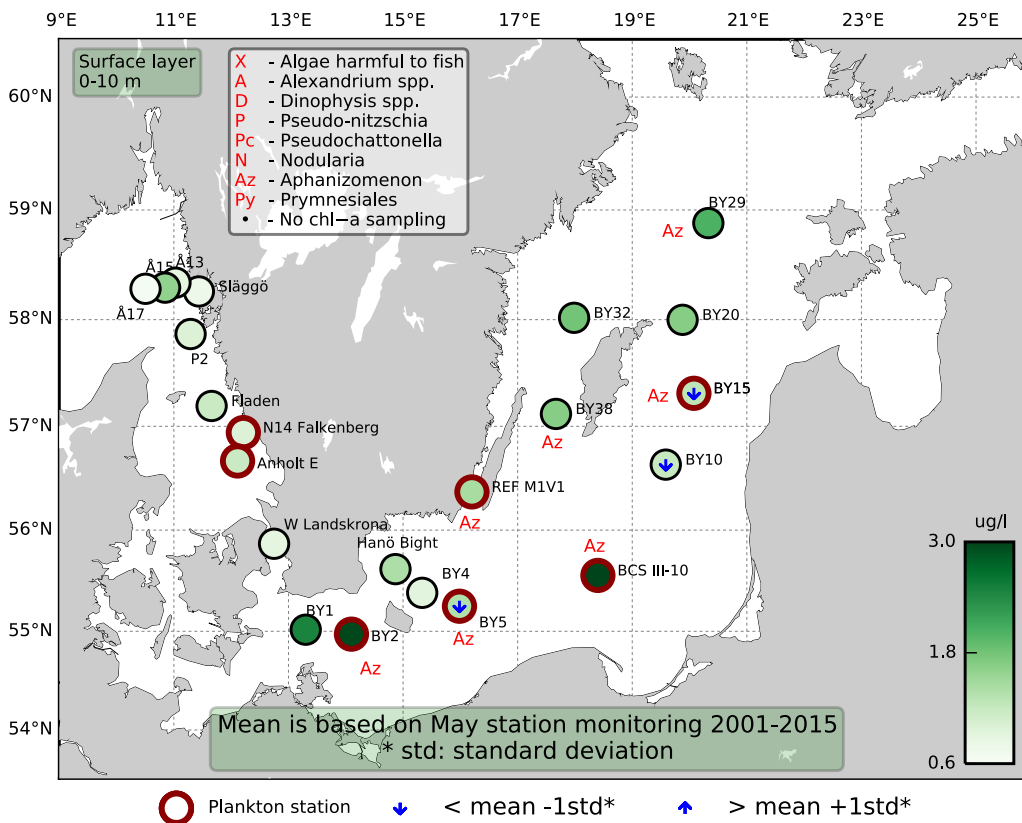


Sammanfattning

De integrerade (0-10 m och 0-20 m) klorofyllvärdena var låga men inom det normala för månaden vid alla stationer i Västerhavet, förutom Å15 där de var högre än normalt. De klorofyllfluorescensmaxima som återfanns orsakades av kiselalger och dinoflagellater. Framför allt dominerade olika arter av *Dinophysis* i dessa toppar men även *Chaetoceros* spp. återfanns vid vissa fluorescensmaxima.

De integrerade (0-20 m) klorofyllvärdena i Östersjön var överlag inom det normala förutom vid BY32 och BY2 där de var högre än normalt, samt vid BY4, BY10 och BY15 där de var lägre än normalt. Vid samtliga stationer i Östersjön var det ett samhälle blandat av dinoflagellater, mindre flagellater, små kolonibildande cyanobakterier och ciliater. Det var även dessa grupper som orsakade de klorofyllfluorescensmaxima på ett par stationer. Även större mängder av den filamentösa cyanobakterien *Aphanizomenon flos-aquae* återfanns vid alla stationer, framför allt vid REF M1V1. Även *Dolichospermum* sp. observerades vid BY2, BY29 samt REF M1V1. Sommarblomningen av cyanobakterier har med andra ord kommit igång i vattenmassan, med det beror på väder och vind hur stora ytansamlingar vi kommer se i sommar.



Abstract

The integrated (0-10 m and 0-20 m) chlorophyll *a* concentrations were low but within normal for this month at all stations in the Kattegat and Skagerrak areas, except for Å15 where chlorophyll concentrations were higher than normal. The chlorophyll fluorescence maxima in these areas were caused by diatoms and dinoflagellates. Species of *Dinophysis* and *Chaetoceros* were most abundant in these peaks.

The integrated (0-20 m) chlorophyll *a* concentrations in the Baltic Sea were within normal at most of the stations except for BY32 and BY2 where concentrations were higher than normal as well as at BY4, BY10 and BY15 where concentrations were below normal. At all Baltic stations the community was a mixture of dinoflagellates, smaller flagellates, tiny colony forming cyanobacteria and ciliates. Several filaments of the cyanobacterium *Aphanizomenon flos-aquae* were also recorded at all stations, especially at REF M1V1. *Dolichospermum* sp. was observed at BY2, BY29 and REF M1V1. The cyanobacteria summer bloom has thus started in the water column, but summer surface accumulations are depending on weather and wind.

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

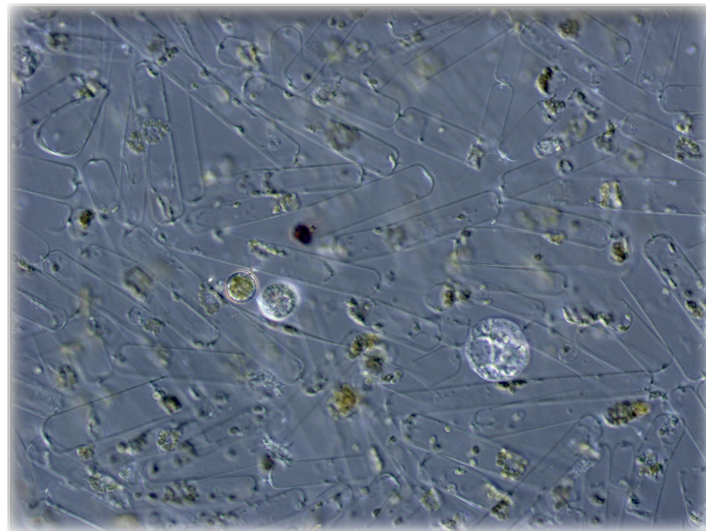
The Skagerrak

Släggö (Skagerrak coast) 26th of May

The community was over all low in cell concentrations, but dominated by the diatoms *Dactyliosolen fragilissimus* and *Skeletonema marinoi*, as well as the dinoflagellate *Ceratium tripos*. A few cells of the toxic species *Dinophysis norvegica** and *Phalacroma rotundatum** were observed. The integrated (both at 0-10 and 0-20 m) chlorophyll *a* concentrations were low but within normal for May.

Å17 (open Skagerrak) 27th of May

This station had a more diverse and higher cell concentration than Släggö. Gymnodiniales (the naked dinoflagellates) dominated, while Cryptomonadales, ciliates and the diatoms *Leptocylindrus danicus* and *Phaeodactylum tricornutum* were found in high numbers. The coccolithophore *Emiliana huxleyi* was also common. A few cells of the toxic species *Alexandrium* sp.*, *Dinophysis acuminata** and *D. norvegica** were observed. The integrated (0-10 m and 0-20 m) chlorophyll *a* concentrations were low but within normal for the month at Å17, Å13 and P2, but above normal at Å15.



The diatom *Dactyliosolen fragilissimus* was common in the Kattegat and Skagerrak samples.

The Kattegat

N14 Falkenberg 27th of May

The total cell numbers were low. The diatoms *Chaetoceros danicus* and *Dactyliosolen fragilissimus* dominated the sample. The integrated (0-10 m and 0-20 m) chlorophyll *a* concentrations were within normal at station N14 as well as at Fladen.

Anholt E 27th of May

The plankton community was dominated by the diatom *Dactyliosolen fragilissimus*, while Gymnodiniales and the smaller Cryptomonadales were also in high numbers. A fluorescence peak was found at 15 meters at Anholt E where *Dinophysis norvegica** was dominating. The peak at 20 m at W Landskrona was dominated by *Chaetoceros curvisetus* and *C. danicus*. The integrated (0-10 m and 0-20 m) chlorophyll *a* concentrations were within normal at stations Anholt E and W Landskrona.

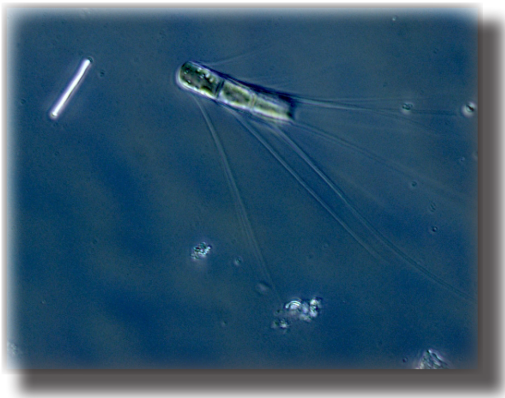
The Baltic Sea

BY2 28th of May

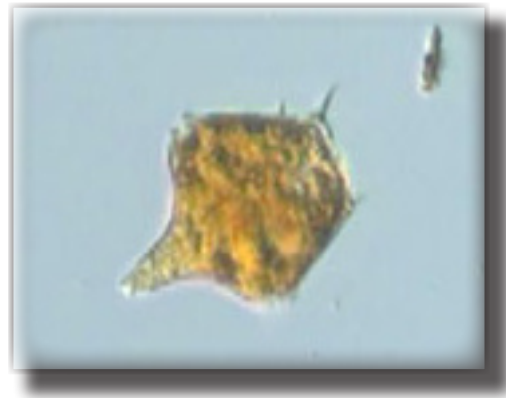
The plankton community was dominated by small flagellates. Several species of cyanobacteria were common, both the small colony forming genus *Aphanothece* and *Cyanodictyon*, as well as the filamentous *Aphanizomenon flos-aquae*. Another filamentous cyanobacteria was also present at this station; *Dolichospermum* sp. A few cells of the toxic *Dinophysis acuminata** and *D. norvegica** were present. The integrated (0-10 m and 0-20 m) chlorophyll *a* concentrations were slightly higher than normal at station BY2 and normal at BY1.

BY5 28th of May

A lot of ciliates, flagellates and colony forming cyanobacteria were found in the sample together with high cell concentrations of the diatom *Chaetoceros similis*, the dinoflagellates Gymnodiniales and the filamentous cyanobacterium *Aphanizomenon flos-aquae*. A few cells of the toxic *Dinophysis acuminata** were present. The integrated (0-20 m) chlorophyll *a* concentration was within normal at station BY5 but below at BY4. However, at 0-10 m the chlorophyll *a* concentration at BY5 was lower than normal for May. The fluorescence peak at 15 meters at BY5 consisted of flagellates and dinoflagellates.



The diatom *Chaetoceros subtilis*



The dinoflagellate *Amylax triacantha* was present at BCSIII-10

REF M1V1 Kalmar Sound 29th of May

The community at this station was very diverse. The dinoflagellates Gymnodiniales and *Peridiniella catenata*, small flagellates, ciliates, the cyanobacterium *Lemmermaniella* sp. as well as the chrysophyte *Dinobryon faculiferum* were present in high cell concentrations. This station had the highest concentration of *Aphanizomenon flos-aquae* of all stations sampled during this cruise. A few cells of the toxic genera *Alexandrium* sp.* and *Dinophysis norvegica** were present. The integrated (0-10 m and 0-20 m) chlorophyll *a* concentrations were within normal.

BCSIII-10 Kalmar Sound 29th of May

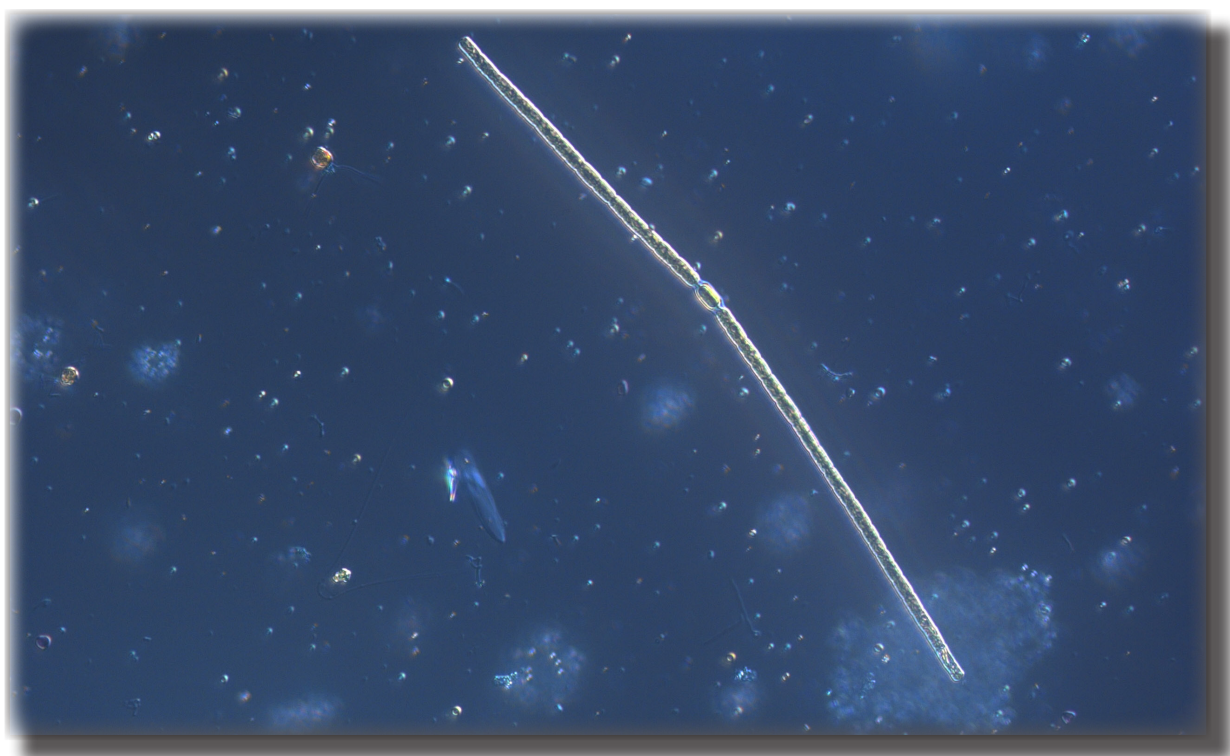
Low total cell numbers were found in the sample. The sample was however dominated by Gymnodiniales, flagellates and *Aphanizomenon flos-aquae*. A few cells of the dinoflagellate *Amylax triacantha* was found only at this station. The integrated (0-10 m and 0-20 m) chlorophyll *a* concentrations were within normal. A fluorescence maximum was found at 15 meters with high cell numbers of dinoflagellates and different flagellates.

BY15 30th of May

At this station the community was dominated by the dinoflagellates *Heterocapsa rotundata* and the group Gymnodiniales, together with smaller cyanobacteria and the filamentous *Aphanizomenon flos-aquae*. Three toxic species were present with low cell numbers; *Dinophysis acuminata**, *D. acuta** and *D. norvegica**. One fluorescence maximum was found at 15 meters at BY15 and one at 17 meters at BY10 where high cell numbers of Gymnodiniales and different flagellates were found. The integrated (0-10 m and 0-20 m) chlorophyll *a* concentrations at both BY10 and BY15 were lower than what is considered normal for this month.

BY38 30th of May

The phytoplankton community was dominated by Gymnodiniales, flagellates, the mixotrophic colony forming chrysophyte *Dinobryon faculiferum* as well as the filamentous cyanobacterium *Aphanizomenon flos-aquae*. A few cells of the toxic *Dinophysis acuminata** and *D. norvegica** were present. The integrated (0-10 m and 0-20 m) chlorophyll *a* concentrations were within normal for BY38 but above normal (0-20 m) for BY32 in May. The fluorescence peak at 20 meters at BY38 consisted of flagellates and dinoflagellates, while the peak at 15 meters at BY32 had a high concentration of ciliates in addition to flagellates and dinoflagellates.



The filamentous cyanobacterium *Aphanizomenon flos-aquae* was common at all Baltic stations, and the most abundant at REF M1V1

BY29 31st of May

The community at this station was very diverse. The dinoflagellates Gymnodiniales and *Peridiniella catenata*, ciliates, the chrysophyte *Dinobryon faculiferum*, the choanoflagellate *Calliacantha natans* and *Aphanizomenon flos-aquae* were all present in high cell concentration. A few cells of the toxic species *Dinophysis acuminata** were identified. The integrated (0-10 m and 0-20 m) chlorophyll *a* concentrations were within normal for BY20.

Phytoplankton analysis by Marie Johansen and Maria Karlberg.

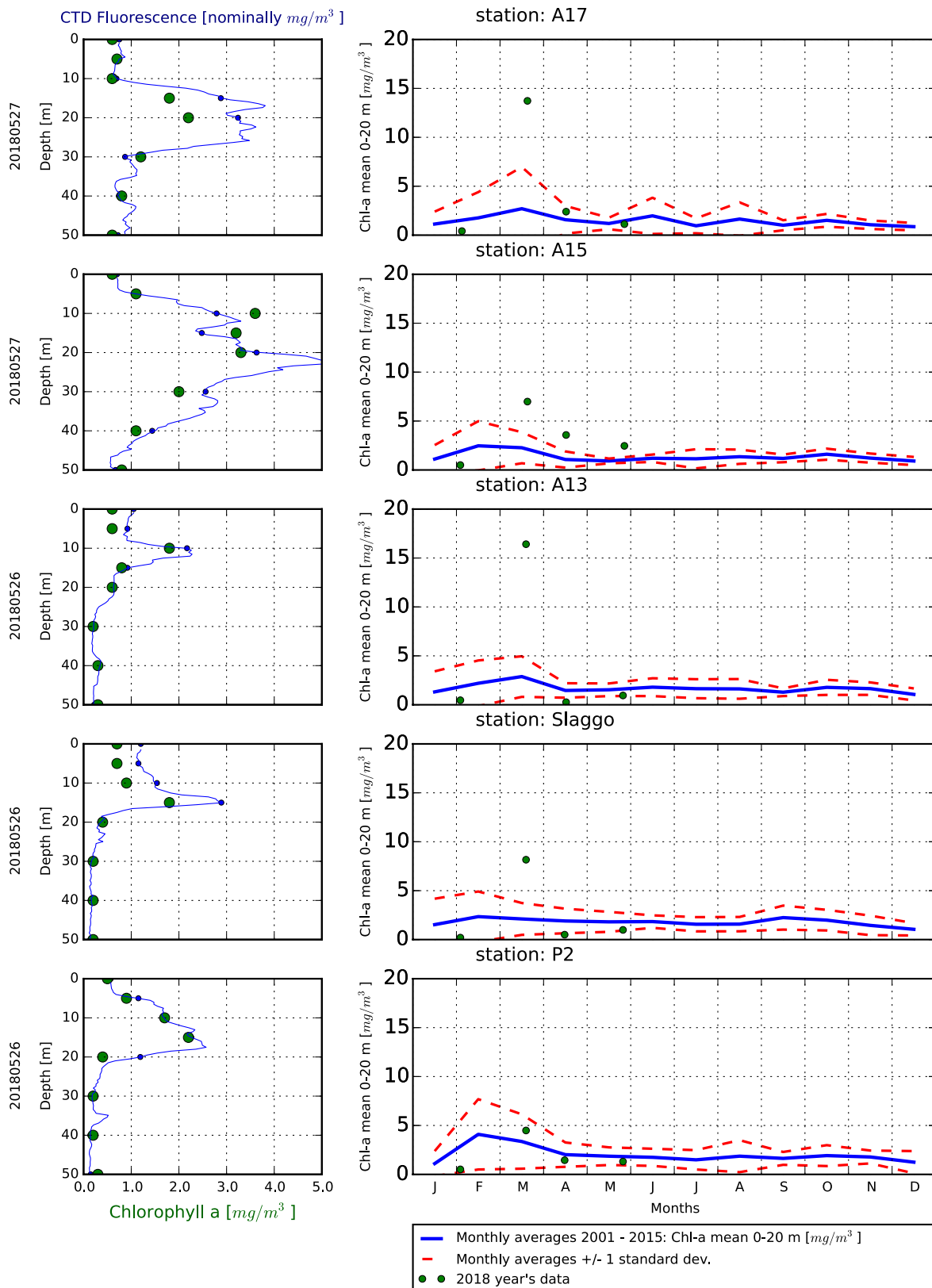
Text by: Maria Karlberg.

Photos: SMHI

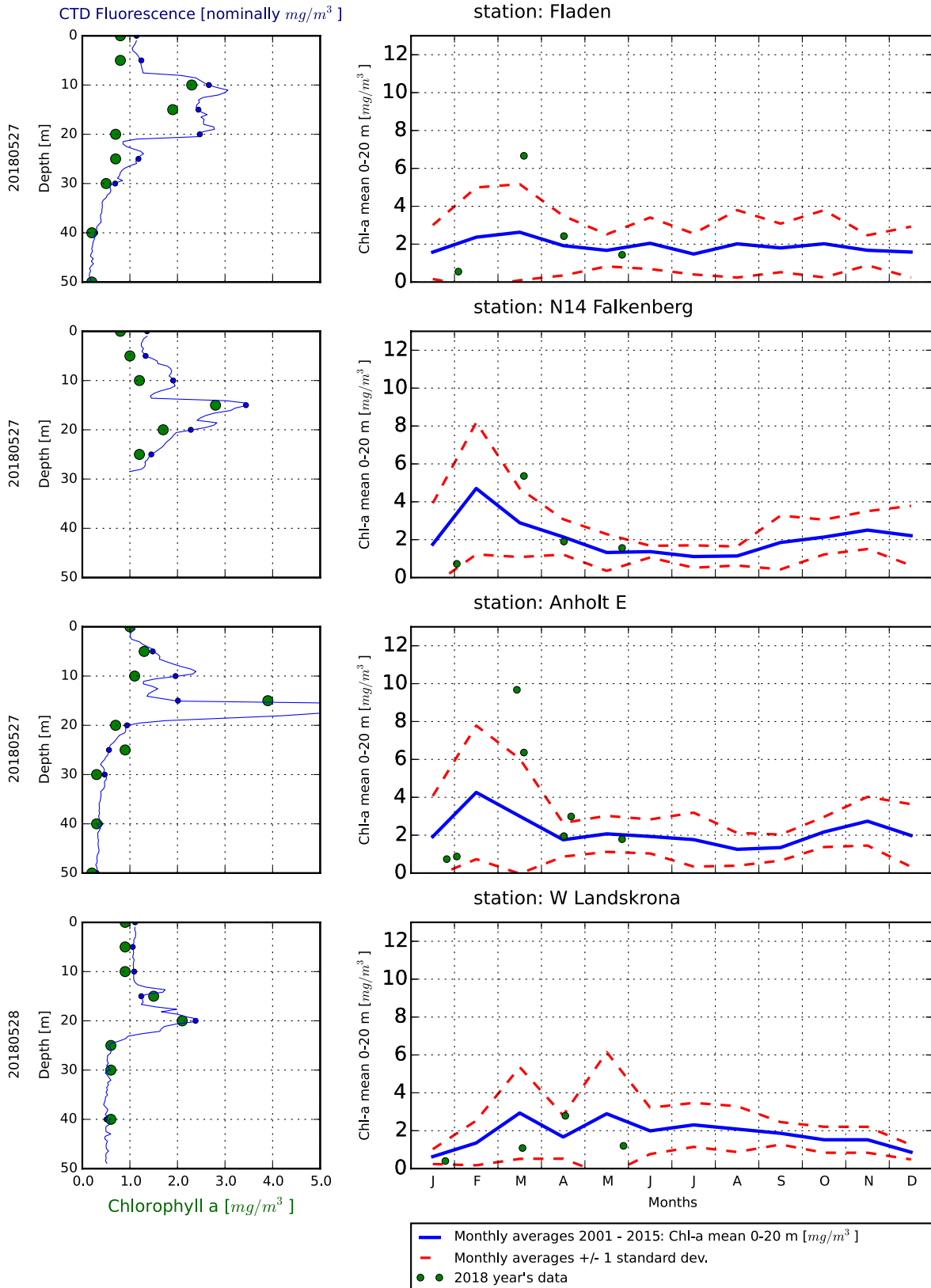
Selection of observed species	Anholt E	N14	Släggö	Å17
Red=potentially toxic species	27/5	27/5	26/5	27/5
Hose 0-10 m	presence	presence	presence	presence
Chaetoceros danicus	present	common	present	present
Chaetoceros decipiens				present
Dactyliosolen fragilissimus	very common	common	common	present
Guinardia delicatula	present			
Leptocylindrus danicus				common
Leptocylindrus minimus				present
Licmophora sp.			present	
Pennales		present	present	present
Phaeodactylum tricornutum				common
Proboscia alata			present	
Skeletonema marinoi			common	present
Thalassionema nitzschioides		present	present	
Alexandrium sp.				present
Ceratium fusus				present
Ceratium tripos	present	present	common	present
Dinophysis acuminata				present
Dinophysis norvegica			present	present
Gymnodiniales	common	present		very common
Karenia mikimotoi				present
Peridinales	present			
Phalacroma rotundatum			present	
Scrippsiella sp.	present			
Dinobryon balticum	present			
Emiliana huxleyi	present			common
Pterosperma sp.	present	present		
Chlorodendrales		present		
Cryptomonadales	common	present	present	common
Leucocryptos marina	present			
Telonema subtile	present			
Ebria tripartita				present
Ciliophora	present	present	present	common
Mesodinium rubrum				present

Selection of observed species	BY2	BY5	BCSIII-10	BY15	BY29	BY38	REFM1V1
Red=potentially toxic species	28/5	29/5	29/5	30/5	31/5	30/5	29/5
Hose 0-10 m	presence	presence	presence	presence	presence	presence	presence
<i>Chaetoceros similis</i>	present	common					
<i>Chaetoceros subtilis</i>				present			
<i>Chaetoceros tenuissimus</i>							present
<i>Cylindrotheca closterium</i>	present		present				
<i>Fragilaria</i> sp.							present
<i>Thalassiosira</i> sp.	present						present
<i>Alexandrium</i> sp.							present
<i>Amphidinium</i> sp.				present			present
<i>Amylax triacantha</i>			present				
<i>Dinophysis acuminata</i>	present	present	present	present	present	present	
<i>Dinophysis acuta</i>				present			
<i>Dinophysis norvegica</i>	present	present		present		present	present
Gymnodinales	present	common	common	common	common	common	common
<i>Gyrodinium</i> sp.		present	present		present	present	
<i>Heterocapsa rotundata</i>	present	present	present	common	present	present	
<i>Peridiniella catenata</i>			present	present	common	present	common
<i>Prorocentrum cordatum</i>			present		present		present
<i>Protoperidinium bipes</i>					present		present
<i>Protoperidinium brevipes</i>				present			
<i>Dinobryon balticum</i>							present
<i>Dinobryon faculiferum</i>				present	common	common	common
<i>Oocystis</i> sp.	present				present		
<i>Planctonema lauterbornii</i>	present				present		
<i>Pyramimonas</i> sp.	present	common	present	present	present	present	common
Cryptomonadales	present	common	present	present	present	present	common
Flagellates (3-6 µm)	very common	common	common		present	common	common
<i>Telonema subtile</i>	present	present					common
<i>Leucocryptos marina</i>	present						
<i>Aphanizomenon flosaquae</i>	common	common	common	common	common	common	very common
<i>Aphanothece</i> sp.	common	common	present	common	present	present	present
<i>Cyanodictyon</i> sp.	common	present	present		present	present	
<i>Dolichospermum</i> sp.	present				present		present
<i>Lemmermanniella</i>		common	present	common	present	present	common
<i>Pseudanabaena</i> sp.	present						
<i>Snowella litoralis</i>		common	present	common	present	present	present
<i>Snowella</i> sp.	present						
<i>Woronichinia</i> sp.	present				present		
<i>Calliacantha natans</i>			present		common		
Choanoflagellata							present
<i>Ebria tripartita</i>	present	present	present	present			present
<i>Mesodinium rubrum</i>	present	present			present	present	present
Ciliophora	present	common	present	present	common	present	common

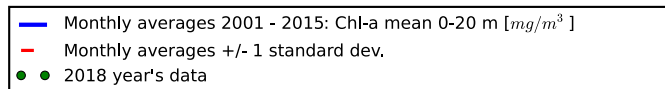
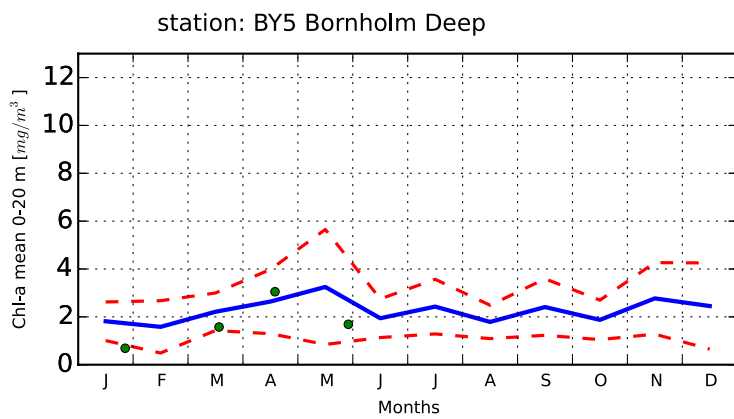
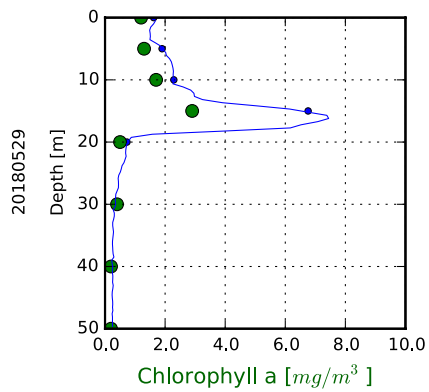
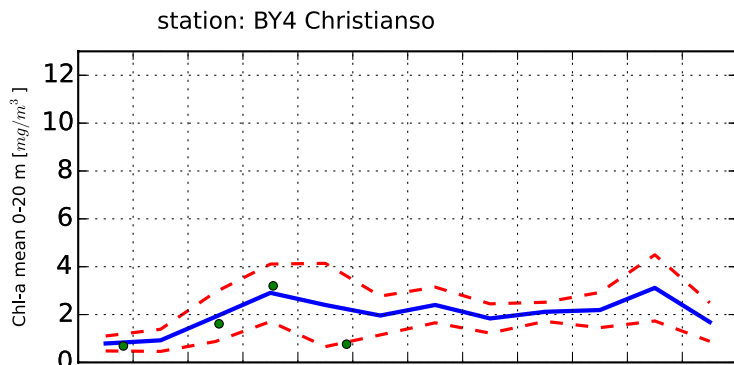
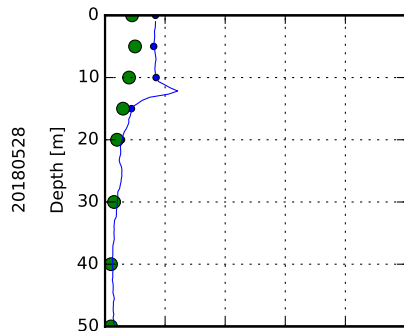
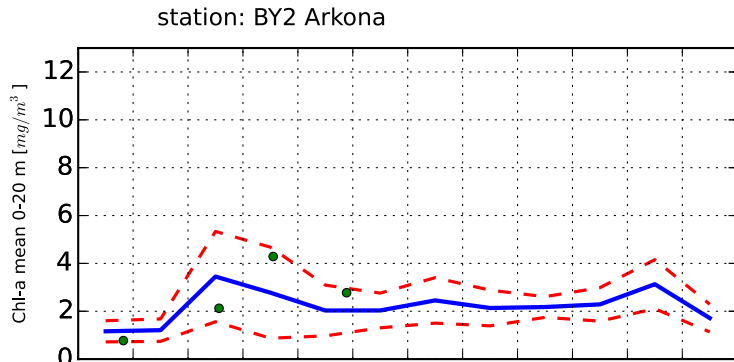
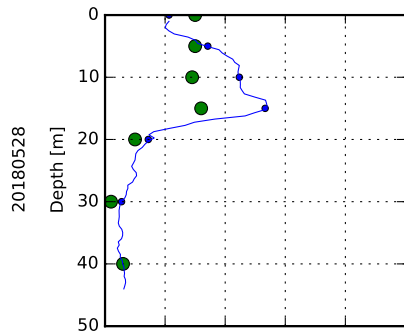
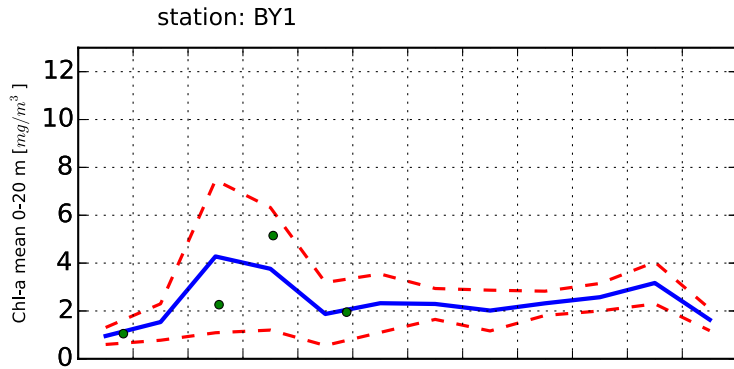
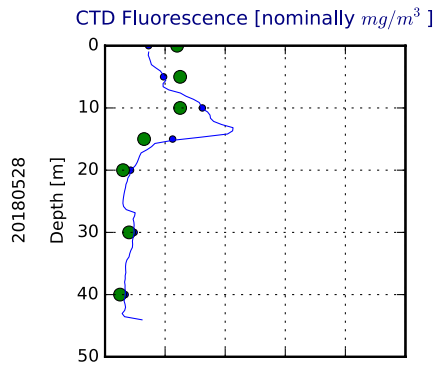
The Skagerrak



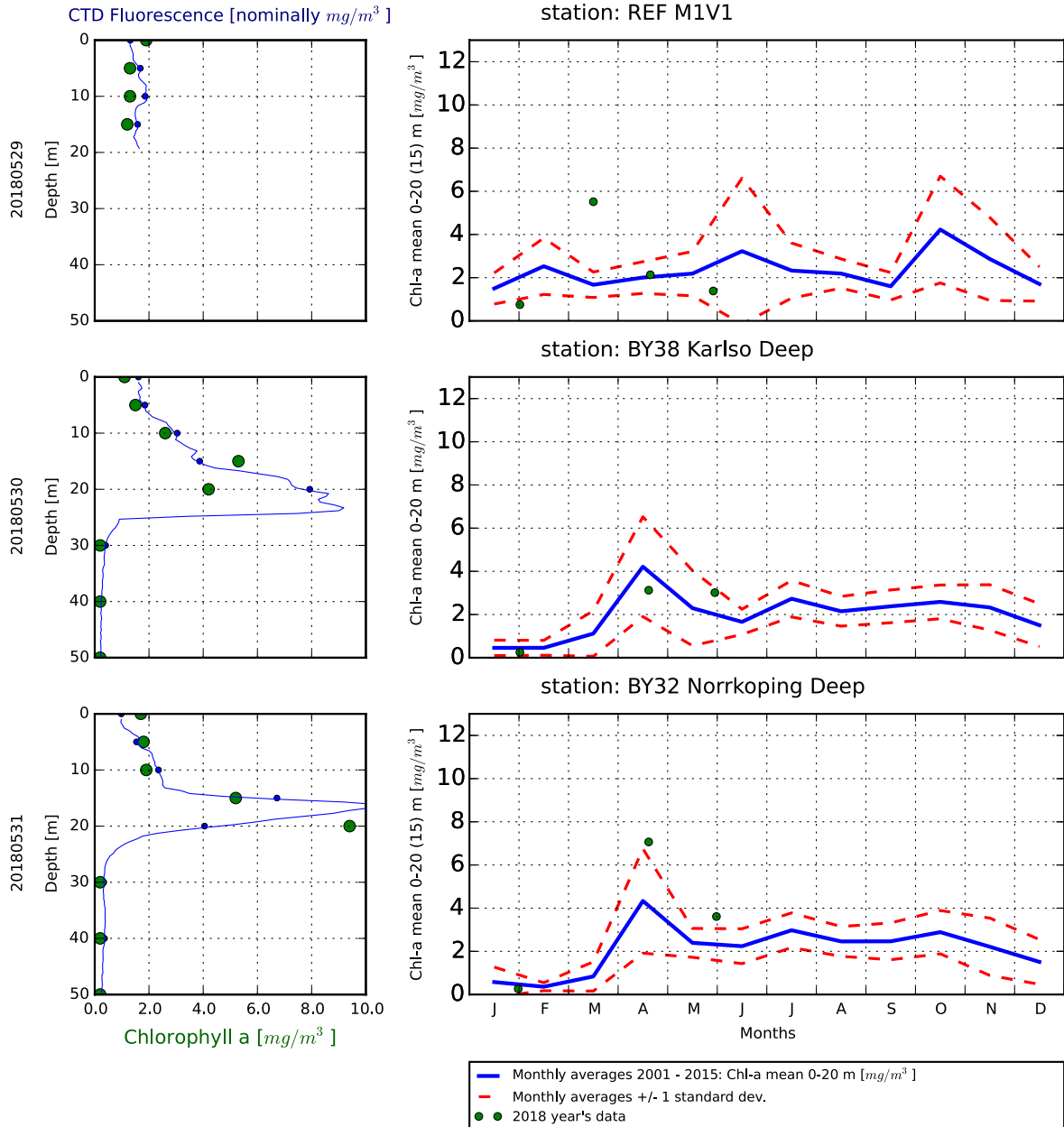
The Kattegat and The Sound



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 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 occurring 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.

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.

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.

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.

