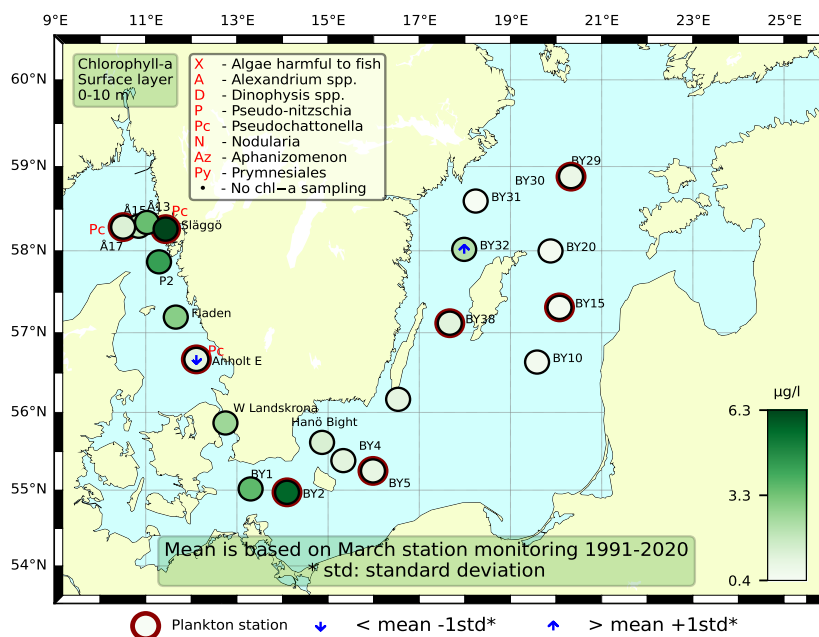


Sammanfattning

Artdiversiteten var generellt låg i Västerhavet, medan celltätheten var relativt hög på grund av en blomning av släktet *Pseudochattonella**. Höga celltätheter av *Pseudochattonella** observerades över hela Västerhavet, från Kullenhalvön till Släggö, med nivåer som översteg 500 000 celler/L enligt Imaging FlowCytobot (IFCB). Spår av vårbloomningen kunde observeras vid samtliga stationer, med låga tätheter av kedjebildande kiselalger. Kryptomonader var mycket vanliga i Skälderviken, tillsammans med *Pseudochattonella**, där ett extra prov togs. De integrerade klorofyllhalterna (0–10 m och 0–20 m) var inom det normala för månaden vid samtliga stationer i Skagerrak, men lägre än normalt vid Anholt E.

Diversiteten och cellantalerna av växtplankton var generellt sett väldigt låga i Östersjön, det enda undantaget var BY2 Arkona där vårbloomningen fångades in i något stadium. Den vertikala CTD profilen vid BY2 var komplex med flertalet fluorescens toppar i djupled. Den höga celltätheten vid BY2 jämfört med resten av Östersjöstationerna blev även tydliga från IFCB:n, där området kring BY2 Arkona hade avsevärt fler bilder jämfört med de andra områdena. Generellt var det kiselalger av arten *Skeletonema marinoi*, Cryptomonader och ciliater så som *Mesodinium rubrum* som noterades i Östersjön. De integrerade klorofyllhalterna var inom det normala för månaden vid alla stationer förutom vid BY2 där de då var över normala för 0–20 m troligtvis på grund av ett fluorescensmaximum strax under 10 m.



Abstract

Species diversity was generally low in the Skagerrak and Kattegat, while cell abundance was relatively high due to a bloom of *Pseudochattonella**. Elevated concentrations of *Pseudochattonella** were observed throughout the Skagerrak and Kattegat, from the Kullen Peninsula to Släggö, exceeding 500 000 cells/L according to the Imaging FlowCytobot (IFCB). Traces of the spring bloom were present at all stations, with low densities of chain-forming diatoms. Cryptomonads were very common in Skälderviken, together with *Pseudochattonella**, where an additional sample was collected. The integrated chlorophyll concentrations (0-10 m and 0-20 m) were within the normal range for the month at all stations in Skagerrak, but lower than normal at Anholt E.

Diversity and cell abundances of phytoplankton were generally very low, with the only exception being BY2 Arkona where a spring bloom situation at some stage was occurring. The vertical CTD profile from this station showed a complex situation with several fluorescens peaks. The higher total cell numbers at BY2 compared to the rest of the Baltic Proper was obvious as the area around BY2 Arkona had many more pictures than the rest of the sampled areas in the Baltic. In general, there were diatoms of the species *Skeletonema marinoi*, cryptomonads and ciliates such as *Mesodinium rubrum* that were found in the Baltic Proper. The integrated chlorophyll concentrations were within the normal range for this month at all stations except BY2 0-20 m where they were higher than normal probably due to a large fluorescence peak just below 10 m.

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 March

Total cell abundance was high, while overall diversity was moderate. The sample was dominated by *Pseudochattonella**. Measurements from the IFCB indicated concentrations exceeding 500 000 cells/L, with the highest values recorded during the cruise near Släggö station. Several *Protoperidinium* species were common, including *Protoperidinium thorianum*. Among the smaller size fractions, various cryptomonads constituted the most abundant group. The integrated 0–10 and 0–20 m chlorophyll concentrations were within the normal range for this month.

Å17 (Skagerrak coast) 14th of March

Both species diversity and total cell abundance were low compared to Släggö. *Pseudochattonella** was common but less abundant than at Släggö. Remnants of the spring bloom were still evident, including the diatom *Skeletonema marinoi* and species of the genus *Pseudo-nitzschia**. The integrated 0–10 and 0–20 m chlorophyll concentrations were within the normal range for this month.

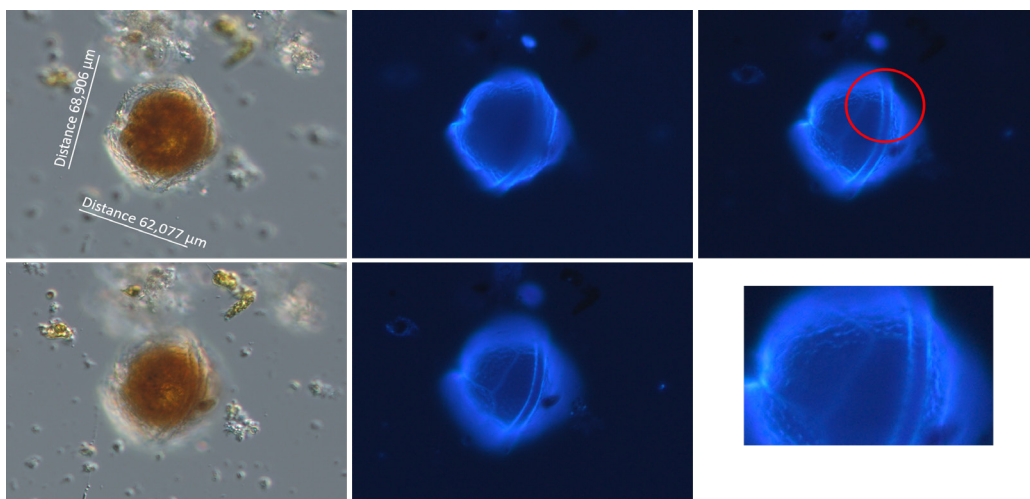


Fig 1. The dinoflagellate *Protoperidinium thorianum* was observed at the Släggö station. Photo M. Karlberg.

The Kattegat

S-5 E Skälderviken 12th of March

This additional sample was dominated by a mixture of cryptomonads and *Pseudochattonella**.

Anholt E 13th of March

Total cell abundance was moderate, while species diversity remained low. *Pseudochattonella** was particularly common. Smaller cells, including cryptomonads and various flagellates, were also abundant. Among the larger cells, the dinoflagellate *Nematopsisides vigilans* was observed. The integrated chlorophyll concentrations from 0–10 and 0–20 m were lower than the normal range for this month.

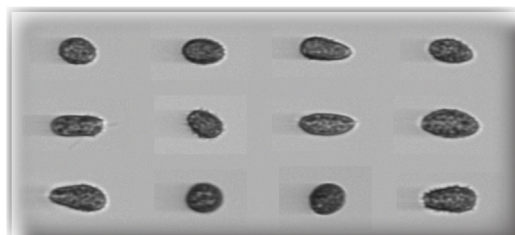


Fig 2. The flagellate *Pseudochattonella* was found in high amounts at all stations along the Swedish west coast. The image is a mosaic of IFCB images collected at Släggö.

The Baltic

BY2 Arkona 12th of March

The phytoplankton diversity and abundances were both high. Some stage of a spring bloom was captured. Diatoms dominated with *Skeletonema marinoi* in highest abundance but also a lot of chains of small *Thalassiosira* and for example *T. levanderi* was noted. Dinoflagellates were only found in low abundance and mainly consisted of small cells such as *Heterocapsa rotundata*. The smaller cells were mainly composed of different cryptomonads. The integrated 0–10 was within normal whereas the 0–20 m chlorophyll concentrations were above normal possible due to the large fluorescence peak around 12 meters.

BY5 Bornholm deep 11th of March

The phytoplankton diversity and abundances were low and no sign of an ongoing spring bloom was noted. The sample mainly contained different ciliates, *Eutreptiella gymnastica* and different cryptomonadales. Among the diatoms, a few cells of *S. marinoi*, was found other species found was *Binuclearia lauterbornii*, the genus *Mesodinium* and other ciliates. The integrated 0–10 and 0–20 m chlorophyll concentrations were within the normal range for this month.

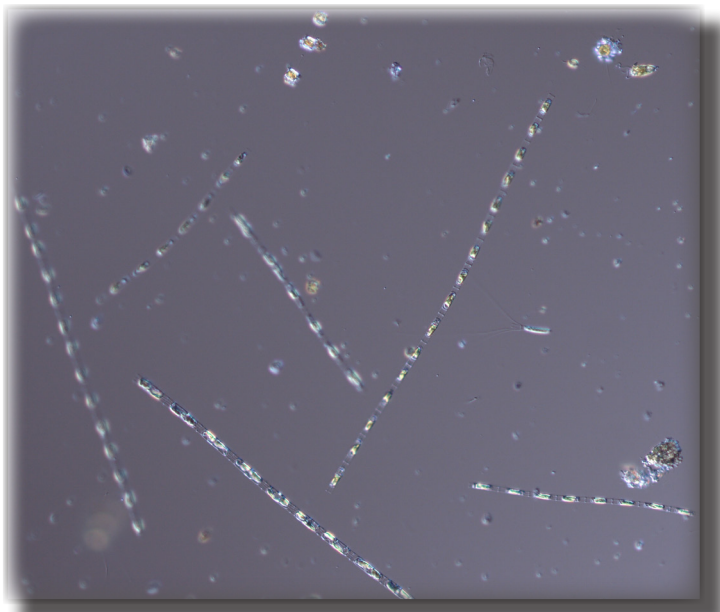


Fig 3. At BY2 Arkona a spring bloom event was captured.
Photo: M. Johansen.

BY15 Gotland deep 10th of March

The phytoplankton diversity and abundances were both very low. Among the diatoms, a few cells of *S. marinoi* was present. Dinoflagellates were represented by some small cells belonging to Gymnodiniales and Peridinales. Different cryptomonadales and the ciliate *Mesodinium rubrum* were present. The integrated 0–10 and 0–20 m chlorophyll concentrations were within the normal range for this month.

BY29 10th of March

The phytoplankton diversity and abundances were low. Mainly different ciliates, *E. gymnastica* and cryptomonadales were present. Among the diatoms, a few cells of *S. marinoi* were present. Among the dinoflagellates only a couple of cells were noted. The integrated 0–10 m chlorophyll concentrations were within the normal range for this month.

BY31 Landsort deep 9th of March

The phytoplankton diversity was moderate but abundances were low. Among the diatoms, a few cells of *S. marinoi* were present together with different species of the genus *Chaetoceros*. Different ciliates and the genus *Mesodinium* were also present. Dinoflagellates were represented by some small chains of *Peridiniella catenata*. The smallest cells were dominated by different cryptomonadales.

BY38 Karlsö deep 9th of March

The phytoplankton diversity and abundances were low. Very few diatom cells were found and they were mainly constituted by *S. marinoi*. Different ciliates and cryptomonadales were found in higher abundance. The integrated 0–10 and 0–20 m chlorophyll concentrations were within the normal range for this month.

BY39 Öland south 8th of March

The phytoplankton diversity and abundances were low. Among the diatoms some cells of *S. marinoi* were present. Dinoflagellates were represented by the small *H. rotundata* and a few chains of *P. catenata*. Different ciliates and especially the genus *Mesodinium* were quite common so also *E. gymnastica*. The integrated 0–10 and 0–20 m chlorophyll concentrations were within the normal range for this month.

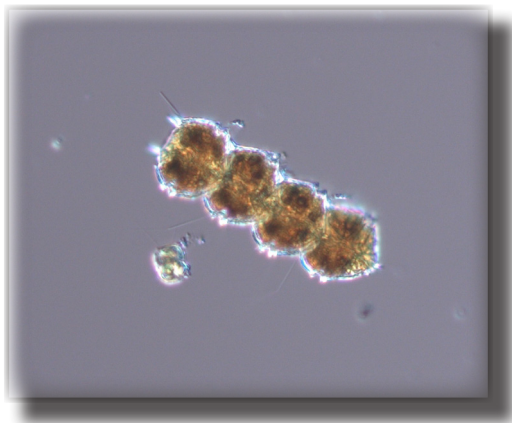
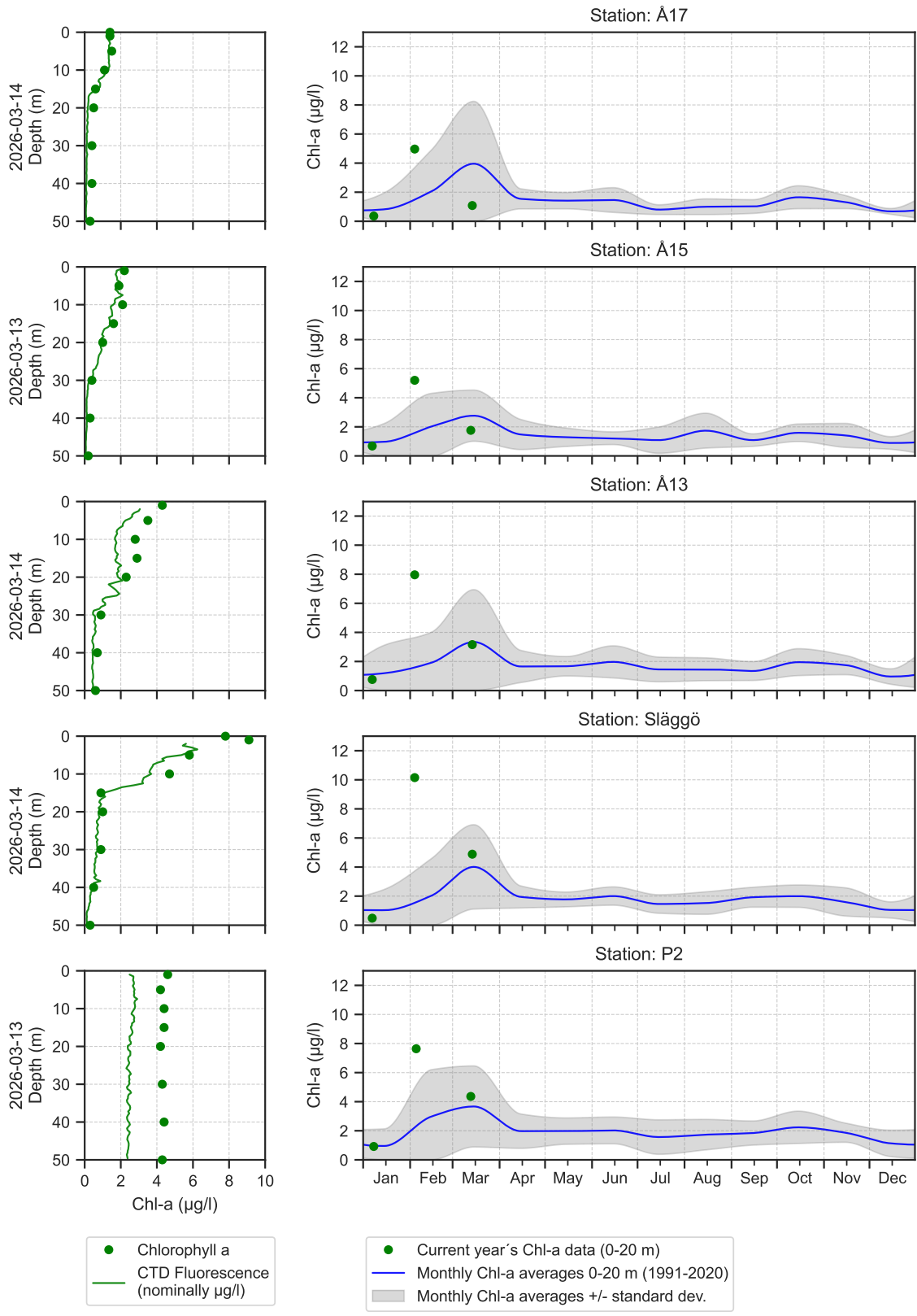


Fig 4. The chain forming dinoflagellate *Peridiniella catenata* was found in the northern Baltic Proper in moderate cell numbers. Photo M. Johansen.

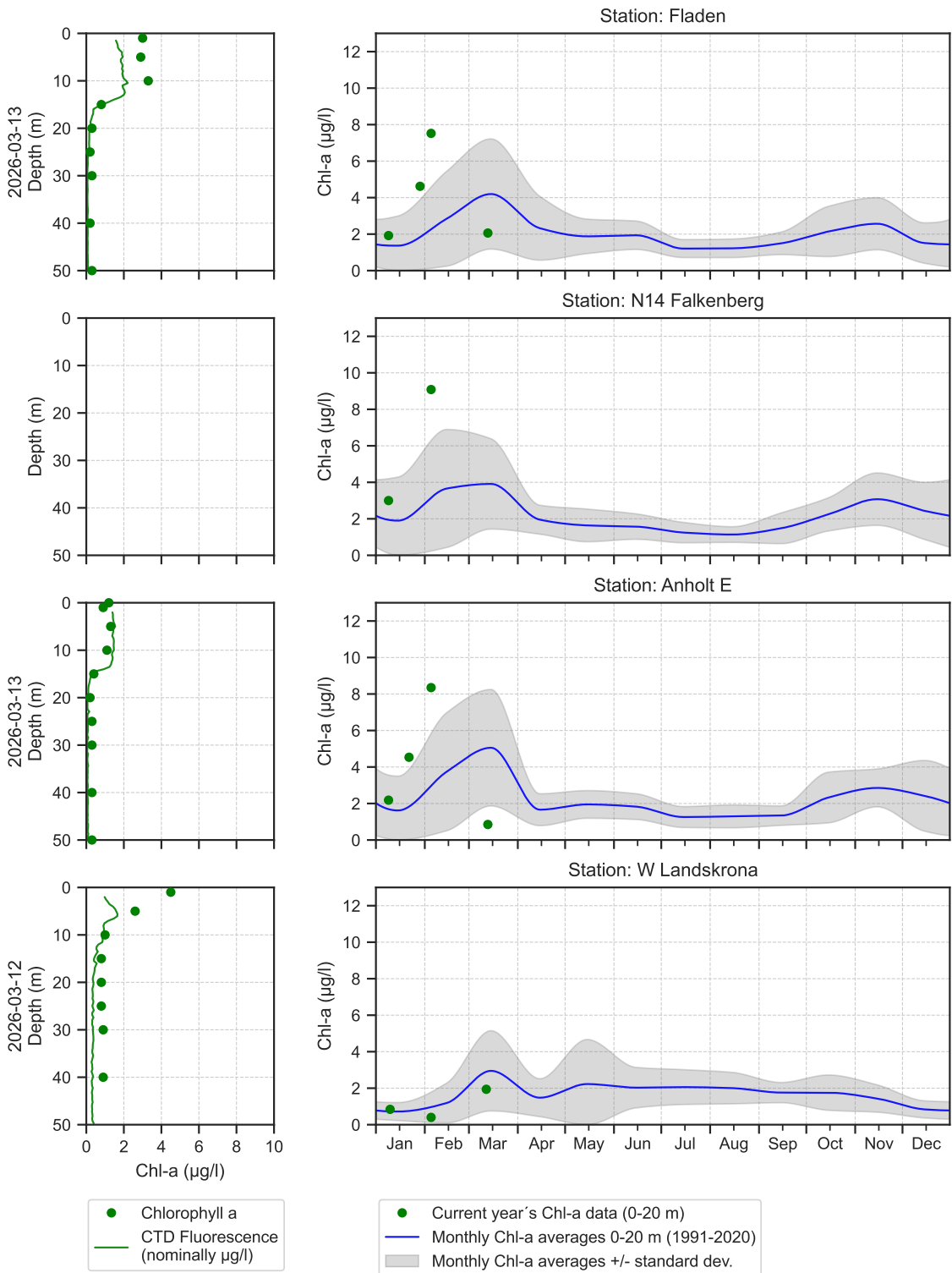
Selection of observed species	Anholt E	Släggö	Å17
Red=potentially toxic species	13/3	14/3	14/3
Hose 0-present0 m	presence	presence	presence
Ciliophora	present	present	
Centrales		present	
Cerataulina pelagica		present	
Chaetoceros danicus	present		
Navicula		present	
Proboscia alata	present	present	present
Pseudo-nitzschia	present	present	present
Skeletonema marinoi	present	present	present
Thalassiosira angulata		present	
Choanoflagellata	present		present
Cryptomonadales	present	present	present
Apedinella radians		present	
Octactis speculum	present	present	present
Pseudochattonella	very common	very common	common
Pseudopedinella	present		
Alexandrium	present		
Dinophysis acuminata		present	present
Dinophysis norvegica		present	
Gymnodiniales	present	present	present
Gyrodinium spirale	present	present	
Karlodinium veneticum		present	
Katodinium glaucum	present	present	present
Nematopsides vigilans	present		present
Peridinales	present		
Peridiniella danica	present	present	
Protoperidinium	present	present	present
Protoperidinium divergens			present
Protoperidinium pellucidum		present	present
Protoperidinium thorianum		present	
Tripos fusus		present	
Tripos muelleri		present	
Eutreptiella		present	
Mesodinium rubrum		present	
Laboea strobila		present	
Tintinnidae	present	present	
Heterosigma akashiwo		present	present

Selection of observed species	BY2	BY5	BY15	BY29	BY31	BY38	BY39
Red=potentially toxic species	12/3	11/3	10/3	10/3	9/3	9/3	8/3
Hose 0-10 m	presence	presence	presence	presence	presence	presence	presence
Actinocyclus						present	
Chaetoceros	common				present		
Chaetoceros ceratosporus	present						
Chaetoceros holsaticus	present						
Chaetoceros similis	present						
Chaetoceros subtilis	present				present		
Chaetoceros wighamii					present		
Cylindrotheca closterium					present		
Melosira arctica	present						
Skeletonema marinoi	dominating	common	common	common	common	present	common
Thalassiosira	common						
Thalassiosira baltica					present		
Thalassiosira levanderi	very common						
Thalassiosira levanderi					present		
Dinophysis acuminata				present	present		
Gymnodiniales	present		present		present		present
Heterocapsa rotundata	present	present			present	present	common
Katodinium glaucum		present					
Peridinales			present				
Peridiniella catenata				present	present	present	
Peridiniella danica					present		present
Dinobryon	present						
Dinobryon faculiferum	present						
Prymnesiales						present	
Binuclearia lauterbornii		common	present			present	
Cryptomonadales	common	common	present	common	common	common	common
Telonema subtile						present	
Eutreptiella gymnastica	present	present	common	common	present	common	common
Aphanizomenon flos-aquae					present		
Aphanocapsa		present					
Lemmermanniella				present		present	
Snowella		present	present	present		present	
Choanoflagellata				present			
Ciliophora	present	very common	common	present	common	common	present
Mesodinium	present	common		present	present		present
Mesodinium rubrum	present	common	present	common	common	common	common

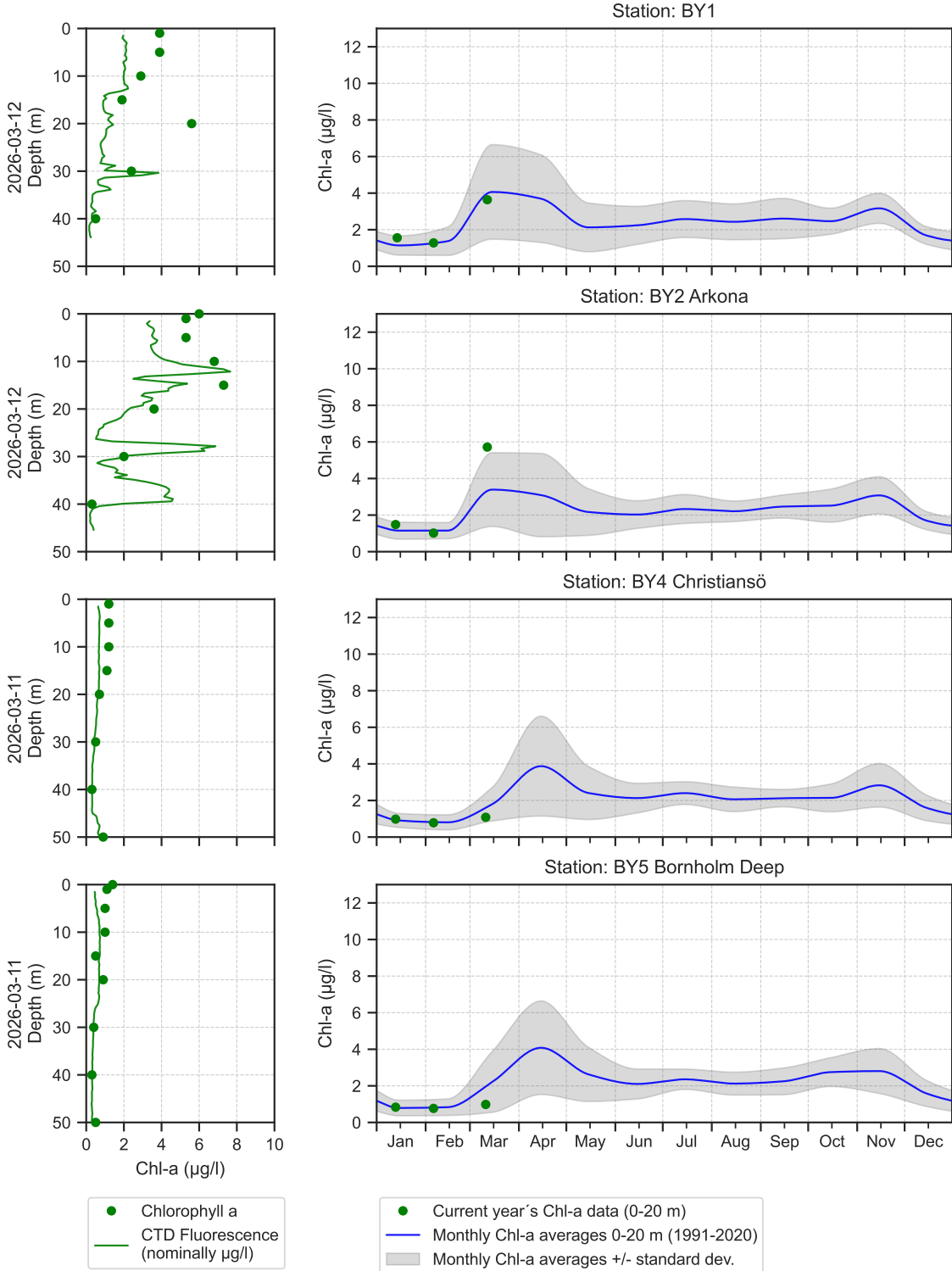
The Skagerrak



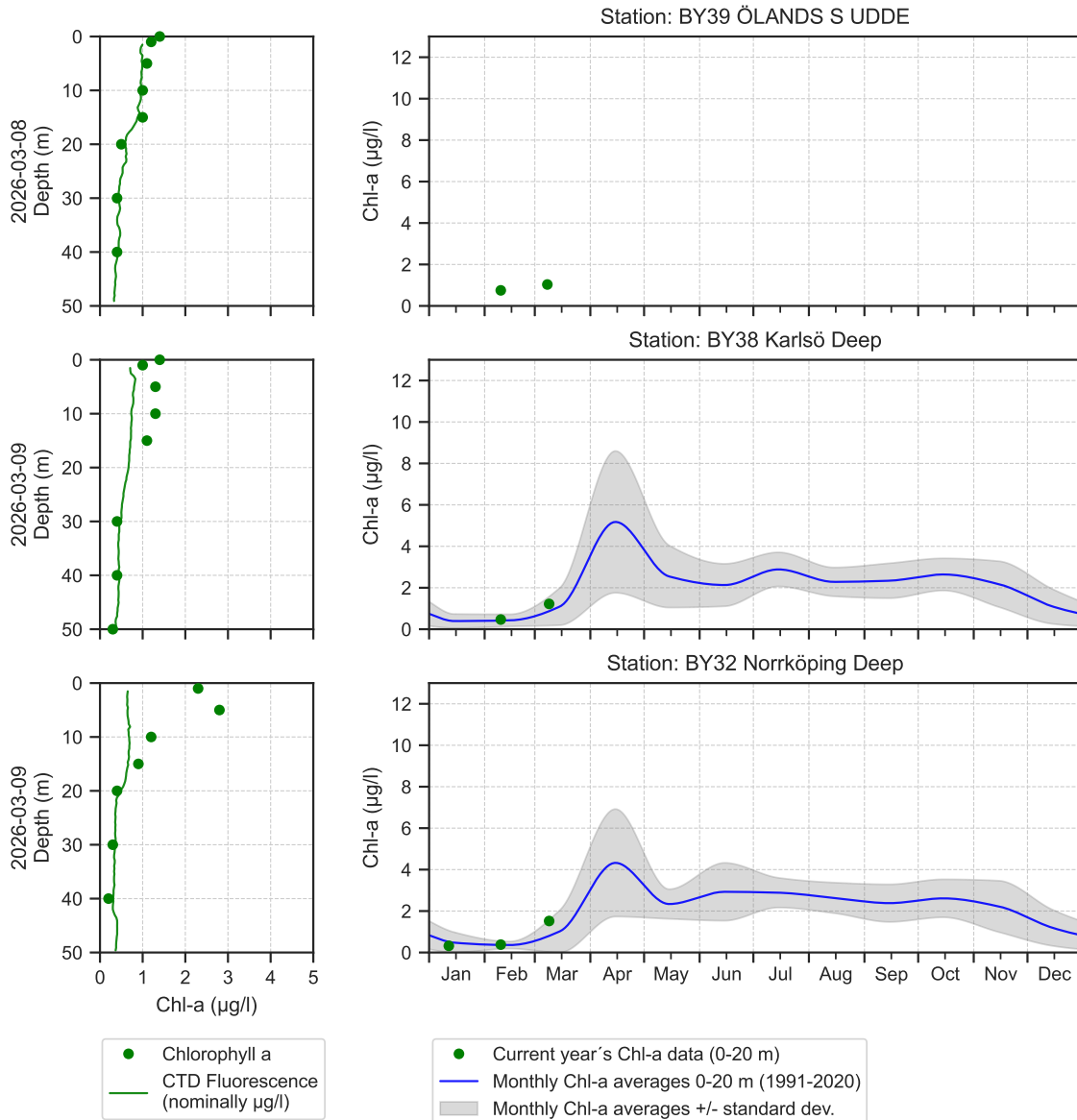
The Kattegat and The Sound



The Southern Baltic



The Western Baltic



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 medelvärdet 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 occurring below the surface.

Om AlgAware

SMHI genomför månatliga expeditioner i Östersjön och Västerhavet. Resultat baserade på semikvantitativ mikroskopisk analys av planktonprover samt klorofyllmätningar presenteras kortfattat i denna rapport. Information från SMHIs satellitövervakning av algbloomingar 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
<i>Alexandrium</i> 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; headache, dizziness, nausea, vomiting, diarrhoea. Extreme case Muscular paralysis; pronounced respiratory difficulty; choking sensation; death through respiratory paralysis may occur within 2-24 hours after ingestion.
<i>Dinophysis</i> spp.	Diarrhetic 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.
<i>Pseudo-nitzschia</i> spp.	Amnesic shellfish poisoning (ASP)	Milda symptom: Efter 3-5 timmar: yrsel, illamående, kräkningar, diarré, magkramp 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.
<i>Chaetoceros concavicornis</i> / <i>C. convolutus</i>	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.
<i>Pseudochattonella</i> 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.

