

## EXPEDITIONSRAPPORT FRÅN U/F ARGOS

### CRUISE REPORT FROM R/V ARGOS

**Expeditionens varaktighet:** 970602-970611  
**Survey period:**

**Undersökningsområde:** The Skagerrak, the Kattegat,  
**Survey area:** the Sound and the Baltic Proper.

**Uppdragsgivare:** SMHI and NSEPA  
**Principal:**

#### SUMMARY

**Skagerrak:** *The surface temperatures varied between 10-14 °C. The nutrient concentrations above the halocline showed low but, for the season, normal values. A strong bloom of *Emiliana Huxleyi* was observed in the area.*

**Kattegat and the Sound:** *The surface temperatures varied between 12-13 °C in the very surface. The nutrients concentrations showed, for the season, normal values, even though the silicate concentrations were on the high side of the expected range. All bottom waters were well oxygenated. The plankton flora was relatively poor and dominated by dinoflagellates.*

**The Baltic Proper:** *The surface temperature was 8-10 °C in the south, east and north, slightly higher in the west. All nutrients showed for the season normal concentrations. The oxygen conditions in the bottom water are displayed in a figure. In the Bornholm Basin at BY4 and BY5 bottom oxygen concentration was about 1 ml/l, a decrease since the last measurements in april. Hydrogen sulphide was found in the Gotland Deep from 200 metres and downwards (low concentrations) and below 100 metres at the stations sampled east-southeast of Gotland as part of the DIAMIX-project. The cyanobacteria *Aphanizomenon "baltica"* was found in most parts of the Baltic proper. East of Gotland a strong bloom was visibly observed, dominated by the same cyanobacteria. In the north more than 10 million cells per litre of a yet unidentified spherical, 8 µm in diameter, organism was observed in a subsurface maximum otherwise dominated by dinoflagellates.*

## PRELIMINÄRA RESULTAT

Expeditionen, som utgick från och avslutades i Göteborg med helguppehåll i Visby, ingick i SMHIs ordinarie havsövervakningsprogram. Dessutom utfördes provtagning enligt HELCOMs "Baltic Monitoring Programme" på uppdrag av Naturvårdsverket. I ett område östsydost om Gotland utfördes CTD-profilering för DIAMIX-projektet på ett 40-tal stationer (summa 52 profiler). I samband med detta togs även bottenvattenprover för kemisk undersökning.

Vädret under expeditionen var mycket bra, med ytterst lätta vindar och mestadels klar himmel.

### Skagerrak

Ytvattentemperaturerna i området varierade mellan 10-14°C. Närsalthalterna i ytlagret var mycket låga, vilket är helt normalt för årstiden. En kraftig blomning av kalkalgen *Emiliania huxleyi* gav en grönaktig färgning av ytvattnet i stora delar av utsjön i regionen. I övrigt förekom små mängder av dinoflagellater, som kan orsaka musselförgiftning. Av diatoméerna påträffades framför allt släktena *Skeletonema* och *Leptocylindrus*.

### Kattegatt och Öresund

Språngskiktet i området låg på cirka 8-12 m djup. Temperaturen i den absoluta ytan låg på 12-13°C. Närsalthalterna i ytlagret var låga och för årstiden normala, även om silikat visade på en viss förhöjning. Syreförhållandena i bottenvattnet var alltjämt mycket goda. Planktonfloran var fattig med dominans av dinoflagellater.

### Östersjön

Ytvattentemperaturen var 8-10°C i söder och öster, någon grad högre väster om Gotland. Samtliga närsalter hade för årstiden normala koncentrationer i hela området. Syreförhållandena i bottenvattnet under haloklinen framgår av bilagd figur. I Arkonabassängen var syrehalterna goda i hela vattenmassan. Syrehalten vid botten på station BY4 (Christiansö) och BY5 (Bornholmsdjupet) låg på cirka 1 ml/l, en försämring sedan mätningarna under expeditionen i mitten av april. I östra, norra och västra Gotlandsbassängen låg gränsen för 2 ml O<sub>2</sub>/l vid 90 till 100 meter. Låga halter av svavelväte återfanns på BY15 (Gotlandsdjupet) under 200 meters djup samt under cirka 100 meters djup på de stationer som togs som en del av DIAMIX-projektet östsydost om Gotland.

I västra och södra Östersjön samt västra gotlandsbassängen var cyanobakterien *Aphanizomenon "baltica"* relativt vanlig. Även *Chrysochromulina spp.* och *Pyraminomas spp.* påträffades i relativt höga koncentrationer.

I östra gotlandsbassängen påträffades en kraftig blomning som var synlig för blotta ögat. Denna blomning dominerades helt av *Aphanizomenon "baltica"*, men enstaka filament av *Nodularia spumigena* fanns också, liksom relativt stora mängder av Pinus-pollen.

I norra Östersjön observerades markanta fluorescensmaxima strax under ytan. Detta maximum dominerades av dinoflagellaterna *Scrippsiella hangoei*, *Protoperidinium brevipes*, *Dinophysis acuminata* samt *Dinophysis norwegica*. Här påträffades även en massförekomst av en ännu oidentifierad 8 µm kulformig organism i en koncentration av 10.6 miljoner celler per liter.

## DELTAGARE

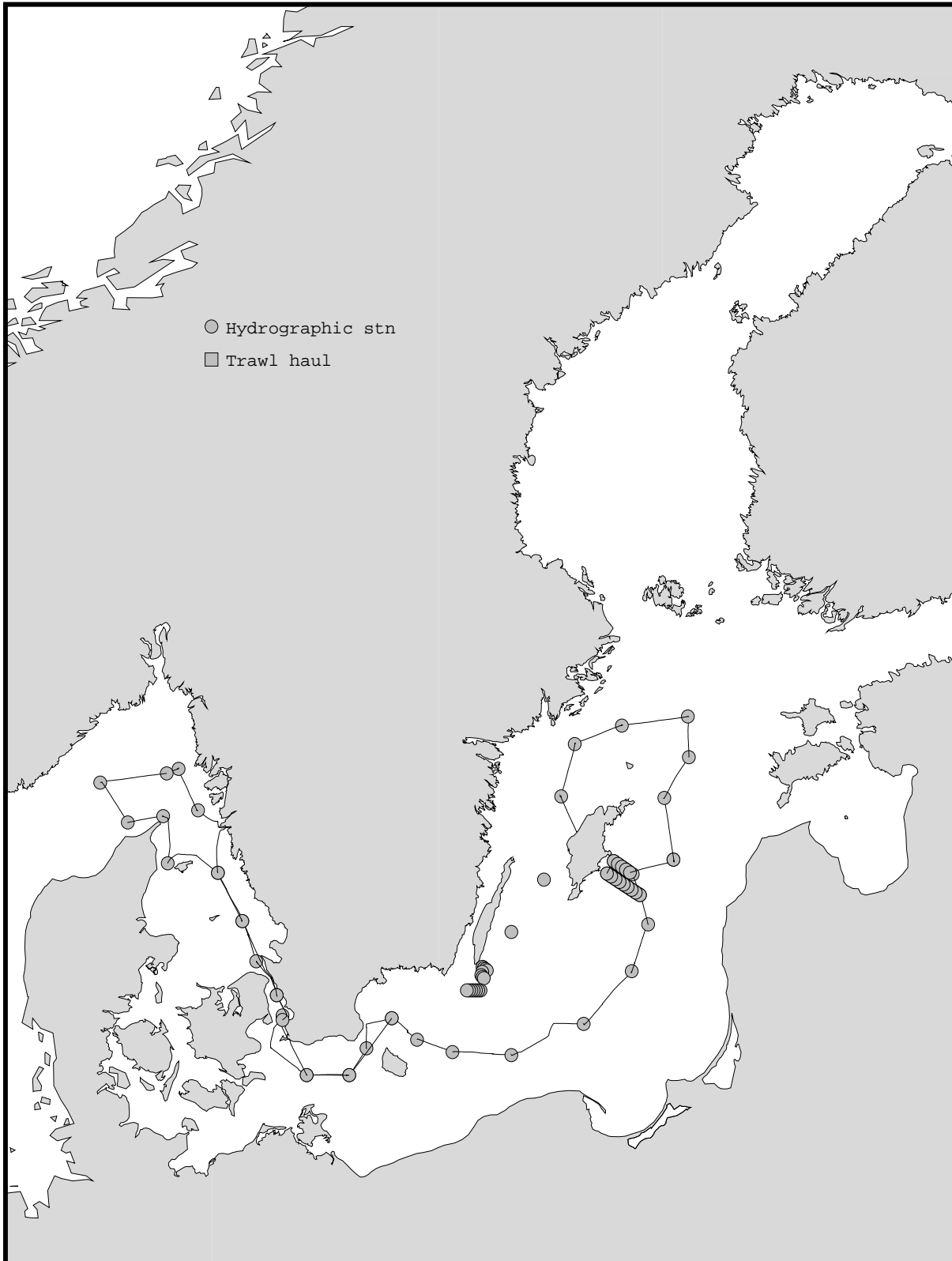
Namn	Från
Björn Sjöberg, expeditonsledare,	SMHI Oceanografiska lab.
Mikael Krysell	- " -
Mats Ohlson	- " -
Marie Larsson	- " -
Eva Nyberg	- " -

## BILAGOR

- Färdkarta
- Tabell över provtagningsprogrammet + meteorologiska förhållanden
- Karta över syrehalter i bottenvattnet i Östersjön
- Profilplottar för vissa basstationer
- Månadsmedelvärdesplottar för vissa basstationer

# TRACK CHART

Country: Sweden  
Ship: Argos  
Date: 970602-970611  
Series: 0329-0436







SMHI Ocean lab \*\*\*\*\* Hydrographic series Ship: 14-Argos Year: 1997 \*\*\*\*\* Date: 1997-06-19 Time: 07:47

Ser no	Stat code	P r o j	Station-----	Lat-----	Lon-----	Date yymmdd	Time hhmm utc	Bott m	Mld m	Secc m	Wind di ve	Air temp C	Air pres hPa	WCSI elec tu	C PPCPZT Cilyooa motPBw PrP l	No de e a h x 2 o o o h o l i u i O O O o	T S P O H P T N N N T A S H L P P T C	S P O H P T N N N T A S H L P P T C	P i g P P N N N N a 3 u n m	
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0391	BPEX00BAS	D1:1		N5657.0	E1926.0	970606	0145	177			14 1	10.7	1020	1120	x	-----	18	- x - - xx - x x	- - - x - - - - -	
0392	BPEX00BAS	D1:4		N5658.7	E1921.5	970606	0210	181			14 1	10.7	1020	1120	x	-----	18	- - - - -	- - - - -	
0393	BPEX00BAS	D1:7		N5700.4	E1917.0	970606	0245	177			14 1	10.0	1020	1110	x	-----	17	- x - - xx - x x	- - - x - - - - -	
0394	BPEX00BAS	D1:10		N5702.2	E1912.5	970606	0310	167			14 1	10.0	1020	1110	x	-----	17	- - - - -	- - - - -	
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0405	BPEX21BMP	BY15	GOTLANDSDJ	N5720	E2003	970606	1055	247		7	00 0	18.0	1022	1100	x	xxx---	20	x x x x x x x x x x x x x x x x	- - - - -	
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0407	BPEX26BAS	BY20	FÅRÖDJ	N5800	E1953	970606	1600	205		8	00 0	16.5	1022	1100	x	--x----	18	xx - x - x x x x x x	- x - - - - - x	
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0409	BPNX35BAS	BY29		N5853	E2019	970606	2240	179			99 2	12.0	1023	9900	x	--x----	17	xx - x - x x x x x x	- x - - - - -	
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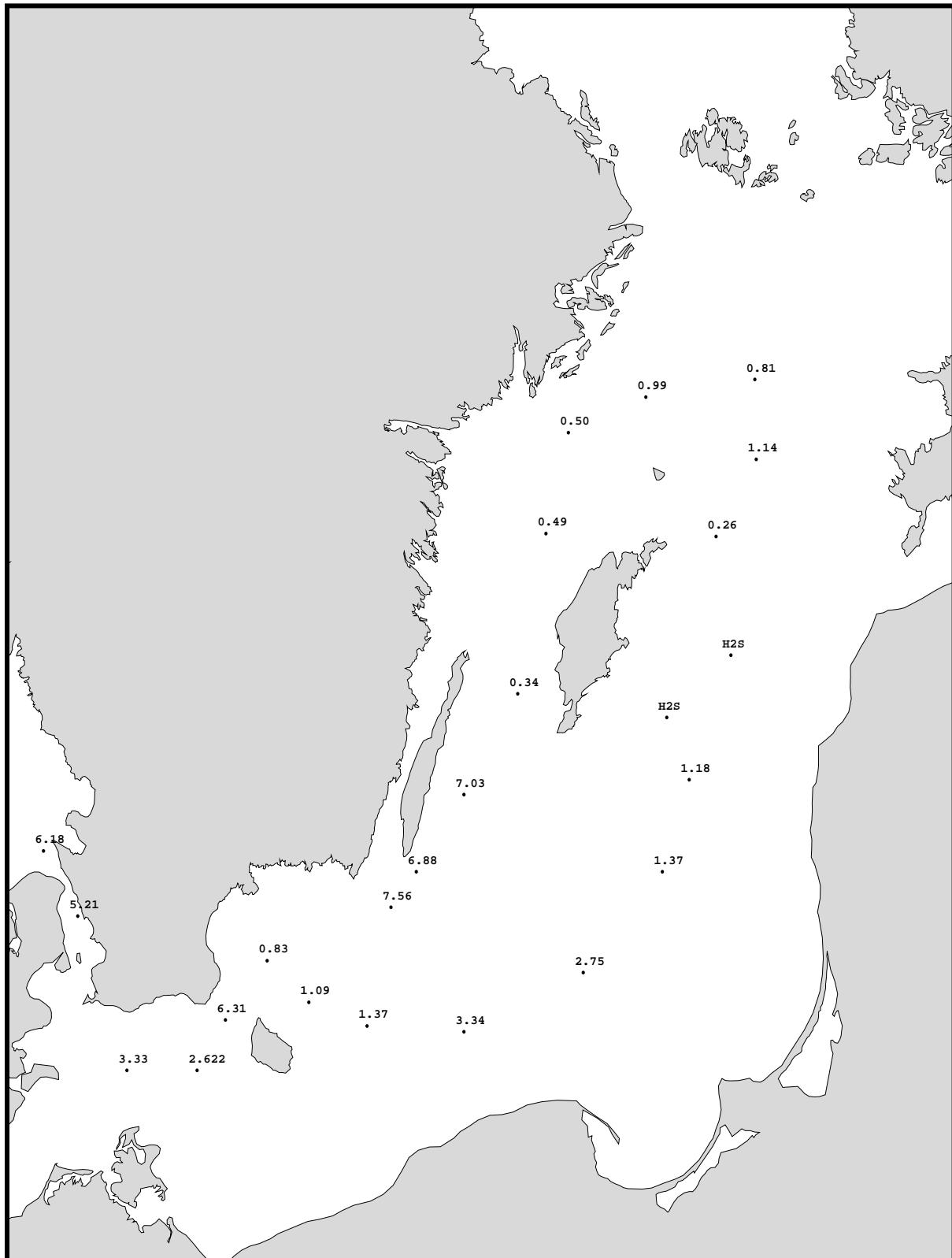
SMHI Ocean lab \*\*\*\*\* Hydrographic series Ship: 14-Argos Year: 1997 \*\*\*\*\* Date: 1997-06-19 Time: 07:47

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0413	BPWX45BMP	BY38	KARLSÖDJ	N5707	E1740	970609	1405	114		8	16 3	16.0	1019	1520	x	xxx---	16	x	x	x	x	-	x	x	x	x	x	x	x	x	x	x	x	-	-	-
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0419	BPSE49BAS	BY39	ÖLANDS S UDDE	N5607	E1632	970609	2220	50			23 2	13.2	1020	9920	x	-----	3	xx	-	x	-	x	-	x	-	-	-	-	-	-	-	-	-	-	-	
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# Bottom water oxygen concentration (ml/l)

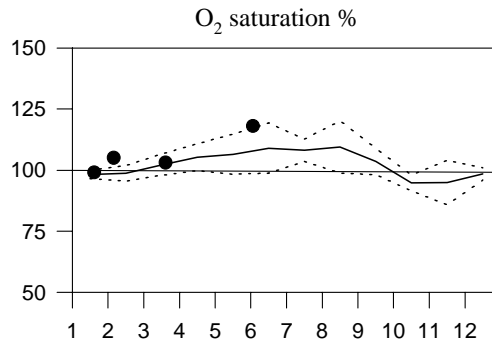
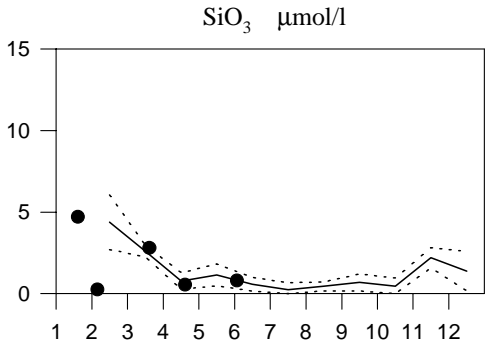
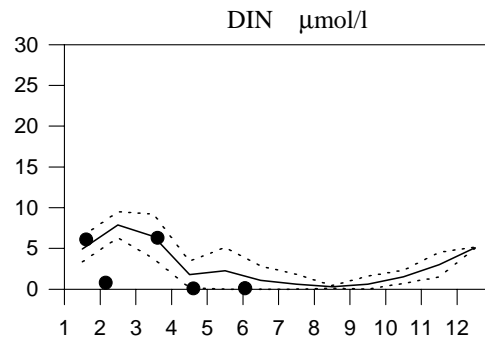
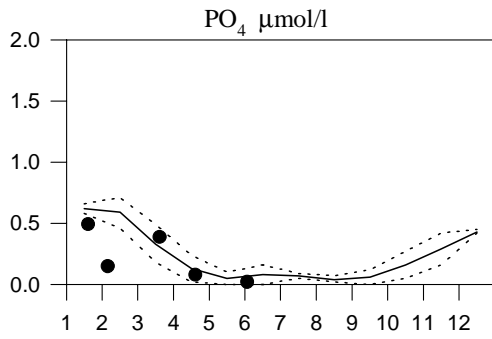
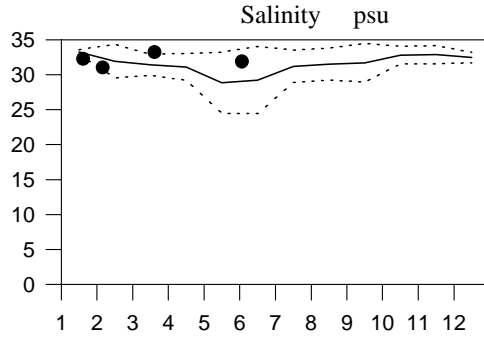
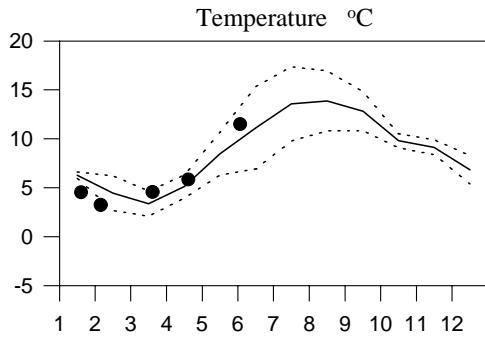
Country: Sweden  
Ship: Argos  
Date: 970602-970611  
Series: 0329-0436



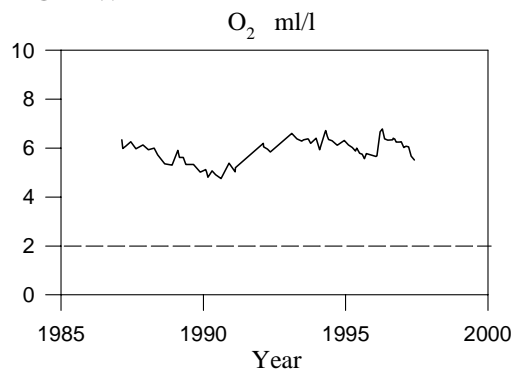
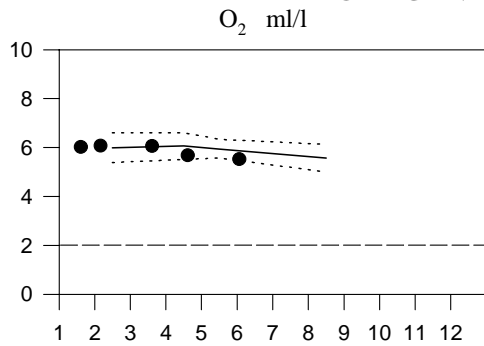
# STATION M6 SURFACE WATER (0-15 m)

## Annual Cycles

— Mean 1986-1995    - - - St.Dev.    ● 1997



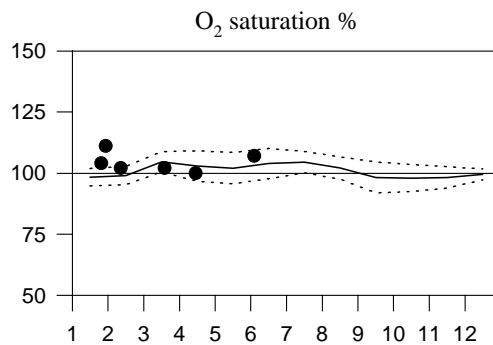
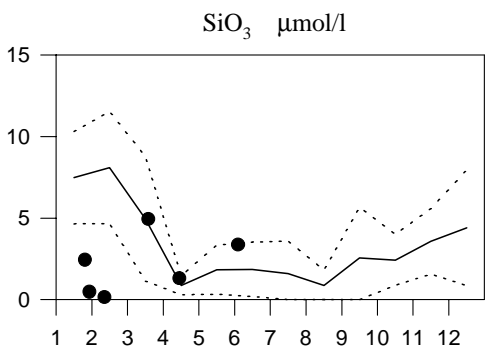
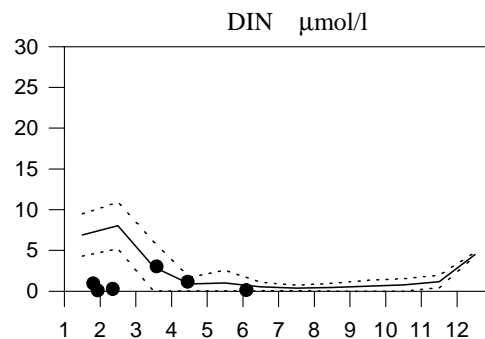
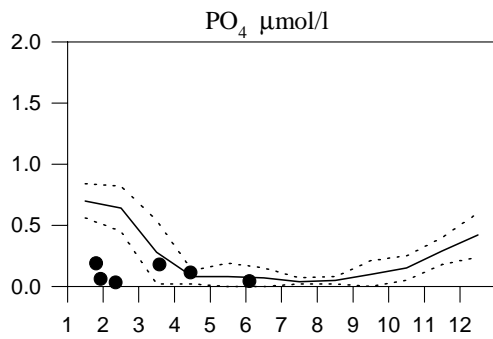
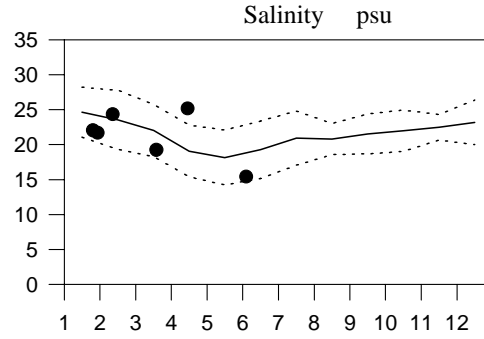
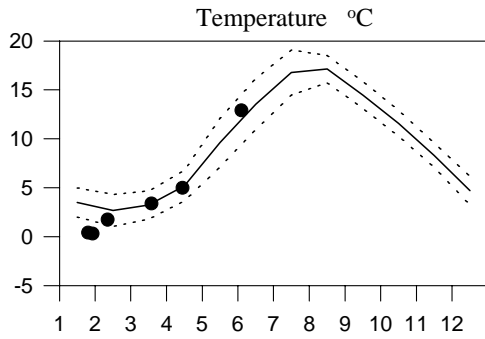
## OXYGEN IN BOTTOM WATER



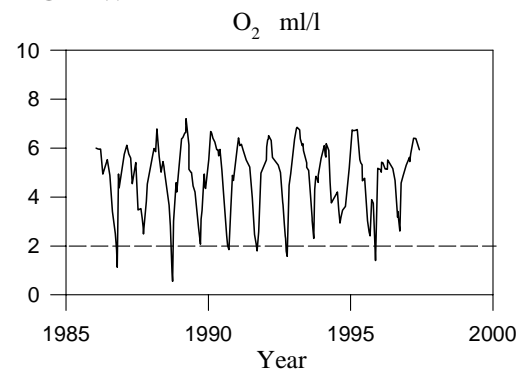
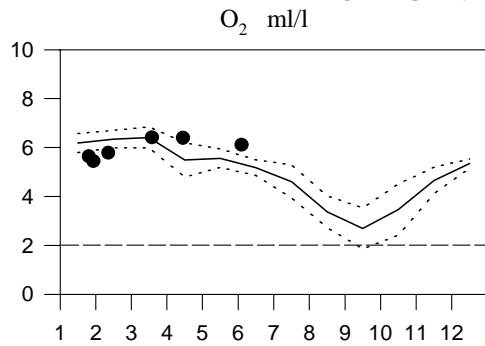
# STATION ANHOLT E SURFACE WATER (above halocline)

## Annual Cycles

— Mean 1986-1995    - - - St.Dev.    ● 1997



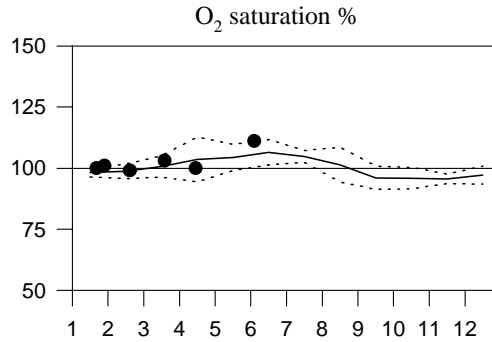
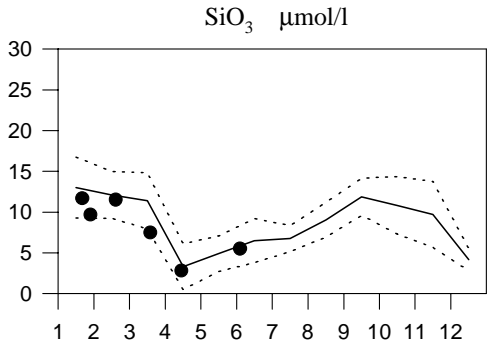
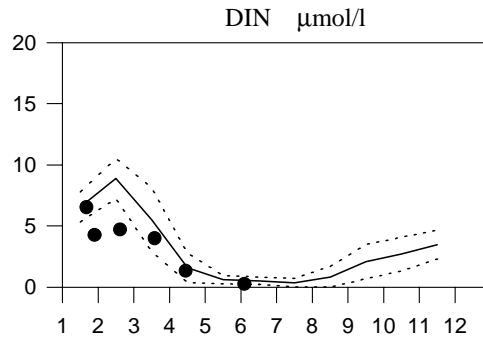
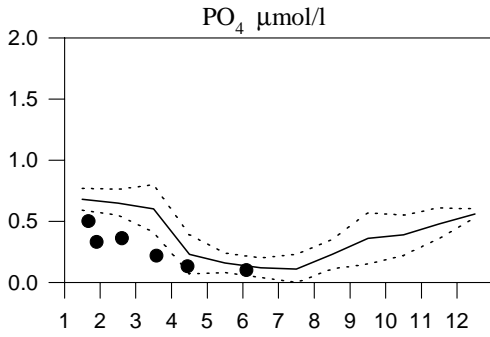
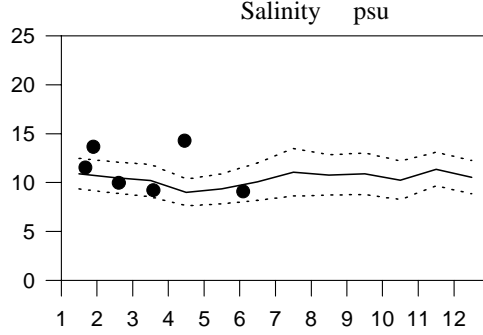
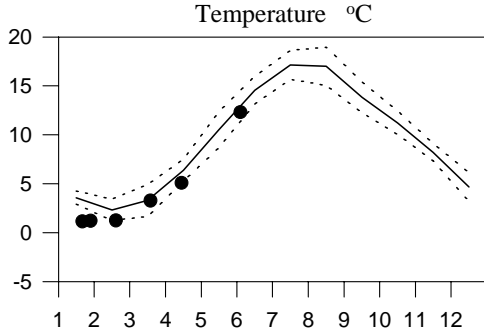
## OXYGEN IN BOTTOM WATER



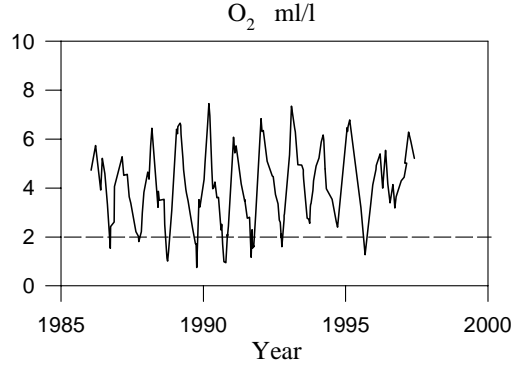
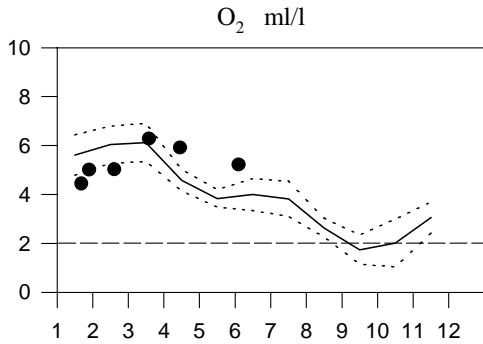
# STATION W LANDSKRONA SURFACE WATER (0-15 m)

## Annual Cycles

— Mean 1986-1995    - - - St.Dev.    ● 1997



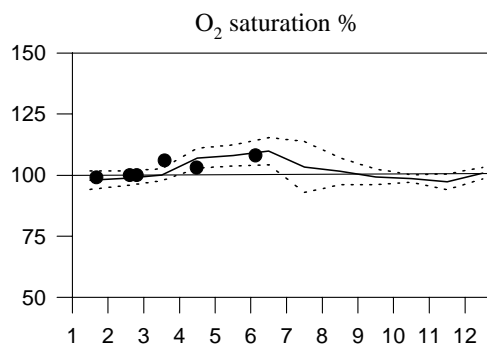
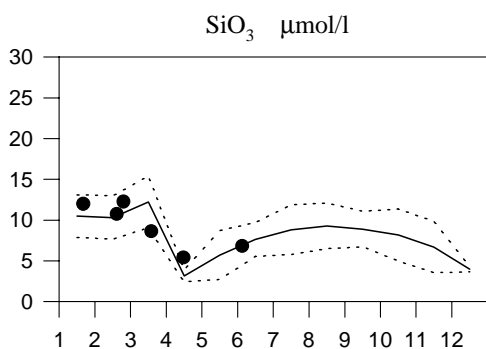
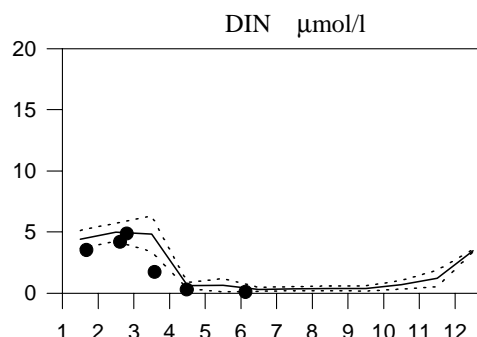
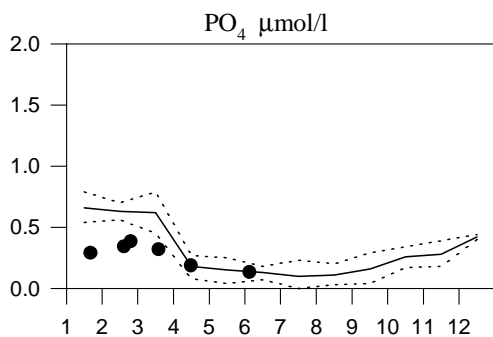
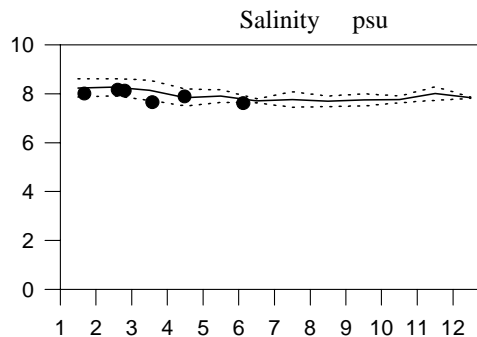
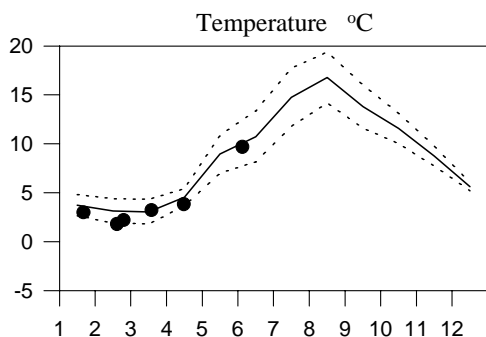
## OXYGEN IN BOTTOM WATER



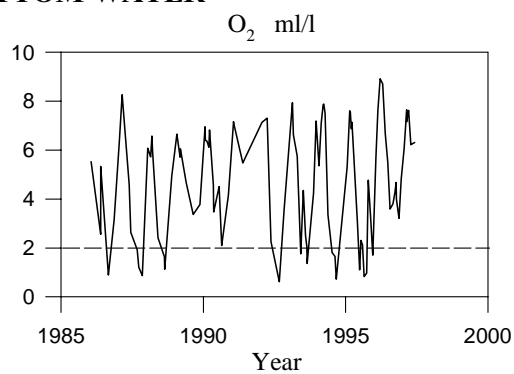
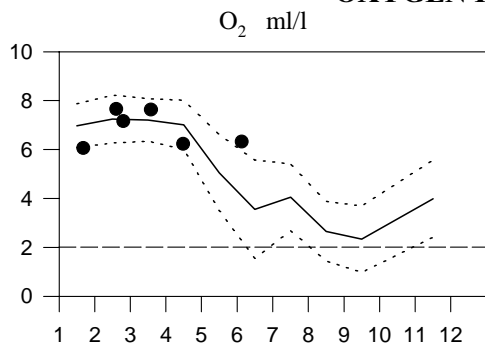
## STATION BY2 SURFACE WATER (0-15 m)

### Annual Cycles

— Mean 1986-1995    - - - St.Dev.    ● 1997



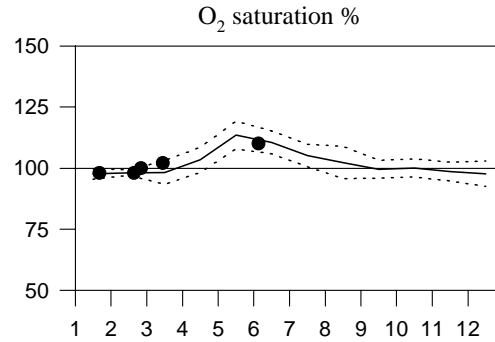
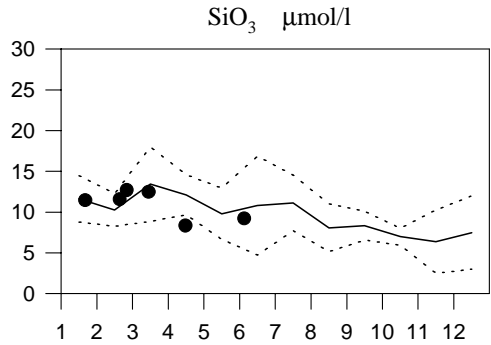
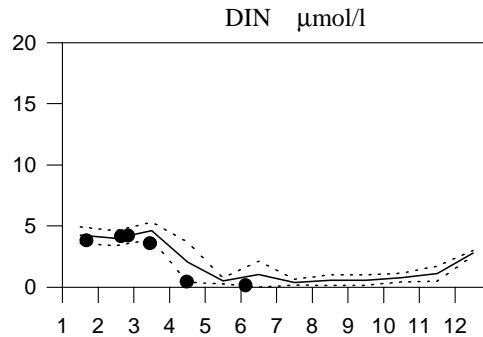
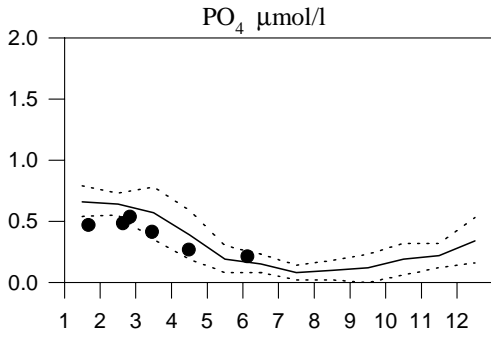
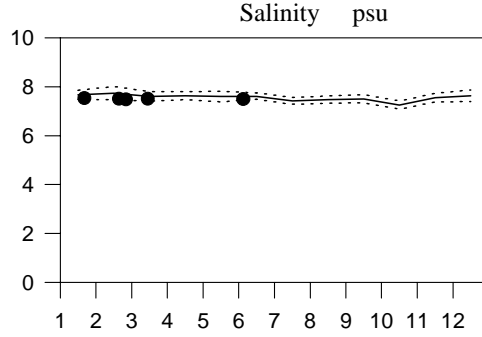
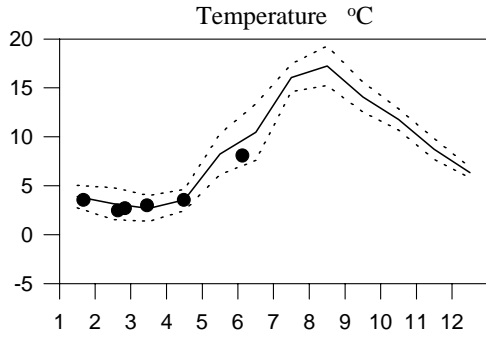
### OXYGEN IN BOTTOM WATER



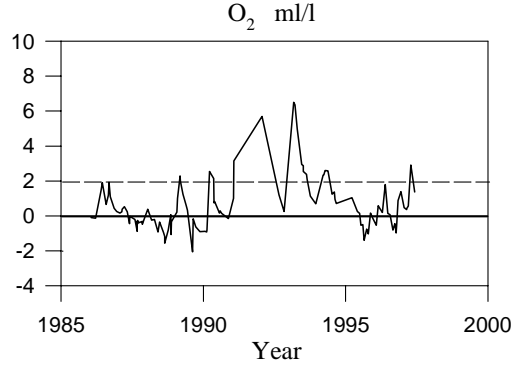
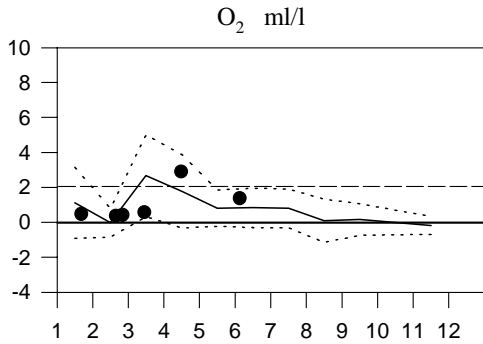
# STATION BY5 SURFACE WATER (0-15 m)

## Annual Cycles

— Mean 1986-1995    - - - St.Dev.    ● 1997



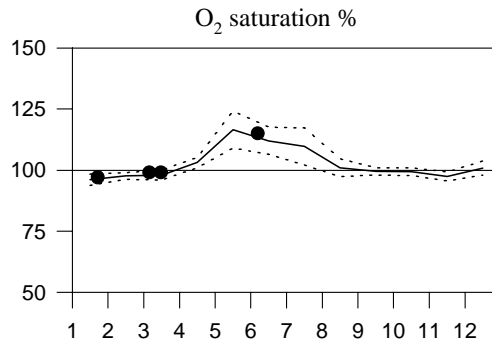
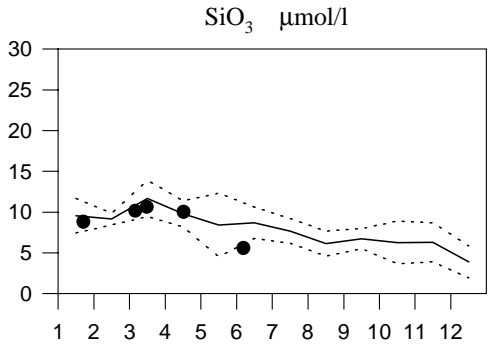
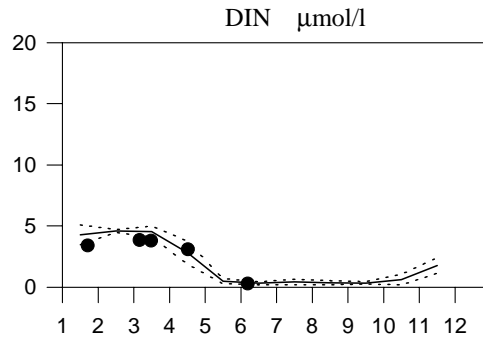
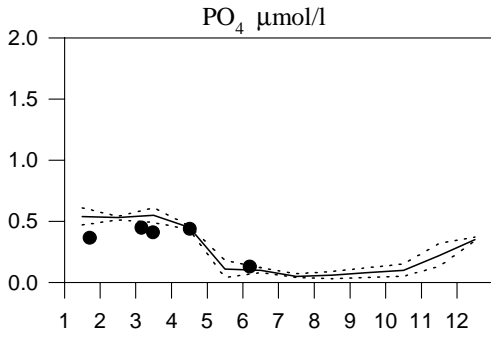
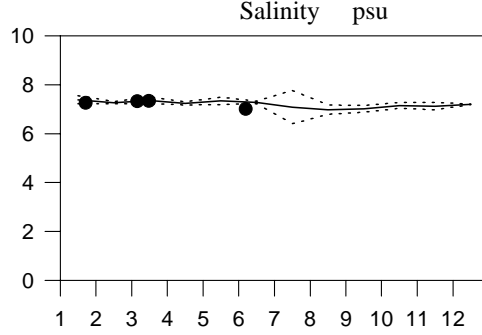
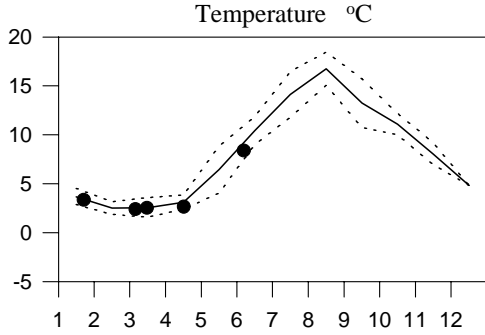
## OXYGEN IN BOTTOM WATER



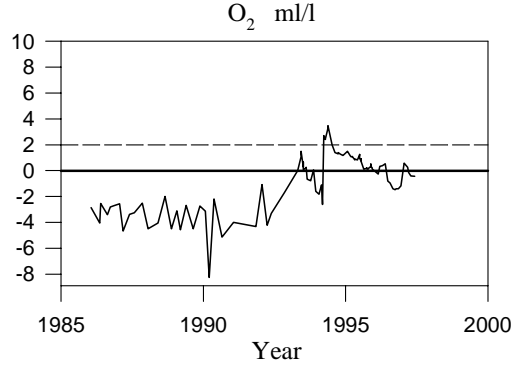
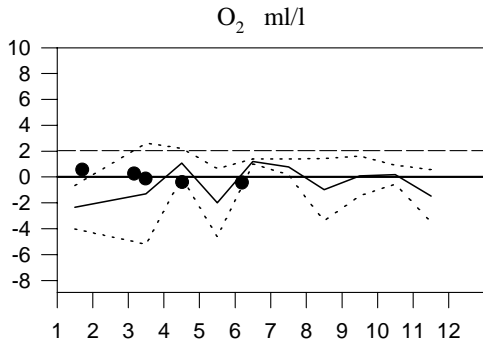
# STATION BY15 SURFACE WATER (0-15 m)

## Annual Cycles

— Mean 1986-1995    - - - St.Dev.    ● 1997



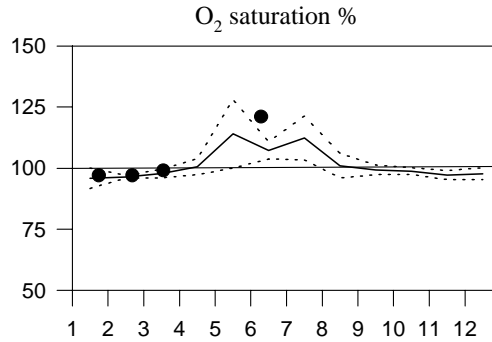
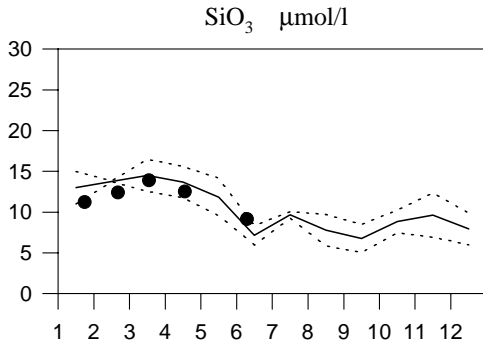
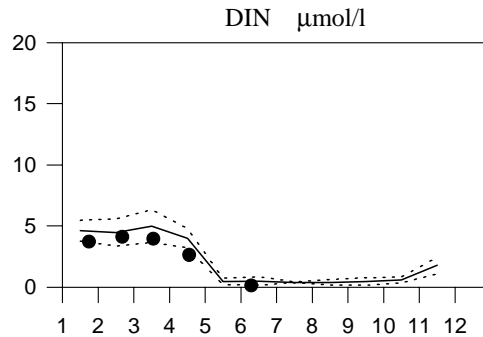
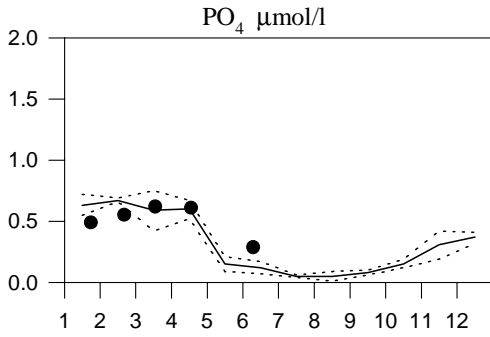
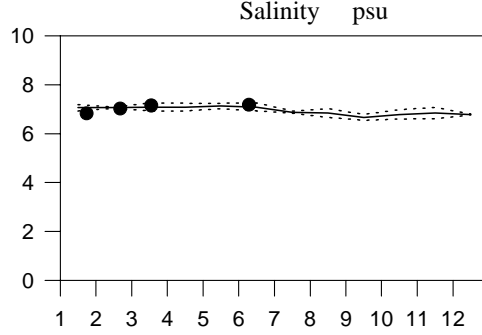
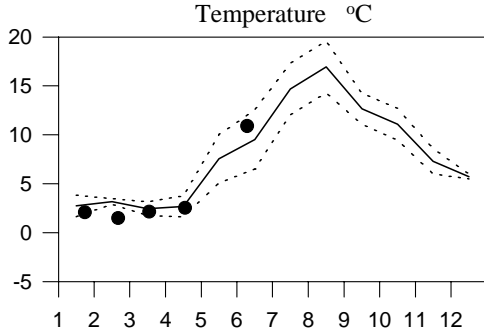
## OXYGEN IN BOTTOM WATER



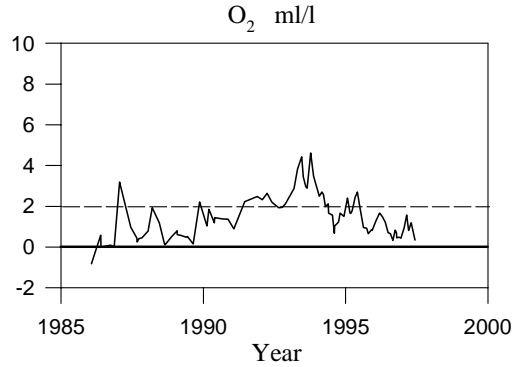
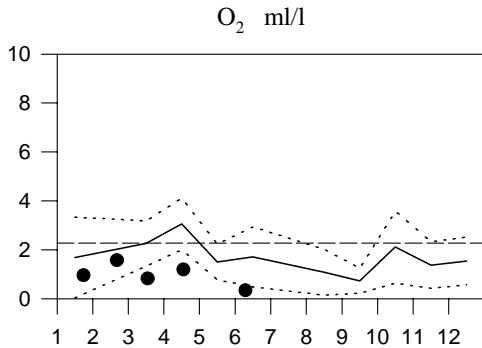
# STATION BY38 SURFACE WATER (0-15 m)

## Annual Cycles

— Mean 1986-1995    - - - St.Dev.    ● 1997

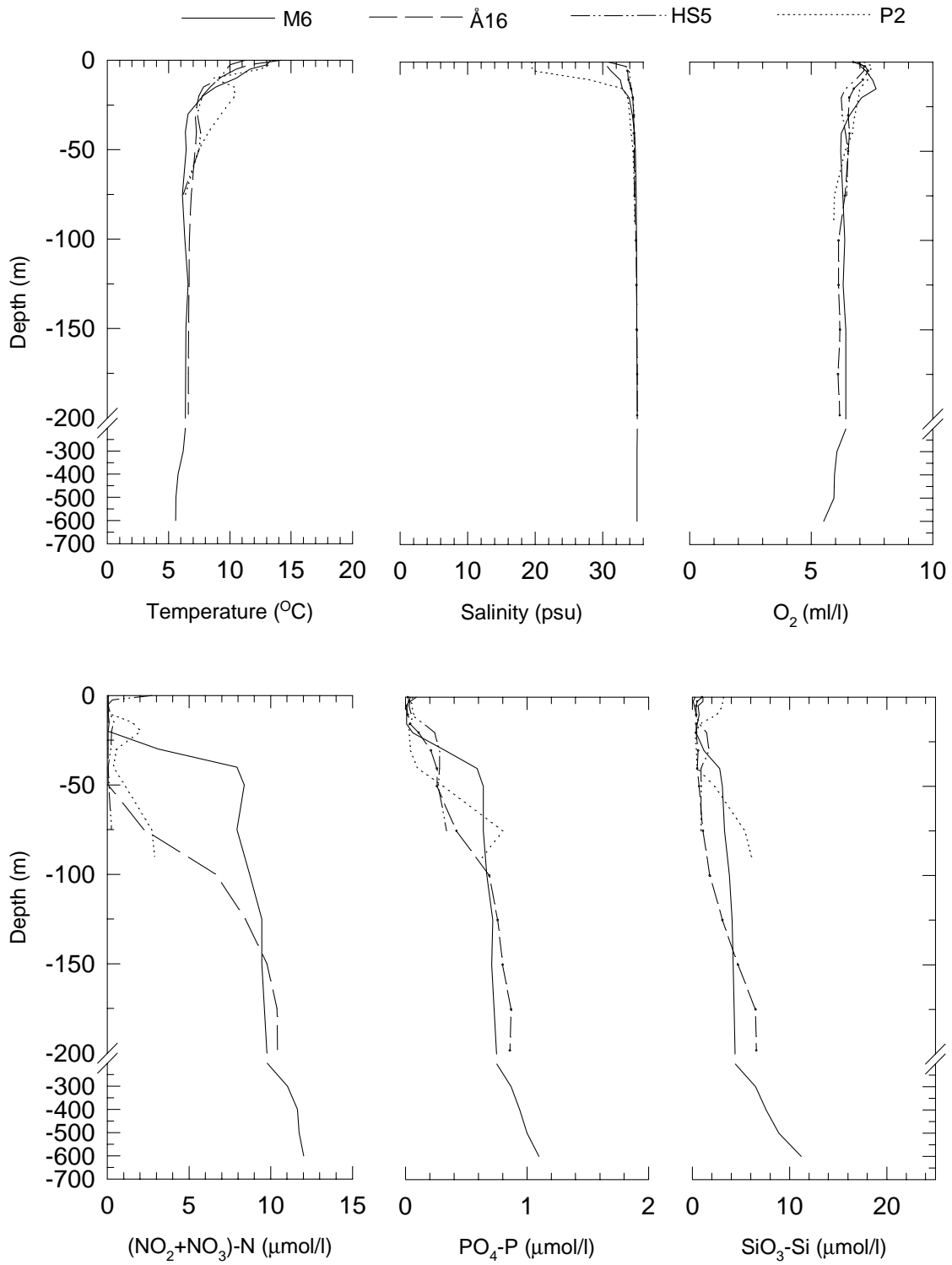


## OXYGEN IN BOTTOM WATER

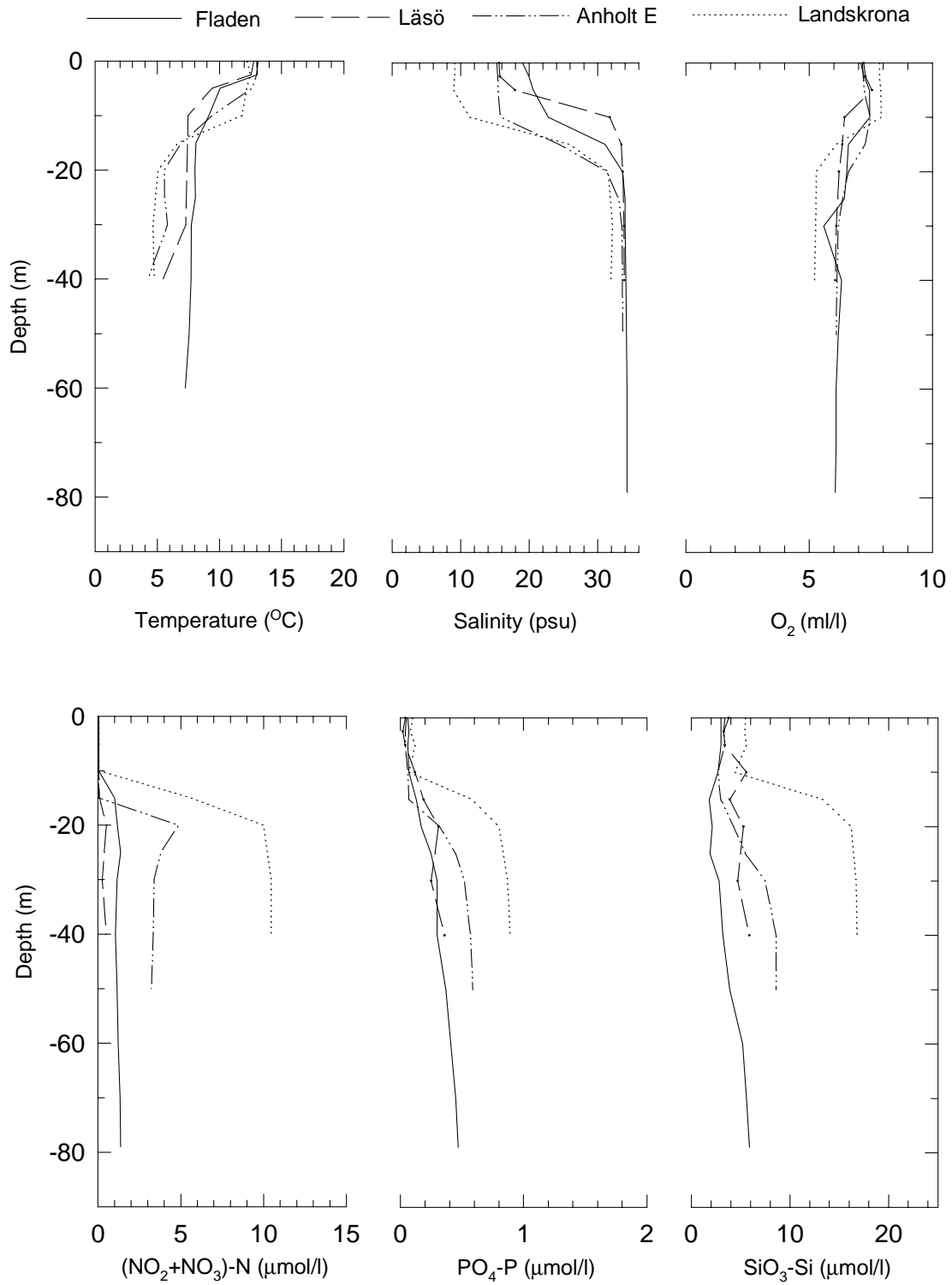




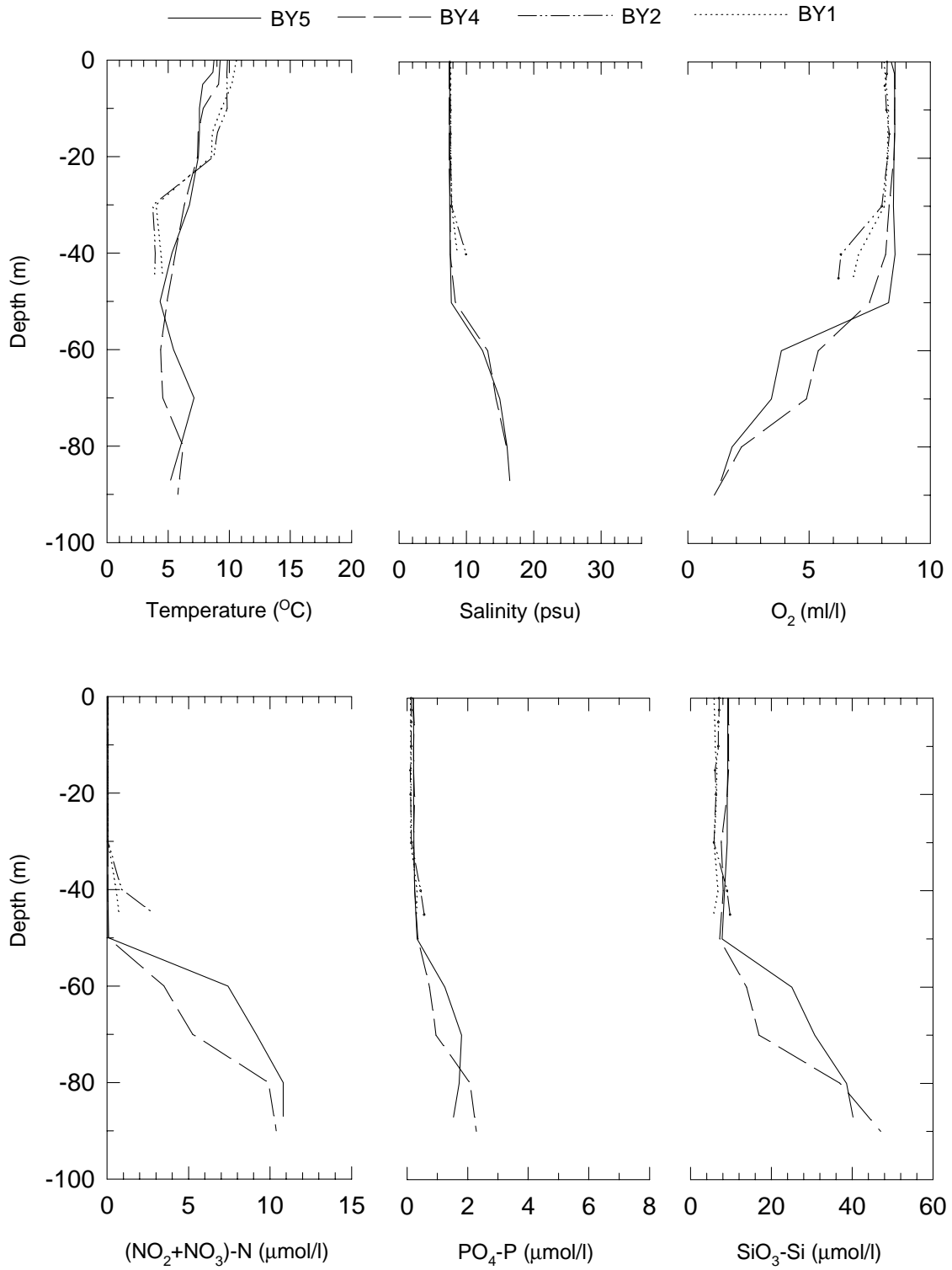
# SKAGERRAK week 23-24 -97



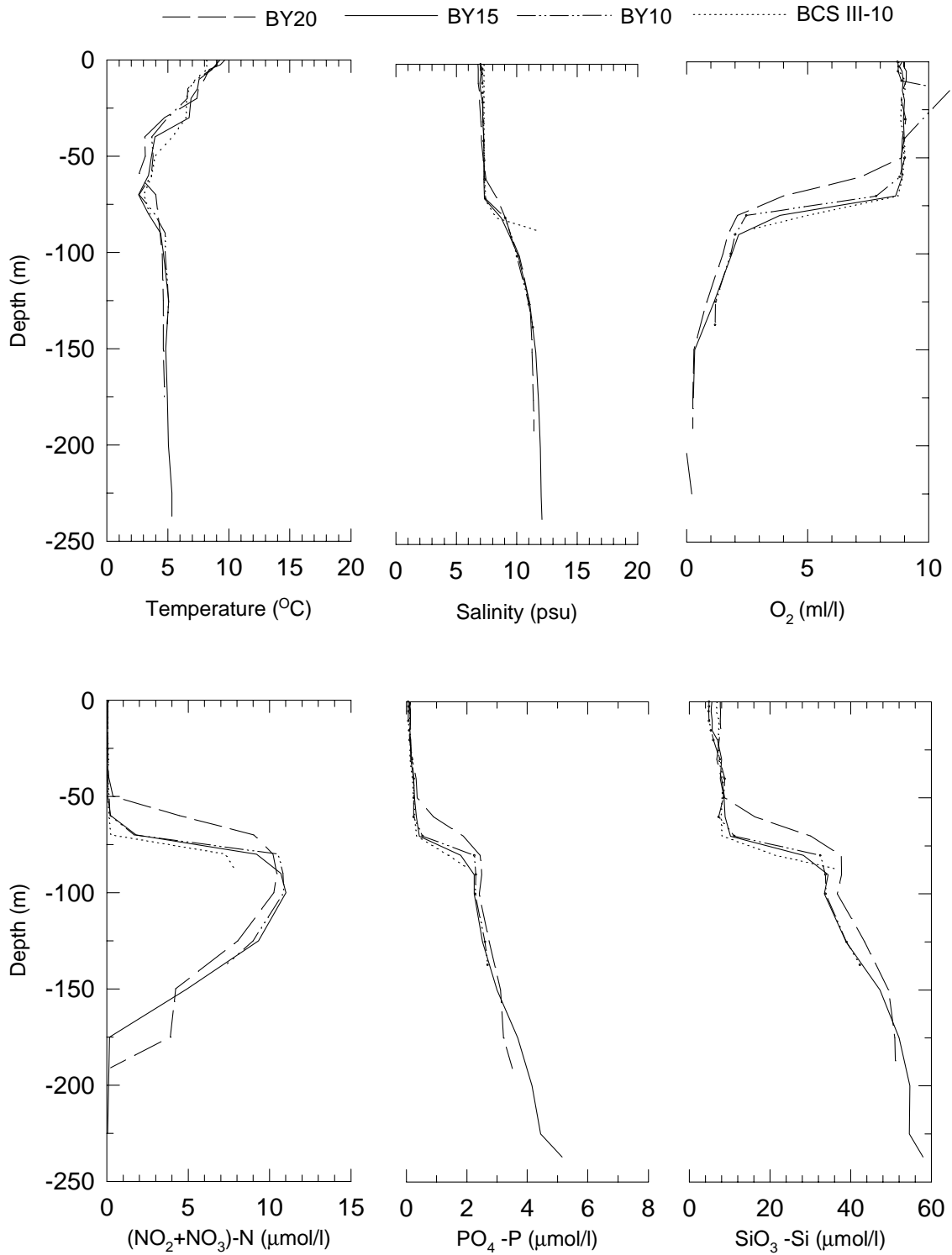
# KATTEGAT and THE SOUND week 23-24 -97



# SOUTH BALTIC week 23-24 -97



# EAST BALTIC week 23-24 -97



# WEST BALTIC week 23-24 -97

