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SMHI
Oceanographic Unit
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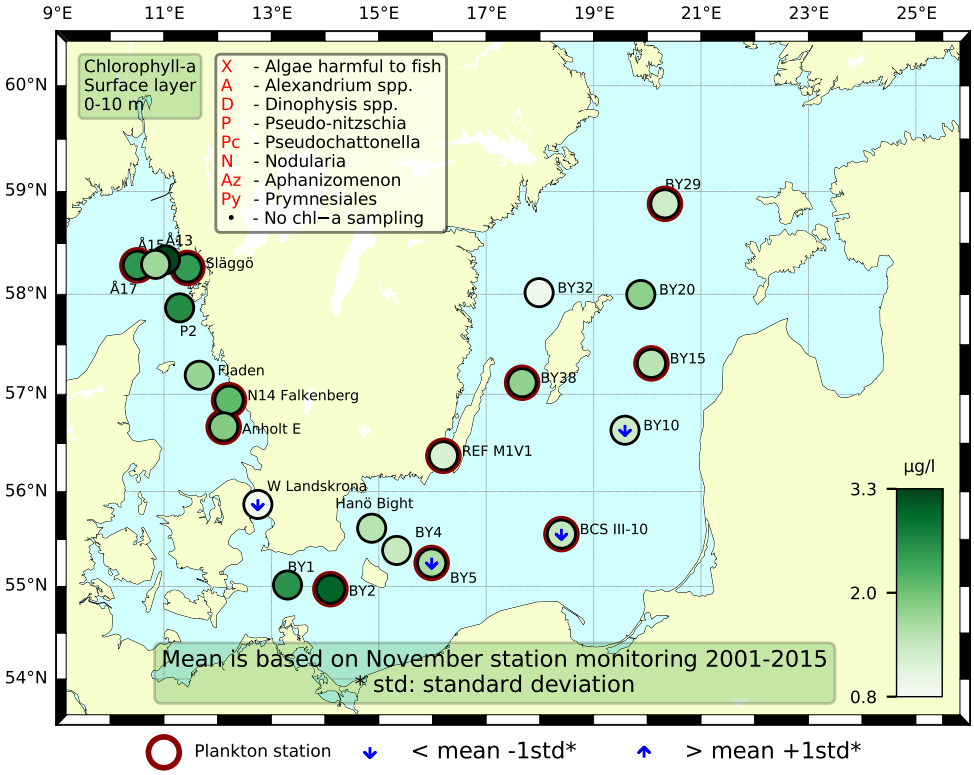
# AlgAware

## ALGAL SITUATION IN MARINE WATERS SURROUNDING SWEDEN

**Sammanfattning**

Diversiteten av växtplankton och totalt antal celler var som man kan förvänta sig av årstiden relativt låg. Å17 stack ut lite med relativt hög artdiversitet. Kiselalger dominerade i antal vid samtliga stationer förutom vid Släggö där dinoflagellater var mer vanliga. Framför allt var kiselalgssläktet *Pseudo-nitzschia** vanlig vid samtliga stationer. Vid Å17, den yttersta stationen i Skagerrak återfanns enstaka celler av arter som normalt förekommer i Nordsjön. De integrerade klorofyllvärdena (0-10 m) som sammanfaller i djup med slangproverna var normala för månaden. I de integrerade klorofyllvärdena (0-20 m) återfanns förhöjda värden vid N14 Falkenberg och Å17. Vid Anholt E var de strax under det normala för månaden.

Diversiteten var allmänt låg vid Östersjöstationerna och de flesta stationerna var dominerade av små celler och ciliater, samt ett fåtal större kiselalger. BY15 och BY29 hade högst diversitet, där det förutom allt smått även hittades flertalet arter större kiselalger samt olika grönalger. Överlag var de integrerade klorofyllvärdena normala för månaden, utom för de sydöstra stationerna BY5, BCS III-10 och BY10 där de var lägre än normalt.




**Abstract**

The phytoplankton diversity and total cell numbers were relatively low as can be expected for the season. The only exception was Å17 that had quite high biodiversity. Diatoms dominated at all stations except at Släggö where dinoflagellates were more abundant. Overall the diatom *Pseudo-nitzschia** was common. At Å17, the outer most station in the Skagerrak, a few cells of species more commonly found in the North Sea were found. The integrated (0-10 m) chlorophyll concentrations that coincide with the depth of the hose samples were within normal for all stations. The integrated (0-20 m) chlorophyll concentrations were above normal at N14 Falkenberg and Å17 whereas they were just below normal at Anholt E.

The phytoplankton diversity was generally low at the Baltic stations and most stations were dominated by small cells and ciliates, and a few larger diatoms. BY15 and BY29 had highest diversity, where in addition to all small cells, several larger diatom species and green algae were found. Overall, the integrated chlorophyll concentrations were normal for the month, except for the South-Eastern stations BY5, BCS III-10 and BY10, where the concentrations were lower than normal.

Below follows a more detailed information on species composition and abundance. Species marked with * are potentially toxic or harmful.

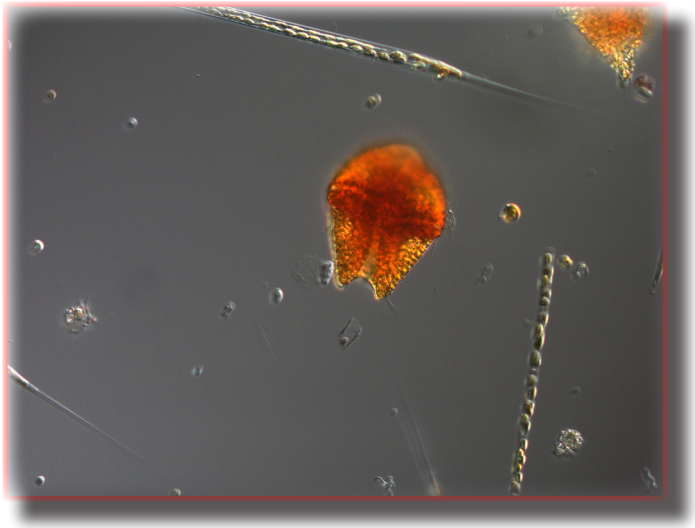
## The Skagerrak

### Å17 (open Skagerrak) 12th of November

The biodiversity was relatively high but total cell numbers were low. Diatoms dominated in cell numbers and among them the potentially toxic genus *Pseudo-nitzschia** was most abundant. The diatom *Proboscia indica*, normally found in the North Sea, was also common. The integrated (0-20 m) chlorophyll concentration was above normal for this month but the integrated (0-10 m) that coincides with the hose sampling was within normal.

### Släggö (Skagerrak coast) 12th of November

The biodiversity and total cell numbers were both moderate. The larger cells were clearly dominated by dinoflagellates where *Akashiwo sanguinea* was the most common. Among the diatoms the genus *Pseudo-nitzschia** and *Pseudosolenia calcal-avis* were common. The integrated (0-10 m and 0-20 m) chlorophyll concentrations were within normal for this month.



The dinoflagellate *Akashiwo sanguinea* was common at station Släggö.

## The Kattegat

### Anholt E 13th of November

The species diversity and total cell numbers were moderate. Diatoms dominated with several species in high cell numbers such as the genus *Rhizosolenia*, *Pseudosolenia calcar-avis and Pseudo-nitzschia**. Among the dinoflagellates both *Dinophysis tripos and D. odiosa* were present. The smaller cells were mainly represented by different cryptomonadales. The integrated (0-10 m) chlorophyll concentration was normal for this month whereas the integrated (0-20 m) was above normal for this month.

### N14 Falkenberg 13th of November

The species diversity and cell numbers were moderate. Diatoms dominated clearly with several species with high cell numbers. *Pseudosolenia calcar-avis* had the highest cell numbers, but the genus *Pseudo-nitzschia** and *Dactyliosolen fragilissimus* were also abundant. The dinoflagellates were quite few in numbers and represented by different naked cells. The integrated (0-10 m) and (0-20 m) chlorophyll concentrations were both within normal for this month

## The Baltic

### BY2 14th of November

This station had relatively high diversity with several large diatom and dinoflagellate species, as well as the smaller community of ciliates, Cryptomonadales and flagellates, but without any small colony-forming cyanobacteria. This was the only station without the two *Chaetoceros* species (*C. castracanei* and *C. danicus*) but had two *Coscinodiscus* species (*C. centralis* and *C. radiatus*), as well as *Dactyliosolen fragilissimus* and the dinoflagellates *Prorocentrum cordatum* and *Tripos muelleri*. Both the integrated (0-20 m) and (0-10 m) chlorophyll concentrations were normal for this month.

### BY5 14th of November

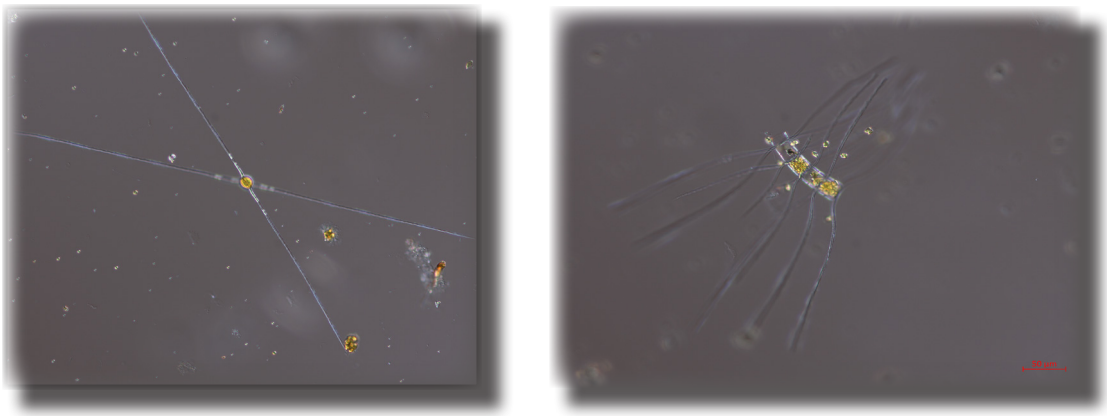
Both phytoplankton diversity and abundance were low. There were however some ciliates, *Leucocryptos marina* and other Cryptomonadales, as well as flagellates and unicells. Some Centrales and *Chaetoceros danicus* were found, as well as the ASP-producing genus *Pseudo-nitzschia*. Both the integrated (0-20 m) and (0-10 m) chlorophyll concentrations were below normal for this month.

### BCSIII-10 15th of November

Both phytoplankton diversity and abundance were low. There were however some ciliates, *Leucocryptos marina* and other Cryptomonadales, as well as flagellates and unicells. Some Centrales, *Chaetoceros castracanei* and *Skeletonema marinoi* were found. Both the integrated (0-20 m) and (0-10 m) chlorophyll concentrations were below normal for this month.

### BY15 15th of November and BY29 16th of November

BY15 and BY29 had a bit higher diversity and abundance than the other Baltic stations. In addition to all the smaller cells, both stations had some larger diatoms, such as *Chaetoceros danicus*, *C. castracanei*, *Pseudosolenia calcar-avis* and *Rhizosolenia hebetata f. semispina*. Furthermore, at both stations, the small colony-forming cyanobacteria *Lemmermanniella cf. parva*, *Snowella* sp., and *Woronichinia* sp. were in quite high numbers. Both the integrated (0-20 m) and (0-10 m) chlorophyll concentrations were low but within normal for this month.



Two large diatoms found in some Baltic Sea stations in November and where you clearly can see their difference. *Chaetoceros danicus* (left) with straight setae and *C. castracanei* (right) with curved setae. Scale bar represent both pictures.

**BY31 16th of November**

Both phytoplankton diversity and abundance were low. There were however some ciliates of various sizes, *Leucocryptos marina* and other Cryptomonadales, as well as flagellates and unicells. Some Centrales, *Chaetoceros danicus* and *Coscinodiscus centralis* were found.

**BY38 17th of November**

Both phytoplankton diversity and abundance were low. There were however some ciliates, *Leucocryptos marina* and other Cryptomonadales, as well as flagellates and unicells. Some Centrales, *Chaetoceros danicus* and *Coscinodiscus* centralis were found. Both the integrated (0-20 m) and (0-10 m) chlorophyll concentrations were within normal for this month.

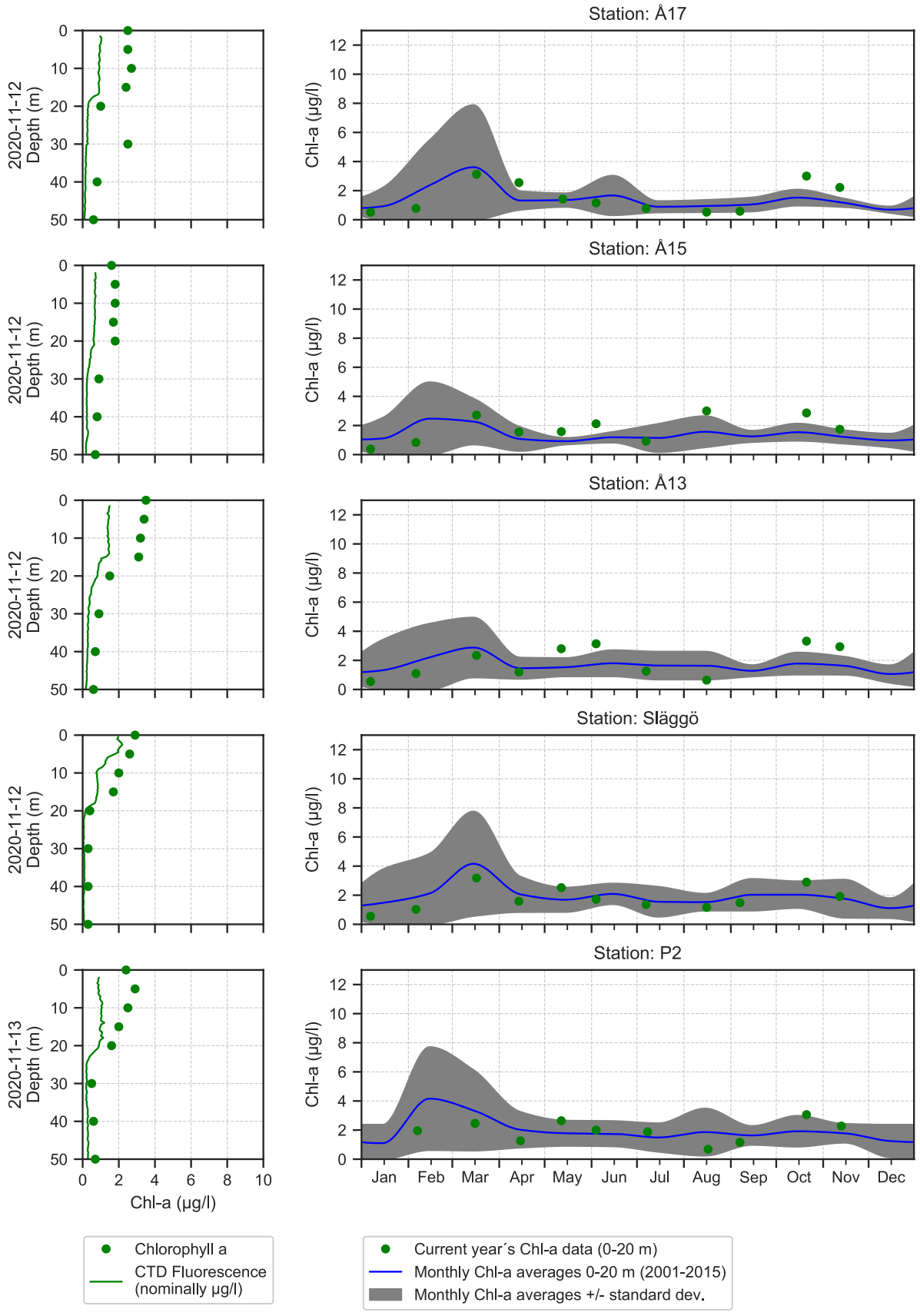
**REFM1V1 17th of November**

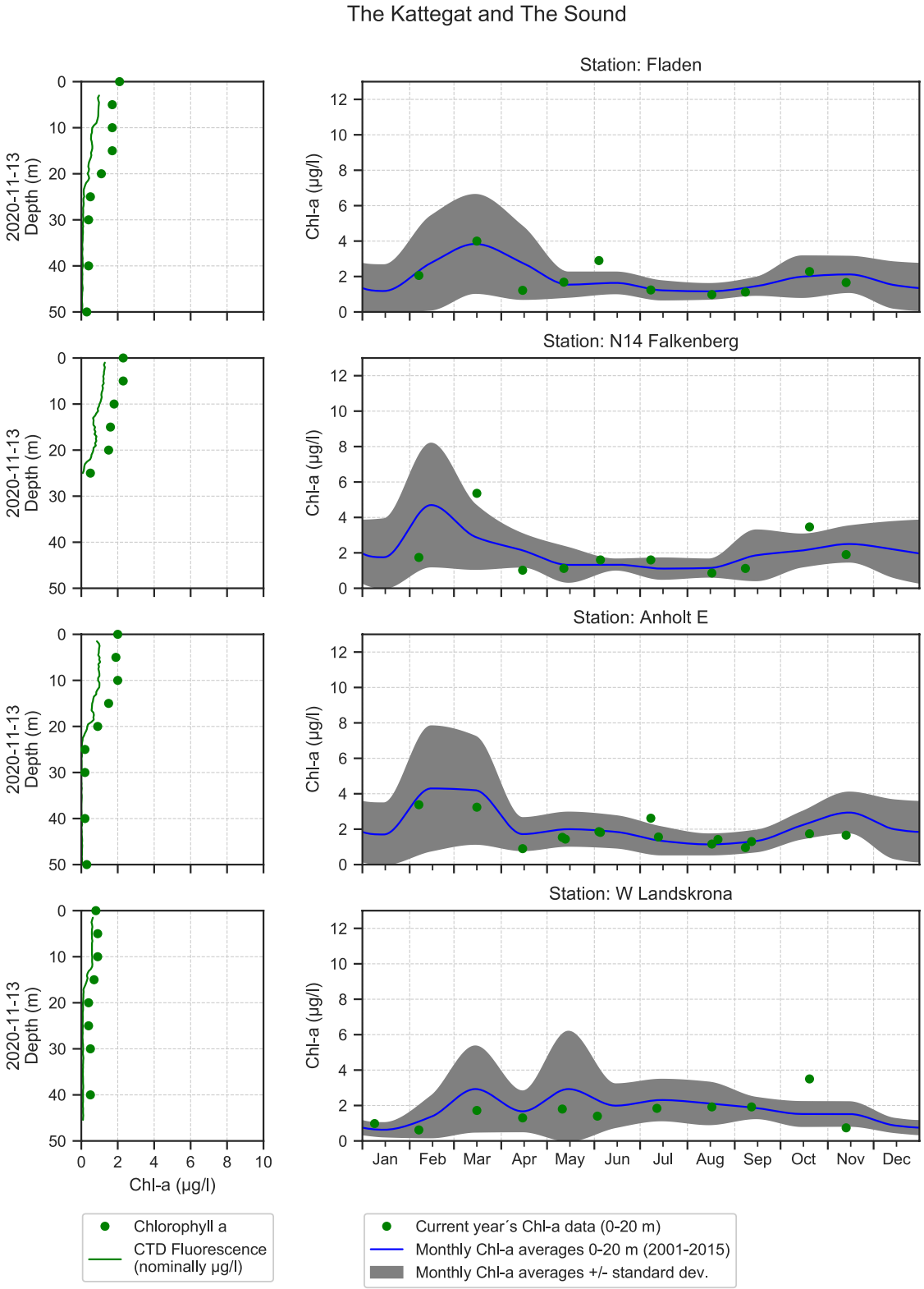
The diversity was low but abundance for the smaller Cryptomonadales and flagellates was quite high. *Skeletonema marinoi* was also represented in somewhat high numbers. Both the integrated (0-20 m) and (0-10 m) chlorophyll concentrations were low but within normal for this month.

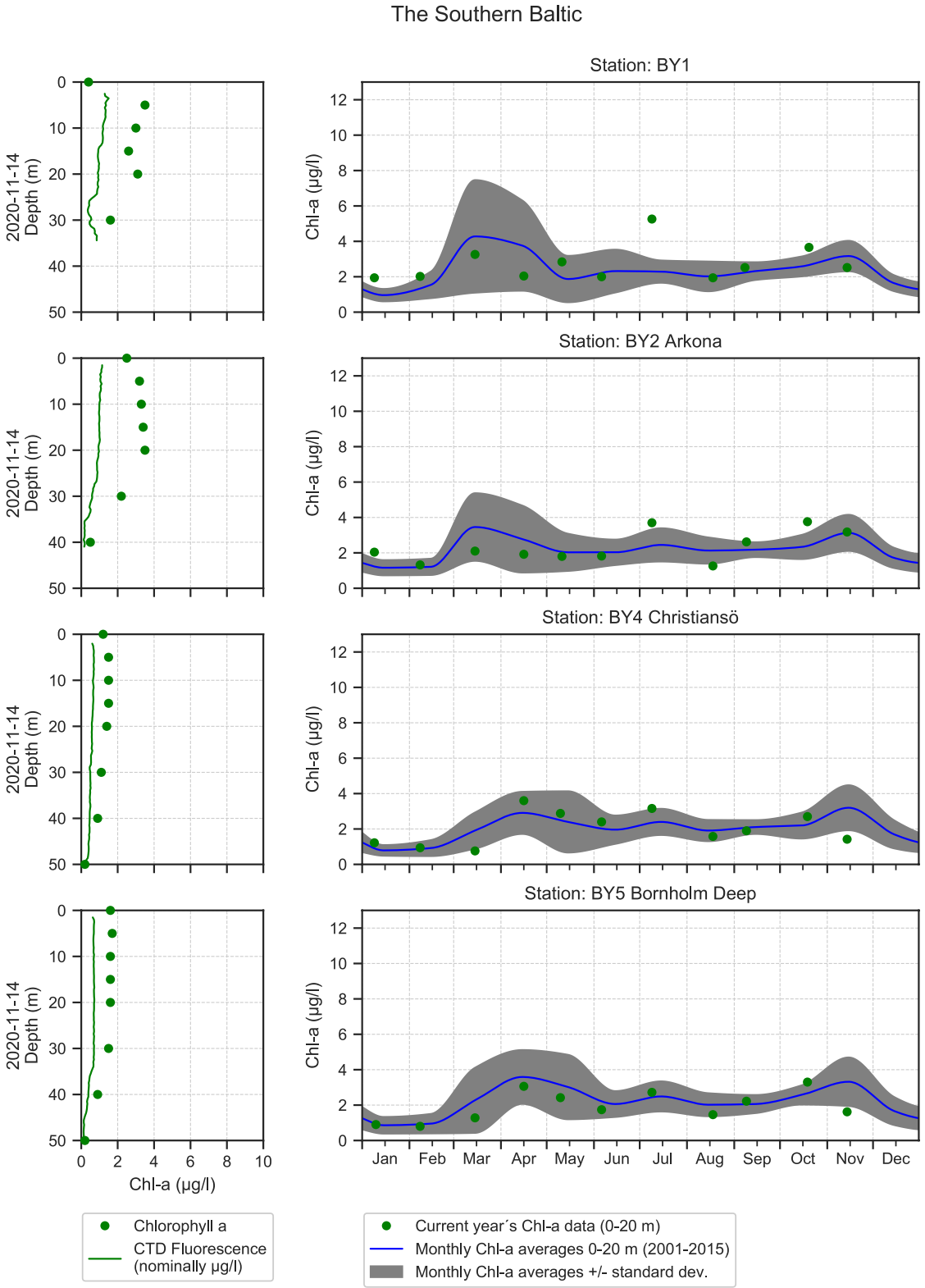
Phytoplankton analysis and text:
Marie Johansen and Maria Karlberg

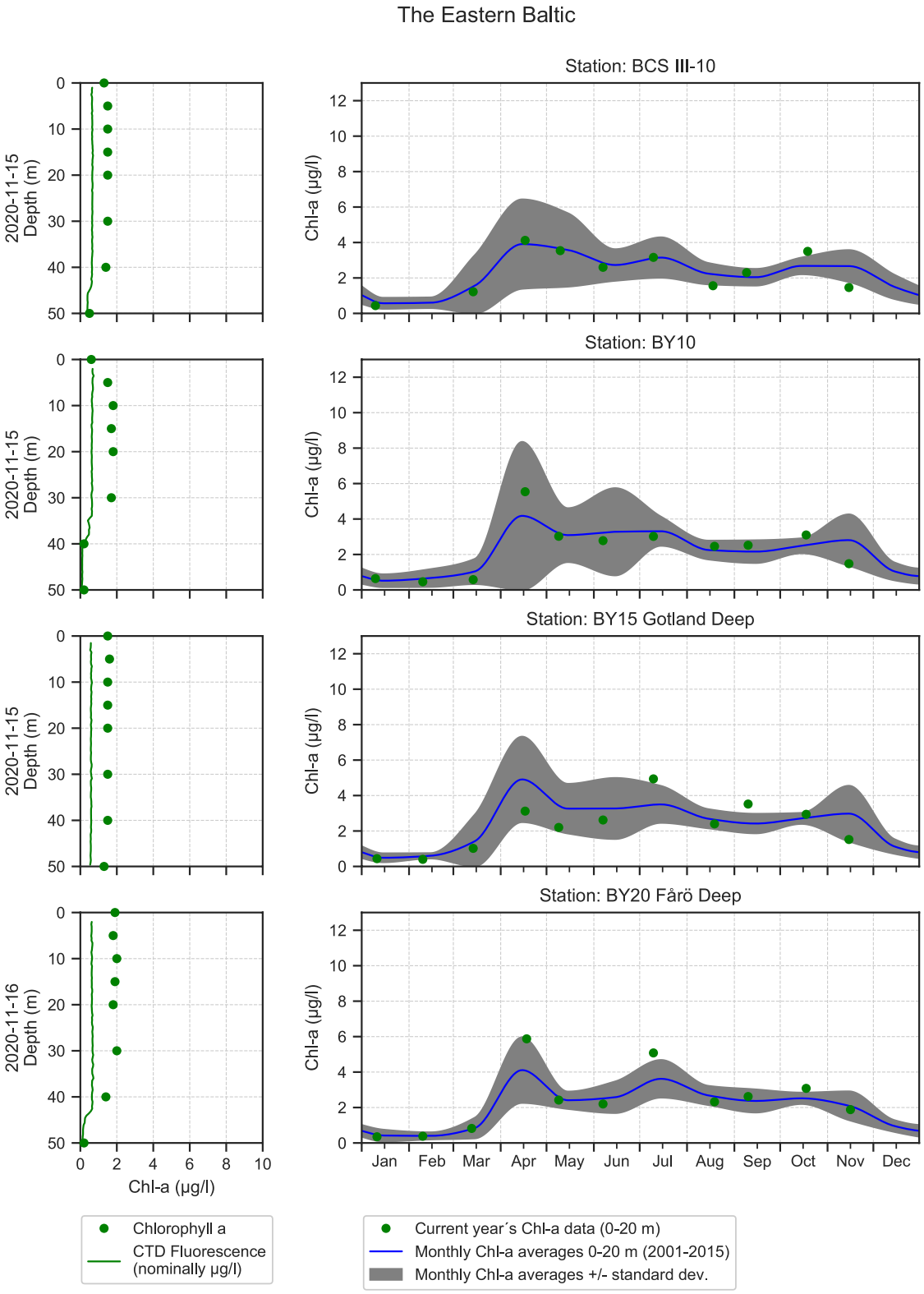
| Selection of observed species | Anholt E | N14 | Släggö | Å17 |
|---|---|---|---|---|
| Red=potentially toxic species | 13/11 | 13/11 | 12/11 | 12/11 |
| Hose 0-10 m | presence | presence | presence | presence |
| Cerataulina pelagica | present | present | present | present |
| Chaetoceros convolutus | present | | present | present |
| Chaetoceros danicus | present | present | present | |
| Chaetoceros socialis | present | | | |
| Chaetoceros tenuissimus | | | | present |
| Cylindrotheca closterium | | | present | present |
| Dactyliosolen fragilissimus | common | common | present | present |
| Ditylum brightwellii | | present | present | present |
| Eucampia zodiacus | present | | | |
| Guinardia delicatula | | present | | |
| Guinardia flaccida | present | present | | |
| Leptocylindrus danicus | common | common | present | present |
| Leptocylindrus minimus | | | | present |
| Nitzschia longissima | | present | present | present |
| Proboscia indica | | | present | present |
| Pseudo-nitzschia | common | very common | common | common |
| Pseudosolenia calcar-avis | very common | very common | common | present |
| Rhizosolenia setigera | common | common | common | common |
| Rhizosolenia setigera f. pungens | common | common | present | |
| Rhizosolenia styliformis | | | | present |
| Skeletonema marinoi | | present | | present |
| Thalassiosira | | present | present | present |
| Thalassiosira gravida | present | present | | |
| Akashiwo sanguinea | | | very common | |
| Dinophysis acuminata | present | present | | present |
| Dinophysis odiosa | present | | | |
| Dinophysis tripos | present | | | |
| Gymnodiniales | present | present | present | |
| Gymnodinium litoralis | present | present | | |
| Gymnodinium verruculosum | | | | present |
| Gyrodinium flagellare | present | present | | present |
| Gyrodinium spirale | | present | | |
| Karenia mikimotoi | | present | | |
| Noctiluca scintillans | | present | present | |
| Polykrikos schwartzii | | | present | |
| Prorocentrum micans | | present | | |
| Protoperidinium | present | | | |
| Protoperidinium crassipes | | | | present |
| Protoperidinium pallidum | | present | | |
| Scrippsiella CPX | | present | present | |
| Torodinium robustum | | | | present |
| Tripos furca | | present | present | present |
| Tripos lineatus | present | present | present | |
| Tripos longipes | | | | present |
| Tripos macroceros | | | present | present |
| Tripos muelleri | present | | present | present |
| Emiliania huxleyi | present | | present | present |
| Cryptomonadales | present | common | present | present |
| Dictyocha fibula | | | | present |
| Octactis speculum | present | | | common |
| Dictyochales | present | present | | present |
| Pseudochattonella | present | present | | |
| Pseudopedinella pyriformis | | present | | |
| Pseudanabaena | present | | present | |
| Choanoflagellatea | present | | | |
| Ciliophora | present | present | | present |
| Laboea strobila | | present | present | |
| Tiarina fusus | present | | | |

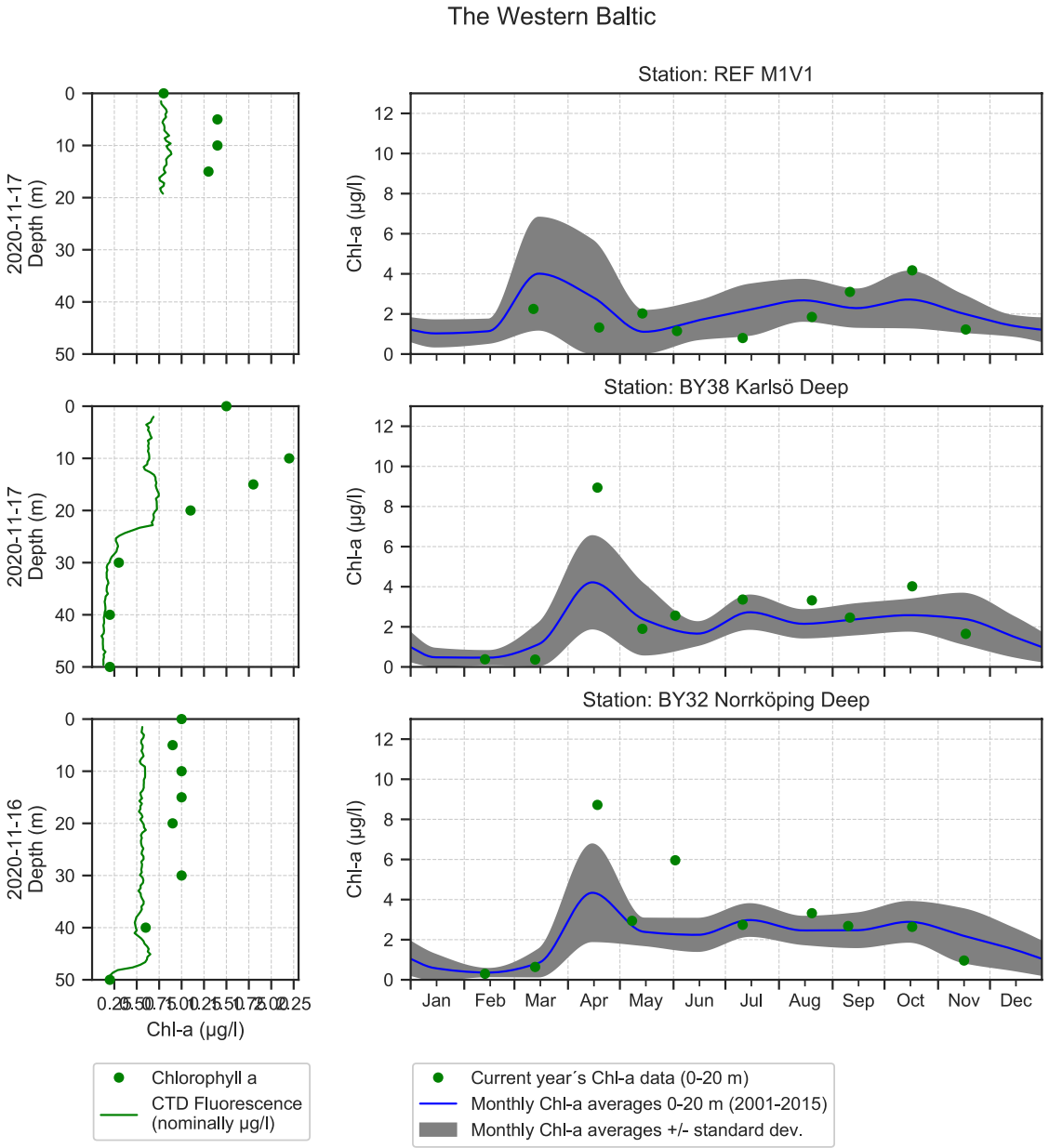
| Selection of observed species | BCSIII10 | BY2 | BY5 | BY15 | BY29 | BY31 | BY38 | REFM1V1 |
|---|---|---|---|---|---|---|---|---|
| Red=potentially toxic species | 15/11 | 14/11 | 14/11 | 15/11 | 16/11 | 16/11 | 17/11 | 17/11 |
| Hose 0-10 m | presence | presence | presence | presence | presence | presence | presence | presence |
| Attheya (cf. genus) | | | | present | | | | |
| Centrales | common | common | common | present | present | present | present | present |
| Chaetoceros castracanei | present | | | present | common | | | |
| Chaetoceros danicus | | | present | present | present | common | present | present |
| Coscinodiscus centralis | | common | | present | present | present | present | present |
| Coscinodiscus radiatus | | present | | | | | | |
| Cylindrotheca closterium | | | | | | | | present |
| Dactyliosolen fragilissimus | | present | | | | | | |
| Leptocylindrus minimus | | | | | | | present | |
| Pseudo-nitzschia | | | present | | | | | |
| Pseudosolenia calcar-avis | | | | present | present | | | |
| Rhizosolenia hebetata f. semispina | | | | present | present | | | |
| Skeletonema marinoi | present | | | | | | | common |
| Gymnodiniales | present | present | present | common | present | present | common | present |
| Gymnodinium verruculosum | present | present | present | present | | | | |
| Heterocapsa rotundata | | | | | present | | | present |
| Heterocapsa triquetra | | | | | | | | present |
| Katodinium glaucum | | | | | | present | | |
| Peridiniales | | | | present | present | | | |
| Peridiniella danica | | | | | | | | present |
| Phalacroma rotundatum | | | | | present | | | |
| Prorocentrum cordatum | | present | | | | present | | |
| Scrippsiella CPX | | | | | | | | present |
| Tripos muelleri | | present | | | | | | |
| Ollicola vangoorii | | present | | | | | | |
| Monoraphidium | | | | | present | | | |
| Oocystis sp. | present | | | present | present | present | present | |
| Binuclearia lauterbornii | present | | | common | common | present | present | |
| Pyramimonas sp. | | present | present | | | | present | common |
| Cryptomonadales | present | common | present | common | common | present | | very common |
| Leucocryptos marina | common | common | common | common | common | common | common | present |
| Pseudopedinella sp. | | | | | present | | | |
| Eutreptiella sp. | | present | | | | | present | |
| Aphanocapsa sp. | | | | | common | | | |
| Cyanodictyon sp. | | | | | | present | | |
| Lemmermanniella cf. parva | | | | present | common | | present | |
| Snowella sp. | present | | present | common | common | present | common | |
| Woronichinia sp. | | | present | present | present | present | | present |
| Calliacantha natans | | common | present | present | present | present | | |
| Choanoflagellatea | | | | | | present | present | present |
| Ebria tripartita | | present | | | | | | |
| Ciliophora | common | common | common | common | common | common | common | present |
| Mesodinium rubrum | present | | present | common | common | common | common | |
| Flagellates | common | common | common | common | common | common | common | very common |
| Unicell | common | common | common | common | common | common | common | common |


The Skagerrak
Station: Å17
Station: Å15
Station: Å13
Station: Släggö
Station: P2
2020-11-12
2020-11-13
Depth (m)
Chl-a (µg/l)
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Chlorophyll a
CTD Fluorescence (nominally µg/l)
Current year´s Chl-a data (0-20 m)
Monthly Chl-a averages 0-20 m (2001-2015)
Monthly Chl-a averages +/- standard dev.


The Kattegat and The Sound
Station: Fladen
Station: N14 Falkenberg
Station: Anholt E
Station: W Landskrona
2020-11-13
Depth (m)
Chl-a (µg/l)
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Chlorophyll a
CTD Fluorescence (nominally µg/l)
Current year´s Chl-a data (0-20 m)
Monthly Chl-a averages 0-20 m (2001-2015)
Monthly Chl-a averages +/- standard dev.


The Southern Baltic
Station: BY1
Station: BY2 Arkona
Station: BY4 Christiansö
Station: BY5 Bornholm Deep
2020-11-14
Depth (m)
Chl-a (µg/l)
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Chlorophyll a
CTD Fluorescence (nominally µg/l)
Current year´s Chl-a data (0-20 m)
Monthly Chl-a averages 0-20 m (2001-2015)
Monthly Chl-a averages +/- standard dev.


The Eastern Baltic
Station: BCS III-10
Station: BY10
Station: BY15 Gotland Deep
Station: BY20 Fårö Deep
2020-11-15
2020-11-16
Depth (m)
Chl-a (µg/l)
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Chlorophyll a
CTD Fluorescence (nominally µg/l)
Current year´s Chl-a data (0-20 m)
Monthly Chl-a averages 0-20 m (2001-2015)
Monthly Chl-a averages +/- standard dev.




**Om klorofylldiagrammen**

Klorofyll *a* är ett mått på mängden växtplankton. Prover tas från ett antal djup. Data presenteras både från de fasta djupen och som medelvärden 0-20 m. Utöver resultaten från laboratorieanalyserna av vattenprover mäts klorofyll *a* som fluorescens från ett automatiskt instrument som sänks ned från fartyget. På så sätt kan djupt liggande, ibland tunna lager av växtplankton observeras.

**About the chlorophyll graphs**

Chlorophyll *a* is sampled from several depths. Data are presented both from the discrete depths and as an average 0-20 m. In addition to the laboratory analysis from the water samples chlorophyll fluorescence is measured in continuous depth profiles from the ship. This is a way to observe thin layers of phytoplankton occuring below the surface.

## Om AlgAware

SMHI genomför månatliga expeditioner i Östersjön och Västerhavet. Resultat baserade på semikvantitativ mikroskopanalys av planktonprover samt klorofyllmätningar presenteras kortfattat i denna rapport. Information från SMHIs satellitövervakning av algblomningar finns under perioden juni-augusti på www.smhi.se. Resultat från provtagningarna kan hämtas från SMHI:s databas på sharkweb.smhi.se. Hydrografidata läggs ut varje månad, växtplanktondata läggs ut en gång per år.

## About AlgAware

SMHI carries out monthly cruises in the Baltic and the Kattegat/Skagerrak. Results from semi quantitative microscopic analysis of phytoplankton samples as well as chlorophyll measurements are presented in brief in this report. Information from SMHIs satellite monitoring of algal blooms is found on www.smhi.se during the period June-August. Results from the expeditions are found in the SMHI database, sharkweb.smhi.se. Data are published monthly, phytoplankton data however, are published once a year.

| Art / Species | Gift / Toxin | Eventuella symptom | Clinical symptoms |
|---|---|---|---|
| *Alexandrium* spp. | Paralytic shellfish poisoning (PSP) | **Milda symptom:** Inom 30 min.: Stickningar eller en känsla av bedövning runt läpparna, som sprids gradvis till ansiktet och nacken; stickningar i fingertoppar och tår; Huvudvärk; yrsel, illamående, kräkningar, diarré **Extrema symptom:** Muskelförlamning; andningssvårigheter; känsla av att kvävas; Man kan vara död inom 2-24 timmar efter att ha fått i sig giftet, på grund av att andningsmuskulaturen förlamas. | **Mild case:** Within 30 min: tingling sensation or numbness around lips, gradually spreading to face and neck; prickly sensation in fingertips and toes; headake, dizziness, nausea, vomiting, diarrhoea. **Extreme case** Muscular paralysis; pronounced respiratory difficulty; choking sensation; death trough respiratory paralysis may occur within 2-24 hours after ingestion. |
| *Dinophysis* spp. | Diarrehetic shellfish poisoning (DSP) | **Milda symptom:** Efter cirka 30 minuter till några timmar: yrsel, illamående, kräkningar, diarré, magont **Extrema symptom:** Upprepad exponering kan orsaka cancer | **Mild case:** Within 30 min-a few hours: dizziness, nausea, vomiting, diarrhoea, abdominal pain. **Extreme case:** Repeated exposure may cause cancer. |
| *Pseudo- niztschia* spp. | Amnesic shellfish poisoning (ASP) | **Milda symptom:** Efter 3-5 timmar: yrsel, illamående, kräkningar, diarré, magkramper **Extrema symptom:** Yrsel, hallucinationer, förvirring, förlust av korttidsminnet, kramper | **Mild case:** Within 3-5 hours: dizziness, nausea, vomiting, diarrhoea, abdominal cramps. **Extreme case:** dizziness, hallucinations, confusion, loss of memory, cramps. |
| *Chaetoceros concavicornis/ C.convolutus* | Mechanical damage through hooks on setae | **Låg celltäthet:** Ingen påverkan. **Hög celltäthet:** Fiskens gälar skadas, fisken dör. | **Low cell numbers:** No effect on fish. **High cell numbers:** Fish death due to gill damage. |
| *Pseudochattonella* spp. | Fish toxin | **Låg celltäthet:** Ingen påverkan. **Hög celltäthet:** Fiskens gälar skadas, fisken dör. | **Low cell numbers:** No effect on fish. **High cell numbers:** Fish death due to gill damage. |

Oversikt över några potentiellt skadliga alger och det aktuella giftets effekt. Overview of potentially harmful algae and effects of toxins. Manual on harmful marine microalgae (2003 - UNESCO Publishing).

Kartan på framsidan visar viktat medelvärde för klorofyll *a,* µg/l (0-10 m) vid de olika stationerna. Pil upp eller ned indikerar om resultatet är över eller under en standardavvikelse från medel. Medel är beräknat utifrån aktuell månad under perioden 2001-2015. Förekomst av skadliga alger vid stationer där arter analyseras markeras med symbol.

The map on the front page shows weighted mean of chlorophyll *a*, µg/l (0-10 m) at sampling stations. The arrow up or down indicate whether the result is above or below one standard deviation from mean. The mean value is calculated using results from the actual month during the period 2001-2015. Presence of harmful algae at stations where species analysis is performed is shown with a symbol.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