

## Report from the SMHI monitoring cruise with M/V Aura



**Survey period:** 2017-12-13 - 2017-12-20  
**Principal:** Swedish Meteorological and Hydrological Institute (SMHI),  
Swedish Agency for Marine and Water Management (SwAM).  
**Cooperation partners:** Finnish Environment Institute (SYKE), VG-Shipping.

### SUMMARY

The December cruise, which is part of the Swedish national marine monitoring programme, covered the Skagerrak, the Kattegat, the Sound and the Baltic Proper.

The deep water, in large parts of the Baltic Proper, oxygen concentrations were near zero. Completely oxygen free areas were found in the Western Gotland Basin from 70 meters depth and in the Northern Baltic Proper from 90-125 meters depth. In the Eastern Gotland Basin low concentrations of hydrogen sulphide, which forms when the oxygen concentrations drops below zero, was found close to the bottom. Acute hypoxia (oxygen < 2ml/l) was found in the Bornholm Basin, Eastern Gotland Basin and in the Western Gotland Basin already at 55-70 meters depth, in Hanöbukten and at Ölands S Udde even shallower from 40-55 meters depth. The whole water column in the Arkona Basin was well oxygenated.

The surface concentrations of dissolved inorganic nitrogen (DIN) and dissolved inorganic phosphorus (DIP) was higher than normal in the Eastern, Western and Northern Gotland Basin. Silicate concentrations in the whole Baltic Proper were still much higher than normal and the values had increased further compared with the measurements performed in November. In Skagerrak and Kattegat the nutrients was overall normal for the season.

The next cruise will be a combined January/February cruise which will start in the end of January. During this cruise, winter nutrient mapping, will be performed in both Kattegat and Baltic Proper.

## RESULTS

The December cruise was conducted aboard the Finnish vessel Aura, it started in Gothenburg on the 13<sup>th</sup> of December and ended in the same port on the morning the 20<sup>th</sup>. The winds during the first half of the expedition were fresh from southwest, later after passing Bornholm going eastwards the winds were weaker, mostly from southwest. The air temperature varied from 0 to 5°C

Additional sampling of jellyfish were conducted during the cruise, sampling was performed at both Anholt E and Släggö. This sampling is carried out to evaluate a new method for monitoring jellyfish.

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

Download data here: <http://www.smhi.se/klimatdata/oceanografi/havsmiljodata> (only available in Swedish).

### **The Skagerrak**

The surface water temperature in the Skagerrak was normal for the season, between 5-7 °C. Warmer in the offshore parts compared to the coastal areas. The salinity in the surface was also normal and was measured to 26 psu at Släggö and between 28-34 psu at the offshore stations. Thermocline and halocline coincided at all stations, and was more or less developed between 5 and 30 meters depth.

Nutrients in the form of dissolved inorganic nitrogen, DIN (the sum of nitrate, nitrite and ammonia), were on normal levels for the season and varied between 4.1 – 5.4 µmol/l. Concentrations of dissolved inorganic phosphorus, DIP were also on normal levels. Values in the surface water ranged from 0.4 – 0.5 µmol/l. Silicate concentrations were normal for the season at all stations, with values around 3.0 – 7.0 µmol/l, highest close to the coast and decreasing concentrations down to around 3 µmol/l in the central offshore parts of Skagerrak.

No large peaks in fluorescence were found but some phytoplankton activity could be seen at all stations above the stratification.

Oxygen conditions were good at all visited stations with normal concentrations for the season.

### **The Kattegat and the Sound**

The water temperature was normal for the season and varied between 6-7°C in the surface layer and around 10°C in the deep water. The salinity was also normal and was in the Kattegat surface water 21-26. In the Sound the salinity was about 12 in the surface and 30 in the bottom water. Thermocline and halocline coincided at all stations and was found at 10-30 meters depth.

The concentration of DIN showed normal values for the season. The concentrations had increased compared to the previous visit in November and varied now around 2.5 – 4.1 µmol/l. Highest at

N14 Falkenberg, near the coast, and in the Sound. The DIP concentrations in the surface water were found to be between 0.4-0.6  $\mu\text{mol/l}$ . In the deep water the DIP concentrations was lower than normal at Fladen. Silicate concentrations were much higher than normal in the Sound, 21  $\mu\text{mol/l}$ , and at N14 Falkenberg, 11 $\mu\text{mol/l}$ . At the remaining stations the silicate in the surface water varied between 5-6 $\mu\text{mol/l}$ .

Fluorescence measurements with the CTD showed evidence of the presence of phytoplankton activity in the surface water above the pycnocline, most evident at Fladen in a separate water mass between 10-20 meters depth. This water mass had lower temperature and higher oxygen content.

The deep water was well oxygenated in the whole area which is normal for the season. The oxygen concentrations near the bottom were generally above 4-5ml/l.

### **The Baltic Proper**

The surface water temperature was normal for the season and varied between 6.0-7.0°C. Highest temperature was found in the south-western and north-eastern parts of the Baltic Proper. Surface salinity varied between 6.9 and 8.3. In the Northern and Eastern Gotland Basin the surface salinity was higher than normal, probably due to deep water reaching surface layer due to wind mixing and upwelling. The surface layer was well mixed and the stratification, where thermocline and halocline coincided, lay at 30-40 meters depth in Arkona, Hanö Bight and the Bornholm Basin and at 60-70 meter depth in the remaining basins.

Surface concentrations of DIN and DIP were higher than normal in the Eastern, Western and Northern Gotland Basin. Concentrations of DIN ranged from 1.9-4.4  $\mu\text{mol/l}$  and DIP from 0.5 – 0.7  $\mu\text{mol/l}$ . Below the stratification, in the deep water, low concentration of DIP was noted in the Northern and Eastern Gotland Basin and in the northern parts of the Western Gotland Basin. The silicate concentration in the whole Baltic Proper continues to be elevated highly above normal in the surface layer. In the deep water the concentrations are somewhat below normal in the Northern and Eastern Gotland Basin.

The deep water in large parts of the Baltic Proper has oxygen concentrations near zero. Completely oxygen free areas, when toxic hydrogen sulphide is formed, were measured in the Western Gotland Basin from 70 meters depth, in the Northern Gotland Basin from depth exceeding 90-125 meters. In the Eastern Gotland Basin, hydrogen sulphide was found close to the bottom, but only low concentrations. Acute hypoxia (oxygen < 2ml/l) was found in the Bornholm Basin, Eastern and Western Gotland Basin from 55-70 meters depth, in the Hanö Bight and at Öland Södra Udde already at 40-50 meters depth. The whole water column was well oxygenated in the Arkona Basin.

Fluorescence measurements from the CTD showed phytoplankton presence above the thermocline, however no large peaks were present at any station.

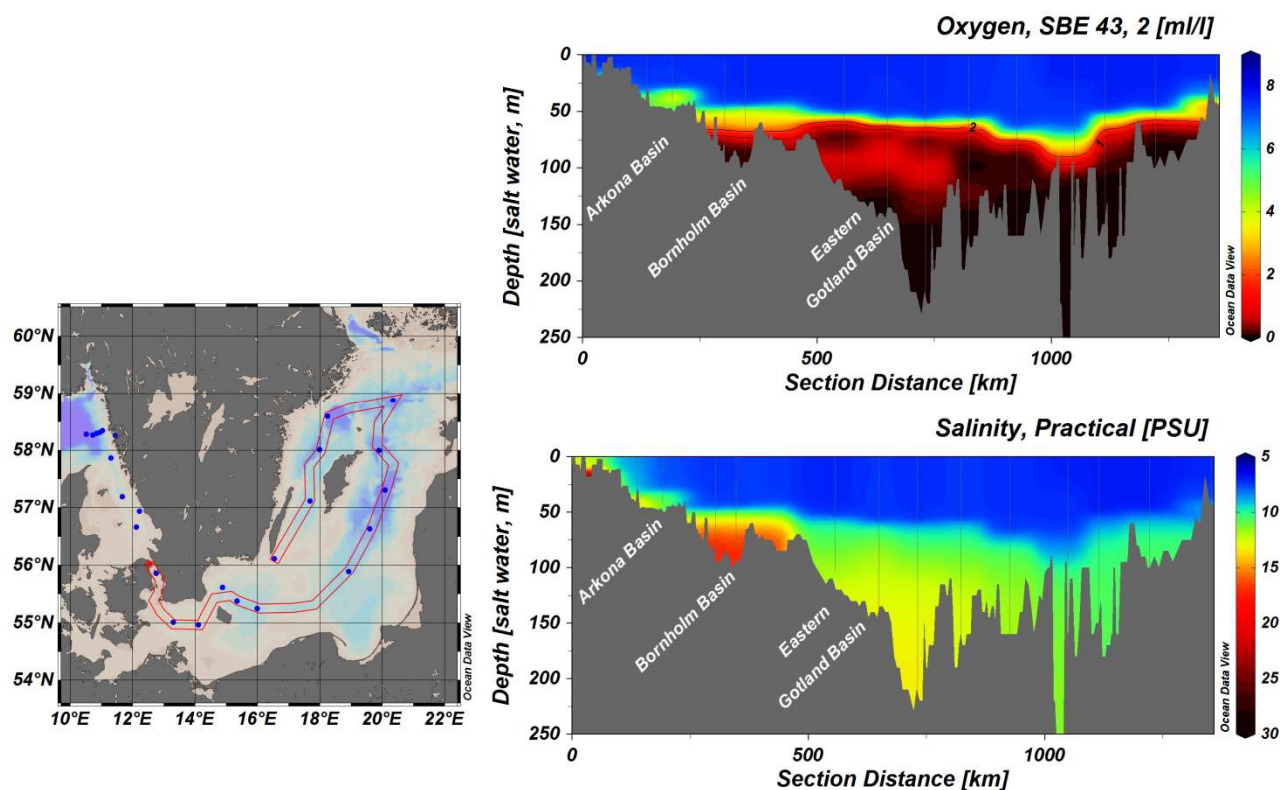


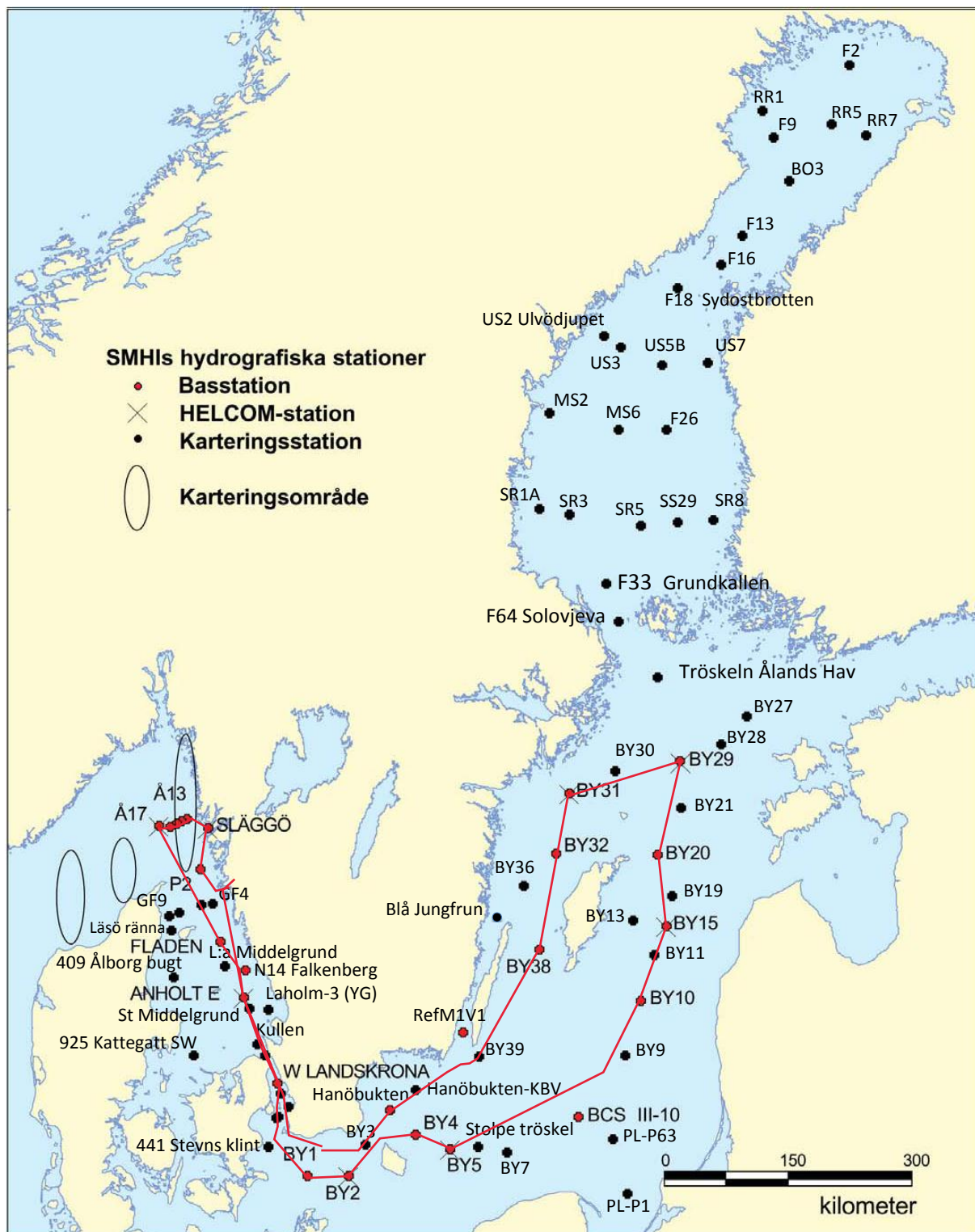
Figure 1. Transect showing dissolved oxygen and salinity from the Sound, through the Baltic Proper, to the Western Gotland Basin.

## PARTICIPANTS

| Name             |                 | From |
|------------------|-----------------|------|
| Martin Hansson   | Chief Scientist | SMHI |
| Johan Kronsell   | Chief Scientist | SMHI |
| Jenny Lycken     |                 | SMHI |
| Sari Sipilä      |                 | SMHI |
| Daniel Simonsson |                 | SMHI |

## APPENDICES

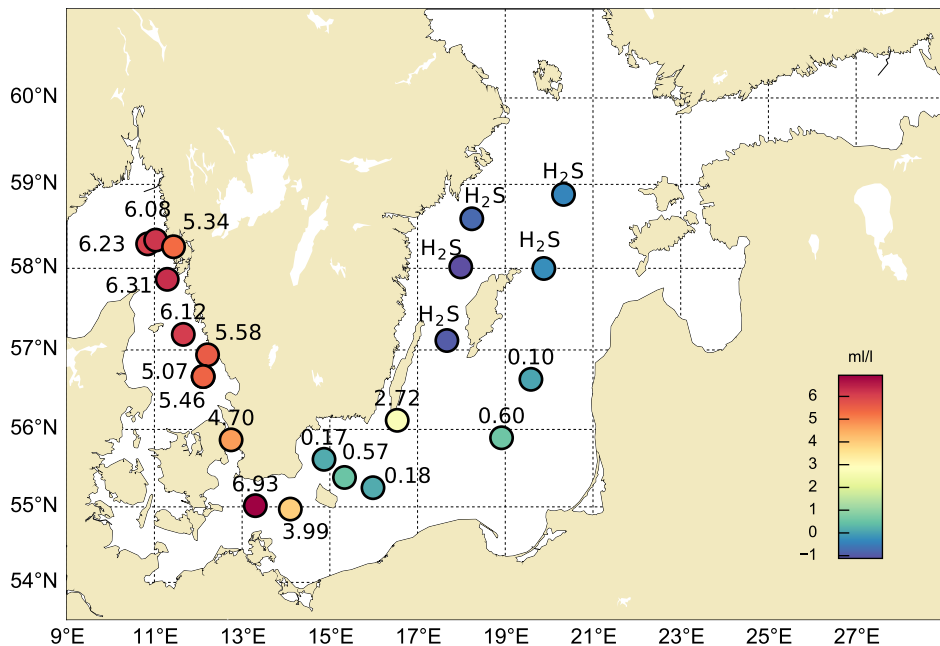
- Track chart
- Table over stations, sampled parameters and number of sampling depths
- Map showing bottom oxygen concentrations
- Vertical profiles for regular monitoring stations
- Monthly average surface water plots for regular monitoring stations



Time: 11:21

Year: 2017

[illegible]

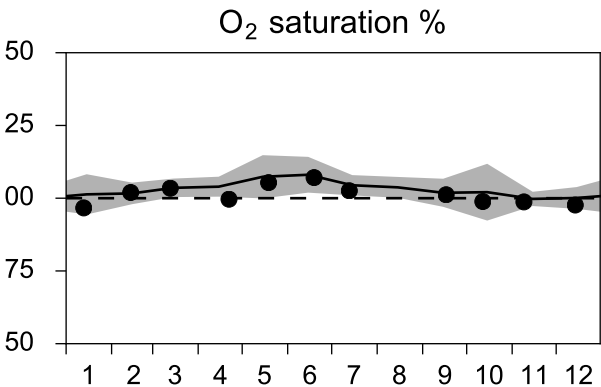
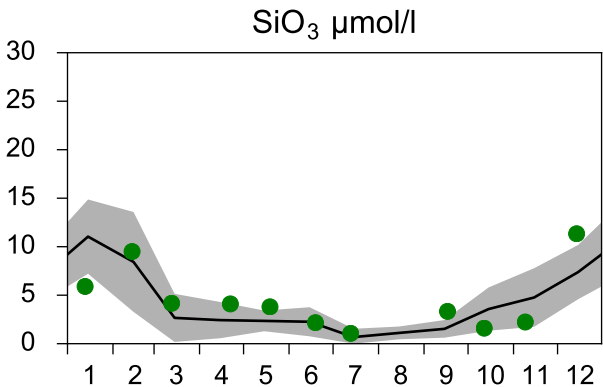
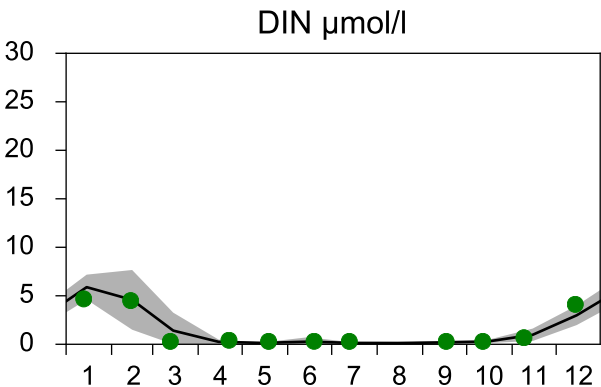
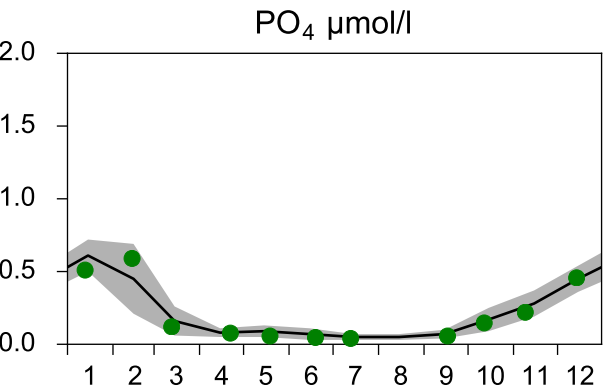
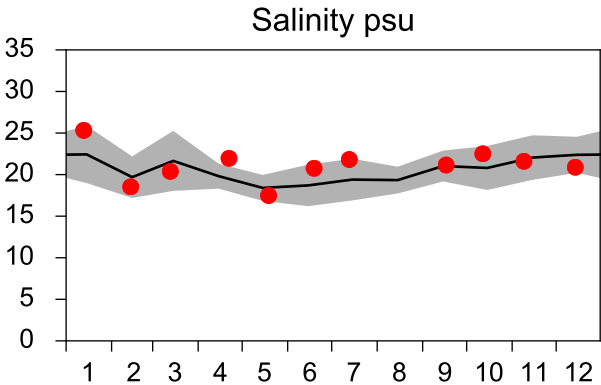
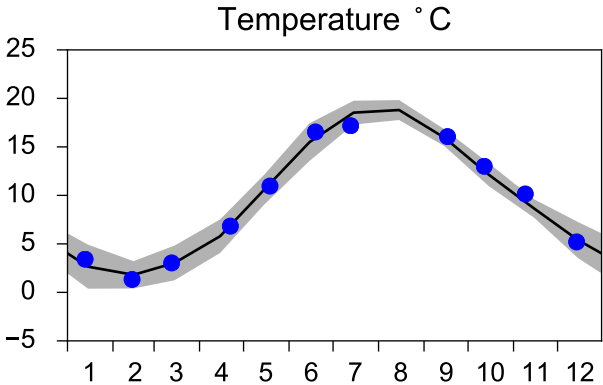




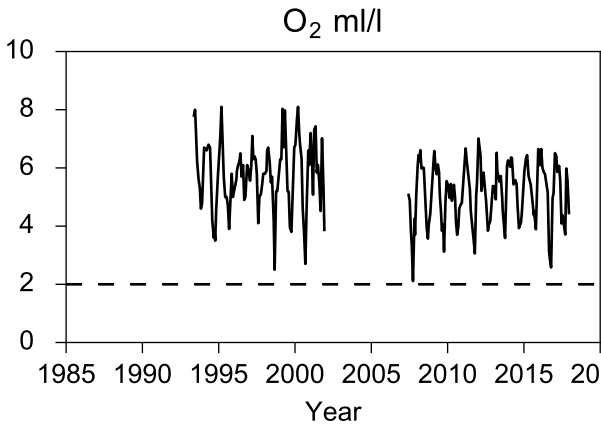
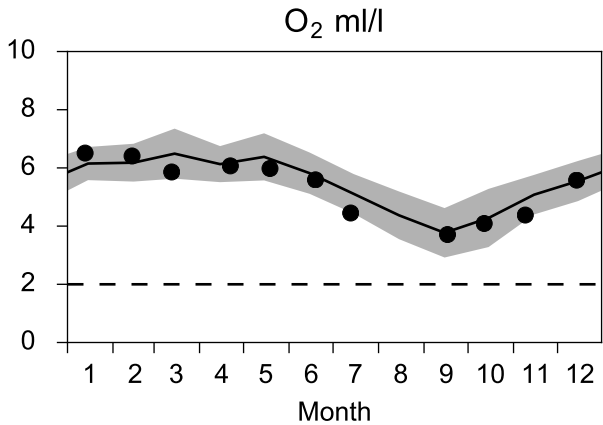
# STATION N14 FALKENBERG SURFACE WATER (0-10 m)

Annual Cycles

— Mean 2001-2015    St.Dev.    • 2017



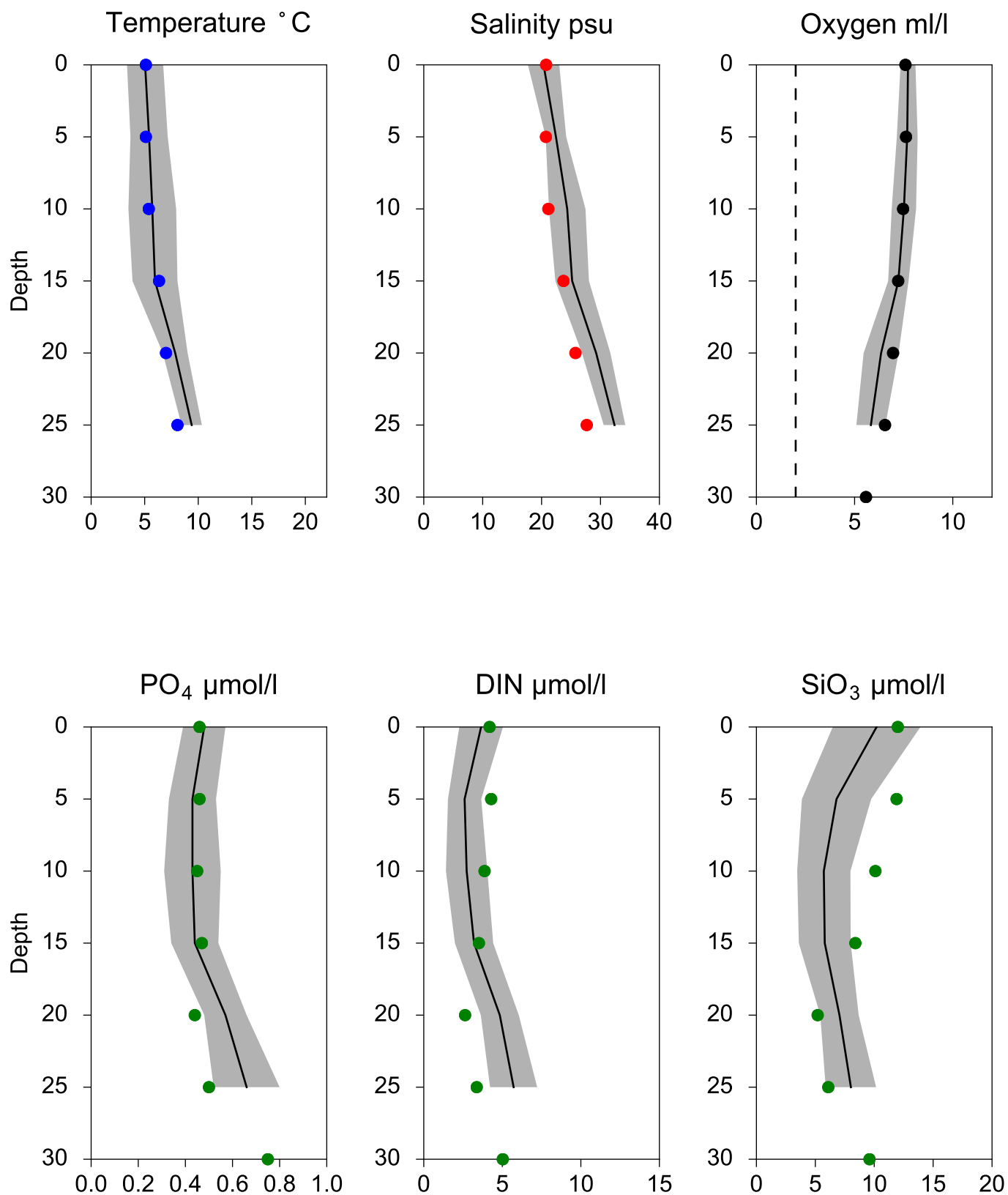
## OXYGEN IN BOTTOM WATER (depth >= 25 m)





# Vertical profiles N14 FALKENBERG December

— Mean 2001-2015    St.Dev.    • 2017-12-14



# STATION ANHOLT E SURFACE WATER (0-10 m)

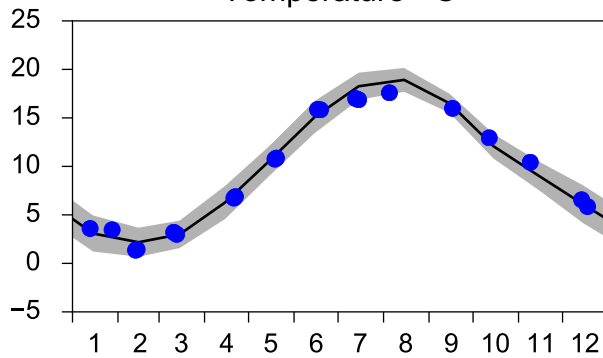
Annual Cycles

— Mean 2001-2015

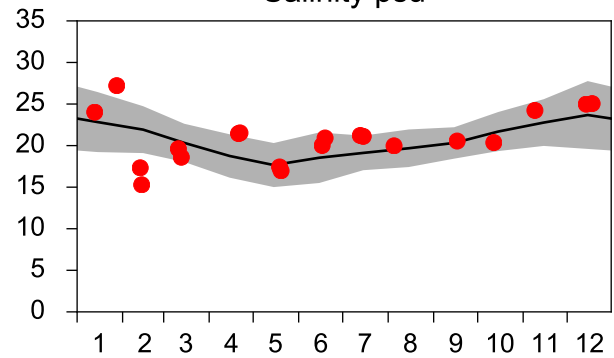
■ St.Dev.

● 2017

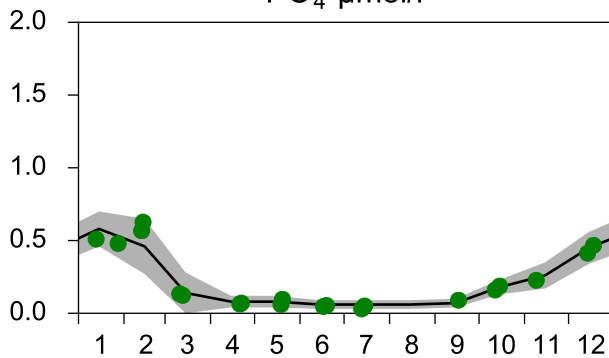
Temperature °C



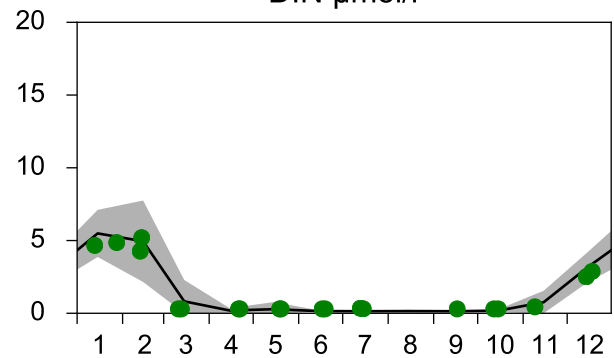
Salinity psu



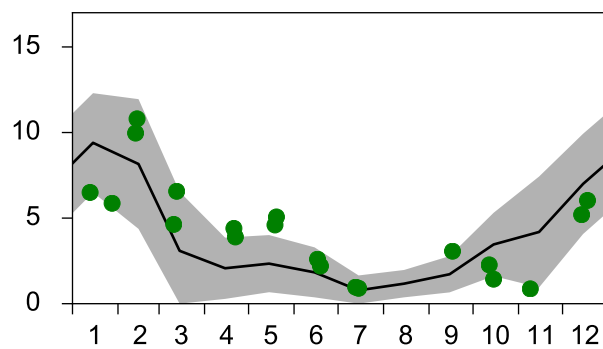
PO<sub>4</sub> µmol/l



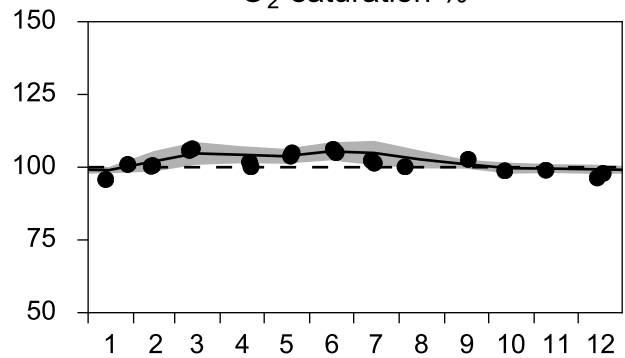
DIN µmol/l



SiO<sub>3</sub> µmol/l

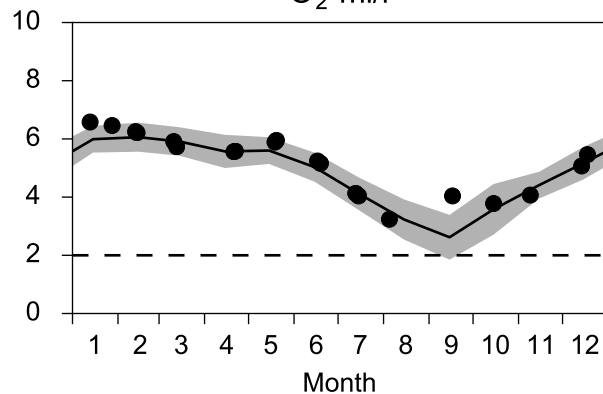


O<sub>2</sub> saturation %

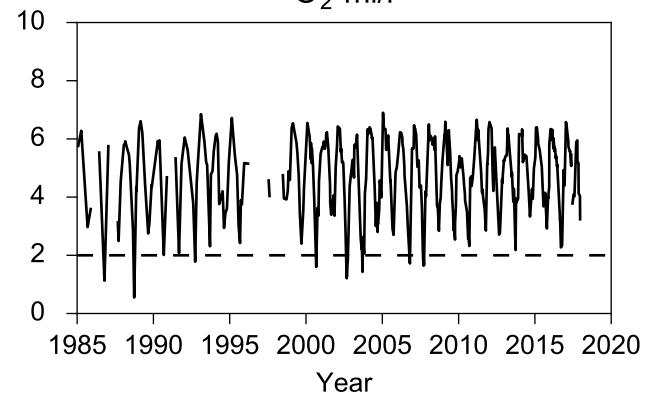


## OXYGEN IN BOTTOM WATER (depth >= 52 m)

O<sub>2</sub> ml/l



O<sub>2</sub> ml/l

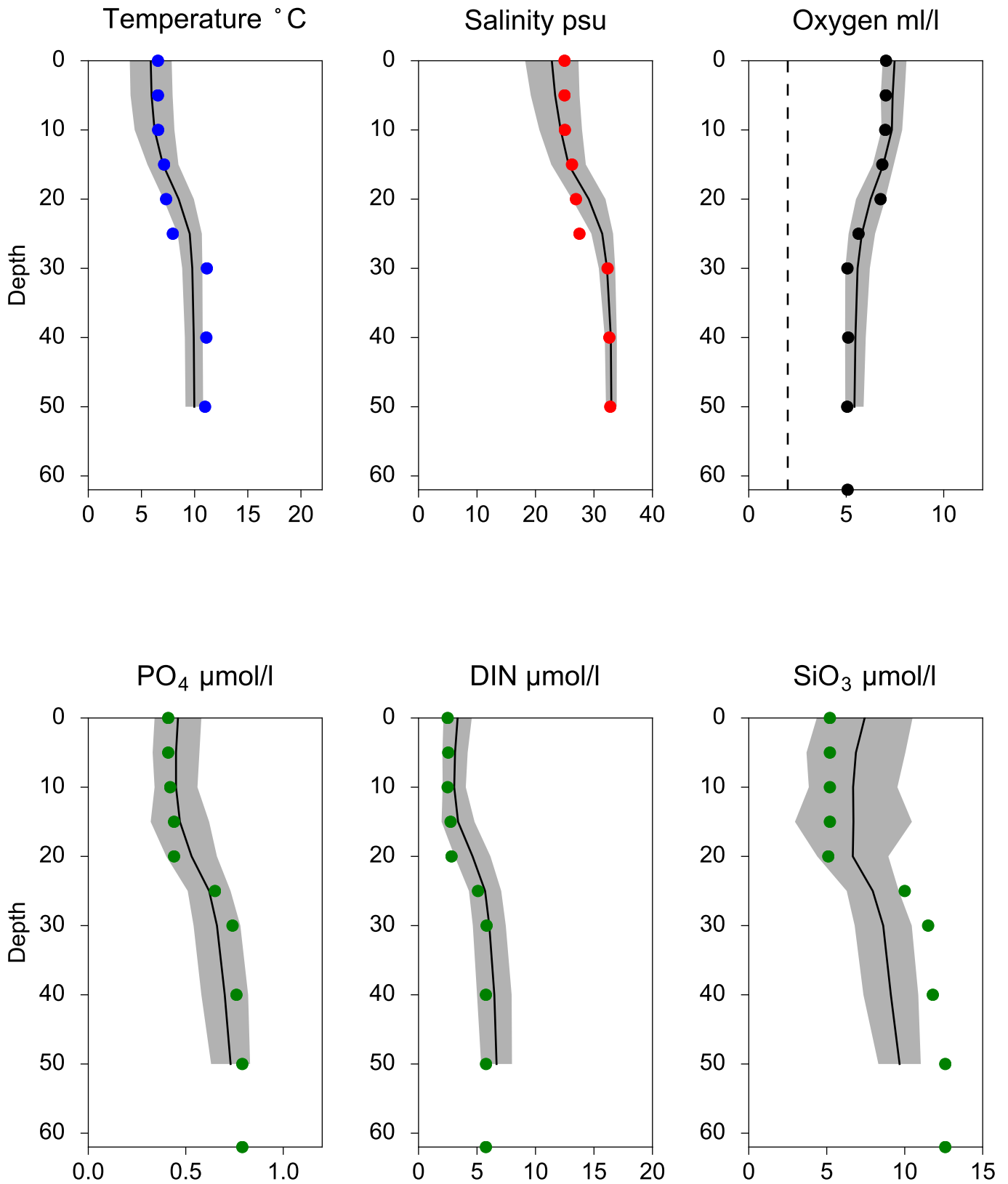


# Vertical profiles ANHOLT E December

— Mean 2001-2015

■ St.Dev.

● 2017-12-14



# STATION W LANDSKRONA SURFACE WATER (0-10 m)

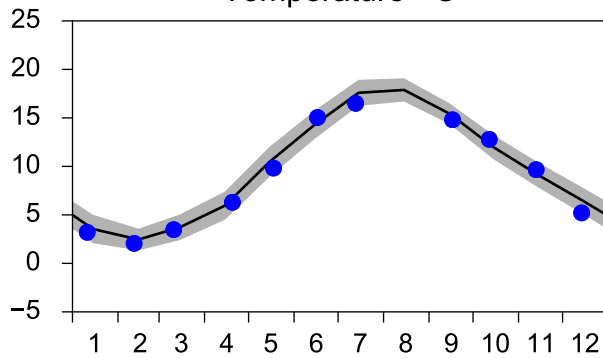
Annual Cycles

— Mean 2001-2015

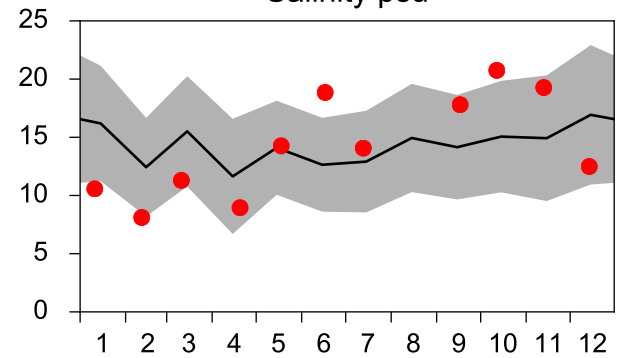
■ St.Dev.

● 2017

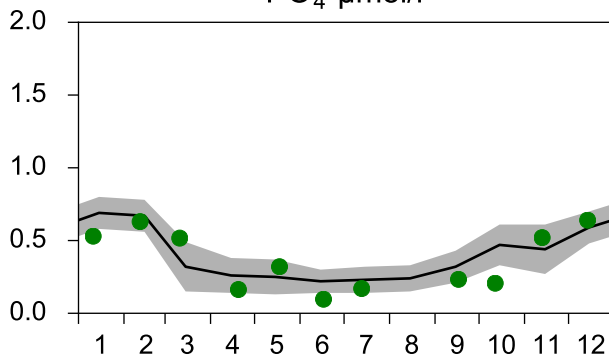
Temperature °C



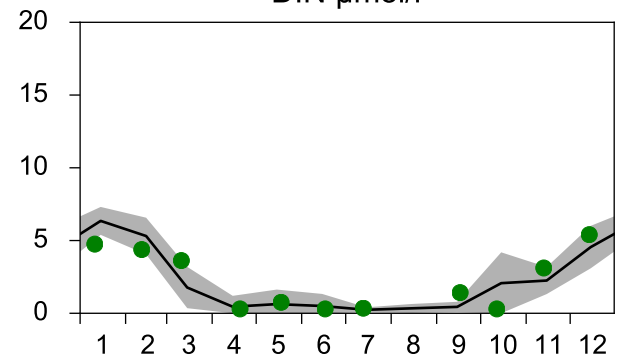
Salinity psu



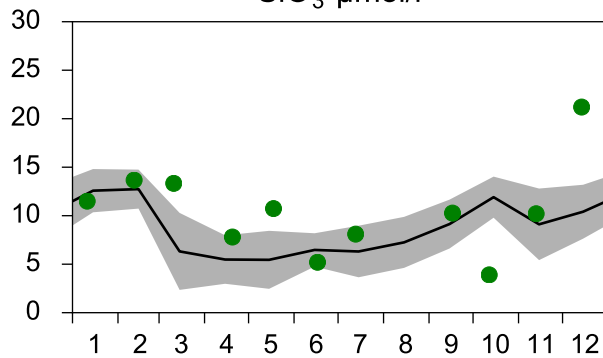
PO<sub>4</sub> μmol/l



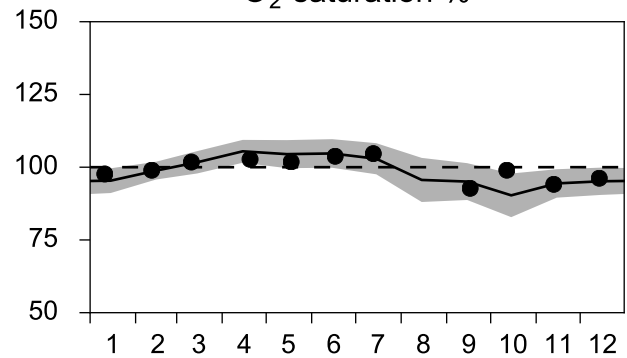
DIN μmol/l



SiO<sub>3</sub> μmol/l

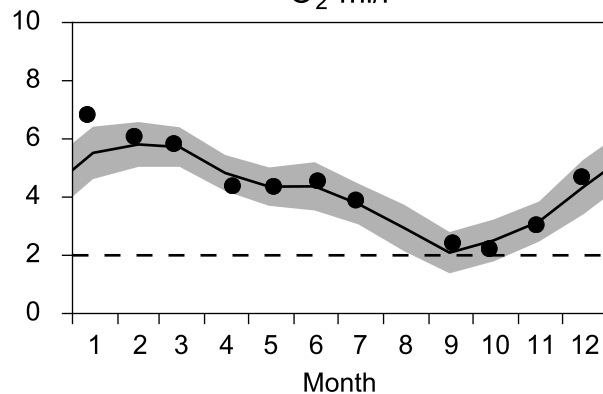


O<sub>2</sub> saturation %

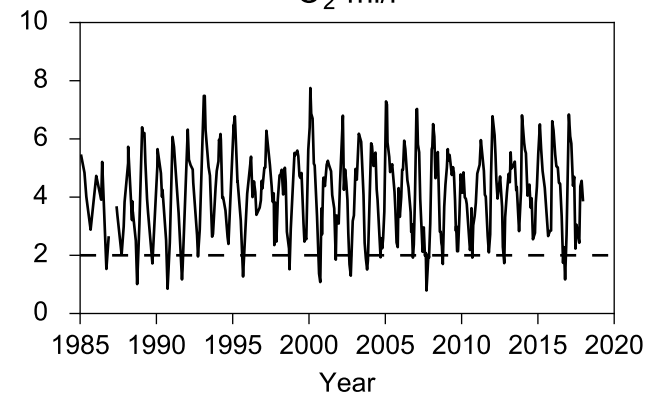


## OXYGEN IN BOTTOM WATER (depth >= 40 m)

O<sub>2</sub> ml/l

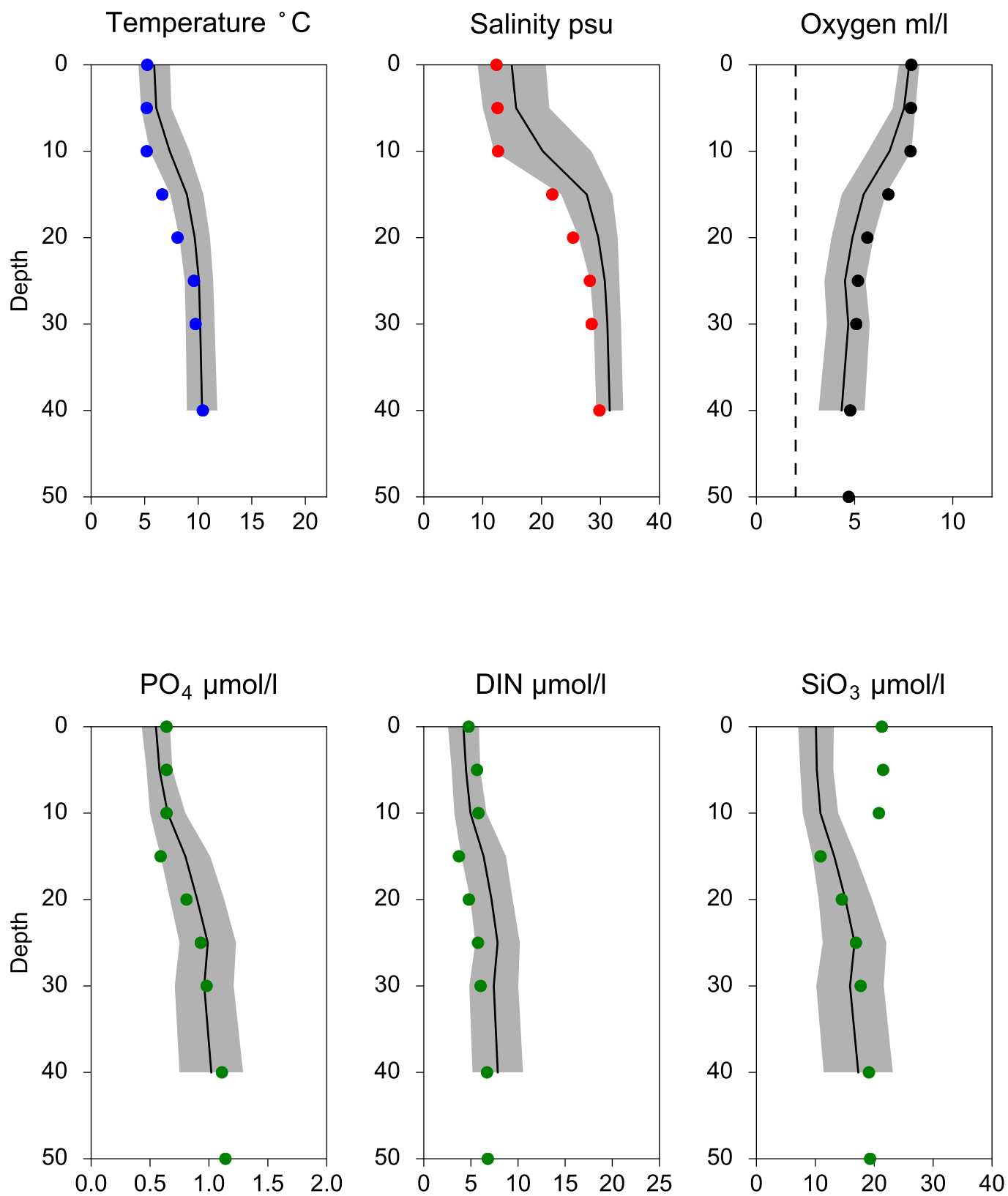


O<sub>2</sub> ml/l



# Vertical profiles W LANDSKRONA December

— Mean 2001-2015    ■ St.Dev.    ● 2017-12-14



## STATION BY1 SURFACE WATER (0-10 m)

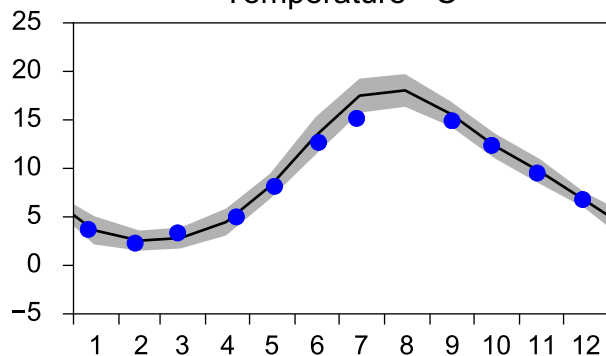
Annual Cycles

— Mean 2001-2015

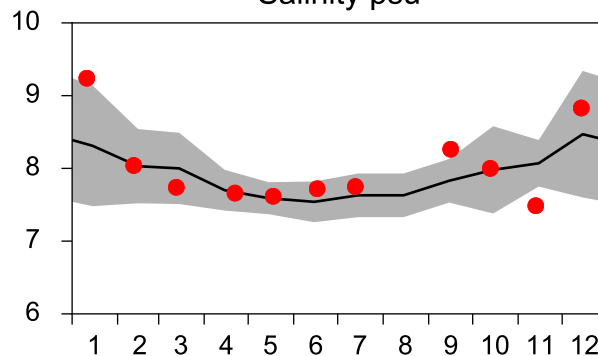
■ St.Dev.

● 2017

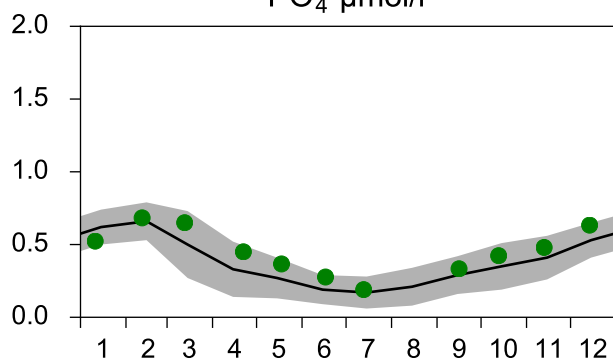
Temperature °C



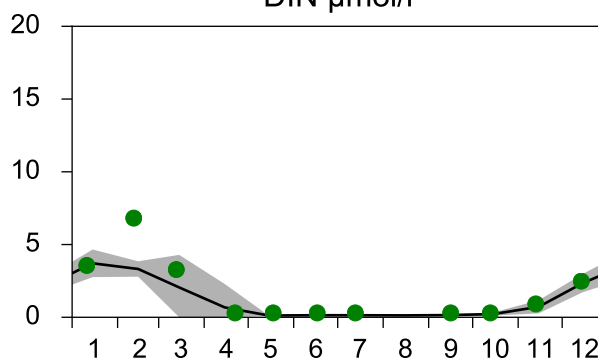
Salinity psu



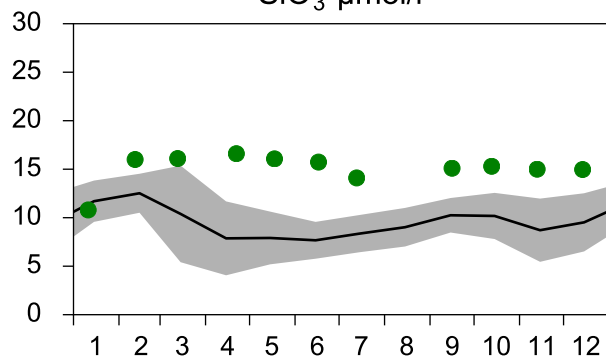
PO<sub>4</sub> µmol/l



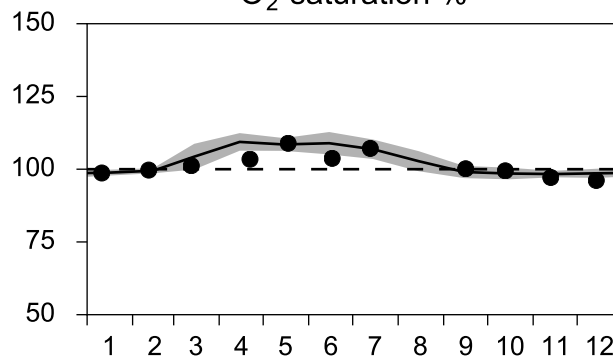
DIN µmol/l



SiO<sub>3</sub> µmol/l

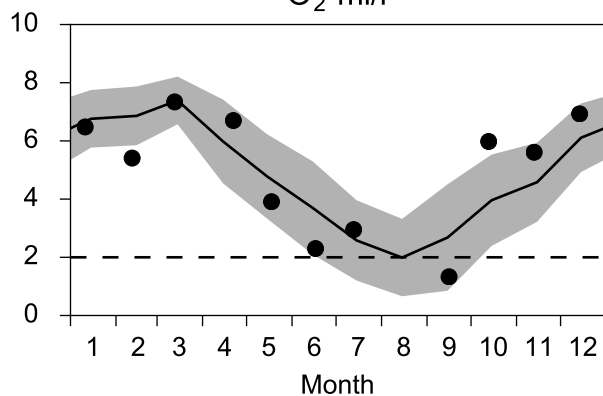


O<sub>2</sub> saturation %

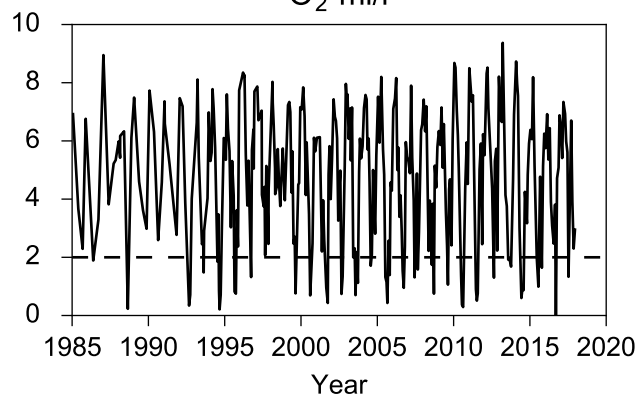


## OXYGEN IN BOTTOM WATER (depth >= 40 m)

O<sub>2</sub> ml/l

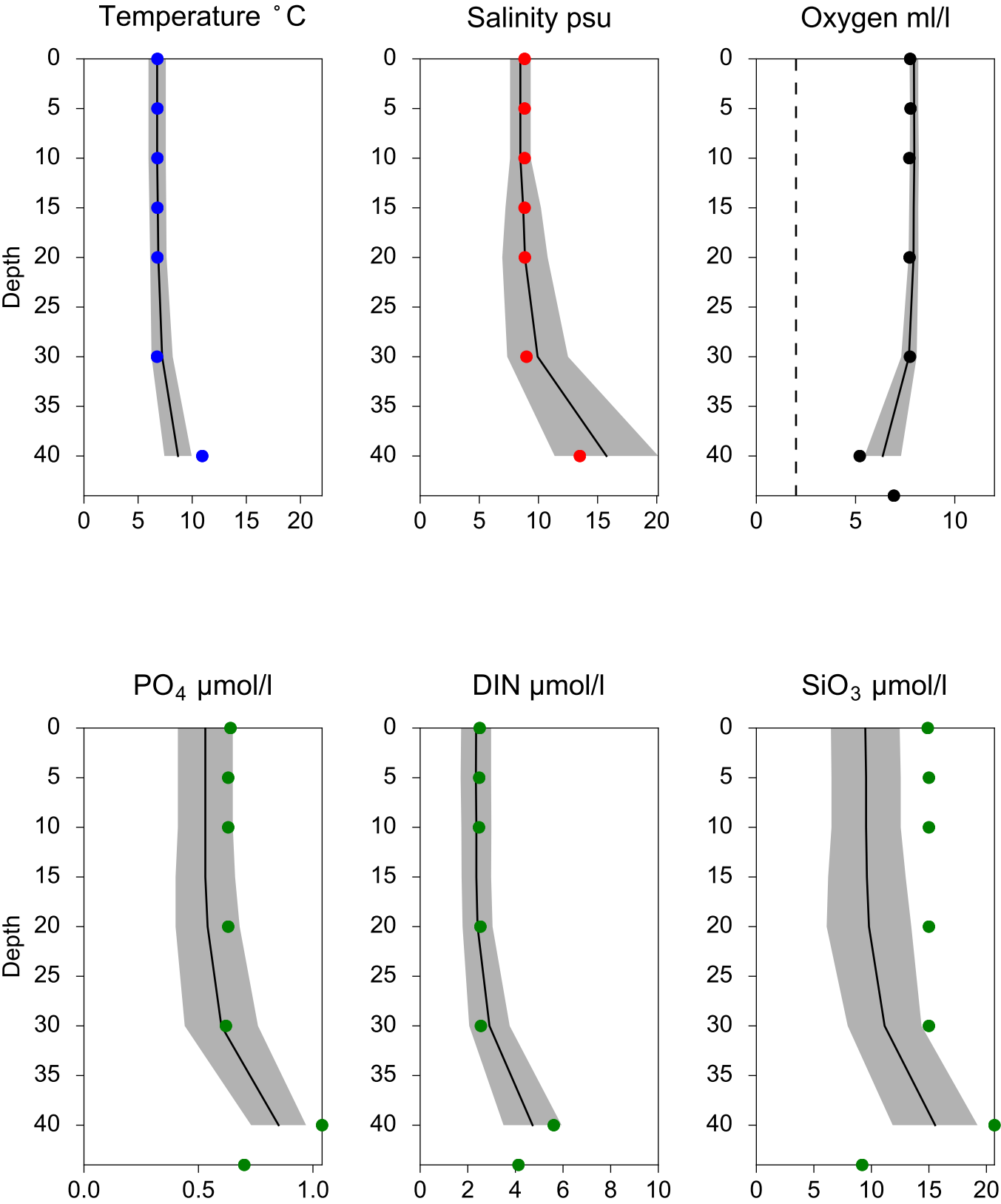


O<sub>2</sub> ml/l



**Vertical profiles BY1  
December**

— Mean 2001-2015    ■ St.Dev.    ● 2017-12-14





# STATION BY2 ARKONA SURFACE WATER (0-10 m)

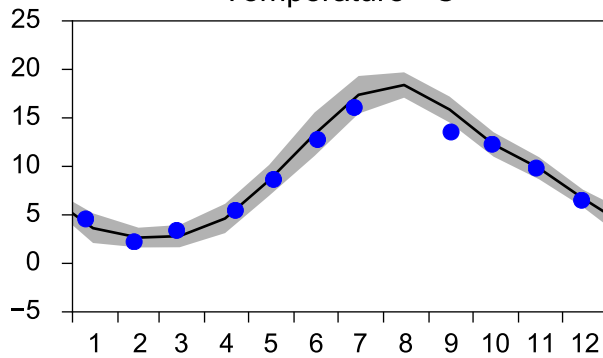
Annual Cycles

— Mean 2001-2015

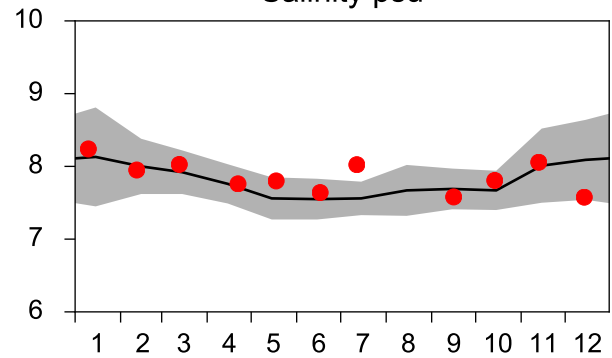
■ St.Dev.

● 2017

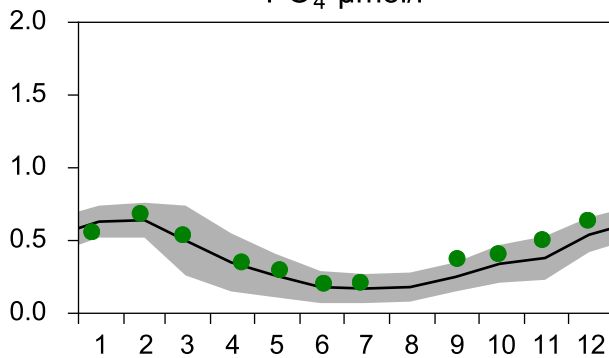
Temperature °C



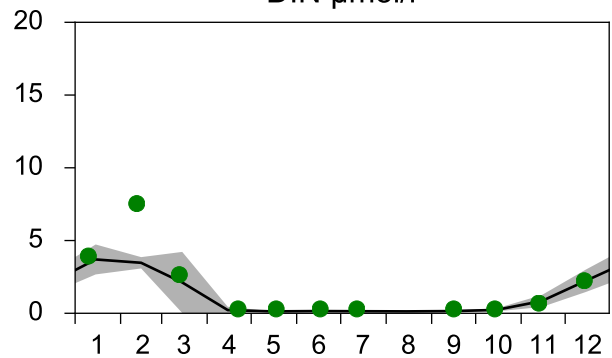
Salinity psu



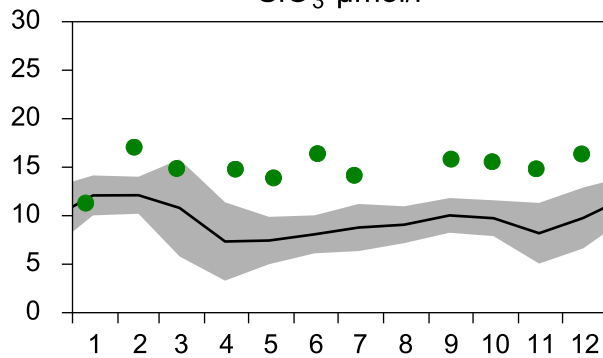
PO<sub>4</sub> µmol/l



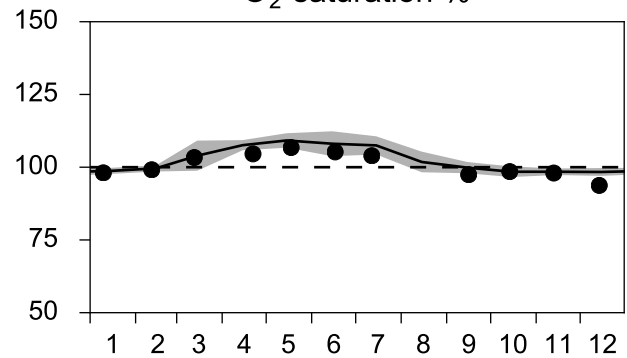
DIN µmol/l



SiO<sub>3</sub> µmol/l

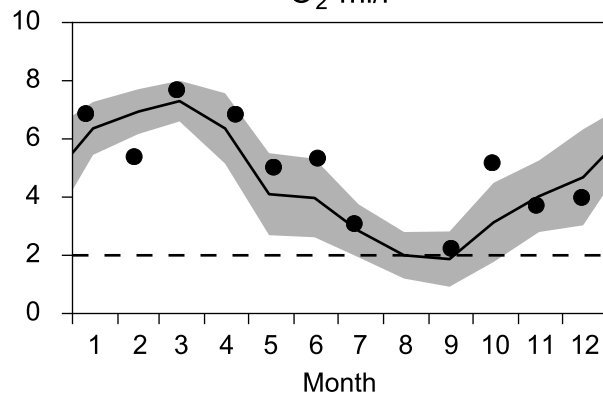


O<sub>2</sub> saturation %

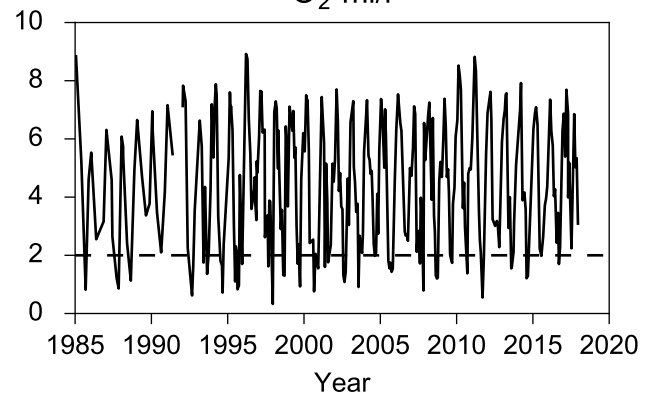


## OXYGEN IN BOTTOM WATER (depth >= 40 m)

O<sub>2</sub> ml/l

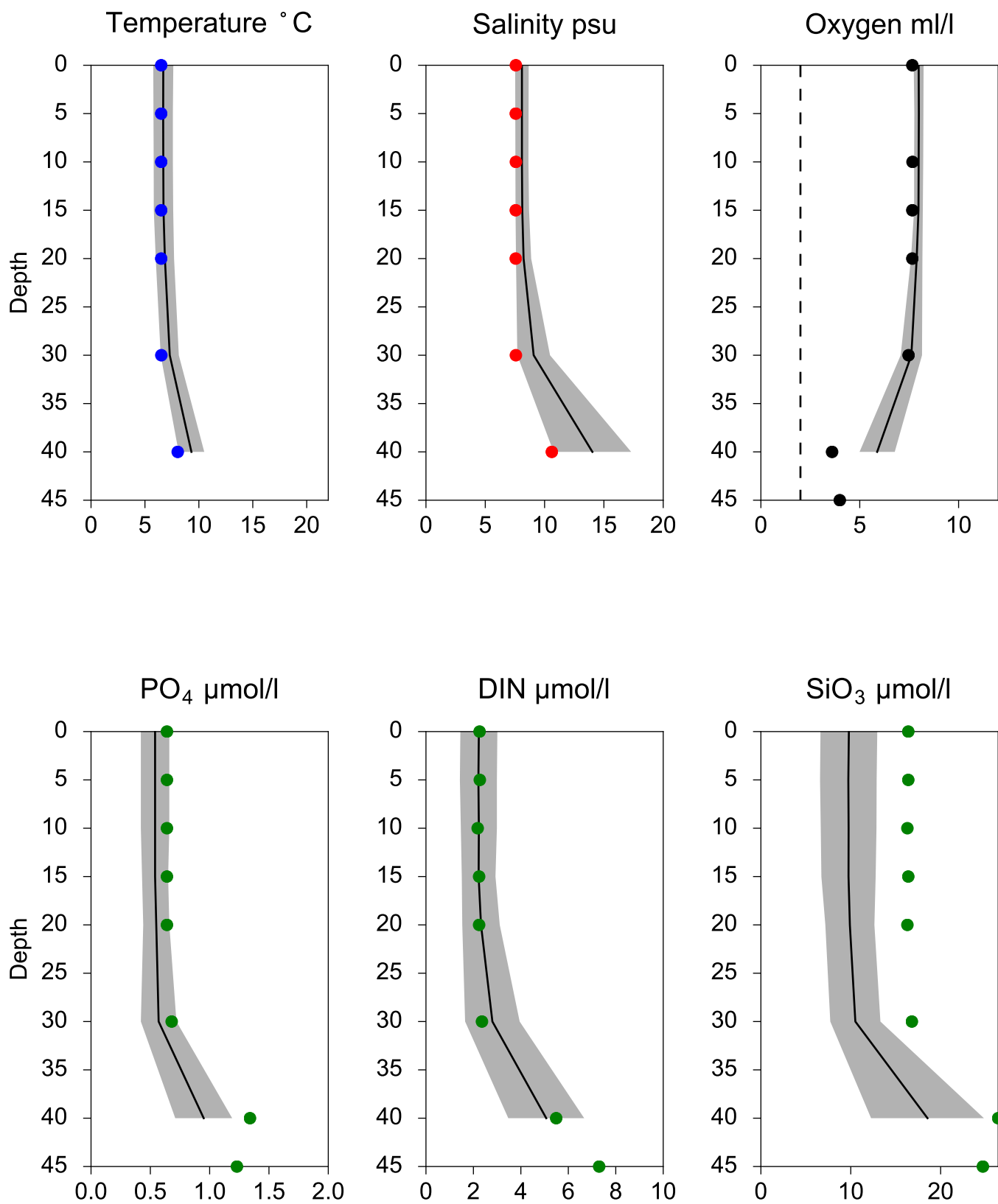


O<sub>2</sub> ml/l



# Vertical profiles BY2 ARKONA December

— Mean 2001-2015    ■ St.Dev.    ● 2017-12-14



# STATION BY4 CHRISTIANSÖ SURFACE WATER (0-10 m)

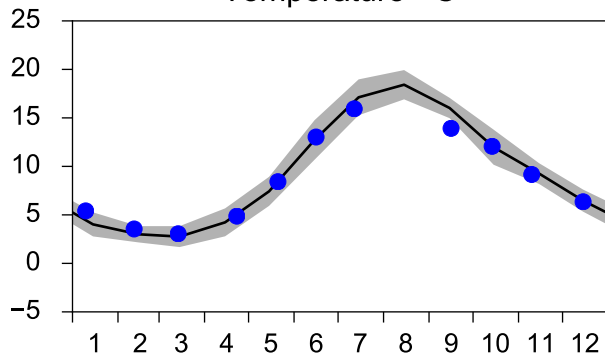
Annual Cycles

— Mean 2001-2015

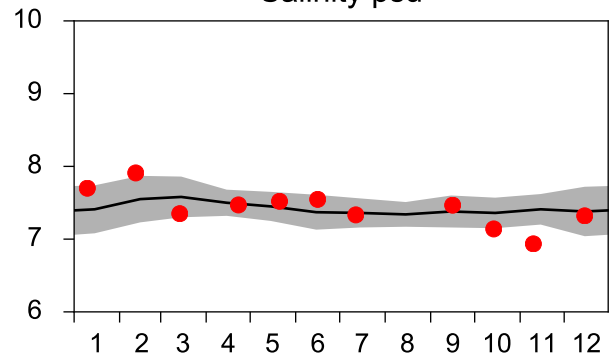
■ St.Dev.

● 2017

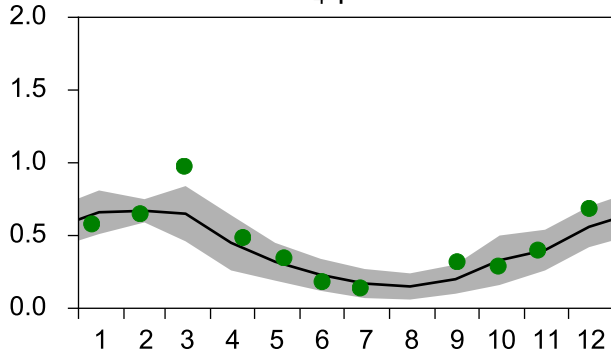
Temperature °C



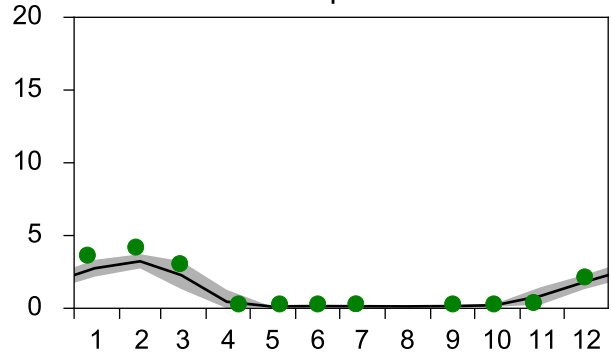
Salinity psu



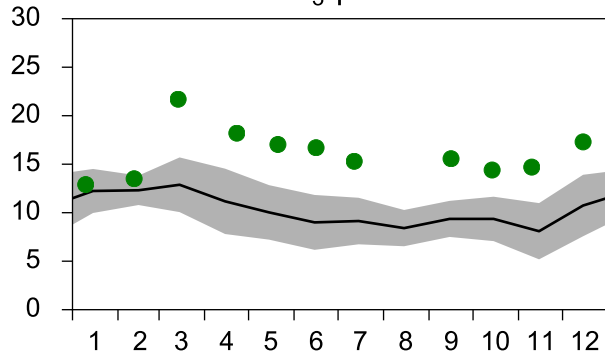
PO<sub>4</sub> µmol/l



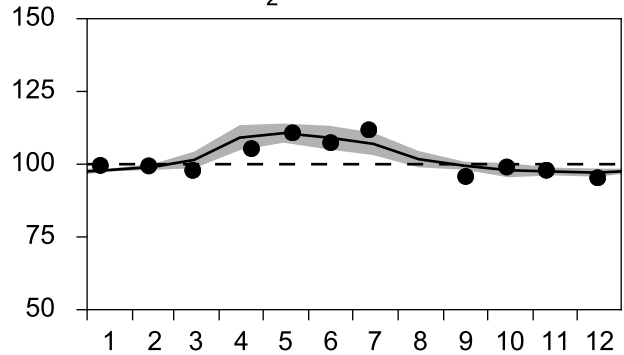
DIN µmol/l



SiO<sub>3</sub> µmol/l

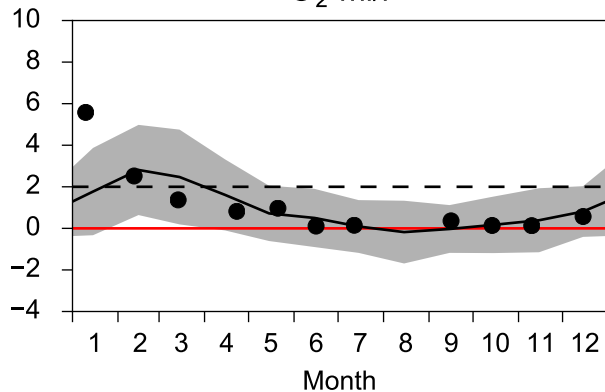


O<sub>2</sub> saturation %

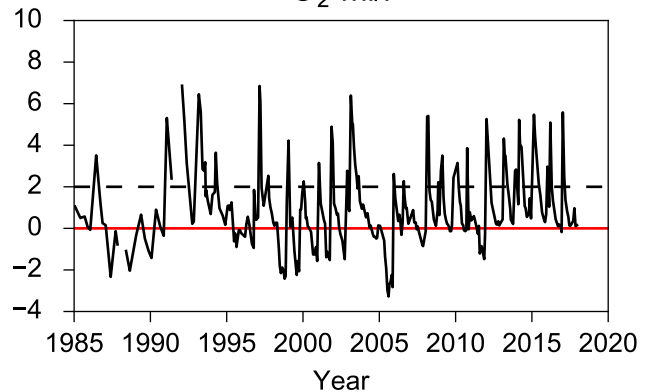


## OXYGEN IN BOTTOM WATER (depth >= 80 m)

O<sub>2</sub> ml/l

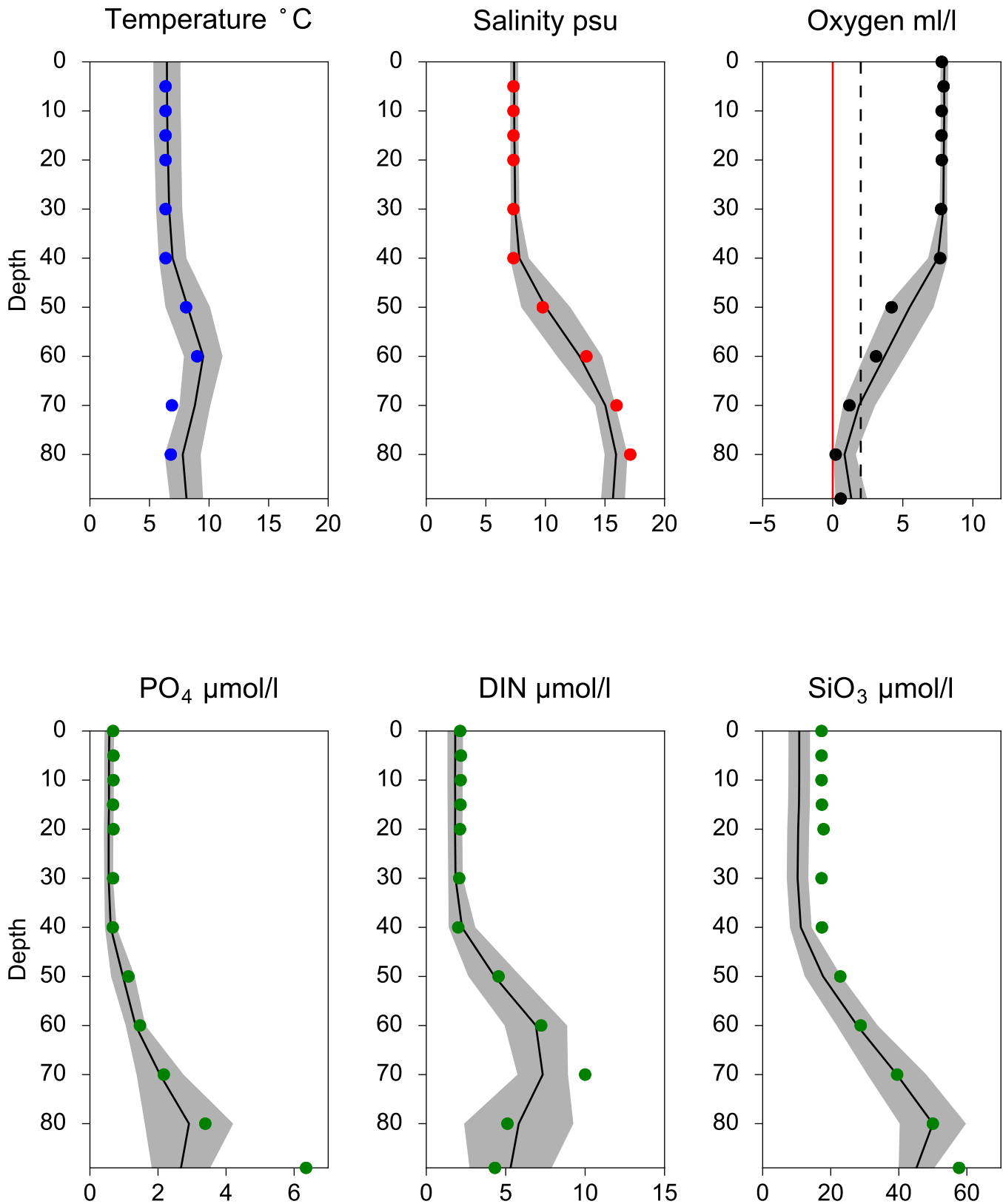


O<sub>2</sub> ml/l



# Vertical profiles BY4 CHRISTIANSÖ December

— Mean 2001-2015    ■ St.Dev.    ● 2017-12-15



# STATION BY5 BORNHOLMSDJ SURFACE WATER (0-10 m)

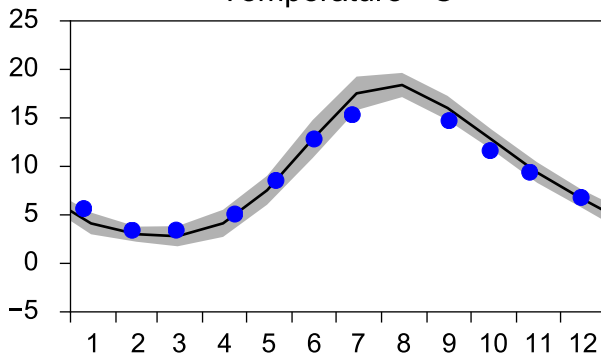
Annual Cycles

— Mean 2001-2015

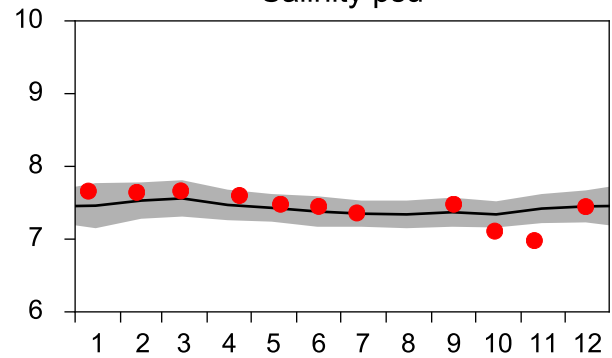
■ St.Dev.

● 2017

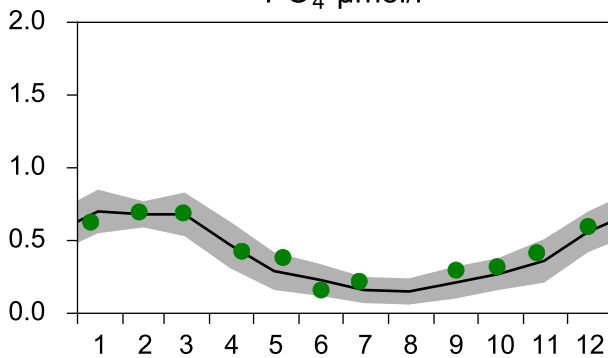
Temperature °C



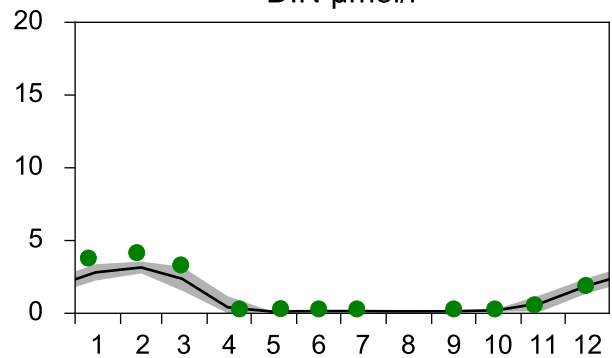
Salinity psu



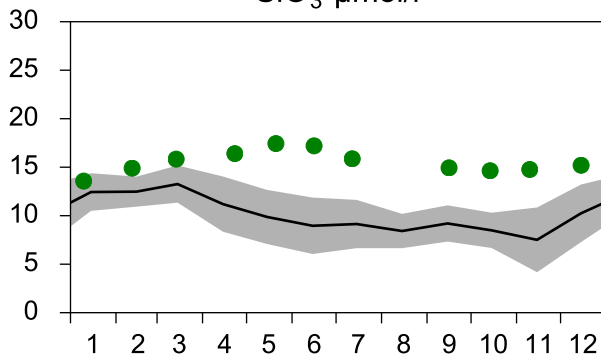
PO<sub>4</sub> µmol/l



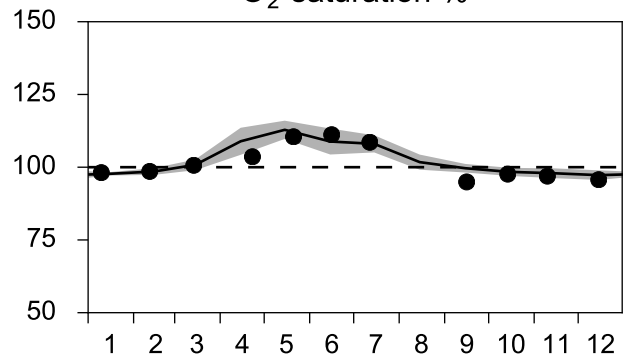
DIN µmol/l



SiO<sub>3</sub> µmol/l

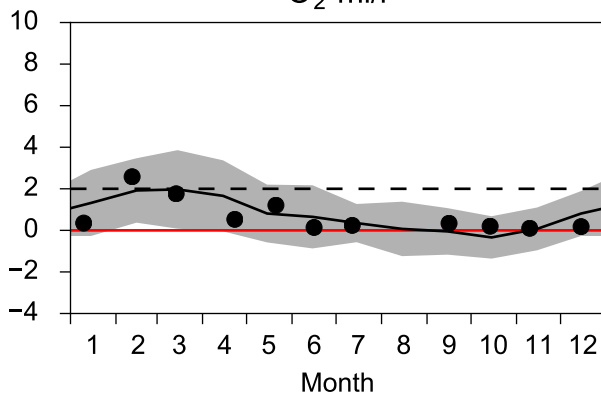


O<sub>2</sub> saturation %

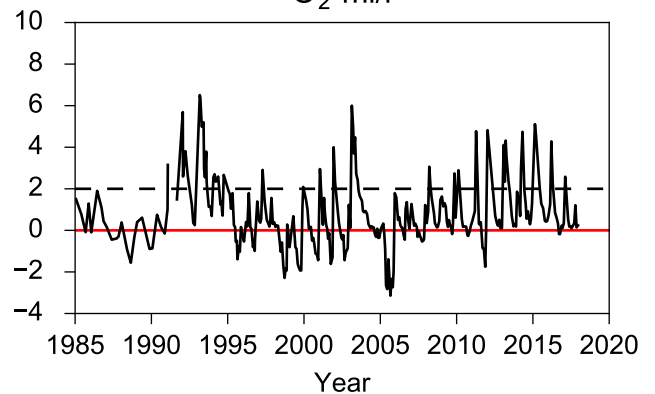


## OXYGEN IN BOTTOM WATER (depth >= 80 m)

O<sub>2</sub> ml/l

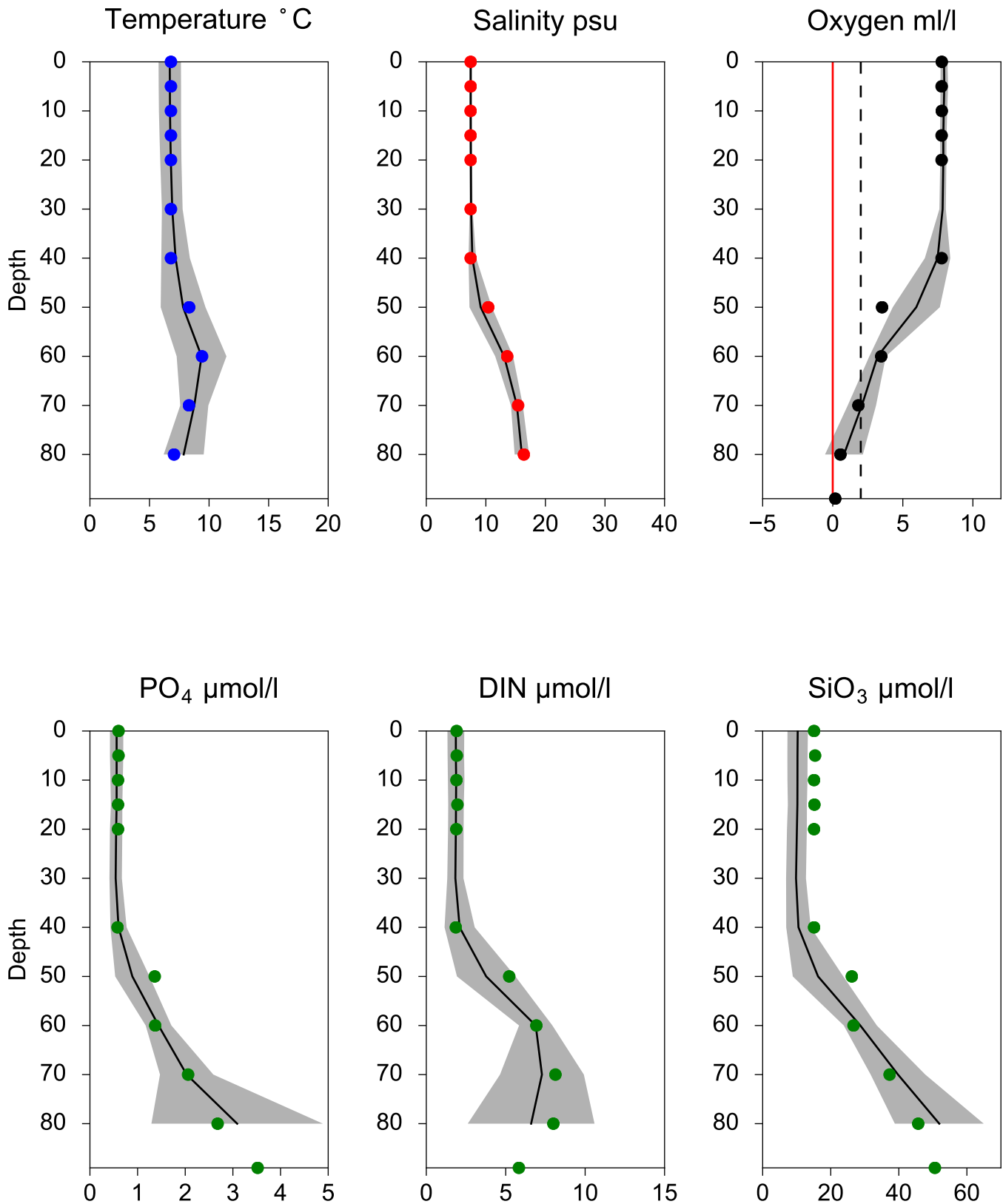


O<sub>2</sub> ml/l



# Vertical profiles BY5 BORNHOLMSDJ December

— Mean 2001-2015    ■ St.Dev.    ● 2017-12-15



# STATION BY10 SURFACE WATER (0-10 m)

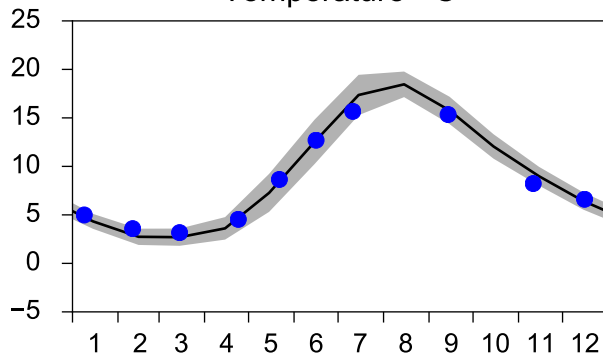
Annual Cycles

— Mean 2001-2015

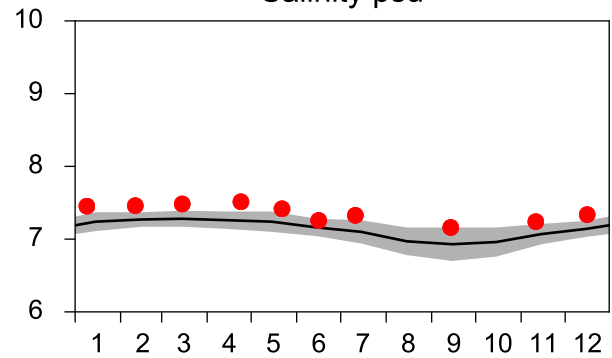
■ St.Dev.

● 2017

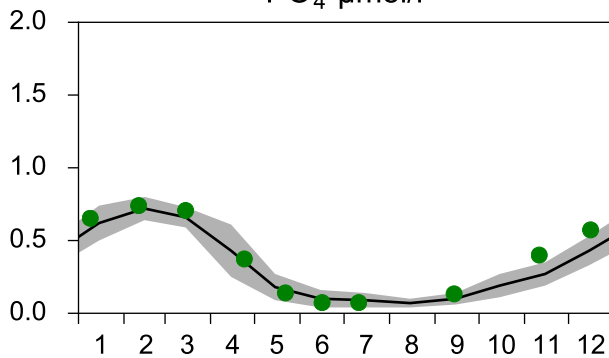
Temperature °C



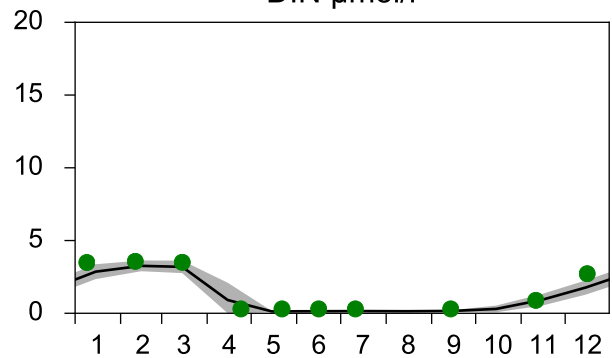
Salinity psu



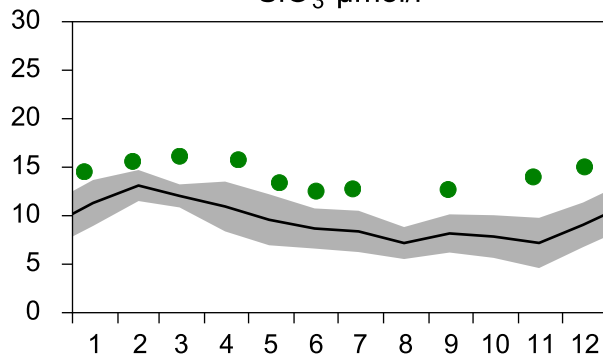
PO<sub>4</sub> µmol/l



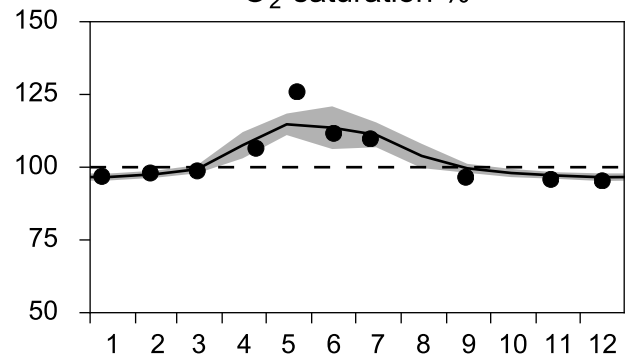
DIN µmol/l



SiO<sub>3</sub> µmol/l

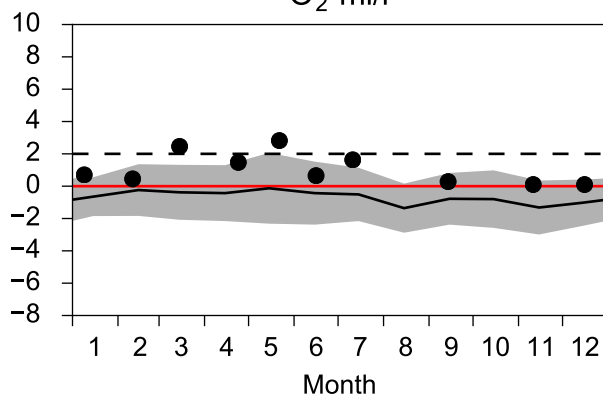


O<sub>2</sub> saturation %

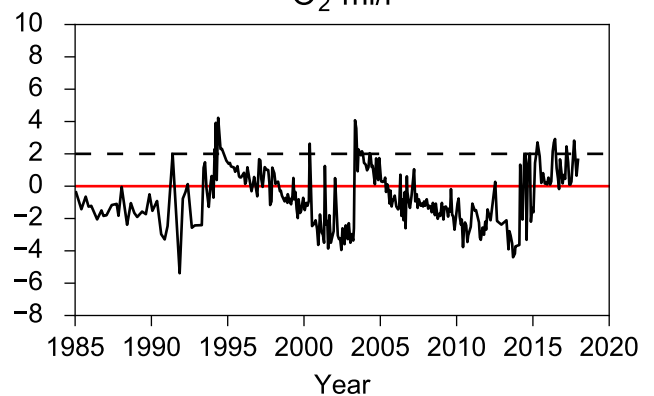


## OXYGEN IN BOTTOM WATER (depth >= 125 m)

O<sub>2</sub> ml/l

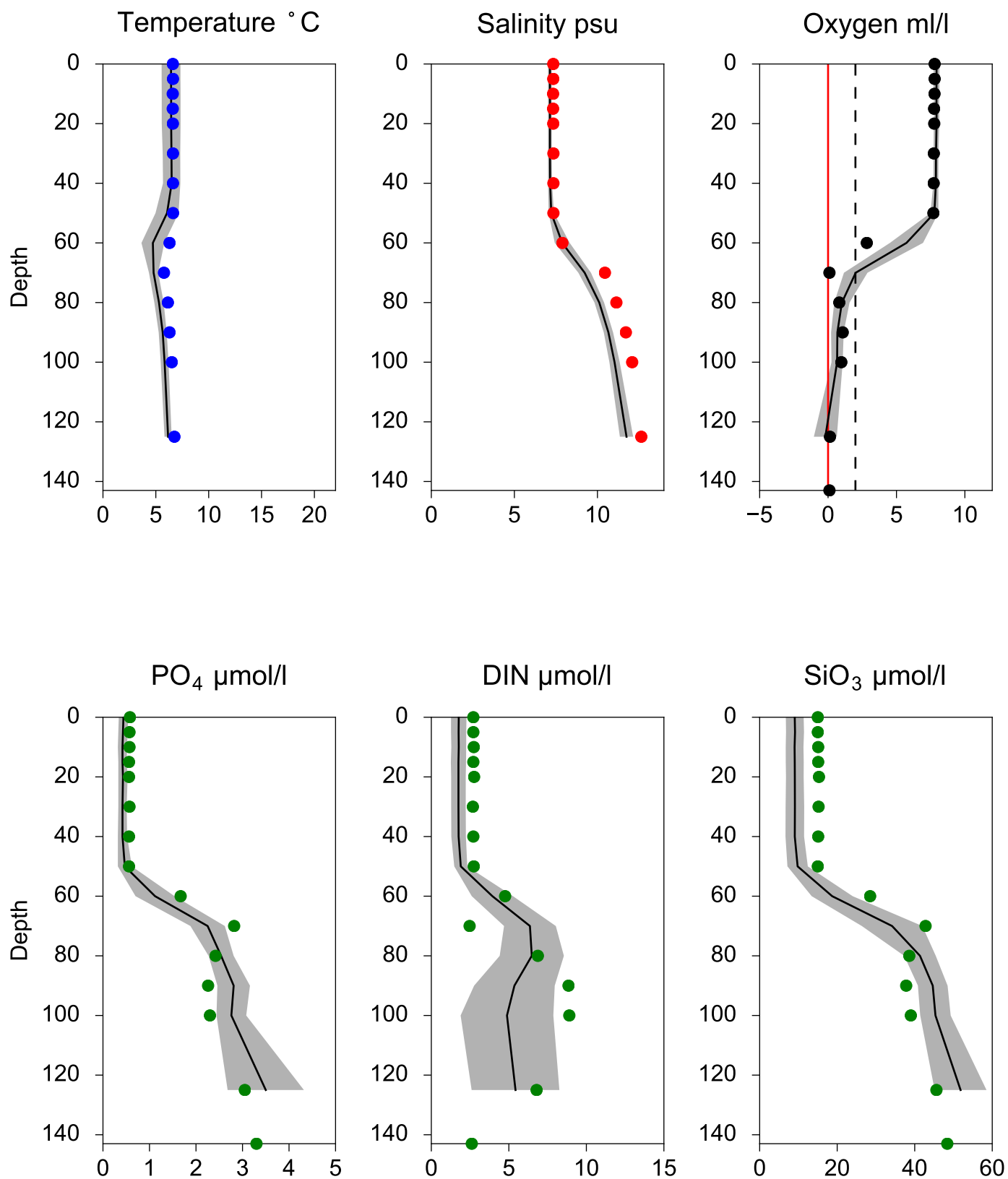


O<sub>2</sub> ml/l



# Vertical profiles BY10 December

— Mean 2001-2015    ■ St.Dev.    ● 2017-12-16





# STATION BY15 GOTLANDSDJ SURFACE WATER (0-10 m)

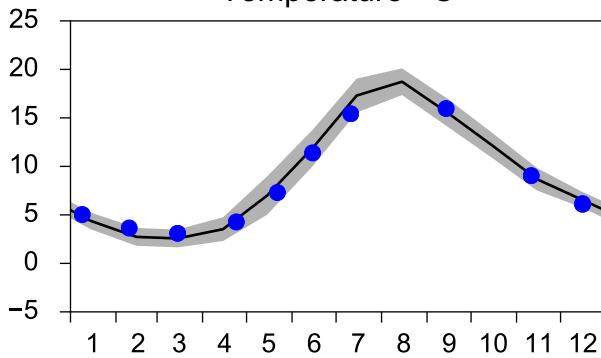
Annual Cycles

— Mean 2001-2015

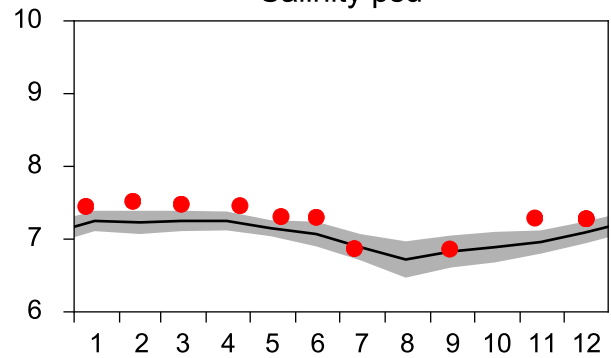
■ St.Dev.

● 2017

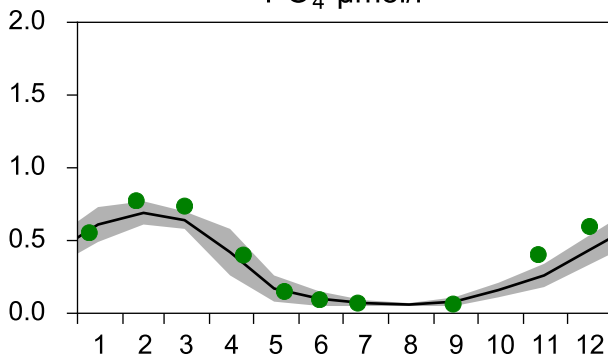
Temperature °C



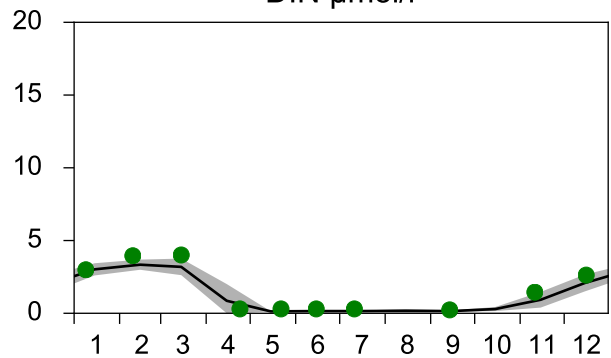
Salinity psu



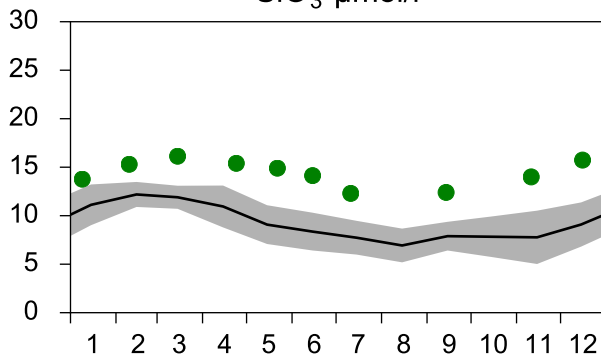
PO<sub>4</sub> µmol/l



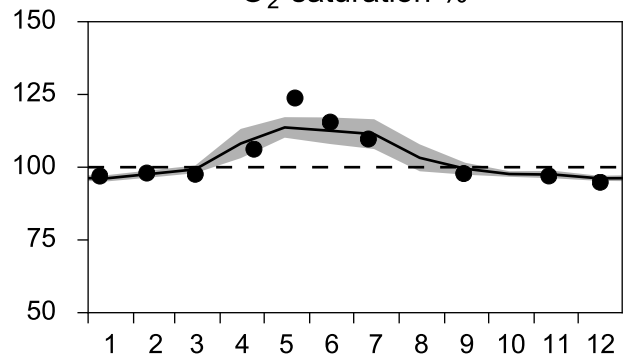
DIN µmol/l



SiO<sub>3</sub> µmol/l

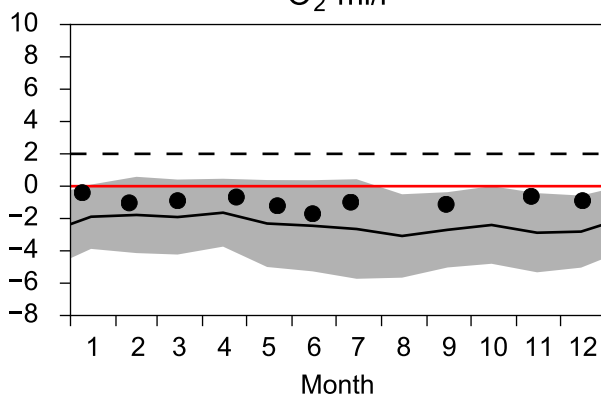


O<sub>2</sub> saturation %

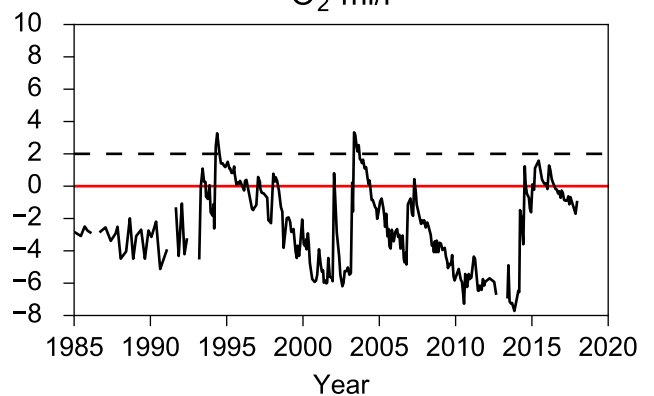


## OXYGEN IN BOTTOM WATER (depth >= 225 m)

O<sub>2</sub> ml/l

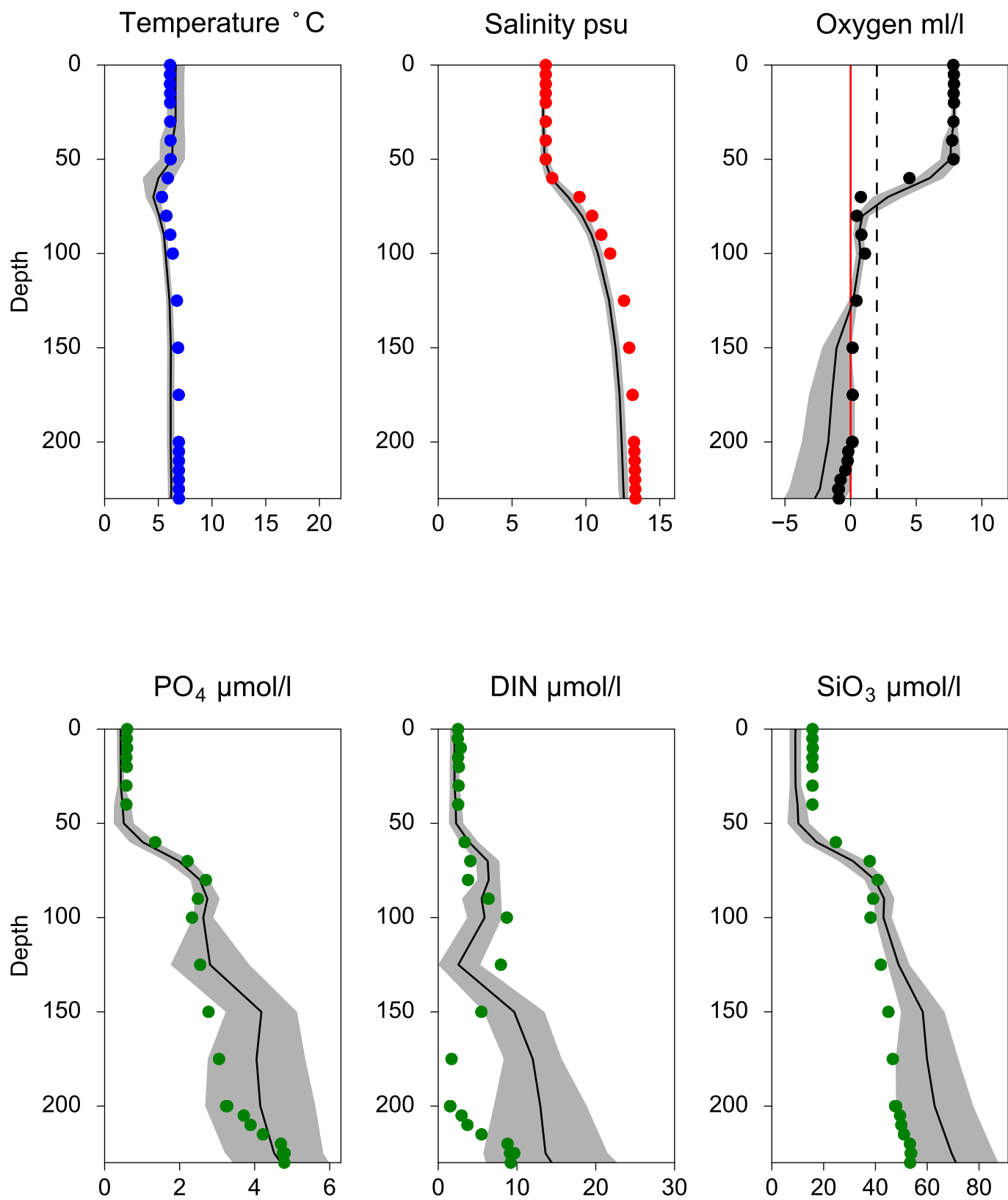


O<sub>2</sub> ml/l



# Vertical profiles BY15 GOTLANDSDJ December

— Mean 2001-2015    St.Dev.    • 2017-12-16



# STATION BY15 GOTLANDSDJ SURFACE WATER (0-10 m)

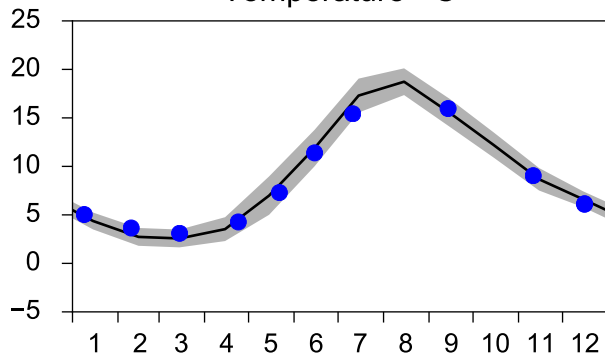
Annual Cycles

— Mean 2001-2015

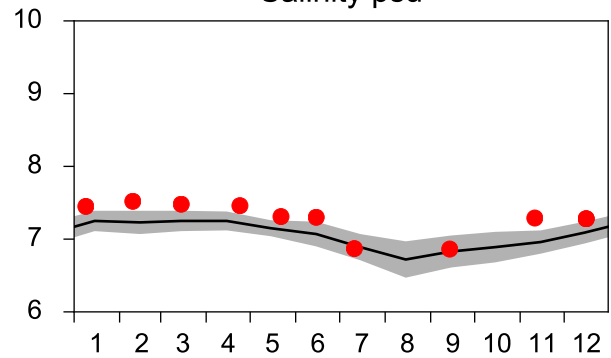
■ St.Dev.

● 2017

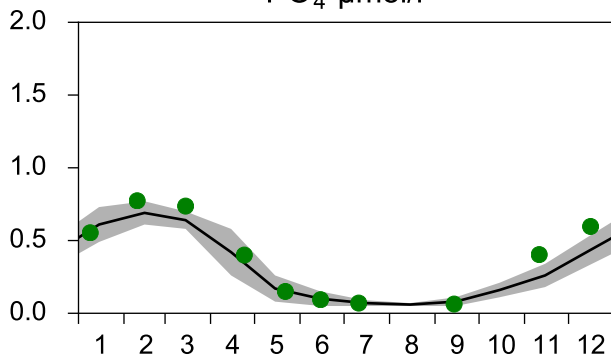
Temperature °C



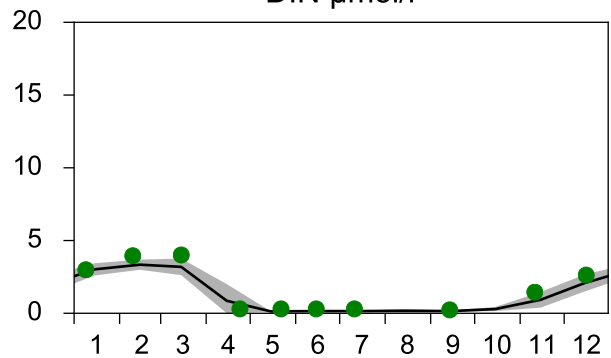
Salinity psu



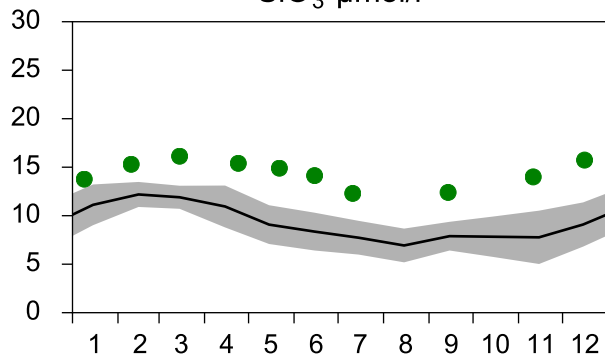
PO<sub>4</sub> µmol/l



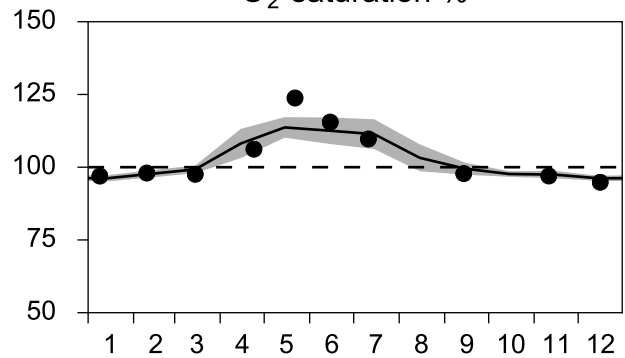
DIN µmol/l



SiO<sub>3</sub> µmol/l

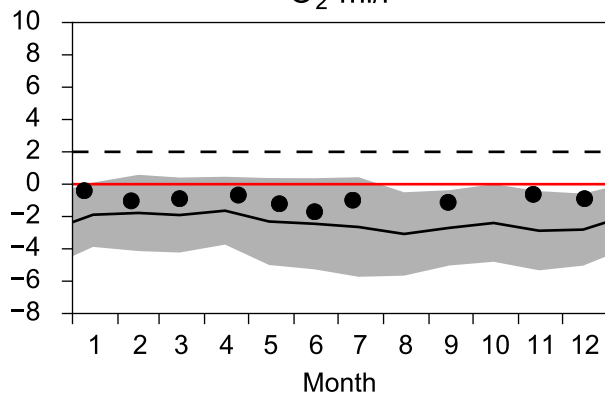


O<sub>2</sub> saturation %

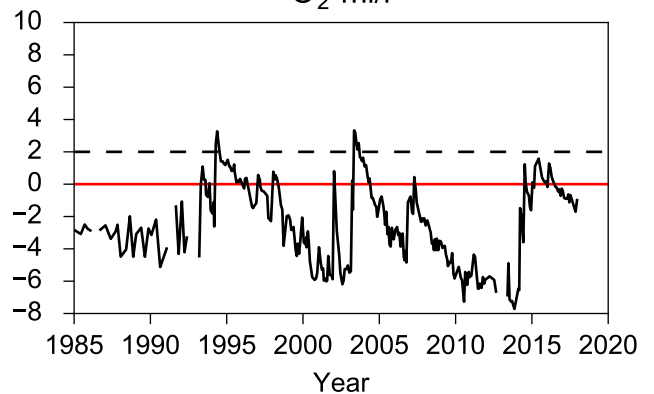


## OXYGEN IN BOTTOM WATER (depth >= 225 m)

O<sub>2</sub> ml/l

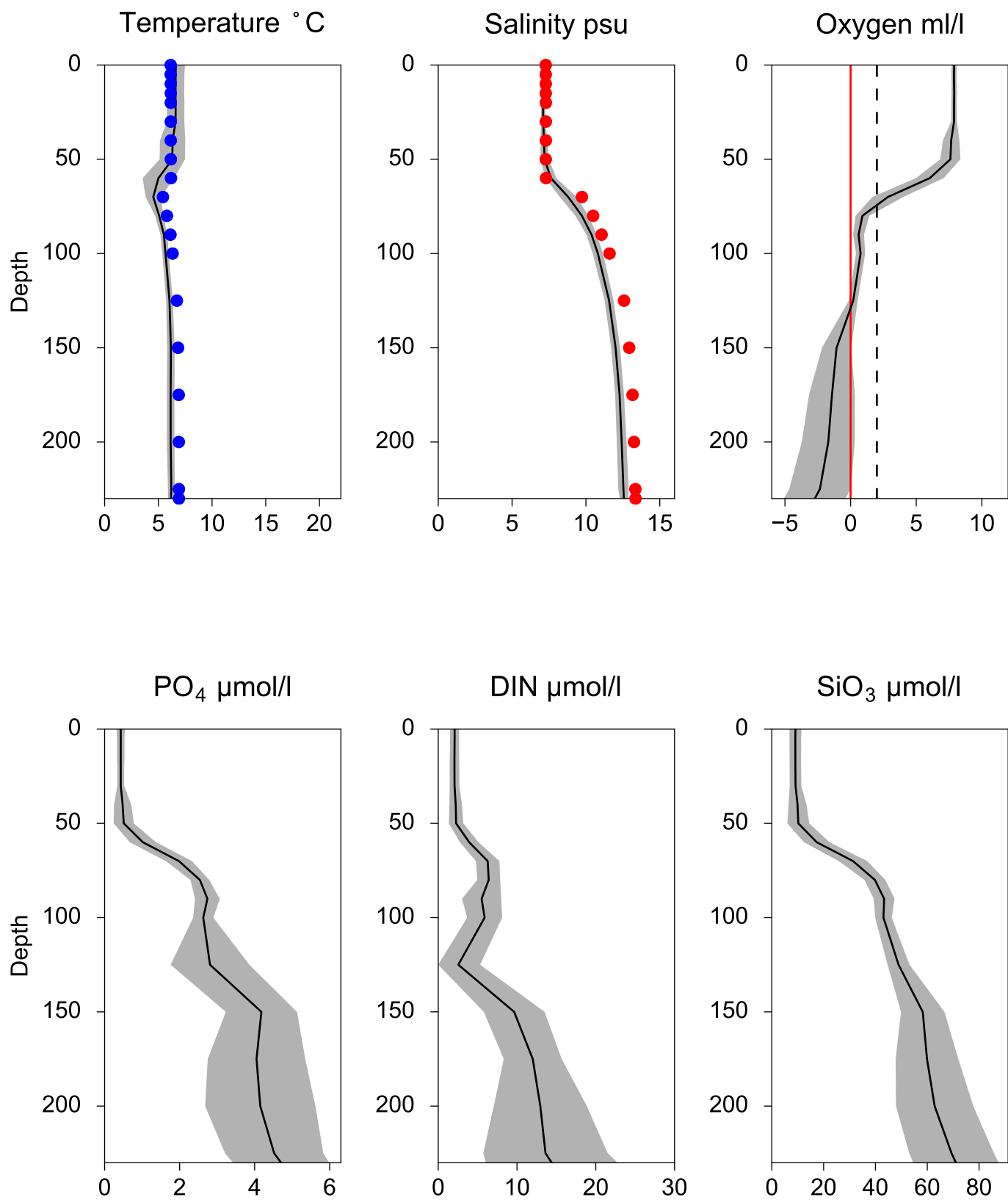


O<sub>2</sub> ml/l



# Vertical profiles BY15 GOTLANDSDJ December

— Mean 2001-2015    ■ St.Dev.    ● 2017-12-16



# STATION BY20 FÅRÖDJ SURFACE WATER (0-10 m)

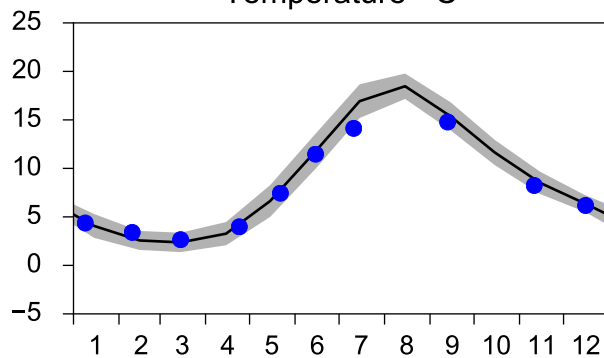
Annual Cycles

— Mean 2001-2015

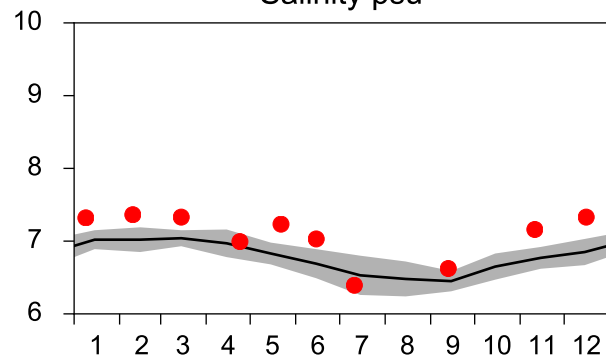
■ St.Dev.

● 2017

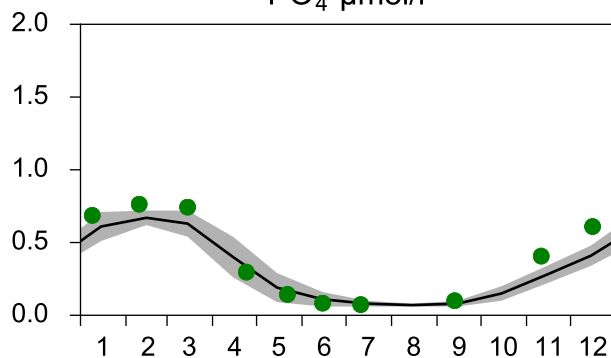
Temperature °C



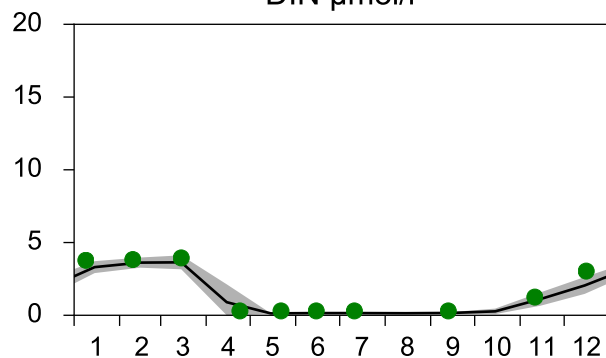
Salinity psu



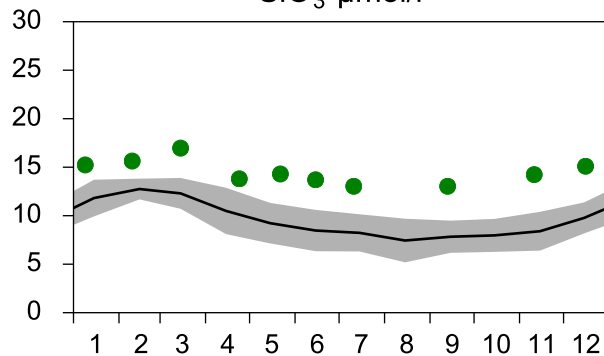
PO<sub>4</sub> µmol/l



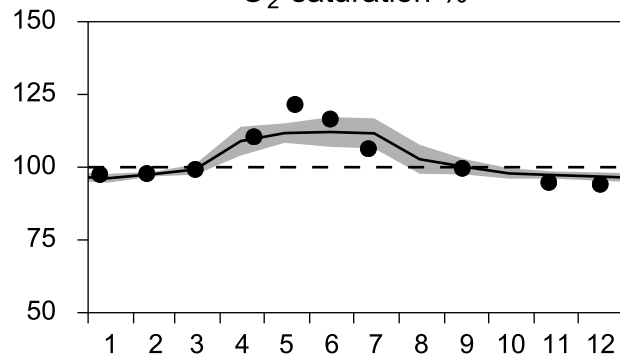
DIN µmol/l



SiO<sub>3</sub> µmol/l

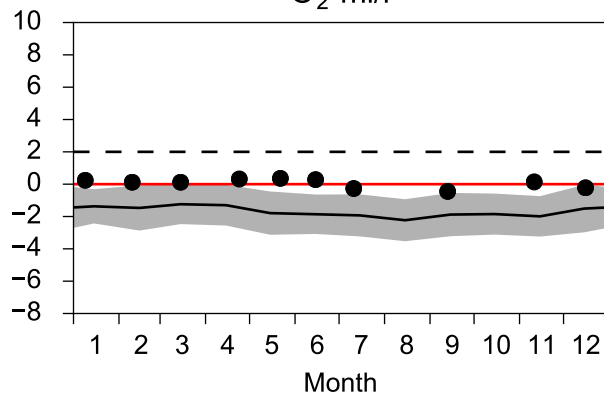


O<sub>2</sub> saturation %

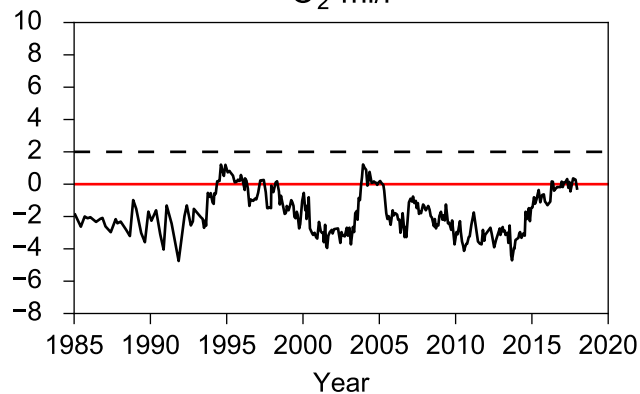


## OXYGEN IN BOTTOM WATER (depth >= 175 m)

O<sub>2</sub> ml/l

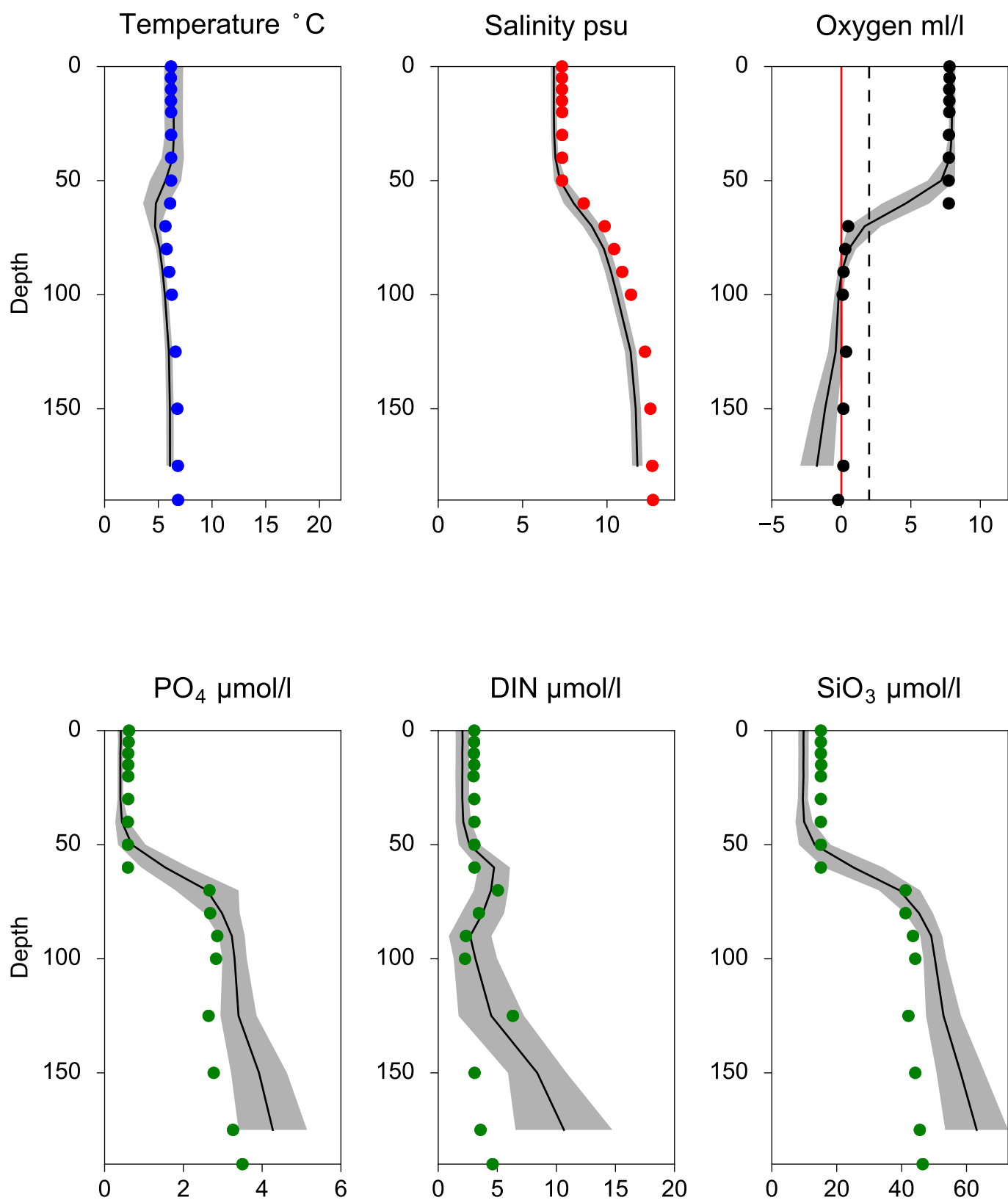


O<sub>2</sub> ml/l



# Vertical profiles BY20 FÅRÖDJ December

— Mean 2001-2015    St.Dev.    • 2017-12-16



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

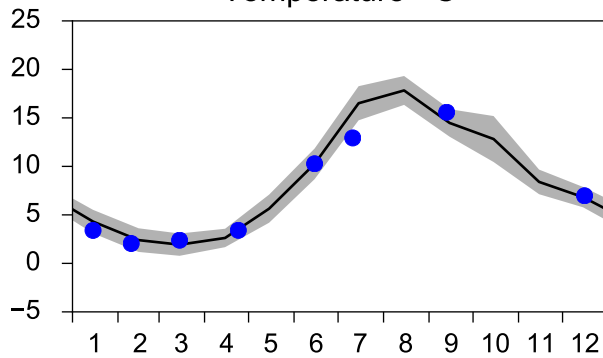
Annual Cycles

— Mean 2001-2015

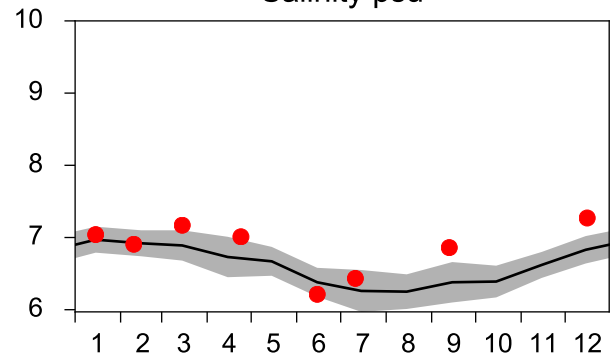
■ St.Dev.

● 2017

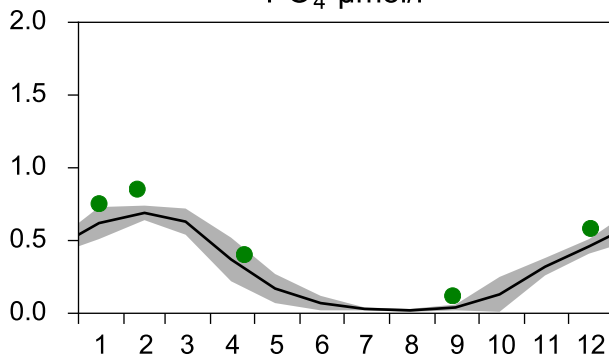
Temperature °C



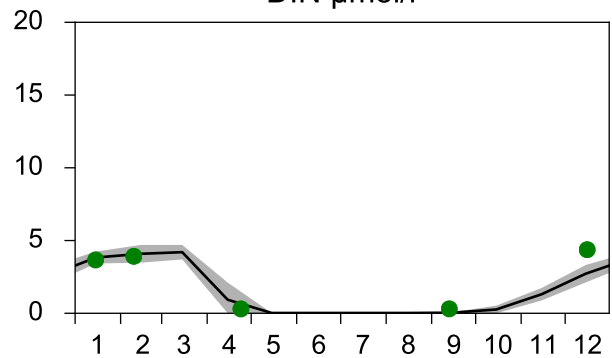
Salinity psu



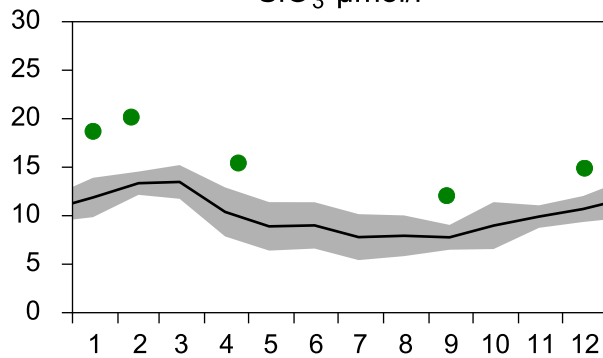
PO<sub>4</sub> µmol/l



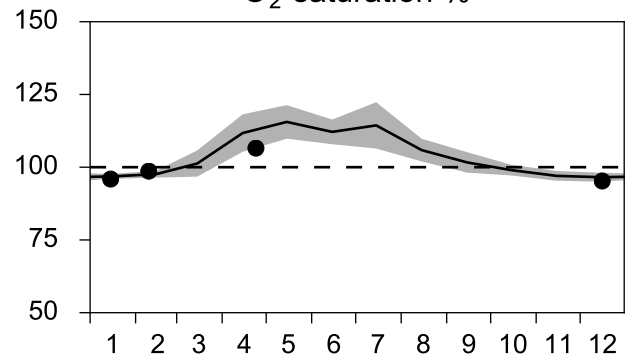
DIN µmol/l



SiO<sub>3</sub> µmol/l

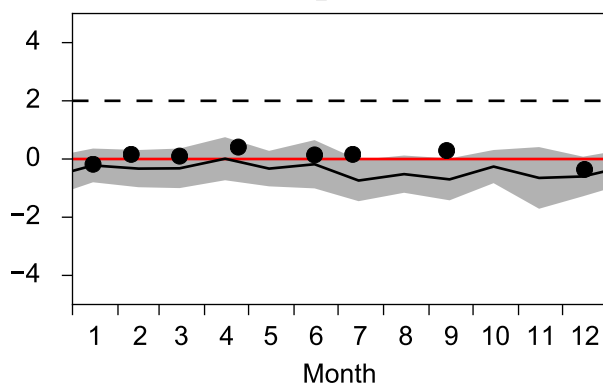


O<sub>2</sub> saturation %

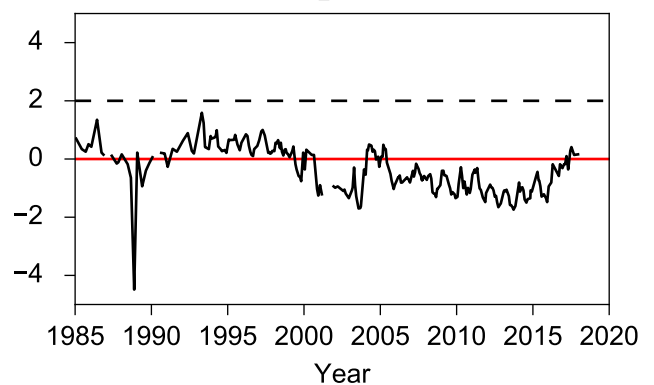


## OXYGEN IN BOTTOM WATER (depth >= 150 m)

O<sub>2</sub> ml/l

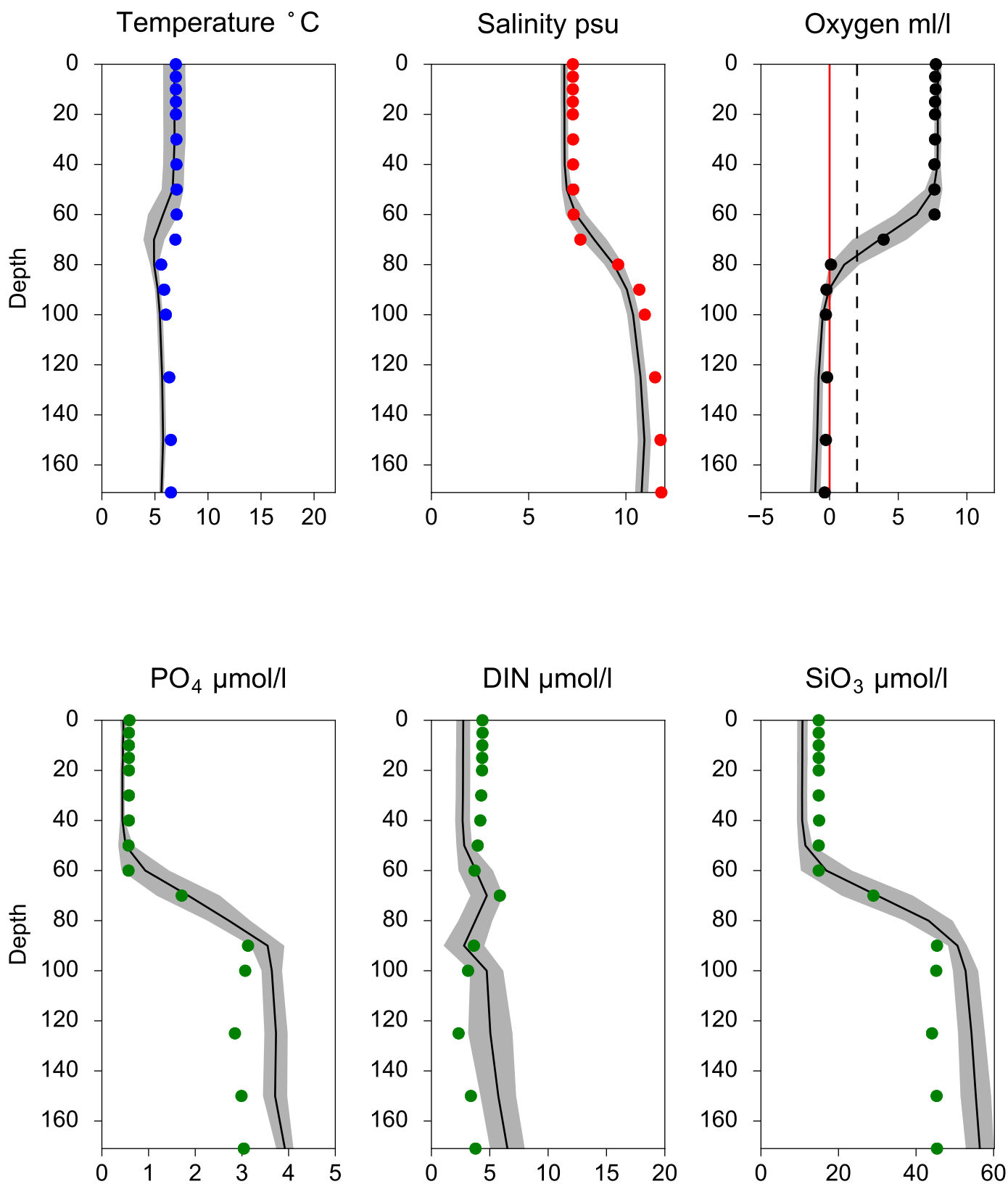


O<sub>2</sub> ml/l



# Vertical profiles BY29 / LL19 December

— Mean 2001-2015    St.Dev.    • 2017-12-16





# STATION BY31 LANDSORTSDJ SURFACE WATER (0-10 m)

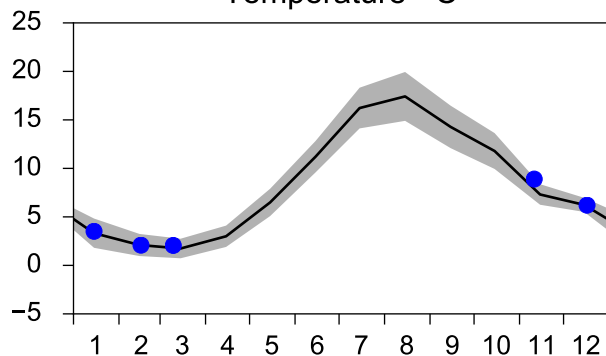
Annual Cycles

— Mean 2001-2015

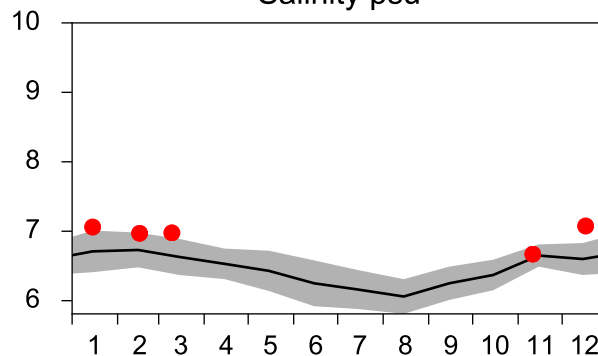
■ St.Dev.

● 2017

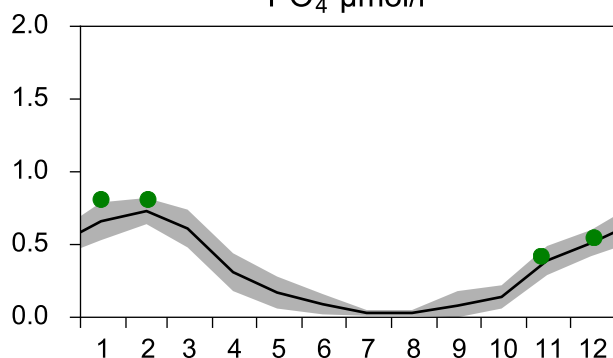
Temperature °C



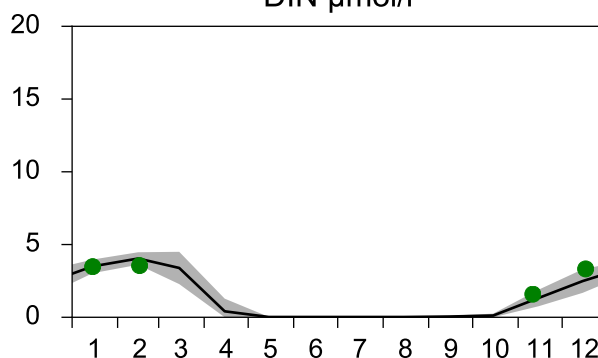
Salinity psu



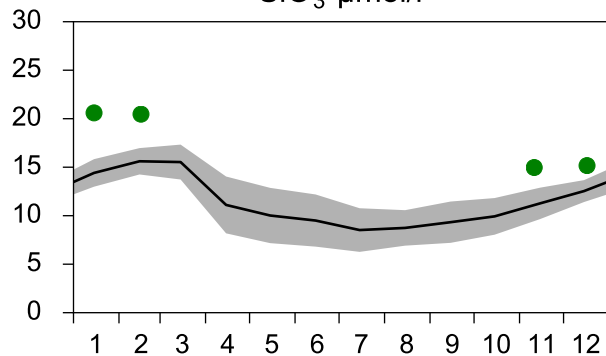
PO<sub>4</sub> µmol/l



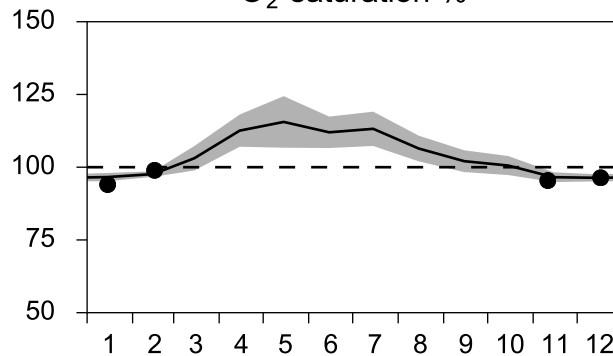
DIN µmol/l



SiO<sub>3</sub> µmol/l

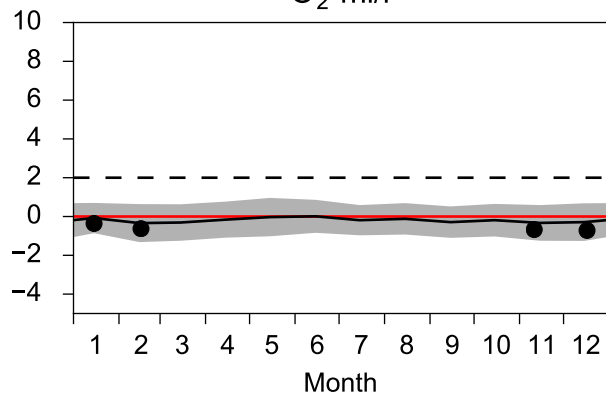


O<sub>2</sub> saturation %

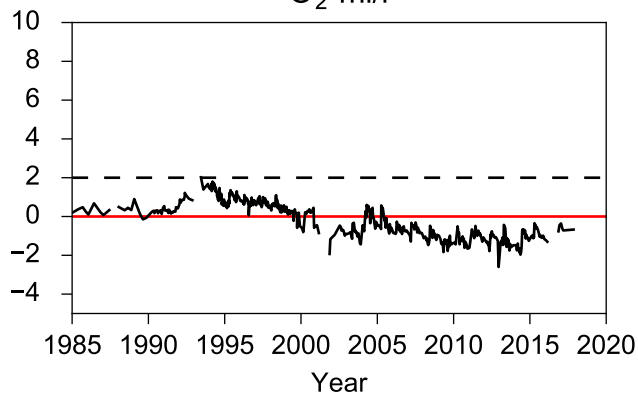


## OXYGEN IN BOTTOM WATER (depth >= 425 m)

O<sub>2</sub> ml/l

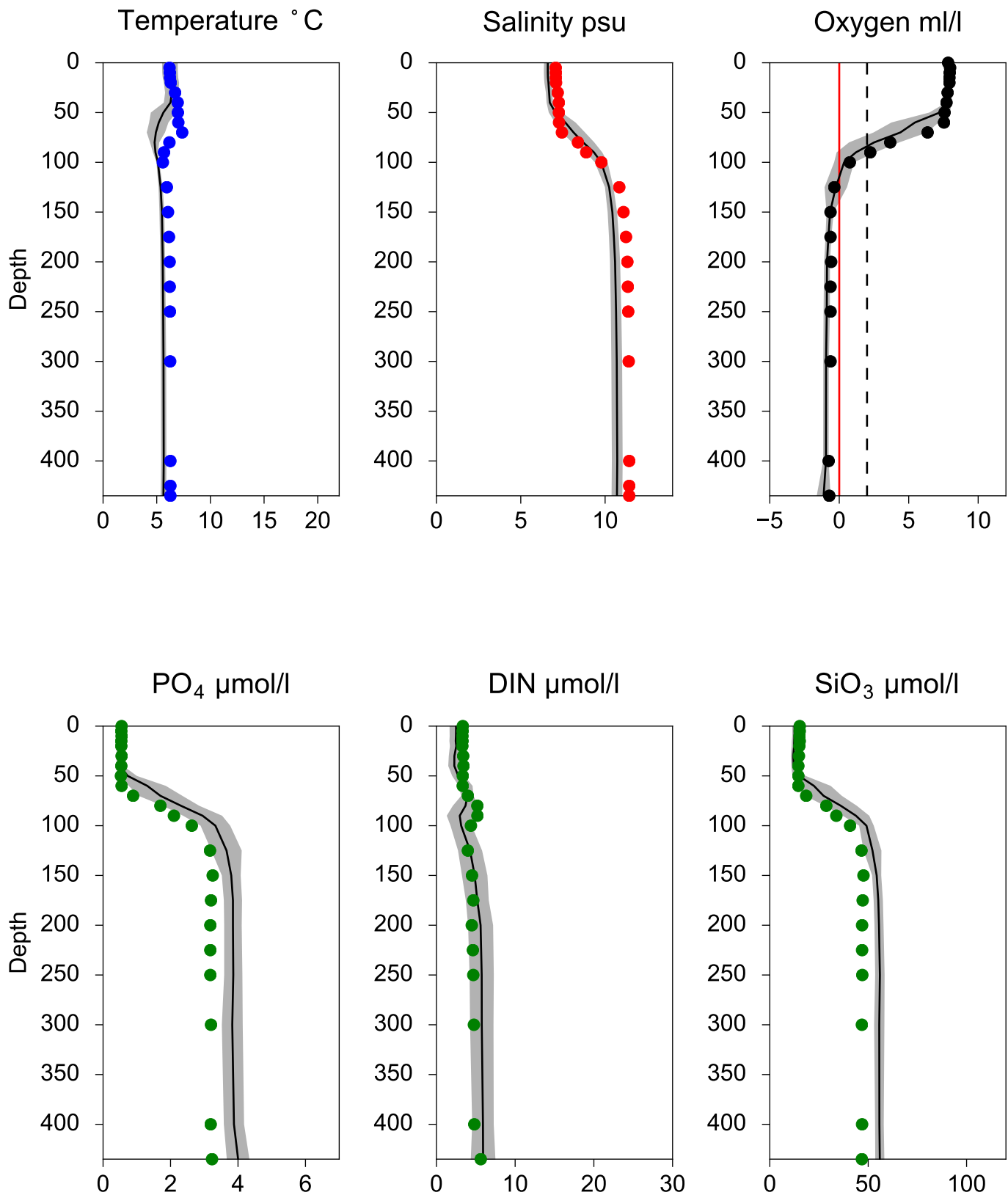


O<sub>2</sub> ml/l



# Vertical profiles BY31 LANDSORTSDJ December

— Mean 2001-2015    ■ St.Dev.    ● 2017-12-17



# STATION BY32 NORRKÖPINGSDJ SURFACE WATER (0-10 m)

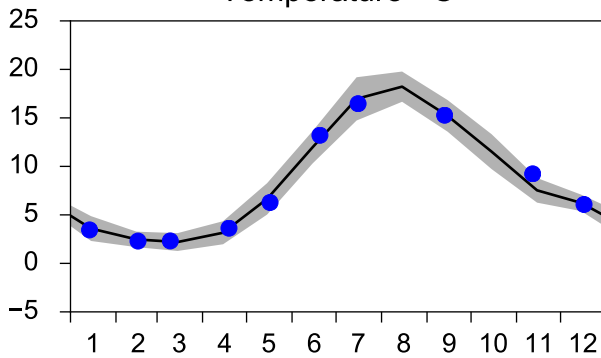
Annual Cycles

— Mean 2001-2015

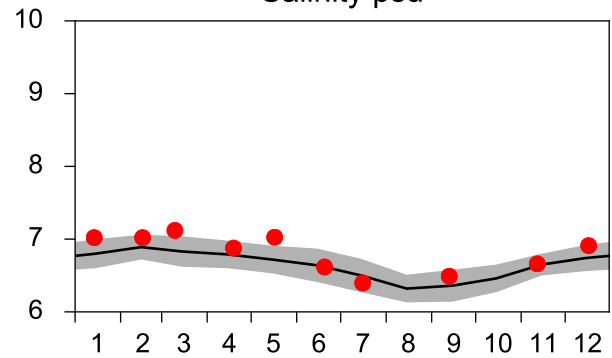
■ St.Dev.

● 2017

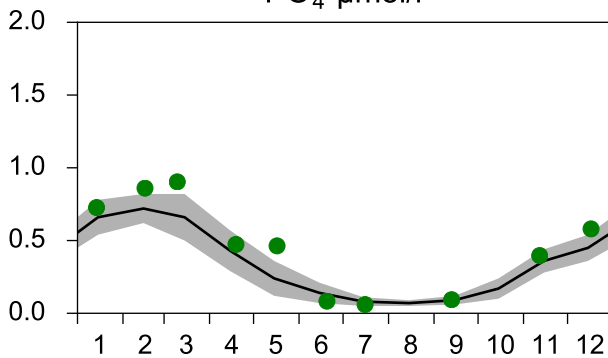
Temperature °C



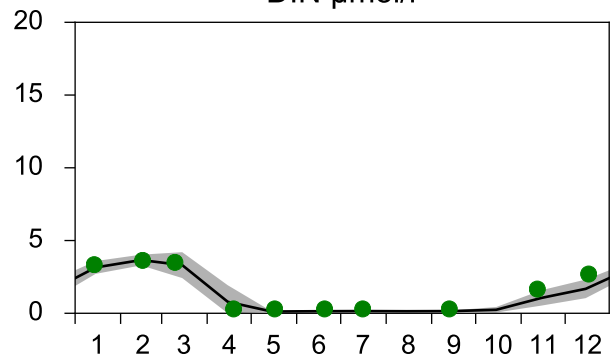
Salinity psu



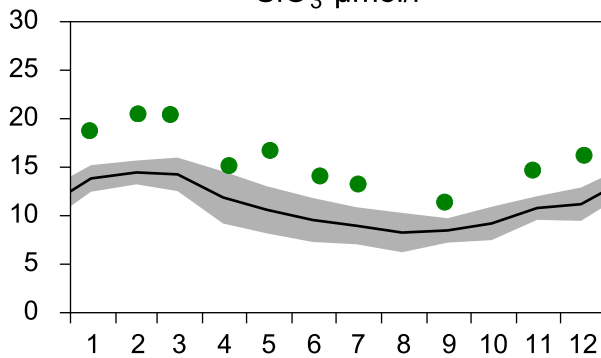
PO<sub>4</sub> µmol/l



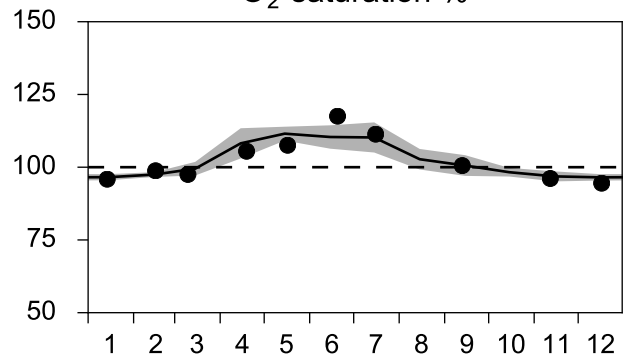
DIN µmol/l



SiO<sub>3</sub> µmol/l

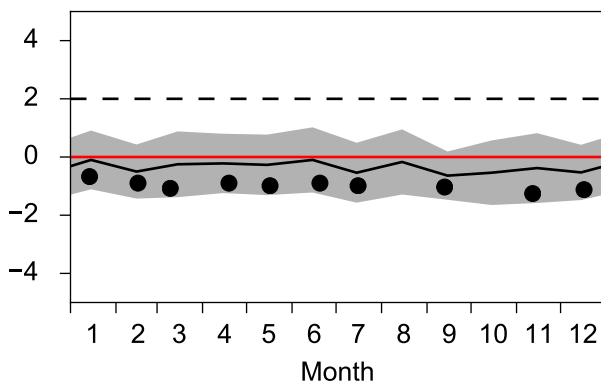


O<sub>2</sub> saturation %

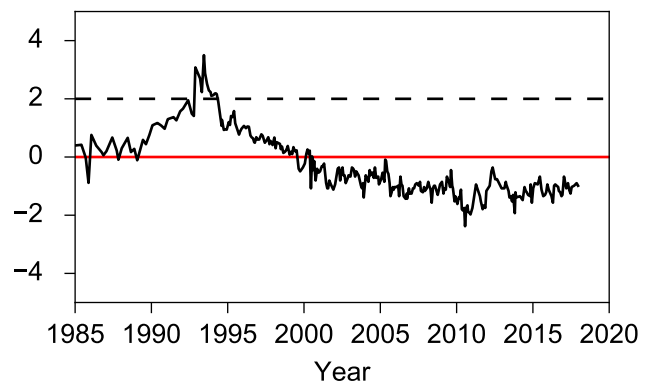


## OXYGEN IN BOTTOM WATER (depth >= 175 m)

O<sub>2</sub> ml/l

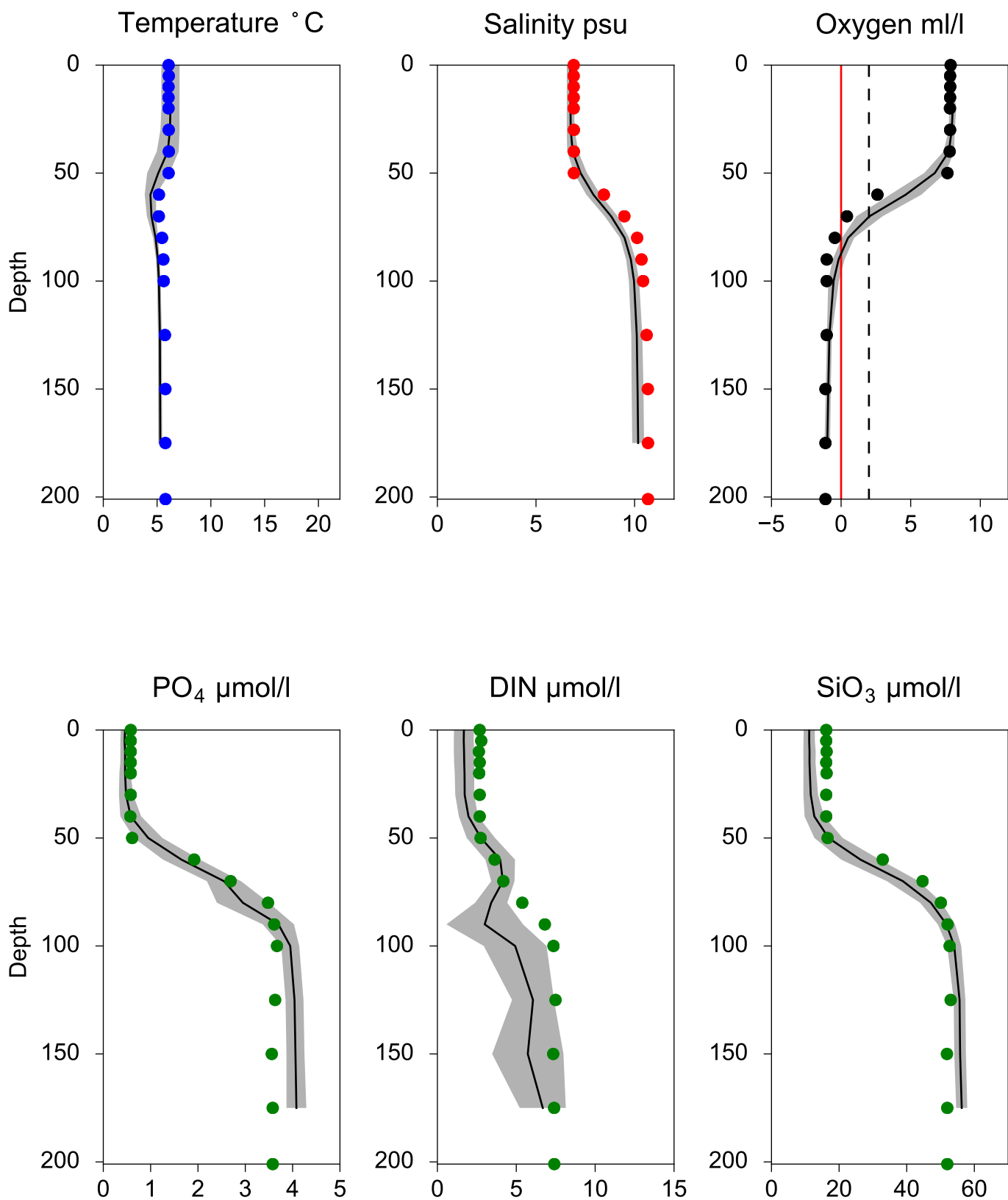


O<sub>2</sub> ml/l



# Vertical profiles BY32 NORRKÖPINGSDJ December

— Mean 2001-2015    ■ St.Dev.    ● 2017-12-17



# STATION BY38 KARLSÖDJ SURFACE WATER (0-10 m)

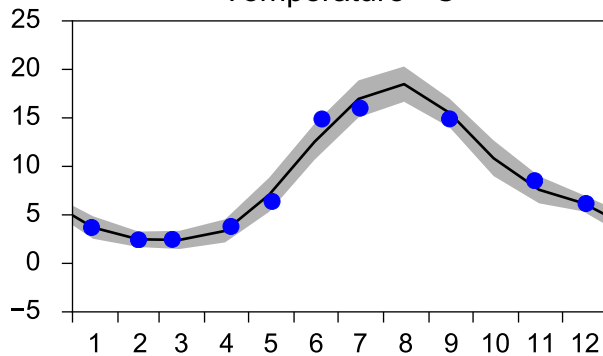
Annual Cycles

— Mean 2001-2015

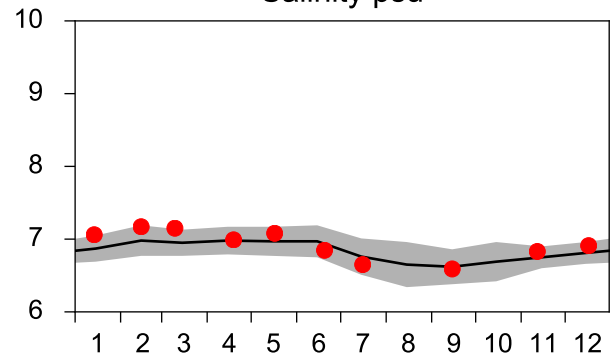
■ St.Dev.

● 2017

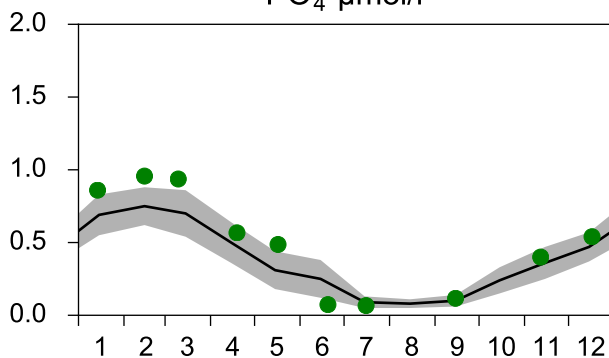
Temperature °C



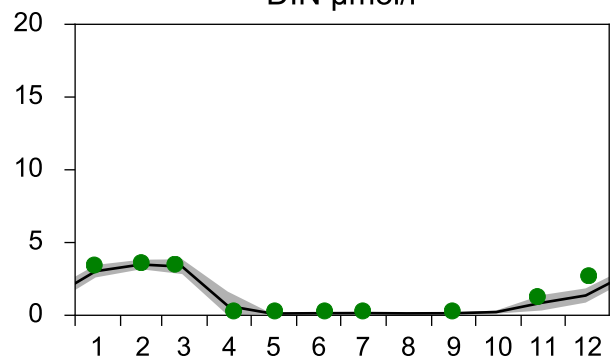
Salinity psu



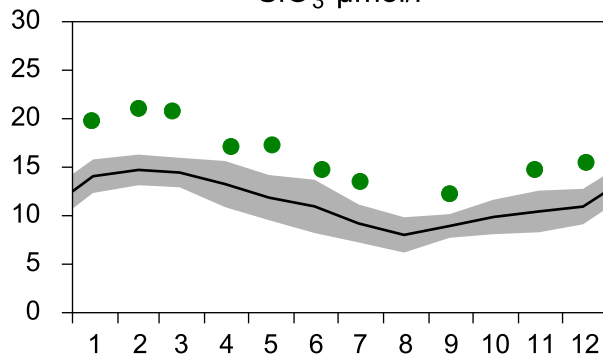
PO<sub>4</sub> µmol/l



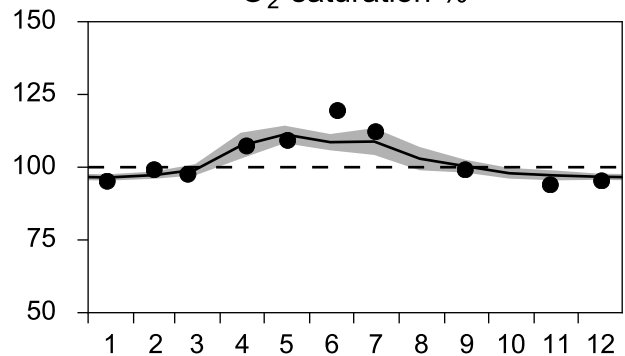
DIN µmol/l



SiO<sub>3</sub> µmol/l

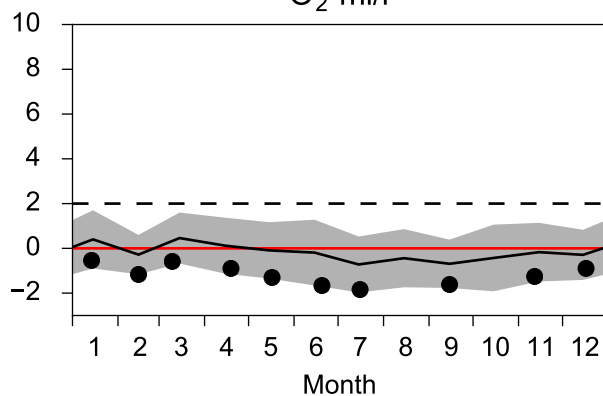


O<sub>2</sub> saturation %

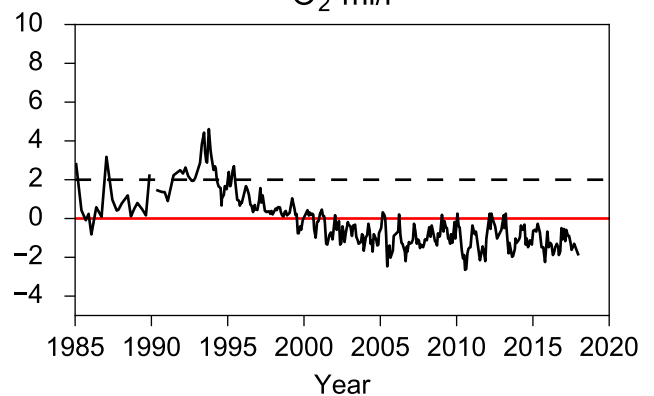


## OXYGEN IN BOTTOM WATER (depth >= 100 m)

O<sub>2</sub> ml/l

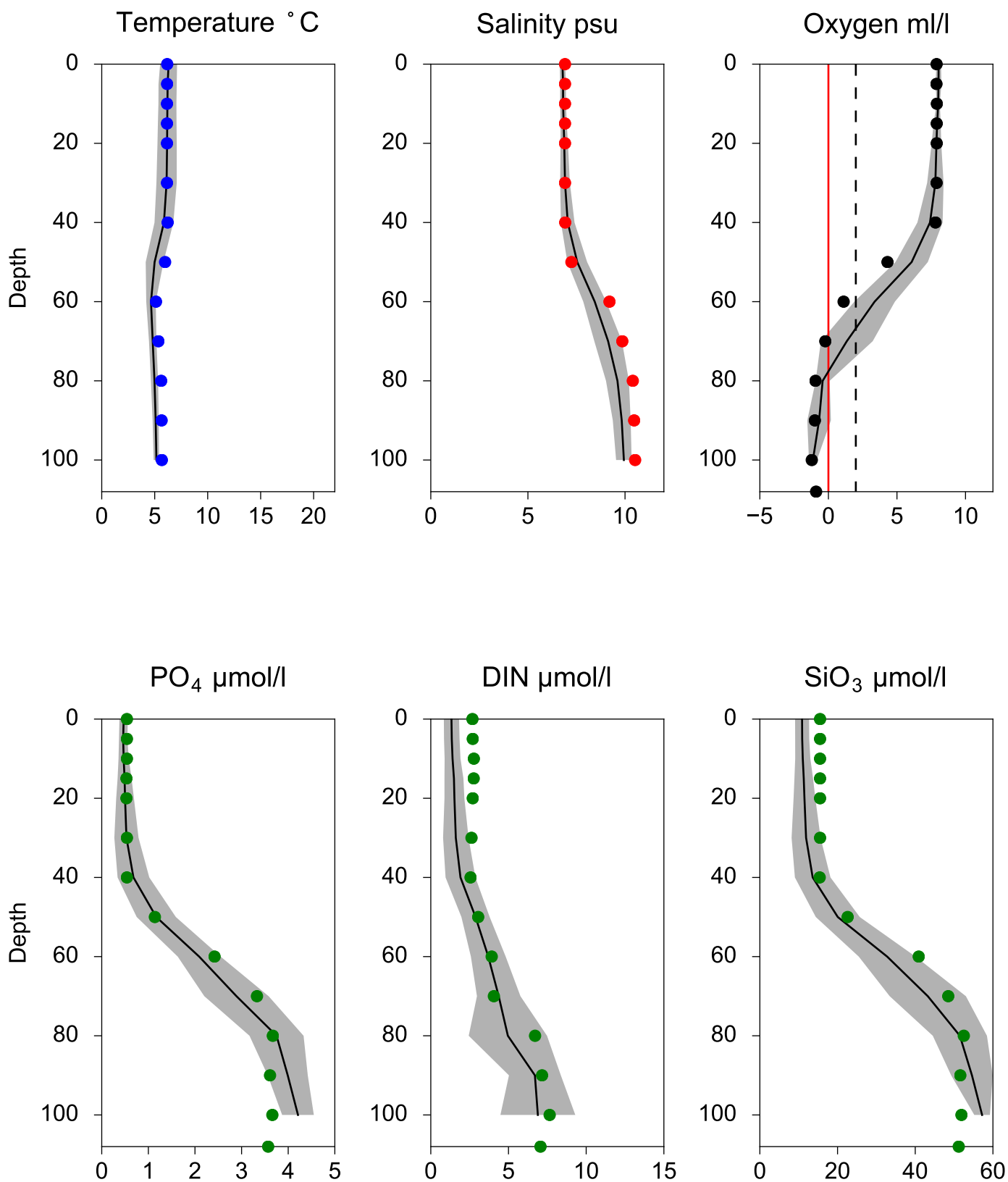


O<sub>2</sub> ml/l



# Vertical profiles BY38 KARLSÖDJ December

— Mean 2001-2015    ■ St.Dev.    ● 2017-12-17



# STATION HANÖBUKTEN SURFACE WATER (0-10 m)

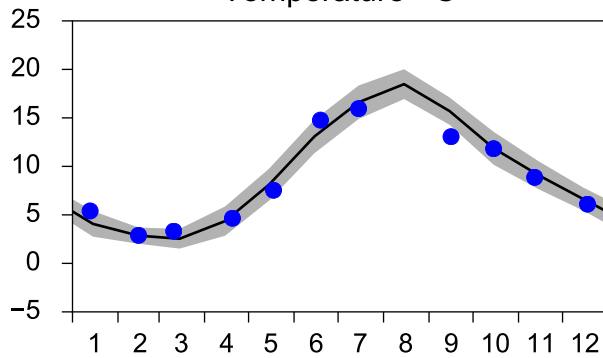
Annual Cycles

— Mean 2001-2015

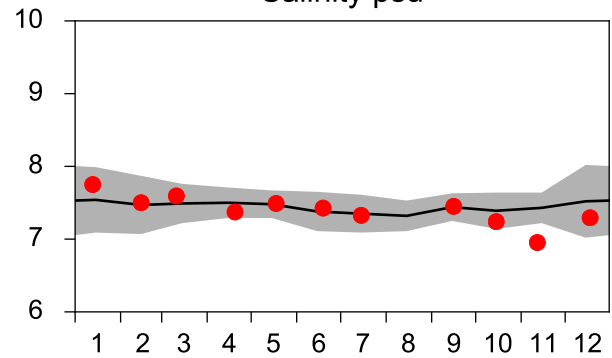
■ St.Dev.

● 2017

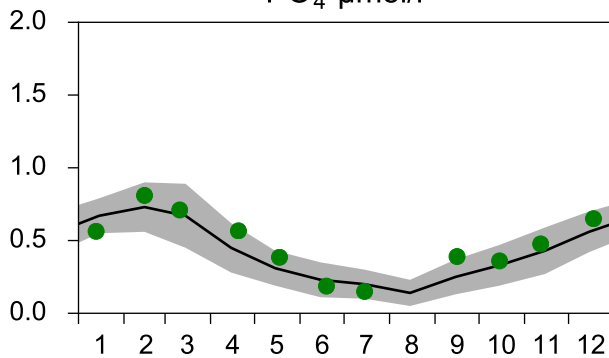
Temperature °C



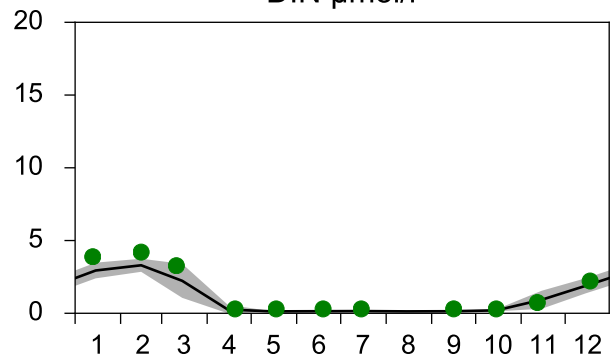
Salinity psu



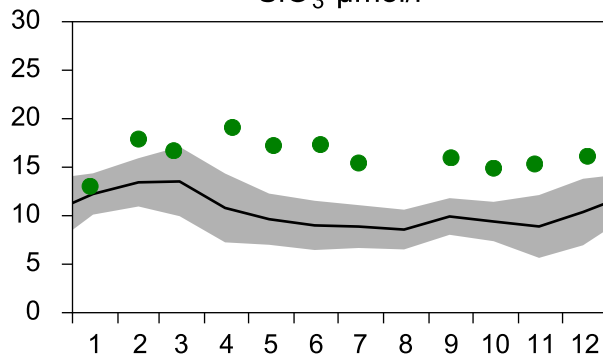
PO<sub>4</sub> µmol/l



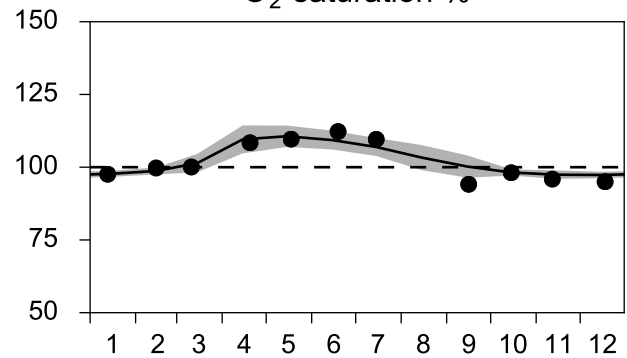
DIN µmol/l



SiO<sub>3</sub> µmol/l

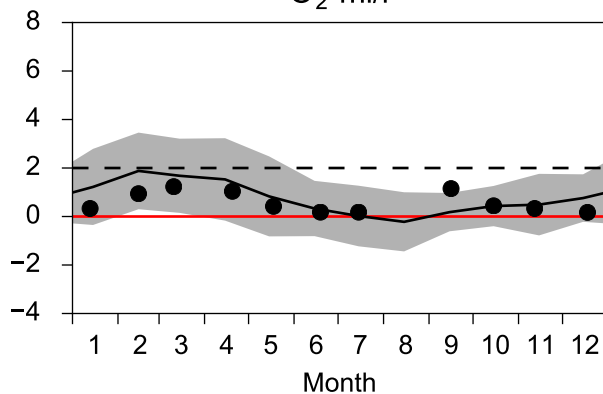


O<sub>2</sub> saturation %

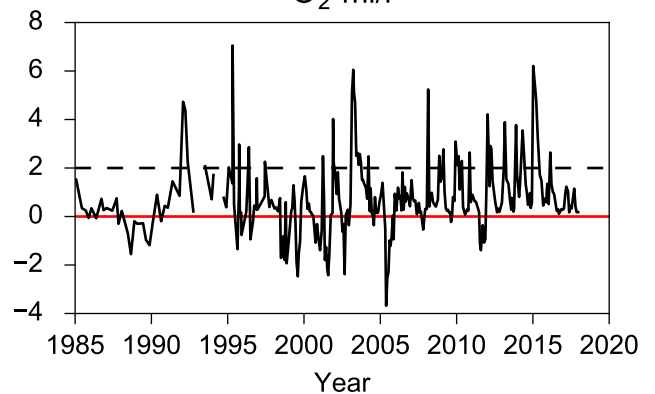


## OXYGEN IN BOTTOM WATER (depth >= 70 m)

O<sub>2</sub> ml/l

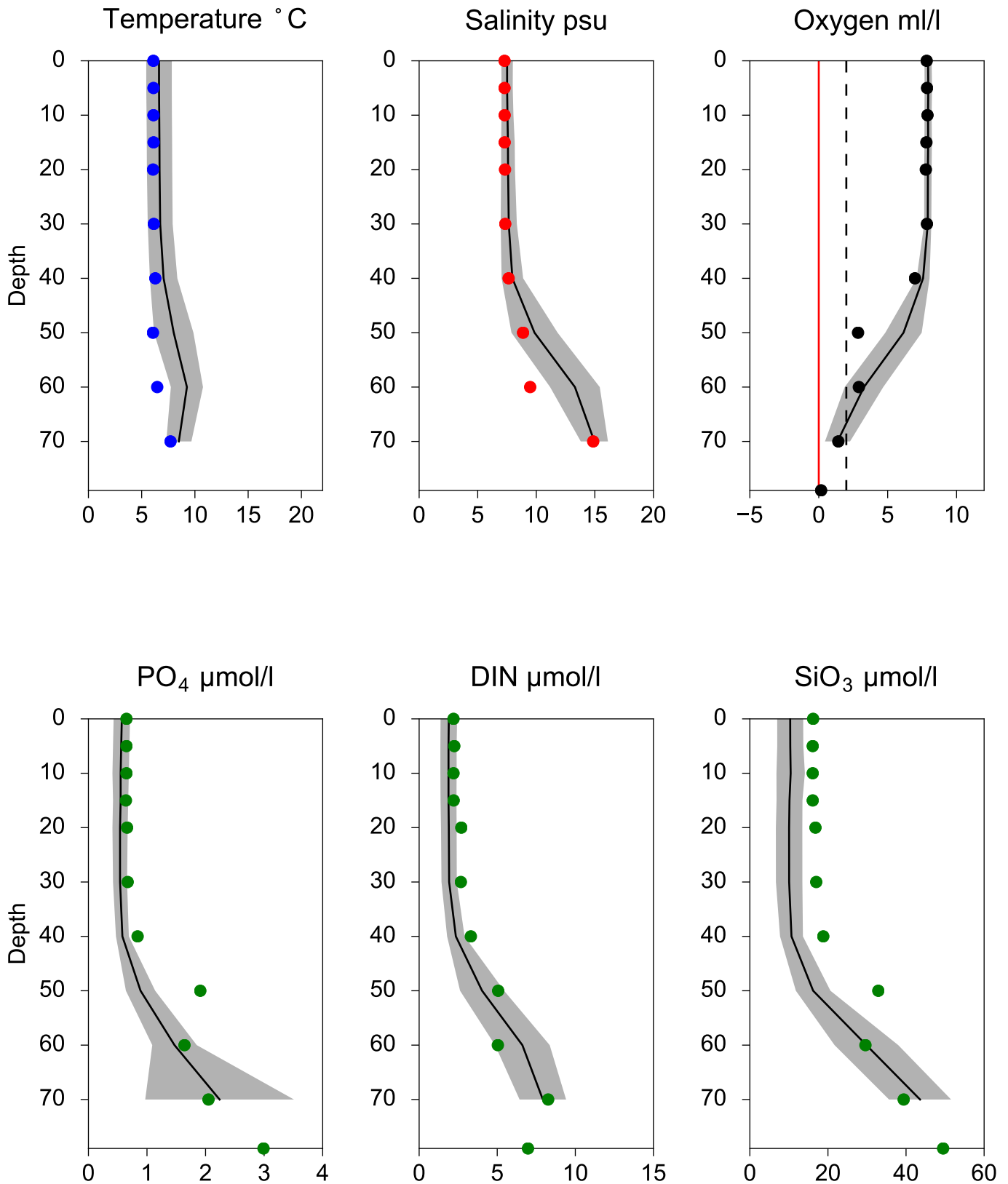


O<sub>2</sub> ml/l



# Vertical profiles HANÖBUKTEN December

— Mean 2001-2015    ■ St.Dev.    ● 2017-12-18





# STATION ANHOLT E SURFACE WATER (0-10 m)

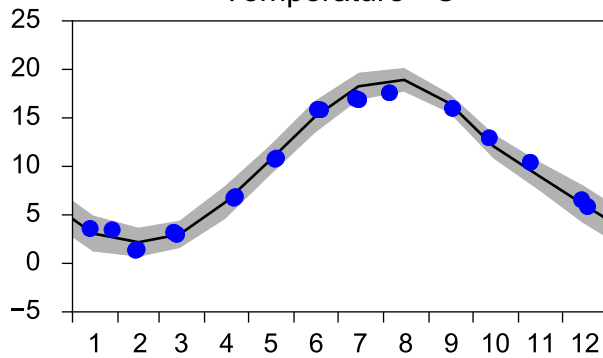
Annual Cycles

— Mean 2001-2015

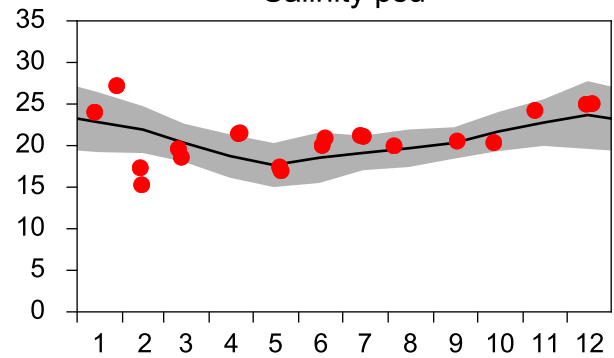
■ St.Dev.

● 2017

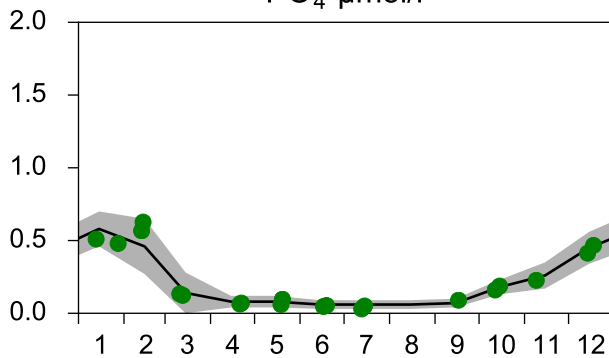
Temperature °C



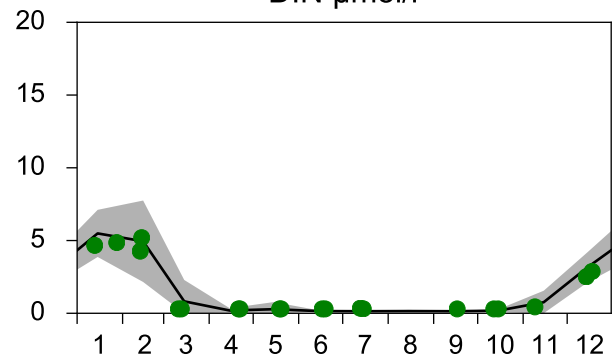
Salinity psu



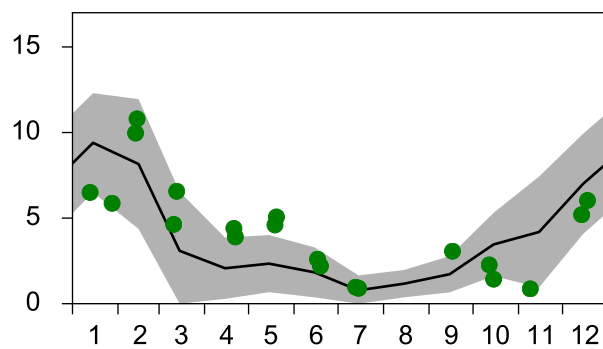
PO<sub>4</sub> µmol/l



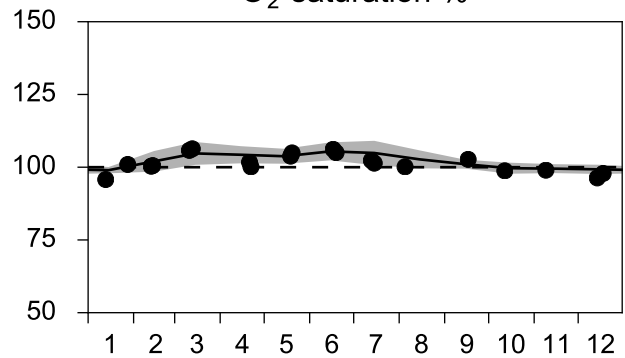
DIN µmol/l



SiO<sub>3</sub> µmol/l

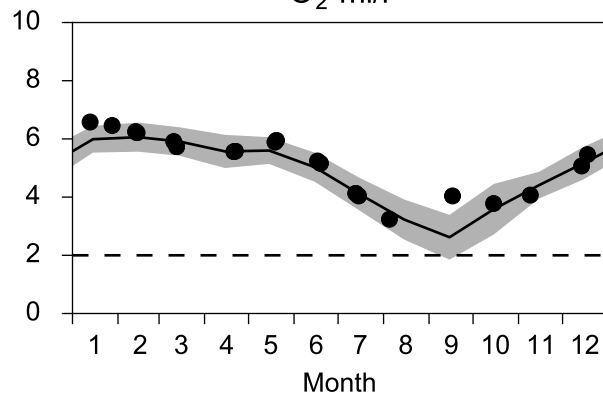


O<sub>2</sub> saturation %

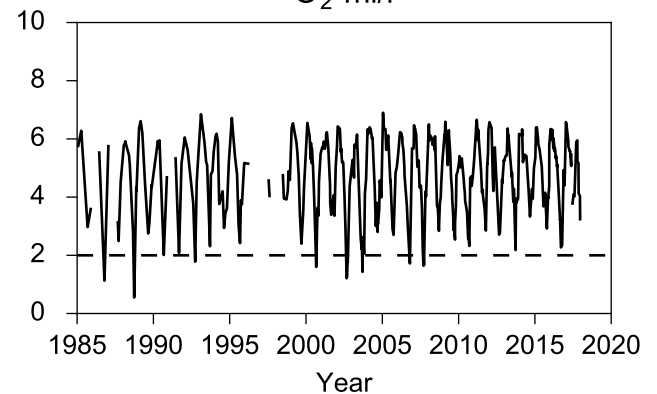


## OXYGEN IN BOTTOM WATER (depth >= 52 m)

O<sub>2</sub> ml/l

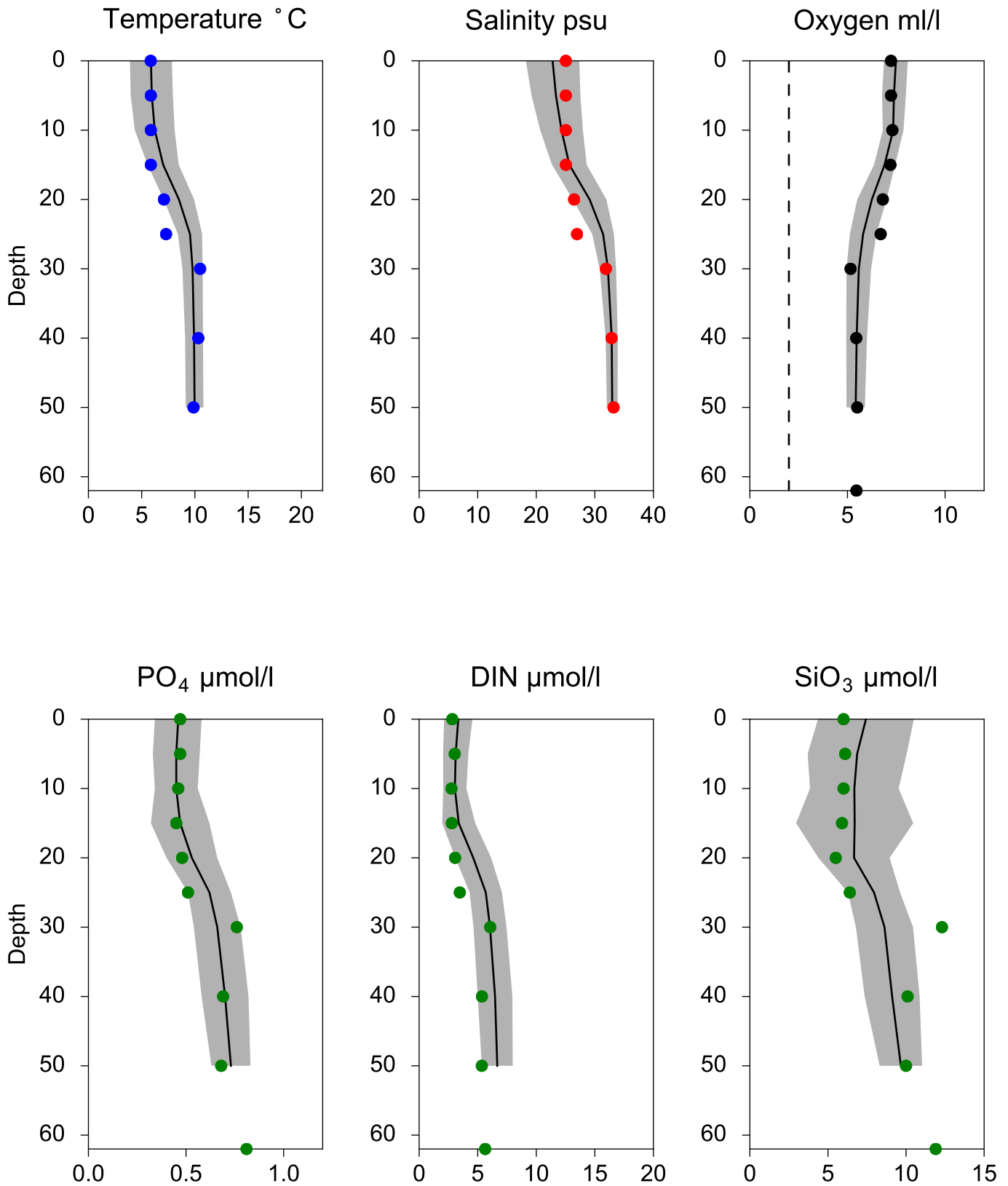


O<sub>2</sub> ml/l



# Vertical profiles ANHOLT E December

— Mean 2001-2015    St.Dev.    • 2017-12-18



# STATION FLADEN SURFACE WATER (0-10 m)

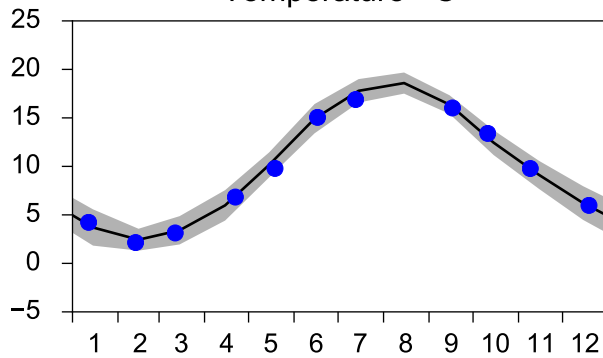
Annual Cycles

— Mean 2001-2015

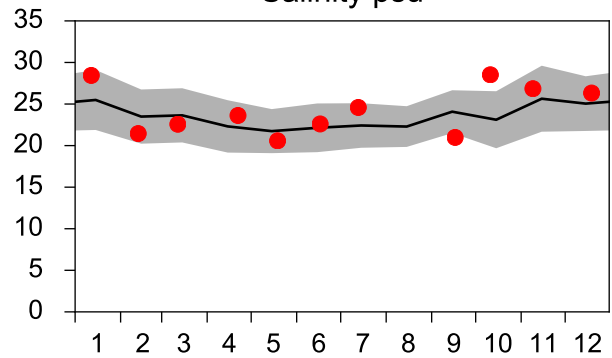
■ St.Dev.

● 2017

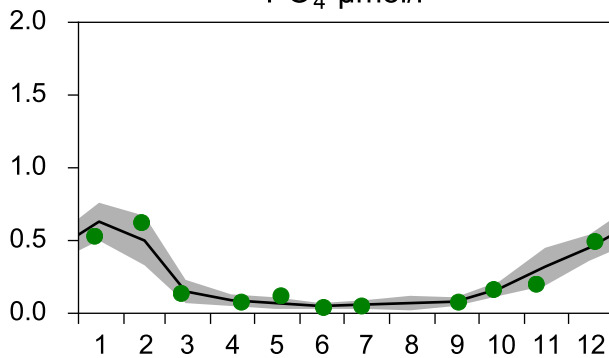
Temperature °C



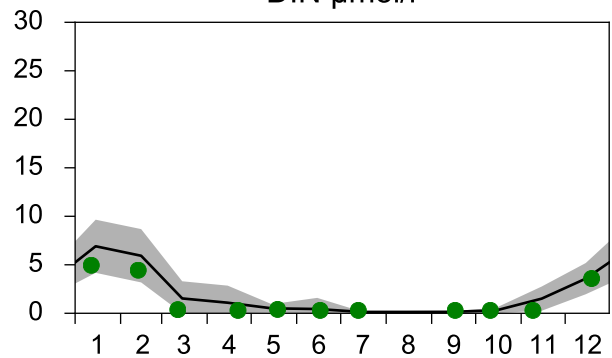
Salinity psu



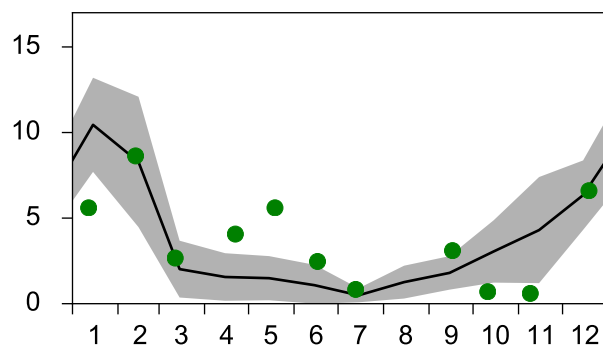
PO<sub>4</sub> µmol/l



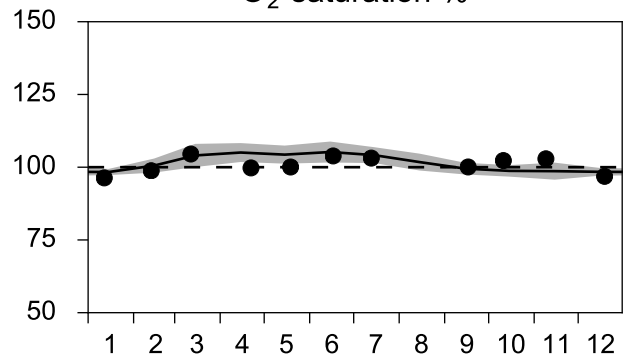
DIN µmol/l



SiO<sub>3</sub> µmol/l

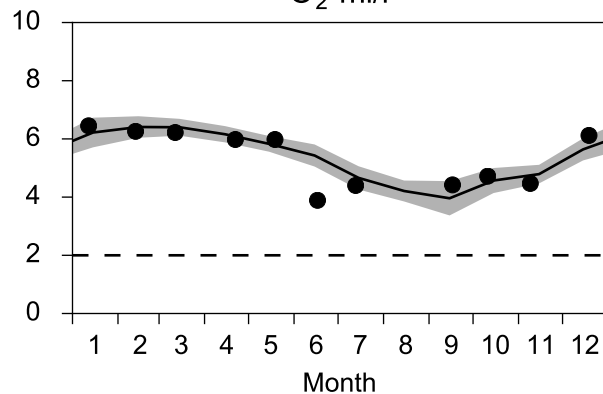


O<sub>2</sub> saturation %

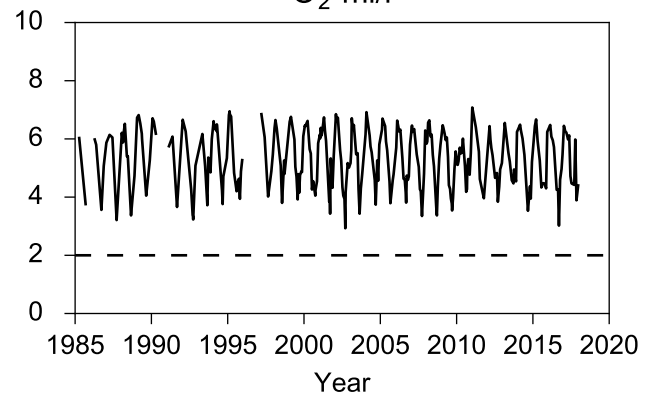


## OXYGEN IN BOTTOM WATER (depth >= 74 m)

O<sub>2</sub> ml/l

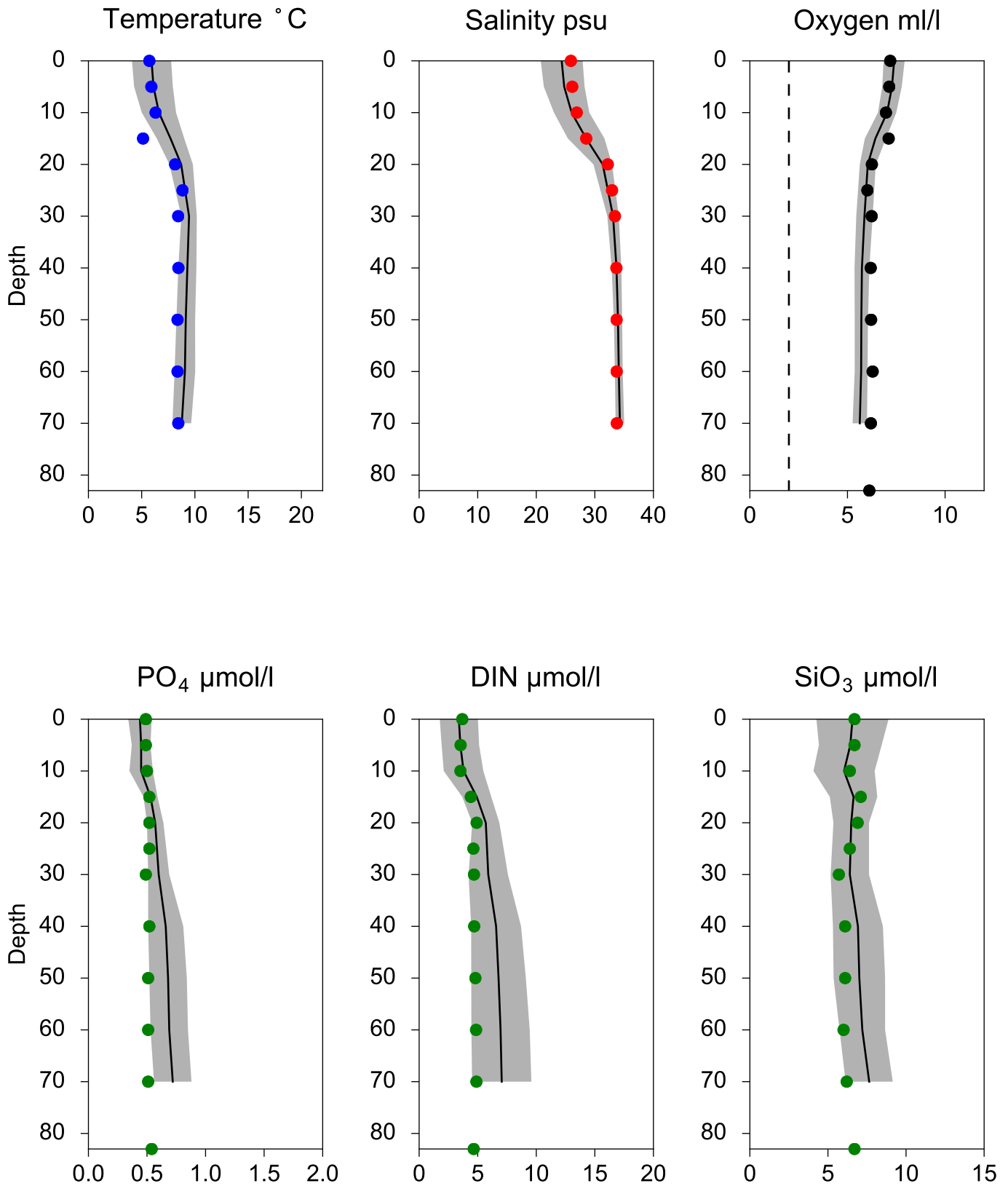


O<sub>2</sub> ml/l



# Vertical profiles FLADEN December

— Mean 2001-2015    St.Dev.    • 2017-12-19



# STATION P2 SURFACE WATER (0-10 m)

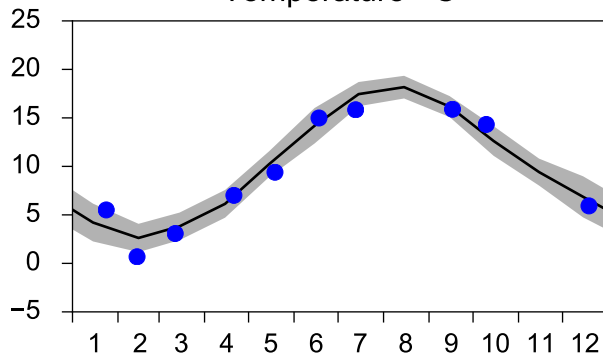
Annual Cycles

— Mean 2001-2015

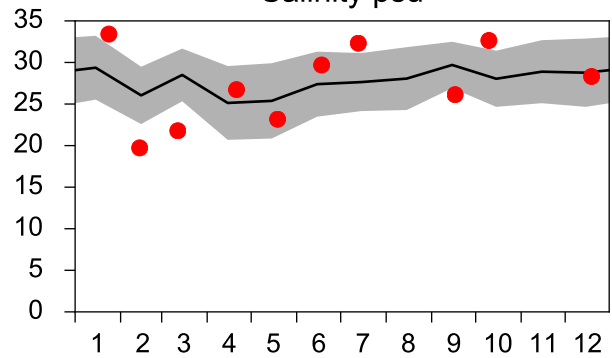
■ St.Dev.

● 2017

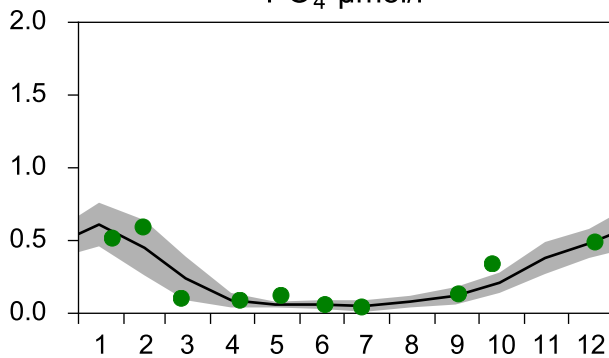
Temperature °C



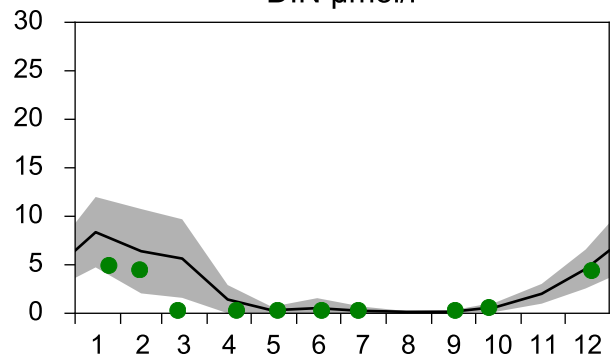
Salinity psu



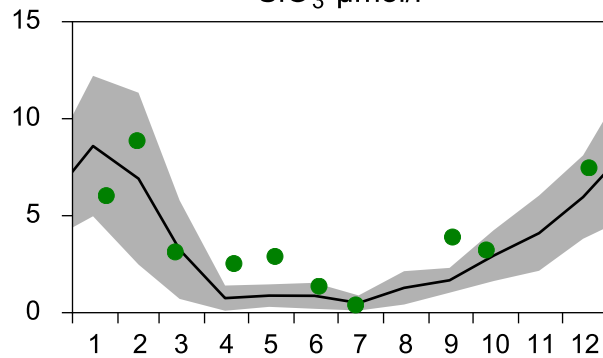
PO<sub>4</sub> µmol/l



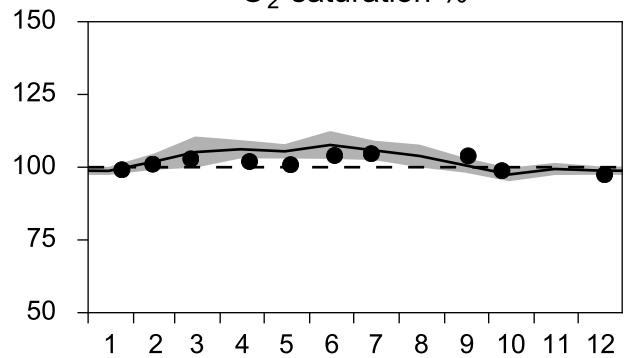
DIN µmol/l



SiO<sub>3</sub> µmol/l

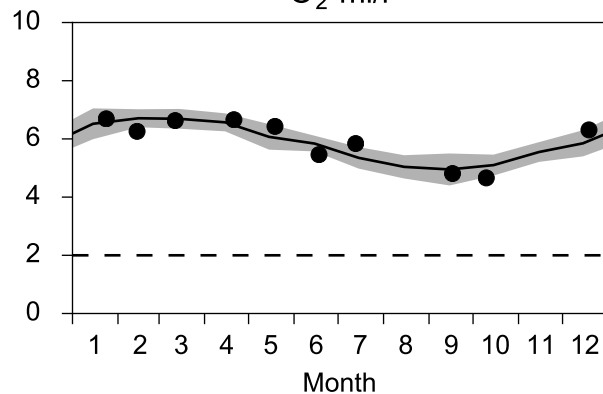


O<sub>2</sub> saturation %

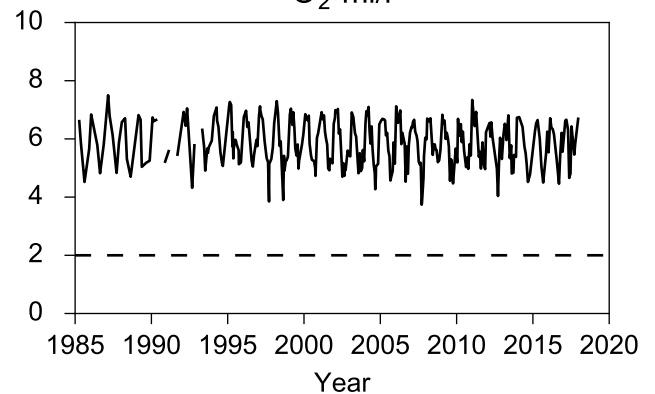


## OXYGEN IN BOTTOM WATER (depth >= 75 m)

O<sub>2</sub> ml/l



O<sub>2</sub> ml/l

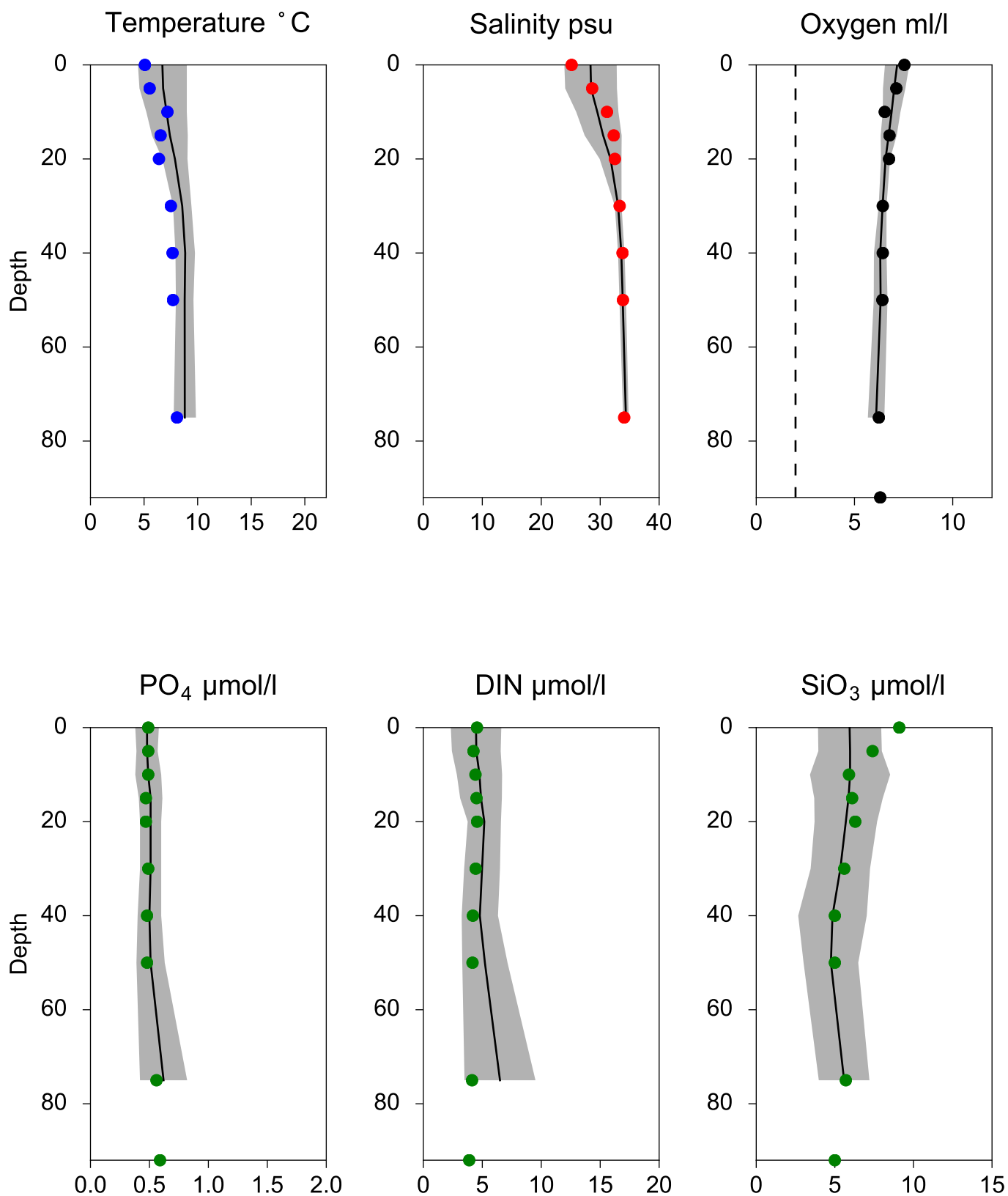


## Vertical profiles P2 December

— Mean 2001-2015

■ St.Dev.

● 2017-12-19



# STATION Å17 SURFACE WATER (0-10 m)

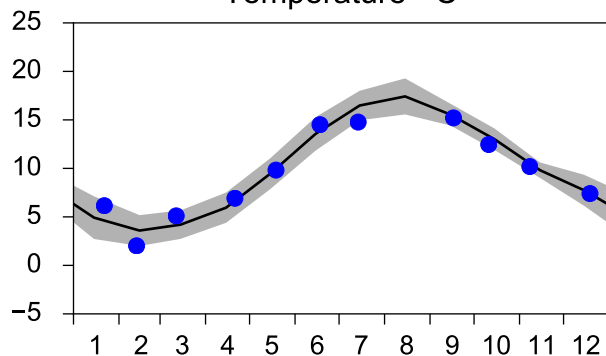
Annual Cycles

— Mean 2001-2015

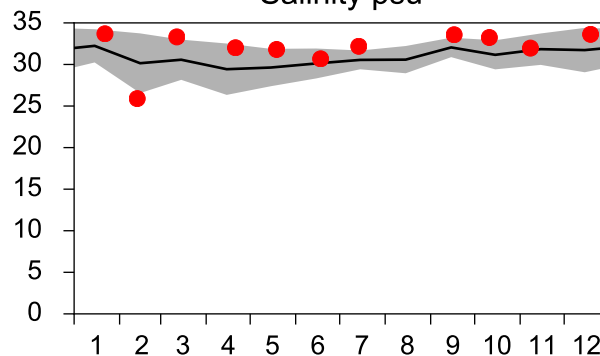
■ St.Dev.

● 2017

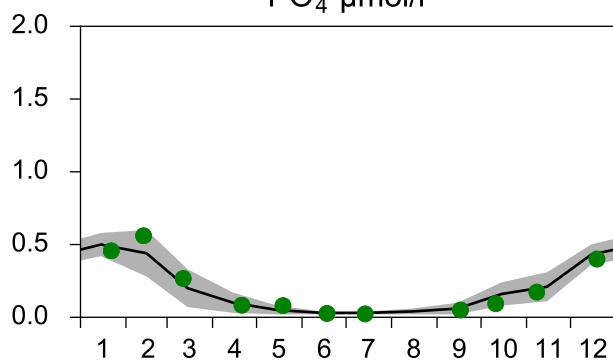
Temperature °C



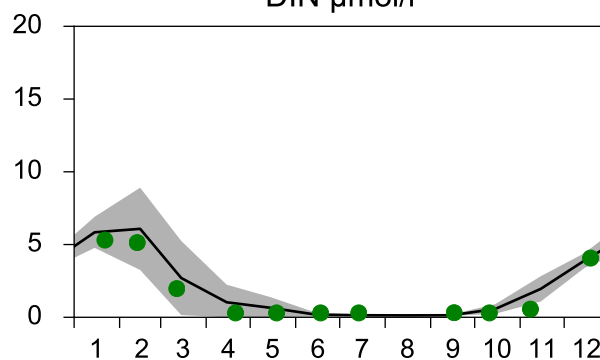
Salinity psu



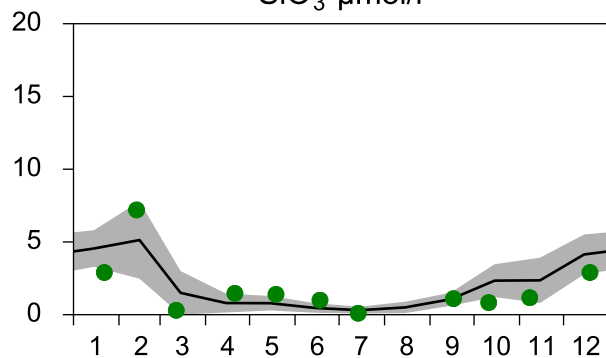
PO<sub>4</sub> µmol/l



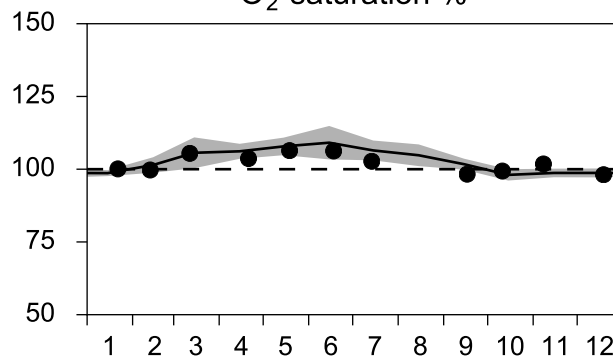
DIN µmol/l



SiO<sub>3</sub> µmol/l

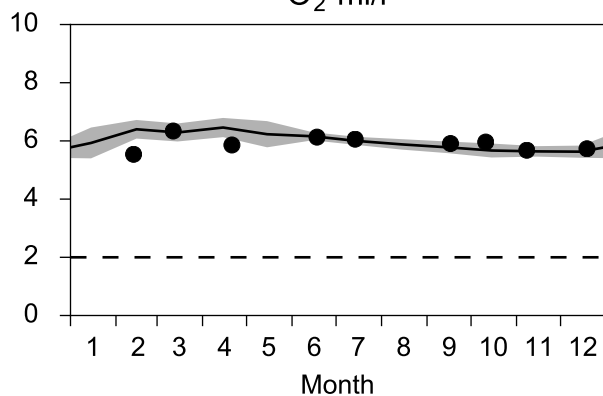


O<sub>2</sub> saturation %

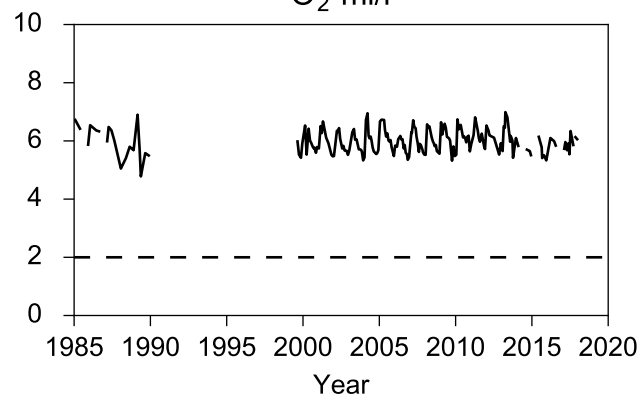


## OXYGEN IN BOTTOM WATER (depth >= 300 m)

O<sub>2</sub> ml/l

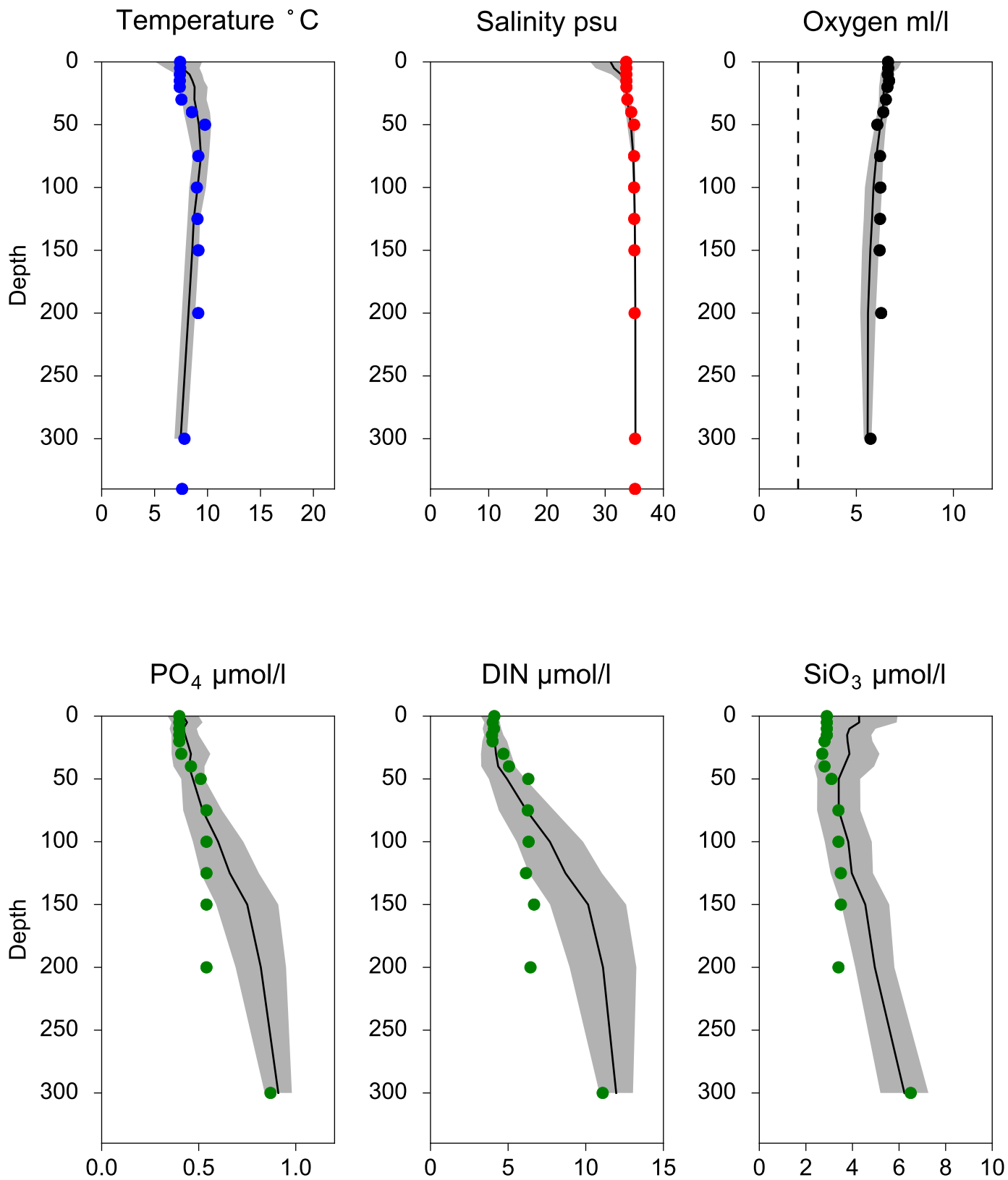


O<sub>2</sub> ml/l



# Vertical profiles Å17 December

— Mean 2001-2015    St.Dev.    • 2017-12-19





# STATION Å15 SURFACE WATER (0-10 m)

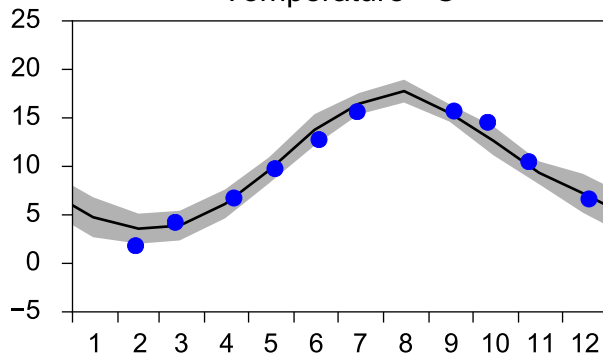
Annual Cycles

— Mean 2001-2015

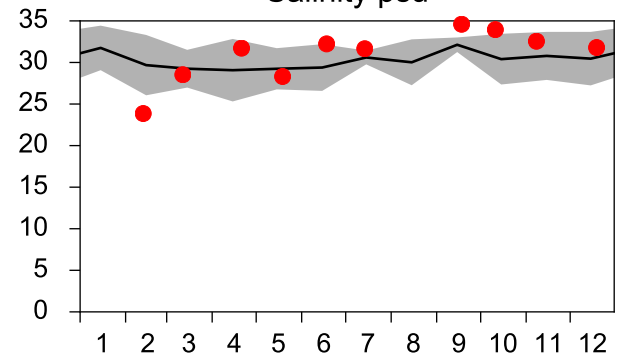
■ St.Dev.

● 2017

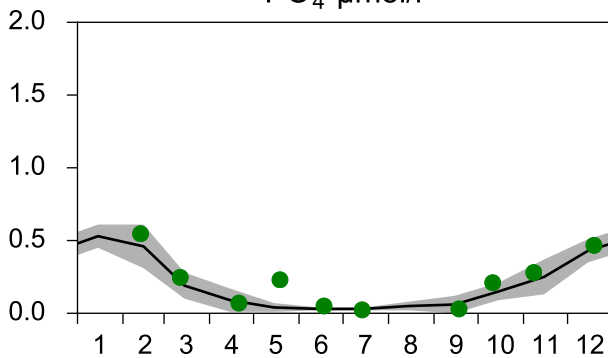
Temperature °C



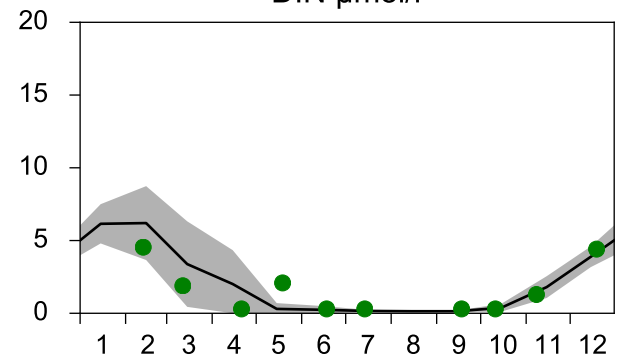
Salinity psu



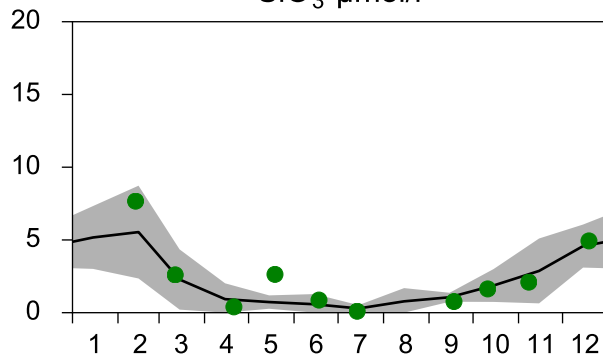
PO<sub>4</sub> µmol/l



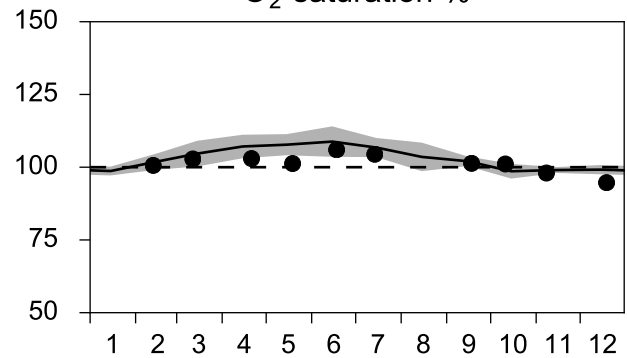
DIN µmol/l



SiO<sub>3</sub> µmol/l

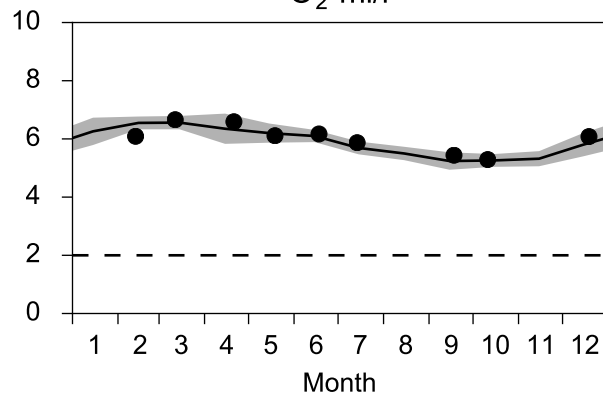


O<sub>2</sub> saturation %

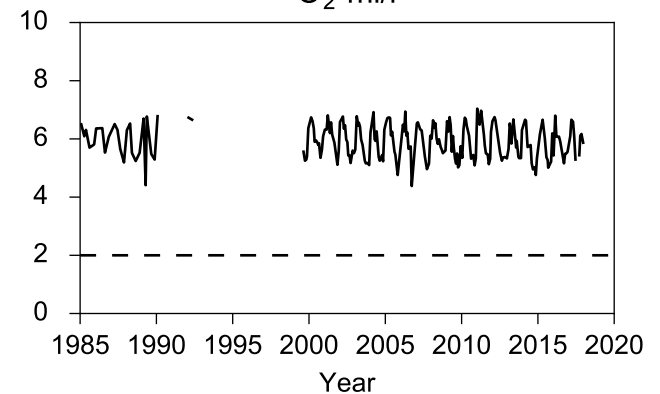


## OXYGEN IN BOTTOM WATER (depth >= 125 m)

O<sub>2</sub> ml/l



O<sub>2</sub> ml/l

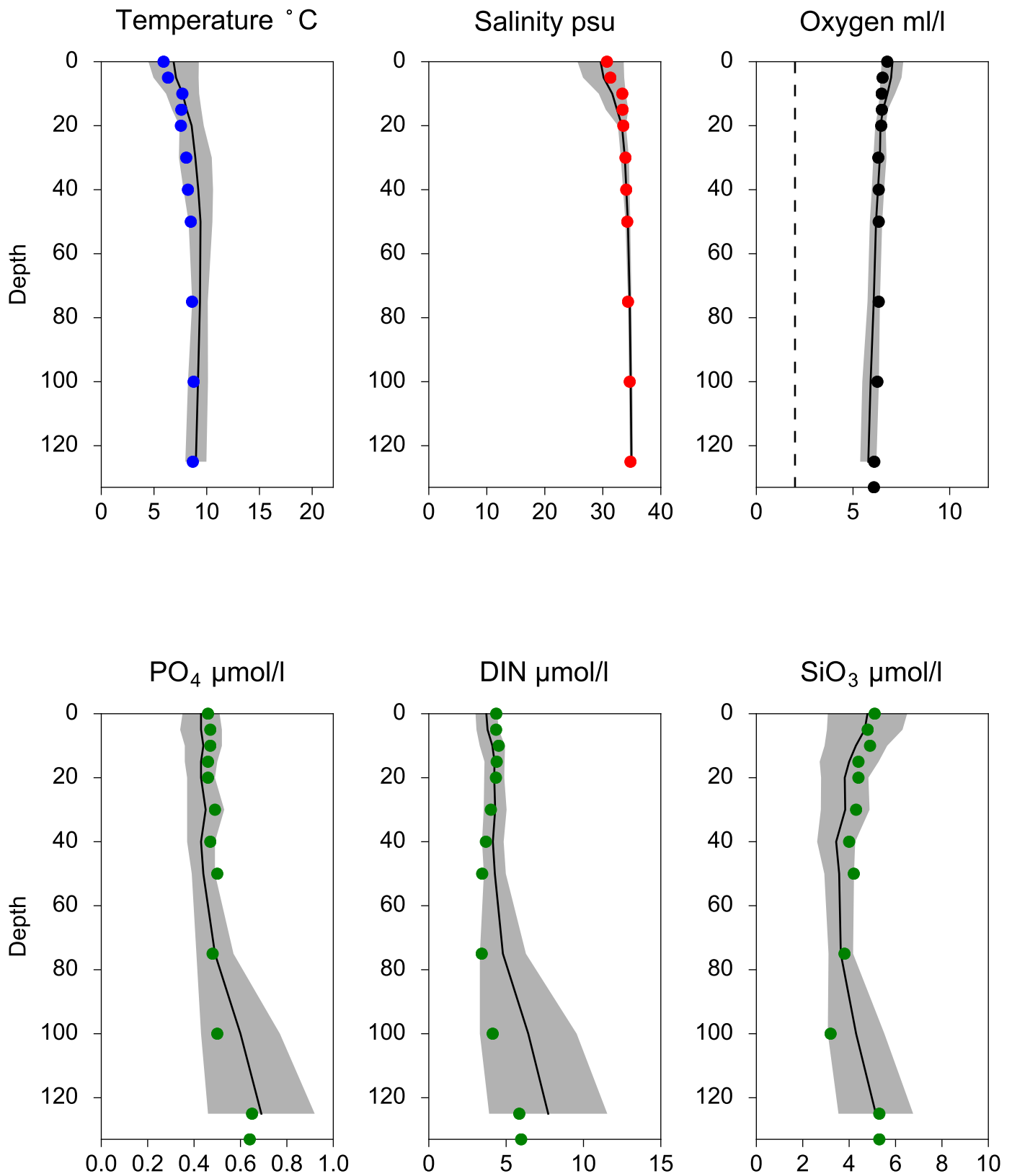


# Vertical profiles Å15 December

— Mean 2001-2015

■ St.Dev.

● 2017-12-19



# STATION Å13 SURFACE WATER (0-10 m)

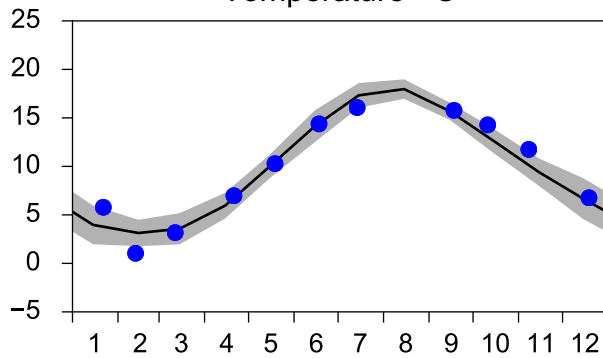
Annual Cycles

— Mean 2001-2015

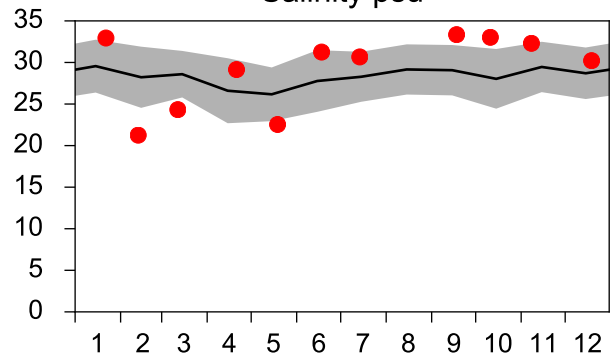
■ St.Dev.

● 2017

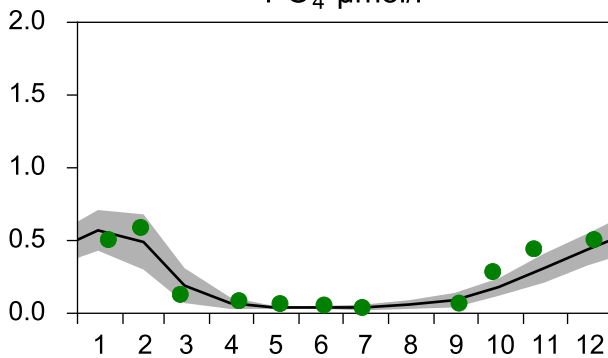
Temperature °C



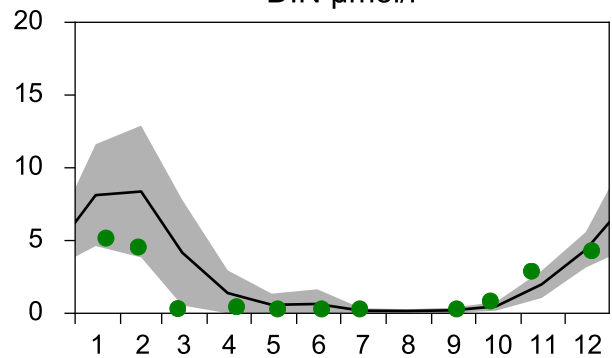
Salinity psu



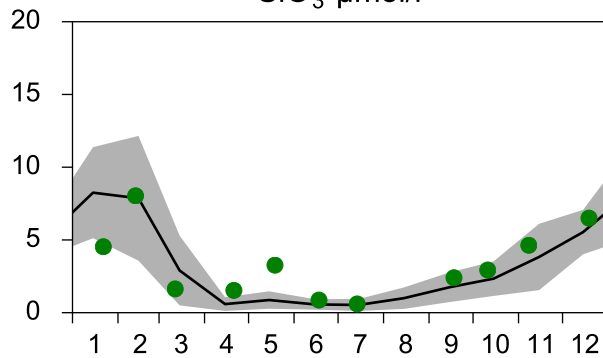
PO<sub>4</sub> µmol/l



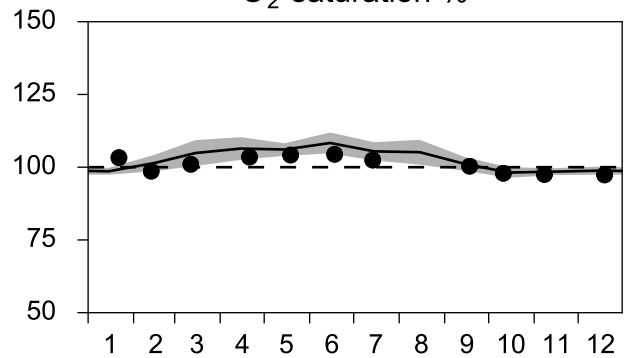
DIN µmol/l



SiO<sub>3</sub> µmol/l

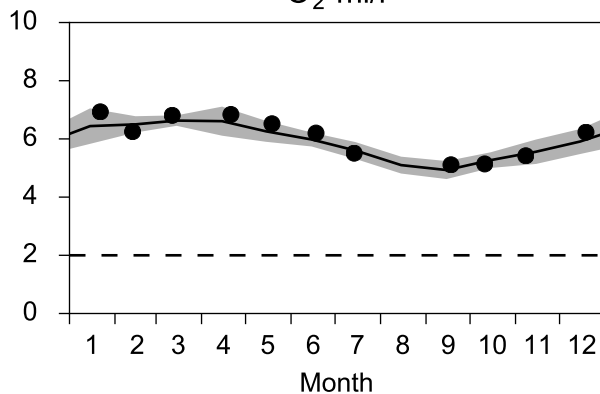


O<sub>2</sub> saturation %

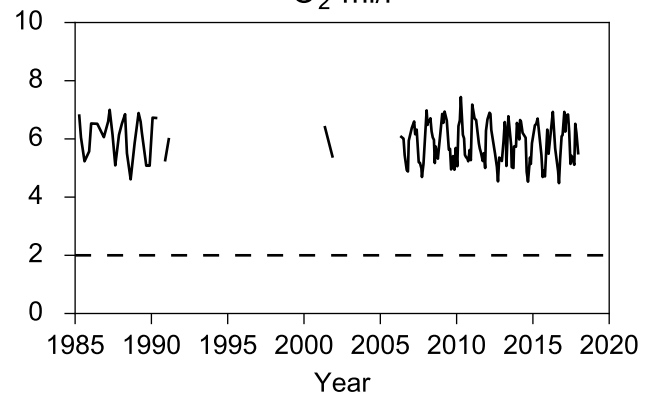


## OXYGEN IN BOTTOM WATER (depth >= 80 m)

O<sub>2</sub> ml/l



O<sub>2</sub> ml/l

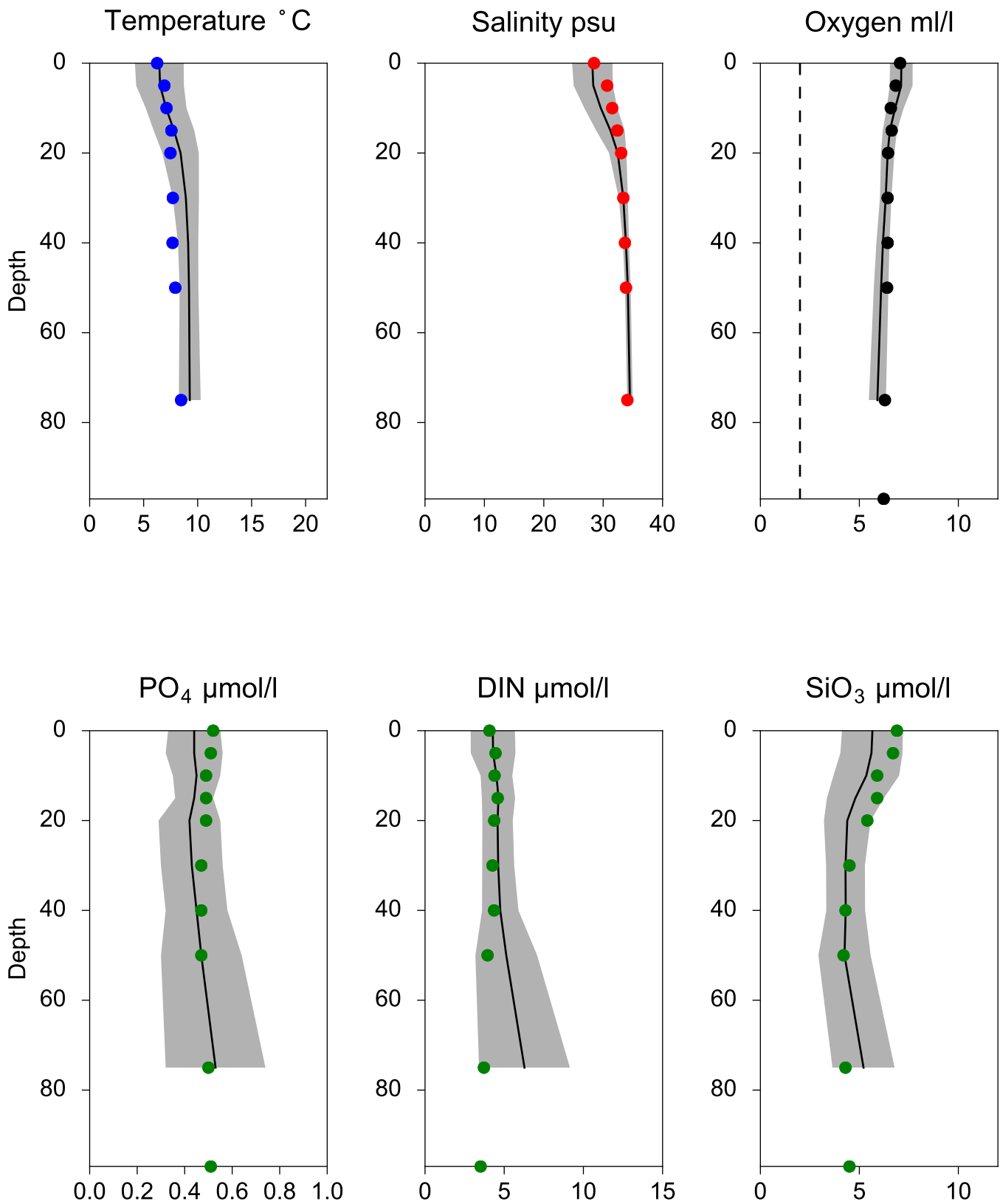


# Vertical profiles Å13 December

— Mean 2001-2015

■ St.Dev.

● 2017-12-19



# STATION SLÄGGÖ SURFACE WATER (0-10 m)

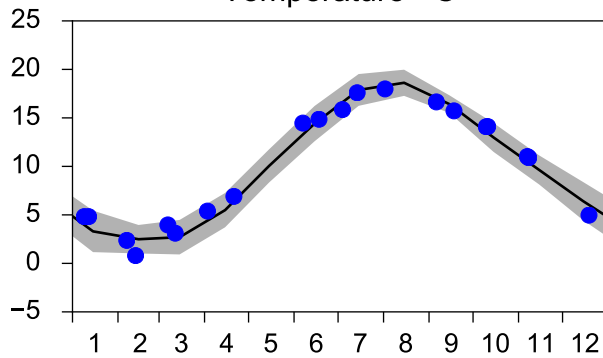
Annual Cycles

— Mean 2001-2015

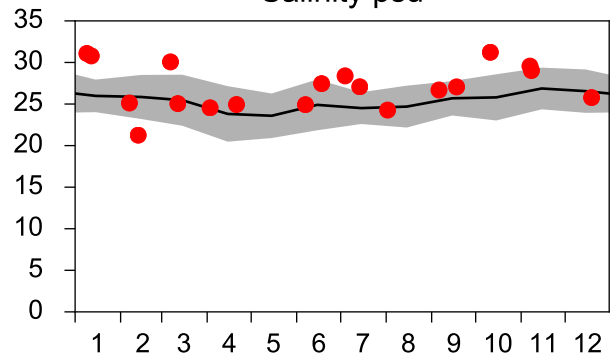
■ St.Dev.

● 2017

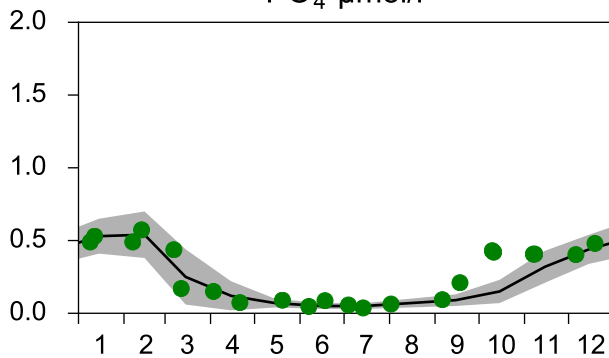
Temperature °C



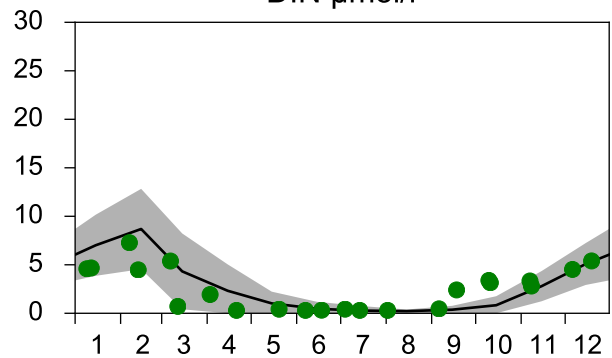
Salinity psu



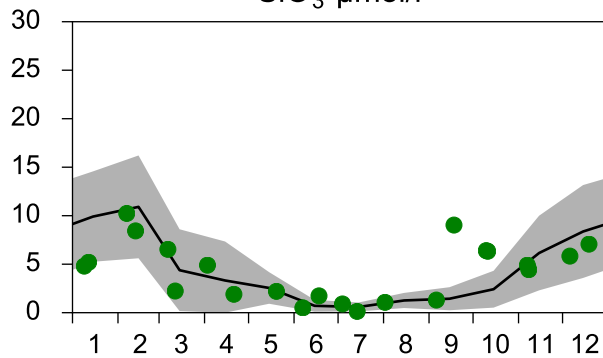
PO<sub>4</sub> µmol/l



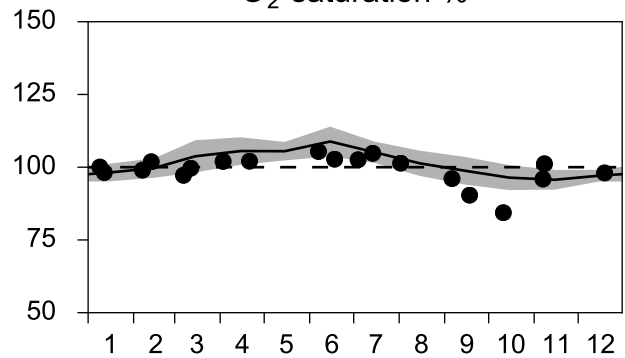
DIN µmol/l



SiO<sub>3</sub> µmol/l

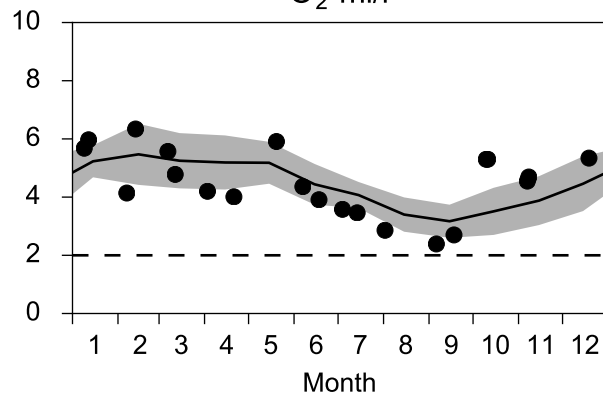


O<sub>2</sub> saturation %

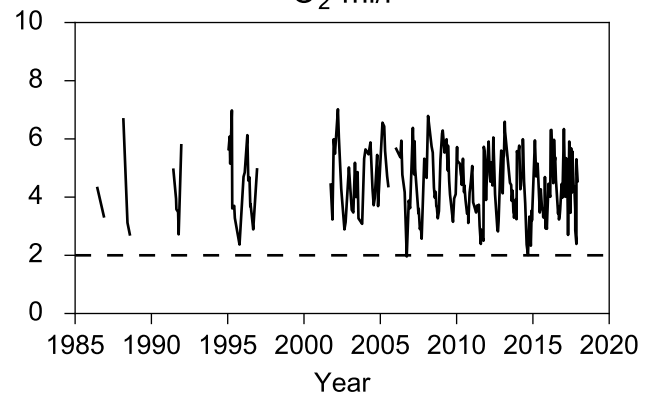


## OXYGEN IN BOTTOM WATER (depth >= 64 m)

O<sub>2</sub> ml/l



O<sub>2</sub> ml/l



# Vertical profiles SLÄGGÖ December

— Mean 2001-2015

■ St.Dev.

● 2017-12-19

