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SMHI

Oceanographic Unit
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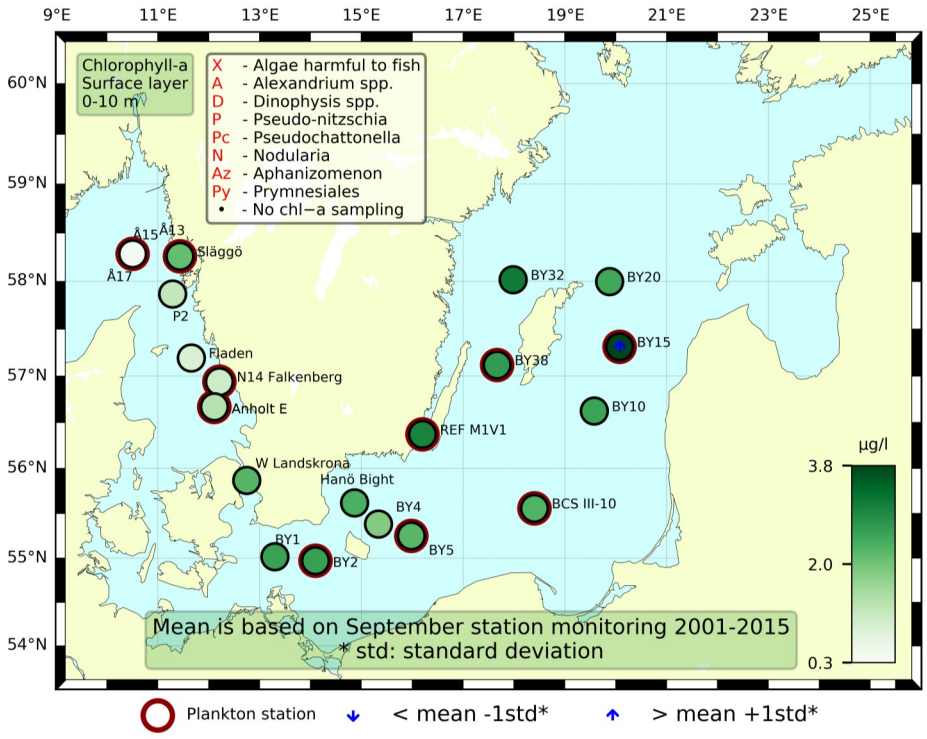
AlgAware

ALGAL SITUATION IN MARINE WATERS SURROUNDING SWEDEN

Sammanfattning

Diversiteten av växtplankton var varierande i Västerhavet. Vid Anholt E samt Släggö var den relativt hög medan Å17 samt N14 Falkenberg innehöll få arter och mestadels små celler. Det fanns relativt höga cellantal av kalkflagellaten *Emiliania huxleyi* i samtliga Västerhavsproverna. De integrerade klorofyllhalterna (0-10 m och 0-20 m) var inom det normala i Västerhavet.

Överlag bestod växtplanktonsamhället i Östersjön av mindre celler med en total dominans av riktigt små celler vid vissa stationer. Olika ciliater var också vanliga i de flesta prover. Några enstaka filament av olika cyanobakterier återfanns också vid flertalet stationer. De integrerade klorofyllhalterna var inom det normala vid de flesta stationer undantag var BY15 och BY38 där de var något över det normala för denna månad.



Abstract

The phytoplankton diversity varied along the Swedish west coast. At Anholt E and Släggö it was moderate whereas Å17 and N14 Falkenberg had few cells and mainly small ones. Relatively high cell abundance of the coccolithophore *Emiliania huxleyi* was found at all stations. The integrated chlorophyll concentrations were within normal for this month all stations.

Overall the phytoplankton community in the Baltic Sea consisted of small cells with a total domination of really small cells at some stations. Different ciliates were also common in most samples. A few filaments of different cyanobacteria were also found at several stations The integrated chlorophyll concentrations were within normal for this month at most of the Baltic stations the only exception were BY15 and BY38 were the concentrations were a bit above what is normal.

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

The Skagerrak

Å17 (open Skagerrak) 7th of September

The biodiversity and total cell numbers were low and consisted mainly of small cells. The larger cells were dominated by naked dinoflagellates that could not be distinguished to species level. The coccolithophorid *Emiliania huxleyi* was found in highest cell numbers.

Släggö (Skagerrak coast) 7th of September

The species diversity was high and the total cell number moderate. Diatoms dominated with several species in high cell numbers such as the genus *Pseudo-nitzschia**, *Pseudosolenia calcar-avis* and *Skeletonema marinoi.* Among the dinoflagellates *Prorocentrum micans* was most numerous. The coccolithophorid *Emiliania huxleyi* was found in highest cell numbers among the small cells.

The integrated (0-10 m and 0-20 m) chlorophyll concentrations were within normal for both stations in the Skagerrak.

The diatom *Pseudosolenia calcar-avis* was common at all stations along the west coast.

The Kattegat

Anholt E 8th and 12th of September

The communities were similar at both sampling occasions. Relatively high total cell numbers were found and biodiversity were high. Among the larger cells the diatom *P. calcar-avis* dominated and even more so on the second occasion. The coc-colithophore *E. huxleyi* was found in high cell numbers among the smaller cells.

N14 Falkenberg 8th of September

The community was quite diverse but total cell numbers was moderate. The coccolithophorid *E. huxleyi* was found in highest cell numbers.

The integrated (0-10 m and 0-20 m) chlorophyll concentrations were normal for this month at all of the Kattegat stations.

The Baltic Sea

West Landskrona 12th of September

A fluorescence peak at 12m was found and contained a mixture of diatoms. Especially *P. calcar-avis* was found in high abundance but also the genus *Pseudo-nitzschia** and *Rhizosolenia setigera f. pungens* were found.

BY2 Arkona basin 9th of September

Both the species diversity and total cell numbers were at moderate levels. The larger cells were dominated by the diatom *Dactyliosolen fragilissimus* and the dinoflagellate *Tripos muelleri*. The smaller cells were numerous and especially different species of the order cryptomonadales were most common. The cyanobacteria *Aphanizomenon flosaquae* and *Dolichospermum* spp. were present in very low amounts. The integrated chlorophyll concentration (0-10 m) were within normal for this month whereas the integrated concentration (0-20 m) were a bit above what is normal for the month.

BY5 Bornholm basin 9th of September

The species diversity and total cell numbers were both low. Different sorts of ciliates were common and among these mixotrophic species *Mesodinium rubrum*. The diatom genus *Actinocyclus* were found in moderate numbers. The community was otherwise dominated by very small cells in the size range of 1.5 -2 µm width. The integrated chlorophyll concentrations (0-10 m and 0-20 m) were within normal for this month.

BCSIII-10 9th of September

The phytoplankton situation was very similar to the one at BY5 except that no filamentous cyanobacteria were present and the dinoflagellate *Heterocapsa rotundata* was found in higher cell numbers. The very small cells found at BY5 were also found but together with numerous cells belonging to the order cryptomonadales. The integrated chlorophyll concentrations (0-10 m and 0-20 m) were within normal for this month.

BY15 10th of September

The species diversity was low and total cell numbers moderate. The larger cells were dominated by the diatom *Chaetoceros castracanei* and the smaller cells by different cryptomonadales. Different ciliates were also common. A few filaments of cyanobacteria were found and among these *Nodularia spumigena* were recorded. The integrated (0-10 m and 0-20 m) chlo-rophyll concentrations were both above normal for this month.

BY38 11th of September

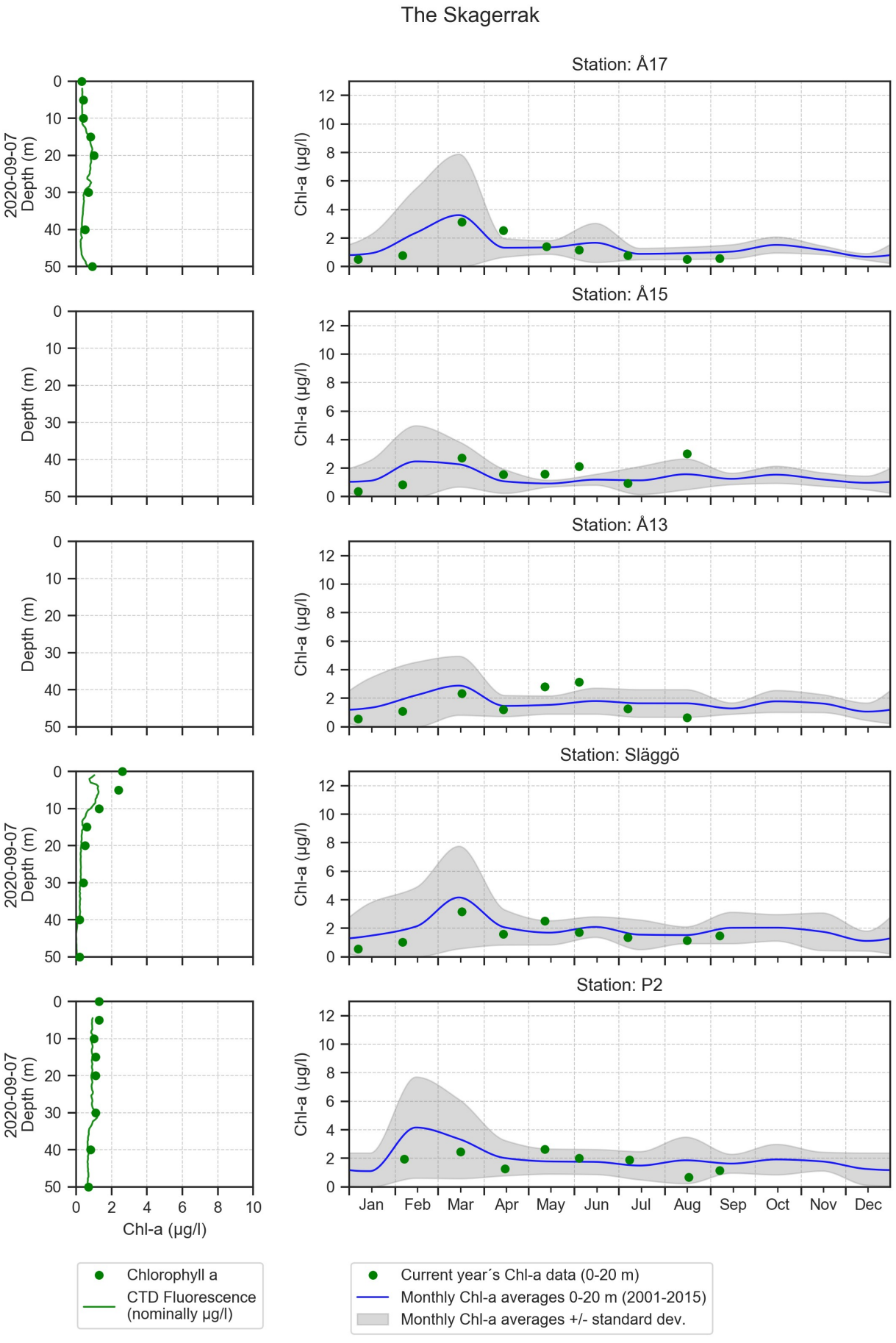
The species diversity and total cell numbers were both low. The larger cells were represented by the diatoms *C. castracanei* and *Actinocyclus* spp. Unarmored dinoflagellate belonging to the order Gymnodiniales were also found in moderate cell numbers. Quite a few filaments of the cyanobacteria *Aphanizomenon flosaquae* were also present. The integrated chloro-phyll concentration (0-10m) was within normal for this month whereas the integrated chlorophyll concentration (0-20m) was above normal for the month.

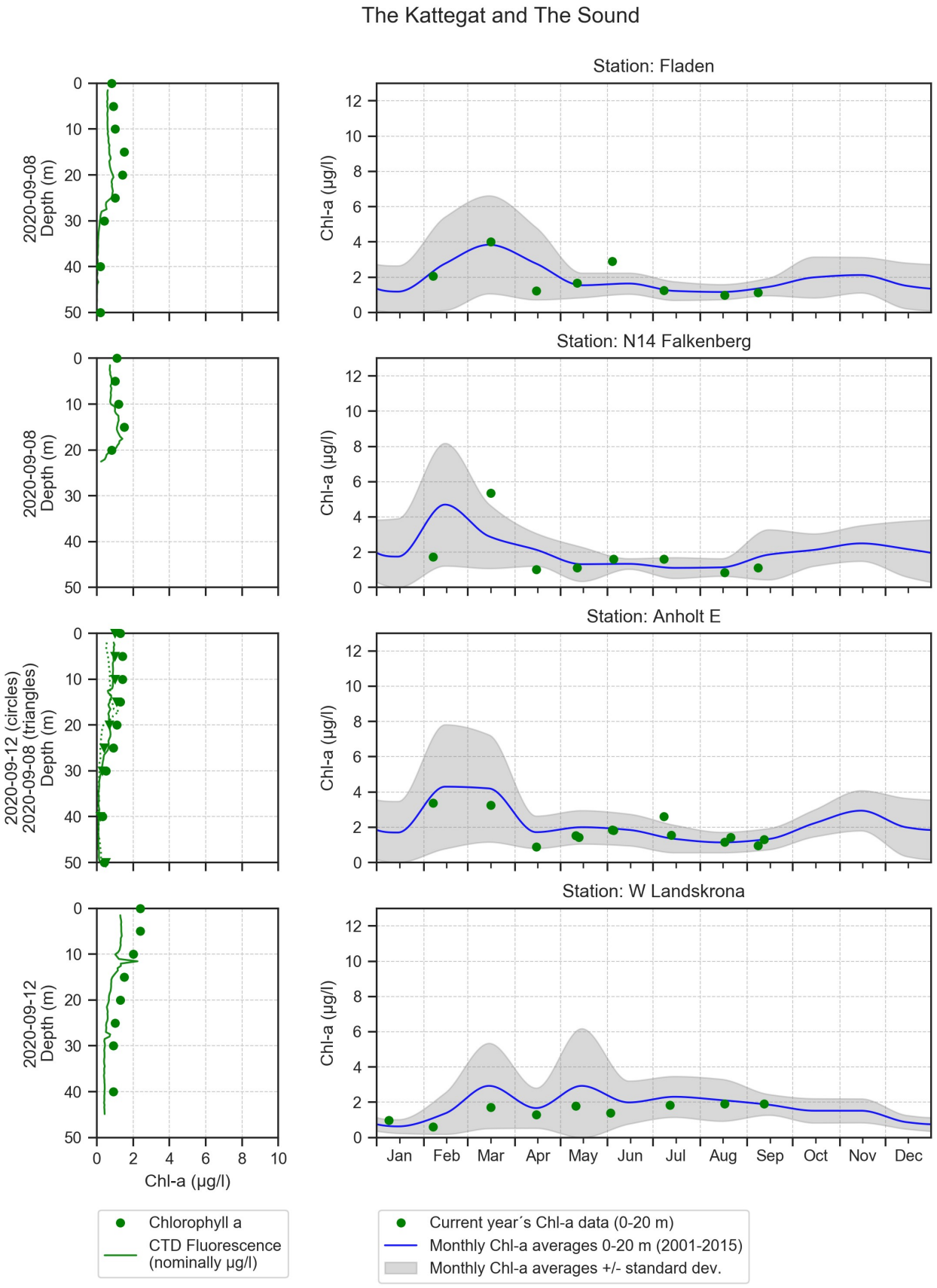
REFM1V1 11th of September

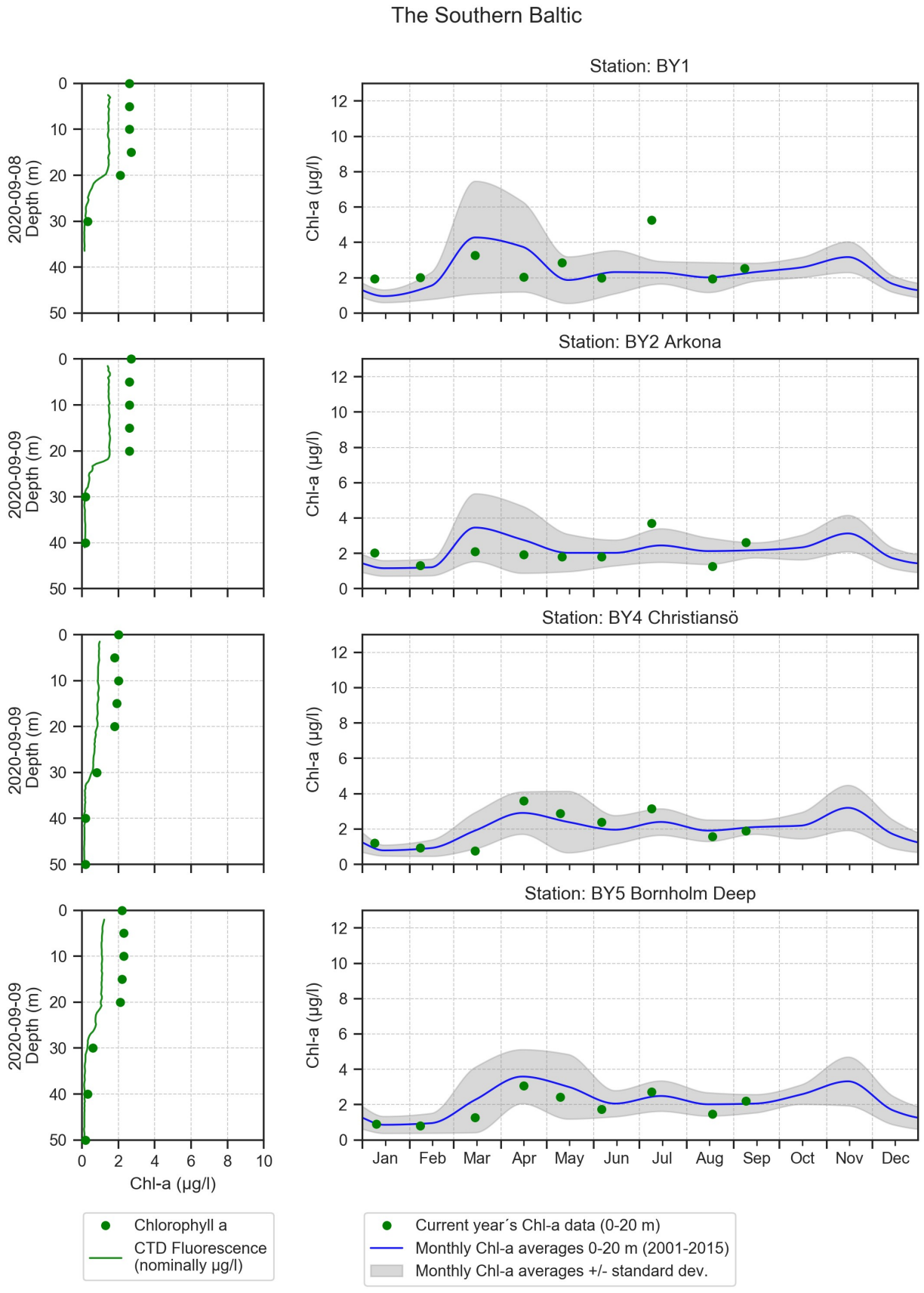
The biodiversity was low but total cell numbers high. The high cell numbers were mainly due to numerous unidentifiable small cells of around 2 µm in diameter. Among the larger cells the dinoflagellate Heterocapsa triquetra were present in moderate numbers. Quite a few filaments of the cyanobacteria *Aphanizomenon flosaquae* were also present. The integrated (0-10 m and 0-20 m) chlorophyll concentrations were within normal for this month.

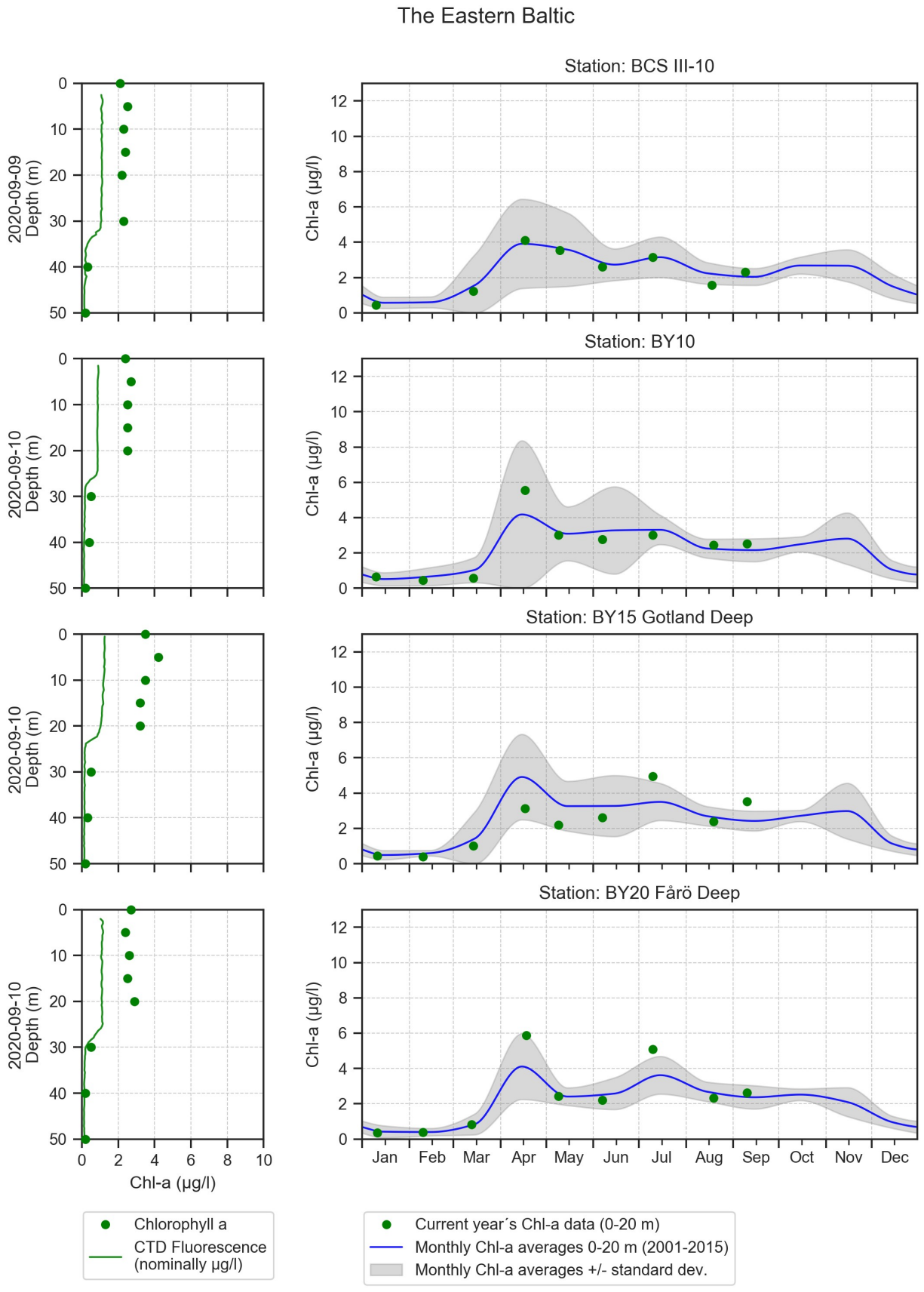
Selection of observed species	Anholt E	Anholt E	N14	Släggö	Å17
Red=potentially toxic species	8/9	12/9	8/9	7/9	7/9
Hose 0-10 m	presence	presence	presence	presence	presence
Cerataulina pelagica				present	
Chaetoceros spp.		present	present	common	present
Chaetoceros affinis		common		present	
Chaetoceros cf. convolutus				present	
Chaetoceros danicus		present			
Chaetoceros muelleri					present
Chaetoceros socialis				common	present
Chaetoceros tenuissimus				common	
Chaetoceros throndsenii		present			
Cylindrotheca closterium				present	
Dactyliosolen fragilissimus	present			present	
Guinardia flaccida	present	present	present		
Lennoxia faveolata					present
Leptocylindrus danicus			present	present	present
Leptocylindrus minimus				present	
Nitzschia longissima	present		present	common	
Pseudo-nitzschia spp.	common	common	common	common	present
Pseudosolenia calcar-avis	common	very common	common	common	present
Rhizosolenia setigera f. pungens	common	present	present	common	present
Skeletonema marinoi				common	
Alexandrium pseudogonyaulax			present		
cf. Azadinium		present			
Dinophysis acuminata	present			present	
Dinophysis norvegica	present	present	present		
Gymnodiniales			present		common
Gymnodinium litoralis	present	present	present		
Gyrodinium spp.	present	present			
Gyrodinium flagellare	present	present			present
Gyrodinium spirale			present	present	
Katodinium glaucum	present		present		
Lingulodinium polyedra				present	
Noctiluca scintillans				present	
Pentapharsodinium dalei			present	present	
Peridiniales			present		present
Polykrikos schwartzii				present	
Prorocentrum micans	present		present	common	
Prorocentrum triestinum				present	
Protoperidinium divergens	present				
Protoperidinium pallidum	present				present
Protoperidinium pyriforme		present			
Tripos furca			present		present
Tripos fusus			present	present	
Tripos lineatus		present			
Tripos macroceros					present
Tripos muelleri	present	present	present		
Dinobryon balticum					present
Dinobryon faculiferum	present	present		present	
Ollicola vangoorii					present
Emiliania huxleyi	common	common	common	common	very common
Pleurochrysis sp.		present			present
Prymnesiales		present	present		
Chlorodendrales	present	present			
Pyramimonas sp.	present	present			present
Cryptomonadales	present	present	present	present	present
Leucocryptos marina					present
Telonema subtile	present	present			present
Dictyocha fibula	present				
Pseudopedinella pyriformis				present	
Choanoflagellatea		present			present
Ciliophora	present	present	present	present	present
Ensiculifera carinata	present		present	present	
Laboea strobila			present		

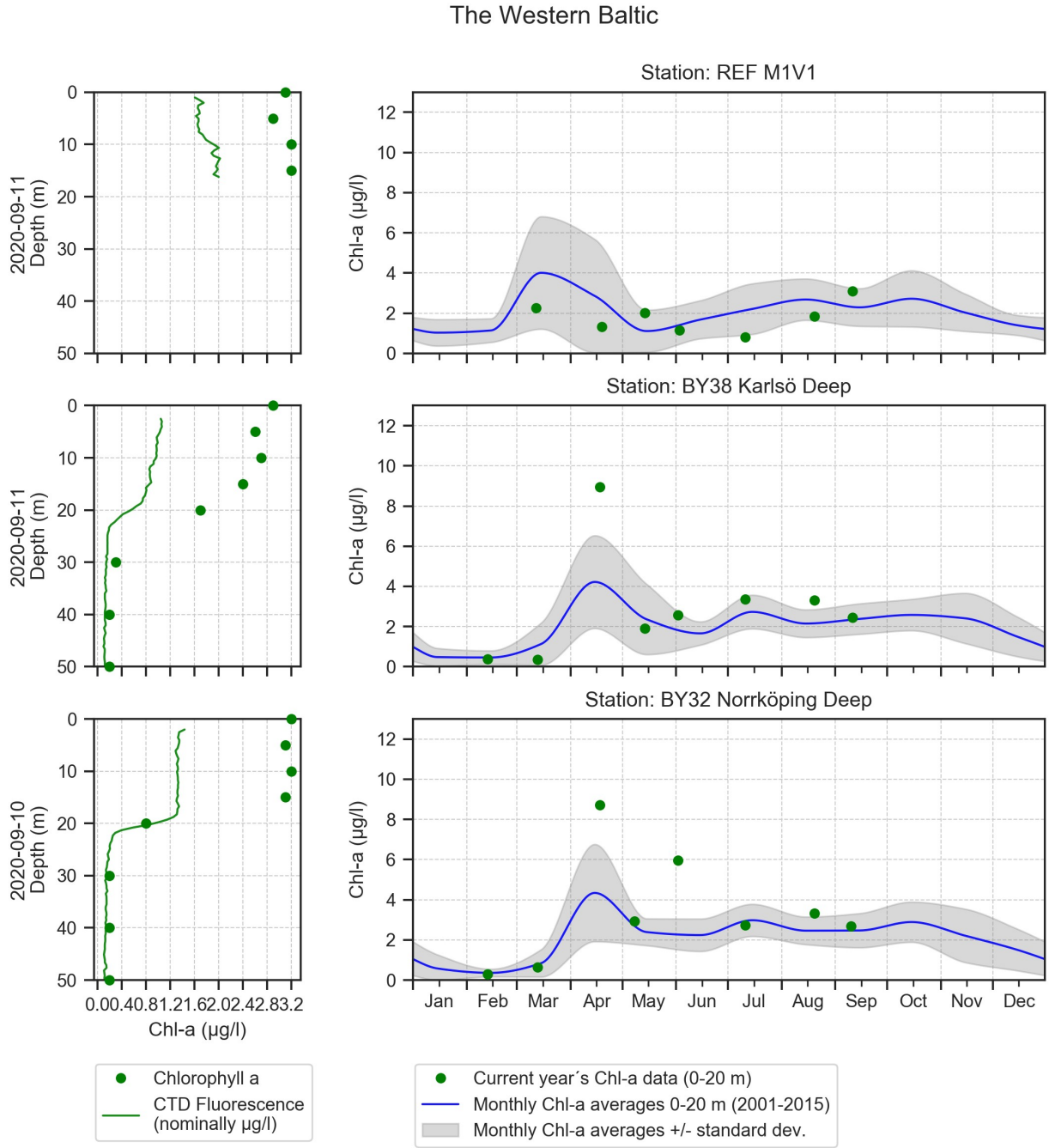
Selection of observed species	BCSIII-10	BY2	BY5	BY15	BY38	RefM1V1
Red=potentially toxic species	9/9	9/9	9/9	10/9	11/9	11/9
Hose 0-10 m	presence	presence	presence	presence	presence	presence
Actinocyclus spp.	present	present	common	present	common	present
Chaetoceros sp.		present				
Chaetoceros castracanei				common	common	present
Chaetoceros convolutus		present				
Chaetoceros danicus				present		
Chaetoceros subtilis					present	
Dactyliosolen fragilissimus		common				
Skeletonema marinoi						present
Dinophysis norvegica					present	
Gymnodiniales	present	common			common	
Heterocapsa rotundata	common	present			present	present
Heterocapsa triquetra	present	present	present			common
Prorocentrum cordatum		present				
Tripos muelleri		common	present			present
Prymnesiales		present				
Oocystis sp.	present					
Pyramimonas sp.	present	present		common	present	
Cryptomonadales	common	very common	present	very common	common	common
Telonema subtile	present	present	present	present		
Aphanizomenon flosaquae		present		present	common	common
Dolichospermum sp.		present				present
Lemmermanniella sp.						present
Nodularia spumigena		present		present		
Pseudanabaena sp.				present	present	present
Snowella sp.	present	present	present	present		
Ebria tripartita		present	present			present
Ciliophora	common	common	common	common	common	common
Mesodinium rubra	common	present	common	common		common
Helicostomella subulata		common				


The Skagerrak
Station: Å17
Station: Å15
Station: Å13
Station: Släggö
Station: P2
2020-09-07
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.


The Kattegat and The Sound
Station: Fladen
Station: N14 Falkenberg
Station: Anholt E
Station: W Landskrona
2020-09-08 Depth (m)
2020-09-12 (circles) 2020-09-08 (triangles) Depth (m)
2020-09-12 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
2020-09-08
2020-09-09
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
2020-09-09
2020-09-10
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.



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 prov-tagningarna kan hämtas från SMHI:s databas på sharkweb.smhi.se. Hydrografidata läggs ut varje månad, växt-planktondata 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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