Dnr: S/Gbg-2019-103

SMHI
Oceanographic Unit
No 8, August 2019

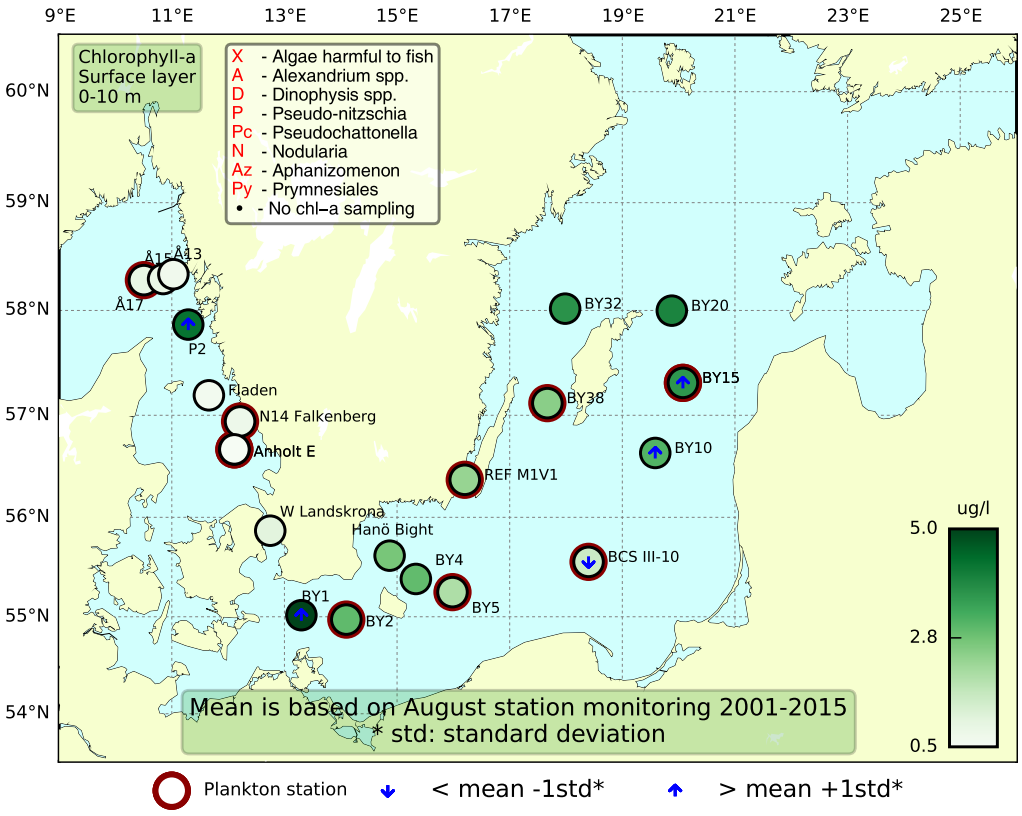
AlgAware

ALGAL SITUATION IN MARINE WATERS SURROUNDING SWEDEN

Sammanfattning

Vid samtliga växtplanktonstationer i Västerhavet dominerade små celler. Kalkalgen *Emiliania huxleyi* var talrikast men även olika cryptomonader var vanliga. Bland de större arterna var kiselalgen *Pseudosolenia calcar-avis* och dinoflagellaten *Prorocentrum micans* vanliga vid båda stationerna i Kattegatt. Olika nakna dinoflagellater var vanliga i Skagerrak. De integrerade klorofyllhalterna visade på låga halter men inom det normala för månaden.

De filamentösa cyanobakterierna hade gått ner rejält i antal och vid BCSII-10 i sydöstra Östersjön saknades de helt i proverna. Bara vid BY5 och BY15 fanns *Aphanizomenon flosaquae* i förhöjda cellantal. Piko cyanobakterier var desto vanligare och vid BY2 var det kiselalgen *Dactyliosolen fragilissimus* som dominerade i provet utöver ciliater och små flagellater. Det var förhöjda klorofyllhalter i Bornholmsbassängen och vid BY1 var de integrerade värdena (0-10 och 0-20m) över det normala för månaden. Även öster om Gotland var klorofyllvärdena höga, till stor del orsakade av filamentösa och kolonibildande cyanobakterier.



Abstract

All stations along the Swedish West coast had a domination of small cells. The coccolithophore *Emiliania huxleyi* dominated in cell numbers at more or less all stations. Different species of the order cryptomonadales were also common. In the Kattegat the larger cells were dominated by the diatom *Pseudosolenia calcar-avis* and the dinoflagellate *Prorocentrum micans*. In the Skagerrak the larger cells were mainly different naked dinoflagellates. The integrated chlorophyll concentrations were low but within normal for the month.

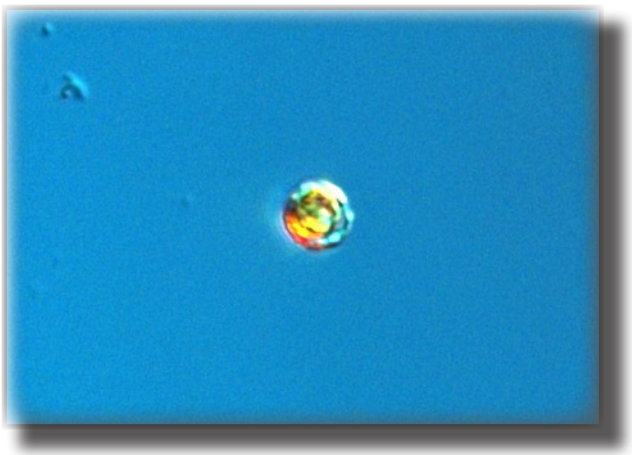
Filamentous cyanobacteria were low in general in cell numbers this month and at BCSIII-10 in the southeastern Baltic they were absent. Only at the stations BY5 and BY15, *Aphanizomenon flosaquae* was found in rather high amounts. Pico cyanobacteria were abundant and at BY2 the diatom *Dactyliosolen fragilissimus* dominated in addition to ciliates and small flagellates. The chlorophyll concentrations were high in the Bornholm Basin and at BY1 the integrated concentrations were above normal for this month. The chlorophyll concentrations were high east of Gotland as well, mainly caused by filamentous and colony forming cyanobacteria.

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

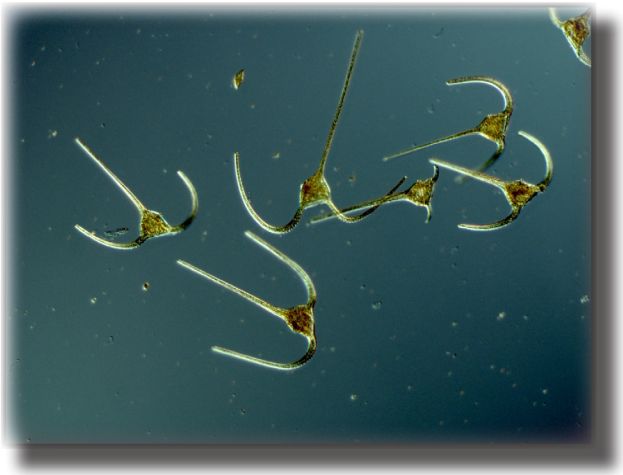
The Skagerrak

Å17 (open Skagerrak) 20th of August
Relatively high biodiversity but low total cell concentrations dominated by small cells. Only a few large cells were found. The community was dominated by the coccolithophore *Emiliania huxleyi* that was found in numbers close to half a million cells per litre. Among the larger cells different naked dinoflagellates belonging to the order gymnodiniales were most abundant. A fluorescence peak was found at 30 meters and contained high cell numbers of different species belonging to the dinoflagellate genus *Ceratium*. The integrated chlorophyll concentrations were within normal for this month.

Släggö (Skagerrak coast) 22nd of August
Total cell numbers was relatively low but biodiversity was moderate. Small cells dominated and the coccolithophore *Emiliania huxleyi,* was found in highest cell concentrations. The dinoflagellate *Prorocentrum micans* dominated in cell numbers among the larger cells. The sample was taken outside the ordinary cruise. The integrated chlorophyll concentrations were low but within normal for the month.



The coccolithophore *Emiliania huxleyi* was very abundant in the Kattegat and Skagerrak samples.



The dinoflagellate genus *Ceratium* caused a fluorescence peak at Å17.

The Kattegat

Anholt E 19th and 20th of August
The total cell number was relatively low and dominated by small cells where the coccolithophore *Emiliania huxleyi,* was found in highest cell numbers. Different species of the order cryptomonadales were also found in higher cell numbers. Among the larger cells the diatom *Pseudosolenia calcar-avis* were found in highest cell numbers. The chlorophyll concentrations were low but within normal for this month.

N14 Falkenberg 20th of August
The total cell number and biodiversity was relatively low and dominated by small cells where the coccolithophore *Emiliania huxleyi,* was found in highest cell numbers. Different species of the order cryptomonadales were also found in higher cell numbers. Among the larger cells the diatom *Pseudosolenia calcar-avis* were found in highest cell numbers. The chlorophyll concentrations were low but within normal for this month.

The Baltic Sea

BY2 19th of August
There were high cell numbers of the diatom *Dactyliosolen fragilissimus*, and *Cerataulina pelagica* and *Pseudosolenia calcar-avis*. Low amounts of the filamentous cyanobacterium *Aphanizomenon flosaquae* were found. Unidentified naked dinoflagellates, gymnodiniales, were abundant. The potentially harmful dinoflagellate *Prorocentrum cordatum* was present in low cell numbers. The integrated chlorophyll concentrations were elevated, but within normal for this month.

BY5 18th of August
Phytoplankton diversity was low. The filamentous cyanobacterium *Aphanizomenon flosaquae* was present in moderate amounts. The integrated chlorophyll concentrations were normal for this month.

The diatoms *Dactyliosolen fragilissimus* and *Pseudosolenia calcar-avis* were abundant at BY2.

Various pico cyanobacteria colonies were abundant at most of the Baltic stations.

BY15 17th of August
Pico cyanobacteria colonies were abundant and small flagellates were found in high cell numbers. Moderate amounts of *A. flosaquae* as well as a few filaments of *Nodularia spumigena* were found. The integrated chlorophyll concentrations were elevated, but just within normal for this month.

BCSIII-10 18th of August
The phytoplankton diversity was low although the diatom *Chaetoceros danicus,* ciliates and small flagellates were rather abundant. The integrated chlorophyll concentrations were below normal for this month.

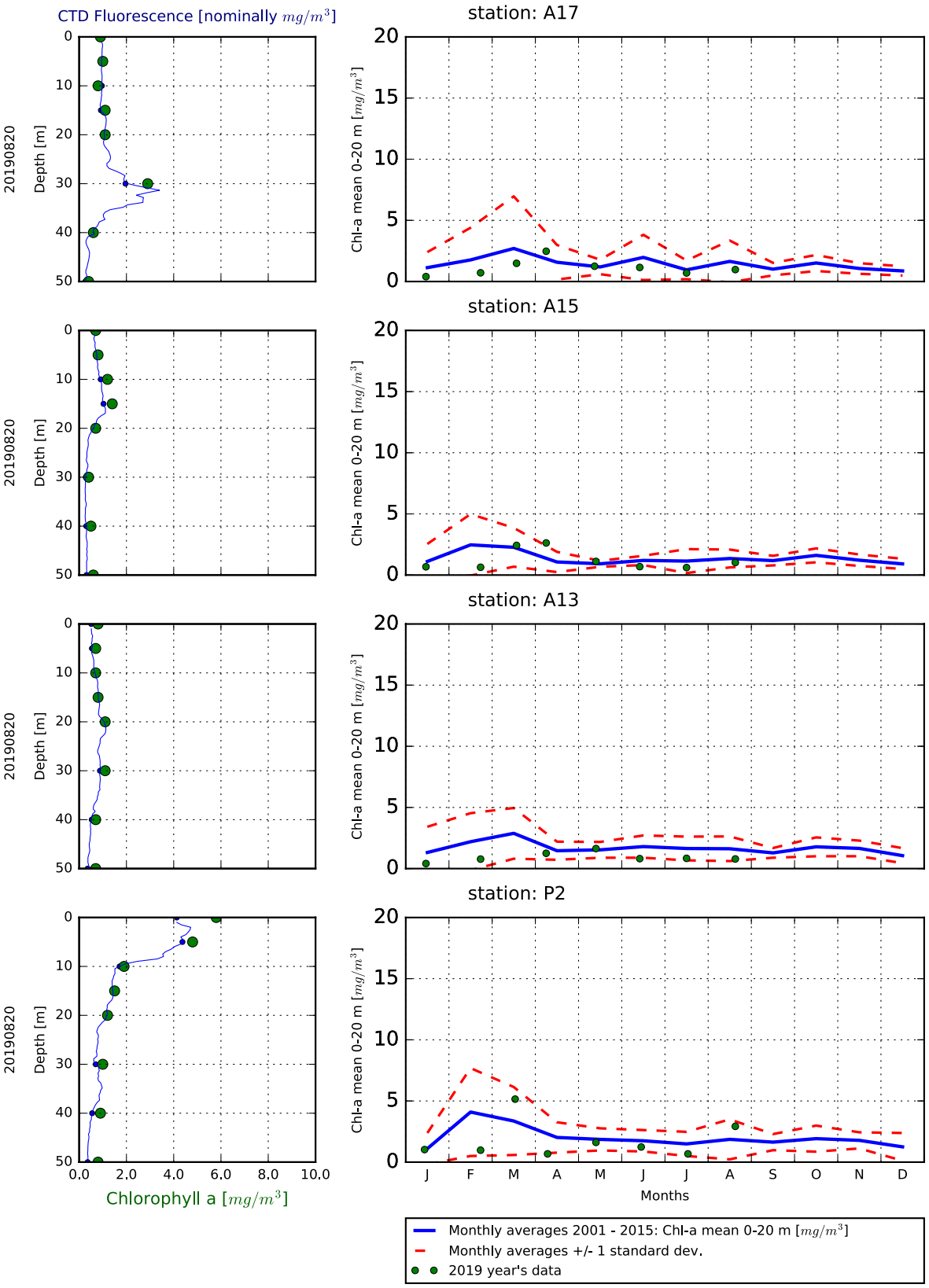
RefM1V1 21st and BY38 22nd of August
The green algae *Binuclearia lauterbornii*, pico cyanobacteria colonies, ciliates and small flagellates were found in high cell numbers. The filamentous cyanobacteria *A. flosaquae* and *Dolichospermum* were present in low amounts. The integrated chlorophyll concentrations were normal for this month.

Phytoplankton analysis, text and photos:
Marie Johansen and Ann-Turi Skjevik.

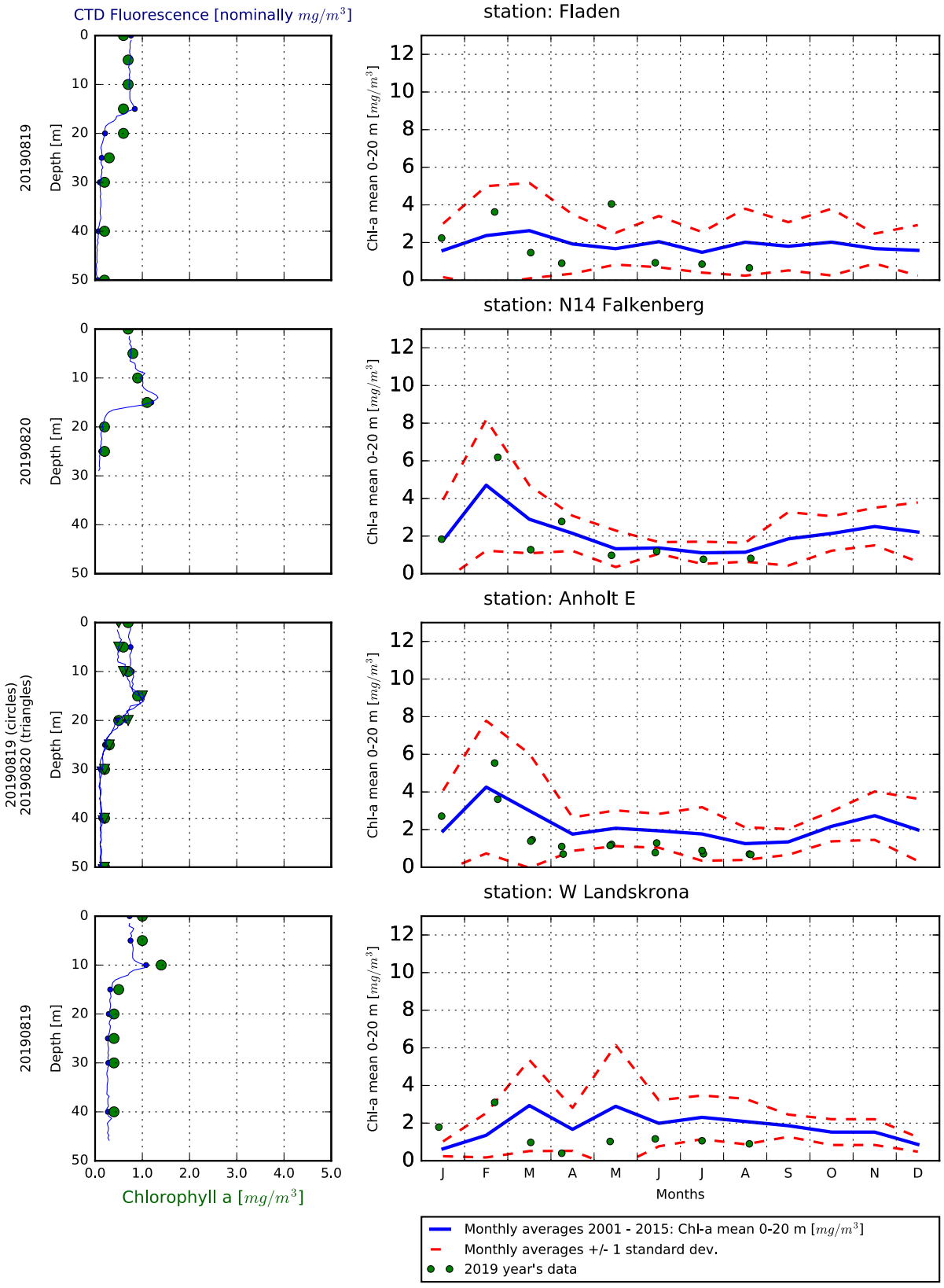
Selection of observed species	Anholt E	Anholt E	N14 Falkenberg	Släggö	Å17
Red=potentially toxic species	19/8	20/8	20/8	22/8	20/8
Hose 0-10 m	presence	presence	presence	presence	presence
Cerataulina pelagica					present
Chaetoceros debilis	present				
Chaetoceros tenuissimus					present
Chaetoceros throndsenii	present				present
Dactyliosolen fragilissimus	present		present		present
Guinardia delicatula				present	
Guinardia flaccida	present				
Leptocylindrus minimus				present	
Nitzschia longissima	present	present		present	
Proboscia alata	present		present		present
Pseudosolenia calcar-avis	common	common	common	present	
Ceratium furca				present	
Ceratium fusus	present	present	present		present
Ceratium horridum				present	
Ceratium macroceros				present	present
Ceratium tripos	present	present	present	present	present
Dinophysis norvegica				present	present
Gonyaulax		present			
Gymnodiniales	common	present	common	common	common
Heterocapsa		present	present		
Lingulodinium polyedrum		present			
Peridiniales				present	
Polykrikos schwartzii		present			
Prorocentrum micans	present	present	present	common	present
Protoperidinium		present	present		present
Protoperidinium divergens	present	present	present		
Protoperidinium pellucidum	present	present			
Dinobryon balticum					present
Dinobryon faculiferum					present
Emiliania huxleyi	very common	very common	very common	very common	common
Prymnesiales		present			
Cryptomonadales	very common	common	common		present
Telonema subtile	present				
Dictyocha speculum					present
Ebria tripartita				present	
Ciliophora	common	present		present	present

Selection of observed species	BCSIII-10	BY2	BY5	BY15	BY38	REFM1V1
Red=potentially toxic species	18/8	19/8	18/8	17/8	22/8	21/8
Hose 0-10 m	presence	presence	presence	presence	presence	presence
Cerataulina pelagica		present	present			
Chaetoceros castracanei	present		present	present	present	present
Chaetoceros convolutus		present	present			
Chaetoceros danicus	common				present	
Chaetoceros throndsenii		present			present	
Cyclotella choctawhatcheeana					present	present
Cylindrotheca closterium		present				
Dactyliosolen fragilissimus		common				
Nitzschia longissima						present
Pseudosolenia calcar-avis		present	present			
Rhizosolenia pungens			present			
Skeletonema marinoi						present
Thalassiosira	present	present	present			
Amphidinium crassum		present	present		present	present
Ceratium tripos		present				
Dinophysis acuminata			present	present		present
Gymnodiniales	present	present	common	present	present	common
Gymnodinium verruculosum	present	present	present			
Heterocapsa			present			
Heterocapsa rotundata	present					
Heterocapsa triquetra		present	present		present	common
Katodinium glaucum	present	present	present	present		
Nematopsides vigilans		present				
Peridiniella danica					present	
Prorocentrum cordatum		present			present	
Prorocentrum micans						present
Dinobryon faculiferum		present				
Cryptomonadales	common	common	common	common	common	common
Prymnesiales	present	present	present	common		
Aphanizomenon flosaquae		present	common	common	present	present
Aphanocapsa		present		common		common
Aphanothece paralleliformis				common	common	present
Cyanodictyon					present	present
Dolichospermum lemmermannii		present			present	present
Lemmermanniella				common	present	present
Nodularia spumigena		present	present	present	present	
Pseudanabaena				common		
Snowella	present	present		common	present	present
Binuclearia lauterbornii				common	common	present
Oocystis				present	present	present
Pseudopedinella pyriformis	present					
Quadricoccus euryhalinicus		present		present		
Pterosperma	present		present	present	present	present
Pyramimonas	present	present	common	present	present	present
Eutreptiella						common
Ebria tripartita	present	present			present	present
Paulinella ovalis						present
Leucocryptos marina						present
Flagellates					common	
Ciliophora	common	common	common	common	common	common
Helicostomella subulata		present	present			
Mesodinium rubrum	present		present	present	present	
Strombidium	present		present			

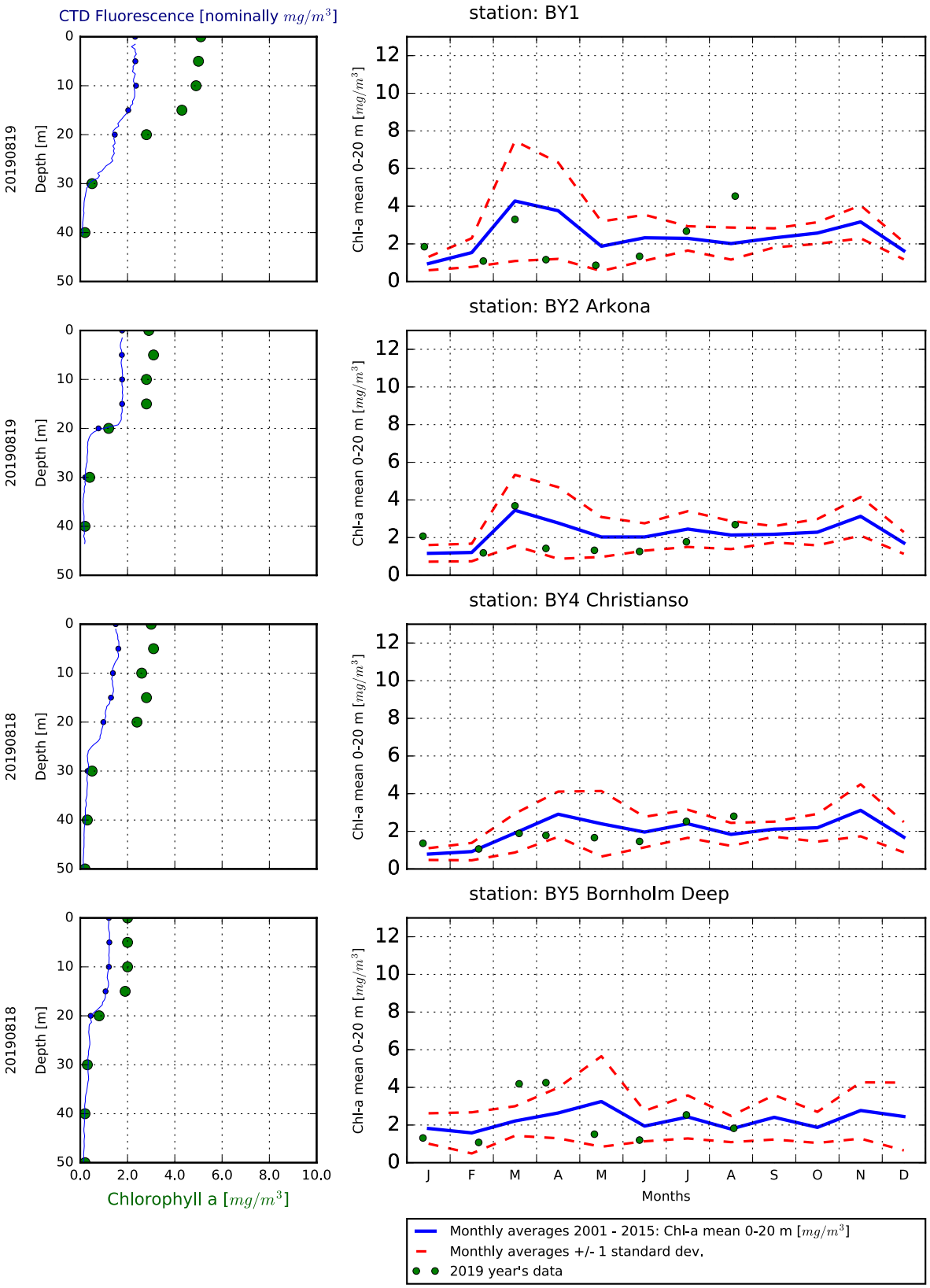
The Skagerrak



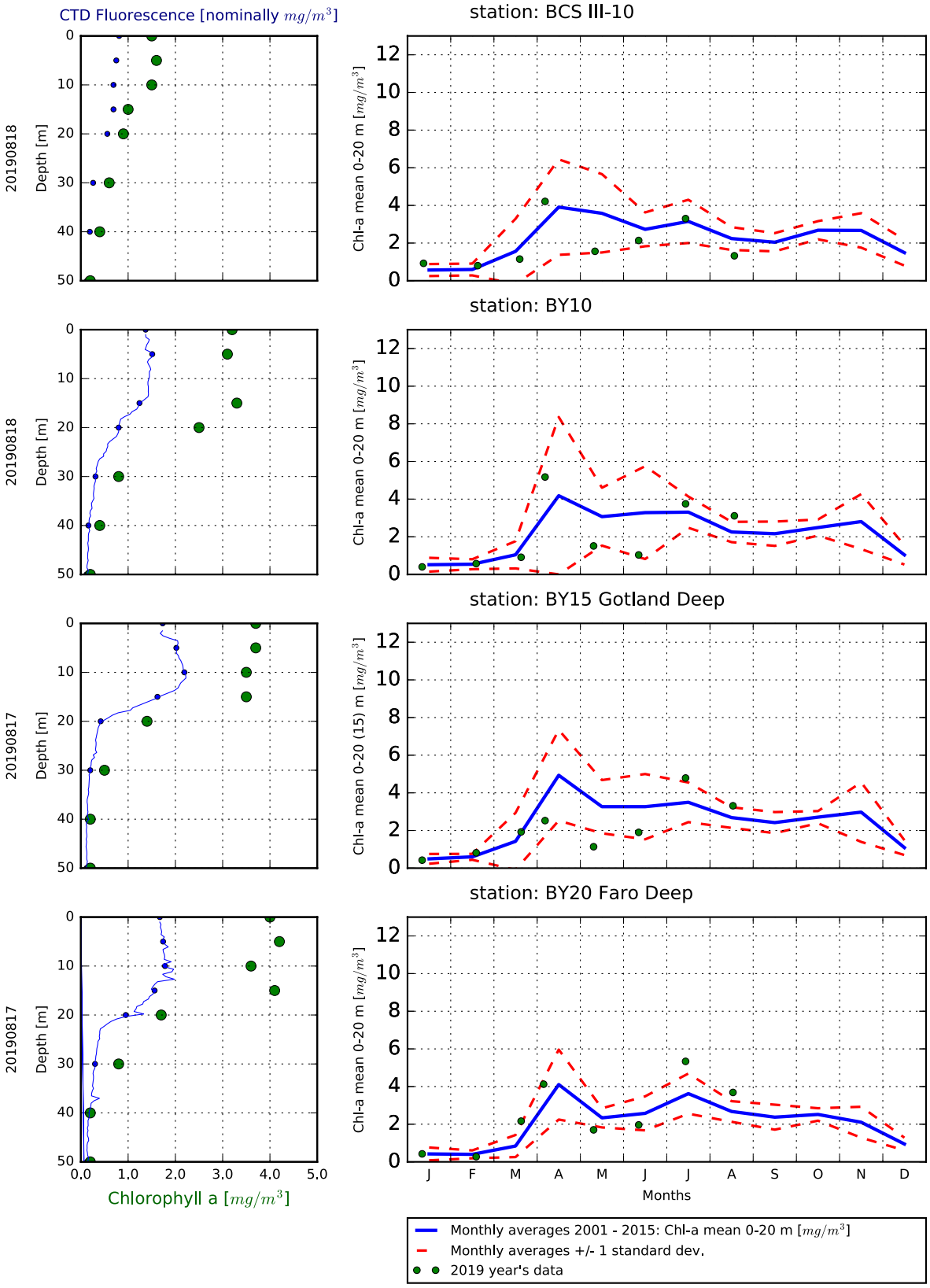
The Kattegat and The Sound

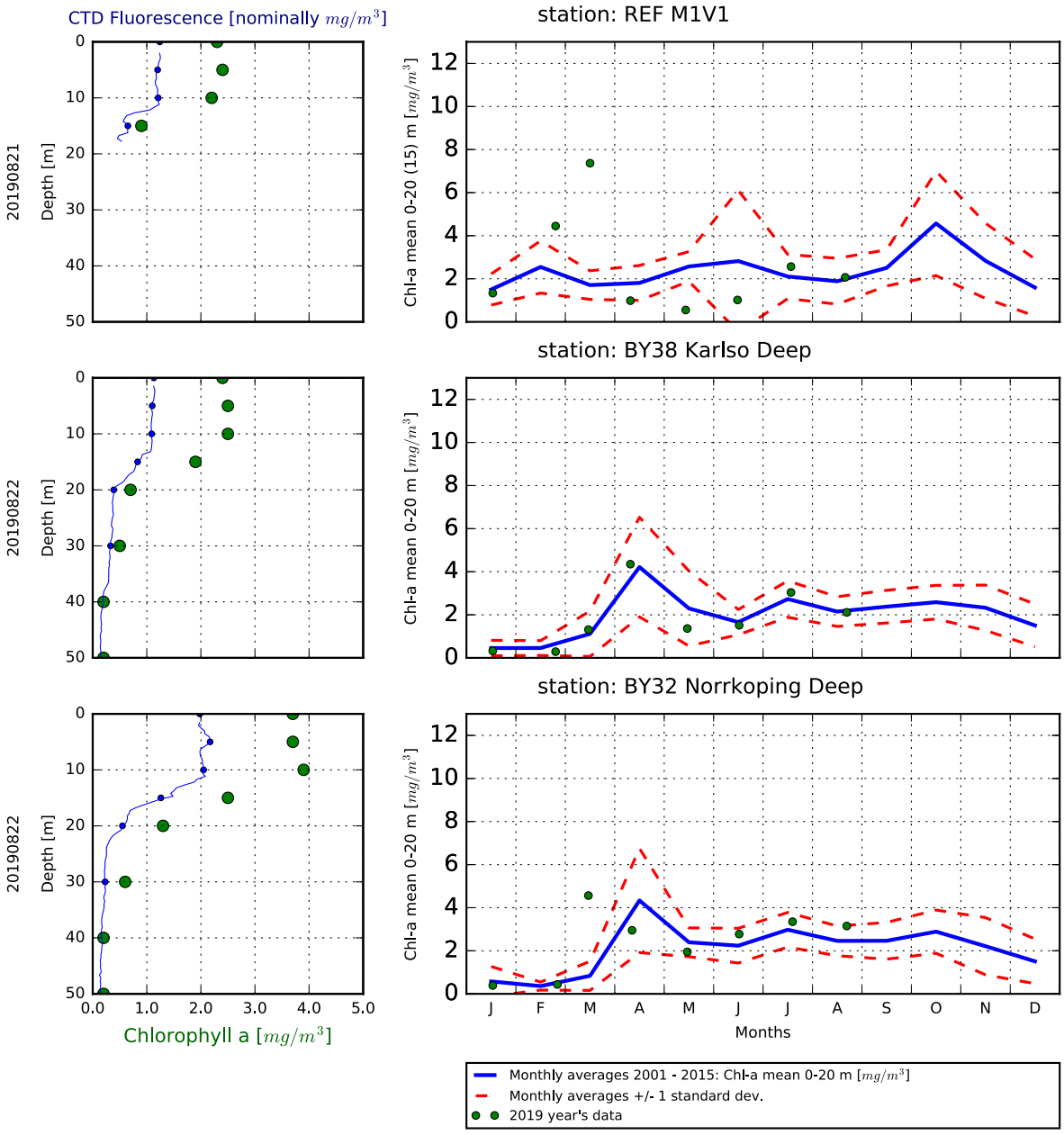


The Southern Baltic



The Eastern 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 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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myndigheten