SMHI
Oceanographic Unit
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AlgAware
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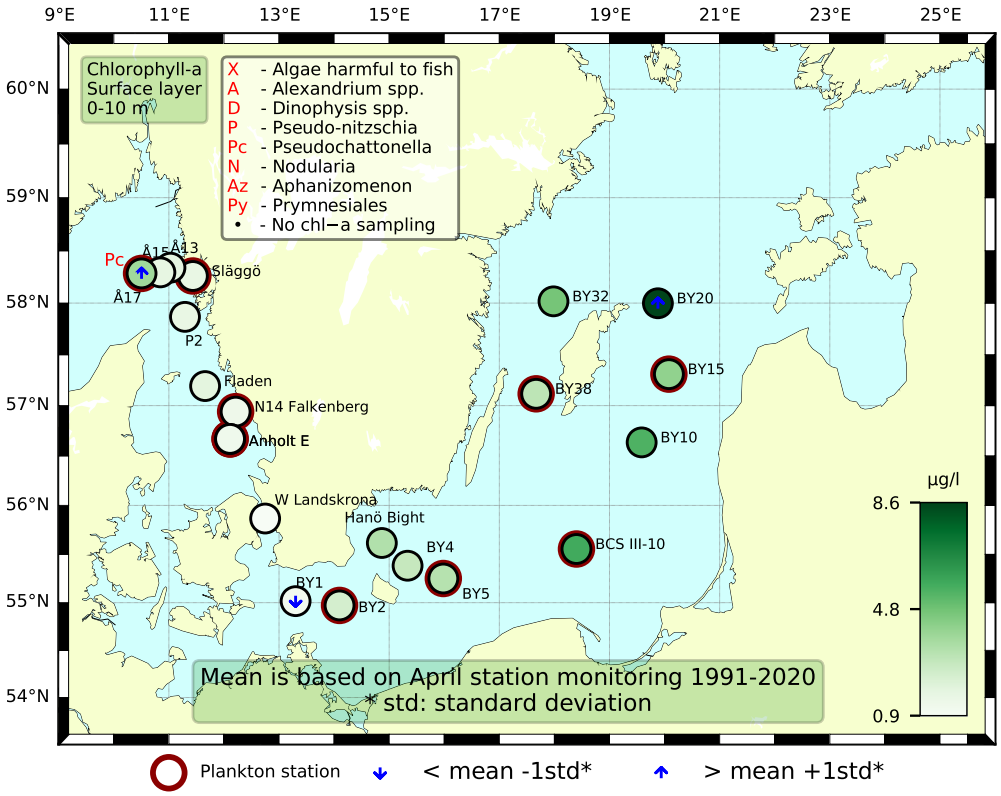
ALGAL SITUATION IN
MARINE WATERS SURROUNDING SWEDEN

Sammanfattning

Vid Å17 i yttre Skagerrak var växtplanktondiversiteten hög med den för fisk potentiellt skadliga flagellaten *Pseudochattonella**, kiselalgen *Guinardia delicatula* och cryptomonadales som de mest talrika organismerna. Vid Släggö var diversiteten mycket låg med högst cellantal av cryptomonadales och ciliater. *G. delicatula* fanns i högst cellantal av kiselalgerna och *Tripos muelleri* av dinoflagellaterna. I Kattegatt var växtplanktondiversiteten högre vid N14 Falkenberg än vid Anholt E, men *G. delicatula* hade höga cellantal vid båda stationer. Den potentiellt giftiga dinoflagellaten *Dinophysis norvegica** fanns i förhöjda cellantal vid N14 Falkenberg. De integrerade klorofyllhalterna (0–10 m och 0–20 m) var över det normala för månaden vid Å17, i övrigt inom det normala.

Diversiteten och cellantalen av växtplankton var höga vid alla stationer i Östersjön och vid toppen av vårblomningen, förutom vid BY5. Vid BY5 var mängden av kiselalger generellt låg men det fanns gott om dinoflagellaterna *Peridiniella catenata* och Gymnodiniales. Vid de andra stationerna dominerade *Skeletonema marinoi* mer eller mindre tillsammans med *Chaetoceros wighamii*, flera andra *Chaetoceros*-arter samt andra släkten. Toxinproducerande arter var få till antalet i Östersjön. De integrerade klorofyllhalterna (0–10 m och 0–20 m) var normala för månaden vid alla stationer.



Abstract

At Å17 in open Skagerrak, the phytoplankton diversity was high with the potentially fish toxic genus *Pseudochattonella**, the diatom *Guinardia delicatula* and cryptomonadales as the most numerous organisms. At Släggö, the diversity was very low and cryptomonadales and ciliates was found with the highest cell numbers. *G. delicatula* was the most common diatom and *Tripos muelleri* the most common dinoflagellate. In the Kattegat the phytoplankton diversity was higher at N14 Falkenberg than at Anholt E, but *G. delicatula* was numerous at both stations. The potentially toxic dinoflagellate *Dinophysis norvegica** was found in elevated cell numbers at N14 Falkenberg. The integrated chlorophyll concentrations (0-10m and 0-20 m) were above normal for this month at Å17, and within normal at all other stations.

Diversity and cell abundance of phytoplankton were high at all stations in the Baltic Sea and at the peak of the spring bloom, except at BY5. At BY5, the amount of diatoms were overall low but there were plenty of the dinoflagellates *Peridiniella catenata* and Gymnodiniales. At the other stations *Skeletonema marinoi* was more or less dominating, along with *Chaetoceros wighamii*, several other species of *Chaetoceros* and other genera. Toxin producing species were in low numbers in the Baltic Sea. The integrated chlorophyll concentrations (0-10m and 0-20 m) were normal for the month at all stations.

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 April

The phytoplankton diversity was the highest of the Skagerrak and Kattegat stations. The potential fish killing algae, *Pseudochattonella**, was abundant as was the diatom *Guinardia delicatula* and cryptomonadales. Other phytoplankton were found in low amounts. The integrated chlorophyll concentrations (0-10 and 0-20 m) were above normal for this month.

Släggö (Skagerrak coast) 12th of April

The phytoplankton diversity was very low, both in number of species and total cell numbers. *Guinardia delicatula* was the most numerous diatom and *Tripos muelleri* the most common dinoflagellate. Cryptomonadales and ciliates were found in rather high cell counts. The integrated chlorophyll concentrations (0-10 and 0-20 m) were normal for this month.

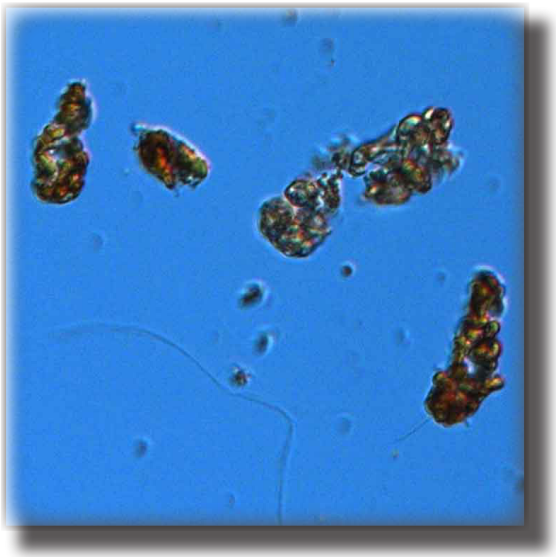


Fig 1. The potentially fish killing flagellate *Pseudochattonella**, was abundant at Å17. Photo: A. Skjevik.

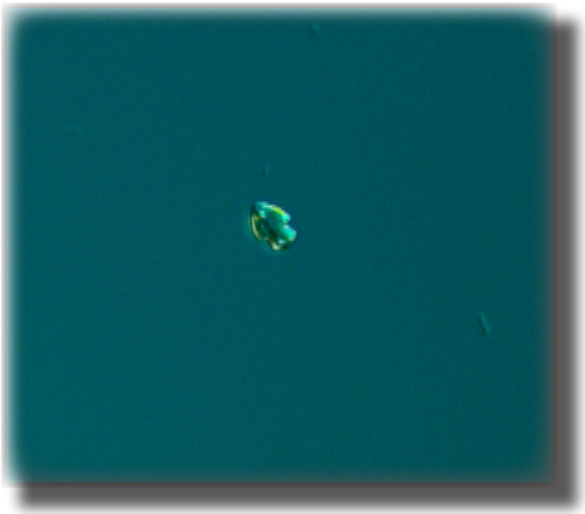


Fig 2. The small dinoflagellate *Heterocapsa rotundata* was found in high cell numbers at N14. Photo: A.Skjevik

The Kattegat

Anholt E 13th and 17th of April

The number of species were low at both visits, but with rather high cell numbers of the diatom *Guinardia delicatula*. The dinoflagellate *Heterocapsa rotundata* was numerous. The integrated chlorophyll concentrations (0-10 and 0-20 m) were normal for this month.

N14 Falkenberg 13th of March

The species diversity was higher at N14 compared to Anholt E. The same diatom however, *G. delicatula,* dominated in the sample, although in lower amounts than at Anholt E. The potentially toxic dinoflagellate *Dinophysis norvegica** was found in elevated cell numbers. The integrated chlorophyll concentrations (0-10 and 0-20 m) were normal for this month.

The Baltic
Station REF M1V1, which was situated in the Kalmar sund is no longer part of the sampling program and has been replaced by BY39, south of Öland. the station will be added to the front page map.

BY5 Bornholm deep 14th of April
The phytoplankton diversity was moderate while abundances were quite high. Within the diatoms there were low cell numbers and diversity with just a few cells of *Chaetoceros danicus*, *C. wighamii*, *Skeletonema marinoi* and *Thalassiosira* cf. *baltica*. Among the dinoflagellates Gymnodiniales and *Peridiniella catenata* were in high cell numbers and there were some cells of *Dinophysis acuminata**. There were some colony-forming cyanobacteria genera present as well as various ciliates. Among other phytoplankton there were mainly Cryptomonadales and *Dinobryon* sp. present. The integrated (0-20 m and 0-10 m) chlorophyll concentrations were within the normal range for this month.

BCSIII-10 14th of April
The phytoplankton diversity and abundances were high. The diatoms were dominated by *S. marinoi*, but there were also plenty of *C. wighamii* and several other species of *Chaetoceros* and other genera. Among the dinoflagellates Gymnodiniales were the most abundant and both *D. acuminata** and *D. norvegica** were found in low counts. Among the colony-forming cyanobacteria, *Snowella* sp. was quite common and *Aphanizomenon* sp. was also found. Various ciliates were present. Among other phytoplankton there were some *Dinobryon* sp., Cryptomonadales and *Eutreptiella* sp. The integrated (0-20 m and 0-10 m) chlorophyll concentrations were within the normal range for this month.

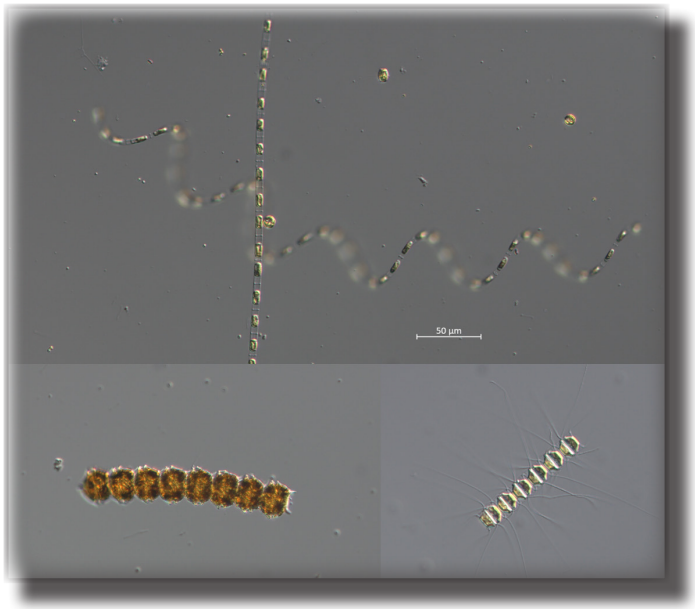


Fig 2. Spring bloom species of the Baltic Sea. *Skeletonema marinoi* (top, in two forms: straight and coiled) more or less dominated at all stations, except at BY5 were *Peridiniella catenata* (lower left) were numerous. *Chaetoceros wighamii* (lower right) was present at all stations in various amounts. Photos: M. Karlberg.

BY2 Arkona 14th of April
The phytoplankton diversity and abundances were high. Within the diatoms there were plenty of *S. marinoi*, but also several *Chaetoceros*-species and other genera. Among the dinoflagellates there were mainly some Gymnodiniales, but also several genera present. There were some colony-forming cyanobacteria genera present, as well as *Aphanizomenon* sp. Various ciliates were quite numerous. Other phytoplankton were in low numbers. The integrated (0-20 m and 0-10 m) chlorophyll concentrations were within the normal range for this month.

BY15 Gotland deep 15th of April

The phytoplankton diversity and abundances were high. The diatoms were dominated by *S. marinoi*, but *C. wighamii* and *Thalassiosira* cf. *minima* were also numerous. Several other *Chaetoceros*-species and other genera were present. The dinoflagellates were in low numbers and *D. acuminata** was present. There were some colony-forming cyanobacteria genera present as well as various ciliates. Other phytoplankton were in low numbers. The integrated (0-20 m and 0-10 m) chlorophyll concentrations were within the normal range for this month.

BY38 16th of April

The phytoplankton diversity and abundances were high. Within the diatoms there were plenty of *S. marinoi*, but also *T.* cf. *baltica*, *C. wighamii* and several other *Chaetoceros*-species as well as other genera. Among the dinoflagellates there were mainly some Gymnodiniales and *Protoperidinium bipes* present, but also *D. acuminata** and other genera. There were some colony-forming cyanobacteria genera present, as well as *Aphanizomenon* sp. Various ciliates were quite numerous. Among other phytoplankton there were mainly Cryptomonadales. The integrated (0-20 m and 0-10 m) chlorophyll concentrations were within the normal range for this month.

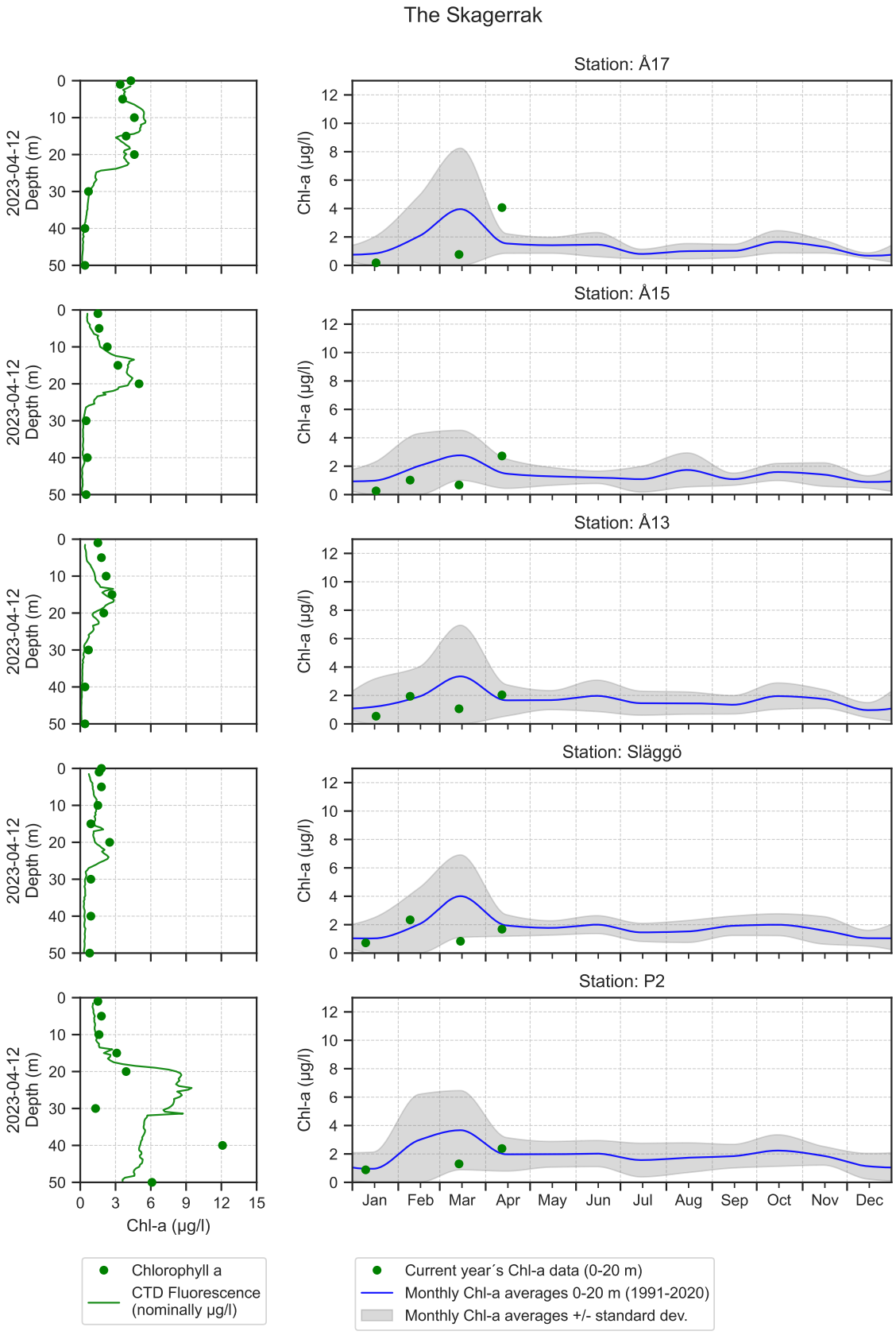
BY39 16th of April

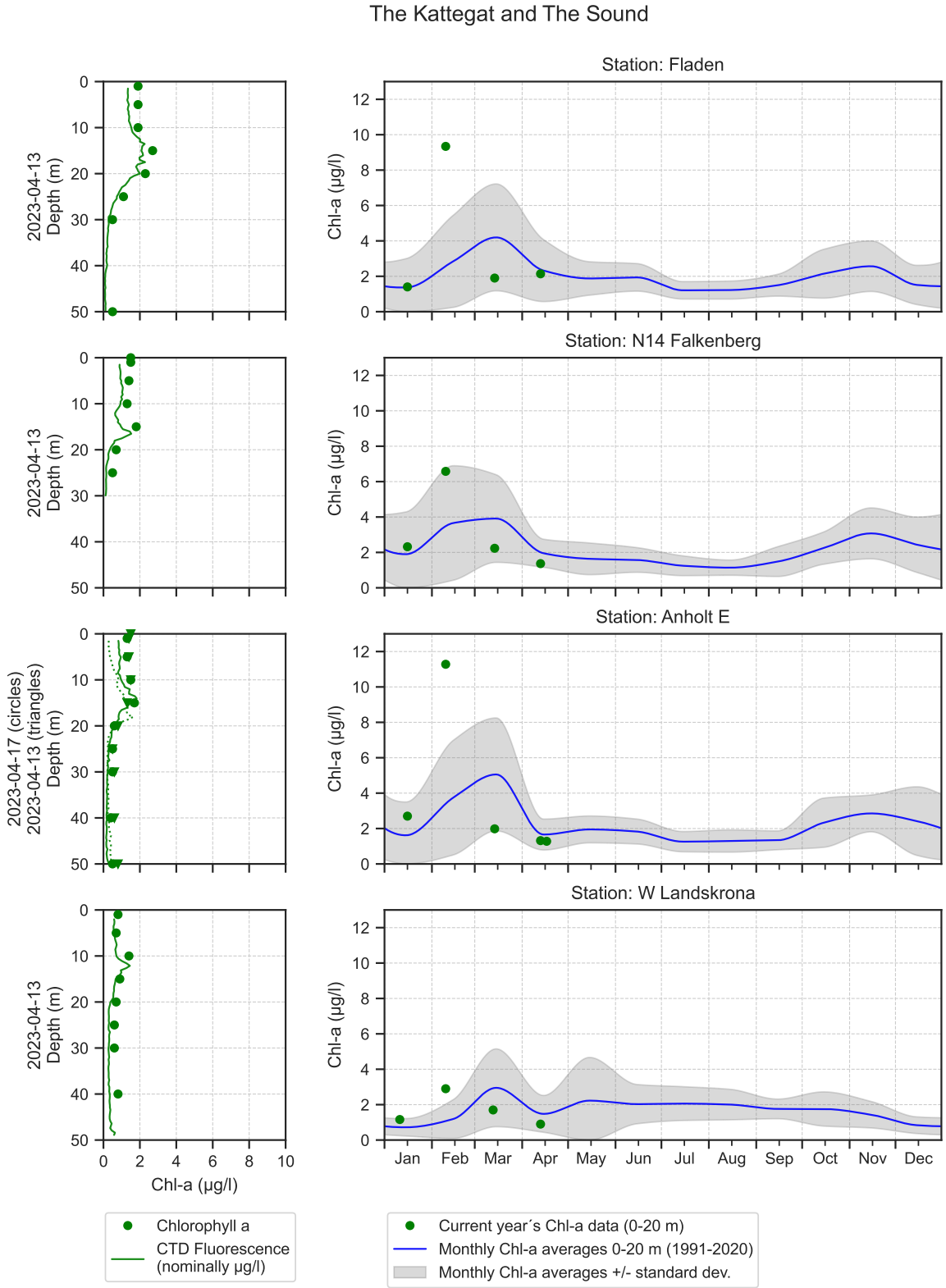
The phytoplankton diversity and abundances were high. Within the diatoms there were plenty of *S. marinoi*, but also *C. wighamii* and several other *Chaetoceros*-species as well as other genera. Among the dinoflagellates Gymnodiniales, *Heterocapsa rotundata* and *P. catenata* were common, and *D. acuminata** was present. There were a few colony-forming cyanobacteria genera present, while various ciliates, *M. rubrum* and other phytoplankton were present in low numbers.

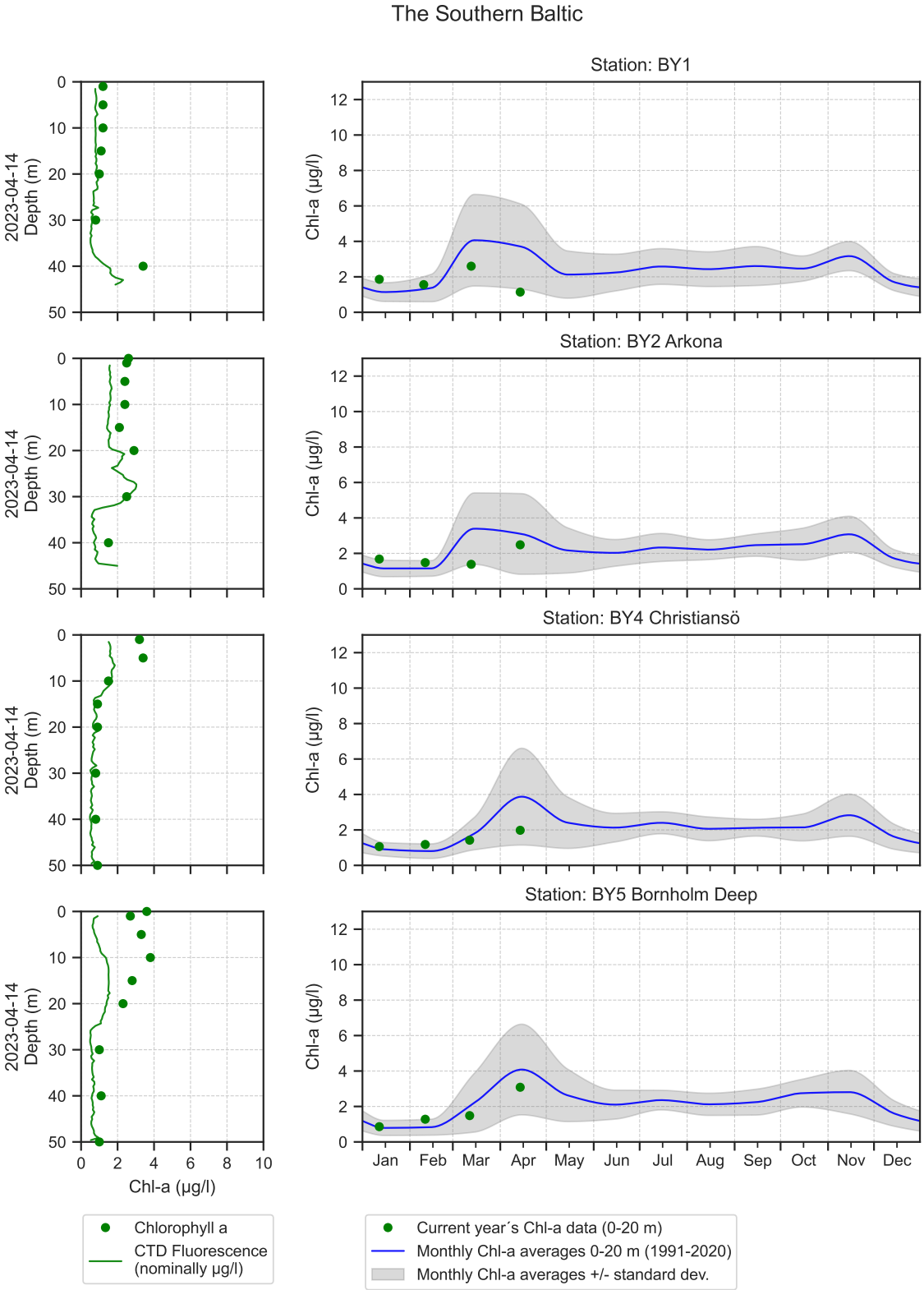
Phytoplankton analysis and text:
Ann-Turi Skjevik and Maria Karlberg.

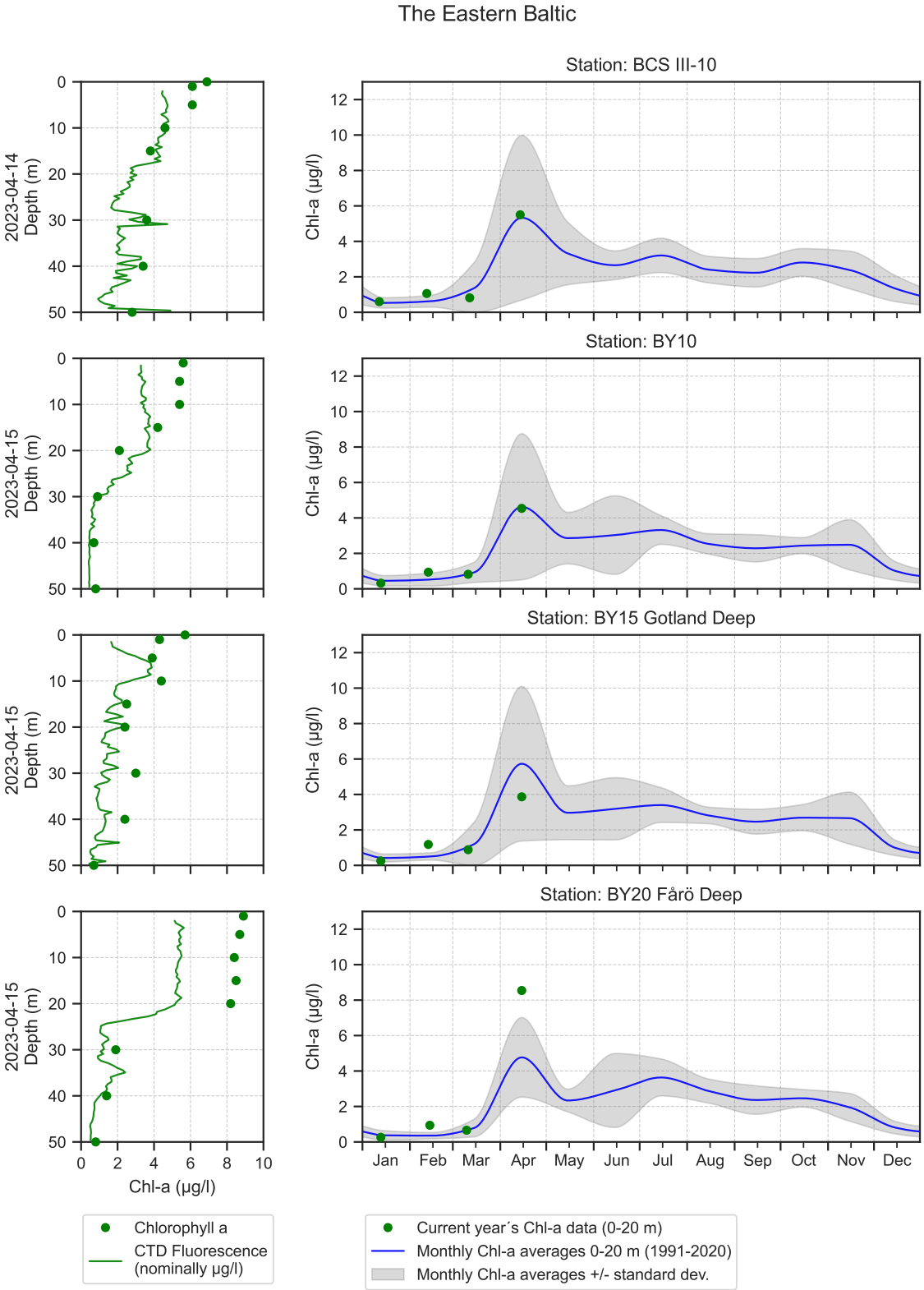
Selection of observed species	Anholt E	Anholt E	N14	Släggö	Å17
Red=potentially toxic species	13/4	17/4	13/4	12/4	12/4
Hose 0-10 m	presence	presence	presence	presence	presence
Chaetoceros subtilis	present	present			
Cylindrotheca closterium		present	present		present
Dactyliosolen fragilissimus			present		
Guinardia delicatula	very common	very common	common	common	common
Guinardia flaccida	present		present		present
Leptocylindrus danicus					present
Leptocylindrus minimus	present	present			present
Proboscia alata	present				
Pseudo-nitzschia					present
Rhizosolenia hebetata f. semispina	present	present	present		present
Skeletonema marinoi		present	present		
Amphidinium sphenoides					present
Azadinium					present
Dinophysis acuminata	present			present	
Dinophysis norvegica	present	present	common	present	present
Gymnodiniales	present	present	present	common	present
Heterocapsa	present	present	present		
Heterocapsa rotundata	common	common	common	common	present
Karlodinium veneficum	present				
Katodinium glaucum		present	present		
Peridiniales		present			present
Protoperidinium			present		present
Protoperidinium bipes					present
Protoperidinium pellucidum	present				
Torodinium robustum		present			
Tripos lineatus					present
Tripos longipes	present		present	present	present
Tripos muelleri	present	common	present	common	present
Octactis speculum				present	
Pseudochattonella					common
Pseudopedinella	present	present			
Eutreptiella					present
Pyramimonas				present	present
Emiliania huxleyi	present	present	present		present
Prymnesiales			present		
Cryptomonadales	present	common	present	common	common
Leucocryptos marina		present			present
Telonema			present		present
Telonema subtile		present			
Quadricoccus euryhalinicus		present			
Commation					present
Calliacantha longicaudata					present
Calliacantha natans		present	present		
Choanoflagellatea		present	present		present
Ebria tripartita	present				
Paulinella ovalis			present		
Laboea strobila		present	present	present	
Mesodinium rubrum	present	present		present	
Strombidium	present	present			present
Ciliophora	present	common	common	common	present

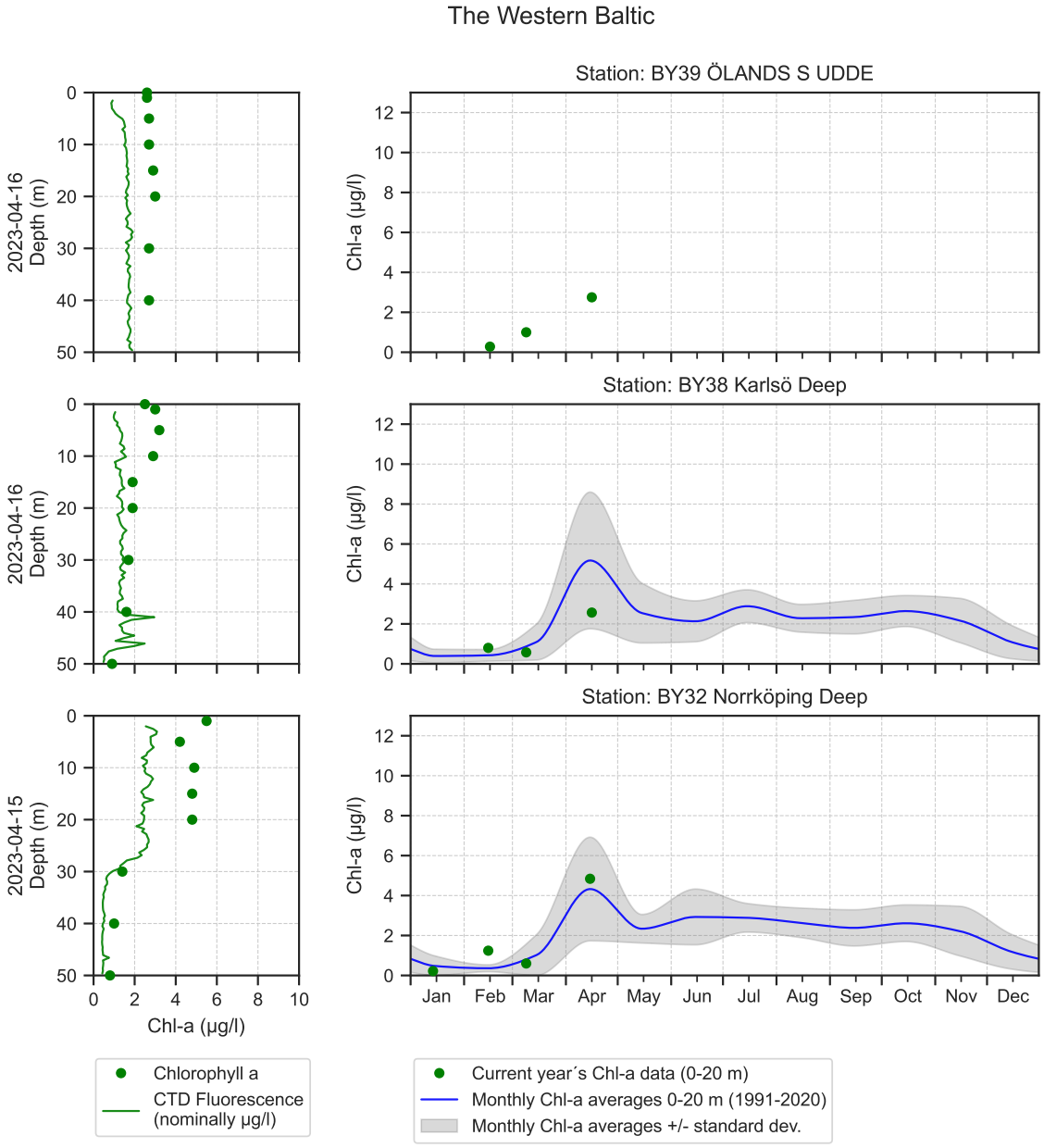
Selection of observed species	BY5	BCSIII-10	BY2	BY15	BY38	BY39
Red=potentially toxic species	12/4	14/4	14/4	15/4	16/4	16/4
Hose 0-10 m	presence	presence	presence	presence	presence	presence
Attheya longicornis			present	present	present	present
Chaetoceros		present		present	present	present
Chaetoceros castracanei		present	present	present		present
Chaetoceros danicus	present	present	present	present	present	present
Chaetoceros similis				present	present	present
Chaetoceros subtilis			present	present		present
Chaetoceros tenuissimus					present	
Chaetoceros wighamii	present	common	present	common	common	common
Guinardia delicatula						present
Melosira arctica		present	present	present	present	present
Navicula		present		present		
Nitzschia longissima					present	present
Pauliella taeniata		present		present		
Skeletonema marinoi	present	dominant	very common	dominant	very common	very common
Thalassiosira cf. baltica	present				common	present
Thalassiosira cf. minima		present		common	present	present
Amphidinium sphenoides			present		present	
Amylax triacantha		present				
Dinophysis acuminata	present	present		present	present	present
Dinophysis norvegica		present				
Gymnodiniales	very common	common	common	present	common	common
Heterocapsa rotundata	present	present	present	present	present	common
Katodinium glaucum	present	present	present	present	present	present
Peridiniales		present	present	present	present	
Peridiniella catenata	very common	present	present		present	common
Peridiniella danica		present		present		
Protoperidinium bipes					common	present
Protoperidinium cf. granii						present
Dinobryon	common	present				
Dinobryon faculiferum			present			present
Monoraphidium						present
Oocystis	present	present	present	present	present	present
Binuclearia lauterbornii	present			present	present	present
Pyramimonas	present		present	present	present	
Cryptomonadales	common	present	present	present	common	present
Telonema					present	present
Eutreptiella	present	present	present	present	present	present
Aphanizomenon		present	present		present	
Aphanocapsa	present	present	present	present	present	present
Aphanothece cf. paralleliformis			present	present		
Lemmermanniella	present	present	present	present	present	present
Snowella	present	common	present	present	present	present


The Skagerrak
Station: Å17
Station: Å15
Station: Å13
Station: Släggö
Station: P2
2023-04-12
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
2023-04-13
Depth (m)
2023-04-17 (circles)
2023-04-13 (triangles)
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
2023-04-14
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 (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
2023-04-14
2023-04-15
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.

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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