SMHI

Oceanographic Unit
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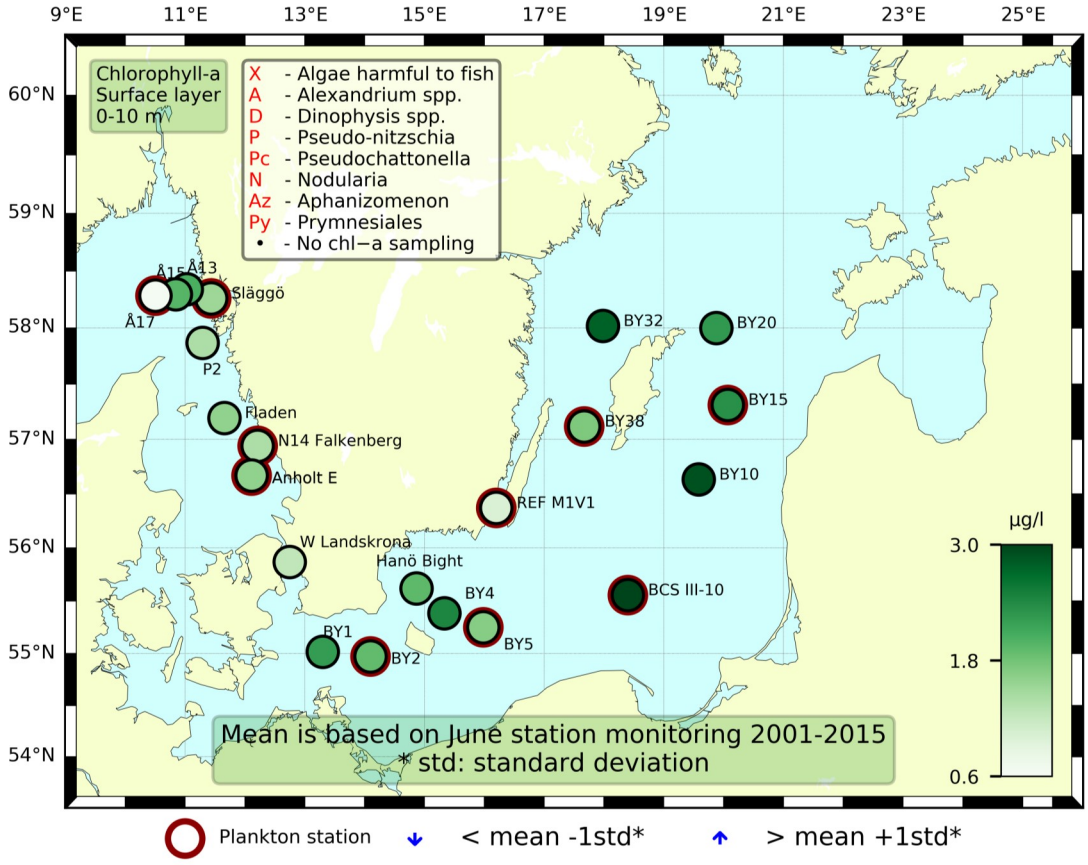
AlgAware

ALGAL SITUATION IN MARINE WATERS SURROUNDING SWEDEN

Sammanfattning

Både artdiversitet och totala cellantal var högre vid Släggö (kuststation) än vid Å17 (utomskärs) vid denna provtagning. Kiselalger dominerade vid båda stationerna med en tydlig dominans av *Guinardia flaccida*. Denna art dominerade även i de fluorescenstoppar som återfanns. De två stationerna i Kattegatt innehöll få celler och generellt var artdiversiteten låg. Även här återfanns fluorescenstoppar som även de dominerades av kiselalgen *Guinardia flaccida*. Klorofyllhalterna var låga men inom det normala för månaden vid samtliga växtplanktonstationer på Västkusten.

Både artdiversiteten och cellantalen var normala för Östersjöstationerna. Mindre dinoflagellater av ordningen *Gymnodiniales* spp., *Heterocapsa triquetra*, den filamentösa cyanobakterien *Aphanizomenon flosaquae* samt flera olika mindre kolonibildande cyanobakterier återfanns i relativt höga cellantal. De integrerade klorofyllhalterna (0-10 samt 0-20 m) var inom det normala för denna månad vid samtliga stationer.



Abstract

Both the species diversity and total cell numbers were higher at Släggö (coastal station) than at Å17 (outer sea) at the time of sampling. Diatoms dominated at both stations and predominantly *Guinardia flaccida* was found. This species also dominated in the fluorescence peaks that were sampled. The two stations in the Kattegat contained few cells and the biodiversity was generally low. The fluorescence peaks found mainly contained the diatom *Guinardia flaccida*. The integrated (0-10 m and 0-20 m) chlorophyll concentrations were low but within normal for the month at all phytoplankton stations along the west coast.

Both species diversity and cell numbers were normal for the Baltic Sea stations. Smaller dinoflagellates of the order *Gymnodiniales* spp., *Heterocapsa triquetra*, the filamentous cyanobacteria *Aphanizomenon flosaquae* as well as several smaller colony-forming cyanobacteria were present in relatively high cell numbers. The integrated chlorophyll (0-10 m and 0-20 m) were within normal for this 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) 4th of June

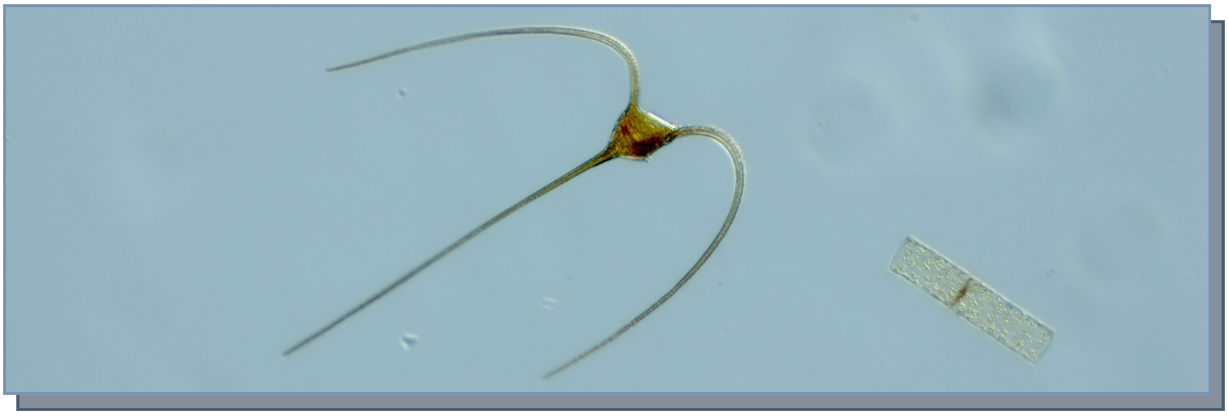
Both the phytoplankton diversity and the total cell concentrations were low. The larger cells of the community were dominated by the diatom *Guinardia flaccida*. The dinoflagellate *Tripos muelleri* was also found in higher numbers. Among the smaller cells the coccolithophore *Emiliania huxleyi* was most common but quite a few cells of the order cryptomonadales were also found. The integrated chlorophyll concentrations (0-10 m and 0-20 m) were within normal for this month.

Släggö (Skagerrak coast) 4th of June

Both the phytoplankton diversity and the total cell concentration were relatively high. The plankton community was dominated by diatoms. Among the larger cells *Guinardia flaccida* clearly dominated, but *Cerataulina pelagica, Dactyliosolen fragilissimus* and *Guinardia delicatula* were also present in moderate cell numbers. The dinoflagellates were less abundant and *Tripos muelleri* was most common. The amount of small cells was low. The integrated chlorophyll concentrations (0-10 m and 0-20 m) were within normal for this month.

Fluorescence peaks

Several fluorescence peaks were found at 15-20 m at several stations in the Skagerrak. The discrete samples taken from these depths were mainly dominated by the diatom *Guinardia flaccida*. At station P2 close to the border of Kattegat the sample taken at about 20 m contained equal amounts of *G. flaccida* and *Tripos macroceros*.



The diatom *Guinardia flaccida (*right) was abundant at all fluorescence peaks found along the west coast. At station P2, close to the border to Kattegat, it was found together with the dinoflagellate Tripos macroceros (left) in equal amounts.

The Kattegat

Anholt E 4th and 5h of June

Both the phytoplankton diversity and the total cell concentrations were low at both sampling occasions. The larger cells were dominated by the diatom *Proboscia alata* on the first occasion but the second occasion was dominated by *Tripos muelleri*. The diatoms *Thalassionema nitzschioides* and *Dactyliosolen fragilissimus* were also relatively abundant on the second occasion. The coccolithophore *Emiliania huxleyi* were most common among the smaller cells. The integrated chlorophyll concentrations (0-10 m and 0-20 m) were low but within normal for this month on both occasions.

N14 Falkenberg 5th of June

The phytoplankton diversity was moderate but the total cell concentration was low. The dinoflagellate genus *Tripos* dominated among the larger cells. The diatom *Thalassionema nitzschioides* was most common among the diatoms. Small cells dominated with a variety of species where the order cryptomonadales and the coccolithophore *Emiliania huxleyi* were most common. The integrated chlorophyll concentrations (0-10 m and 0-20 m) were low but within normal for this month.

Fluorescence peaks

A couple of fluorescence peaks were found and sampled. These samples were dominated by *Guinardia flaccida* but the dinoflagellate *Tripos macroceros* was also found.

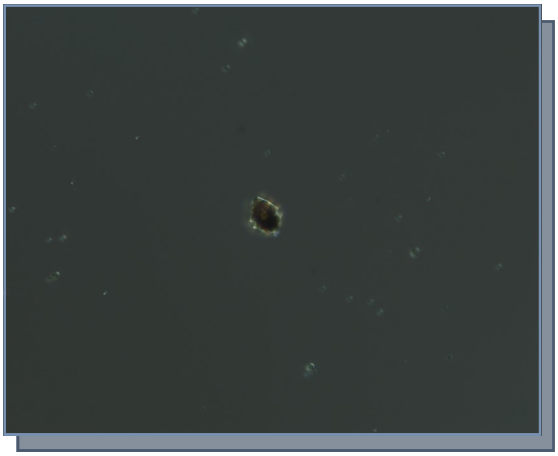
The Baltic Sea

BY2 and BY5 6th of June

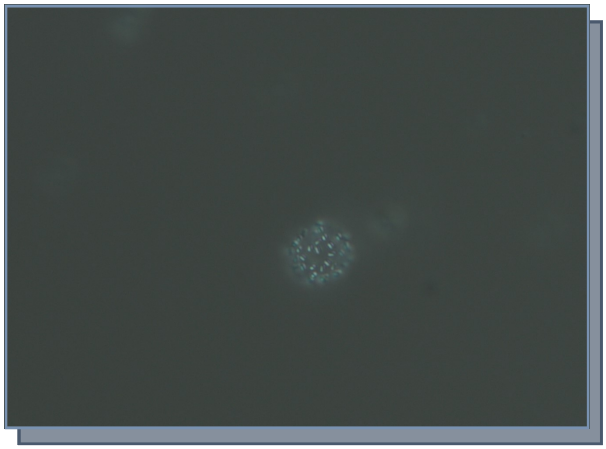
BY2 and BY5 were very similar in cell numbers. At both stations small *Gymnodiniales* spp. were in high numbers as well as the dinoflagellate *Heterocapsa triquetra*. *Aphanizomenon flosaquae* was also abundant at both stations and at BY2 *Snowella litoralis* showed high cell numbers. At BY5 *Nodularia spumigena** was present. The integrated chlorophyll (0-10 m and 0-20 m) were, at both stations, within normal for this month.

BCSIII-10 6th of June

Small *Gymnodiniales* spp., *A. flosaquae* and many different small colony-forming cyanobacteria were most numerous at this station. The integrated chlorophyll (0-10 m and 0-20 m) were within normal for this month.



The dinoflagellate *Heterocapsa triquetra* were in high cell number at BY2 and BY5.



Small colony-forming cyanobacteria, here represented as *Lemmermanniella* cf. *pallida*, were present at all of the Bal-

BY15 7th of June

Small *Gymnodiniales* spp., *A. flosaquae* and the small colony-forming cyanobacteria *Lemmermanniella* cf. *pallida* were most numerous at this station. Also the dinoflagellate *Dinophysis norvegica** were quite common. The integrated chlorophyll (0-10 m and 0-20 m) were within normal for this month.

BY38 2nd of June

BY38 was the station with lowest abundance of cells. Species with highest abundance were small *Gymnodiniales* spp., the choanoflagellate *Calliacantha natans*, the prymnesiophyte *Phaeocystis* sp., *A. flosaquae* and the green algae *Binuclearia lauterbornii*. The integrated chlorophyll (0-10 m and 0-20 m) were within normal for this month.

REFM1V1 3rd of June

This station had low abundance of cells with small *Gymnodiniales* spp., *A. flosaquae*, *H. triquetra* and many different small colony-forming cyanobacteria in highest cell numbers. The integrated chlorophyll (0-10 m and 0-20 m) were within normal for this month.

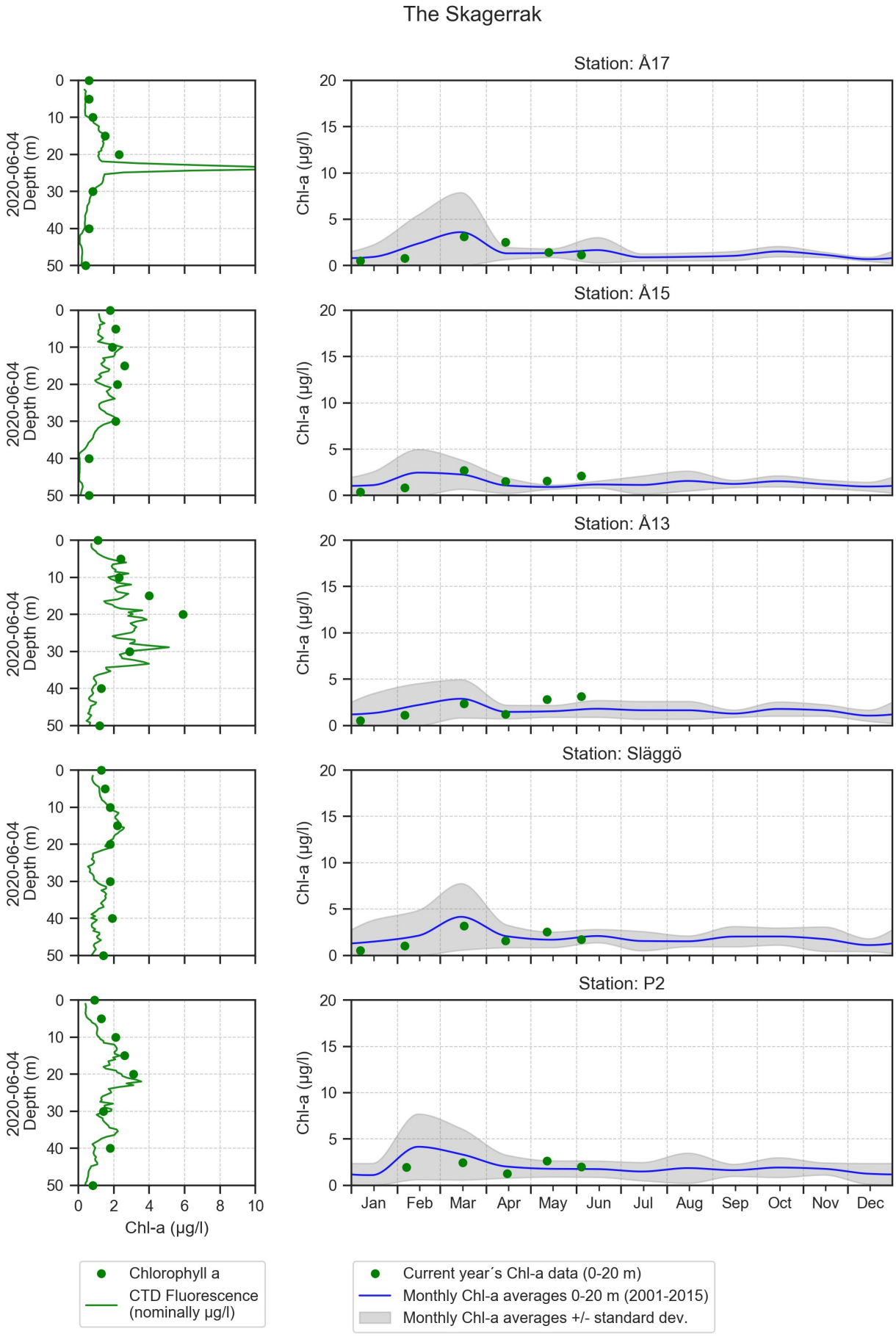
Fluorescence peaks

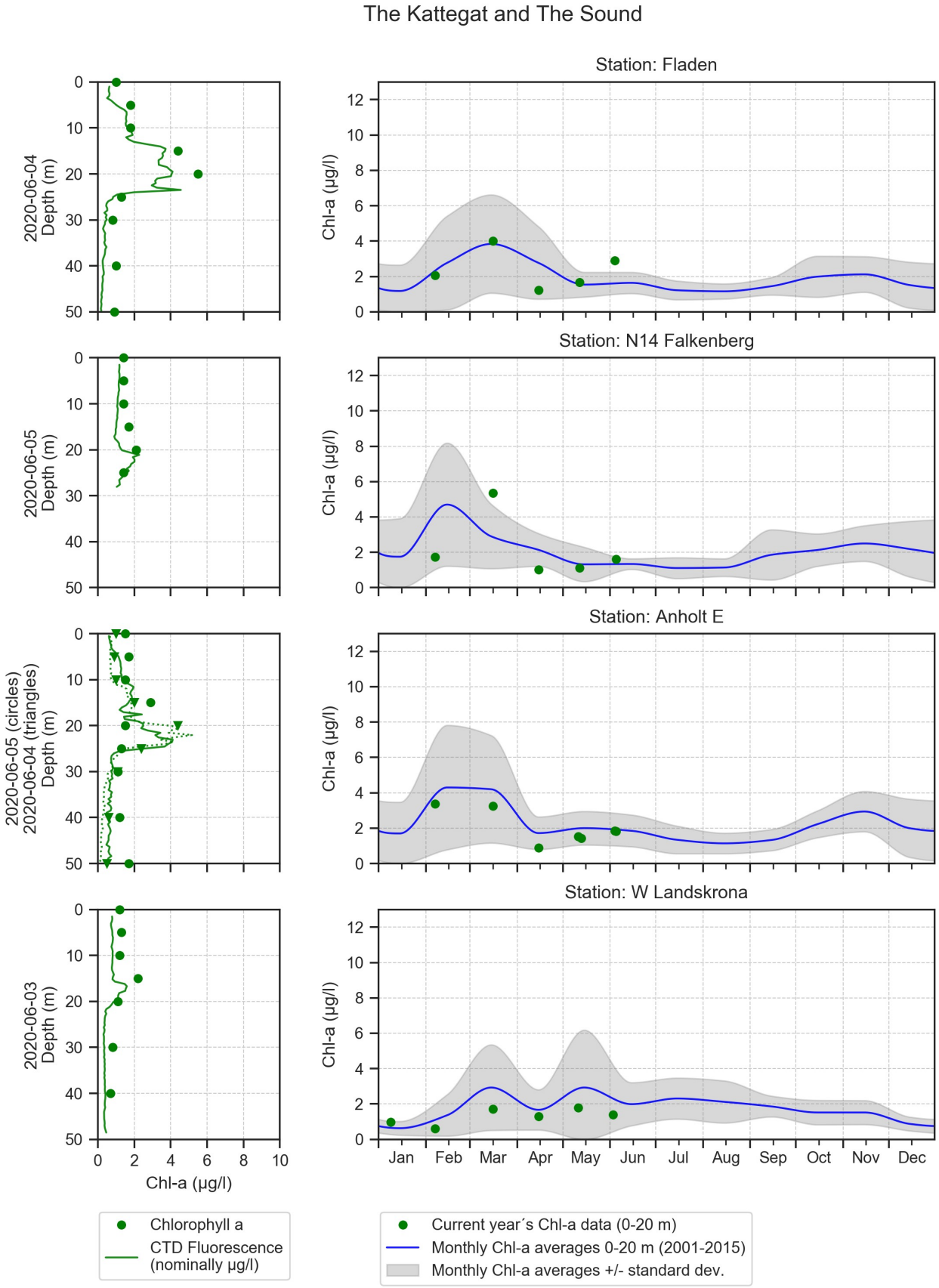
All sampled fluorescent peaks were very similar to the integrated sample, except at BY32 where the peak consisted of mainly *Phaeocystis* sp.

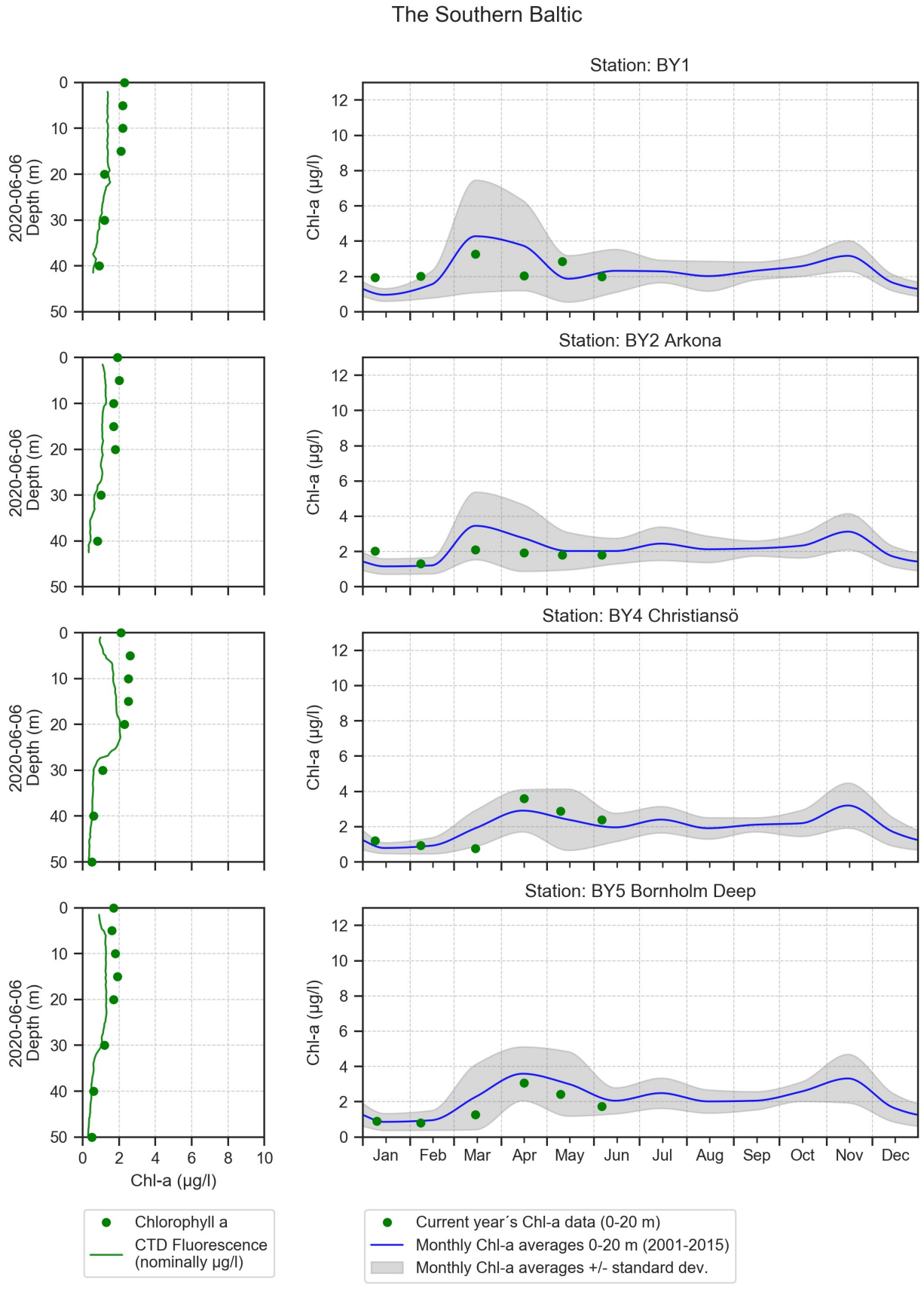
Phytoplankton analysis, text and photos:
Maria Karlberg och Marie Johansen.

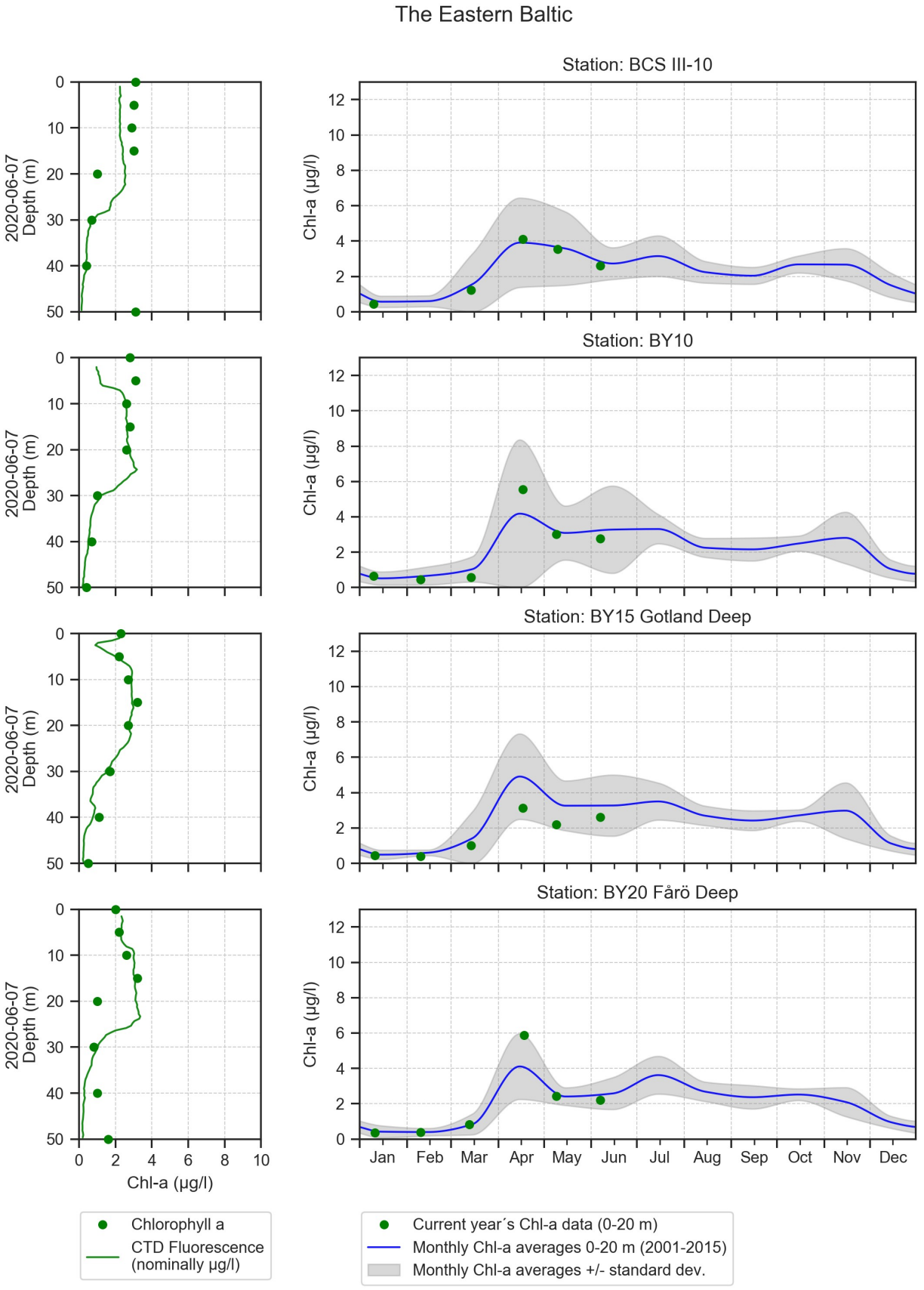
Selection of observed species	**Anholt E**	**Anholt E**	**N14**	**Släggö**	**Å17**
Red=potentially toxic species	**4/6**	**5/6**	**5/6**	**4/6**	**4/6**
Hose 0-10 m	**presence**	**presence**	**presence**	**presence**	**presence**
Cerataulina pelagica		present		very common	common
Chaetoceros danicus	present	present	present		
Coscinodiscus radiatus	present		present		
Cylindrotheca closterium			present		
Dactyliosolen fragilissimus	present	common	present	common	present
Guinardia delicatula		present	present	present	
Guinardia flaccida	present	present	present	very common	very common
Proboscia alata	common	common	common	present	present
Rhizosolenia hebetata f. semispina	present	present		present	present
Rhizosolenia imbricata					present
Rhizosolenia setigera				present	
Skeletonema marinoi	present		present	present	
Thalassionema nitzschioides	present	common	very common		
Tripos fusus	present	present	present	present	
Tripos longipes					present
Tripos muelleri	common	very common	very common	common	common
Gymnodiniales		present	present	common	
Peridiniales		present		present	
Prorocentrum balticum		present		present	
Protoperidinium bipes			present		
Protoperidinium pellucidum				present	
Dinobryon				present	
Dinobryon faculiferum	present				
Emiliania huxleyi	common		common	present	common
Prymnesiales		present		present	present
Pterosperma			present		
Pyramimonas	present				
Cryptomonadales		present	common	present	common
Leucocryptos marina		present	common	present	
Telonema subtile			present		
Pseudopedinella pyriformis			present		
Lemmermanniella	present	present	present		
Choanoflagellatea	present	present	present		
Ebria tripartita		present	present		
Ciliophora	present	common	common		present
Helicostomella subulata	present				
Laboea strobila			present	present	present

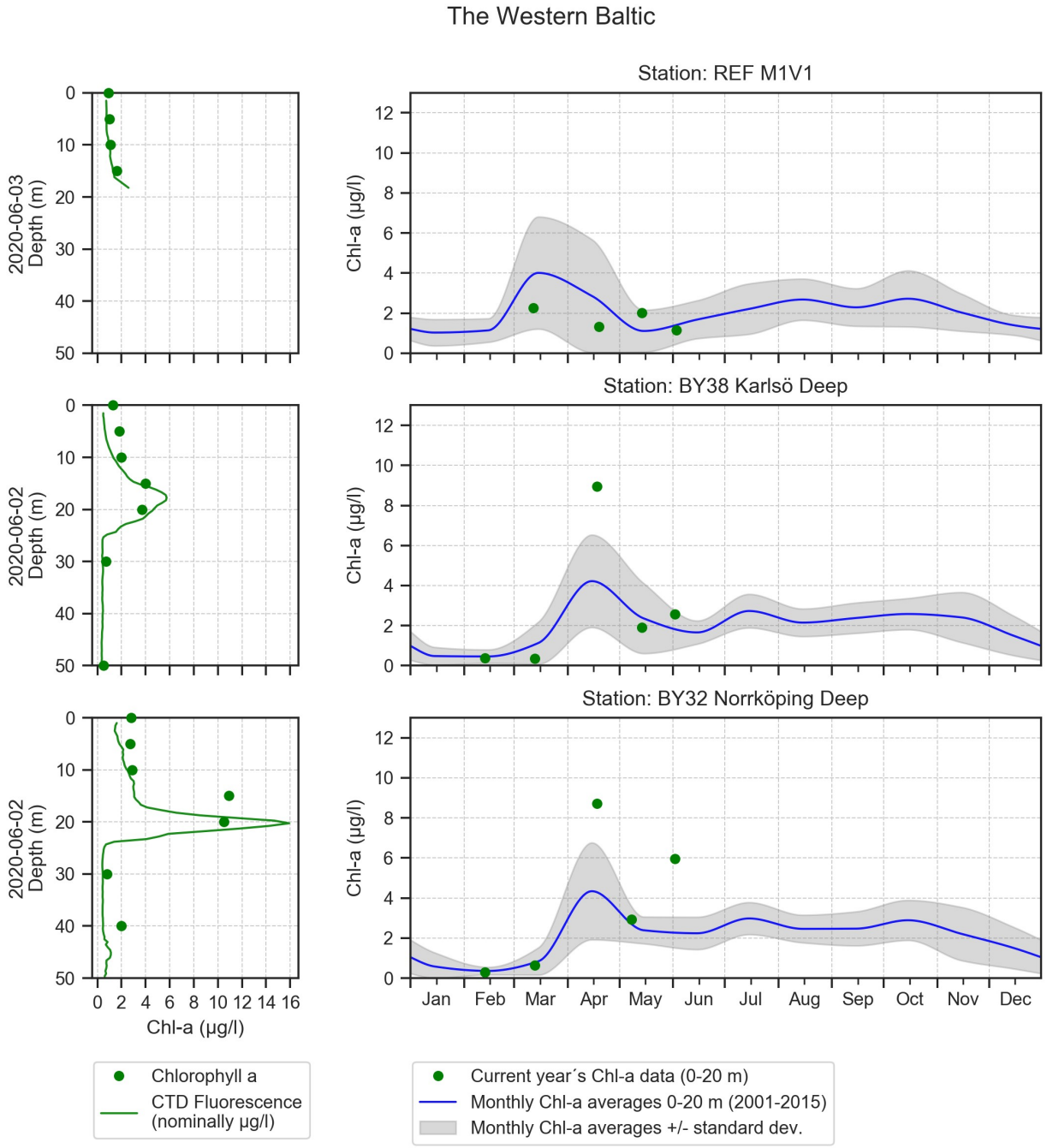
Selection of observed species	BCSIII-10	BY2	BY5	BY15	BY38	REFM1V1
Red=potentially toxic species	7/6	6/6	6/6	7/6	2/6	3/6
Hose 0-10 m	presence	presence	presence	presence	presence	presence
Centrales		present	present			
Chaetoceros danicus			present			
Chaetoceros similis	present	present		present		
Chaetoceros subtilis	present			present		
Coscinodiscus radiatus					present	
Dactyliosolen fragilissimus		present				
Pennales					present	
Skeletonema marinoi					present	present
Alexandrium	present					present
Dinophysis acuminata	present	present	present	present	present	
Dinophysis norvegica	common			common		
Gymnodiniales	very common	very common	very common	very common	common	common
Gymnodinium verruculosum	present	present		present		
Gyrodinium fusiforme						present
Heterocapsa rotundata	present	common	common	present		present
Heterocapsa triquetra	present	very common	very common			common
Karenia mikimotoi	common		present	common		
Karlodinium veneficum	present	present	common	common	present	
Peridiniella danica	present				common	
Protoperidinium bipes						present
Protoperidinium brevipes				present		present
Protoperidinium steinii	present					
Dinobryon divergens						present
Dinobryon faculiferum	present		present	present		present
Ollicola vangoorii						present
Phaeocystis	common	common	common	common	common	present
Prymnesiales				present		
Oocystis	present					
Binuclearia lauterbornii	common	present	present	common	present	present
Pyramimonas		common		present		present
Cryptomonadales	common	common	common	common	present	present
Eutreptiella	present	common	present	present		present
Aphanizomenon flosaquae	very common	common	common	very common	present	common
Aphanocapsa	common	present	present	common	present	common
Aphanothece	common			present		
Cyanodictyon			present			
Cyanodictyon cf. balticum	present			present		
Cyanodictyon cf. planctonicum						present
Dolichospermum						present
Lemmermanniella cf. pallida	common	common	present	very common	common	common
Lemmermanniella cf. parva	common	common	present	present	common	present
Limnothrix					present	
Nodularia spumigena			present			
Pseudanabaena		present	present	present		present
Snowella litoralis	common	very common	common	present	present	common
Calliacantha natans					common	
Ebria tripartita		common	present			
Ciliophora	common	present	present	common	present	present
Mesodinium rubrum	present					present
Strombidium						present


The Skagerrak
Station: Å17
Station: Å15
Station: Å13
Station: Släggö
Station: P2
2020-06-04
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
2020-06-04 Depth (m)
2020-06-05 Depth (m)
2020-06-05 (circles) 2020-06-04 (triangles) Depth (m)
2020-06-03 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
2020-06-06
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
2020-06-07
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, the Kattegat and the Skagerrak. Results from semi quantitative microscopic analysis of phytoplankton samples as well as chlorophyll measurements are presented in brief in this report. Information from SMHI's 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; headache, 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.	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.
Pseudo- nitzschia 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

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Havs och Vatten myndigheten