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2023-03-06
Dnr: SMHI Gbg-2023-15

Report from SMHI's marine monitoring cruise with R/V Svea

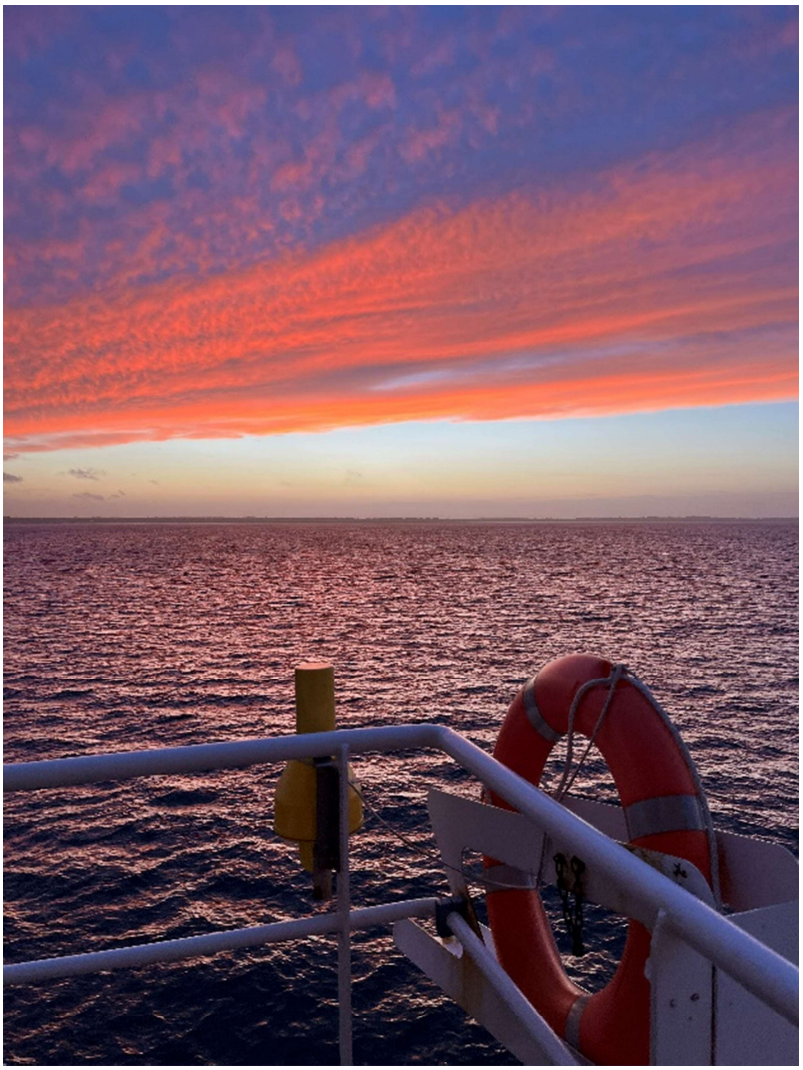

Photo: Madeleine Nilsson, SMHI

Survey period:	2023-02-09 - 2023-02-16
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 Agency (SMA)

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SUMMARY

During the expedition, which is part of the Swedish pelagic monitoring program, the Skagerrak, Kattegat, the Sound and the Baltic Sea were visited. In the Baltic Proper, the annual mapping of nutrients was also carried out.

Due to severe weather during the first day of the expedition, two stations in the Skagerrak could not be sampled. After the expedition entered the Baltic Proper, the weather was mostly calm and all stations included in the nutrient mapping were sampled.

The concentration of nutrients in the surface water remained at high winter levels in all sea areas except in the Kattegat where the nutrients had begun to decrease and increased activity of phytoplankton was reflected in chlorophyll fluorescence. In the Baltic Proper, the concentration of phosphate and silicate in the surface water was normal, while the levels of dissolved inorganic nitrogen were below normal. In the deep water of the Baltic Proper, the concentrations of nutrients and hydrogen sulphide remained very high. In the Eastern and Western Gotland basins, it was anoxic from 70–80 m. In the Eastern Gotland basin, hydrogen sulphide concentrations increased rapidly below 125 m depth to record high levels. In the Northern Baltic Proper it was anoxic from 90–100 m and here and in the Western Gotland Basin the levels of hydrogen sulfide and nutrients were lower than in the Eastern Gotland Basin, but also here above normal. Above all, the levels of ammonium were well above normal in the deep water of the Baltic Proper.

SMHI’s next regular expedition with R/V Svea is planned for 9 – 15 March.

RESULTS

The expedition was carried out on board the R/V Svea and started in Lysekil on the Swedish west coast on February 9th and ended in Kalmar harbour on February 16th.

The expedition began with strong winds and two stations in the Skagerrak had to be cancelled, Å17 and P2. After the first day the winds decreased and for the rest of the expedition the weather was mostly calm. The air temperature varied between 2 and 7 degrees.

Svea's instruments for continuous measurements of surface water Ferry box was in operation throughout the cruise and the ADCP (Acoustic Doppler Current Profiler) were in operation from entering the Arkona basin to the end of the cruise. Svea's profiling instrument during transit, the MVP (Moving Vessel Profiler), could not be operated due to bad weather in the Skagerrak and Kattegat and a technical problem was discovered once it was launched and no profiles during transit could be collected.

During the expedition, one of two units for analyzing oxygen from water samples broke and at all stations after this (Hanö Bay) the analysis of oxygen in water samples at depths between 5–40 m was cancelled. Measurements of oxygen concentration from these depths are therefore only available from the oxygen sensor on the CTD. At these depths, where there is no lack of oxygen, analyzes from water samples and measurements with an oxygen sensor agree well.

Extra phytoplankton samples were taken at the stations Släggö and Anholt E for a project at Uppsala and Stockholm University.

The report is based on data that has undergone an initial quality control and is compared against the monthly average for the period 1991 – 2020. When further quality control is carried out, some values may change. The data is published as soon as possible on the data host's website, normally within about a week after the end of the expedition. Some analyses are carried out after the expedition and are therefore published later.

Data can be downloaded here:
https://sharkweb.smhi.se/hamta-data/

The Skagerrak

The expedition started with strong winds and two stations in the Skagerrak had to be cancelled because of this, the westernmost station Å17 and station P2 on the border with the Kattegat.

The temperature in Skagerrak's surface water (0–10 m) had decreased by approx. 2 degrees in the open sea since January and now varied between 5–6°C, at the coastal station Släggö the difference compared to January was smaller, only barely one degree lower, around 4 degrees was measured. Despite this, the temperature at all stations was above normal at all visited stations in the sea area. The salinity of the surface water in the open sea varied between 32–33, which is normal or slightly above normal.

At the westernmost stations, Å14, Å15 and Å16, there was only a very weak stratification around 20 m depth. Apart from the temperature, which was above normal at the surface, all parameters were within the normal range and varied little with depth. At station Å13 there was a halocline around 10 m below which the levels of dissolved inorganic nitrogen and silicon increased, also a small increase in phosphate was noted. At the coastal station Släggö there was a halocline around 30 m and there the salinity and the concentration of dissolved inorganic nutrients increased. Nutrient levels in surface water were normal at high winter levels. Chlorophyll fluorescence, which is a measure of phytoplankton activity, showed generally low values, with an increased activity around the depth of the halocline at stations Å13 and Släggö.

No oxygen deficiency was noted in Skagerrak. At the coastal station Släggö, where oxygen deficiency is sometimes observed in the bottom water, the oxygen situation was good with a concentration of 6 ml/l.

The Kattegat and the Sound

The temperature in the surface water (0–10 m) in Kattegat and the Sound had decreased since January and was between 3–5°C, warmest at the two stations in the open sea (Fladen and Anholt E) where it was also slightly warmer than normal. There, the salinity in the surface water was also higher than normal, 27–30 psu. In the Sound at station W Landskrona, the salinity in the surface water was above normal, at 18 psu. In the Kattegat there was a pycnocline at about 20 m, below which both salinity and temperature were normal. In the Öresund, the pycnocline was somewhat shallower around 15 m deep.

In the Kattegat phytoplankton activity had started, which was seen both in the measurements of chlorophyll fluorescence and by the fact that the concentration of nutrients had decreased significantly since January. The concentration of inorganic nitrogen, phosphorus and silicate was below normal in the well-mixed surface layer, down to 20 m. At station N14 Falkenberg near the coast and in Öresund, the levels of nutrients were normal and chlorophyll fluorescence lower, which indicates that spring is a little late there.

The oxygen situation in the Kattegat's deep water was good. No hypoxia (<4 ml/l) was measured.

The Baltic Proper

The temperature in the surface water varied between 3–5 °C. It was warmest in the southern basins, where it was above normal at all stations. It got colder to the north, but it was still above normal at several of the stations. The salinity of the surface water varied between 7–10 psu. Highest at the nutirentmapping station Stevns Klint just south of the Sound. The salinity in the surface water was above normal in the Hanö Bay and the Bornholm Basin, approx. 7.9–8.0 psu, and in the Gdansk Bay, 7.6 psu.

The water was well mixed down to a depth of 50–60 m where the halocline began. At the shallower stations in Arkona, the halocline was slightly shallower, around 40 m. In the deep water, the temperature was above normal, while the salinity was within normal. In the Eastern Gotland basin, the levels of nutrients and hydrogen sulphide increased sharply around 125 m and were above normal from 125 m and deeper. In the Northern Baltic Proper and the Western Gotland Basin, the concentration of hydrogen sulphide was still significantly lower than in the Eastern Gotland Basin, but above normal for the Western Gotland basin, also the levels of nutrients increased to above normal at the sharp transition between oxygenated and deoxygenated water. Hydrogen sulfide was measured at all stations except in Gdansk Bay, Bornholm Basin, Hanö Bay and Arkona Basin. In the Eastern and Western Gotland basins, it was anoxic from 70–80 m, while in the Northern Baltic Proper it became anoxic at 90–100 m. In the Arkona basin, the bottom water was well oxygenated with levels between 5.5–7.8 ml/l. In the Hanö bay and the Bornholm Basin acute oxygen deficiency (<2 ml/l) occurred at intermediate depths. In the bottom water the oxygen levels were higher, just above 2 ml/l. That the levels near the bottom were higher indicates that new inflowing water has reached the area.

During the expedition, mapping of nutrients in the Baltic Proper was carried out by visiting 16 additional stations. The mapping-stations cover spatial variation in each basin as well as the Gulf of Gdansk and the westernmost parts of the Gulf of Finland.

Compared to January, the concentration of nutrients in the surface water had not changed very much. At some stations, the concentration of dissolved inorganic nitrogen had decreased slightly, while the content of phosphate had increased slightly at the same stations. In the Northern Baltic Proper, a small increase in both phosphate and dissolved inorganic nitrogen was seen.

The mapping showed that the concentration of phosphate varied very little throughout the Baltic Proper. At the majority of the stations, the concentration was around 0.6 µmol/l, which was within the normal range. Only at seven stations did the concentration deviate from 0.6 µmol/l. At two stations in the eastern part of the Northern Baltic Proper (stations BY27 and BY28) it was about 0.7 µmol/l and at two stations in the Eastern Gotland Basin (BY15 and

BY20) the concentration was instead around 0.5 µmol/l, which was below normal. The highest concentration in the surface water was measured at BY39 Öland's södra udde, approx. 0.8 µmol/l.

The concentration of dissolved inorganic nitrogen, on the other hand, was lower than normal at the majority of the stations and was between 2.4–4.6 µmol/l. Concentrations >3 µmol/l were found in the Northern Baltic Proper, highest concentrations in the easternmost part (>4 µmol/l, stations BY27 and BY28). Also at a station in the western part of the Eastern Gotland Basin (BY15) and at BY39 Ölands södra udde, the concentration was >3 µmol/l. At a couple of stations, the level was within the normal range and this coincided in several cases with the stations where the concentration of phosphate was the highest (stations BY27, BY28, BY39).

The concentration of silicate varied between 14–17 µmol/l with the highest levels in the Northern Baltic Proper and the Western Gotland Basin. At two stations the concentration was above normal (BY13, Eastern Gotland Basin and Stevns Klint in Arkona).

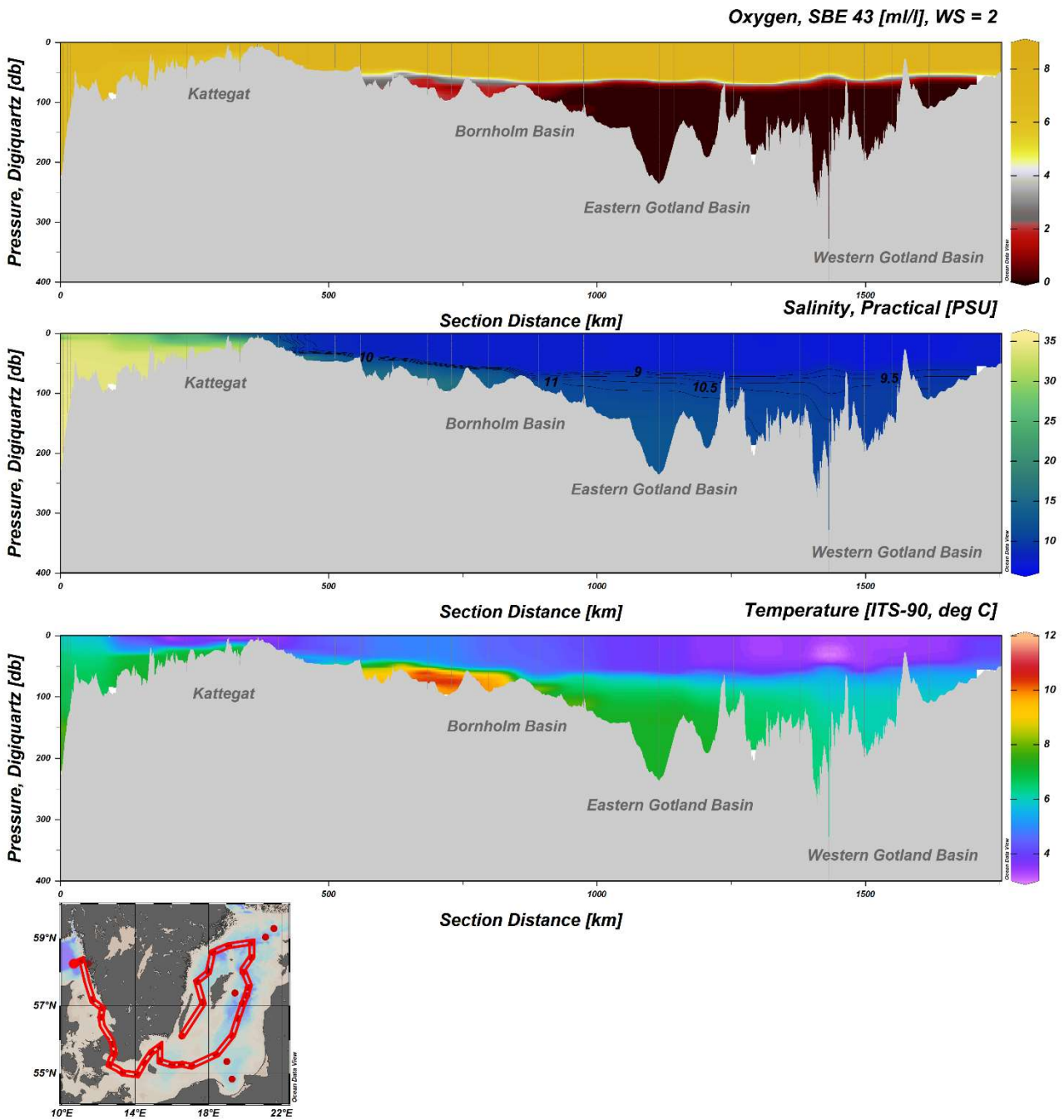


Figure 1. Section showing temperature, salinity and oxygen concentration from the Skagerrak, through the Sound and further up through the Baltic Sea proper according to the map (bottom). Data is missing from large parts of the Western Gotland basin due to rough weather.

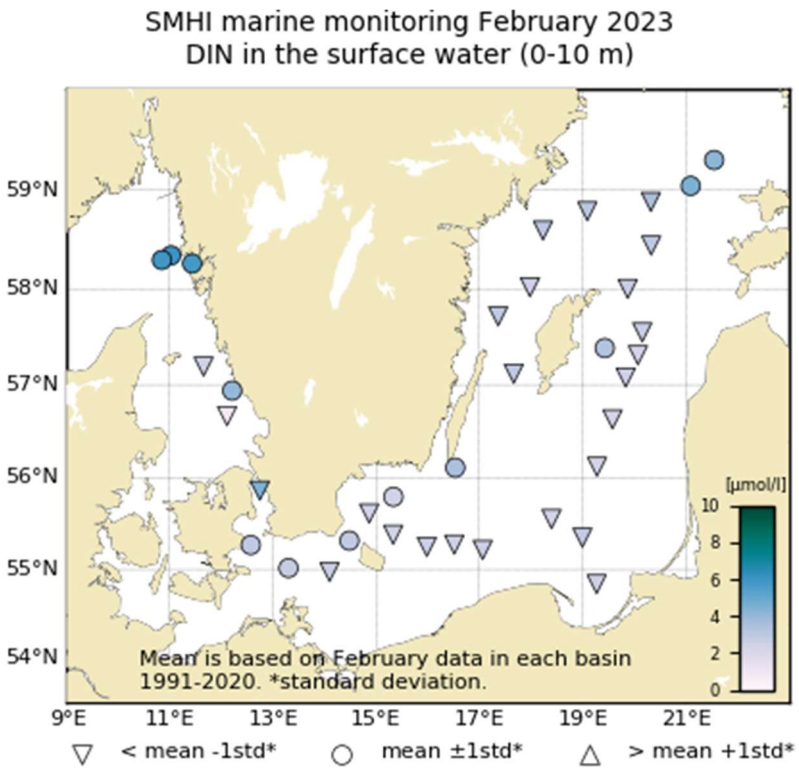


Figure 2. The concentration of dissolved inorganic nitrogen (DIN) in the surface water (0–10m). The mean value is based on February data within each basin from 1991–2020.

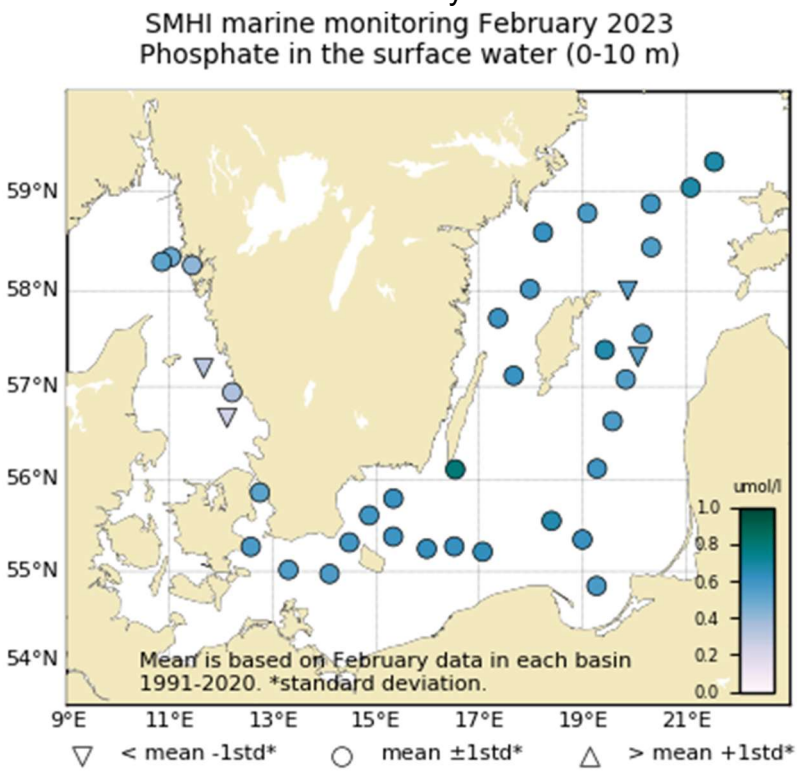


Figure 3. The concentration of phosphate in the surface water (0– 0 m). The mean value is based on January data within each basin from 1991–2020.

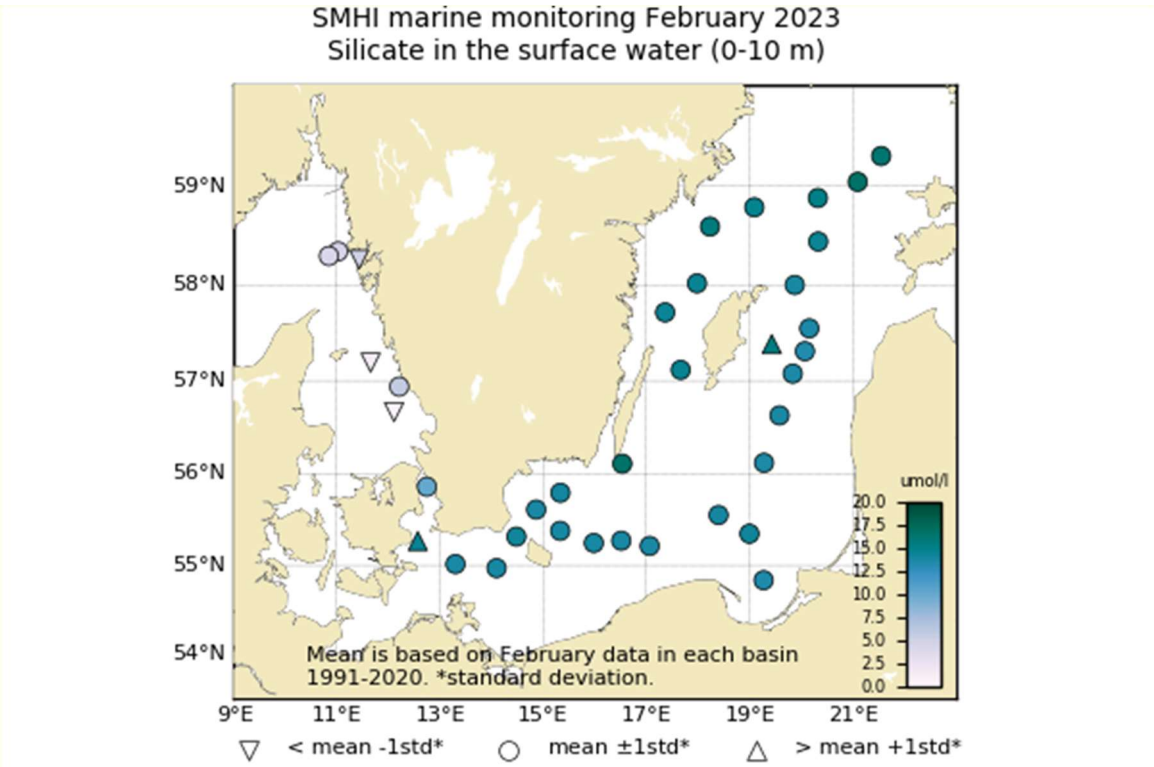


Figure 4. The concentration of silicate in the surface water (0–10 m). The mean value is based on February data within each basin from 1991–2020.

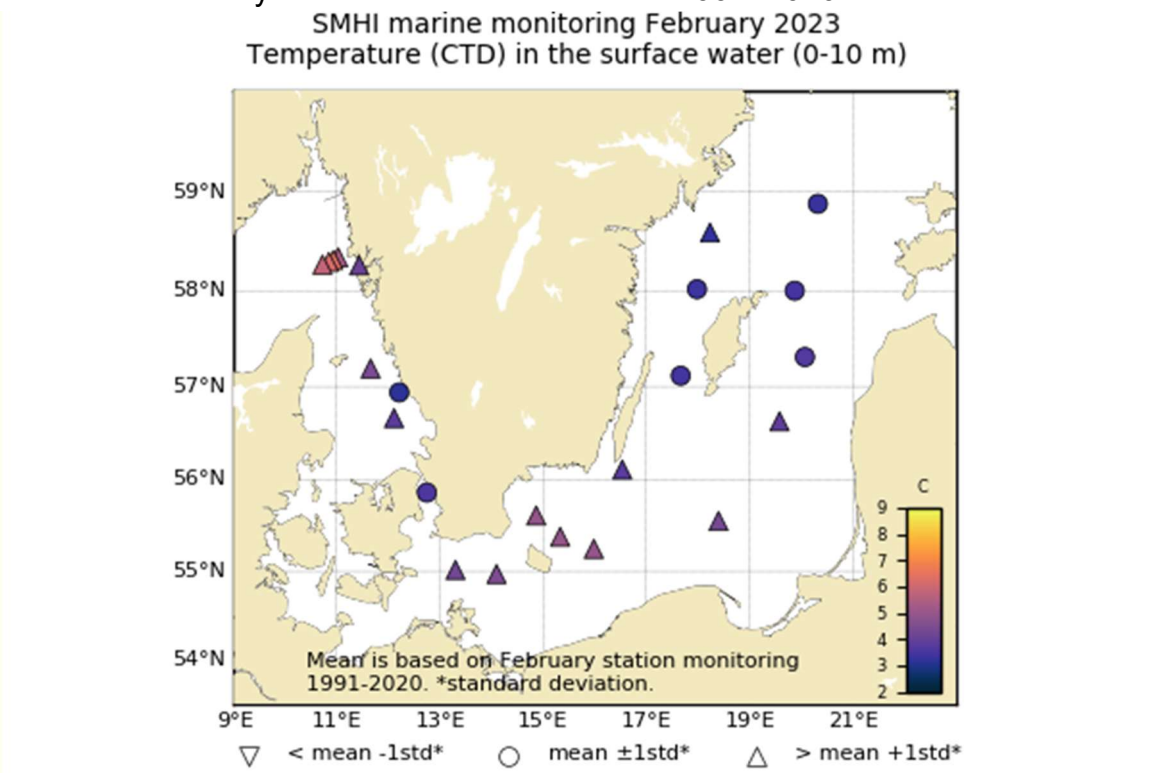


Figure 5. Temperature in the surface water (0–10 m). The mean value is based on February data within each basin from 1991–2020.

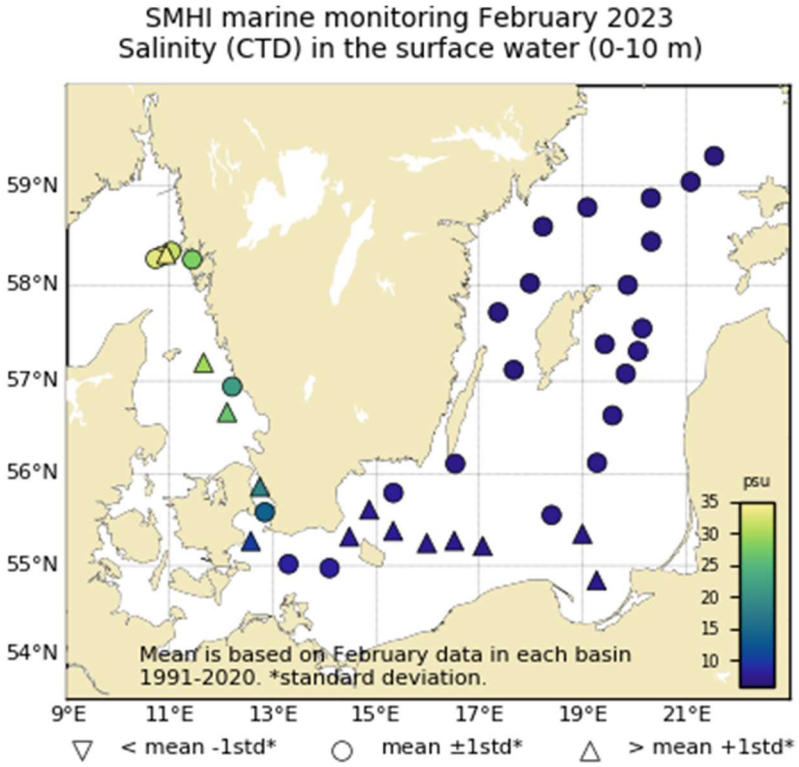


Figure 6. Salinity in the surface water (0–10 m). The mean value is based on February data within each basin from 1991–2020.

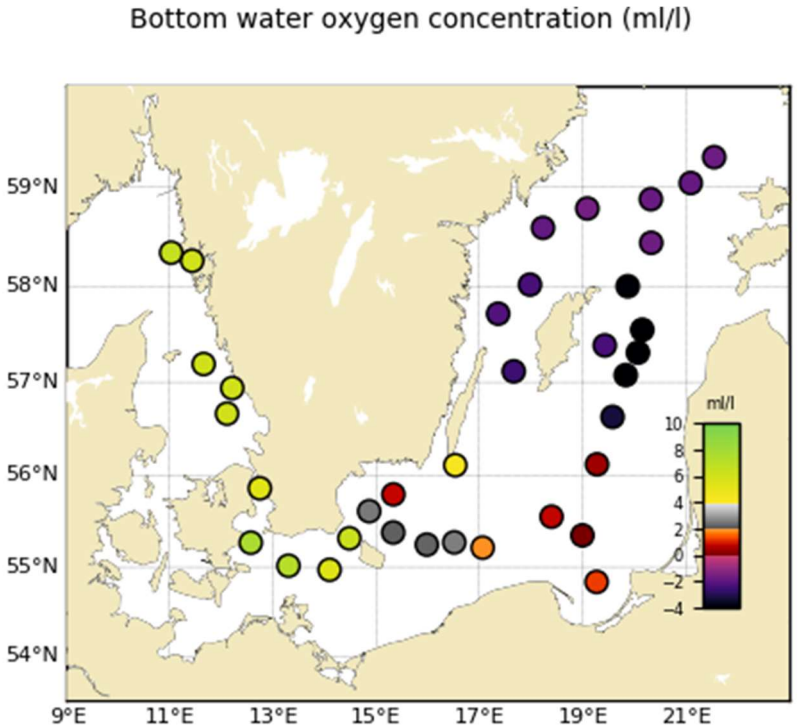


Figure 7. The concentration of oxygen (in ml/l) in the bottom water, about 1 m above the bottom. Note that the value is not compared against statistics in the same way as Figures 2–6 and therefore only circles are shown in the graph. Presence of hydrogen sulphide is illustrated as negative oxygen concentration.

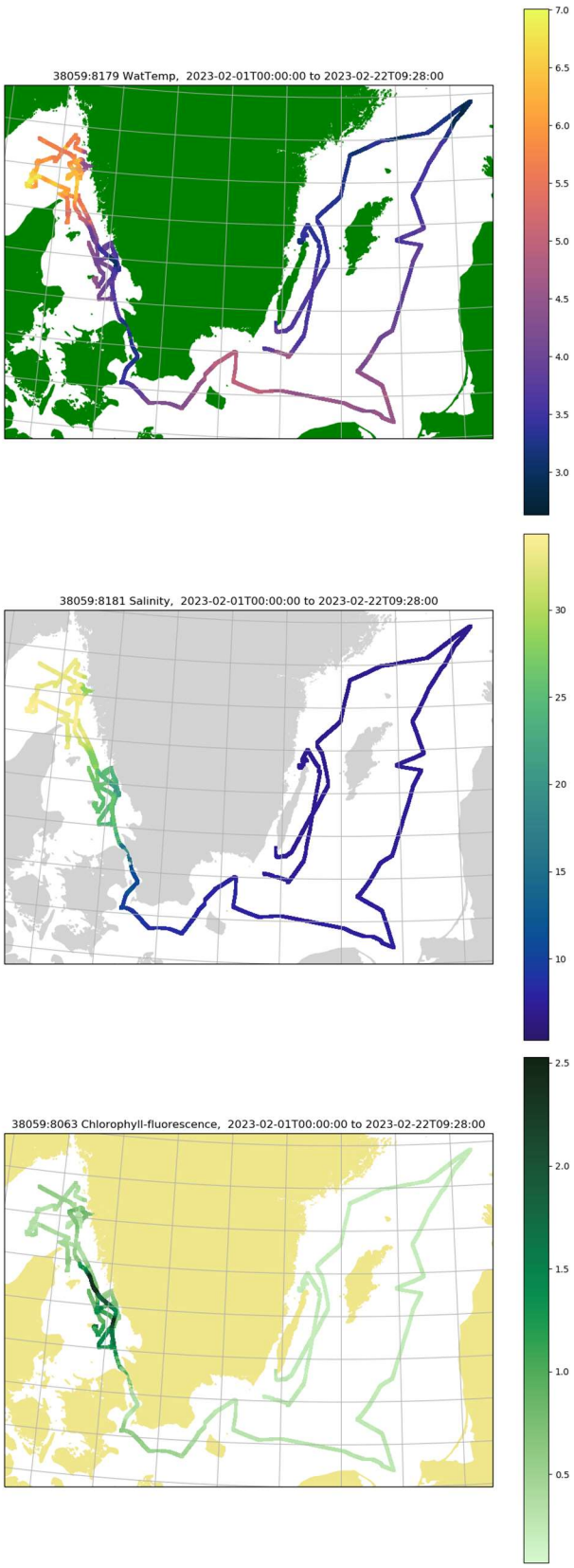


Figure 8. Temperature (top), salinity (middle) and chlorophyll fluorescence (bottom) in the surface water measured with Svea's ferrybox. The maps show data from both the previous fisheries expedition (IBTS, International Bottom trawl Survey) as well as SMHI's regular expedition. The data has undergone only a rough quality control.

DELTAGARE

Name	Role	Institute
Lena Viktorsson	Chief Scientist, Oceanographer	SMHI
Sara Johansson	Nutrient analysis, quality assurance, chemist	SMHI
Ann-Turi Skjevik	Marin biologist	SMHI
Sari Sipilä	Chemist	SMHI
Anna-Kerstin Thell	Chemist	SMHI

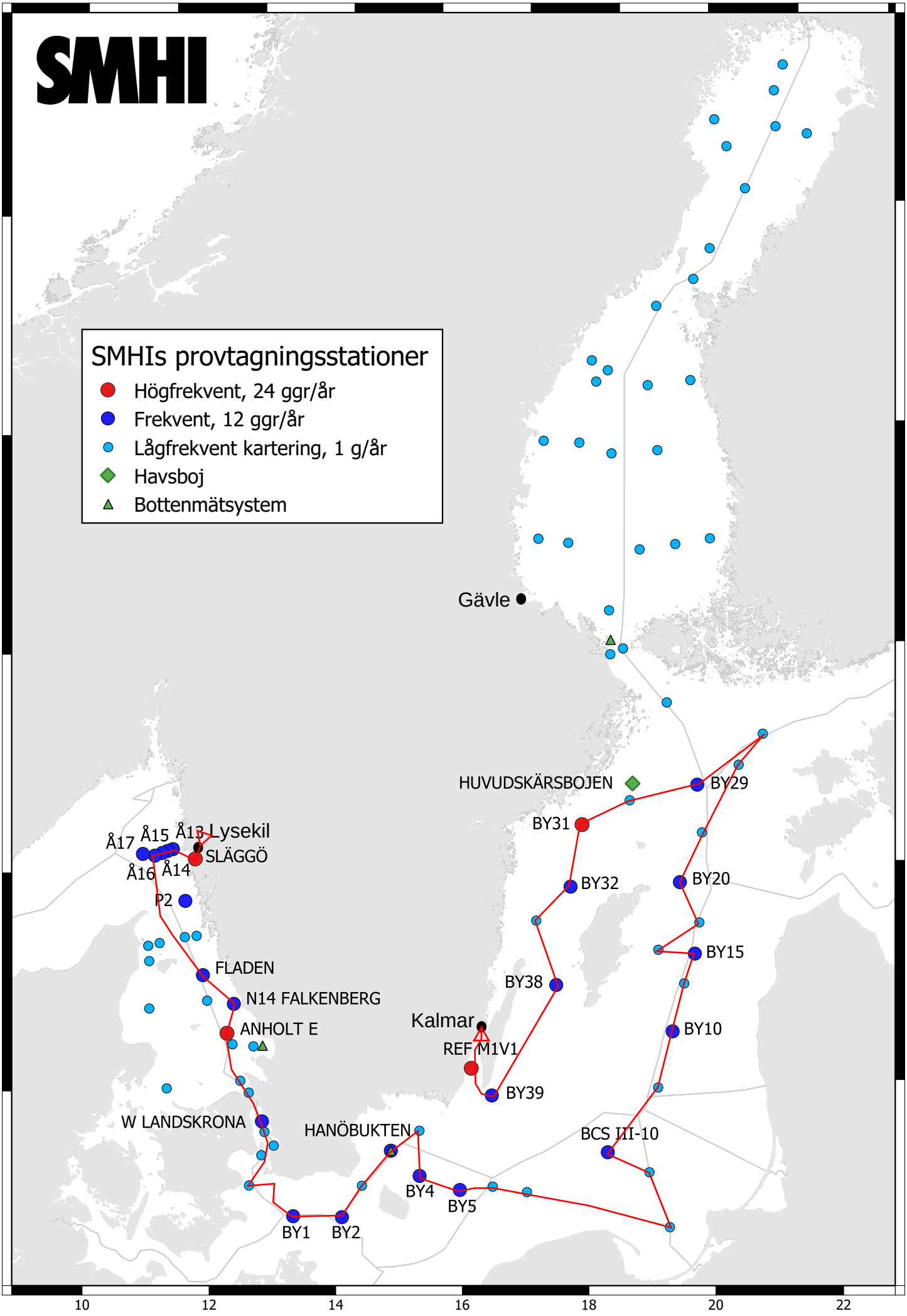
APPENDICES

- Track chart
- Table of stations, analysed parameters and number of sampling depths
- Vertical profiles
- Annual cycles of surface water (0 – 10 m) and oxygen development in the bottom water.

Photo: Ola Kalén, SMHI

SMHI

Havs
och Vatten
myndigheten


SMHI
SMHIs provtagningsstationer
Högfrekvent, 24 ggr/år
Frekvent, 12 ggr/år
Lågfrekvent kartering, 1 g/år
Havsboj
Bottenmätsystem
Gävle
HUVUDSKÄRSBOJEN
BY29
BY31
BY32
BY20
BY15
BY38
BY10
Kalmar
REF M1V1
BY39
BCS III-10
Å17
Å15
Å13
Lysekil
SLÄGGÖ
Å16
Å14
P2
FLADEN
N14 FALKENBERG
ANHOLT E
W LANDSKRONA
HANÖBUKTEN
BY4
BY5
BY1
BY2
64
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Date: 2023-02-21
Time: 15:13

Ship: SE
Year: 2023

Ser no	Cru no	Stat code	Proj	Stat name	Lat	Lon	Start date yyyymmdd	Start time hhmm	Bottom depth m	Secchi depth m	Wind dir	vel	Air temp C	Air pres hPa	WCWI elacaoveteuohdsb	CZPP hohploypto p	No de	No btl	Temp_bottl	Cond_bottl	Sal_bottl	Chl_bottl	Phy_bottl	Do_bottl	Oxy_bottl	H2S	Phosphate	Nitrite	Nitrate	Nitrite	Ammonia	Alkalinity	Silicate	Silicate-Si	Humus	Cond_vism	Cond_tsam
0140	3	FIBG27	BAS...	SLÄGGÖ	5815.59	01126.14	20230209	1035	74	6	23	10	6	1020	1230	xxx-	9	9	x	x	x	x	-	x	x	-	x	x	x	x	x	x	-	x	-	x	-
0141	3	SKEX14	BAS...	Å13	5820.53	01101.71	20230209	1330	90		23	13	7	1020	1140	x---	10	10	x	x	x	x	-	x	x	-	x	x	x	x	x	x	-	x	-	-	-
0142	3	SKEX15	BAS...	Å14	5818.88	01056.11	20230209	1455	110		24	17	6.3	1015	1250	----	11	0	-	x	-	x	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-
0143	3	SKEX16	BAS...	Å15	5817.74	01050.86	20230209	1605	135		23	19	6.4	1014	1350	x---	12	12	x	x	x	x	-	x	x	-	x	x	x	x	x	x	-	x	-	-	-
0144	3	SKEX17	BAS...	Å16	5816.03	01043.45	20230209	1750	202		25	19	6.4	1013	9990	----	14	(13)	-	x	-	x	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-
0145	3	KANX25	BAS...	FLADEN	5711.55	01139.47	20230210	0215	84		28	14	4.7	1023	9990	x---	13	13	x	x	x	x	-	x	x	-	x	x	x	x	x	x	-	x	-	-	-
0146	3	KANX50	BAS...	N14 FALKENBERG	5656.40	01212.70	20230210	0530	30		16	9	3.9	1025	9990	xxx-	7	7	x	x	x	x	-	x	x	-	x	x	x	x	x	x	-	x	-	x	-
0147	3	KAEX29	BAS...	ANHOLT E	5640.11	01206.67	20230210	0815	62	5	28	10	4.2	1027	1330	xxxx	10	10	x	x	x	x	x	x	x	-	x	x	x	x	x	x	x	x	-	-	-
0148	3	SOCX39	BAS...	W LANDSKRONA	5551.97	01244.85	20230210	1420	50	8	25	7	5.5	1028	2820	x---	9	9	x	x	x	x	-	x	x	-	x	x	x	x	x	x	-	x	-	-	-
0149	3	SOSX00	EXT...	FLINTEN-7	5535.32	01250.62	20230210	1715	8		24	10	5.1	1026	9990	----	3	0	-	x	-	x	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-
0150	3	BPSA01	BAS...	441 STEVNS KLINT	5516.29	01234.32	20230210	2010	26		24	13	4.9	1024	9990	----	6	6	x	x	x	x	-	x	x	-	x	x	x	x	x	x	-	x	-	-	-
0151	3	BPSA02	BAS...	BY1	5500.98	01318.15	20230210	2350	47		19	14	4.7	1022	9990	x---	8	8	x	x	x	x	-	x	x	-	x	x	x	x	x	x	-	x	-	-	-
0152	3	BPSA03	BAS...	BY2 ARKONA	5458.27	01405.93	20230211	0340	47		26	16	4.5	1021	9990	x-x-	8	8	x	x	x	x	-	x	x	-	x	x	x	x	x	x	-	x	x	x	-
0153	3	BPSA04	BAS...	BY3 HAMRARNE SUND	5519.17	01428.99	20230211	0720	48		26	14	5.5	1017	2840	----	8	8	x	x	x	x	-	x	x	-	x	x	x	x	x	x	-	x	-	-	-
0154	3	BPSH05	BAS...	HANÖBUKTEN	5537.02	01452.03	20230211	1015	80		29	12	7.3	1018	1140	x-xx	11	11	x	x	x	x	x	x	x	-	x	x	x	x	x	x	x	x	-	-	-
0155	3	BPSH51	BAS...	HANÖBUKTEN-KBV	5548.02	01520.14	20230211	1300	60	10	28	10	6.7	1019	1130	---x	9	9	x	x	x	x	x	x	x	-	x	x	x	x	x	x	-	x	-	-	-
0156	3	BPSB06	BAS...	BY4 CHRISTIANSÖ	5523.00	01519.95	20230211	1730	94		31	8	6.3	1024	1330	x---	12	12	x	x	x	x	-	x	x	-	x	x	x	x	x	x	-	x	-	-	-
0157	3	BPSB07	BAS...	BY5 BORNHOLMSDJ	5514.99	01559.05	20230211	2000	91		7	6	3.5	1030	9990	xxx-	12	12	x	x	x	x	x	x	x	-	x	x	x	x	x	x	x	x	-	-	-
0158	3	BPSE08	BAS...	STOLPE TRÖSKEL	5516.49	01630.98	20230211	2315	63		10	2	3.2	1033	9990	----	9	9	x	x	x	x	-	x	x	-	x	x	x	x	x	x	-	x	-	-	-
0159	3	BPSE09	BAS...	BY7 STOLPE RÄNNA	5512.99	01704.01	20230212	0150	91		0	3	3.3	1034	9990	----	12	12	x	x	x	x	-	x	x	-	x	x	x	x	x	x	-	x	-	-	-
0160	3	BPSG71	BAS...	PL-P1	5450.17	01916.54	20230212	1000	110	13	22	9	2.9	1036	1730	----	14	14	x	x	x	x	-	x	x	x	x	x	x	x	x	x	-	x	-	-	-
0161	3	BPSE70	BAS...	PL-P63	5521.11	01900.01	20230212	1345	83		25	13	3.6	1032	2830	----	11	11	x	x	x	x	-	x	x	x	x	x	x	x	x	x	-	x	-	-	-
0162	3	BPSE11	BAS...	BCS III-10	5533.42	01824.08	20230212	1710	90		25	12	4.8	1031	9990	x-x-	12	12	x	x	x	x	-	x	x	-	x	x	x	x	x	x	-	x	x	-	-
0163	3	BPSE12	BAS...	BY9 KLAIPEDA	5607.54	01916.99	20230212	2240	127		29	9	4.7	1029	9990	----	14	14	x	x	x	x	-	x	x	x	x	x	x	x	x	x	-	x	-	-	-
0164	3	BPEX13	BAS...	BY10	5638.05	01935.04	20230213	0730	147		27	9	4.1	1027	1630	x---	15	15	x	x	x	x	-	x	x	x	x	x	x	x	x	x	-	x	-	x	-
0165	3	BPEX14	BAS...	BY11	5704.60	01950.42	20230213	1130	213		30	8	4.5	1026	1230	----	17	17	x	x	-	x	-	x	x	x	x	x	x	x	x	x	-	x	-	-	-
0166	3	BPEX21	BAS...	BY15 GOTLANDSDJ	5718.73	02004.56	20230213	1415	249	11	30	8	4.4	1026	2630	xxxx	24	24	x	x	-	x	x	x	x	x	x	x	x	x	x	x	x	x	-	-	-
0167	3	BPEX19	BAS...	BY13	5723.23	01926.02	20230213	1820	122		30	7	4.6	1028	9990	----	14	14	x	x	x	x	-	x	x	x	x	x	x	x	x	x	-	x	-	-	-
0168	3	BPEX25	BAS...	BY19	5733.02	02009.65	20230213	2130	160		31	9	5.1	1029	9990	----	15	15	x	x	-	x	-	x	x	x	x	x	x	x	x	x	-	x	-	-	-
0169	3	BPEX26	BAS...	BY20 FÅRÖDJ	5759.96	01952.72	20230214	0055	203		31	8	5.3	1031	9990	x---	17	17	x	x	-	x	-	x	x	x	x	x	x	x	x	x	-	x	-	-	-
0170	3	BPNX27	BAS...	BY21	5826.52	02020.02	20230214	0720	122	14	29	5	3.9	1032	1320	----	14	14	x	x	x	x	-	x	x	x	x	x	x	x	x	x	-	x	-	-	-
0171	3	BPNX34	BAS...	BY28	5902.53	02106.00	20230214	1230	200	13	28	4	3.3	1032	1220	----	17	17	x	x	-	x	-	x	x	x	x	x	x	x	x	x	-	x	-	-	-
0172	3	BPNX33	BAS...	BY27	5917.95	02133.25	20230214	1615	180		29	5	3.1	1031	9990	----	16	16	x	x	-	x	-	x	x	x	x	x	x	x	x	x	-	x	-	-	-
0173	3	BPNX35	BAS...	BY29 / LL19	5852.87	02019.63	20230214	2130	178		25	5	3.1	1031	9990	x-x-	16	16	x	x	-	x	-	x	x	x	x	x	x	x	x	x	-	x	-	-	-
0174	3	BPNX36	BAS...	BY30	5847.28	01905.72	20230215	0440	191		25	6	3.2	1030	9990	----	16	16	x	x	-	x	-	x	x	x	x	x	x	x	x	x	-	x	-	-	-

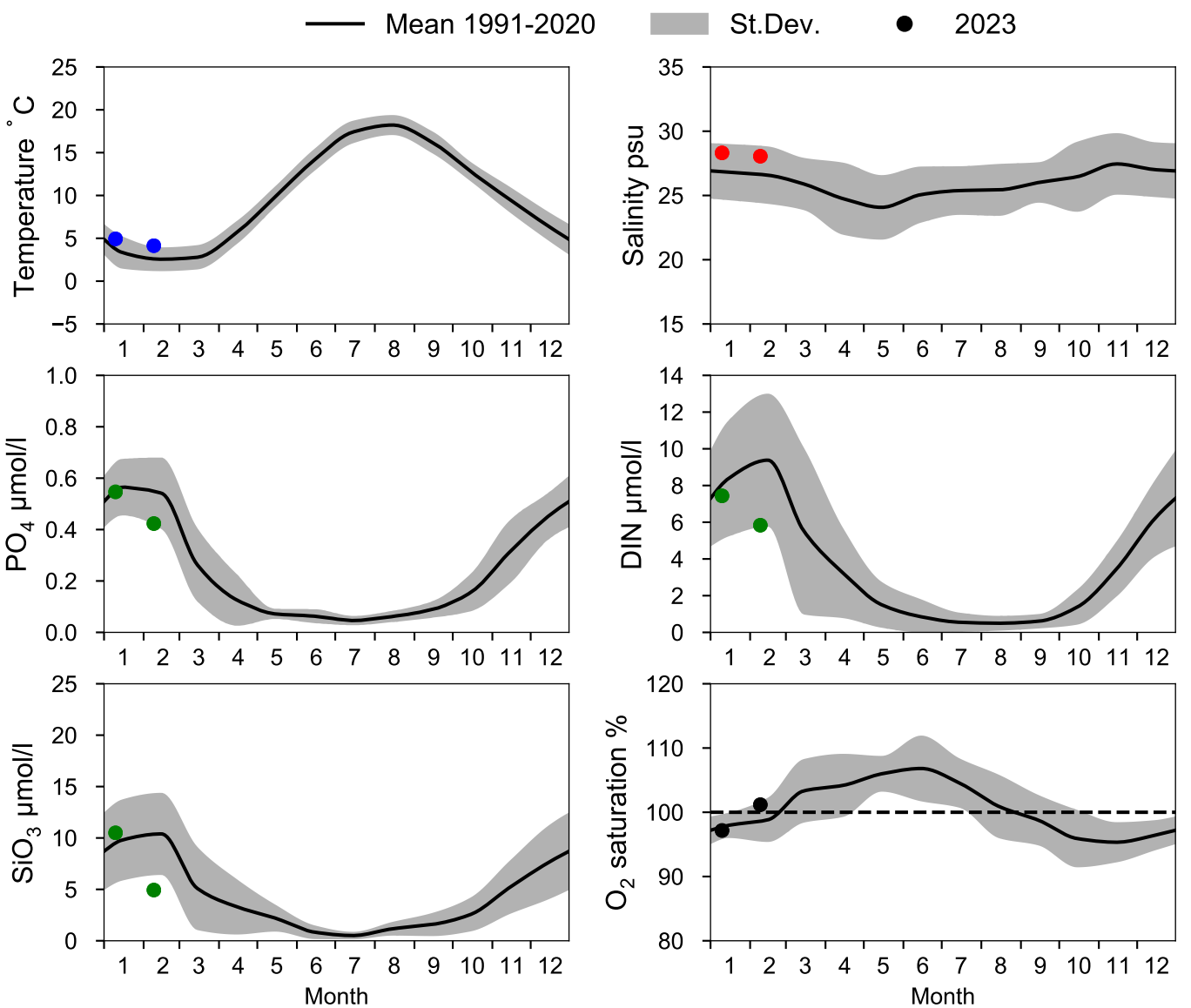
Date: 2023-02-21
Time: 15:13

Ship: SE
Year: 2023

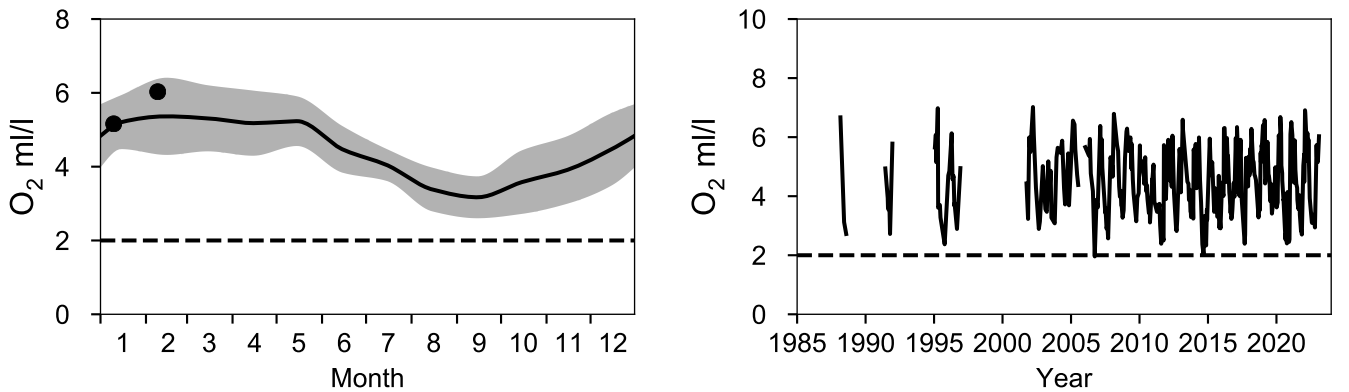
Ser no	Cru no	Stat code	Proj	Stat name	Lat	Lon	Start date yyyymmdd	Start time hhmm	Bottom depth m	Secchi depth m	Wind dir	Wind vel	Air temp C	Air pres hPa	WCWI elac aoveo tueo hdsb	CZPP hohp loy apt o p	No de	No btl	Temp_bottle	Temp_cast_bottle	Salt_bottle	Salt_cast_bottle	Phos_bottle	Phos_cast_bottle	Oxy_bottle	Oxy_cast_bottle	H2S	Phosphate	Nitrite	Nitrate	Nitrite	Nitrate	Ammonia	Nitrite	Ammonia	Silicate	Silicate-Si	Humus	Cocolithus vision	Coccolithus sample
0175	3	BPNX37	BAS...	BY31 LANDSORTSDJ	5835.62	01814.16	20230215	0845	459	13	25	6	2.5	1028	2830	xxxx	23	23	x	x	-	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	-	-
0176	3	BPWX38	BAS...	BY32 NORRKÖPINGSDJ	5800.95	01759.02	20230215	1410	205		24	7	1.6	1026	2830	x---	17	17	x	x	-	x	-	x	x	x	x	x	x	x	x	x	-	x	-	-	-	-
0177	3	BPWX42	BAS...	BY36	5743.39	01722.39	20230215	1740	140		26	6	1.9	1025	9990	----	15	15	x	x	x	x	-	x	x	x	x	x	x	x	x	x	-	x	-	-	-	-
0178	3	BPWX45	BAS...	BY38 KARLSÖDJ	5706.98	01740.11	20230215	2220	114		24	9	3.3	1023	9990	x-x-	14	14	x	x	x	x	-	x	x	x	x	x	x	x	x	x	-	x	x	-	-
0179	3	BPSE49	BAS...	BY39 ÖLANDS S UDDE	5606.97	01632.16	20230216	0615	50		24	8	2.6	1020	9990	xxx-	8	8	x	x	x	x	x	x	-	x	x	x	x	x	x	-	x	-	-	-	-

STATION SLÄGGÖ SURFACE WATER (0-10 m)

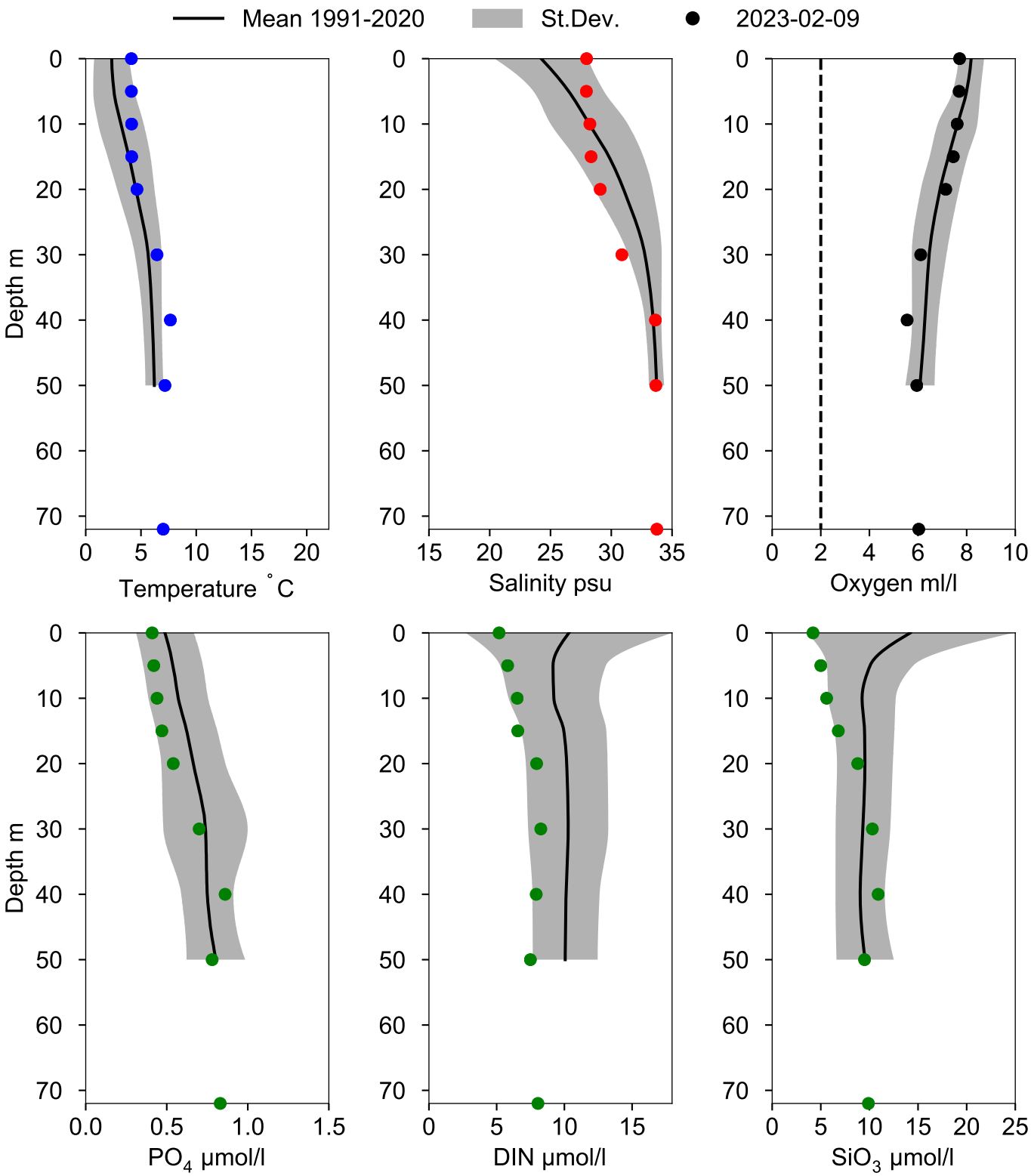
Annual Cycles



OXYGEN IN BOTTOM WATER (depth >= 64 m)

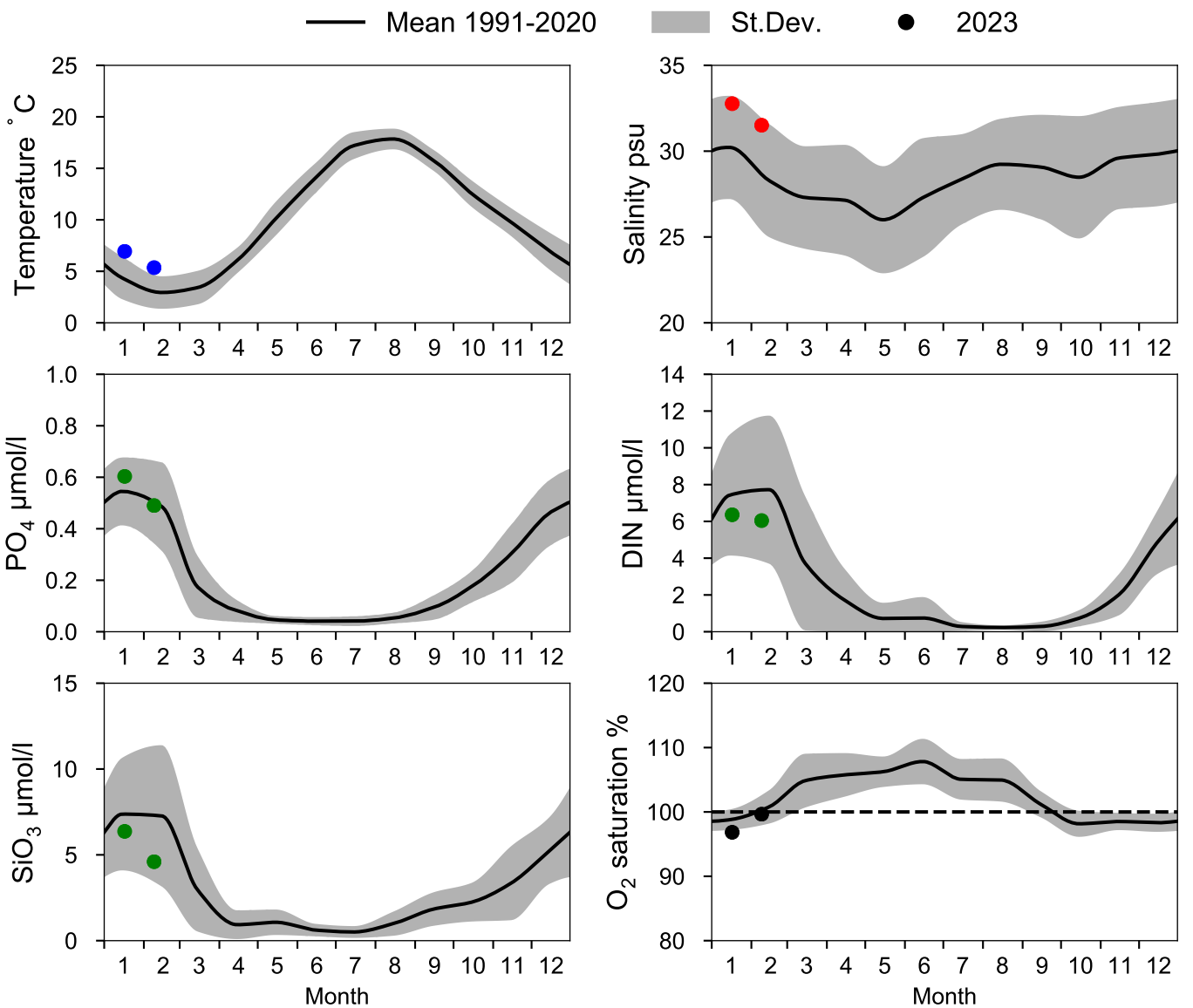


Vertical profiles SLÄGGÖ
February

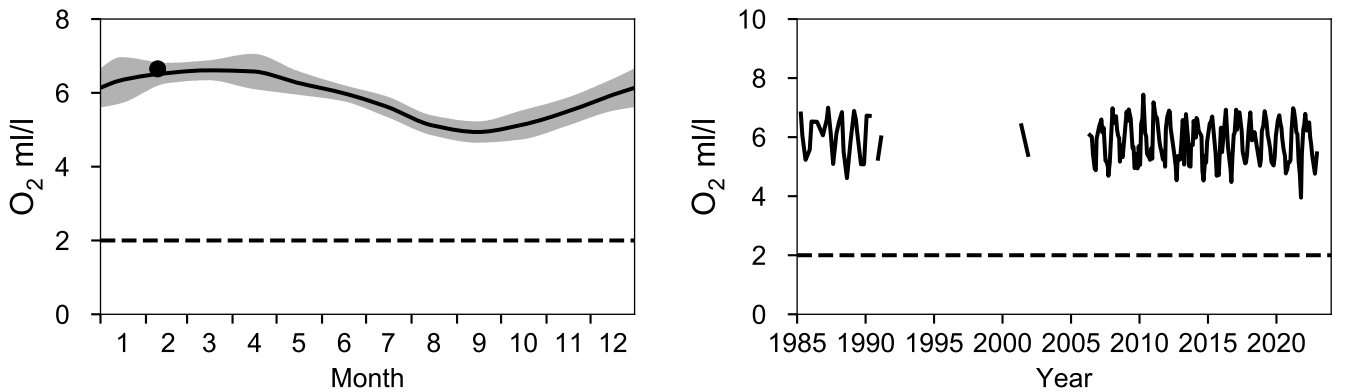


STATION Å13 SURFACE WATER (0-10 m)

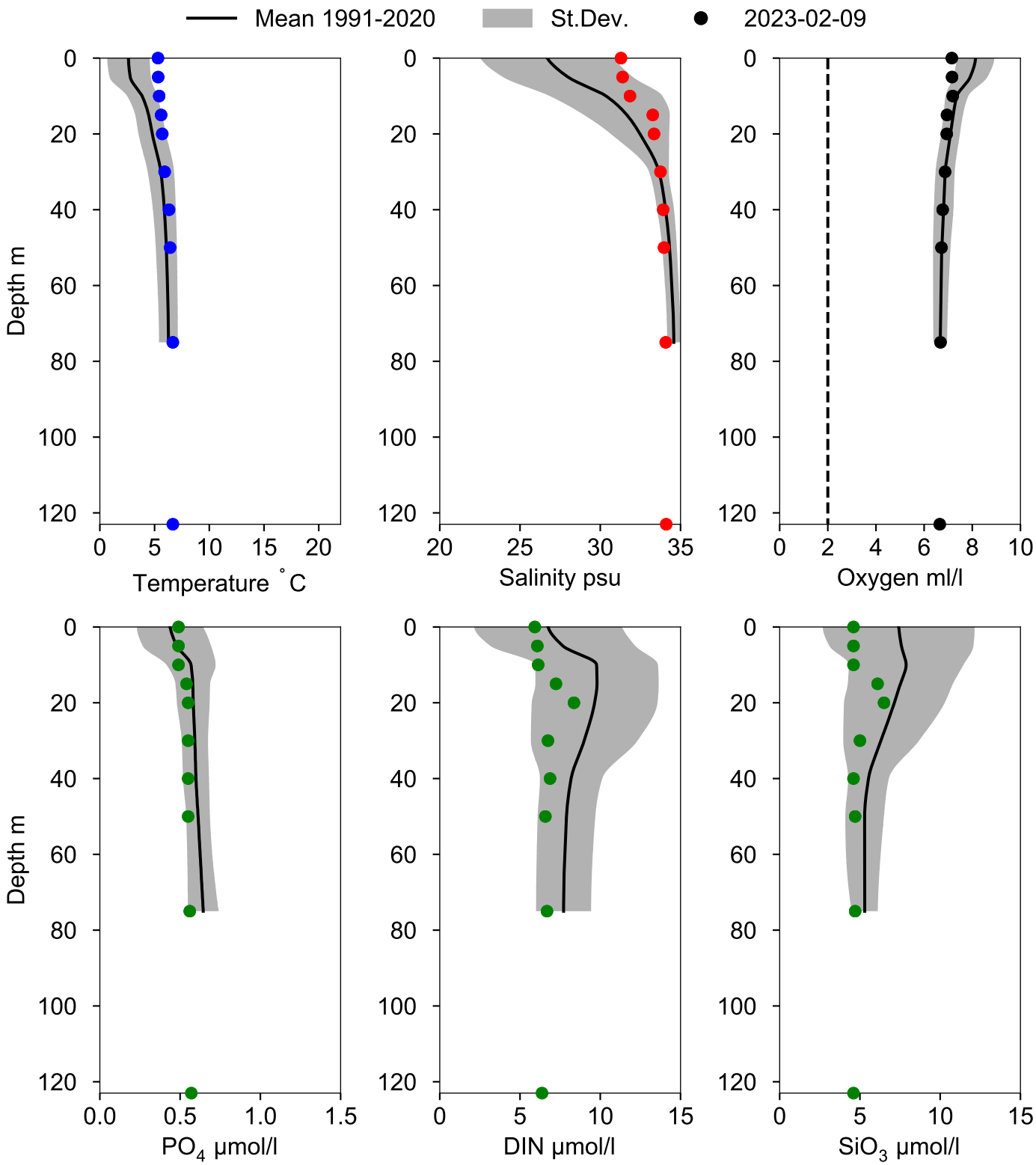
Annual Cycles



OXYGEN IN BOTTOM WATER (depth >= 82 m)

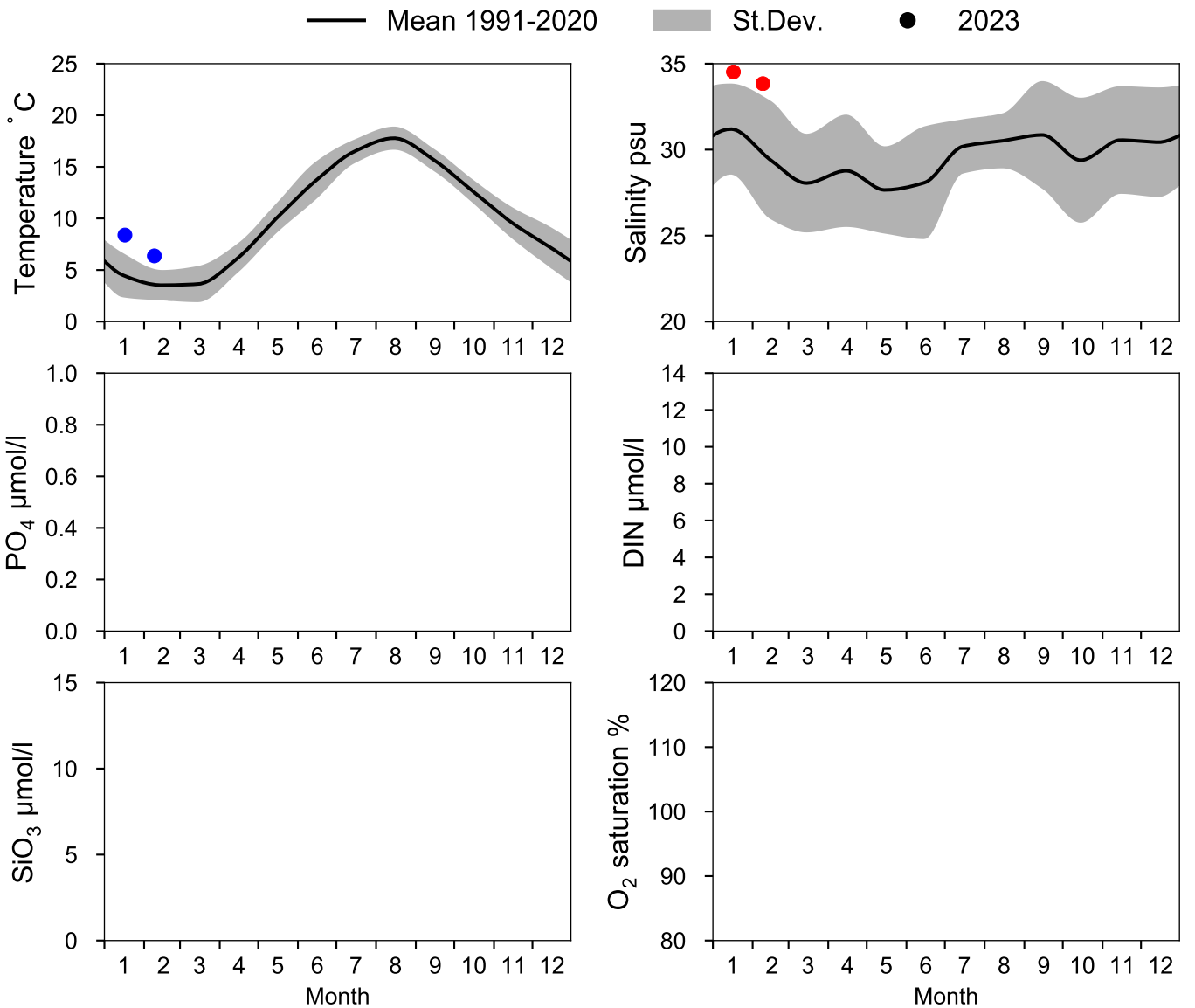


Vertical profiles Å13
February

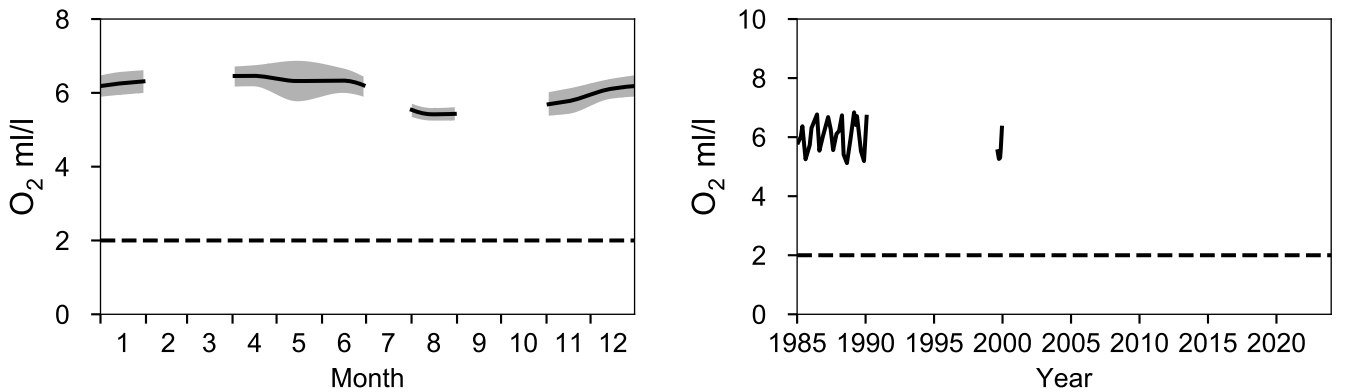


STATION Å14 SURFACE WATER (0-10 m)

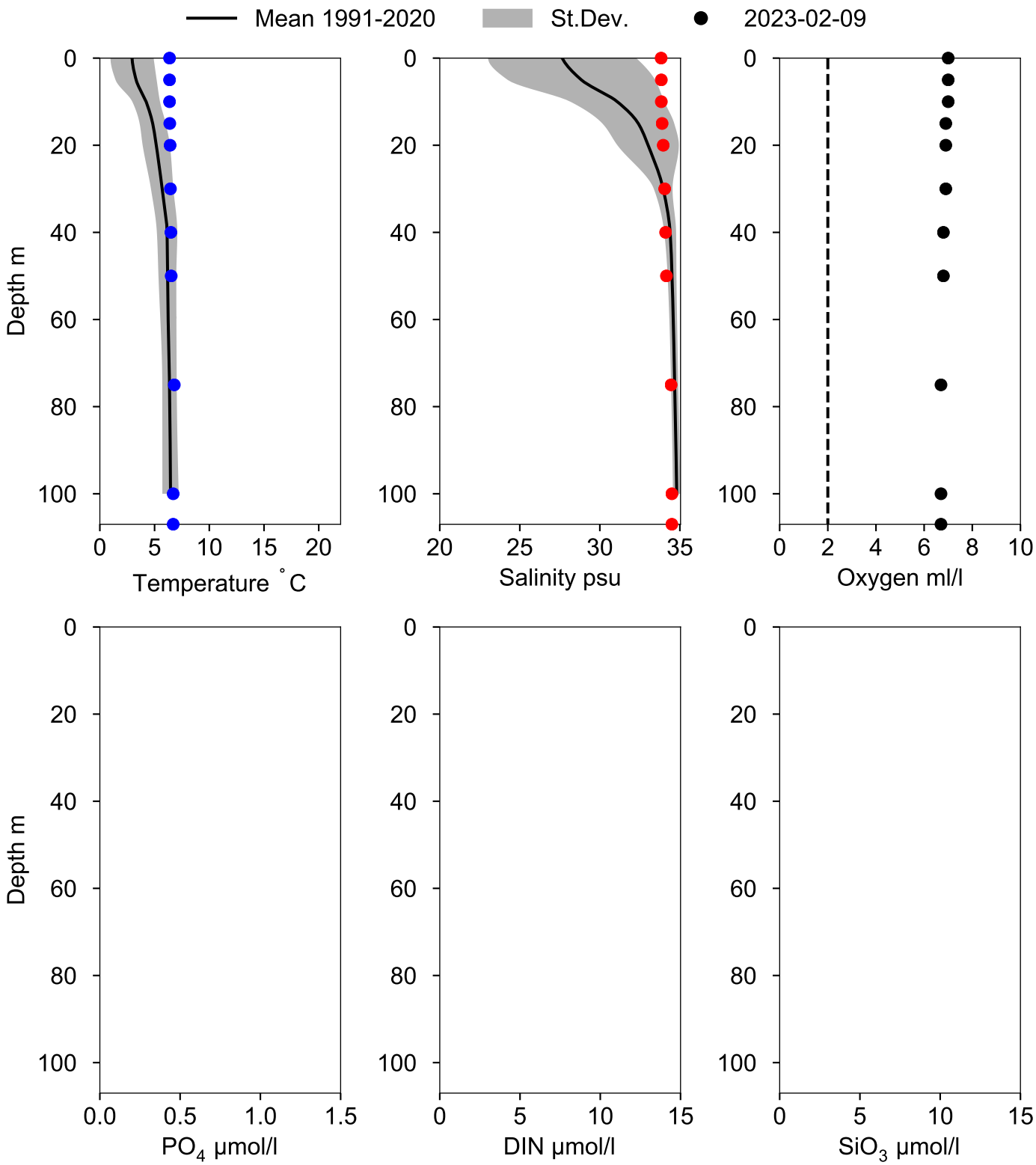
Annual Cycles



OXYGEN IN BOTTOM WATER (depth >= 100 m)

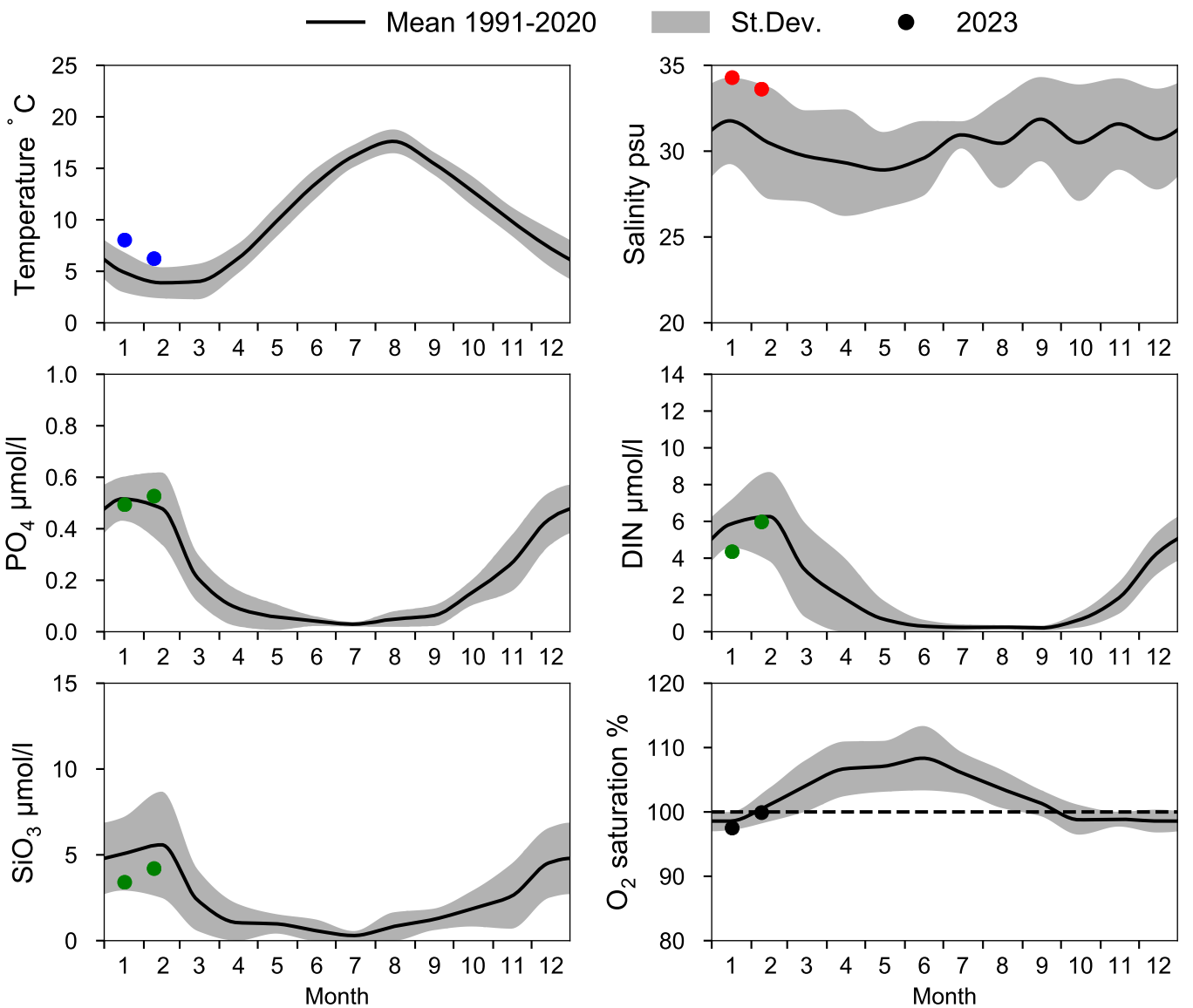


Vertical profiles Å14
February

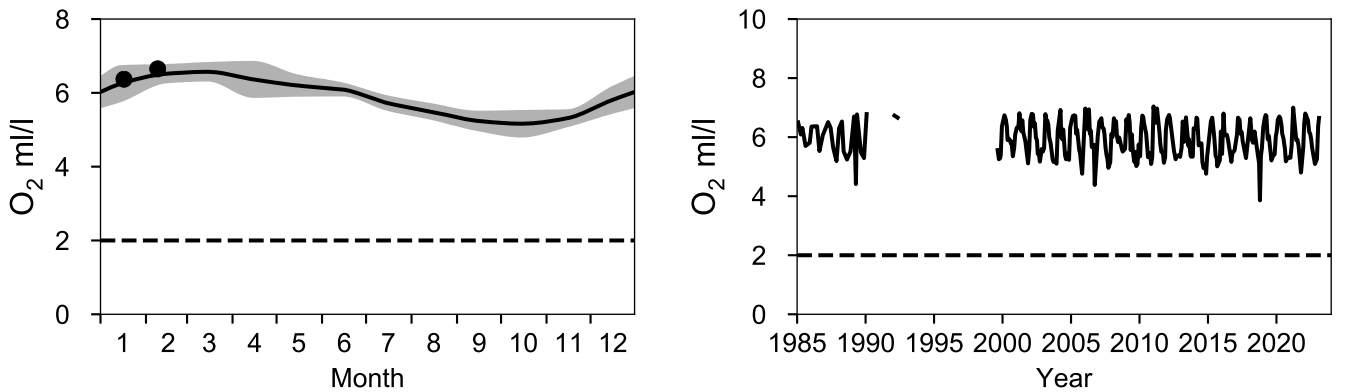


STATION Å15 SURFACE WATER (0-10 m)

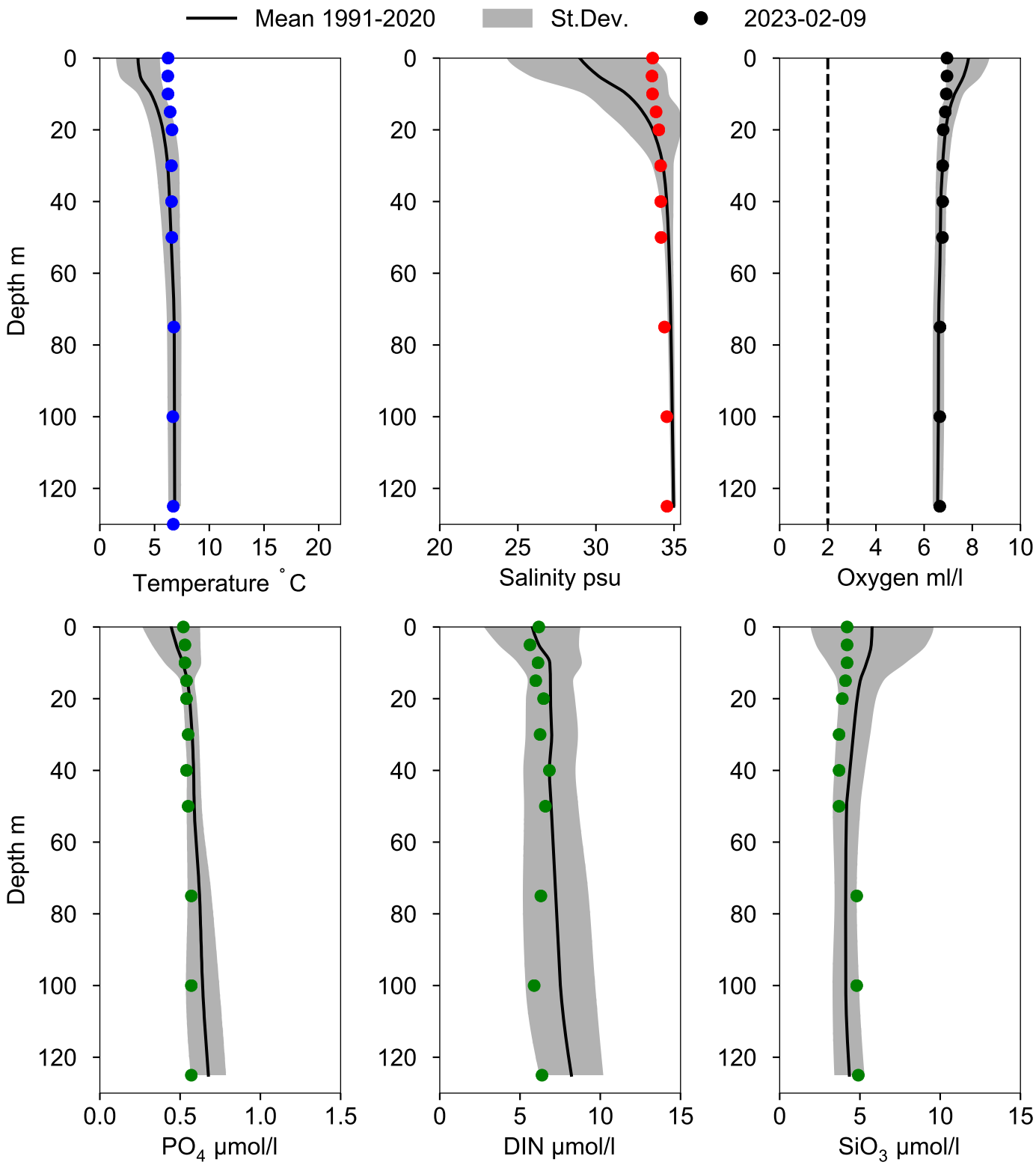
Annual Cycles



OXYGEN IN BOTTOM WATER (depth >= 125 m)

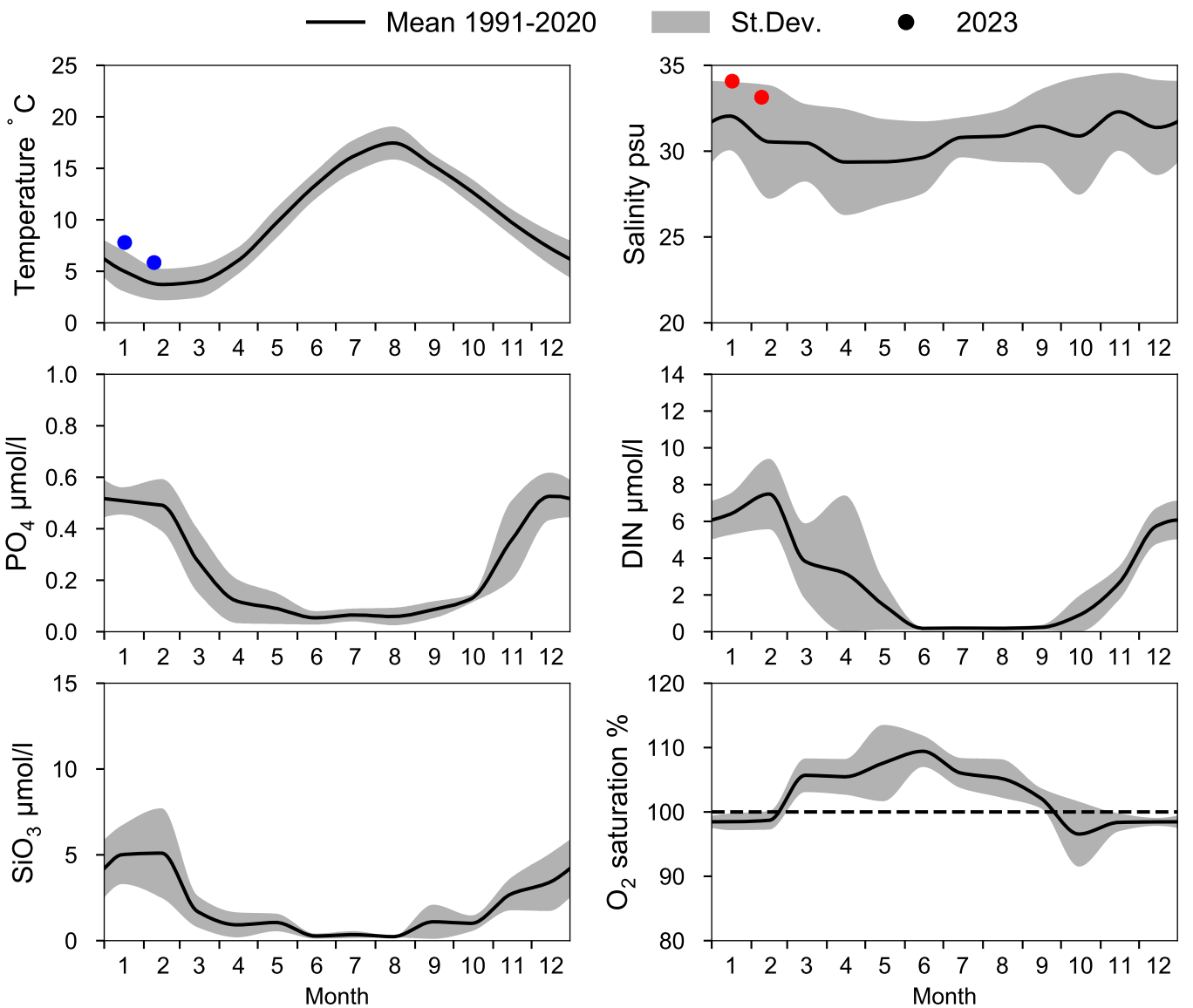


Vertical profiles Å15
February

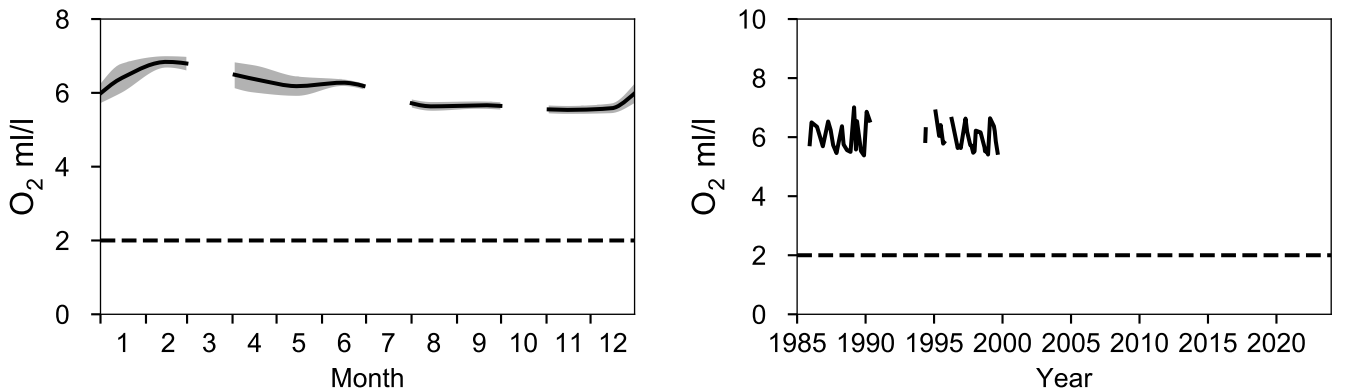


STATION Å16 SURFACE WATER (0-10 m)

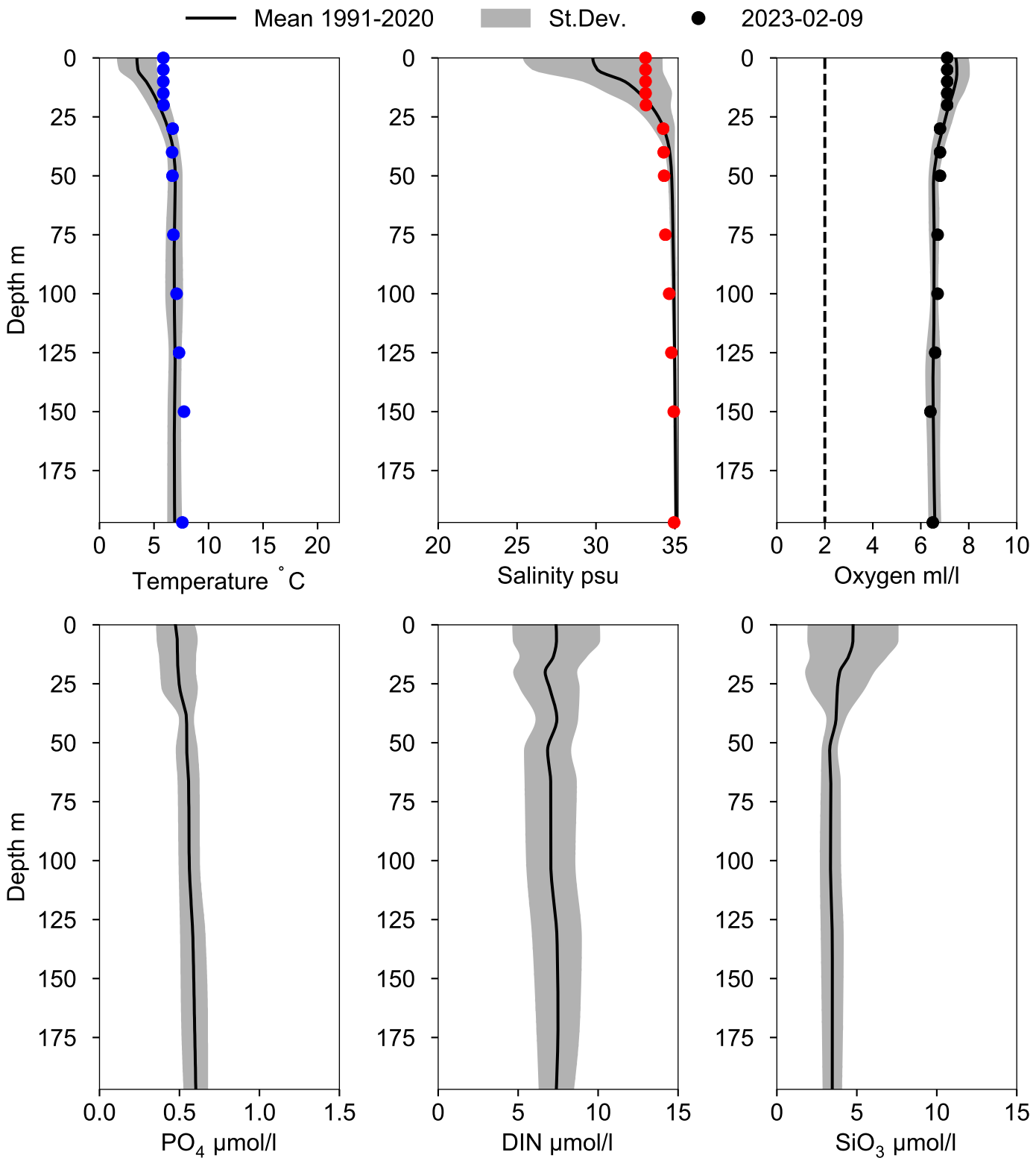
Annual Cycles



OXYGEN IN BOTTOM WATER (depth >= 193 m)

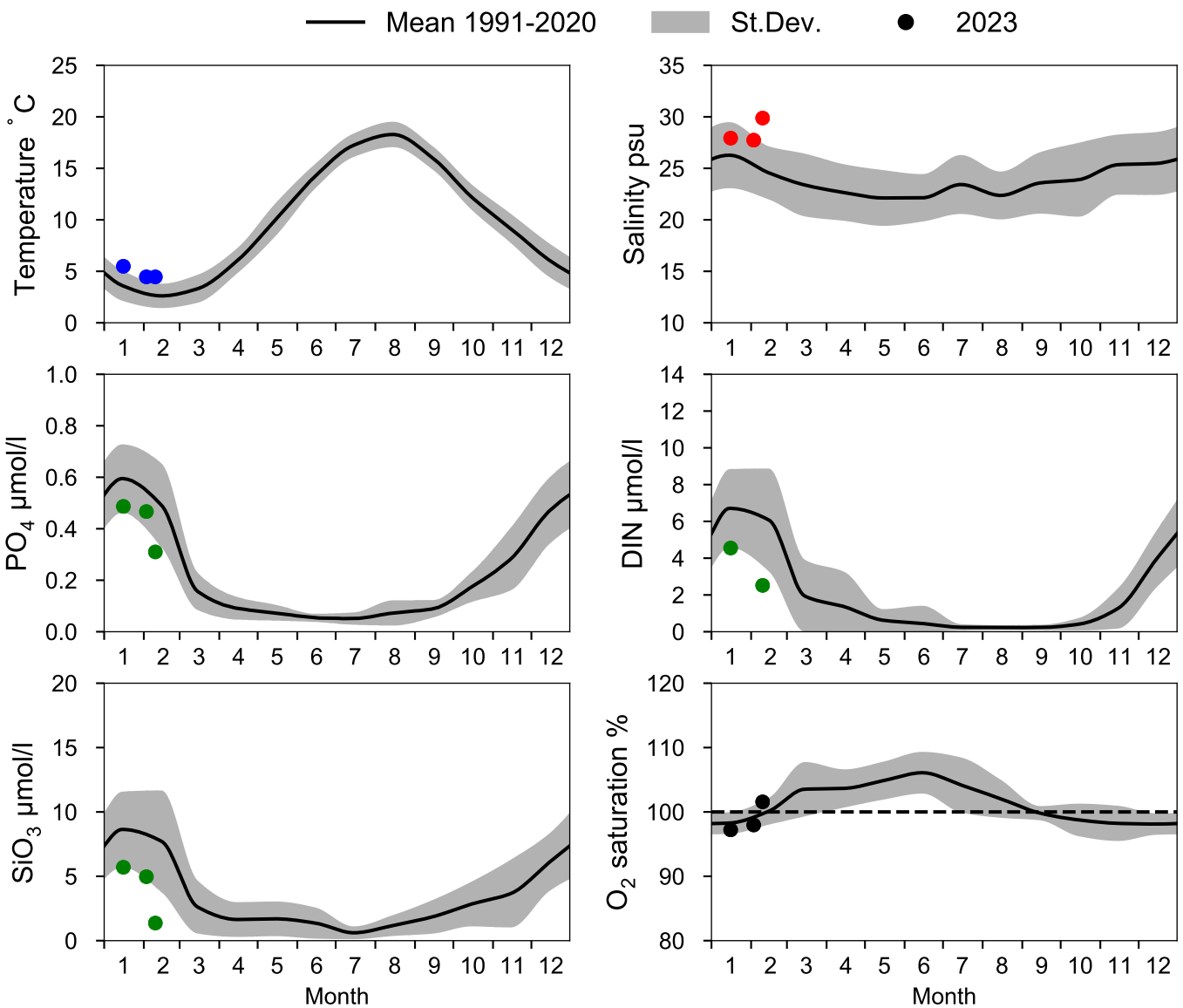


Vertical profiles Å16
February

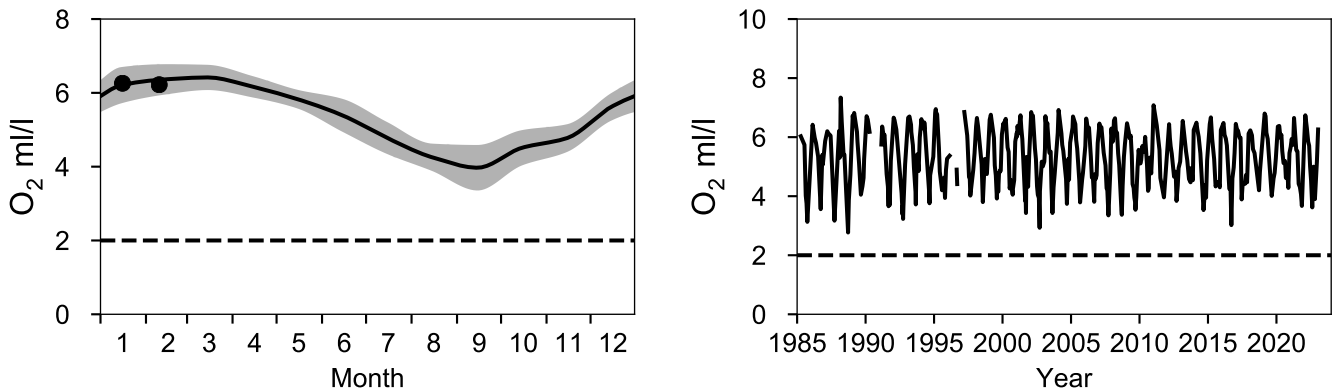


STATION FLADEN SURFACE WATER (0-10 m)

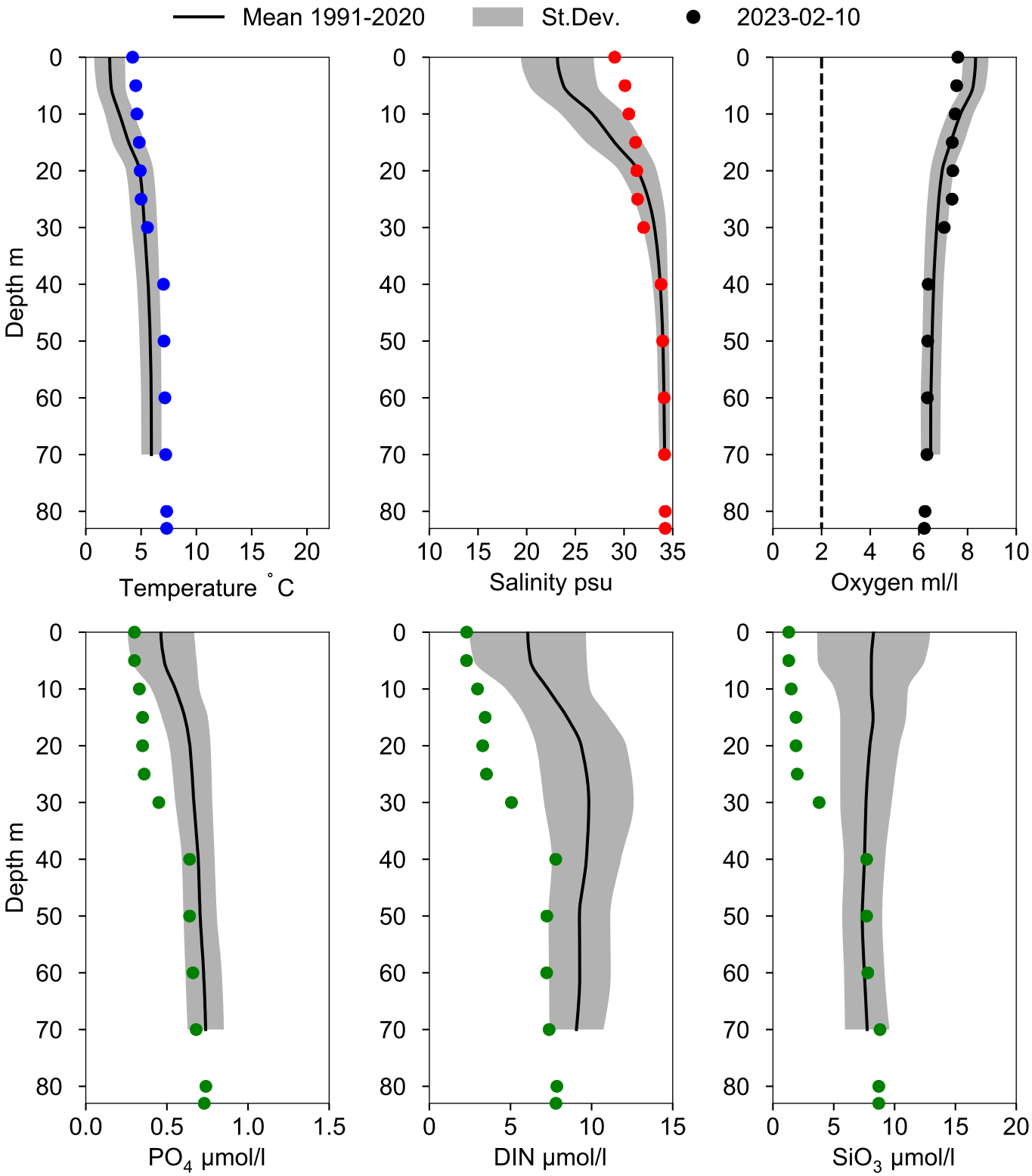
Annual Cycles



OXYGEN IN BOTTOM WATER (depth >= 74 m)

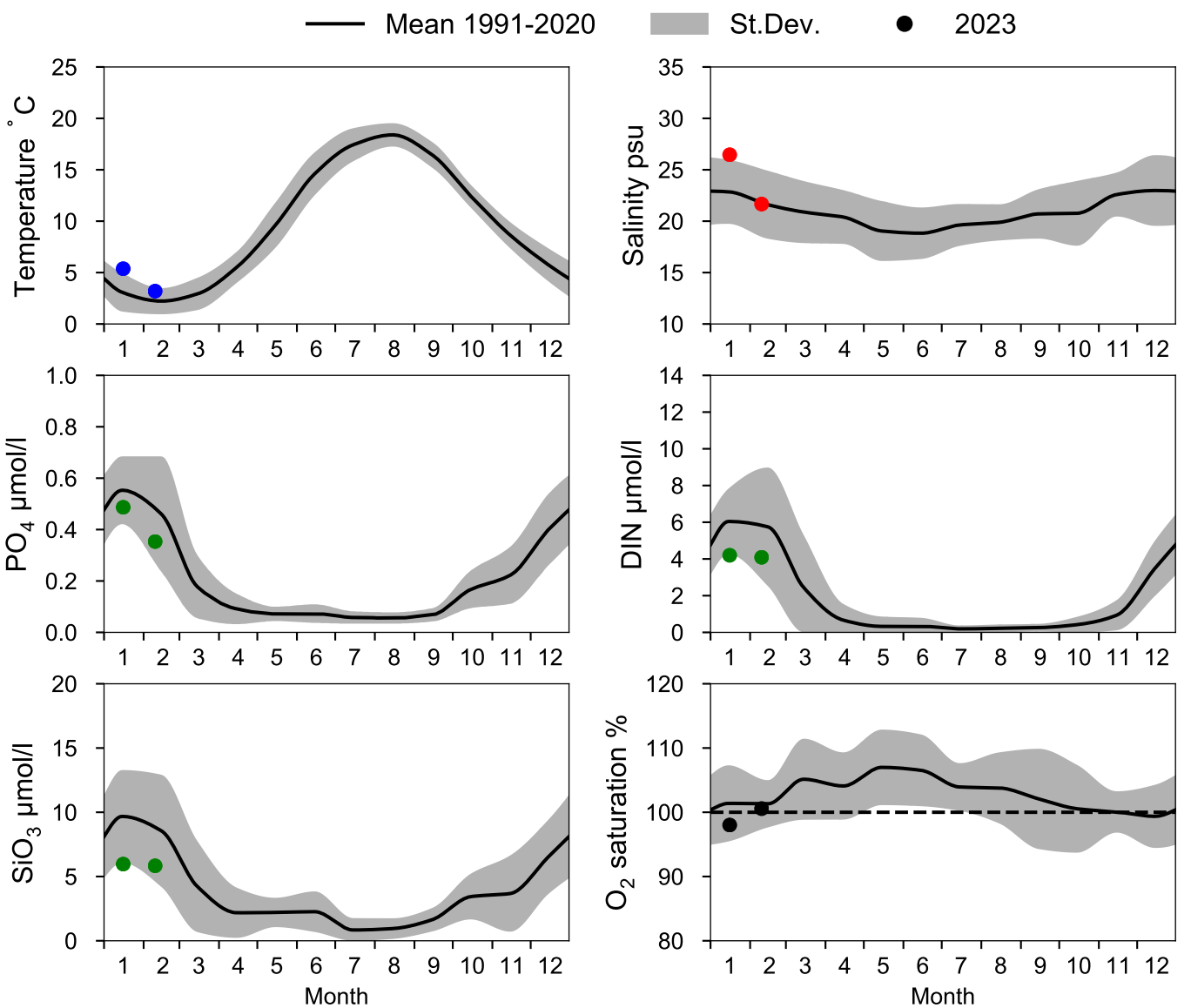


Vertical profiles FLADEN
February

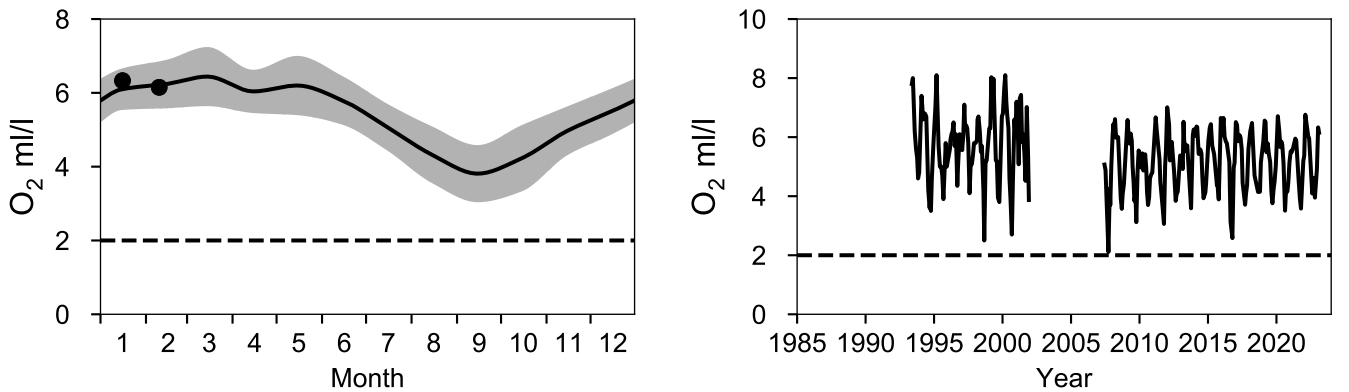


STATION N14 FALKENBERG SURFACE WATER (0-10 m)

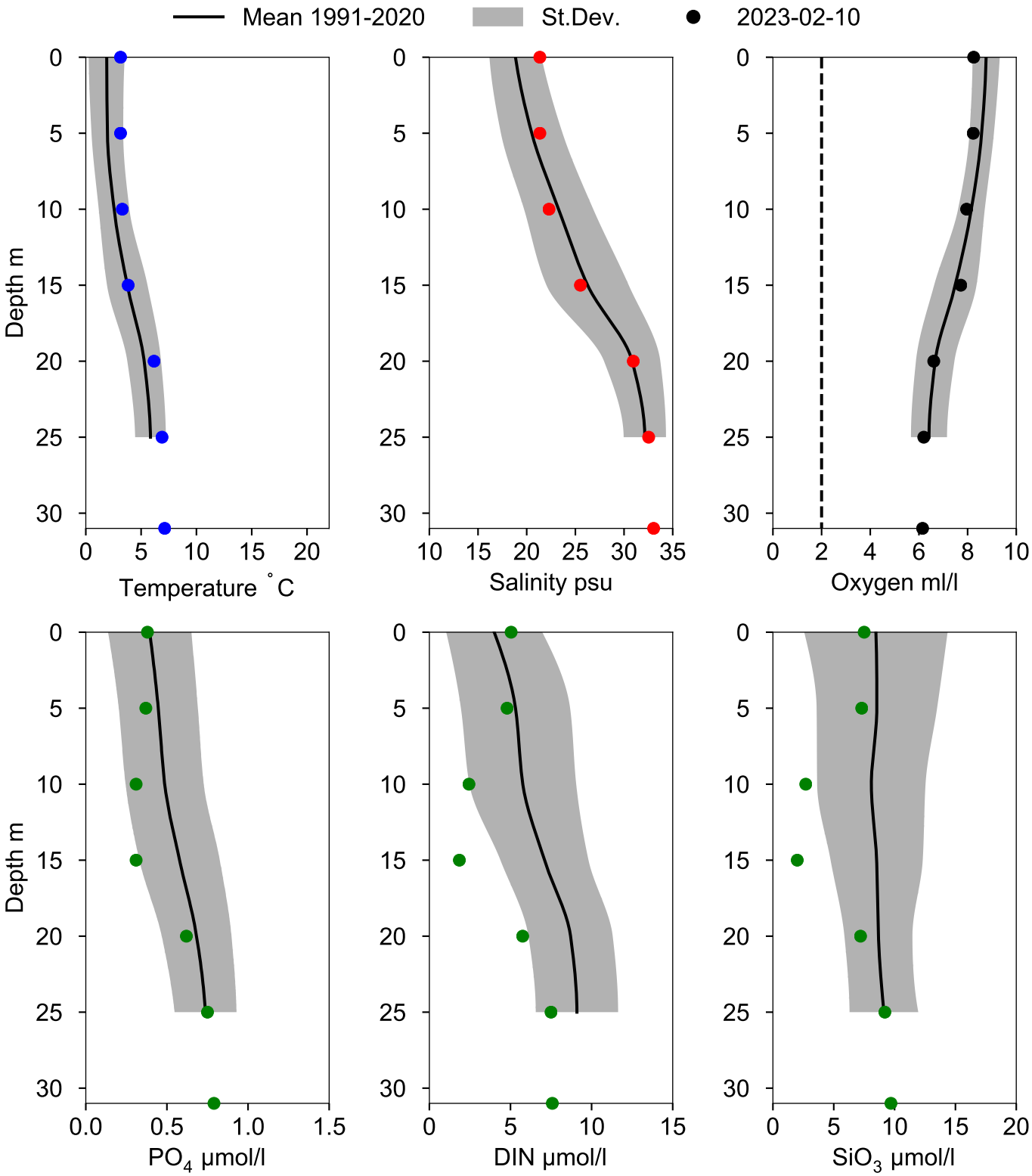
Annual Cycles



OXYGEN IN BOTTOM WATER (depth >= 25 m)

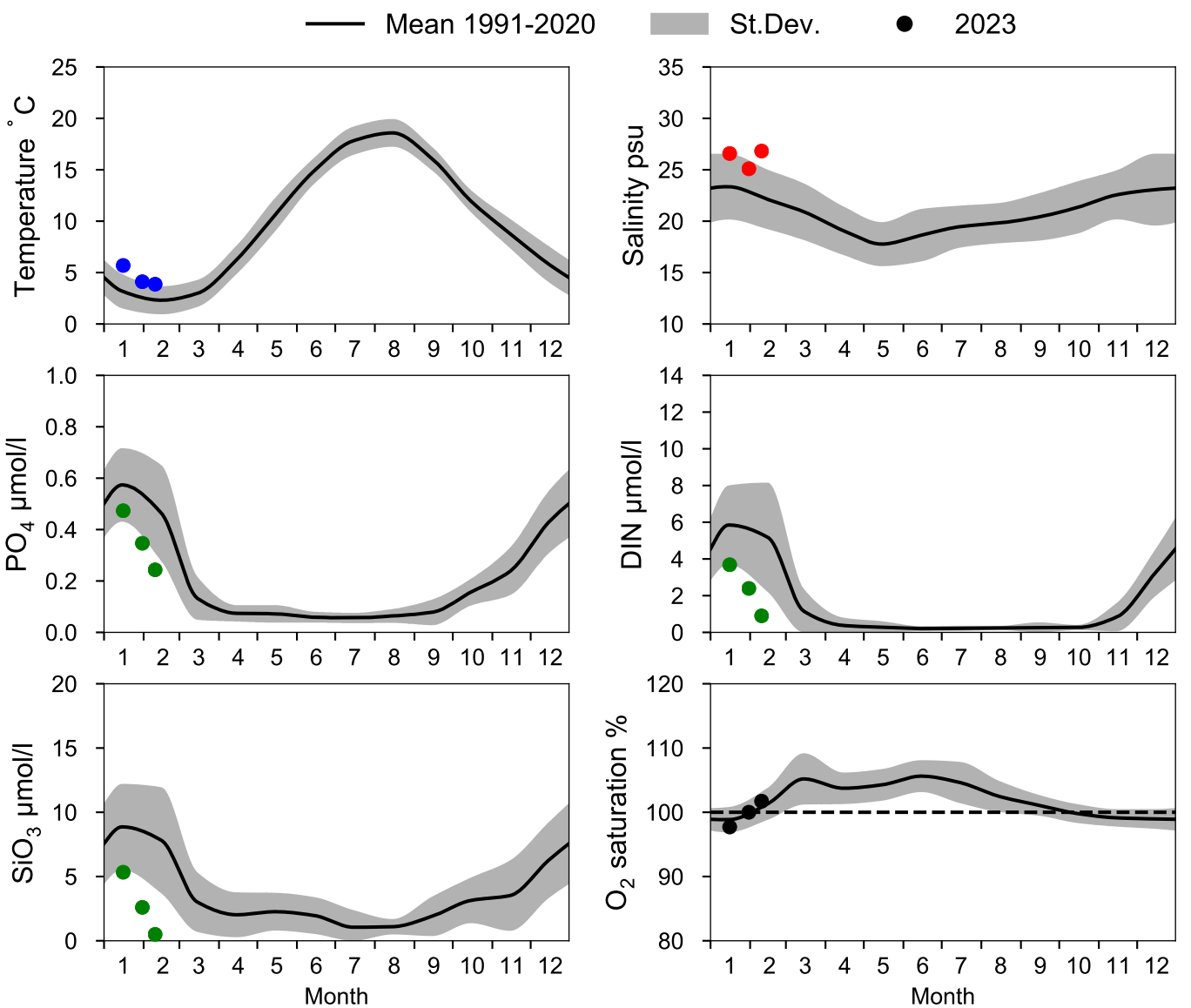


Vertical profiles N14 FALKENBERG
February

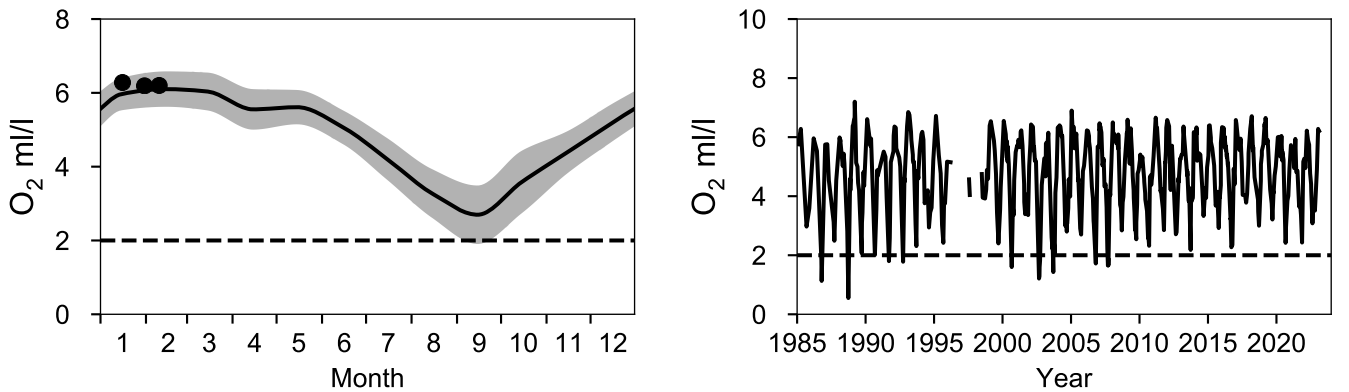


STATION ANHOLT E SURFACE WATER (0-10 m)

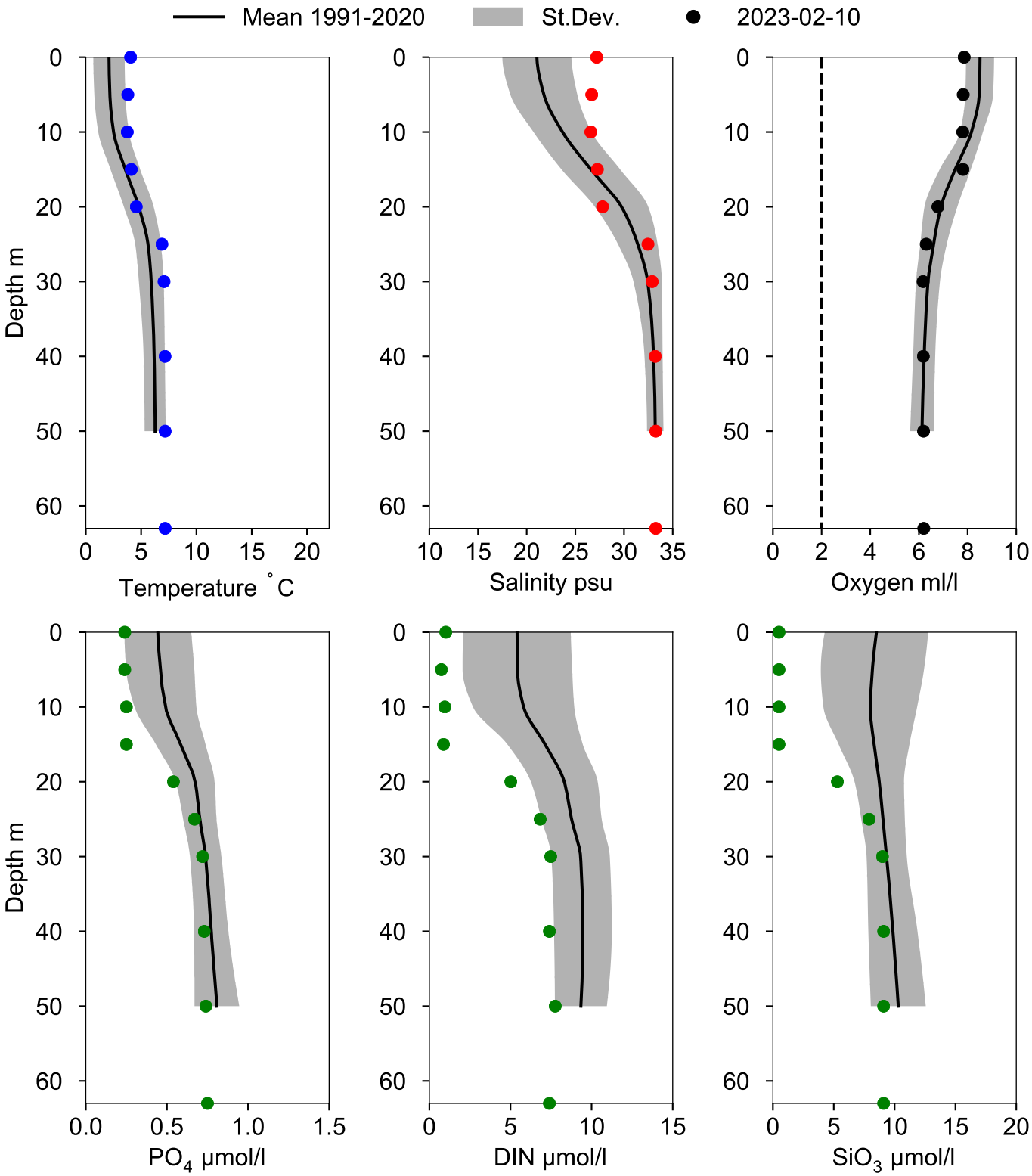
Annual Cycles



OXYGEN IN BOTTOM WATER (depth >= 52 m)

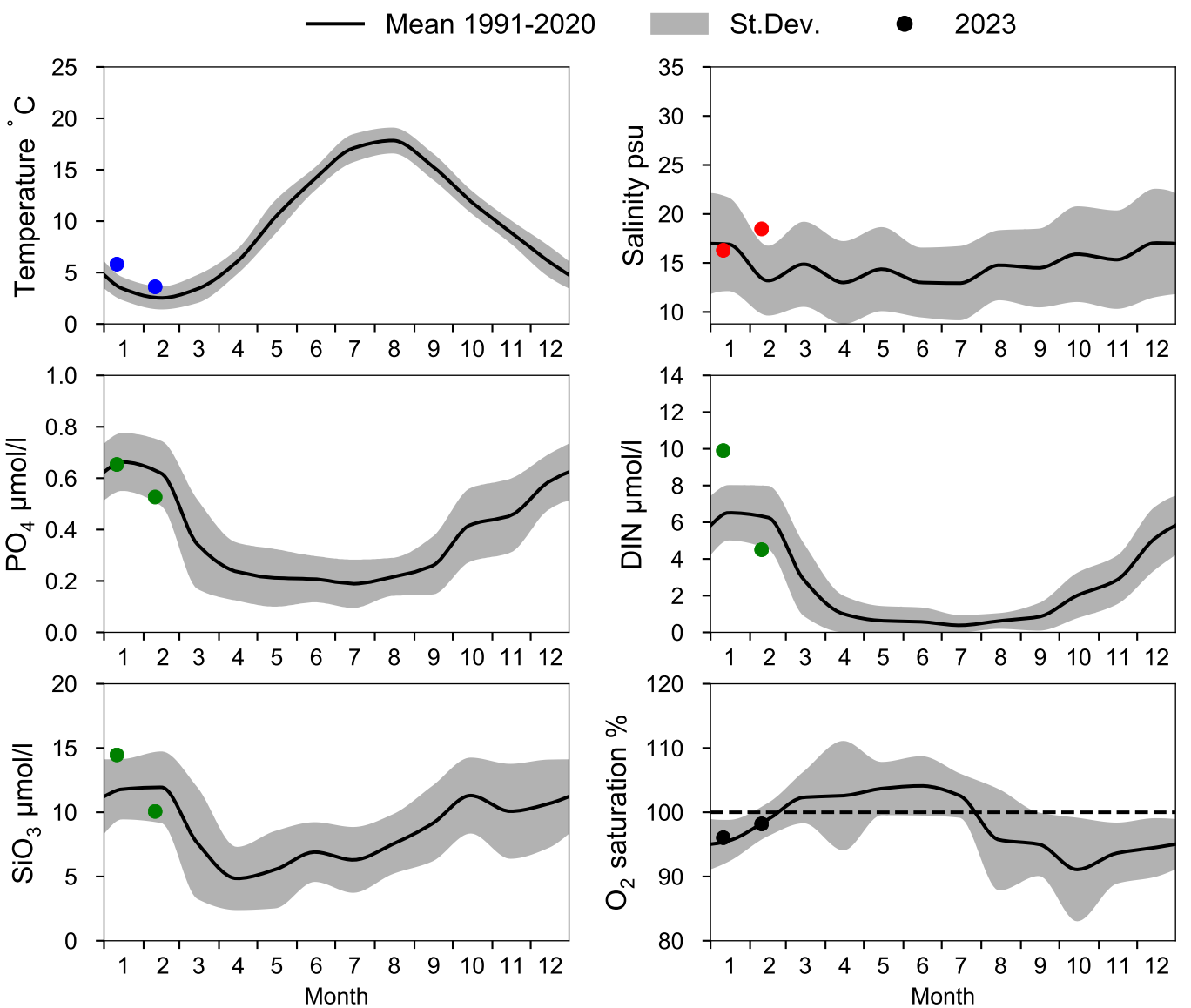


Vertical profiles ANHOLT E
February

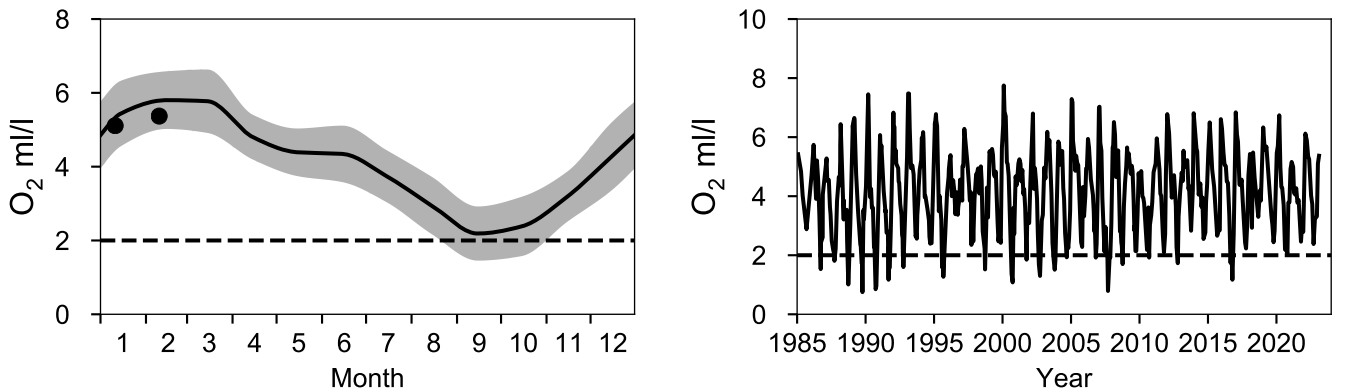


STATION W LANDSKRONA SURFACE WATER (0-10 m)

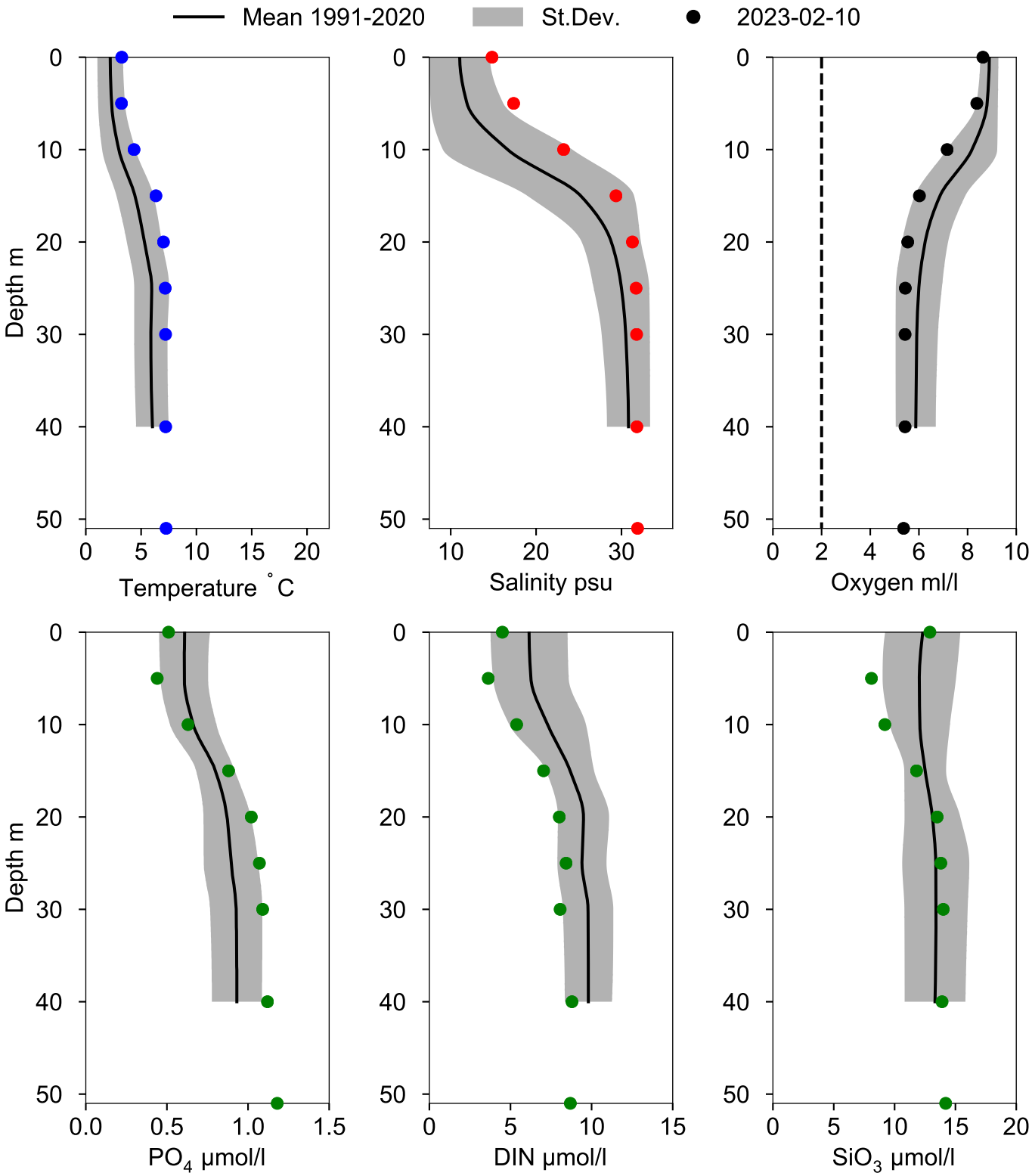
Annual Cycles



OXYGEN IN BOTTOM WATER (depth >= 40 m)



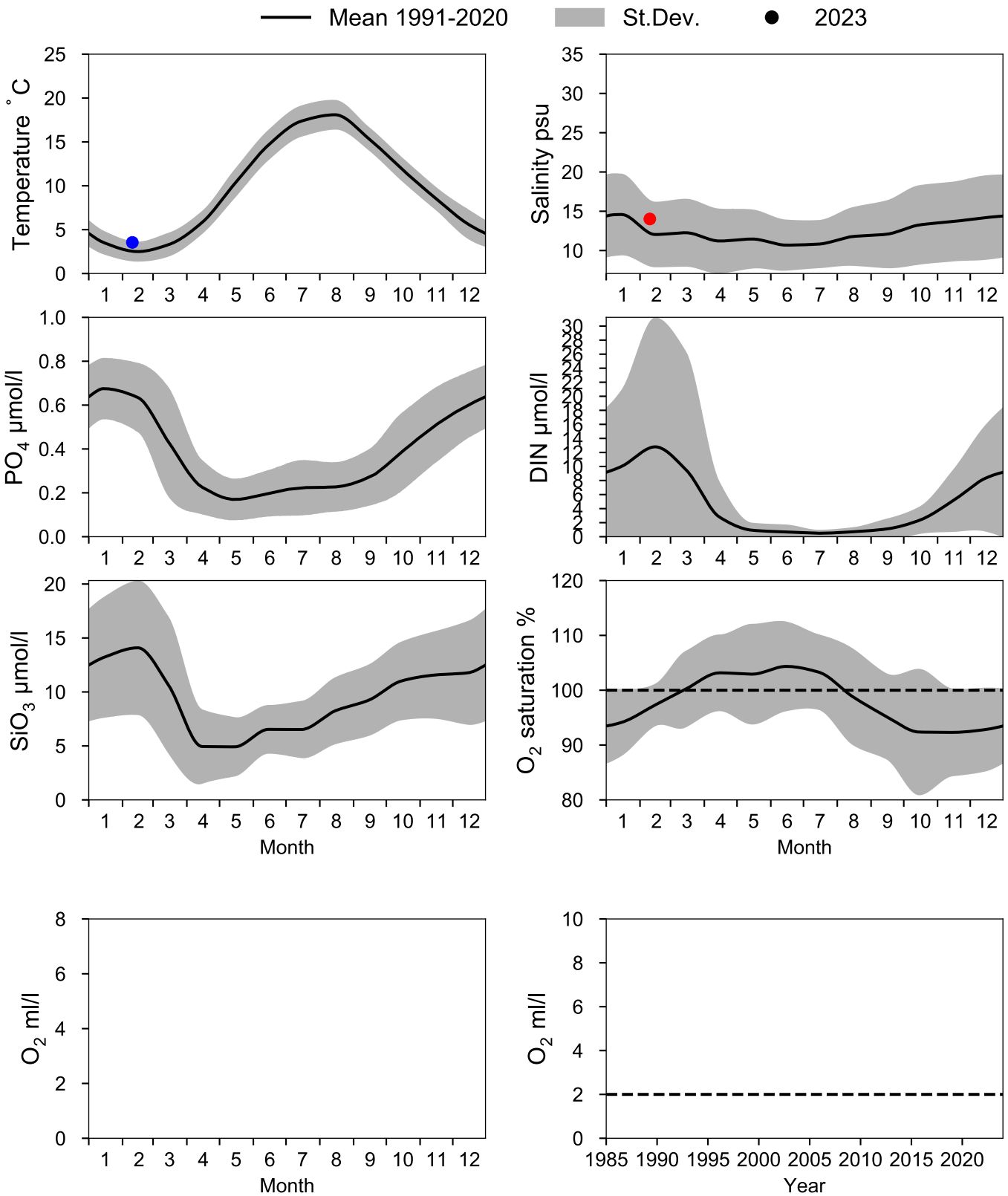
Vertical profiles W LANDSKRONA
February



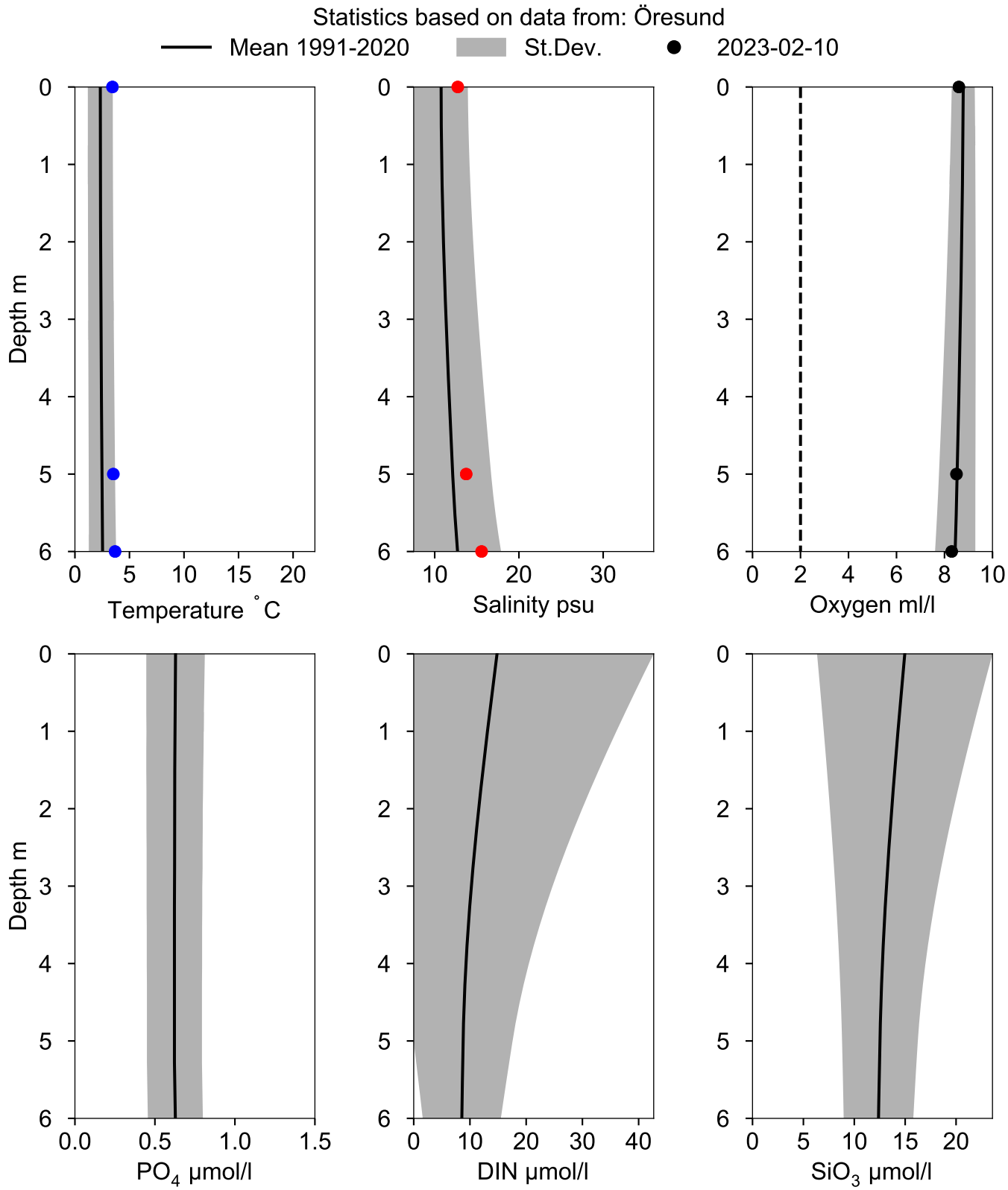
STATION FLINTEN-7 SURFACE WATER (0-10 m)

Annual Cycles

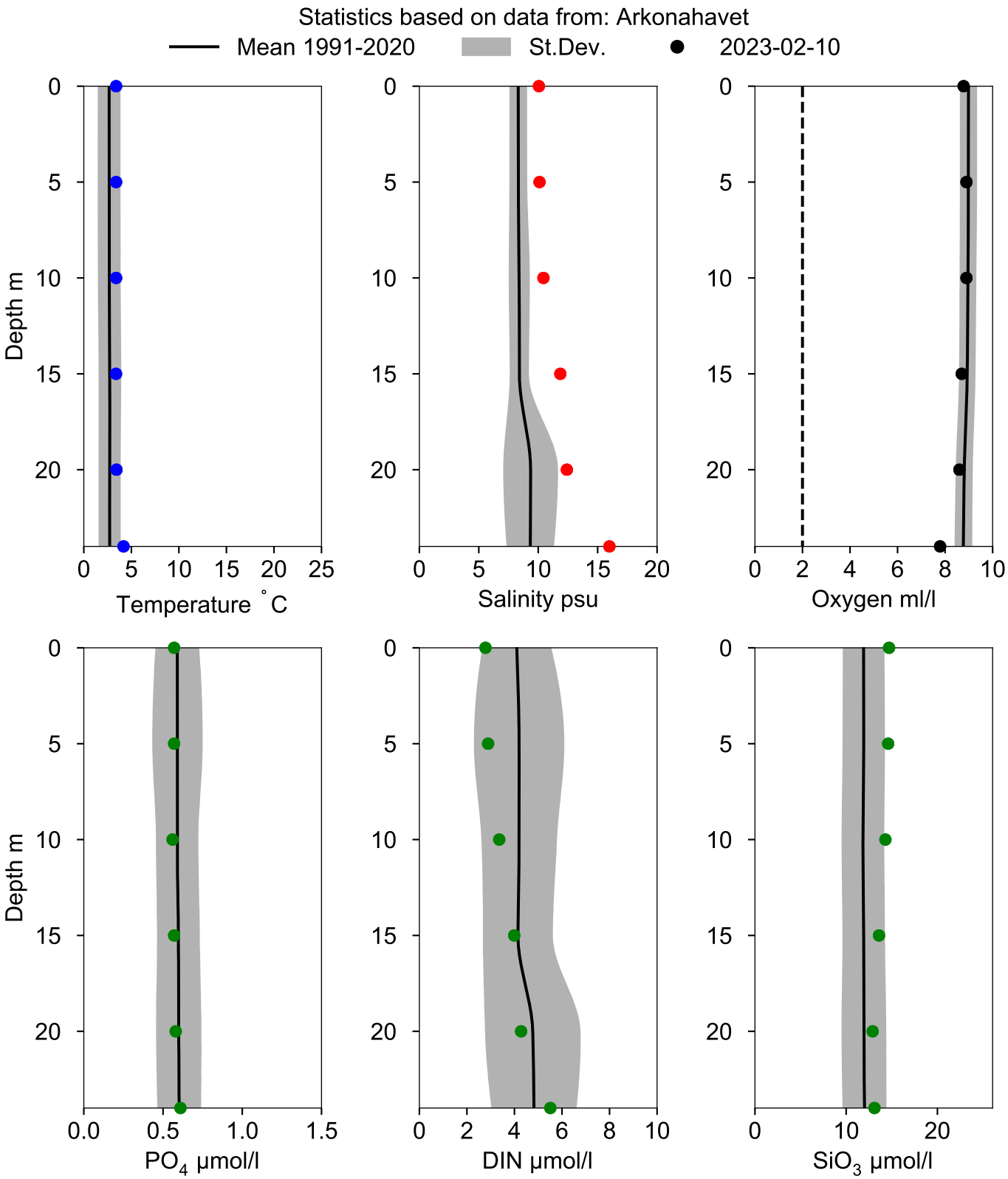
Statistics based on data from: Öresund



Vertical profiles FLINTEN-7
February

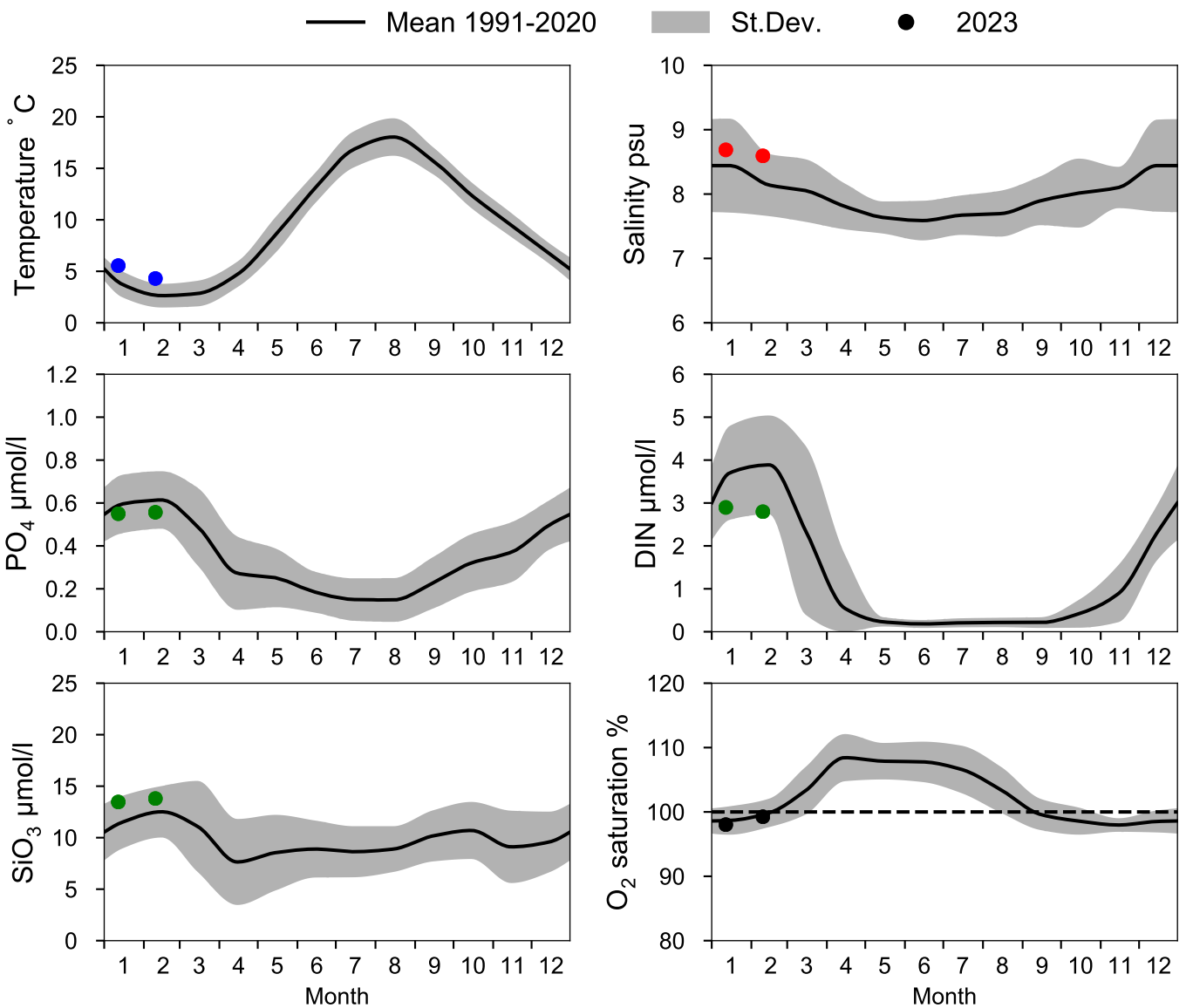


Vertical profiles 441 STEVNS KLINT
February

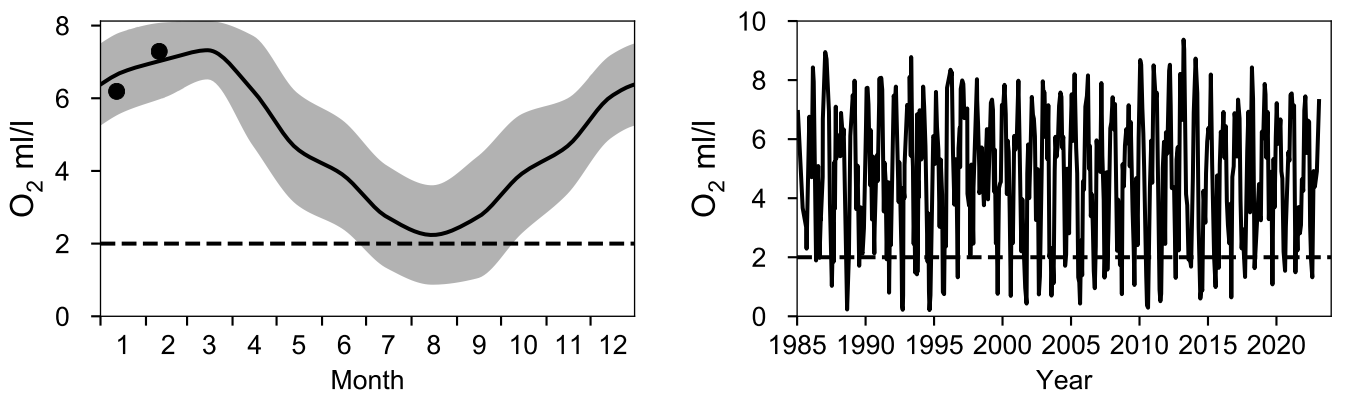


STATION BY1 SURFACE WATER (0-10 m)

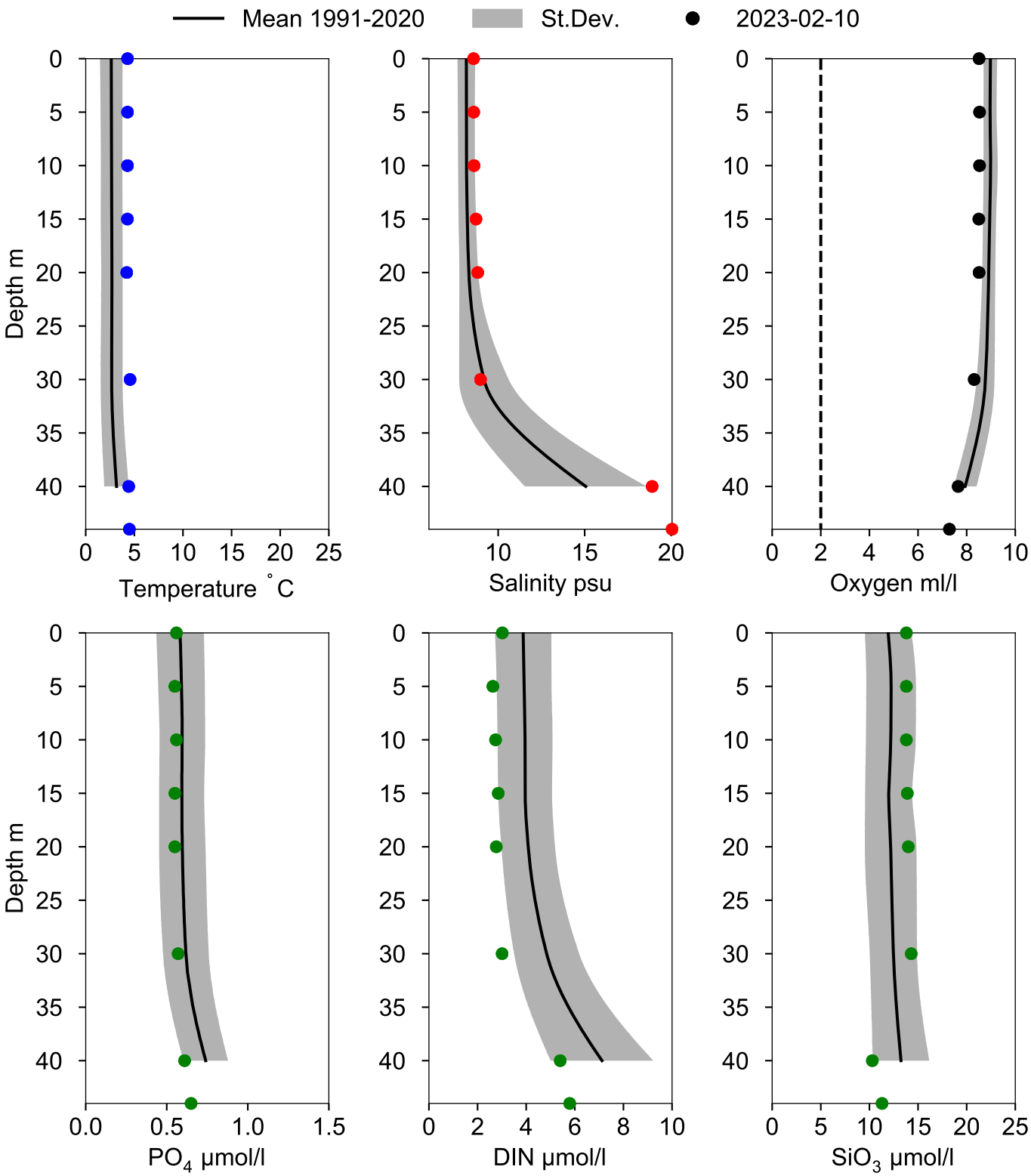
Annual Cycles



OXYGEN IN BOTTOM WATER (depth >= 39 m)

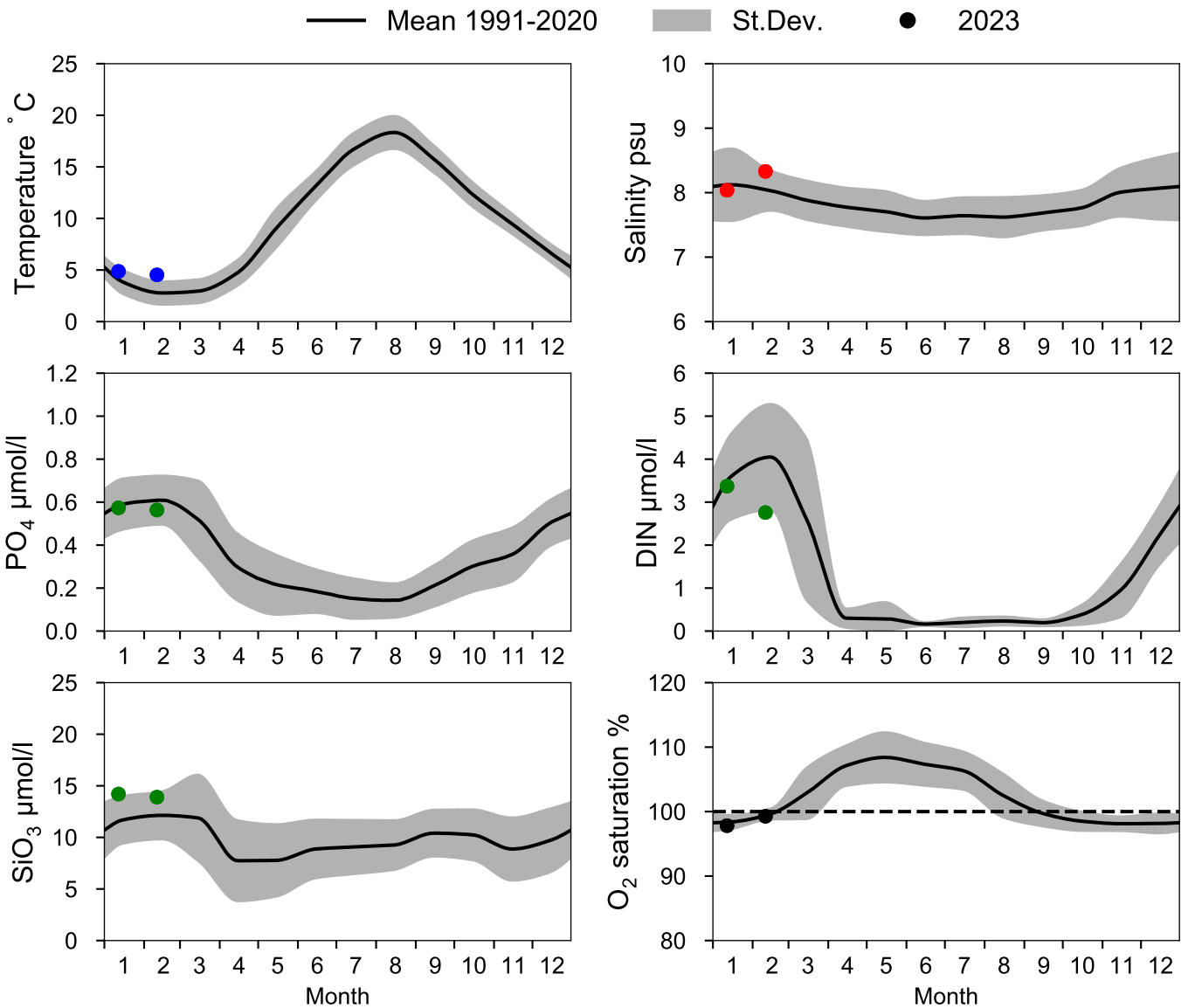


Vertical profiles BY1
February

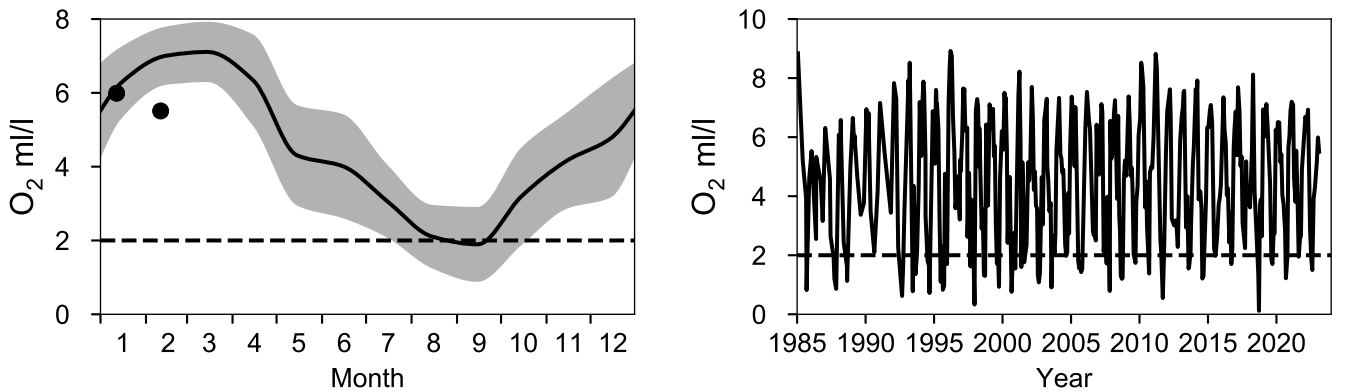


STATION BY2 ARKONA SURFACE WATER (0-10 m)

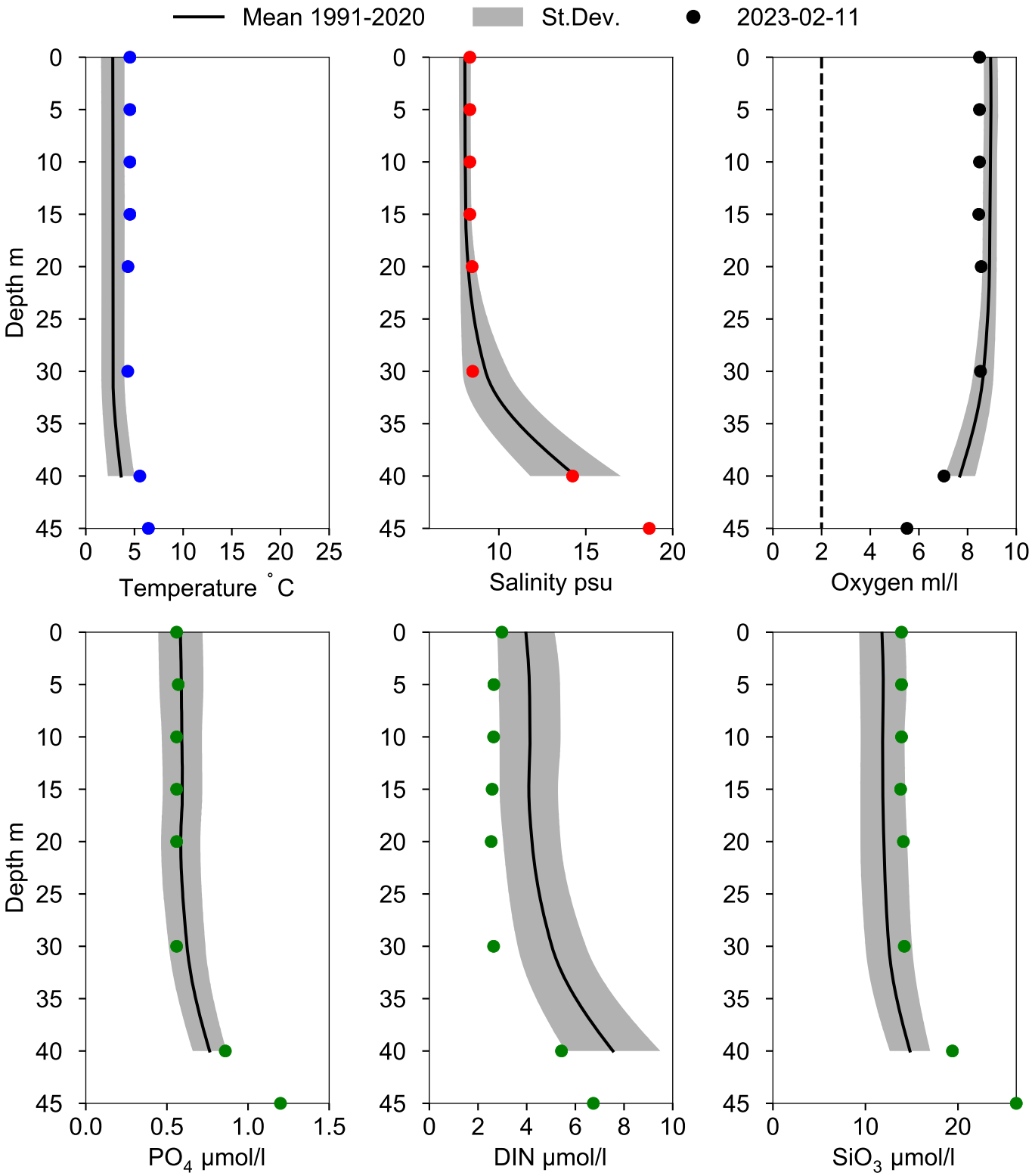
Annual Cycles



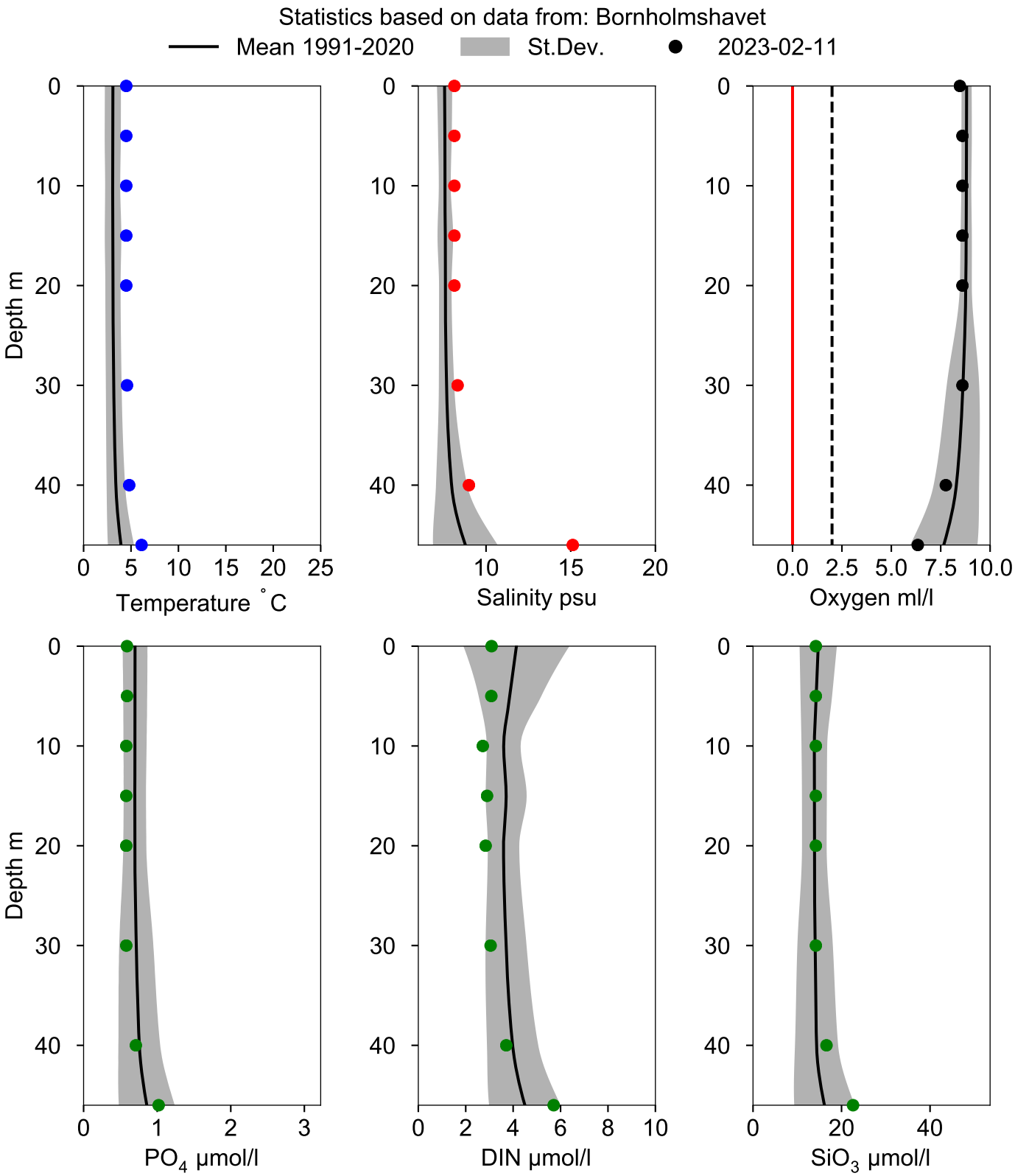
OXYGEN IN BOTTOM WATER (depth >= 40 m)



Vertical profiles BY2 ARKONA
February

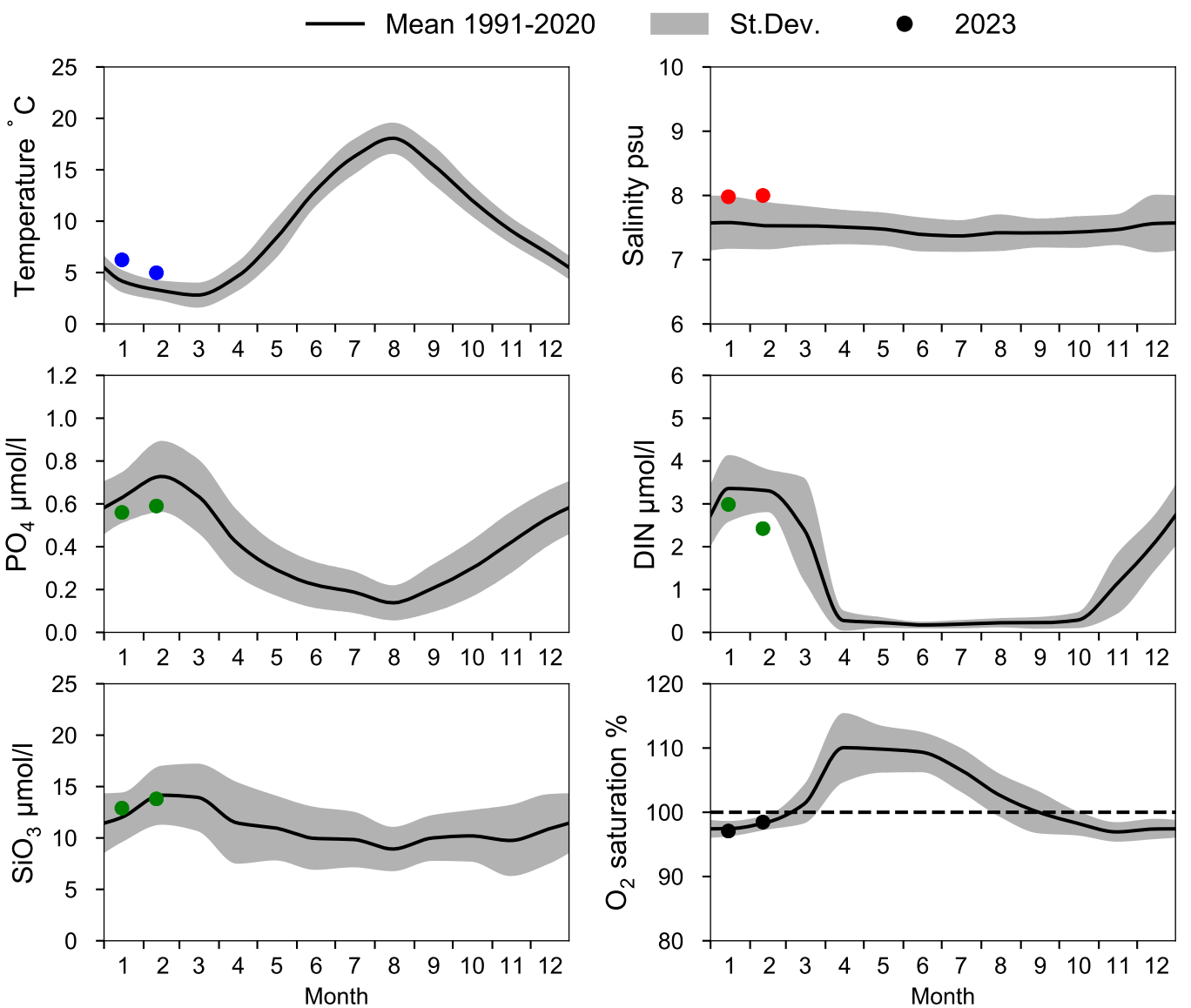


Vertical profiles BY3 HAMRARNE SUND
February

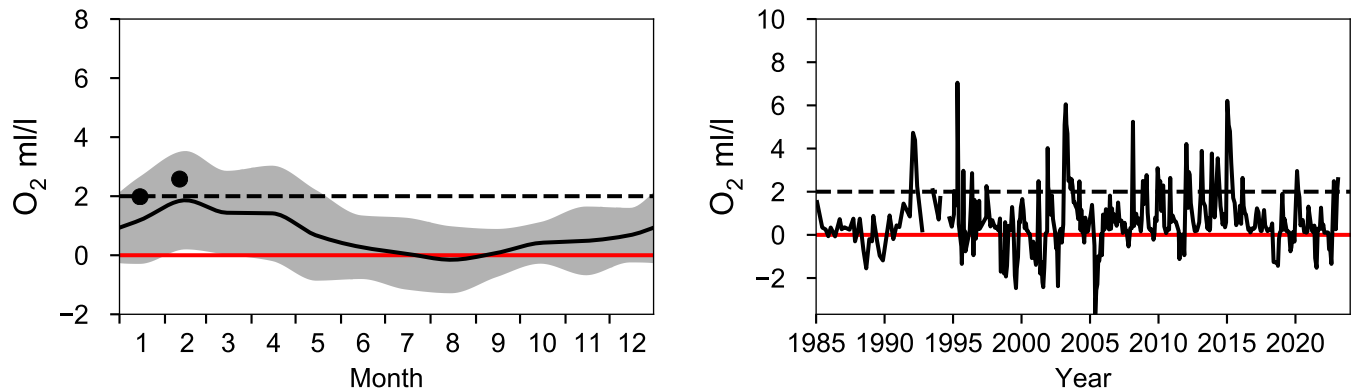


STATION HANÖBUKTEN SURFACE WATER (0-10 m)

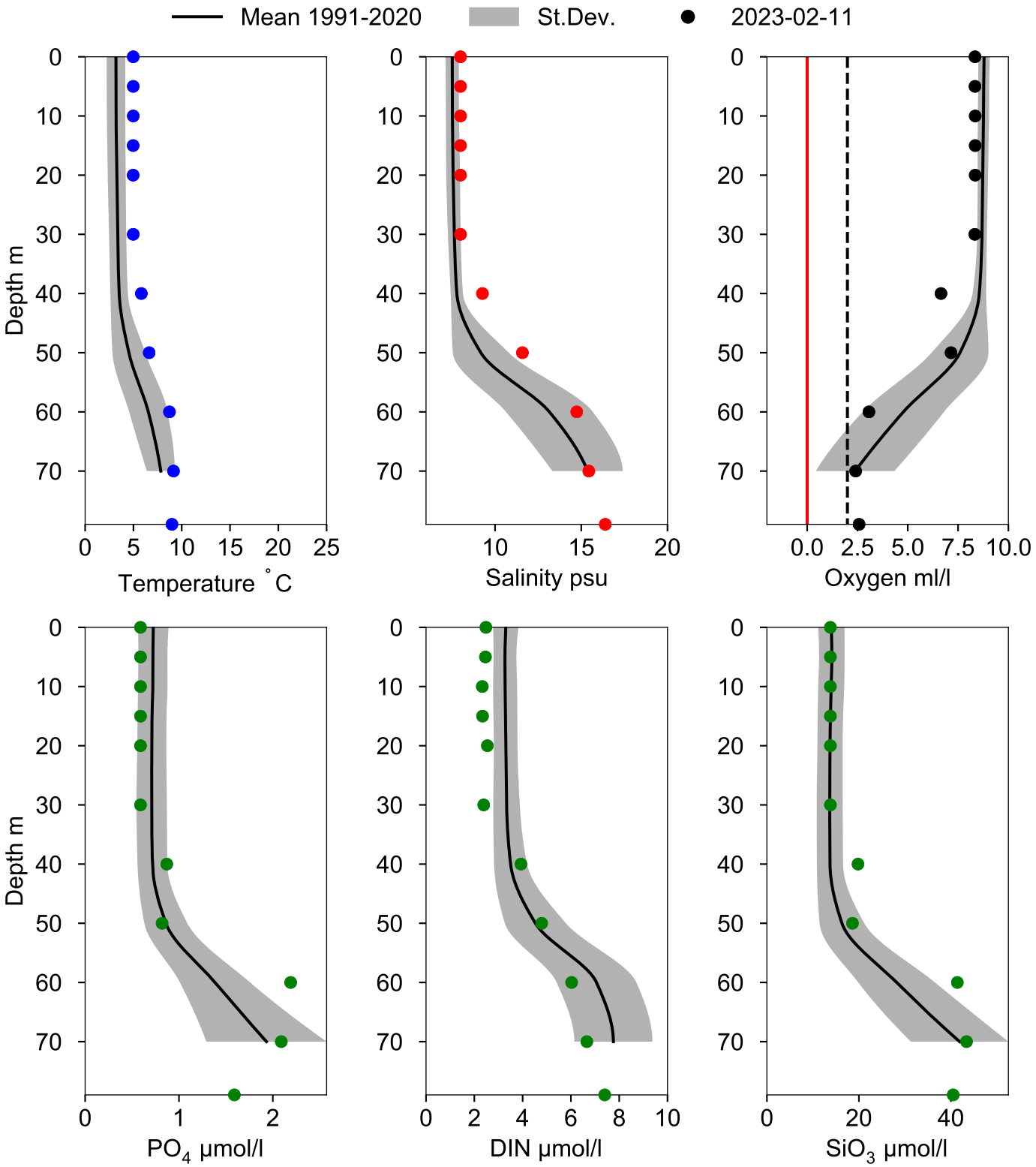
Annual Cycles



OXYGEN IN BOTTOM WATER (depth >= 70 m)



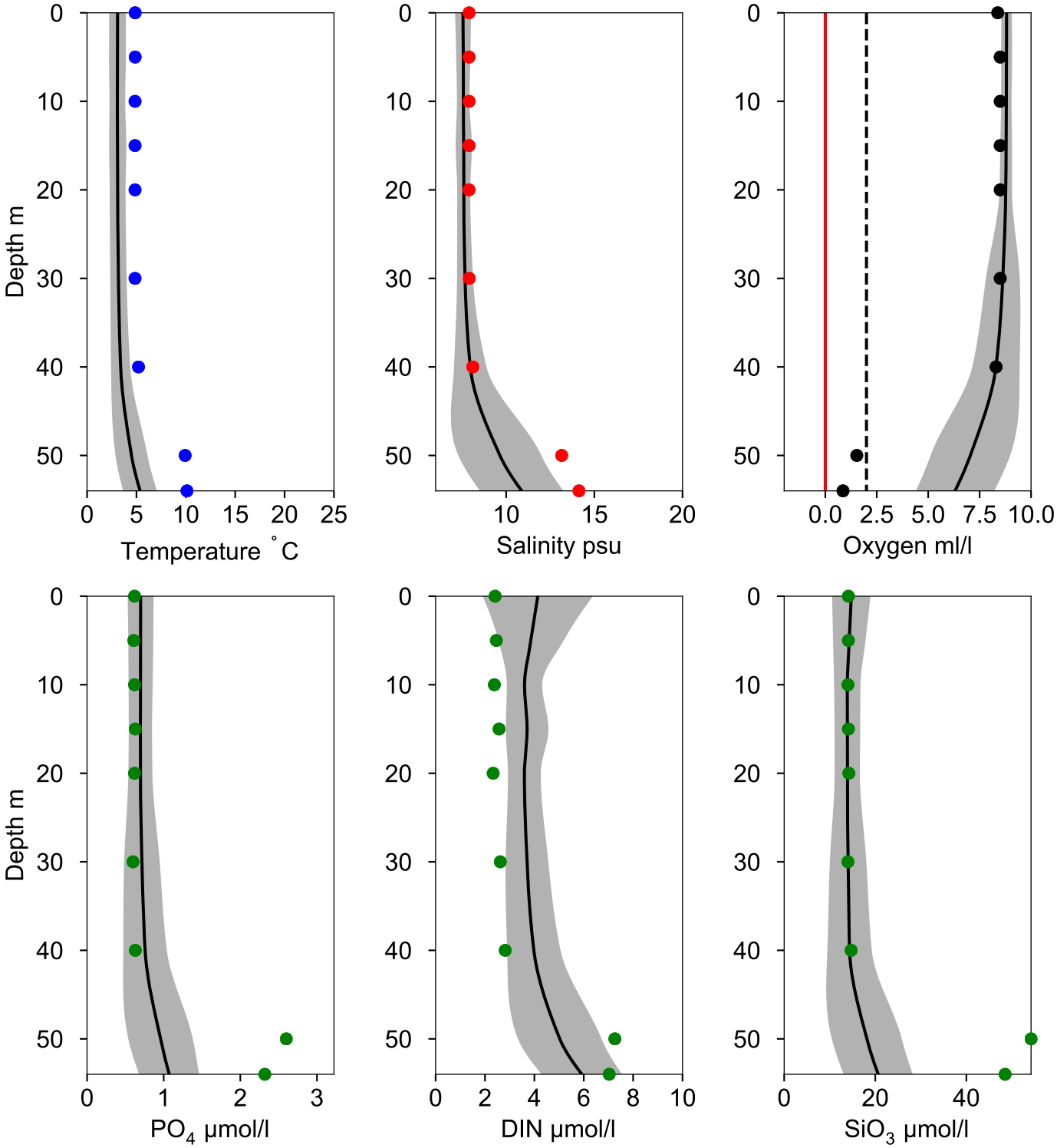
Vertical profiles HANÖBUKTEN
February



Vertical profiles HANÖBUKTEN-KBV
February

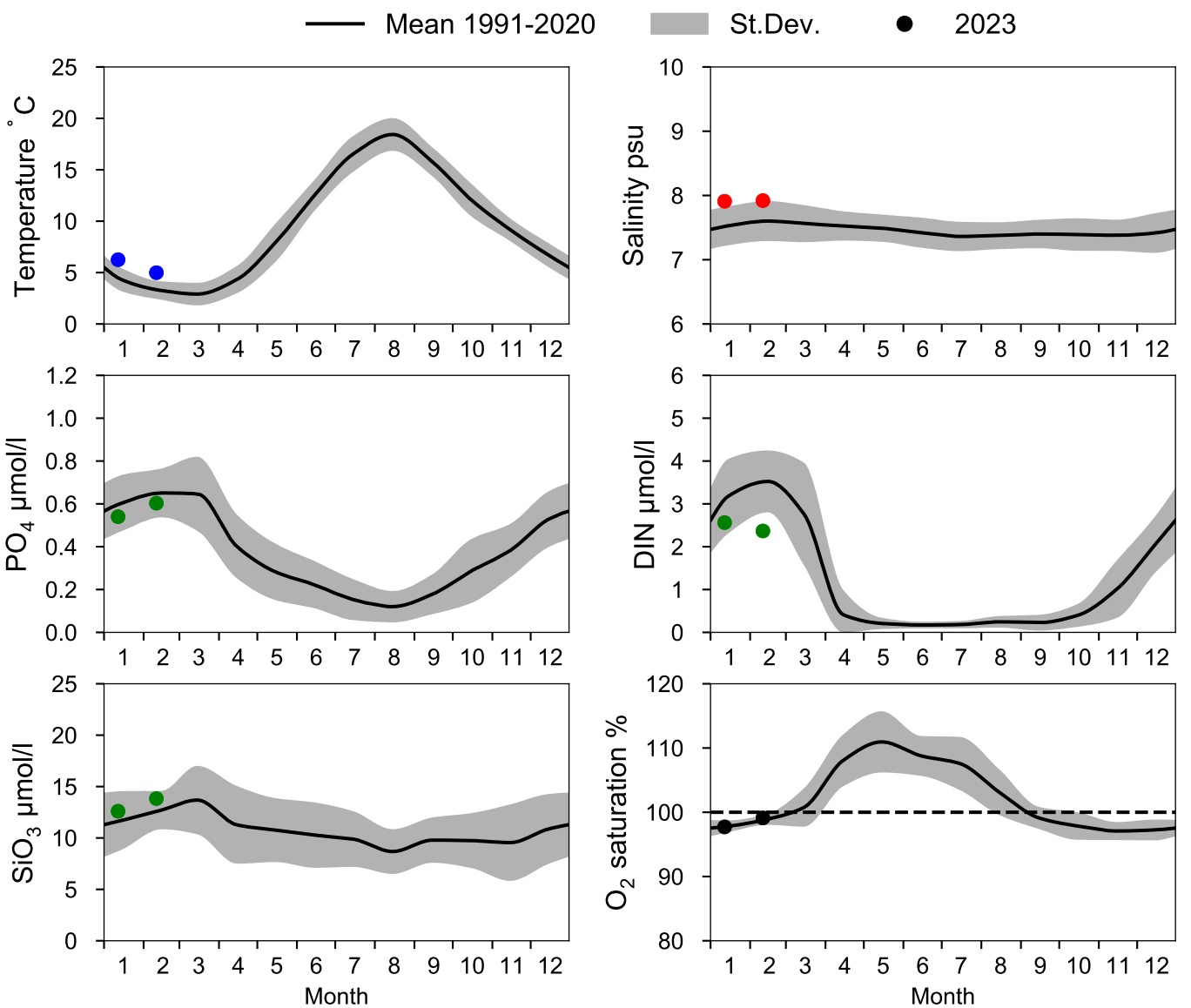
Statistics based on data from: Bornholmshavet

Mean 1991-2020 | St.Dev. | 2023-02-11

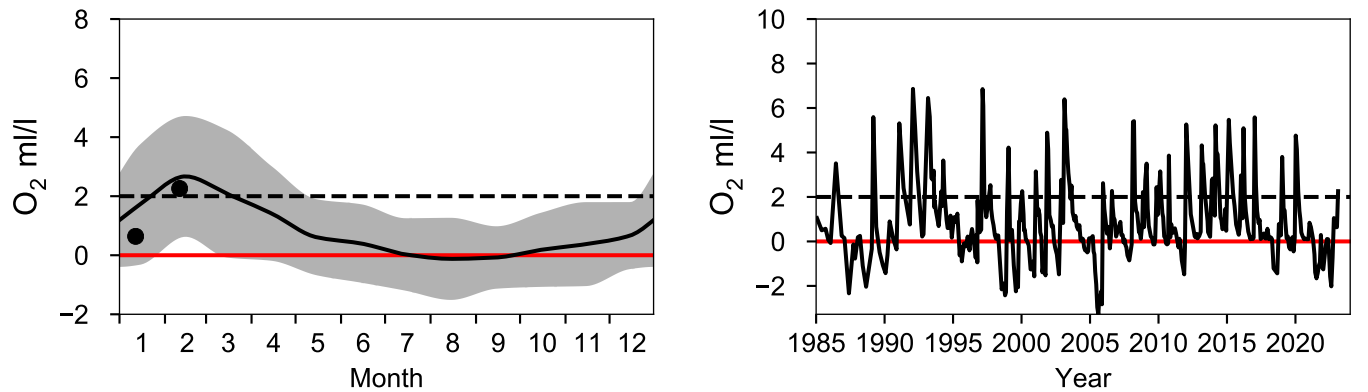


STATION BY4 CHRISTIANSÖ SURFACE WATER (0-10 m)

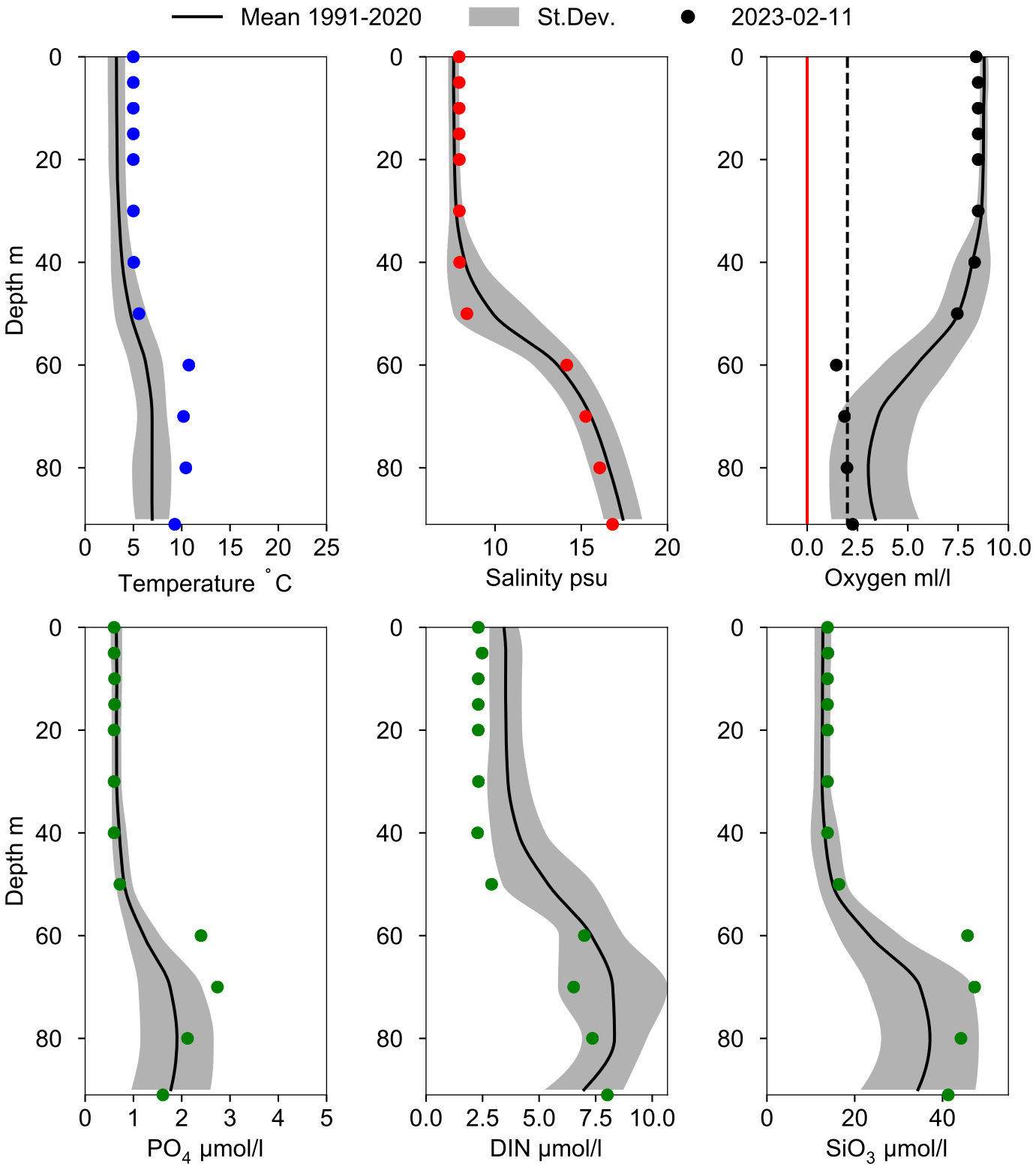
Annual Cycles



OXYGEN IN BOTTOM WATER (depth >= 80 m)

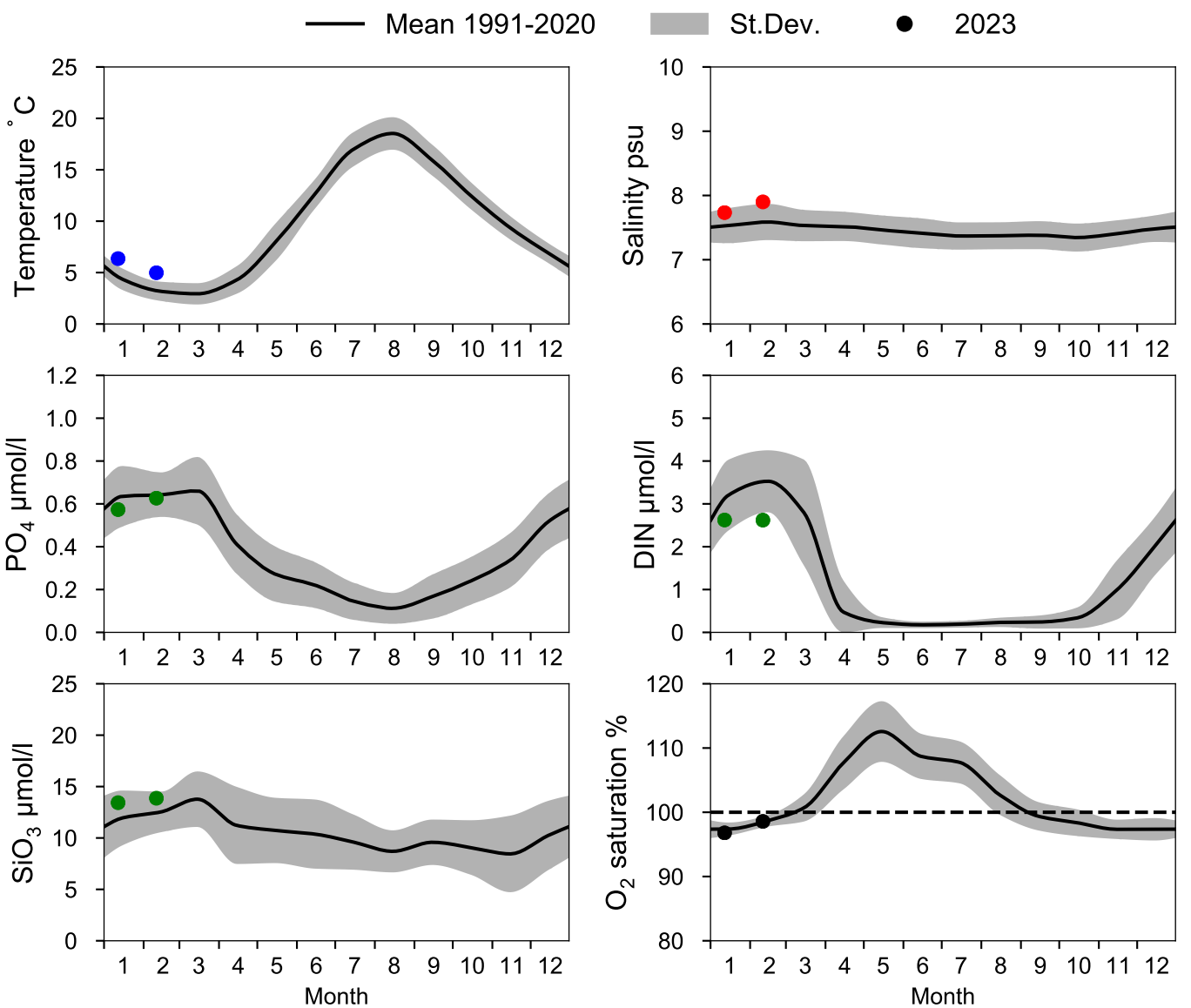


Vertical profiles BY4 CHRISTIANSÖ
February

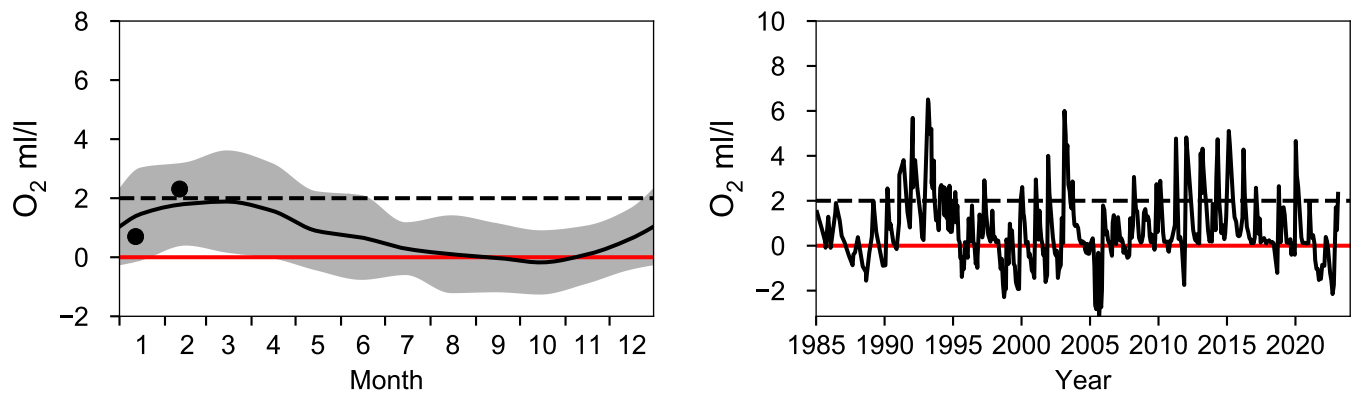


STATION BY5 BORNHOLMSDJ SURFACE WATER (0-10 m)

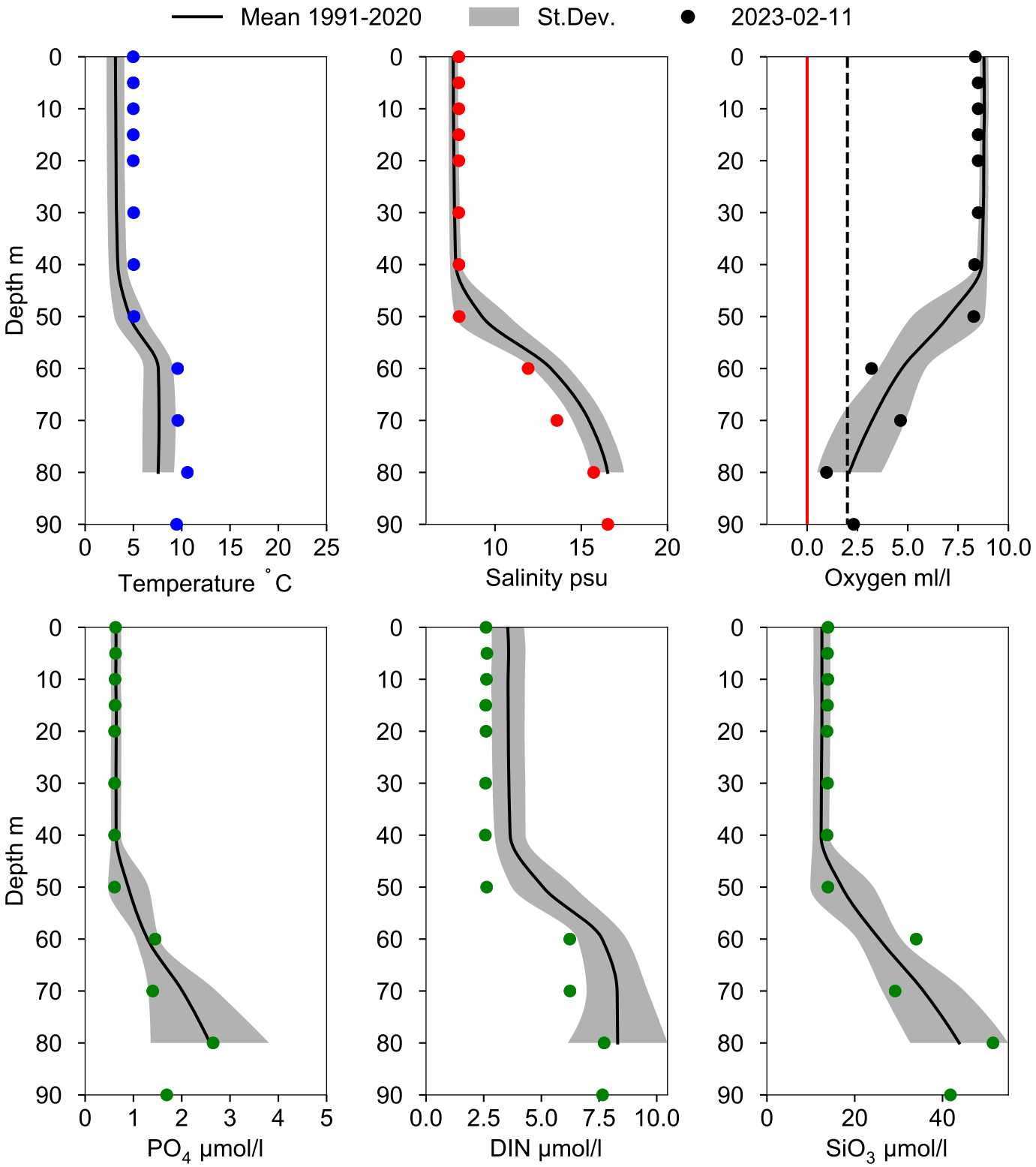
Annual Cycles



OXYGEN IN BOTTOM WATER (depth >= 80 m)



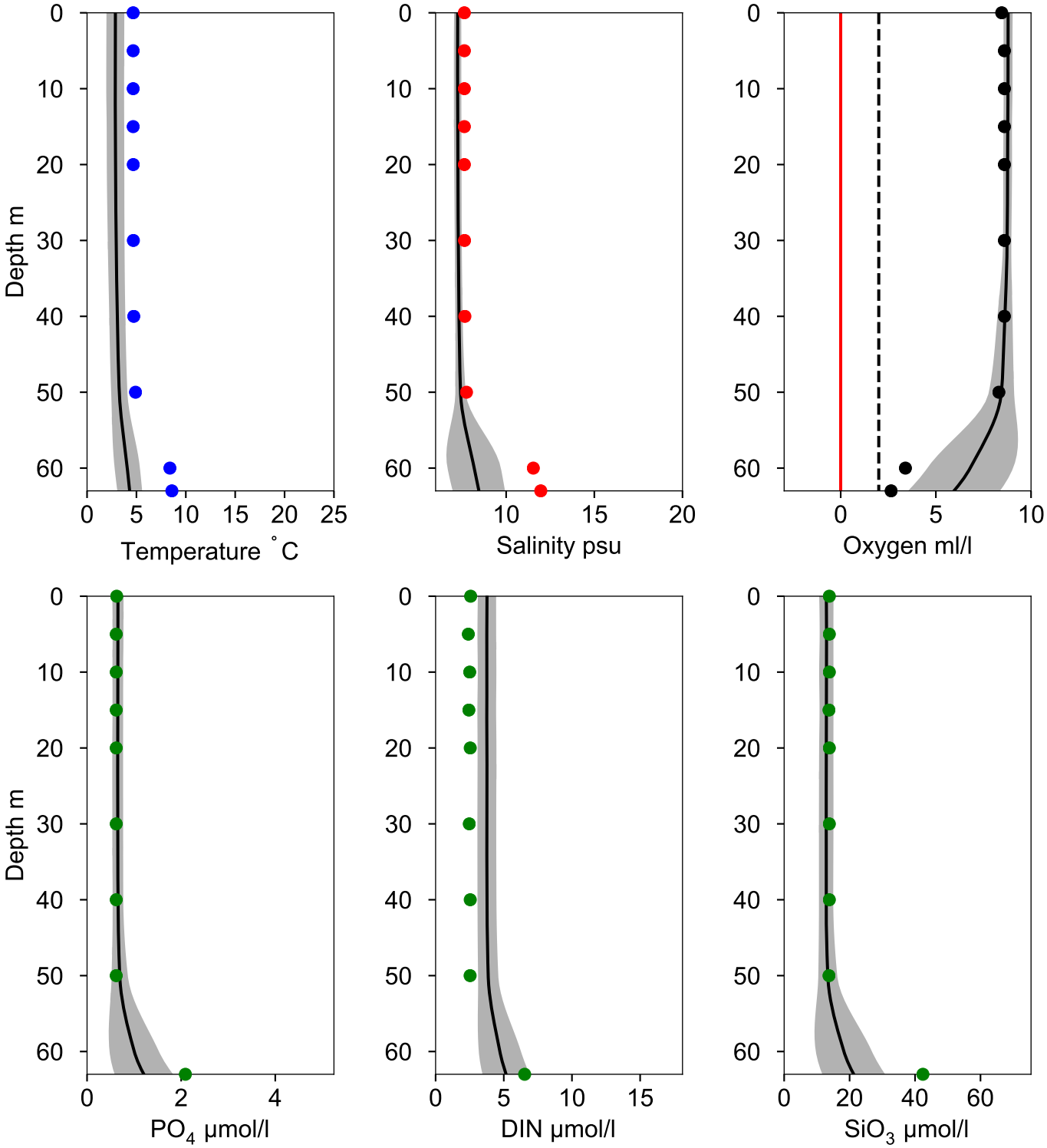
Vertical profiles BY5 BORNHOLMSDJ
February



Vertical profiles STOLPE TRÖSKEL
February

Statistics based on data from: Östra Gotlandshavet

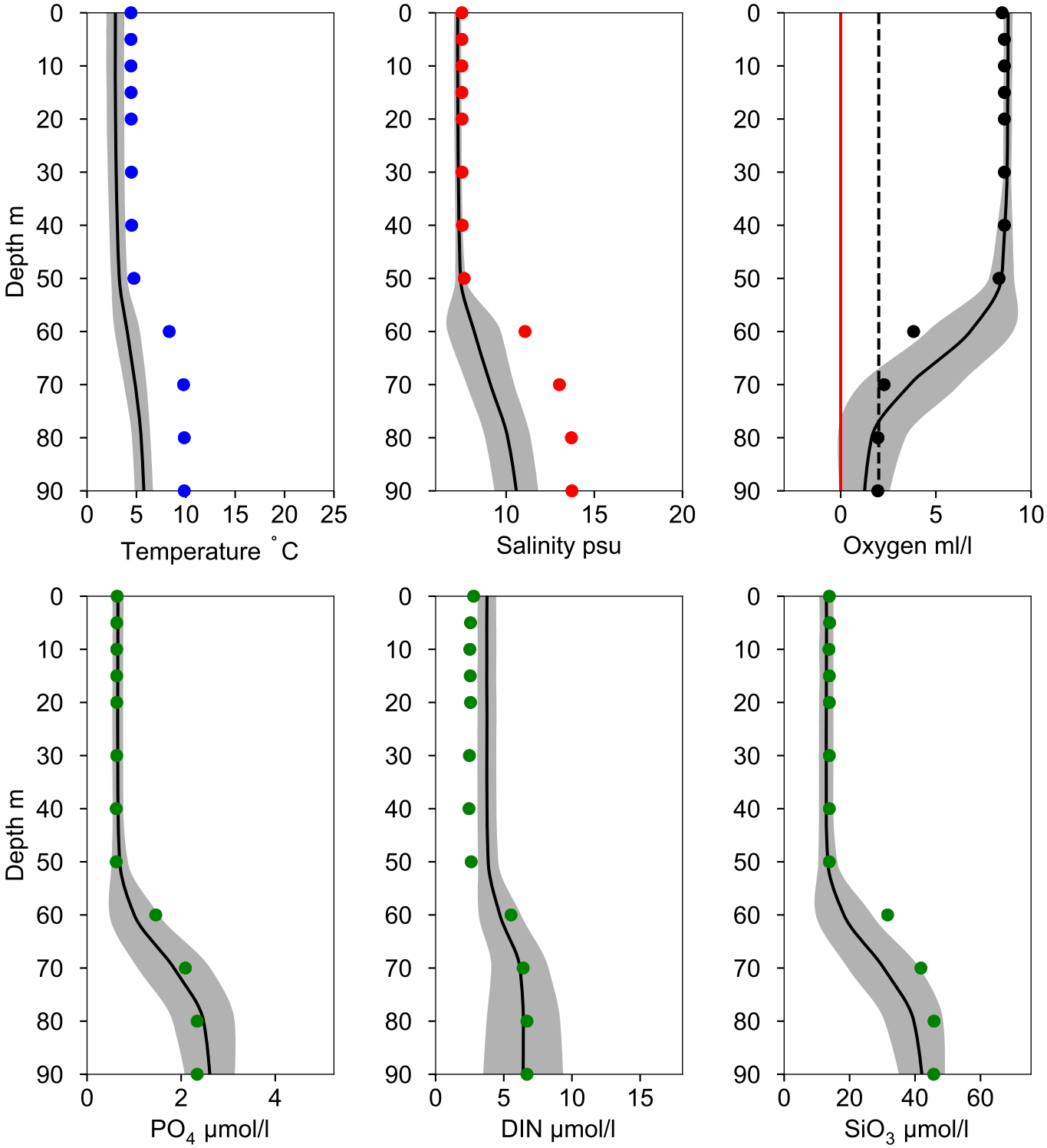
Mean 1991-2020 | St.Dev. | 2023-02-11



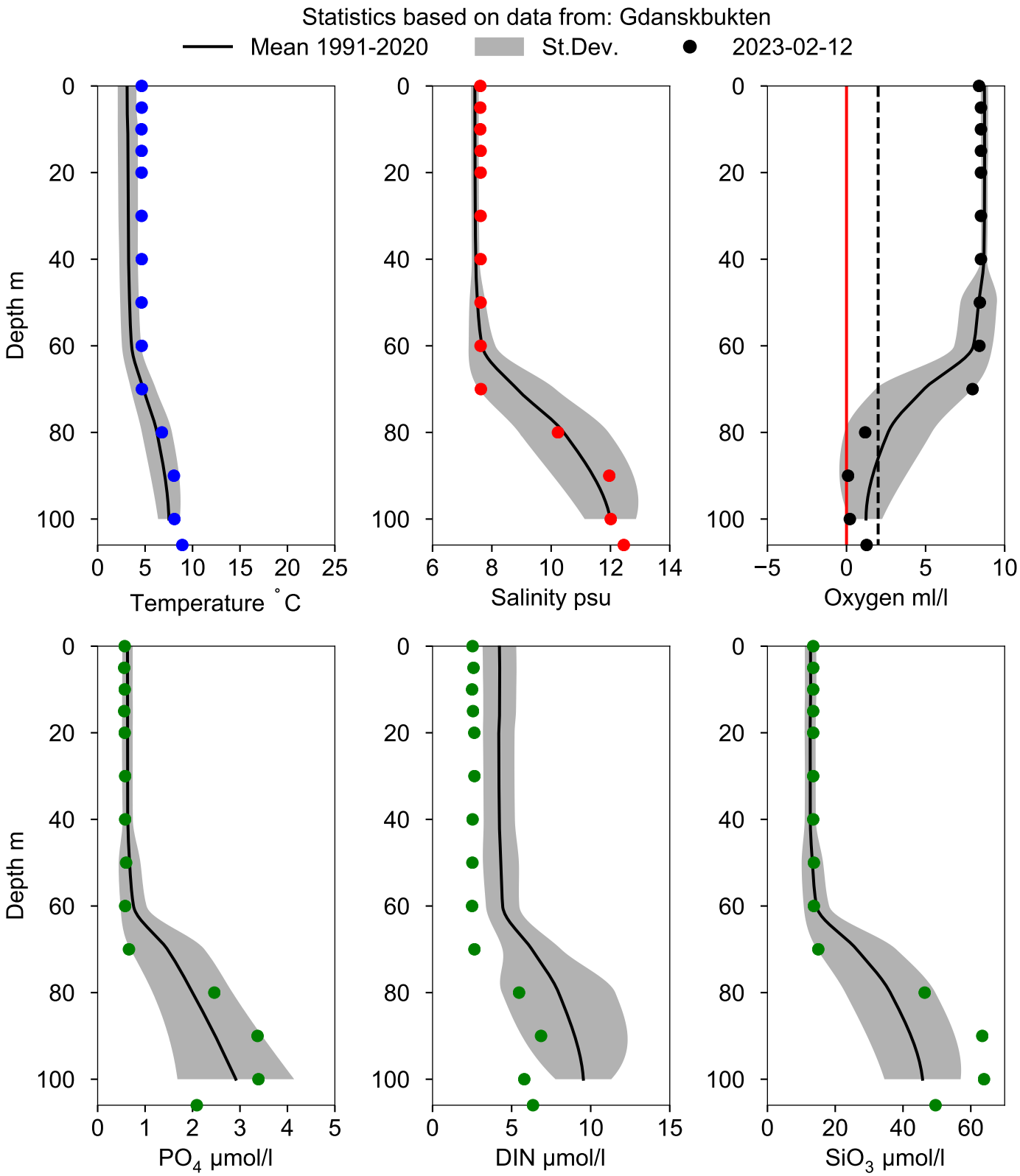
Vertical profiles BY7 STOLPE RÄNNA
February

Statistics based on data from: Östra Gotlandshavet

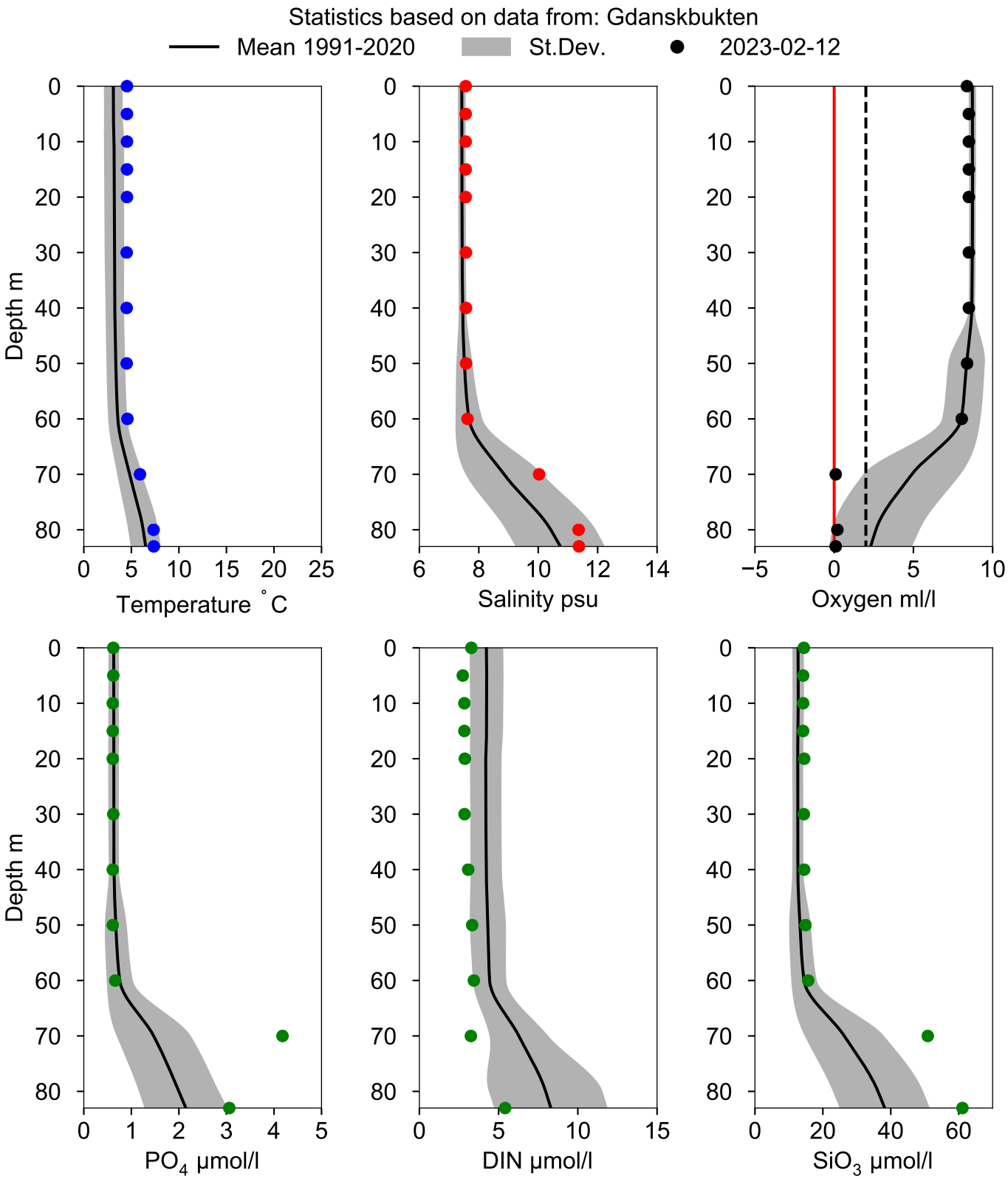
Mean 1991-2020 | St.Dev. | 2023-02-12



Vertical profiles PL-P1
February

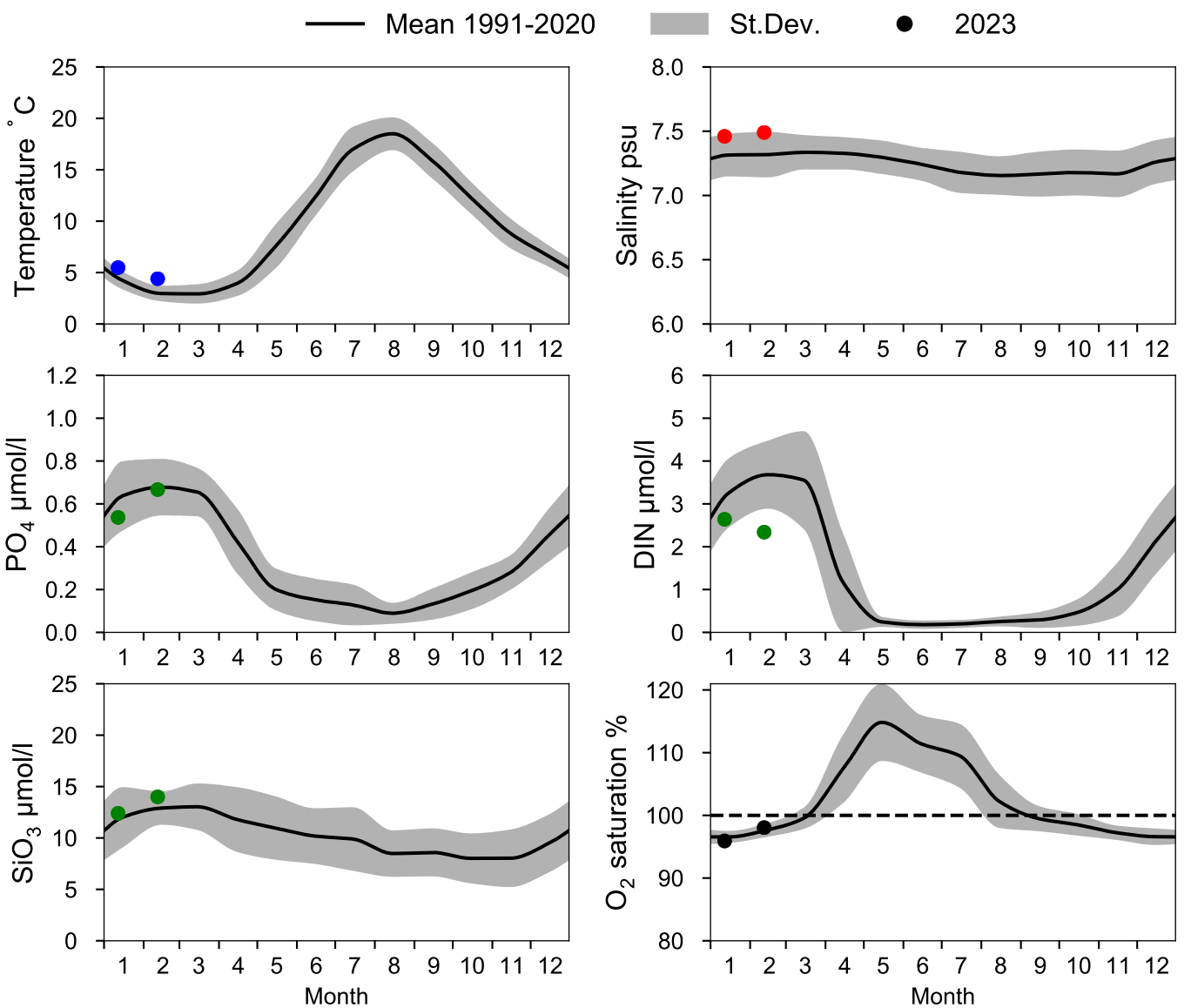


Vertical profiles PL-P63
February

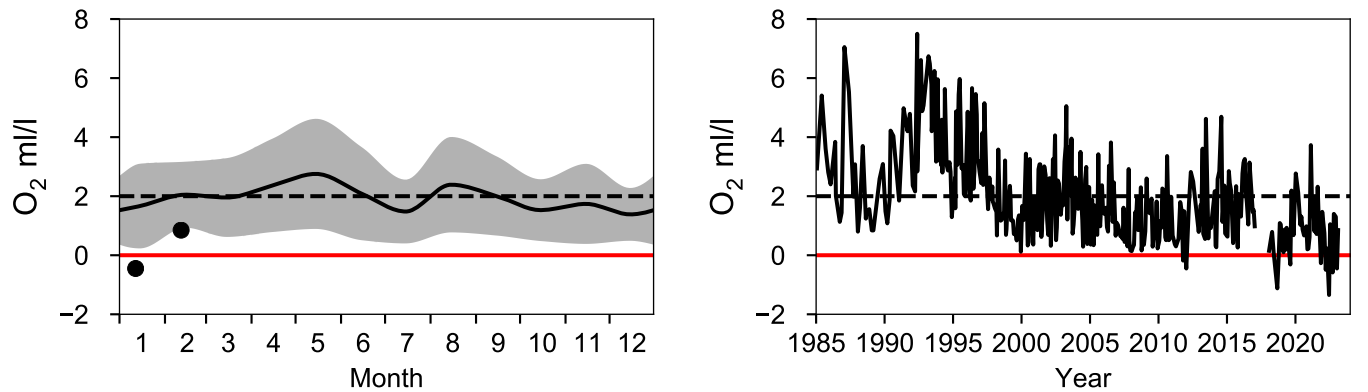


STATION BCS III-10 SURFACE WATER (0-10 m)

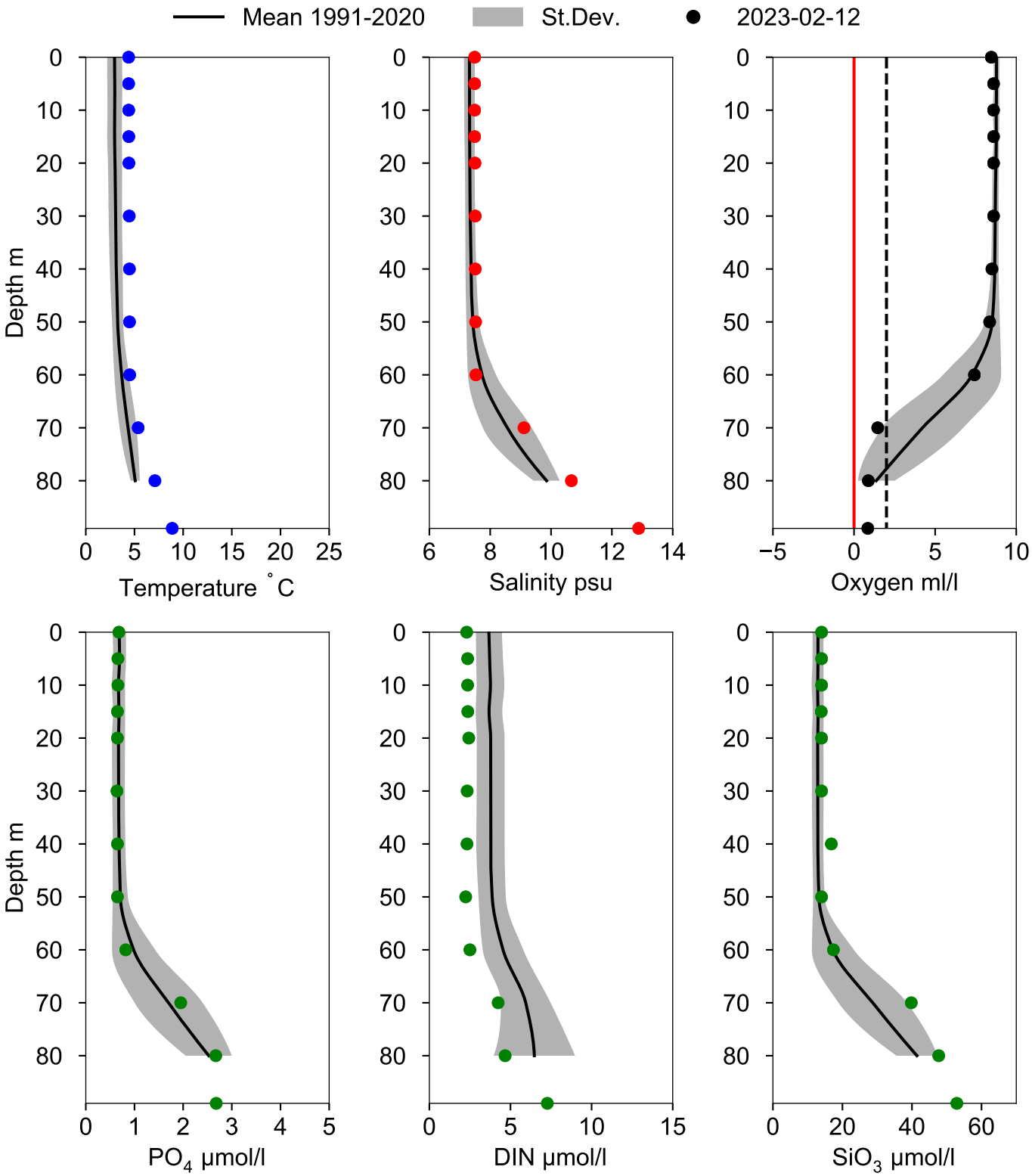
Annual Cycles



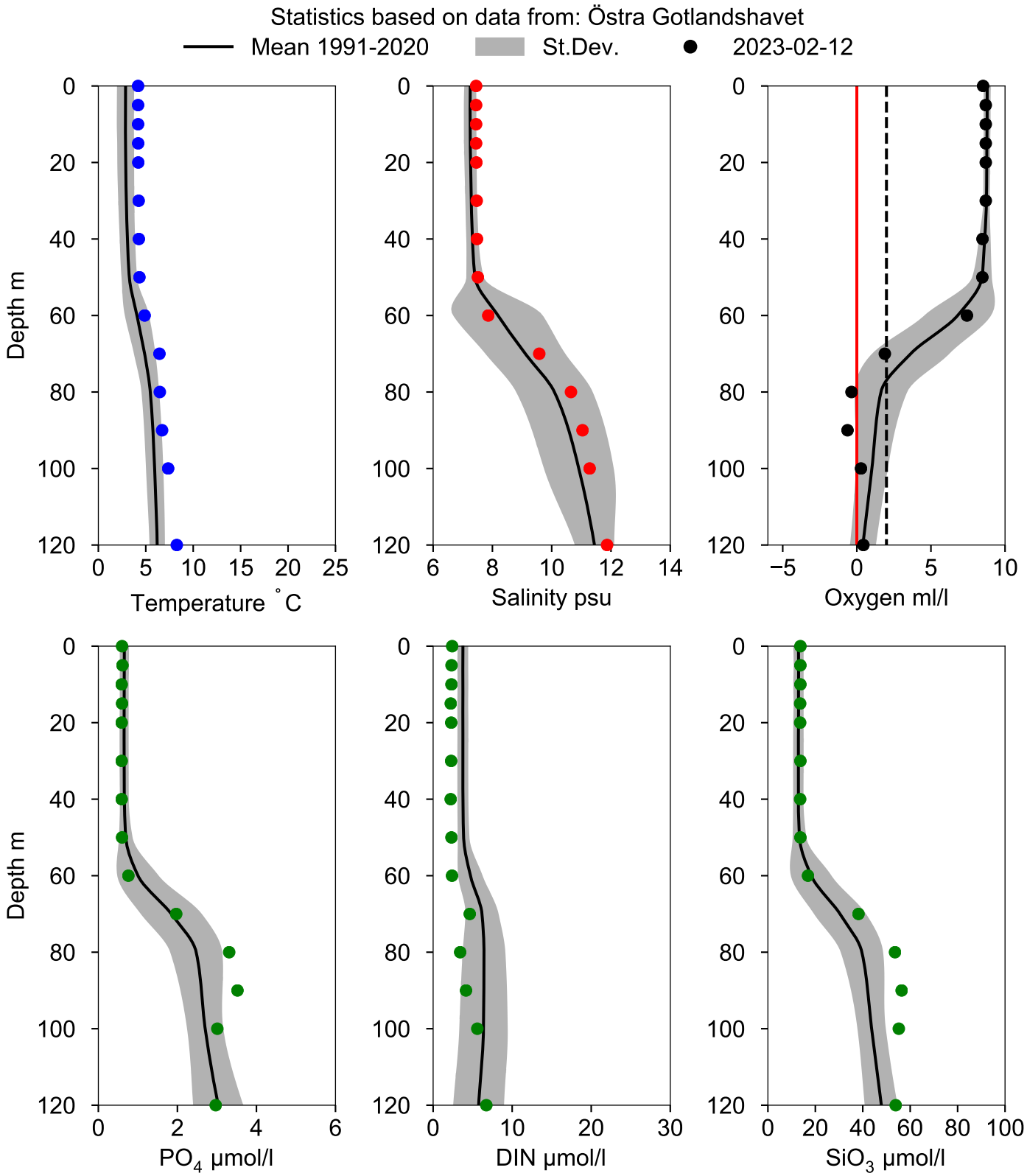
OXYGEN IN BOTTOM WATER (depth >= 80 m)



Vertical profiles BCS III-10
February

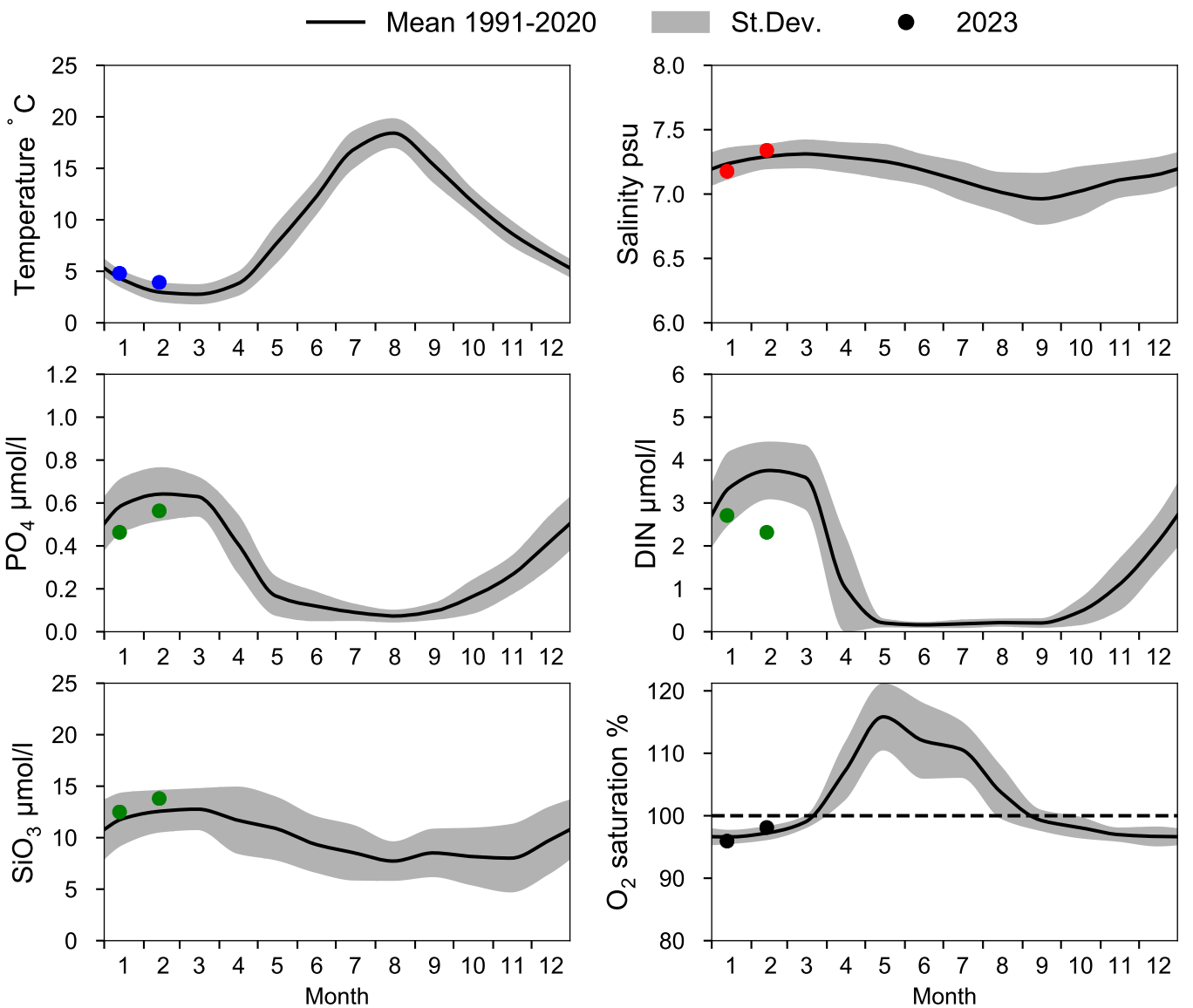


Vertical profiles BY9 KLAIPEDA
February

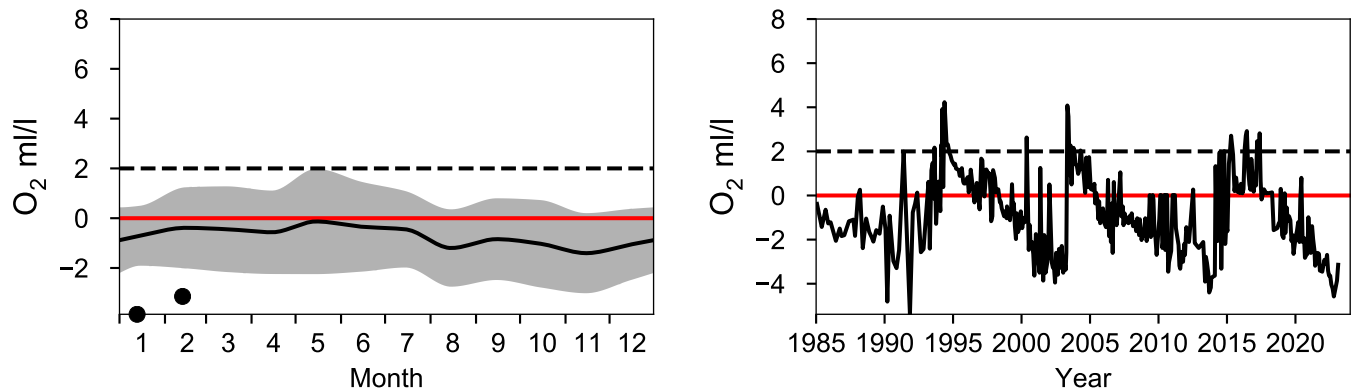


STATION BY10 SURFACE WATER (0-10 m)

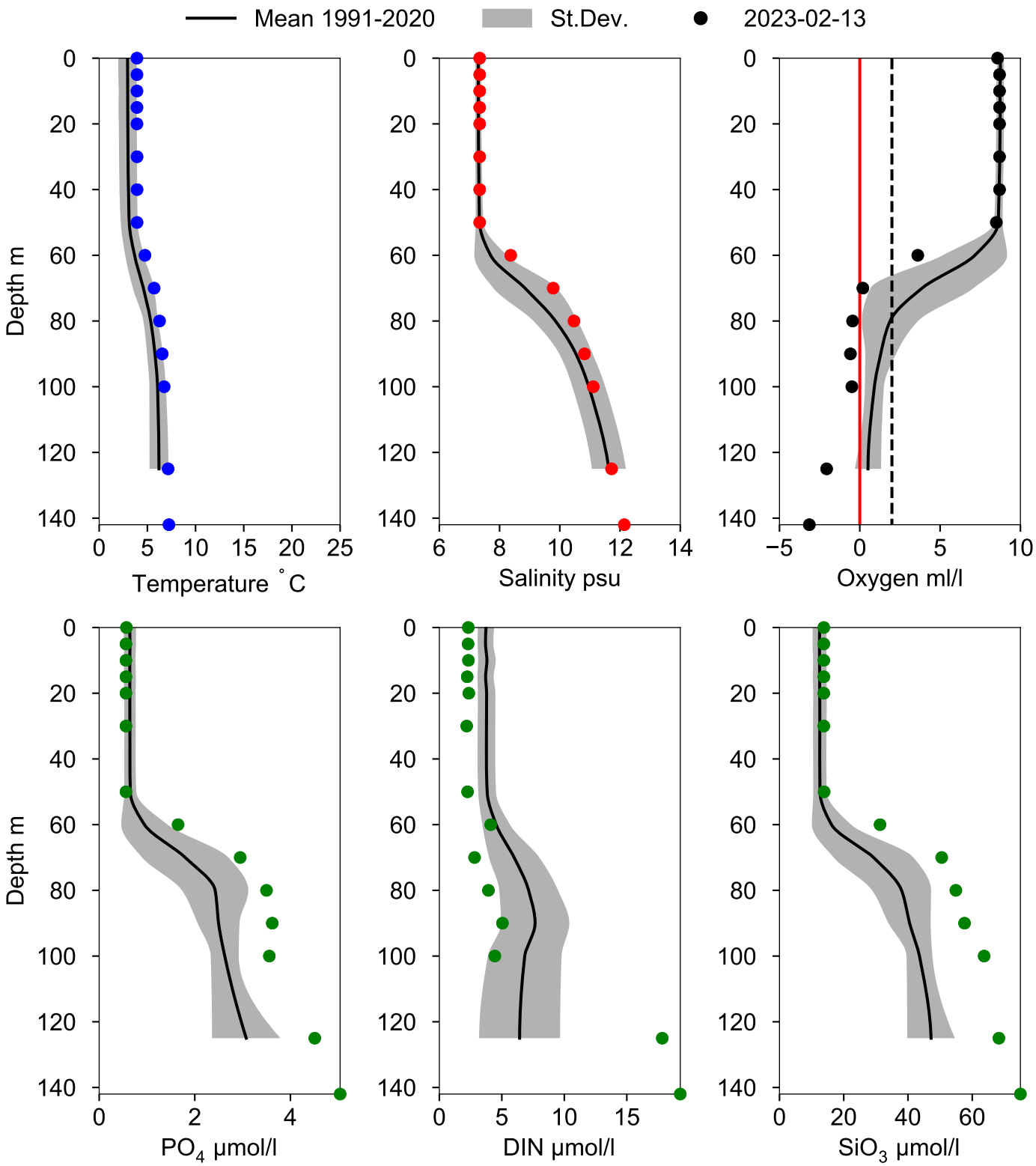
Annual Cycles



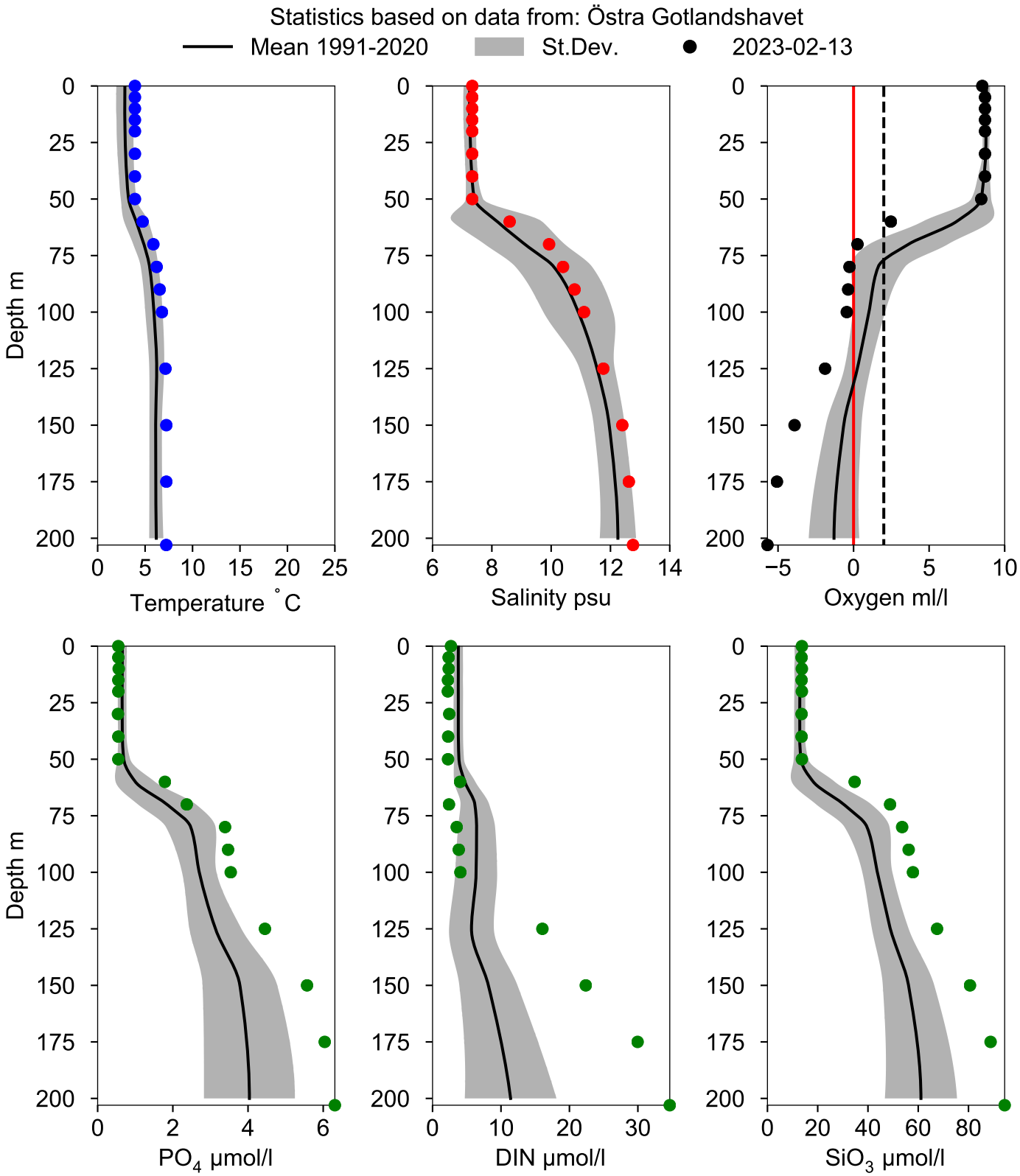
OXYGEN IN BOTTOM WATER (depth >= 125 m)



Vertical profiles BY10
February

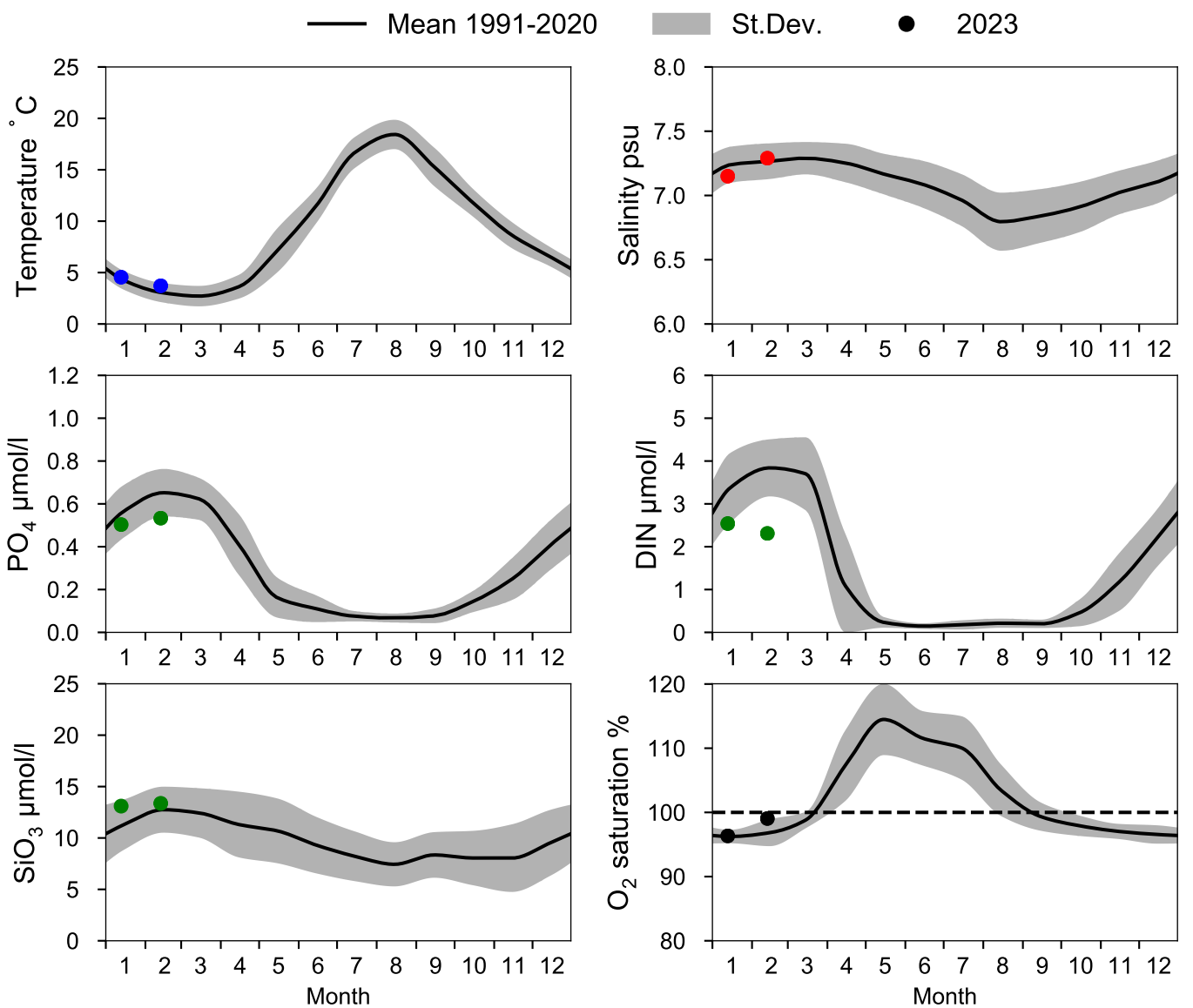


Vertical profiles BY11
February

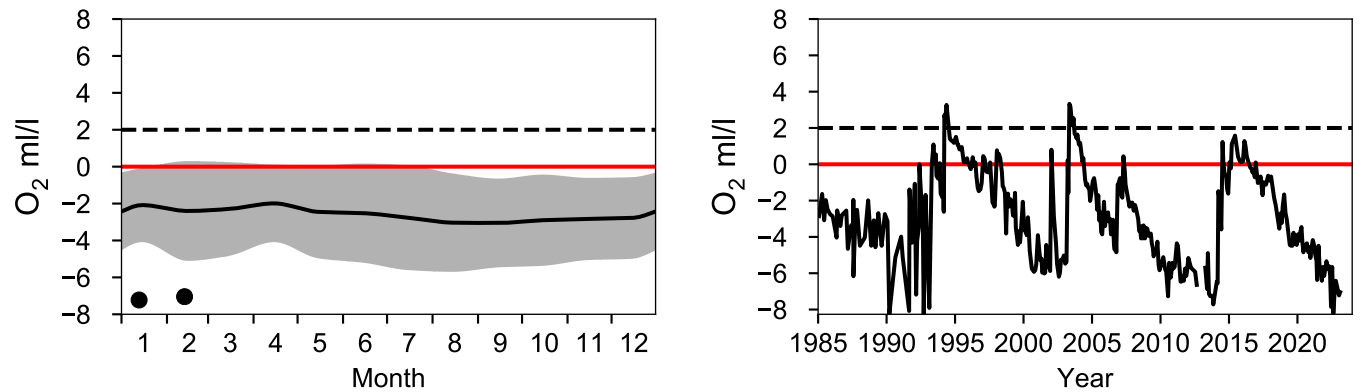


STATION BY15 GOTLANDSDJ SURFACE WATER (0-10 m)

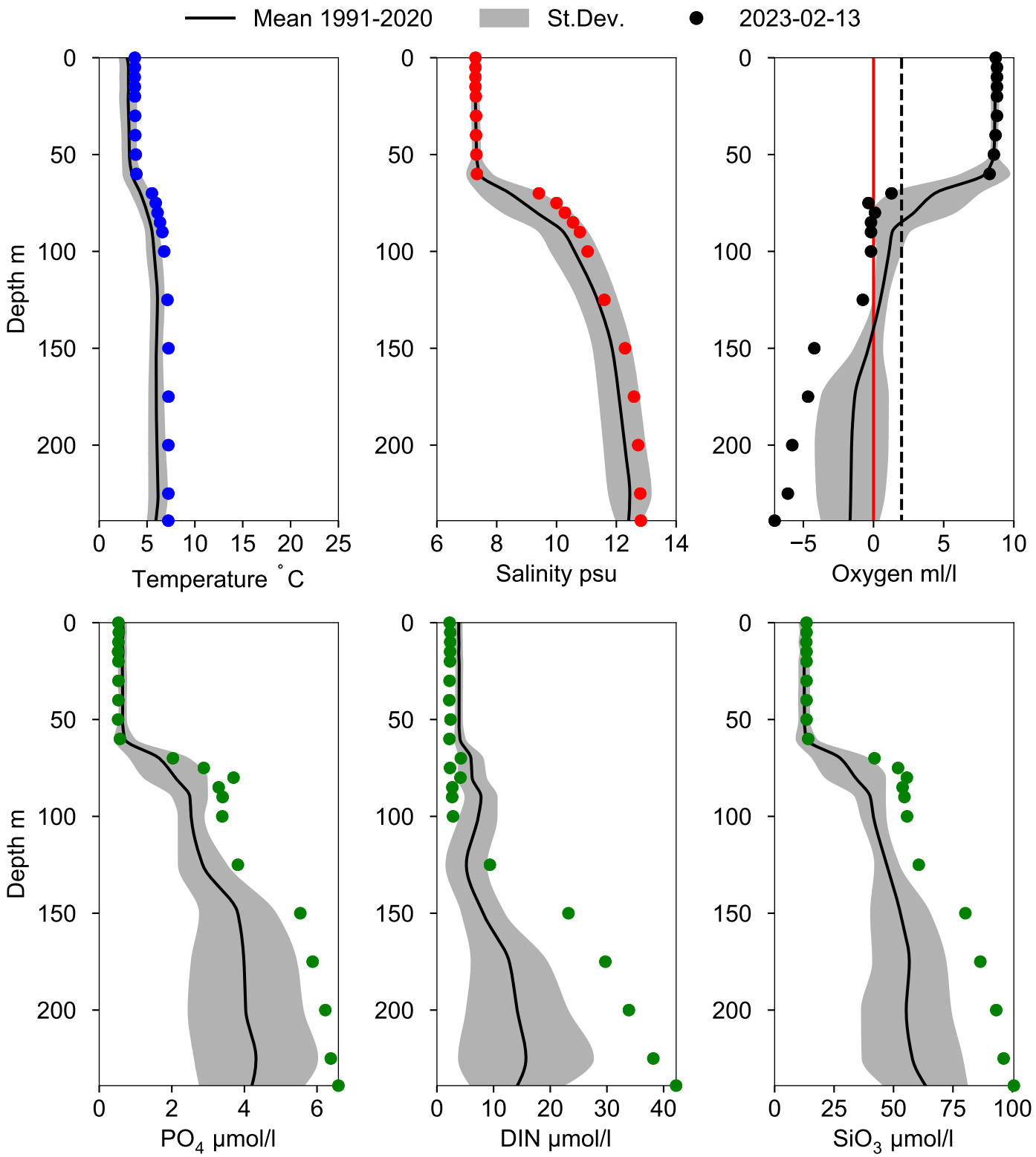
Annual Cycles



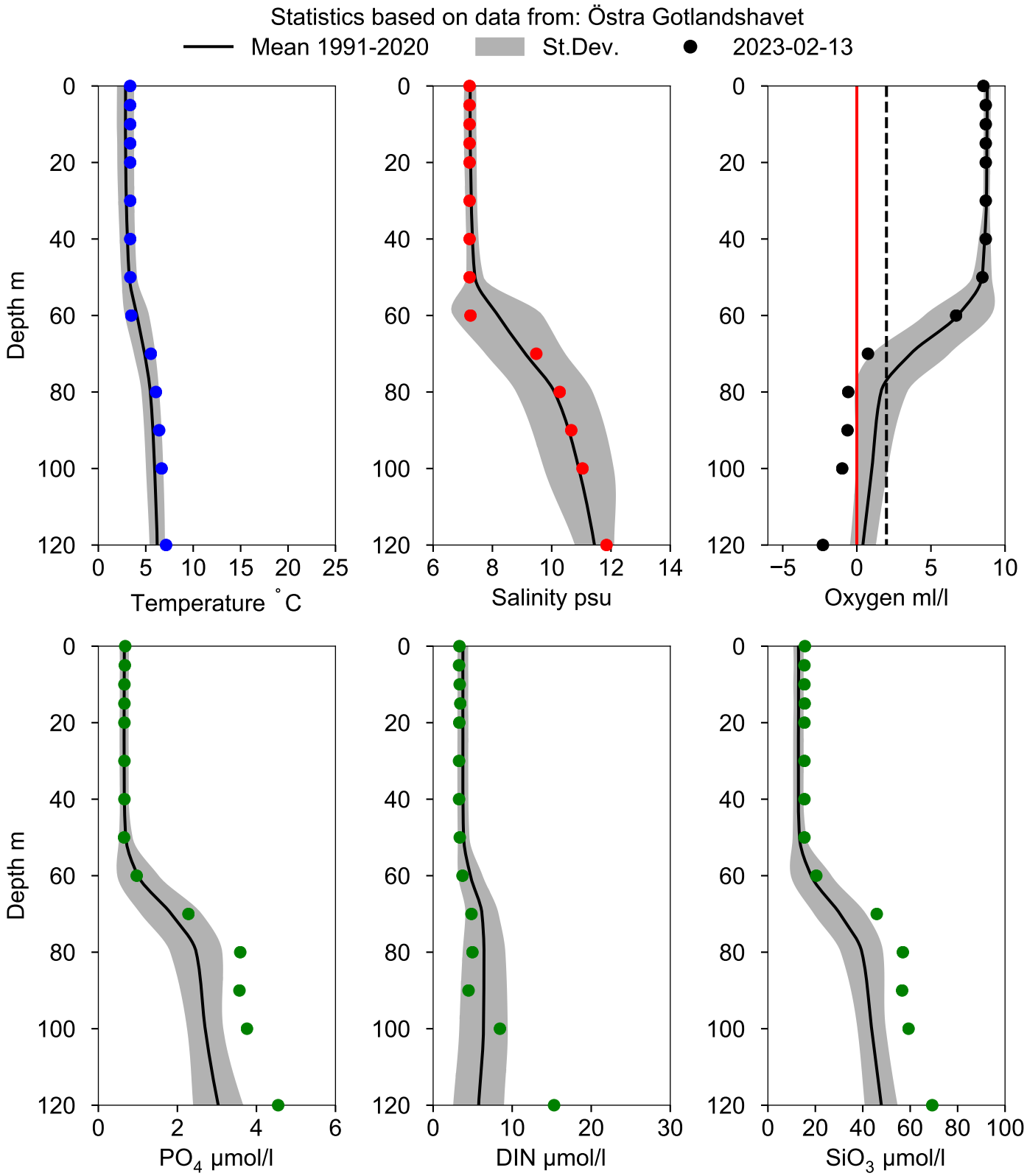
OXYGEN IN BOTTOM WATER (depth >= 225 m)



Vertical profiles BY15 GOTLANDSDJ
February



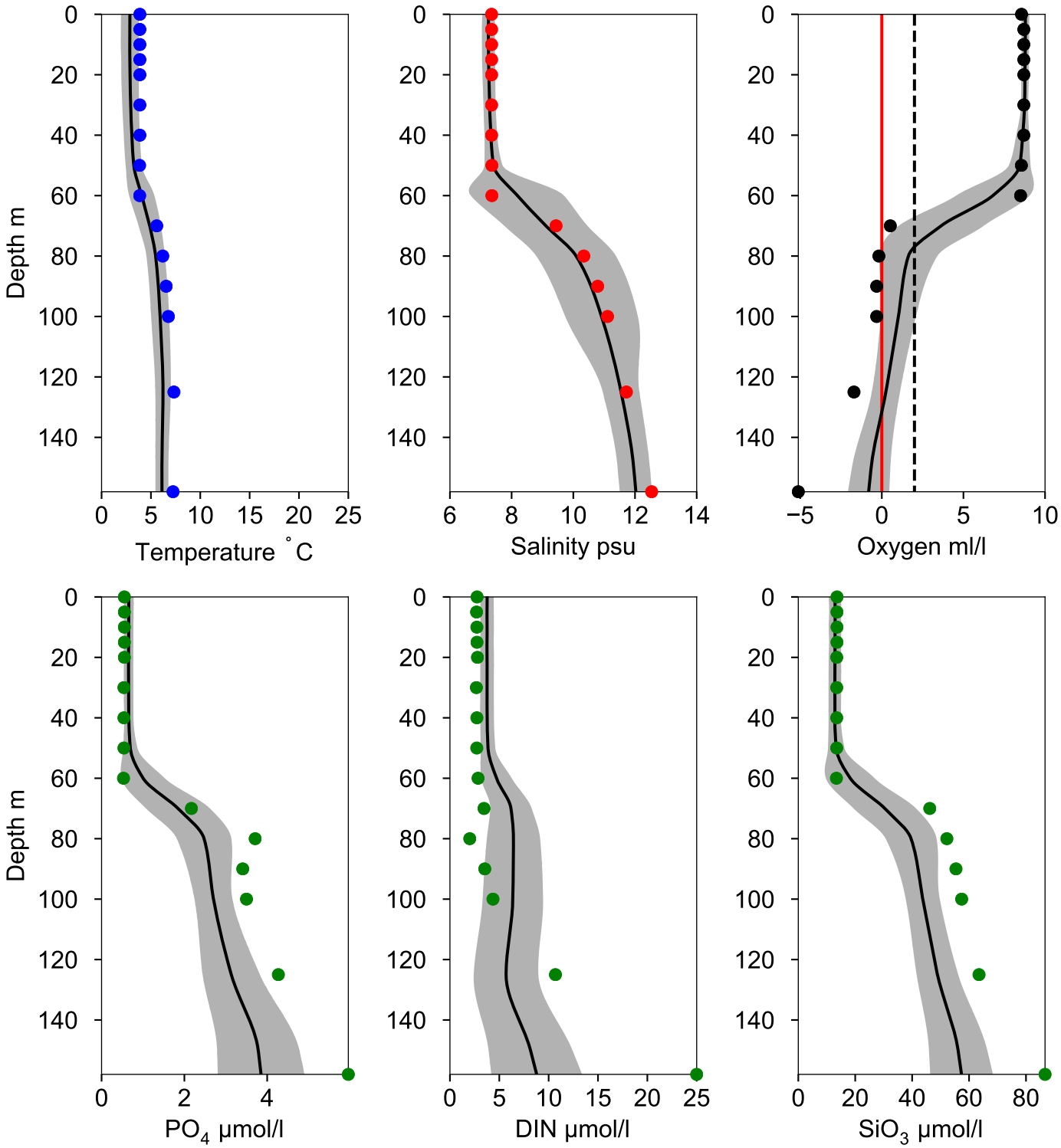
Vertical profiles BY13
February



Vertical profiles BY19
February

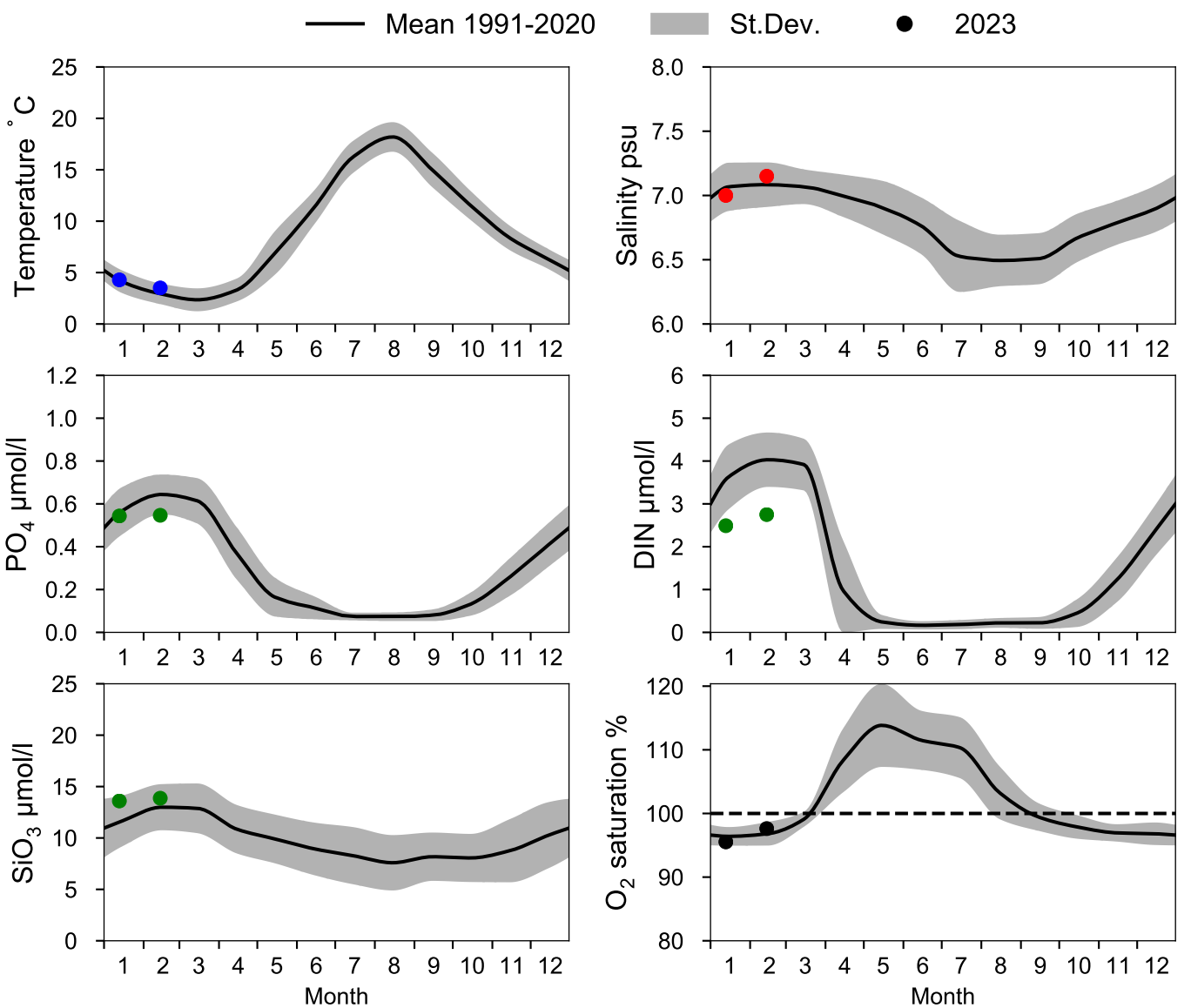
Statistics based on data from: Östra Gotlandshavet

Mean 1991-2020 | St.Dev. | 2023-02-13

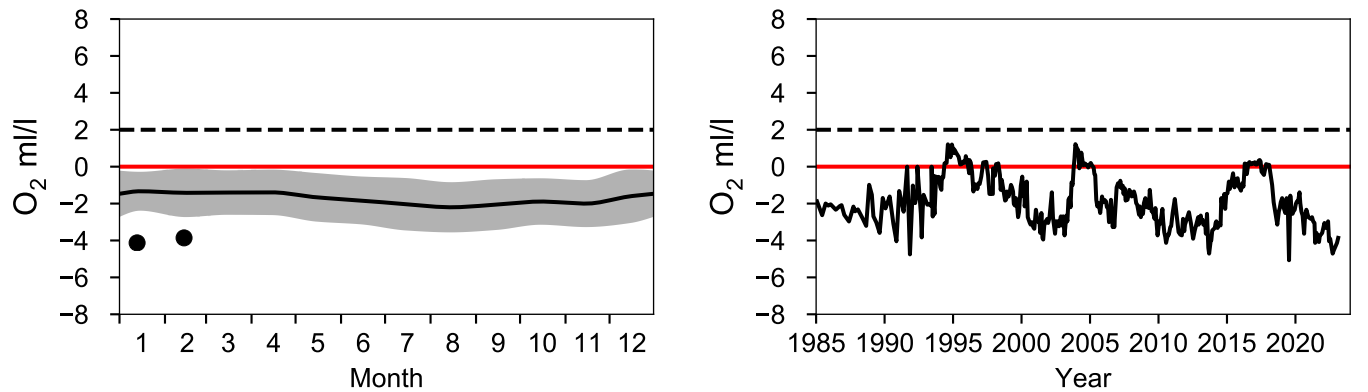


STATION BY20 FÅRÖDJ SURFACE WATER (0-10 m)

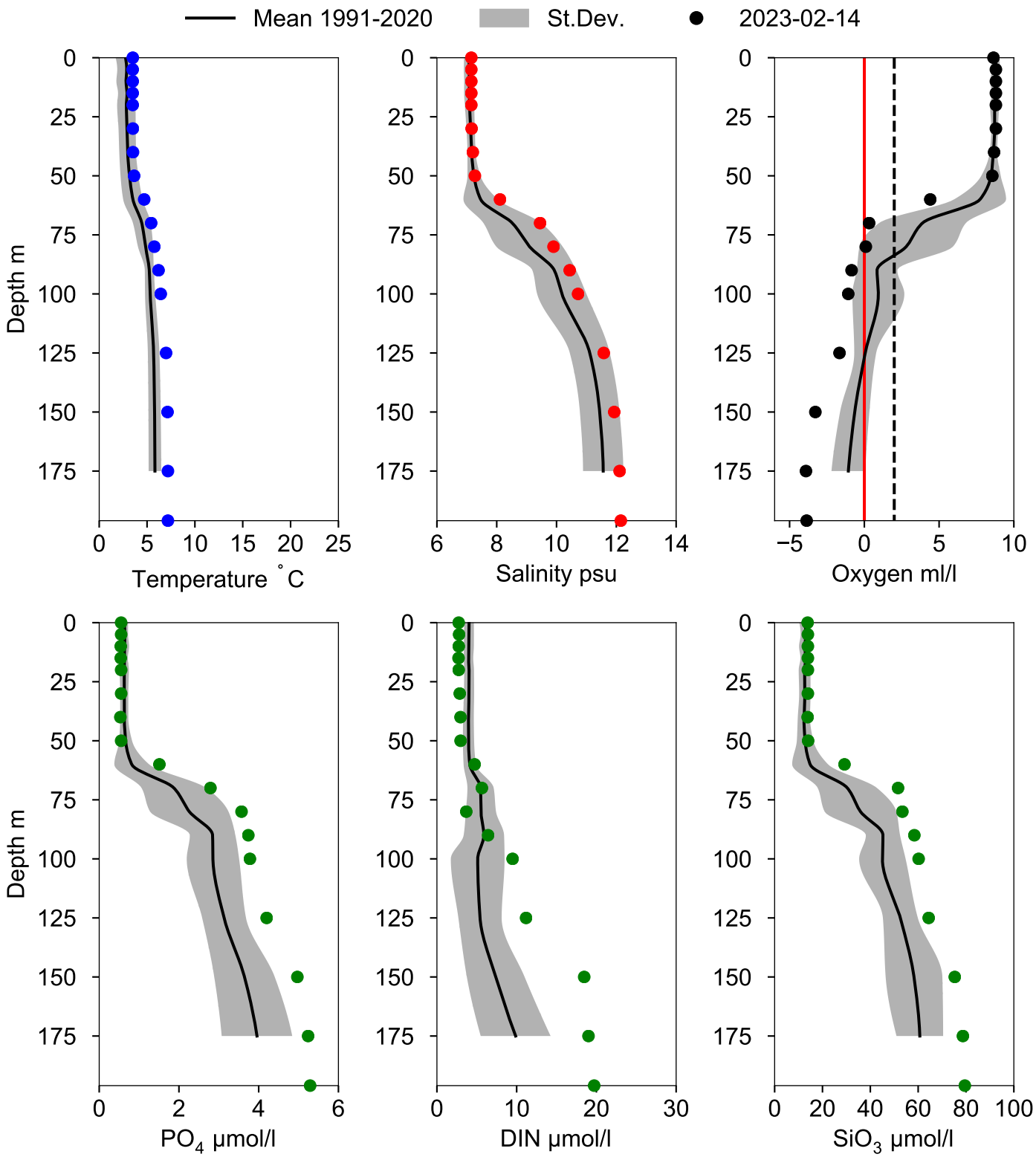
Annual Cycles



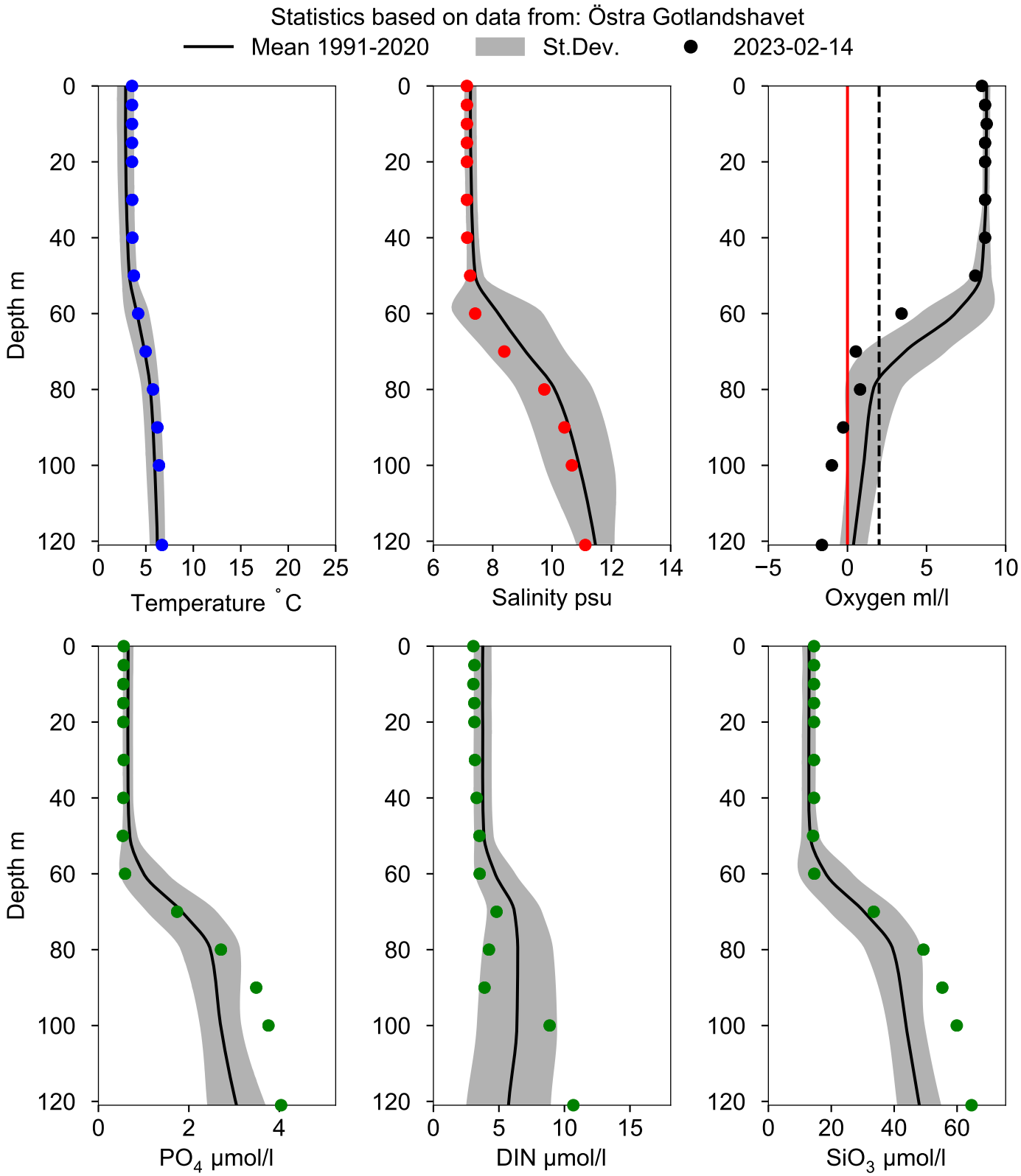
OXYGEN IN BOTTOM WATER (depth >= 175 m)



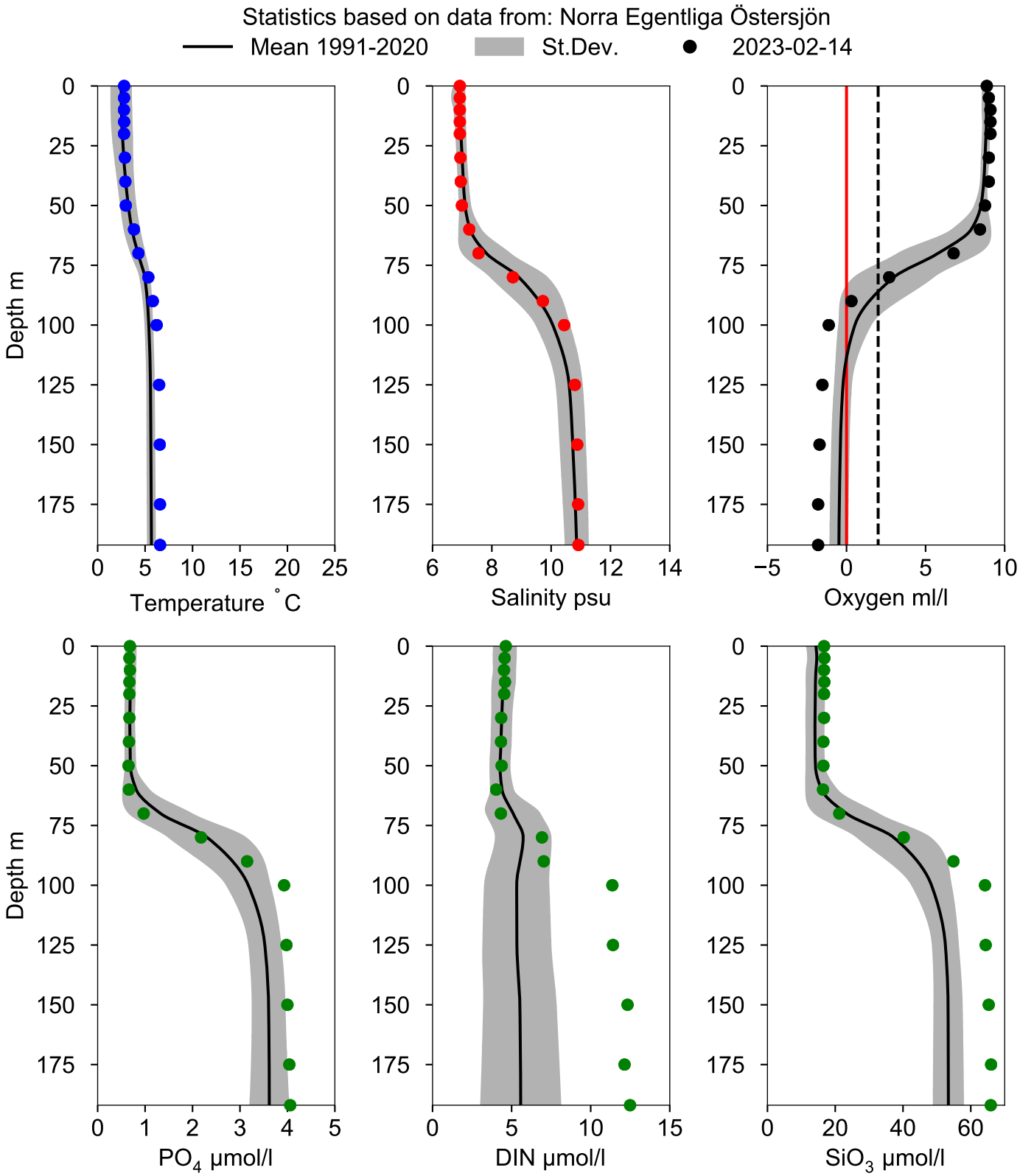
Vertical profiles BY20 FÅRÖDJ
February



Vertical profiles BY21
February



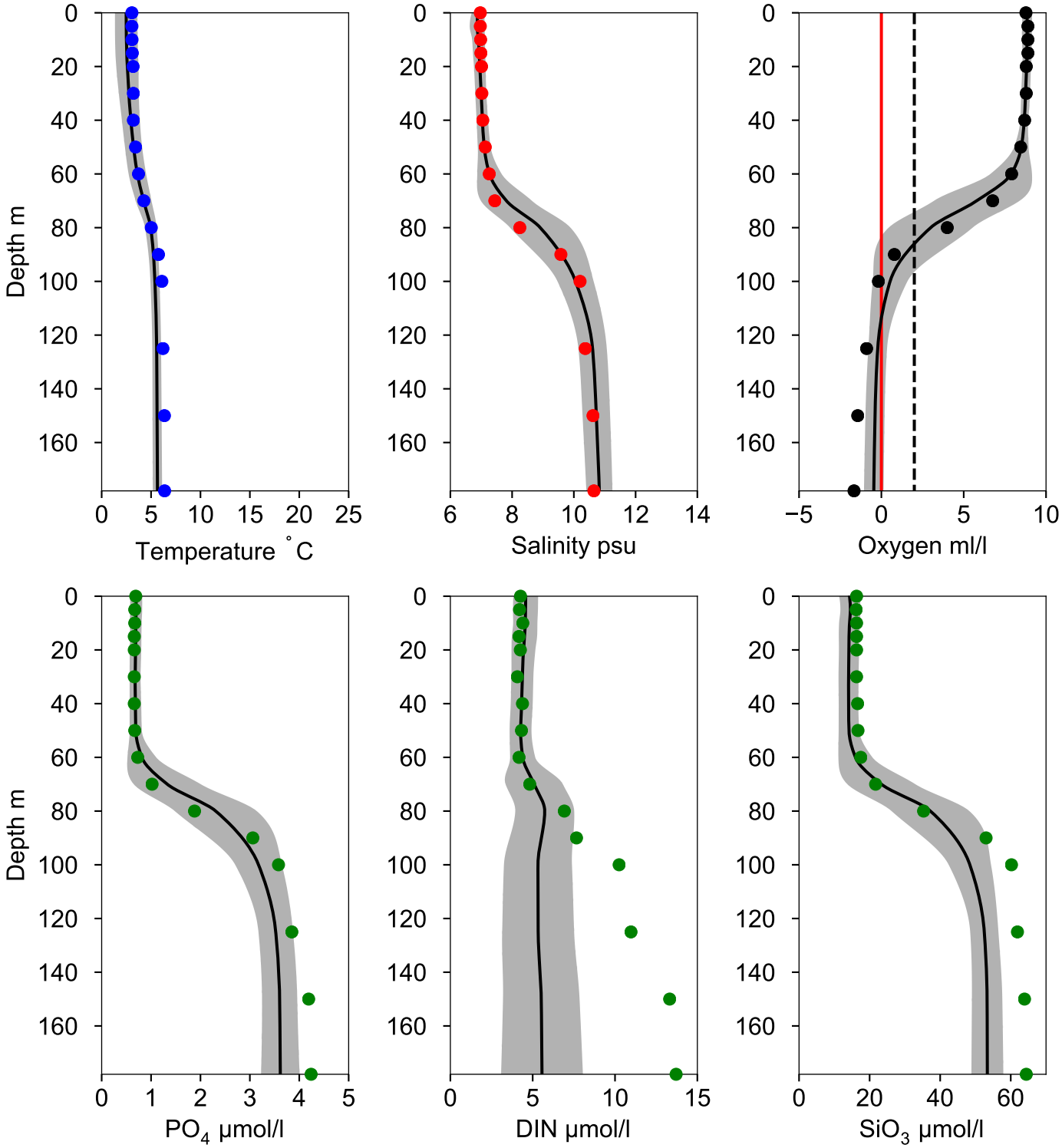
Vertical profiles BY28
February



Vertical profiles BY27
February

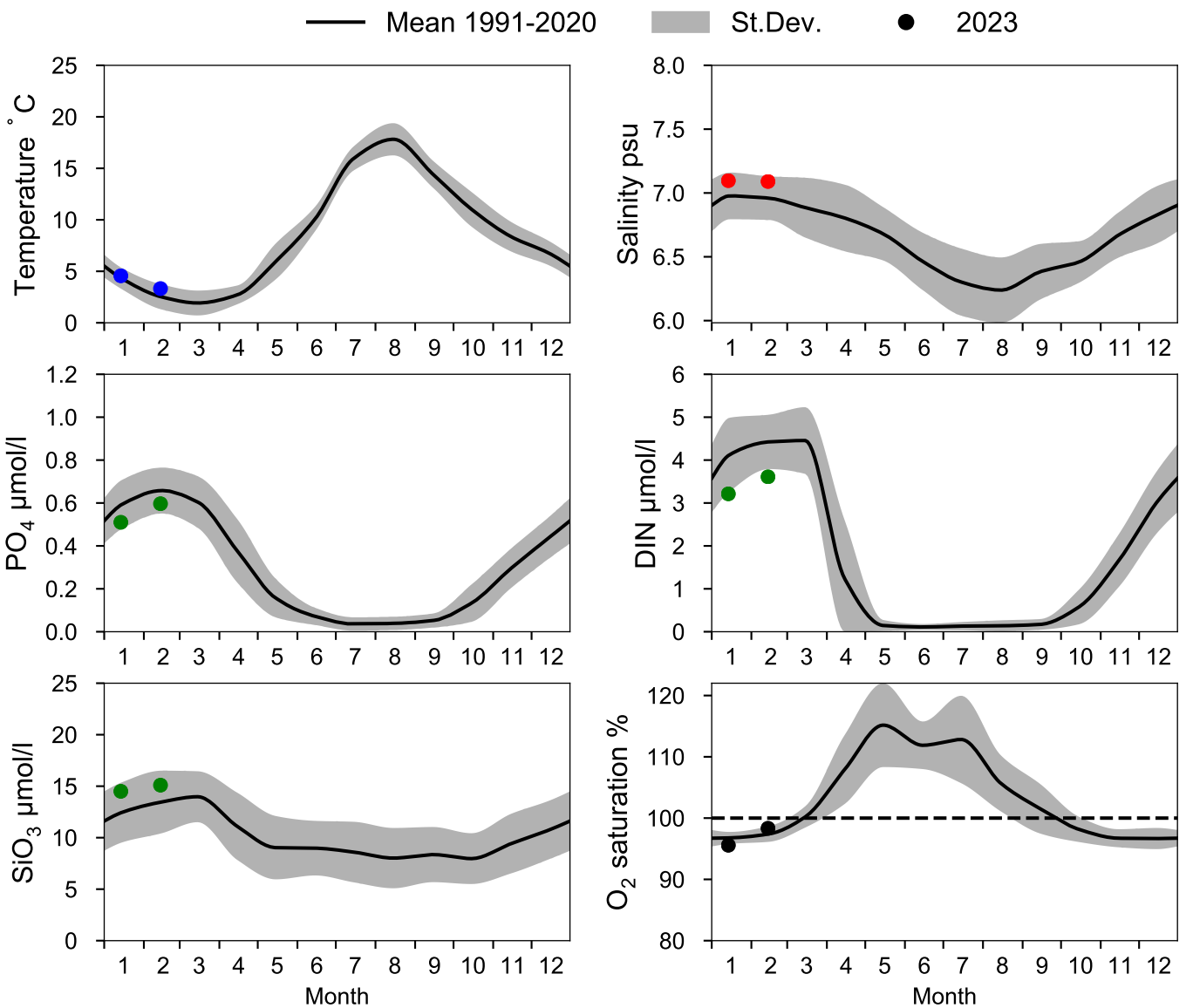
Statistics based on data from: Norra Egentliga Östersjön

Mean 1991-2020 | St.Dev. | 2023-02-14

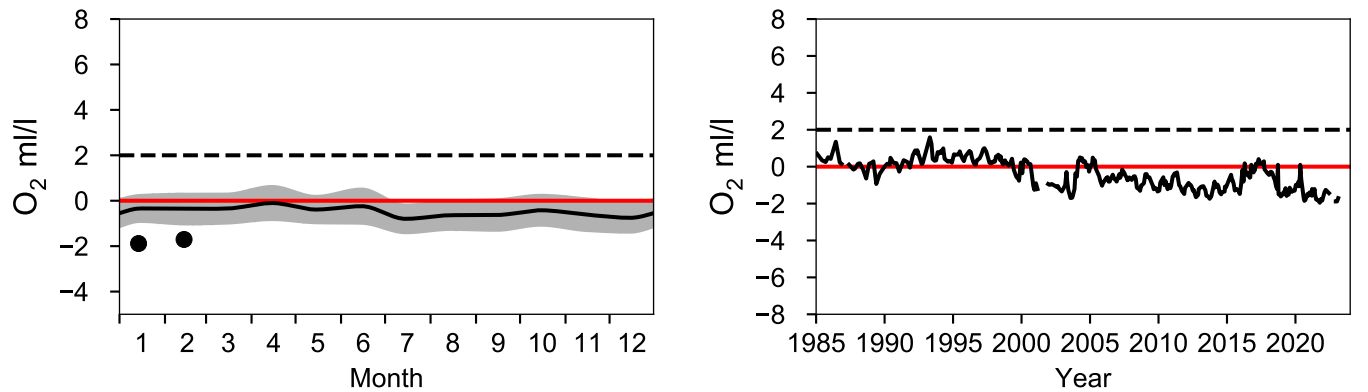


STATION BY29 / LL19 SURFACE WATER (0-10 m)

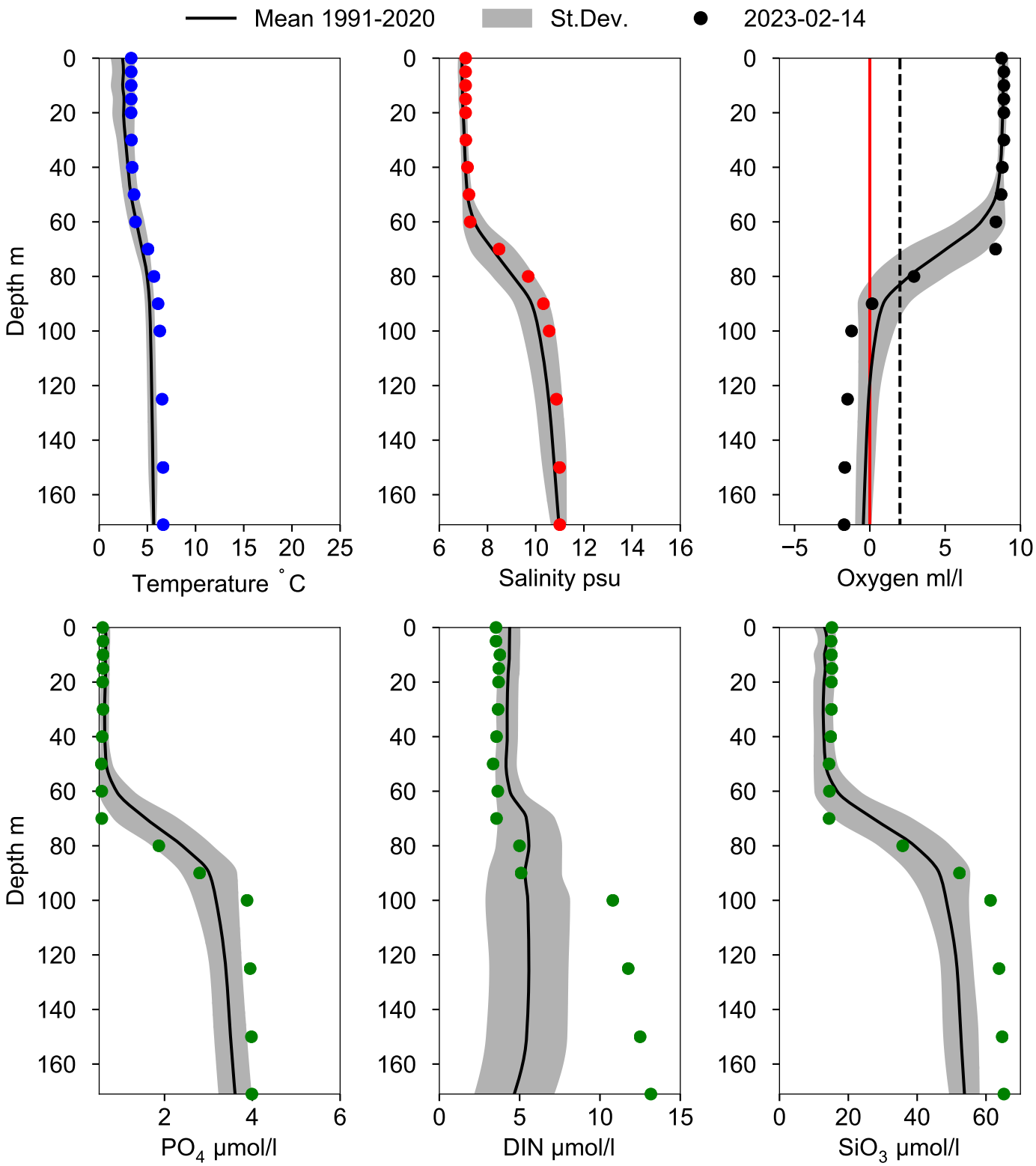
Annual Cycles



OXYGEN IN BOTTOM WATER (depth >= 150 m)



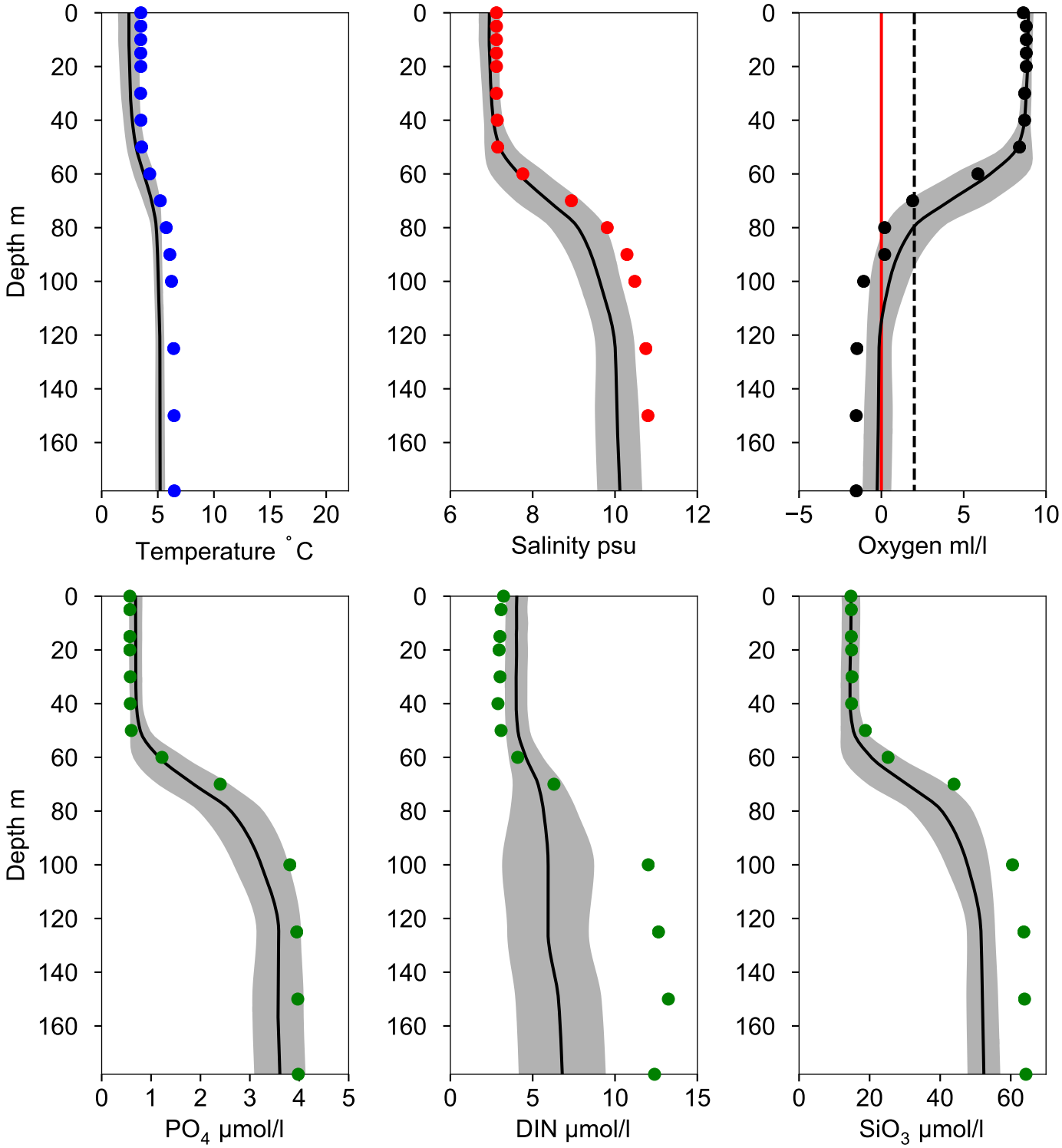
Vertical profiles BY29 / LL19
February



Vertical profiles BY30
February

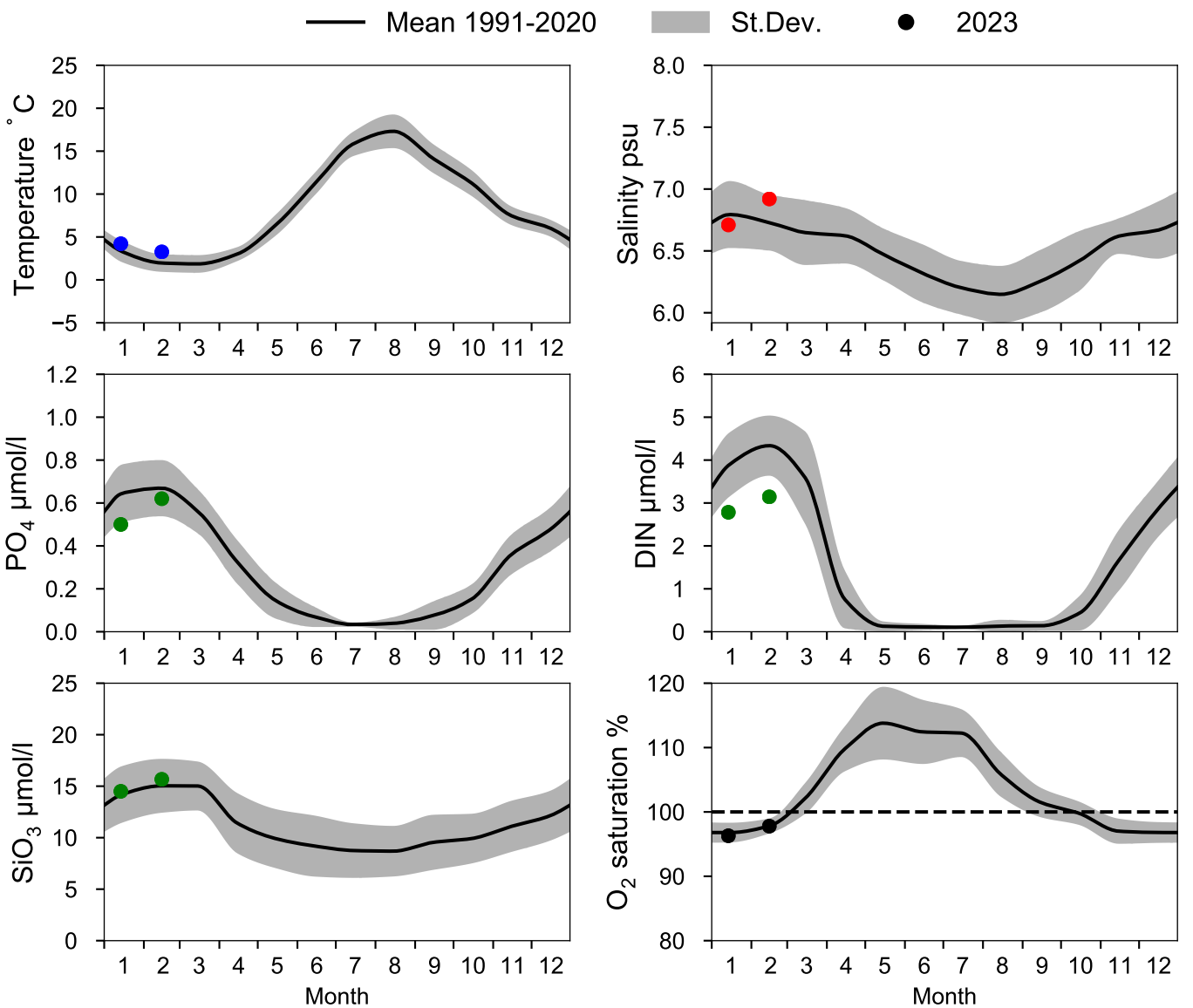
Statistics based on data from: Västra Gotlandshavet

Mean 1991-2020 | St.Dev. | 2023-02-15

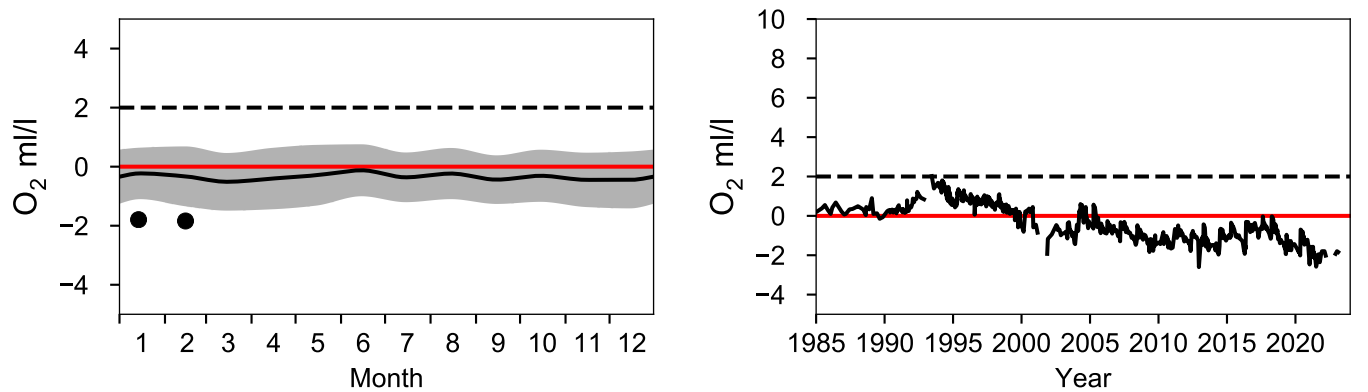


STATION BY31 LANDSORTSDJ SURFACE WATER (0-10 m)

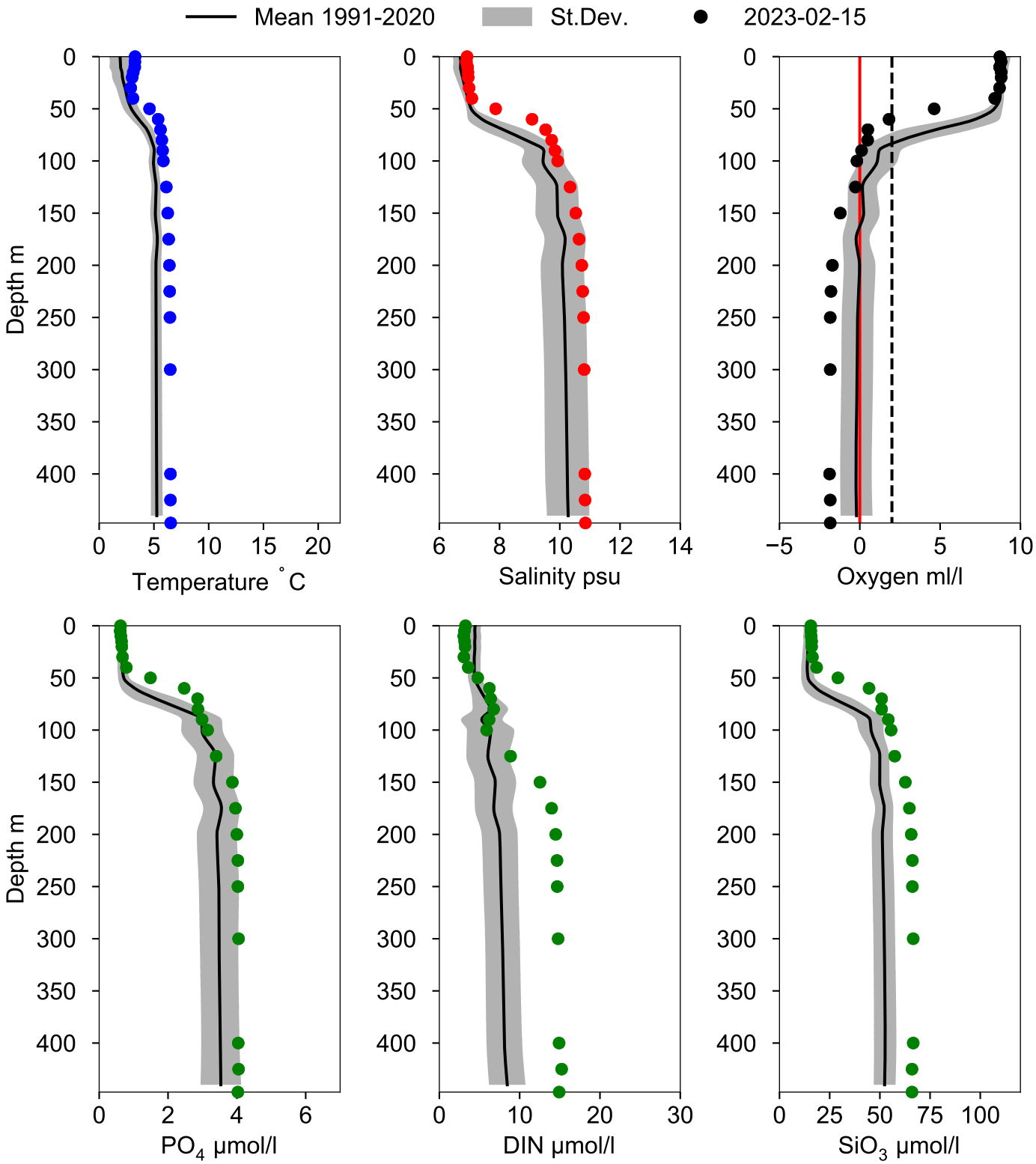
Annual Cycles



OXYGEN IN BOTTOM WATER (depth >= 419 m)

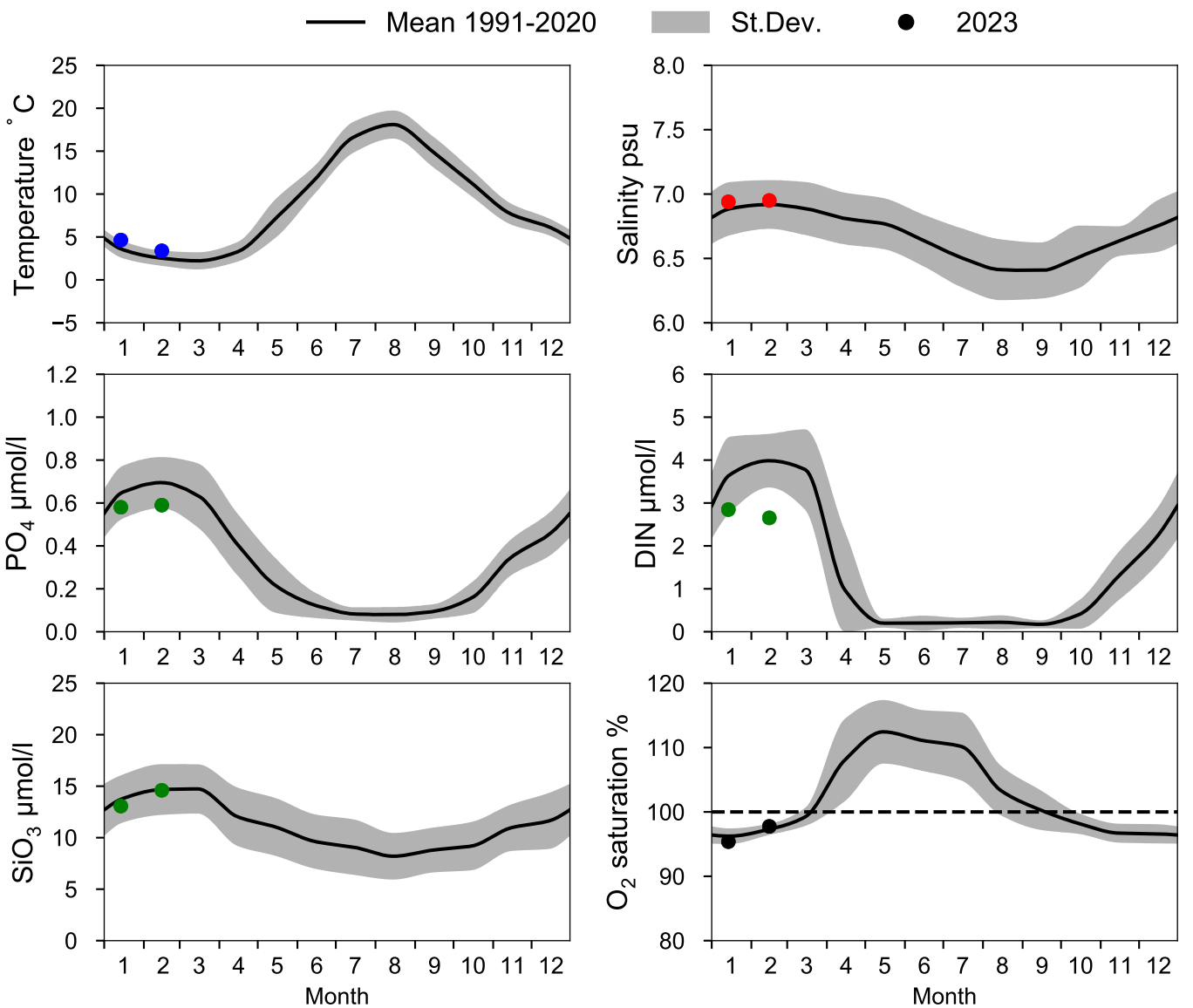


Vertical profiles BY31 LANDSORTSDJ
February

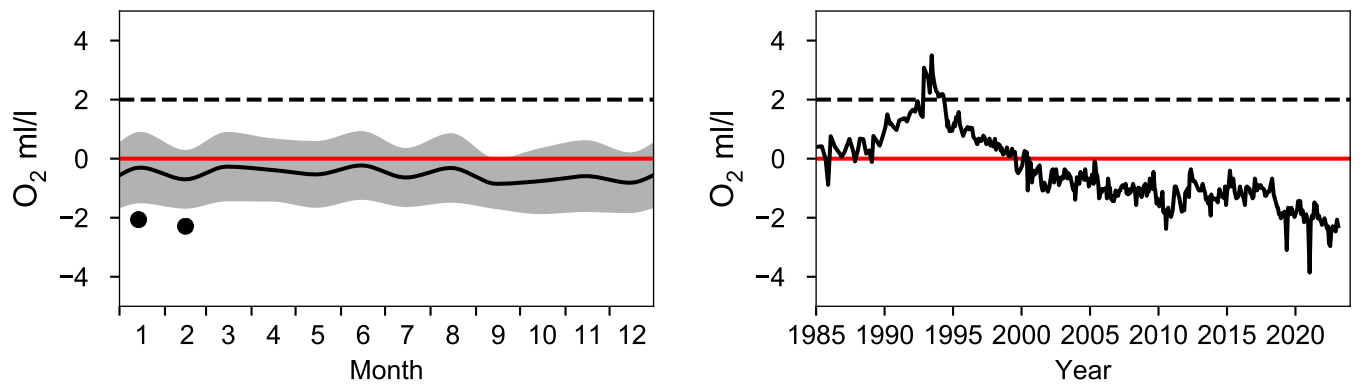


STATION BY32 NORRKÖPINGSDJ SURFACE WATER (0-10 m)

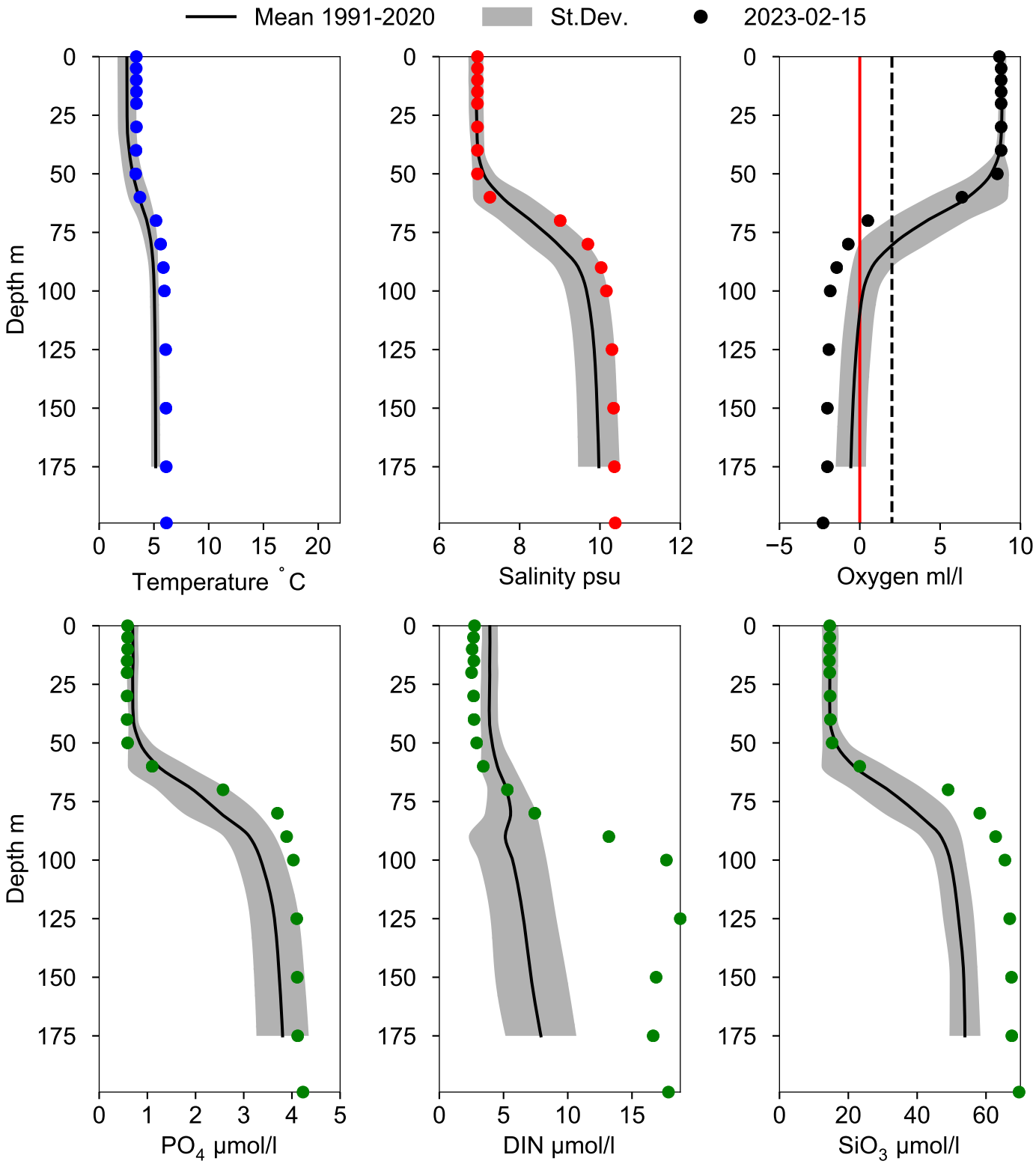
Annual Cycles



OXYGEN IN BOTTOM WATER (depth >= 175 m)



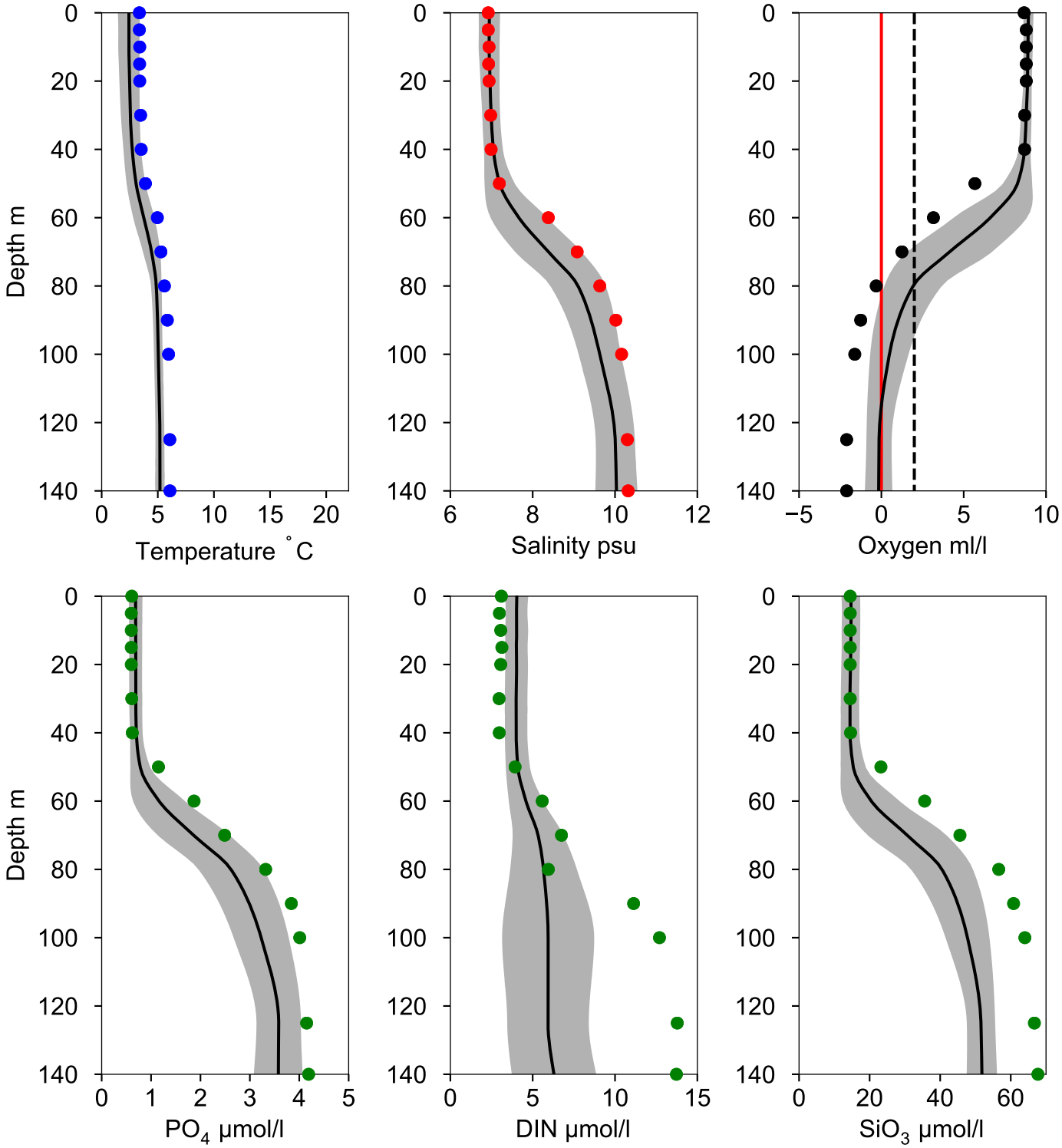
Vertical profiles BY32 NORRKÖPINGSDJ
February



Vertical profiles BY36
February

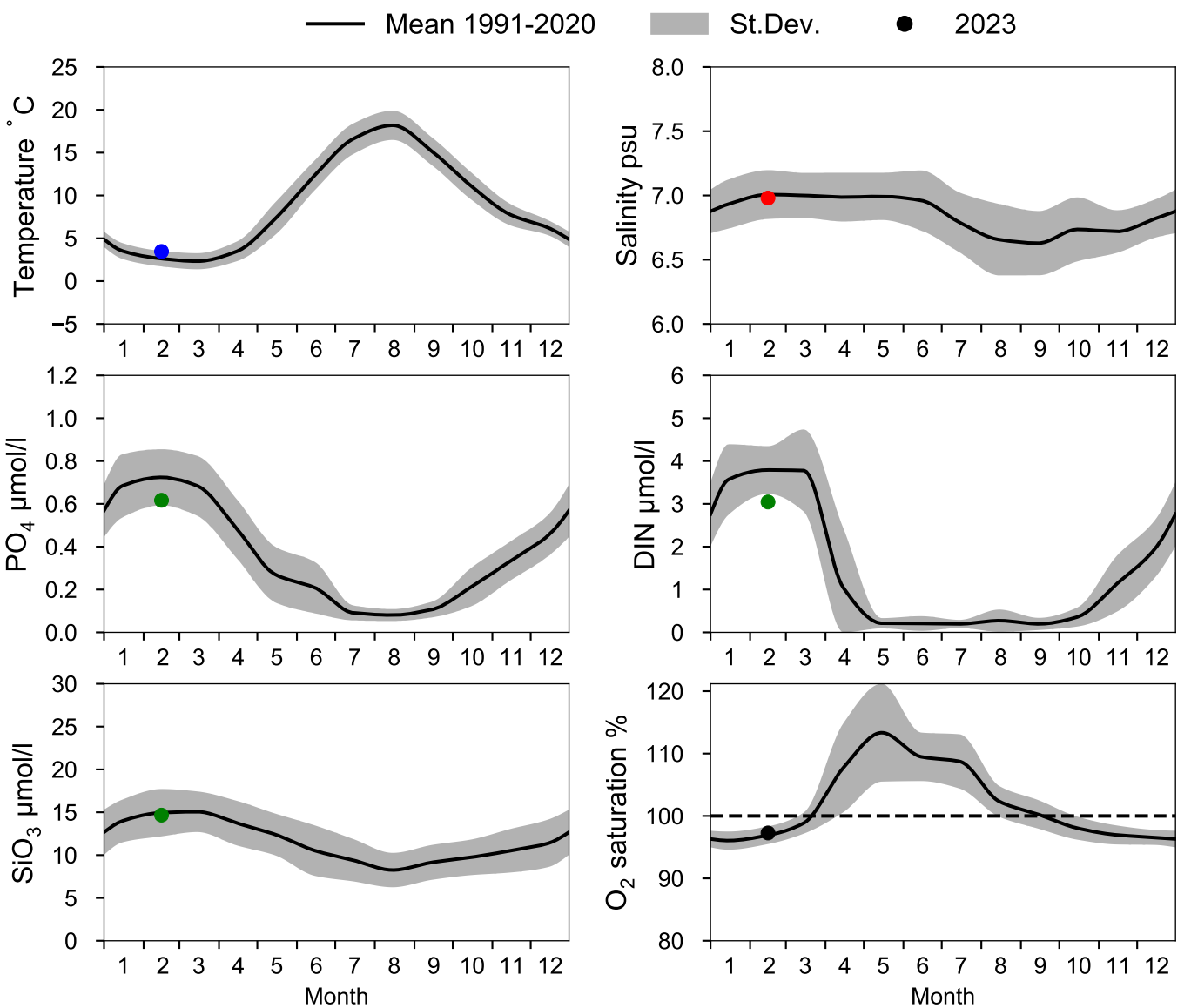
Statistics based on data from: Västra Gotlandshavet

Mean 1991-2020 | St.Dev. | 2023-02-15

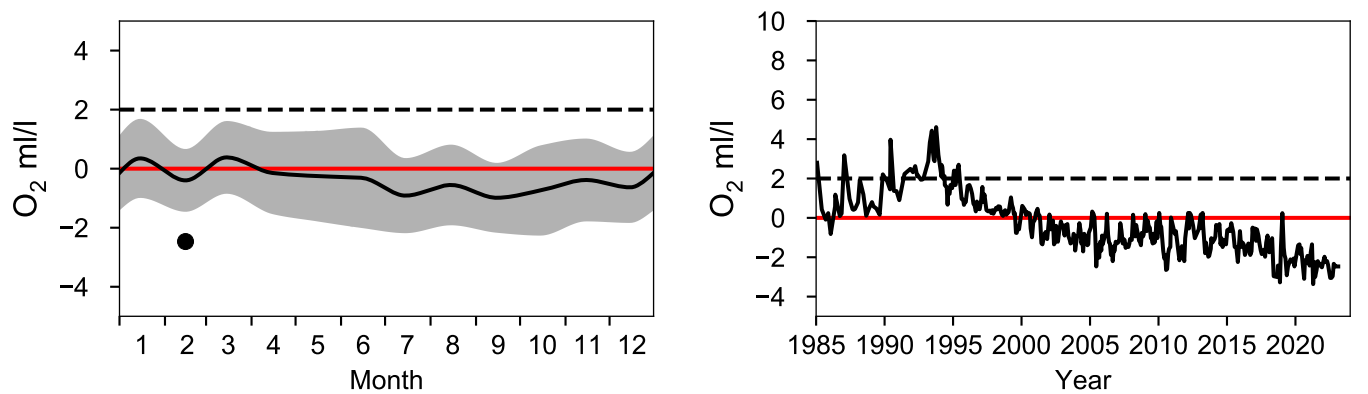


STATION BY38 KARLSÖDJ SURFACE WATER (0-10 m)

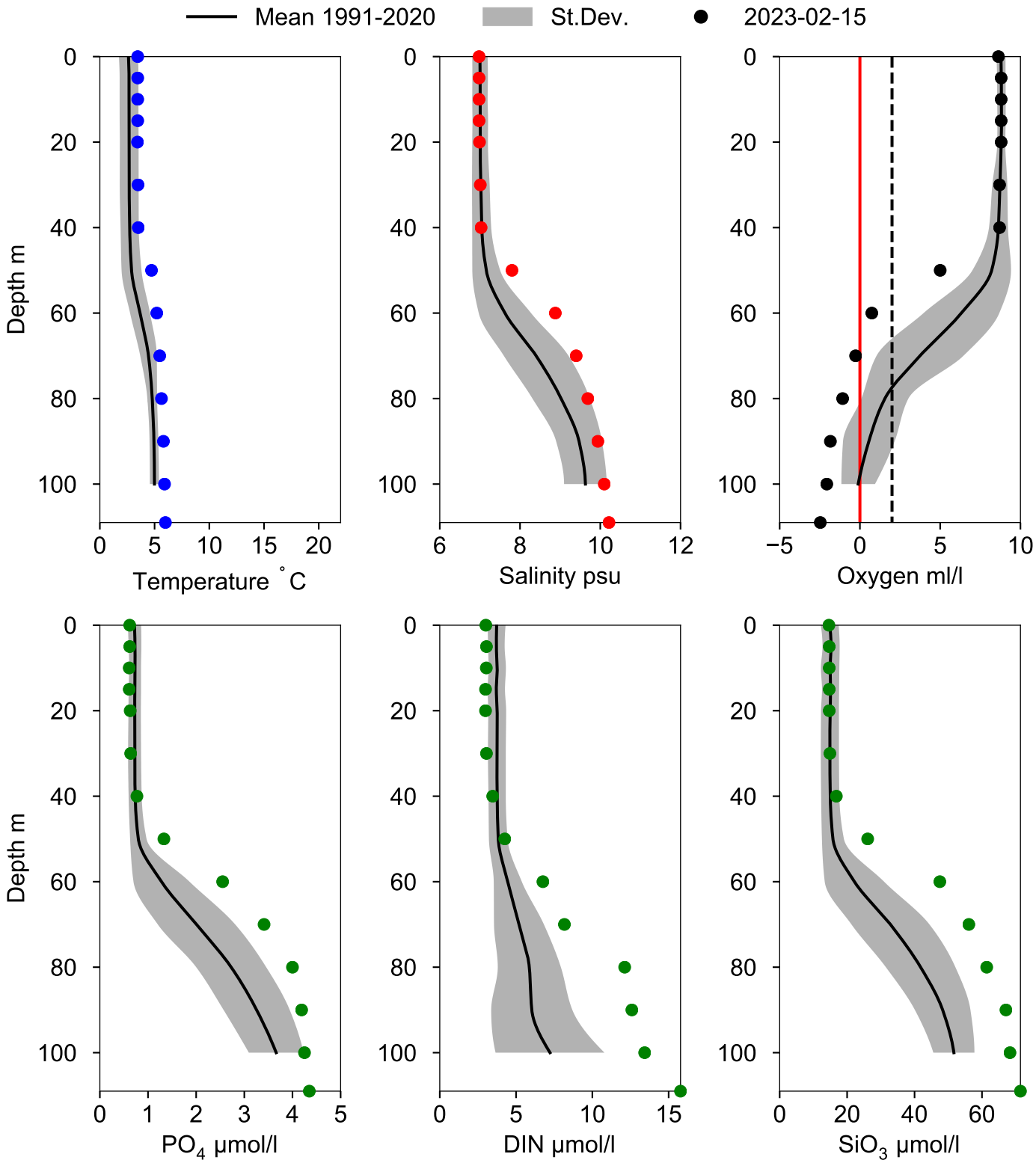
Annual Cycles



OXYGEN IN BOTTOM WATER (depth >= 100 m)

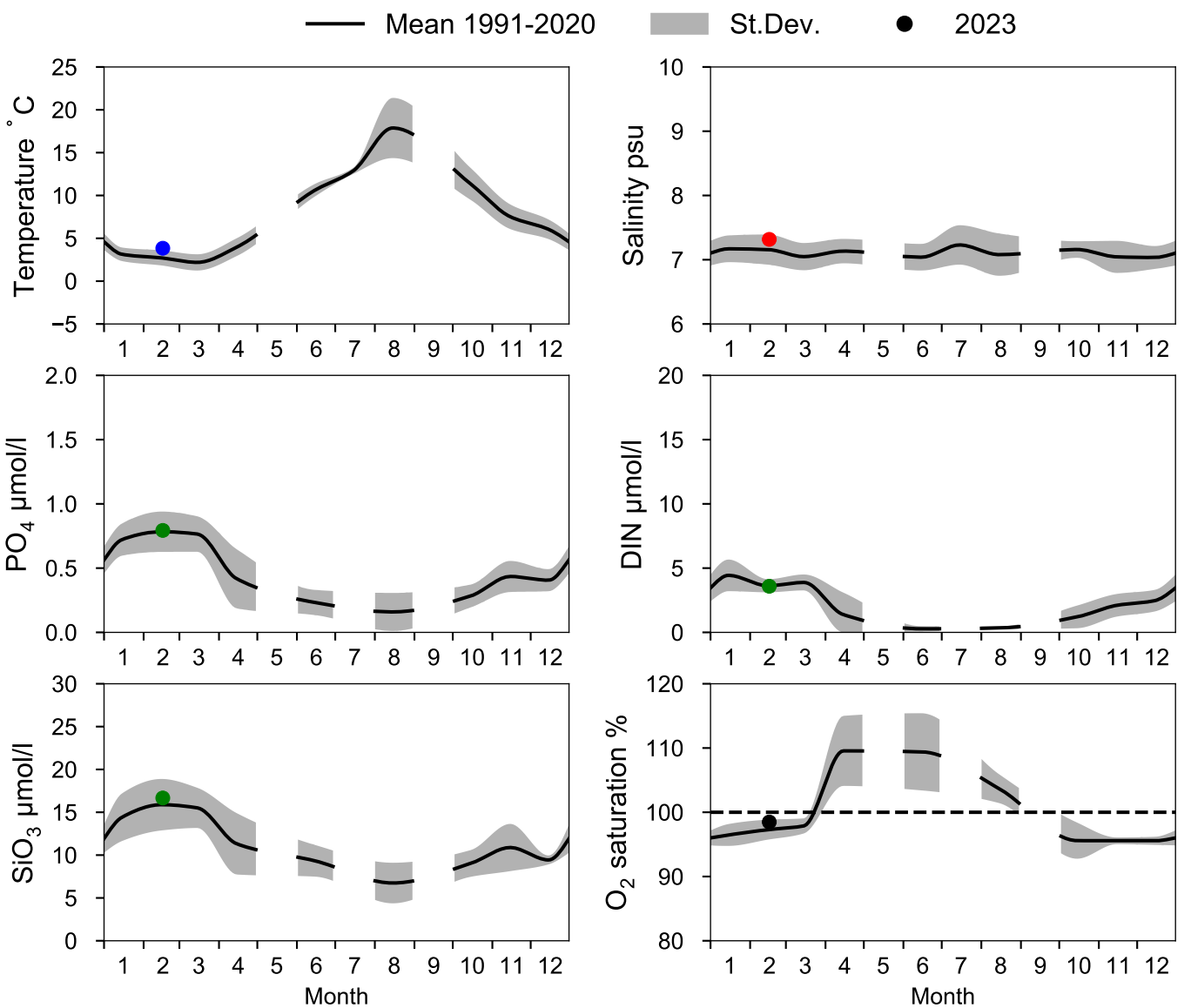


Vertical profiles BY38 KARLSÖDJ
February

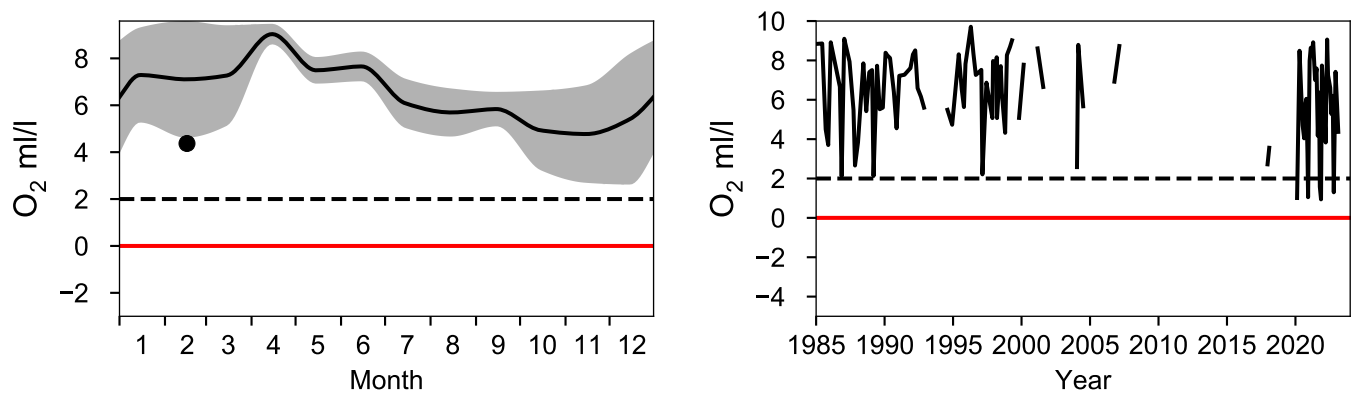
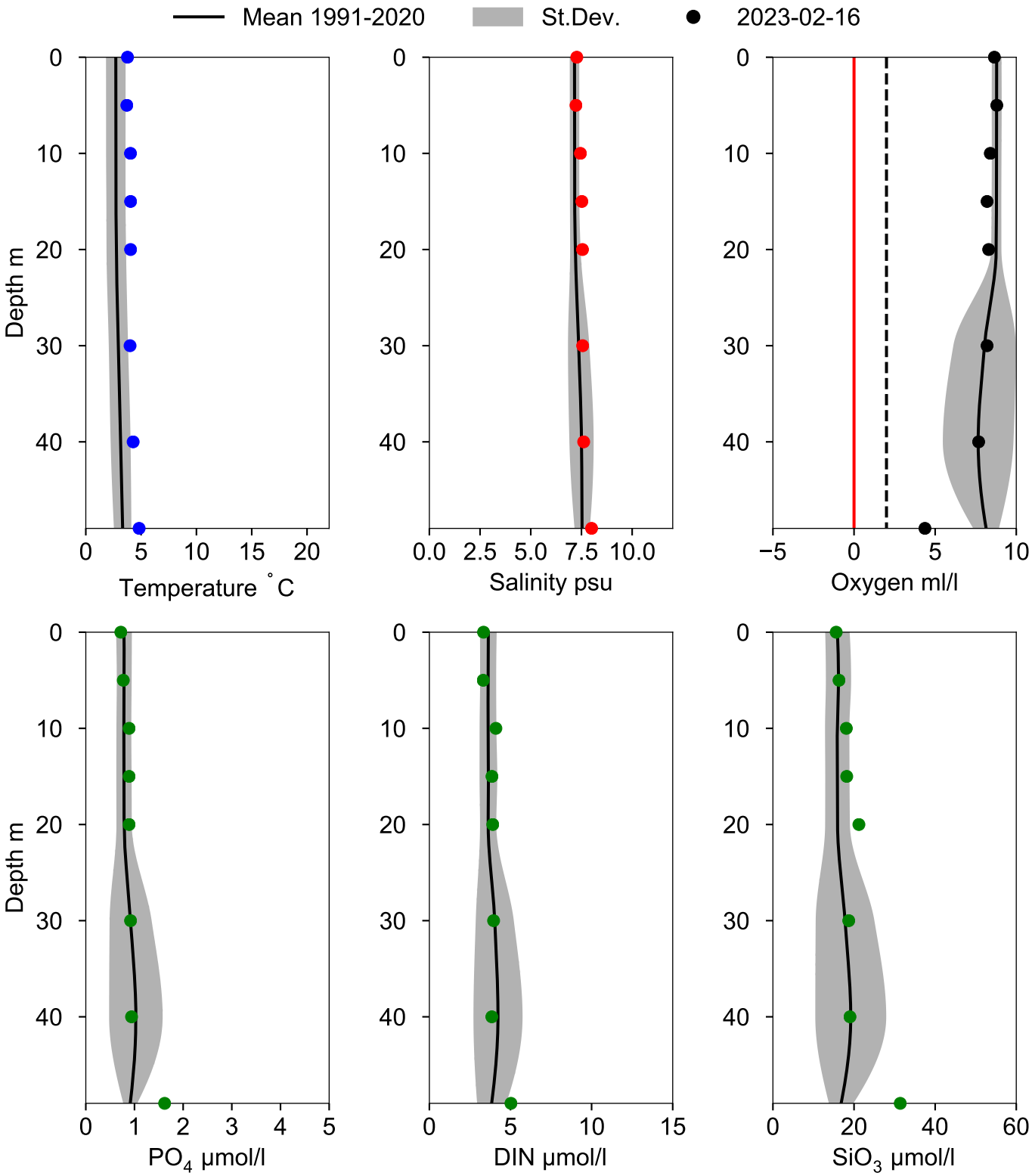


STATION BY39 ÖLANDS S UDDE SURFACE WATER (0-10 m)

Annual Cycles



OXYGEN IN BOTTOM WATER (depth >= 40 m)



Vertical profiles BY39 ÖLANDS S UDDE
February