WATER MASS ANALYSIS IN RELATION TO PRIMARY PRODUCTIVITY IN KILINDINI AND TUDOR ESTUARIES.

J.M.Kazungu.

Introduction

Kilindini and Tudor Estuaries form a very interesting area for Oceanographic study. As pointed out in my earlier research project proposal, it is not clear as to why Kilindini estuary- though not scientifically proven- has relatively more fish than the Tudor creek. This implies that primary productivity in Kilindini estuary is higher then that of Tudor creek.

The present study is therefore centered on the identification of various water types which might be existing within the estuaries and try to relate them to primary productivity.

To do this the study is divided into three sections, namely:

1. Analysis of the nutrients (phosphates, silicates, nitrates, ammonia) distribution within the estuaries.
2. Analysis of particulate organic carbon (POC) distribution both within the estuaries water column and the bottom sediments.
3. Analysis of the salinity and oxygen distribution within the creeks.

Period of study.

This study is to be conducted in both the wet and the dry seasons. This would place us in a better position of understanding the effect of the monsoon rains on the river input of nutrients and organics in the creeks.

Discussion.

So far little can be said due to limited data. However, it is noticed that for the Tudor Creek, lowest concentrations of nitrate, phosphate and silicates were found at the mouth of the estuary near the open sea, whereas high concentrations were found upstream. Figs. 2 and 3 show representative graphs of nutrients concentration Vs sampling stations for the Tudor and Kilindini Estuaries respectively. As indicated in Fig.2 the highest nutrient concentrations for the Tudor Creek were found around station A6 near the river mouth, while the lowest were recorded at station A2 near the open sea. As expected, salinity concentrations decreased upstream. The highest silicate, nitrate and phosphate concentrations were 186.0 µg-atSi/$_1$ 28.50 µg-at N/$_1$, and 4.12 µg-at P/$_1$ respectively, while the lowest were 65.50 µg-at Si/$_1$, 5.20 µg-at N/$_1$ and 0.64 µg-atP/$_1$ respectively.

For Kilindini Estuary (Fig.3), the situation was different. Salinity and silicate concentrations behaved as expected, with salinity decreasing upstream and silicate increasing. However, it is surprising to find phosphate concentrations decreasing upstream. Nitrate concentrations oscillated between 0.2 and 0.5 µg-at N/$_1$ except station B1 which had 1.80 µg-at N/$_1$.

It is also surprising to discover that nutrients concentrations are higher in Tudor than in Kilindini Creek which is thought to be having a higher fish stock.

RESULTS FOR THE FIRST TWO MONTHS

Date: 08/04/86 Estuary: Tudor

STATION	NO_3^- /µg-at N/l	NO_2^- /µg-at N/l	NH_4^+ /µg-at N/l	Si /µg-at Si/l	PO_4^- /µg-at P/l
A1 (0m)	1.02	0	-	6.0	0.35
(5m)	1.56	-	-		0.25
A2 (0m)	2.98	0.05	-	8.0	0.35
A3 (0m)	1.78	0.05	-	12.0	0.35
A4 (0m)	1.70	0.05	-	15.50	0.25
A5 (0m)	2.05	0.02	-	28.50	0
(2.5m)	1.80				
A6 (0m)	6.80	0.15	-	105.00	0.55

Date: 22/4/86 Estuary: Tudor

STATION	NO_3^- µg-at N/l	NO_2^- µg-at N/l	NH_4^+ µg-at N/l	Si µg-at Si/l	PO_4^- µg-at P/l	S o/oo
A1 (0m)	0.15	0	0	4.00	0.30	36.36
(5m)	0.37	0	-	3.50	0.50	36.36
A2 (0m)	1.60	0.04	0	5.00	0.70	36.26
A3 (0m)	3.10	0.06	2.65	13.40	0.70	34.09
A4 (0m)	3.40	0.08	2.70	20.00	0.95	32.25
A5 (0m)	9.25	0.24	8.50	70.00	1.20	12.41
(5m)	1.90	0.22		17.80	0.95	34.63
A6 (0m)	9.25	0.64	10.65	71.50	0.10	1.11

Date: 22/05/86

A1 (0m)	-	-	-	-	-	-
A2 (0m)	5.20	0.05	-	65.50	0.64	25.07
A3 (0m)	9.30	0.05	-	116.00	0.68	18.53
A4 (0m)	17.80	0.05	-	163.50	1.46	11.29
A5 (0m)	22.50	0.05	-	186.00	1.92	5.66
A6 (0m)	28.50	0.08	-	180.50	4.12	0.72

Date: 06/05/86 Estuary: Kilindini

STATION	NO_3^- /µg-at N/l	NO_2^- /µg-at N/l	NH_4^+ /µg-at N/l	Si /µg-at Si/l	PO_4^- /µg-at P/l	S o/oo
A1 (0m)	0.30	0.04	-	4.00	0.90	34.99
(5m)	0.30	0.04	-	4.00	0.56	35.53
B1 (0m)	1.80	0.00	-	6.70	0.66	34.45
(5m)	0.60			4.00	0.66	34.81
B2 (0m)	0.25	0.00	-	7.20	0.52	34.09
(5m)	0.50	0.04	-	5.70	0.48	34.99
B3 (0m)	0.53	0.05	-	8.30	0.56	34.27
(5m)	0.80	0.04	-	8.80	0.52	38.42
B4 (0m)	0.40	0.05	-	8.80	0.42	33.55
(5m)	0.80	0.10	-	11.80	0.71	33.91
B5 (0m)	0.55	0.07	-	24.00	0.38	31.17
(5m)	1.00	0.08	-	23.50	0.86	31.71
B6 (0m)	0.40	0.04	-	16.00	0.66	32.97
(5m)	0.75	0.13	-	14.00	0.86	33.33

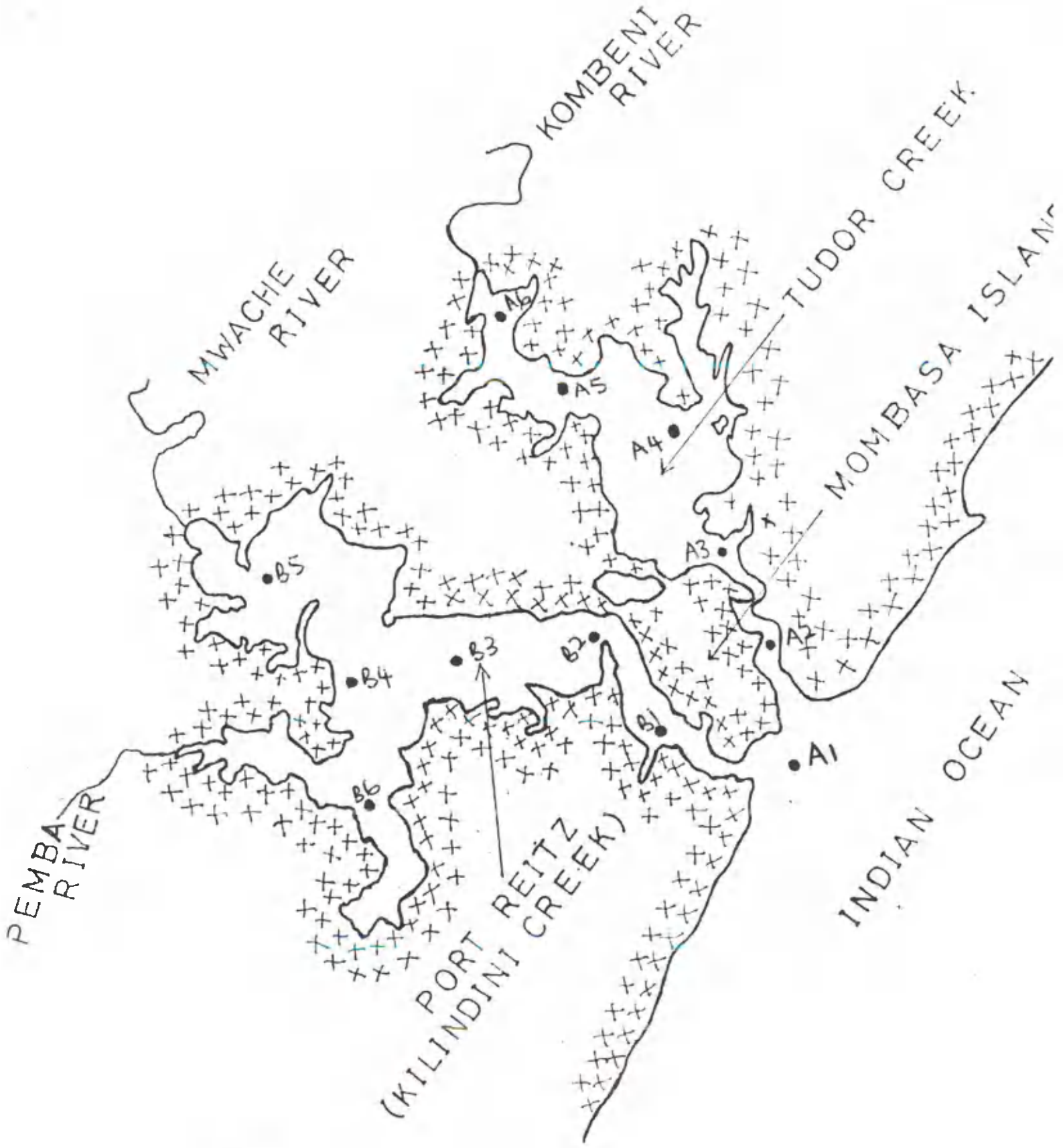

FIG 1
A1 – A6 (TUDOR CREEK)
B1 – B6 (KILINDINI CREEK).

7.

FIG. 2

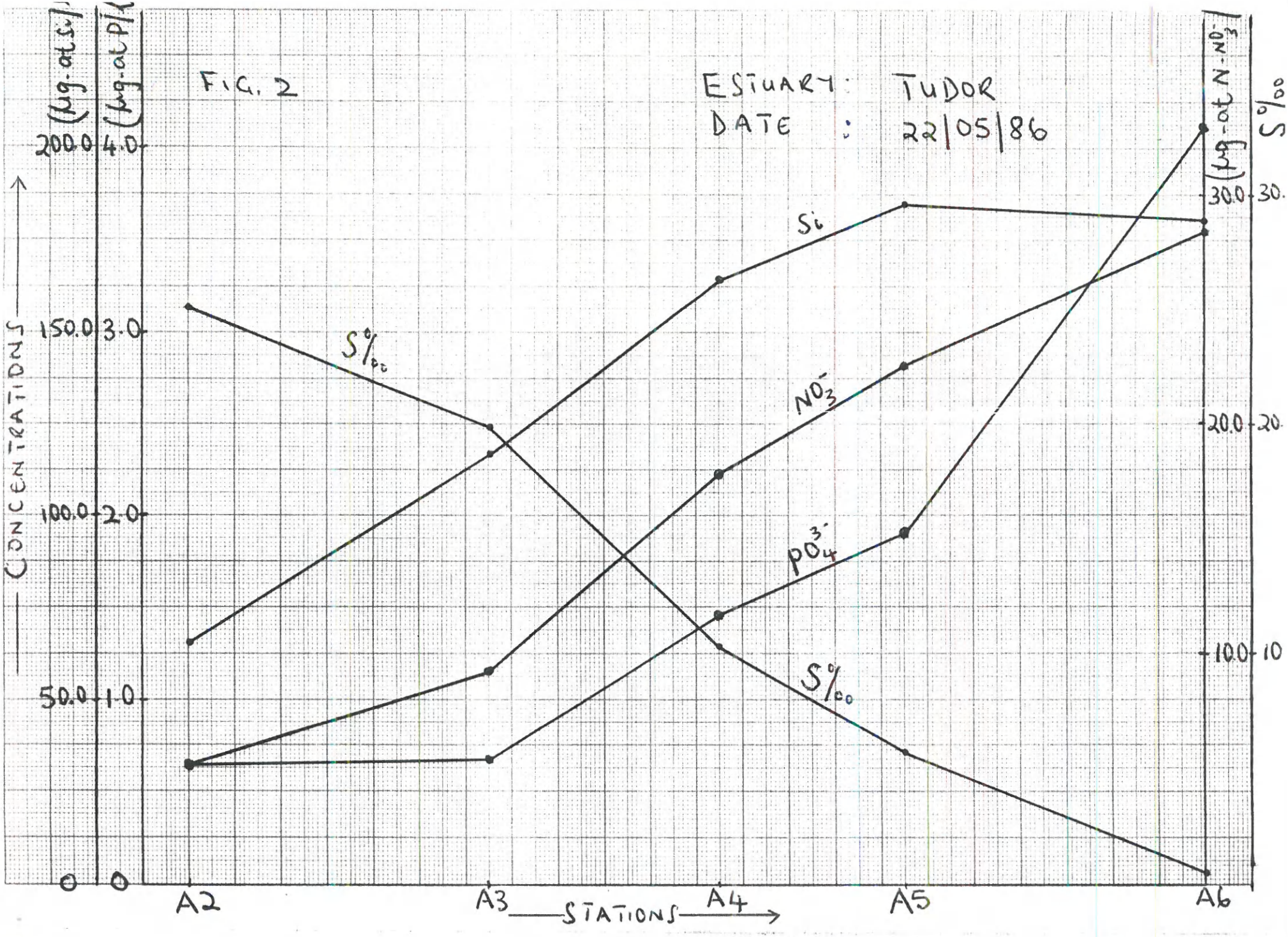
ESTUARY: TUDOR
DATE : 22|05|86
(µg-at.Si)/l
(µg-at.PO4)/l
(µg-at N-NO3)/l
S‰
CONCENTRATIONS
200.0
150.0
100.0
50.0
0
4.0
3.0
2.0
1.0
0
30.0
20.0
10.0
30
20
10
Si
S‰
NO3
PO4
S‰
A2
A3
A4
A5
A6
STATIONS

FIG. 3

ESTUARY : KILINDINI
DATE : 06/05/86