

Rapport från SMHIs utsjöexpedition med R/V Aranda



Expeditionens varaktighet: 2014-08-01 - 2014-08-08
Undersökningsområde: Skagerrak, Kattegatt och egentliga Östersjön
Uppdragsgivare: SMHI samt Havs- och Vattenmyndigheten

SAMMANFATTNING

Under expeditionen, vilken ingick i det svenska havsövervakningsprogrammet, besöktes Skagerrak, Kattegatt och egentliga Östersjön. Denna rapport är baserad på preliminära, endast delvis kvalitetskontrollerade data.

Ytvattentemperaturen låg över det normala i hela det undersökta området. Närsalterna i ytvattnet uppvisade, för årstiden normala värden i samtliga besökta havsområden. Syreförhållandena i Arkonabassängens, Bornholmsbassängens och Hanöbuktens bottenvatten låg under gränsen för akut syrebrist (< 2 ml/l). I östra Gotlandsbassängen hade syreförhållandena försämrats sedan förgående mätning i juli. I västra Gotlandsbassängen förekom svavelväte redan från 80 meters djup. Akut syrebrist förekom i hela egentliga Östersjön på djup överstigande 70 till 80 meter.

En utförlig algrapport återfinns på:

http://www.smhi.se/oceanografi/oce_info_data/reports/alg/algsit14_6.pdf

Nästa ordinarie expedition är planerad till vecka 36. Då kommer Skagerrak, Kattegatt och egentliga Östersjön att besökas.

PRELIMINÄRA RESULTAT

Expeditionen, som var en för SMHI ordinarie övervakningstur med det finska forskningsfartyget Aranda, startade i Helsingfors den 1:e augusti och avslutades i samma hamn den 8:e. Vindarna under expeditionen var svaga till måttliga, av varierande riktning. Lufttemperaturen varierade mellan 19 och 24°C.

Skagerrak

Ytvattentemperaturen låg något över det normala för årstiden, kring 20°C. Salthalten i ytlagret varierade från 23 till 32 psu, högst i Baltiska strömmen invid kusten. Termoklin och haloklin sammanföll och återfanns på 5 till 20 meters djup, djupast i de västra delarna.

Samtliga närsalter uppvisade, i ytlagret, koncentrationer typiska för årstiden. Fosfathalterna varierade mellan 0.03 och 0.16 µmol/l, silikat från <0.1 till 1.3 µmol/l medan koncentrationerna av oorganiskt kväve (nitrit + nitrat) låg under detektionsgränsen (< 0.10 µmol/l) i hela området. Det lägsta syrevärdet i bottenvattnet uppmättes vid stationen Släggö i Gullmarfjordens mynning, 2.4 ml/l på 60 meters djup.

Kattegatt och Öresund

I detta område var ytvattentemperaturen betydligt högre än normalt, mellan 21 och 22°C.

Ytsalthalten låg under medel och varierade från 16.2 till 18.6 psu i Kattegatt, medan den i Öresund låg på 10.4 psu. Termoklin och haloklin sammanföll och låg på 10 till 15 meters djup i hela området.

Halterna av näringsämnen i ytvattnet låg inom det normala för årstiden. I Kattegatt låg fosfathalten på 0.06 µmol/l, medan den i Öresund låg på 0.19 µmol/l. Silikathalten i Kattegatt varierade mellan 1.2 och 1.6 µmol/l och låg i Öresund på 6.7 µmol/l. Halten av nitrit + nitrat låg under detektionsgränsen (< 0.10 µmol/l) i båda havsområdena.

Det lägsta syrevärdet i Kattegatts djupvatten återfanns vid Anholt E i södra Kattegatt, 4.19 ml/l. I Öresund uppmättes som lägst 3.96 ml/l.

Egentliga Östersjön

Även i detta område låg ytvattentemperaturen över det normala, mellan 20.1 och 22.6°C. Salthalten i ytvattnet var normal och låg mellan 6.4 och 7.7 psu. Haloklinen återfanns på omkring 60 till 80 meters djup i norra, västra och östra Gotlandsbassängerna, medan den låg grundare i de södra delarna, på djup mellan 40 och 60 meter. Termoklinen sträckte sig från ytan ner till ett djup av 20 - 30 meter.

Samtliga närsalter, i ytlagret, uppvisade i stort sett normala koncentrationer för årstiden.

Fosfathalterna låg i intervallet 0.07–0.19 µmol/l och silikalthalterna varierade mellan 7.8 och 11.8 µmol/l. Oorganiskt kväve (nitrit + nitrat) var förbrukat i ytvattnet och låg under detektionsgränsen i hela det undersökta området.

I Arkonabassängen, Bornholmsbassängen och Hanöbukten låg syrehalterna i bottenvattnet under gränsen för akut syrebrist (< 2 ml/l). Vid stationen BCS III-10, i de sydöstra delarna, hade syrehalten i bottenvattnet minskat från 2.8 ml/l vid mätningen i juni till 1 ml/l. I södra delen av östra Gotlandsbassängen, stationen BY10, där en syrehalt på 1.99 ml/l uppmättes i juli registrerades nu återigen svavelväte, vilket återfanns på djup överstigande 125 meter. Vid Gotlandsdjupet (BY15) registrerades under juli en syrekonzentration av 1.23 ml/l i bottenvattnet, vilken nu sjunkit till 0.18 ml/l. Svavelväte förekom här på djup mellan 125 och 225 meter. I västra Gotlandsbassängen

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förekom svavelväte redan från 80 meters djup. Akut syrebrist förekom på djup överstigande 70 till 80 meter, i Arkonabassängen på djup överstigande 40 meter.

DELTAGARE

Namn		Från
Lars Andersson	Expeditionsledare	SMHI
Kristin Andreasson		SMHI
Marie Johansen		SMHI
Sara Johansson		SMHI
Sari Sipilä		SMHI
Arne Svensson		SMHI

BILAGOR

- Färdkarta
- Tabell över stationer, antal parametrar och provtagningsdjup
- Karta över syrehalter i bottenvattnet
- Vertikalprofiler för basstationer
- Månadsmedelvärdesplottar för ytvatten

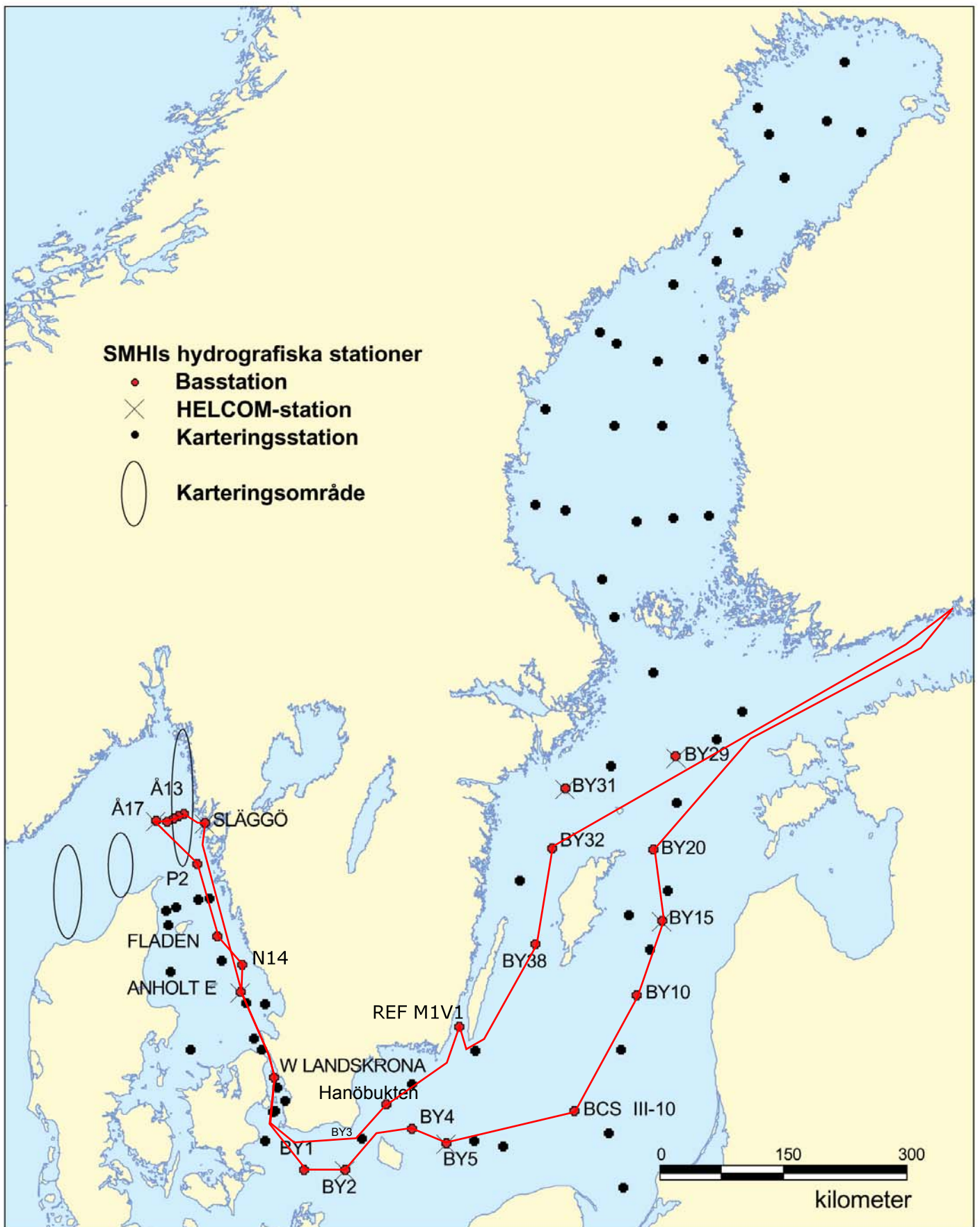
TRACKCHART

Country: Sweden

Ship: R/V ARANDA

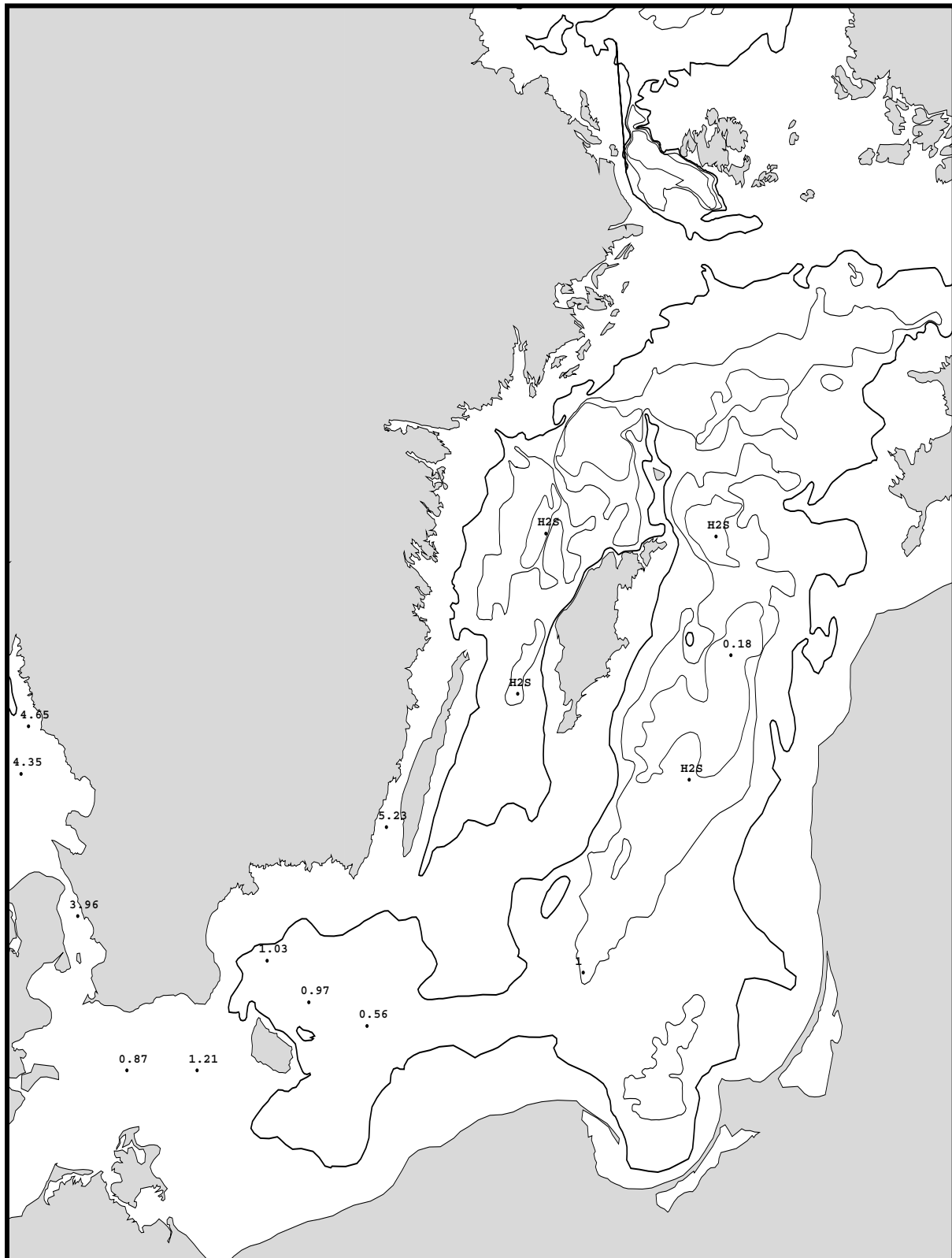
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Series: 0472-0497



Bottom water oxygen concentration (ml/l)

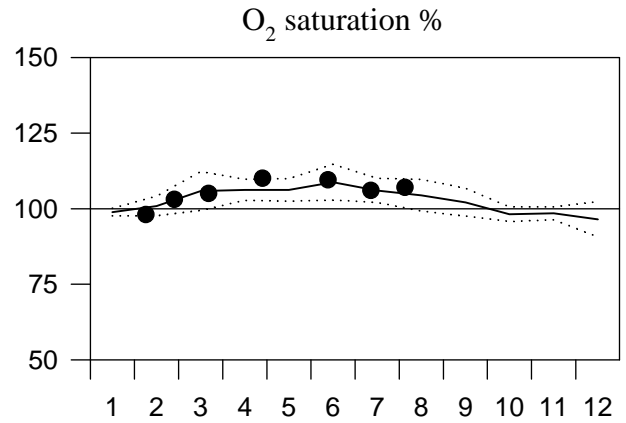
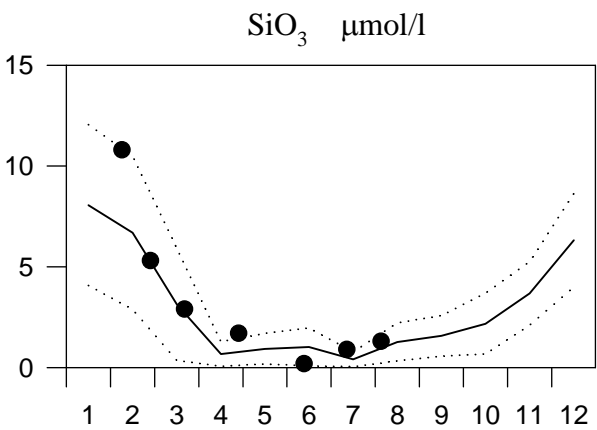
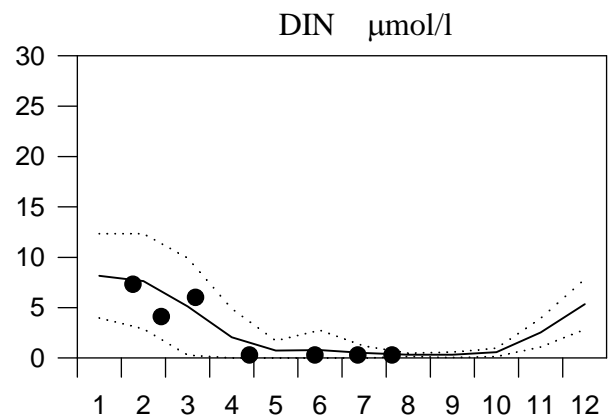
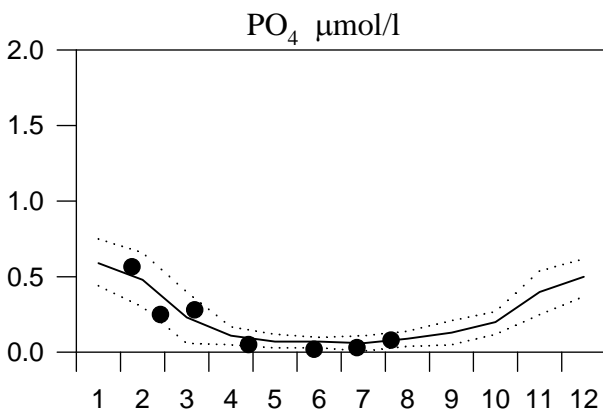
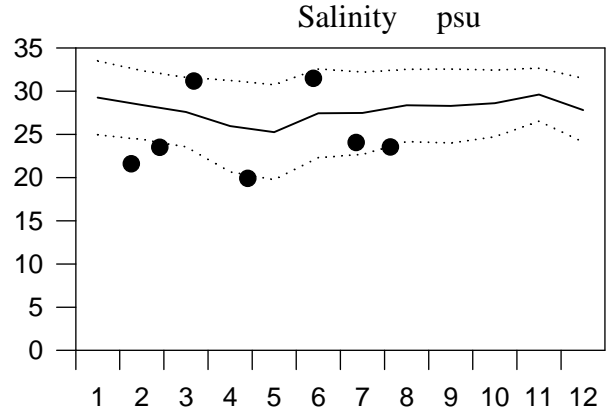
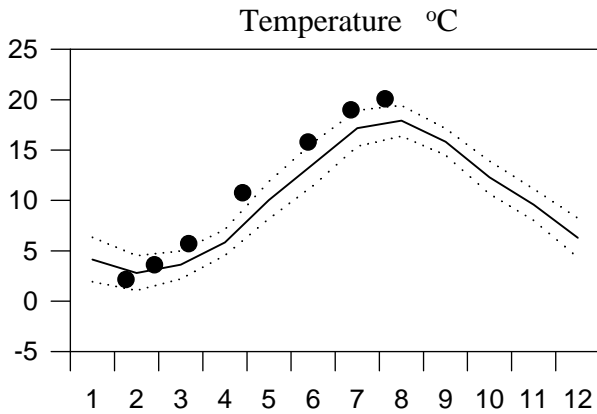
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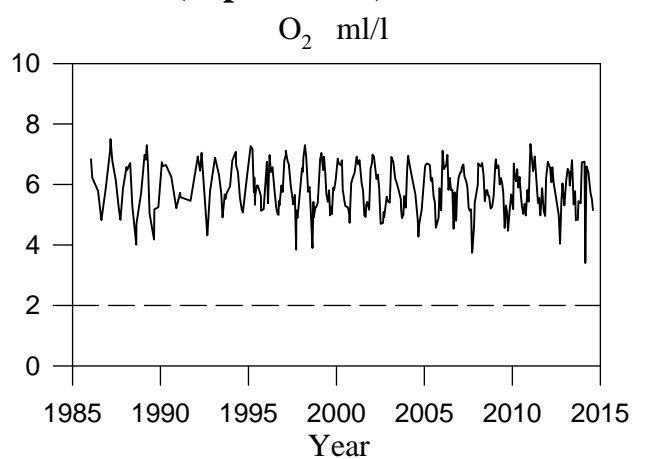
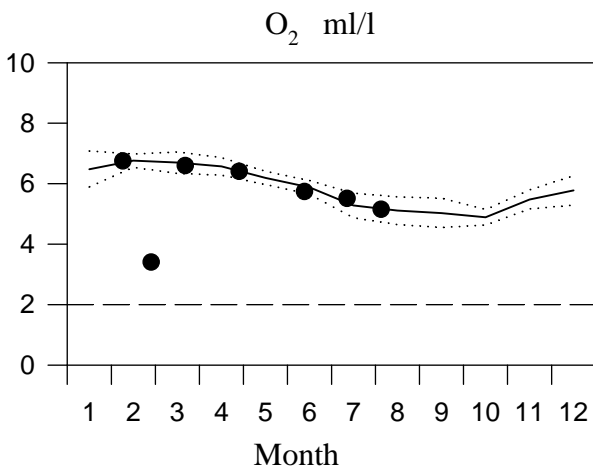
STATION P2 SURFACE WATER

Annual Cycles

— Mean 1996-2010 ····· St.Dev. ● 2014

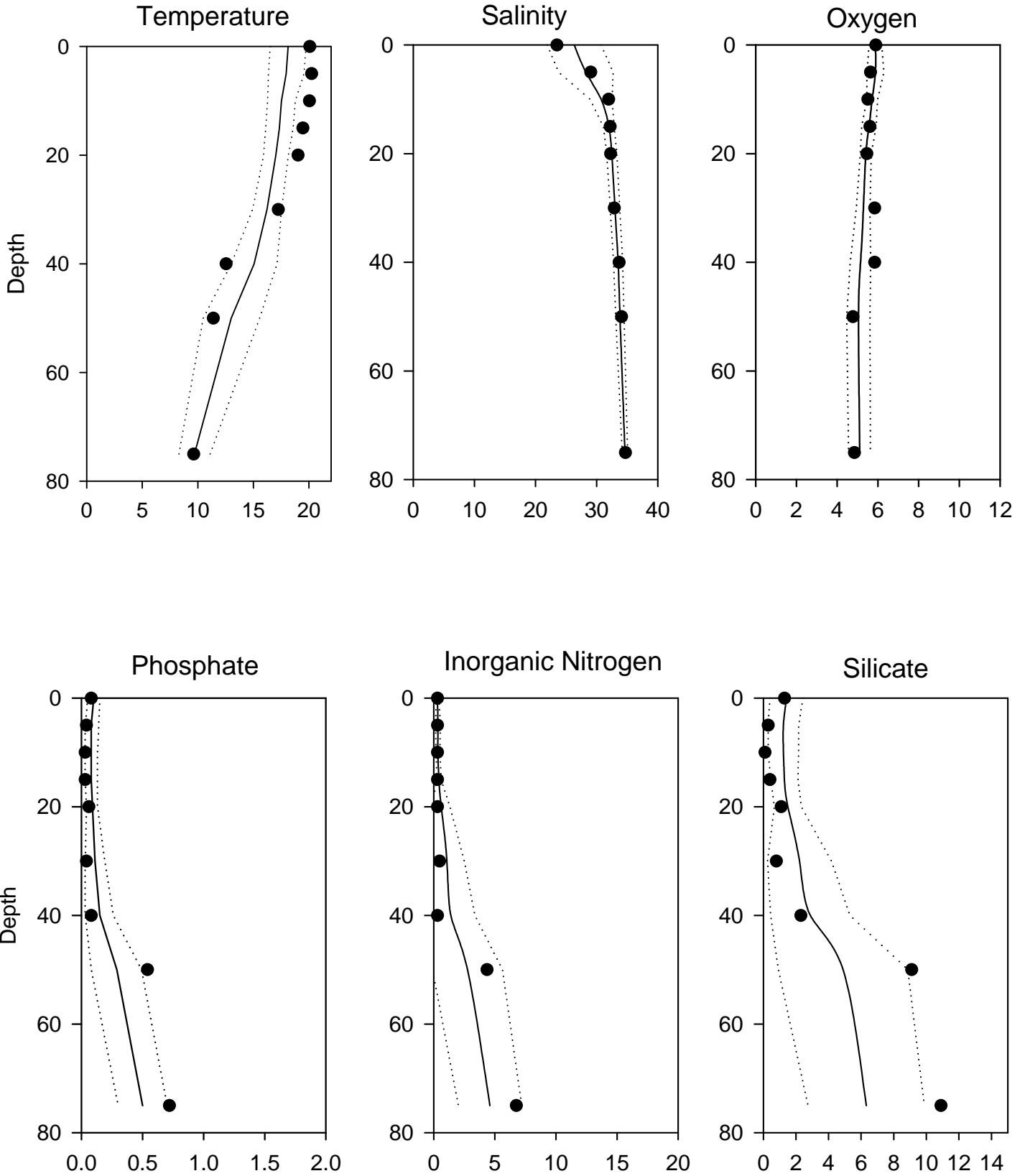


OXYGEN IN BOTTOM WATER (depth >75m)



Vertical profiles P2 August

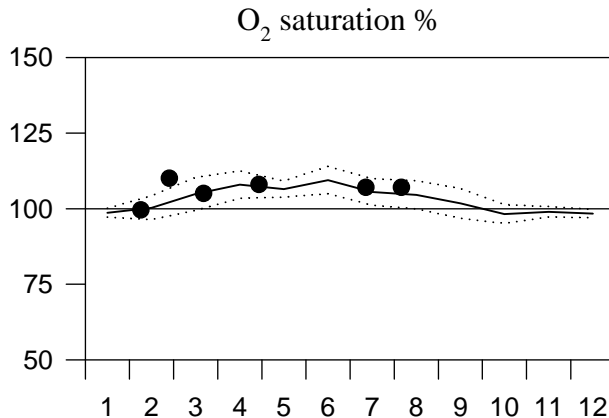
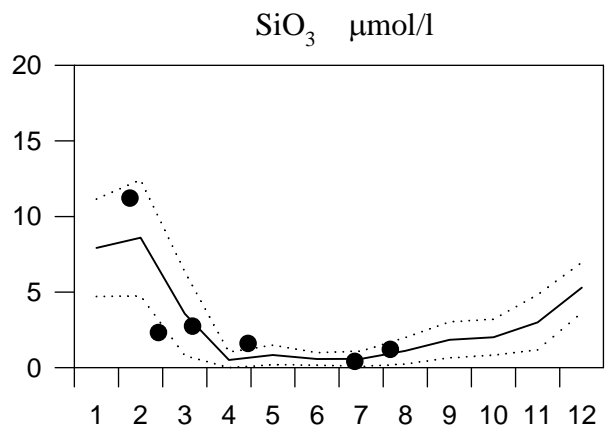
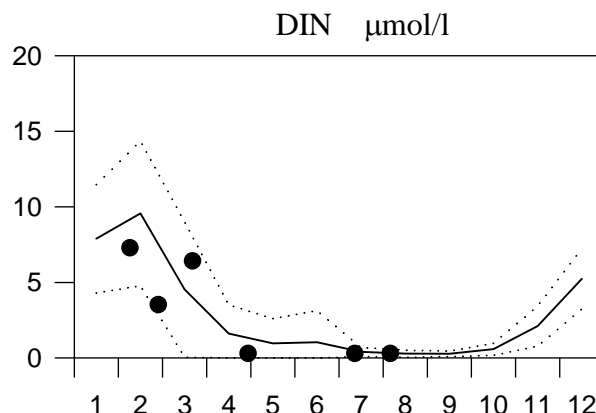
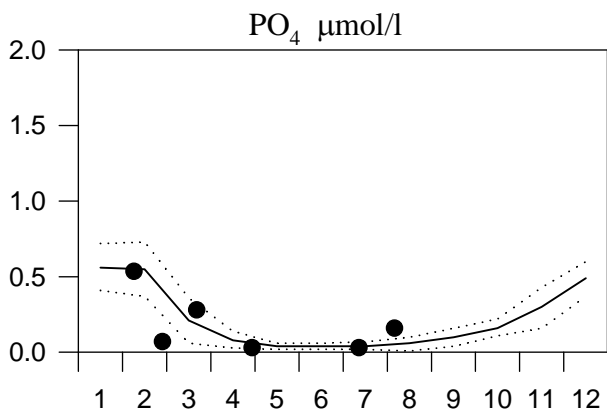
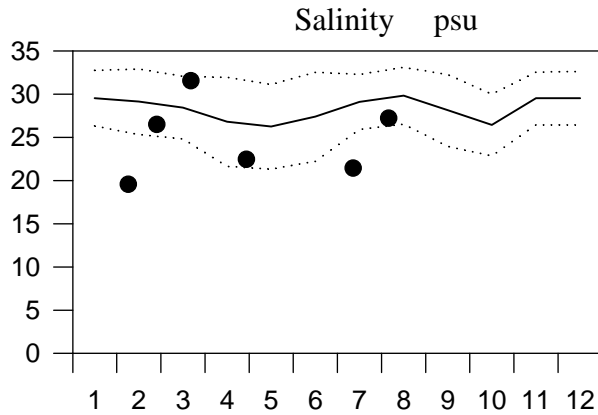
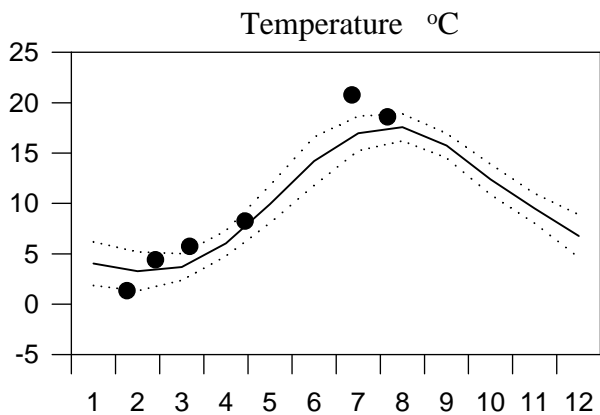
— Mean 1996-2010 St.Dev. ● 2014



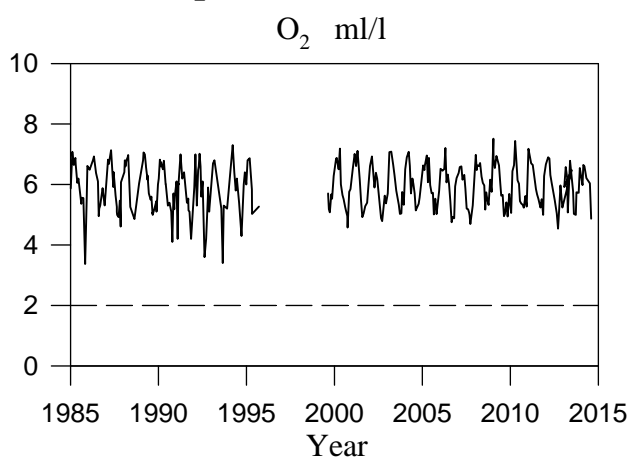
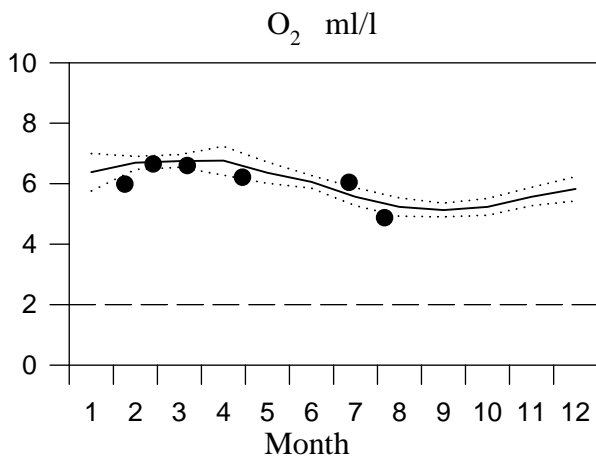
STATION Å13 SURFACE WATER

Annual Cycles

— Mean 1996-2010 ····· St.Dev. ● 2014

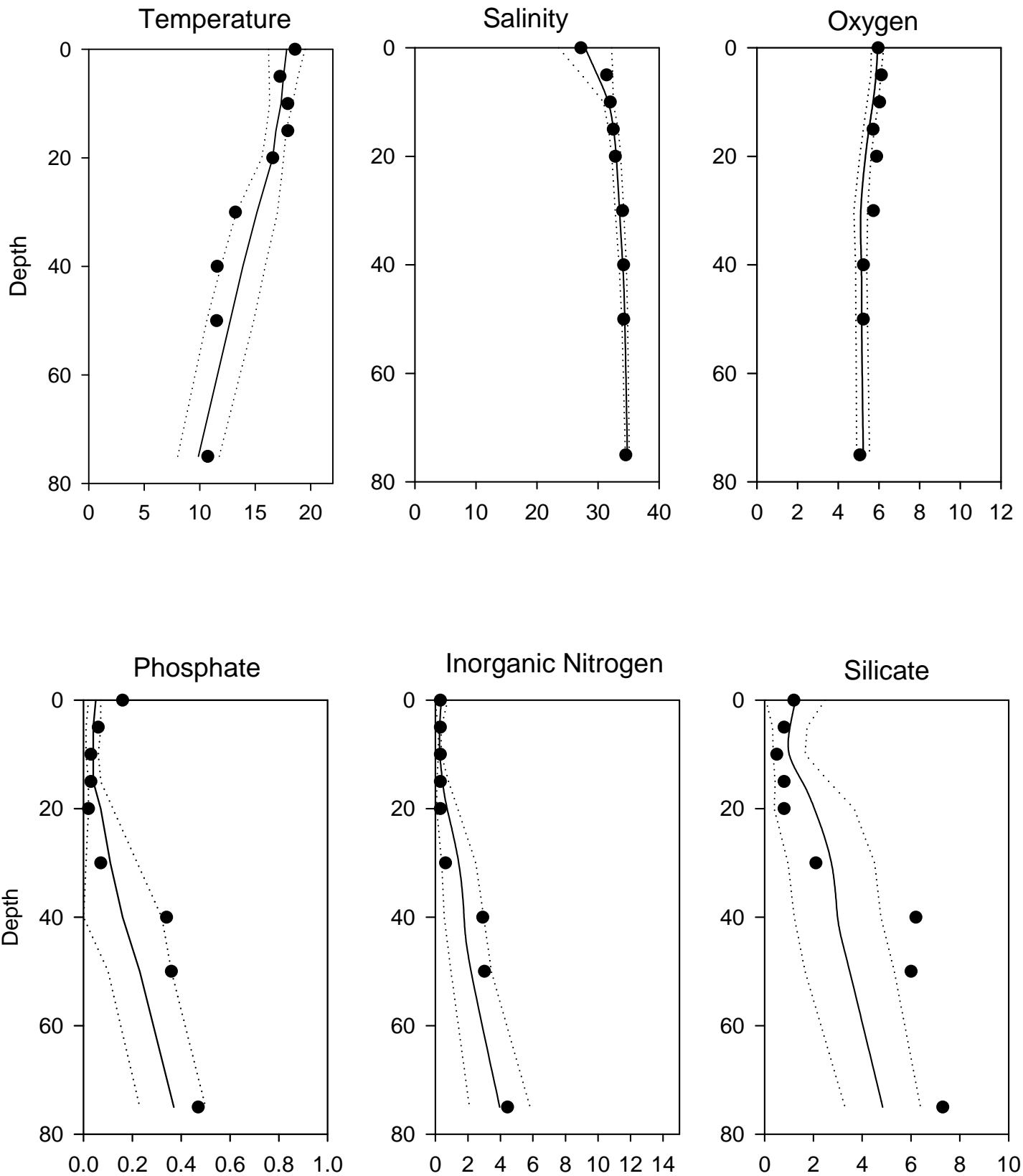


OXYGEN IN BOTTOM WATER (depth >=75m)



Vertical profiles Å13 August

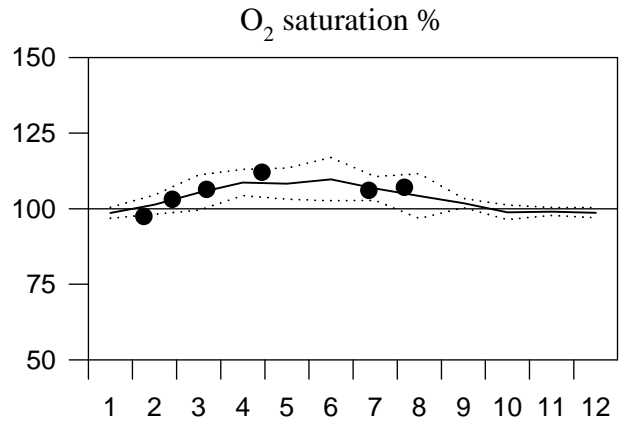
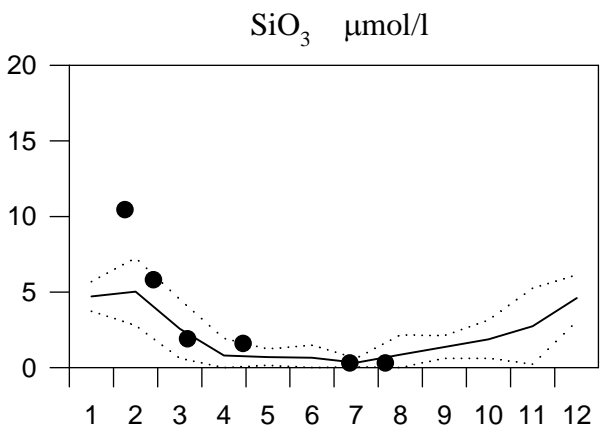
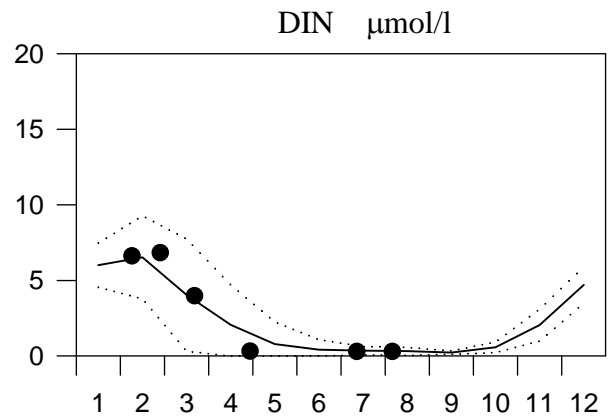
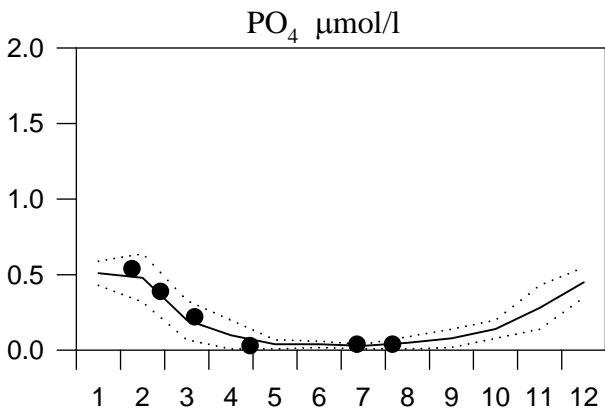
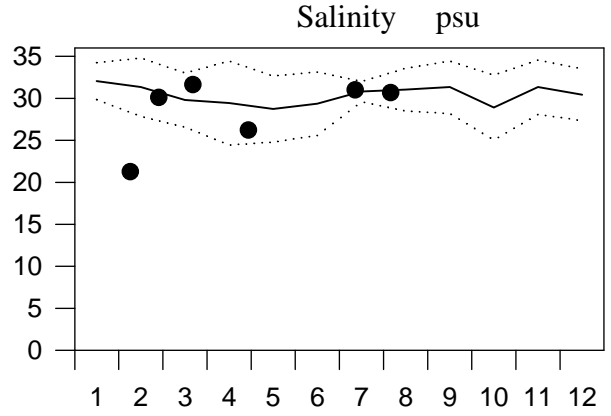
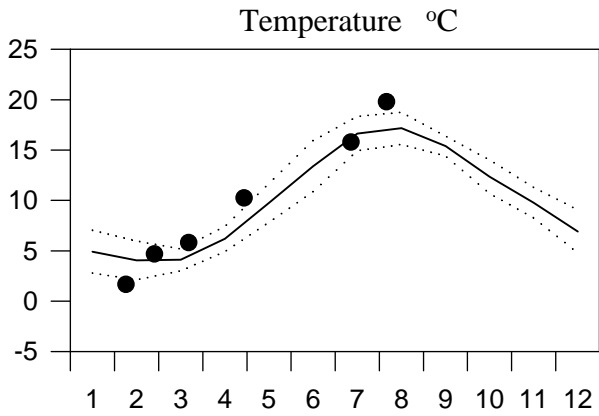
— Mean 1996-2010 St.Dev. ● 2014



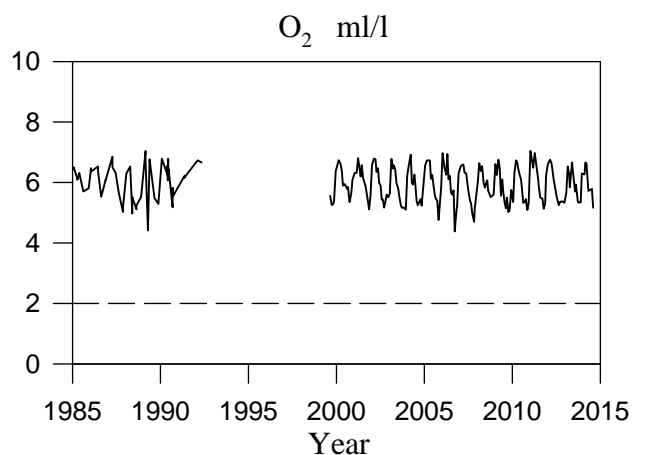
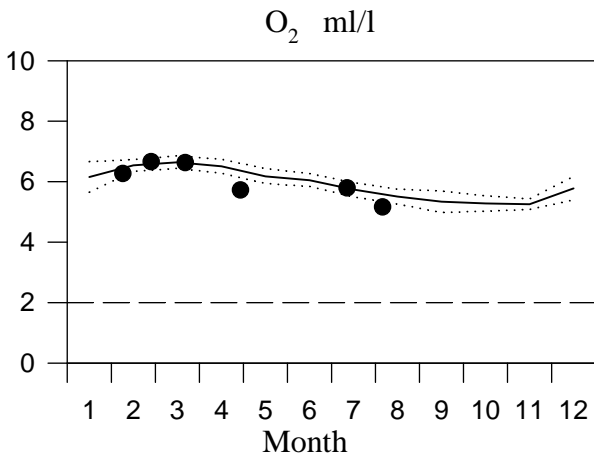
STATION Å15 SURFACE WATER

Annual Cycles

— Mean 1996-2010 ····· St.Dev. ● 2014

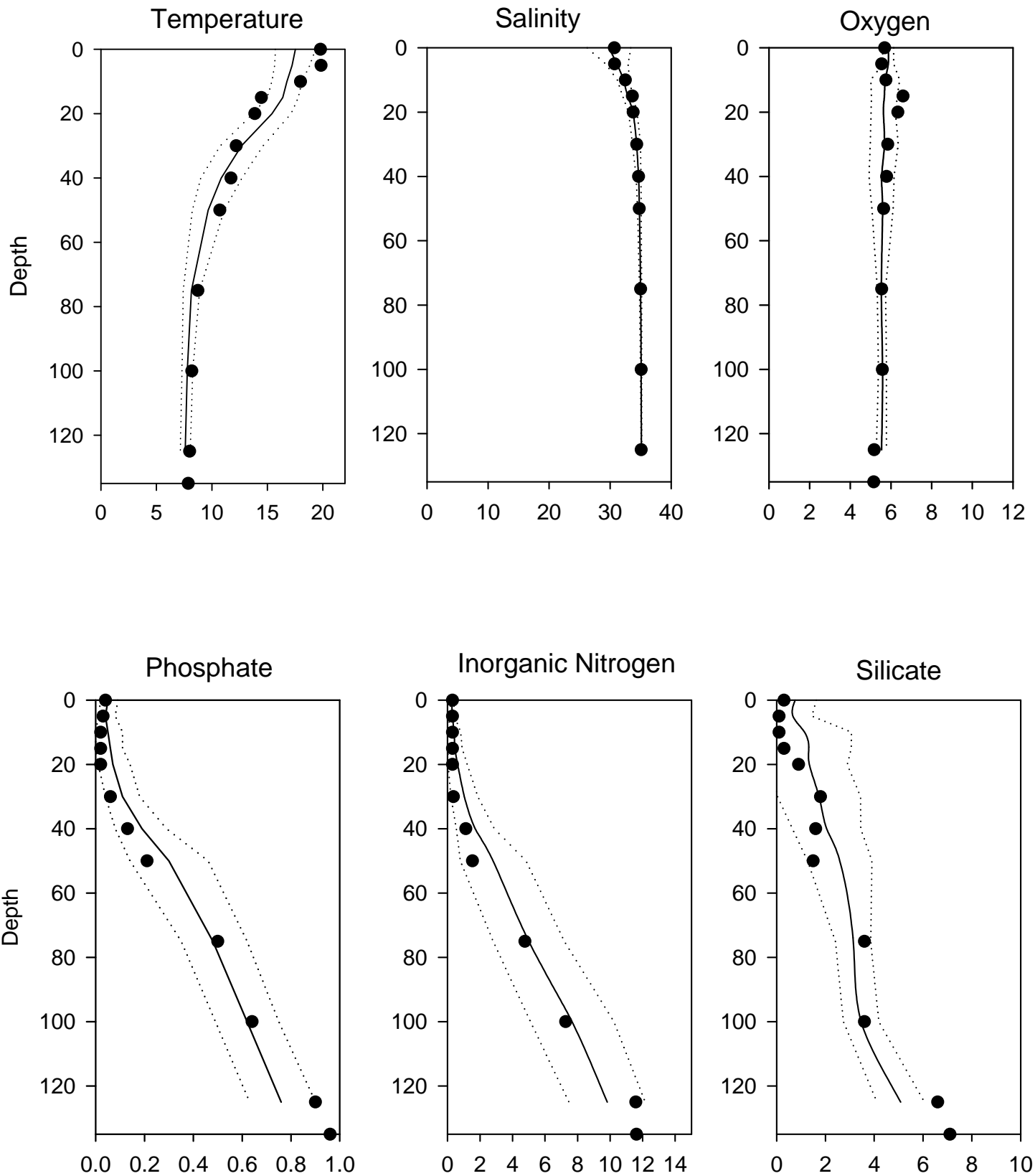


OXYGEN IN BOTTOM WATER (depth >=125m)



Vertical profiles Å15 August

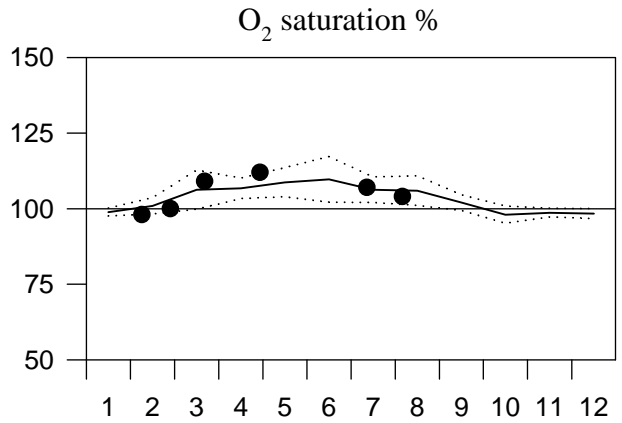
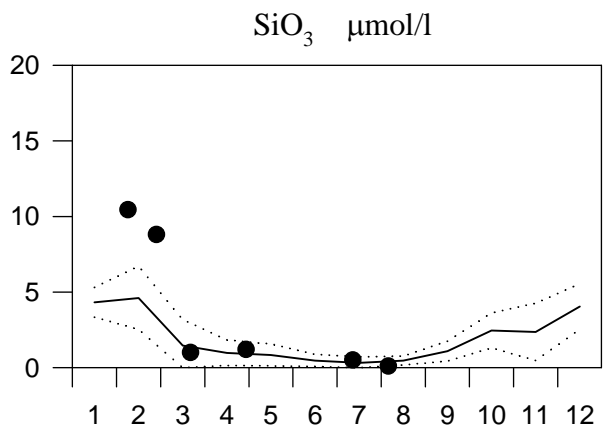
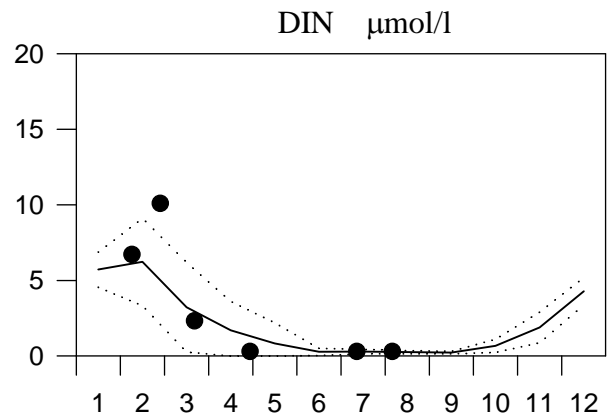
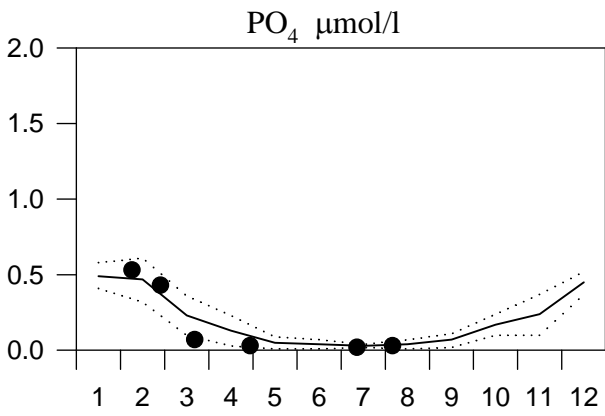
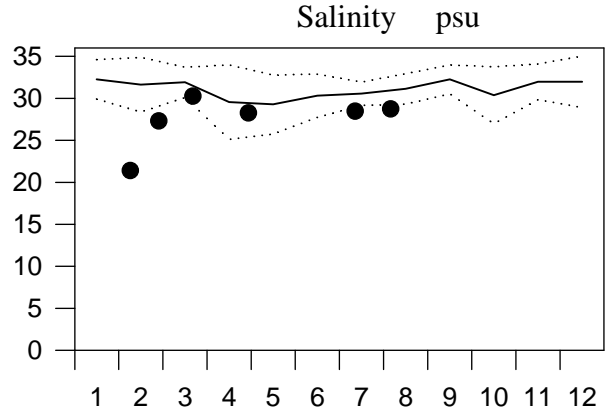
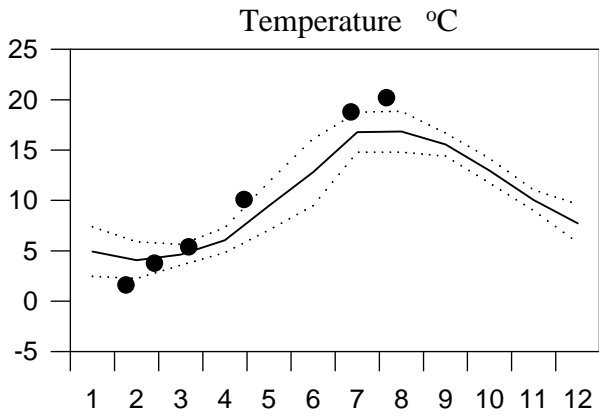
— Mean 1996-2010 St.Dev. ● 2014



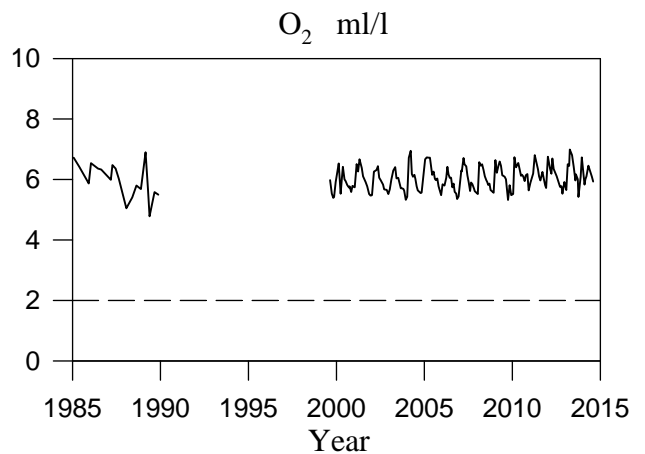
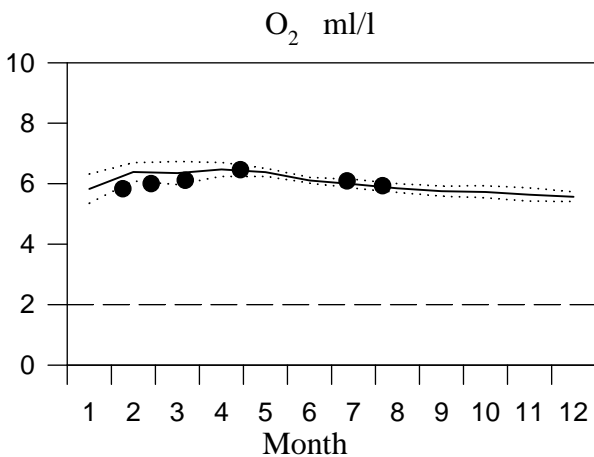
STATION Å17 SURFACE WATER

Annual Cycles

— Mean 1996-2010 St.Dev. ● 2014

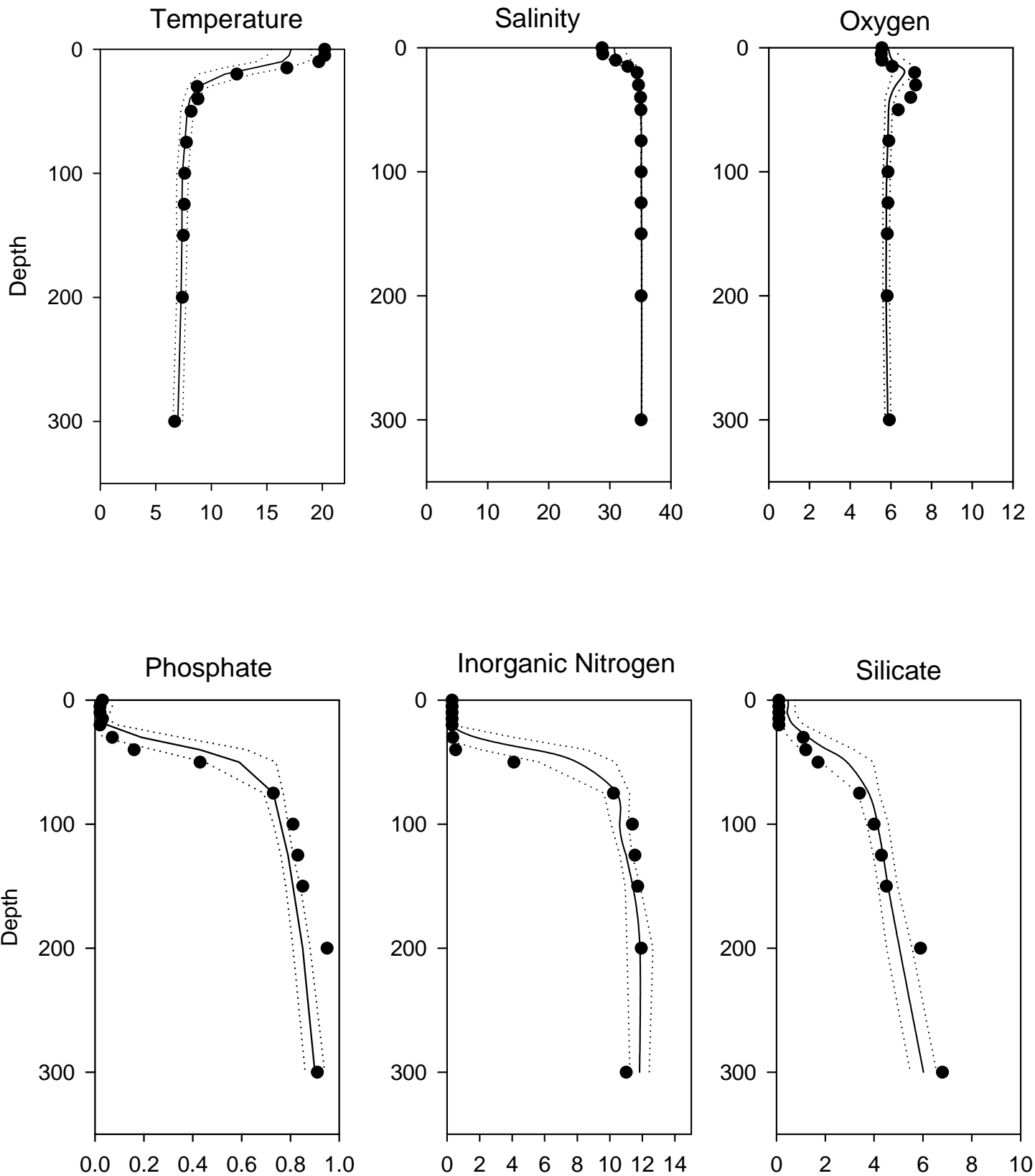


OXYGEN IN BOTTOM WATER (depth = 300m)



Vertical profiles Å17 August

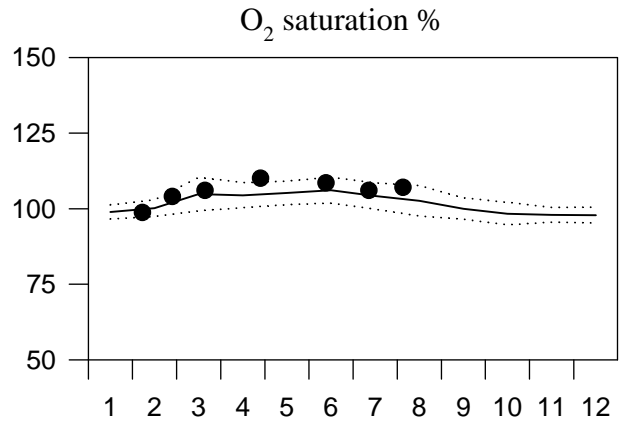
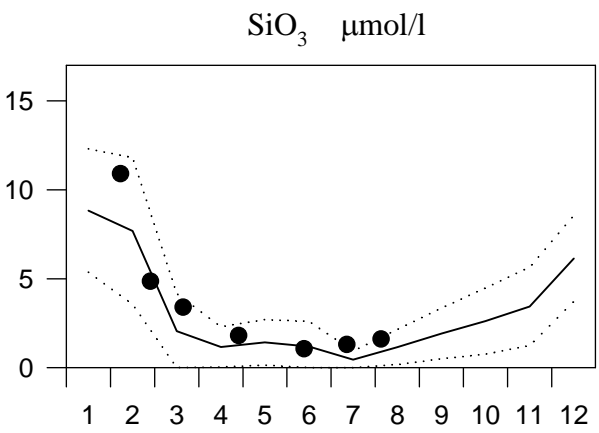
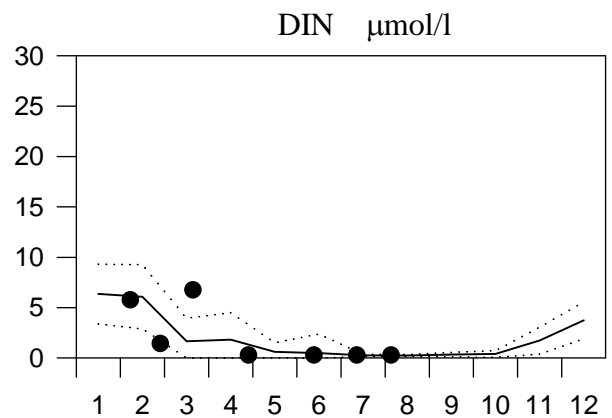
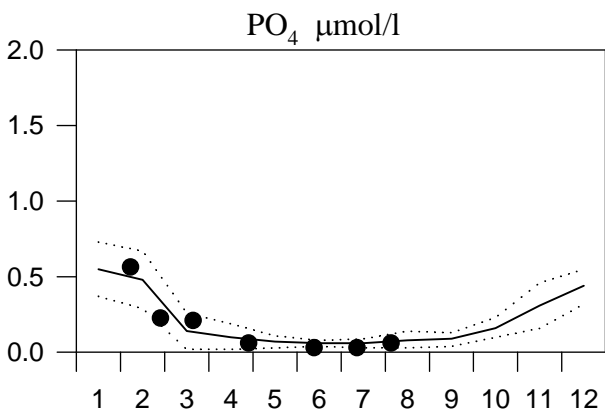
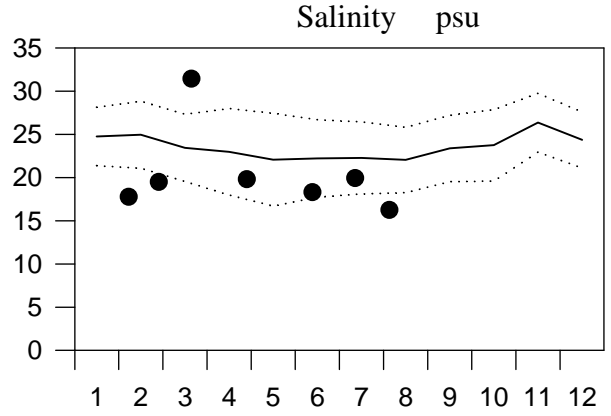
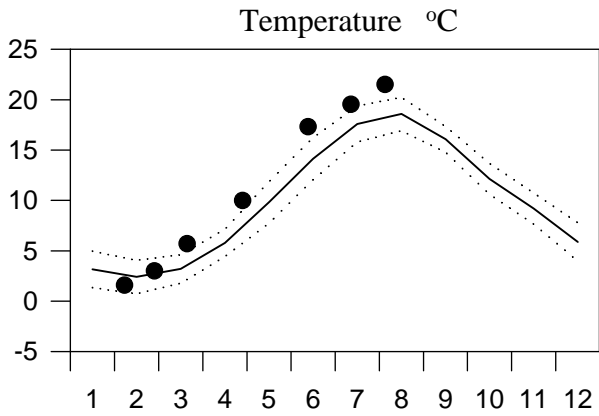
— Mean 1996-2010 St.Dev. ● 2014



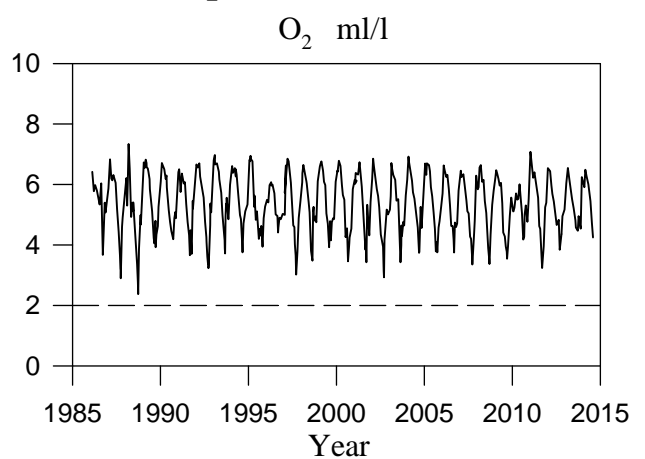
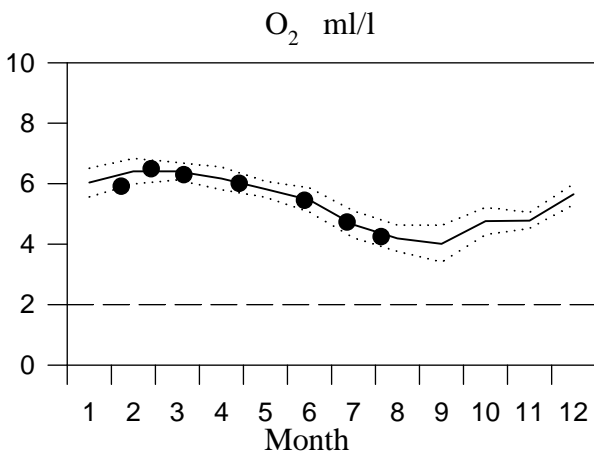
STATION FLADEN SURFACE WATER

Annual Cycles

— Mean 1996-2010 ····· St.Dev. ● 2014

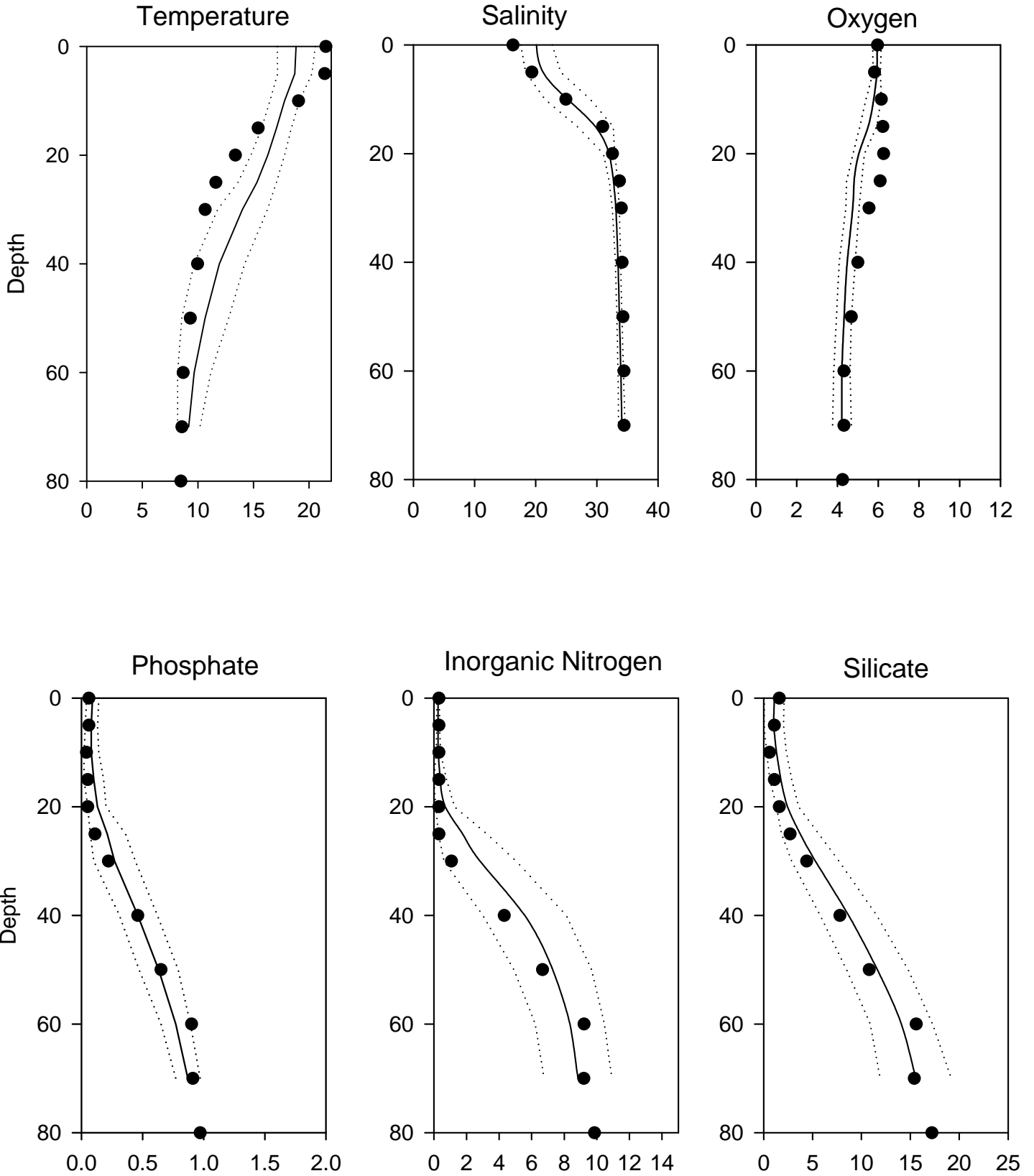


OXYGEN IN BOTTOM WATER (depth > 70m)



Vertical profiles Fladen August

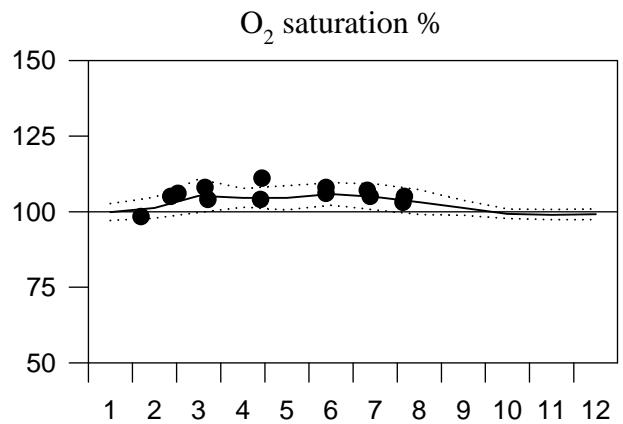
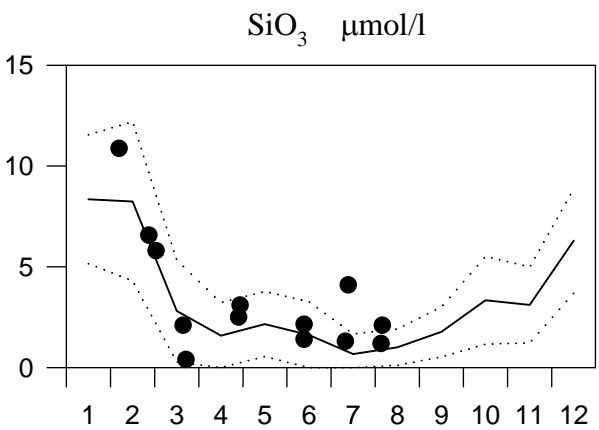
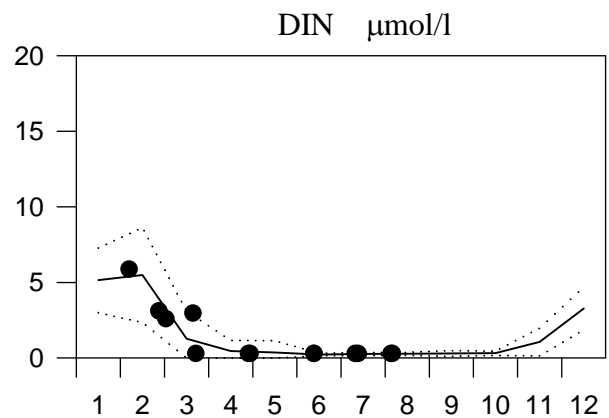
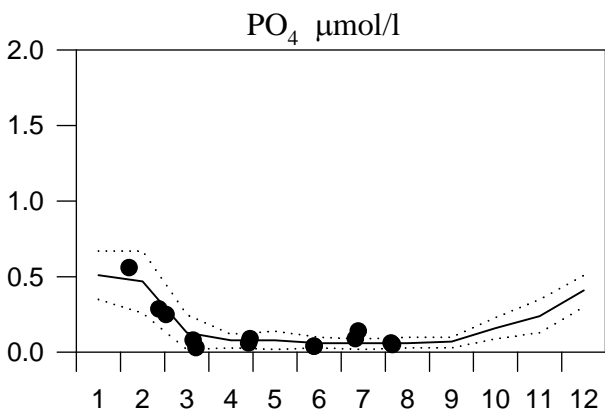
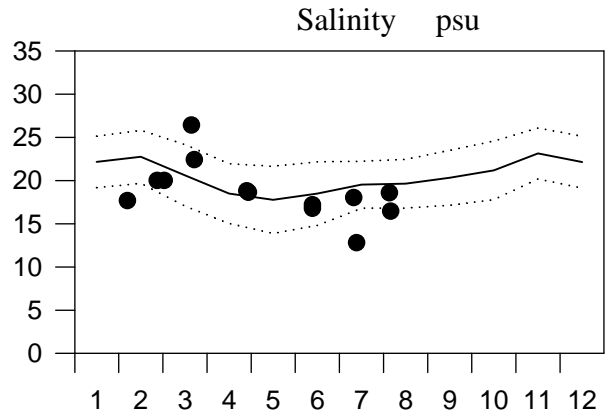
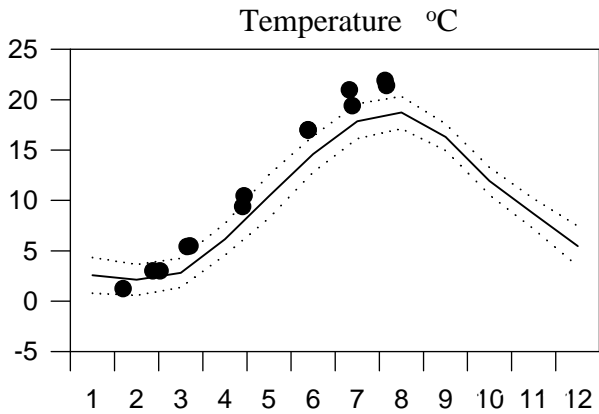
— Mean 1996-2010 St.Dev. ● 2014



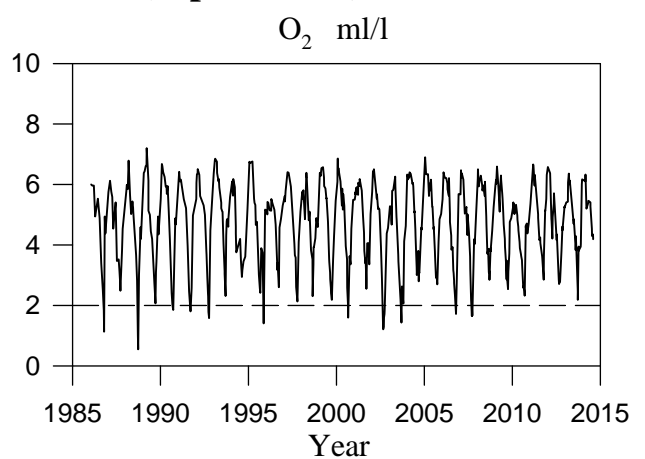
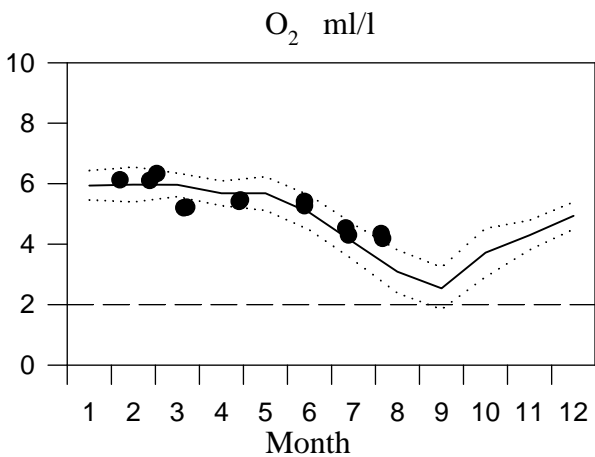
STATION ANHOLT E SURFACE WATER

Annual Cycles

— Mean 1996-2010 St.Dev. ● 2014

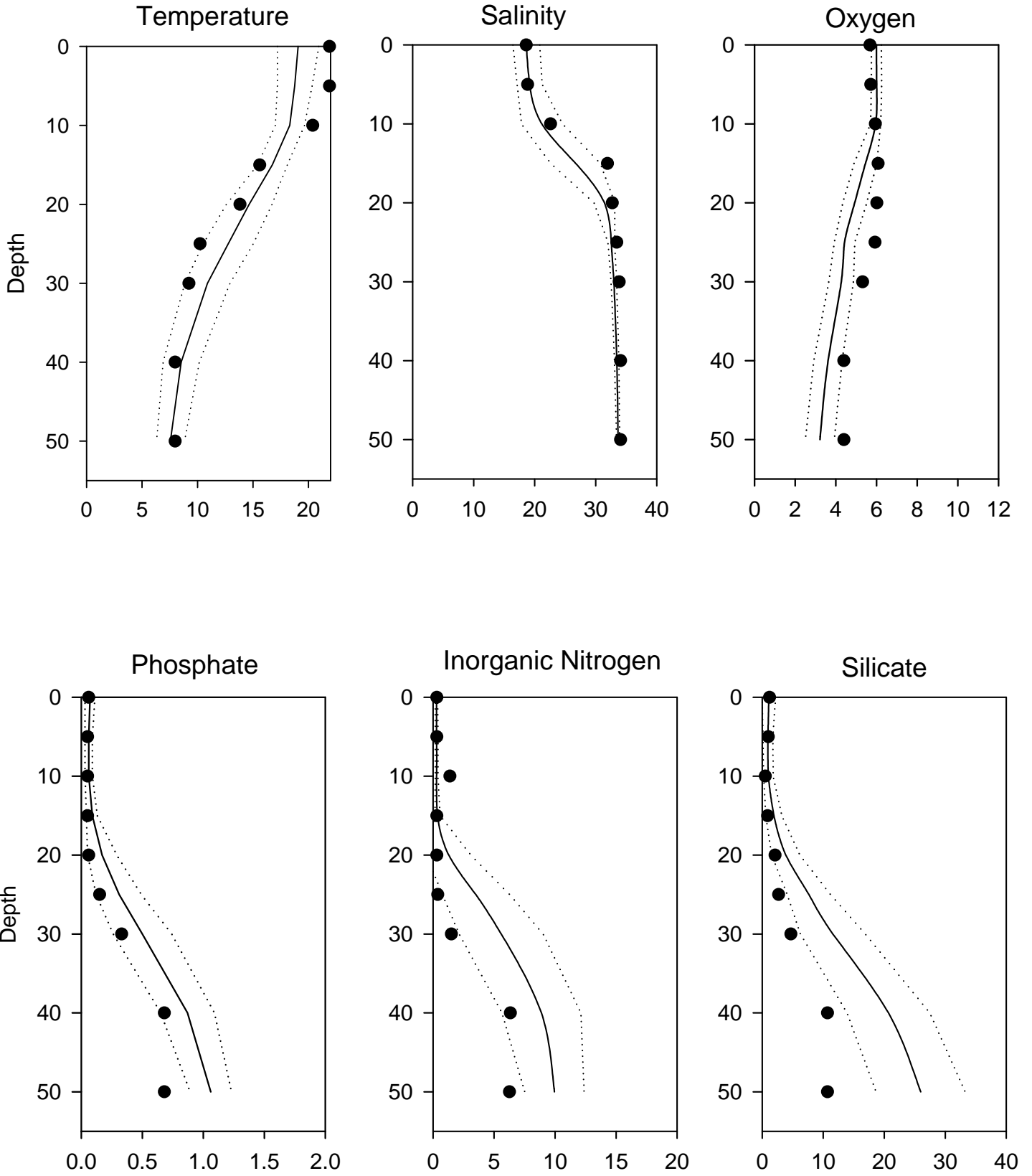


OXYGEN IN BOTTOM WATER (depth > 50m)



Vertical profiles Anholt E August

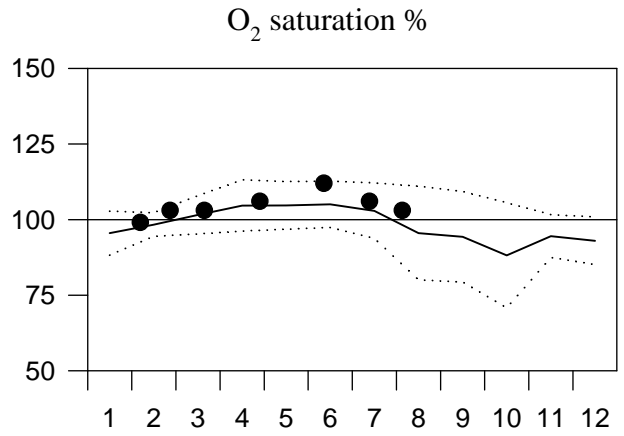
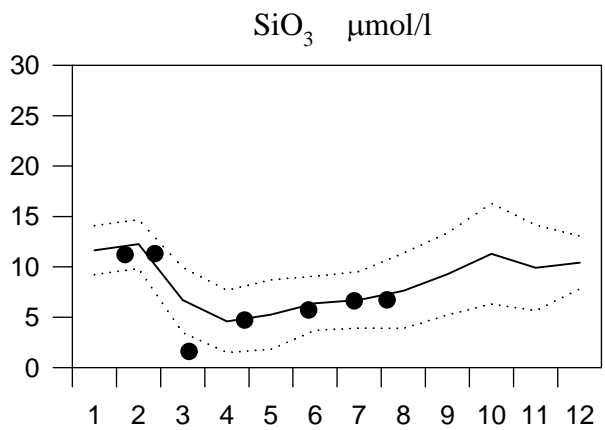
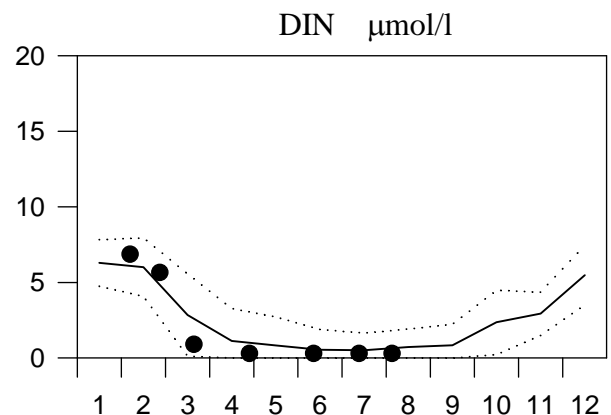
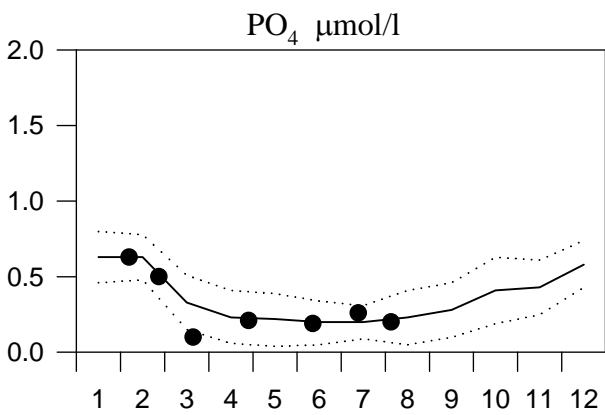
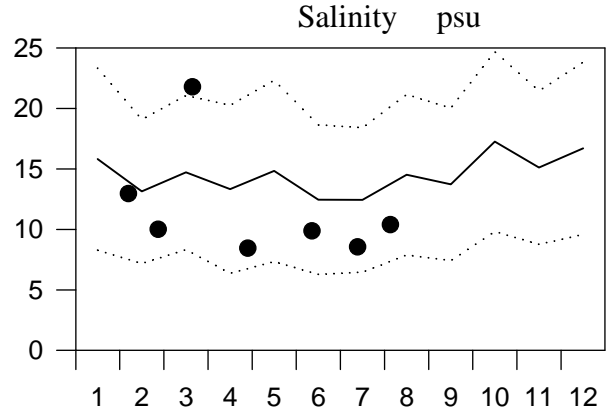
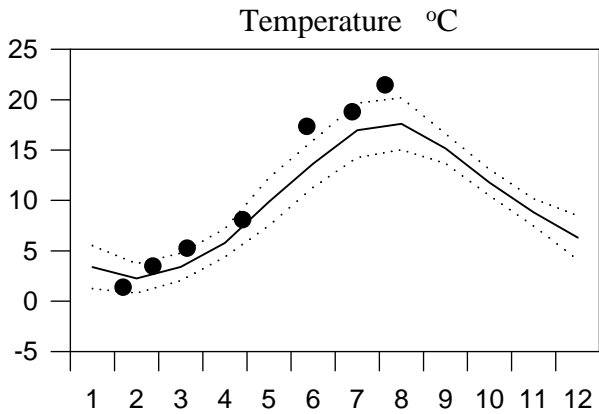
— Mean 1996-2010 St.Dev. ● 2014



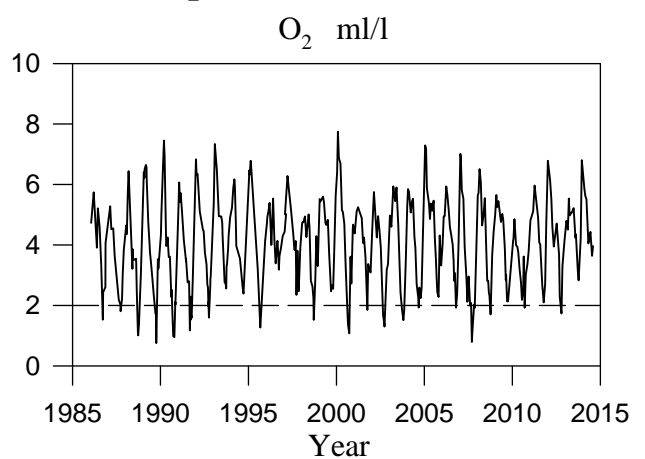
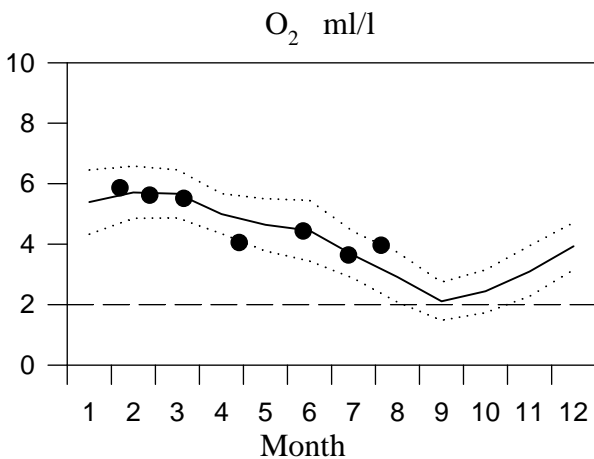
STATION W LANDSKRONA SURFACE WATER

Annual Cycles

— Mean 1996-2010 St.Dev. ● 2014

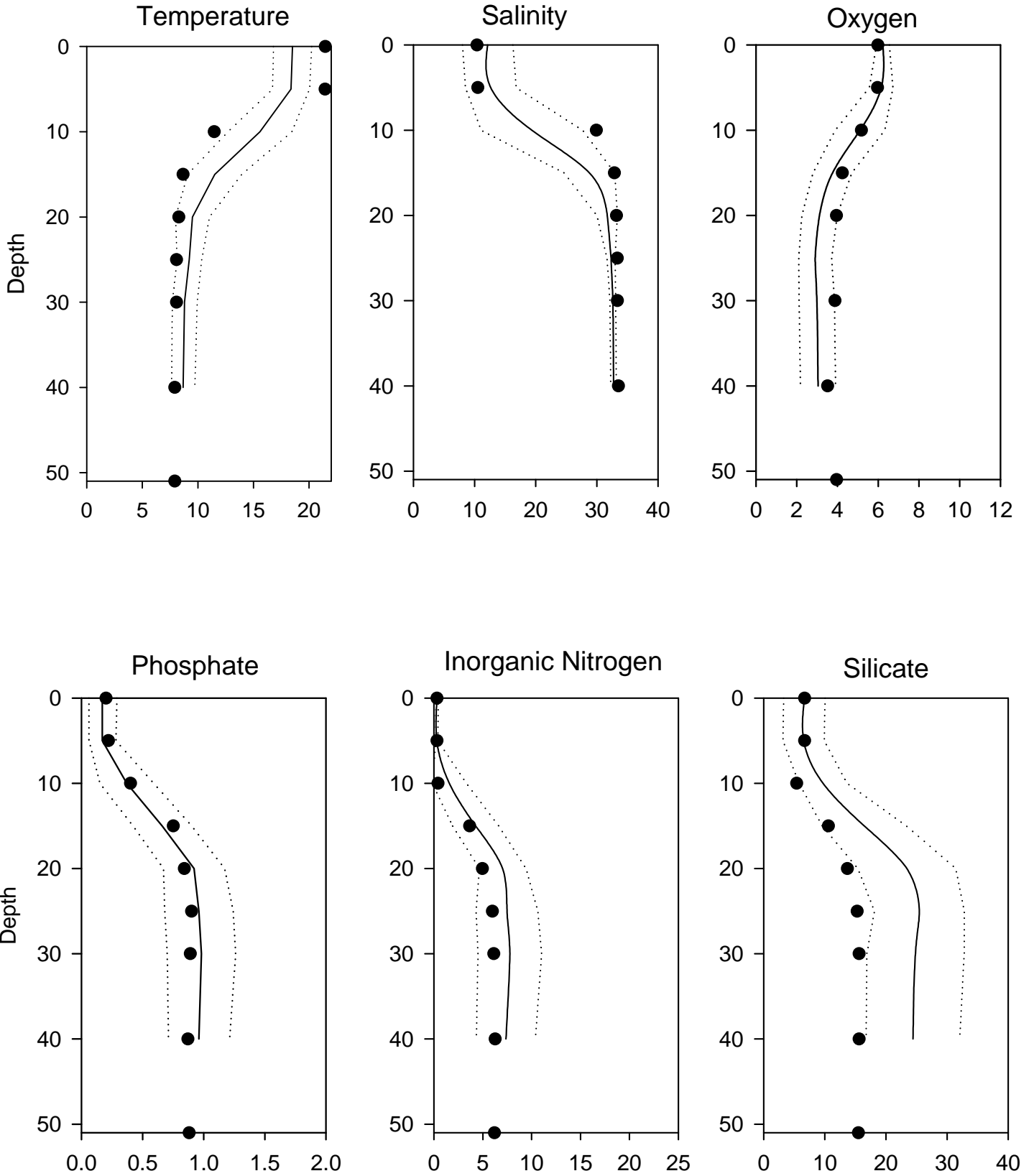


OXYGEN IN BOTTOM WATER (depth >40m)



Vertical profiles W Landskrona August

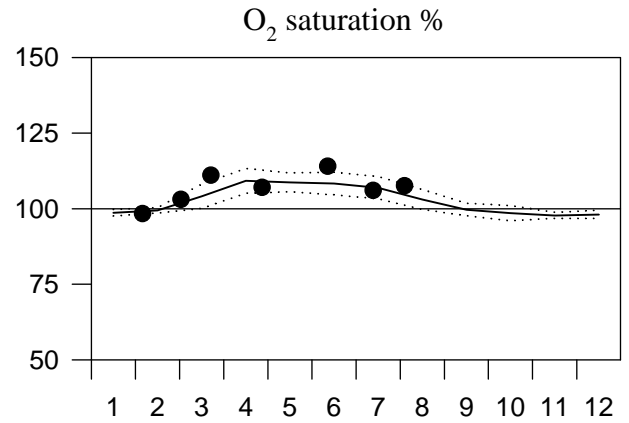
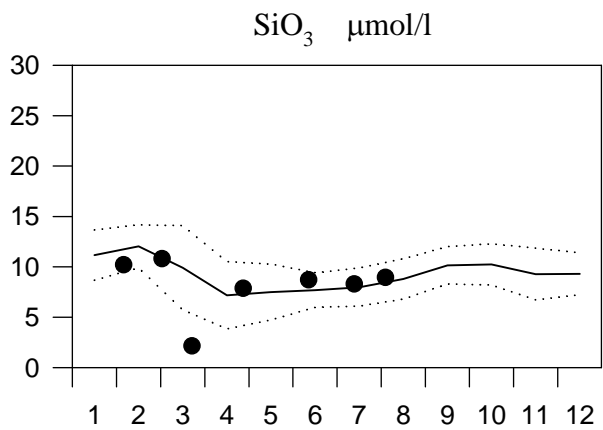
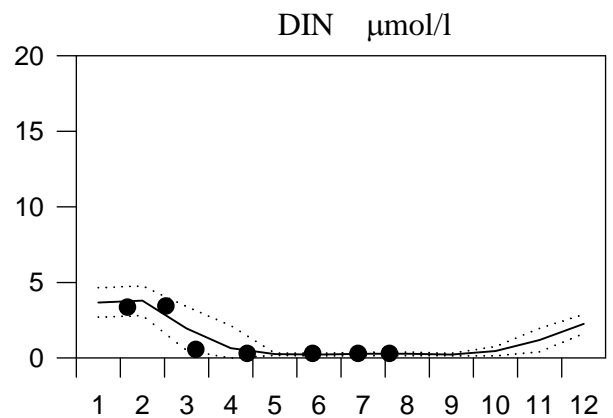
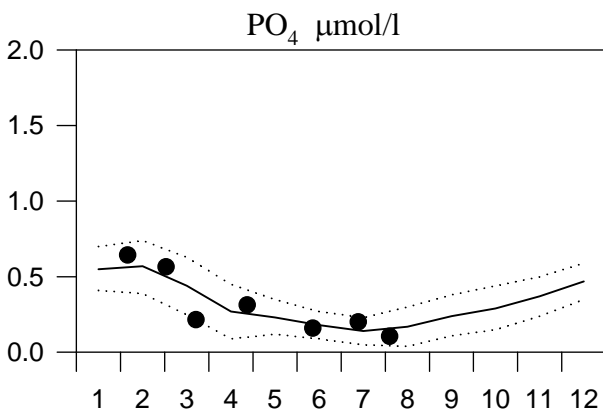
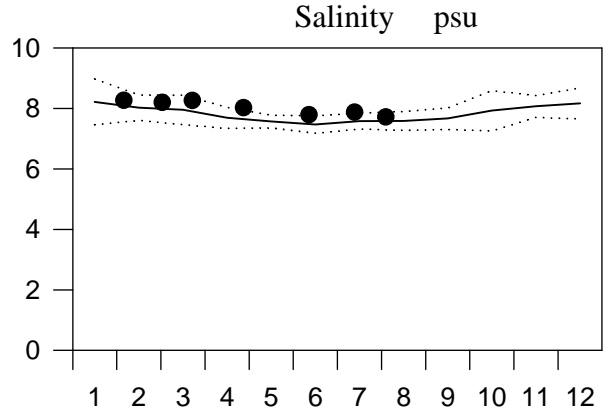
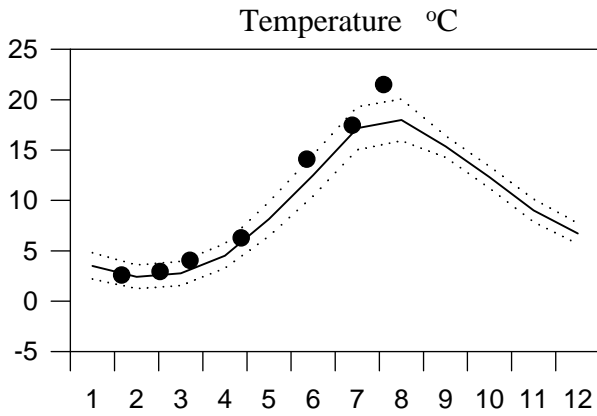
— Mean 1996-2010 St.Dev. ● 2014



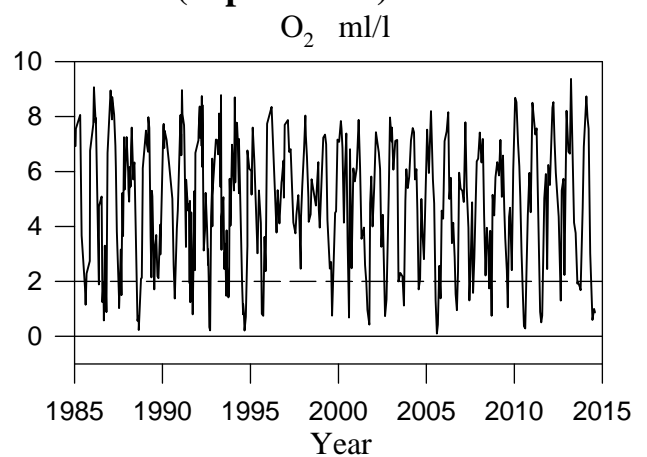
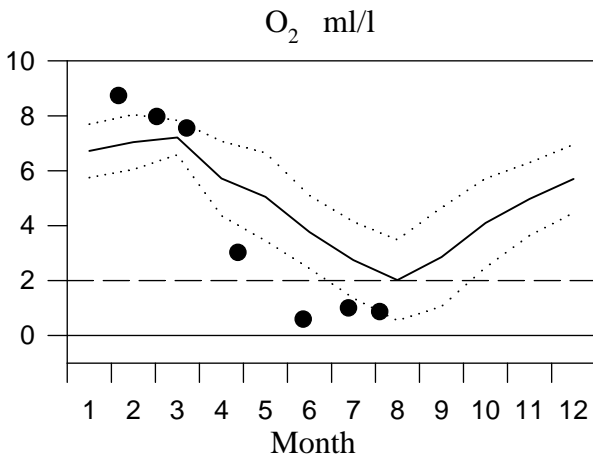
STATION BY1 SURFACE WATER

Annual Cycles

— Mean 1996-2010 ····· St.Dev. ● 2014

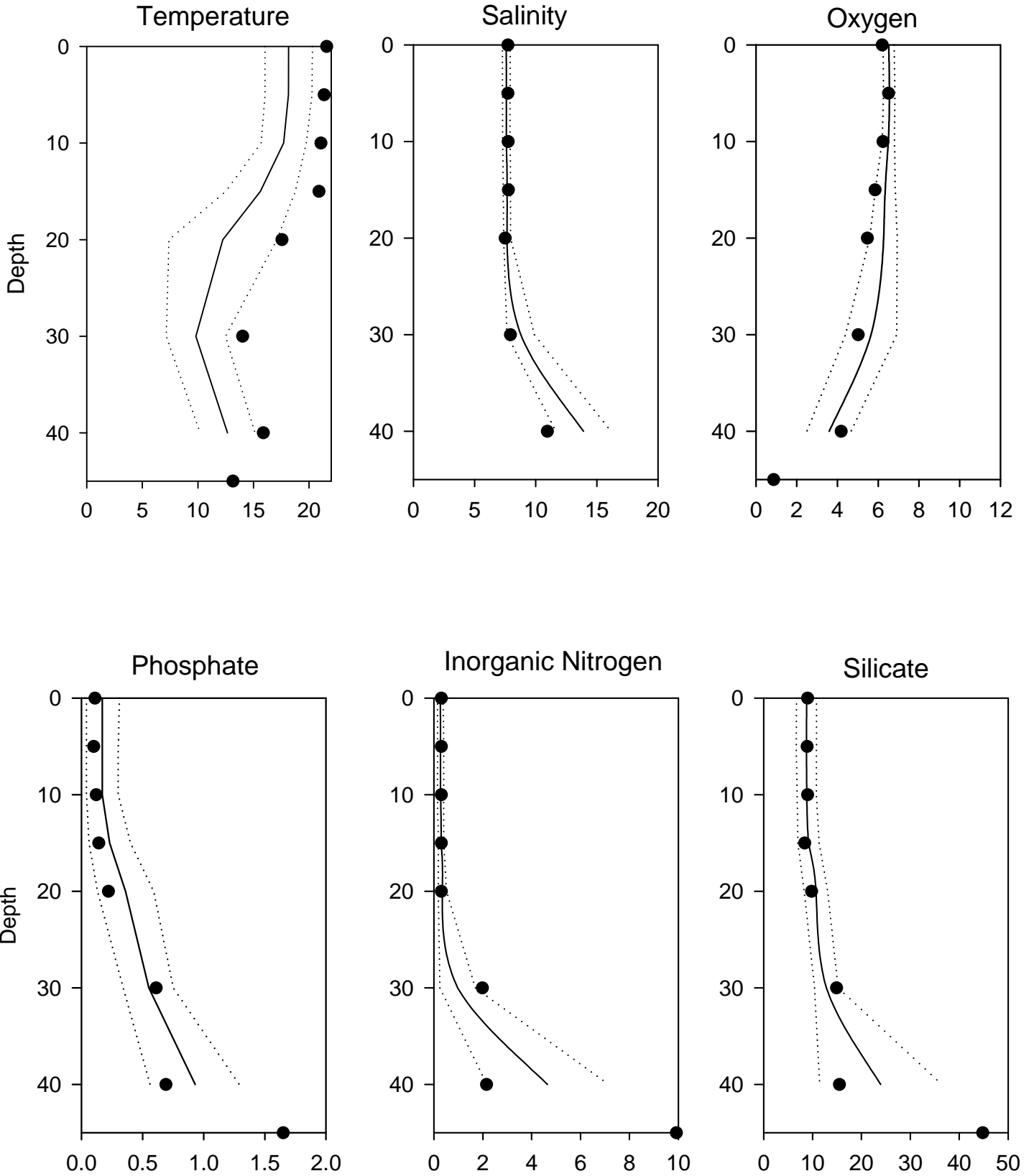


OXYGEN IN BOTTOM WATER (depth >40m)



Vertical profiles BY1 August

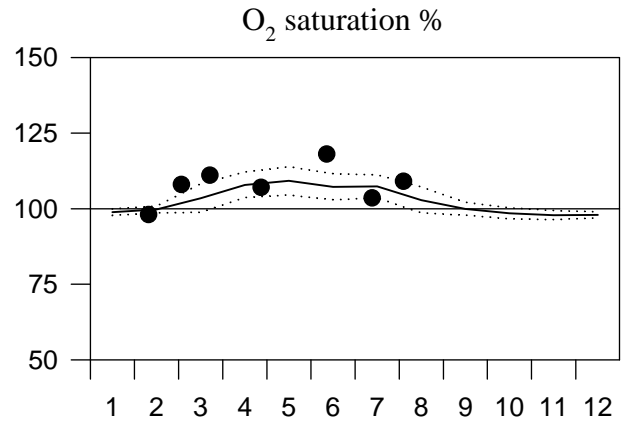
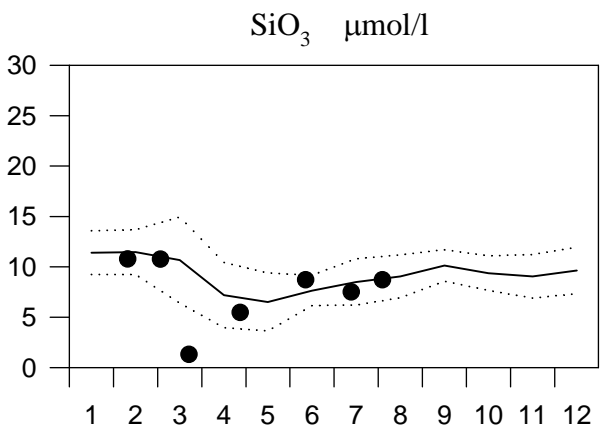
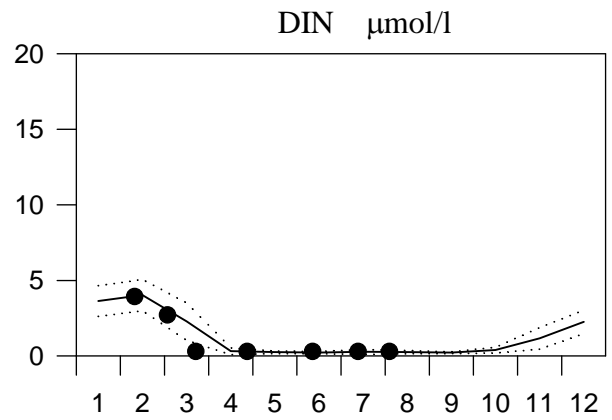
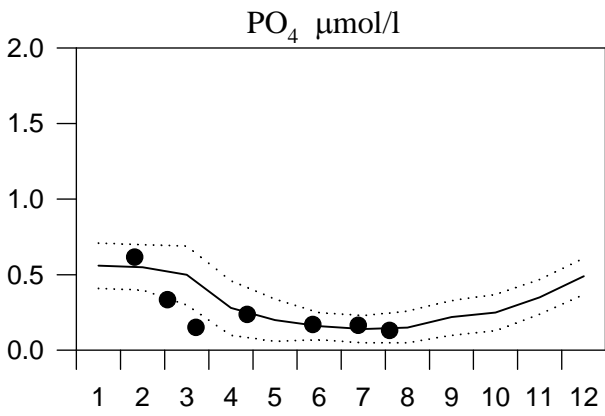
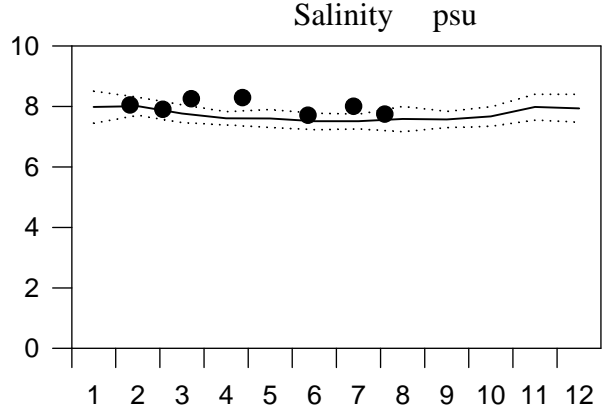
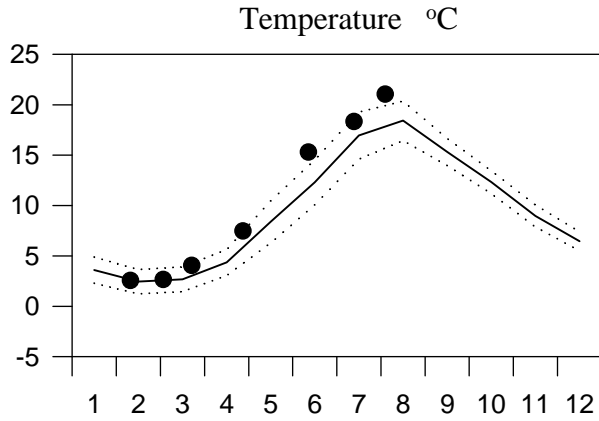
— Mean 1996-2010 ····· St.Dev. ● 2014



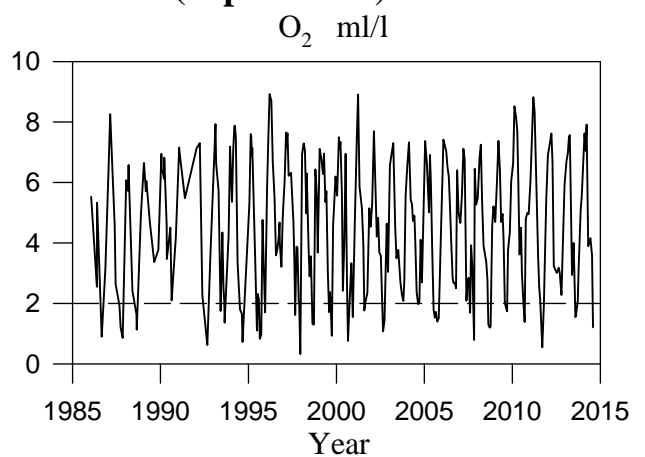
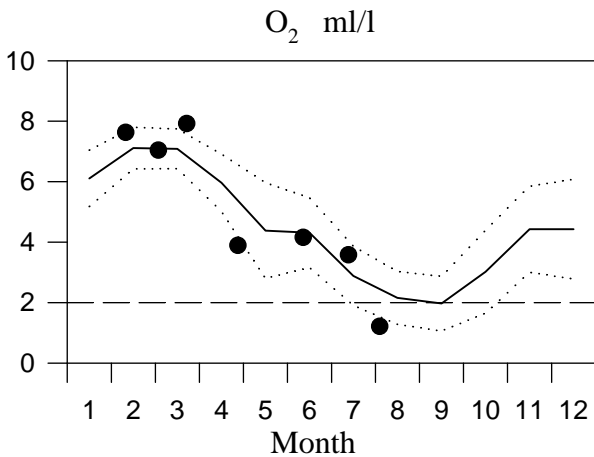
STATION BY2 SURFACE WATER

Annual Cycles

— Mean 1996-2010 ····· St.Dev. ● 2014

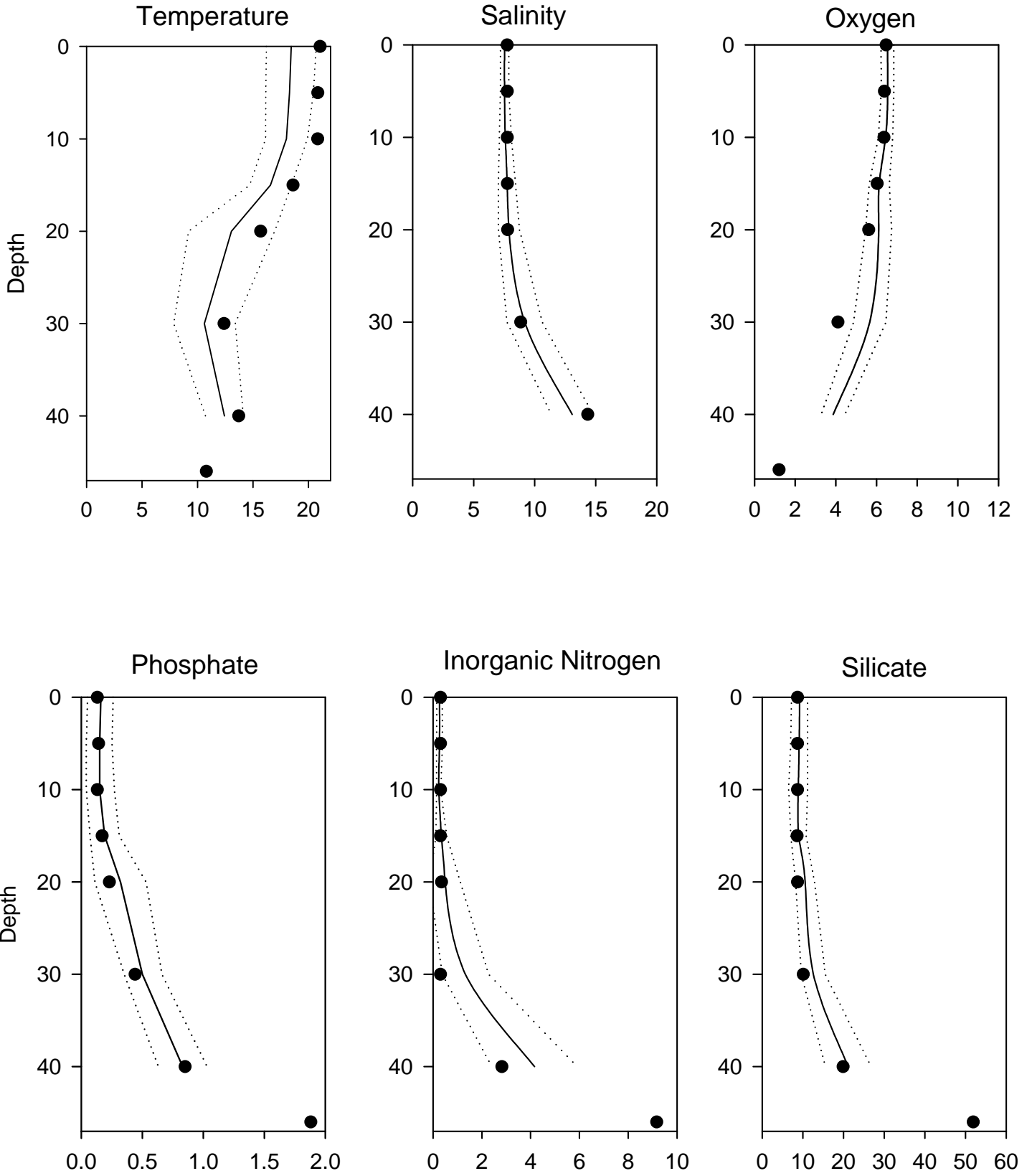


OXYGEN IN BOTTOM WATER (depth >40m)



Vertical profiles BY2 August

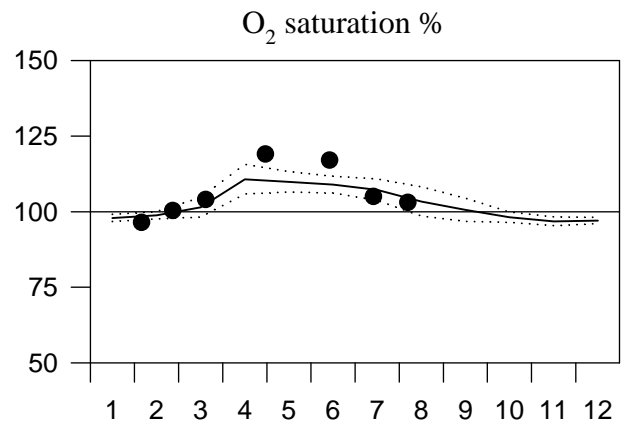
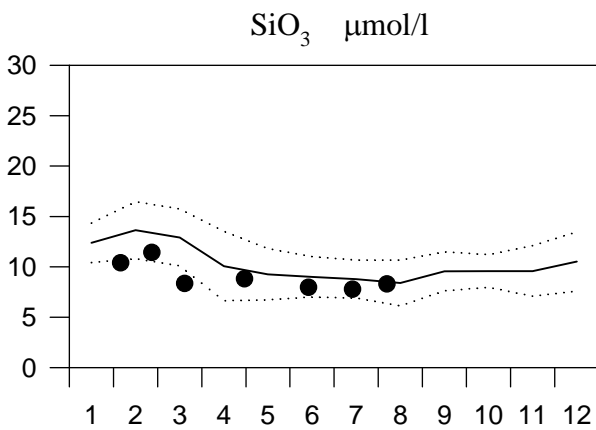
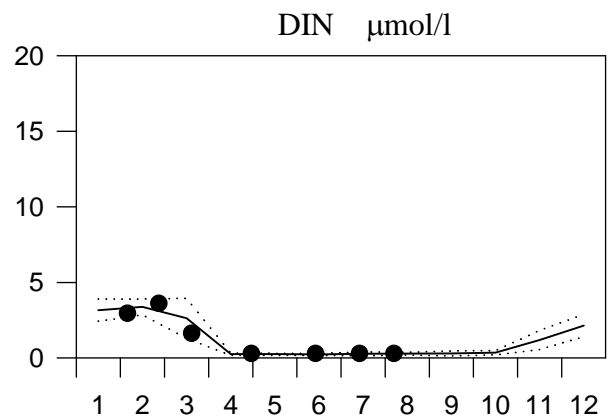
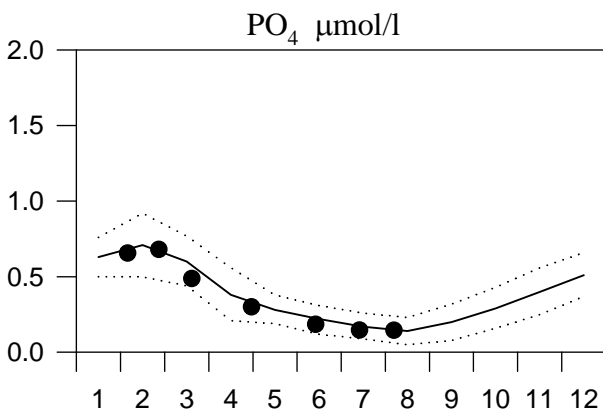
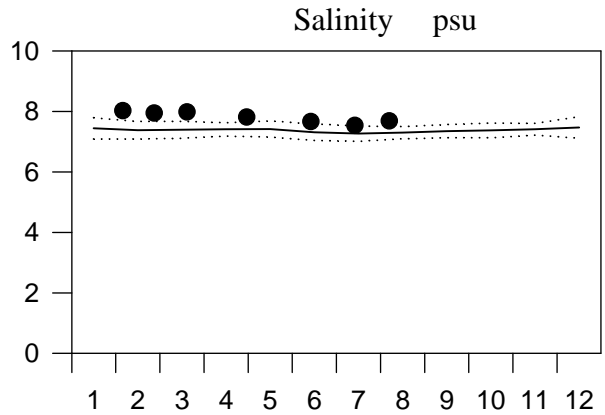
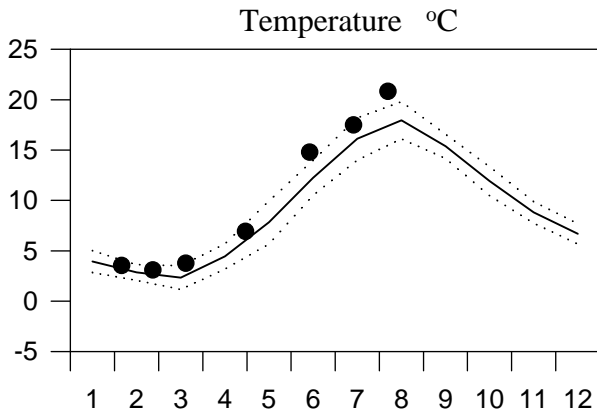
— Mean 1996-2010 ····· St.Dev. ● 2014



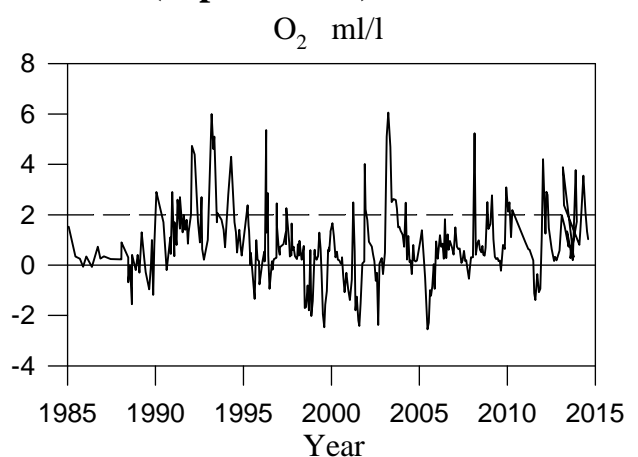
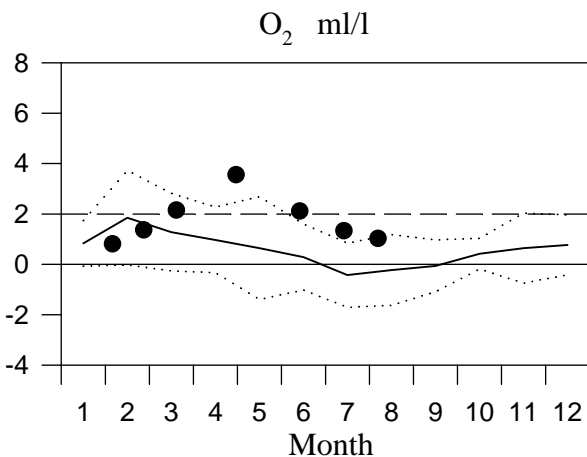
STATION HANÖBUKTEN SURFACE WATER

Annual Cycles

— Mean 1996-2010 ····· St.Dev. ● 2014

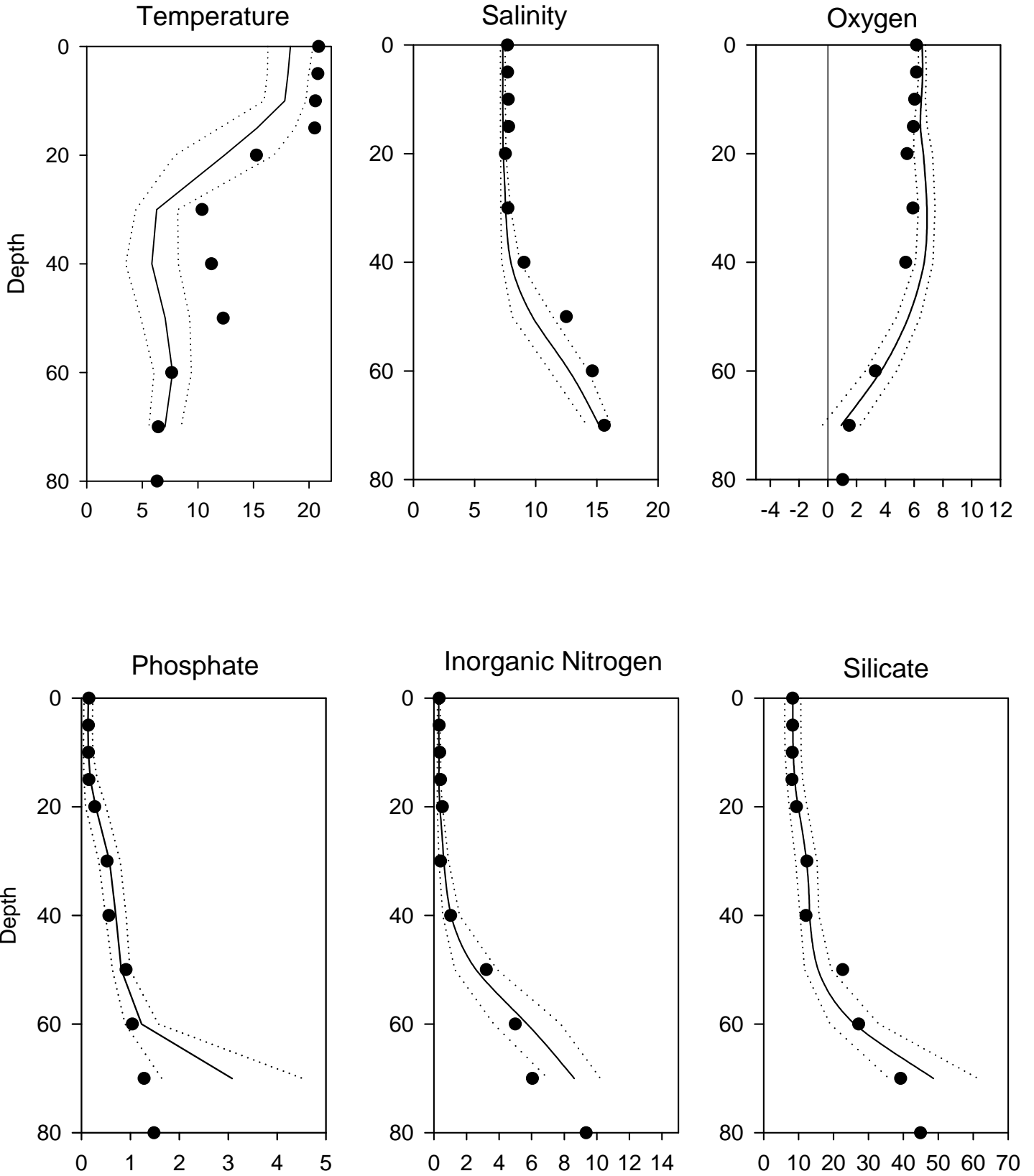


OXYGEN IN BOTTOM WATER (depth > 70m)



Vertical profiles Hanöbukten August

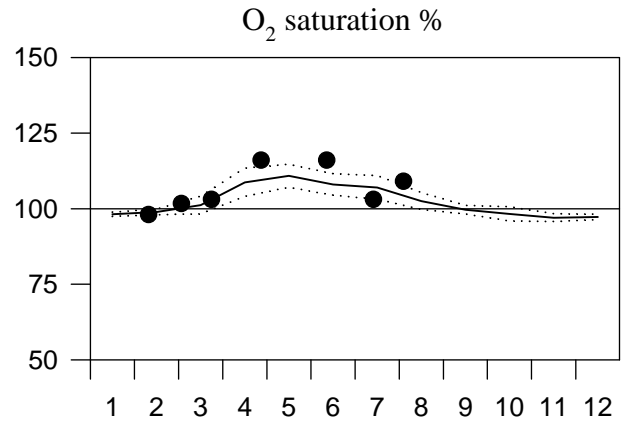
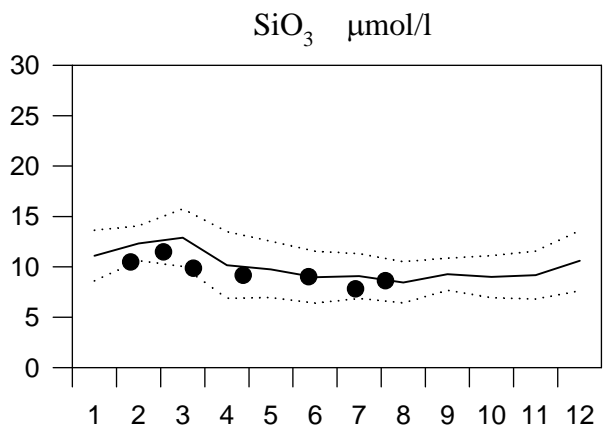
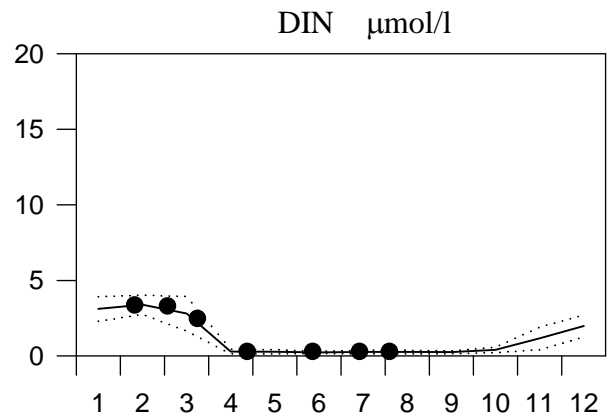
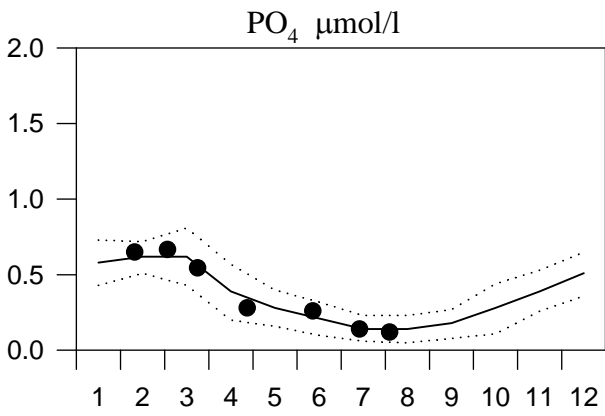
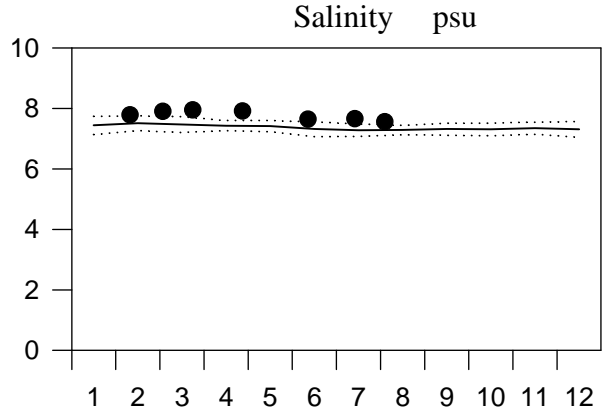
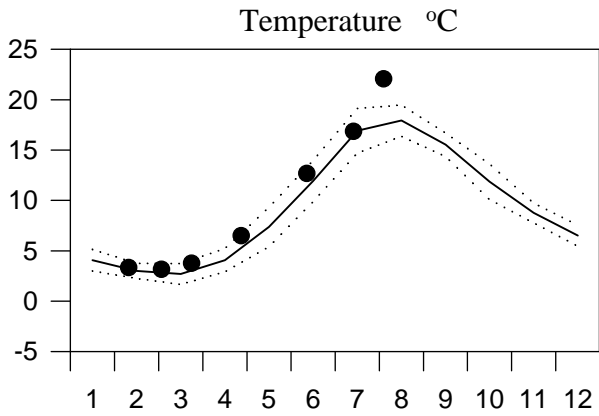
— Mean 1996-2010 ····· St.Dev. ● 2014



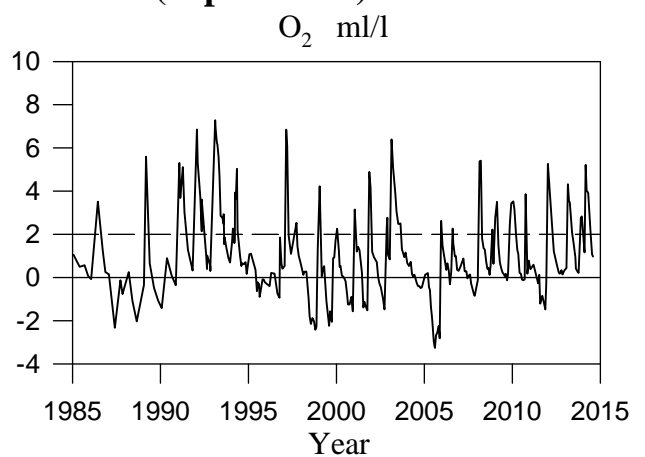
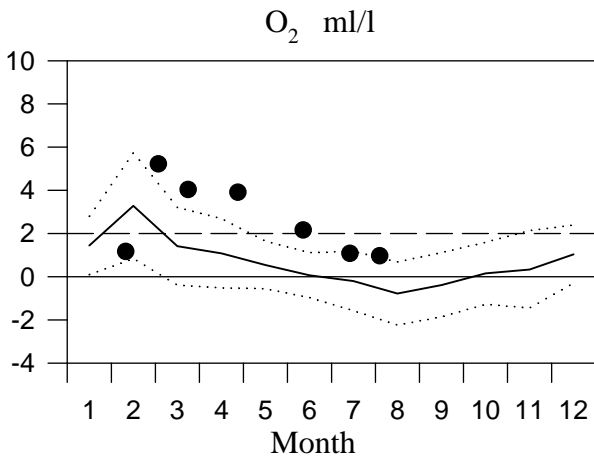
STATION BY4 SURFACE WATER

Annual Cycles

— Mean 1996-2010 ····· St.Dev. ● 2014

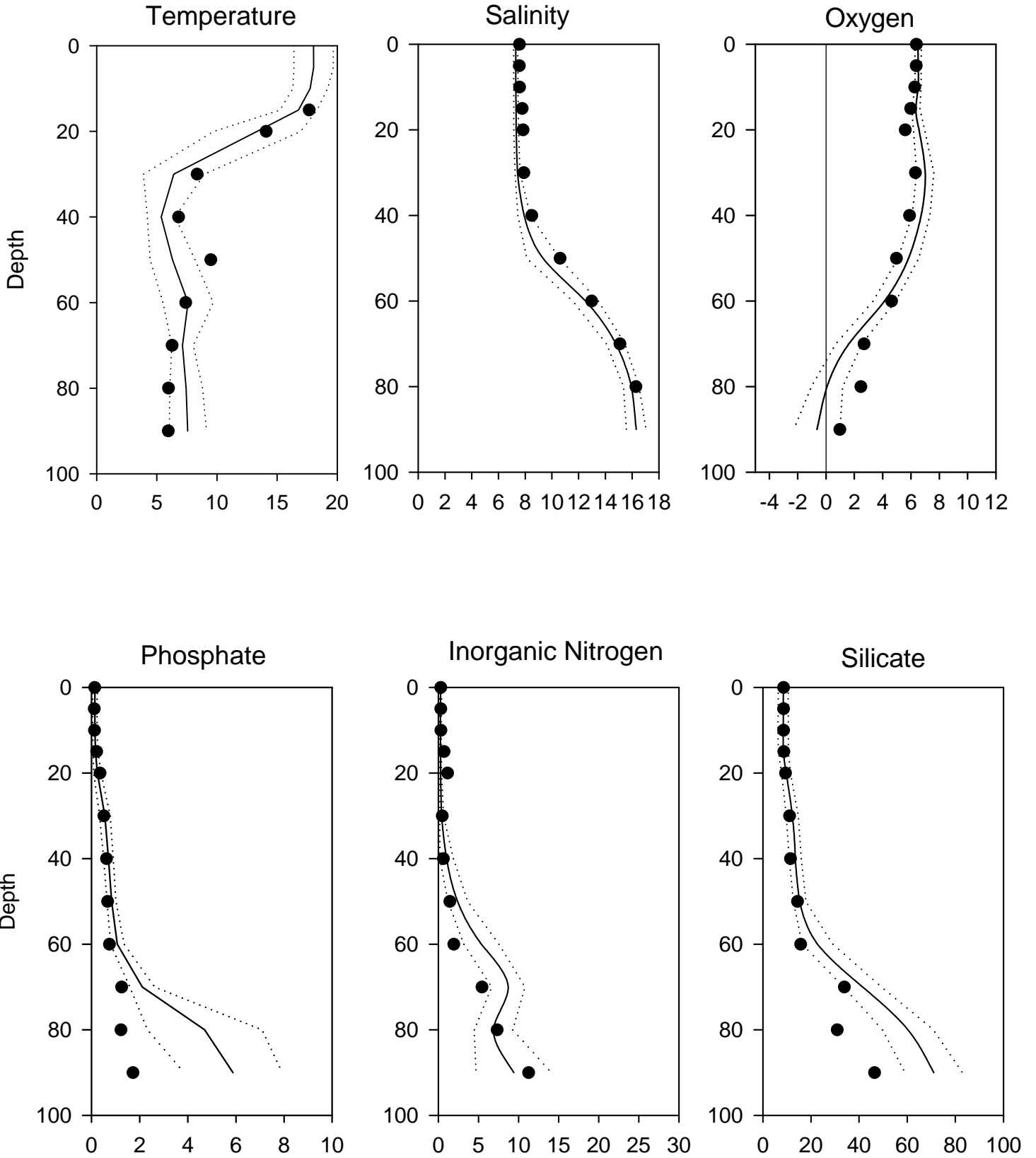


OXYGEN IN BOTTOM WATER (depth >80m)



Vertical profiles BY4 August

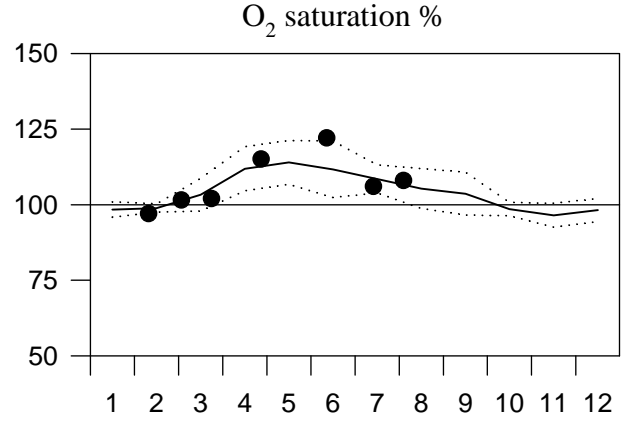
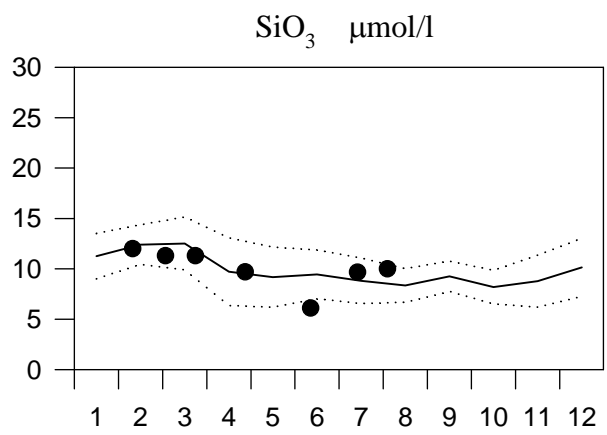
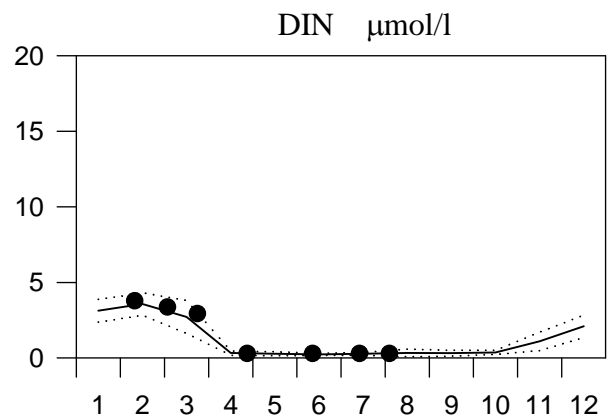
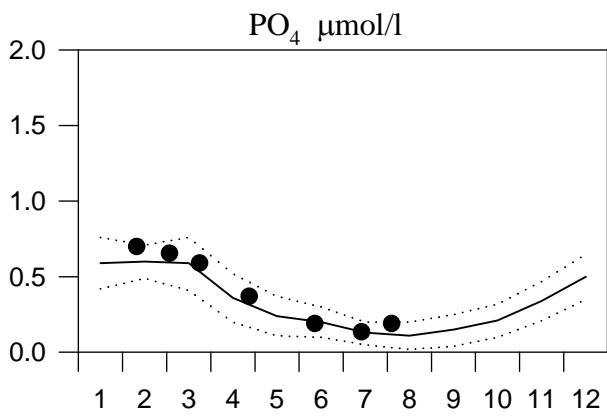
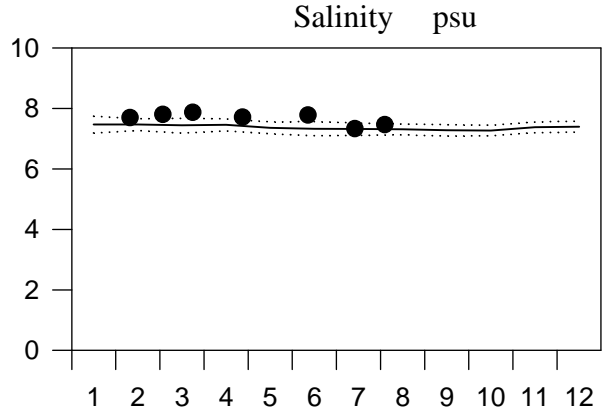
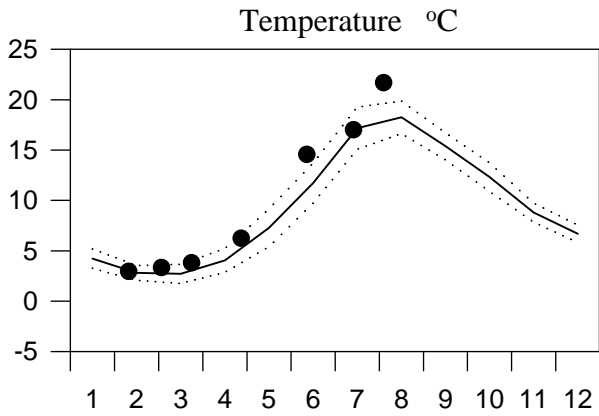
— Mean 1996-2010 ····· St.Dev. ● 2014



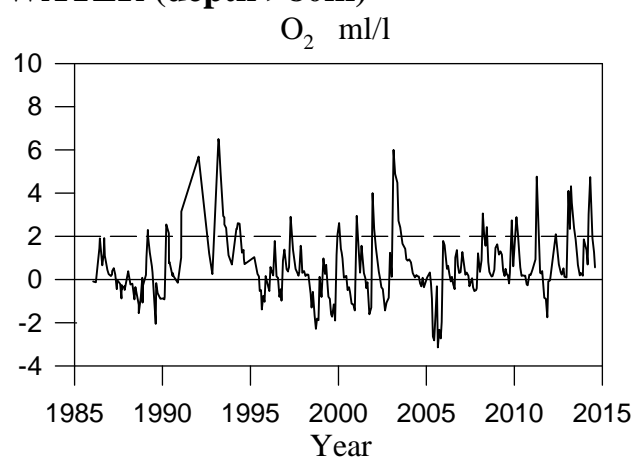
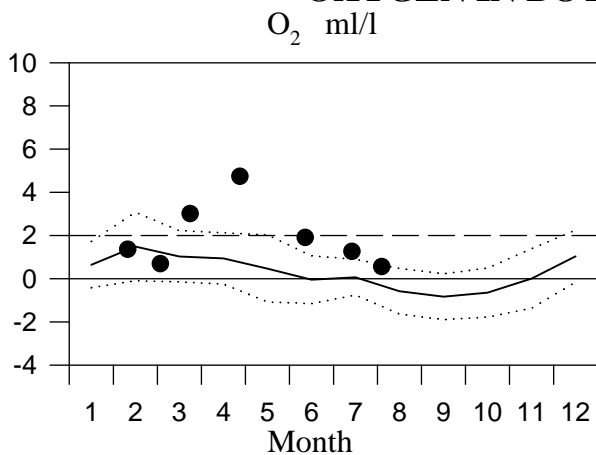
STATION BY5 SURFACE WATER

Annual Cycles

— Mean 1996-2010 ····· St.Dev. ● 2014

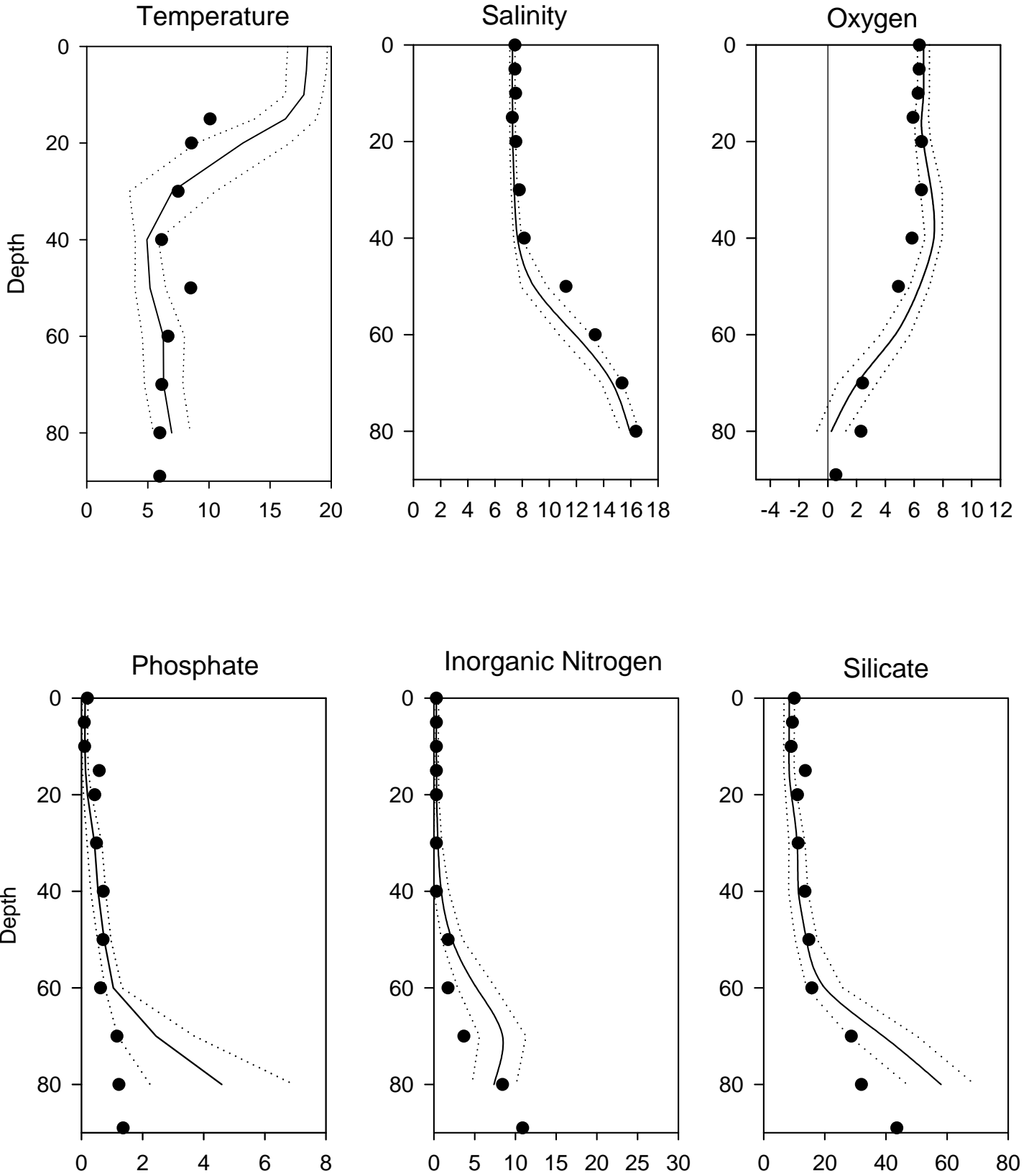


OXYGEN IN BOTTOM WATER (depth >80m)



Vertical profiles BY5 August

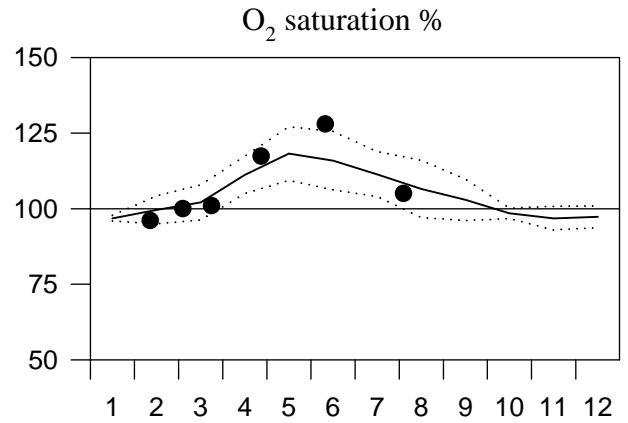
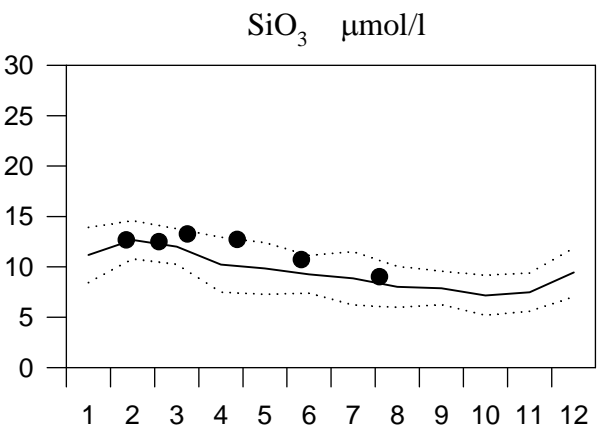
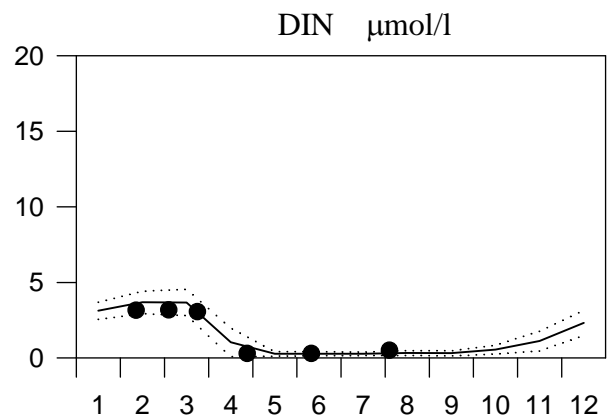
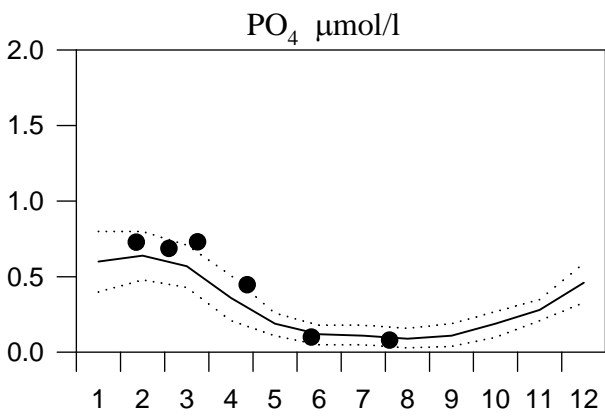
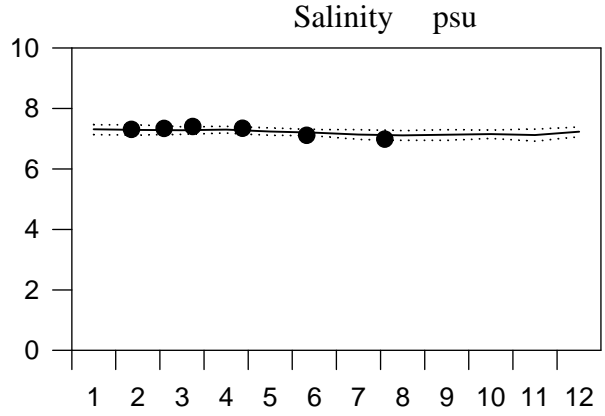
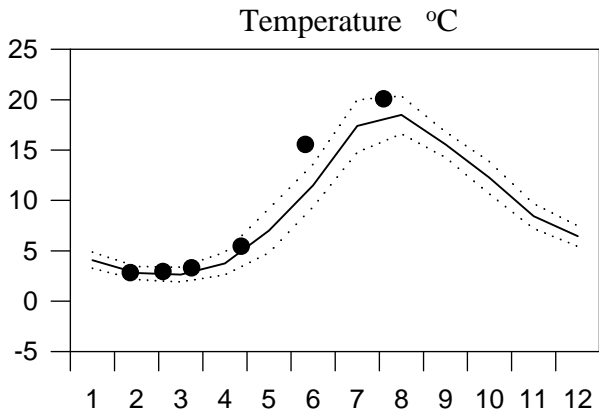
— Mean 1996-2010 ····· St.Dev. ● 2014



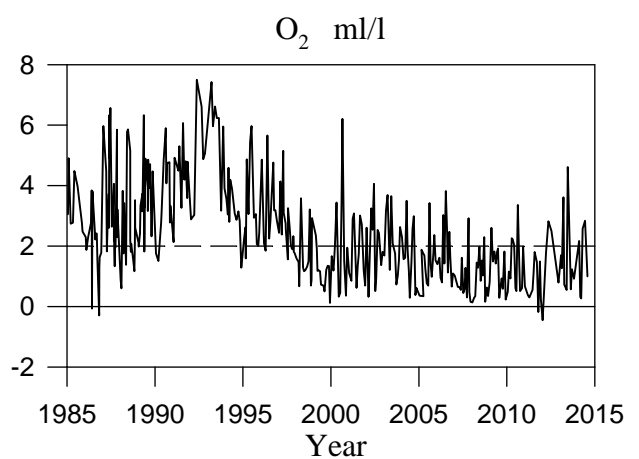
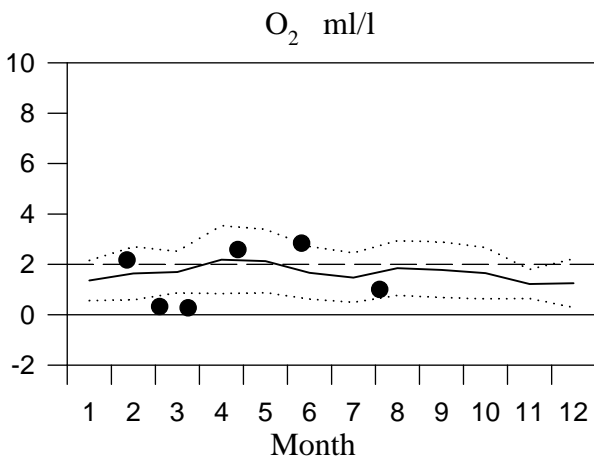
STATION BCS III-10 SURFACE WATER

Annual Cycles

— Mean 1996-2010 ····· St.Dev. ● 2014

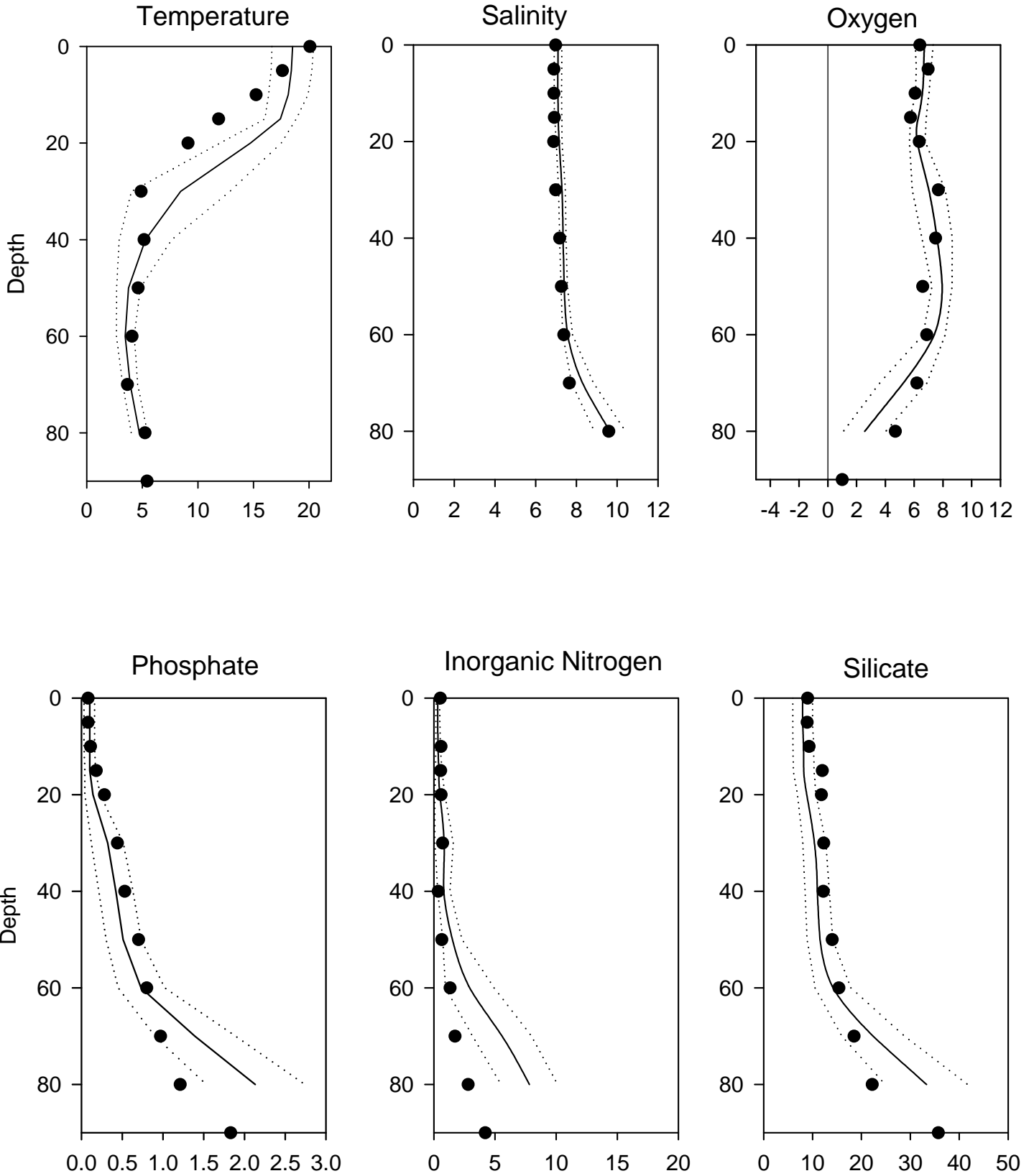


OXYGEN IN BOTTOM WATER (depth > 80m)



Vertical profiles BCS III-10 August

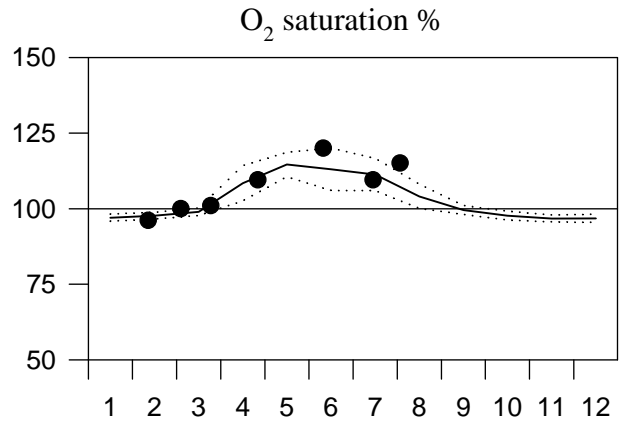
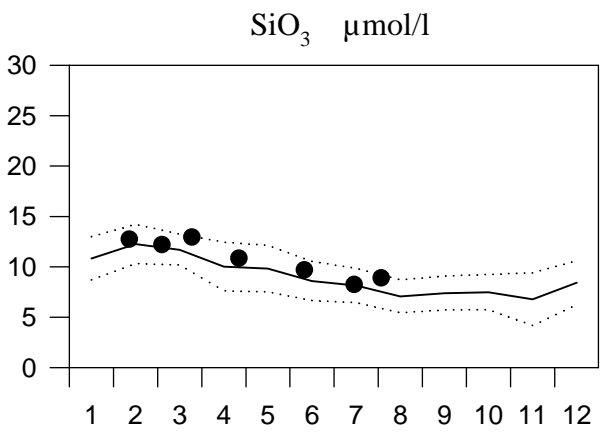
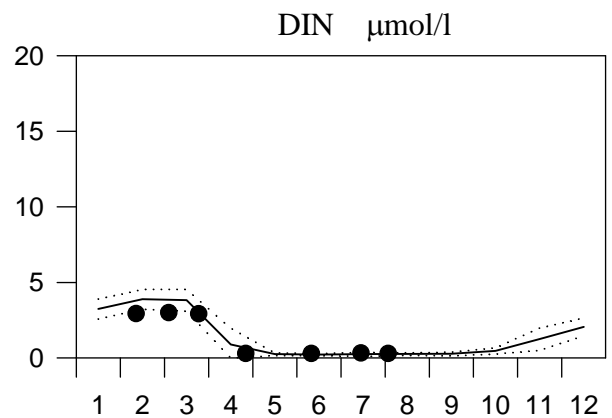
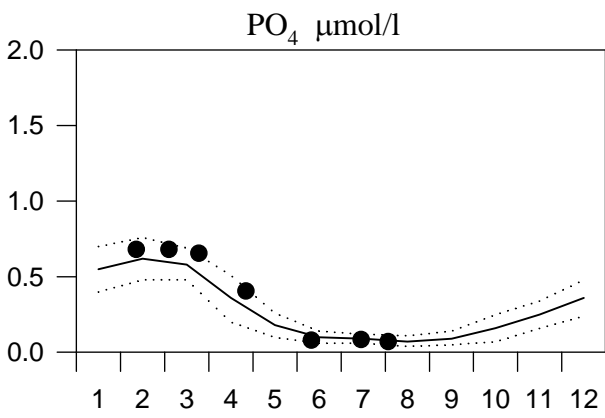
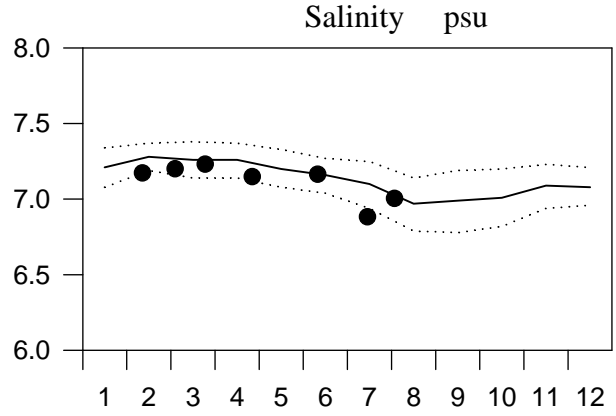
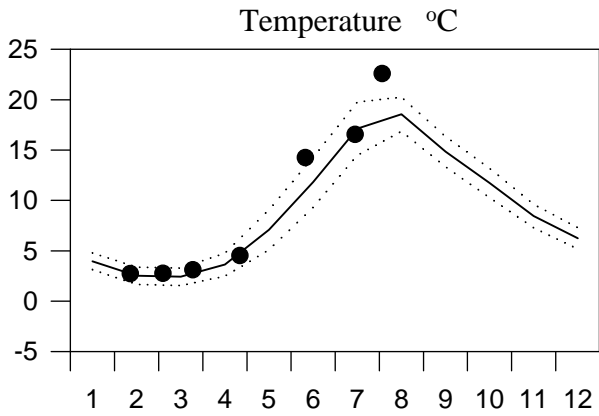
— Mean 1996-2010 ····· St.Dev. ● 2014



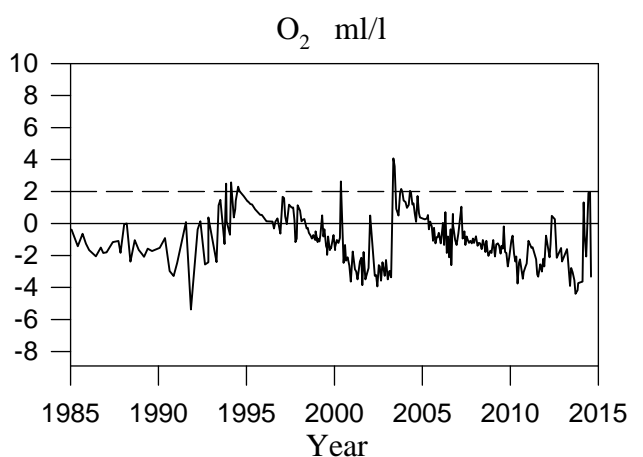
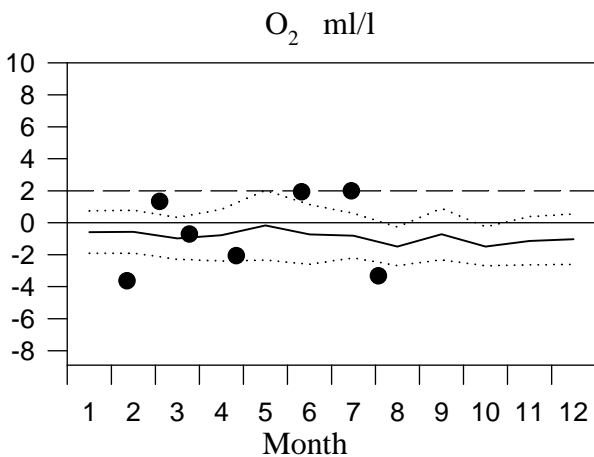
STATION BY10 SURFACE WATER

Annual Cycles

— Mean 1996-2010 ····· St.Dev. ● 2014

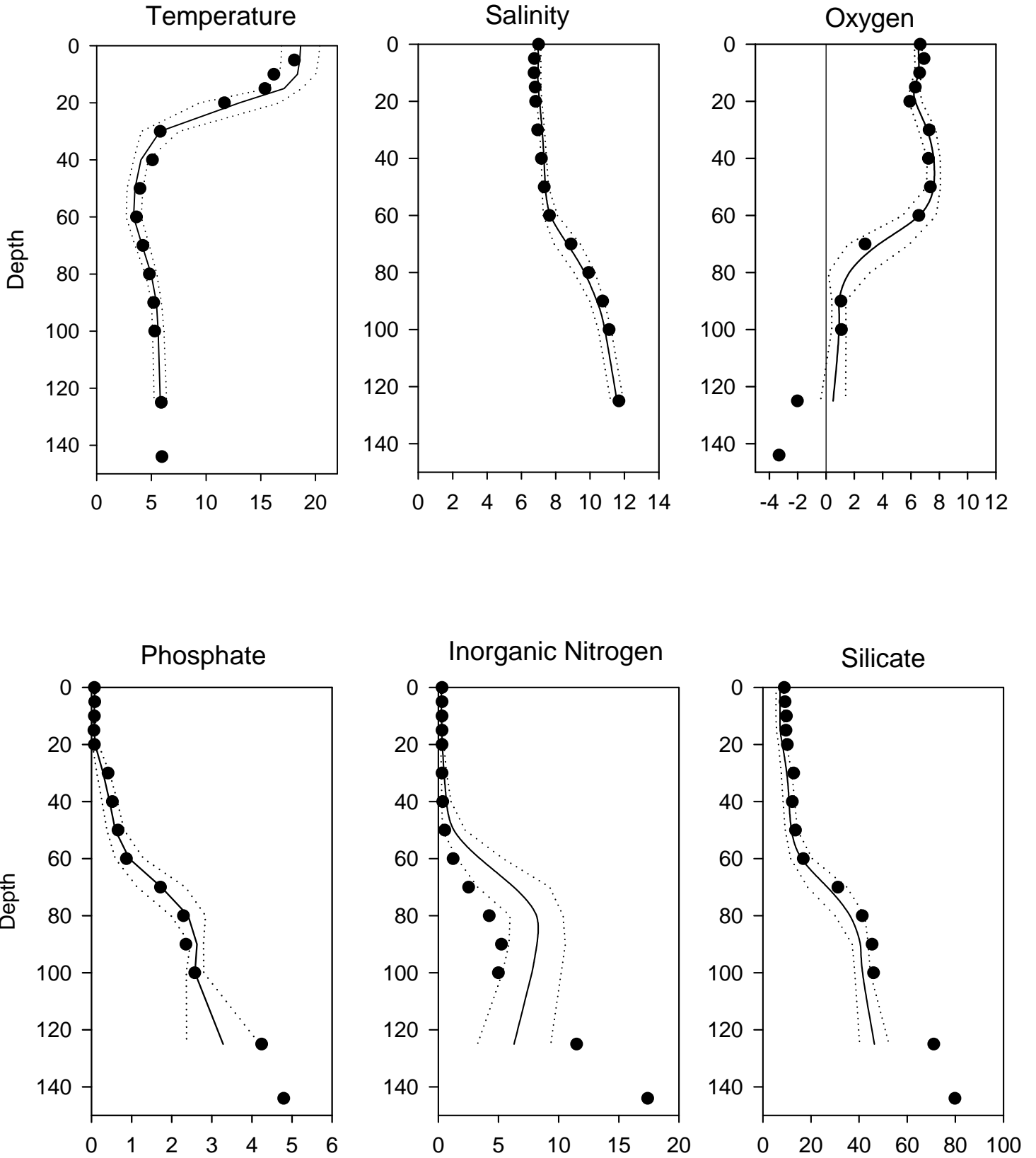


OXYGEN IN BOTTOM WATER (depth >125m)



Vertical profiles BY10 August

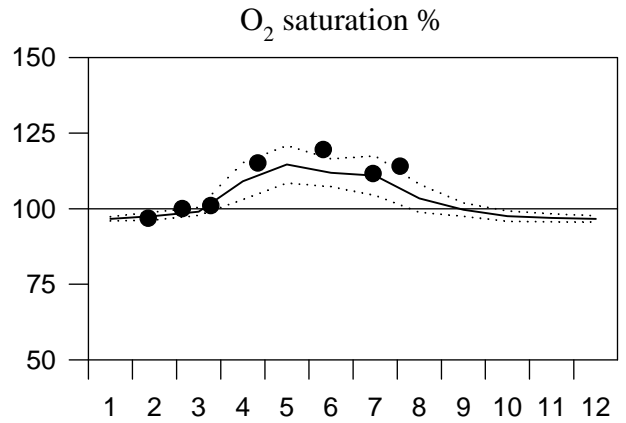
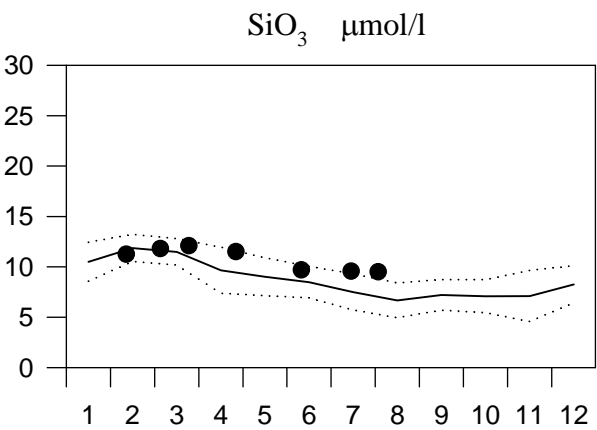
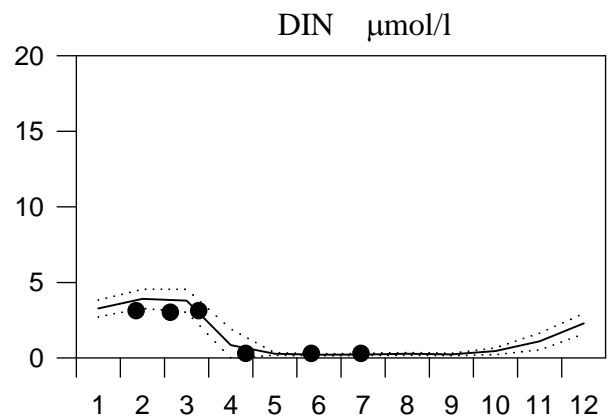
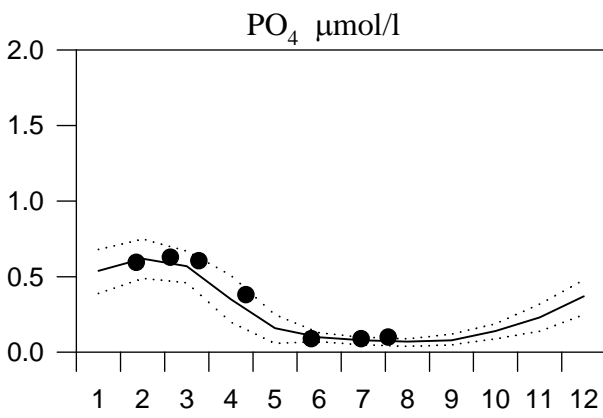
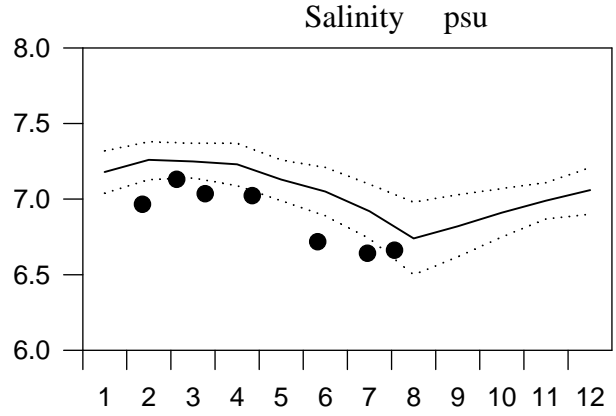
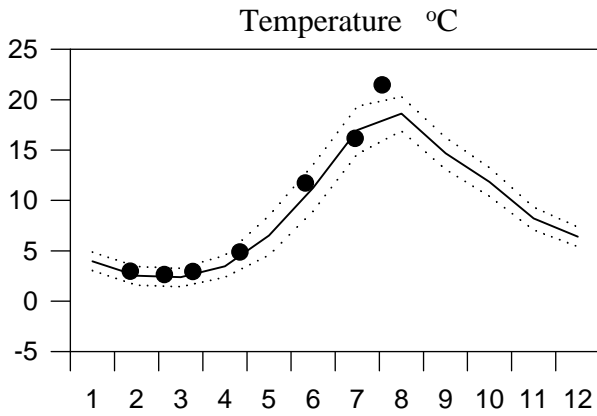
— Mean 1996-2010 ····· St.Dev. ● 2014



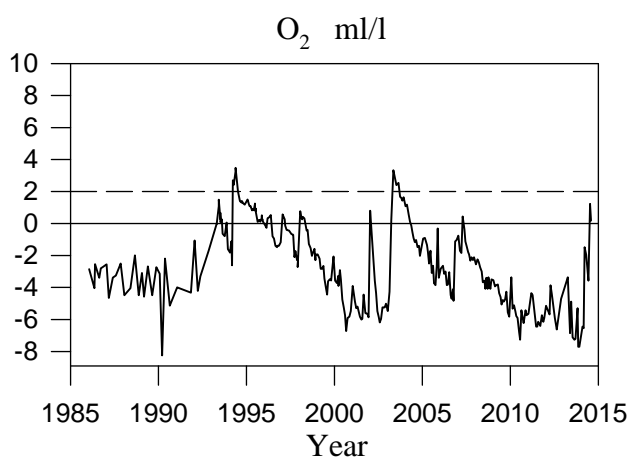
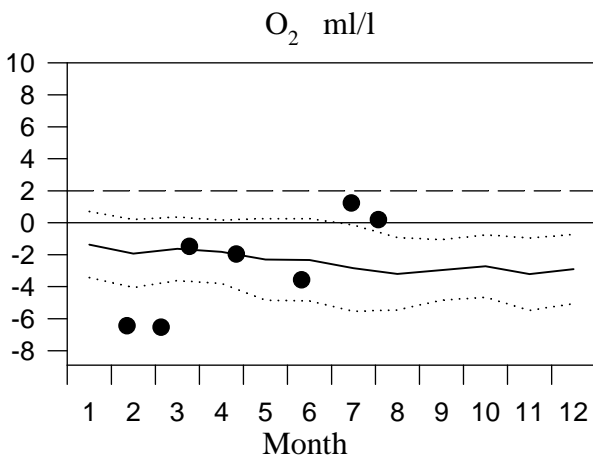
STATION BY15 SURFACE WATER

Annual Cycles

— Mean 1996-2010 St.Dev. ● 2014

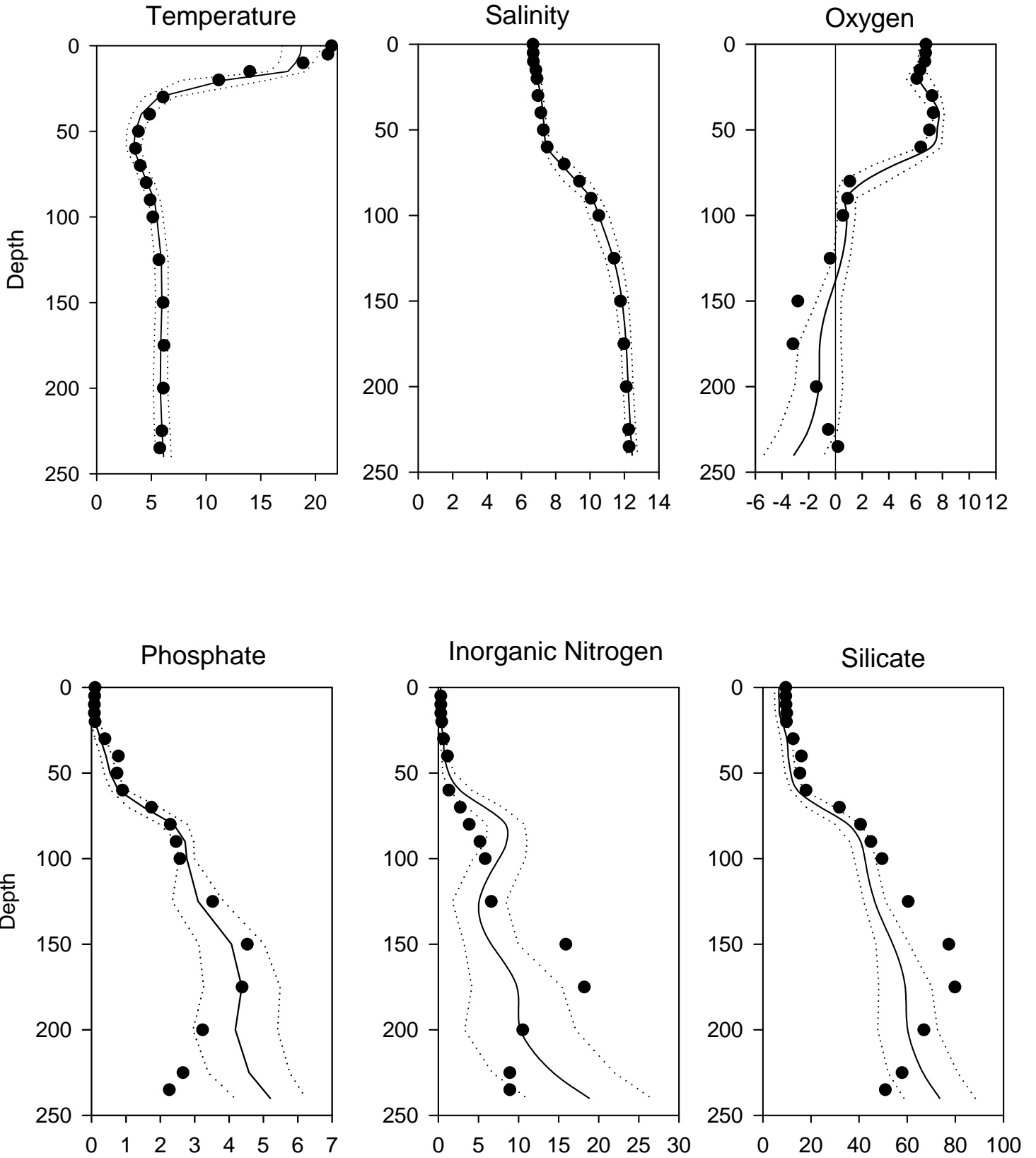


OXYGEN IN BOTTOM WATER (depth >225m)



Vertical profiles BY15 August

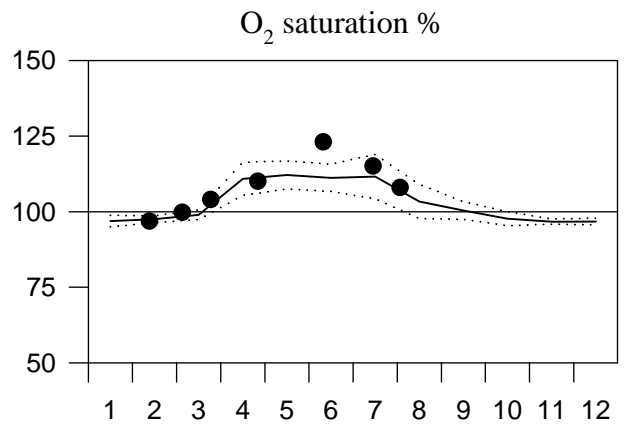
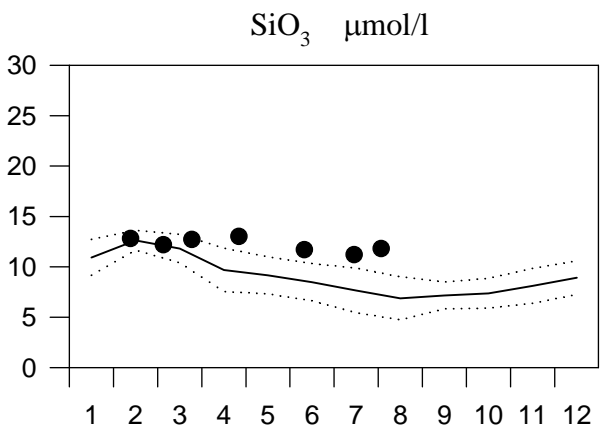
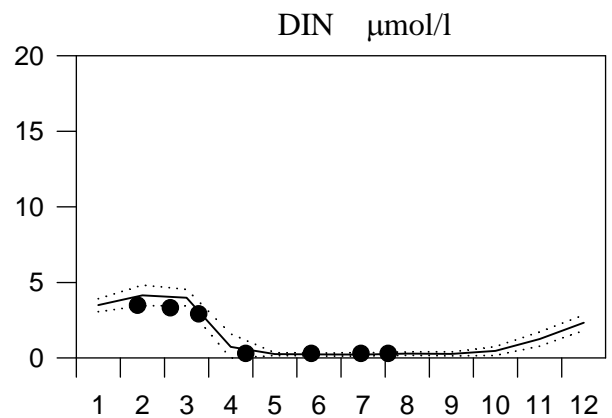
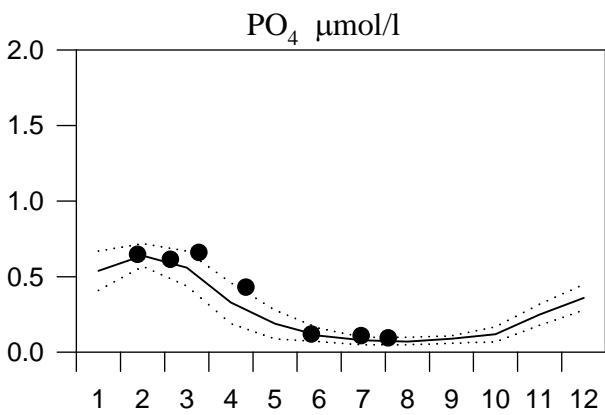
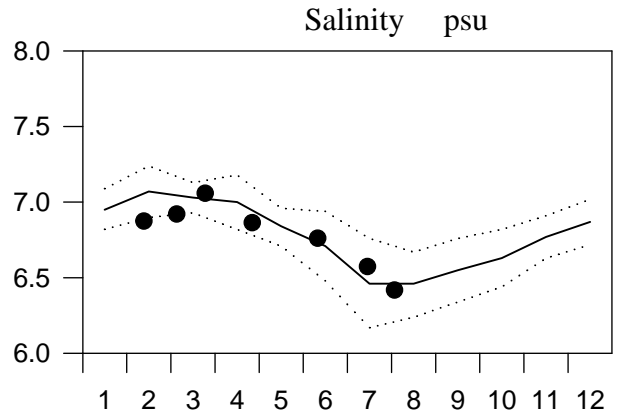
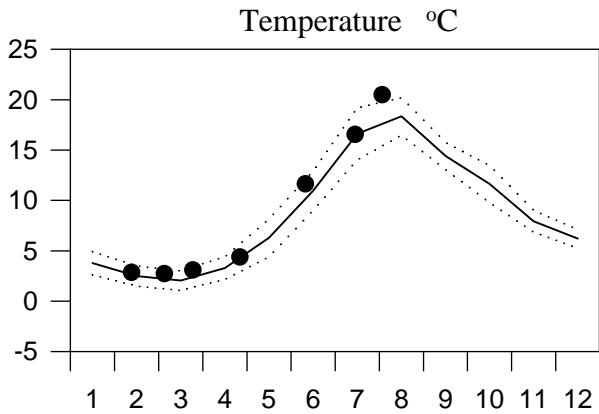
— Mean 1996-2010 ····· St.Dev. ● 2014



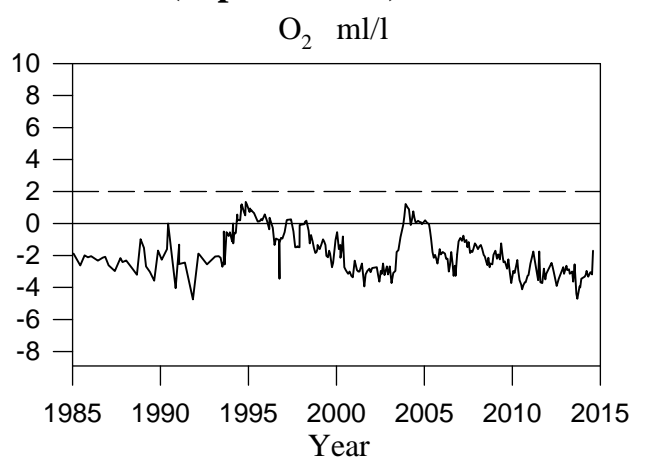
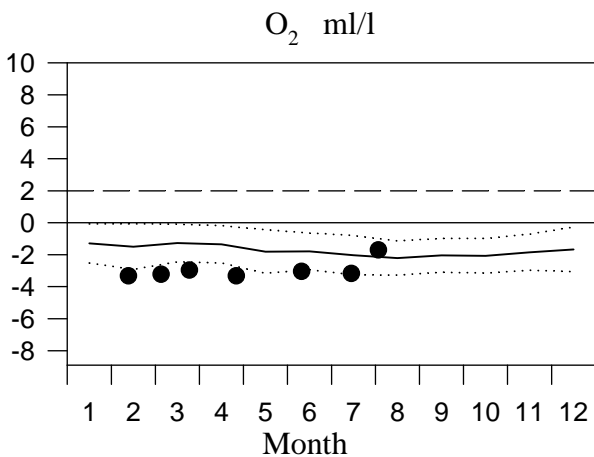
STATION BY20 SURFACE WATER

Annual Cycles

— Mean 1996-2010 ····· St.Dev. ● 2014

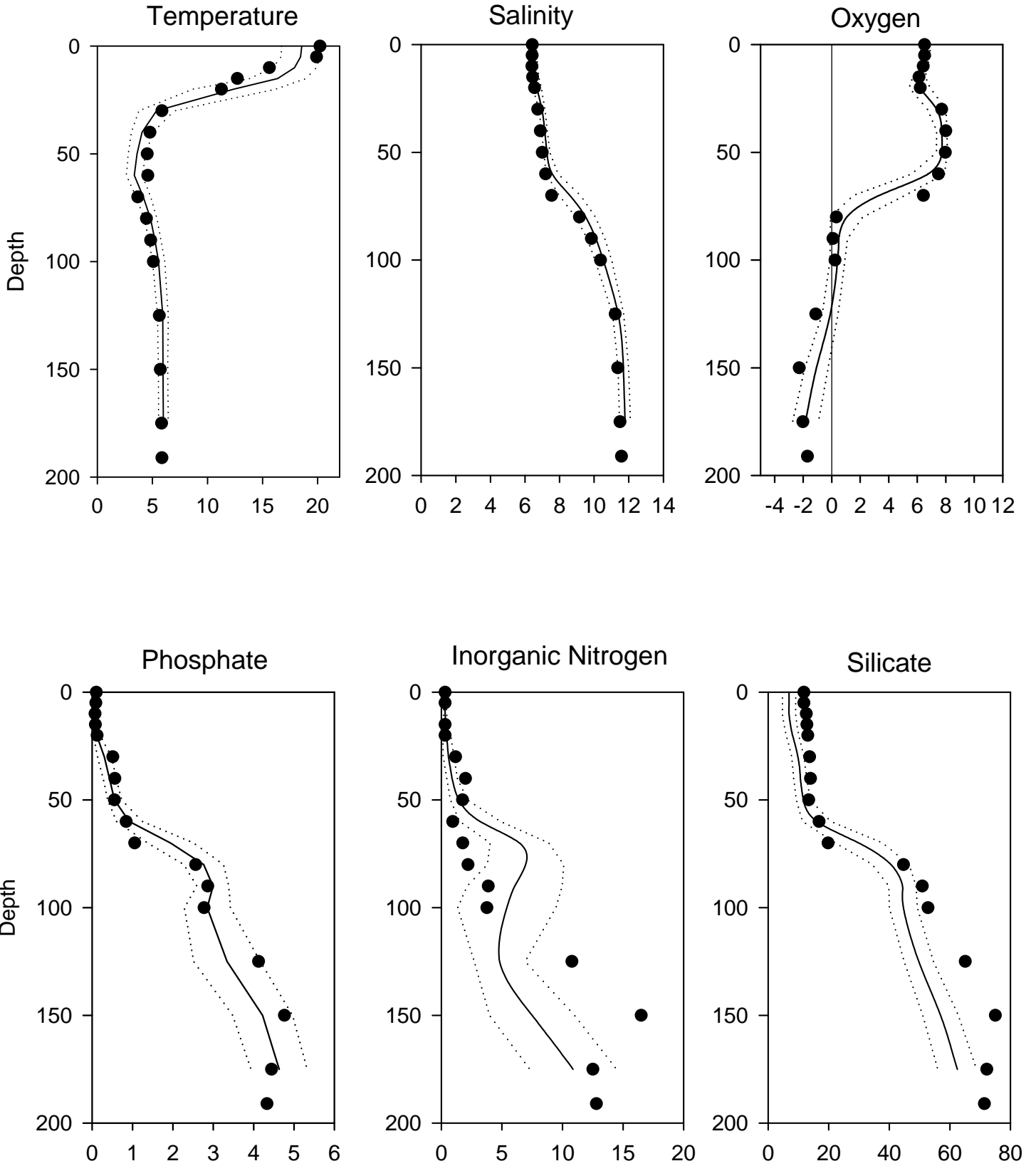


OXYGEN IN BOTTOM WATER (depth >175m)



Vertical profiles BY20 August

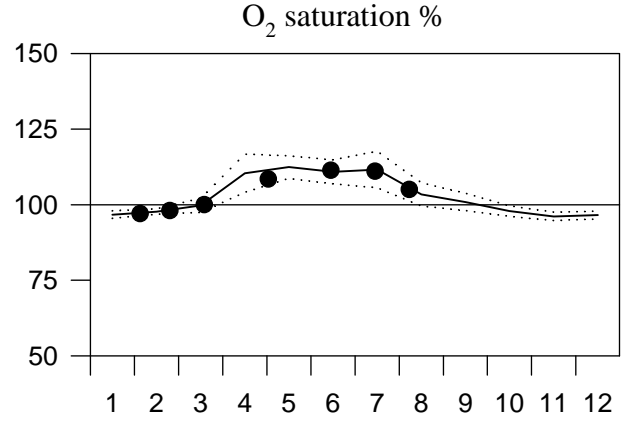
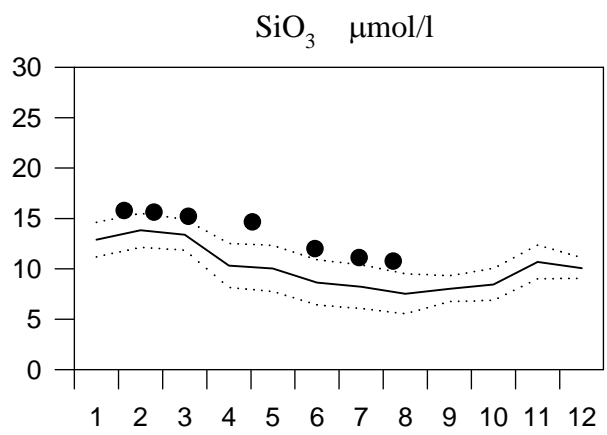
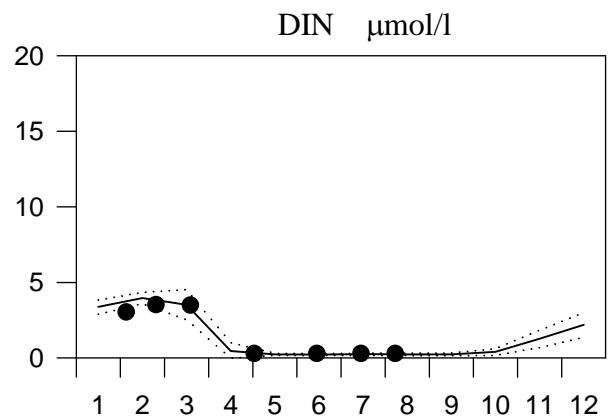
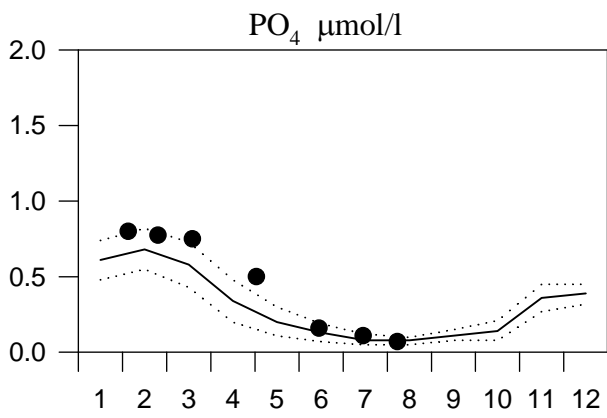
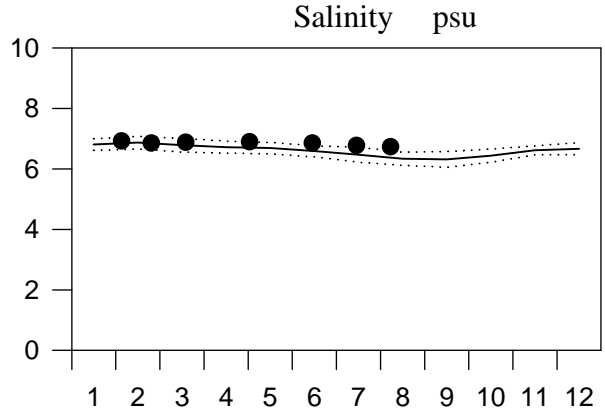
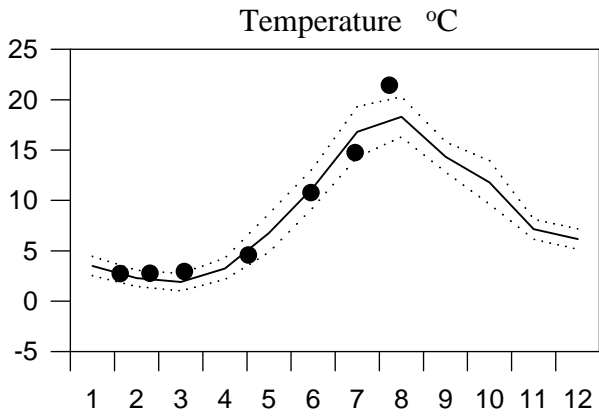
— Mean 1996-2010 ····· St.Dev. ● 2014



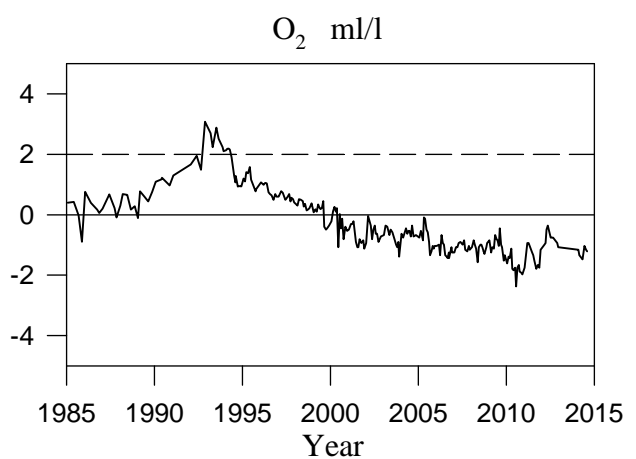
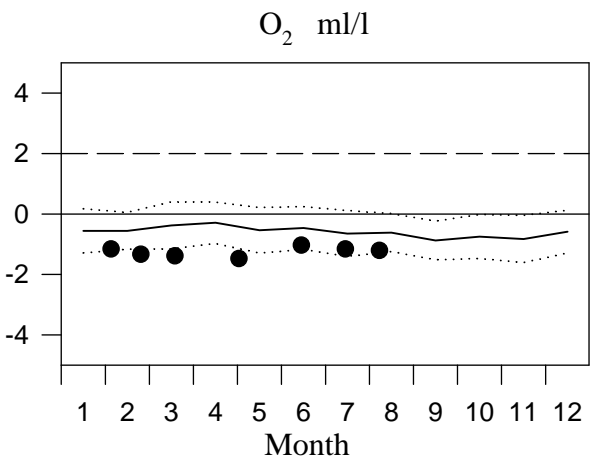
STATION BY32 SURFACE WATER

Annual Cycles

— Mean 1996-2010 ····· St.Dev. ● 2014

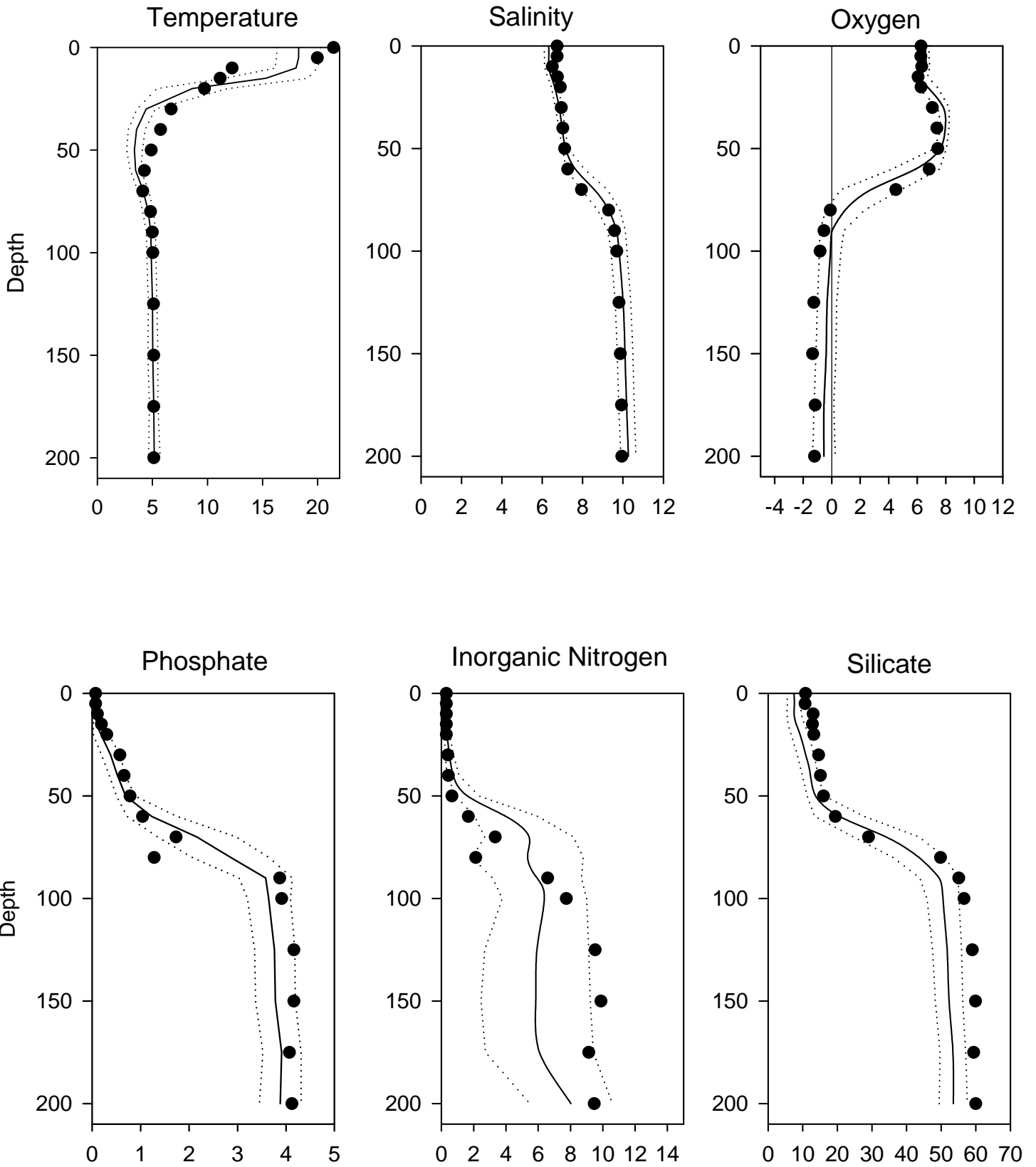


OXYGEN IN BOTTOM WATER (depth > 175m)



Vertical profiles BY32 August

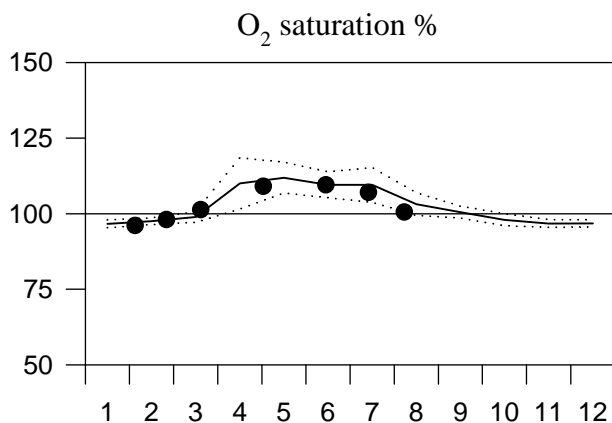
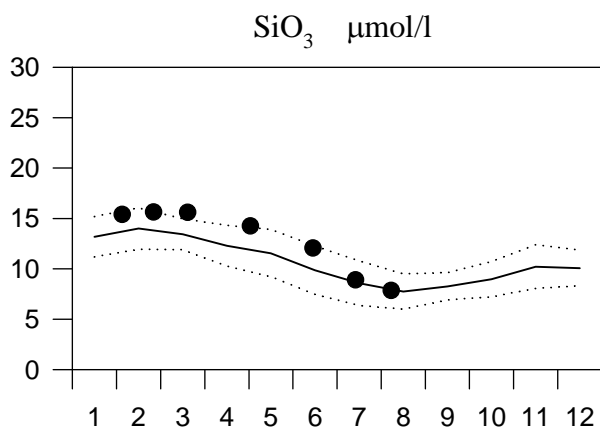
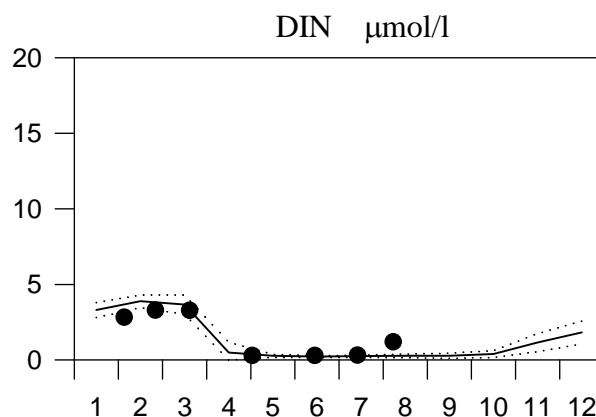
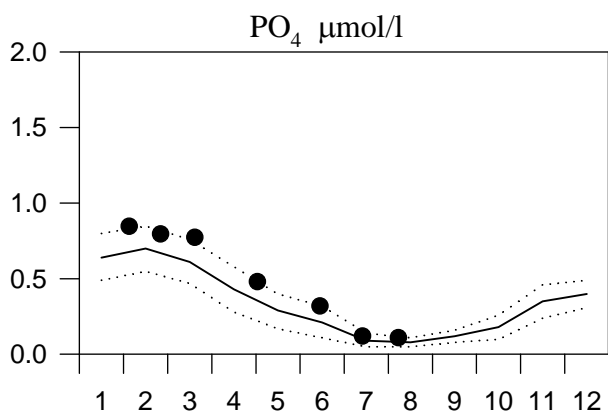
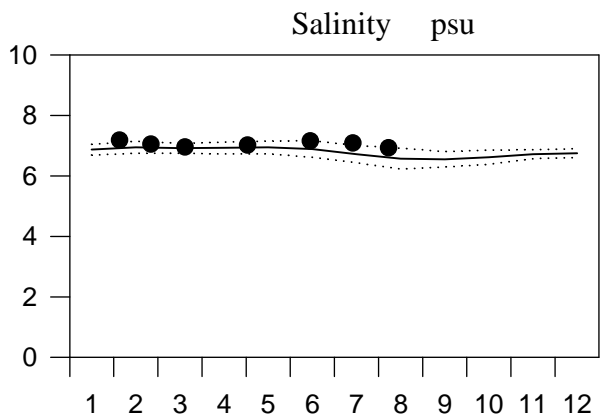
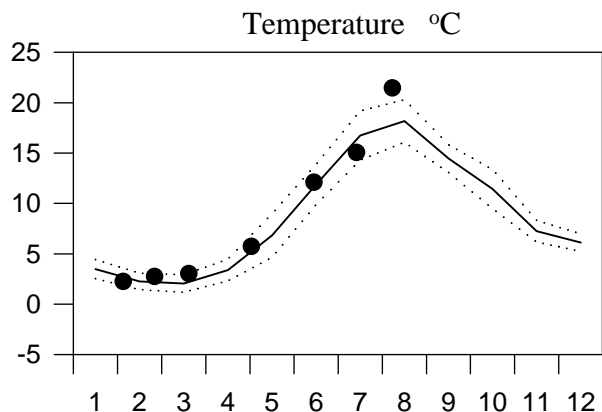
— Mean 1996-2010 ····· St.Dev. ● 2014



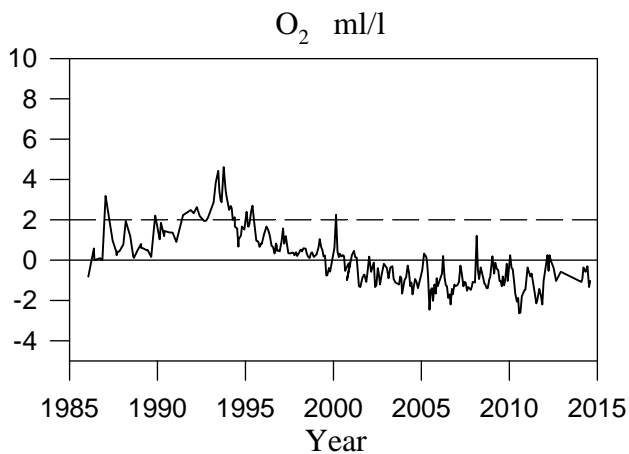
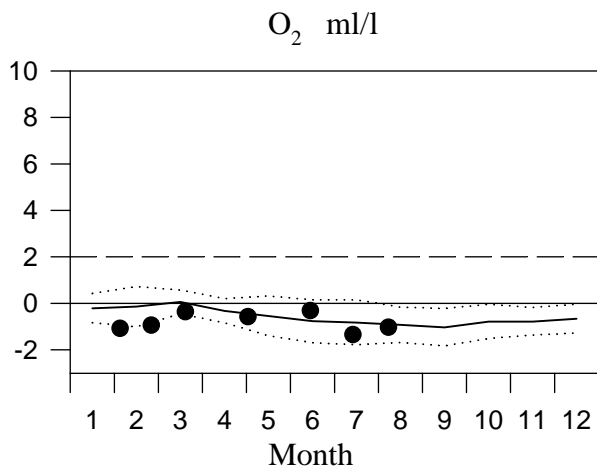
STATION BY38 SURFACE WATER

Annual Cycles

— Mean 1996-2010 ····· St.Dev. ● 2014

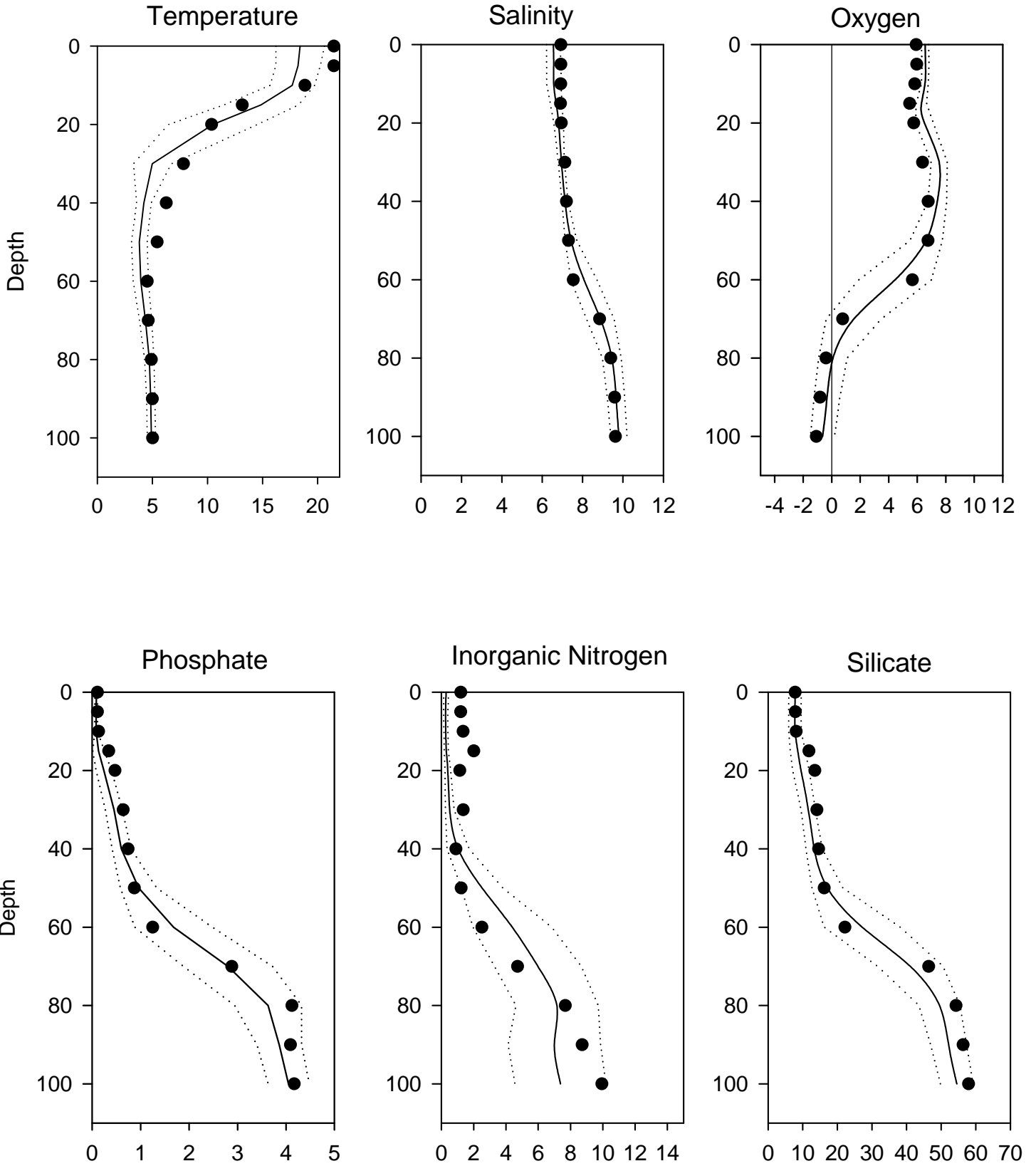


OXYGEN IN BOTTOM WATER (> 100m)



Vertical profiles BY38 August

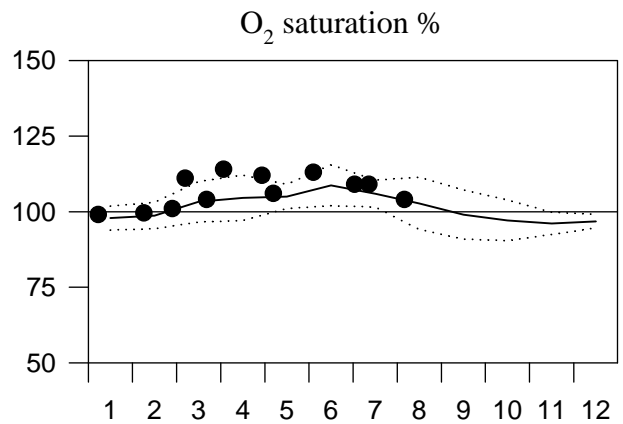
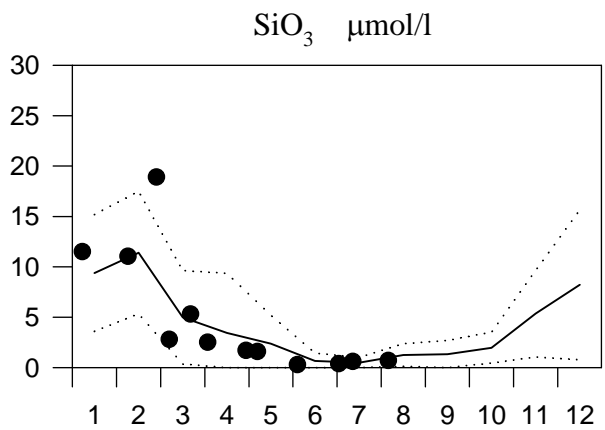
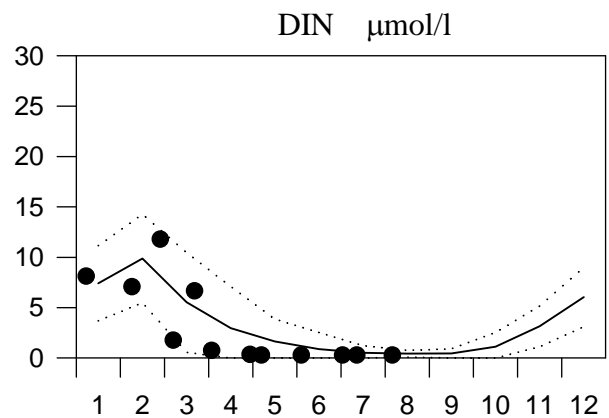
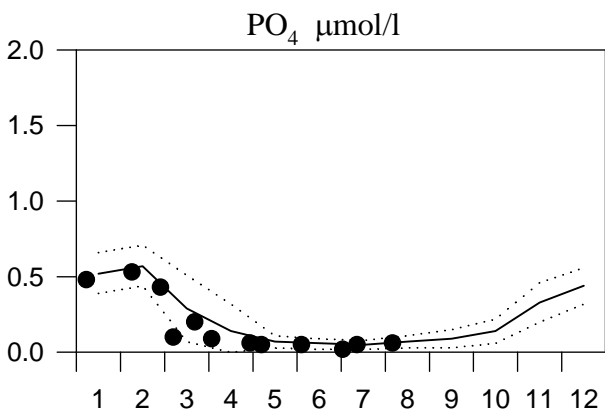
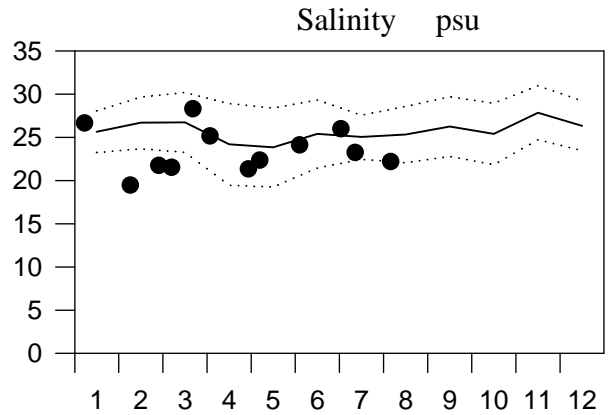
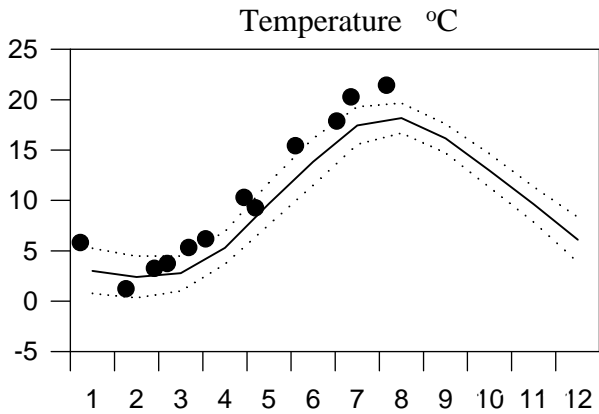
— Mean 1996-2010 ····· St.Dev. ● 2014



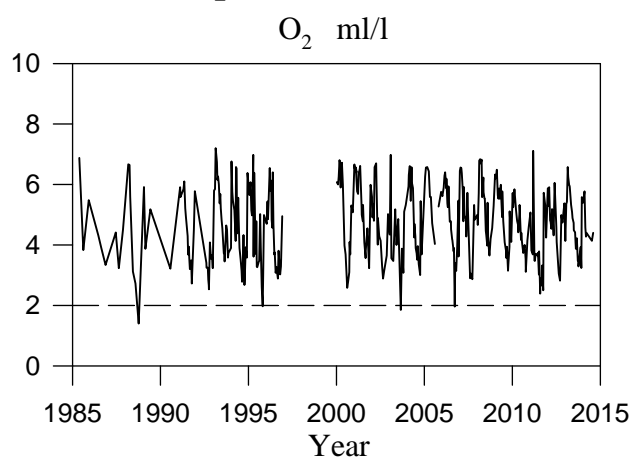
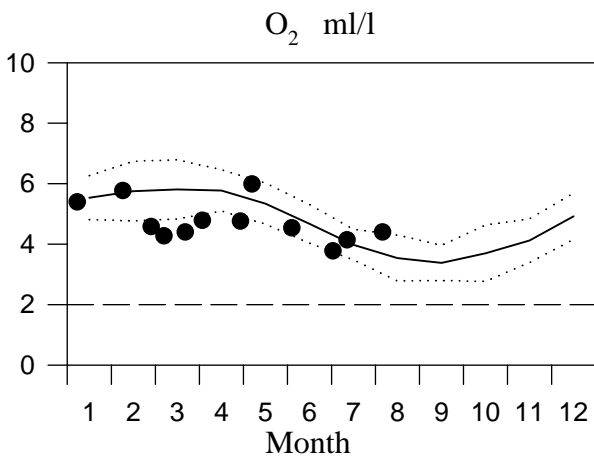
STATION SLÄGGÖ SURFACE WATER

Annual Cycles

— Mean 1996-2010 St.Dev. ● 2014

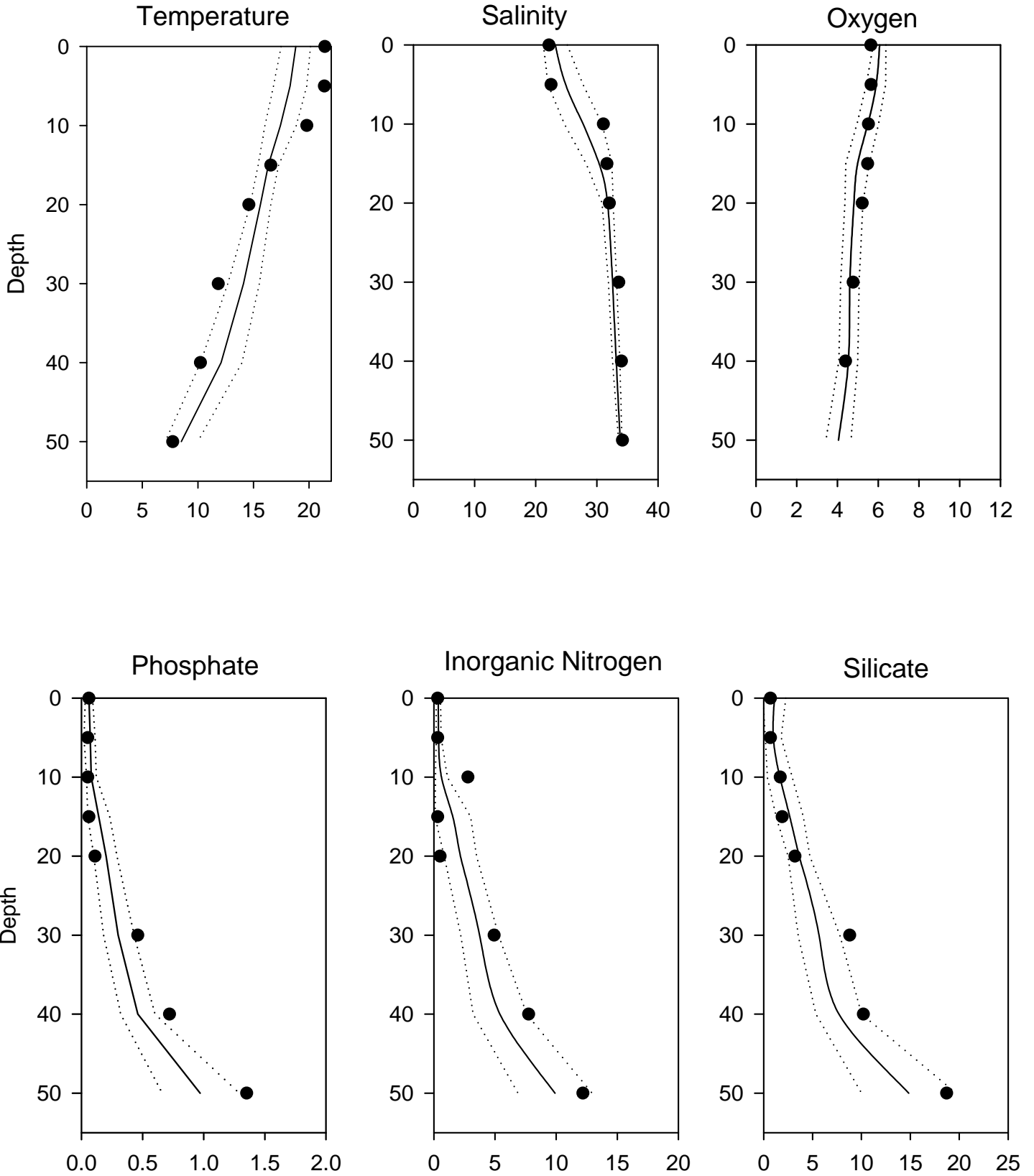


OXYGEN IN BOTTOM WATER (depth >50m)



Vertical profiles Släggö August

— Mean 1996-2010 St.Dev. ● 2014



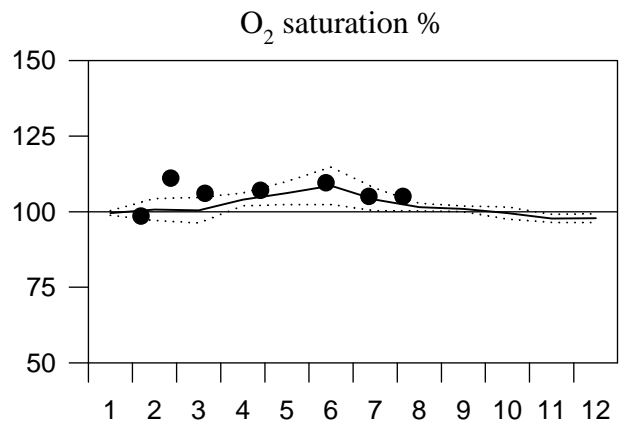
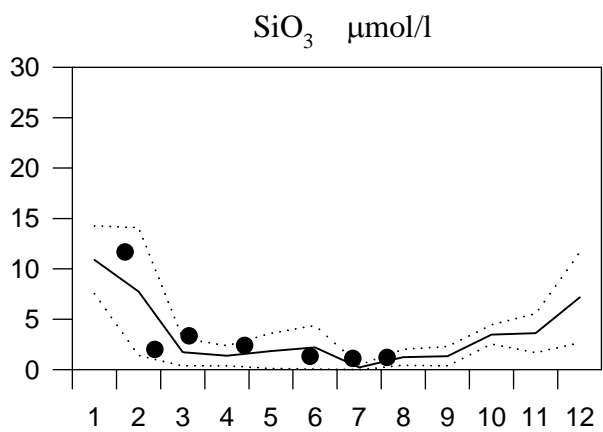
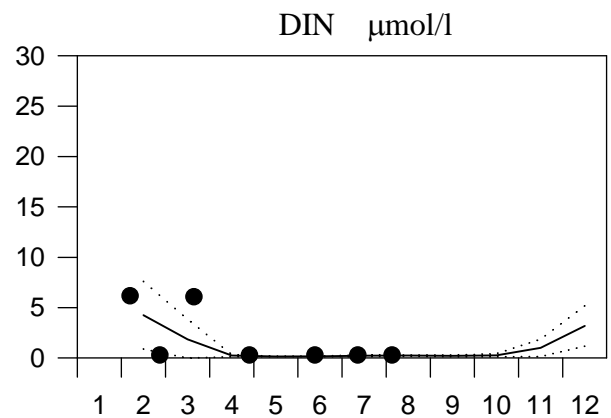
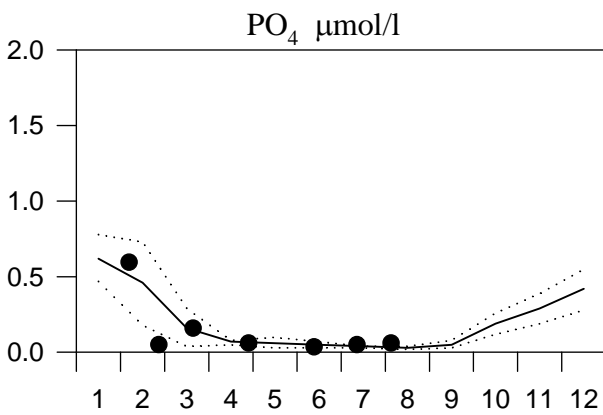
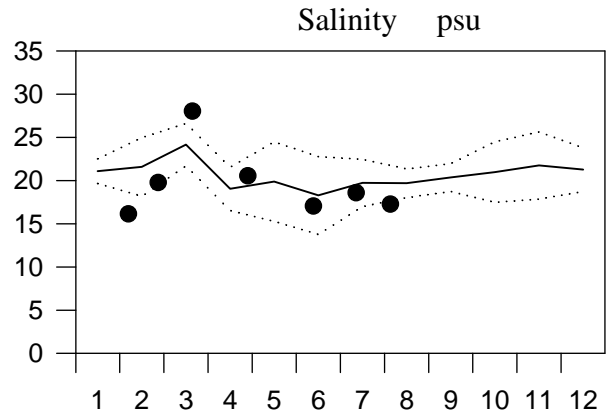
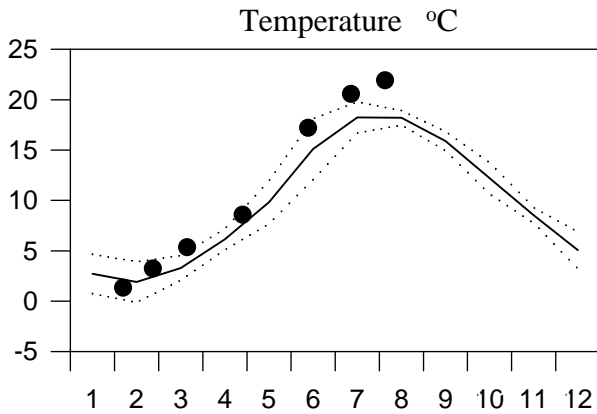
STATION N14 Falkenberg SURFACE WATER

Annual Cycles

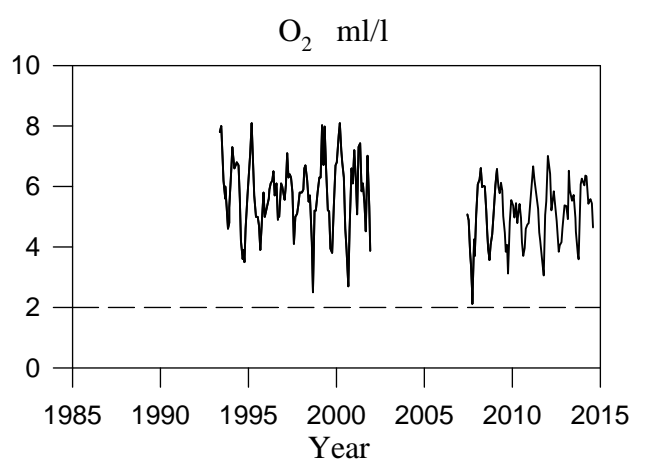
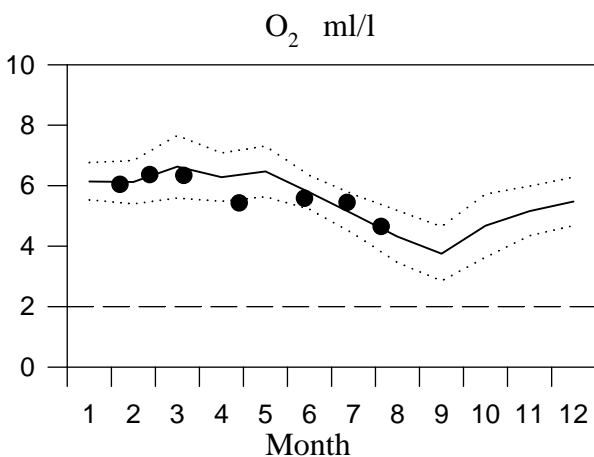
— Mean 2007-2010

..... St.Dev.

● 2014

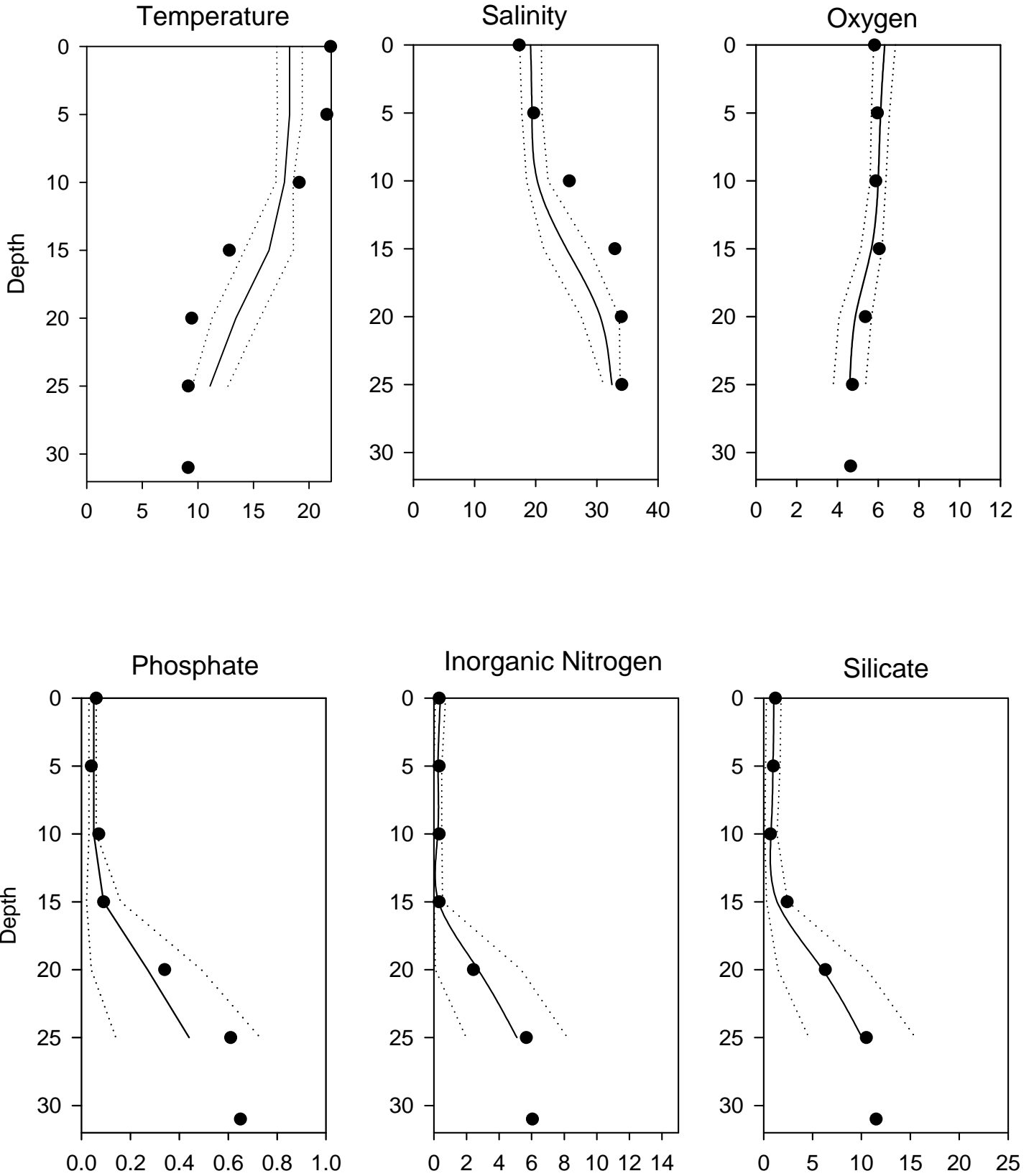


OXYGEN IN BOTTOM WATER (depth > 25m)



Vertical profiles N14 Falkenberg August

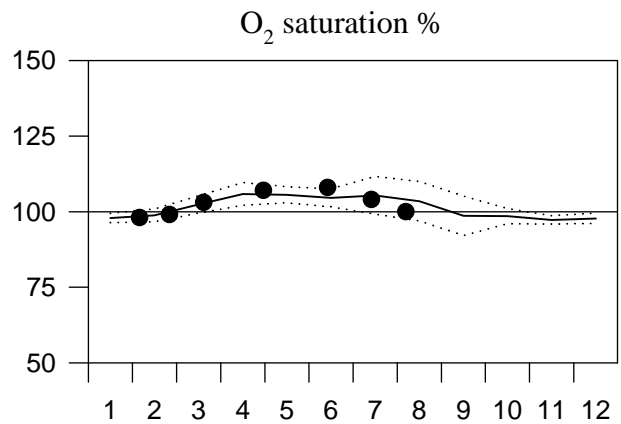
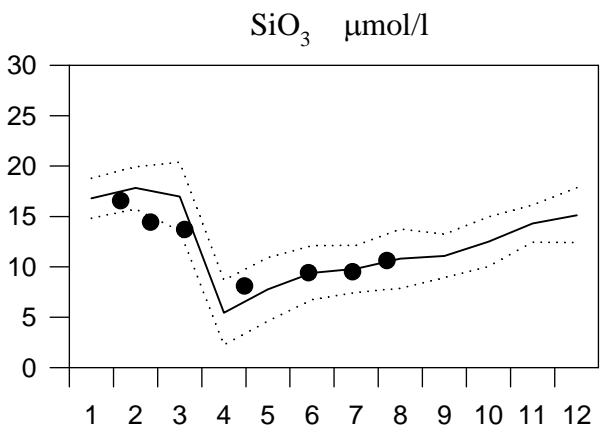
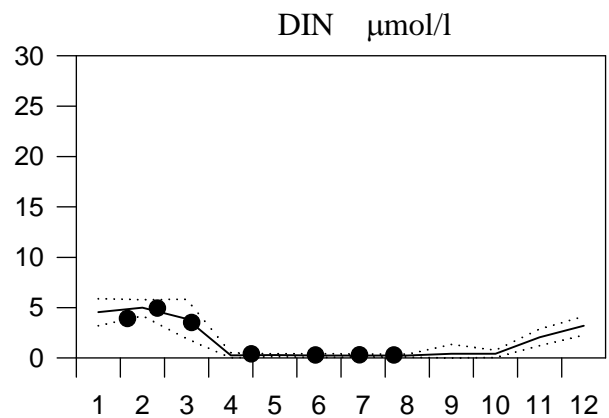
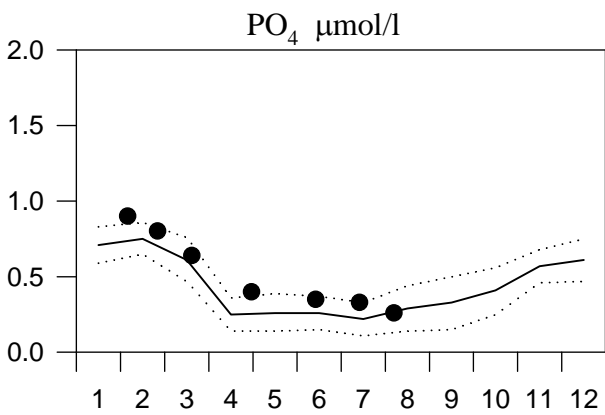
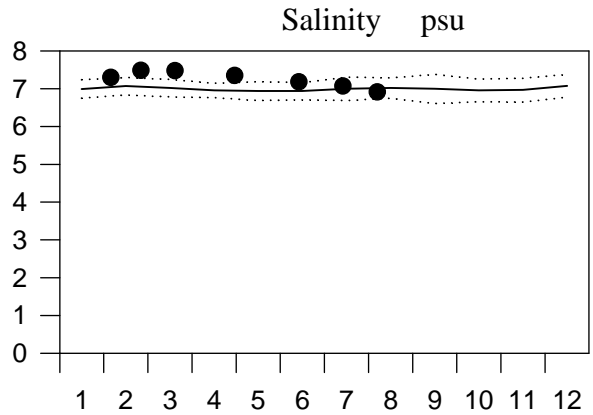
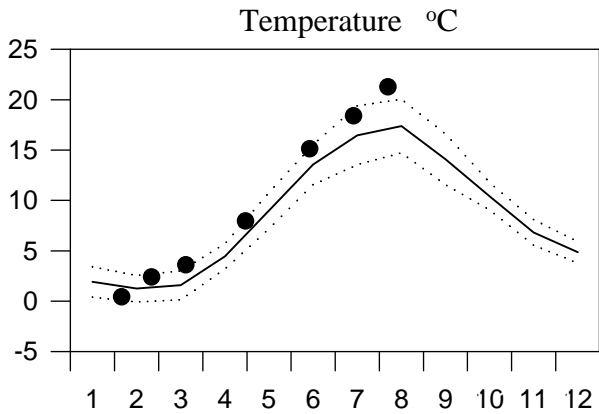
— Mean 1996-2010 St.Dev. ● 2014



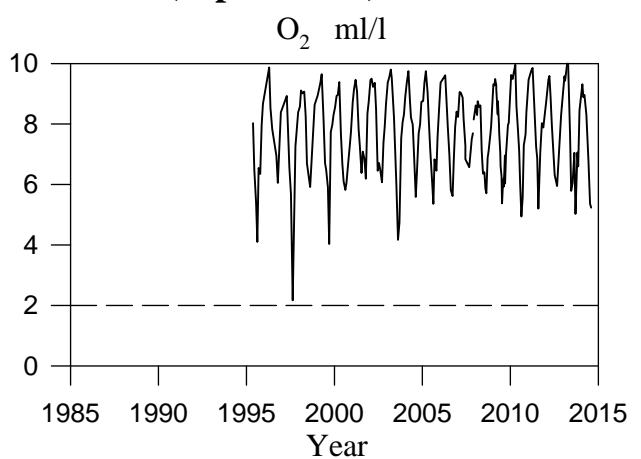
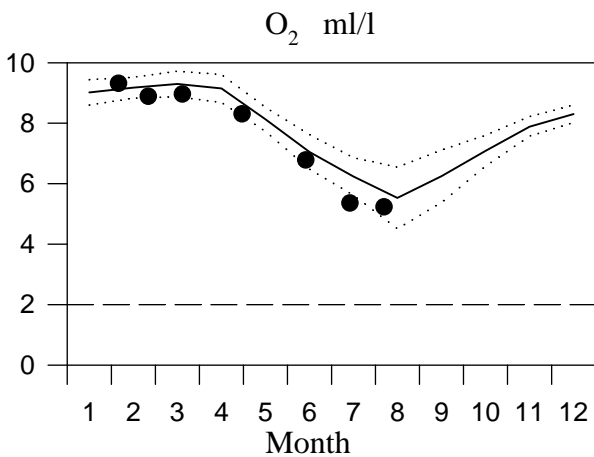
STATION REF M1V1 SURFACE WATER

Annual Cycles

— Mean 1996-2010 ····· St.Dev. ● 2014



OXYGEN IN BOTTOM WATER (depth >15m)



Vertical profiles Ref M1V1 August

— Mean 1996-2010 ····· St.Dev. ● 2014

