Report from the SMHI monitoring cruise with R/V Svea

Survey period:	2020-08-16 - 2020-08-21
Principal:	Swedish Meteorological and Hydrological Institute (SMHI), Swedish Agency for Marine and Water Management (SwAM)
Cooperation partners:	Swedish University of Agricultural Sciences (SLU)

Address:
Sven Källfelts Gata 15
426 71 Västra Frölunda

Telephone:
+4611-495 80 00

E-mail:
lena.viktorsson@smhi.se
WWW:
http://www.smhi.se/

SUMMARY

During the expedition, which is part of the Swedish national marine monitoring programme, the Skagerrak, the Kattegat, the Sound and the Baltic Proper were visited. The weather was calm and sunny throughout the expedition.

The surface water was, unlike in June, warmer than normal at most stations in the Baltic Proper, but mostly normal in the Kattegat and the Skagerrak. The surface water temperature varied between 18-21 degrees, of which the highest temperatures were measured in the Baltic Proper. The salinity of the surface water was higher than normal in the Baltic Proper, between 7 and 8, and at several stations the salinity was above normal all the way down to the bottom. There was a thermocline around 10 m at most stations and some stations a pycnocline at about 20 m. At the stations around Gotland, the halocline was around 70 m and in the Bornholm Basin around 50-60 m.

The concentrations of nitrogen and phosphorus in the surface water (0-10 m) were generally low. In the Baltic Proper lower than normal for dissolved inorganic nitrogen, within the normal for phosphate and above normal for silicon. The concentrations of dissolved inorganic nitrogen was close to or at the detection limit at most stations in all sea areas, while there were measurable but low concentrations of phosphate at all stations. In the deep water, the concentration of nutrients was normal, except in the Western Gotland Basin where there were unusually high levels of dissolved inorganic nitrogen.

In the Skagerrak and the kattegat, the oxygen concentration in the bottom water was generally good, the lowest concentrations were found at Släggö, Anholt E, N14 Falkenberg and in the Sound where the oxygen concentrations were below 4 ml/l closest to the bottom. In Arkona, Bornholm and in the south-eastern part of the Gotland Basin, there was an acute oxygen deficiency (<2 ml/l) at the bottom. Completely oxygen-free conditions, when toxic hydrogen sulphide was formed, were found from a depth of 70-80 meters and acute oxygen deficiency (<2 ml/l) from a depth of 60-70 m in the eastern and western Gotland Basin.

During the expedition, there was an ongoing cyanobacteria bloom in the Baltic Sea and surface accumulations were visible both east and west of Gotland, but were most extensive west of Gotland. It also appeared that cyanobacteria were present in the surface water of the Kattegat. At several stations there were peaks in chlorophyll fluorescence around 10-15 m.

Next expedition is planned to 7-13 of September with R/V Svea

Front page: Sampling of phytoplankton in the Western Gotland Basin during ongoing cyanobacterial bloom.

RESULTS

The cruise was performed with the Swedish research vessel Svea and started in Lysekil on August 16th 2020 and ended in the same harbour on August 22nd.

The weather during the expedition was calm and sunny, no or weak winds throughout the week and mostly sun. Only at the last sampling on Anholt E was the weather worse with stronger winds and a thunderstorm.

In total, 25 of the planned 25 stations were sampled, two of three planned MVP transect were made. The transect over the Baltic current in the Skagerrak was replaced by a transect in the Stolpe channel in the Baltic Proper.

At some of the stations, extra sampling of phytoplankton for Uppsala University and water and plankton samples were performed to measure selenium for EAWAG in Switzerland (Swiss Federal Institute of Aquatic Science and Technology). During the expedition, three researchers from Umeå University also took part, taking samples for studies of methylmercury in sulphidic water at stations BY15 and BY32.

In addition to the regular sampling program, profiles of salinity, temperature and oxygen were collected with Svea's instrument for measuring profiles during operation, MVP. MVP transects were performed on three stretches; from Bornholmsdjupet into Stolpe Ränna; in the Western Gotland Basin from station BY10 to station BY15 and in the Eastern Gotland Basin from station BY32 to station BY38.

Normally, no biological samples have been analyzed at the time of writing this report, but within 2 weeks after the cruise there will be an algae report for the current month where more information on phytoplankton is available: https://www.smhi.se/publikationer/publikationer/algrapporter.

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 at the data center's webpage, normally within a week after the cruise.

Data can be downloaded here: http://www.smhi.se/klimatdata/oceanografi/havsmiljodata (only available in Swedish).

The Skagerrak

The surface water temperature (0-10 m) was between 17-19 ° C, which is normal for the season, however, the temperature at the surface and at 5 m was slightly above normal at most stations. The salinity in the surface water (0-10 m) was normal and varied between 22 and 32, except at station P2 where the salinity was below normal down to 20 m, where the lowest salinity in the entire sea area was observed. A thermocline with warmer surface water was observed around 10 m, which was least clear at Å13 and P2. The thermocline coincided with a halocline at all stations. At station Å17 there was another halocline around 30 m and at Släggö a thermocline around 50 m. With exception of station P2 the temperature and salinity was within the normal range from 10 m and deeper.

At the station Å13, there was a strong north-going surface current of 2 knots which then decreased in strength to the west but never completely subsided.

The concentrations of all nutrients were low from the surface down to 40 m, which is normal during summer. At the station Släggö, the levels of nutrients increased already at the thermocline at 10 m. In the surface water (0-10 m) the nutrient concentrations varied; phosphate between 0.03-0.07 µmol/l; dissolved inorganic nitrogen between 0.1-0.4 µmol/l and silicon between 0.3-1.5 µmol/l. The nitrate concentration was below the detection limit (0.1 µmol/l) at all stations, but there were measurable levels of ammonium at the stations Släggö, Å13 and Å17 stations.

A peak in chlorophyll fluorescence was observed at station Å15 at 12 m and therefore an extra phytoplankton sample was taken. At all other stations, chlorophyll fluorescence was measured from the surface down to about 50 m, except at station Släggö where the chlorophyll fluorescence decreased already at 20 m.

The oxygen concentration in the bottom water was around 5 ml/l at the stations in the open sea, while it was only 2.8 ml/l at the more coastal station Släggö.

The Kattegat and the Sound

Unlike in July when it was colder than normal at all stations in the Kattegat, the temperature in the surface water (0-10 m) was now, in August, above normal at the stations N14 Falkenberg and W Landskrona. The temperature in the surface water varied between 18-21 degrees, coldest at station Fladen. The salinity of the surface water (0-10 m) varied between 19-22 in the Kattegat, which is normal. A thermocline was present at about 10 m, but it was not very sharp. At all stations in the Kattegat there was a halocline at 15-20 m. At Fladen, the thermocline coincided with a sharp halocline where the salinity increased from 20 in the surface to 25 below 10 m, at the deeper halocline the salinity increased from 25 to 30. At station W Landskrona in the Sound, the salinity in the surface was 8 and a sharp halocline was present at 10 m, below this the salinity was the same as in the deep water in the Kattegat, 32.

The levels of phosphate and dissolved inorganic nitrogen were normal in the surface water (0-10 m) in the Kattegat. Phosphate concentrations were around 0.05 µmol/l and the concentrations of dissolved inorganic nitrogen were below the detection limit (0.1 µmol/l) in the surface water at all stations. On the other hand, there were elevated levels of silicate (2 µmol/l) at the station Anholt E and lower levels than normal at the station N14 Falkenberg (0.4 µmol/l). In the Sound the silicate concentration was higher than normal (11 µmol/l), the phosphate levels were higher here than in the Kattegat (0.2 µmol/l) which is normal and dissolved inorganic nitrogen was also below the detection limit (0.1 µmol/l). The concentrations of nutrients below the halocline were normal at all stations. At Fladen there was an increase in the concentration of all nutrients around 40-50 m, which coincided with a slightly lower temperature than at 60-70 m.

At Anholt E and N14 Falkenberg, a lot of plankton was seen in the surface water and reports from phytoplankton analyses along the coast show that these are cyanobacteria that followed the water out from the Baltic Sea. At all stations in the Kattegat, there was a peak in chlorophyll fluorescence between 5-20 m, largest at Anholt E. In the Sound, the chlorophyll fluorescence was significantly higher than in the Kattegat.

The oxygen concentration in the bottom water was low, except at station Fladen. At Anholt E and N14 Falkenberg the oxygen concentration was 3.0-3.5 ml/l and in the Sound 2.2 ml / l, i.e. almost hypoxic.

The Baltic Proper

In the Baltic Proper, apart from Hanö Bight, the surface water temperature (0-10 m) was just over 20 degrees, which is warmer than normal and warmer than in the Skagerrak and Kattegat. At all stations in the Baltic Proper there was a thermocline around 10 m and at most stations there was another thermocline slightly deeper, around 20-30 m. In the Arkona Basin the halocline was at around 30 m and there the temperature dropped to 10-12 degrees and then increased to about 15 degrees again closest to the bottom. In the Bornholm Basin, the halocline was between 50-60 m and below this the temperature increased about 2 degrees. The halocline in the Gotland Basins was at about 70 m and the salinity of the bottom water was 13 at BY15 and then decreased into the western Gotland Basin to just over 10 at BY38 in the southern part of the western Gotland Basin. The salinity in the surface water was above normal at all stations in the Baltic Proper except at stations BY2 and BY38, and varied from about 8 in the Arkona Basin and the Bornholm Basin to 7-7.5 in the eastern and western Gotland Basin. At several stations, the salinity in all or large parts of the profile was above normal.

The concentrations of phosphate in the surface water (0-10 m) were normal at all stations in the Baltic Proper (BY15 and Hanö Bay had higher than normal, but were very close to normal) and varied from 0.1 µmol/l in the Gotland Basins to 0.2 µmol/l in the Arkona basin and the Bornholm basin. The concentrations of dissolved inorganic nitrogen in the surface water were lower than normal and were close to or at the detection limit at most stations, on BCS III-10 in the south-eastern part the content was 0.3 µmol/l, which is above normal. The concentration of silicate in the surface water was above normal at all stations and varied from 9 µmol/l in the western Gotland Basin to 14 µmol/l in the Arkona Basin and the Bornholm Basin

The concentrations of nutrients below the halocline in the Arkona Basin and the Bornholm Basin were mostly normal. At the stations BY4, the concentrations of all inorganic nutrients were above normal between 40-70 m, at the same depths the oxygen concentration was also slightly lower than normal. Also in the Eastern Gotland Basin, the concentrations of inorganic nutrients were normal below the halocline, with the exception of dissolved inorganic nitrogen at station BY15 where the concentration was above normal from 150 m and down to the bottom. In the Western Gotland Basin, the concentration of dissolved inorganic nitrogen was well above normal during the halocline of both BY32 and BY38. From about 100 m down to the bottom, the concentration of dissolved inorganic nitrogen was up to 14-19 µmol / l, which is about twice as much as the 15-year average. The high concentrations of dissolved inorganic nitrogen coincide with unusually high levels of hydrogen sulphide (shown in figures as negative oxygen concentrations).

Completely oxygen-free conditions, when toxic hydrogen sulphide is formed, were found from a depth of 70-80 meters and acute oxygen deficiency (oxygen concentration <2 ml/l) from a depth of 60-70 m in the eastern and western Gotland Basins. In the Bornholm Basin, the oxygen concentration in the bottom water has, as usual, decreased since the beginning of the year and has been just around the detection limit of 0.1 ml/l since July. Also in Hanö Bight, the oxygen concentration was close to zero in the bottom water. In the Arkona Basin, there was an acute lack of oxygen (<2 ml/l) at station BY1, but at station BY2 the oxygen concentration was slightly higher, 2.8 ml/l in the bottom water. At stations BY10 and BCS-III 10, where earlier in the year traces of a smaller inflow that occurred in the winter of 2019/2020 were seen, there is now very little of this left. At station BY10 the measurements with an oxygen sensor showed a small peak in oxygen concentration at 125 m in the same way as earlier in the year, but the oxygen sample from the water bottle at 125 m was unfortunately lost.

Due to the calm and warm weather during the week, a cyanobacteria bloom was in progress and surface accumulations were noted in both the eastern and western Gotland Basin, mostly west of Gotland. A peak in chlorophyll fluorescence was noted at station BY32.

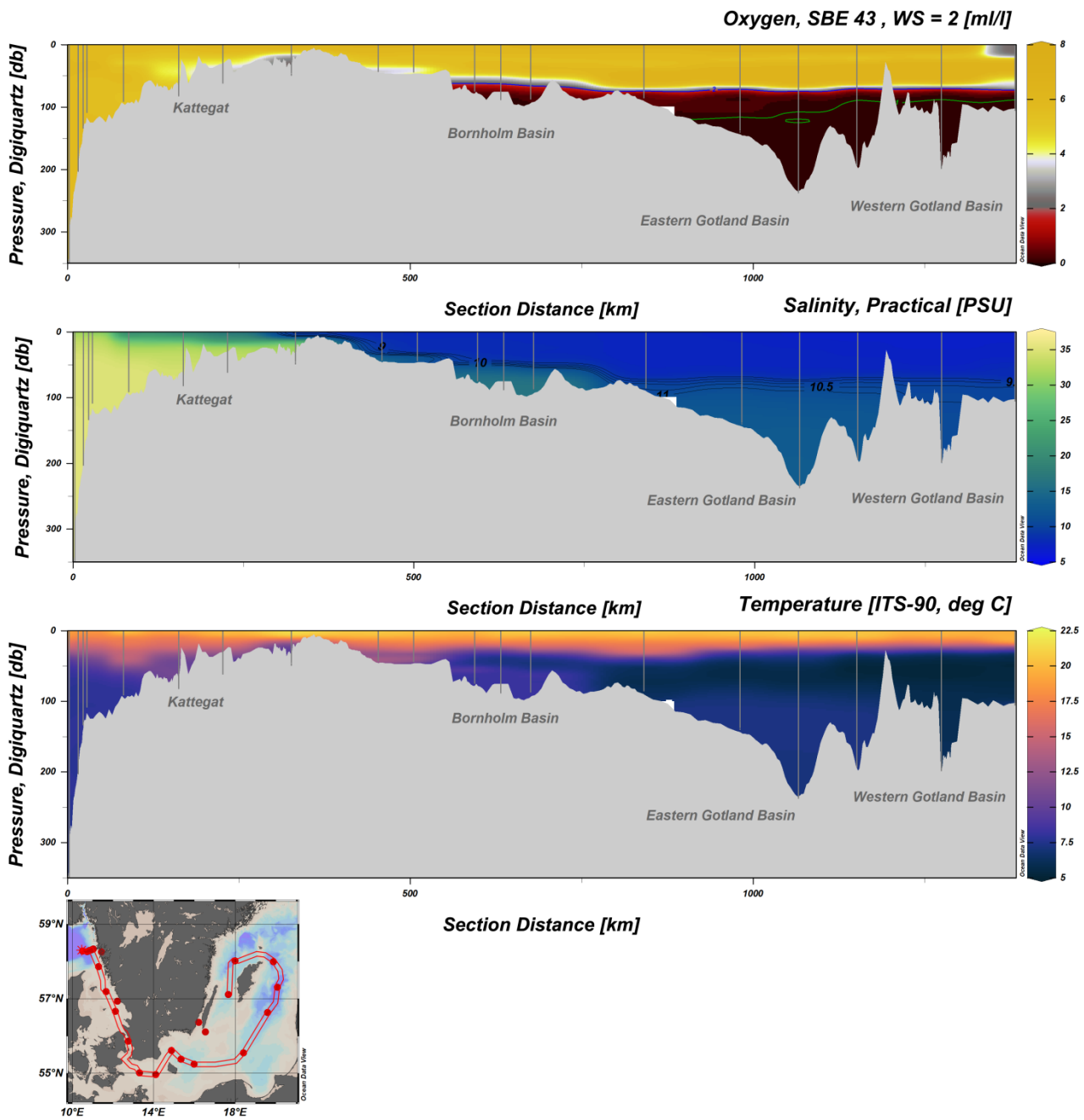


Figure 1. Transect showing dissolved oxygen, salinity and temperature from the Sound, through the Baltic Proper, to the Western Gotland Basin.

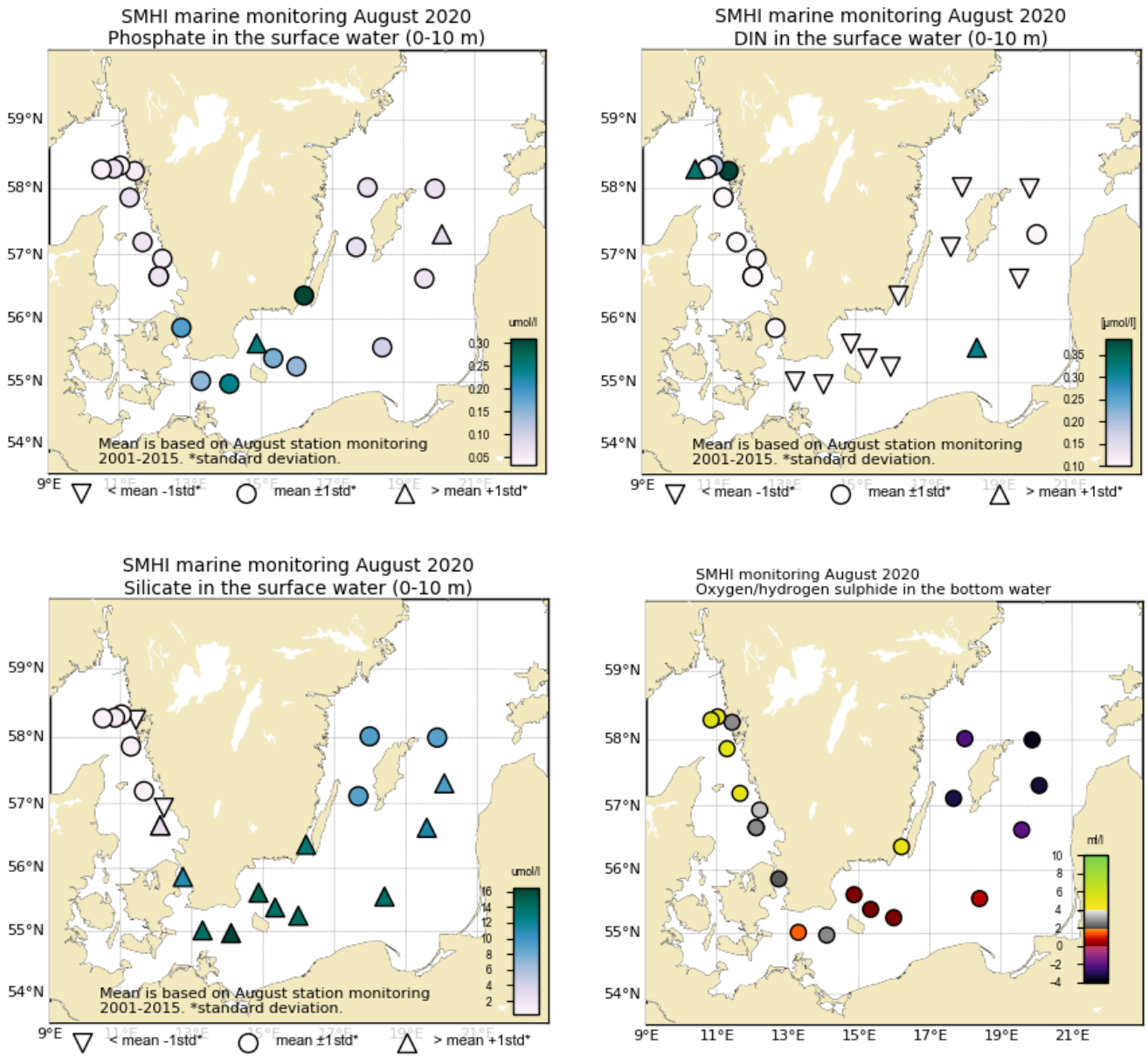


Figure 2. Surface mean (0-10 m) concentrations of phosphate, dissolved inorgainc nitrogena and silicate and bottom water concentration of oxygen, hydrogen sulphide is presented as negative oxygen.

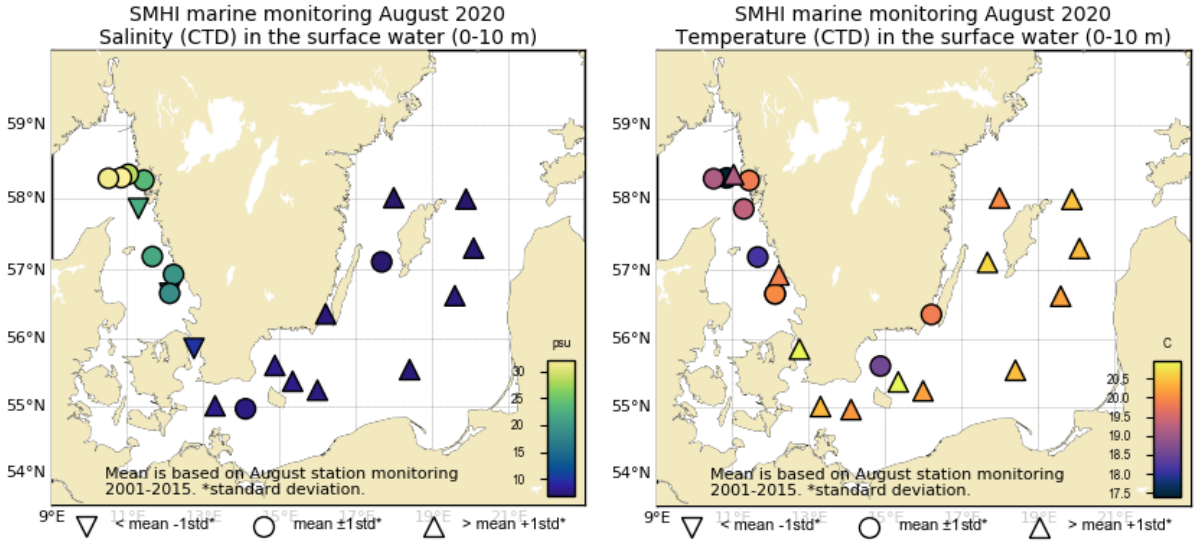


Figure 3. Surface mean (0-10 m) salinity and temperature from CTD measurements.

PARTICIPANTS

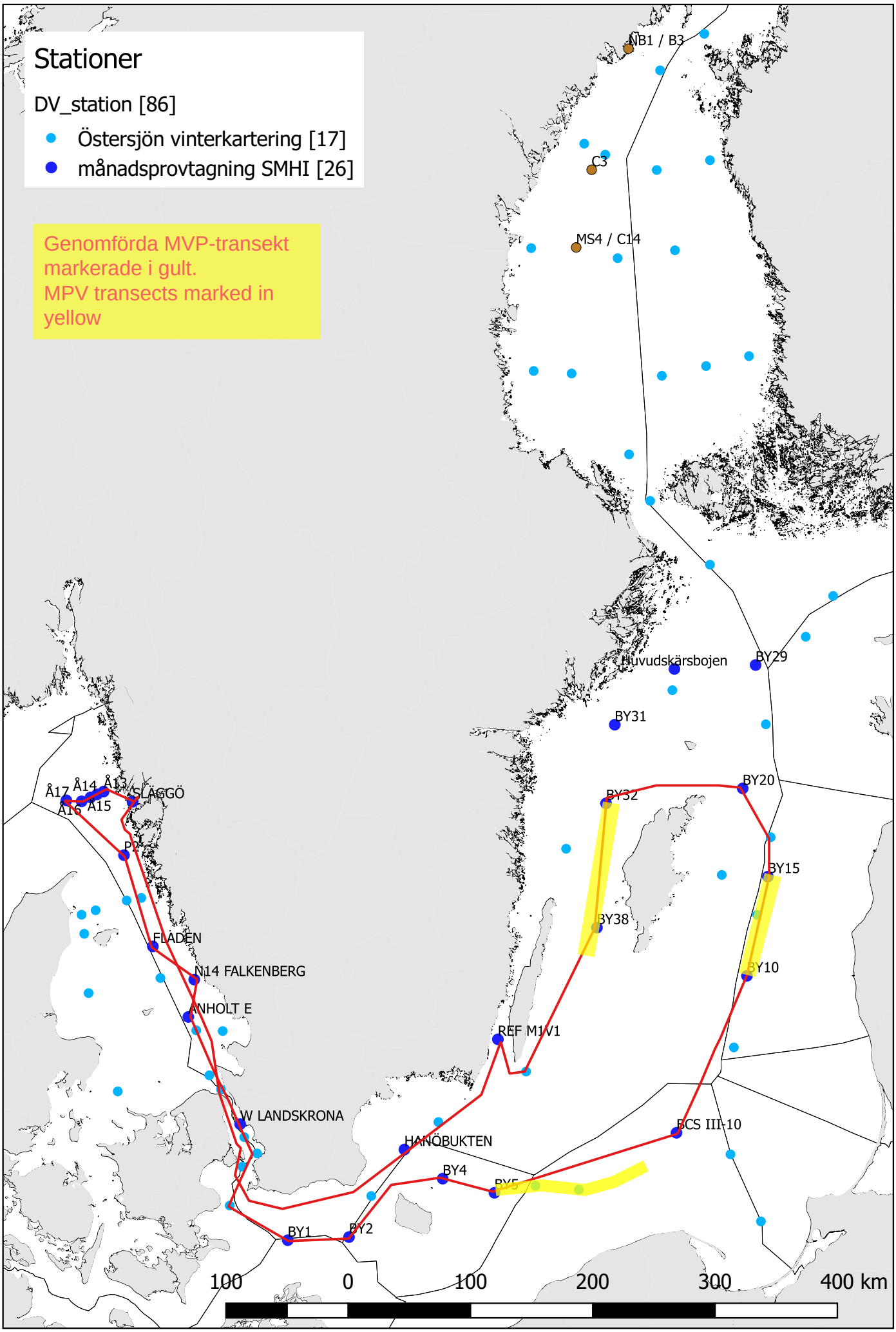
Name		From
Lena Viktorsson	Chief Scientist	SMHI
Sari Sipilä		SMHI
Johan Håkansson		SMHI
Ola Kalén		SMHI
Anna-Kerstin Thell		SMHI

APPENDICES

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

SMHI

Havs
och Vatten
myndigheten


Stationer
DV_station [86]
Östersjön vinterkartering [17]
månadsprovtagning SMHI [26]
Genomförda MVP-transekt markerade i gult.
MPV transects marked in yellow
NB1 / B3
C3
MS4 / C14
Huvudskärsbojen
BY29
BY31
BY20
BY32
BY15
BY38
BY10
Å17
Å14
Å13
Å16
Å15
SLÄGGÖ
FLÅDEN
N14 FALKENBERG
ANHOLT E
REF M1 V1
W LANDSKRONA
HANÖBUKTEN
BCS III-10
BY4
BY5
BY1
BY2
100
0
100
200
300
400 km

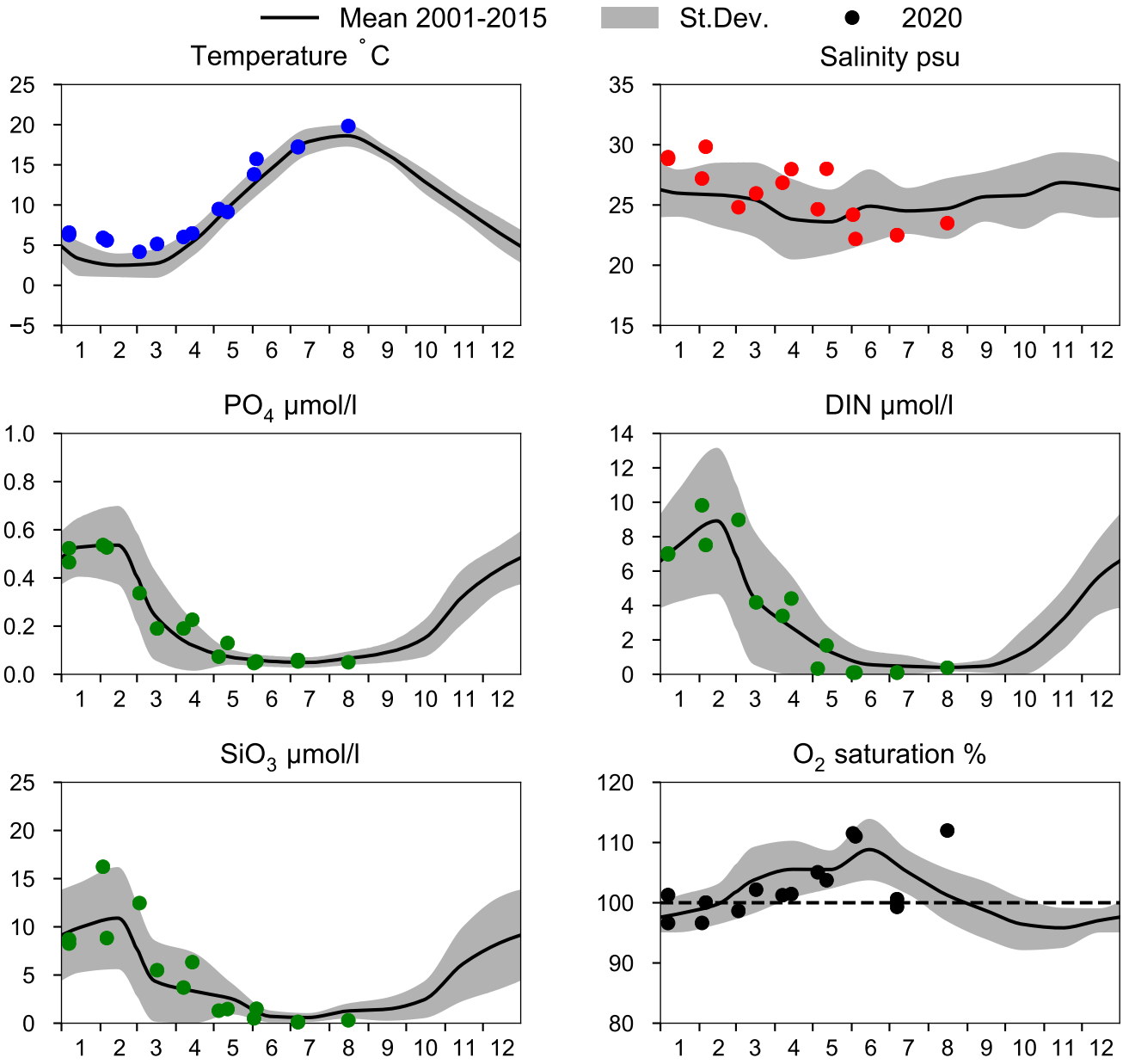
Date: 2020-08-22
Time: 10:11

Ship: SE
Year: 2020

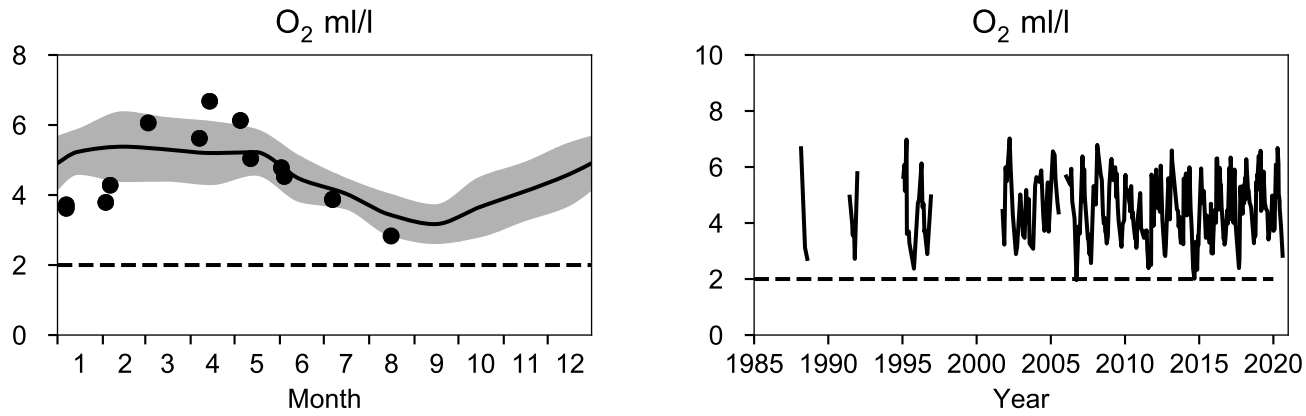
Ser no	Cru no	Stat code	Proj	Stat name	Lat	Lon	Start date yyyymmdd	Start time hhmm	Bottom depth m	Secchi depth m	Wind dir	Wind vel	Air temp C	Air pres hPa	WCWI elac aove tueo hdsb	CZPHP hohop loys apte o p	No de	No btl	Temp_bottle	Temp_bottle_day	Salt_bottle	Salt_bottle_day	Phosphate_bottle	Phosphate_bottle_day	DO_bottle	DO_bottle_day	DO_bottle_man	H2S	Phosphate	Phosphate_day	Nitrite	Nitrite_day	Nitrate	Nitrate_day	Ammonia	Ammonia_day	Silicate	Silicate_day	Silicate_man	Silicate_mid	Silicate_mid_day	Silicate_mid_man	Silicate_mid_time	Silicate_mid_value	Silicate_mid_sample	Chlorophyll_a	Chlorophyll_a_25	Chlorophyll_a_mid	Chlorophyll_a_mid_day	Chlorophyll_a_mid_man	Chlorophyll_a_mid_time	Chlorophyll_a_mid_value	Chlorophyll_a_mid_sample
0496	16	FIBG27	BAS...	SLÄGGÖ	5815.58	01126.12	20200816	1100	77	6	28	2	21.3	1015	0010	-x---	9		x	x	-	x	-	x	-	-	-	x	-	x	x	x	x	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-
0497	16	SKEX14	BAS...	Å13	5820.39	01101.69	20200816	1400	96	9	24	1	21.3	1014	0020	-----	10		x	x	-	x	-	x	-	-	-	x	-	x	x	x	x	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0498	16	SKEX15	BAS...	Å14	5818.92	01056.57	20200816	1530	108		33	1	19.7	1014	4200	-----	10		-	x	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0499	16	SKEX16	BAS...	Å15	5817.66	01050.71	20200816	1630	138	8	5	2	18.7	1013	1200	-----	13		x	x	-	x	-	x	-	-	-	x	-	x	x	x	x	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-
0500	16	SKEX17	BAS...	Å16	5816.03	01043.49	20200816	1815	202		6	2	19.7	1013	0010	-----	12		-	x	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0501	16	SKEX18	BAS...	Å17	5817.06	01030.29	20200816	2000	349		10	2	19.6	1013	9999	-x---	15		-	x	-	x	x	x	-	-	-	x	-	x	x	x	x	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-
0502	16	SKEX23	BAS...	P2	5751.99	01117.56	20200817	0050	94		7	3	22.2	1012	9999	-----	10		x	x	-	x	-	x	-	-	-	x	-	x	x	x	x	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x
0503	16	KANX25	BAS...	FLADEN	5711.56	01139.47	20200817	0530	85		8	4	17.4	1011	1220	-----	12		x	x	-	x	-	x	-	-	-	x	-	x	x	x	x	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0504	16	KANX50	BAS...	N14 FALKENBERG	5656.28	01212.79	20200817	0830	32	7	4	3	17.8	1011	1210	-x---	7		x	x	-	x	x	x	-	-	-	x	-	x	x	x	x	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-
0505	16	KAEX29	BAS...	ANHOLT E	5640.11	01206.71	20200817	0930	64	7	7	2	24.8	1011	1210	-x--x	10		x	x	-	x	x	x	-	-	-	x	-	x	x	x	x	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	x
0506	16	SOCX39	BAS...	W LANDSKRONA	5551.99	01244.90	20200817	1730	52		16	4	24	1008	1120	-----	9		x	x	-	x	-	x	-	-	-	x	-	x	x	x	x	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-
0507	16	BPSA02	BAS...	BY1	5500.96	01318.04	20200818	0030	46		7	5	21.2	1008	9999	-----	8		x	x	-	x	-	x	-	-	-	x	-	x	x	x	x	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0508	16	BPSA03	BAS...	BY2 ARKONA	5458.27	01405.96	20200818	0400	47	9	10	3	21.2	1007	1210	-x---	8		x	x	-	x	-	x	-	-	-	x	-	x	x	x	x	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0509	16	BPSB06	BAS...	BY4 CHRISTIANSÖ	5522.98	01520.03	20200818	1040	92	7	8	5	21.4	1008	1130	-----	12		x	x	-	x	-	x	-	-	-	x	-	x	x	x	x	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0510	16	BPSB07	BAS...	BY5 BORNHOLMSDJ	5515.01	01559.04	20200818	1400	92	8	8	6	21.4	1007	1220	-x--x	12		x	x	-	x	x	x	-	-	x	x	-	x	x	x	x	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-
0511	16	BPSE11	BAS...	BCS III-10	5533.32	01823.97	20200818	2335	91		36	6	20.7	1007	9990	-----	12		x	x	-	x	-	x	-	-	-	x	-	x	x	x	x	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0512	16	BPEX13	BAS...	BY10	5638.01	01935.09	20200819	0730	145		3	6	19.8	1008	1120	-----	15		x	x	-	x	-	x	-	-	x	x	-	x	x	x	x	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-
0513	16	BPEX21	BAS...	BY15 GOTLANDSDJ	5718.74	02004.59	20200819	1300	239	6	1	6	20.6	1008	1120	-x---	24		x	x	-	x	x	x	-	-	x	x	-	x	x	x	x	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-
0515	16	BPEX26	BAS...	BY20 FÅRÖDJ	5759.92	01952.69	20200819	2030	197		5	6	20.7	1009	9990	-----	17		-	x	-	x	-	x	-	-	x	x	-	x	x	x	x	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-
0516	16	BPWX38	BAS...	BY32 NORRKÖPINGSDJ	5801.01	01759.06	20200820	0300	201		8	3	19.7	1008	1410	-----	17		x	x	-	x	-	x	-	-	x	x	-	x	x	x	x	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-
0518	16	BPWX45	BAS...	BY38 KARLSÖDJ	5707.00	01740.10	20200820	1115	112	4	18	2	20.6	1010	1610	-----	14		x	x	-	x	-	x	-	-	x	x	-	x	x	x	x	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-
0519	16	AOXX00	BAS...	BY39 ÖLANDS SÖDRA	560697	01632.18	20200820	1830	52		15	7	21.4	1011	9999	-----	8		x	x	-	x	-	x	-	-	-	x	-	x	x	x	x	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0520	16	BPWK01	BAS...	REF M1V1	5622.24	01612.11	20200820	2130	21		20	3	20.3	1011	9999	-x---	5		x	x	-	x	x	x	-	-	-	x	-	x	x	x	x	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0521	16	BPSH05	BAS...	HANÖBUKTEN	5537.04	01452.04	20200821	0415	81		9	4	21.3	1010	1230	-----	11		x	x	-	x	-	x	-	-	x	x	-	x	x	x	x	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0522	16	KAEX29	BAS...	ANHOLT E	5640.1	01206.69	20200821	2100	65		16	8	21.7	1007	6990	-----	10		x	x	-	x	x	x	-	-	-	x	-	x	x	x	x	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-

STATION SLÄGGÖ SURFACE WATER (0-10 m)

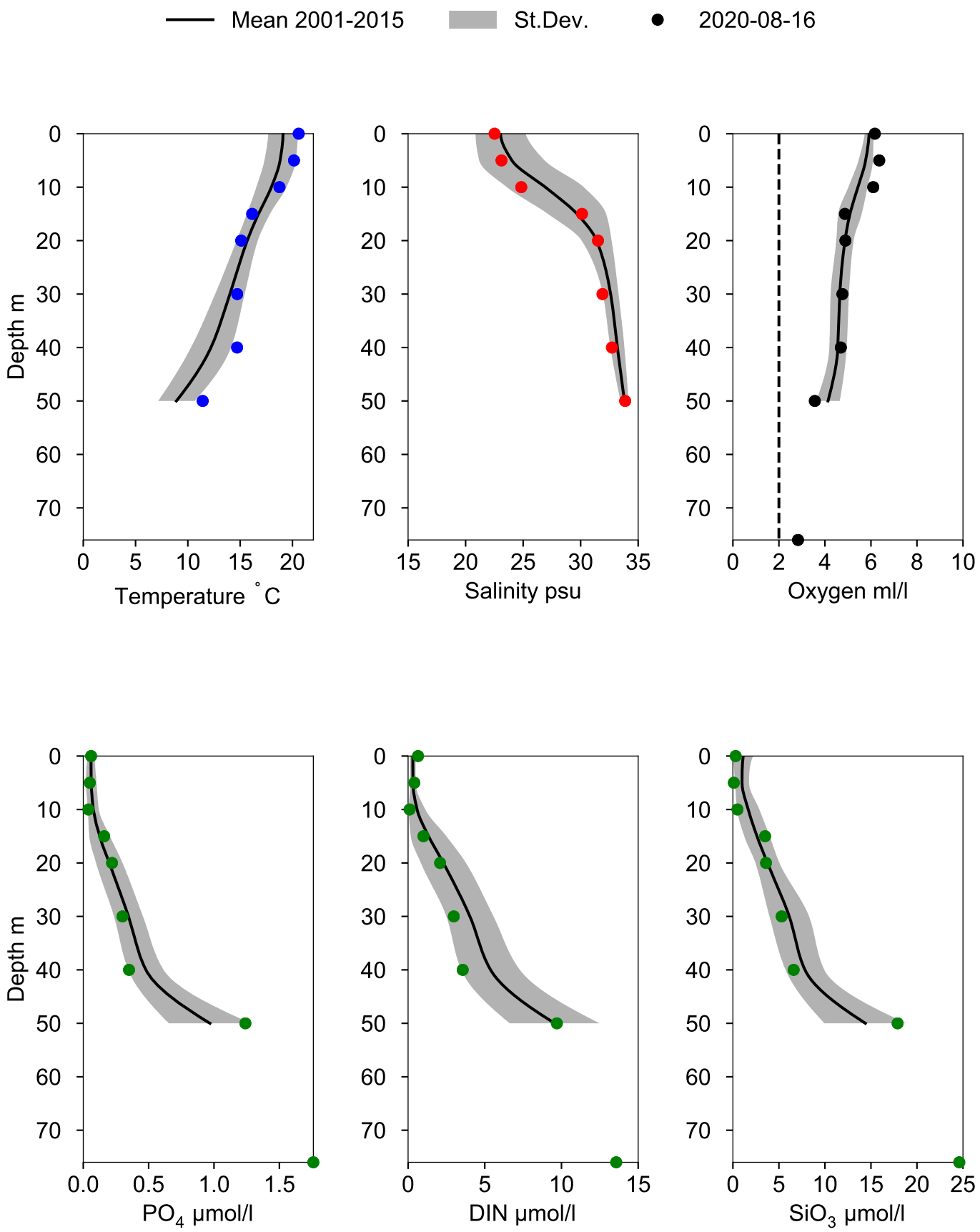
Annual Cycles



OXYGEN IN BOTTOM WATER (depth >= 64 m)

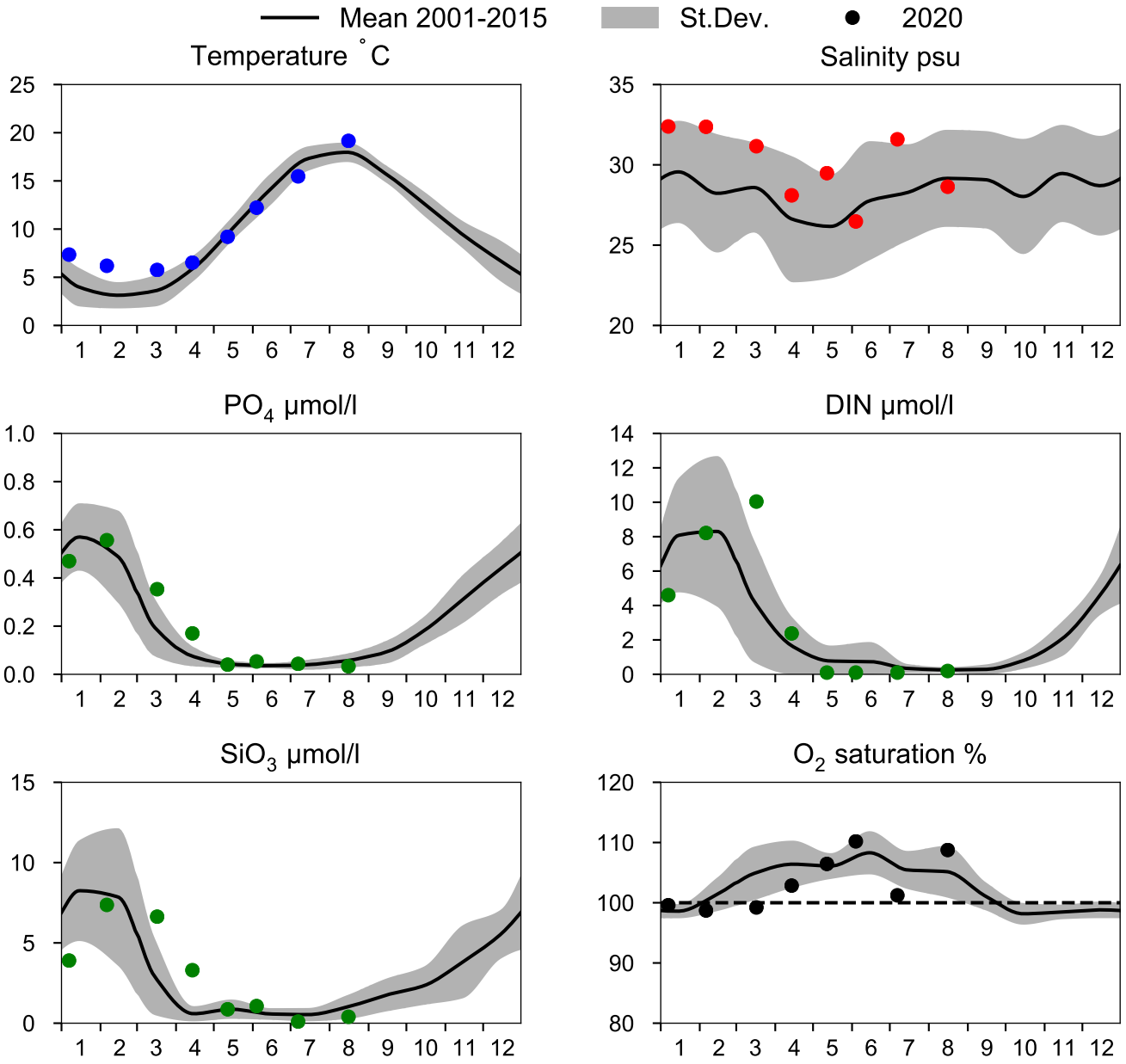


Vertical profiles SLÄGGÖ
August

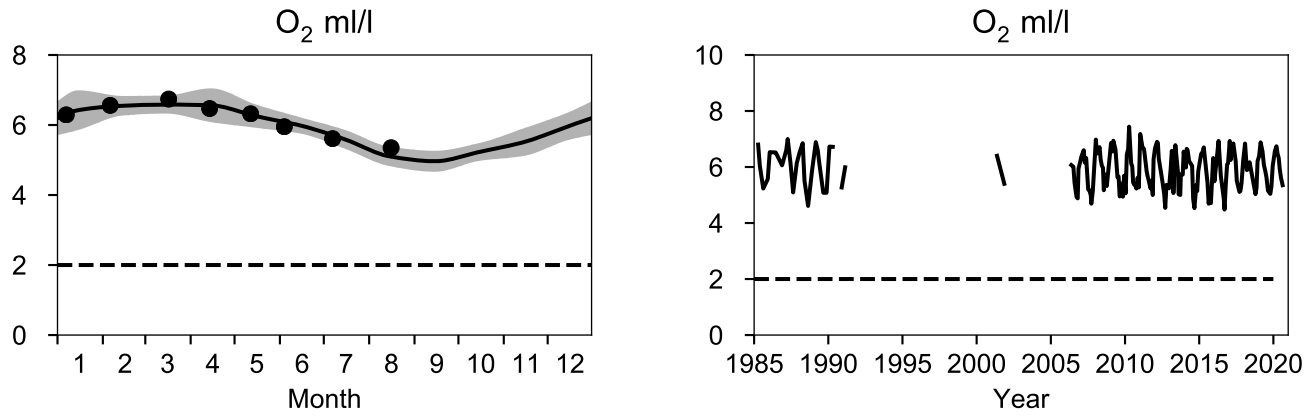


STATION Å13 SURFACE WATER (0-10 m)

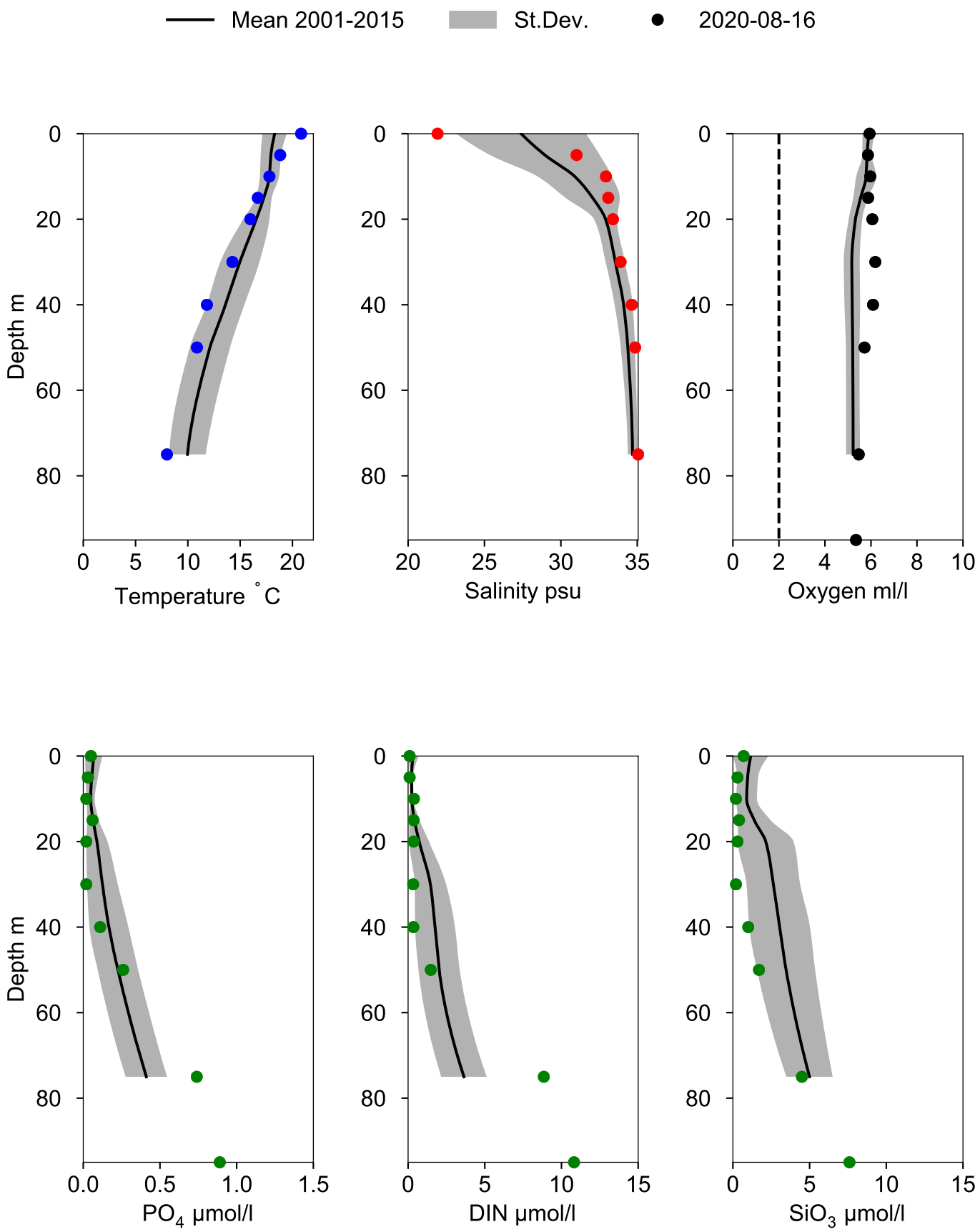
Annual Cycles



OXYGEN IN BOTTOM WATER (depth >= 80 m)

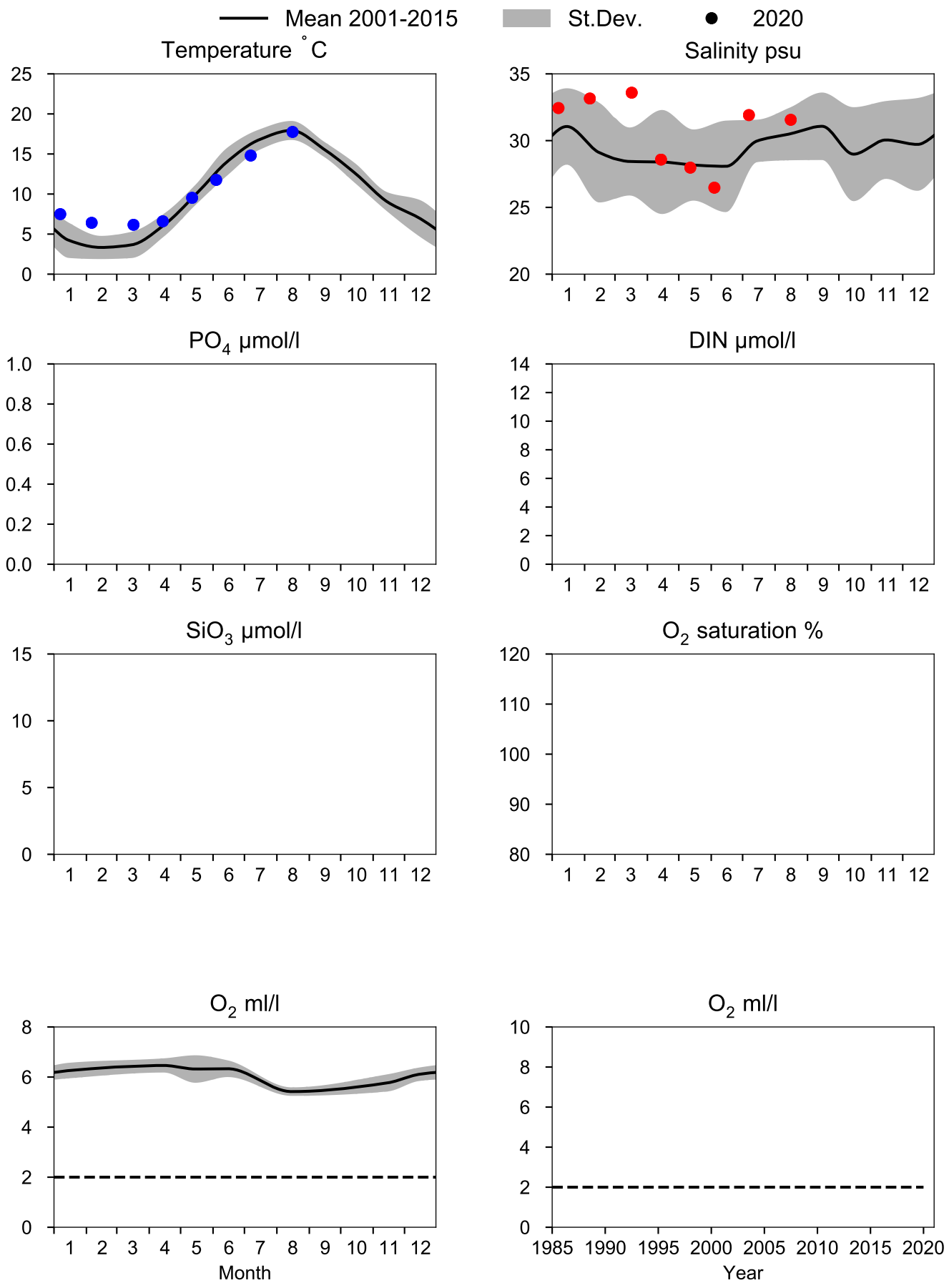


Vertical profiles Å13
August

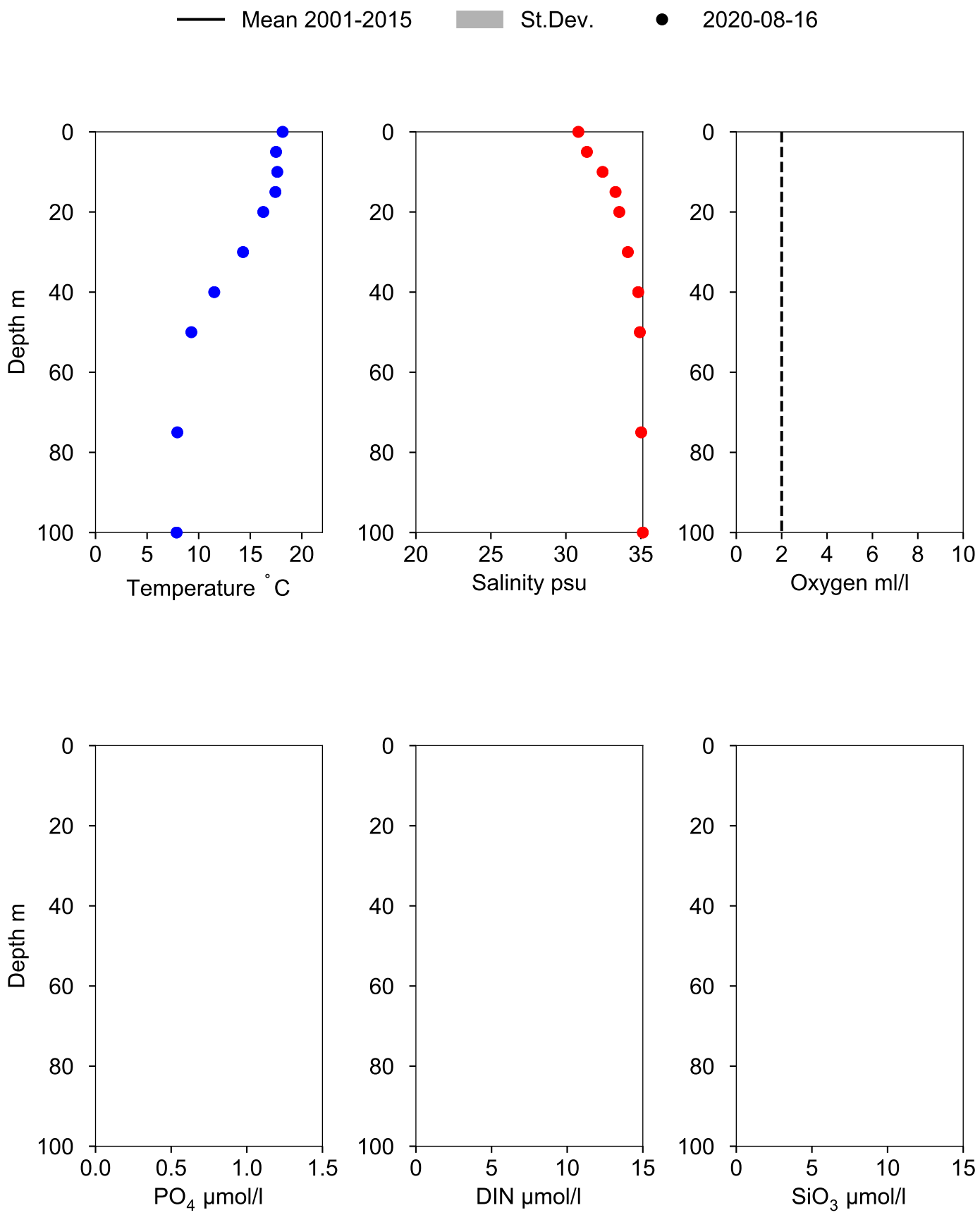


STATION Å14 SURFACE WATER (0-10 m)

Annual Cycles

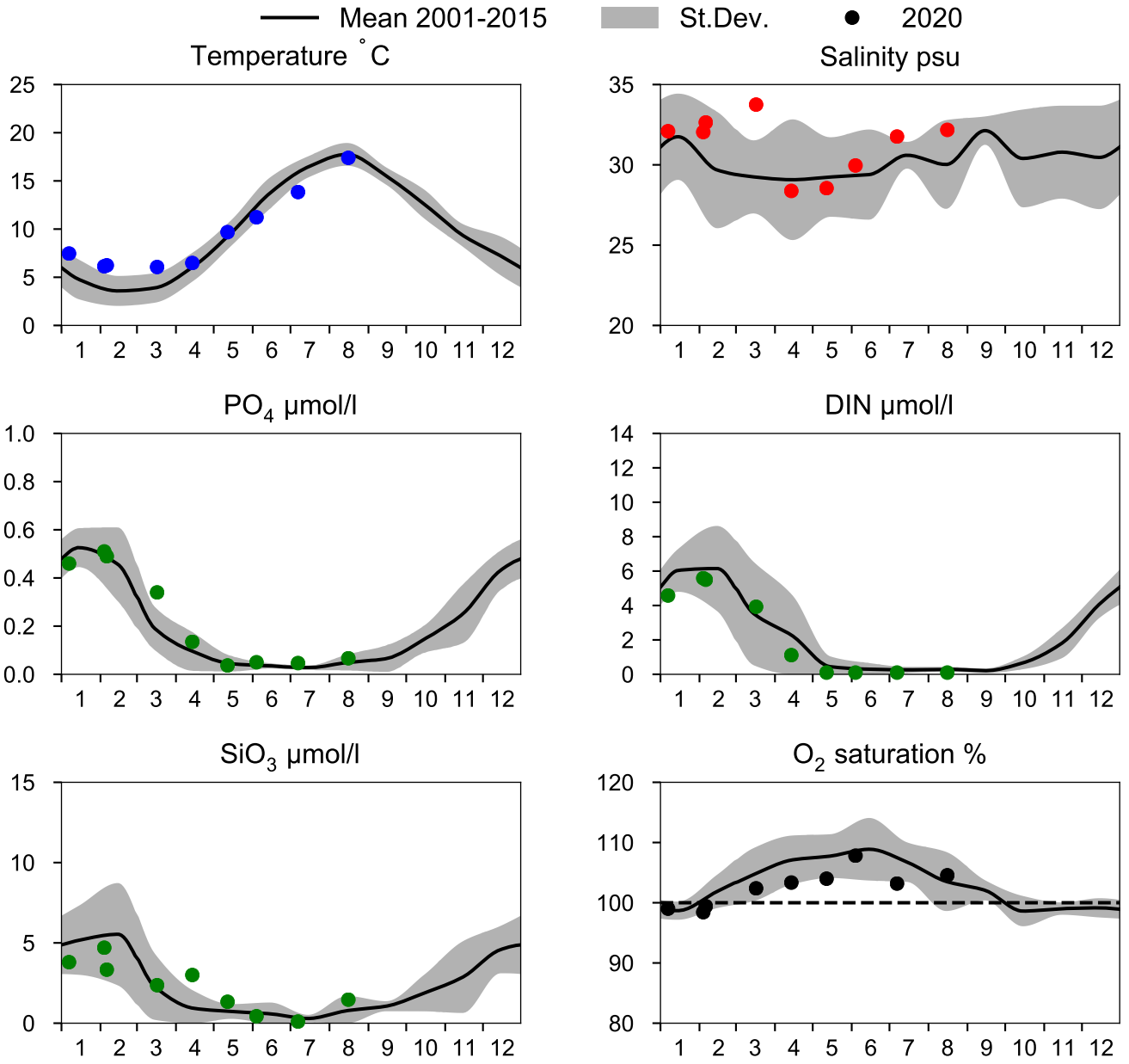


Vertical profiles Å14
August

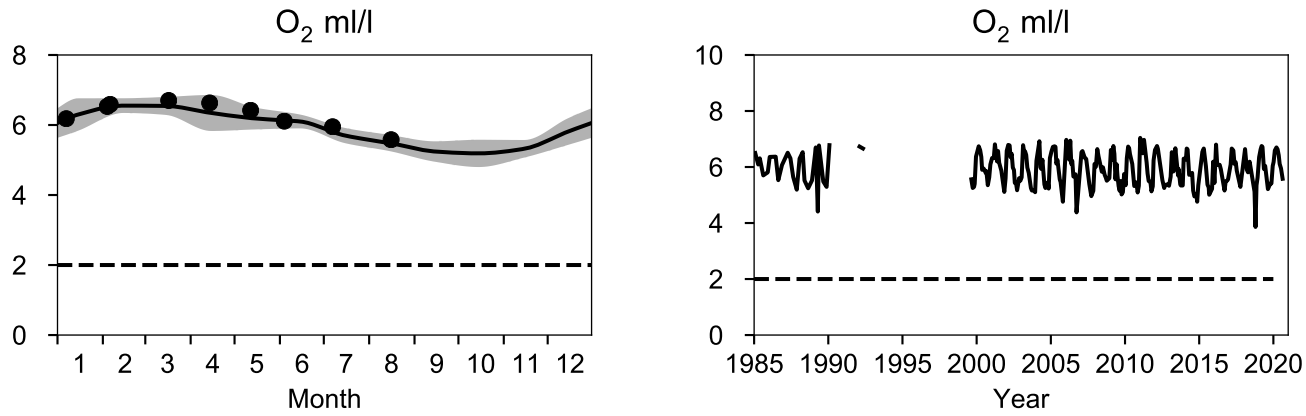


STATION Å15 SURFACE WATER (0-10 m)

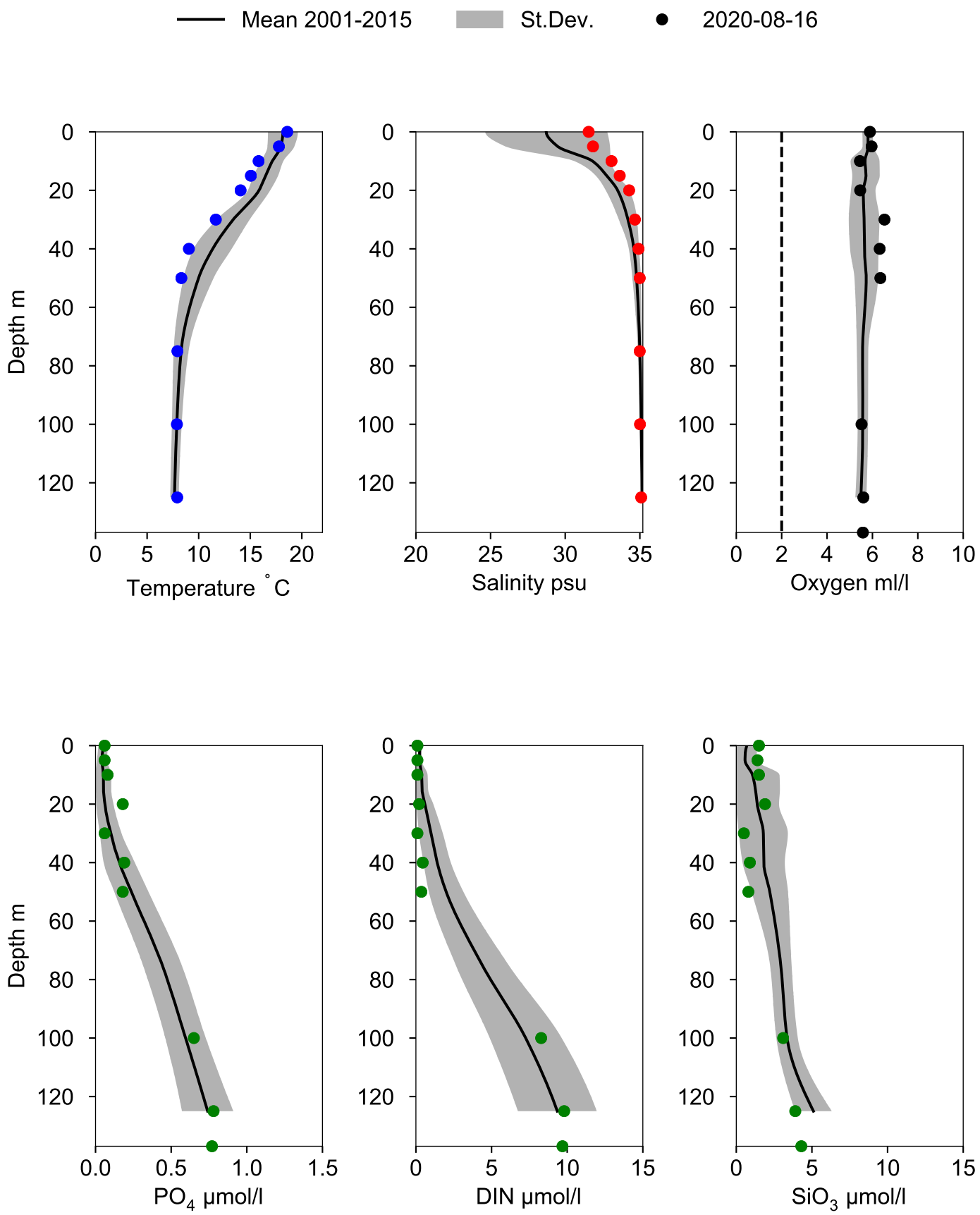
Annual Cycles



OXYGEN IN BOTTOM WATER (depth >= 125 m)

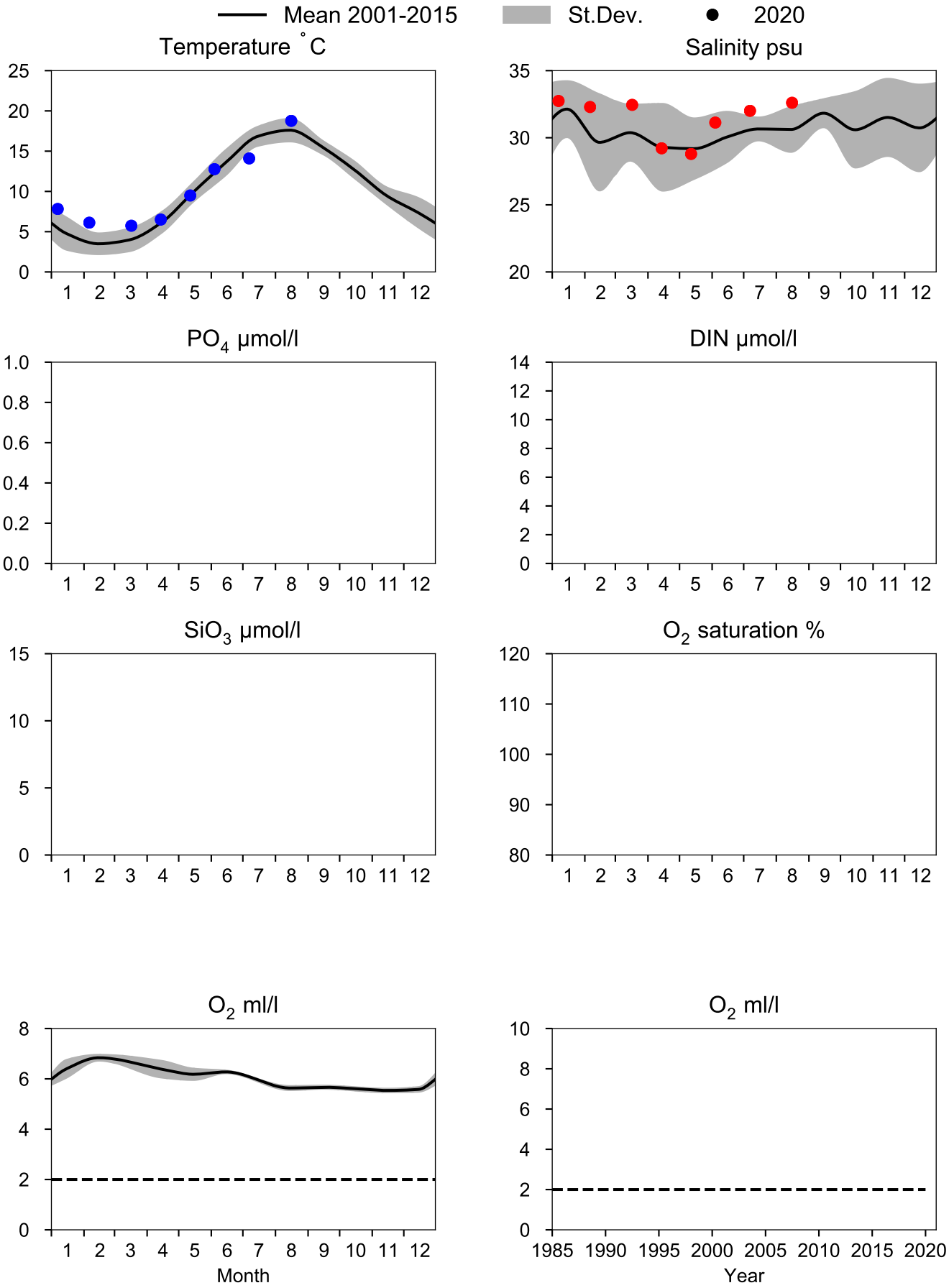


Vertical profiles Å15
August

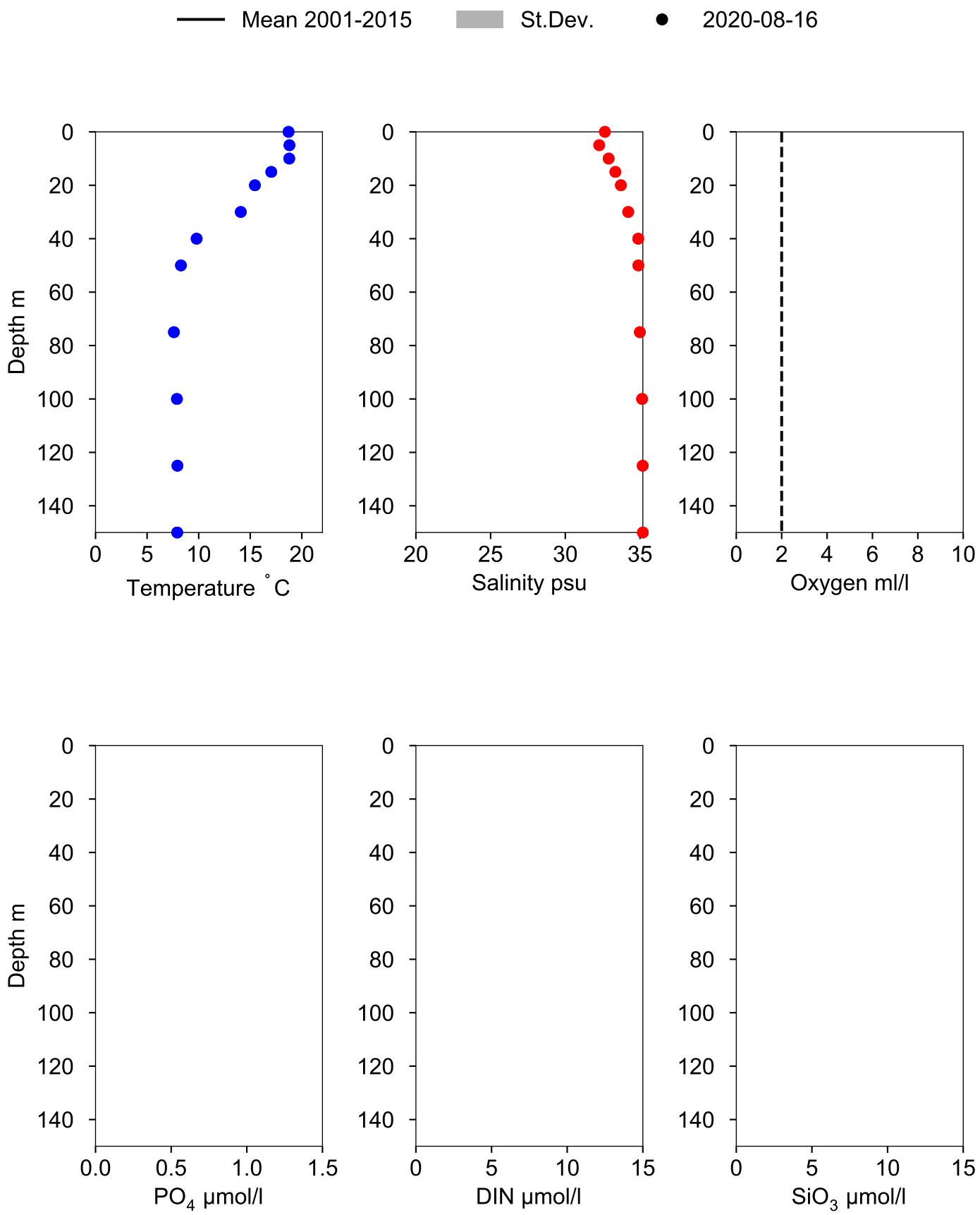


STATION Å16 SURFACE WATER (0-10 m)

Annual Cycles

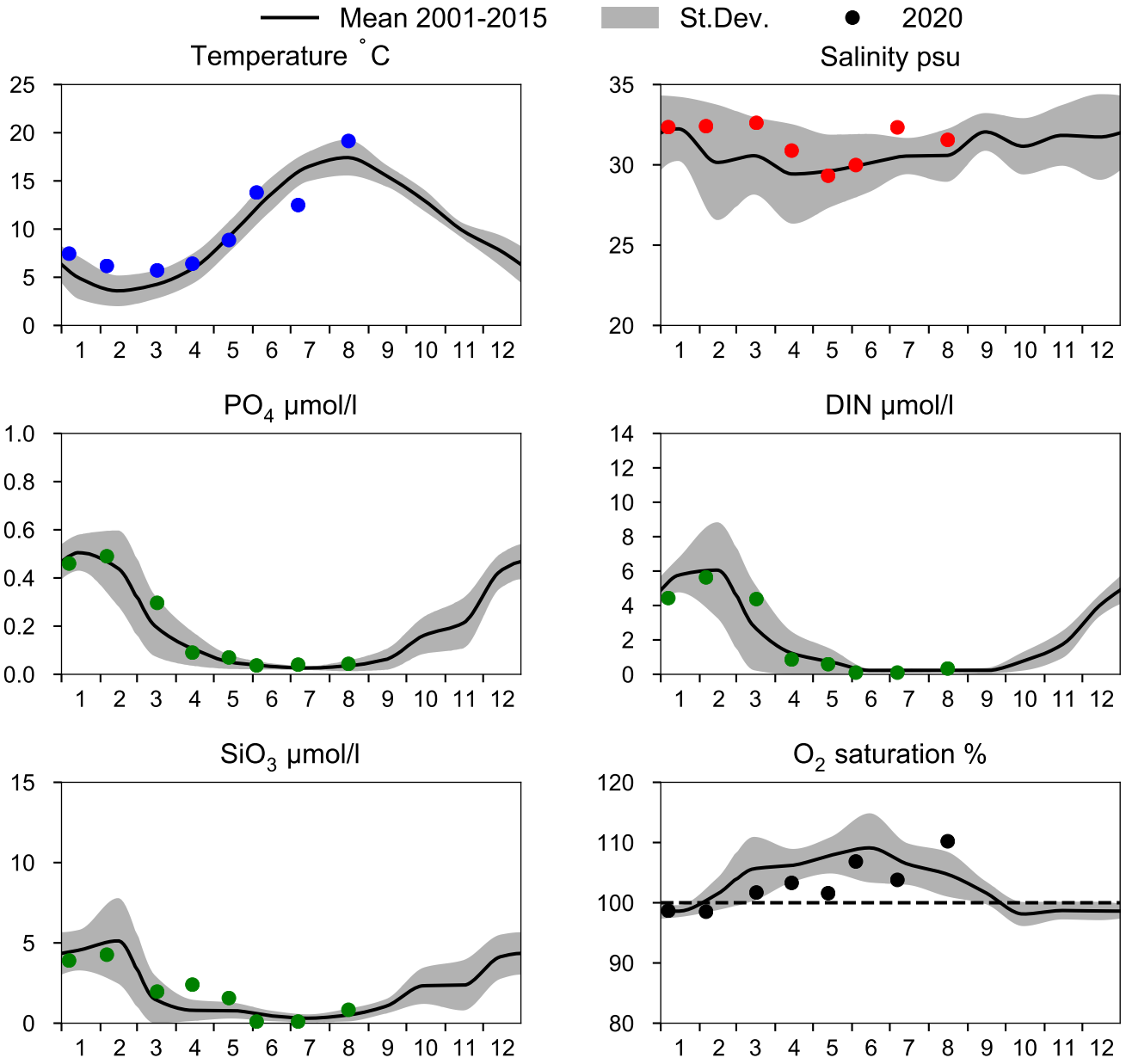


Vertical profiles Å16
August

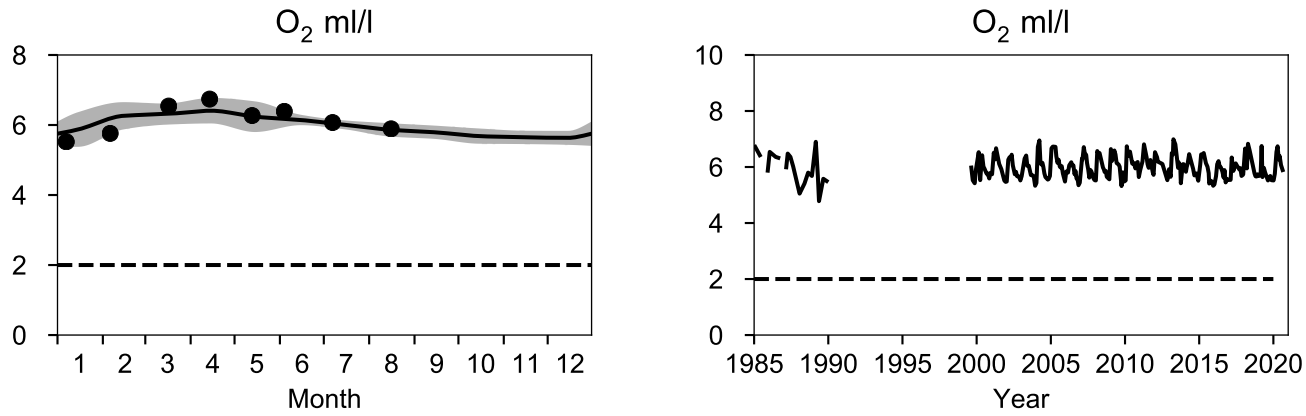


STATION Å17 SURFACE WATER (0-10 m)

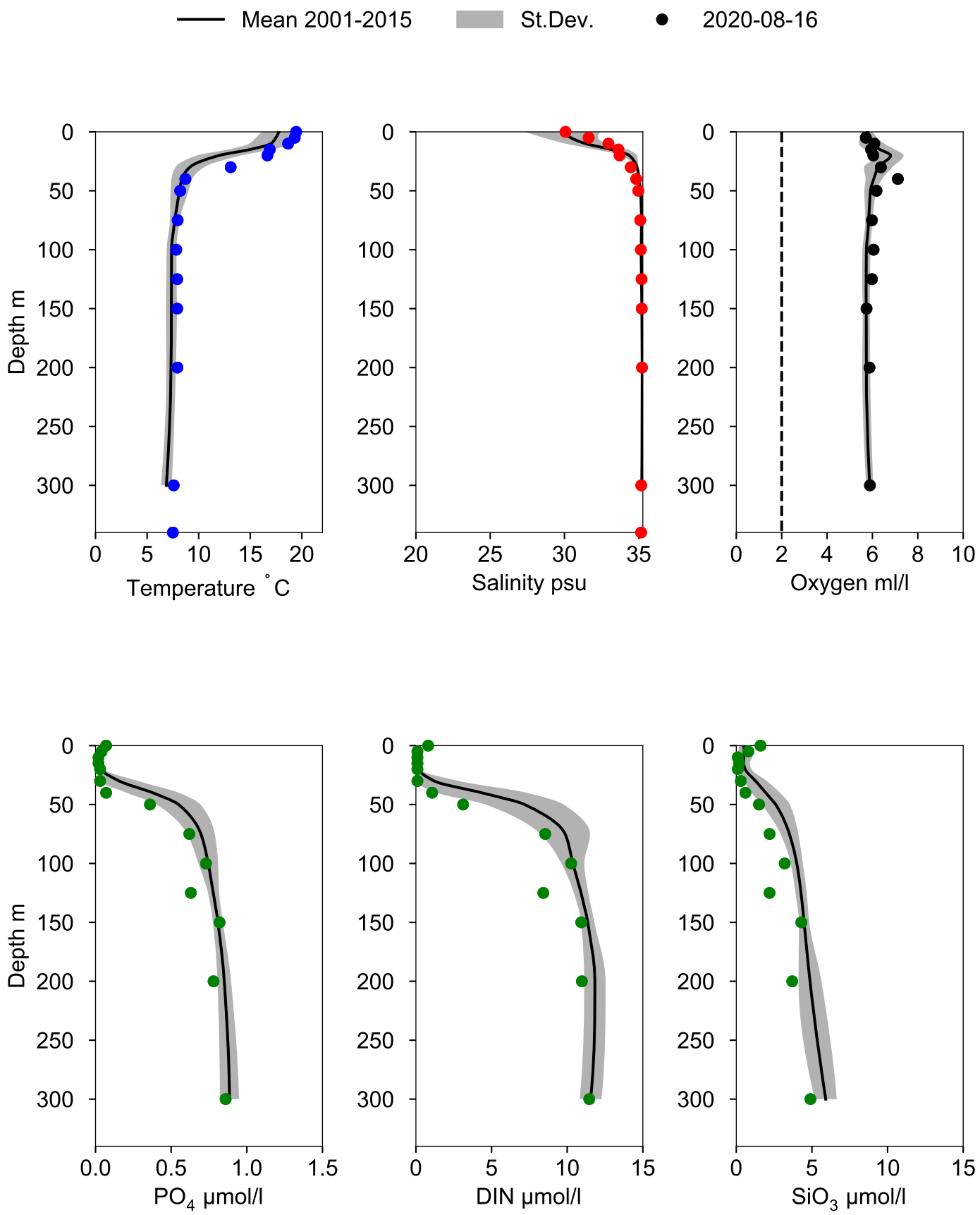
Annual Cycles



OXYGEN IN BOTTOM WATER (depth >= 300 m)

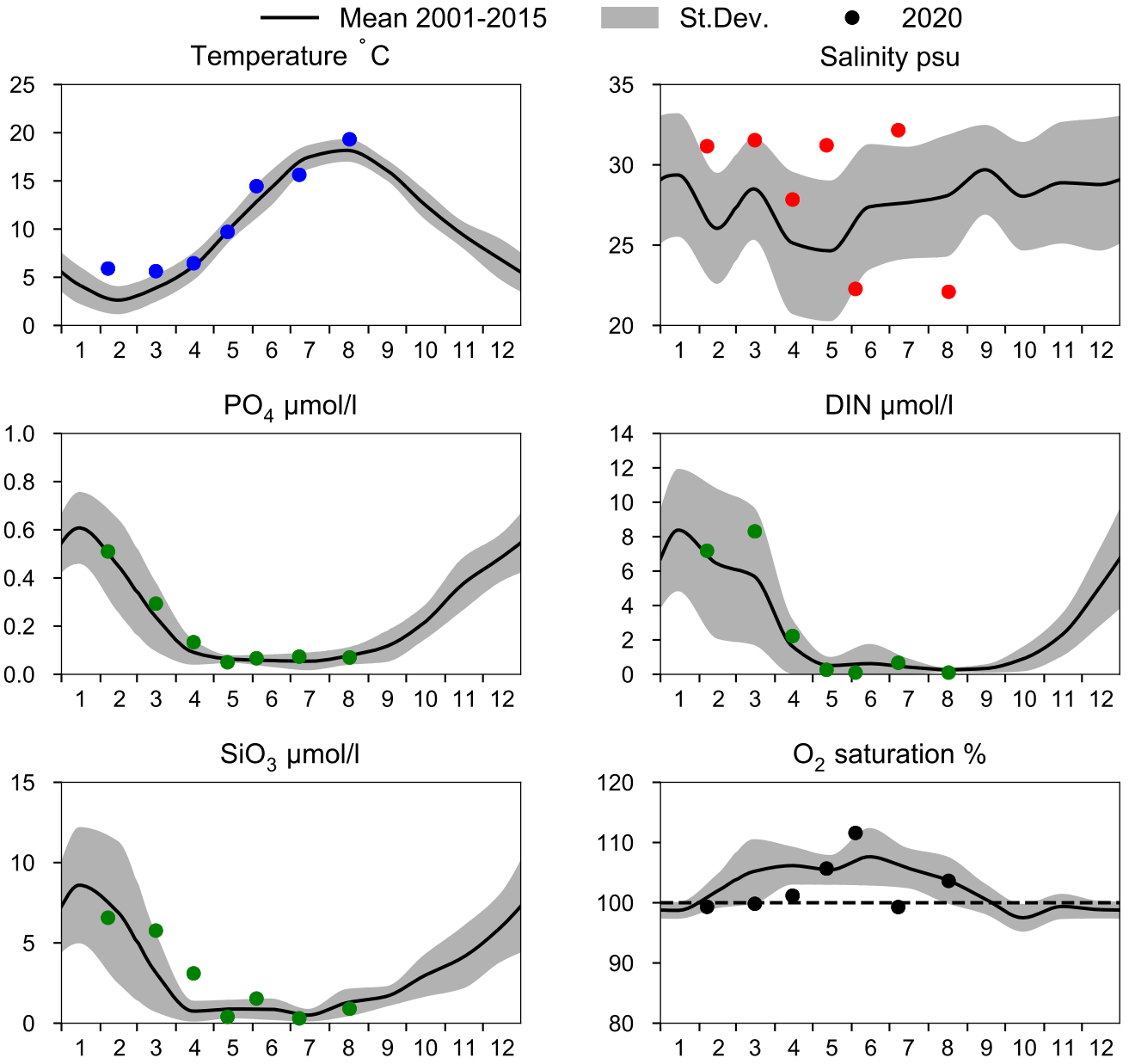


Vertical profiles Å17
August

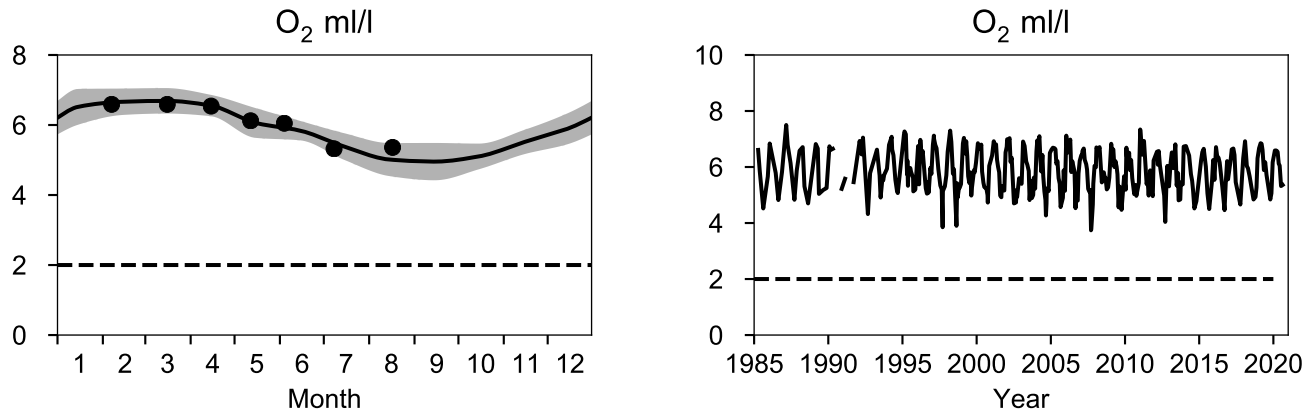


STATION P2 SURFACE WATER (0-10 m)

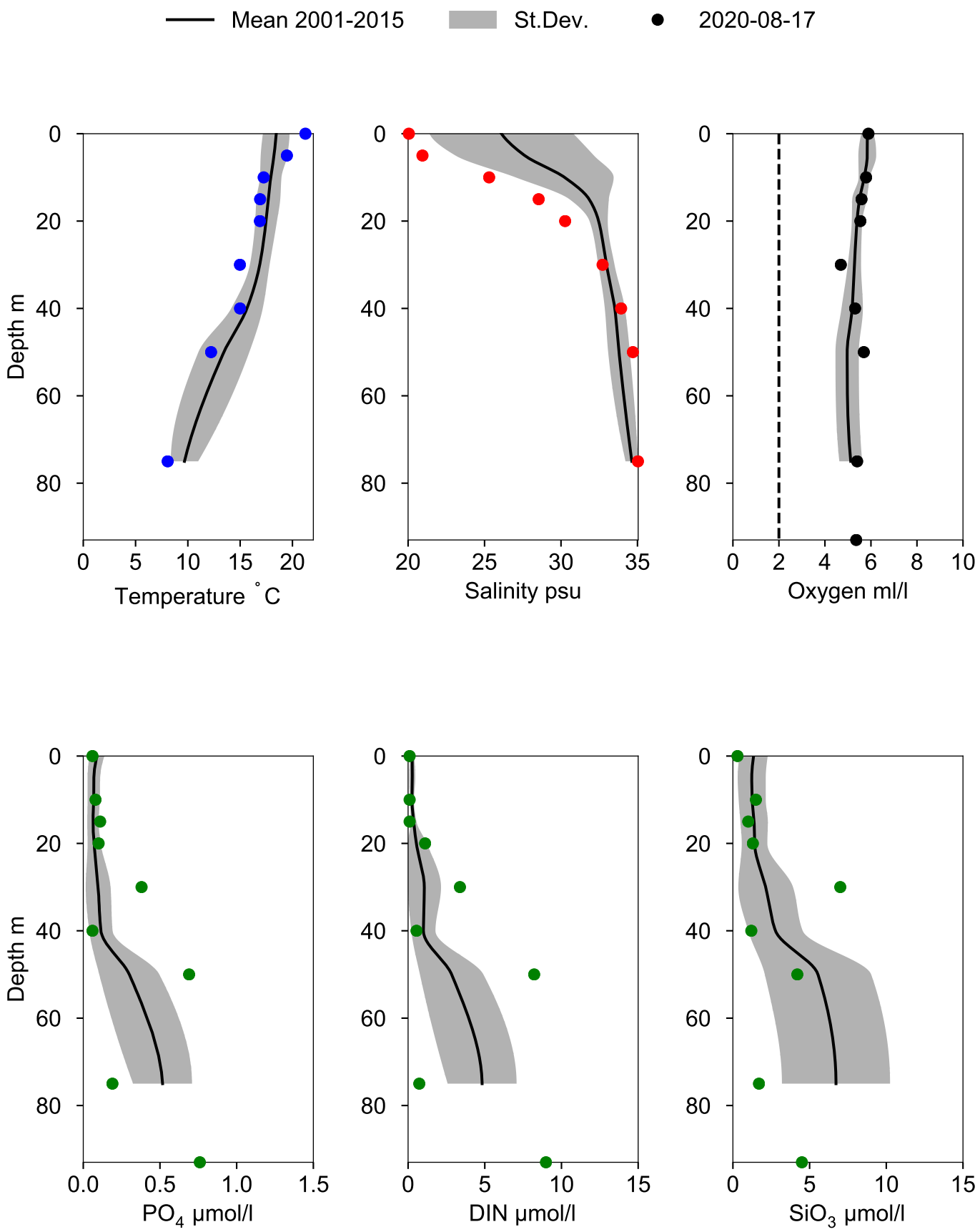
Annual Cycles



OXYGEN IN BOTTOM WATER (depth >= 75 m)

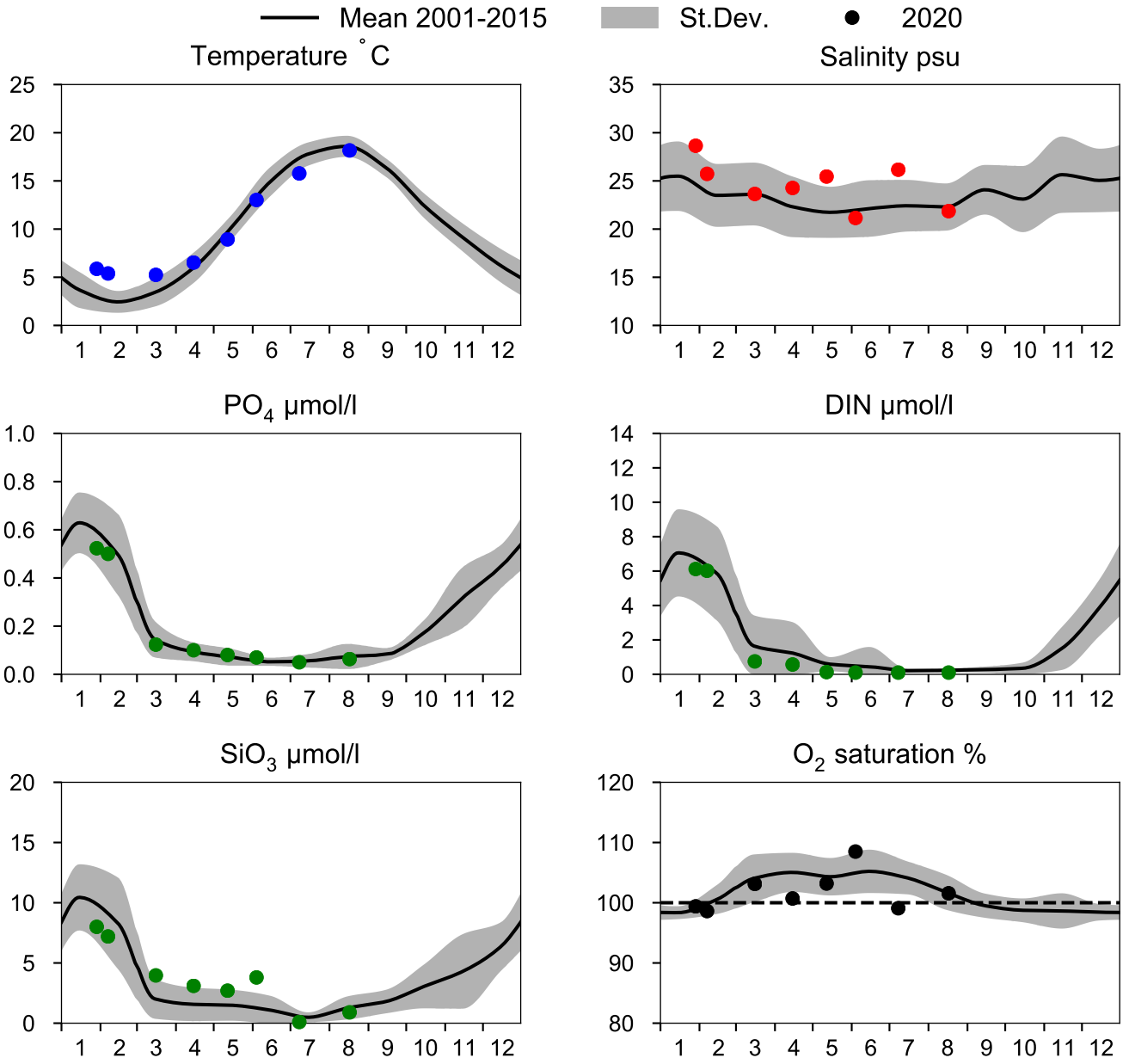


Vertical profiles P2
August

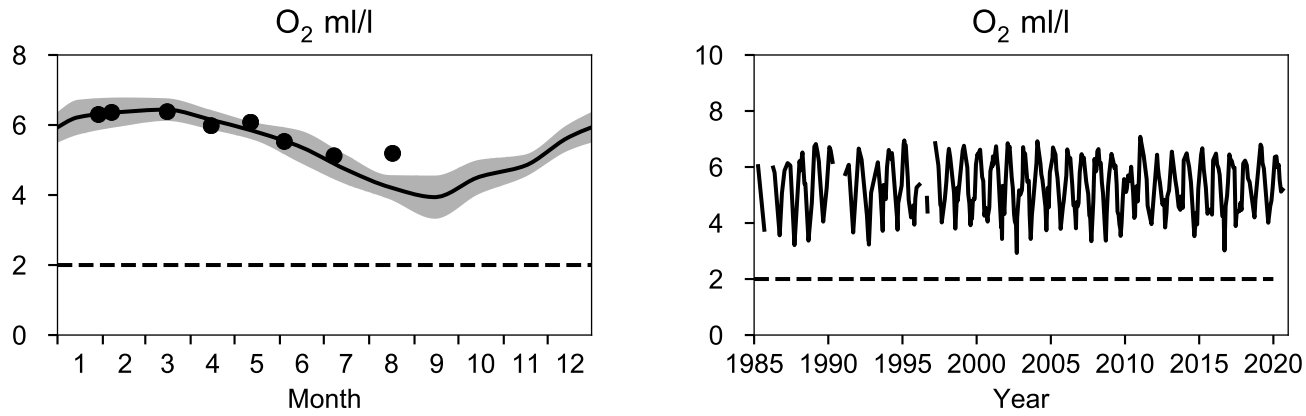


STATION FLADEN SURFACE WATER (0-10 m)

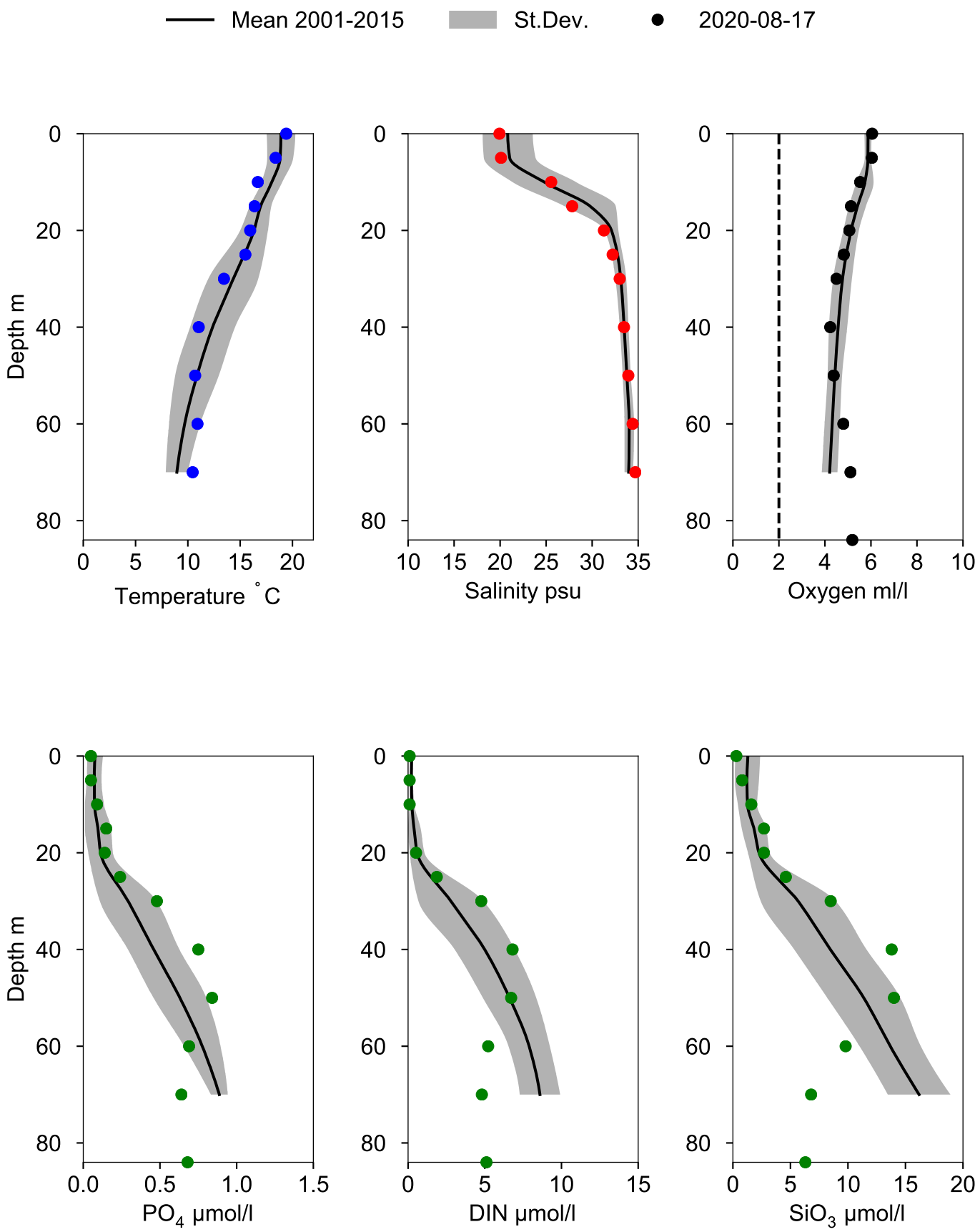
Annual Cycles



OXYGEN IN BOTTOM WATER (depth >= 74 m)

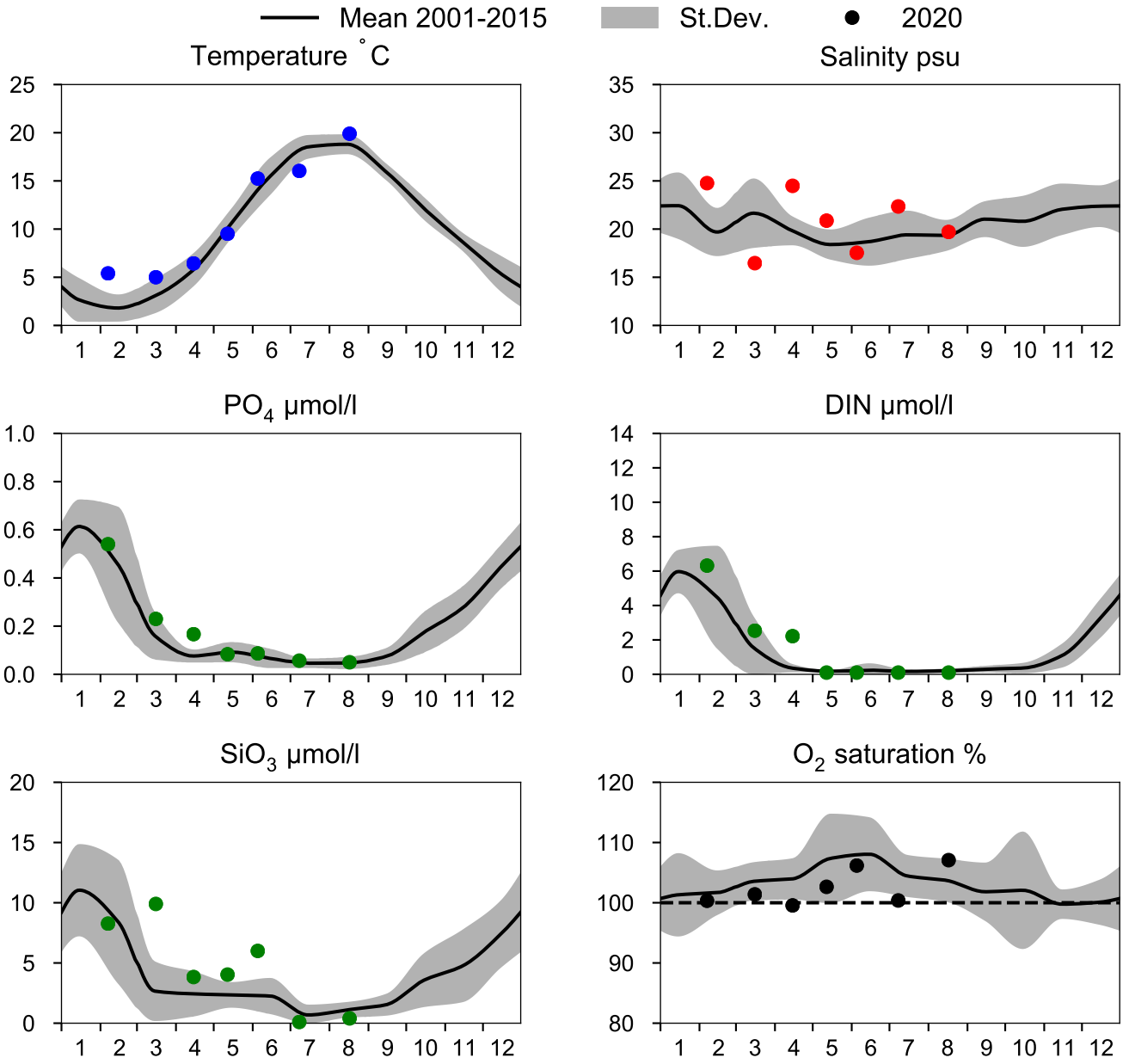


Vertical profiles FLADEN
August

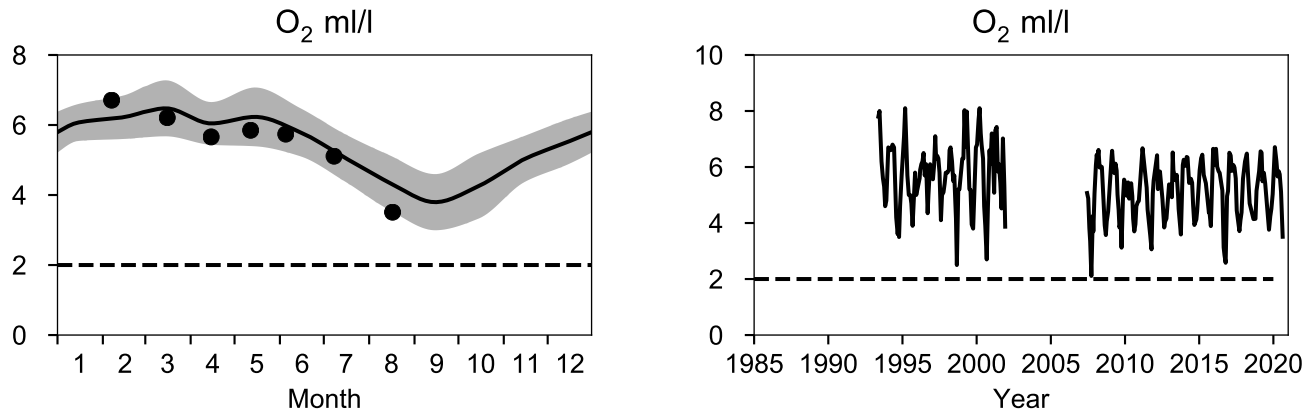


STATION N14 FALKENBERG SURFACE WATER (0-10 m)

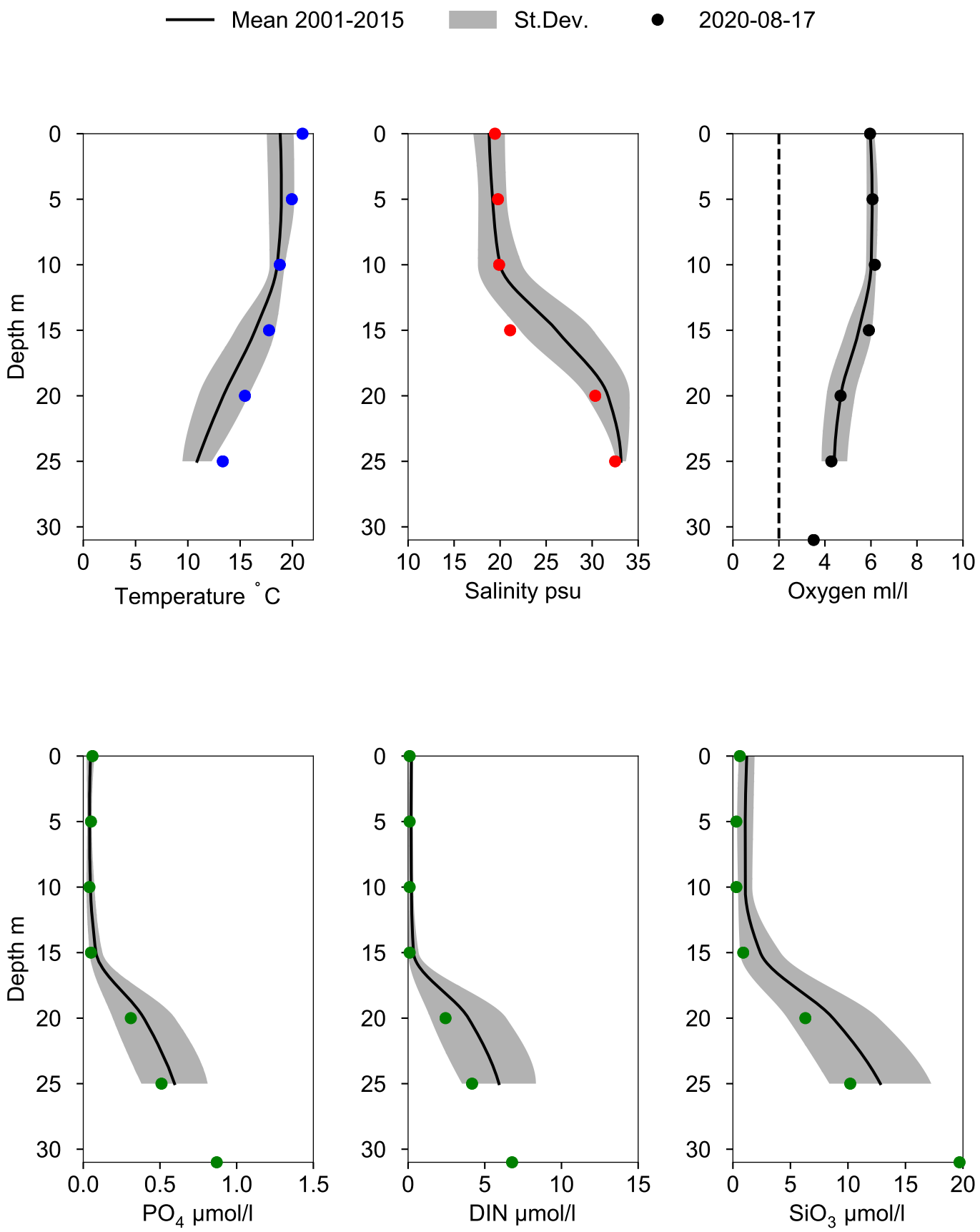
Annual Cycles



OXYGEN IN BOTTOM WATER (depth >= 20 m)

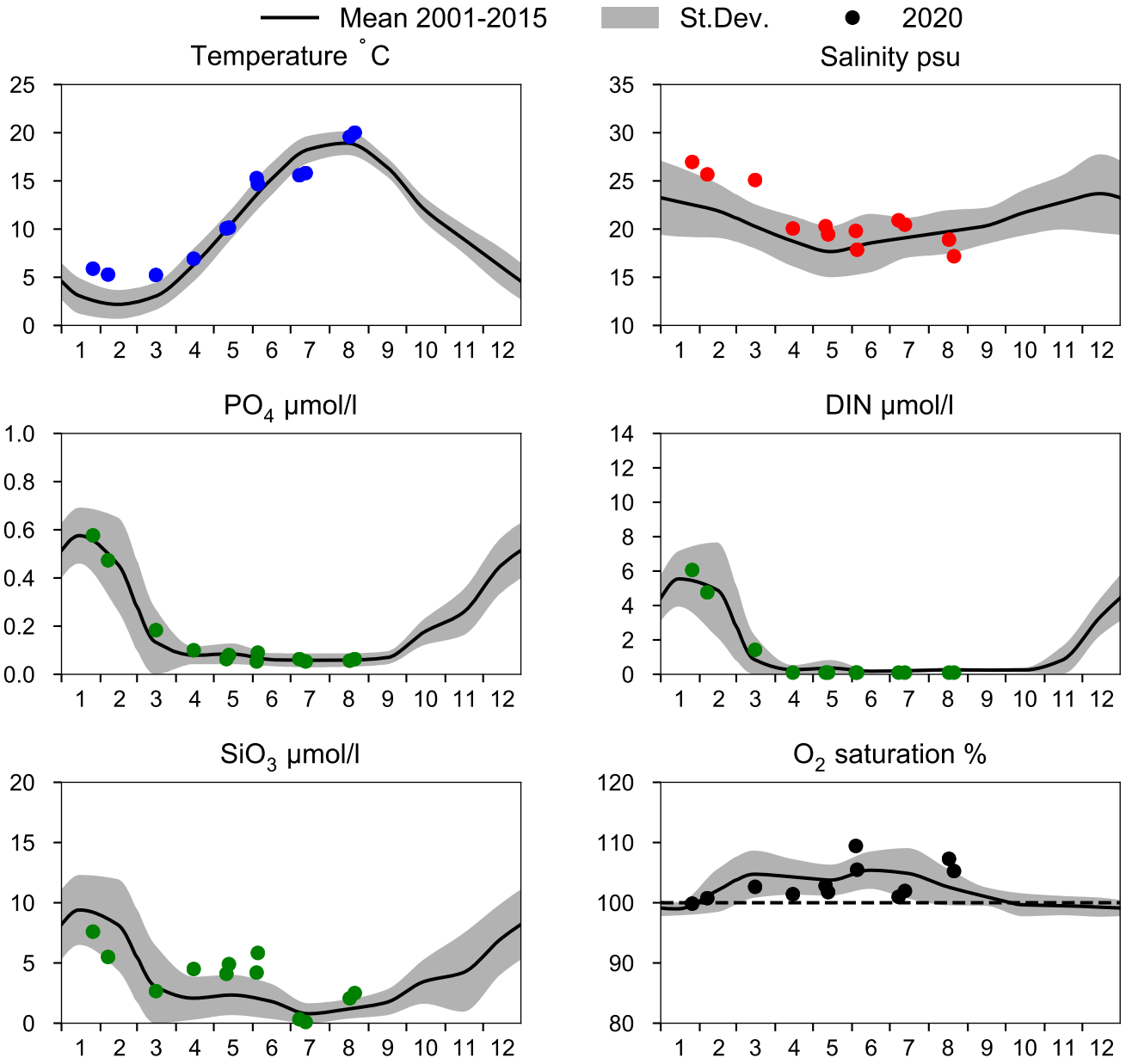


Vertical profiles N14 FALKENBERG
August

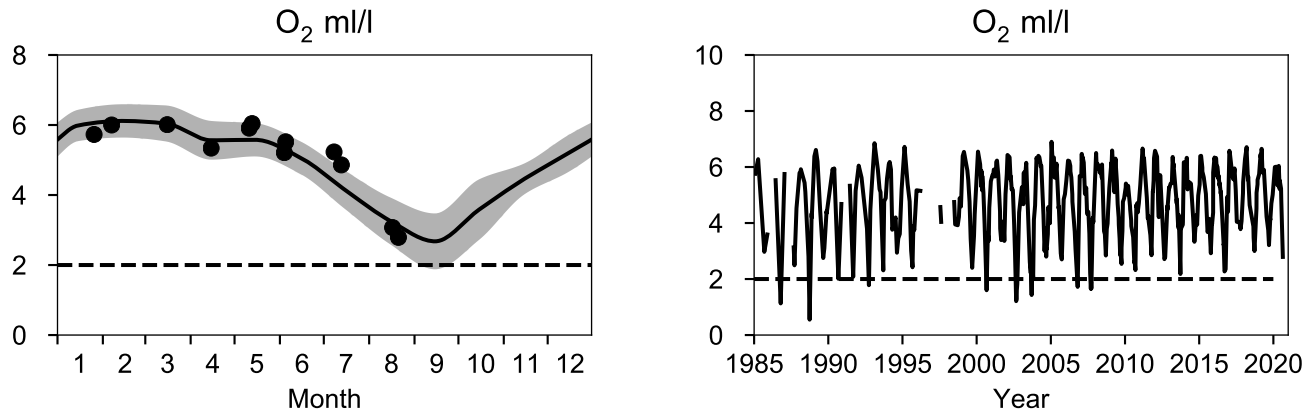


STATION ANHOLT E SURFACE WATER (0-10 m)

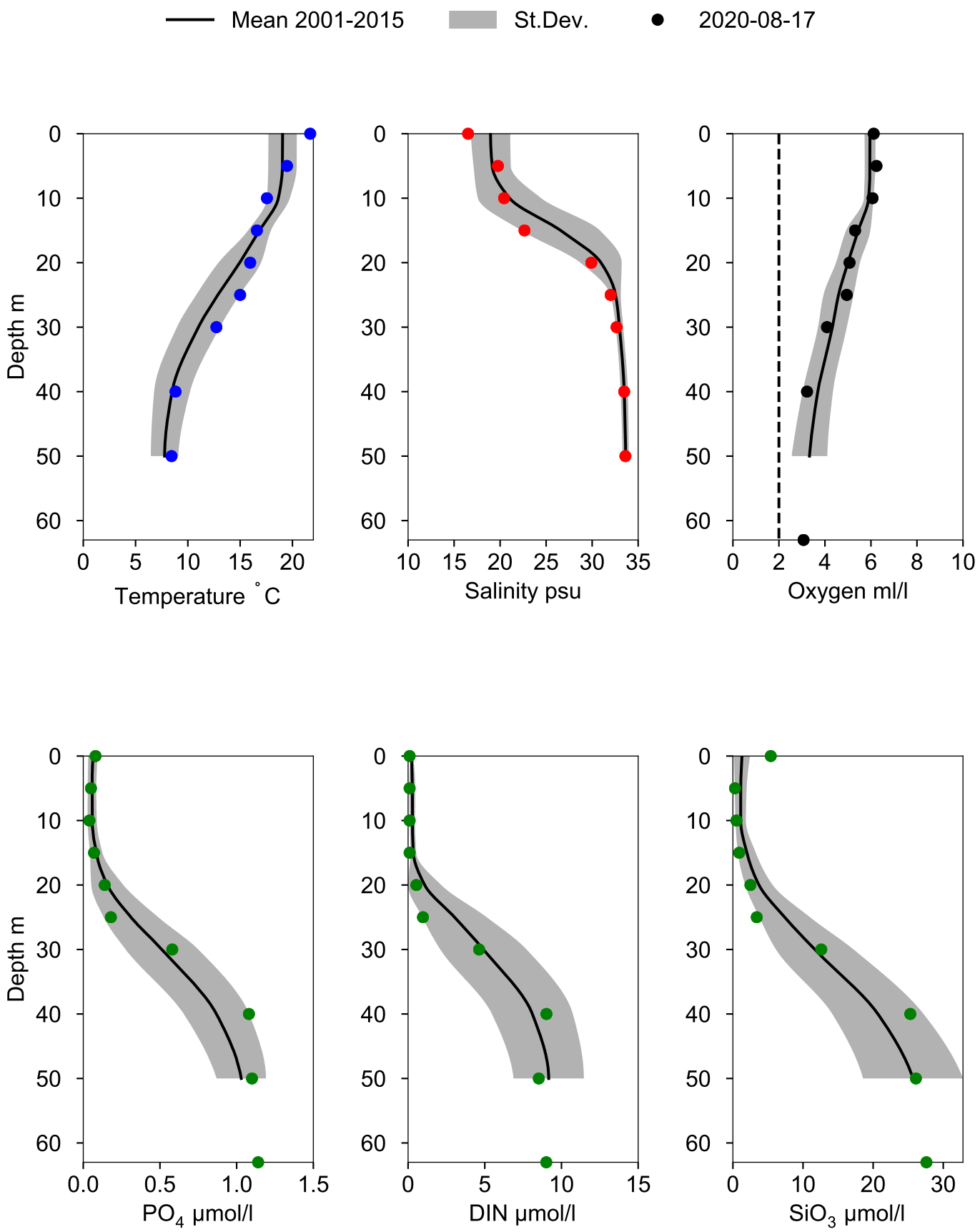
Annual Cycles



OXYGEN IN BOTTOM WATER (depth >= 52 m)

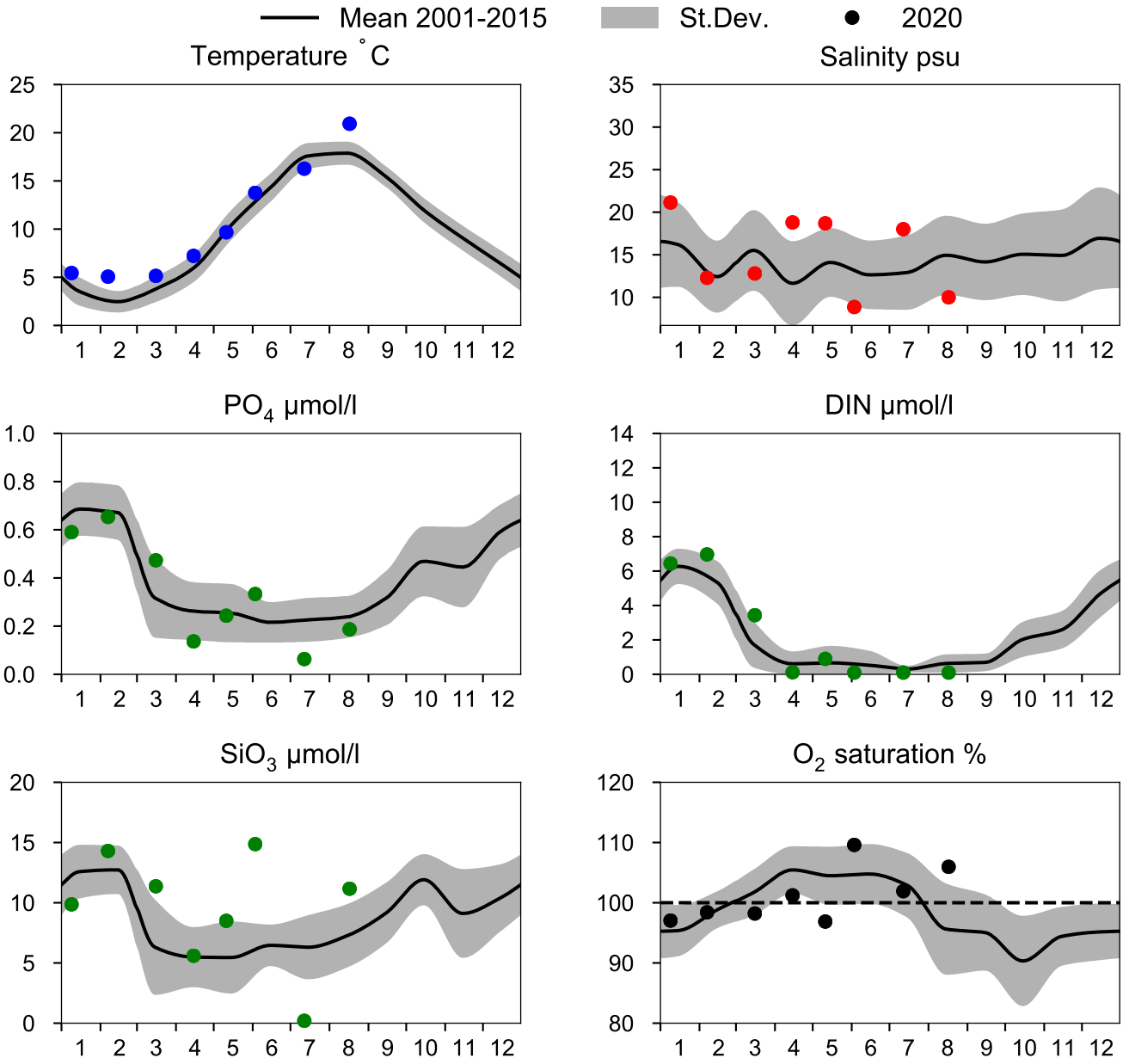


Vertical profiles ANHOLT E
August

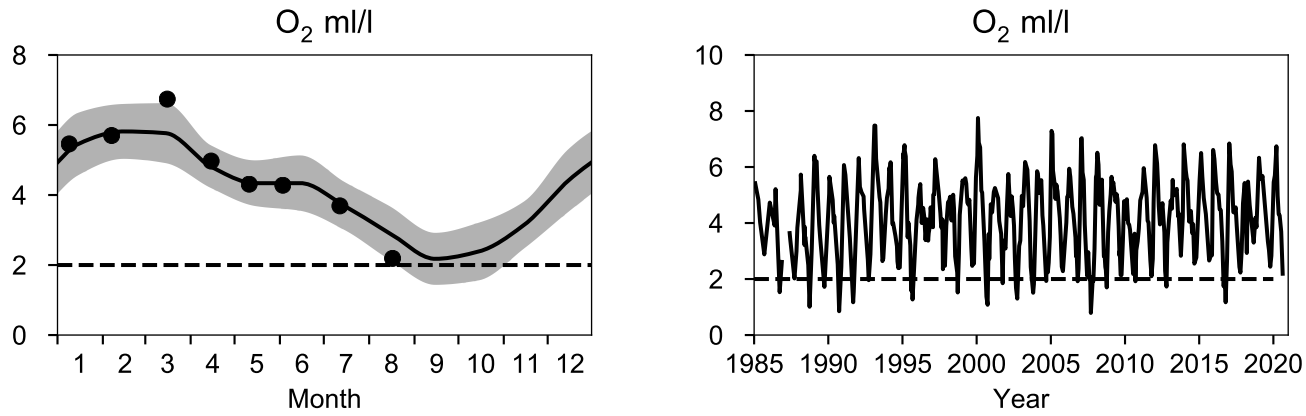


STATION W LANDSKRONA SURFACE WATER (0-10 m)

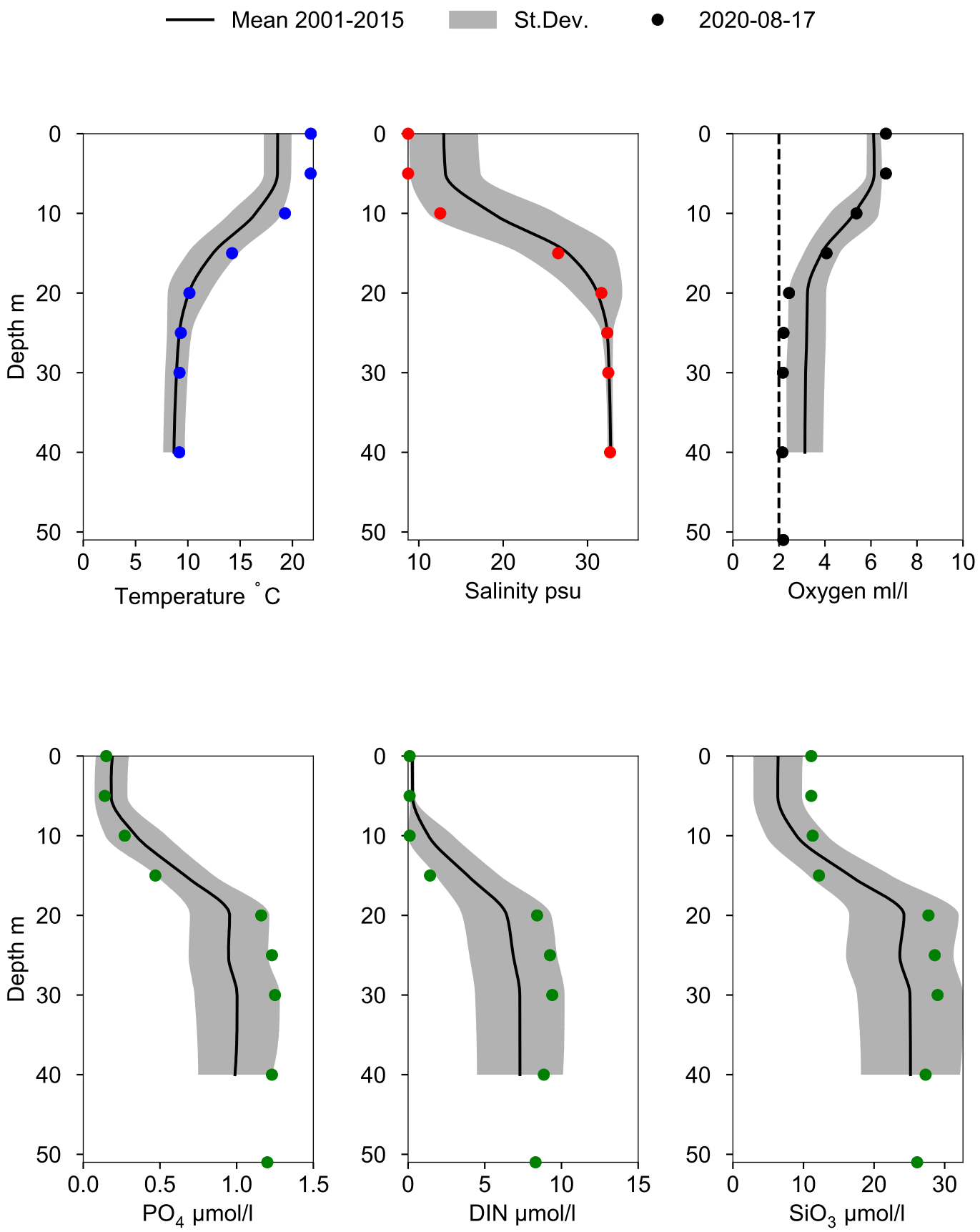
Annual Cycles



OXYGEN IN BOTTOM WATER (depth >= 40 m)

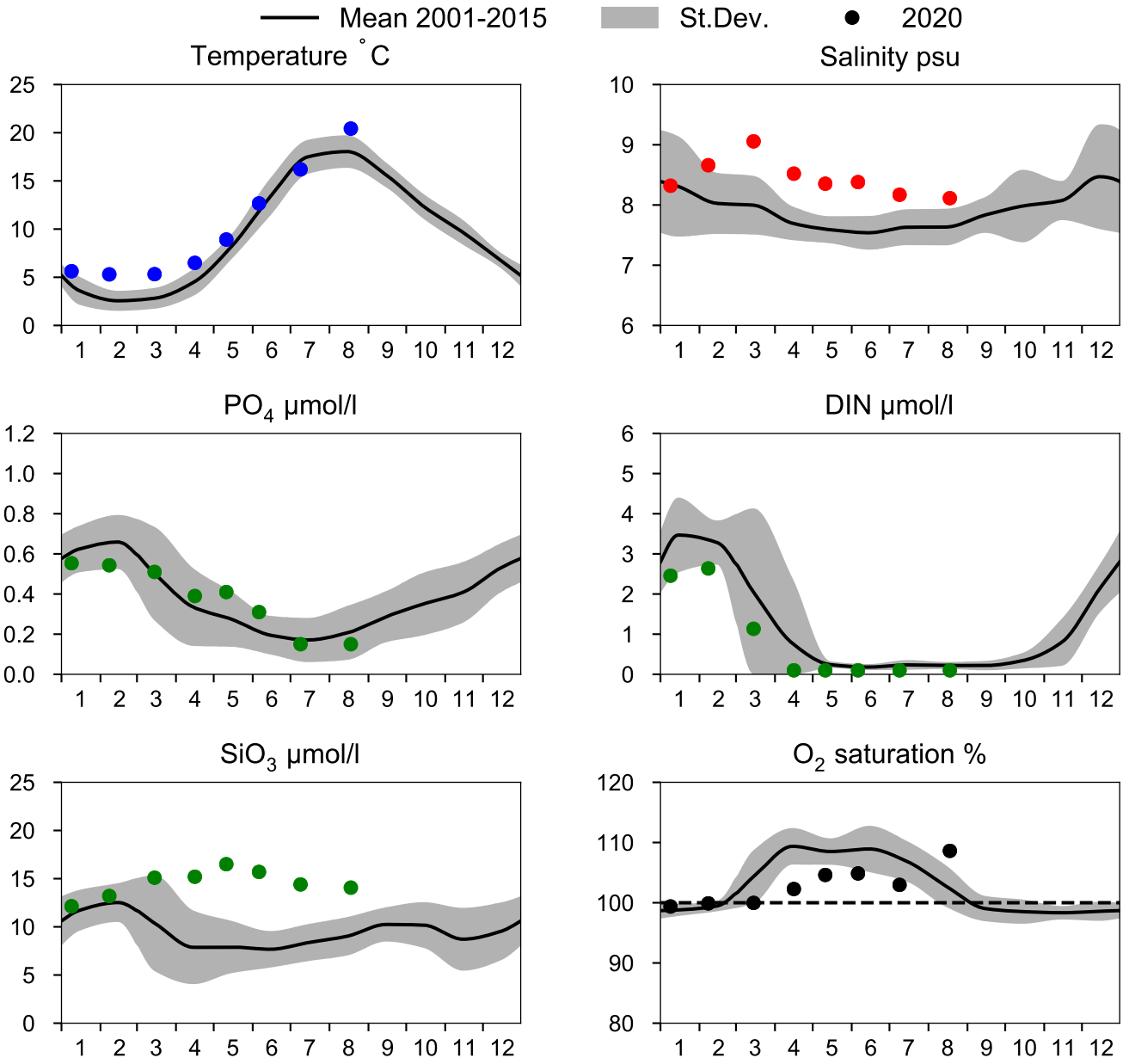


Vertical profiles W LANDSKRONA
August

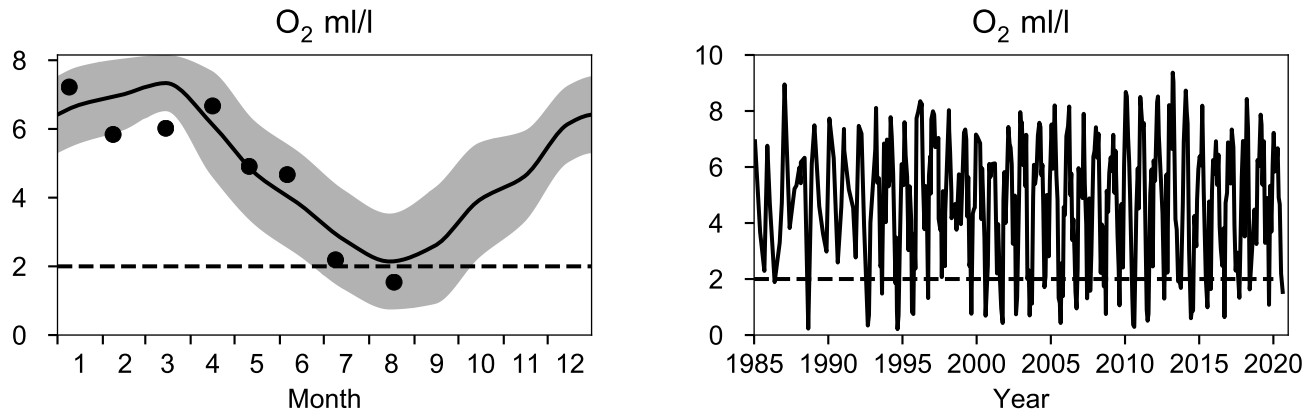


STATION BY1 SURFACE WATER (0-10 m)

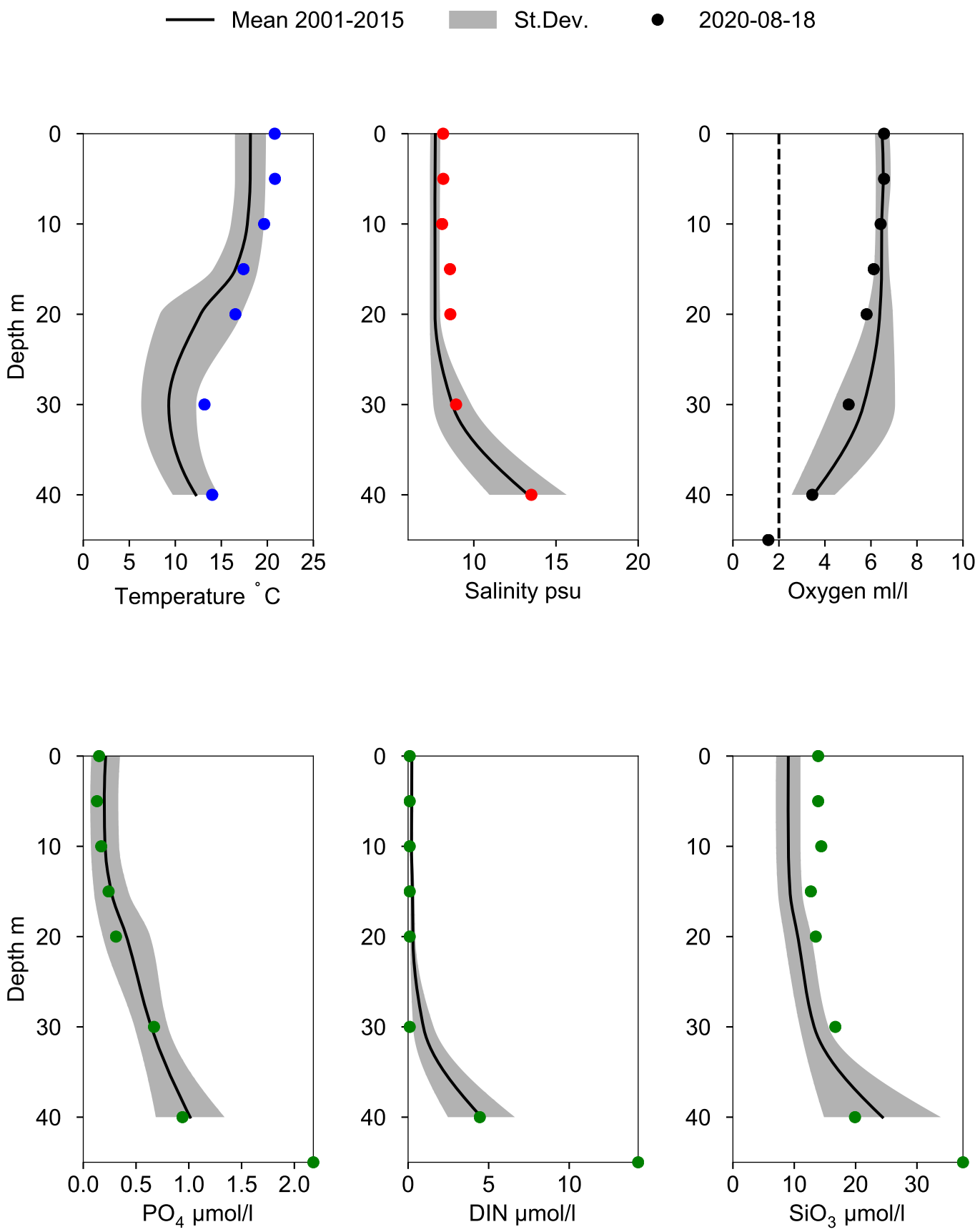
Annual Cycles



OXYGEN IN BOTTOM WATER (depth >= 40 m)

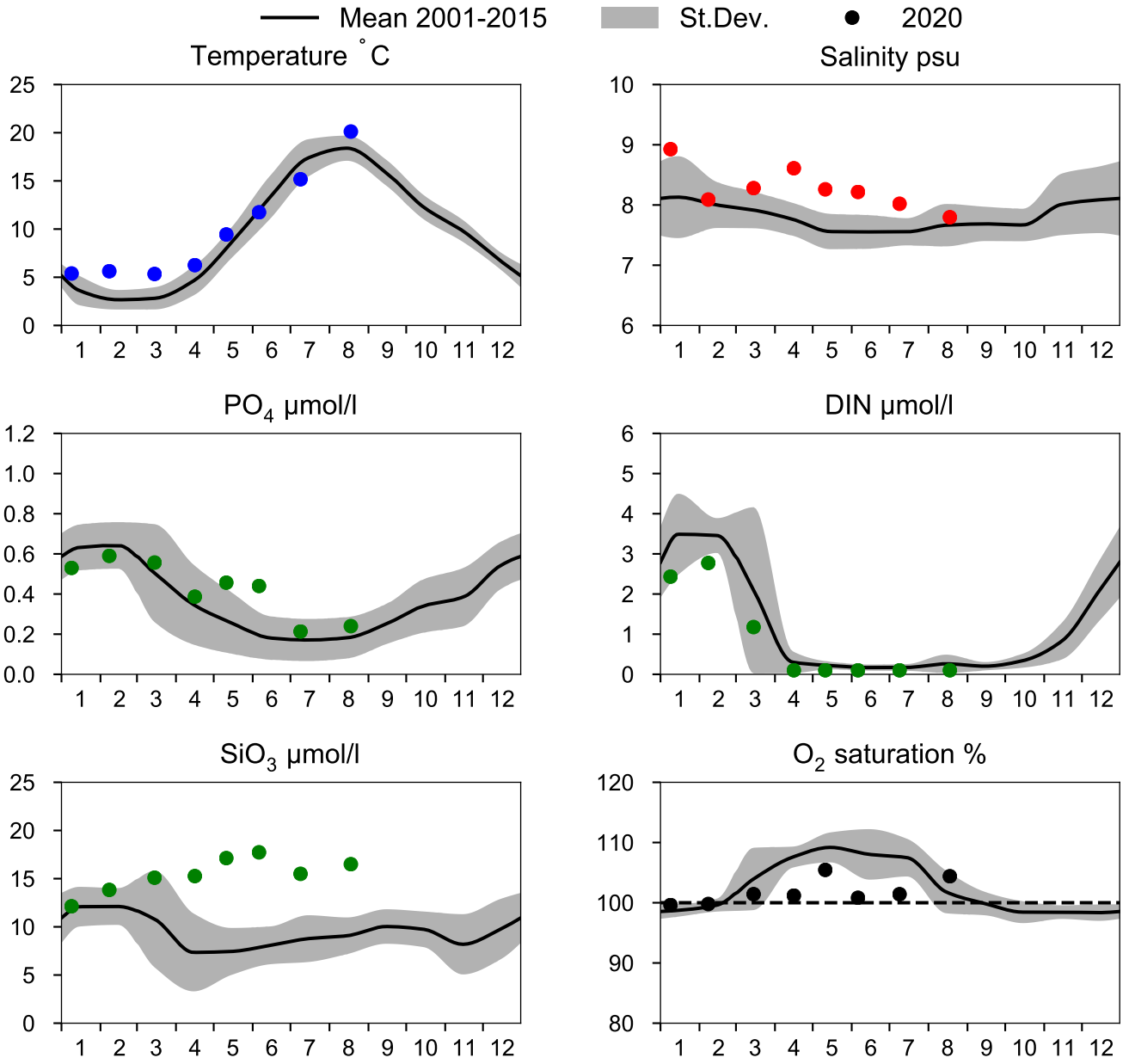


Vertical profiles BY1
August

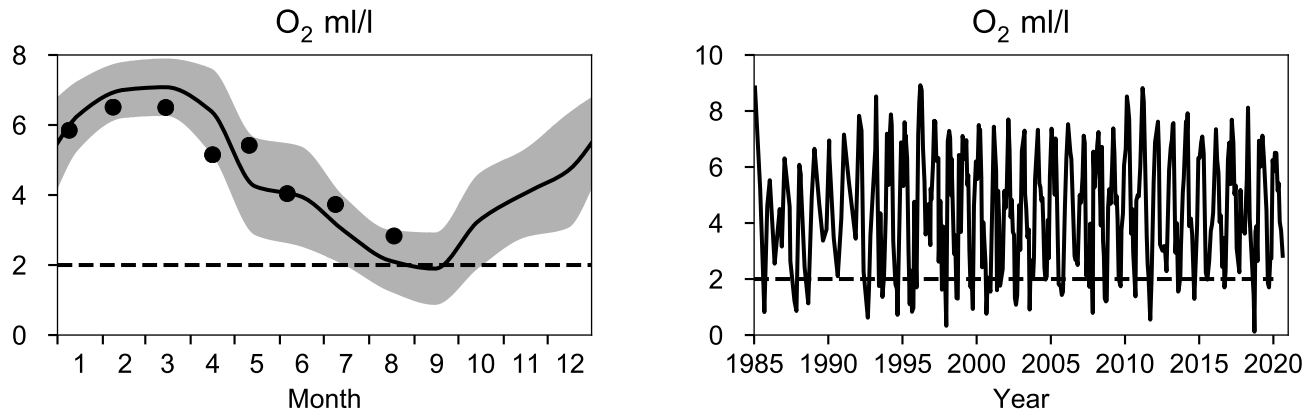


STATION BY2 ARKONA SURFACE WATER (0-10 m)

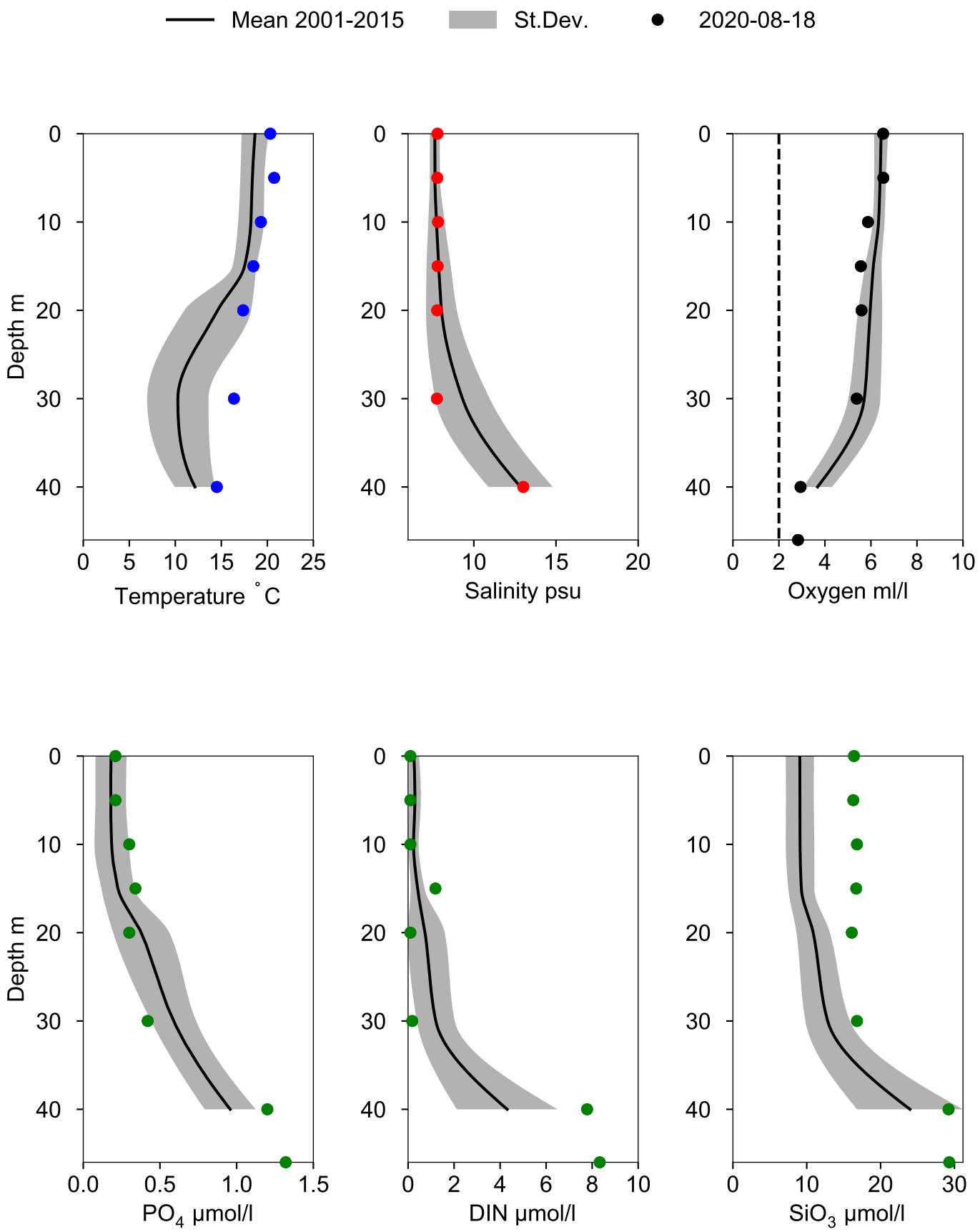
Annual Cycles



OXYGEN IN BOTTOM WATER (depth >= 40 m)

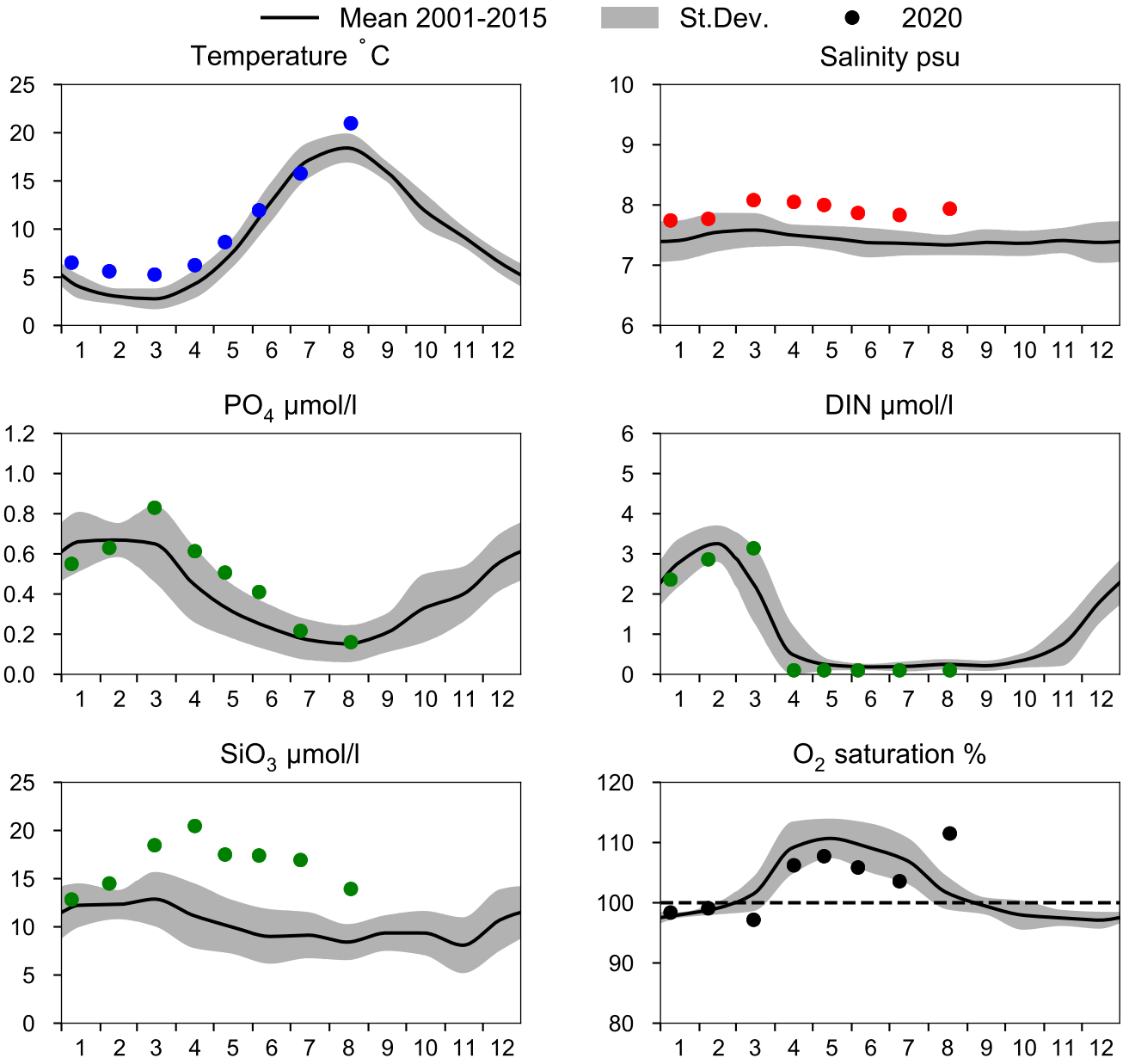


Vertical profiles BY2 ARKONA
August

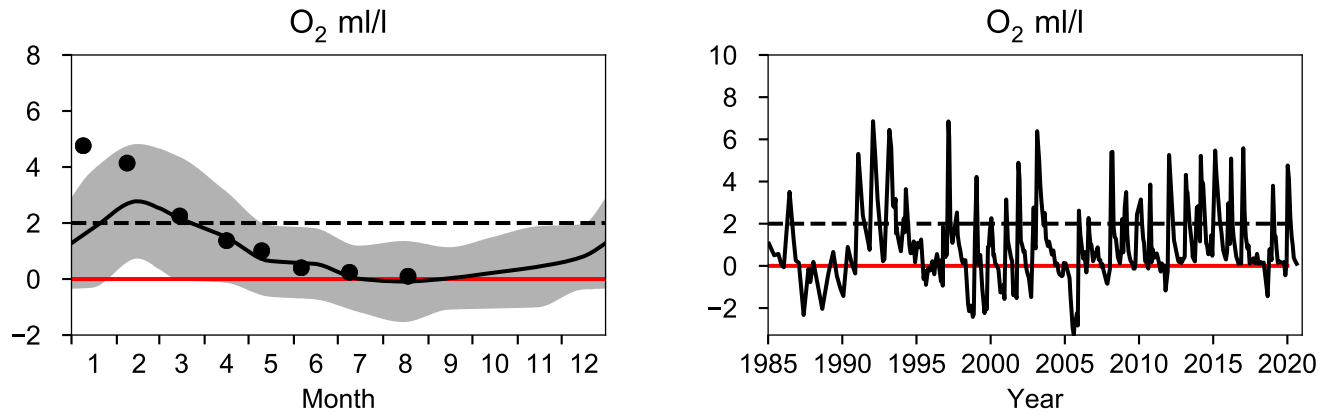


STATION BY4 CHRISTIANSÖ SURFACE WATER (0-10 m)

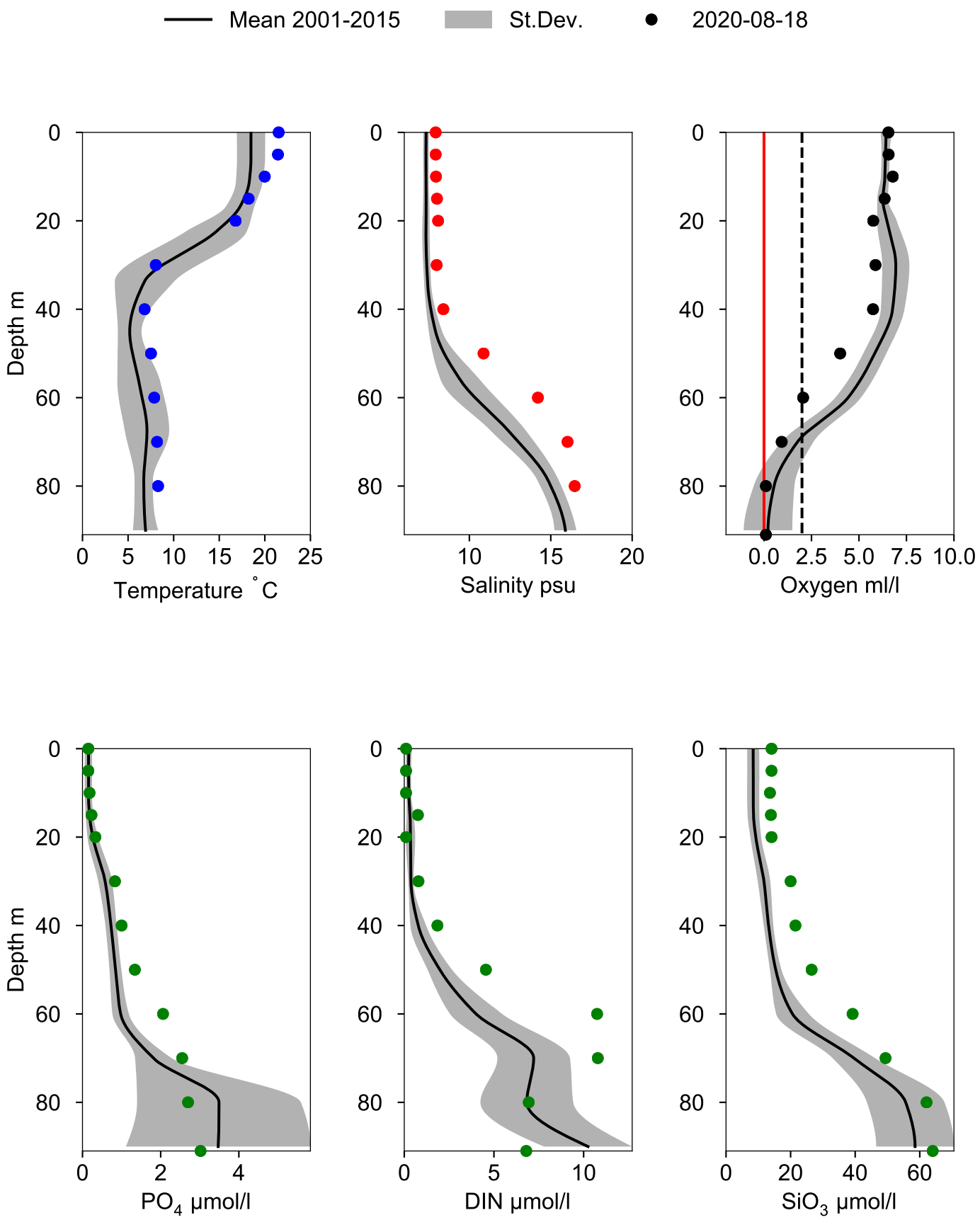
Annual Cycles



OXYGEN IN BOTTOM WATER (depth >= 80 m)

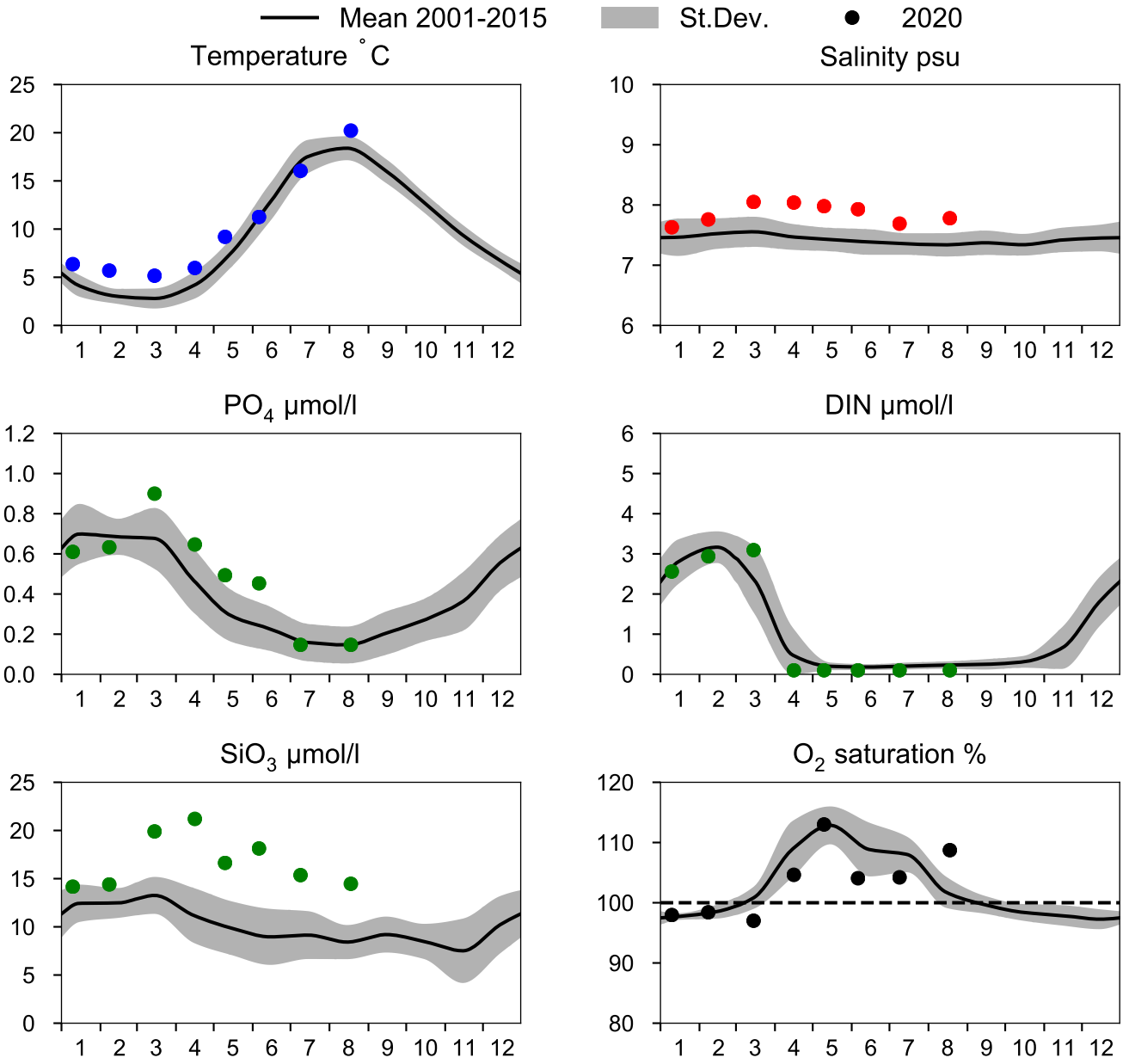


Vertical profiles BY4 CHRISTIANSÖ
August

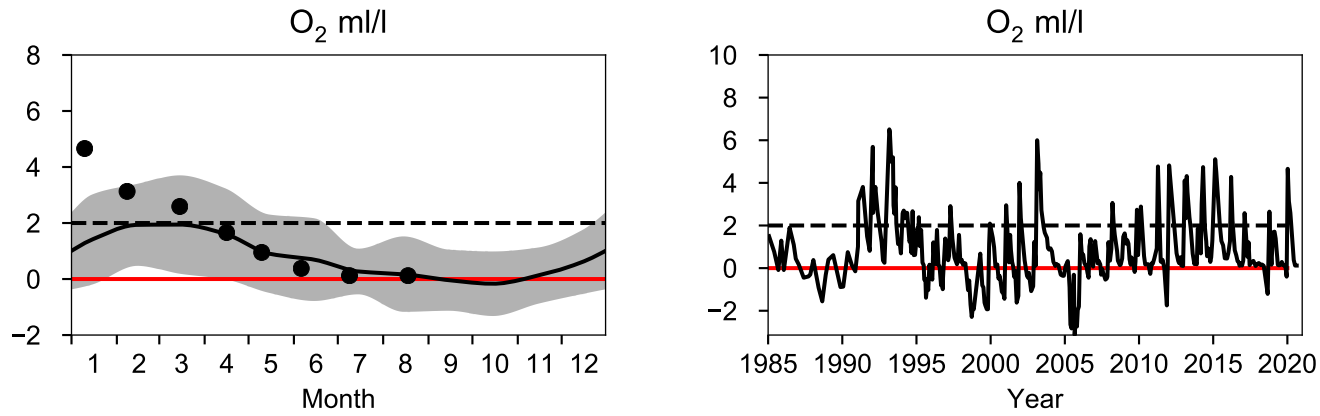


STATION BY5 BORNHOLMSDJ SURFACE WATER (0-10 m)

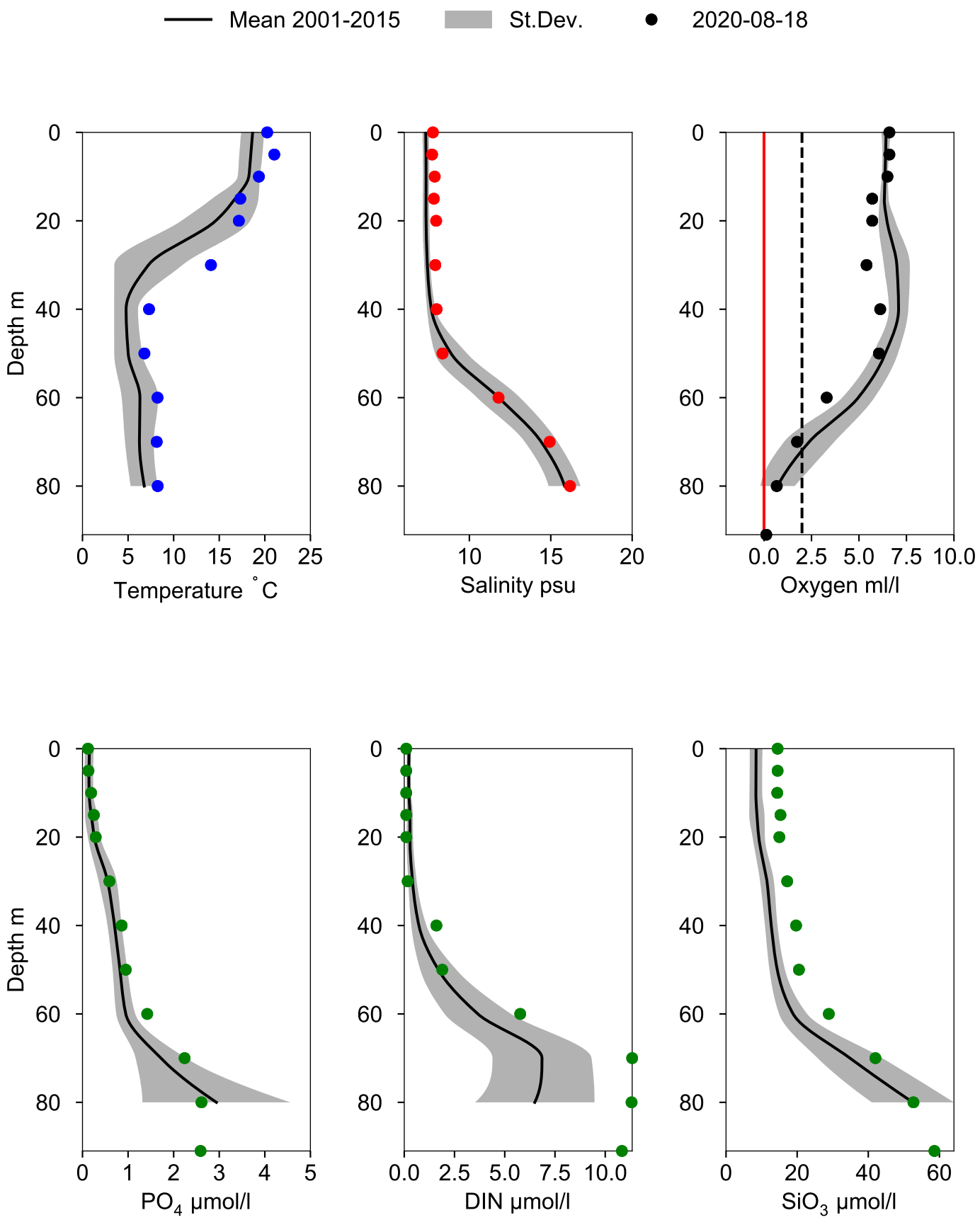
Annual Cycles



OXYGEN IN BOTTOM WATER (depth >= 80 m)

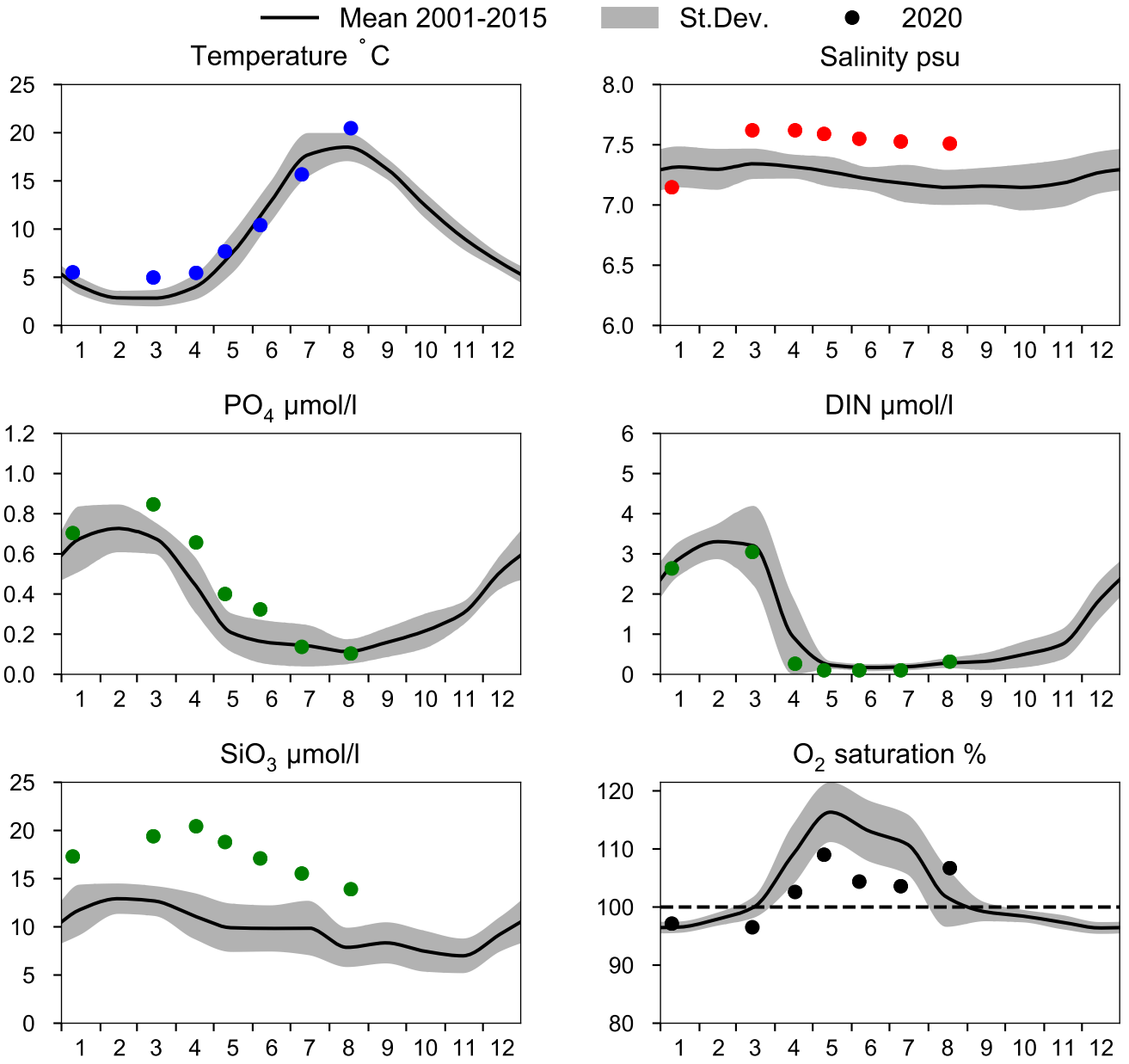


Vertical profiles BY5 BORNHOLMSDJ
August

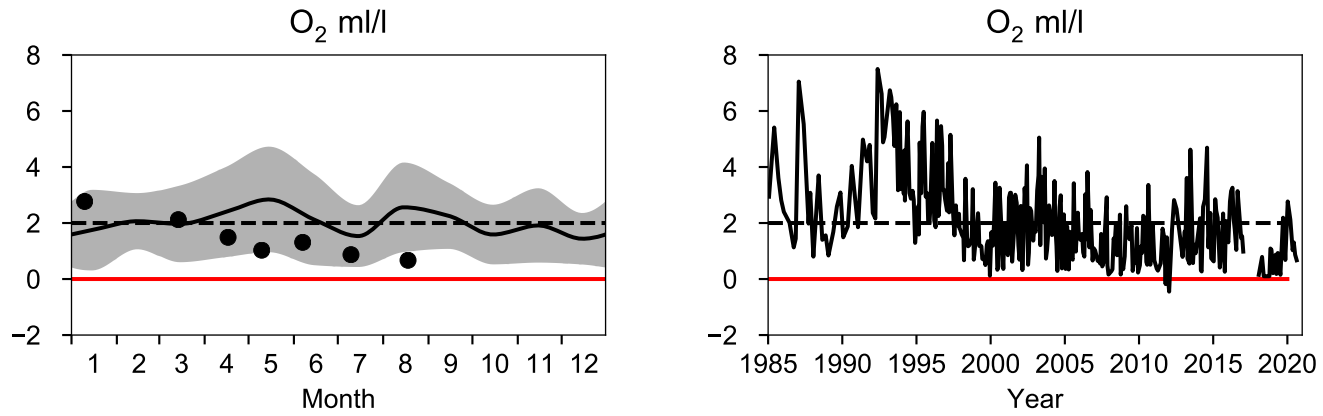


STATION BCS III-10 SURFACE WATER (0-10 m)

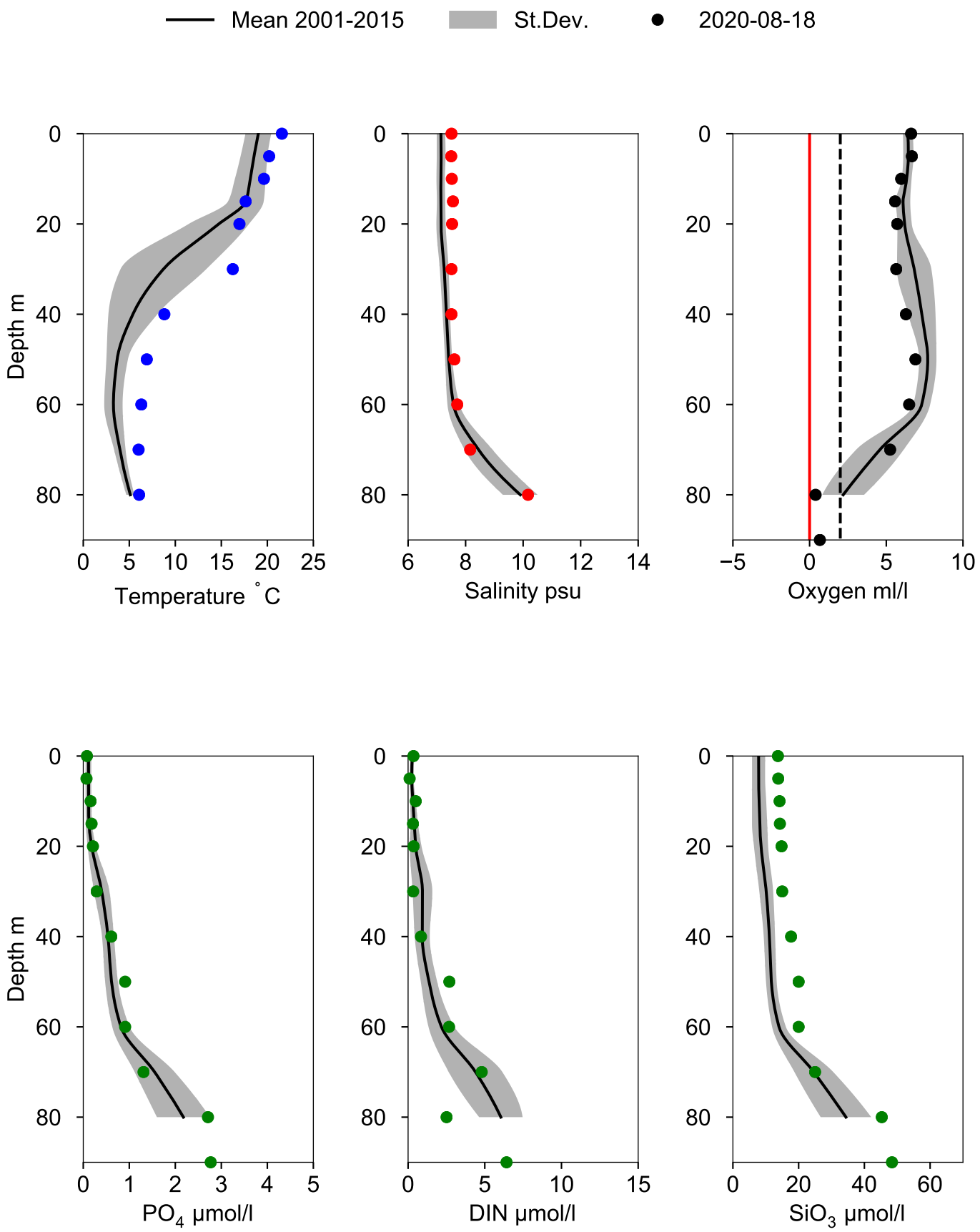
Annual Cycles



OXYGEN IN BOTTOM WATER (depth >= 80 m)

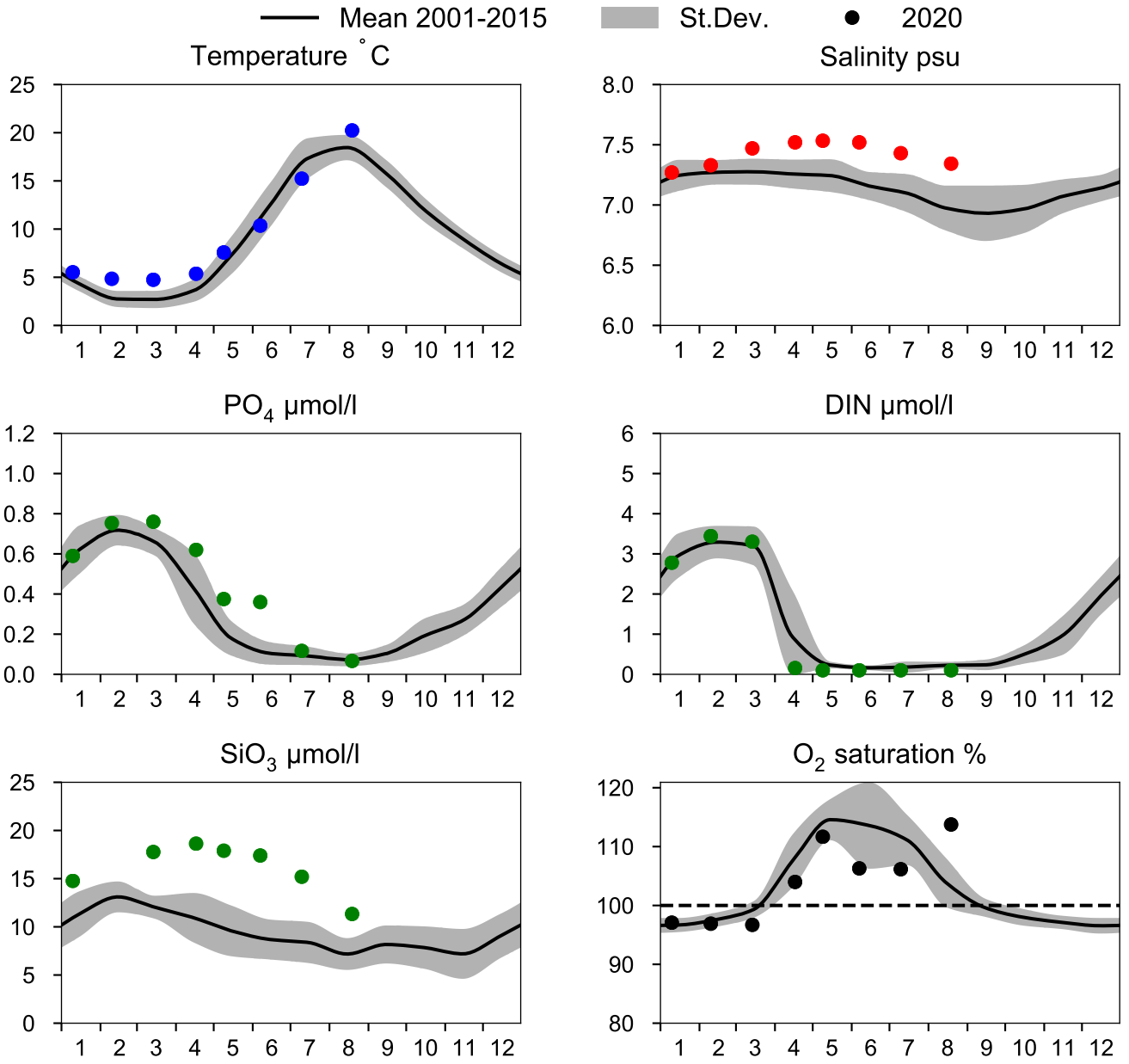


Vertical profiles BCS III-10
August

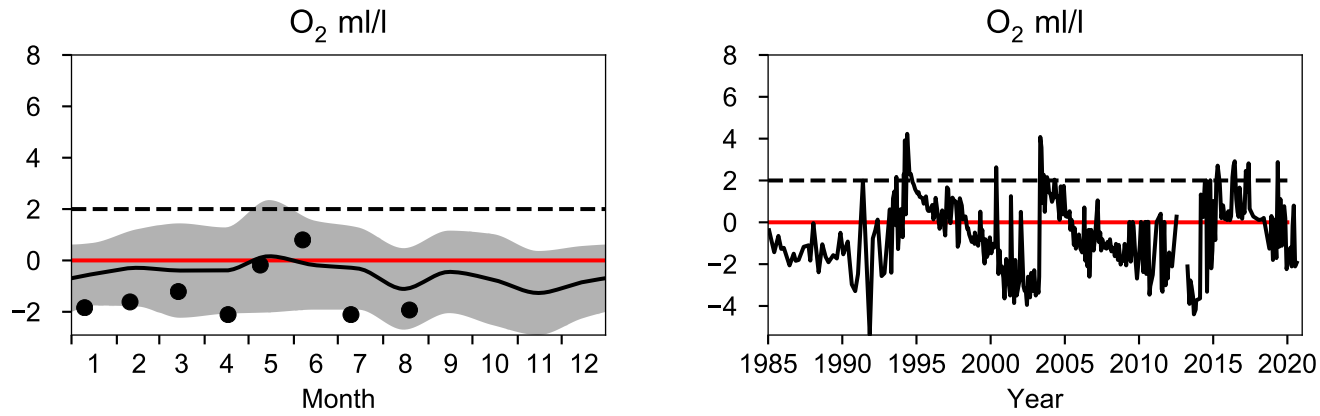


STATION BY10 SURFACE WATER (0-10 m)

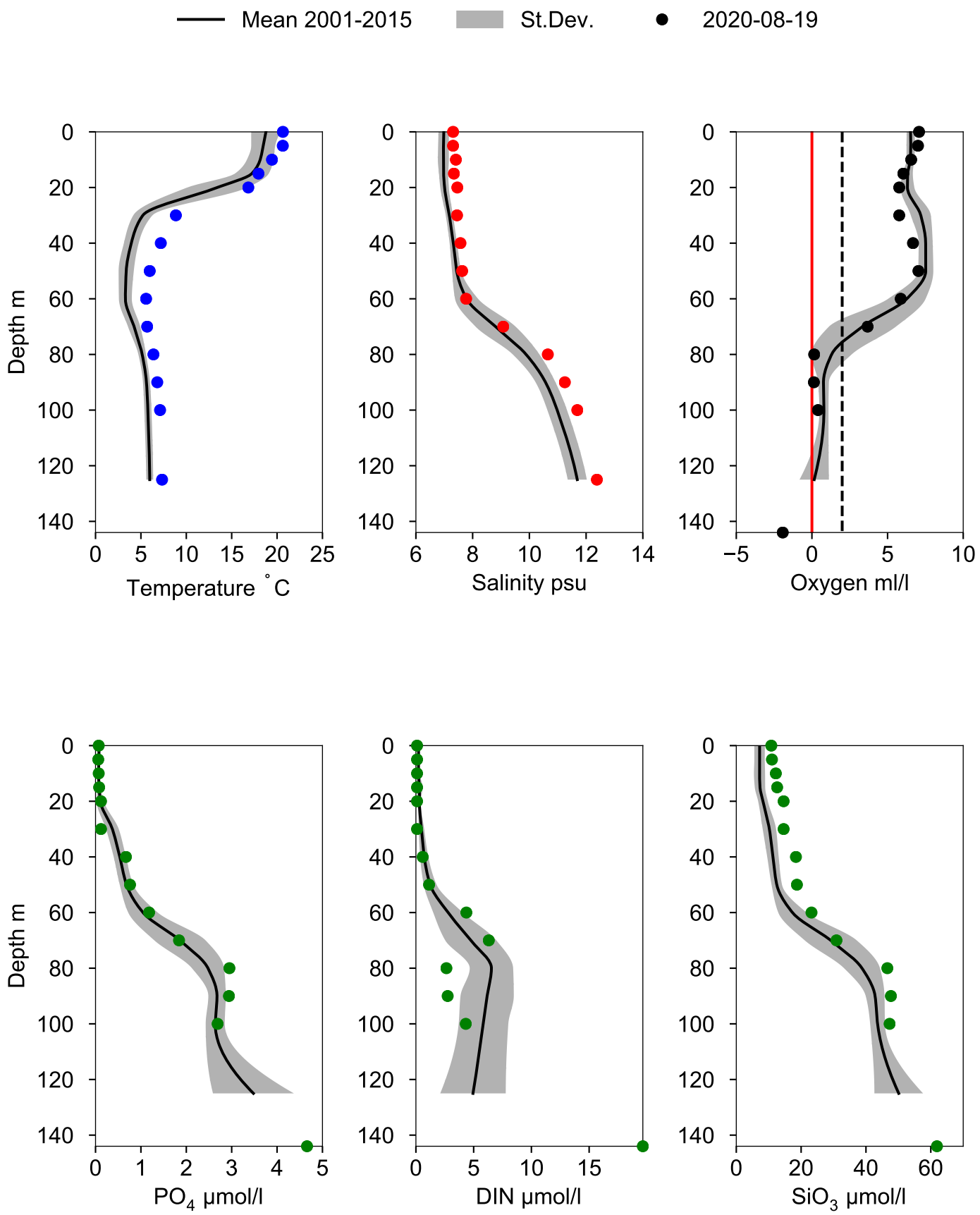
Annual Cycles



OXYGEN IN BOTTOM WATER (depth >= 125 m)

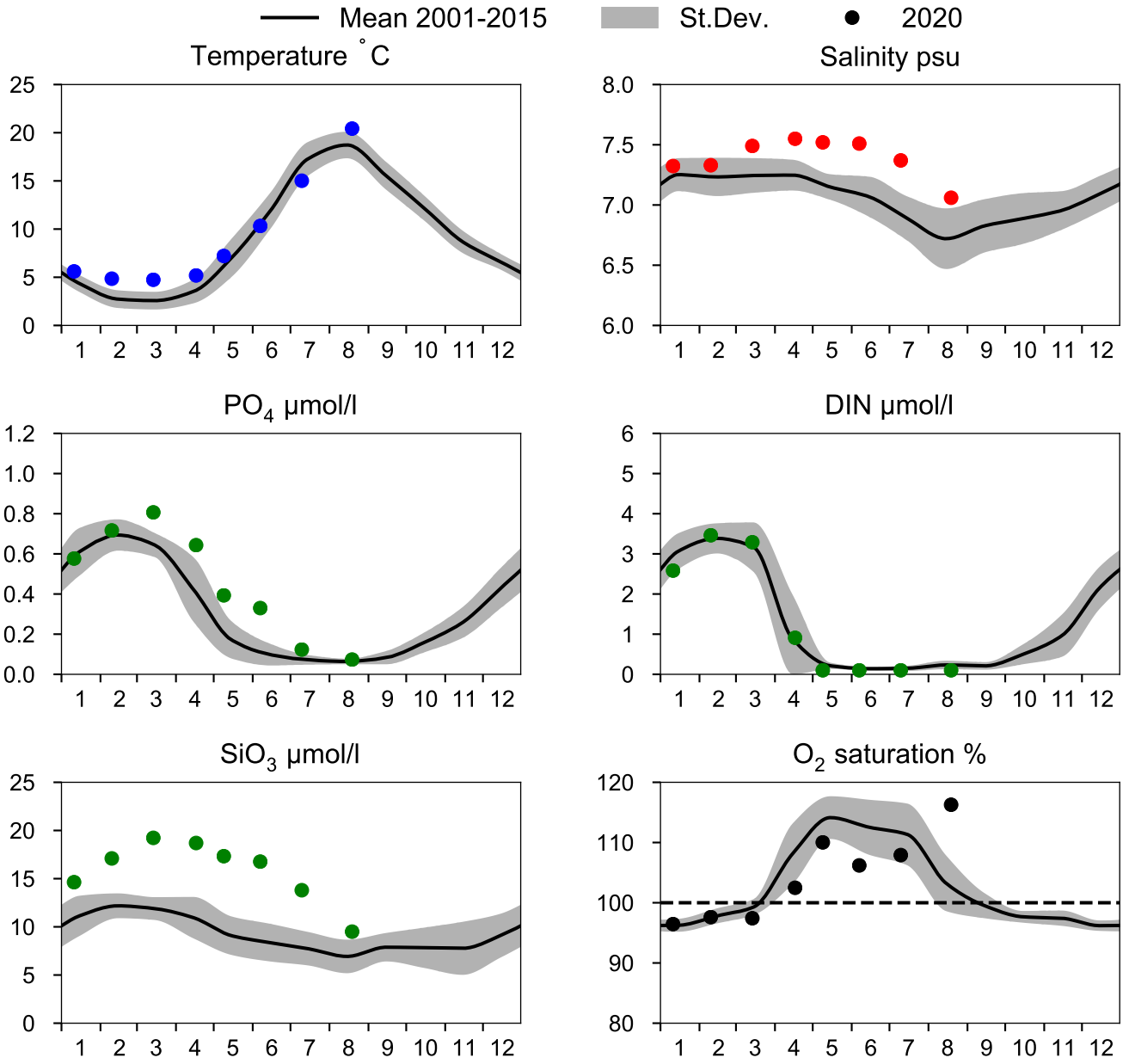


Vertical profiles BY10
August

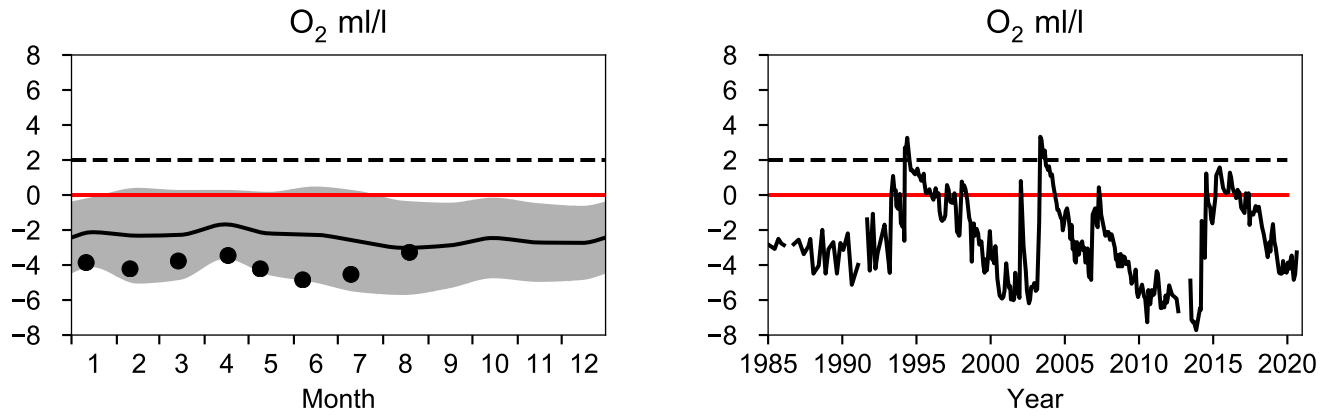


STATION BY15 GOTLANDSDJ SURFACE WATER (0-10 m)

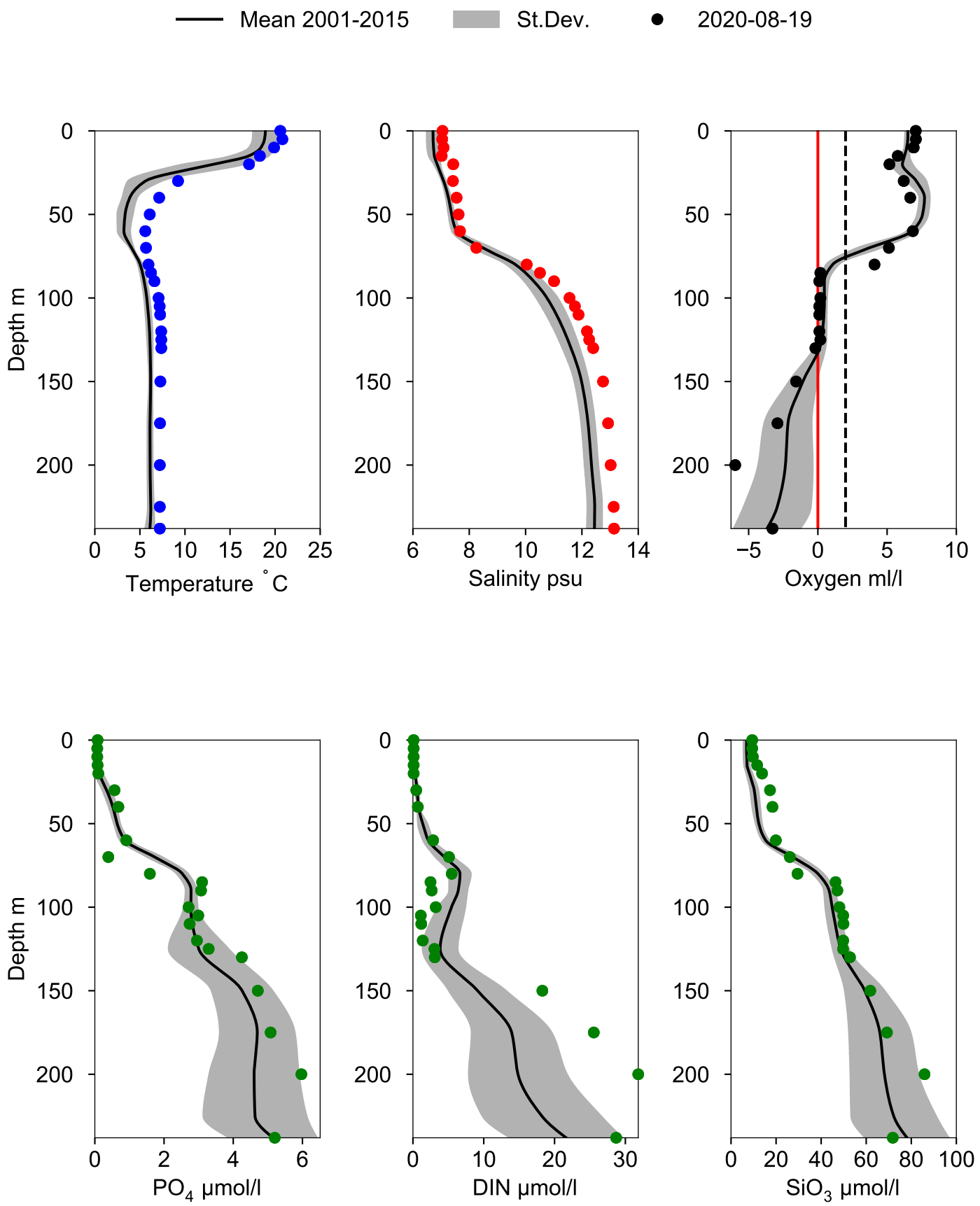
Annual Cycles



OXYGEN IN BOTTOM WATER (depth >= 225 m)

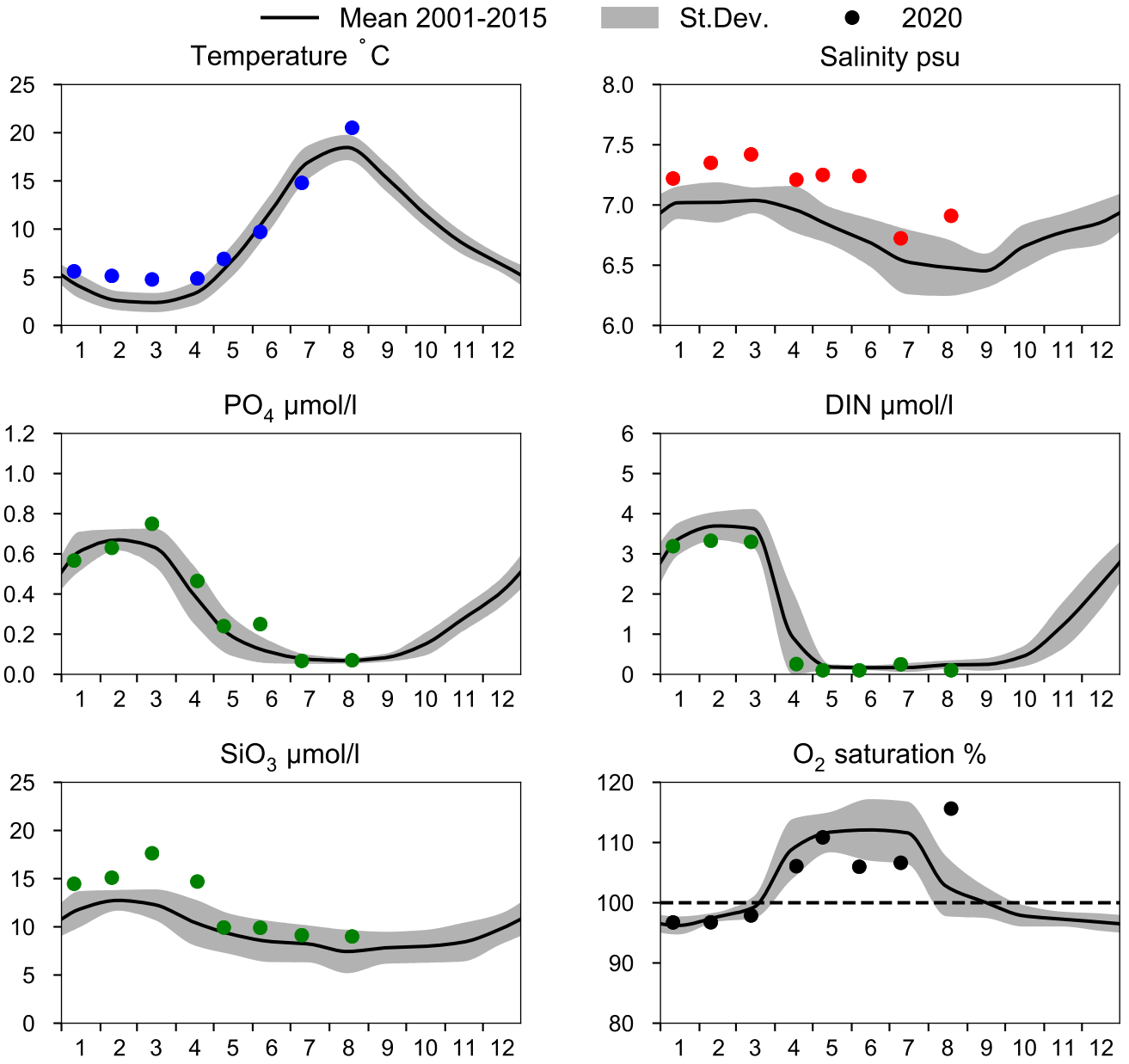


Vertical profiles BY15 GOTLANDSDJ
August

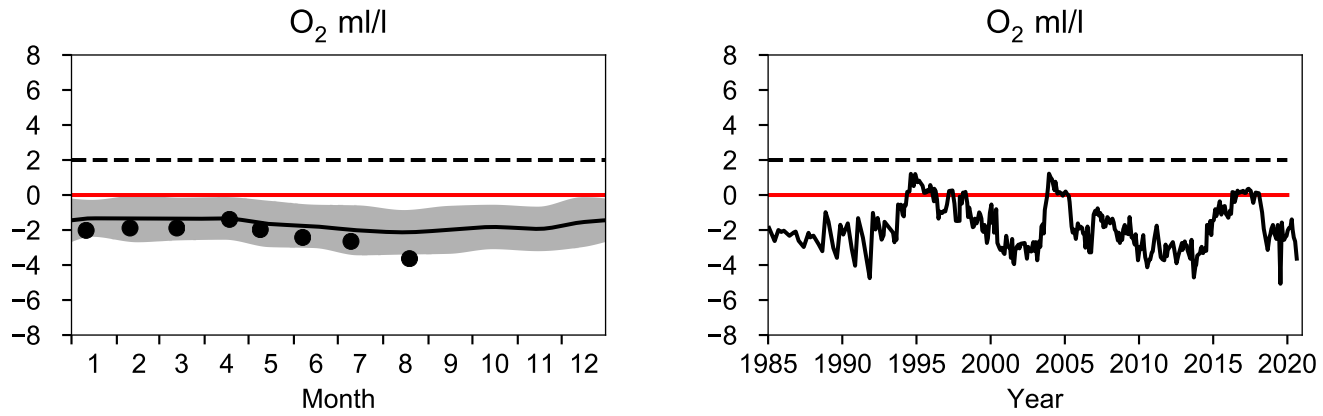


STATION BY20 FÅRÖDJ SURFACE WATER (0-10 m)

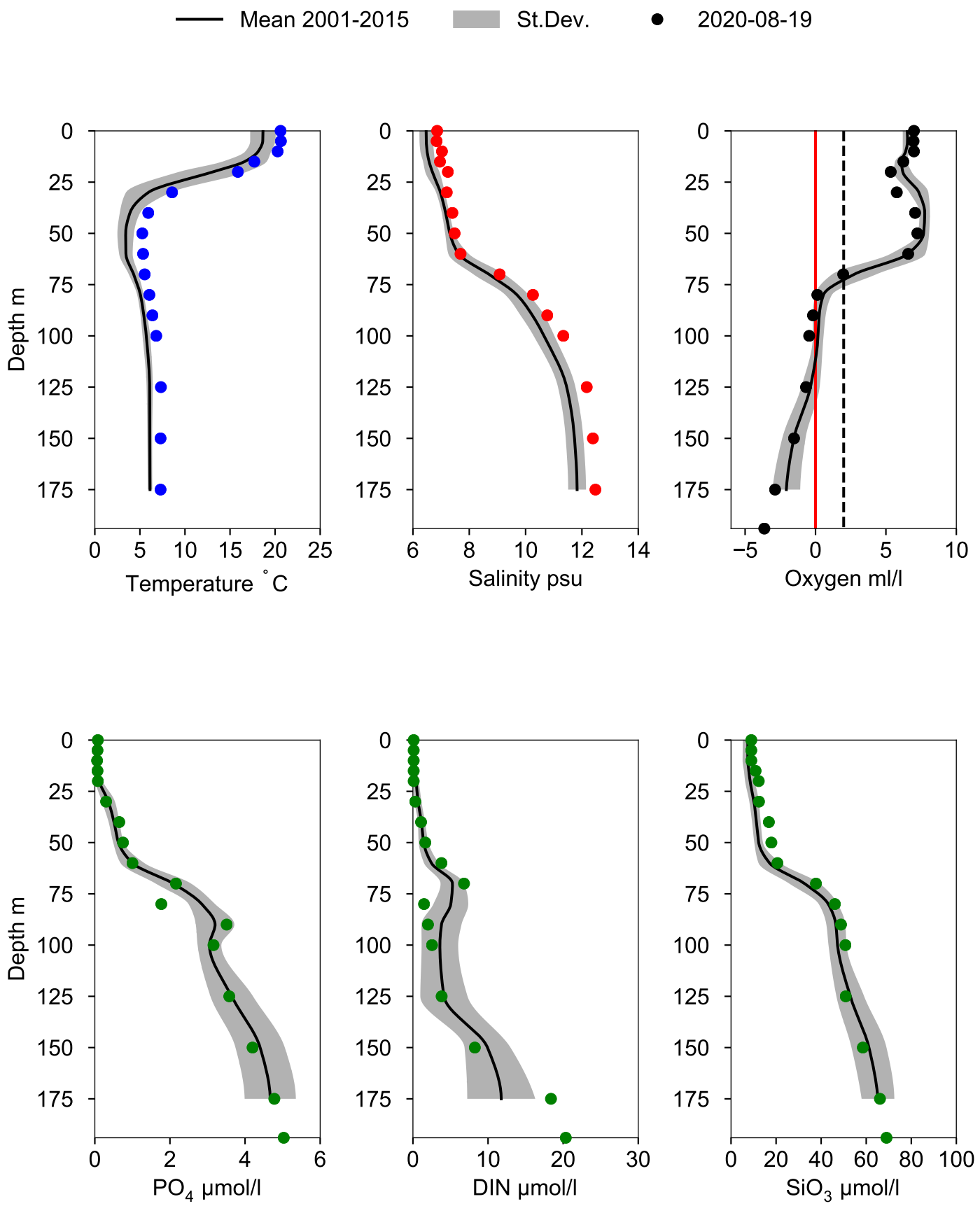
Annual Cycles



OXYGEN IN BOTTOM WATER (depth >= 175 m)

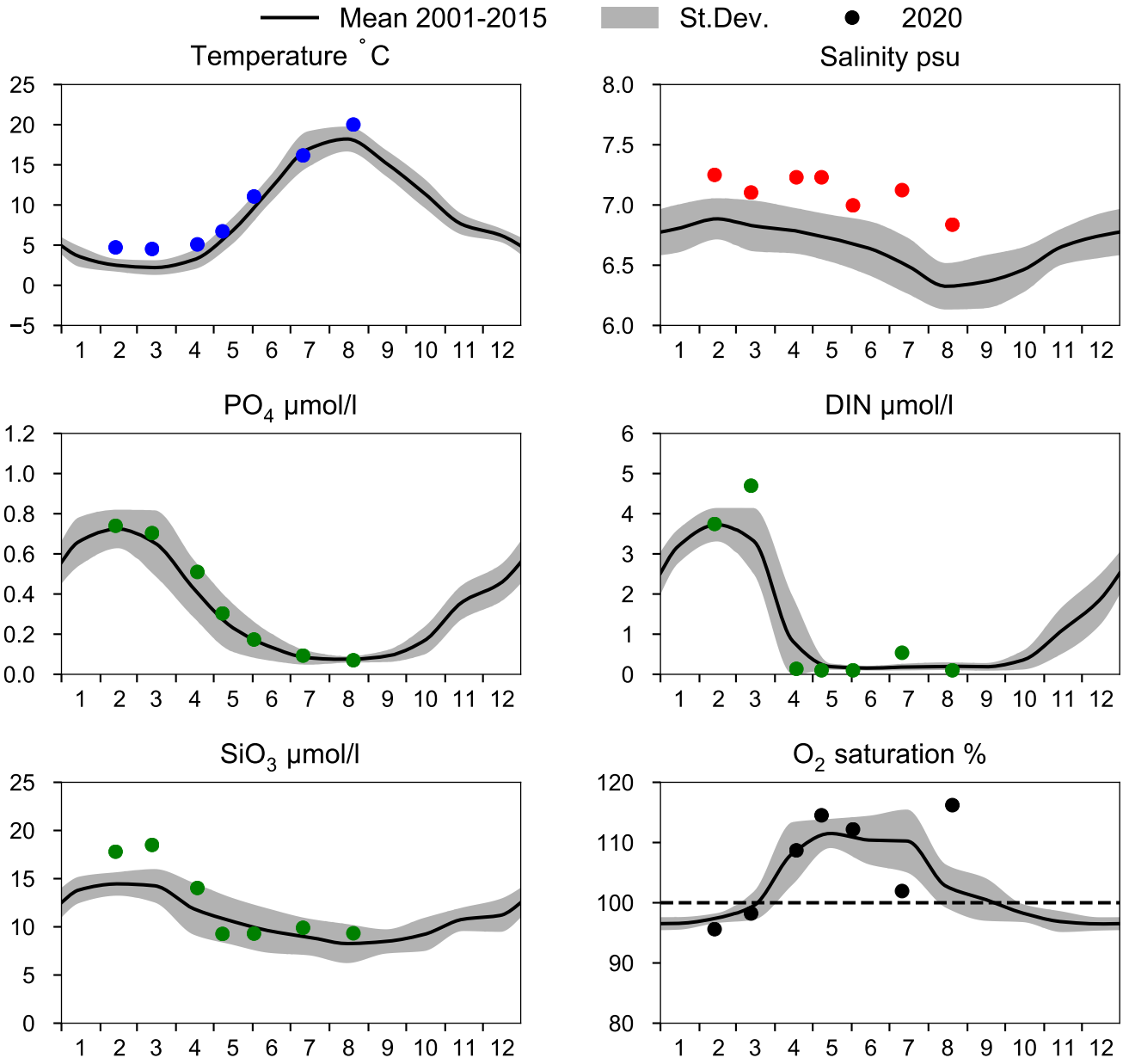


Vertical profiles BY20 FÅRÖDJ
August

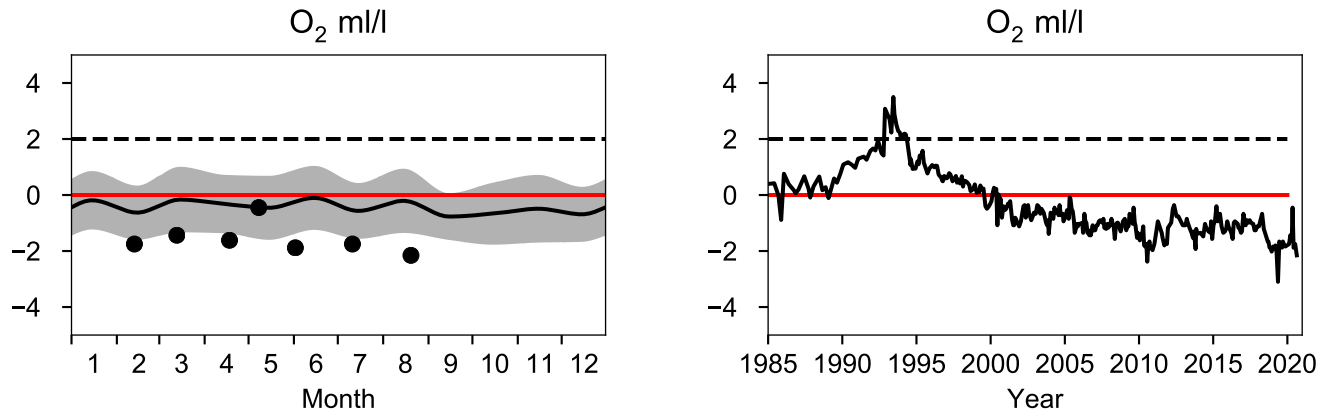


STATION BY32 NORRKÖPINGSDJ SURFACE WATER (0-10 m)

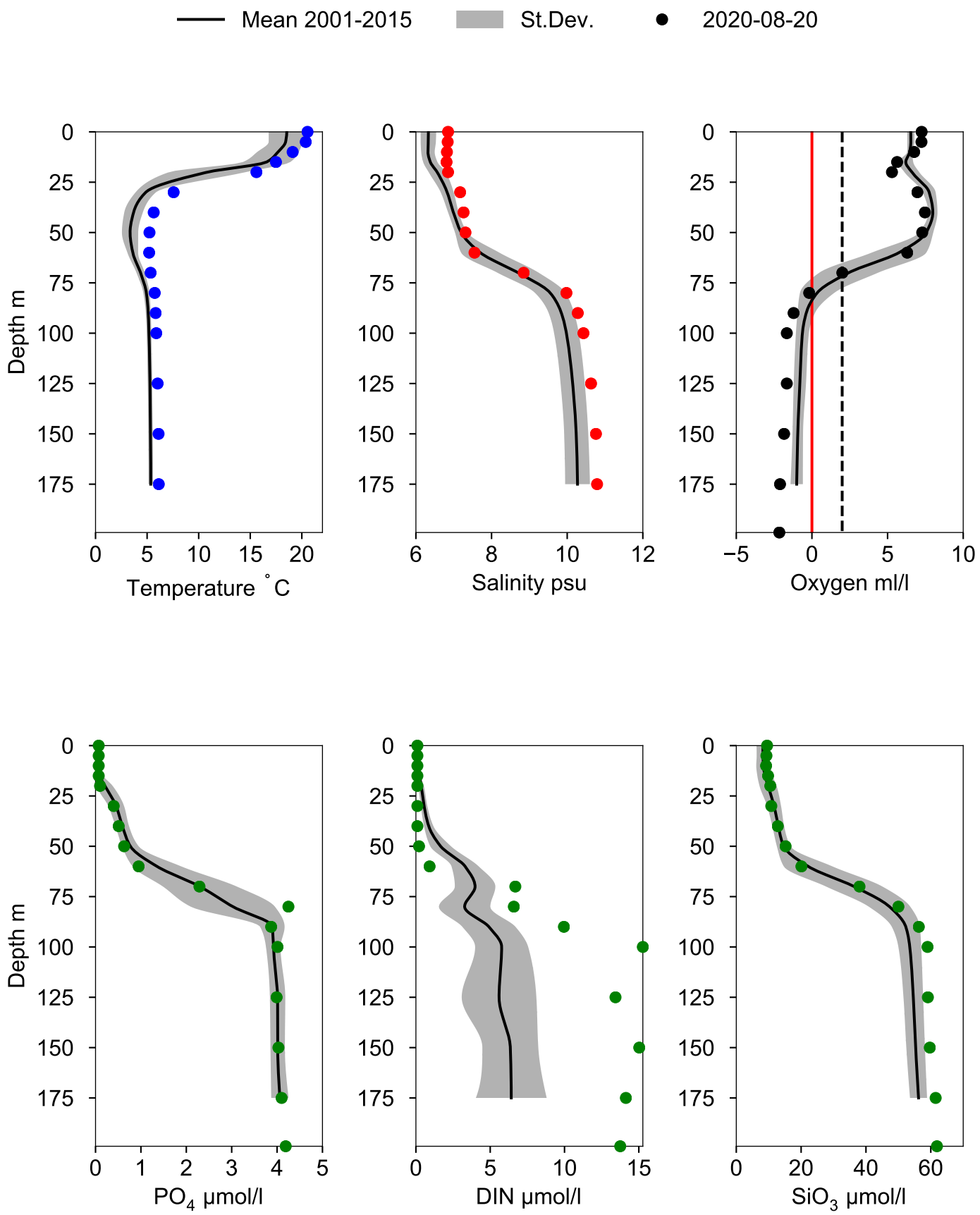
Annual Cycles



OXYGEN IN BOTTOM WATER (depth >= 175 m)

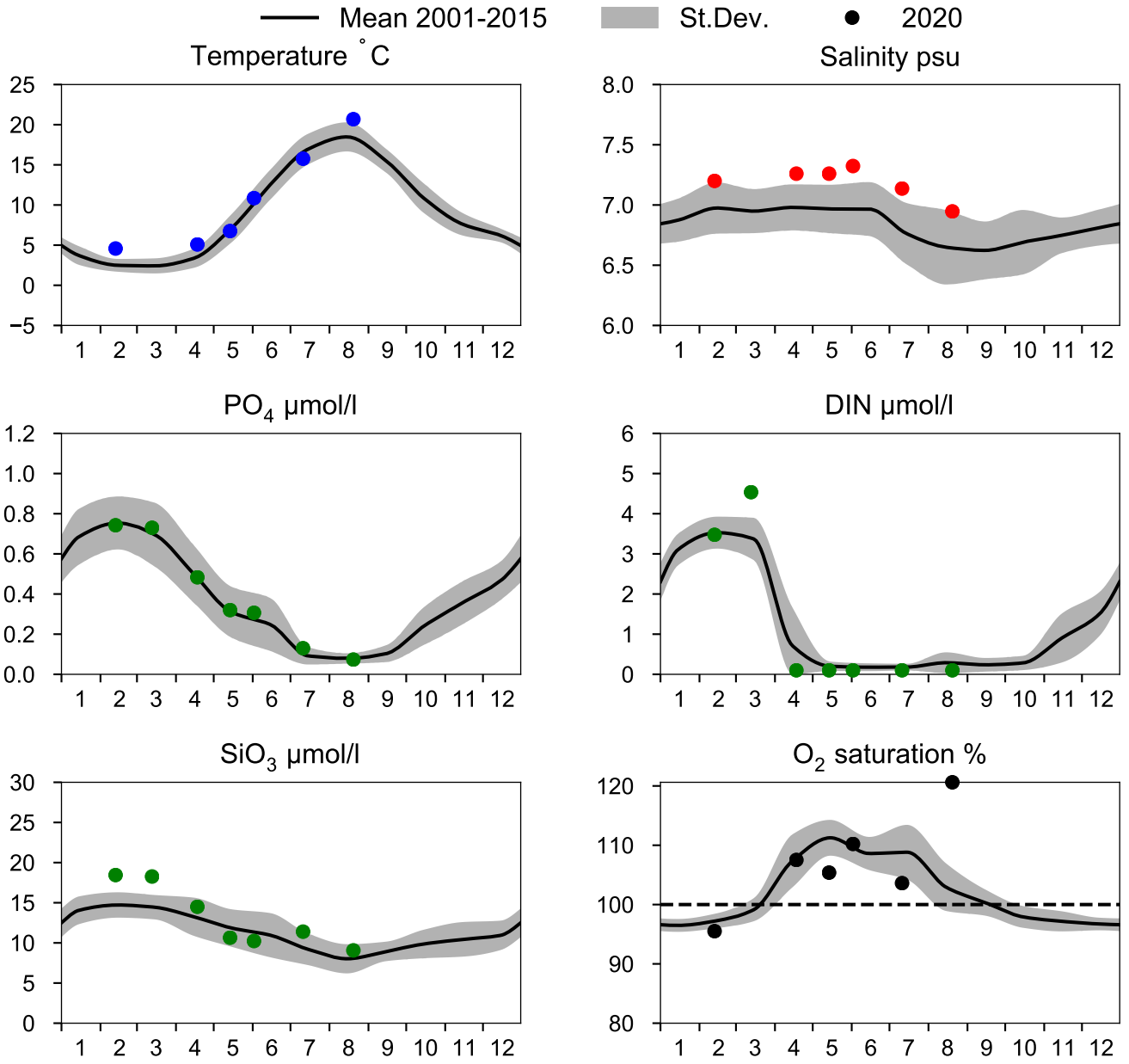


Vertical profiles BY32 NORRKÖPINGSDJ
August

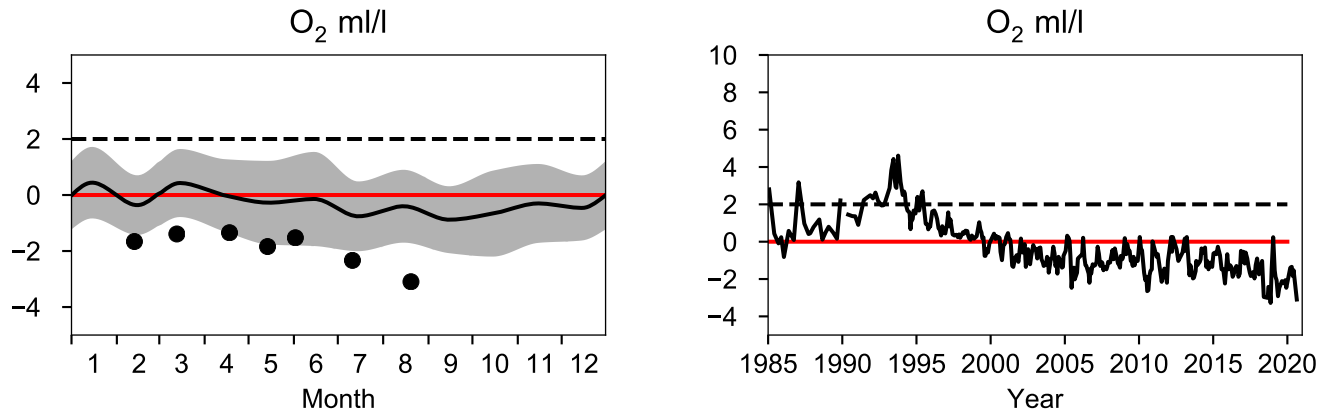


STATION BY38 KARLSÖDJ SURFACE WATER (0-10 m)

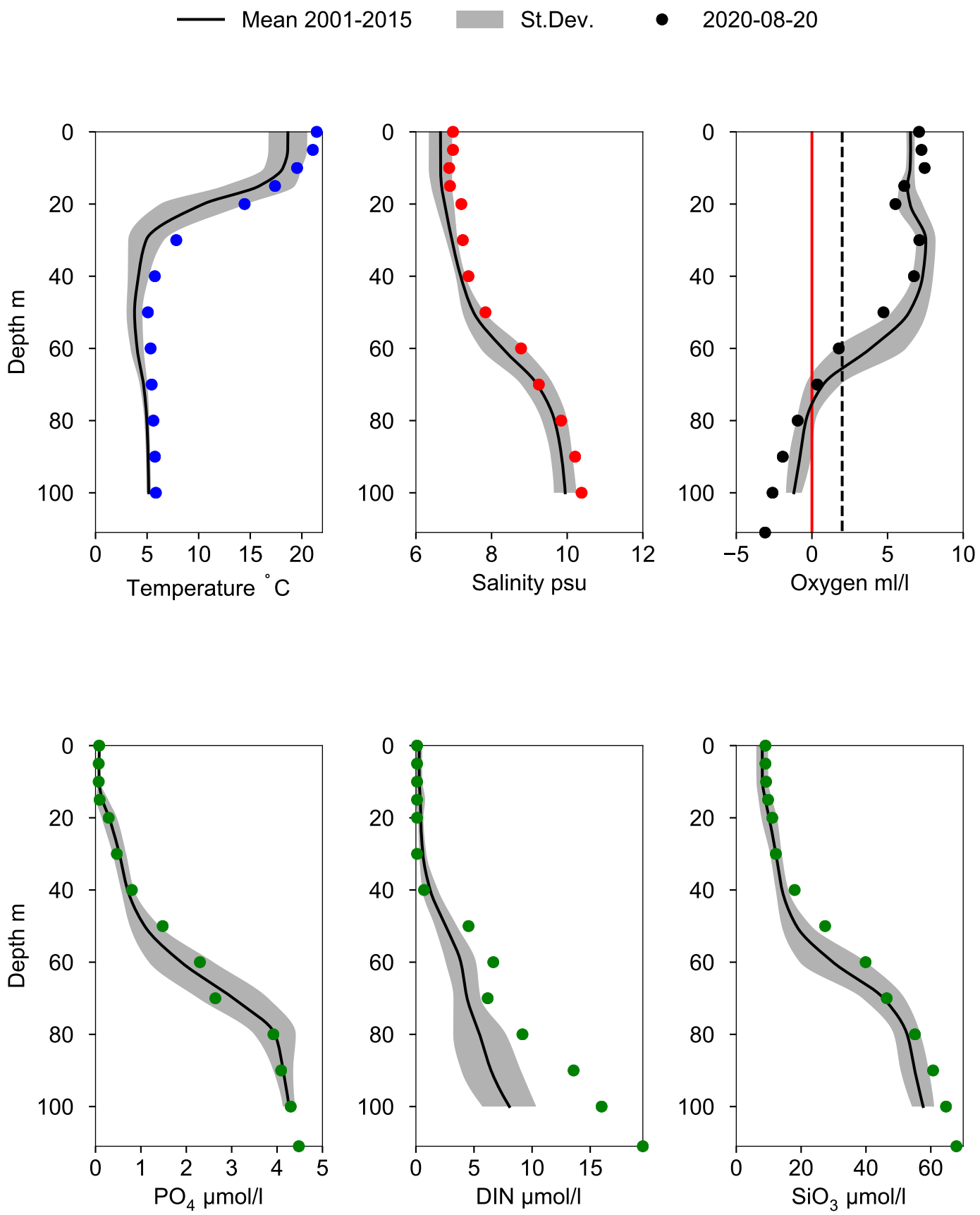
Annual Cycles



OXYGEN IN BOTTOM WATER (depth >= 100 m)

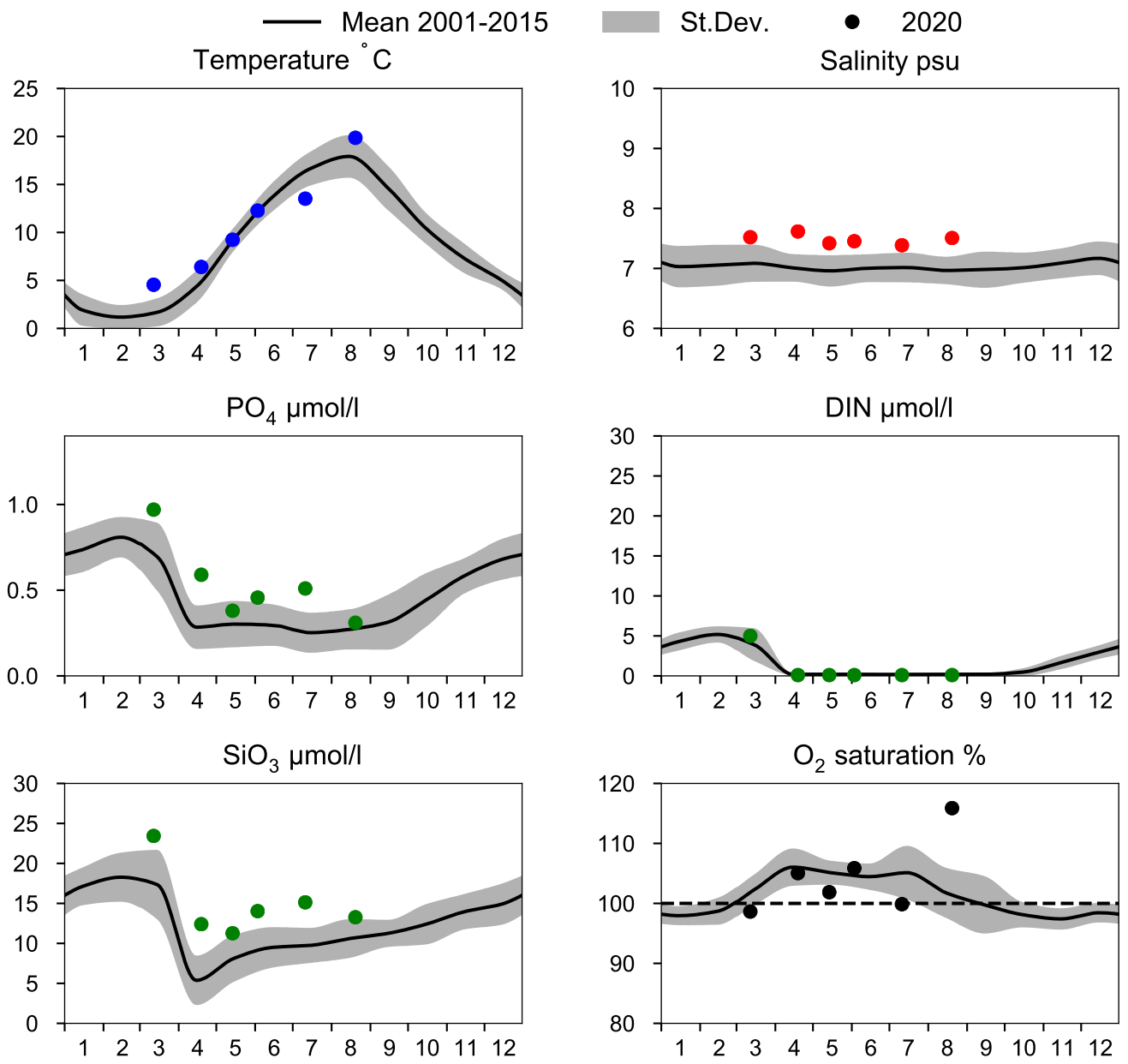


Vertical profiles BY38 KARLSÖDJ
August

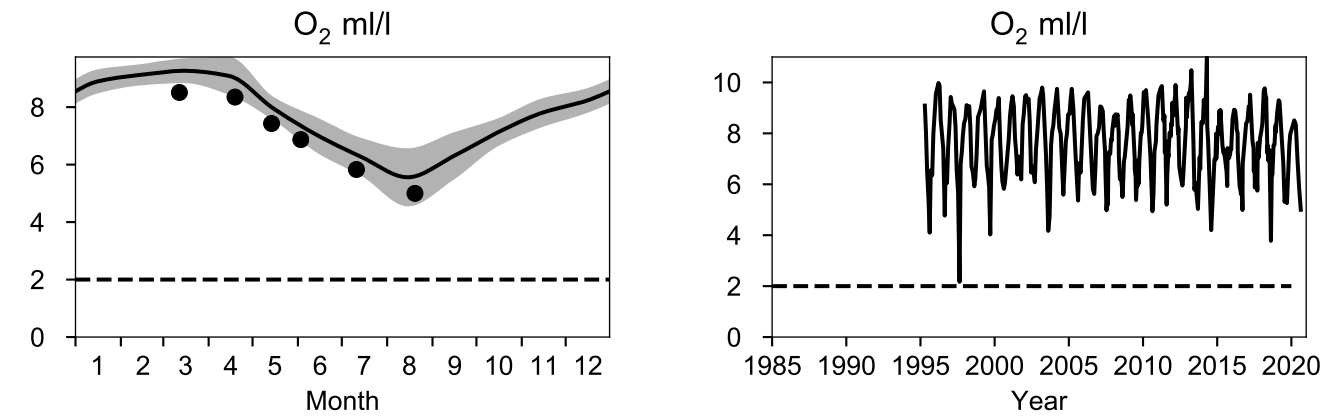


STATION REF M1V1 SURFACE WATER (0-10 m)

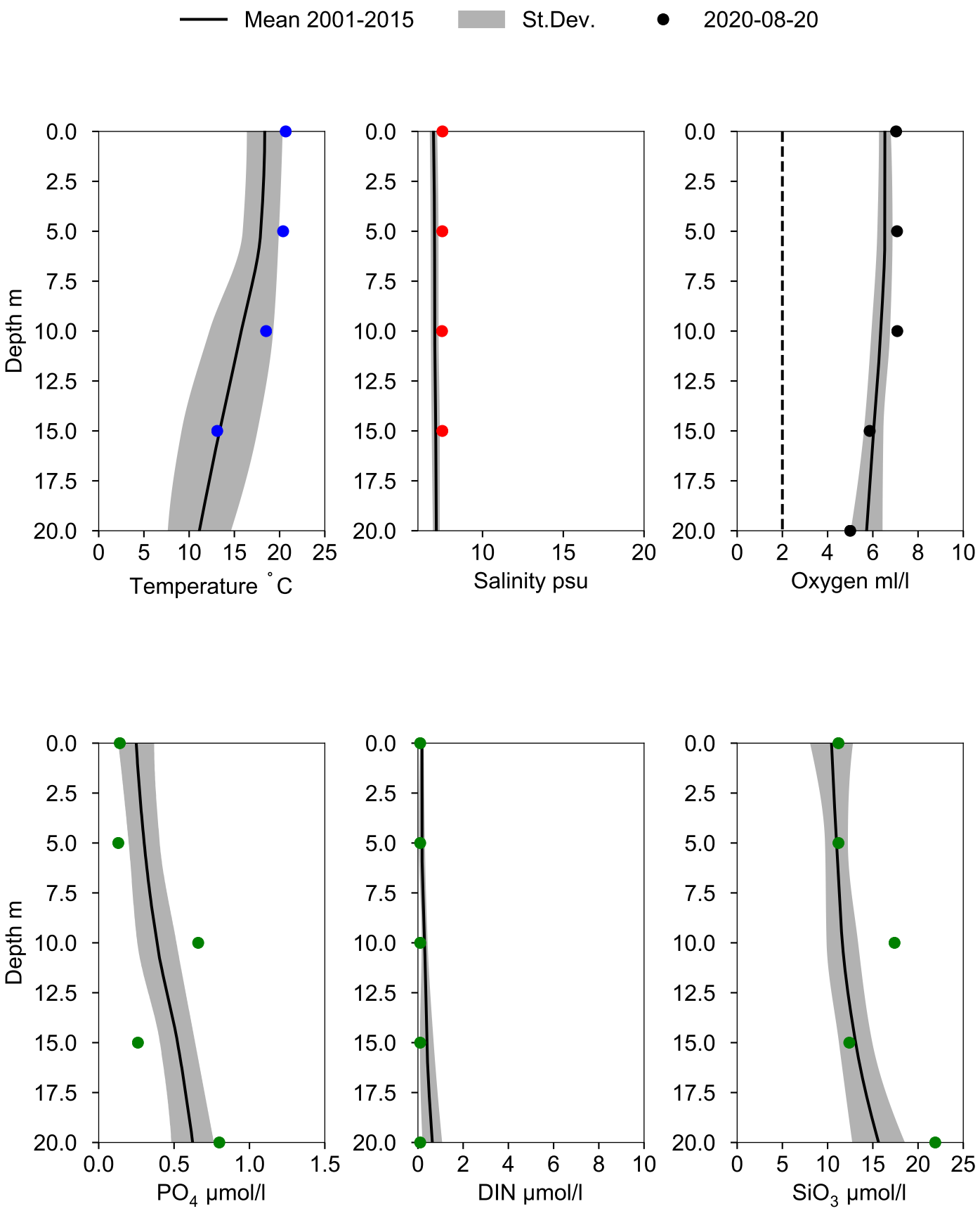
Annual Cycles



OXYGEN IN BOTTOM WATER (depth >= 15 m)

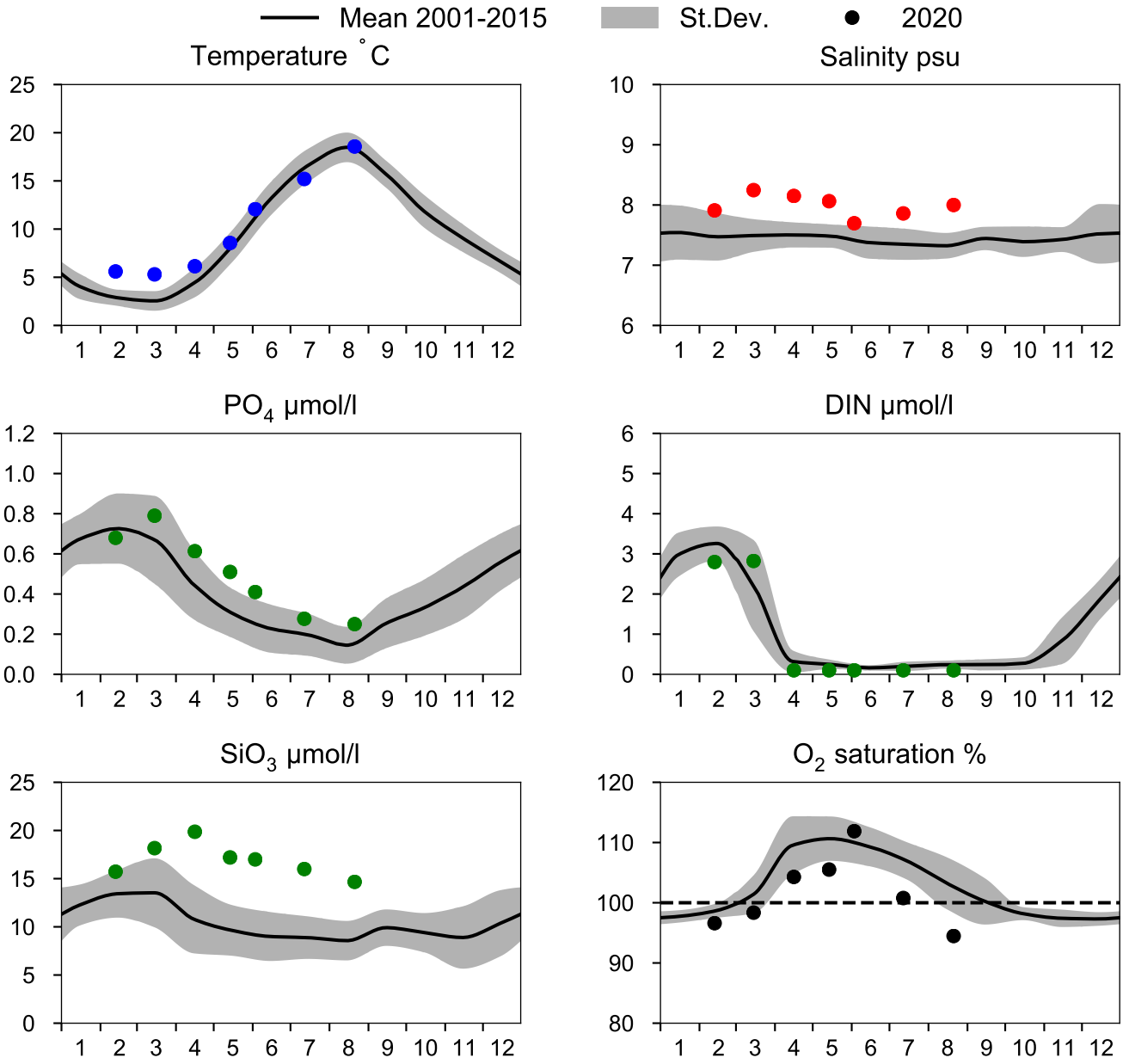


Vertical profiles REF M1V1
August

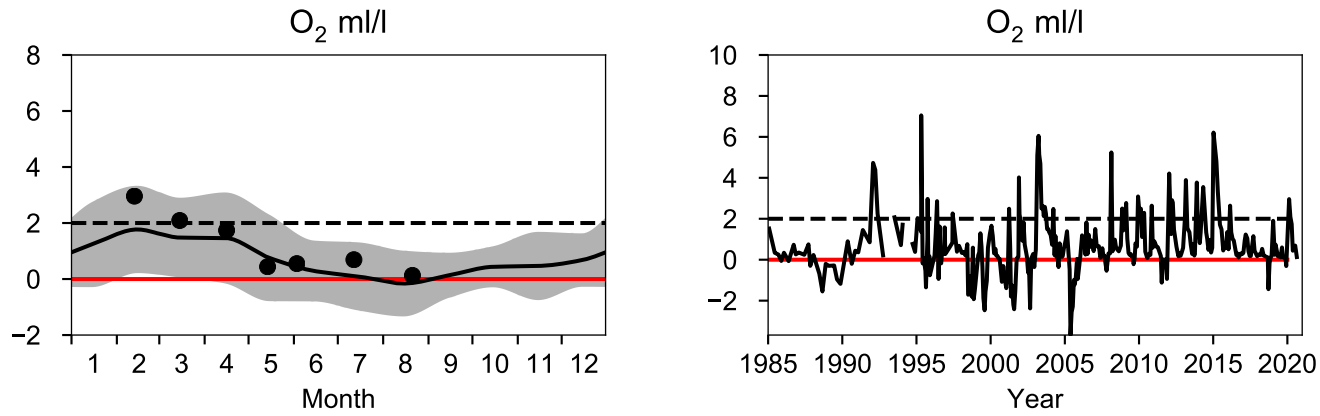


STATION HANÖBUKTEN SURFACE WATER (0-10 m)

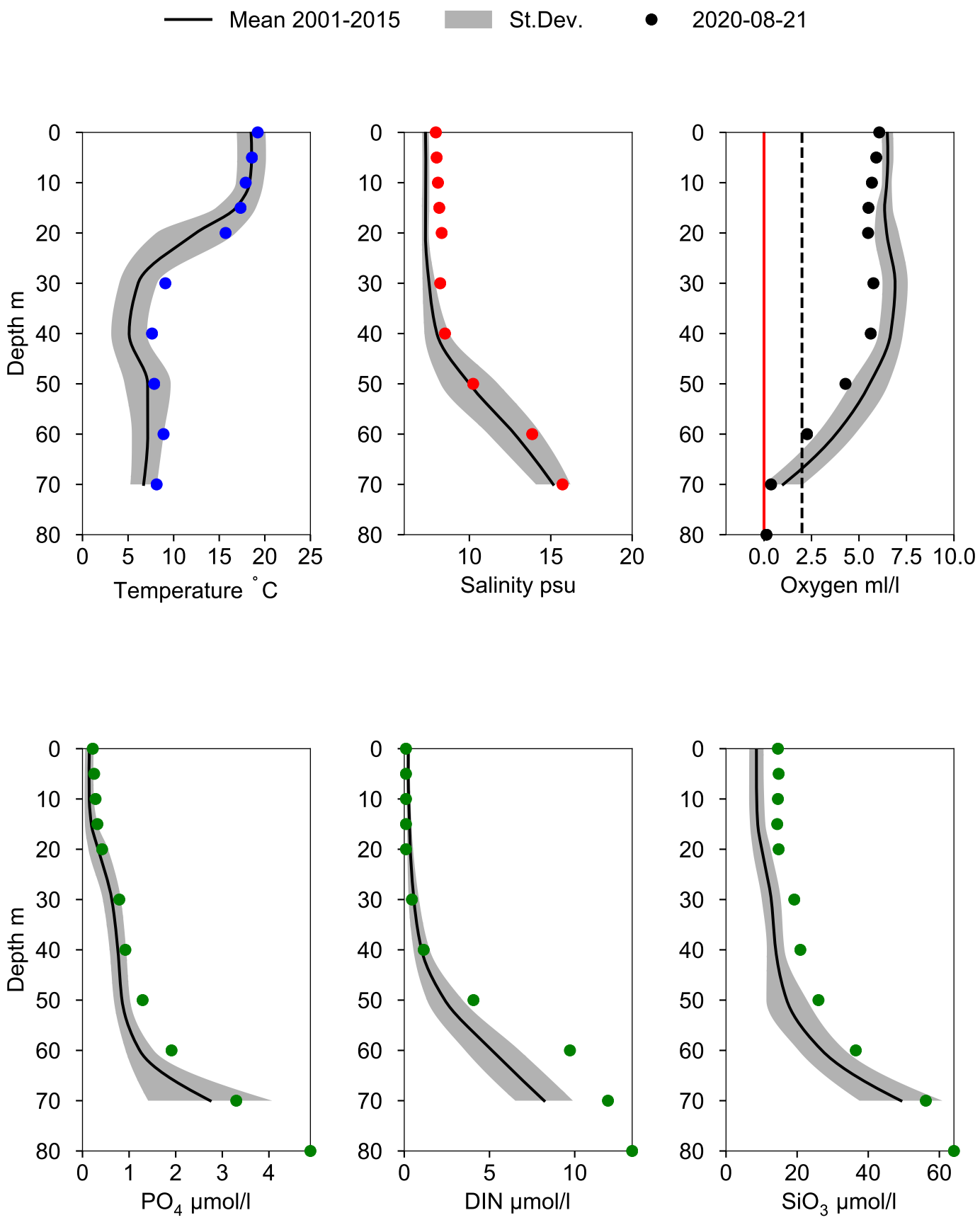
Annual Cycles



OXYGEN IN BOTTOM WATER (depth >= 70 m)

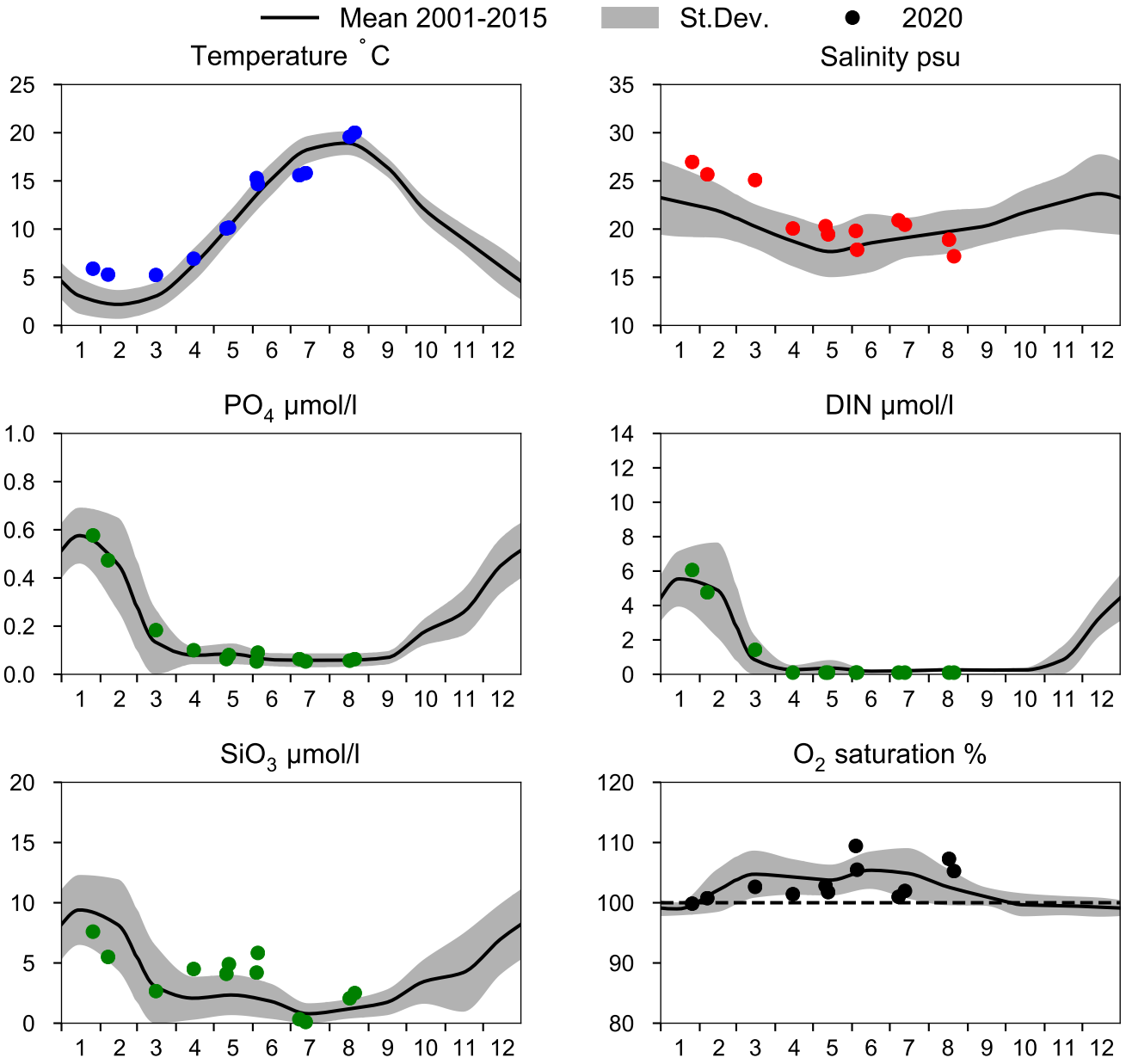


Vertical profiles HANÖBUKTEN
August

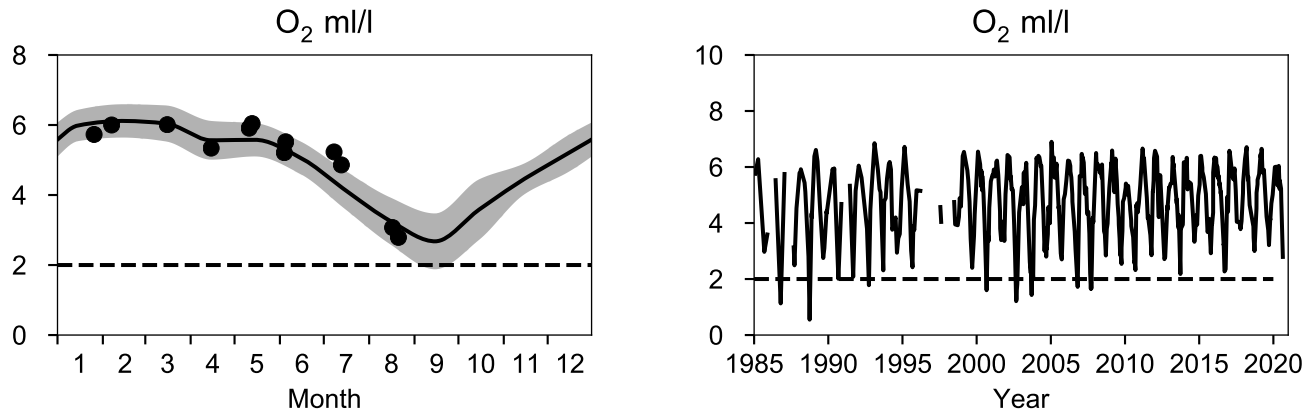


STATION ANHOLT E SURFACE WATER (0-10 m)

Annual Cycles



OXYGEN IN BOTTOM WATER (depth >= 52 m)



Vertical profiles ANHOLT E
August