

Rapport från SMHIs utsjöexpedition med R/V Svea



Foto: Sara Johansson, SMHI

Expeditionens varaktighet:

2022-02-08 - 2022-02-15

Uppdragsgivare:

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

Samarbetspartner:

Sveriges Lantbruksuniversitet (SLU), Sjöfartsverket (SjöV)

SAMMANFATTNING

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

Temperaturen i ytvattnet var över normal för månaden utom i Norra Egentliga Östersjön och Västra Gotlandsbassängen. Temperaturen varierade från knappt 3 grader i mynningen till Finska Viken till drygt 6 grader i Skagerrak.

Koncentrationerna av näringsämnen i ytvattnet hade ökat ytterligare något sedan januari och närmade sig nu vintermaxima. Halterna av näringsämnen var normala i Skagerrak och Kattegatt. I Östersjön, där kartering av näringsämnen genomfördes, var halterna av fosfat och löst oorganiskt kväve normala vid de flesta stationer medans halterna av kisel var över normala vid de flesta stationer.

Syresituationen i Kattegatts djupvatten var god, ingen syrebrist, d.v.s. halter under 4 ml/l, noterades. Syresituationen i Egentliga Östersjön är fortsatt dålig med akut syrebrist (<2 ml/l) från 60–80 m. I bassängerna runt Gotland uppmättes svavelväte från 80–100 m. I Bornholmsbassängen var bottenvattnet syrefritt och svavelväte uppmättes från 80 m djup. I Bornholmsbassängen är bottenvattnet syrefritt med låga koncentrationer av svavelväte medans inget svavelväte uppmättes i Hanöbukten där syrekoncentrationen i bottenvattnet är nära noll. I Gdanskbukten råder akut syrebrist från 80 m men inget svavelväte uppmättes. I Arkonabassängen uppmättes ingen syrebrist.

SMHI:s nästa ordinarie expedition är planerad 17-23 mars med R/V Svea.

RESULTAT

Expeditionen genomfördes ombord på R/V Svea och startade i Lysekil den 8:e februari och avslutades i Kalmar hamn den 15:e februari.

Under expeditionens första dygn var det frisk västlig vind kring 15 m/s som sedan avtog och det var måttliga sydliga vindar fram till expeditionens fjärde dygn då vinden ökade till som mest runt 18 m/s med hög sjö och motvind då Svea gick från de östligaste stationerna tillbaka mot väster. Lufttemperaturen varierade mellan 4–6 grader i Västerhavet och mellan 0–4 grader i Egentliga Östersjön.

Extra växtplanktonprover togs vid stationerna Å17, Släggö och Anholt E till ett projekt vid Uppsala Universitet. Vatten från strax under språngskiktet togs också vid Anholt E och BY38 till ett projekt vid Göteborgs universitet.

Sveas instrument för kontinuerliga mätningar av ytvatten och ström, (Ferrybox och ADCP:er) var i gång under hela expeditionen. Sveas instrument för att mäta profiler under gång (MVP, Moving Vessel Profiler) användes för fyra transekter; Å13–Å16 i Skagerrak, Kriegers flak i Arkona, tvärs Stolpe ränna och mellan stationerna BY38–BY36–BY32 i Västra Gotlandsbassängen.

Under expeditionen var också IOW i Tyskland på expedition med R/V Elisabeth Mann Borgese och flera stationer i Arkona- och Bornholmsbassängen provtogs med endast några timmars mellanrum.

Denna rapport är baserad på data som genomgått en första kvalitetskontroll. När ytterligare kvalitetsgranskning genomförts kan vissa värden ändras. Data från denna expedition publiceras så fort som möjligt på datavärdens hemsida, normalt sker detta inom en vecka efter avslutad expedition. Vissa analyser görs efter expeditionen och publiceras senare.

Data kan hämtas från SHARKweb här: <https://sharkweb.smhi.se/hamta-data/>

Skagerrak

Avkylningen av ytvattnet (0–10 m) hade avstannat till följd av det milda vädret och temperaturen var ungefär samma som i december och januari. Temperaturen varierade mellan 5–6 grader i ytvattnet, vilket är något över det normala för månaden. Det kallare och sötare ytvattnet var separerat från djupvattnet, d.v.s. skiktat, och skiktningen återfanns på omkring 20–30 meters djup närmast kusten, ca 10 m djupare jämfört med i januari. Längre ut i Skagerrak återfanns mer eller mindre oskiktade vatten och längst ut vid stationen Å17 återfanns skiktningen betydligt djupare, på ca 50 meters djup, ca 20 m djupare än i januari. Salthalten i ytvattnet var något över normal vid samtliga stationer och varierade mellan 31 psu vid Släggö och 34 psu vid Å17.

Ökningen av näringsämnen i ytvattnet som normalt sker under vintern, hade fortsatt uppåt sedan januari och koncentrationerna var normala för månaden. Vid stationerna Å13 och P2 hade koncentrationen av silikat minskat, men det är snarast en effekt av ökad inblandning av Nordsjövatten med högre salthalt och lägre silikatkoncentration och inte orsakat av biologiska processer. I djupvattnet var koncentrationen av näringsämnen normal bortsett från vid Släggö där koncentrationen av fosfat och oorganiskt kväve var under normal. Vid Å17 där språngskiktet låg ovanligt djupt och det välblandade ytlagret sträckte sig ända ner till 50 m var koncentrationen av fosfat och oorganiskt löst kväve under normal från 20–50 m.

Ingen syrebrist noterades i Skagerrak. Vid kuststationen Släggö där syrebrist uppmättes i bottenvattnet i november, ökade halterna till omkring 5 ml/l, i december och januari och vid mätningen nu i februari hade det ökat till 6,8 ml/l.

Planktonaktiviteten, bedömd utifrån klorofyllfluorescens uppmätt med CTD-sond, visade på en låg aktivitet i ytlagret i hela Skagerrak.

Kattegatt och Öresund

Temperaturen i ytvattnet (0–10 m) var över normal vid samtliga stationer och varierade mellan 4–5 grader, lägst i Öresund. Salthalten hade ökat markant sedan januari och var mycket över normal i ytvattnet vid samtliga stationer, från ca 21 psu i Öresund till ca 30 psu vid Fladen. En svag salthaltskiktning fanns kring 10 m. I Öresund var det en kraftig sydgående ström på omkring 2,7 knop (vid stationen Flinten-7). Salthalt och temperatur var normala i djupvattnet (under det svaga språngskiktet).

Koncentrationen av näringsämnen fosfor och kväve i ytvattnet hade ökat ytterligare sedan januari medans koncentrationen av silikat hade minskat något eller var oförändrad. Alla näringsämnen var inom det normala för månaden. I djupvattnet var koncentrationen av löst oorganiskt kväve lägre än normalt, fosfat och silikat var inom det normala men på gränsen till lägre än normalt.

Syresituationen i Kattegatts djupvatten var god, ingen syrebrist, d.v.s. halter under 4 ml/l, noterades. Lägsta syrekoncentrationen uppmättes vid Anholt E där det var strax under 5 ml/l, vid övriga stationer var koncentrationen över 6 ml/l i bottenvattnet.

Planktonaktiviteten, bedömd utifrån klorofyllfluorescens uppmätt med CTD-sond, visade på en låg aktivitet i ytlagret i hela Skagerrak.

Egentliga Östersjön

Temperaturen i ytvattnet var över normal, ca 4 grader, i de södra bassängerna (Arkona, Bornholm och Östra Gotlandsbassängen) i övrigt var temperaturen normal, runt 3 grader (Norra Egentliga Östersjön och Västra Gotlandsbassängen). Vattnet var välblandat ned till det permanenta språngskiktet och temperaturen var också över normal från ytan ned till språngskiktet vid samtliga stationer där temperaturen i ytvattnet var över normal. Vid flertalet stationer var också temperaturen under språngskiktet över det normala, tydligast i Västra Gotlandsbassängen där temperaturen var över normal i djupvattnet vid samtliga stationer. Salthalten i ytvattnet var över normal från Stolpe ränna och på nästan alla stationer österut (7,2–7,7 psu) och normal i Arkona och Bornholmsbassängen (7,6–8,6 psu). Det permanenta språngskiktet låg kring 70–80 m i Östra Gotlandsbassängerna, i de östra delarna av Norra Egentliga Östersjön och i Gdanskbukten. I Västra Gotlands bassängen låg språngskiktet något grundare, ca 60–70 m vilket också var mindre skarpt. I Arkonabassängen syntes tydligt att det kommit in salt tungt vatten genom Öresund efter de senaste veckornas kraftiga vindar, där fanns ett skarpt salthaltssprångskikt på 30–40 m där salthalten ökade till som mest 18 psu i bottenvattnet på stationen BY1. I Bornholmsbassängen och i Hanöbukten var salthalten normal kring 15 psu i bottenvattnet och språngskiktet fanns runt 50 m.

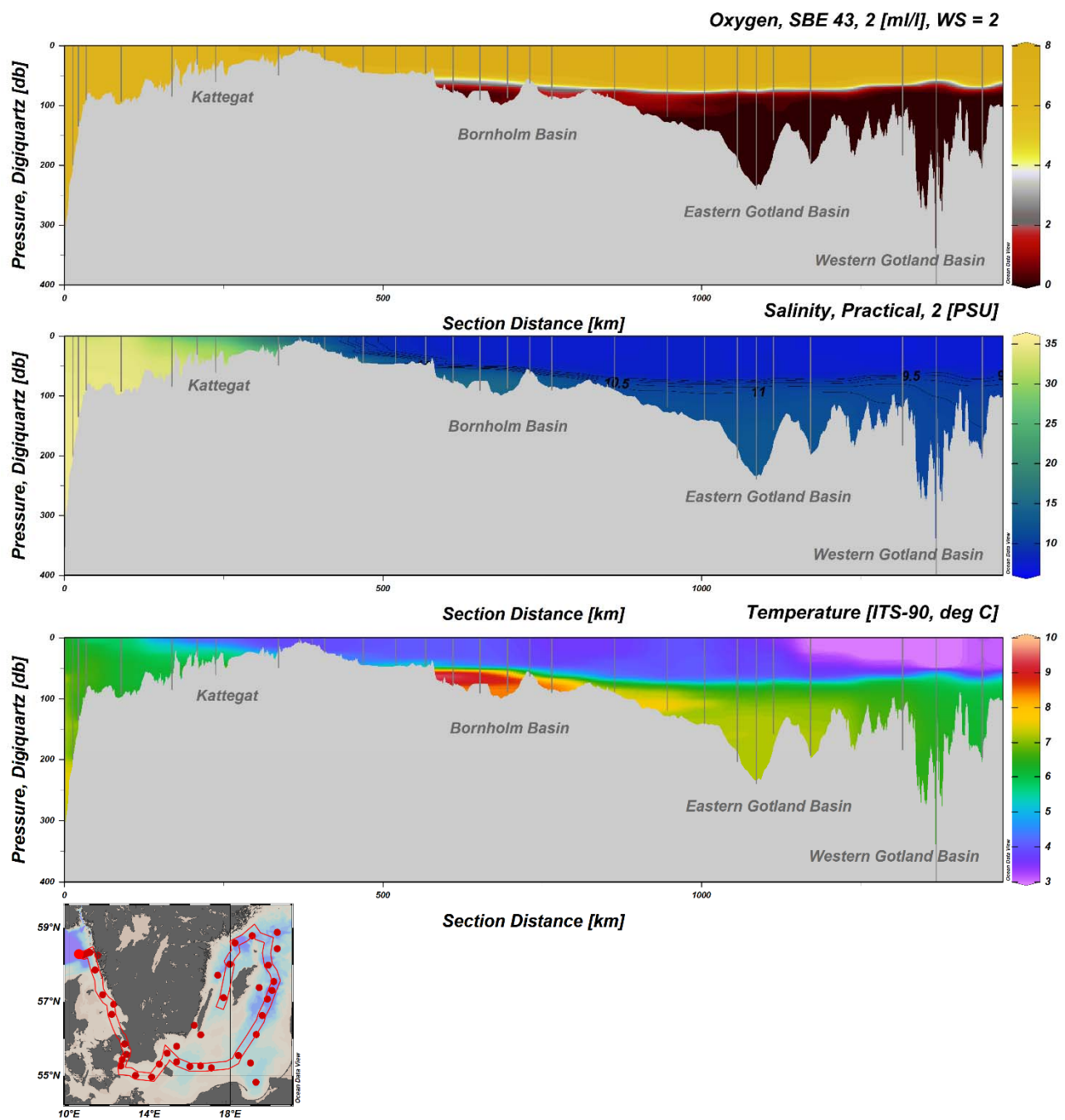
I Egentliga Östersjön genomfördes kartering av näringsämnen. Det innebär att fler stationer än vanligt besöks i området för att få en bild av näringssituationen i hela området. Under vintern, då planktonaktiviteten är som lägst, är vanligtvis närsalterna som högst och återspeglar då hur mycket näring som är tillgängligt i ekosystemet inför årets vårblooming. Vid denna kartering var halterna

av fosfat och löst oorganiskt kväve normala i ytvattnet vid de flesta stationerna. Koncentrationen av löst oorganiskt kväve var lägre än normal vid endast tre stationer i Östra Gotlandsbassängen (Stolpe ränna, Stolpe tröskel och BCS III-10). Koncentrationen av fosfat var normal vid alla stationer utom vid BY27 längst österut i Norra Egentliga Östersjön där det var något över normalt. Vid stationen 441 Stevns Klint strax innanför Öresund var koncentrationen av löst oorganiskt kväve över normalt vilket återspeglar inflöde av vatten med högre salthalt och kväve från Kattegatt. Koncentrationen av silikat är den som avviker mest med högre koncentrationer än normalt vid de flesta stationer, undantagen är några stationer i Västra Gotlandsbassängen, Hanöbukten och Bornholmsbassängen.

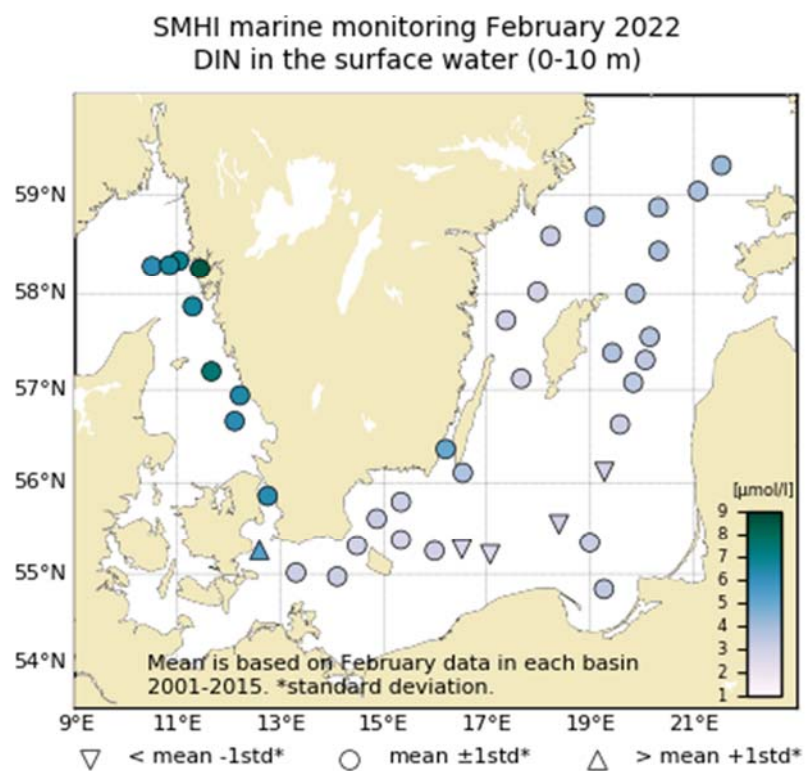
I bottenvattnet förekom koncentrationer över det normala för alla näringsämnen på flera stationer, men det var framförallt den höga koncentrationen av löst oorganiskt kväve som avvek från det normala. Vid stationen BY15 Gotlandsdjupet mitt i Östra Gotlandsbassängen var koncentrationen av löst oorganiskt kväve dubbelt så hög som normalt, 40 $\mu\text{mol/l}$ jämfört med 15-årsmedel som är 20 $\mu\text{mol/l}$ i bottenvattnet. I Västra Gotlandsbassängen var koncentrationerna av löst oorganiskt kväve lägre men ändå långt över det normala, omkring 15 $\mu\text{mol/l}$ jämfört med det normala runt 5–7 $\mu\text{mol/l}$. I de norra delarna av Östra Gotlandsbassängen var halterna lägre och inom det normala (5–10 $\mu\text{mol/l}$) för att i Norra Egentliga Östersjön återigen vara över normala kring 10 $\mu\text{mol/l}$.

Syresituationen i Egentliga Östersjön är fortsatt dålig med akut syrebrist (<2 ml/l) från 70–80 m, utom i Hanöbukten där det är akut syrebrist redan på 60 m. I Västra Gotlandsbassängen uppmättes svavelväte (total frånvaro av syre) från 80 m och i Östra Gotlandsbassängen något djupare, kring 90–100 m. I Bornholmsbassängen är bottenvattnet syrefritt med låga koncentrationer av svavelväte medans inget svavelväte uppmättes i Hanöbukten där syrekoncentrationen i bottenvattnet är nära noll. I Gdanskbukten råder akut syrebrist från 80 m men inget svavelväte uppmättes.

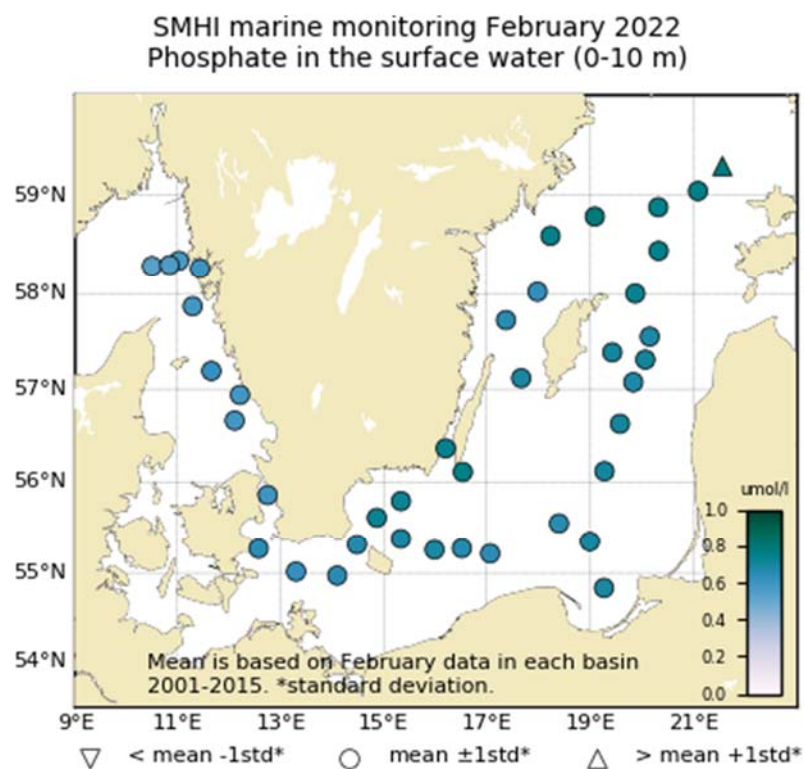
Planktonaktiviteten, bedömd utifrån klorofyllfluorescens uppmätt med CTD-sond, visade på en låg aktivitet vid alla stationer vilket är normalt under vinterperioden.



Figur 1. Snitt som visar syrekonzentration, salthalt och temperatur från Skagerrak, genom Öresund till Bornholmsbassängen. Observera att endast stationer inom transekten på kartan ligger till grund för figurerna.

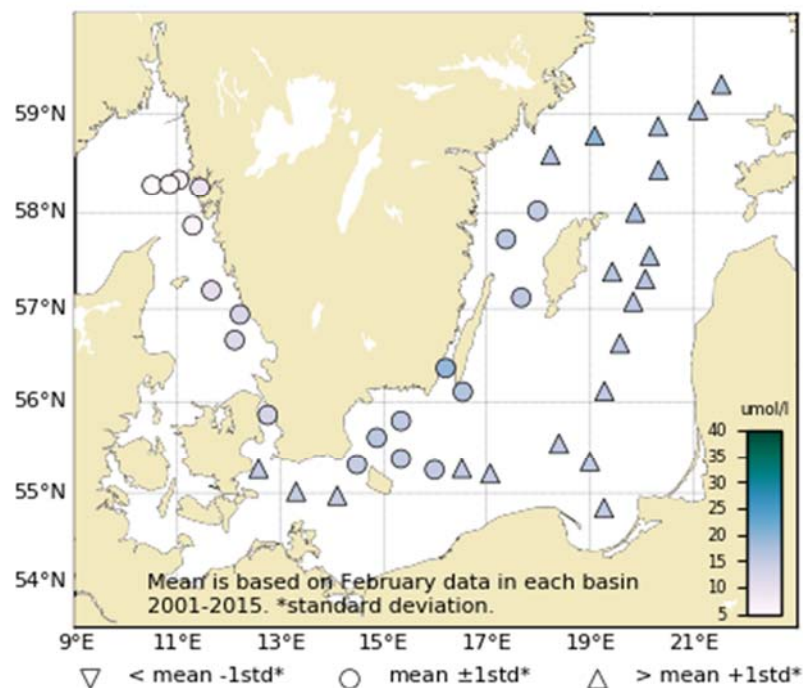


Figur 2. Koncentrationen av oorganiskt kväve (DIN) i ytvattnet (0-10m).



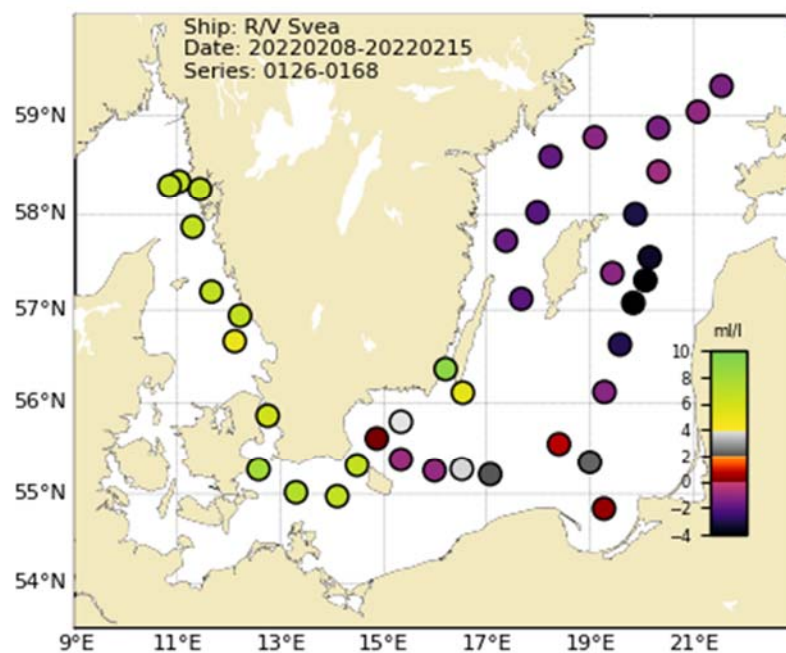
Figur 3. Koncentrationen av fosfat i ytvattnet (0-10m).

SMHI marine monitoring February 2022
Silicate in the surface water (0-10 m)



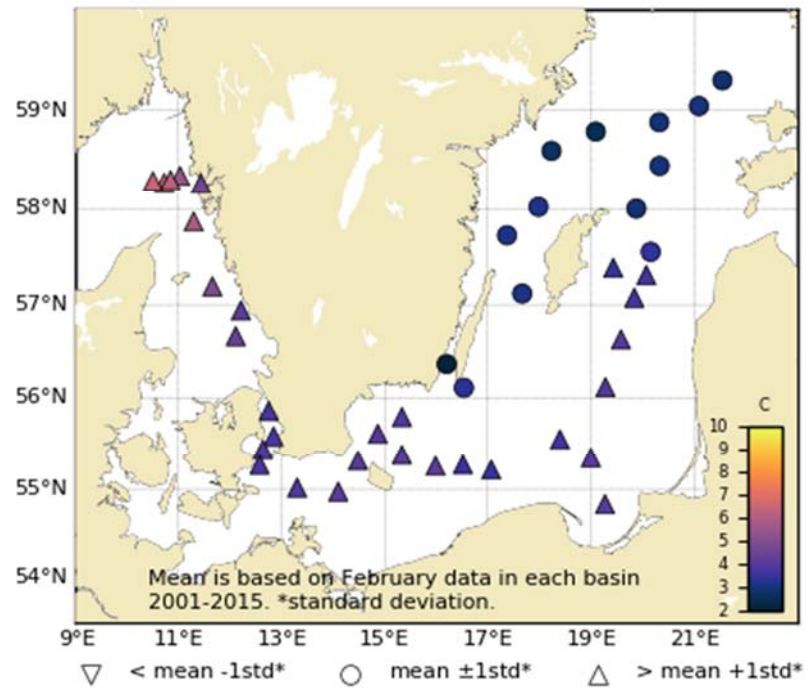
Figur 4. Koncentrationen av silikat i ytvattnet (0-10m).

Bottom water oxygen concentration (ml/l)



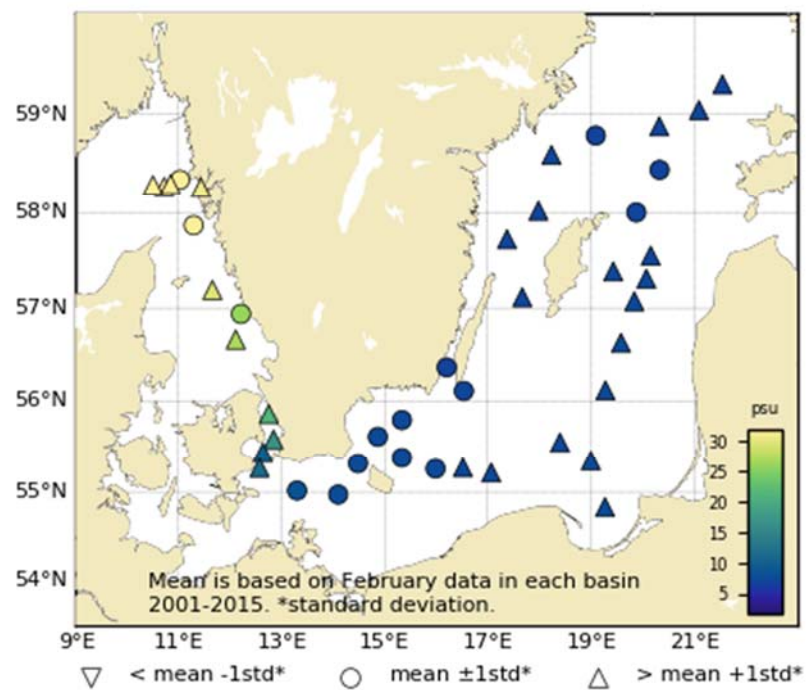
Figur 5. Koncentrationen av syre i bottenvattnet, ca 1 m ovanför botten.

SMHI marine monitoring February 2022
Temperature (CTD) in the surface water (0-10 m)

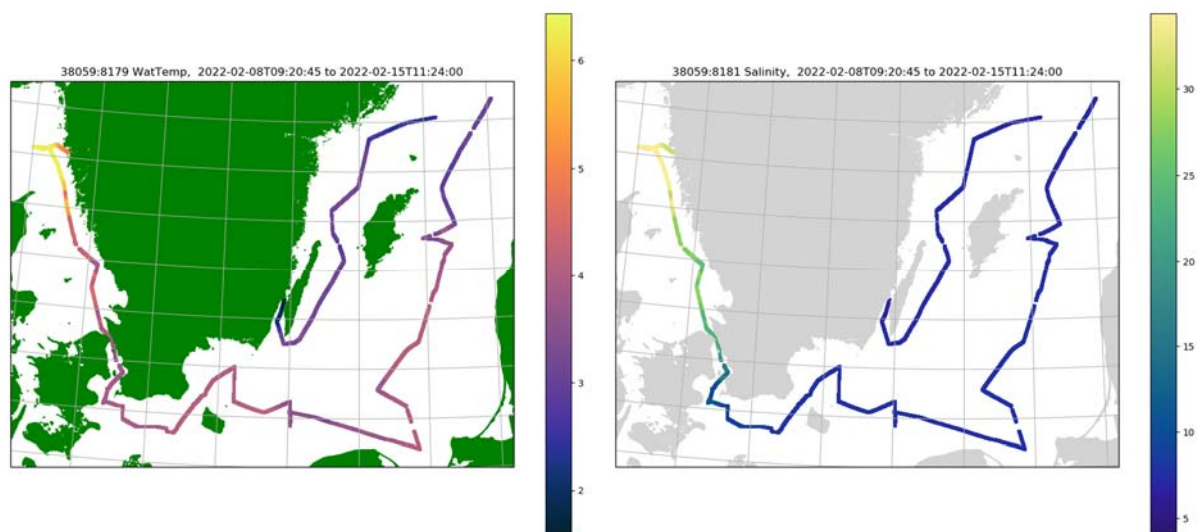


Figur 6. Temperatur i ytvattnet (0–10 m).

SMHI marine monitoring February 2022
Salinity (CTD) in the surface water (0-10 m)



Figur 7. Salthalt i ytvattnet (0–10 m).



Figur 8. Temperatur (t.v) och salthalt (t.h.) i ytvattnet uppmätt med Sveas ferrybox.
Data har endast genomgått en grov kvalitetskontroll.

DELTAGARE

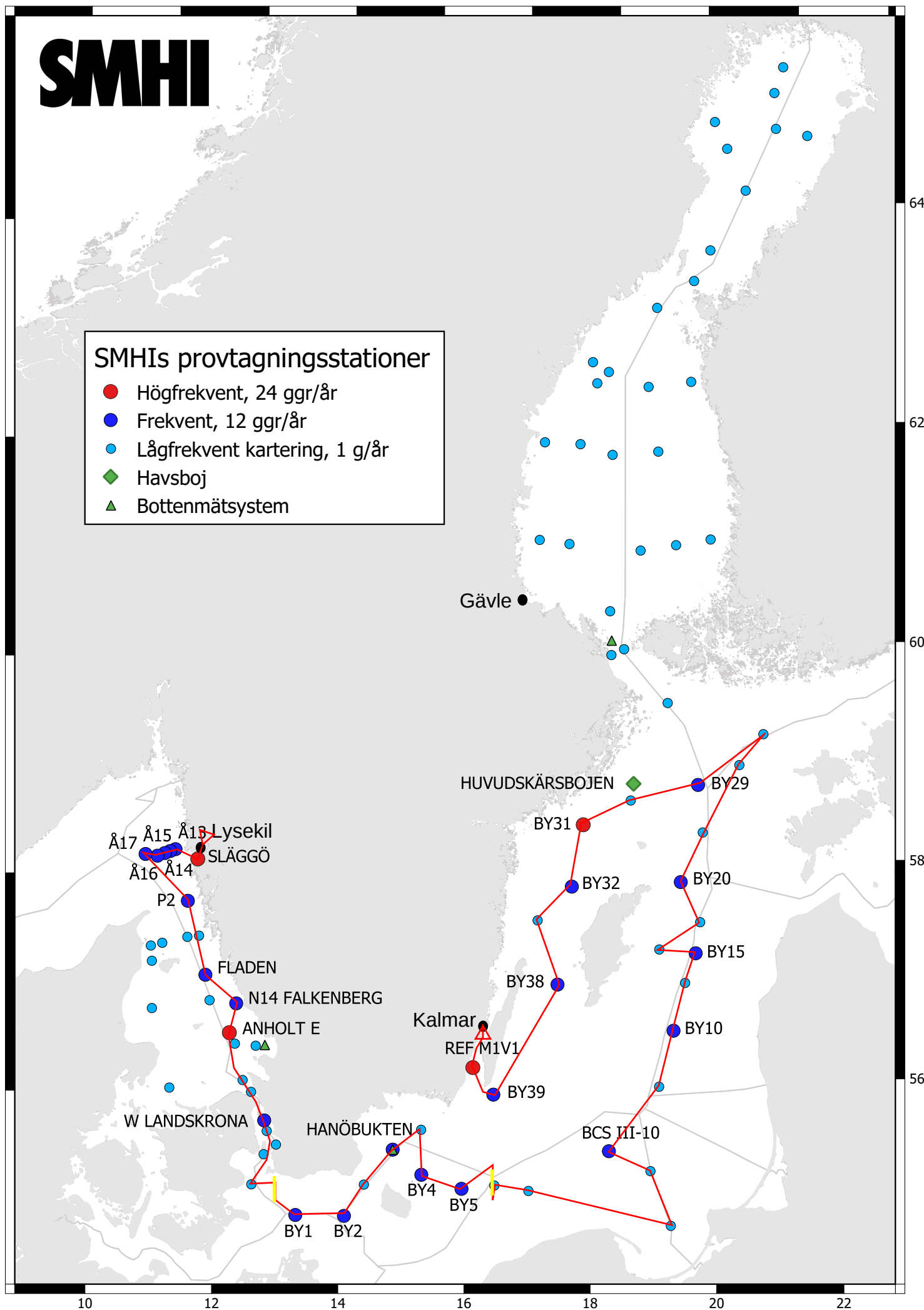
Namn	Roll	Från
Lena Viktorsson	Expeditionsledare	SMHI
Kristin Andreasson	Kvalitetsansvarig	SMHI
Madeleine Nilsson		SMHI
Ann-Turi Skjevik		SMHI
Anna-Kerstin Thell		SMHI

BILAGOR

- Färdkarta
- Tabell över stationer, analyserade parametrar och antal provtagningsdjup
- Vertikalprofiler
- Årssammanställning per station, 0–10 m, samt syreutveckling i bottenvattnet

SMHIs provtagningsstationer

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



Time: 17:00

Ser no	Cru no	Stat code	Proj	Stat name	Lat	Lon	Start date yyyymmdd	Start time hhmm	Bottom depth m	Secchi depth m	Wind dir vel	Air temp C	Air pres hPa	WCWI elac aoe	CZPP hozh loy	No No de btl	T e e T S S P D D H P P N N N A N A S H C C e e a a h o o 2 h t t t t m t l i u o o m m l l x x s o o r r r o o k o m m m p p t t y y s t i a z n t y 3 u n n - - - - - hdsb o p b c b c b c t t t t t t l d l d l d
0126	03	FIBG27	BAS...	SLÄGGÖ	5815.59	01126.15	20220208	1000	74	4	27 14	6.6	1002	0030	xxx-	9 9	x x x x - x x - x x x x x x x - x - x -
0127	03	SKEX14	BAS...	Å13	5820.36	01101.76	20220208	1245	90		27 14	6.5	1004	0040	x---	10 10	x x x x - x x - x x x x x x x - x - - -
0128	03	SKEX17	BAS...	Å16	5816.06	01043.34	20220208	1520	202		27 14	6.6	1006	0040	----	14 0	- x - x - x - - - - - - - - - - - -
0129	03	SKEX18	BAS...	Å17	5817.07	01030.26	20220208	1640	340		25 15	6.4	1006	9990	xxx-	15 14	x x - x x x x - x x x x x x x x - - - -
0130	03	SKEX16	BAS...	Å15	5817.70	01050.72	20220208	1910	135		26 14	6.1	1007	9990	x---	12 12	x x x x - x x - x x x x x x x - x - - -
0131	03	SKEX23	BAS...	P2	5751.98	01117.63	20220208	2330	93		25 10	5.9	1010	9990	x---	10 10	x x x x - x x - x x x x x x x - x - - -
0132	03	KANX25	BAS...	FLADEN	5711.56	01139.46	20220209	0415	84		22 12	4.8	1010	9990	x---	13 13	x x x x - x x - x x x x x x x - x - - -
0133	03	KANX50	BAS...	N14 FALKENBERG	5656.41	01212.72	20220209	0710	30	5	22 11	5.0	1009	1330	xxx-	7 7	x x x x - x x - x x x x x x x - x - - -
0134	03	KAEX29	BAS...	ANHOLT E	5640.11	01206.62	20220209	1000	62	5	22 10	5.5	1008	1630	xxxx	10 10	x x x x x x x - x x x x x x x x x x - -
0135	03	SOCX39	BAS...	W LANDSKRONA	5551.97	01244.98	20220209	1610	50		26 9	7.0	1011	1130	x---	9 9	x x x x - x x - x x x x x x x - x - - -
0136	03	SOSX00	EXT...	FLINTEN 7	5535.29	01250.64	20220209	1845	8		29 6	5.4	1013	9990	----	3	- x - x - - x - - - - - - - - - - x -
0137	03	SOSX00	EXT...	6W FALSTERBO	5526.54	01238.23	20220209	2020	11		25 7	5.1	1014	9990	----	3	- x - x - - x - - - - - - - - - - - -
0138	03	BPSA01	BAS...	441 STEVNS KLINT	5516.29	01234.39	20220209	2150	26		25 6	4.6	1015	9990	----	6 6	x x x x - x x - x x x x x x x - x - - -
0139	03	BPSA02	BAS...	BY1	5500.92	01318.06	20220210	0140	47		25 8	4.7	1015	9990	x---	8 8	x x x x - x x - x x x x x x x x - x - -
0140	03	BPSA03	BAS...	BY2 ARKONA	5458.27	01405.92	20220210	0510	47		24 8	4.3	1013	9990	xxx-	8 8	x x x x - x x - x x x x x x x x - x x -
0141	03	BPSA04	BAS...	BY3 HAMRARNE SUND	5519.10	01428.99	20220210	0845	48	13	23 10	4.3	1012	2830	----	8 8	x x x x - x x - x x x x x x x x - x - -
0142	03	BPSH05	BAS...	HANÖBUKTEN	5537.03	01452.01	20220210	1140	80	11	25 7	4.4	1010	2830	x-x	11 11	x x x x x x x - x x x x x x x x x x - - x
0143	03	BPSH51	BAS...	HANÖBUKTEN-KBV	5548.03	01520.09	20220210	1430	60		27 7	4.4	1009	1630	----	9 9	x x x x - x x - x x x x x x x x - x - -
0144	03	BPSB06	BAS...	BY4 CHRISTIANSÖ	5522.98	01520.03	20220210	1730	94		25 11	4.2	1010	9990	x---	12 12	x x x x - x x x x x x x x x x x x - - -
0145	03	BPSB07	BAS...	BY5 BORNHOLMSDJ	5515.54	01559.21	20220210	2030	91		26 9	4.1	1010	9990	xxx-	12 12	x x x x x x x x x x x x x x x x x x - -
0146	03	BPSE08	BAS...	STOLPE TRÖSKEL	5516.49	01631.01	20220211	0240	63		27 12	3.8	1011	9990	----	9 9	x x x x - x x - x x x x x x x x - x - -
0147	03	BPSE09	BAS...	BY7 STOLPE RÄNNA													

Ship: SE
Year: 2022

[illegible]

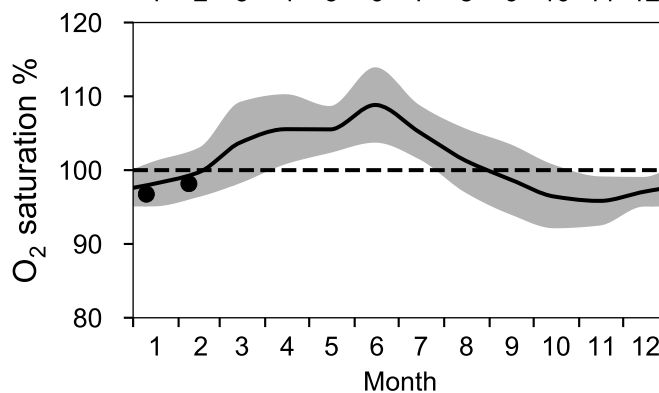
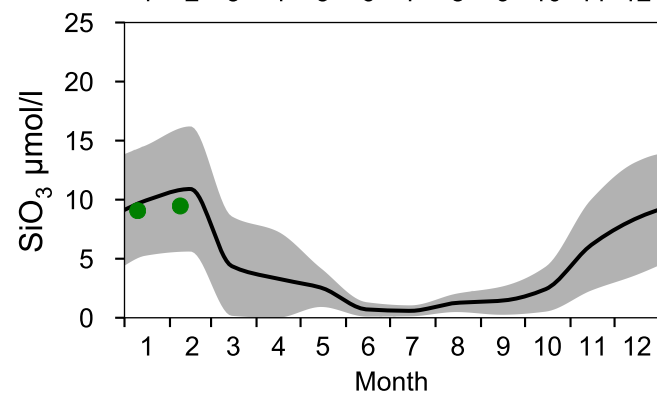
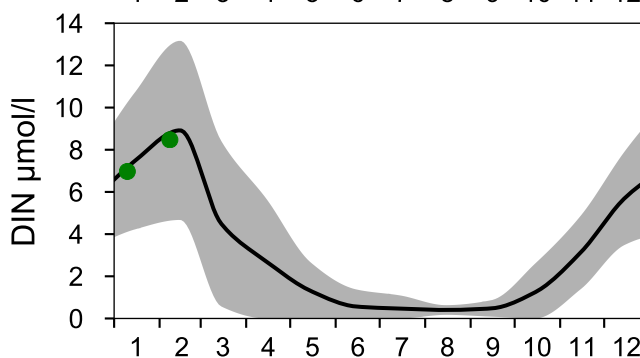
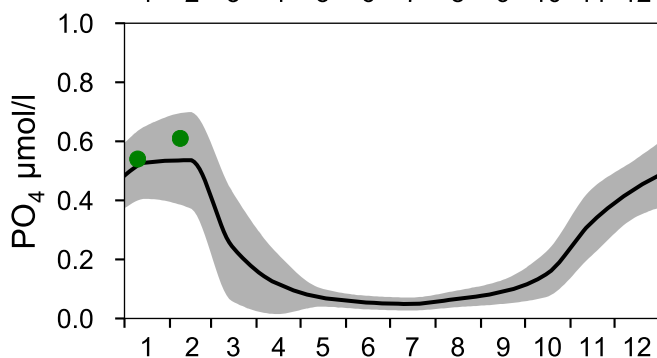
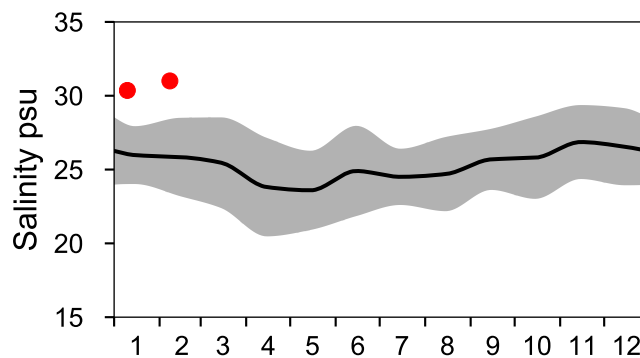
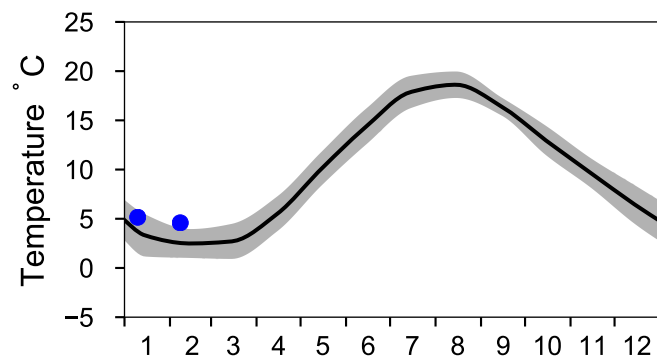
STATION SLÄGGÖ SURFACE WATER (0-10 m)

Annual Cycles

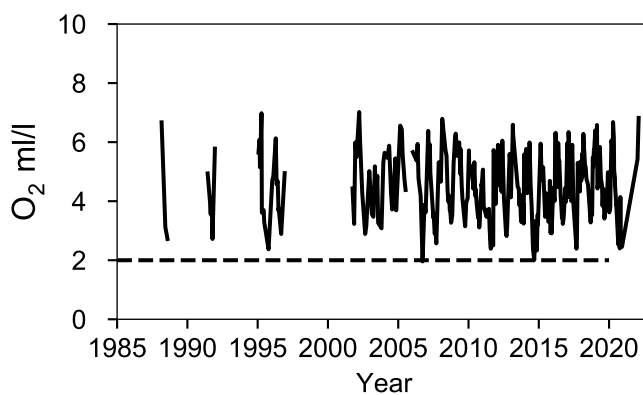
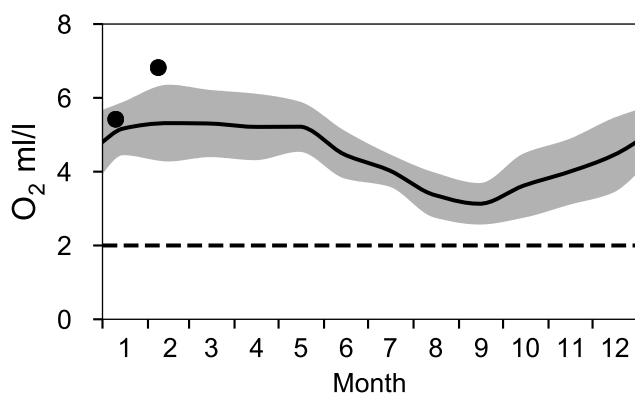
— Mean 2001-2015

■ St.Dev.

● 2022



OXYGEN IN BOTTOM WATER (depth >= 64 m)

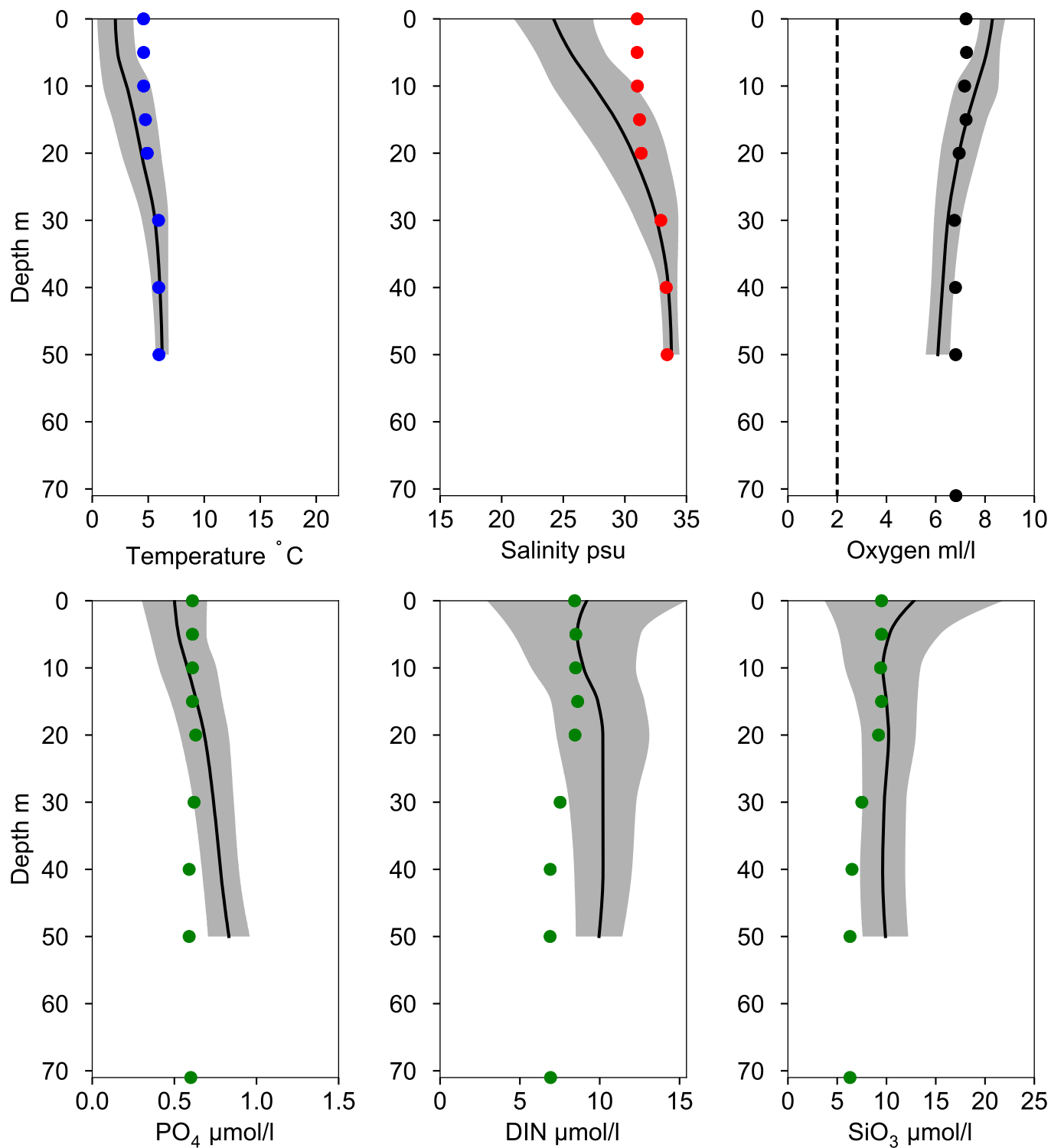


Vertical profiles SLÄGGÖ February

— Mean 2001-2015

■ St.Dev.

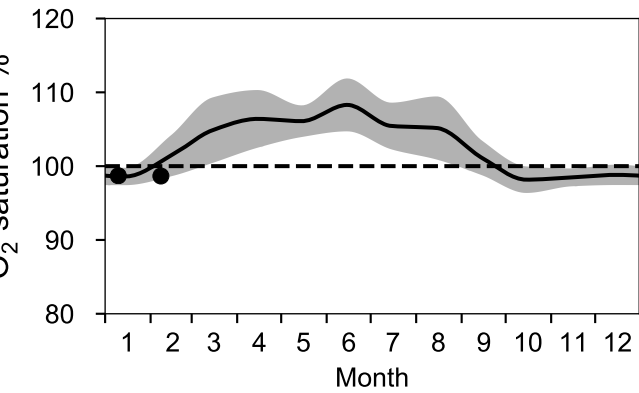
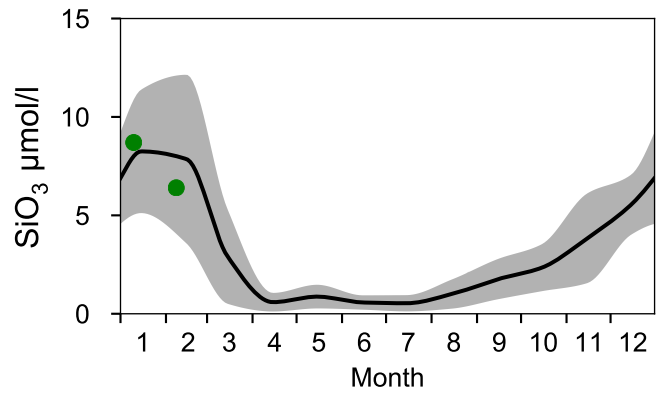
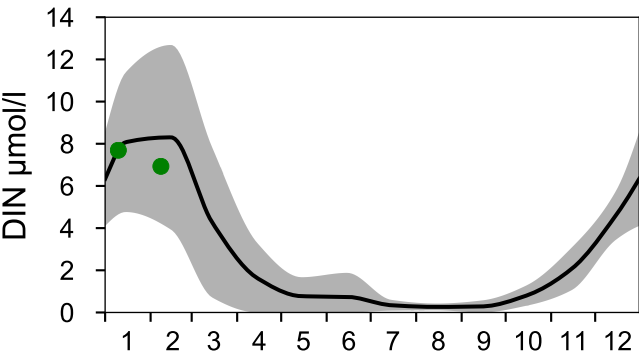
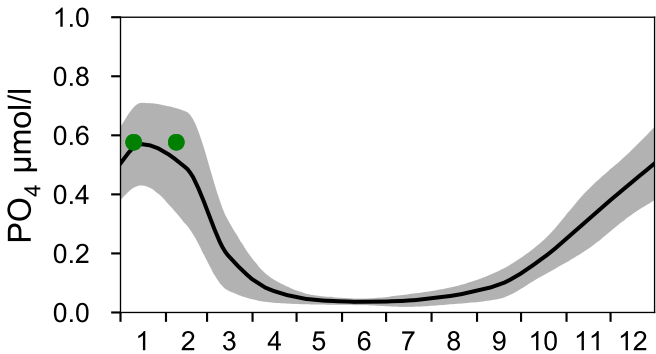
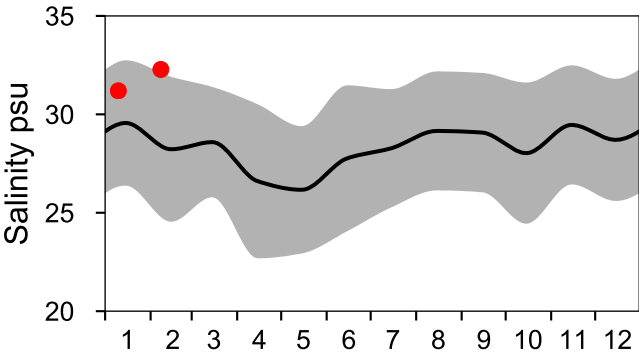
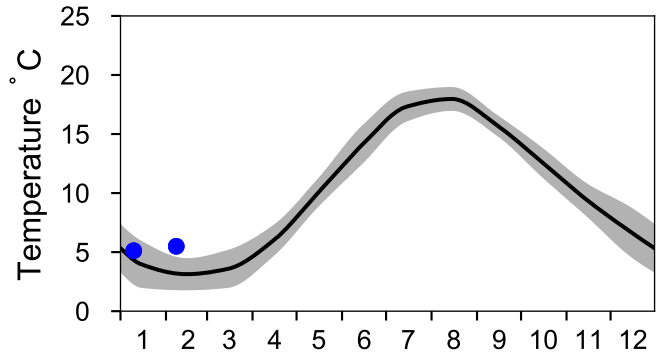
● 2022-02-08



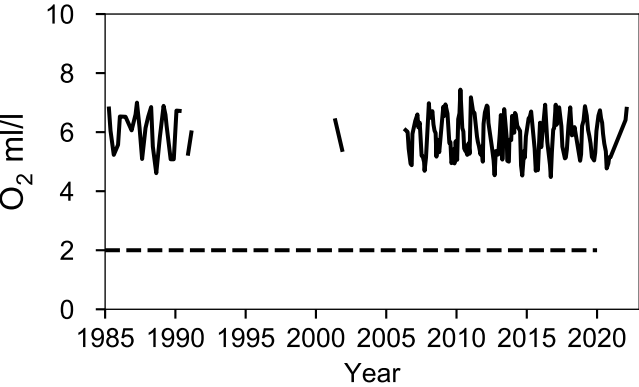
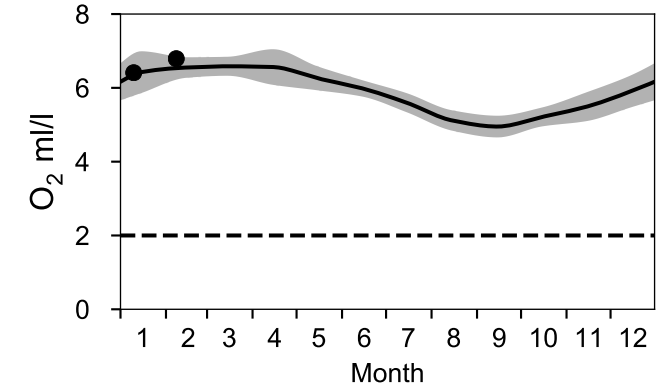
STATION Å13 SURFACE WATER (0-10 m)

Annual Cycles

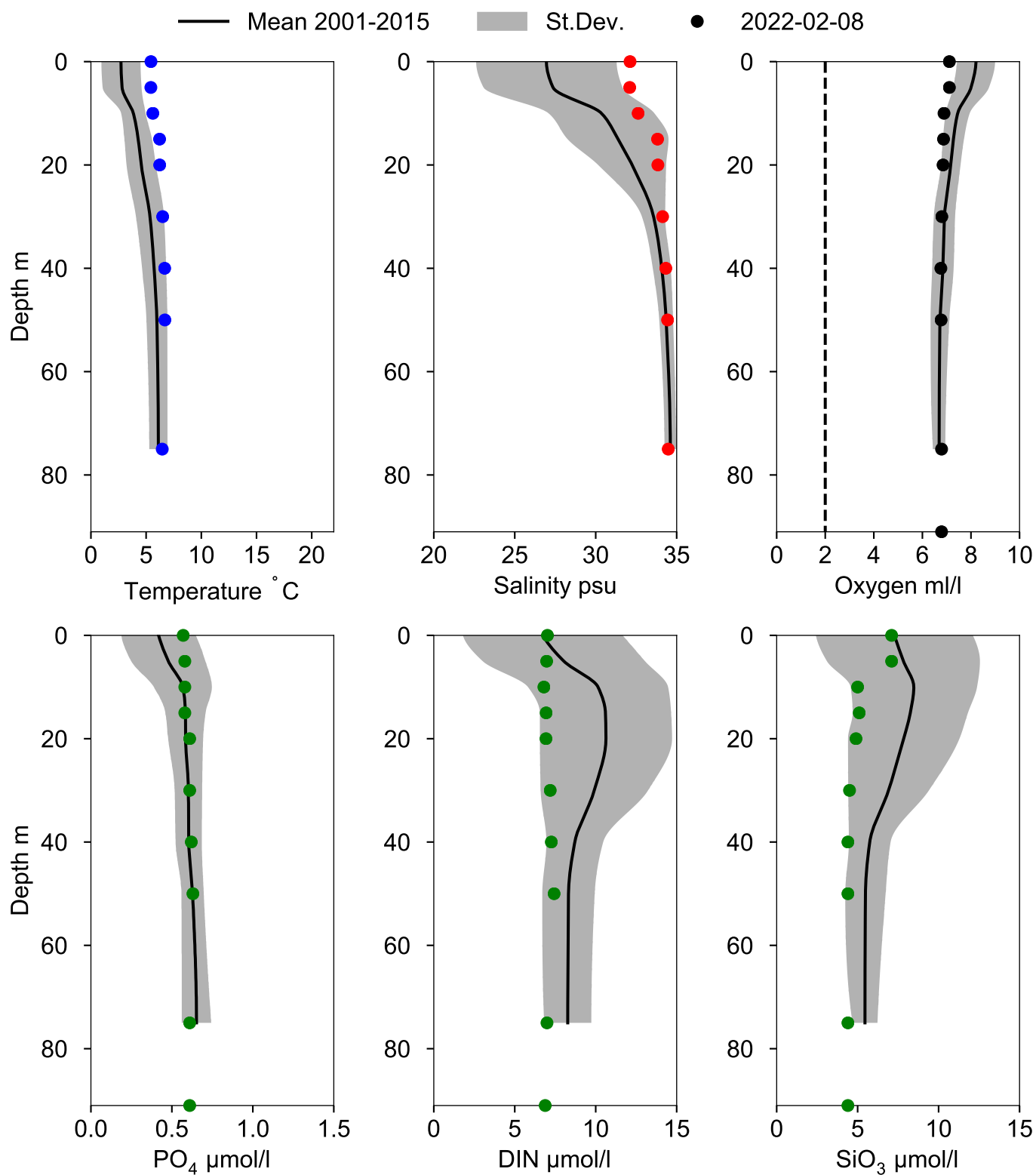
— Mean 2001-2015 St.Dev. • 2022



OXYGEN IN BOTTOM WATER (depth >= 82 m)



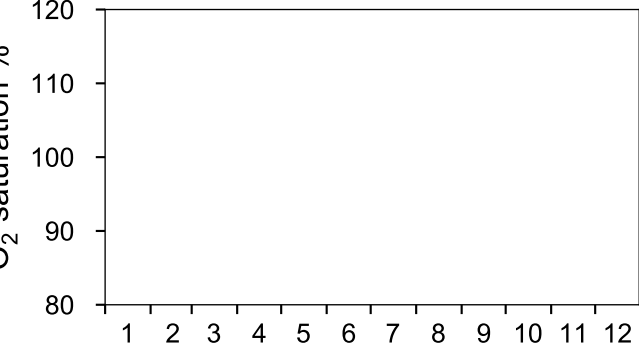
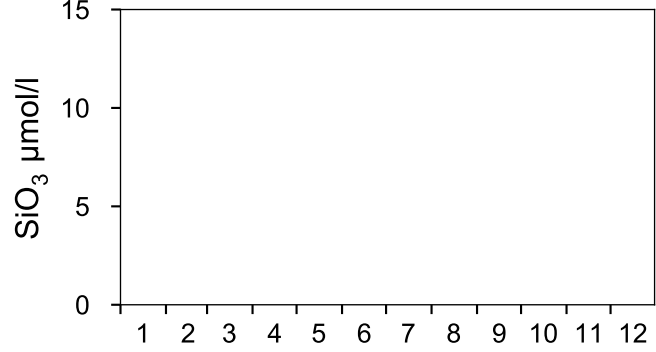
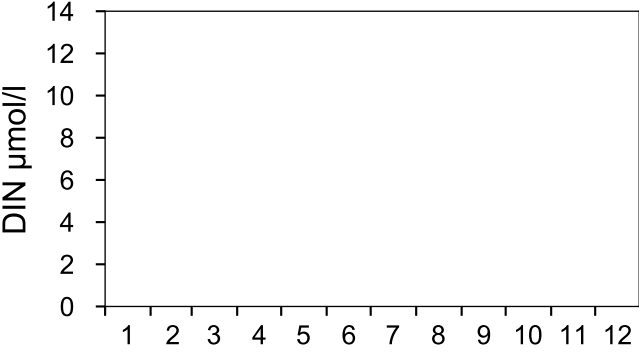
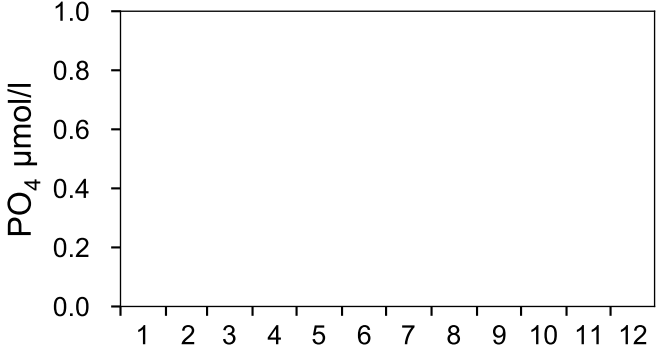
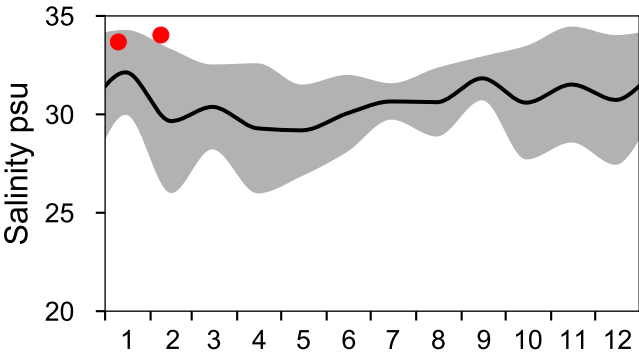
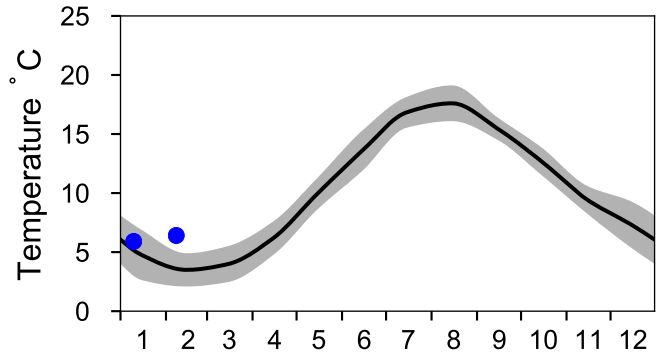
Vertical profiles Å13 February



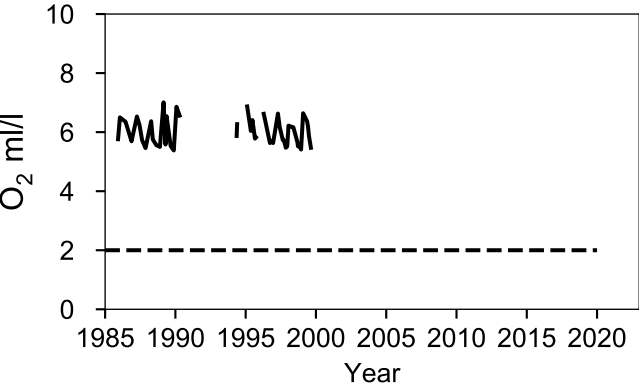
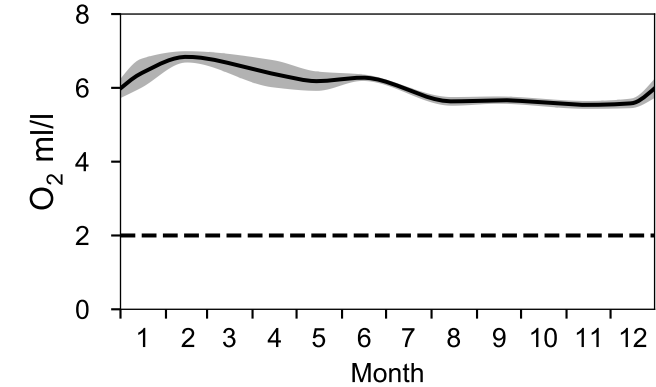
STATION Å16 SURFACE WATER (0-10 m)

Annual Cycles

— Mean 2001-2015 St.Dev. • 2022

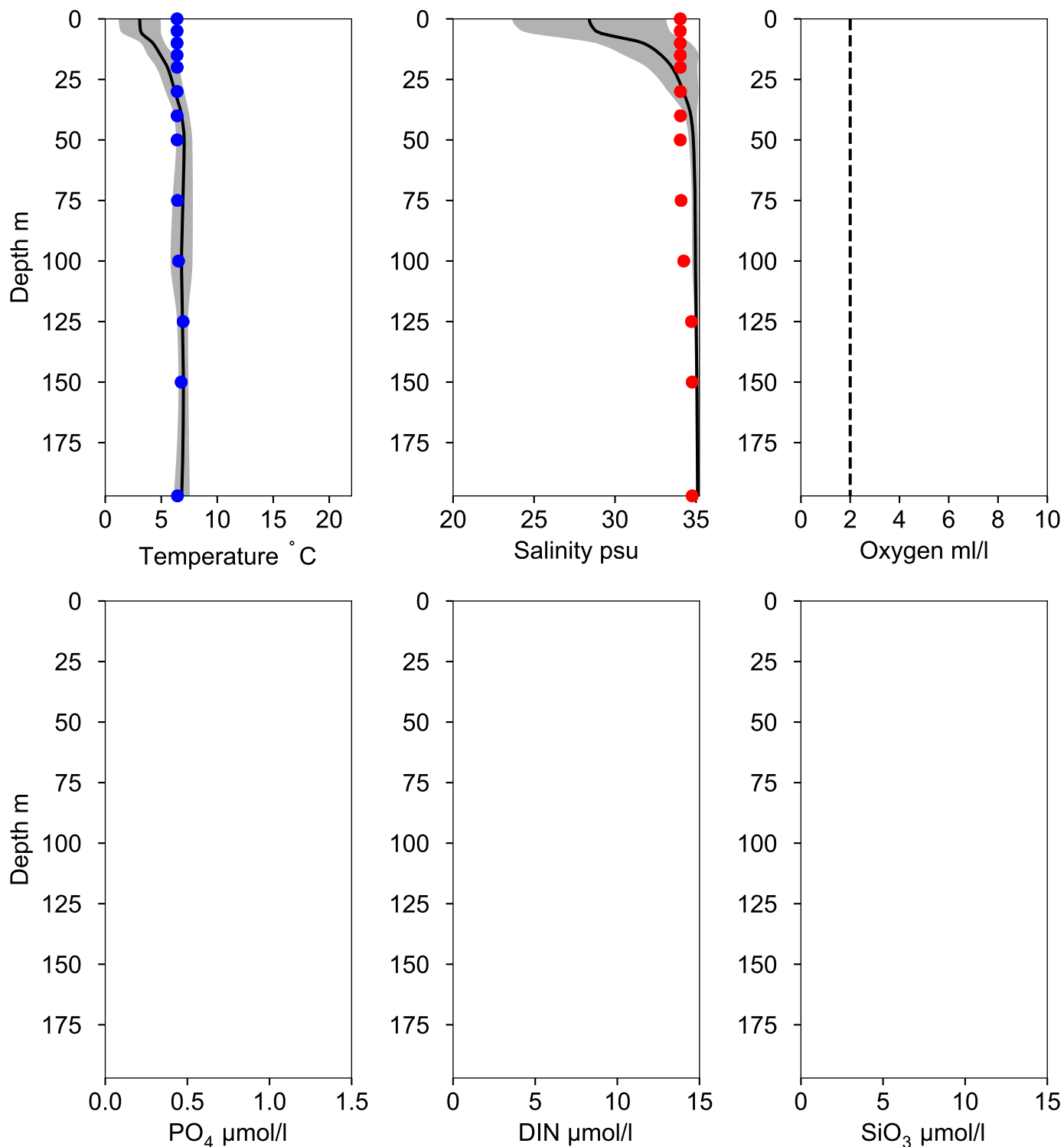


OXYGEN IN BOTTOM WATER (depth >= 193 m)



Vertical profiles A16 February

— Mean 2001-2015 St.Dev. • 2022-02-08



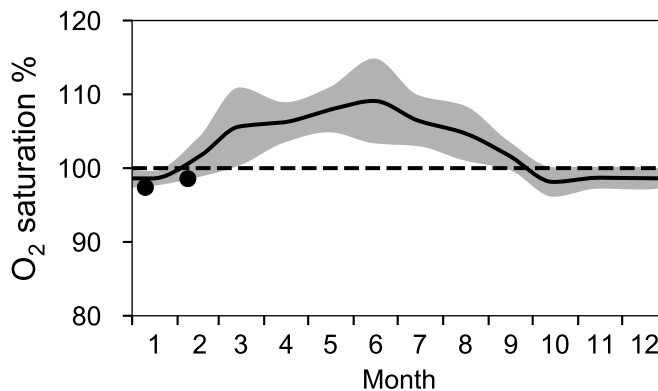
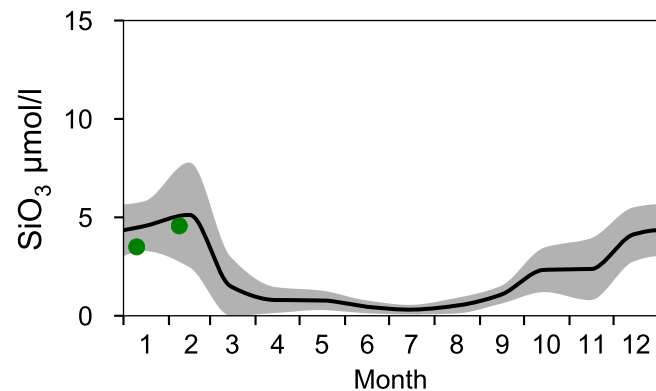
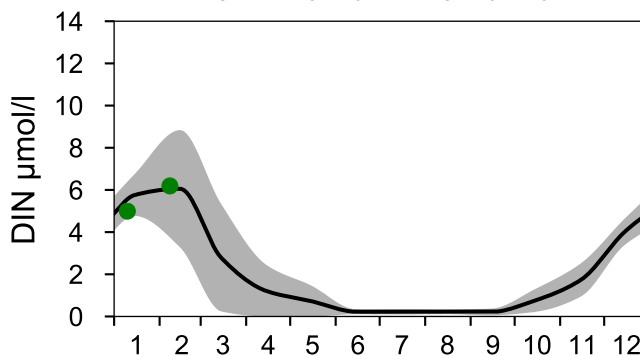
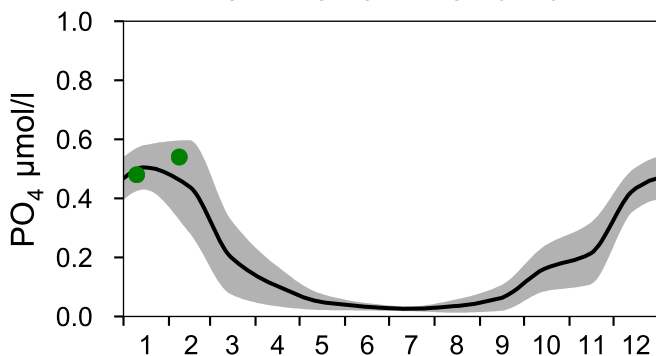
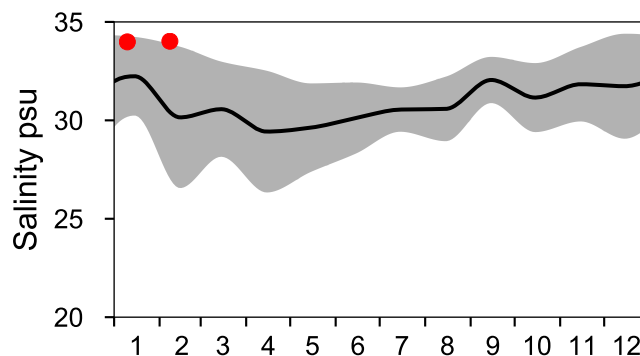
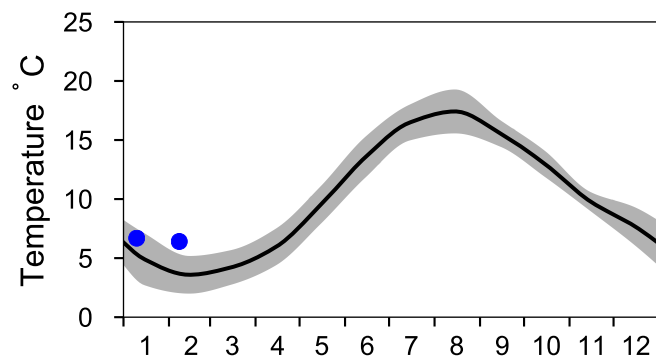
STATION Å17 SURFACE WATER (0-10 m)

Annual Cycles

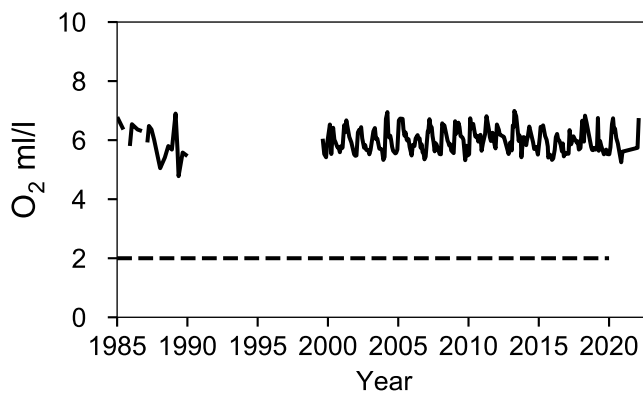
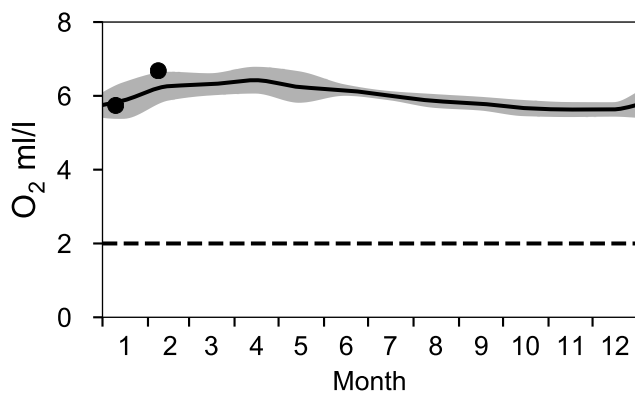
— Mean 2001-2015

■ St.Dev.

● 2022

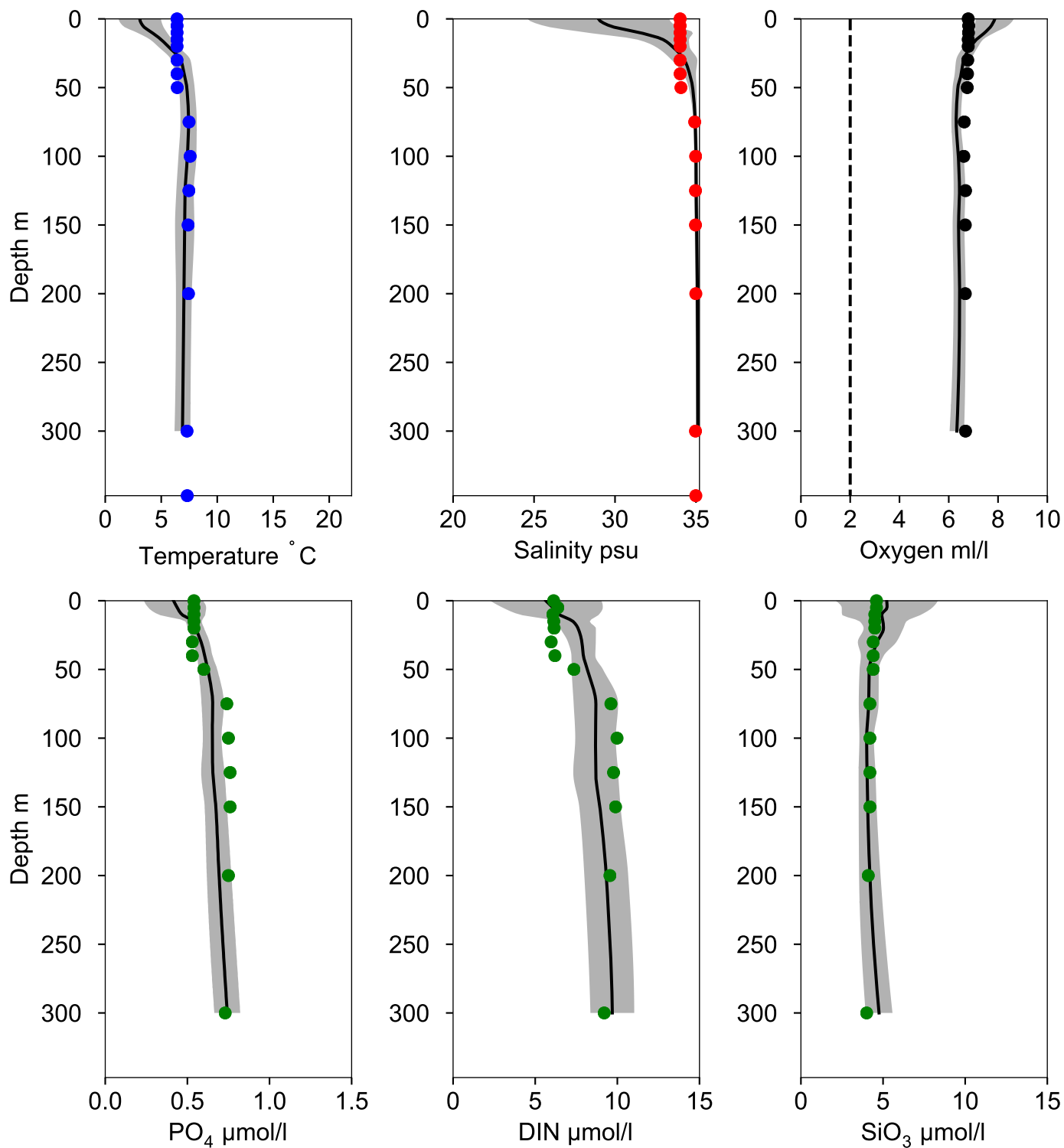


OXYGEN IN BOTTOM WATER (depth >= 300 m)



Vertical profiles A17 February

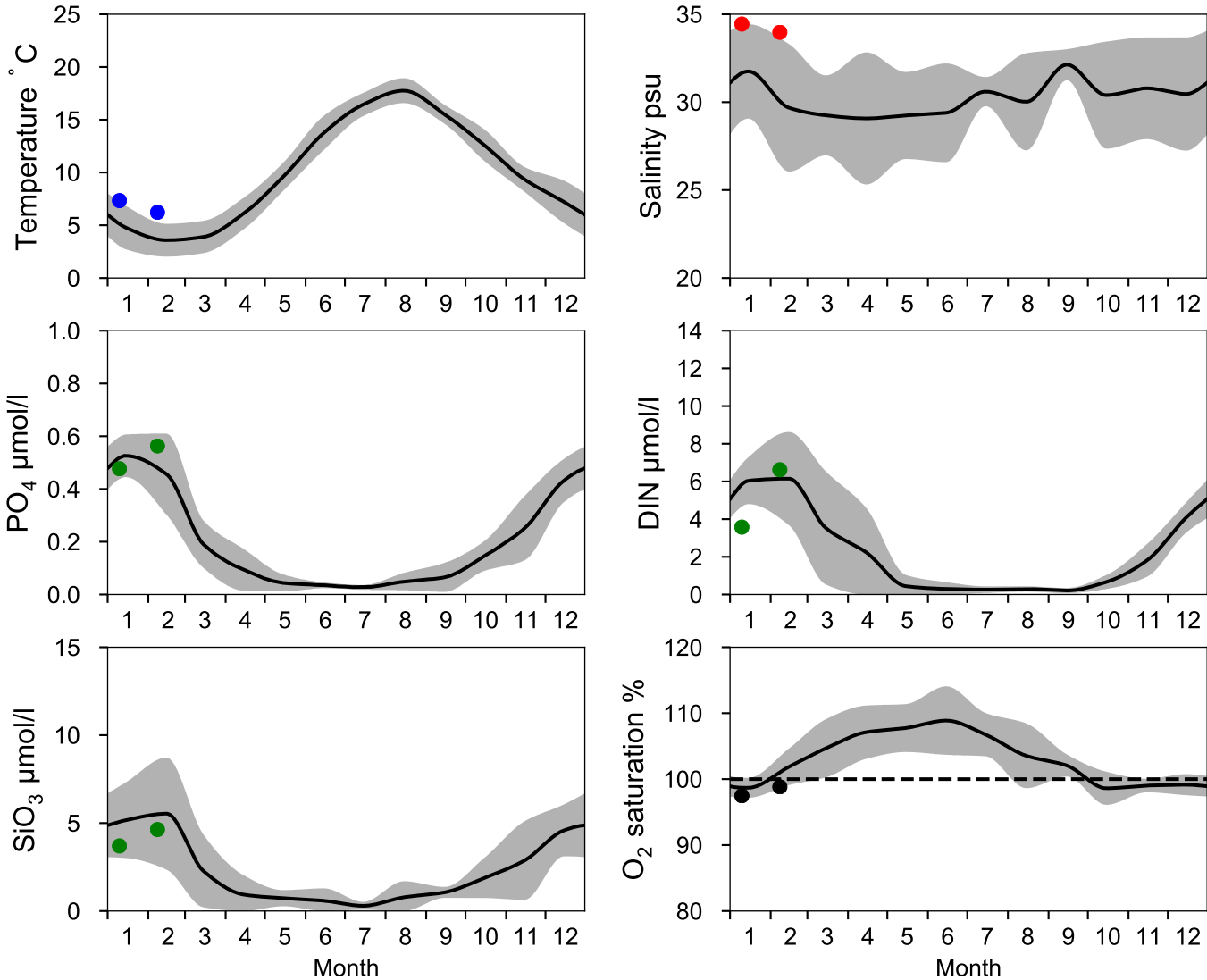
— Mean 2001-2015 St.Dev. • 2022-02-08



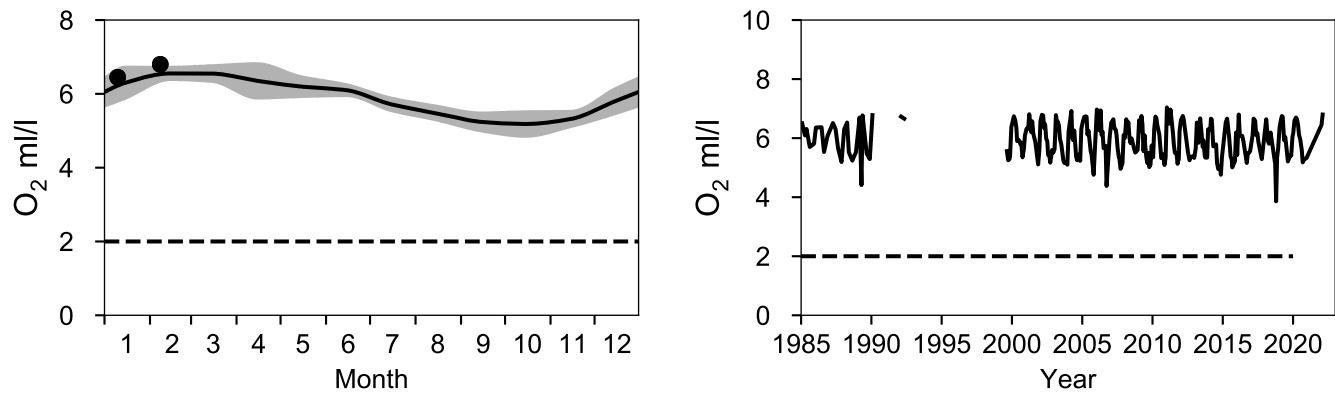
STATION Å15 SURFACE WATER (0-10 m)

Annual Cycles

— Mean 2001-2015 St.Dev. • 2022

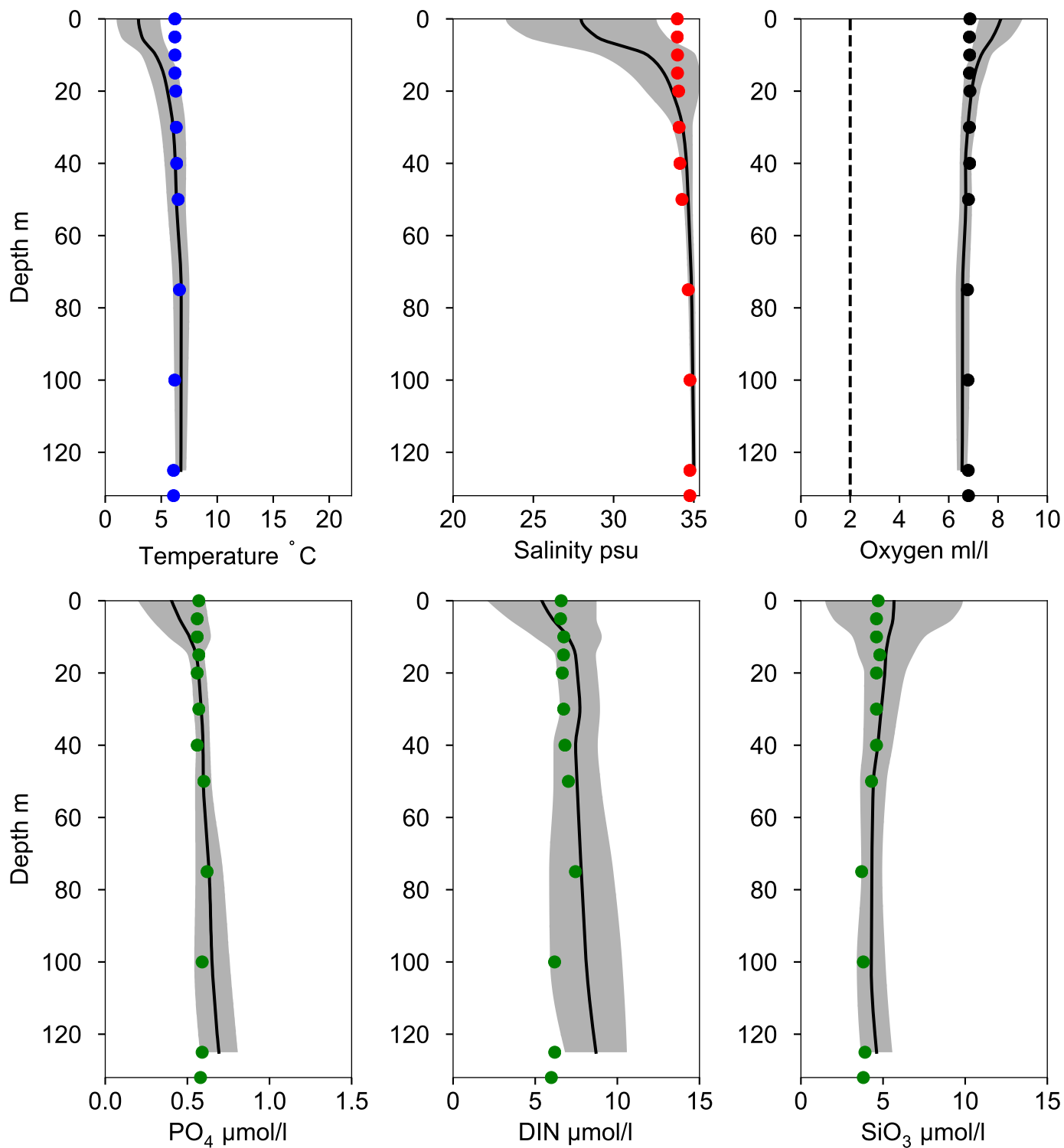


OXYGEN IN BOTTOM WATER (depth >= 125 m)



Vertical profiles Å15 February

— Mean 2001-2015 St.Dev. • 2022-02-08



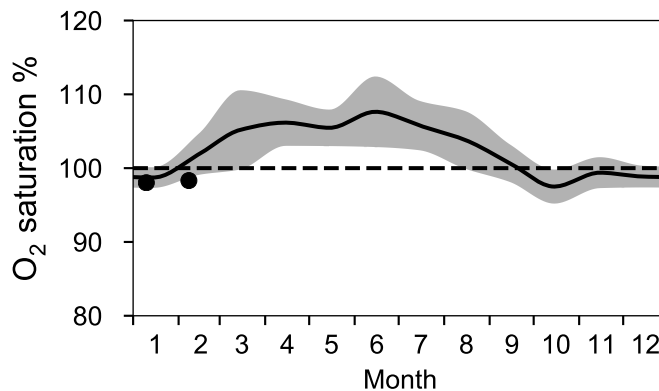
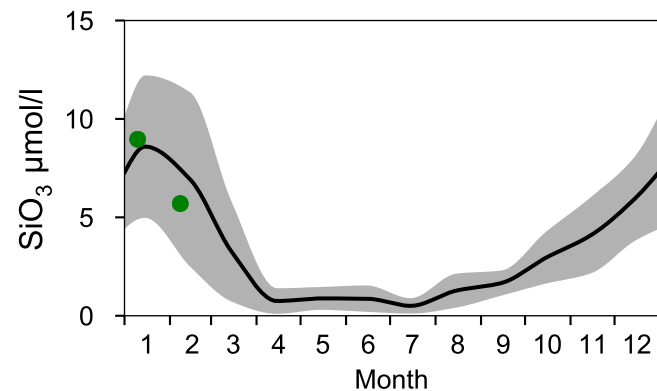
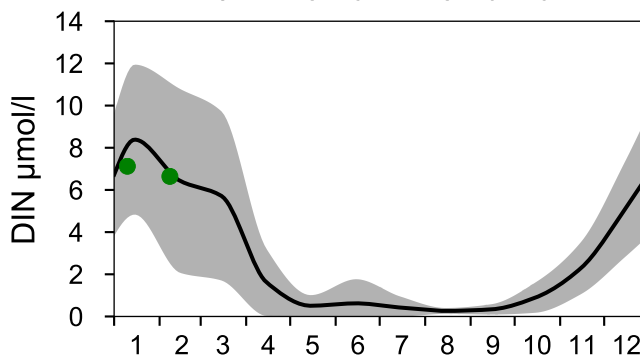
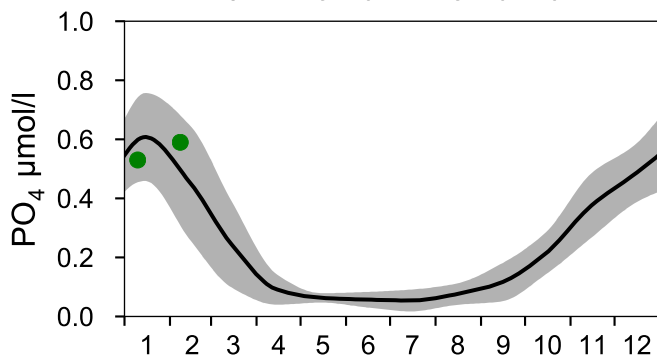
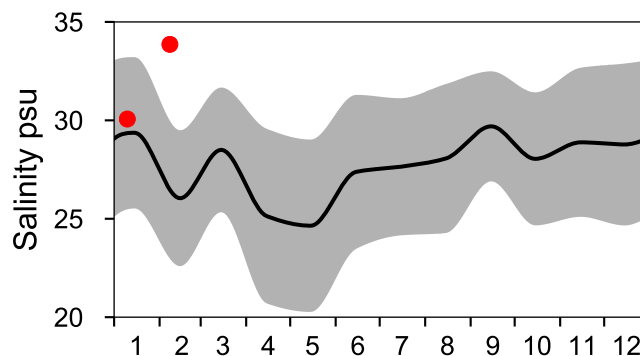
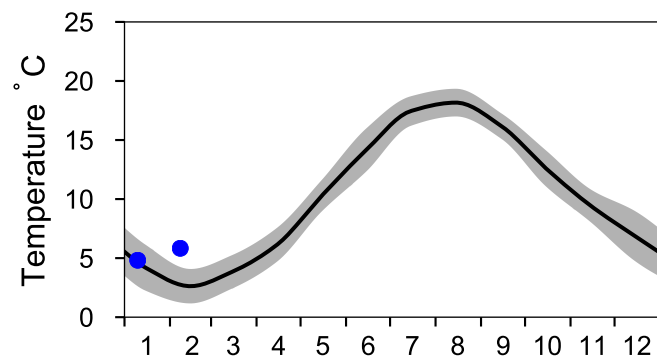
STATION P2 SURFACE WATER (0-10 m)

Annual Cycles

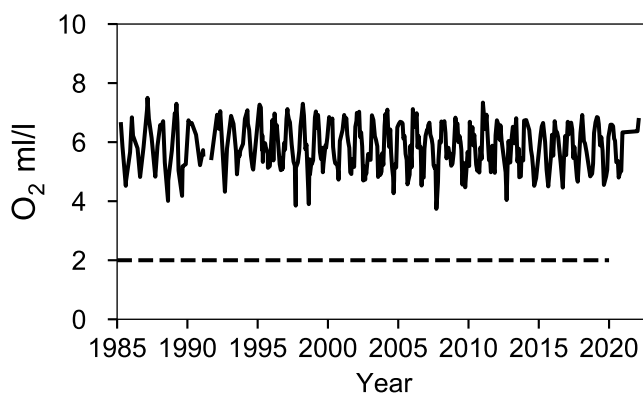
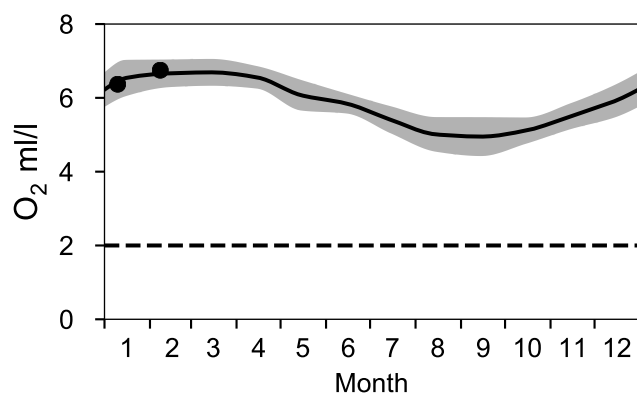
— Mean 2001-2015

■ St.Dev.

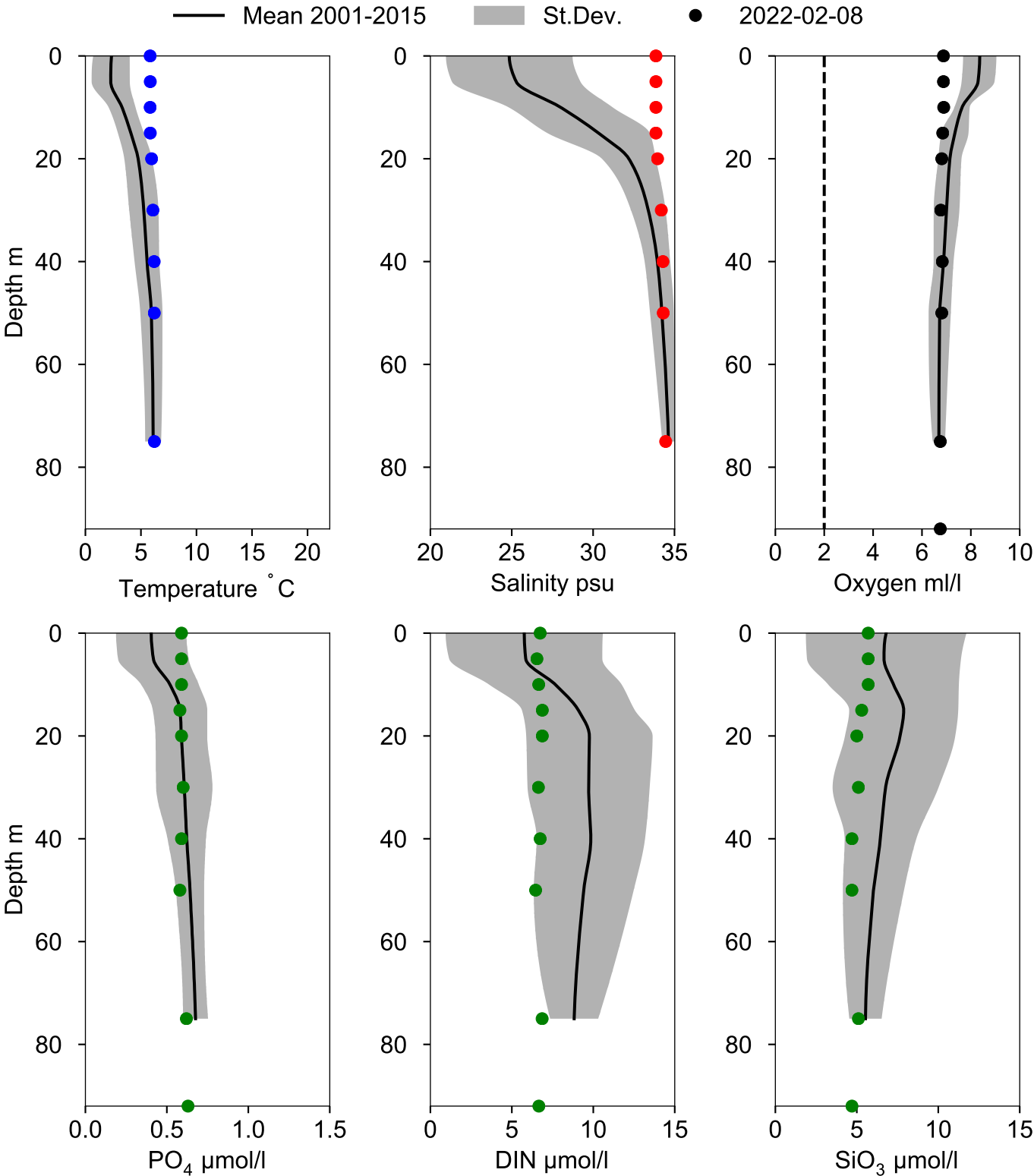
● 2022



OXYGEN IN BOTTOM WATER (depth >= 75 m)



Vertical profiles P2 February



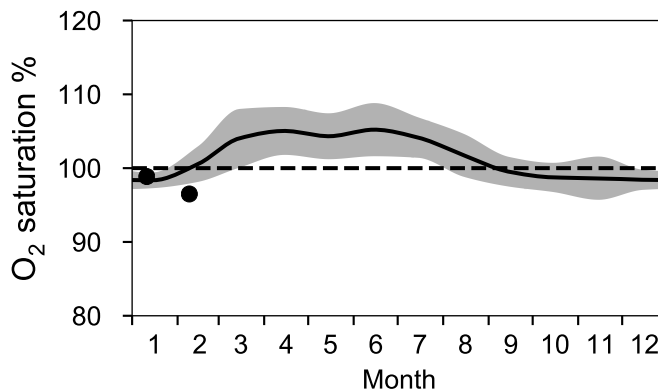
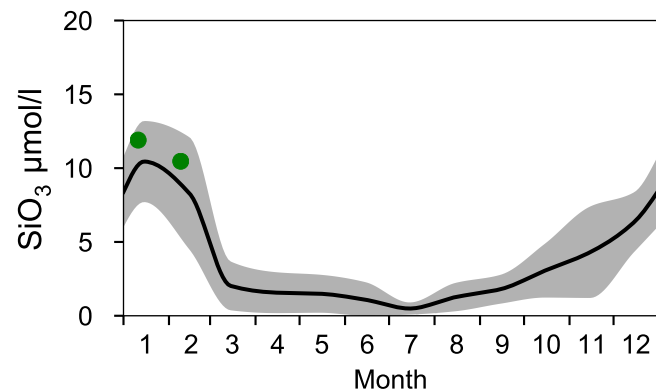
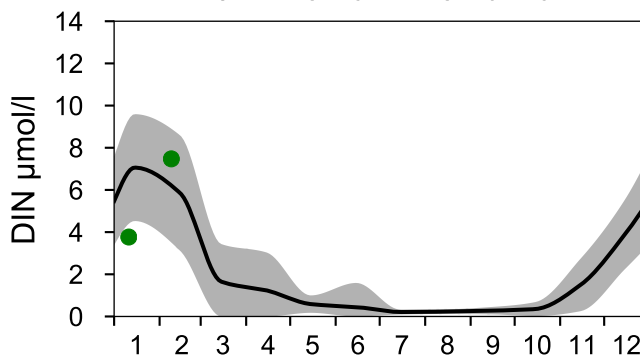
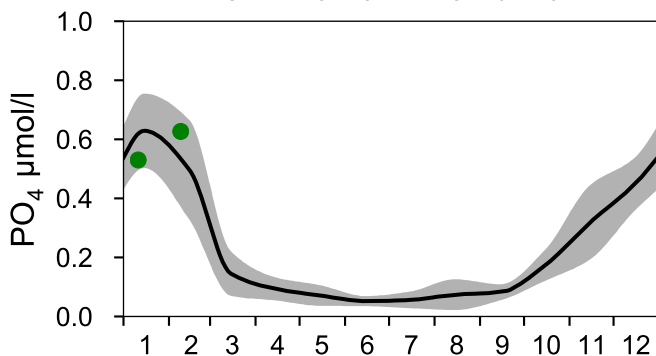
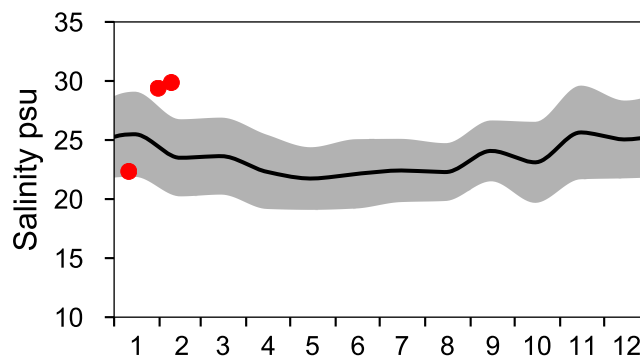
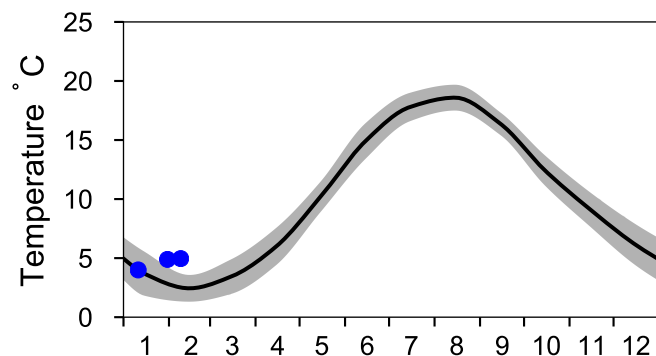
STATION FLADEN SURFACE WATER (0-10 m)

Annual Cycles

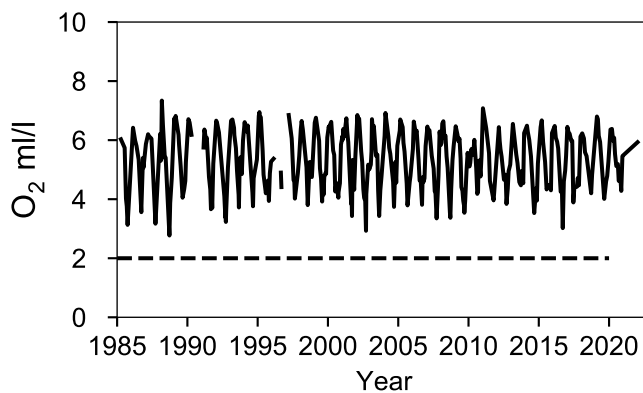
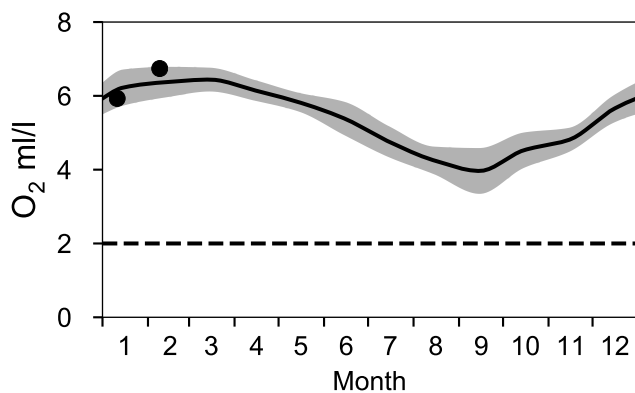
— Mean 2001-2015

■ St.Dev.

● 2022



OXYGEN IN BOTTOM WATER (depth >= 74 m)

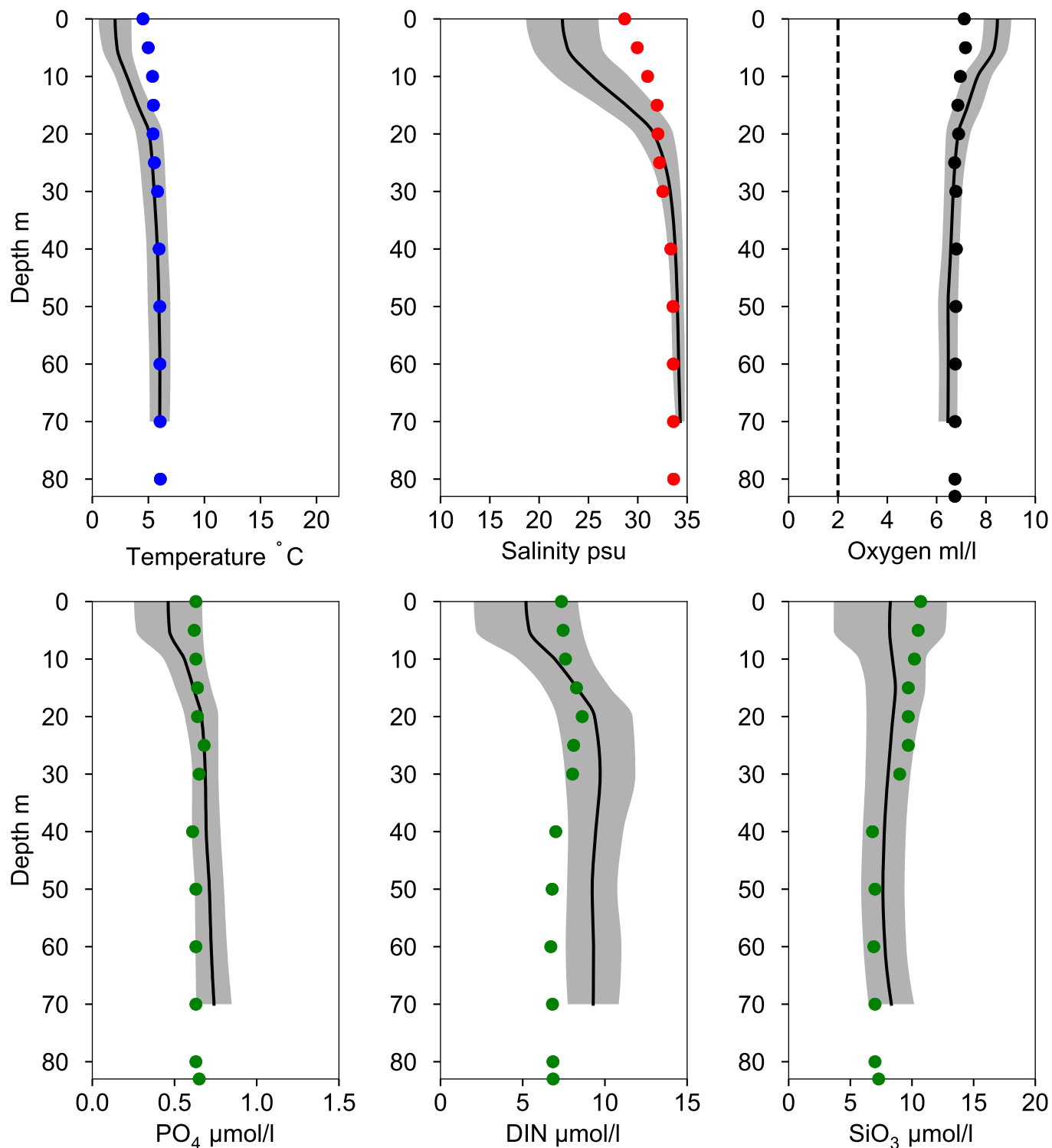


Vertical profiles FLADEN February

— Mean 2001-2015

■ St.Dev.

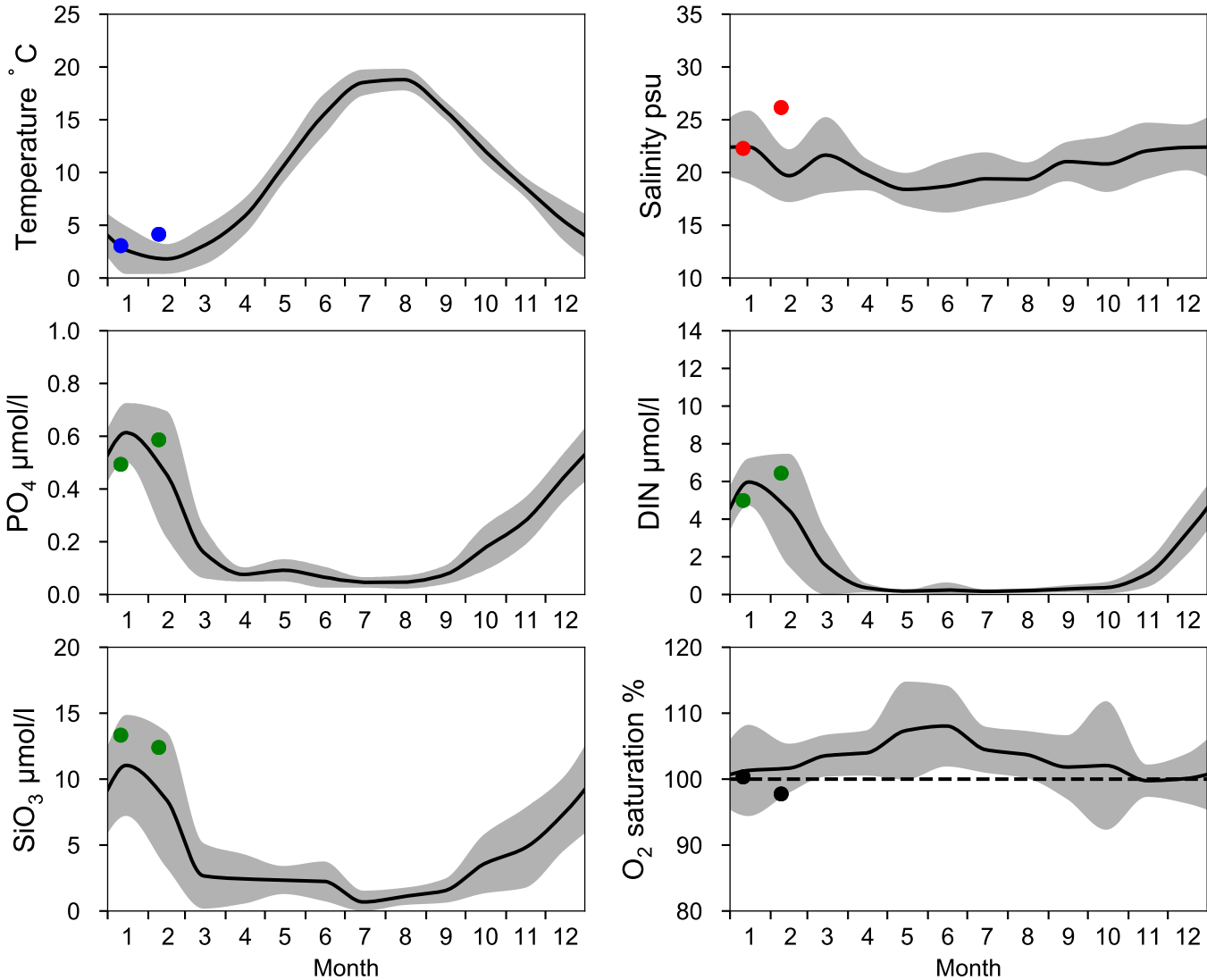
● 2022-02-09



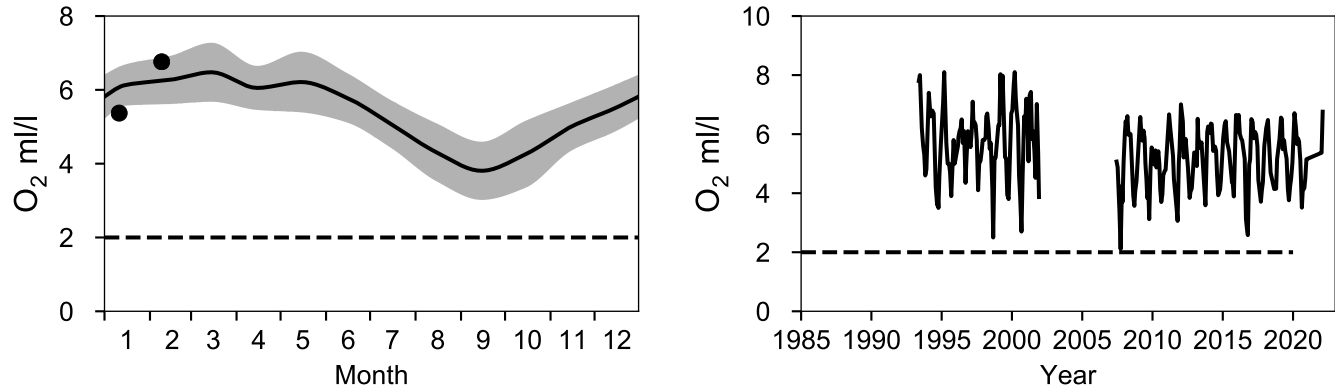
STATION N14 FALKENBERG SURFACE WATER (0-10 m)

Annual Cycles

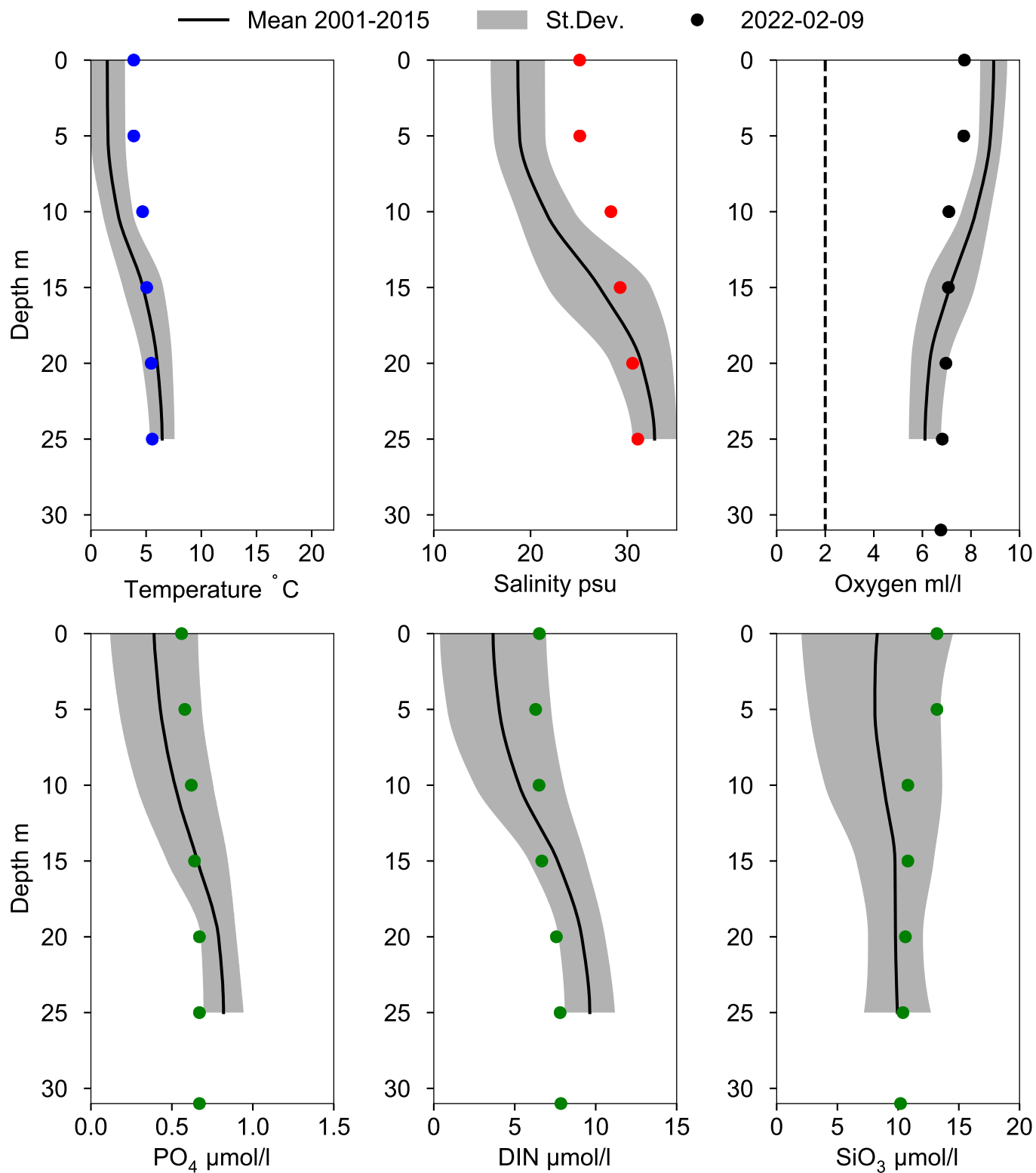
— Mean 2001-2015 St.Dev. • 2022



OXYGEN IN BOTTOM WATER (depth >= 25 m)



Vertical profiles N14 FALKENBERG February



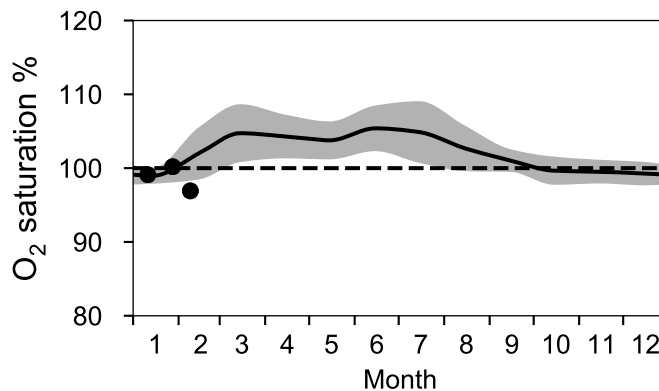
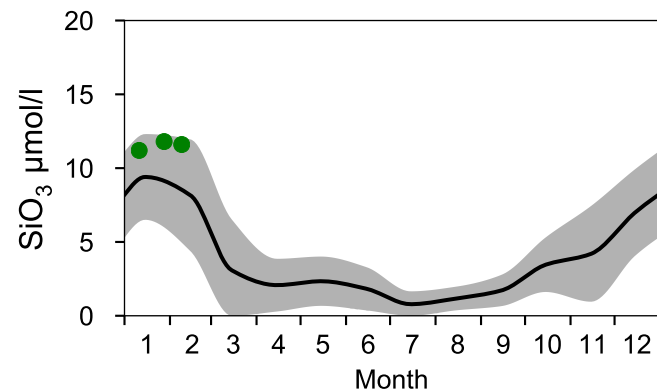
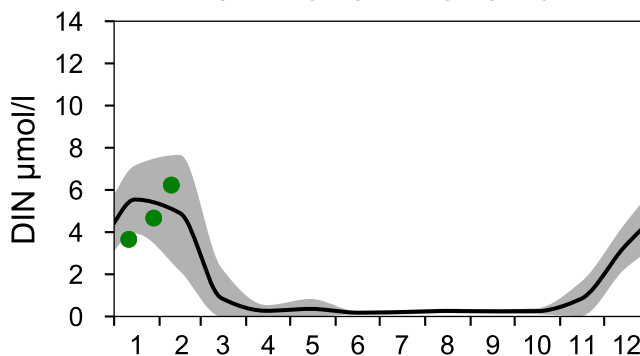
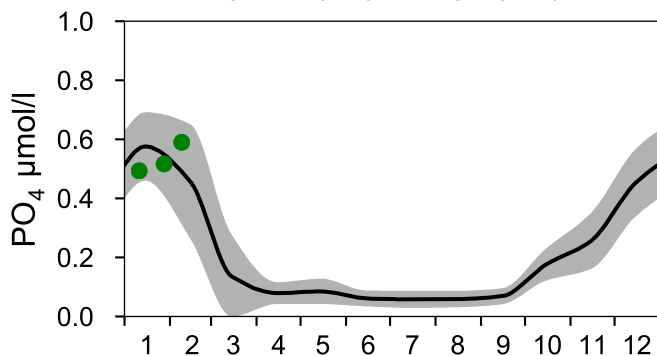
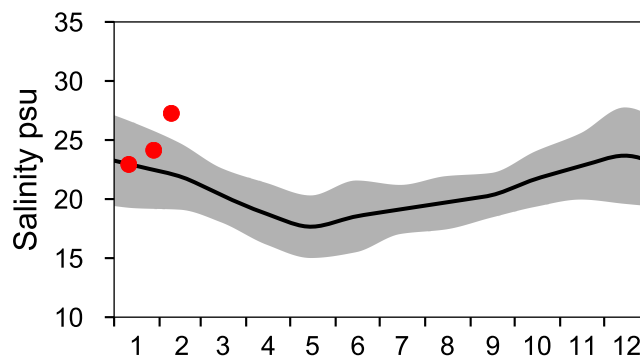
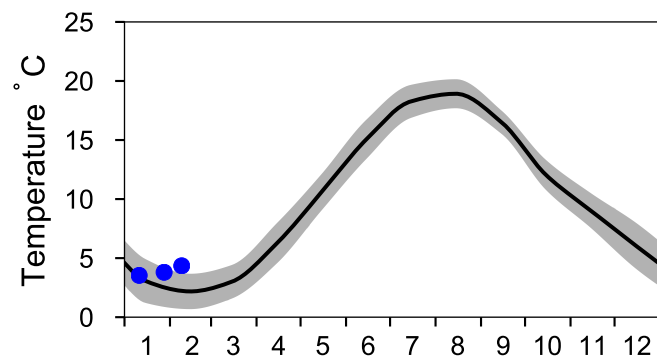
STATION ANHOLT E SURFACE WATER (0-10 m)

Annual Cycles

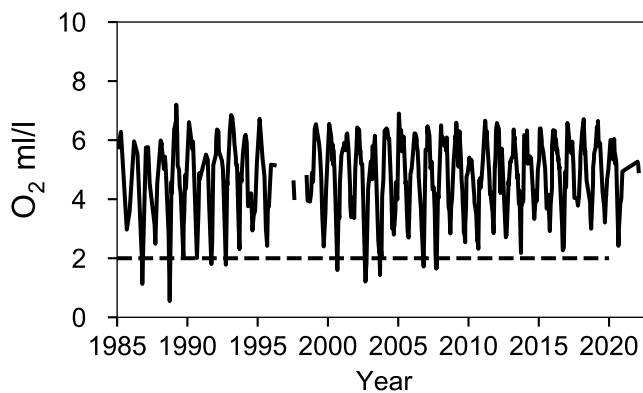
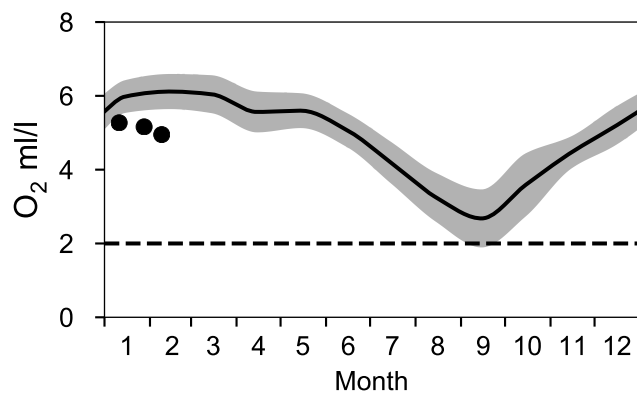
— Mean 2001-2015

■ St.Dev.

● 2022



OXYGEN IN BOTTOM WATER (depth >= 52 m)

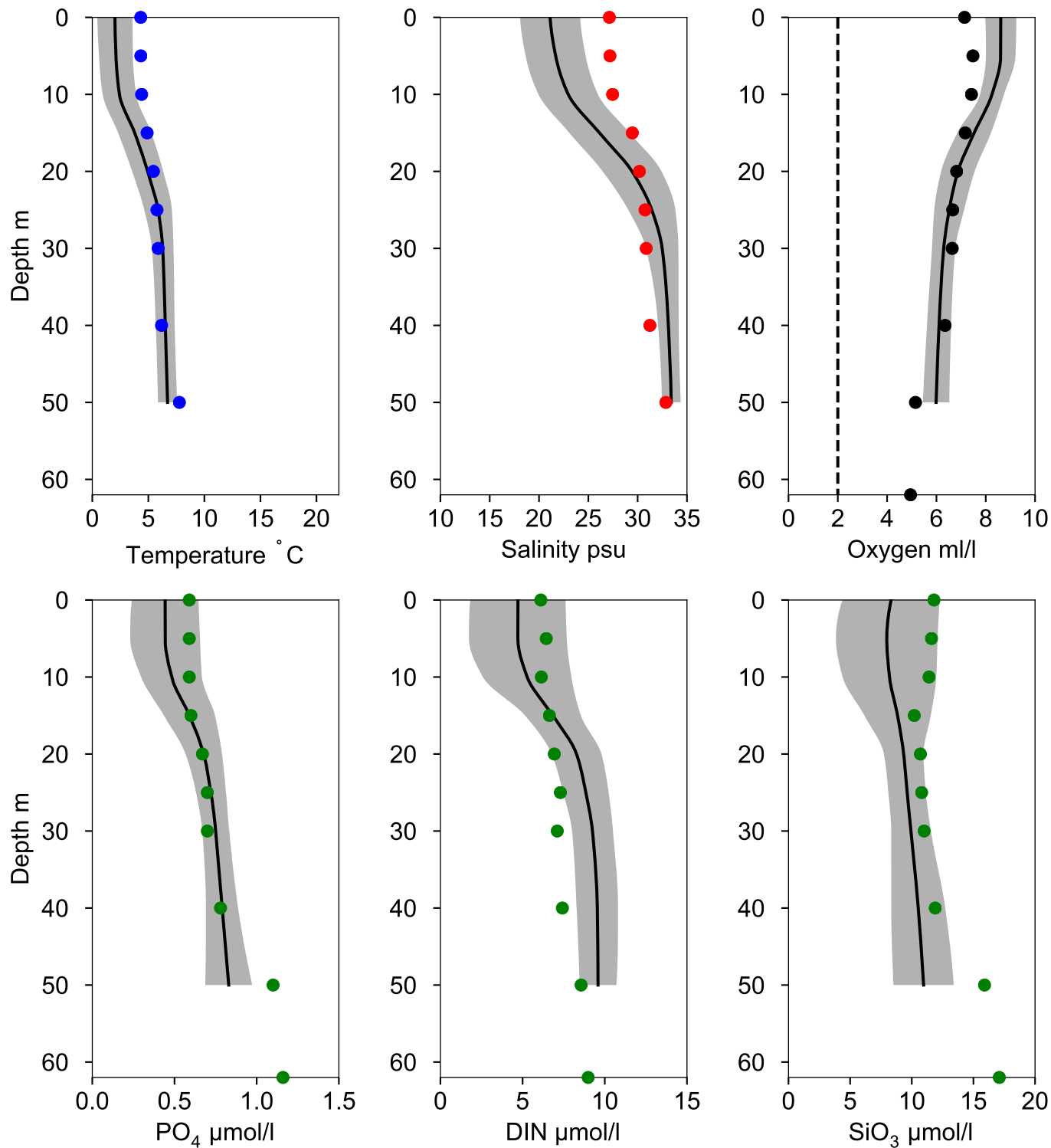


Vertical profiles ANHOLT E February

— Mean 2001-2015

■ St.Dev.

● 2022-02-09



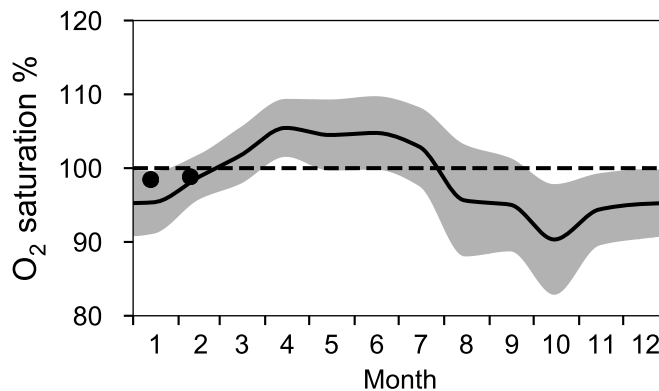
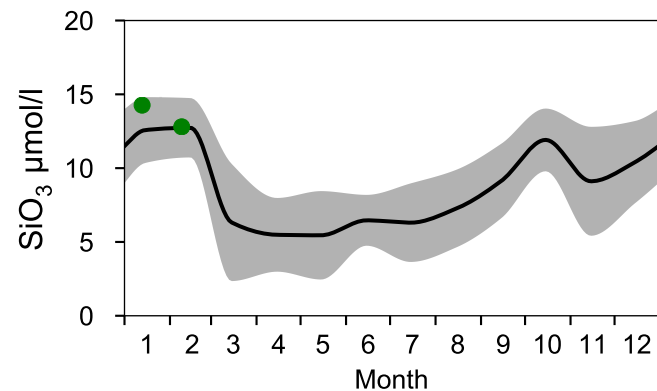
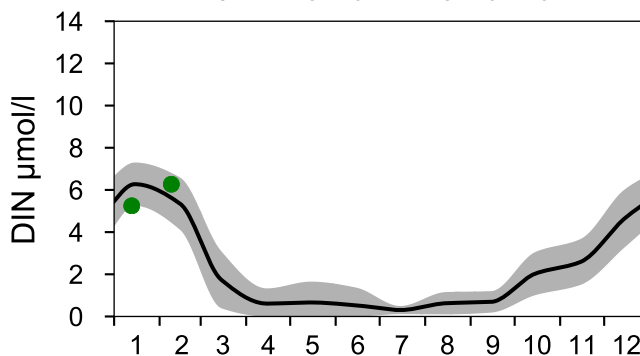
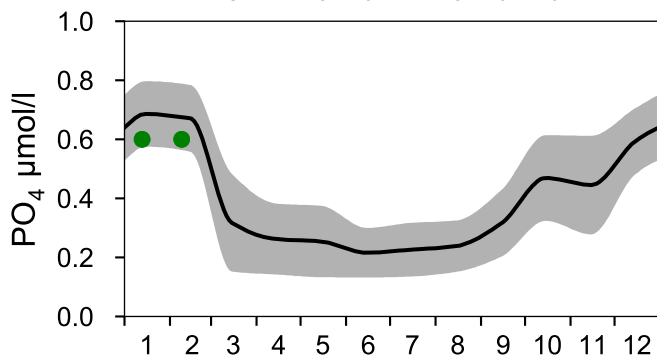
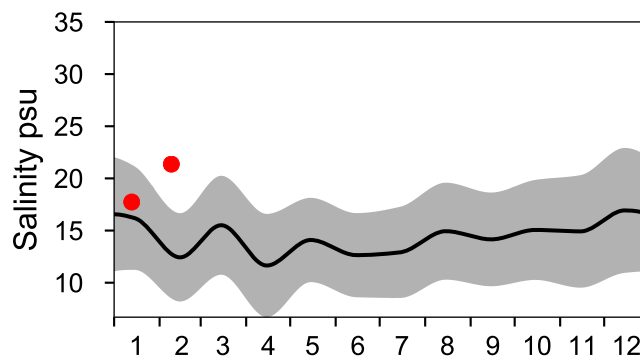
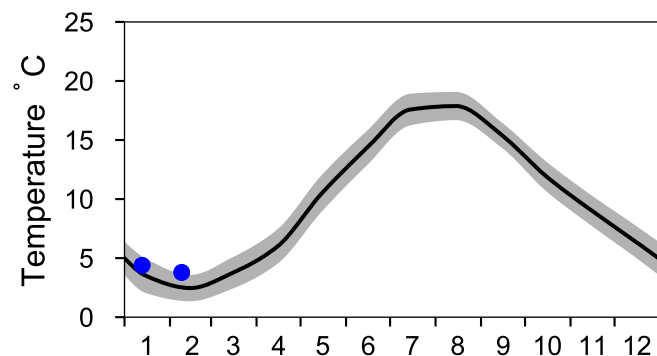
STATION W LANDSKRONA SURFACE WATER (0-10 m)

Annual Cycles

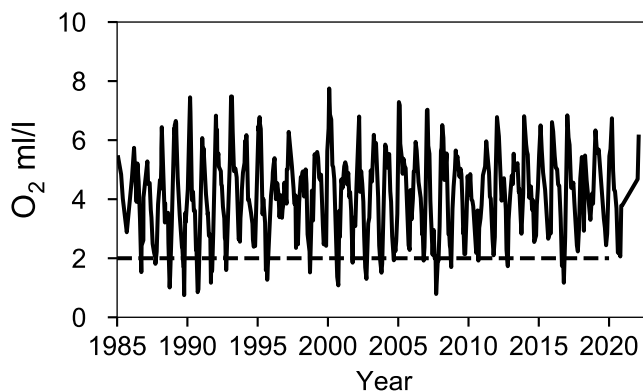
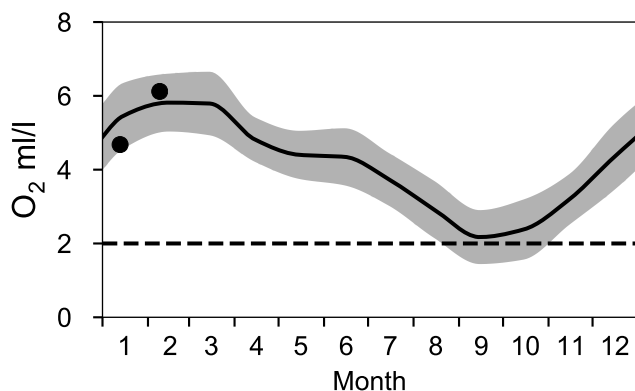
— Mean 2001-2015

■ St.Dev.

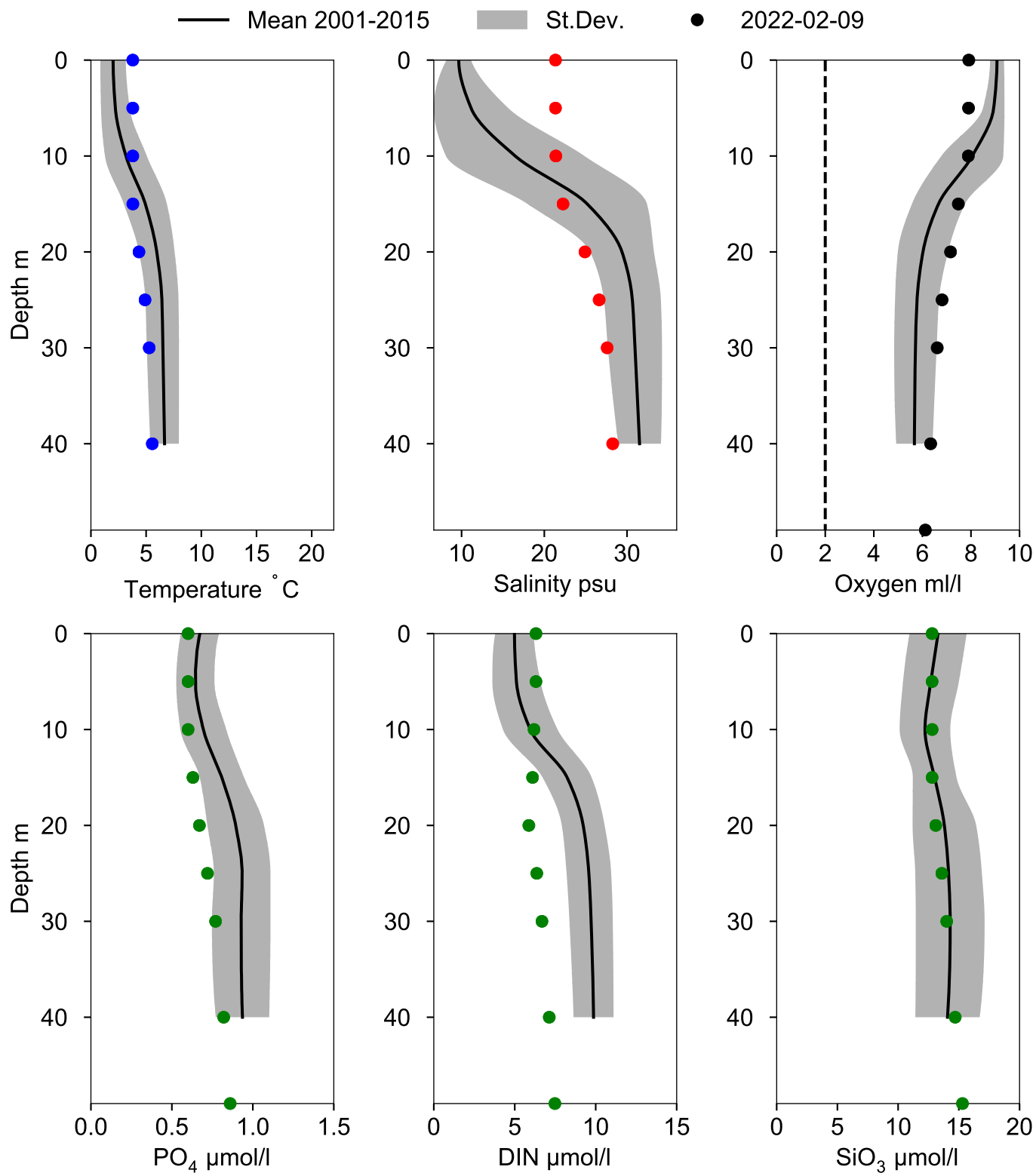
● 2022



OXYGEN IN BOTTOM WATER (depth >= 40 m)



Vertical profiles W LANDSKRONA February

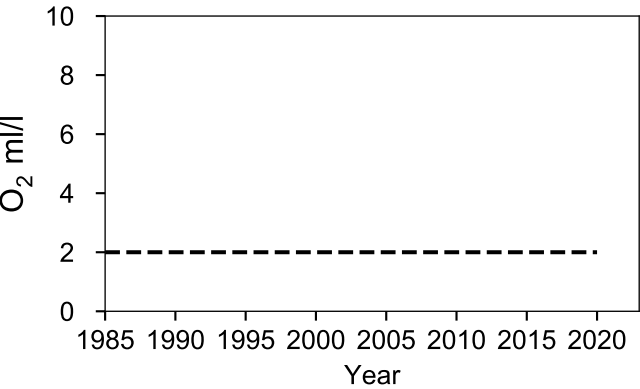
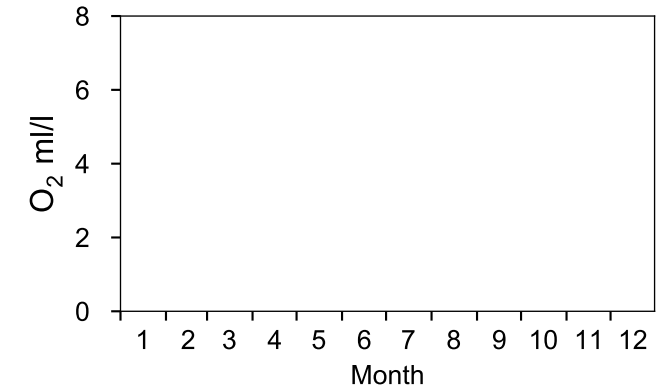
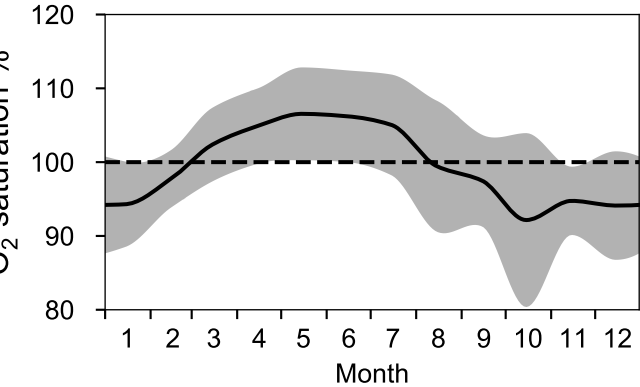
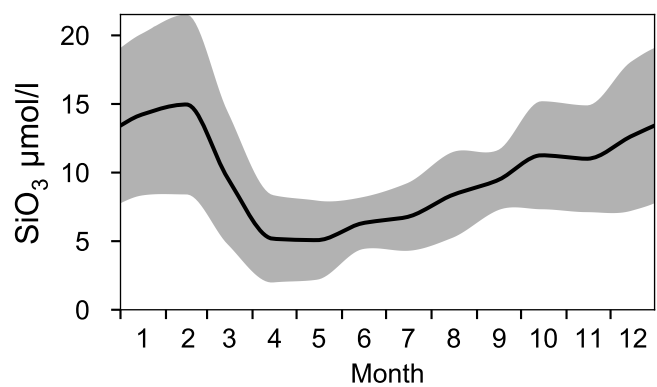
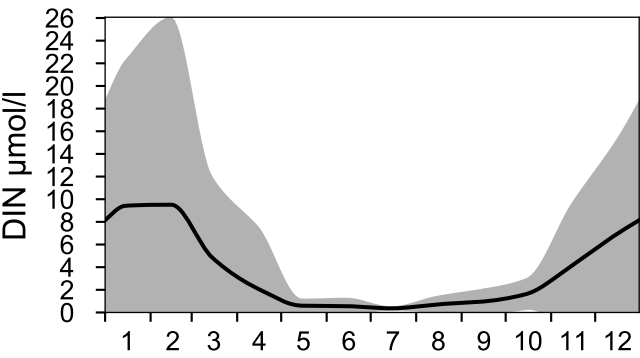
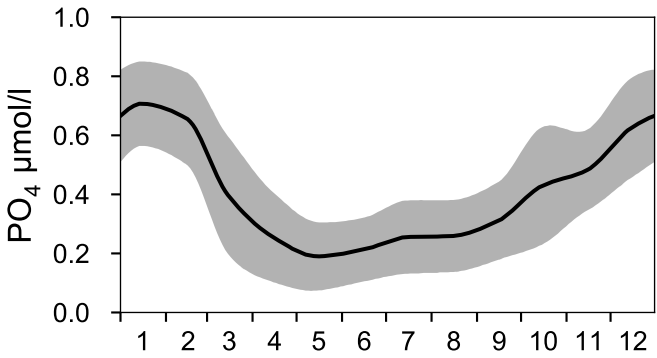
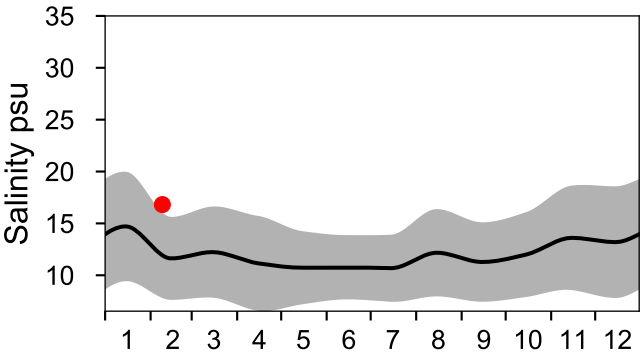
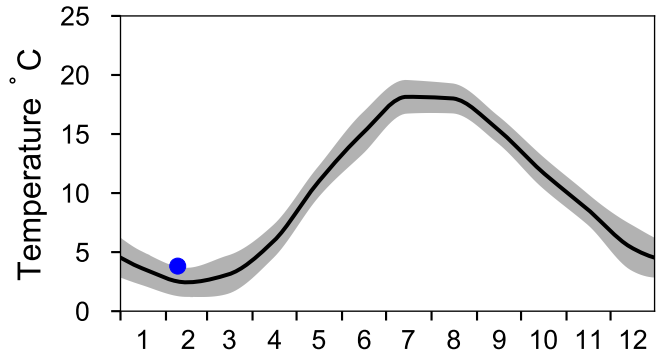


STATION FLINTEN 7 SURFACE WATER (0-10 m)

Annual Cycles

Statistics based on data from: Öresund

— Mean 2001-2015 St.Dev. ● 2022



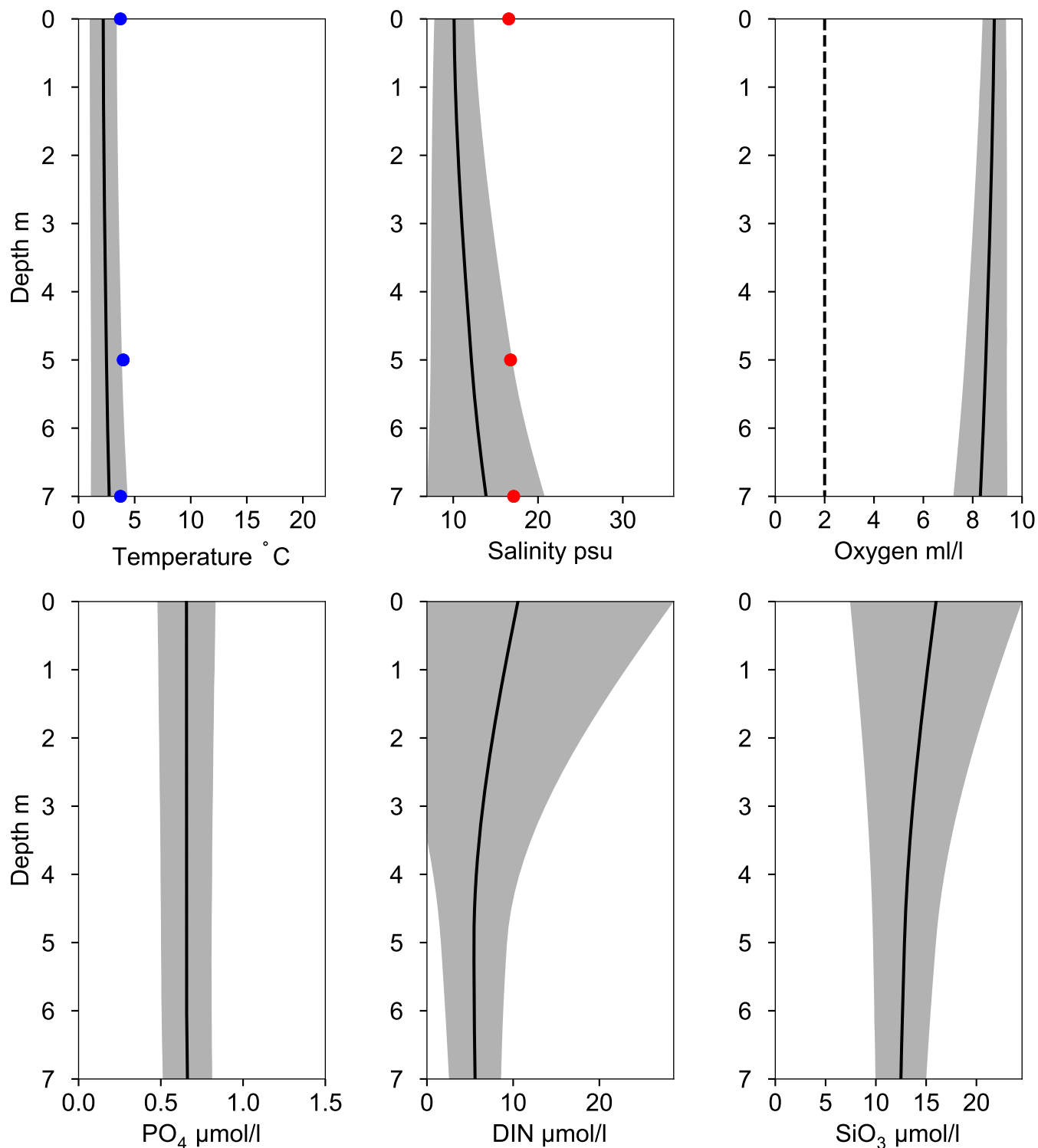
Vertical profiles FLINTEN 7 February

Statistics based on data from: Öresund

— Mean 2001-2015

■ St.Dev.

● 2022-02-09

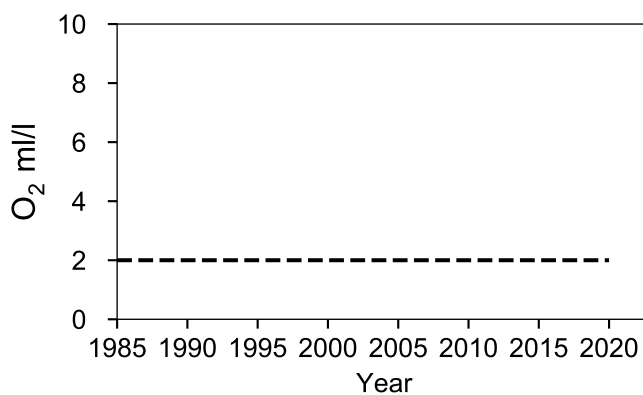
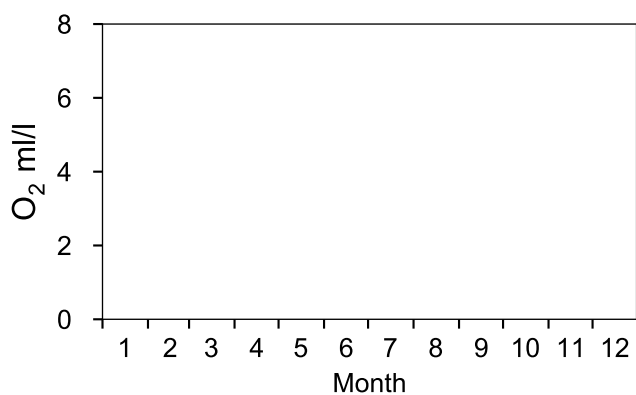
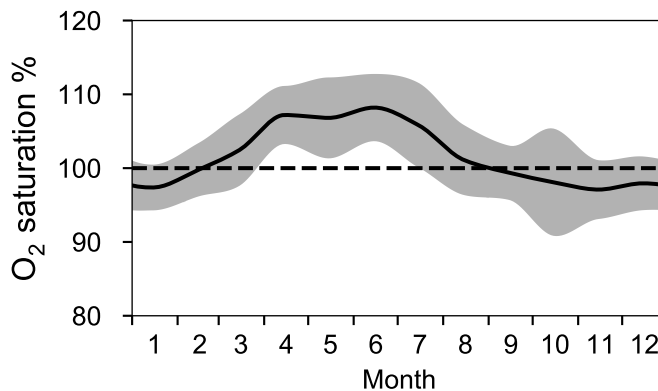
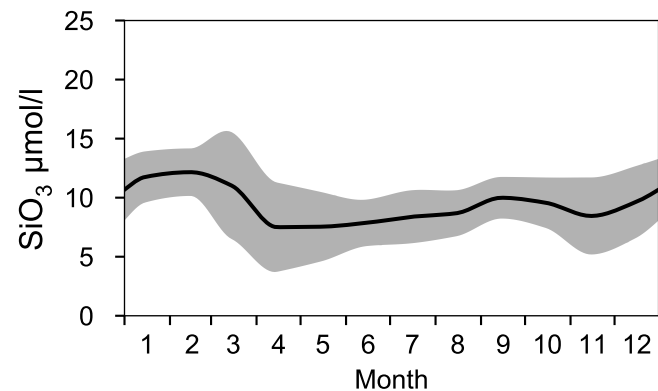
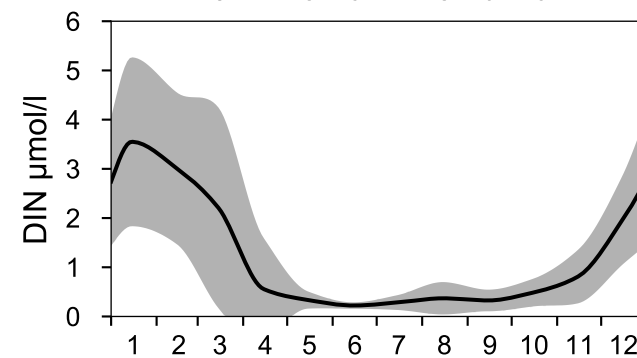
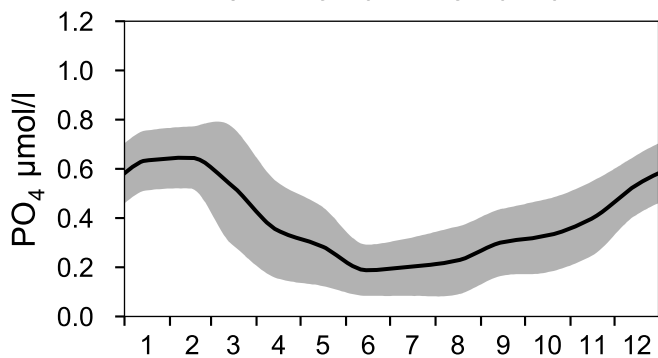
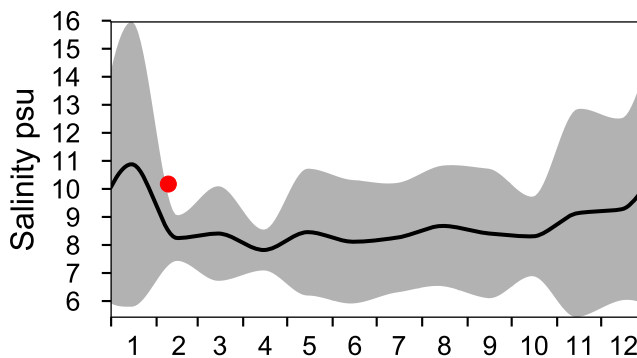
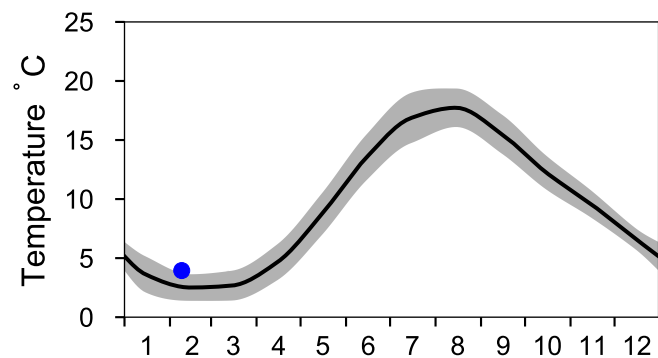


STATION 6W FALSTERBO SURFACE WATER (0-10 m)

Annual Cycles

Statistics based on data from: Arkonahavet

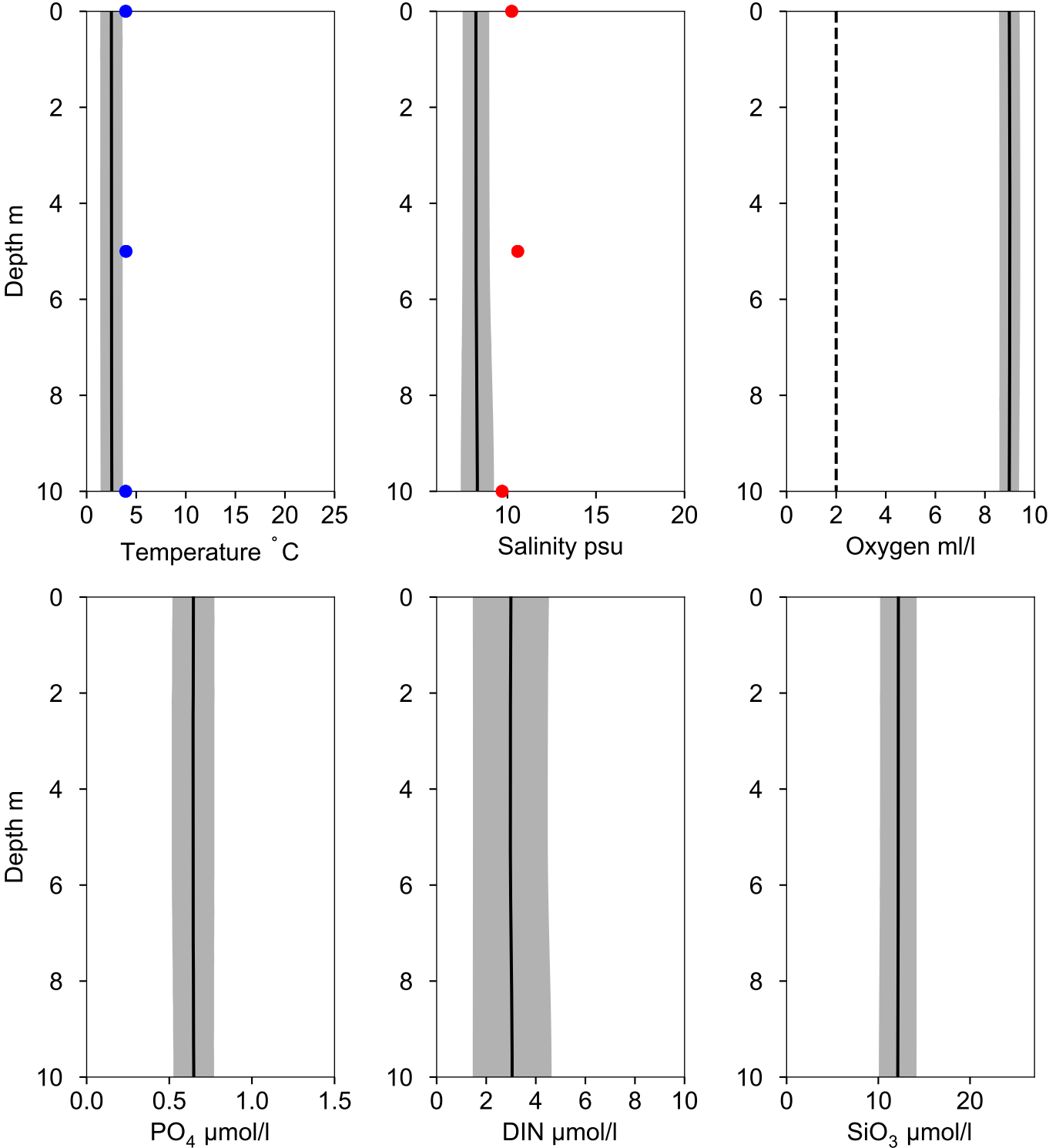
— Mean 2001-2015 St.Dev. ● 2022



Vertical profiles 6W FALSTERBO February

Statistics based on data from: Arkonahavet

— Mean 2001-2015 St.Dev. ● 2022-02-09



STATION 441 STEVNS KLINT SURFACE WATER (0-10 m)

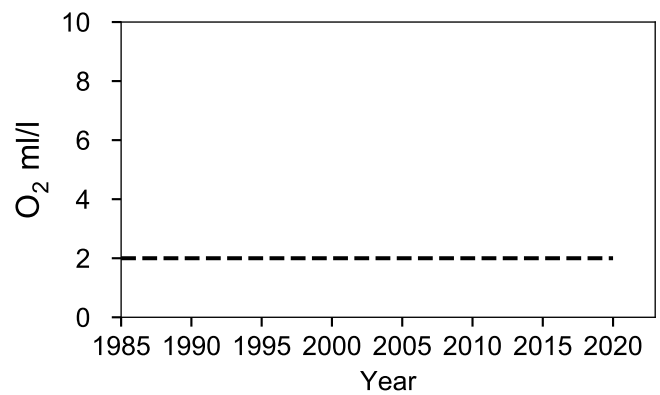
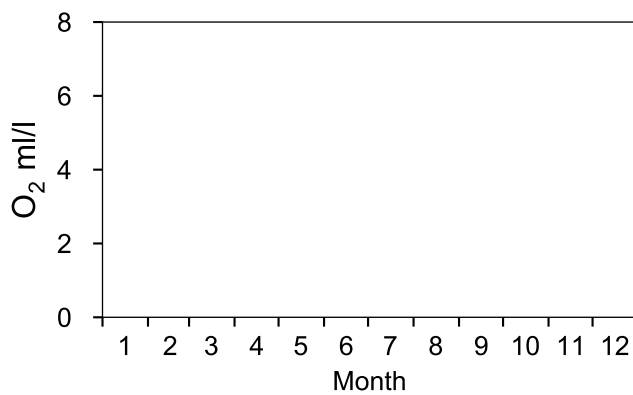
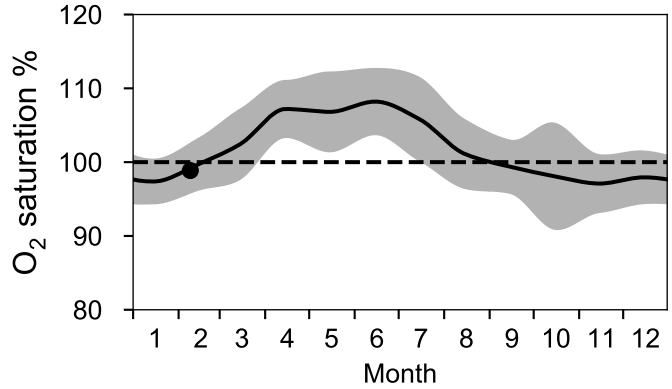
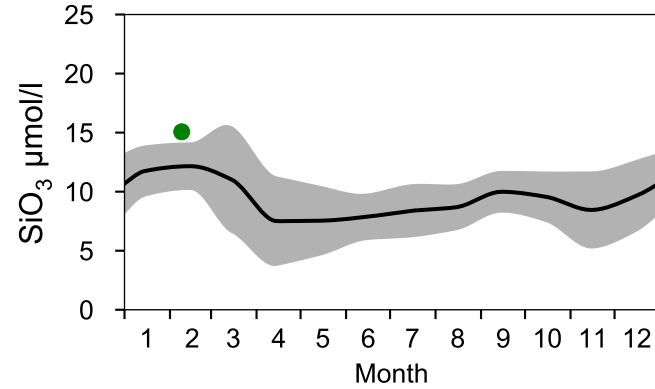
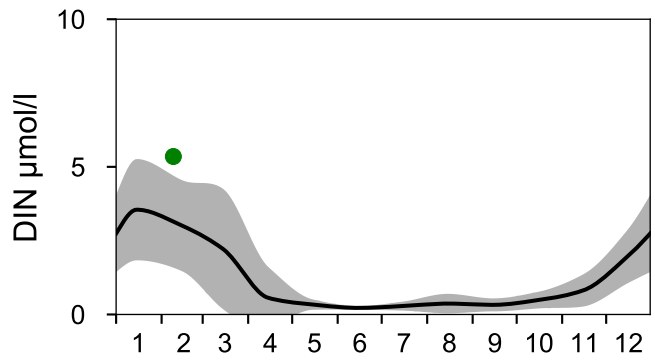
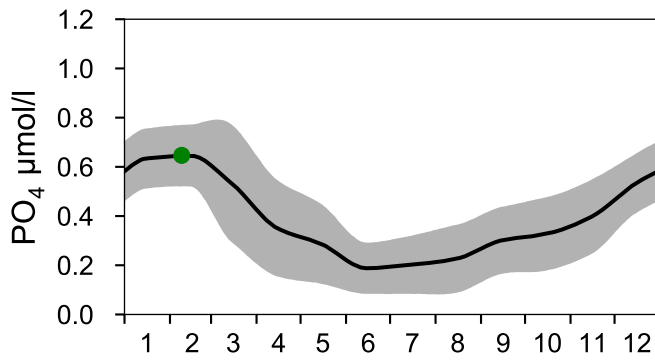
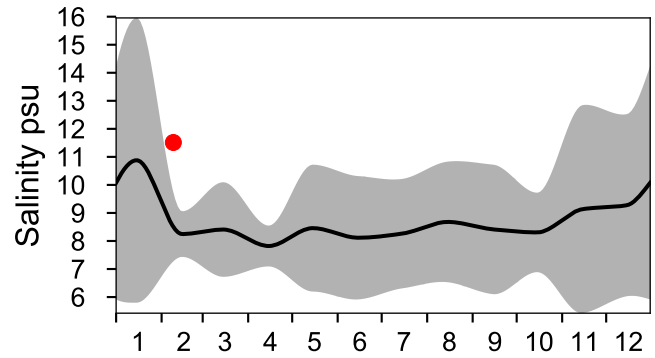
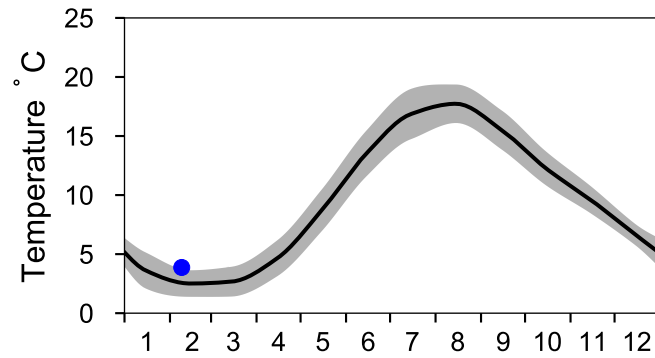
Annual Cycles

Statistics based on data from: Arkonahavet

— Mean 2001-2015

■ St.Dev.

● 2022



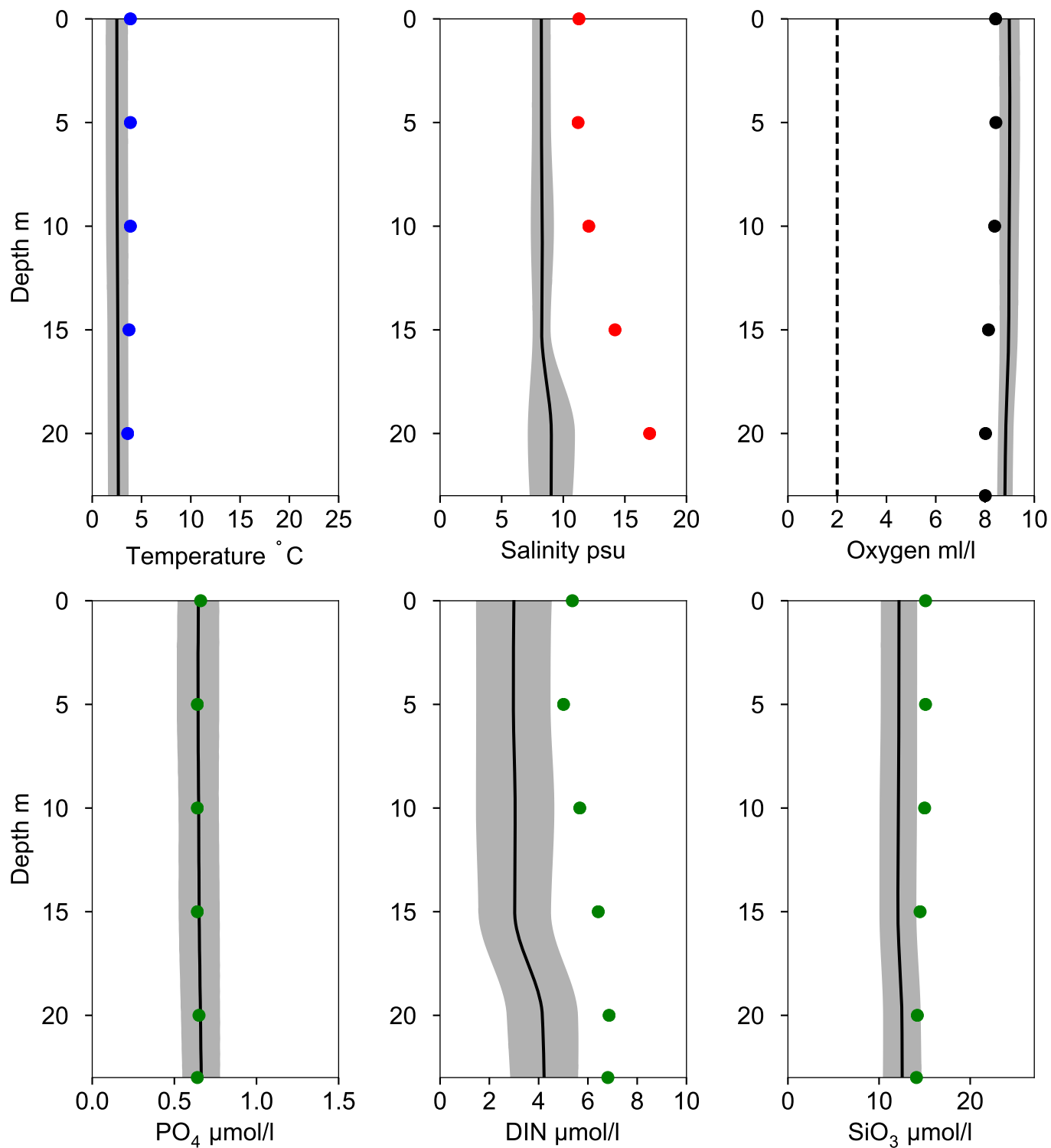
Vertical profiles 441 STEVNS KLINT February

Statistics based on data from: Arkonahavet

— Mean 2001-2015

■ St.Dev.

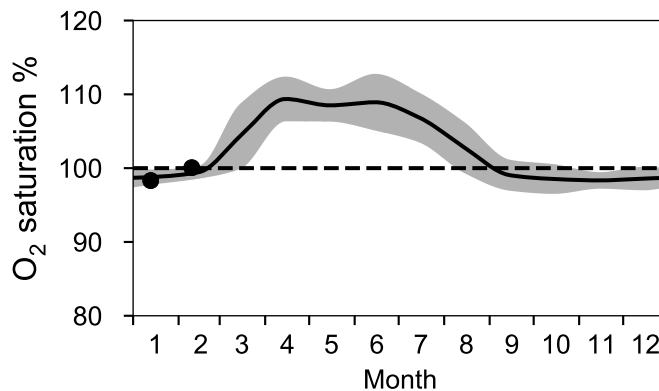
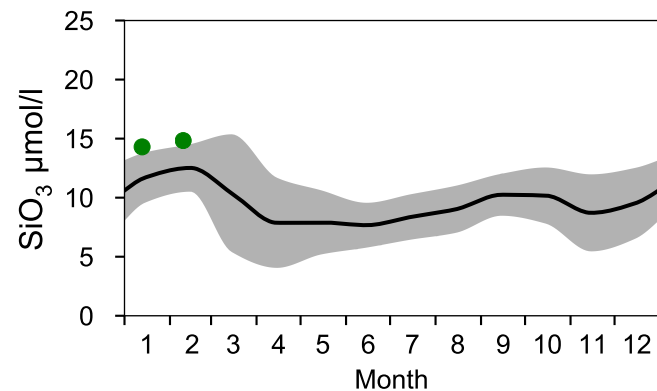
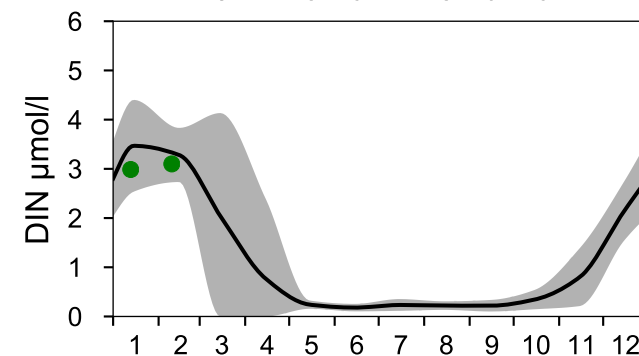
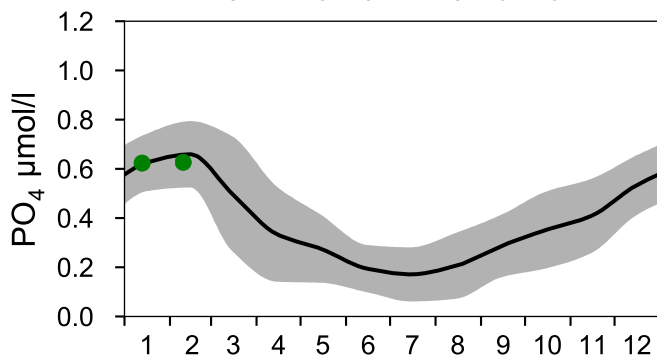
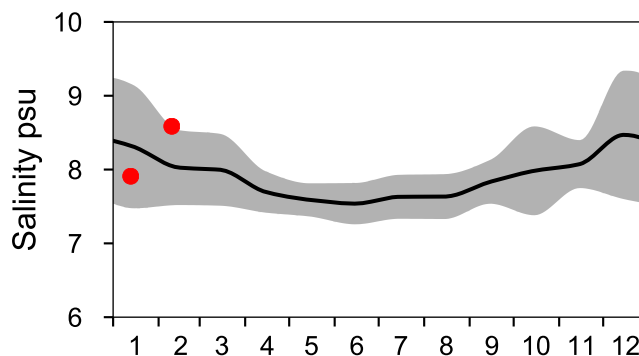
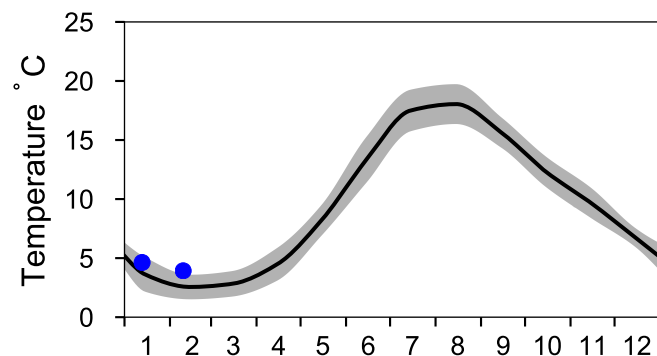
● 2022-02-09



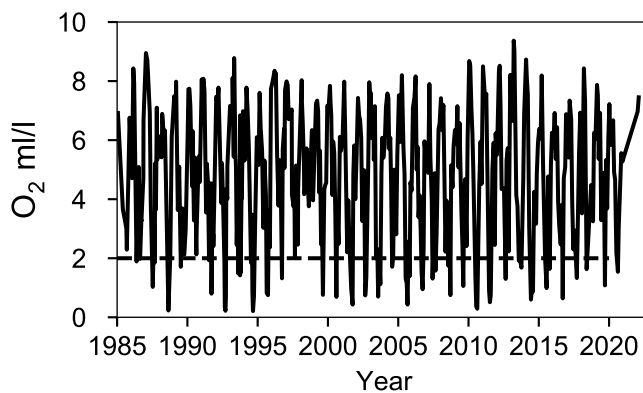
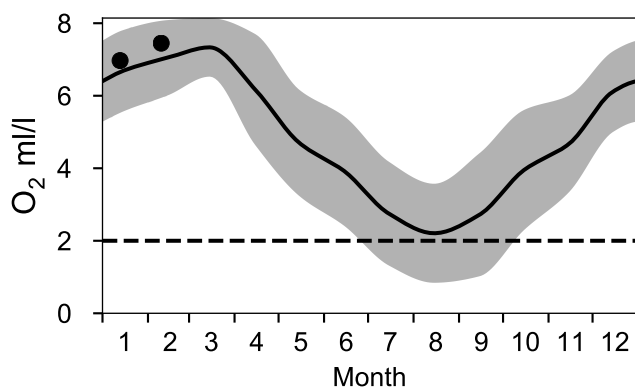
STATION BY1 SURFACE WATER (0-10 m)

Annual Cycles

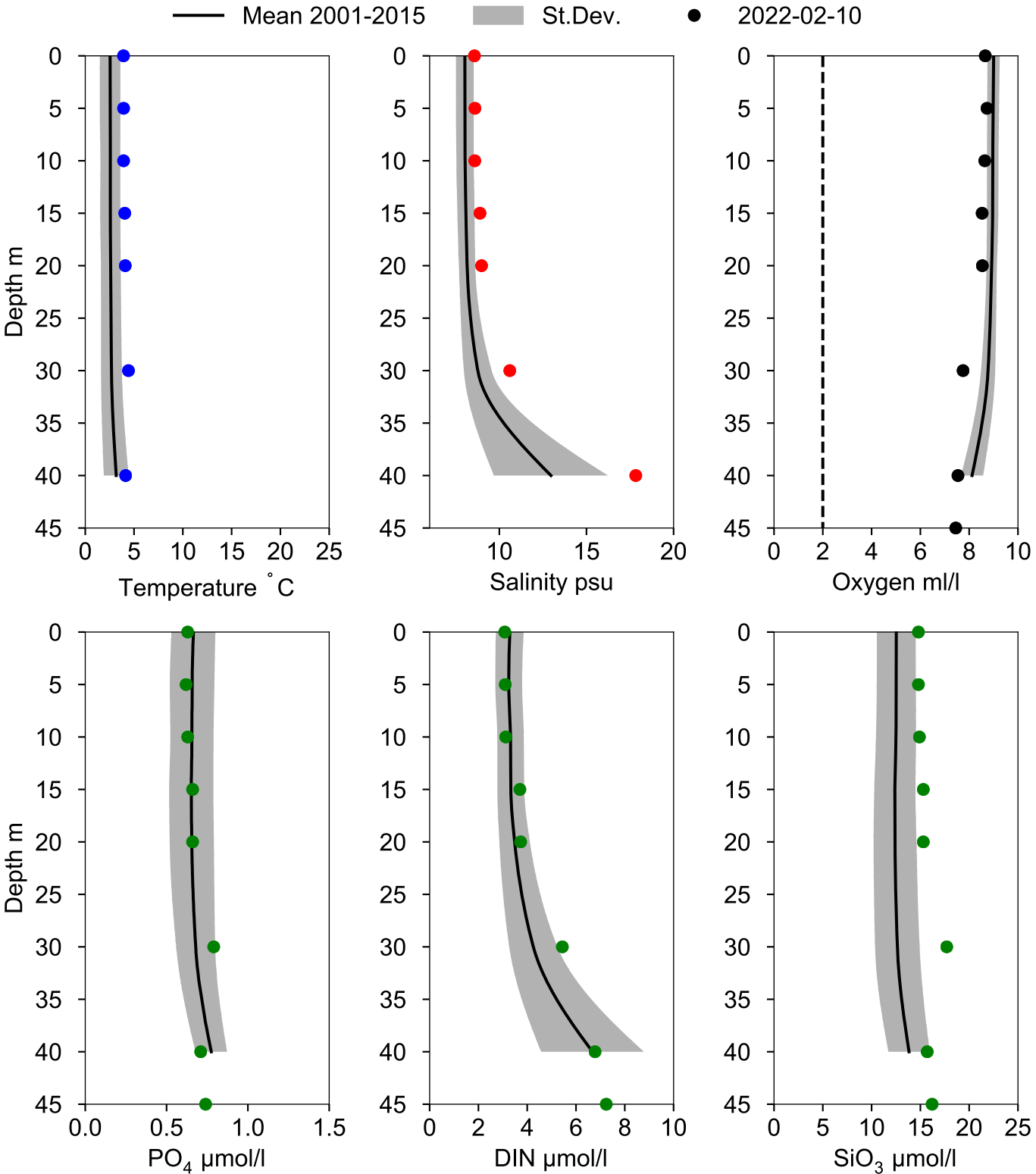
— Mean 2001-2015 St.Dev. • 2022



OXYGEN IN BOTTOM WATER (depth >= 39 m)



Vertical profiles BY1
February



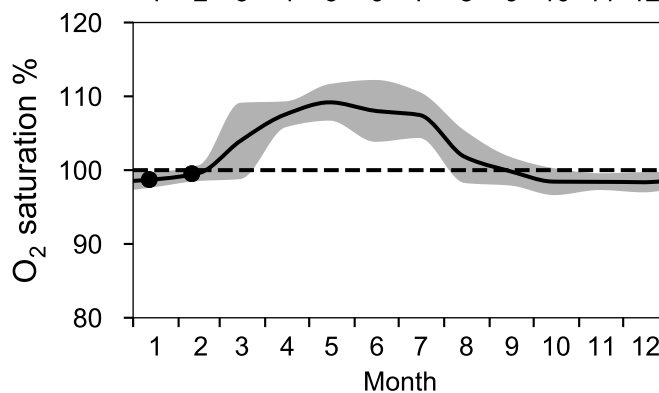
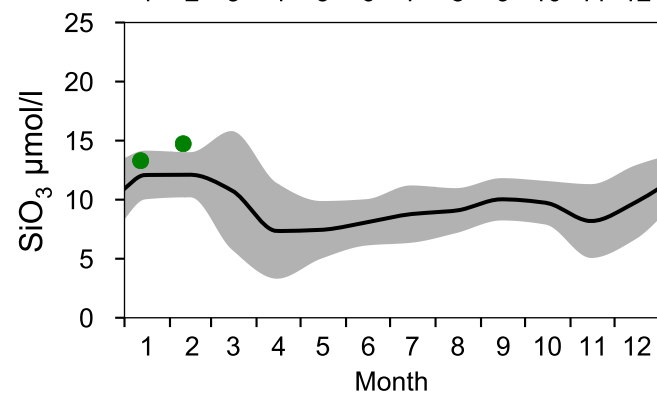
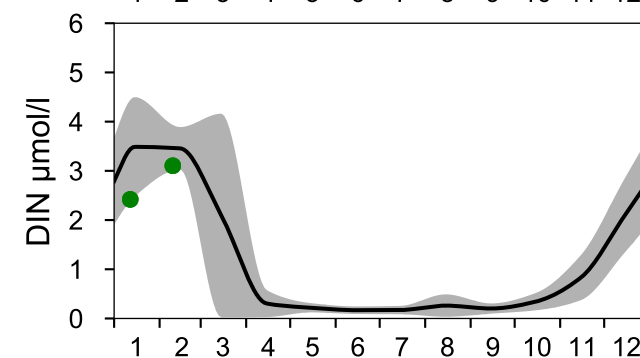
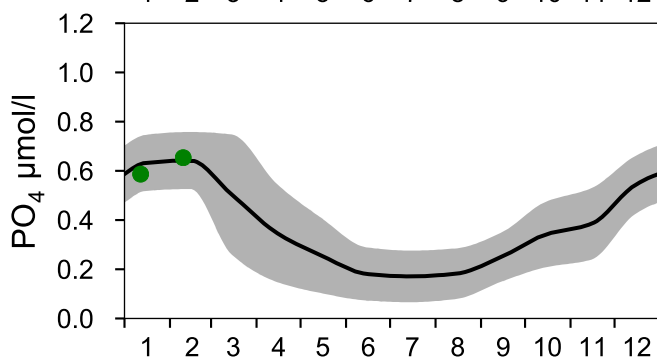
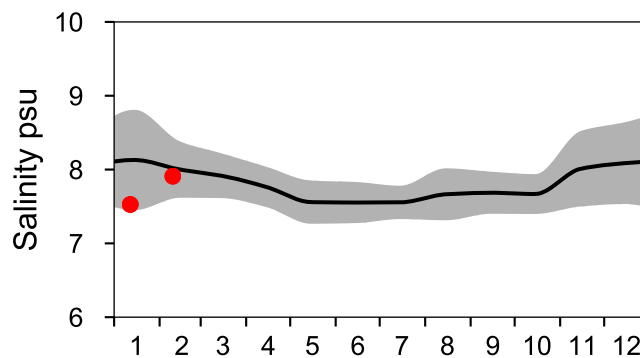
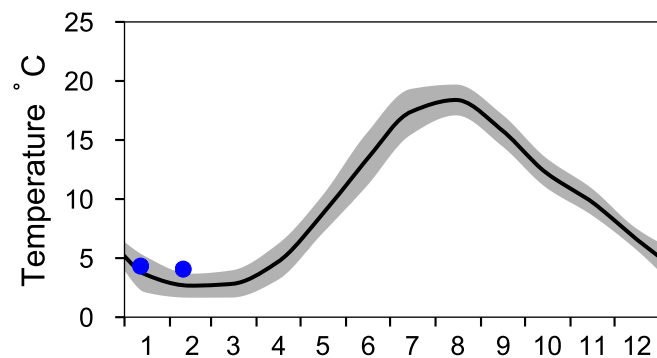
STATION BY2 ARKONA SURFACE WATER (0-10 m)

Annual Cycles

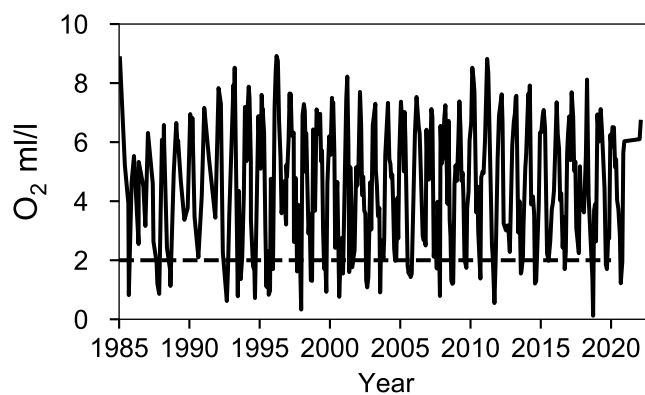
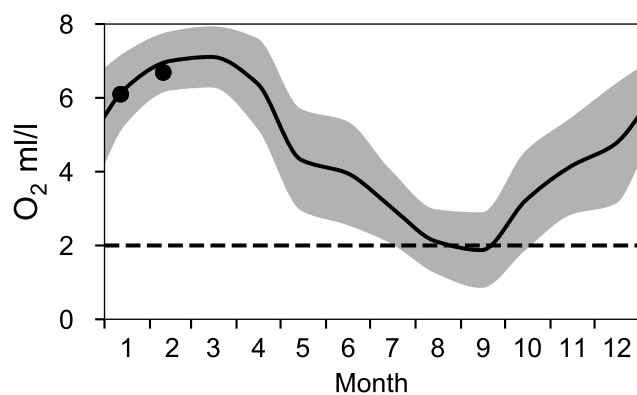
— Mean 2001-2015

■ St.Dev.

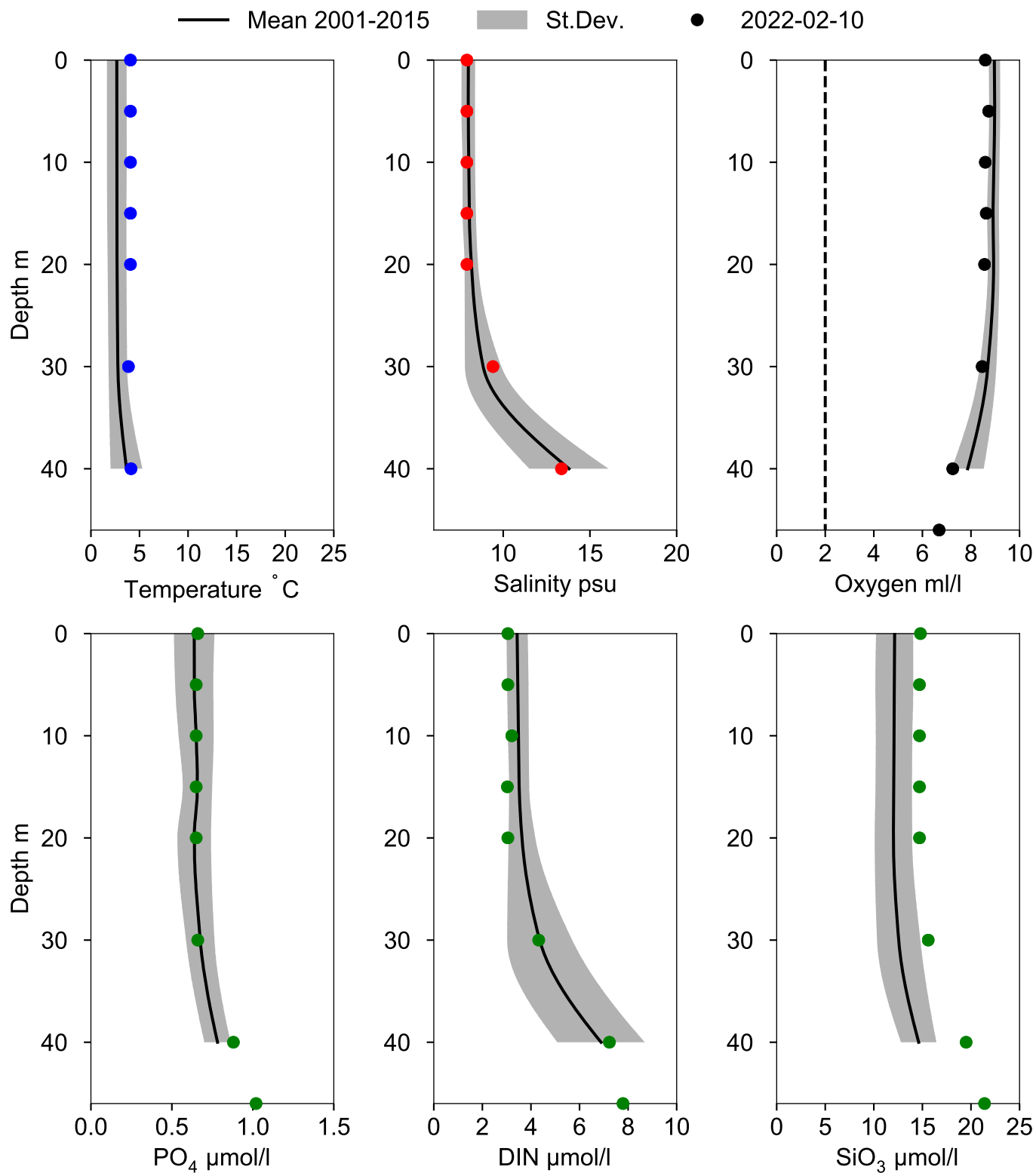
● 2022



OXYGEN IN BOTTOM WATER (depth >= 40 m)



Vertical profiles BY2 ARKONA February

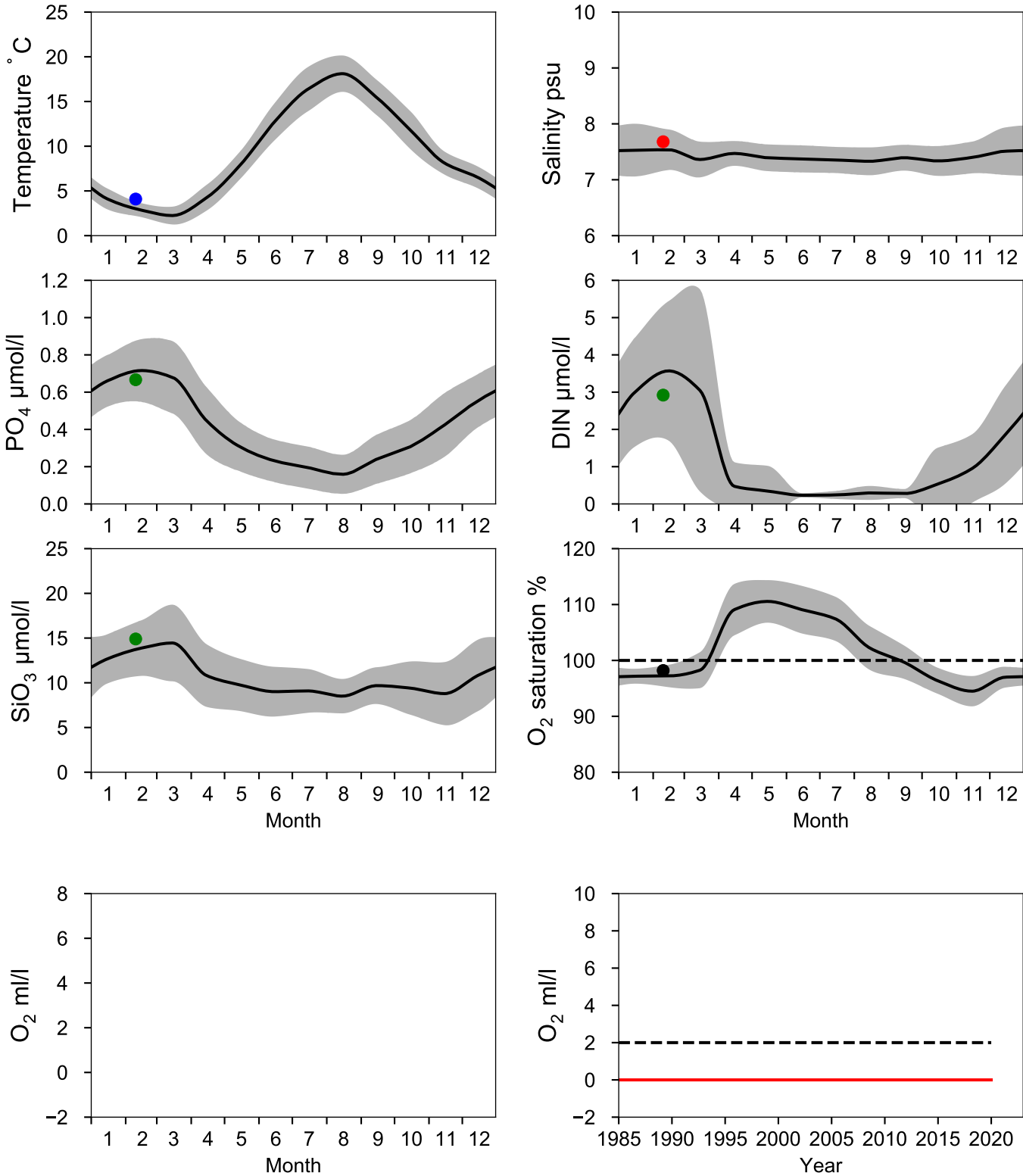


STATION BY3 HAMRARNE SUND SURFACE WATER (0-10 m)

Annual Cycles

Statistics based on data from: Bornholmshavet

— Mean 2001-2015 St.Dev. ● 2022



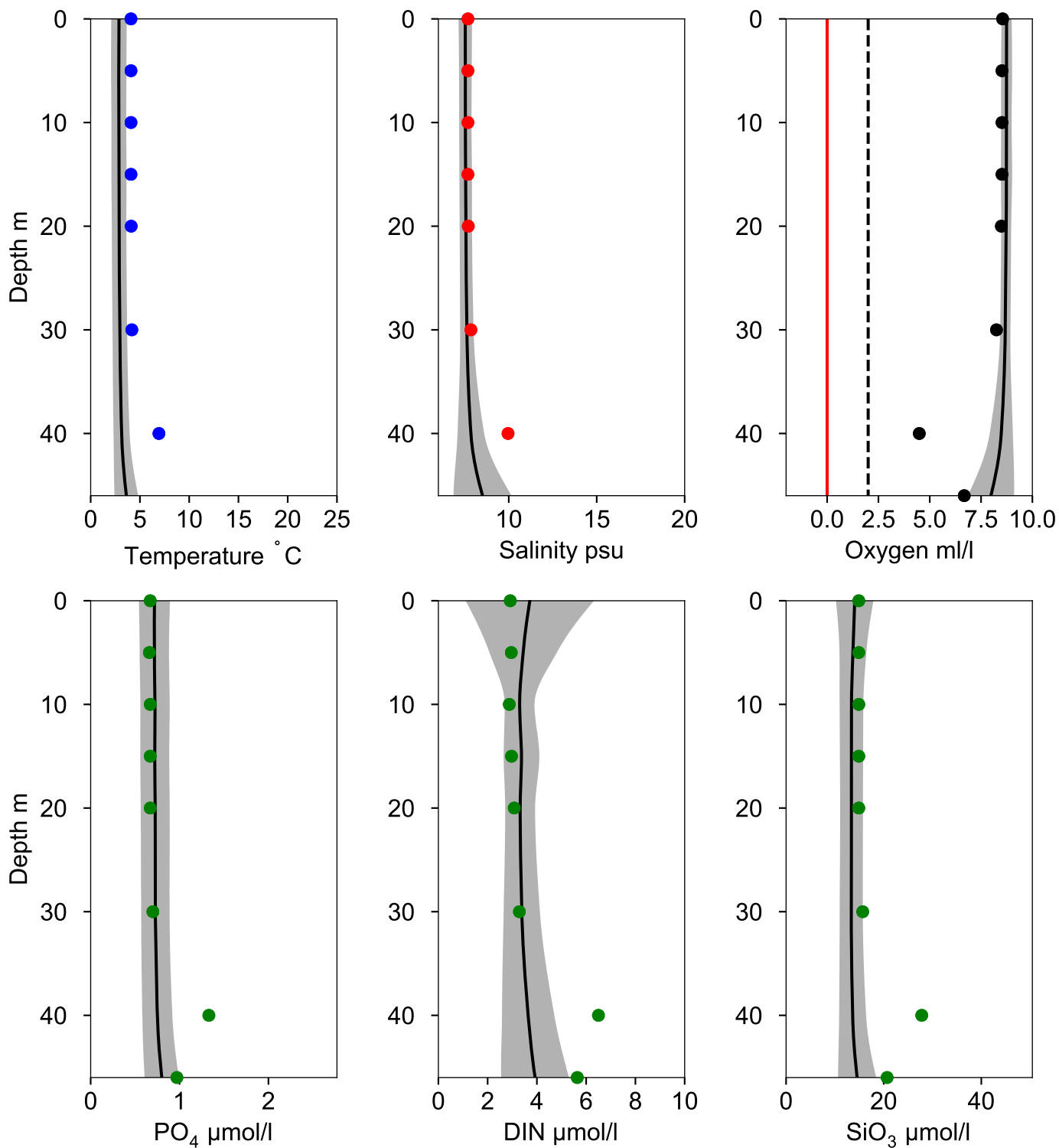
Vertical profiles BY3 HAMRARNE SUND February

Statistics based on data from: Bornholmshavet

— Mean 2001-2015

■ St.Dev.

● 2022-02-10



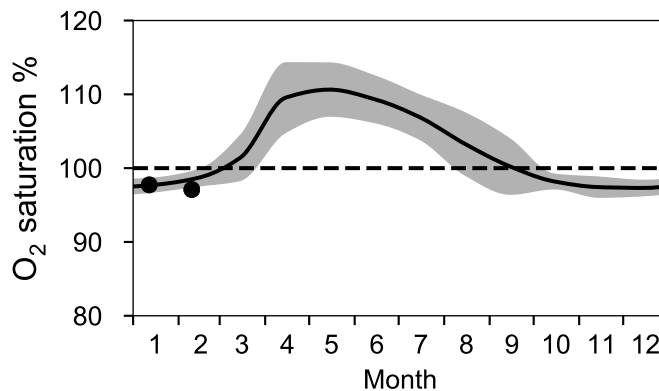
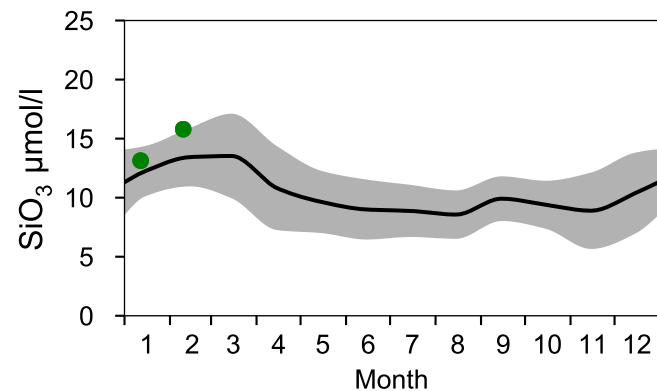
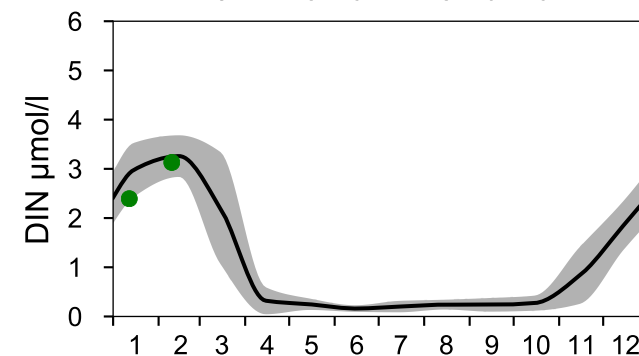
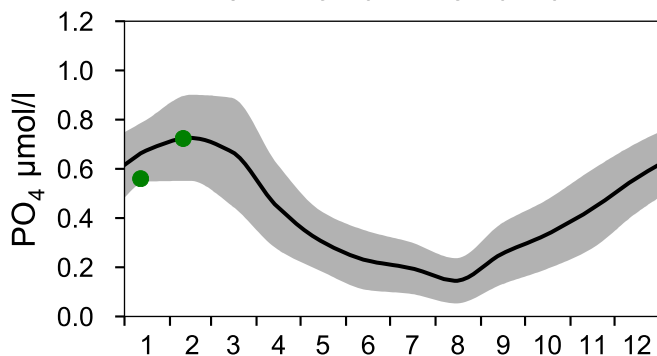
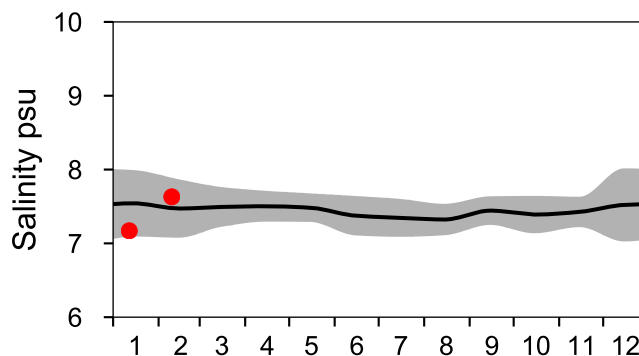
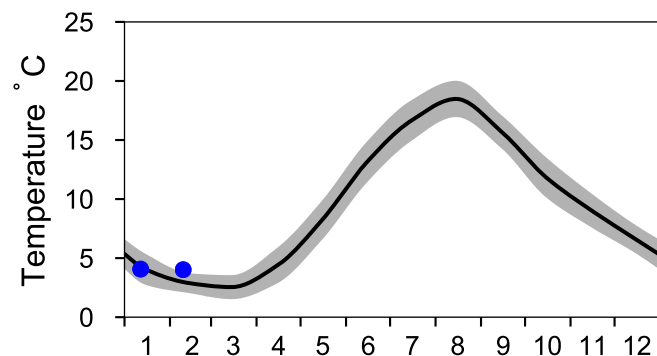
STATION HANÖBUKTEN SURFACE WATER (0-10 m)

Annual Cycles

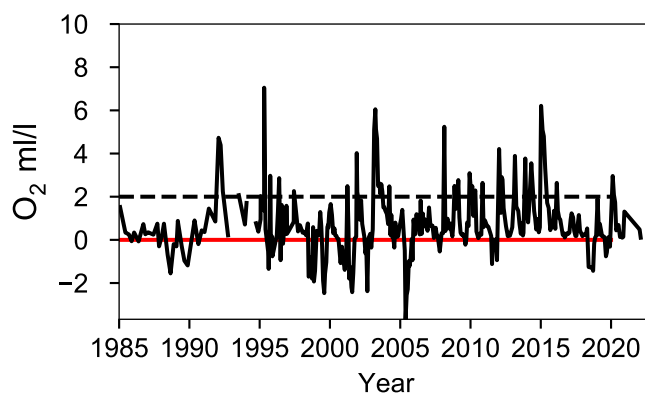
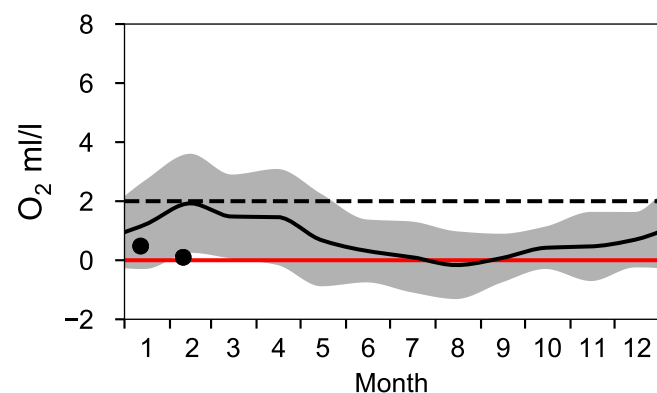
— Mean 2001-2015

■ St.Dev.

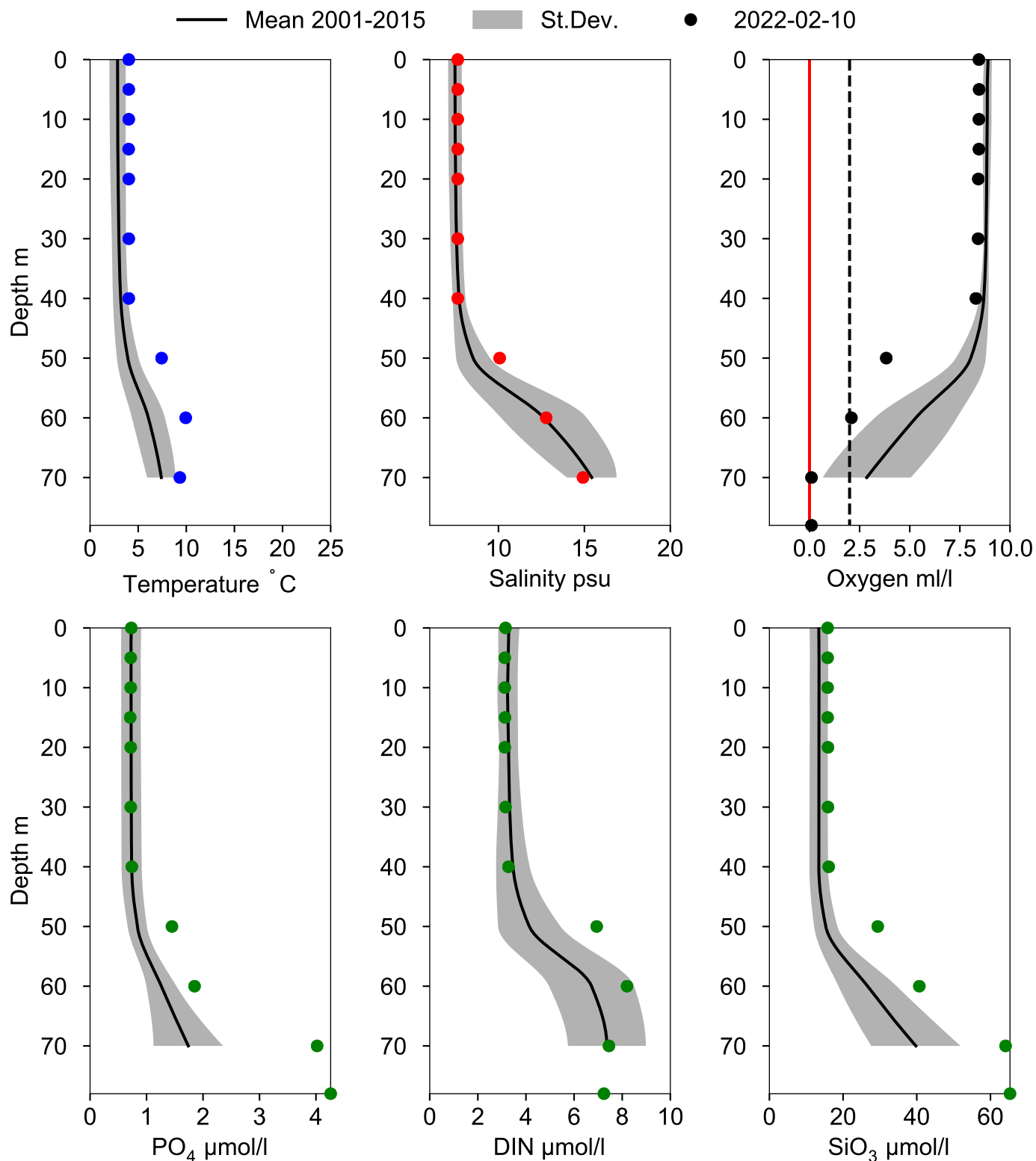
● 2022



OXYGEN IN BOTTOM WATER (depth >= 70 m)



Vertical profiles HANÖBUKTEN February



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

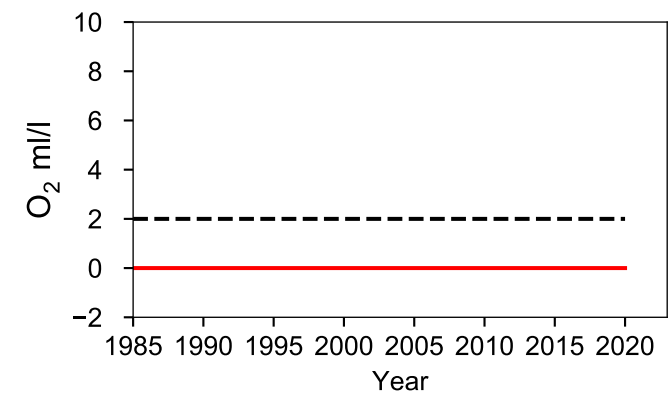
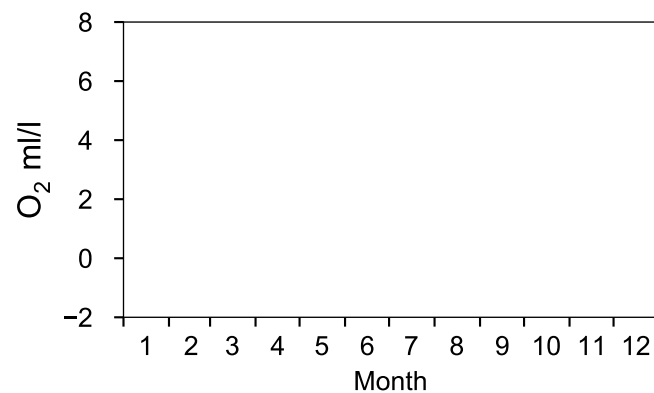
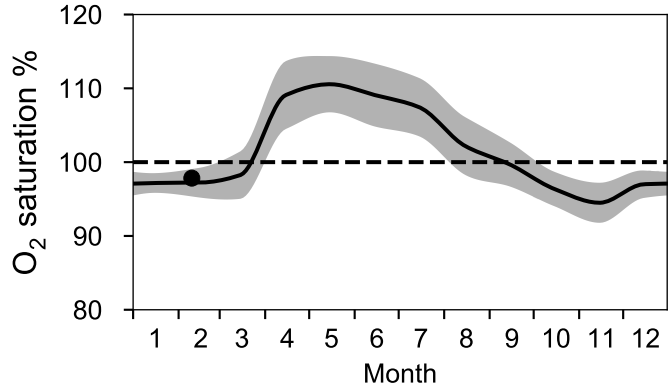
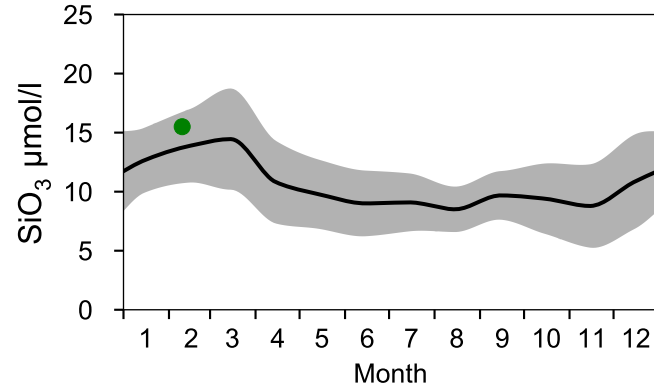
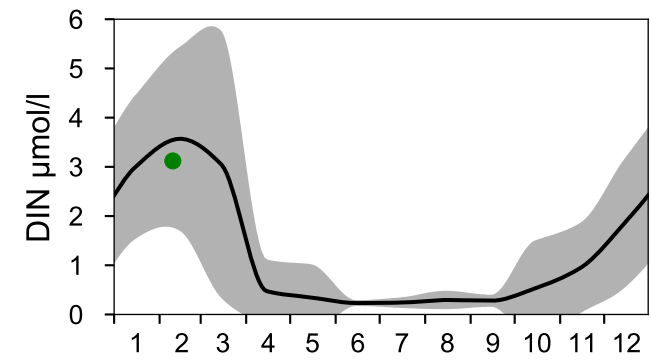
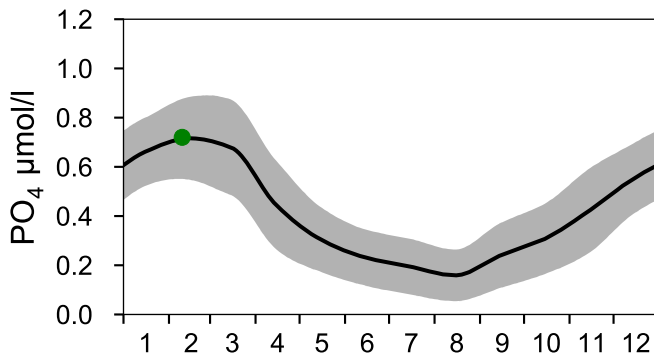
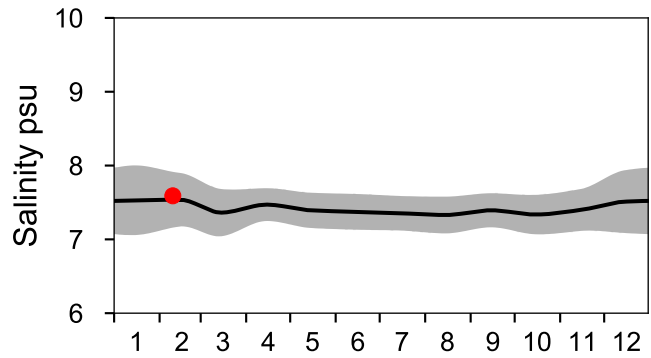
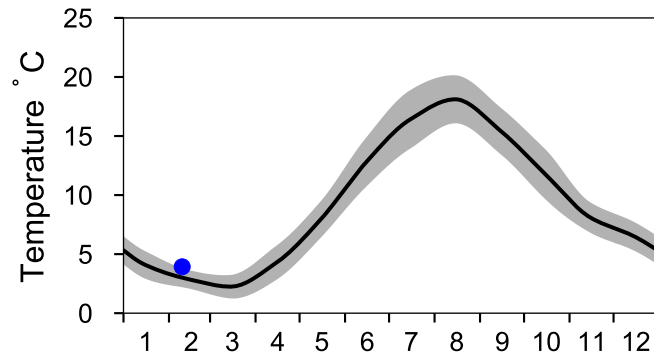
Annual Cycles

Statistics based on data from: Bornholmshavet

— Mean 2001-2015

■ St.Dev.

● 2022



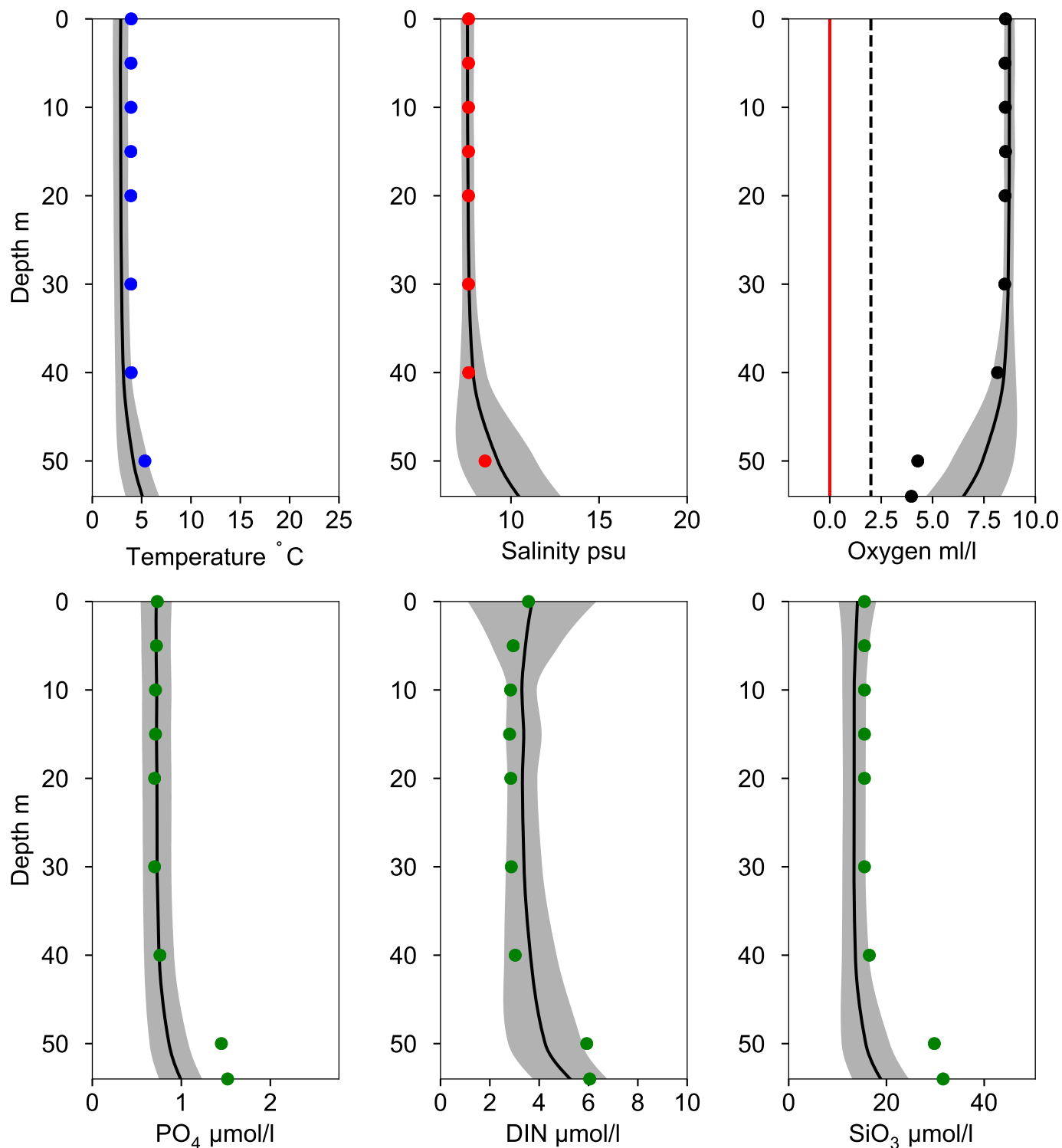
Vertical profiles HANÖBUKTEN-KBV February

Statistics based on data from: Bornholmshavet

— Mean 2001-2015

■ St.Dev.

● 2022-02-10



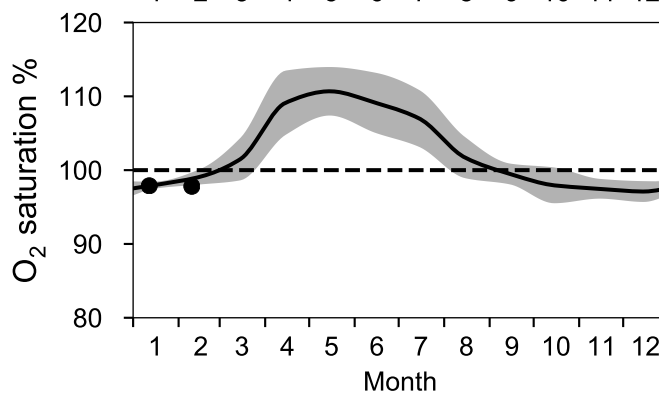
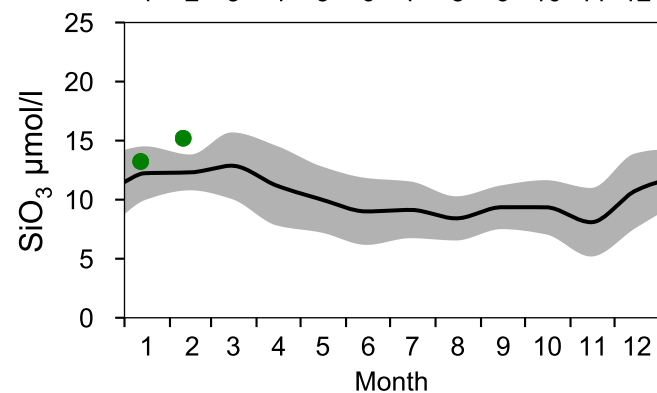
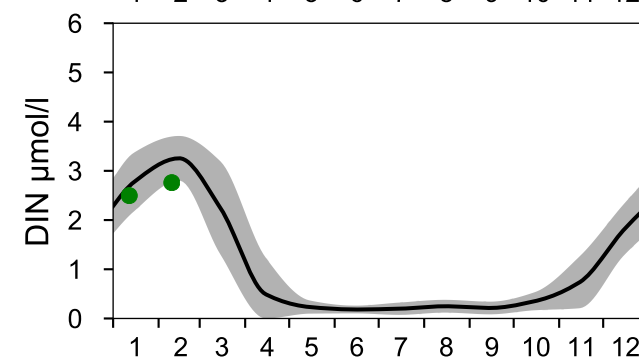
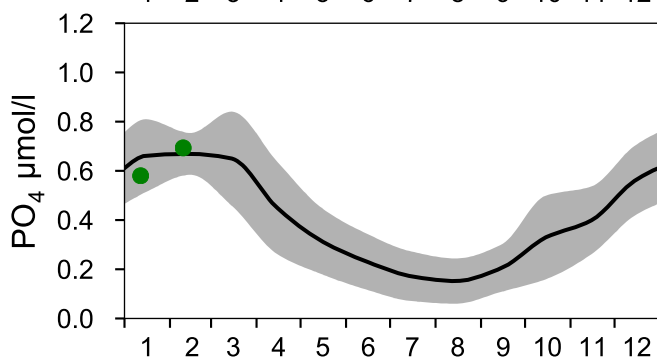
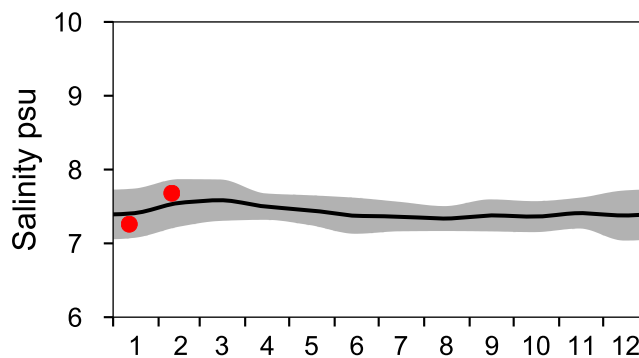
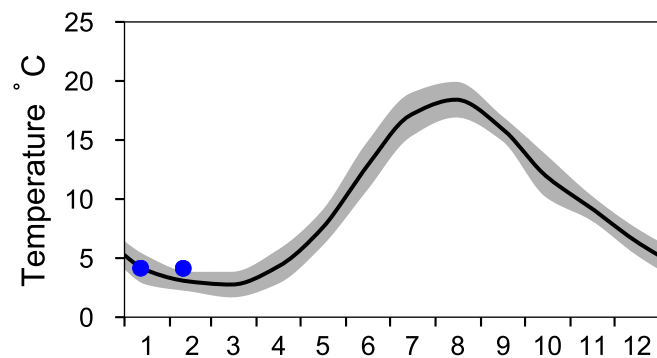
STATION BY4 CHRISTIANSÖ SURFACE WATER (0-10 m)

Annual Cycles

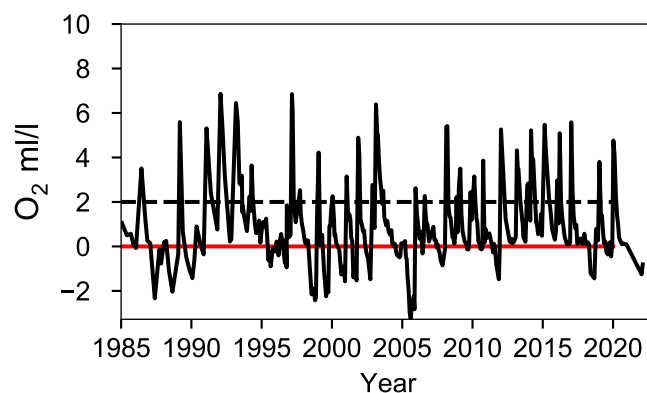
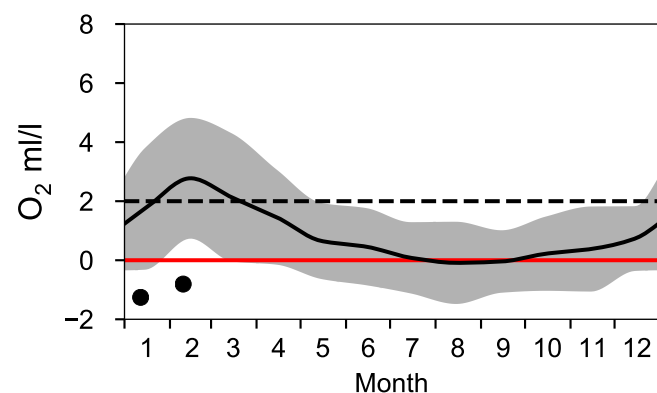
— Mean 2001-2015

■ St.Dev.

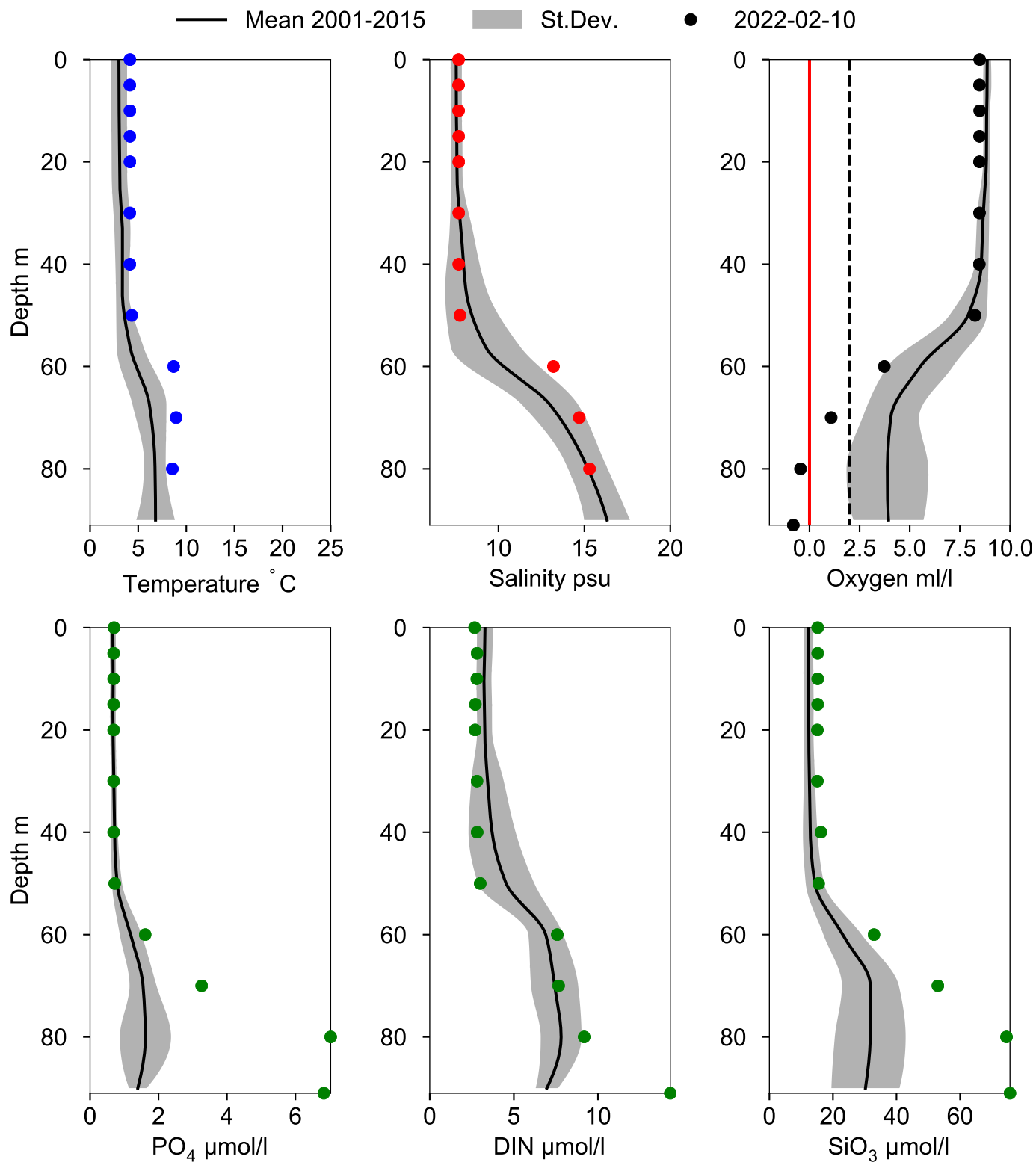
● 2022



OXYGEN IN BOTTOM WATER (depth >= 80 m)



Vertical profiles BY4 CHRISTIANSÖ February



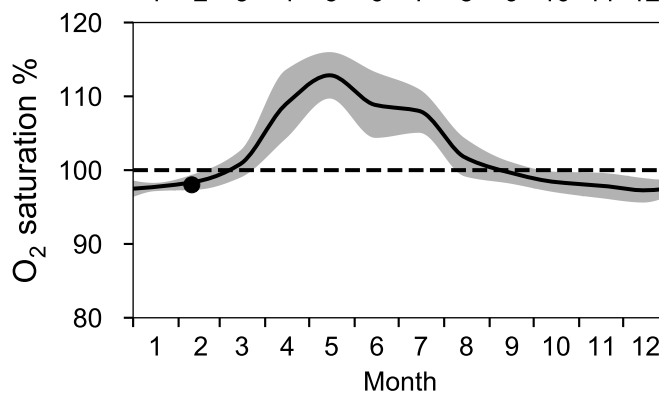
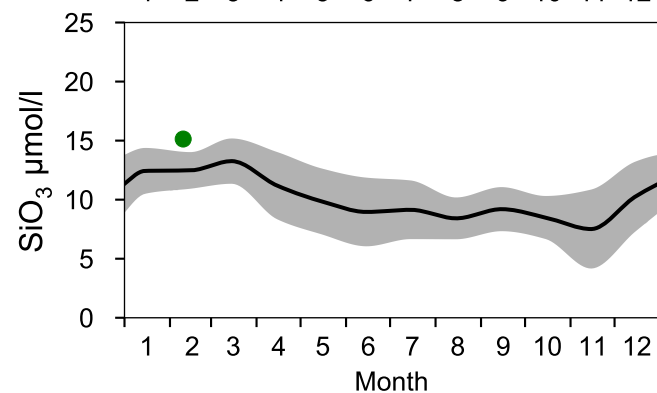
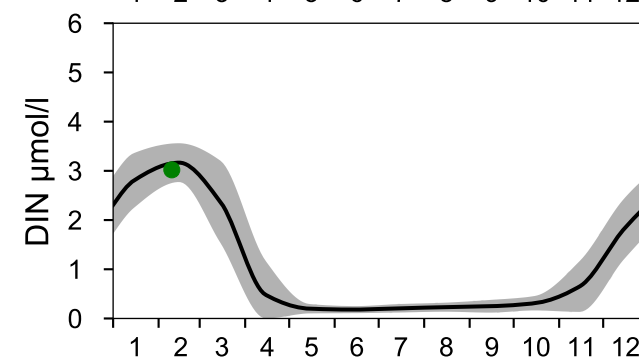
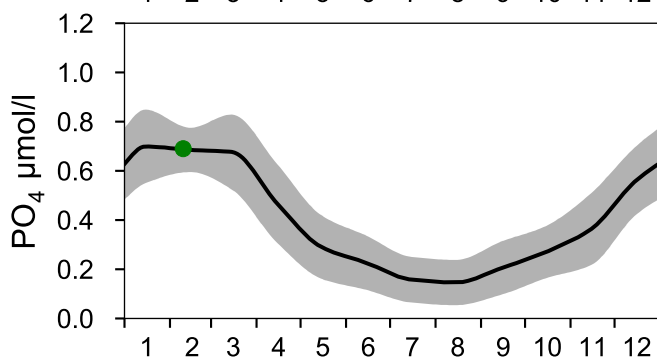
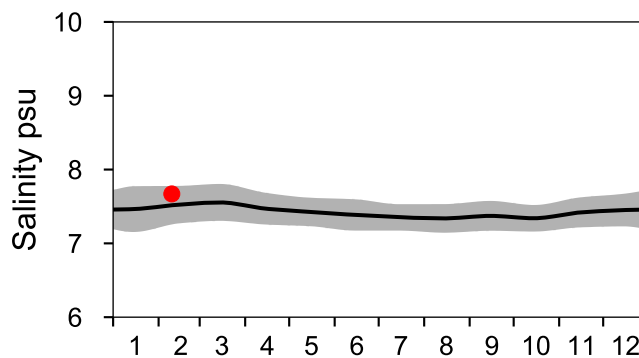
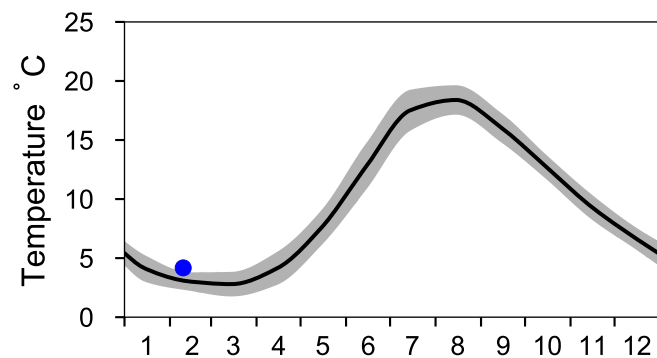
STATION BY5 BORNHOLMSDJ SURFACE WATER (0-10 m)

Annual Cycles

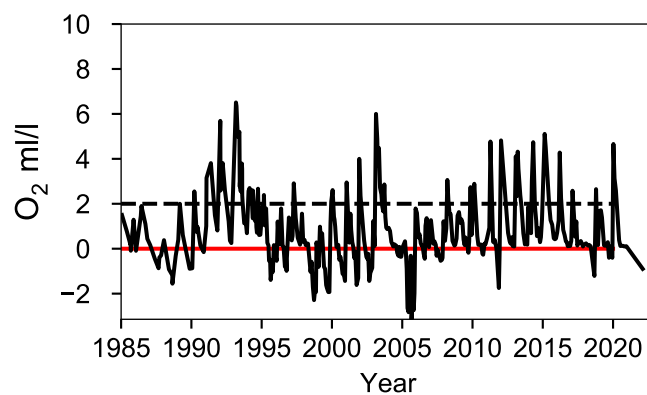
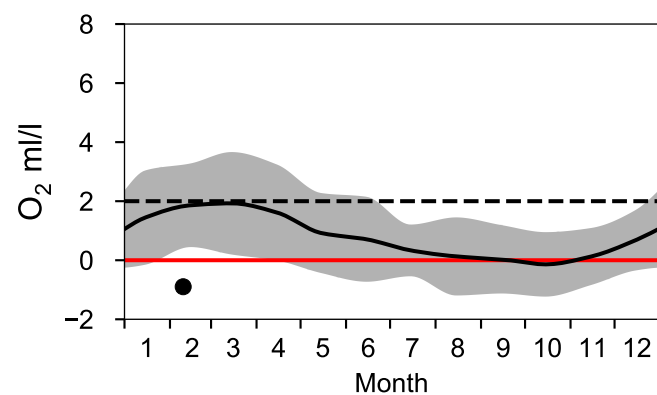
— Mean 2001-2015

■ St.Dev.

● 2022

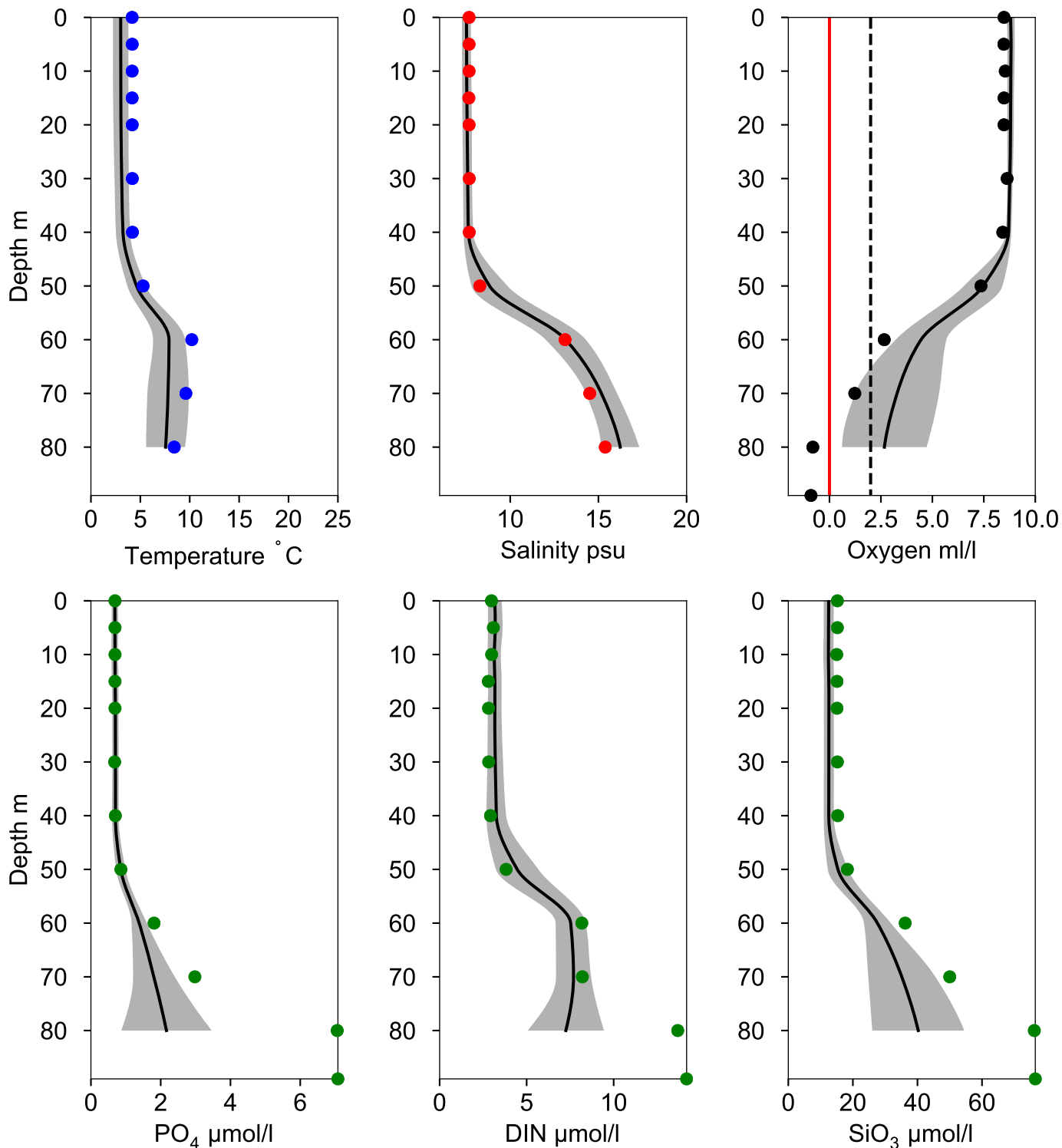


OXYGEN IN BOTTOM WATER (depth >= 80 m)



Vertical profiles BY5 BORNHOLMSDJ February

— Mean 2001-2015 St.Dev. • 2022-02-10

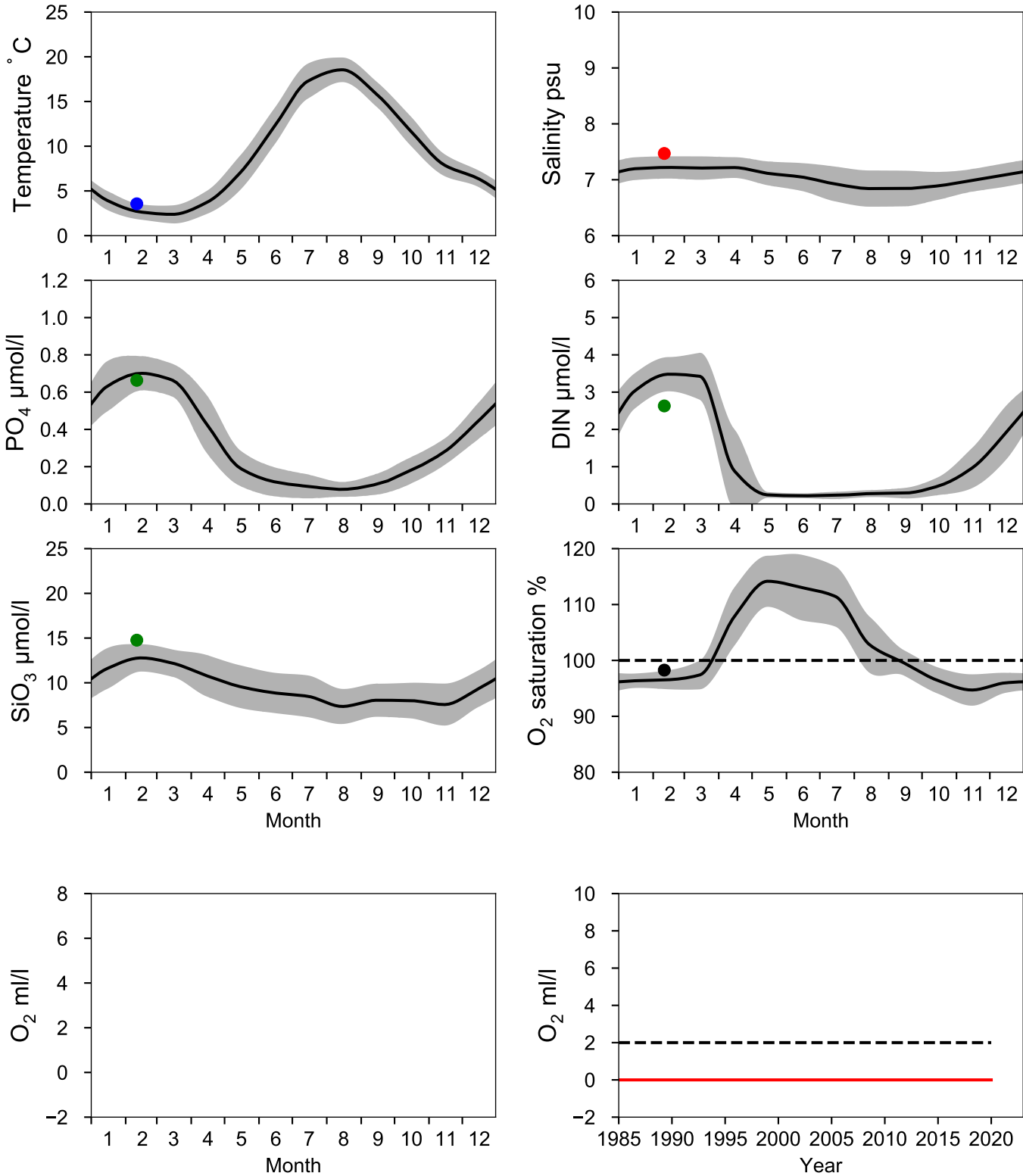


STATION STOLPE TRÖSKEL SURFACE WATER (0-10 m)

Annual Cycles

Statistics based on data from: Östra Gotlandshavet

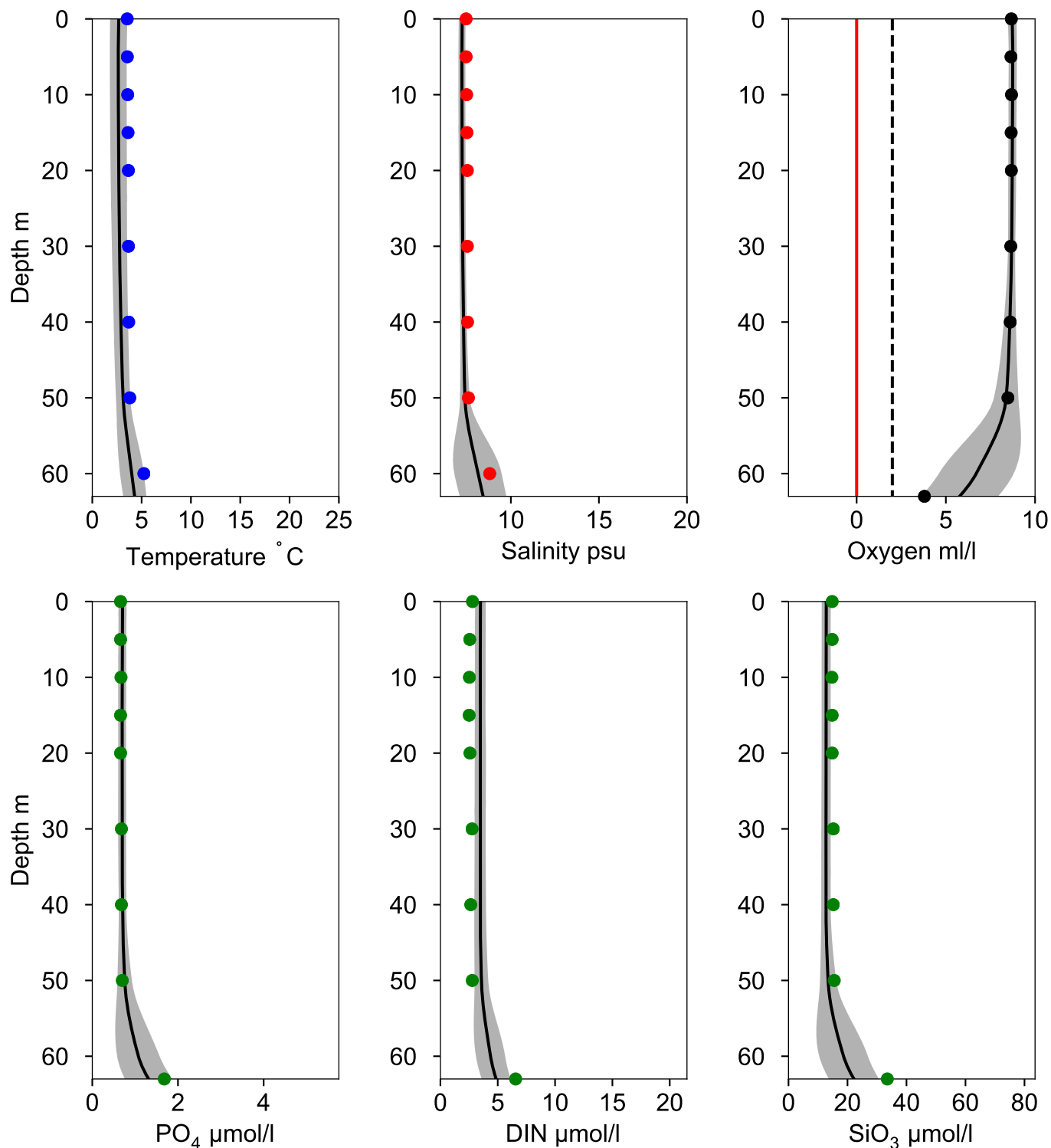
— Mean 2001-2015 St.Dev. ● 2022



Vertical profiles STOLPE TRÖSKEL February

Statistics based on data from: Östra Gotlandshavet

— Mean 2001-2015 St.Dev. ● 2022-02-11



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

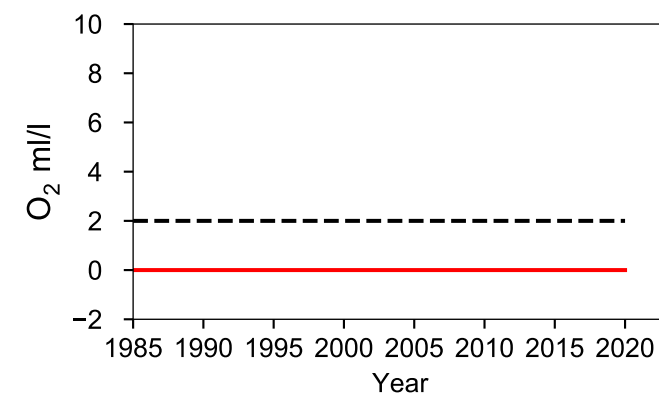
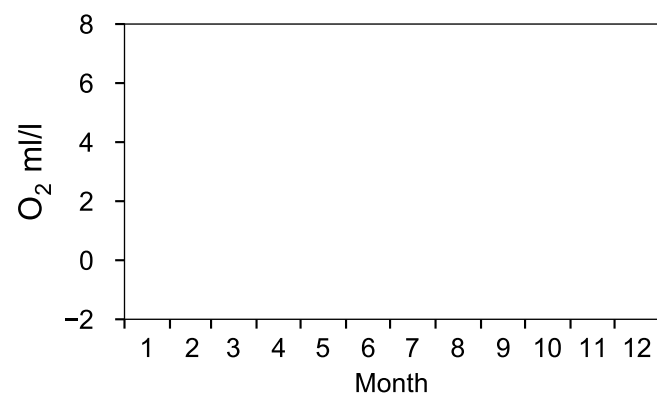
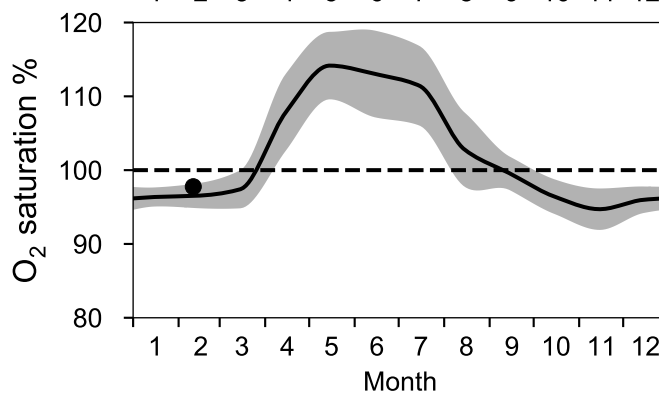
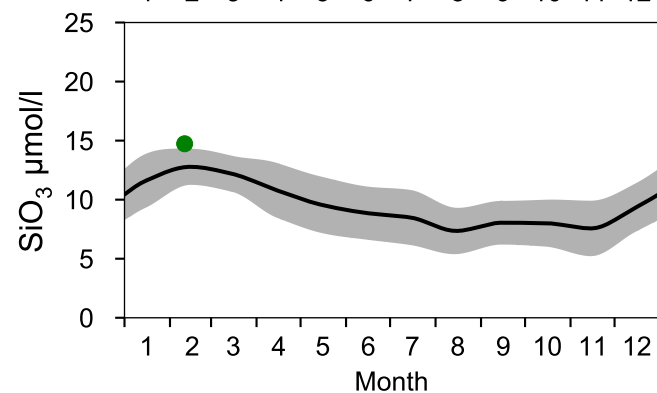
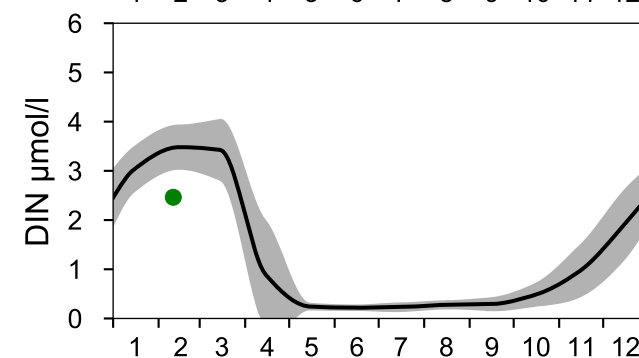
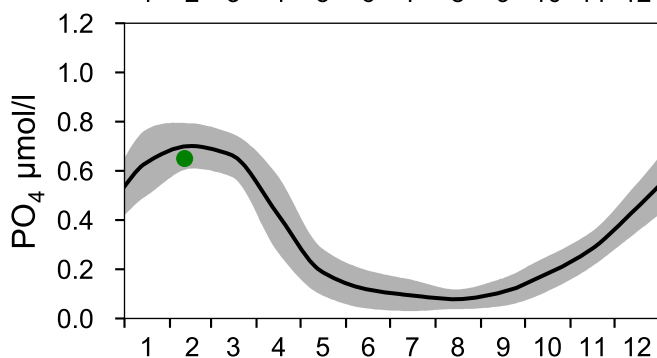
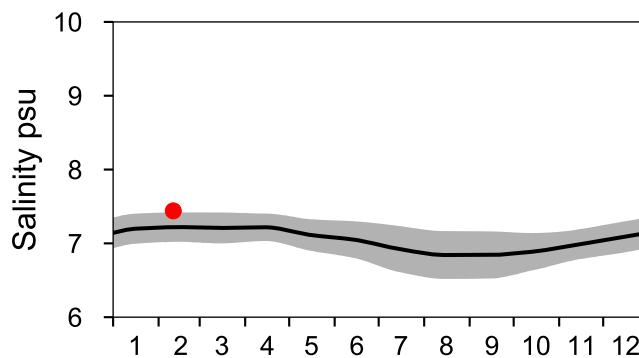
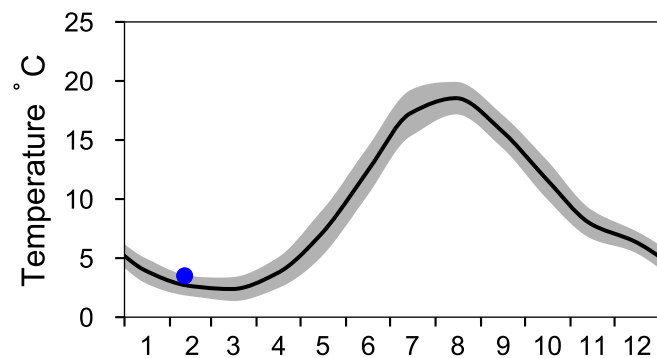
Annual Cycles

Statistics based on data from: Östra Gotlandshavet

— Mean 2001-2015

■ St.Dev.

● 2022



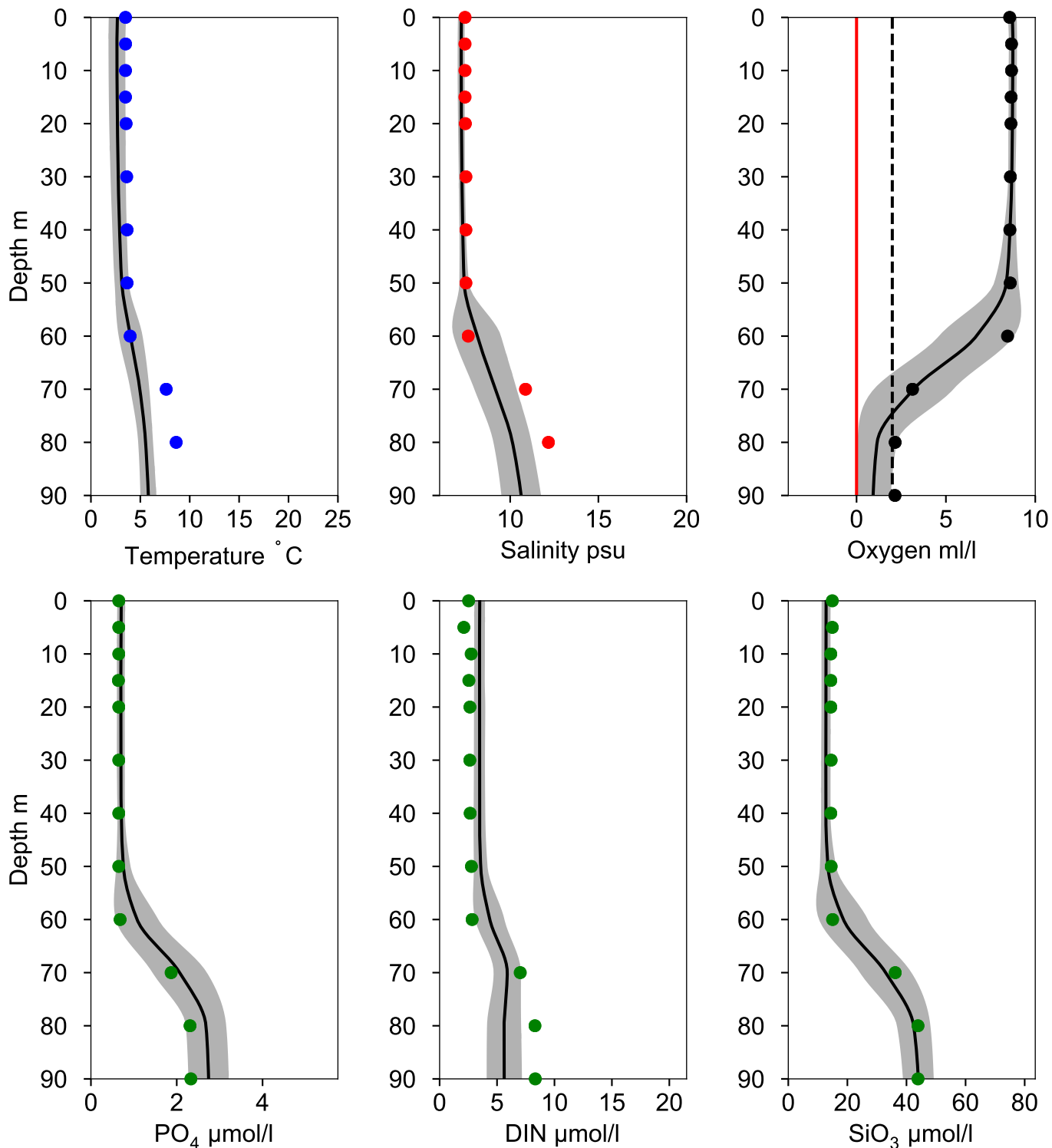
Vertical profiles BY7 STOLPE RÄNNA February

Statistics based on data from: Östra Gotlandshavet

— Mean 2001-2015

■ St.Dev.

● 2022-02-11

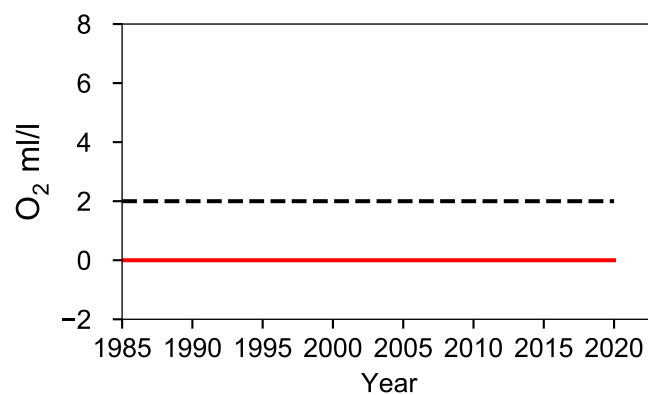
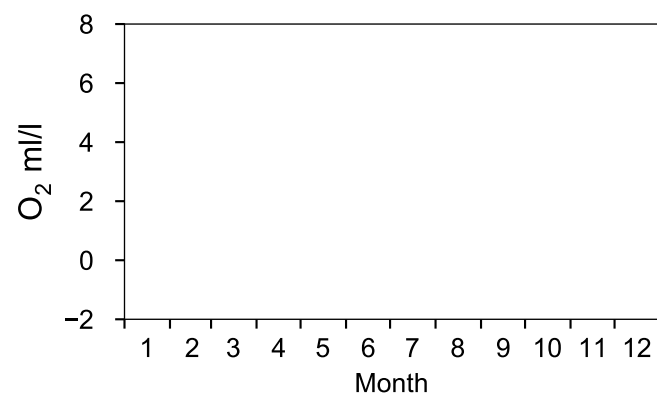
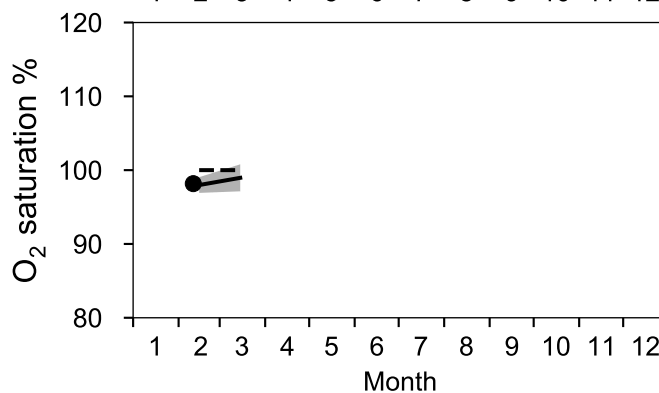
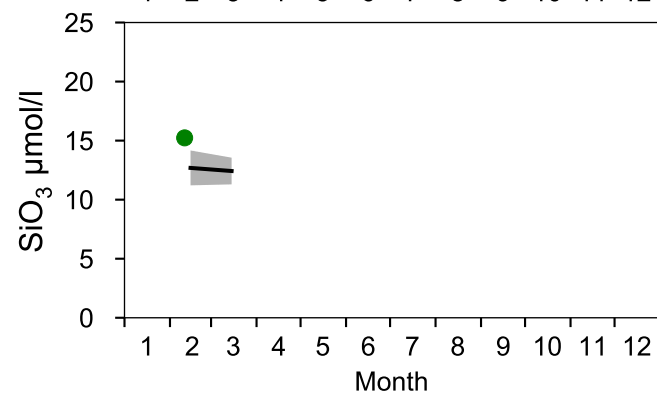
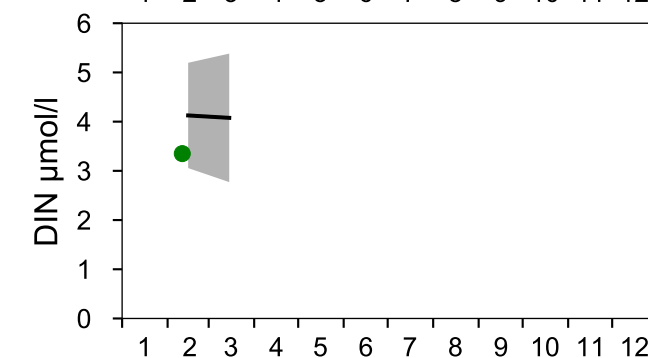
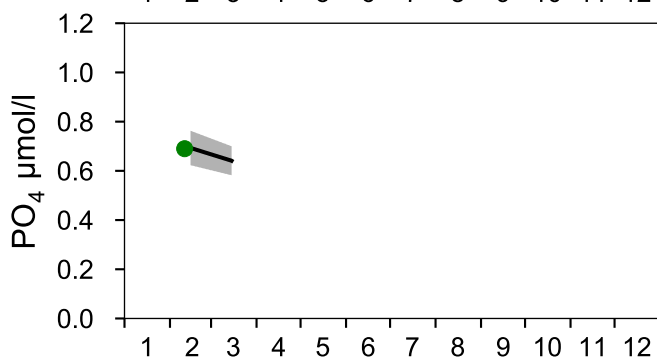
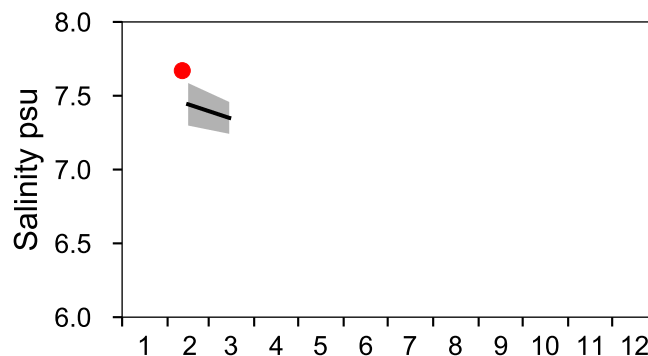
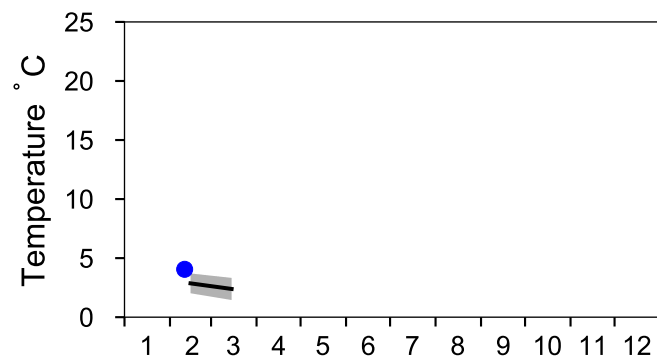


STATION PL-P1 SURFACE WATER (0-10 m)

Annual Cycles

Statistics based on data from: Gdanskbukten

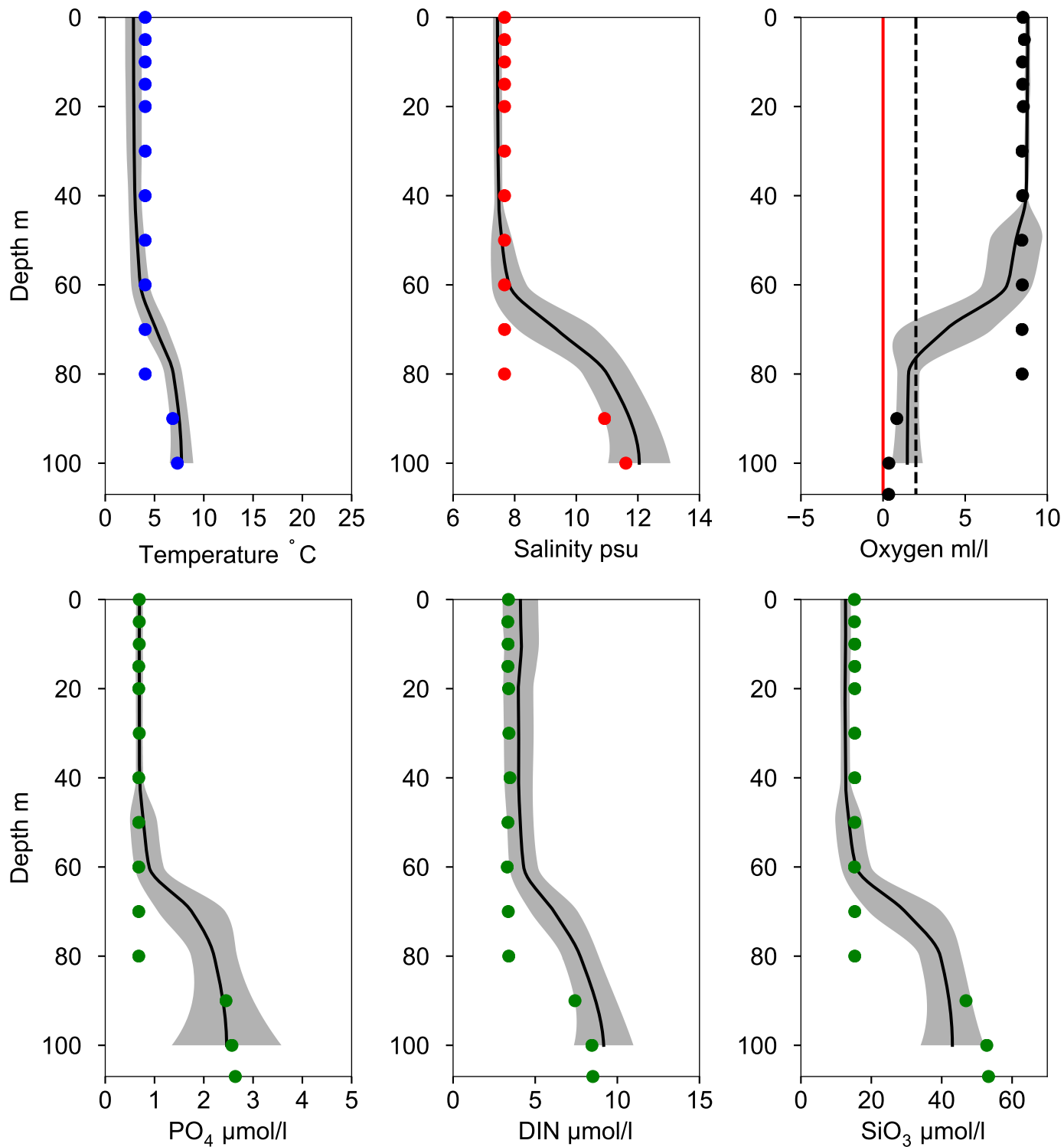
— Mean 2001-2015 St.Dev. ● 2022



Vertical profiles PL-P1 February

Statistics based on data from: Gdanskbukten

— Mean 2001-2015 St.Dev. • 2022-02-11

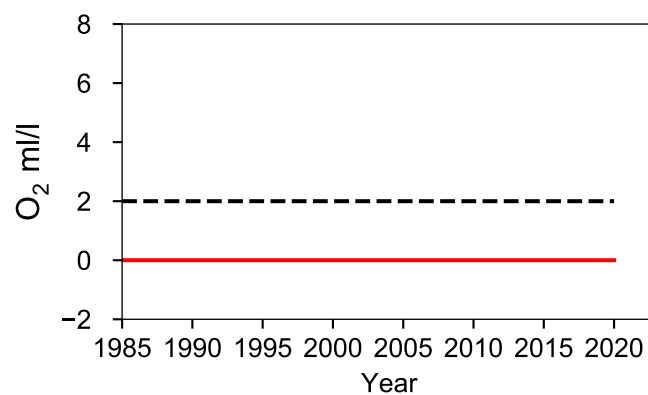
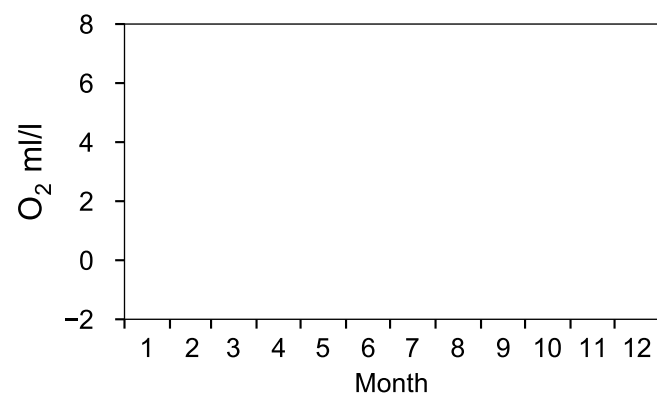
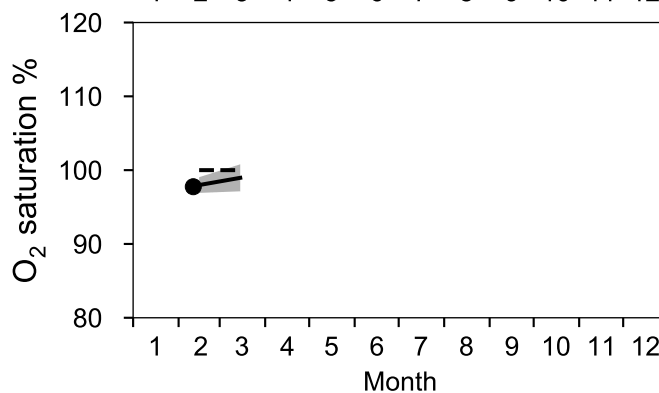
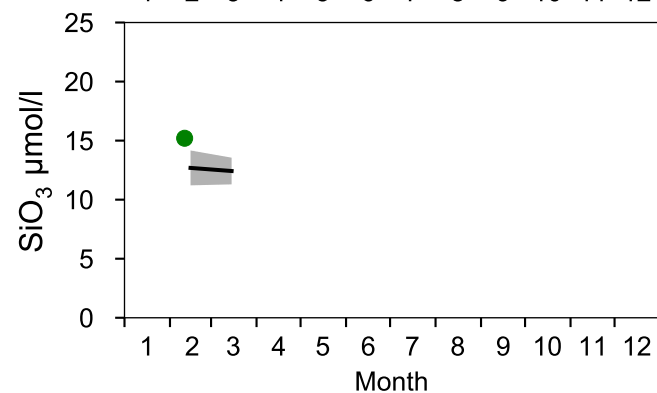
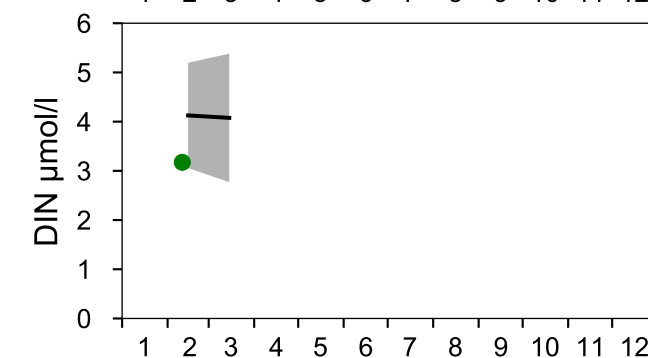
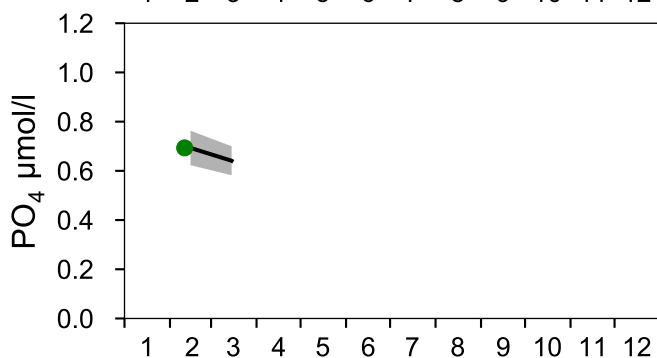
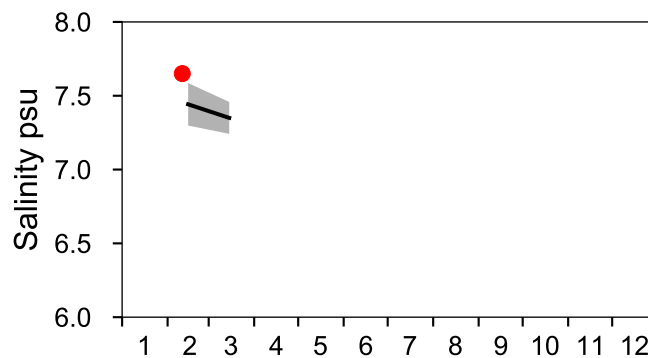
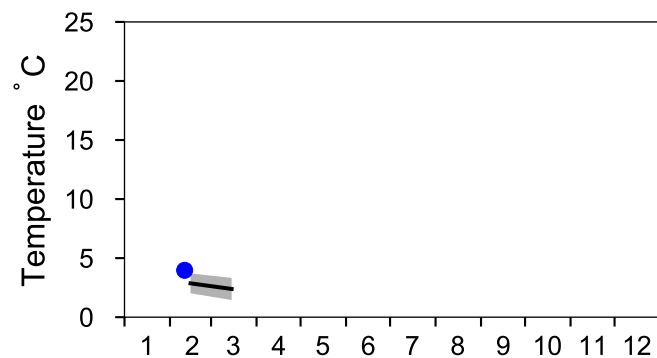


STATION PL-P63 SURFACE WATER (0-10 m)

Annual Cycles

Statistics based on data from: Gdanskbukten

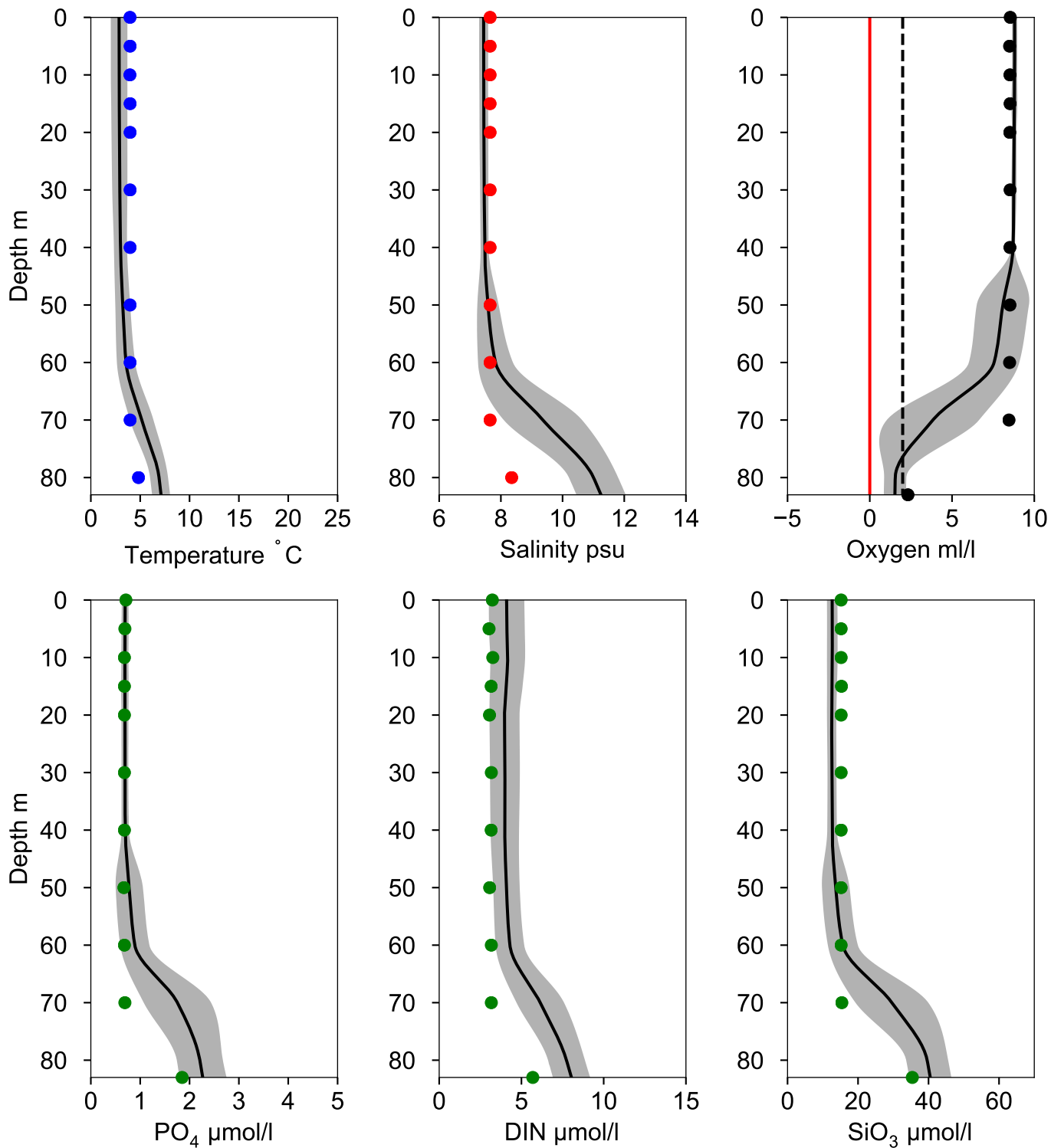
— Mean 2001-2015 St.Dev. ● 2022



Vertical profiles PL-P63 February

Statistics based on data from: Gdanskbukten

— Mean 2001-2015 St.Dev. • 2022-02-11



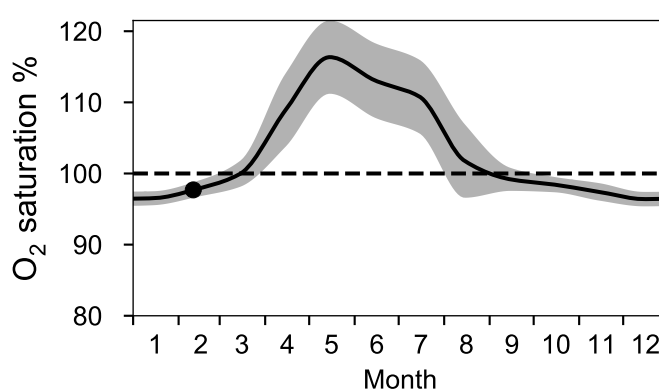
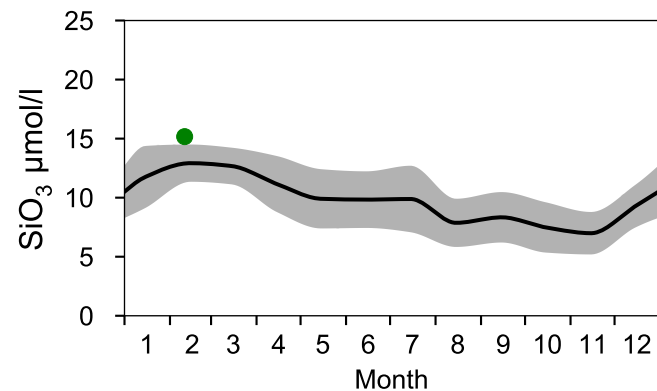
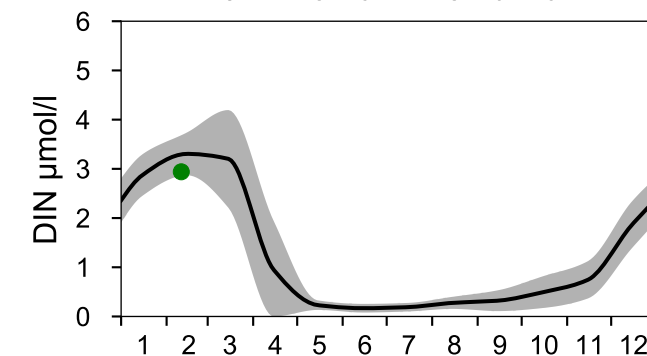
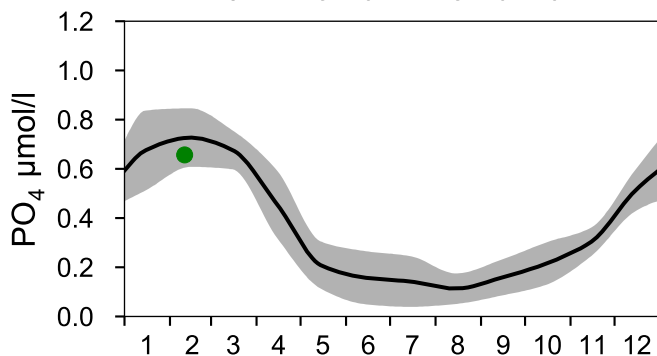
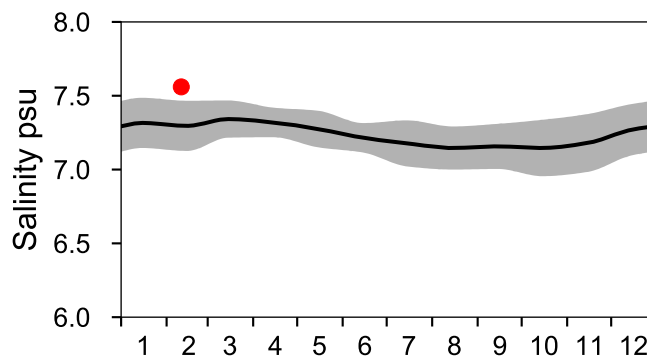
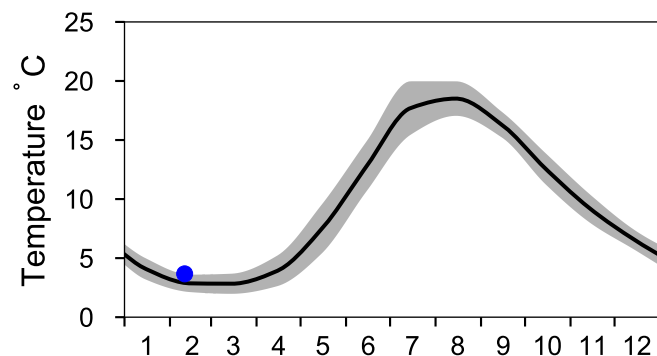
STATION BCS III-10 SURFACE WATER (0-10 m)

Annual Cycles

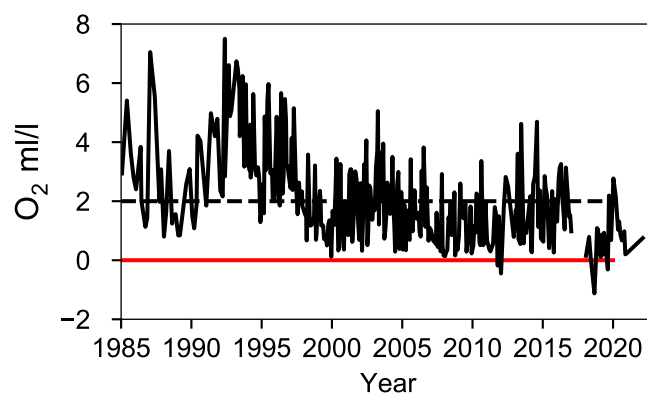
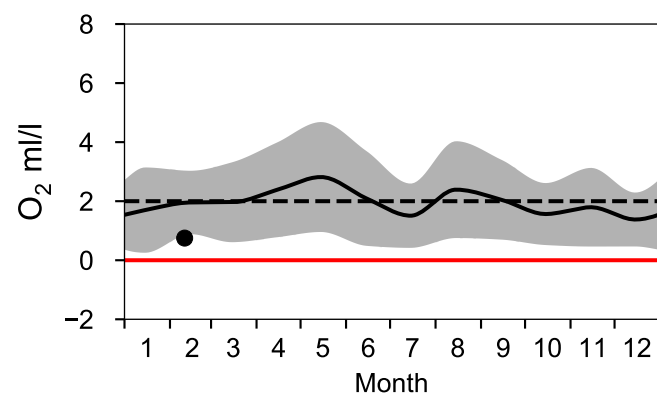
— Mean 2001-2015

■ St.Dev.

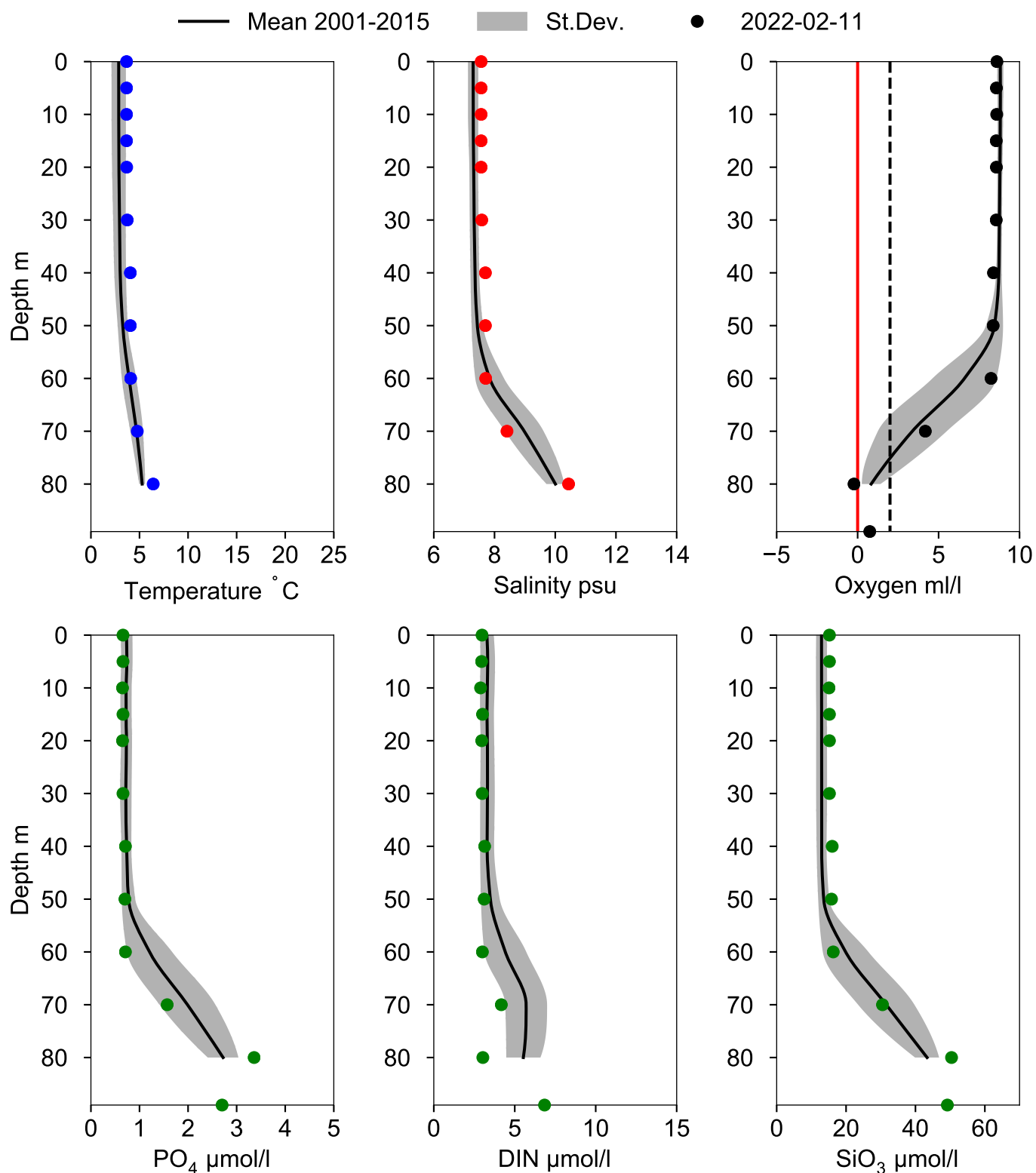
● 2022



OXYGEN IN BOTTOM WATER (depth >= 80 m)



Vertical profiles BCS III-10 February



STATION BY9 KLAIPEDA SURFACE WATER (0-10 m)

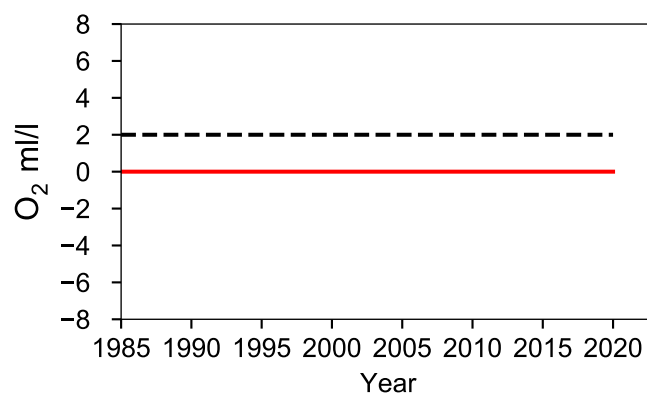
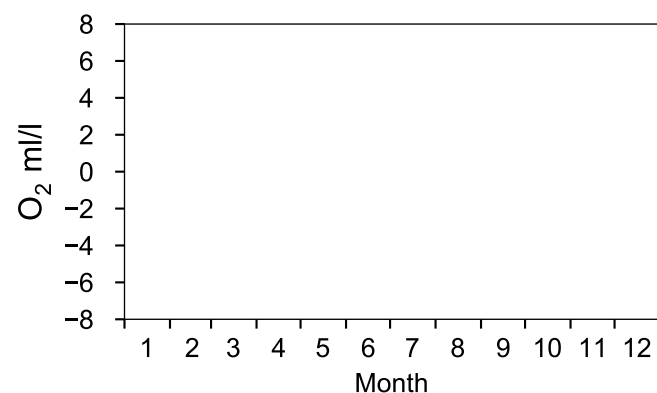
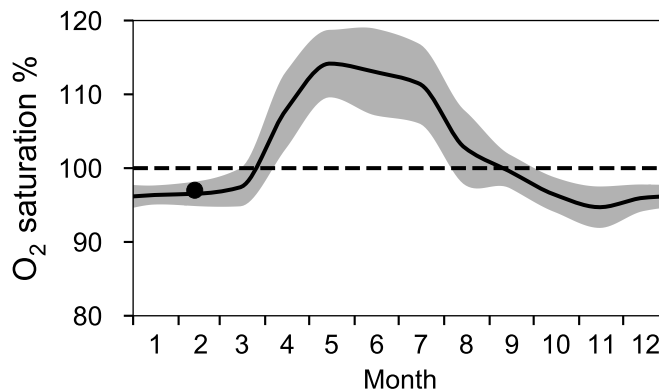
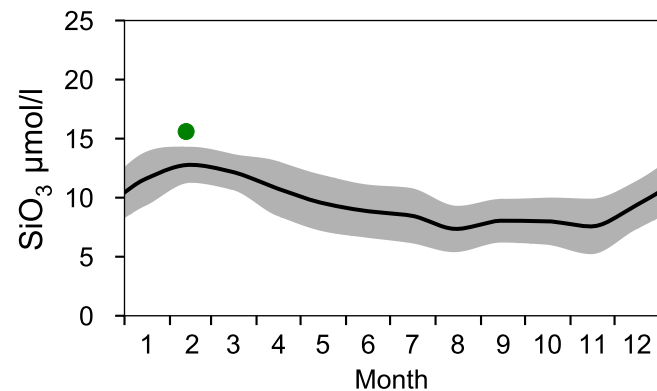
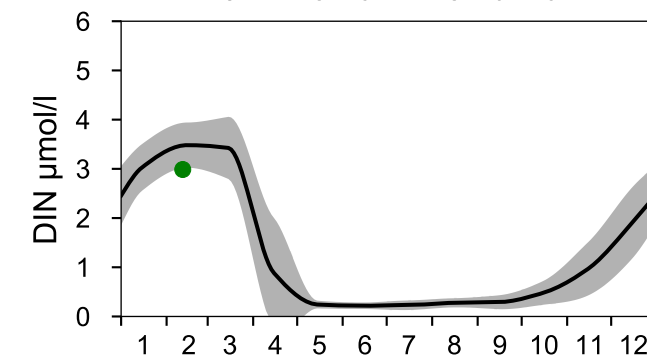
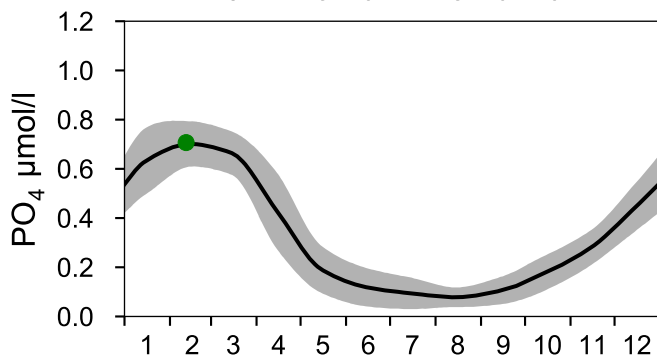
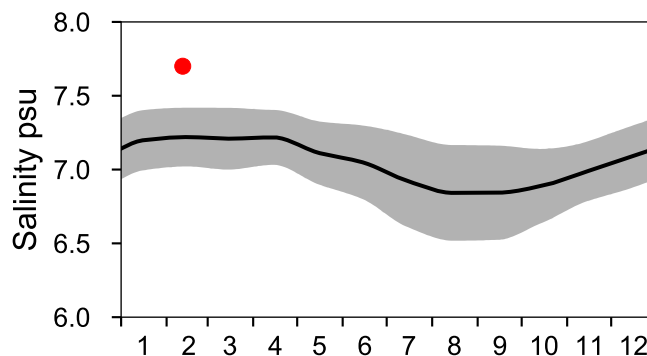
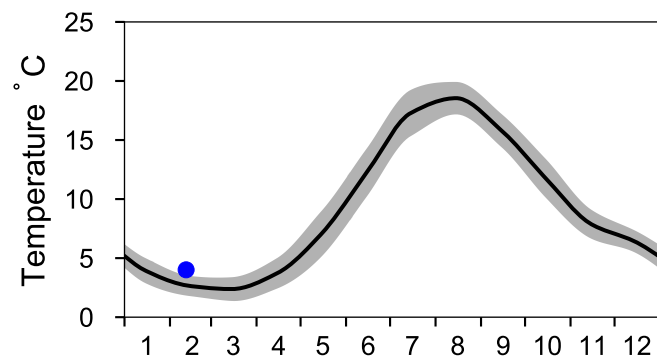
Annual Cycles

Statistics based on data from: Östra Gotlandshavet

— Mean 2001-2015

■ St.Dev.

● 2022



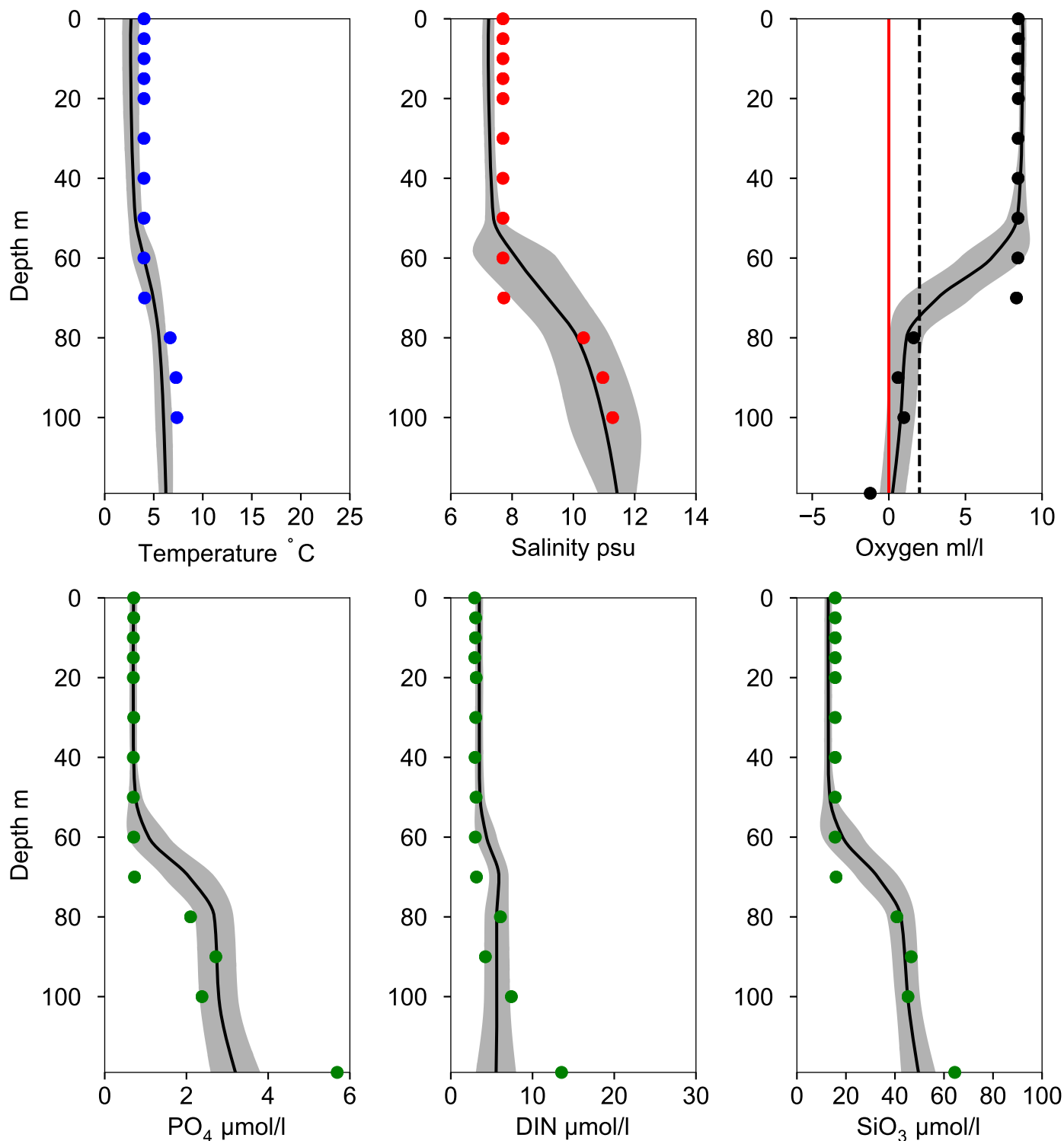
Vertical profiles BY9 KLAIPEDA February

Statistics based on data from: Östra Gotlandshavet

— Mean 2001-2015

■ St.Dev.

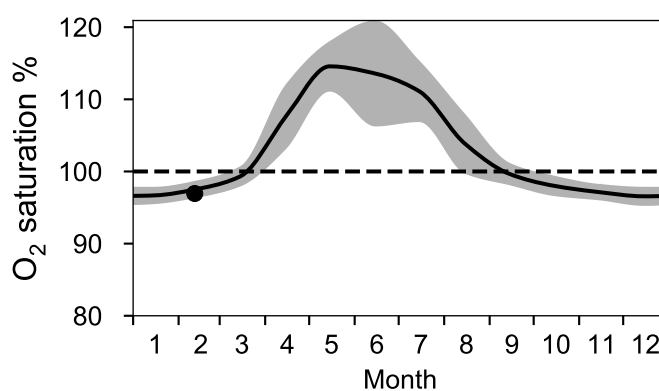
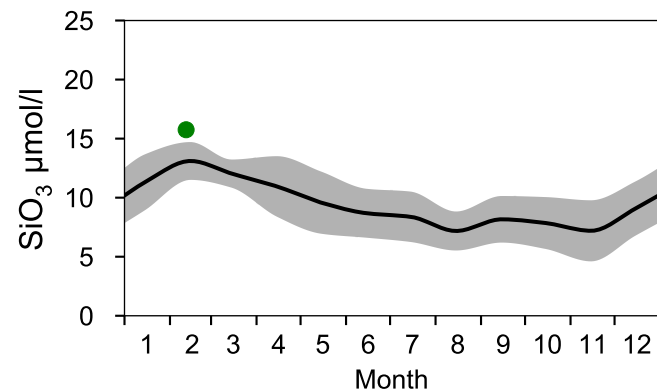
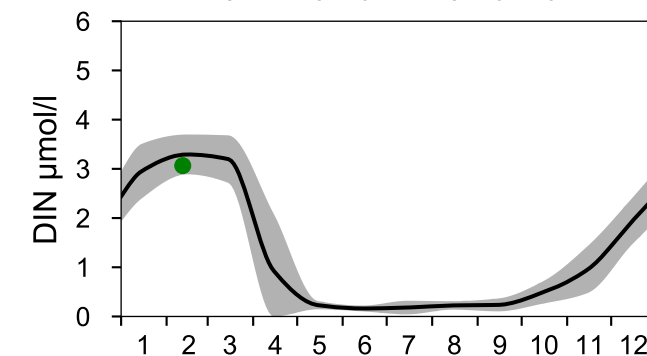
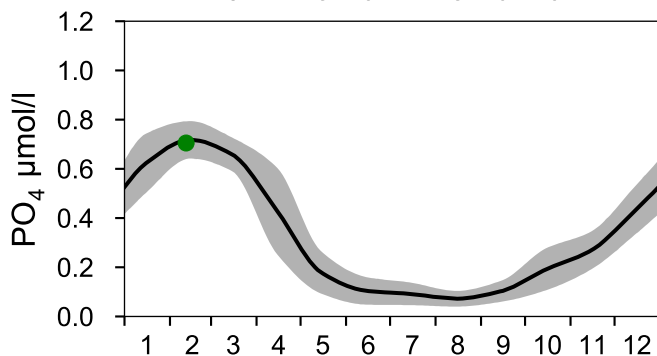
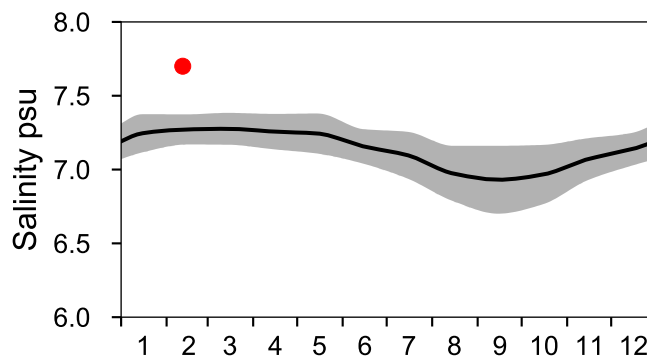
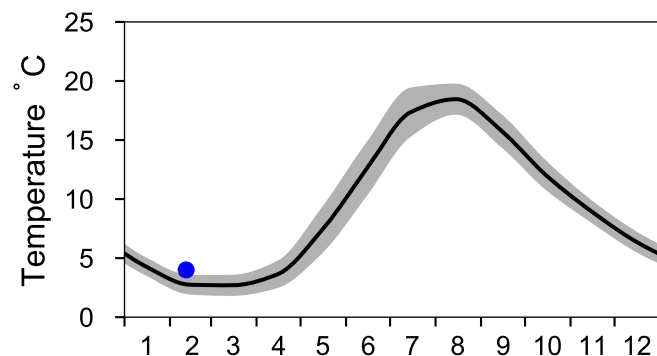
● 2022-02-12



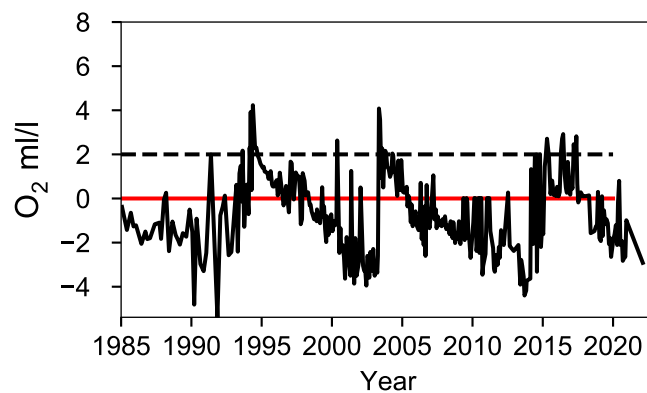
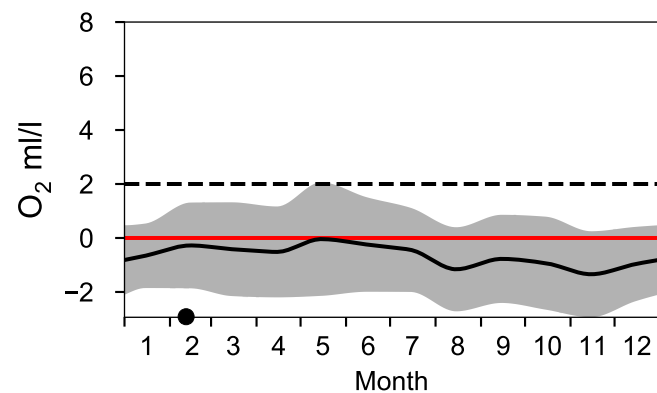
STATION BY10 SURFACE WATER (0-10 m)

Annual Cycles

— Mean 2001-2015 St.Dev. • 2022

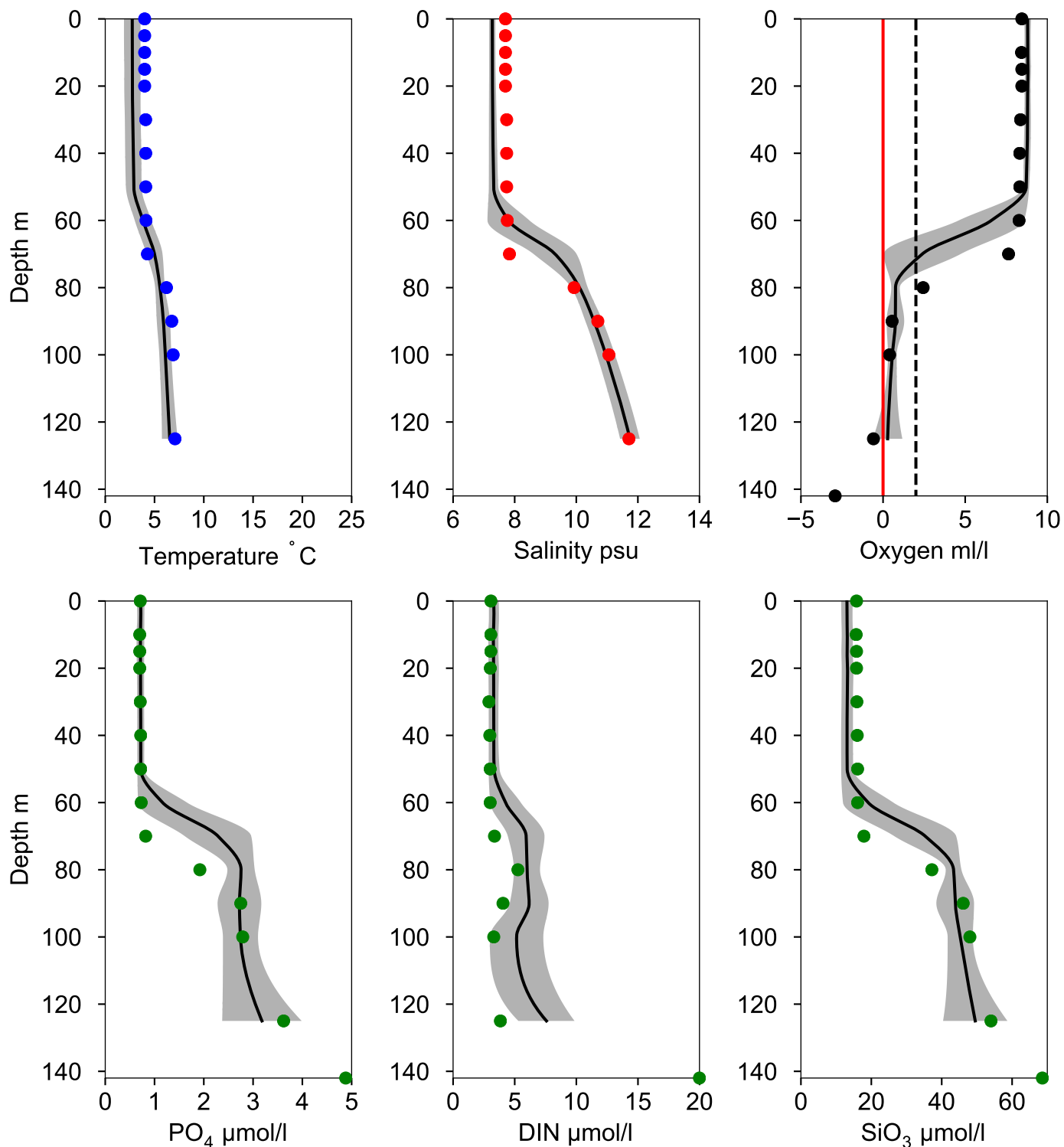


OXYGEN IN BOTTOM WATER (depth >= 125 m)



Vertical profiles BY10 February

— Mean 2001-2015 ■ St.Dev. ● 2022-02-12



STATION BY11 SURFACE WATER (0-10 m)

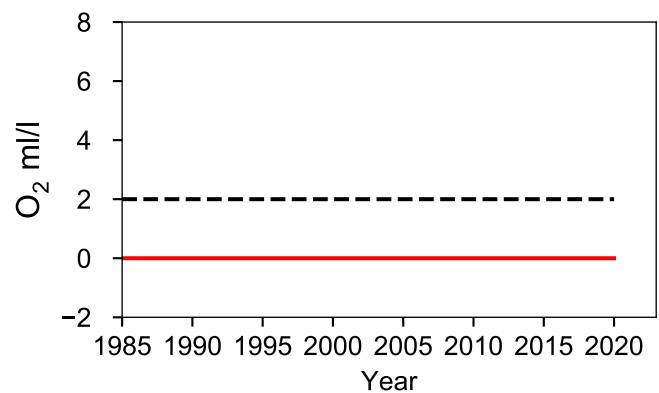
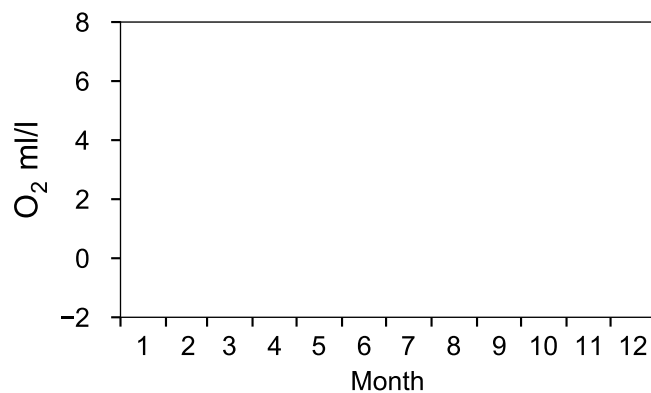
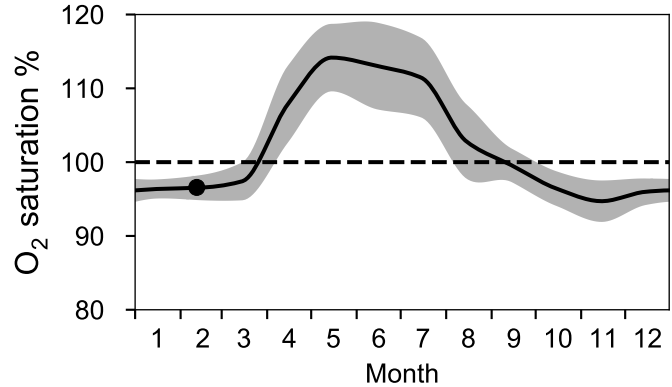
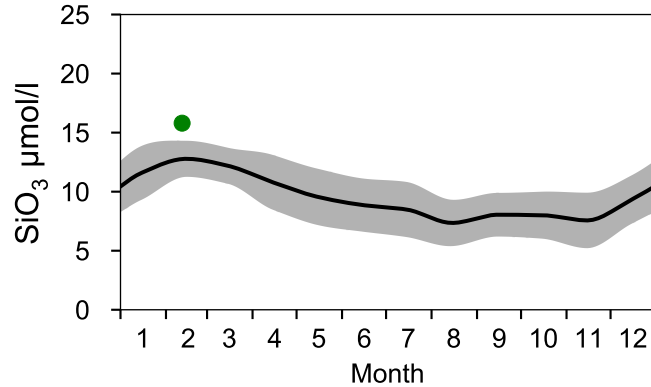
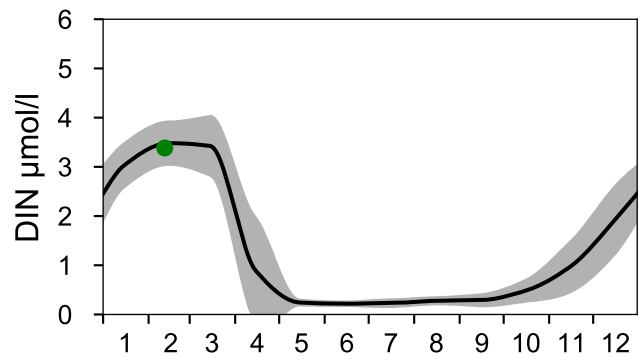
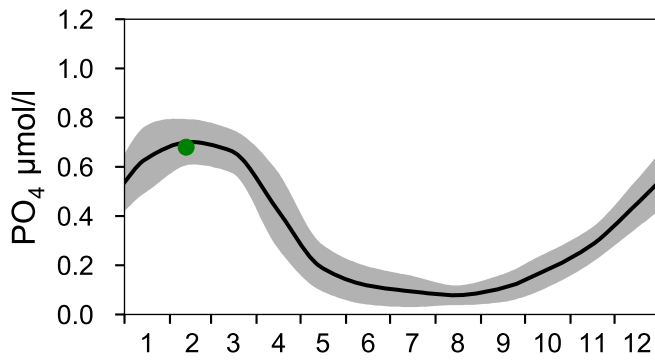
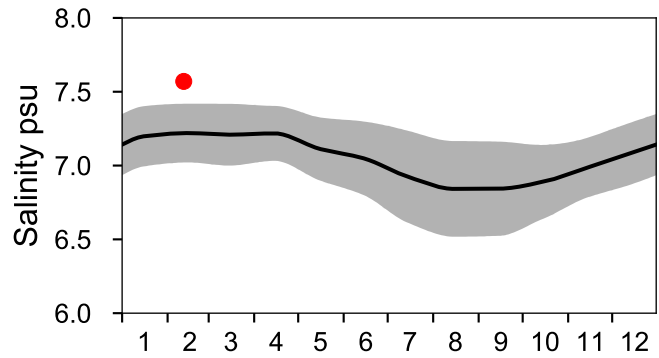
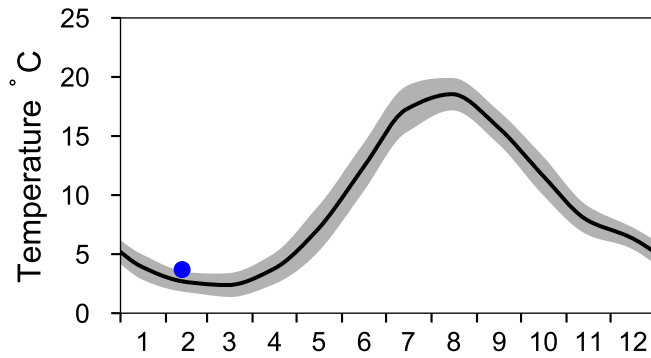
Annual Cycles

Statistics based on data from: Östra Gotlandshavet

— Mean 2001-2015

■ St.Dev.

● 2022



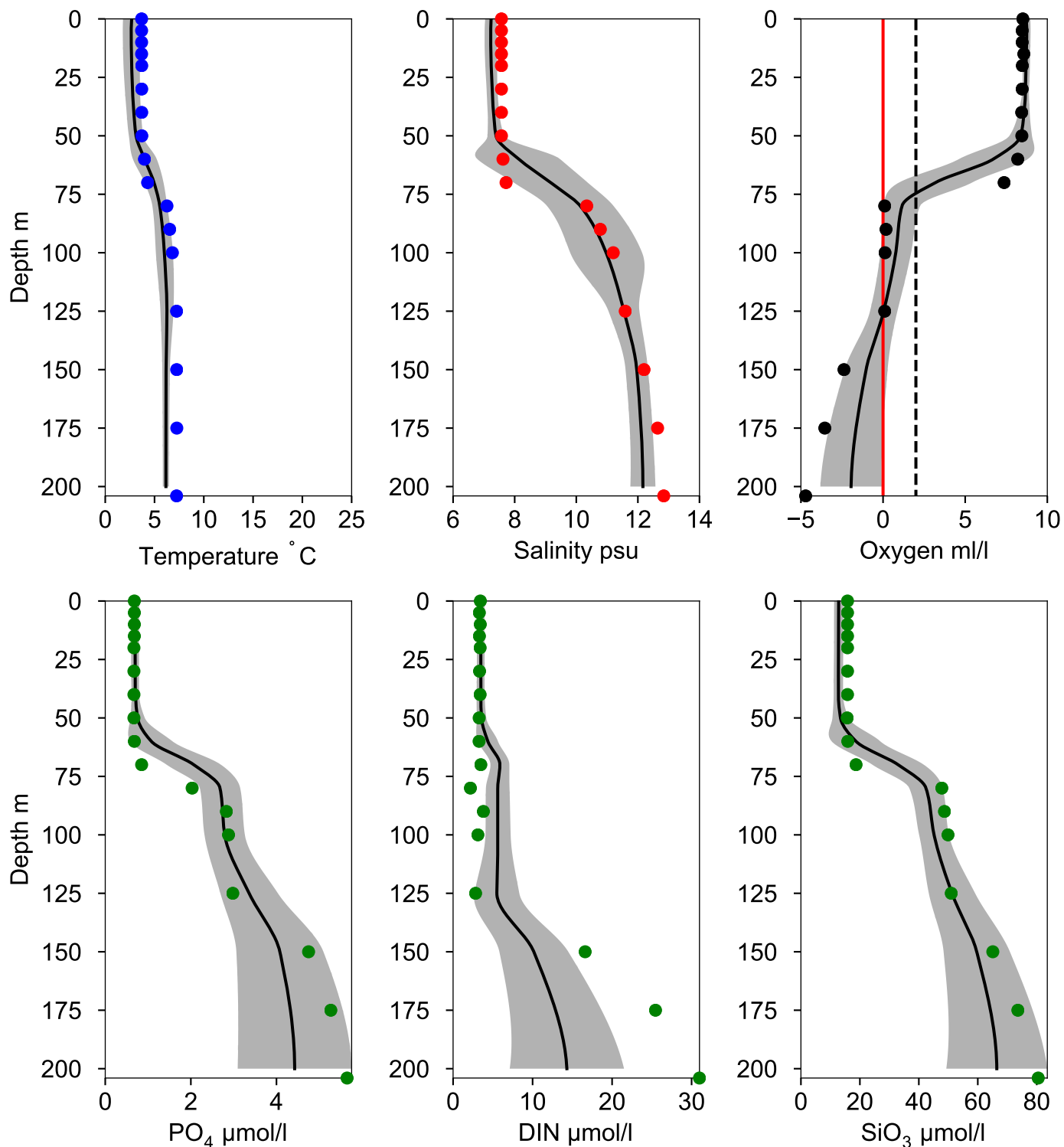
Vertical profiles BY11 February

Statistics based on data from: Östra Gotlandshavet

— Mean 2001-2015

■ St.Dev.

● 2022-02-12



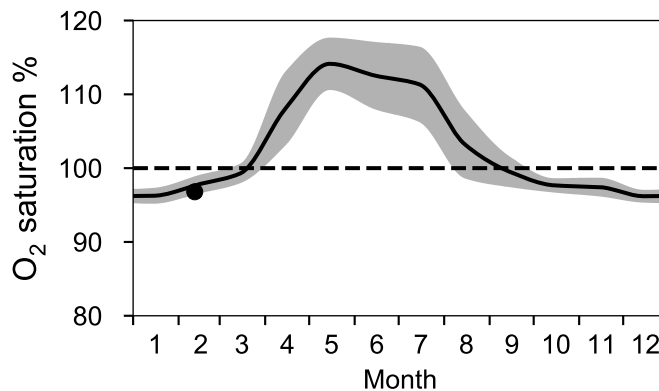
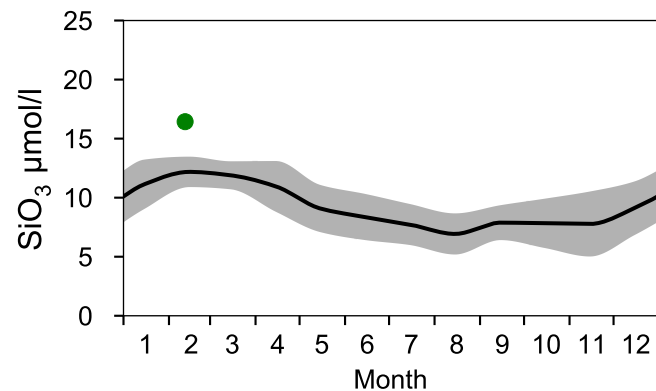
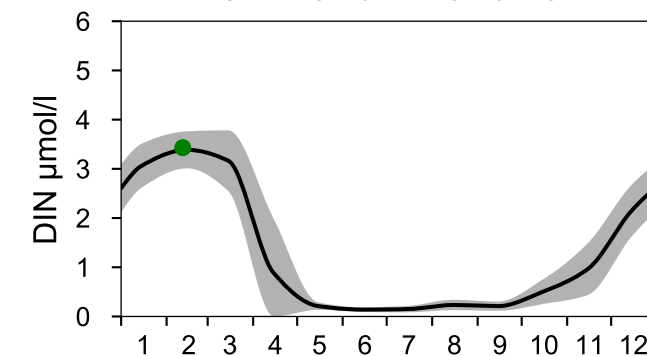
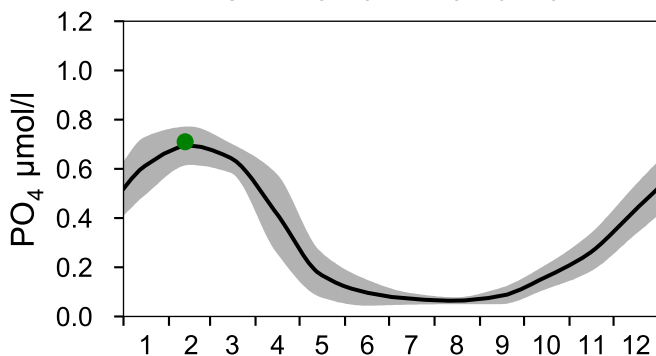
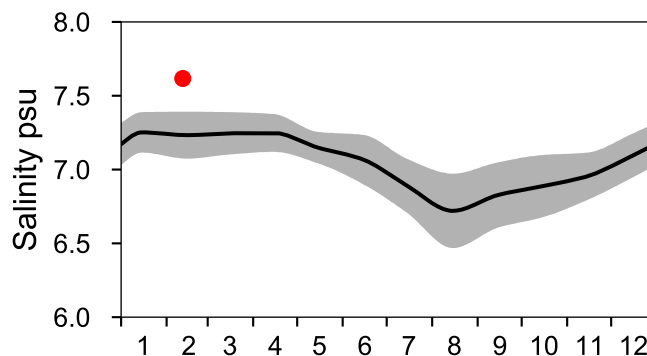
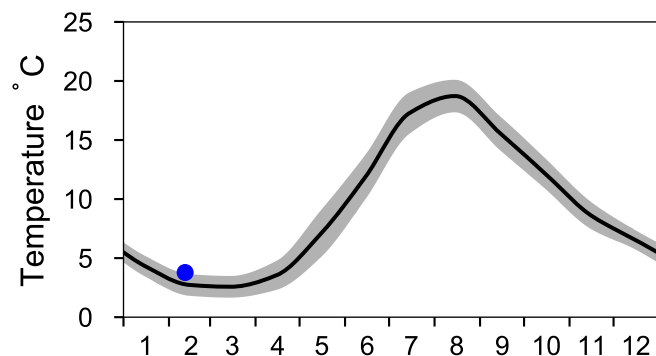
STATION BY15 GOTLANDSDJ SURFACE WATER (0-10 m)

Annual Cycles

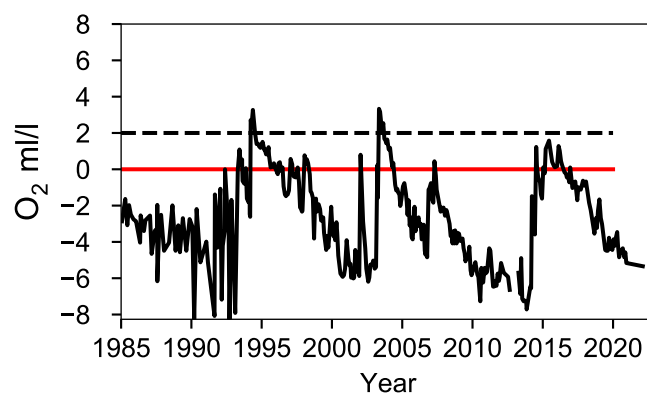
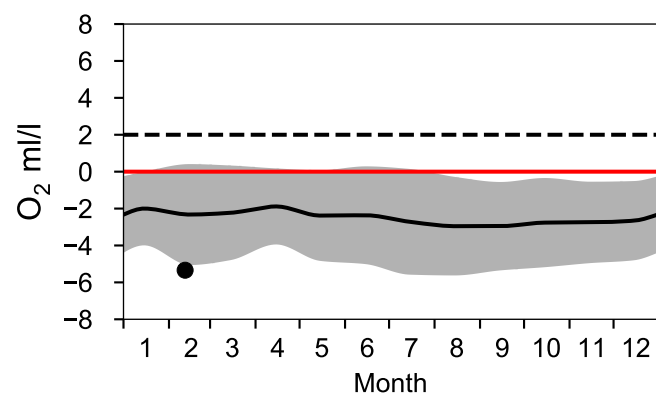
— Mean 2001-2015

■ St.Dev.

● 2022

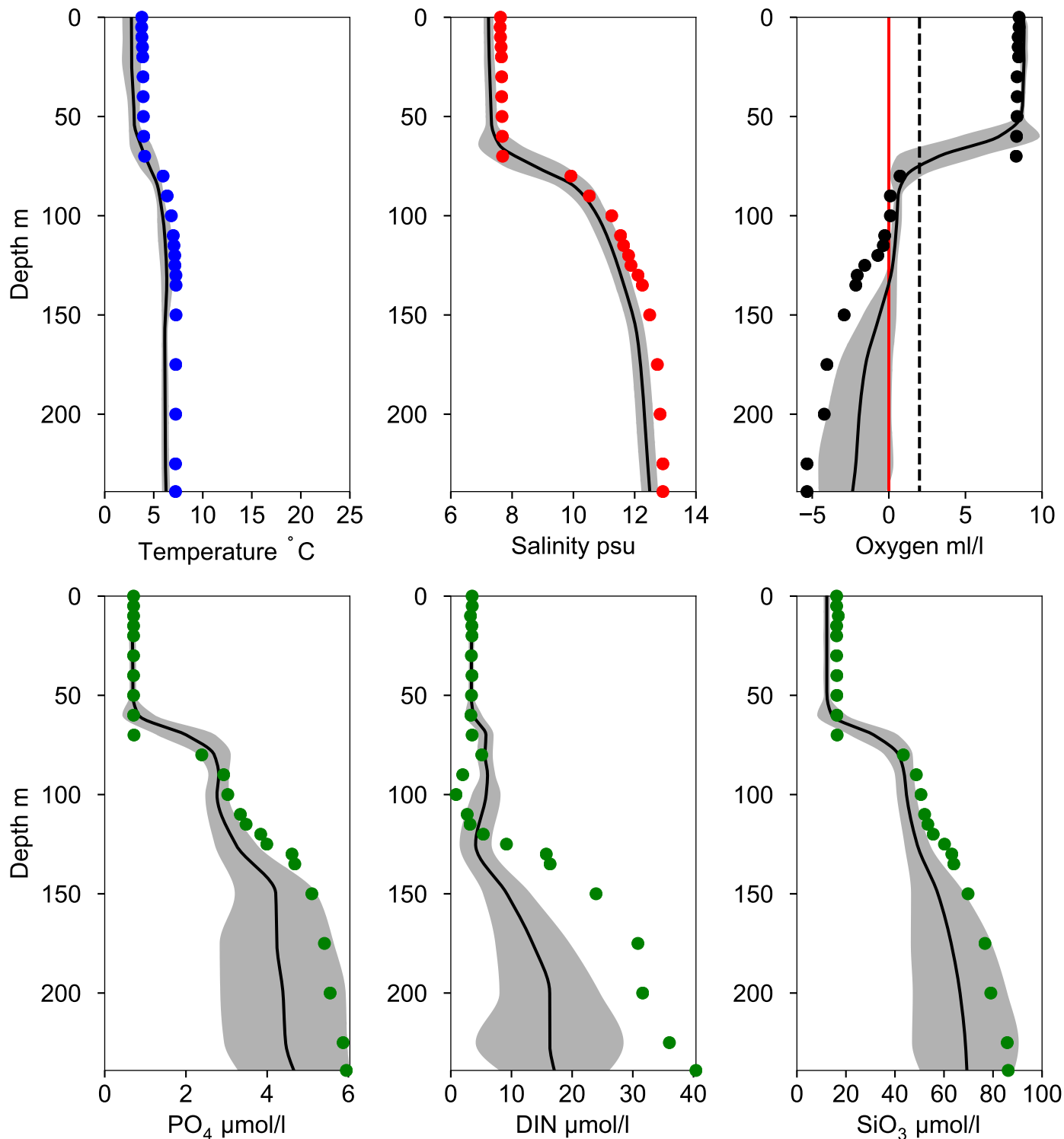


OXYGEN IN BOTTOM WATER (depth >= 225 m)



Vertical profiles BY15 GOTLANDSDJ February

— Mean 2001-2015 St.Dev. • 2022-02-12



STATION BY13 SURFACE WATER (0-10 m)

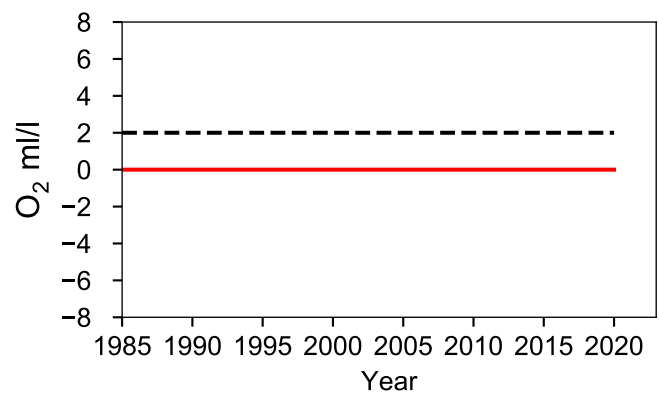
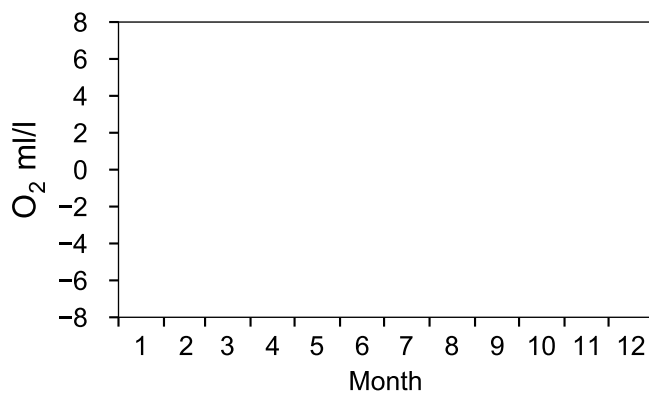
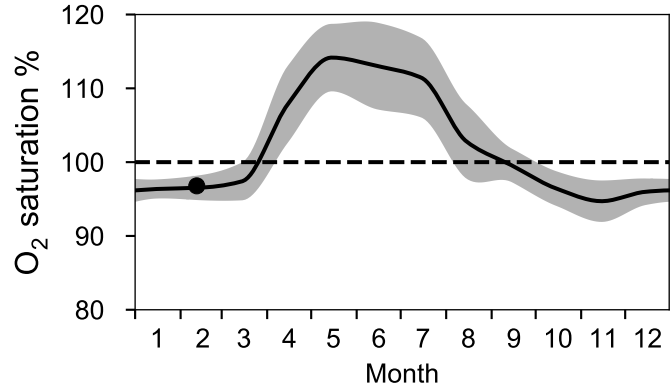
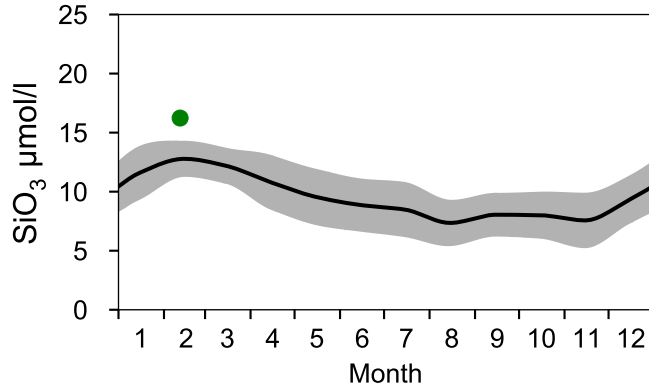
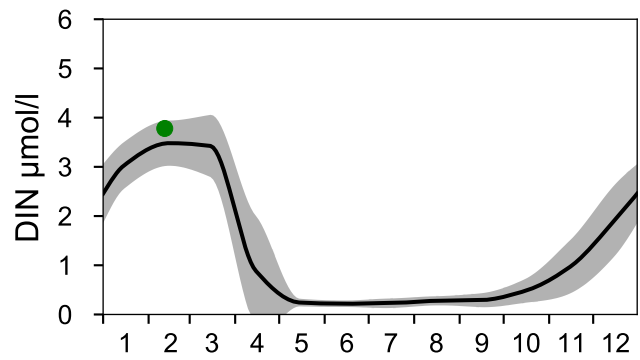
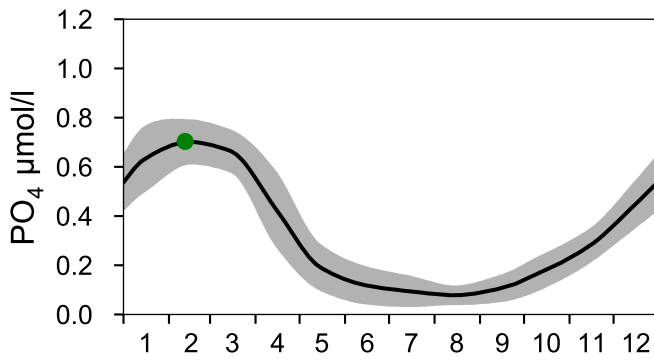
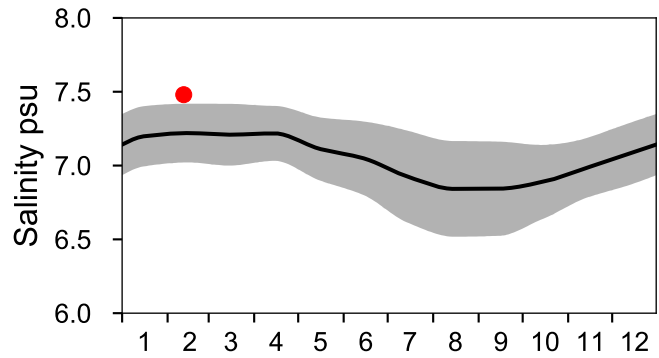
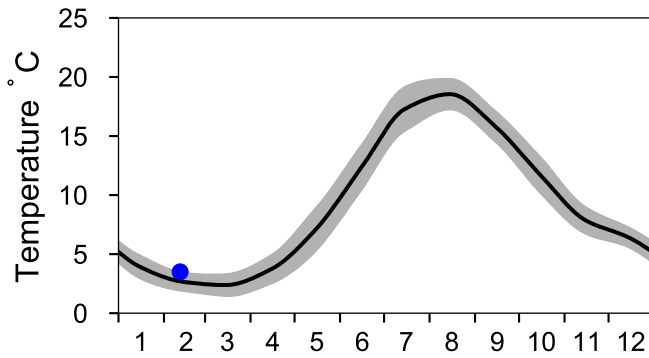
Annual Cycles

Statistics based on data from: Östra Gotlandshavet

— Mean 2001-2015

■ St.Dev.

● 2022



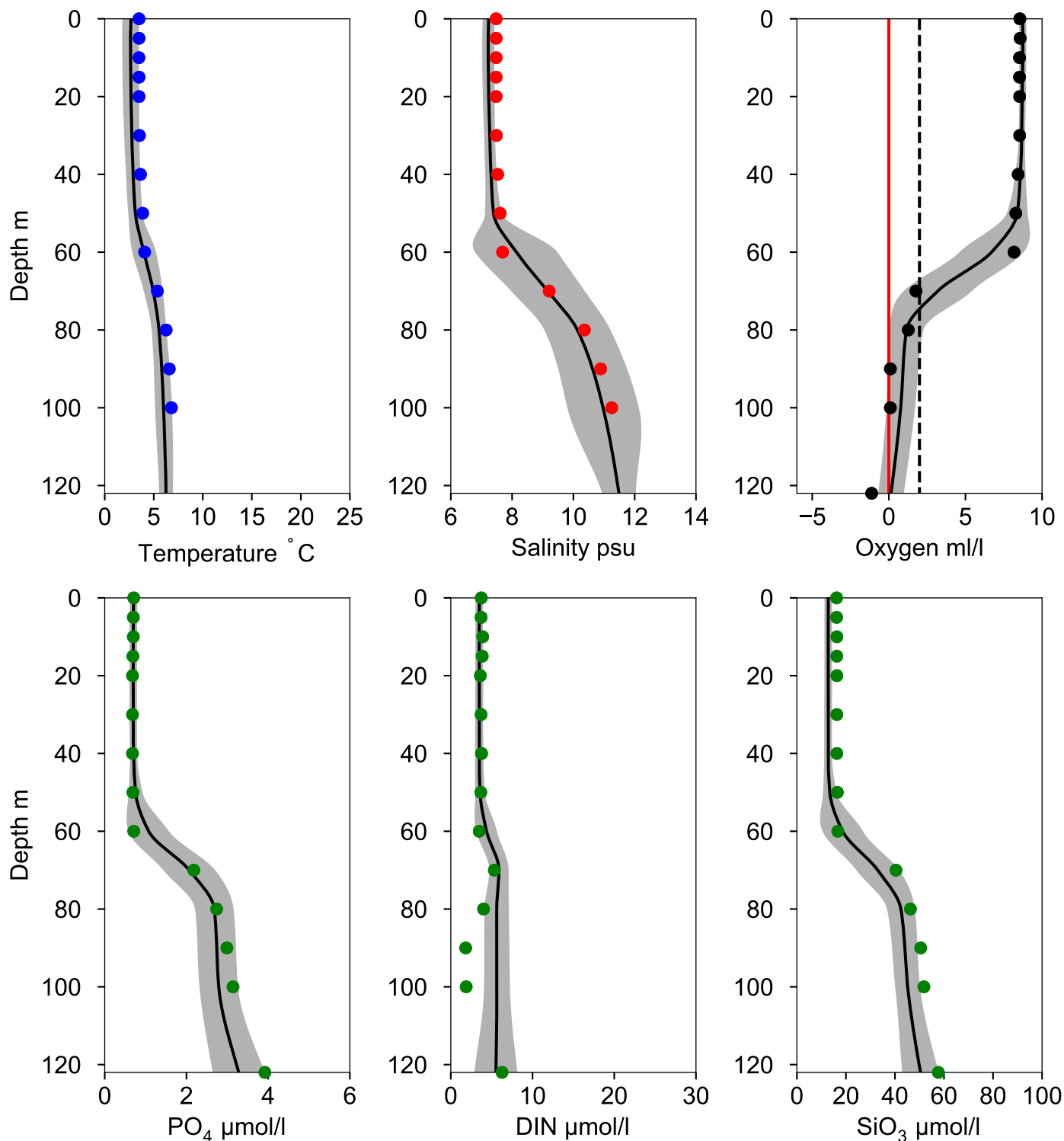
Vertical profiles BY13 February

Statistics based on data from: Östra Gotlandshavet

— Mean 2001-2015

■ St.Dev.

● 2022-02-12



STATION BY19 SURFACE WATER (0-10 m)

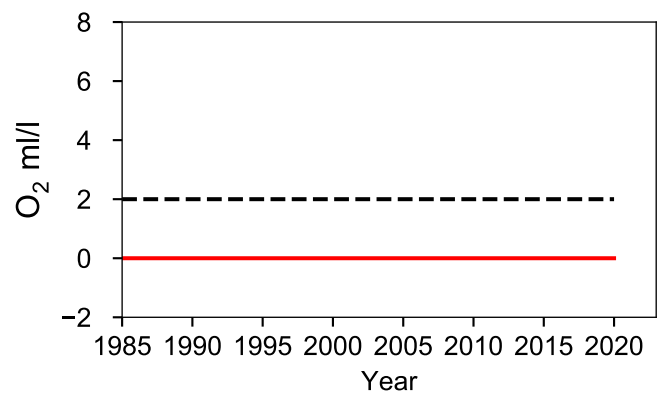
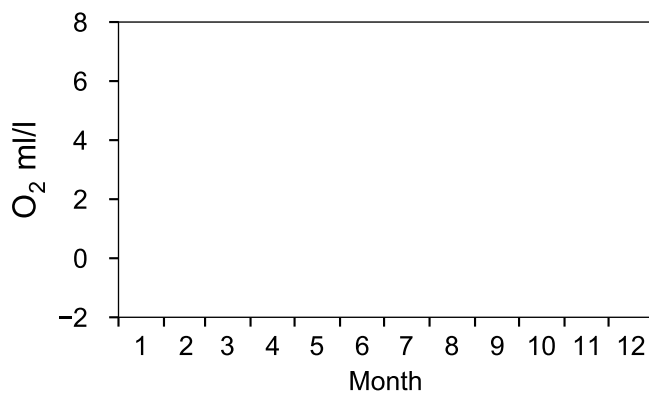
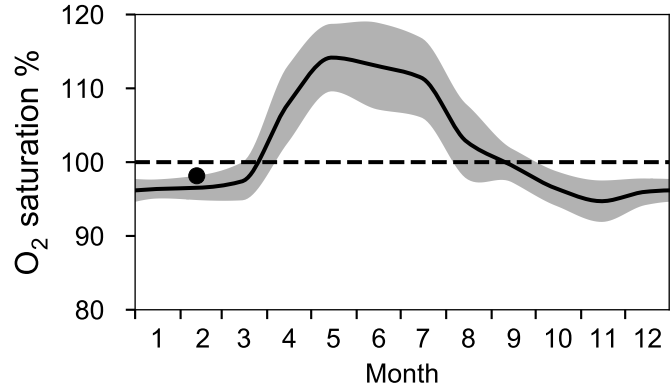
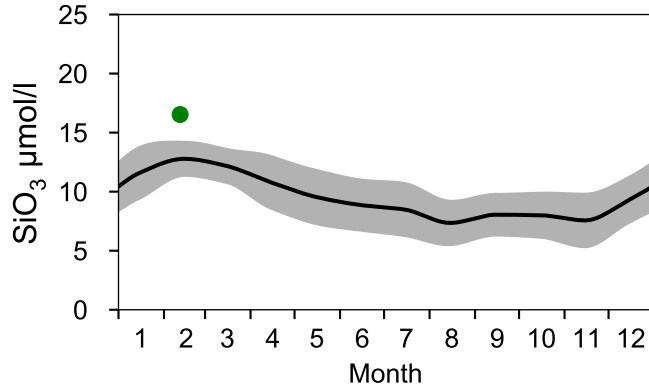
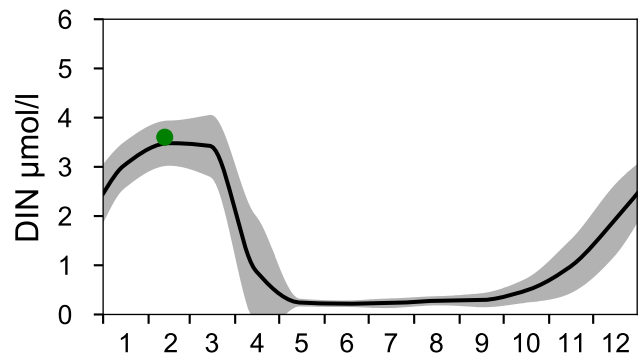
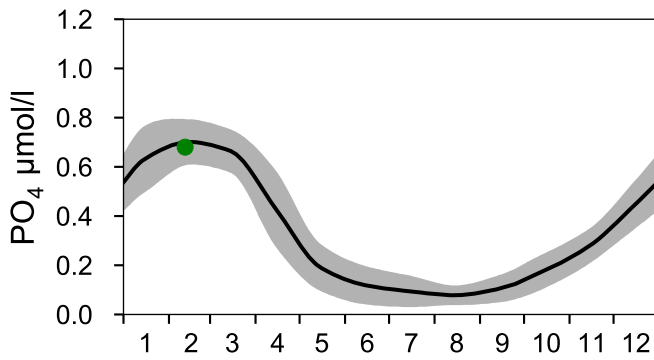
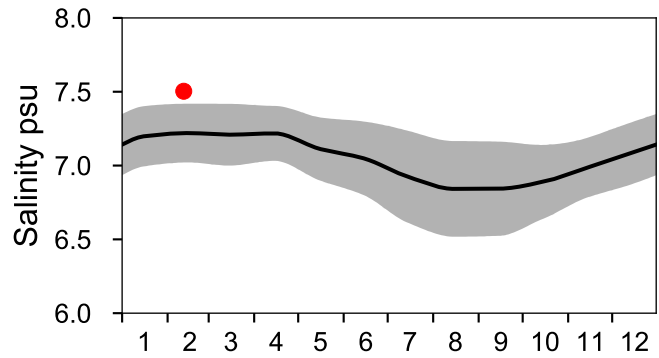
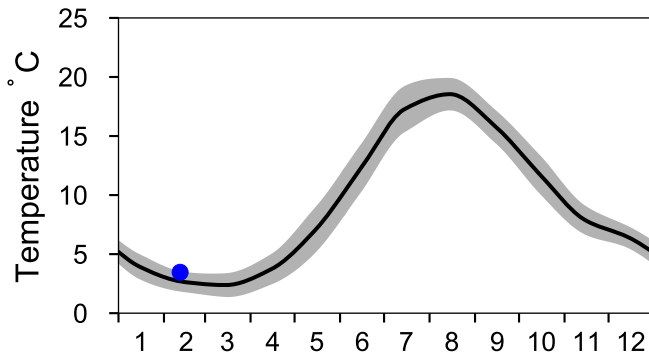
Annual Cycles

Statistics based on data from: Östra Gotlandshavet

— Mean 2001-2015

■ St.Dev.

● 2022



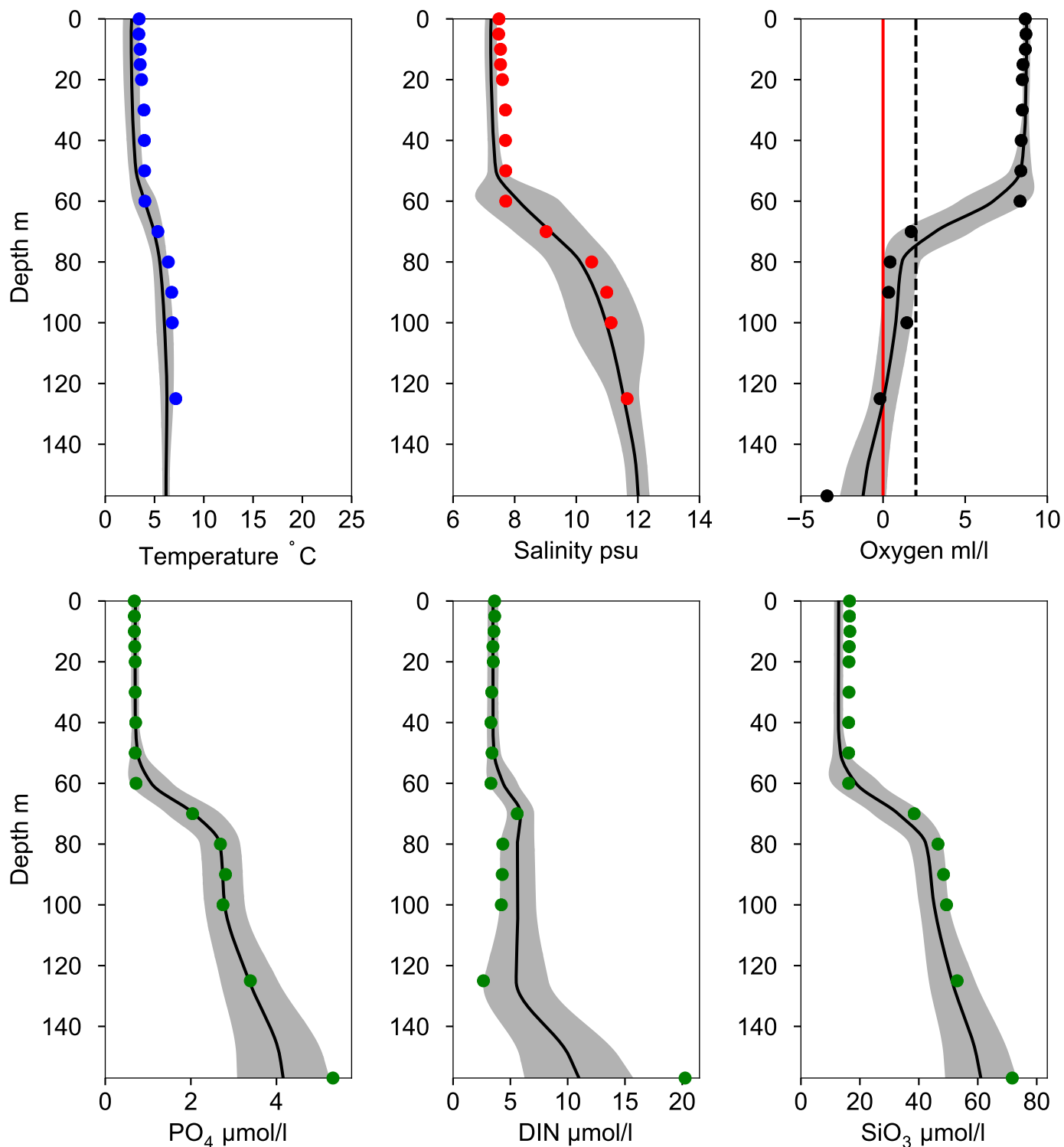
Vertical profiles BY19 February

Statistics based on data from: Östra Gotlandshavet

— Mean 2001-2015

■ St.Dev.

● 2022-02-12



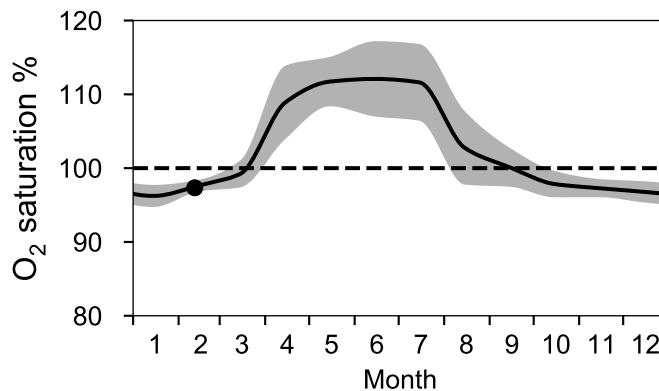
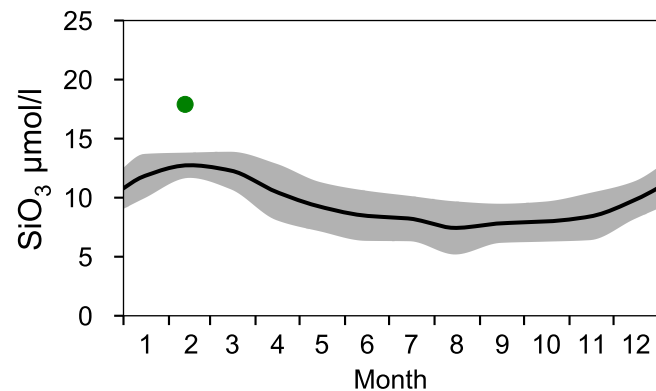
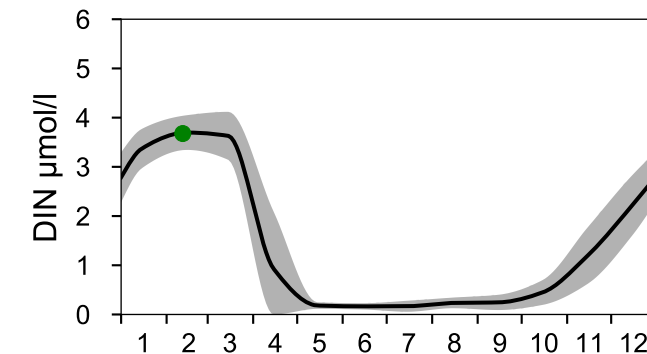
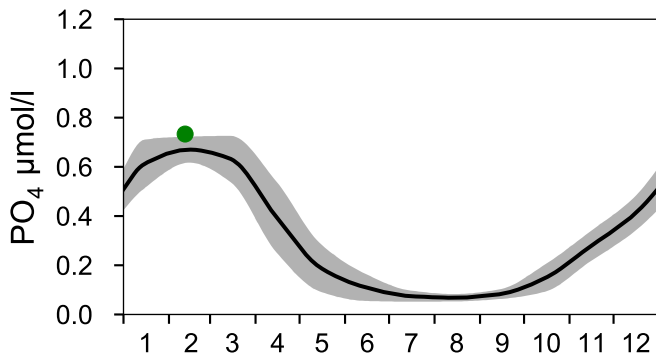
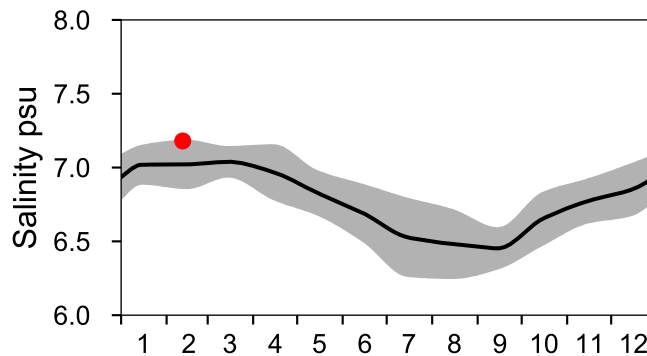
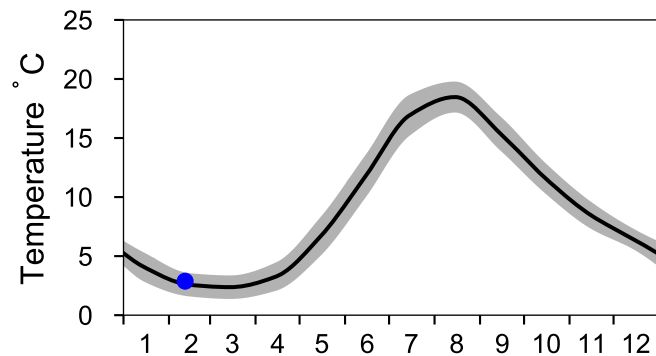
STATION BY20 FÄRÖDJ SURFACE WATER (0-10 m)

Annual Cycles

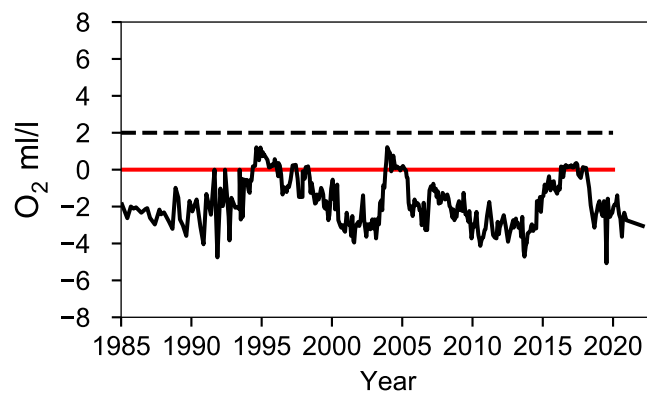
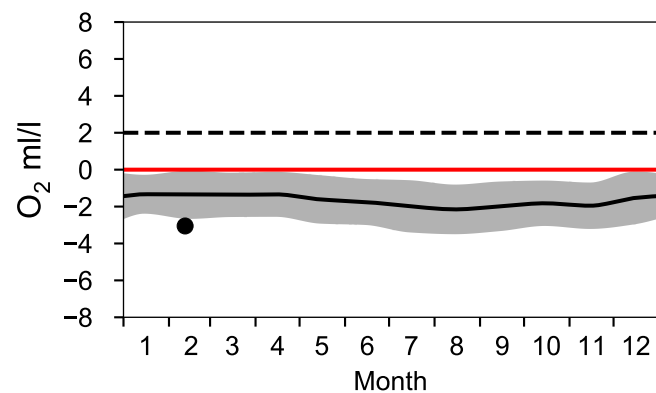
— Mean 2001-2015

■ St.Dev.

● 2022

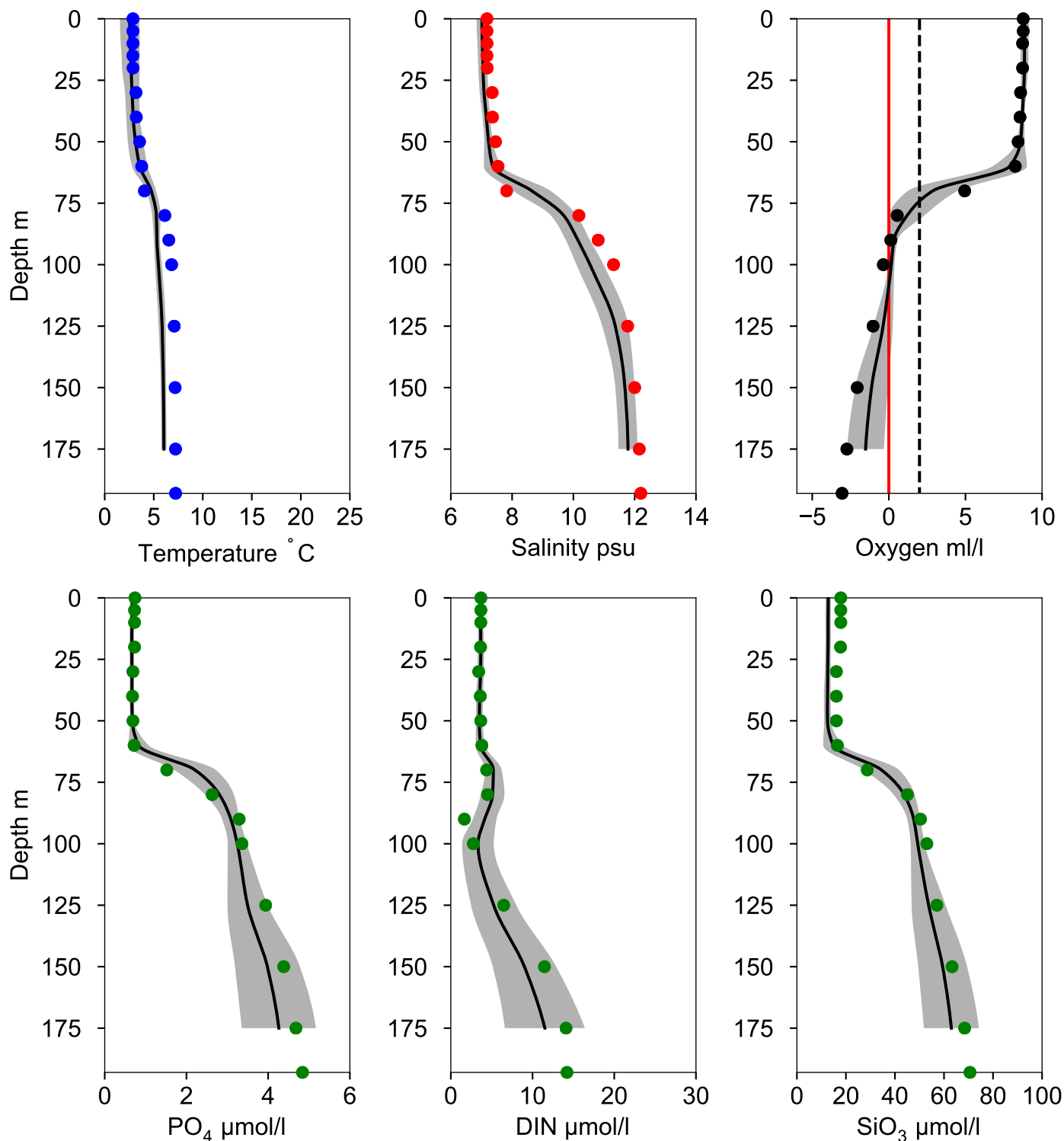


OXYGEN IN BOTTOM WATER (depth >= 175 m)



Vertical profiles BY20 FÅRÖDJ February

— Mean 2001-2015 St.Dev. • 2022-02-12



STATION BY21 SURFACE WATER (0-10 m)

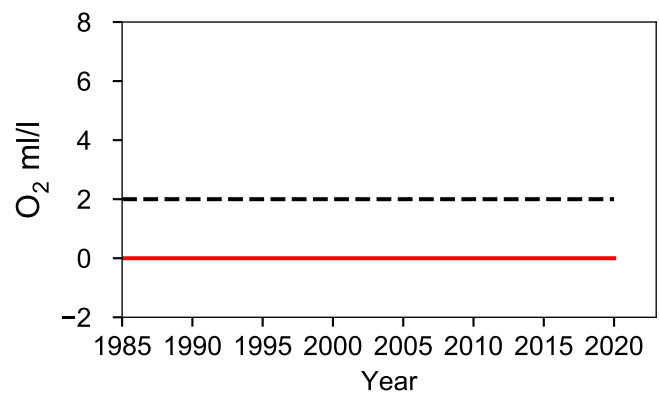
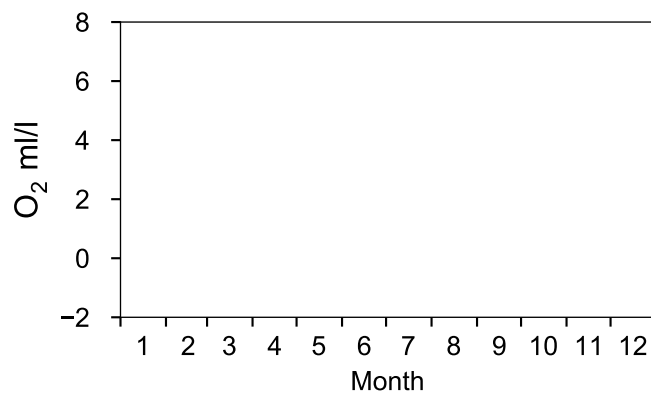
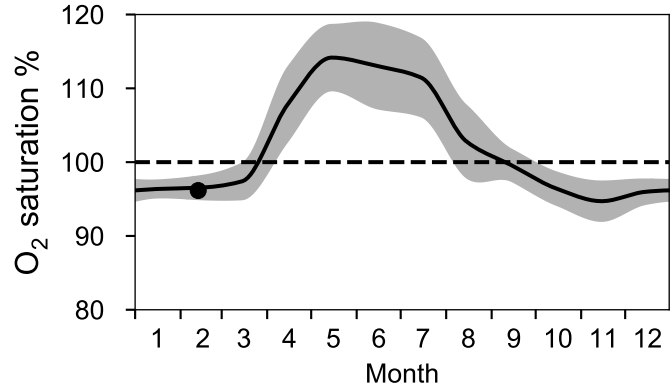
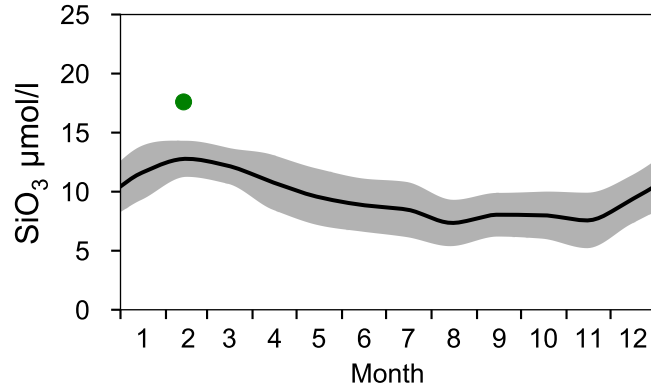
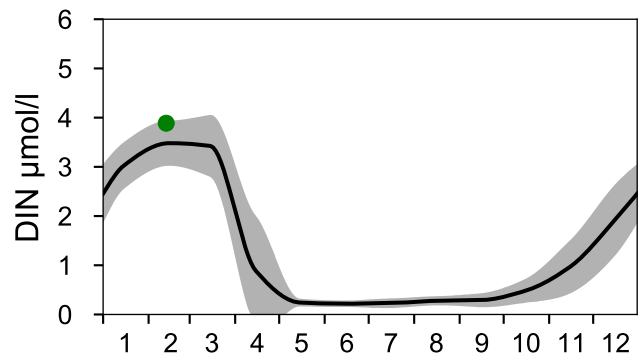
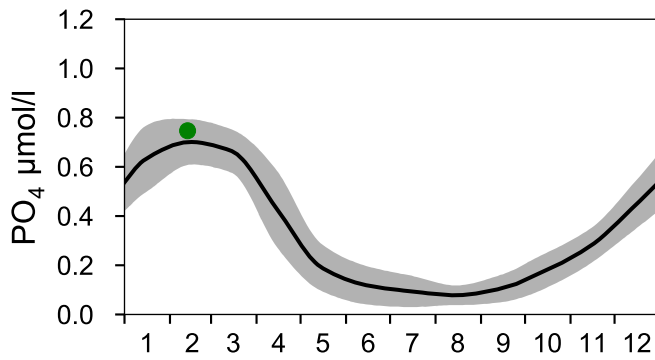
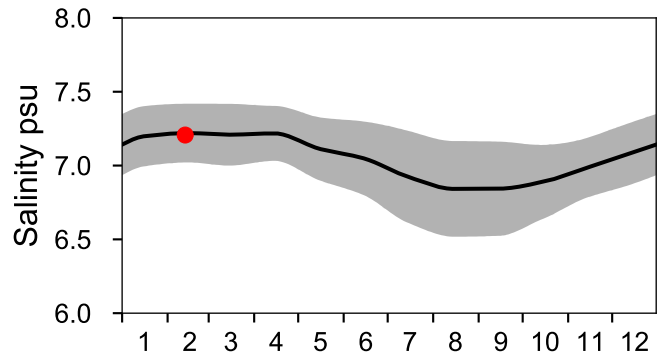
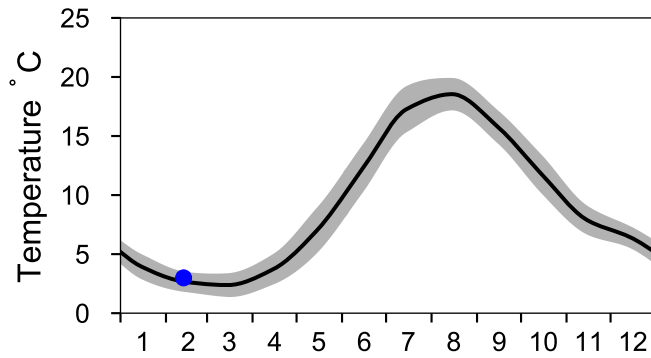
Annual Cycles

Statistics based on data from: Östra Gotlandshavet

— Mean 2001-2015

■ St.Dev.

● 2022



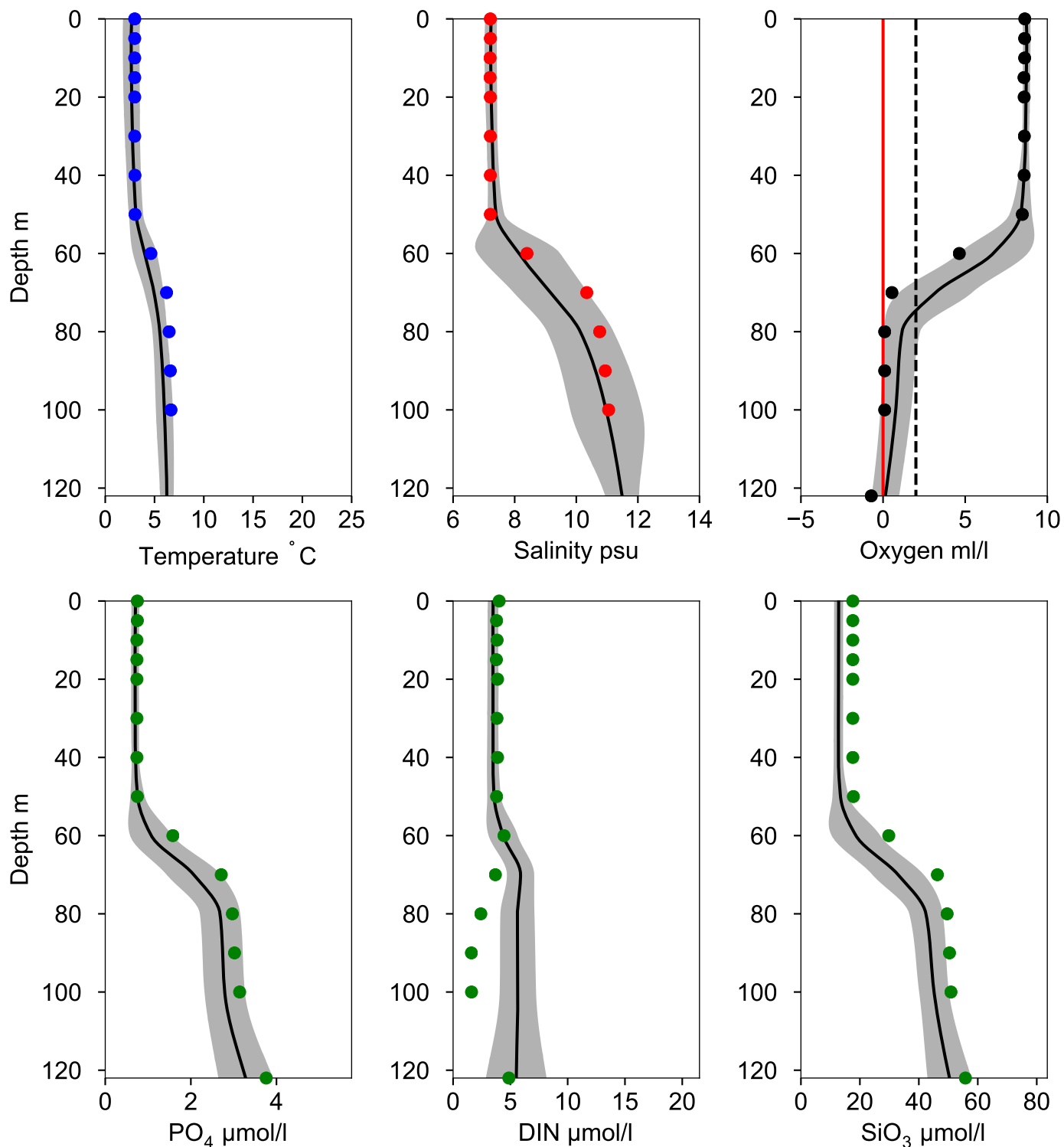
Vertical profiles BY21 February

Statistics based on data from: Östra Gotlandshavet

— Mean 2001-2015

■ St.Dev.

● 2022-02-13



STATION BY28 SURFACE WATER (0-10 m)

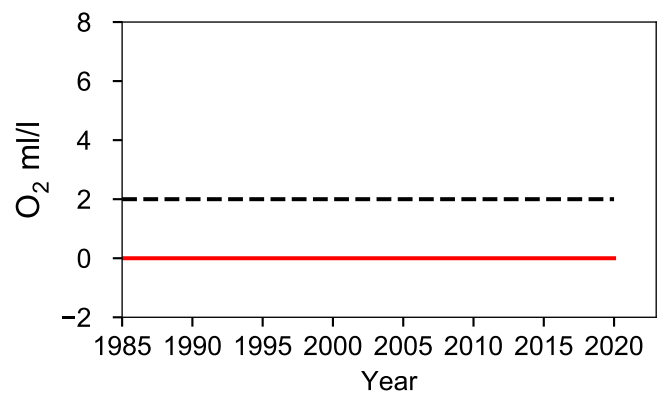
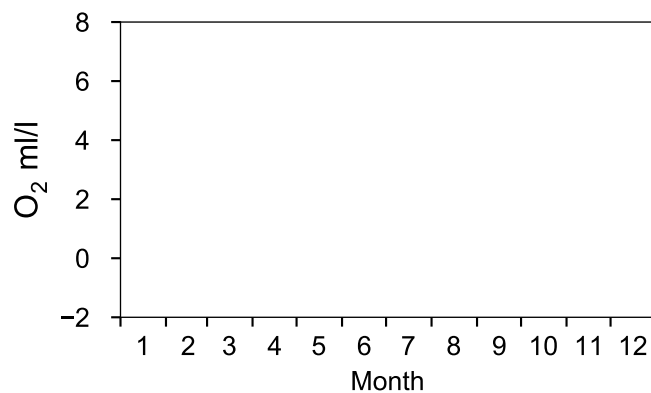
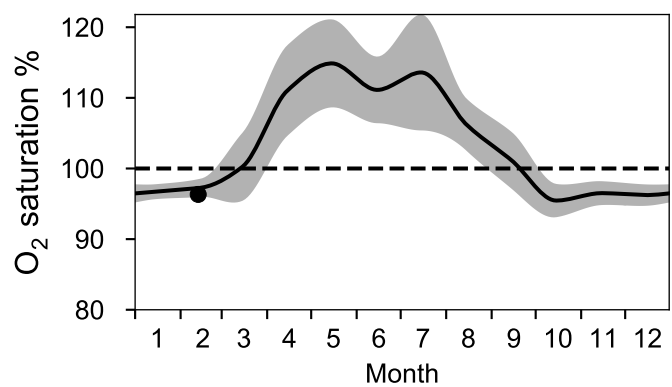
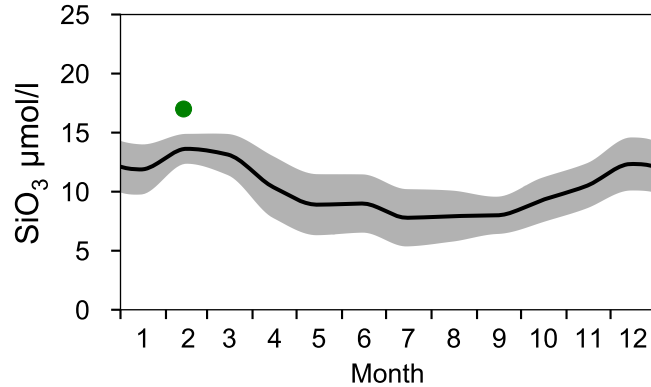
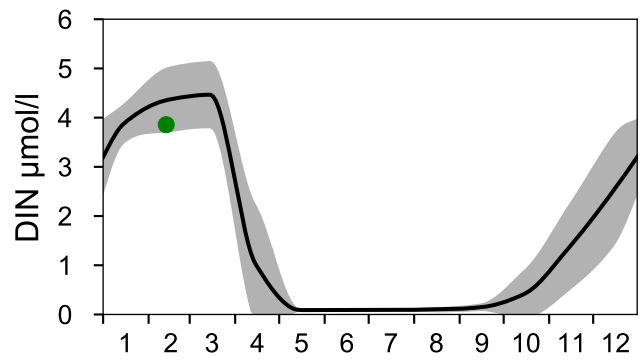
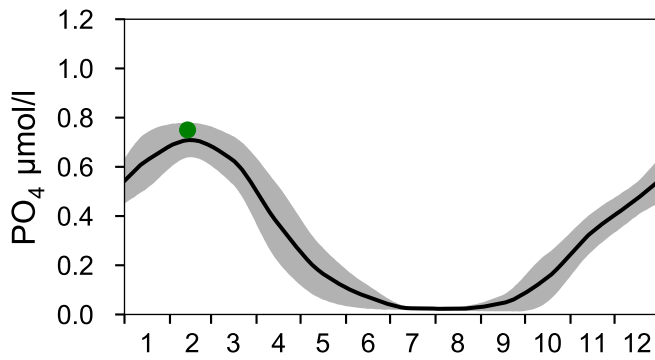
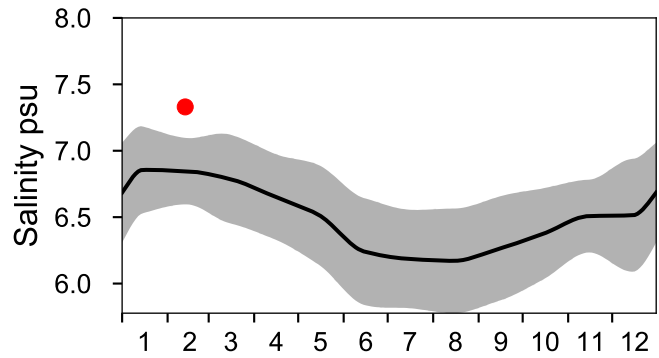
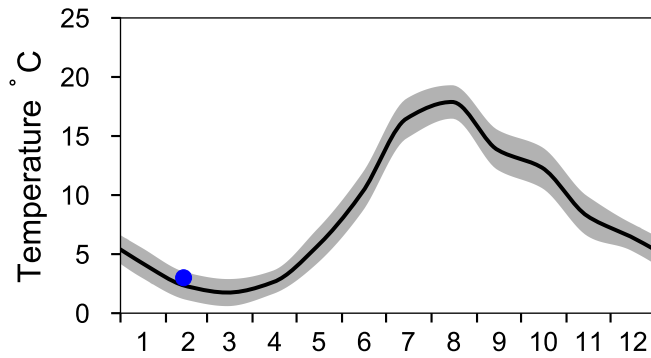
Annual Cycles

Statistics based on data from: Norra Egentliga Östersjön

— Mean 2001-2015

■ St.Dev.

● 2022



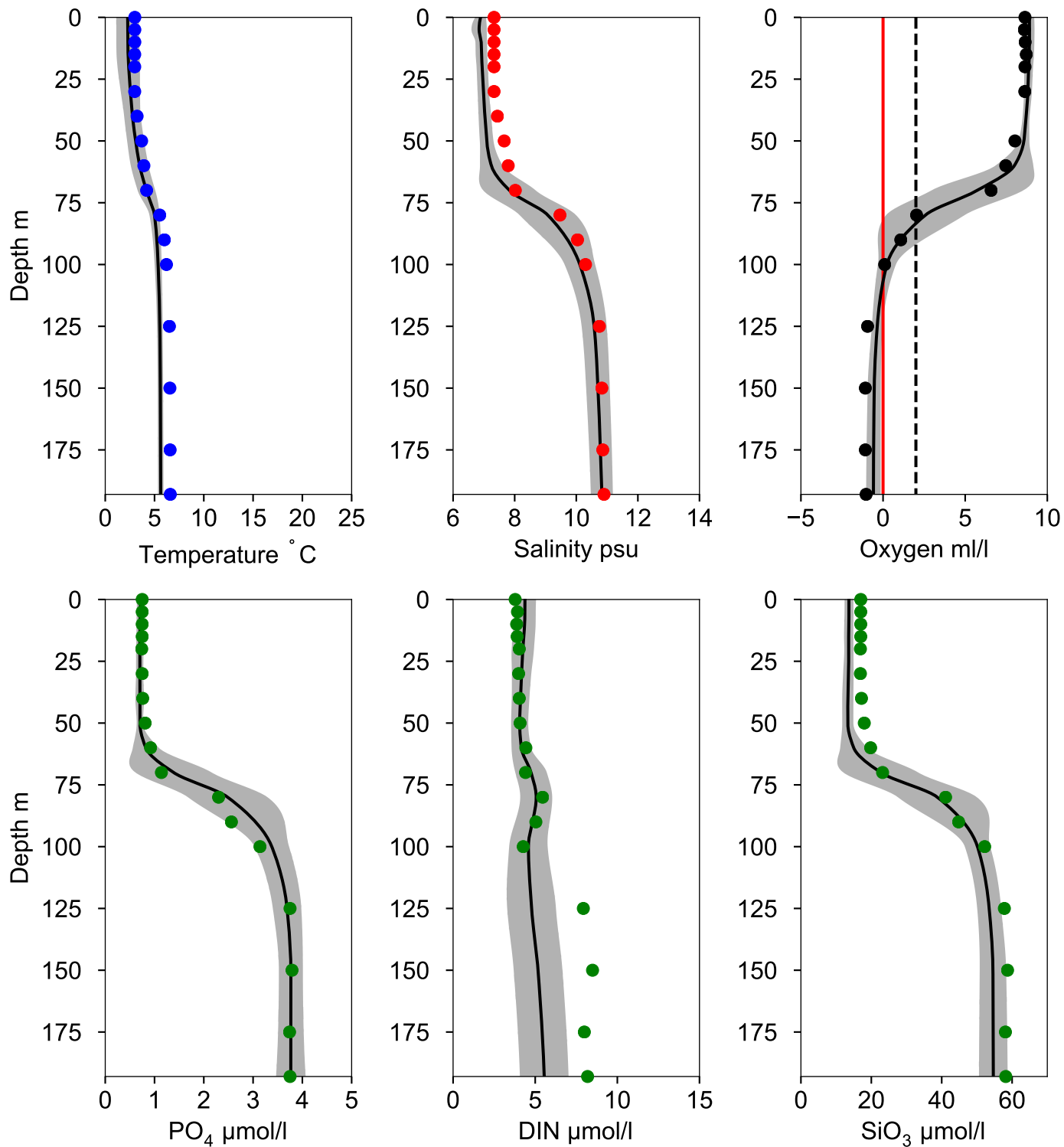
Vertical profiles BY28 February

Statistics based on data from: Norra Egentliga Östersjön

— Mean 2001-2015

■ St.Dev.

● 2022-02-13



STATION BY27 SURFACE WATER (0-10 m)

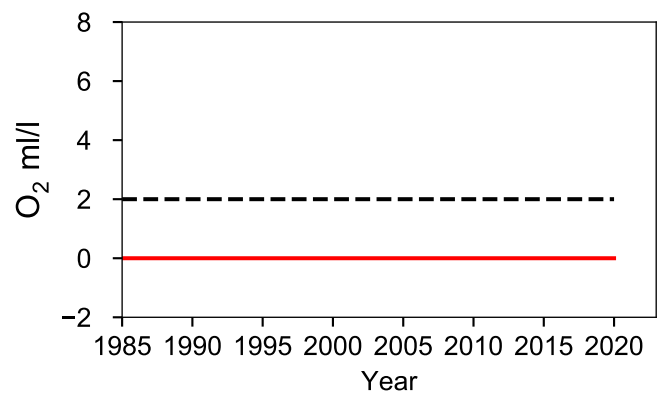
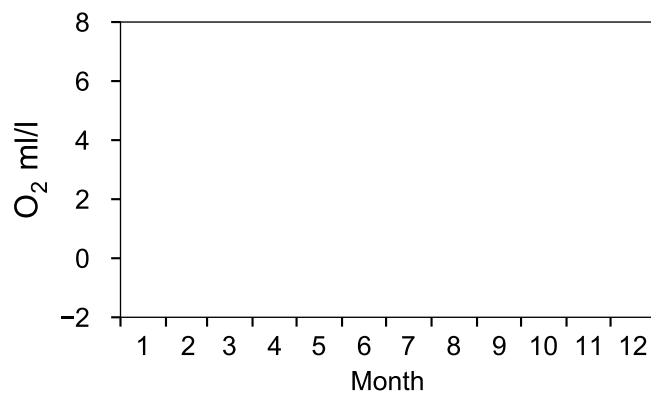
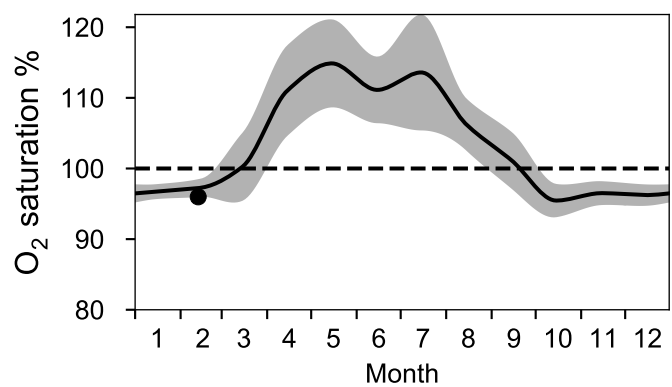
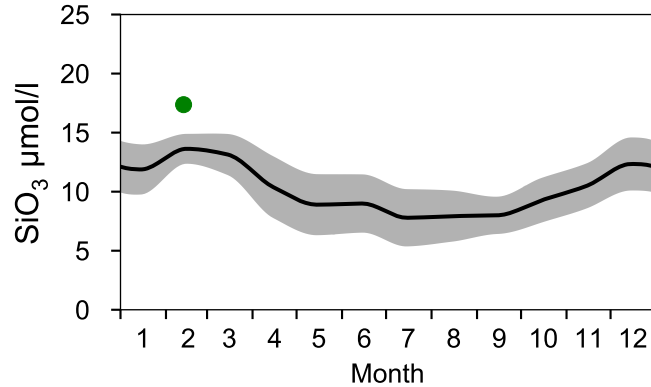
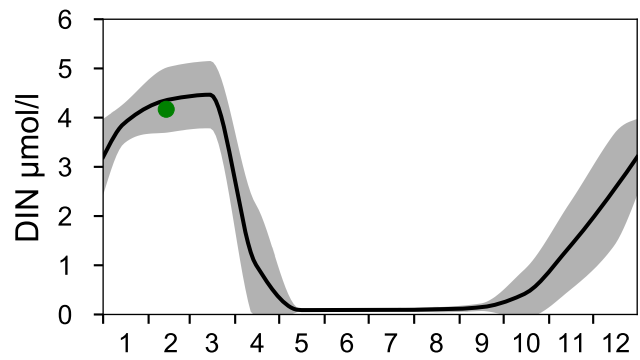
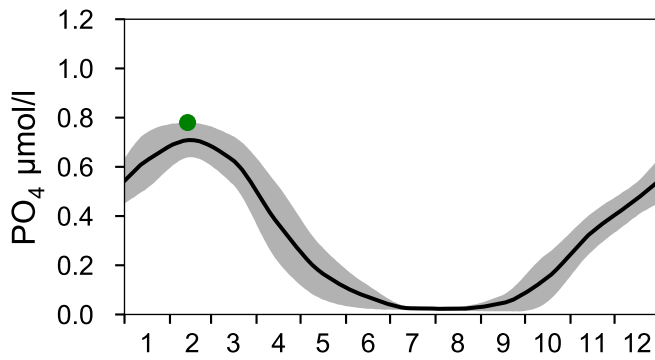
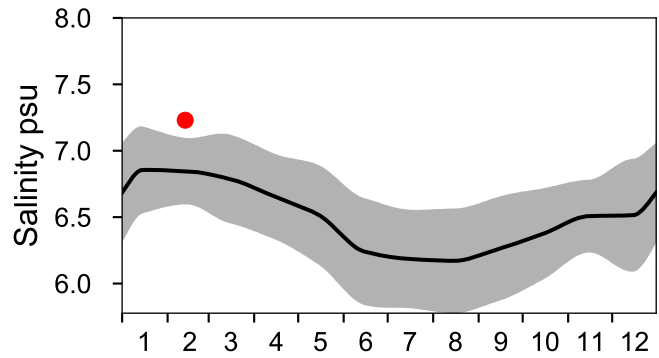
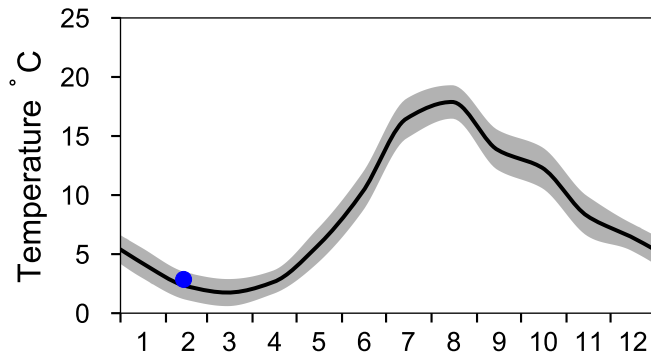
Annual Cycles

Statistics based on data from: Norra Egentliga Östersjön

— Mean 2001-2015

■ St.Dev.

● 2022



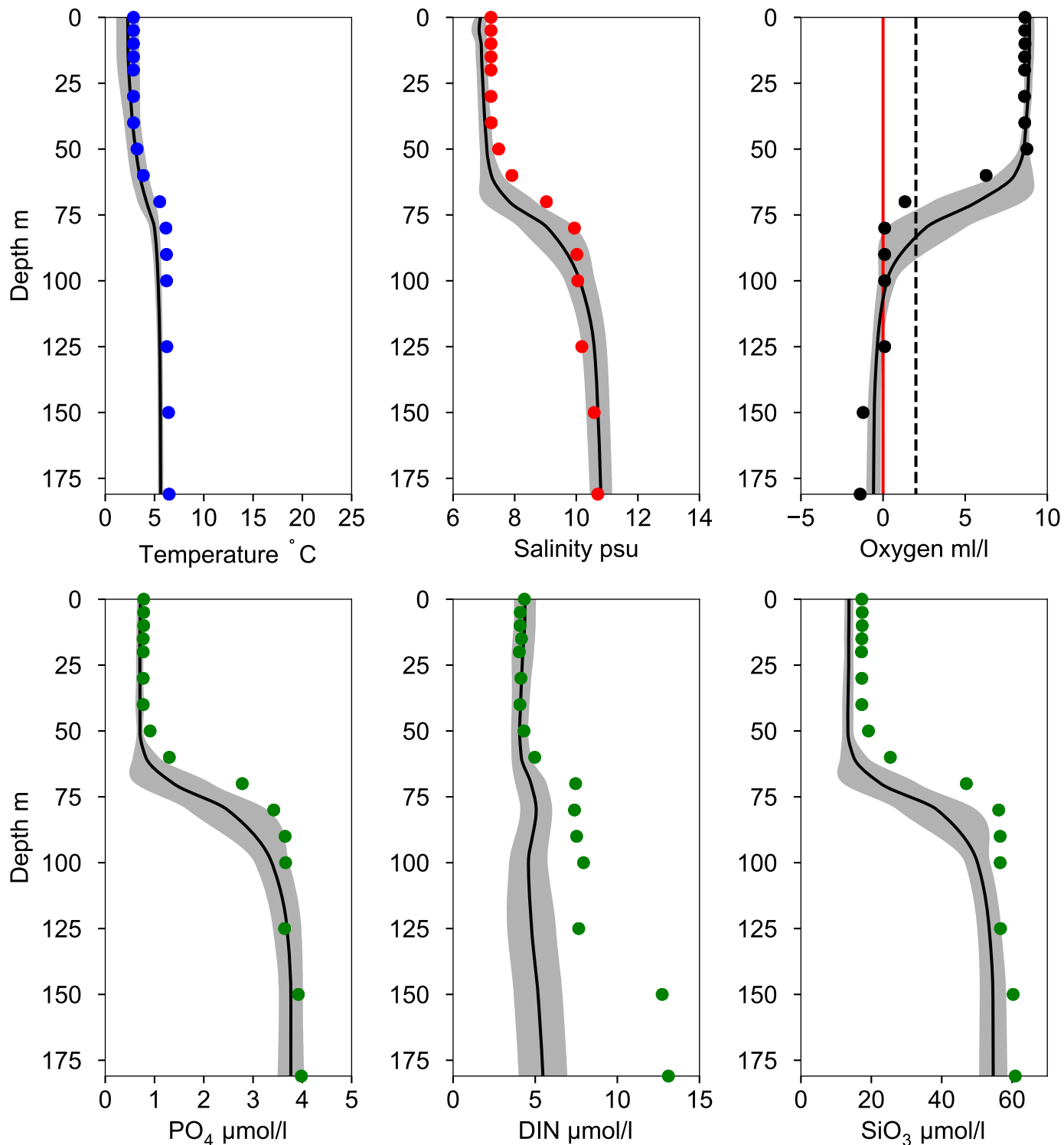
Vertical profiles BY27 February

Statistics based on data from: Norra Egentliga Östersjön

— Mean 2001-2015

■ St.Dev.

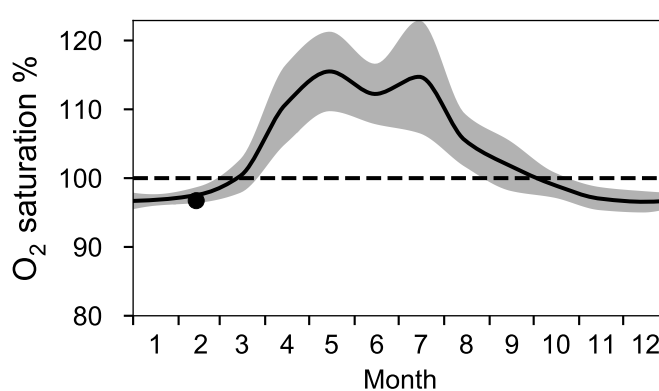
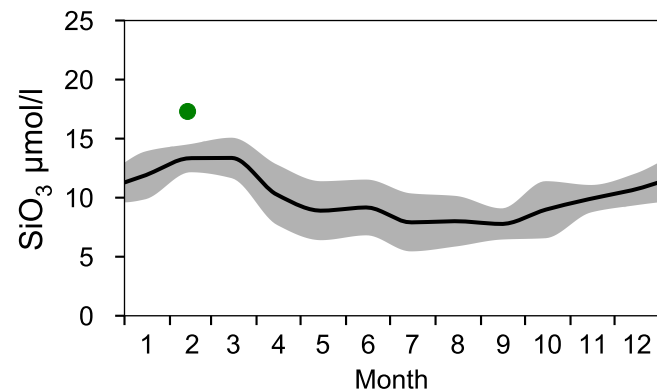
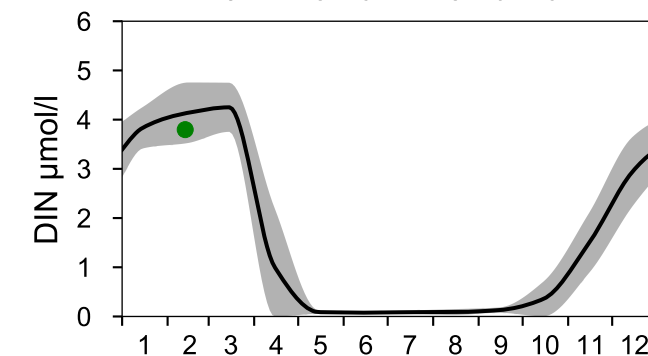
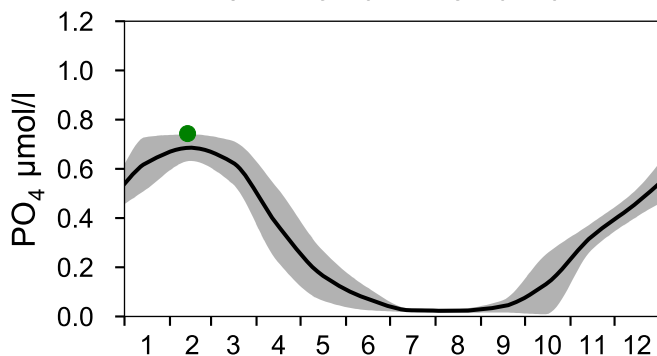
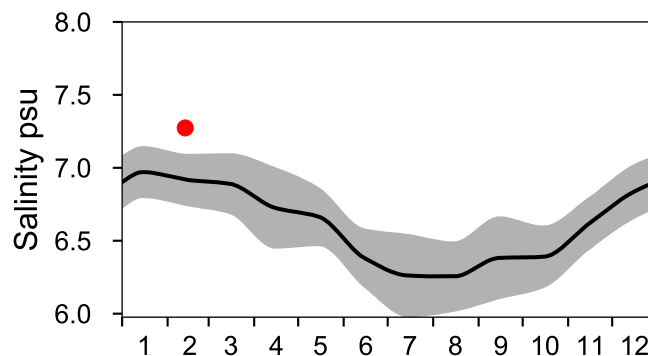
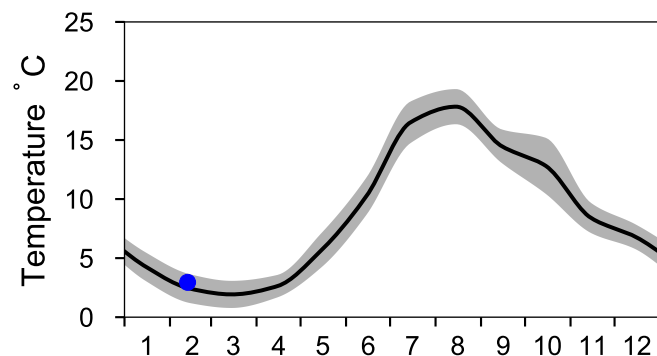
● 2022-02-13



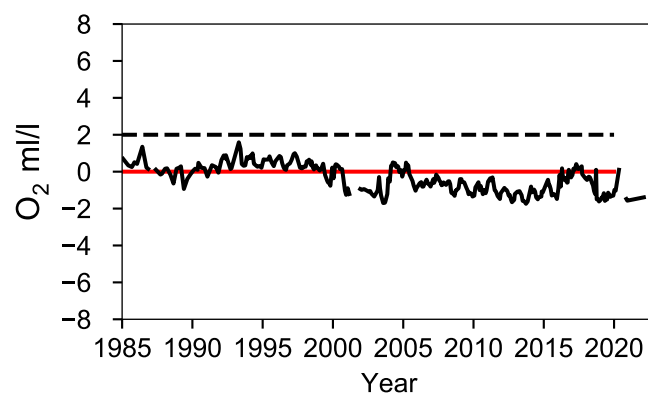
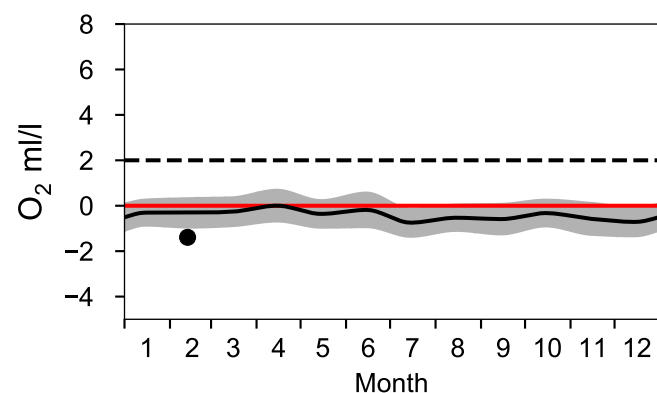
STATION BY29 / LL19 SURFACE WATER (0-10 m)

Annual Cycles

— Mean 2001-2015 St.Dev. • 2022

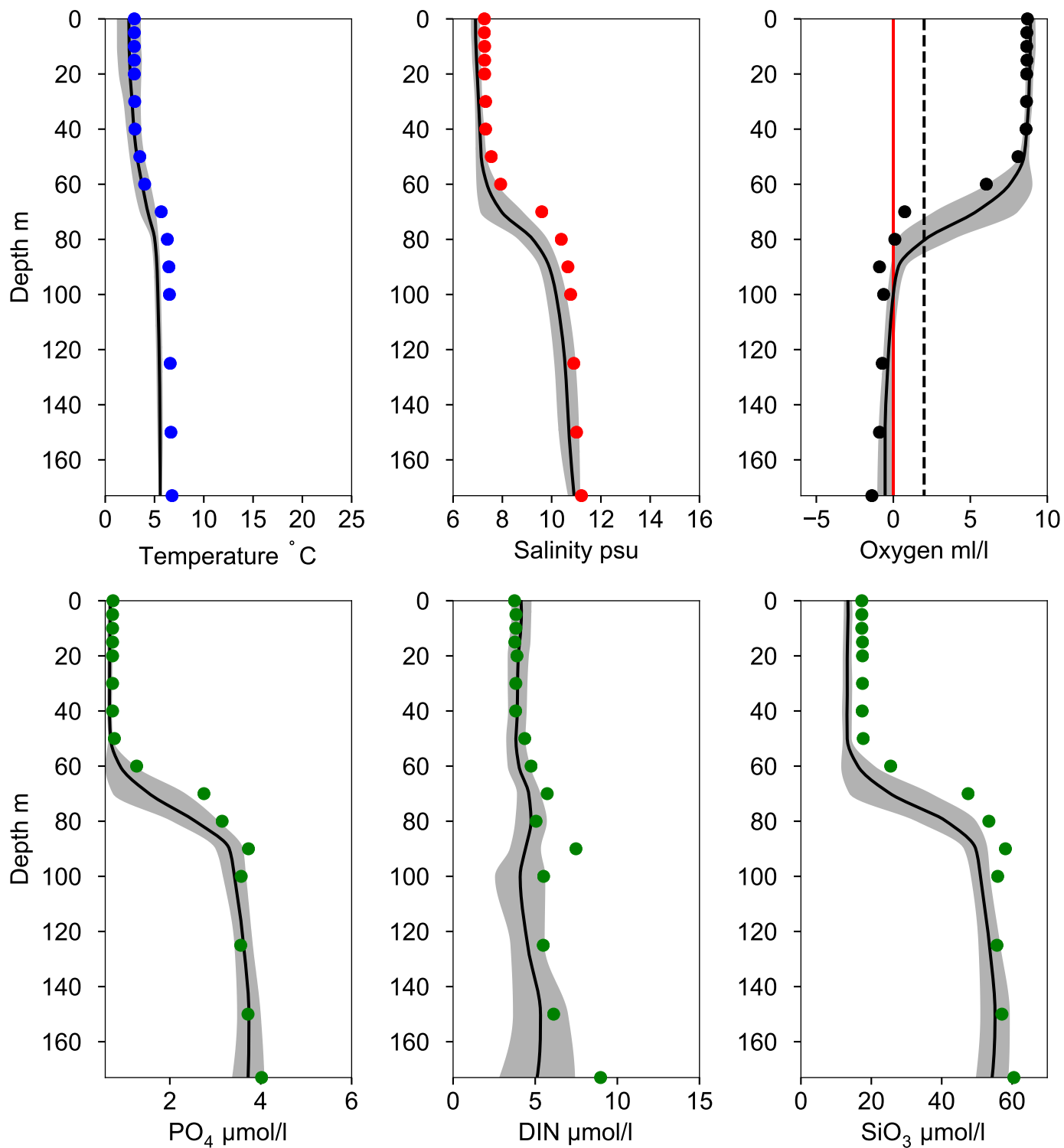


OXYGEN IN BOTTOM WATER (depth >= 150 m)



Vertical profiles BY29 / LL19 February

— Mean 2001-2015 St.Dev. • 2022-02-13



STATION BY30 SURFACE WATER (0-10 m)

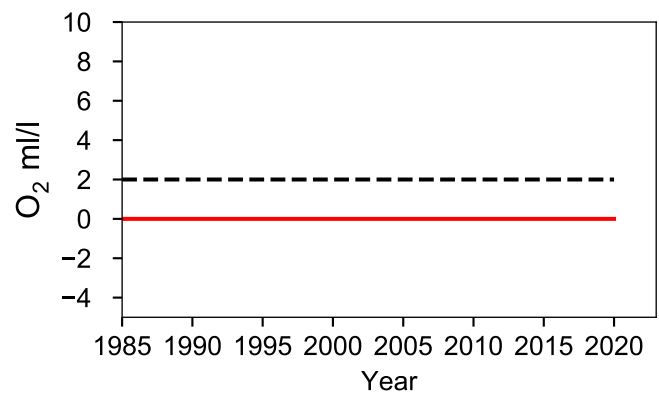
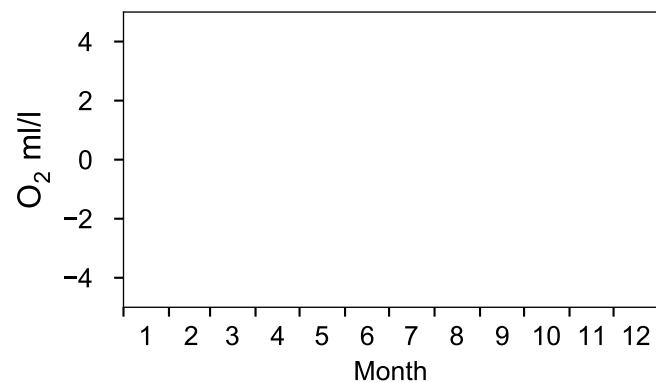
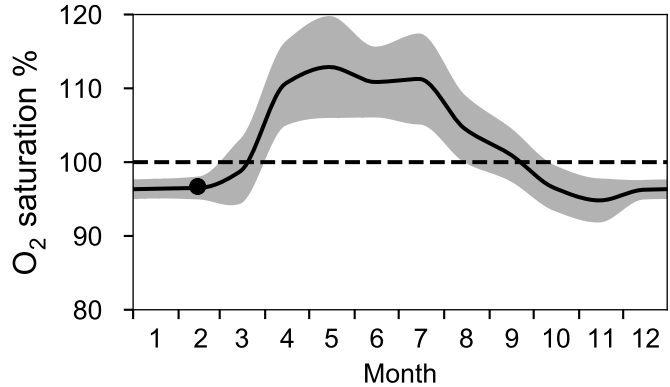
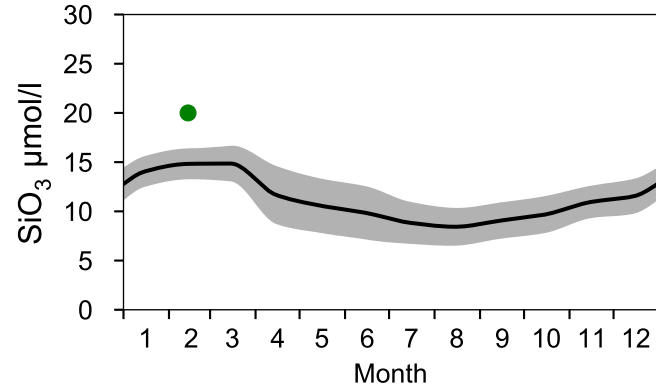
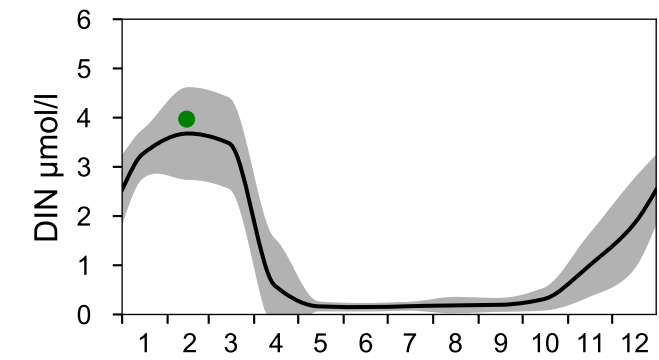
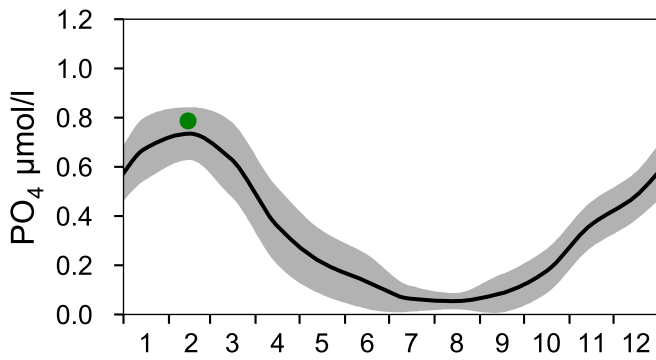
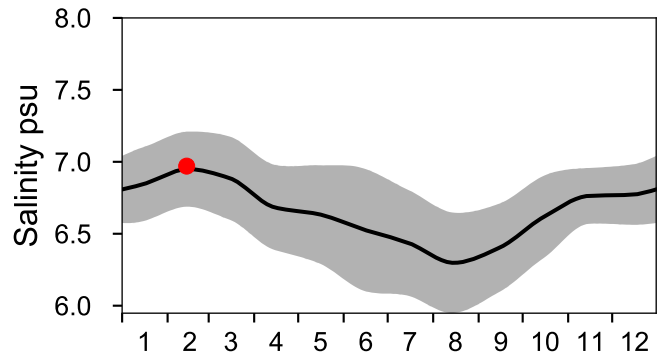
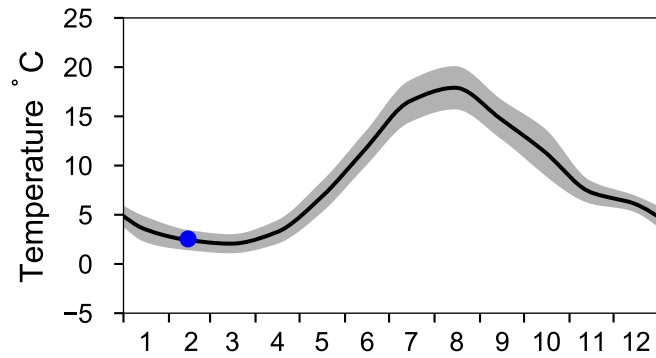
Annual Cycles

Statistics based on data from: Västra Gotlandshavet

— Mean 2001-2015

■ St.Dev.

● 2022



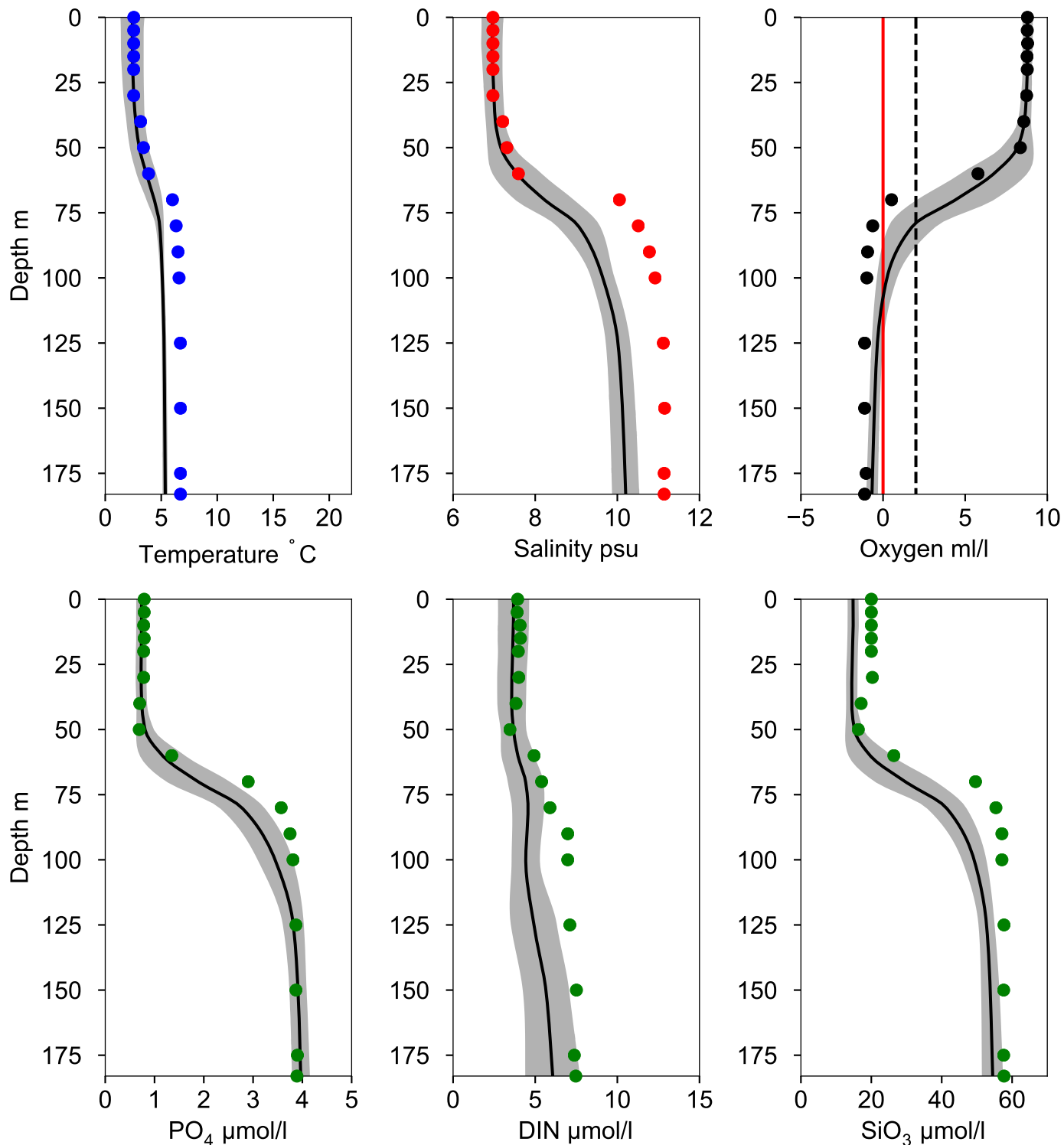
Vertical profiles BY30 February

Statistics based on data from: Västra Gotlandshavet

— Mean 2001-2015

■ St.Dev.

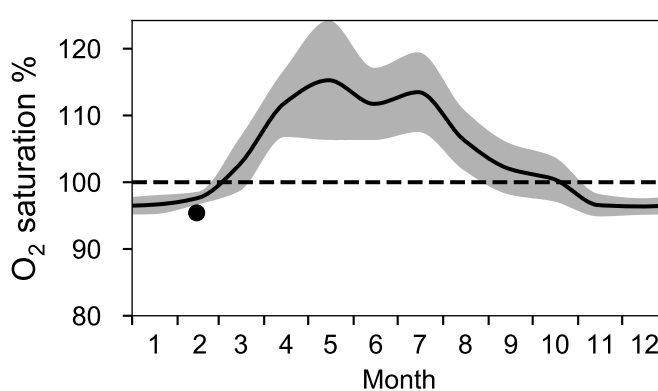
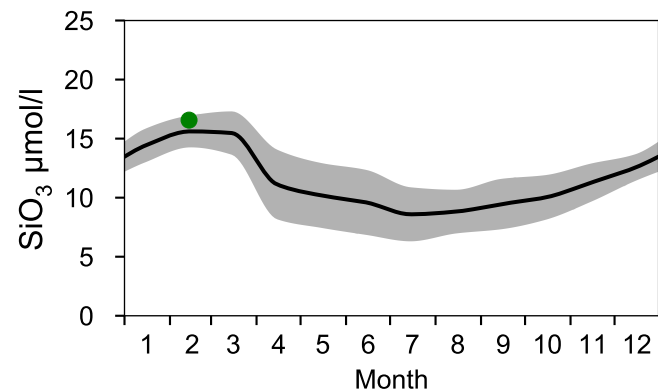
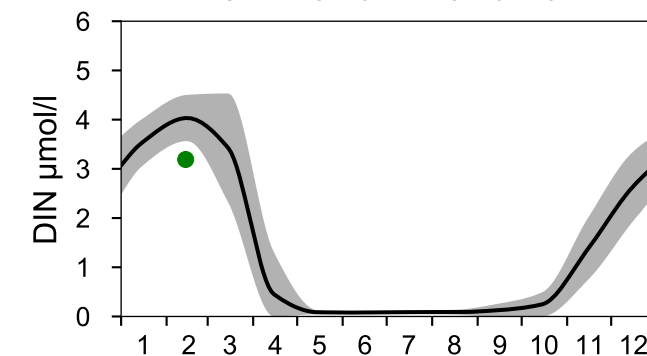
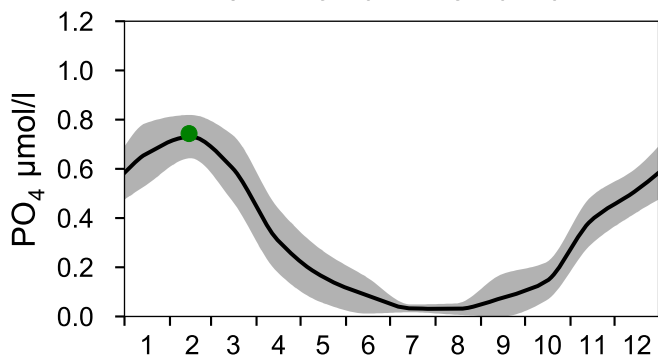
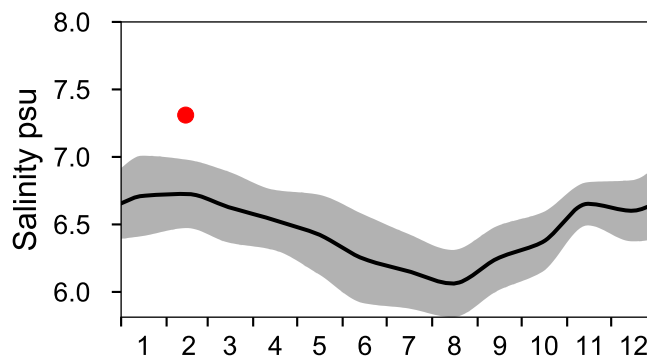
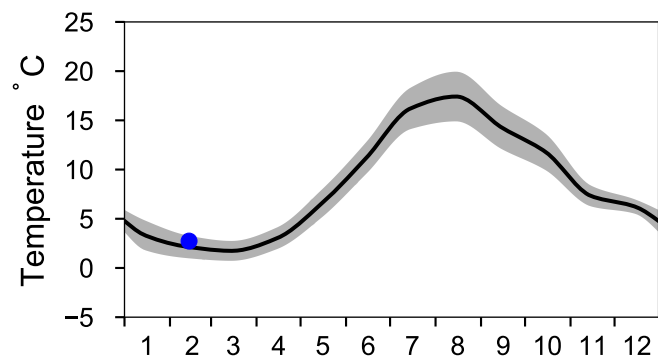
● 2022-02-14



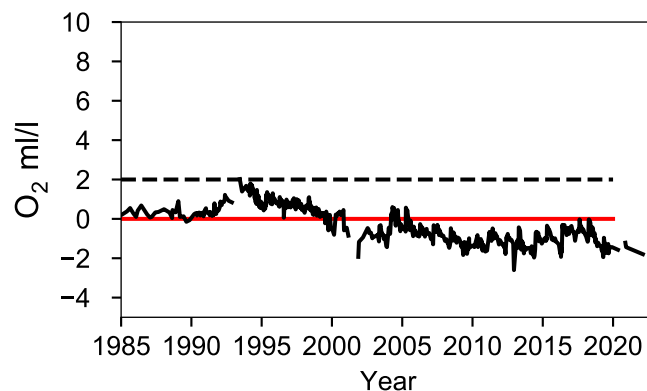
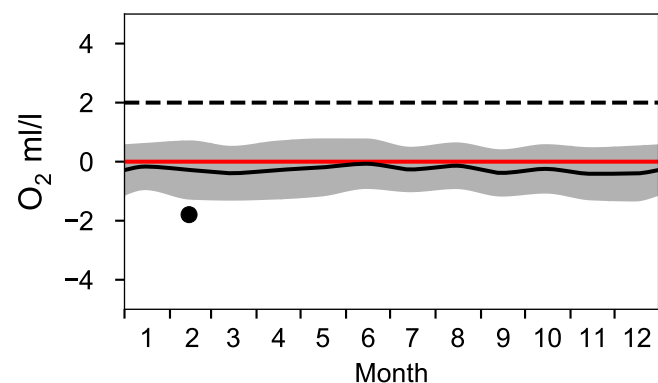
STATION BY31 LANDSORTSDJ SURFACE WATER (0-10 m)

Annual Cycles

— Mean 2001-2015 St.Dev. • 2022

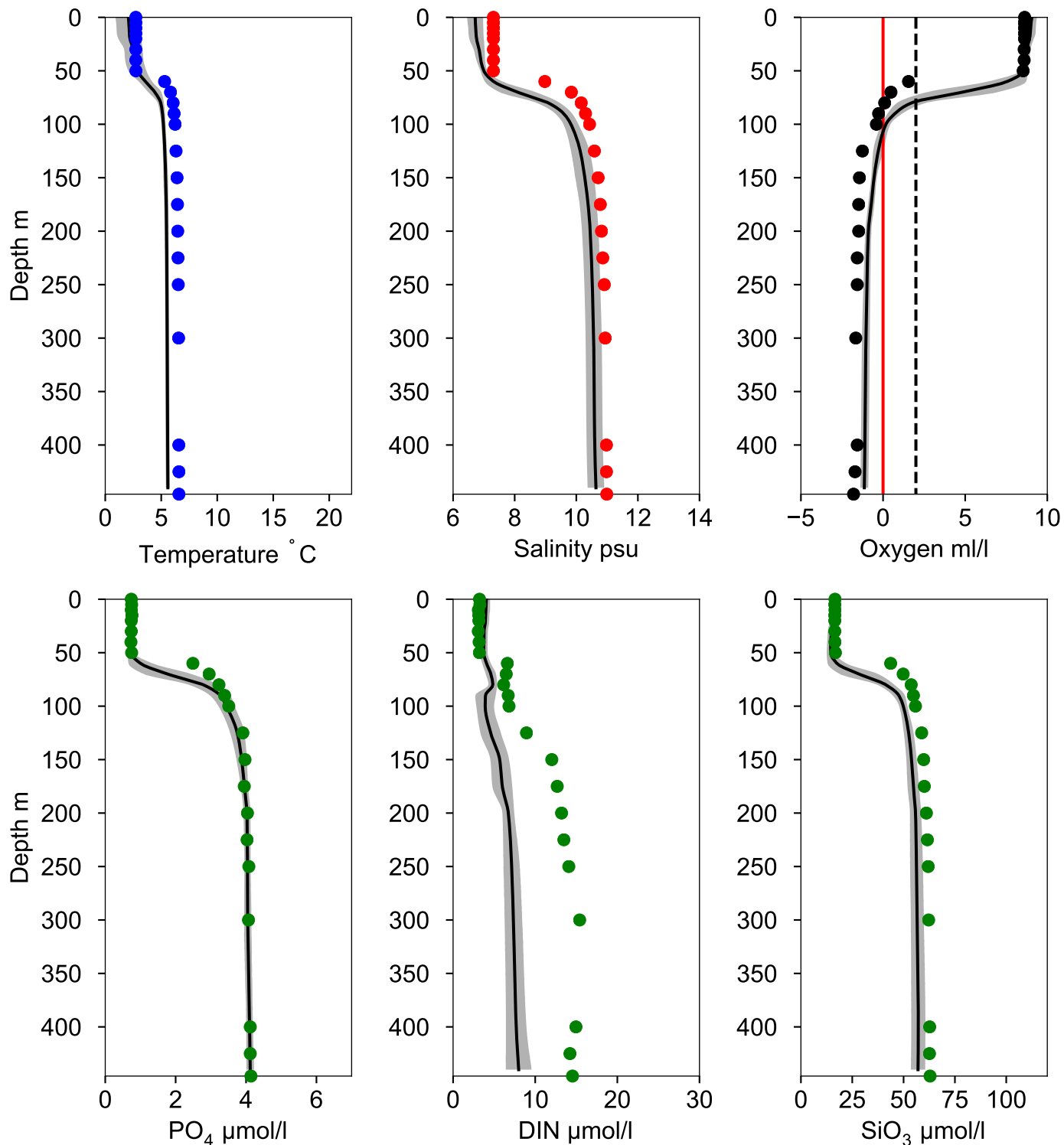


OXYGEN IN BOTTOM WATER (depth >= 419 m)



Vertical profiles BY31 LANDSORTSDJ February

— Mean 2001-2015 St.Dev. • 2022-02-14



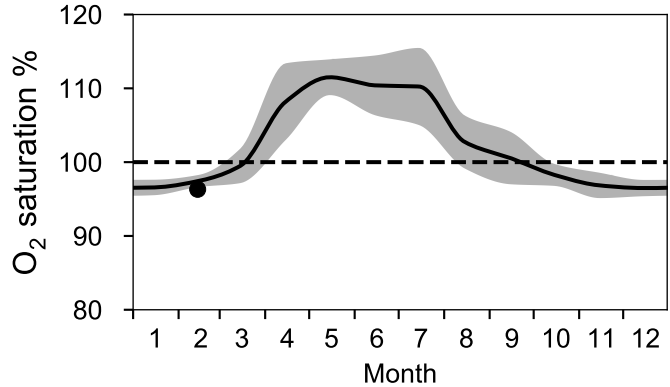
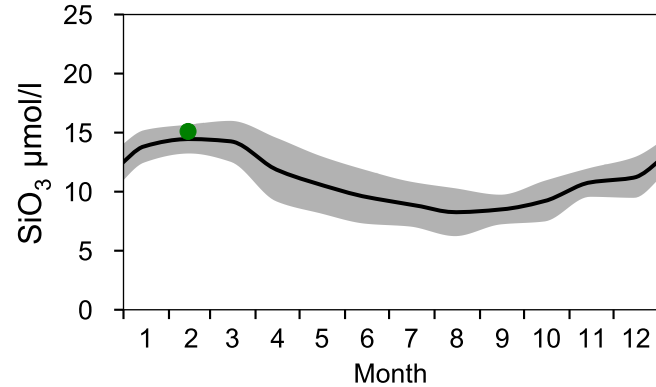
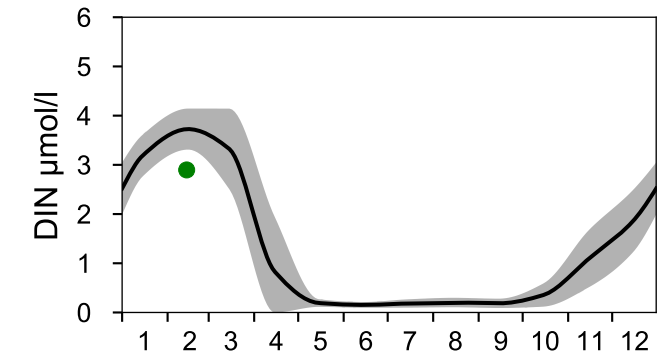
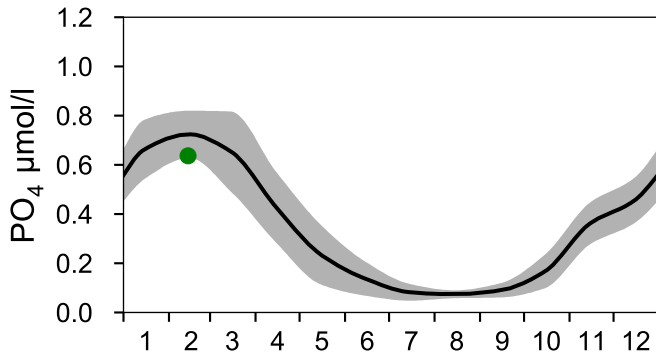
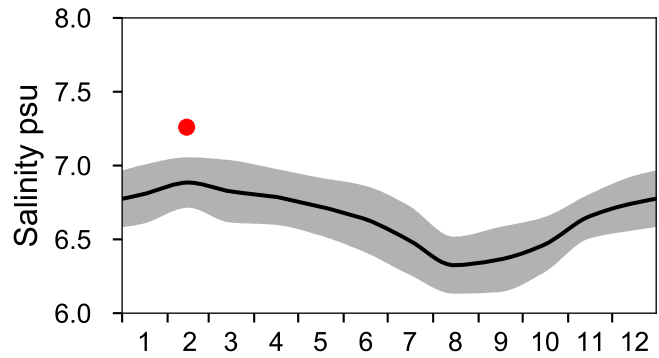
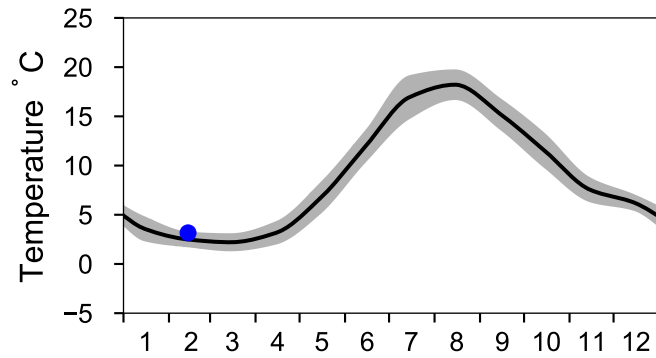
STATION BY32 NORRKÖPINGSDJ SURFACE WATER (0-10 m)

Annual Cycles

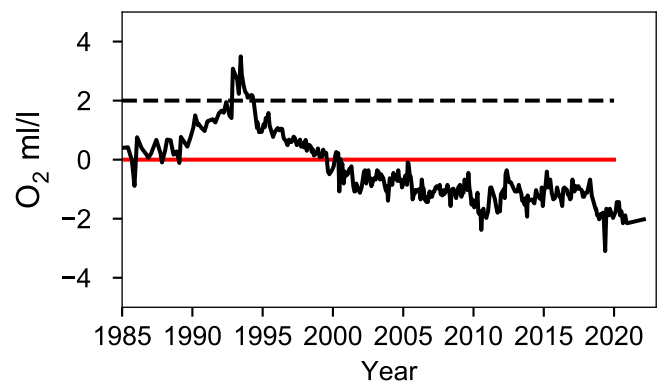
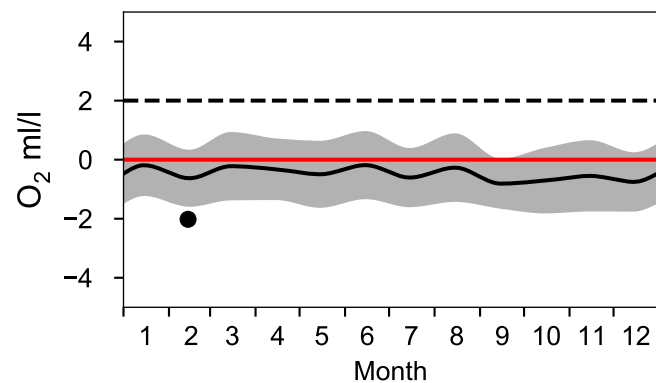
— Mean 2001-2015

■ St.Dev.

● 2022



OXYGEN IN BOTTOM WATER (depth >= 175 m)

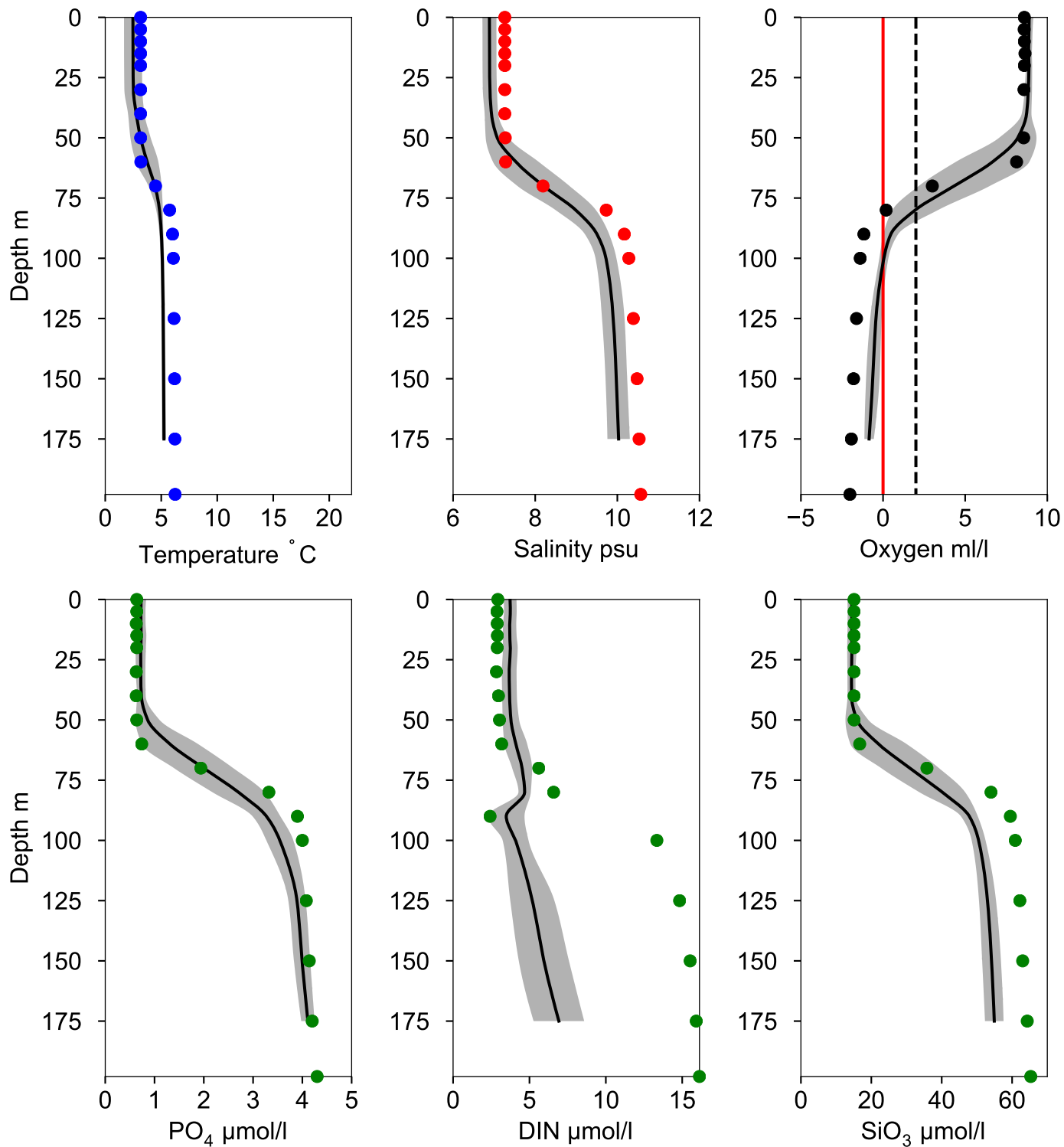


Vertical profiles BY32 NORRKÖPINGSDJ February

— Mean 2001-2015

■ St.Dev.

● 2022-02-14



STATION BY36 SURFACE WATER (0-10 m)

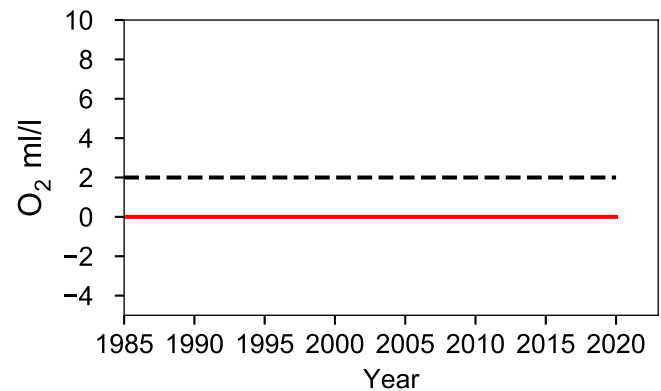
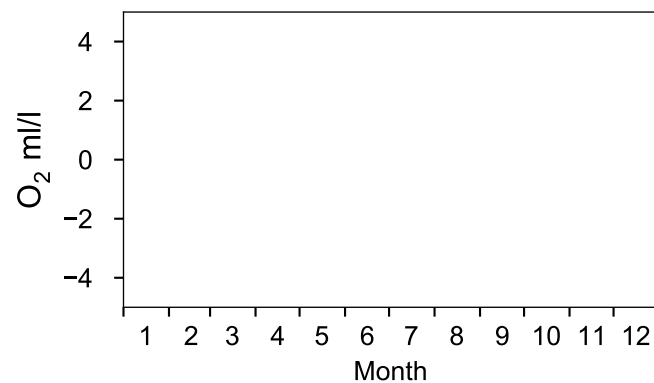
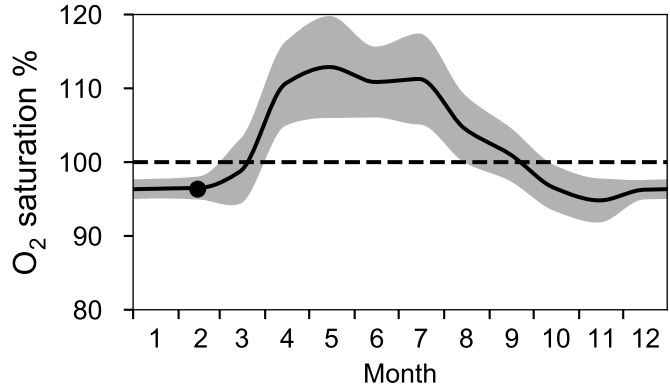
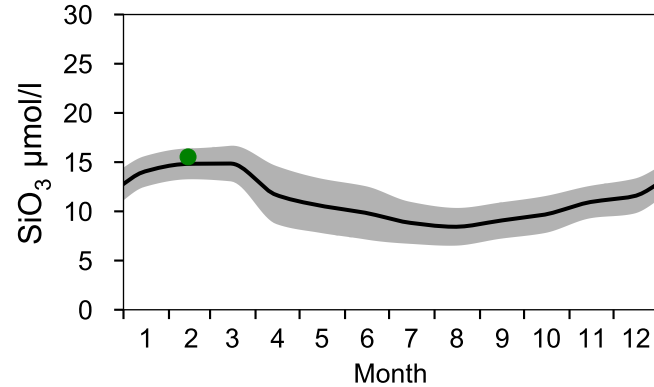
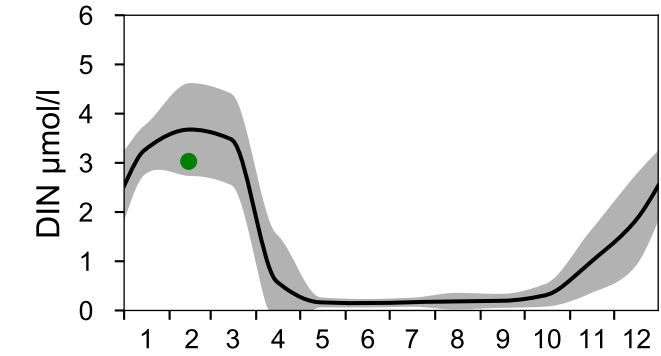
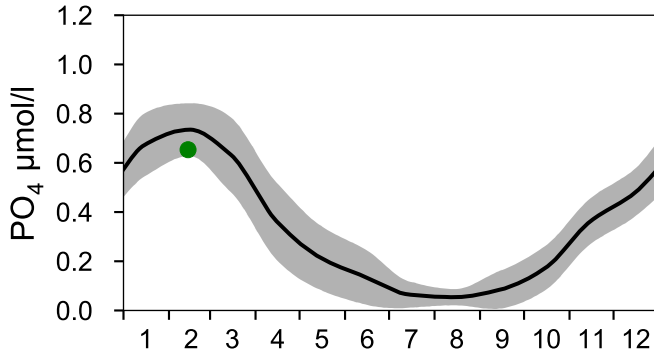
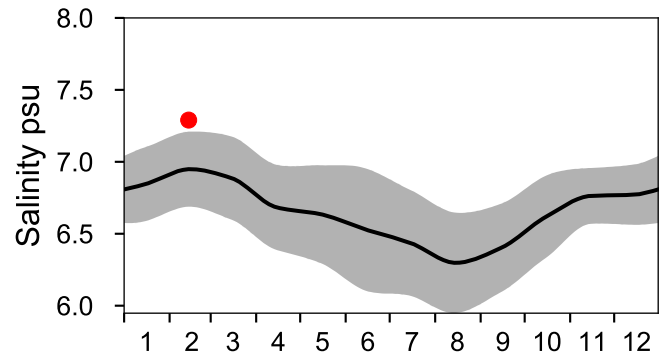
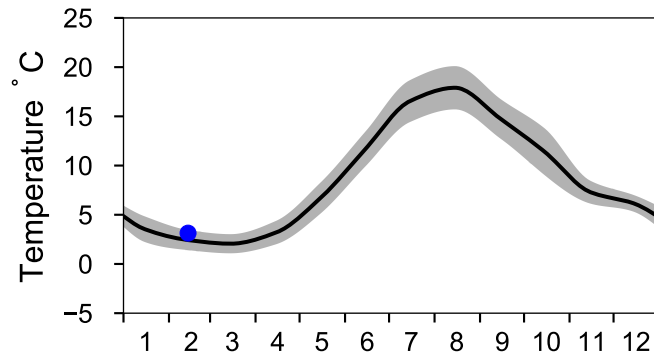
Annual Cycles

Statistics based on data from: Västra Gotlandshavet

— Mean 2001-2015

■ St.Dev.

● 2022



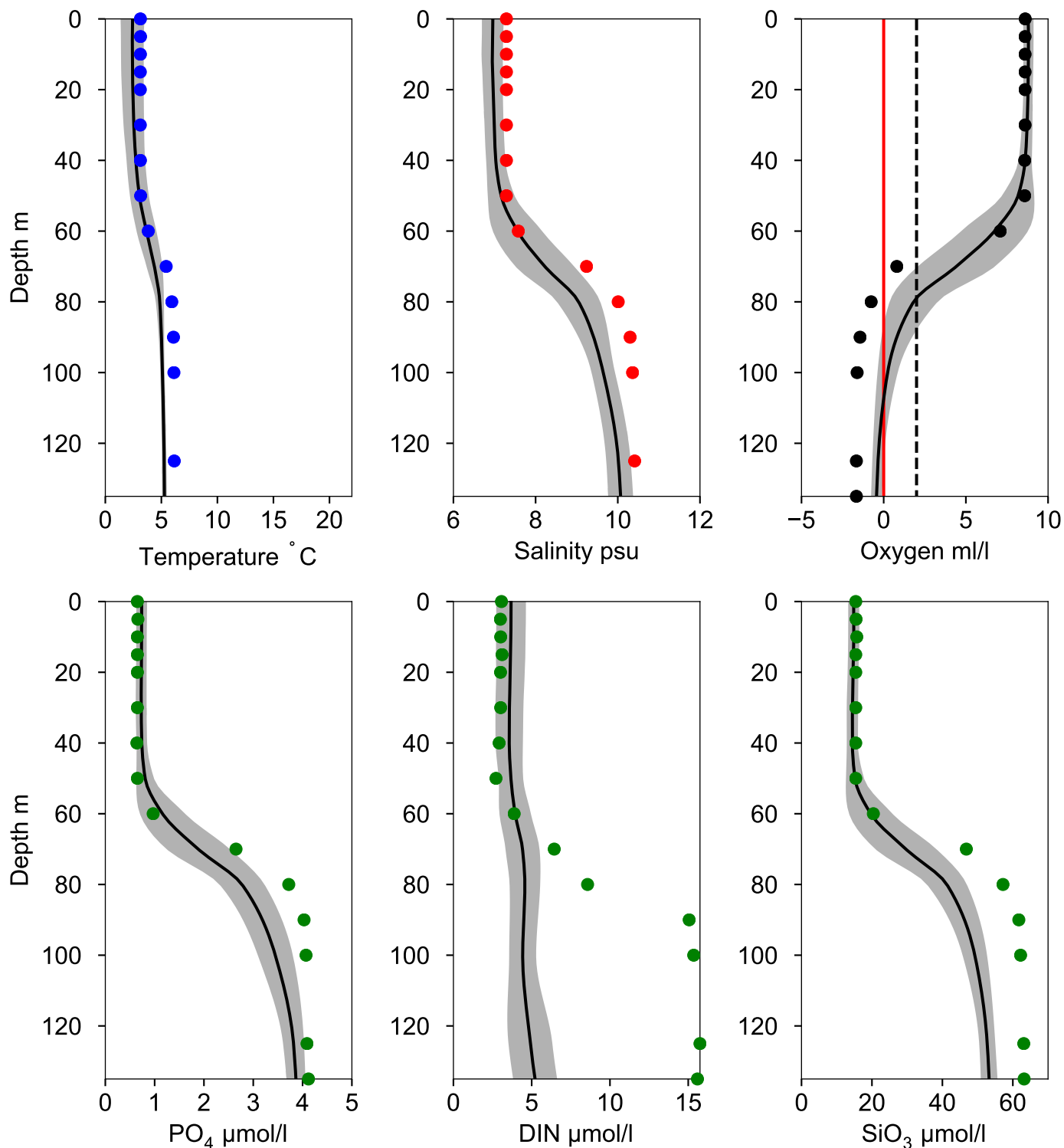
Vertical profiles BY36 February

Statistics based on data from: Västra Gotlandshavet

— Mean 2001-2015

■ St.Dev.

● 2022-02-14



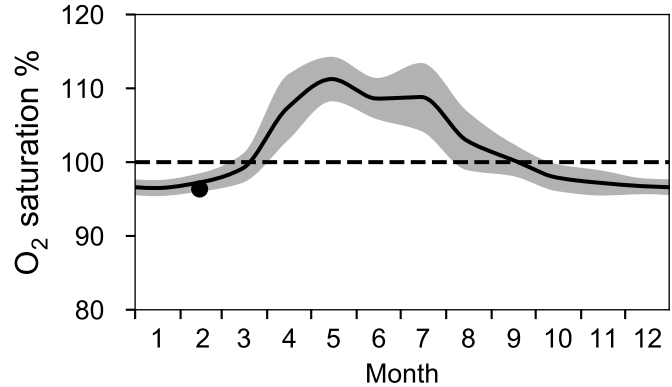
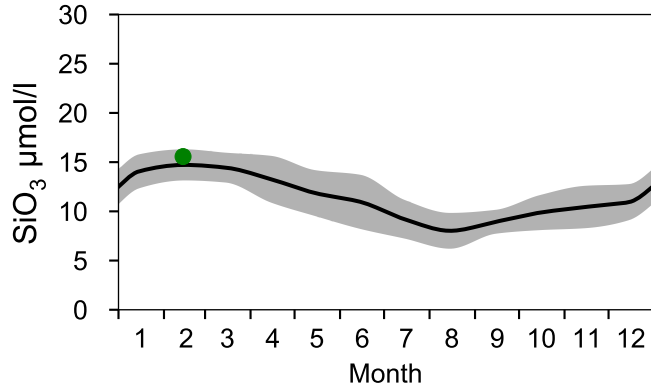
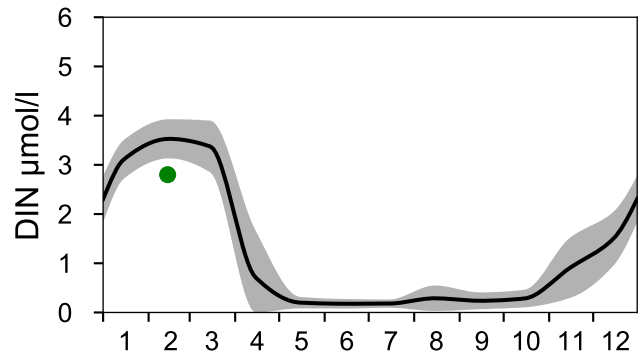
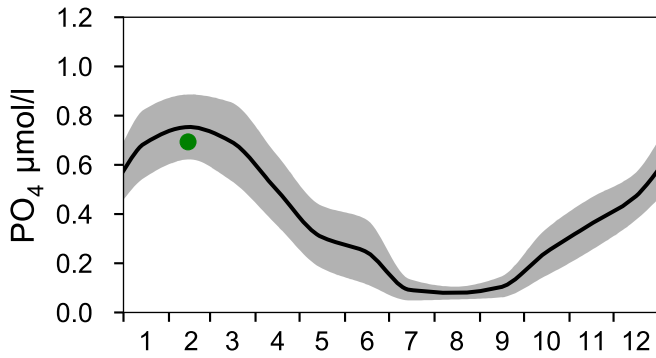
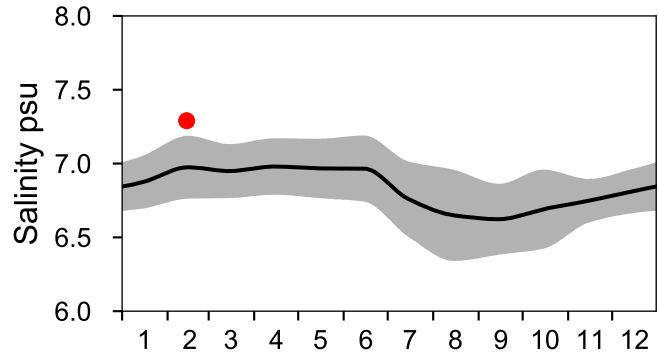
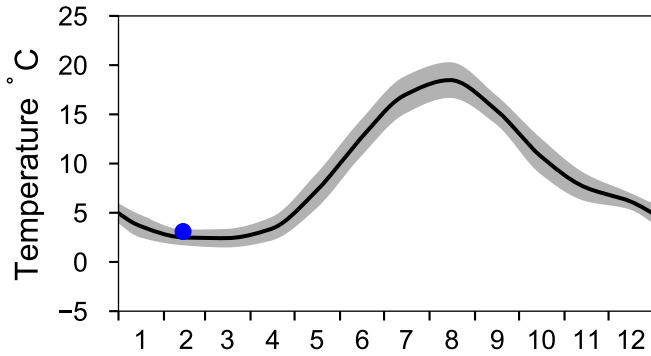
STATION BY38 KARLSÖDJ SURFACE WATER (0-10 m)

Annual Cycles

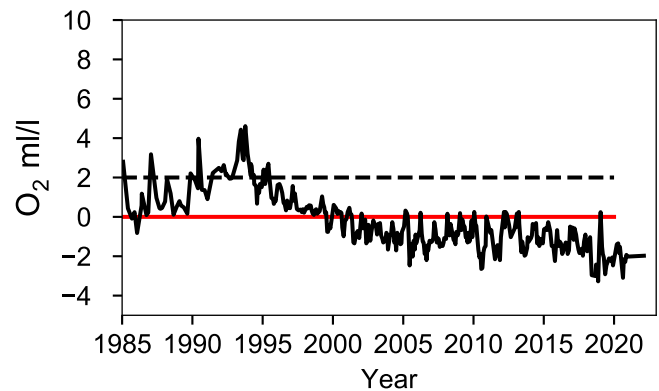
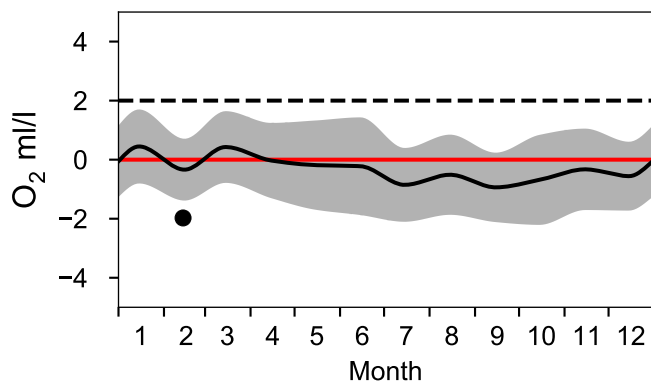
— Mean 2001-2015

■ St.Dev.

● 2022

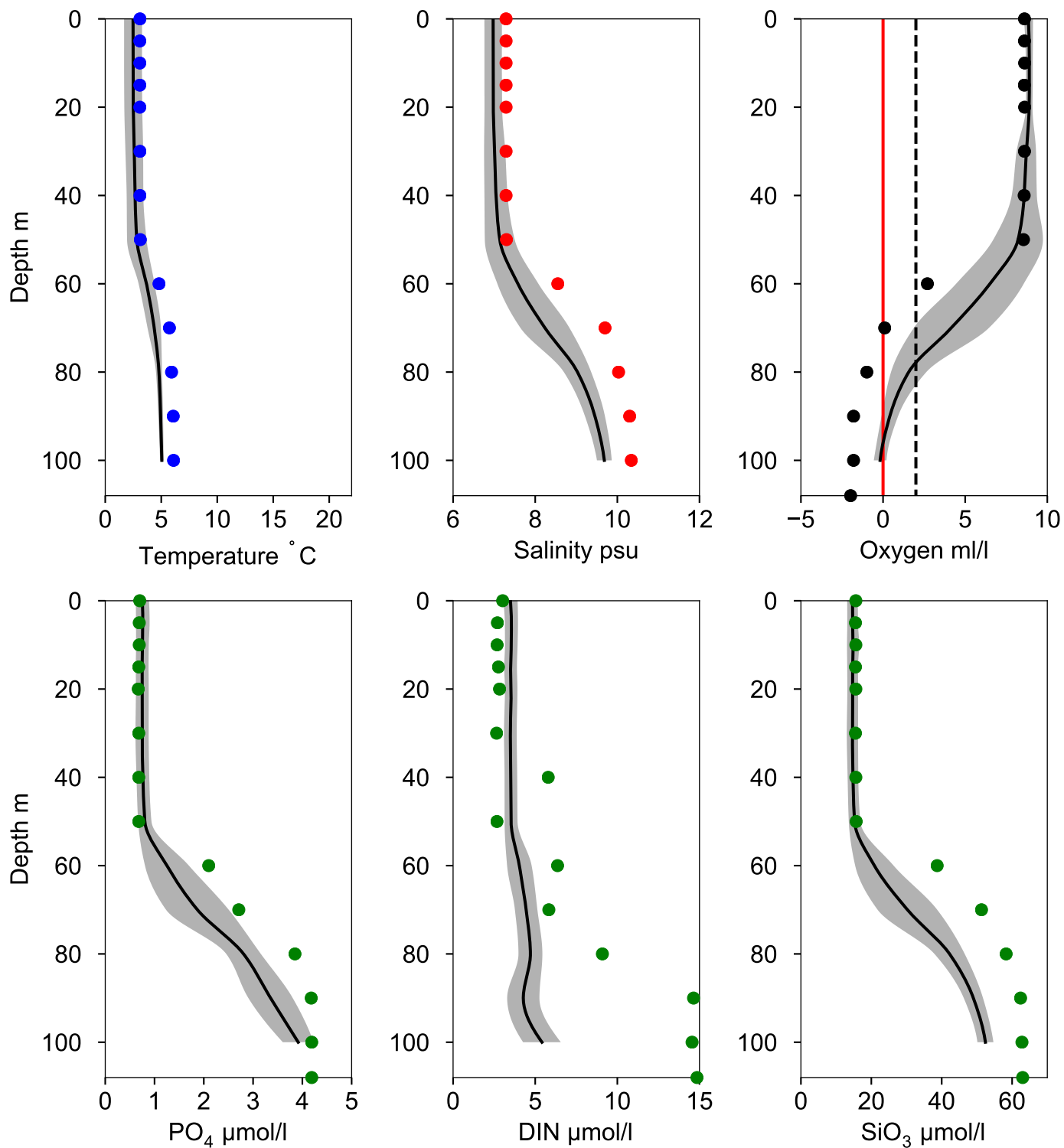


OXYGEN IN BOTTOM WATER (depth >= 100 m)



Vertical profiles BY38 KARLSÖDJ February

— Mean 2001-2015 St.Dev. • 2022-02-14



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

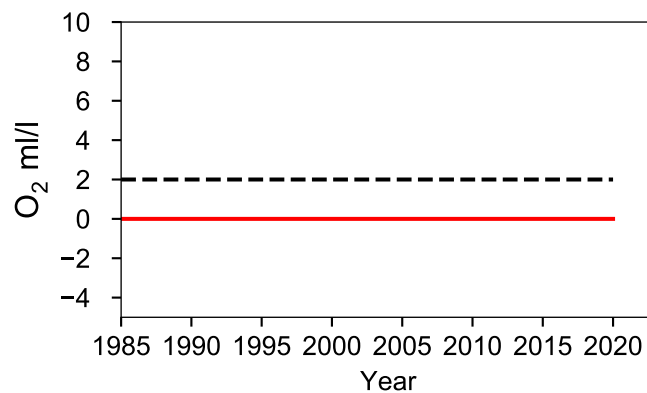
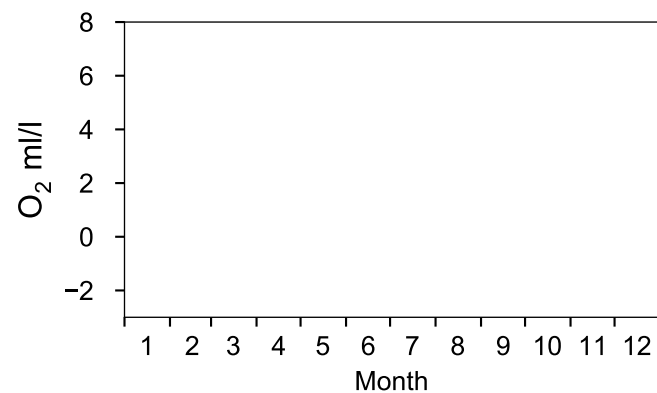
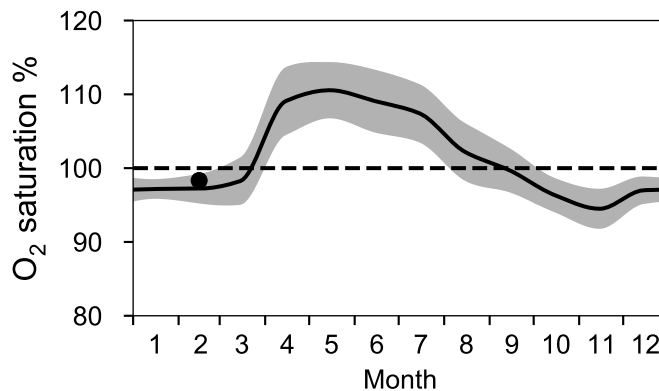
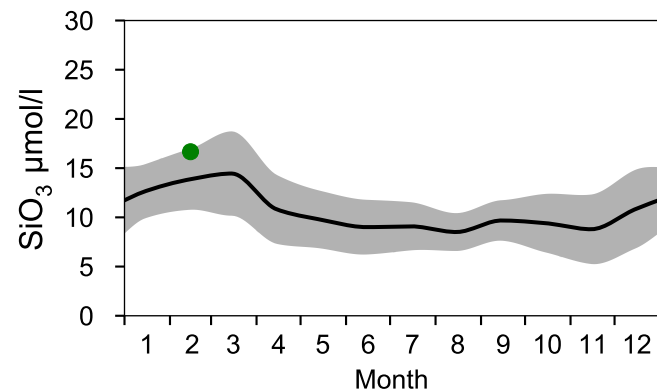
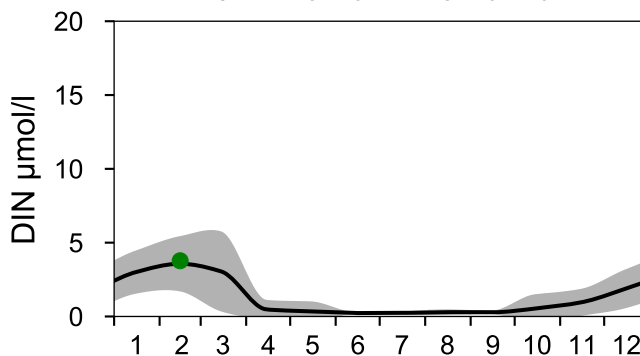
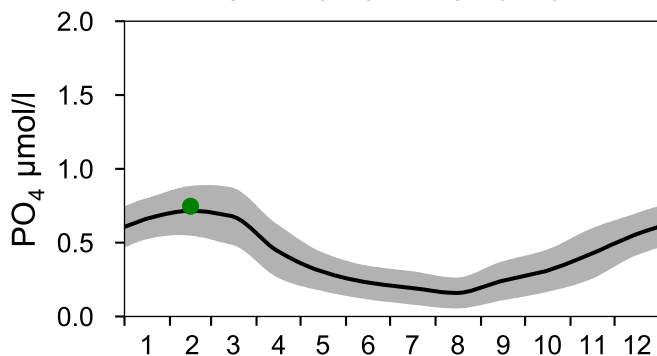
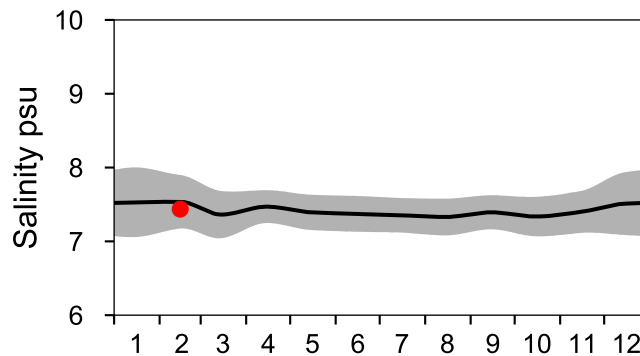
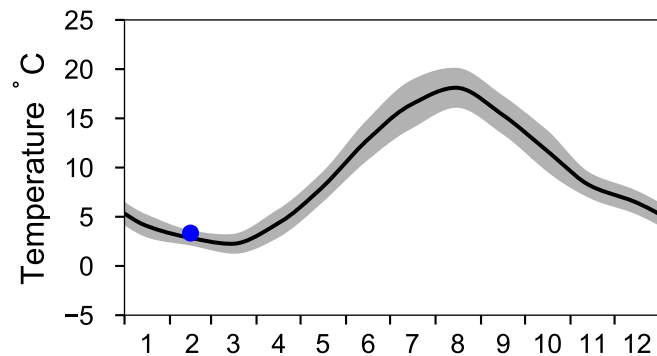
Annual Cycles

Statistics based on data from: Bornholmshavet

— Mean 2001-2015

■ St.Dev.

● 2022



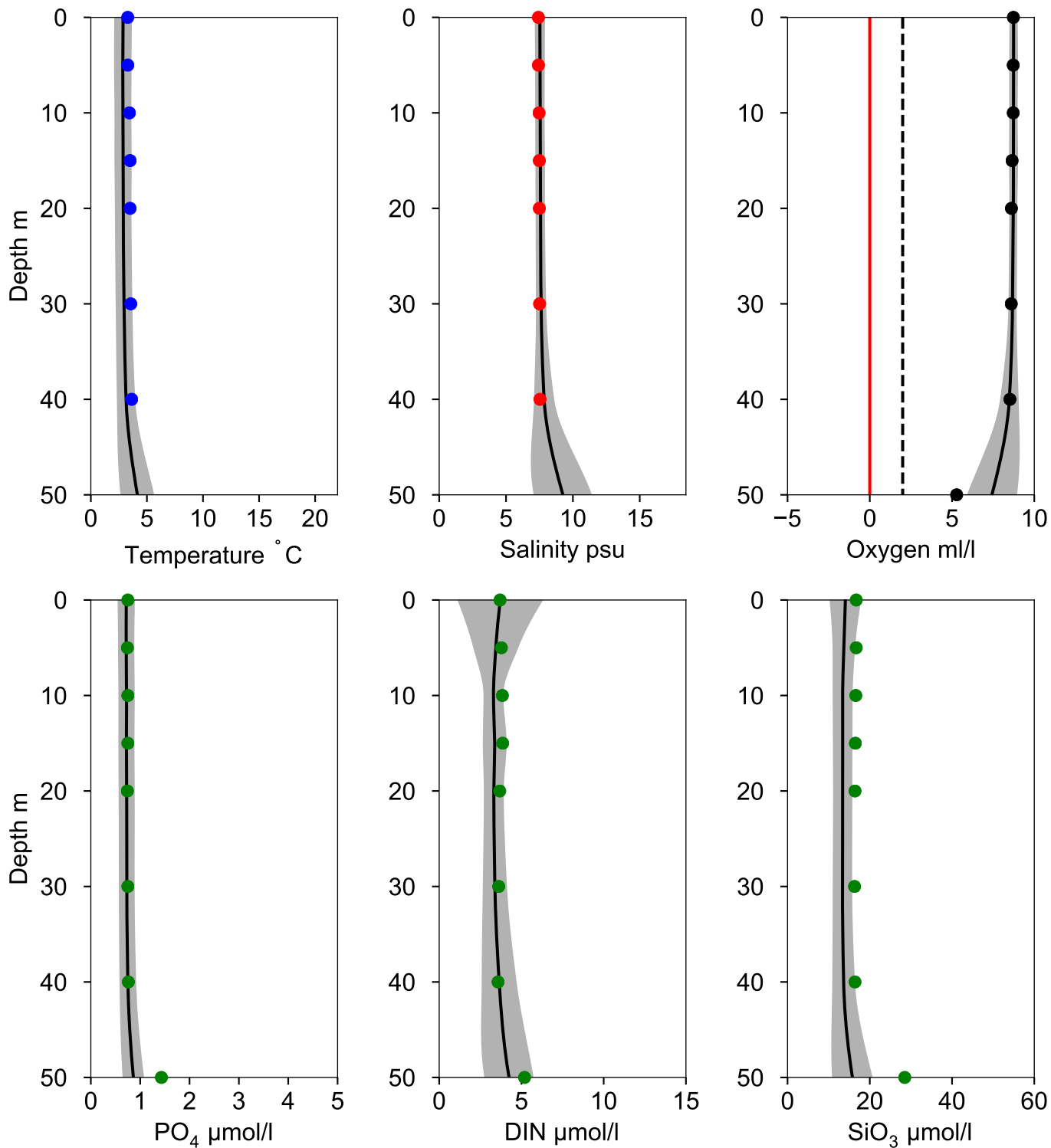
Vertical profiles BY39 ÖLANDS S UDDE February

Statistics based on data from: Bornholmshavet

— Mean 2001-2015

■ St.Dev.

● 2022-02-15



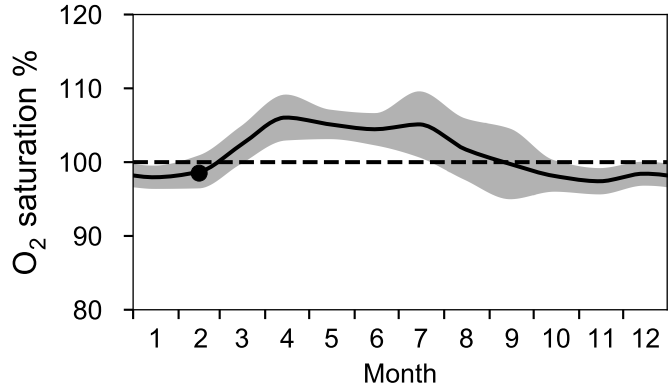
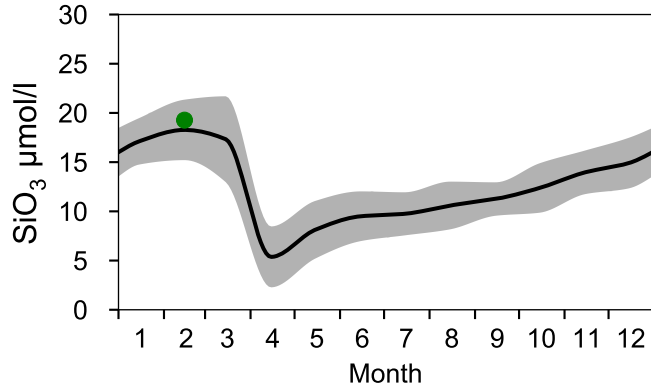
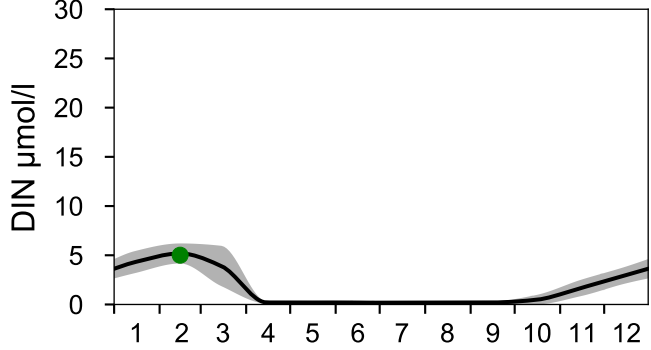
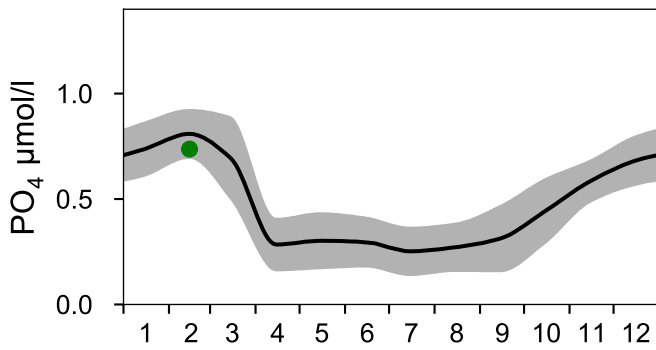
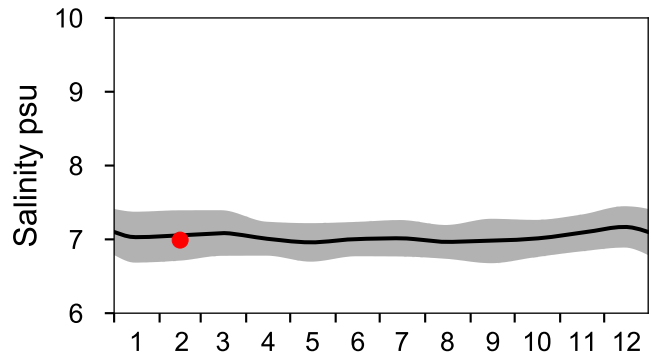
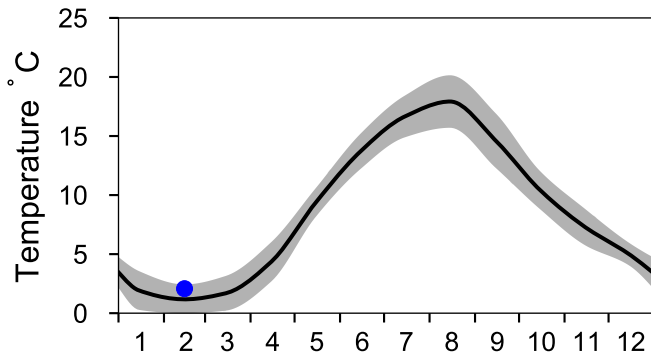
STATION REF M1V1 SURFACE WATER (0-10 m)

Annual Cycles

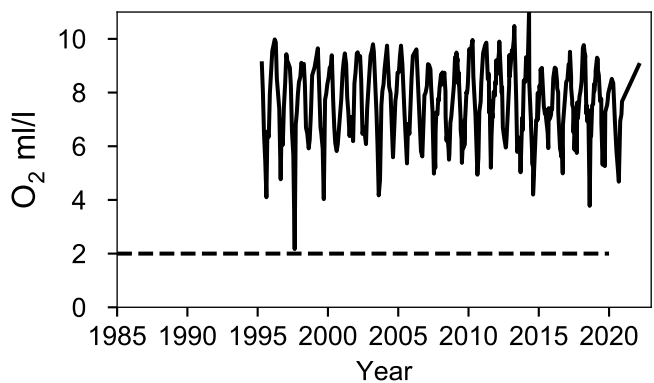
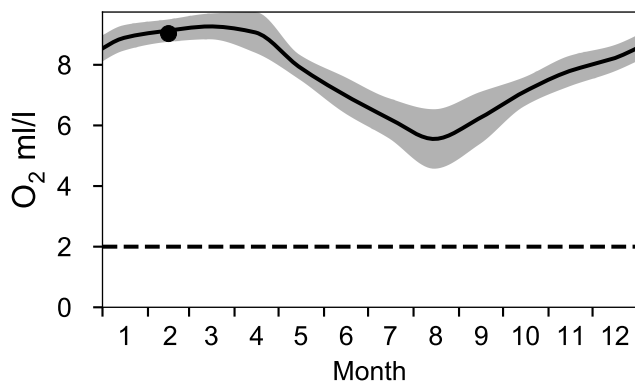
— Mean 2001-2015

■ St.Dev.

● 2022



OXYGEN IN BOTTOM WATER (depth >= 15 m)



Vertical profiles REF M1V1 February

