Dnr: S/Gbg-2019-125

SMHI

Oceanographic Unit
No 10, October 2019

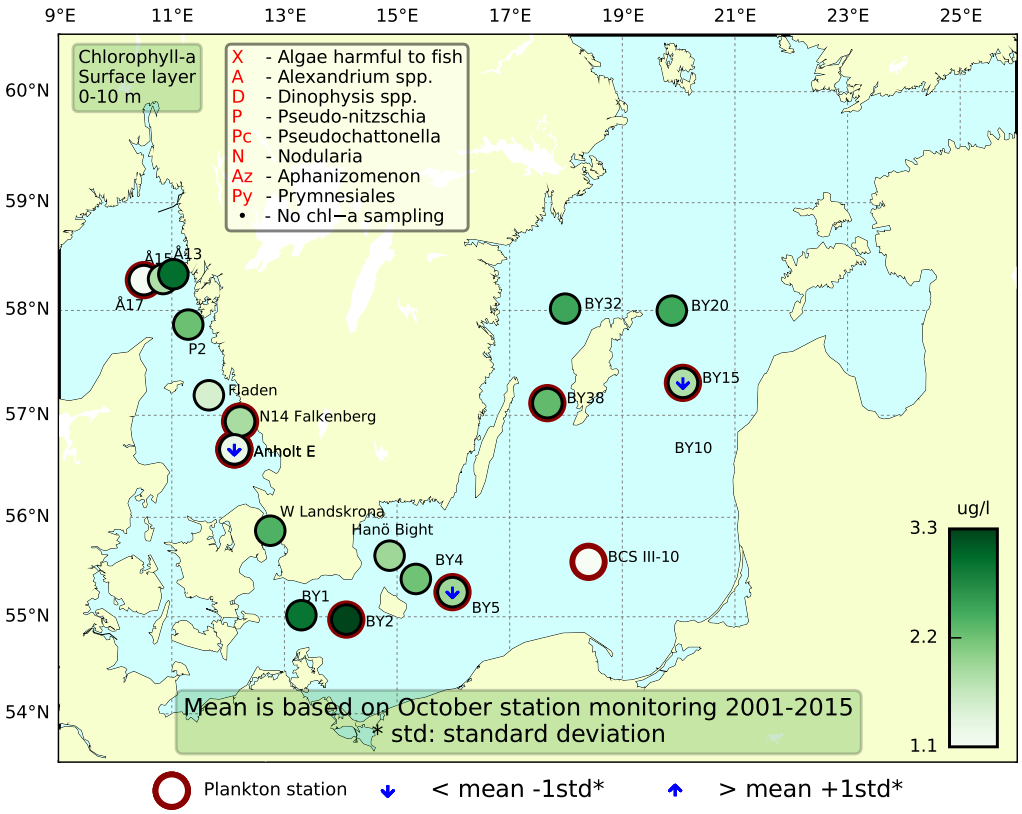
AlgAware

ALGAL SITUATION IN MARINE WATERS SURROUNDING SWEDEN

Sammanfattning

I Skagerraks utsjövatten samt i Kattegatt var celltätheten låg och dominerades av små celler. Kalkalgen *Emiliania huxleyi* dominerade i cellantal vid samtliga stationer. Det potentiellt giftiga kiselalgssläktet *Pseudo-nitzschia* var vanligt förekommande vid samtliga stationer. De integrerade klorofyllhalterna var inom det normala för månaden.

I Östersjön fick provtagningen på RefM1V1 strykas på grund av militärövning. Generellt sett var både cellantal och artdiversiteten låg på samtliga stationer i Östersjön, förutom vid BY2 där kiselalgerna *Cerataulina pelagica* och *Dactyliosolen fragilissimus* fanns med höga cellantal. De låga cellantalen på Östersjöstationerna speglades även i klorofyllhalterna som var normala eller lägre än normala, förutom för BY2 vars integrerade klorofyllhalt var hög.



Abstract

The total cell concentrations in the open Skagerrak and in the Kattegat were low and dominated by small cells. The coccolithophorid *Emiliania huxleyi* was found with the highest cell numbers. The potentially toxic diatom genus *Pseudo-nitzschia** was common at all stations along the west coast. The integrated chlorophyll concentrations were within normal for this month.

In the Baltic Sea sampling at RefM1V1 had to be cancelled due to military exercise. In general, both cell numbers and species diversity were low on all Baltic stations, except at BY2 where the diatoms *Cerataulina pelagica* and *Dactyliosolen fragilissimus* were found in high cell numbers. The low cell numbers at the Baltic stations were also visible in the chlorophyll concentrations, which were normal or below normal for this month, except at BY2 where there were high integrated chlorophyll concentrations.

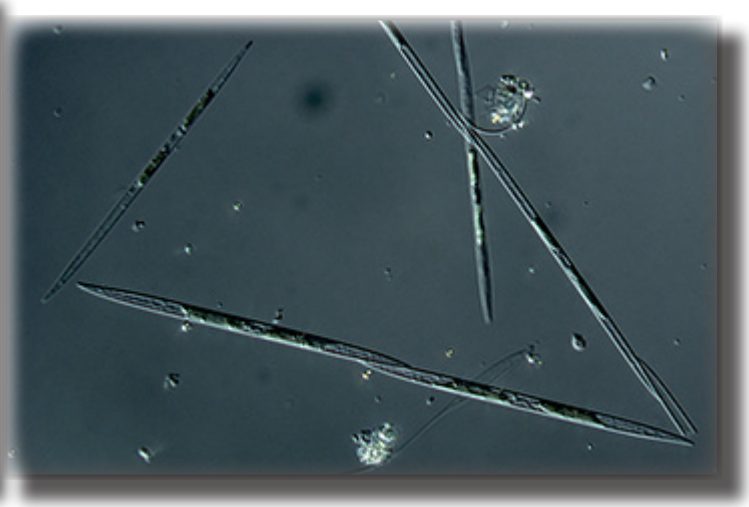
Below follows a more detailed information on species composition and abundance. Species marked with * are potentially toxic or harmful.

The Skagerrak

Å17 (open Skagerrak) 17th of October

Low total cell numbers were found, mainly consisting of small cells. Different species of the order Cryptomonadales and the coccolithophorid *Emiliania huxleyi* were most common among the small cells. The larger cells were mainly represented by the diatoms *Pseudosolenia calcar-avis, Dactyliosolen fragilissimus* and the genus *Pseudo-nitzchia**. The dinoflagellate cf. *Azadinium* * were also found. The integrated chlorophyll concentrations were within normal for this month.

The potentially toxic dinoflagellate *Dinophysis acuminata** was common at N14 Falkenberg.



The potentially toxic genus *Pseudo-nitzschia** was common at all stations along the west coast.

The Kattegat

Anholt E 16th and 18th of October

The phytoplankton composition was almost identical at both visits. Total cell numbers were relatively low. *E. huxleyi* was the most numerous species of the small cells. The larger cells were quite low in total cell numbers and the diatom genus *Pseudo-nitzchia** dominated. The diatoms *Proboscia alata* and *Dactyliosolen fragilissimus* were also quite common. The integrated chlorophyll concentrations were slightly below normal for this month.

N14 Falkenberg 17h of October

Low total cell numbers were found and mainly consisted of small cells. The coccolithophorid *Emiliania huxleyi* was the most common among the small cells. The larger cells were mainly represented by different diatoms such as *Dactyliosolen fragilissimus, Cerataulina pelagica* and the genus *Pseudo-nitzchia**. The integrated chlorophyll concentrations were within normal for this month.

The Baltic Sea

BY2 16th of October

The phytoplankton diversity and cell numbers were higher at BY2 then the other Baltic stations. *Cerataulina pelagica* and *Dactyliosolen fragilissimus* were represented in highest cell numbers, while *Chaetoceros* cf. *convolutus*, ciliates, cryptomonads, *Ebria tripartita*, *Lemmermanniella pallida* and *Prorocentrum cordatum* also were quite numerous. Several filaments of the cyanobacterium *Aphanizomenon flosaquae* were observed, as well as a few cells of the toxic diatom *Pseudo-nitzschia* sp.* The integrated (0-10 m) chlorophyll concentrations were high but within normal, but the deeper integrated concentrations (0-20 m) were higher than normal.

BY5 15th of October

Ciliates, cryptomonads, *Dactyliosolen fragilissimus*, *Gymnodinium verruculosum* and *Prorocentrum cordatum* were the most abundant organisms. Notable is that the toxin producing filamentous cyanobacterium *Nodularia spumigena** was present. The integrated (0-10 m) chlorophyll concentrations were below normal, while the deeper (0-20 m) was normal.

Station BY2 had high cell numbers of both *Cerataulina pelagica* (left) and *Dactyliosolen fragilissimus* (right).

BY15 14th of October

Small cryptomonads were abundant. Other small cells, such as *Calliacantha natans*, *Oocystis* sp. and *Snowella litoralis*, as well as the larger ciliates, naked dinoflagellates, *Pseudanabaena* sp. and *Coscinodiscus centralis* were abundant. A few filaments of the green algae *Binuclearia lauterbornii* and a few cells of the diatom *Chaetoceros castracanei* were present. The integrated (0-10 and 0-20 m) chlorophyll concentrations were below normal for this month.

BCSIII-10 15th of October

Both the phytoplankton diversity and cell numbers were low. The most abundant groups were ciliates, cryptomonads and naked dinoflagellates as well as the species *Chaetoceros castracanei* and *Heterocapsa rotundata*. There were no chlorophyll results for this station in October.

RefM1V1

There was no sampling at this station in October due to military exercise.

BY38 19th of October

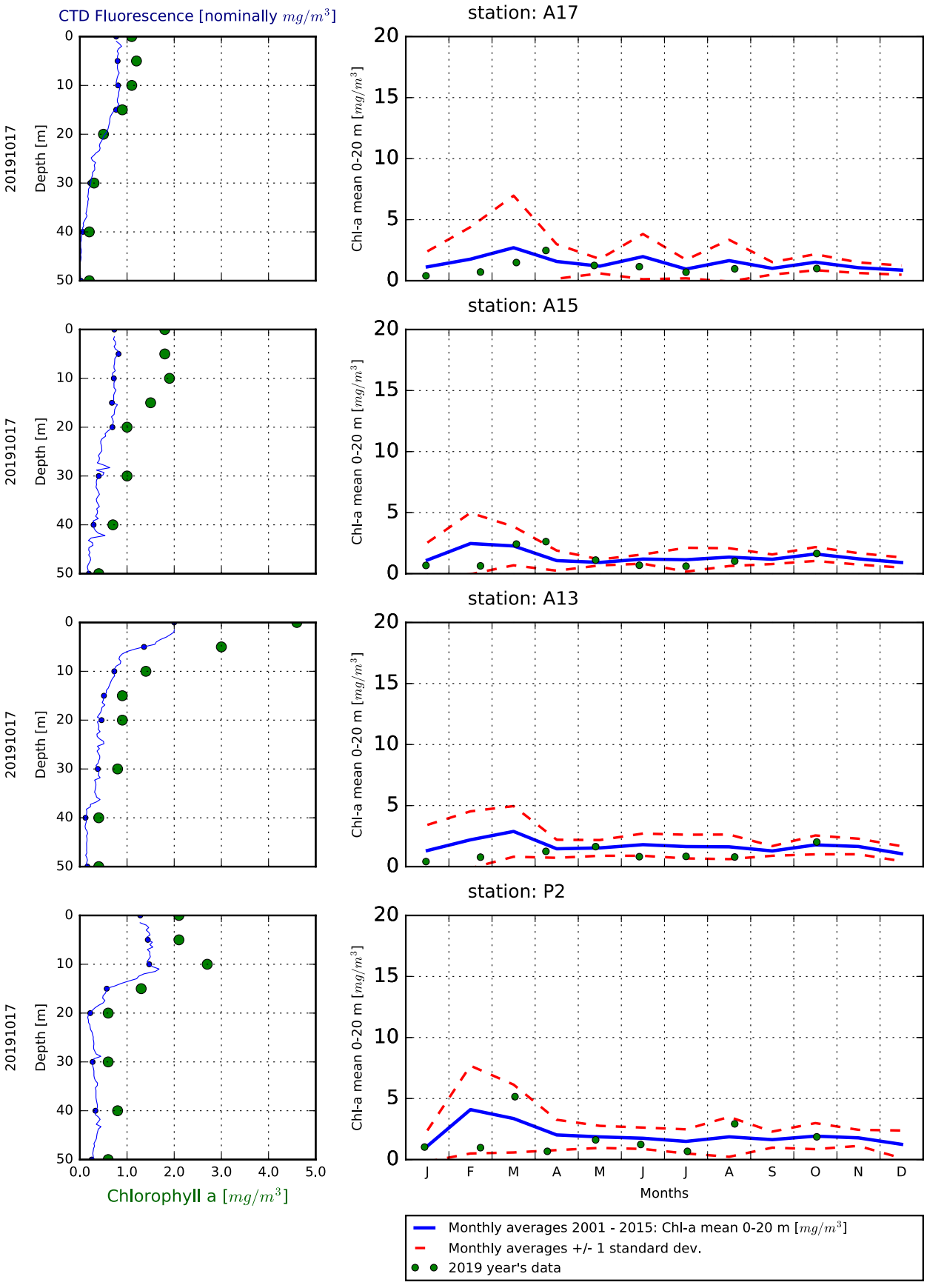
The phytoplankton diversity was low. Colony-forming cyanobacteria, ciliates, naked dinoflagellates, *Oocystis* sp. and *Coscinodiscus centralis* were the most numerous organisms. The integrated (0-10 and 0-20 m) chlorophyll concentrations were normal for this month.

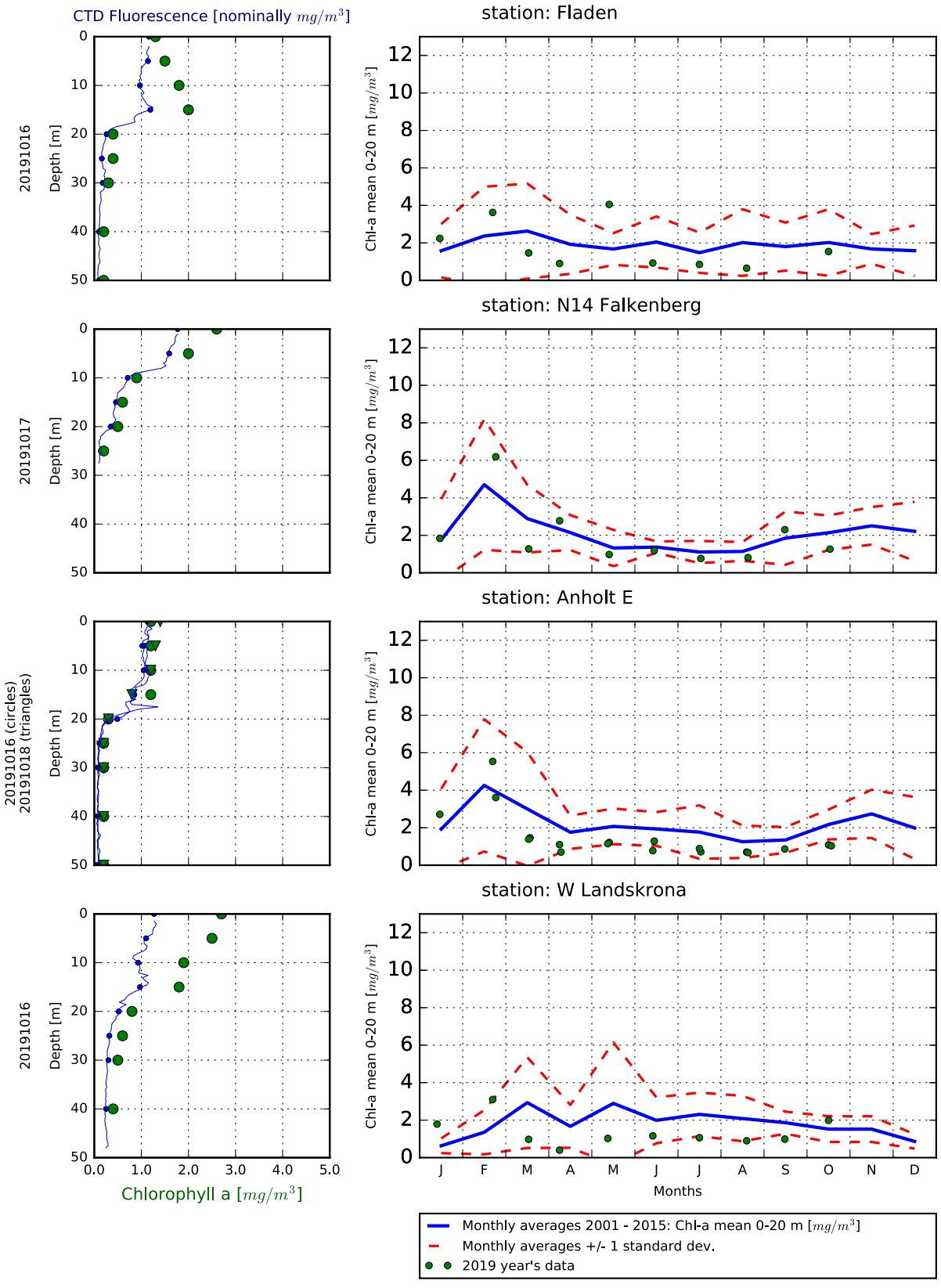
Phytoplankton analysis, text and photos:
Marie Johansen and Maria Karlberg.

Selection of observed species	Anholt E	N14 Falkenberg	Å17
Red=potentially toxic species	16/10	17/10	17/10
Hose 0-10 m	presence	presence	presence
Cerataulina pelagica	present	present	
Chaetoceros affinis	present		
Chaetoceros curvisetus		present	present
Chaetoceros danicus	present		
Chaetoceros debilis		present	
Chaetoceros socialis		present	present
Cylindrotheca closterium			present
Dactyliosolen fragilissimus	common	common	common
Ditylum brightwellii		present	
Guinardia delicatula	present	present	
Leptocylindrus danicus	present	present	
Proboscia alata	common	present	
Pseudo-nitzschia spp	common	common	common
Pseudosolenia calcar-avis	present	present	common
Rhizosolenia pungens	present	present	
Rhizosolenia setigera	present		
Skeletonema marinoi			present
Thalassionema nitzschioides			present
Amphidinium sphenoides			present
Azadinium spp			present
Ceratium furca		present	present
Ceratium fusus		present	present
Ceratium lineatum	present	present	
Ceratium macroceros			present
Ceratium tripos	present	present	present
Dinophysis acuminata		common	
Dinophysis norvegica	present		
Gymnodiniales	present	present	present
Gyrodinium flagellare			present
Karenia mikimotoi			present
Prorocentrum micans	present	present	
Protoperidinium bipes			present
Protoperidinium crassipes		present	present
Protoperidinium divergens	present		
Protoperidinium pallidum	present		
Emiliania huxleyi	common	common	common
Pleurochrysis spp			present
Dictyocha fibula			present
Cryptomonadales	present	present	common
Leucocryptos marina			present

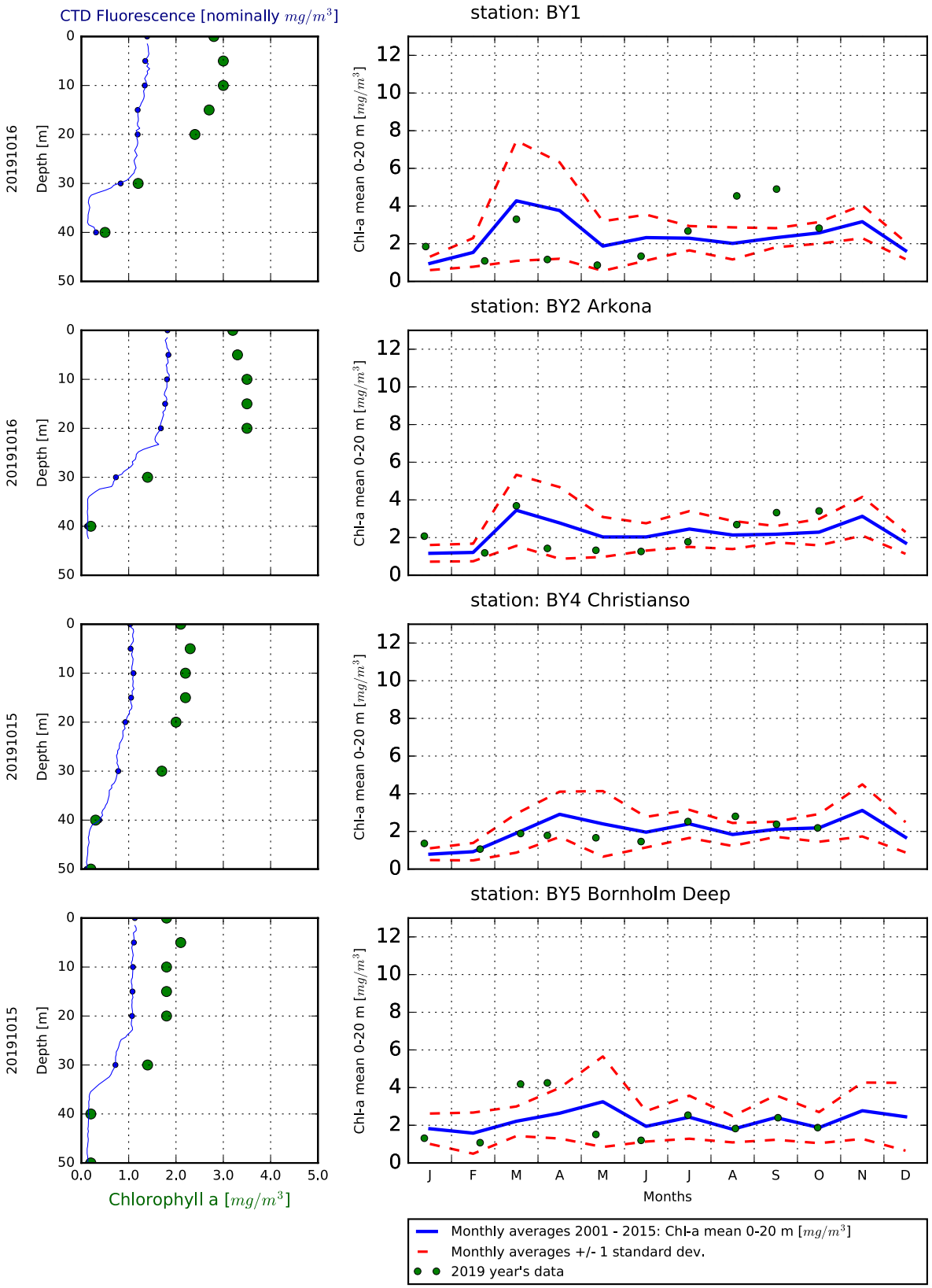
Selection of observed species	BCSIII-10	BY2	BY5	BY15	BY38
Red=potentially toxic species	15/10	16/10	15/10	14/10	19/10
Hose 0-10 m	presence	presence	presence	presence	presence
Cerataulina pelagica		very common	present		
Chaetoceros castracanei	common			present	
Chaetoceros cf. convolutus		common	present		
Coscinodiscus sp.					present
Coscinodiscus centralis	present			common	common
Coscinodiscus granii				present	
Cyclotella sp.					present
Cylindrotheca closterium		present			
Dactyliosolen fragilissimus	present	very common	common		
Pseudo-nitzschia sp.		present			
Pseudosolenia calcar-avis		present	present		
Thalassiosira sp.	present	present	present	present	common
Ceratium tripos		present			
Diplopsalis CPX		present			
Gymnodiniales	common	present	present	common	common
Gymnodinium verruculosum	present	present	common		present
Gyrodinium cf. fusiforme	present	present		present	present
Heterocapsa rotundata	common	present	present	present	present
Heterocapsa triquetra		present			
Katodinium glaucum					present
Prorocentrum cordatum	present	common	common	present	
Prorocentrum micans		present			
Protoperidinium brevipes				present	
Ollicola vangoorii					present
Monoraphidium sp.				present	present
Oocystis sp.				common	common
Binuclearia lauterbornii	present	present		present	present
Pyramimonas sp.	present	present	present	present	
Cryptomonadales	common	common	common	very common	common
Telonema subtile	present				present
Pseudopedinella sp.	present				present
Eutreptiella sp.			present		
Aphanizomenon sp.		common			
Aphanizomenon flosaquae		common			
Lemmermanniella cf. pallida		common		present	very common
Lemmermanniella cf. parva				present	present
Nodularia spumigena			present		
Pseudanabaena sp.		present		common	
Snowella litoralis	present		present	common	common
Woronichinia sp.				present	common
Calliacantha natans		present	present	common	present
Ebria tripartita	present	common	present	present	present
Ciliophora	common	common	common	common	common
Mesodinium rubrum	present		present	present	present
Helicostomella subulata	present			present	

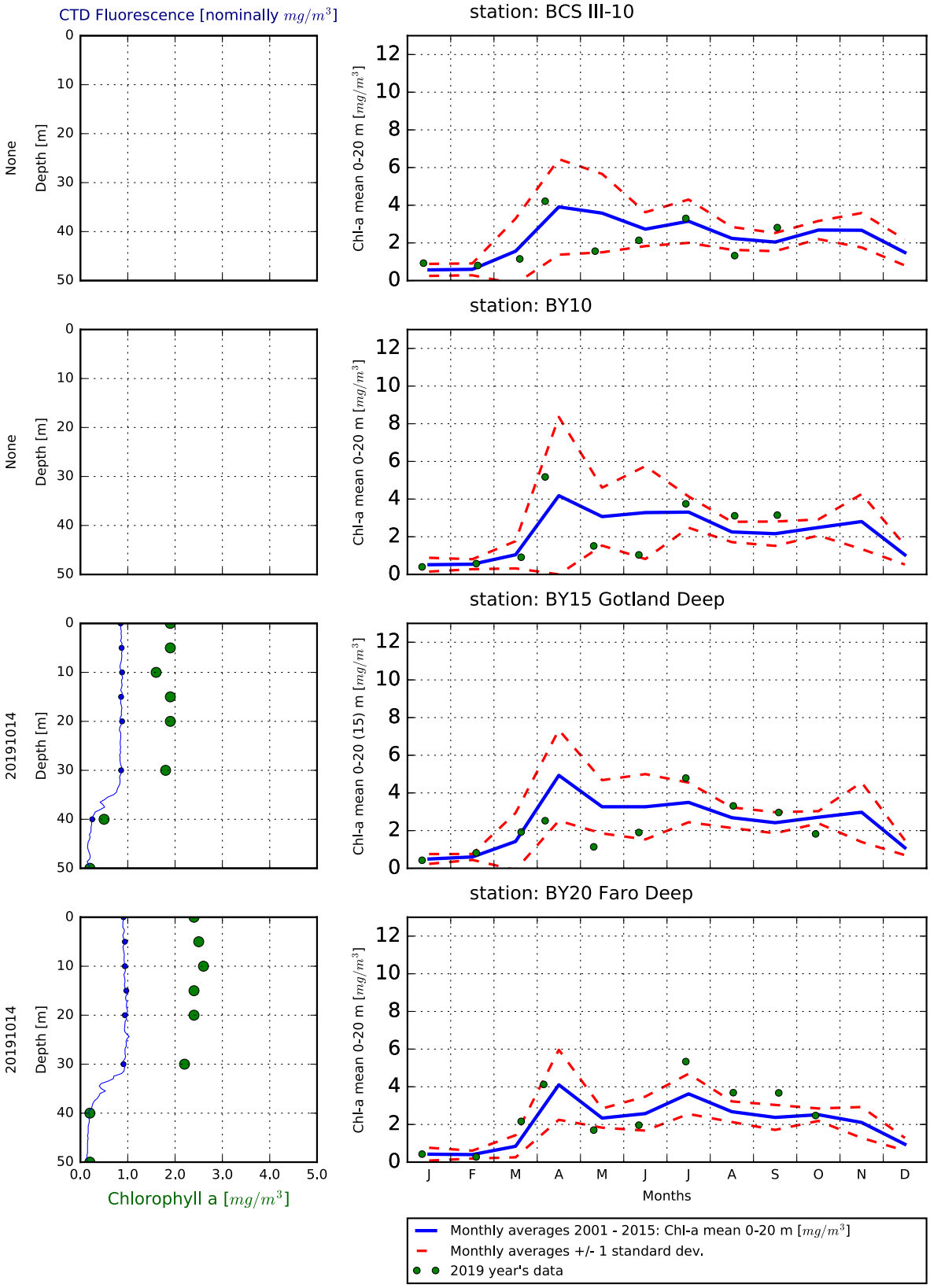
The Skagerrak



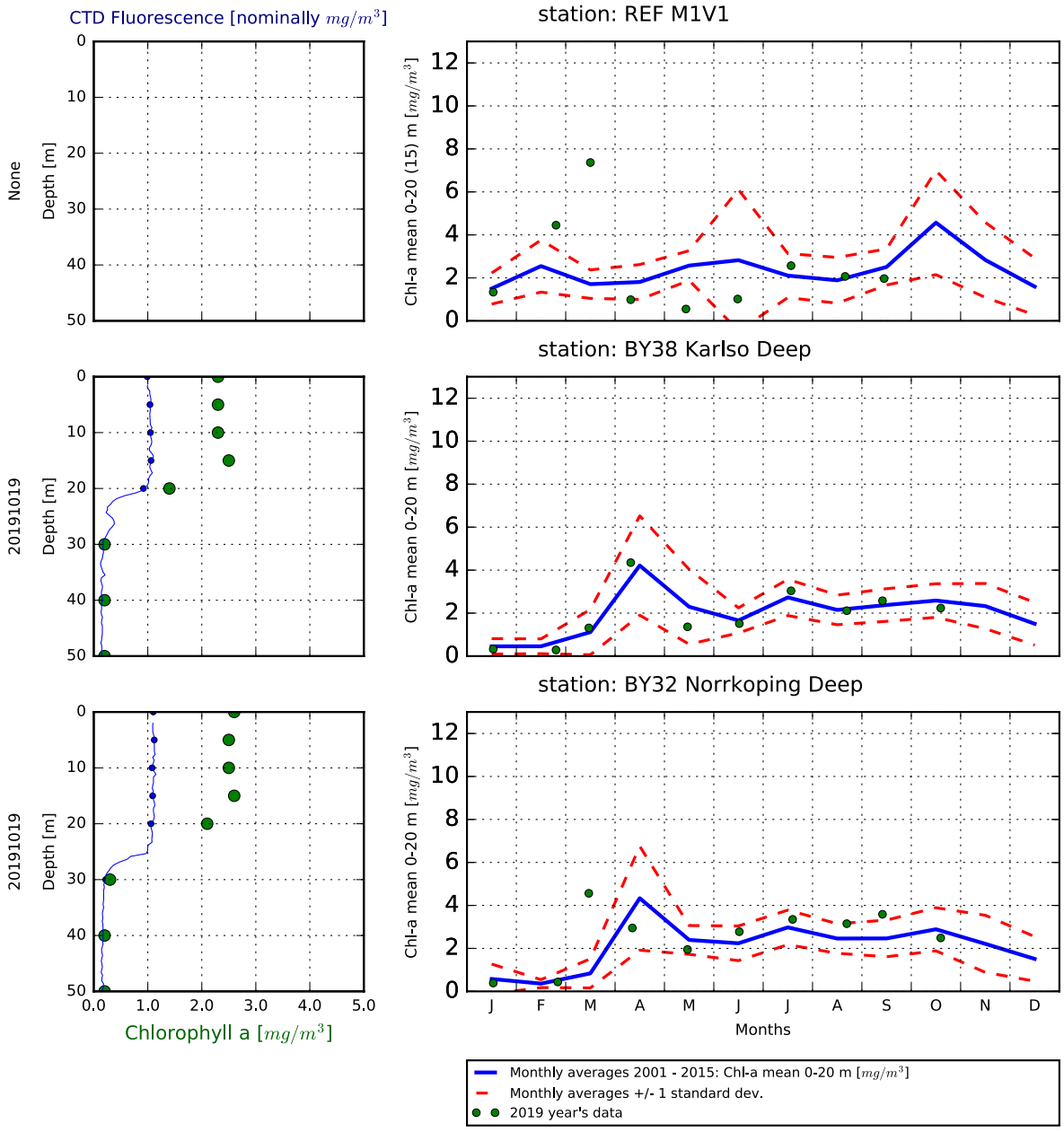

CTD Fluorescence [nominally mg/m^3]
station: Fladen
20191016
Depth [m]
Chl-a mean 0-20 m [mg/m^3]
station: N14 Falkenberg
20191017
station: Anholt E
20191016 (circles)
20191018 (triangles)
station: W Landskrona
20191016
Chlorophyll a [mg/m^3]
J F M A M J J A S O N D
Months
Monthly averages 2001 - 2015: Chl-a mean 0-20 m [mg/m^3]
Monthly averages +/- 1 standard dev.
2019 year's data

The Southern Baltic





The chlorophyll samples from BCS III-10 and BY10 were unfortunately lost.



The station REFM1V1 was not visited during this crusie.

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