

Rapport från SMHIs utsjöexpedition med R/V Aranda



Expeditionens varaktighet: 2018-12-04 - 2018-12-11
Uppdragsgivare: Sveriges Meteorologiska och Hydrologiska Institut,
Havs- och Vattenmyndigheten.
Samarbetspartner: Finlands miljöcentral (SYKE)

SAMMANFATTNING

Under expeditionen, som ingår i det svenska pelagiala övervakningsprogrammet, besöktes Skagerrak, Kattegatt, Öresund och Egentliga Östersjön. Två forskare från Finlands miljöcentral, SYKE, deltog under expeditionen för att göra interkalibrering mellan SYKE och SMHI.

I stora delar av Egentliga Östersjöns djupvatten påträffades syrgashalter nära noll. I både Östra och Västra Gotlandsbassängen förekom svavelväte vid samtliga besökta stationer. Djupet där det först påträffades varierade mellan stationerna och var mellan 85-125 meters djup. I Bornholmsbassängen, Hanöbukten och södra Östersjön var det akut syrebrist, < 2 ml/l, från cirka 70 meters djup.

Samtliga närsalter i ytvattnet i Skagerrak och Kattegatt var generellt under normal nivå för årstiden, undantaget silikat som låg på normala nivåer i Kattegatt. I norra delen av Egentliga Östersjön var silikatnivåerna och fosfatnivåerna över det normala för årstiden i ytvattnet, och i den södra delen var de normala. För oorganiskt kväve var nivåerna i ytvattnet vid de flesta stationer i Egentliga Östersjön normala för årstiden.

Temperaturen i ytvattnet var normal för årstiden vid nästan alla besökta stationer i samtliga havsområden. Salthalten i ytvattnet var högre än normalt i Östra och Västra Gotlandsbassängen och överlag normal vid övriga besökta stationer.

Nästa ordinarie expedition planeras starta 10:e januari, då utförs bland annat vinterkartering av närsalter i Kattegatt.

RESULTAT

Expeditionen genomfördes ombord på det finska forskningsfartyget Aranda och startade i Helsingfors den 4:e december och avslutades i Rauma den 11:e. Vindarna var inledningsvis friska och ökade till hårda, och strax innan BY29 blåste det 20 m/s i byarna. Därefter lugnade det ner sig något. Efter stoppet i Lysekil på väg söderut var vindarna åter hårda, med vindbyar på 20 m/s. Under resans sista del var det måttliga och nordliga vindar.

Under expeditionen deltog två forskare från Finlands miljöcentral SYKE. Syftet var att de skulle ta prover och göra samma typ av analyser som SMHI själva gör, så att resultaten sedan kan jämföras och utvärderas.

Denna rapport är baserad på data som genomgått en första kvalitetskontroll. När data publiceras hos datavärden kan vissa värden ha ändrats då ytterligare kvalitetsgranskning genomförts. Data från denna expedition publiceras så fort som möjligt på datavärdens hemsida, normalt sker detta inom en till två veckor efter avslutad expedition.

Data kan hämtas här: <http://www.smhi.se/klimatdata/oceanografi/havsmiljodata>

Skagerrak

Temperaturen i ytvattnet var normal för årstiden på alla stationer, och varierade mellan 8,1-6,6°C. Varmast i utsjön, och kallast vid kusten. Salthalten var 27 psu vid Släggö, och omkring 33 psu för stationerna längre västerut. För både P2 och Å13 var det högre temperatur än normalt för årstiden, övriga stationer hade för årstiden normala värden. Termoklin och haloklin sammanföll på 10-15 meters djup.

Halten av oorganiskt kväve (nitrat+nitrit+ammonium) i ytvattnet var lägre än normalt för årstiden för de flesta stationer i utsjön och varierade mellan 3,0-3,6 µmol/l. Vid kusten uppmättes normala värden för årstiden i ytvattnet och här var halten 3,6 µmol/l. I djupare liggande vattenlager var halten normal eller något under normal på samtliga stationer. Silikathalten var under normal för årstiden i hela vattenkolumnen ner till cirka 100 meter, undantaget Släggö där halterna från ytan ner till 20 meter var normala. Halterna i ytvattnet varierade mellan 1,8-5,2 µmol/l. Fosfathalterna var under det normala för årstiden i ytvattnet vid samtliga stationer, och mättes till 0,3 µmol/l. Längre ner i vattenkolumnen var värdena under det normala eller normala.

Djupvattnet var väl syresatt och syrgashalten vid botten varierade mellan 6,2-5,1ml/l.

Fluorescensmätningarna från CTDn visade på viss planktonaktivitet från ytan ner till termoklinen.

Kattegatt och Öresund

Temperaturen i Kattegatts och Öresunds ytvatten var normal för årstiden och varierade mellan 6,5 och 7,0°C. Salthalten i Öresunds ytvatten var normal för årstiden och uppmättes till 21,4 psu, och i Kattegatt varierade den mellan 22 och 25 psu. Salthalten var något över normal för N14 Falkenberg och normalt för övriga stationer. Kattegatts vatten var skiktat och termoklin och haloklin sammanföll på 15-20 meters djup. I Öresund var skiktningen mindre tydlig.

Halten oorganiskt kväve i Kattegatts ytvatten var lägre än normalt för årstiden, medan den var normal i Öresund. Halterna varierade mellan 1,1 och 1,9 $\mu\text{mol/l}$ i Kattegatt och cirka 3,5 $\mu\text{mol/l}$ i Öresund. Halten av fosfat i ytvattnet var även den lägre än normal för årstiden i Kattegatt medan den var normal i Öresund. Silikathalterna var normala för årstiden i hela området och varierade mellan 4,6-6,2 $\mu\text{mol/l}$ i Kattegatt och drygt 10 $\mu\text{mol/l}$ i Öresund.

Djupvattnet var väl syresatt i hela Kattegatt och Öresund med normala värden för årstiden. Nivåerna närmast botten var omkring 5,5 ml/l i Kattegatt, något lägre i Öresund.

Fluorescensmätningar indikerade planktonaktivitet i Kattegatt från ytan ner till språngskiktet. I Öresund visades mätningar från CTDn på ett maximum vid cirka 10 meter, och därefter avtagande ner mot botten.

Egentliga Östersjön

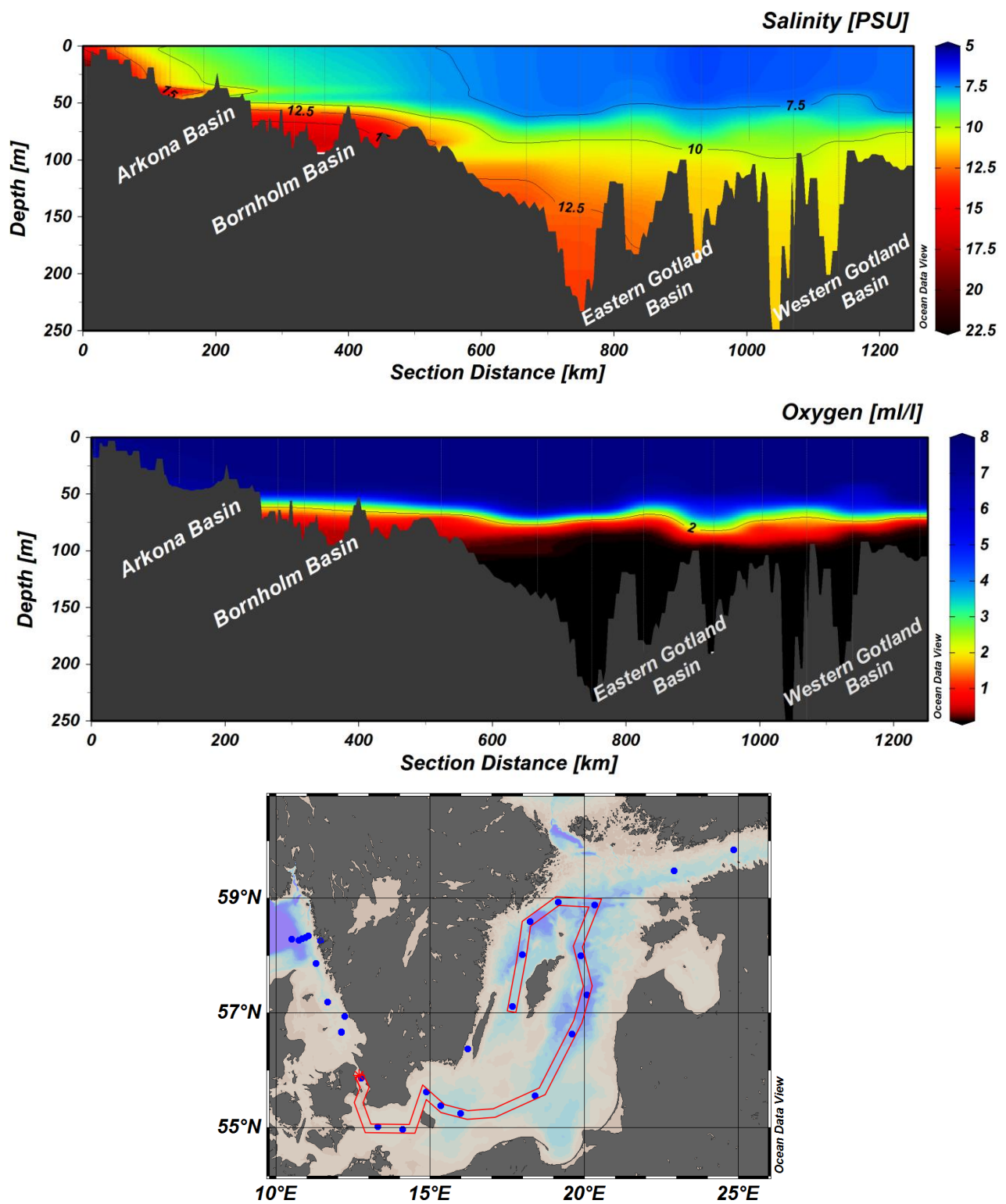
Temperaturen i ytvattnet var normal för årstiden, undantaget BCS III-10 i södra Östersjön samt BY2 i Arkonabassängen. Temperaturen i ytvattnet varierade mellan 5,2 och 7,8°C. Ytvattnets salthalt var över det normala vid samtliga stationer i Västra Gotlandsbassängen, och vid övriga stationer i Egentliga Östersjön var salthalten normal till över normal. Uppmätta värden varierade mellan 6,8-8,6 psu med lägst salthalt i Östra Gotlandsbassängen och högst salthalt i Arkona. Ytlagret var väl omblandat ner till 50-60 meters djup vid de djupare stationerna.

Halterna av oorganiskt kväve i ytvattnet var normal eller under normal för årstiden vid alla stationer utom BY29 längst norrut i Östra Gotlandsbassängen, där halterna var över normal. I havsområdet som helhet uppmättes koncentrationer på 1,1-3,6 $\mu\text{mol/l}$. Fosfathalten i ytvattnet var generellt över normal för årstiden i norra delen av Egentliga Östersjön, och var ca 0,6 $\mu\text{mol/l}$. Vid övriga stationer var koncentrationen normal undantaget BCS III-10 i södra Östersjön och BY5 i Bornholmsbassängen, där den var under normal för årstiden. För de södra delarna av Egentliga Östersjön var koncentrationen i utsjön 0,3-0,5 $\mu\text{mol/l}$ och 0,7 $\mu\text{mol/l}$ vid den kustnära stationen Ref M1V1. Silikatkoncentrationen var över normal för årstiden i både Östra och Västra Gotlandsbassängens ytvatten och varierade mellan 13-20 $\mu\text{mol/l}$. I övriga områden i Egentliga Östersjön var nivåerna normala och varierade mellan 8-13 $\mu\text{mol/l}$ i utsjön, och ca 17 $\mu\text{mol/l}$ vid stationen Ref M1V1.

I stora delar av Egentliga Östersjöns djupvatten påträffades syrgashalter nära noll. I både Östra och Västra Gotlandsbassängen rådde akut syrebrist från ca 70-80 meters djup. Svavelväte förekom i båda bassängerna från varierande djup. Vid BY38, BY32 och BY31 uppmättes svavelväte vid 80,90 samt 125 meters djup. För stationerna i Östra Gotlandsbassängen varierade djupet där nivåer av svavelväte större än 4 $\mu\text{mol/l}$ (rapporteringsgränsen) först påträffades mellan 85 till 125 meter.

Vid stationen BCS III-10 i södra Östersjön liksom i Bornholmsbassängen och Hanöbukten var det akut syrebrist från 70 meters djup. Vid BY5 uppmättes syrgashalten till 0,16ml/l som lägst, vilket var vid botten på 89 meters djup. För Arkonabassängen var syrgasförhållandena bättre. Som lägst uppmättes drygt 2,7ml/l, vilket var vid BY2 på 46 meters djup.

Fluorescensmätningarna visade att planktonaktiviteten var mycket låg i hela området.



Figur 1. Snitt som visar salt- och syrgashalt genom Egentliga Östersjön från Öresund till Västra Gotlandsbassängen.

DELTAGARE

Namn

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Lysekil-Rauma
Lysekil-Rauma

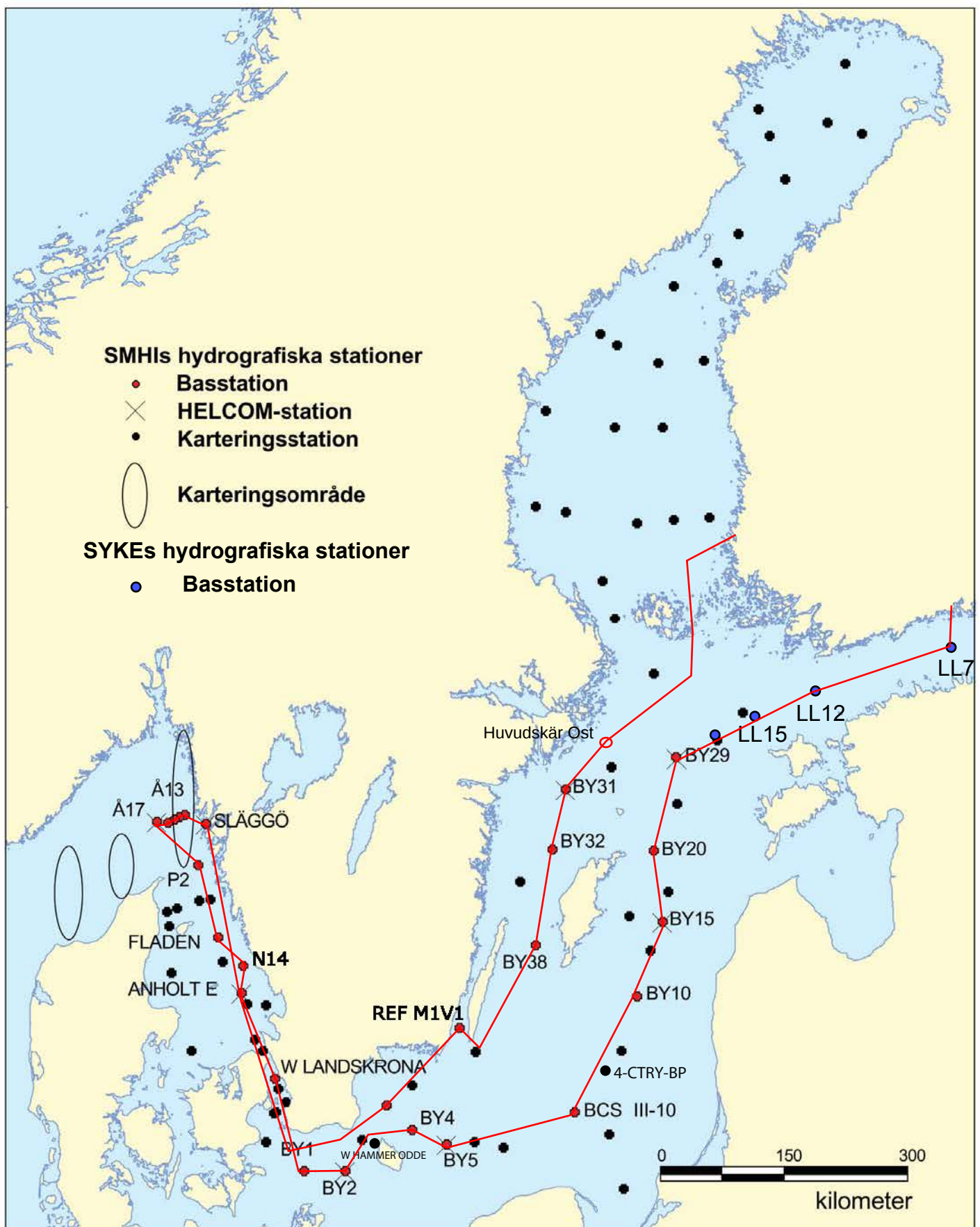
Från

SMHI
SMHI
SMHI
SMHI
SMHI
SMHI
SMHI
SYKE
SYKE

BILAGOR

- Färdkarta
- Tabell över stationer, analyserade parametrar och antal provtagningsdjup
- Karta över syrehalter i bottenvattnet
- Vertikalprofiler för basstationer
- Figurer över månadsmedelvärden

TRACKCHART
 Country: Sweden
 Ship: R/V Aranda
 Date: 20181204-20181211
 Series: 0149-0179



Time: 15:28

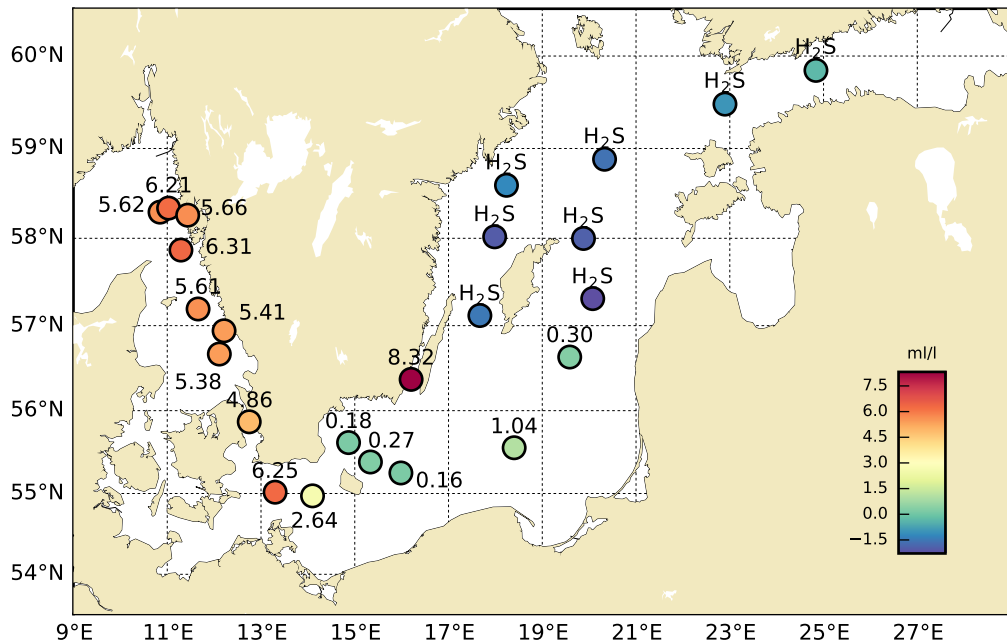
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0149	7	GFXX29	SYK	BY23 / LL7	5950.80	02450.27	20181204	1210	100		18 11	5.1	997	2840	x---	13 13			x x x x	- x x x	x x x x	x x x x	x x x x	x x x x	- x x x	- x x x	- x x x	- x x x	- x x x	- x x x	- x x x
0150	7	BPNX60	SYK	LL12	5929.01	02253.81	20181204	1850	84		20 11.9	6.0	996	9990	x---	11 11		x x x x	- x x x	x x x x	x x x x	x x x x	x x x x	- x x x	- x x x	- x x x	- x x x	- x x x	- x x x	- x x x	
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0154	7	BPEX21	BAS...	BY15 GOTLANDSDJ	5718.72	02004.57	20181205	1535	249		30 15	4.2	1016	1250	----	0 0		- x x x	- x x x	- x x x	- x x x	- x x x	- x x x	- x x x	- x x x	- x x x	- x x x	- x x x	- x x x	- x x x	
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0158	7	BPSB06	BAS...	BY4 CHRISTIANSÖ	5522.99	01520.03	20181206	1515	94		20 11.9	4.3	1010	9990	x---	12 12		x x x x	- x x x	- x x x	x x x x	x x x x	x x x x	- x x x	- x x x	- x x x	- x x x	- x x x	- x x x	- x x x	
0159	7	BPSA03	BAS...	BY2 ARKONA	5458.25	01405.93	20181206	2100	47		23 10.9	7.2	1007	9990	xxx-	8 8		x x x x	- x x x	- x x x	x x x x	x x x x	x x x x	- x x x	- x x x	- x x x	- x x x	- x x x	- x x x	- x x x	
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0161	7	SOCX39	BAS...	W LANDSKRONA	5552.00	01244.92	20181207	0630	50		27 9	8.5	1000	2720	x---	9 9		x x x x	- x x x	- x x x	x x x x	x x x x	x x x x	- x x x	- x x x	- x x x	- x x x	- x x x	- x x x	- x x x	
0162	7	KAEX29	BAS...	ANHOLT E	5640.12	01206.65	20181207	1200	62	7	15 4.1	7.0	1007	2730	xxxx	10 10		x x x x	x x x x	- x x x	x x x x	x x x x	x x x x	- x x x	- x x x	- x x x	- x x x	- x x x	- x x x	- x x x	
0163	7	KANX25	BAS...	FLADEN	5711.56	01139.45	20181207	1530	84		14 11.2	6.3	991	9990	x---																

Bottom water oxygen concentration (ml/l)

Ship: Aranda

Date: 20181204-20181211

Series: 0149-0179



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

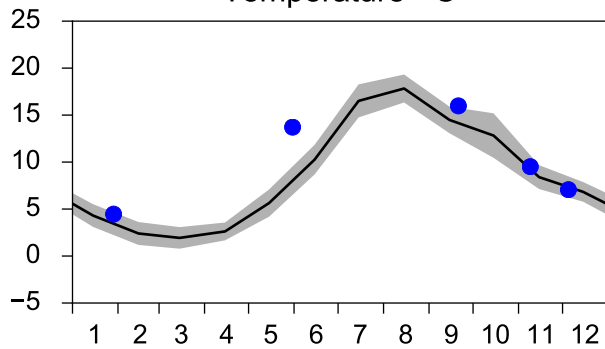
Annual Cycles

— Mean 2001-2015

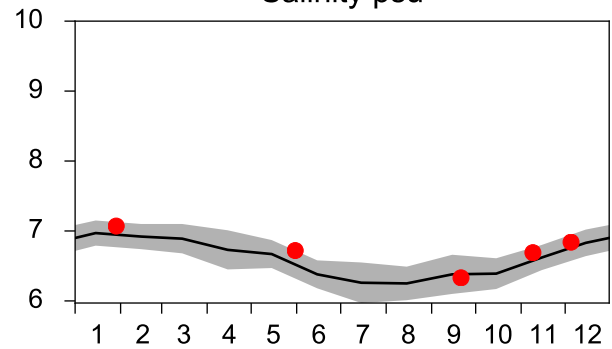
■ St.Dev.

● 2018

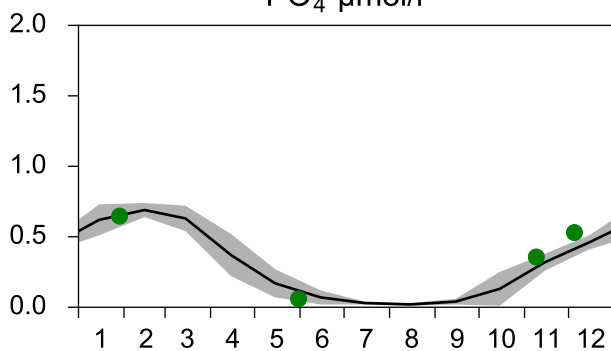
Temperature °C



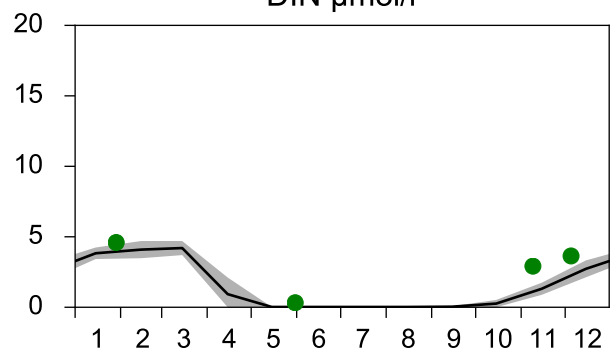
Salinity psu



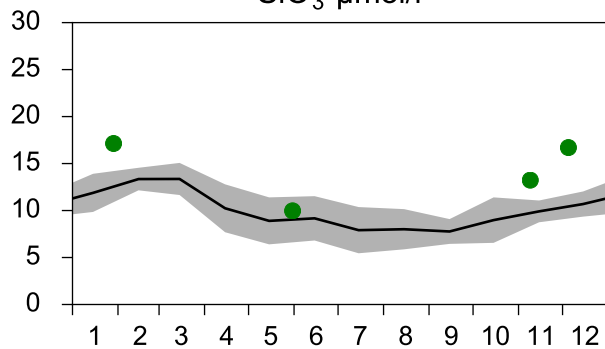
PO₄ µmol/l



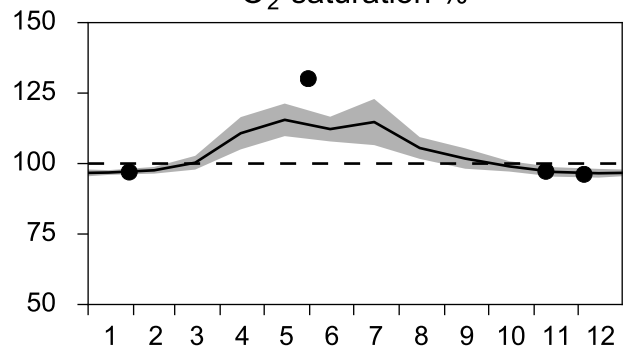
DIN µmol/l



SiO₃ µmol/l

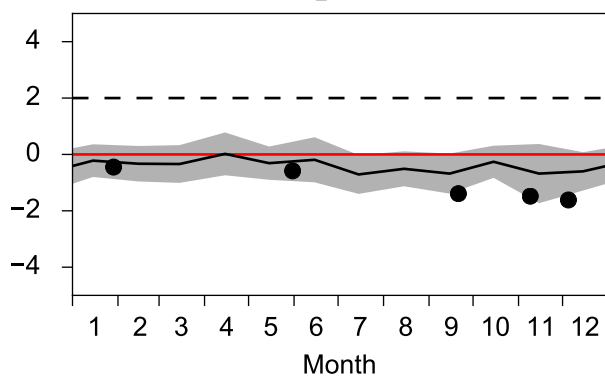


O₂ saturation %

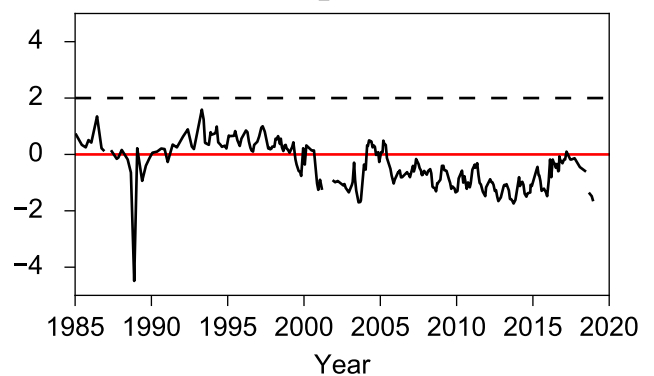


OXYGEN IN BOTTOM WATER (depth >= 150 m)

O₂ ml/l

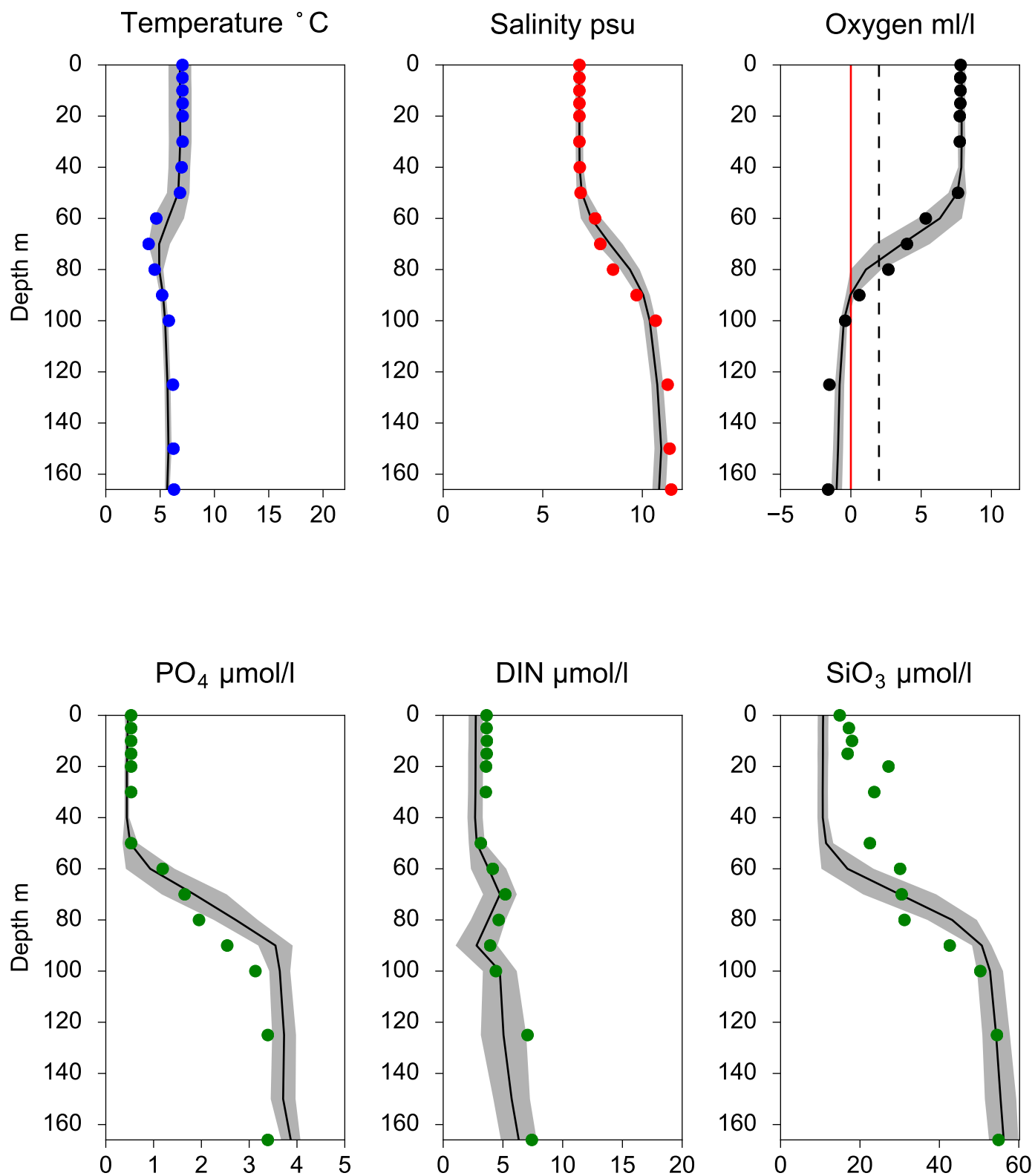


O₂ ml/l



Vertical profiles BY29 / LL19 December

— Mean 2001-2015 St.Dev. • 2018-12-05



STATION BY20 FÅRÖDJ SURFACE WATER (0-10 m)

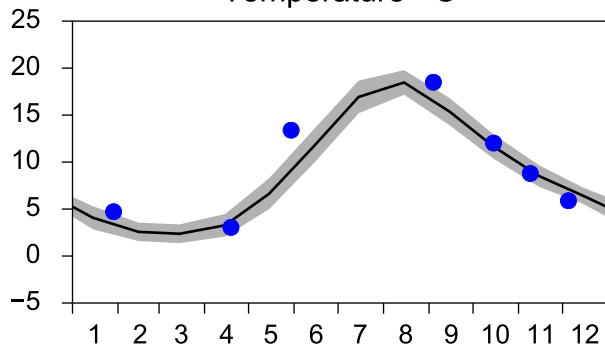
Annual Cycles

— Mean 2001-2015

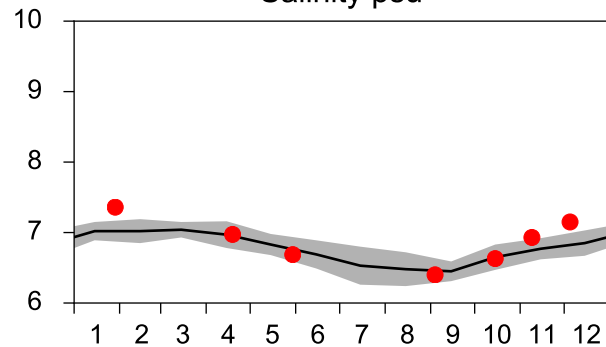
■ St.Dev.

● 2018

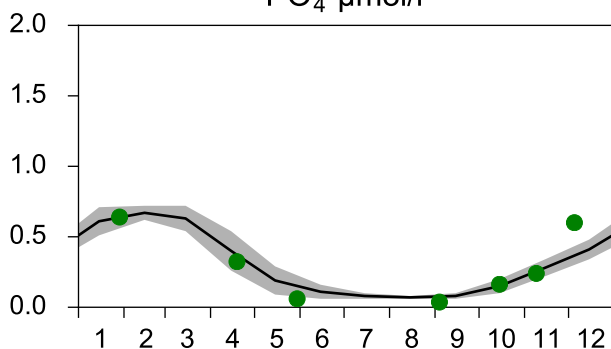
Temperature °C



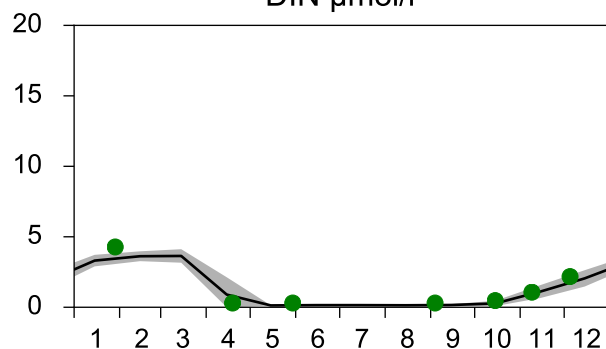
Salinity psu



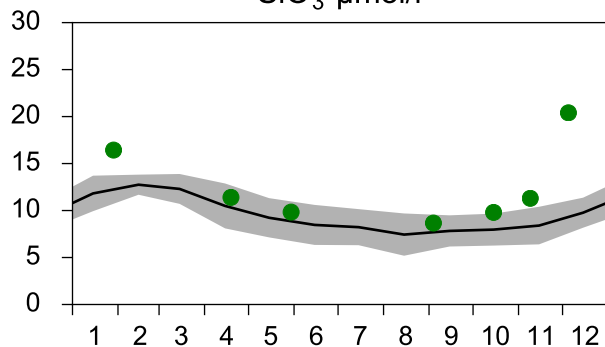
PO₄ µmol/l



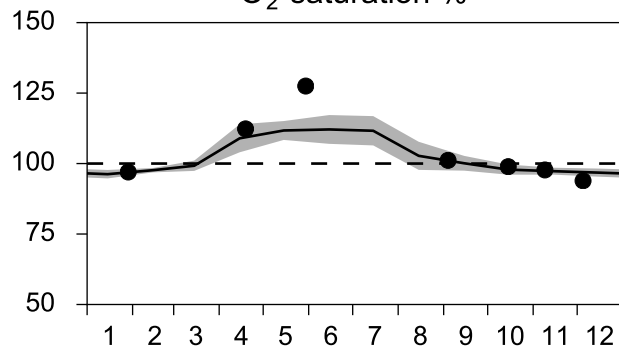
DIN µmol/l



SiO₃ µmol/l

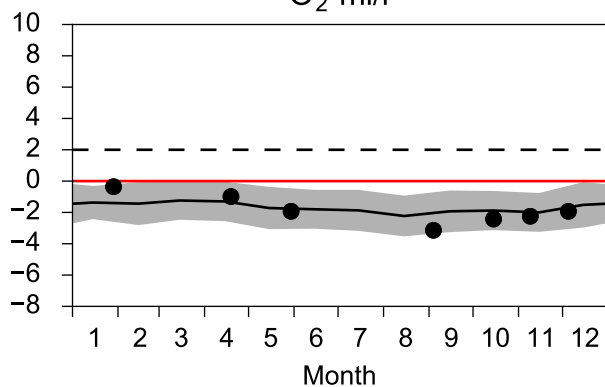


O₂ saturation %

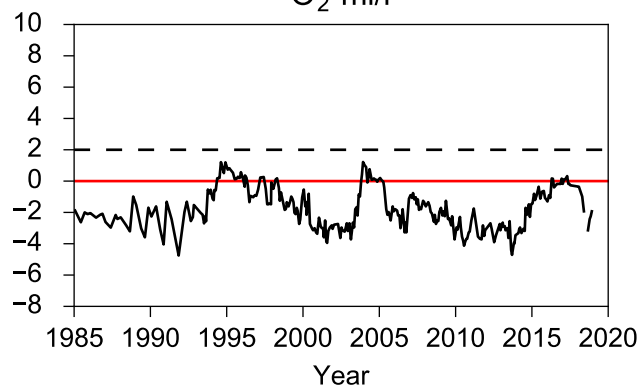


OXYGEN IN BOTTOM WATER (depth >= 175 m)

O₂ ml/l

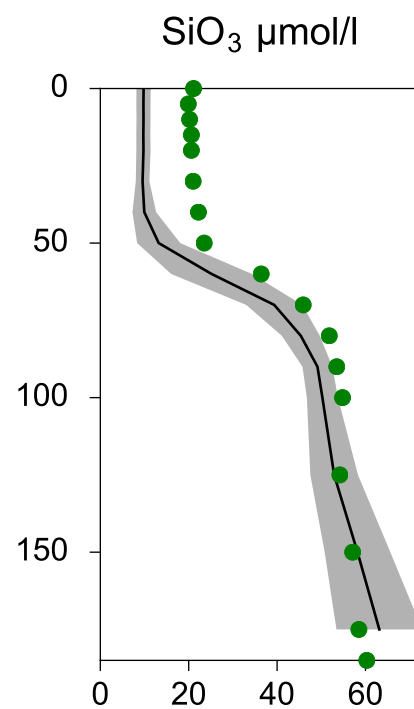
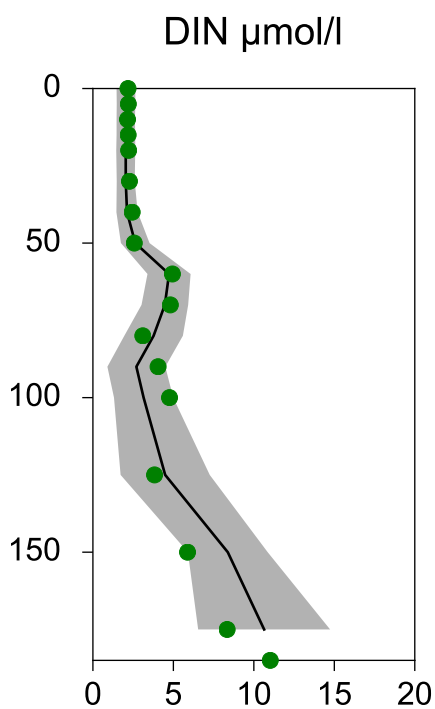
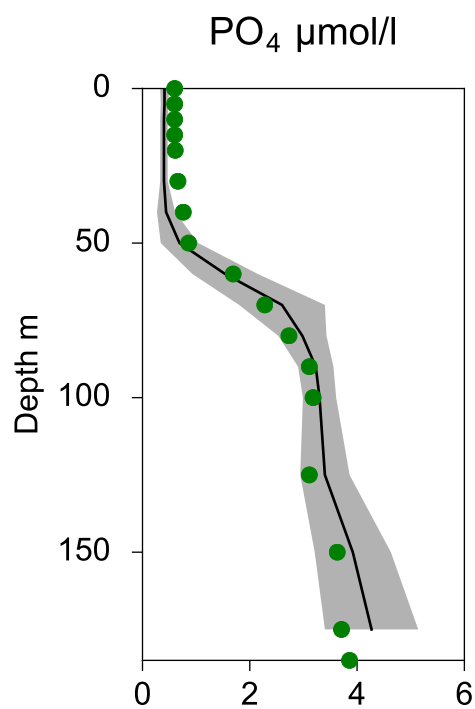
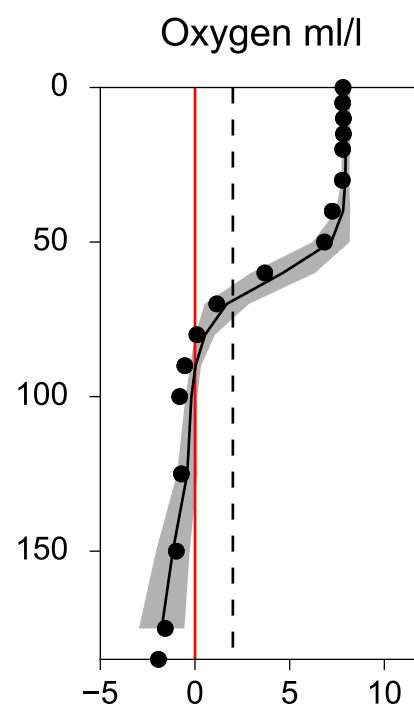
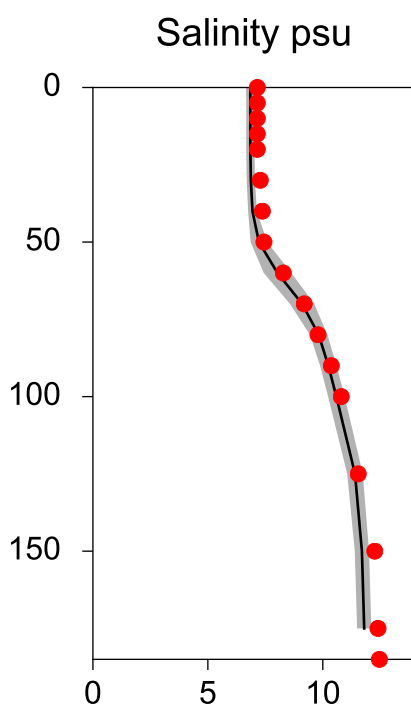
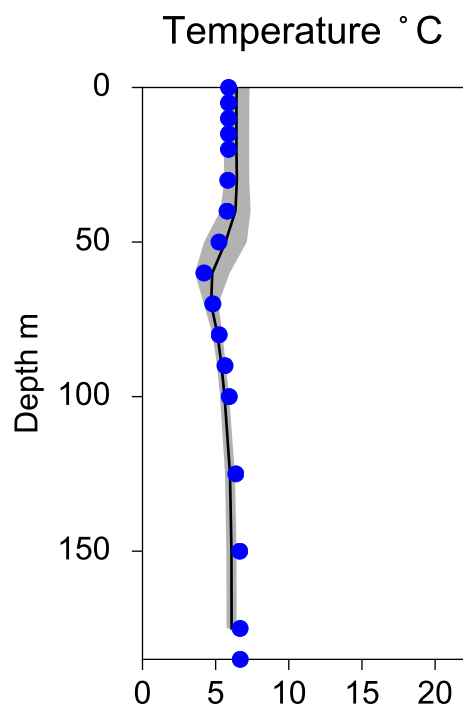


O₂ ml/l



Vertical profiles BY20 FÅRÖDJ December

— Mean 2001-2015 ■ St.Dev. ● 2018-12-05



STATION BY15 GOTLANDSDJ SURFACE WATER (0-10 m)

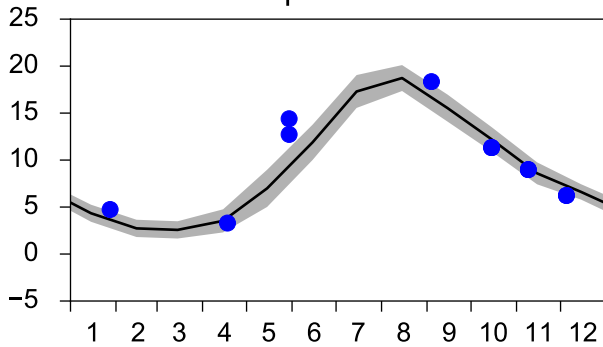
Annual Cycles

— Mean 2001-2015

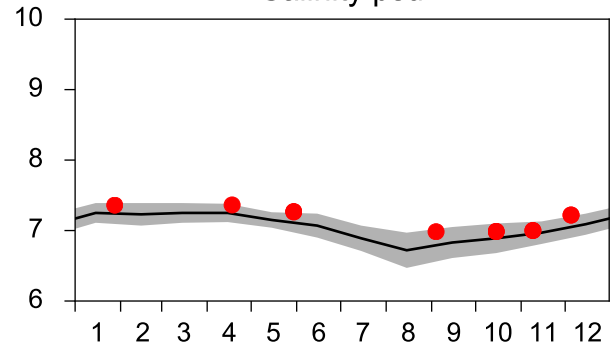
■ St.Dev.

● 2018

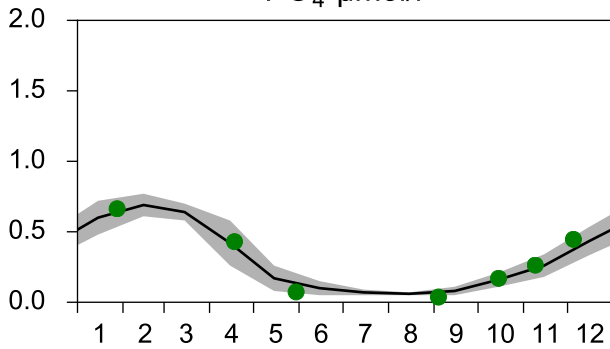
Temperature °C



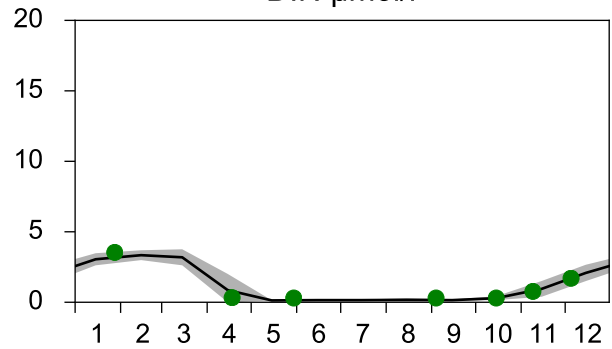
Salinity psu



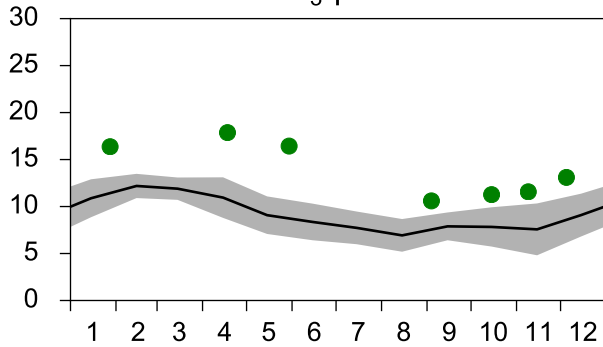
PO₄ µmol/l



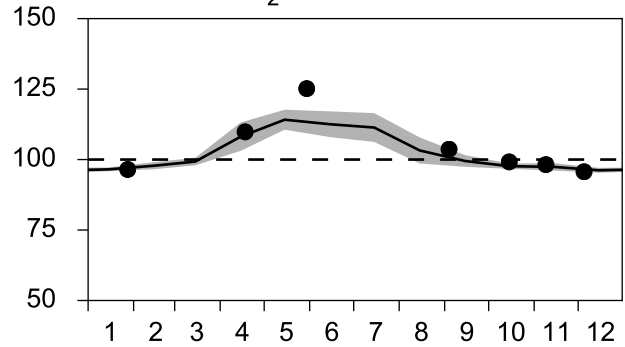
DIN µmol/l



SiO₃ µmol/l

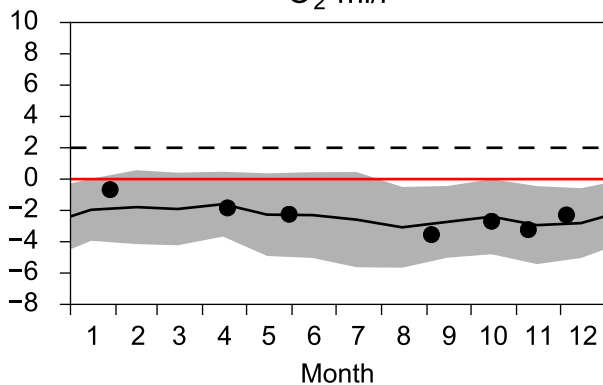


O₂ saturation %

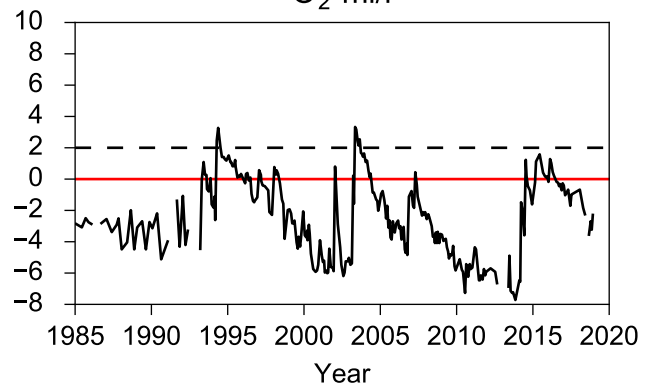


OXYGEN IN BOTTOM WATER (depth >= 225 m)

O₂ ml/l

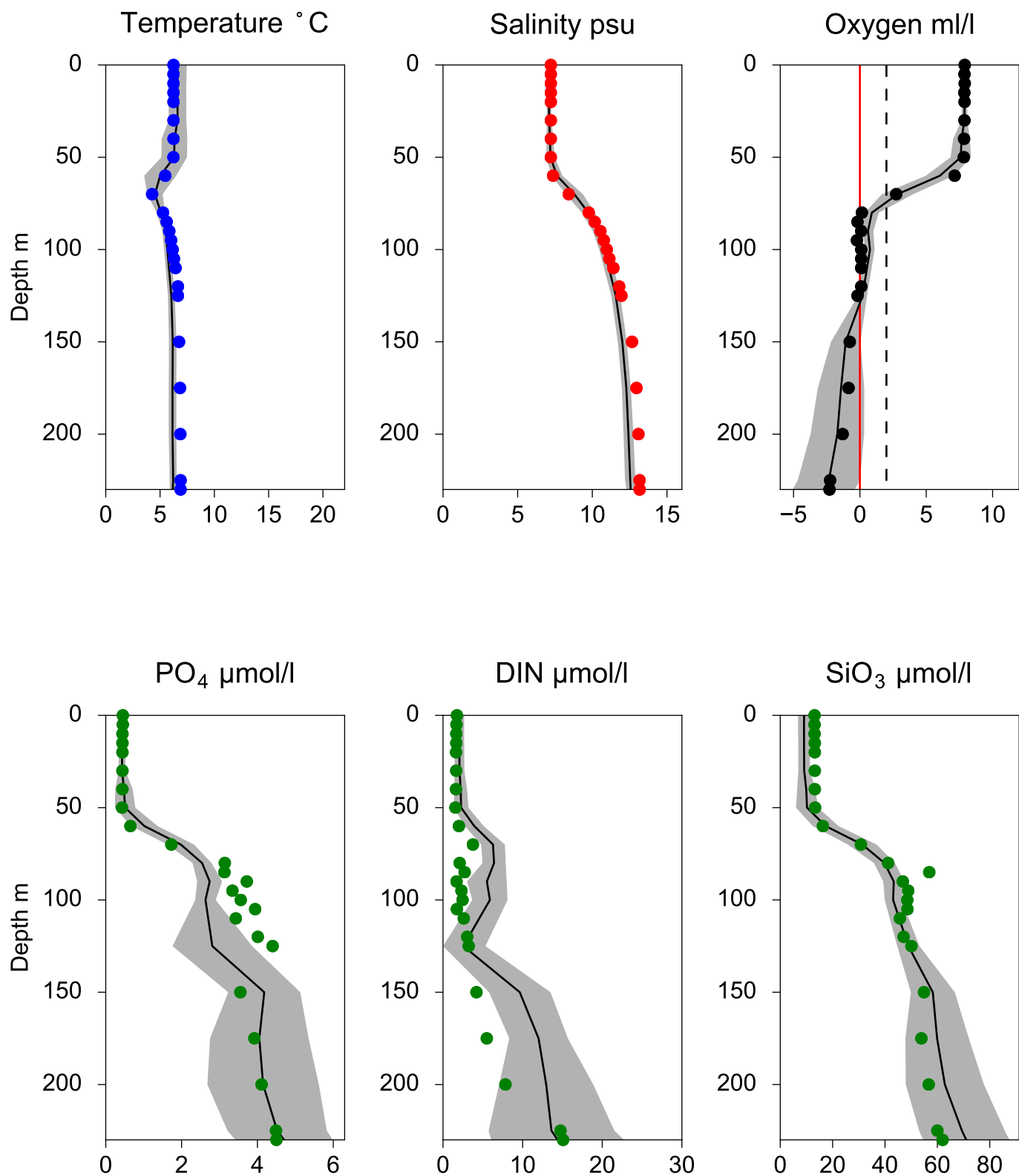


O₂ ml/l



Vertical profiles BY15 GOTLANDSDJ December

— Mean 2001-2015 ■ St.Dev. ● 2018-12-05



STATION BY10 SURFACE WATER (0-10 m)

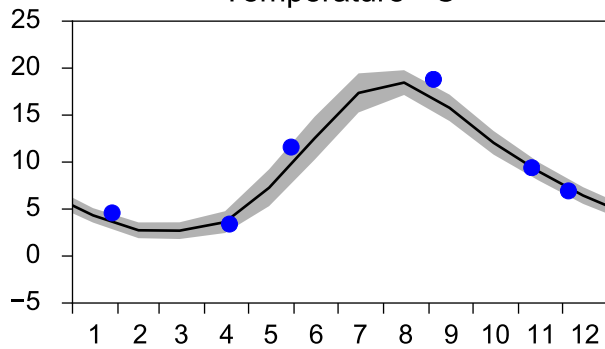
Annual Cycles

— Mean 2001-2015

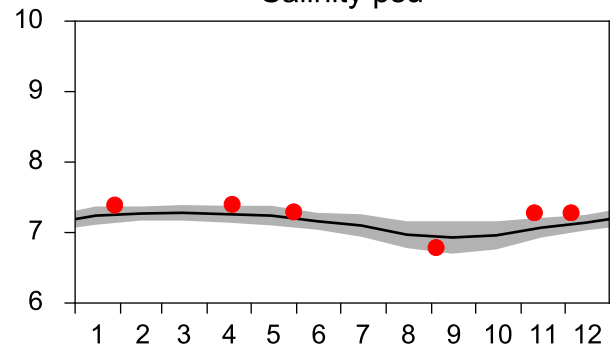
■ St.Dev.

● 2018

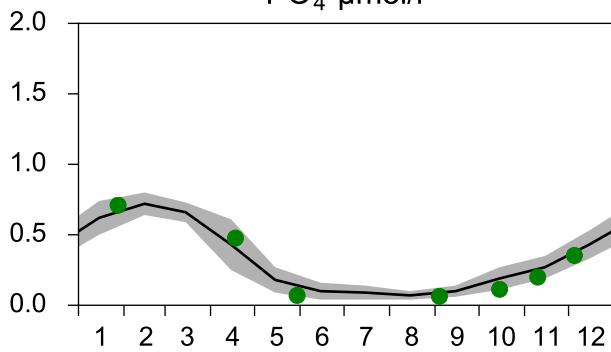
Temperature °C



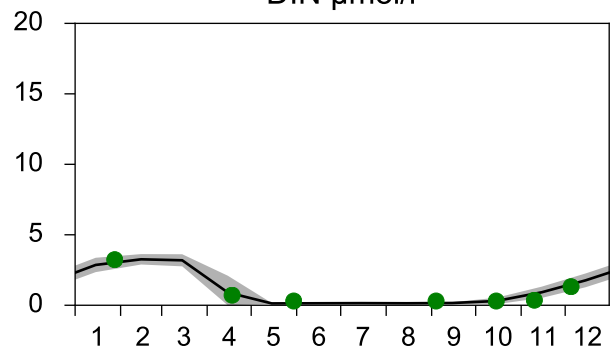
Salinity psu



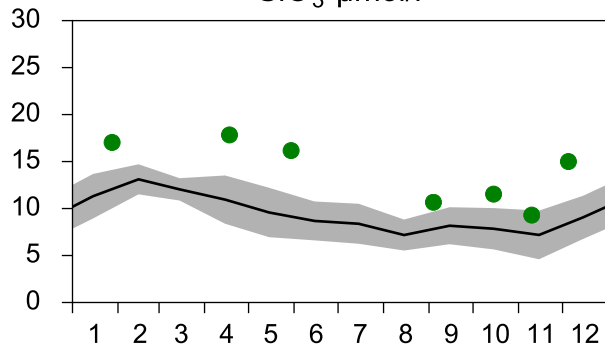
PO₄ µmol/l



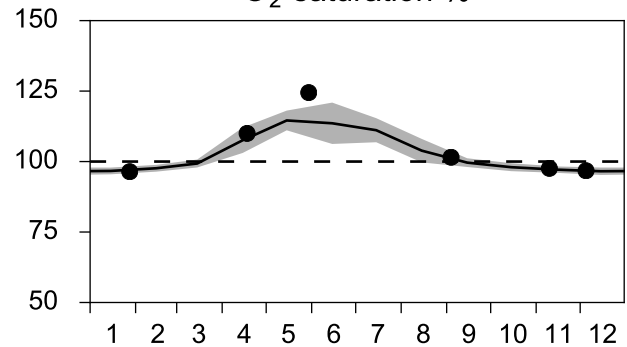
DIN µmol/l



SiO₃ µmol/l

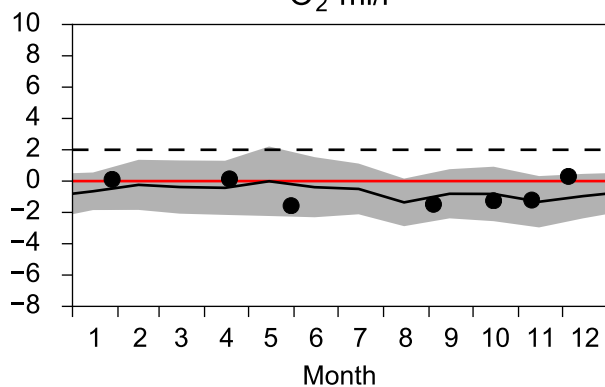


O₂ saturation %

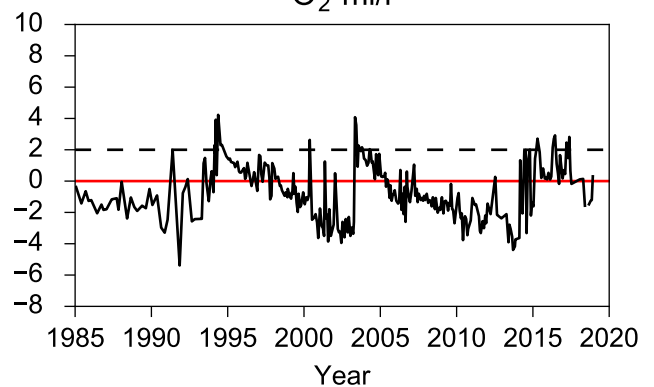


OXYGEN IN BOTTOM WATER (depth >= 125 m)

O₂ ml/l

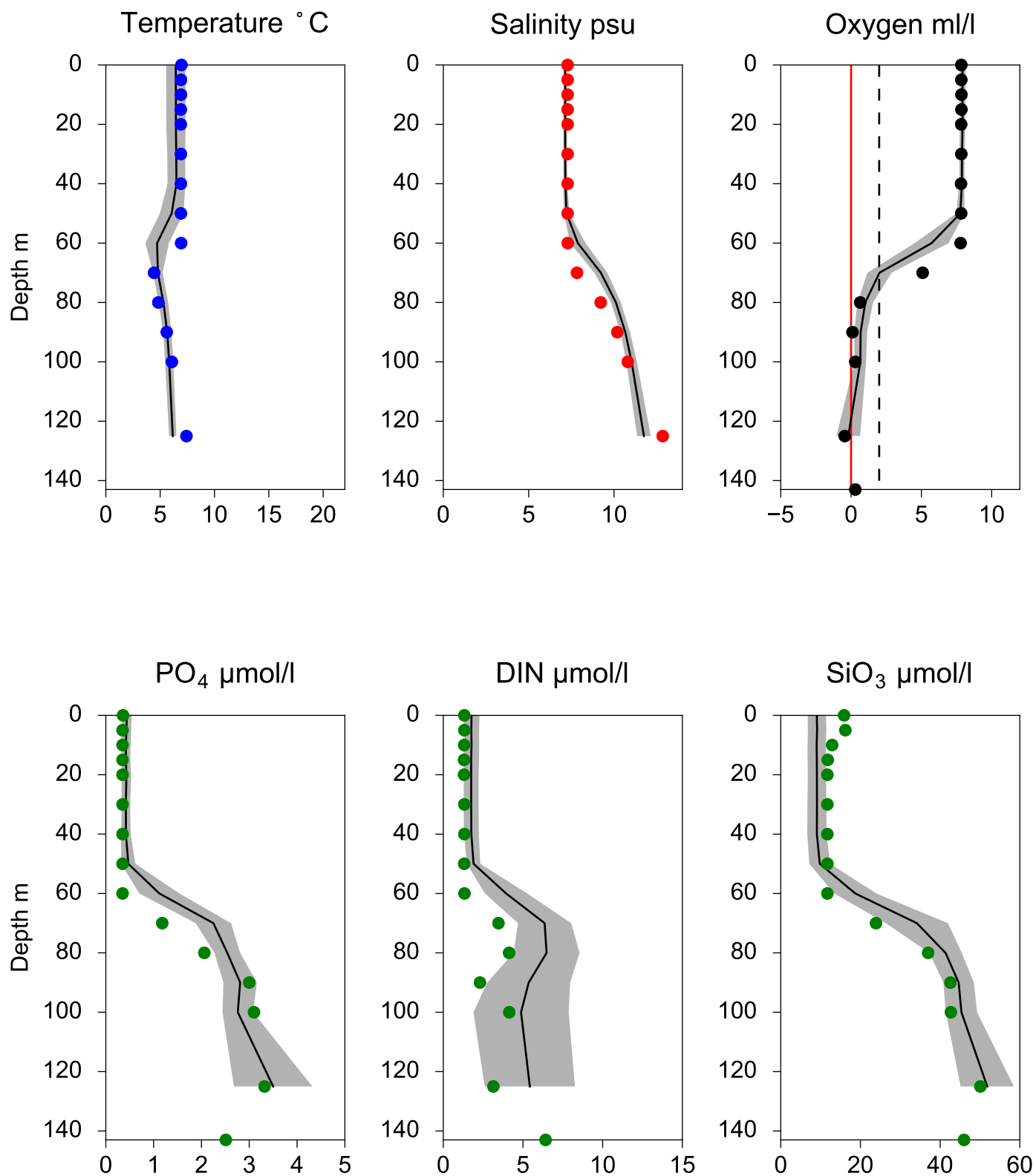


O₂ ml/l



Vertical profiles BY10 December

— Mean 2001-2015 ■ St.Dev. ● 2018-12-05



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

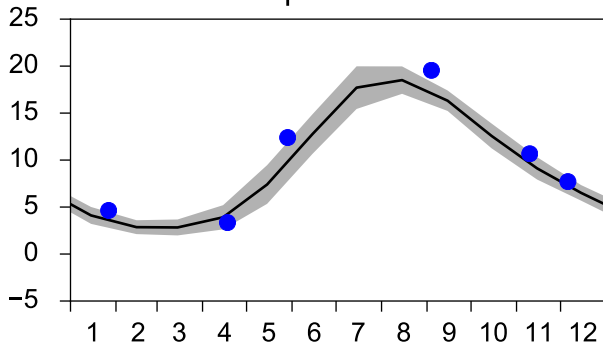
Annual Cycles

— Mean 2001-2015

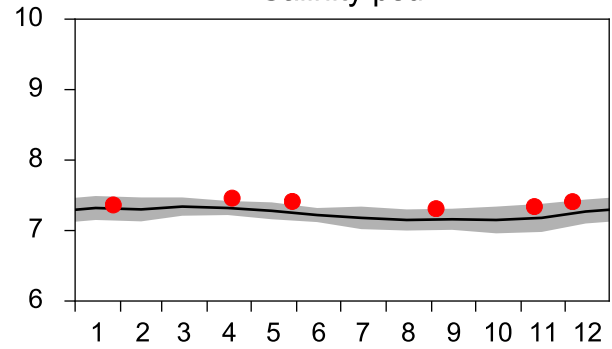
■ St.Dev.

● 2018

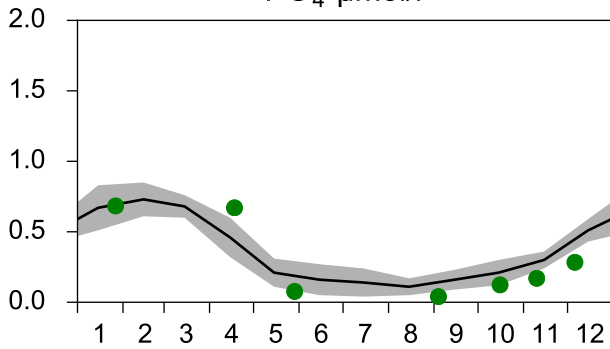
Temperature °C



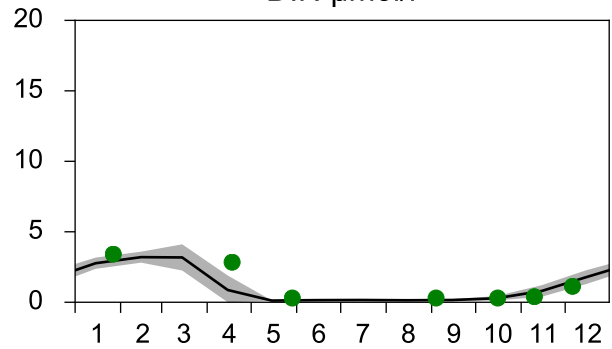
Salinity psu



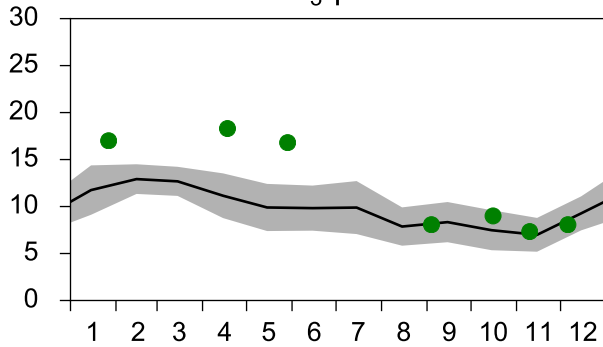
PO₄ µmol/l



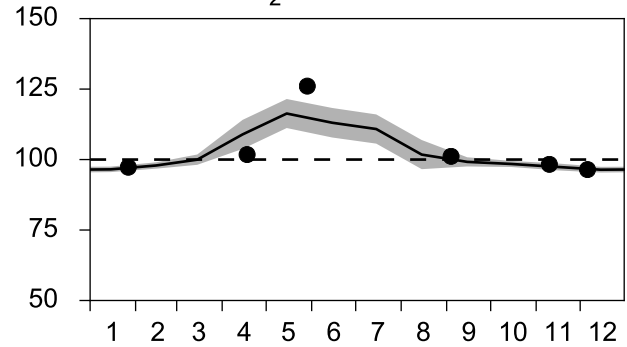
DIN µmol/l



SiO₃ µmol/l

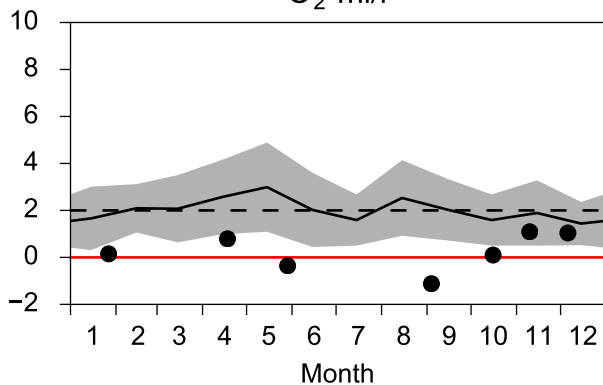


O₂ saturation %

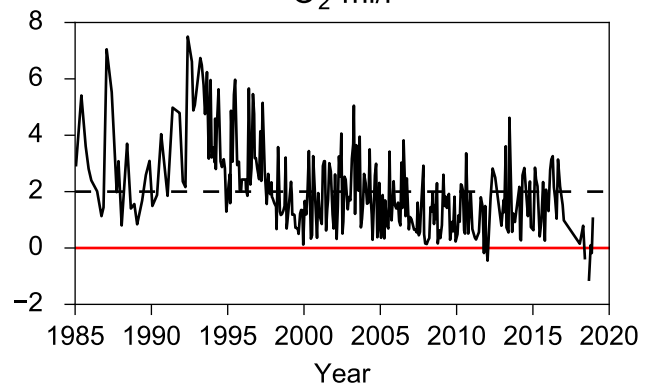


OXYGEN IN BOTTOM WATER (depth >= 80 m)

O₂ ml/l

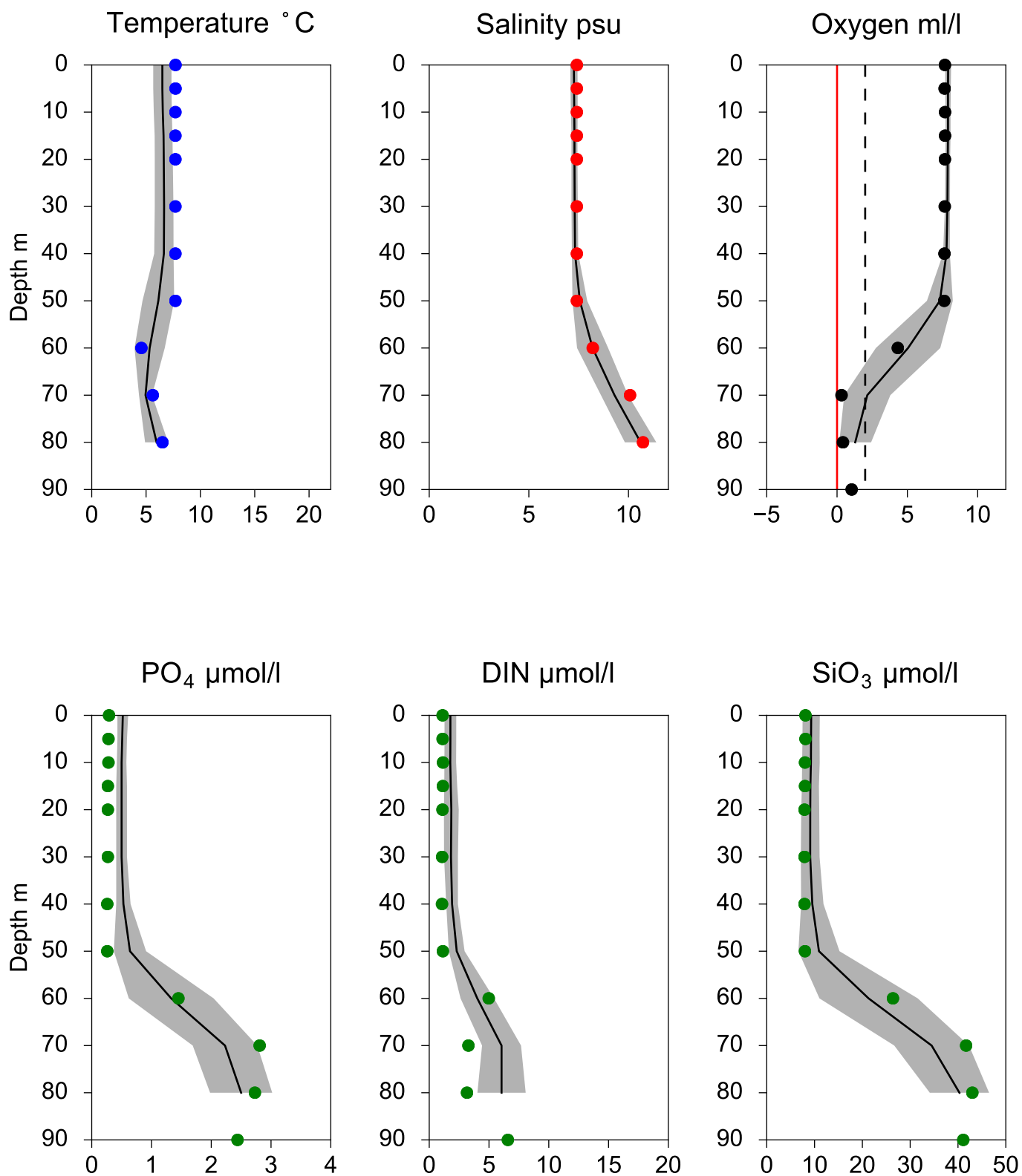


O₂ ml/l



Vertical profiles BCS III-10 December

— Mean 2001-2015 St.Dev. • 2018-12-06



STATION BY5 BORNHOLMSDJ SURFACE WATER (0-10 m)

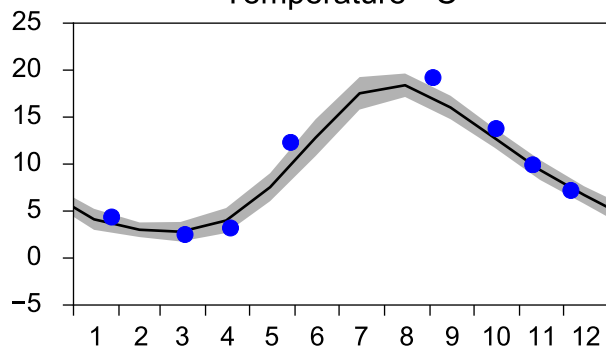
Annual Cycles

— Mean 2001-2015

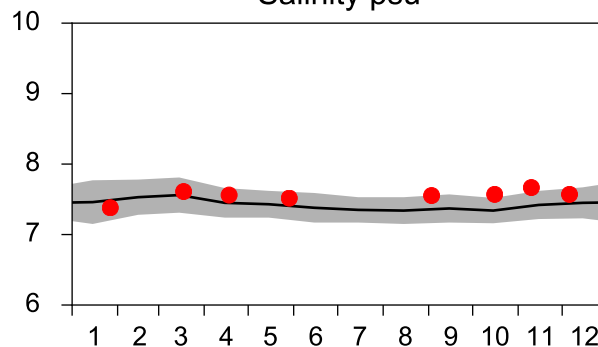
■ St.Dev.

● 2018

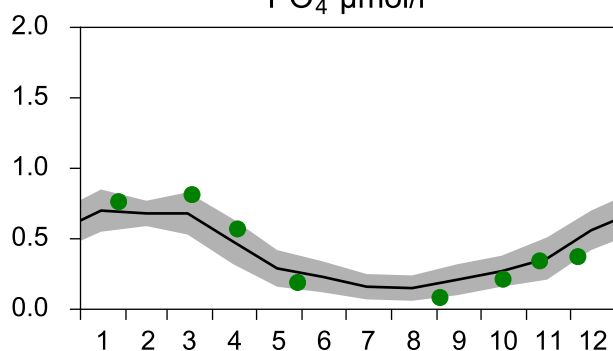
Temperature °C



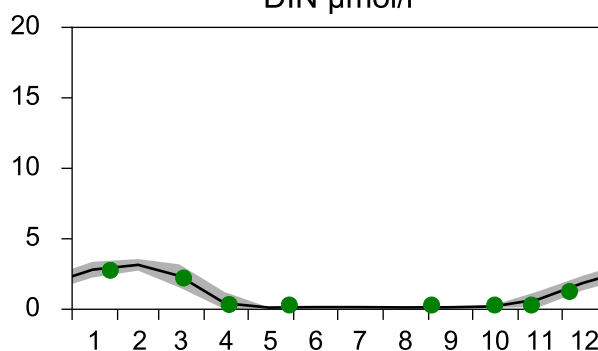
Salinity psu



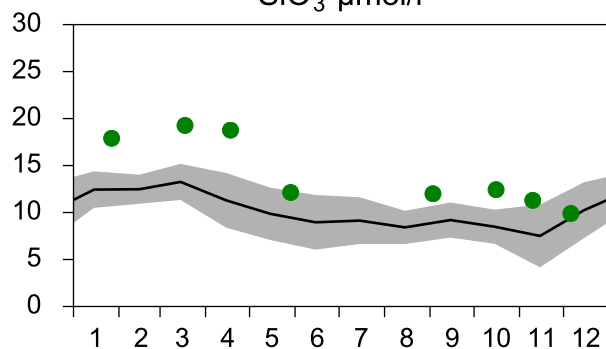
PO₄ µmol/l



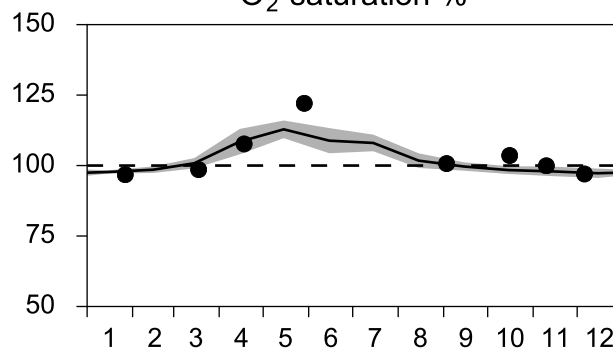
DIN µmol/l



SiO₃ µmol/l

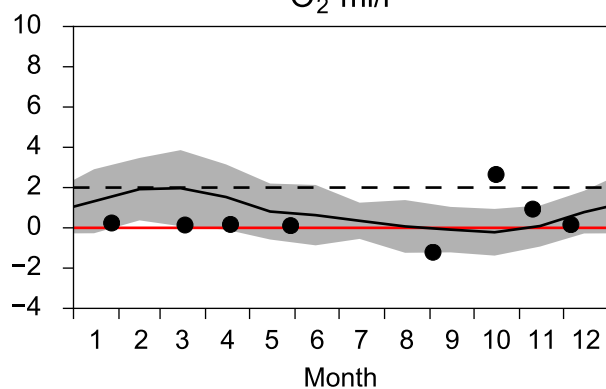


O₂ saturation %

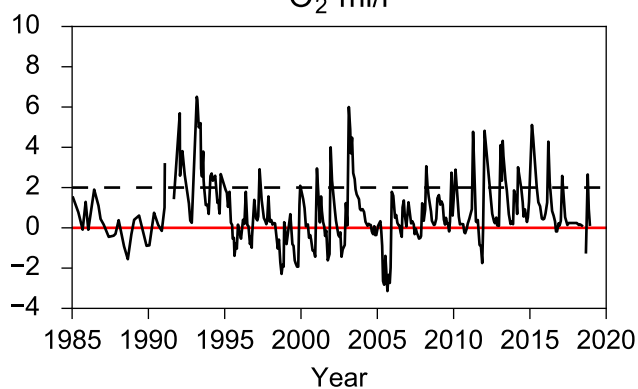


OXYGEN IN BOTTOM WATER (depth >= 80 m)

O₂ ml/l

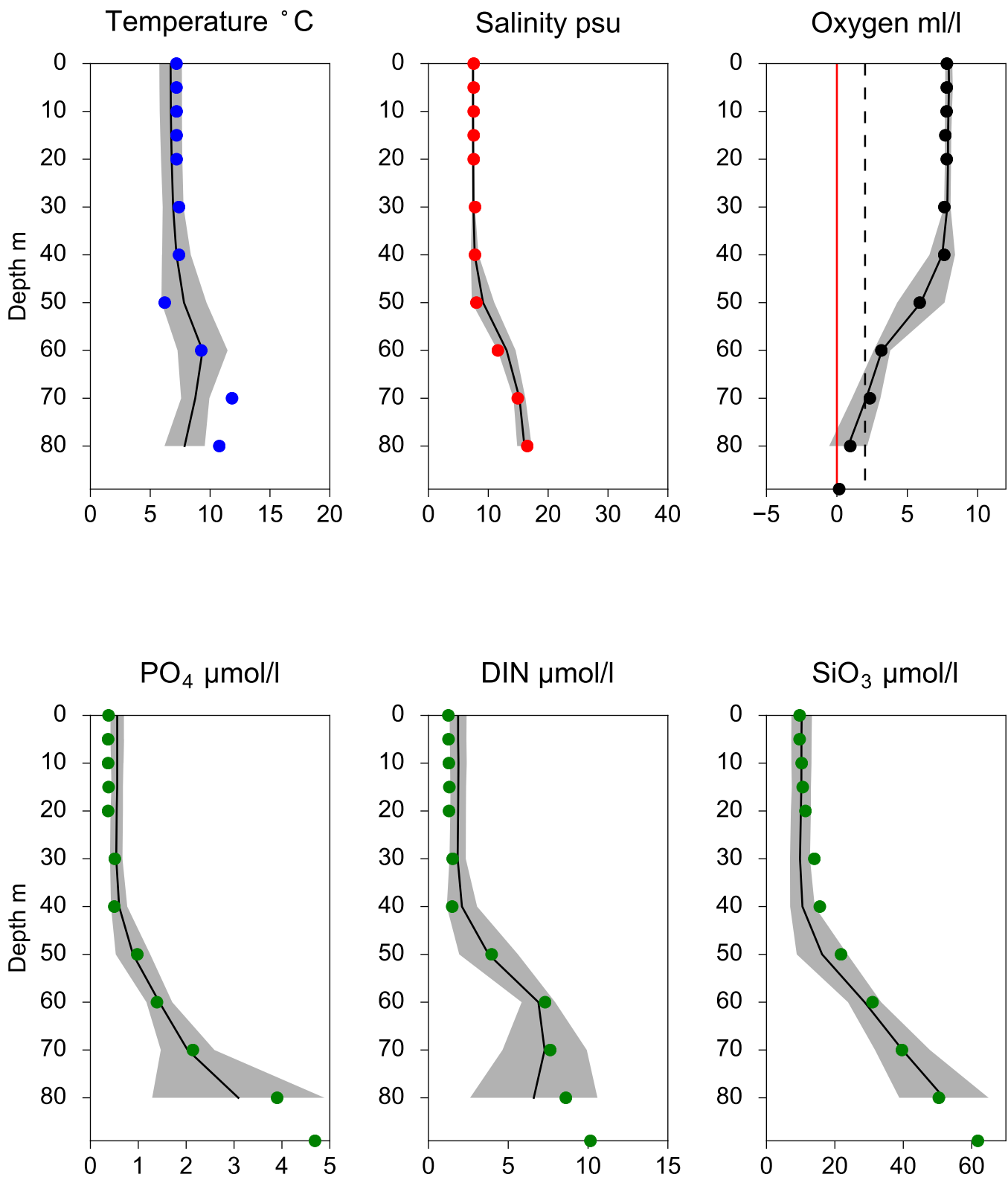


O₂ ml/l



Vertical profiles BY5 BORNHOLMSDJ December

— Mean 2001-2015 ■ St.Dev. ● 2018-12-06



STATION BY4 CHRISTIANSÖ SURFACE WATER (0-10 m)

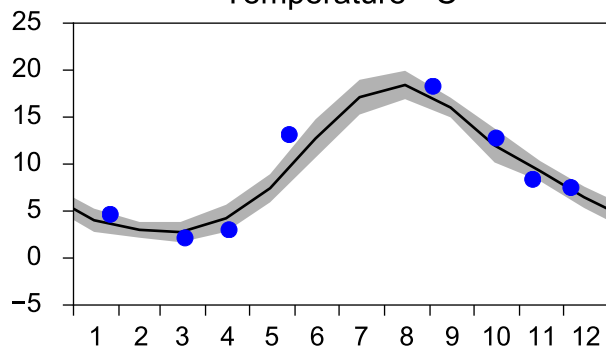
Annual Cycles

— Mean 2001-2015

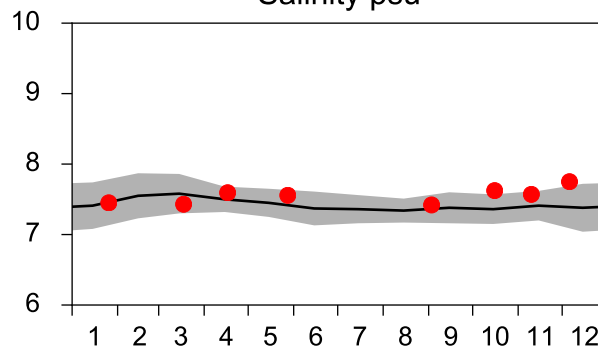
■ St.Dev.

● 2018

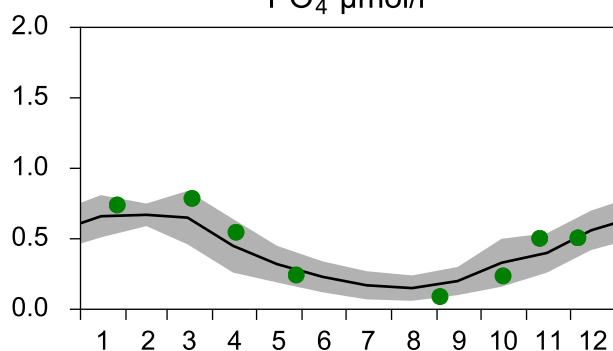
Temperature °C



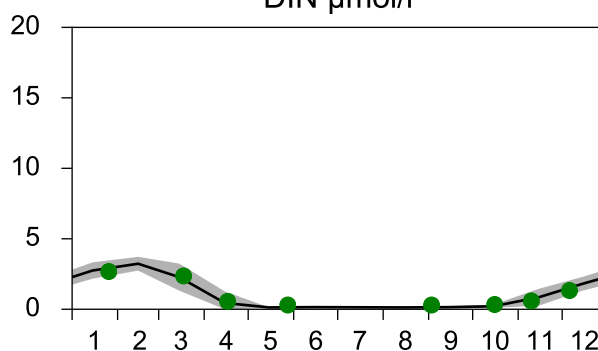
Salinity psu



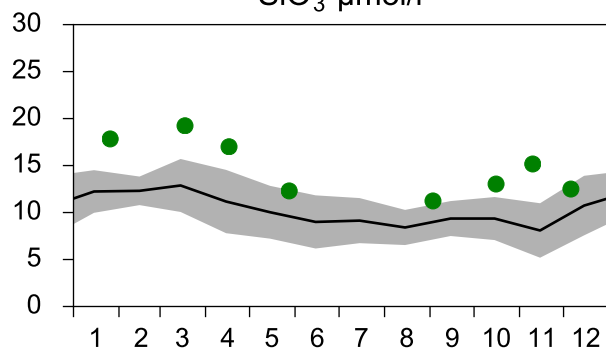
PO₄ µmol/l



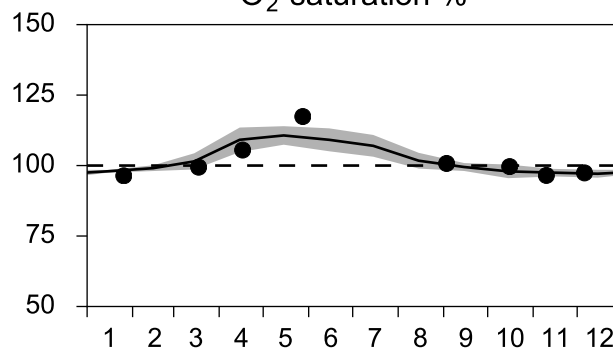
DIN µmol/l



SiO₃ µmol/l

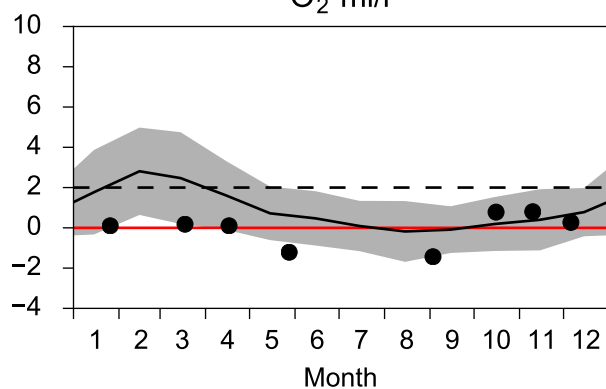


O₂ saturation %

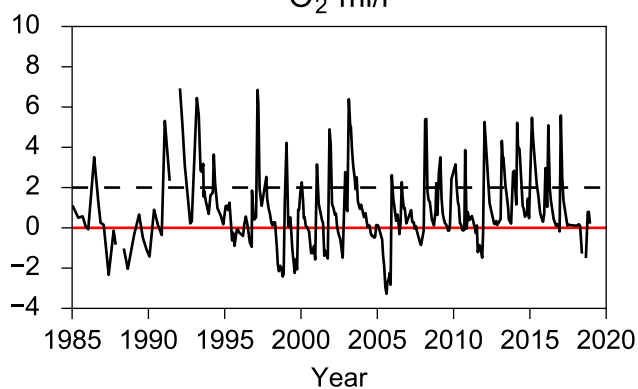


OXYGEN IN BOTTOM WATER (depth >= 80 m)

O₂ ml/l



O₂ ml/l



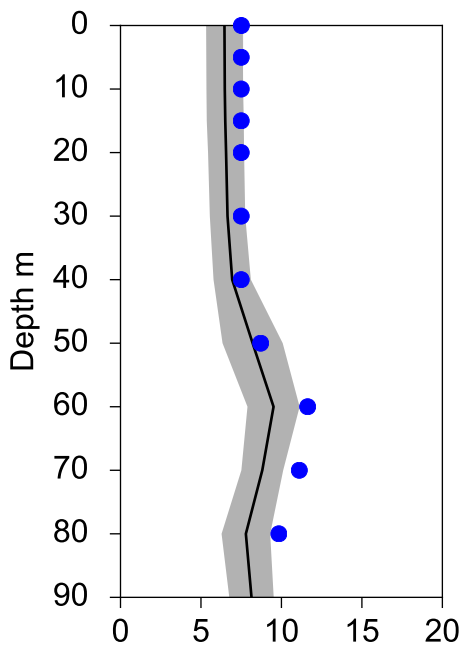
Vertical profiles BY4 CHRISTIANSÖ December

— Mean 2001-2015

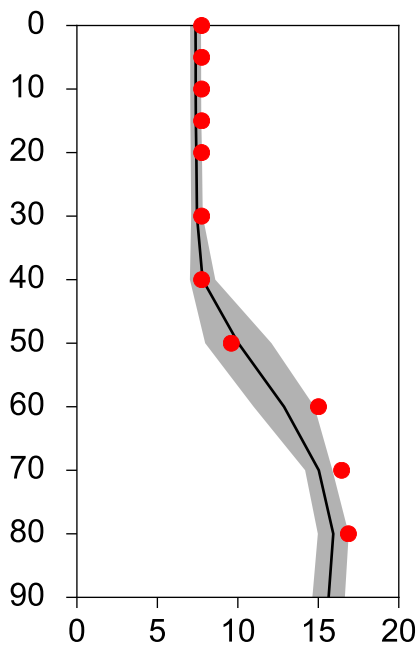
■ St.Dev.

● 2018-12-06

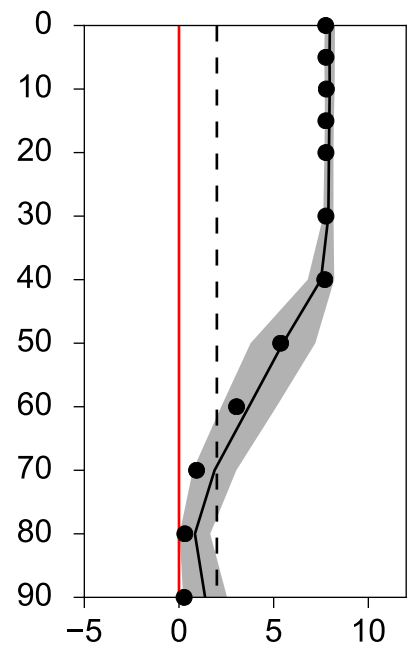
Temperature °C



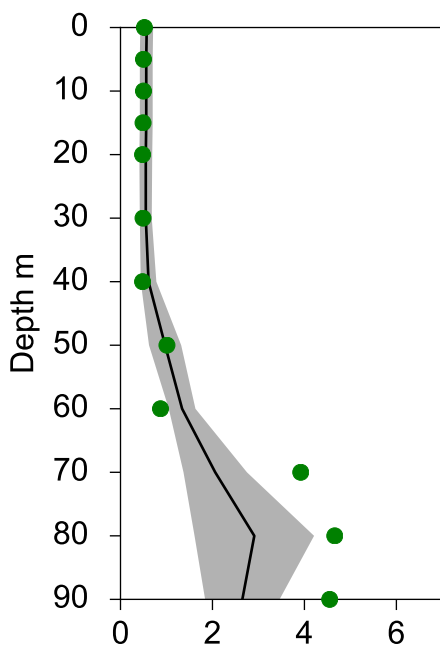
Salinity psu



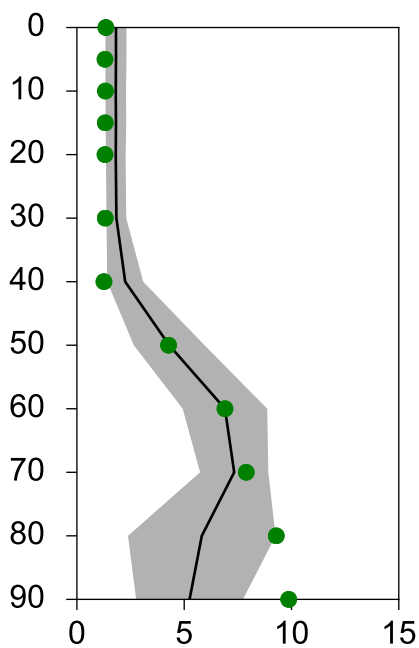
Oxygen ml/l



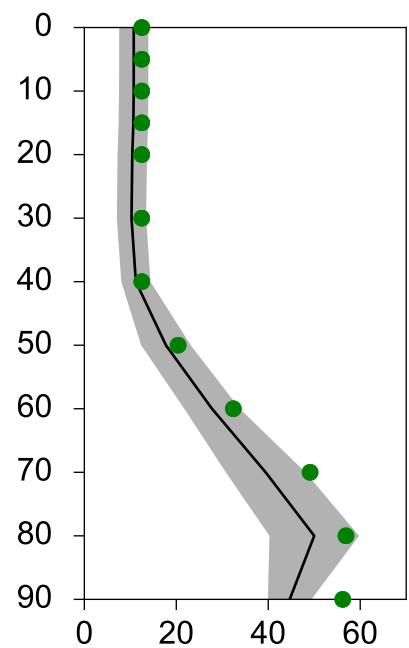
PO₄ μmol/l



DIN μmol/l



SiO₃ μmol/l



STATION BY2 ARKONA SURFACE WATER (0-10 m)

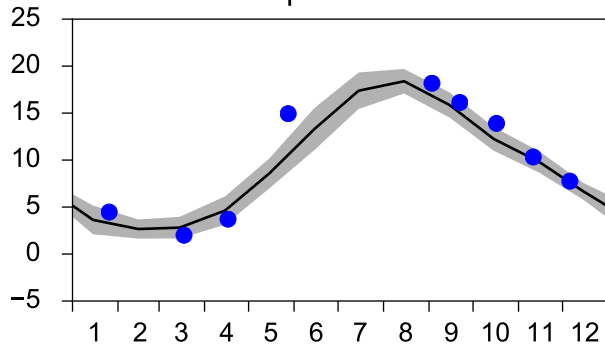
Annual Cycles

— Mean 2001-2015

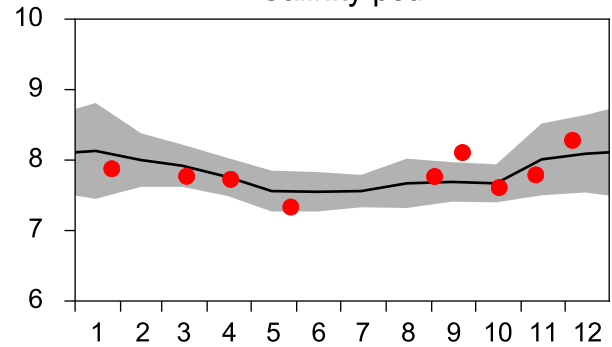
■ St.Dev.

● 2018

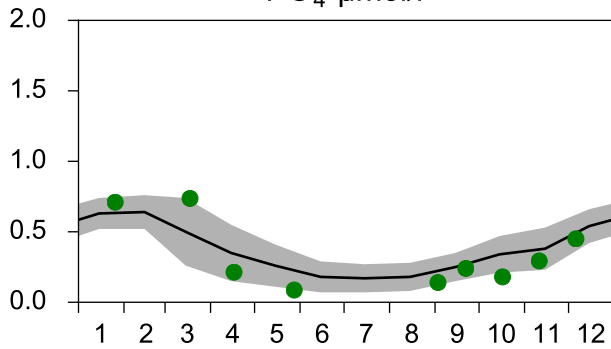
Temperature °C



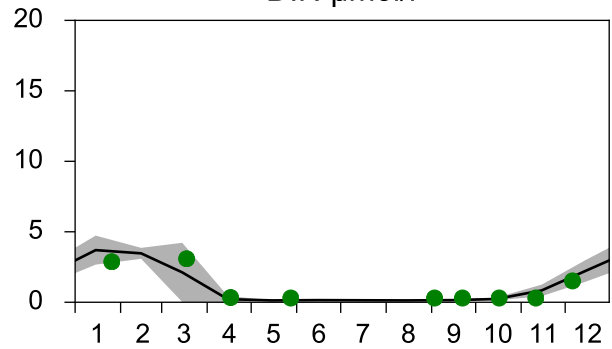
Salinity psu



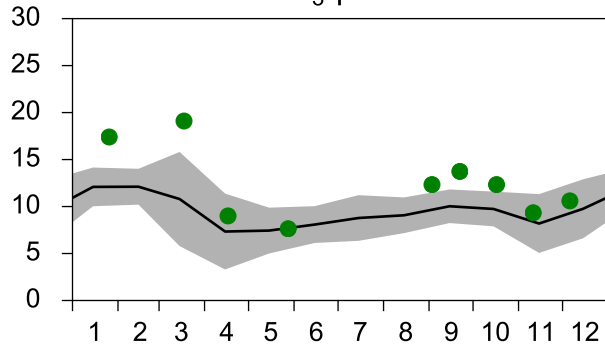
PO₄ µmol/l



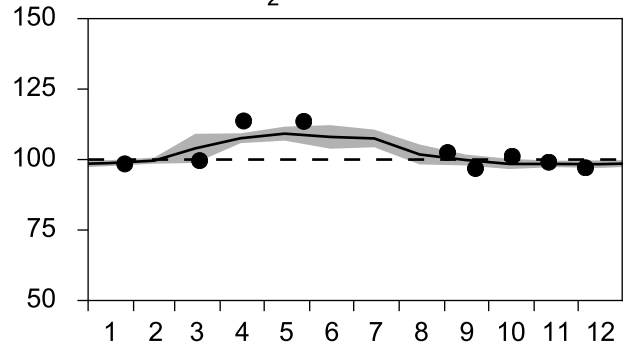
DIN µmol/l



SiO₃ µmol/l

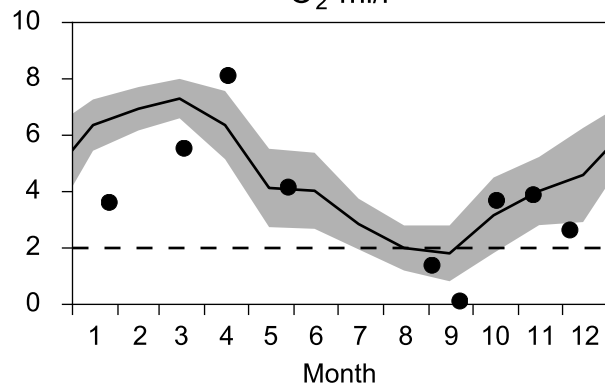


O₂ saturation %

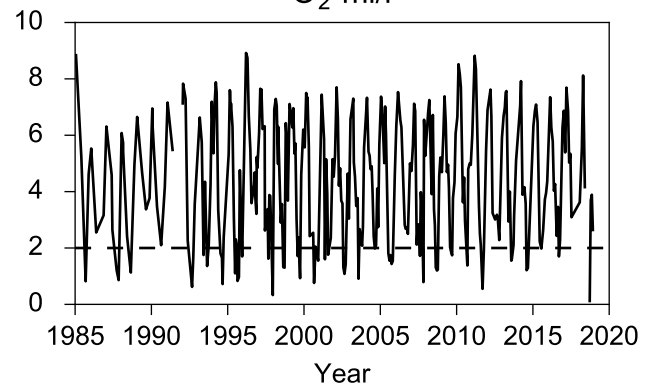


OXYGEN IN BOTTOM WATER (depth >= 40 m)

O₂ ml/l

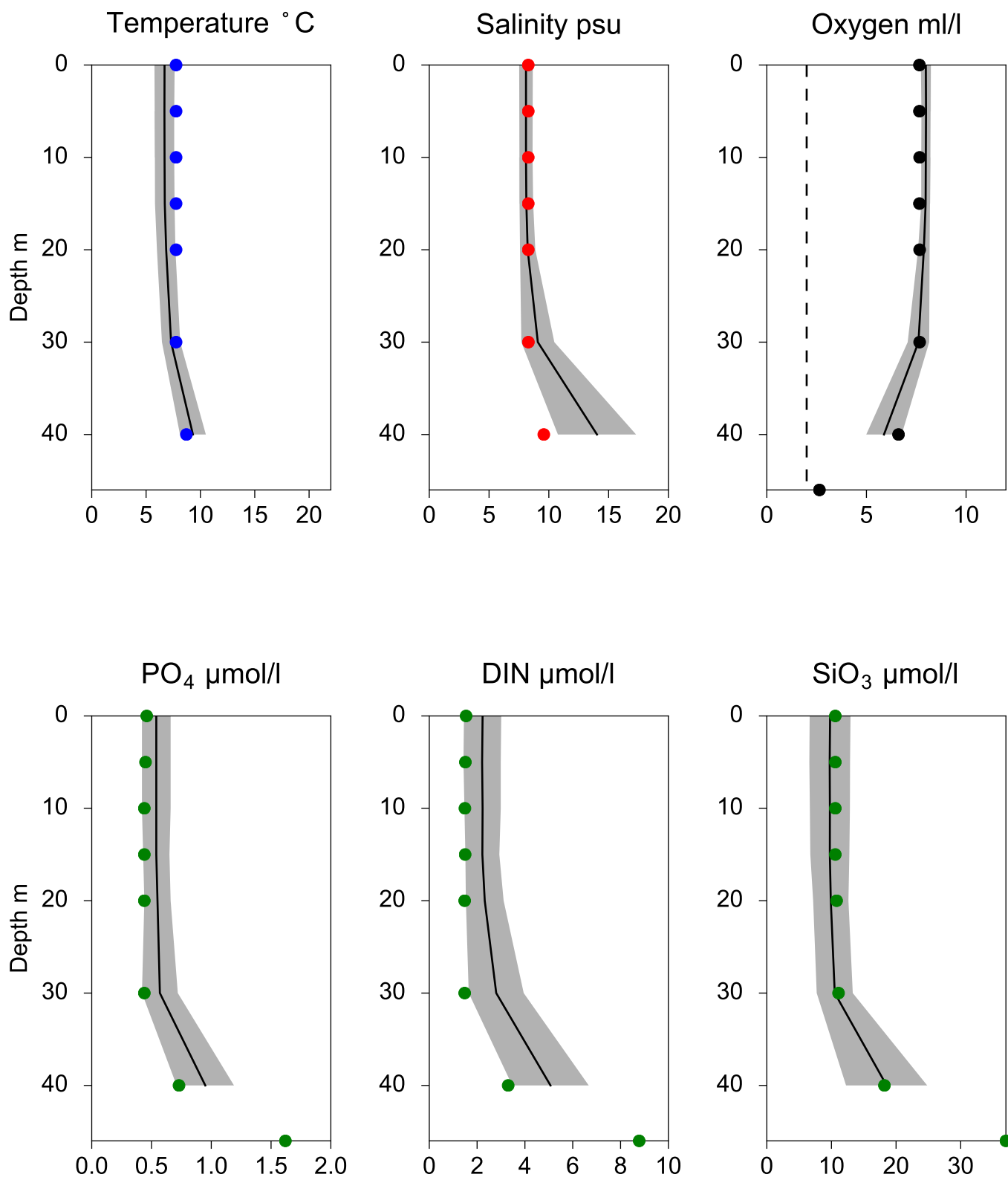


O₂ ml/l



Vertical profiles BY2 ARKONA December

— Mean 2001-2015 ■ St.Dev. ● 2018-12-06



STATION BY1 SURFACE WATER (0-10 m)

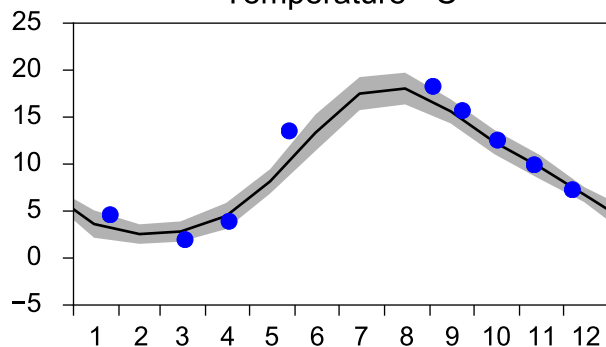
Annual Cycles

— Mean 2001-2015

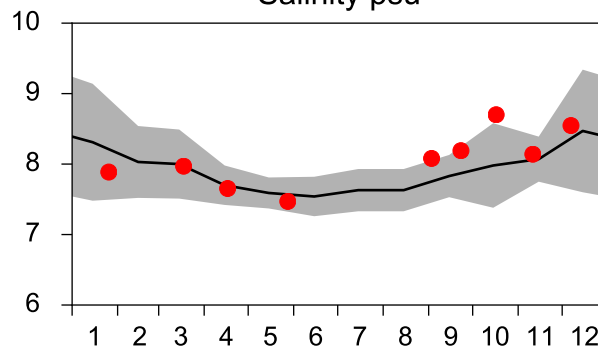
■ St.Dev.

● 2018

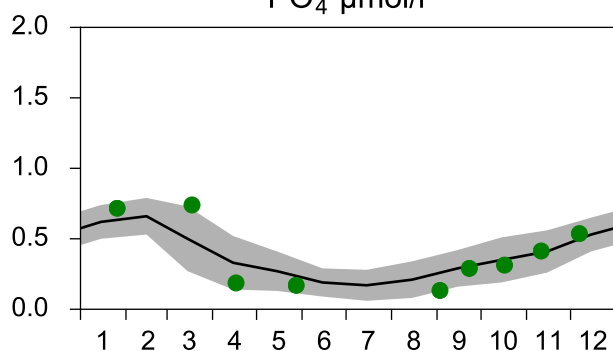
Temperature °C



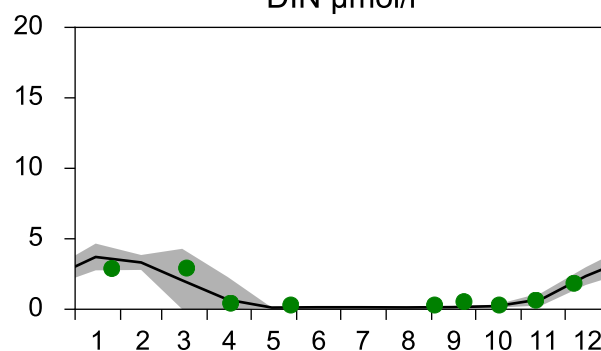
Salinity psu



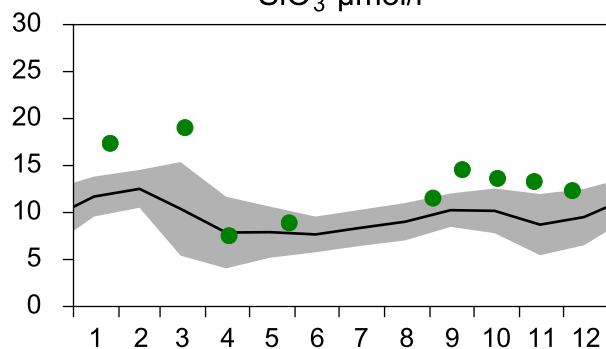
PO₄ µmol/l



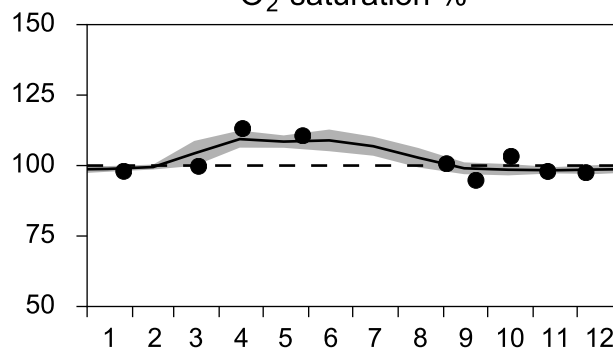
DIN µmol/l



SiO₃ µmol/l

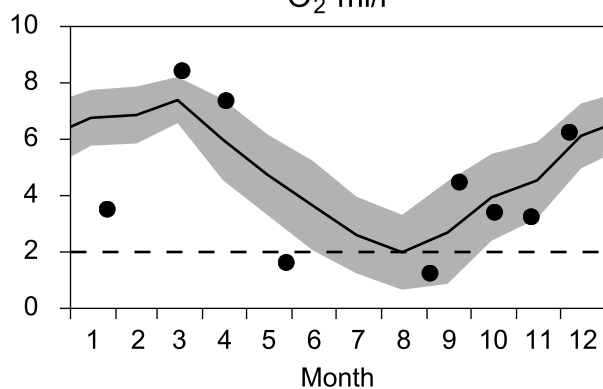


O₂ saturation %

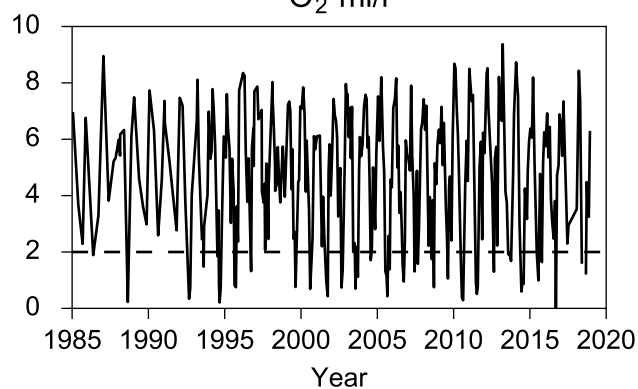


OXYGEN IN BOTTOM WATER (depth >= 40 m)

O₂ ml/l



O₂ ml/l



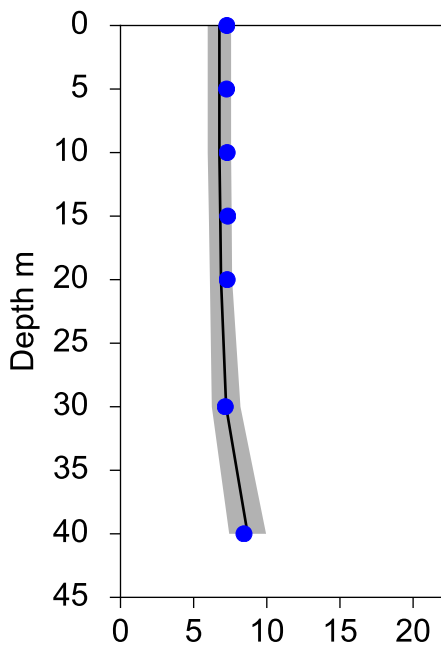
Vertical profiles BY1 December

— Mean 2001-2015

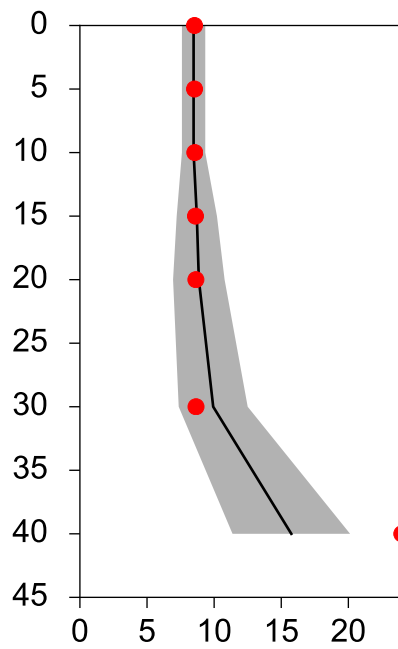
■ St.Dev.

● 2018-12-07

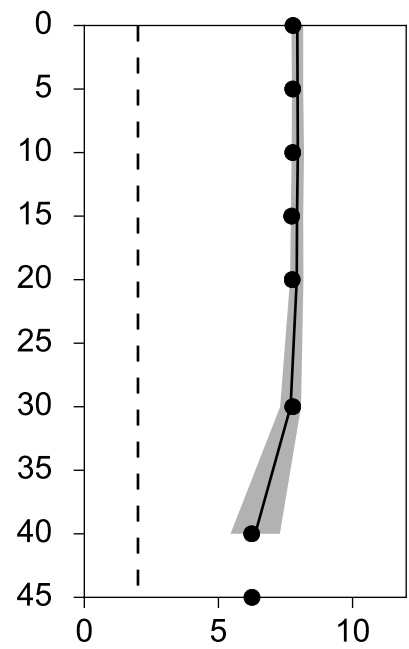
Temperature °C



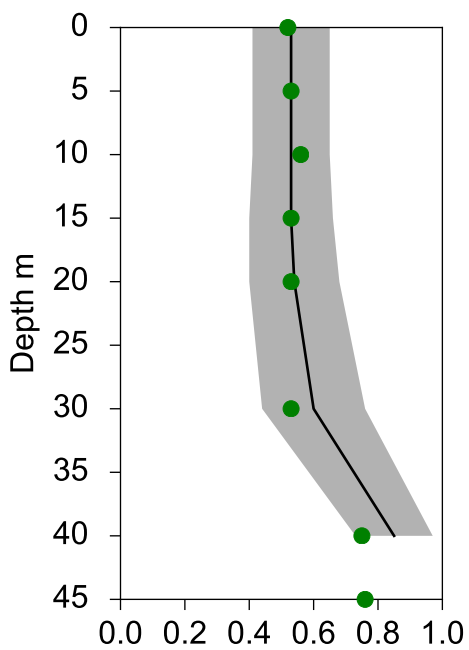
Salinity psu



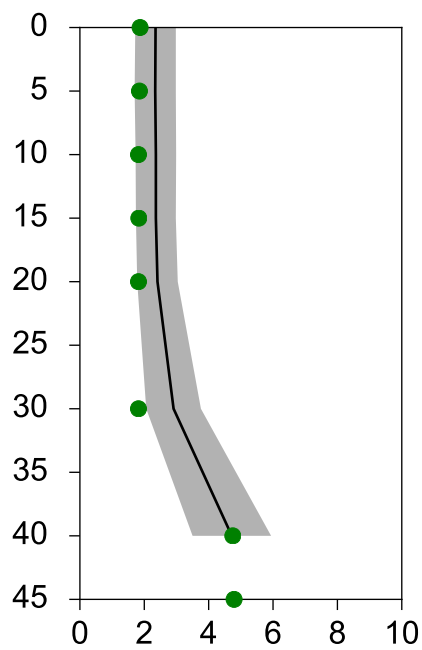
Oxygen ml/l



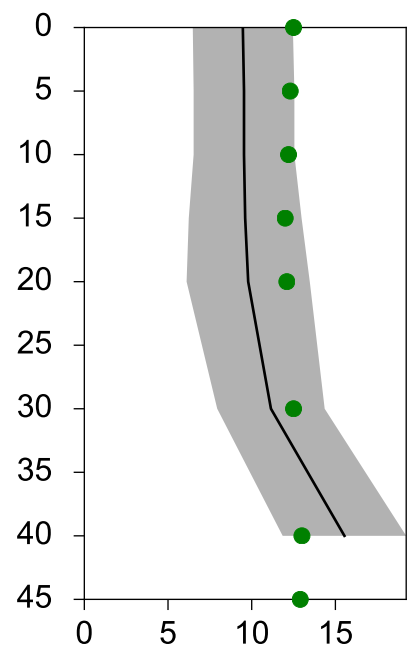
PO₄ μmol/l



DIN μmol/l



SiO₃ μmol/l



STATION W LANDSKRONA SURFACE WATER (0-10 m)

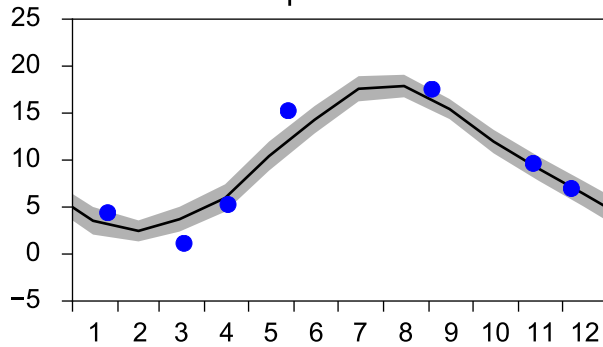
Annual Cycles

— Mean 2001-2015

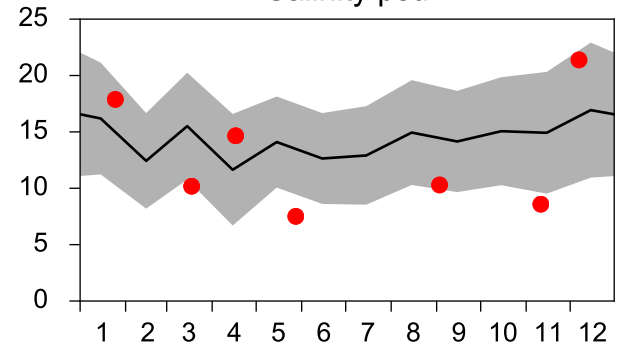
■ St.Dev.

● 2018

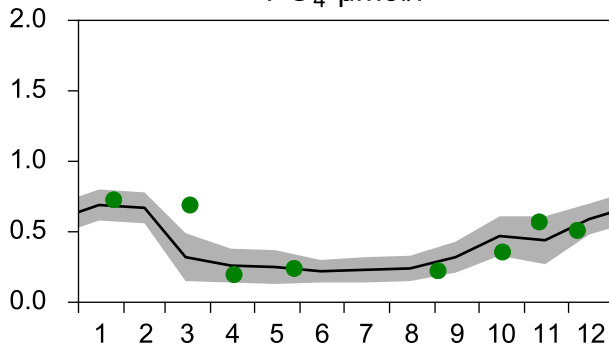
Temperature °C



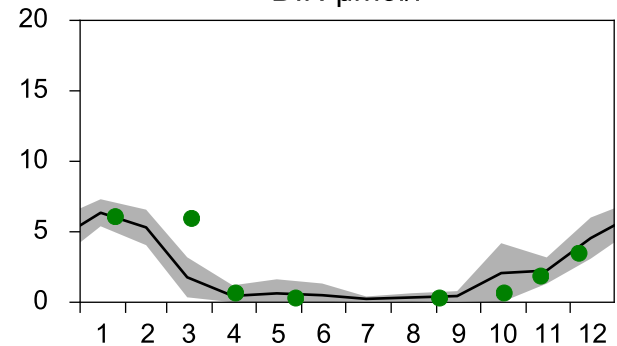
Salinity psu



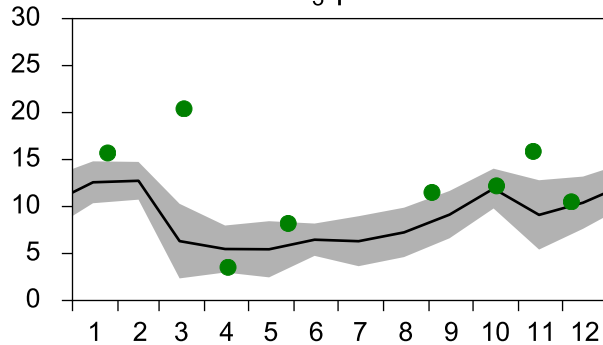
PO₄ µmol/l



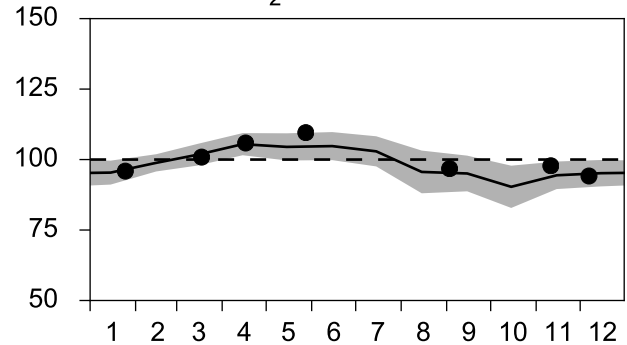
DIN µmol/l



SiO₃ µmol/l

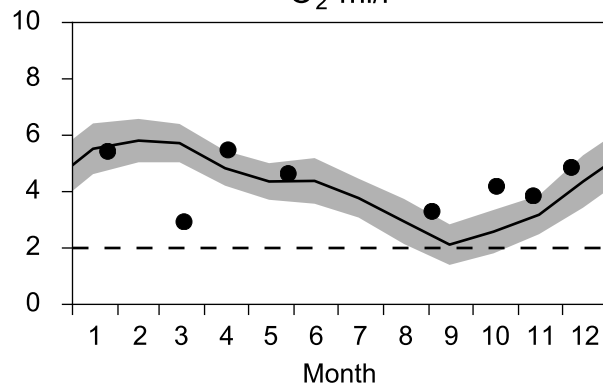


O₂ saturation %

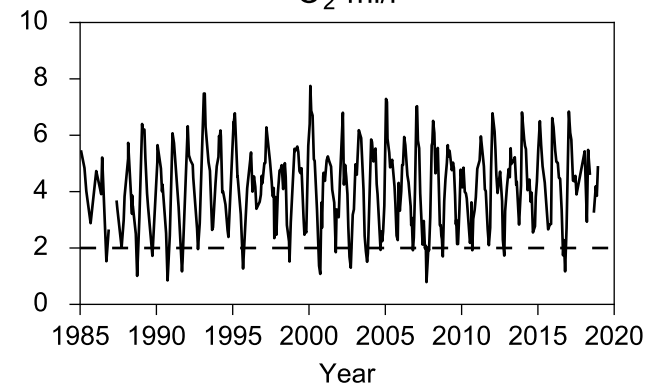


OXYGEN IN BOTTOM WATER (depth >= 40 m)

O₂ ml/l

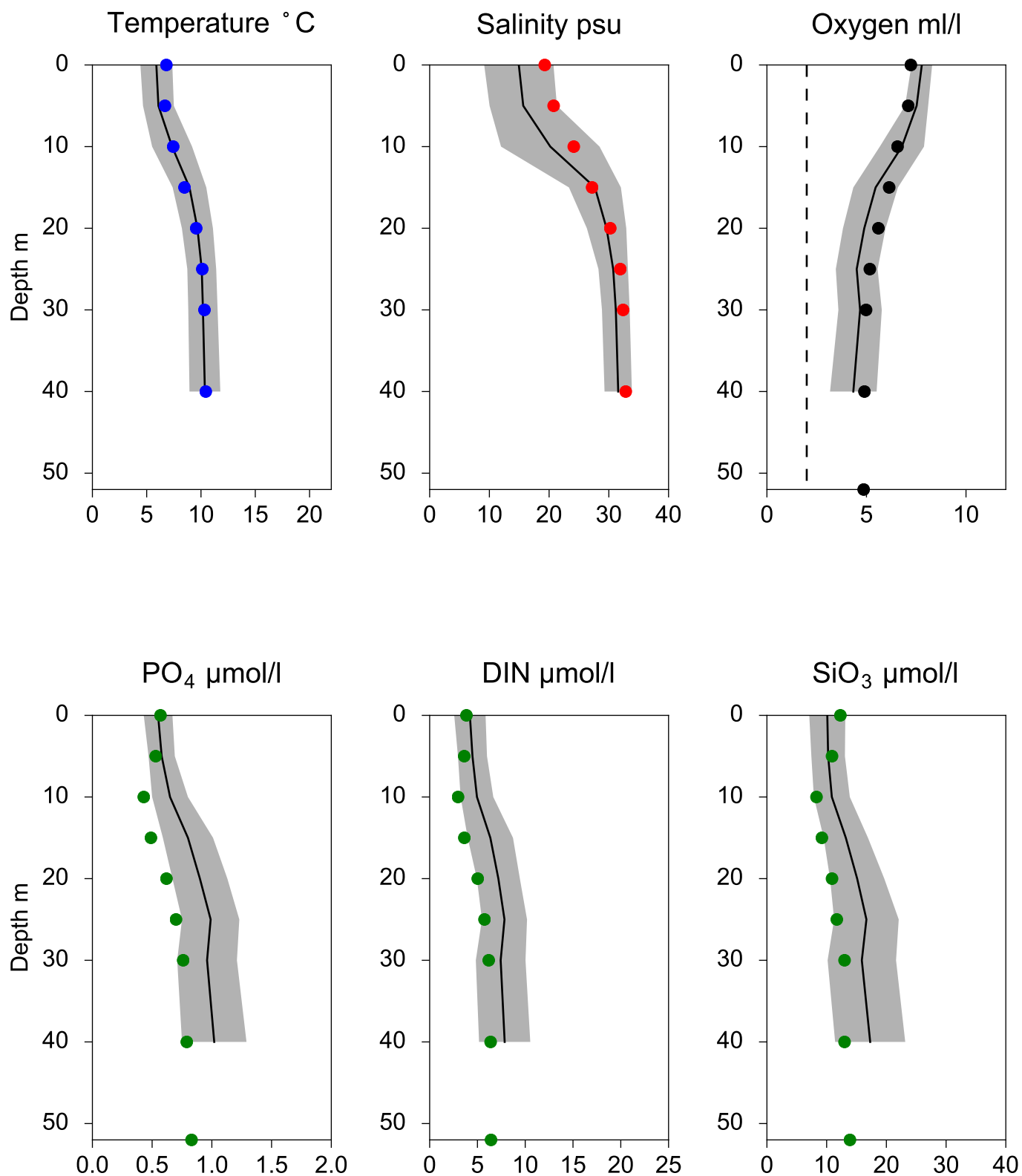


O₂ ml/l



Vertical profiles W LANDSKRONA December

— Mean 2001-2015 St.Dev. • 2018-12-07



STATION ANHOLT E SURFACE WATER (0-10 m)

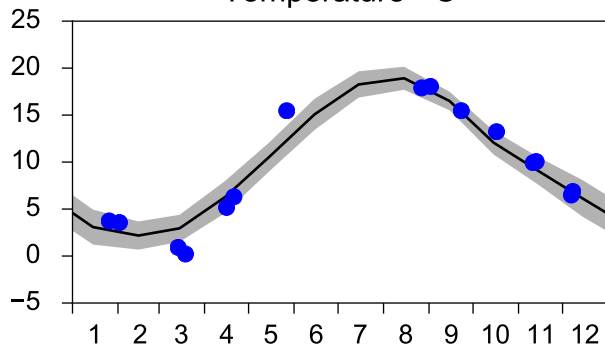
Annual Cycles

— Mean 2001-2015

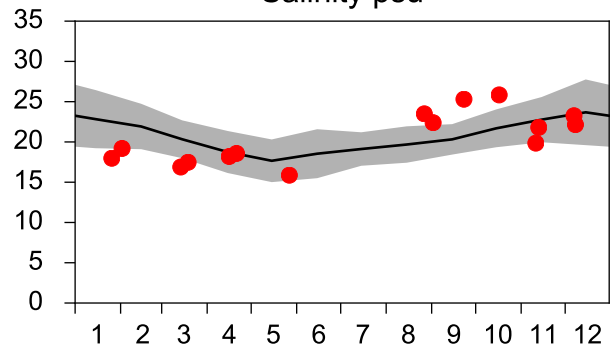
■ St.Dev.

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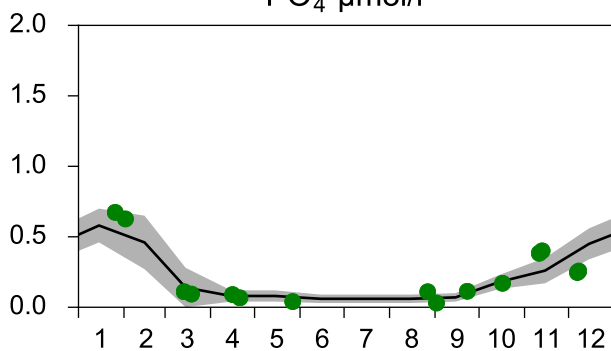
Temperature °C



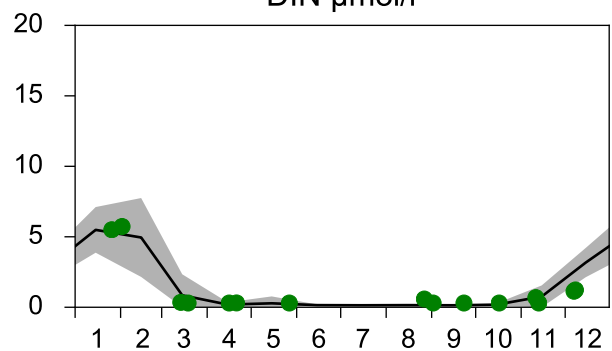
Salinity psu



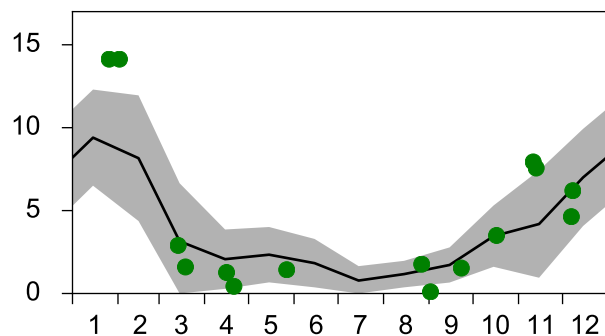
PO₄ µmol/l



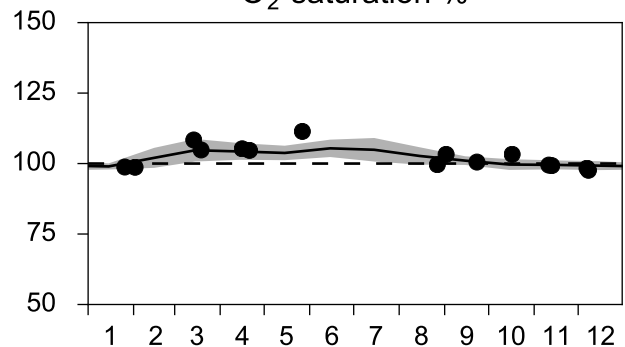
DIN µmol/l



SiO₃ µmol/l

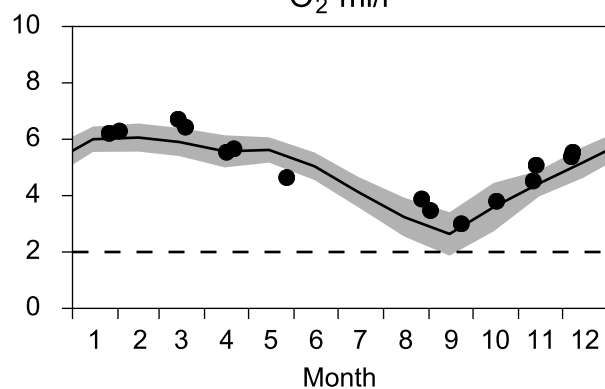


O₂ saturation %

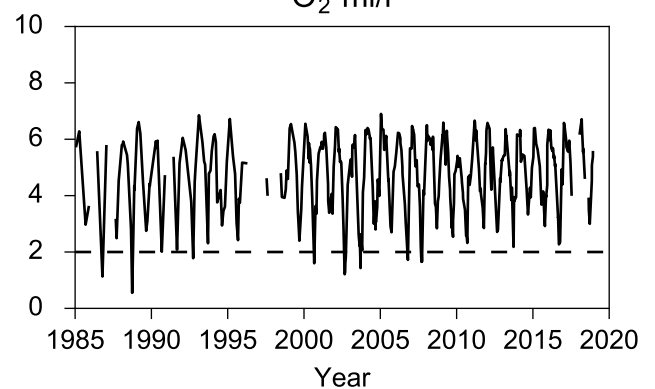


OXYGEN IN BOTTOM WATER (depth >= 52 m)

O₂ ml/l



O₂ ml/l

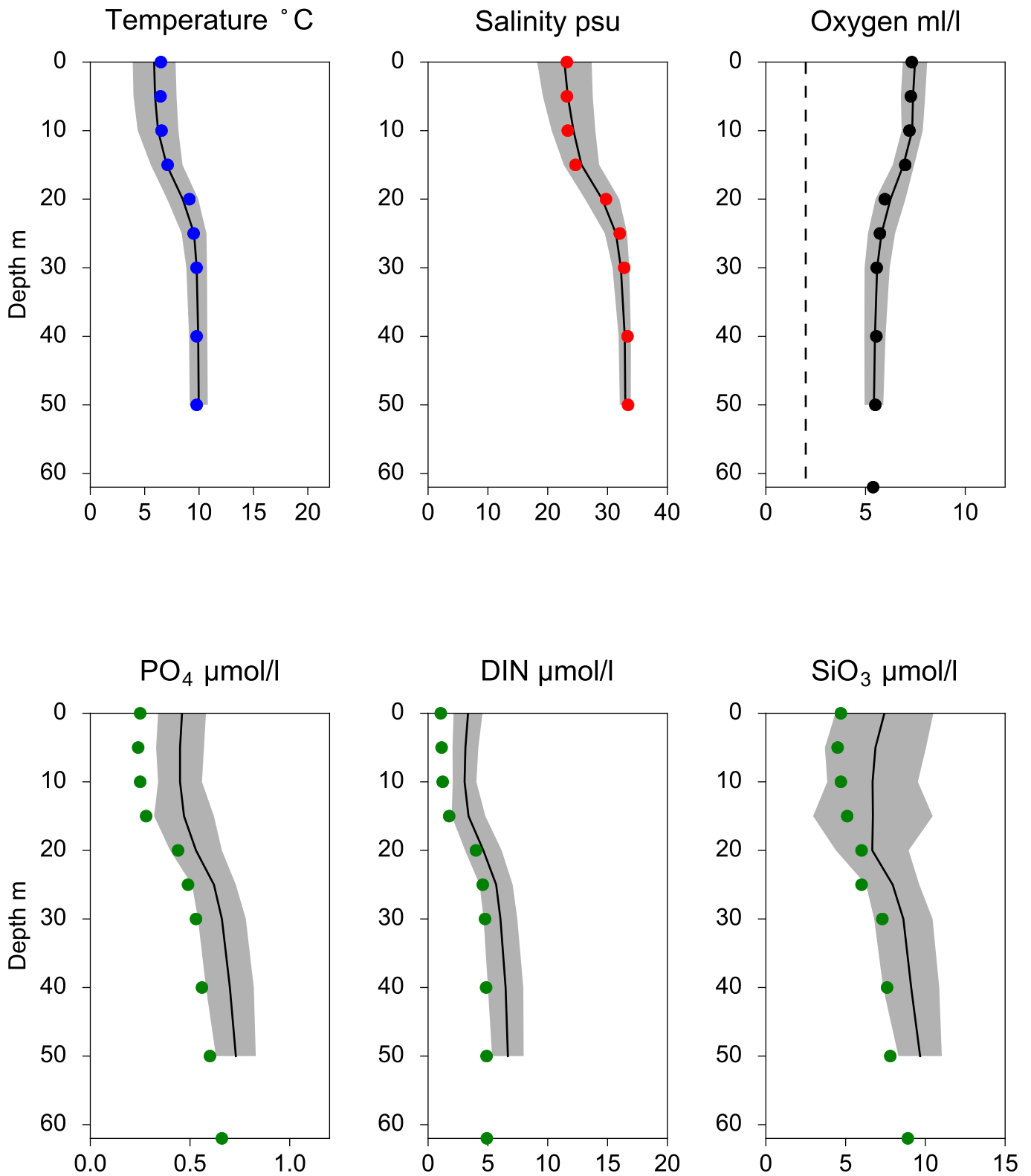


Vertical profiles ANHOLT E December

— Mean 2001-2015

■ St.Dev.

● 2018-12-07



STATION FLADEN SURFACE WATER (0-10 m)

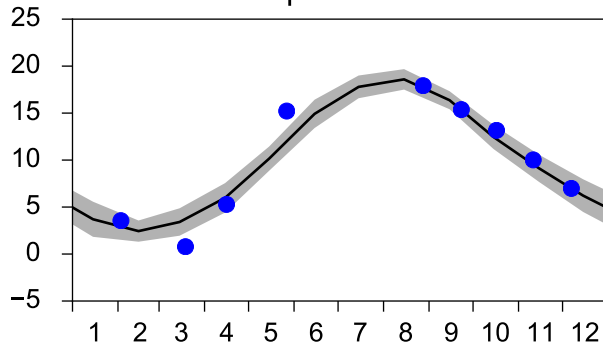
Annual Cycles

— Mean 2001-2015

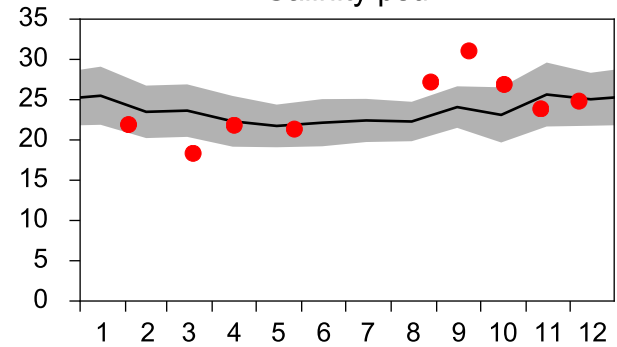
■ St.Dev.

● 2018

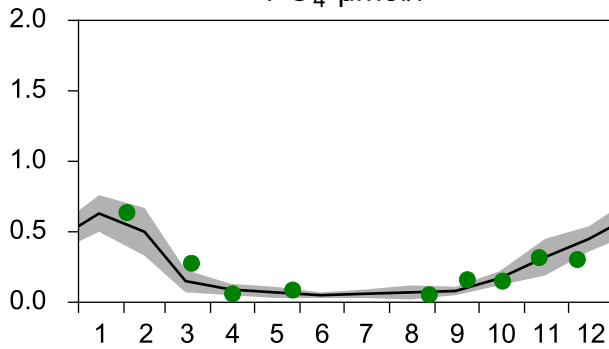
Temperature °C



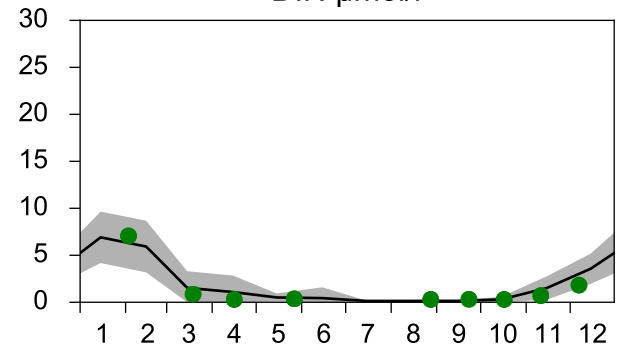
Salinity psu



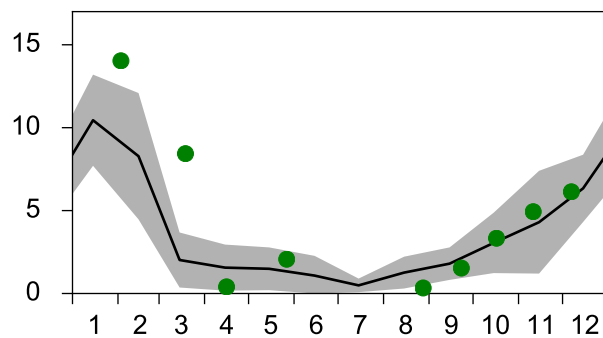
PO₄ µmol/l



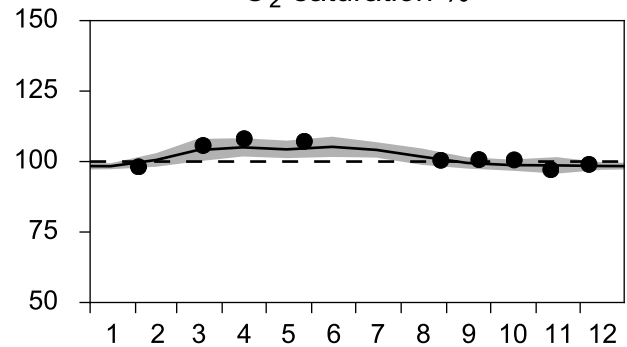
DIN µmol/l



SiO₃ µmol/l

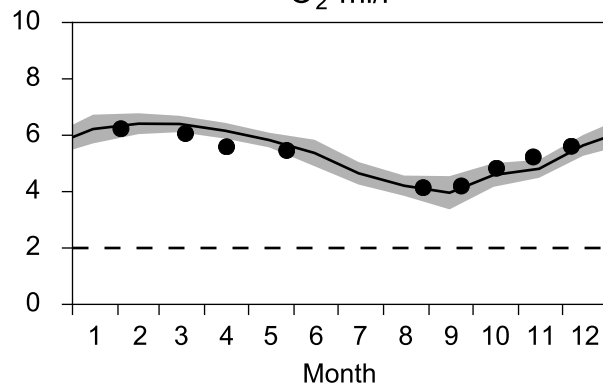


O₂ saturation %

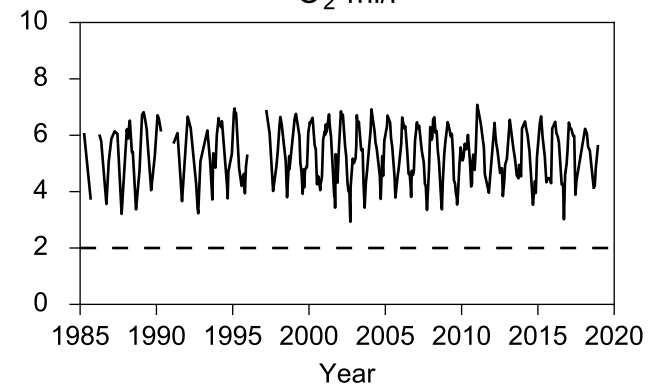


OXYGEN IN BOTTOM WATER (depth >= 74 m)

O₂ ml/l

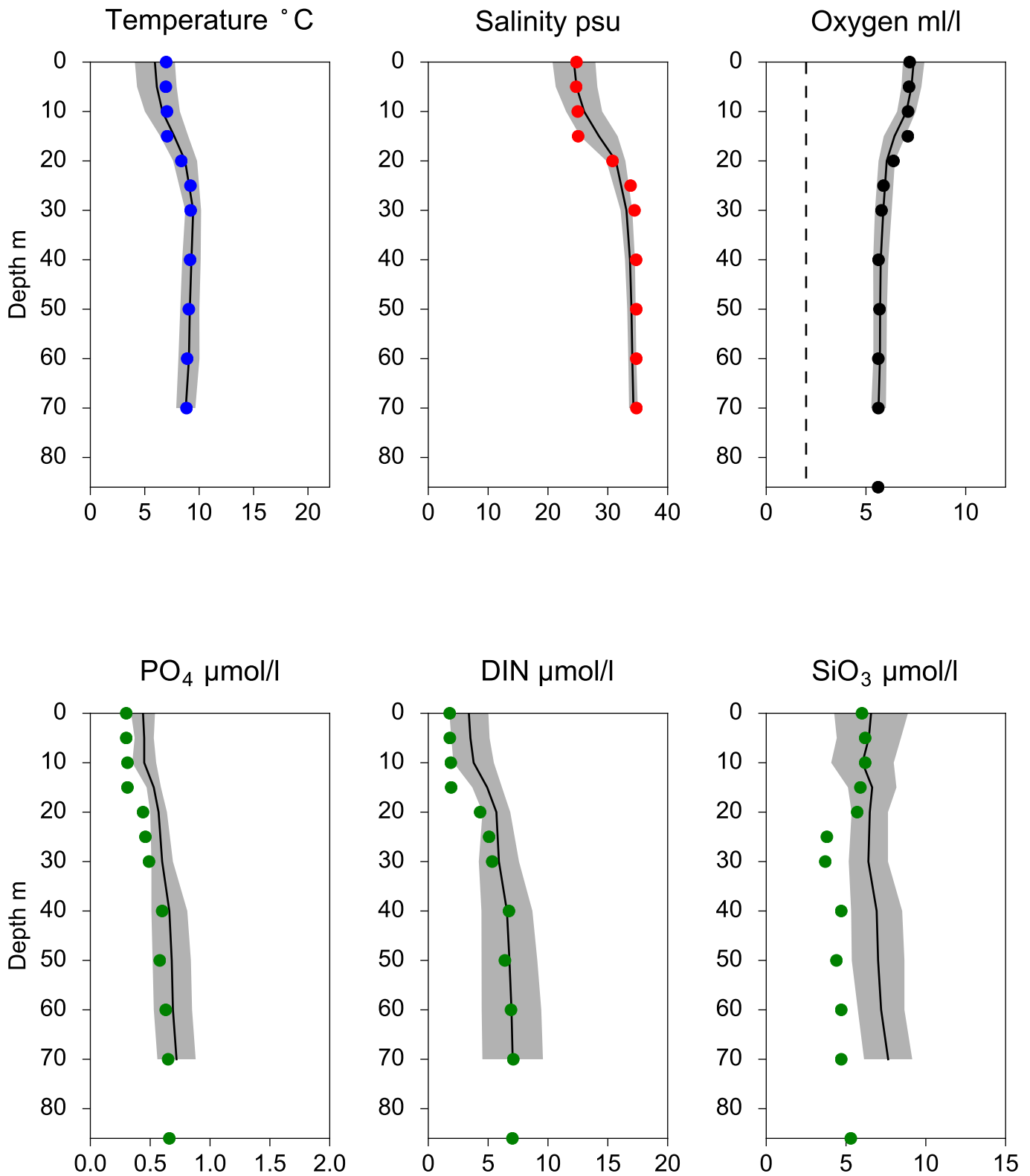


O₂ ml/l



Vertical profiles FLADEN December

— Mean 2001-2015 St.Dev. • 2018-12-07



STATION P2 SURFACE WATER (0-10 m)

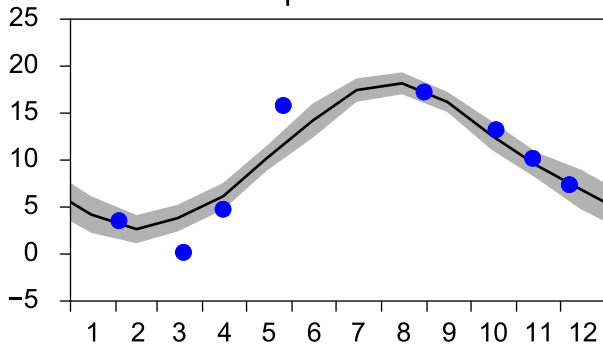
Annual Cycles

— Mean 2001-2015

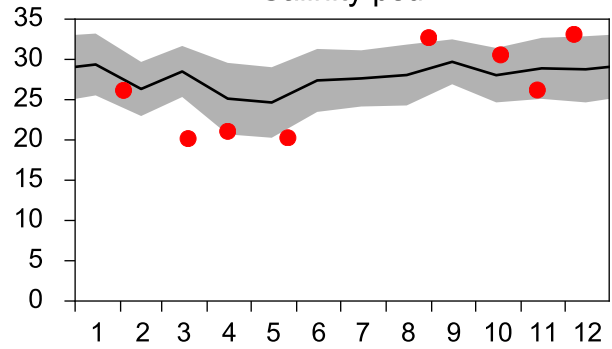
■ St.Dev.

● 2018

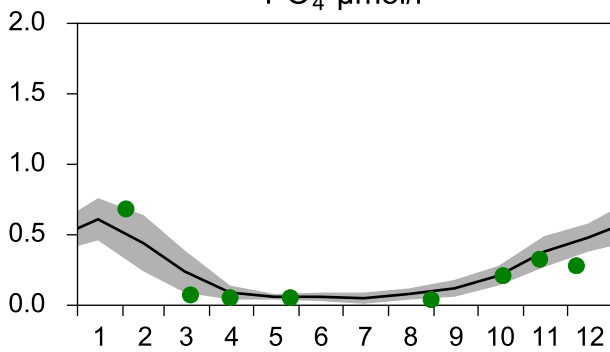
Temperature °C



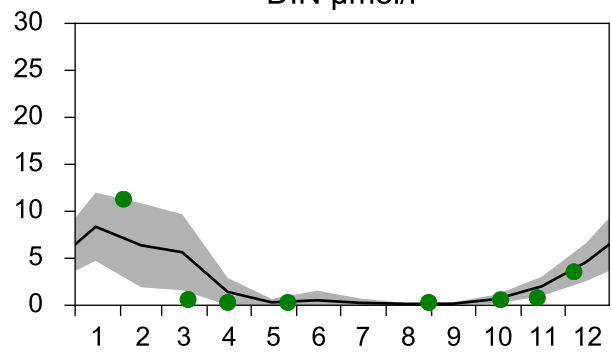
Salinity psu



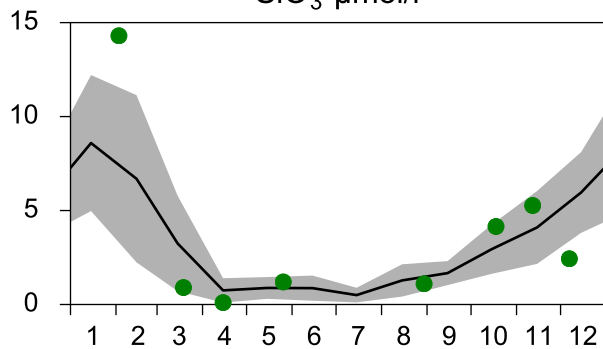
PO₄ µmol/l



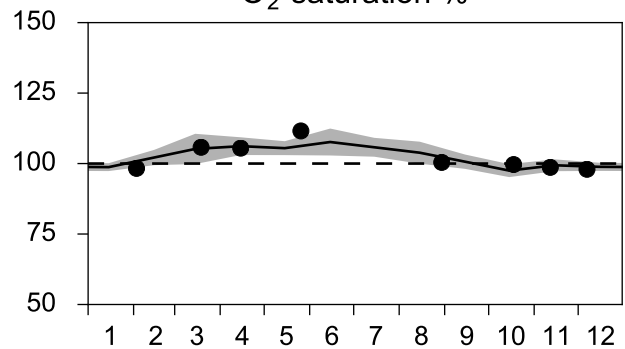
DIN µmol/l



SiO₃ µmol/l

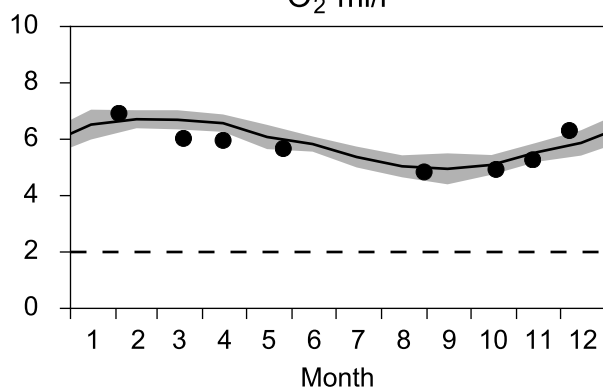


O₂ saturation %

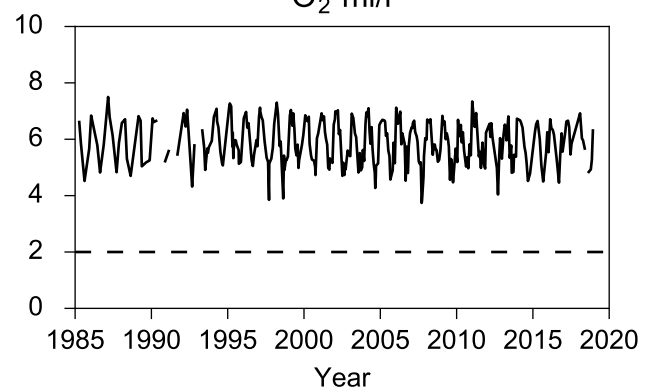


OXYGEN IN BOTTOM WATER (depth >= 75 m)

O₂ ml/l



O₂ ml/l

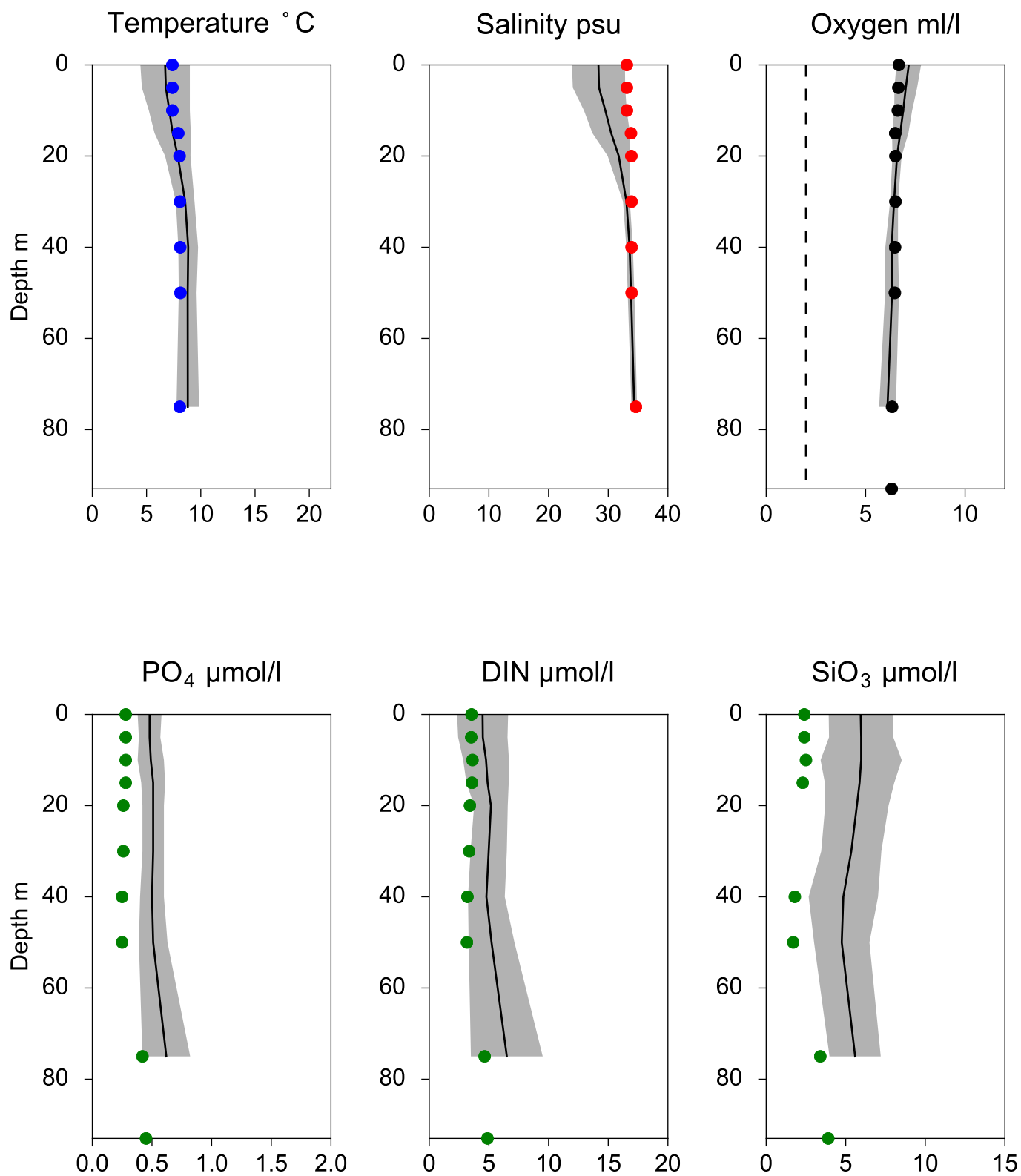


Vertical profiles P2 December

— Mean 2001-2015

■ St.Dev.

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STATION Å17 SURFACE WATER (0-10 m)

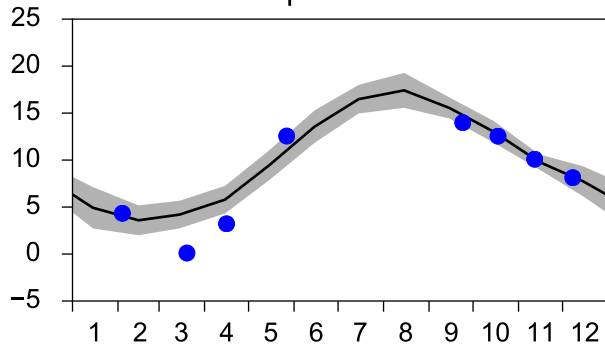
Annual Cycles

— Mean 2001-2015

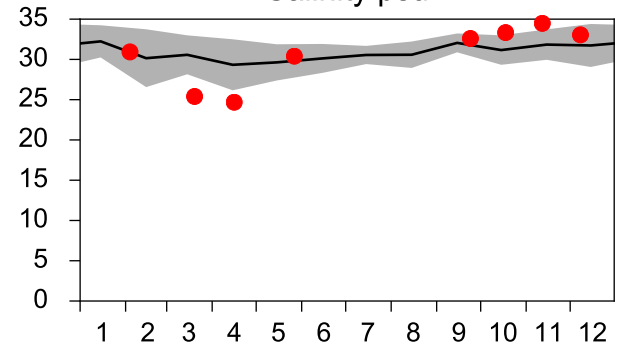
■ St.Dev.

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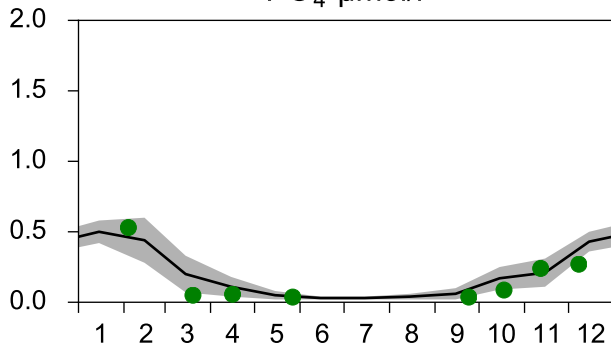
Temperature °C



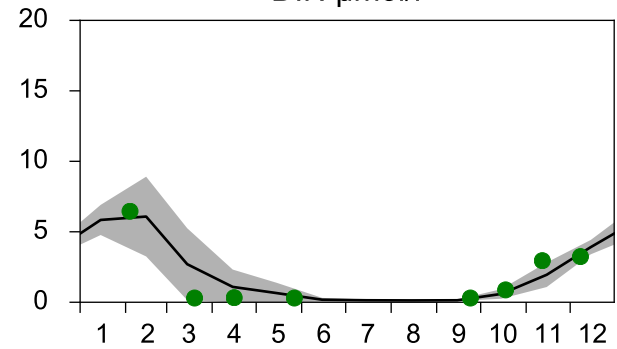
Salinity psu



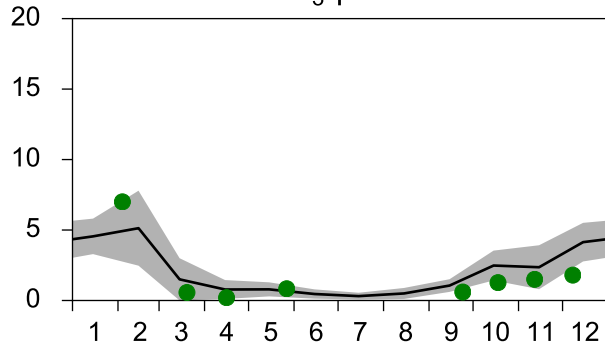
PO₄ µmol/l



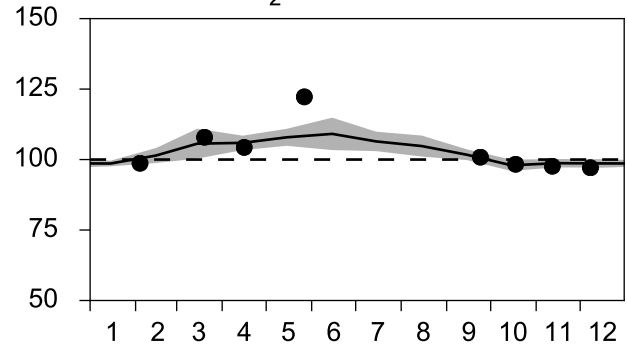
DIN µmol/l



SiO₃ µmol/l

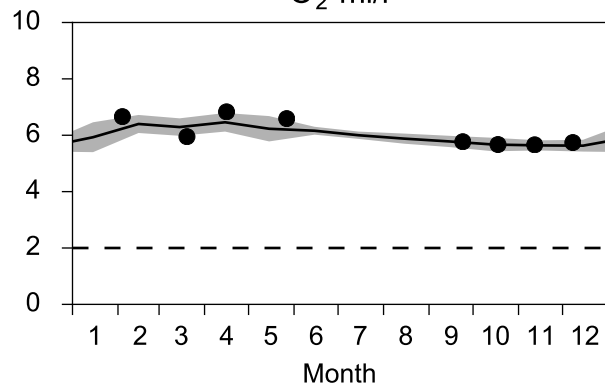


O₂ saturation %

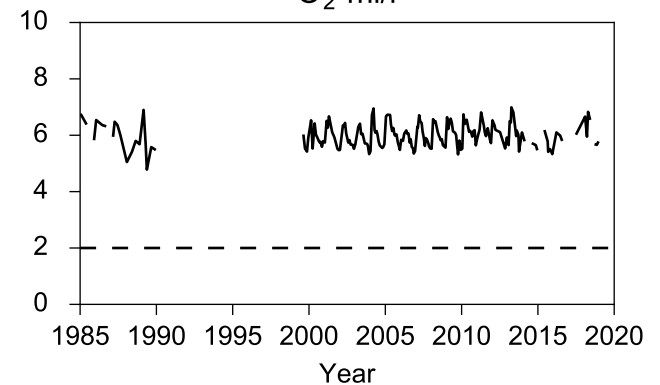


OXYGEN IN BOTTOM WATER (depth >= 300 m)

O₂ ml/l

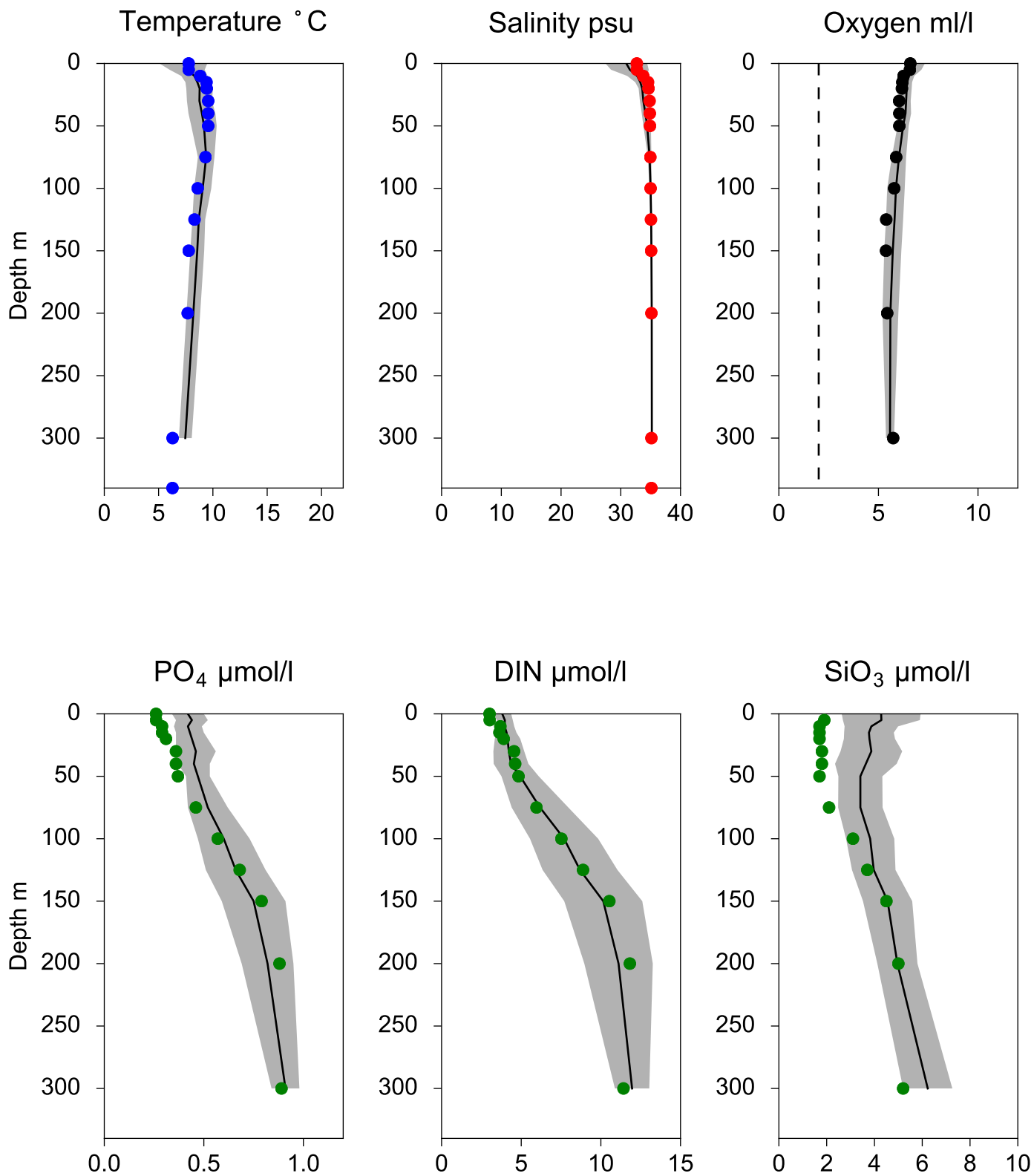


O₂ ml/l



Vertical profiles Å17 December

— Mean 2001-2015 ■ St.Dev. ● 2018-12-08



STATION Å15 SURFACE WATER (0-10 m)

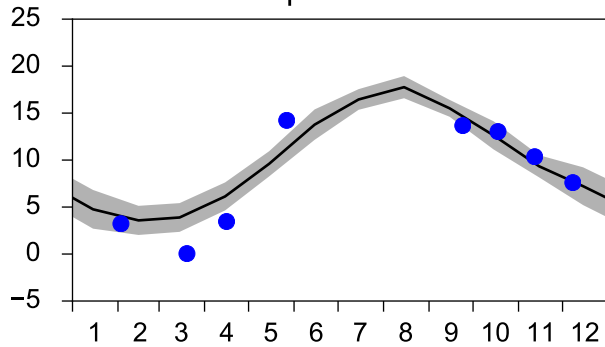
Annual Cycles

— Mean 2001-2015

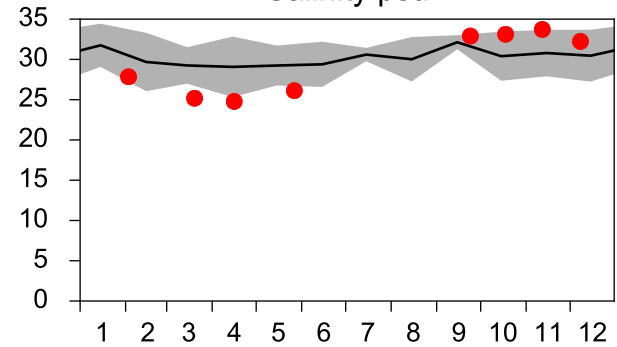
■ St.Dev.

● 2018

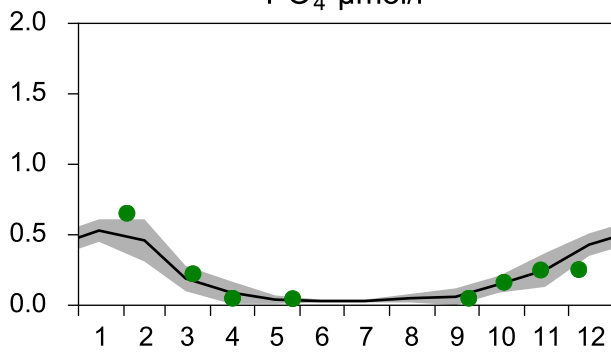
Temperature °C



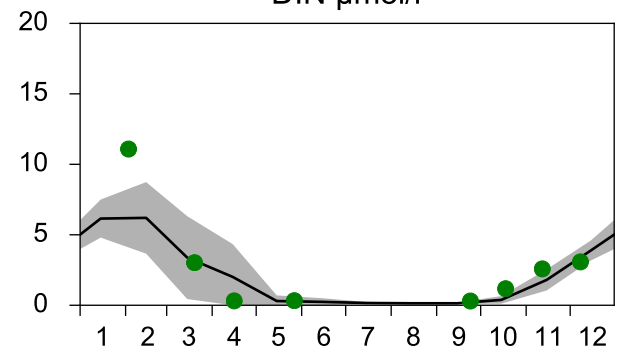
Salinity psu



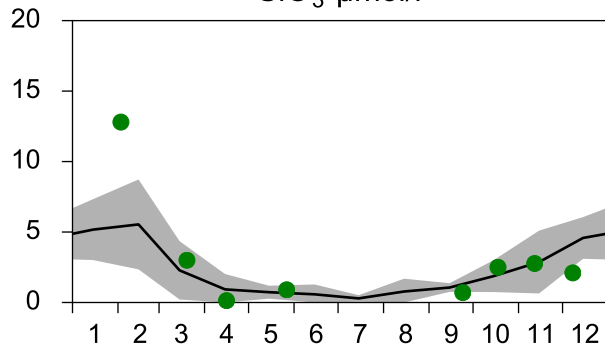
PO₄ µmol/l



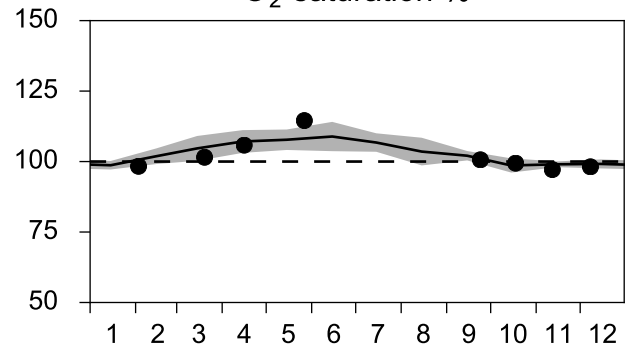
DIN µmol/l



SiO₃ µmol/l

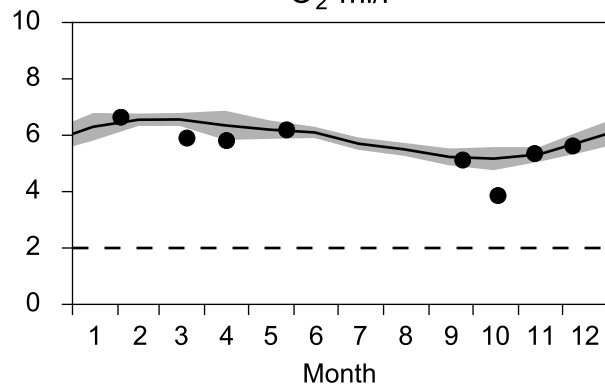


O₂ saturation %

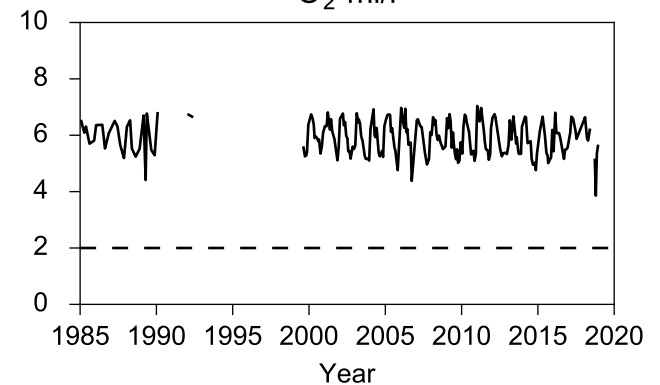


OXYGEN IN BOTTOM WATER (depth >= 125 m)

O₂ ml/l

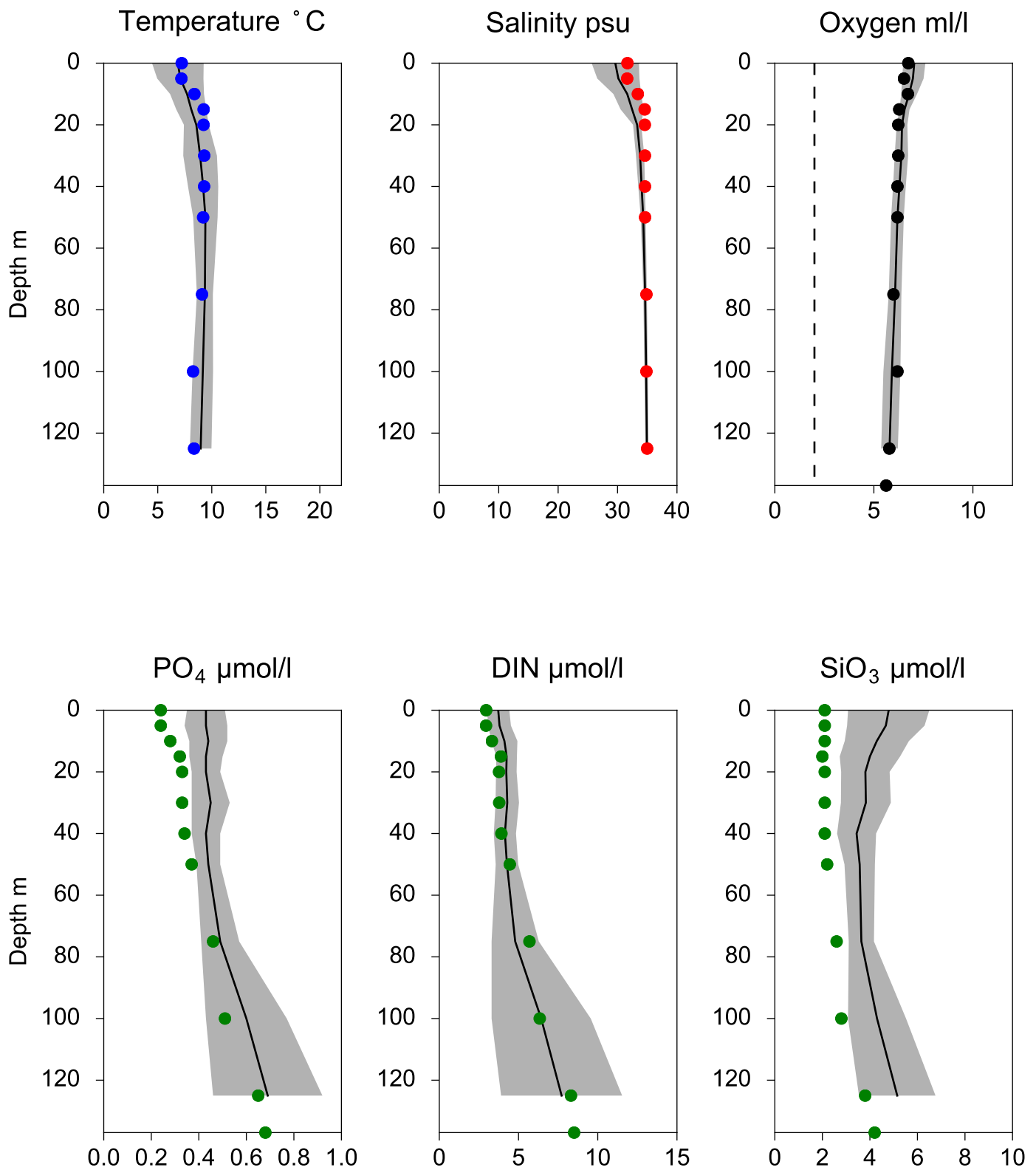


O₂ ml/l



Vertical profiles Å15 December

— Mean 2001-2015 ■ St.Dev. ● 2018-12-08



STATION Å13 SURFACE WATER (0-10 m)

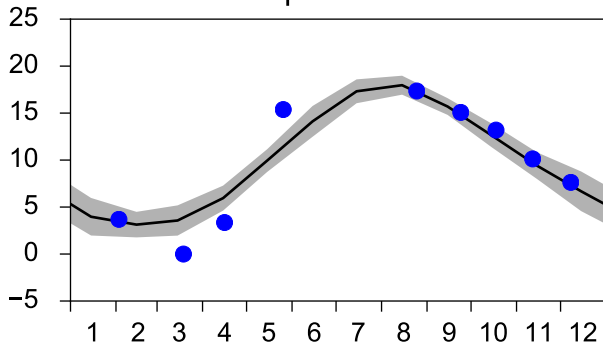
Annual Cycles

— Mean 2001-2015

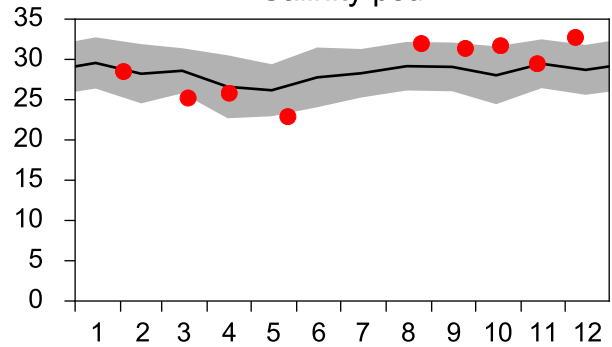
■ St.Dev.

● 2018

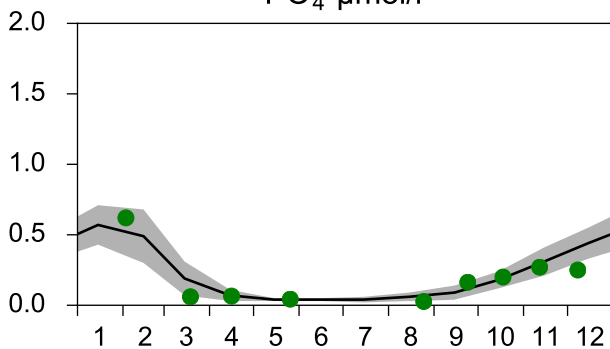
Temperature °C



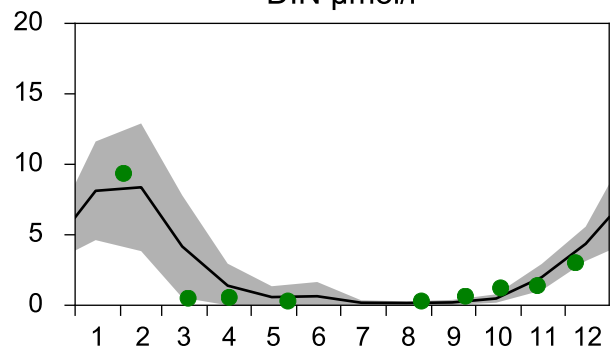
Salinity psu



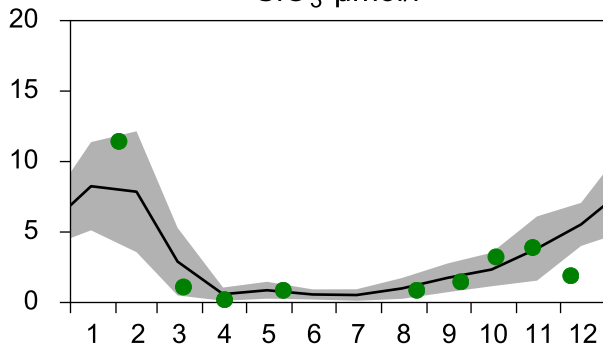
PO₄ µmol/l



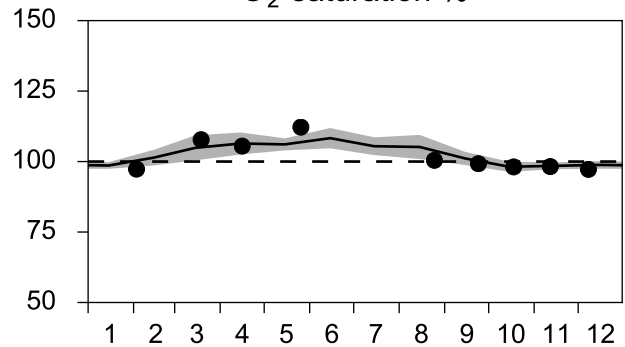
DIN µmol/l



SiO₃ µmol/l

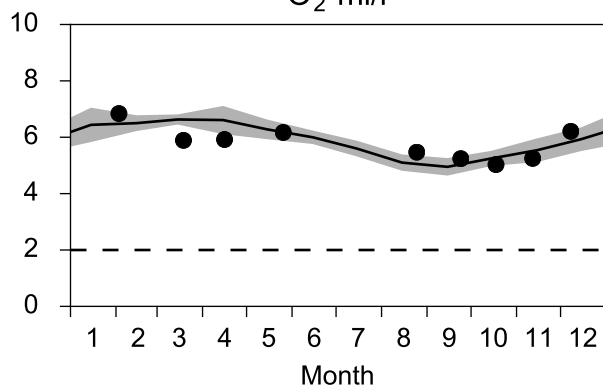


O₂ saturation %

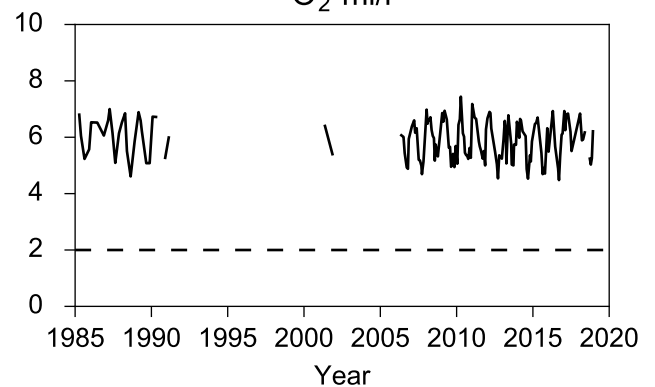


OXYGEN IN BOTTOM WATER (depth >= 80 m)

O₂ ml/l

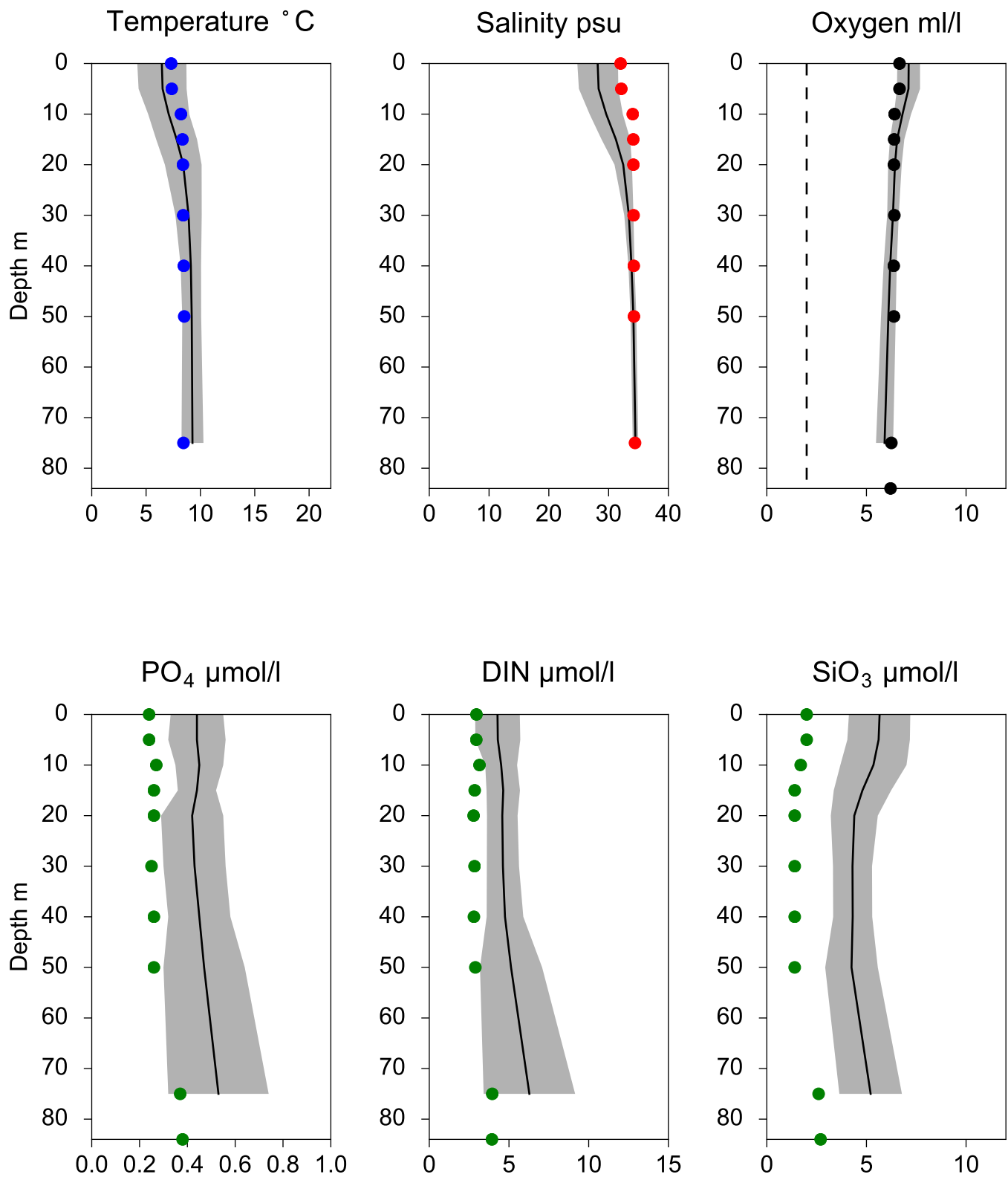


O₂ ml/l



Vertical profiles Å13 December

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STATION SLÄGGÖ SURFACE WATER (0-10 m)

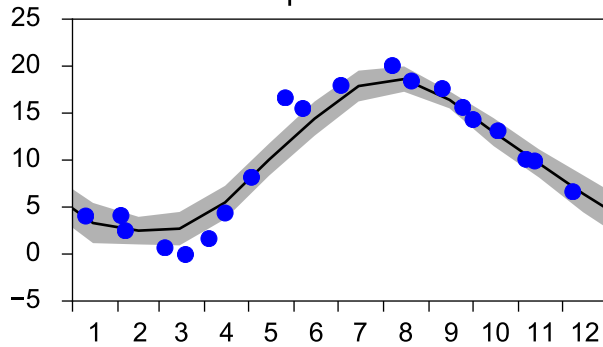
Annual Cycles

— Mean 2001-2015

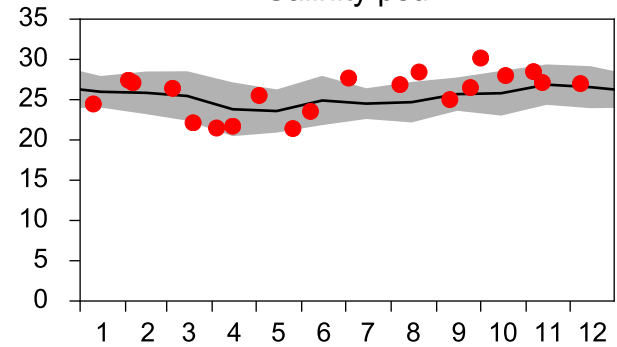
■ St.Dev.

● 2018

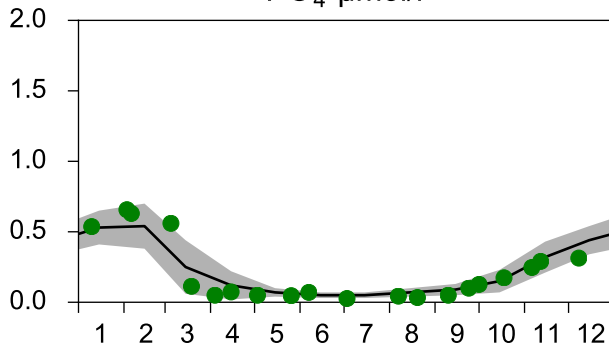
Temperature °C



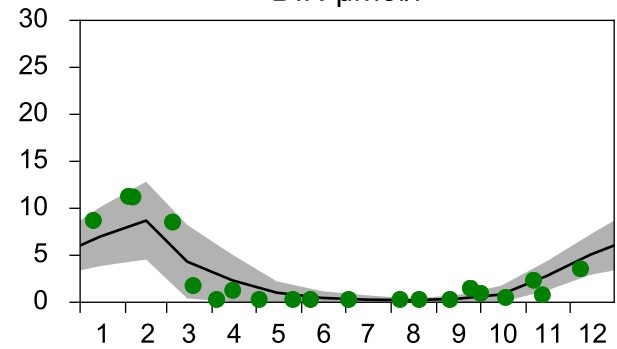
Salinity psu



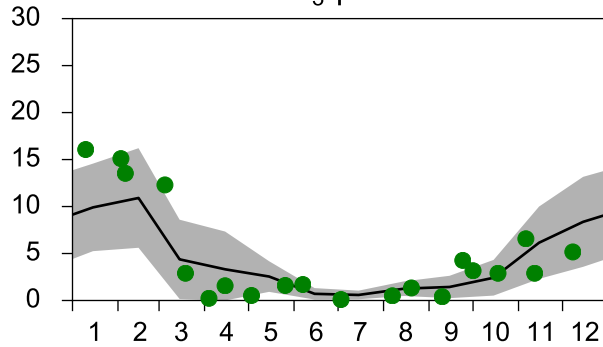
PO₄ µmol/l



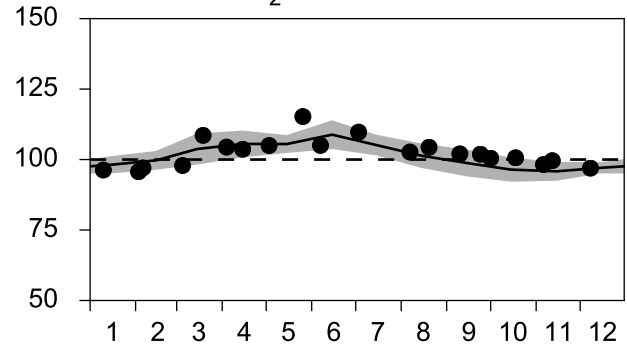
DIN µmol/l



SiO₃ µmol/l

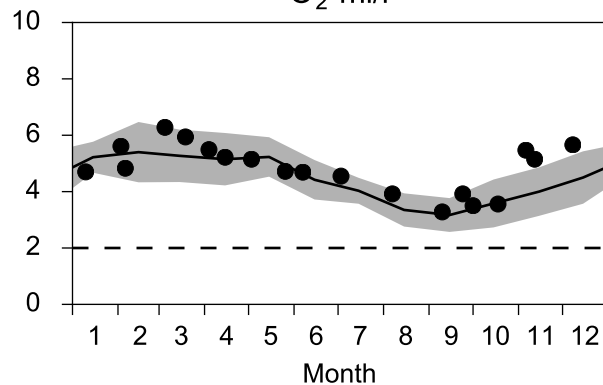


O₂ saturation %

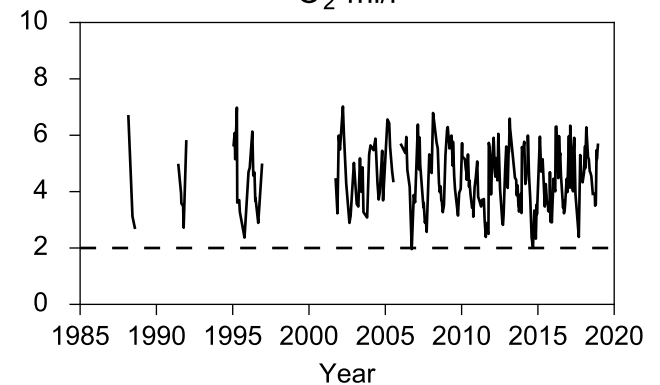


OXYGEN IN BOTTOM WATER (depth >= 64 m)

O₂ ml/l

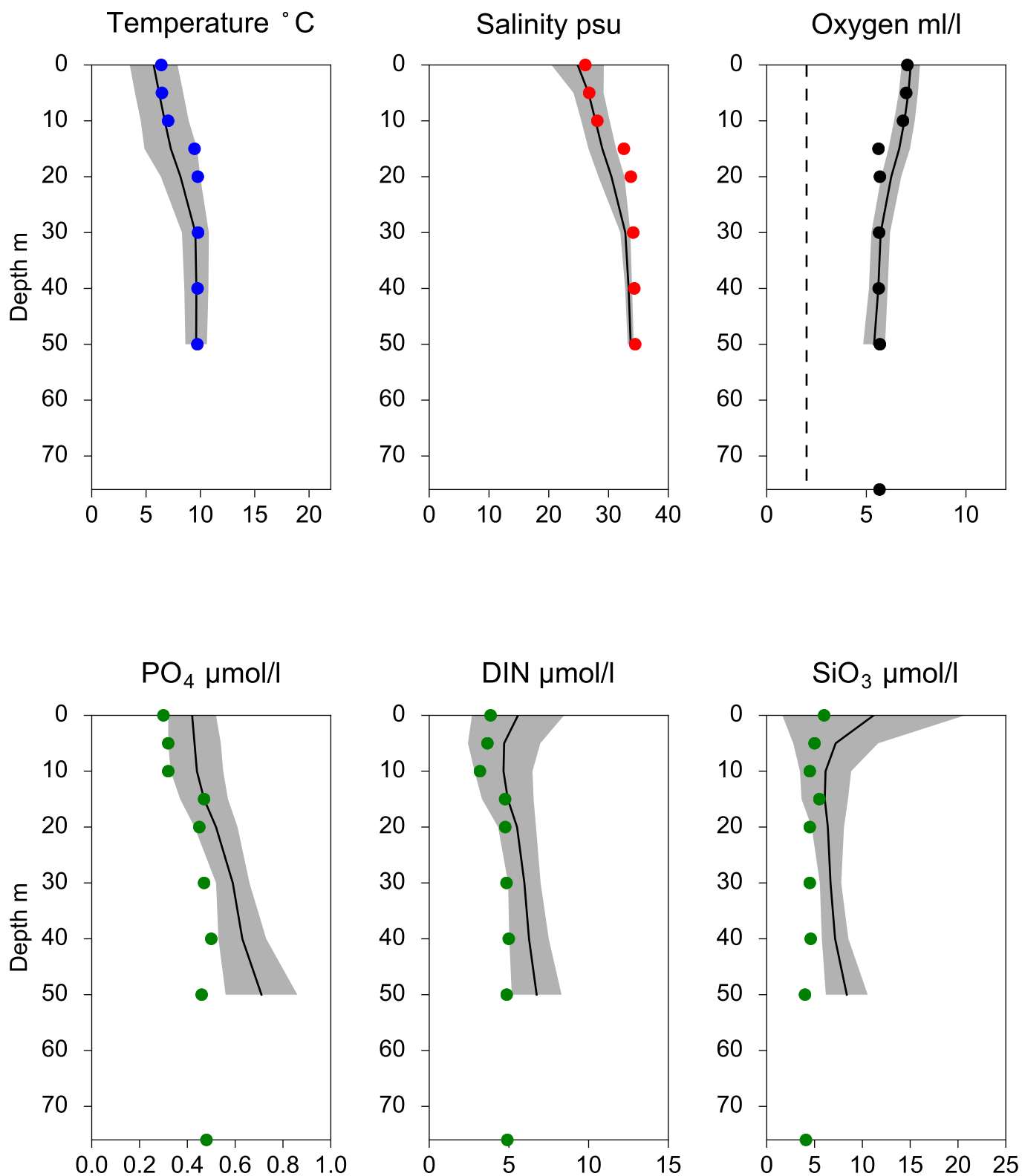


O₂ ml/l



Vertical profiles SLÄGGÖ December

— Mean 2001-2015 St.Dev. • 2018-12-08



STATION N14 FALKENBERG SURFACE WATER (0-10 m)

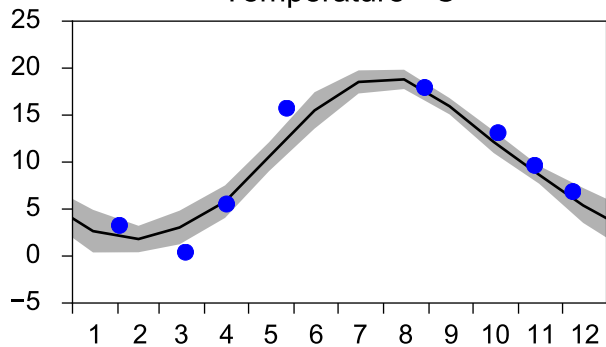
Annual Cycles

— Mean 2001-2015

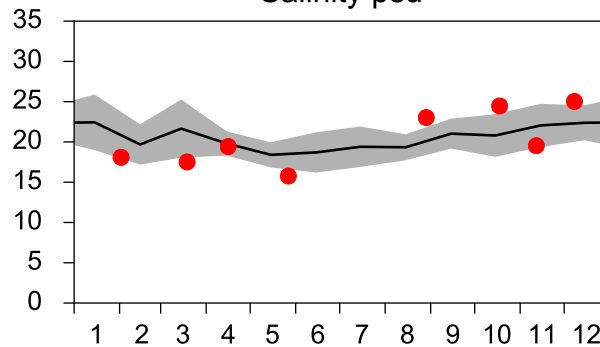
■ St.Dev.

● 2018

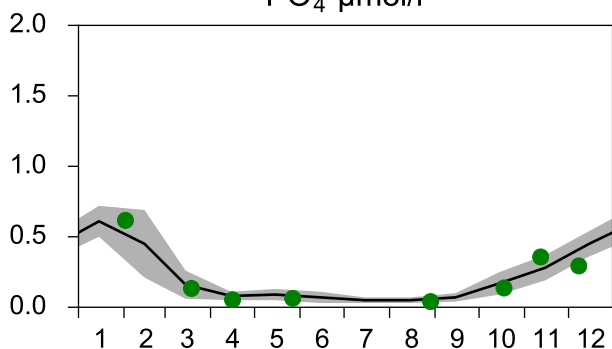
Temperature °C



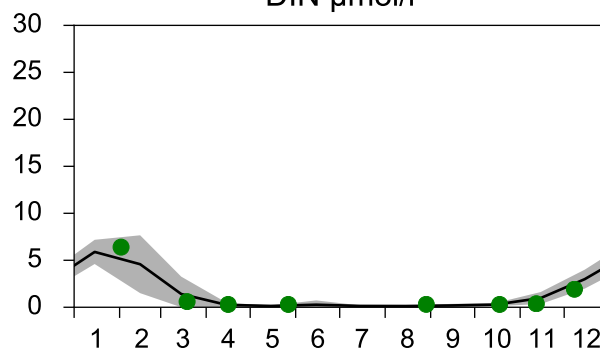
Salinity psu



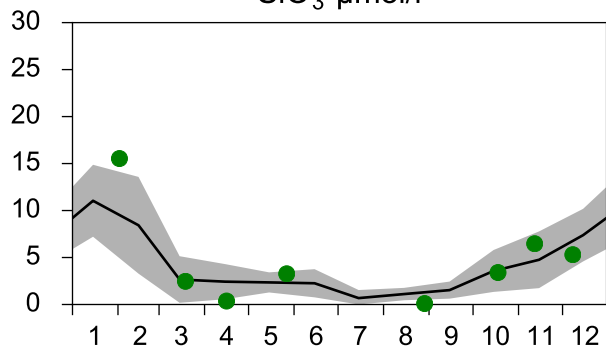
PO₄ µmol/l



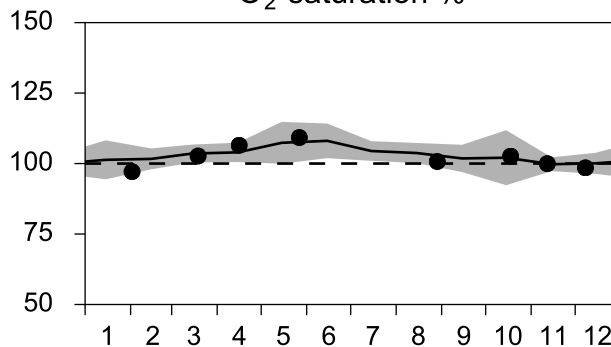
DIN µmol/l



SiO₃ µmol/l

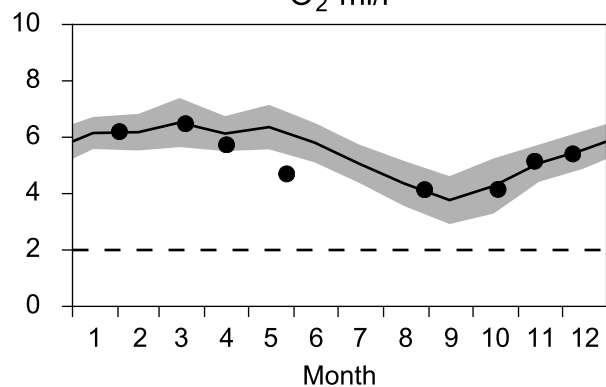


O₂ saturation %

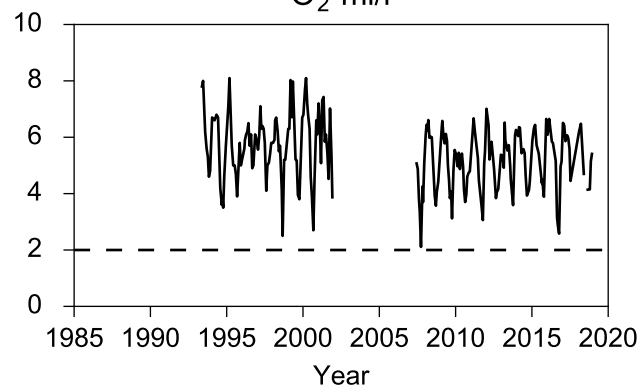


OXYGEN IN BOTTOM WATER (depth >= 25 m)

O₂ ml/l

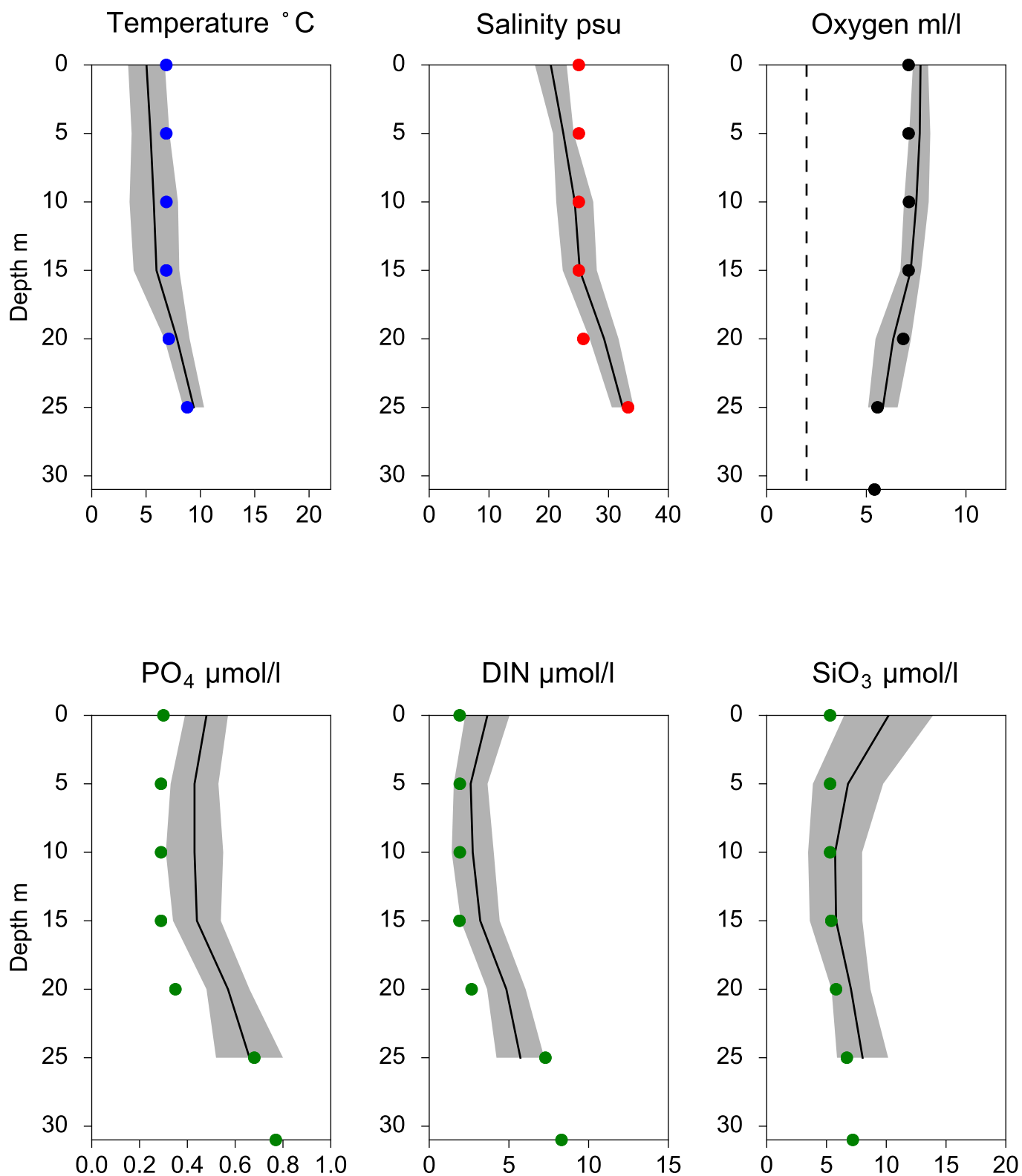


O₂ ml/l



Vertical profiles N14 FALKENBERG December

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STATION ANHOLT E SURFACE WATER (0-10 m)

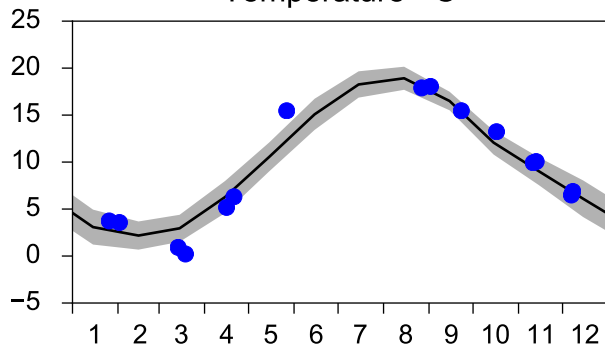
Annual Cycles

— Mean 2001-2015

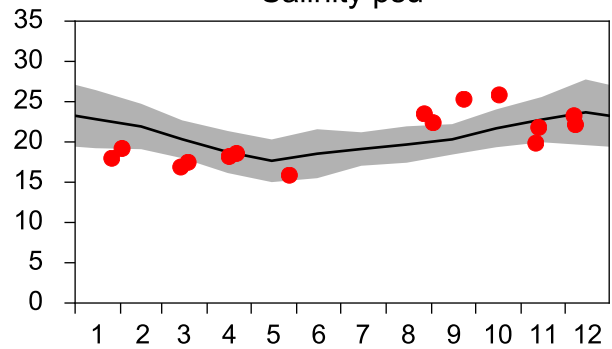
■ St.Dev.

● 2018

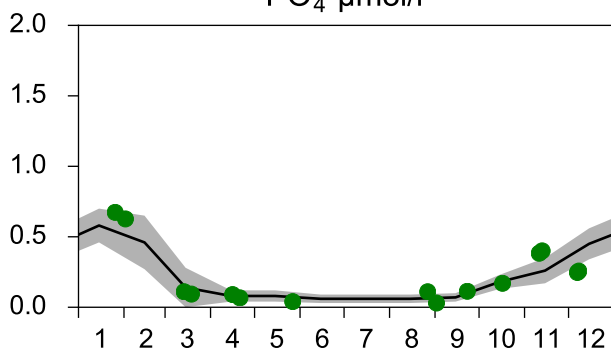
Temperature °C



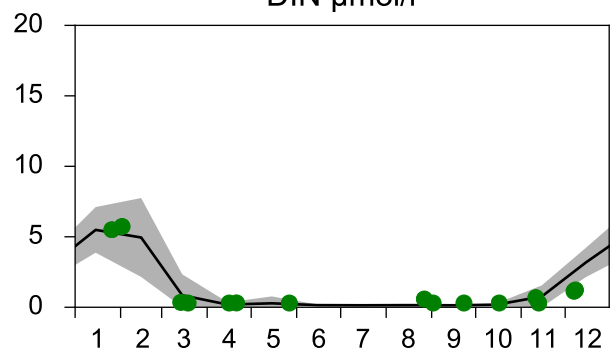
Salinity psu



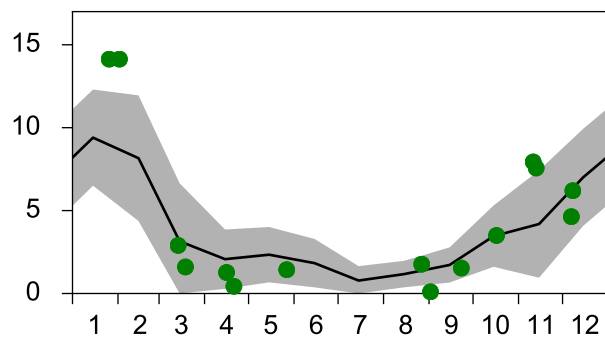
PO₄ µmol/l



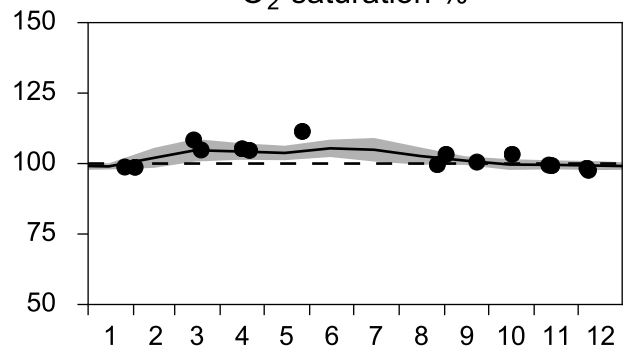
DIN µmol/l



SiO₃ µmol/l

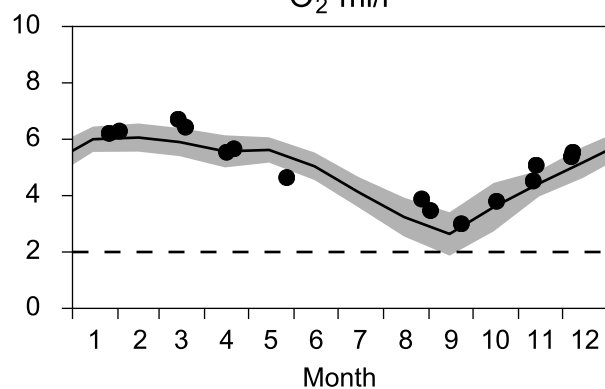


O₂ saturation %

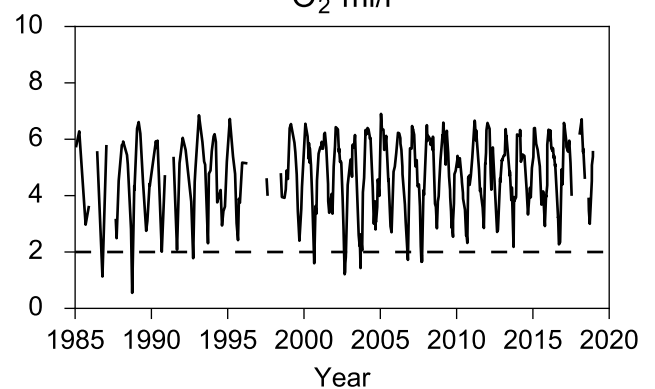


OXYGEN IN BOTTOM WATER (depth >= 52 m)

O₂ ml/l

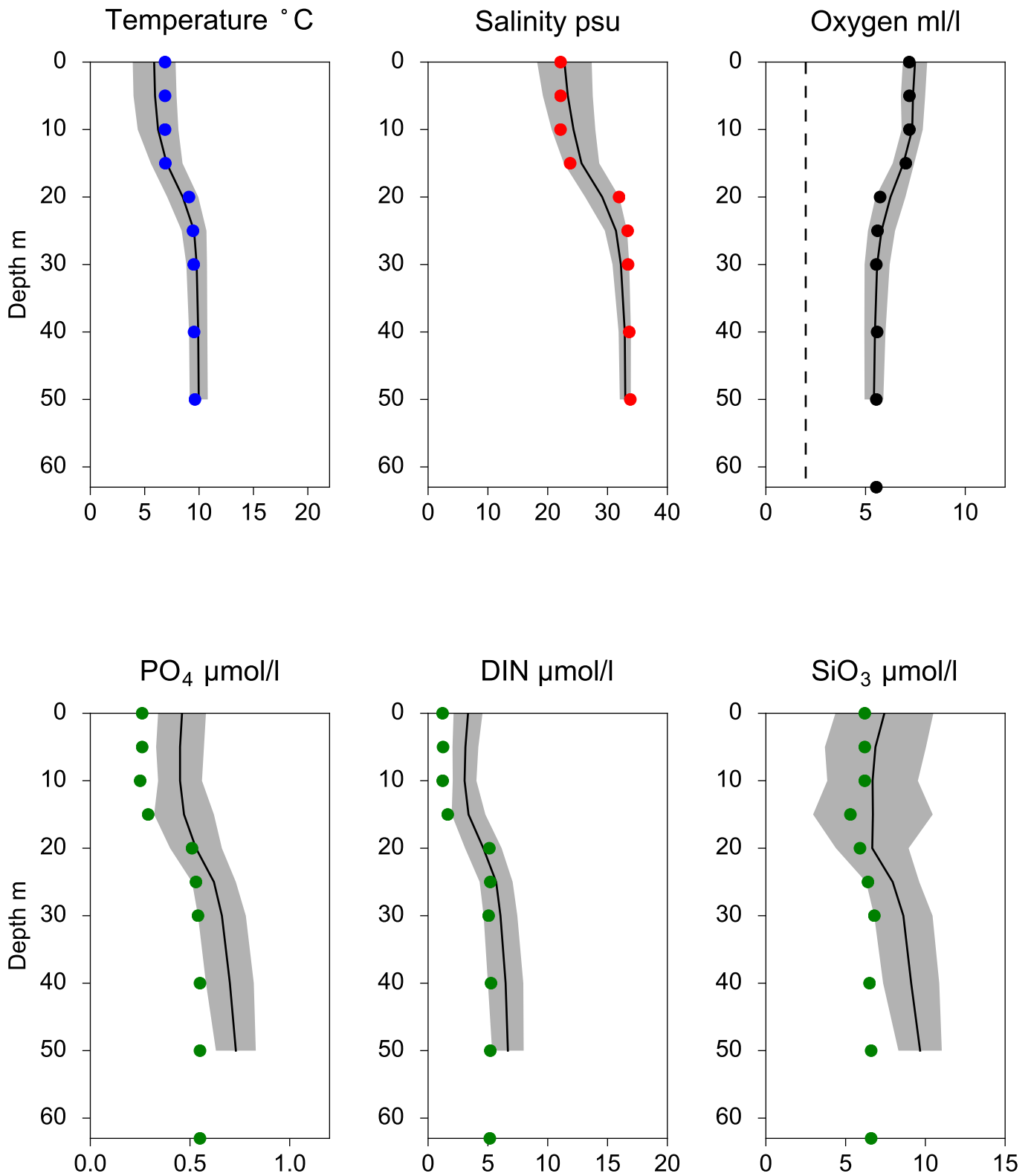


O₂ ml/l



Vertical profiles ANHOLT E December

— Mean 2001-2015 St.Dev. • 2018-12-08



STATION HANÖBUKTEN SURFACE WATER (0-10 m)

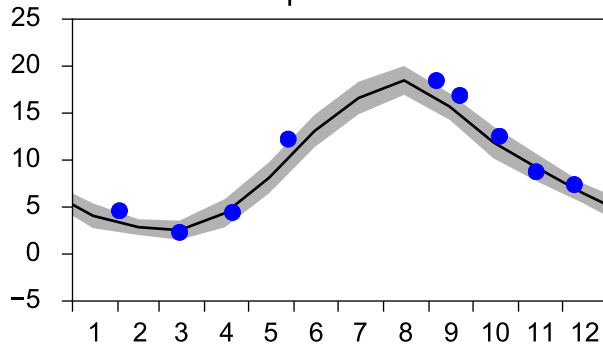
Annual Cycles

— Mean 2001-2015

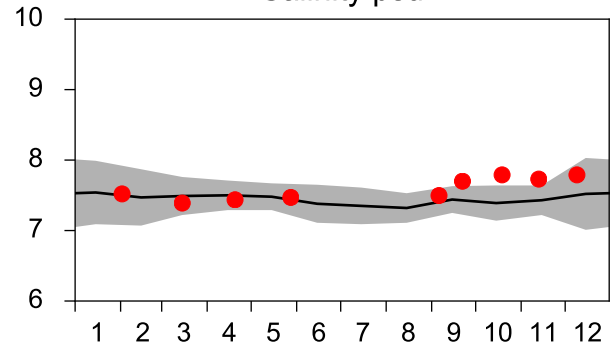
■ St.Dev.

● 2018

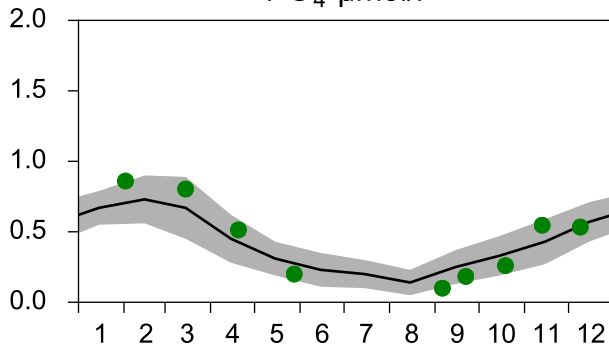
Temperature °C



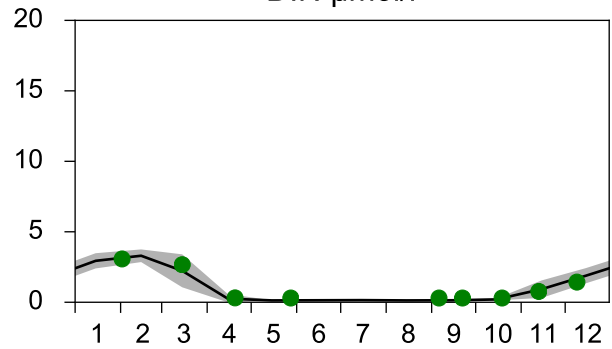
Salinity psu



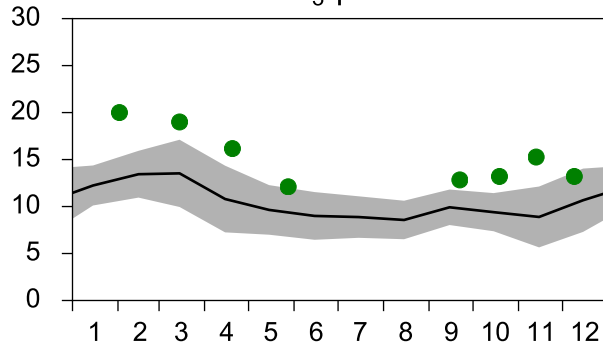
PO₄ µmol/l



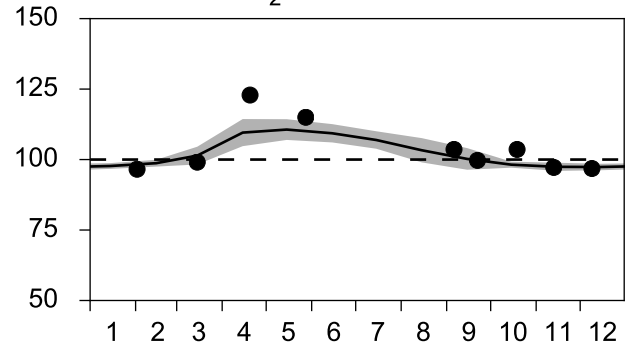
DIN µmol/l



SiO₃ µmol/l

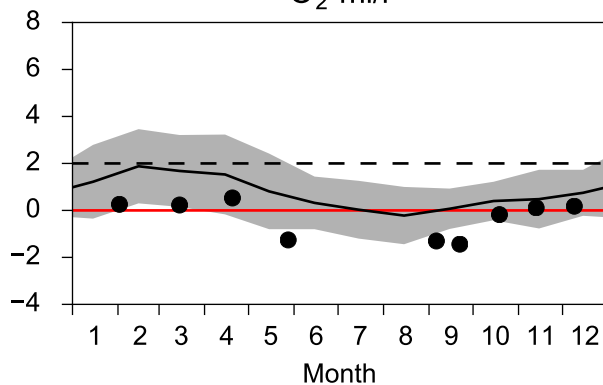


O₂ saturation %

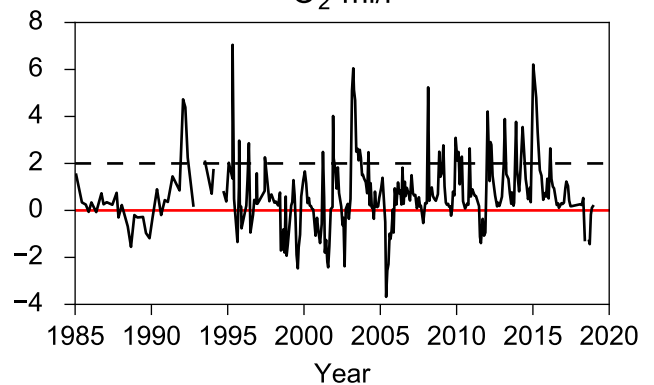


OXYGEN IN BOTTOM WATER (depth >= 70 m)

O₂ ml/l



O₂ ml/l



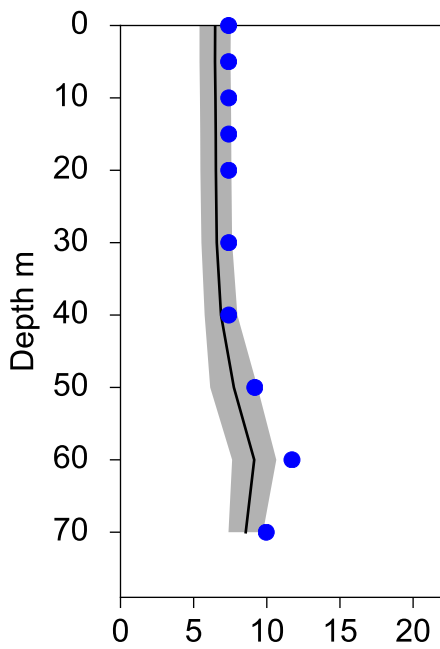
Vertical profiles HANÖBUKTEN December

— Mean 2001-2015

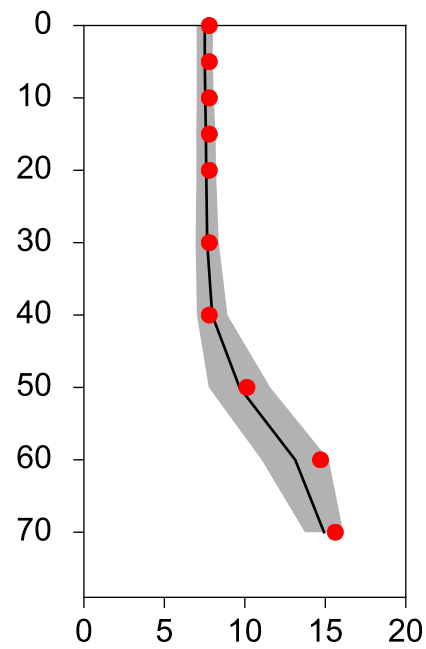
■ St.Dev.

● 2018-12-09

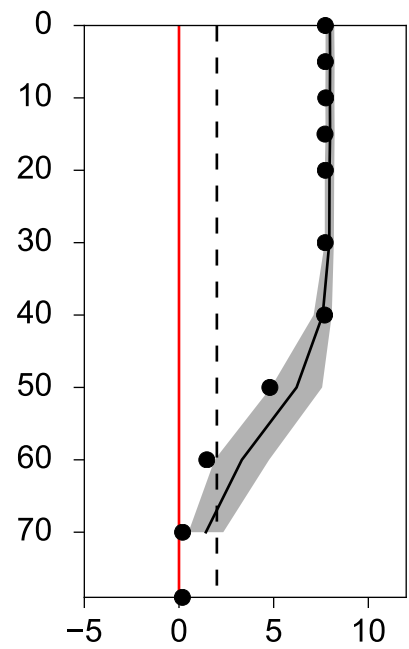
Temperature °C



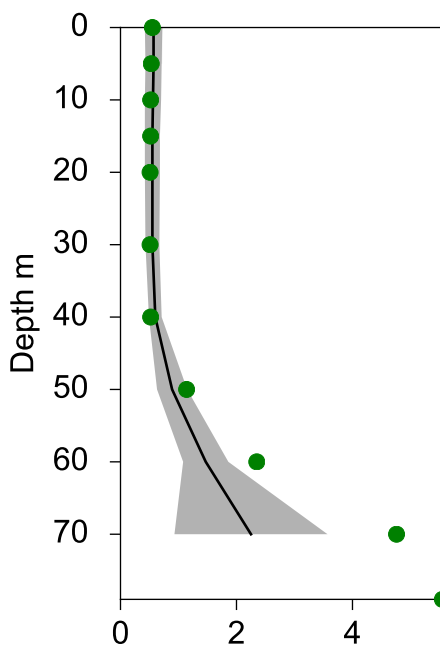
Salinity psu



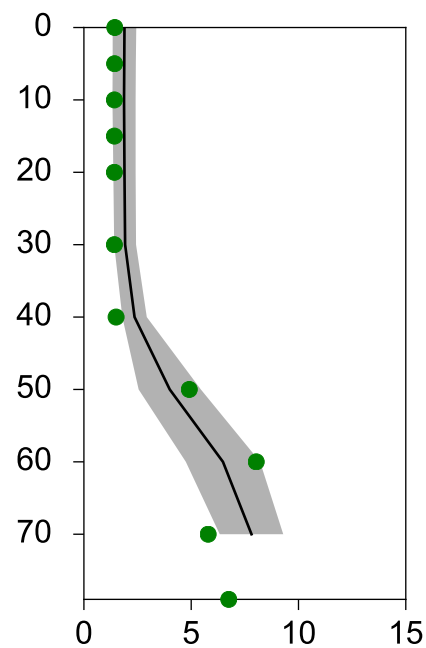
Oxygen ml/l



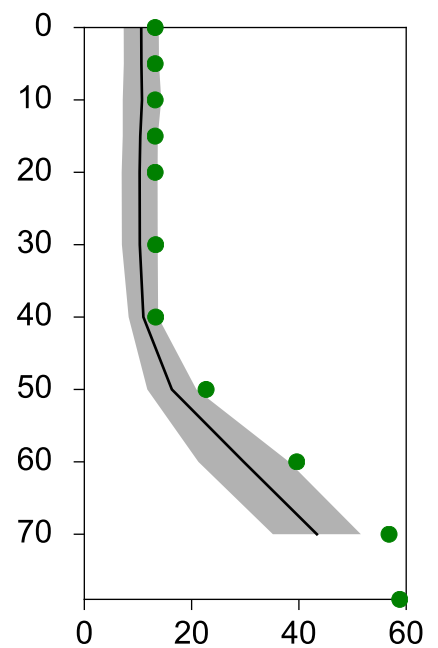
PO₄ μmol/l



DIN μmol/l



SiO₃ μmol/l



STATION REF M1V1 SURFACE WATER (0-10 m)

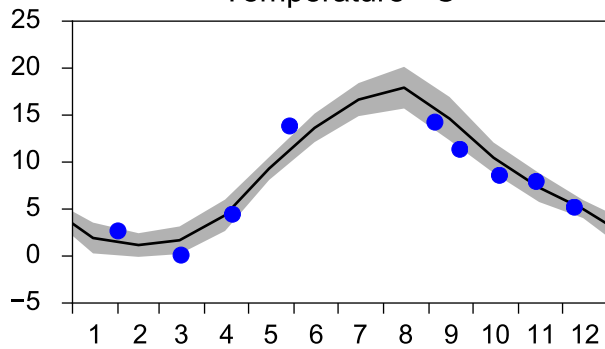
Annual Cycles

— Mean 2001-2015

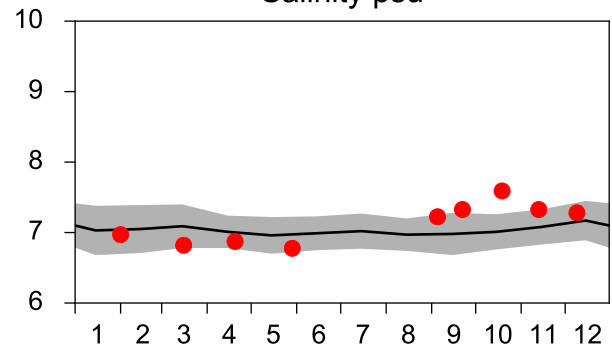
■ St.Dev.

● 2018

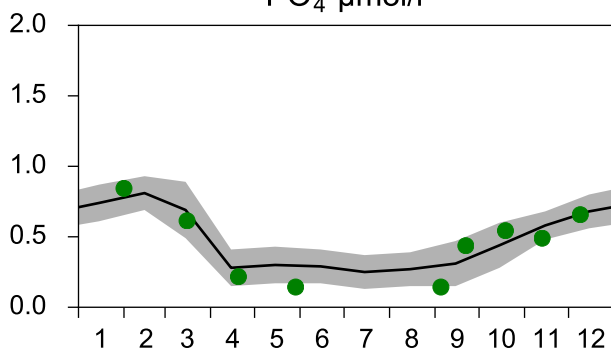
Temperature °C



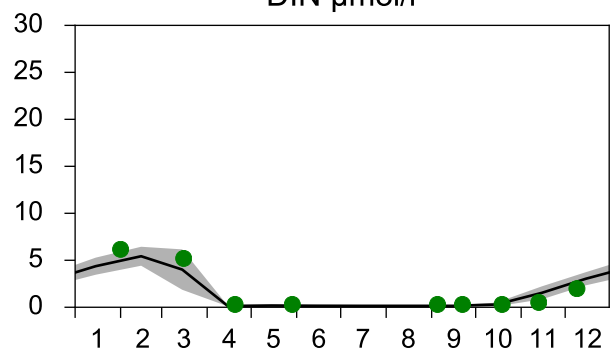
Salinity psu



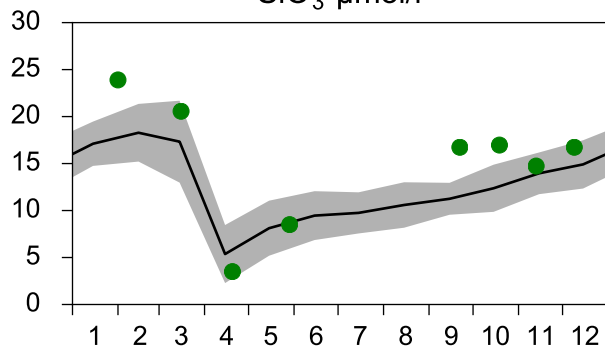
PO₄ µmol/l



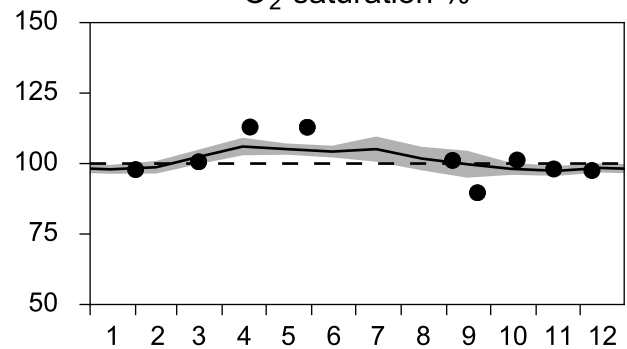
DIN µmol/l



SiO₃ µmol/l

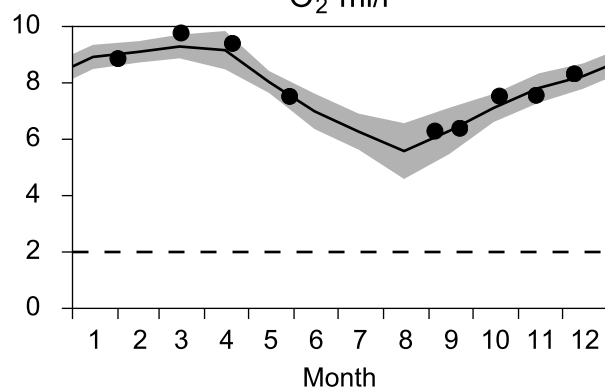


O₂ saturation %

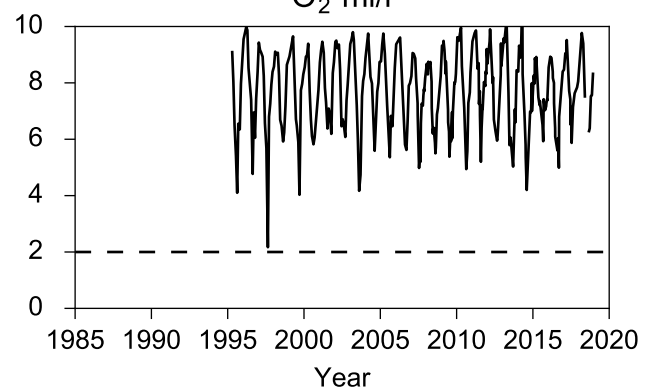


OXYGEN IN BOTTOM WATER (depth >= 17 m)

O₂ ml/l

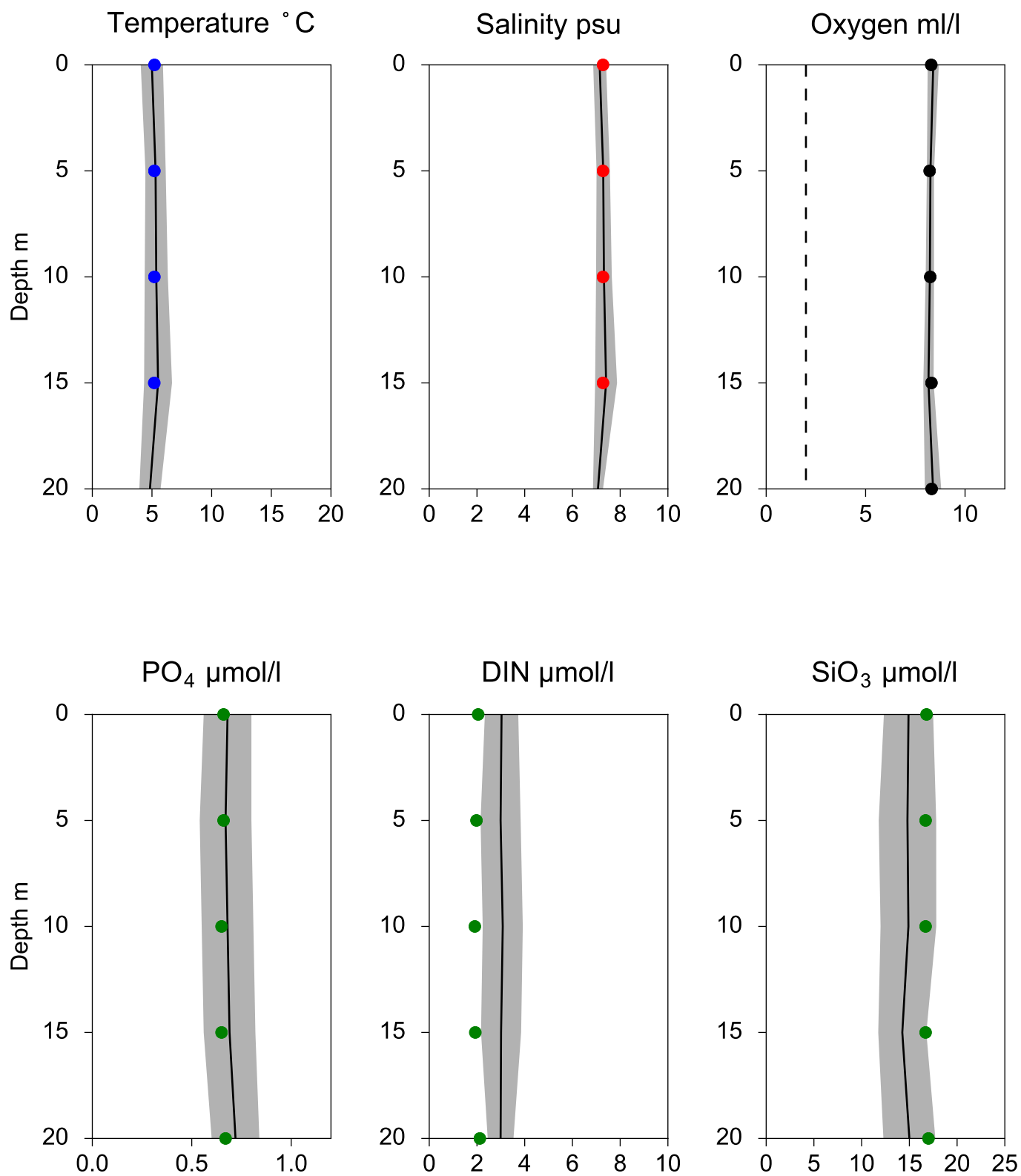


O₂ ml/l



Vertical profiles REF M1V1 December

— Mean 2001-2015 St.Dev. • 2018-12-09



STATION BY38 KARLSÖDJ SURFACE WATER (0-10 m)

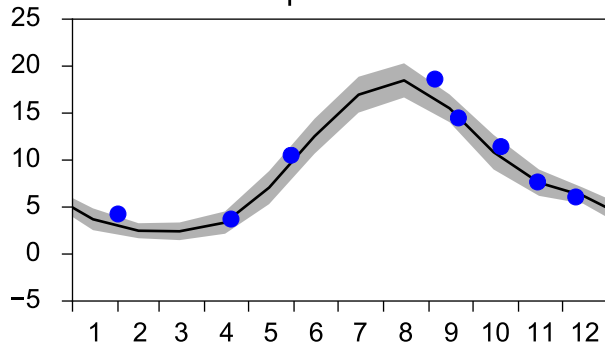
Annual Cycles

— Mean 2001-2015

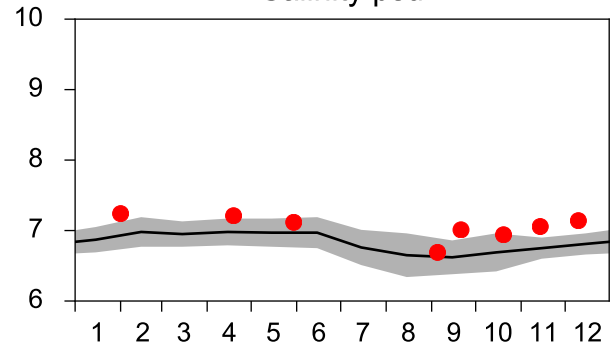
■ St.Dev.

● 2018

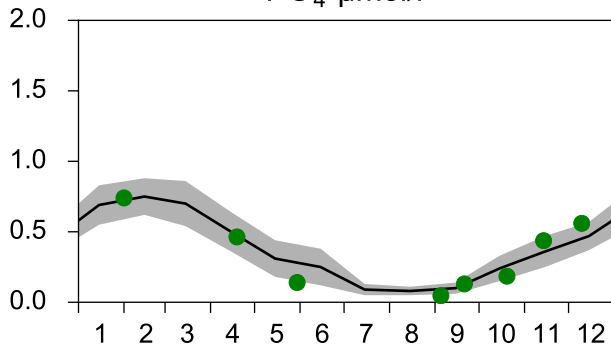
Temperature °C



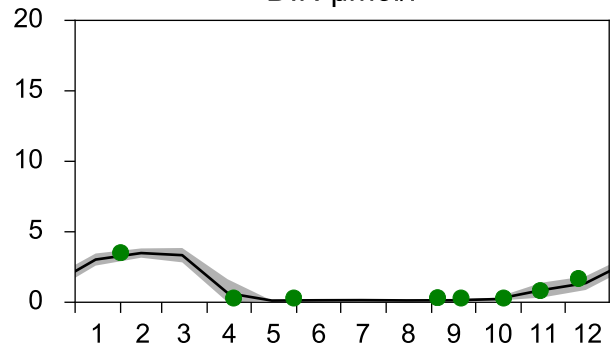
Salinity psu



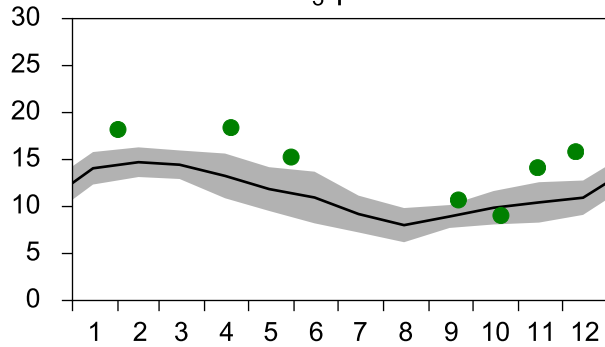
PO₄ µmol/l



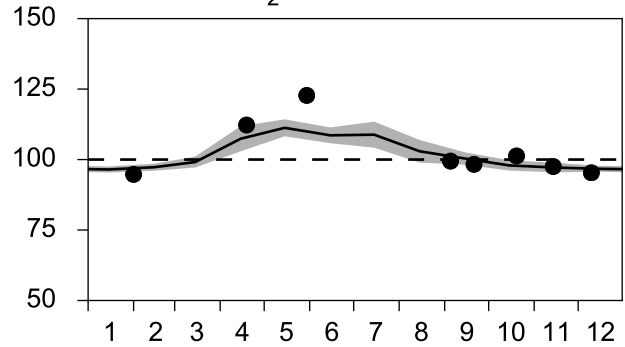
DIN µmol/l



SiO₃ µmol/l

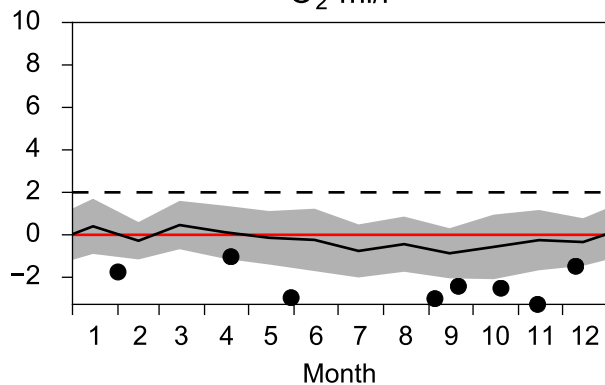


O₂ saturation %

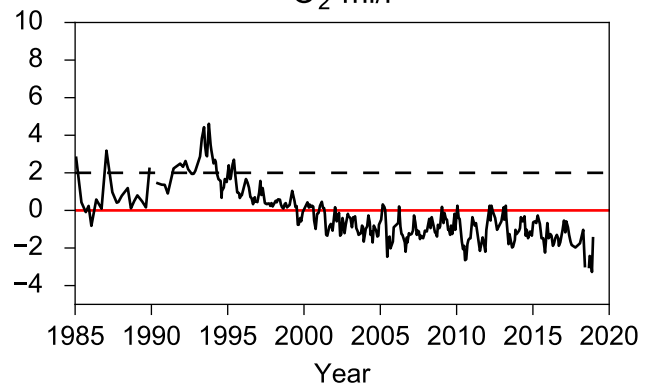


OXYGEN IN BOTTOM WATER (depth >= 100 m)

O₂ ml/l

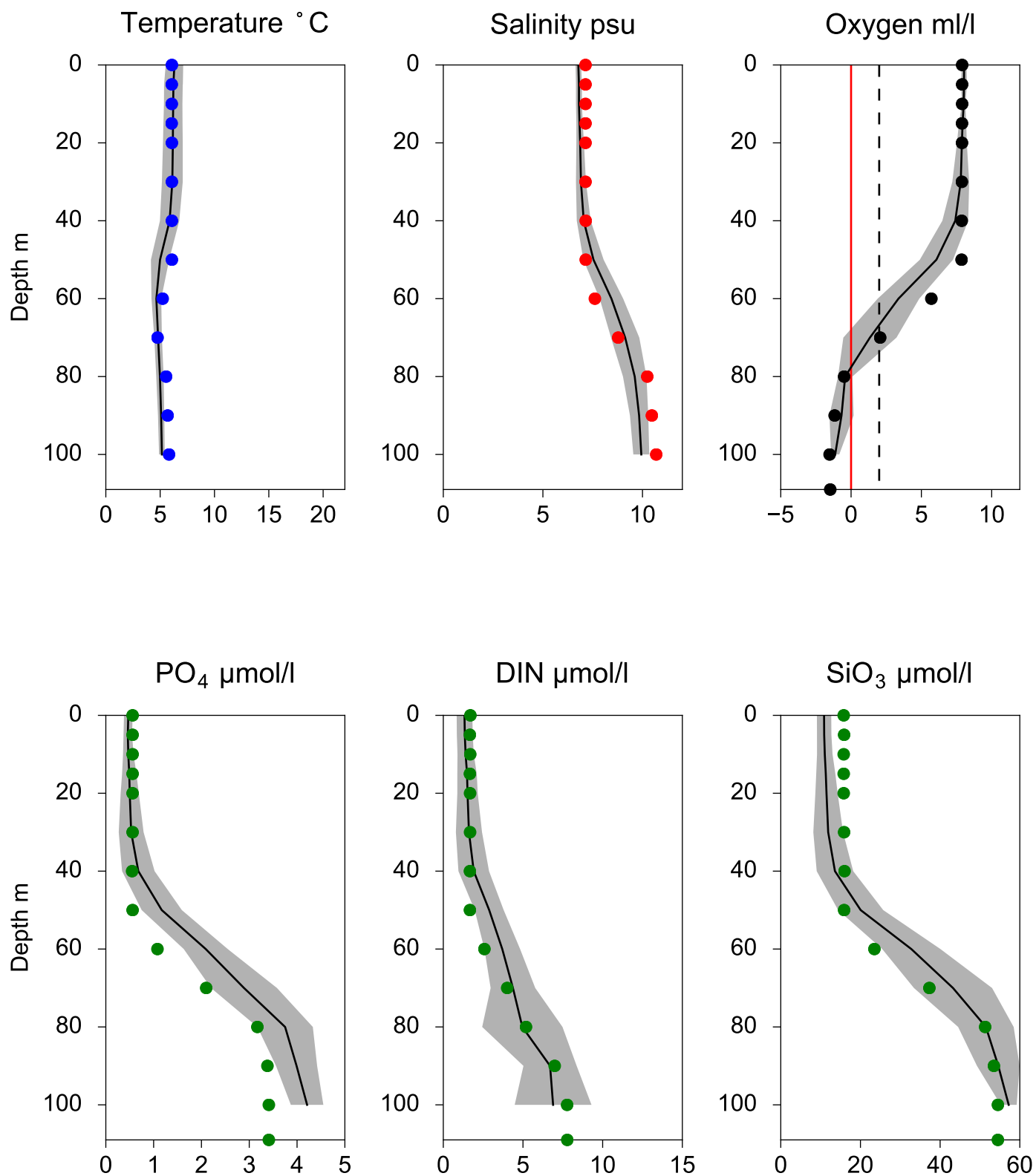


O₂ ml/l



Vertical profiles BY38 KARLSÖDJ December

— Mean 2001-2015 St.Dev. ● 2018-12-10



STATION BY32 NORRKÖPINGSDJ SURFACE WATER (0-10 m)

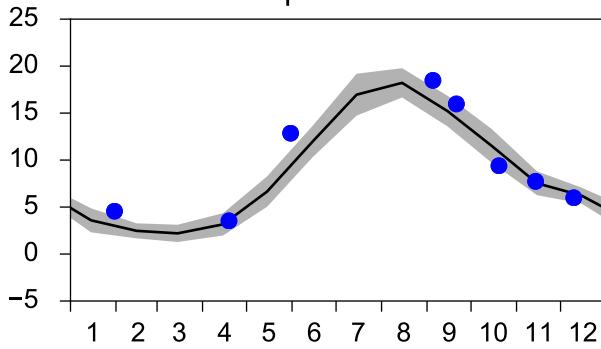
Annual Cycles

— Mean 2001-2015

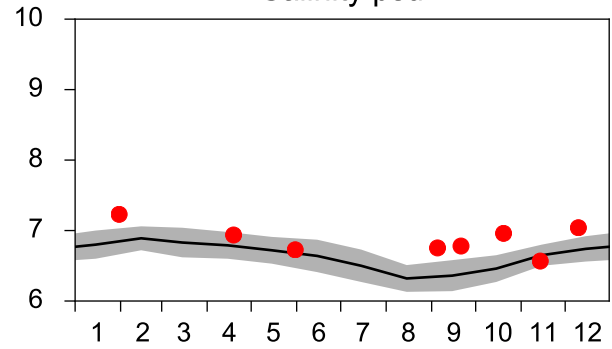
■ St.Dev.

● 2018

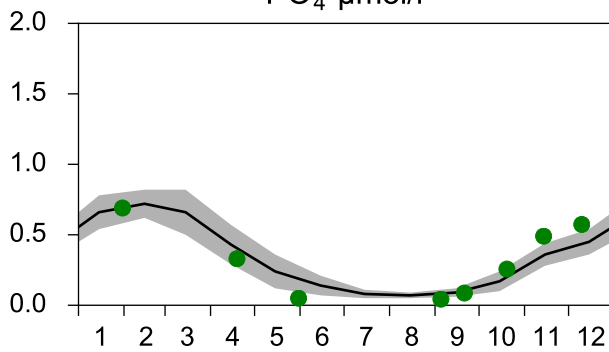
Temperature °C



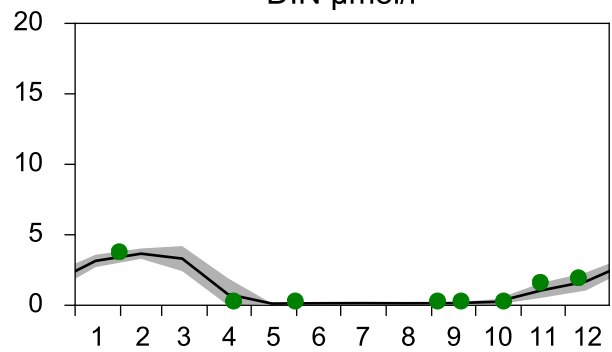
Salinity psu



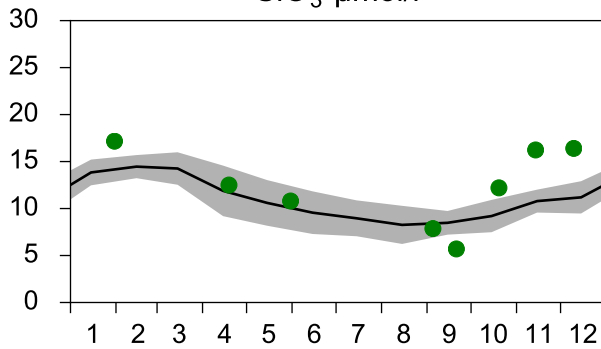
PO₄ µmol/l



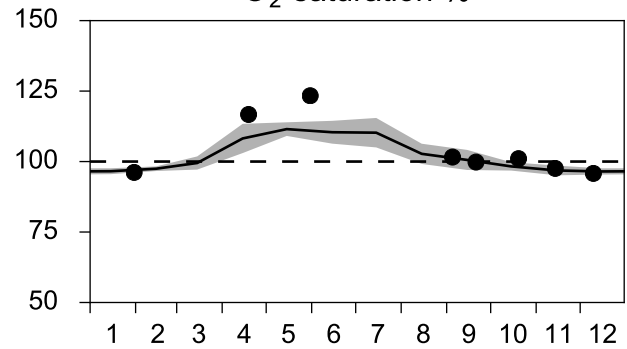
DIN µmol/l



SiO₃ µmol/l

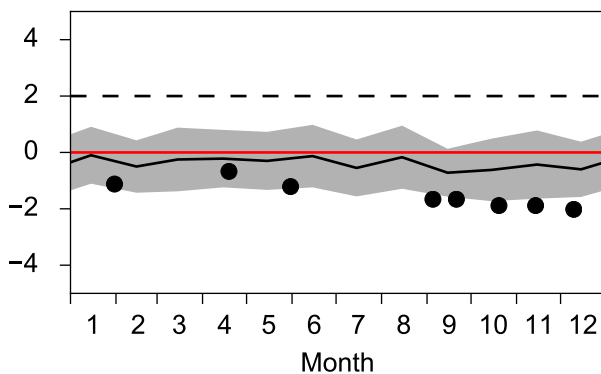


O₂ saturation %

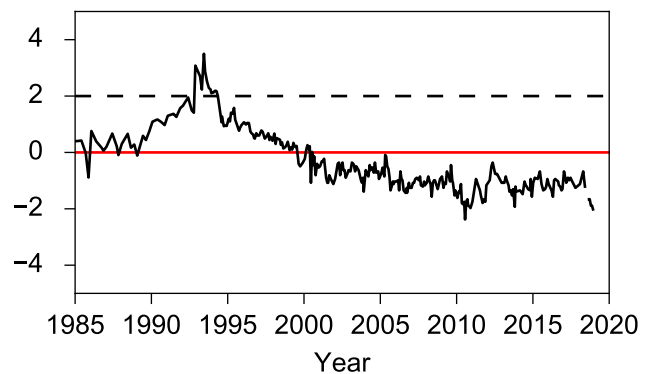


OXYGEN IN BOTTOM WATER (depth >= 175 m)

O₂ ml/l

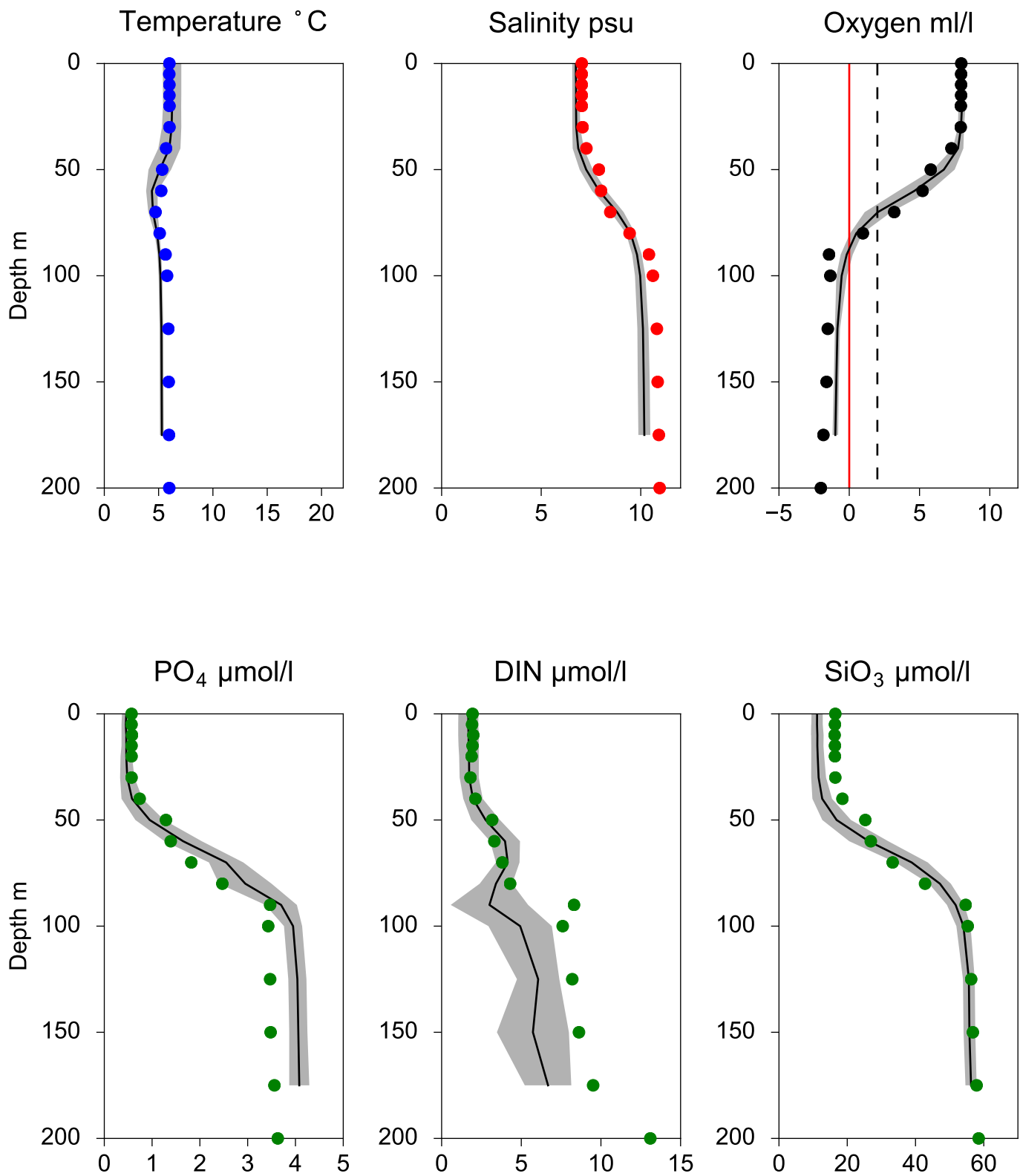


O₂ ml/l



Vertical profiles BY32 NORRKÖPINGSDJ December

— Mean 2001-2015 St.Dev. • 2018-12-10



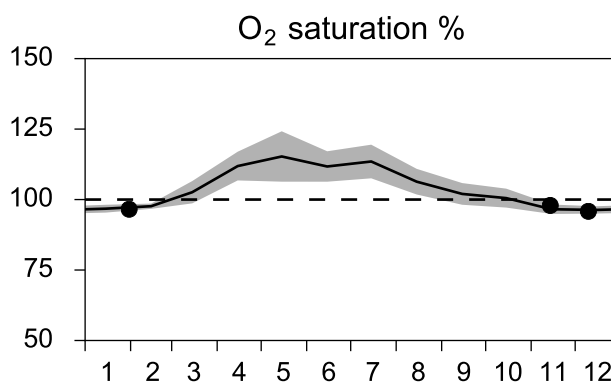
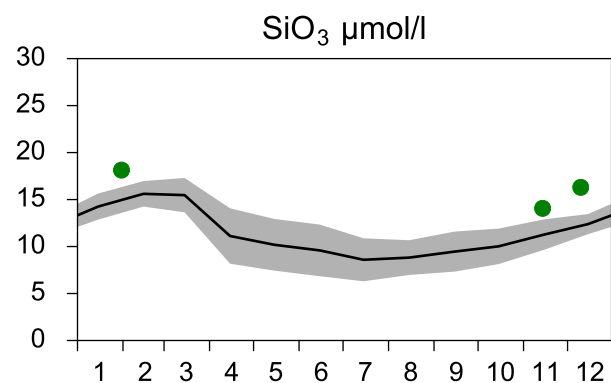
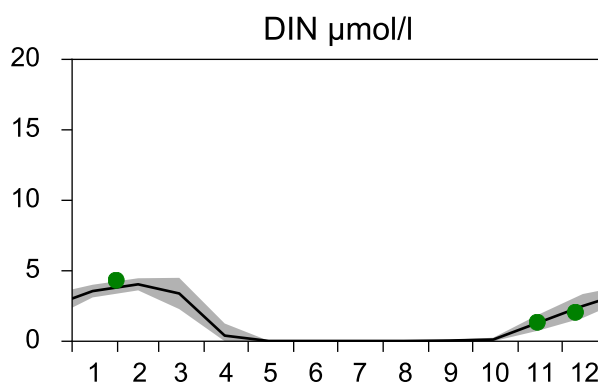
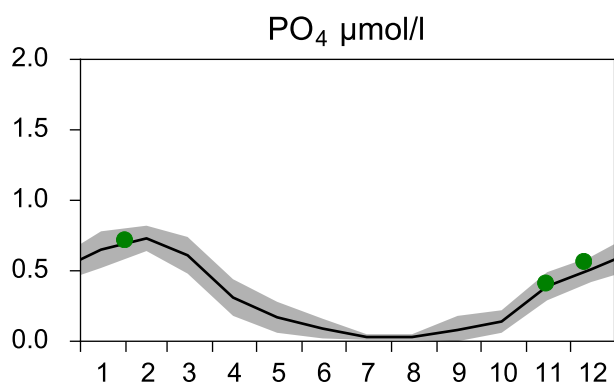
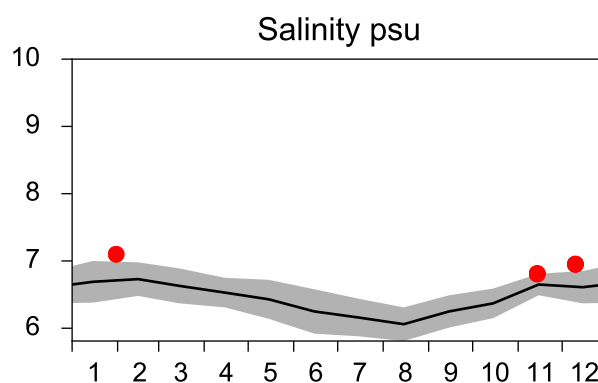
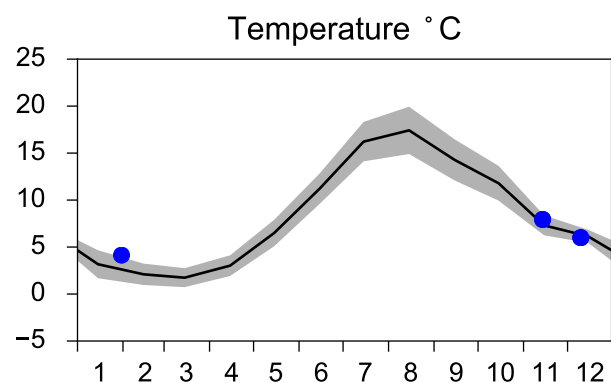
STATION BY31 LANDSORTSDJ SURFACE WATER (0-10 m)

Annual Cycles

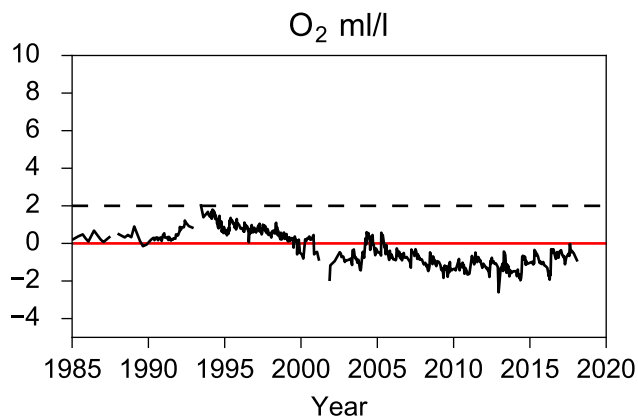
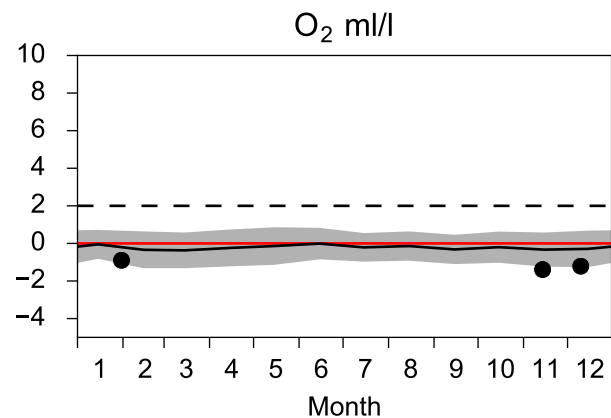
— Mean 2001-2015

■ St.Dev.

● 2018



OXYGEN IN BOTTOM WATER (depth >= 425 m)



Vertical profiles BY31 LANDSORTSDJ December

— Mean 2001-2015 St.Dev. • 2018-12-10

