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Dnr: S/Gbg-2018-73
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Report from the SMHI monitoring cruise with R/V Dana

Survey period: 2018-09-02 - 2018-09-07
Principal: Swedish Meteorological and Hydrological Institute (SMHI), Swedish Agency for Marine and Water Management (SwAM)

SUMMARY

The cruise, which is part of the Swedish pelagic monitoring program, visited the Sound, the Baltic Proper and parts of the Kattegat. In the Kattegat, Anholt E represents the entire sea area since neither N14 nor Fladen were sampled. This is otherwise done during a regular monitoring cruise.

Due to limited ship time in combination with a recent fishing survey covering the Skagerrak and the Kattegat where some hydrographical sampling was done, the main focus of the expedition was to visit sampling stations in the Baltic Proper.

As during the most recent expedition, which was in May, the surface water temperature was above normal at all visited stations, except for the station REF M1V1 where the surface water temperature was normal. No monitoring cruises have been done during the summer due to technical problems on R/V Aranda.

Nutrients in the form of dissolved inorganic nitrogen (DIN) in the surface water were generally below limit of quantification, which is normal for the season. For dissolved inorganic phosphorus (DIP) the levels were normal for the season. The silicate concentrations were normal or above normal for the season.

The next regular cruise was scheduled to take place from 20th to 27th of September, but was cancelled half ways, and stopped in Lysekil.

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RESULTS

The cruise was conducted aboard the Danish research vessel Dana. It started in Fredrikshavn the 2nd of September and ended at the same port the 7th of September. The winds were mostly moderate.

During the expedition, no zooplankton sampling was conducted due to technical issues. No stations were visited in the Skagerrak, and in the Kattegat the only visited station was Anholt E. In total 15 stations were sampled during the cruise. The Skagerrak and the Kattegat had been sampled in late August by R/V Dana during a fishing survey, and a report from that cruise will be published.

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

Downloadable data can be found here: http://www.smhi.se/klimatdata/oceanografi/havsmiljodata (only available in Swedish).

The Kattegat and the Sound

The sea surface temperature was above normal for the season, 18.1°C in the Kattegat and 17.6°C in the Sound. The salinity in the surface water of the Kattegat was above normal for the season and in the Sound it was normal. Measured values were about 22 psu and 10 psu respectively.

Nutrients in the form of dissolved inorganic nitrogen, DIN (the sum of nitrate, nitrite and ammonia) were below limit of quantification in the surface water, which is normal for the season. Concentrations of dissolved inorganic phosphorus, DIP, were normal for the season in the Sound, and below normal in the Kattegat. The silicate concentrations were lower than normal in the Kattegat, but normal in the Sound.

Oxygen levels in the deep water of the Kattegat and the Sound were normal for the season. In the bottom water at Anholt E the oxygen level was measured to 3.47 ml/l, and at W Landskrona it was measured to 3.30 ml/l.

Fluorescence measurements from the CTD indicated low plankton activity.

The Baltic Proper

The surface water temperature was above normal at all visited offshore stations, and varied between 18.2 and 19.6°C. At the coastal station REF M1V1 between Öland and the mainland the surface water temperature was 14.3°C and this is normal for the season. Surface water salinity was normal for the season and varied from 6.4 to 8.1 psu, lowest in the northern part and highest in southwest. A distinct thermocline was found at 20-30 meters depth, and a halocline was present at 60-70 meters depth at the deepest stations.

Levels of DIN and DIP in the surface water were low, which this is normal for the season. The dissolved inorganic nitrogen in the surface was depleted and below limit of quantification. Surface water concentrations of silicate were normal or above normal, it varied from 7.9 to 12.3 µmol/l, highest concentrations in the southwest.

Acute hypoxia (oxygen < 2ml/l) was found at the bottom of the Arkona Basin. The Bornholm Basin and the Eastern and Western Gotland Basin had anoxic conditions from 70-80 meters depth.

Fluorescence measurements from the CTD showed low plankton activity.

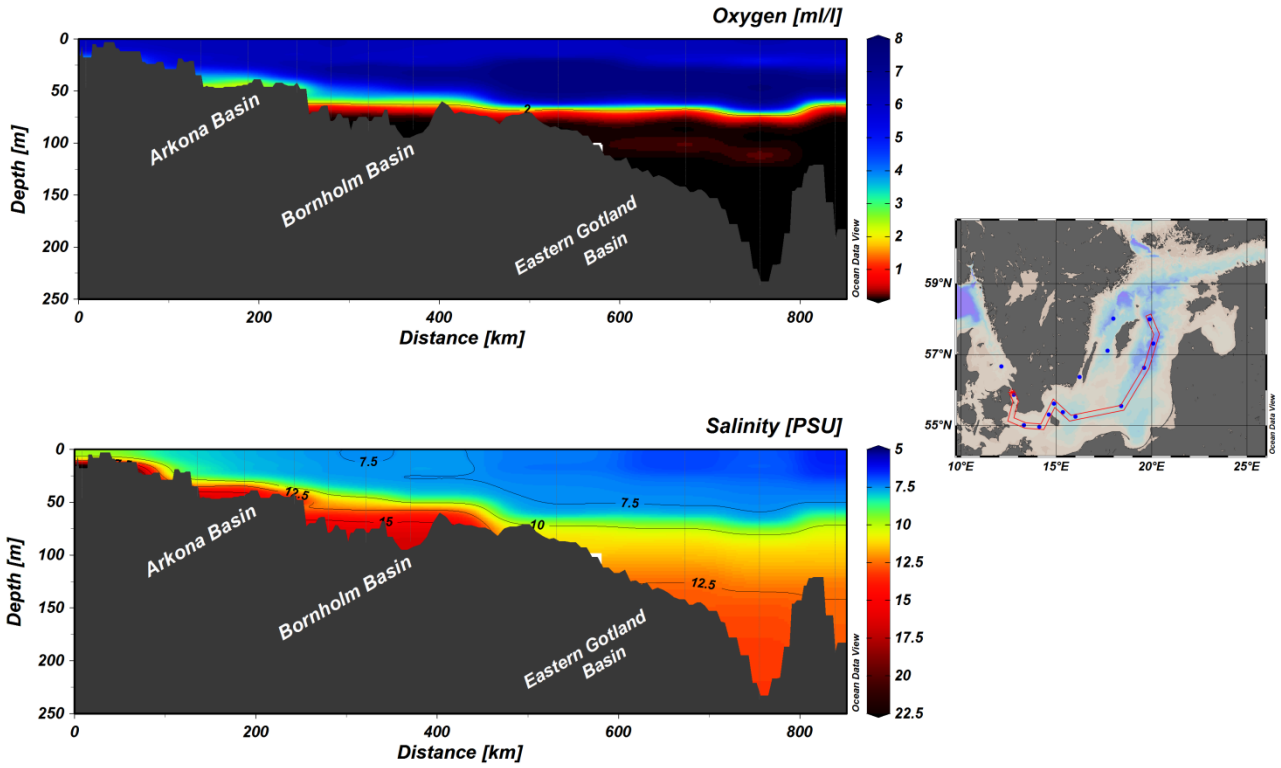


Figure 1. Transect showing dissolved oxygen and salinity from the Sound through the Baltic Proper to the Eastern Gotland Basin.

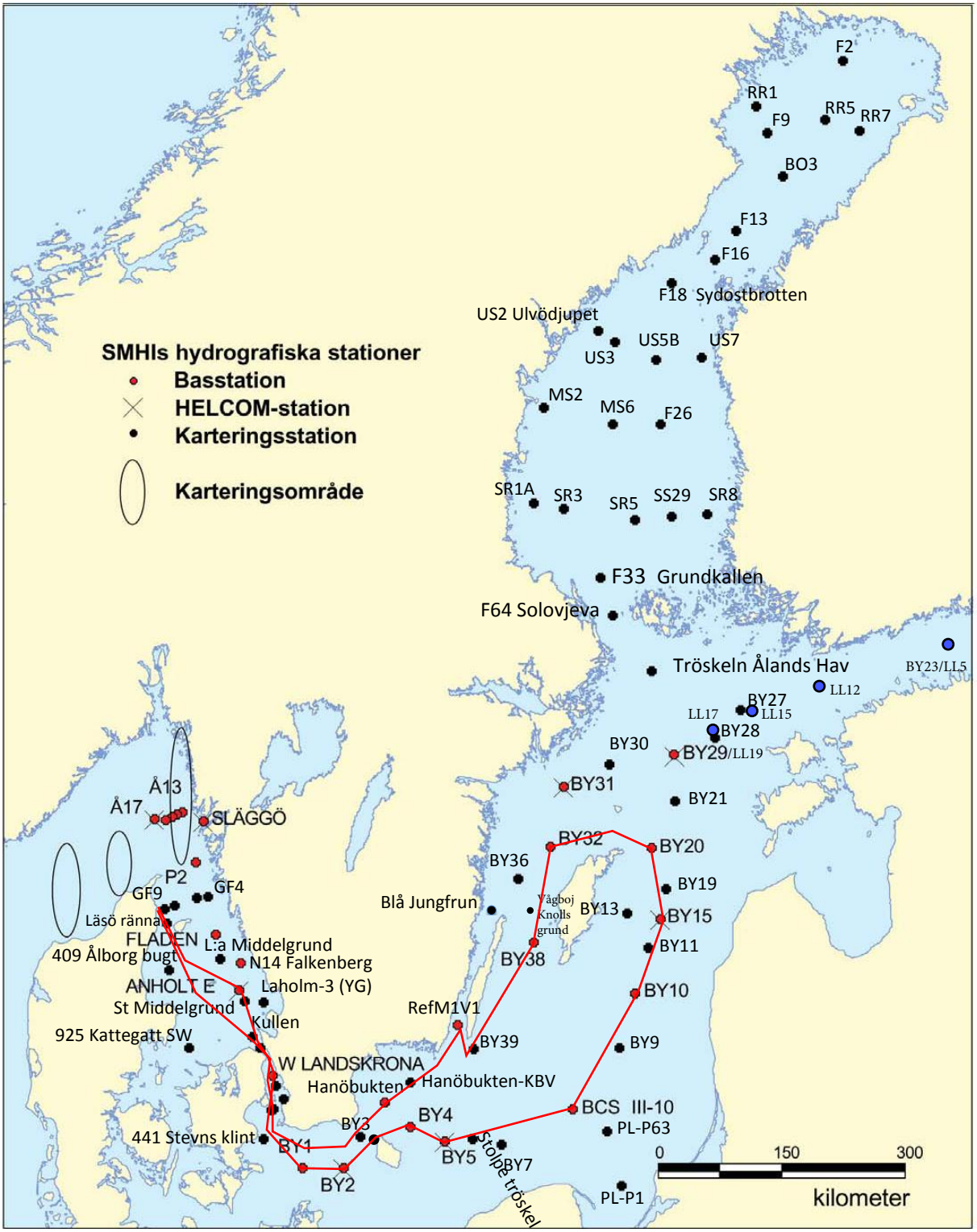
PARTICIPANTS

Name		From
Anna-Kerstin Thell	Chief Scientist	SMHI
Sara Johansson		SMHI
Johan Kronsell		SMHI
Kristin Andreasson		SMHI

APPENDICES

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

SMHI
Havs och Vatten myndigheten


SMHIs hydrografiska stationer
Basstation
HELCOM-station
Karteringsstation
Karteringsområde
F2
RR1
RR5
RR7
F9
BO3
F13
F16
F18 Sydostbrotten
US2 Ulvödjupet
US3
US5B
US7
MS2
MS6
F26
SR1A
SR3
SR5
SS29
SR8
F33 Grundkallen
F64 Solovjeva
Tröskeln Ålands Hav
BY23/LL5
LL12
BY27
LL17
LL15
BY28
BY30
BY29/LL19
BY31
BY21
Å13
Å17
SLÄGGÖ
BY32
BY20
BY36
P2
GF9
GF4
BY19
Blå Jungfrun
Vågboj Knolls grund
BY13
BY15
Läsö ränna
FLADEN
L:a Middelgrund
BY11
409 Ålborg bugt
N14 Falkenberg
BY38
ANHOLT E
Laholm-3 (YG)
BY10
St Middelgrund
RefM1V1
Kullen
925 Kattegatt SW
BY39
BY9
W LANDSKRONA
Hanöbukten
Hanöbukten-KBV
BCS III-10
BY4
BY3
PL-P63
441 Stevns klint
BY1
BY5
BY7
Stolpe tröskel
BY2
PL-P1
0
150
300
kilometer

Date: 2018-10-02
Time: 07:50

Ship: DA
Year: 2018

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	Wind vel	Air temp C	Air pres hPa	WCWI (Weath Cloud Waves Iceob)	CZPP (Chla Zoop Phytop Pp)	No de	No btl	Temp_btl	Temp_ctd	Salt_btl	Salt_ctd	Ph	Doxy_btl	Doxy_ctd	H2s	Phos	Ptot	Ntri	Ntra	Ntrz	Amon	Ntot	Alky	Sio3-si	Humus	Comnt_visit	Comnt_samp
0951	09	KAEX29	BAS...	ANHOLT E	5640.13	01206.44	20180902	1830	60		05	5	17.8	1027	1130	x---	10		-	x	-	x	-	x	x	-	x	-	x	x	x	x	-	-	x	-	x	-
0952	09	SOCX39	BAS...	W LANDSKRONA	5552.05	01244.86	20180903	0115	48		06	5	15.4	1026	9990	x---	9		-	x	-	x	-	x	x	-	x	-	x	x	x	x	-	-	x	-	x	-
0953	09	BPSA02	BAS...	BY1	5501.16	01317.29	20180903	0735	44		07	9	18.5	1024	1530	x---	8		-	x	-	x	-	x	x	-	x	-	x	x	x	x	-	-	x	-	x	-
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0955	09	BPSA05	BAS...	W HAMMER ODDE	5518.65	01436.13	20180903	1350	51		05	8	17.9	1023	2730	----	8		-	x	-	x	-	-	x	-	-	-	-	-	-	-	-	-	-	-	x	-
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0958	09	BPSE11	BAS...	BCS III-10	5533.16	01824.00	20180904	0405	90		27	6	18.5	1018	1330	x---	12		-	x	-	x	-	x	x	x	x	-	x	x	x	x	-	-	x	-	x	-
0959	09	BPEX13	BAS...	BY10	5638.14	01935.12	20180904	1145	139		02	6	18.7	1018	1130	x---	15		-	x	-	x	-	x	x	x	x	-	x	x	x	x	-	-	x	-	x	x
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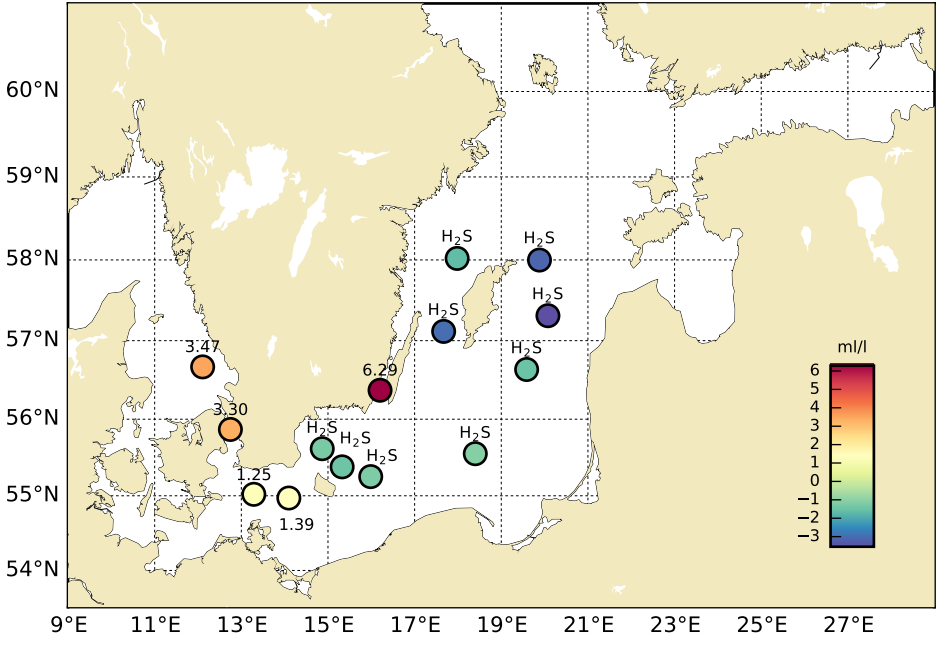
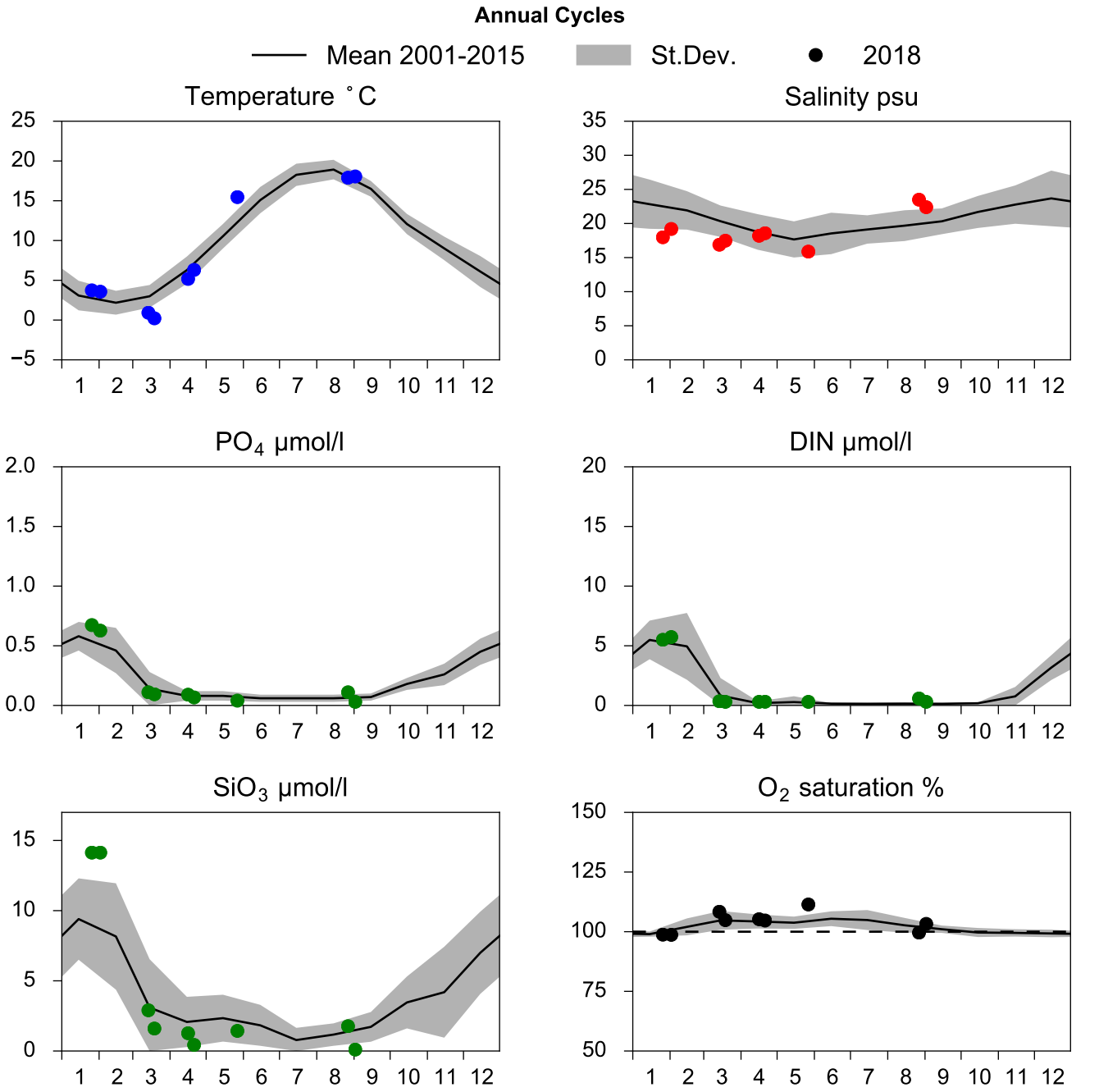
0966	09	BPSH05	BAS...	HANÖBUKTEN	5537.06	01452.06	20180906	0400	76		06	6	17.9	1018	1430	x---	11		-	x	-	x	-	x	x	x	x	-	-	-	x	x	-	-	-	-	x	x

Bottom water oxygen concentration (ml/l)

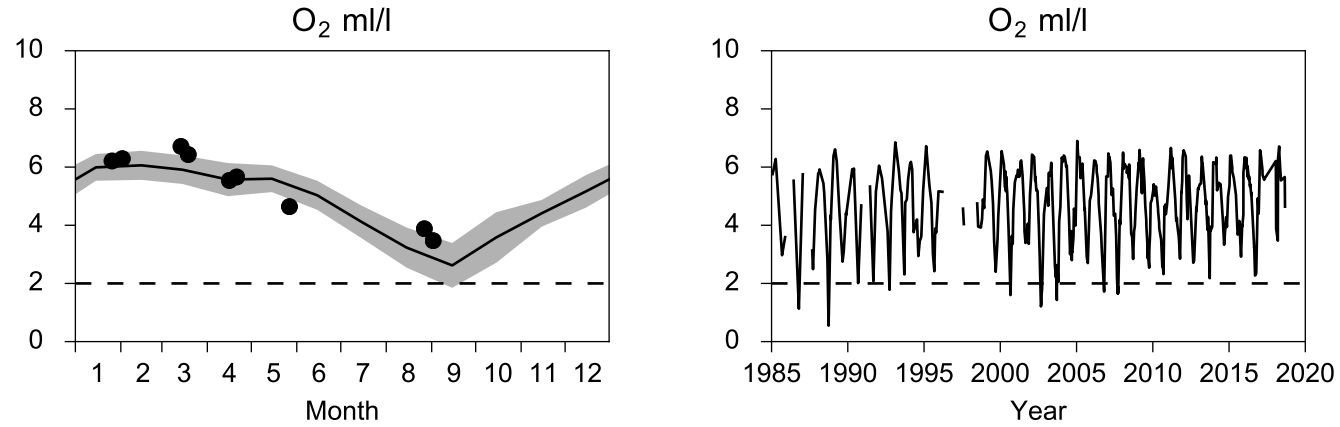
Ship: Dana
Date: 20180902-20180906
Series: 0951-0966



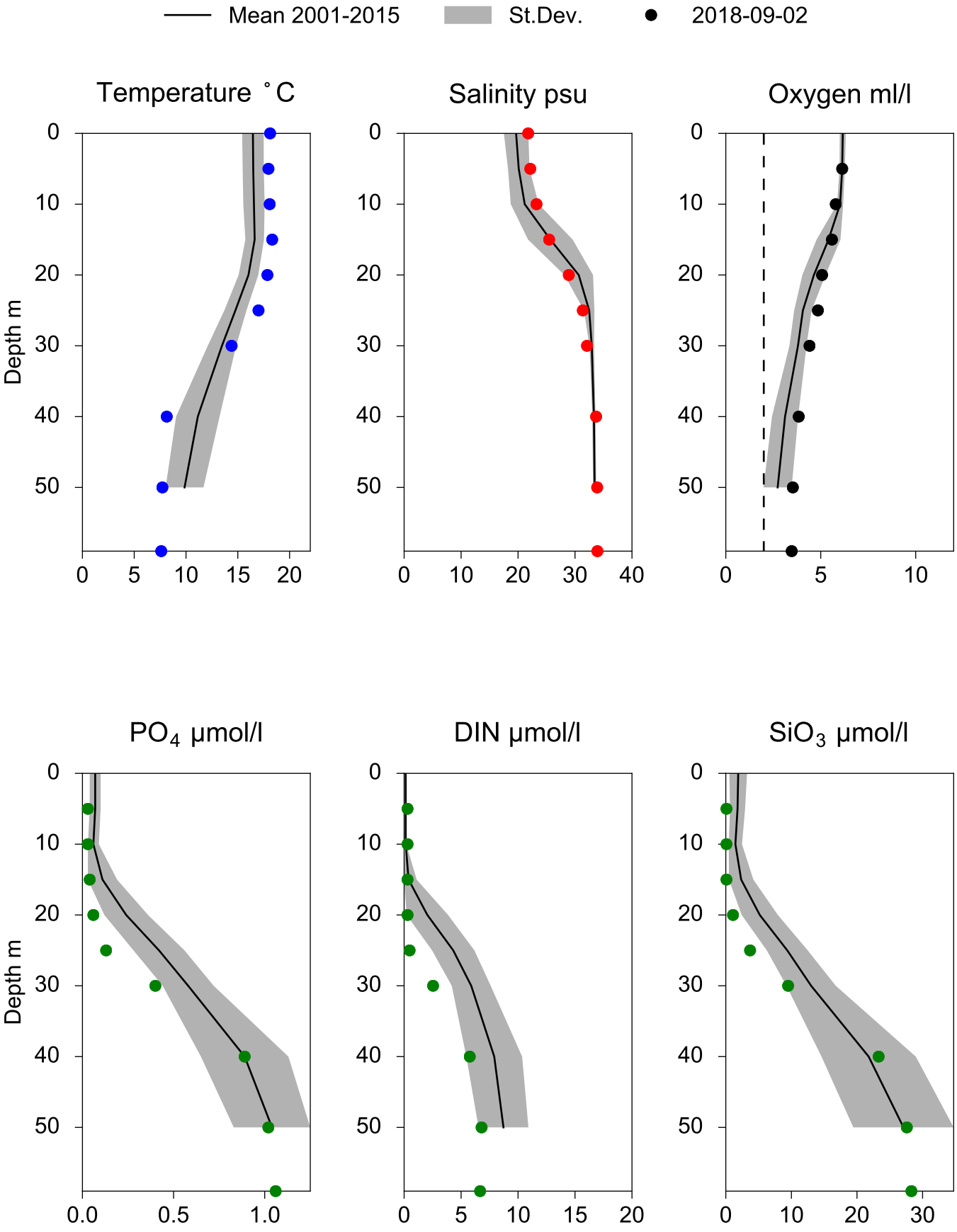
STATION ANHOLT E SURFACE WATER (0-10 m)



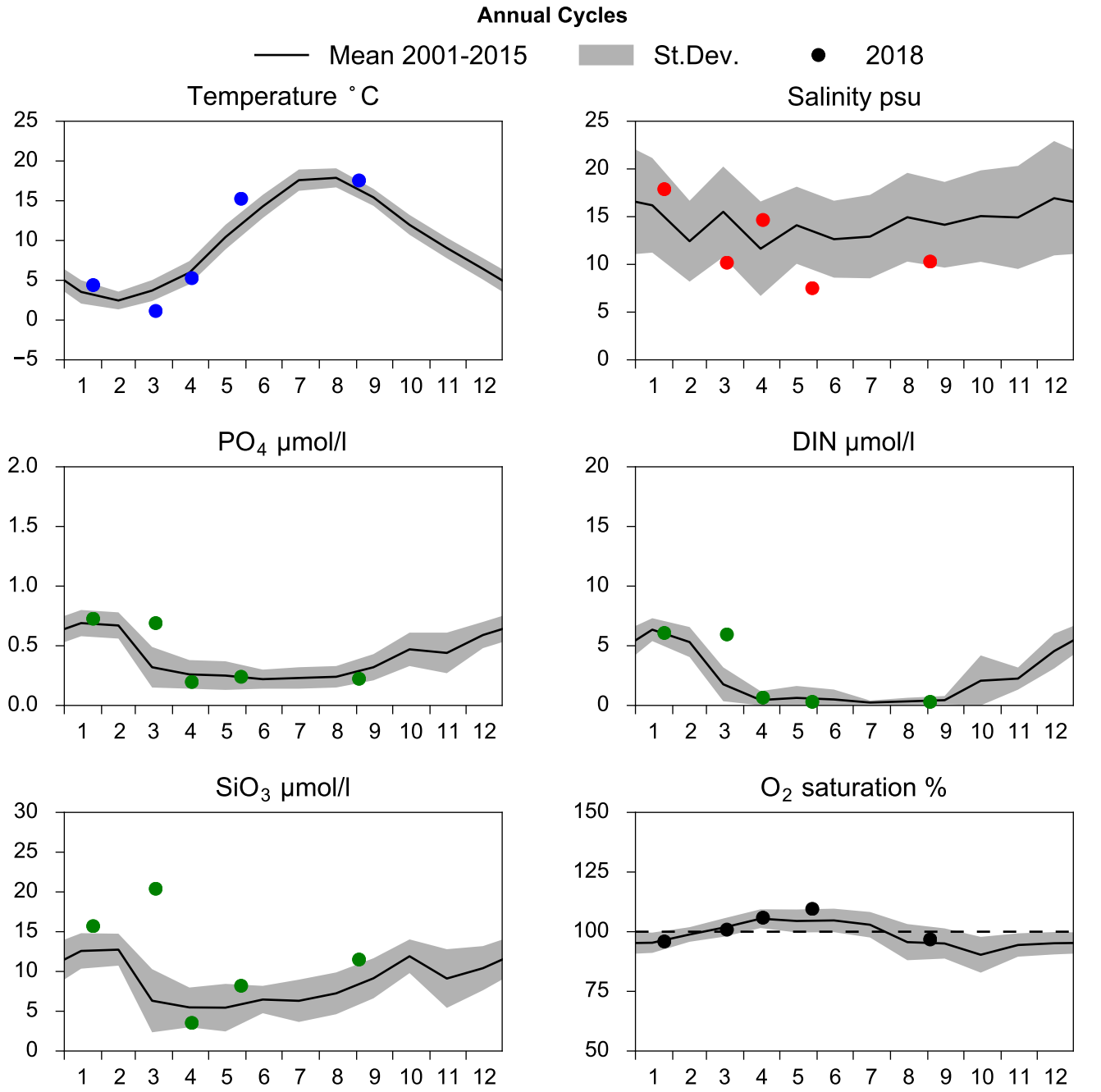
OXYGEN IN BOTTOM WATER (depth >= 52 m)



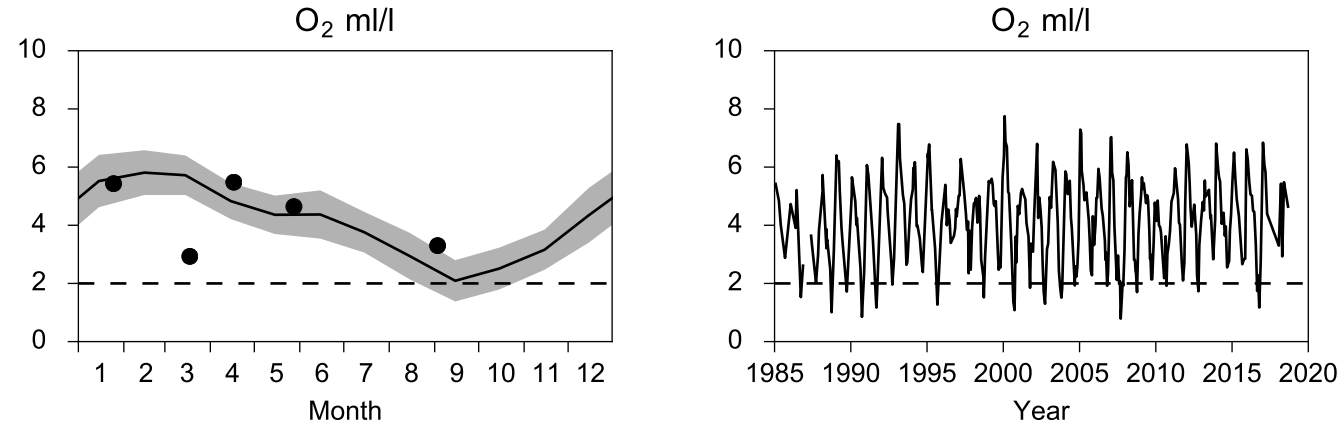
Vertical profiles ANHOLT E
September



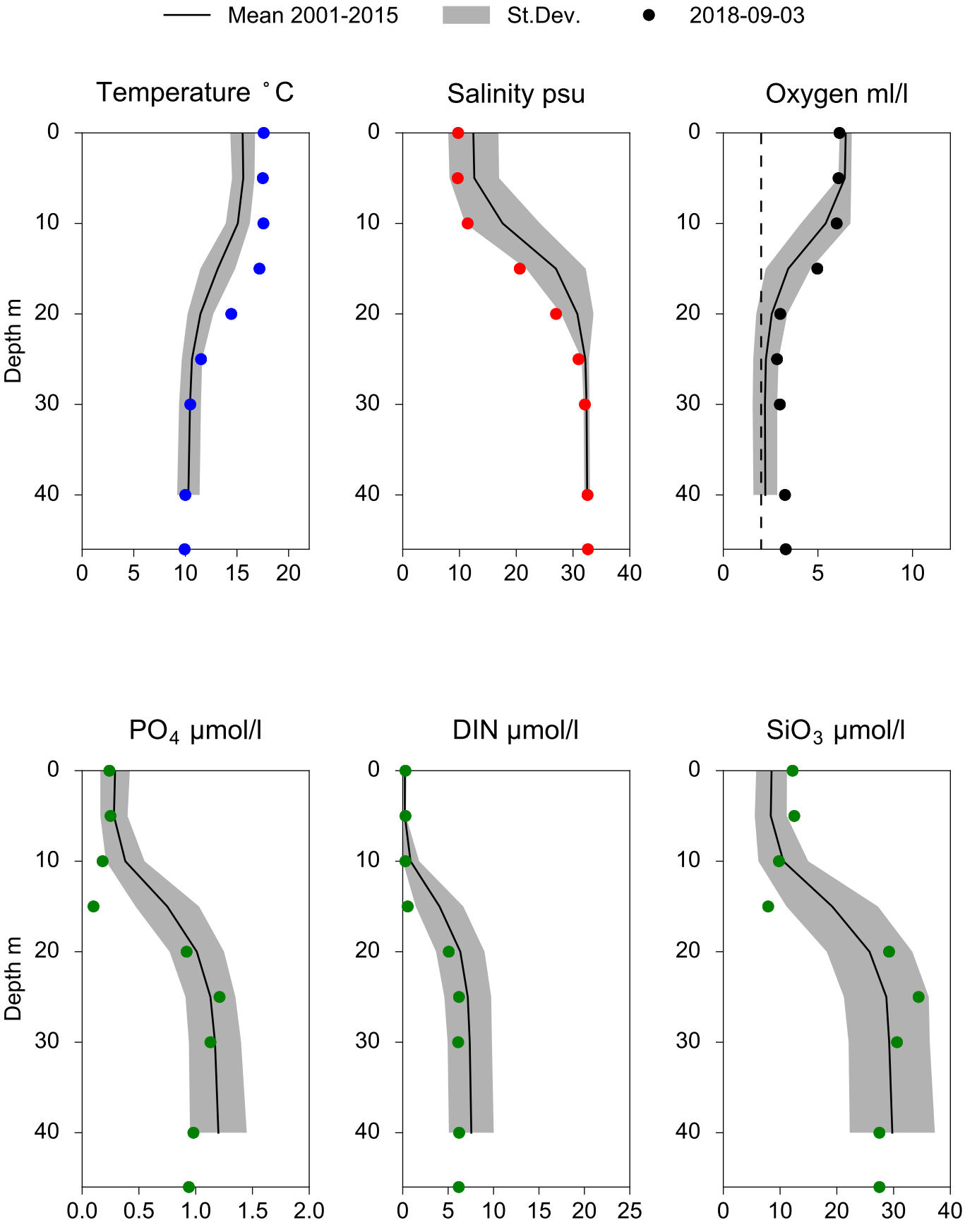
STATION W LANDSKRONA SURFACE WATER (0-10 m)



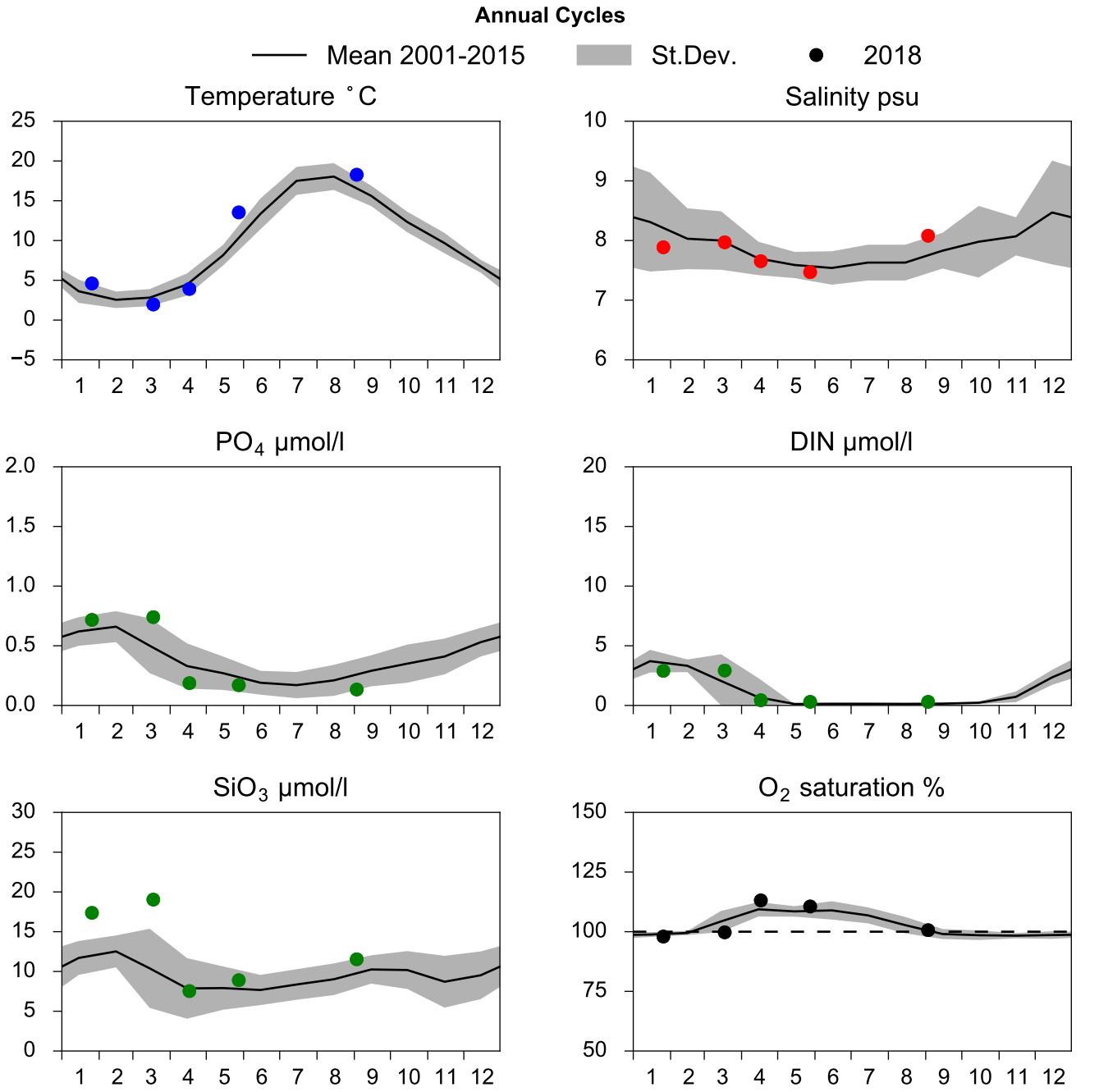
OXYGEN IN BOTTOM WATER (depth >= 40 m)



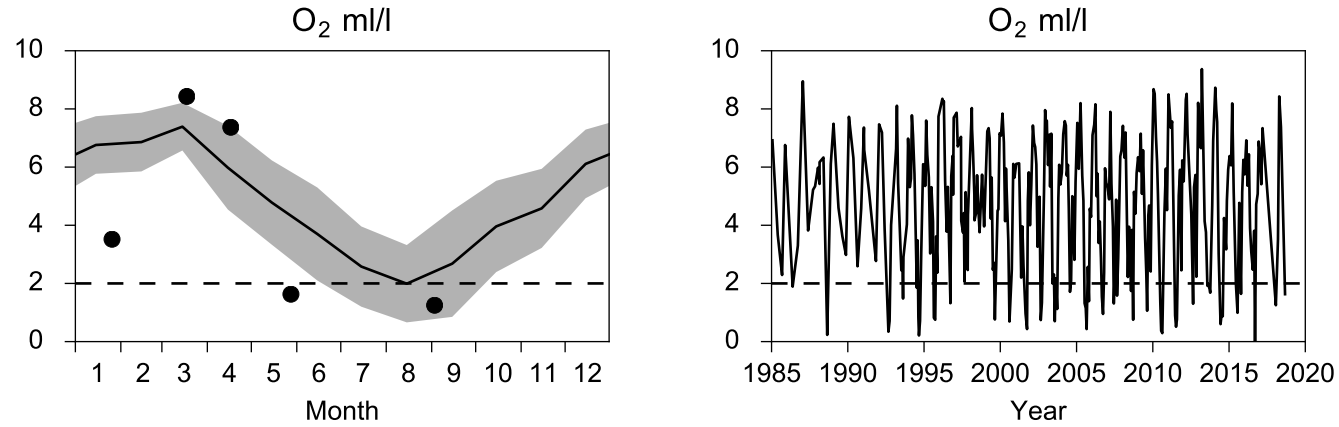
Vertical profiles W LANDSKRONA
September



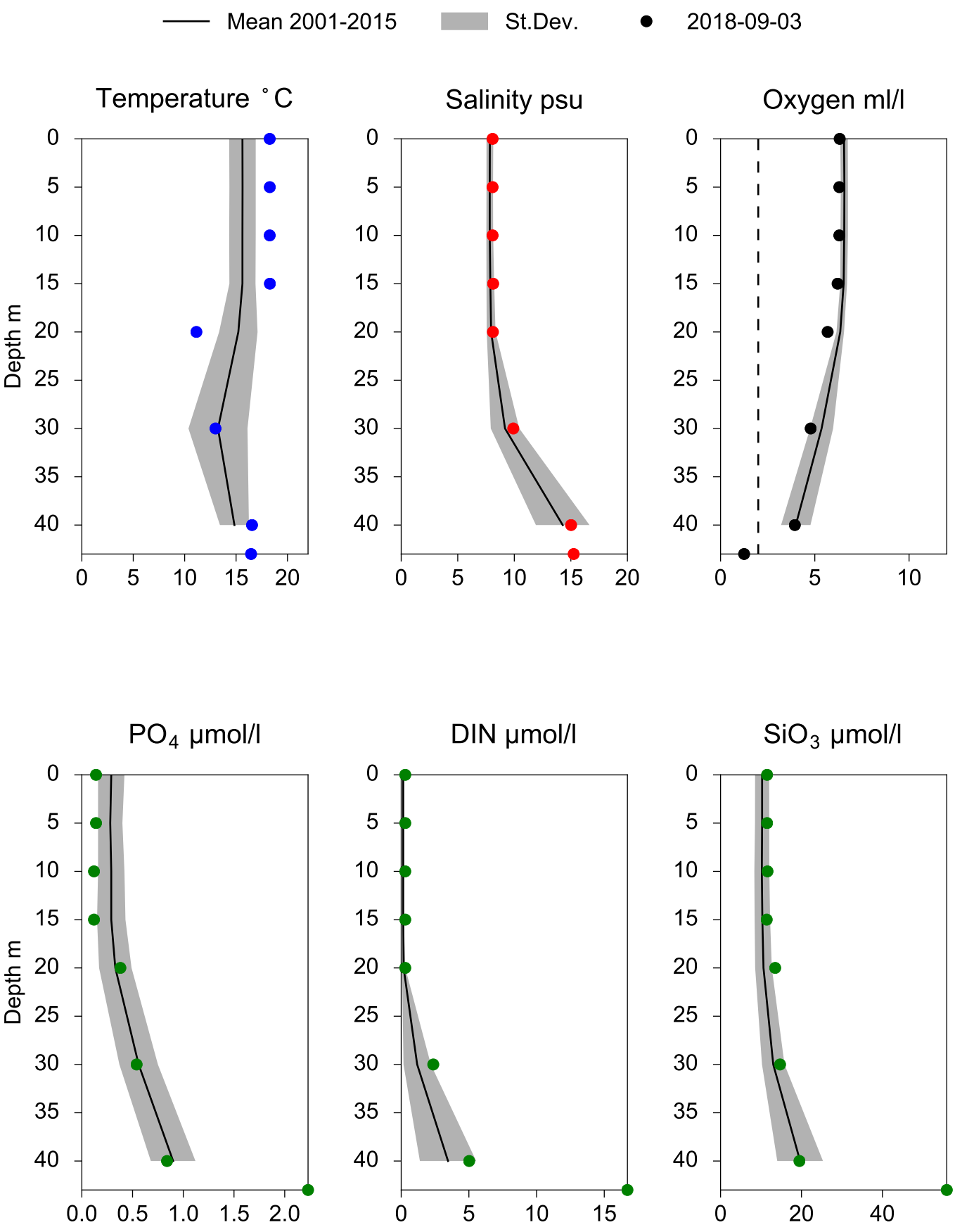
STATION BY1 SURFACE WATER (0-10 m)



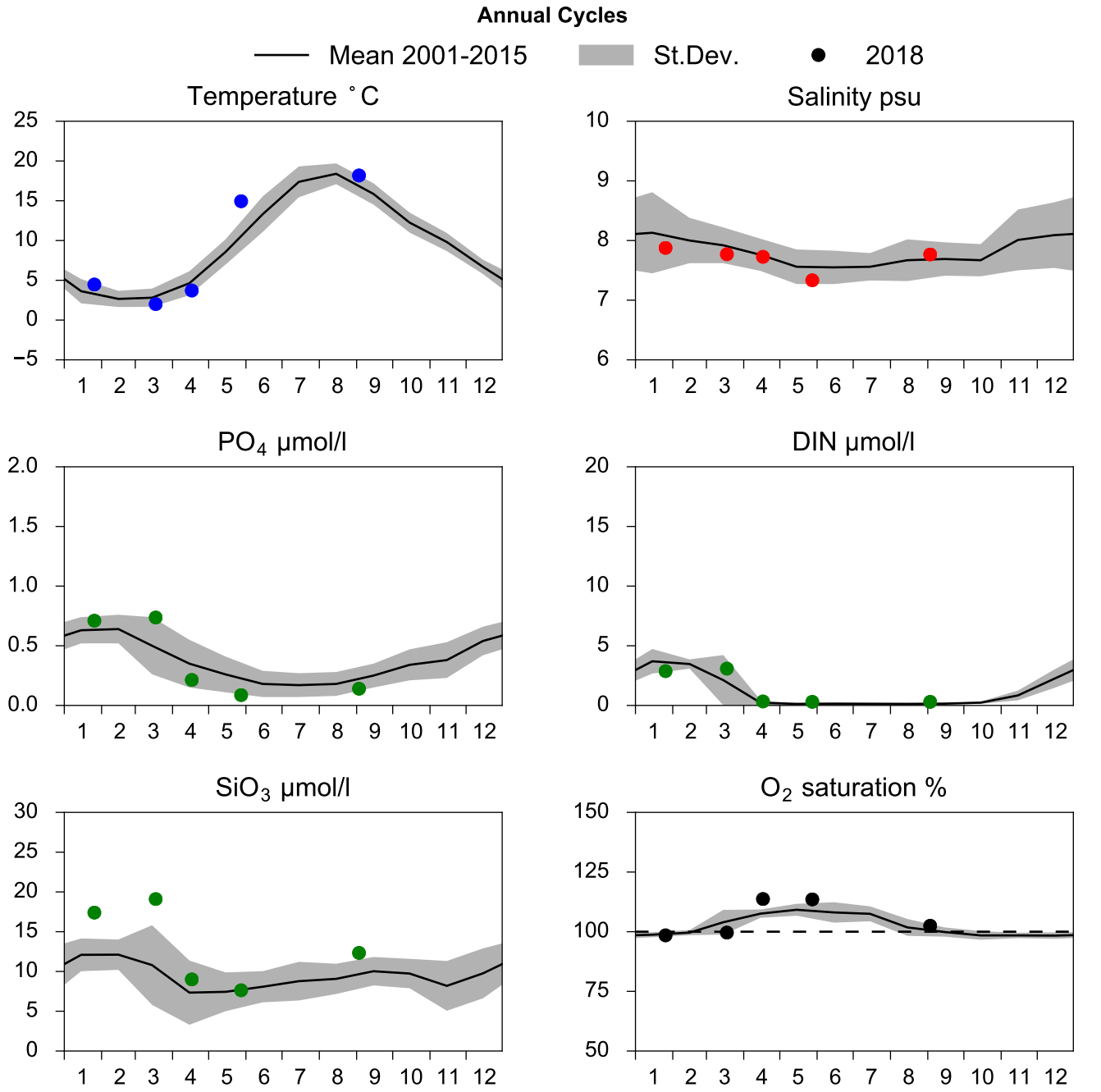
OXYGEN IN BOTTOM WATER (depth >= 40 m)



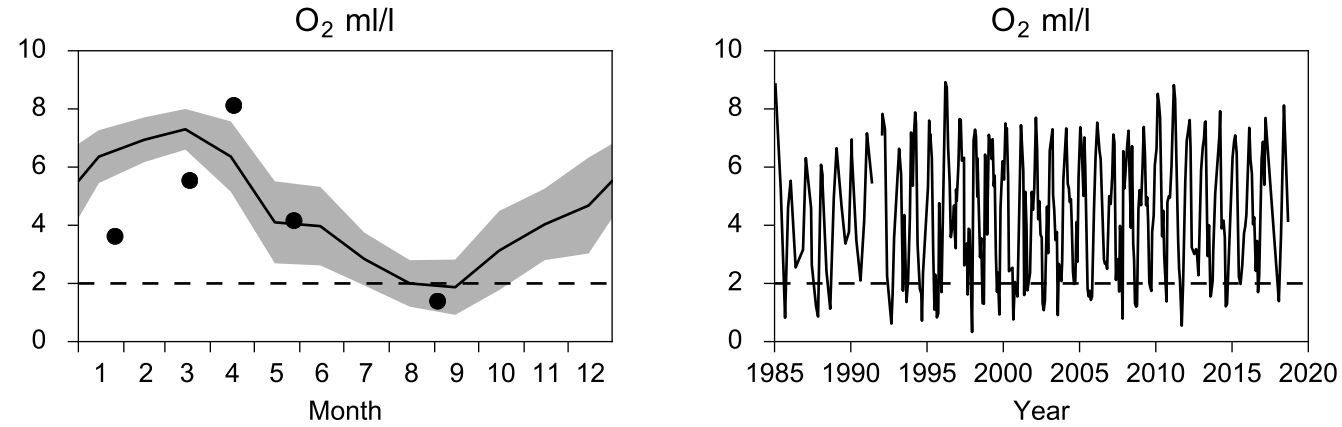
Vertical profiles BY1
September



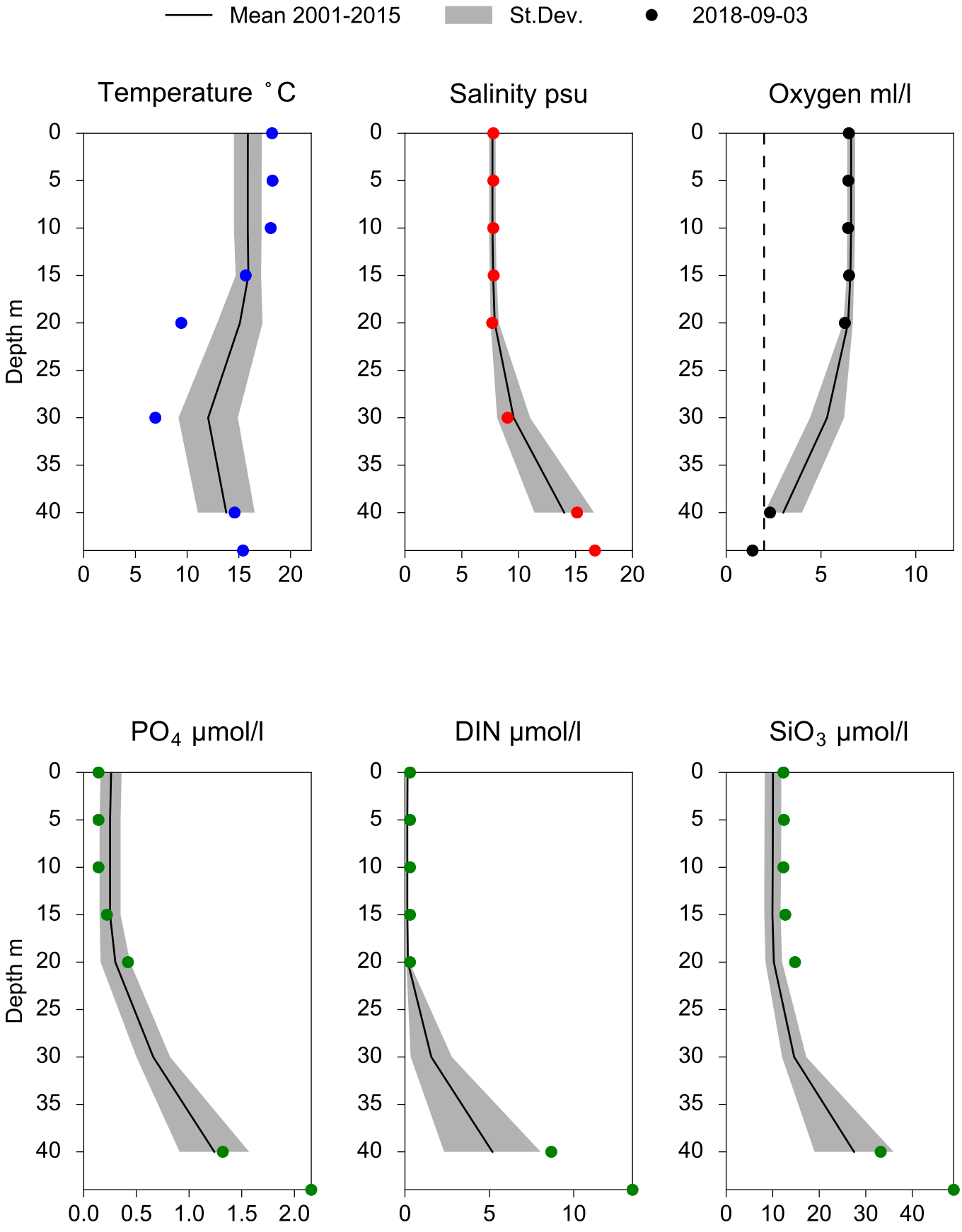
STATION BY2 ARKONA SURFACE WATER (0-10 m)



OXYGEN IN BOTTOM WATER (depth >= 40 m)



Vertical profiles BY2 ARKONA
September

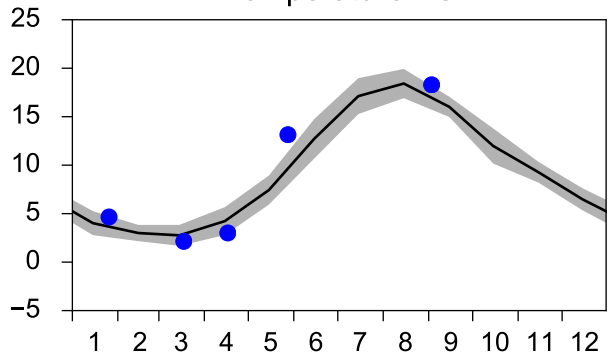


STATION BY4 CHRISTIANSÖ SURFACE WATER (0-10 m)

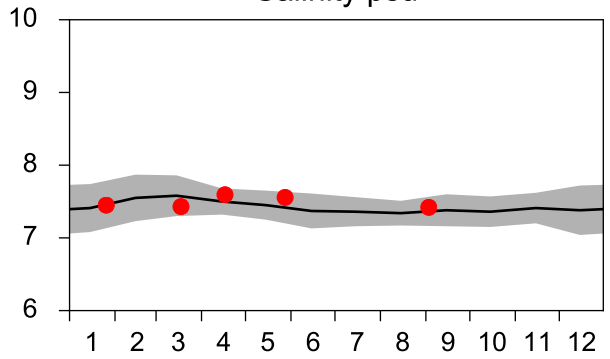
Annual Cycles

Mean 2001-2015 St.Dev. 2018

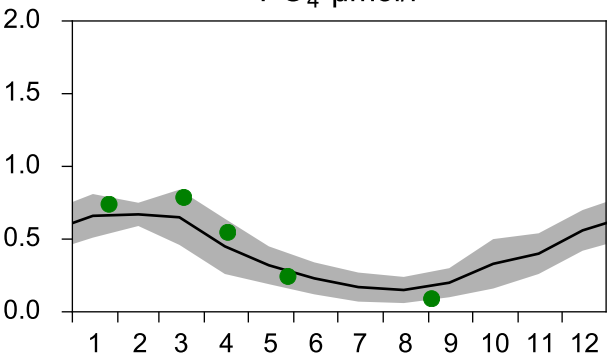
Temperature ˚C



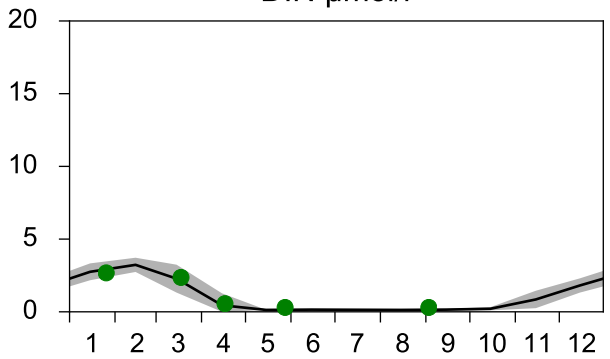
Salinity psu



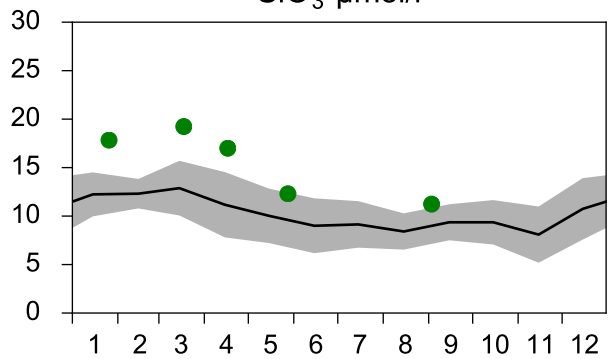
PO_4 µmol/l



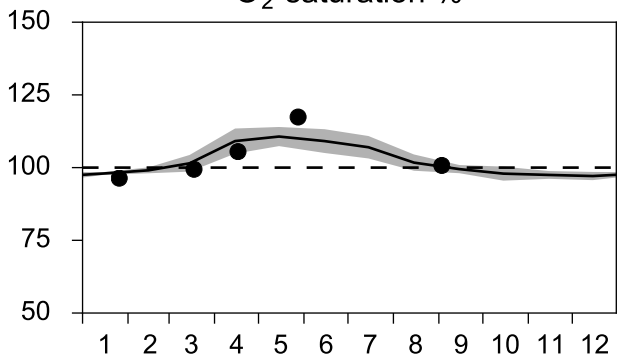
DIN µmol/l



SiO_3 µmol/l

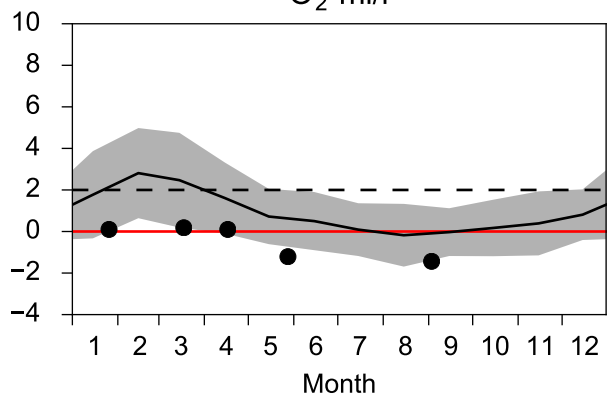


O_2 saturation %

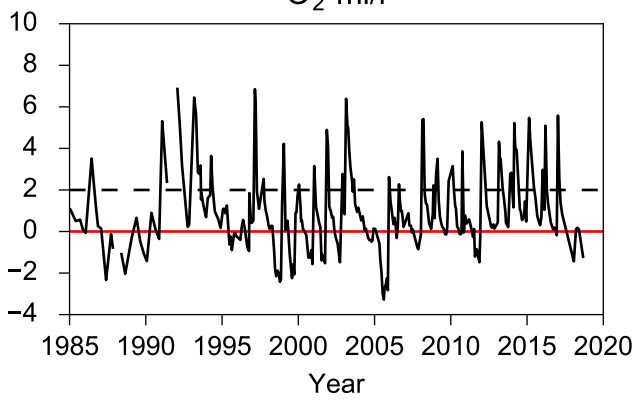


OXYGEN IN BOTTOM WATER (depth >= 80 m)

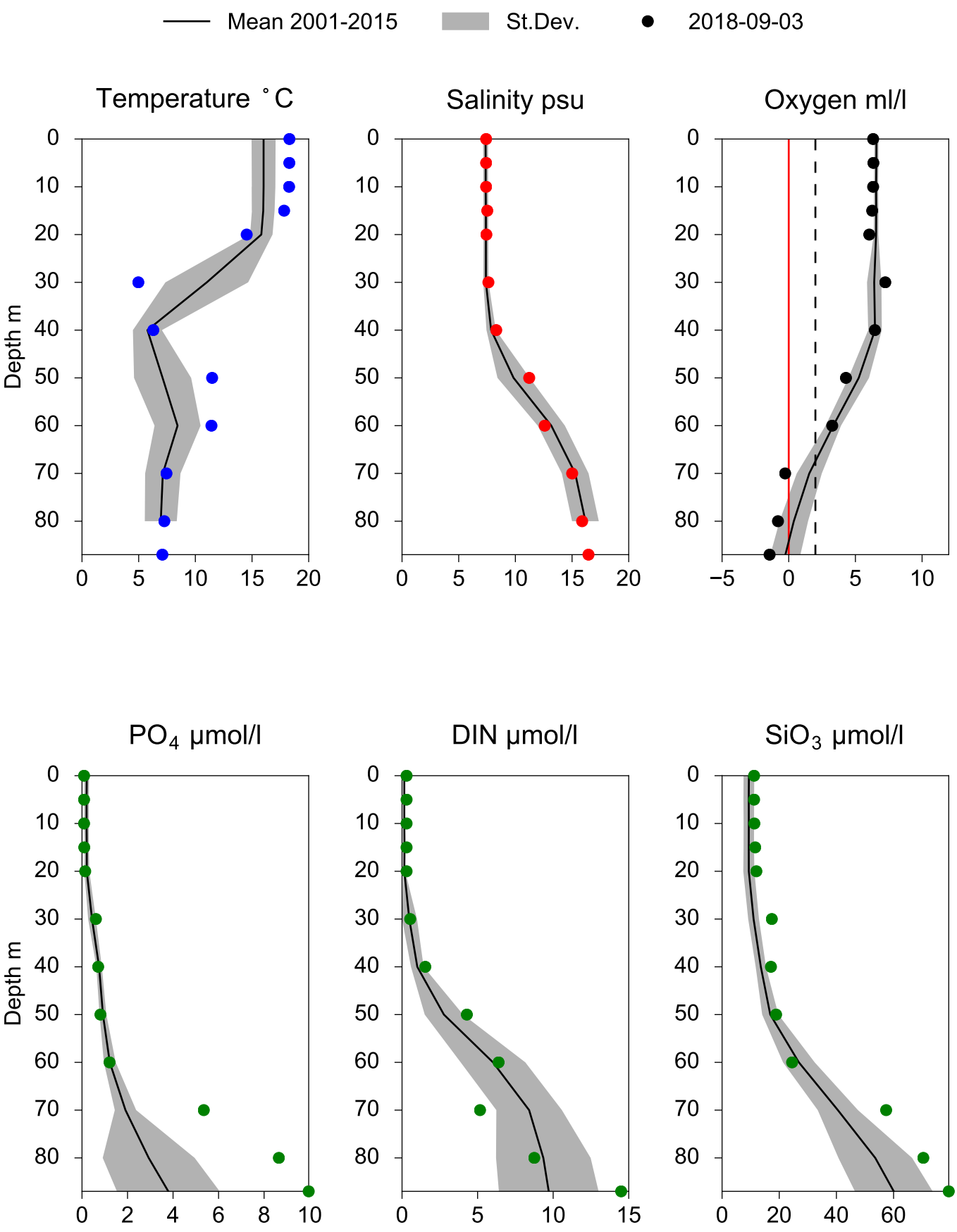
O_2 ml/l



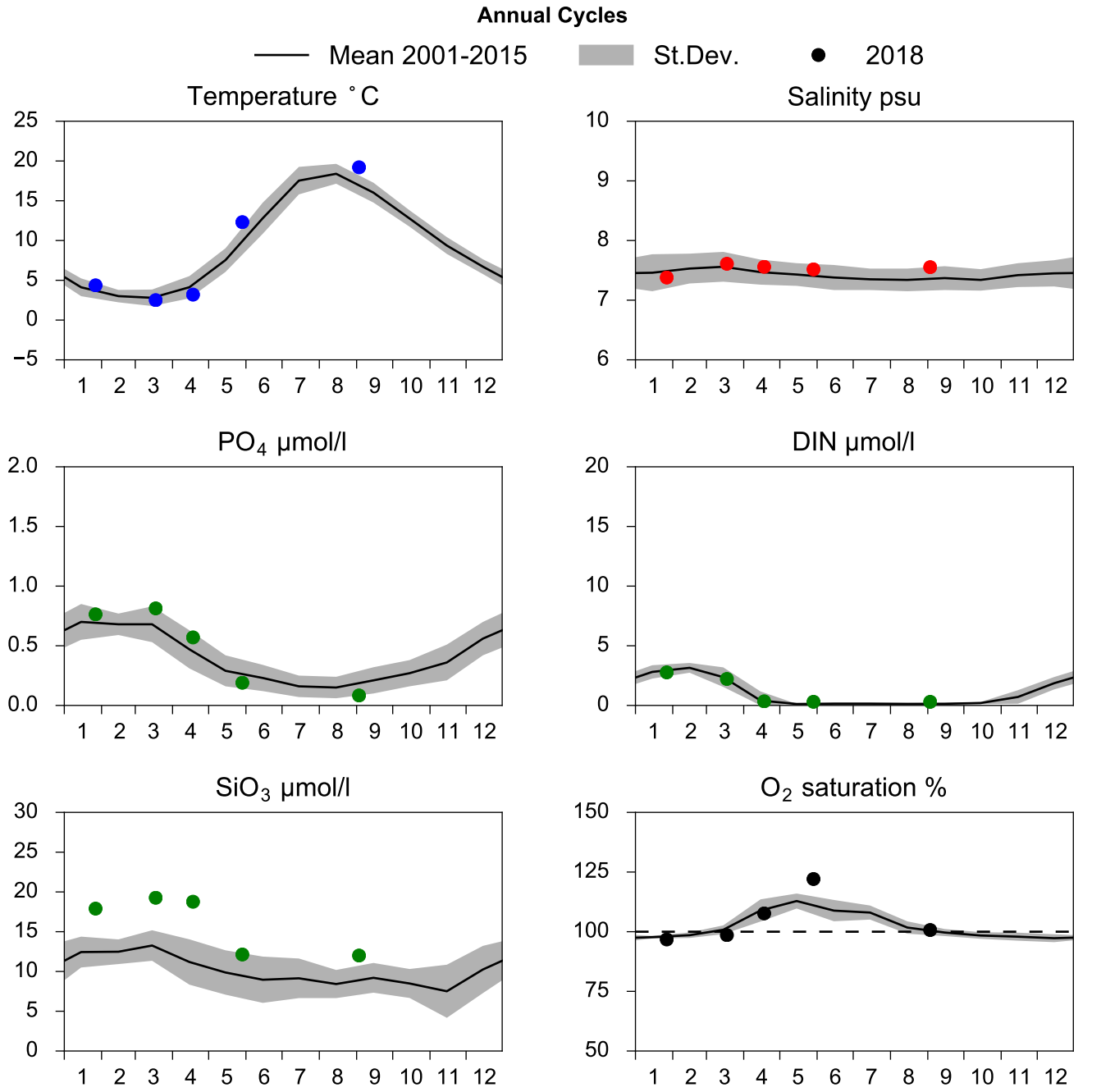
O_2 ml/l



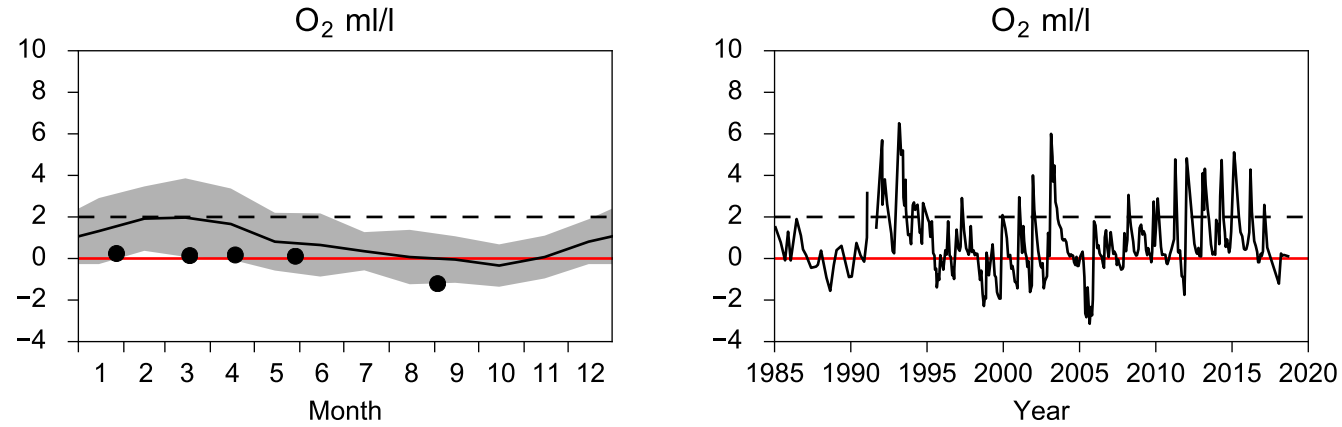
Vertical profiles BY4 CHRISTIANSÖ
September



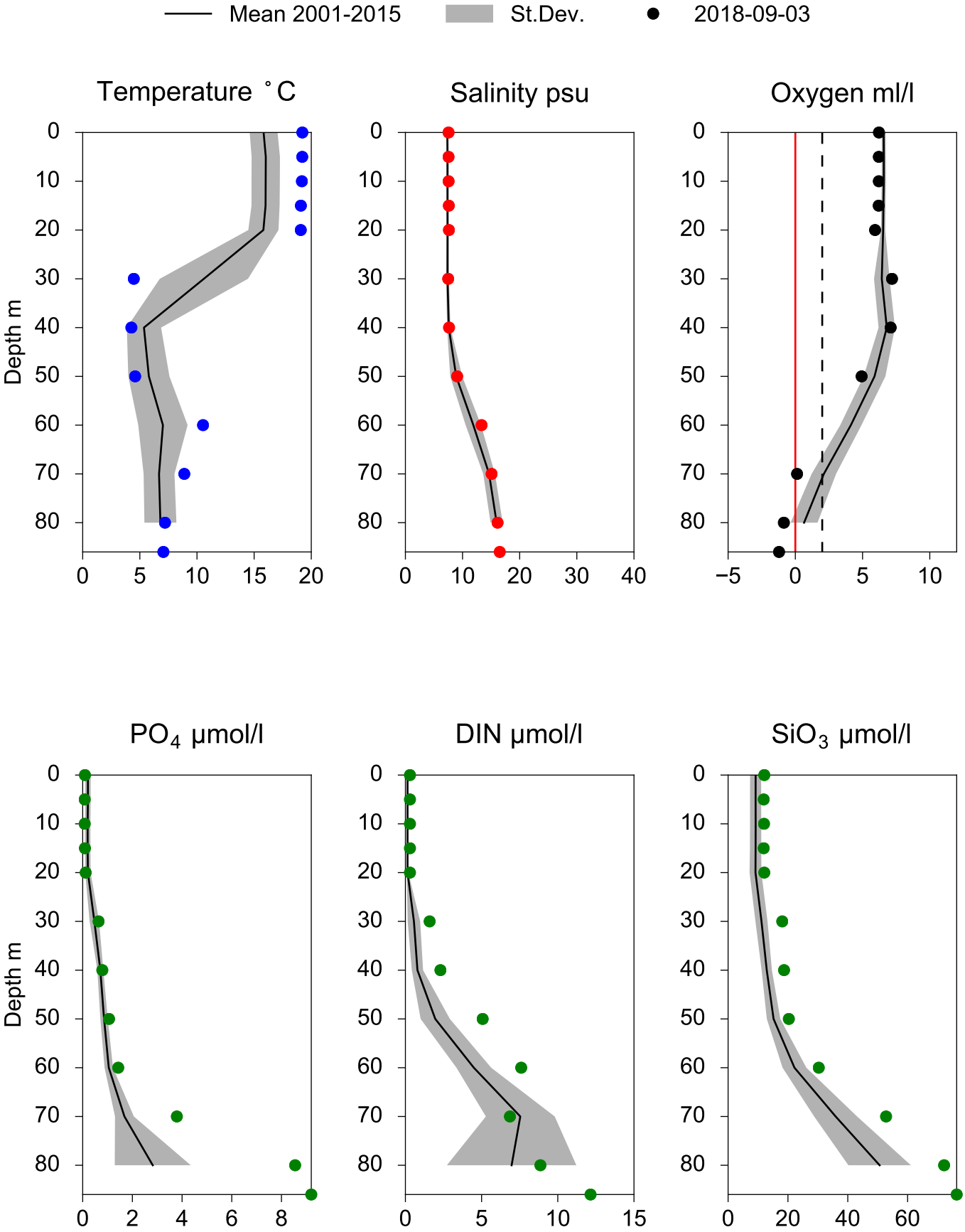
STATION BY5 BORNHOLMSDJ SURFACE WATER (0-10 m)



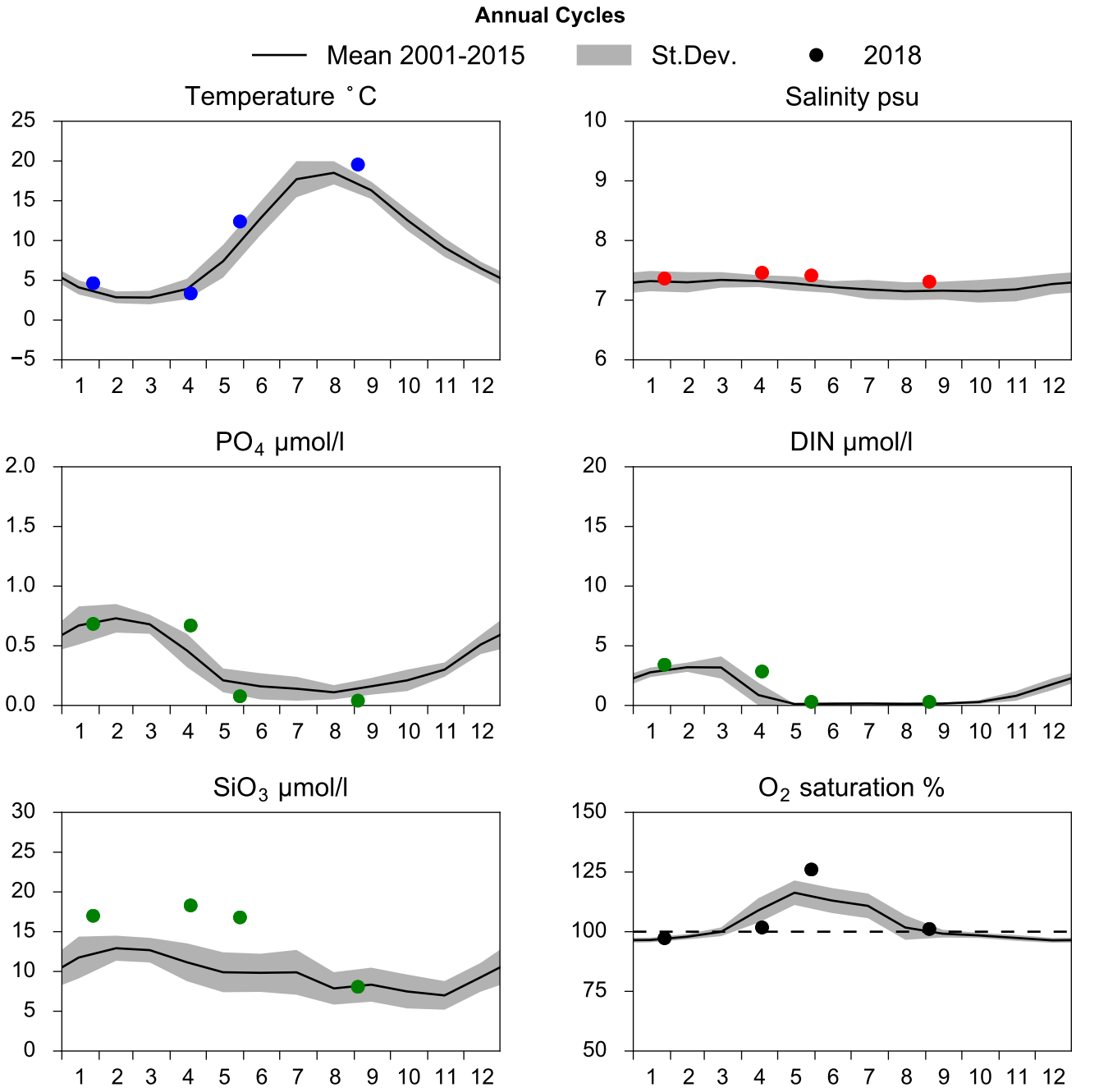
OXYGEN IN BOTTOM WATER (depth >= 80 m)



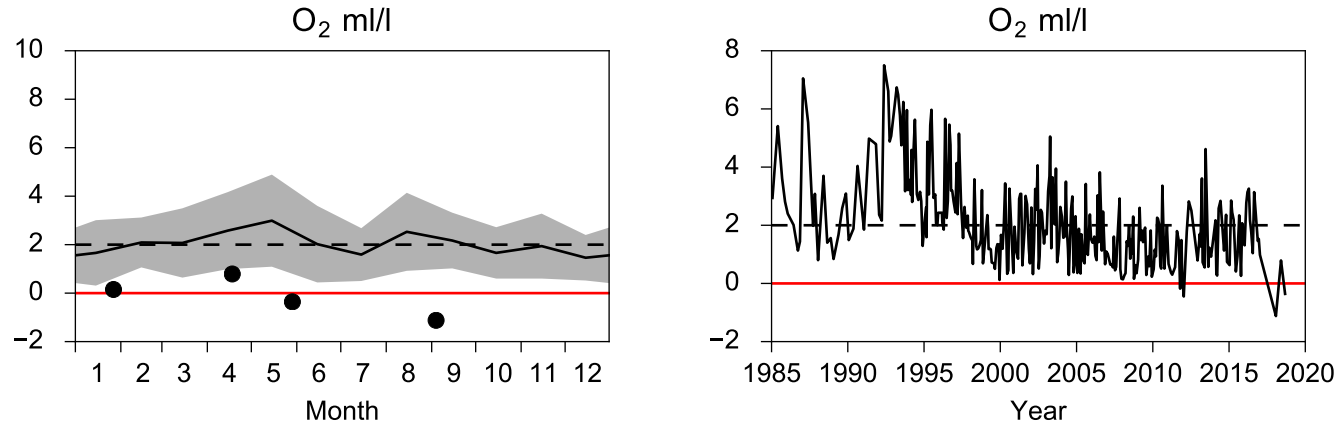
Vertical profiles BY5 BORNHOLMSDJ
September



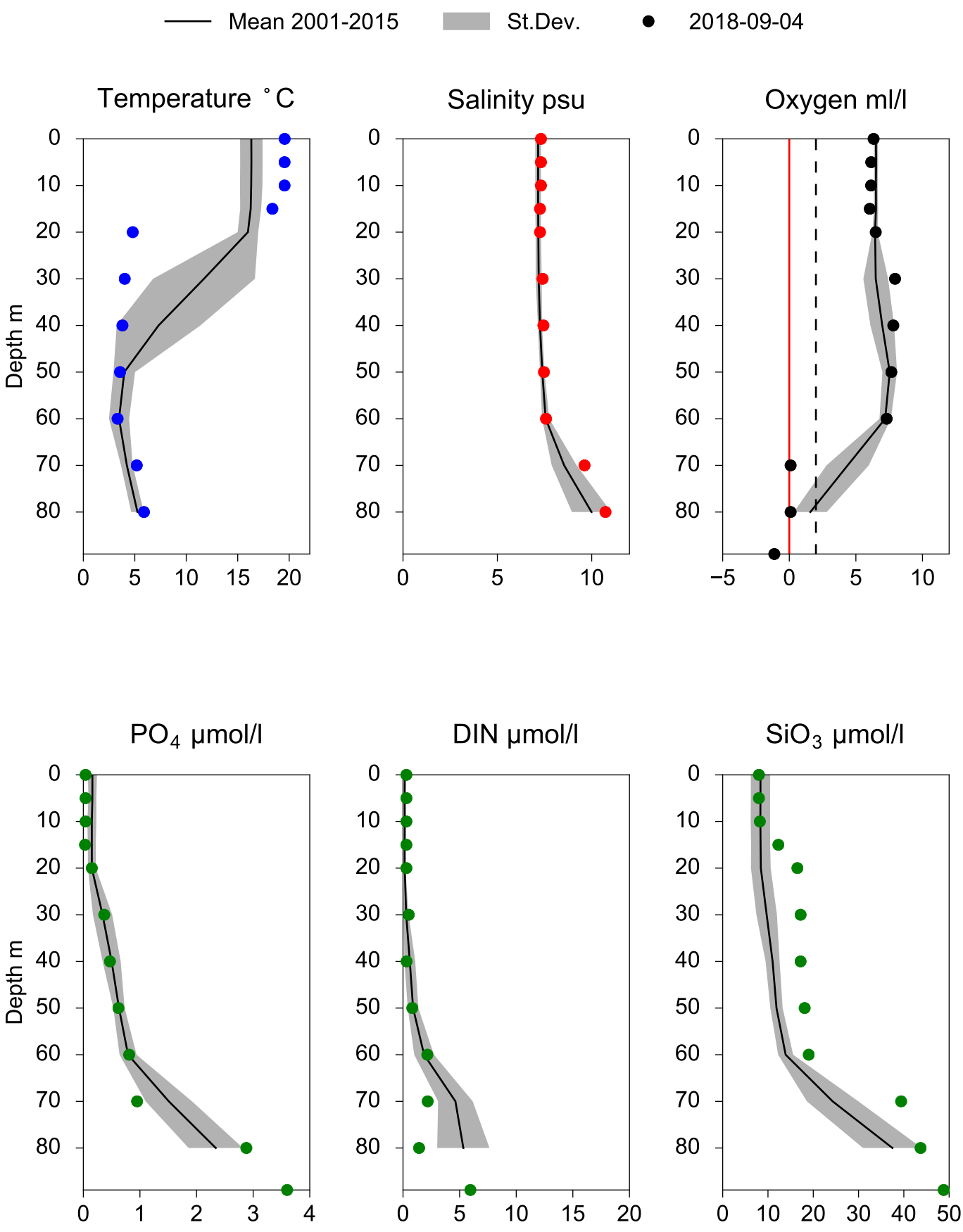
STATION BCS III-10 SURFACE WATER (0-10 m)



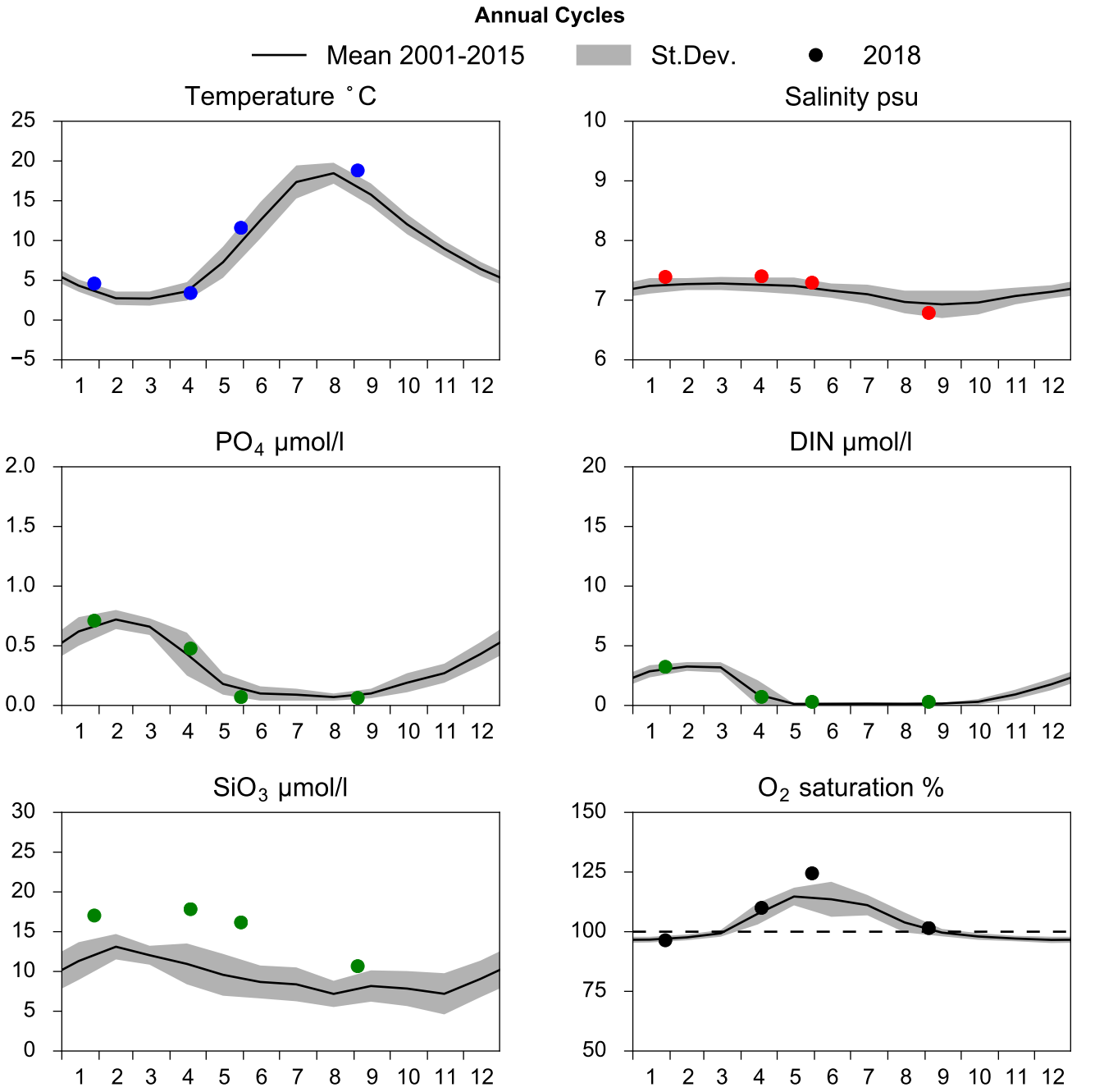
OXYGEN IN BOTTOM WATER (depth >= 80 m)



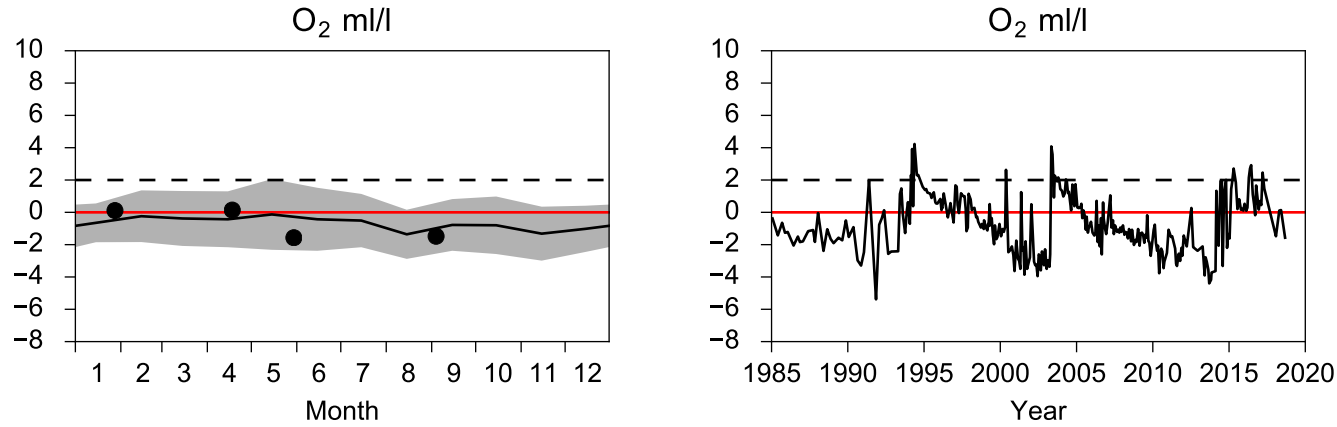
Vertical profiles BCS III-10
September



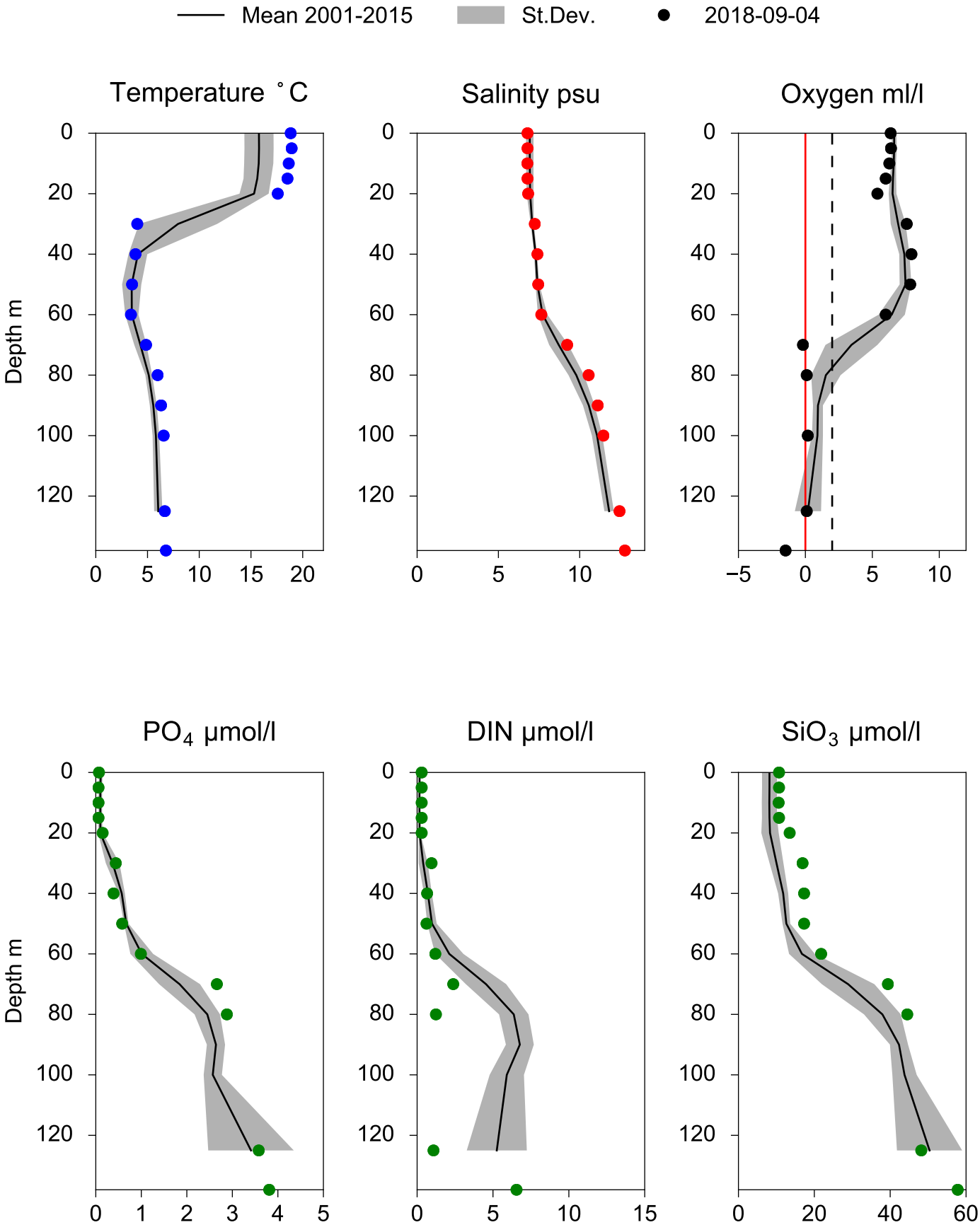
STATION BY10 SURFACE WATER (0-10 m)



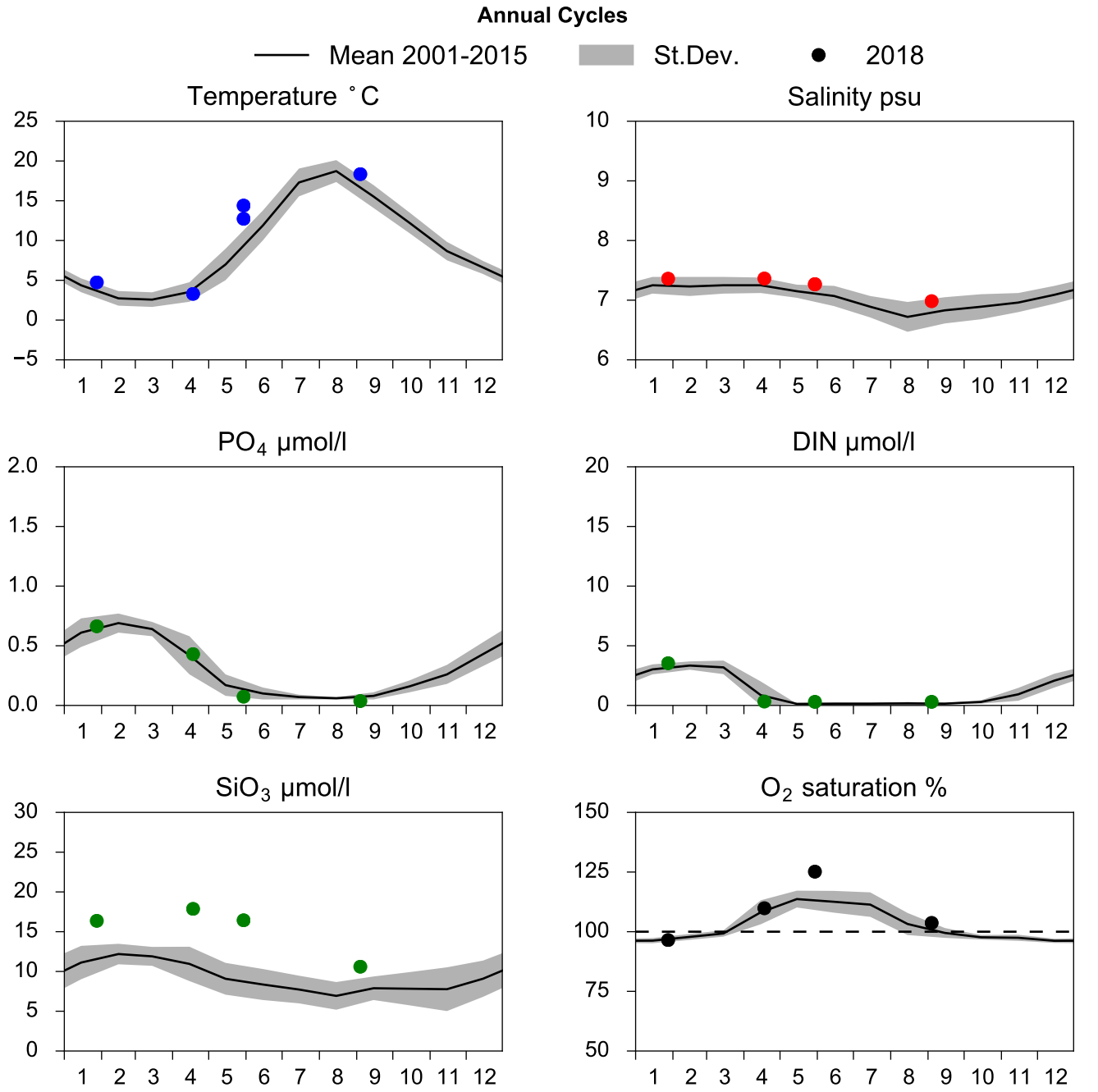
OXYGEN IN BOTTOM WATER (depth >= 125 m)



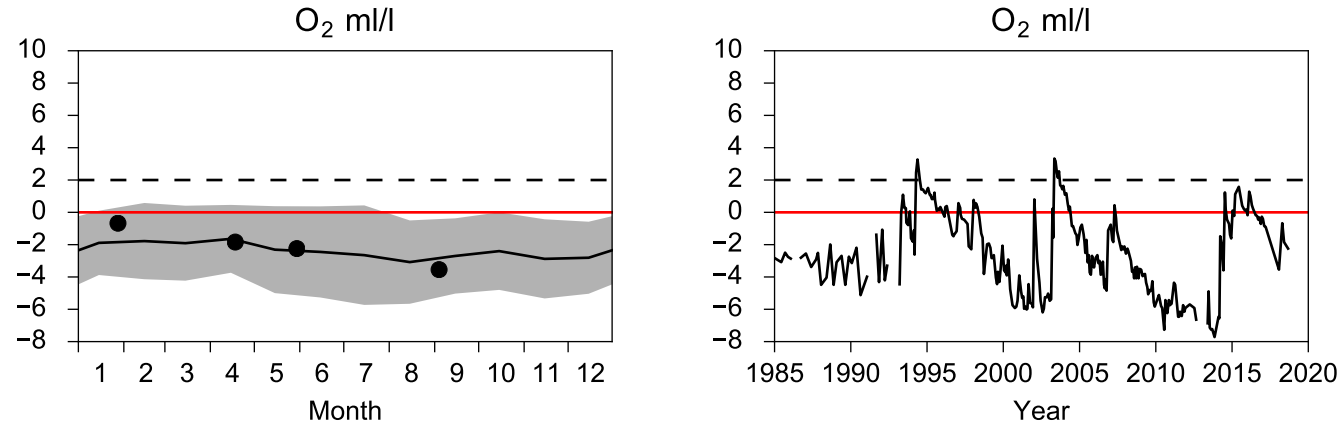
Vertical profiles BY10
September



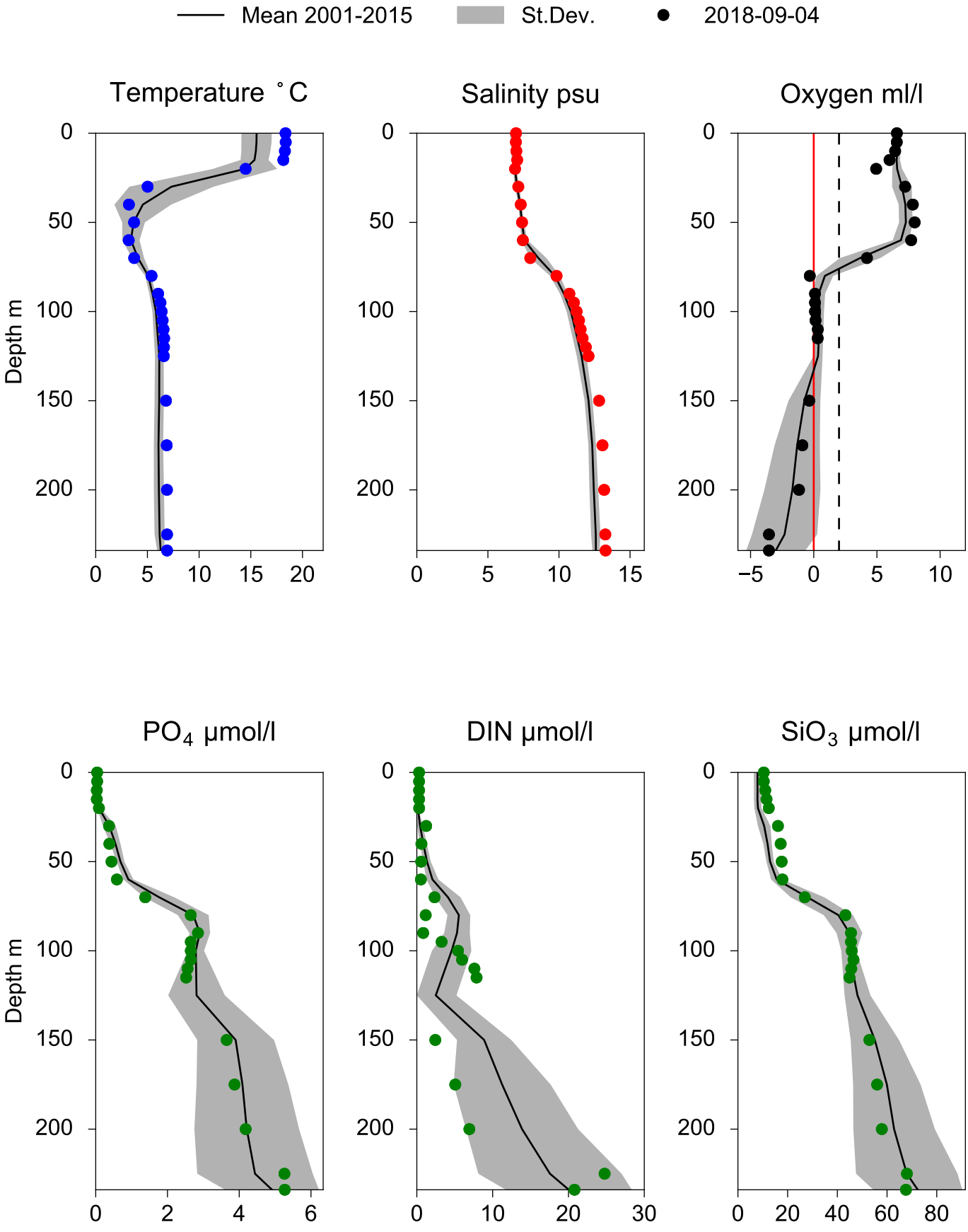
STATION BY15 GOTLANDSDJ SURFACE WATER (0-10 m)



OXYGEN IN BOTTOM WATER (depth >= 225 m)



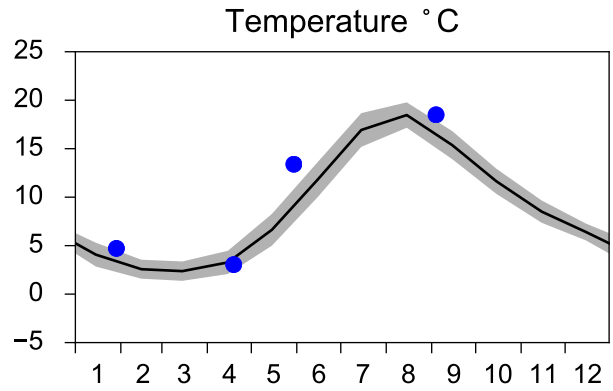
Vertical profiles BY15 GOTLANDSDJ
September

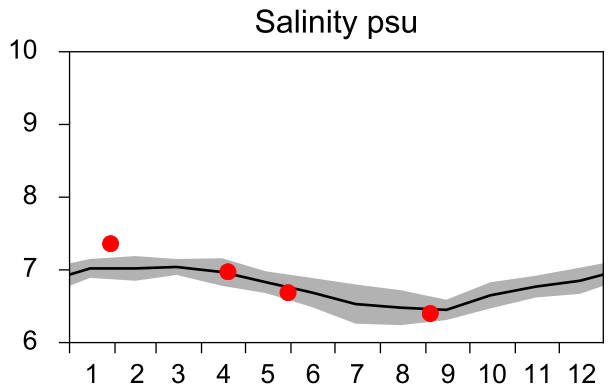


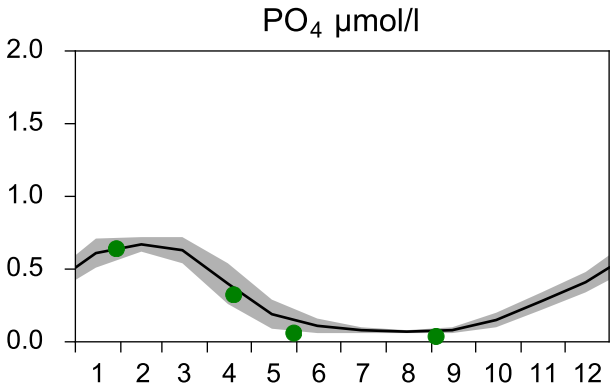
STATION BY20 FÅRÖDJ SURFACE WATER (0-10 m)

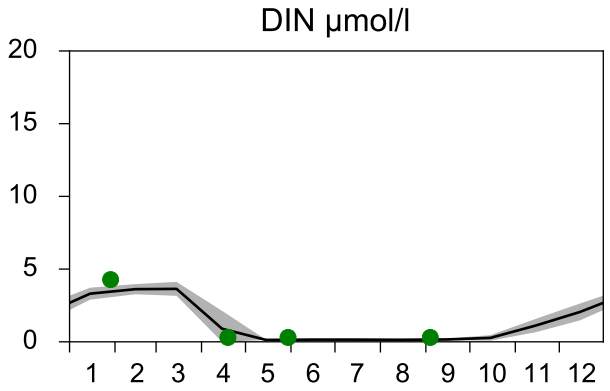
Annual Cycles

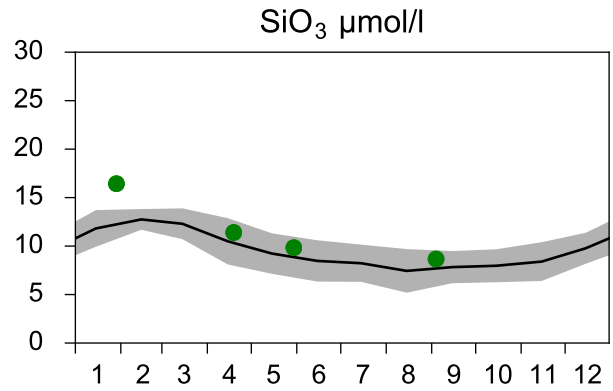
Mean 2001-2015 St.Dev. 2018

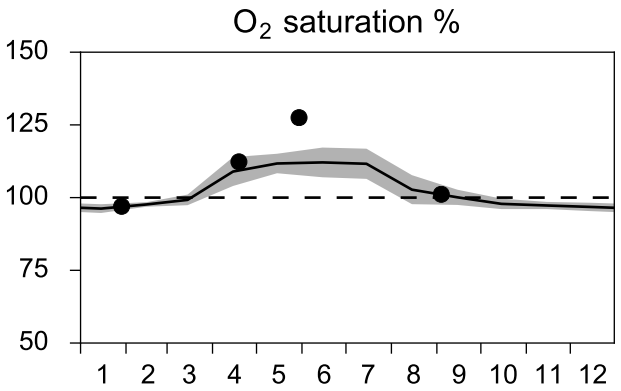




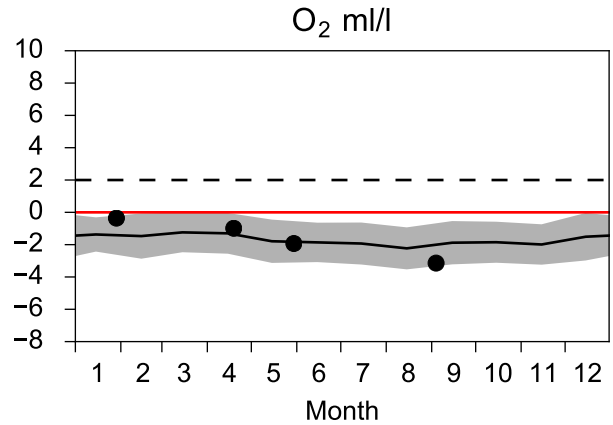


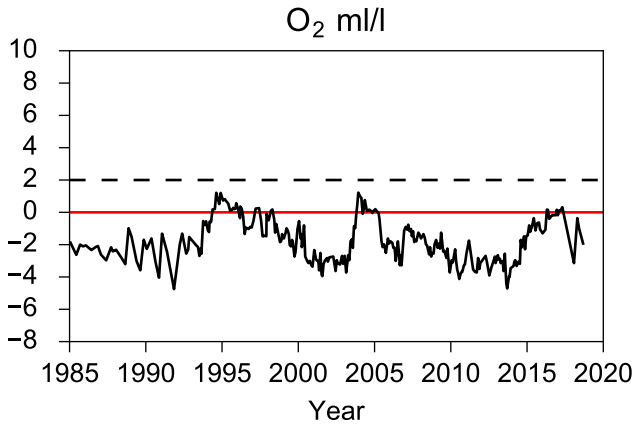




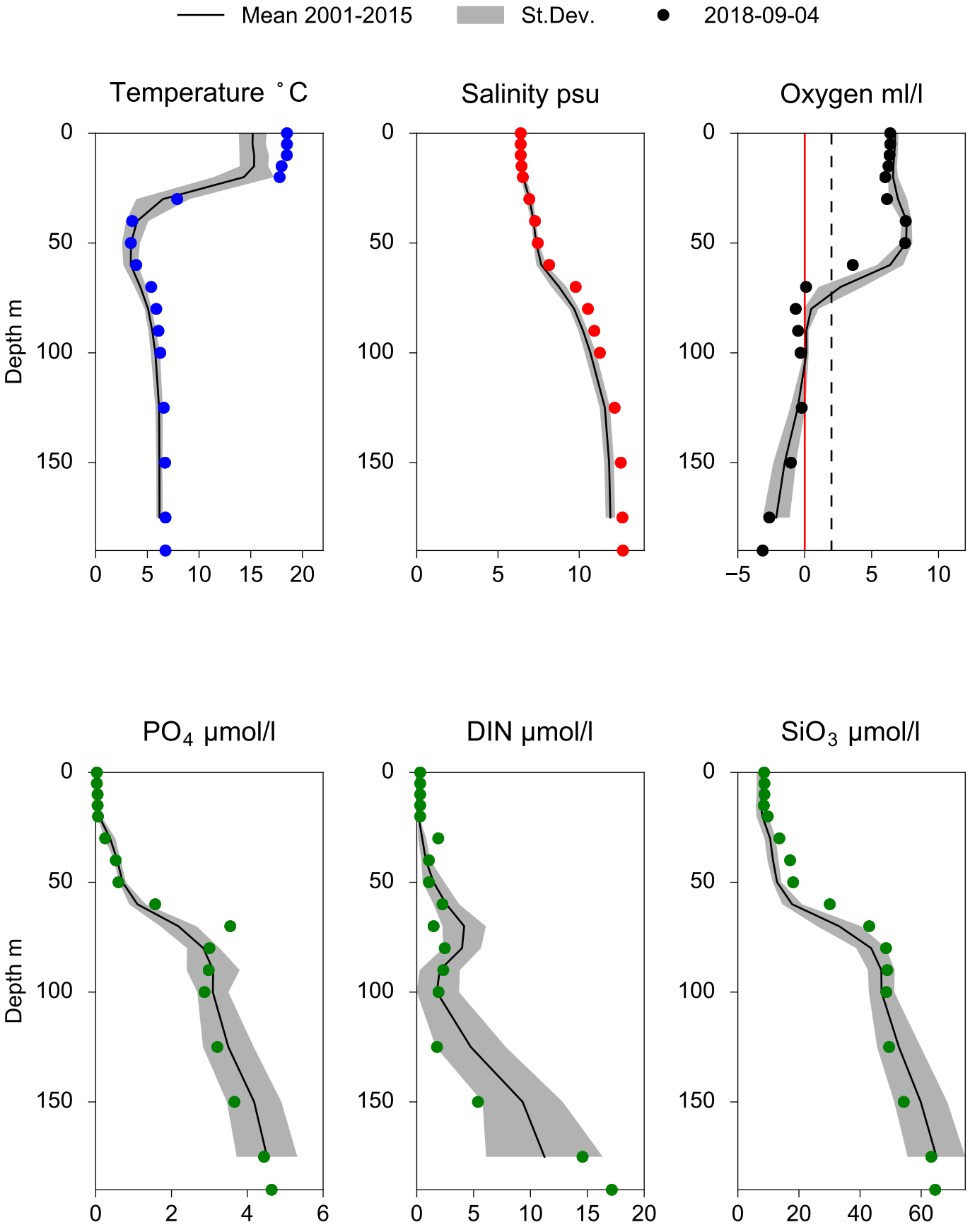


OXYGEN IN BOTTOM WATER (depth >= 175 m)

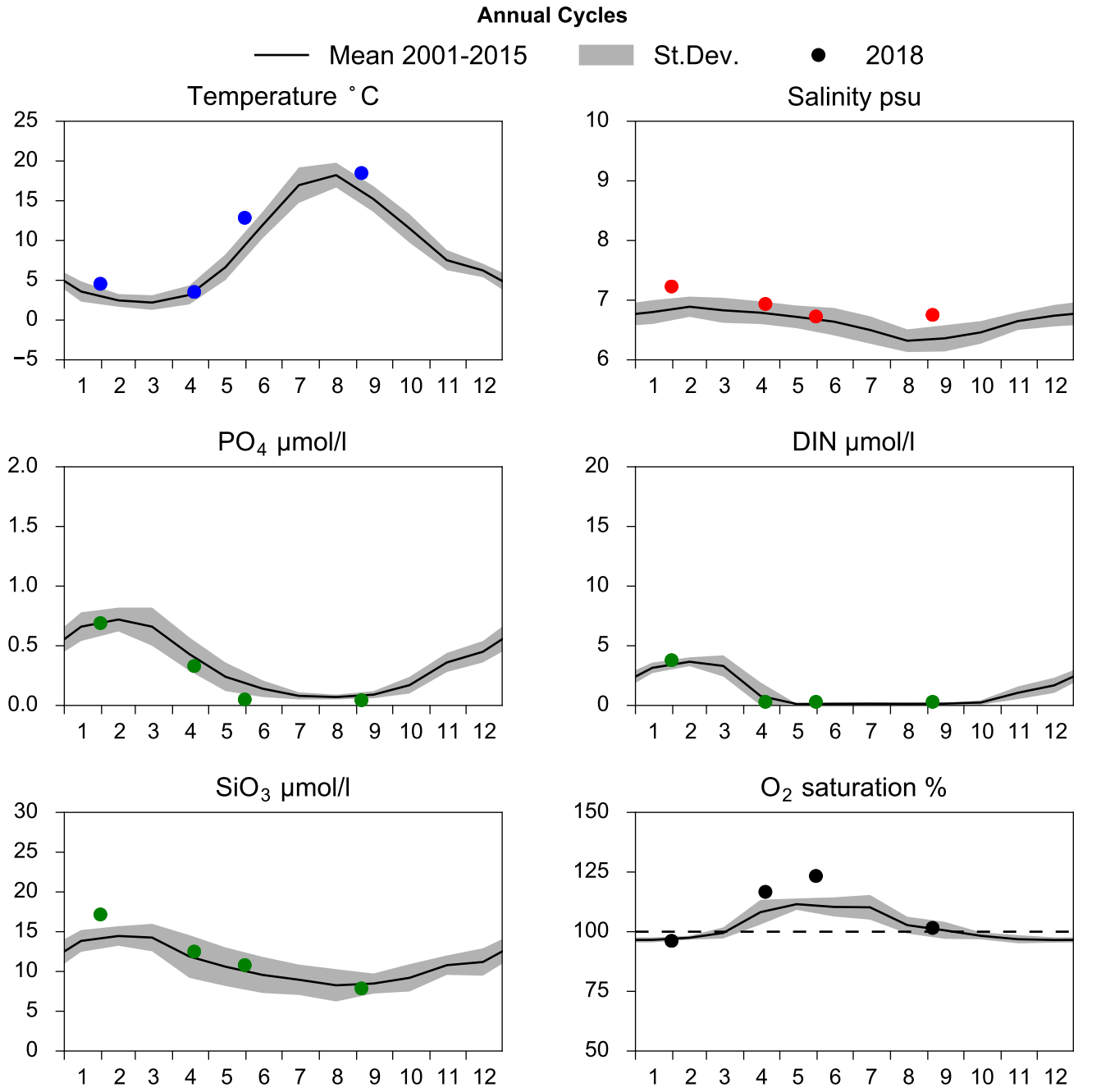




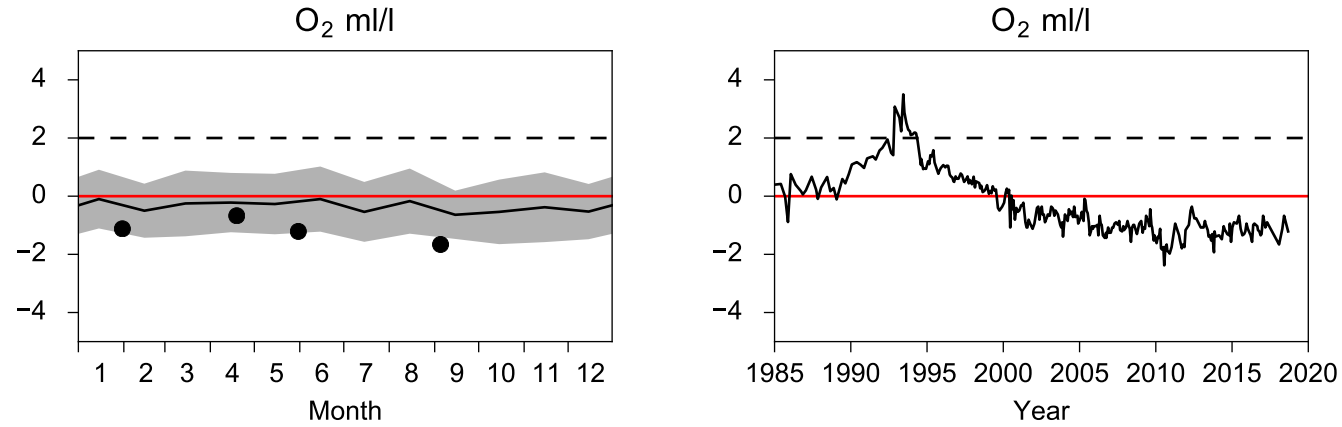
Vertical profiles BY20 FÅRÖDJ
September



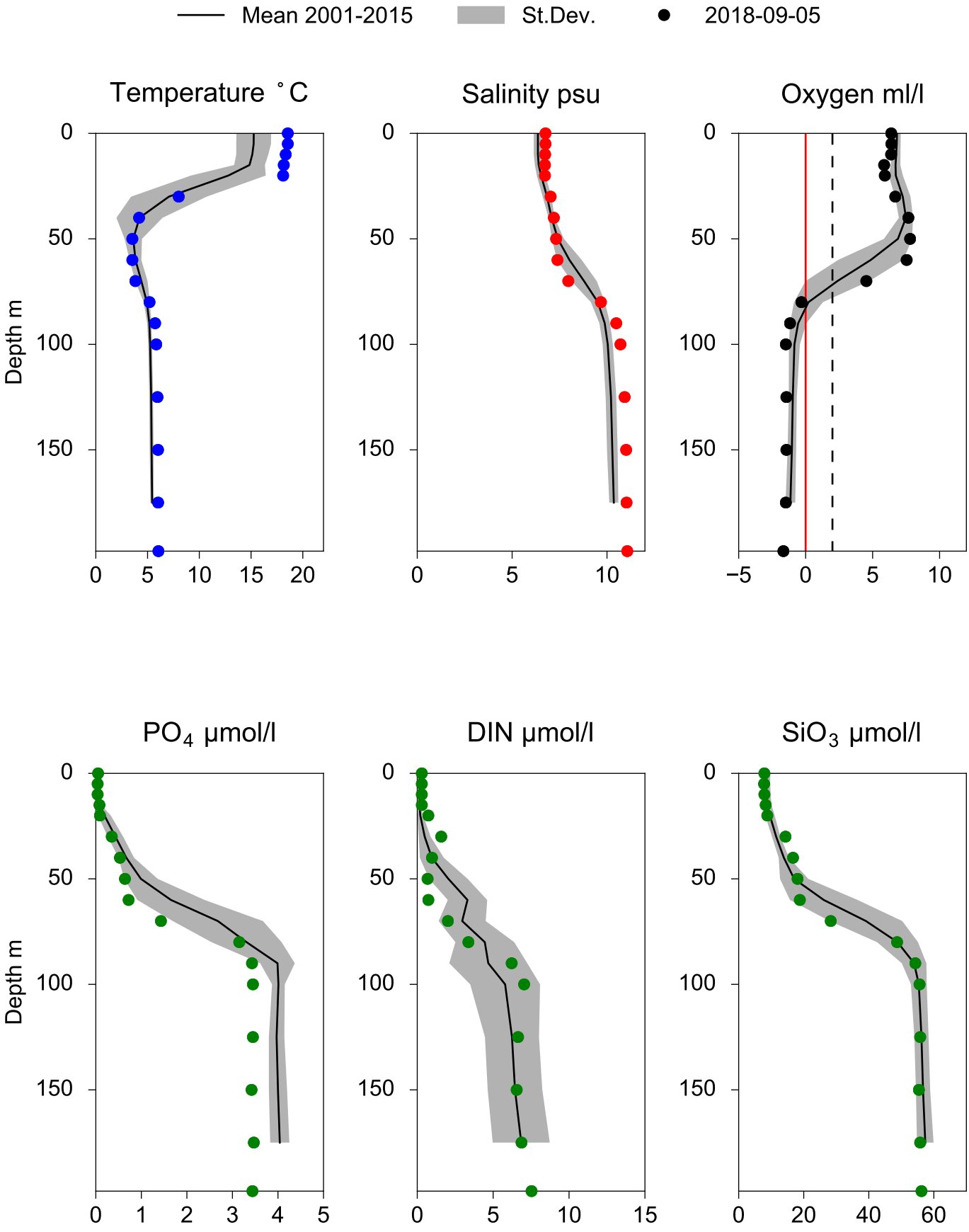
STATION BY32 NORRKÖPINGSDJ SURFACE WATER (0-10 m)



OXYGEN IN BOTTOM WATER (depth >= 175 m)

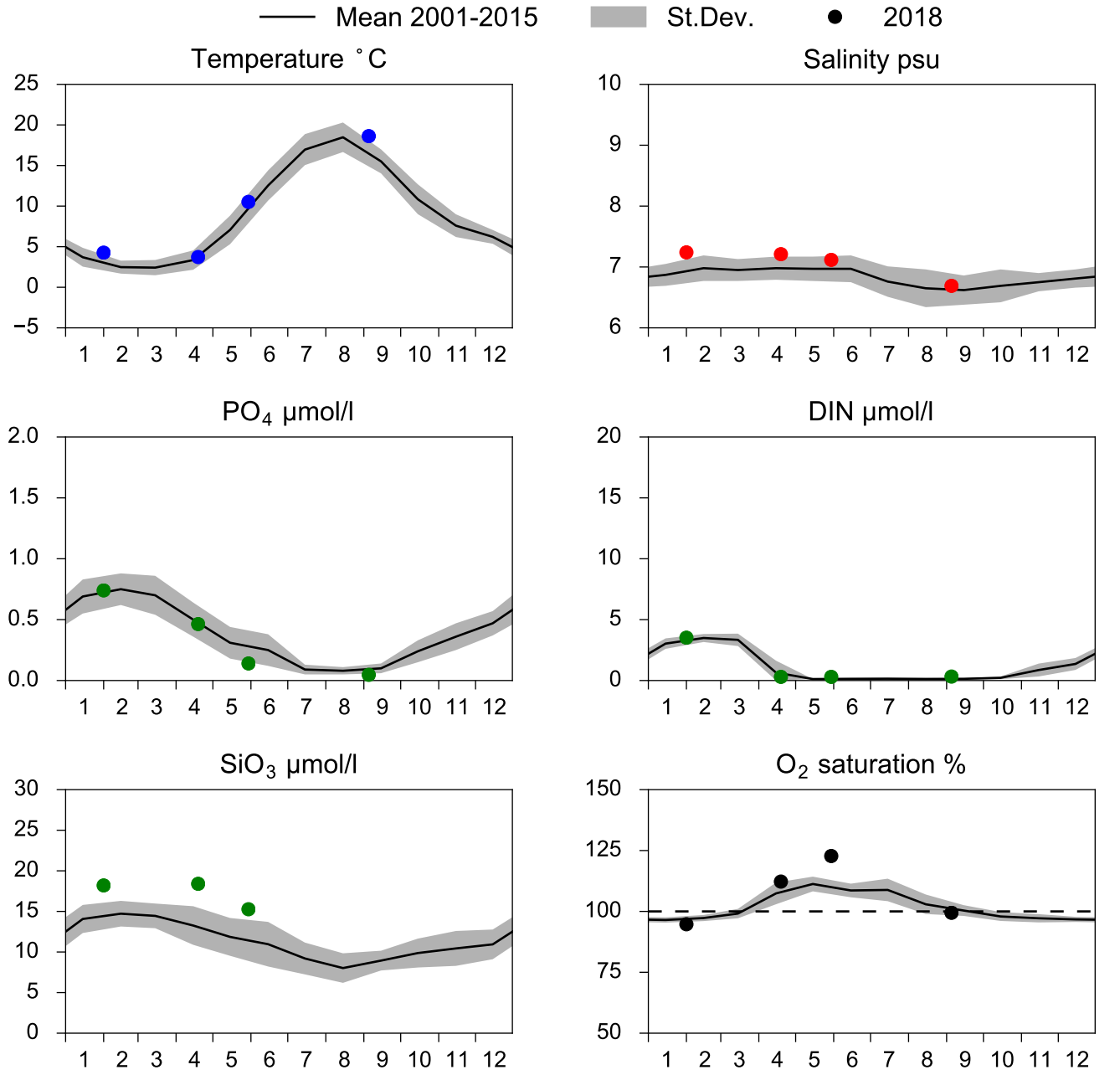


Vertical profiles BY32 NORRKÖPINGSDJ
September

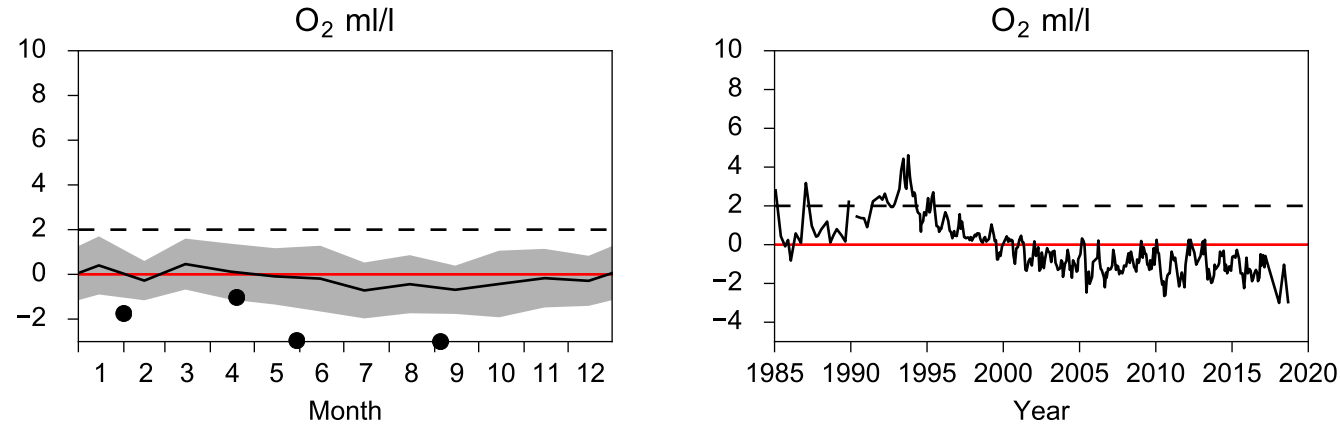


STATION BY38 KARLSÖDJ SURFACE WATER (0-10 m)

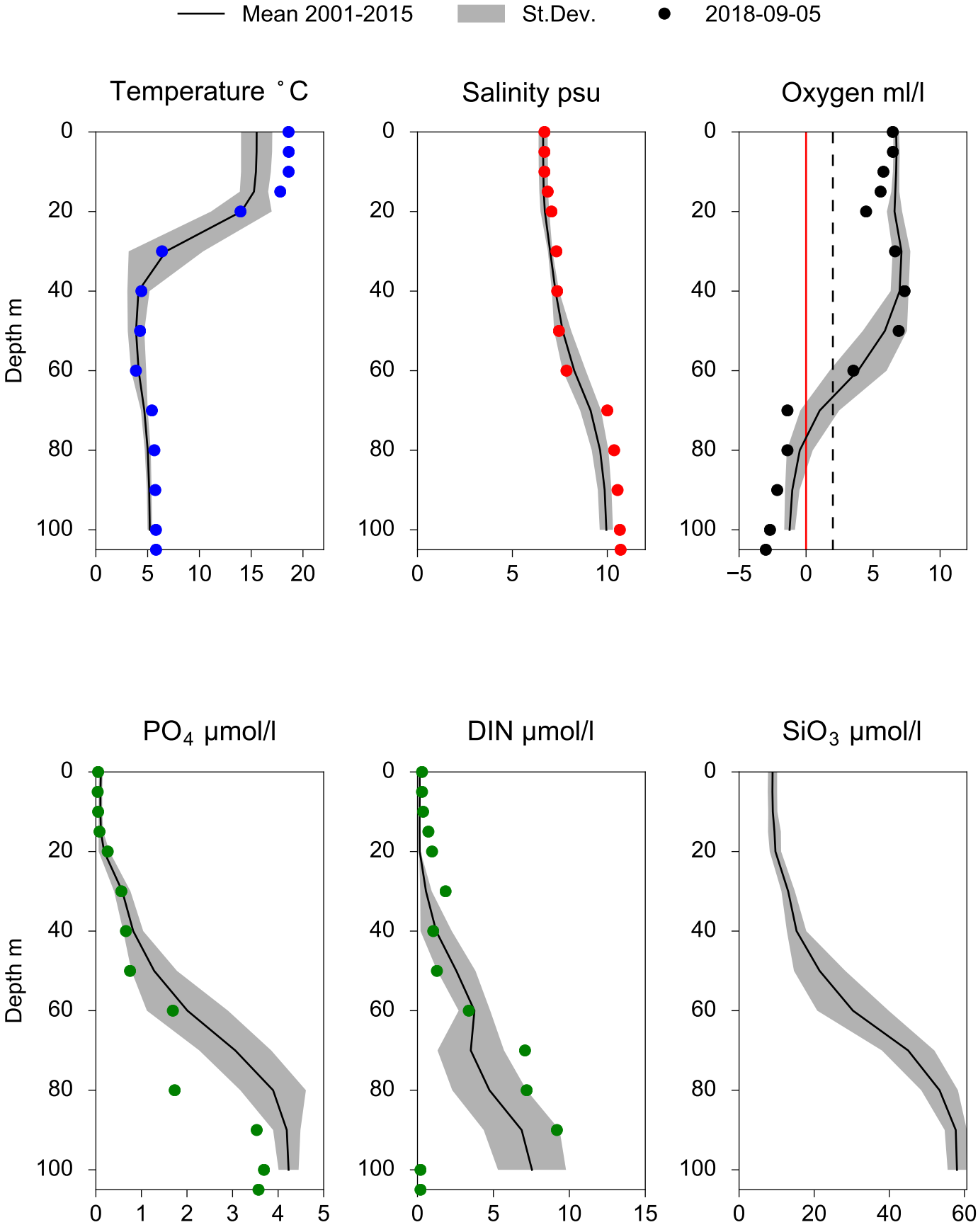
Annual Cycles



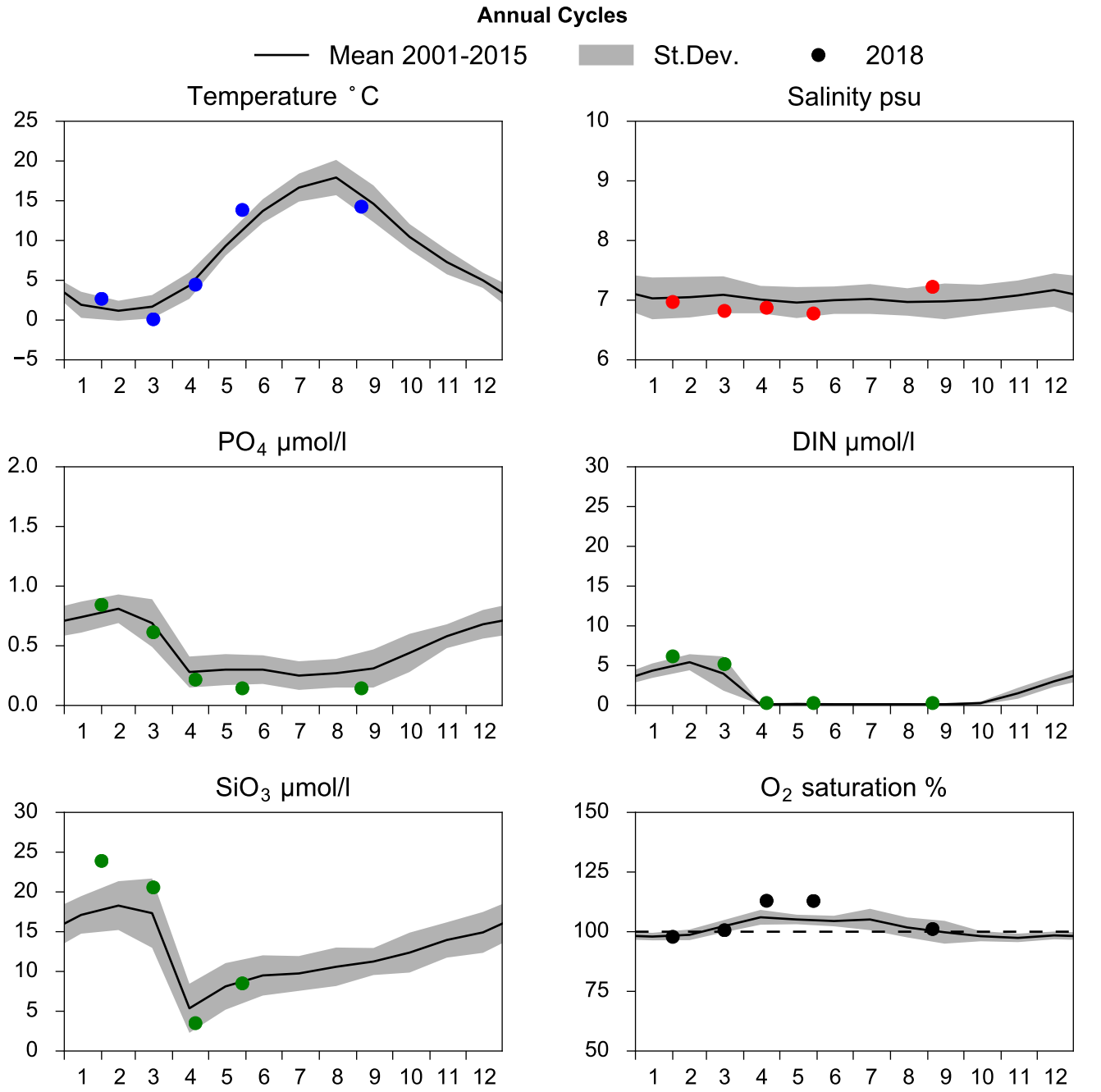
OXYGEN IN BOTTOM WATER (depth >= 100 m)



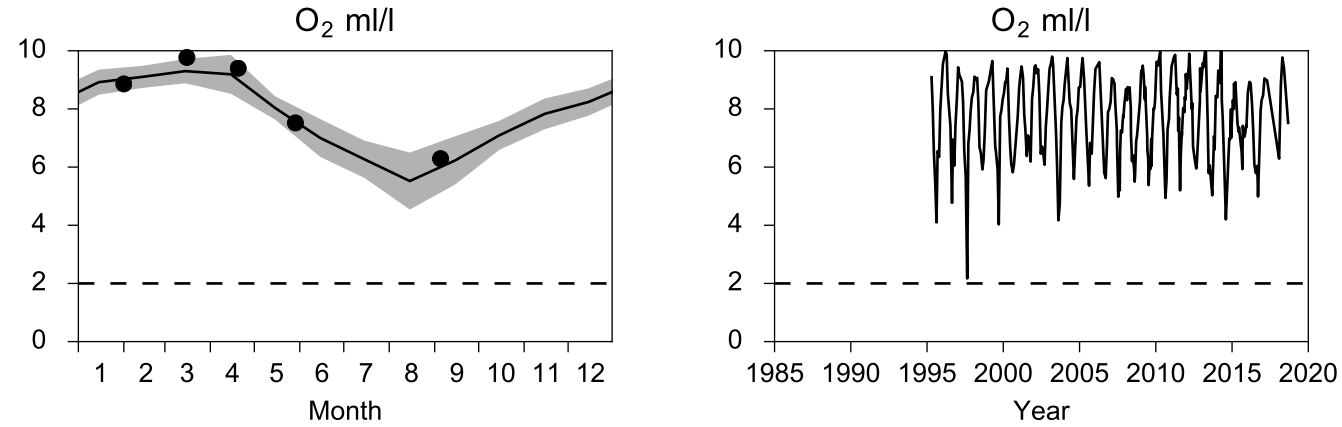
Vertical profiles BY38 KARLSÖDJ
September



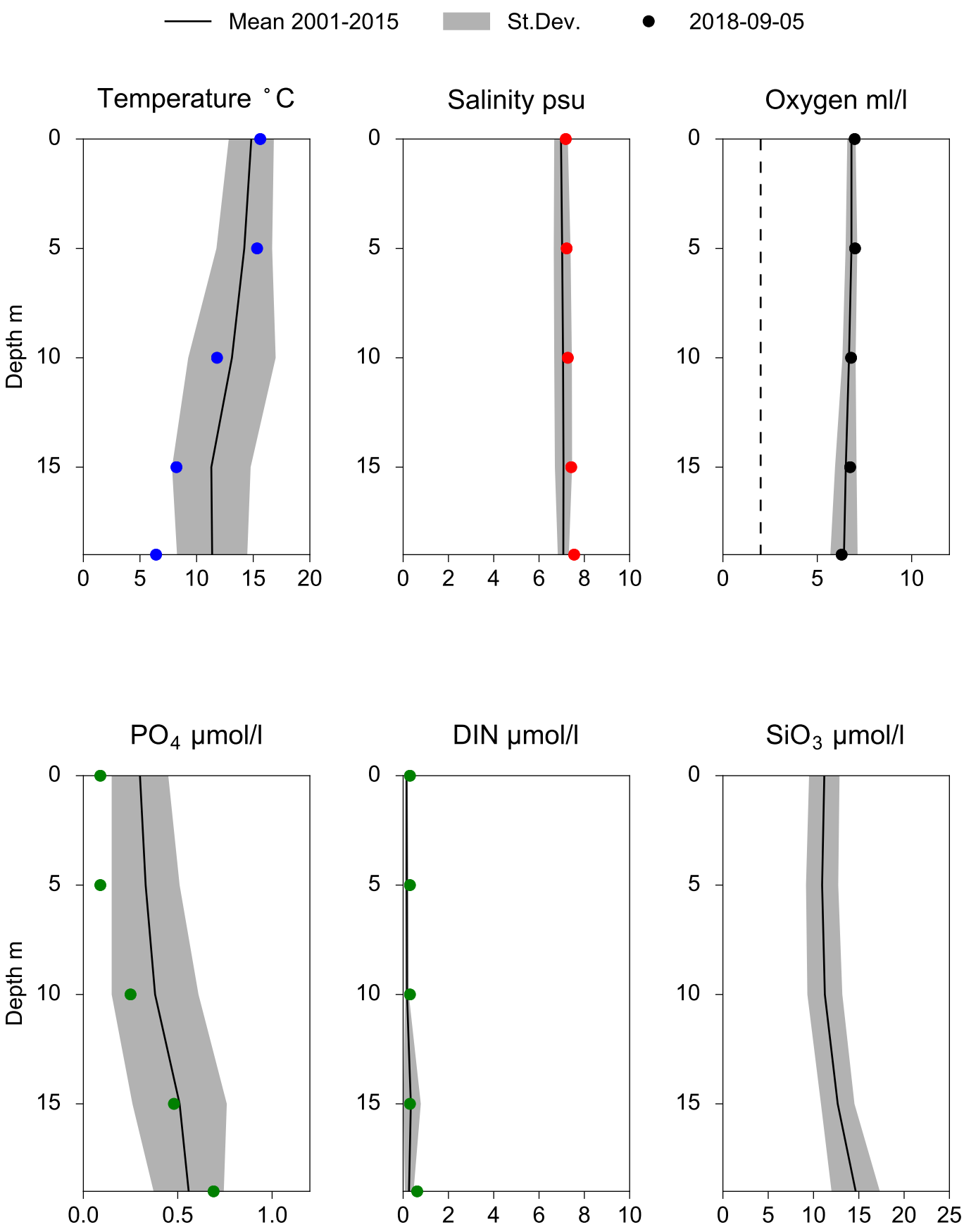
STATION REF M1V1 SURFACE WATER (0-10 m)



OXYGEN IN BOTTOM WATER (depth >= 17 m)

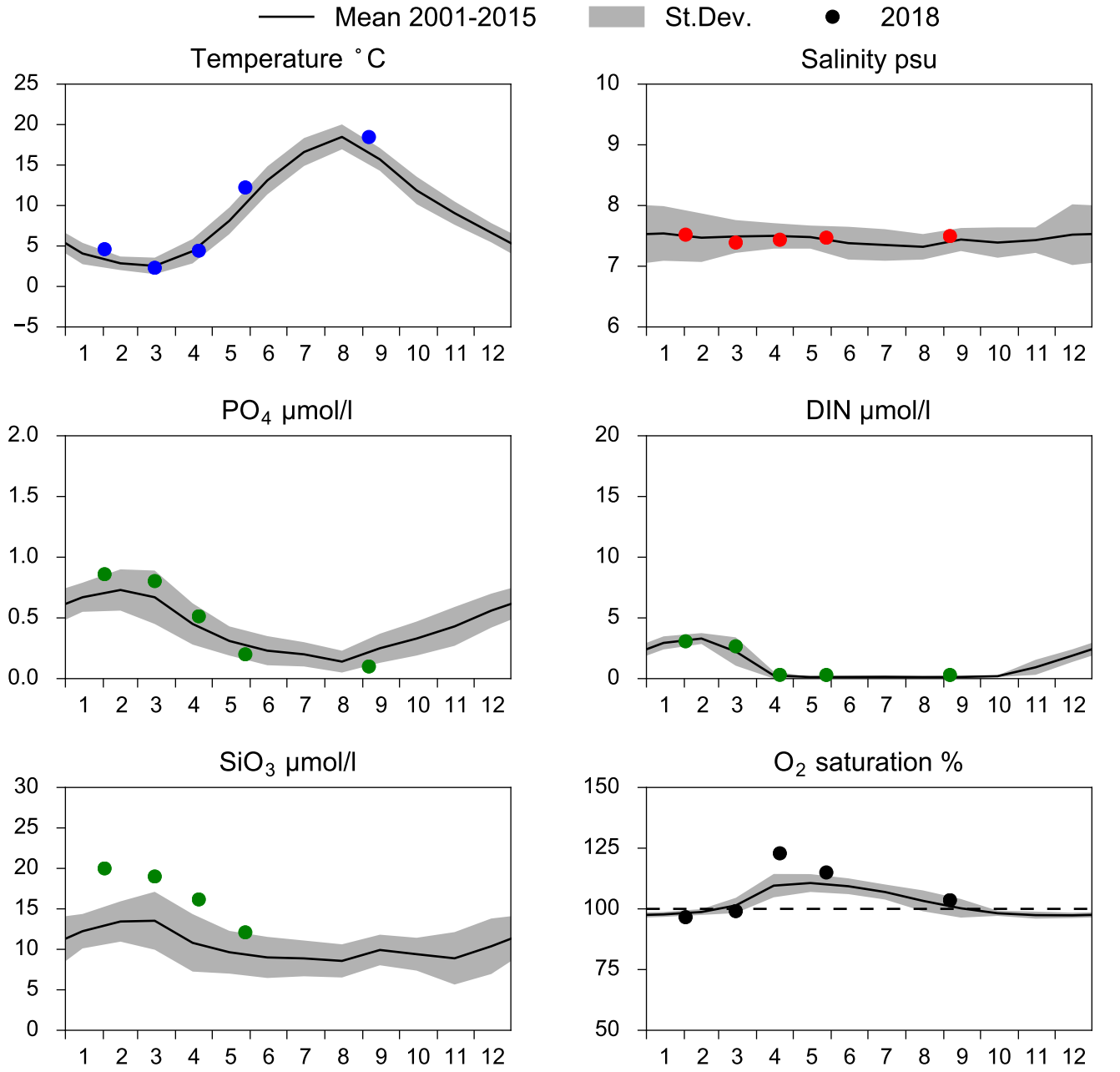


Vertical profiles REF M1V1
September

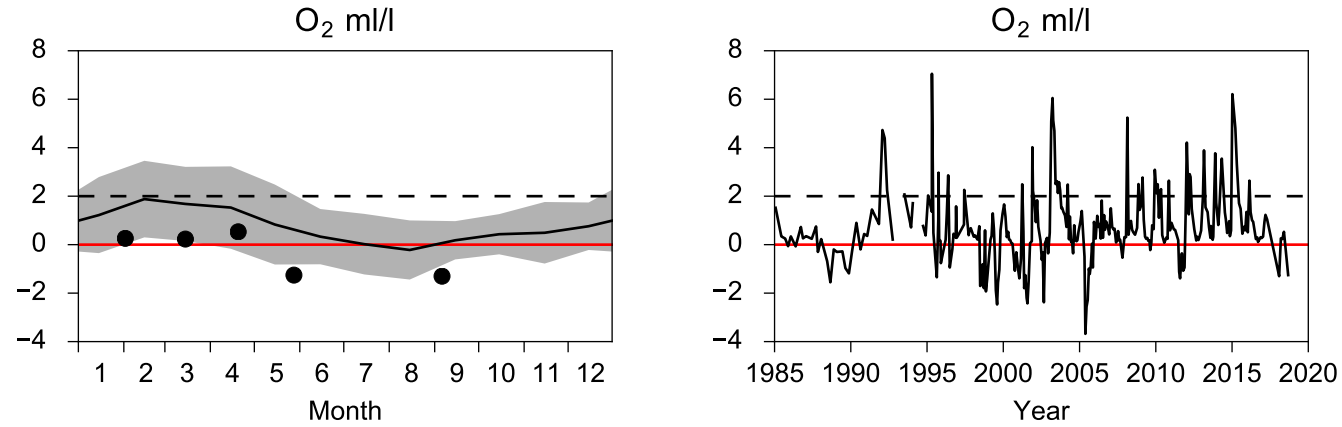


STATION HANÖBUKTEN SURFACE WATER (0-10 m)

Annual Cycles



OXYGEN IN BOTTOM WATER (depth >= 70 m)



Vertical profiles HANÖBUKTEN
September