SMHI
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AlgAware
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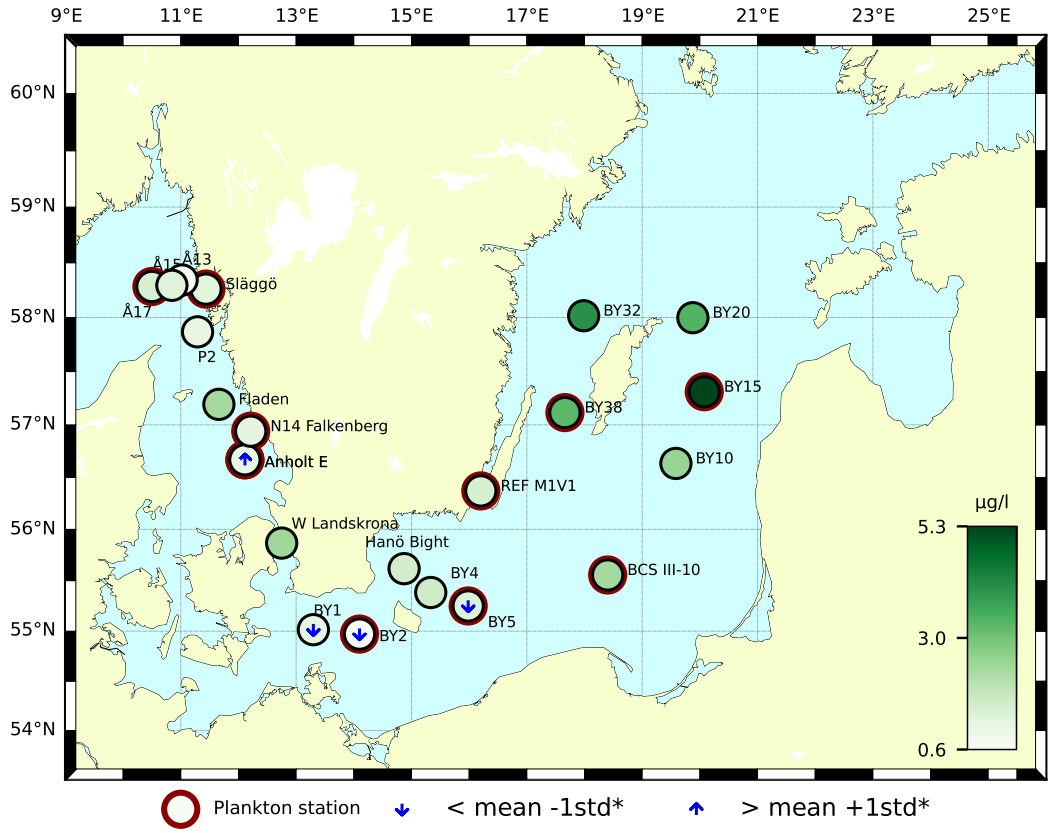
ALGAL SITUATION IN
MARINE WATERS SURROUNDING SWEDEN

Sammanfattning

I Skagerrak var både de totala cellantalen och biodiversiteten låga på Å17 medan diversiteten var högre på Släggö. På Släggö återfanns den toxinbildande dinoflagellaten *Dinophysis norvegica** i rätt höga cellantal. I Kattegatt, vid första provtagningstillfället på Anholt E, var vattnet stratifierat ner till 10 m, det djupet växtplankton tas på. Detta resulterade i höga cellantal. Vid andra provtagningstillfället hade vattnet blandats om och ett mer normalt växtplanktonsamhälle visade sig. N14 hade låga cellantal och diversitet. De integrerade klorofyllhalterna var normala på samtliga stationer, förutom vid det första provtagningstillfället på Anholt E, då de var högre än normalt.

Bland Östersjöstationerna var vårblomningen i slutskedet. Några typiska vårblomningsarter fanns fortfarande, såsom *Skeletonema marinoi* och *Peridiniella catenata*, men det var även mycket ”efter-blomningsarter” såsom Gymnodiniales och *Dinobryon* sp. BCSIII-10 var den enda stationen med den filamentösa cyanobakterien *Aphanizomenon flosaquae* och på samtliga övriga stationer återfanns den toxinbildande *Dinophysis acuminata**. De integrerade klorofyllhalterna var normala på samtliga stationer och visade på att vårblomningen var i sitt slutskede.



Abstract

In the Skagerrak, both cell abundance and diversity were low at Å17, the diversity was however higher at Släggö. At Släggö the toxin producing dinoflagellate *Dinophysis norvegica** was present in quite high cell numbers. In Kattegat, at the first sampling occasion at Anholt E the water was stratified down to 10 m, the depth at which phytoplankton are sampled. This resulted in high cell numbers. At the second sampling occasion the water column had been mixed, resulting in a more normal phytoplankton community. N14 had low cell abundance and diversity. The integrated chlorophyll concentrations were normal at all stations, except at the first sampling occasion at Anholt E, where they were higher than normal.

Among the Baltic stations the spring bloom was coming to an end. Some typical spring bloom species were still present though, such as *Skeletonema marinoi* and *Peridiniella catenate*. There were also a lot of “post spring bloom species” such as Gymnodiniales and *Dinobryon* sp. BCSIII-10 was the only station where the filamentous cyanobacteria *Aphanizomenon flosaquae* was present and at all other stations the toxin producing *Dinophysis acuminata** was found. The integrated chlorophyll concentrations were normal at all stations indicating the end of the spring bloom.

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

The Skagerrak

Å17 (open Skagerrak) **20th of April**
Both the phytoplankton diversity and abundance were low. There were some Gymnodiniales, *Emiliania huxleyi*, *Pyramimonas* spp., Ciliates and flagellates but in low cell numbers. A few larger dinoflagellates, such as *Protoperidinium* cf. *breve*, *Scrippsiella*-group, and *Tripos longipes*, were present. The integrated (0-20 m) and (0-10 m) chlorophyll concentrations were within the normal range for this month.

Släggö (Skagerrak coast) 20th of April
This station had the highest diversity among the West coast stations, yet the abundance was low. Many different diatoms were in quite high cell numbers, such as *Chaetoceros danicus*, *Dactyliosolen fragilissimus* and *Guinardia delicatula*, while *Chaetoceros debilis* and *Guinardia flaccida* were in low numbers. Among the dinoflagellates only the toxin producing *Dinophysis norvegica** was found in quite high numbers. Among the smaller cells *Pyramimonas* spp., Cryptomonadales and flagellates were numerous. The integrated (0-20 m) and (0-10 m) chlorophyll concentrations were within the normal range for this month.

The Kattegat

Anholt E 21st of April
On the first sampling occasion at Anholt E *C. danicus* was quite numerous. There were also some *Heterocapsa rotundata*, *Ollicola vangoorii* as well as ciliates and the smaller *Pyramimonas* spp., Cryptomonadales, *Telonema* sp. and flagellates. The water column between 0-10 m, where phytoplankton are collected, were very homogenous (Fig 1). The integrated (0-20 m) and (0-10 m) chlorophyll concentrations were higher than normal for this month.

Anholt E 26th of April
The species diversity and total cell numbers were lower on the second sampling occasion. The phytoplankton community contained mainly ciliates and the smaller *Pyramimonas* spp., Cryptomonadales, *Telonema* sp. and flagellates. Some *C. danicus* and *H. rotundata* were still present. At the second sampling occasion at Anholt E, the water column was thoroughly mixed, and all phytoplankton cells had been mixed down into the water mass. The integrated (0-20 m) and (0-10 m) chlorophyll concentrations were low but within the normal range for this month.

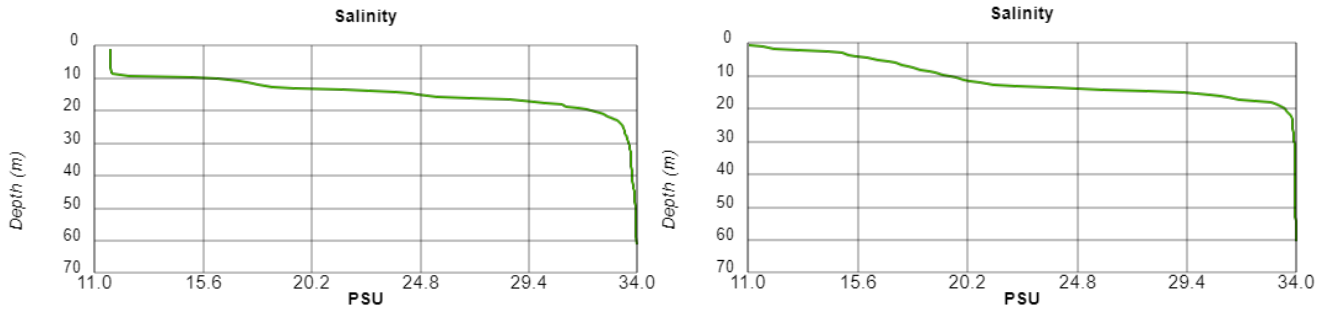


Fig 1. Salinity measured with CTD onboard the R/V Svea, at Anholt E 21st of April (left) and 26th of April (right).

N14 Falkenberg 26th of April
Both the phytoplankton diversity and abundance were low. The phytoplankton community existed mainly of *C. danicus*, ciliates and the smaller *Pyramimonas* spp., Cryptomonadales, *Telonema* sp. and flagellates. There were some larger dinoflagellates present, such as *D. norvegica** and *Protoperidinium conicum*. The integrated (0-20 m) and (0-10 m) chlorophyll concentrations were within the normal range for this month.

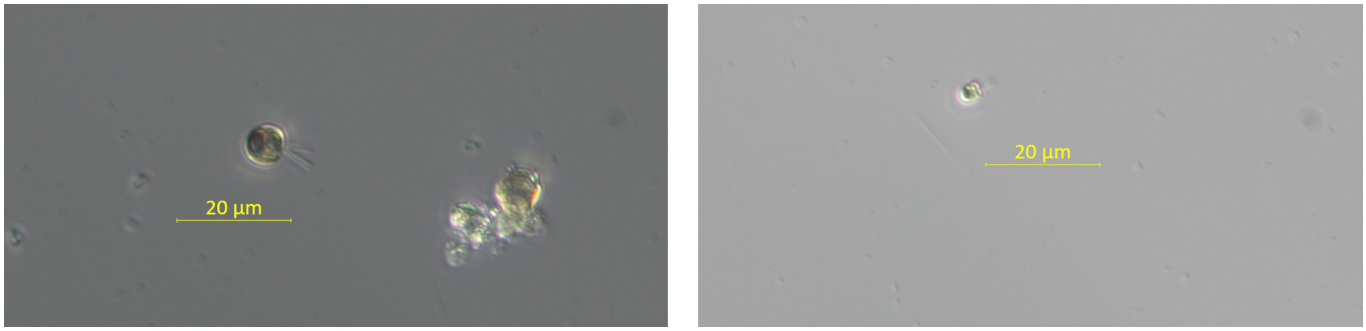


Fig. 2. Pyramimonas is a genus with cells in various sizes. Photo: M. Karlberg.

The Baltic

BCSIII-10 22nd of April
Phytoplankton diversity was high and cell numbers was moderate. Last month´s spring bloom was coming to an end, but there were still some spring phytoplankton species present, such as *Skeletonema marinoi*, *Chaetoceros wighamii* and *Peridiniella catenata*. Post spring bloom species were also present, such as *Dinobryon* sp. Cryptomonadales, flagellates and ciliates. Various colony-forming cyanobacteria were present as well as filaments of *Aphanizomenon flosaquae*. The integrated (0-20 m) and (0-10 m) chlorophyll concentrations were within the normal range for this month.

BY2 22nd of April
Both phytoplankton diversity and abundance were moderate. Gymnodiniales, *H. rotundata*, *P. catenata*, *Dinobryon* sp., Cryptomonadales, flagellates and ciliates were quite numerous. *Dinophysis acuminata** was present in small numbers. Both the integrated (0-20 m) and (0-10 m) chlorophyll concentrations were lower than normal for this month.

BY5 22nd of April
Both phytoplankton diversity and abundance were moderate. Gymnodiniales, *H. rotundata*, *P. catenata*, *Dinobryon* sp., Cryptomonadales, flagellates and ciliates were quite numerous. *D. acuminata** was present in small numbers. Both the integrated (0-20 m) and (0-10 m) chlorophyll concentrations were lower than normal for this month.

BY15 23rd of April
Both phytoplankton diversity and abundance were moderate. *P. catenata* and flagellates were present in high cell numbers, while Gymnodiniales, *H. rotundata*, *Dinobryon* sp., Cryptomonadales and ciliates were quite numerous. *D. acuminata** was present in low numbers. The integrated (0-20 m) and (0-10 m) chlorophyll concentrations were within normal for this month.

BY38 24th of April

The phytoplankton diversity was low but cell abundance was quite high, especially for Gymnodiniales, *P. catenata* and *Dinobryon* sp. There were also some *H. rotundata*, Cryptomonadales, ciliates and flagellates. *D. acuminata** was present in low cell numbers. The integrated (0-20 m) and (0-10 m) chlorophyll concentrations were within normal for this month.

REFM1V1 25th of April

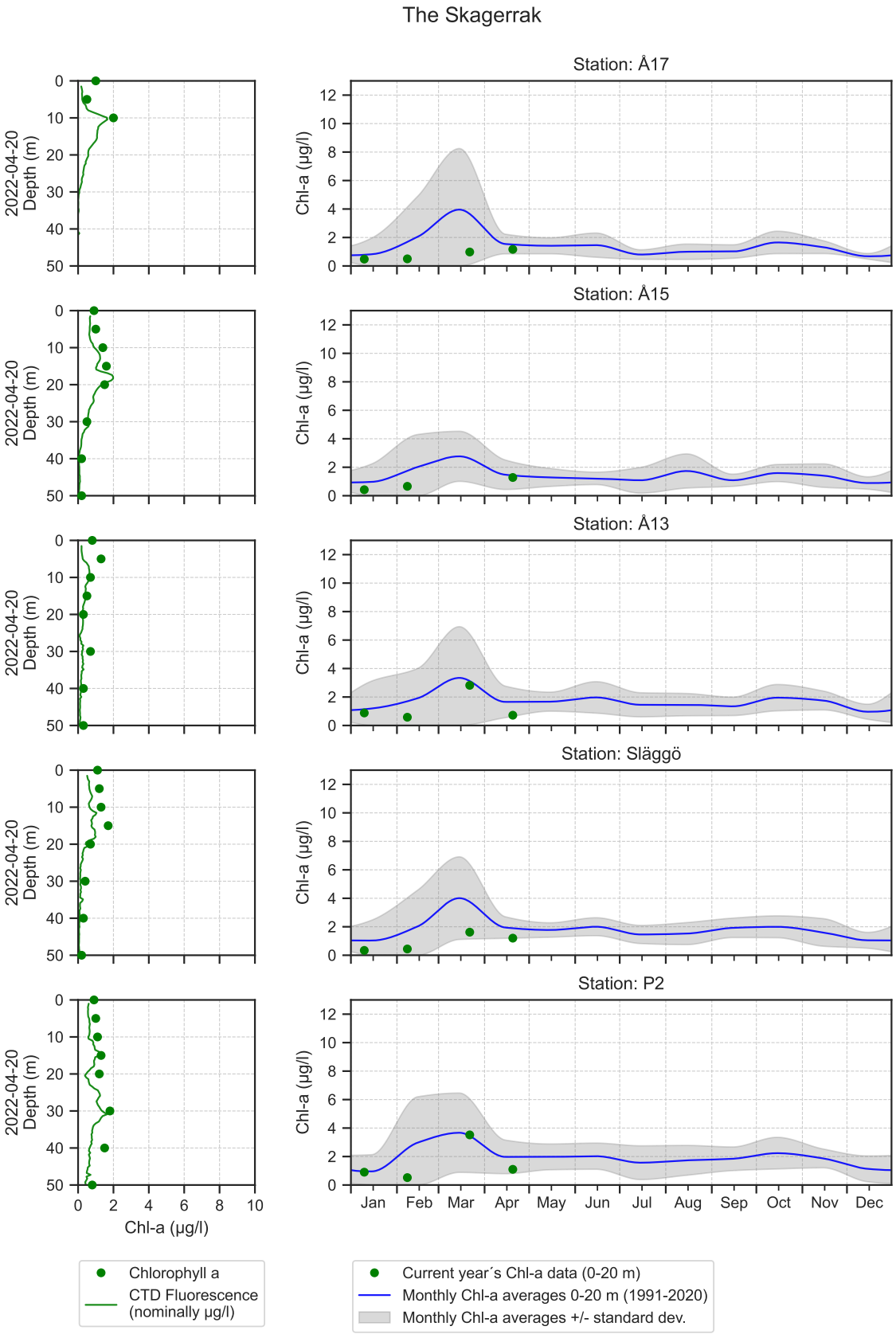
Both phytoplankton diversity and abundance were quite high. Last month´s spring bloom was coming to an end, but was not completely over. *S. marinoi* was still found in cell counts and Gymnodiniales, *H. rotundata*, *P. catenata*, Cryptomonadales and *Dinobryon* sp. were quite numerous. *D. acuminata** was present in low numbers. The integrated (0-20 m) and (0-10 m) chlorophyll concentrations were within normal for this month.

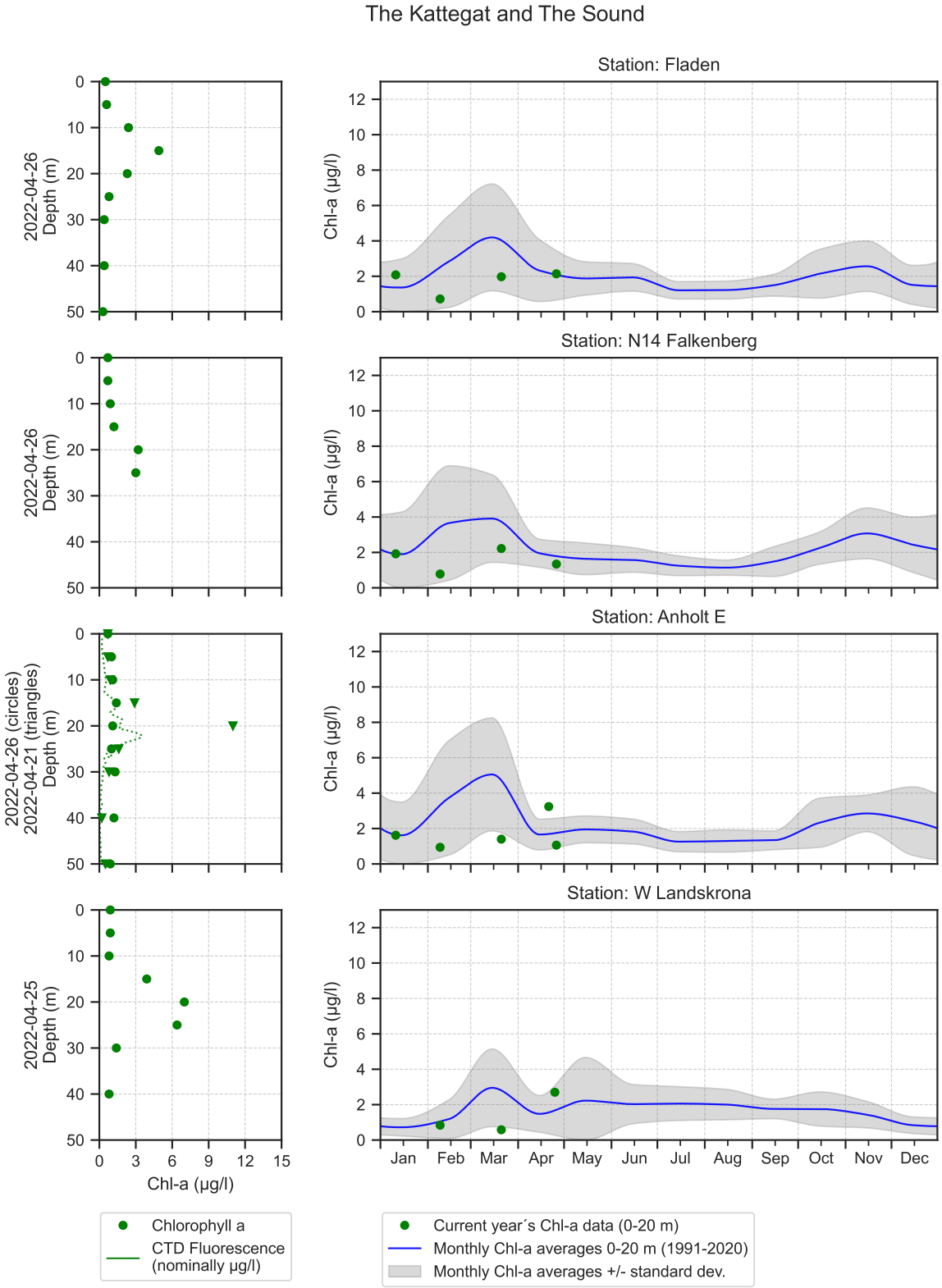
Fig. 3. *Peridiniella catenata* was present in quite high cell numbers at all Baltic stations, but considering the bloom is coming to an end the cells start to look a bit scruffy. Photo: M. Karlberg.

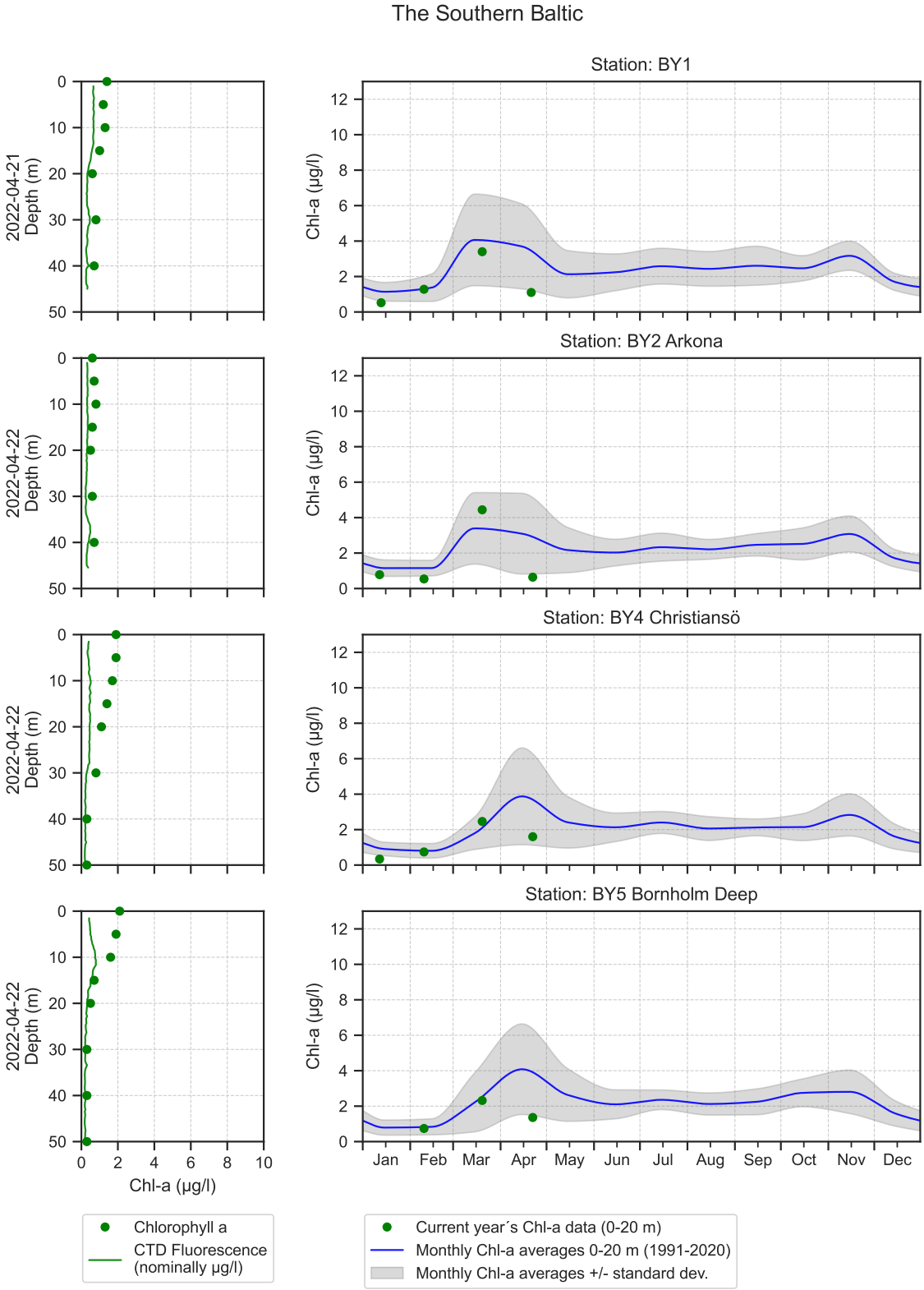
Phytoplankton analysis and text:
Maria Karlberg.

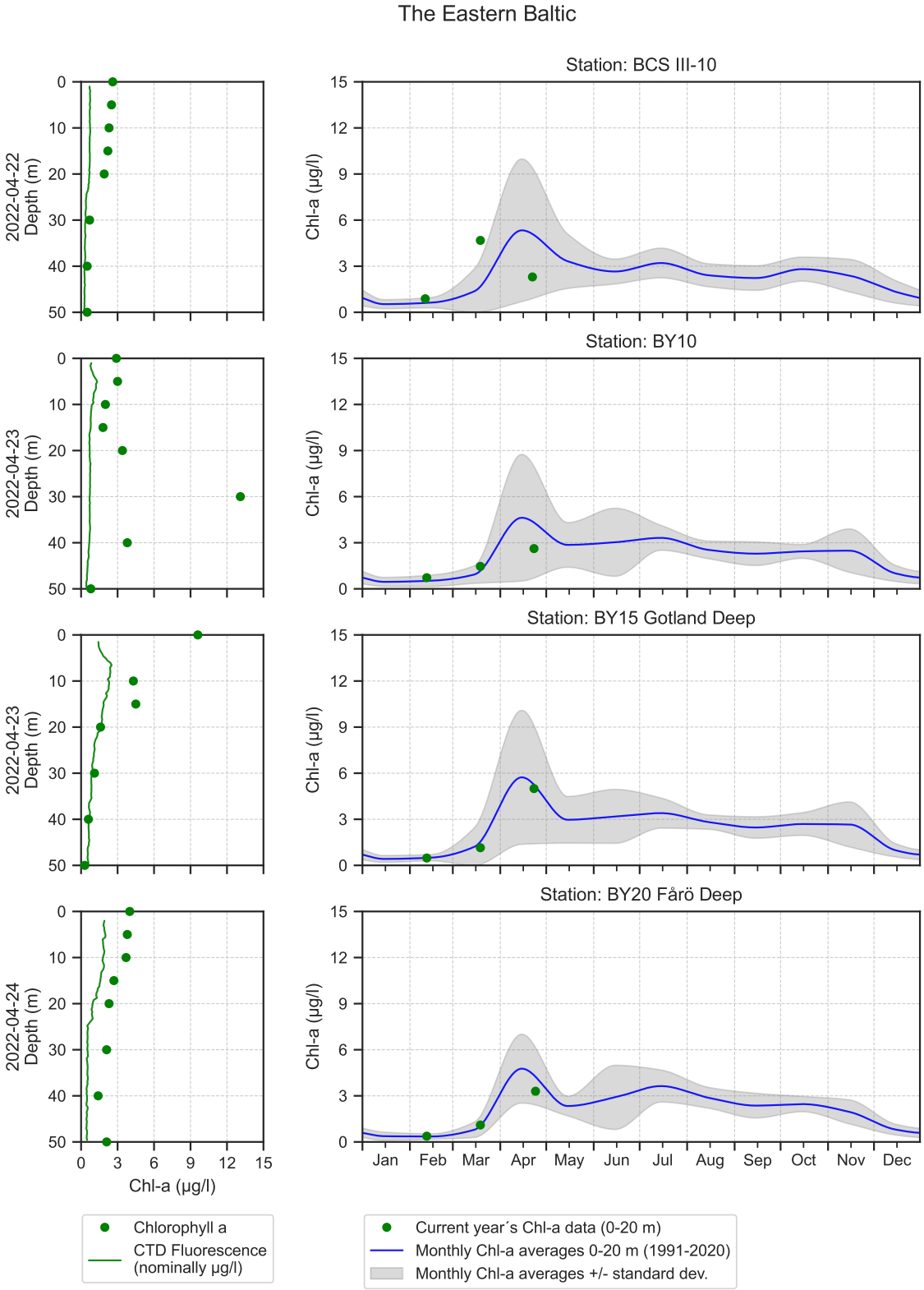
Selection of observed species	Anholt E	Anholt E	N14	Släggö	Å17
Red=potentially toxic species	21/4	26/4	26/4	22/4	20/4
Hose 0-10 m	presence	presence	presence	presence	presence
Chaetoceros danicus	very common	present	common	common	
Chaetoceros debilis				present	
Dactyliosolen fragilissimus	present			common	
Guinardia delicatula				common	
Guinardia flaccida				present	
Licmophora	present				
Proboscia alata				present	
Skeletonema marinoi		present	present	present	
Dinophysis norvegica		present	present	common	
Gymnodiniales	present	present	present	present	common
Heterocapsa rotundata	common	common	common	present	
Heterocapsa triquetra					present
Peridiniales					present
Protoperidinium cf. breve					present
Protoperidinium conicum			present		
Protoperidinium pallidum				present	
Scrippsiella GRP					present
Tripos lineatus				present	
Tripos longipes					present
Tripos muelleri		present		present	
Dinobryon	present				
Ollicola vangoorii	common		present	present	
Emiliania huxleyi					common
Oocystis	present	present	present	present	
Binuclearia lauterbornii		present			
Pyramimonas	common	common	common	common	common
Cryptomonadales	common	common	present	common	present
Telonema	common	common	common		
Pseudopedinella	present			present	present
Merismopedia	present				
Choanoflagellatea	present	present		present	
Ebria tripartita			present	common	
Ciliophora	common	common	common	common	common
Laboea strobila	present				
Flagellates	common	common	common	common	common

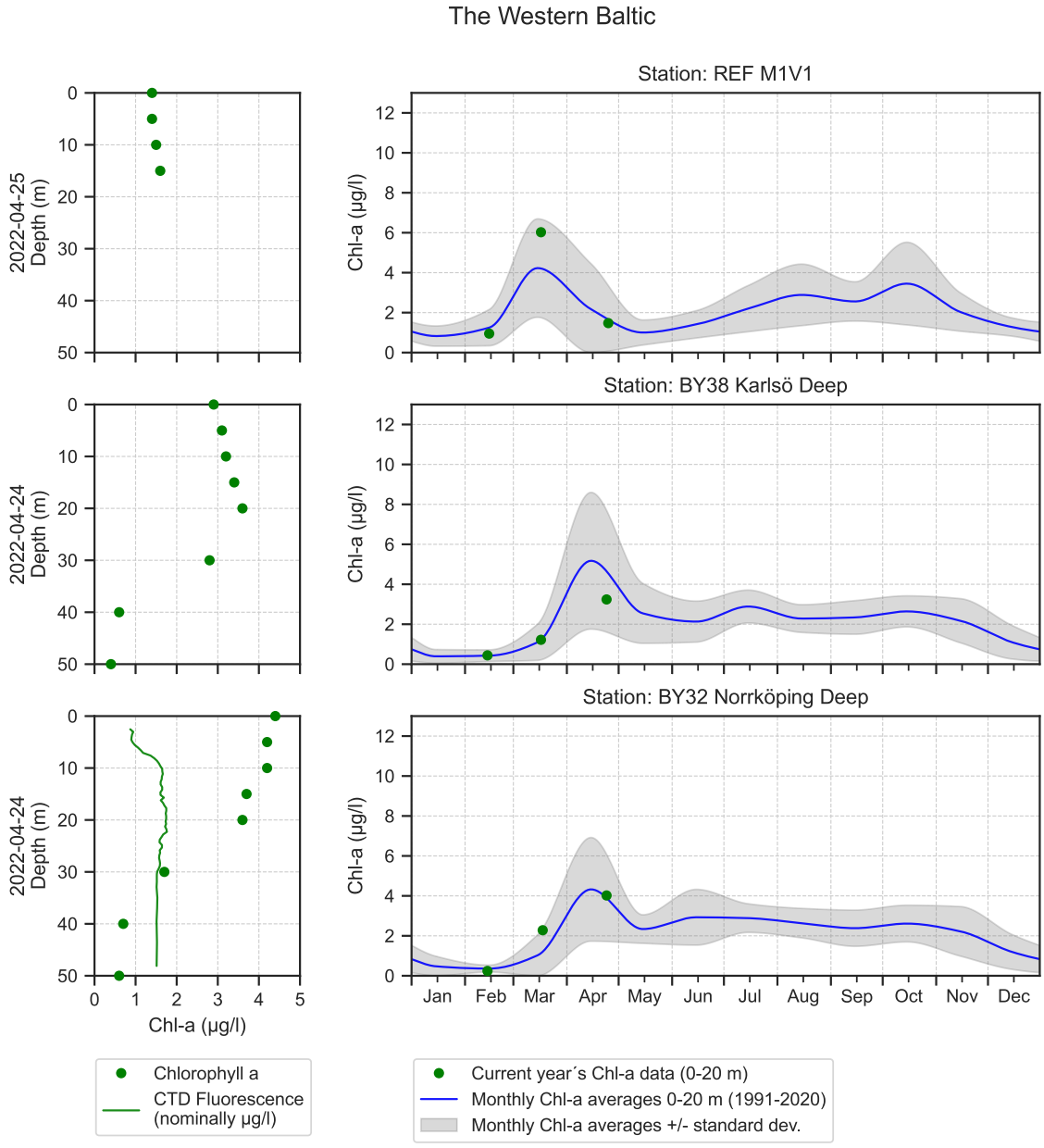
Selection of observed species	BCSIII-10	BY2	BY5	BY15	BY38	REFM1V1
Red=potentially toxic species	22/4	22/4	22/4	23/4	24/4	25/4
Hose 0-10 m	presence	presence	presence	presence	presence	presence
Attheya longicornis	present		present	present		
Centrales	present	present	present			
Chaetoceros	present		present			present
Chaetoceros wighamii	present					
Cylindrotheca closterium	present					
Melosira arctica						present
Nitzschia longissima		present				
Pennales					present	
Skeletonema marinoi	common	present	present	present		very common
Thalassiosira			present	present		
Amphidinium crassum	present				present	
Amphidinium longum					present	
Amylax triacantha	present	present	present		present	
Dinophysis acuminata		present	present	present	present	present
Gymnodiniales	common	common	common	common	very common	common
Gyrodinium spirale	present	present	present	present	present	present
Heterocapsa rotundata	common	common	common		common	common
Heterocapsa triquetra		present				present
Katodinium glaucum	present	present	present	common	present	present
Peridiniales	present	present	present			present
Peridiniella catenata	common	common	common	very common	very common	common
Peridiniella danica		present		present	present	present
Protoperidinium bipes		present	present		present	present
Dinobryon	common	common	common	common	very common	common
Monoraphidium					present	
Oocystis			present			
Binuclearia lauterbornii		present	present	present		
Pyramimonas	present					
Cryptomonadales	common	common	common	common	common	common
Telonema				present		present
Eutreptiella		present				present
Aphanizomenon flosaquae	present					
Aphanocapsa	present	present		present		
Aphanothece	present		present	common	present	
Pseudanabaena						present
Snowella	present		present	present	present	
Choanoflagellatea				present		
Ebria tripartita	present	present		present		present
Ciliophora	common	common	common	common	common	common
Mesodinium rubrum	present	present	present	common	present	present
Flagellates	common	common	common	very common	common	common


The Skagerrak
Station: Å17
Station: Å15
Station: Å13
Station: Släggö
Station: P2
2022-04-20
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 (1991-2020)
Monthly Chl-a averages +/- standard dev.


The Kattegat and The Sound
Station: Fladen
Station: N14 Falkenberg
Station: Anholt E
Station: W Landskrona
2022-04-26
Depth (m)
2022-04-26 (circles)
2022-04-21 (triangles)
2022-04-25
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 (1991-2020)
Monthly Chl-a averages +/- standard dev.


The Southern Baltic
Station: BY1
Station: BY2 Arkona
Station: BY4 Christiansö
Station: BY5 Bornholm Deep
2022-04-21
2022-04-22
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 (1991-2020)
Monthly Chl-a averages +/- standard dev.


The Eastern Baltic
Station: BCS III-10
Station: BY10
Station: BY15 Gotland Deep
Station: BY20 Fårö Deep
2022-04-22
2022-04-23
2022-04-23
2022-04-24
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 (1991-2020)
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.

Översikt 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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