Dnr: S/Gbg-2021-27

SMHI
Oceanographic Unit
No 2, February 2021

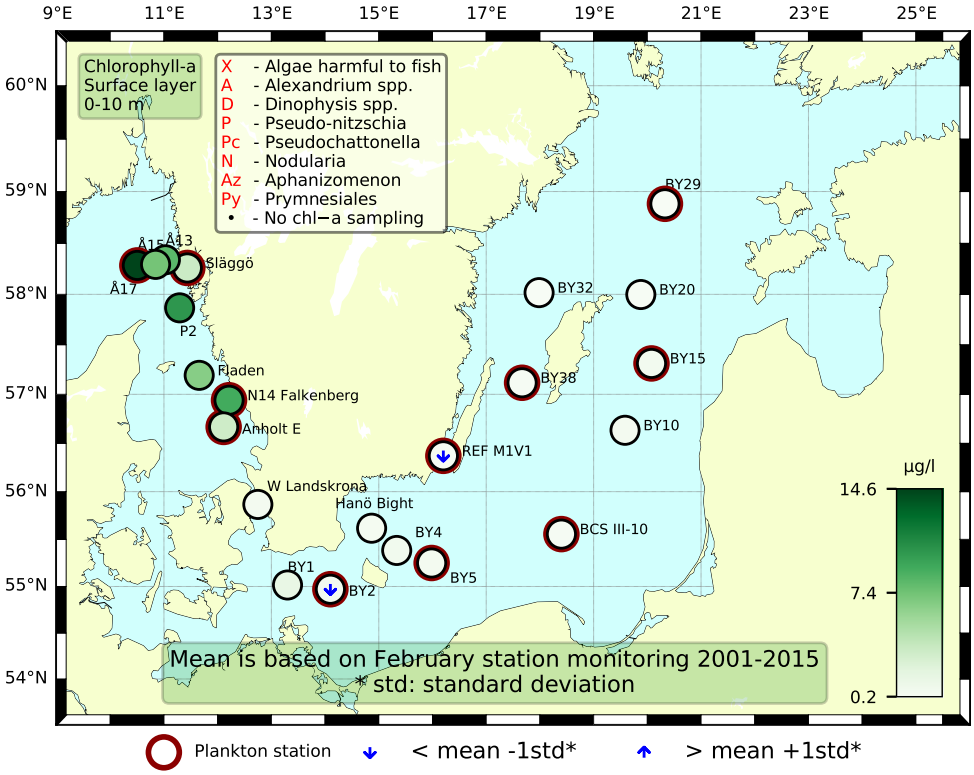
AlgAware

ALGAL SITUATION IN MARINE WATERS SURROUNDING SWEDEN

Sammanfattning

Vårblomningen var i gång vid Å17 i yttre Skagerrak med höga cellantal av framför allt kiselalgen Skeletonema marinoi. I övrigt var cellantalen förvånansvärt låga med tanke på de höga klorofyllvärdena. Vid Släggö var det fortfarande låg växtplanktondiversitet. I Kattegatt var det också vårblomning med S. marinoi i täten och högst diversitet och cellantal uppmättes vid N14 Falkenberg.

Bland Östersjöstationerna var det endast vid REFM1V1 vårblomningen var nära, med dominans av S. marinoi. Trots detta var klorofyllvärdena under det normala vid denna station. De andra stationerna hade låg diversitet och växtplanktonsamhället bestod av relativt små växtplanktonceller, vilket representerades i de låga men normala klorofyllvärdena för februari månad.



Abstract

Spring bloom was ongoing at Å17 in the open Skagerrak with high cell numbers of the diatom *Skeletonema marinoi*. Other cell numbers were surprisingly low considering the high chlorophyll concentrations. At Släggö the phytoplankton diversity was still low. Spring bloom was observed even in the Kattegat area, with *S. marinoi* having the highest cell counts. The highest diversity and total cell numbers were found at N14 Falkenberg.

Among the Baltic stations it was only at REFM1V1 the spring bloom was imminent, with a dominance of *S. marinoi*. In spite of this the chlorophyll concentrations were below normal at this station. The other stations had low diversity and the phytoplankton community was composed of relatively small cells, which was represented in the low but normal chlorophyll concentrations for the month of February.

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

The Skagerrak

Å17 (open Skagerrak) 9th of February
Spring bloom had started with high species diversity, of especially diatoms, and high total cell numbers. The diatom *Skeletonema marinoi* dominated the sample and several species of the diatom genus *Thalassiosira* were present. The cell numbers of other species than *S. marinoi* were surprisingly low considering the high chlorophyll concentrations. The integrated chlorophyll concentration was far above normal for this month.

Släggö (Skagerrak coast) 9th of February
The total cell numbers were low, but the species diversity was similar to the one at Å17, suggesting that spring bloom was on its way. The integrated chlorophyll concentration was normal for this month.

The Kattegat

Anholt E 10th of February
Spring bloom was ongoing with high species diversity and high amounts of different diatom species, but also others. The diatom *S. marinoi* was the most abundant, and the diatom *Chaetoceros danicus* was rather numerous. *Thalassiosira* species were relatively abundant too. The total cell numbers were moderate though, which is why this probably was the beginning of the spring bloom. The integrated chlorophyll concentration was normal for this month.

N14 Falkenberg 10th of February
The phytoplankton situation was very similar to the one at Anholt E and Å17. However, both species diversity and total cell numbers were higher. *S. marinoi* dominated and *C. danicus* and the potentially toxic diatom *Pseudo-nitzschia* spp.* were relatively numerous. The integrated chlorophyll concentration was normal for this month.

Figure 1: The diatom *Skeletonema marinoi* dominated at the Kattegat and Skagerrak stations. Photo: A-T Skjevik.

Figure 2: The potentially toxic diatom *Pseudo-nitzschia* spp. was numerous at N14 Falkenberg. Photo: A-T Skjevik.

The Baltic

BY2 11th of February
Both phytoplankton diversity and abundance were low. There were however high cell numbers of Cryptomonadales and colonies of *Snowella* sp. Several filaments of the cyanobacterium *Aphanizomenon* sp., small Gymnodiniales (< 20 μm), *Mesodinium rubrum*, ciliates, flagellates and unicells were found. Both the integrated (0-20 m) and (0-10 m) chlorophyll concentrations were below normal for this month.

BY5 16th of February
Both phytoplankton diversity and abundance were low. There were however high cell numbers of Cryptomonadales and colonies of *Snowella* sp. The chain-forming dinoflagellate *Peridiniella catenata* was quite numerous, as well as small Gymnodiniales (< 20 μm), ciliates, centric diatoms, flagellates and unicells. Both the integrated (0-20 m) and (0-10 m) chlorophyll concentrations were low but within normal for this month.

BCSIII-10 15th of February
Both phytoplankton diversity and abundance were low. There were however high cell numbers of Cryptomonadales and colonies of *Snowella* sp. Some of the smaller cells such as Gymnodiniales (< 20 μm), *Mesodinium rubrum*, ciliates and unicells were common. The toxin producing *Dinophysis acuminata** was observed. Both the integrated (0-20 m) and (0-10 m) chlorophyll concentrations were normal for this month.

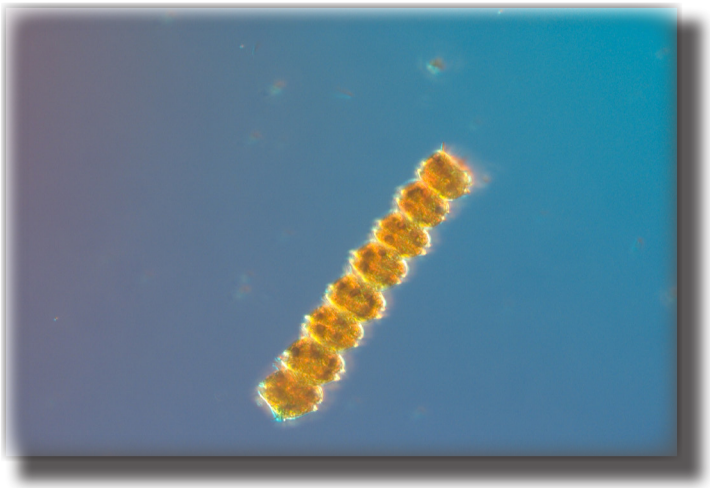


Figure 3: There are not many species of dinoflagellates that form chains, but *Peridiniella catenata* is one of them. The species was found at four of the Baltic stations in February. Photo: A-T Skjevik.

BY15 14th of February
Both phytoplankton diversity and abundance were low. The colony forming cyanobacterium *Snowella* sp. was however numerous. Additionally, Gymnodiniales (< 20 μm), Cryptomonadales, *Mesodinium rubrum*, ciliates, centric diatoms as well as flagellates and unicells were found. A few filaments of the cyanobacterium *Aphanizomenon* sp. were also present. Both the integrated (0-20 m) and (0-10 m) chlorophyll concentrations were normal for this month.

BY29 13th of February
This station had the lowest diversity and abundance. The phytoplankton community consisted of small cells such as Cryptomonadales, small Gymnodiniales (< 20 μm), ciliates, flagellates and unicells. Several colonies of the cyanobacterium *Snowella* sp. were found, as well as a few colonies of *Lemmermanniella* cf. *pallida* and filaments of *Pseudanabaena* sp. The integrated (0-10 m) chlorophyll concentrations were normal for this month.

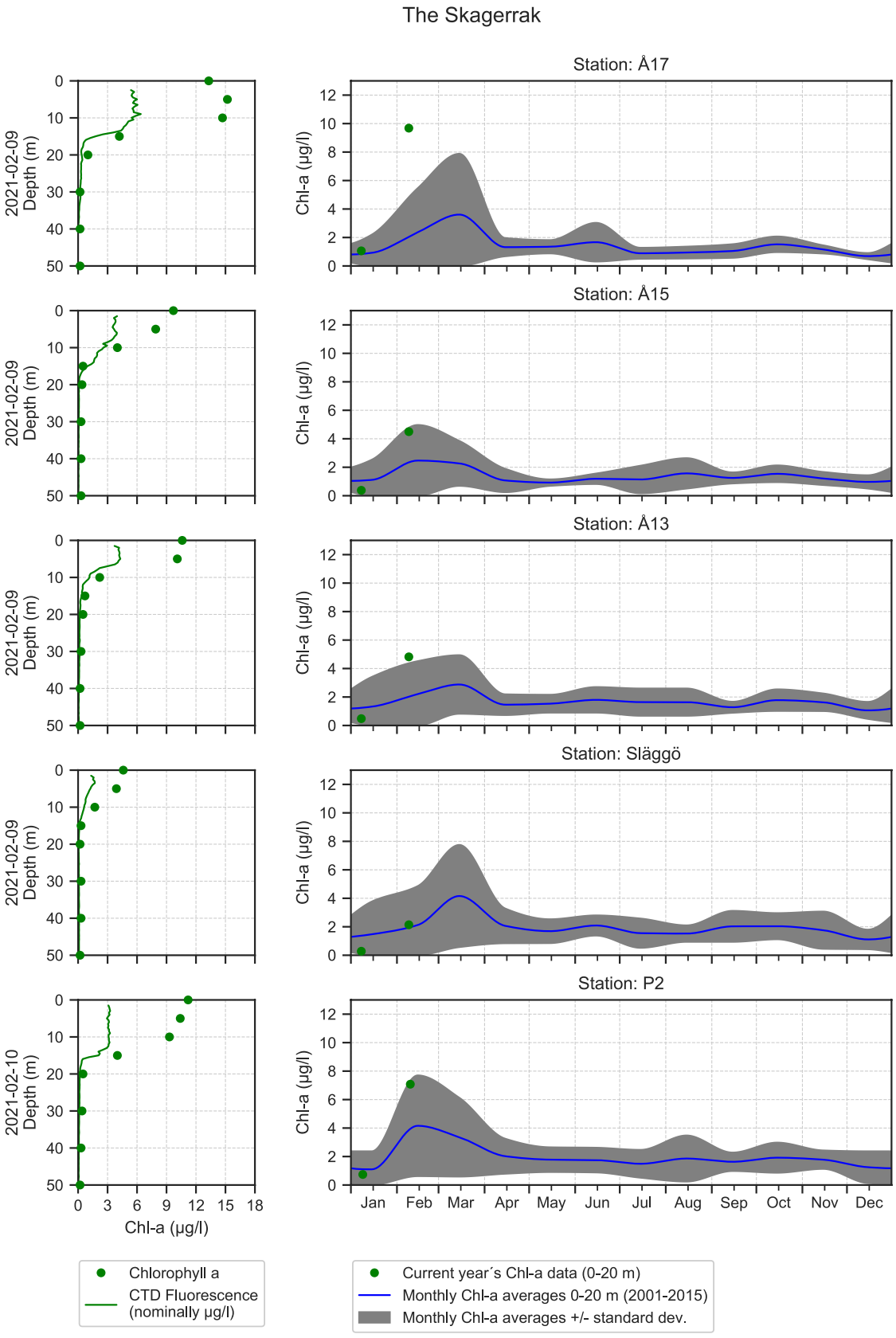
BY31 12th of February
Both phytoplankton diversity and abundance were low. There were however high cell numbers of the diatom *Skeletonema marinoi*, colonies of *Snowella* sp., several filaments of the cyanobacterium *Aphanizomenon* sp. small Gymnodiniales (< 20 μm), Cryptomonadales and *Mesodinium rubrum*. Several species of the diatom genus *Chaetoceros* were found: *C. castracanei*, *C. danicus* and *C. subtilis*. Ciliates, centric diatoms, flagellates and unicells were also found.

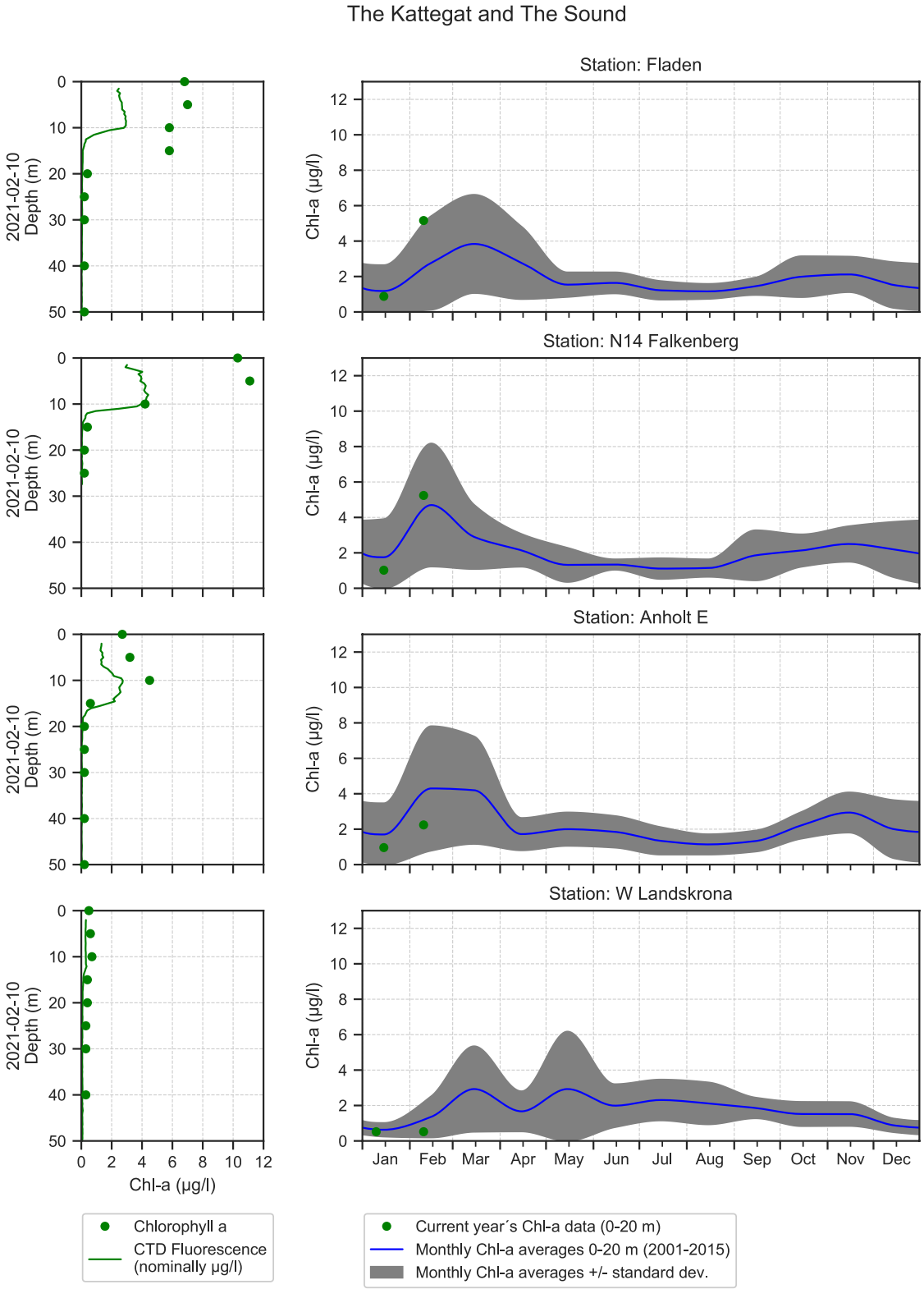
BY38 12th of February
Both phytoplankton diversity and abundance were low. There were however high cell numbers of Cryptomonadales. Other groups that were numerous were small Gymnodiniales (< 20 μm), *Peridiniella catenata*, *Aphanizomenon* sp. *Snowella* sp., *Mesodinium rubrum*, ciliates, as well as flagellates and unicells. Both the integrated (0-20 m) and (0-10 m) chlorophyll concentrations were normal for this month.

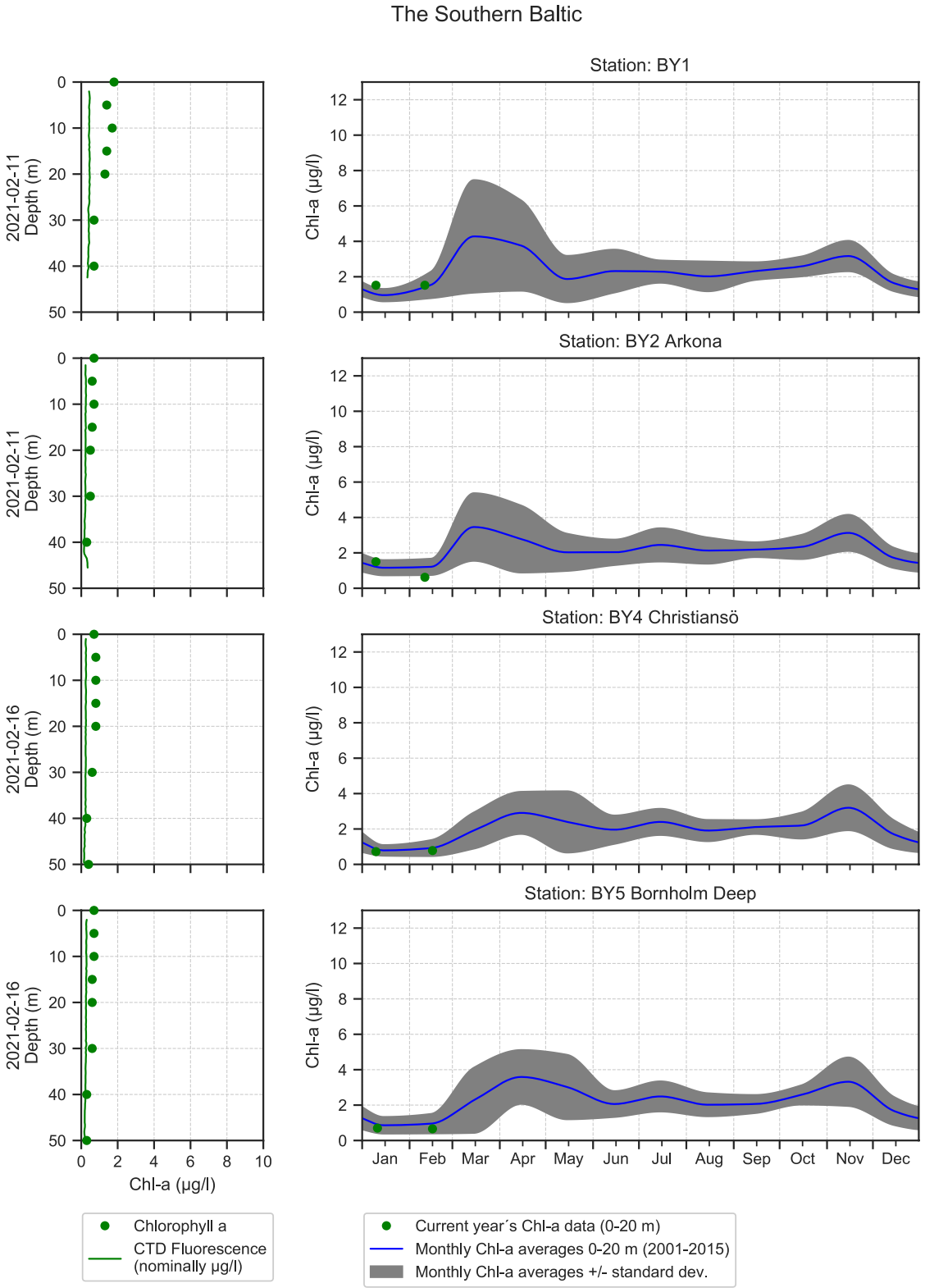
REFM1V1 16th of February
Phytoplankton diversity was low but the abundance was quite high. This was mainly due to the domination of the chain forming diatom *Skeletonema marinoi*. The rest of the phytoplankton community consisted of small cells such as Cryptomonadales, *Mesodinium rubrum*, ciliates as well as flagellates and unicells. There were also a few species of *Chaetoceros* spp. and the toxin producing dinoflagellate genus *Alexandrium** was present. Both the integrated (0-20 m) and (0-10 m) chlorophyll concentrations were below normal for this month.

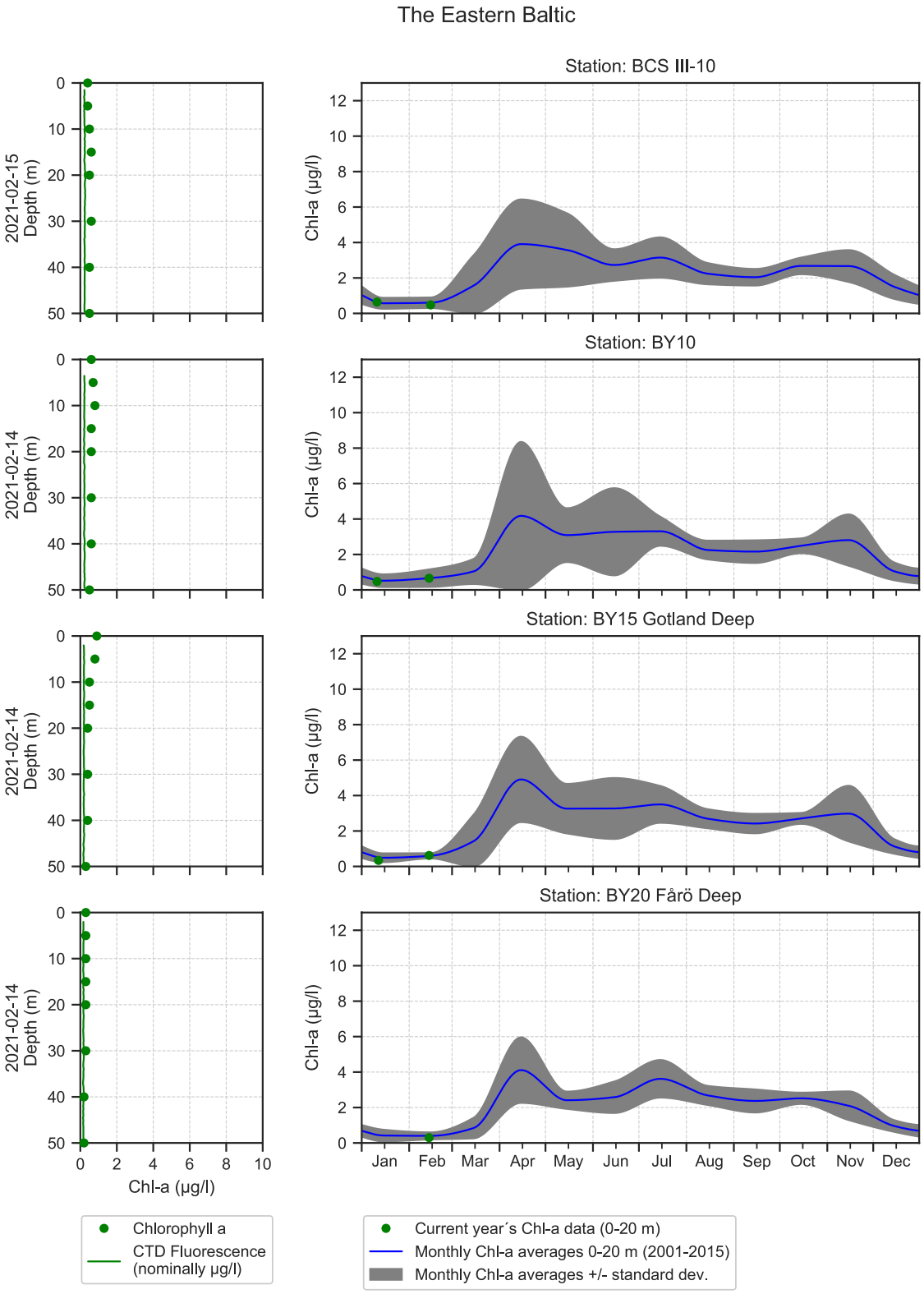
Selection of observed species	Anholt E	N14	Släggö	Å17
Red=potentially toxic species	10/2	10/2	9/2	9/2
Hose 0-10 m	presence	presence	presence	presence
Attheya septentrionalis		present	present	present
Chaetoceros curvisetus		present		
Chaetoceros danicus	common	common	present	present
Chaetoceros minimus		present		
Chaetoceros similis	present	present		present
Chaetoceros subtilis	present	present		
Dactyliosolen fragilissimus	present			
Ditylum brightwellii		present		present
Guinardia delicatula	present	present	present	present
Guinardia flaccida	present	present	present	present
Leptocylindrus minimus	present	present	present	present
Nitzschia longissima	present	present	present	present
Porosira glacialis	present	present	present	
Proboscia alata	present	present		present
Pseudo-nitzschia	present	common	present	present
Pseudosolenia calcar-avis		present		
Rhizosolenia setigera	present	present	present	present
Skeletonema marinoi	very common	very common	common	very common
Thalassionema nitzschioides		present		
Thalassiosira angulata	present	present	present	present
Thalassiosira anguste-lineata	present	present	present	present
Thalassiosira constricta				present
Thalassiosira gravida	present	present	present	present
Thalassiosira nordenskioeldii	present	common	present	present
Dinophysis acuminata	present	present		
Dinophysis dens		present		
Dinophysis norvegica	present	present		present
Gymnodinium verruculosum		present		
Gyrodinium flagellare			present	
Gyrodinium spirale	present	present	present	
Heterocapsa				present
Heterocapsa rotundata	present			
Heterocapsa triquetra			present	
Katodinium glaucum	present	present		
Peridiniella danica			present	
Phalacroma rotundatum		present		present
Protoperidinium bipes			present	
Tripos furca			present	
Tripos fusus		present		
Tripos horridus			present	
Tripos lineatus		present	present	
Tripos muelleri	present	present	present	
Octactis speculum	present	present		present
Pseudopedinella	present	present		
Pseudopedinella pyriformis		present		
Pseudanabaena	present	present	present	present
Eutreptiella	present	present		present
Heterosigma akashiwo	present			
Emiliania huxleyi	present	present	present	present
Pyramimonas		present		present
Cryptomonadales	common	common	present	present
Leucocryptos marina	present	present	present	present
Ebria tripartita		present		
Choanoflagellatea			present	
Mesodinium rubrum	present			present
Stenosemella		present		present
Strombidium	present	present		present
Ciliophora		present	present	present

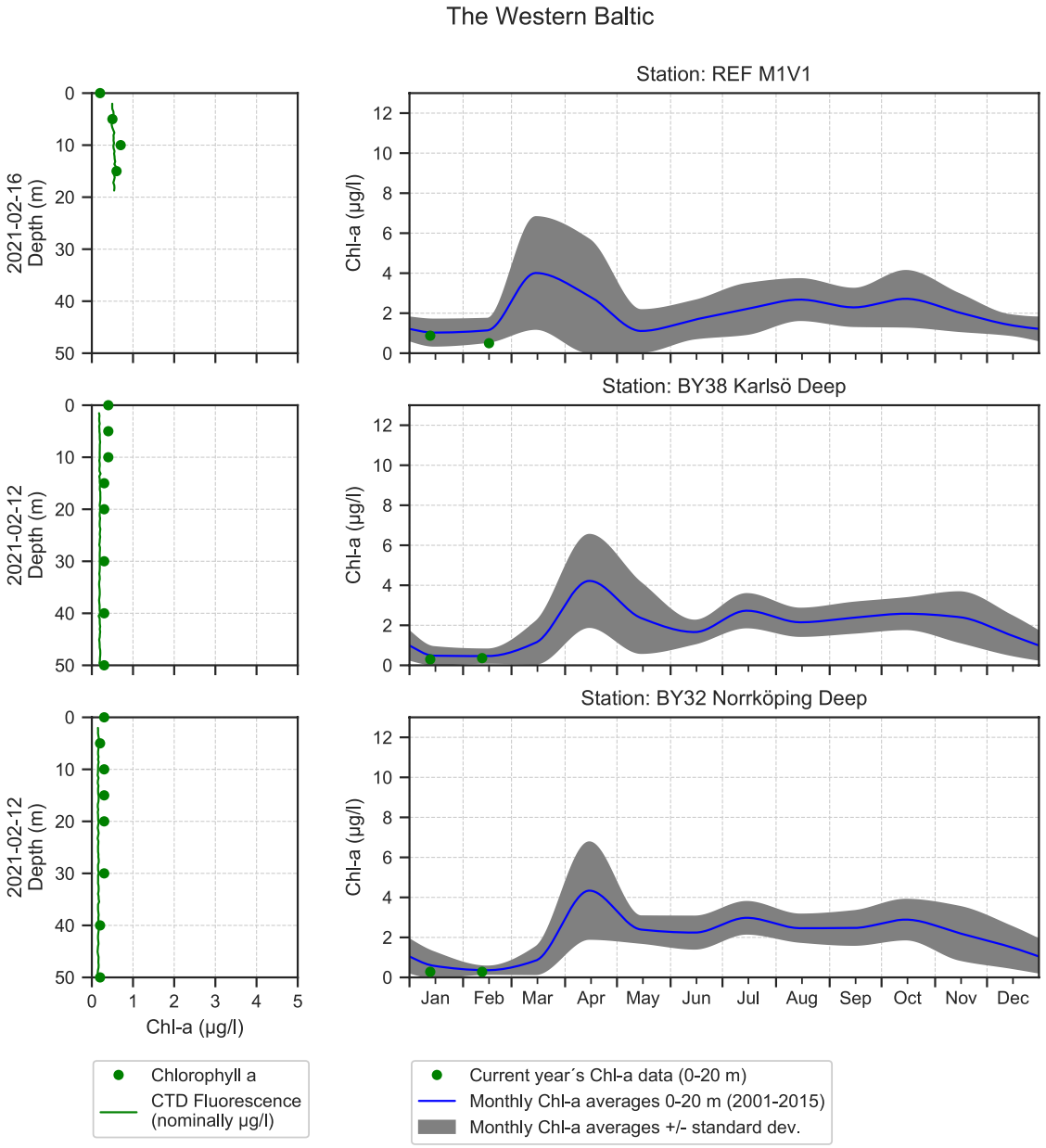
Selection of observed species	BCSIII-10	BY2	BY5	BY15	BY29	BY31	BY38	REFM1V1
Red=potentially toxic species	15/2	11/2	16/2	14/2	13/2	12/2	12/2	16/2
Hose 0-10 m	presence	presence	presence	presence	presence	presence	presence	presence
Centrales	present	present	common	common	present	present	present	present
Chaetoceros								present
Chaetoceros castracanei						present		
Chaetoceros danicus					present	present	present	
Chaetoceros similis								present
Chaetoceros subtilis						present		
Cylindrotheca closterium								present
Licmophora		present						
Skeletonema marinoi	present	present		present	present	common	present	dominating
Thalassiosira								present
Thalassiosira angulata	present							
Alexandrium								present
Amphidinium							present	
Amphidinium sphenoides				present				
Dinophysis acuminata	present							
Gymnodiniales	common	common	common	common	common	common	common	present
Gyrodinium			present				present	
Gyrodinium flagellare			present		present			
Katodinium glaucum	present			present	present			
Peridiniales				present				
Peridiniella catenata			common	present		present	common	
Octactis speculum		present						
Aphanizomenon		common		present		common	common	
Lemmermanniella pallida				present	present			
Pseudanabaena		present			common	present		
Snowella	very common	very common	very common	very common	common	common	common	common
Binuclearia lauterbornii	present		present	present	present	present	present	present
Cryptomonadales	very common	very common	very common	common	common	common	very common	common
Pyramimonas			present					
Oocystis		present	present	present	present		present	
Choanoflagellatea						present		
Mesodinium rubrum	common	common	present	common	present	common	common	common
Ciliophora	common	common	common	common	common	present	common	common
Flagellates	present	common	common	common	present	present	common	common
Unicell	common	common	common	common	common	present	common	common


The Skagerrak
Station: Å17
Station: Å15
Station: Å13
Station: Släggö
Station: P2
2021-02-09
2021-02-10
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
2021-02-10
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
2021-02-11
2021-02-16
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.


The Eastern Baltic
Station: BCS III-10
Station: BY10
Station: BY15 Gotland Deep
Station: BY20 Fårö Deep
2021-02-15
2021-02-14
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.



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.


SMHI
www.smhi.se


Havs
och Vatten
myndigheten