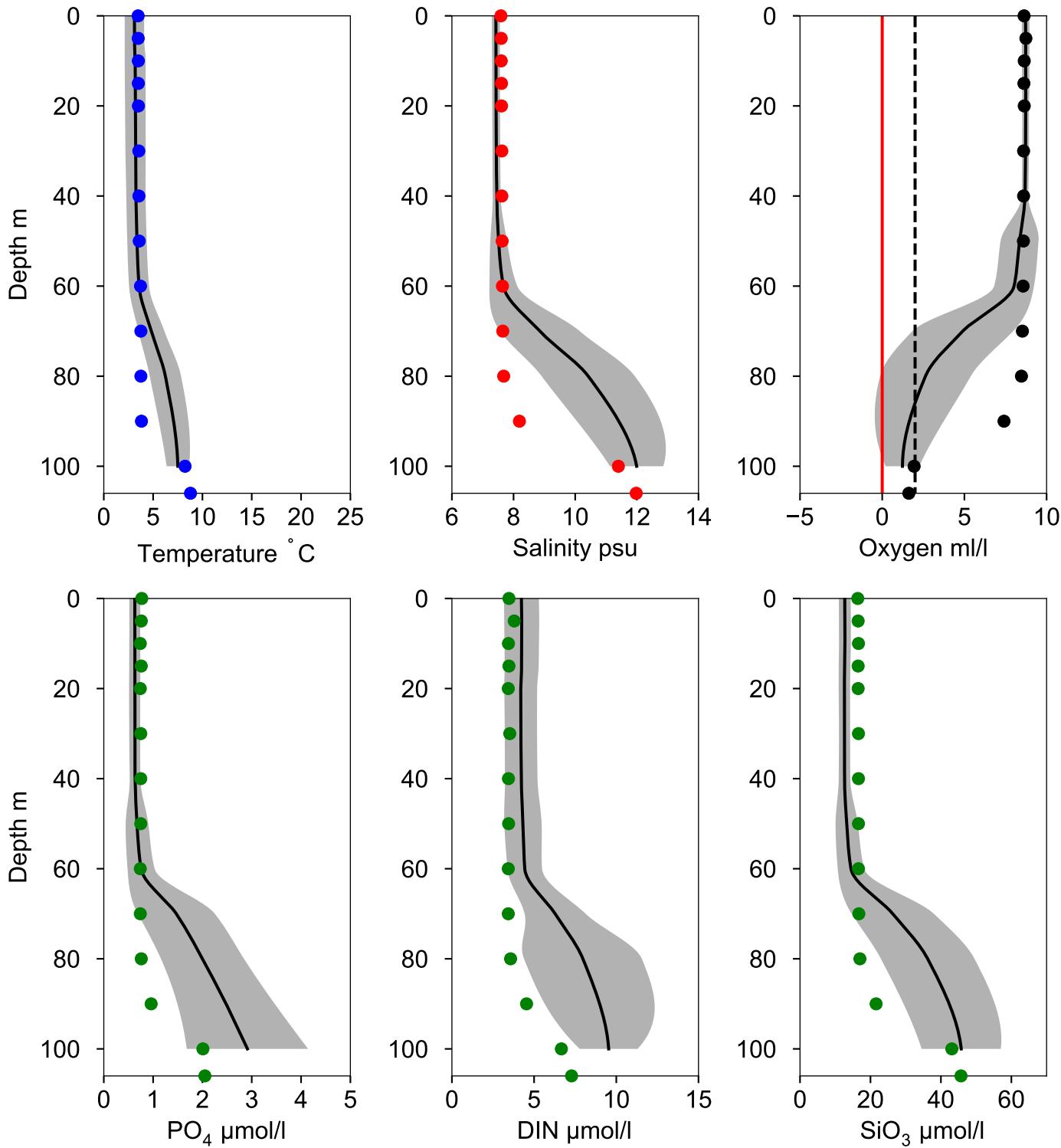


# Vertical profiles PL-P1

## February

Statistics based on data from: Gdanskbuken

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



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

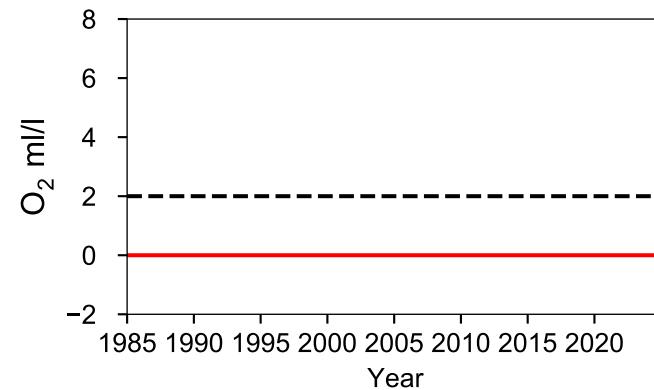
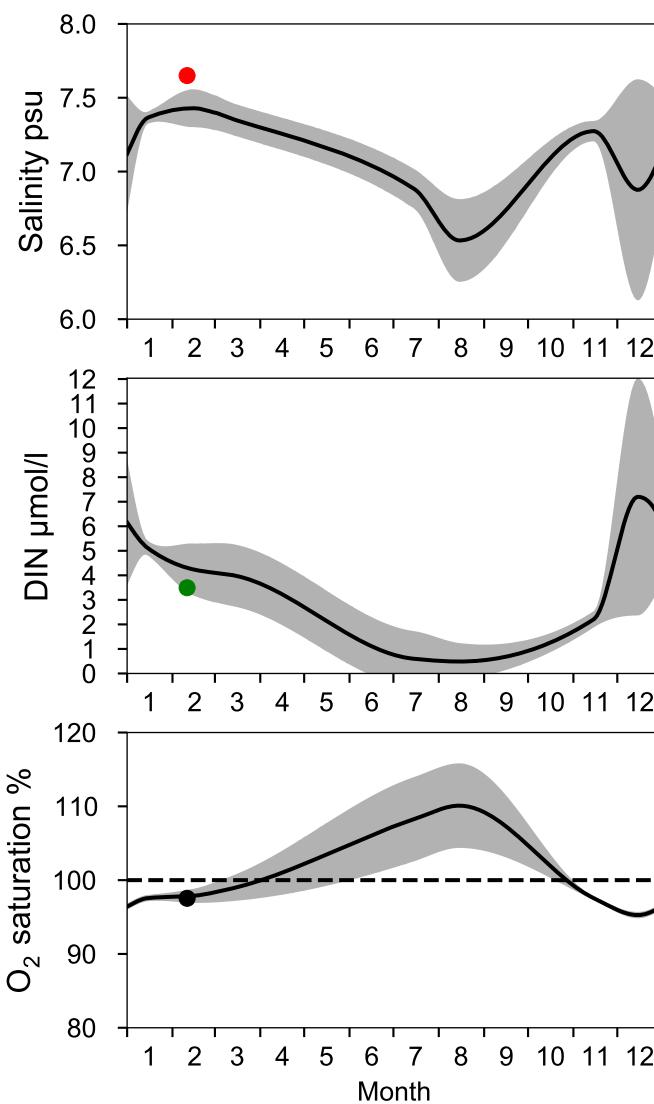
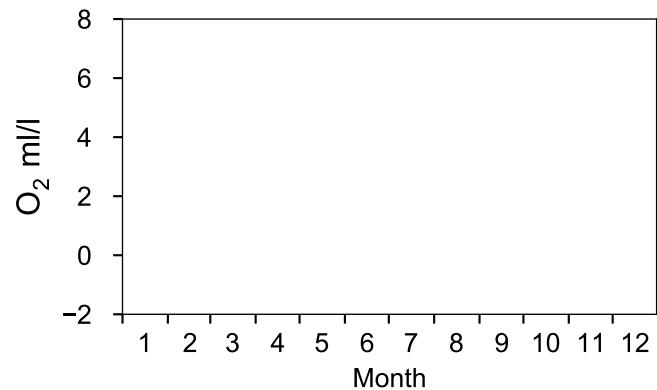
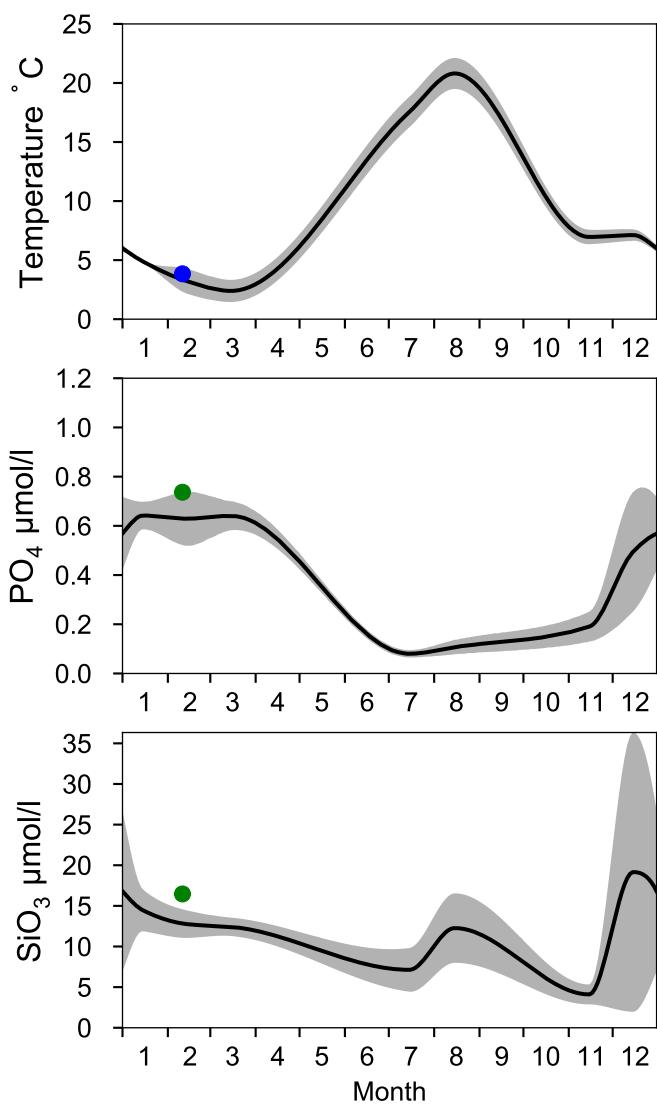
## Annual Cycles

Statistics based on data from: Gdanskbuken

— Mean 1991-2020

St.Dev.

● 2024

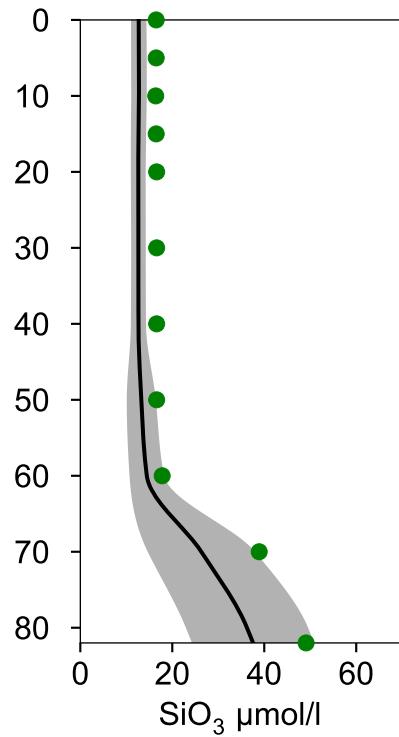
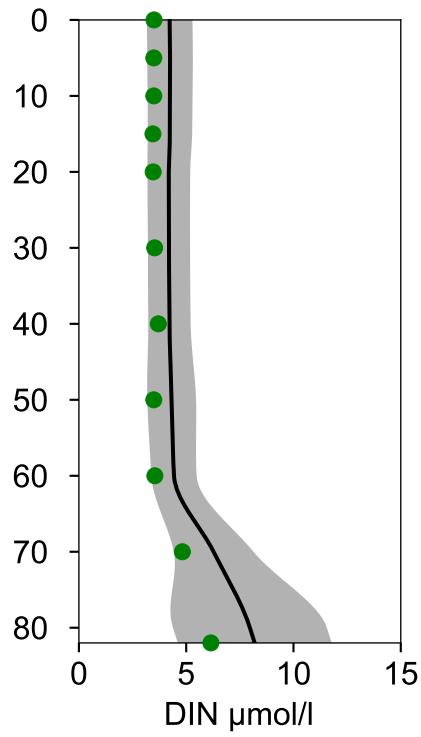
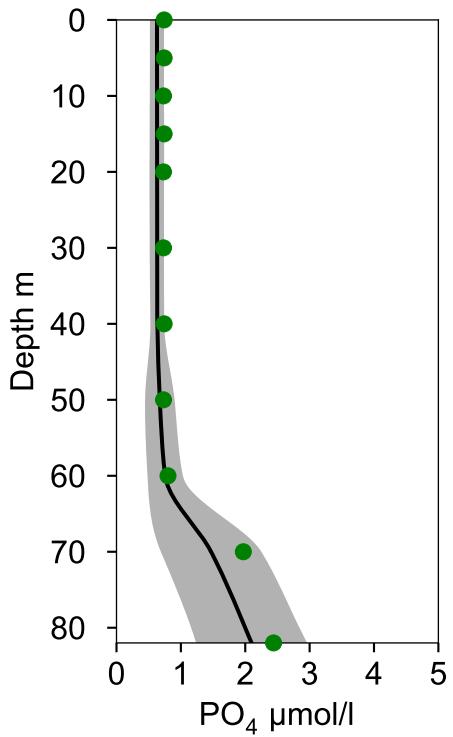
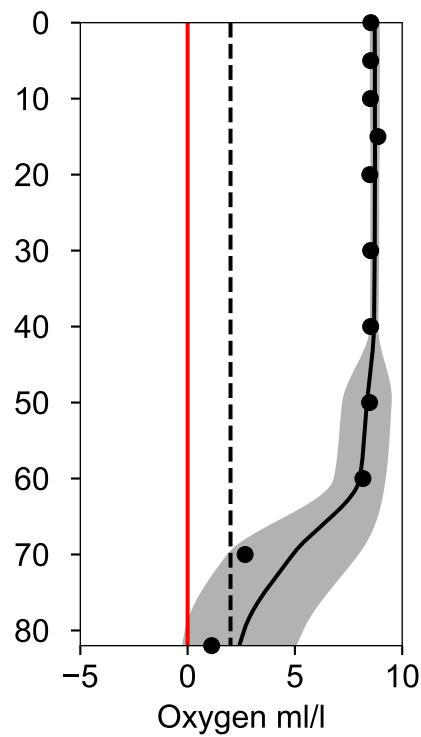
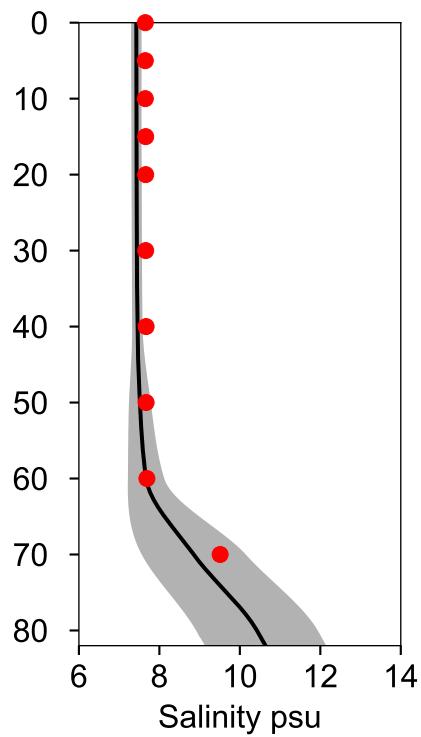
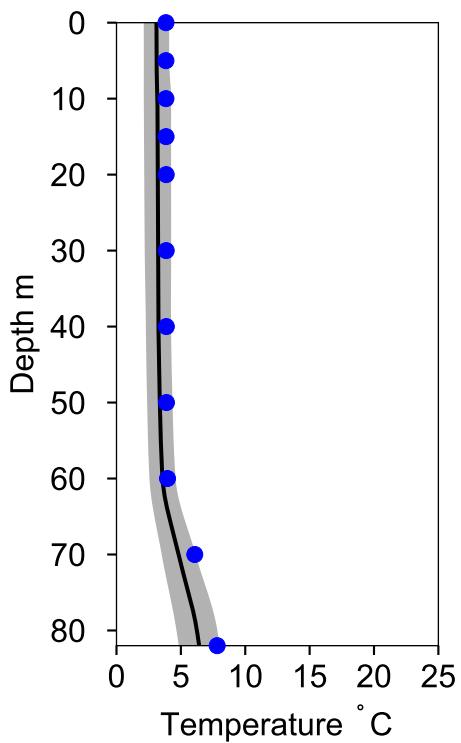


# Vertical profiles PL-P63

## February

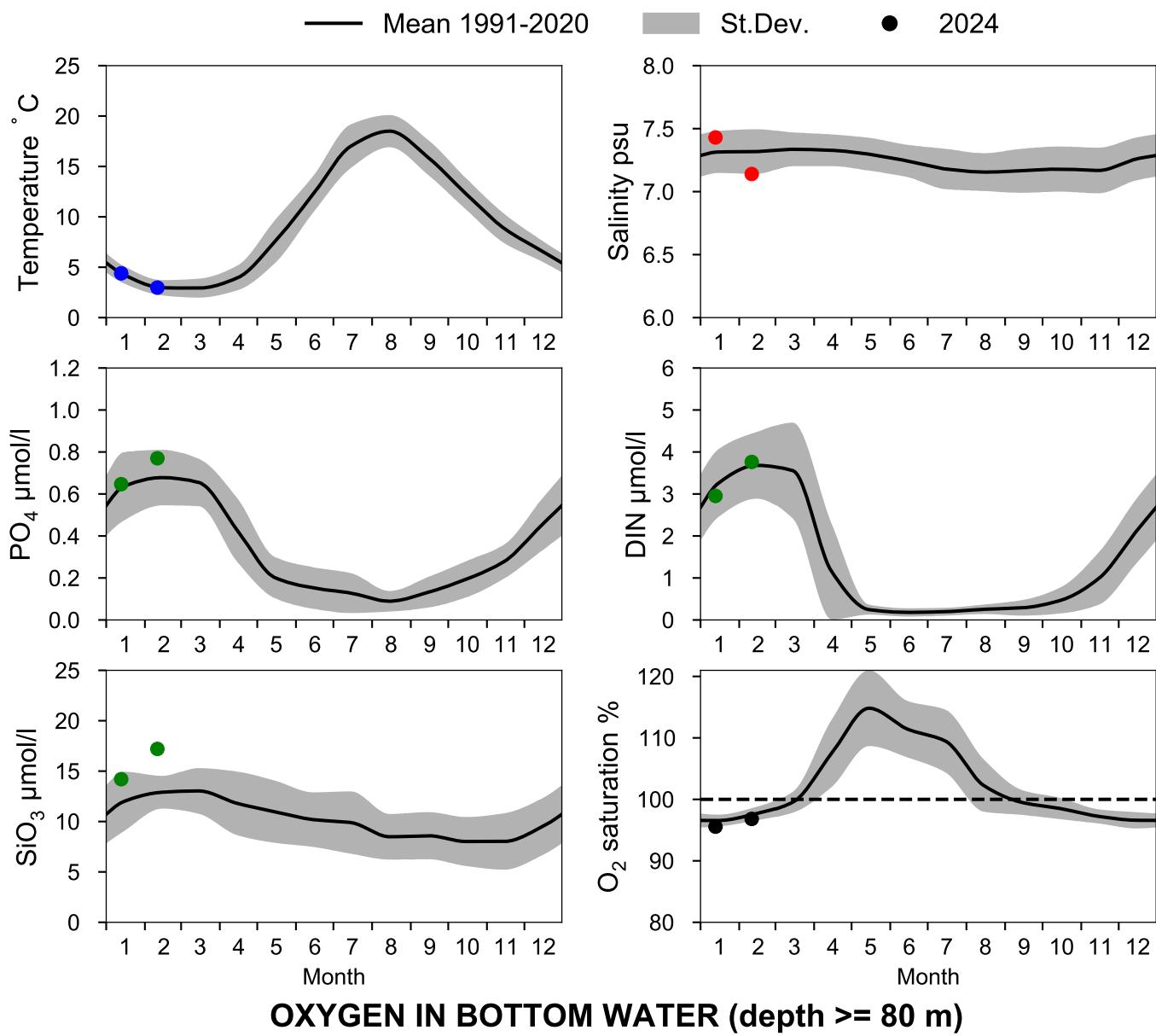
Statistics based on data from: Gdanskbuken

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

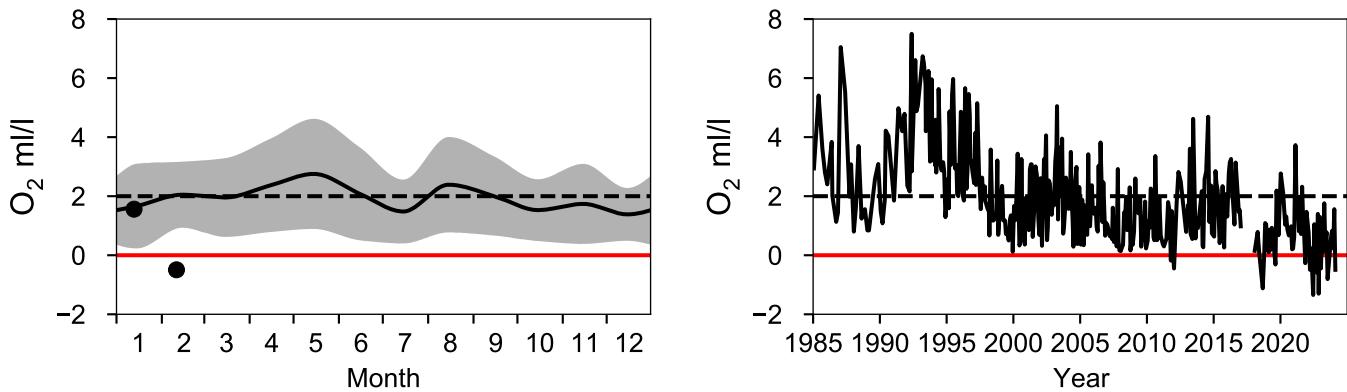


# STATION BCS III-10 SURFACE WATER (0-10 m)

Annual Cycles

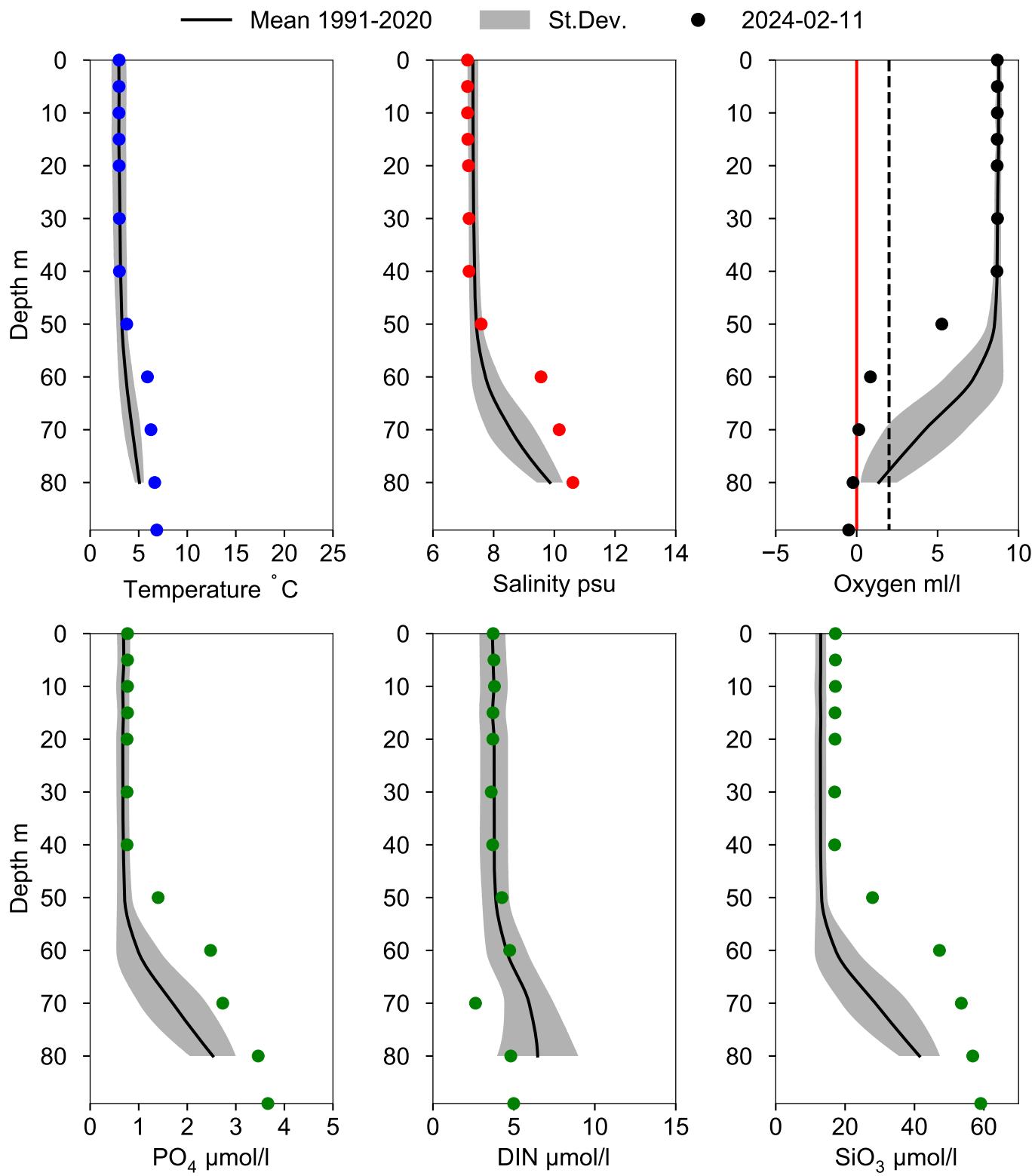


## OXYGEN IN BOTTOM WATER (depth >= 80 m)



# Vertical profiles BCS III-10

## February



# STATION BY9 KLAIPEDA SURFACE WATER (0-10 m)

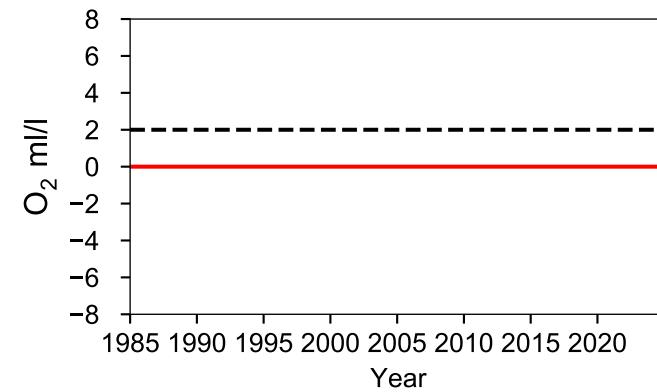
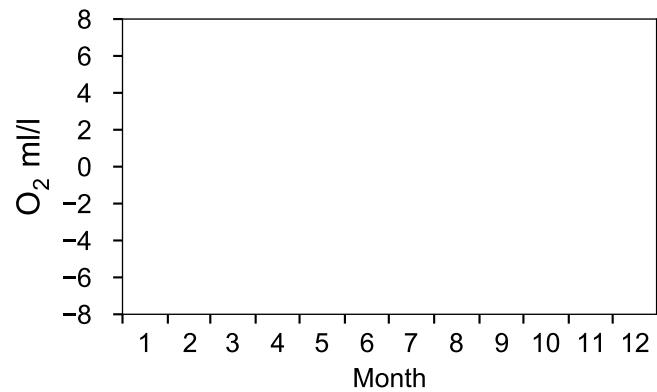
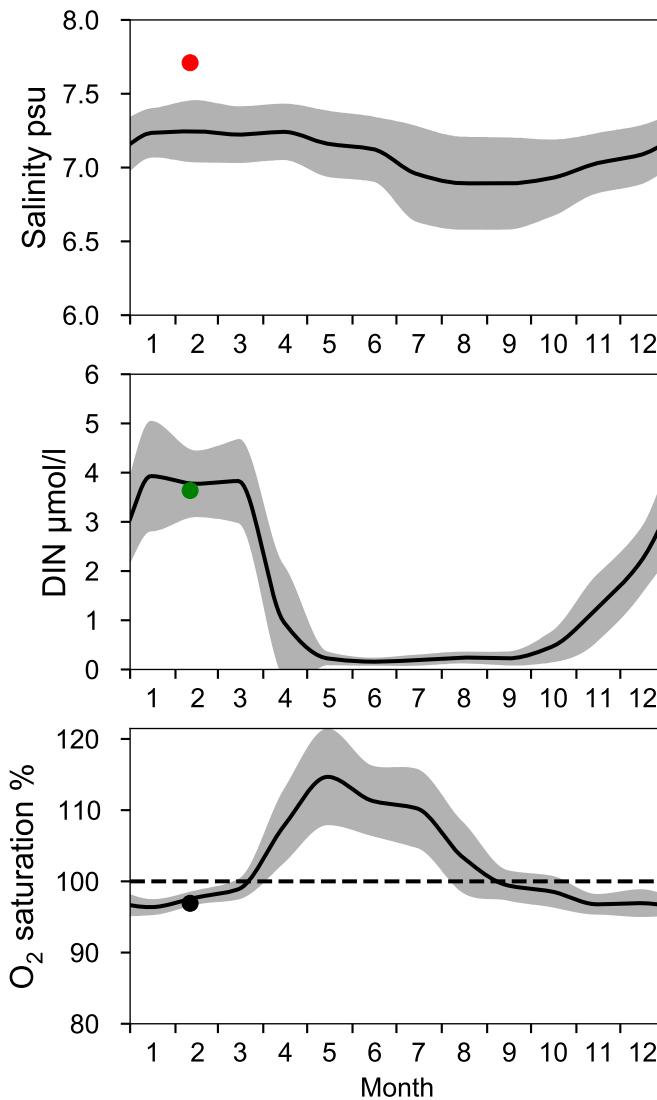
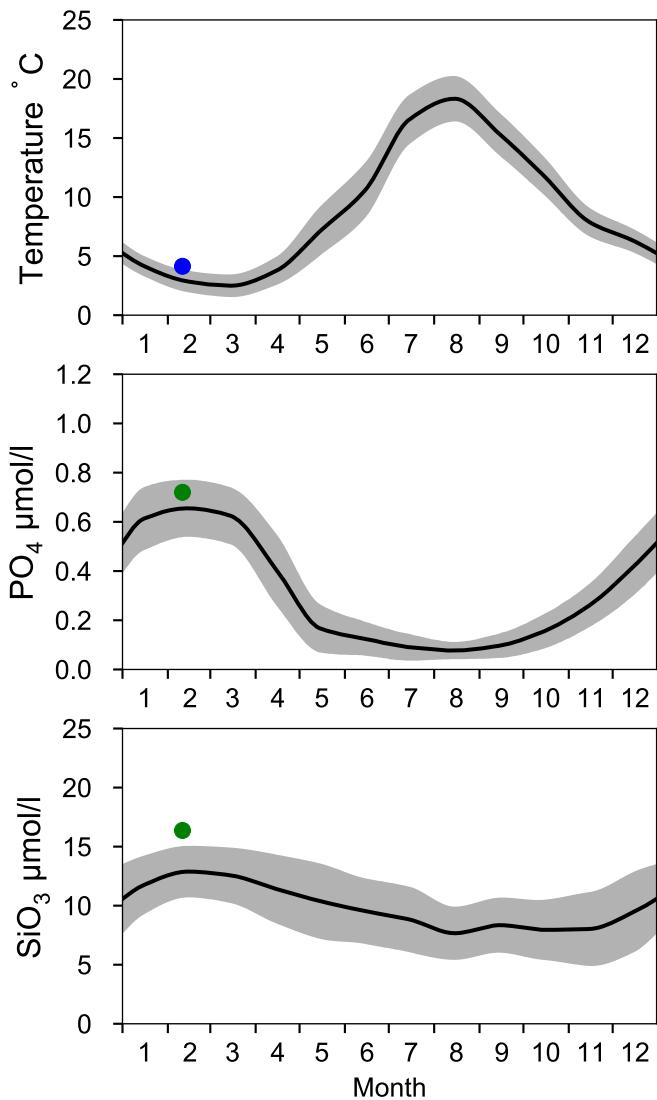
## Annual Cycles

Statistics based on data from: Östra Gotlandshavet

— Mean 1991-2020

St.Dev.

● 2024

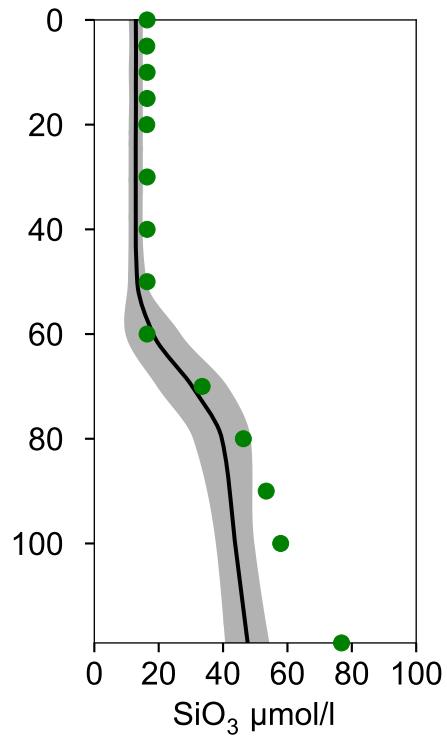
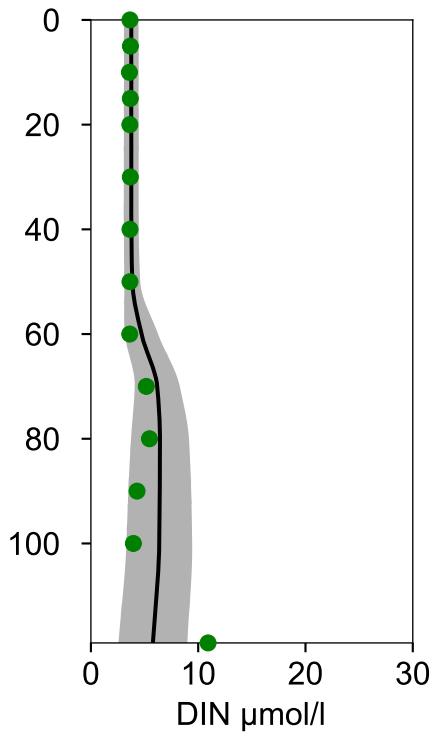
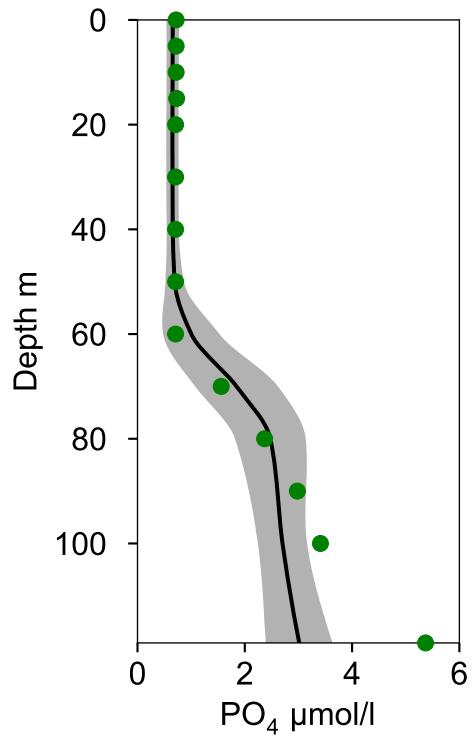
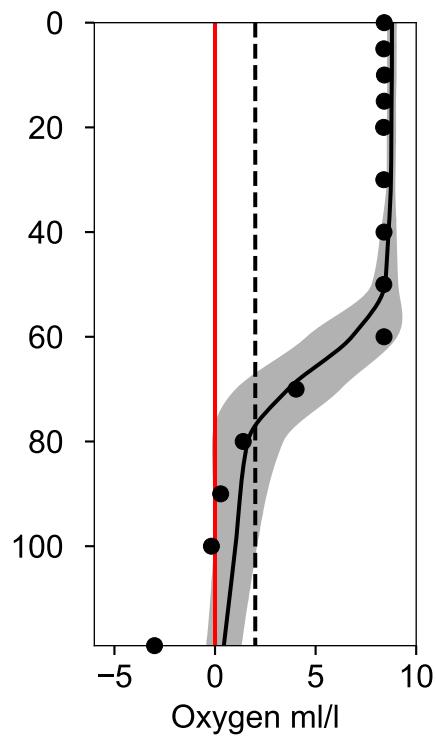
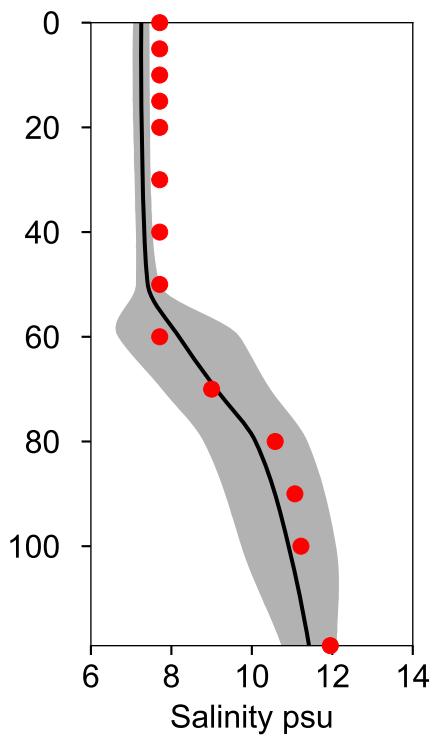
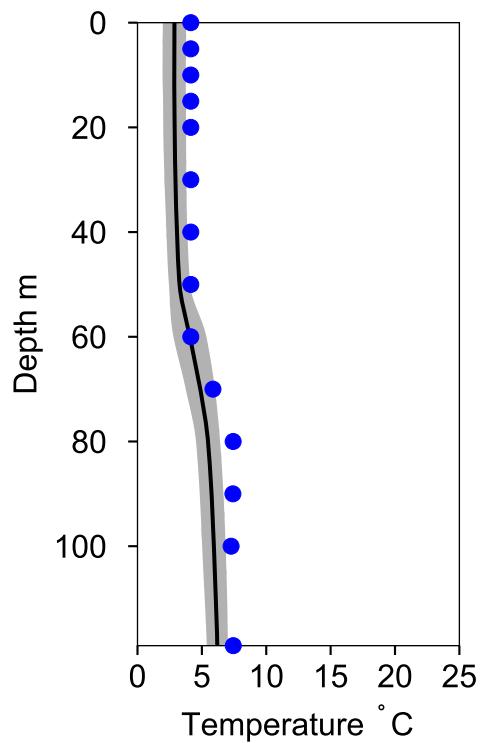


# Vertical profiles BY9 KLAIPEDA

## February

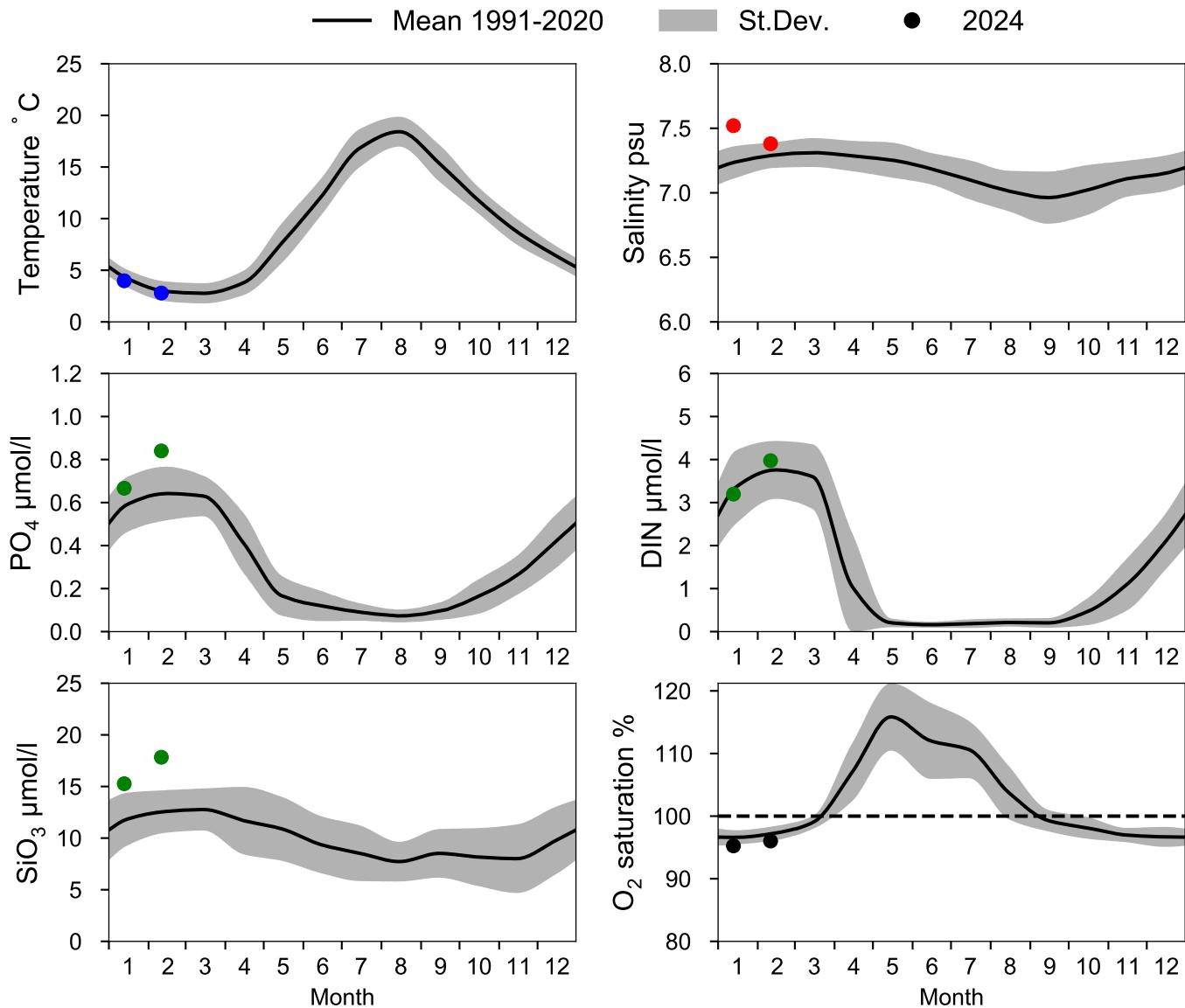
Statistics based on data from: Östra Gotlandshavet

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

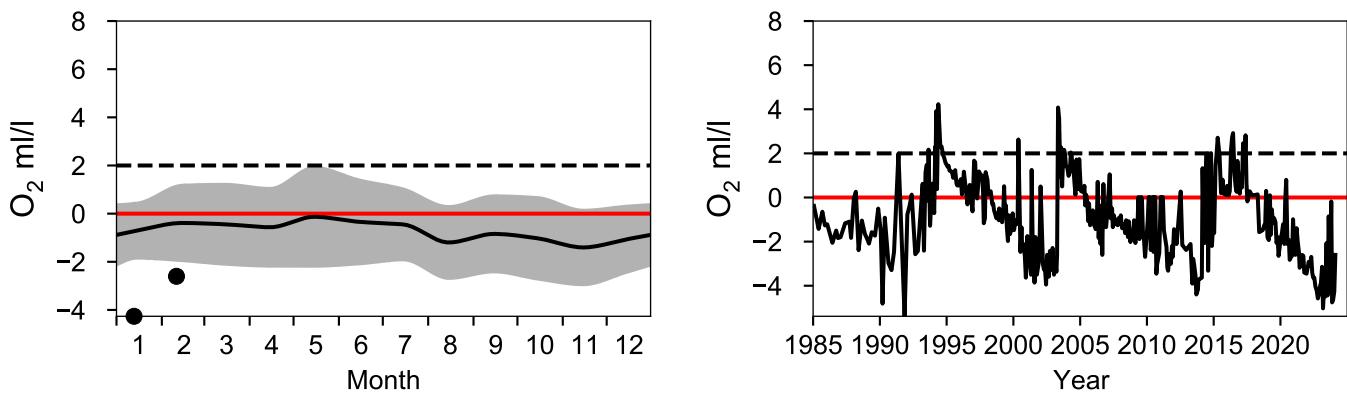


# STATION BY10 SURFACE WATER (0-10 m)

Annual Cycles

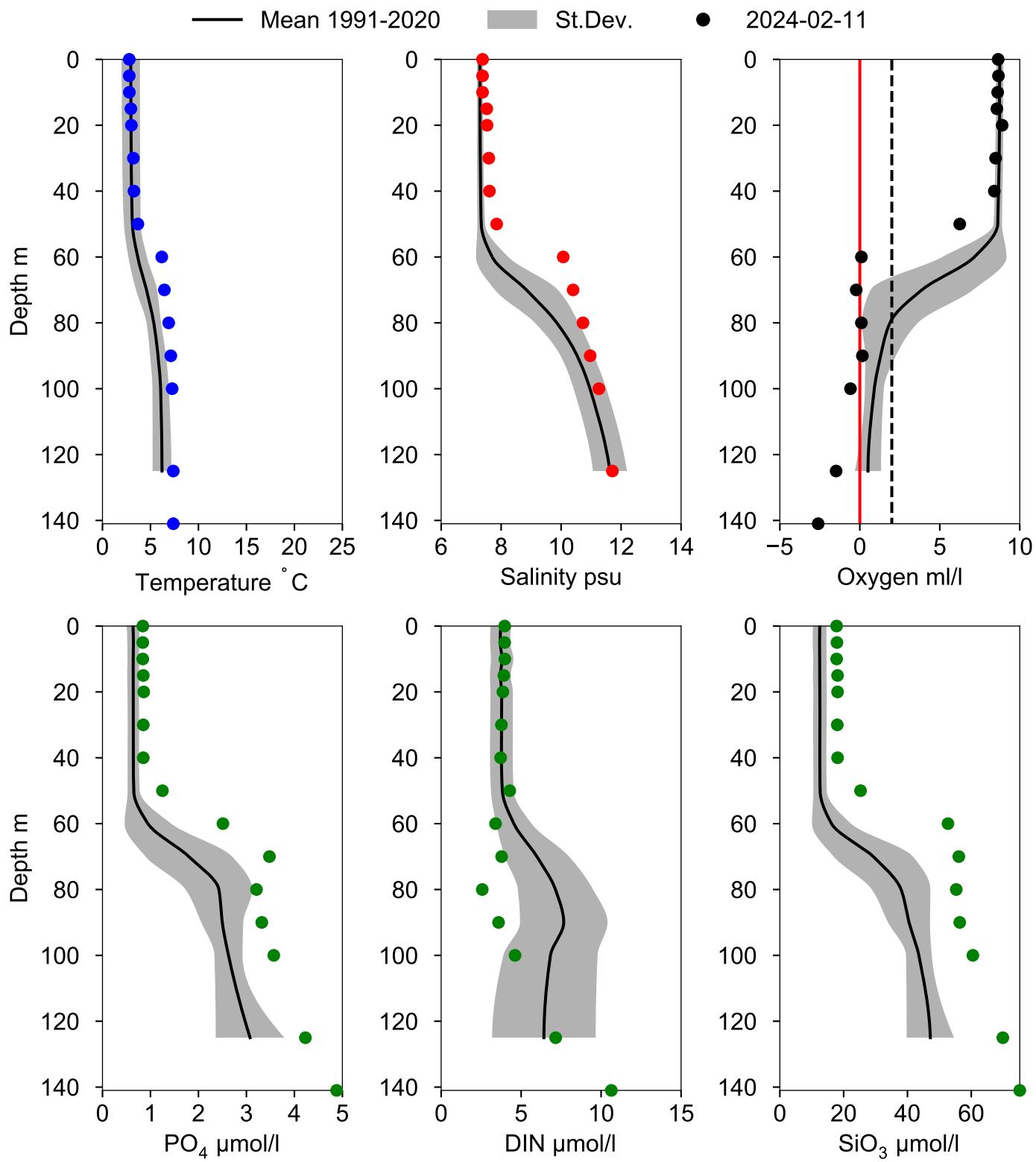


## OXYGEN IN BOTTOM WATER (depth >= 125 m)



# Vertical profiles BY10

## February



# STATION BY11 SURFACE WATER (0-10 m)

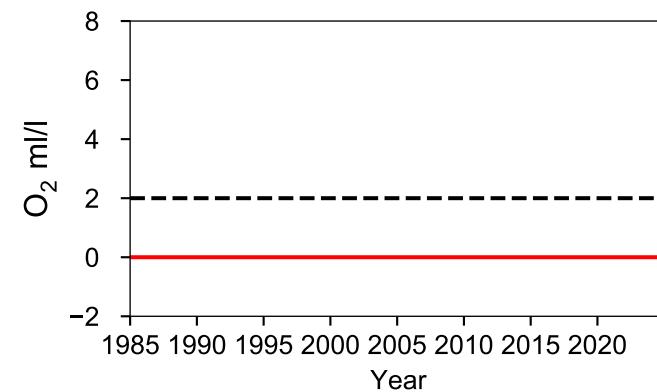
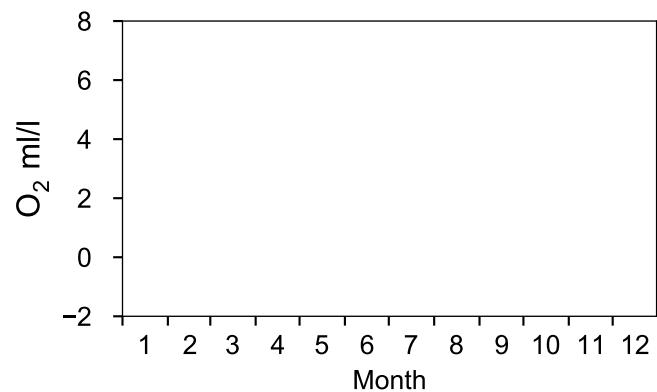
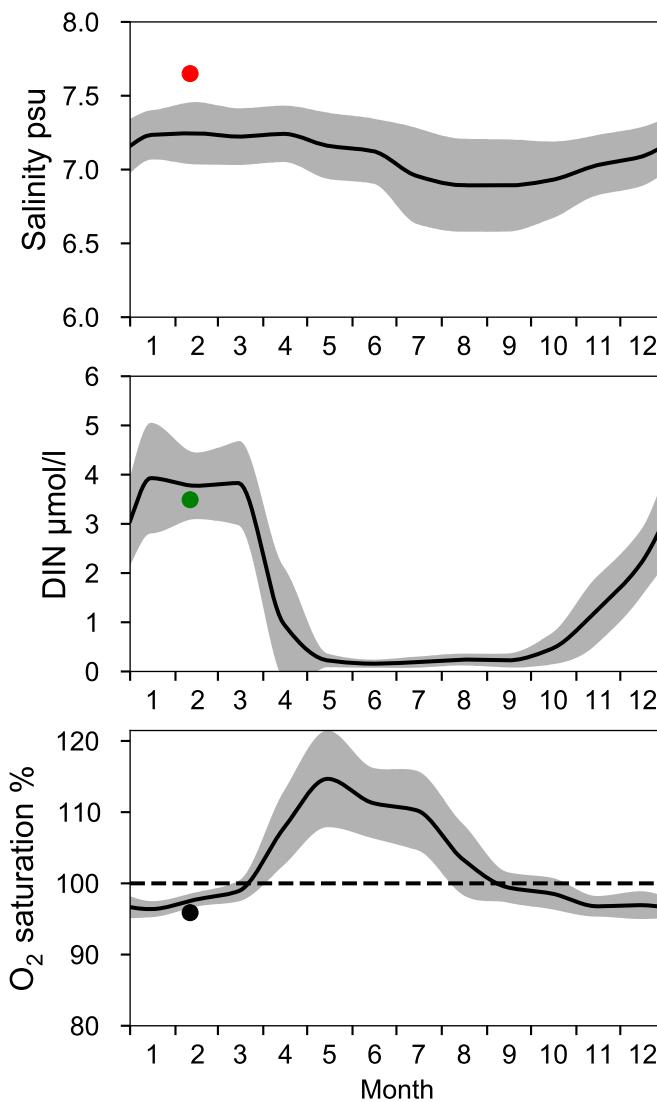
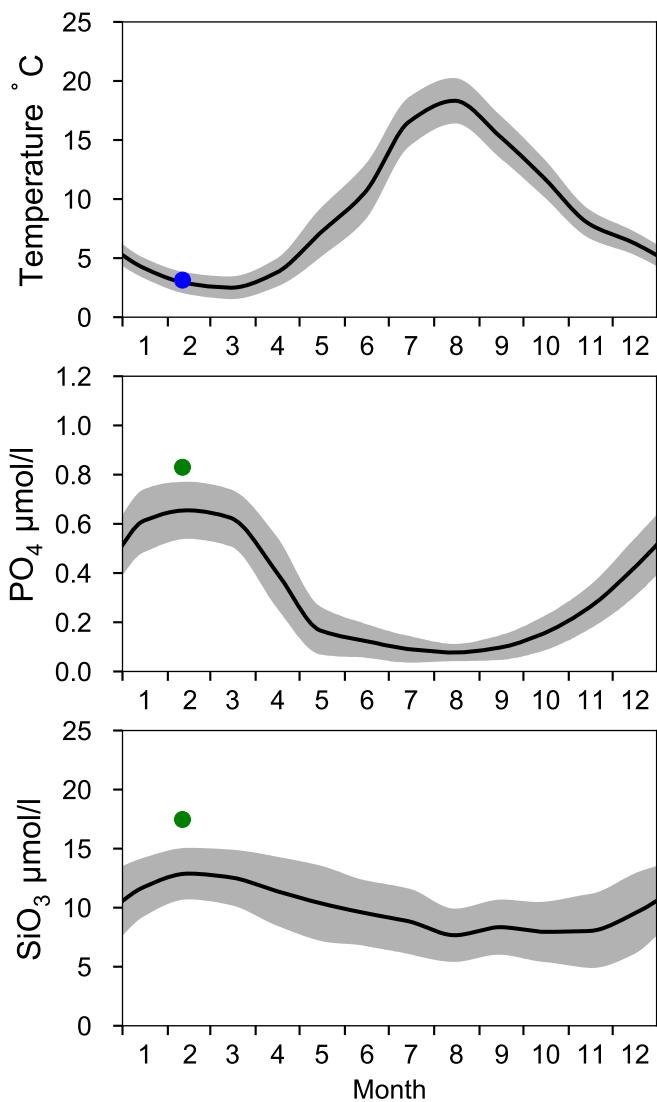
## Annual Cycles

Statistics based on data from: Östra Gotlandshavet

— Mean 1991-2020

St.Dev.

● 2024



# Vertical profiles BY11

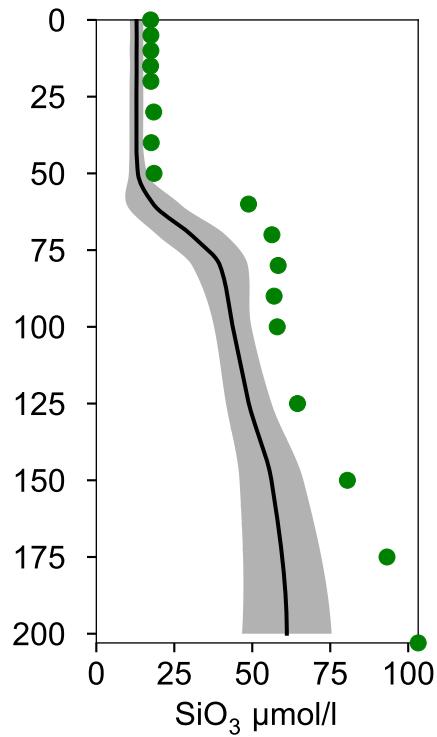
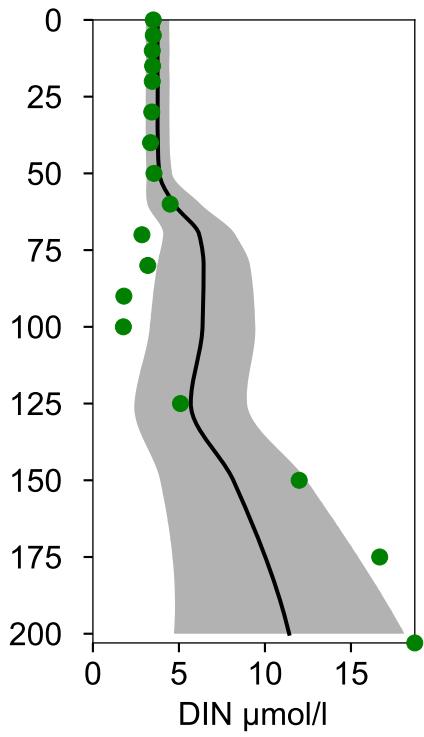
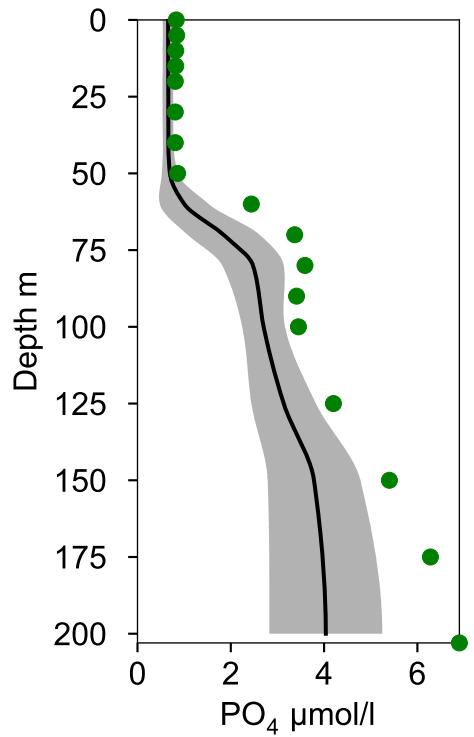
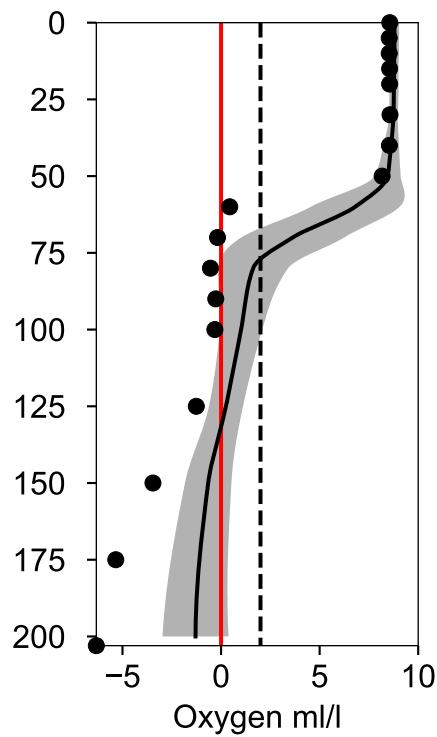
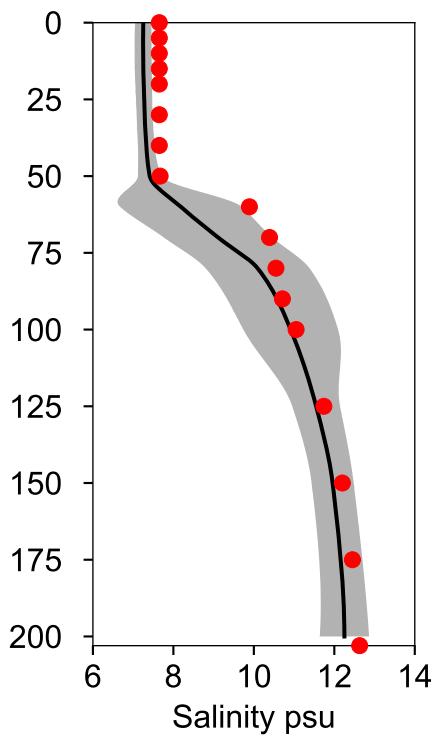
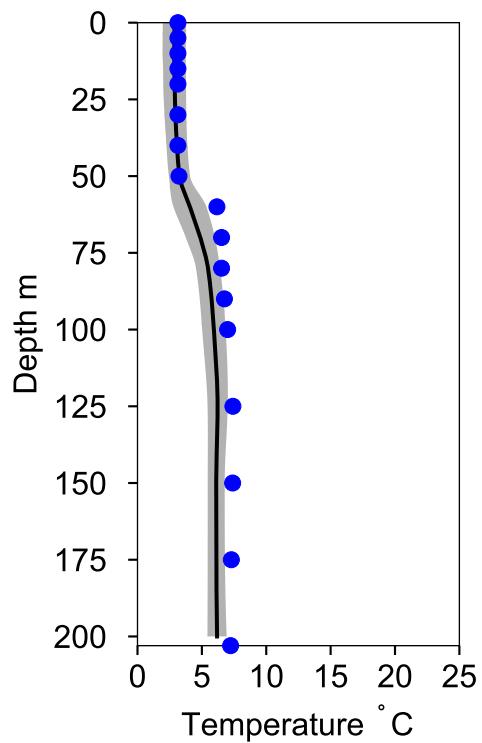
## February

Statistics based on data from: Östra Gotlandshavet

— Mean 1991-2020

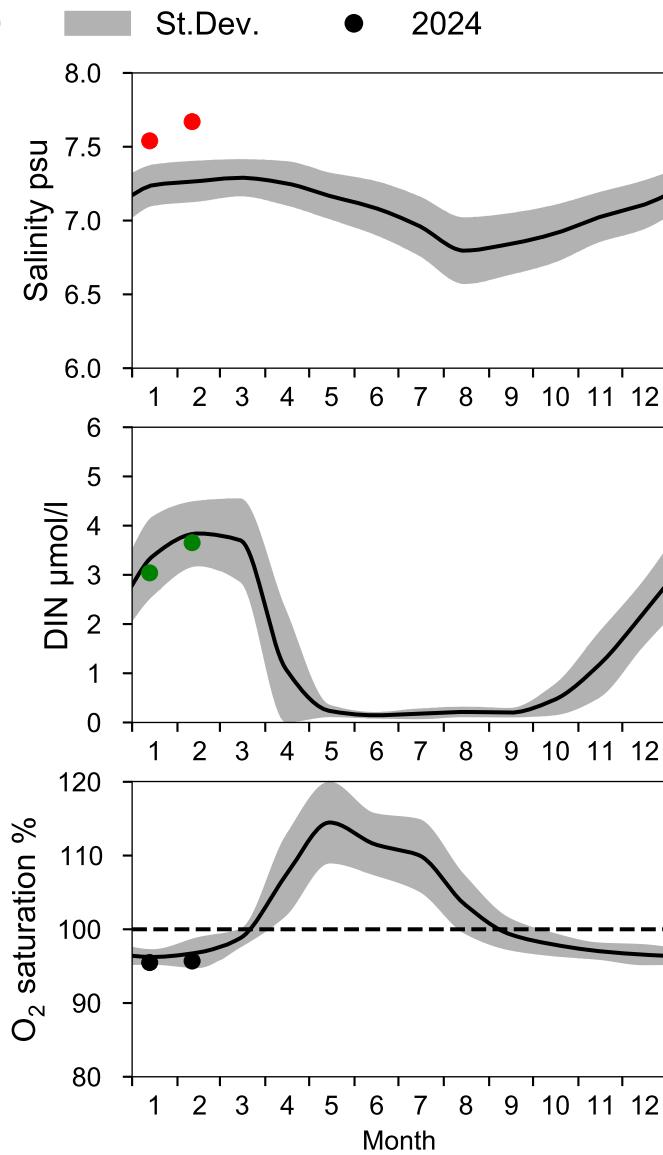
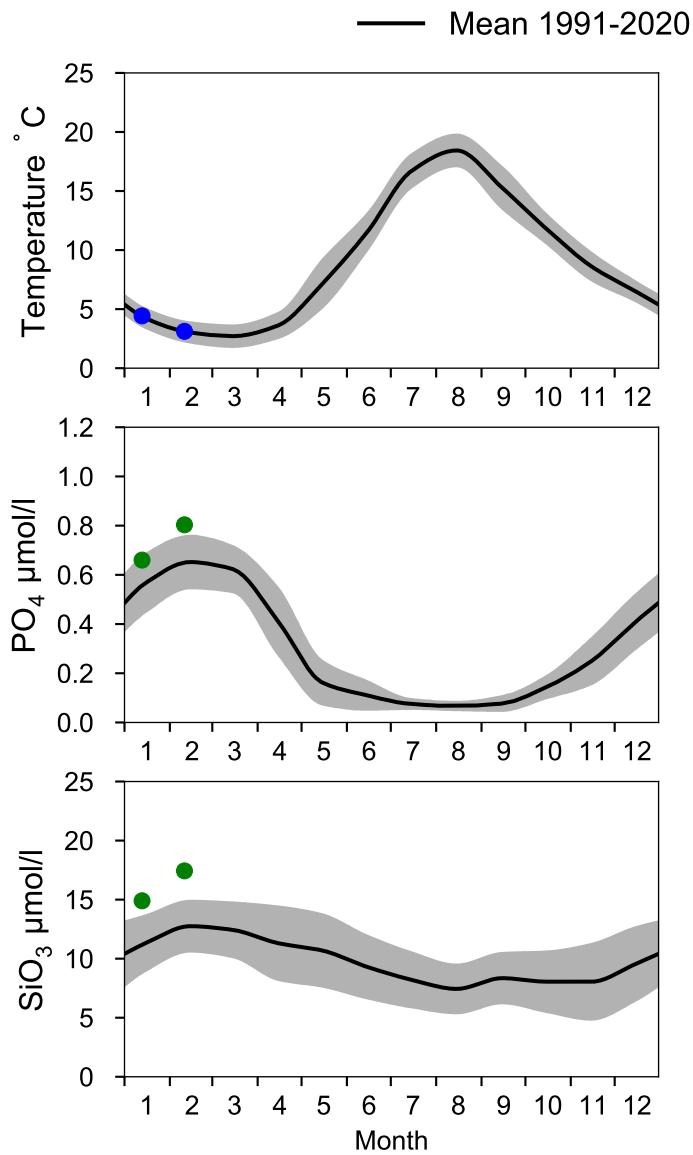
■ St.Dev.

● 2024-02-11

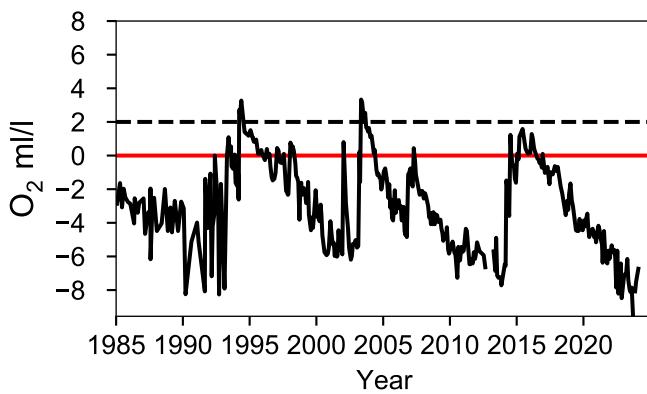
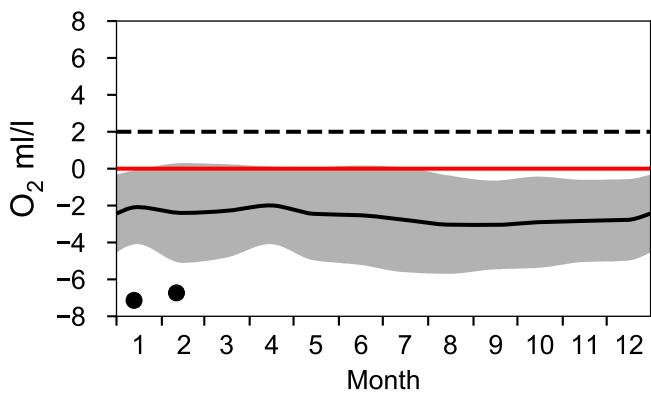


# STATION BY15 GOTLANDSDJ SURFACE WATER (0-10 m)

Annual Cycles

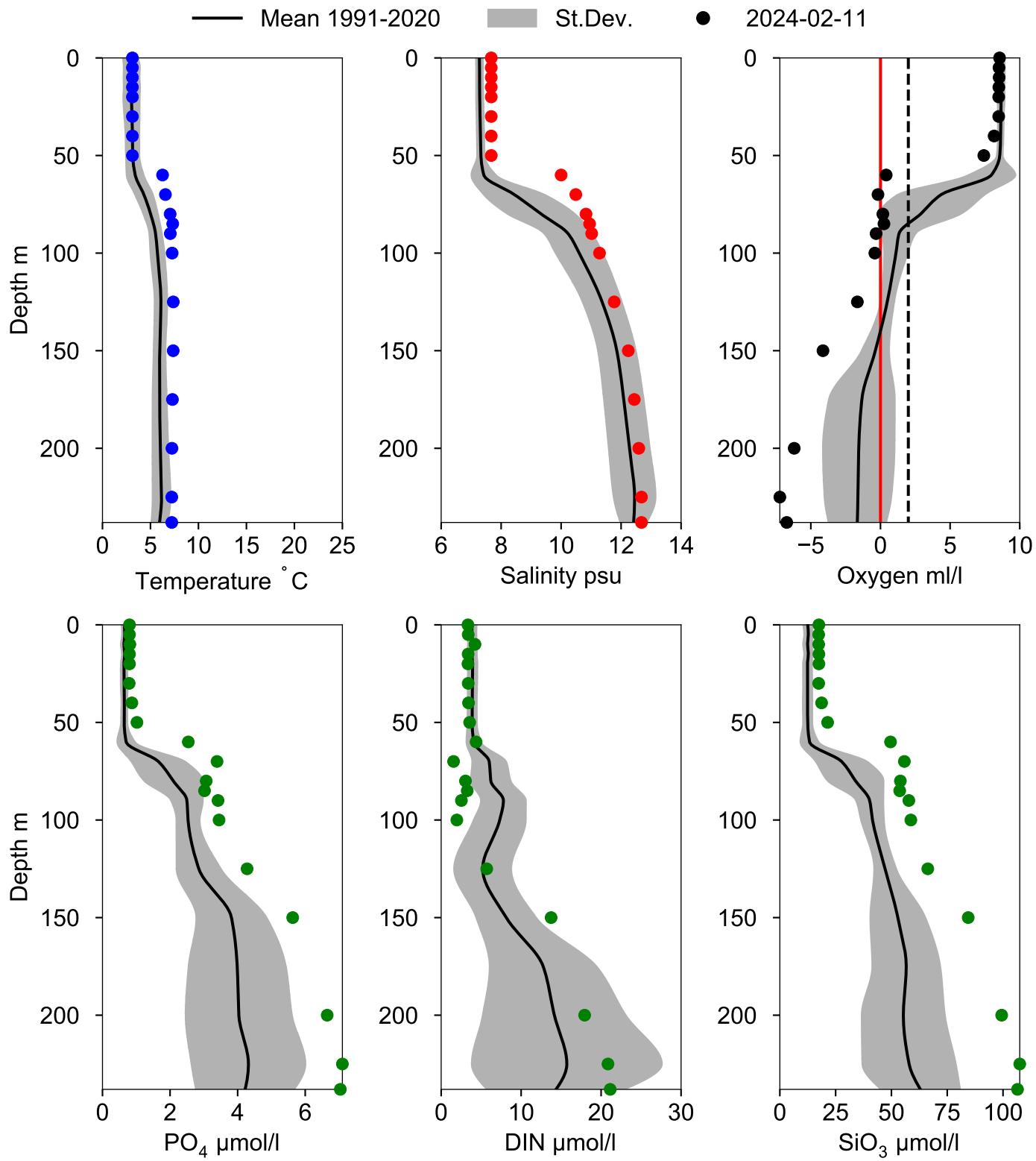


## OXYGEN IN BOTTOM WATER (depth >= 225 m)



# Vertical profiles BY15 GOTLANDSDJ

## February



# STATION BY13 SURFACE WATER (0-10 m)

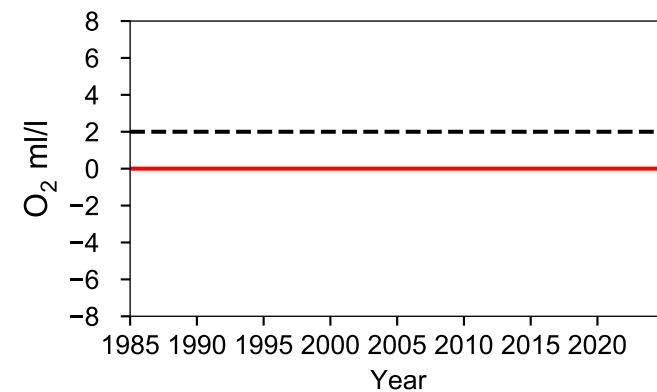
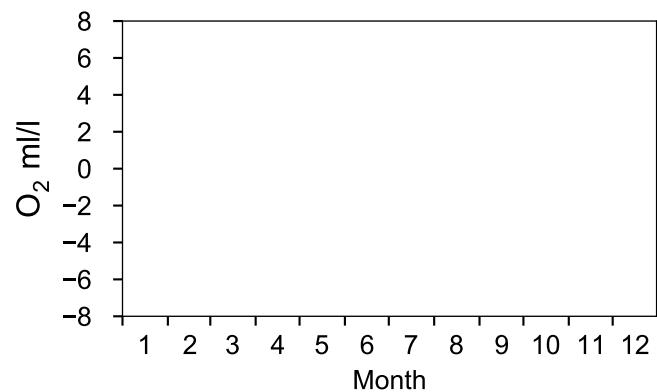
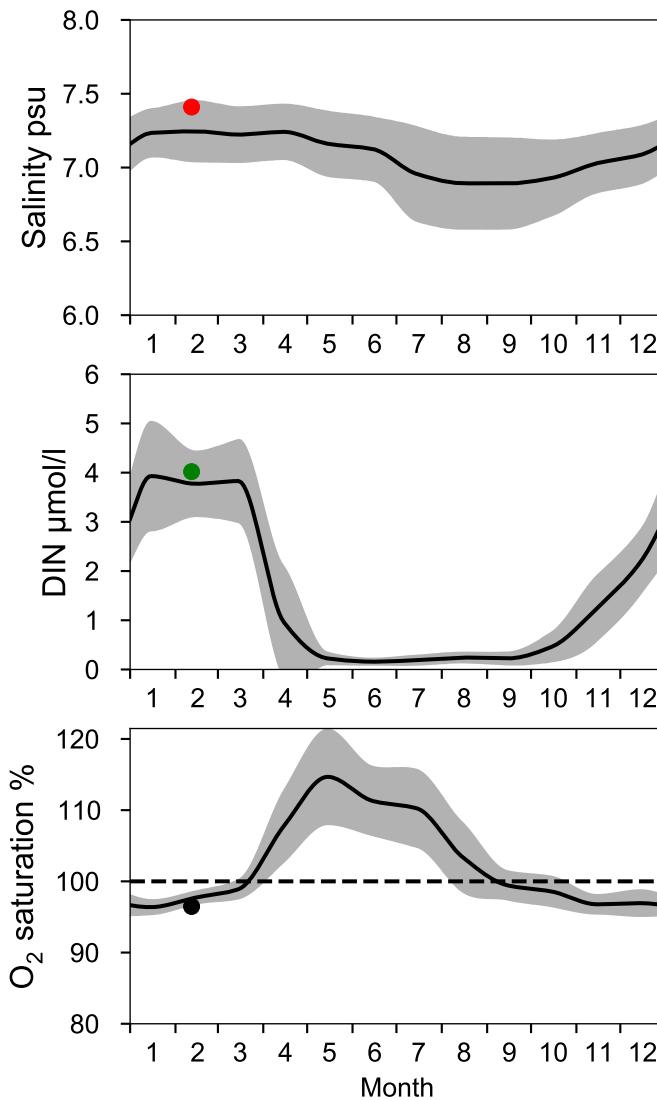
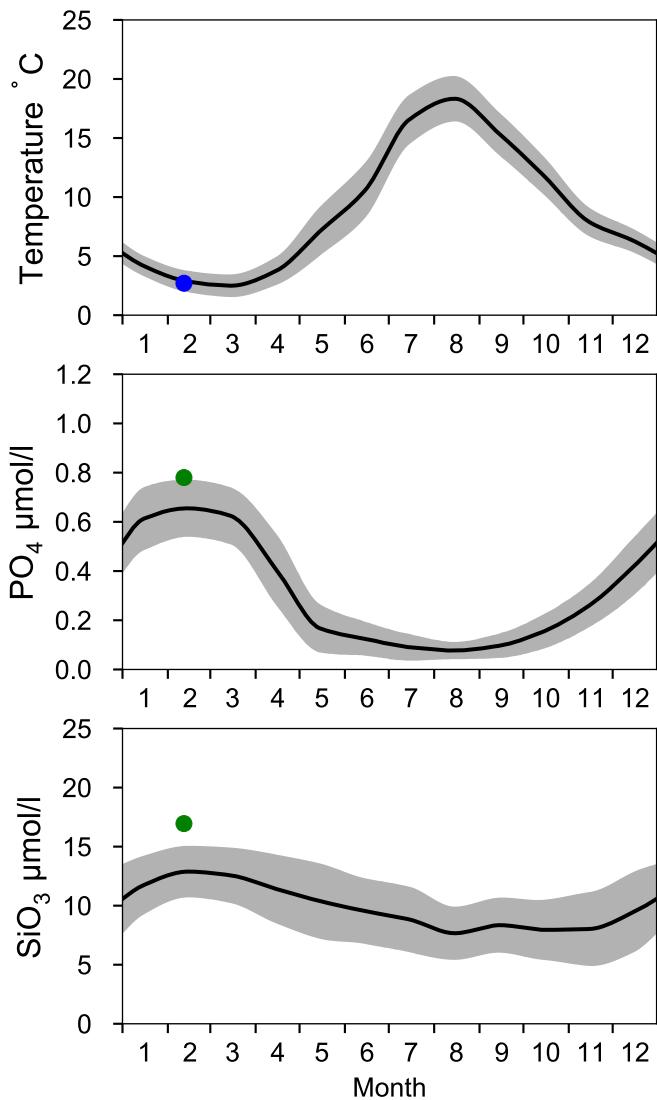
## Annual Cycles

Statistics based on data from: Östra Gotlandshavet

— Mean 1991-2020

St.Dev.

● 2024

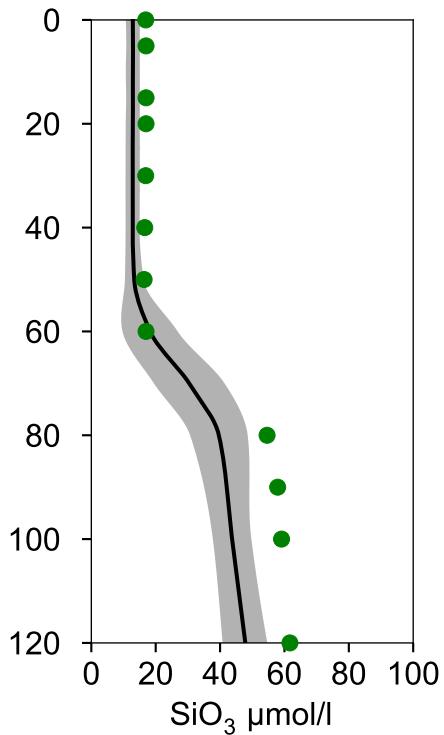
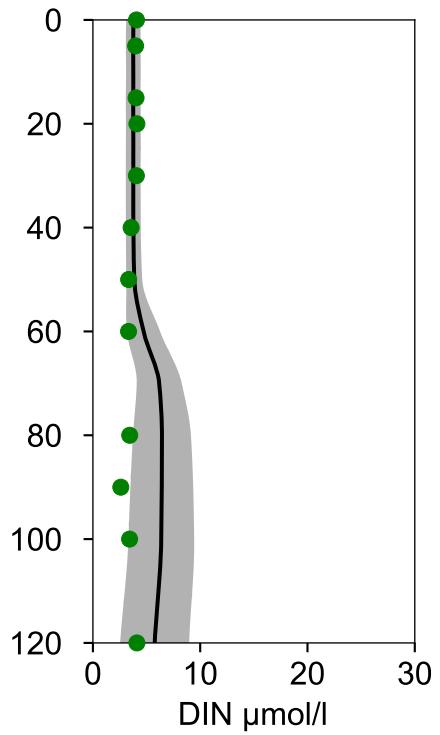
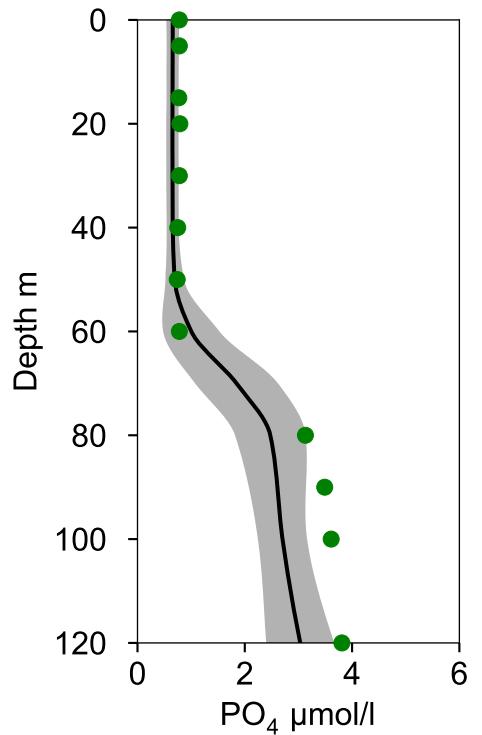
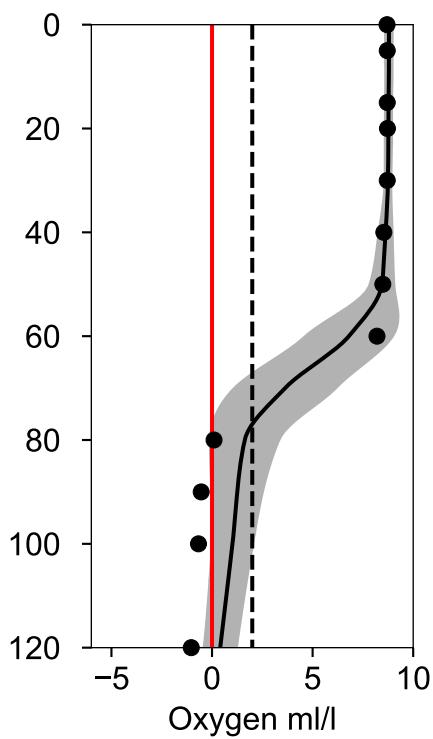
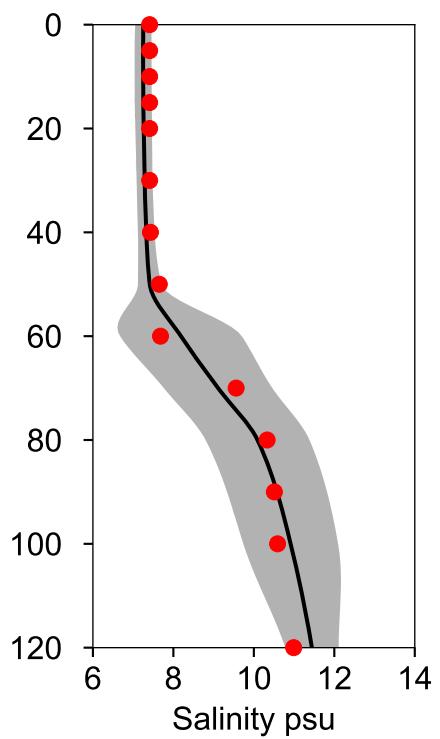
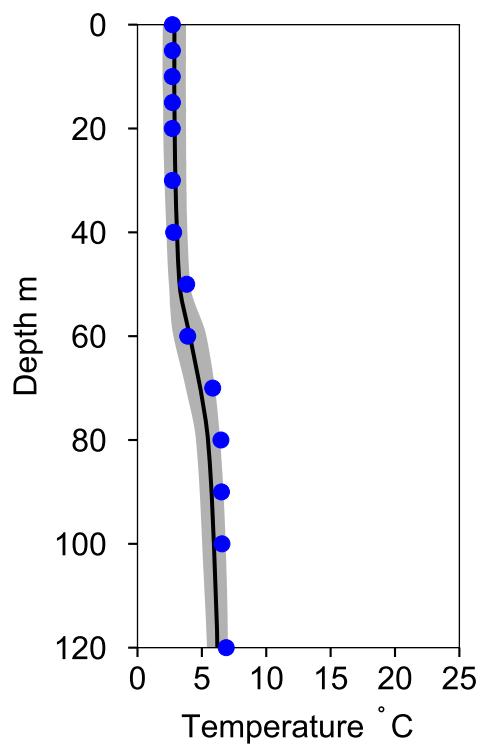


# Vertical profiles BY13

## February

Statistics based on data from: Östra Gotlandshavet

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



# STATION BY19 SURFACE WATER (0-10 m)

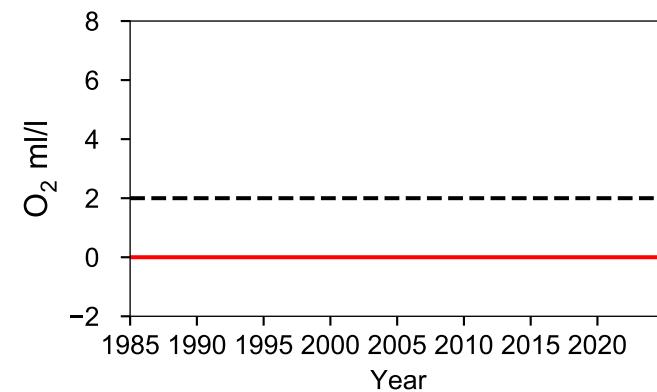
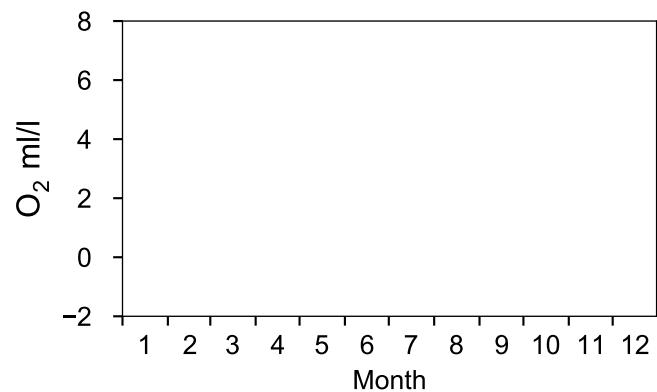
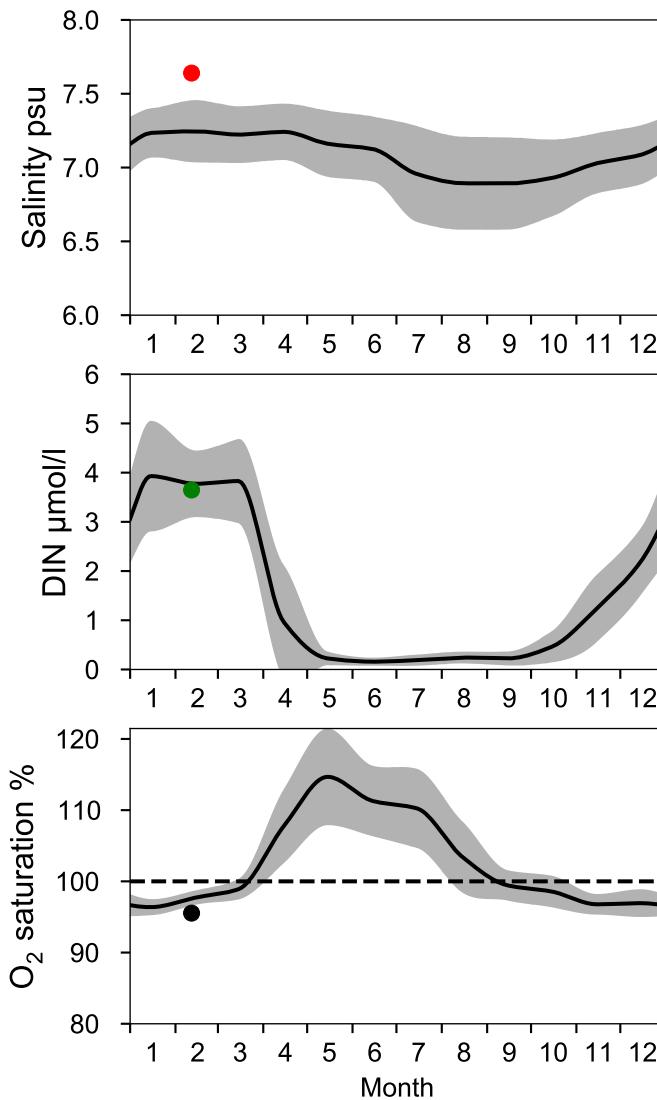
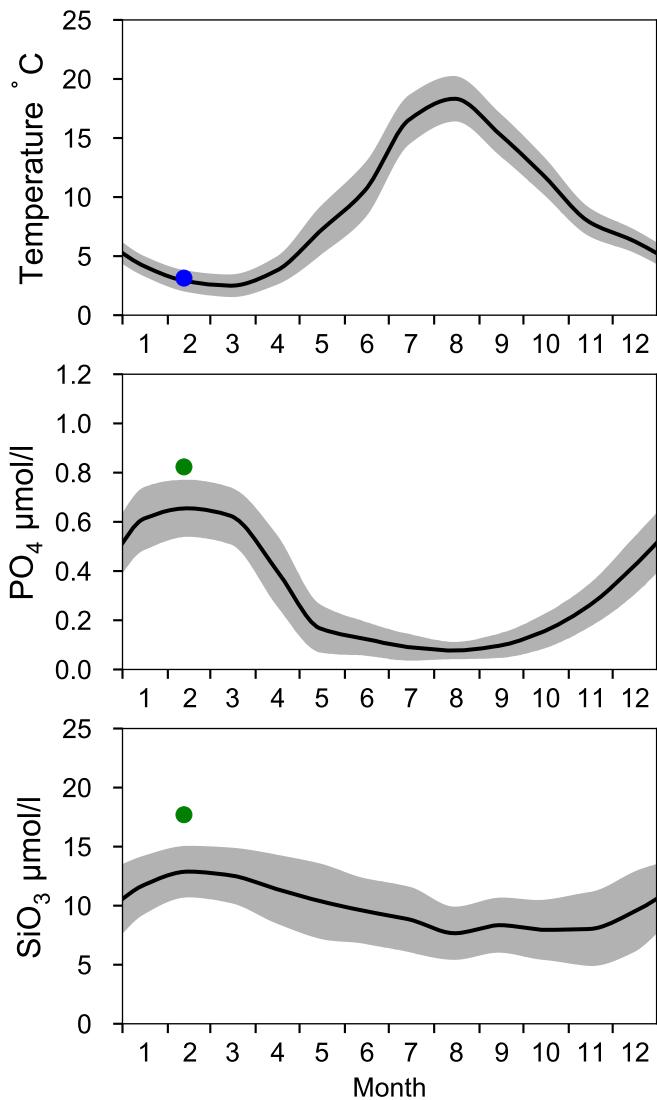
## Annual Cycles

Statistics based on data from: Östra Gotlandshavet

— Mean 1991-2020

St.Dev.

● 2024

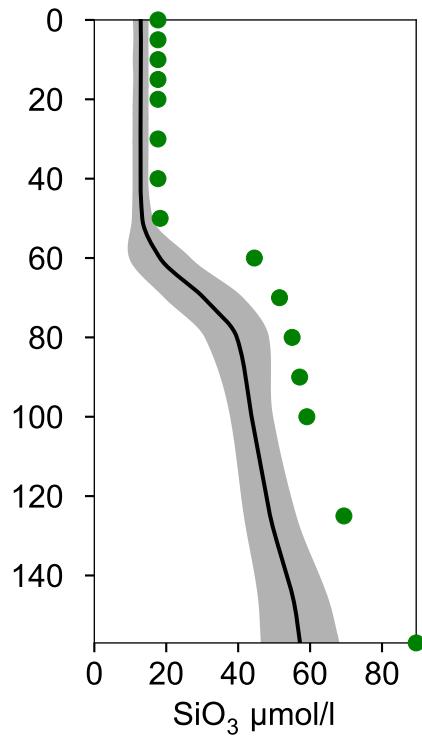
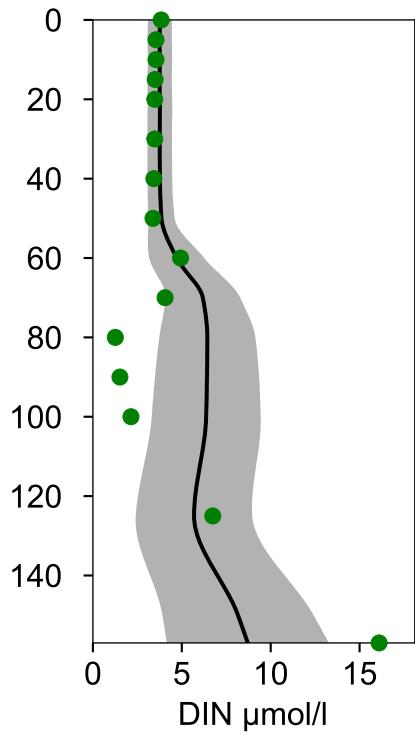
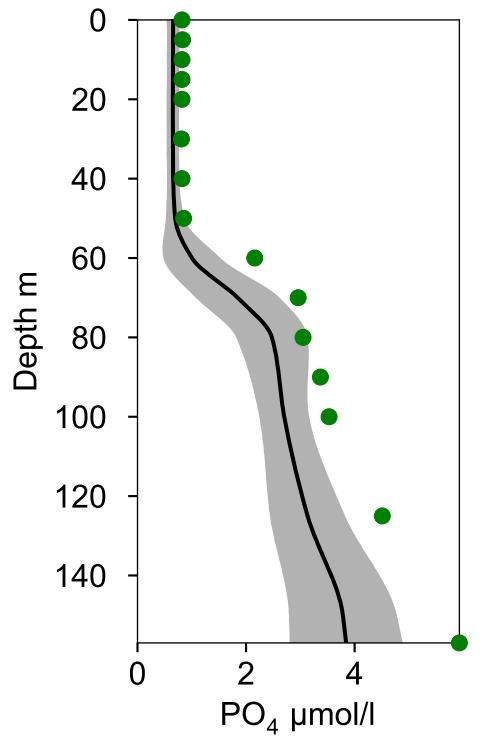
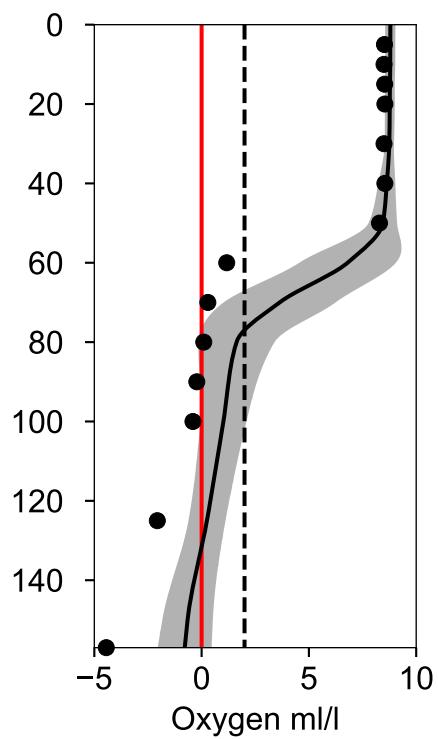
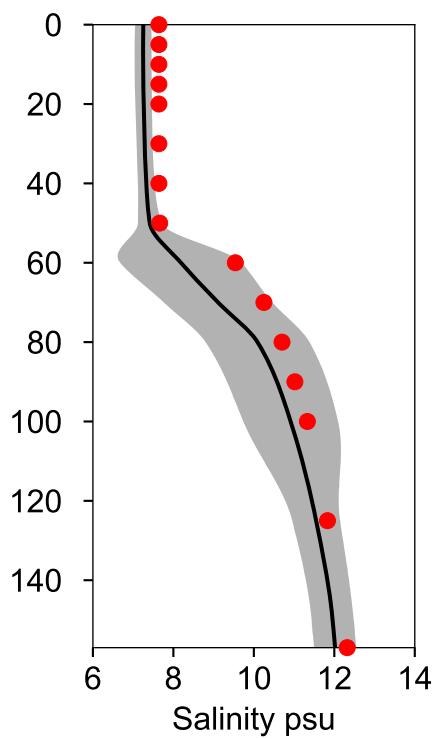
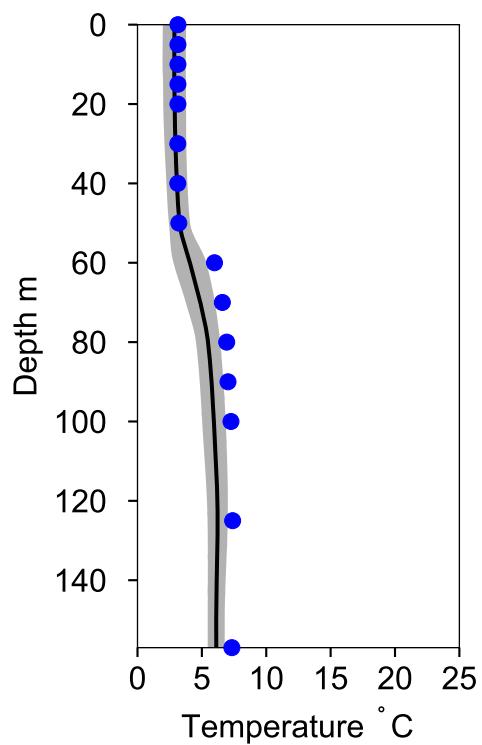


# Vertical profiles BY19

## February

Statistics based on data from: Östra Gotlandshavet

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



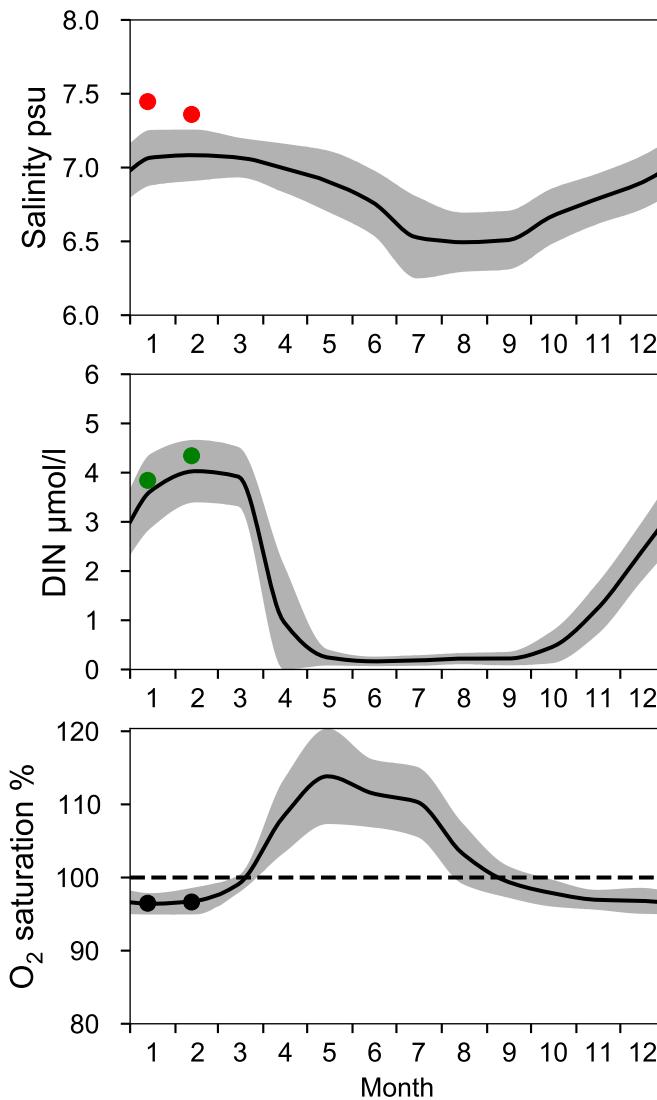
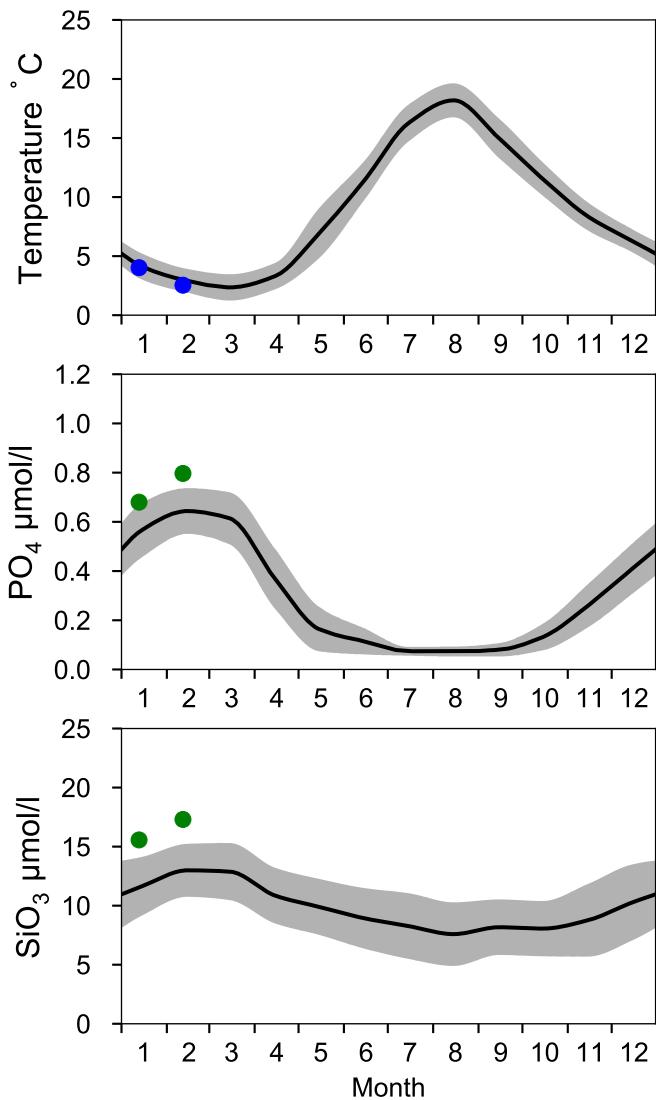
# STATION BY20 FÄRÖDJ SURFACE WATER (0-10 m)

Annual Cycles

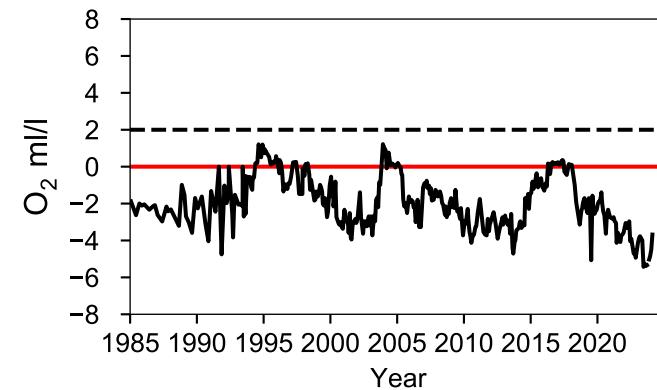
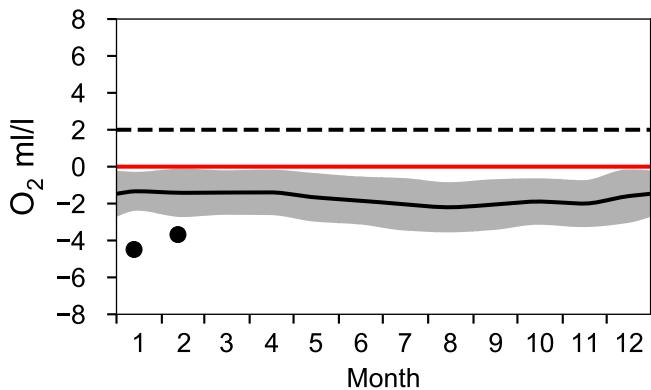
— Mean 1991-2020

St.Dev.

● 2024

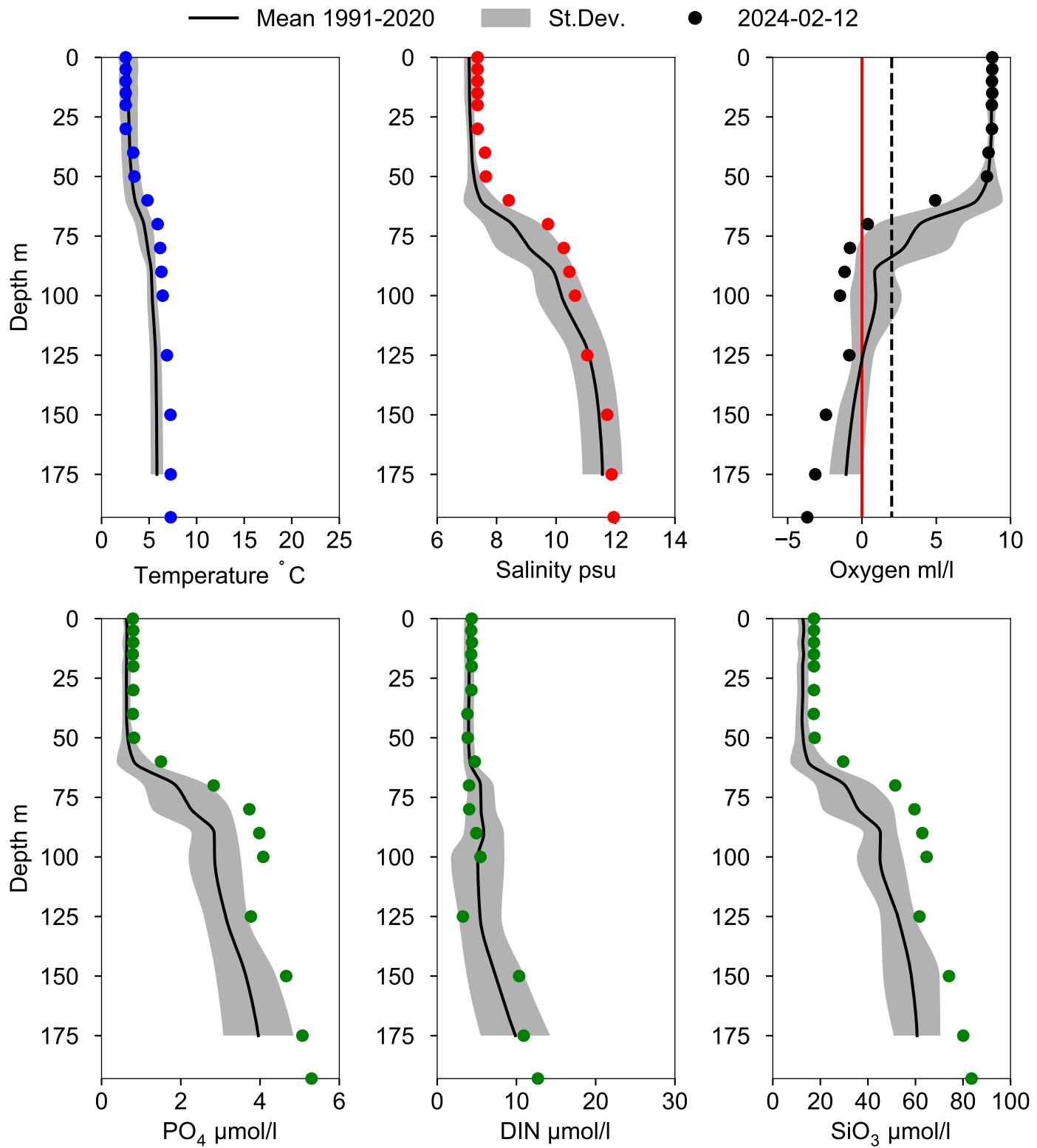


## OXYGEN IN BOTTOM WATER (depth $\geq 175 \text{ m}$ )



# Vertical profiles BY20 FÅRÖDJ

## February



# STATION BY21 SURFACE WATER (0-10 m)

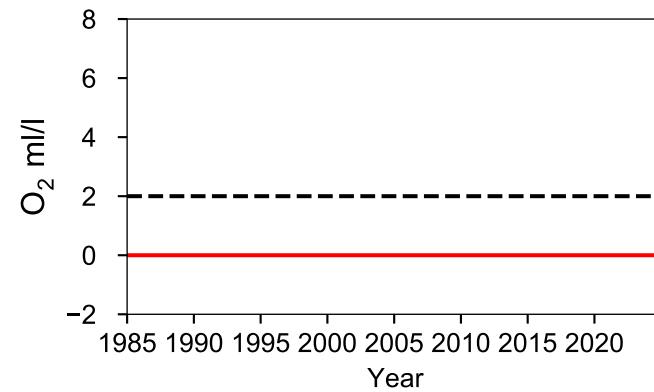
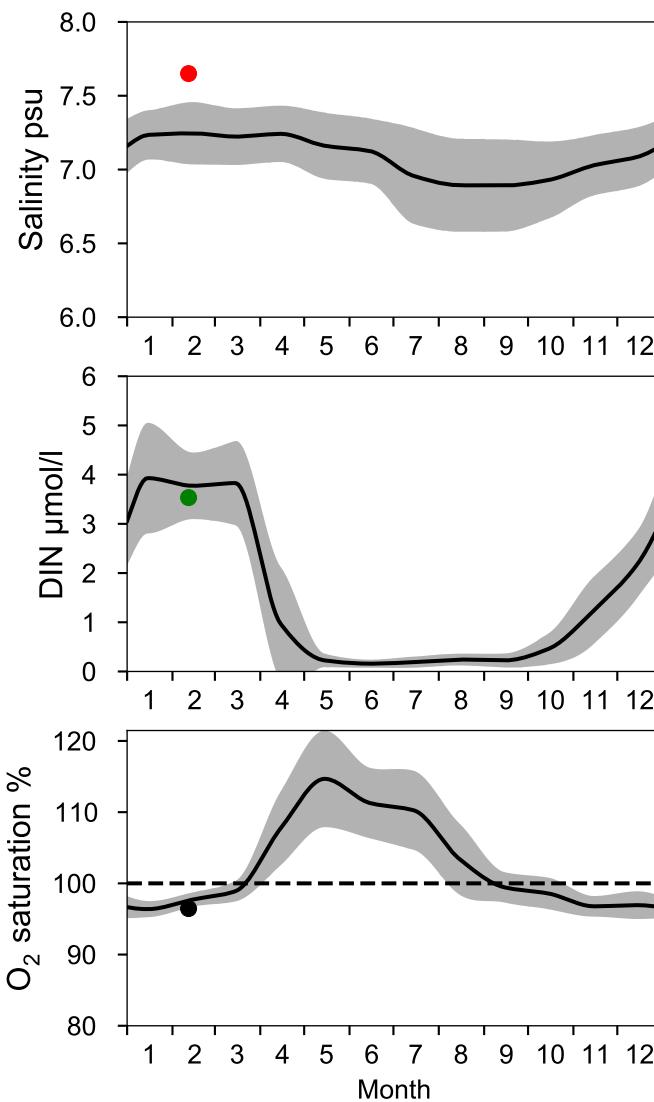
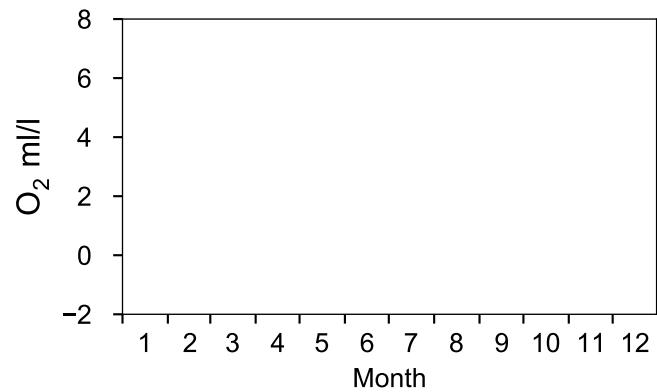
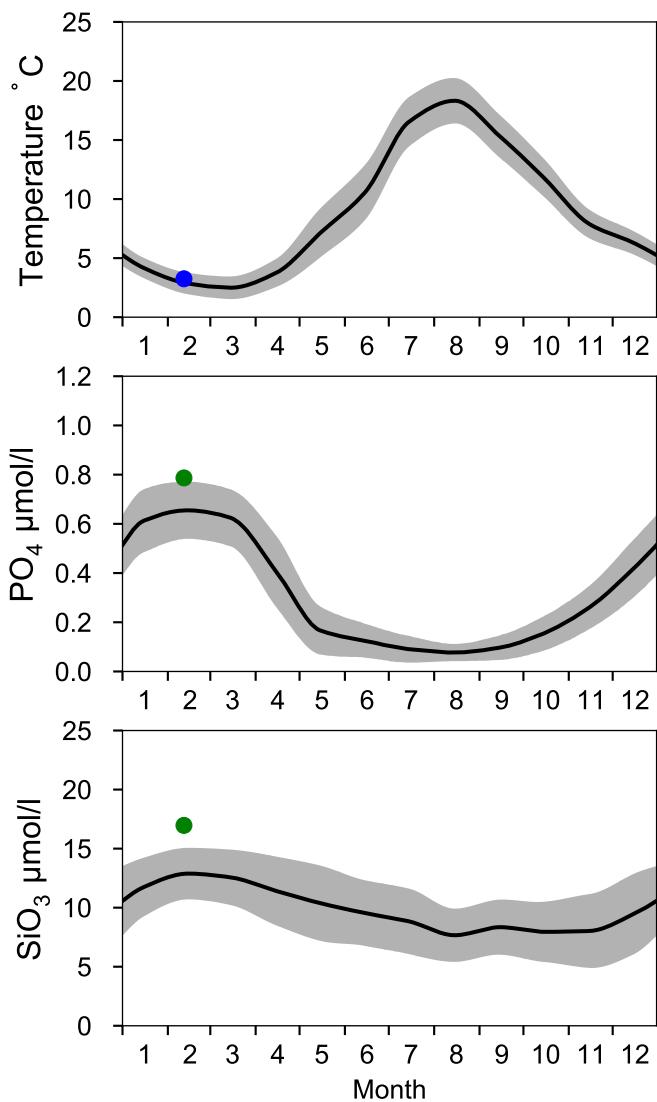
## Annual Cycles

Statistics based on data from: Östra Gotlandshavet

— Mean 1991-2020

St.Dev.

● 2024

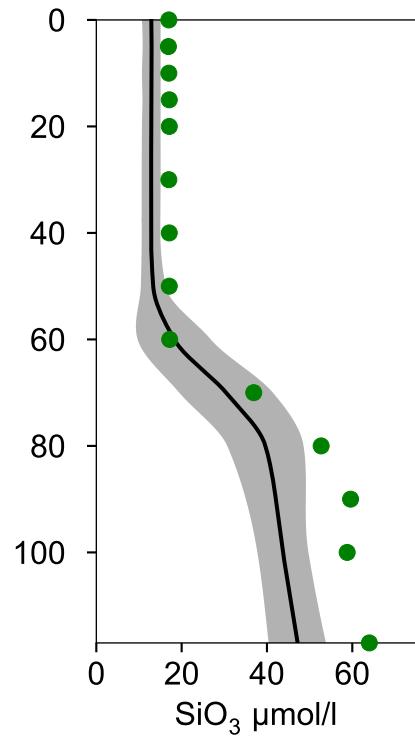
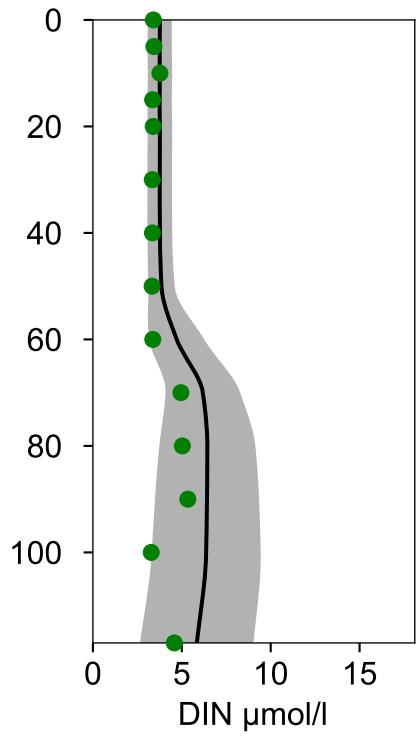
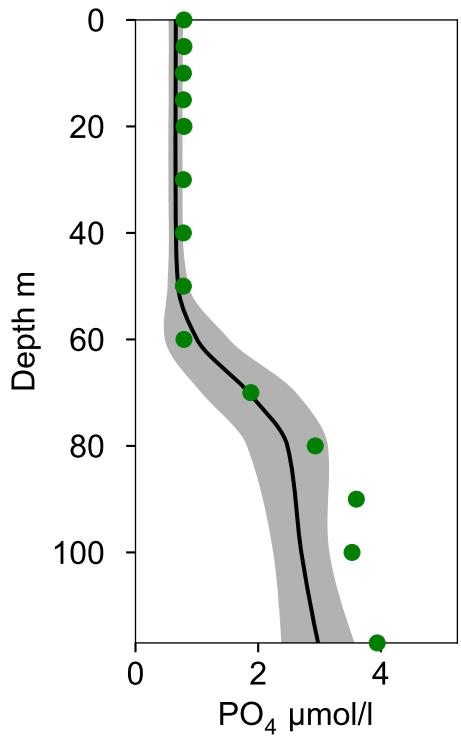
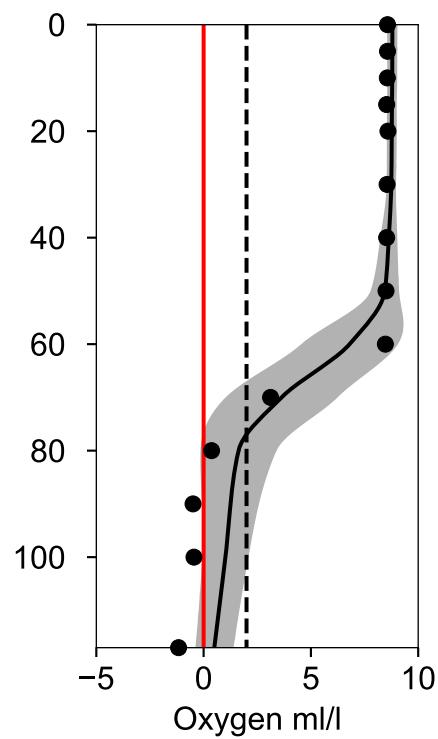
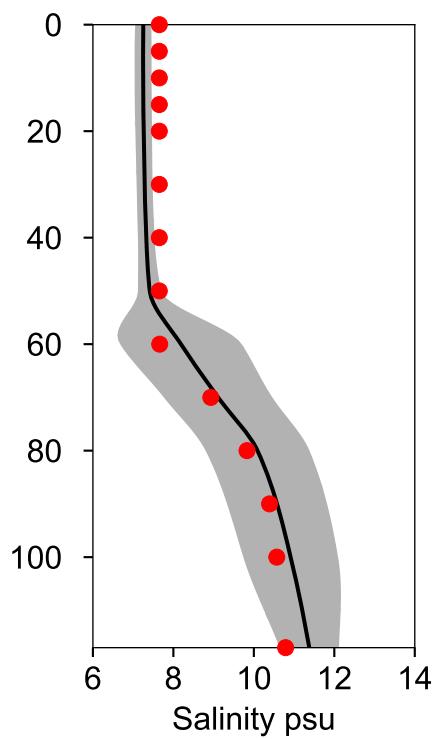
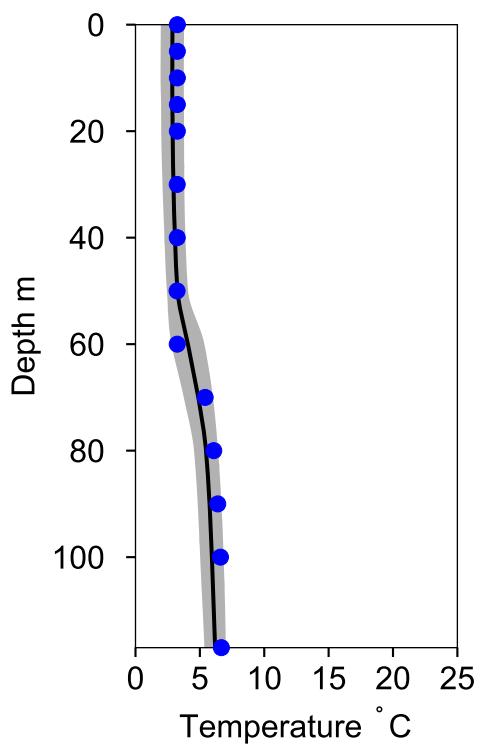


# Vertical profiles BY21

## February

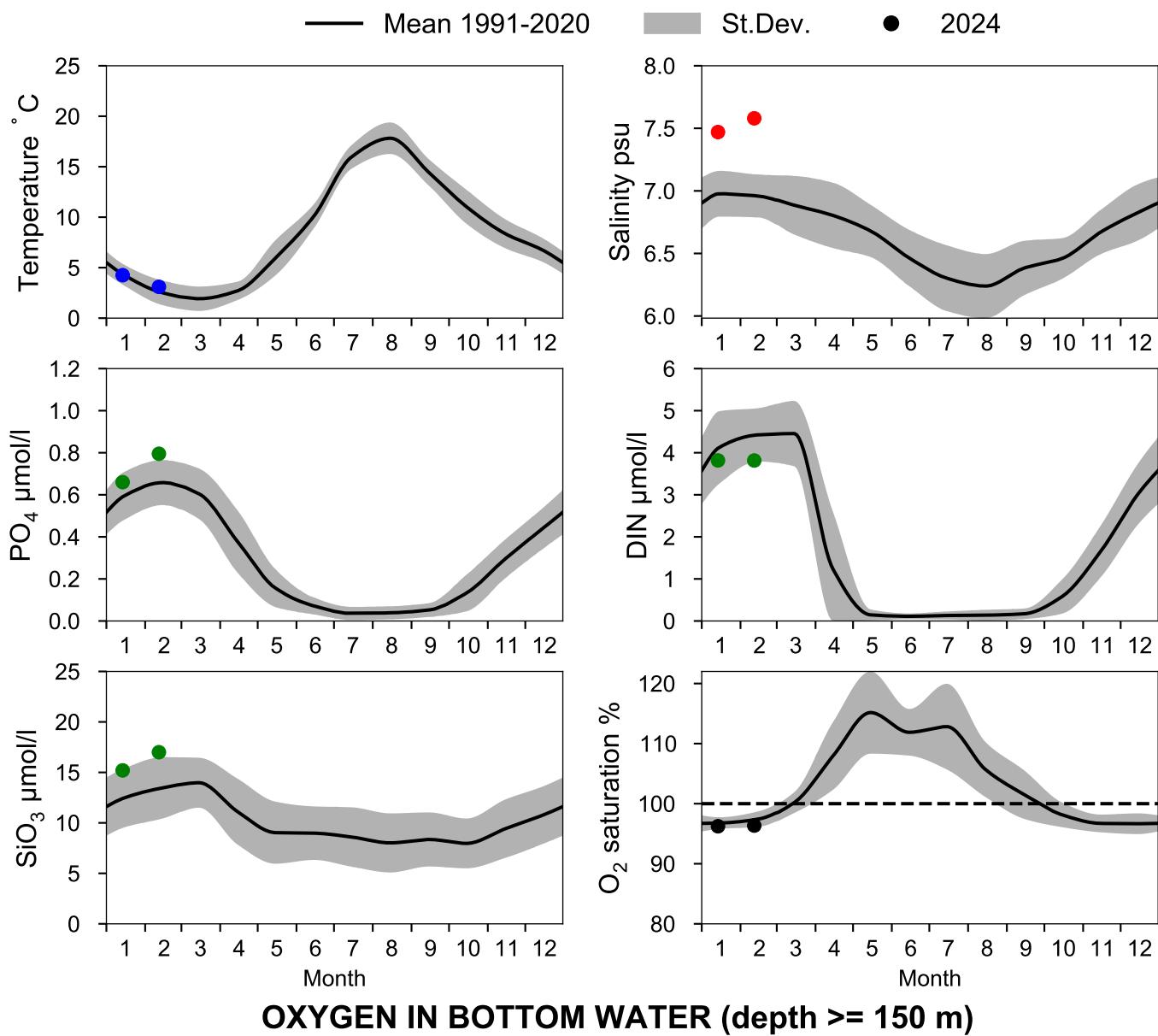
Statistics based on data from: Östra Gotlandshavet

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

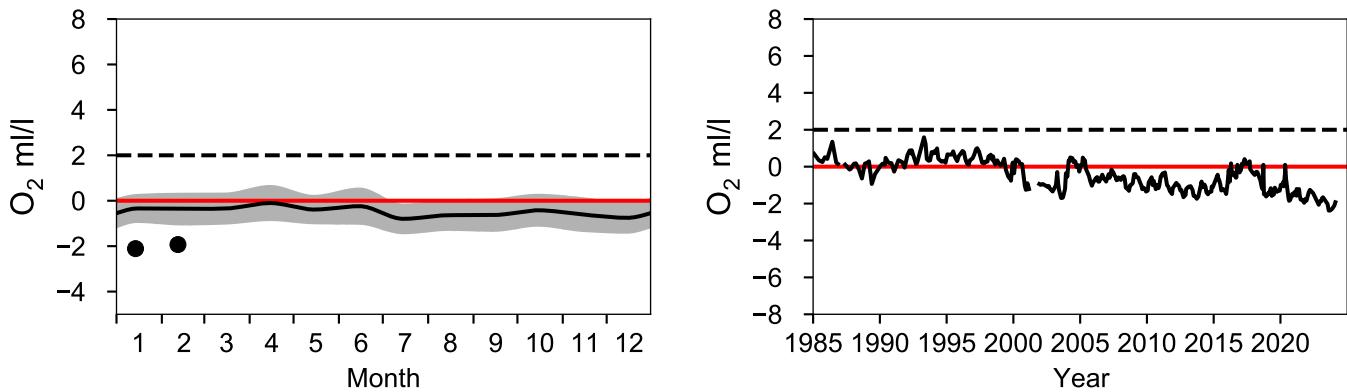


# STATION BY29 / LL19 SURFACE WATER (0-10 m)

Annual Cycles

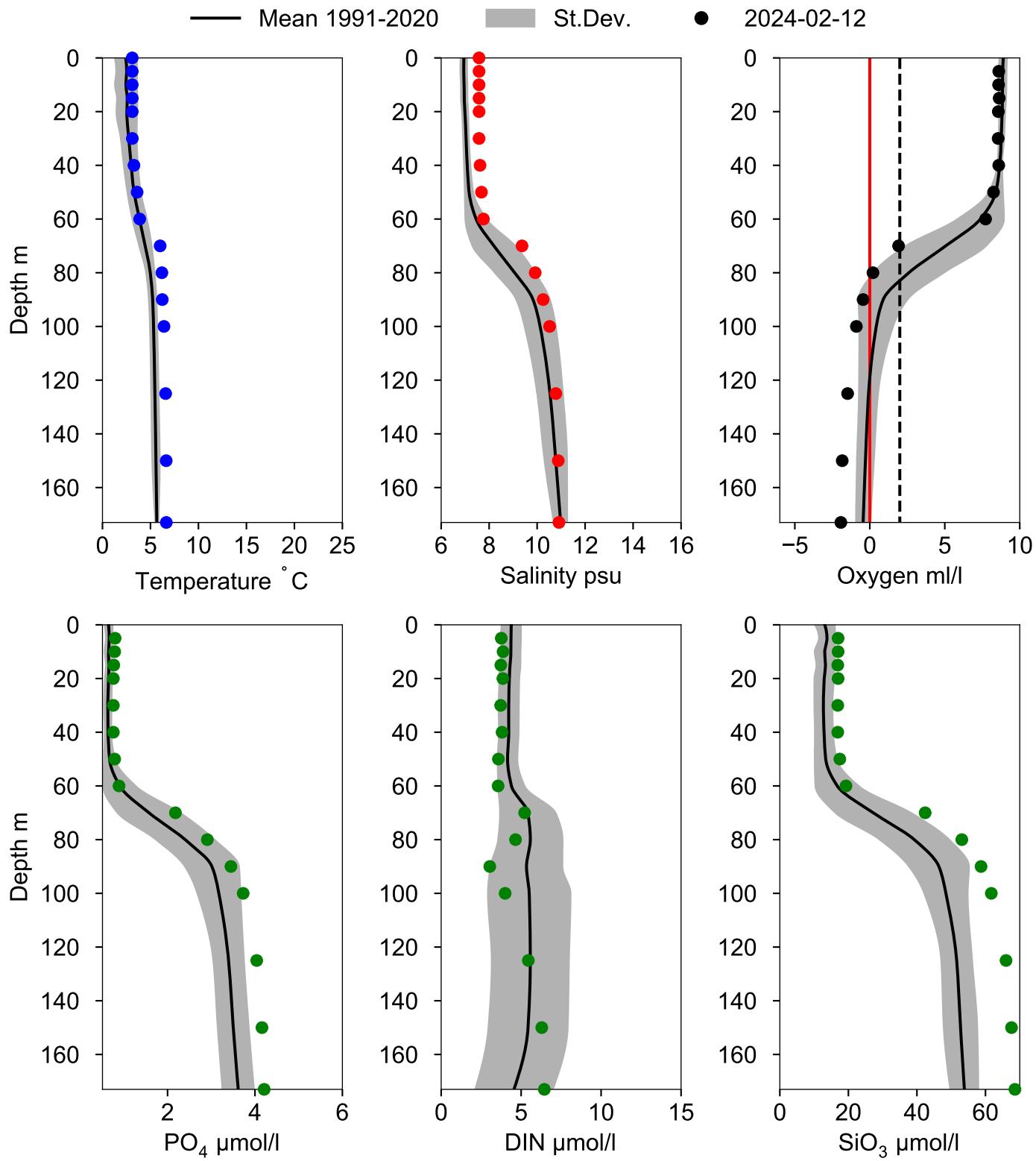


## OXYGEN IN BOTTOM WATER (depth >= 150 m)



# Vertical profiles BY29 / LL19

## February



# STATION BY30 SURFACE WATER (0-10 m)

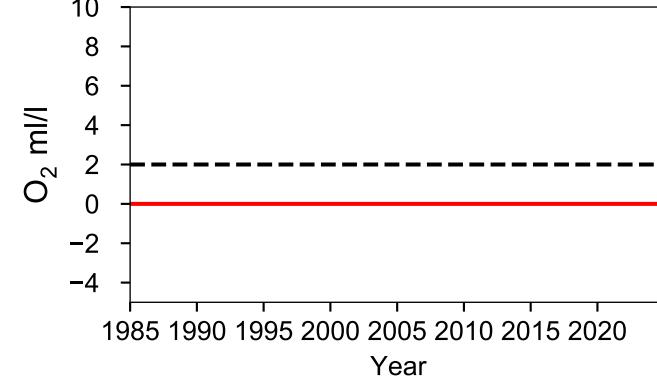
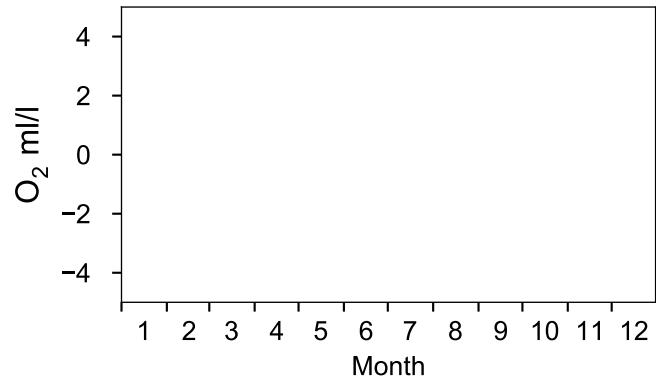
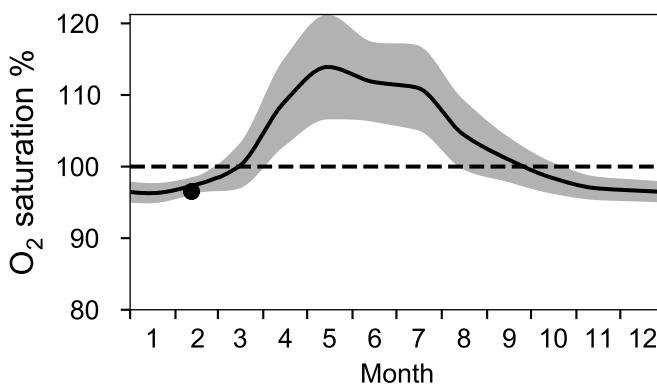
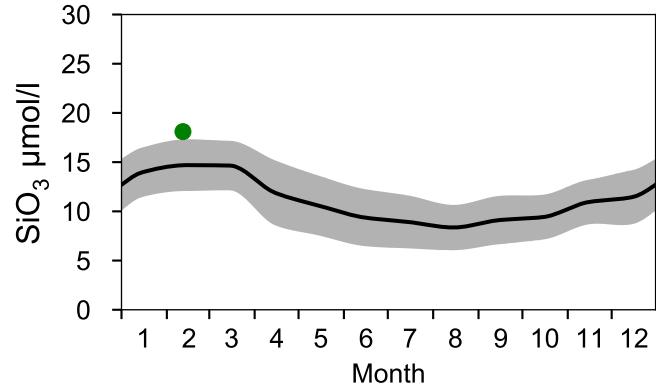
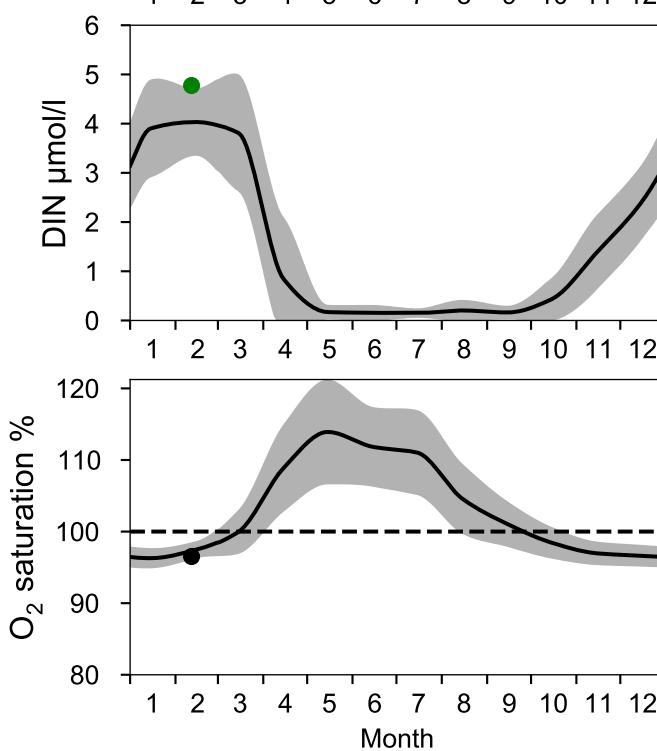
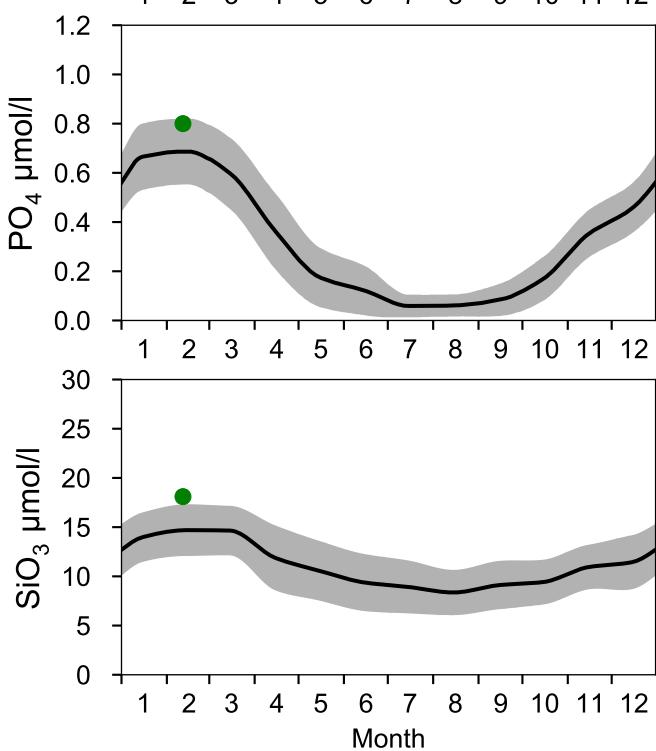
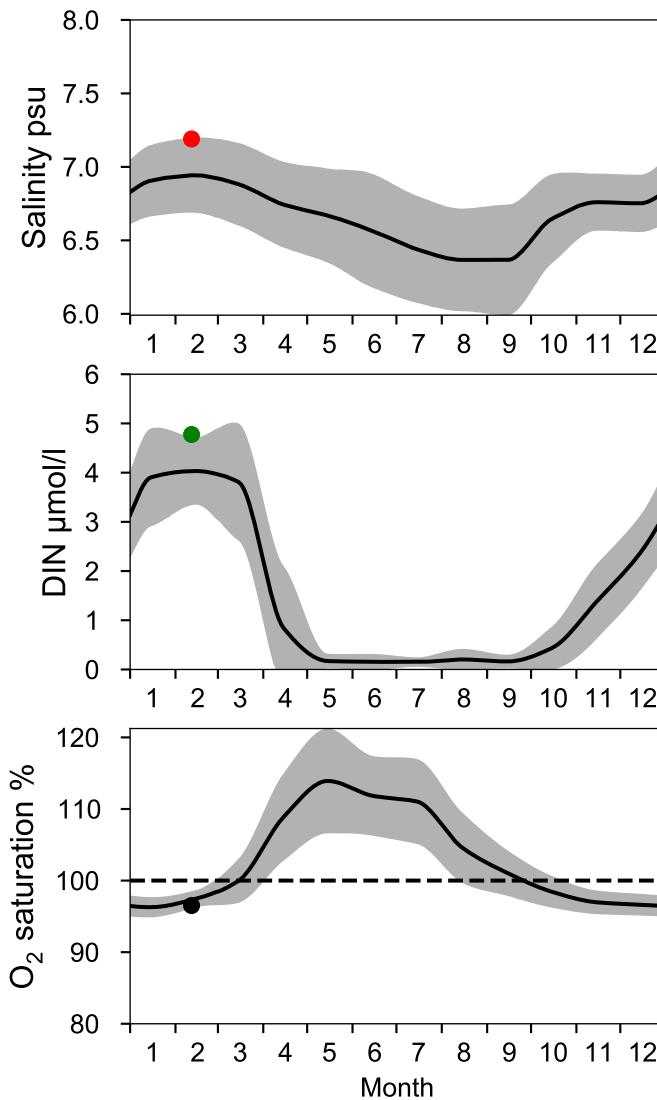
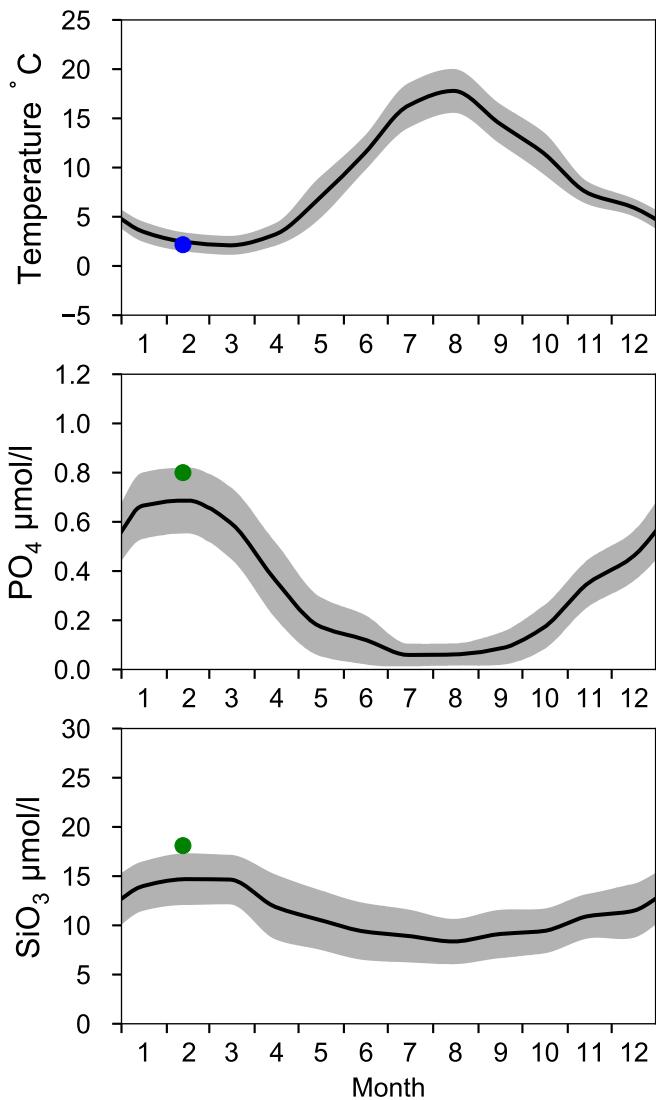
## Annual Cycles

Statistics based on data from: Västra Gotlandshavet

— Mean 1991-2020

St.Dev.

● 2024

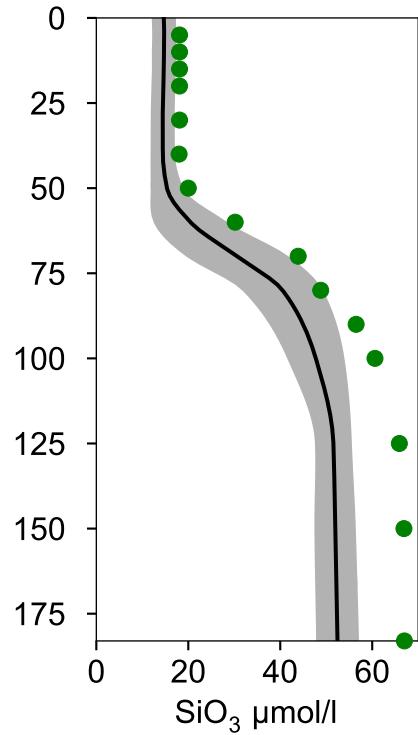
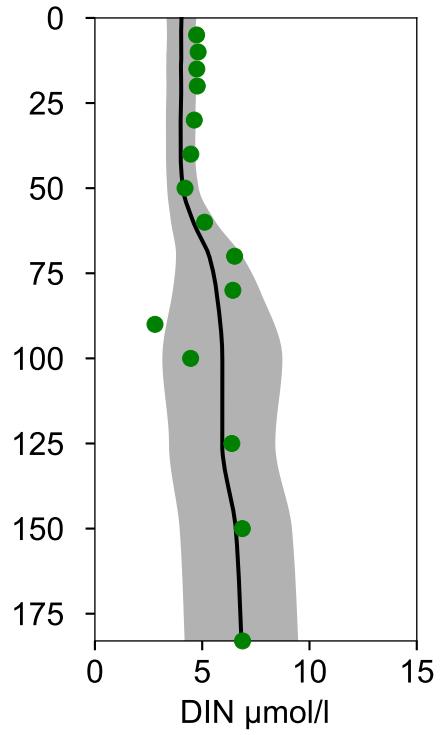
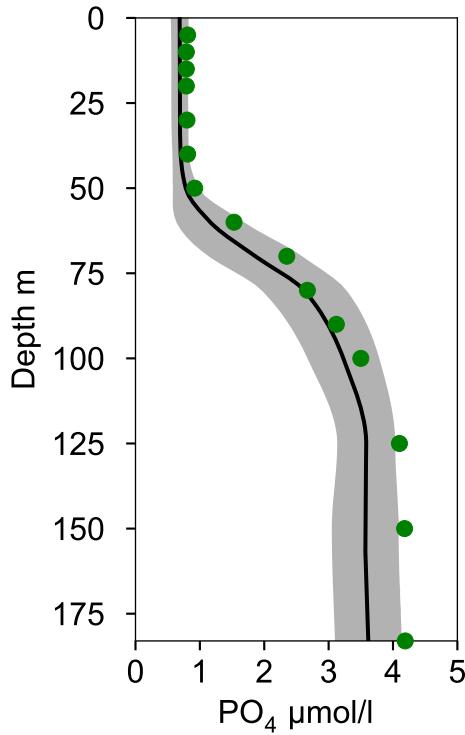
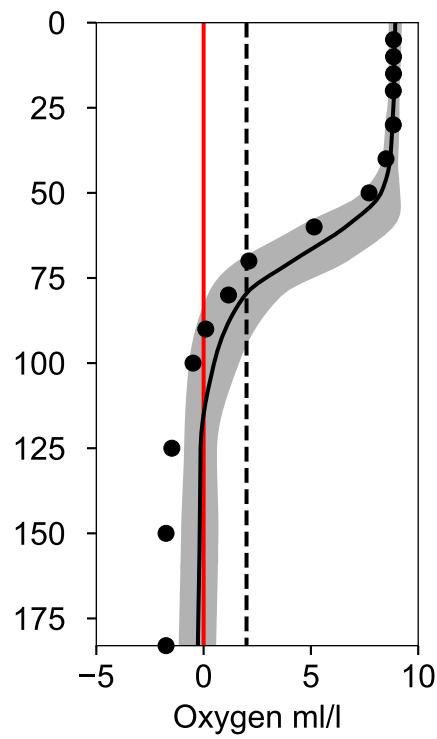
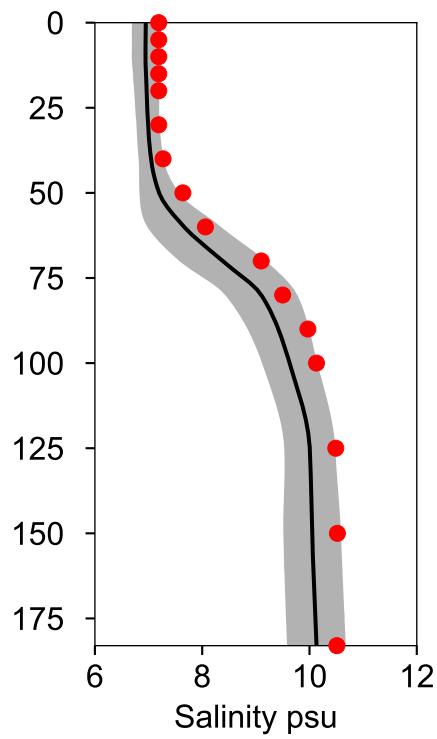
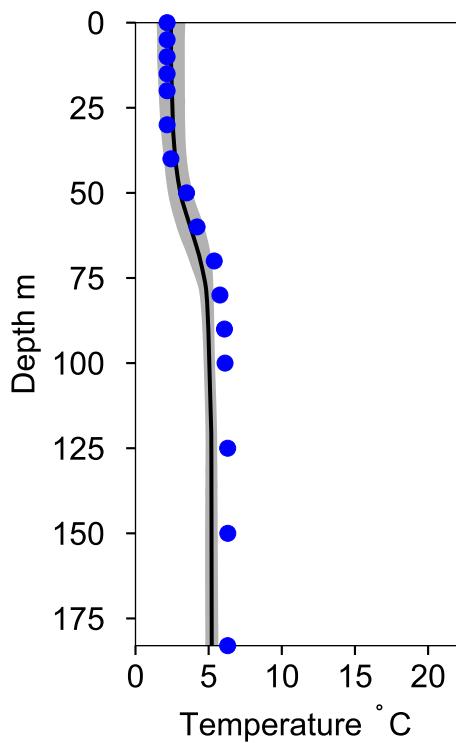


# Vertical profiles BY30

## February

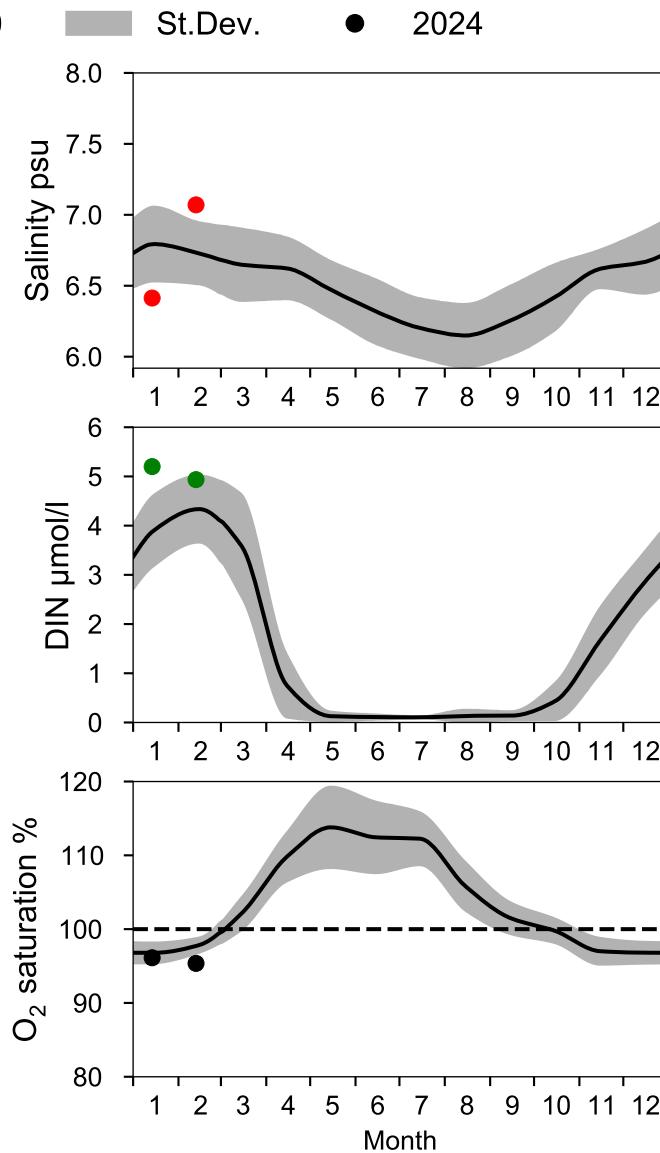
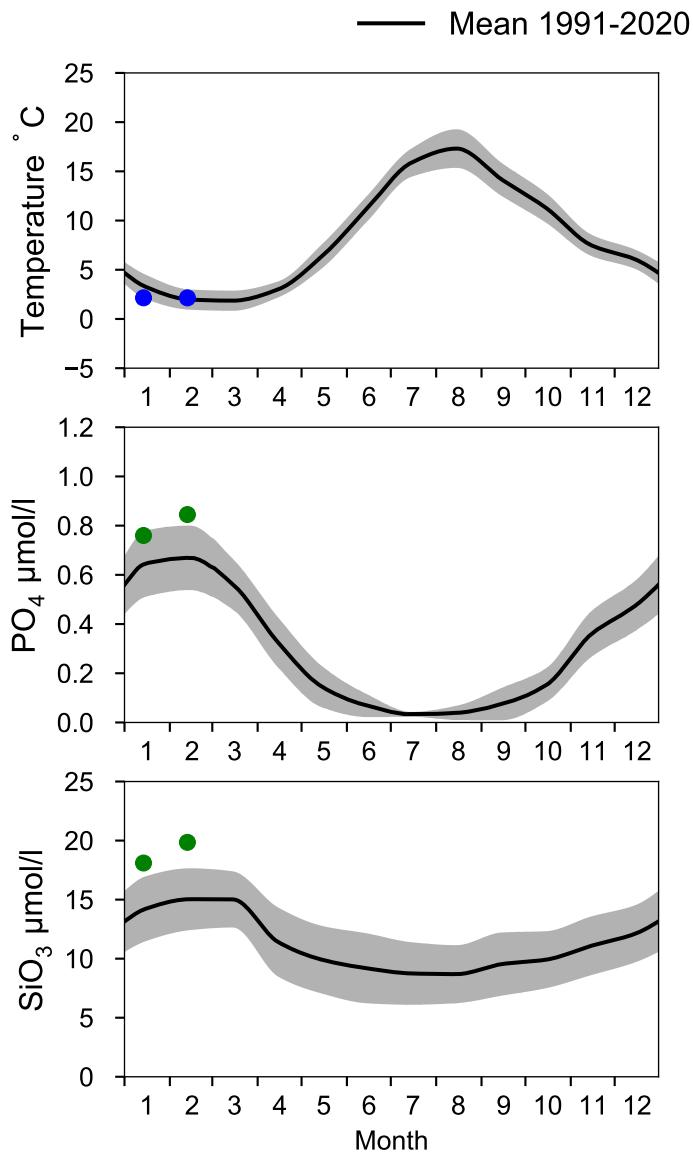
Statistics based on data from: Västra Gotlandshavet

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

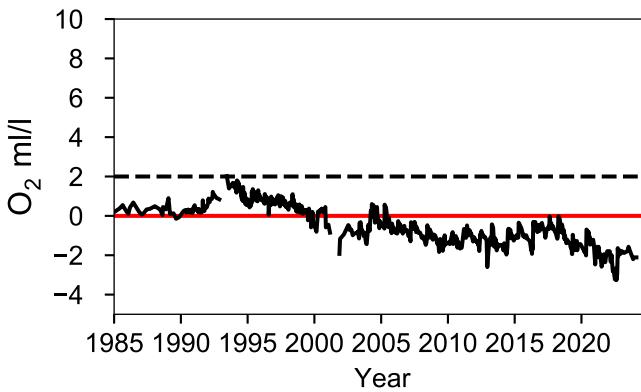
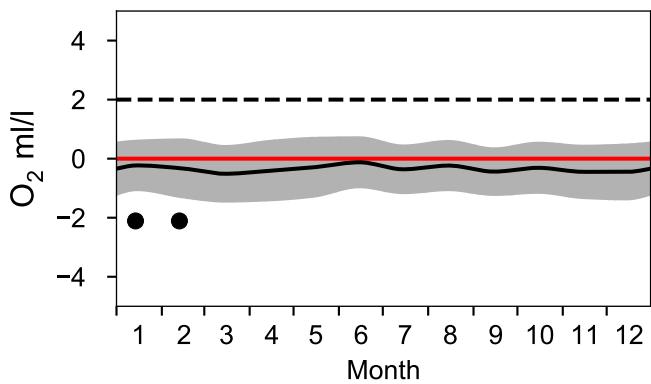


# STATION BY31 LANDSORTSJD SURFACE WATER (0-10 m)

Annual Cycles

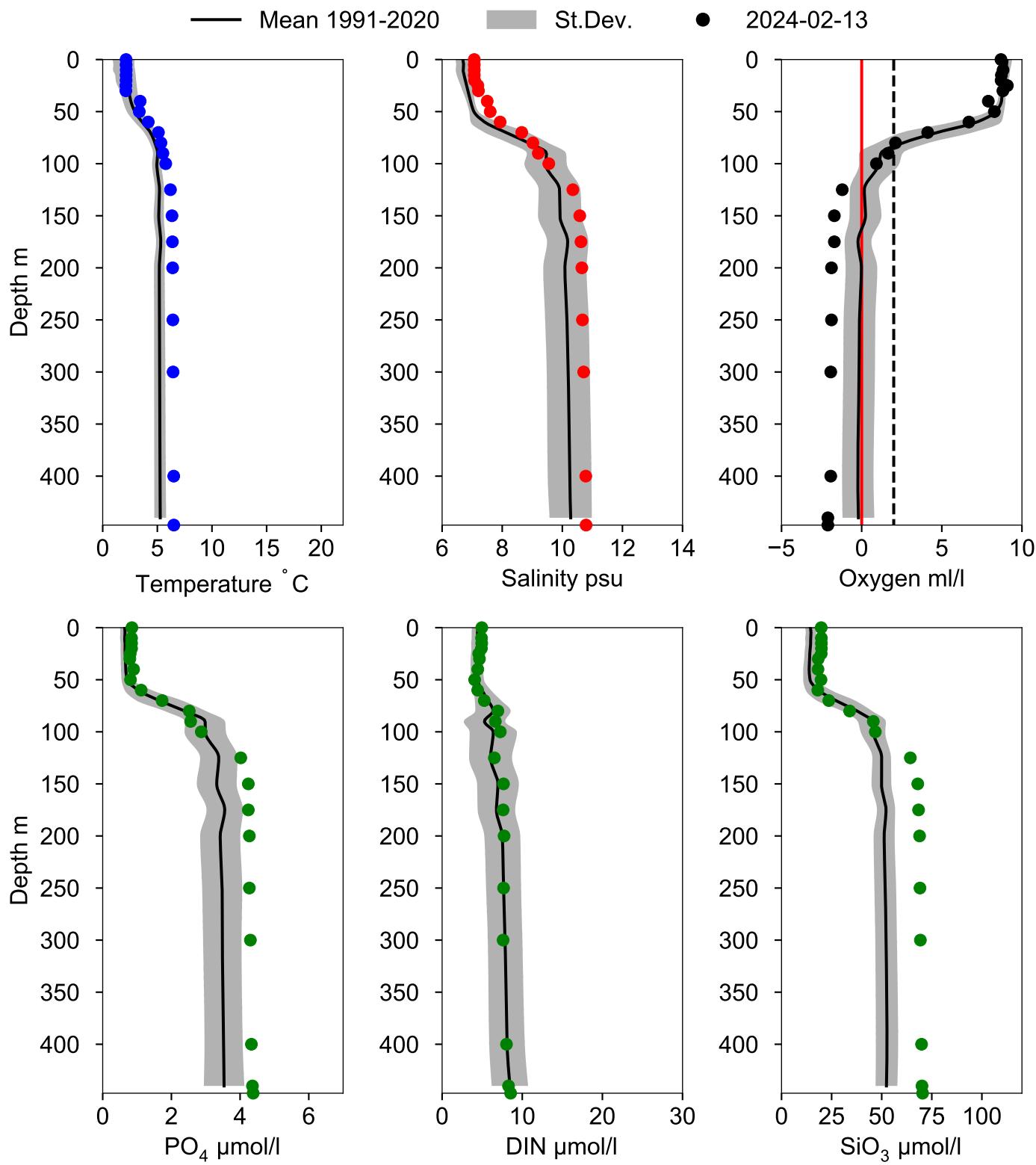


## OXYGEN IN BOTTOM WATER (depth >= 419 m)



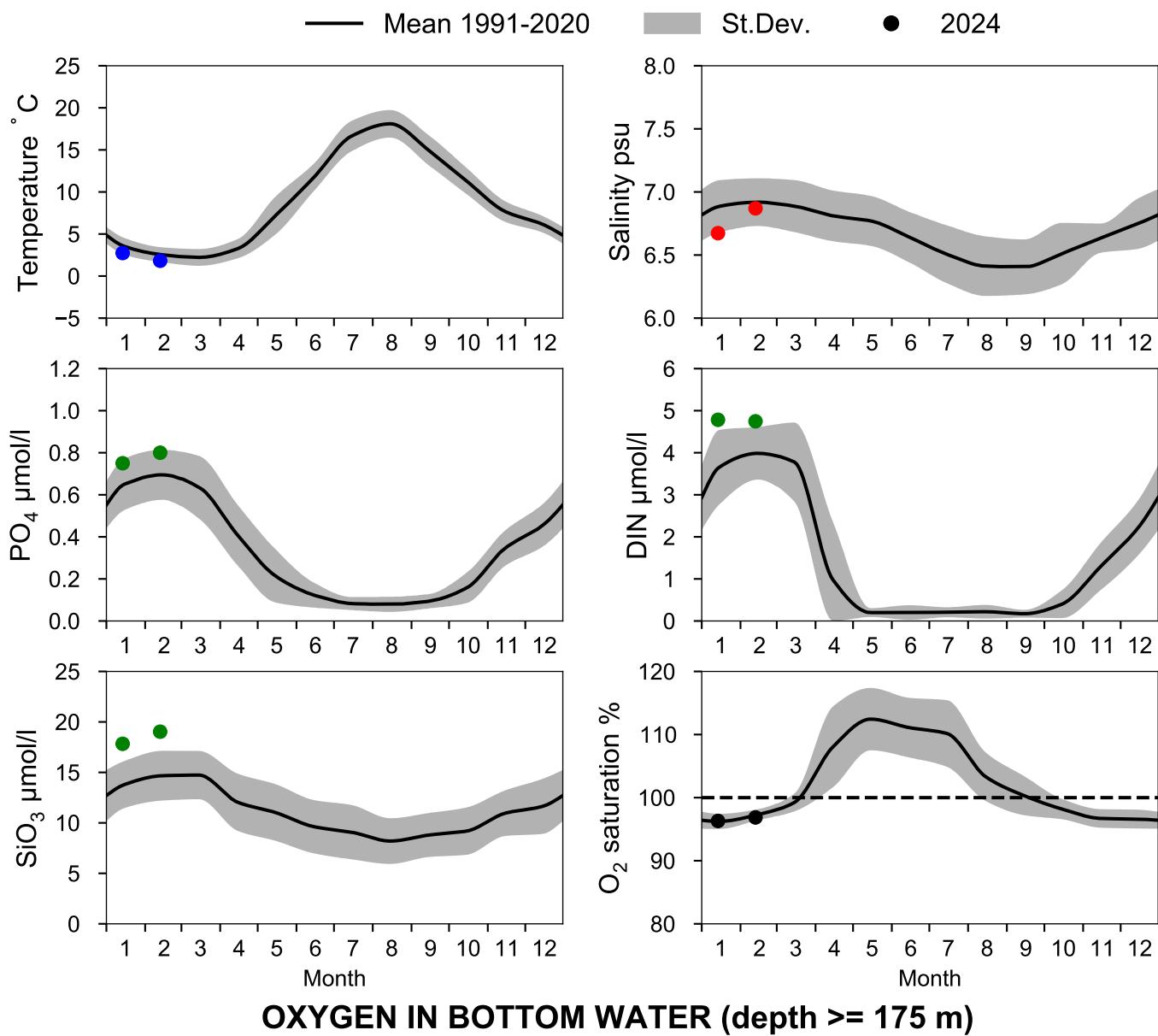
# Vertical profiles BY31 LANDSORTSDJ

## February

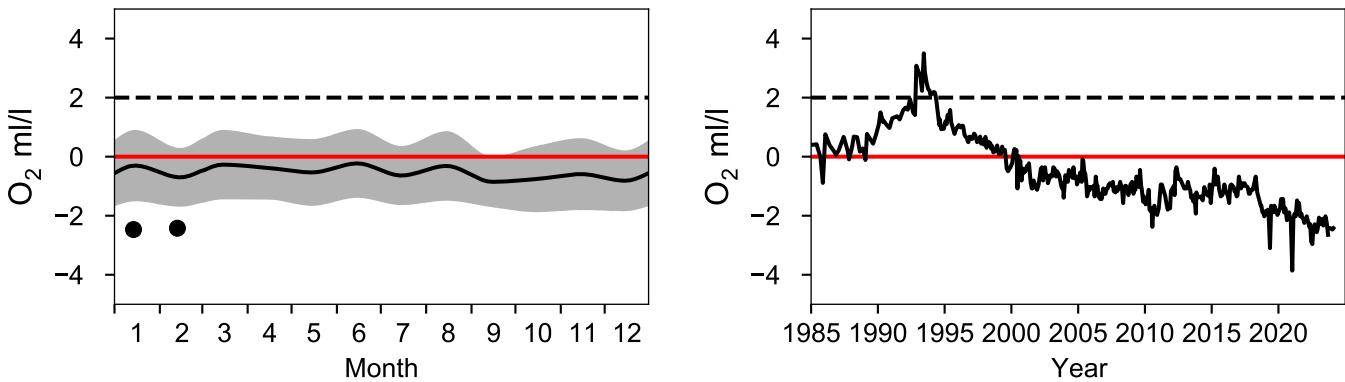


# STATION BY32 NORRKÖPINGSJD SURFACE WATER (0-10 m)

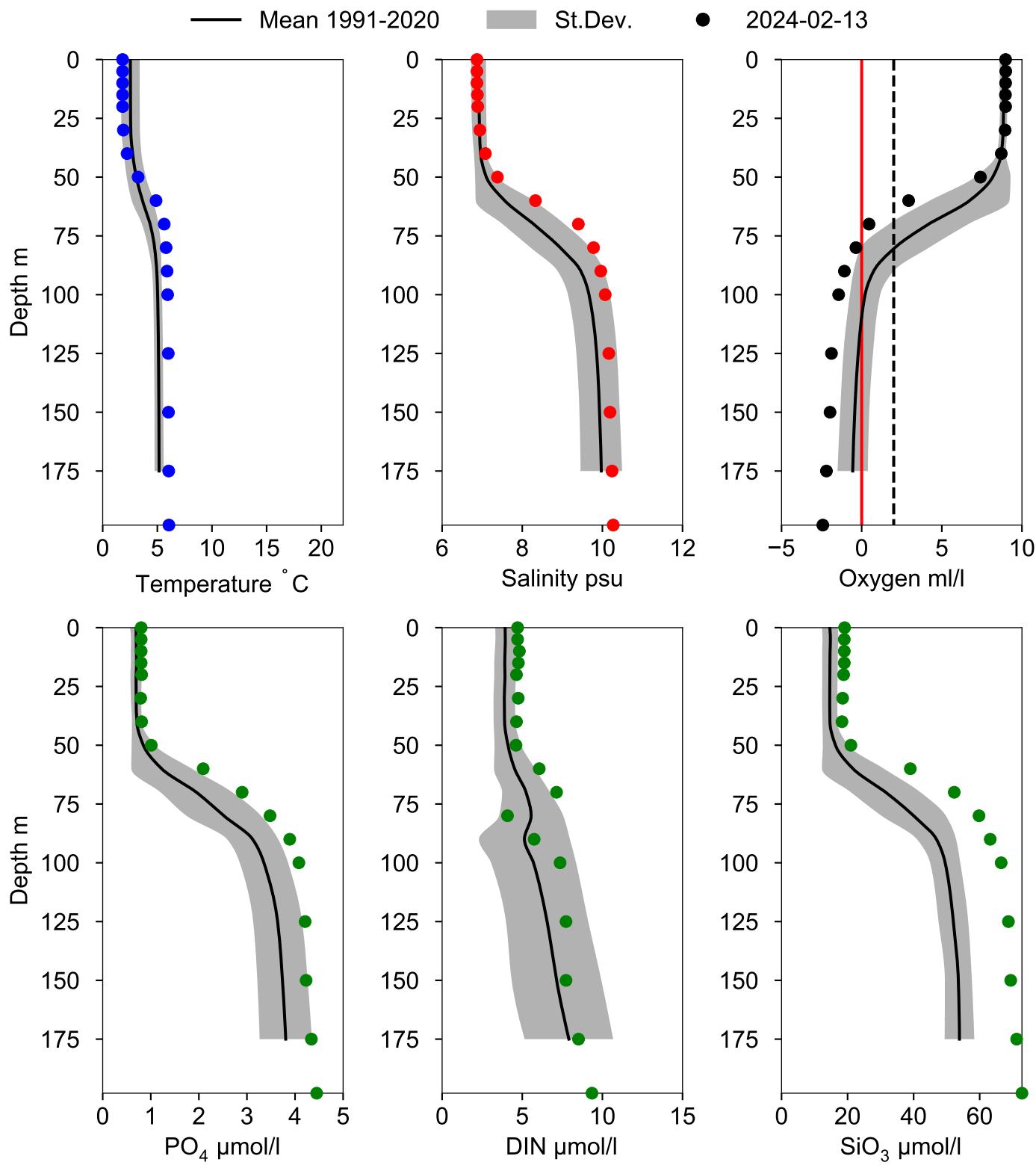
Annual Cycles



## OXYGEN IN BOTTOM WATER (depth >= 175 m)



# Vertical profiles BY32 NORRKÖPINGSJÖ February



# STATION BY36 SURFACE WATER (0-10 m)

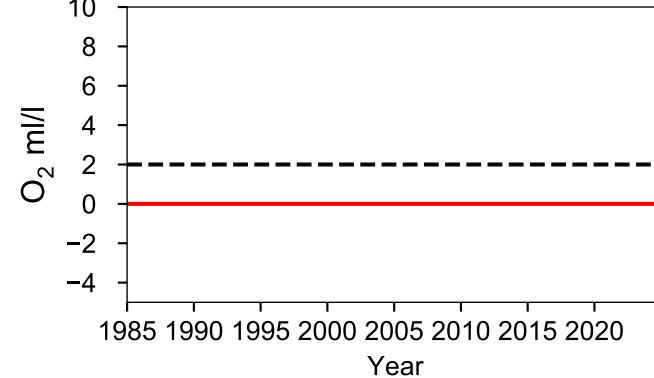
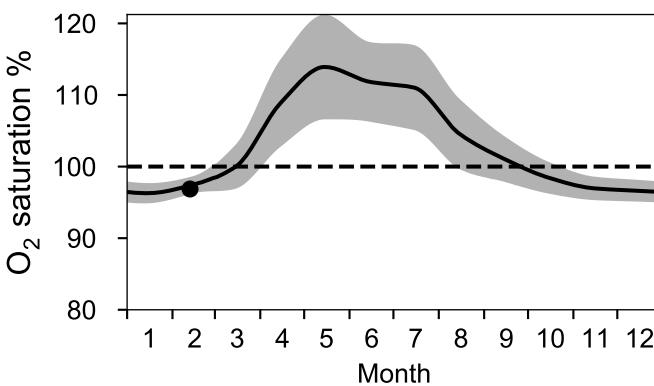
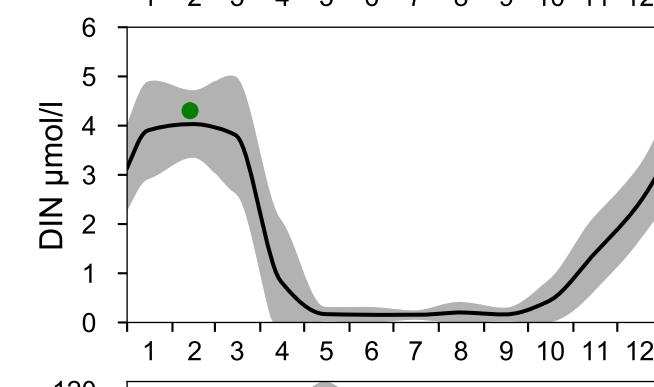
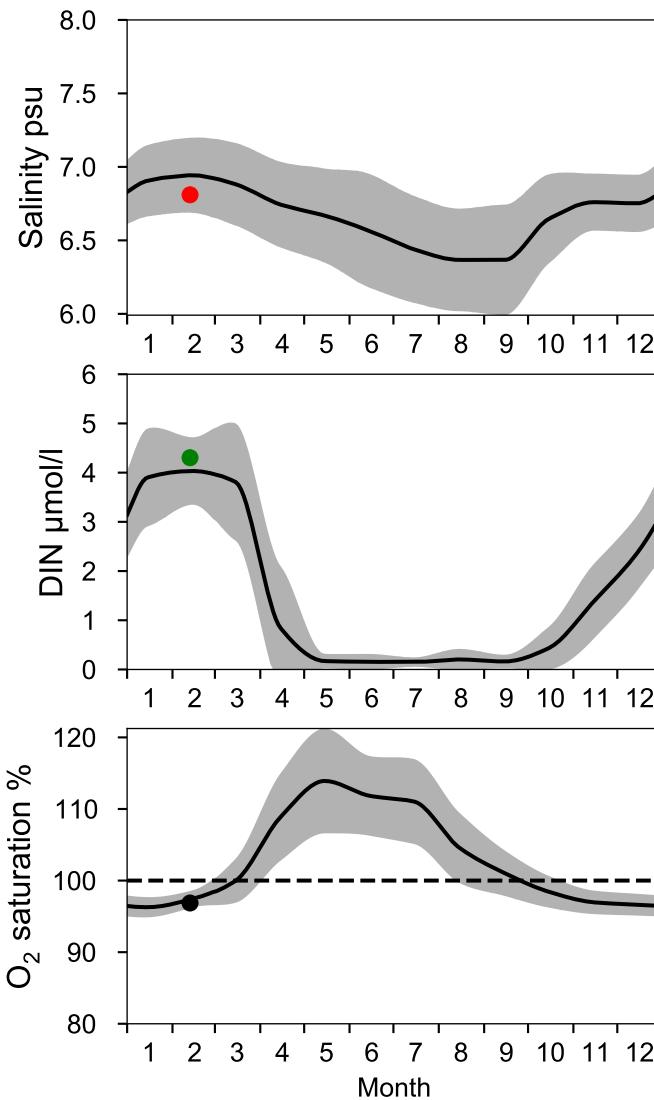
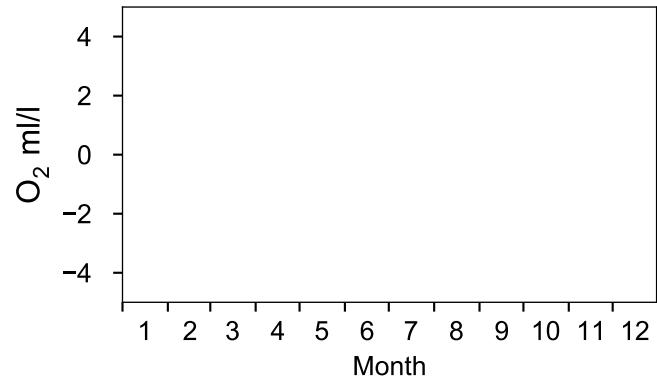
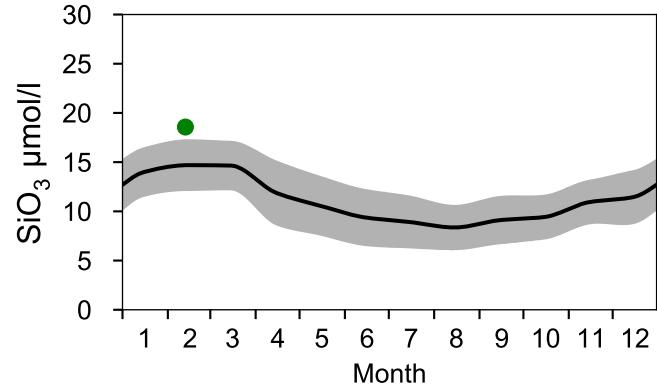
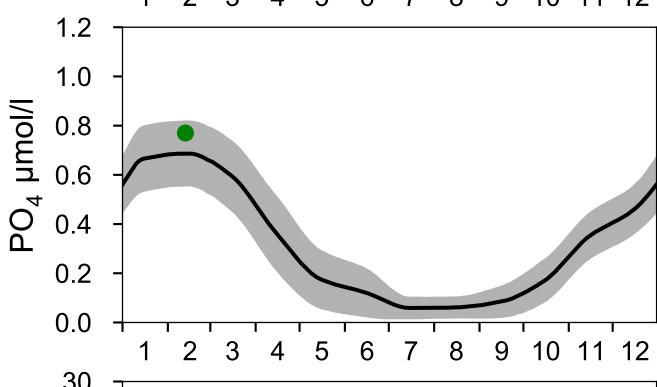
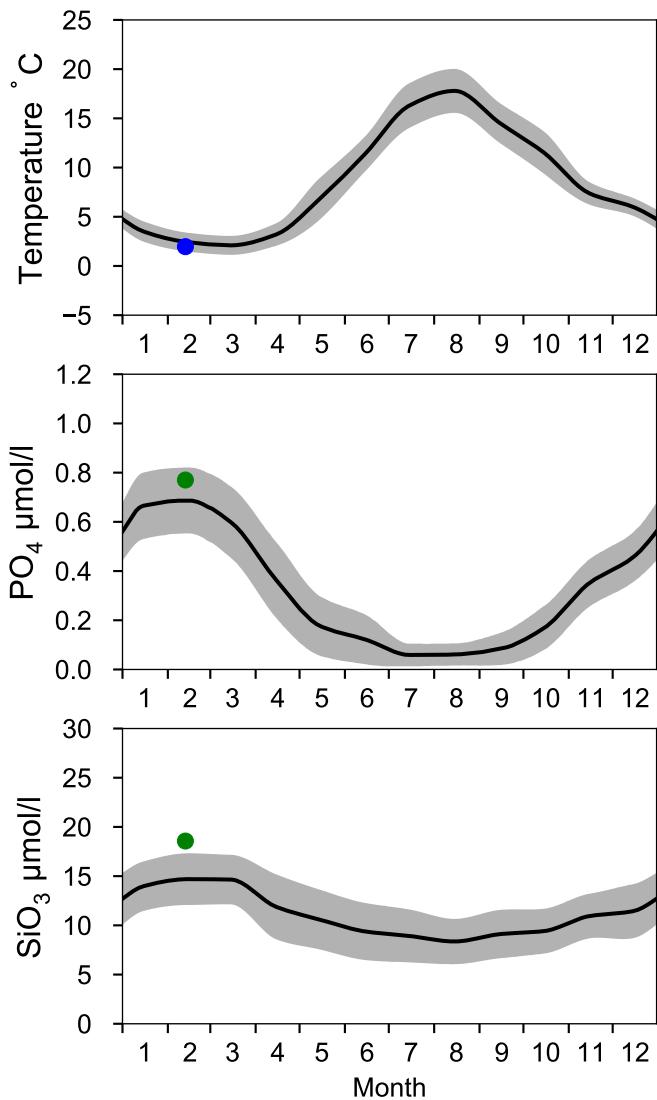
## Annual Cycles

Statistics based on data from: Västra Gotlandshavet

— Mean 1991-2020

St.Dev.

● 2024

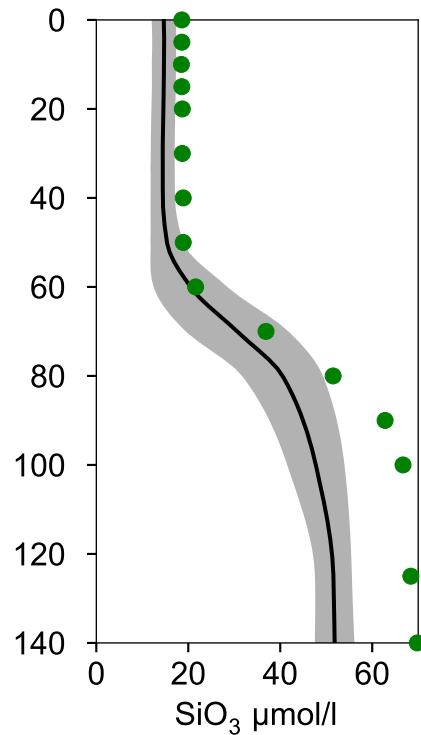
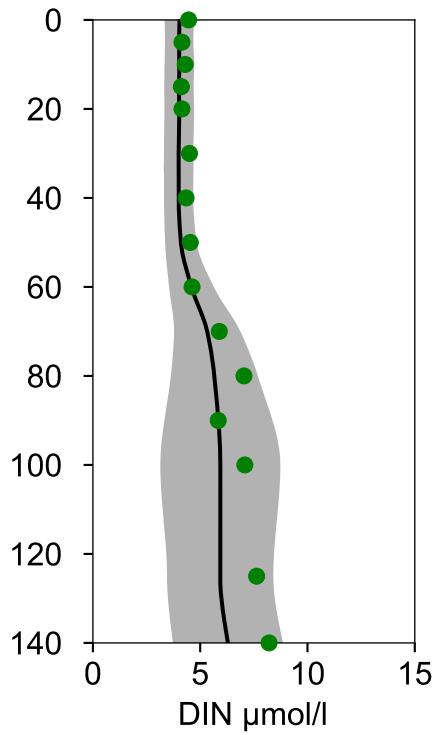
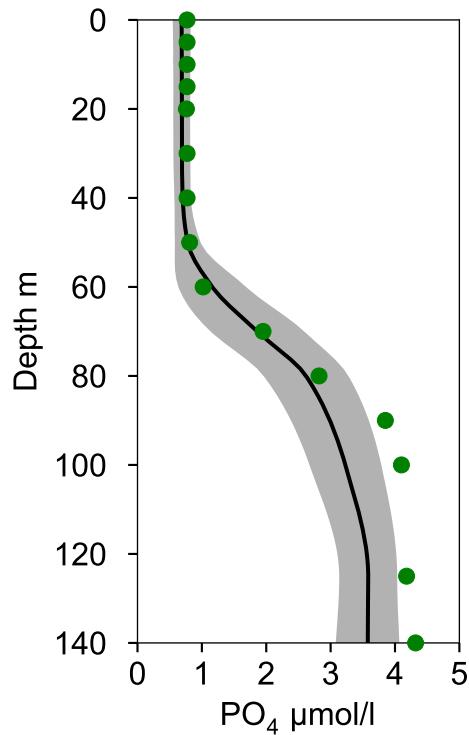
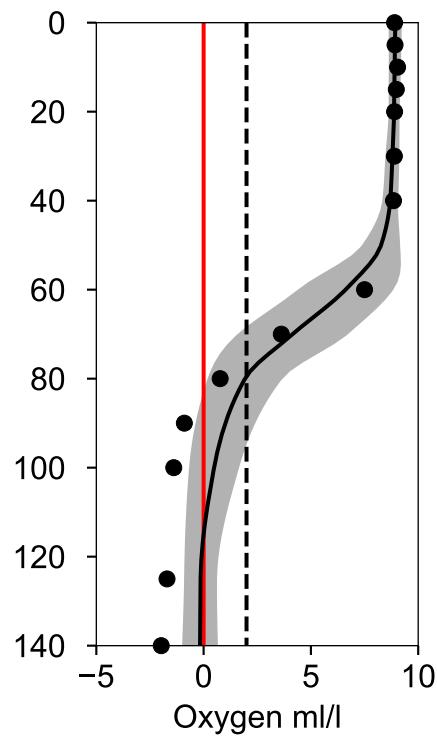
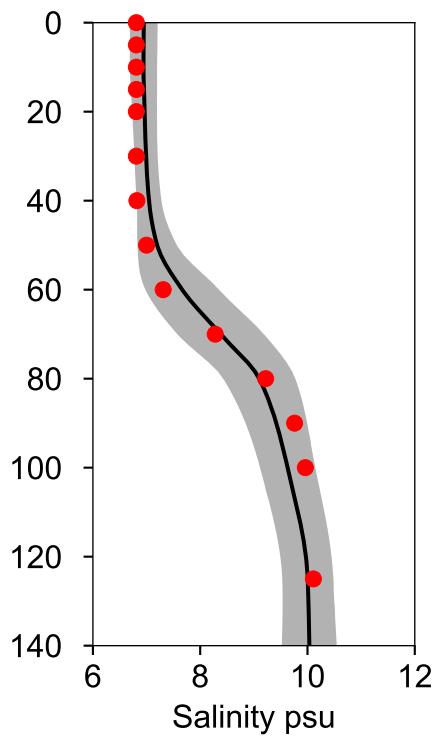
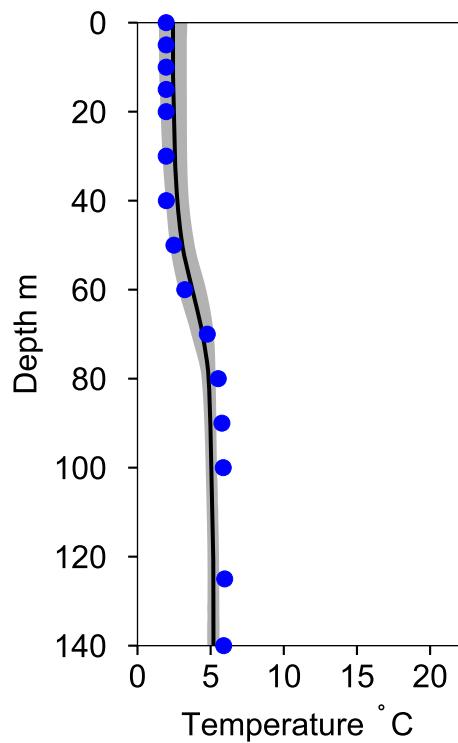


# Vertical profiles BY36

## February

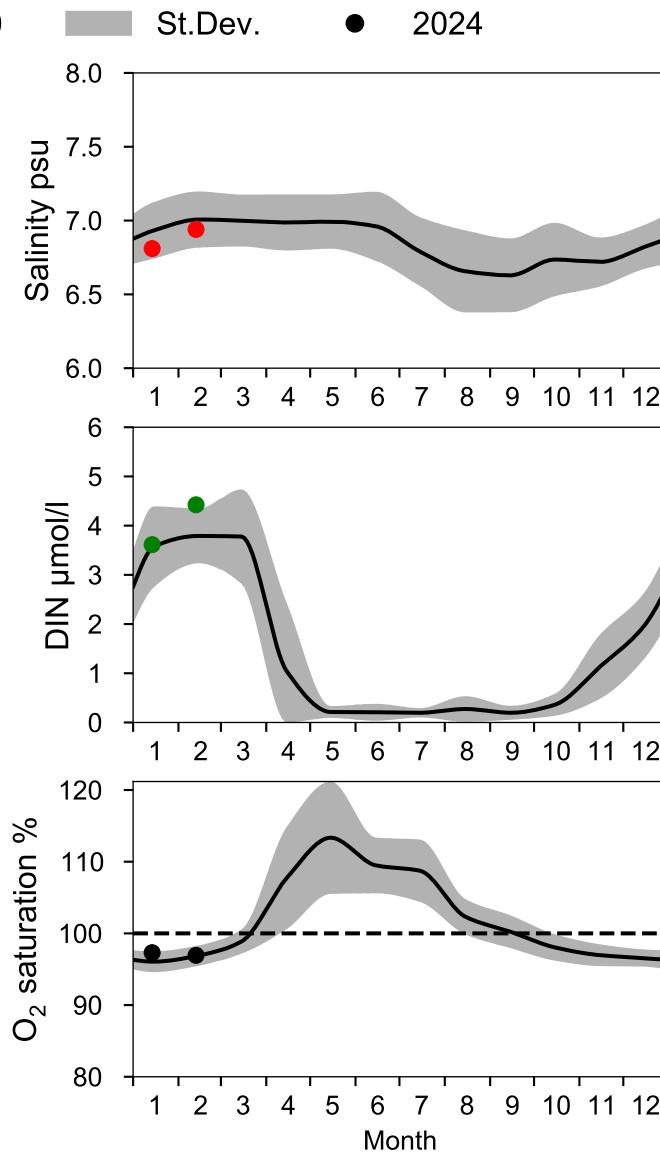
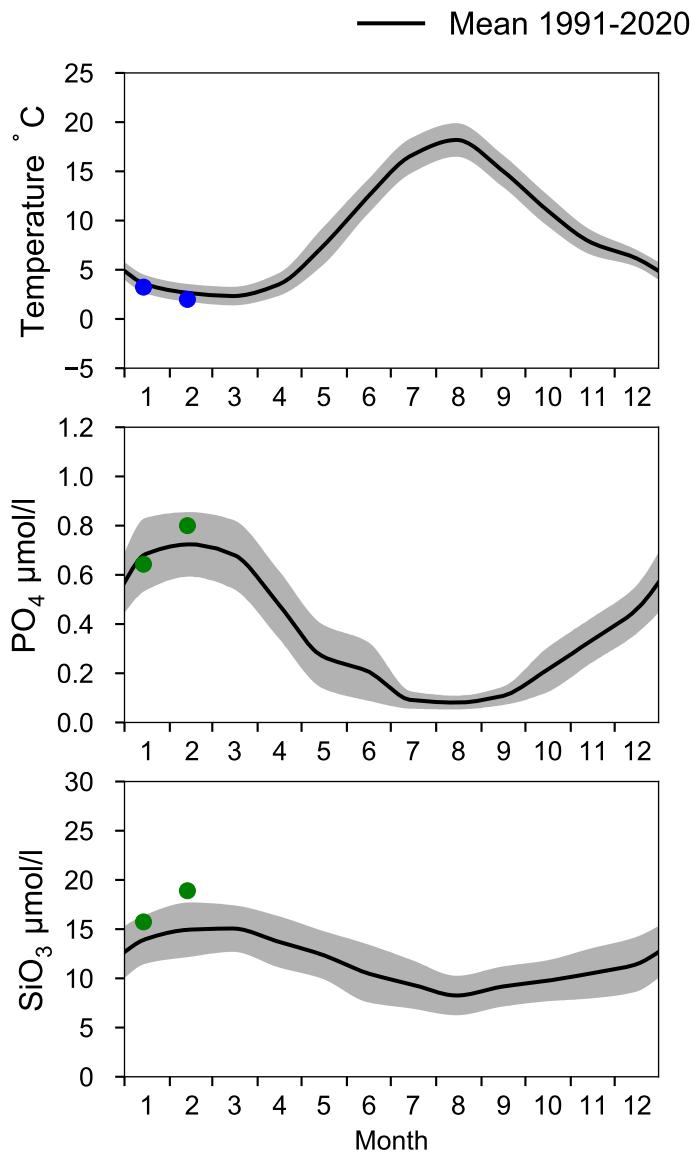
Statistics based on data from: Västra Gotlandshavet

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

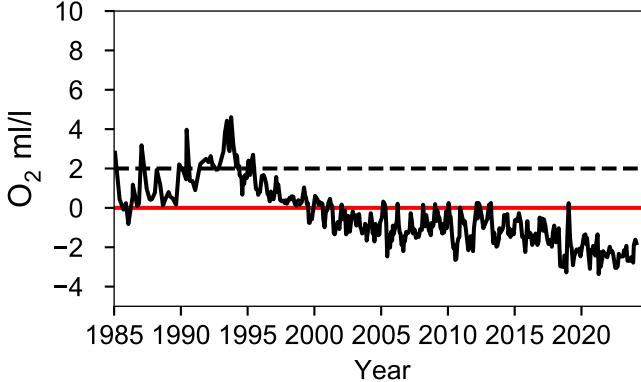
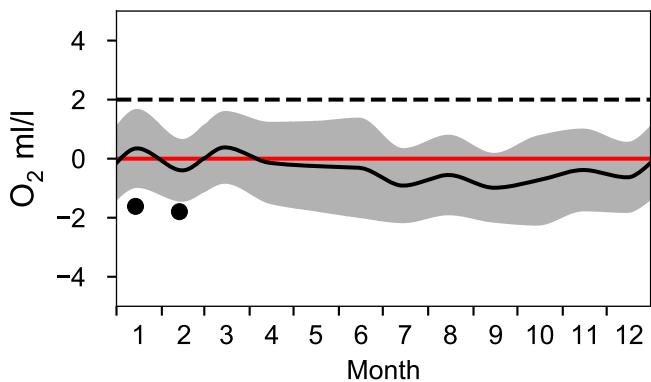


# STATION BY38 KARLSÖDJ SURFACE WATER (0-10 m)

Annual Cycles



## OXYGEN IN BOTTOM WATER (depth >= 100 m)



# Vertical profiles BY38 KARLSÖDJ

## February

