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

Foto: Sara Johansson, SMHI

Survey period: 2022-01-10 to 2022-01-16

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 Administration (SMA)

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SUMMARY

During the cruise, which is part of the Swedish pelagic surveillance program, the Skagerrak, the Kattegat, the Sound and the southern parts of the Baltic Proper were visited. In the Kattegat, nutrient mapping was carried out.

When R/V Svea approached the Bornholm Basin, a crew member fell ill with confirmed covid-19 and it was decided that the cruise would be interrupted and that R/V Svea would go home, but that the stations on the way home could be sampled provided no more fell ill or the crew member became acutely worse. A total of 11 stations in the Baltic Proper were cancelled, but all stations in the Skagerrak and Kattegat as well as the nutrient mapping stations in the Kattegat could be sampled as planned.

The concentrations of nutrients in the surface water had increased slightly further since December and were now approaching winter maxima. The content of dissolved inorganic nitrogen and phosphorus was lower than normal in the south-western and eastern parts of the Kattegat. The silicate content was normal for the season in the entire area except at the coastal station N14 and in the Sound at W Landskrona and Öresund-2 where higher than normal levels were noted. In the deep water, levels were generally lower than normal in the north-eastern parts of the Kattegat. In the southwestern part, dissolved inorganic nitrogen was lower than normal, while phosphate and silicate showed higher levels than normal in deep water.

The oxygen situation in the Kattegatts deep water was good. No oxygen deficiency, i.e. levels below 4 ml / l, were noted. In the Bornholm Basin, the deep water was oxygen-free and hydrogen sulphide was measured from a depth of 80 meters. In Hanö Bight, there were still measurable concentrations of oxygen, but very low from 70 meters and downwards. Acute oxygen deficiency was noted at a depth of 60 meters. No oxygen deficiency was measured in the Arkona basin.

The next cruise with Svea begins on January 20, when SLU-Aqua conducts a fishing survey in the North Sea and the Skagerrak and Kattegat. SMHI participates with two persons who will map nutrients in connection with the test fishing. SMHI's next regular cruise is planned for 8–16 February with R/V Svea, when winter mapping of nutrients also will be carried out in the Baltic Proper.

RESULTS

The cruise was performed onboard R/V Svea and began in Lysekil on 10 January and ended in the same port on 16 January.

During the expedition, the wind was mostly fresh between 10-15 m/s from the south during the beginning of the expedition and turning to the west/northwest towards the end and then the wind also increased to storm strength. The temperature varied between 0.8 degrees C to a maximum of 7.6 degrees C.

On the way into the Baltic Proper, when R/V Svea was in the Bornholm Basin, a person in the crew became ill with confirmed covid-19. Due to the illness and when the weather forecast showed storms in large parts of the Baltic Sea in the coming days, it was decided that the cruise would be interrupted but that the remaining stations on the way home could be taken as long as R/V Svea was close to the coast to get assistance if the crew member became acutely worse. All stations on the way home could be sampled according to plan and no more person onboard fell ill with covid-19 during the return trip to Lysekil.

Extra phytoplankton samples were taken at the Å17, Släggö and Anholt E for a project at Uppsala University.

Svea's instruments for continuous measurements of surface water and currents (Ferrybox and ADCPs) were in operation throughout the cruise. Svea's instrument for measuring profiles while in transit, MVP (Moving Vessel Profiler) was at service and was not used. The MVP is expected to be back in use for SMHI's February cruise.

This report is based on data that has undergone an initial quality control. When additional quality control has been performed, certain values may change. Data from this cruise is published as soon as possible on the data host's website, this usually takes place within a week after the cruise has ended. Some analyses are made after the cruise and are published later.

Data can be downloaded from SHARKweb here:
https://www.smhi.se/klimatdata/oceanografi/havsmiljodata

The Skagerrak

The cooling of the surface water (0–10 m) had stopped due to the mild weather and the temperature was about the same as in December. The temperature varied between 5-7 degrees C in the surface water, which is slightly above normal for the season. The colder and less saline surface water was separated from the deep water, i.e. the stratification was found at a depth of about 10-20 meters along the coast. Further out in the Skagerrak more or less unstratified water was found and at the far end at the Å17 station, the stratification was found somewhat deeper, at a depth of 15-30 meters. The salinity in the surface was normal for the season except at the coastal station Släggö where the salinity was higher than normal (30 psu).

The surface water originating from German rivers flowing into the North Sea, which was reported in the cruise report for December, could now not be seen. This water is characterized by low

salinity and high levels of silicate. Now the concentrations were back to normal in the area and this water has probably moved further in the Skagerrak and/or mixed.

The increase in nutrients in the surface water, which normally occurs during the winter, continued in January, but the increase was not as large as in December. The nutrients increased at all stations except at Å15 where the levels of dissolved inorganic nitrogen were lower than normal. At Å15, the content of dissolved inorganic nitrogen was lower than normal in the entire profile, even phosphate and silicate showed lower levels than normal in the entire profile at this station. The levels of nutrients in the surface water were normal at all stations but at the limit of low levels in the outer Skagerrak. Even in the deep water of the offshore parts, the levels were generally lower than normal.

No oxygen deficiency was noted in the Skagerrak. At the coastal station Släggö, where oxygen deficiency was measured in the deep water in November, the levels increased to 5.0 ml/l in December and now in January the oxygen content had increased further to 5.4 ml/l.

The plankton activity, assessed on the basis of chlorophyll fluorescence measured with a CTD probe, showed a low activity in the surface layer throughout the Skagerrak.

The Kattegat and the Sound

The temperature in the surface water (0–10 m) varied between 3-6 degrees. The lowest temperatures were found along the Swedish west coast and in the Sound. Here the salinity of the surface was also lower; 22-25 psu. This water originates from the Baltic Sea and usually flows north along the Swedish west coast in the so-called Baltic current. In the northwestern Kattegat, warmer and more saline surface water was found coming from the Skagerrak, both salinity and temperature in this water were higher than normal for the month. In deep water, the temperature was generally higher than normal while the salinity was normal for the season.

The salinity and temperature stratification were found at a depth of 15-20 meters. At the last two stations (GF8 and GF9) which were sampled in the northern parts of the Kattegat, after the storm had passed, the water column had mixed and no stratification was found, i.e. the strong wind had mixed the entire body of water down to a depth of 40 meters.

In the Kattegat and the Sound, mapping of nutrients was carried out. This means that more stations are commonly visited in the area to get an idea of the nutrient situation throughout the Kattegat. During the winter, when plankton activity is at its lowest, the nutrients are usually at their highest and then reflect how much nutrients that are available in the ecosystem before this year's spring bloom.

The concentrations of nutrients in the surface water had increased slightly further since December and were now approaching winter maxima. The content of dissolved inorganic nitrogen and phosphorus was lower than normal in the south-western and eastern parts of the Kattegat. Otherwise, normal levels were noted. The silicate content was also normal for the season in the entire area, except at the coastal station N14 and in the Sound at W Landskrona and Öresund-2 where higher than normal levels were noted. In deep water, the levels were generally lower than normal in the north-eastern parts of the Kattegat. In the southwestern part, dissolved inorganic nitrogen was lower than normal, while phosphate and silicate showed higher levels than normal in deep water.

The oxygen situation in the Kattegat deep water was good. No oxygen deficiency, i.e. levels below 4 ml/l, were noted. In some areas, however, the levels were measured close to 4 ml/l, e.g. in the outer Laholm Bay, in the southwestern Kattegat and in the Sound, where oxygen levels in the deep water were measured between 4-5 ml/l.

The plankton activity, assessed on the basis of chlorophyll fluorescence measured with a CTD probe, showed some activity in the surface layer at most of the stations in the Kattegat. However, no strong fluorescence peaks were noted. In the Sound, which is more affected by Baltic Sea water, where plankton activity begins later, plankton activity was also lower. The Secchi disk depth was about 5 meters in the Kattegat and about 9-10 meters in the Sound.

The Baltic Proper

When R/V Svea was in the Sound on its way into the Baltic Sea, the weather forecast showed that the weather would worsen and that there would be a storm in the East Gotland Basin when the cruise was expected to get there. In order to reach the stations in the eastern Baltic Proper before the storm, it was decided to move stations to be taken on the way home, thus go directly from Kullen to BY4. When Svea approached BY4 in the Bornholm Basin, however, a crew member had fallen ill with confirmed covid-19 and the captain decided that the cruise would be interrupted and that Svea would go to the home port, but that the stations on the way home could be sampled provided no more fell ill or the crew became acutely worse.

Due to this, only stations in the western Bornholm Basin, Hanö Bight and the Arkona Basin in the Baltic Proper were sampled. A total of 11 stations were cancelled in the Baltic Proper.

The temperature in the surface water was normal for the season and was just over 4 degrees C. The salinity was slightly lower than normal at Hanö Bight and at BY2. The salinity varied between 7.2-7.9 psu. In the Arkona Basin, temperature and salinity stratification was found at a depth of 30-35 meters. In Hanö Bight and the Bornholm Basin, the temperature stratification was slightly shallower than the salinity stratification. Both were found between 30-60 meters depth.

In the Bornholm Basin, the deep water was oxygen-free and hydrogen sulphide was measured from a depth of 80 meters. In Hanö Bight, there were still measurable concentrations of oxygen, but very low from 70 meters depth and downwards. Acute oxygen deficiency was noted at a depth of 60 meters. No oxygen deficiency was measured in the Arkona basin.

The levels of nutrients in the surface water were generally normal at the few stations visited. Dissolved inorganic nitrogen was slightly lower than normal at Hanö Bight and at BY2. The silicate content was normal except at BY1 where slightly higher than normal levels were noted. In the Bornholm Basin and the deep waters of Hanö Bight, where low oxygen levels and hydrogen sulphide were measured, the nutrient levels were much higher than normal. In the Arkona Basin, the levels of nutrients in the deep water were normal for the season.

The plankton activity, assessed on the basis of chlorophyll fluorescence measured with a CTD probe, showed a low activity at all stations, which is normal during the winter period.

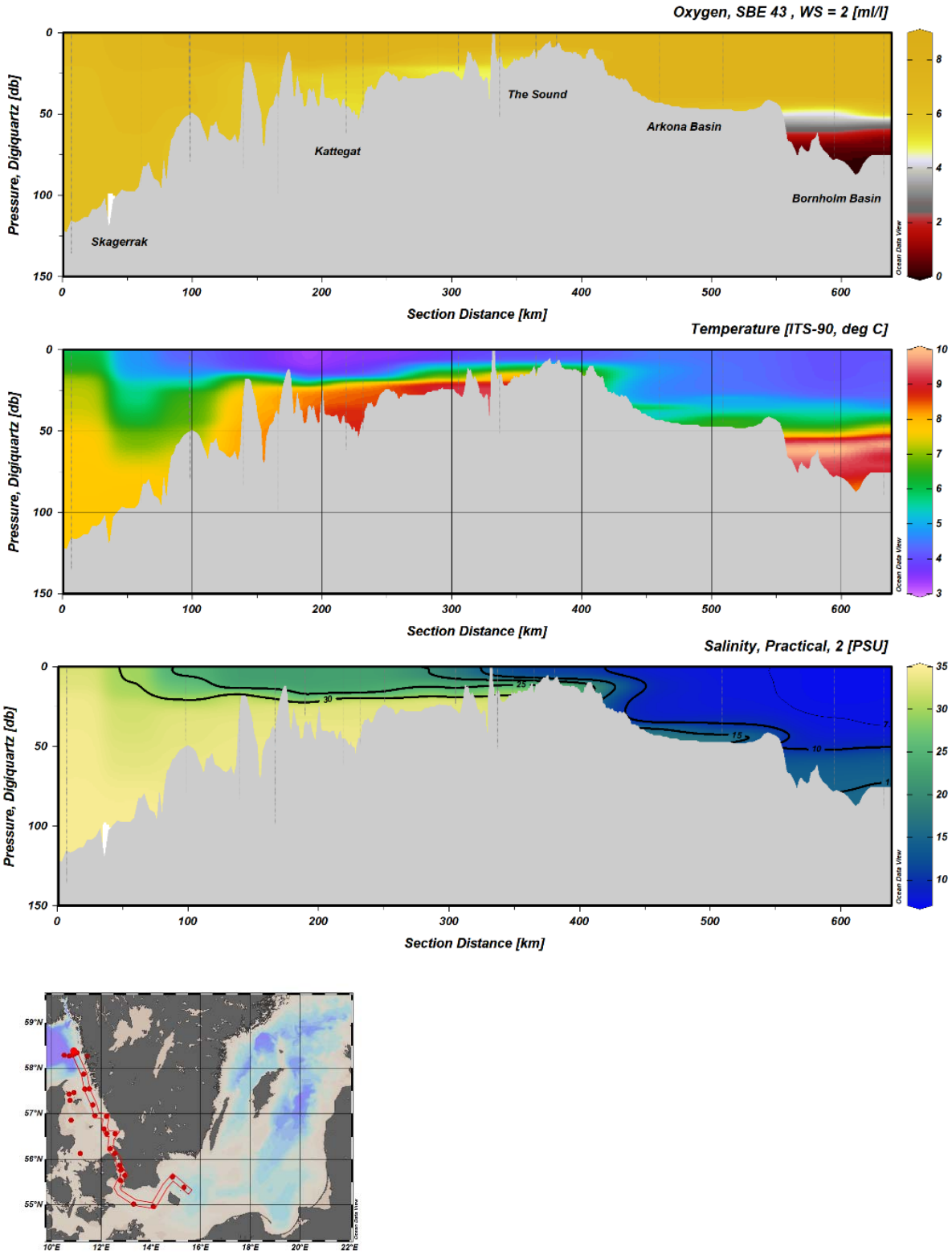


Figure 1. Transect showing CTD measurements of dissolved oxygen, salinity and temperature from Skagerrak, Kattegat, the Sound and to the Bornholm Basin. Data from major parts of the Baltic Proper is missing.

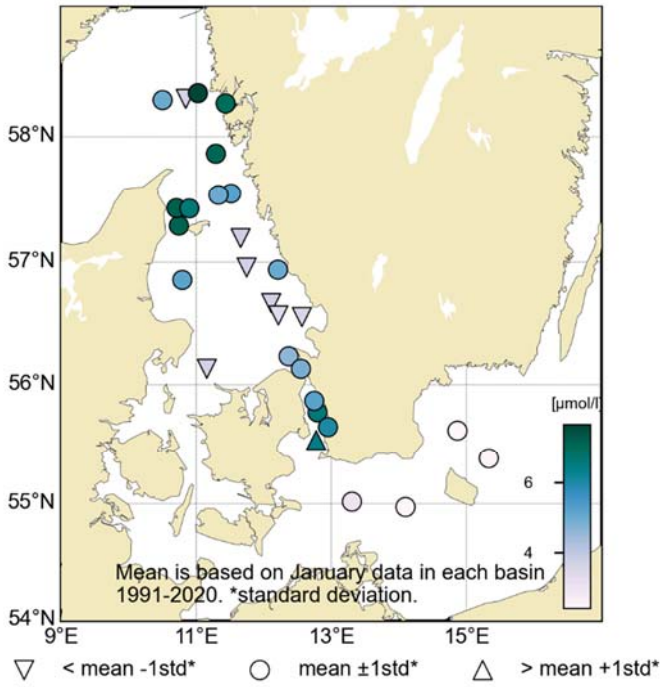


Figure 2. Concentration of dissolved inorganic nitrogen in the surface water (0-10m).

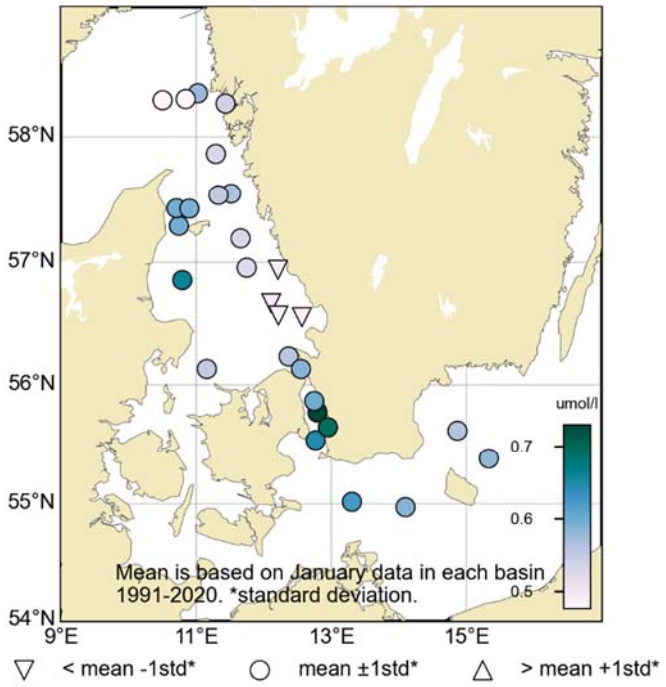


Figure 3. Concentration of phosphate in the surface water (0-10m).

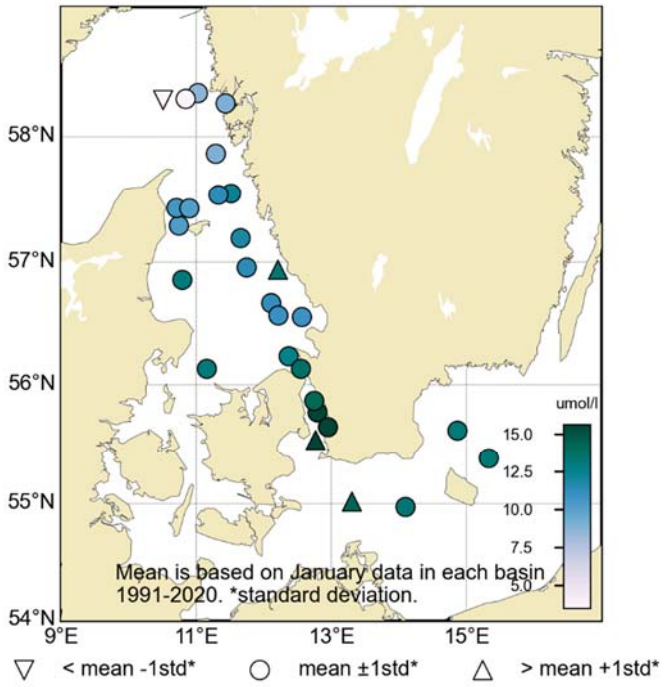


Figure 4. Concentration of silicate in the surface water (0-10m).

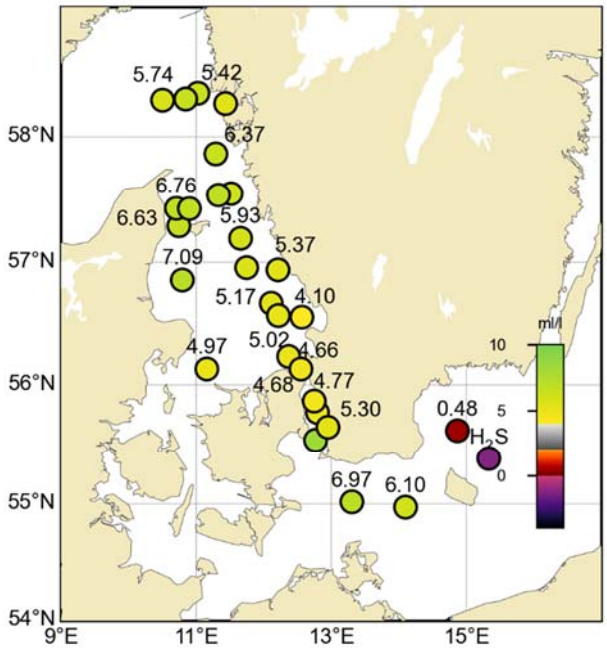


Figure 5. Oxygen concentration in the bottom water.

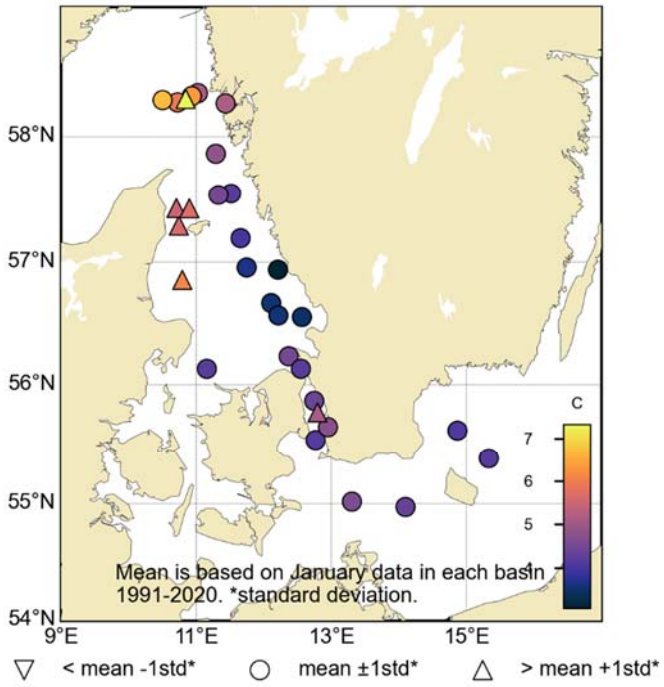


Figure 6. Temperature in the surface water (0-10m).

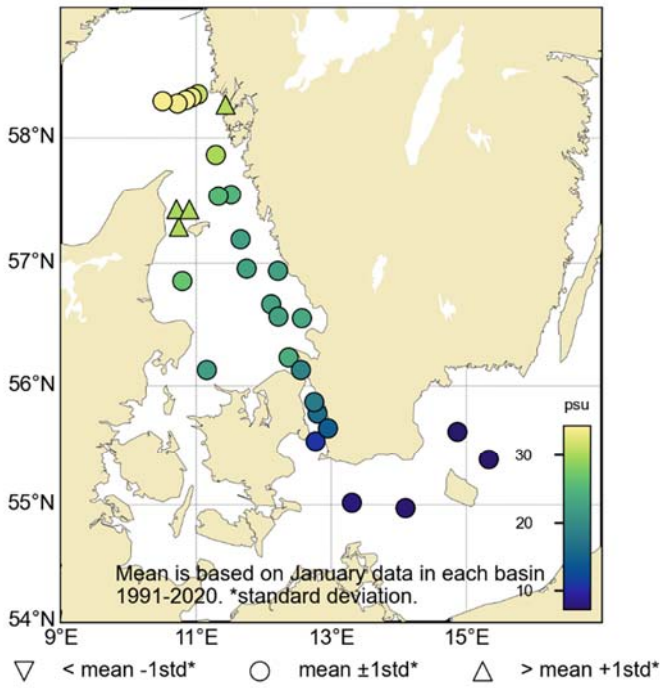


Figure 7. Salinity in the surface water (0-10m).

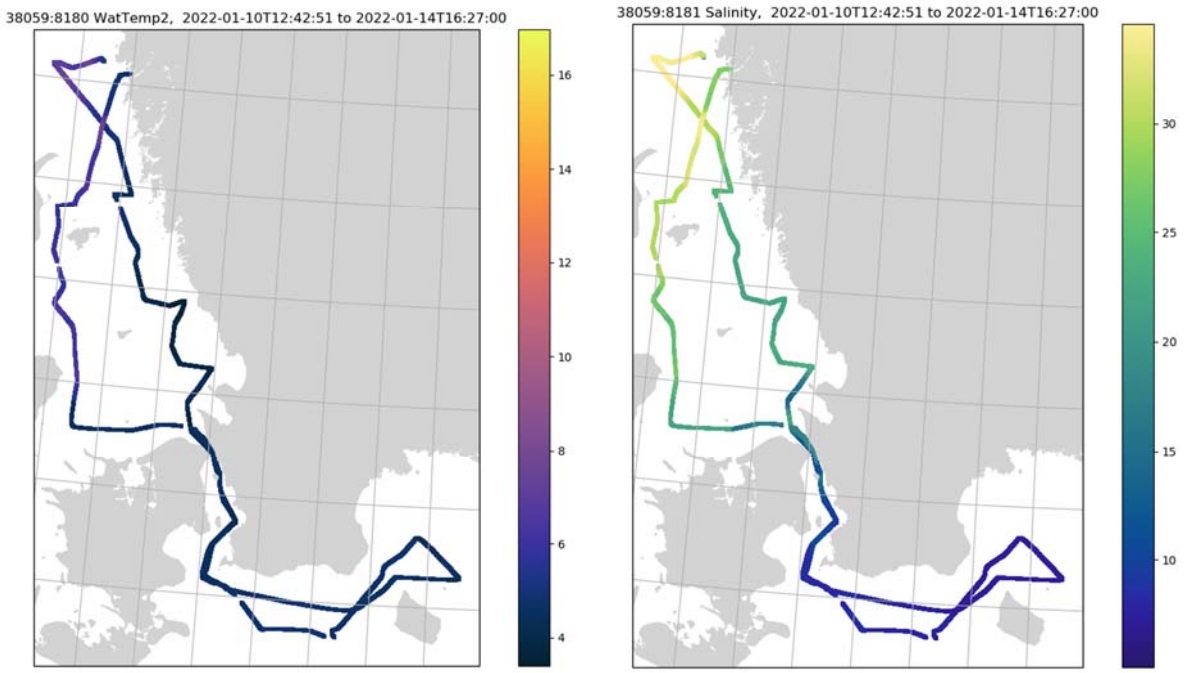


Figure 8. Surface water temperature (left) and salinity (right) from the ferrybox on Svea. Data has only undergone a rough quality control.

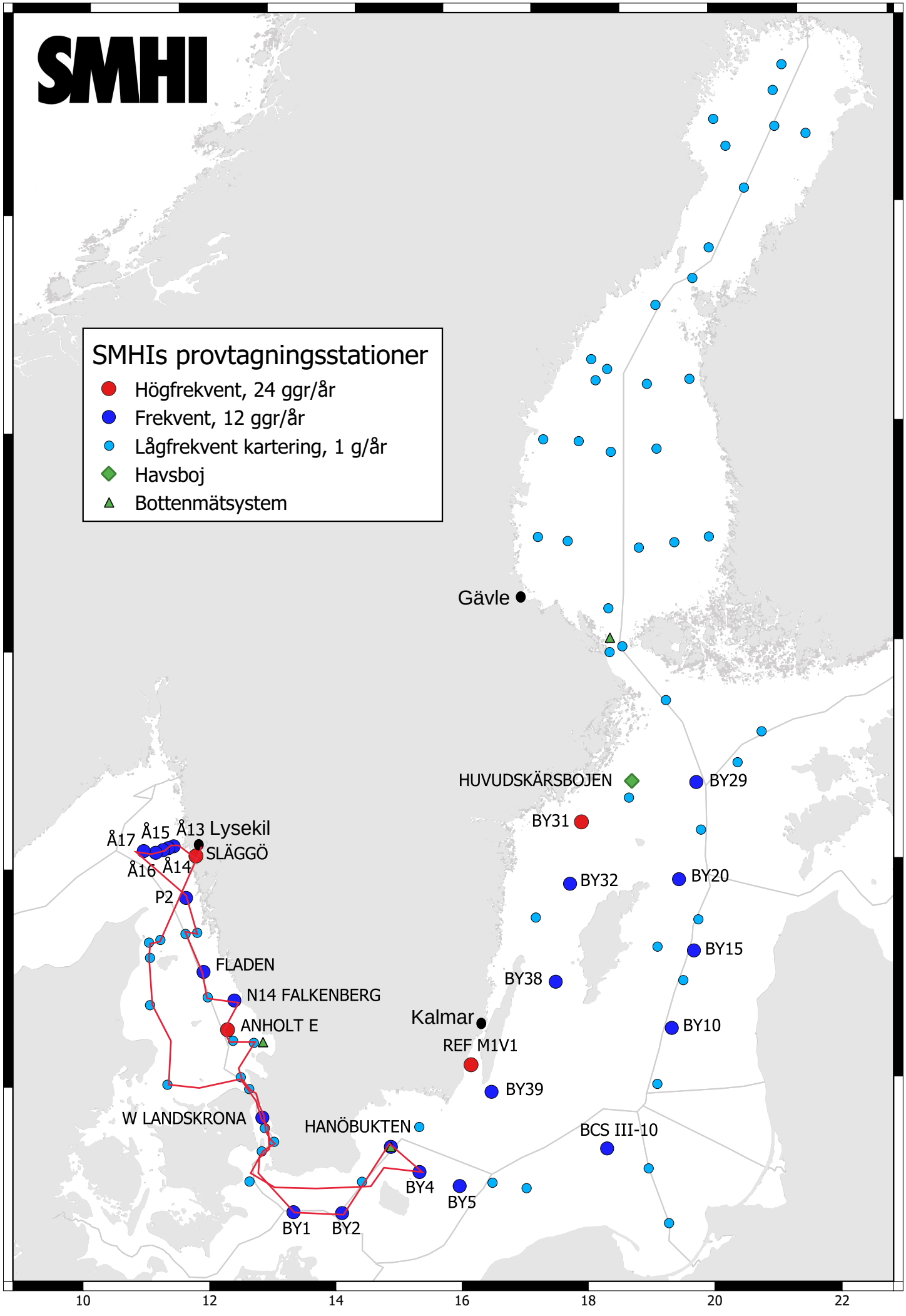
PARTICIPANTS

Name	Role	Institute
Sara Johansson	Chief scientist	SMHI
Johan Håkansson	Quality manager	SMHI
Martin Hansson		SMHI
Sari Sipilä		SMHI
Ola Kalén		SMHI

APPENDICES

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

SMHI
Havs och Vatten myndigheten


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
HANÖBUKTEN
BY4
BY5
BY1
BY2
W LANDSKRONA
ANHOLT E
N14 FALKENBERG
FLADEN
P2
Å16
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Å17
Å15
Å13 Lysekil
SLÄGGÖ
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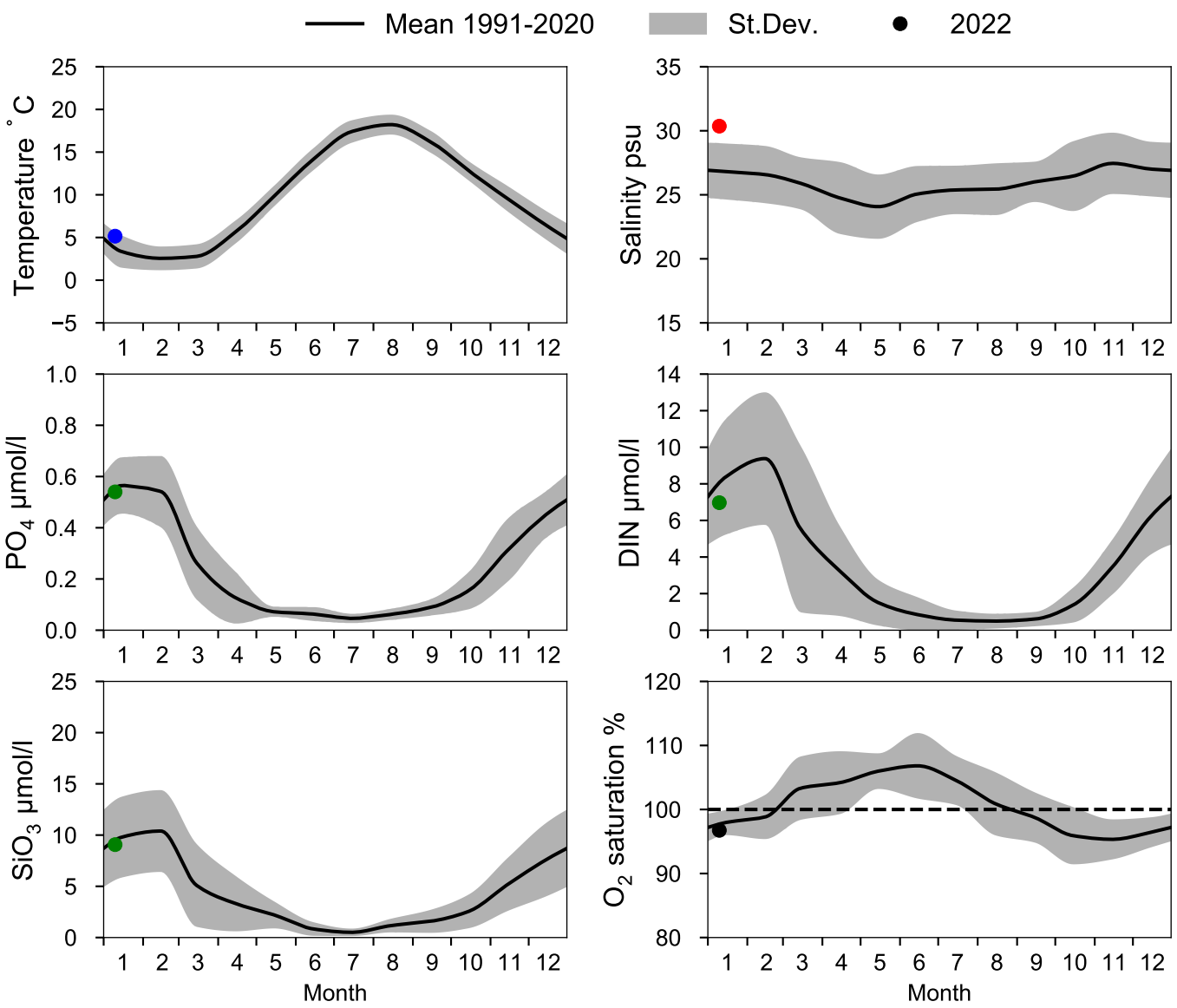
Date: 2022-02-02
Time: 13:46

Ship: SE
Year: 2022

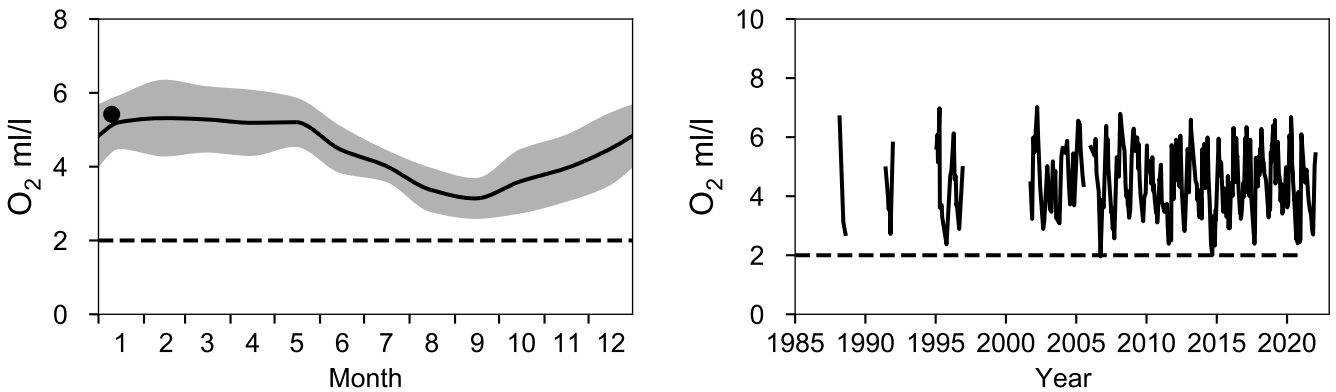
Ser no	Cru no	Stat code	Proj	Stat name	Lat	Lon	Start date yyyymmdd	Start time hhmm	Bottom depth m	Secchi depth m	Wind dir	Wind vel	Air temp C	Air pres hPa	WCWI Weather Cloud Wave Ice	CZPP Chlorophyll Zooplankton Phytoplankton Primary prod	No de	No btl	Temp_btl	Temp_ctd	Salt_btl	Salt_ctd	Ph	Doxy_btl	Doxy_ctd	H2S	Phos	Ptot	Ntri	Ntra	Ntrz	Amon	Ntot	Alky	Sio3-si	Humus	Comnt_visit	Comnt_samp
0001	1	FIBG27	BAS...	SLÄGGÖ	5815.58	01126.16	20220110	1030	71	6			0.8	1023	1110	-x--	9		x	x	-	x	-	x	x	-	x	-	x	x	x	x	-	-	x	-	-	-
0002	1	SKEX14	BAS...	Å13	5820.38	01101.62	20220110	1330	118	6	13	10	1.8	1025	1220	----	10		x	x	-	x	-	x	x	-	x	-	x	x	x	x	-	-	x	-	-	-
0003	1	SKEX15	BAS...	Å14	5818.98	01056.08	20220110	1445	112		12	10	2	1026	1230	----	11		-	x	-	x	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-
0004	1	SKEX16	BAS...	Å15	5817.68	01050.74	20220110	1550	136		12	8	2.6	1027	9990	----	12		x	x	-	x	-	x	x	-	x	-	x	x	x	x	-	-	x	-	-	-
0005	1	SKEX17	BAS...	Å16	5816.06	01043.47	20220110	1712	202		12	7	3	1031	9990	----	13		-	x	-	x	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-
0006	1	SKEX18	BAS...	Å17	5817.14	01030.19	20220110	1835	347		18	10	4	1031	9990	-x--	15		x	x	-	x	-	x	x	-	x	-	x	x	x	x	-	-	x	-	x	-
0007	1	SKEX23	BAS...	P2	5752.04	01117.52	20220110	2345	93		18	11	2.9	1028	9999	----	10		x	x	-	x	-	x	x	-	x	-	x	x	x	x	-	-	x	-	-	-
0008	1	KANX02	BAS...	SW VINGA GF4	5733.08	01131.07	20220111	0245	79		18	14	2.9	1029	9999	----	12		x	x	-	x	-	x	x	-	x	-	x	x	x	x	-	-	x	-	-	-
0009	1	KANX04	BAS...	GF6	5732.38	01119.81	20220111	0415	46		18	14	2.8	1028	9999	----	9		x	x	-	x	-	x	x	-	x	-	x	x	x	x	-	-	x	-	-	-
0010	1	KANX25	BAS...	FLADEN	5711.56	01139.49	20220111	0715	84		17	12	2.4	1028	2840	----	13		x	x	-	x	-	x	x	-	x	-	x	x	x	x	-	-	x	-	-	-
0011	1	KANX26	BAS...	L:A MIDDELGRUND	5657.42	01144.87	20220111	0935	99		18	10	2.4	1028	2840	----	14		x	x	-	x	-	x	x	-	x	-	x	x	x	x	-	-	x	-	-	-
0012	1	KANX50	BAS...	N14 FALKENBERG	5656.35	01212.69	20220111	1155	32	5	18	8	2.4	1028	2840	-x--	7		x	x	-	x	-	x	x	-	x	-	x	x	x	x	-	-	x	-	-	-
0013	1	KAEX29	BAS...	ANHOLT E	5640.14	01206.68	20220111	1435	63		18	13	2.7	1028	2630	-x--	10		x	x	-	x	x	x	x	-	x	-	x	x	x	x	-	-	x	-	-	-
0014	1	KAEX30	BAS...	ST MIDDELGRUND	5634.11	01213.04	20220111	1655	50		18	13	2.7	1028	9999	----	9		x	x	-	x	-	x	x	-	x	-	x	x	x	x	-	-	x	-	-	-
0015	1	KAEL63	BAS...	LAHOLM-3 (YG)	5633.34	01233.96	20220111	1855	23		18	11	2.8	1028	9999	----	5		x	x	-	x	-	x	x	-	x	-	x	x	x	x	-	-	x	-	-	-
0016	1	KAEX33	BAS...	KULLEN	5614.08	01222.18	20220111	2140	24		18	7	2.2	1028	9999	----	6		x	x	-	x	-	x	x	-	x	-	x	x	x	x	-	-	x	-	-	-
0017	1	BPSB06	BAS...	BY4 CHRISTIANSÖ	5522.98	01520.02	20220112	1350	91	11	27	10	2.5	1029	2730	----	12		x	x	-	x	-	x	x	x	x	-	x	x	x	x	-	-	x	-	-	-
0018	1	BPSH05	BAS...	HANÖBUKTEN	5537.08	01452.16	20220112	1640	80		27	10	4.2	1031	9990	----	11		x	x	-	x	-	x	x	-	x	-	x	x	x	x	-	-	x	-	-	-
0019	1	BPSA03	BAS...	BY2 ARKONA	5458.28	01406.01	20220112	2310	46		27	12	5.1	1027	9990	----	8		x	x	-	x	-	x	x	-	x	-	x	x	x	x	-	-	x	-	-	-
0023	1	SOCX41	BAS...	ÖRESUND-7	5546.25	01247.79	20220113	0113	20	6	27	13	7.6	1027	2830	----	5		x	x	-	x	-	x	x	-	x	-	x	x	x	x	-	-	x	-	-	-
0020	1	BPSA02	BAS...	BY1	5500.99	01318.39	20220113	0310	44		27	15	5.4	1026	9999	----	8		x	x	-	x	-	x	x	-	x	-	x	x	x	x	-	-	x	-	-	-
0021	1	SOSX46	BAS...	ÖRESUND-2	5532.32	01246.15	20220113	0825	10	>10	27	10	6.2	1028	2730	----	3		x	x	-	x	-	x	x	-	x	-	x	x	x	x	-	-	x	-	-	-
0022	1	SOCX44	BAS...	ÖRESUND-4	5538.86	01257.13	20220113	1015	15	9	29	11	7	1028	2730	----	4		x	x	-	x	-	x	x	-	x	-	x	x	x	x	-	-	x	-	-	-
0024	1	SOCX39	BAS...	W LANDSKRONA	5551.99	01244.90	20220113	1305	51	9	27	8	7.4	1027	2830	----	9		x	x	-	x	-	x	x	-	x	-	x	x	x	x	-	-	x	-	x	-
0025	1	SONX33	BAS...	ÖRESUND-12X	5607.89	01233.1	20220113	1600	25		27	9	6.8	1022	9990	----	6		x	x	-	x	-	x	x	-	x	-	x	x	x	x	-	-	x	-	-	-
0026	1	KAWX14	BAS...	925 KATTEGAT SW	5607.9	01109.48	20220113	2130	48		27	12	7.1	1022	9990	----	9		x	x	-	x	-	x	x	-	x	-	x	x	x	x	-	-	x	-	-	-
0027	1	KAWA11	BAS...	409 ÅLBORG BUGT	5651.42	01047.69	20220114	0300	14		30	25	8.3	1017	9990	----	4		x	x	-	x	-	x	x	-	x	-	x	x	x	x	-	-	x	-	x	-
0028	1	KANX09	BAS...	LÄSÖ RÄNNA	5717.58	01044.68	20220114	0755	45		29	15	6.9	1018	1130	----	9		x	x	-	x	-	x	x	-	x	-	x	x	x	x	-	-	x	-	-	-
0029	1	KANX07	BAS...	GF9	5726.01	01042.49	20220114	0910	27	5	29	15	6.8	1019	1130	----	6		x	x	-	x	-	x	x	-	x	-	x	x	x	x	-	-	x	-	-	-
0030	1	KANX06	BAS...	GF8	5725.86	01053.97	20220114	1030	42	5			6.8	1021	0030	----	8		x	x	-	x	-	x	x	-	x	-	x	x	x	x	-	-	x	-	-	-

STATION SLÄGGÖ SURFACE WATER (0-10 m)

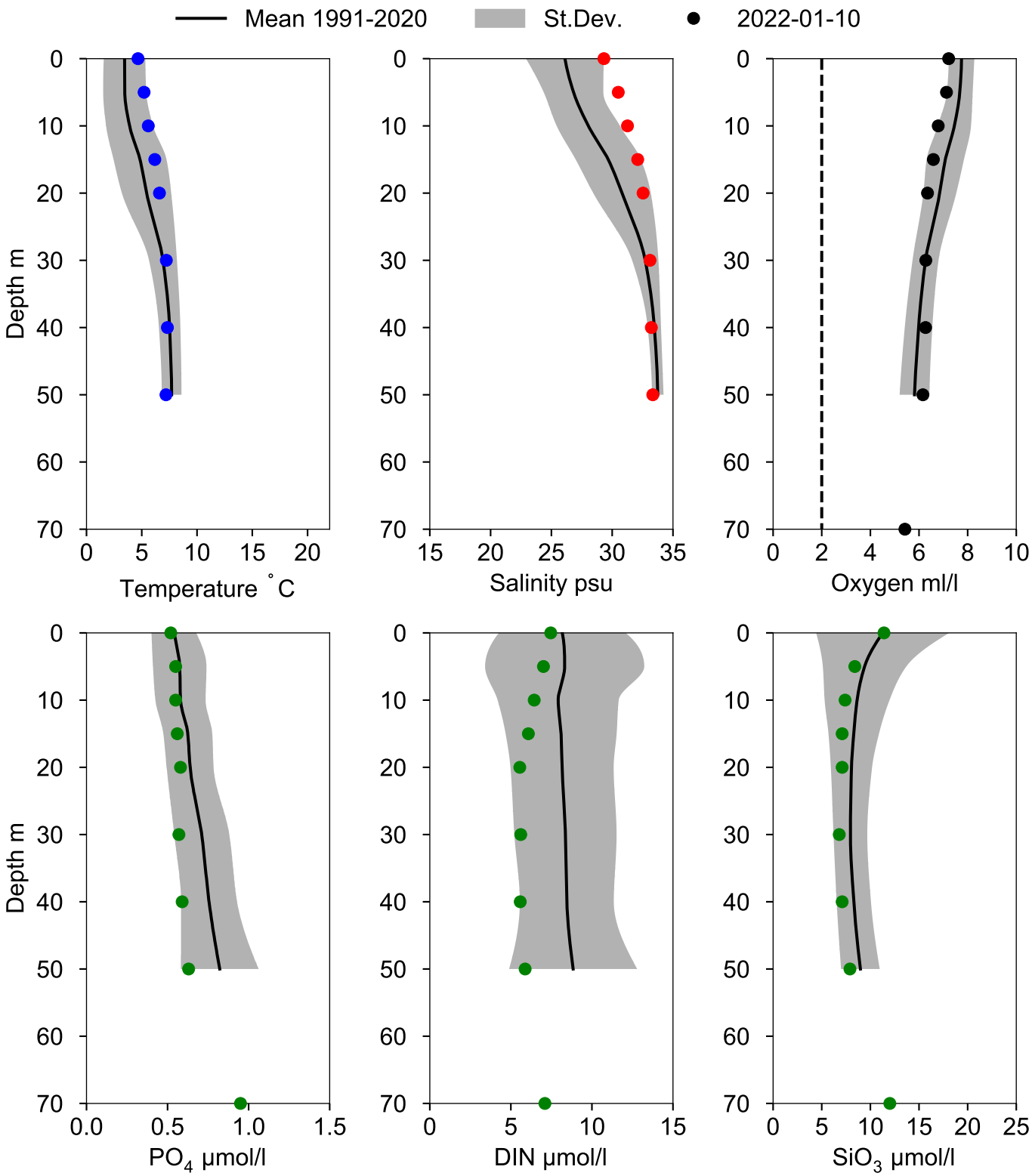
Annual Cycles



OXYGEN IN BOTTOM WATER (depth >= 64 m)

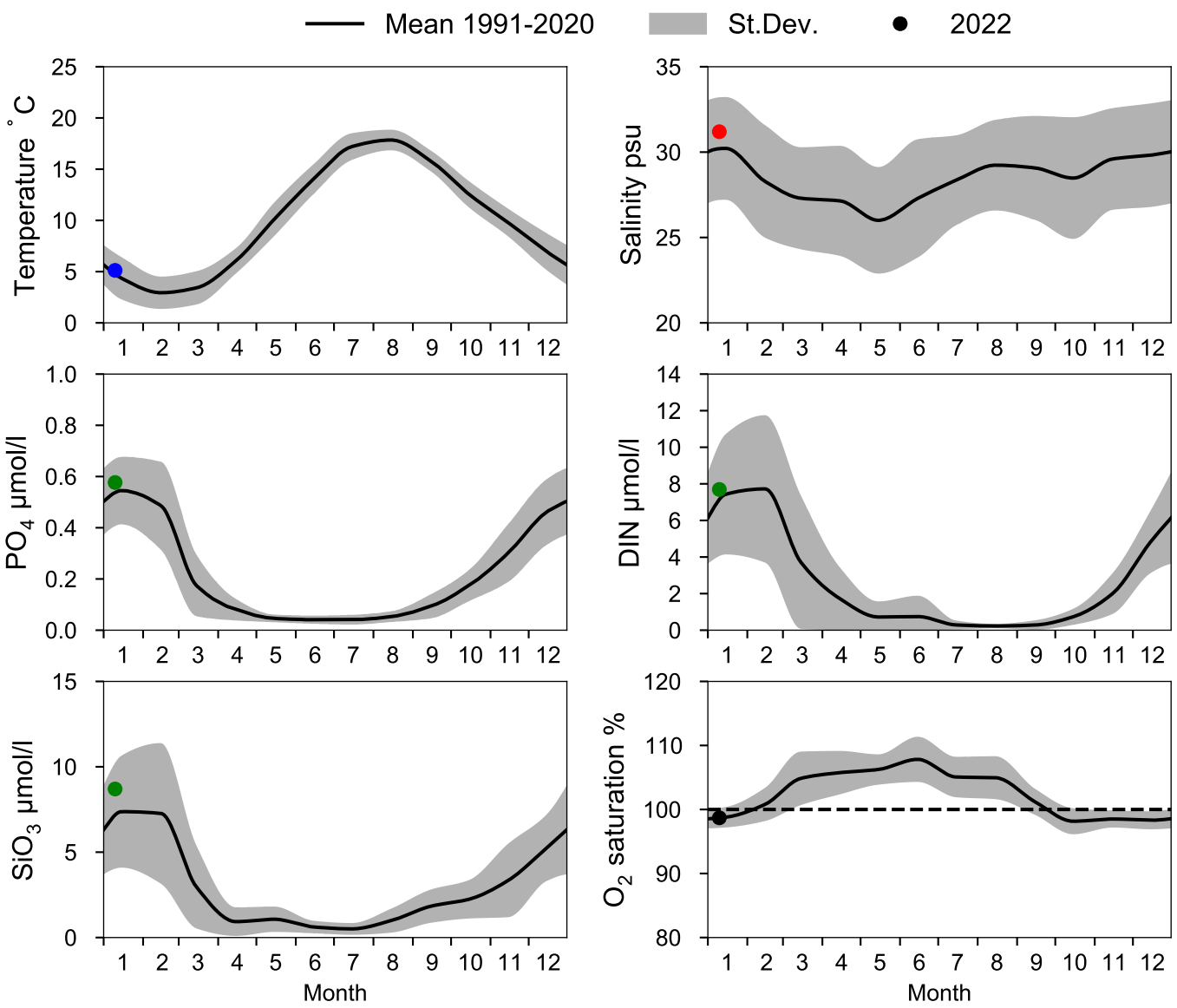


Vertical profiles SLÄGGÖ
January

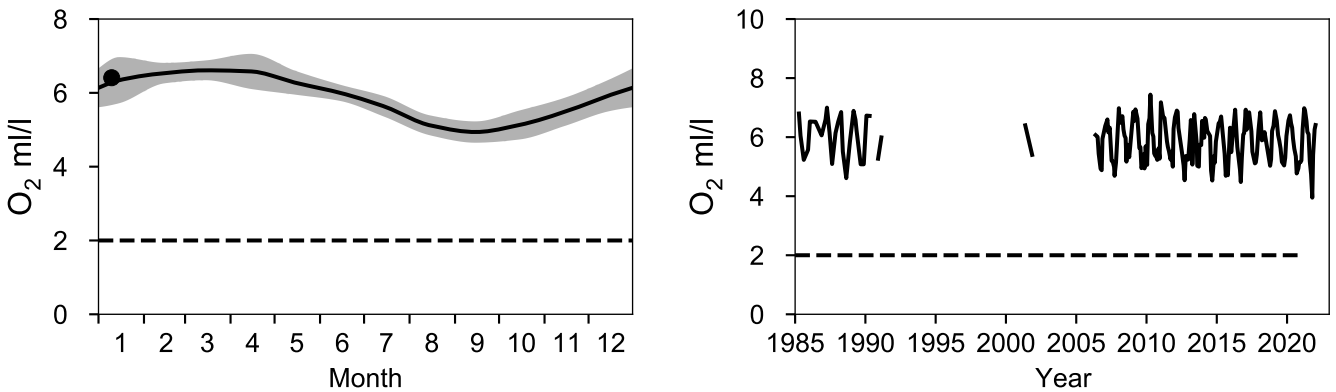


STATION Å13 SURFACE WATER (0-10 m)

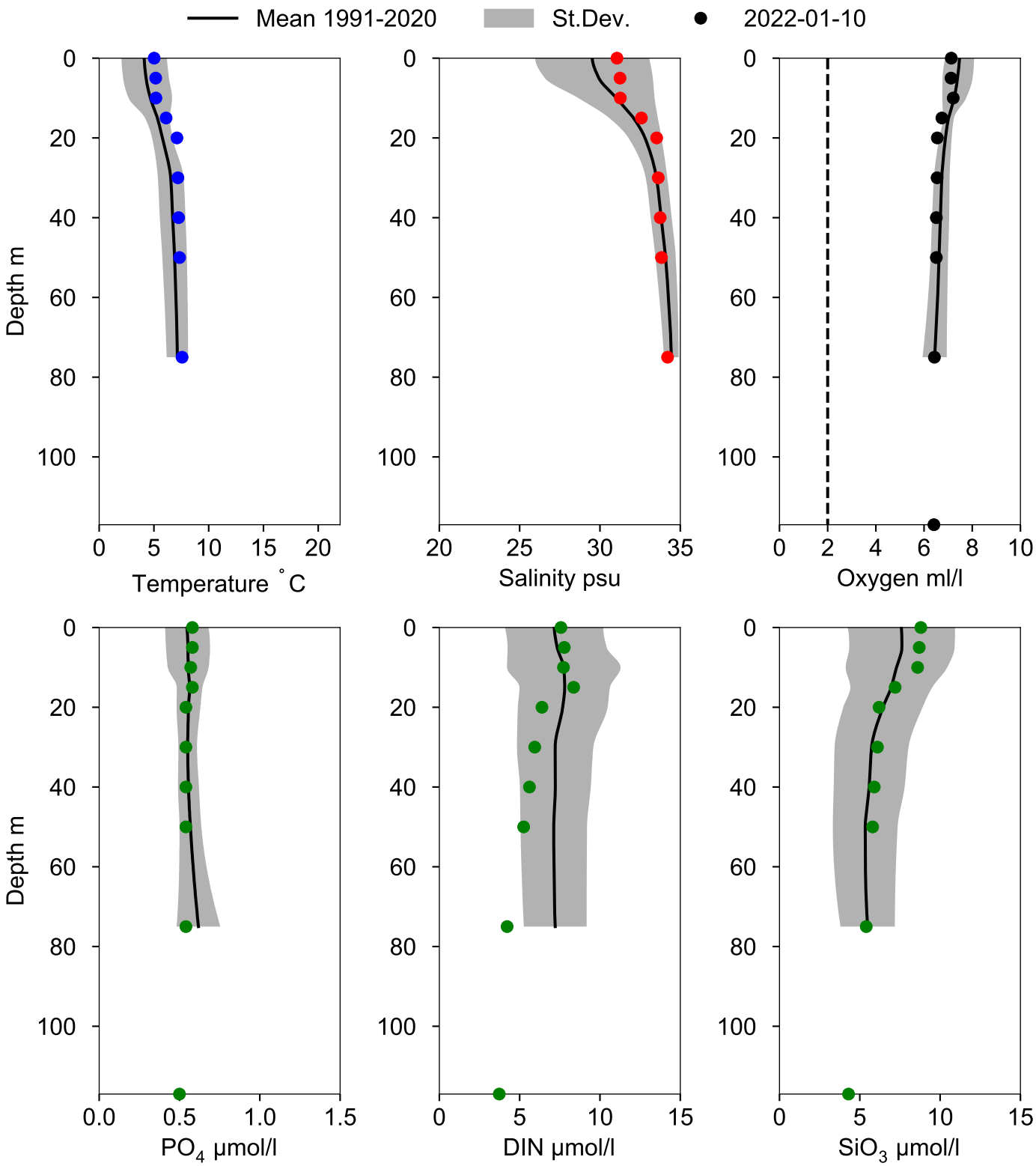
Annual Cycles



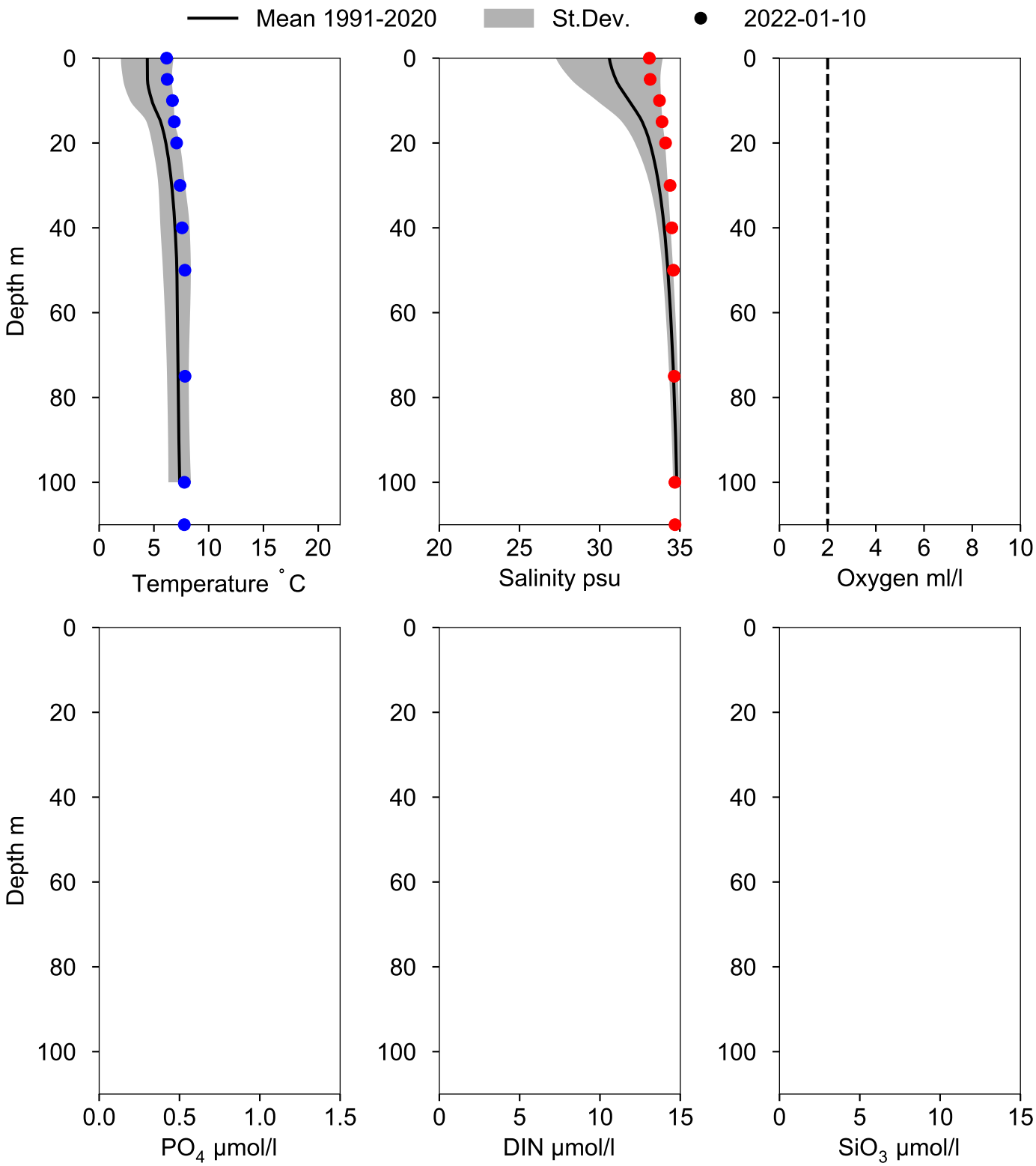
OXYGEN IN BOTTOM WATER (depth >= 82 m)



Vertical profiles Å13
January

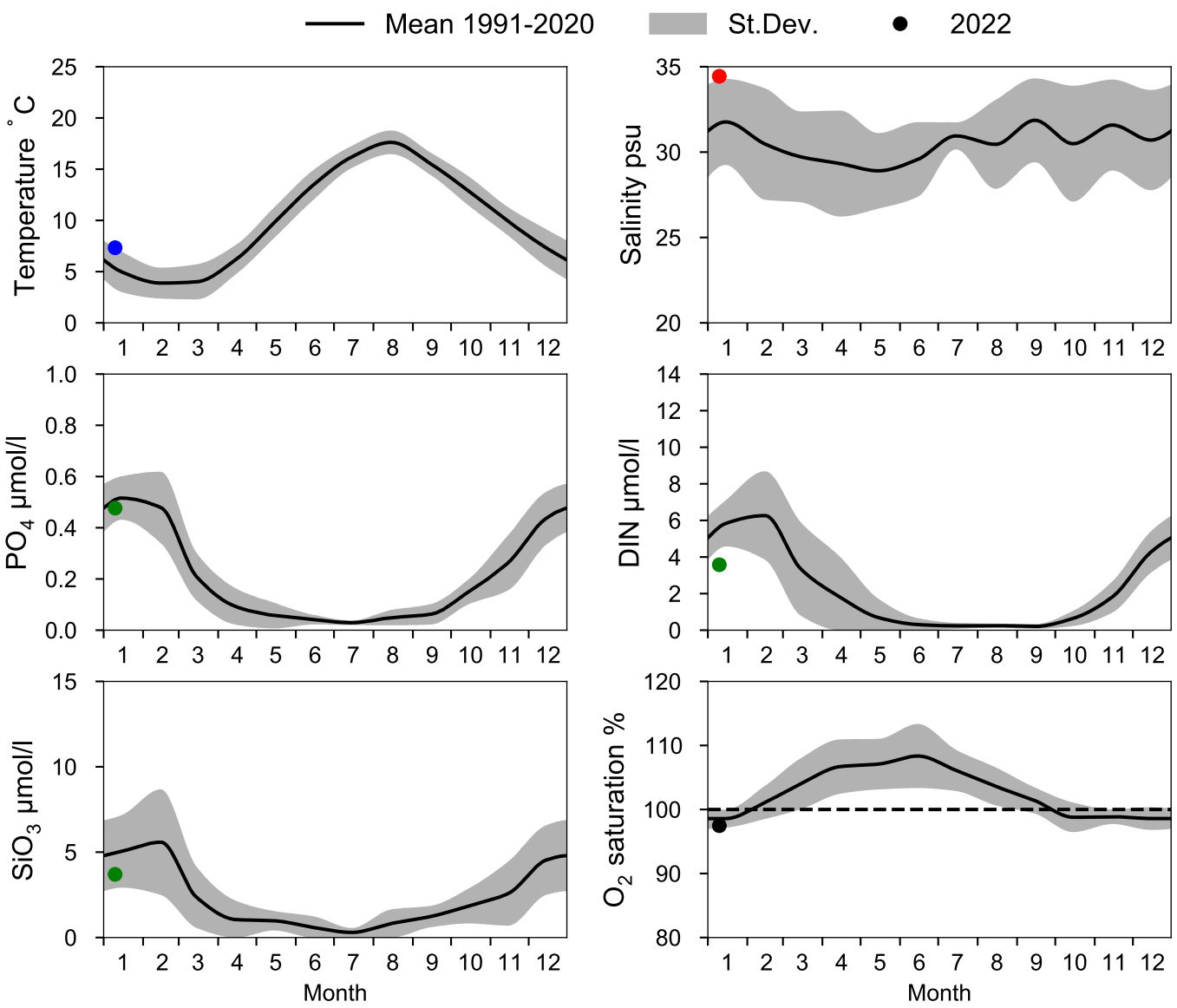


Vertical profiles Å14
January

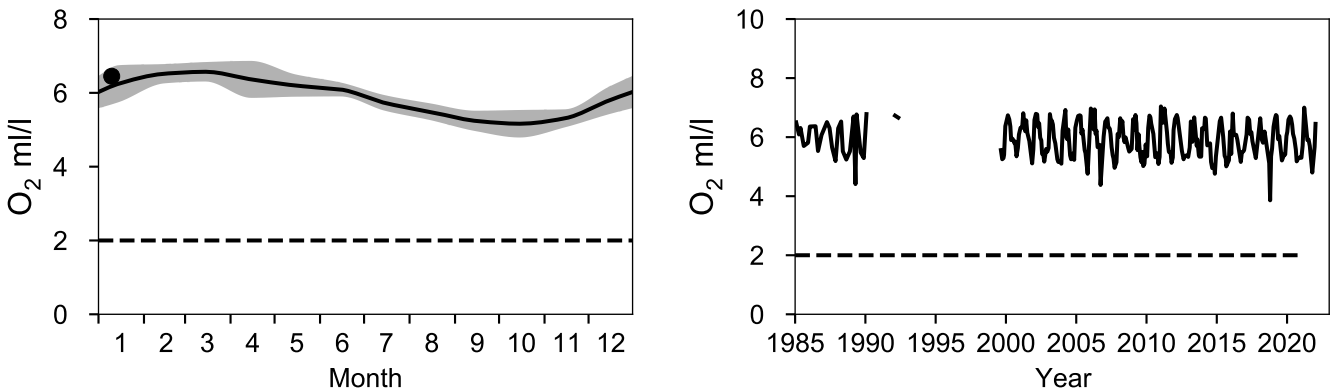


STATION Å15 SURFACE WATER (0-10 m)

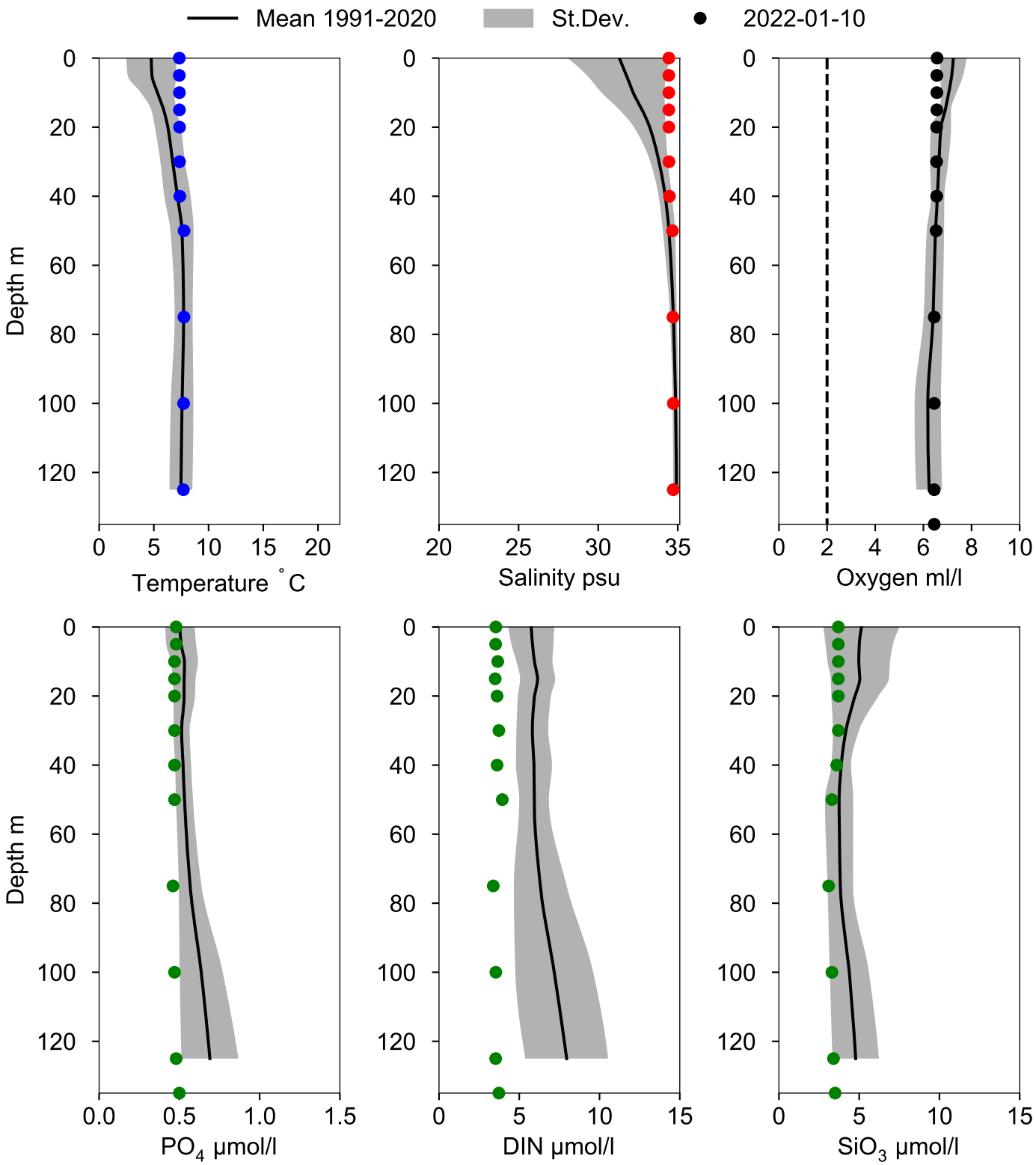
Annual Cycles



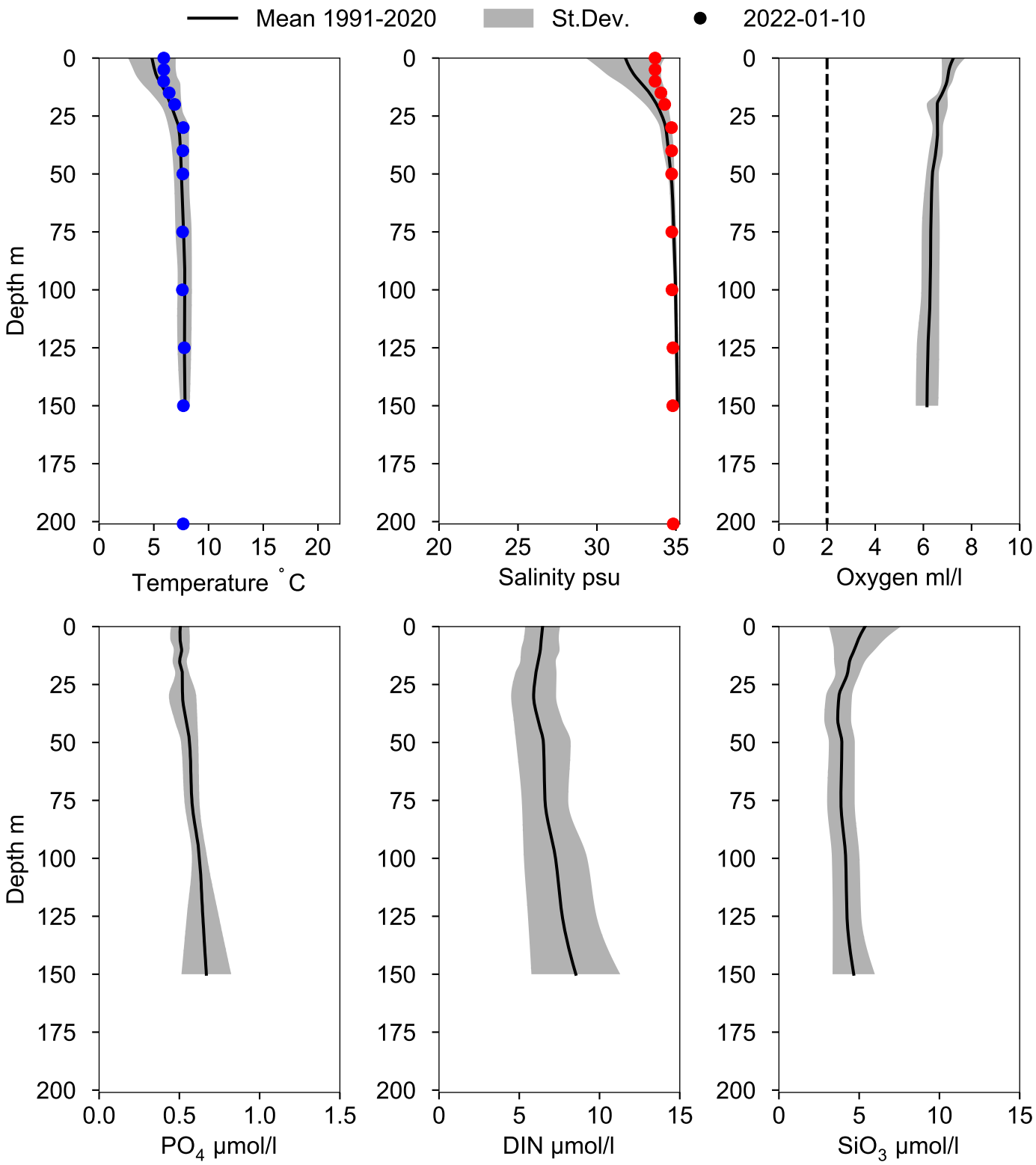
OXYGEN IN BOTTOM WATER (depth >= 125 m)



Vertical profiles Å15
January

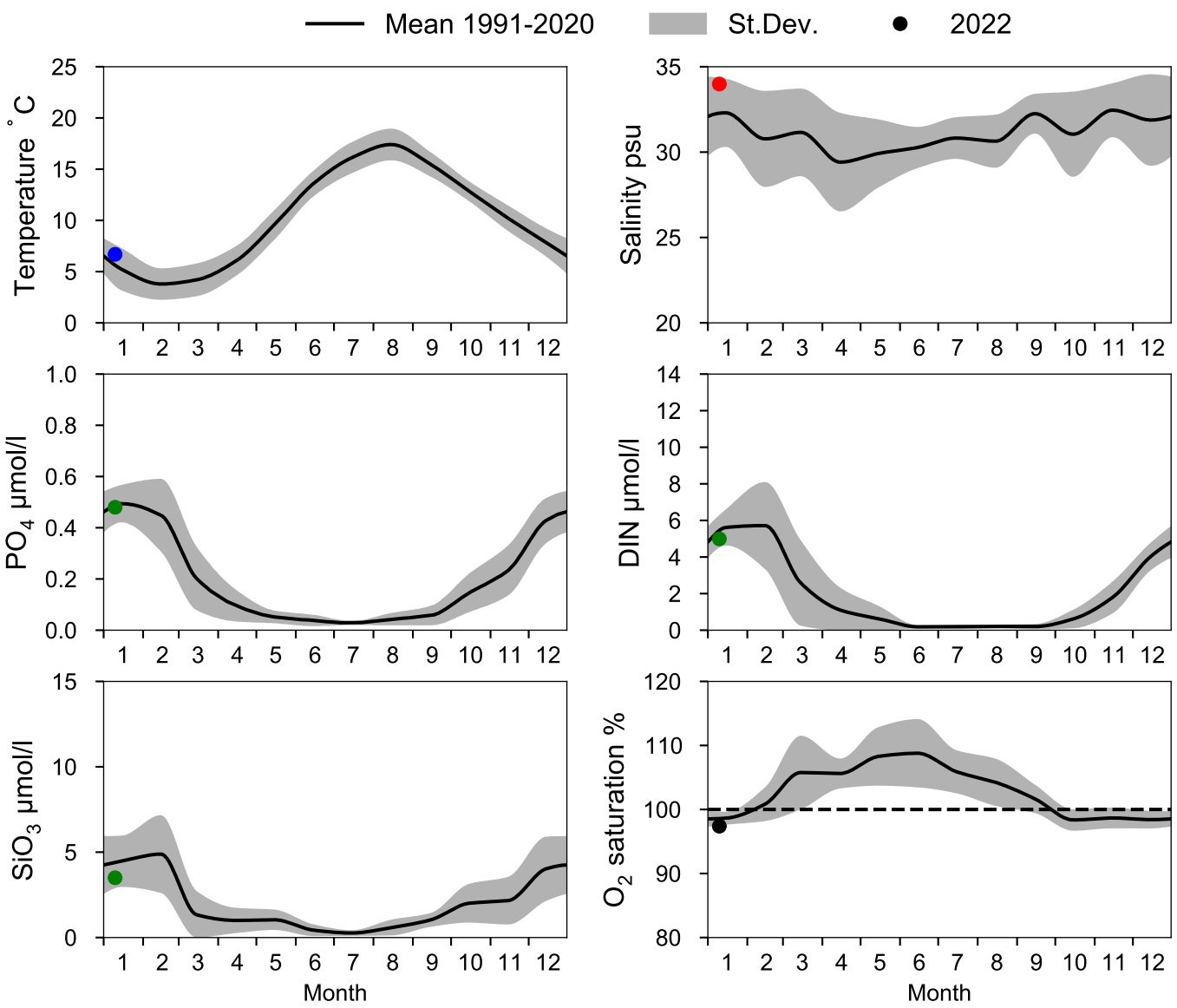


Vertical profiles Å16
January

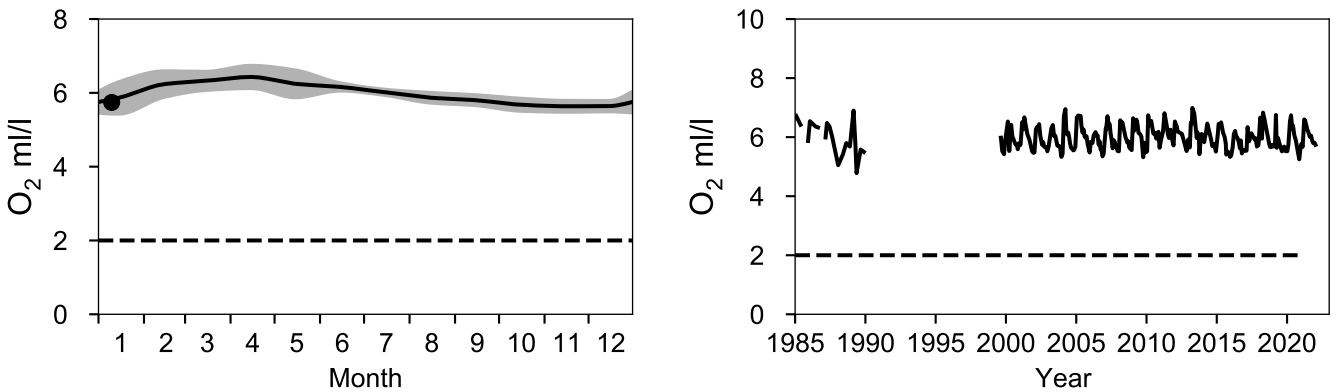


STATION Å17 SURFACE WATER (0-10 m)

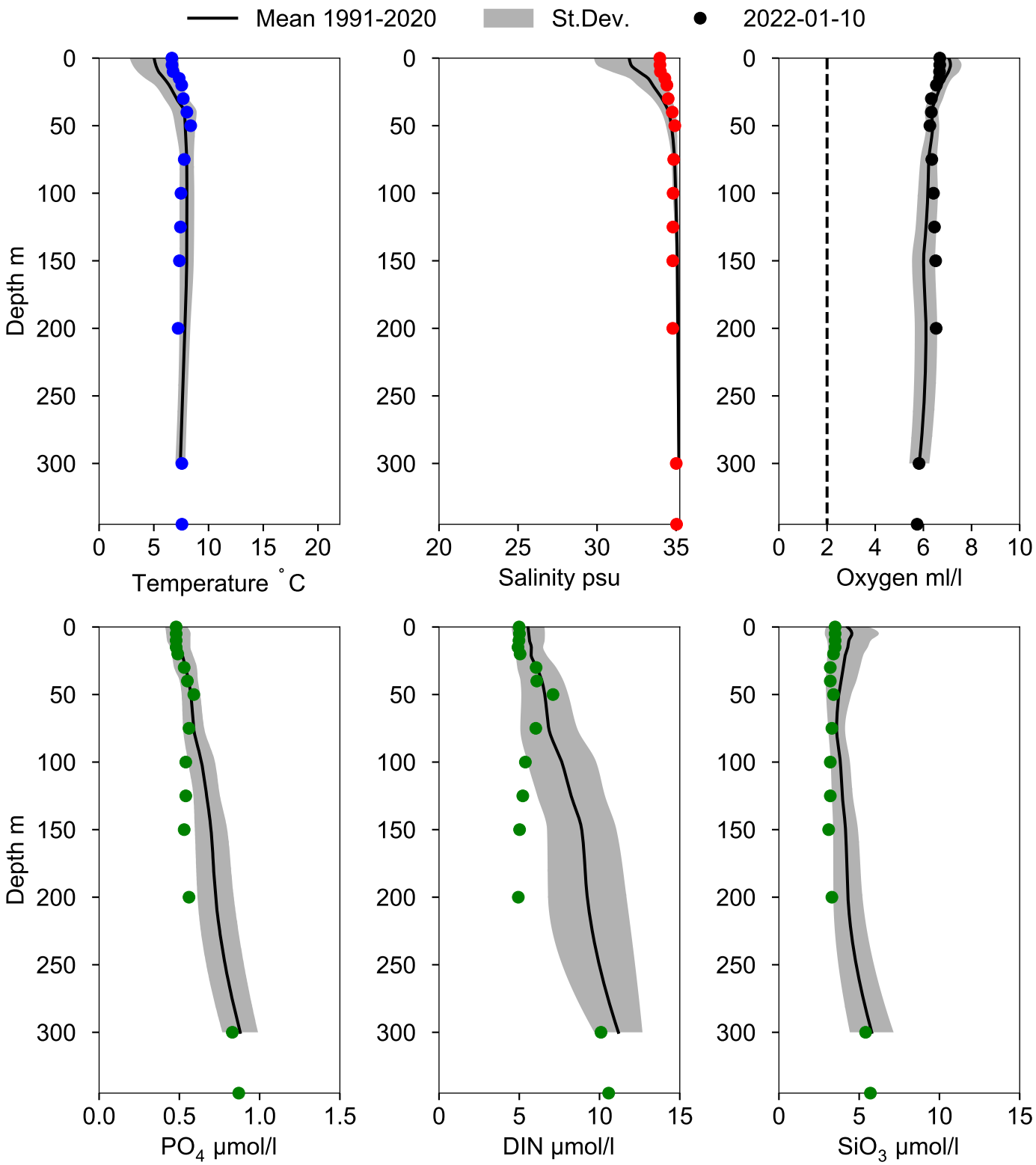
Annual Cycles



OXYGEN IN BOTTOM WATER (depth >= 300 m)

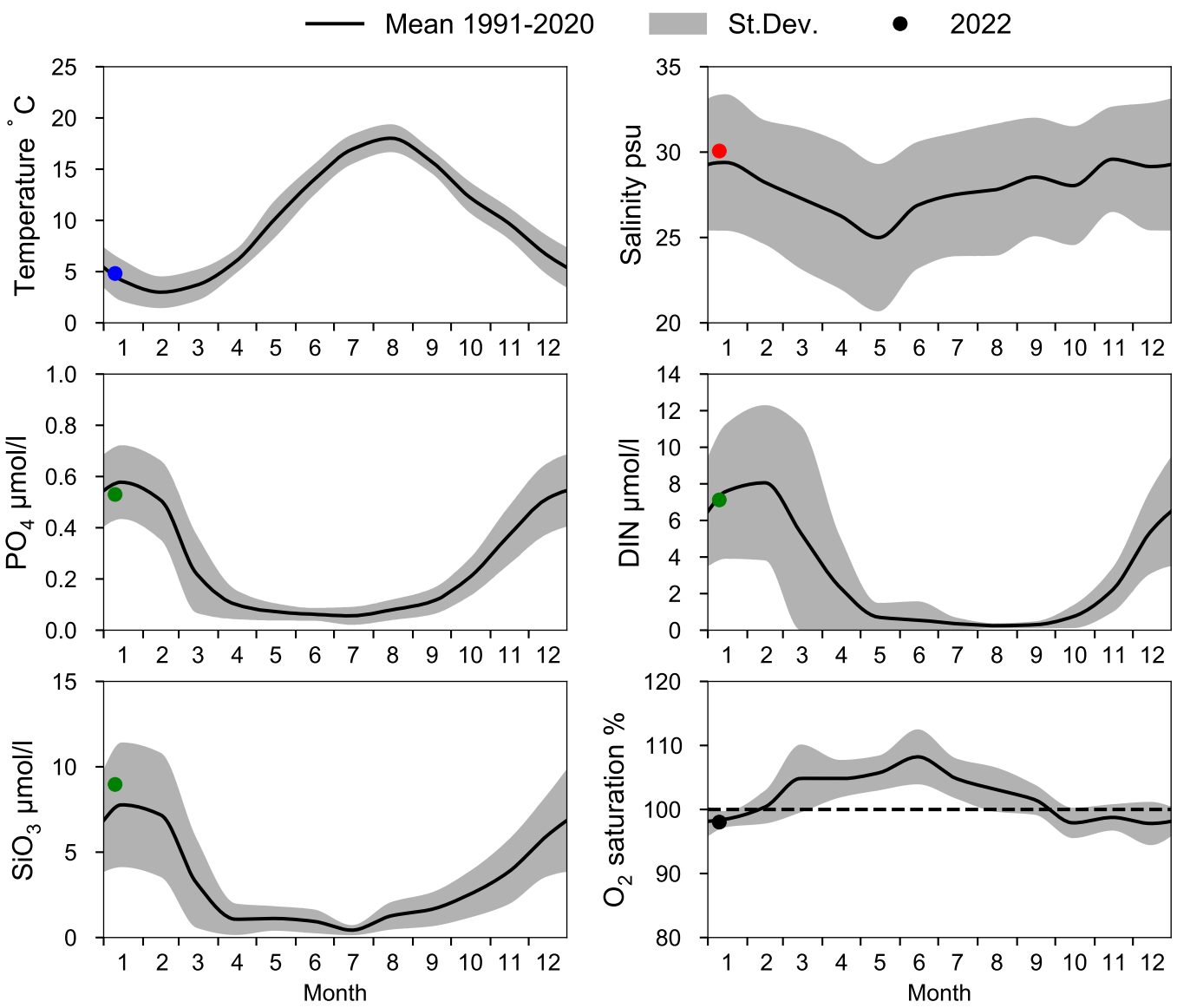


Vertical profiles Å17
January

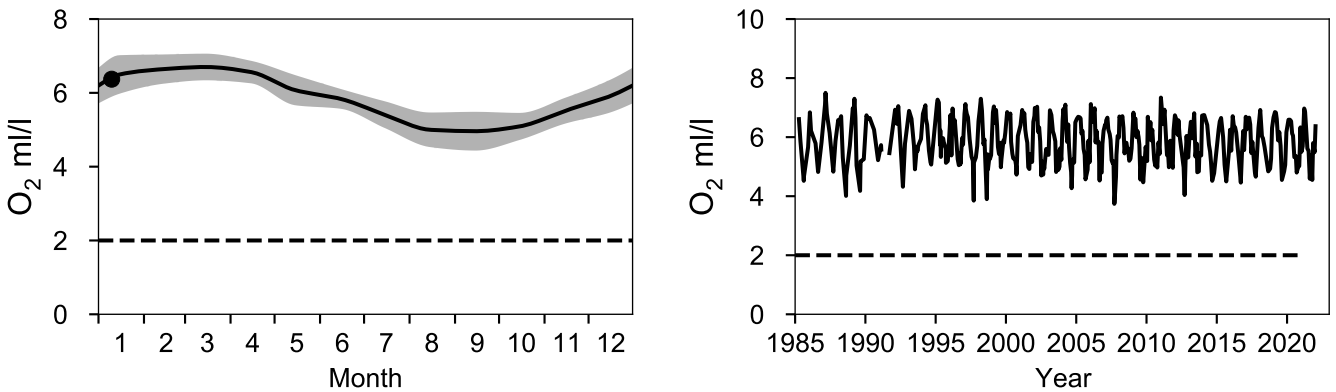


STATION P2 SURFACE WATER (0-10 m)

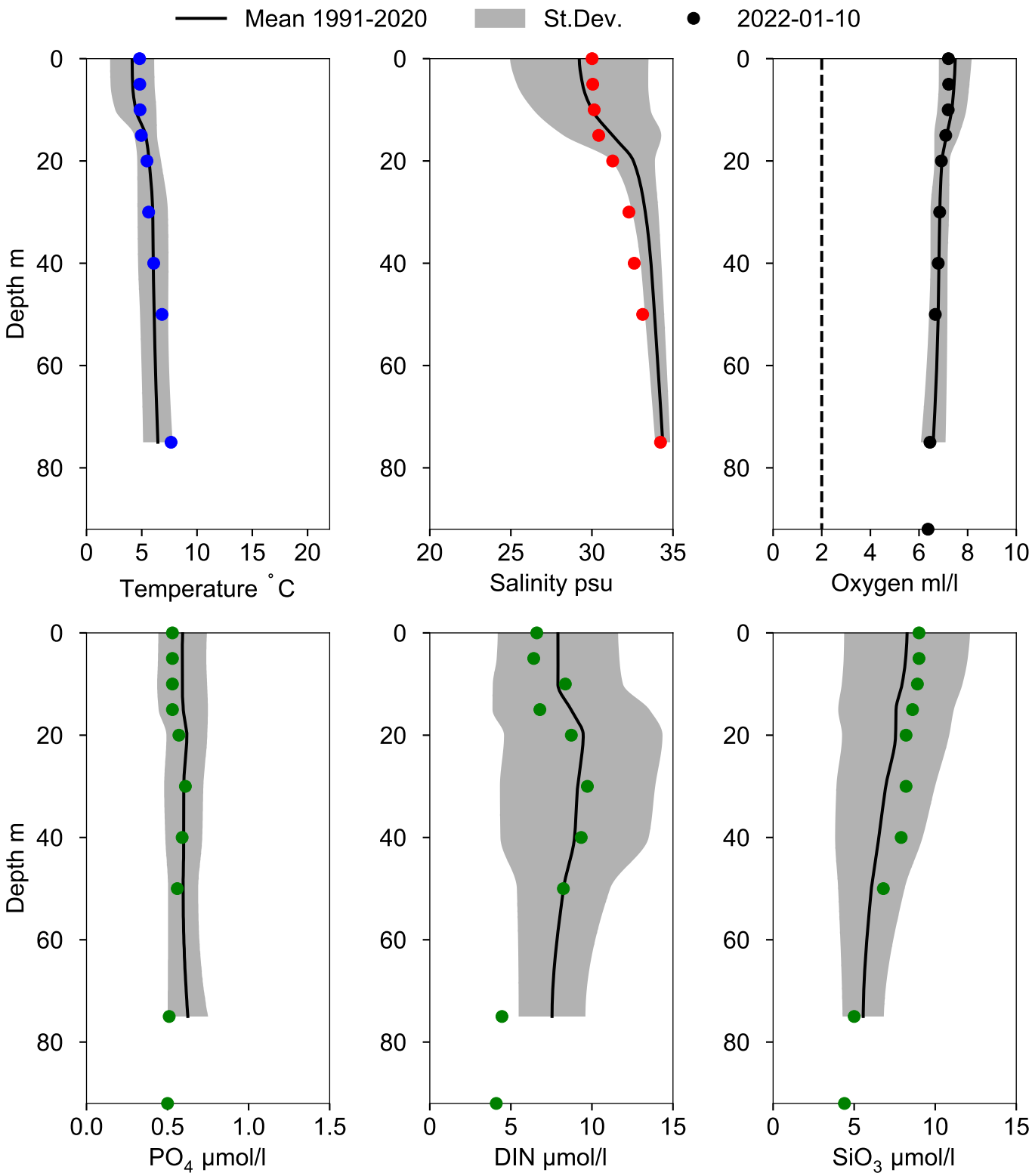
Annual Cycles



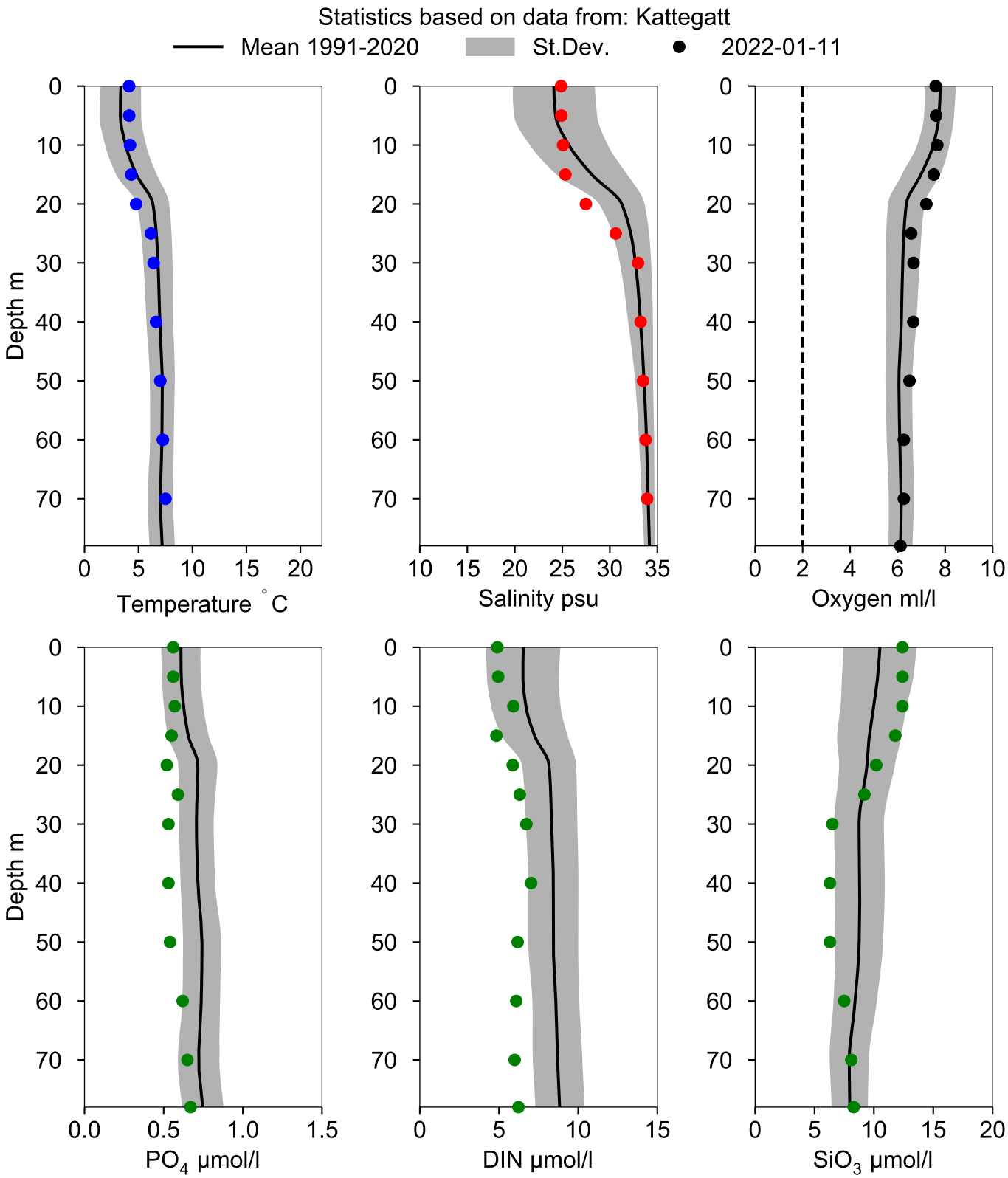
OXYGEN IN BOTTOM WATER (depth >= 75 m)



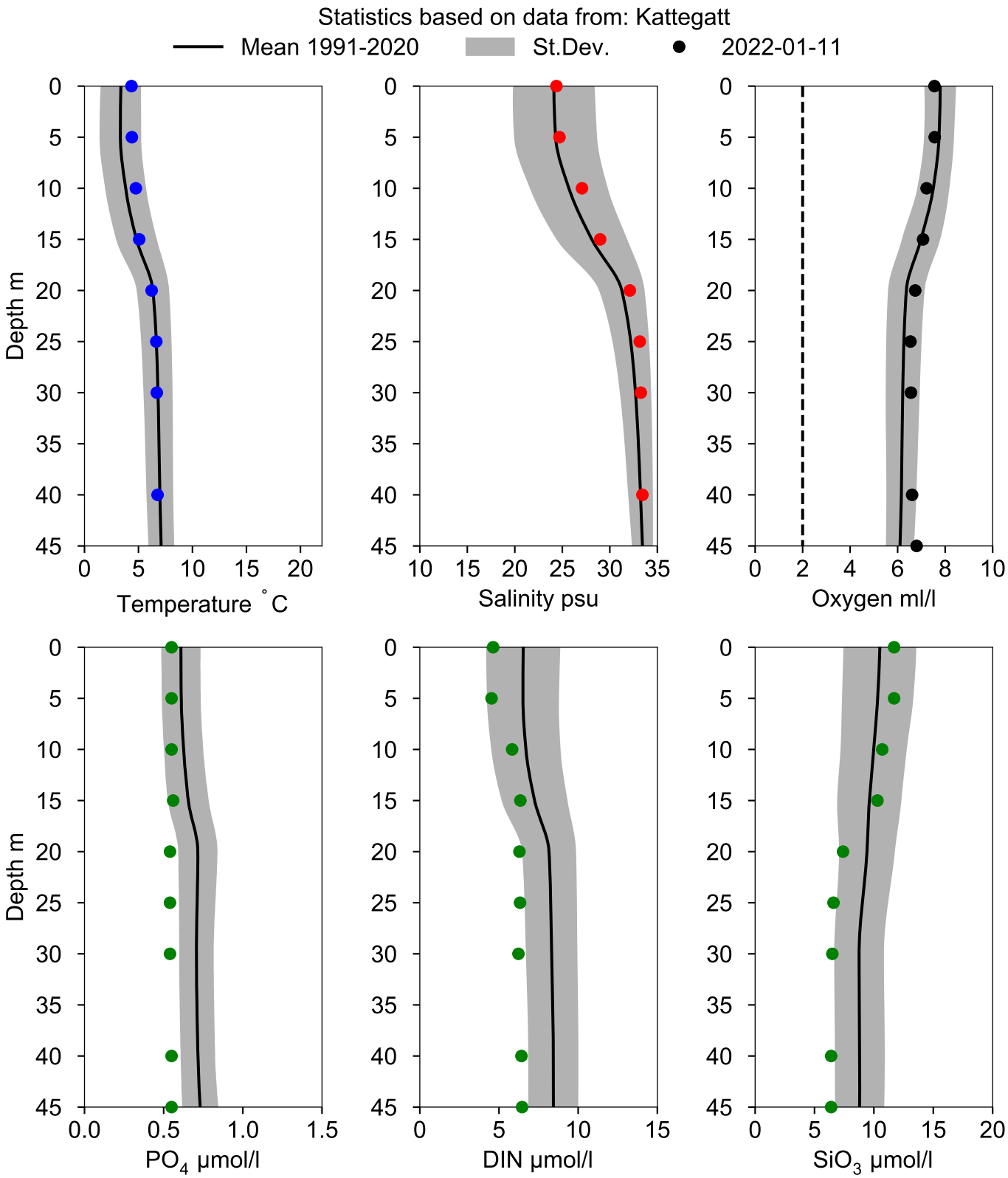
Vertical profiles P2
January



Vertical profiles SW VINGA GF4
January

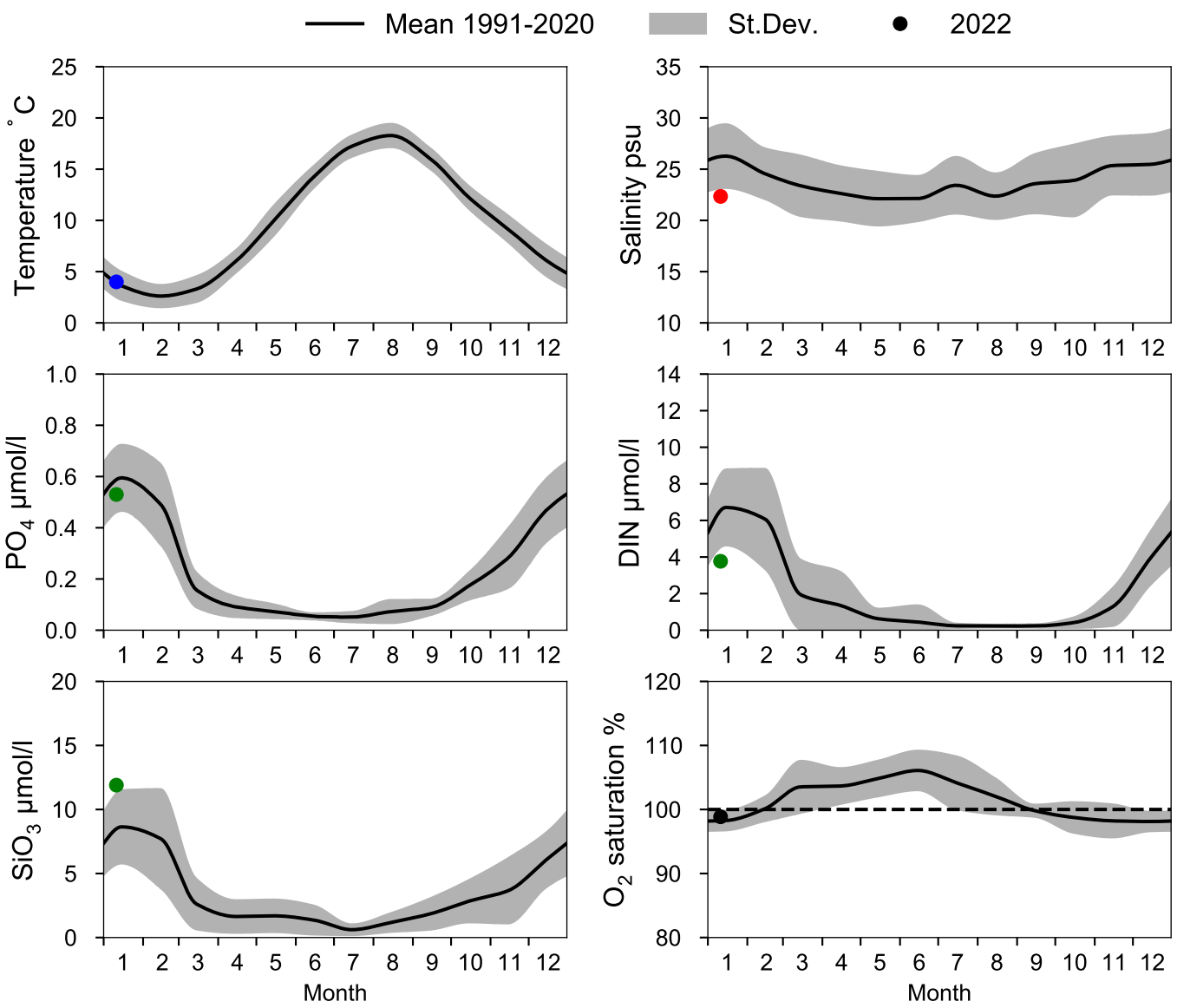


Vertical profiles GF6
January

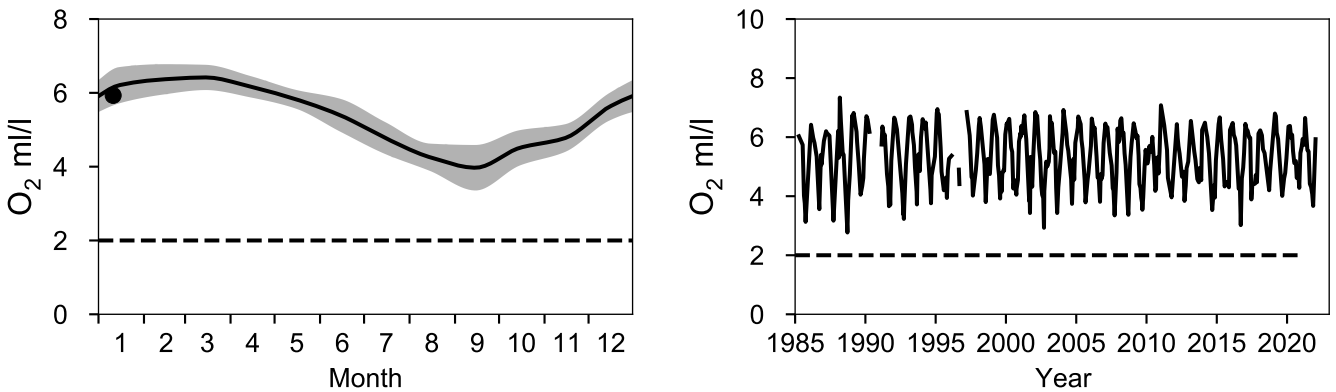


STATION FLADEN SURFACE WATER (0-10 m)

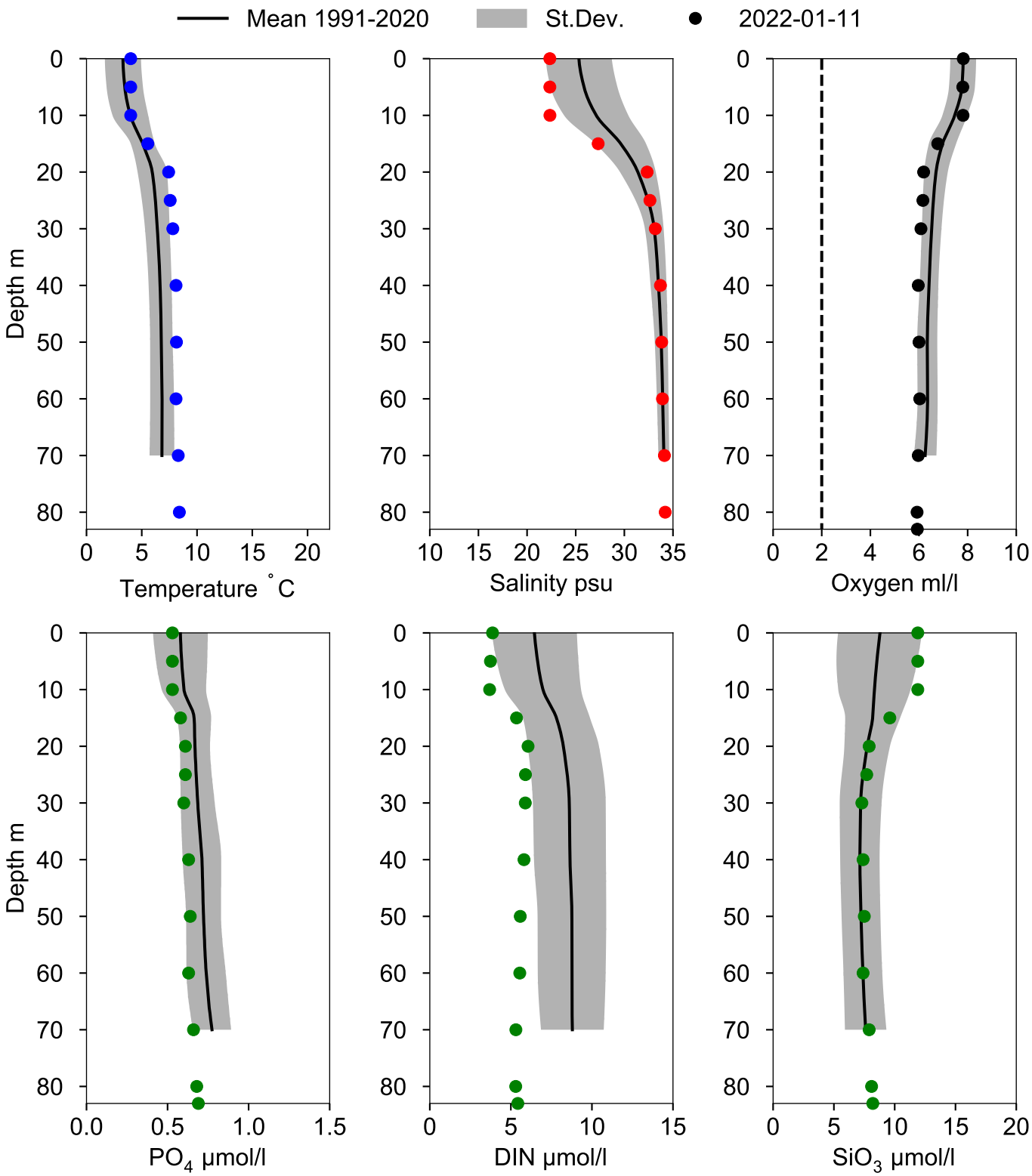
Annual Cycles



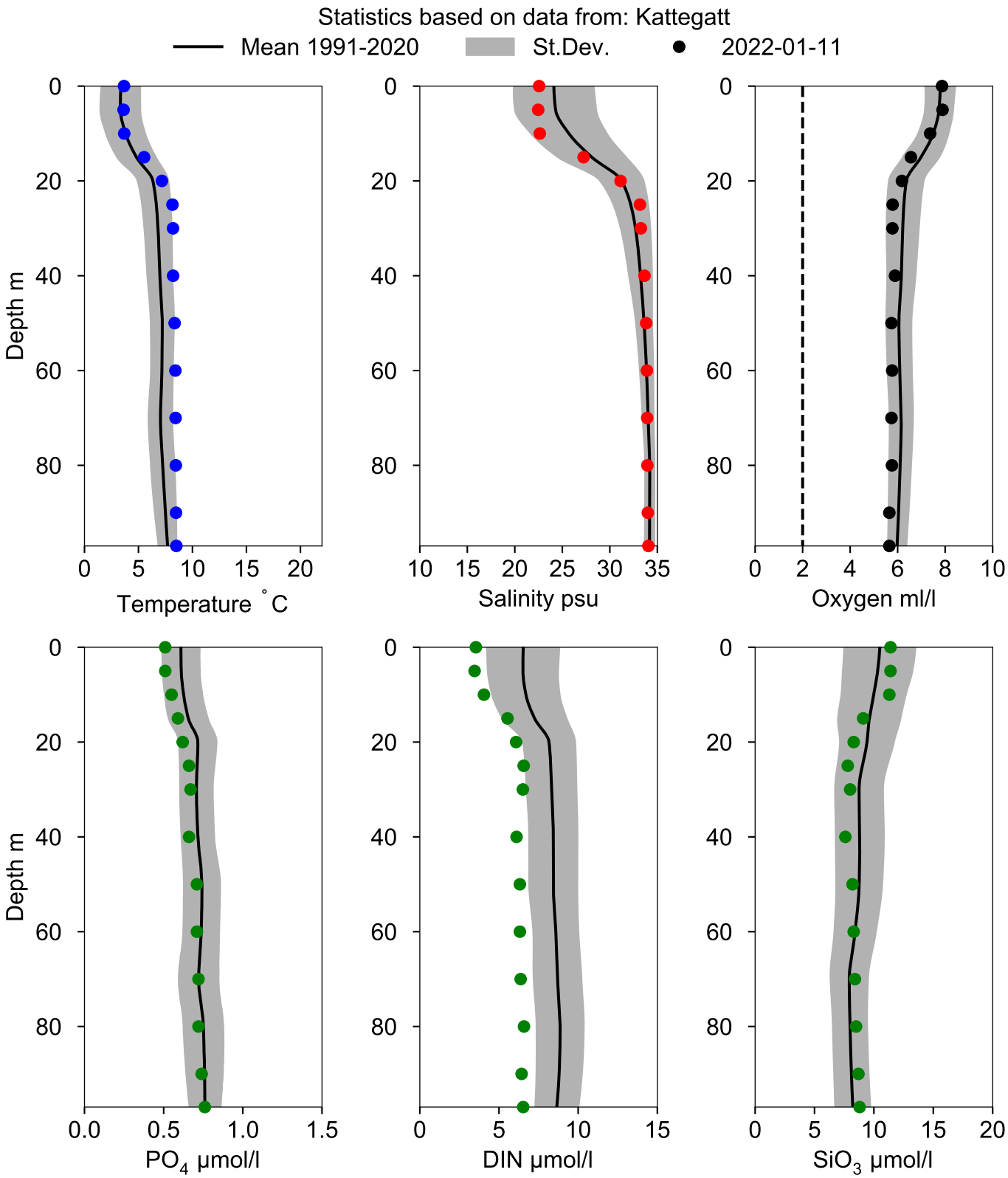
OXYGEN IN BOTTOM WATER (depth >= 74 m)



Vertical profiles FLADEN
January

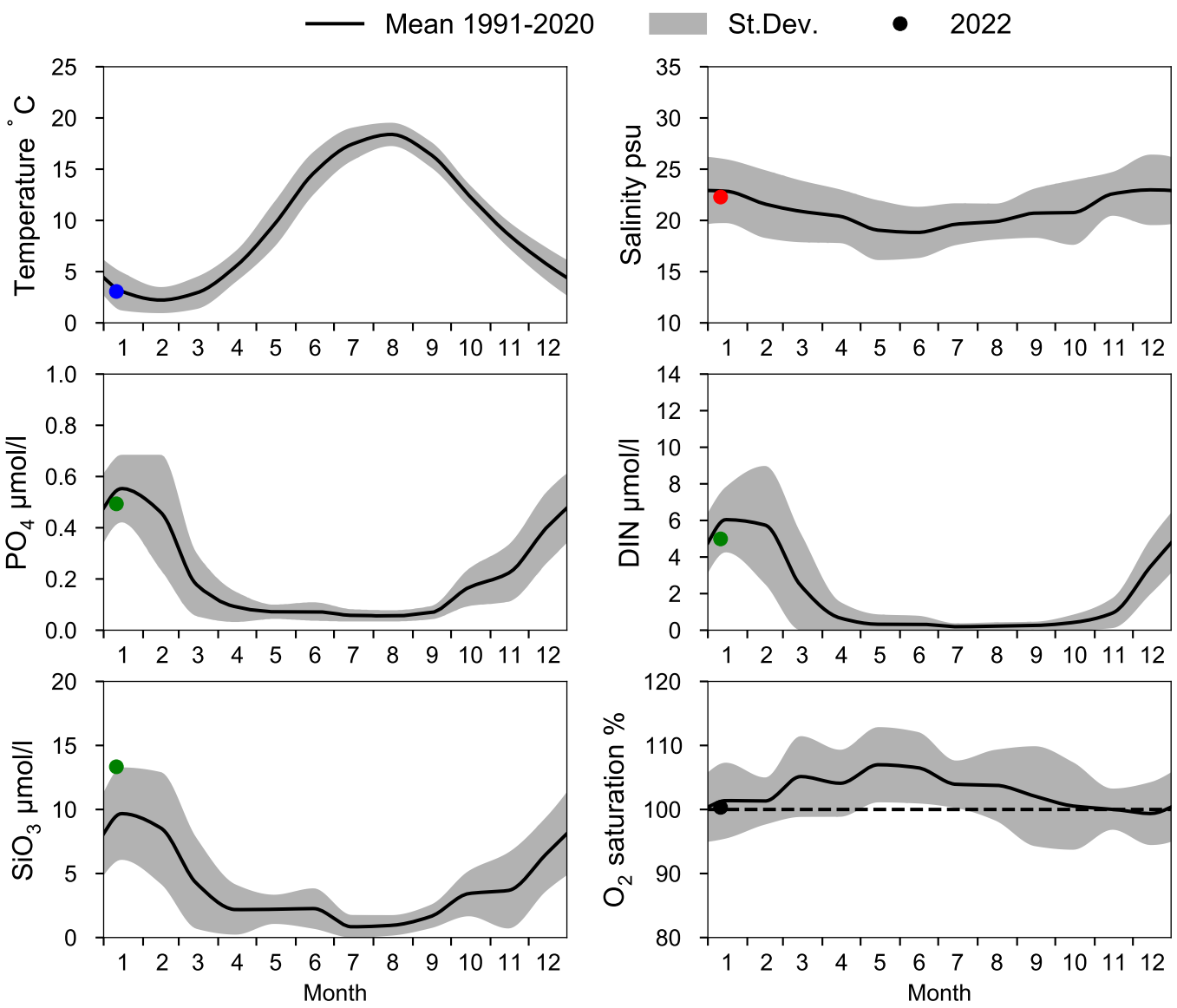


Vertical profiles L:A MIDDELGRUND
January

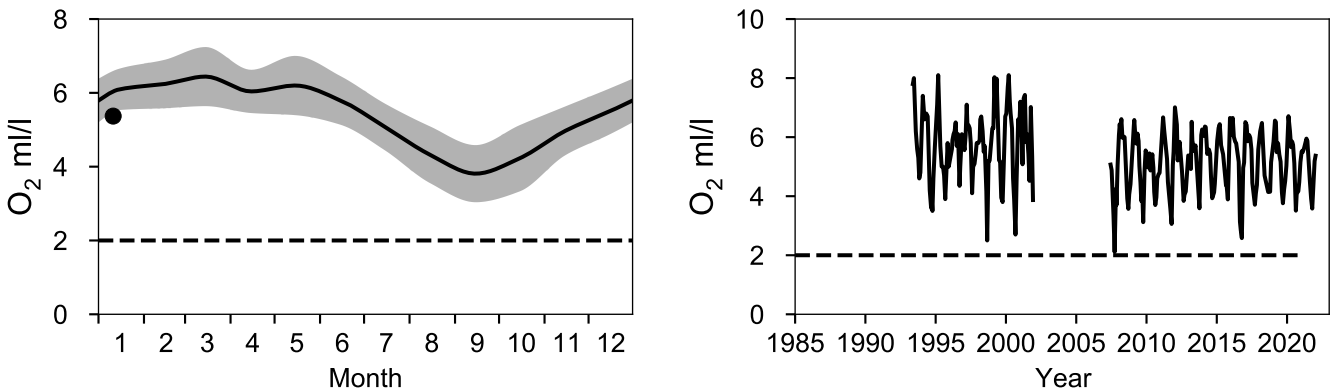


STATION N14 FALKENBERG SURFACE WATER (0-10 m)

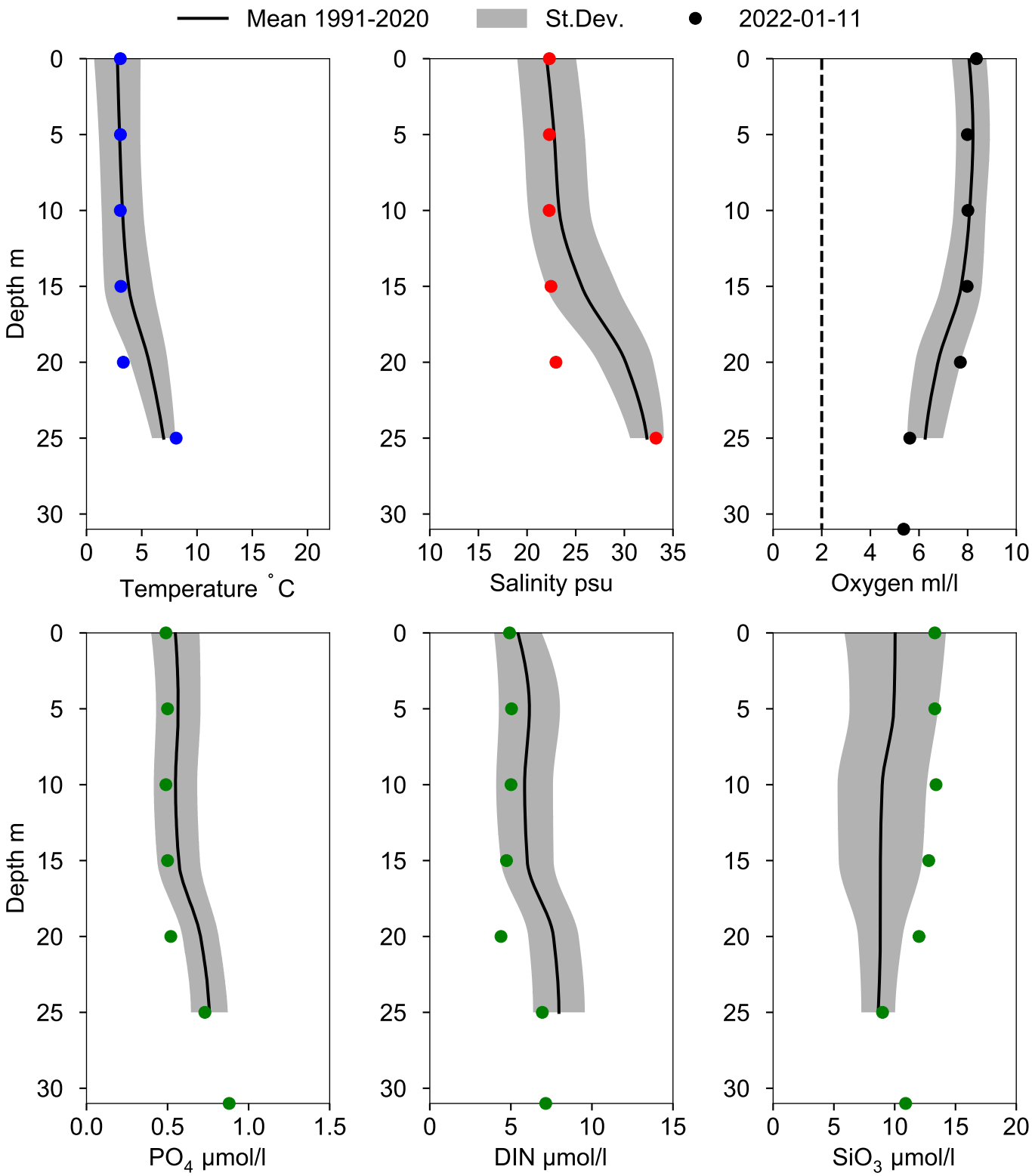
Annual Cycles



OXYGEN IN BOTTOM WATER (depth >= 25 m)

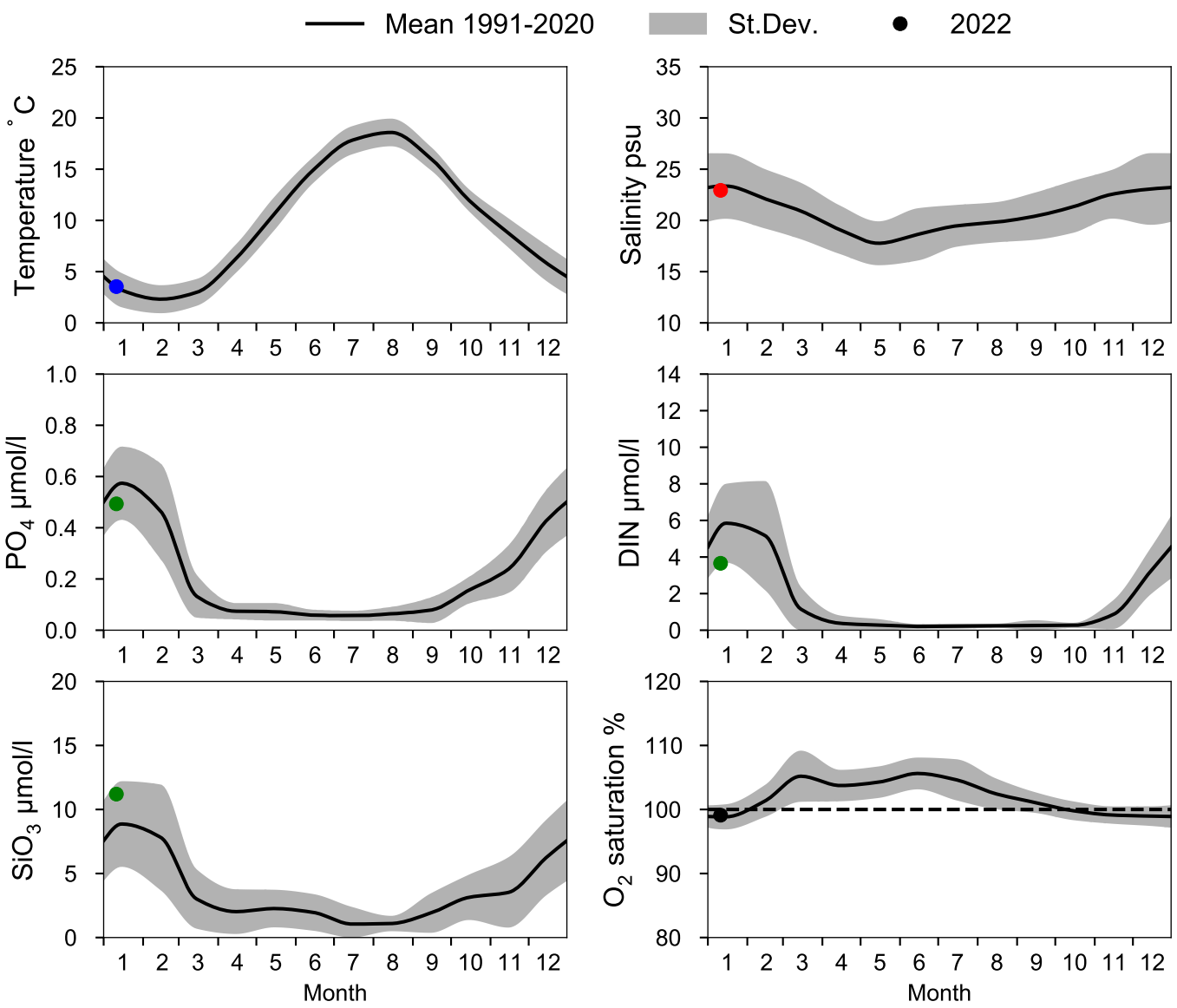


Vertical profiles N14 FALKENBERG
January

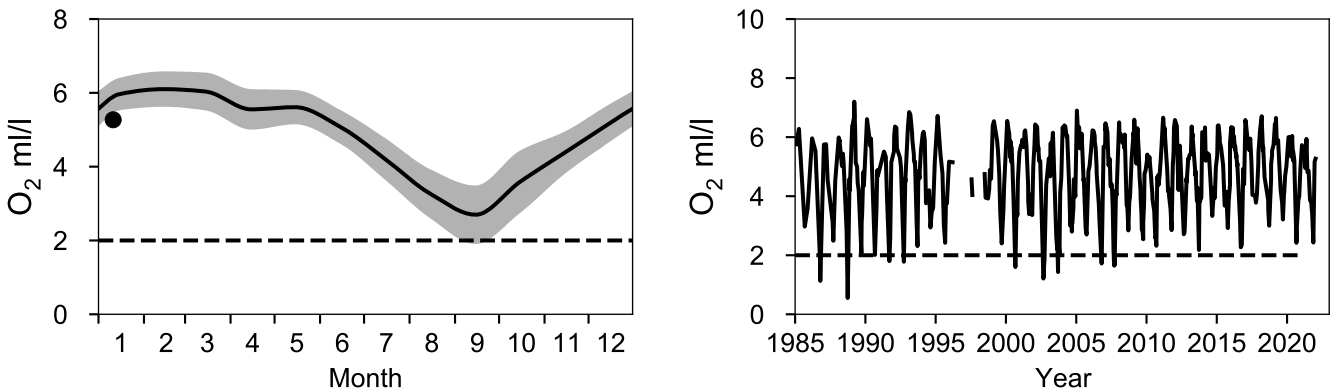


STATION ANHOLT E SURFACE WATER (0-10 m)

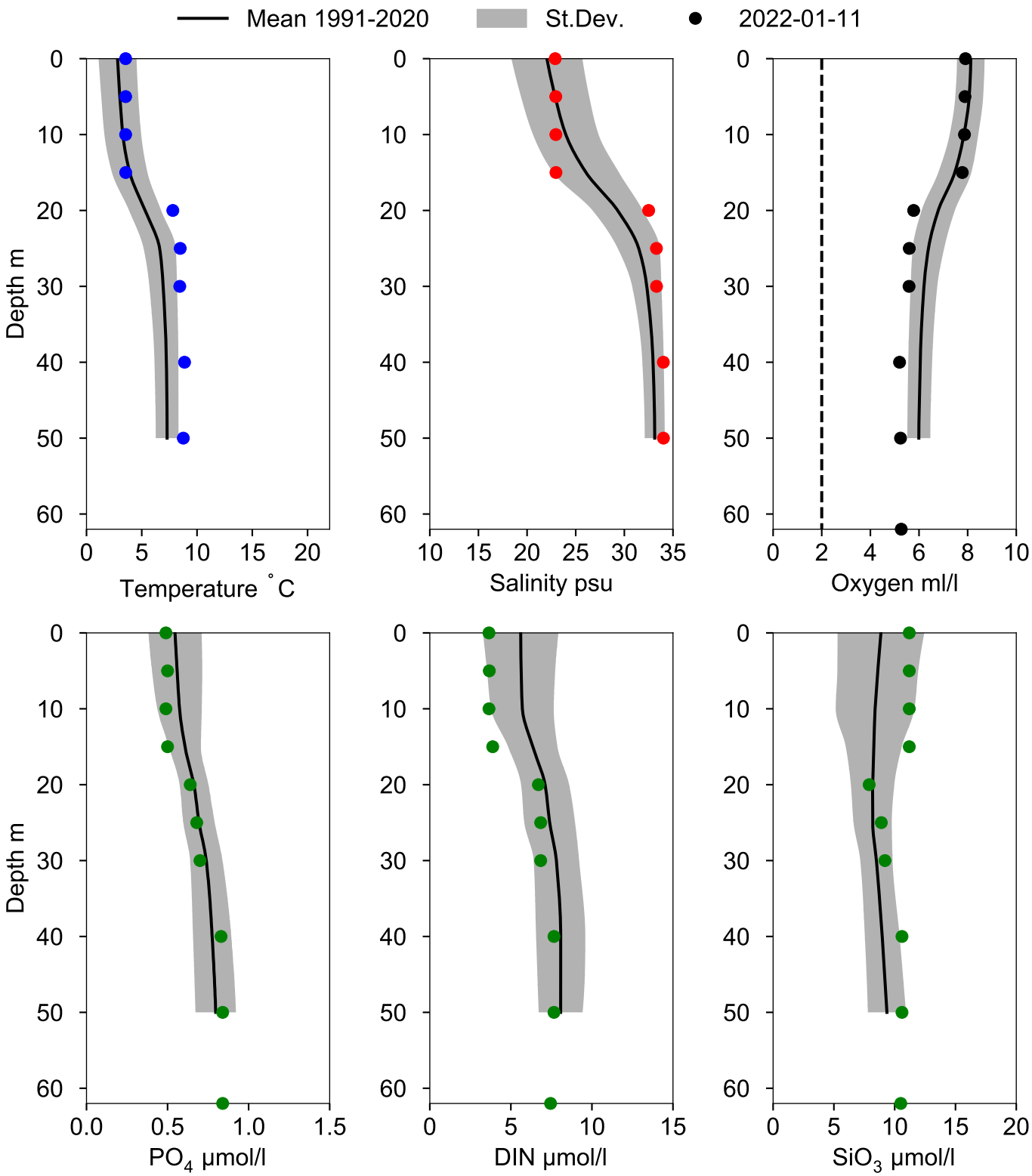
Annual Cycles



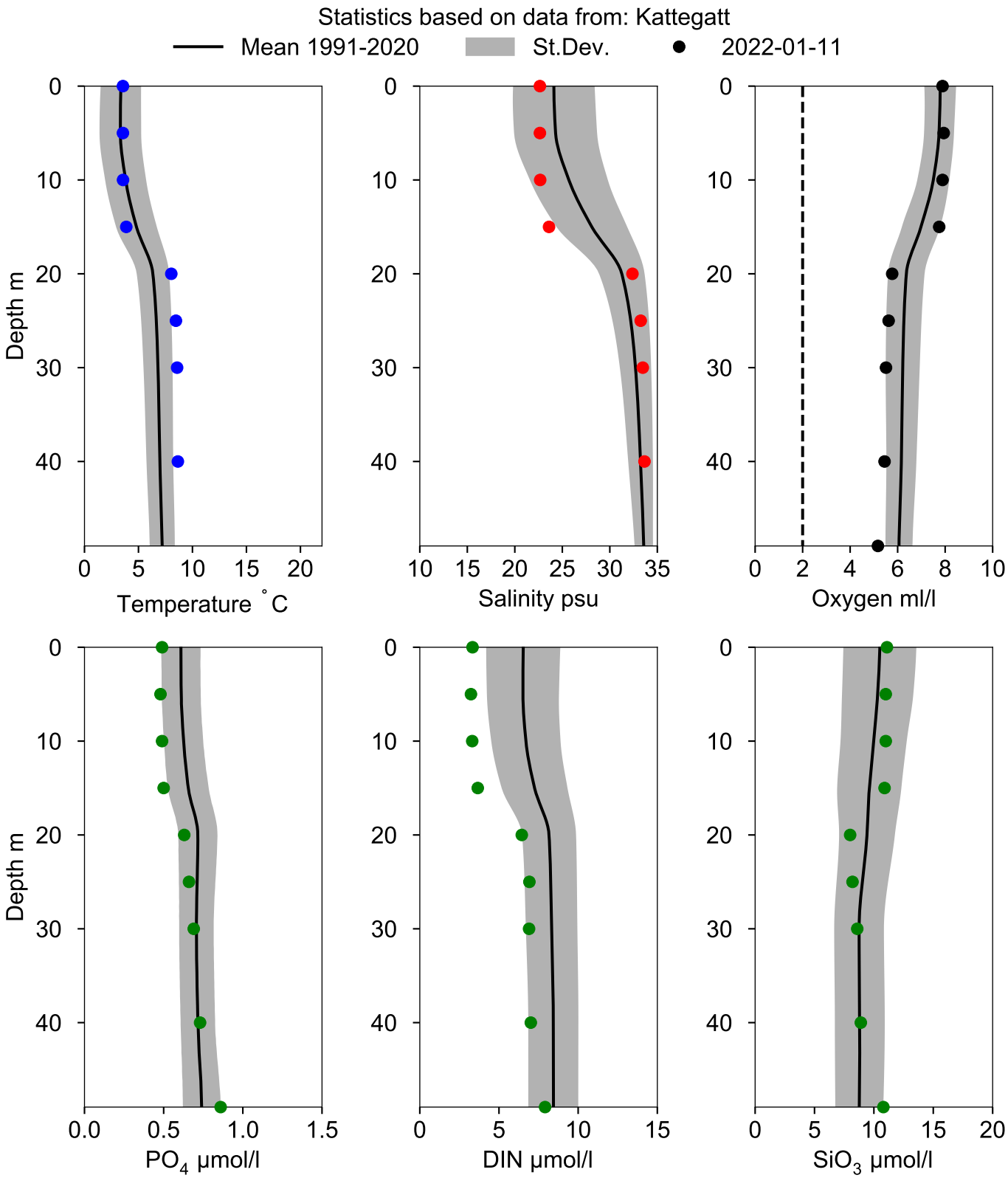
OXYGEN IN BOTTOM WATER (depth >= 52 m)



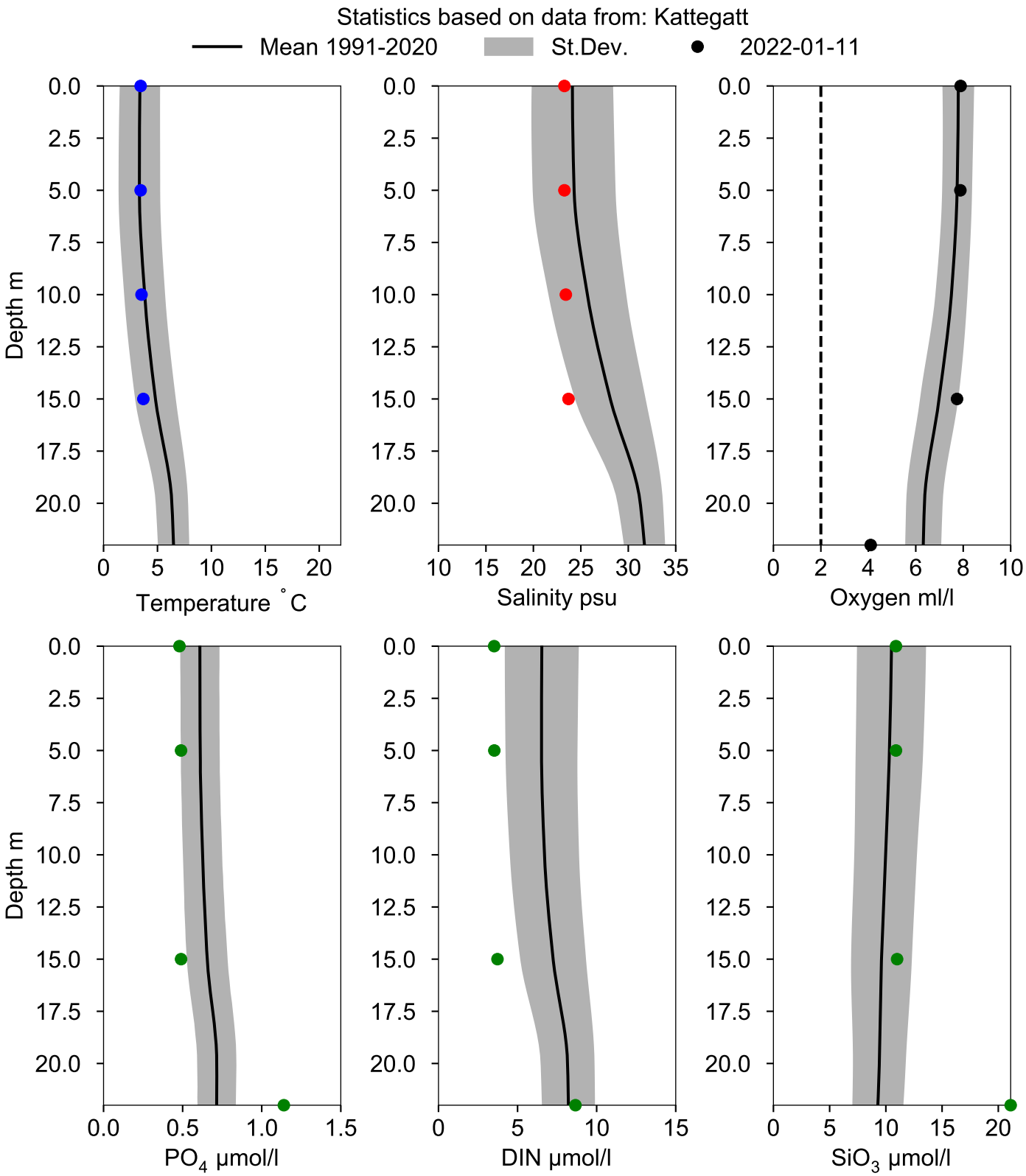
Vertical profiles ANHOLT E
January



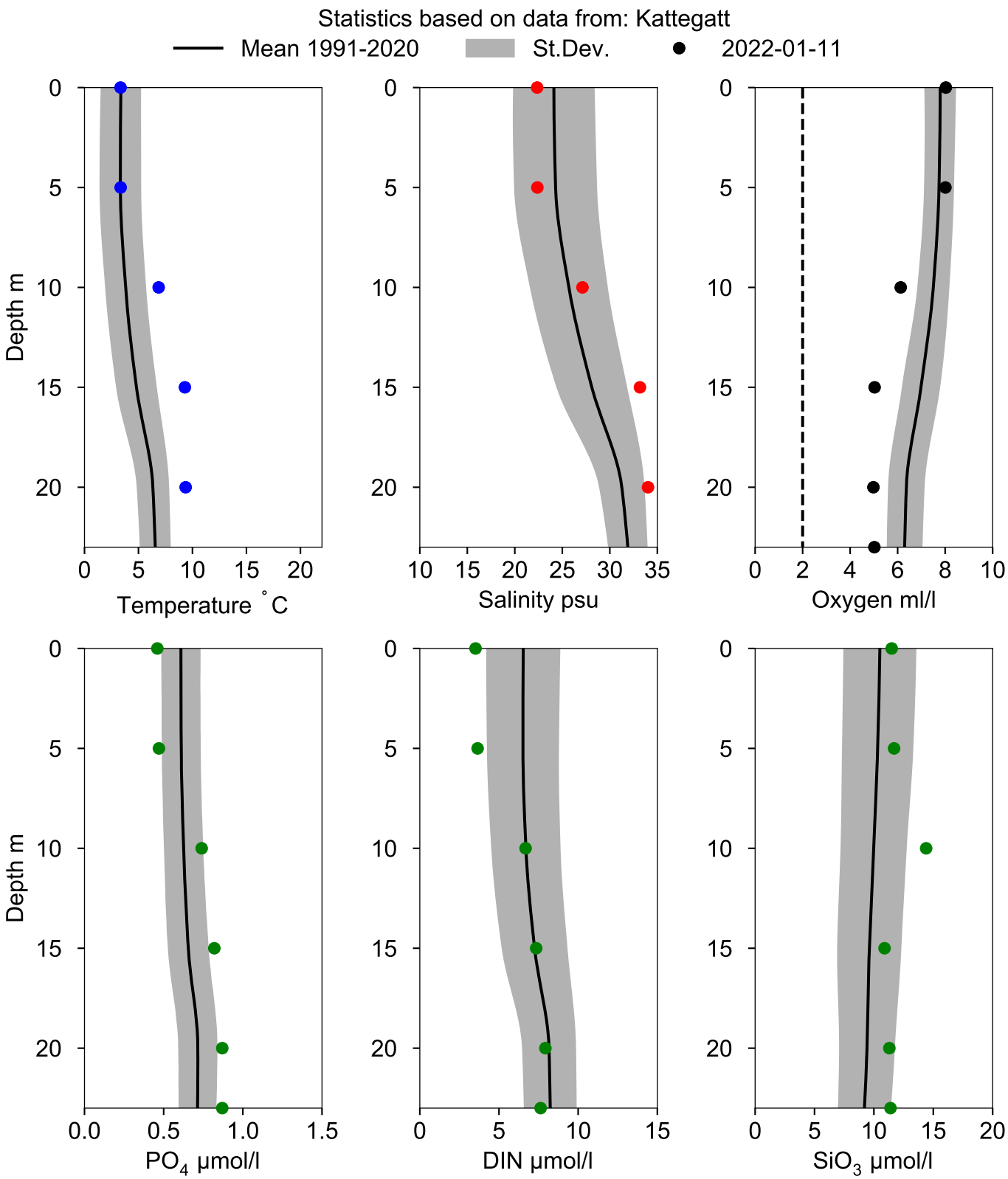
Vertical profiles ST MIDDELGRUND
January



Vertical profiles LAHOLM-3 (YG)
January

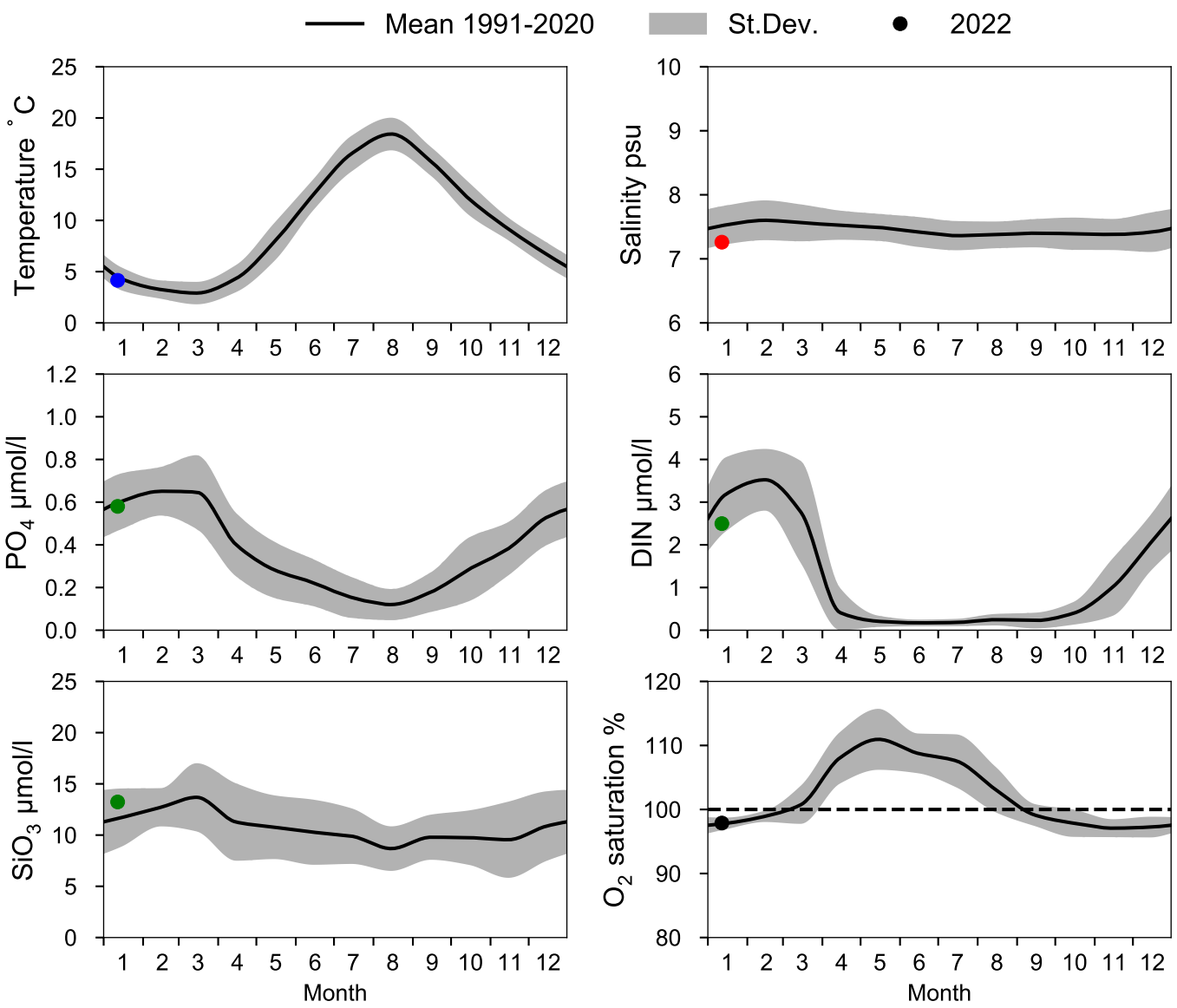


Vertical profiles KULLEN
January

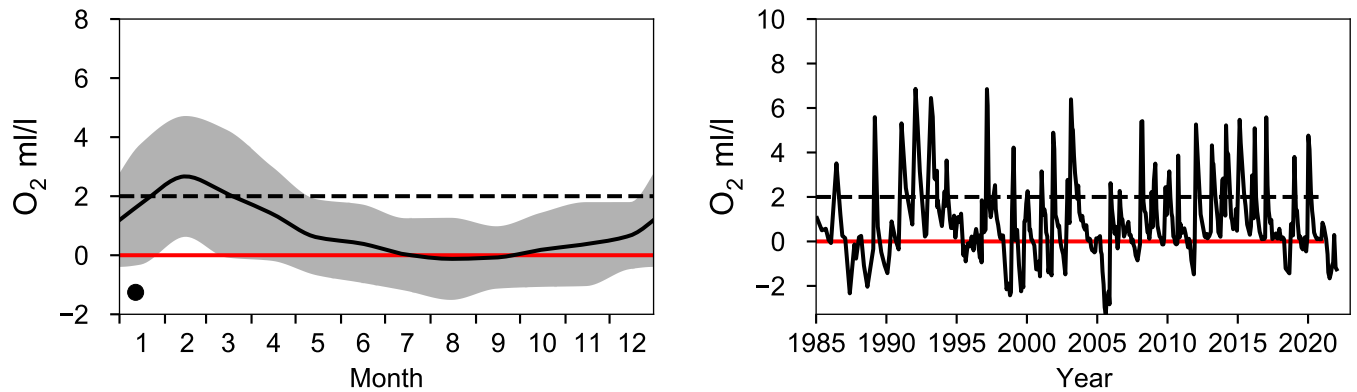


STATION BY4 CHRISTIANSÖ SURFACE WATER (0-10 m)

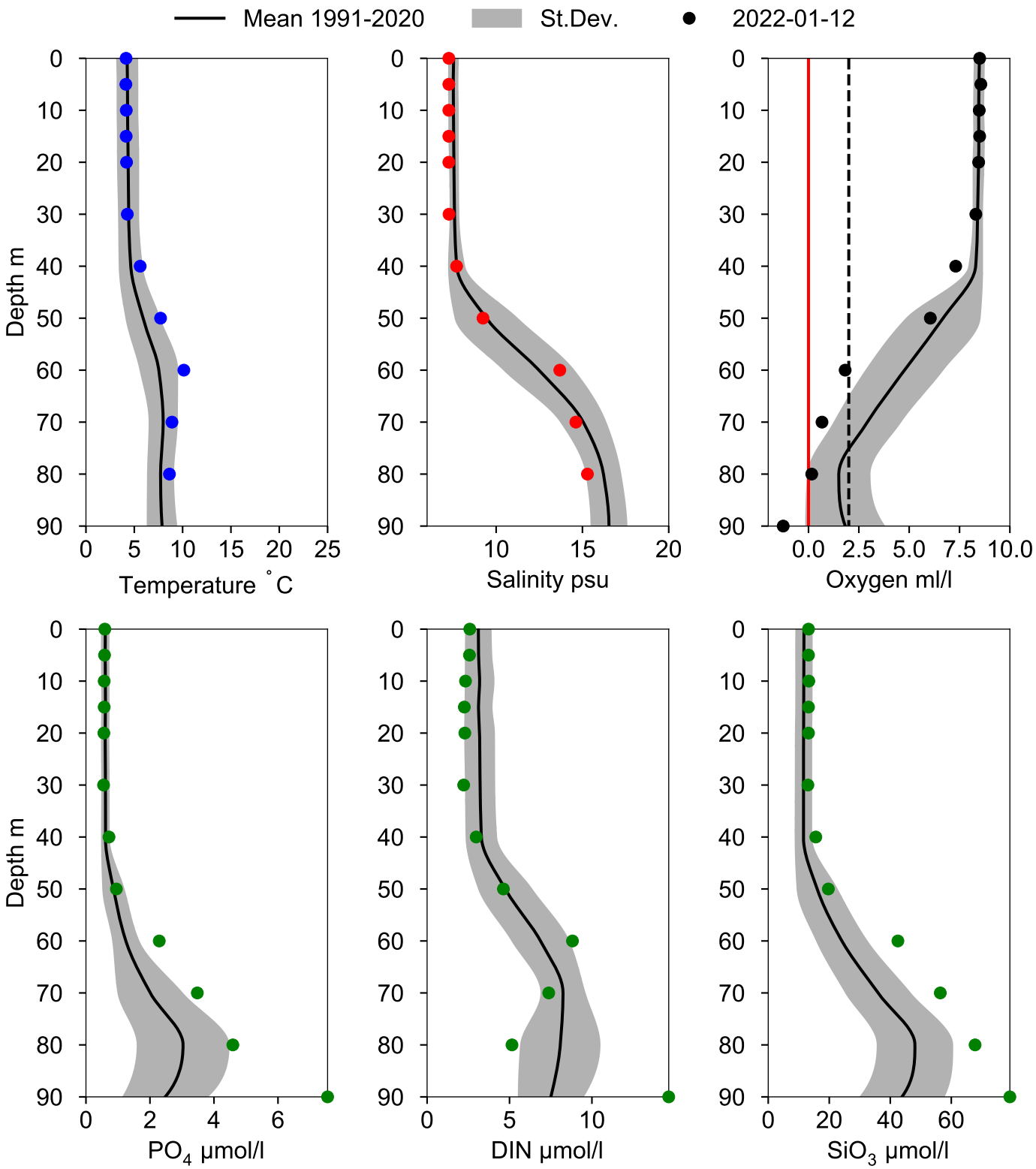
Annual Cycles



OXYGEN IN BOTTOM WATER (depth >= 80 m)

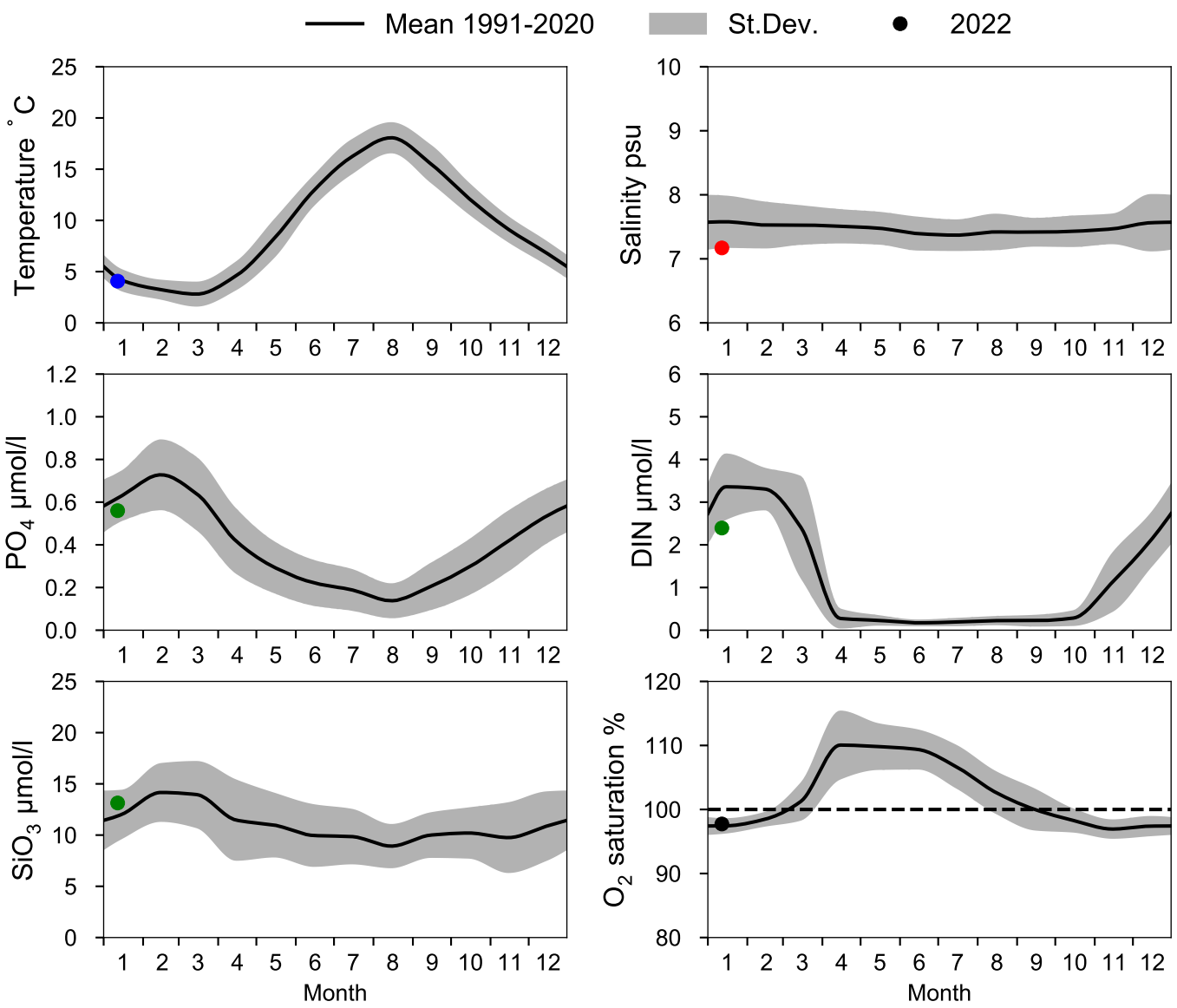


Vertical profiles BY4 CHRISTIANSÖ
January

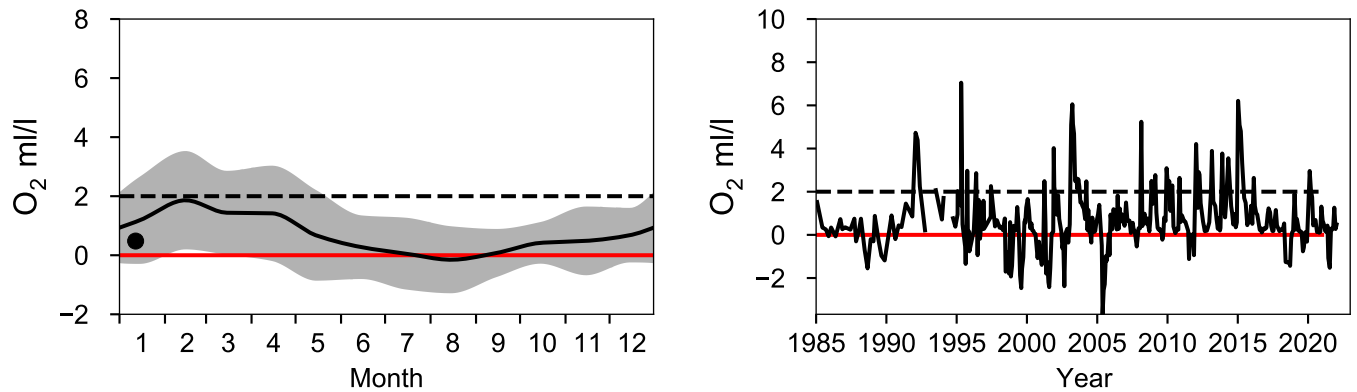


STATION HANÖBUKTEN SURFACE WATER (0-10 m)

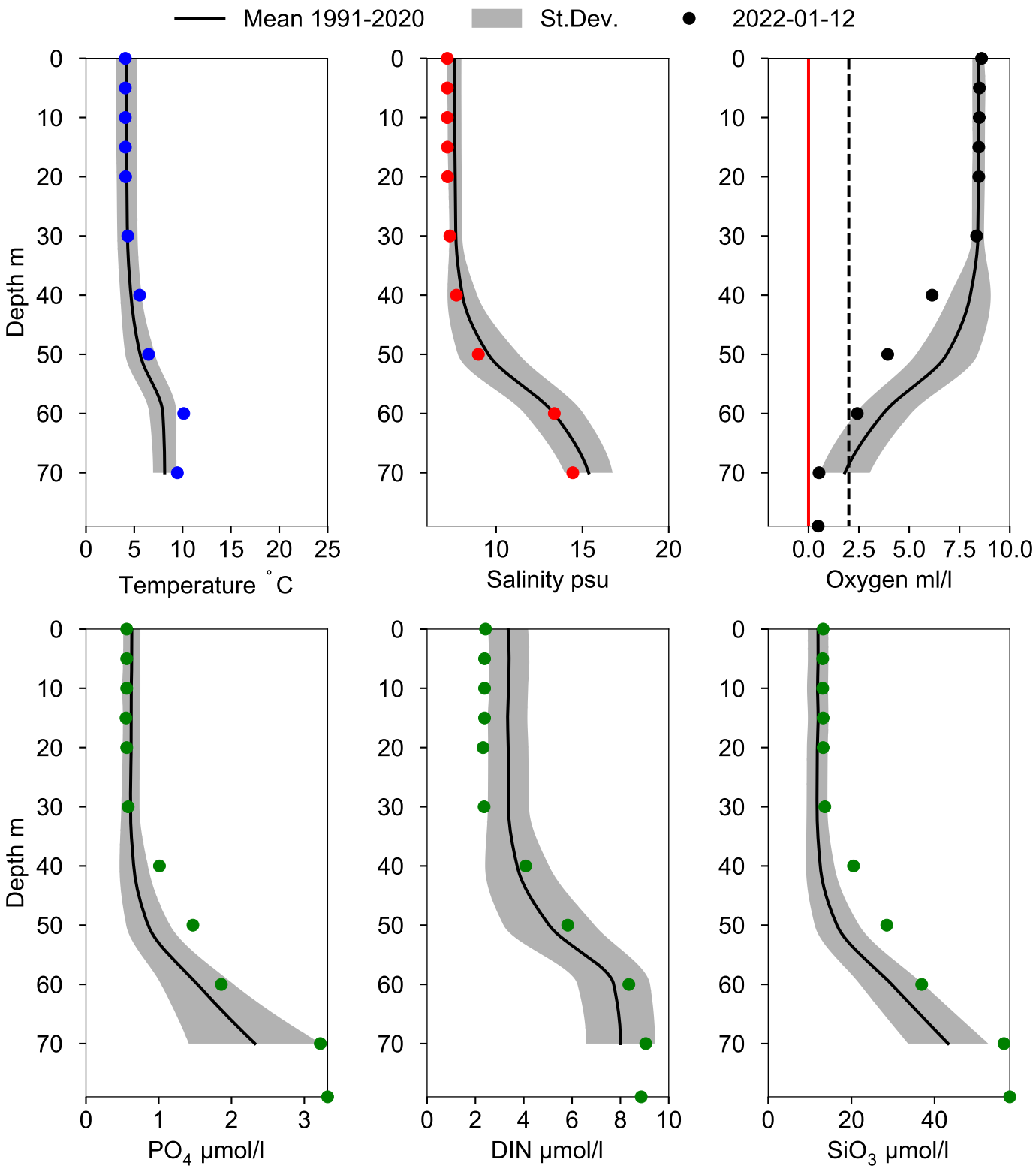
Annual Cycles



OXYGEN IN BOTTOM WATER (depth >= 70 m)

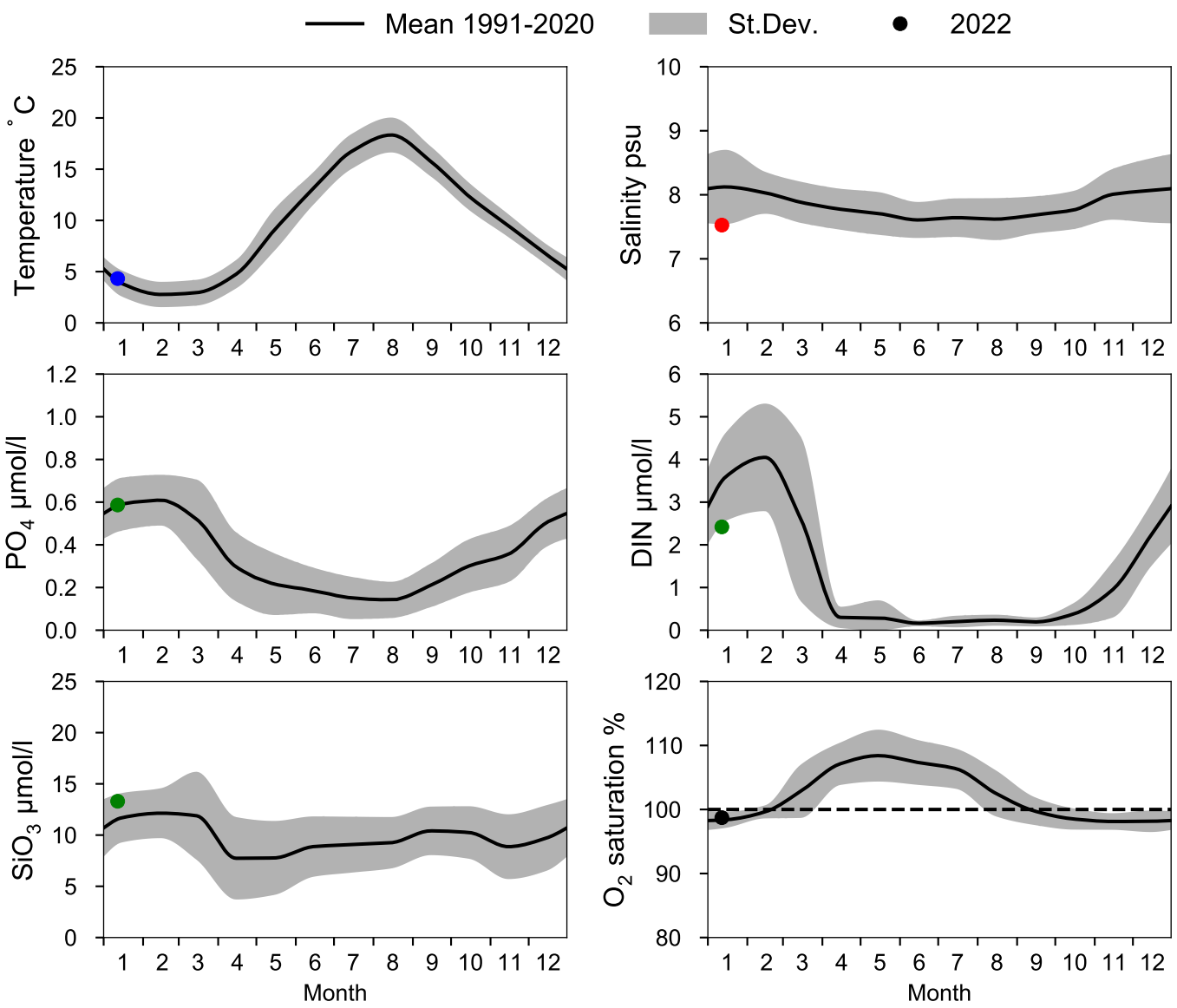


Vertical profiles HANÖBUKTEN
January

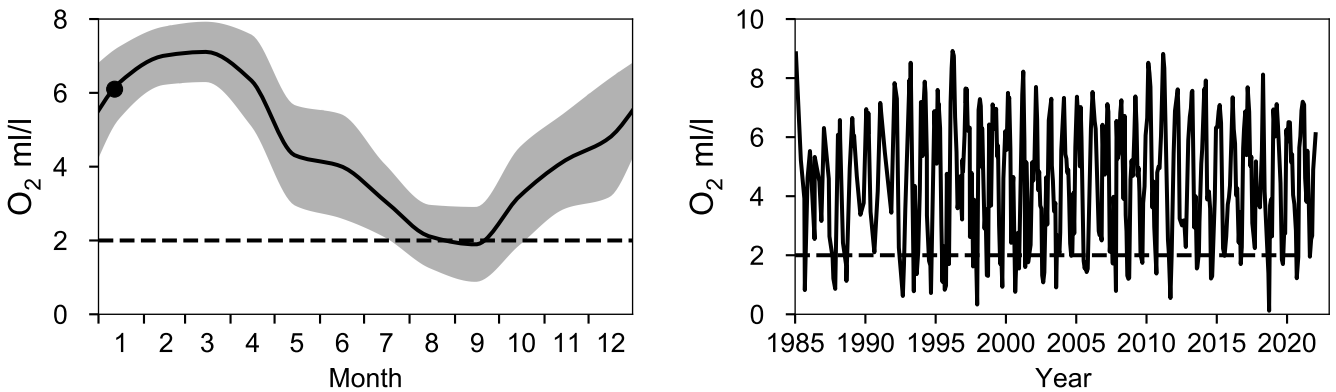


STATION BY2 ARKONA SURFACE WATER (0-10 m)

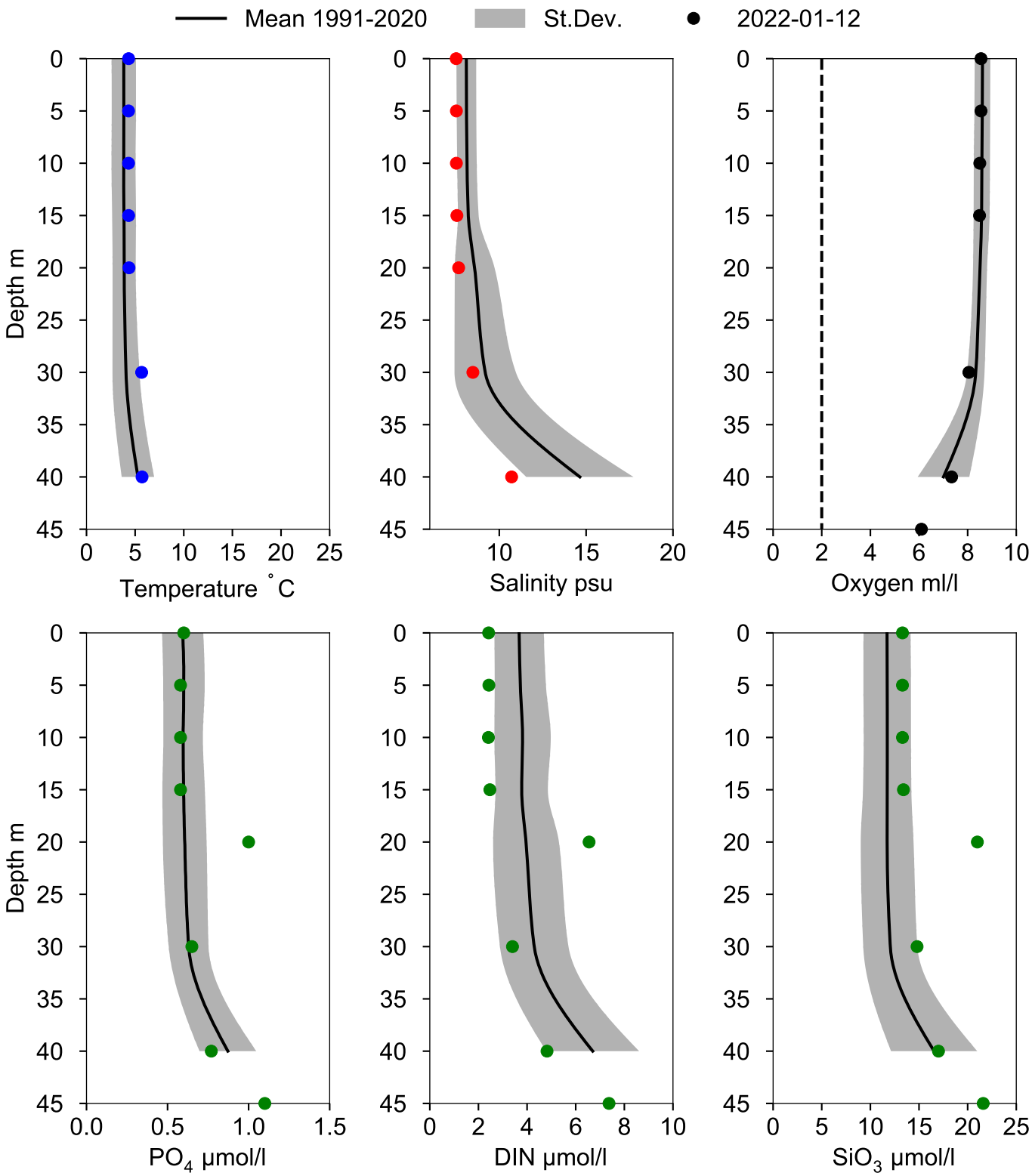
Annual Cycles



OXYGEN IN BOTTOM WATER (depth >= 40 m)

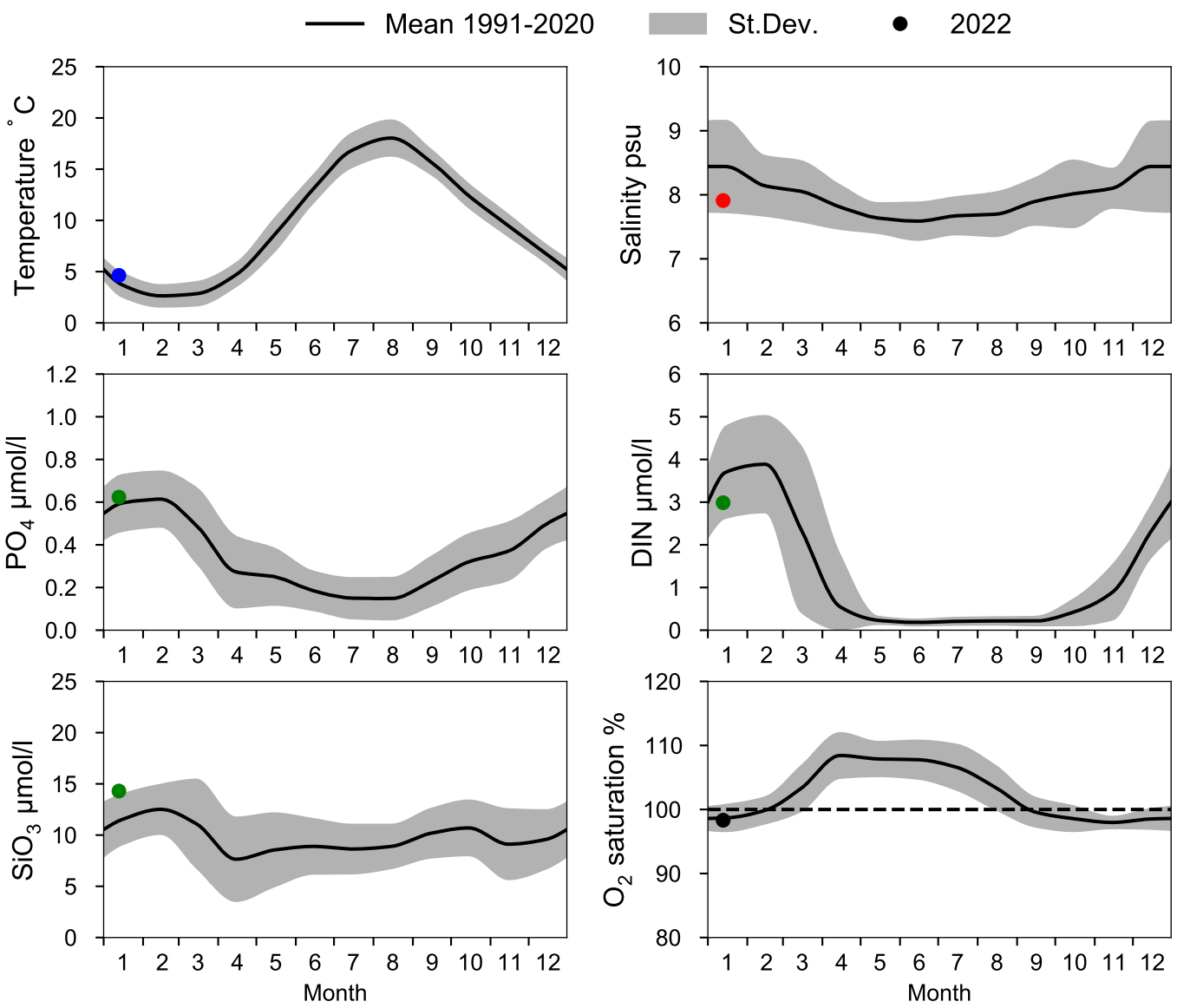


Vertical profiles BY2 ARKONA
January

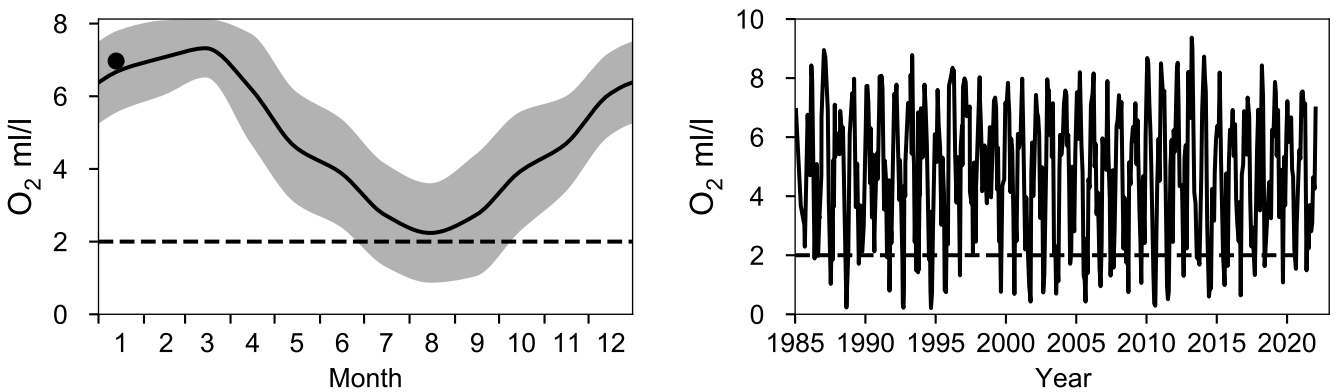


STATION BY1 SURFACE WATER (0-10 m)

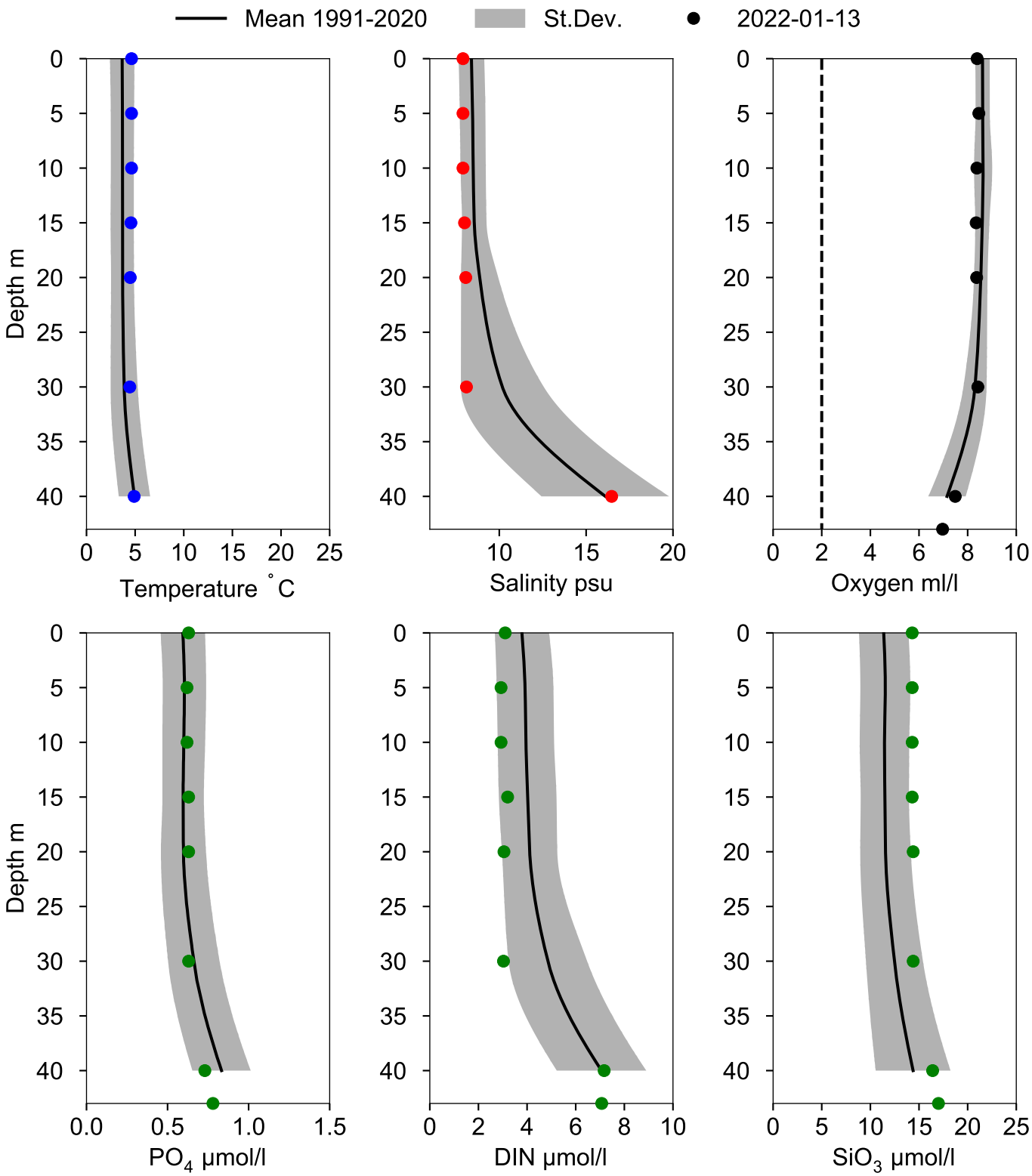
Annual Cycles



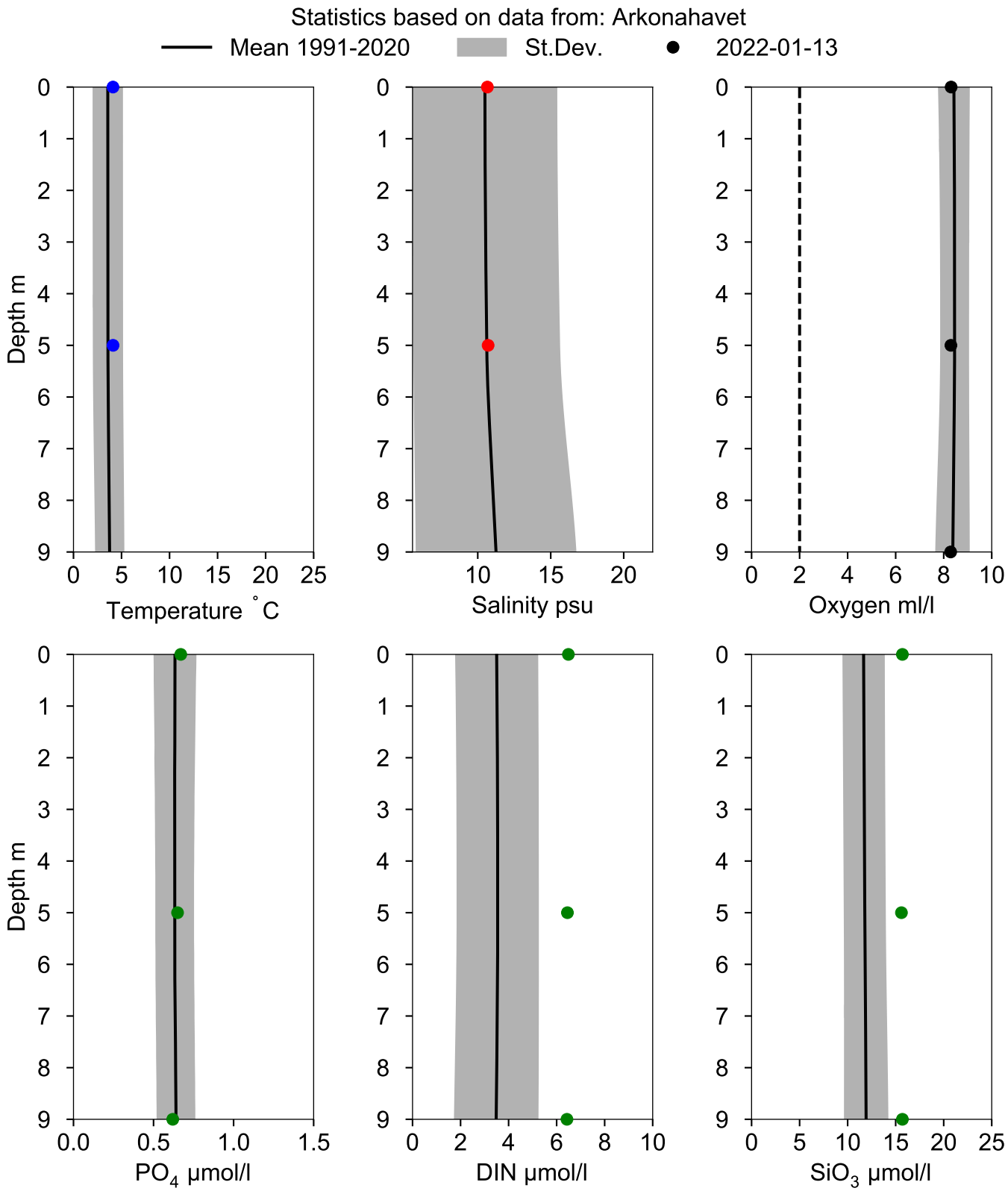
OXYGEN IN BOTTOM WATER (depth >= 39 m)



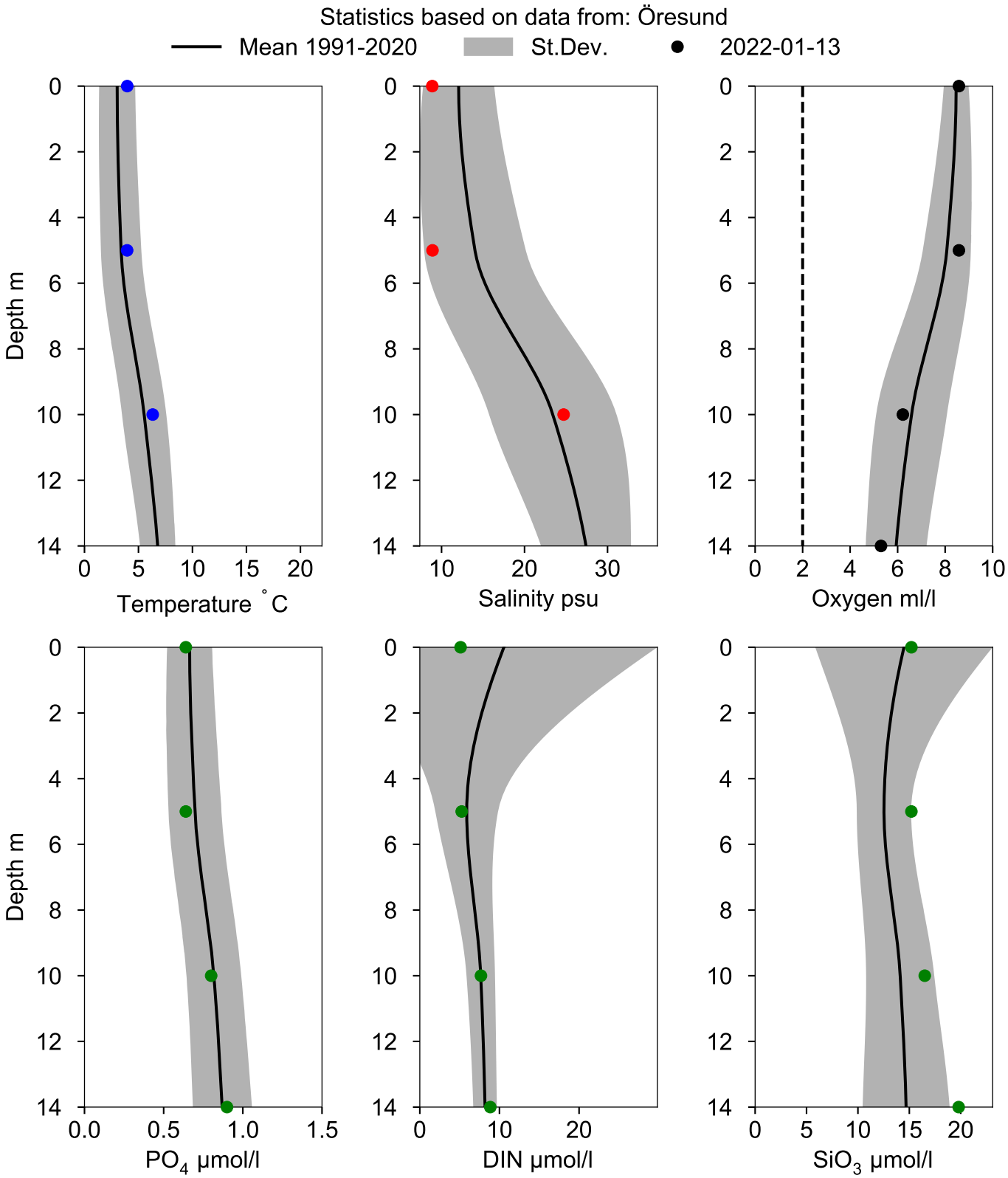
Vertical profiles BY1
January



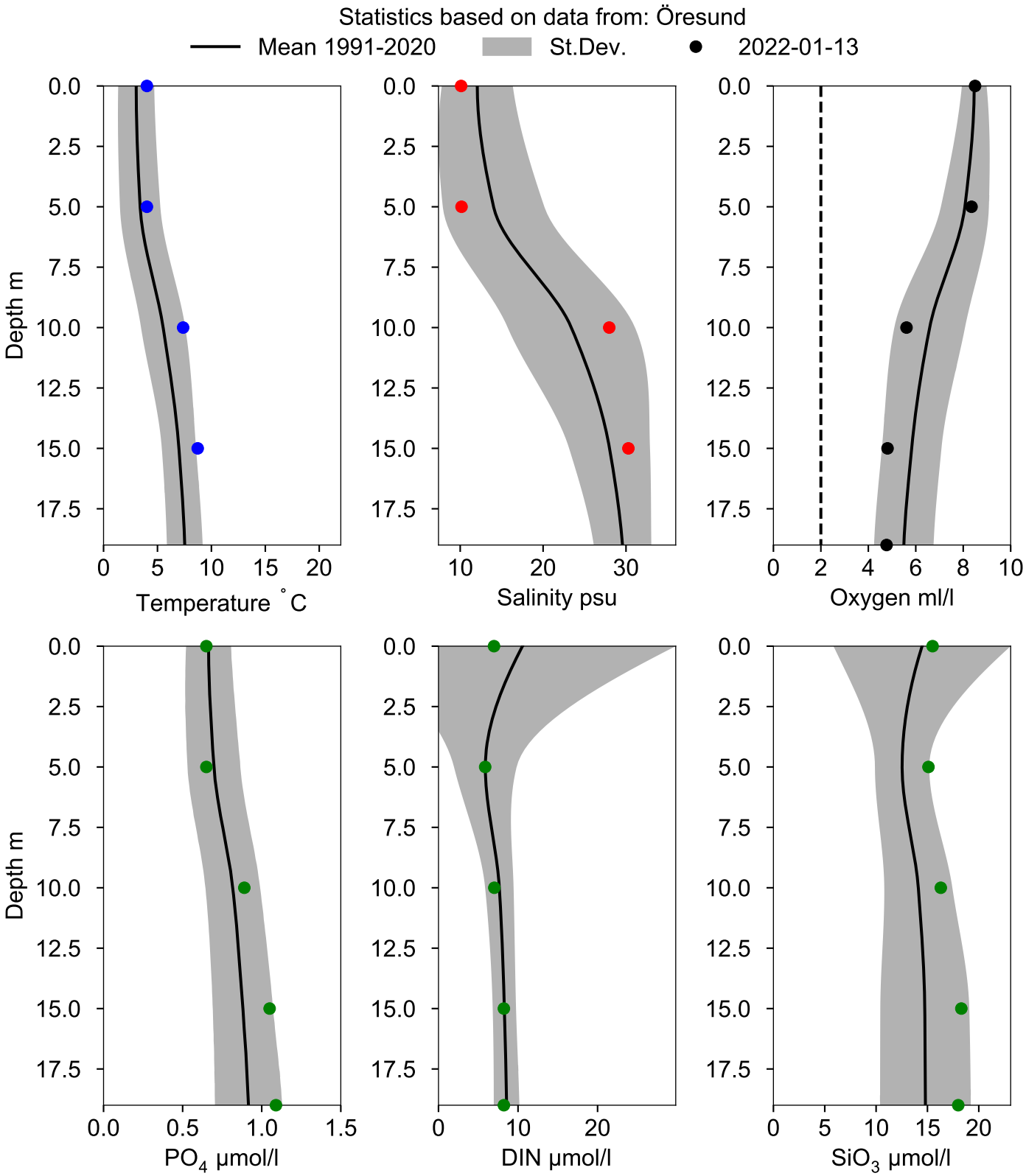
Vertical profiles ÖRESUND-2
January



Vertical profiles ÖRESUND-4
January

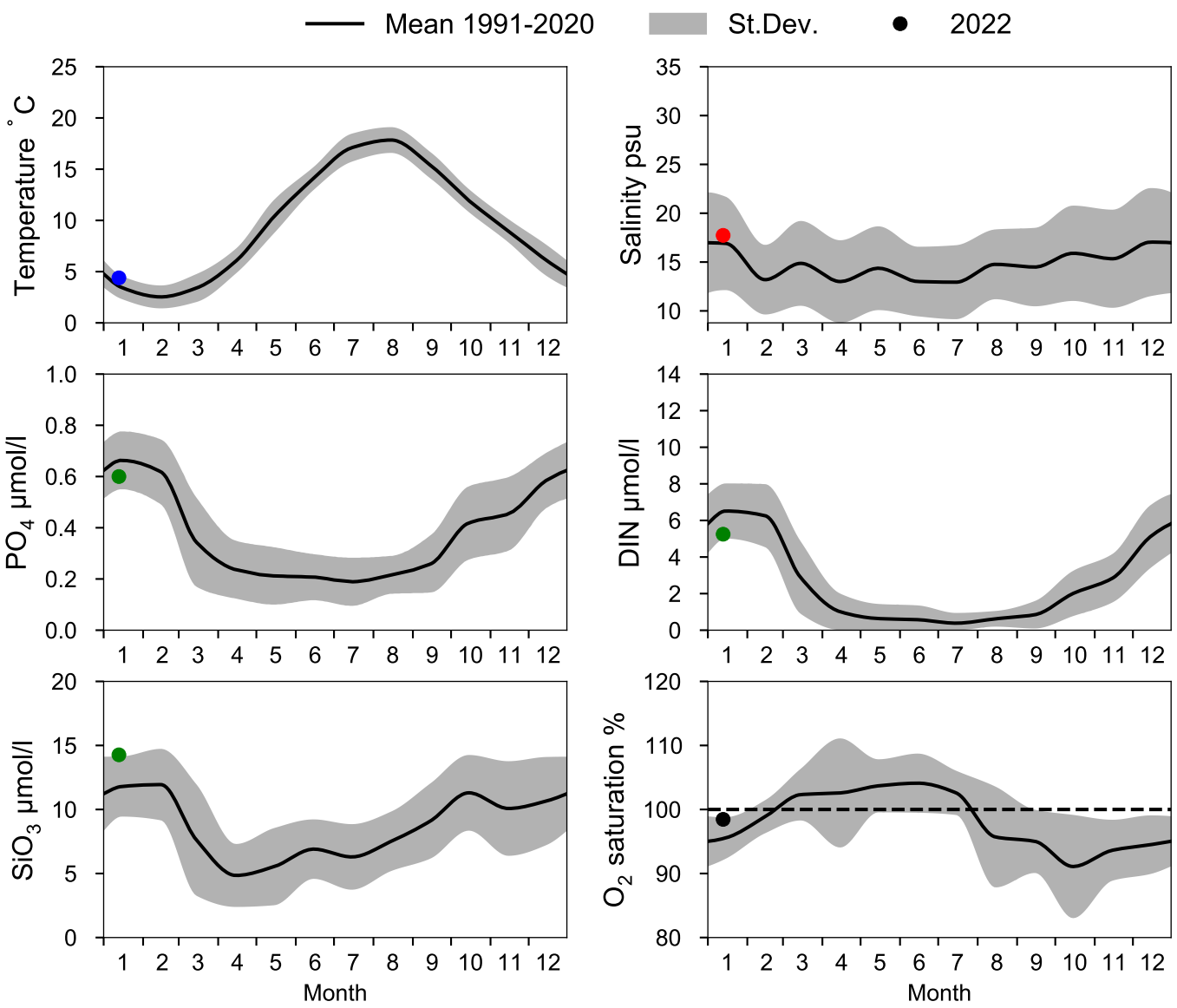


Vertical profiles ÖRESUND-7
January

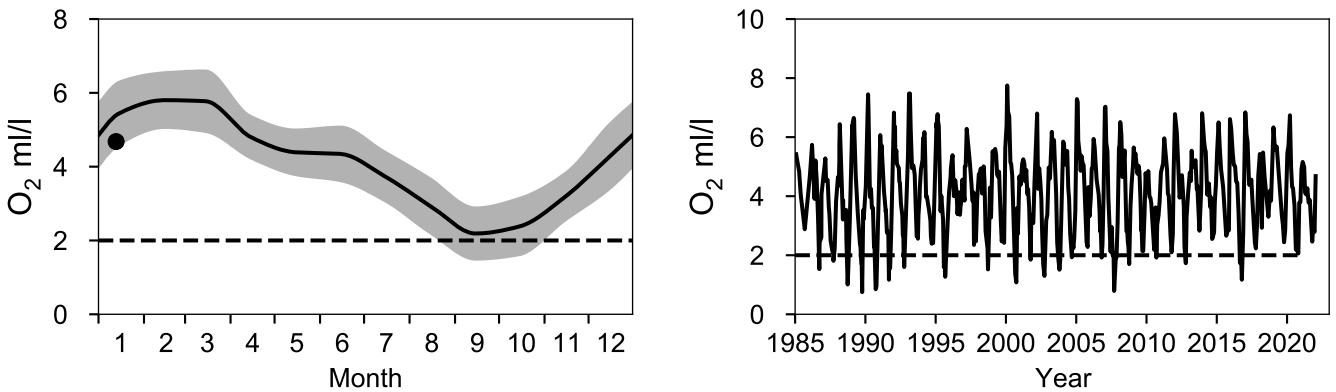


STATION W LANDSKRONA SURFACE WATER (0-10 m)

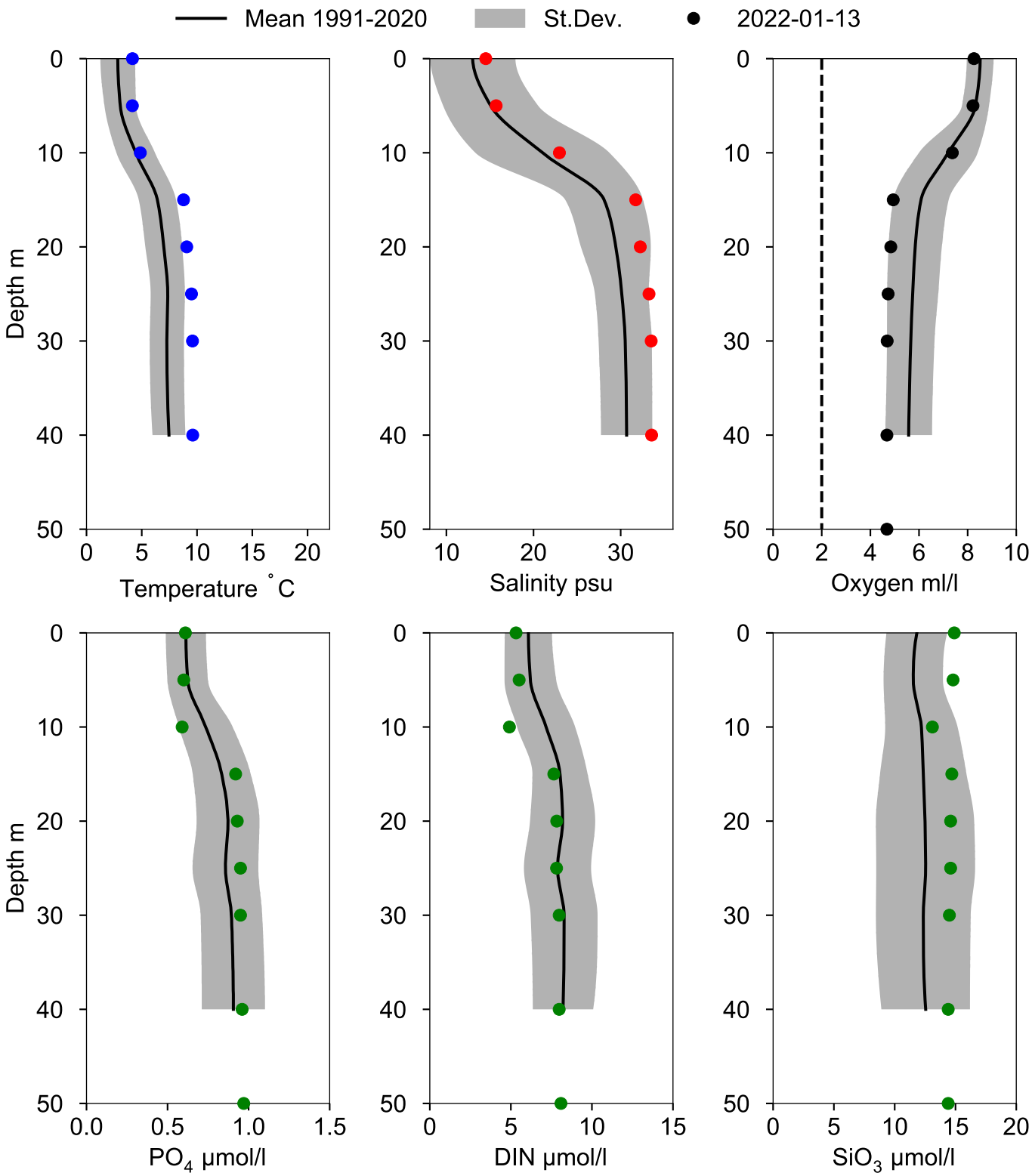
Annual Cycles



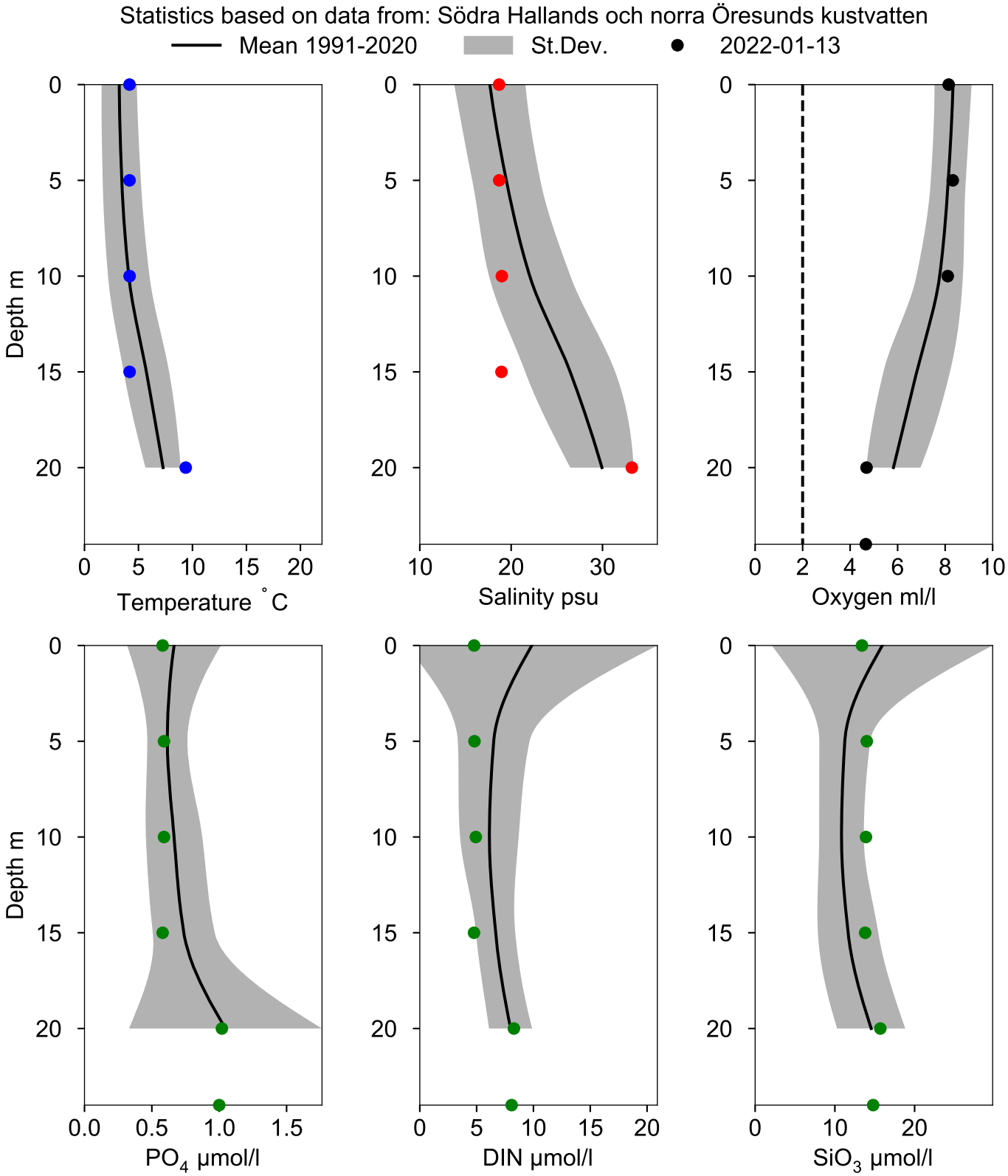
OXYGEN IN BOTTOM WATER (depth >= 40 m)



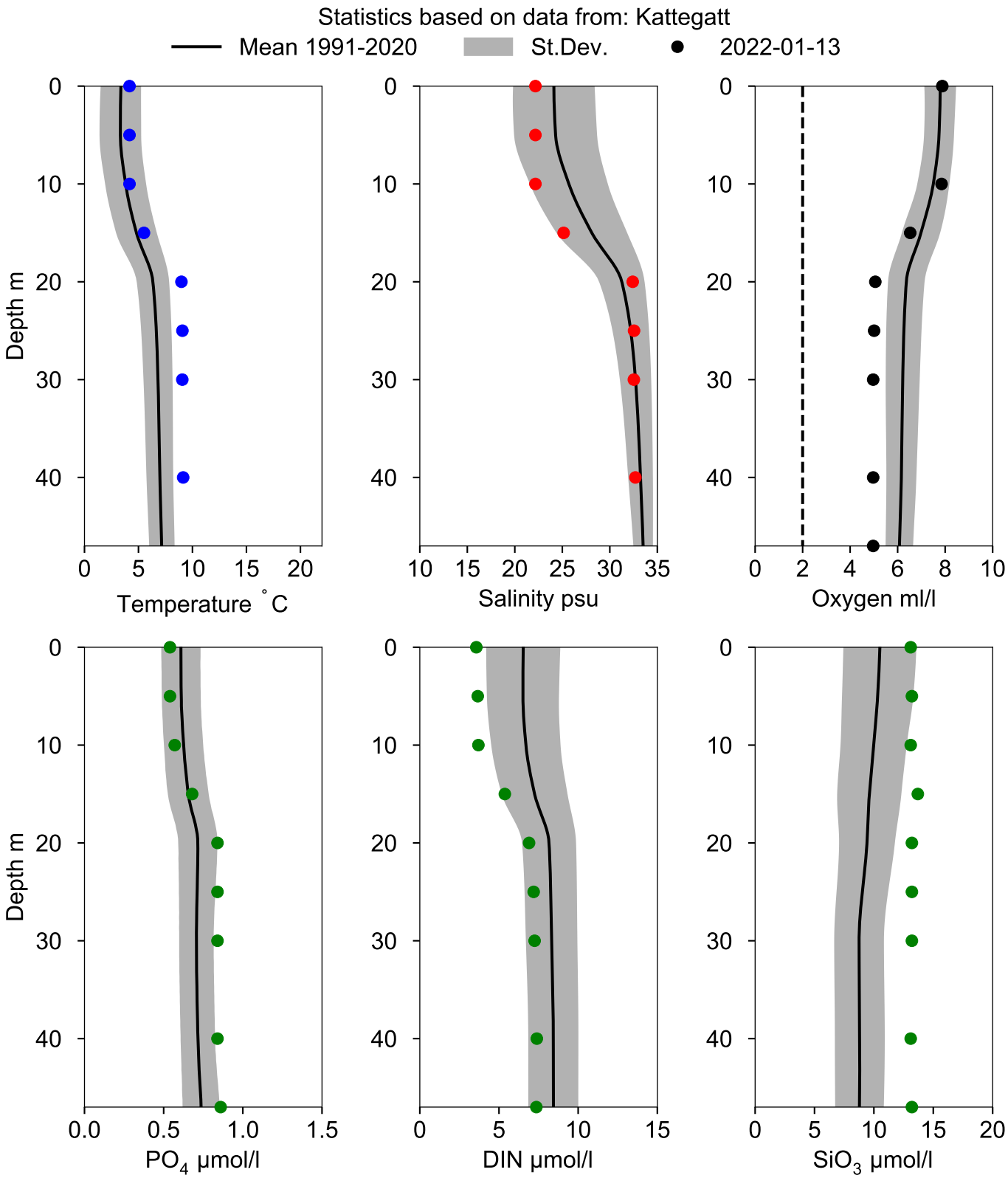
Vertical profiles W LANDSKRONA
January



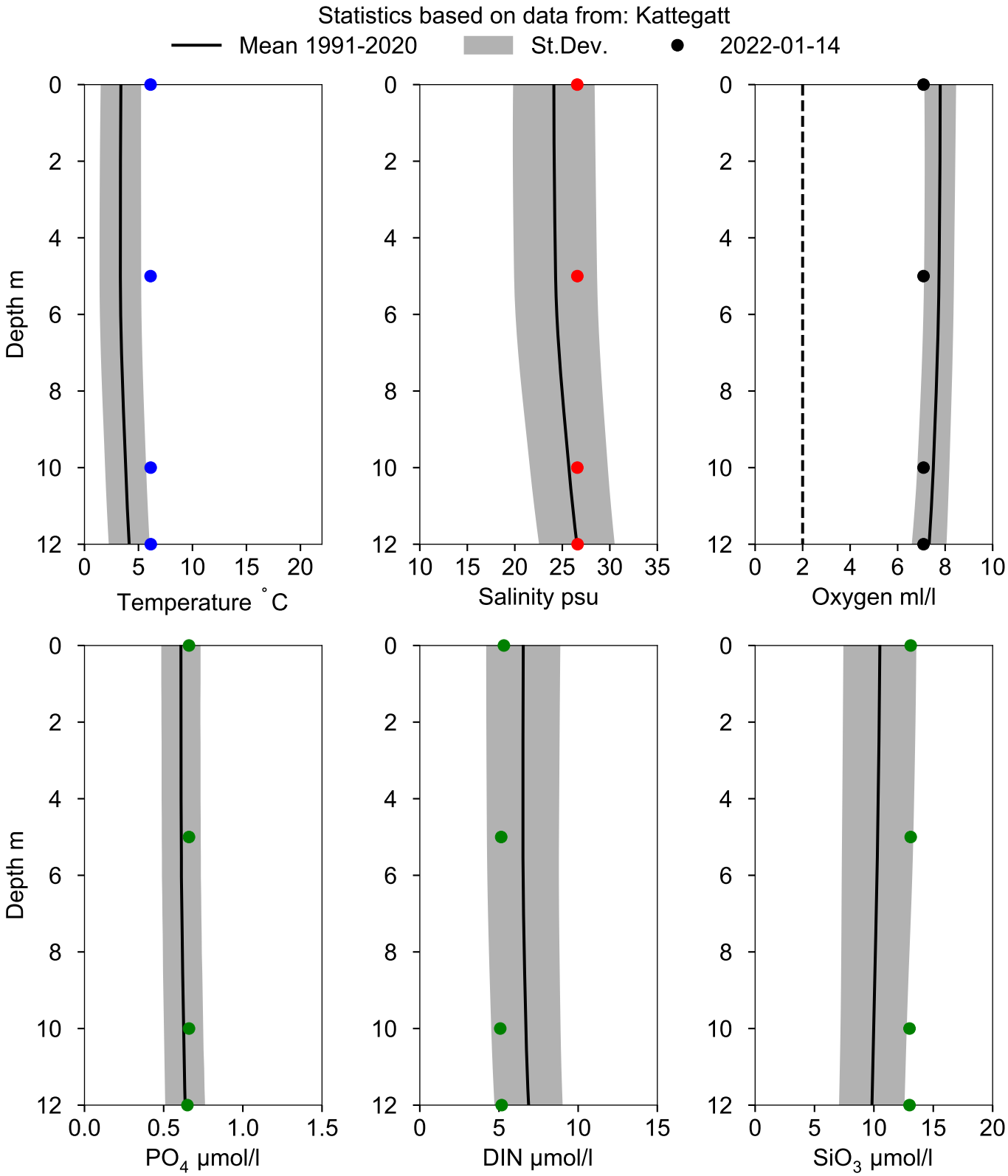
Vertical profiles ÖRESUND-12X
January



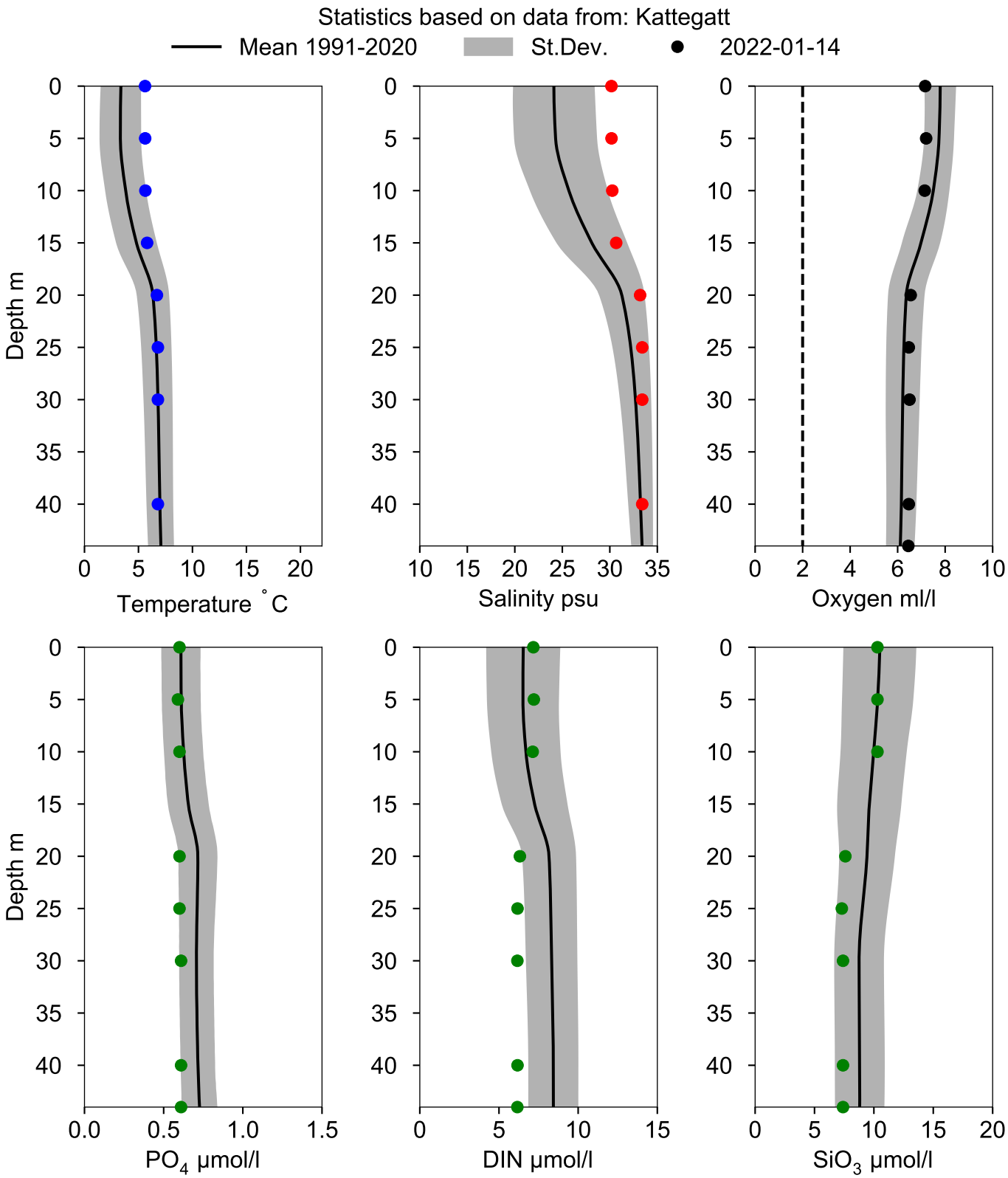
Vertical profiles 925 KATTEGAT SW
January



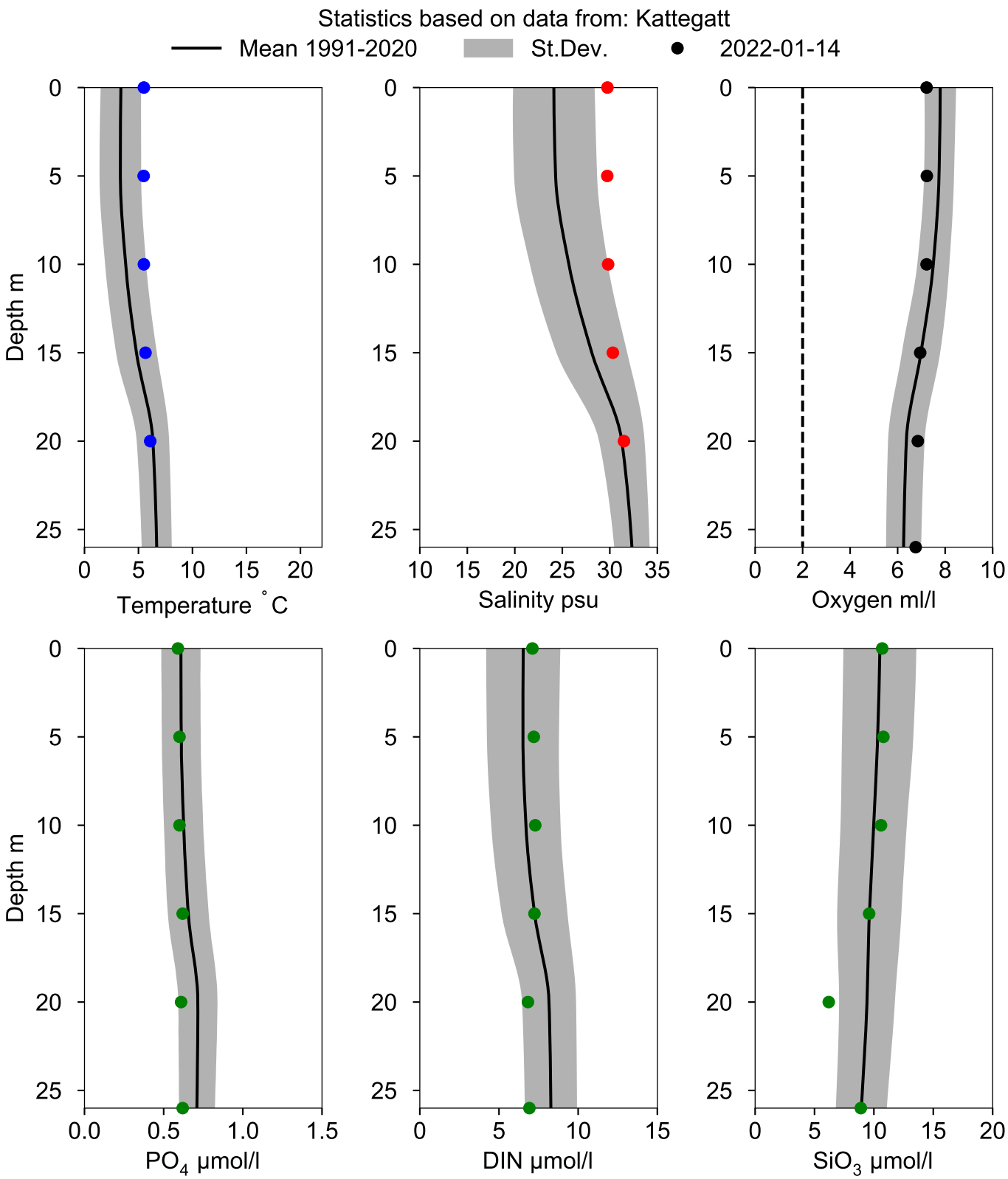
Vertical profiles 409 ÅLBORG BUGT
January



Vertical profiles LÄSÖ RÄNNA
January



Vertical profiles GF9
January



Vertical profiles GF8
January