SMHI
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AlgAware
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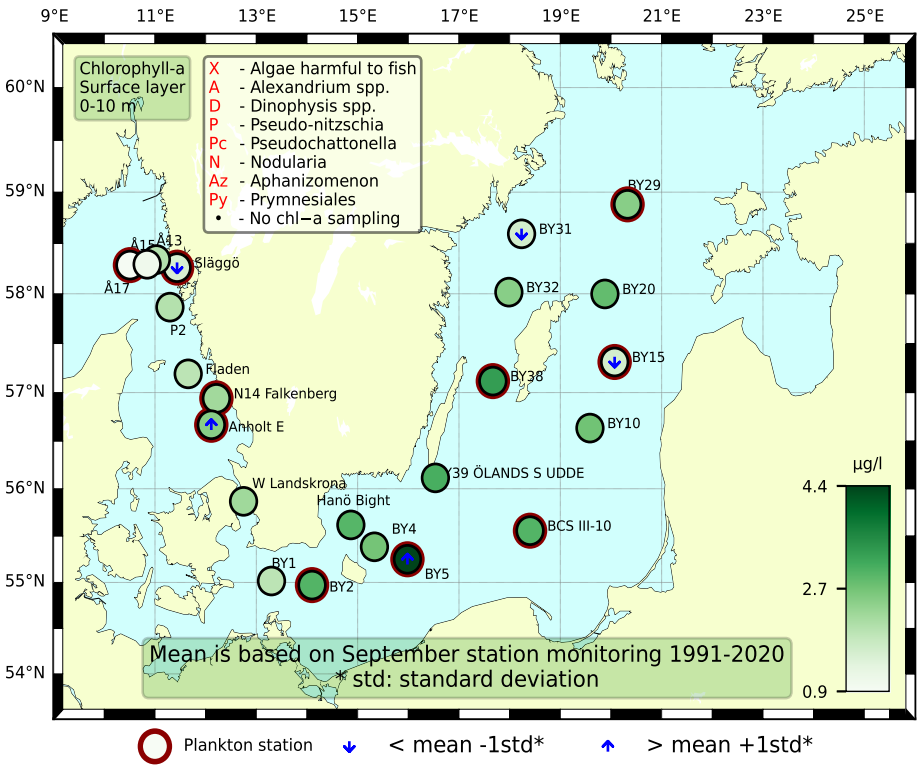
ALGAL SITUATION IN
MARINE WATERS SURROUNDING SWEDEN

Sammanfattning

Hög artdiversitet noterades vid alla fyra stationer i Västerhavet. Det fanns dock en variation i mängden celler och högst antal fanns i Kattegatt, framför allt vid N14 Falkenberg. Artsammansättningen var relativt lik vid de olika stationerna, det var Å17 som avvek genom att ha ett färre antal dinoflagellater jämfört med de andra stationerna. En dinoflagellat, *Gymnodinium* cf. *litoralis* fanns i moderata till höga cellantal vid samtliga stationer. De potentiellt skadliga dictyochales* fanns i förhöjda cellantal i Kattegatt och vid Släggö i Skagerrak. De integrerade klorofyllkoncentrationerna var något låga i Skagerrak och något höga i Kattegatt för denna månaden.

Mångfalden av arter och det totala cellantalet varierade mellan stationer i Östersjön, med måttliga nivåer på de flesta platser. Kiselalgen *Dactyliosolen fragilissimus* var riklig på flera platser, särskilt dominerande vid BY5, BY38 och BY39. Mindre celler, såsom cryptomonadales och arter från släktet *Pyramimonas*, var ofta närvarande. Toxinproducerande dinoflagellater (*Dinophysis acuminata** och *Phalacroma rotundatum**) och blomningsbildande cyanobakterier (*Aphanizomenon flosaquae* och *Nodularia spumigena**) upptäcktes i några prover. Integrerade klorofyllkoncentrationer var generellt normala för månaden, med vissa avvikelser observerade på specifika djup.



Abstract

High species diversity was found at all of the four stations in the Skagerrak and Kattegat areas. There were however variations in the total cell counts, and the Kattegat stations had the highest abundancies. The species composition was relatively similar at the various stations, Å17 differed by containing fewer dinoflagellates compared to the other stations. The dinoflagellate *Gymnodinium* cf. *litoralis* was found in moderate to high cell numbers at all stations. The potentially harmful group dictyochales* was found with elevated cell numbers in the Kattegat and at Släggö in the Skagerrak. The integrated chlorophyll concentrations were somewhat low in the Skagerrak and somewhat high in the Kattegat for this month.

Species diversity and total cell numbers varied across stations in the Baltic Sea, with moderate levels at most sites. The diatom *Dactyliosolen fragilissimus* was abundant at several locations, particularly dominating at BY5, BY38, and BY39. Smaller cells, such as Cryptomonadales and species from the genus *Pyramimonas*, were commonly present. Toxin-producing dinoflagellates (*Dinophysis acuminata** and *Phalacroma rotundatum**) and bloom-forming cyanobacteria (*Aphanizomenon flosaquae* and *Nodularia spumigena**) were detected in some samples. Integrated chlorophyll concentrations were generally normal for the month, with some deviations observed at specific depths.

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

The Skagerrak

Släggö (Skagerrak coast) 14th of September
The species diversity was relatively high and similar to the Kattegat species compositions. The total cell numbers were however low. The only taxa with moderate cell counts were small organisms like the diatoms *Skeletonema marinoi* and *Nitzschia longissimia*, small flagellates like cryptomonadales and the coccolithophorid *Emiliania huxleyi*. The dinoflagellate *Gymnodinium* cf. *litoralis* was rather numerous. The potentially harmful dinoflagellate *Karenia mikimotoi** was present in very low amounts as were the rather rare dinoflagellate *Pronoctiluca pelagica*. The integrated chlorophyll concentration (0–10m) was lower than normal for this month, the wider integration (0–20m) was low but within one standard deviation.

Å17 (Skagerrak coast) 14th of September
The species diversity was unusually high and differed from the other stations in having a larger part of diatoms in relation to dinoflagellates. As at Släggö, the cell numbers were low, but unlike Släggö the relatively large diatom *Pseudosolenia calcar-avis* was found in moderate cell counts. The dinoflagellate *Gymnodinium* cf. *litoralis* was rather numerous. The integrated chlorophyll concentrations were low but normal for this month.

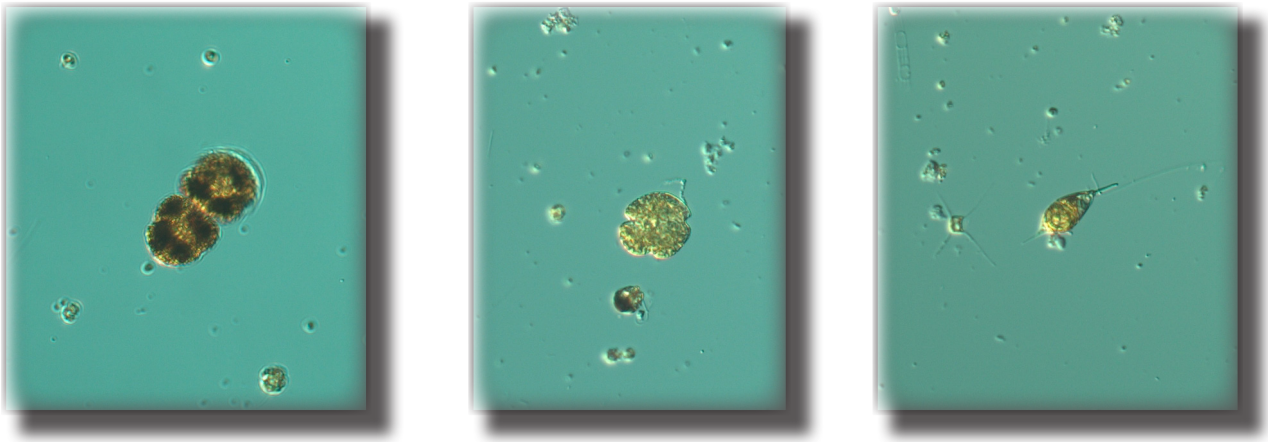


Fig 1. The dinoflagellate *Gymnodinium cf. litoralis* (left) was common in all Kattegat and Skagerrak samples and *Karenia mikimotoi** (middle) and *Pronoctiluca pelagica* (right), also dinoflagellates, were present at Släggö in the Skagerrak. Photos: A-T. Skjevik.

The Kattegat

Anholt E 15th of September
The species diversity was high although the individual cell numbers were moderate. Both diatoms and dinoflagellates were richly represented, as were small flagellated cells and even cells without flagellas, like *Emiliania huxleyi*. The dinoflagellate *Gymnodinium* cf. *litoralis* was numerous. The diversity included size variations, meaning that e.g. diatoms were found in large varieties of shapes and sizes. The integrated chlorophyll concentration (0–10m) was above normal for this month, the wider integration (0–20m) was high but within one standard deviation.

N14 Falkenberg 15th of September
The high species diversity contained similar species as those at Anholt. The cell counts were however higher at N14. The integrated chlorophyll concentrations were normal for this month.

The Baltic

BY2 Arkona 16th of September
The species diversity and total cell numbers were high. The diatom *Dactyliosolen fragilissimus* was abundant in the sample, as well as several species of the genus *Pyramimonas* and order Cryptomonadales. Dinoflagellates were in high diversity and the toxin producing *Dinophysis acuminata** was present. The cyanobacterium *A. flosaquae* was also quite abundant. The integrated chlorophyll concentrations were normal for this month.

BY5 Bornholm deep 16th of September
The species diversity was moderate but the total cell number was high. The diatom *D. fragilissimus* dominated clearly in the sample. The smaller cells were dominated by Cryptomonadales and the toxin producing *D. acuminata** was present. No bloom forming filamentous cyanobacteria were present. The integrated chlorophyll concentrations were above normal for this month.

BCS lll-10 17th of September
The species diversity and total cell number were both moderate. Small cells dominated and among these Cryptomonadales were common. No bloom forming filamentous cyanobacteria were present. The integrated chlorophyll concentrations were normal for this month.

BY15 17th of September
The species diversity and total cell number were both low. Small cells dominated, especially Cryptomonadales, several species within the genus Pyramimonas and various ciliates. No bloom forming filamentous cyanobacteria were present. The integrated (0–10 m) chlorophyll concentration was below normal, while 0–20 m was normal for this month.

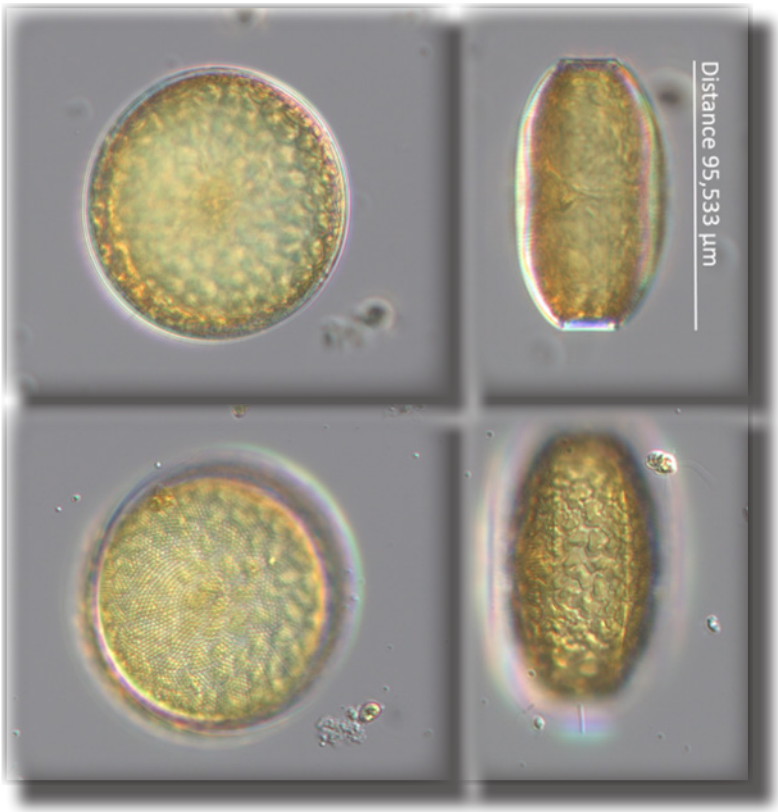


Fig 2. The diatom *Coscinodiscus centralis* needs to lie flat with the valve face up in order to be identified (left). In girdle view (right) it is harder. This cell was photographed first in girdle view, then I knocked it over in order to examine the valve. Photo: M. Karlberg.

BY29 18th of September
The species diversity and total cell number were both moderate. Cryptomonadales were abundant. The toxin producing *Phalacroma rotundatum** was present, and the cyanobacterium *A. flosaquae* was quite abundant. The integrated (0–10 m) chlorophyll concentration was normal for this month.

BY31 Landsort deep 18th of September
The species diversity and total cell number were both moderate. The toxin producing dinoflagellate *D. acuminata** as well as the filamentous cyanobacterium *Nodularia spumigena** were present. The integrated (0–10 m) chlorophyll concentration was below normal.

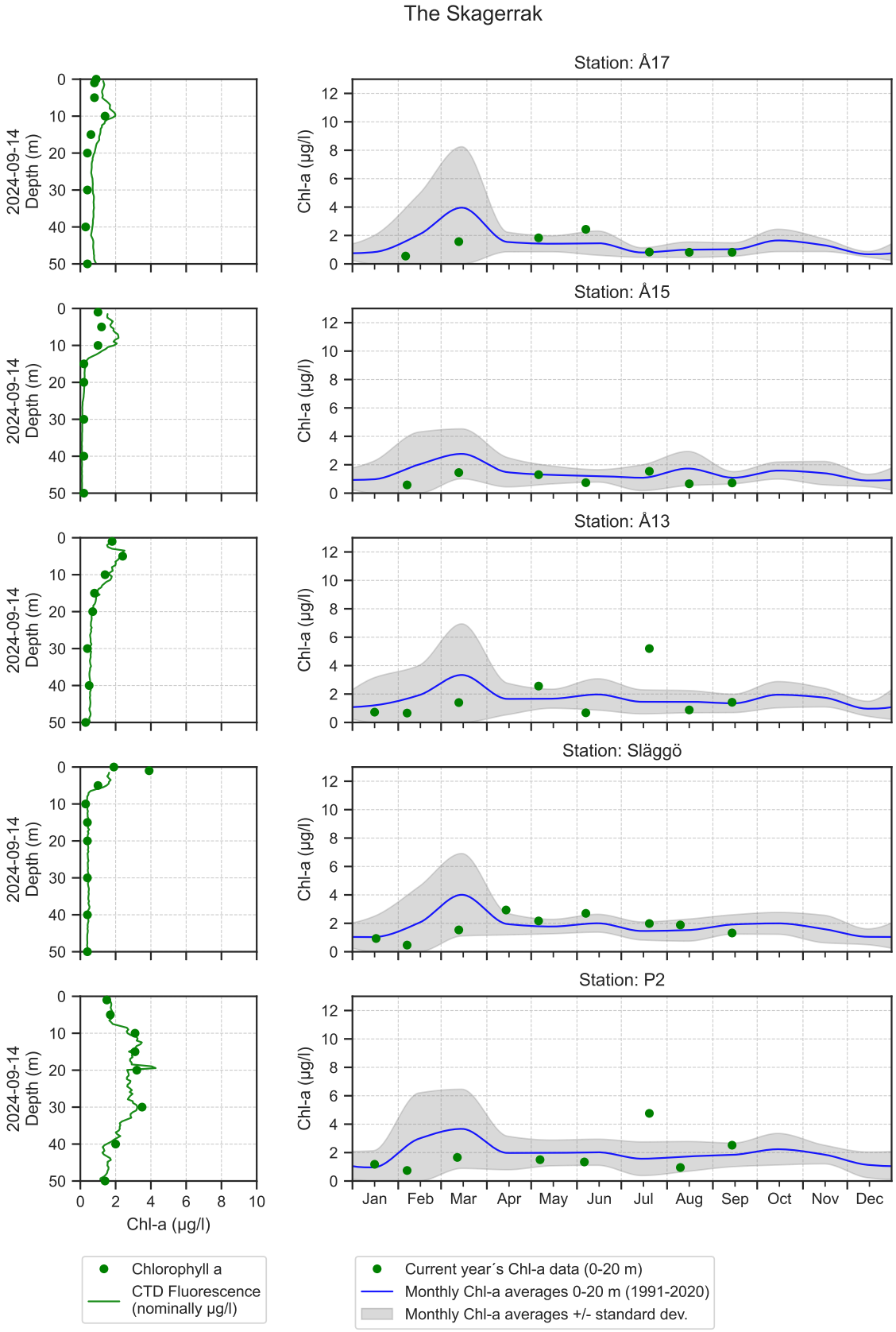
BY38 19th of September
The species diversity and total cell number were both moderate, but the diatom *D. fragilissimus* dominated clearly in the sample. No bloom forming filamentous cyanobacteria were present. The integrated chlorophyll concentrations were normal for this month.

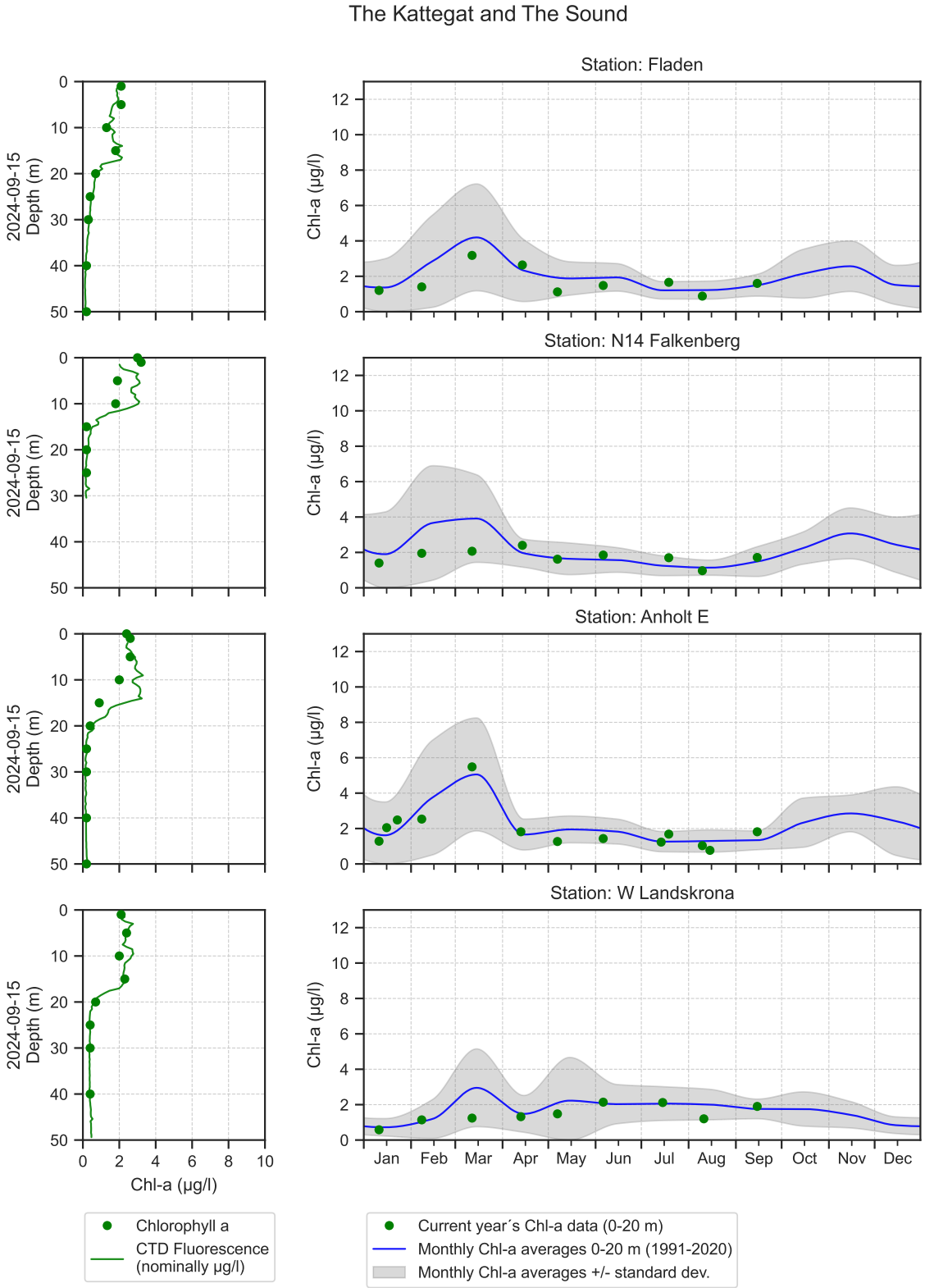
BY39 19th of September
The species diversity and total cell number were both moderate, but the diatom *D. fragilissimus* dominated clearly in the sample. The toxin producing dinoflagellate *D. acuminata** was present, but no bloom forming filamentous cyanobacteria. The integrated chlorophyll concentrations were normal for this month.

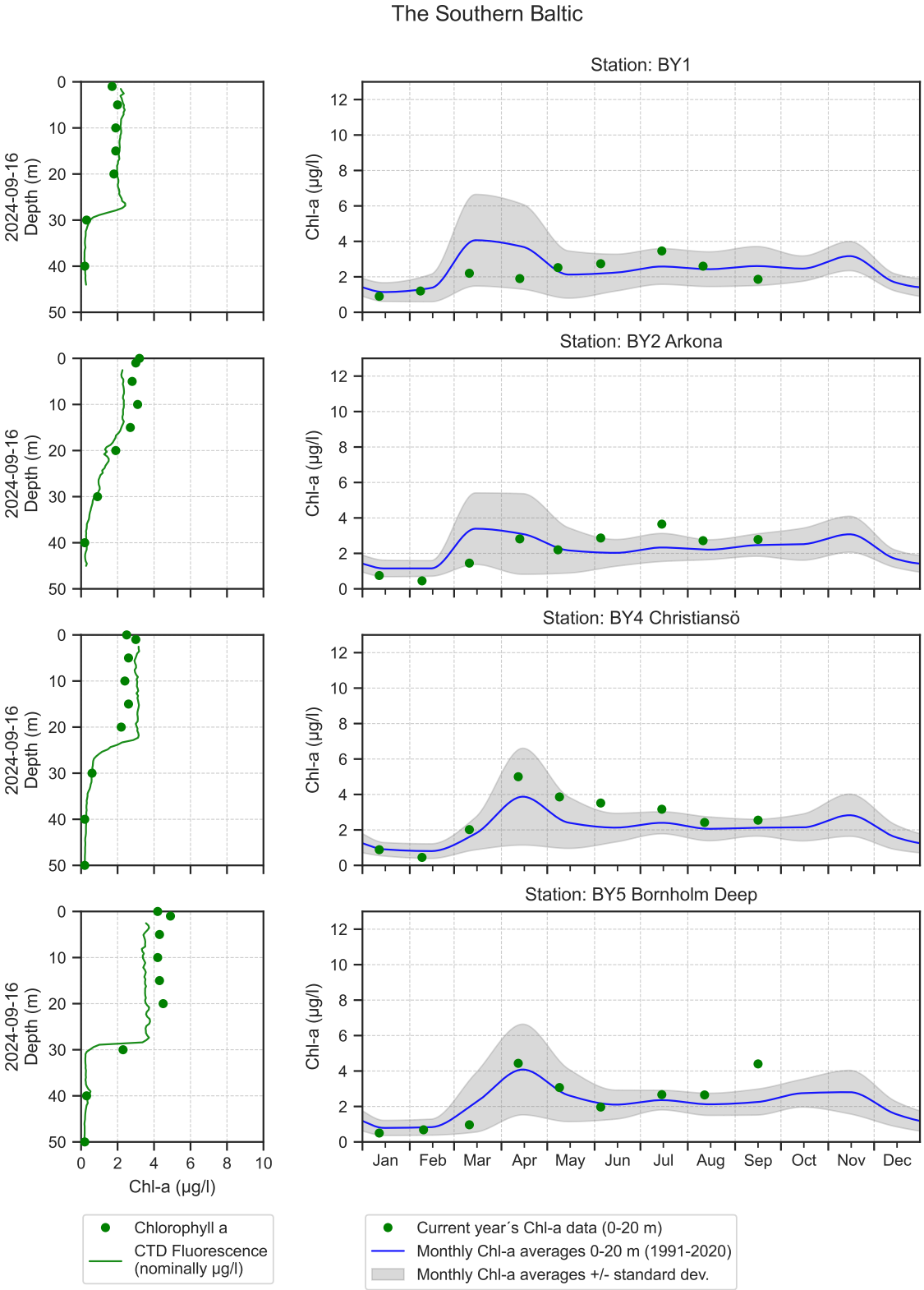
Phytoplankton analysis and text:
Ann-Turi Skjevik and Maria Karlberg.

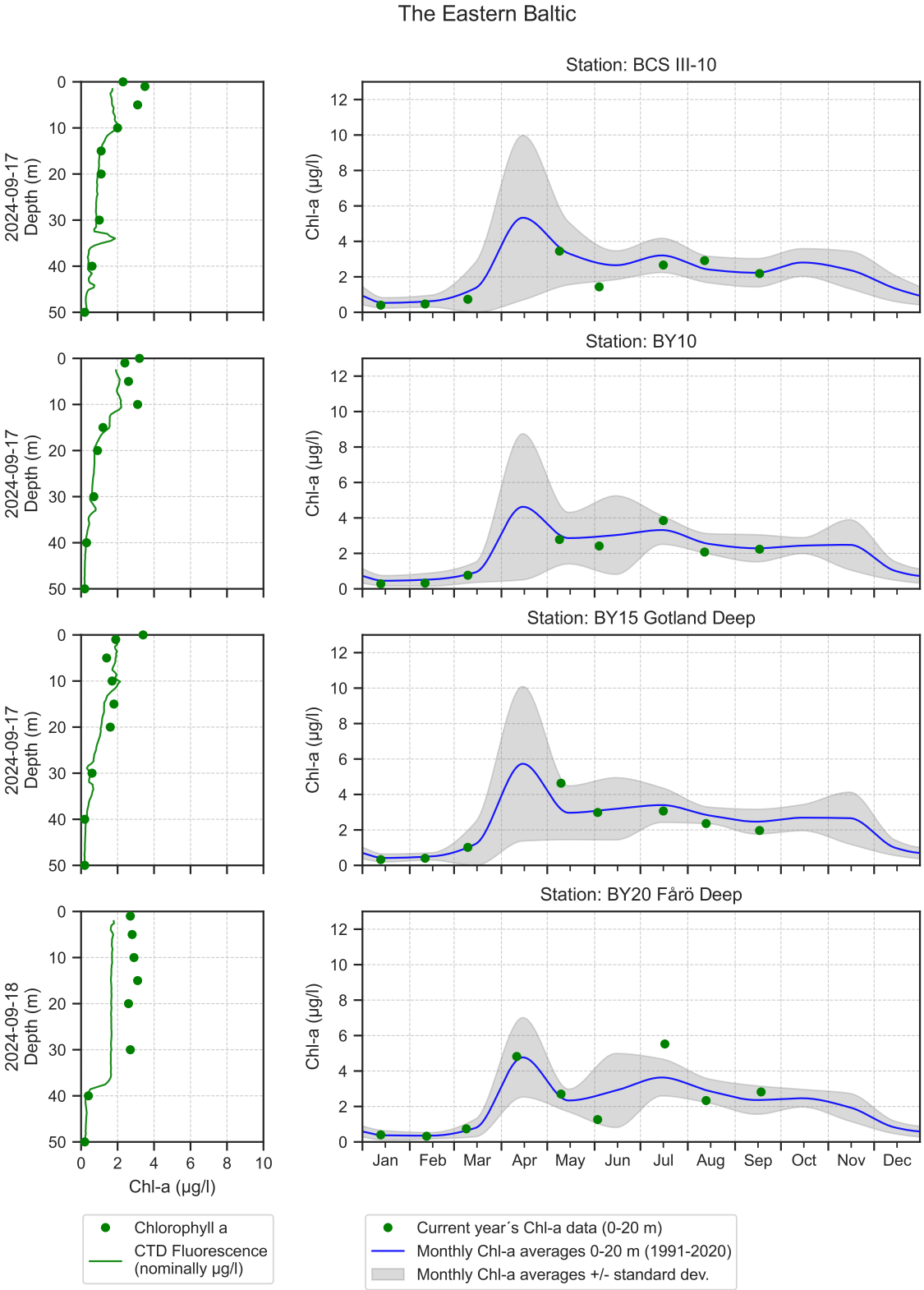
Selection of observed species	Anholt E	N14 Falkenberg	Släggö	Å17
Red=potentially toxic species	15/9	15/9	14/9	14/9
Hose 0-10 m	presence	presence	presence	presence
Cerataulina pelagica	present	present		present
Chaetoceros affinis	present	present		present
Chaetoceros convolutus	present	present		
Chaetoceros curvisetus	present		present	present
Chaetoceros danicus	present	present	present	
Chaetoceros laciniosus			present	
Chaetoceros lorenzianus			present	
Chaetoceros minimus			present	present
Chaetoceros similis	present		present	present
Chaetoceros socialis	present		present	present
Chaetoceros throndsenii		present		
Cylindrotheca closterium	present	present	present	present
Dactyliosolen fragilissimus	present	present	present	present
Ditylum brightwellii	present	present	present	present
Eucampia zodiacus				present
Guinardia delicatula	present	present		present
Guinardia flaccida	present			
Leptocylindrus danicus	present	present	present	present
Leptocylindrus minimus	present	common	present	present
Nitzschia longissima	common	common	common	common
Proboscia alata	present	present		present
Proboscia indica			present	present
Pseudo-nitzschia	present	common	present	common
Pseudosolenia calcar-avis	common	very common	present	common
Rhizosolenia setigera f. pungens	present	present	present	
Skeletonema marinoi	present	very common	common	present
Thalassionema nitzschioides	present			present
Thalassiosira gravida				present
Amphidinium crassum	present			
Amphidinium sphenoides		present		
Dinophysis acuminata	present	present	present	
Dinophysis norvegica	present			present
Gymnodinium litoralis	common	very common	common	common
Gyrodinium flagellare	present	present		present
Gyrodinium spirale			present	
Heterocapsa				present
Heterocapsa rotundata	present			present
Karenia mikimotoi			present	
Karlodinium veneficum	present			
Katodinium glaucum	present	present	present	
Lessardia elongata	present	present	present	
Lingulodinium polyedra	present			
Oxytoxum gracile	present	present		present
Phalacroma rotundatum	present			present
Polykrikos schwartzii	present	common	present	
Pronoctiluca pelagica			present	
Prorocentrum cordatum			present	present
Prorocentrum micans	common	present		present
Prorocentrum triestinum	present	present	present	
Protoperidinium	present	present	present	
Protoperidinium divergens		present	present	
Protoperidinium steinii			present	
Scrippsiella	present	present	present	present
Spatulodinium pseudonoctiluca	present			
Torodinium robustum		present	present	present
Tripos furca	present	present		
Tripos fusus			present	present
Tripos lineatus		present	present	
Tripos longipes			present	present
Tripos muelleri	present	present	present	present
Pseudanabaena	present	present		
Dictyocha fibula				present
Dictyochales	common	common	common	present
Cryptomonadales	present	common	common	common
Acanthoica quattrospina		present		present
Emiliania huxleyi	common	common	common	common
Prymnesiales		present		present
Dinobryon faculiferum		present		
Pyramimonas	present	present		present
Ebria tripartita		present		
Katablepharis remigera	present			present
Leucocryptos marina		present	present	
Ciliophora	present	present	present	present
Laboea strobila	present		present	present

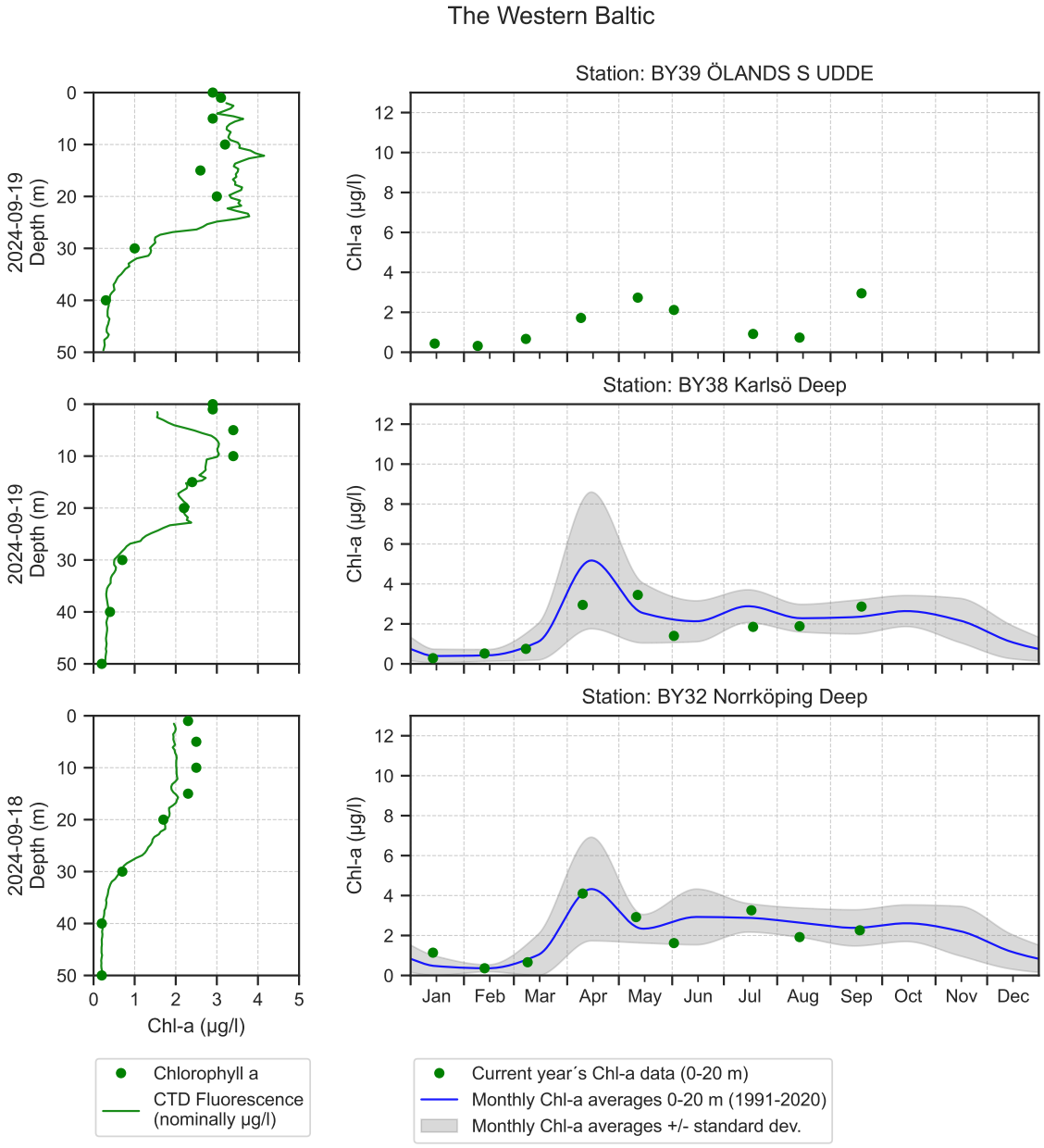
Selection of observed species	BY2	BY5	BCSIII-10	BY15	BY29	BY31	BY38	BY39
Red=potentially toxic species	16/9	16/9	17/9	17/9	18/9	18/9	19/9	19/9
Hose 0-10 m	presence	presence	presence	presence	presence	presence	presence	presence
cf. Actinocyclus					present			
Centrales	present	present	present		common	common		
Chaetoceros castracanei				present		present		present
Chaetoceros convolutus	present							
Chaetoceros danicus		present	present			present	present	present
Chaetoceros lorenzianus	present							
Coscinodiscus centralis	present	present		present	present			
Dactyliosolen fragilissimus	very common	dominant	present				dominant	dominant
Amphidinium crassum	present	present						
Dinophysis acuminata	present	present				present		present
Gymnodiniales	present	common	common	present	present	common	common	common
Gymnodinium verruculosum	present	present	present				present	present
Heterocapsa rotundata	common	present		common	common		present	present
Micracanthodinium claytonii			present					
Phalacroma rotundatum					present			
Prorocentrum micans	present							
Protoperidinium	present							
Scrippsiella GRP							present	present
Tripos muelleri	present							
cf. Pachysphaera	present							
Oocystis						present		
Binuclearia lauterbornii	present							
Pyramimonas spp.	very common	common	present	very common	common		present	present
Cryptomonadales	very common	very common	very common	very common	very common	common	common	common
Telonema	present						present	present
Pseudopedinella	present	present	common			present		present
Aphanizomenon flosaquae	common		common		common			
Lemmermanniella	present						present	
Nodularia spumigena						present		
Pseudanabaena	common	present	present			present	common	common
Ciliophora	common	present	common	very common	common	common		common
Mesodinium rubrum	present				present	present		


The Skagerrak
Station: Å17
Station: Å15
Station: Å13
Station: Släggö
Station: P2
2024-09-14
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 Kattegat and The Sound
Station: Fladen
Station: N14 Falkenberg
Station: Anholt E
Station: W Landskrona
2024-09-15
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.


The Southern Baltic
Station: BY1
Station: BY2 Arkona
Station: BY4 Christiansö
Station: BY5 Bornholm Deep
2024-09-16
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 (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
2024-09-17
2024-09-18
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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