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THE BALTIC ENTRANCE PROJECT : DATA INVENTORY
by
Peter Möller, Artur Svansson and Jan Szaron

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Fyll bara i en sida. Bifoga om möjligt ett ex av rapporten!

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The Baltic Entrance Project: Data Inventory

Sammanfattning av rapport (fakta med huvudvikt på resultatet)

The Baltic Entrance Project, sometimes named the GF project, had its field phase during July 1974 - December 1977 in the northern Kattegat. One of its main objects was to determine the transport of nutrients through a section Göteborg - Frederikshavn. The paper presents an inventory of all kinds of data related to the project. Most of the data are stored on magnetic discs and/or magnetic tapes (computer files). A second type of file is a list file, which consists of lists, most often printouts of semi- or fully processed data.

Projektet, som ibland kallas GF-projektet, hade sin fältfas under tiden juli 1974 - december 1977 i norra Kattegatt. En av de viktigaste uppgifterna var att bestämma närsaltstransporterna genom snittet Göteborg-Frederikshavn. Artikeln presenterar en inventering av alla typer av data, som har relevans till projektet. De flesta data är lagrade på skivminne och eller magnetband (computer file). Ett andra lagringsmedium är "listfile" som består av listor, oftast utskrifter av halv- eller helbearbetade data.

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THE BALTIC ENTRANCE PROJECT: DATA INVENTORY
by Peter Möller, Artur Svansson and Jan Szaron

1. Introduction

The Baltic Entrance Project (BEP) started in July 1974 and ended in December 1977. The main object of the project was to collect data of currents and nutrients for the purpose of computing the transports of water and nutrients through a cross section in the Northern Kattegat. The BEP Project has resulted in 15 papers, the present one included, and they are all listed in "References". They will be referred to in this paper as (1)-(15).

During 1974-77 a section of 10 stations between Göteborg (actually Askim, see Fig. 1) and Frederikshavn (the GF-section) was surveyed 75 times, mostly by the Rescue Vessel Ulla Rinman but a few times by Thetis and Argos, Research Vessels of the National Board of Fisheries. Automatically recording Aanderaa instruments were also used and the ordinary measurements at the light-vessel Läsö Nord or Läsö Trindel were supplemented with daily total phosphorus determinations.

The project was sponsored by the Environment Protection Board (no 7-182). Participants were Staffan Lööf, Peter Möller, Jan Szaron (replaced by Jan Johansson for nearly one year) and Bodil Thorstensson. Project leader was Artur Svansson.

2. The Data

It is convenient to subdivide the data material into 3 categories: 1) the section data of the 75 cruises, 2) the Aanderaa data and 3) other data. In 3) is also included data collected simultaneously however not for the purpose of the project (e.g. the light-vessel data).

Most of the data is stored on magnetic discs and/or magnetic tapes (computer files). In the Institute of Hydrographic Research (IHR) we also have lists of semi- or fully processed data (list files). Information about these files will be given below.

2.1 The GF-Section Data

Fig. 1 and Table 1 show the positions of the section stations. Table 2 contains information about every cruise, date of cruise, determined parameters. Fig. 2 shows the GF-section with depth distribution of the parameters and Fig. 3 the time distribution of the cruises.

The original forms (example in Fig 4) were filled in on board and in the laboratory. The contents of these forms were punched and processed at Göteborgs Datacentral (GD) and the following files were produced:

- a) List files of station data (example in Fig 5) and cross sections of all parameters (example in Fig 6).

- b) A Computer file of parameter data (record layout in Table 3). This computer file produced 3 list files with the same layout as in Fig 6: ba) mean values for each of the years 1975, 1976 and 1977, bb) quarterly means for the whole period 1974 (1975) - 1977 and bc) grand means 1975-1977.
- c) A Computer file of data of parameters used for water and matter transport computations (missing values were interpolated). This computer file produced two list files for each cruise: ca) a summary page (example in Fig 7) and cb) cross section (example in Fig 8). Table 4 presents the record layout of this computer file.
- d) Bathythermographs slides were collected but have so far not been processed.
- e) Phytoplankton and zooplankton data.
Zooplankton hauls were taken for and results published by Öresland (1983). Phytoplankton samples were collected for and results published by Eklund (1979).

2.2 The Aanderaa Data

Fig. 1 shows positions where Aanderaa meters were anchored. The data are stored on paper tape. The following files were produced (Time is given as GMT + 1 hour in the list files and as GMT in the computer files):

- a) List files of aa) 10 minutes raw data and parameter data, ab) hourly, weekly and fortnightly means.
- b) Computer files.
The posts can be illustrated as follows:

1.	Date	YYMMDD	Double integer, i.e. 4 bytes
2.	Time (GMT)	HHMMSS	Double integer, i.e. 4 bytes
3.	Temperature	Celcius degree	Real, i.e. 6 bytes
4.	Salinity	promille	Real, i.e. 6 bytes
5.	Depth	metre	Real, i.e. 6 bytes
6.	N-comp. of current	cm/s	Real, i.e. 6 bytes
7.	E-comp. of current	cm/s	Real, i.e. 6 bytes
8.	Current direction	(vel.-vector)degree	Real, i.e. 6 bytes
9.	Current velocity	(vel.-scalar) cm/s	Real, i.e. 6 bytes

Thus every measurement has a length of 50 bytes.

The files are stored at: VOLUME STROM1
 OWNED BY PETER

The files are stored with 1600 BPI.

The files can be illustrated as follows:

FILE 1 : (PETER)GF600-15:SYMB;1 GEN. 1, 1709 PAGES

Position: N 57 31.5 E 11 19.0
 Depth: 15 metres
 Period: 741213 - 760412
 Remarks: Low values of velocity (channel 6,7,9)
 75-09-22 - 75-10-25. Probably due to dirt
 in the rotor.

FILE 2 : (PETER)GF600-30:SYMB;1 GEN. 1, 1709 PAGES

Position: N 57 31.5 E 11 19.0
 Depth: 30 metres
 Period: 741213 - 760412
 Remarks:ngar: 750404 - 750417: Doubtful values due to
 instrument defect. Can be used with some
 discretion.

FILE 3 : (PETER)GF604-8:SYMB;1 GEN. 1, 716 PAGES

Position N 57 30.0 E 11 32.7
 Depth: 8 metres
 Period: 760308 - 760928
 Remarks: 750330: Strong currents - the rig pressed
 down, otherwise OK.
 760623 - 760928 : Questionable measuring
 quality, but practicable.
 OBS! Measurements on this file are done at
 an approximate depth of 8 metres, in order
 to obtain correct velocity.

FILE 4 : (PETER)GF604-15:SYMB;1 GEN. 1, 1241 PAGES

Position: N 57 30.0 E 11 32.7
 Depth: 15 metres
 Period: 761221 - 771209
 Remarks: 770824 - 771003: Depth values questionable.
 771019 - 771209: The meter has been moved
 to 8-9 metres.

FILE 5 : (PETER)GF604-30:SYMB;1 GEN. 1, 2018 PAGES

Position: N 57 30.0 E 11 32.7
 Depth: 30 metres
 Period: 760308 - 771003
 Remarks: 760623 - 760818: Velocity suspected low.

FILE 6 : (PETER)GF606-15:SYMB;1 GEN. 1, 2013 PAGES

Position: N 57 27.8 E 11 21.0
 Depth: 15 metres
 Period: 760426 - 771119
 Remarks: 760818 - 761025: Salinity values mostly inferior.
 770524 - 770704: Temperature and salinity values very fluctuating, but possibly OK.

FILE 7 : (PETER)GF606-30:SYMB;1 GEN. 1, 2082 PAGES

Position: N 57 27.8 E 11 21.0
 Depth: 30 metres
 Period: 760426 - 771209
 Remarks: Seems OK.

2.3 Other Data

2.3.1 L/V Läsö Nord or Läsö Trindel ordinary data

One of the section stations, i.e. no. 6 coincided with the position of the L/V Läsö Nord. On March 12, 1975 the light vessel position was changed 5 nm to the SE and got another name, i.e. Läsö Trindel. On November 24, 1977 it was withdrawn permanently. The data has been published by "Det Danske Meteorologiske Institut, 2100 København Ö".

2.3.1.1 Data of currents

The surface current was measured 8 times a day 00,03 etc GMT. The original data as well as N- and E- components are stored in our list files. These list files also contain daily, monthly, annual and total means. Daily means are also contained in a computer file (Table 3).

2.3.1.2 Data of temperature and salinity

Temperature and salinity was measured once a day at Läsö N at 0, 5, 10, 15, 20, 30 and 38 m depth and at Läsö Trindel at 0, 5, 10, 15, 20 and 28 m depth. We have in our list files the original data, monthly, quarterly, semiannual, annual and total means. The files also contain data of computed density. The original data are also stored in a computer file (Table 3).

2.3.1.3 Data of winds

Daily and monthly means of winds (measured simultaneously with the currents) are stored in our list files both as direction (from) and velocity as well as components but by mistake S- and W-components. Daily means of direction and velocity are also stored in the same computer file as mentioned in 2.3.1.2.

2.3.2 L/V data of total phosphorus

Samples for the determination of total phosphorus at our laboratory were taken at the light-vessel (Läsö Nord or Trindel) simultaneously with the sampling for salinity. In our list files we have these original data as well as monthly, 3-monthly, annual and total means. The original data are stored in the same computer file as mentioned in 2.3.1.2.

2.3.3 Other light-vessel data

Beside the Läsö N and Läsö Trindel data there are ordinary L/V data also from "Skagens Rev" in the Skagerrak, "Anholt Nord or (from 750321) Knob" in the Kattegat and "Gedser Rev", "Kadetrenden" and "Drogden" (surface data only at "Drogden") in the Belt Sea. They have been published in the annual Danish reports.

2.3.4 Sea level data, Baltic water exchange data

We have in our files SMHI:s hourly values of the sea levels measured at 12 places along the Swedish coasts. In the present project we have had special interest in the sea level data from Göteborg (Torshammen). Other sea level data of special interest are those of Smögen, Varberg and (in the middle of the Baltic) Landsort.

We have also in our files Danish hourly values of sea levels (kindly sent to us by the Danish Meteorologic Institute). We have been particularly interested in data from Frederikshavn.

During July 1975 - December 1976 inclusive, the International Hydrological Decade (later IH project) had a special Pilot "Year" for the study of the water budget of the Baltic. In Jacobsen (1980) are presented daily components of the water balance during the Pilot period. During 1976 the river inflow to the Baltic and the Kattegat area was only $360 \text{ km}^3/\text{y}$ (Jacobsen l.c.) compared with a normal value of $475 \text{ km}^3/\text{y}$ (Paper 10).

2.3.5 The Belt Project Data

From August 1974 to April 1978 the Danish Belt Project was carried through with recording current meters and monthly cruises in the Belt Sea and the Kattegat (Aertebjerg et al 1981).

2.3.6 Jonsdap 76 data

During March-June 1976 the International North Sea Project Jonsdap 76 was carried out partly as FLEX and partly as INOUT. Only the latter one with its numerous series of current data has any relevance to Kattegat problems. J76-Inout data are available both in DOD Hamburg and MIAS Bidston. The ICES Service Hydrographique is preparing a J76 Inventory and can always give advice if there are difficulties in finding J76 data.

2.3.7 Läsö Rende data

There has been (is still?) at Läsö Rende Lighthouse a semipermanent oceanographic station (in being from 1972). There was (is?) at 2.5 m depth an Aanderaa meter recording and we have in our files data kindly sent to us by the Danish Farvandsdirektoratet. Our data is only covering the J76 Inout period, March-April 1976.

2.3.8 City of Göteborg data

The city of Göteborg is carrying out a regular program of checking the water environment in the River of Göta and in the Archipelago. During many years at the position Hällan (see fig. 1) Aanderaa meters were recording and this was also the case during 741122-750209 of our period. Data of temperature, salinity, nutrients etc are being published by GRYAAB (S-41722 Göteborg), which also can give information of not published data (e.g. Aanderaa currents).

3. Acronyms

- DOD = Deutsches Ozeanographisches Datenzentrum, B. Nocht-Strasse 78, 2-Hamburg 4, W. Germany.
- MIAS = Marine Information and Advisory Service, Merseyside, L43 7RA, England.
- ICES = International Council for the Exploration of the Sea, Palaegade 2-4, 1261-Copenhagen K.
- BEP = Baltic Entrance Project.
- GF = Göteborg - Frederikshavn.
- IHR = Institute of Hydrographic Research.
- L/V = Light-vessel.

4. Acknowledgement

Special thanks are expressed to Eric Westerström and Alf Lundgren of the Rescue Vessel "Ulla Rinman".

5. References

Papers where BEP data are used and which were published or will be published by the BEP Group members.

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Table 1

Positions

<u>Stations</u>				<u>Bottom depth m</u>
GF 1	57° 34.7' N	11° 51.5' E		16
GF 2	57° 34.45' N	11° 48.5' E		14
GF 3	57° 33.7' N	11° 40.0' E		36
GF 4	57° 33.0' N	11° 31.5' E		79
GF 5	57° 32.3' N	11° 26.0' E		50
GF 6	57° 32.0' N	11° 19.5' E		42
GF 7	57° 30.3' N	11° 8.5' E		39
GF 8	57° 27.9' N	10° 54.0' E		40
GF 9	57° 26.0' N	10° 42.5' E		26
GF 10	57° 25.0' N	10° 35.7' E		14
<u>Aanderaa meters</u>				
600	57° 31.5' N	11° 19.0' E		42-43
604	57° 30.0' N	11° 32.7' E		62
606	57° 27.8' N	11° 21.0' E		52
<u>Light-Vessels</u>				
Läsö Nord	57° 32.2' N	11° 20.3' E		38
Läsö Trindel	57° 28.1' N	11° 25.0' E		28

1974

Cruise	Date	Temp	Sal	Oxygen	PO ₄	Tot-P	NO ₂	NO ₂ + NO ₃	NH ₄	Tot-N	TOC	Current	Ship no
1	74 08 07	x	x	x	x	x				x		x	16
2	08 13	x	x	x	x	x				x		x	16
3	08 27	x	x	x	x	x				x		x	16
4	09 10-11	x	x	x	x	x				x		x	16
5	09 18	x	x	x	x	x				x		x	16
6	09 30	x	x	x	x	x				x		x	16
7	10 09	x	x	x	x	x				x		x	16
8	10 14	x	x	x	x	x				x		x	16
9	11 06	x	x	x	x	x				x		x	16
10	11 19	x	x	x	x	x				x		x	16
11	12 02	x	x	x	x	x				x		x	16
12	12 16	x	x	x	x	x				x		x	16

Ship No 13 = Research Vessel Thetis
 Ship No 14 = Research Vessel Argos
 Ship No 16 = Rescue Vessel Ulla Rinnmann

Table 2 a

1975

Cruise	Date	Temp	Sal	Oxygen	PO ₄	Tot-P	NO ₂	NO ₂ + NO ₃	NH ₄	Tot-N	TOC	Current	Ship no
13	75 02 03	x	x	x	x	x				x		x	16
14	02 11	x	x	x	x	x				x		x	13
15	02 19	x	x	x	x	x		x	x	x		x	16
16	03 05	x	x	x	x	x				x		x	16
17	03 18	x	x	x	x	x				x		x	13
18	04 03	x	x	x	x	x		x	x	x		x	16
19	04 08	x	x	x	x	x				x		x	16
20	04 17	x	x	x	x	x				x		x	16
21	04 22	x	x	x	x	x				x		x	16
22	05 05	x	x	x	x	x				x		x	16
23	05 13	x	x	x	x	x				x		x	16
24	05 27	x	x	x	x	x				x		x	16
25	06 10	x	x	x	x	x				x		x	16
26	06 17	x	x	x	x	x	x		x	x		x	16
27	07 29	x	x	x	x	x				x		x	16
28	08 05	x	x	x	x	x				x	x	x	16
29	08 19	x	x	x	x	x				x	x	x	16
30	10 09	x	x	x	x	x				x		x	16
31	10 16	x	x	x	x	x				x	x	x	16
32	10 21	x	x	x	x	x				x	x	x	16
33	11 12	x	x	x	x					x	x	x	16
34	12 17-18	x	x	x	x	x				x	x	x	16

Table 2 b

1976

Cruise	Date	Temp	Sal	Oxygen	PO ₄	Tot-P	NO ₂	NO ₂ + NO ₃	NH ₄	Tot-N	Current	Ship no
35	76 01 26	x	x	x	x	x		x		x	x	16
36	02 09	x	x	x	x	x	x	x	x	x	x	13
37	02 18	x	x	x	x	x		x		x	x	16
38	03 17	x	x	x	x	x	x	x	x	x	x	13
39	03 24	x	x	x	x	x	x	x	x	x	x	16
40	04 02	x	x	x	x	x	x	x	x	x	x	16
41	04 07-08	x	x	x	x	x	x	x	x	x		14
42	04 12	x	x	x	x	x	x	x	x	x	x	16
43	04 21	x	x	x	x	x	x	x	x	x	x	13
44	04 28	x	x	x	x	x	x	x	x	x	x	13
45	05 04	x	x	x	x	x	x	x	x	x	x	16
46	05 18-19	x	x	x	x	x	x	x	x	x	x	16
47	06 09	x	x	x	x	x	x	x	x	x	x	16
48	06 22	x	x	x	x	x	x	x	x	x	x	16
49	07 14	x	x	x	x	x	x	x	x	x	x	16
50	09 14	x	x	x	x	x	x	x	x	x	x	16
51	09 21	x	x	x	x	x	x	x	x	x	x	16
52	10 05	x	x	x	x	x	x	x	x	x	x	16
53	10 26	x	x	x	x	x	x	x	x	x	x	16
54	11 18	x	x	x	x	x	x	x	x	x	x	16

Table 2 c

1977

Cruise	Date	Temp	Sal	Oxygen	PO ₄	Tot-P	NO ₂	NO ₂ + NO ₃	NH ₄	Tot-N	TOC	Current	Ship no
55	77 01 04	x	x	x	x	x	x	x	x	x	x	x	16
56	02 22	x	x	x	x	x	x	x	x	x	x	x	16
57	03 01	x	x	x	x	x	x	x	x	x	x	x	16
58	03 21	x	x	x	x	x	x	x	x	x	x	x	14
59	04 13	x	x	x	x	x	x	x	x	x	x	x	16
60	05 03	x	x	x	x	x	x	x	x	x	x	x	16
61	05 10	x	x	x	x	x	x	x	x	x	x	x	16
62	05 24	x	x	x	x	x	x	x	x	x	x	x	13
63	06 14	x	x	x	x	x	x	x	x	x	x	x	16
64	07 05	x	x	x	x	x	x	x	x	x	x	x	13
65	07 13	x	x	x	x	x	x	x	x	x	x	x	16
66	07 26	x	x	x	x	x	x	x	x	x	x	x	16
67	08 03	x	x	x	x	x	x	x	x	x	x	x	16
68	08 17	x	x	x	x	x	x	x	x	x	x	x	13
69	09 20	x	x	x	x	x	x	x	x	x	x	x	16
70	10 05	x	x	x	x	x	x	x	x	x	x	x	13
71	10 11	x	x	x	x	x	x	x	x	x	x	x	16
72	11 17	x	x	x	x	x	x	x	x	x	x	x	16
73	11 29	x	x	x	x	x	x	x	x	x	x	x	16
74	12 06	x	x	x	x	x	x	x	x	x	x	x	13
75	12 20	x	x	x	x	x	x	x	x	x	x	x	16

Table 2 d

Table 3: GF-data, Läsö Nord/Trindel and future Aanderaa data.

Volume: GFSECT
 1600 BPI
 NL-tape
 ASCII
 LRECL=80
 BLKSIZE=2048

File 1: GF-data
 File 2: Läsö Nord/Trindel data
 Aanderaa data are stored on Vol: GFSTR-AA

Item	Parameter	No Pos	Pos	Format on output	Legal Values
1	Station	3	1- 3		
2	Year	2	4- 5		
3	Month	2	6- 7		
4	Day	2	8- 9		
5	Time (GMT)	4	10-13		
6	Wind Direction	3	14-16		
7	Wind Speed	2	17-18		
8	Cloud Amount	1	19-19		
9	State of Sea	1	20-20		
10	Air Temp	4	21-24		
11	MLD	2	25-26		
12	Secchi Disc	4	27-30		
13	Depth	2	31-32		
14	Temp	4	33-36	F5.2	
15	Salinity	5	37-41	F6.3	
16	Density	4	42-45	F5.2	
17	O2 (ml/l)	4	46-49	F5.2	
18	O2 (%)	3	50-52	I3	
19	Current Dir.	3	53-55	I3	
20	Current Velocity	3	56-58	I3	
21	TOT-P	3	59-61	F4.2	
22	PO4-P	3	62-64	F4.2	... , <02
23	TOTN-N	2	65-66	I2	
24	NO3-N + NO2-N	3	67-69	F4.1	... , <.1
25	NO2-N	3	70-72	F4.2	... , <02
26	NH4-N	4	73-76	F5.2 , <.02
27	TOC	3	77-79	F4.1	
28	Blank	1	80-80		

Valid items for GF-data: 1-28
 - " - Läsö Nord/Trindel: 2-7, 13-15, 19-21
 - " - Aanderaa: 2-5, 13-15, 19-20

(A (.) means a blank position (Ex ... = 3 blank pos).

Table 4: GF-transport-data

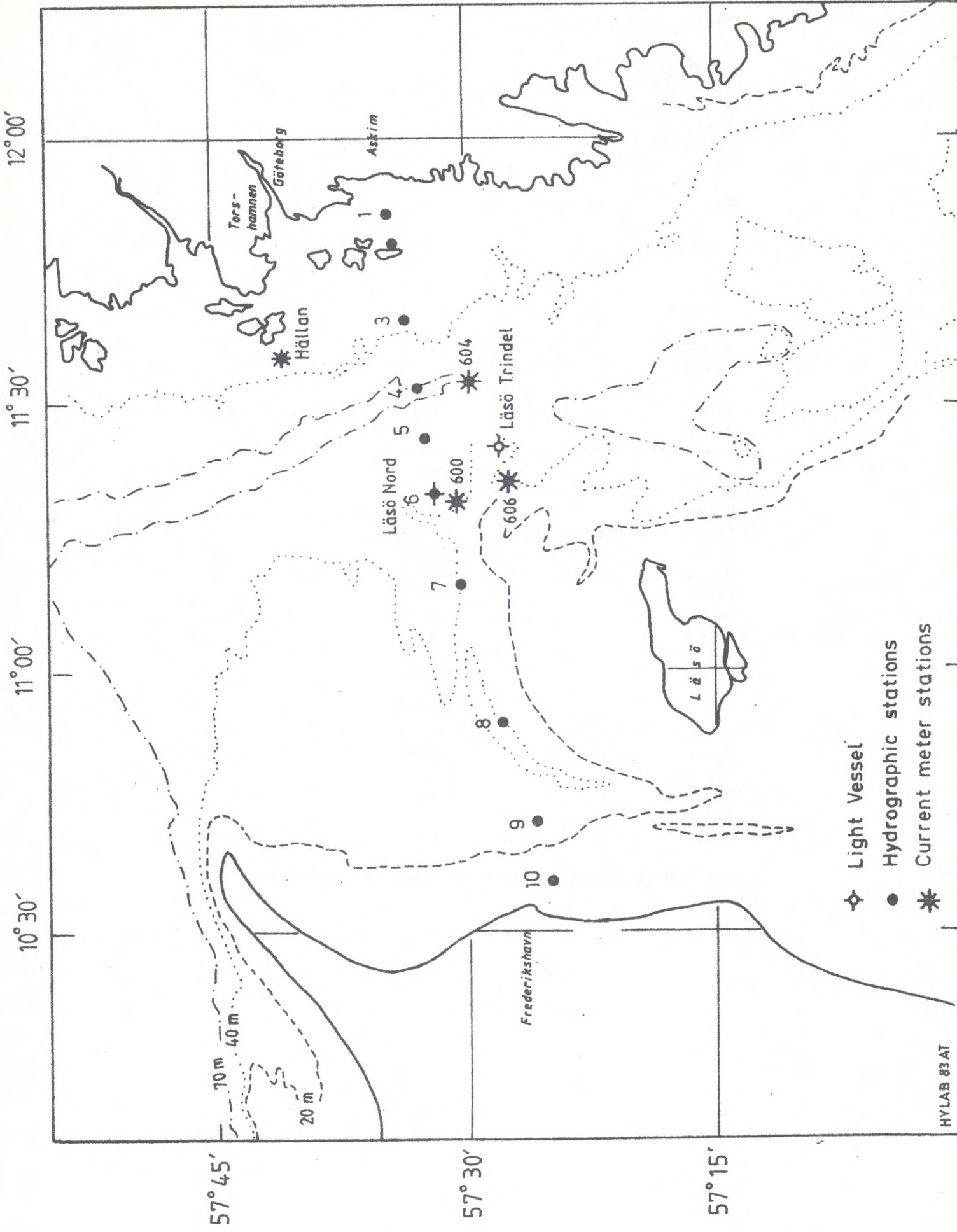
Volume: GFSECT
1600 BPI
NL-tape
ASCII
LRECL=80
BLKSIZE=2048

File 3: GF-transport-data

Parameter	No	Pos	Format
	Pos		on output
Exp no.	2	1- 2	I2
Blank	1	3- 3	
Stn no.	2	4- 5	I2
Blank	1	6- 6	
Depth	2	7- 8	I2
Blank	1	9- 9	
Area	6	10-15	I6 (x10** ⁻⁶ km2)
Blank	1	16-16	
Geostrophic current	7	17-23	F7.4
Blank	1	24-24	
Pendulum current Dir.	3	25-27	I3
Blank	1	28-28	
Pendulum current Vel.	3	29-31	I3
Blank	1	32-32	
Salinity	5	33-37	F5.2
Blank	1	38-38	
O2	4	39-42	F4.2
Blank	1	43-43	
TOTP-P	4	44-47	F4.2
Blank	1	48-48	
PO4	4	49-52	F4.2
Blank	1	53-53	
TOTN-N	2	54-55	I2
Blank	1	56-56	
NO3+NO2	4	57-60	F4.1
Blank	1	61-61	
TOC	4	62-65	F4.1
Blank	15	66-80	

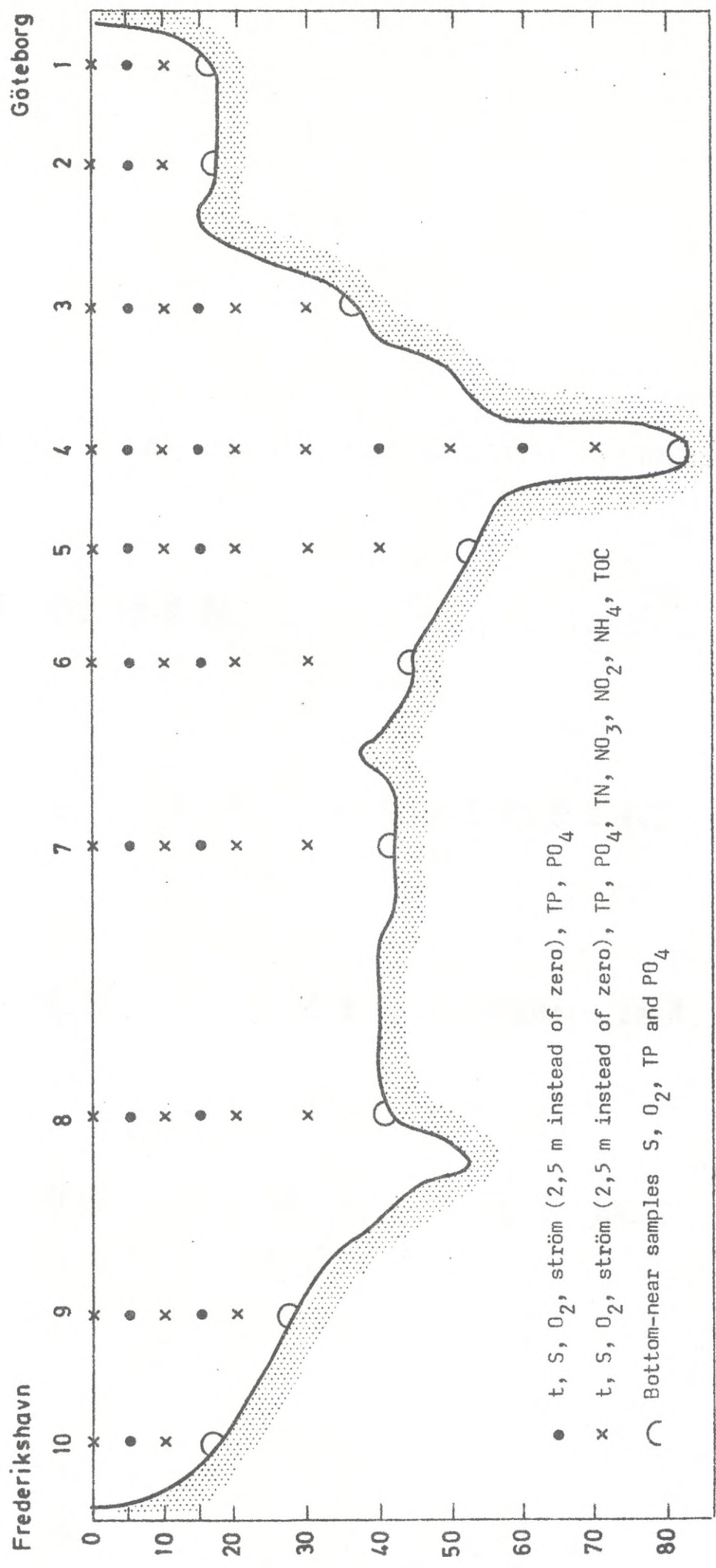
Missing values in primary data are interpolated.

FIG. 1

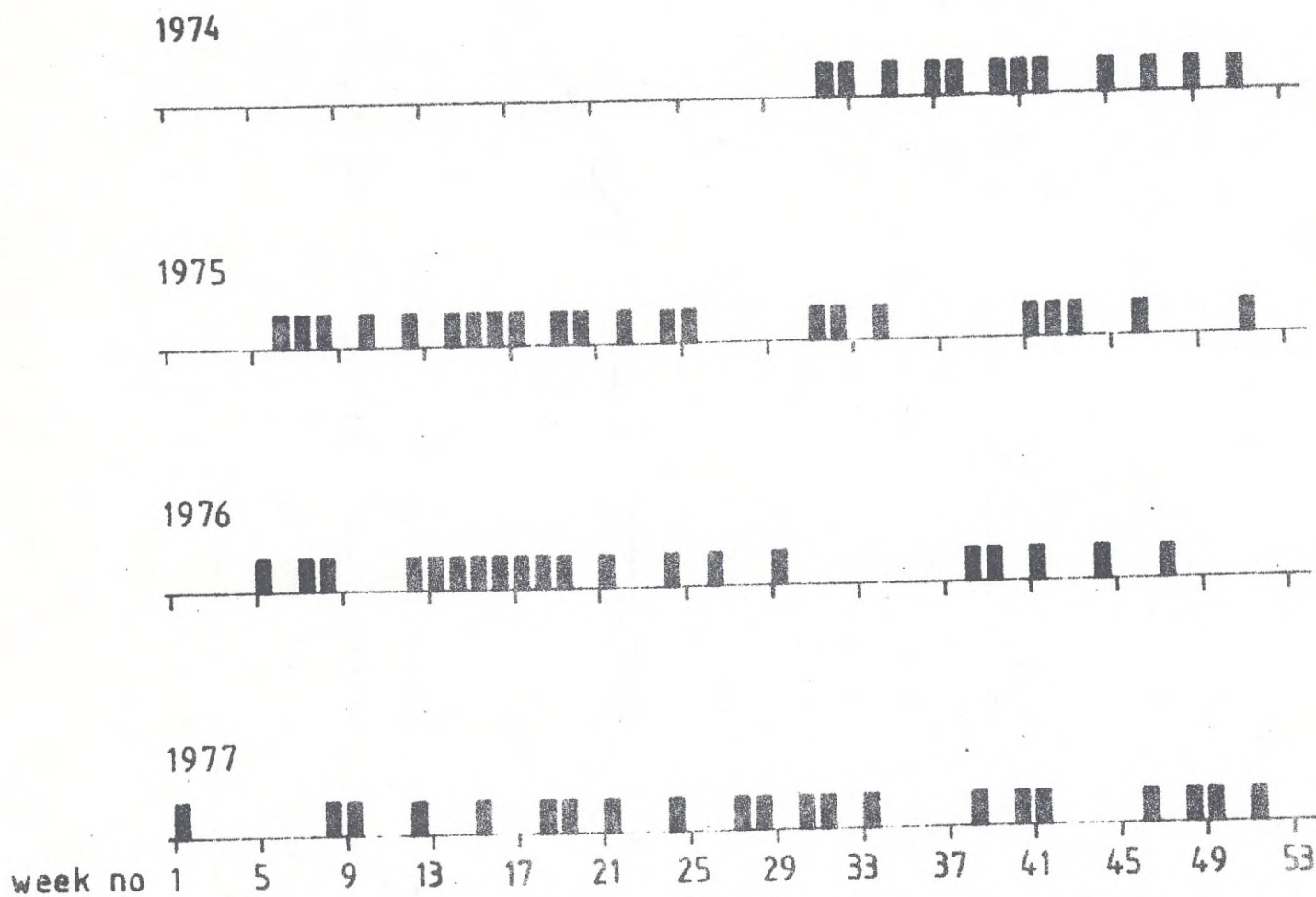


HYLAB 83 AT

FIG. 2



Expedition cruises with Ulla Rinman, Thetis and Argos



Obs. Theodons nr.	Fartyg		Serie nr		Stn. nr		år		mån		deg		kl.		BT nr		Betskiva	
	Ullariman		12 728		16 G F		22 04		24 11		26 28		17 10.15		32		37 378587	
Väder	Botten- djup	Språng- skikt	Vind- riktning	Vind- hast.	Lufttemp.	Moln. höjd	Våg- höjd	Titer	Salinometer		Siktdjup		Siktdjup		Siktdjup		Siktdjup	
bare fint	40 80	42 0	44 E	47 3	49 6	54 09	55 18	56 0204	63 20.8		67 6.0		67 6.0		67 6.0		67 6.0	

TOC fl.nr	Djup	Rem	Temp.	Hjälp- temp.	Syre fl.nr	Syre avläs.	Strömavläsning		Tot-P	Salinometer- avläsning	NO ₃ -N + NO ₂ -N	NO ₂ -N µgat/l	NH ₄ -N	TOC µgC/l
							Rikt.	Hast.						
1379	0	13	826	11	14	17	20 21 357	24	39	32	31	40	47	51
	5	12	950	87	368	—	17039070	2	33	75413	78882	93606	390	16
1380	10	11	1031	88	369	338	153	18	18	94188	94205	44087	326	15
	15	10	1046	93	371	341	166	15	15	94647	55095	374	15	15
1381	20	8	1059	90	372	333	166	18	18	95523	35071	285	15	15
	30	7	1065	91	373	316	163	18	18	96789	25054	240	13	13
	40	6	1054	88	374	338	137	12	12	97487	97988	240	13	13
1383	50	5	1099	88	375	312	100	11	11	97988	97988	240	13	13
	60	2	1118	90	376	327	179	11	11	97988	97988	240	13	13
1384	70	1	1139	91	377	329	6	11	11	97988	97988	240	13	13
	80				378	314	046080	080	080	97988	97988	240	13	13

Ann. PHYTO- AND ZOOPLANKTON HAULS. 41

SHIP: ULLA RINMAN
SWEDEN

HYDROGRAPHIC SECTION GÖTEBORG-FREDERIKSHAVN
STATION GF-04

LAT: 57 33.0 N
LONG: 11 31.5 E

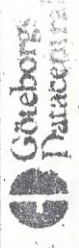
SERIAL NP: 72A

DATE: 77-11-17
TIME: 1015 GMT
WIND DIR: E
WIND VEL: 3 M/S
WAVE HEIGHT: 0-0.1 M
AIR TEMP: 6.0 C
MIXED LAYER DEPTH: 0 M
SECCHI DEPTH: 6.0 M
BT-NR: 378
BT-SLIDE: 587

DEPTH M	TEMP C	SAL O/00	SIGMAT	-OXYGEN- ML/L	DIR DEC	VEL CM/S	CURRENT			TOT-P CM/S	P04-P MICROGRAM/L	TOT-N	NO2-N	NO3-N	NH4-N	TOC MG C/L
							X CM/S	Y CM/S	Z CM/S							
0	8.13	25.544	19.89	6.76	97	28	-27	7	0.67	0.32	22	3.1	0.36	2.27	2.6	
5	9.43	26.852	20.73		2	22	-21	8	0.70	0.39						
10	10.21	32.500	24.99	6.14	96	6	6	0	0.71	0.65	18	5.3	0.93	3.90	1.6	
15	10.36	32.726	25.14	6.13	96	10	10	0	0.69	0.57						
20	10.52	32.733	25.12*	6.10	96	12	12	0	0.71	0.54	15	4.4	0.87	3.26	1.5	
30	10.57	32.905	25.24	6.03	95	0	0	0	0.88	0.68	18	5.5	0.95	3.74	1.5	
40	10.49	33.246	25.52	6.11	97	7	6	3	0.77	0.55						
50	10.89	33.741	25.84	5.97	96	11	5	10	0.69	0.58	12	3.5	0.71	2.85	1.5	
60	11.11	34.014	26.01	5.95	96	0	0	0	0.80	0.53						
70	11.28	34.210	26.13	5.90	96	0	0	0	0.67	0.55	11	2.5	0.54	2.40	1.3	
80		34.176		5.92					0.80	0.46						

COMMENTS: EXP 72. X,Y= VELOCITY COMPONENTS TOWARDS 162 AND 72 DEGREES RESP. SURFACE CURRENT MEASURED AT 2.5 M.
 ** UNSTABLE DENSITY STRATIFICATION.
 PHYTO- AND ZOOPLANKTON HAULS.

FIG. 5



TRANSPORT COMPUTATIONS (GELATIN PENDULUMS)

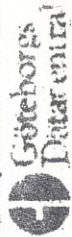
EXP 72 77-11-17

WATER (M**3/S): INWARDS: 32250 TOT-N (TONS/YEAR): INWARDS: 221546
 OUTWARDS: 157813 OUTWARDS: 1224934
 DIFFERENCE: -125562 DIFFERENCE: -1003388

SALT (TONS/YEAR): INWARDS: 33253795756 NO3-N+ (TONS/YEAR): INWARDS: 58154
 OUTWARDS: 156221045652 OUTWARDS: 234645
 DIFFERENCE: -122967249896 DIFFERENCE: -176492

TOT-P (TONS/YEAR): INWARDS: 25127 TOC (TONS/YEAR): INWARDS: 1674409
 OUTWARDS: 135684 OUTWARDS: 9563982
 DIFFERENCE: -110556 DIFFERENCE: -7889572

PO4-P (TONS/YEAR): INWARDS: 17931
 OUTWARDS: 94440
 DIFFERENCE: -76509



TRANSPORT COMPUTATIONS

(GELATIN PENDULUMS)

EXP 72

MATER (M**3/S):

-3056	-5365	-9699	-993	667	-917	-7219	-4278	-417
-2674	-4650	-6126	0	0	1834	-5615	-5056	-417
-3704	-6676	-6806	0	0	917	2139	-4667	1157
	-7153	-3403	662	889	917	3565	-2889	
	-11445	-6126	-3973	-1333	-3209	6417	-1875	
		-14293	0	-18335	-4278	0	0	
					4584	4278		
						2940		
						0		
						0		

INWARDS: 32250
 OUTWARDS: 157813
 DIFFERENCE: -125562

