

## Report from the SMHI monitoring cruise with R/V Aranda



**Survey period:**

2017-04-18 to 2017-04-25

**Principal:**

The Swedish Meteorological and Hydrological Institute and  
the Swedish Agency for Marine and Water Management

### SUMMARY

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

In large parts of the deep water in the Baltic Proper the oxygen concentrations were close to zero. Completely oxygen free conditions, when hydrogen sulfide is measured, was found in the Western Gotland Basin from 90 meters depth and in the Eastern Gotland Basin, but then only in the Gotland Deep BY15 nearest bottom (235 meters depth). In the remaining areas in the Eastern Gotland Basin oxygen concentrations was close to zero, but no hydrogen sulfide were observed at any depth. Acute hypoxia was found in all basins in the Baltic Proper at depths exceeding 65-80 meters.

Silicate concentrations were above or more than above normal in the whole area except for the Skagerrak where it was normal. The surface concentration of phosphate and inorganic nitrogen was normal for the season in the investigated area.

The surface temperature was normal for the season but the salinity was slightly higher than normal in the Skagerrak, Kattegat and Eastern Gotland Basin.  
The spring bloom was ongoing in almost the whole area.

Next cruise is scheduled to start 16<sup>th</sup> of May.

## RESULTS

The cruise was performed aboard the Finnish research vessel Aranda and started in Åbo/Turku on the 18<sup>th</sup> of April and ended in Helsinki on 25<sup>th</sup> of April. The winds during the first days of the cruise were very weak, but increased to gale from west when reaching the west coast, later in the Baltic Proper the wind decreased again. In the end of the cruise in the Gulf of Finland the wind increased to 19 m/s from southeast. The air temperature varied between +1 and +8 ° C.

The Swedish Defence Research Agency (FOI) joined the cruise to do service on their acoustic measurement equipment in the Baltic Proper (<https://biasproject.wordpress.com/>).

The Swedish Museum of Natural History (NRM) has been assigned the task of monitoring the acute endangered Baltic Sea population of porpoises in the Baltic Sea, using acoustic porpoises detectors, and deployed three around the N Midsjöbanken.

This report is based on data that have passed a first quality control. When data are published at the SMHI data centre some values might have changed due to further performed quality controls. Data from this cruise are published as soon as possible on the data centres webpage, normally within one or two weeks after a cruise.

Download data here: <http://www.smhi.se/klimatdata/oceanografi/havsmiljodata>

### **The Skagerrak**

The surface water temperature in the Skagerrak was normal for the season and varied between 6.7 – 7.0°C. The salinity in the surface was slightly above normal and varied between 26.7 psu in the southern parts and 32.0 psu in the outer parts. The thermocline and halocline coincided and was found at 10 – 20 meters depth.

The concentration of inorganic nitrogen ( $\Sigma$  nitrate + nitrite + ammonia) was generally lower than normal in the surface water and ranged from 0.30 – 0.45  $\mu\text{mol/l}$ . Phosphate and silicate showed normal values for the season in the surface water. In the surface water phosphate concentrations varied between 0.07 - 0.09  $\mu\text{mol/l}$  and silicate concentrations between 0.4 – 2.5  $\mu\text{mol/l}$ .

The spring blooms was continuing in Skagerrak, near the coast the intensity was higher compared with the offshore areas.

The whole water column was well oxygenated at all sampling stations.

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

The temperature in the surface water was normal for the season and varied between 6.3 – 6.9 °C, lowest in the Sound. The salinity was normal to slightly above normal and varied between 21.4 – 23.6 psu, highest in the northern parts. In the Sound the salinity in the surface was slightly below normal 11.3 psu. The stratification was found at 15-25 meters depth.

The concentration of phosphate and inorganic nitrogen in Kattegat showed normal amounts for the season while the silicate concentrations were above normal. The concentration of inorganic nitrogen varied around  $0.3 \mu\text{mol/l}$  and phosphate between  $0.06 - 0.16 \mu\text{mol/l}$ . The silicate concentration varied from  $4.0 \mu\text{mol/l}$  in the Kattegat to  $7.8 \mu\text{mol/l}$  in the Sound.

The deep water was well oxygenated in the whole area, the concentrations in the deep water varied from  $4.4$  to  $6.1 \text{ ml/l}$ .

The spring bloom was ongoing in Kattegat which was seen in the fluorescence profiles. High fluorescence was found from the surface down to 15 meters depth.

### **The Baltic Proper**

The temperature in the surface water was normal for the season and varied from  $2.5$  to  $5.5^\circ\text{C}$ , lowest in the northern parts and highest in the southwestern parts. The salinity was higher than normal in the Eastern Gotland Basin, around  $7.5 \text{ psu}$  while normal values,  $6.9 - 7.8 \text{ psu}$  were found in the other investigated areas. The surface layer was well mixed down to the pycnocline that was found at 50-70 meters depth, except from Arkona and Bornholm Basins where the pycnocline was found shallower, at 40 meters depth.

The amount of inorganic nitrogen in the surface water was normal in the whole area  $\sim 0.3 \mu\text{mol/l}$ . The concentration of phosphate was normal for the season and varied between  $0.30 - 0.57 \mu\text{mol/l}$ . The silicate concentration was higher than normal in the whole Baltic Proper and ranged from  $13.8$  to  $19.1 \mu\text{mol/l}$ .

In large parts of the deep water in the Baltic Proper the oxygen concentrations were close to zero. Completely oxygen free conditions, where hydrogen sulfide is measured, were found in the Western Gotland Basin at depth exceeding 90 meters and in the Eastern Gotland Basin hydrogen sulfide was only found at BY15, the Gotland Deep in the bottom water, 235 meters. All other stations in that basin showed oxygen concentrations near zero but no hydrogen sulfide was found.

Acute hypoxia ( $< 2 \text{ ml/l}$ ) was found in all basins from 65-80 meters depths in the Baltic Proper. Though, the whole water column was well oxygenated in the Arkona Basin.

The fluorescence profiles from the CTD showed that the spring bloom was ongoing in almost the whole investigated area.

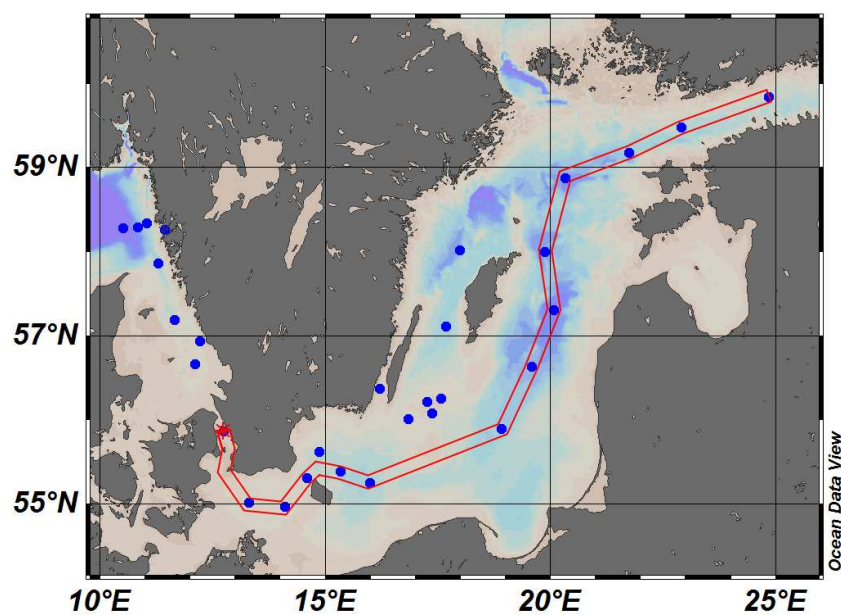
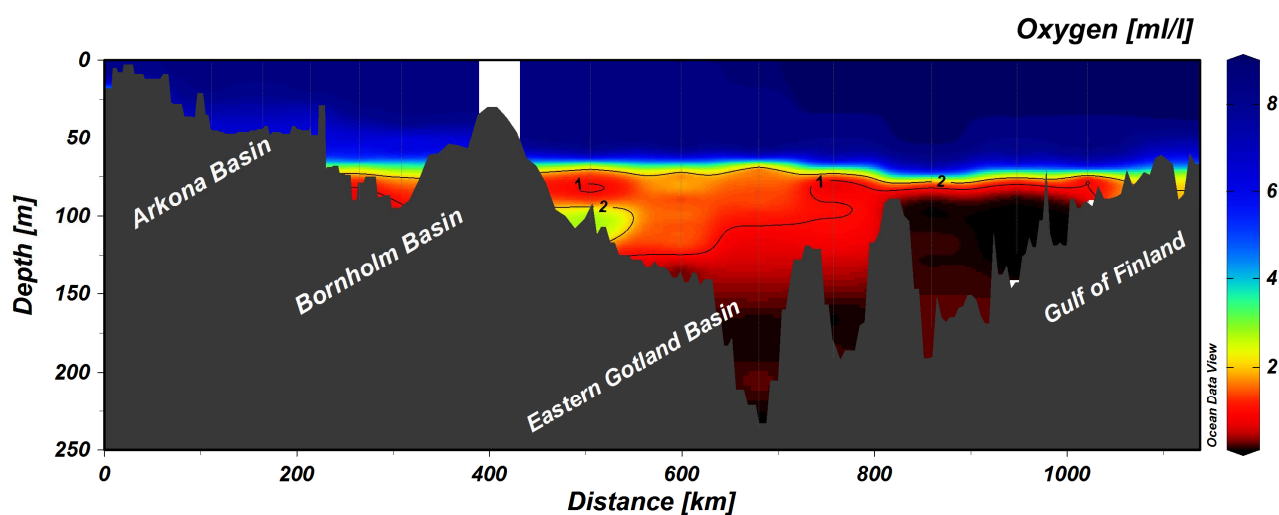
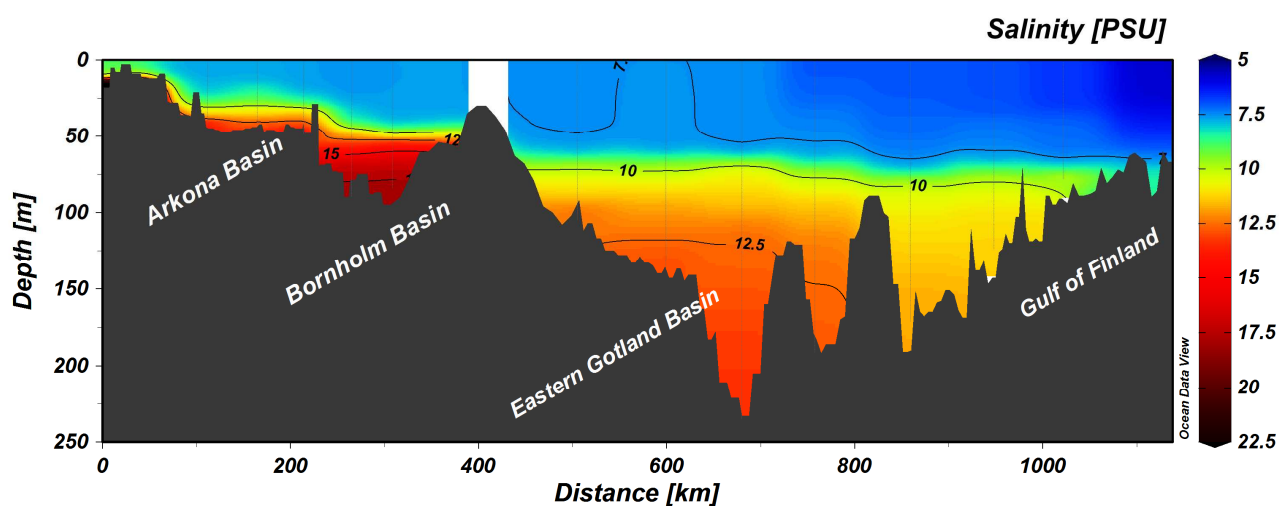


Figure 1. Transect showing oxygen and salinity through the Baltic Proper, from the Sound to the Gulf of Finland.

## PARTICIPANTS

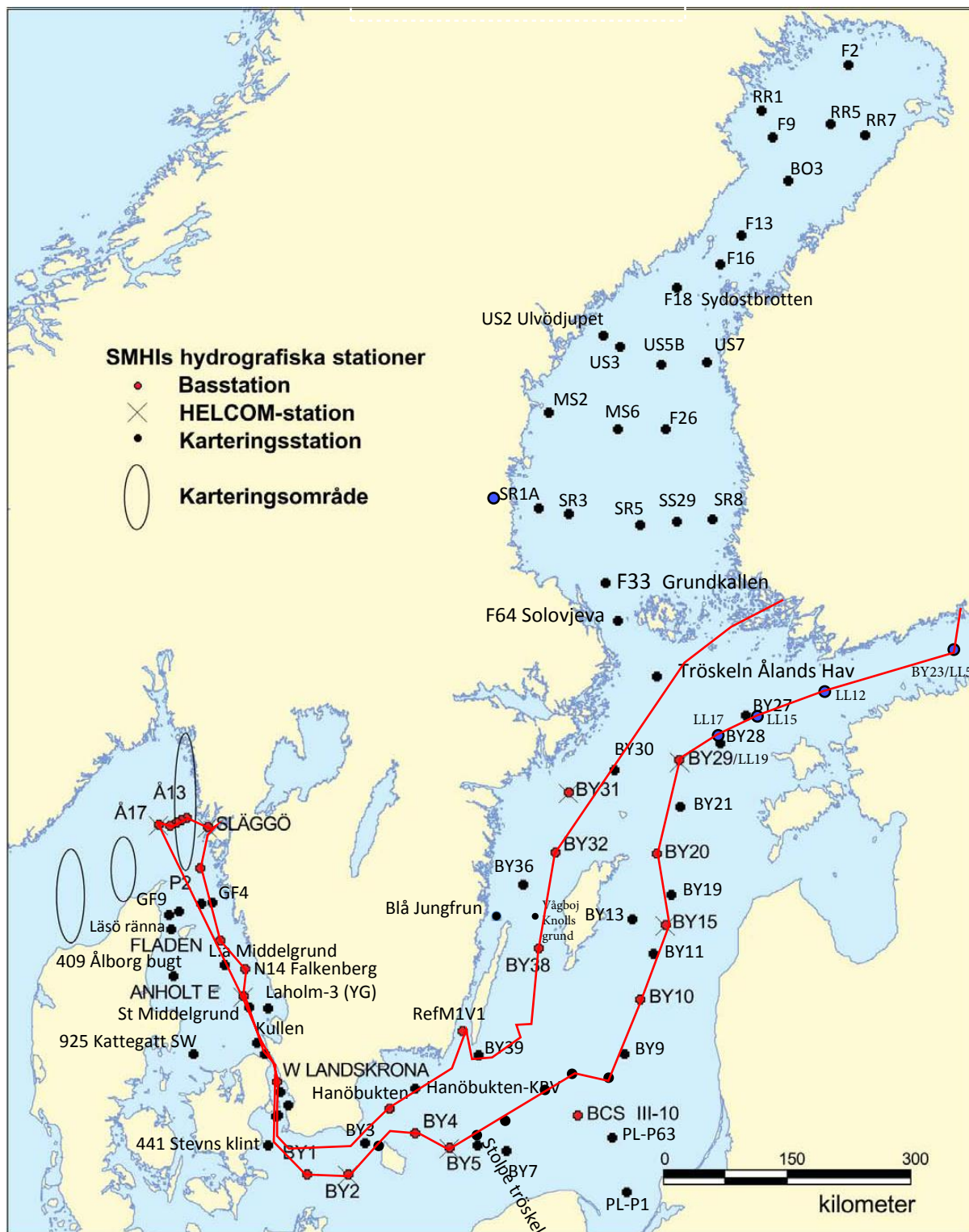
| Name                 |                 | Institute |
|----------------------|-----------------|-----------|
| Anna-Kerstin Thell   | Chief Scientist | SMHI      |
| Carl Johan Andersson |                 | SMHI      |
| Kristin Andreason    |                 | SMHI      |
| Johanna Linders      |                 | SMHI      |
| Jenny Lycken         |                 | SMHI      |
| Sari Sipilä          |                 | SMHI      |
| Mathias Andersson    | Åbo – Lysekil   | FOI       |
| Julia Carlström      | Åbo – Lysekil   | NRM       |

## APPENDICES

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

# TRACKCHART

Country: Sweden  
 Ship: R/V ARANDA  
 Date: 20170418-20170425  
 Series: 0173-0204



Time: 12:24

Ship: AR  
Year: 2017

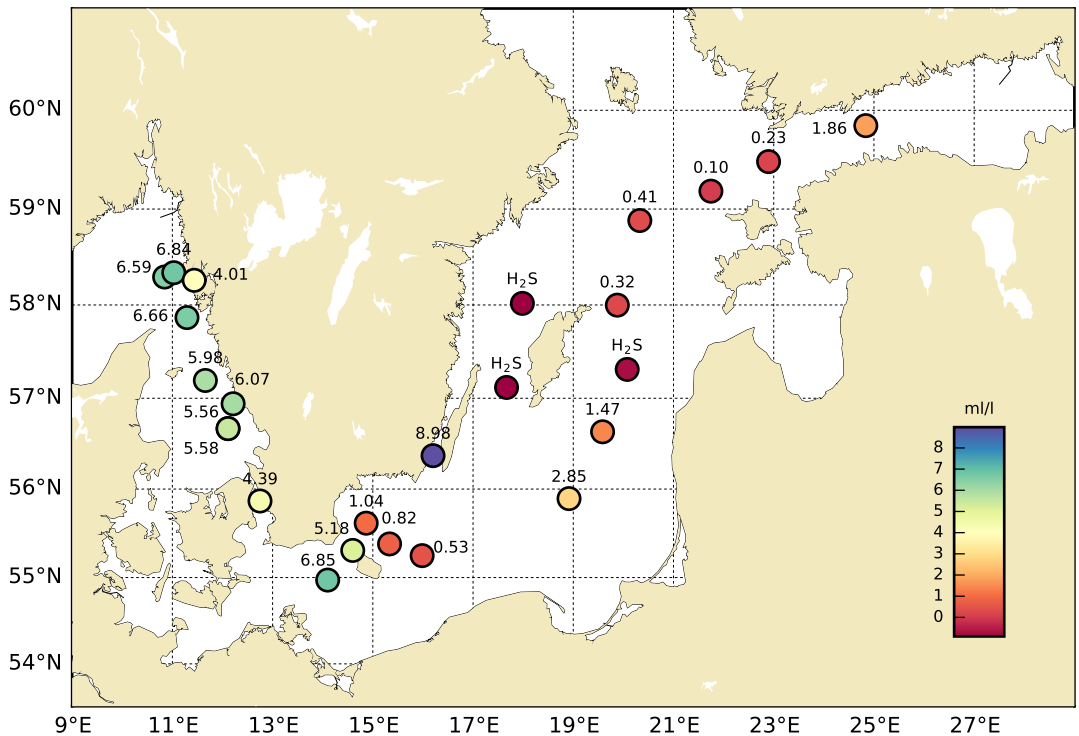
| Ser no | Cru no | Stat code | Proj | Stat name           | Lat     | Lon      | Start date<br>yyyymmdd | Start time<br>hhmm | Bottom depth<br>m | Secchi depth<br>m | Wind dir vel | Air temp<br>C | Air pres<br>hPa | WCWI elac<br>aoe | CZPP hohp<br>loy | No de                                     | No btl | T e e a a h o o<br>m m l l x x s o o | T T S S P D D H P P<br>t t s s o o r r r r o o | N N N N A N A S H C C<br>n n n n t l i u o o         |                                |                                         |
|--------|--------|-----------|------|---------------------|---------|----------|------------------------|--------------------|-------------------|-------------------|--------------|---------------|-----------------|------------------|------------------|-------------------------------------------|--------|--------------------------------------|------------------------------------------------|------------------------------------------------------|--------------------------------|-----------------------------------------|
|        |        |           |      |                     |         |          |                        |                    |                   |                   |              |               |                 |                  |                  |                                           |        |                                      | p p t t y y s t i a z n t y 3 u n n            | - - - - -<br>b c b c b c<br>t t t t t<br>l d l d l d | - - - - -<br>b c<br>t t<br>l d | - s t t<br>s<br>i<br>a<br>s<br>i p<br>t |
| 0173   | 5      | BPWX38    | BAS  | BY32 NORRKÖPINGS DJ | 5801.01 | 01759.07 | 20170419               | 0600               | 202               | 12                | 20 1         | 1.8 1034      | 1120            | x---             | 17               | x x - x - x x x x - x x x x - - x - x x   |        |                                      |                                                |                                                      |                                |                                         |
| 0174   | 5      | BPWX45    | BAS  | BY38 KARLSÖDJ       | 5707.03 | 01740.12 | 20170419               | 1150               | 110               |                   | 30 2         | 2.1 1034      | 1120            | x---             | 14               | x x - x - x x x x - x x x x - - x - - x   |        |                                      |                                                |                                                      |                                |                                         |
| 0175   | 5      | BPSE00    | EXT  | 1041                | 5615.30 | 01733.89 | 20170419               | 1640               | 28                |                   | 23 1         | 3.5 1034      | 1220            | ----             | 6                | - x - x - - x - - - - - - - - - - x -     |        |                                      |                                                |                                                      |                                |                                         |
| 0176   | 5      | BPSE00    | EXT  | N Midsjobanken      | 5613.07 | 01715.93 | 20170419               | 1825               | 24                |                   | 24 4         | 2.7 1034      | 1120            | ----             | 5                | - x - x - - x - - - - - - - - - - x -     |        |                                      |                                                |                                                      |                                |                                         |
| 0177   | 5      | BPSE00    | EXT  | 1036                | 5604.50 | 01721.65 | 20170419               | 2130               | 39                |                   | 25 5         | 2.9 1034      | 9990            | ----             | 7                | - x - x - - x - - - - - - - - - - x -     |        |                                      |                                                |                                                      |                                |                                         |
| 0178   | 5      | BPSE00    | EXT  | 1032                | 5600.73 | 01650.37 | 20170419               | 2345               | 40                |                   | 25 5         | 3.4 1033      | 9990            | ----             | 7                | - x - x - - x - - - - - - - - - - x -     |        |                                      |                                                |                                                      |                                |                                         |
| 0179   | 5      | BPWK01    | BAS  | REF M1V1            | 5622.25 | 01612.11 | 20170420               | 0340               | 21                |                   | 29 5         | 1.2 1031      | 1120            | xxxx             | 5                | x x - x x x x - x - x x x x - - x - - -   |        |                                      |                                                |                                                      |                                |                                         |
| 0180   | 5      | BPSH05    | BAS  | HANÖBUKTEN          | 5537.04 | 01452.04 | 20170420               | 1015               | 79                | 7                 | 22 4         | 5.2 1031      | 1430            | x---             | 11               | x x - x - x x x - x - x x x x - - x - x - |        |                                      |                                                |                                                      |                                |                                         |
| 0181   | 5      | SOCX39    | BAS  | W LANDSKRONA        | 5551.99 | 01244.9  | 20170420               | 2110               | 52                |                   | 26 9         | 7.1 1024      | 9990            | x---             | 9                | x x - x - x x x - x - x x x x - - x - x - |        |                                      |                                                |                                                      |                                |                                         |
| 0182   | 5      | KAEX29    | BAS  | ANHOLT E            | 5640.12 | 01206.67 | 20170421               | 0220               | 63                |                   | 26 14        | 7.6 1018      | 9990            | x-x-             | 10               | x x - x x x x - x - x x x x - - x - x x   |        |                                      |                                                |                                                      |                                |                                         |
| 0183   | 5      | SKEX18    | BAS  | Å17                 | 5817.06 | 01030.26 | 20170421               | 1310               | 348               |                   | 25 16        | 7.2 1006      | 1350            | x-x-             | 15               | x x - x x x x - x - x x x x - - x - x -   |        |                                      |                                                |                                                      |                                |                                         |
| 0184   | 5      | SKEX16    | BAS  | Å15                 | 5817.66 | 01050.71 | 20170421               | 1500               | 136               |                   | 25 14        | 7.5 1004      | 1260            | x---             | 12               | x x - x - x x x - x - x x x x - - x - - - |        |                                      |                                                |                                                      |                                |                                         |
| 0185   | 5      | SKEX14    | BAS  | Å13                 | 5820.37 | 01101.67 | 20170421               | 1630               | 95                |                   | 27 14        | 8.1 1003      | 1640            | x---             | 10               | x x - x - x x x - x - x x x x - - x - - - |        |                                      |                                                |                                                      |                                |                                         |
| 0186   | 5      | FIBG27    | BAS  | SLÄGGÖ              | 5815.58 | 01126.14 | 20170421               | 2100               | 70                |                   | 31 14        | 6.4 1005      | 9990            | x-x-             | 9                | x x - x - x x x - x - x x x x - - x - x x |        |                                      |                                                |                                                      |                                |                                         |
| 0187   | 5      | SKEX23    | BAS  | P2                  | 5751.98 | 01117.48 | 20170421               | 2340               | 96                |                   | 30 12        | 7.0 1007      | 9990            | x---             | 10               | x x - x - x x x - x - x x x x - - x - - - |        |                                      |                                                |                                                      |                                |                                         |
| 0188   | 5      | KANX25    | BAS  | FLADEN              | 5711.56 | 01139.47 | 20170422               | 0430               | 85                |                   | 30 14        | 5.5 1008      | 1140            | x---             | 12               | x x - x - x x x - x - x x x x - - x - - - |        |                                      |                                                |                                                      |                                |                                         |
| 0189   | 5      | KANX50    | BAS  | N14 FALKENBERG      | 5656.40 | 01212.71 | 20170422               | 0725               | 30                | 3                 | 30 11        | 6.2 1009      | 1140            | xxxx             | 7                | x x - x x x x - x - x x x x - - x - - -   |        |                                      |                                                |                                                      |                                |                                         |
| 0190   | 5      | KAEX29    | BAS  | ANHOLT E            | 5640.11 | 01206.67 | 20170422               | 0945               | 63                |                   | 30 11        | 6.8 1010      | 1140            | xxxx             | 10               | x x - x x x x - x - x x x x - - x - - -   |        |                                      |                                                |                                                      |                                |                                         |
| 0191   | 5      | BPSA02    | BAS  | BY1                 | 5500.94 | 01318.04 | 20170422               | 2015               | 47                |                   | 30 7         | 6.4 1012      | 9990            | x---             | 8                | x x - x - x x x - x - x x x x - - x - x - |        |                                      |                                                |                                                      |                                |                                         |
| 0192   | 5      | BPSA03    | BAS  | BY2 ARKONA          | 5458.26 | 01405.93 | 20170422               | 2325               | 46                |                   | 30 6         | 5.9 1012      | 9990            | xxx-             | 8                | x x - x - x x x - x - x x x x - - x - - - |        |                                      |                                                |                                                      |                                |                                         |
| 0193   | 5      | BPSA05    | EXT  | W HAMMER ODDE       | 5518.54 | 01435.94 | 20170423               | 0250               | 53                |                   | 28 6         | 4.5 1011      | 9990            | ----             | 9                | x x - x - x x x - - - - - - - - - - -     |        |                                      |                                                |                                                      |                                |                                         |
| 0194   | 5      | BPSB06    | BAS  | BY4 CHRISTIANSÖ     | 5522.97 | 01520.03 | 20170423               | 0545               | 93                |                   | 27 6         | 4.2 1011      | 1430            | x---             | 12               | x x - x - x x x - x - x x x x - - x - - x |        |                                      |                                                |                                                      |                                |                                         |
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| 0196   | 5      | BPSE00    | BAS  | 4-CTRY-BP           | 5553.60 | 01854.90 | 20170423               | 1940               | 111               |                   | 25 7         | 1010          | 9990            | x-x-             | 14               | x x - x - x x x - x - x x x x - - x - x - |        |                                      |                                                |                                                      |                                |                                         |
| 0197   | 5      | BPEX13    | BAS  | BY10                | 5638.02 | 01935.08 | 20170424               | 0100               | 144               |                   | 29 5         | 3.7 1009      | 9990            | x---             | 15               | x x - x - x x x - x - x x x x - - x - x - |        |                                      |                                                |                                                      |                                |                                         |
| 0198   | 5      | BPEX21    | BAS  | BY15 GOTLANDS DJ    | 5718.73 | 02004.57 | 20170424               | 0525               | 240               | 7                 | 24 5         | 3.6 1008      | 1130            | xxxx             | 19               | x x - x x x x x x - x x x x - - x - x -   |        |                                      |                                                |                                                      |                                |                                         |
| 0199   | 5      | BPEX21    | EXT  | BY15 GOTLANDS DJ    | 5718.42 | 02004.58 | 20170424               | 0710               | 240               | 7                 | 24 5         | 3.2 1008      | 1130            | ----             | 5                | x x - x - x x x - x - x x x x - - x - - - |        |                                      |                                                |                                                      |                                |                                         |
| 0200   | 5      | BPEX26    | BAS  | BY20 FÅRÖ DJ        | 5759.89 | 01952.73 | 20170424               | 1135               | 196               | 7                 | 20 8         | 1005          | 2730            | x---             | 17               | x x - x - x x x - x - x x x x - - x - x - |        |                                      |                                                |                                                      |                                |                                         |
| 0201   | 5      | BPNX35    | BAS  | BY29 / LL19         | 5852.91 | 02019.66 | 20170424               | 1730               | 175               |                   | 17 18        | 2.1 1000      | 6840            | x-x-             | 16               | x x - x - x x x x - x x x x - - x - - -   |        |                                      |                                                |                                                      |                                |                                         |
| 0202   | 5      | BPNX62    | SYK  | LL15                | 5911.00 | 02144.79 | 20170424               | 2240               | 131               |                   | 13 19        | 1.3 997       | 6990            | ----             | 14               | x x - x - x x x x - - - - - - - - - - x - |        |                                      |                                                |                                                      |                                |                                         |
| 0203   | 5      | BPNX60    | SYK  | LL12                | 5929.04 | 02253.83 | 20170425               | 0235               | 83                |                   | 15 18        | 1.2 996       | 2850            | x---             | 11               | x x - x - x x x x - x x x x - - x - - x   |        |                                      |                                                |                                                      |                                |                                         |
| 0204   | 5      | GFXX29    | SYK  | BY23 / LL7          | 5950.79 | 02450.26 | 20170425               | 0830               | 103               |                   | 13 8         | 2.8 1000      | 1630            | x---             | 13               | x x - x - x x x - x - x x x x - - x - x - |        |                                      |                                                |                                                      |                                |                                         |

## Bottom water oxygen concentration (ml/l)

Ship: Aranda

Date: 20170419-20170425

Series: 0173-0204





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

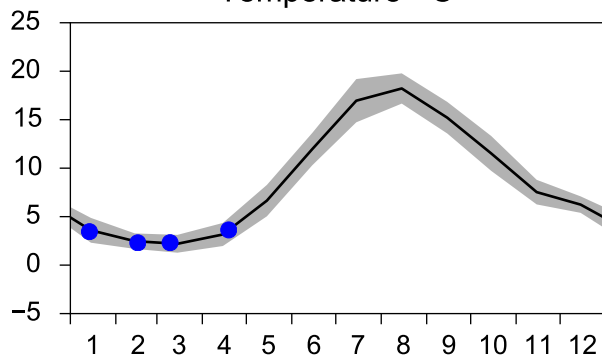
Annual Cycles

— Mean 2001-2015

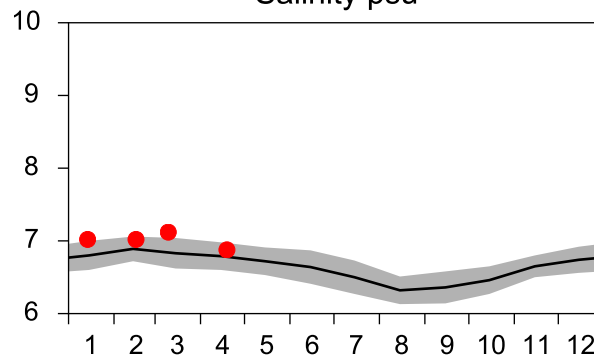
■ St.Dev.

● 2017

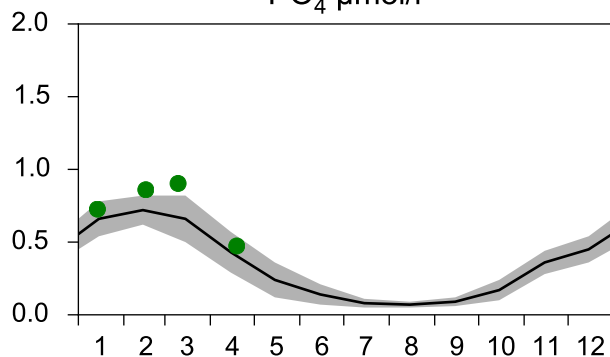
Temperature °C



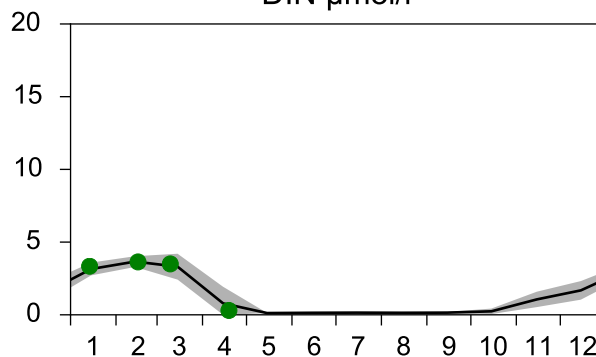
Salinity psu



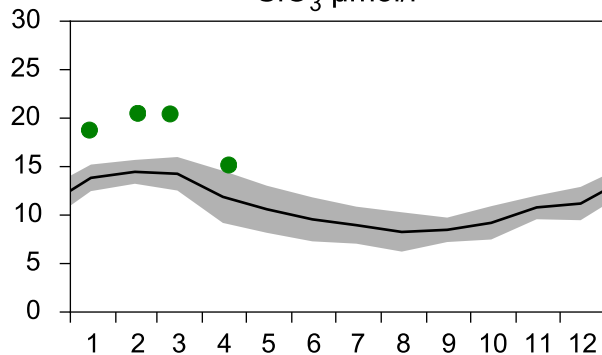
PO<sub>4</sub> µmol/l



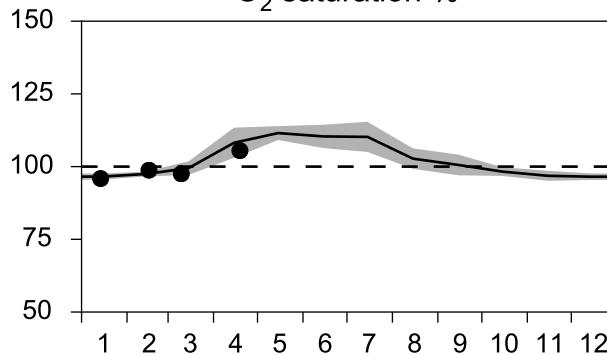
DIN µmol/l



SiO<sub>3</sub> µmol/l

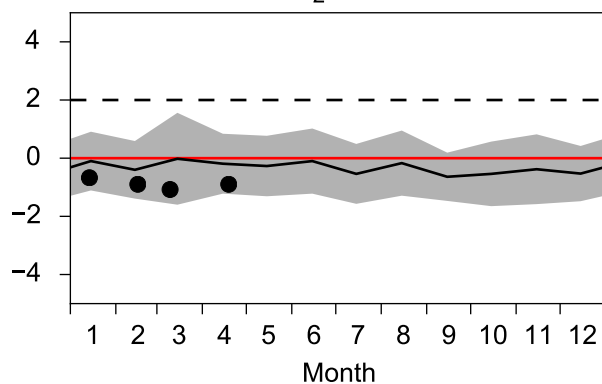


O<sub>2</sub> saturation %

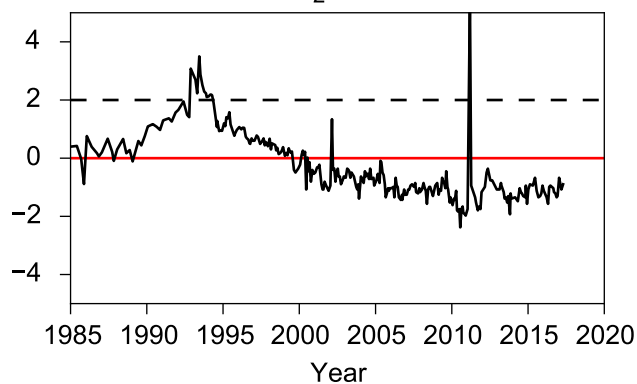


## OXYGEN IN BOTTOM WATER (depth >= 175 m)

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

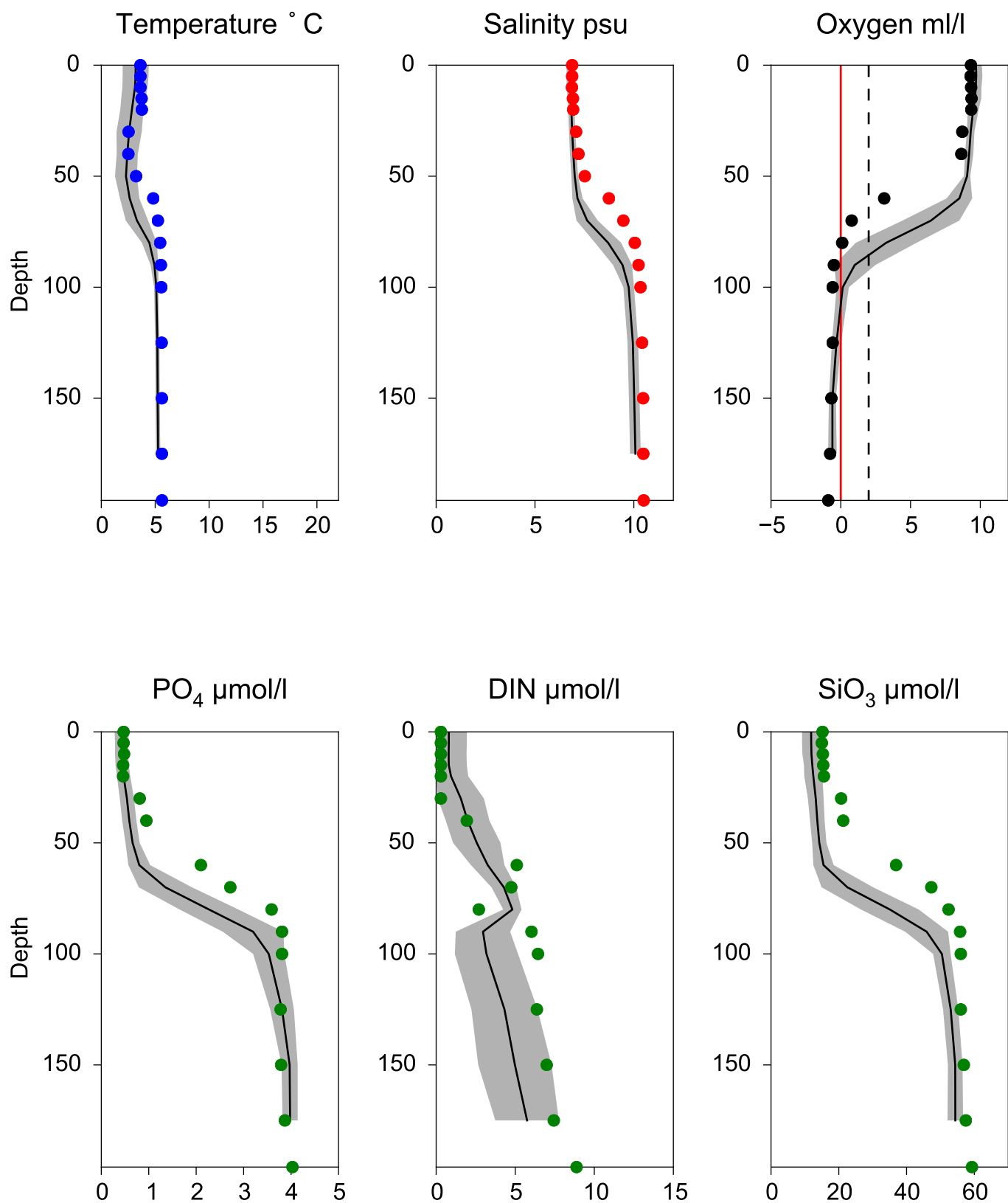


O<sub>2</sub> ml/l



# Vertical profiles BY32 NORRKÖPINGSDJ April

— Mean 2001-2015    St.Dev.    • 2017-04-19



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

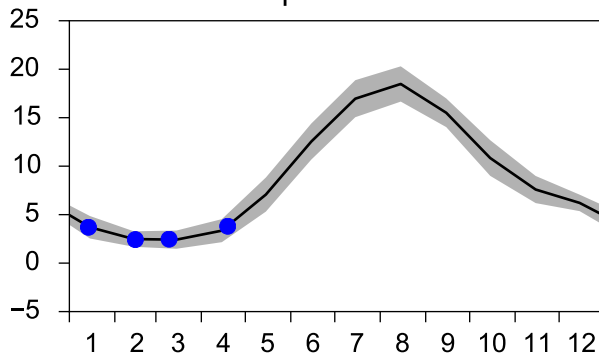
Annual Cycles

— Mean 2001-2015

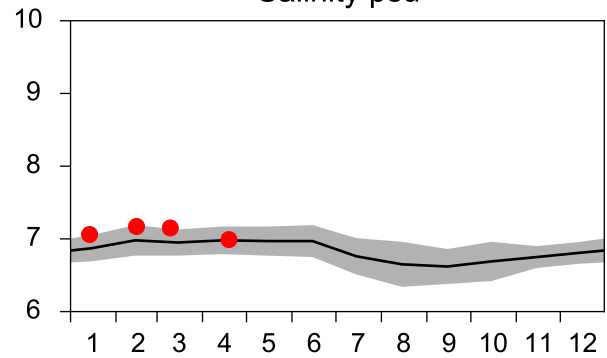
■ St.Dev.

● 2017

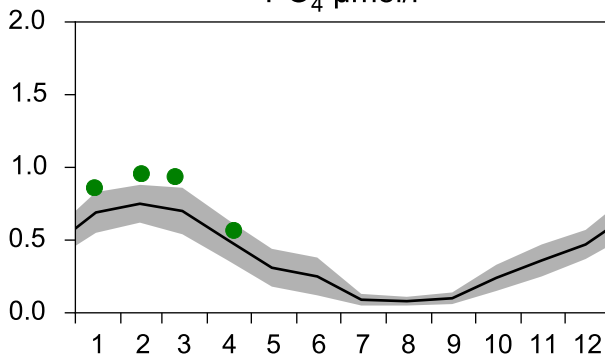
Temperature °C



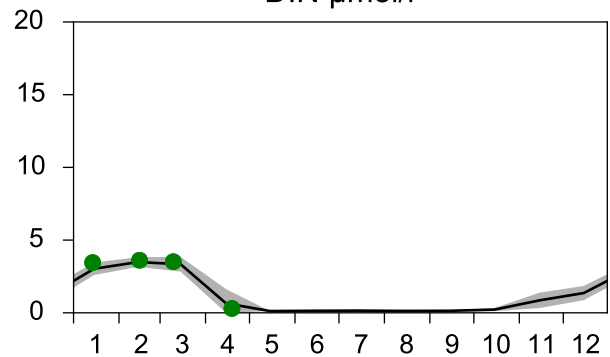
Salinity psu



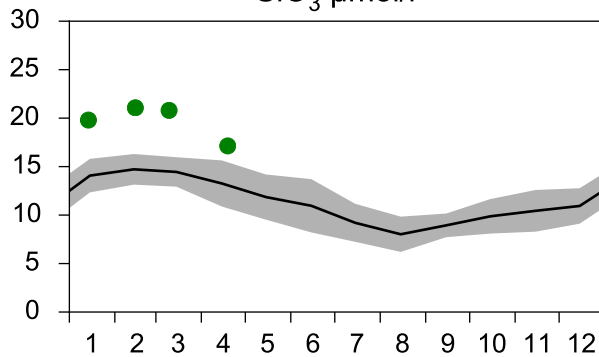
PO<sub>4</sub> µmol/l



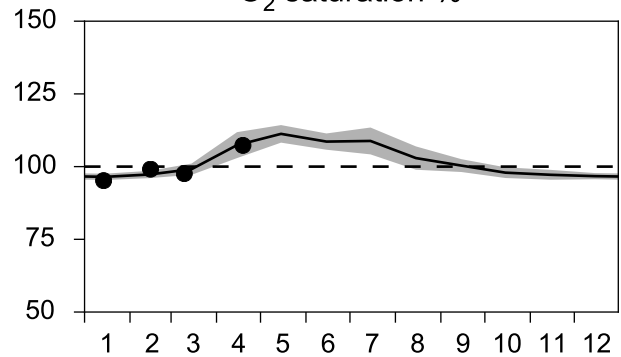
DIN µmol/l



SiO<sub>3</sub> µmol/l

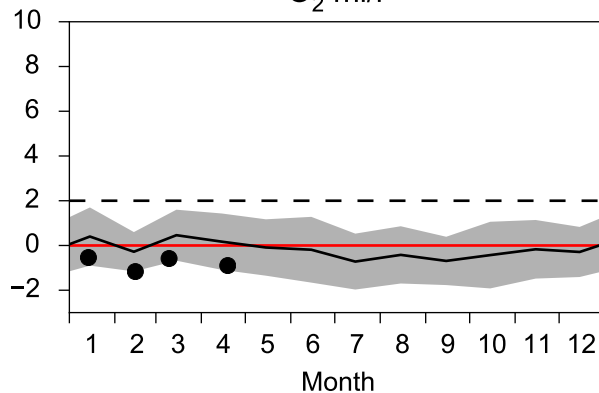


O<sub>2</sub> saturation %

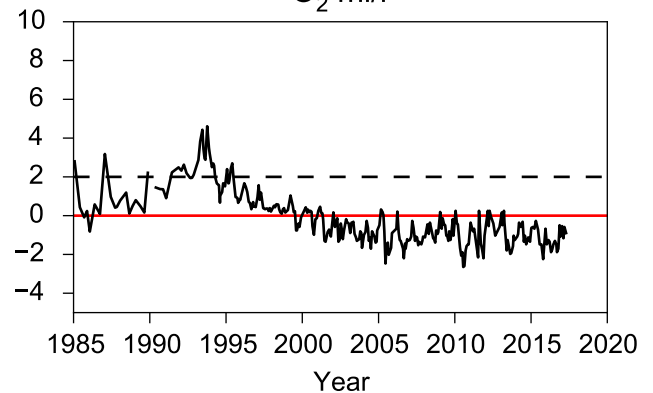


## OXYGEN IN BOTTOM WATER (depth >= 100 m)

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

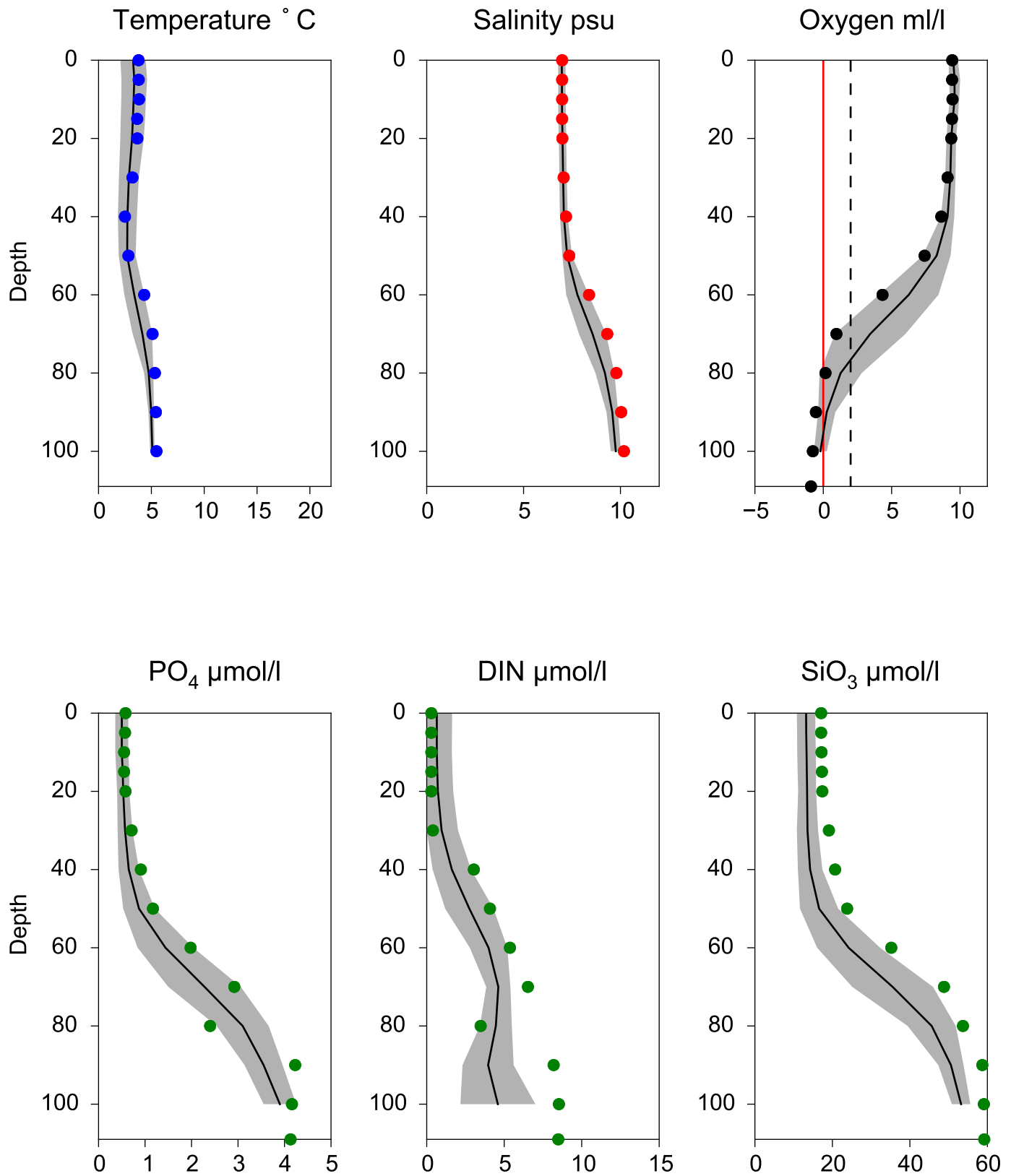


O<sub>2</sub> ml/l



# Vertical profiles BY38 KARLSÖDJ April

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## STATION REF M1V1 SURFACE WATER (0-10 m)

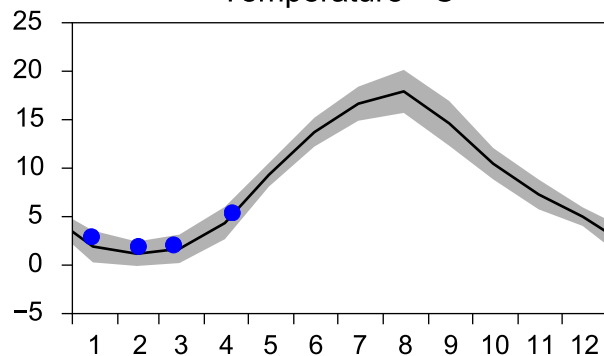
Annual Cycles

— Mean 2001-2015

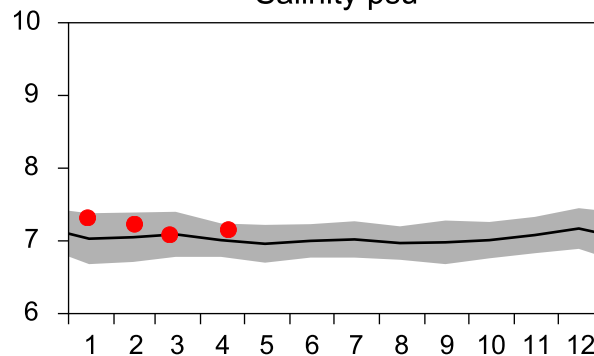
■ St.Dev.

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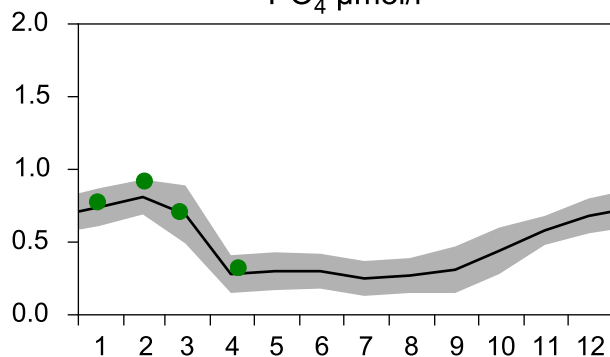
Temperature °C



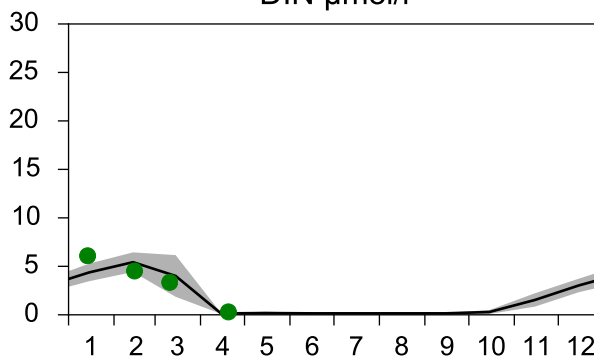
Salinity psu



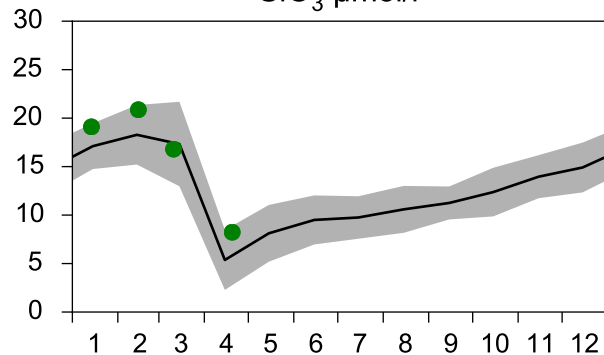
PO<sub>4</sub> µmol/l



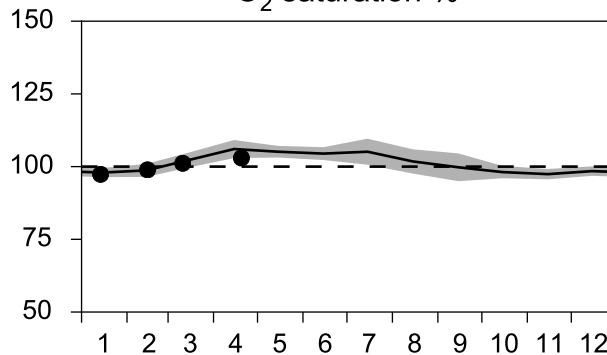
DIN µmol/l



SiO<sub>3</sub> µmol/l

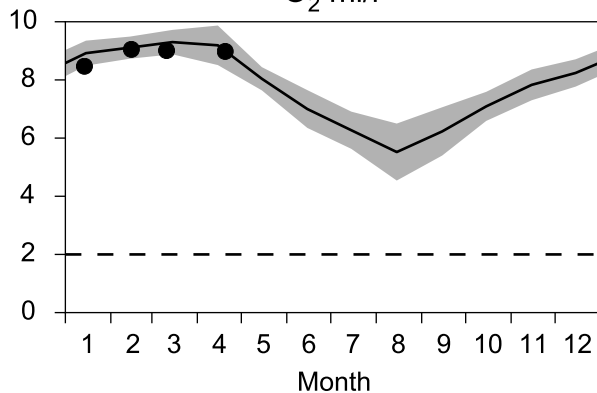


O<sub>2</sub> saturation %

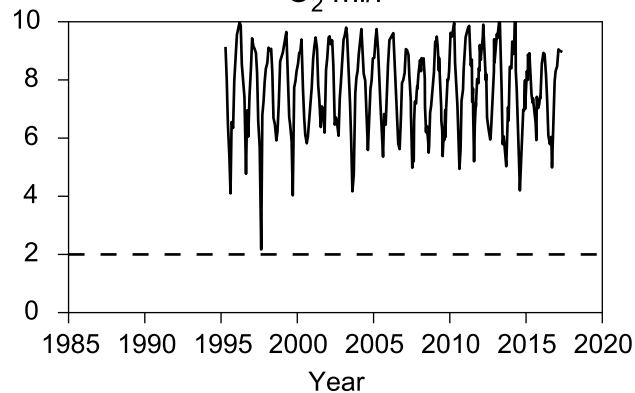


## OXYGEN IN BOTTOM WATER (depth >= 17 m)

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

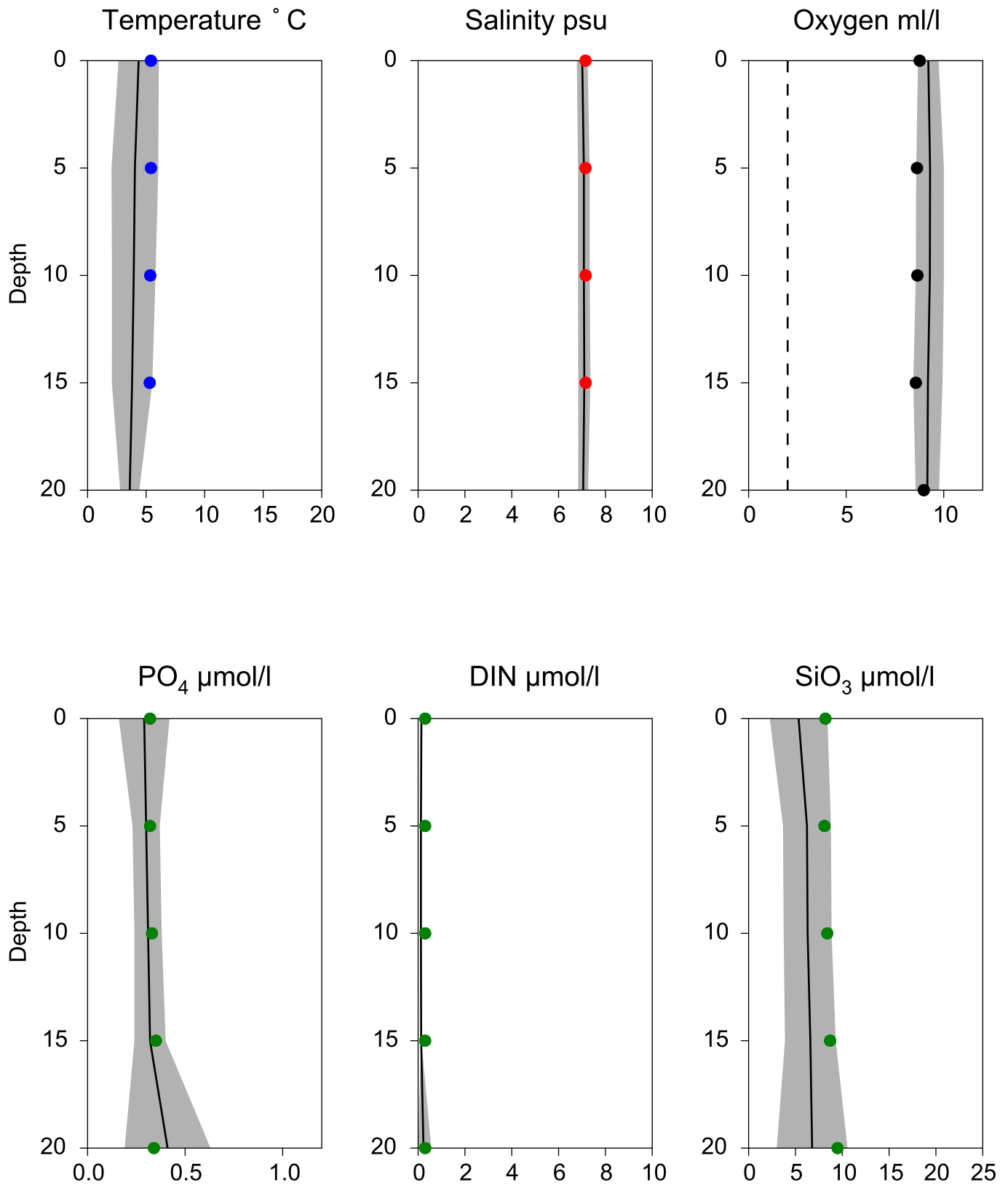


O<sub>2</sub> ml/l



# Vertical profiles REF M1V1 April

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# STATION HANÖBUKTEN SURFACE WATER (0-10 m)

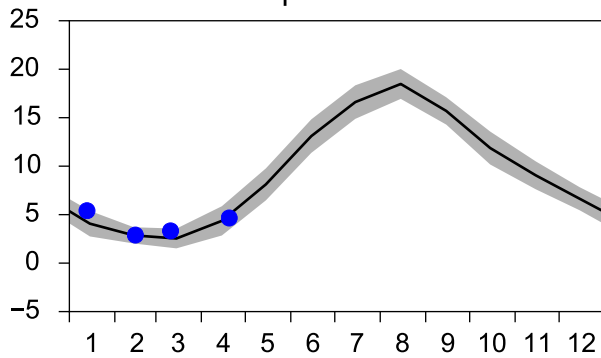
Annual Cycles

— Mean 2001-2015

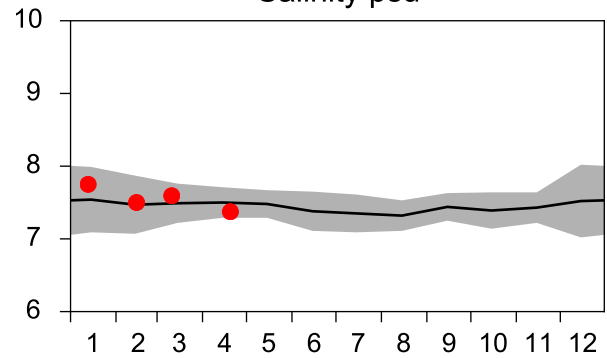
■ St.Dev.

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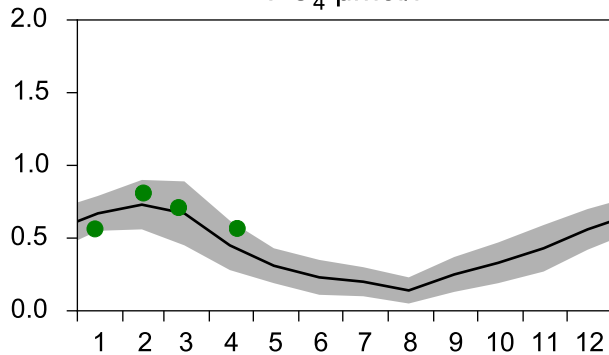
Temperature °C



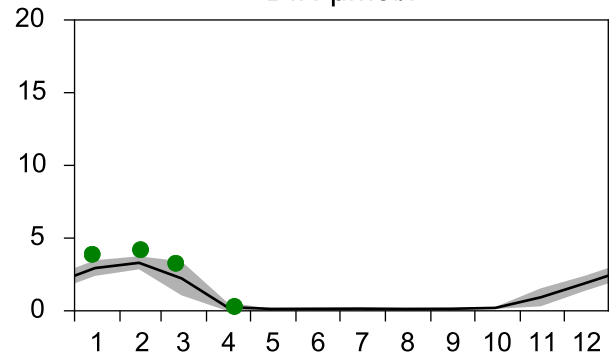
Salinity psu



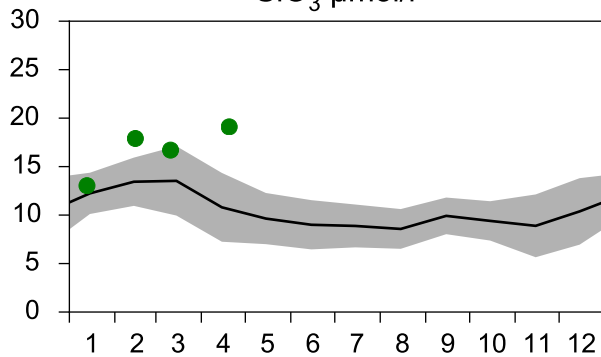
PO<sub>4</sub> µmol/l



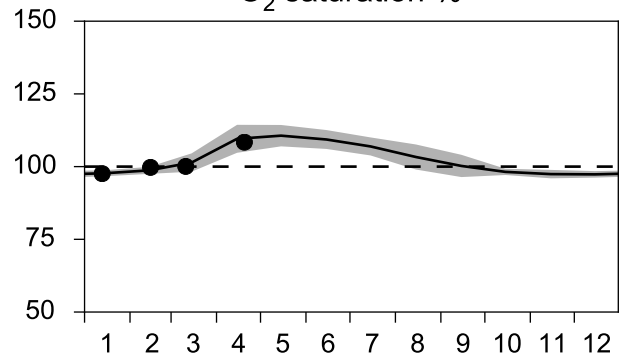
DIN µmol/l



SiO<sub>3</sub> µmol/l

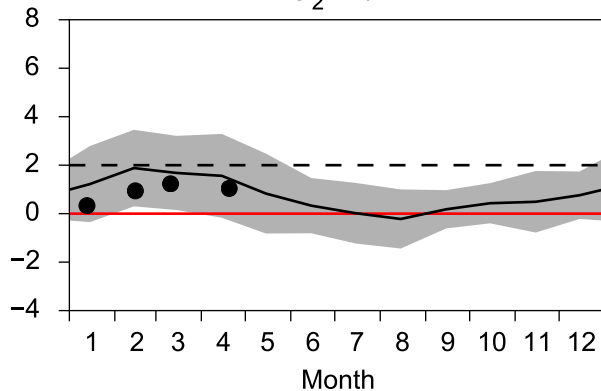


O<sub>2</sub> saturation %

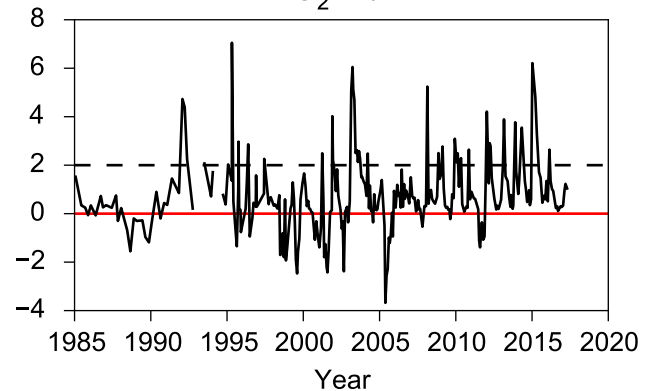


## OXYGEN IN BOTTOM WATER (depth ≥ 70 m)

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

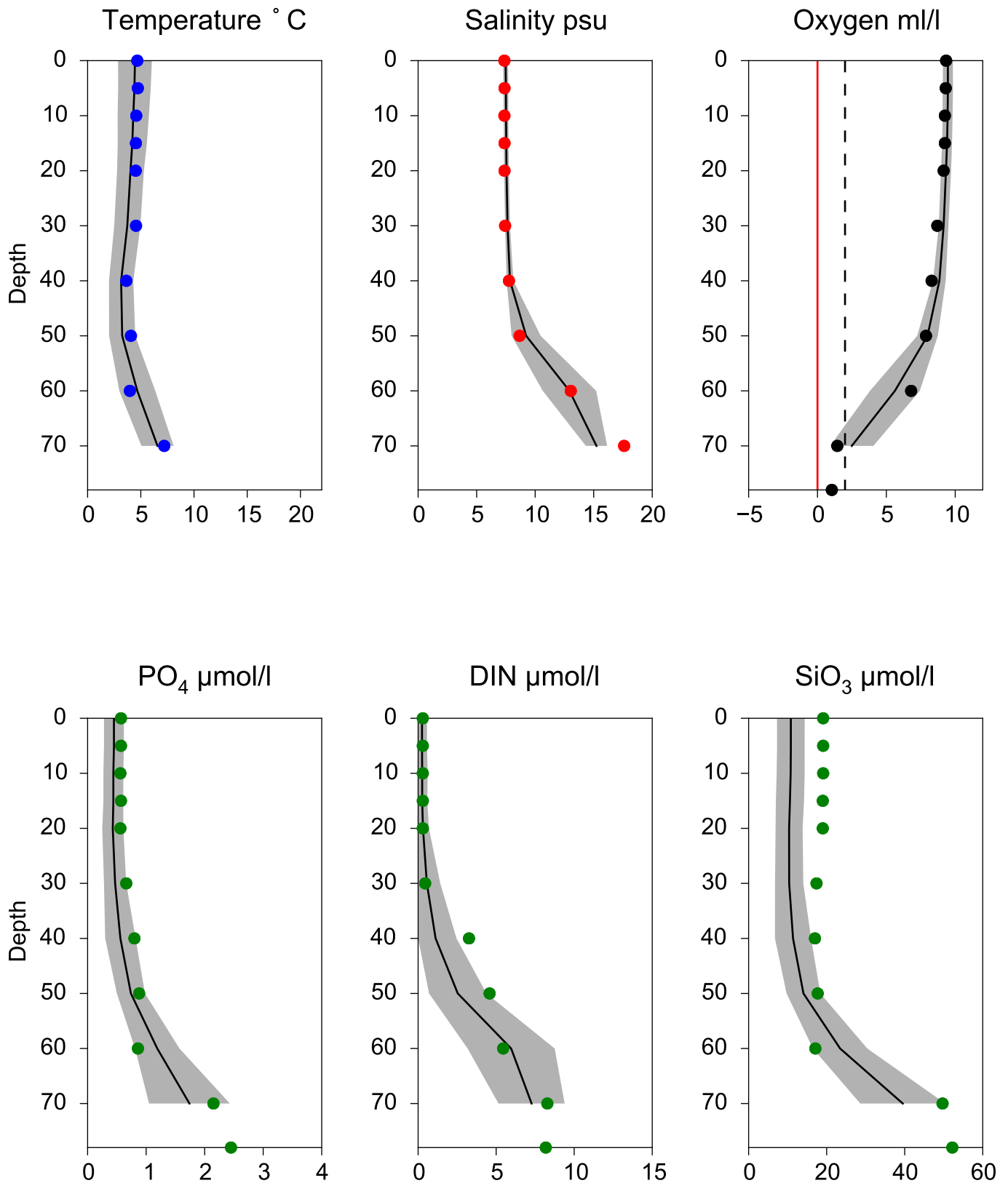


O<sub>2</sub> ml/l



# Vertical profiles HANÖBUKTEN April

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

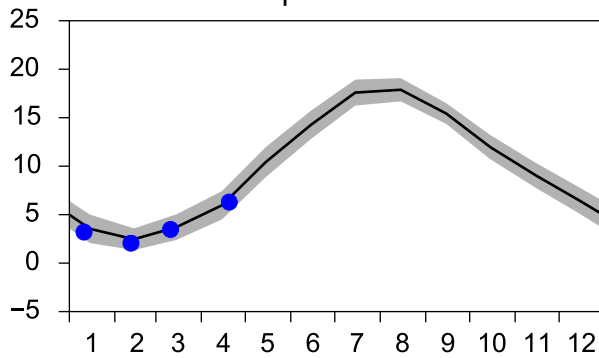
Annual Cycles

— Mean 2001-2015

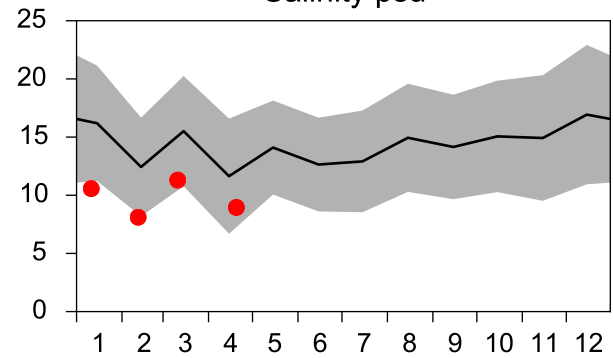
■ St.Dev.

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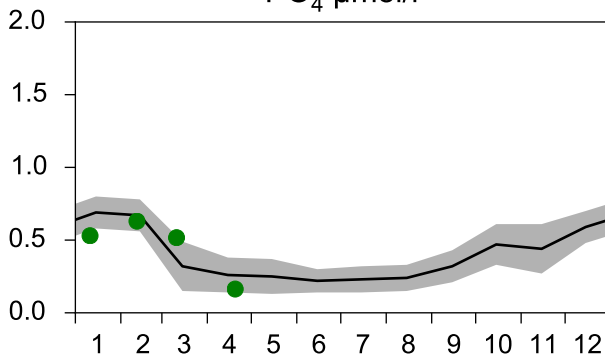
Temperature °C



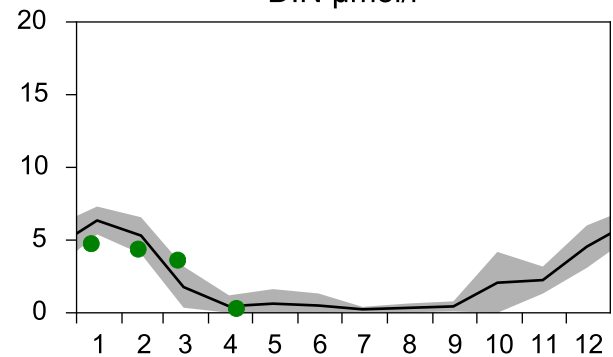
Salinity psu



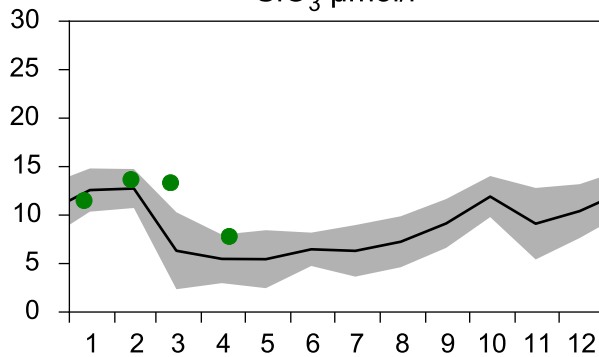
PO<sub>4</sub> µmol/l



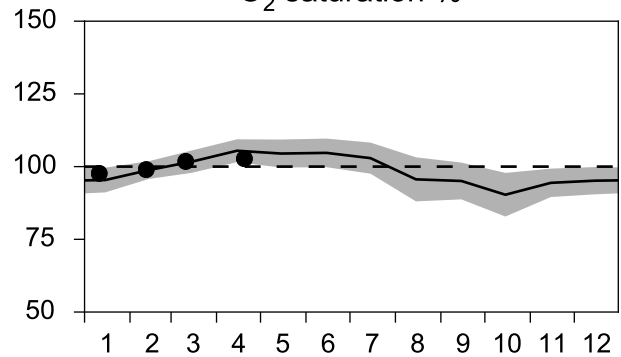
DIN µmol/l



SiO<sub>3</sub> µmol/l

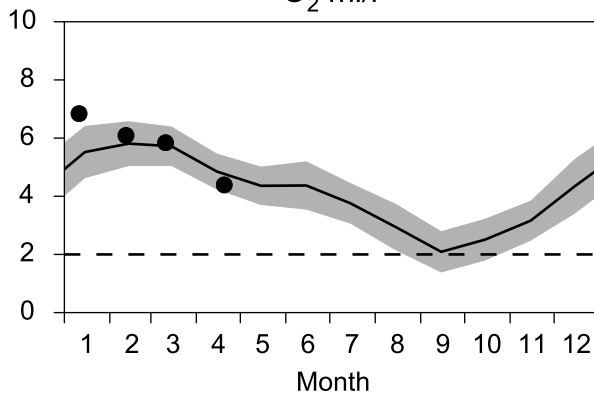


O<sub>2</sub> saturation %

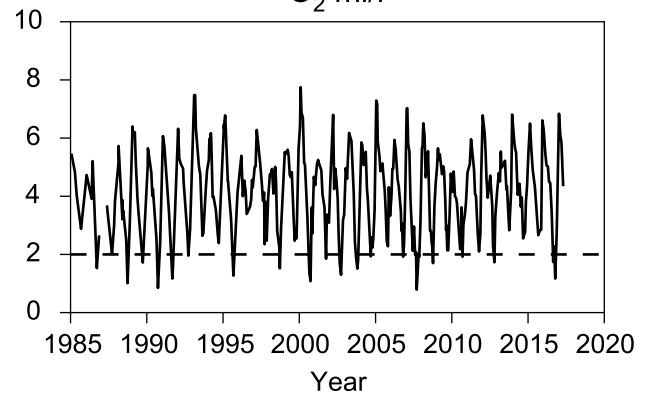


## OXYGEN IN BOTTOM WATER (depth >= 40 m)

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

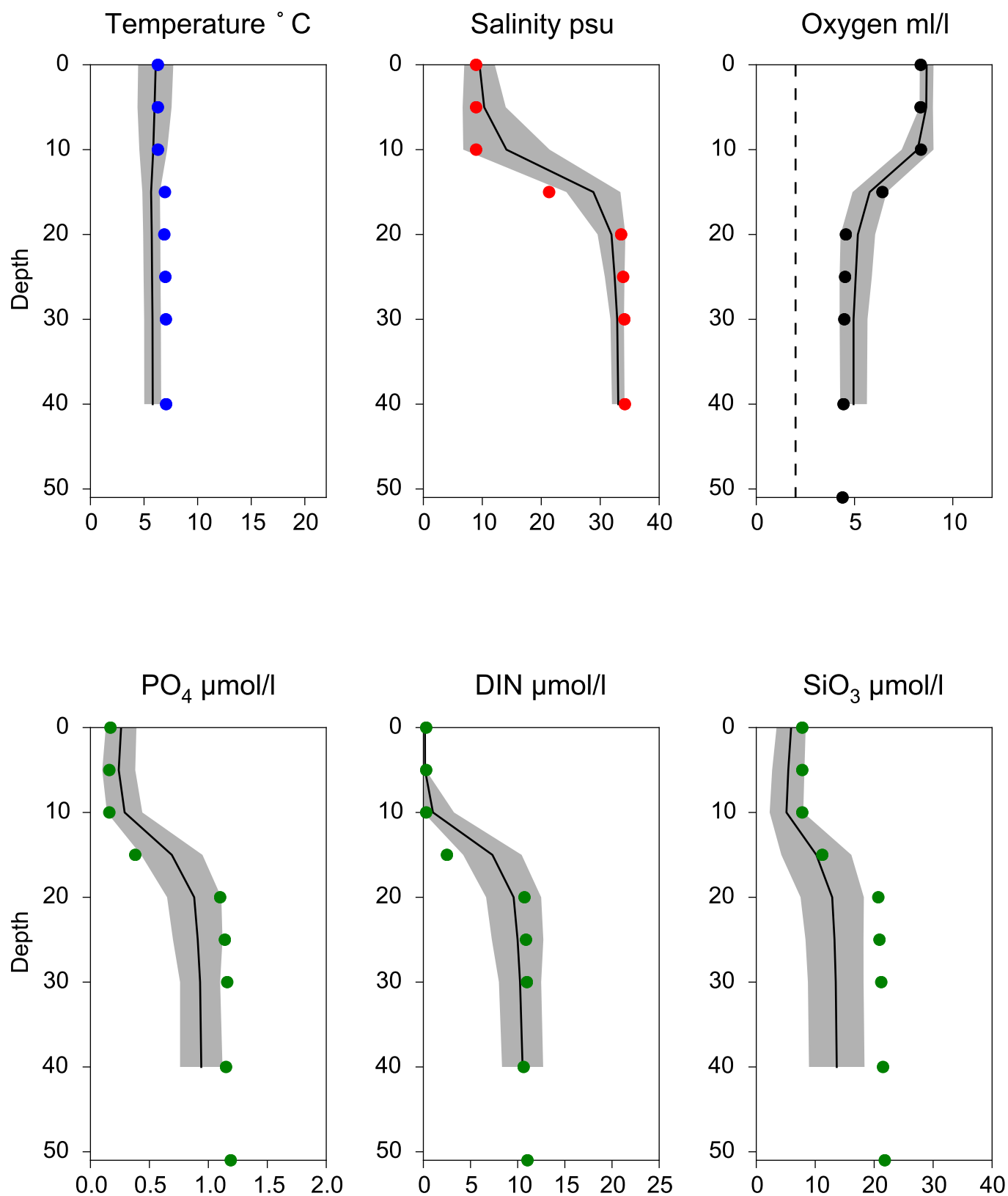


O<sub>2</sub> ml/l



# Vertical profiles W LANDSKRONA April

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

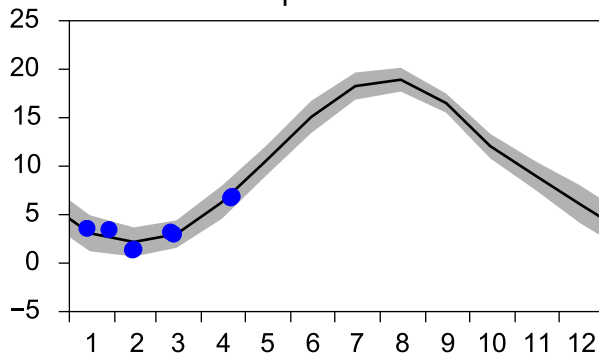
Annual Cycles

— Mean 2001-2015

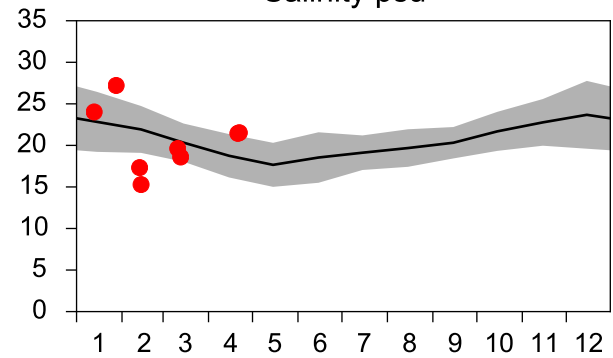
■ St.Dev.

● 2017

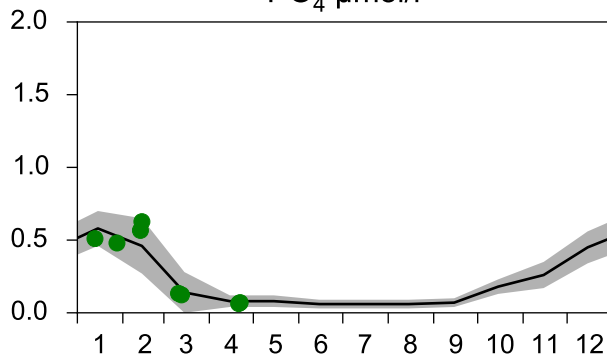
Temperature °C



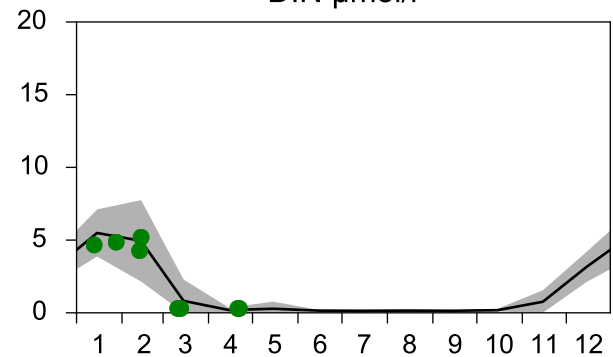
Salinity psu



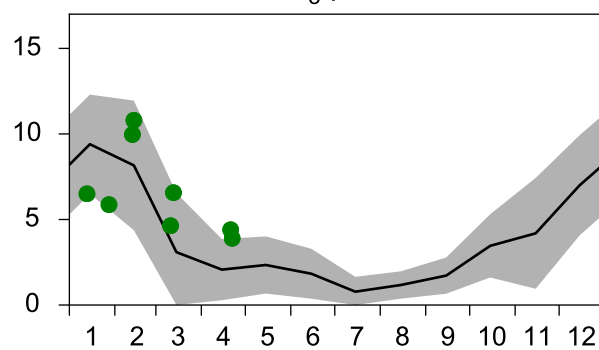
PO<sub>4</sub> µmol/l



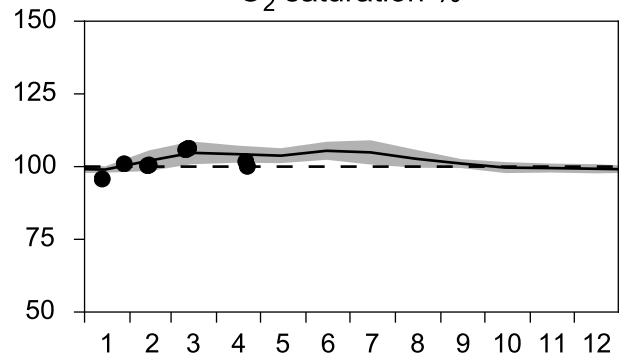
DIN µmol/l



SiO<sub>3</sub> µmol/l

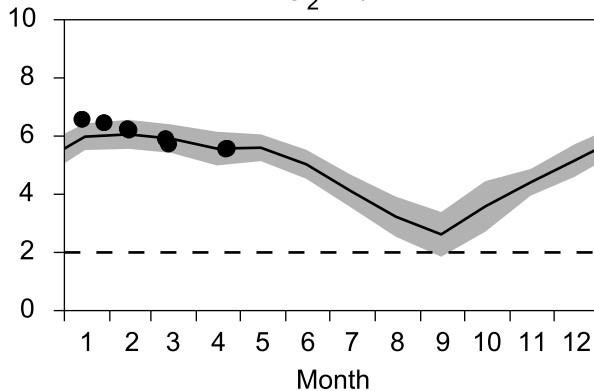


O<sub>2</sub> saturation %

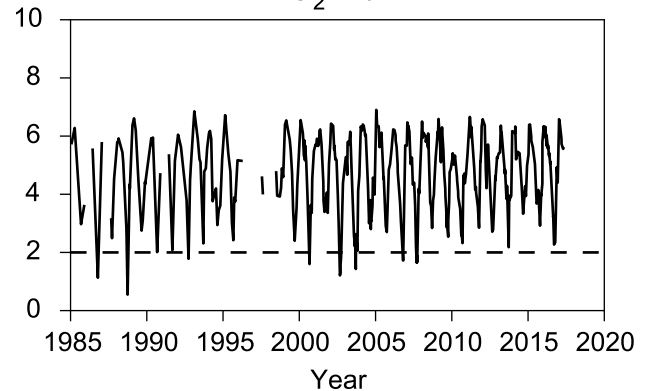


## OXYGEN IN BOTTOM WATER (depth >= 52 m)

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

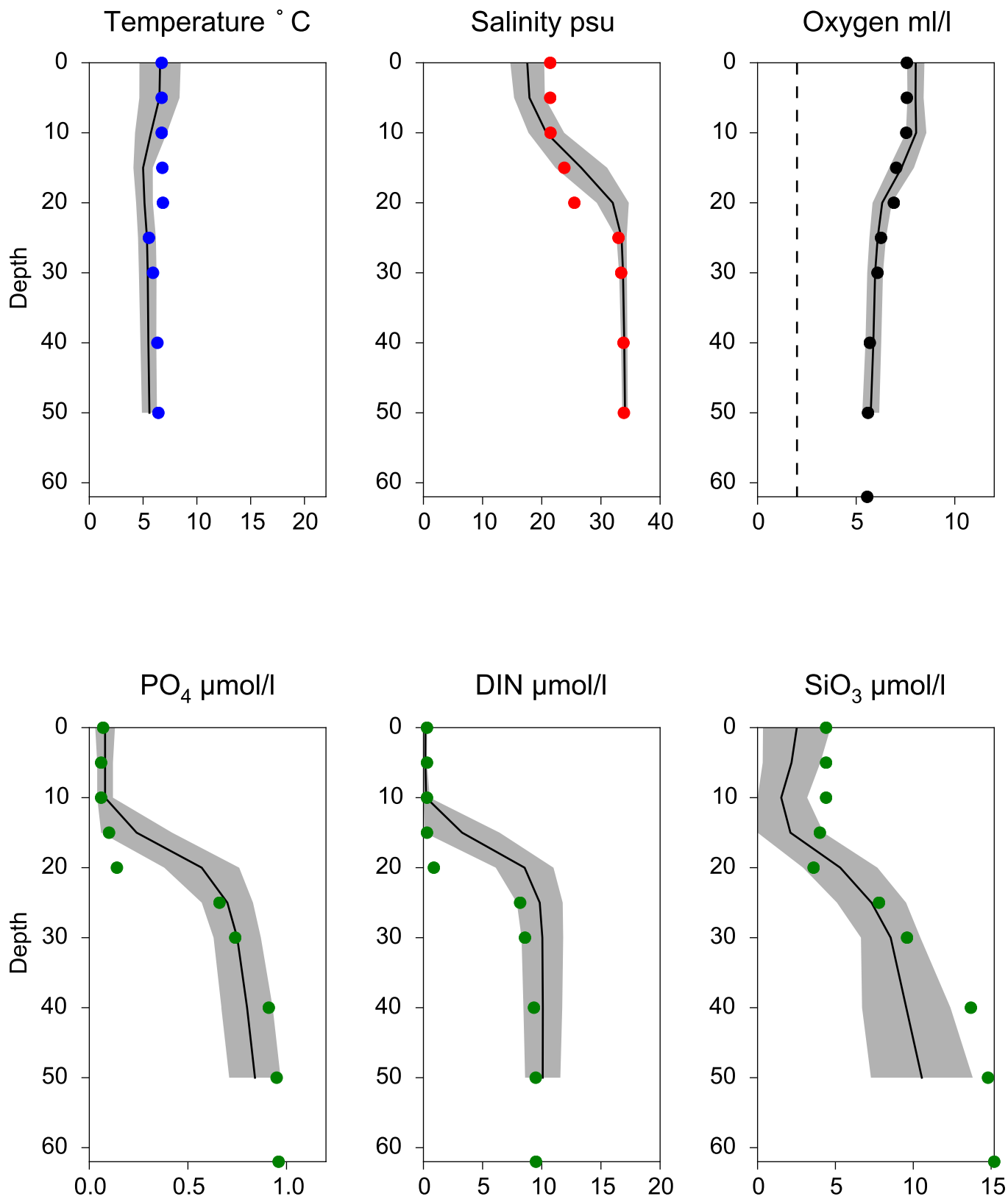


O<sub>2</sub> ml/l



# Vertical profiles ANHOLT E April

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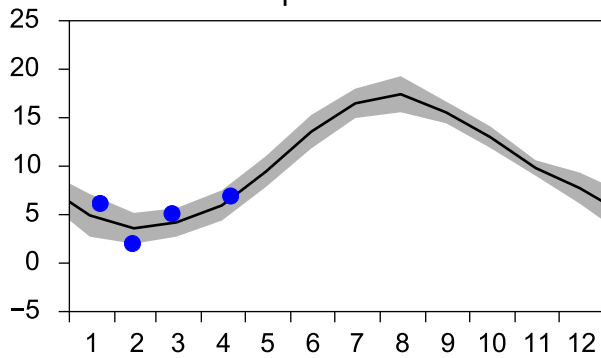


# STATION Å17 SURFACE WATER (0-10 m)

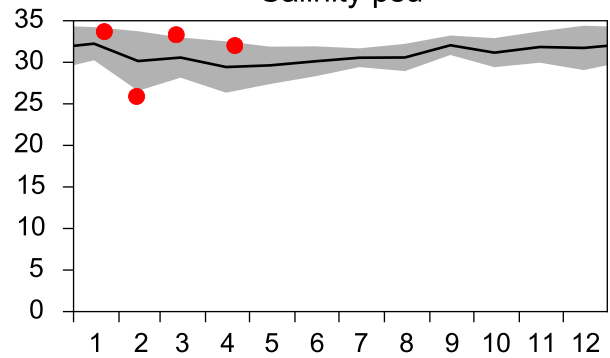
Annual Cycles

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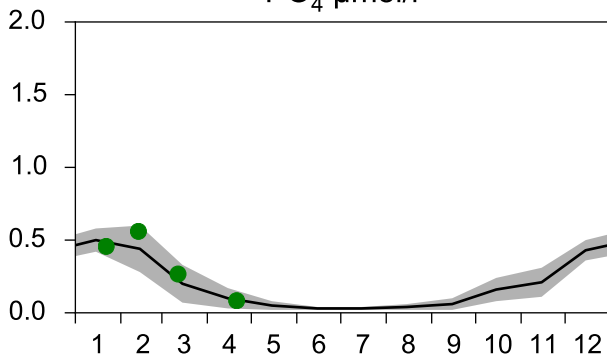
Temperature °C



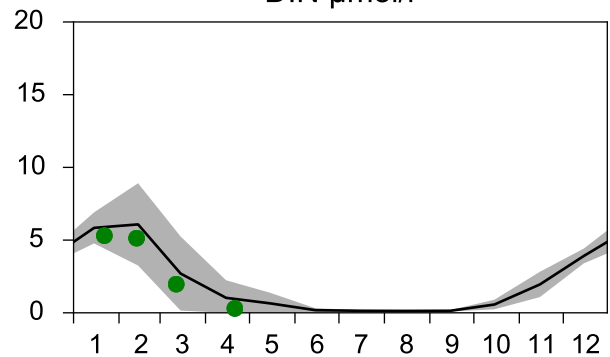
Salinity psu



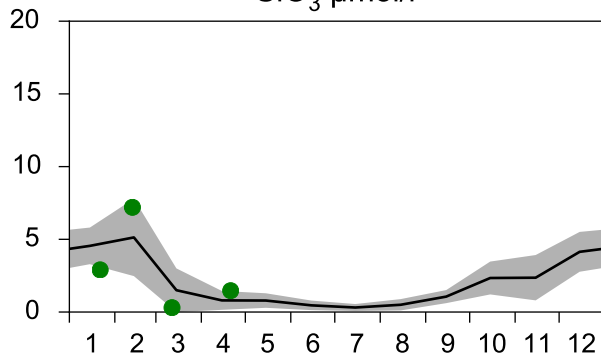
PO<sub>4</sub> µmol/l



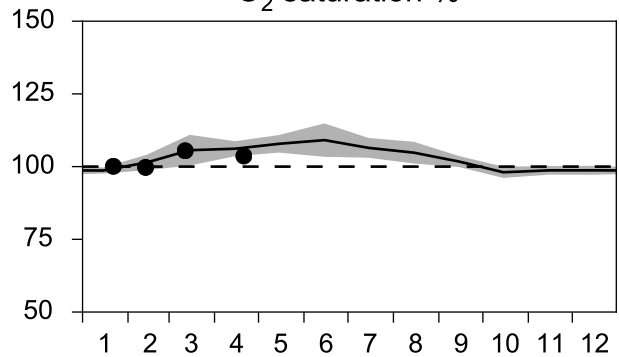
DIN µmol/l



SiO<sub>3</sub> µmol/l

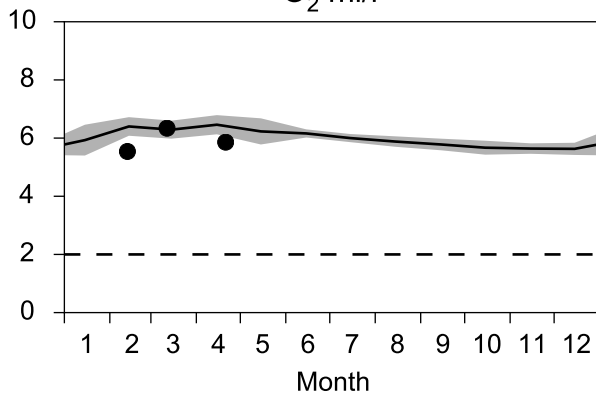


O<sub>2</sub> saturation %

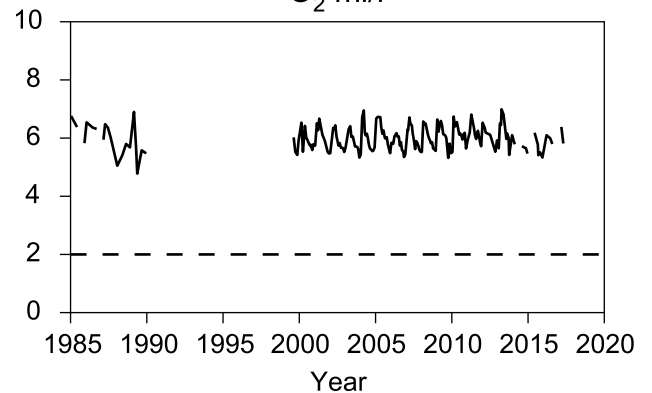


## OXYGEN IN BOTTOM WATER (depth >= 300 m)

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

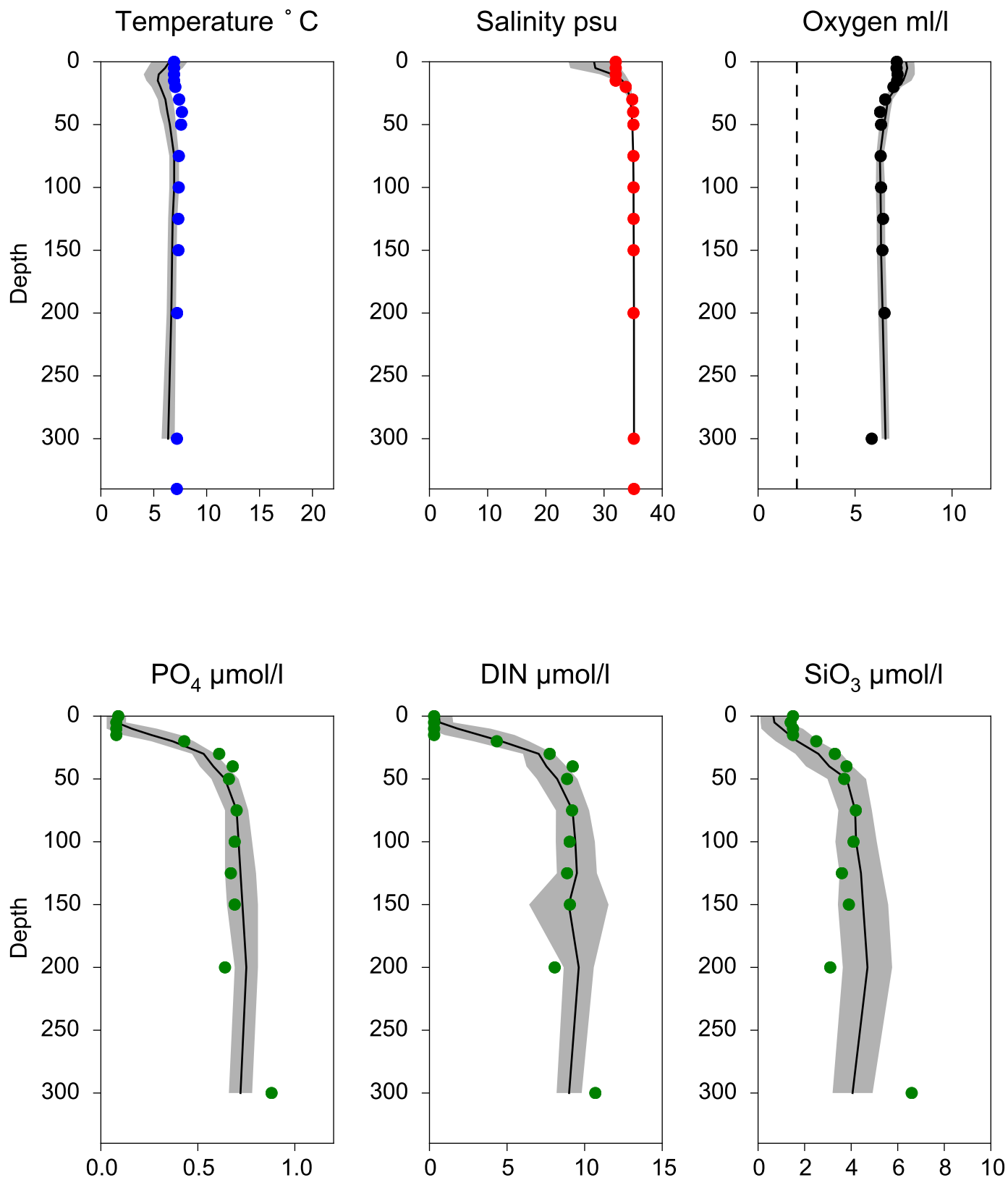


O<sub>2</sub> ml/l



# Vertical profiles Å17 April

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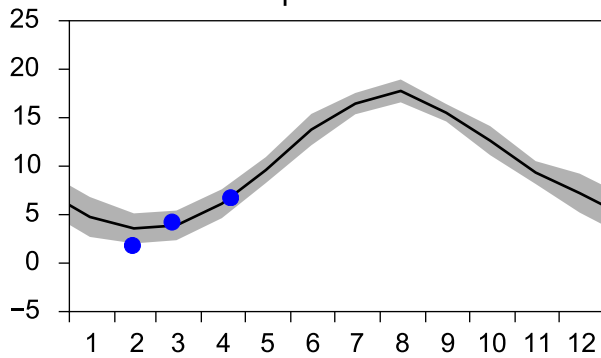


# STATION Å15 SURFACE WATER (0-10 m)

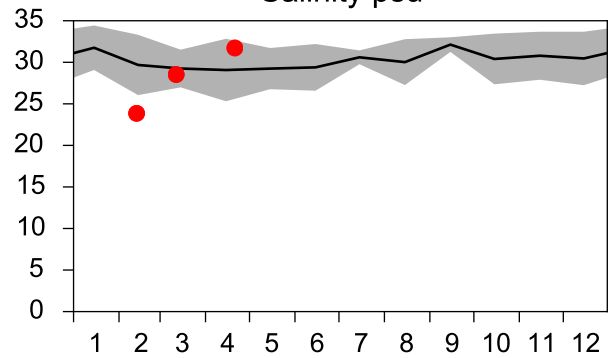
Annual Cycles

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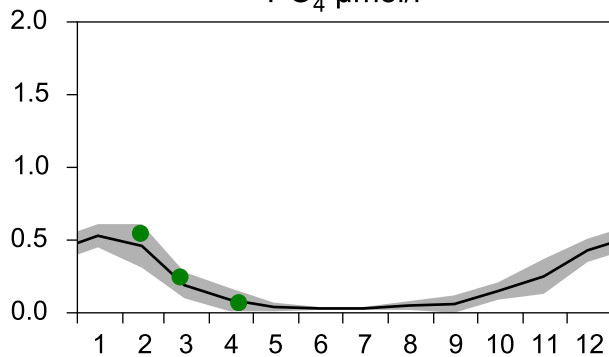
Temperature °C



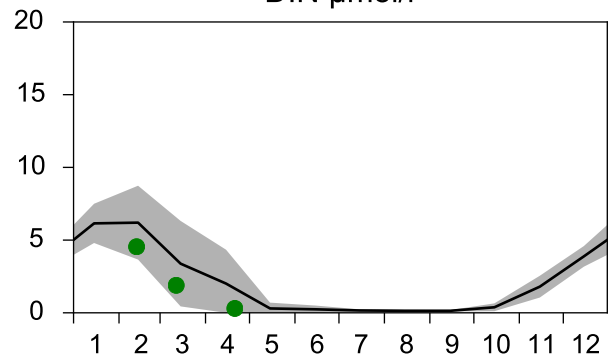
Salinity psu



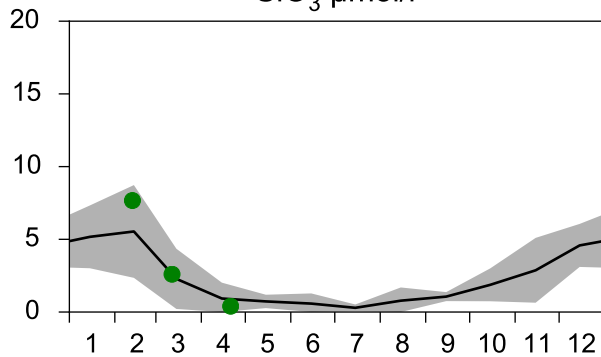
PO<sub>4</sub> µmol/l



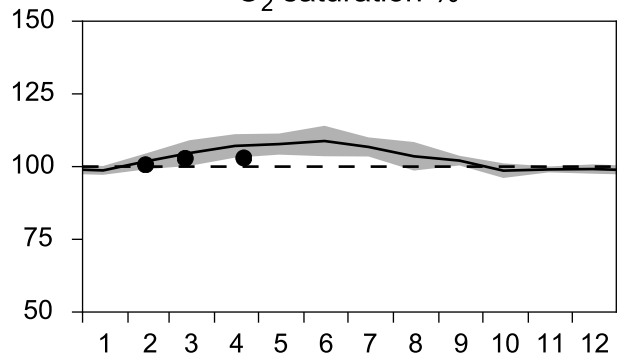
DIN µmol/l



SiO<sub>3</sub> µmol/l

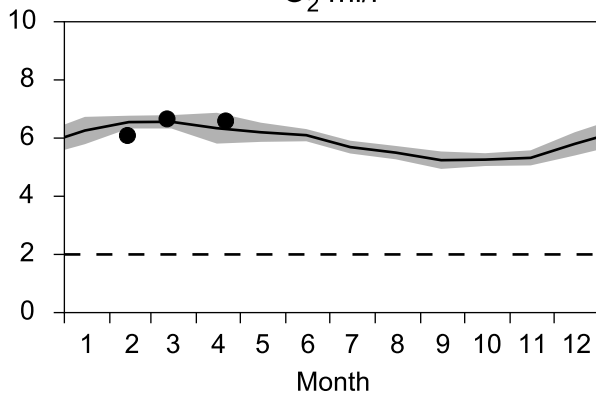


O<sub>2</sub> saturation %

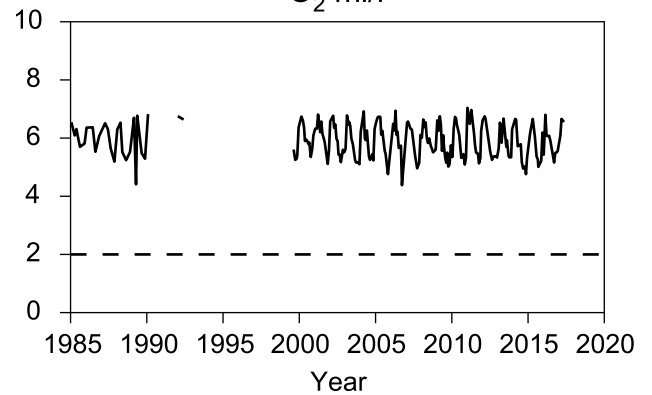


## OXYGEN IN BOTTOM WATER (depth >= 125 m)

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

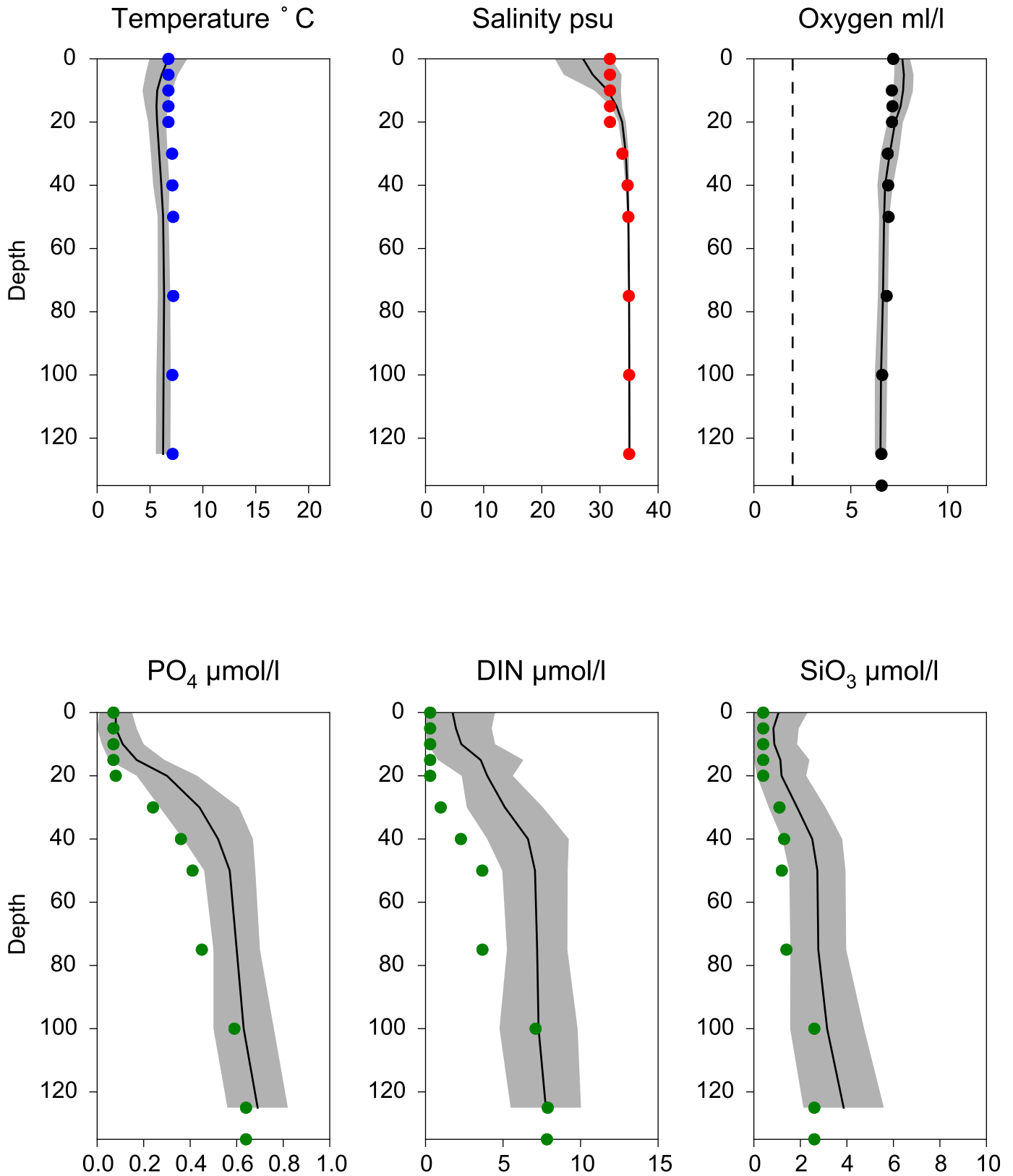


O<sub>2</sub> ml/l



# Vertical profiles Å15 April

— Mean 2001-2015    ■ St.Dev.    ● 2017-04-21





# STATION Å13 SURFACE WATER (0-10 m)

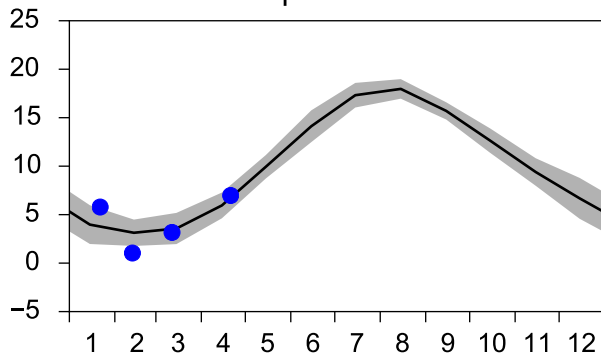
Annual Cycles

— Mean 2001-2015

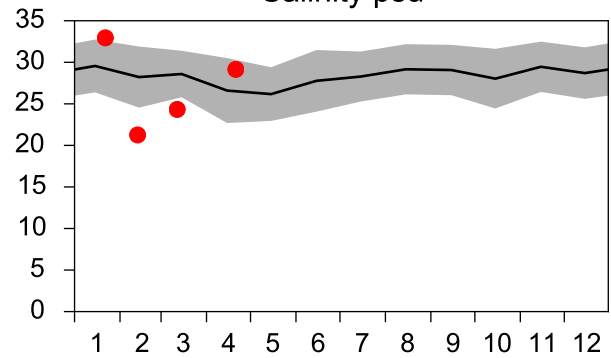
■ St.Dev.

● 2017

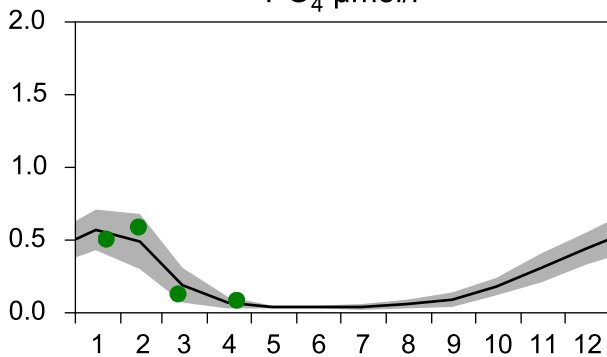
Temperature °C



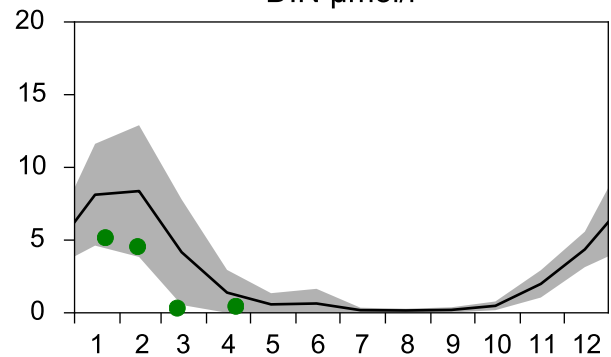
Salinity psu



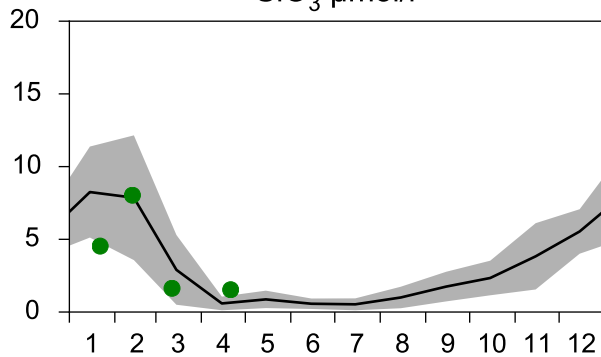
PO<sub>4</sub> µmol/l



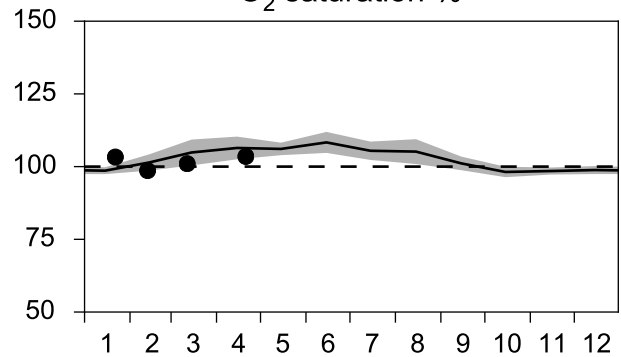
DIN µmol/l



SiO<sub>3</sub> µmol/l

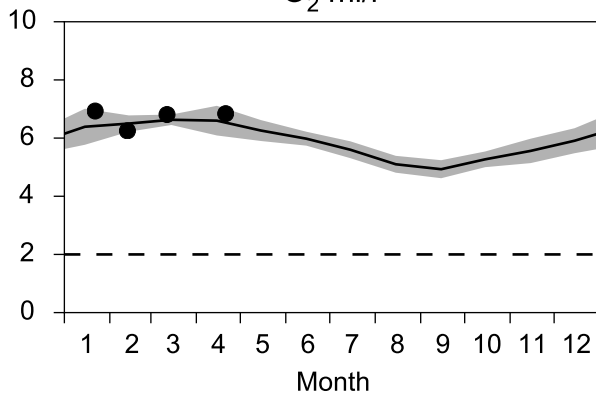


O<sub>2</sub> saturation %

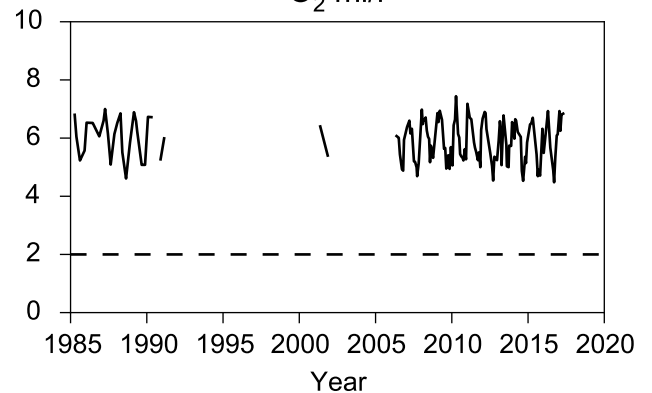


## OXYGEN IN BOTTOM WATER (depth >= 80 m)

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

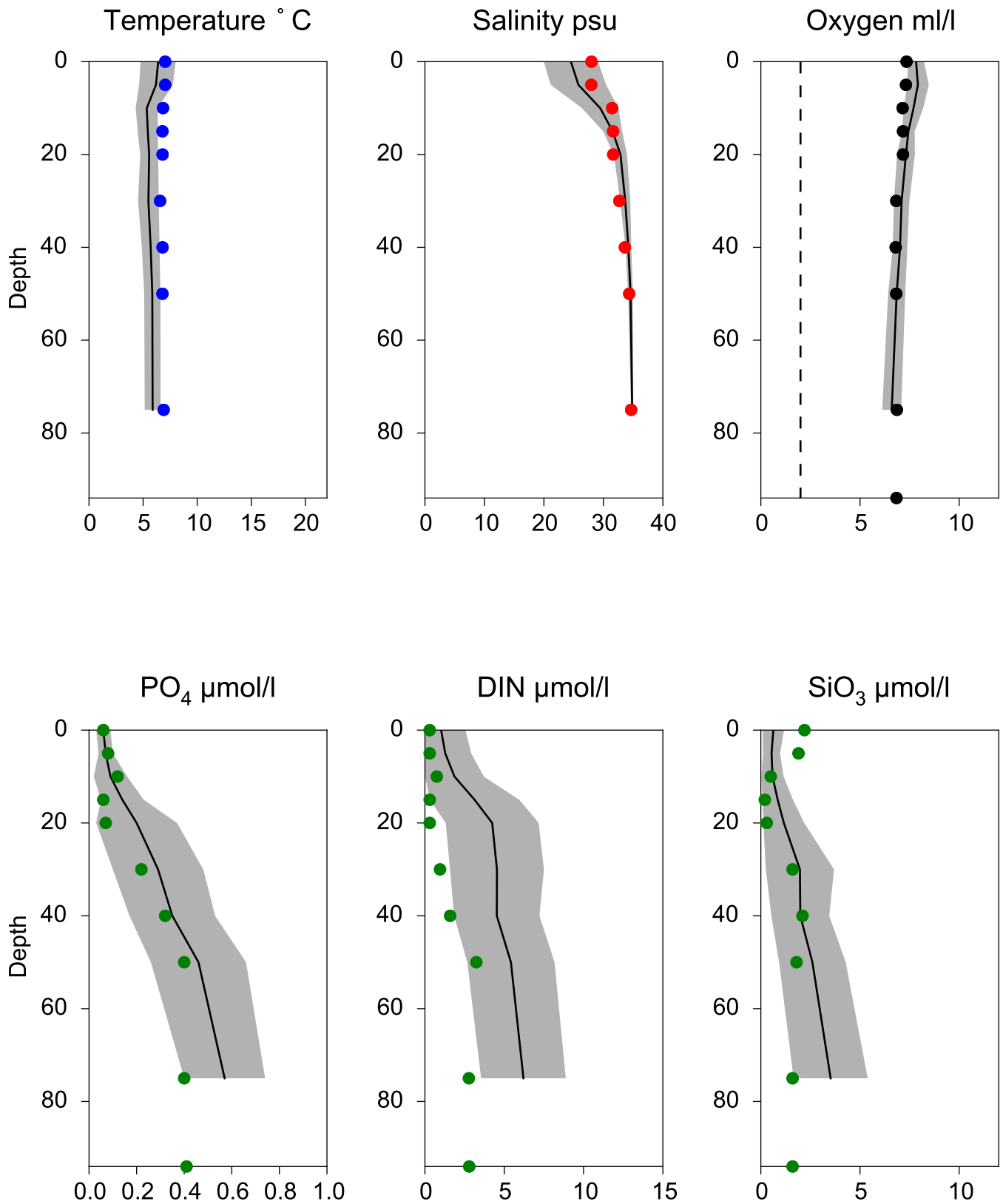


O<sub>2</sub> ml/l



# Vertical profiles Å13 April

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# STATION SLÄGGÖ SURFACE WATER (0-10 m)

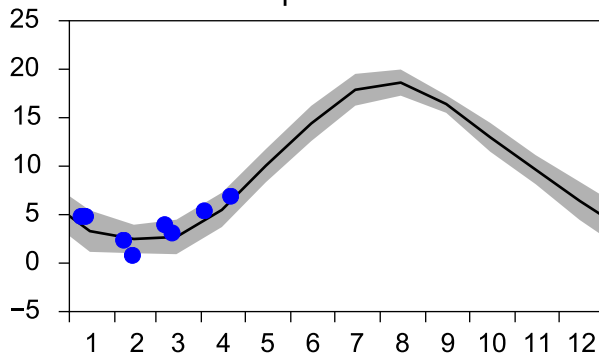
Annual Cycles

— Mean 2001-2015

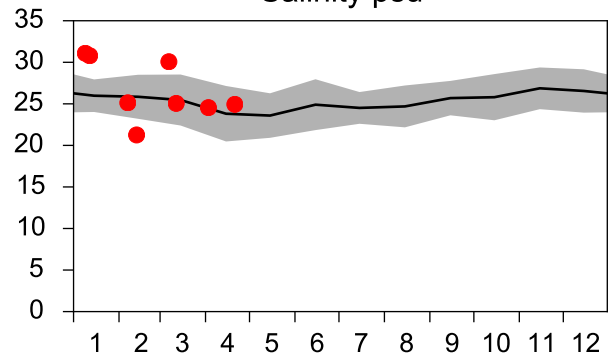
■ St.Dev.

● 2017

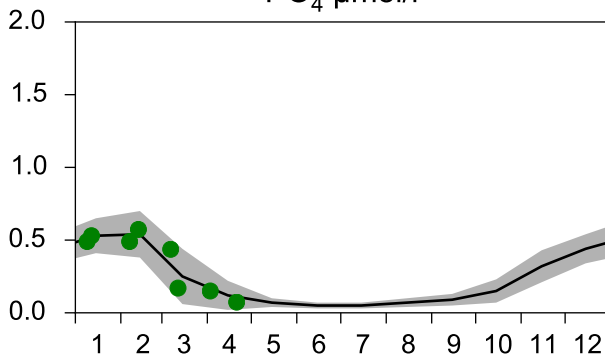
Temperature °C



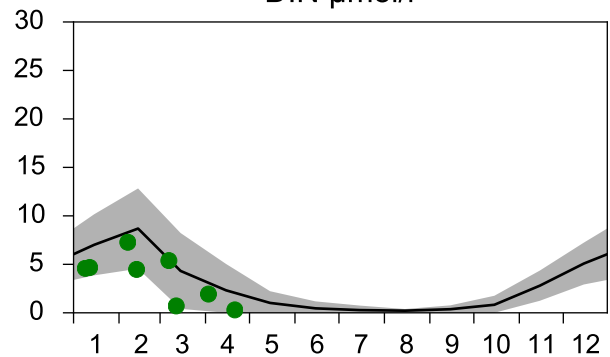
Salinity psu



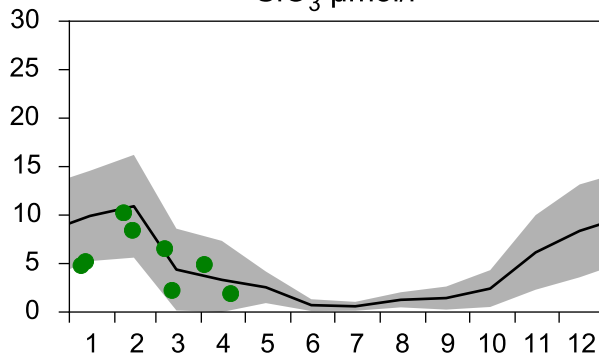
PO<sub>4</sub> µmol/l



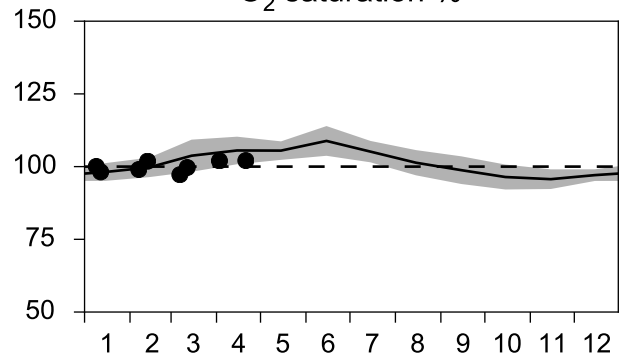
DIN µmol/l



SiO<sub>3</sub> µmol/l

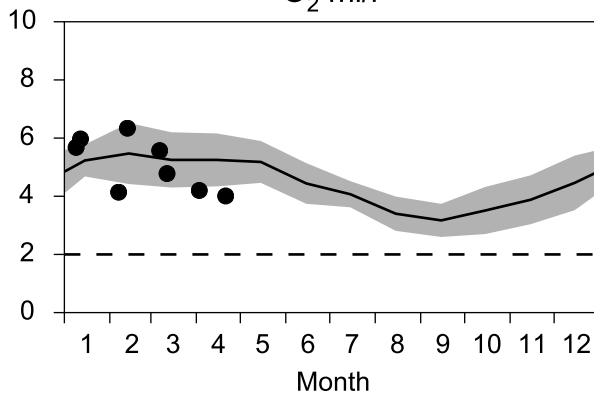


O<sub>2</sub> saturation %

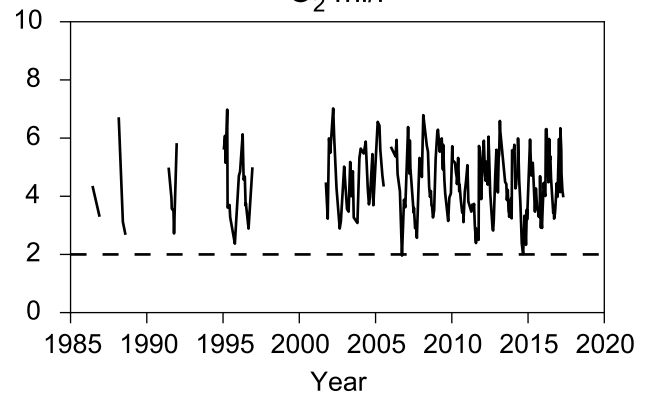


## OXYGEN IN BOTTOM WATER (depth >= 64 m)

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



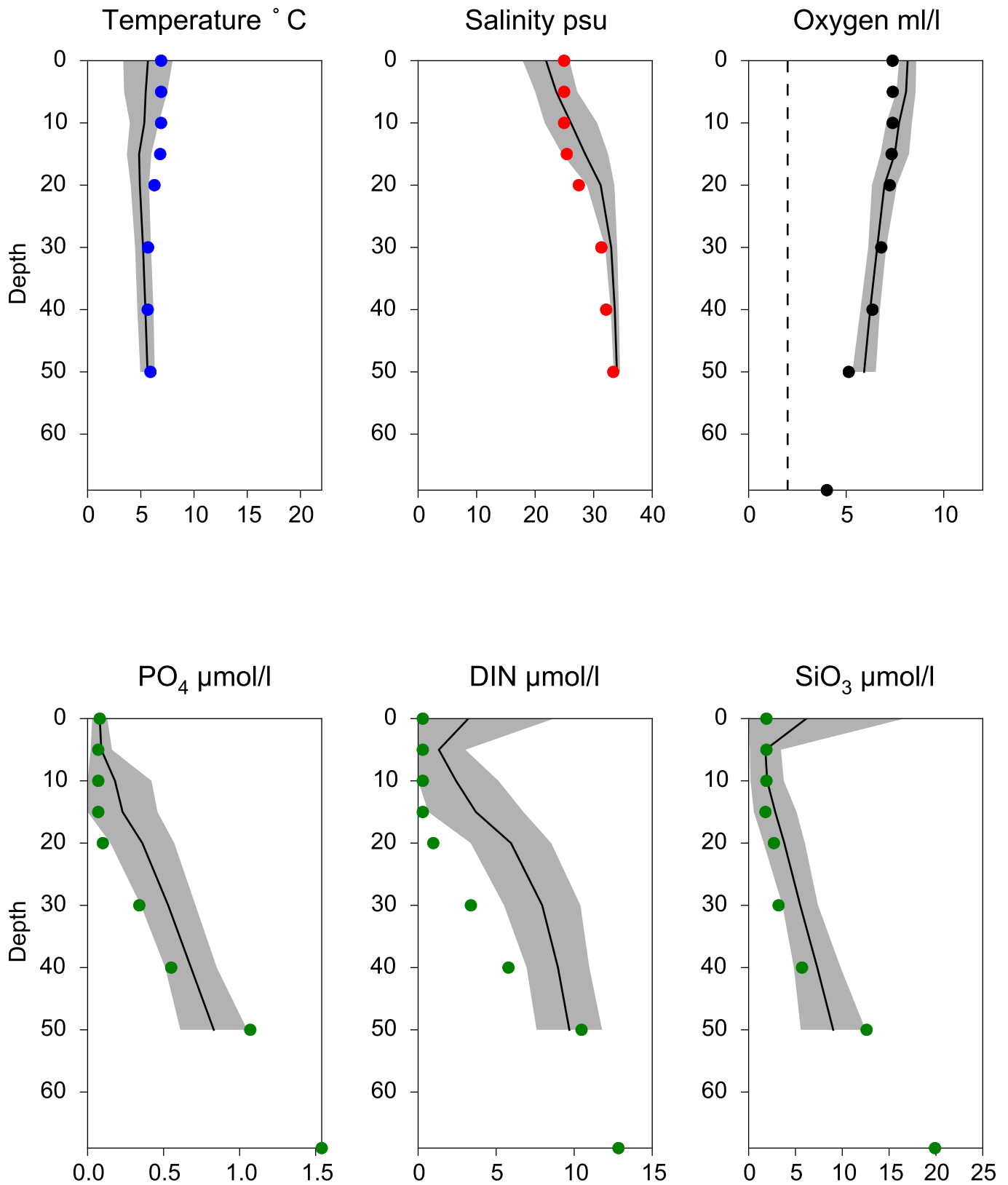
O<sub>2</sub> ml/l



# Vertical profiles SLÄGGÖ

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# STATION P2 SURFACE WATER (0-10 m)

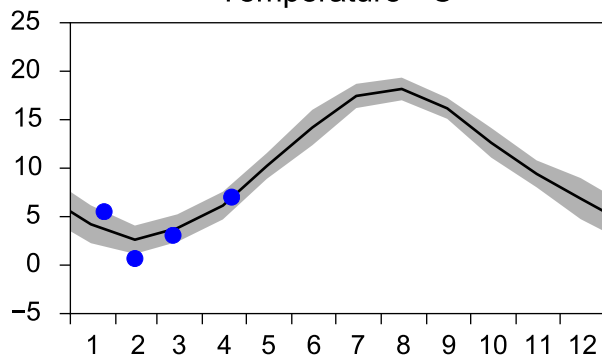
Annual Cycles

— Mean 2001-2015

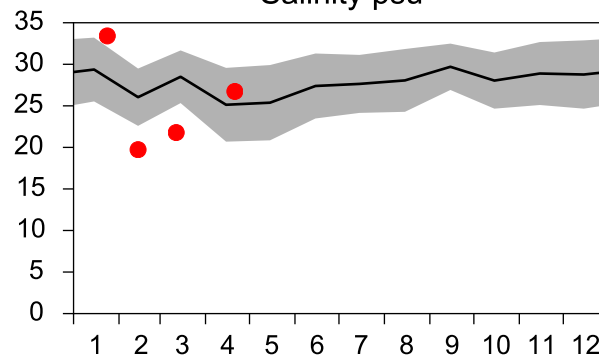
■ St.Dev.

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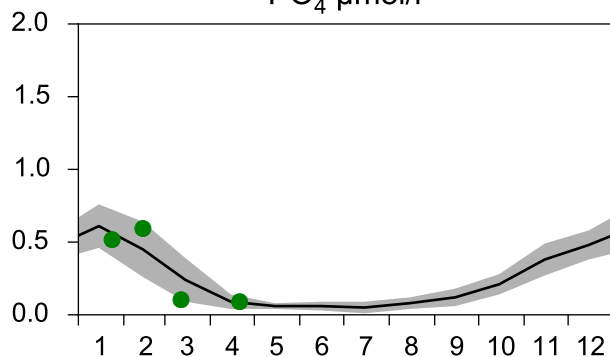
Temperature °C



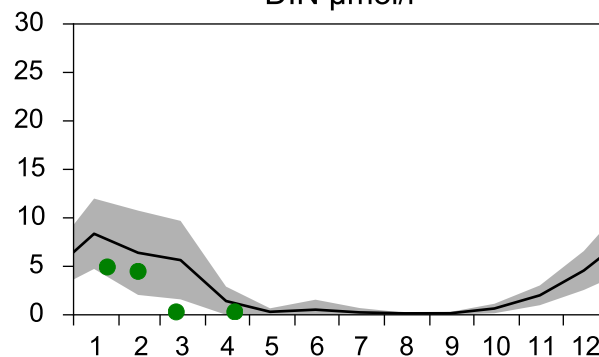
Salinity psu



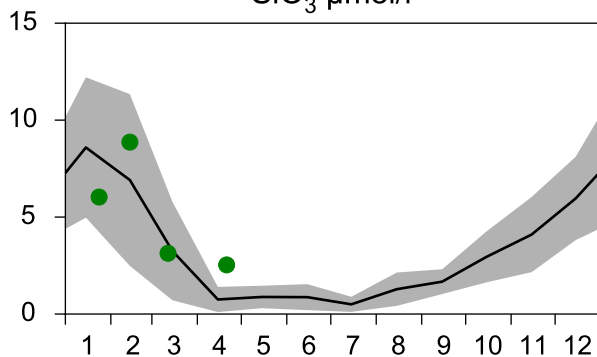
PO<sub>4</sub> µmol/l



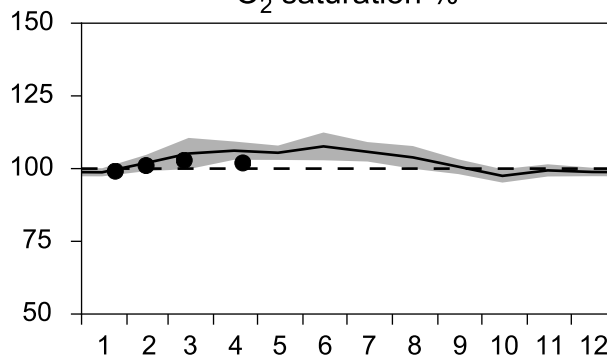
DIN µmol/l



SiO<sub>3</sub> µmol/l

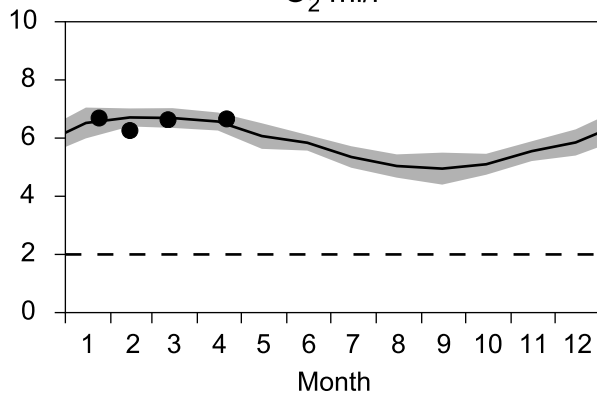


O<sub>2</sub> saturation %

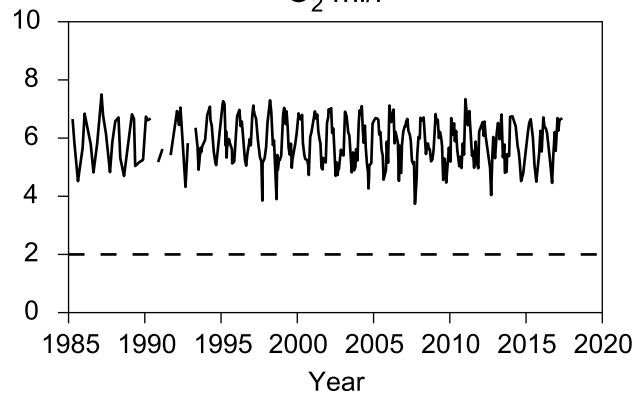


## OXYGEN IN BOTTOM WATER (depth >= 75 m)

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

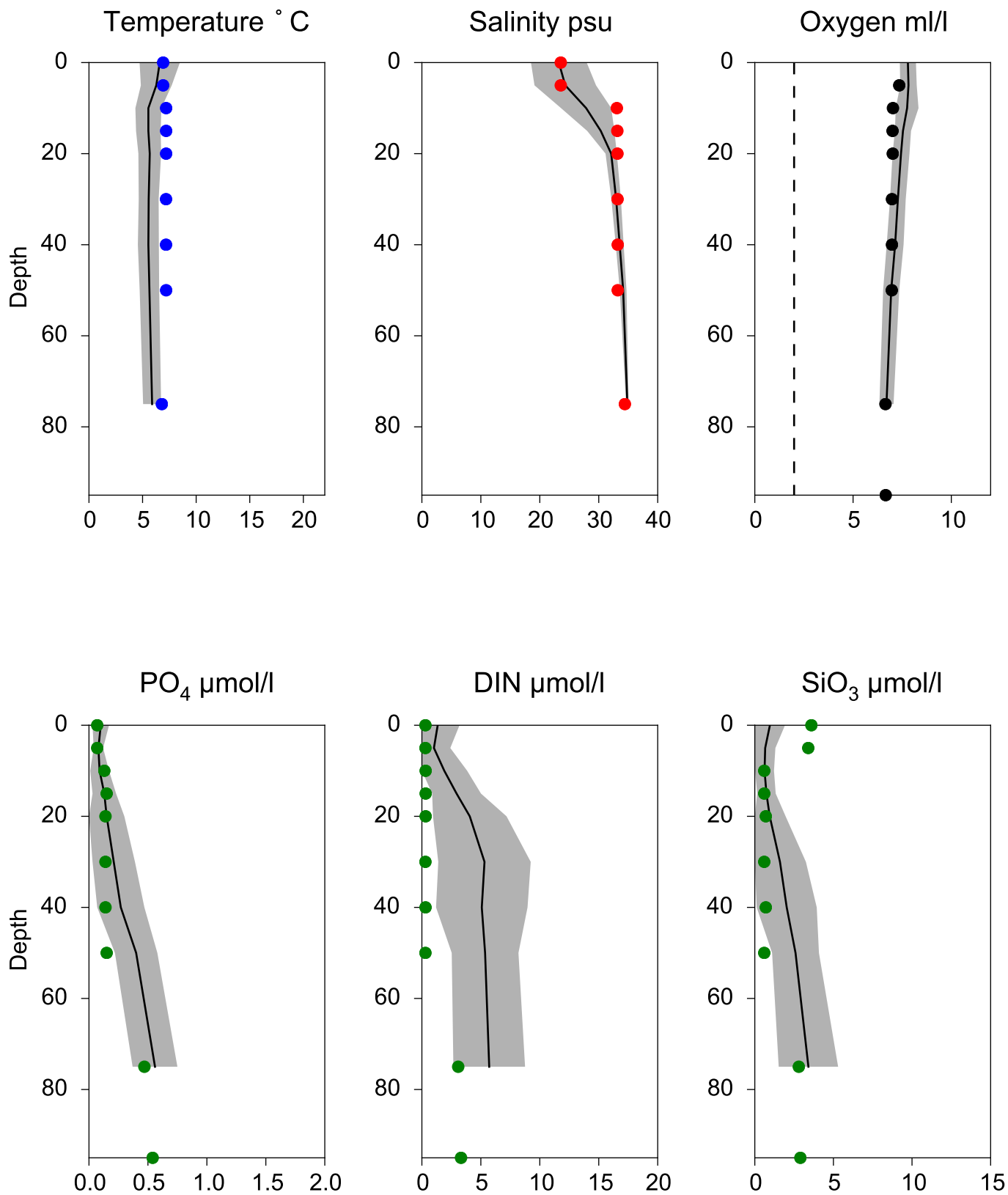


O<sub>2</sub> ml/l



## Vertical profiles P2 April

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# STATION FLADEN SURFACE WATER (0-10 m)

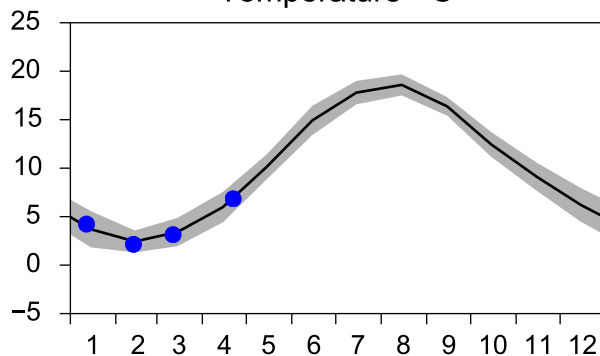
Annual Cycles

— Mean 2001-2015

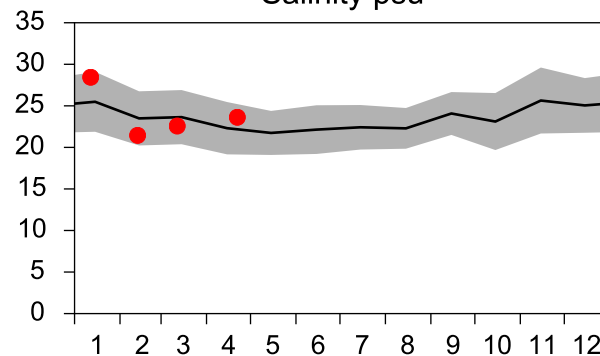
■ St.Dev.

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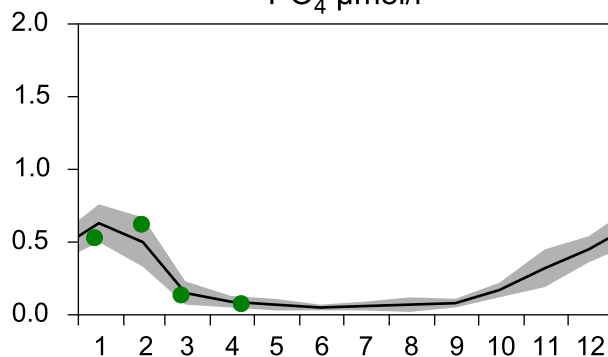
Temperature °C



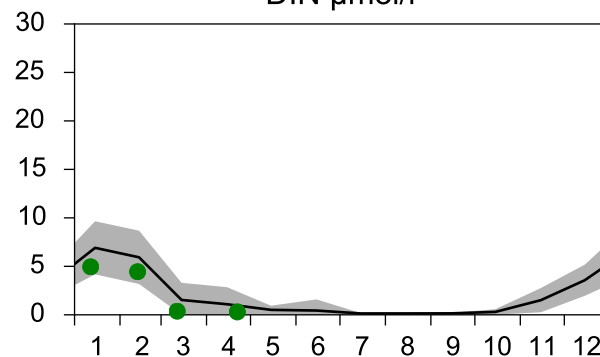
Salinity psu



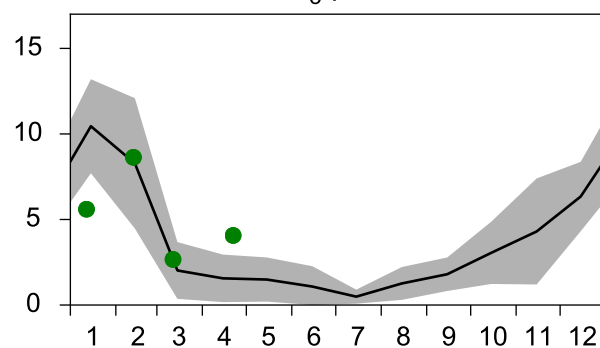
PO<sub>4</sub> µmol/l



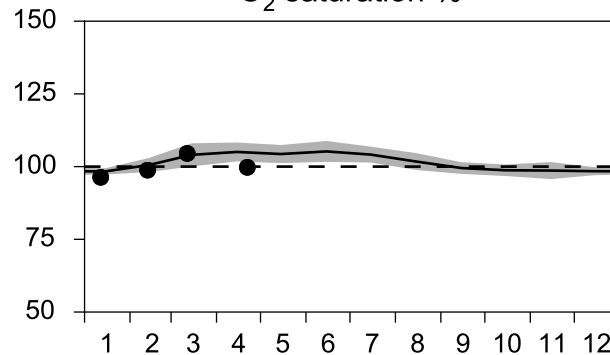
DIN µmol/l



SiO<sub>3</sub> µmol/l

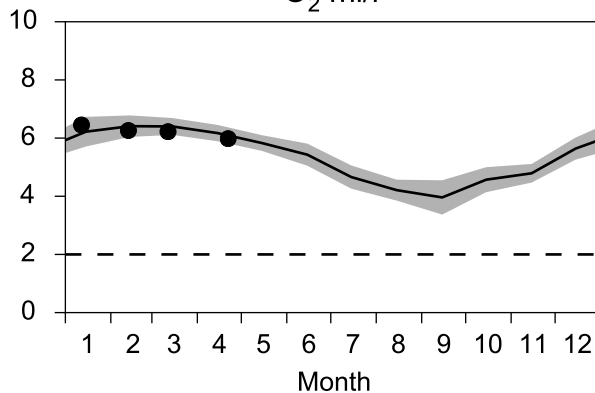


O<sub>2</sub> saturation %

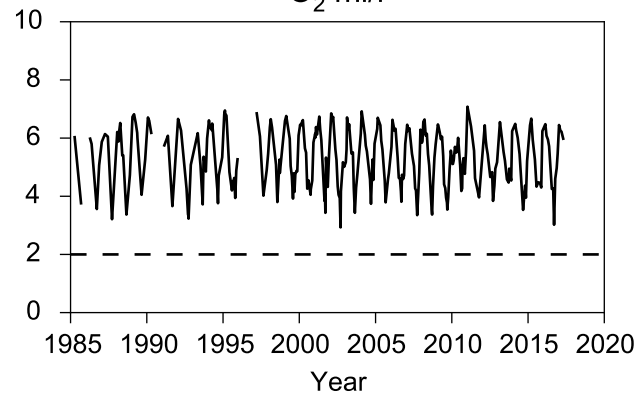


## OXYGEN IN BOTTOM WATER (depth >= 74 m)

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

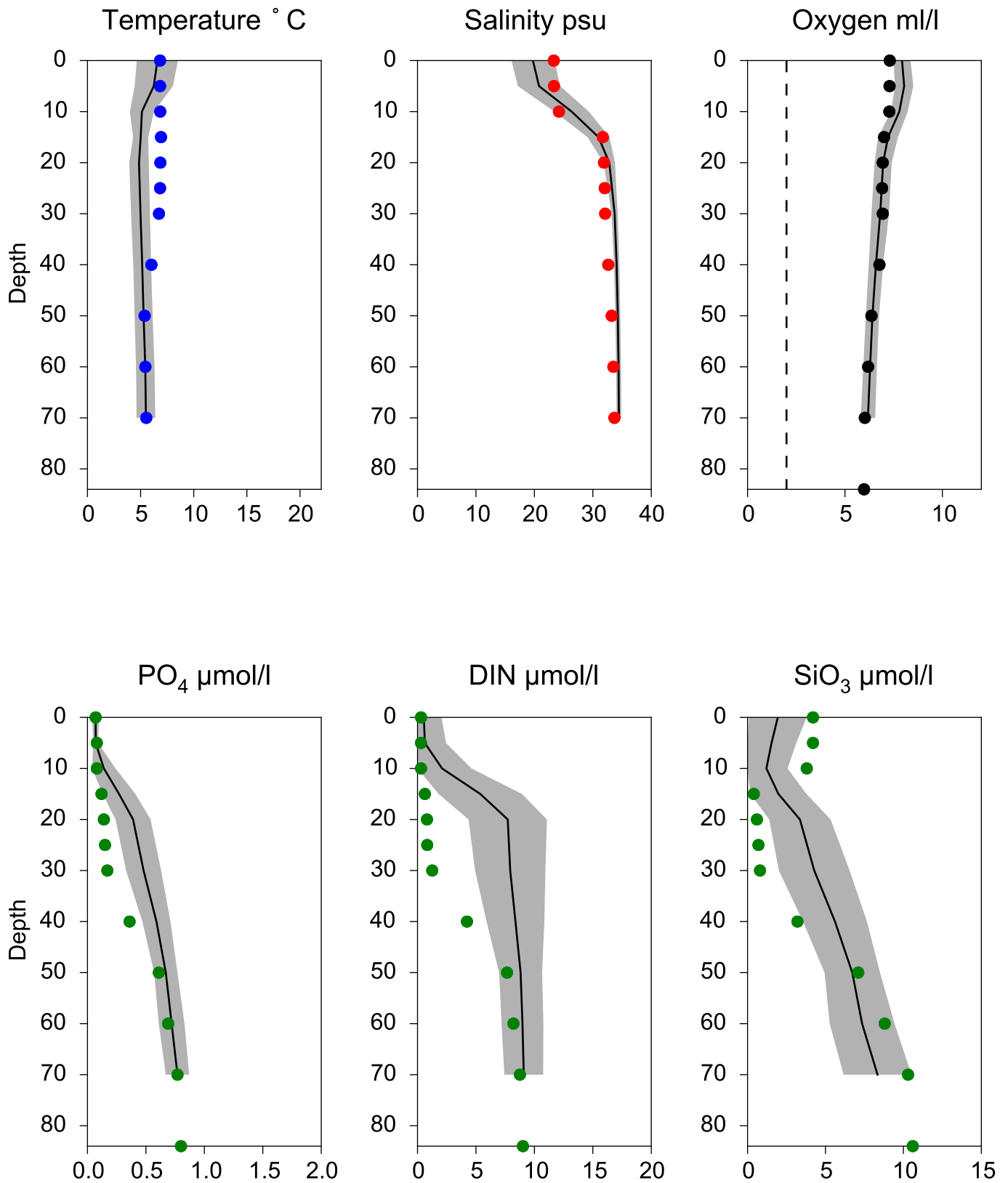


O<sub>2</sub> ml/l



# Vertical profiles FLADEN April

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

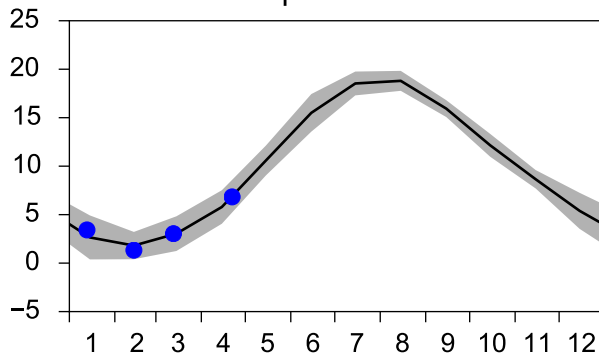
Annual Cycles

— Mean 2001-2015

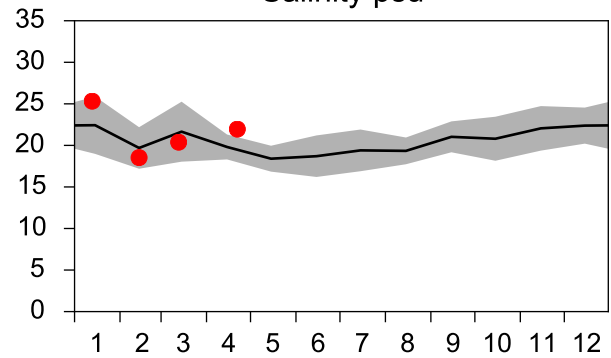
■ St.Dev.

● 2017

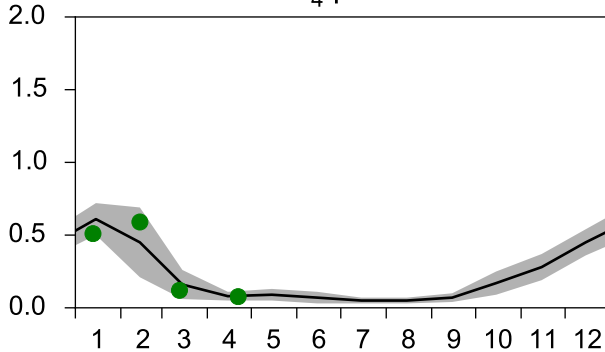
Temperature °C



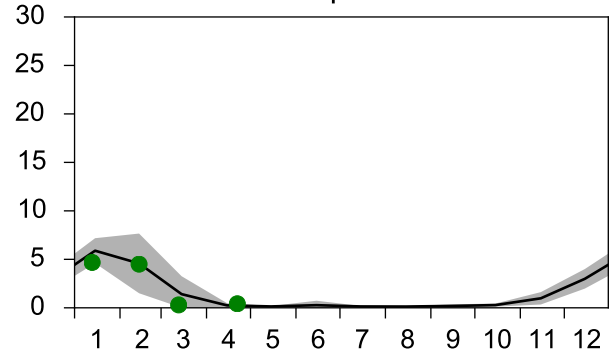
Salinity psu



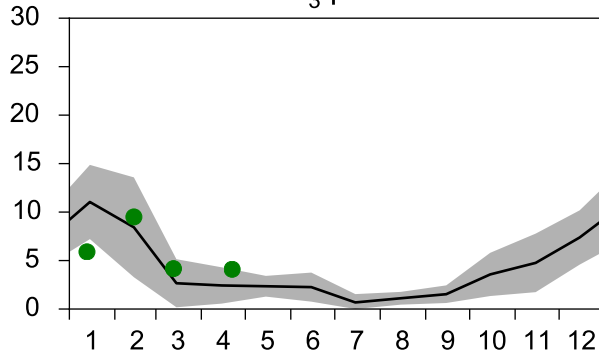
PO<sub>4</sub> µmol/l



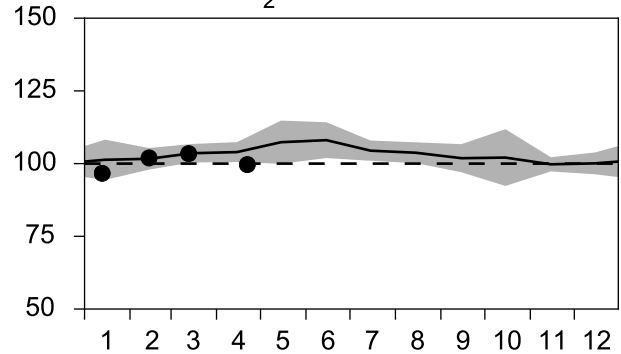
DIN µmol/l



SiO<sub>3</sub> µmol/l

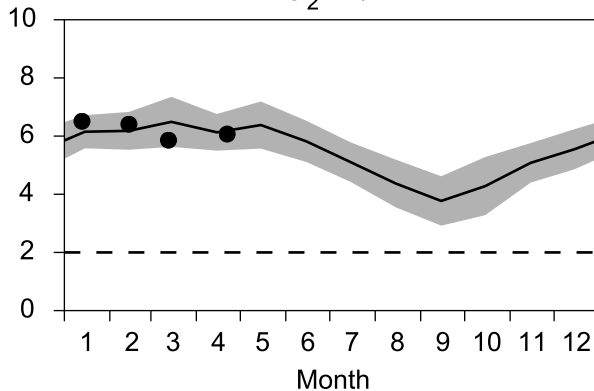


O<sub>2</sub> saturation %

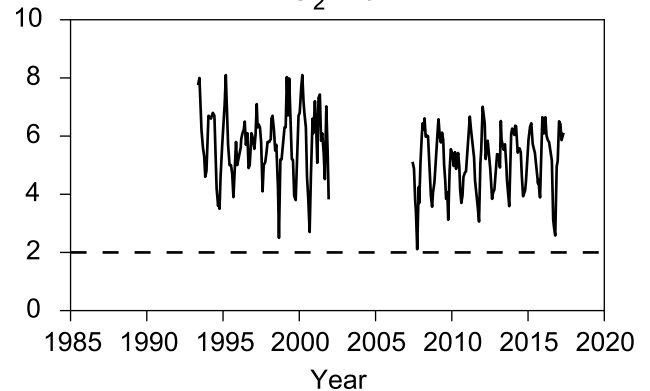


## OXYGEN IN BOTTOM WATER (depth >= 25 m)

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

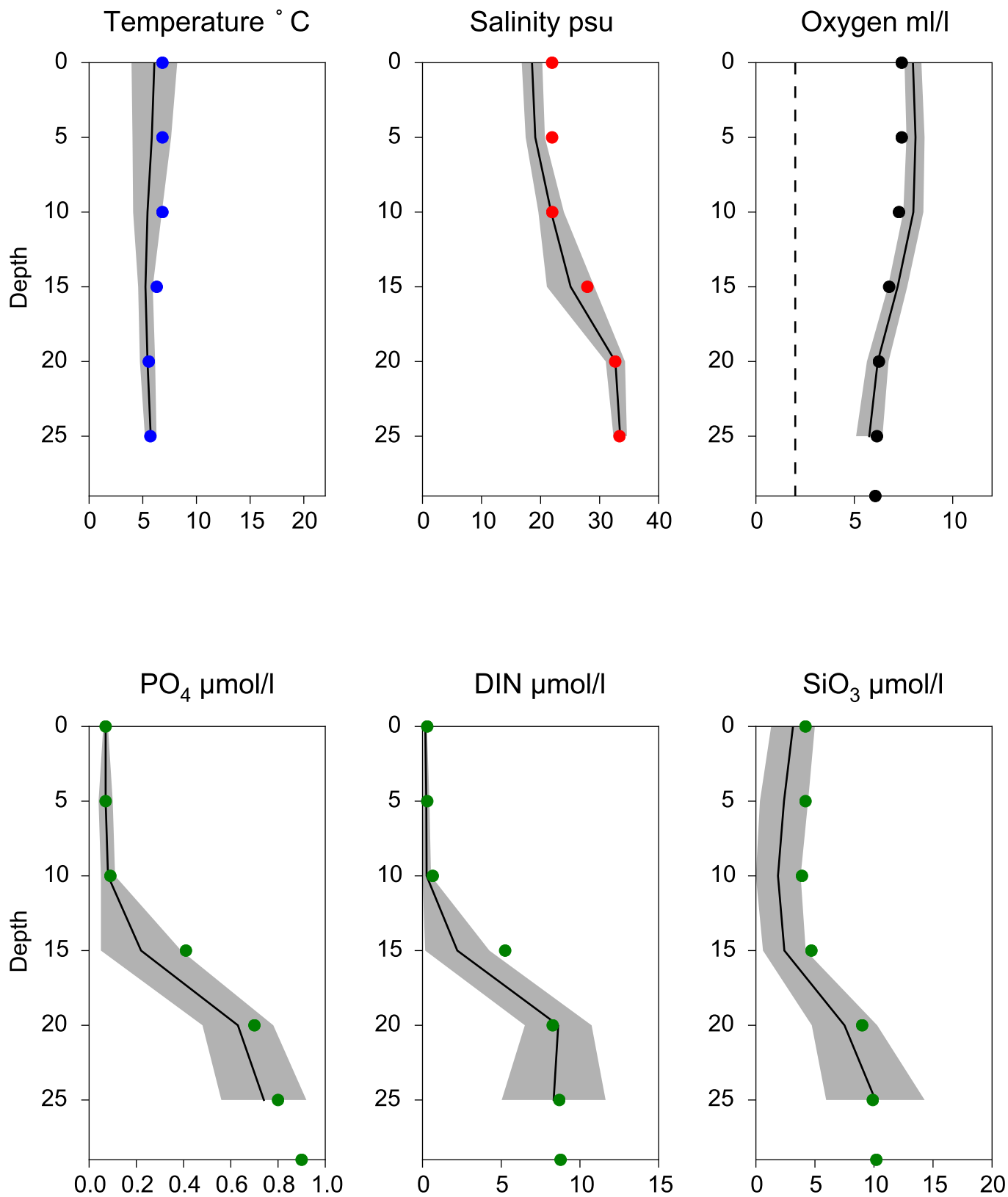


O<sub>2</sub> ml/l



# Vertical profiles N14 FALKENBERG April

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

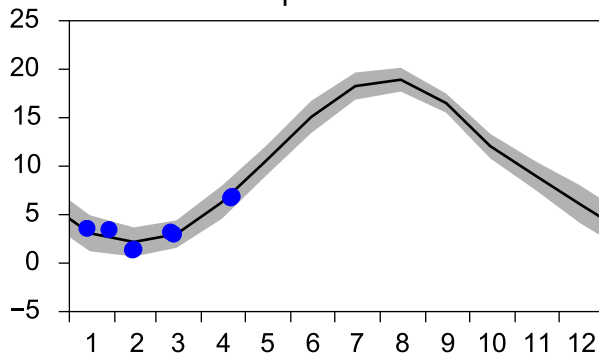
Annual Cycles

— Mean 2001-2015

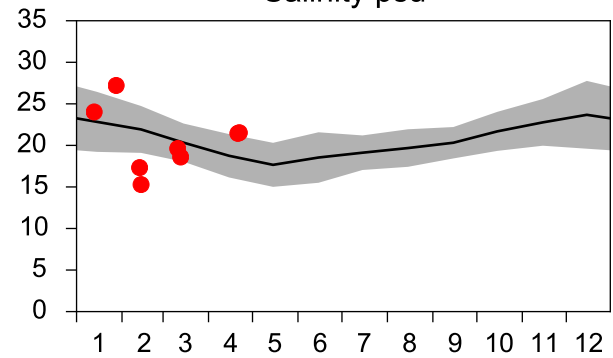
■ St.Dev.

● 2017

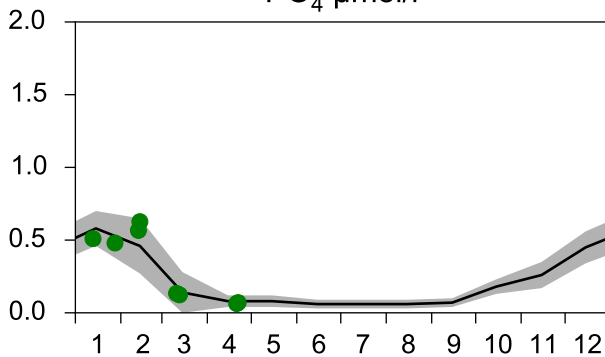
Temperature °C



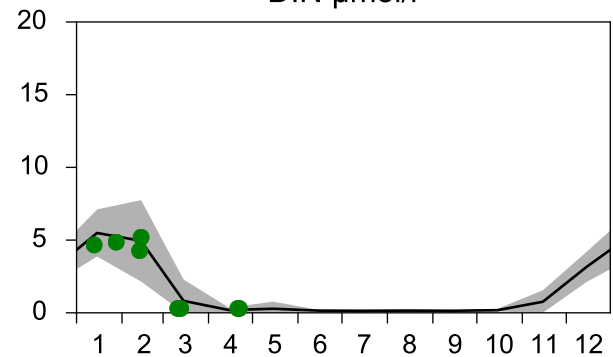
Salinity psu



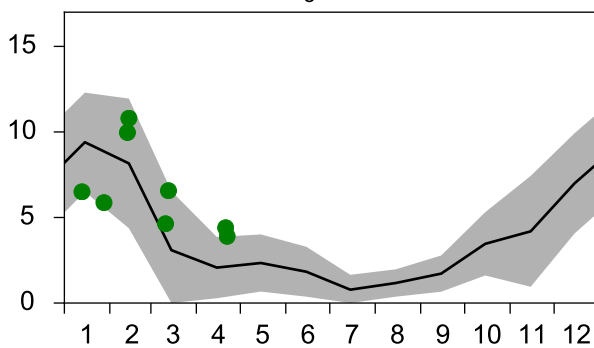
PO<sub>4</sub> µmol/l



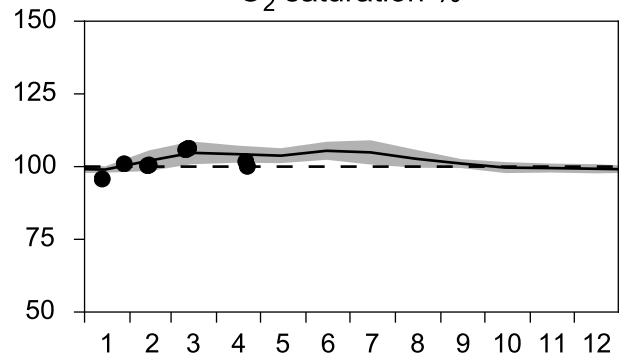
DIN µmol/l



SiO<sub>3</sub> µmol/l

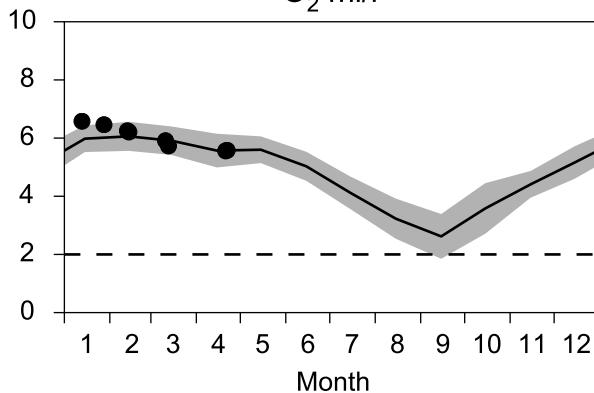


O<sub>2</sub> saturation %

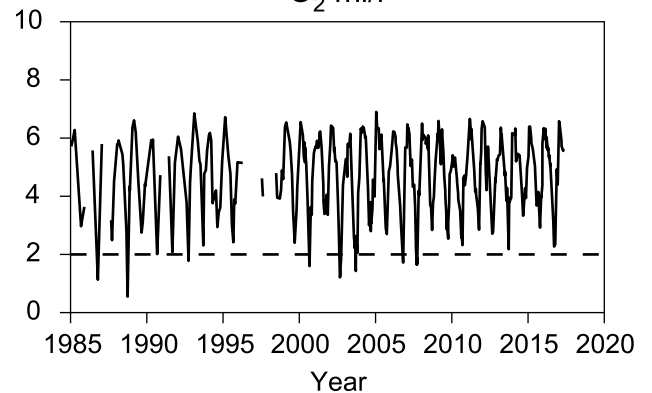


## OXYGEN IN BOTTOM WATER (depth >= 52 m)

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

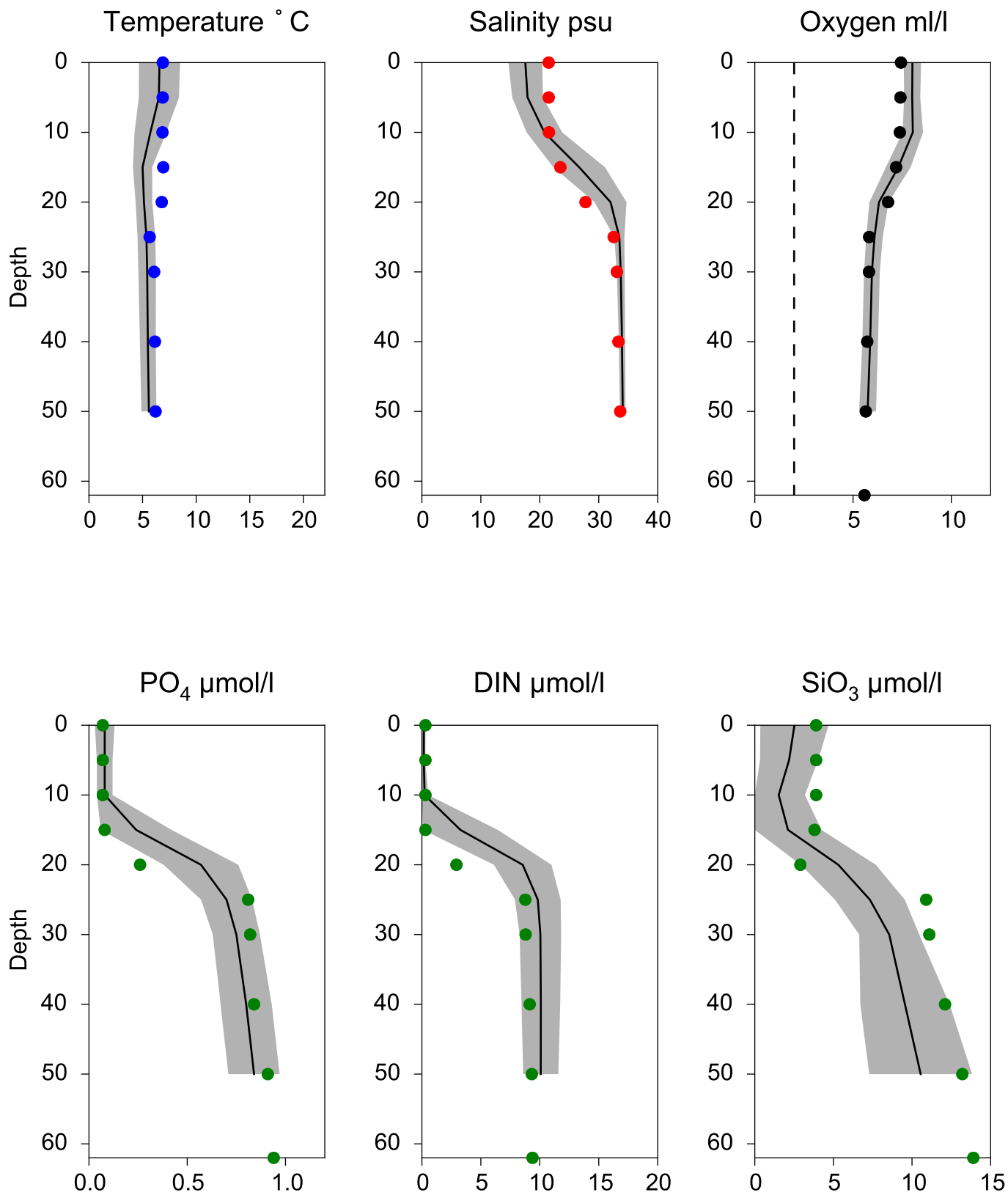


O<sub>2</sub> ml/l



# Vertical profiles ANHOLT E April

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

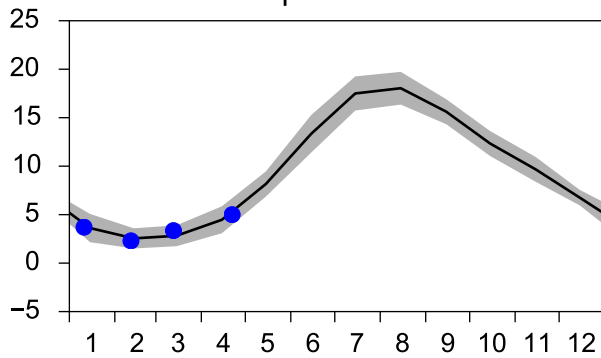
Annual Cycles

— Mean 2001-2015

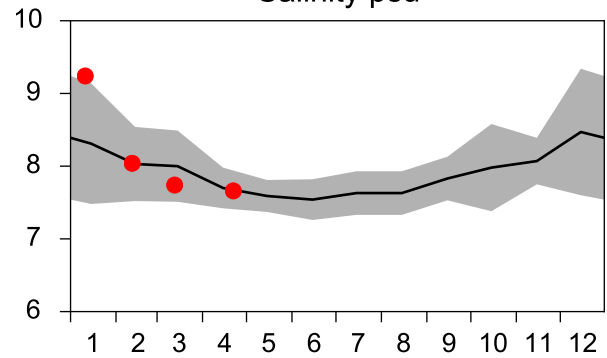
■ St.Dev.

● 2017

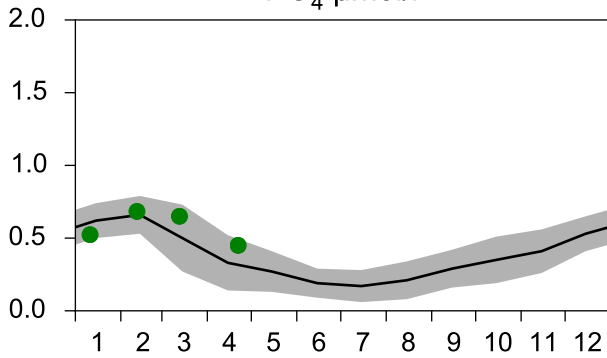
Temperature °C



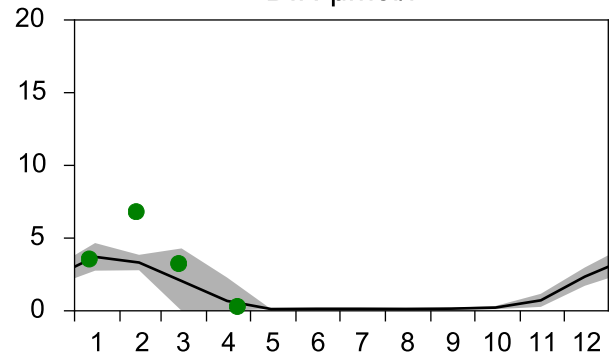
Salinity psu



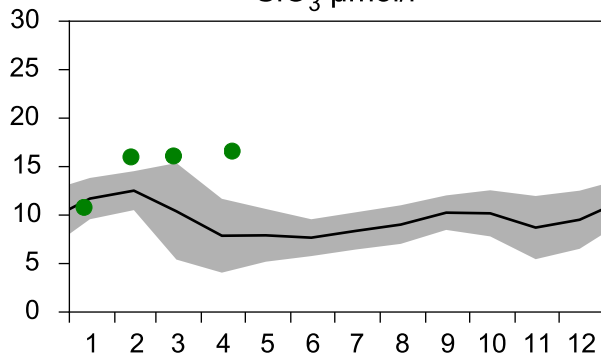
PO<sub>4</sub> µmol/l



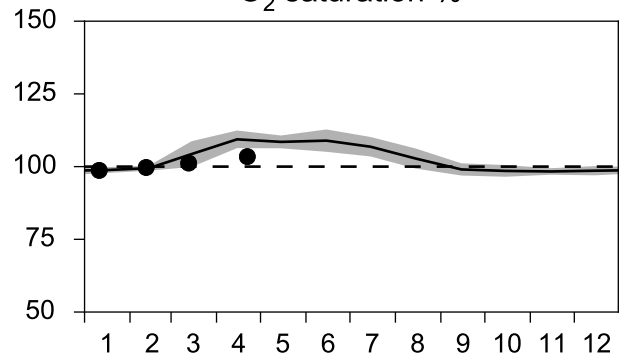
DIN µmol/l



SiO<sub>3</sub> µmol/l

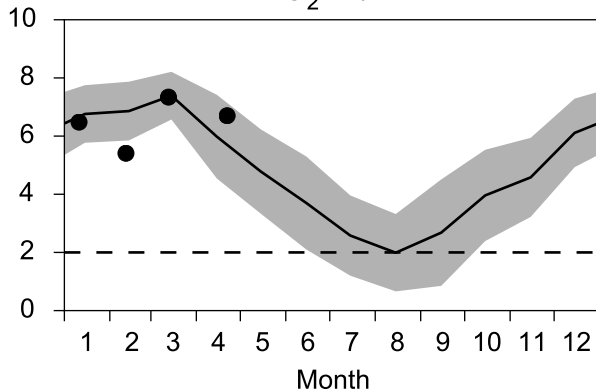


O<sub>2</sub> saturation %

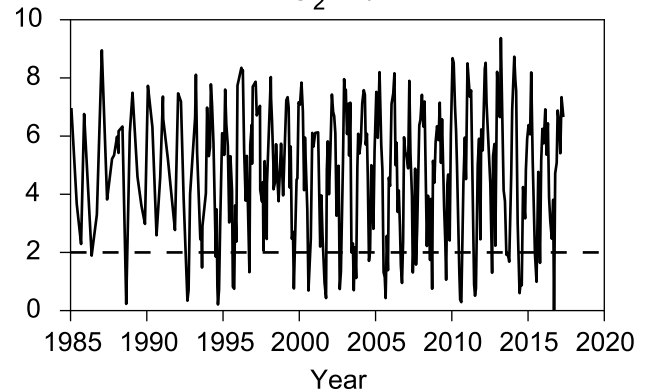


## OXYGEN IN BOTTOM WATER (depth ≥ 40 m)

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

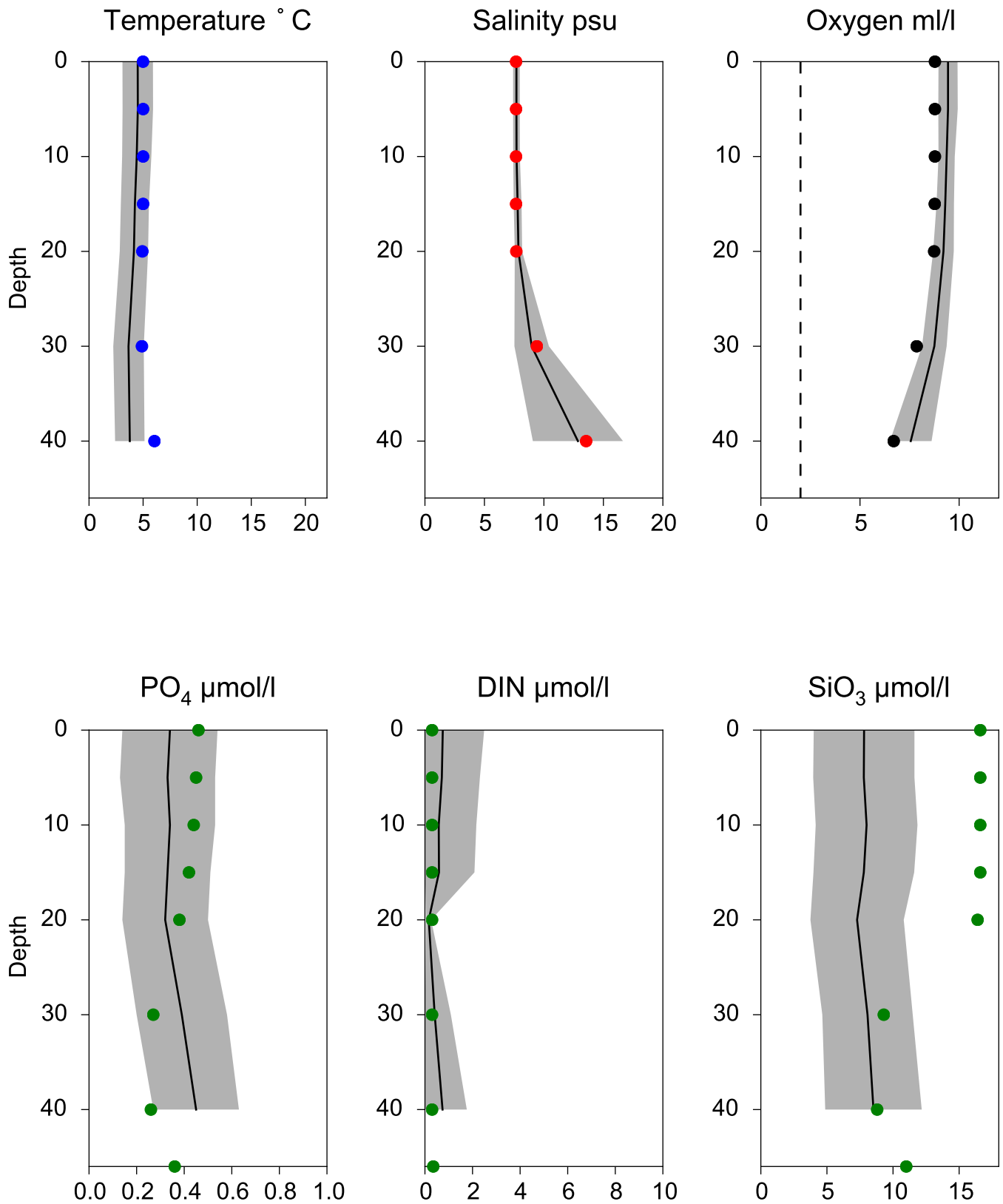


O<sub>2</sub> ml/l



# Vertical profiles BY1 April

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

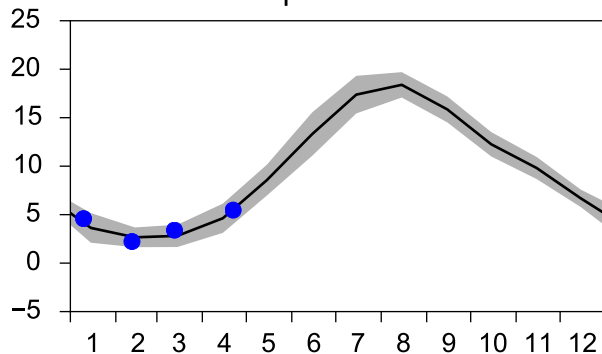
Annual Cycles

— Mean 2001-2015

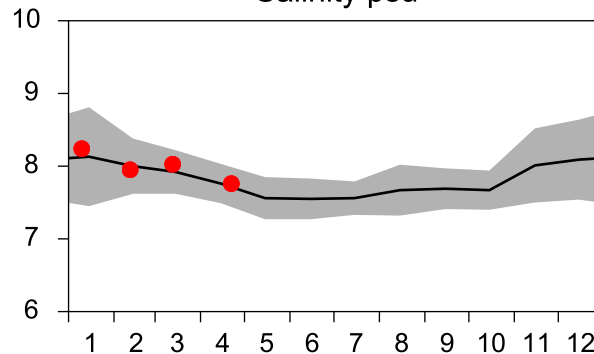
■ St.Dev.

● 2017

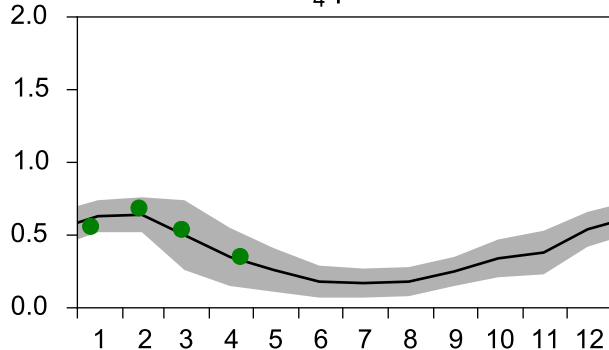
Temperature °C



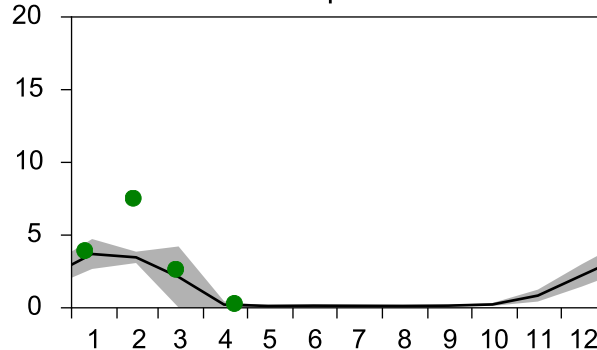
Salinity psu



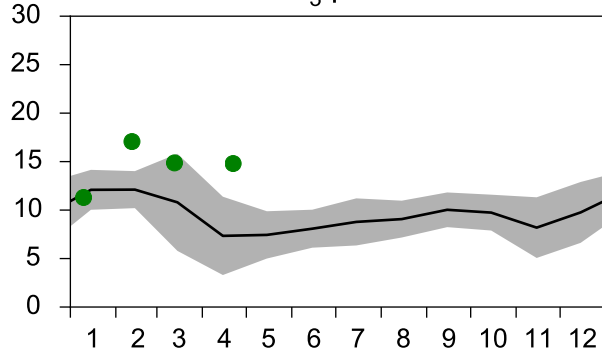
PO<sub>4</sub> µmol/l



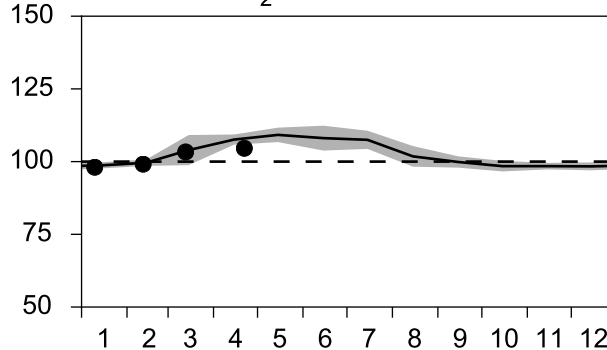
DIN µmol/l



SiO<sub>3</sub> µmol/l

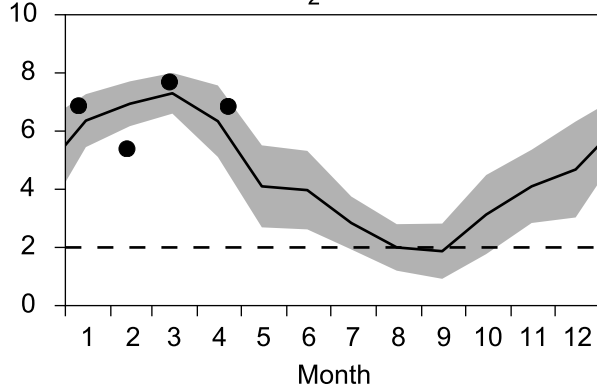


O<sub>2</sub> saturation %

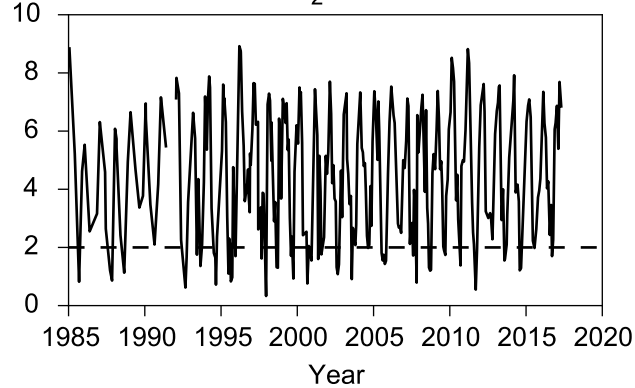


## OXYGEN IN BOTTOM WATER (depth >= 40 m)

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

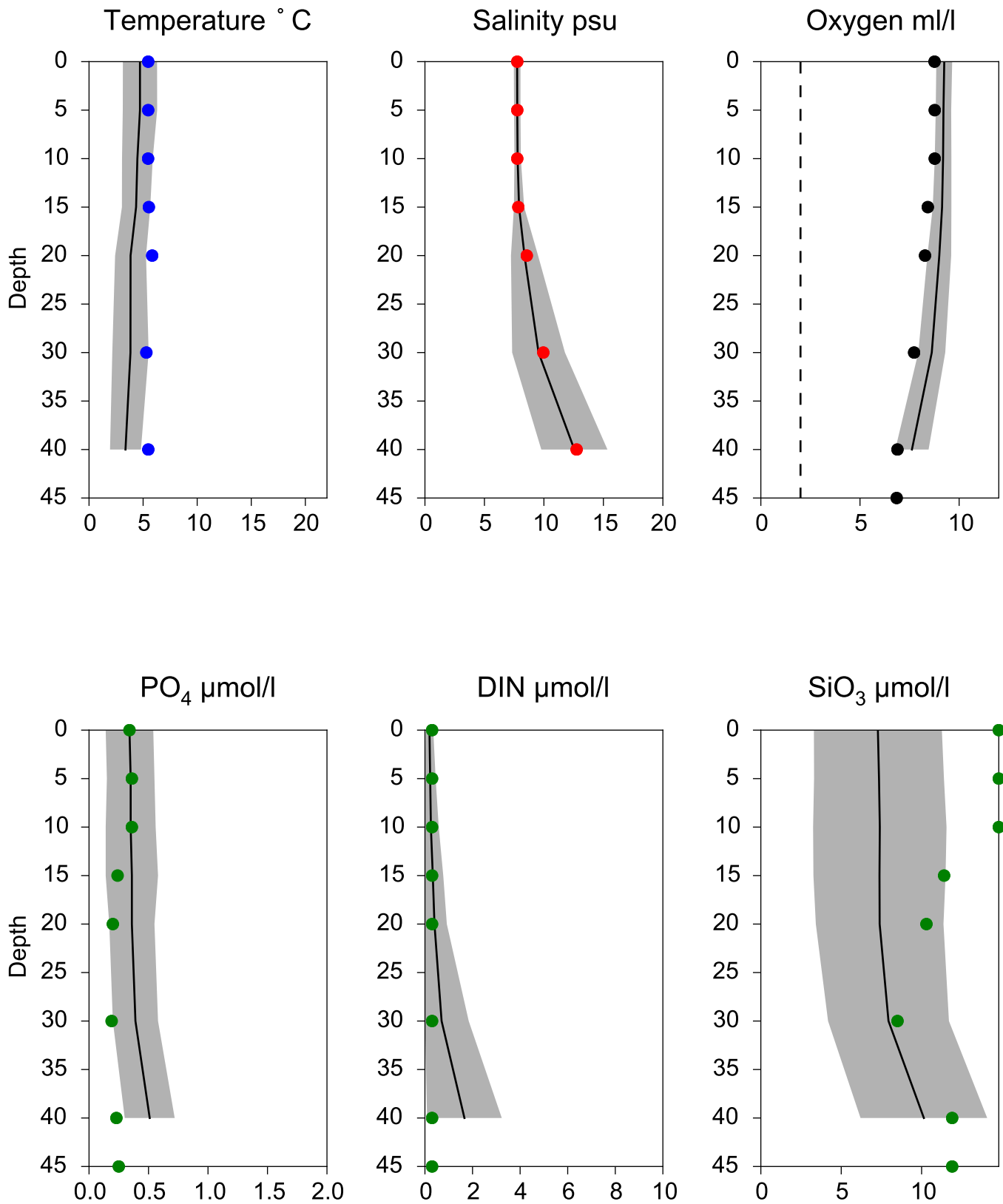


O<sub>2</sub> ml/l



# Vertical profiles BY2 ARKONA April

— Mean 2001-2015    St.Dev.    • 2017-04-22





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

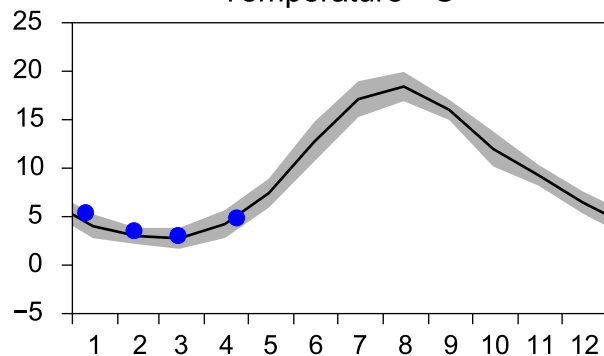
Annual Cycles

— Mean 2001-2015

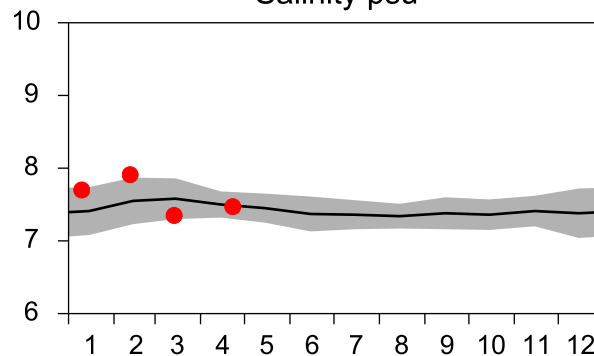
■ St.Dev.

● 2017

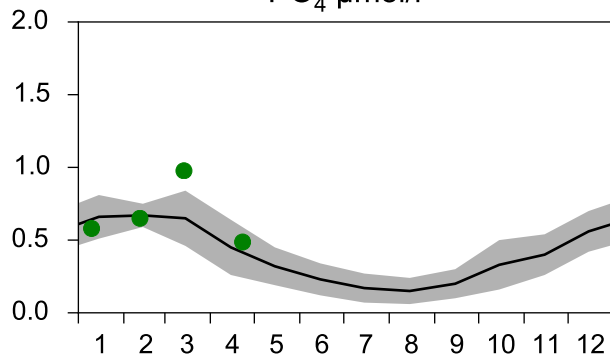
Temperature °C



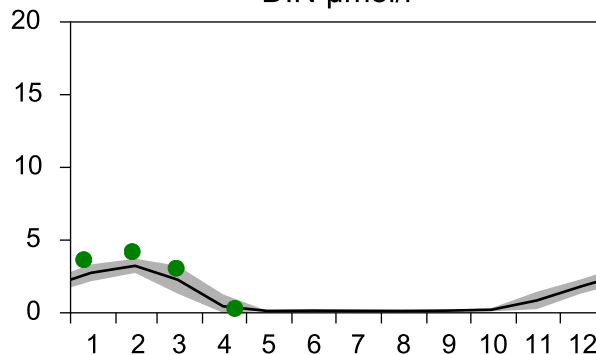
Salinity psu



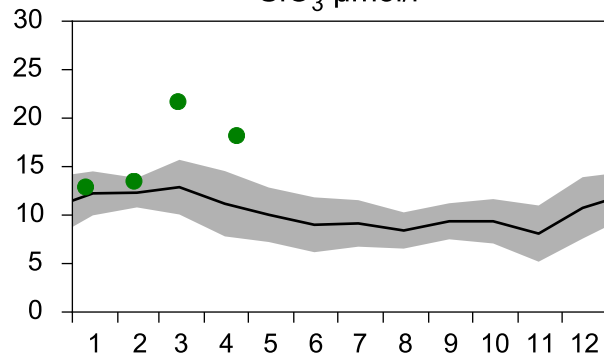
PO<sub>4</sub> µmol/l



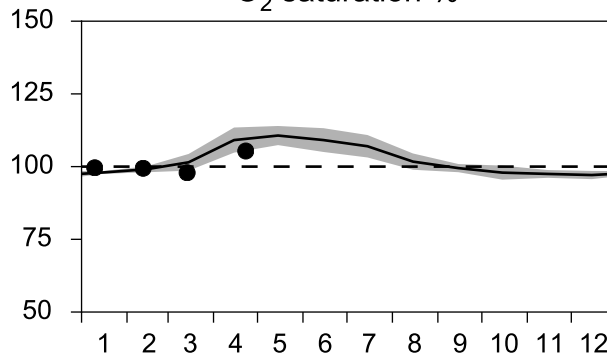
DIN µmol/l



SiO<sub>3</sub> µmol/l

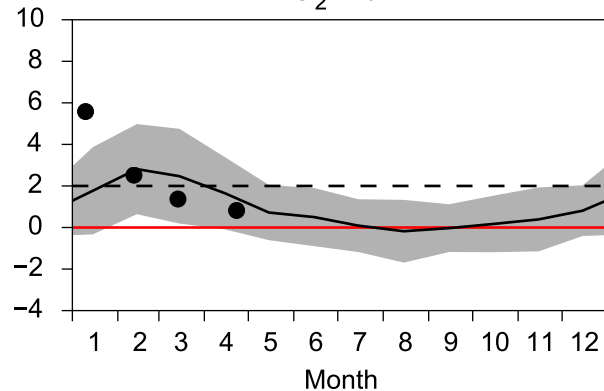


O<sub>2</sub> saturation %

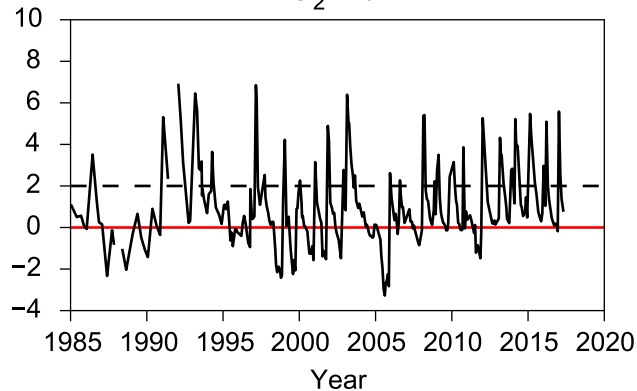


## OXYGEN IN BOTTOM WATER (depth >= 80 m)

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

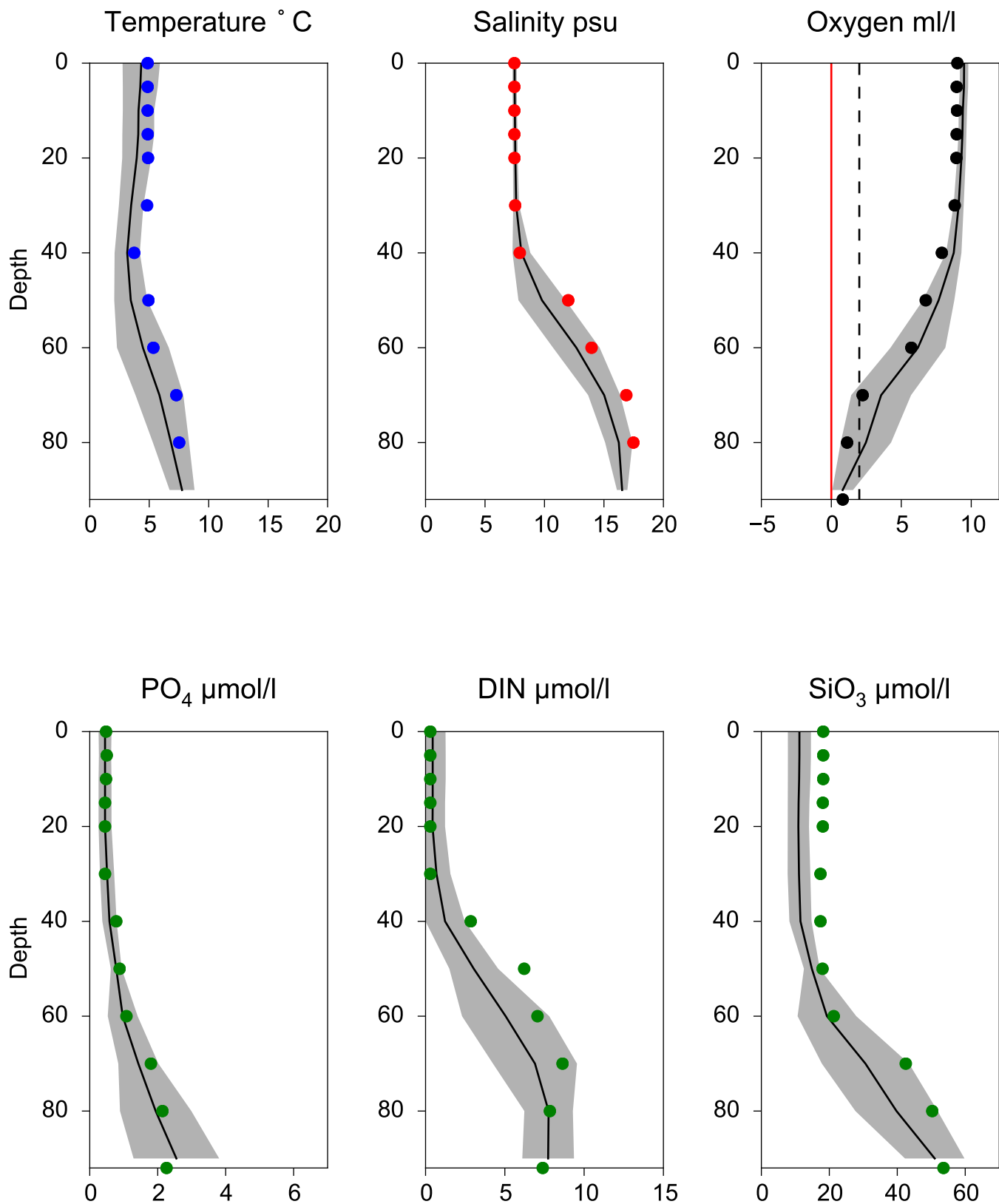


O<sub>2</sub> ml/l



# Vertical profiles BY4 CHRISTIANSÖ April

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

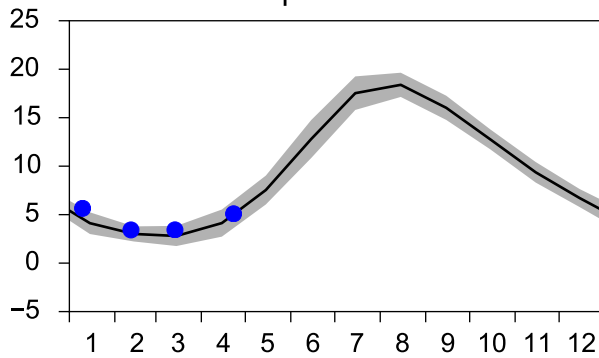
Annual Cycles

— Mean 2001-2015

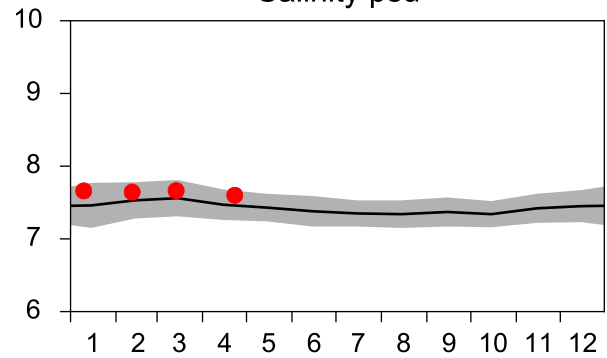
■ St.Dev.

● 2017

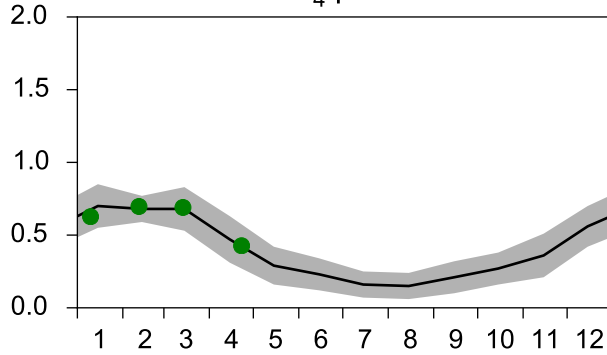
Temperature °C



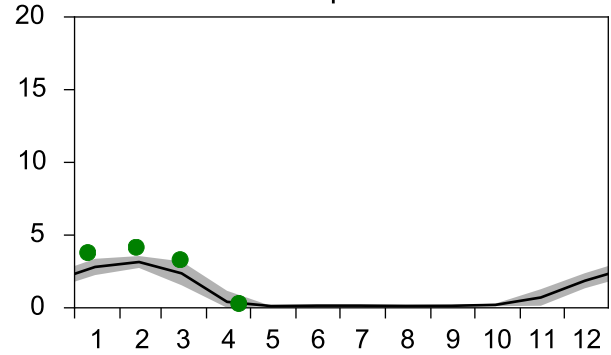
Salinity psu



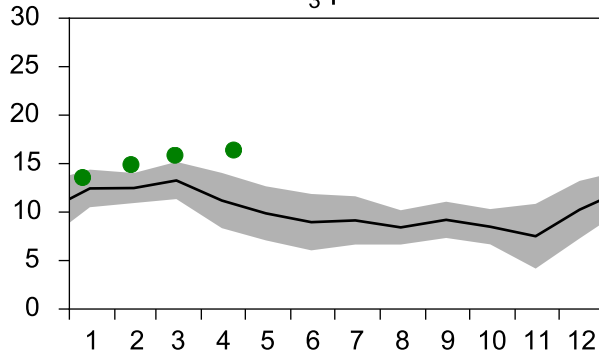
PO<sub>4</sub> µmol/l



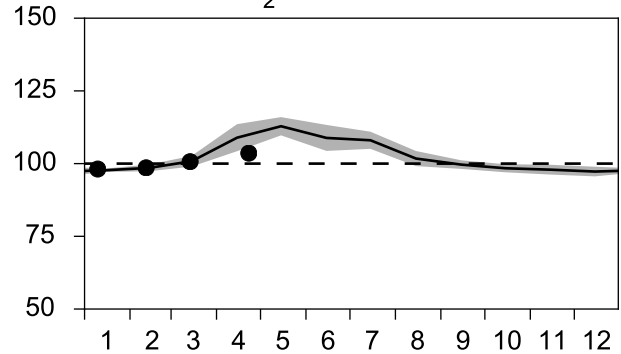
DIN µmol/l



SiO<sub>3</sub> µmol/l

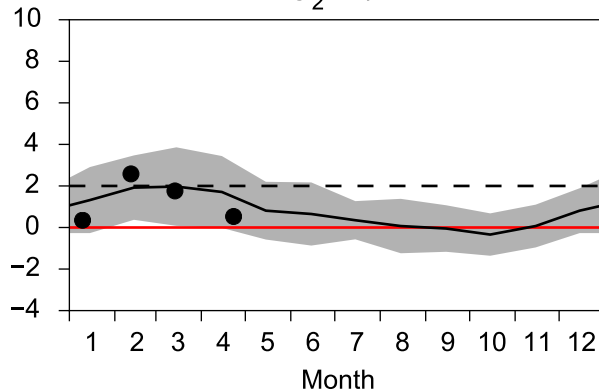


O<sub>2</sub> saturation %

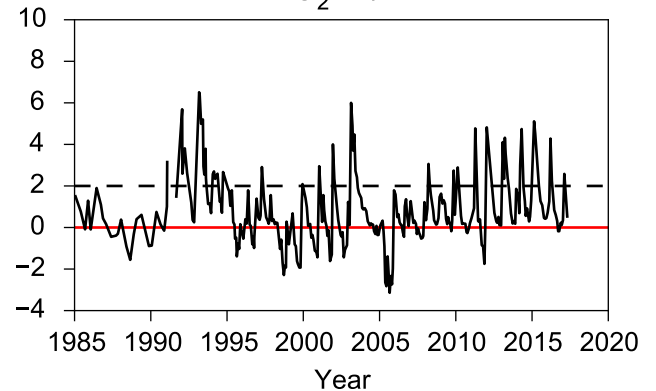


## OXYGEN IN BOTTOM WATER (depth >= 80 m)

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

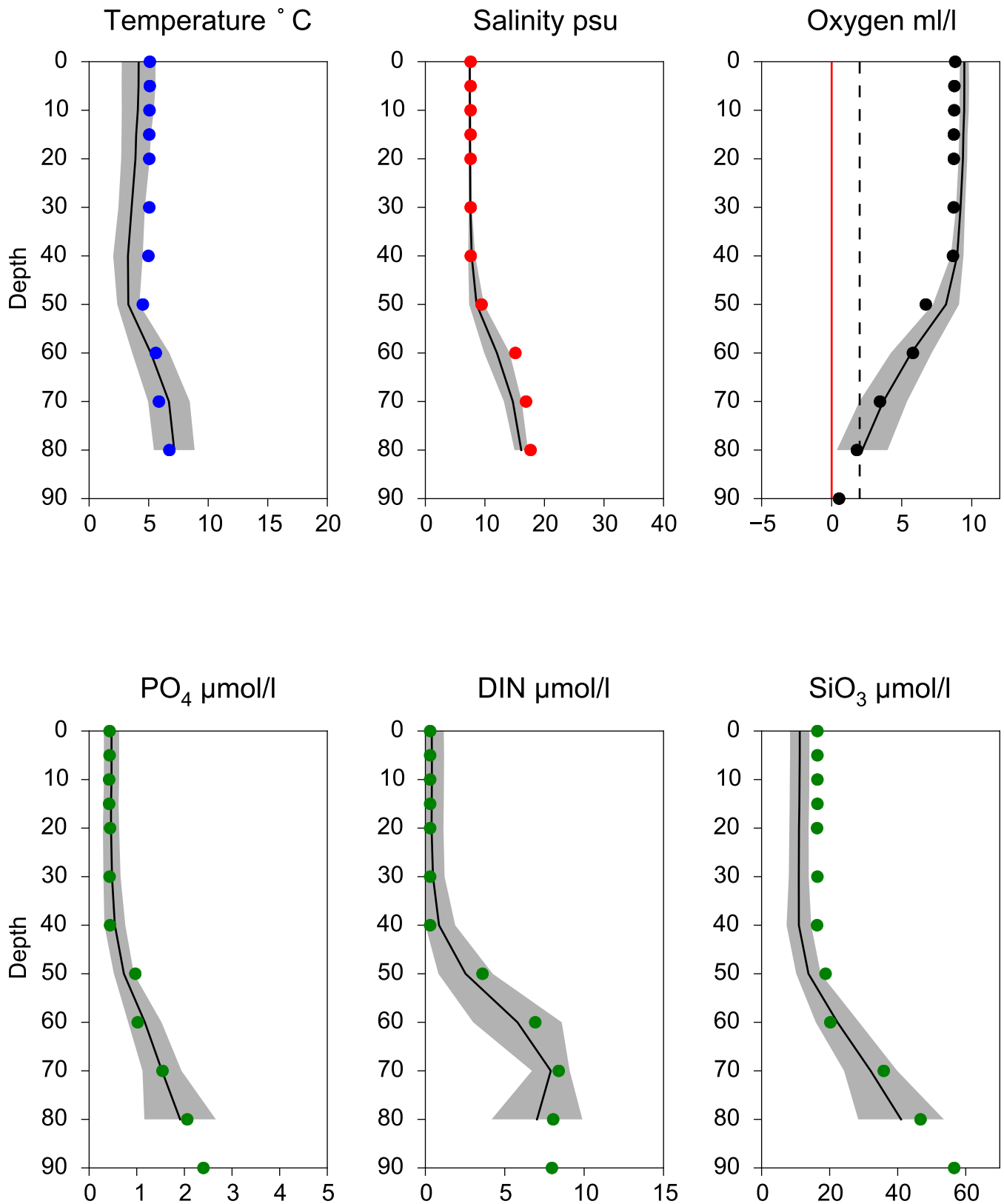


O<sub>2</sub> ml/l



# Vertical profiles BY5 BORNHOLMSDJ April

— Mean 2001-2015    ■ St.Dev.    ● 2017-04-23



# STATION BY10 SURFACE WATER (0-10 m)

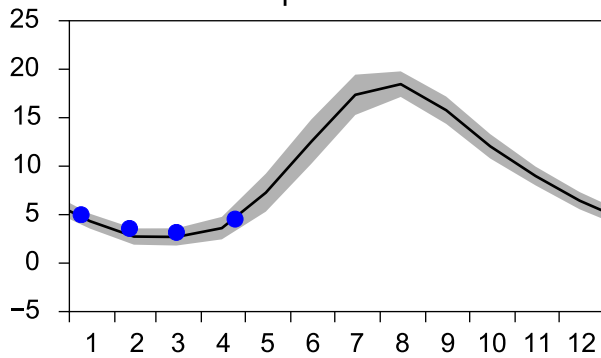
Annual Cycles

— Mean 2001-2015

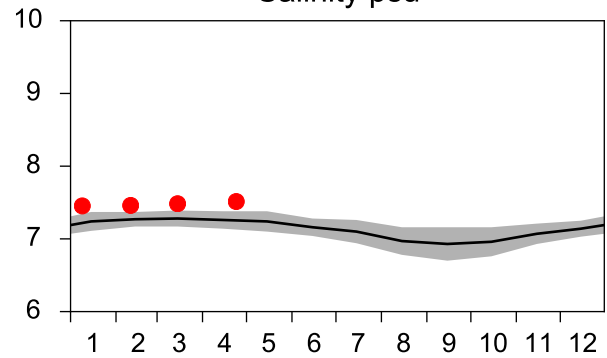
■ St.Dev.

● 2017

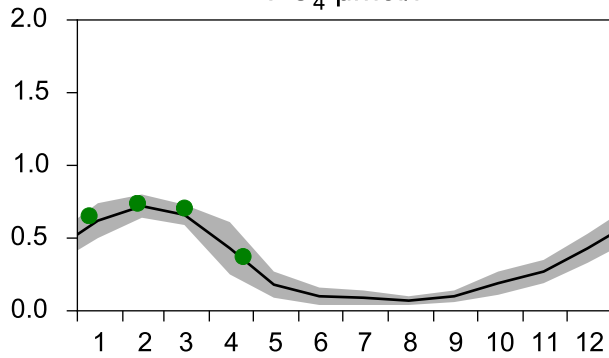
Temperature °C



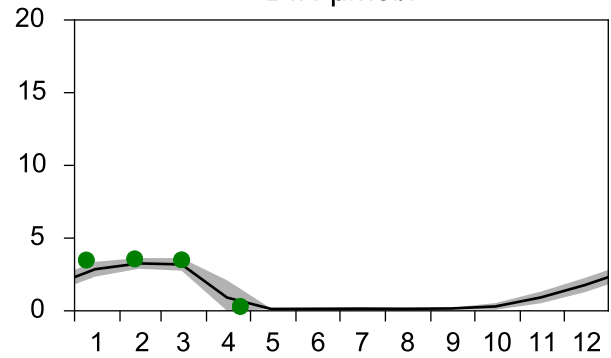
Salinity psu



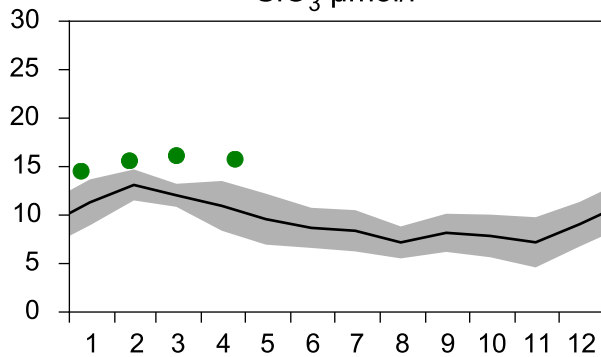
PO<sub>4</sub> µmol/l



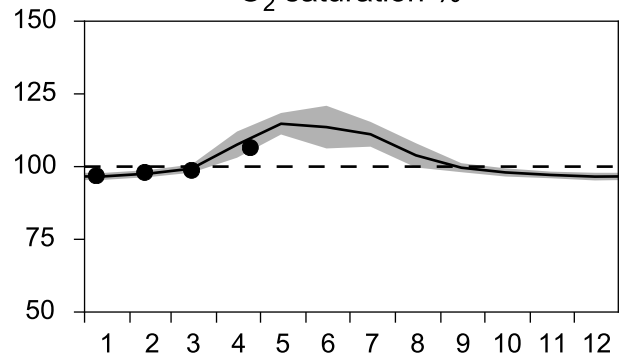
DIN µmol/l



SiO<sub>3</sub> µmol/l

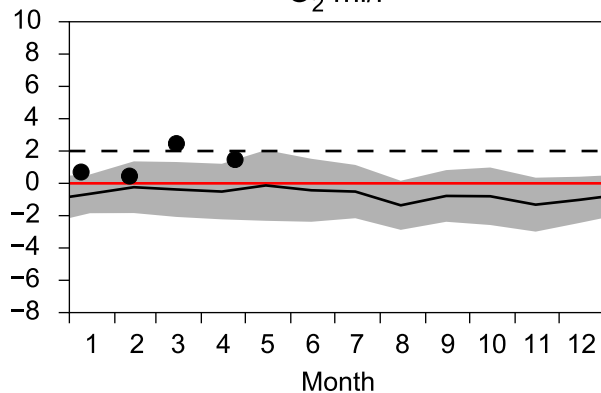


O<sub>2</sub> saturation %

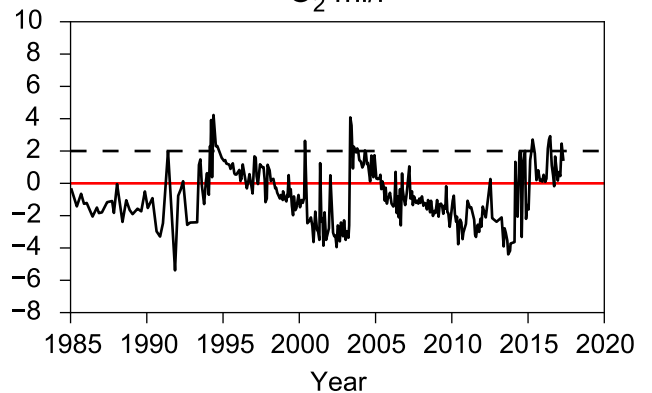


## OXYGEN IN BOTTOM WATER (depth >= 125 m)

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

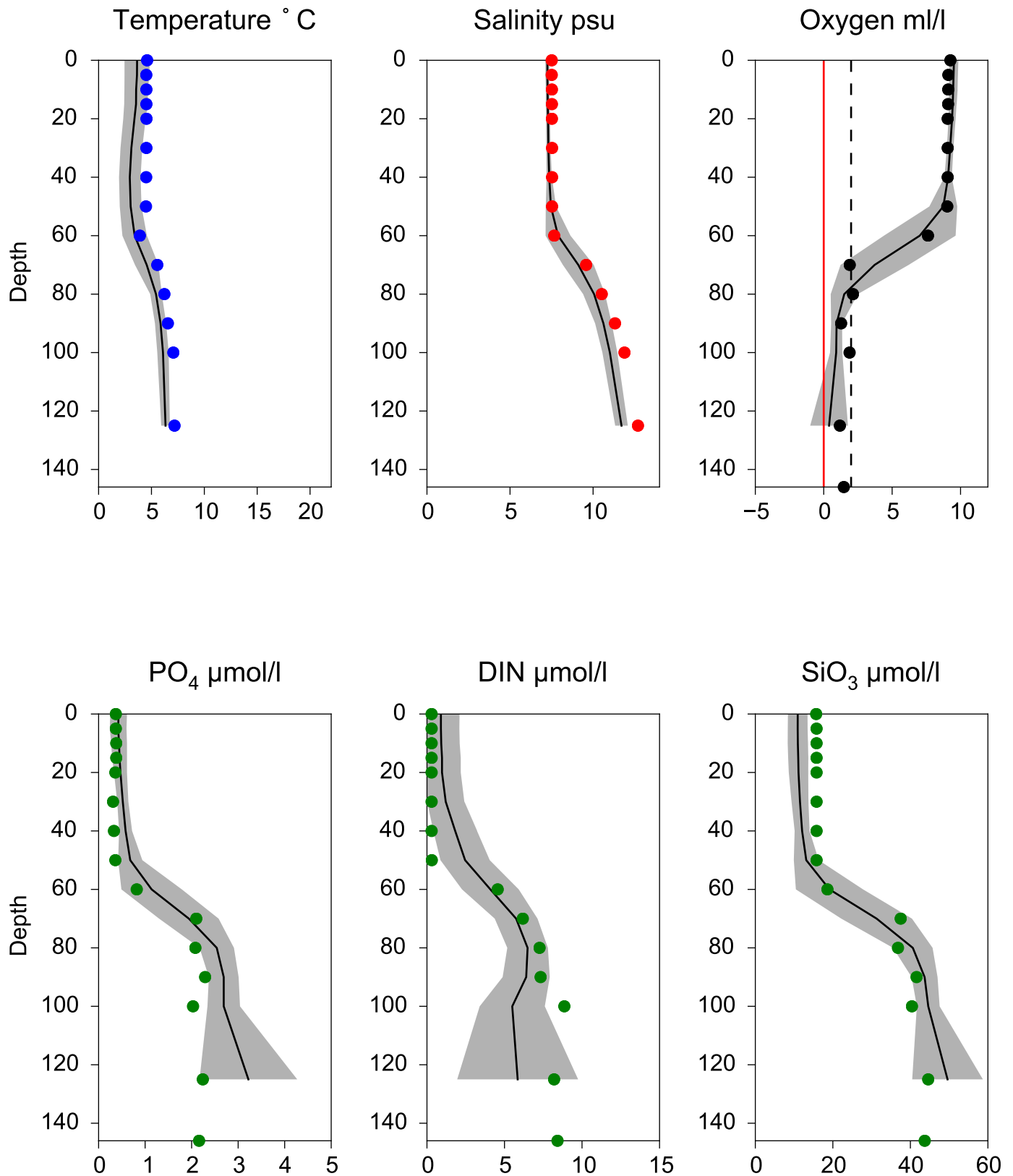


O<sub>2</sub> ml/l



# Vertical profiles BY10 April

— Mean 2001-2015    ■ St.Dev.    ● 2017-04-24



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

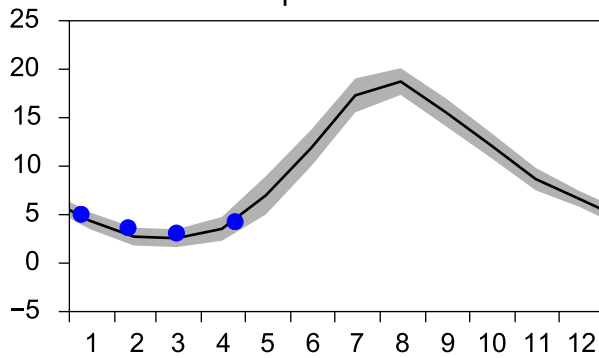
Annual Cycles

— Mean 2001-2015

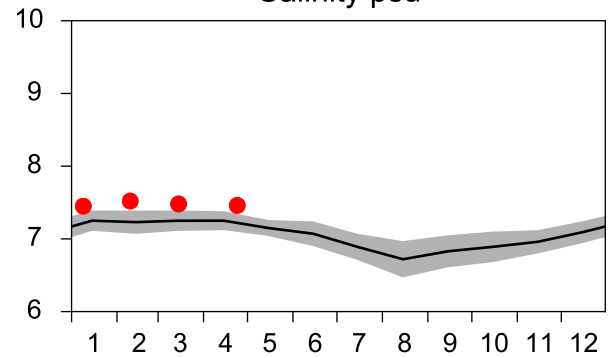
■ St.Dev.

● 2017

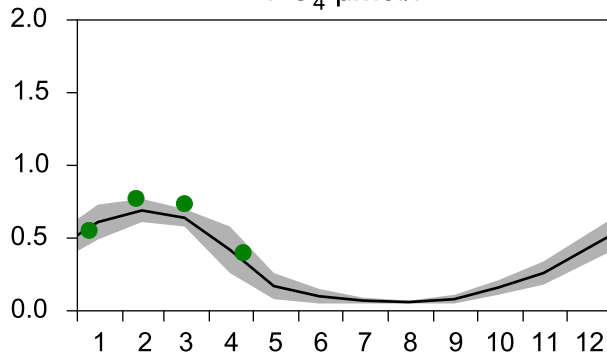
Temperature °C



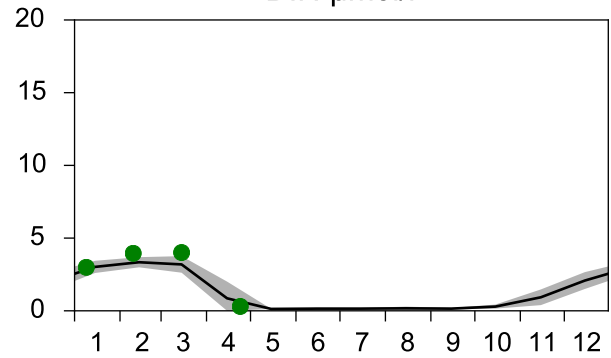
Salinity psu



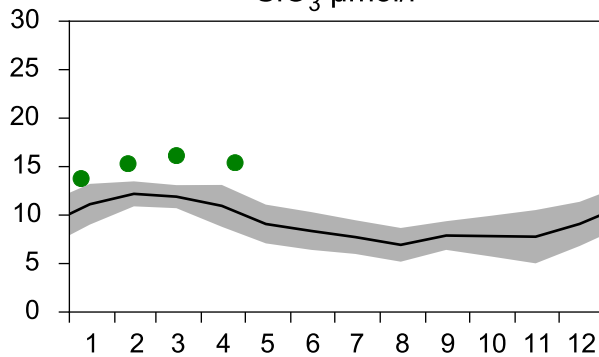
PO<sub>4</sub> µmol/l



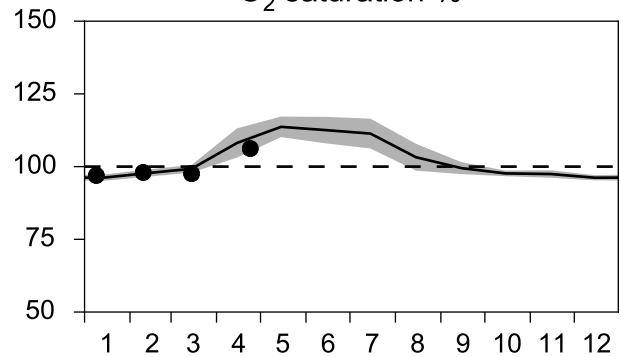
DIN µmol/l



SiO<sub>3</sub> µmol/l

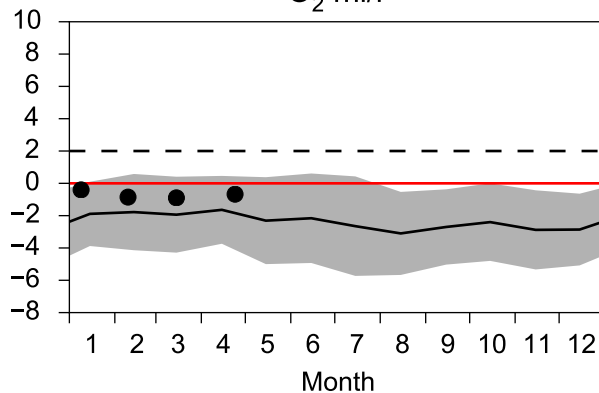


O<sub>2</sub> saturation %

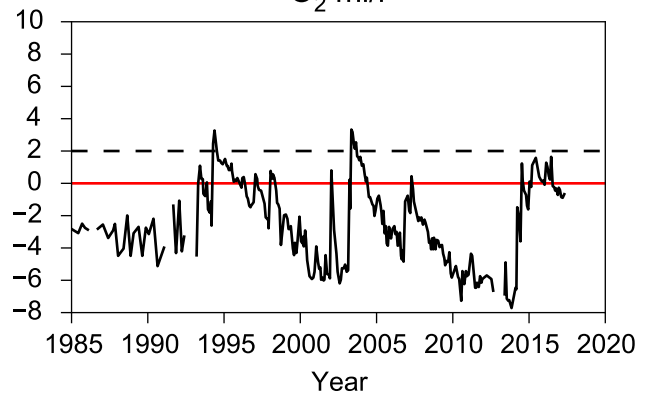


## OXYGEN IN BOTTOM WATER (depth >= 225 m)

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

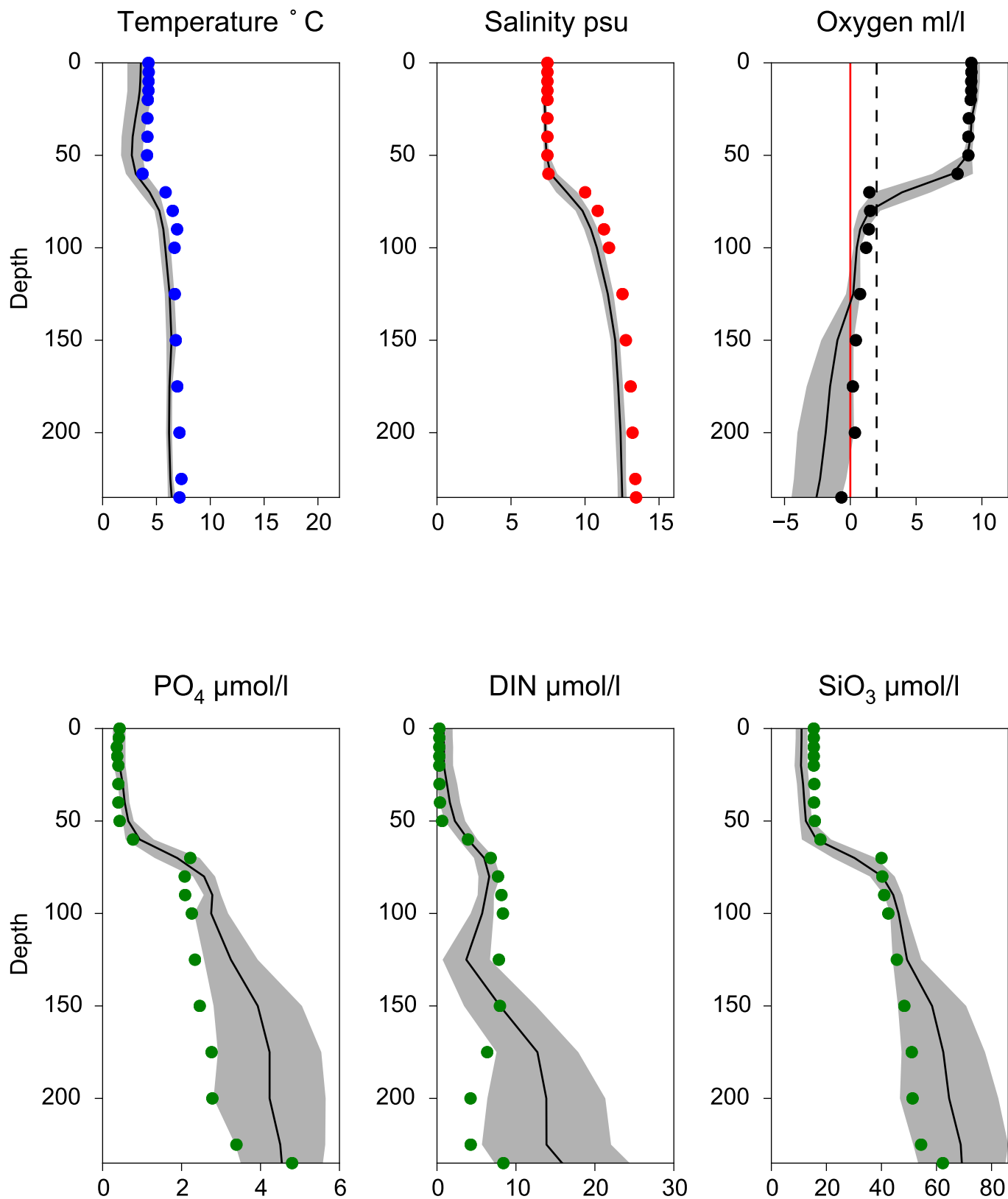


O<sub>2</sub> ml/l



# Vertical profiles BY15 GOTLANDSDJ April

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

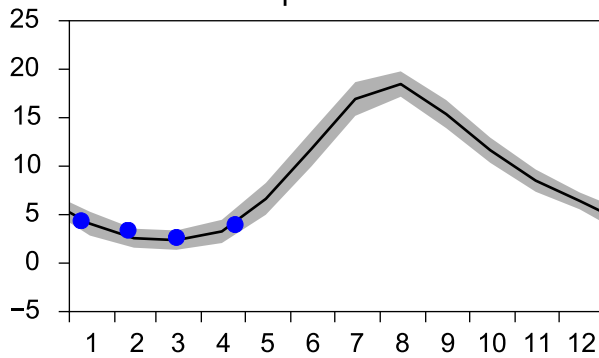
Annual Cycles

— Mean 2001-2015

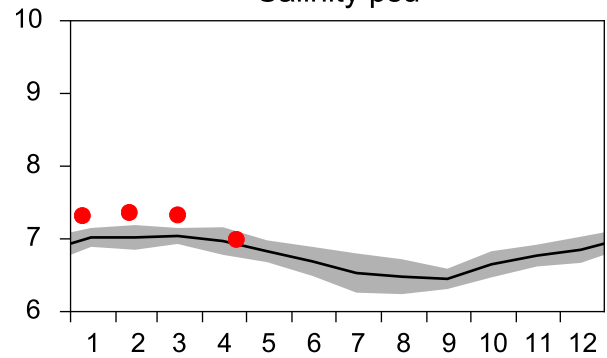
■ St.Dev.

● 2017

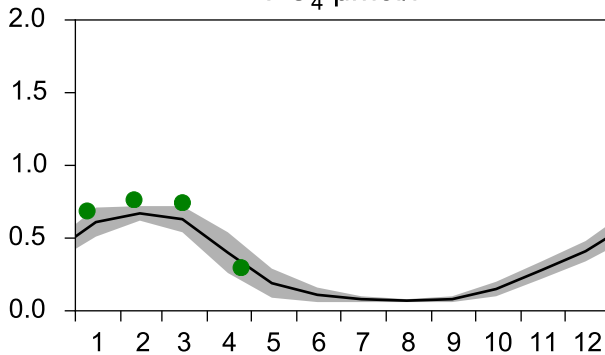
Temperature °C



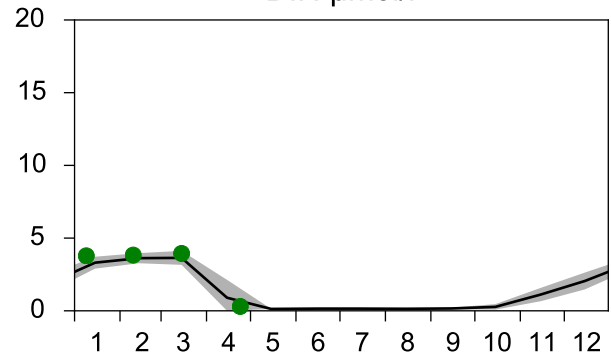
Salinity psu



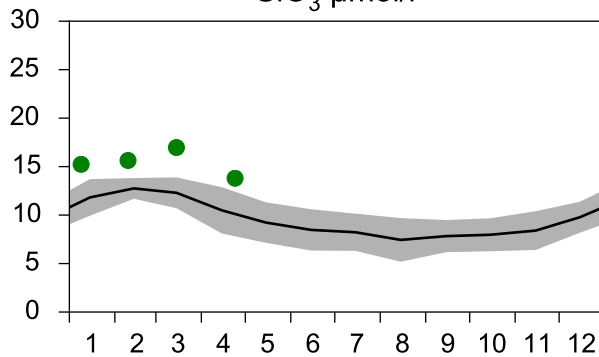
PO<sub>4</sub> µmol/l



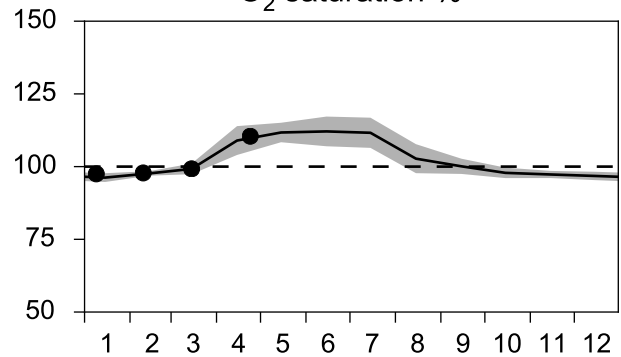
DIN µmol/l



SiO<sub>3</sub> µmol/l

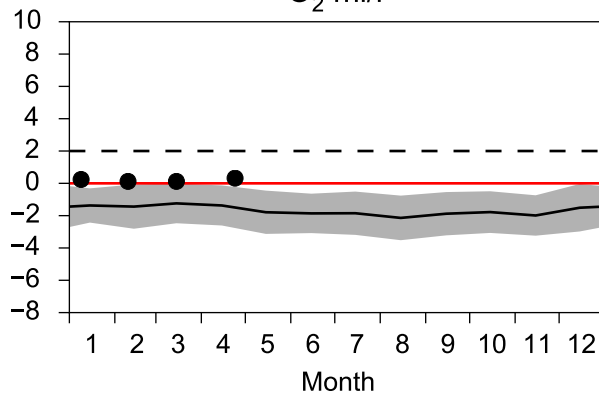


O<sub>2</sub> saturation %

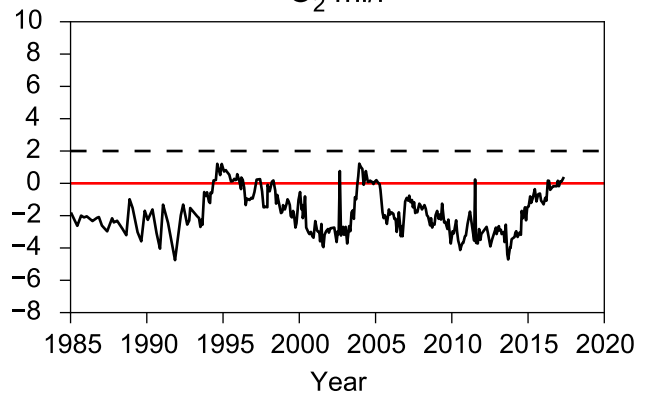


## OXYGEN IN BOTTOM WATER (depth >= 175 m)

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

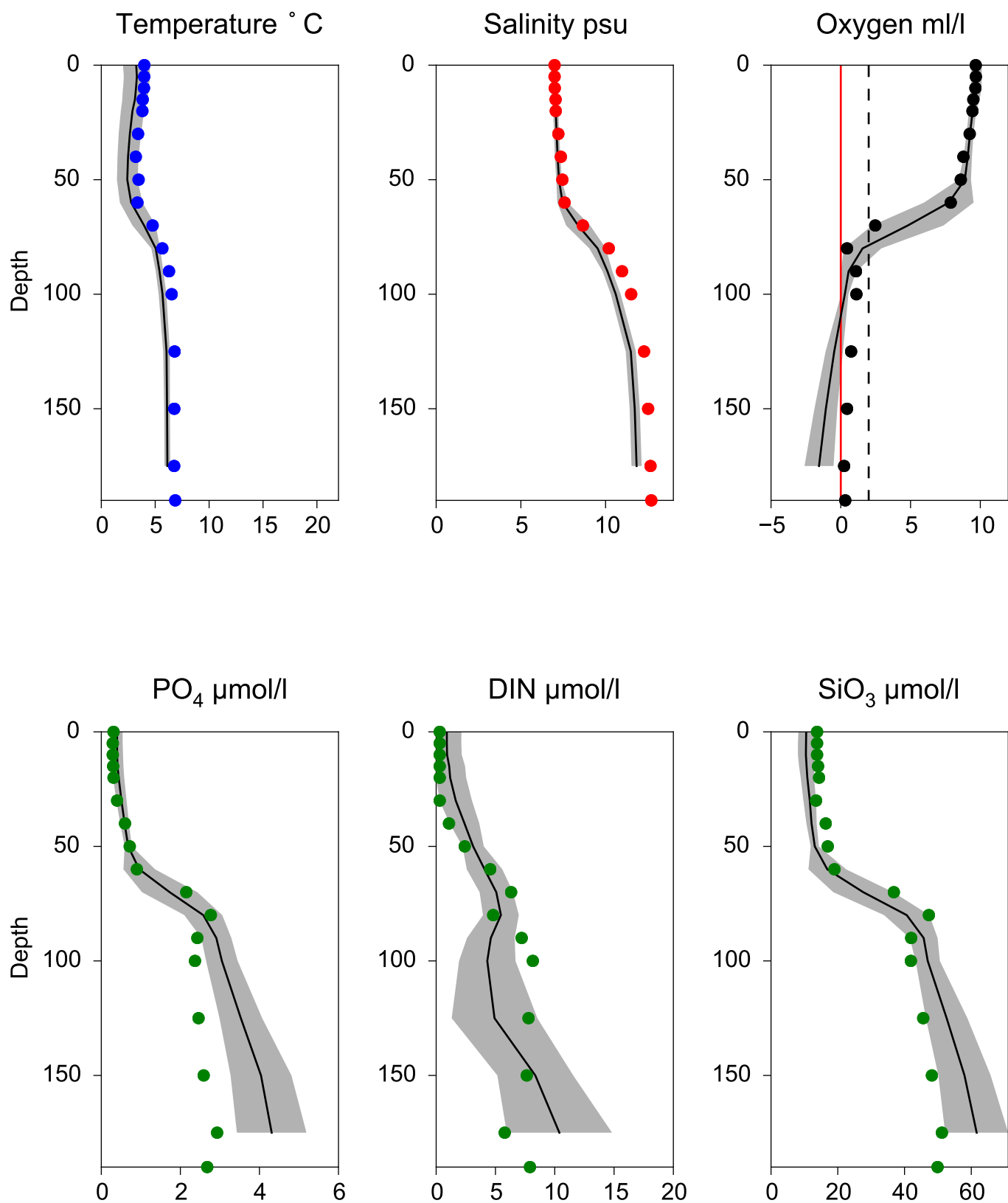


O<sub>2</sub> ml/l



# Vertical profiles BY20 FÅRÖDJ April

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

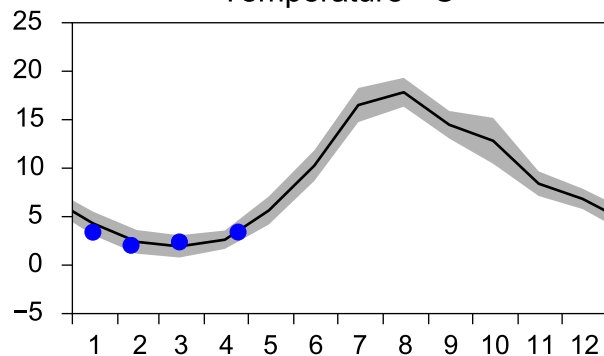
Annual Cycles

— Mean 2001-2015

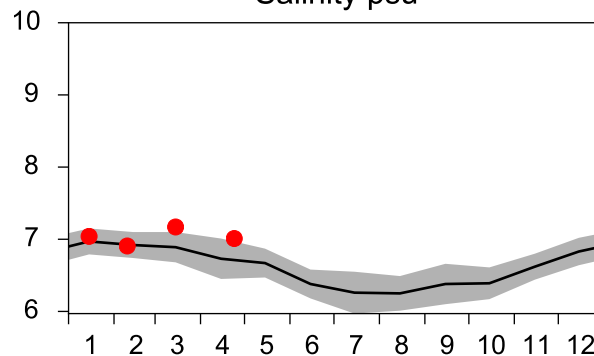
■ St.Dev.

● 2017

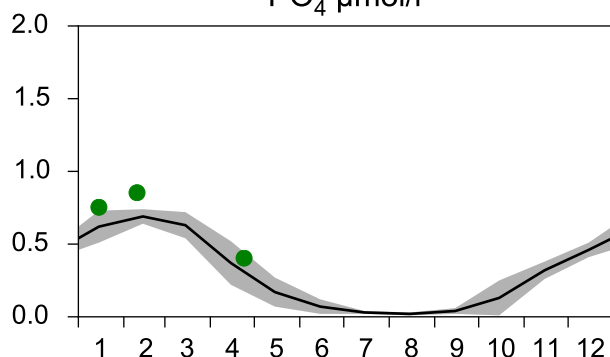
Temperature °C



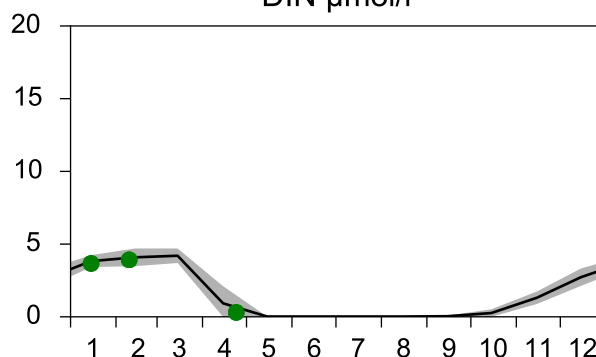
Salinity psu



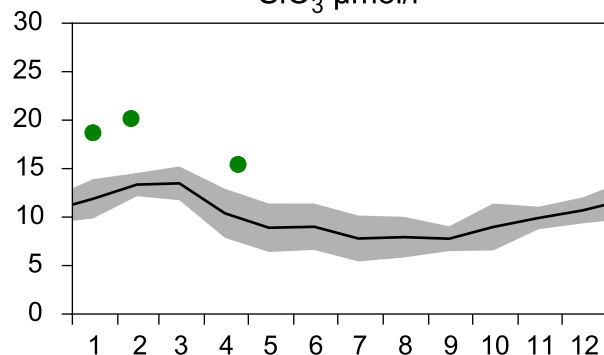
PO<sub>4</sub> µmol/l



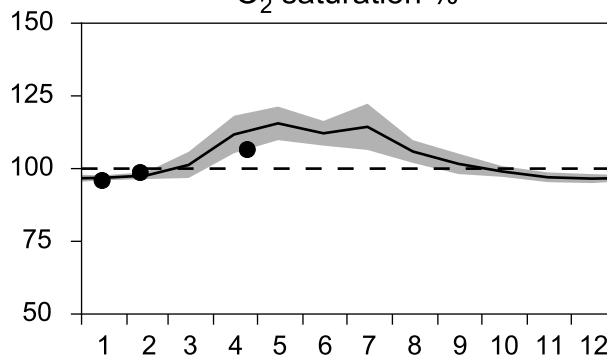
DIN µmol/l



SiO<sub>3</sub> µmol/l

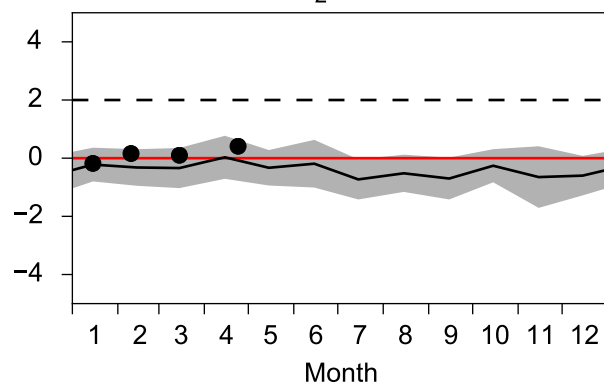


O<sub>2</sub> saturation %

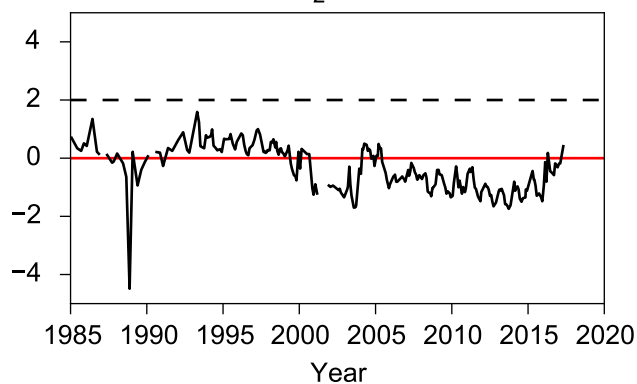


## OXYGEN IN BOTTOM WATER (depth >= 150 m)

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

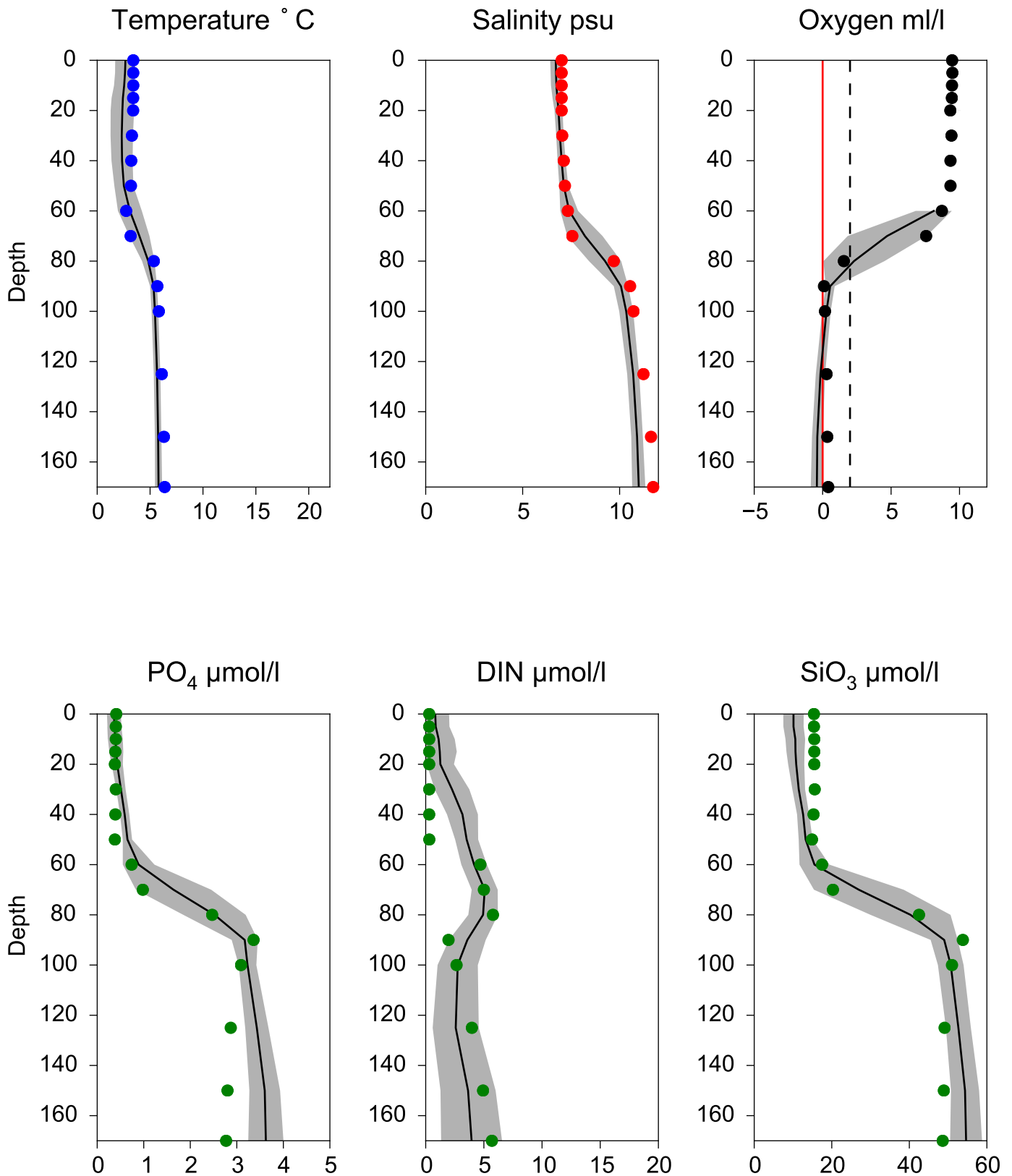


O<sub>2</sub> ml/l



# Vertical profiles BY29 / LL19 April

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# STATION SLÄGGÖ SURFACE WATER (0-10 m)

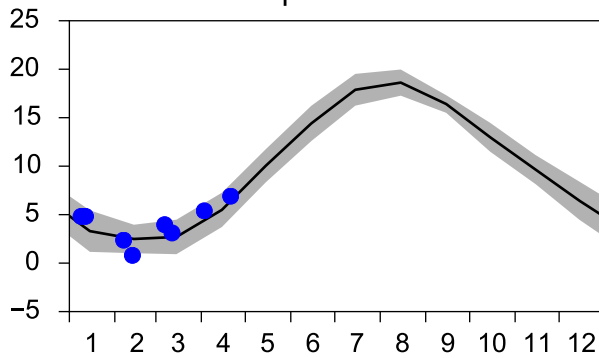
Annual Cycles

— Mean 2001-2015

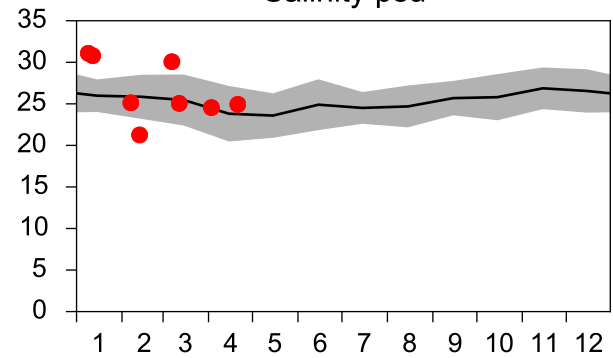
■ St.Dev.

● 2017

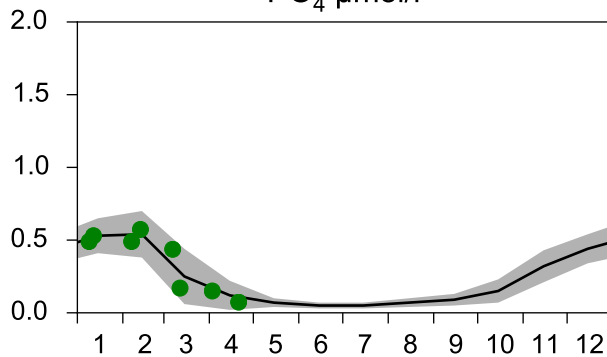
Temperature °C



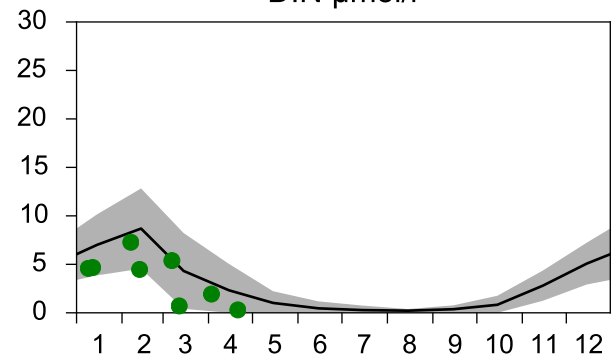
Salinity psu



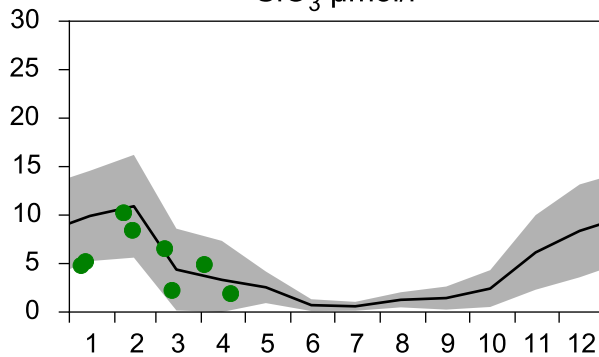
PO<sub>4</sub> µmol/l



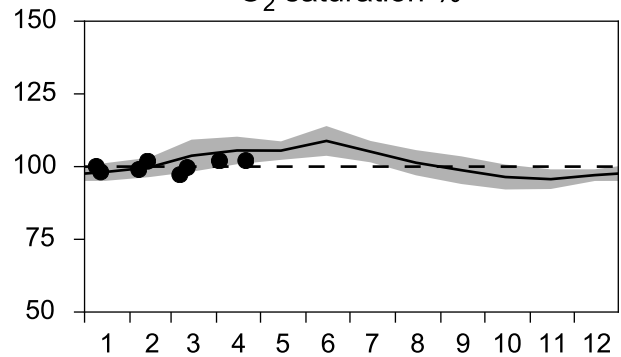
DIN µmol/l



SiO<sub>3</sub> µmol/l

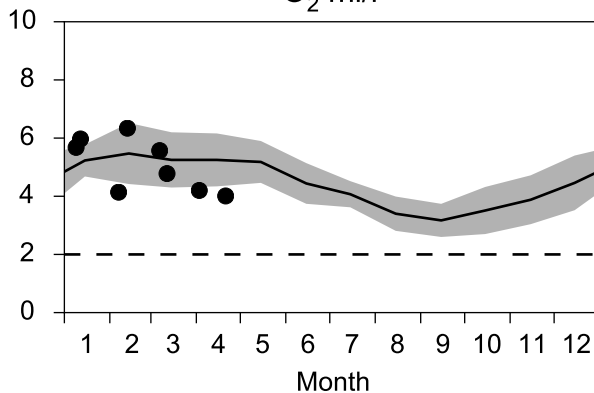


O<sub>2</sub> saturation %

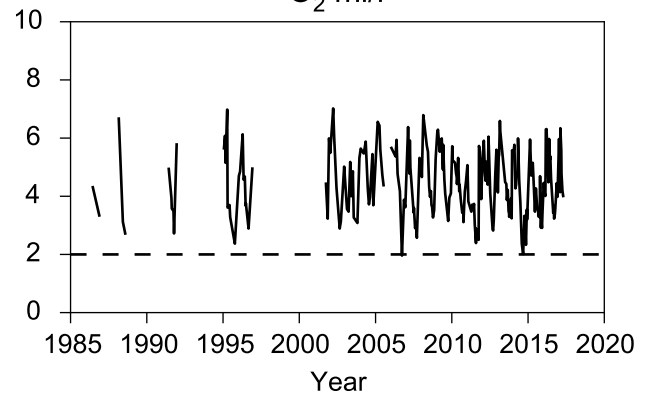


## OXYGEN IN BOTTOM WATER (depth >= 64 m)

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



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



# Vertical profiles SLÄGGÖ April

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