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Report from the SMHI monitoring cruise with R/V Svea

photo: Ola Kalén, SMHI

Survey period: 2021-05-18 - 2021-05-25
Principals: Swedish Meteorological and Hydrological Institute (SMHI), Swedish Agency for Marine and Water Management (SwAM)
Cooperation partners: Swedish University of Agricultural Sciences (SLU), Swedish Maritime Administration (SMA)

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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.

Warming of the surface water (0-10m) at all sea basins continued in May. At several stations, the increase was about 5 °C compared with previous month. The salinity of the surface water at the outer stations in the Skagerrak were slightly above normal. In the Kattegat, which had salinity above normal in the surface during the last expeditions, more normal levels in May. In the Baltic Sea, the salinity of the surface water was generally normal for the season, but deeper down in the water column the salinity was above normal at many of the deeper stations.

Dissolved inorganic nitrogen in the surface water was in general consumed by the spring bloom at all stations except in the Sound. Concentration of dissolved inorganic phosphorus in the surface water was normal for the season at all stations. Dissolved silicate concentrations in surface water remained higher than normal in large parts of the Baltic Proper and in the Sound. In the Kattegat in general normal concentrations and in the Skagerrak concentrations below normal for the season.

In the southern basins of the Baltic Proper, a significant fluorescence peak was found in the water column. Also at BY20 in the Eastern Gotland Basin and BY31 and BY32 in the Western Gotland Basin there were distinct peaks in the measurement of chlorophyll fluorescence. At the other stations in the Baltic Proper a more even activity in the surface layer. A distinct peak of chlorophyll fluorescence was also found in the Sound and at the outer stations in the Skagerrak.

The oxygen situation is still poor in large parts of the Baltic Proper. In the Bornholm Basin, hydrogen sulfide was found in the bottom water and acute oxygen deficiency (<2 ml/l) was found from a depth of 70 meters. Also in the Bight of Hanö the oxygen concentration at a depth of 70 meters was significantly below the limit for acute oxygen deficiency. And at BY1 in the Arkona Basin - which is just below 45 meters deep - acute oxygen deficiency was found in the bottom water. At BCSIII-10 in the southeastern Baltic Proper, the oxygen concentration had decreased since April, and was now only 0.8 ml/l.

In the Eastern Gotland Basin, oxygen-free conditions were found at 80 meters depth, and from a depth of 125 meters and down, hydrogen sulfide was found at all stations. In the Western Gotland Basin, acute oxygen deficiency was found from a depth of just below 60 meters, and in the water sample at 70 meters, the oxygen concentration was below reporting limit, and hydrogen sulfide was measured at a depth of 80 meters. At the shallow station in Kalmarsund and at BY39 south of Öland, which is also a relatively shallow station, oxygen conditions were good from surface down to bottom.

Next expedition with R/V Svea is planned to 7th - 14th of June. It starts in Kalmar and ends in Lysekil.

RESULTS

The expedition was undertaken on board the Swedish research vessel Svea and started in Kalmar the 18th of May and ended in the same port the 25th.

During the expedition, the winds were mostly weak, mainly from the southwest. The highest wind speed at any station was 10 m/s, and this occurred at two stations in the Skagerrak. The air temperature was generally between 10-11°C during the entire expedition.

All planned stations were visited and sampled during the expedition.

At one station in the Skagerrak, two in the Kattegat and two in the Baltic Proper, samples were taken for analysis of eDNA (environmental DNA) for researchers at Åbo Akademi University. Water samples for selenium analysis were taken at three stations in the Baltic Proper and one in the in the Skagerrak and one in the Kattegat for EAWAG in Switzerland. Phytoplankton was also sampled for Uppsala University at one station in the Skagerrak.

Close to Östergarnsholm at the east coast of Gotland, a measuring system was deployed for Uppsala University. It was planned to be done in April, but the weather prevented it then.

Svea's MVP (Moving Vessel Profiler), which is used to measure temperature, salinity and oxygen profiles during transit, was used during four transects. The transects were at Å17-Å13, Kriegers Flak, across the Slupsk Furrow and BY10 via BY15 to just east of Östergarnsholm. Due to technical problems, the MVP could not be used deeper than about 150 meters. A planned transect, BY32-BY38 was cancelled.

Both the ferrybox and Svea's both ADCPs (current measurement) were running throughout the trip.

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 centre's webpage, normally within a week after the cruise. Some analyses are done after the expedition and will be published later.

Data and reports can be downloaded here: https://www.smhi.se/en/publications/cruise-reports-from-the-marine-monitoring

The Skagerrak

The sea surface temperature at the offshore stations were 8.6-10.2°C, and was 11.3°C at the coastal station Släggö. This is normal temperatures for the season, and compared to the previous expedition there was an increase of 3–5°C. In deep water mostly normal temperatures. A distinct thermocline was found at a depth of 10-20 meters at Släggö and at Å14.

The salinity in the surface water was above normal for the season at P2, Å15 and Å17, with levels of 31-33 psu. At Släggö and Å13 normal levels, 22 and 28 psu respectively. At Å14, the difference in salinity between the surface and the bottom was only about 1 psu, and the weak stratification was found at a depth of just below 10 meters. At the other stations there was a greater difference between the salinity of the surface water and deep water. A distinct halocline was found at Släggö at a depth of 10-20 meters. The salinity in the deep water was normal at all stations.

Dissolved inorganic nitrogen in the surface water was consumed, and below the reporting limit of 0.1 µmol/l at all stations except Å13 where the concentration in the surface water was 0.19 µmol/l. But this is within normal for the season. In the deep water, the differences between the stations were greater, and at Å13 all values from 30 meters to the bottom were below normal, while at Å17 the levels were mostly normal in deep water. Concentrations of dissolved inorganic phosphate in the surface water were normal for the season except at Å13 where the levels were slightly above normal. Measured values were between 0.05-0.07 µmol/l, highest at Släggö and Å17. In the deep water, concentrations were normal or slightly below normal. Levels of dissolved silicate in the surface water were below normal, with the exception of Å13 where levels were normal. At Å17 and Å15 below the reporting limit, 0.1 µmol/l. At the other stations 0.13-0.47 µmol/l. In deeper water normal or slightly below normal concentrations.

At the two outer stations in the Skagerrak, higher levels or peaks of chlorophyll fluorescence were found at depths of 30-40 meters. Highest levels were measured at Å16. At the other stations there were no distinct fluorescence peaks. At Å14, the levels were almost the same from surface to bottom. The secchi depth was 14 meters at Å17 and 8 meters at Släggö.

Oxygen concentration in the bottom water of Släggö was 4.9 ml/l, and at the offshore stations oxygen concentrations of 6-7 ml/l were found in the deep water.

The Kattegat and the Sound

The sea surface temperature varied between 10.5-11.1°C, which is normal for the season. It is about 5°C higher compared to the last cruise. The salinity of the surface water varied between 18-21 psu in the Kattegat. At the N14 it was slightly above normal for the season, normal at the other two stations in the Kattegat. In the Sound, the salinity down to about 5 meters depth was 9 psu, but about 23 psu at 10 meters depth. The average salinity in the surface water was therefore just under 14 psu, which is normal for the season. At most stations there was a well-mixed surface layer down to a depth of 5-10 meters, and below that down to a depth of 20 meters both thermocline and halocline were found. In the bottom water, salinity and temperature were generally normal in the Kattegat, but the temperature in the Sound was slightly above normal for the season.

Dissolved inorganic nitrogen in the surface water was in principle consumed in the Kattegat, which is normal for the season and the concentrations were below the reporting limit, 0.1 µmol/l. In the surface water of the Sound, the concentration was higher, 0.25 µmol/l, but also this was normal for

the season. Dissolved inorganic phosphate concentrations in the surface water of the Kattegat was about 0.07 µmol/l and 0.23 µmol/l in the Sound. These were also normal concentrations for the season. Deeper down in the water column normal or slightly below normal concentrations of dissolved inorganic nitrogen and generally normal levels of phosphate. The concentration of silicate was above normal in the water profile in the Sound, except for the value at a depth of 10 meters which was normal. In the Kattegat, the concentration in the surface water was slightly above normal at Fladen, normal at the other stations. Measured values varied between 1.5-2.9 µmol/l in the Kattegat and was 10.2 in the Sound. In the deep water of Kattegat mostly normal concentrations, but at Fladen below normal at 15-40 meters depth.

The oxygen situation in the Kattegat was good with levels in the bottom water of about 6 ml/l at all stations. In the Sound, the oxygen concentration was just over 4 ml/l in the deep water, which is the same as during the previous expedition.

Measurements of chlorophyll fluorescence with the sensor on the CTD indicated activity at all stations in the form of fluorescence peaks. These were found at a depth of about 15-20 meters in the Kattegat and 10 meters deep in the Sound, where the fluorescence peak was a little stronger compared to the Kattegat. The secchi depth was 7-8 meters.

The Baltic Proper

At all stations, the warming of the surface had begun. A thin surface layer down to between 5-10 meters depth had a higher temperature compared to deeper water and at several stations the difference in temperature at 10 meters compared to 15 meters depth were several degrees. The temperature in the surface water was normal or slightly above normal for the season and was generally between 8-10°C. Warmest in Kalmarsund, and coldest at BY29 which is located furthest north in the Eastern Gotland Basin. At BY32 in the Western Gotland Basin, the surface temperature was 9.8°C and the divergent surface temperature is clearly visible in the vertical profile compared with the normal value for May. Deeper down, the temperature was generally above normal in both the Eastern and Western Gotland Basins. In the southern parts of the Baltic Proper, which are much shallower, mostly normal temperatures below the surface layer down to the bottom.

The salinity of the surface water was normal for the season at most stations, but at 3 stations in the eastern parts - BSCIII-10, BY10 and BY15 - and also at BY2 in the Arkona Basin, the salinity in the surface was slightly above normal. The sea surface salinity varied between 6.6-7.9 psu, with the exception of BY31 where the salinity was only 6.0 psu. At BY31, where only a CTD cast was made, the salinity of the surface was below normal. In the Arkona Basin the halocline was found near the bottom, and in the Bornholm Basin and the Bight of Hanö it was found at a depth of about 50-60 meters and in other deeper basins it was found at 60-70 meters. In the deep water, the salinity was higher than normal in the Western and Eastern Gotland basins.

The amount of dissolved inorganic nitrogen in the surface water was unchanged since the previous expedition, and the levels were below the reporting limit, 0.10 µmol/l at all stations. In the Eastern Gotland Basin at BY15, concentrations were below normal at a depth of 75-110 meters, which is the depth where neither oxygen nor hydrogen sulfide is present. And the situation was similar at 90-100 meters depth at BY20. At the depths where hydrogen sulfide was present, the content of dissolved inorganic nitrogen was generally above normal in both the Eastern and Western Gotland Basins. In the southern basins mostly normal levels in the deep water.

Concentrations of dissolved inorganic phosphate in the surface water were normal for the season at all stations and were 0.18-0.22 µmol/l in the Eastern and Western Gotland Basin and 0.27-0.43 at the other stations. The highest content was measured at BY4 in the Bornholm Basin. In the Bornholm Basin, the levels from about 50 meters to the bottom were above normal. Concentrations above normal were also found in the deep water of the Eastern Gotland Basin.

The content of silicate in the surface water was above normal for the season at almost all stations. Only the station in Kalmarsund, which had just below 11 µmol/l and was the lowest measured concentration, and BY38, had normal levels. Measured values in the surface water were generally between 13-16 µmol/l. In the deep water, concentrations above normal at several stations.

The oxygen situation remains poor in large parts of the Baltic Proper. Only in the southern basins, i.e. the Arkona Basin, the Bight of Hanö and the Bornholm Basin, as well as the station in the southeastern Baltic Proper, BCSIII-10, have on most expedition oxygen from the surface down to the bottom, although usually at very low levels near the bottom. During this expedition, conditions in the Arkona Basin down to a depth of 40 meters were good, with oxygen levels between 7-8 ml/l. The oxygen sensor on the CTD showed a thin and oxygen-poor layer near the bottom at BY1, and the water sample had only 1.5 ml/l, which is below the limit for acute oxygen deficiency, <2 ml/l. The Arkona Basin, with its vicinity to the Kattegat and thanks to its shallow depth, is the basins in the Baltic Proper that has the best oxygen situation. In the Bight of Hanö and the Bornholm Basin, which are approximately 80 and 90 meters deep, respectively, there was an acute oxygen deficiency from a depth of 60-70 meters. In Bight of Hanö, the oxygen sample from the bottom had 0.4 ml/l, and in the Bornholm Basin hydrogen sulfide was present in the bottom water at one of the stations and the oxygen level was below the reporting limit (<0.1 ml/l) at the other station. At BCSIII-10 in the south-eastern Baltic Proper, the oxygen level in the bottom water was 0.8 ml/l, which is a clear deterioration compared with April, when the concentration in the bottom water was 1.8 ml/l.

At the two shallow stations RefM1V1 in Kalmarsund and BY39 just southeast of Öland, concentrations of oxygen were good from surface to bottom.

In the Arkona and Bornholm basins, as well as Bight of Hanö, the chlorophyll fluorometer on the CTD showed a distinct peak a bit down in the water column. It was found at a depth of 25-30 meters in the Arkona Basin and at a depth of 10-20 meters in the other two basins. In the Eastern Gotland Basin, there was a slightly increased activity in the surface layer, and only at BY20 was there a clear peak at a depth of about 15 meters. In the Western Gotland Basin there was an increased activity at BY31, BY32 and BY39 at a depth of 15-20 meters. At BY31, there was also a second peak at just below 25 meters deep. The visibility depth varied between 6-8 meters, but in Kalmarsund it was 10 meters. Here, the chlorophyll fluorometer on CTD also showed low activity in the whole water column.

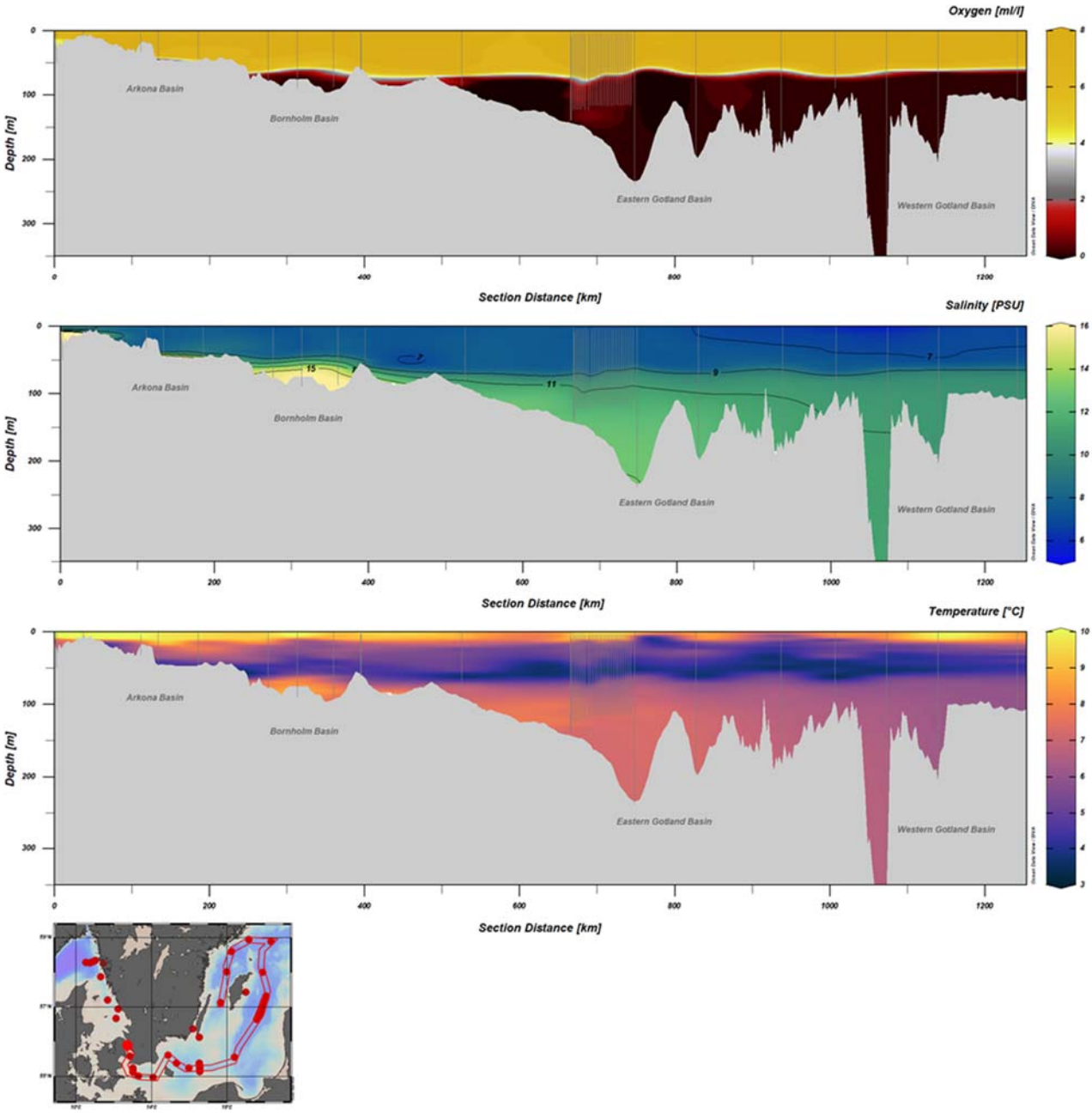

Figure 1. Transect showing CTD and MVP measurements of dissolved oxygen, salinity and temperature from the Sound through the Eastern Gotland Basin to the Western Gotland Basin.

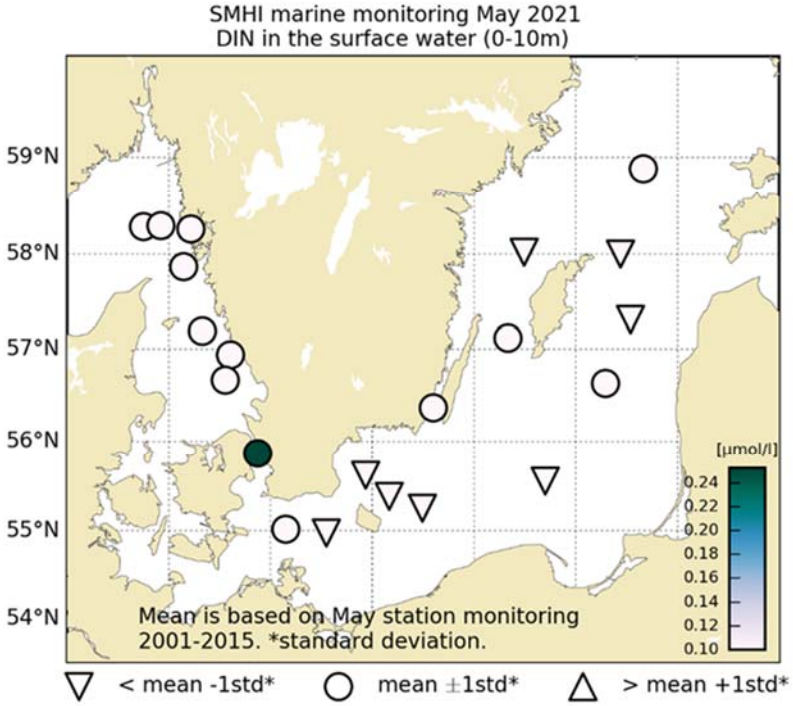

Figure 2. Concentration of dissolved inorganic nitrogen in the surface water (0-10m).

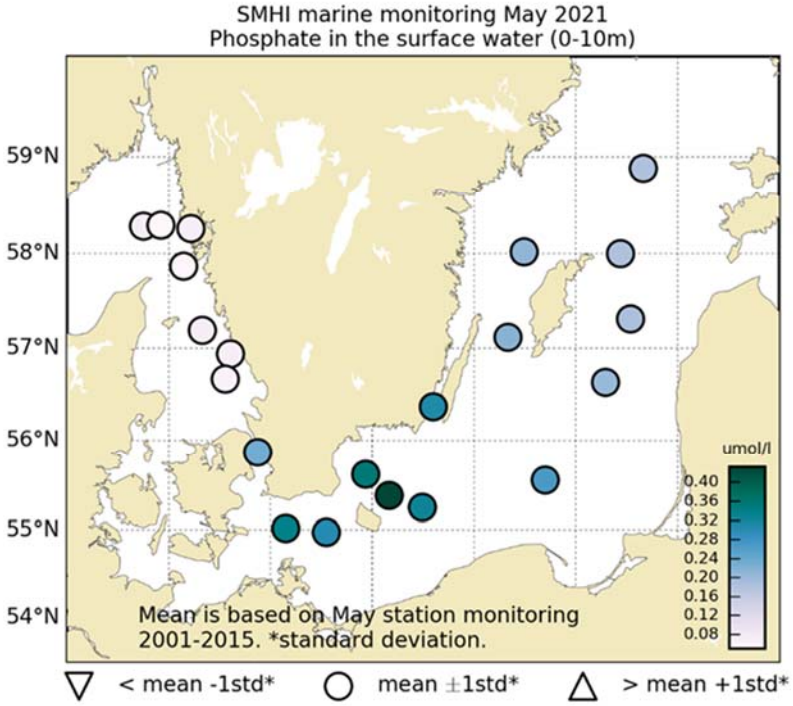

Figure 3. Concentration of phosphate in the surface water (0-10m).

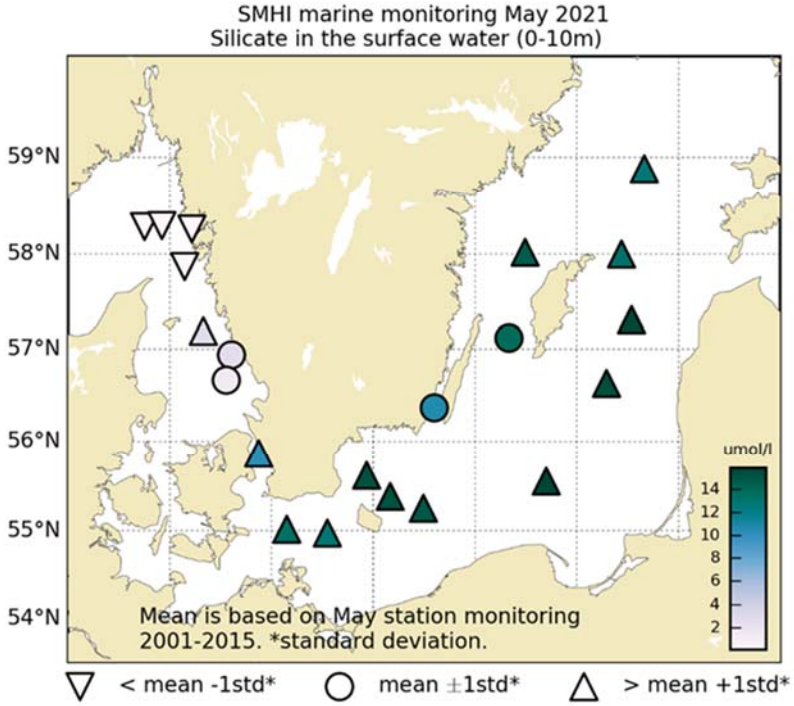

Figure 4. Concentration of silicate in the surface water (0-10m).

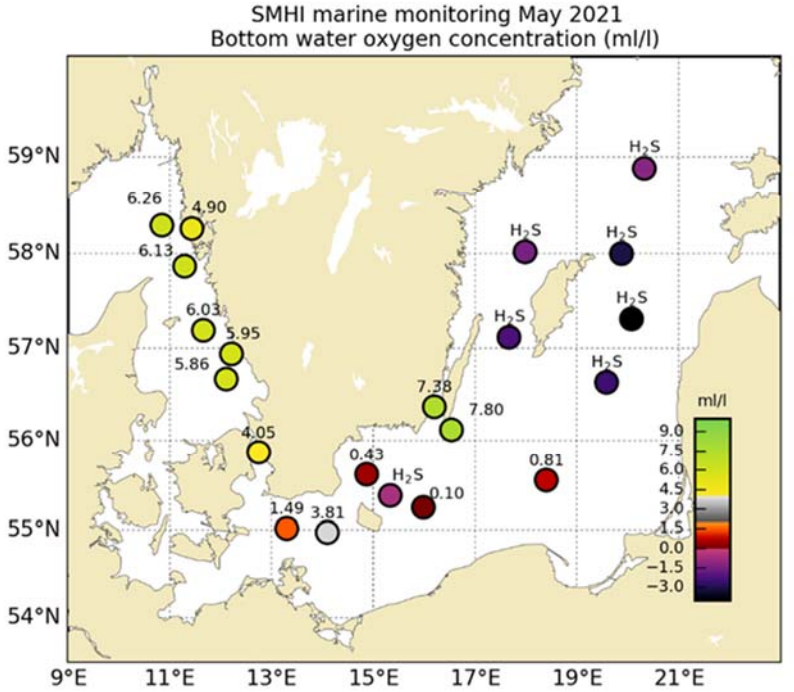

Figure 5. Oxygen concentration in the bottom water.

PARTICIPANTS

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Johanna Linders		SMHI
Jenny Lycken	Quality controller	SMHI
Anna-Kerstin Thell		SMHI
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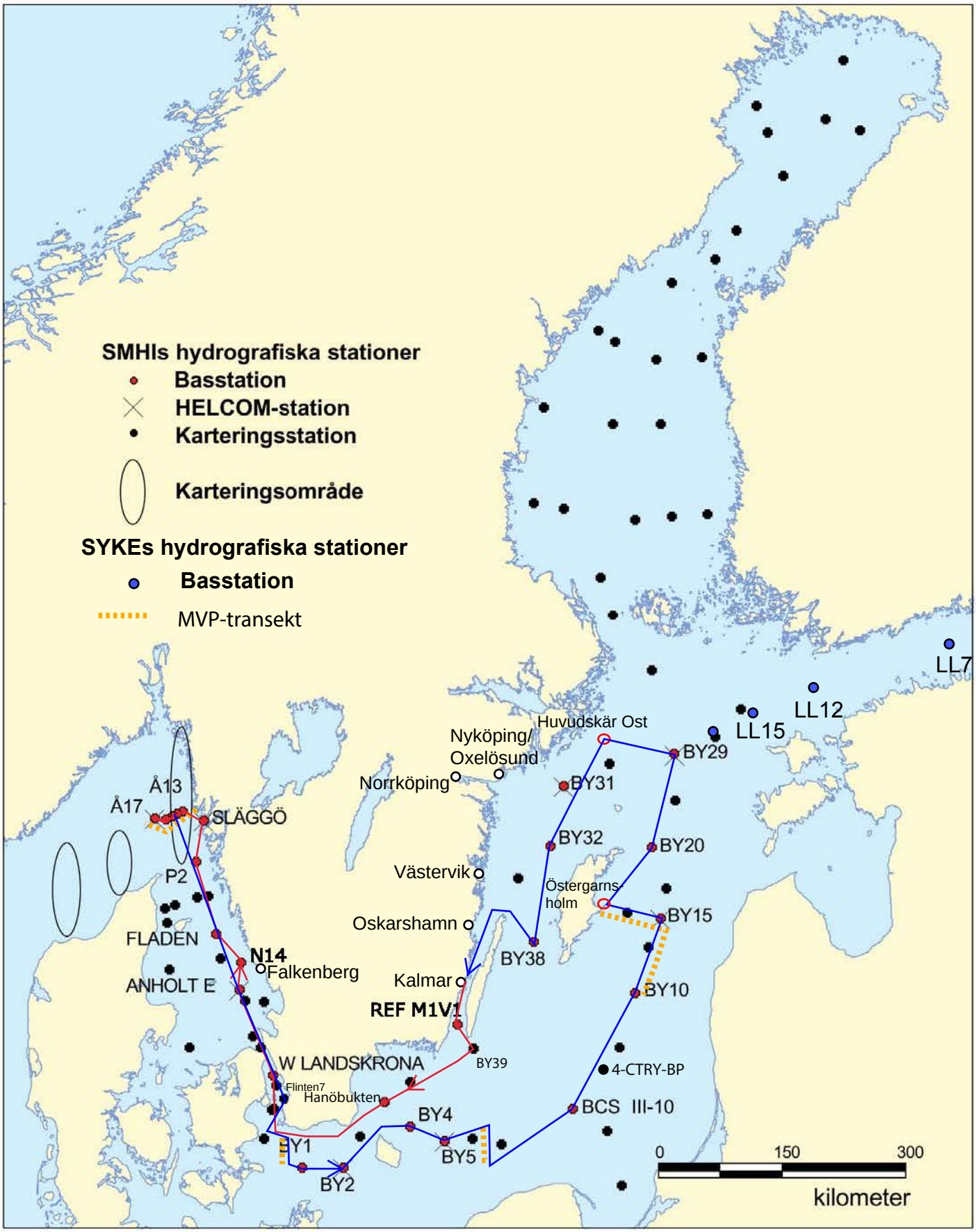
APPENDICES

- 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

TRACKCHART
Country: Sweden
Ship: R/V Svea
Date: 20210518-20210525
Series: 441-470



Date: 2021-06-03
Time: 11:46

Ship: SE
Year: 2021

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	CZPP hohp loy apt o p	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
0441	10	BPWK01	BAS...	REF M1V1	5622.13	01611.97	20210518	1430	21	10	05	2	13.8	1006	1420	xxx-	5	5	x	x	x	x	x	x	x	-	x	x	x	x	x	x	x	x	x	-	-	-
0442	10	BPSE49	BAS...	BY39 ÖLANDS S UDDE	5606.97	01632.20	20210518	1730	50		24	4	10.1	1006	1220	----	8	8	x	x	x	x	-	x	x	-	x	x	x	x	x	x	x	-	x	-	-	-
0443	10	BPSH05	BAS...	HANÖBUKTEN	5537.13	01452.21	20210519	0015	80		30	5	9.8	1008	9990	x---	11	11	x	x	x	x	-	x	x	-	x	x	x	x	x	x	x	-	x	-	x	-
0444	10	SOCX39	BAS...	W LANDSKRONA	5551.93	01244.88	20210519	1225	50	7	30	5	12.2	1011	1220	x---	9	9	x	x	x	x	-	x	x	-	x	x	x	x	x	x	x	-	x	-	x	-
0445	10	KAEX29	BAS...	ANHOLT E	5640.13	01206.74	20210519	1820	62	8	25	6	12.4	1010	1630	xxxx	10	10	x	x	x	x	x	x	x	-	x	x	x	x	x	x	x	x	x	x	x	-
0446	10	KANX50	BAS...	N14 FALKENBERG	5656.40	01212.76	20210519	2120	30		28	9	11.3	1010	9990	xxx-	7	7	x	x	x	x	x	x	x	-	x	x	x	x	x	x	x	x	x	-	x	x
0447	10	KANX25	BAS...	FLADEN	5711.50	01139.58	20210520	0040	84		25	9	9.4	1009	9990	x---	13	13	x	x	x	x	-	x	x	-	x	x	x	x	x	x	x	-	x	-	-	-
0448	10	SKEX23	BAS...	P2	5752.06	01117.53	20210520	0530	93		23	7	8.8	1008	1340	x---	10	10	x	x	x	x	-	x	x	-	x	x	x	x	x	x	x	-	x	-	-	-
0449	10	FIBG27	BAS...	SLÄGGÖ	5815.57	01126.10	20210520	0850	74	8	26	6	10.9	1005	1210	xxx-	9	9	x	x	x	x	-	x	x	-	x	x	x	x	x	x	x	-	x	-	x	-
0450	10	SKEX14	BAS...	Å13	5820.39	01101.63	20210520	1115	90		20	5	8.9	1010	1740	x---	10	10	x	x	x	x	-	x	x	-	x	x	x	x	x	x	x	-	x	-	x	-
0451	10	SKEX18	BAS...	Å17	5817.04	01030.23	20210520	1430	340	14	24	8	10.3	1007	1130	x-x-	15	14	x	x	-	x	x	x	x	-	x	x	x	x	x	x	x	x	x	-	x	-
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0455	10	KAEX29	BAS...	ANHOLT E	5640.11	01206.68	20210521	0550	62	8	16	5	10.1	1003	2830	xxx-	10	10	x	x	x	x	x	x	x	-	x	x	x	x	x	x	x	x	x	x	x	x
0456	10	SOSX00	EXT...	FLINTEN-7	5535.33	01250.66	20210521	1340	8		18	4	11.5	999	1220	----	3	3	-	x	-	x	-	-	x	-	-	-	-	-	-	-	-	-	-	-	x	-
0457	10	BPSA02	BAS...	BY1	5500.91	01318.00	20210521	1930	47		25	5	10.5	1000	1330	x---	8	8	x	x	x	x	-	x	x	-	x	x	x	x	x	x	x	-	x	-	-	-
0458	10	BPSA03	BAS...	BY2 ARKONA	5458.27	01405.85	20210521	2310	47		21	5	10.1	1000	9990	xxx-	8	8	x	x	x	x	-	x	x	-	x	x	x	x	x	x	x	-	x	x	-	-
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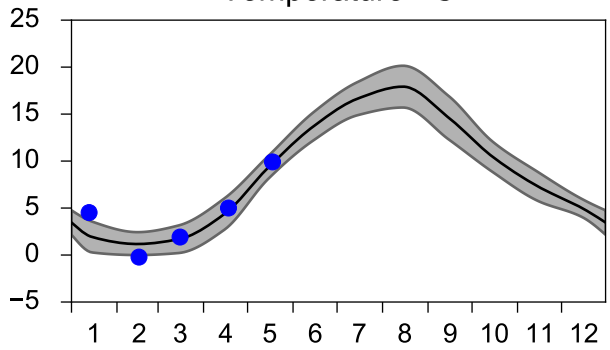
0460	10	BPSB07	BAS...	BY5 BORNHOLMSDJ	5515.02	01559.12	20210522	0840	91	7	15	3	10.0	1001	1720	xxxx	12	12	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	-	x
0461	10	BPSE11	BAS...	BCS III-10	5533.25	01824.00	20210522	1940	90		24	4	9.4	1002	1230	x---	12	12	x	x	x	x	-	x	x	-	x	x	x	x	x	x	x	-	x	x	-	x
0462	10	BPEX13	BAS...	BY10	5638.03	01935.08	20210523	0335	147	6	25	3	9.8	1002	1320	x---	15	15	x	x	x	x	-	x	x	x	x	x	x	x	x	x	x	-	x	-	-	x
0463	10	BPEX21	BAS...	BY15 GOTLANDSDJ	5718.75	02004.57	20210523	0900	249	8	22	5	11.0	1004	1330	xxxx	24	24	x	x	-	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	-	x
0464	10	BPEX00	EXT...	ÖSTERGARNSHOLM	5725.4	01859.6	20210523	1510	20		21	8	9.7	1005	1530	----	5		-	x	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-
0465	10	BPEX26	BAS...	BY20 FÅRÖDJ	5759.91	01952.75	20210523	1935	203		23	5	9.5	1006	2830	x---	17	17	x	x	-	x	-	x	x	x	x	x	x	x	x	x	x	-	x	-	-	x
0466	10	BPNX35	BAS...	BY29 / LL19	5853.06	02019.66	20210524	0210	178		16	2	9.4	1009	2820	x---	16	16	x	x	-	x	-	x	x	x	x	x	x	x	x	x	x	-	x	-	-	-
0467	10	BPNX00	EXT...	HUVUDSKAR BUOY	5856.18	01909.73	20210524	0615	91		06	2	10.0	1011	2720	----	12		-	x	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-
0468	10	BPNX37	BAS...	BY31 LANDSORTSDJ	5835.60	01814.12	20210524	1000	459		24	5	9.7	1014	2830	----	23	23	-	x	-	x	-	-	x	-	-	-	-	-	-	-	-	-	-	-	x	-
0469	10	BPWX38	BAS...	BY32 NORRKÖPINGSDJ	5801.04	01759.08	20210524	1450	205	8	19	7	10.1	1015	1130	x---	17	17	x	x	-	x	-	x	x	x	x	x	x	x	x	x	x	-	x	-	-	x
0470	10	BPWX45	BAS...	BY38 KARLSÖDJ	5707.05	01740.04	20210524	2130	114		11	4	9.4	1015	9990	x---	14	14	x	x	x	x	-	x	x	x	x	x	x	x	x	x	x	-	x	x	x	-

STATION REF M1V1 SURFACE WATER (0-10 m)

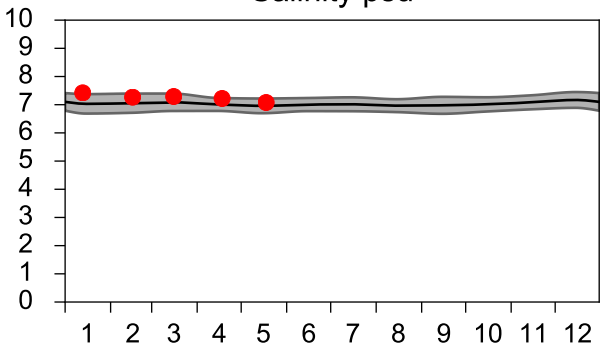
Annual Cycles

Mean 2001-2015 St.Dev. 2021

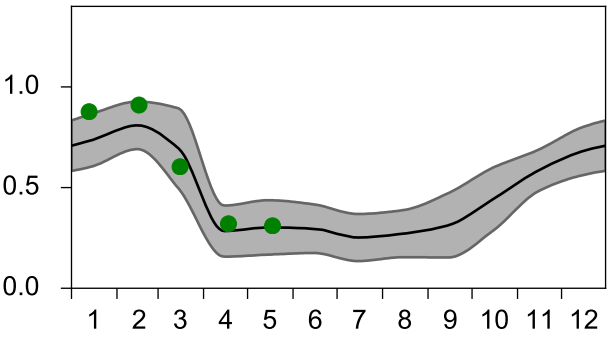
Temperature ˚C



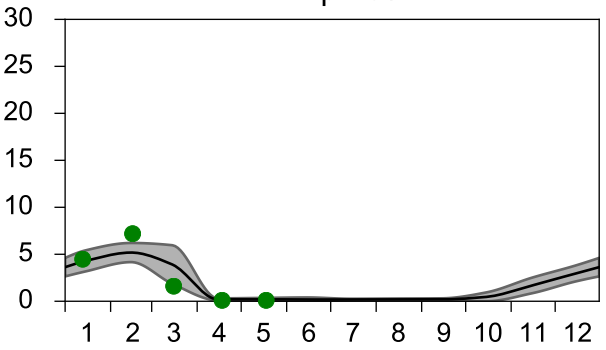
Salinity psu



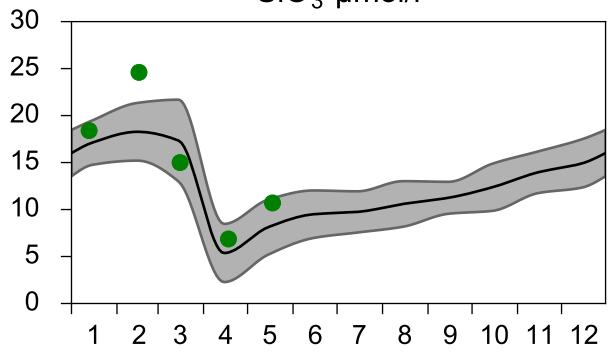
PO_4 µmol/l



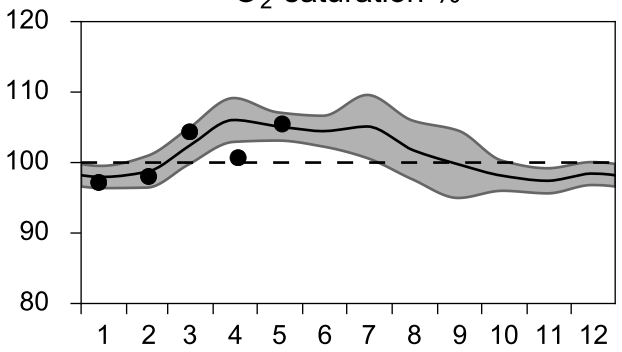
DIN µmol/l



SiO_3 µmol/l

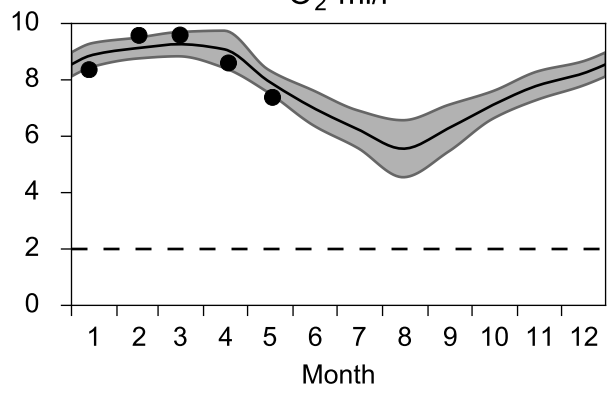


O_2 saturation %

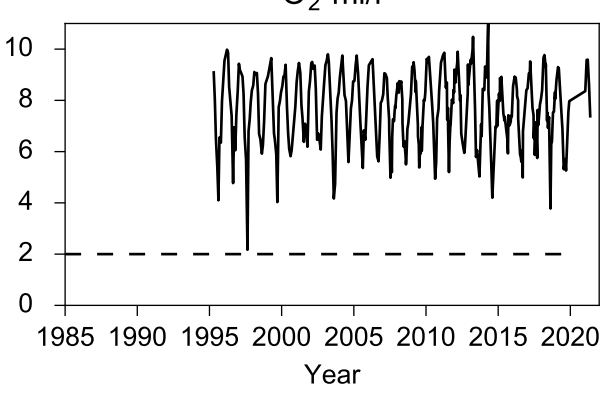


OXYGEN IN BOTTOM WATER (depth >= 15 m)

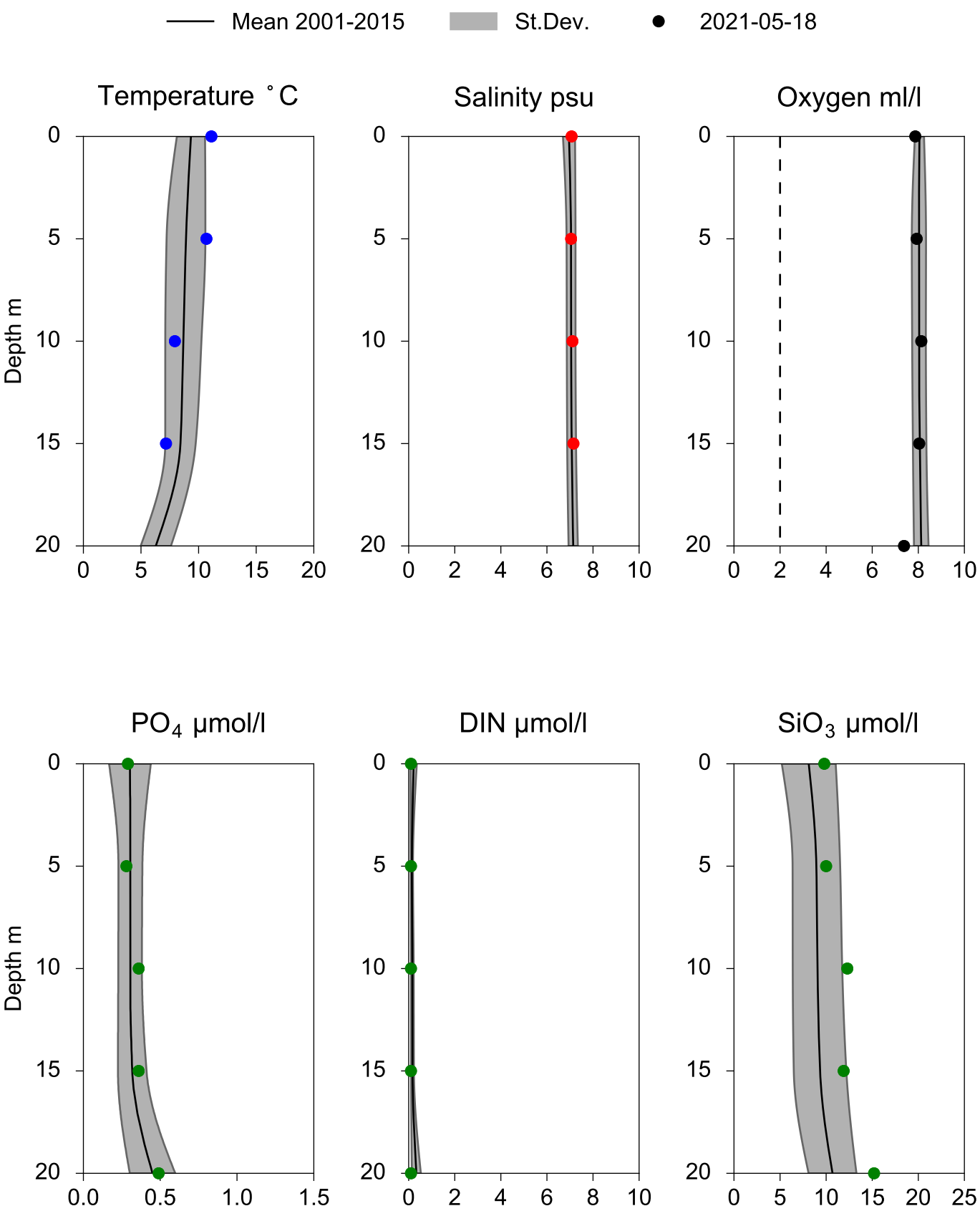
O_2 ml/l



O_2 ml/l



Vertical profiles REF M1V1
May

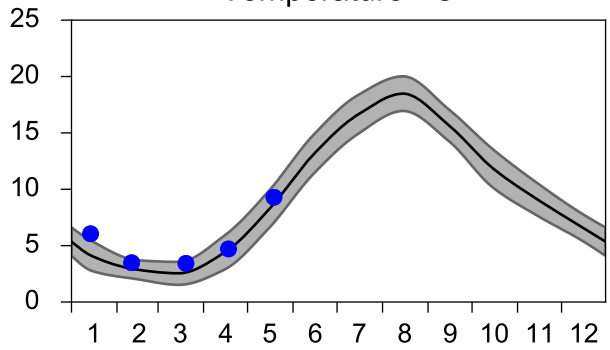


STATION HANÖBUKTEN SURFACE WATER (0-10 m)

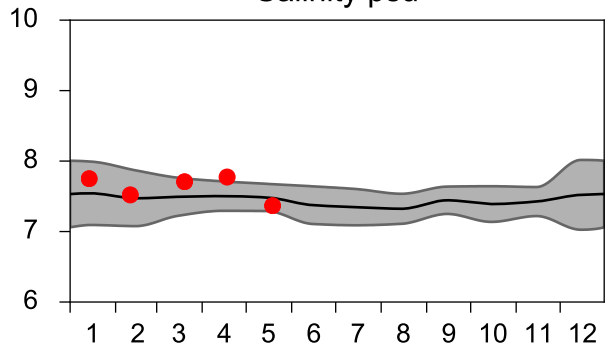
Annual Cycles

Mean 2001-2015 St.Dev. 2021

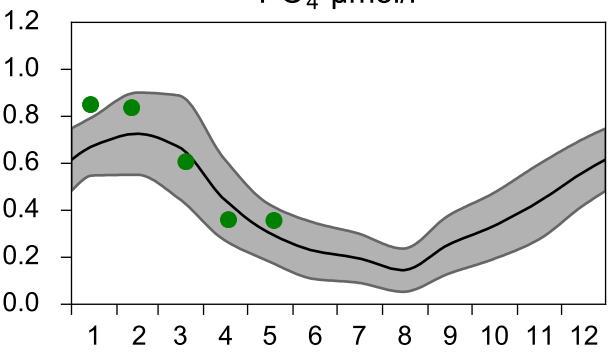
Temperature ˚C



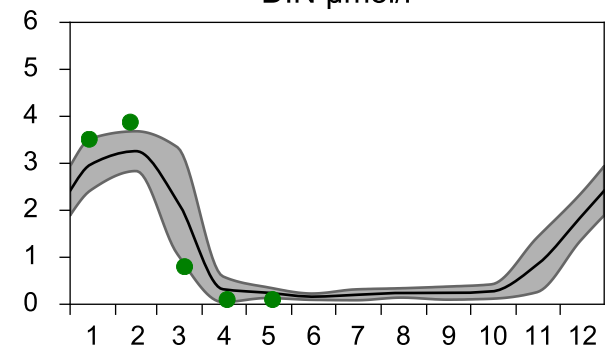
Salinity psu



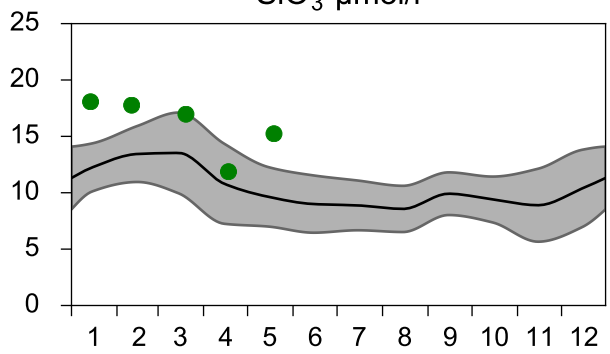
PO_4 µmol/l



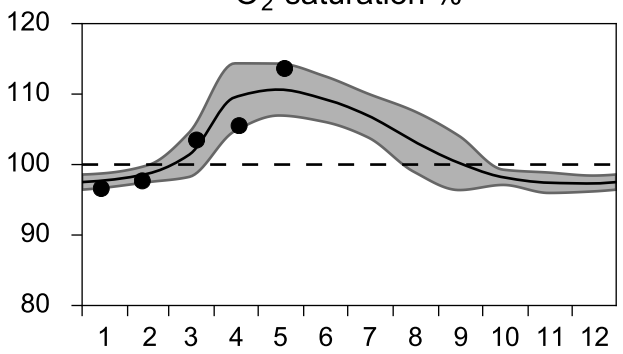
DIN µmol/l



SiO_3 µmol/l

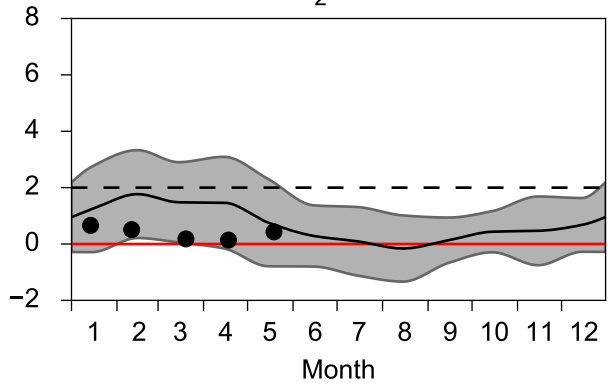


O_2 saturation %

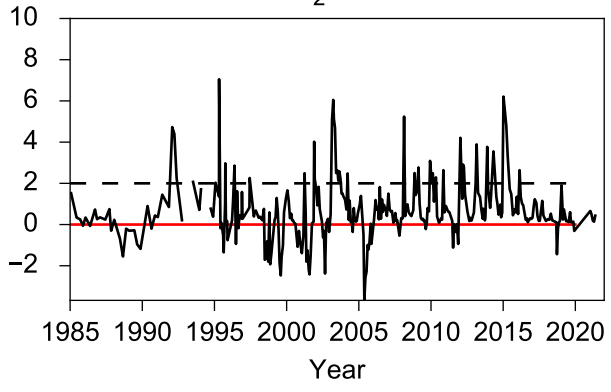


OXYGEN IN BOTTOM WATER (depth >= 70 m)

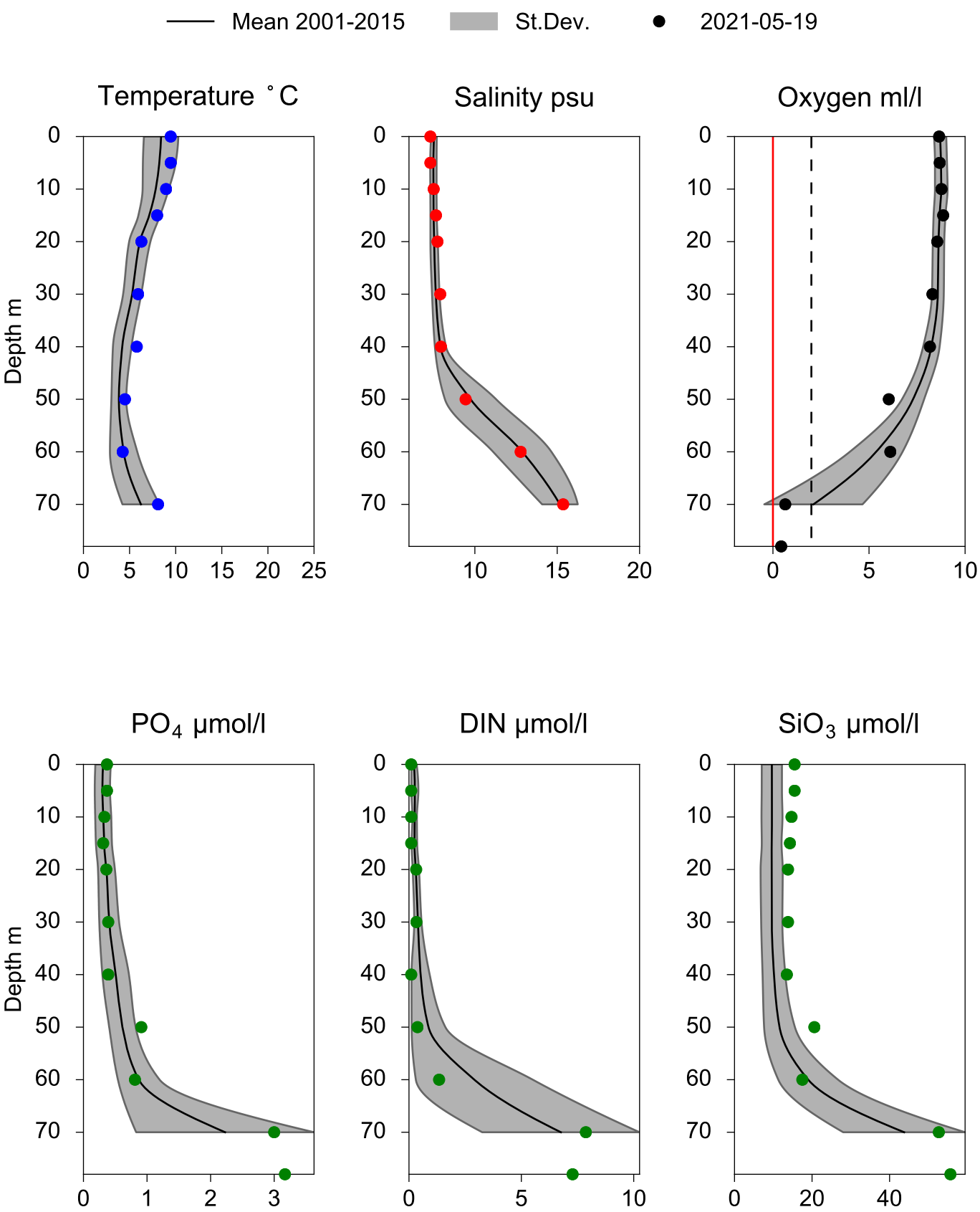
O_2 ml/l



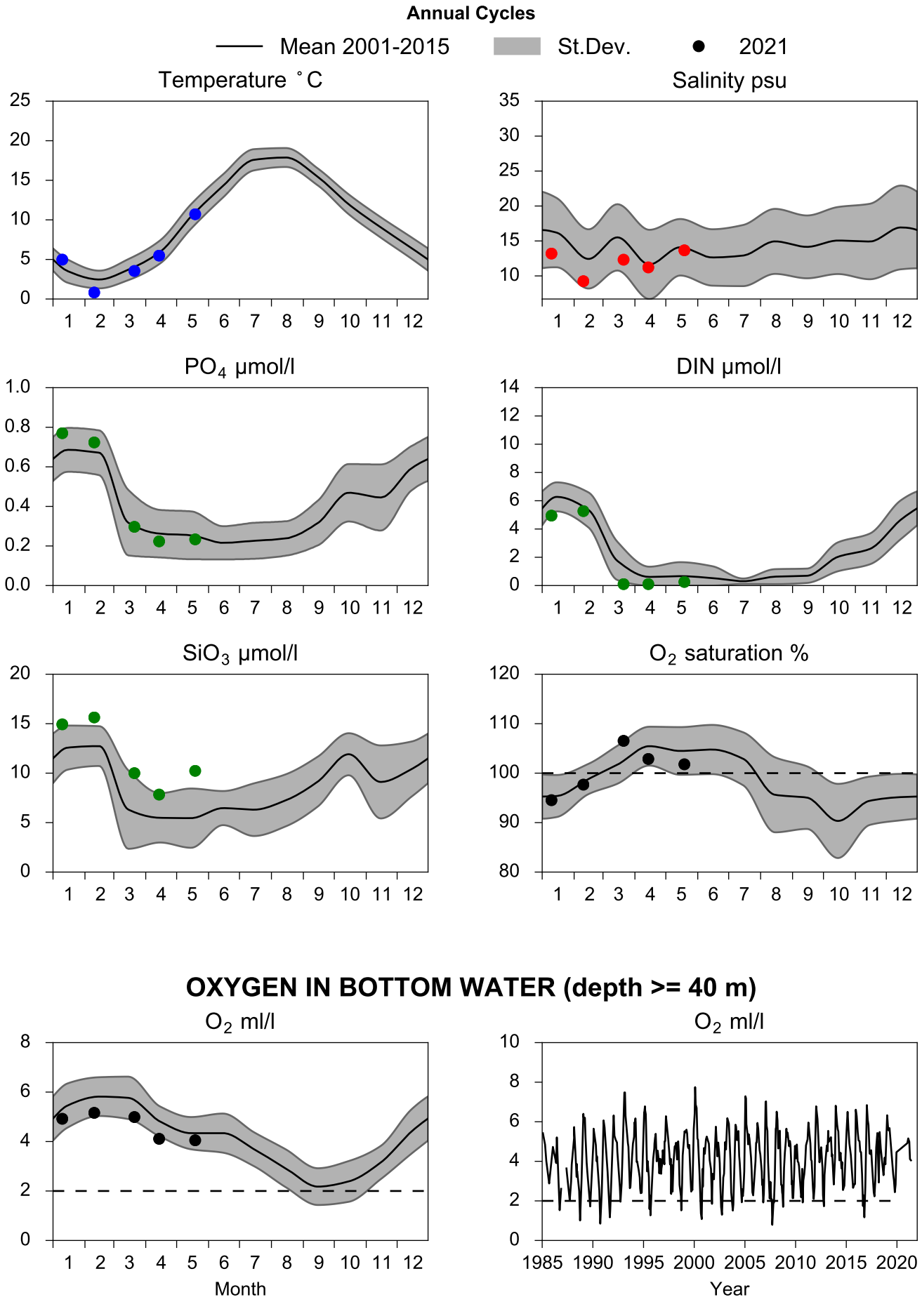
O_2 ml/l



Vertical profiles HANÖBUKTEN
May

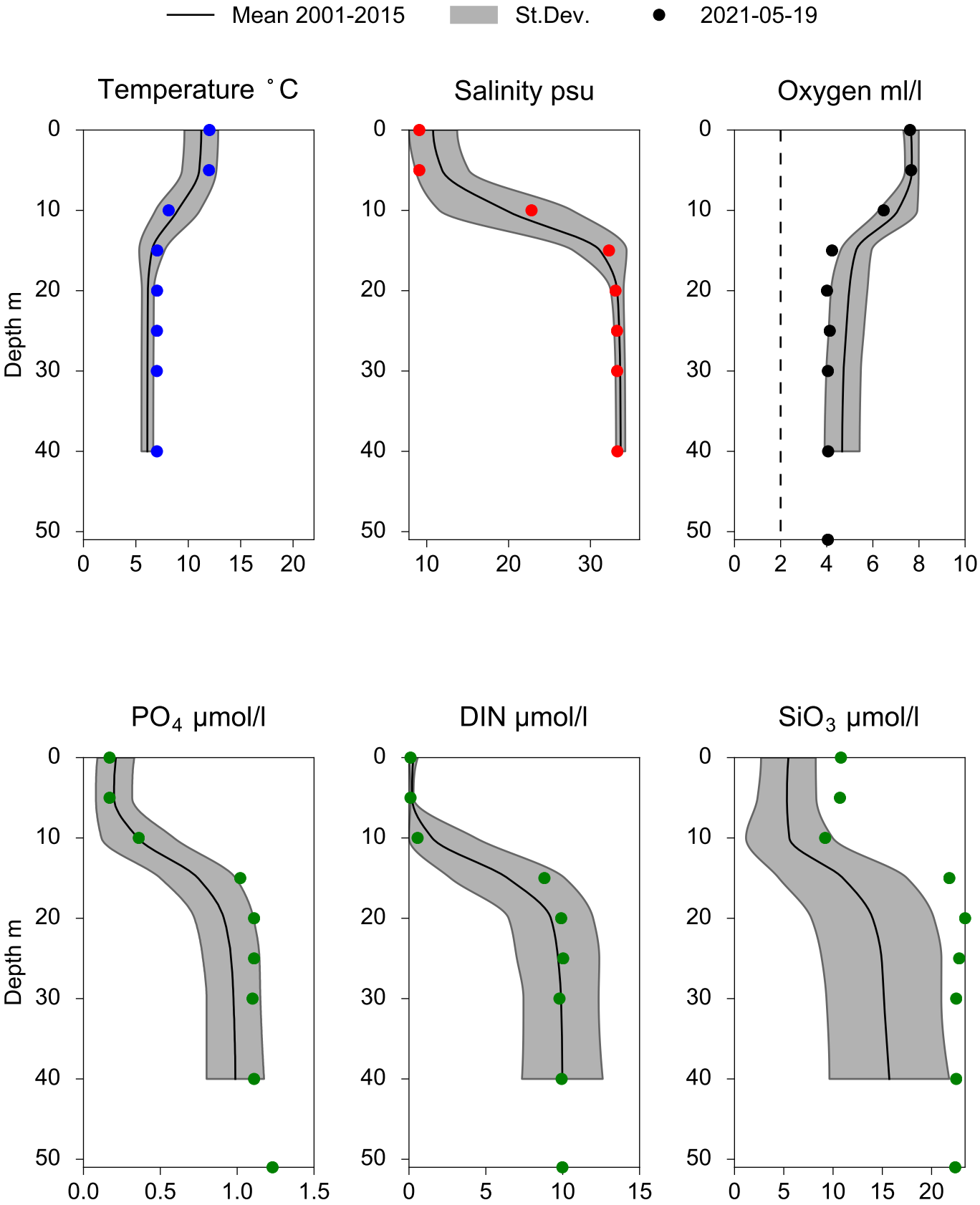


STATION W LANDSKRONA SURFACE WATER (0-10 m)

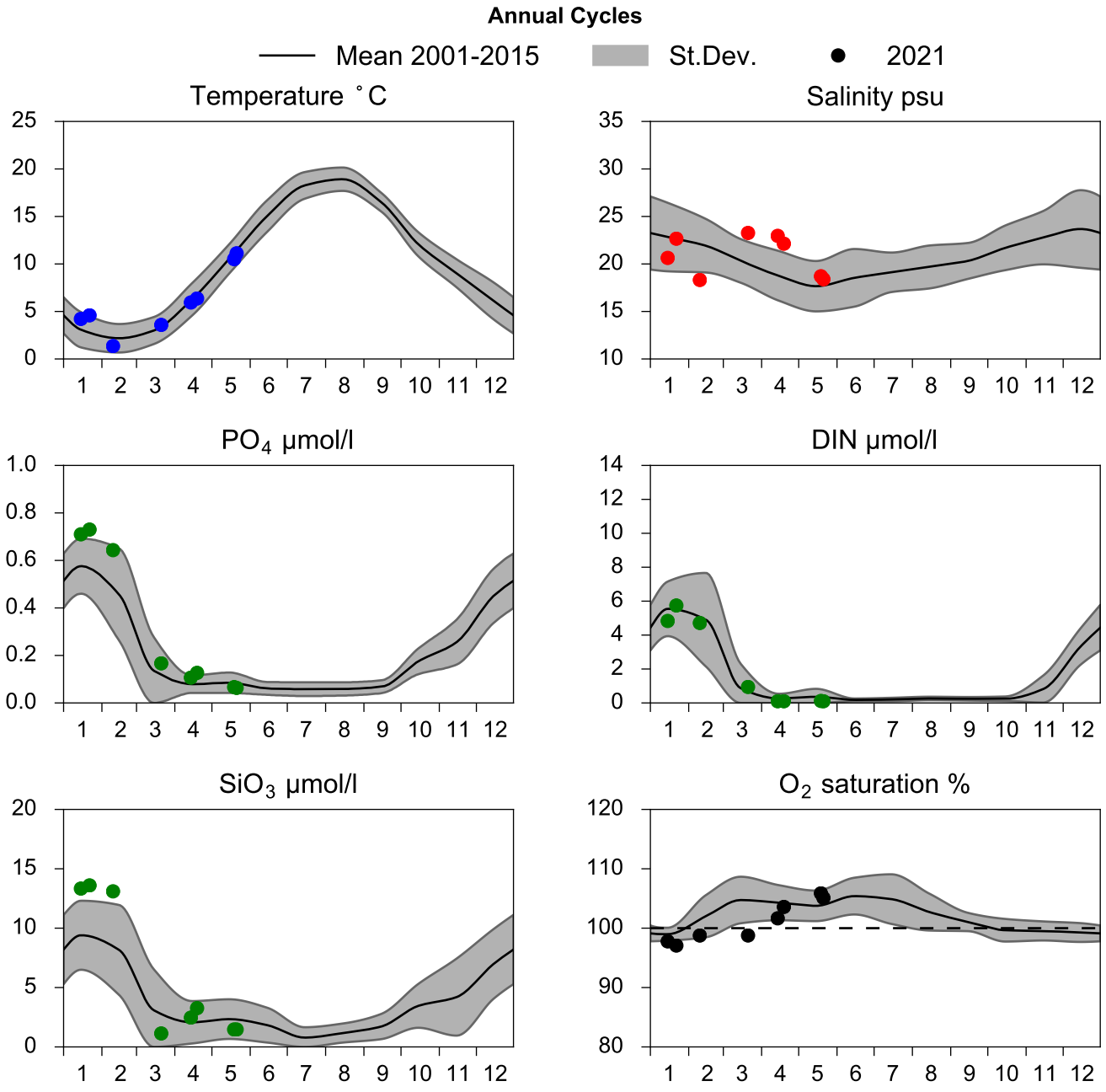


OXYGEN IN BOTTOM WATER (depth >= 40 m)

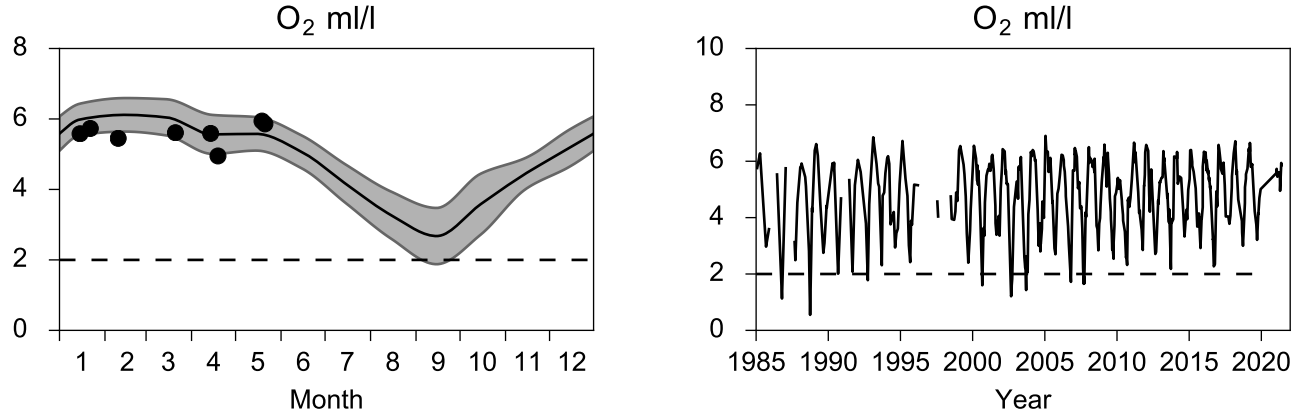
Vertical profiles W LANDSKRONA
May



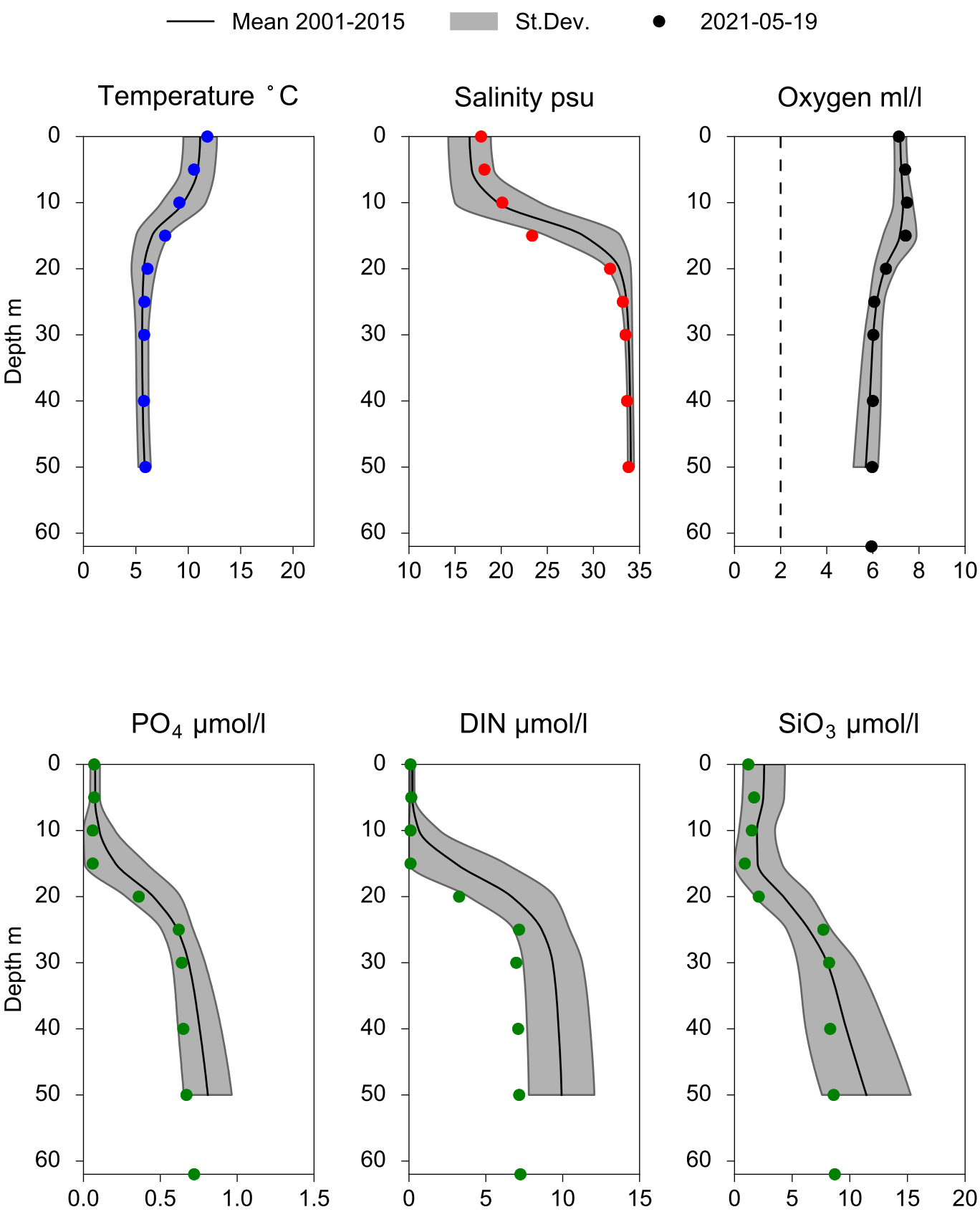
STATION ANHOLT E SURFACE WATER (0-10 m)



OXYGEN IN BOTTOM WATER (depth >= 52 m)



Vertical profiles ANHOLT E
May

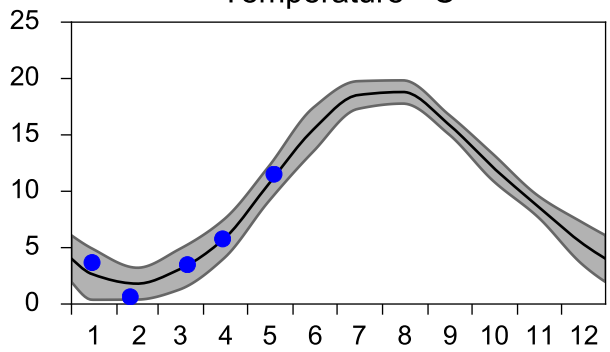


STATION N14 FALKENBERG SURFACE WATER (0-10 m)

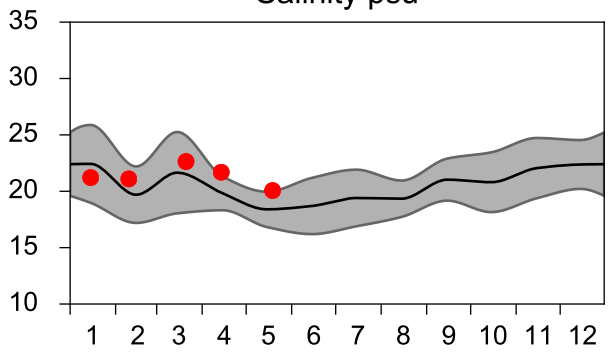
Annual Cycles

Mean 2001-2015 St.Dev. 2021

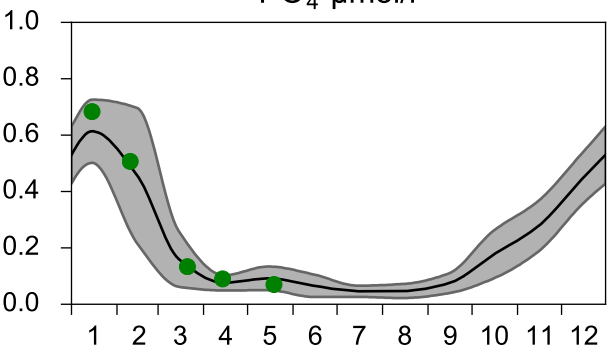
Temperature ˚C



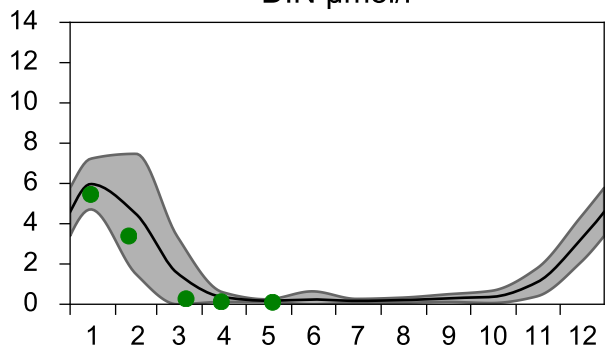
Salinity psu



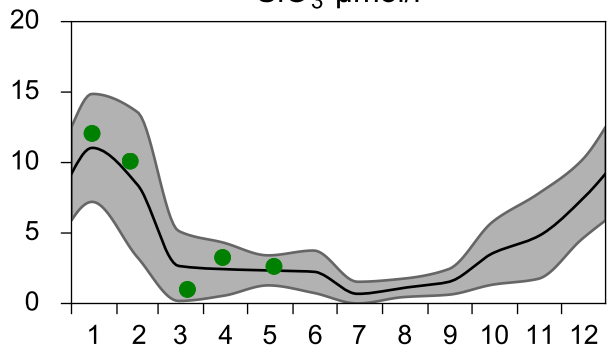
PO_4 µmol/l



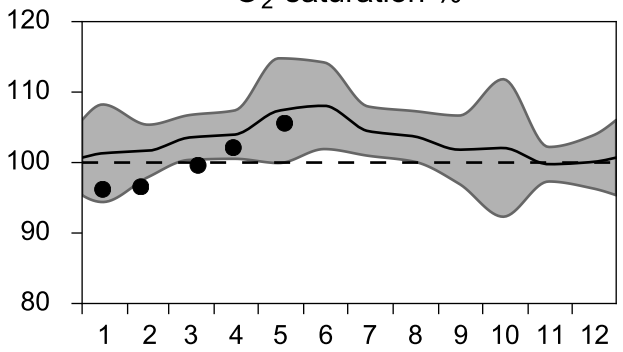
DIN µmol/l



SiO_3 µmol/l

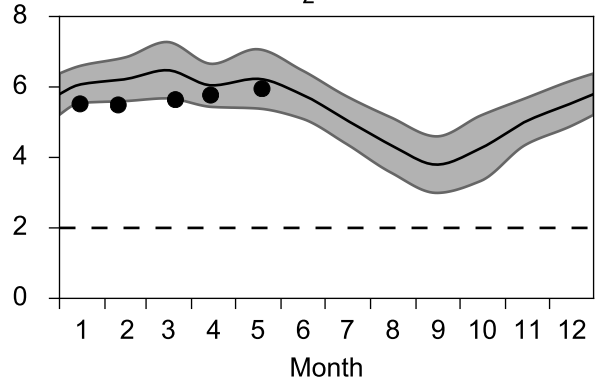


O_2 saturation %

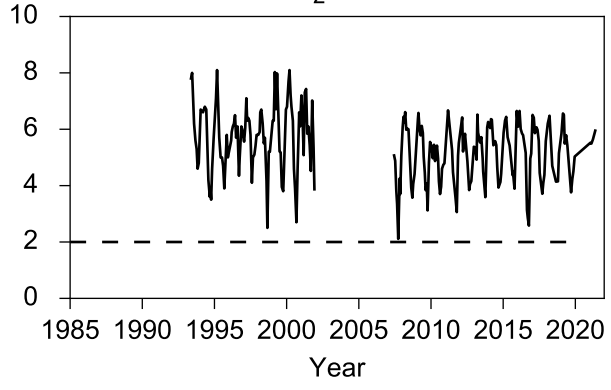


OXYGEN IN BOTTOM WATER (depth >= 20 m)

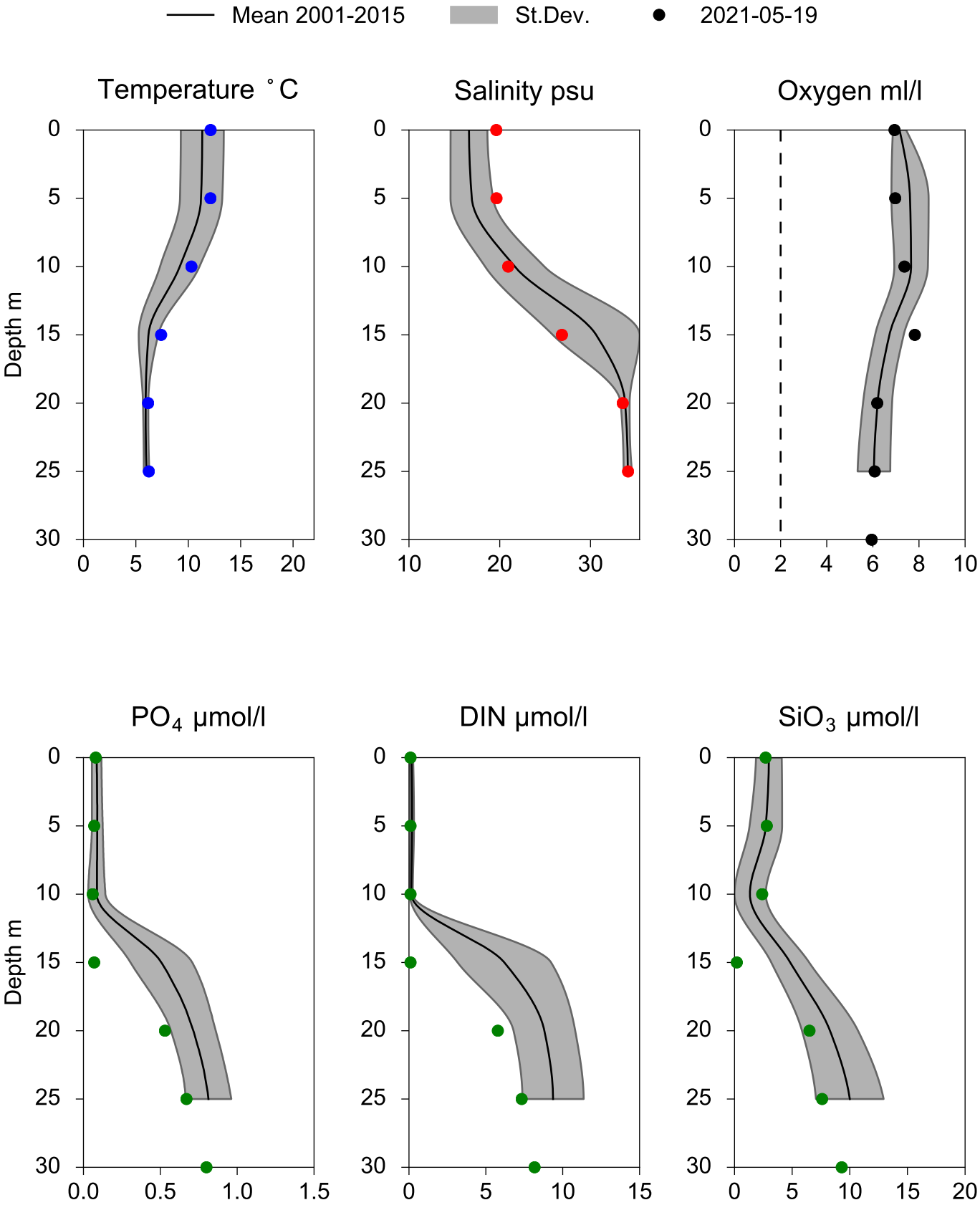
O_2 ml/l



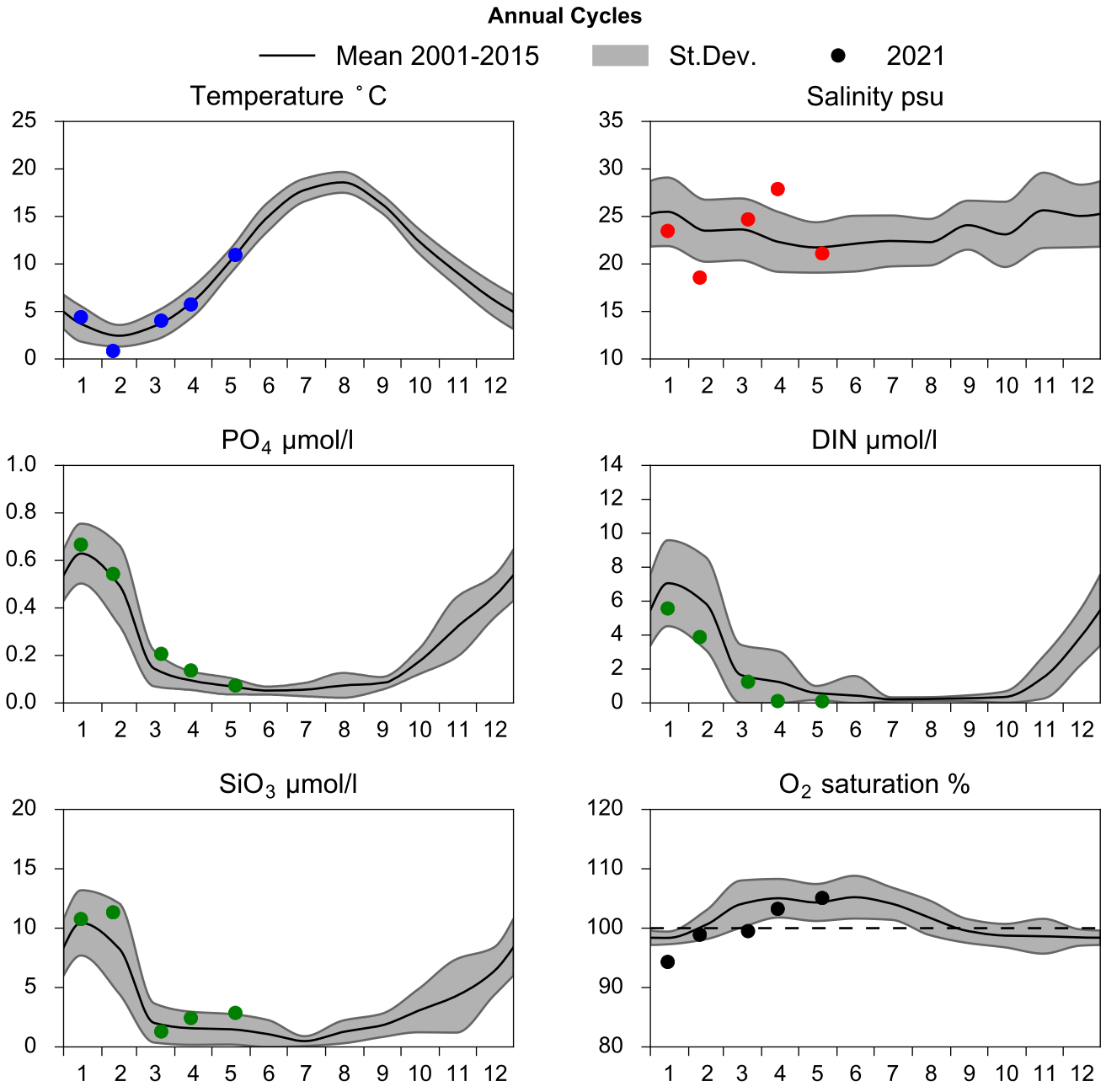
O_2 ml/l



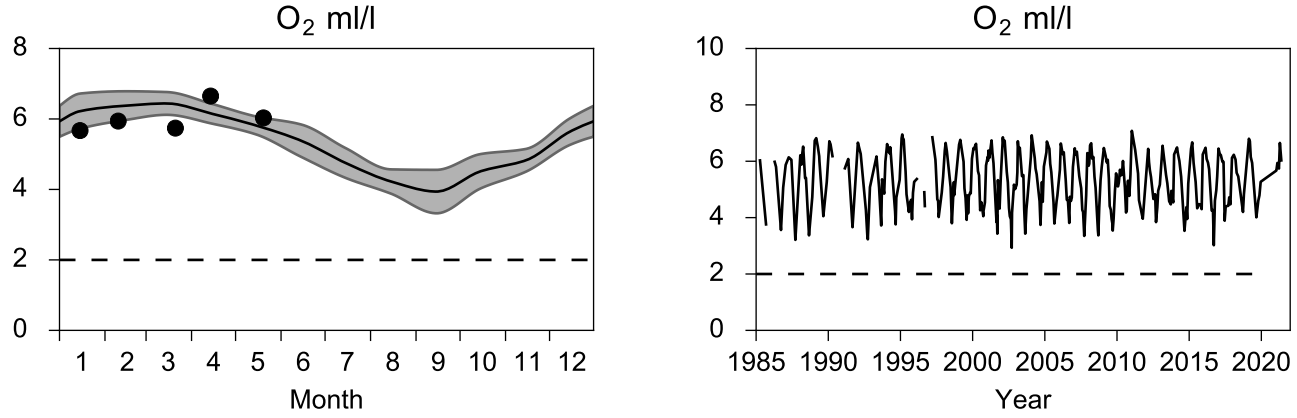
Vertical profiles N14 FALKENBERG
May



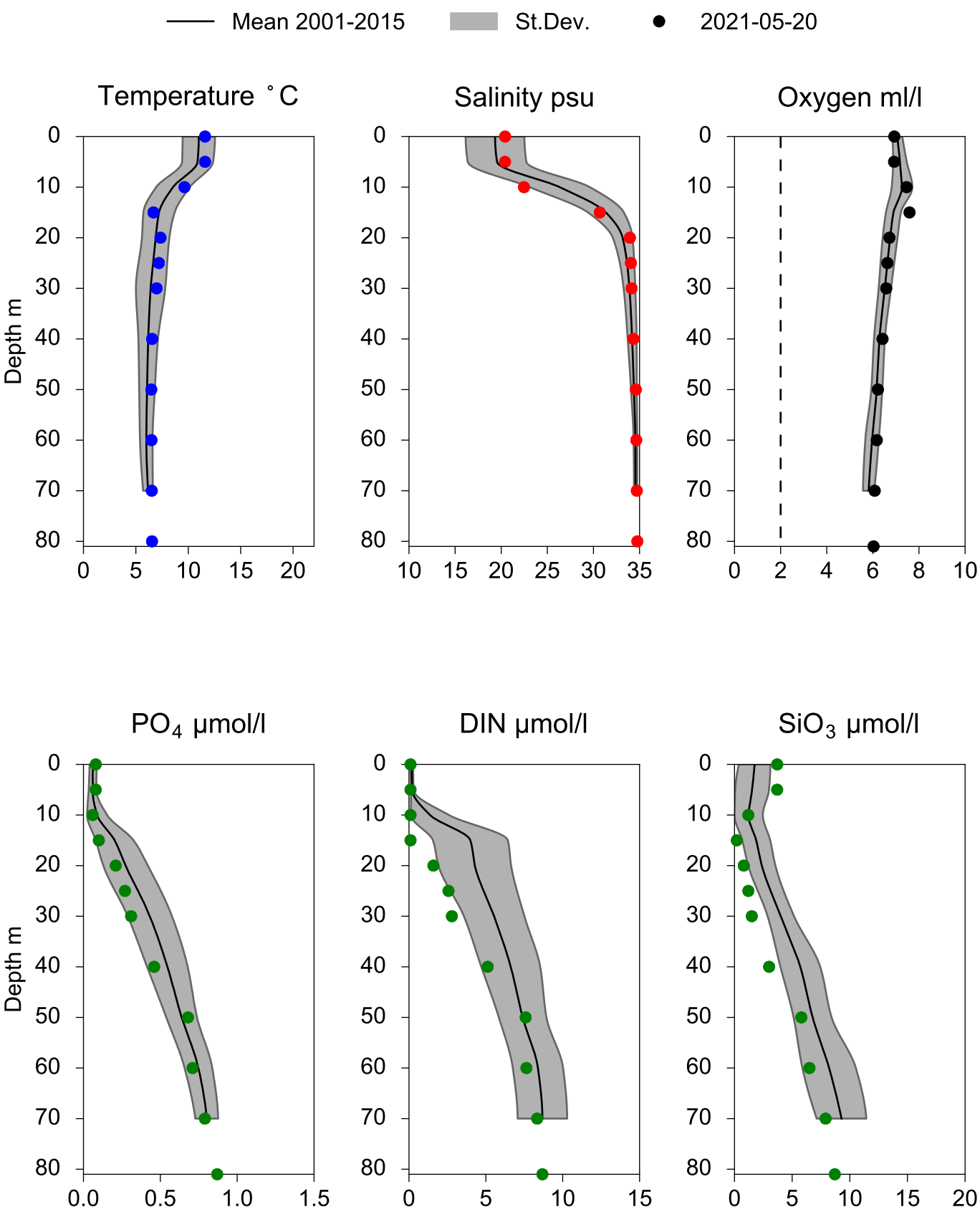
STATION FLADEN SURFACE WATER (0-10 m)



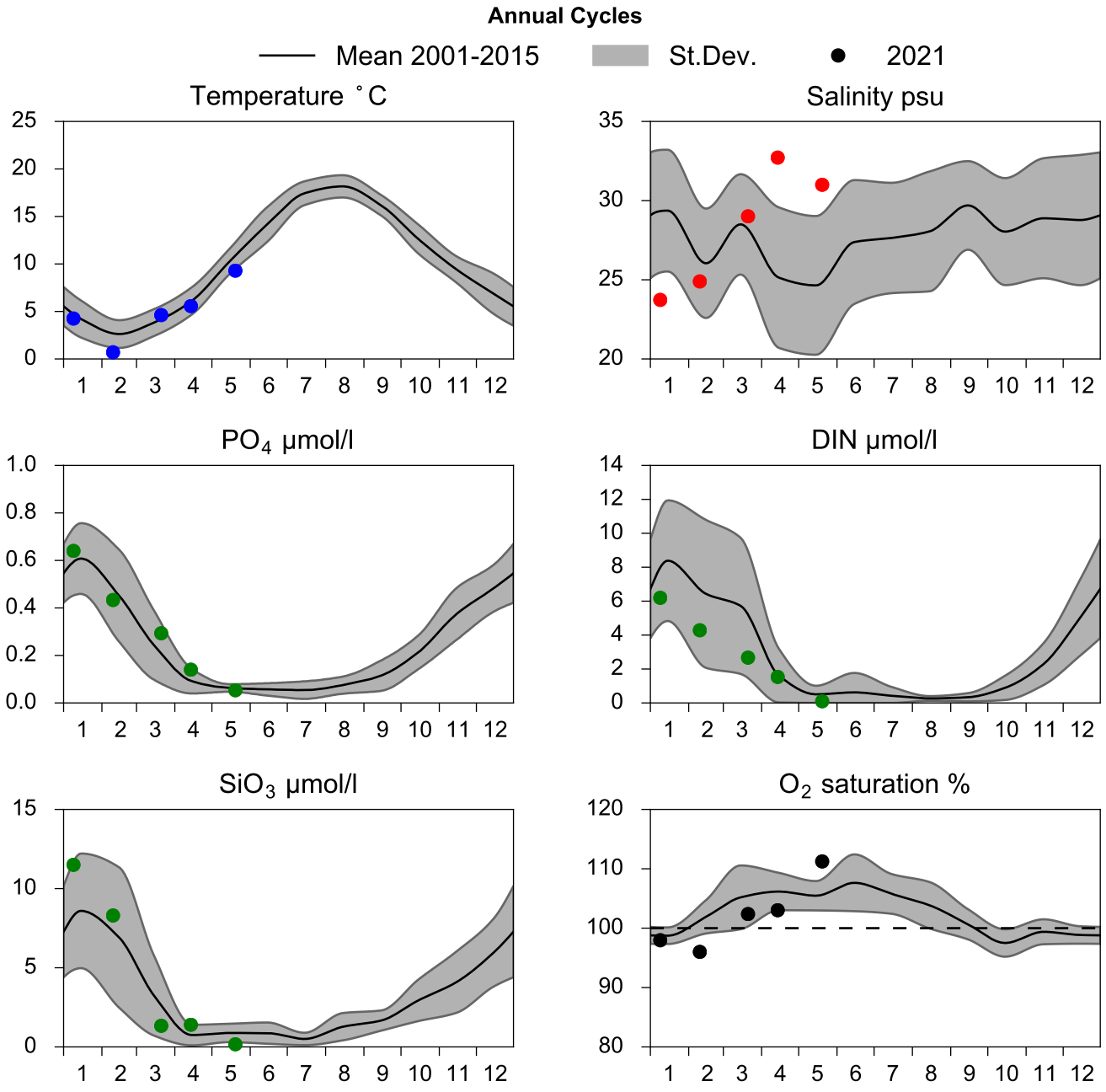
OXYGEN IN BOTTOM WATER (depth >= 74 m)



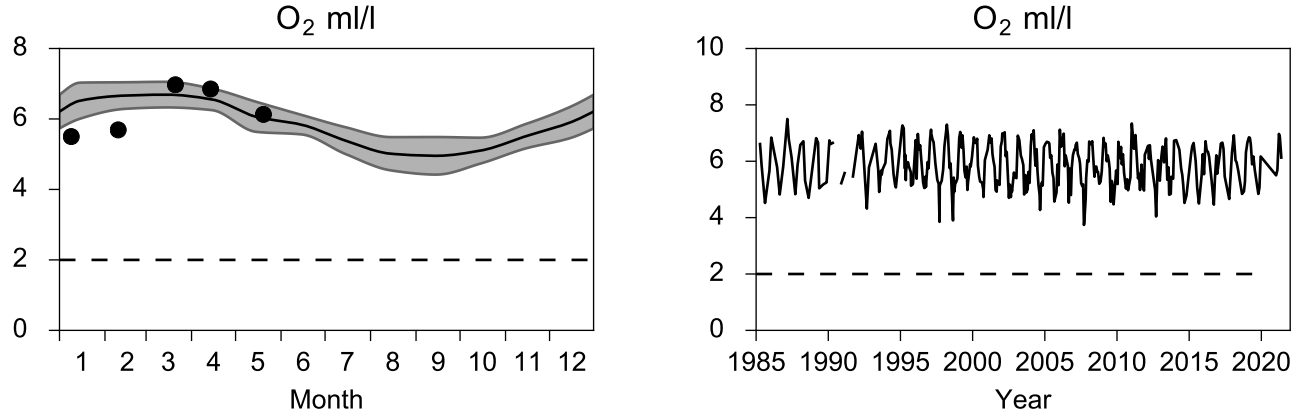
Vertical profiles FLADEN
May



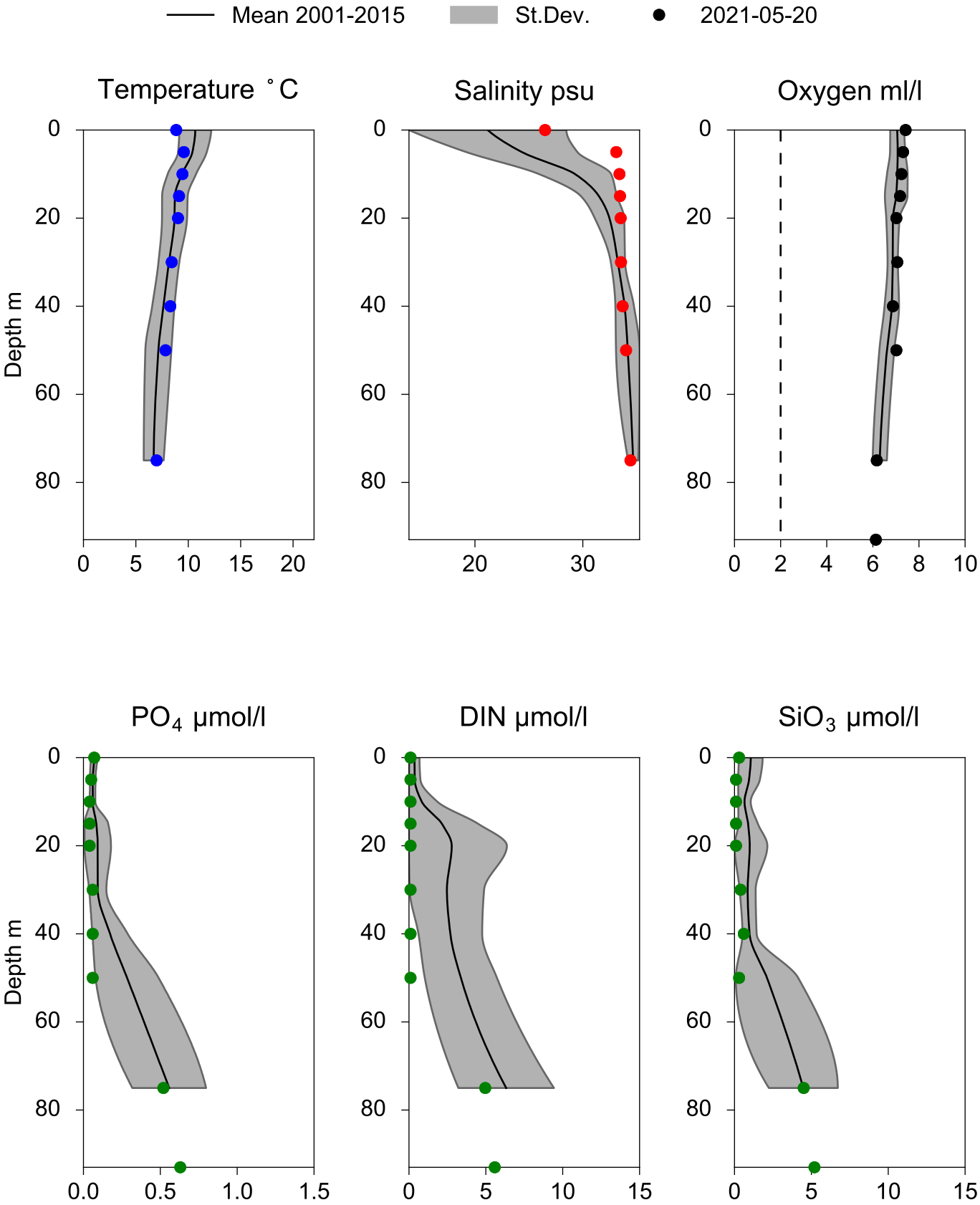
STATION P2 SURFACE WATER (0-10 m)



OXYGEN IN BOTTOM WATER (depth >= 75 m)

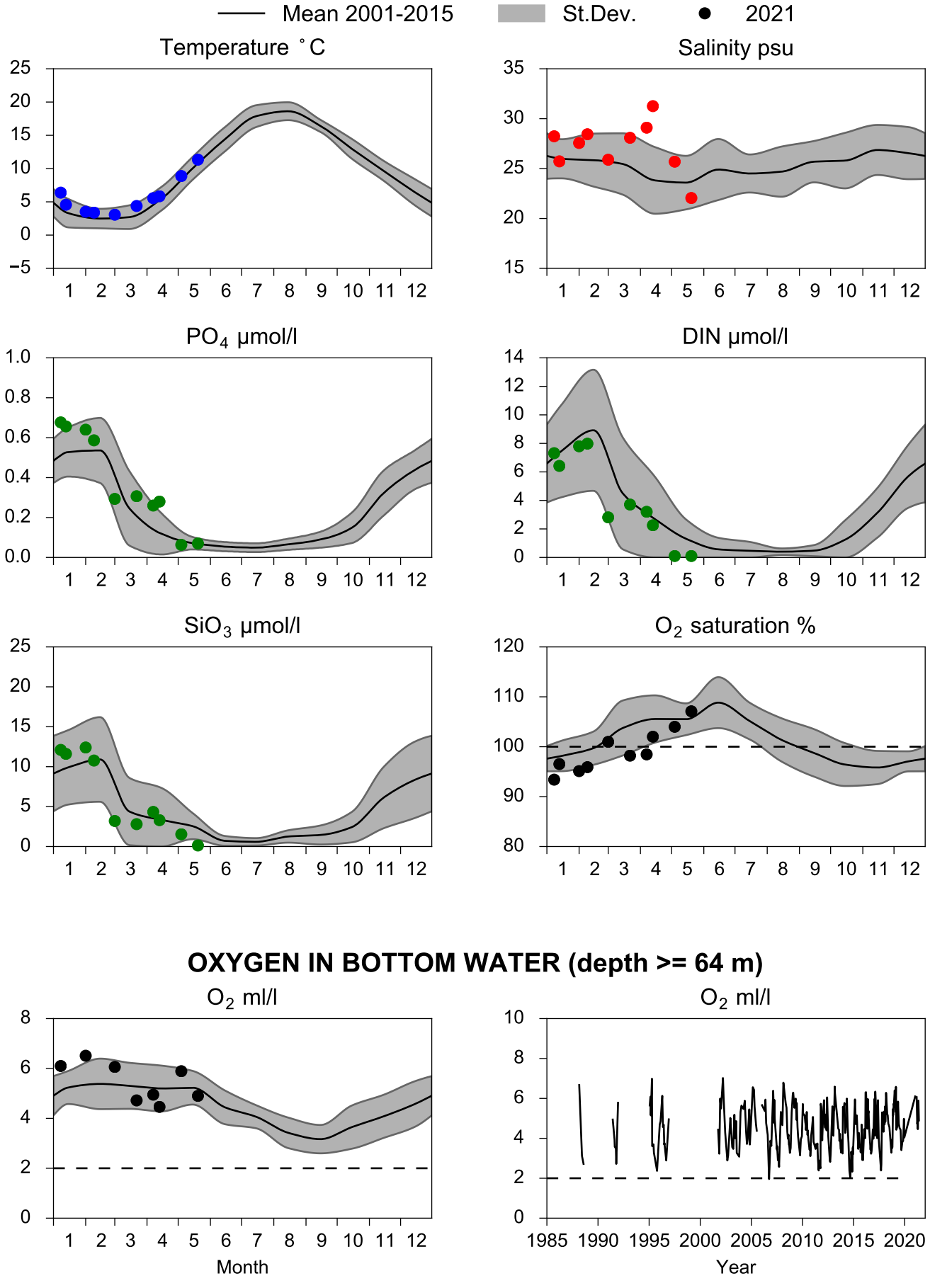


Vertical profiles P2
May



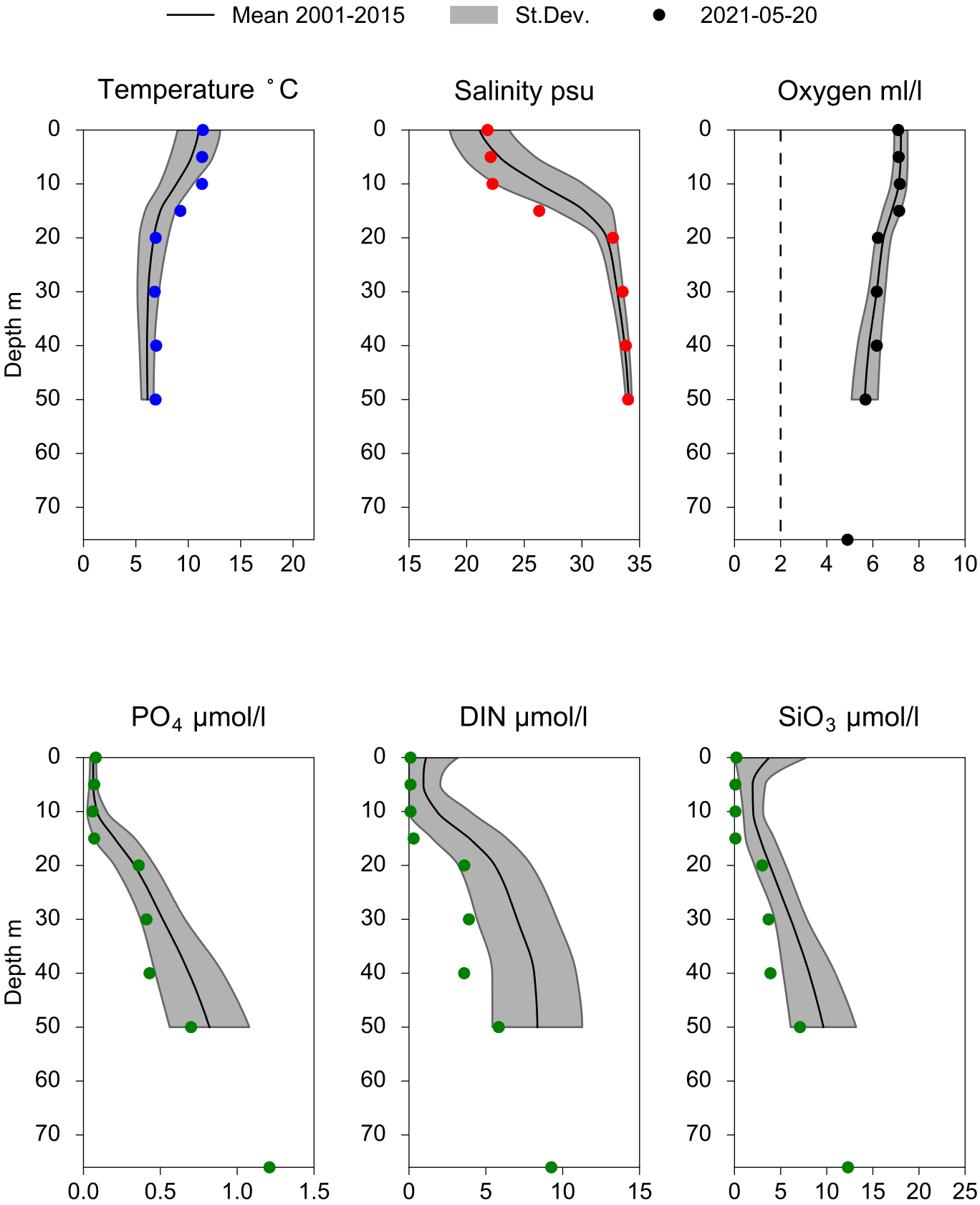
STATION SLÄGGÖ SURFACE WATER (0-10 m)

Annual Cycles



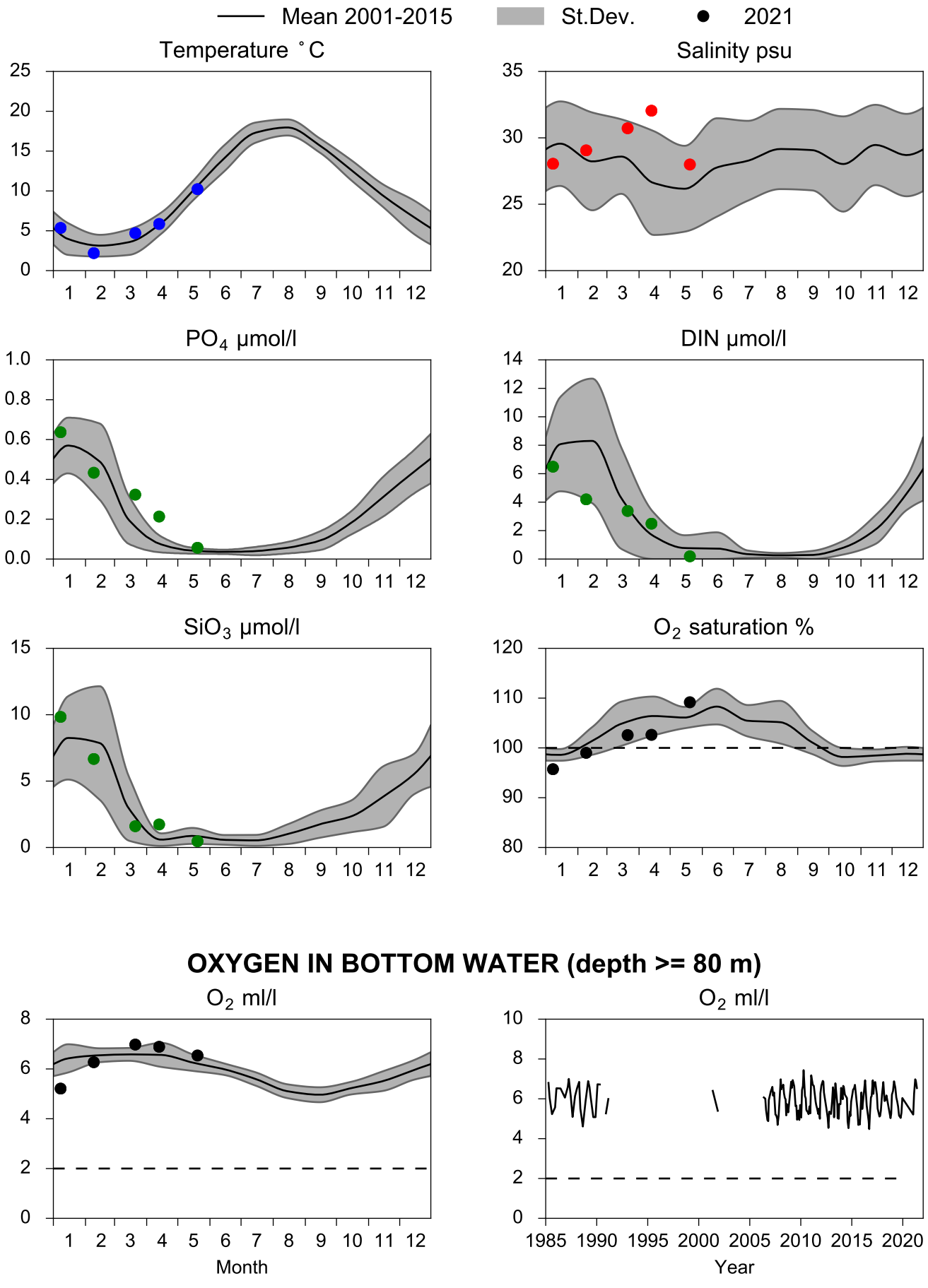
OXYGEN IN BOTTOM WATER (depth >= 64 m)

Vertical profiles SLÄGGÖ
May



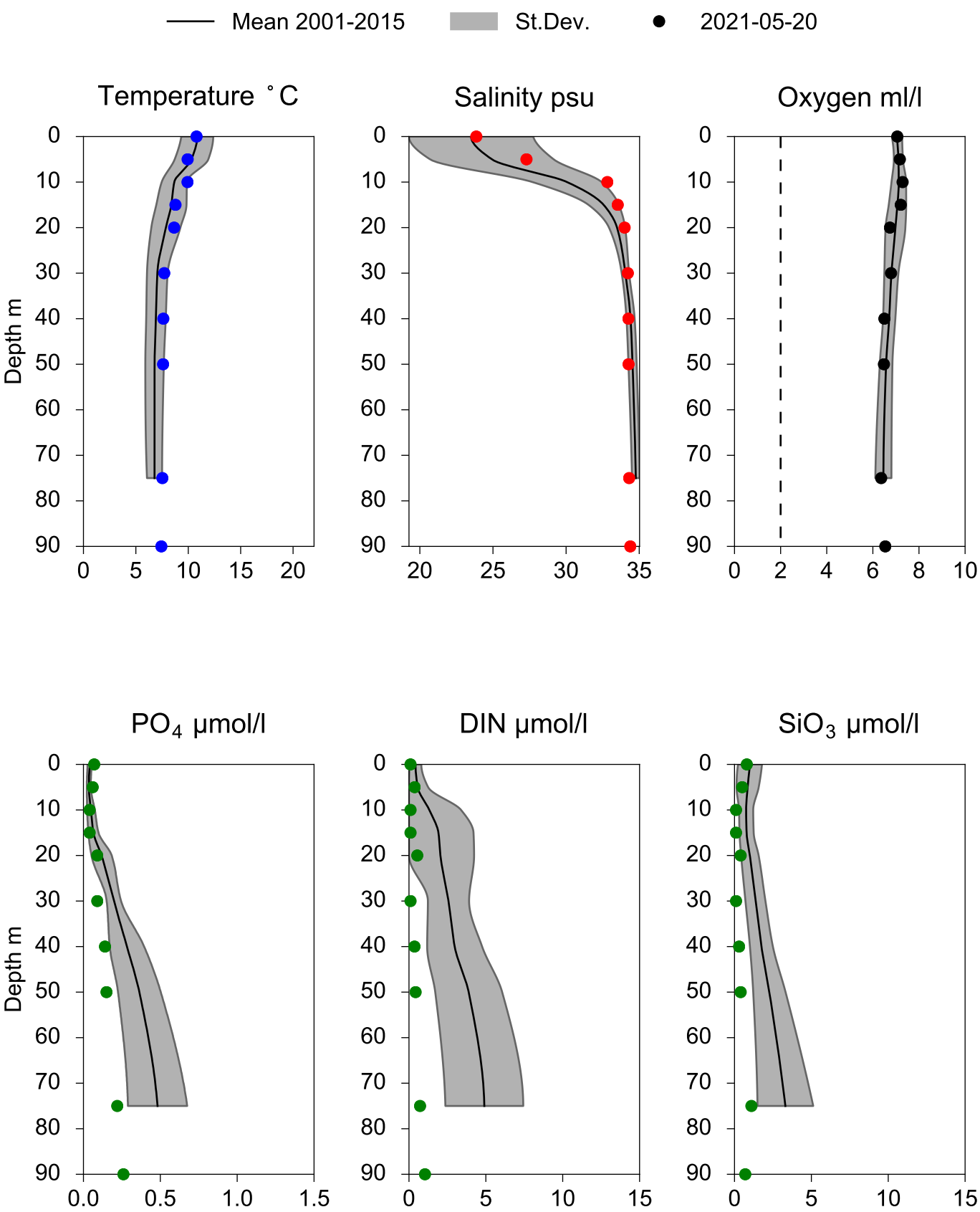
STATION Å13 SURFACE WATER (0-10 m)

Annual Cycles



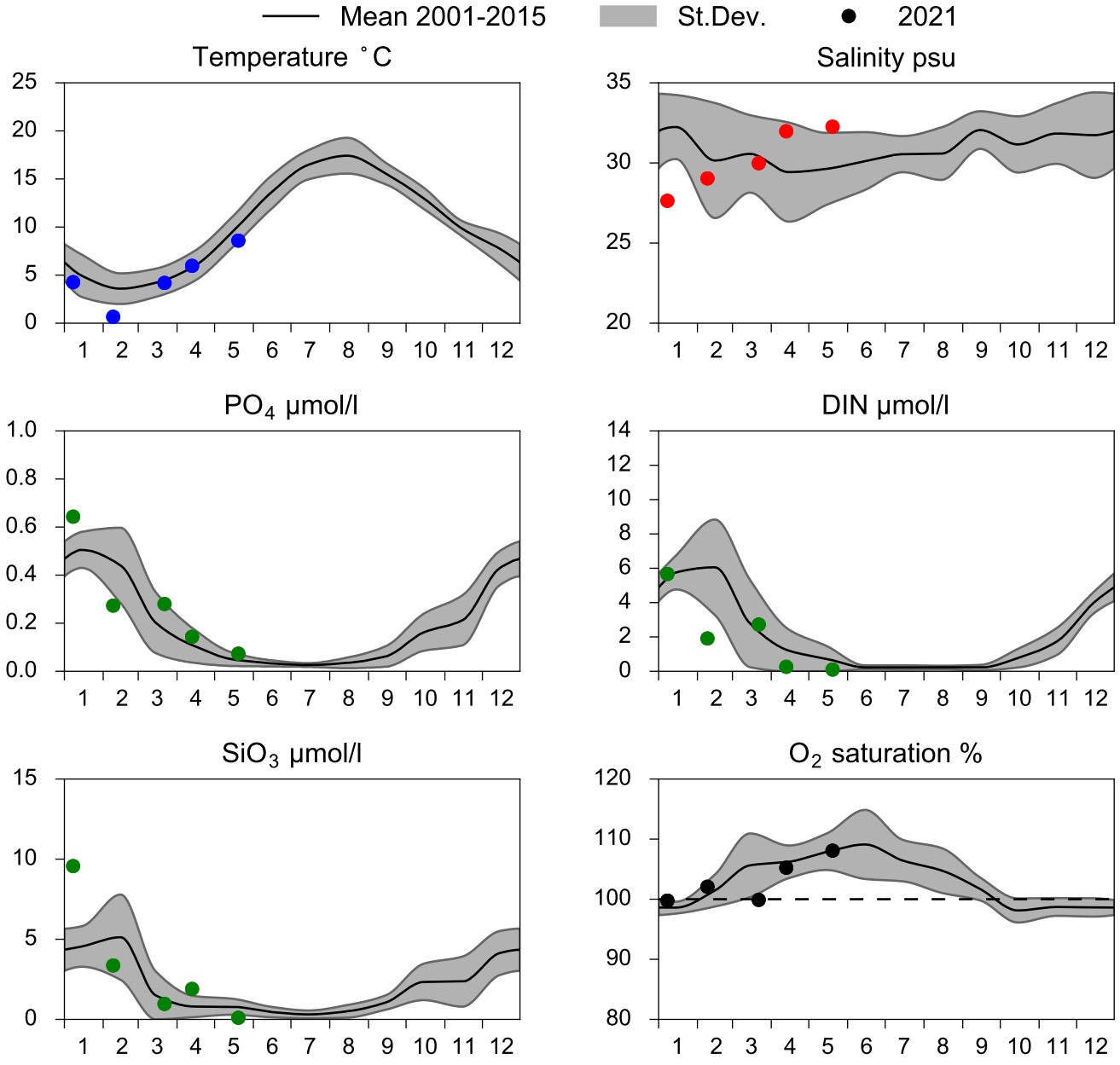
OXYGEN IN BOTTOM WATER (depth >= 80 m)

Vertical profiles Å13
May

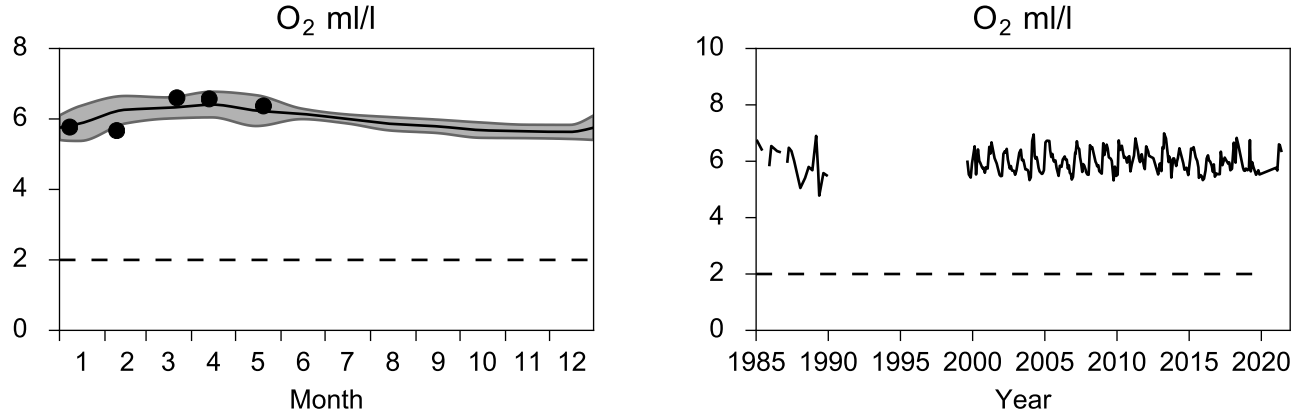


STATION Å17 SURFACE WATER (0-10 m)

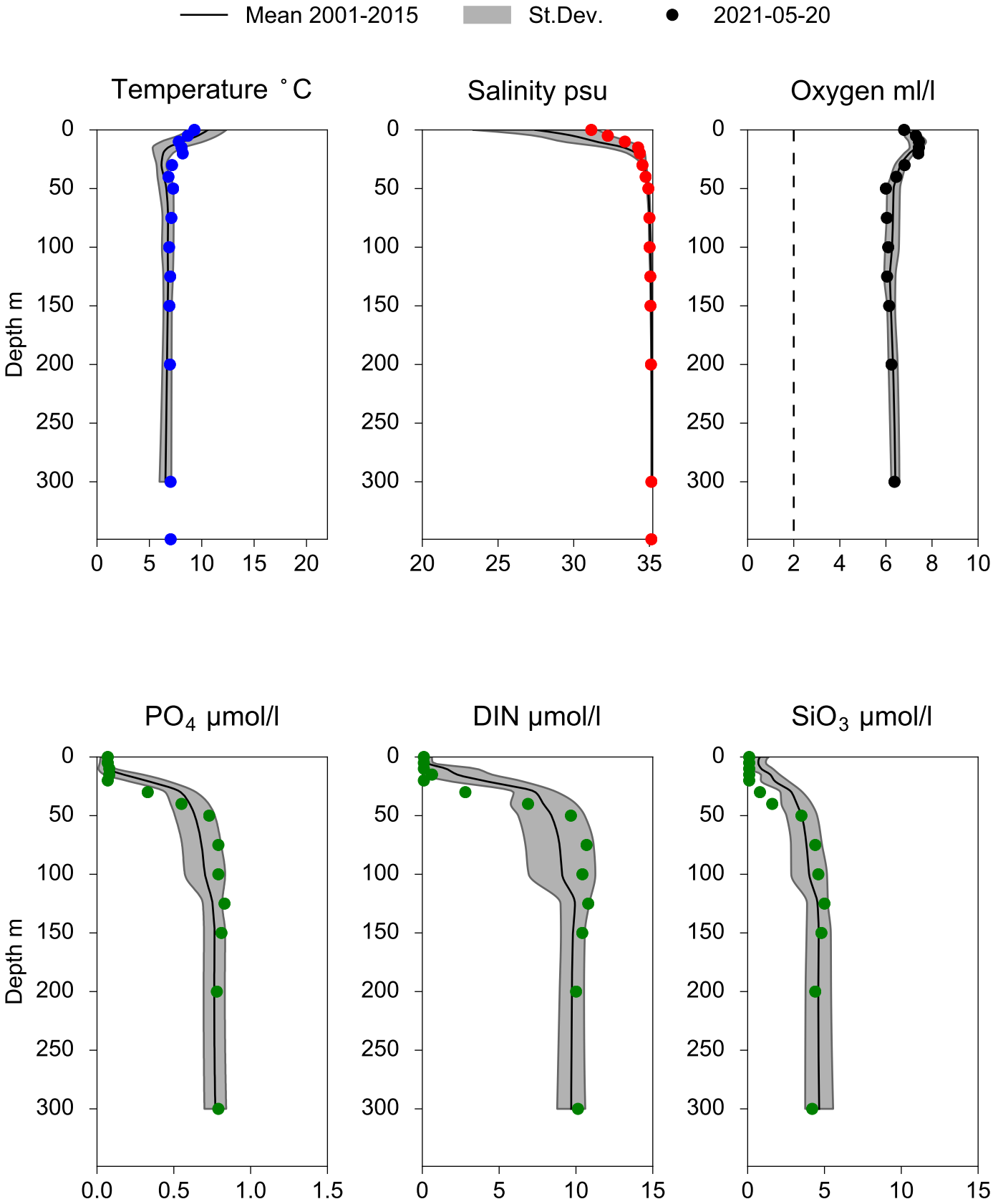
Annual Cycles



OXYGEN IN BOTTOM WATER (depth >= 300 m)

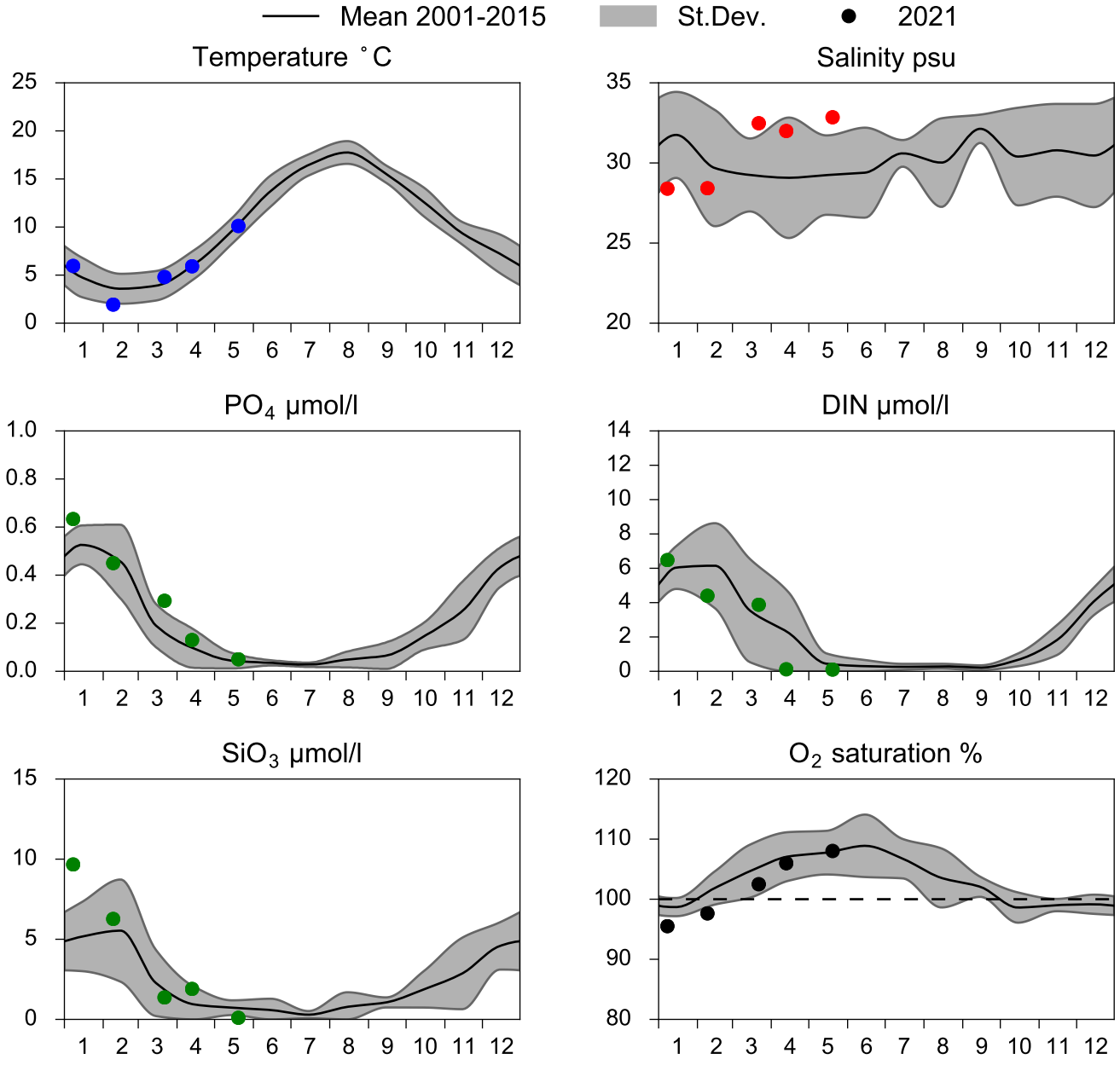


Vertical profiles Å17
May

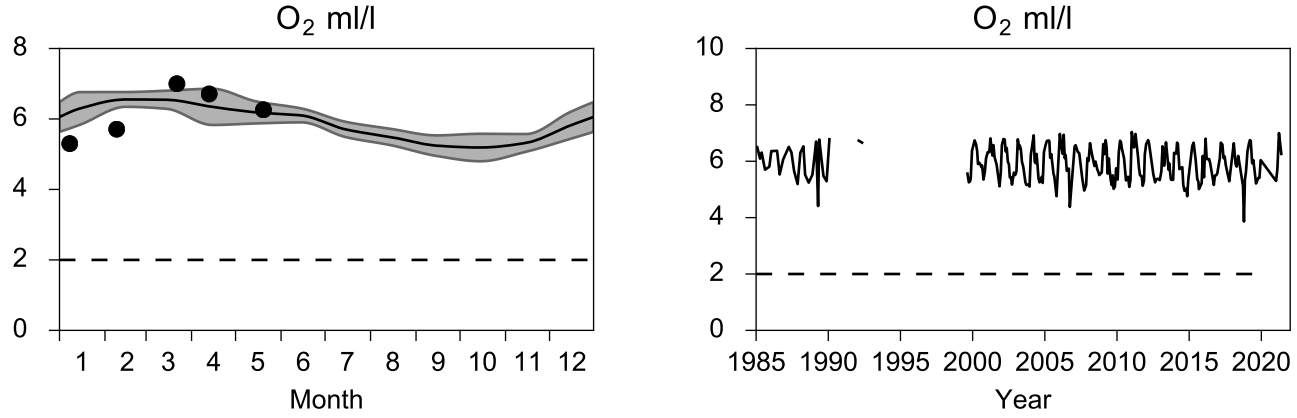


STATION Å15 SURFACE WATER (0-10 m)

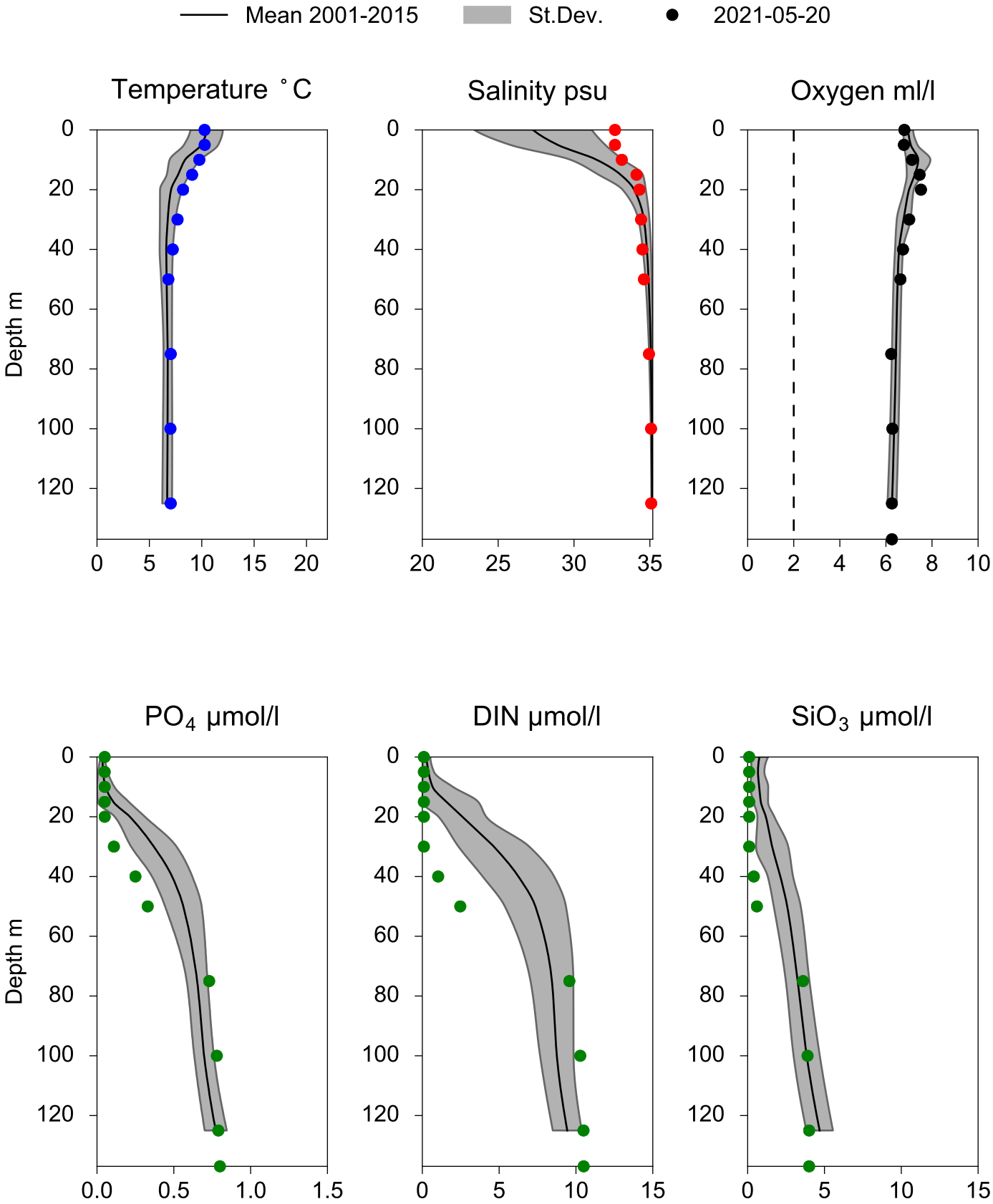
Annual Cycles



OXYGEN IN BOTTOM WATER (depth >= 125 m)

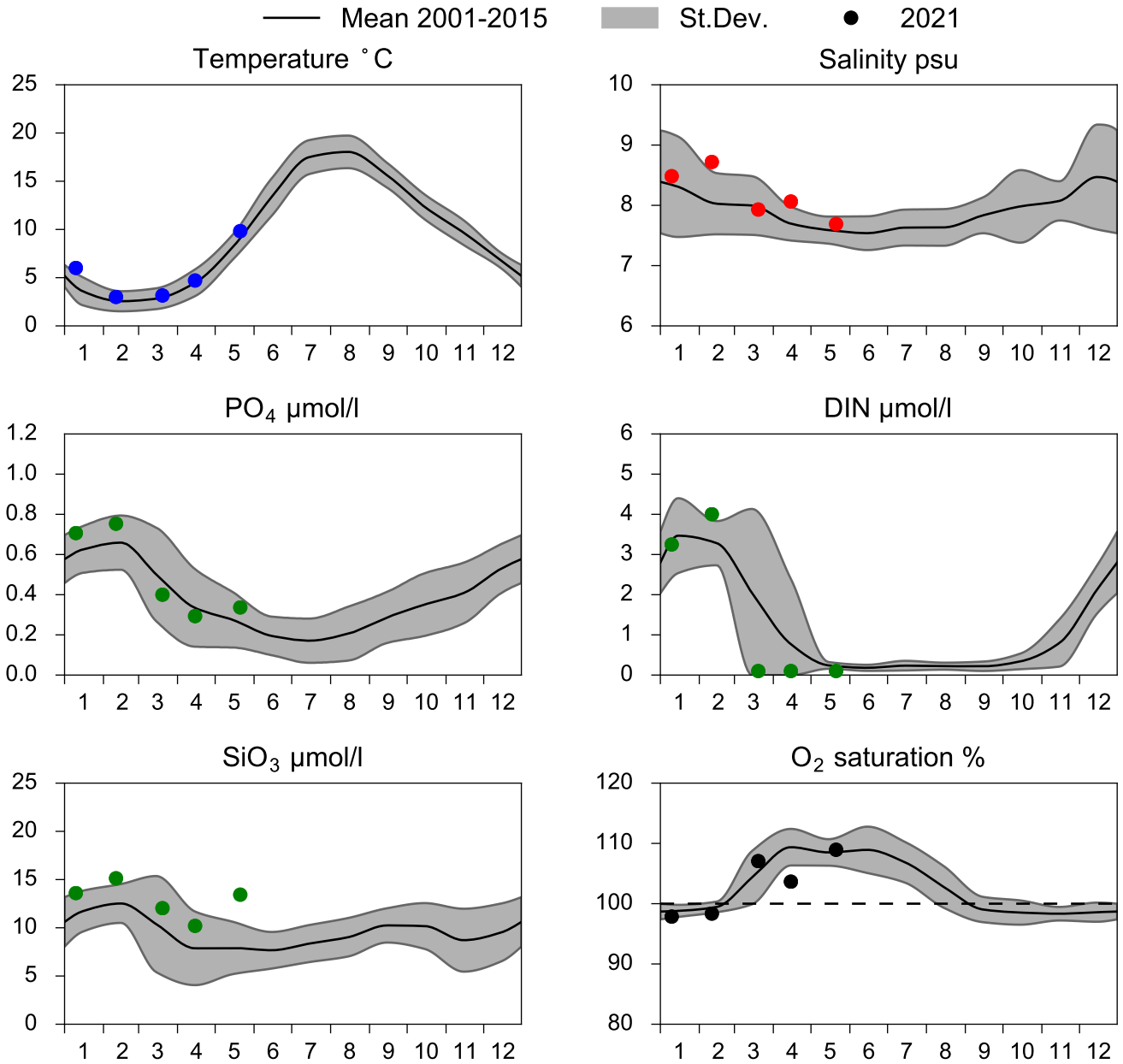


Vertical profiles Å15
May

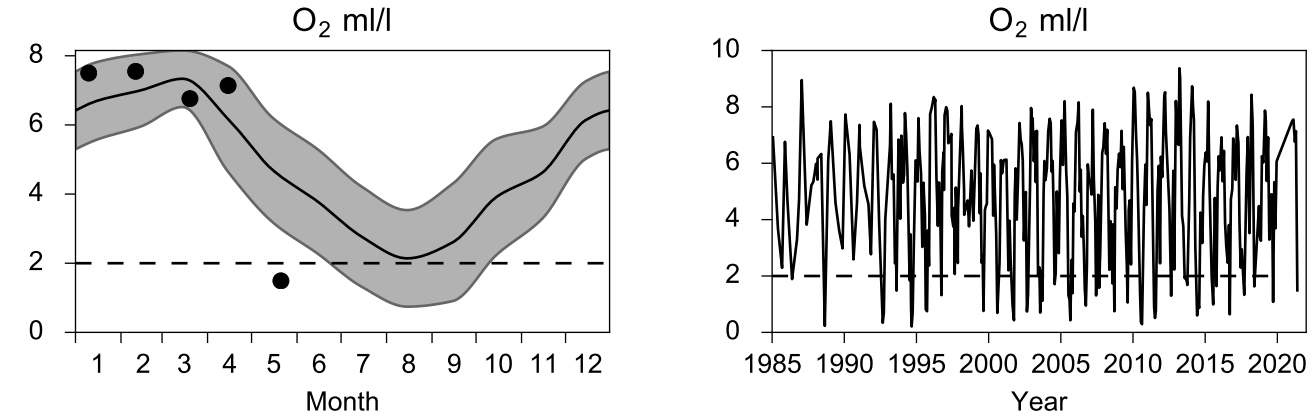


STATION BY1 SURFACE WATER (0-10 m)

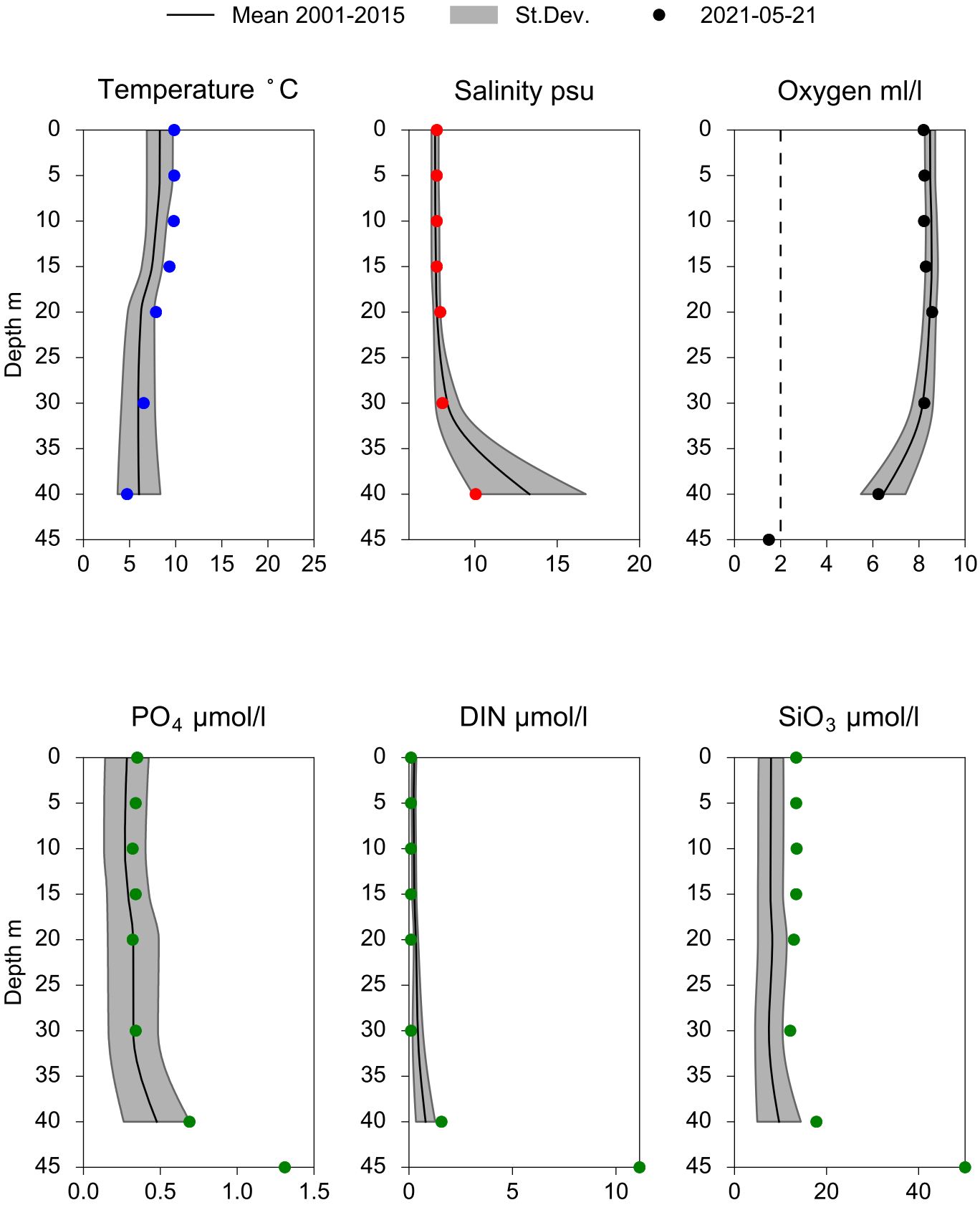
Annual Cycles



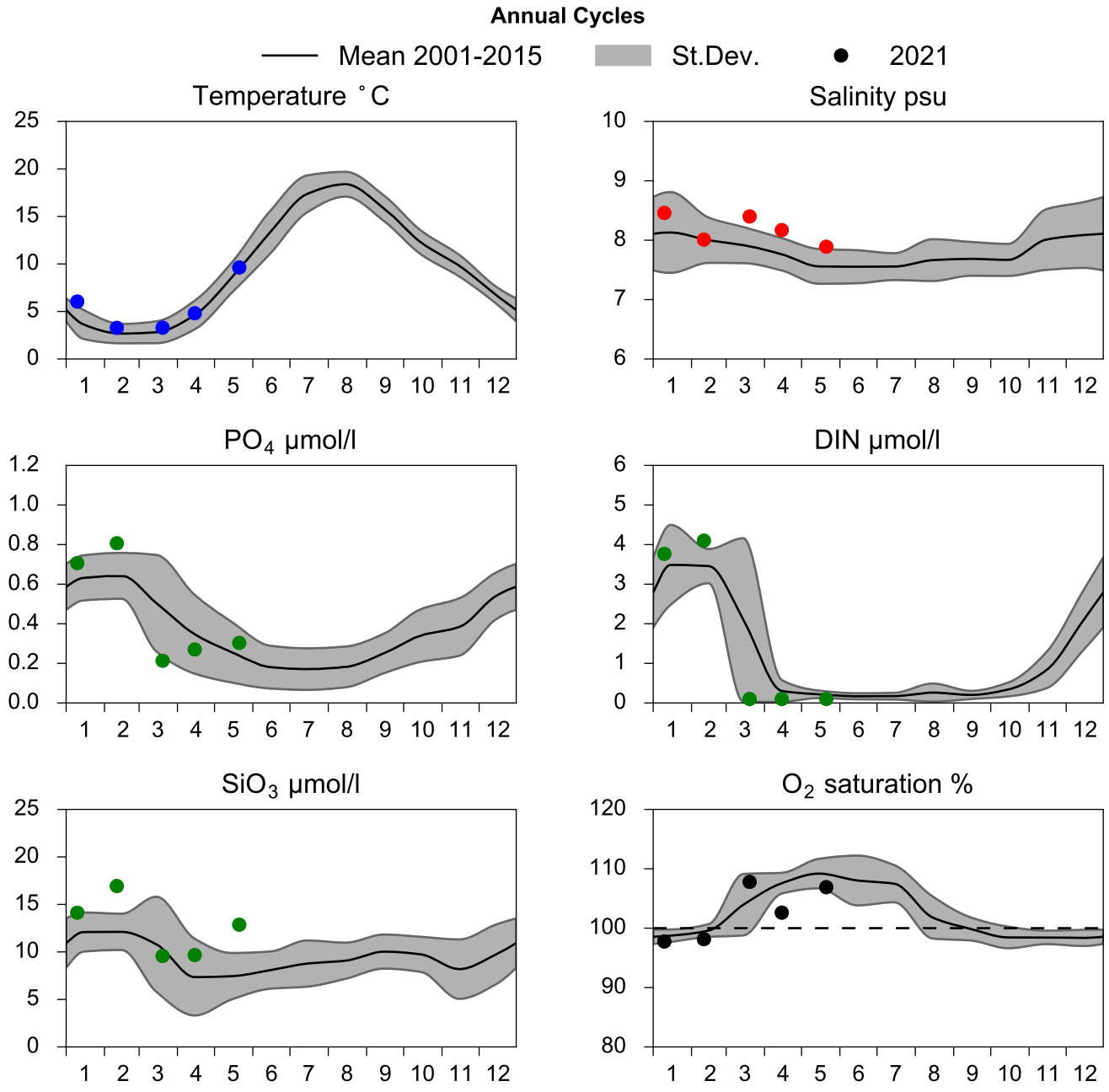
OXYGEN IN BOTTOM WATER (depth >= 40 m)



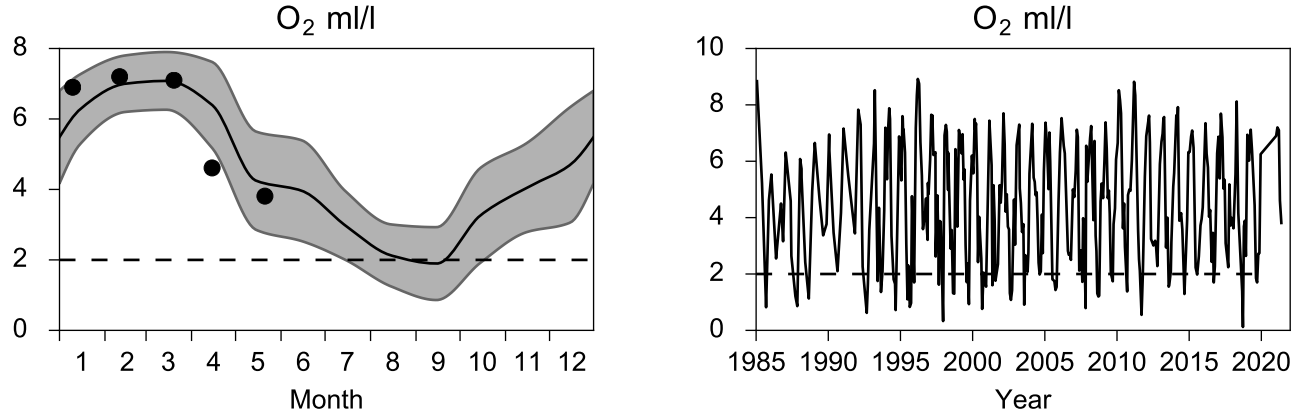
Vertical profiles BY1
May



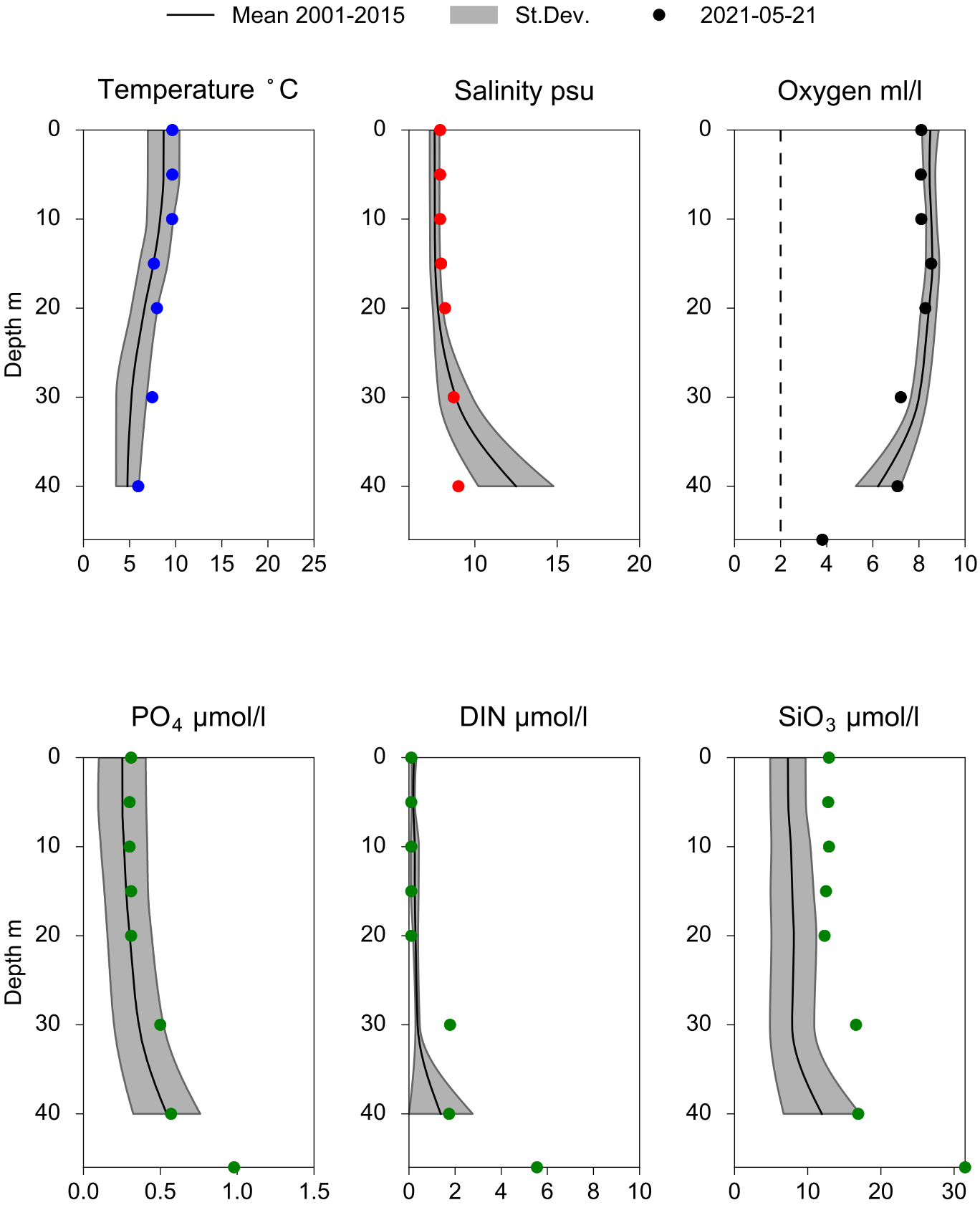
STATION BY2 ARKONA SURFACE WATER (0-10 m)



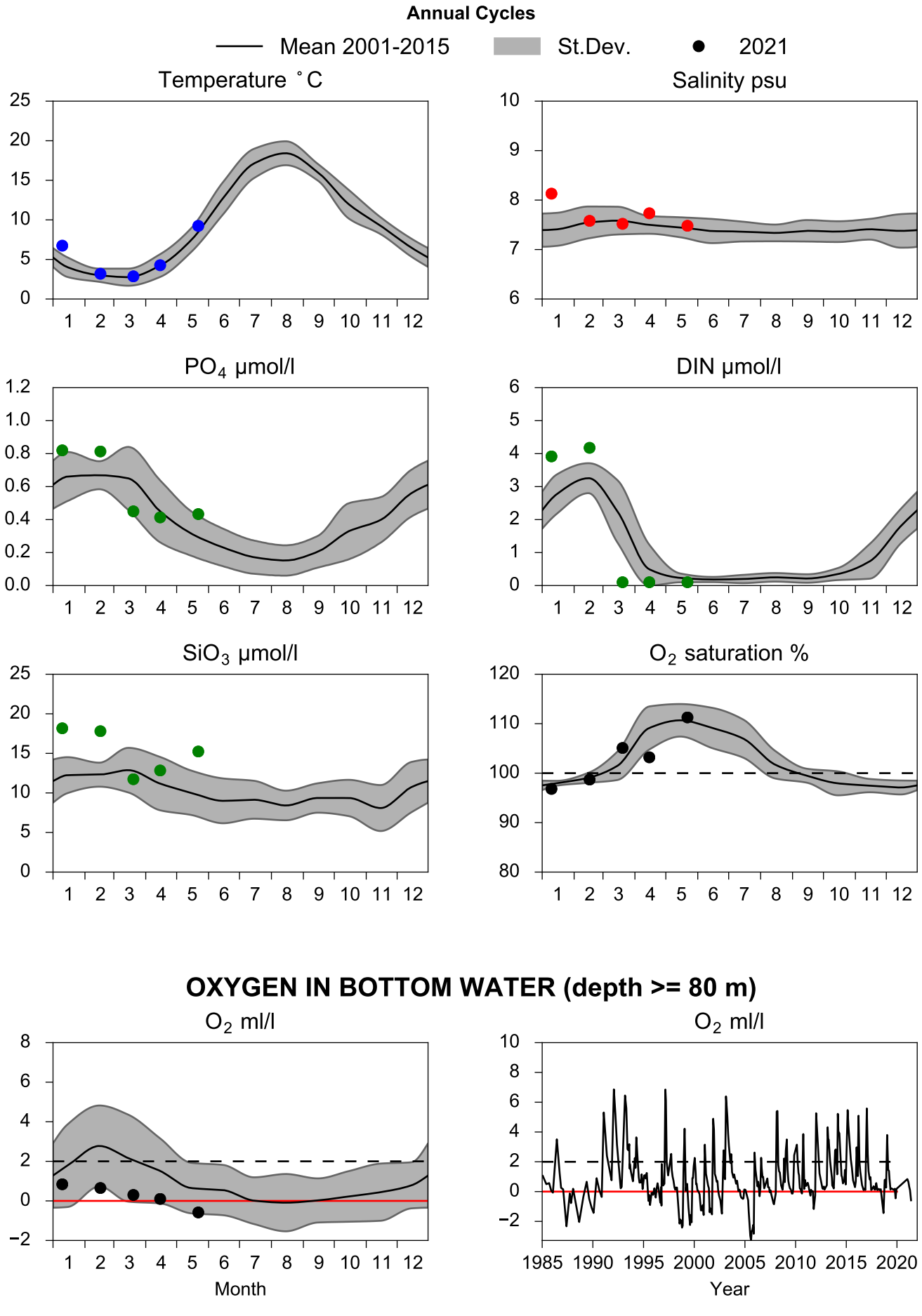
OXYGEN IN BOTTOM WATER (depth >= 40 m)



Vertical profiles BY2 ARKONA
May

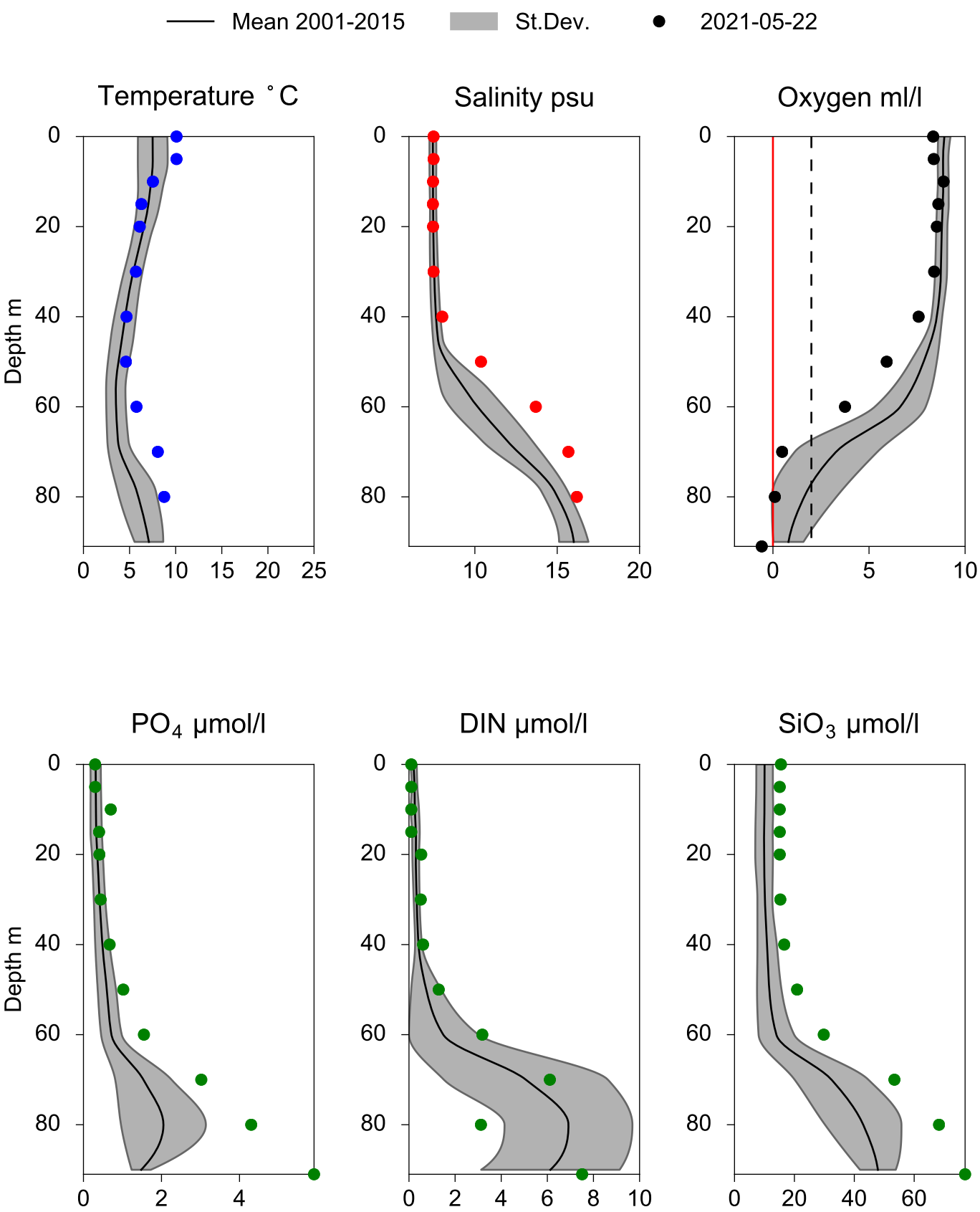


STATION BY4 CHRISTIANSÖ SURFACE WATER (0-10 m)

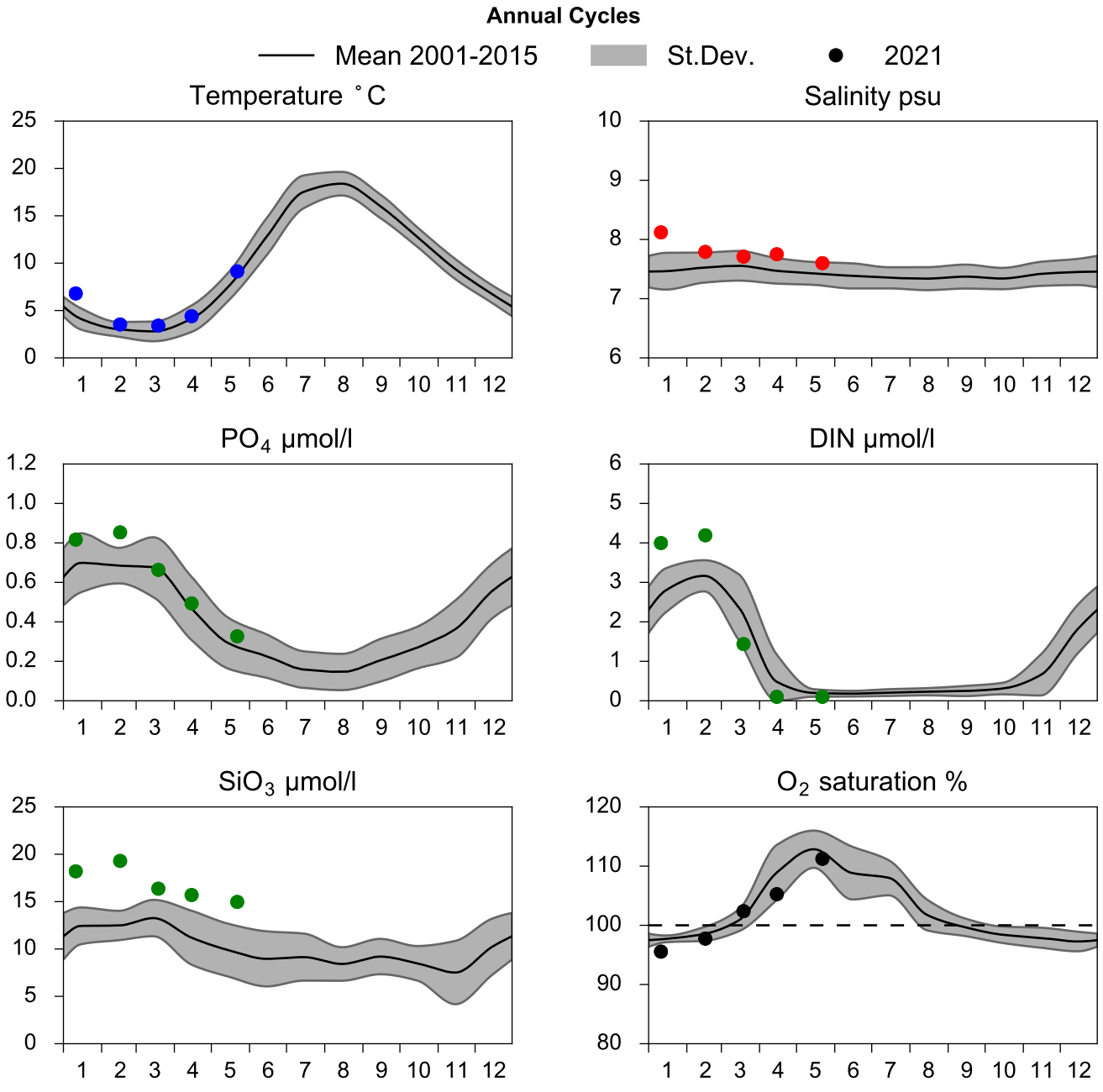


OXYGEN IN BOTTOM WATER (depth >= 80 m)

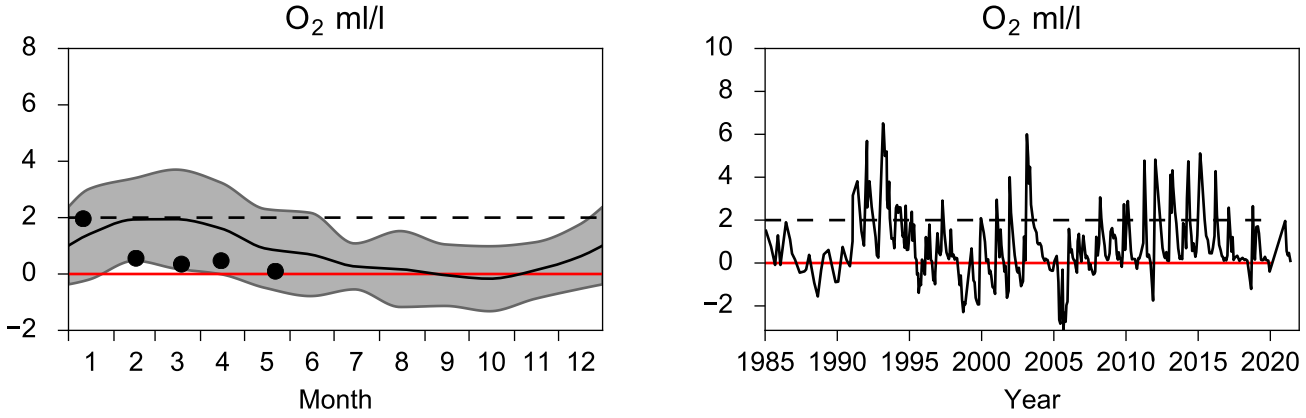
Vertical profiles BY4 CHRISTIANSÖ
May



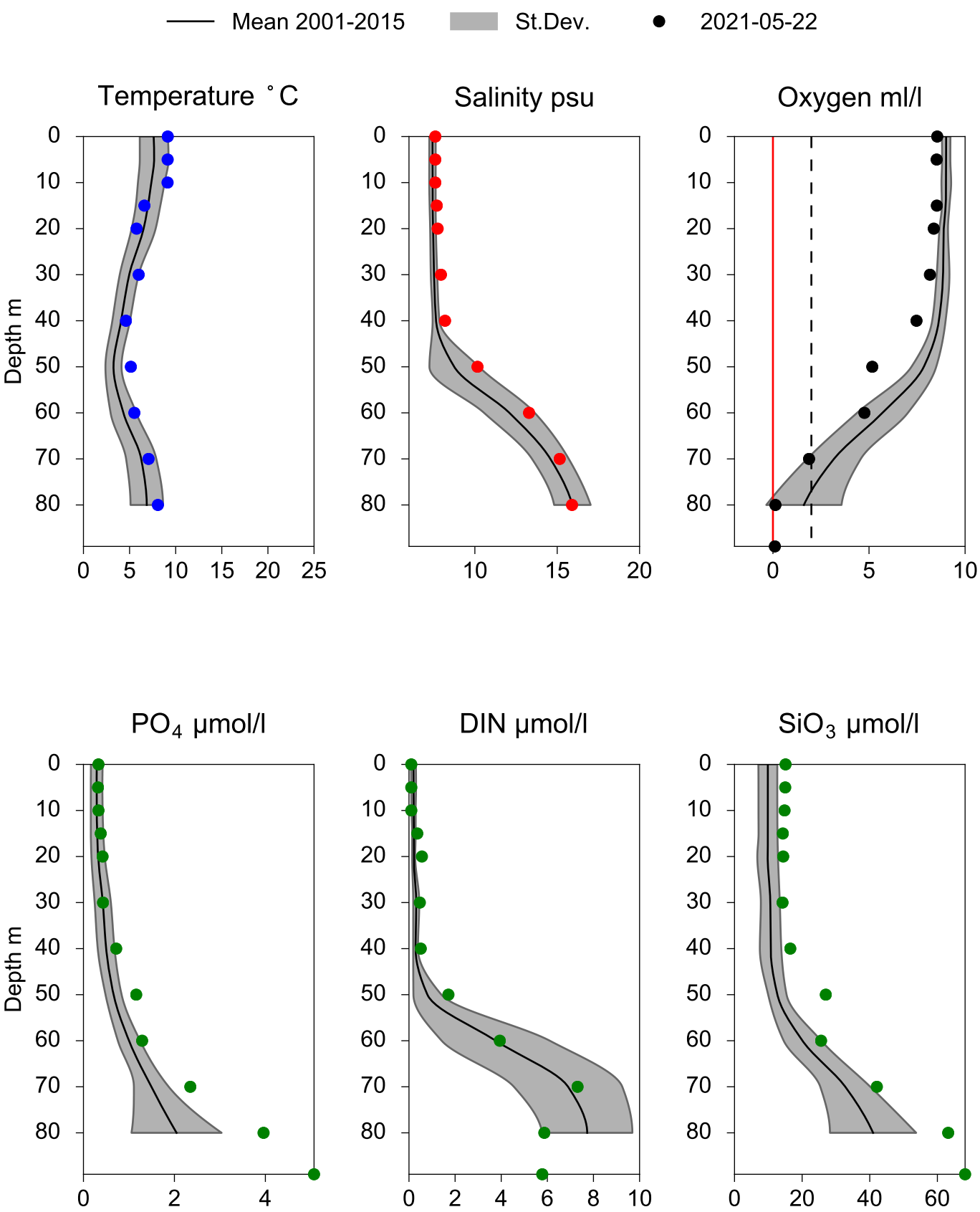
STATION BY5 BORNHOLMSDJ SURFACE WATER (0-10 m)



OXYGEN IN BOTTOM WATER (depth >= 80 m)



Vertical profiles BY5 BORNHOLMSDJ
May

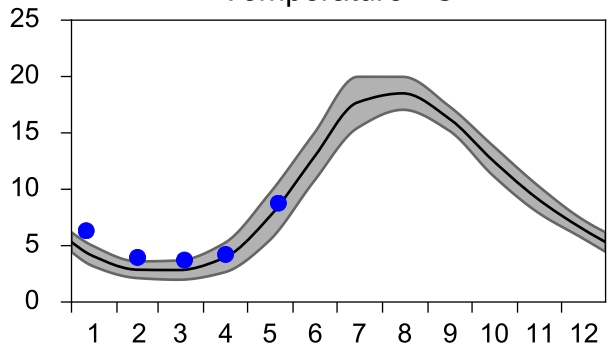


STATION BCS III-10 SURFACE WATER (0-10 m)

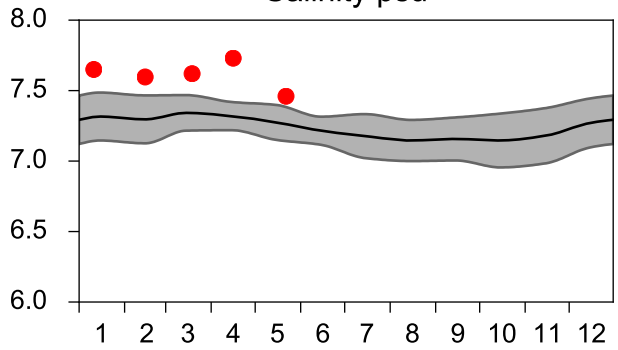
Annual Cycles

Mean 2001-2015 St.Dev. 2021

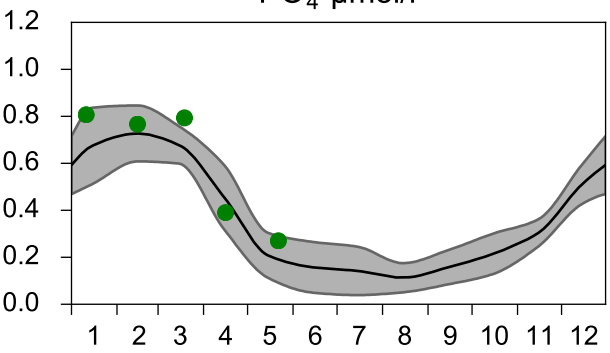
Temperature ˚C



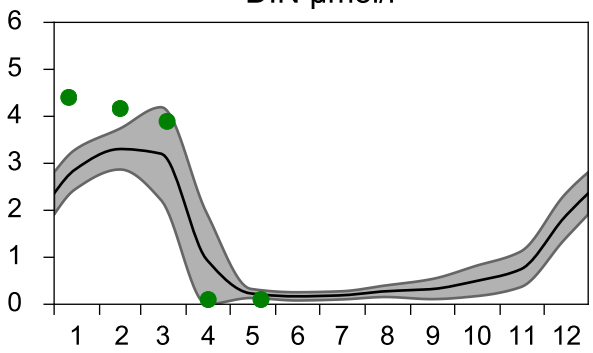
Salinity psu



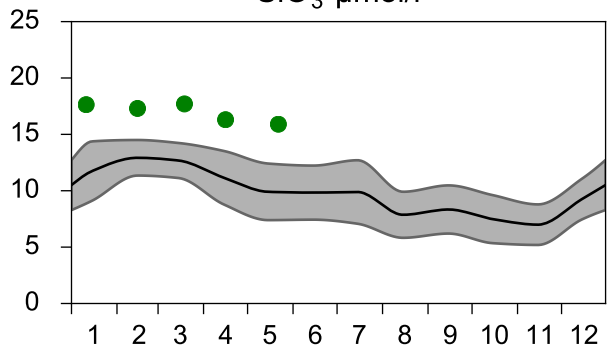
PO_4 µmol/l



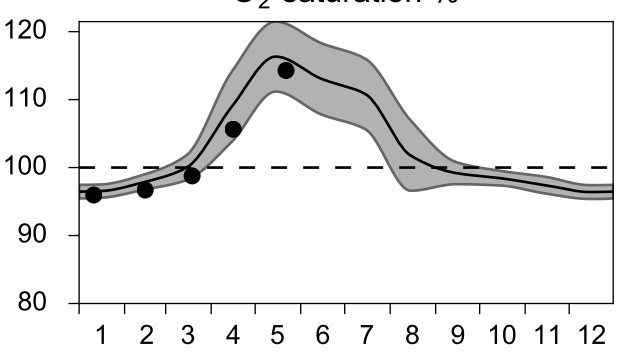
DIN µmol/l



SiO_3 µmol/l

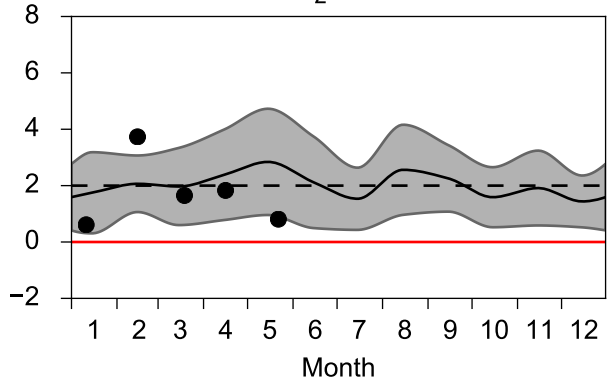


O_2 saturation %

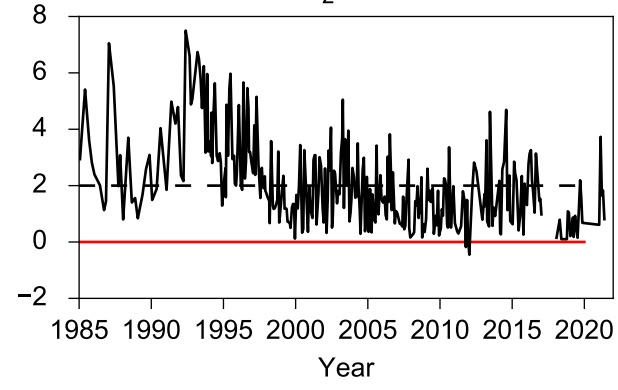


OXYGEN IN BOTTOM WATER (depth >= 80 m)

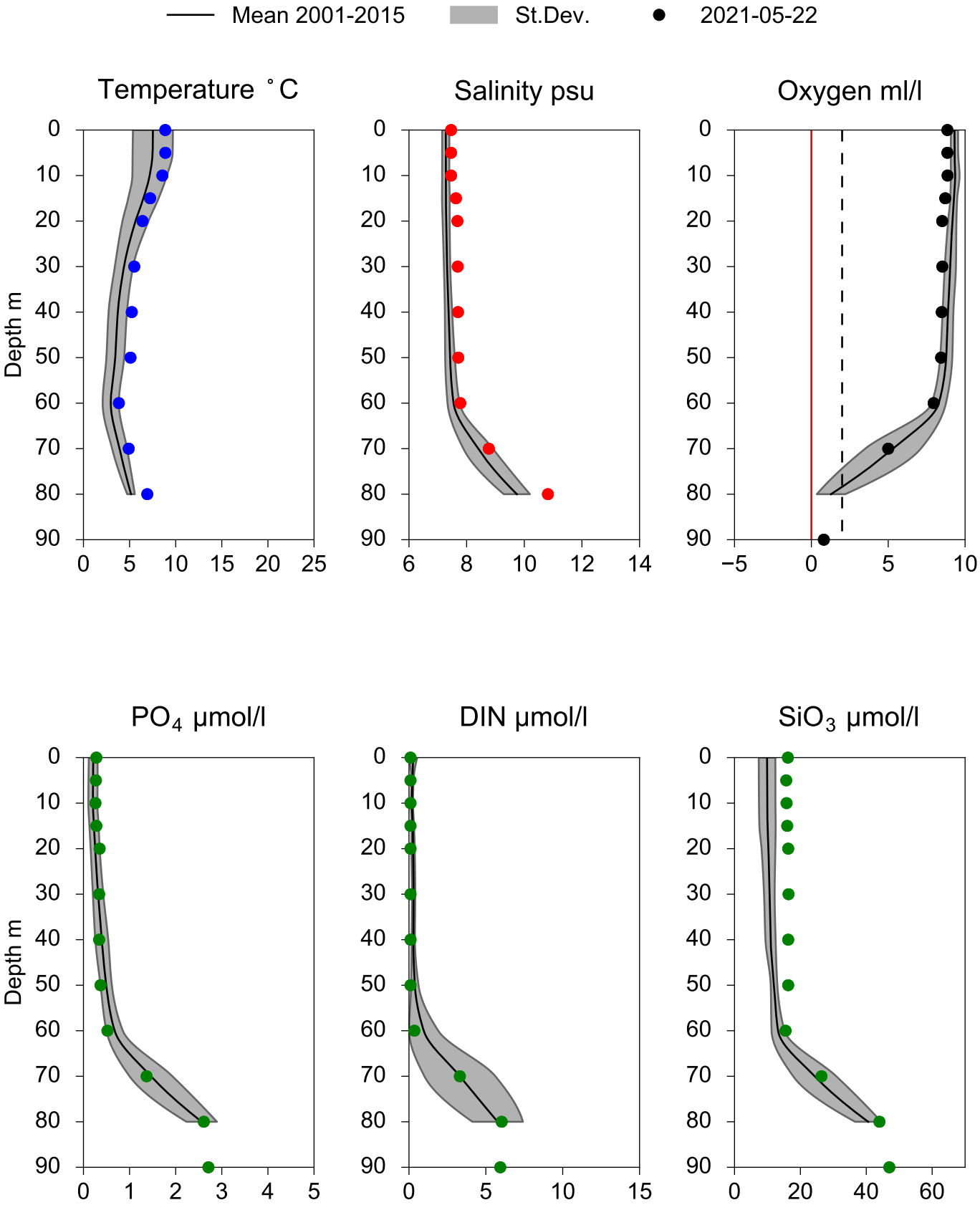
O_2 ml/l



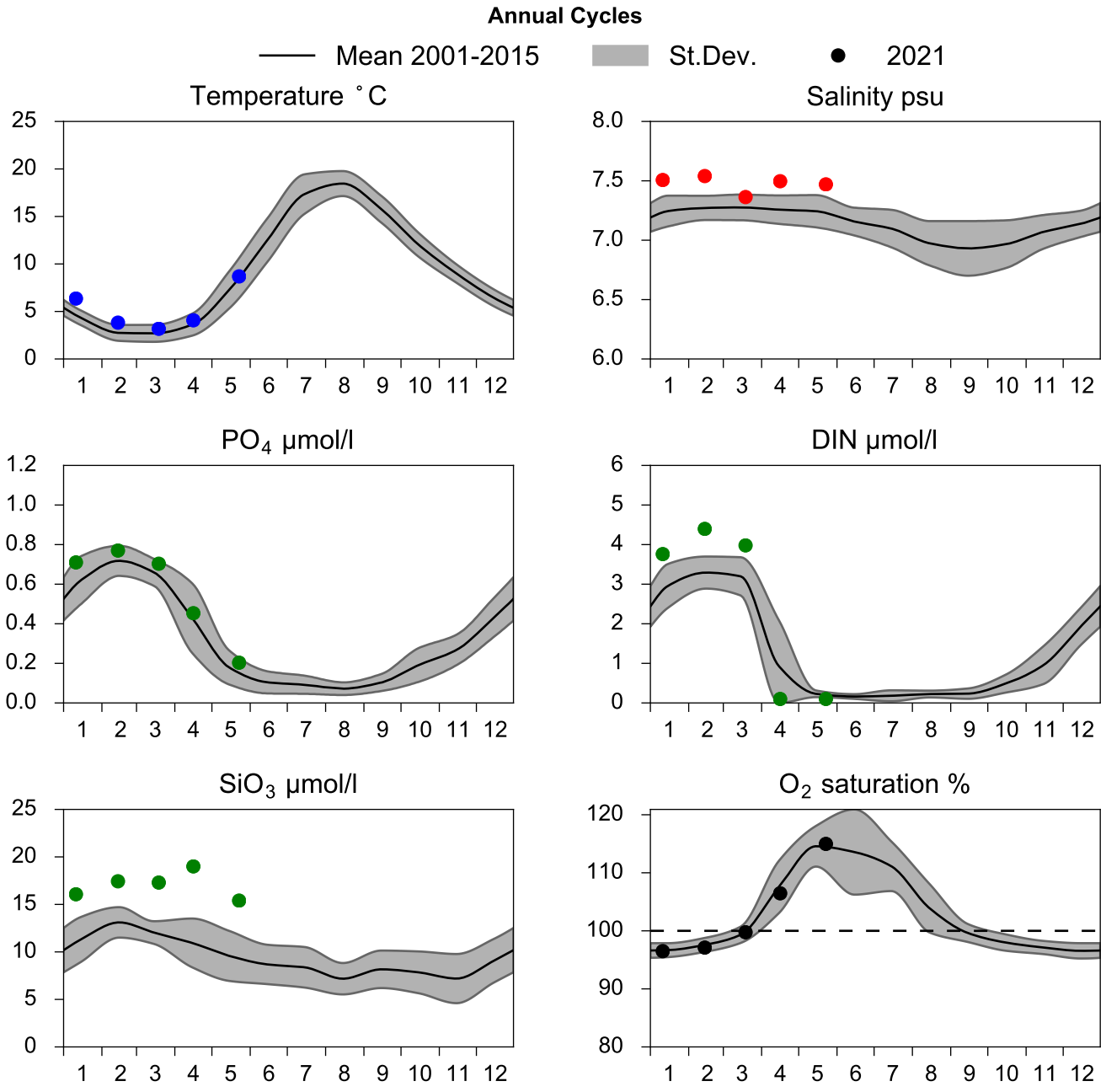
O_2 ml/l



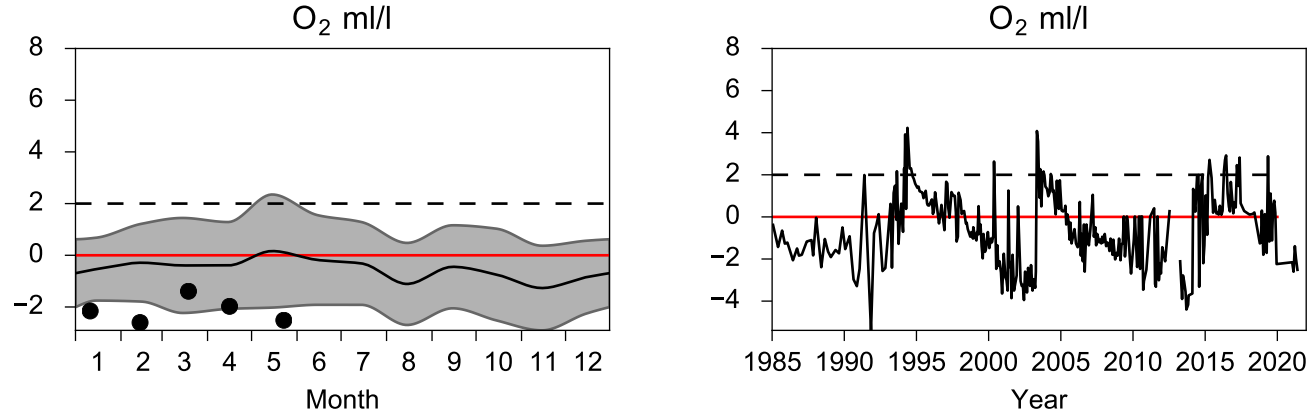
Vertical profiles BCS III-10
May



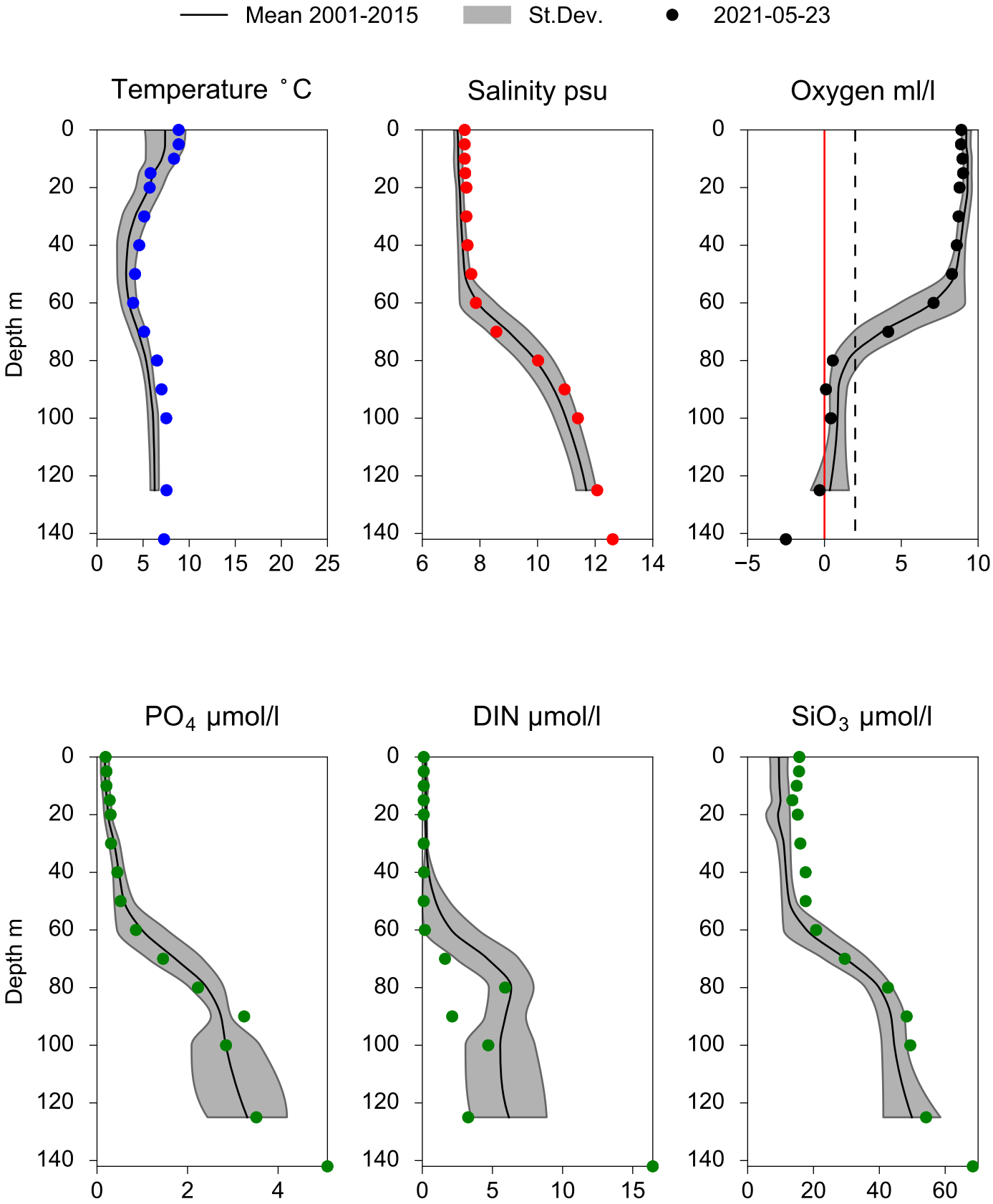
STATION BY10 SURFACE WATER (0-10 m)



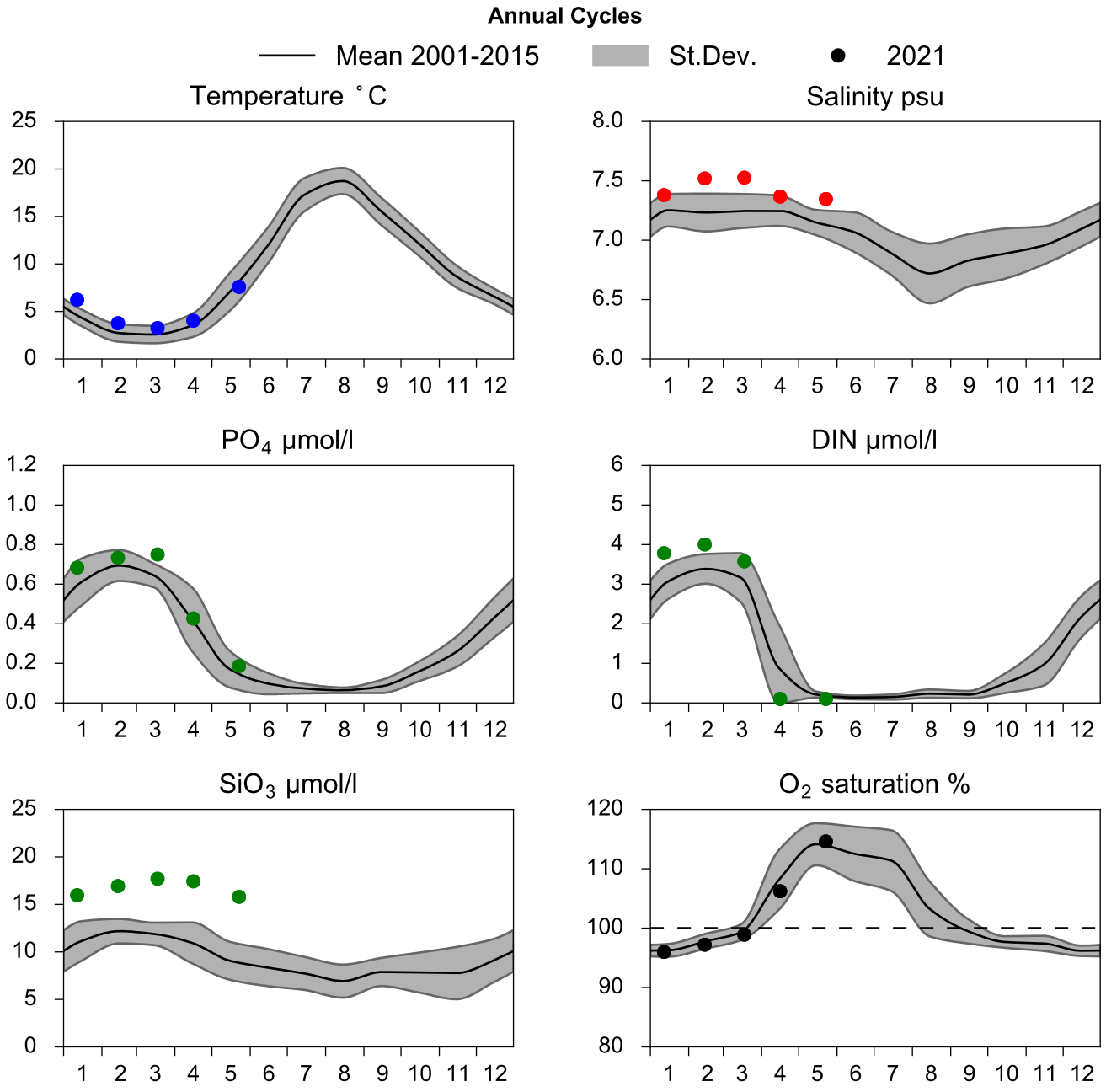
OXYGEN IN BOTTOM WATER (depth >= 125 m)



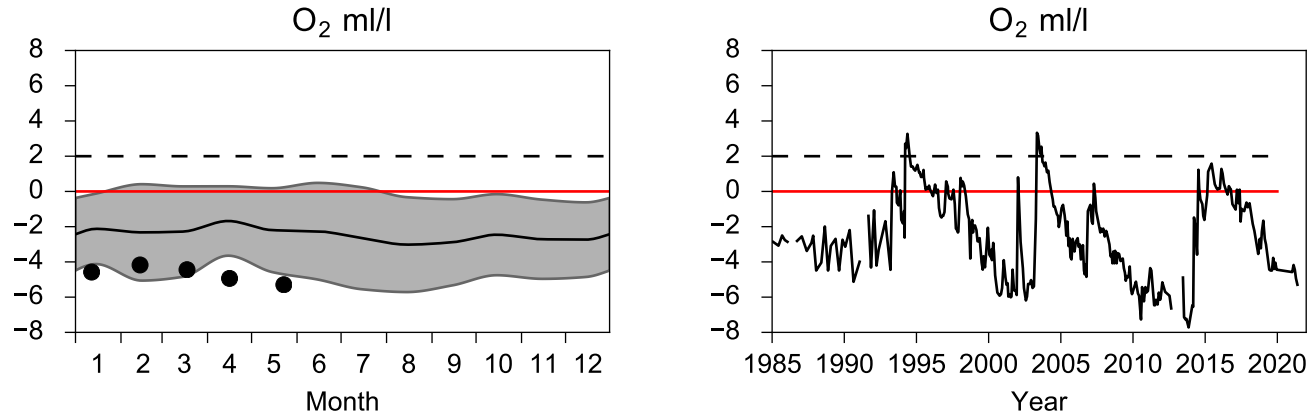
Vertical profiles BY10
May



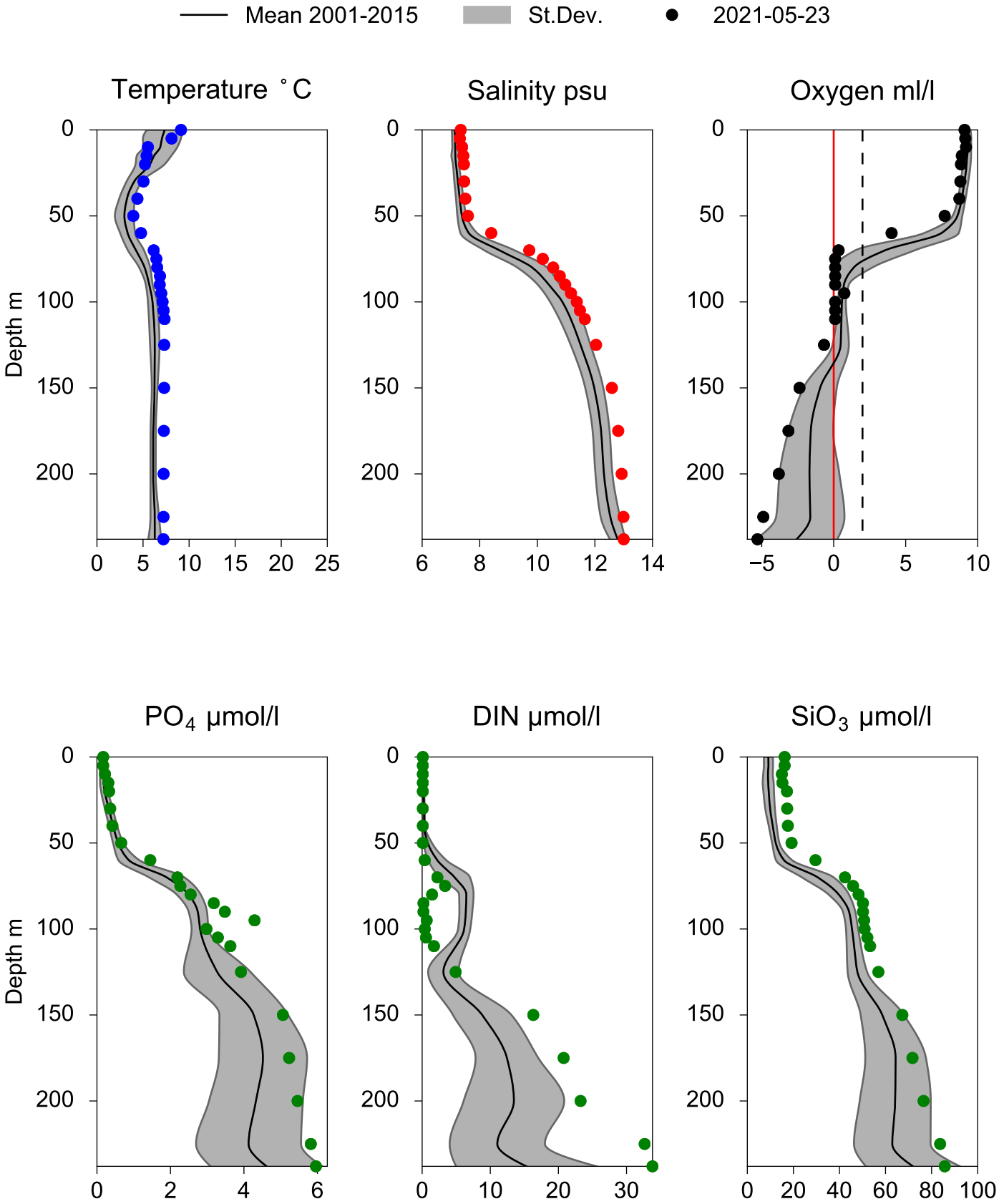
STATION BY15 GOTLANDSDJ SURFACE WATER (0-10 m)



OXYGEN IN BOTTOM WATER (depth >= 225 m)

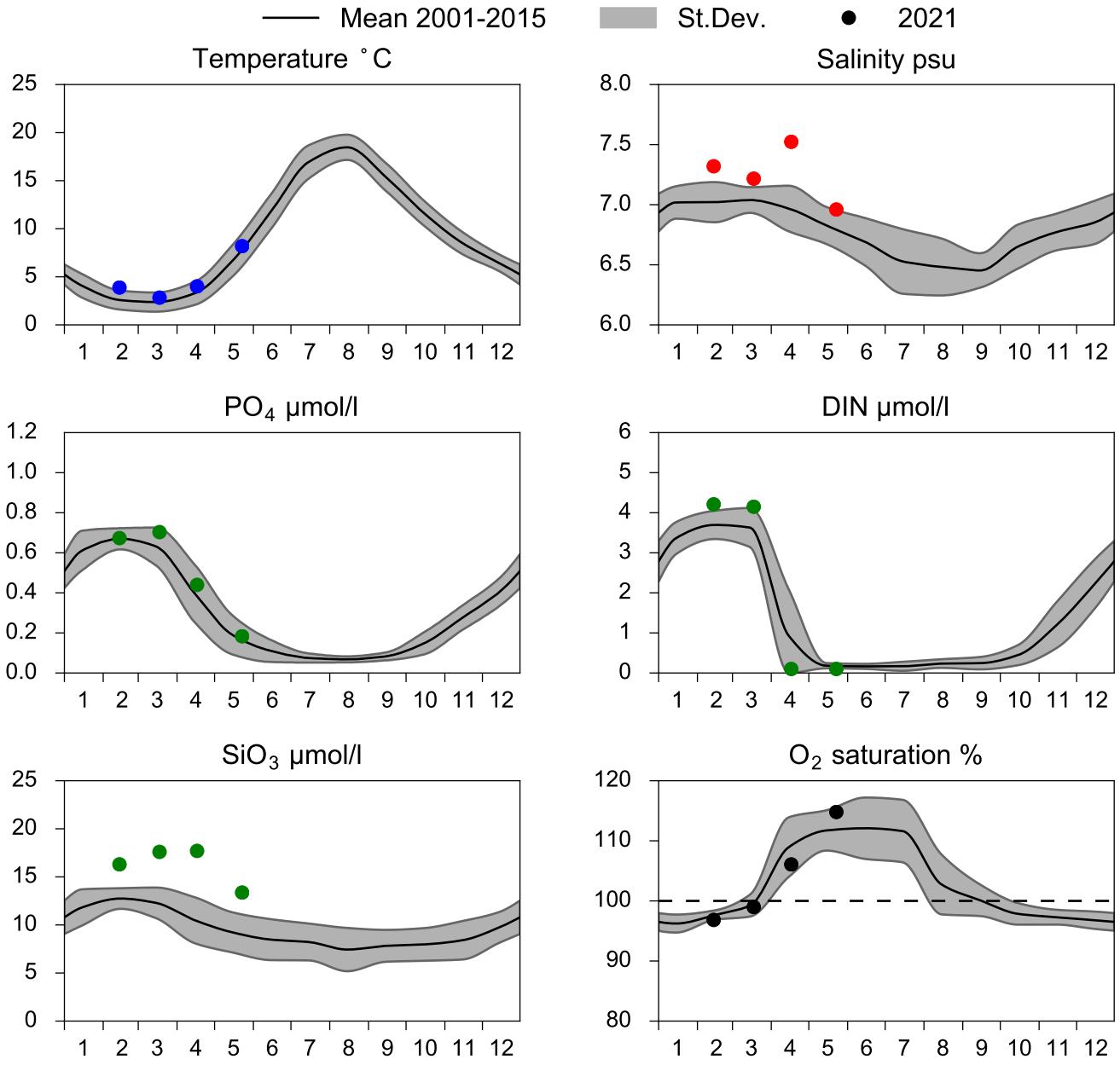


Vertical profiles BY15 GOTLANDSDJ
May

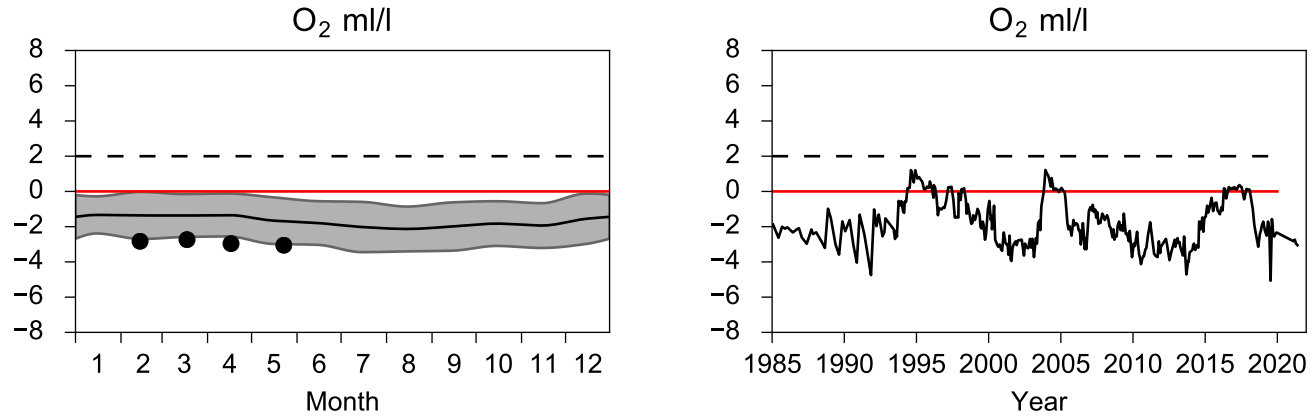


STATION BY20 FÅRÖDJ SURFACE WATER (0-10 m)

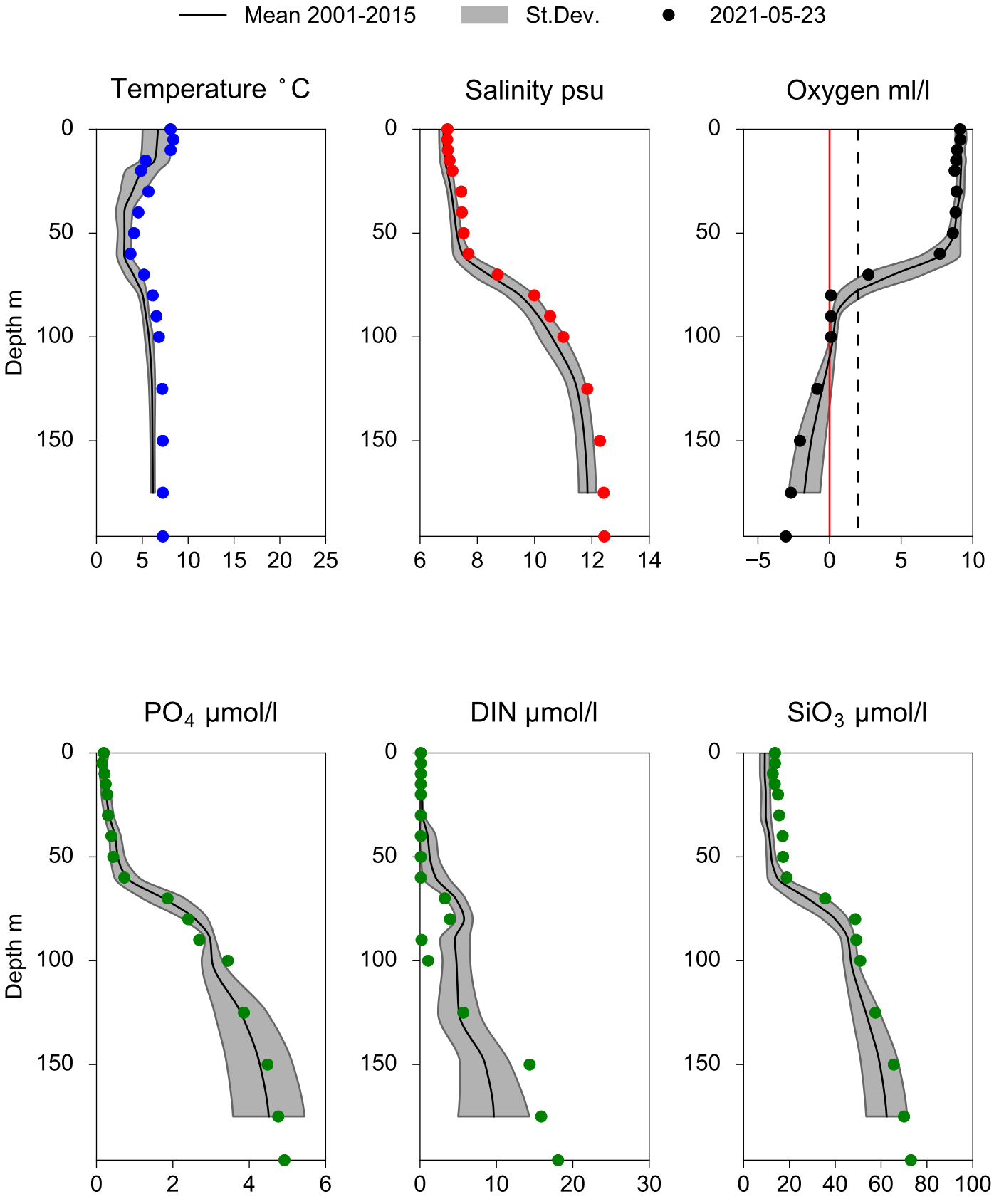
Annual Cycles



OXYGEN IN BOTTOM WATER (depth >= 175 m)



Vertical profiles BY20 FÅRÖDJ
May

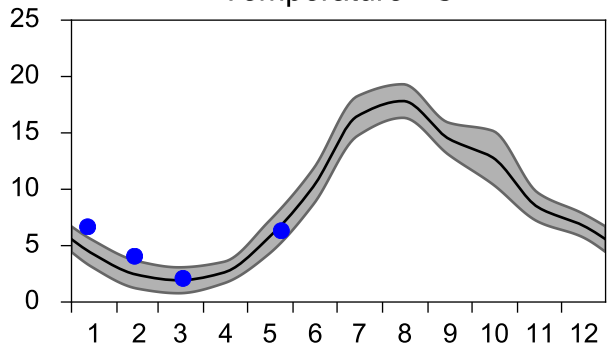


STATION BY29 / LL19 SURFACE WATER (0-10 m)

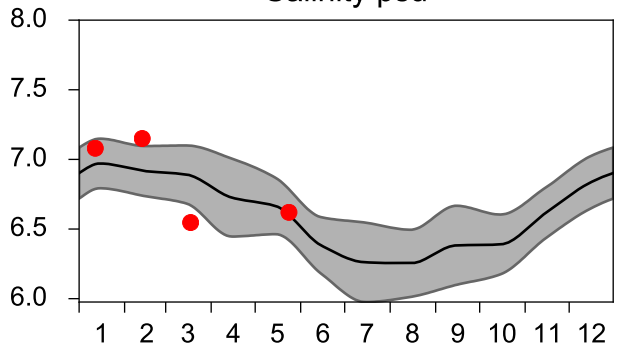
Annual Cycles

Mean 2001-2015 St.Dev. 2021

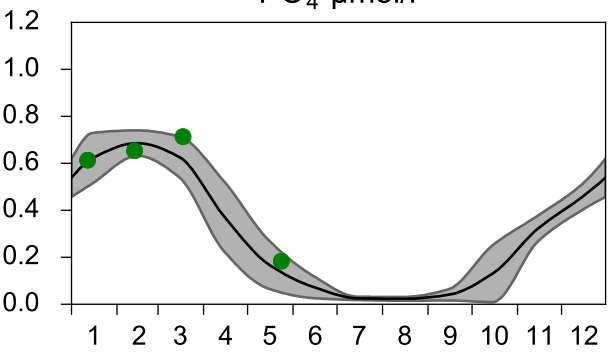
Temperature ˚C



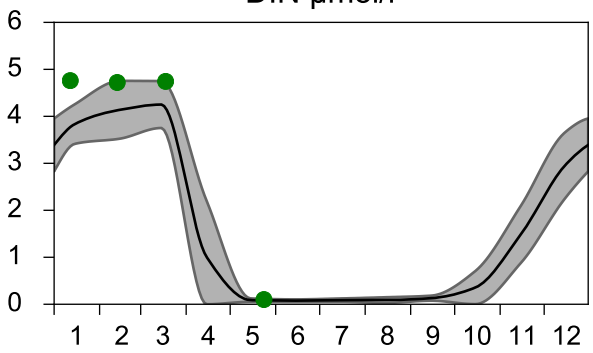
Salinity psu



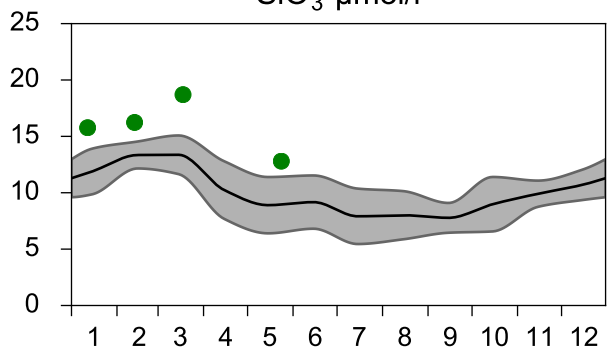
PO_4 µmol/l



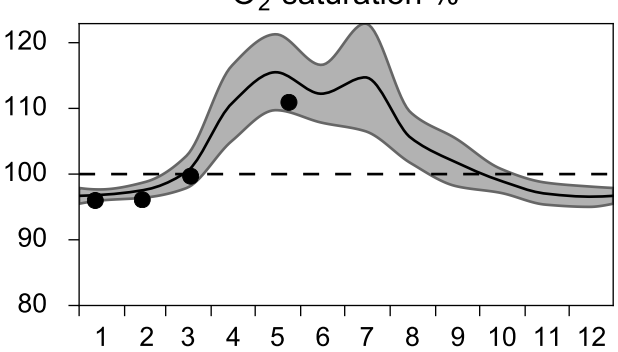
DIN µmol/l



SiO_3 µmol/l

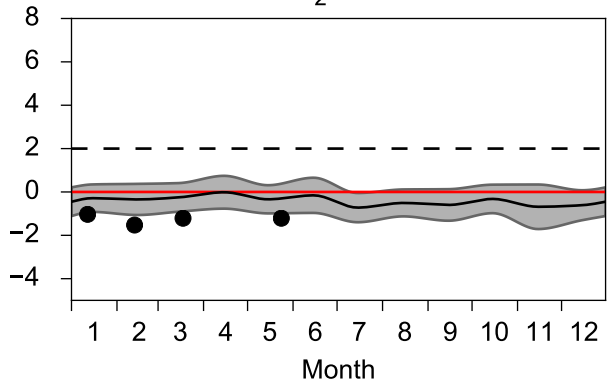


O_2 saturation %

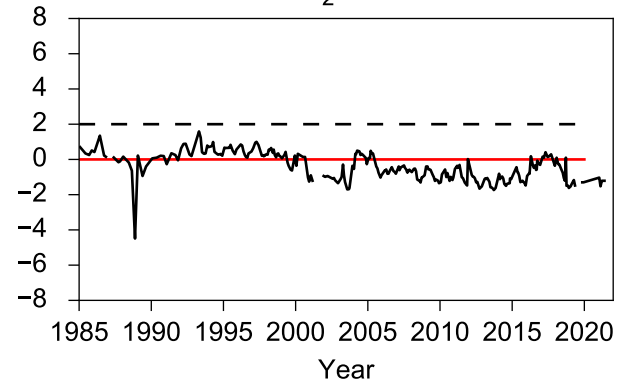


OXYGEN IN BOTTOM WATER (depth >= 150 m)

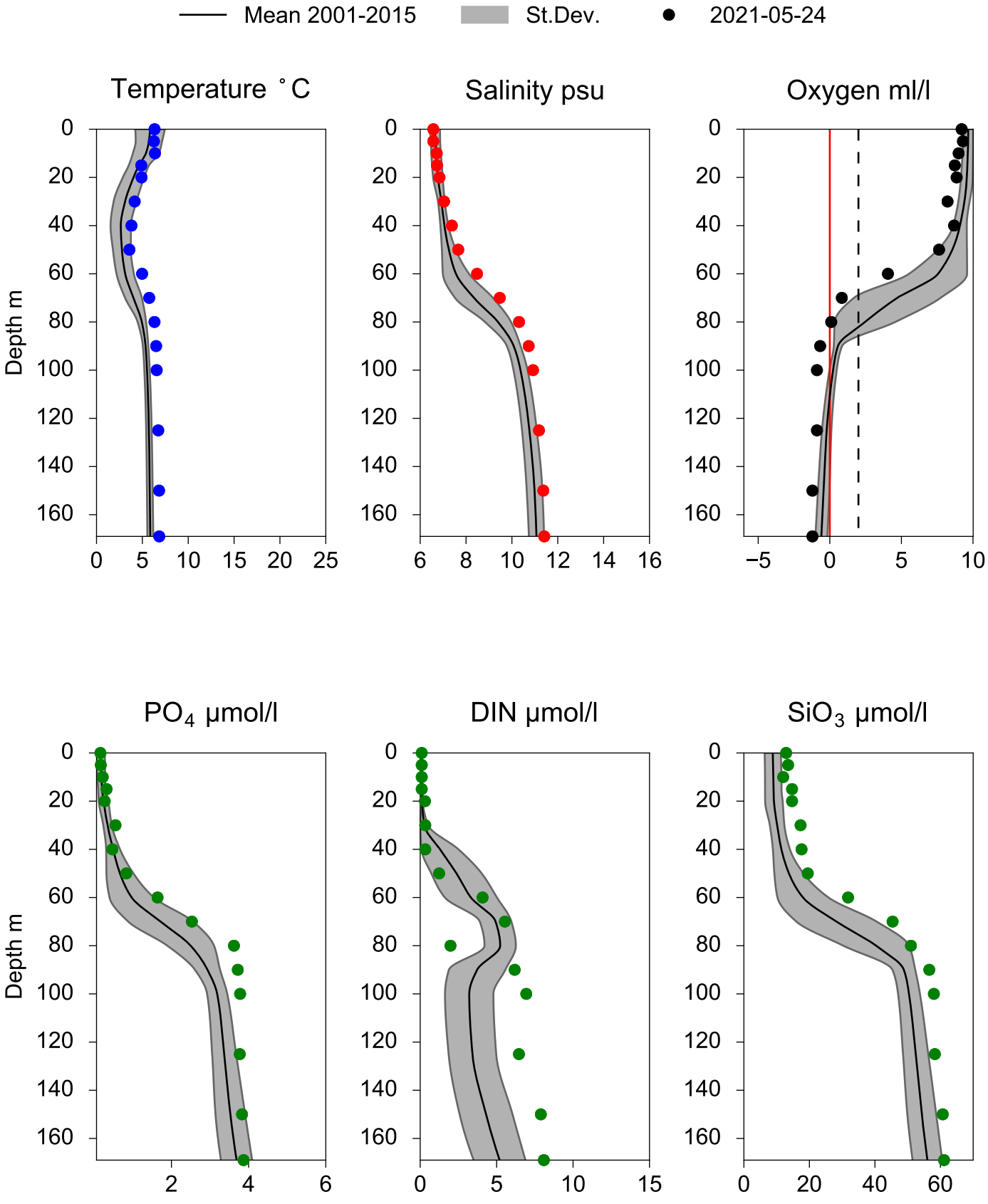
O_2 ml/l



O_2 ml/l



Vertical profiles BY29 / LL19
May

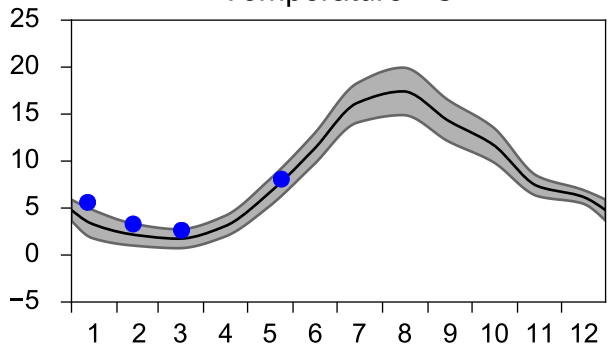


STATION BY31 LANDSORTSDJ SURFACE WATER (0-10 m)

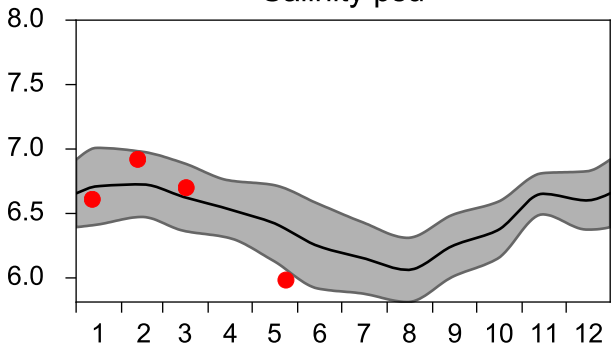
Annual Cycles

Mean 2001-2015 St.Dev. 2021

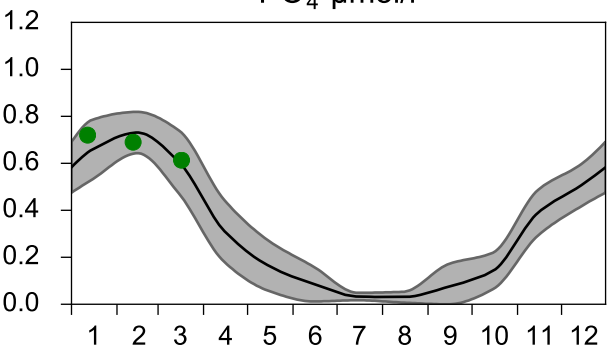
Temperature ˚C



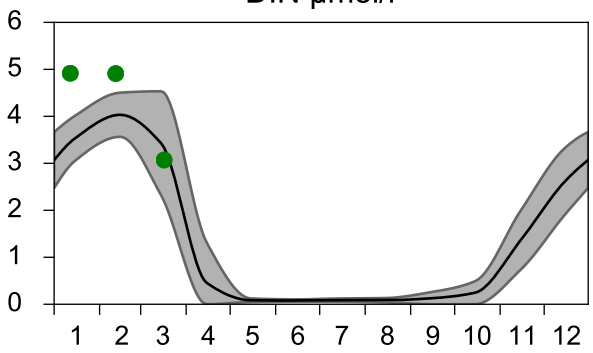
Salinity psu



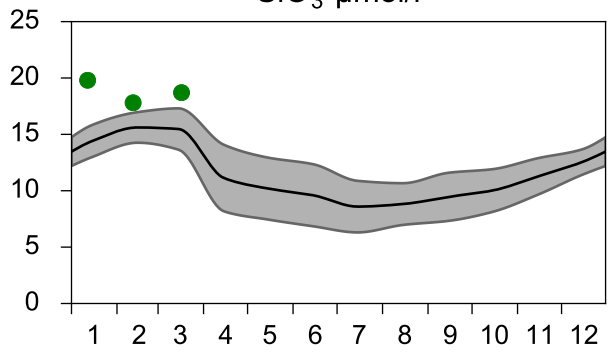
PO_4 µmol/l



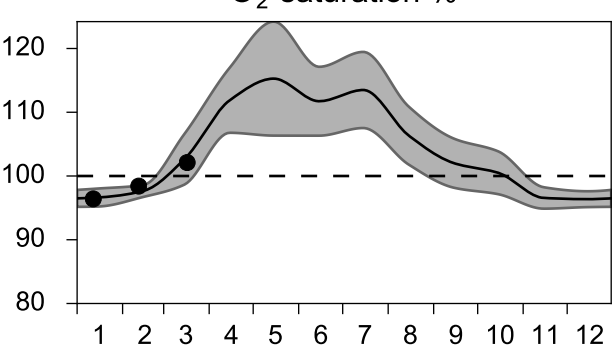
DIN µmol/l



SiO_3 µmol/l

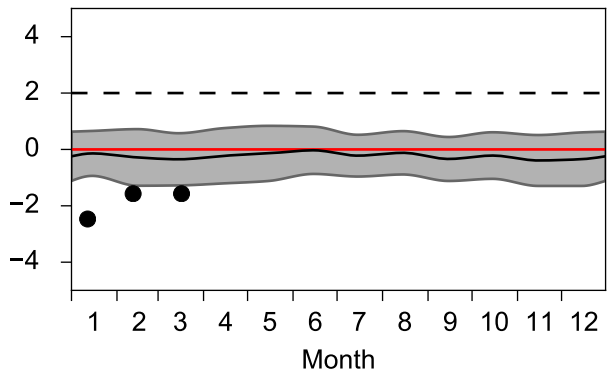


O_2 saturation %

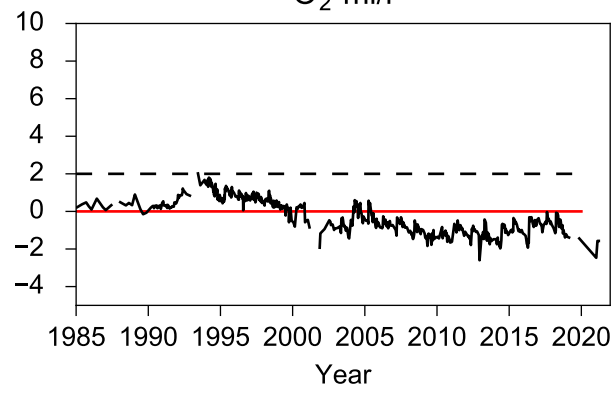


OXYGEN IN BOTTOM WATER (depth >= 419 m)

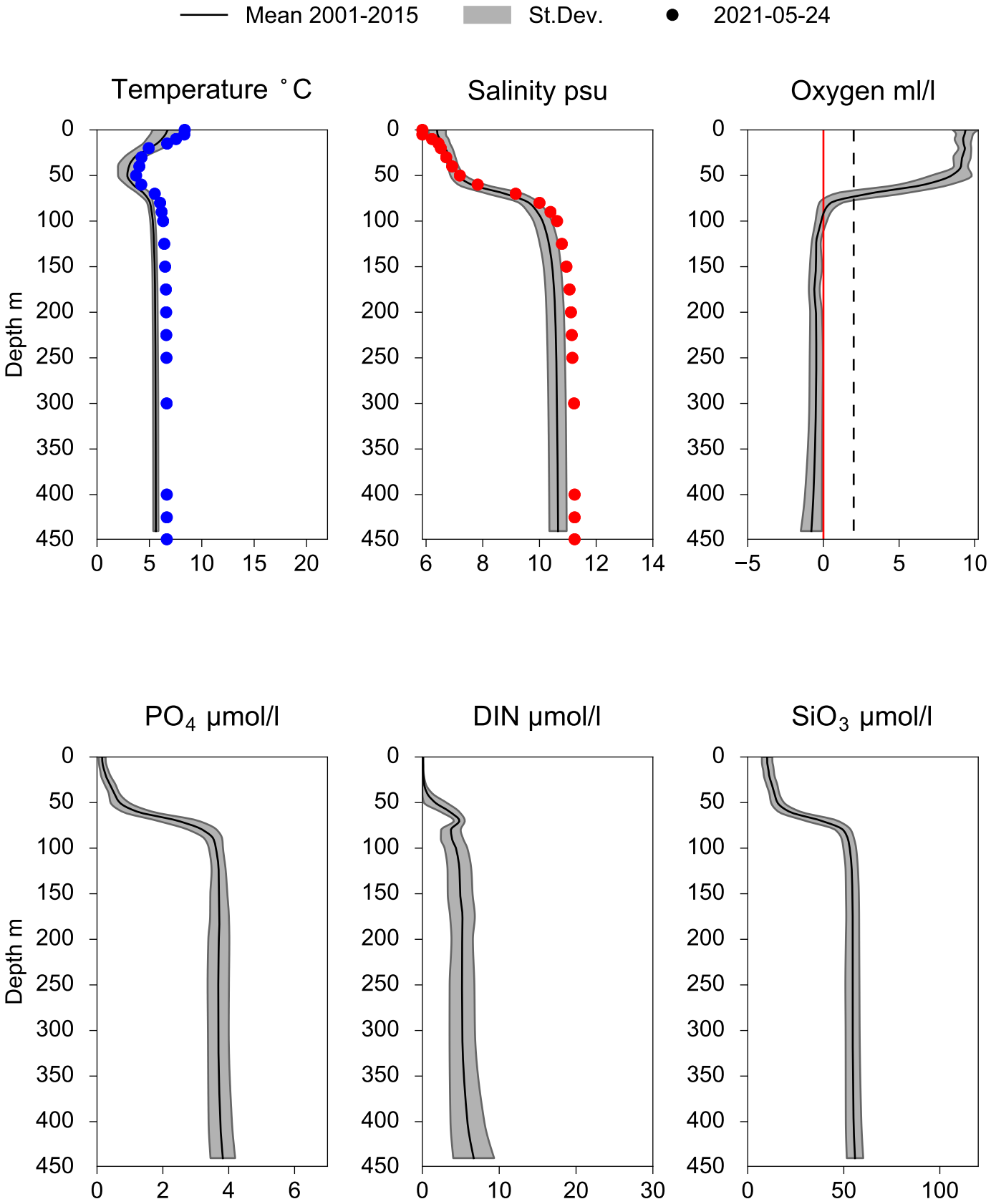
O_2 ml/l



O_2 ml/l



Vertical profiles BY31 LANDSORTSDJ
May

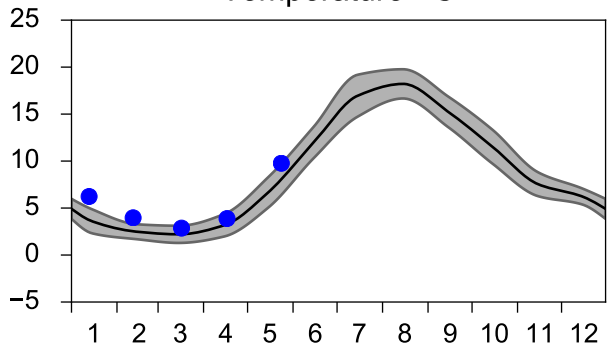


STATION BY32 NORRKÖPINGSDJ SURFACE WATER (0-10 m)

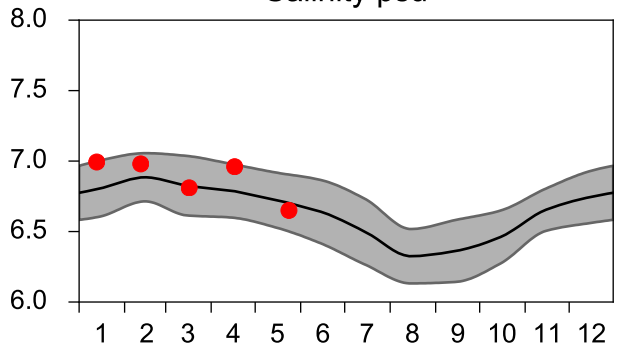
Annual Cycles

Mean 2001-2015 St.Dev. 2021

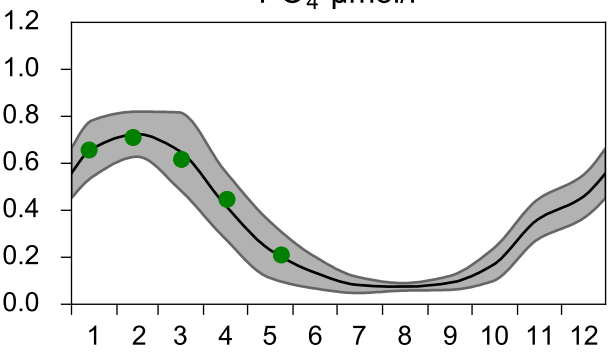
Temperature ˚C



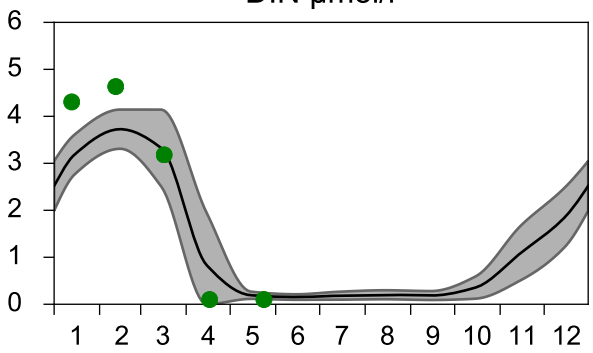
Salinity psu



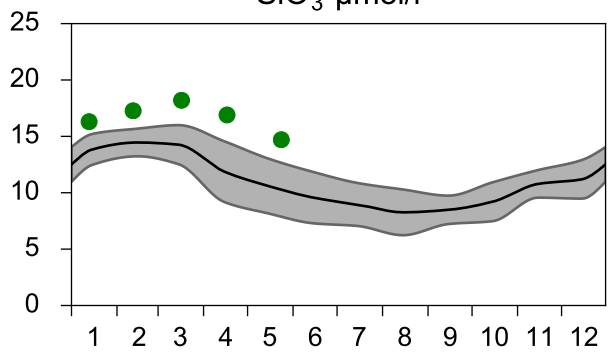
PO_4 µmol/l



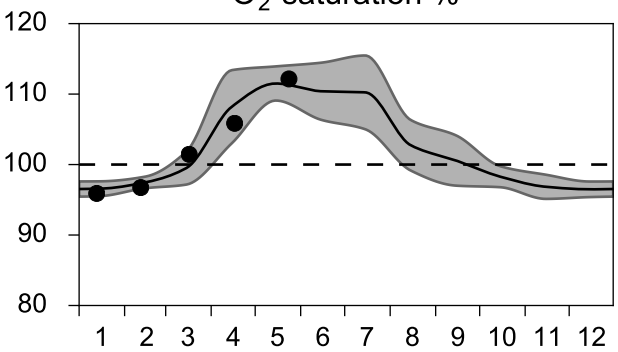
DIN µmol/l



SiO_3 µmol/l

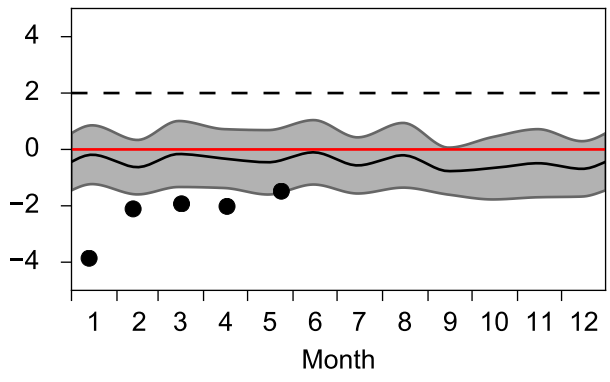


O_2 saturation %

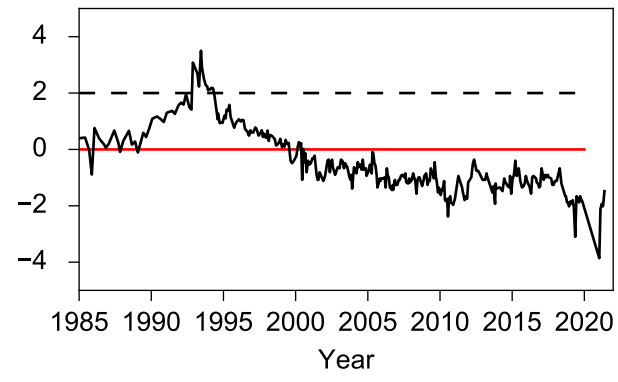


OXYGEN IN BOTTOM WATER (depth >= 175 m)

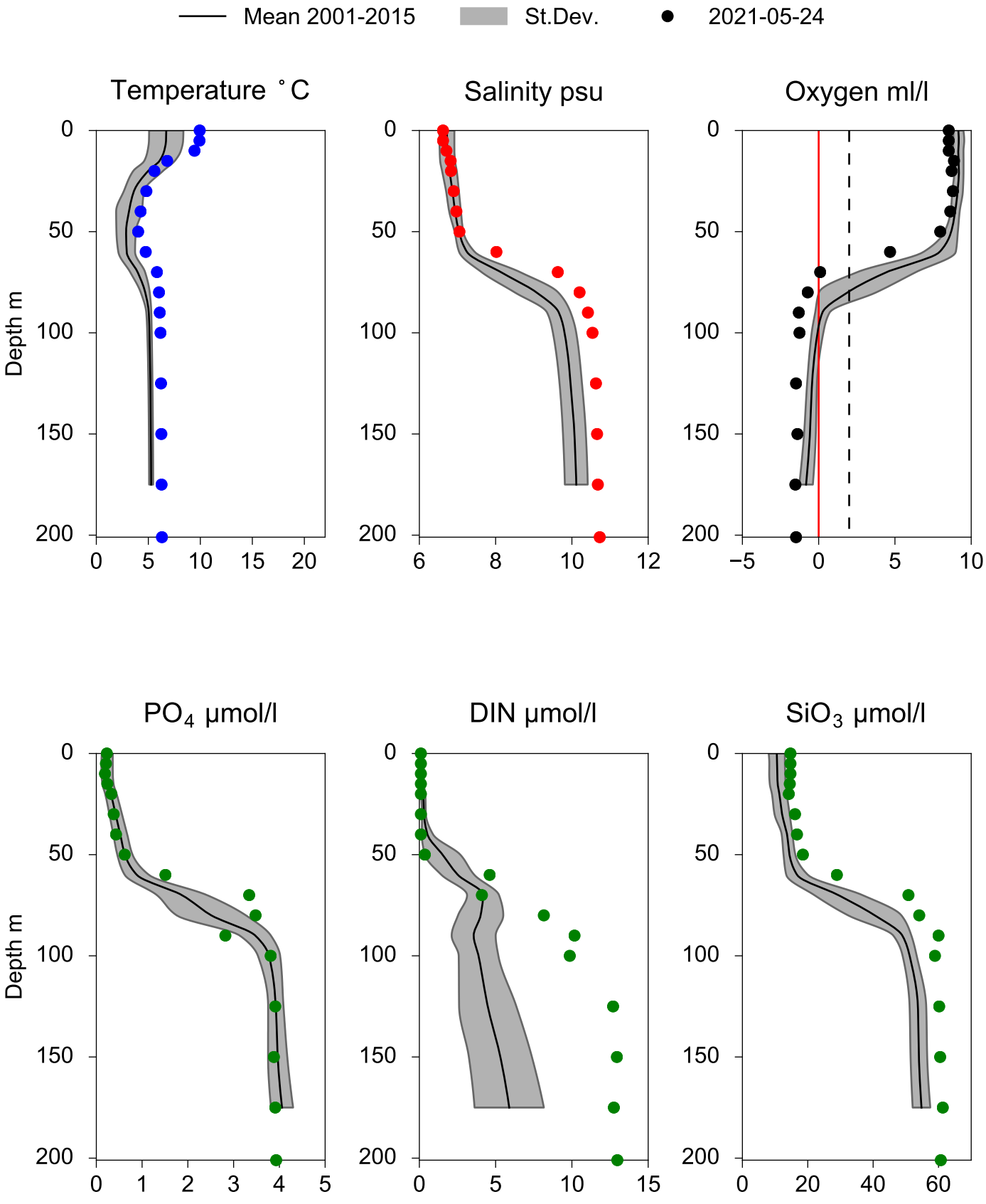
O_2 ml/l



O_2 ml/l

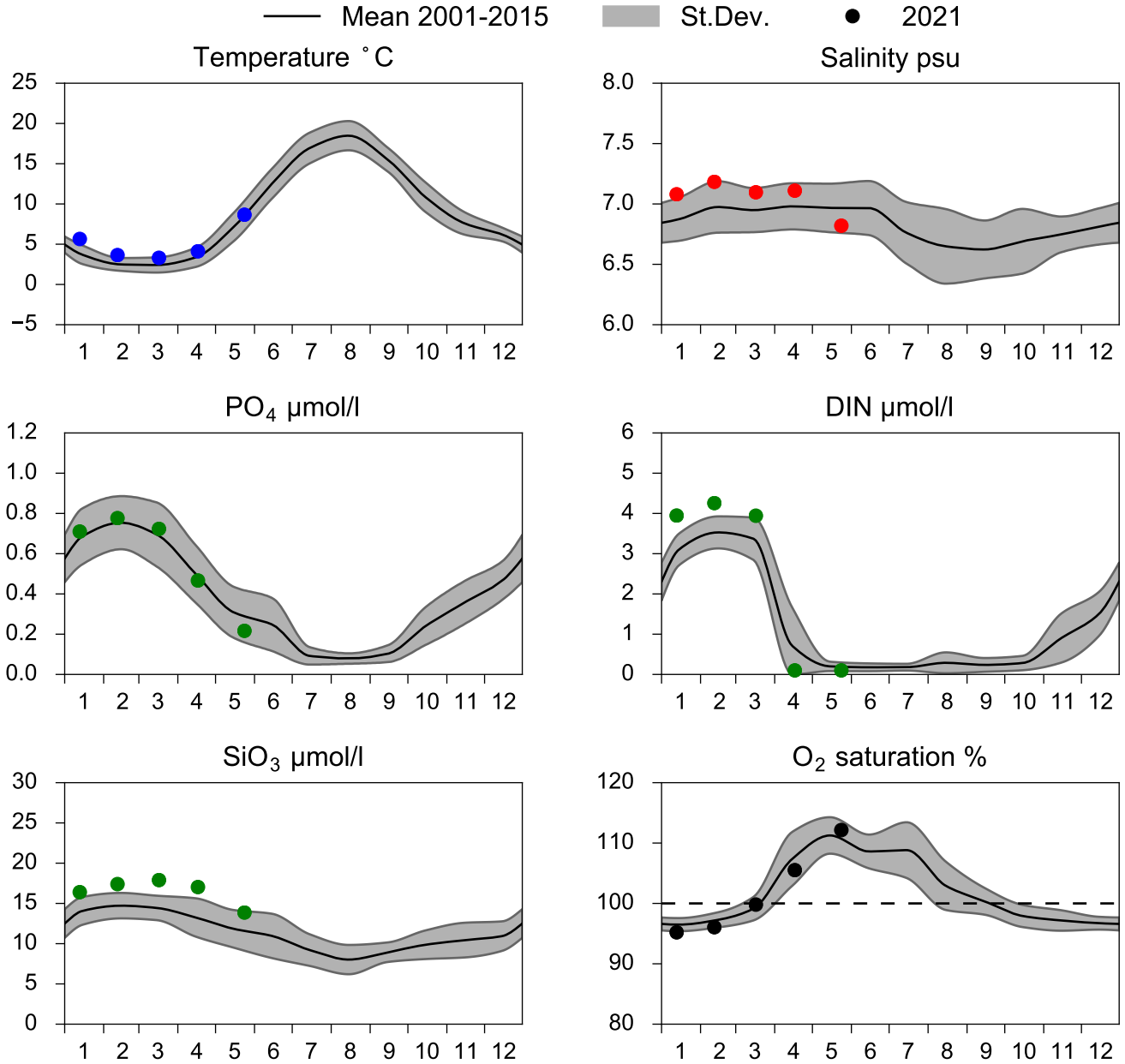


Vertical profiles BY32 NORRKÖPINGSDJ
May

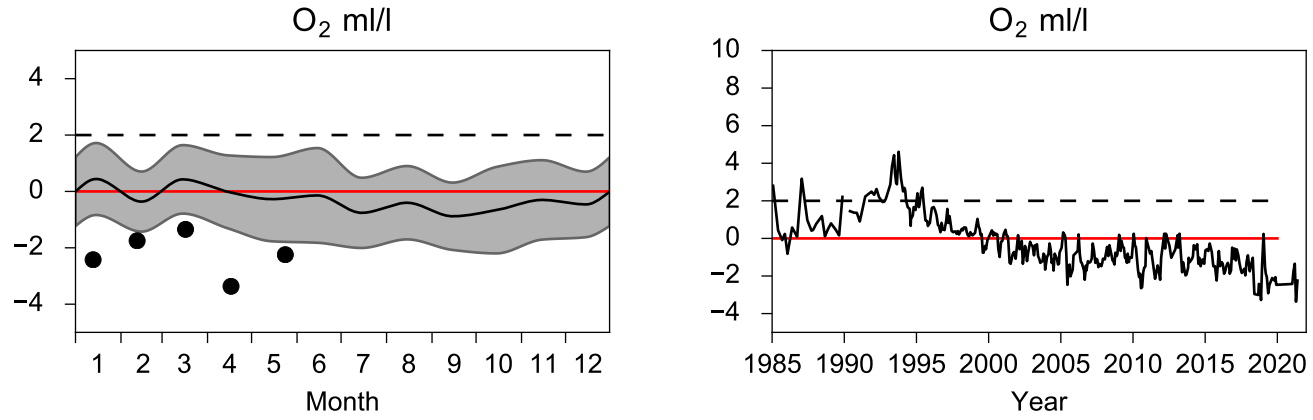


STATION BY38 KARLSÖDJ SURFACE WATER (0-10 m)

Annual Cycles



OXYGEN IN BOTTOM WATER (depth >= 100 m)



Vertical profiles BY38 KARLSÖDJ
May