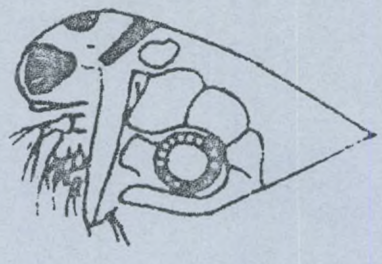

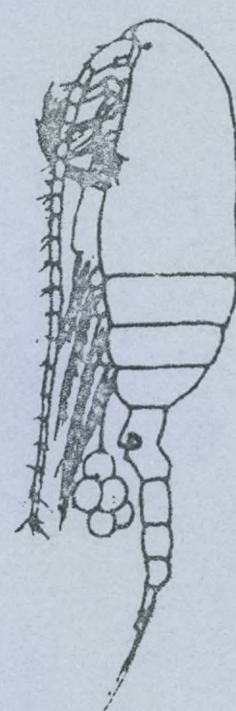

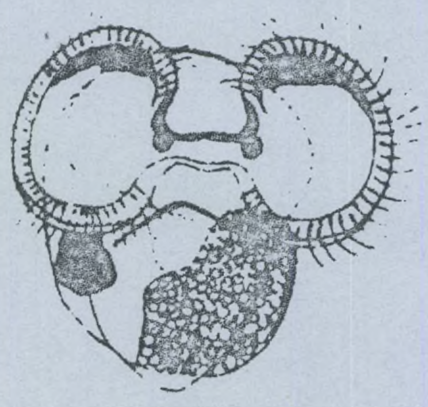

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Seasonal and vertical distribution of zooplankton off the coast in the Baltic proper in 1970

by

Hans Ackefors & Lars Hernroth

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CONTENTS

INTRODUCTION

Joint biological and hydrographical investigations have been carried out in the Baltic proper by our institute for many years. Since 1967 zooplankton samples have been taken in connection with the hydrographical investigations in the Baltic proper. In January, 1969, "The BALTIC YEAR 1969-1970" started. The Baltic Oceanographers had agreed to start an international cooperation and it was decided that biological investigations should take place in connection with the hydrographical studies. Both phytoplankton and zooplankton samples have therefore been taken since 1969. The results of the zooplankton investigations from 1968 year studies as well as from the year of 1969 have been published earlier (ACKEFORS & HERNROTH 1970a,b). The results from 1970 are now available in this paper. The results are published as charts, diagrams and preliminary data.

A new stagnation period began in the Baltic proper in 1967. Hydrogen sulphide was formed in the Gotland basin towards the end of 1967 (FONSELIUS 1970). In 1968 hydrogen sulphide appeared in the deep water of the Bornholm basin (fig.1), the eastern Gotland basin (MEG), the northern part of the Gotland Sea (NEG) and the western Gotland basin (MWG). A new inflow of oxygen-rich water started to flow in over the Sill of Darss in November 1968. In January 1969 the stagnant water of the Bornholm basin was replaced by oxygen-rich water. In November the hydrogen sulphide had disappeared from the Gotland basins. The bottom water saturated with hydrogen sulphide was forced towards the north and in June parts of the bottom water in the Gulf of Finland was covered with hydrogen sulphide. In the Landsort Deep the hydrogen sulphide water was present in the bottom water during the whole year of 1969 and was still there in January 1970 (see table 2). In the bottom water saturated with hydrogen sulphide nutrient salts were accumulated until the stagnation period was broken in 1969. The turn-over of this water may probably have effected the primary production in the Baltic proper in 1970. One of the actual questions in this zooplankton investigation is to investigate, if the secondary production of zooplankton has been influenced by the new hydrographical situation, which appeared in 1969.

ACKNOWLEDGEMENTS

This investigation was supported by grants from "Statens Naturvårdsverk", which is greatfully acknowledged. The authors are greatly indebted to Dr. Stig Fonselius and Mr. Sven Engström, who have been responsible for the work on board the R/V "Skagerak" when the samples were taken. We also want to express our thanks to Miss Birgitta Bengtsson and Miss Solveig Åkermo for their help with the illustrations.

MATERIAL AND METHODS

Zooplankton samples have been taken at seven plankton stations in the Baltic proper; S 12, S 24, 8 A, S 41, F 81, F 78 and F 72 (fig.1). The samples were taken with a Nansen net with a diameter of 50 cm and a mesh size of 0.16 mm. The plankton stations were visited in January, May-June, August-September and October. The actual hour of the day when the samples were taken, is evident from the legends. The zooplankton samples were taken at the intervals 25-0, 50-25, 100-50, 150-100, 200-150 and 240-200 m. Due to weather conditions and in some cases for other reasons the samples were sometimes taken at intervals, different from those above.
The plankton samples were subsampled with the modified whirling apparatus constructed by KOTT (1953:87). The samples were coloured before the analyses, according to the method described by ACKEFORS & HERNROTH (1970 a).
In the diagrams, showing the vertical distribution of the zooplankton, no finds of specimens are indicated by hatched lines and solid lines indicate occasional occurrence. In other cases the occurrence is reproduced according to the scale in each diagram.
The hydrographical data have been analysed by the Hydrographical Department, Institute of Marine Research and they have been partly published (ANON., 1971).

RESULTS

HYDROGRAPHY

The hydrographical data from 1970 are partly published as hydrographical tables by the Hydrographical Department, Institute of Marine Research, Lysekil (ANON., 1971). In this context all data about temperature, salinity and oxygen concentration at the plankton stations visited are published as tables (tables 2-5).
In 1970 there were still areas in the Baltic proper, where the bottom water had no oxygen content and hydrogen sulphide was found in the water, although the inflow of oxygen-rich bottom water started at the end of 1968. In 1969 the bottom water in the Bornholm basin and in the central Gotland basin was renewed. The hydrogen sulphide disappeared from those areas, as mentioned in the introduction. During the year of 1970 no hydrogen sulphide was formed in the southern Baltic proper in the Bornholm basin but the oxygen concentration deterioated in the basin from 2,76 ml O_2/l to 0,39 ml O_2/l. In the Gotland Deep the decrease was from 1,07 to 0,22 ml O_2/l. In the northern Baltic proper there was still hydrogen sulphide in the Landsort Deep in January from 300 m depth to the bottom. At station F 72 hydrogen sulphide was evident in May-June and September (probably also in January, when no investigation was made at that station). At station S 41 the bottom water had a low content of oxygen in January and the conditions deterioated during spring, so that oxygen-free conditions occurred during the rest of 1970 with amounts of hydrogen sulphide in the bottom water.
The surface temperature was about 1-3.5°C during the sampling period in January. Rather homogenous conditions appeared down to the halocline. Below this discontinuity layer the temperature was higher than 4.5°C. In May-June the surface temperature was about 5-7°C except at station F 81 where the surface temperature was about 10°C. In September the temperature of the surface water had risen to about 15-17°C. The thermocline was situated at different levels at different stations. At station F 72 in the north the thermocline appeared below 15 m level and at station 8 A in the south below 30 m level. Below the thermocline the temperature was in the range 3-4°C. In October the surface temperature had sunk to 8-12°C.

ZOOPLANKTON

Cnidaria

Cyanea capillata (L.)

In the Gotland Deep (F 81) C. capillata was found in January. A specimen of a size 6 mm was taken in a net haul between 200 and 150 m depth. The salinity at that interval was about 12 $^{o}/oo$ and the temperature about 5 ^{o}C. In September on two different occasions one specimen of 5 mm size and one of 25 mm size were taken at station 8 A in the southern Gotland Sea in net hauls between 90 and 50 m. The salinity was about 12 $^{o}/oo$ at 90 m depth and 8 $^{o}/oo$ at 50 m depth, and the temperature was below 4.5 ^{o}C.

Ctenophora

Pleurobrachia pileus (O.F. MÜLLER)

Cydippid larvae were found in May at stations S 24 and 8 A. They were most abundant in a net haul between 50 and 25 m depth at station S 24. At that station 80 specimens were taken.

Rotatoria

Keratella quadrata quadrata (MUELLER)

Usually very few specimens are found of the genus Keratella off the coast in the Baltic proper. In September, however, 200 specimens of K.qu. quadrata were found in a net haul between 25 m depth and the surface in the Landsort Deep (F 78). At the same time single specimens were taken at stations F 72 and S 41 and later in October also at station S 24. At station F 78 the temperature from 15 m to the surface was about 16 ^{o}C and the salinity was about 6 $^{o}/oo$.

Keratella quadrata platei (JÄGERSKIÖLD)

One specimen was taken in September at station F 78 in a net haul from 25 m to the surface.

Keratella cruciformis eichwaldi (LEVANDER)

Single specimens were taken in September at station F 78 in a net haul from 50 m to 25 m depth.

Synchaeta spp.

We have not distinguished between the six different species in the Baltic proper: S. baltica, S. curvata, S. fennica, S. gyrina, S. monopus and S. triophthalma (BERZINS 1960).
The species were very abundant in June at station F 81, especially in the net haul from 25 m to the surface (fig.3).At the same time Synchaeta spp. were less frequent at the other stations. In October the species were also most frequent at station F 78 but less frequent than in June (fig.5). In January (fig.2) the species occurred very sparsely at station S 12 and only single specimens were found at three other stations. In August-September (fig.4) the species occurred sparsely in the northern Baltic proper.

Polychaeta

Pygospio elegans CLAPARÈDE

Larvae occurred at stations S 12 and S 24 in the Arkona and the Bornholm Sea from June to October (figs.6-9). Most of the specimens were found in June when the bottom temperature was about 1°C at station S 12 and about 5°C at station S 24. The corresponding salinity and oxygen concentrations were 15.21‰ resp. 16.72‰ and 5.57 ml O_2/l resp. 1.68 ml O_2/l.

Harmothoe sarsi KINBERG

Larvae were found on all sampling occasions (figs.6-9). Most of them were found in deep net hauls below 50 m depth from May to September. In January (fig.6) not less than 350 larvae were taken at station 8 A. They were found in all of the three net hauls from the bottom to the surface (90-50 m, 50-25 m and 25-0 m).

Cladocera

Bosmina coregoni maritima (P.E.MÜLLER)

Single specimens appeared at the end of May and in the beginning of June, when the surface temperature was in the range 5-10°C (fig.11). Later at the end of August and in the beginnig of September B.cor.maritima was extremely abundant in the southern Baltic proper,where the surface temperature was above 15°C (fig.12). In October the abundance had decreased to about 1/10 at the stations S 24 and 8 A (fig.13). The surface temperature was then about 11-12°C. In the northern Baltic proper the abundance was rather similar from August to October (figs.12-13). The population density was rather low on the two sampling occasions. Most individuals were always taken in the net hauls from 25 m to the surface, but in September not less than 20 000 individuals were taken in a net haul below 50 m depth.

Podon intermedius LILLJEBORG

The distribution of this species is evident from figs.14-17. In August-September *P.intermedius* appeared in the net hauls. The species was evenly distributed over the whole Baltic proper and most individuals were found in the net hauls between 25 m and the surface. In October only single specimens appeared at all stations except at station S 24, where 150 individuals were found in the net hauls 50-25 m and 25 m to the surface.

Podon polyphemoides LEUCKART

This species is not frequent off the coast (ACKEFORS 1969a). Only single specimens occurred in 1970 (figs.18-21). Normally this species is very abundant near the coast when the surface water is in the range 10-15°C, which usually occurs in July or in the beginning of August (cf.ACKEFORS 1969,1971). As the sampling was performed in May-June and August-September, when the surface water was in the range 7-10°C resp. 15-17°C, the species may have been more frequent in the interval between these two sampling occasions.

Podon leuckarti G.O. SARS

This species appears only in the southern Baltic proper from April to July (cf.ACKEFORS 1969a). In 1970 the species was found in May-June in a low abundance (figs.22-25). Single specimens occurred so far to the north as in the Gotland Deep (fig.23). The occurrence is thus in accordance with earlier experience.

Evadne nordmanni LOVÉN

This species is an eurytherm cladoceran. It occurred from May-June to October when the last sampling occasion took place (figs.26-29). It was most frequent at station F 81 in May-June (fig.27). This sample was taken later (June, 8th) than the other samples and the surface temperature had risen to about 10°C. At the other stations the temperature varied from 5-7°C when sampling occurred. On the other occasions in August-September and October (figs.28-29) it was rather evenly distributed over the whole Baltic proper. September 1st, one specimen was taken which was very like the species *E.spinifera*.

Copepoda

Calanus finmarchicus (GUNNERUS)

In October single specimens of *C.finmarchicus* were found at station S 12 in a net haul from 45 m to 25 m.

Limnocalanus grimaldii (DE GUERNE)
Limnocalanus macrurus SARS

Limnocalanus grimaldii and L. macrurus are not treated as separate species by some authors (PEJLER 1965, HOLMQUIST 1970).
In January single specimens of stage C.IV-V were found as far to the south in the Baltic proper as at station 8 A and S 41 in net hauls below 50 m depth. In June single specimens were taken only at the most northern plankton stations F 72 and F 78 in different net hauls from 200 m depth to the surface. Nauplii, stages C.I-III and C.IV-V occurred. In September 50 specimens of stage C.I-III appeared in a net haul between 50-25 m at station F 72. Later in October adult individuals as well as stage C.IV-V were found at the same station. On that occasion single specimens of stages C.I-III and C.IV-V were also taken at station F 78 and F 81.

Acartia bifilosa GIESBRECHT and A.longiremis LILLJEBORG

The nauplii and the copepodite stages except stage C.VI were put together for the two species A.bifilosa and A.longiremis. The horisontal distribution of the two species above and below 50 m level is evident from figs.30-33 and the vertical distribution of the different stages appears from figs.78-89. Figs.66-77 describe the vertical distribution of Acartia spp. and other common copepods in the Baltic proper.
From figs.30-33 it is evident that the species were more abundant above than below 50 m depth. There were in most cases a greater accumulation of the species in the middle and northern part of the Gotland Sea, except in January when the species were evenly distributed over the whole Baltic proper.
The vertical distribution shows that the species were most common in the net hauls from 25 m depth to the surface (figs.66-77 and figs.78-89). The vertical distribution of the different developmental stages did not show any real difference except for the distribution of adult A.longiremis females. In some cases they were more abundant than the males or the adults of A.bifilosa below 25 or 50 m depth (figs.85-88). The great accumulation of nauplii and stages C.I-III in October (figs.88-89) indicated that one or both species spawned in September-October.

Eurytemora sp.

The horisontal distribution above and below 50 m level is evident from figs.34-37 and the vertical distribution from figs.66-77. The species was most common in August-October. The greatest accumulation was found in the northern Baltic proper, at stations F 78 and F 72.

Centropages hamatus (LILLJEBORG)

This species was rather evenly distributed over the whole Baltic proper (figs.38-41). It was most common in August-October (figs.40-41). In January and October (figs.66-68 and figs.75-77) the vertical distribution above 25 m and below 25 m was rather even. In August-September, however, most of the individuals were accumulated above the 25 m level (figs.72-74). In this case all the net hauls were taken at night. At two other stations, however, F 72 in the northern Baltic proper and S 12 in the southern Baltic proper the net hauls were taken at daytime. At F 72 there were four times more individuals between 25 m and 50 m depth than above 25 m depth. At station S 12 there were about twice as many individuals in the net haul between 25 m and the surface as between 45 m and 25 m depth. At station F 72 and S 12 the surface salinity was 6.5 ^{0}/oo resp. 8.1 ^{0}/oo and the temperature was about 15 ^{0}C at both stations. This indicates that this euryhaline copepod occurs in lower levels in the northern Baltic proper than in the southern part of the sea. The very small salinity difference seems to have a great importance when the variation is in the interval 6-8 ^{0}/oo, which has been reported earlier by ACKEFORS (1969a). In the Bothnian Sea, where the surface salinity is less than 6 ^{0}/oo, the species occurs only occasionally.

Pseudocalanus minutus elongatus (BOECK)

The horisontal distribution above and below 50 m depth shows that this species was also very significant below 50 m depth (figs.42-45). In some cases it was more abundant below 50 m level than above (see also figs.66-77). The vertical distribution of the different developmental stages is evident in figs.90-101. In most cases the relative frequency of the stages C.I-III and the nauplii was higher above 50 m level than below that level in comparison with C.IV-V. The greatest accumulation of nauplii and C.I-III was found in May-June, which indicates that a spawning period occurred at the end of April or beginning of May. In October and January the stages IV-V were most common.

Temora longicornis P.MÜLLER

The horisontal distribution is evident from figs.46-49. The species was most abundant at the end of summer and in the autumn. In January it occurred evenly over the whole Baltic proper but it was not frequent. In May-June it occurred sparsely. The vertical distribution is evident in figs.66-77 and in figs.102-113. In January the vertical distribution did not seem to be different in day and night. In September and October there was, however, a great difference between net hauls taken at night and in daytime. The greatest accumulation was always between 25 m and the surface at night. In daytime the greatest accumulation occurred either in the net haul between 25 m and the surface or between 50 m and 25 m depth or between 100-50 m depth. (Comparisons have been made for all stations, even those which are not reproduced in special diagrams.) In winter the stages C.IV-V were abundant. In August-September all stages except the nauplii were abundant, and in October all stages inclusive the nauplii.

Oithona similis CLAUS

This species occurred at those stations situated along the line, where the salt bottom water flows into the Baltic proper, from S 12-S 24-8 A to F 81. The species is most frequent in the deep net hauls below 50 m depth. In the Gotland Deep (F 81) e.g. the abundance in September was the following: 100-50 m 50 ind., 200 m-100 m 500 ind.; in October 100-50 m 50 ind., 235-100 m 1400 ind. that means that the greatest accumulation occurred below 100 m depth where the salinity was more than 11 °/oo.

Cyclops sp.

Single specimens of Cyclops sp. were found at the most northern plankton stations, F 72 and F 78, in the investigated area, in September and October.

Harpacticoida

Single specimens were found at station 8 A, F 81 and F 72 in January, June and September. The finds at station 8 A in a net haul between 95-50 m and at station F 81 in a net haul between 230 and 150 m were defined as Ectinosoma curticorne.

Parasites appeared on all the species of copepods in the northern and middle part of the Baltic proper. On single occasions the parasites were very common and about 10 °/o of the copepod populations were infected. In the southern part, however, at stations S 12, S 24 and 8 A, not a single copepod was infected by a parasite.

Mysidaceae

Mysis mixta LILLJEBORG

Single specimens were found in October at station F 81 in net hauls from 100-50 m and from 235-100 m.

Amphipoda

Hyperia galba MONTAGY

One specimen was found at station F 81 in January in a net haul from 200-150 m. In the same month single specimens of not identified amphipods were found at station S 12.

Gastropoda

The Gastropod larvae were found at 4 stations in September from station S 12 in the south to station F 78 in the north. The greatest abundance was found at S 12, where 250 ind. appeared in a net haul between 25 m and the surface.

Lamellibranchiata

Mytilus edulis (L.)

The horisontal distribution of larvae above and below 50 m level is evident from figs.54-57. They were most abundant in August-September and October.

Macoma baltica (L.) Cardium lamarcki REEVE Mya arenaria (L.)

The three species were put together when the samples were analysed. The distribution is evident from figs.58-61.

Chaetognatha

Sagitta elegans baltica RITTER-ZAHONY

This species was only found at stations S 12, S 24, 8 A and F 81 and most of the specimens in the deep net hauls. The greatest accumulation was found at station S 24 where 30 to 200 specimens were taken in the net haul from 85 m to 50 m, on all sampling occasions. But also in the net haul above 50 m level 50 specimens were taken in October. The finds so far to the north as at station F 81 were taken in net hauls below 150 m depth where the salinity is more than 12°/oo.

Copelata

Oikopleura dioica FOL

At station S 12 50 specimens were found in September and 250 specimens in October in the net hauls between 45 and 25 m depth.

Fritillaria borealis LOHM

The greatest abundance of this species appeared in May-June, which is evident from figs.62-65.

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Legends

Fig.1. Chart of the Baltic proper.

Figs.2-65. During 1970 four expeditions to the Baltic proper were made. On three of these occations all seven of the plankton stations were visited. In January station F72 was left out. The most common species and their seasonal distribution are evident in figs.2-65. Winter (Dec.-Febr.) is reproduced as white charts, spring (March-May) as yellow charts, summer (June-August) as green charts and autumn (Sept.-Nov.) as blue charts. The abundance appears from the size of the circles. Open circles indicate the two hauls 25-0 m and 50-25 m together and black circles all the deep net hauls together.

	Jan.	May-June	Aug.-Sept.	Oct.
Synchaeta spp.	2	3	4	5
Harmothoe sarsi Pygospio elegans	6	7	8	9
Bosmina coregoni maritima	10	11	12	13
Podon intermedius	14	15	16	17
Podon polyphemoides	18	19	20	21
Podon leuckarti	22	23	24	25
Evadne nordmanni	26	27	28	29
Acartia bifilosa Acartia longiremis	30	31	32	33
Eurytemora sp.	34	35	36	37
Centropages hamatus	38	39	40	41
Pseudocalanus minutus elongatus	42	43	44	45
Temora longicornis	46	47	48	49
Oithona similis	50	51	52	53
Mytilus edulis	54	55	56	57
Macoma baltica Cardium lamarcki Mya arenaria	58	59	60	61
Fritillaria borealis	62	63	64	65

Figs.66-77. Vertical distribution of different copepods.

Fig.66.	Station	5A in	January	0430-0440	local	time
" 67.	"	15A "	"	0655-0855	"	"
" 68.	"	31A "	"	1130-1225	"	"
" 69.	"	5A "	May	1755-1830	"	"
" 70.	"	15A "	June	1250-1345	"	"
" 71.	"	31A "	"	1010-1100	"	"
" 72.	"	5A "	September	0050-0105	"	"
" 73.	"	15A "	"	0350-0425	"	"
" 74.	"	31A "	"	0010-0045	"	"
" 75.	"	5A "	October	0240-0250	"	"
" 76	"	15A "	"	1500-1520	"	"
" 77.	"	31A "	"	1855-1905	"	"

Figs.78-89. Vertical distribution of different stages of Acartia bifilosa and A. longiremis.

Fig.78.	Station	5A in	January	0430-0440	local	time
" 79.	"	15A "	"	0655-0855	"	"
" 80.	"	31A "	"	1130-1225	"	"
" 81.	"	5A "	May	1755-1830	"	"
" 82.	"	15A "	June	1250-1345	"	"
" 83.	"	31A "	"	1010-1100	"	"
" 84.	"	5A "	September	0050-0105	"	"
" 85.	"	15A "	"	0350-0425	"	"
" 86.	"	31A "	"	0010-0045	"	"
" 87.	"	5A "	October	0240-0250	"	"
" 88.	"	15A "	"	1500-1520	"	"
" 89.	"	31A "	"	1855-1905	"	"

Figs.90-101. Vertical distribution of different stages of Pseudocalanus m. elongatus.

Fig.90.	Station	5A in	January	0430-0440	local	time
" 91.	"	15A "	"	0655-0855	"	"
" 92.	"	31A "	"	1130-1225	"	"
" 93.	"	5A "	May	1755-1830	"	"
" 94.	"	15A "	June	1250-1345	"	"
" 95.	"	31A "	"	1010-1100	"	"
" 96.	"	5A "	September	0050-0105	"	"
" 97.	"	15A "	"	0350-0425	"	"
" 98.	"	31A "	"	0010-0045	"	"

cont.)

Fig. 99.	Station	5A	in	October	0240–0250	local	time
" 100.	"	15A	"	"	1500–1520	"	"
" 101.	"	31A	"	"	1855–1905	"	"

Verticak distribution

Figs.102-113. Vertical distribution of different stages of *Temora longicornis*.

Fig.102.	Station	5A	in	January	0430–0440	local	time
" 103.	"	15A	"	"	0655–0855	"	"
" 104.	"	31A	"	"	1130–1225	"	"
" 105.	"	5A	"	May	1755–1830	"	"
" 106.	"	15A	"	June	1250–1345	"	"
" 107.	"	31A	"	"	1010–1100	"	"
" 108.	"	5A	"	September	0050–0105	"	"
" 109.	"	15A	"	"	0350–0425	"	"
" 110.	"	31A	"	"	0010–0045	"	"
" 111.	"	5A	"	October	0240–0250	"	"
" 112.	"	15A	"	"	1500–1520	"	"
" 113.	"	31A	"	"	1855–1905	"	"

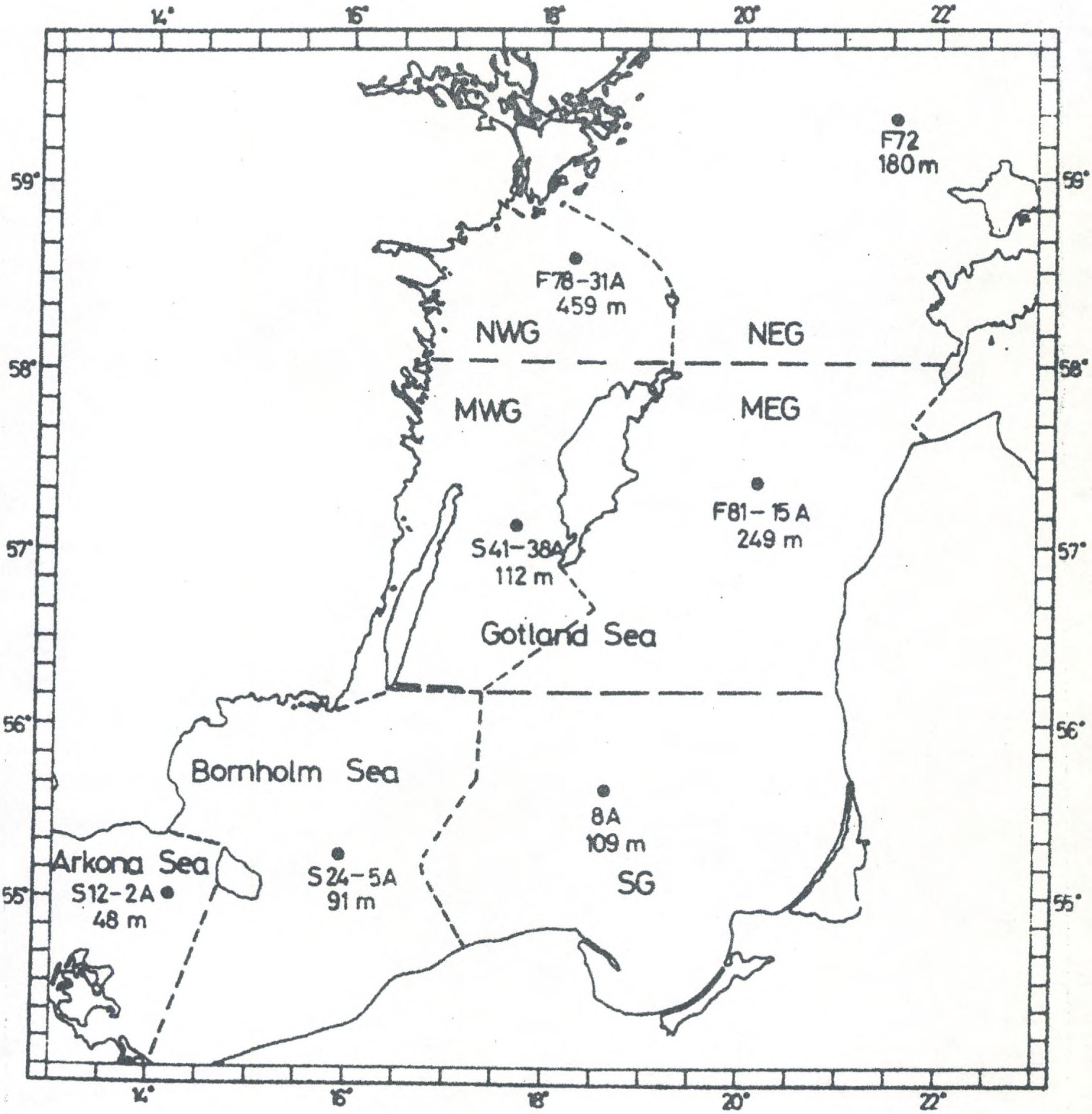
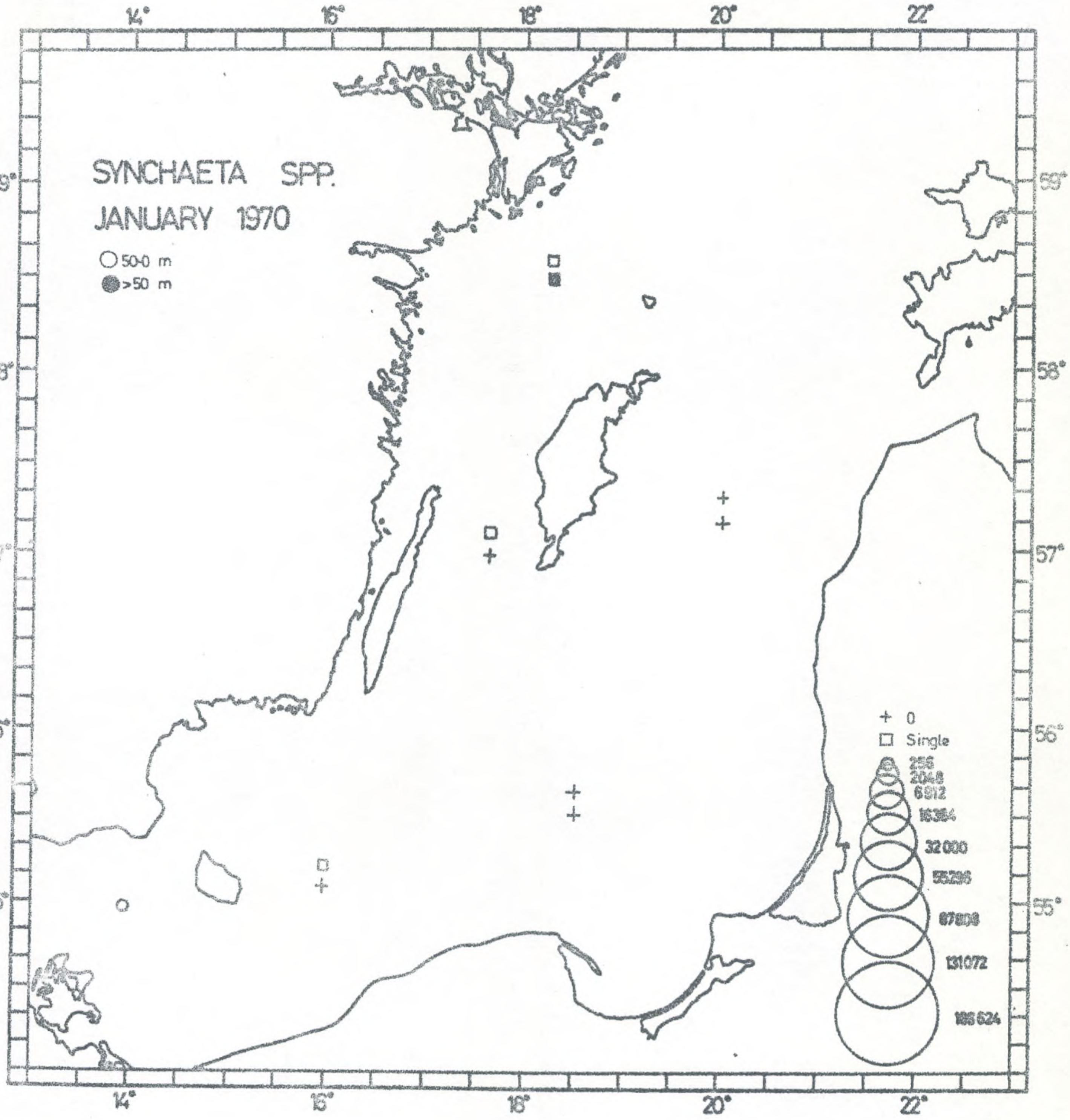


Fig 1. Chart of the Baltic proper and the three subareas, the Arkona Sea, the Bornholm Sea and the Gotland Sea according to WATTENBERG(1949). The Gotland Sea is devided into an eastern and western part by WATTENBERG. According to ACKEFORS(1969a) the Gotland Sea may be devided into five subareas; the southern(SG), the middle eastern and western(MEG and MWG) and the north-eastern and north-western(NEG and NWG). The seven plankton stations are evident from the chart, in some cases with both old and new symbols as well as the depths.

Fig 2.



SYNCHAETA SPP.
JANUARY 1970
50-0 m
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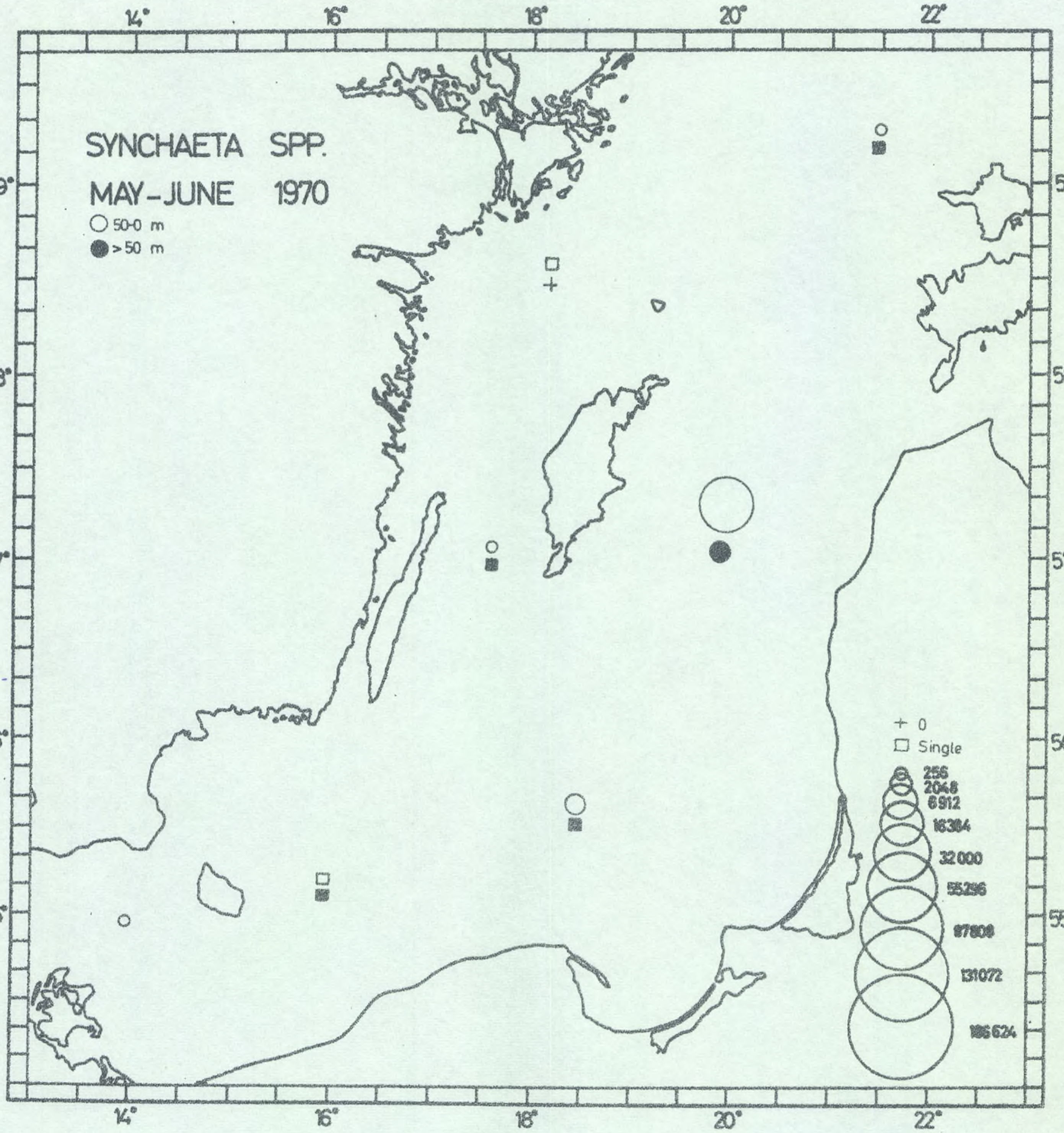
Fig 3.



SYNCHAETA SPP.
MAY-JUNE 1970
50-0 m
> 50 m
+ 0
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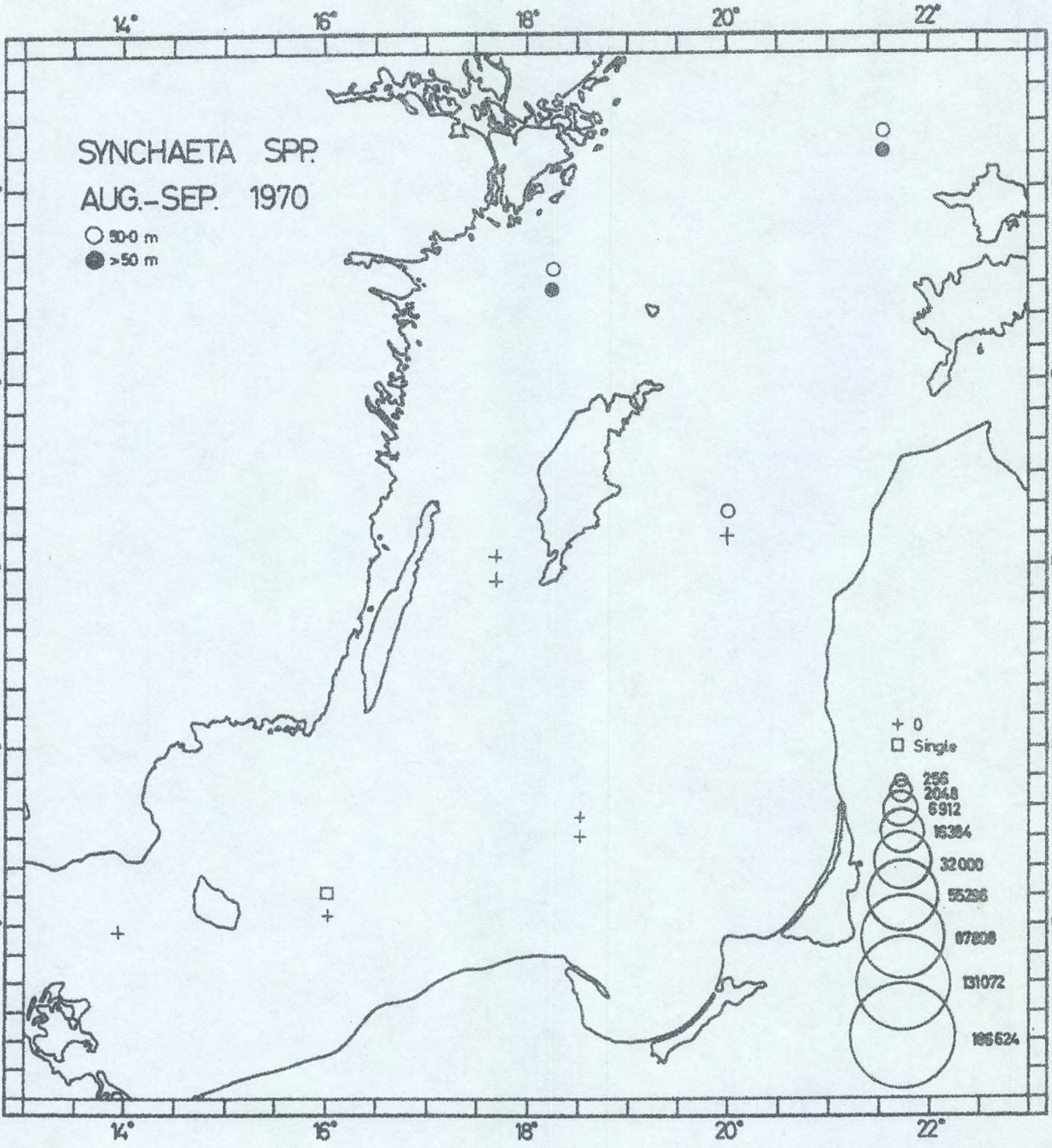
Fig 4.



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AUG.-SEP. 1970
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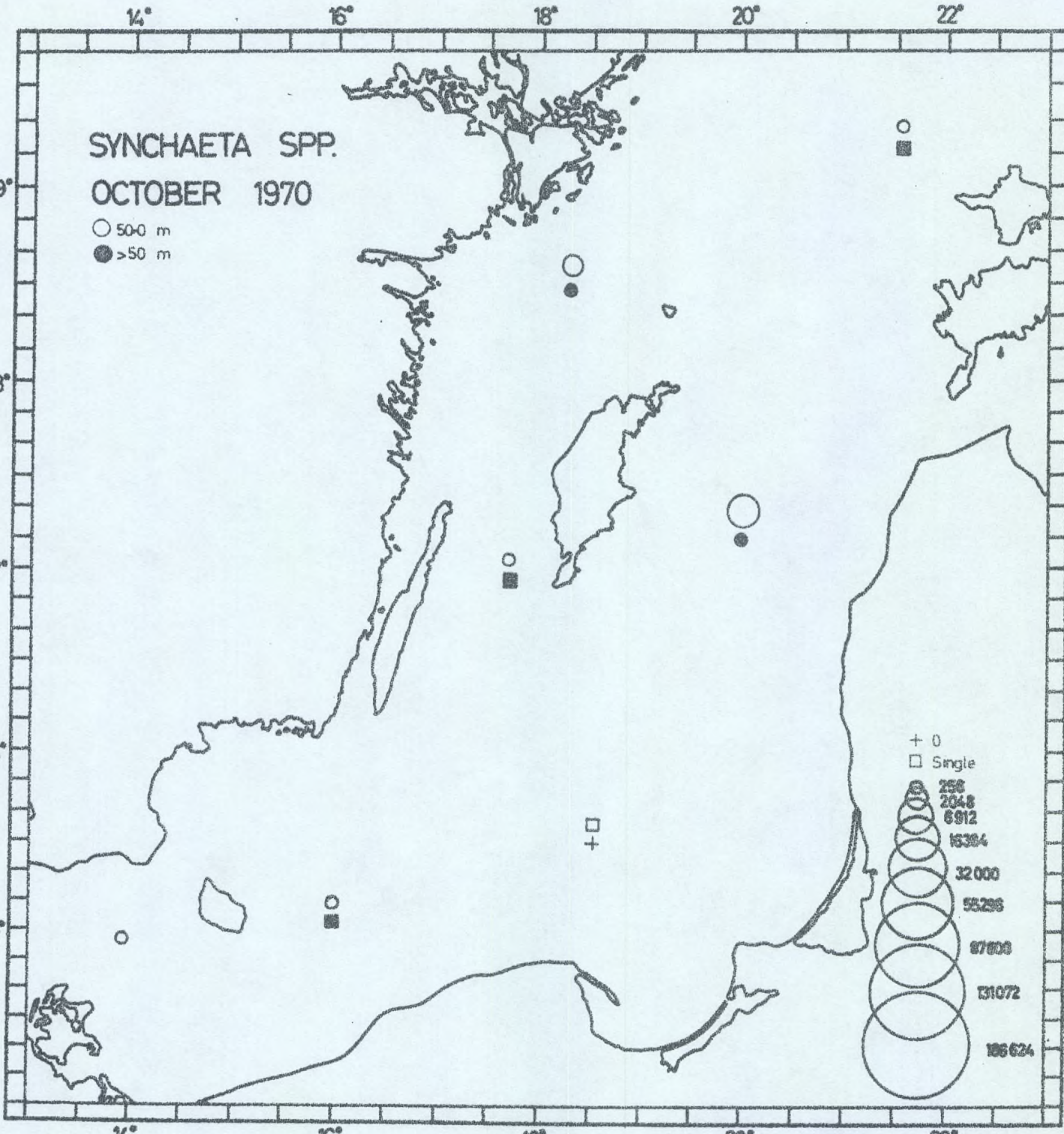
Fig 5.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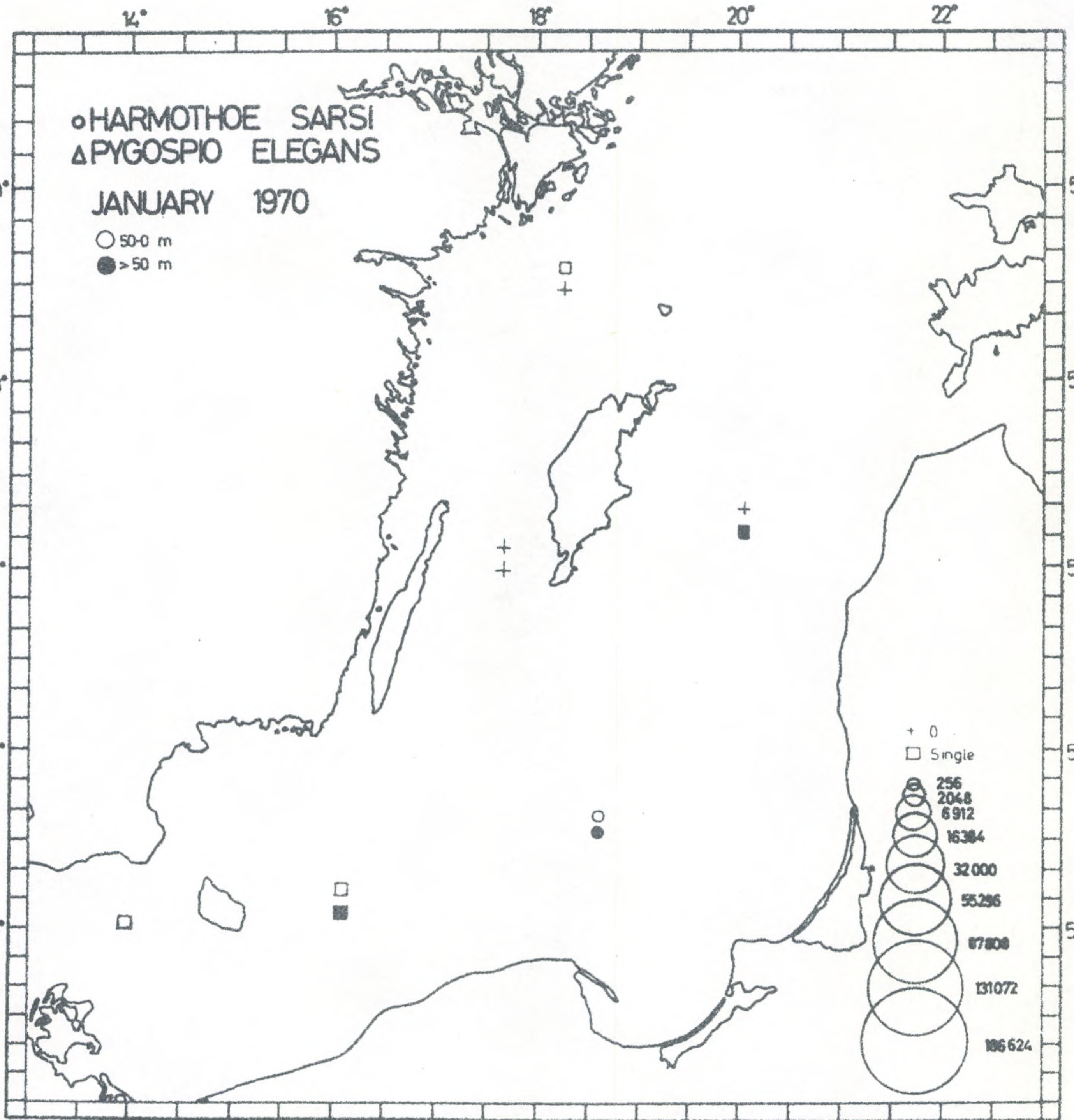

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o HARMOTHOE SARSI
Δ PYGOSPIO ELEGANS
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○ 50-0 m
● > 50 m
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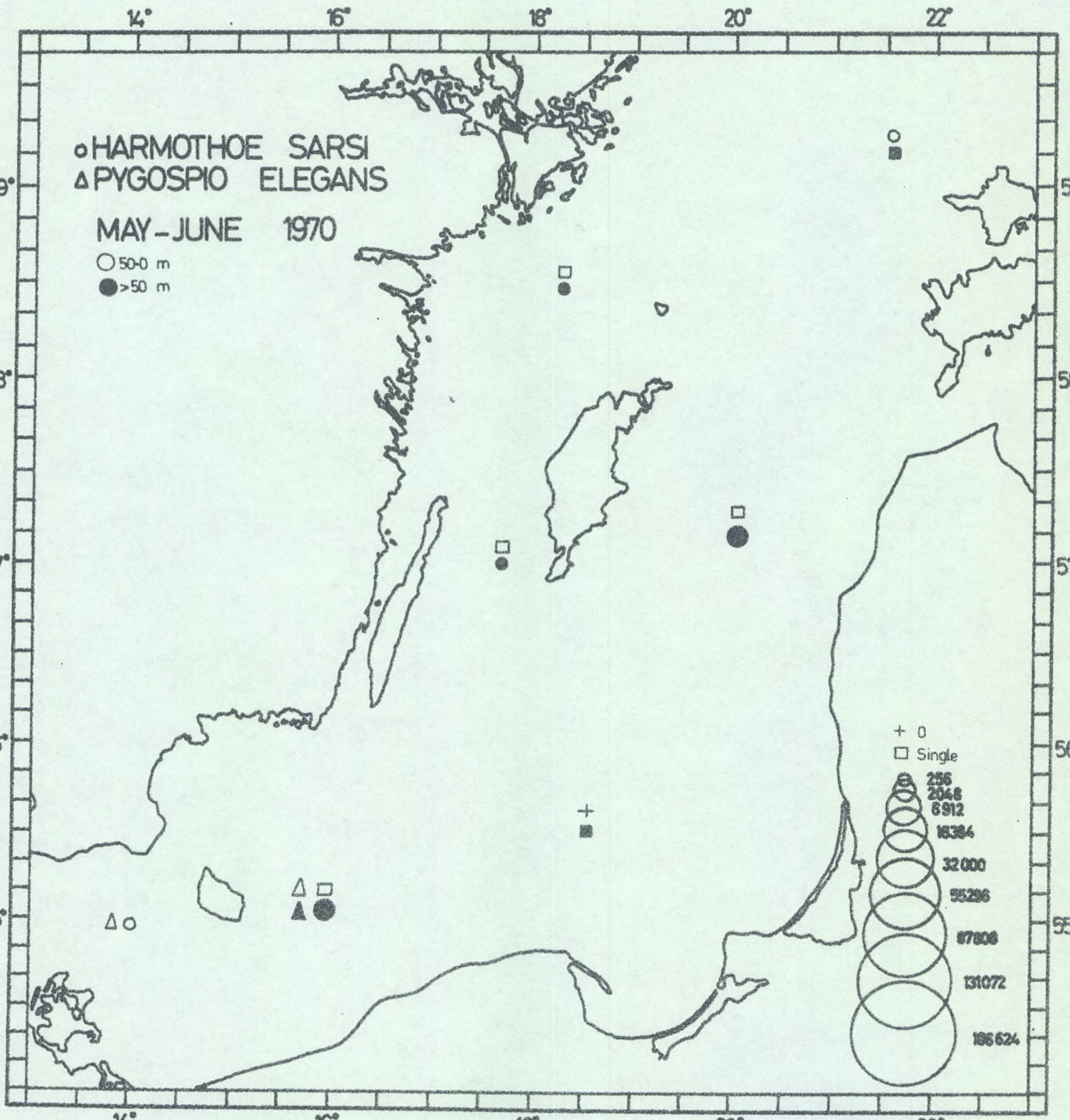
Fig 7.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MAY - JUNE 1970
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Fig 8.

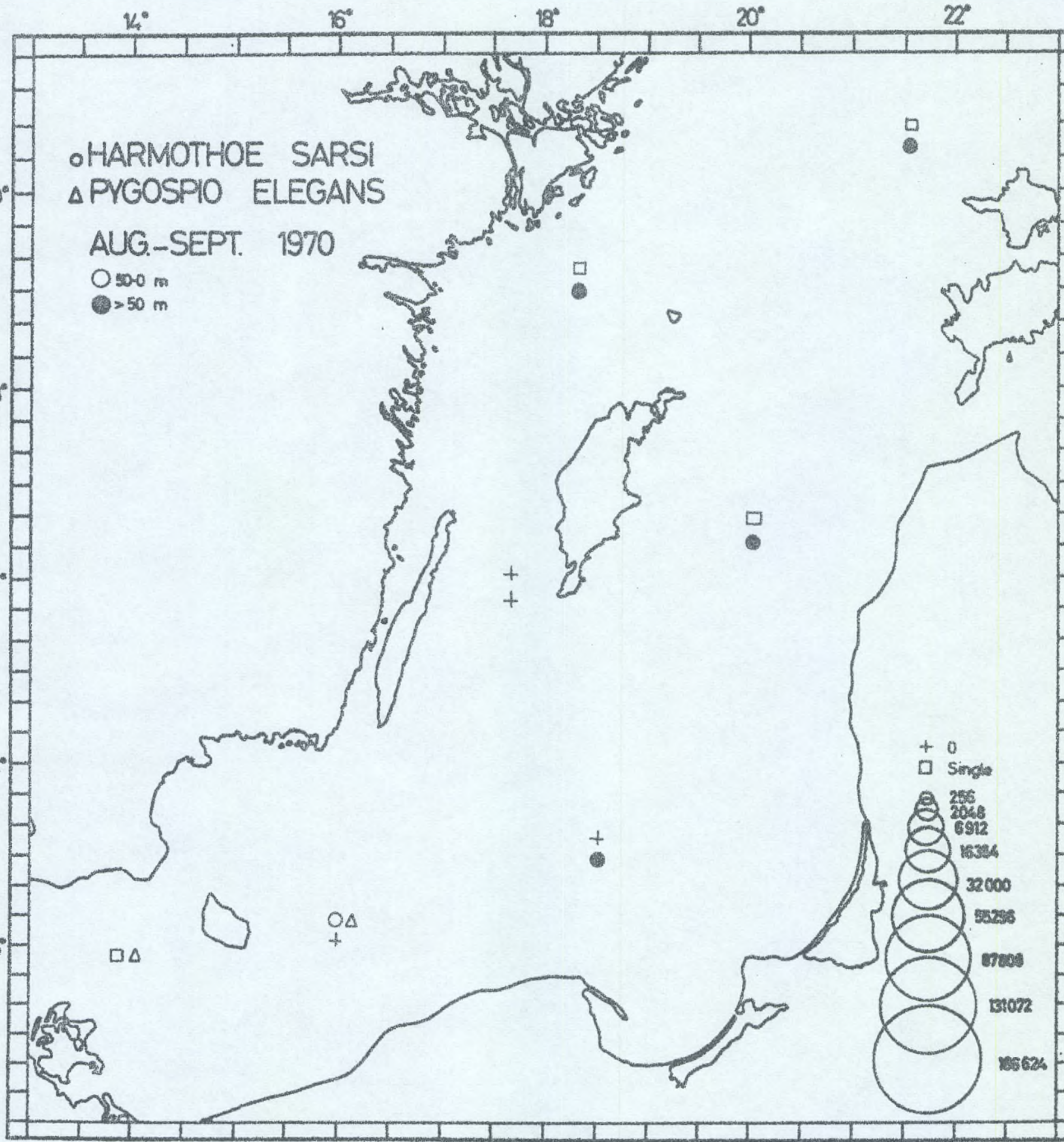

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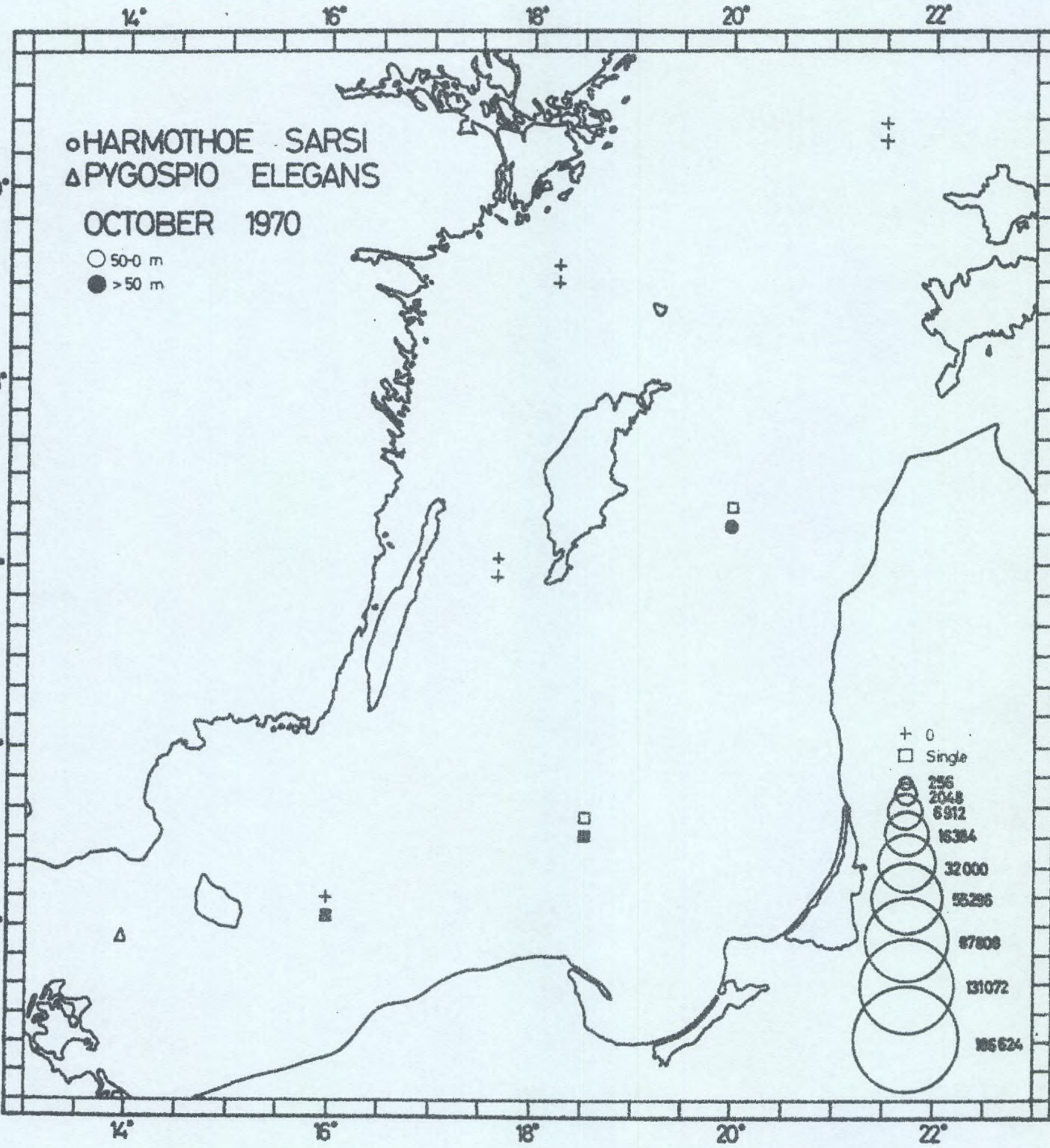
Fig 9.



oHARMOTHOE SARSI
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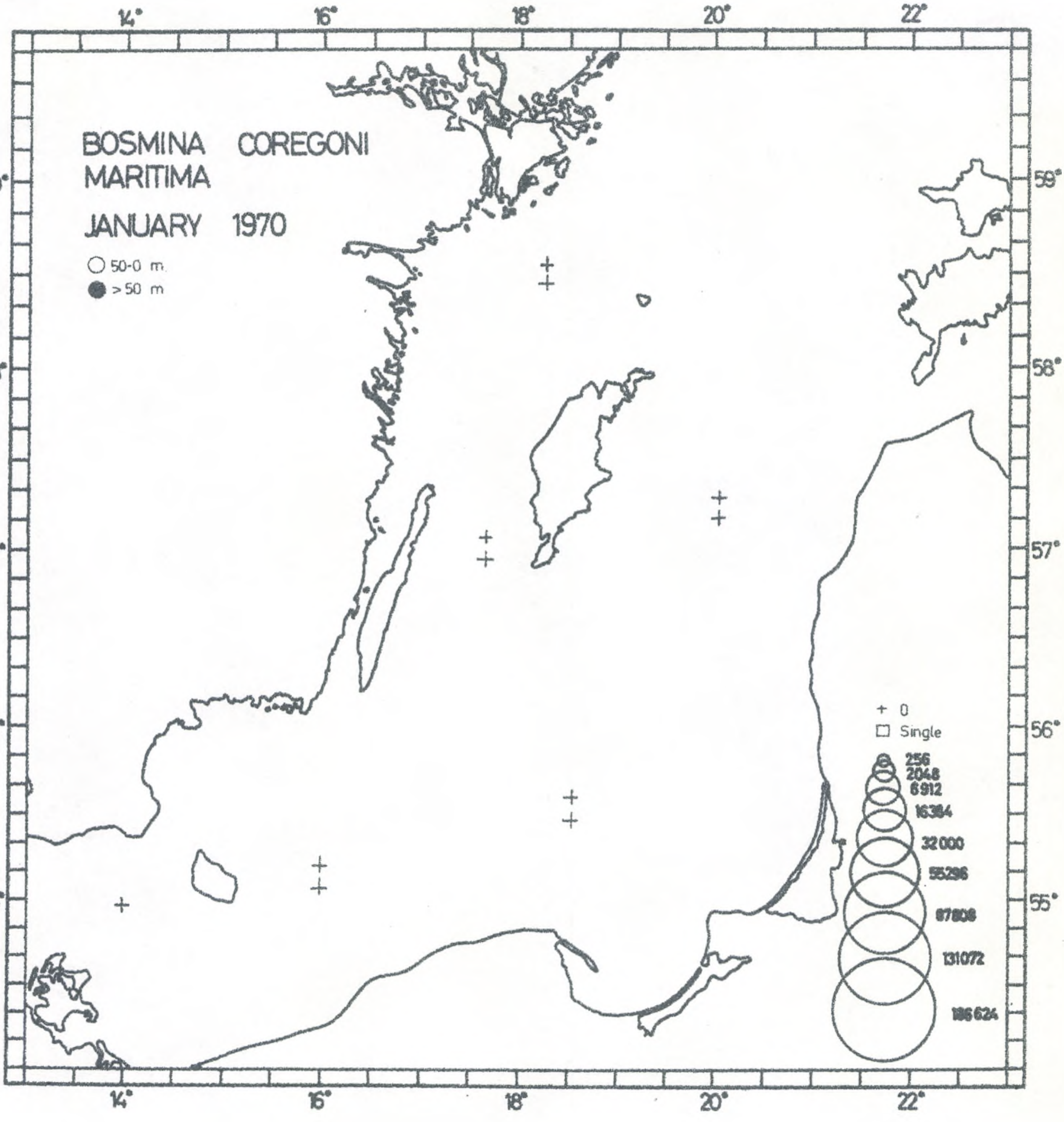
Fig 10.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MARITIMA
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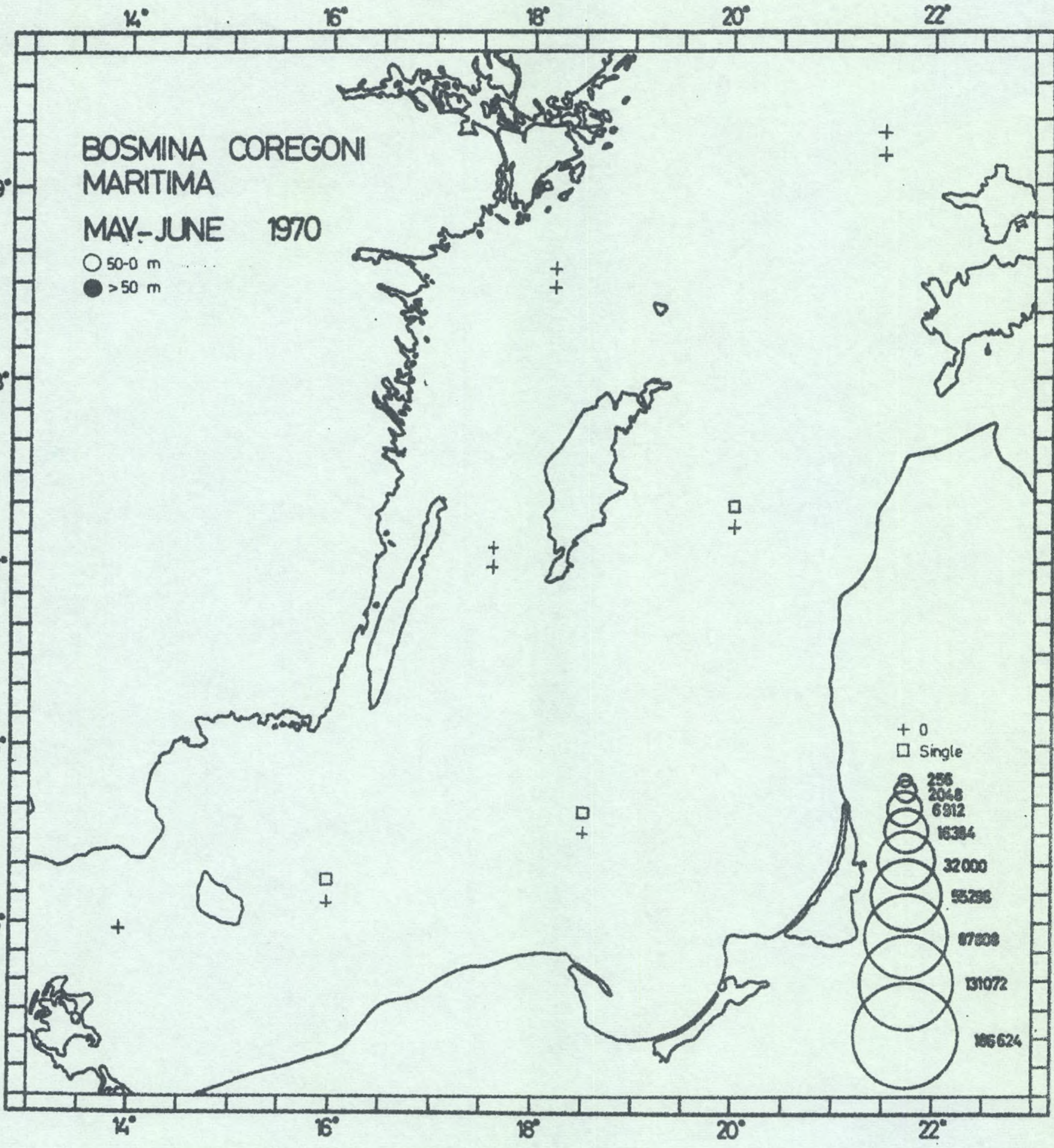
Fig 11.



BOSMINA COREGONI
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MAY-JUNE 1970
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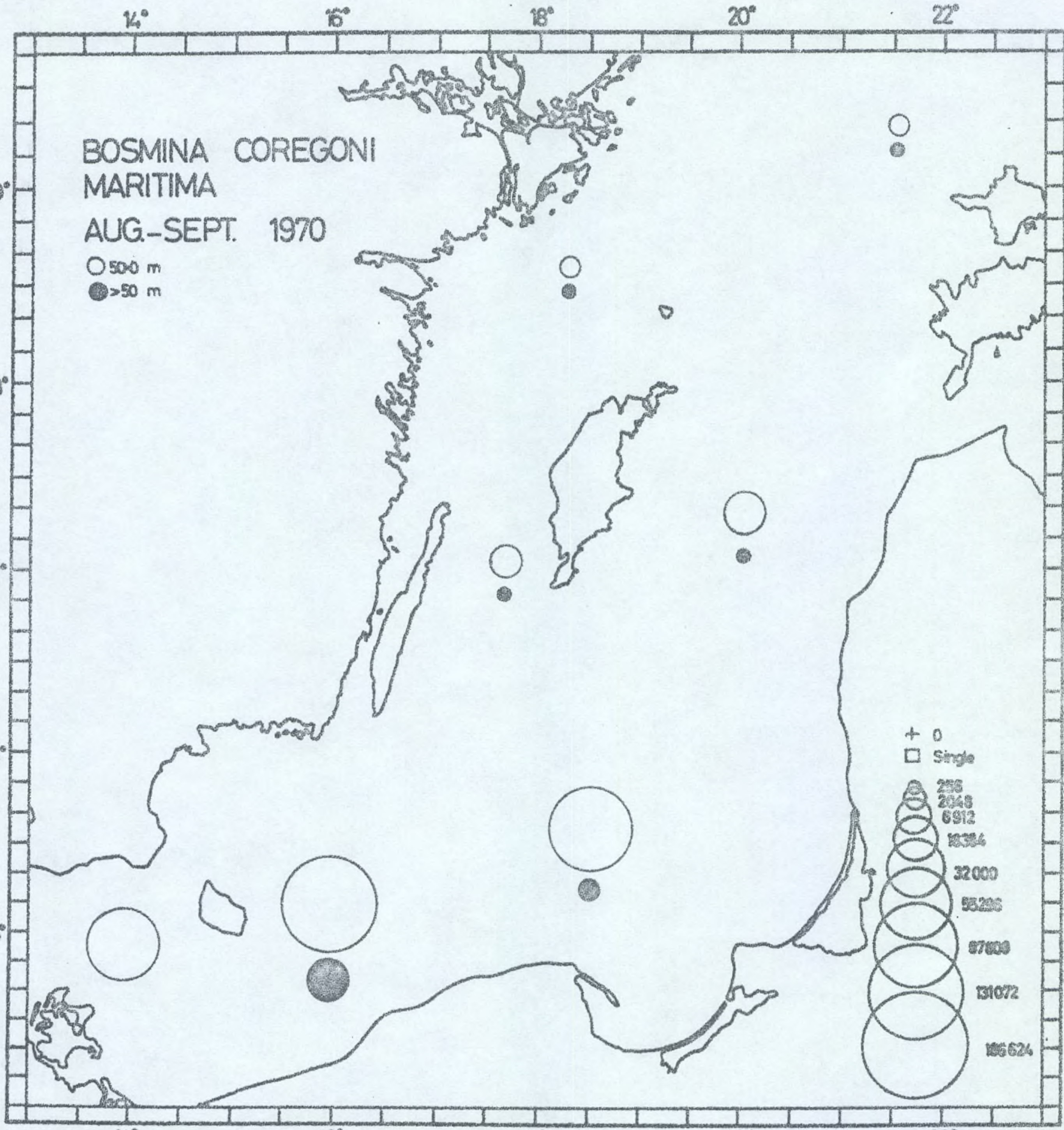
Fig 12.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BOSMINA COREGONI MARITIMA
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Fig 13.

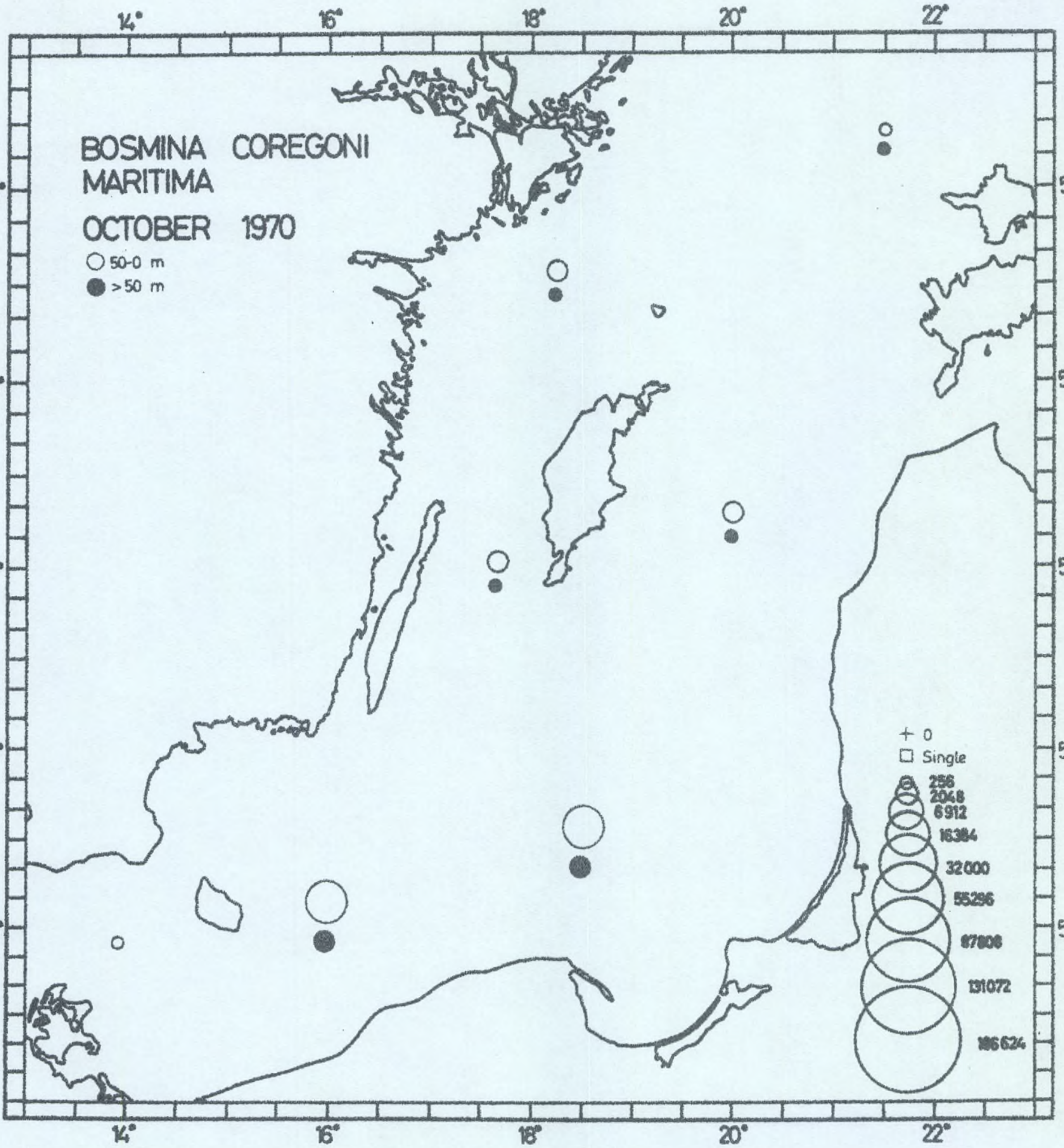

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Fig 14.

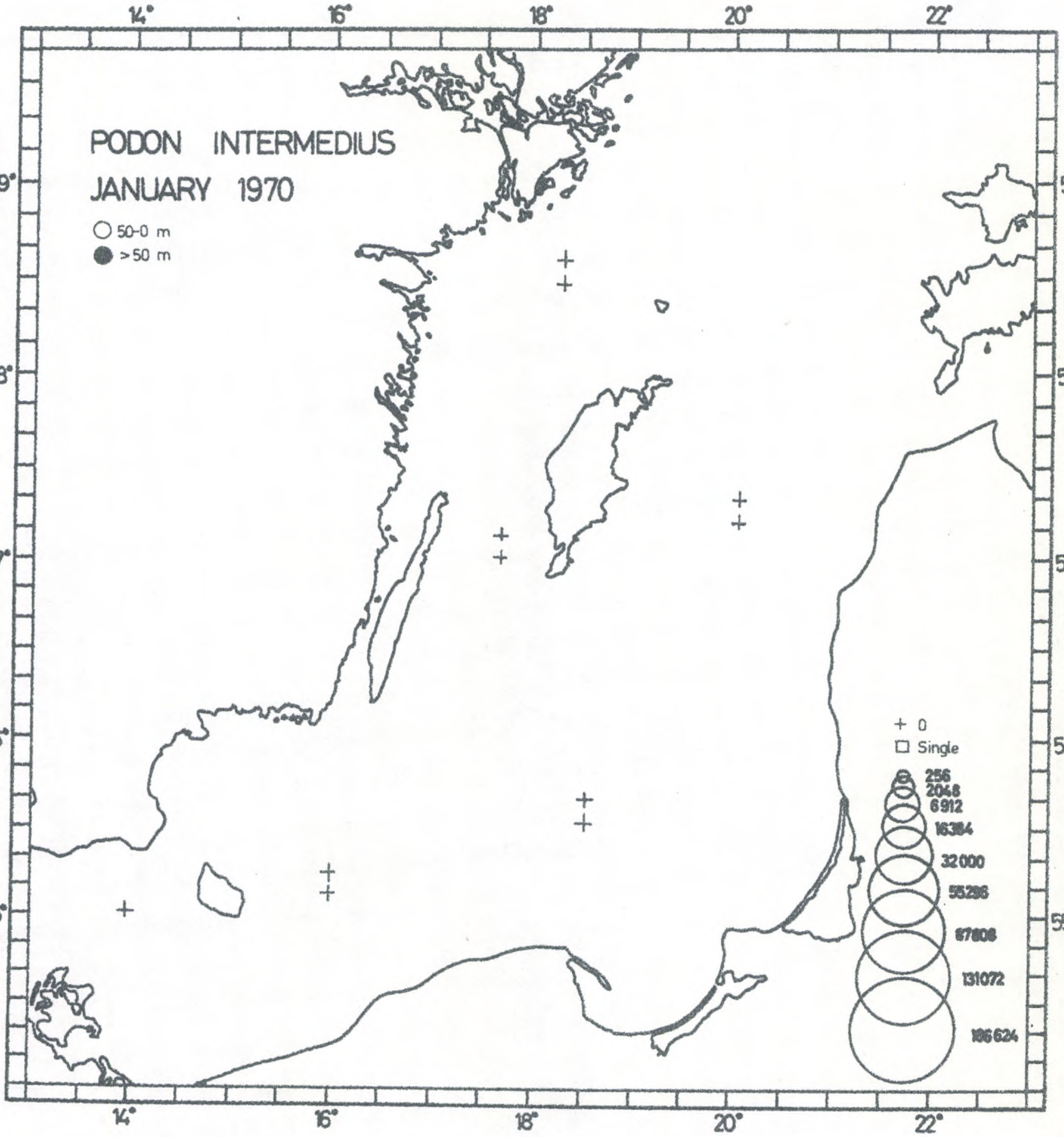

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Fig 15.

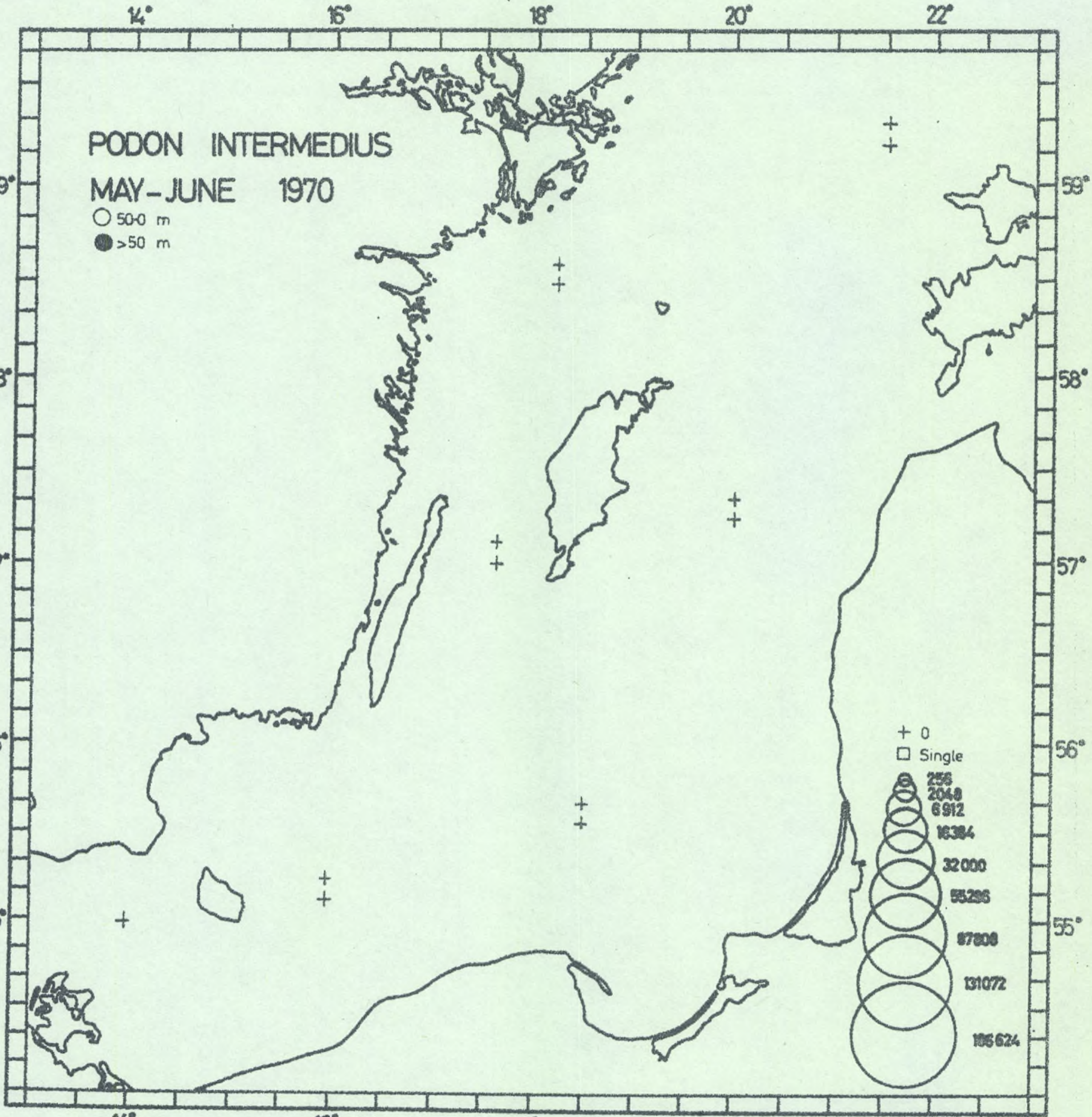

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Fig 16.

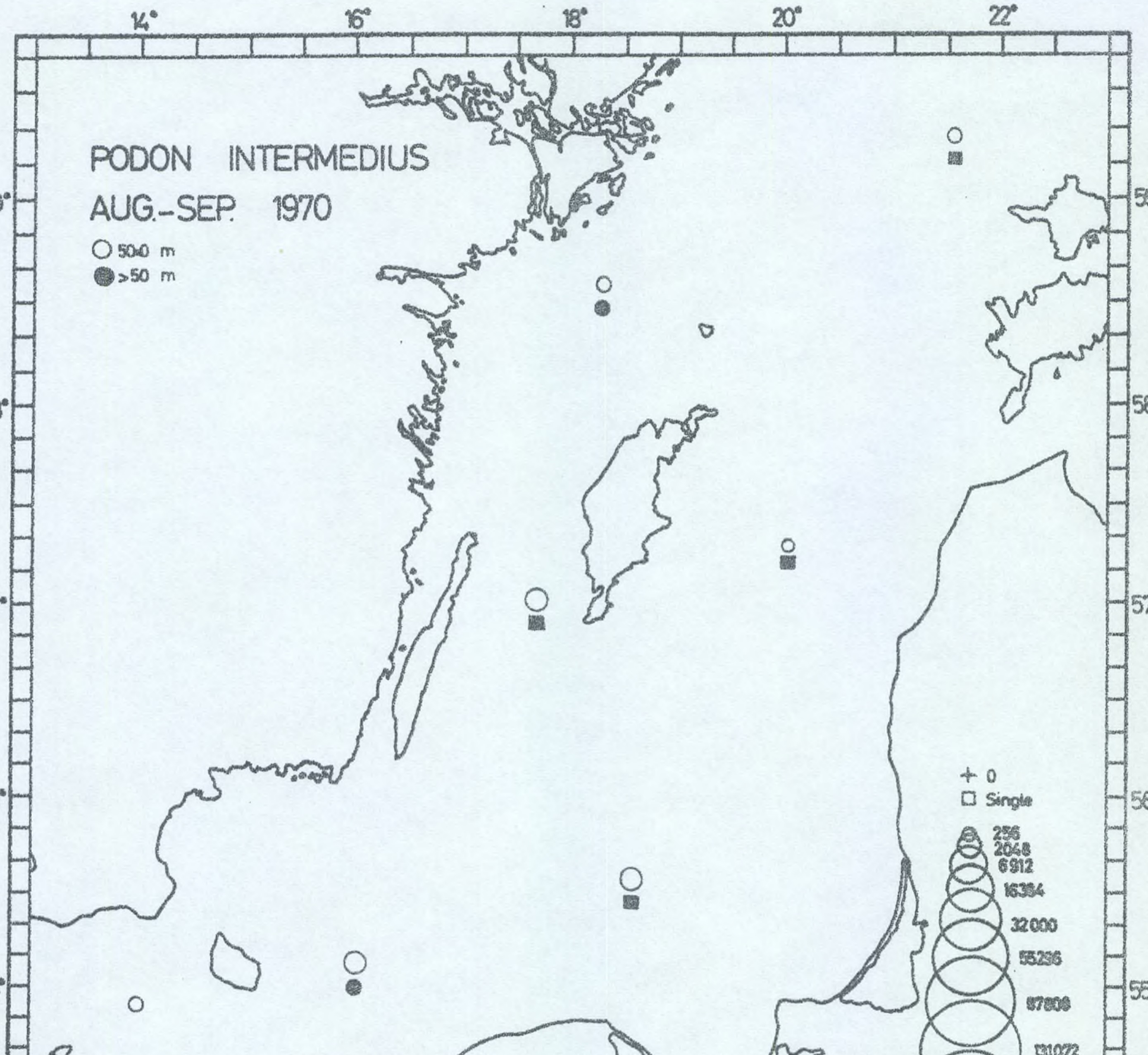

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Fig 17.

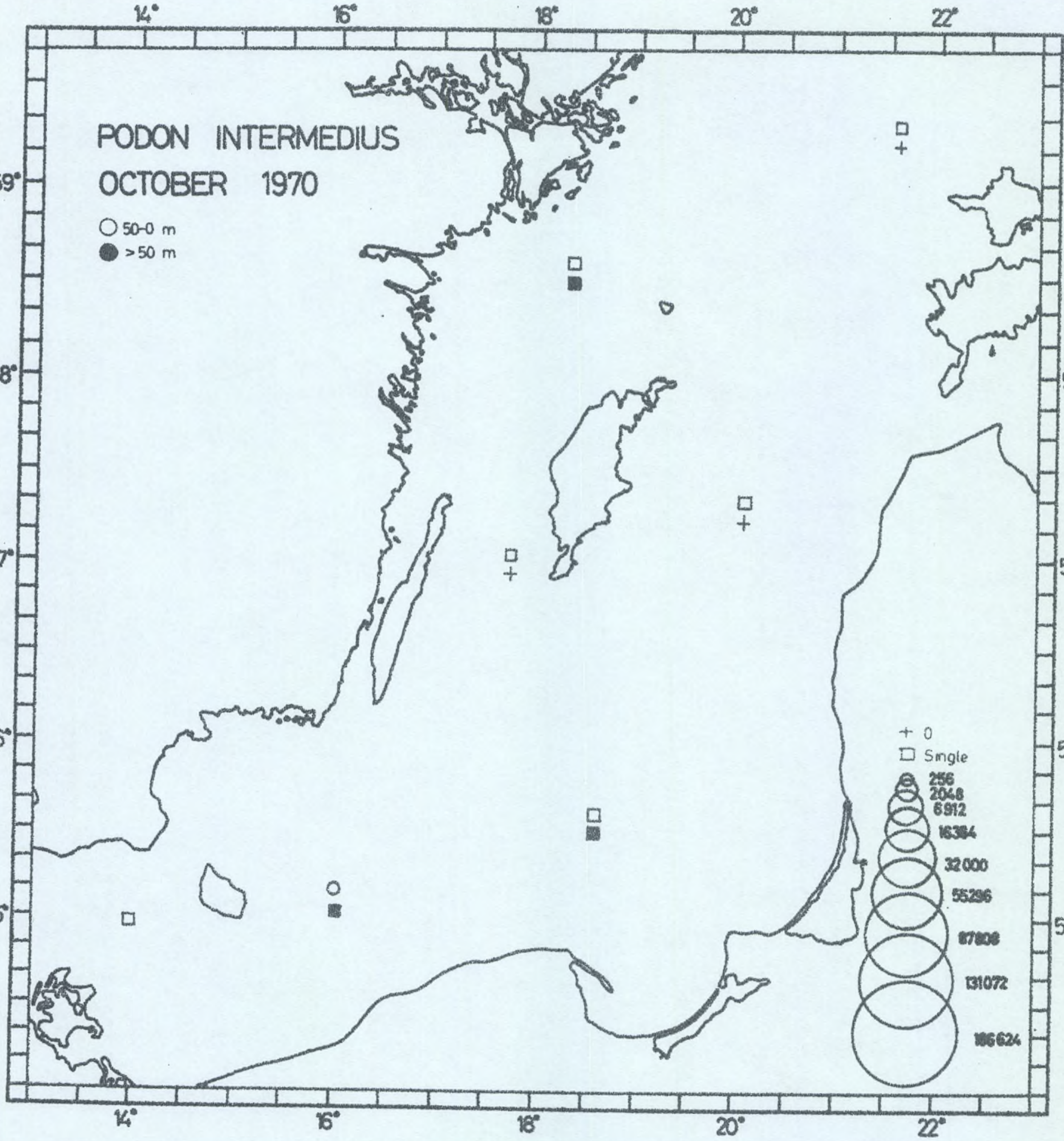

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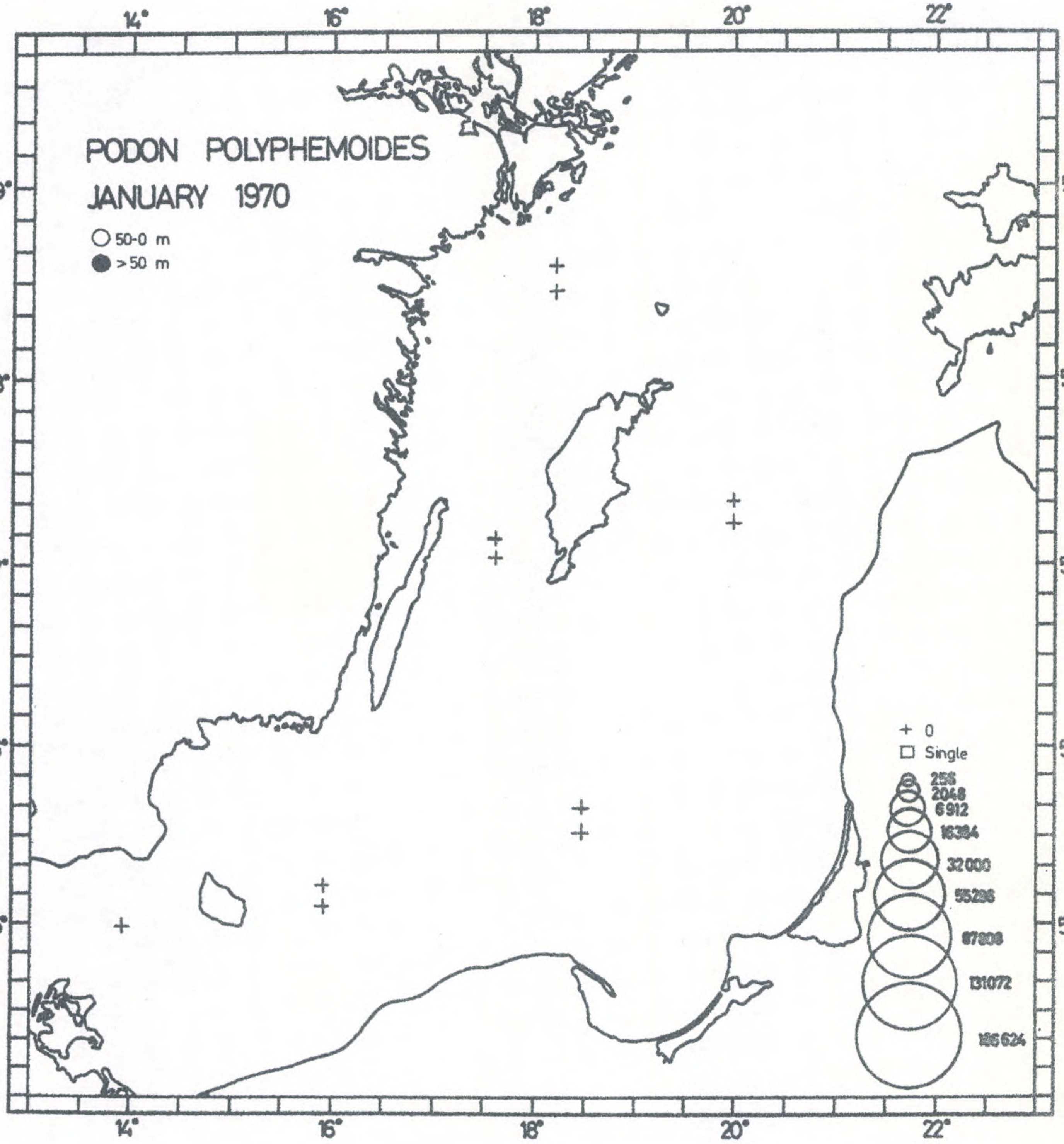
Fig 18.



PODON POLYPHEMOIDES
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Fig 19.

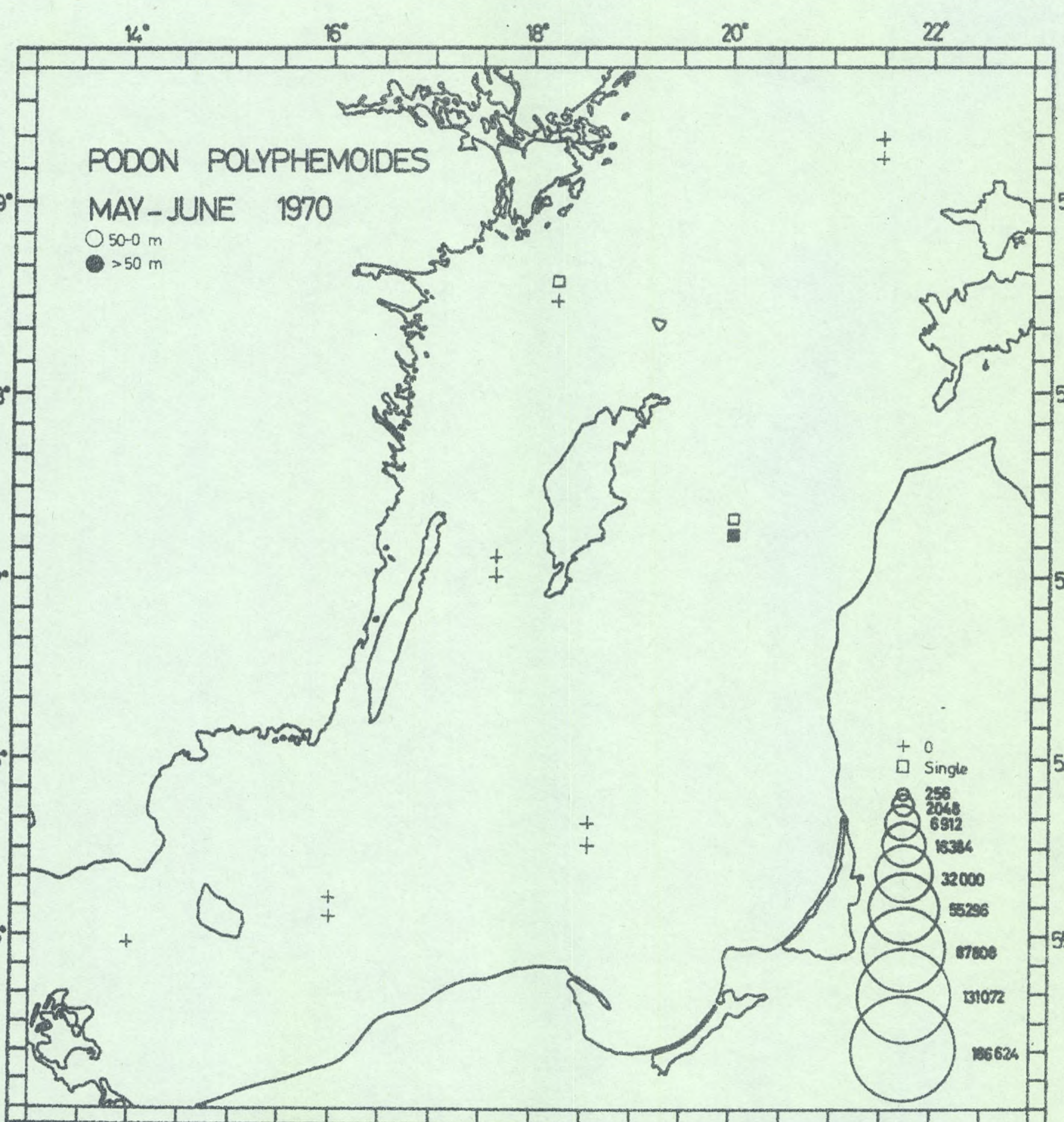
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Fig 20.

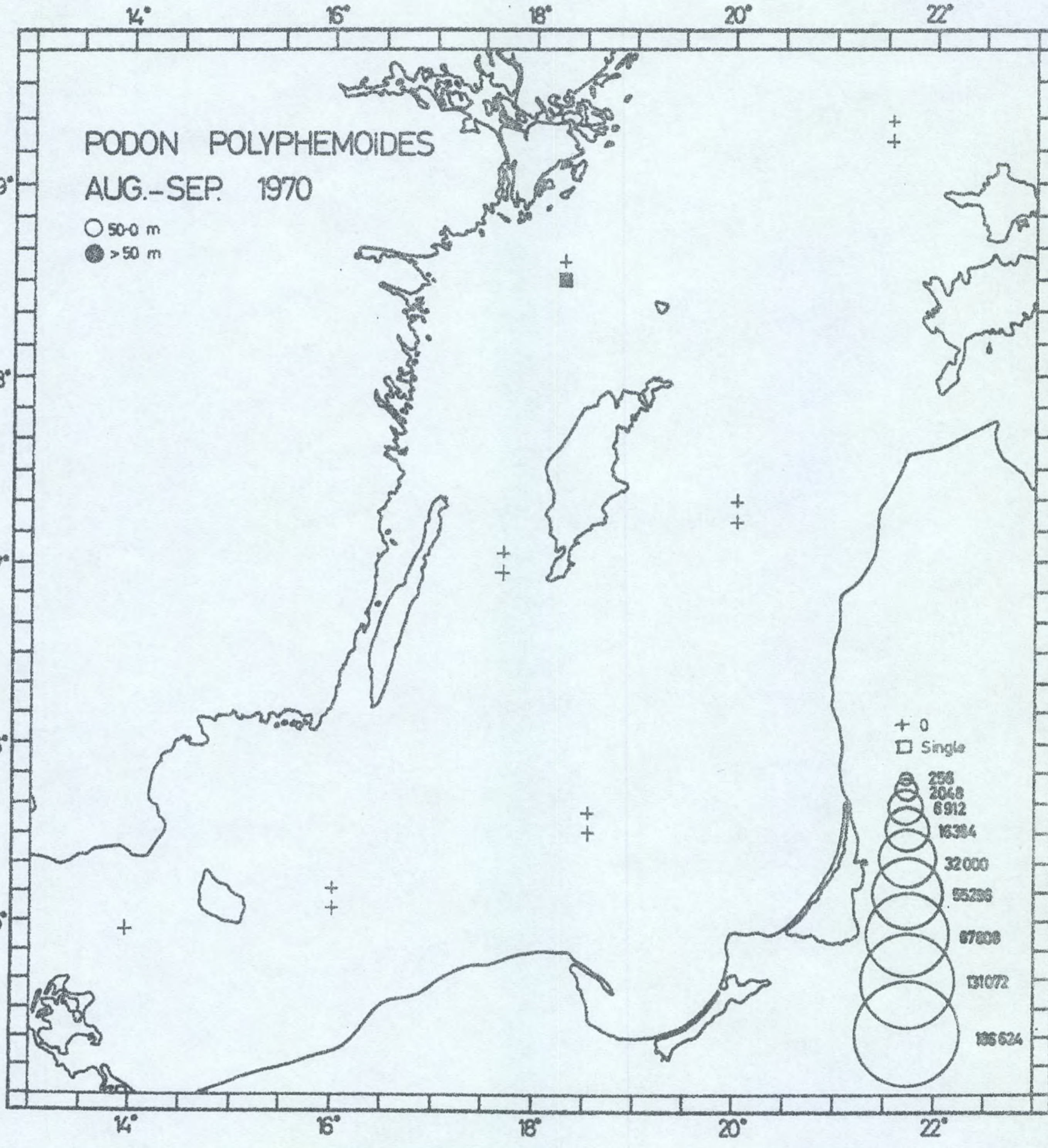
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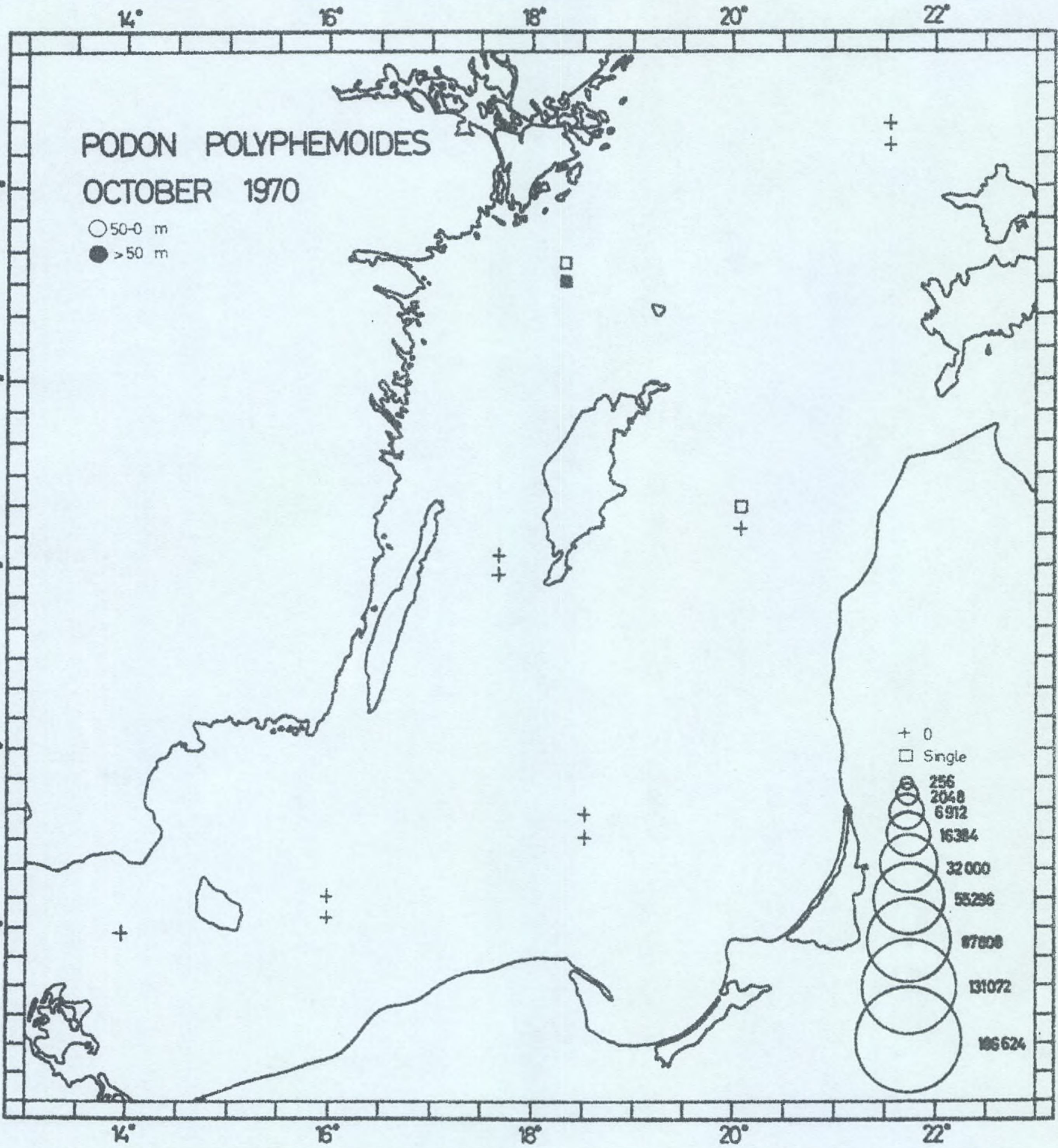
Fig 21.



PODON POLYPHEMOIDES
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Fig 22.

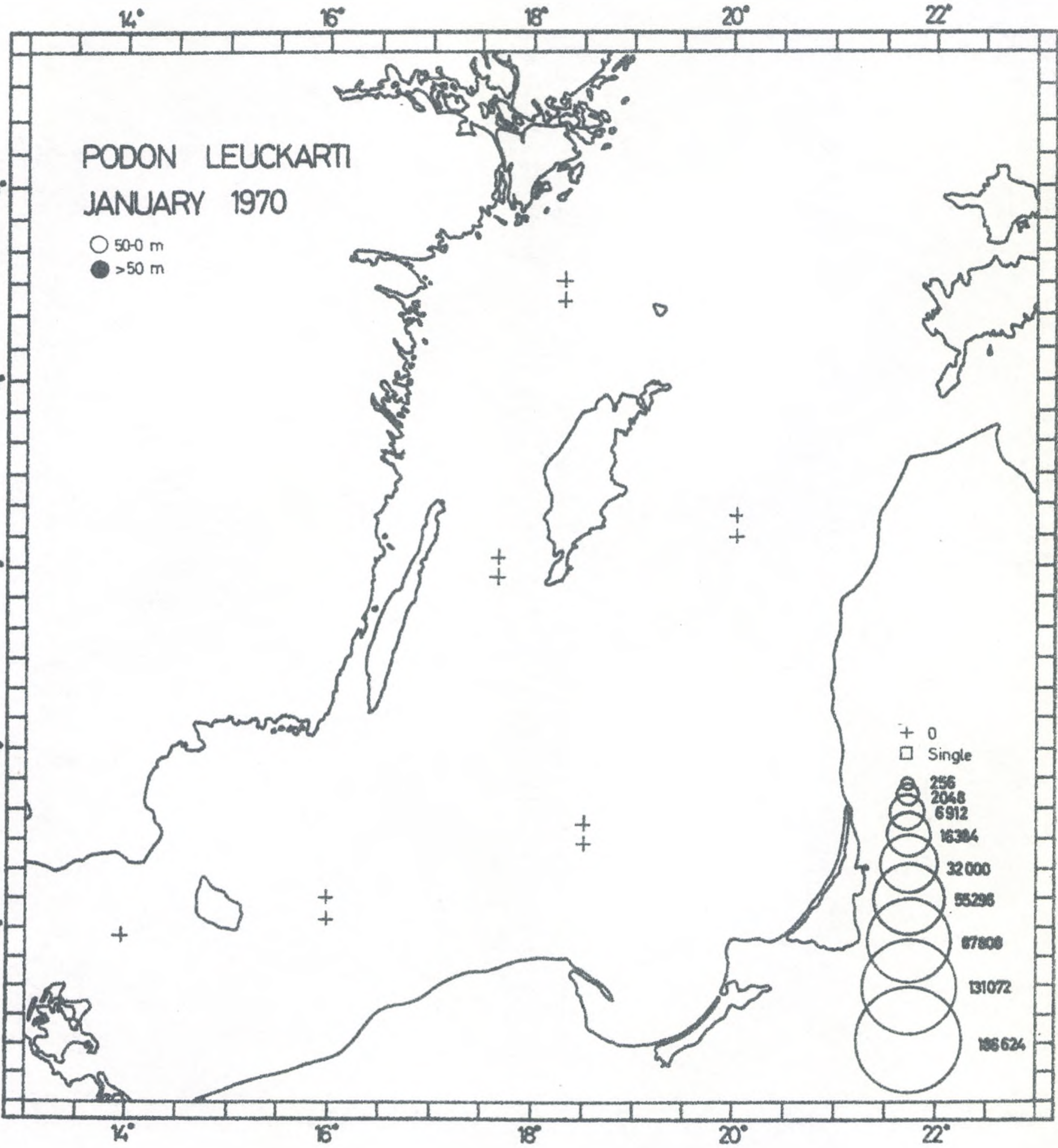
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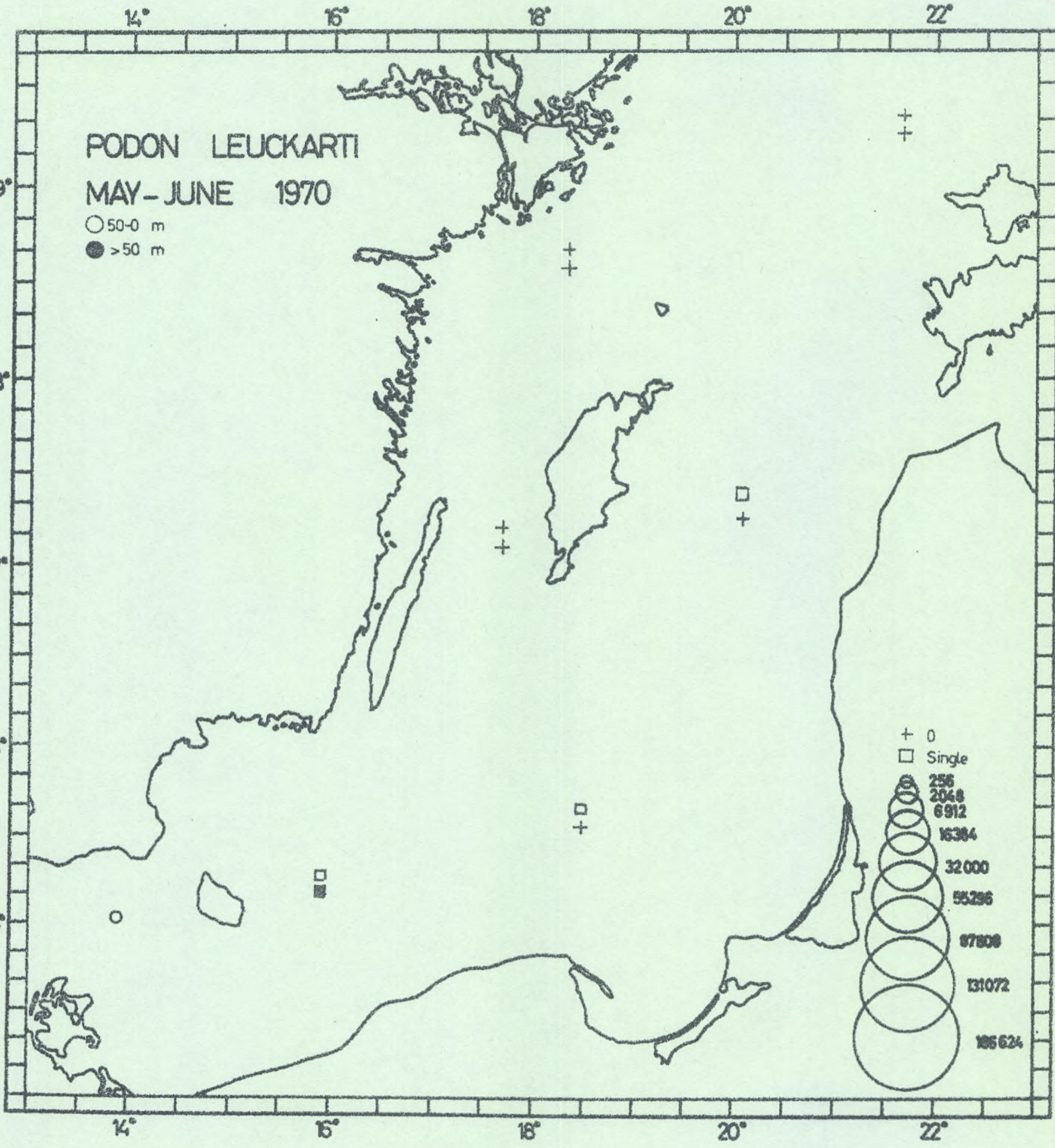
Fig 23.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MAY-JUNE 1970
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Fig 24.

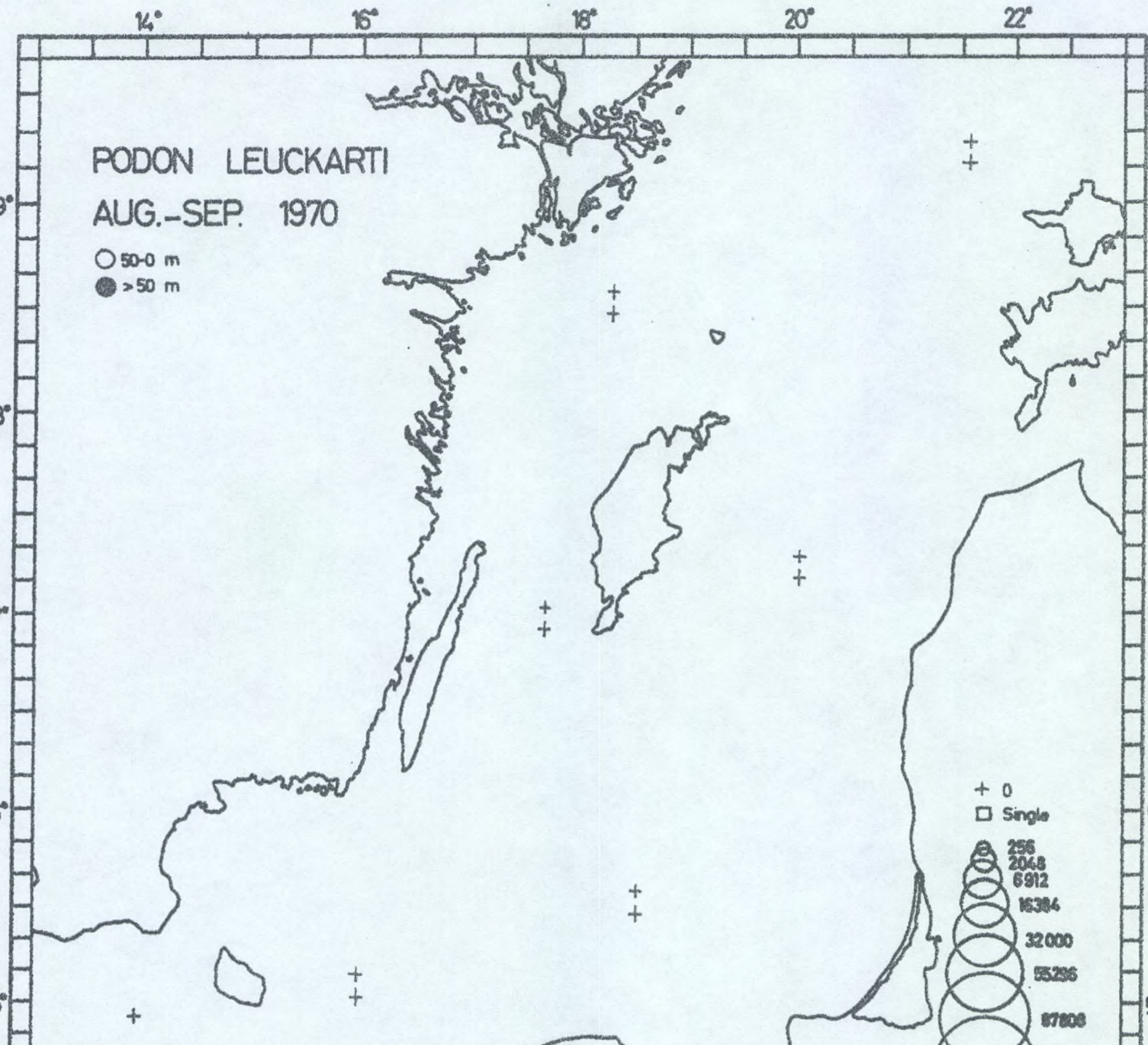
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Fig 25.

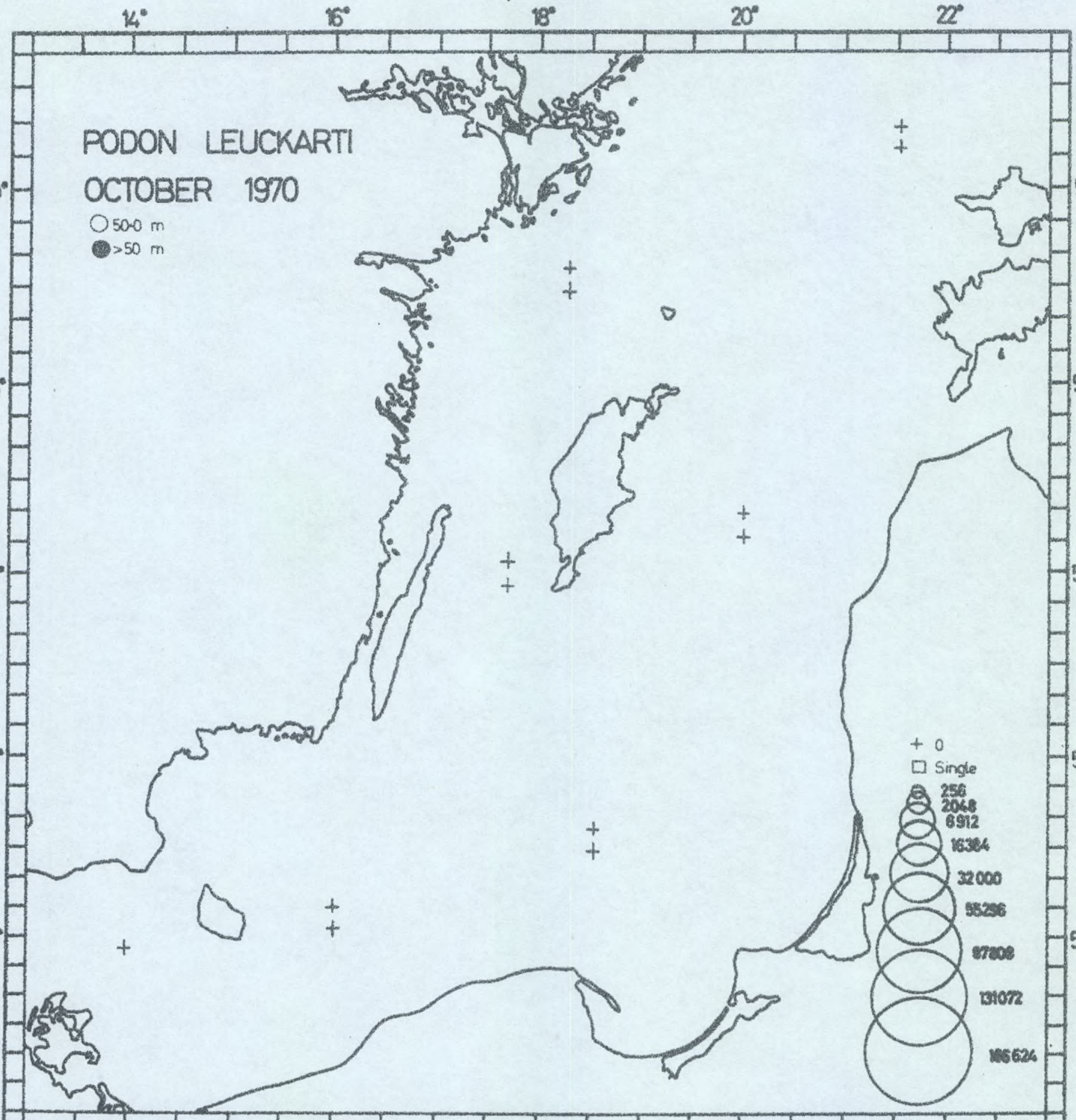

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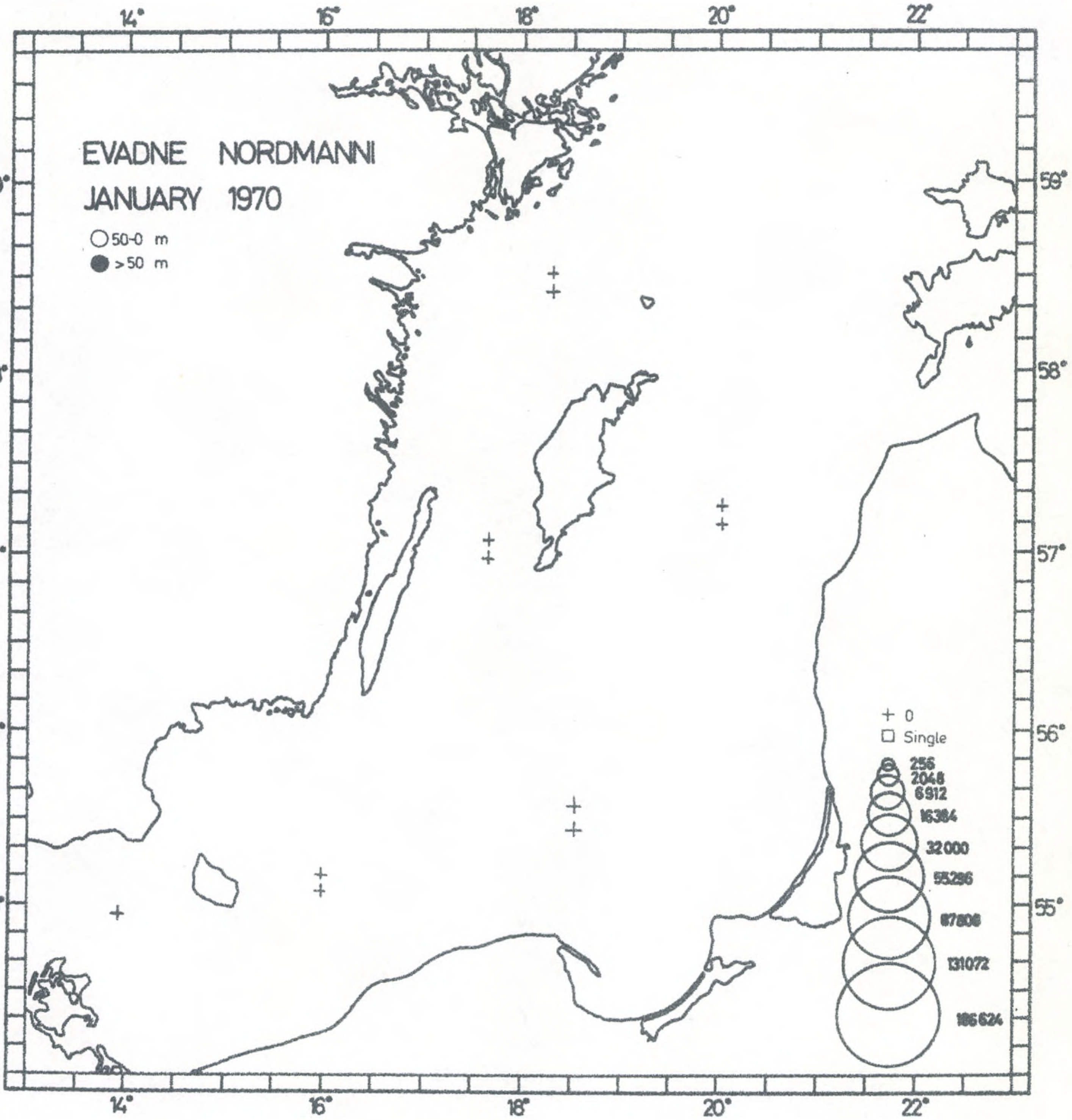
Fig 26.



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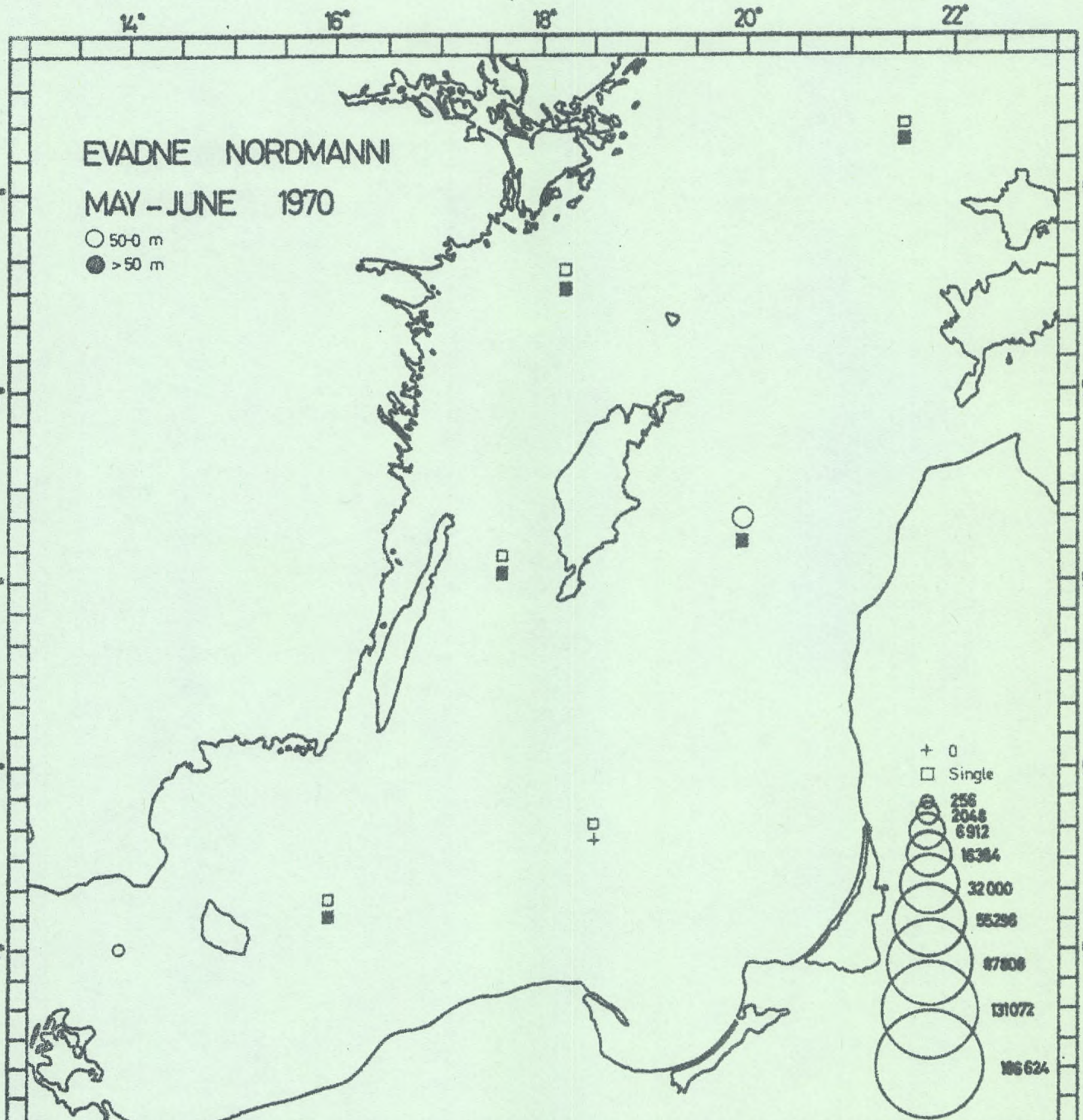
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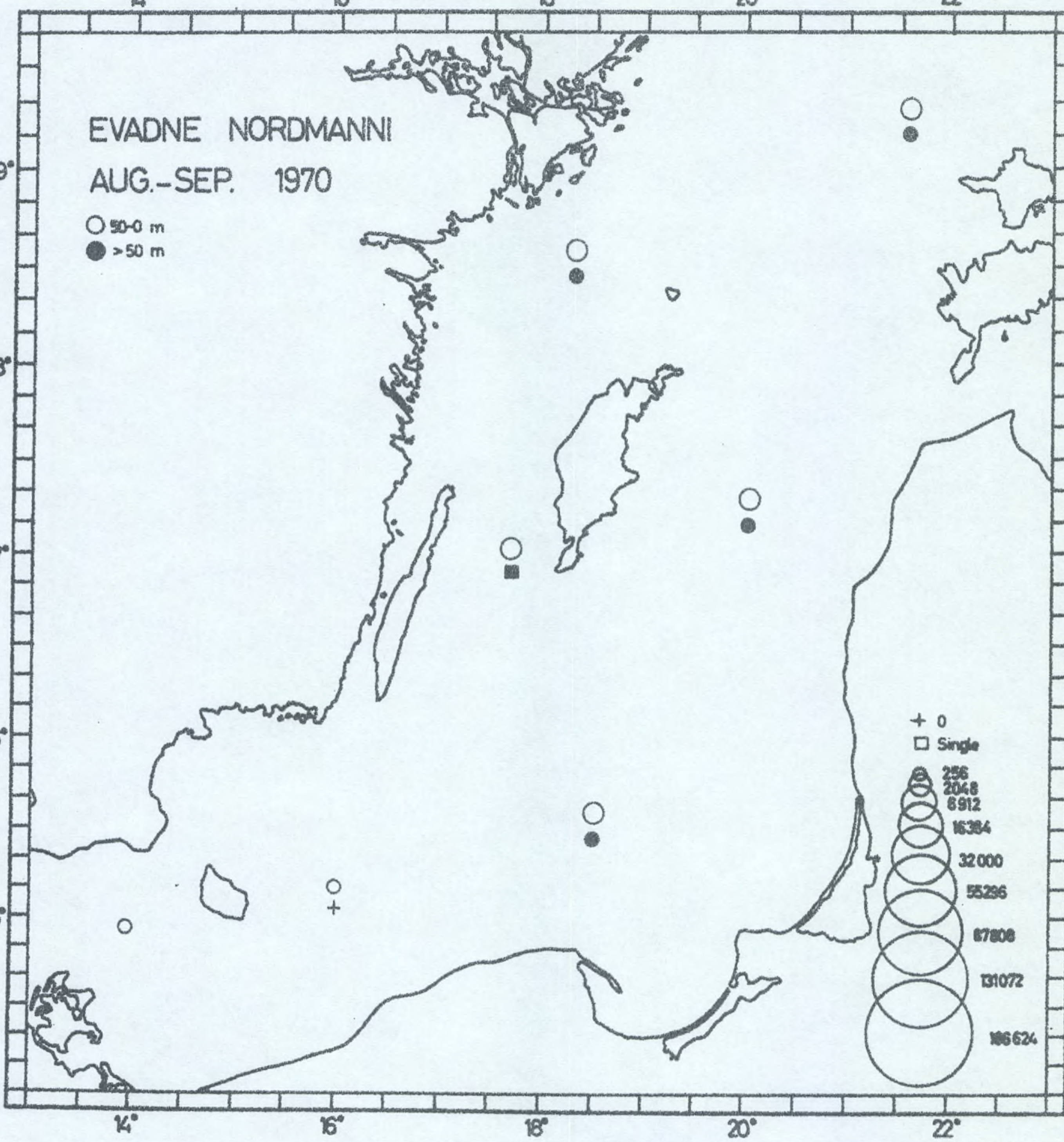
Fig 28.



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AUG.-SEP. 1970
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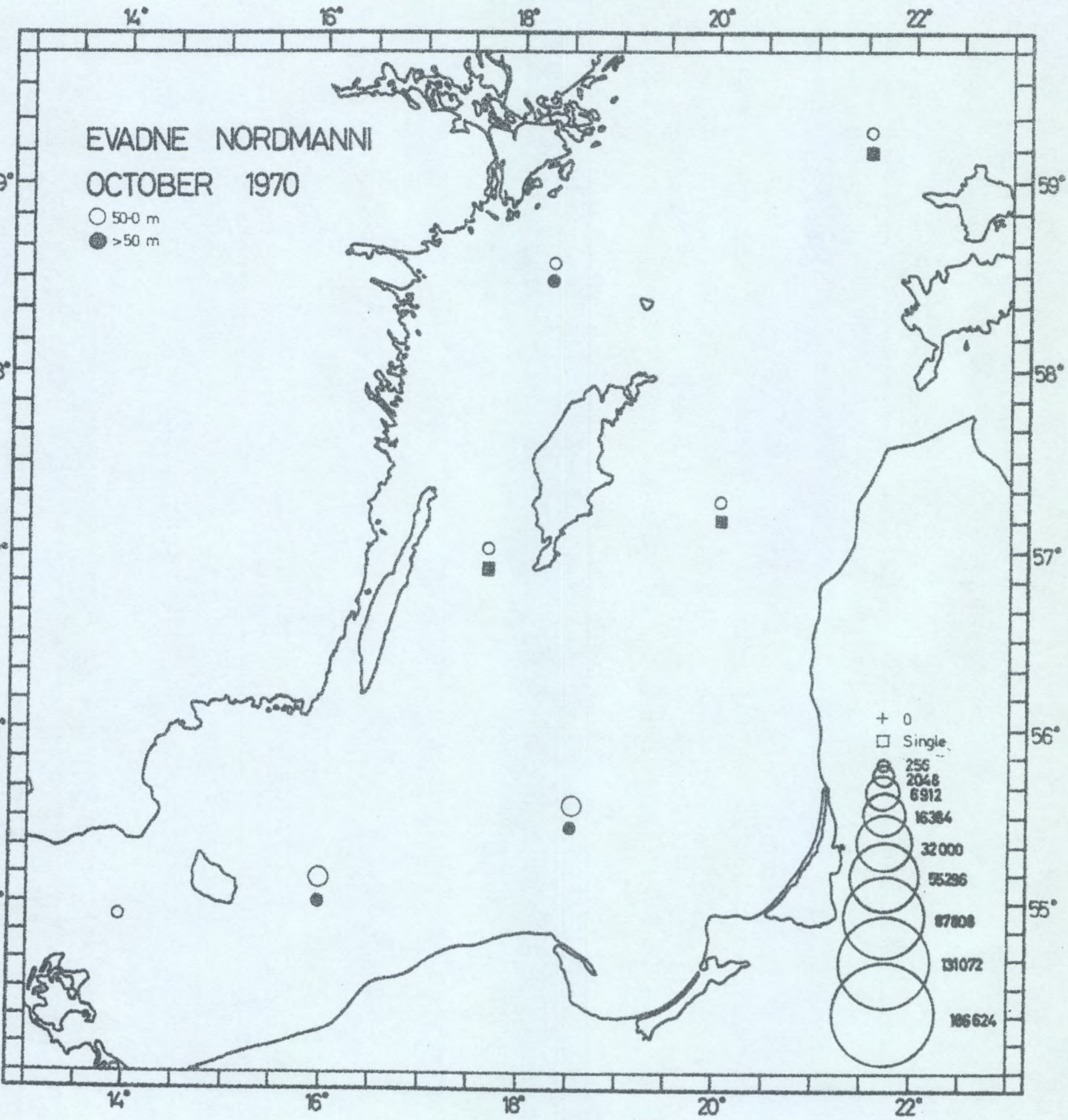
Fig 29.



EVADNE NORDMANNI
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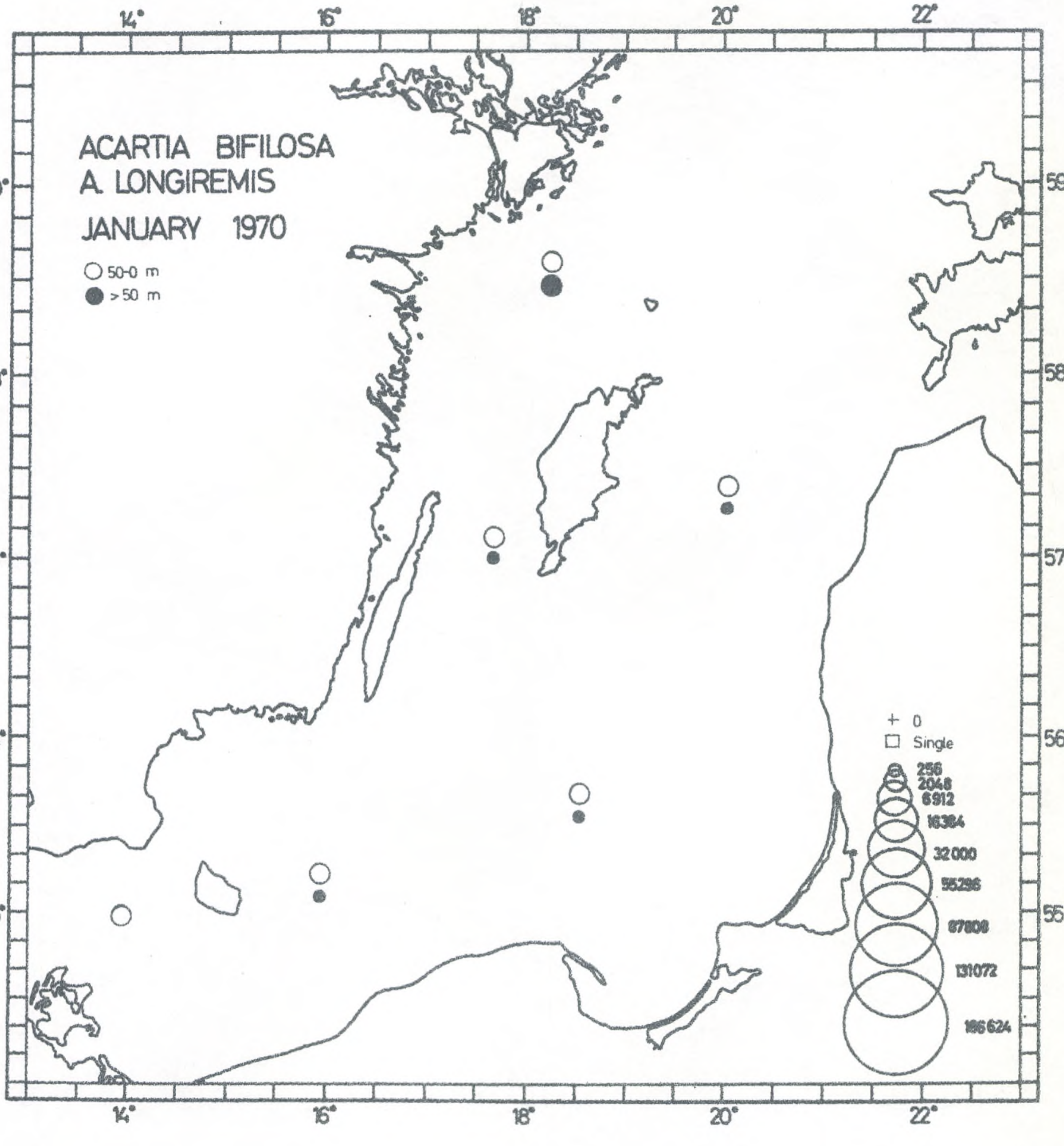
ACARTIA BIFILOSA
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JANUARY 1970
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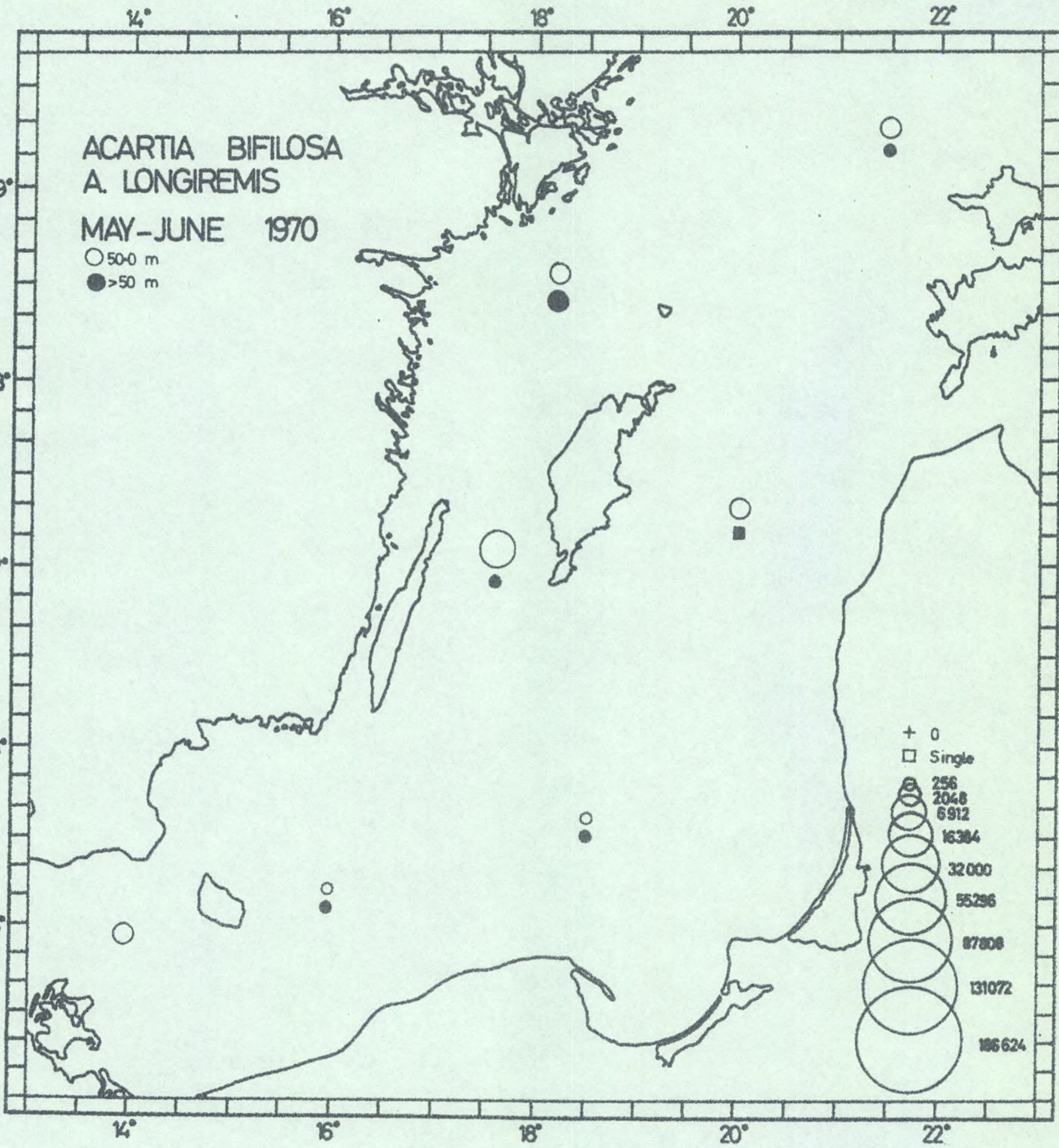
Fig 31.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A. LONGIREMIS
MAY-JUNE 1970
50-0 m
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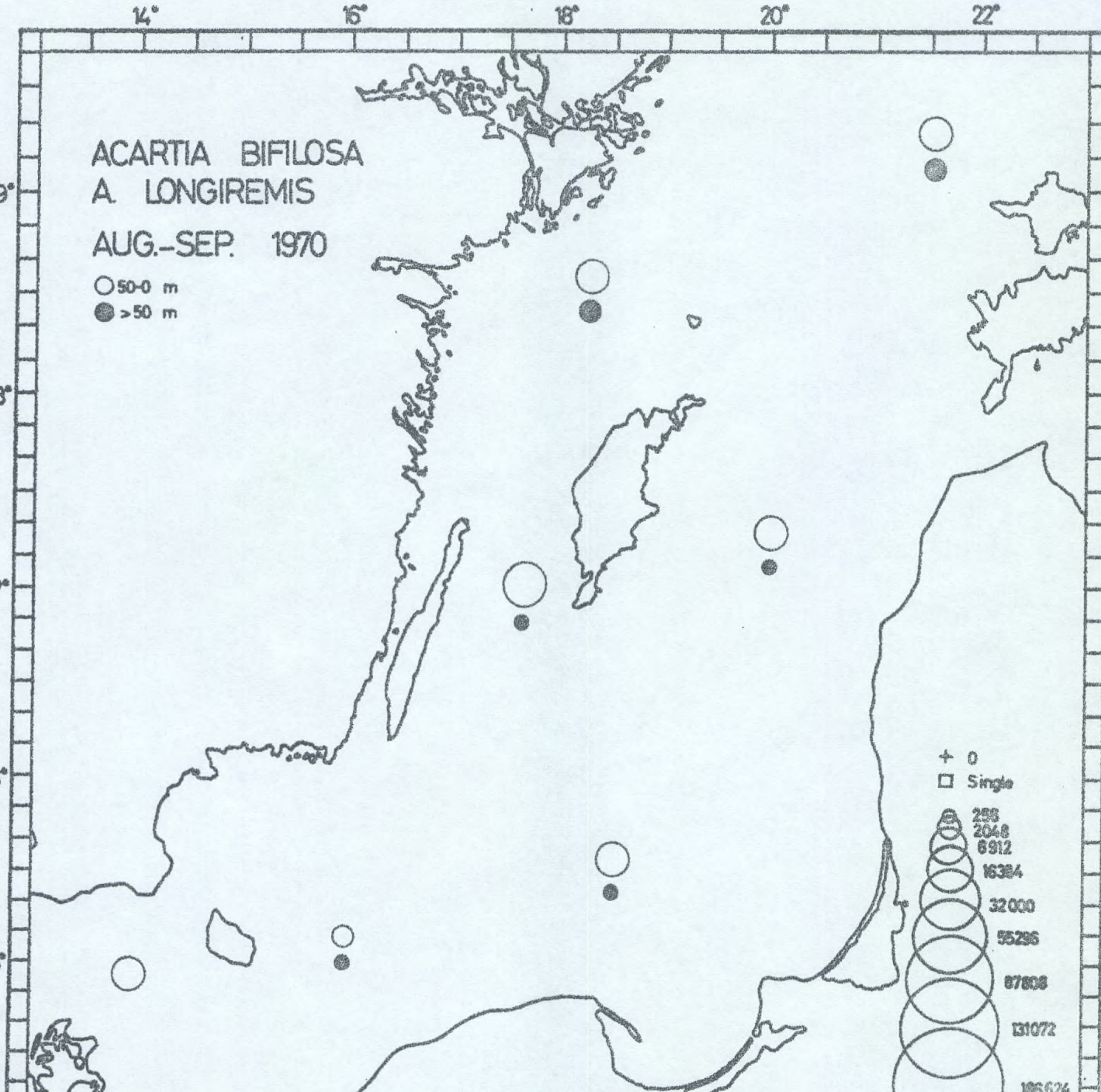
Fig 32.



ACARTIA BIFILOSA
A. LONGIREMIS
AUG.-SEP. 1970
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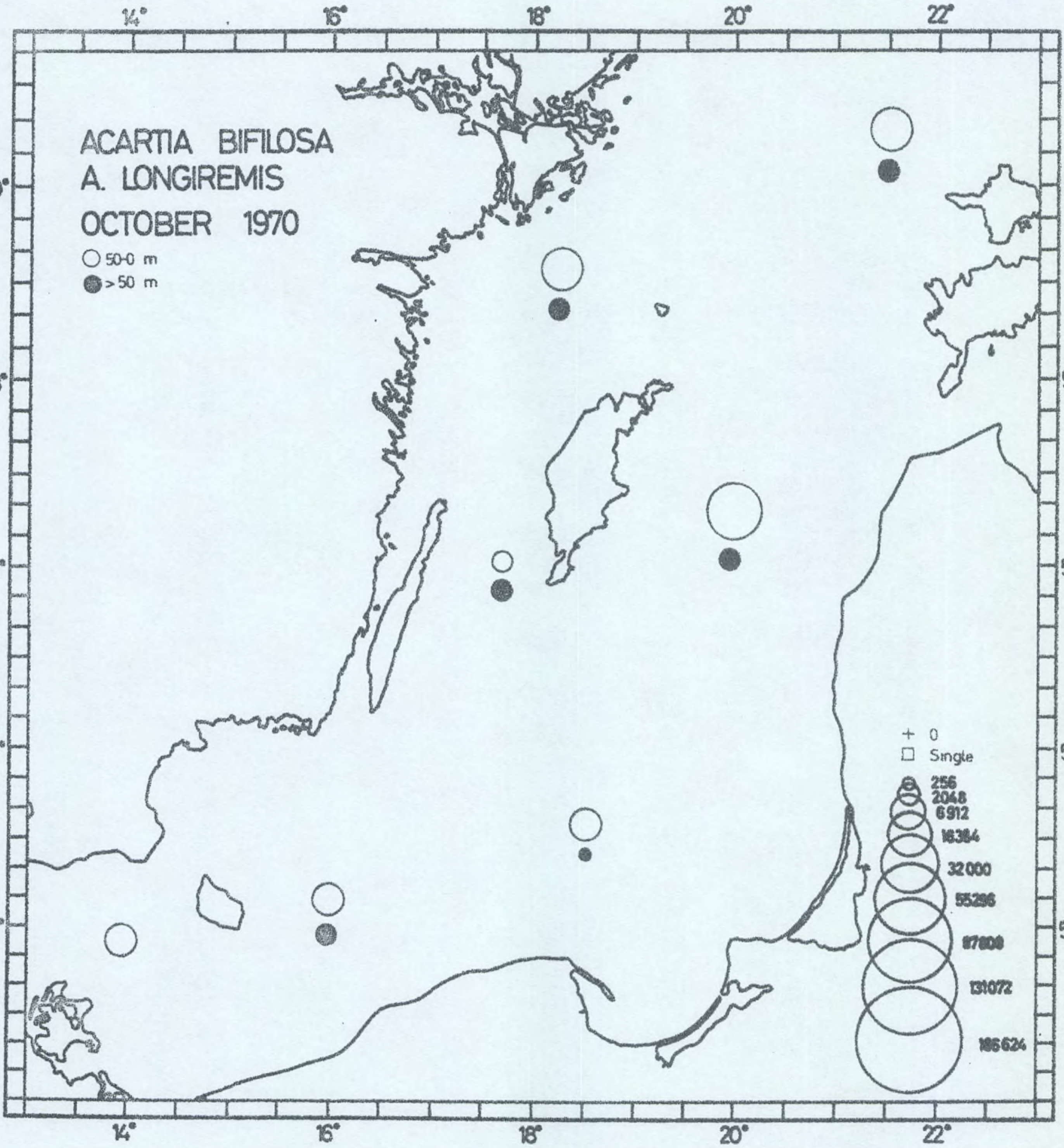
Fig 33.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A. LONGIREMIS
OCTOBER 1970
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> 50 m
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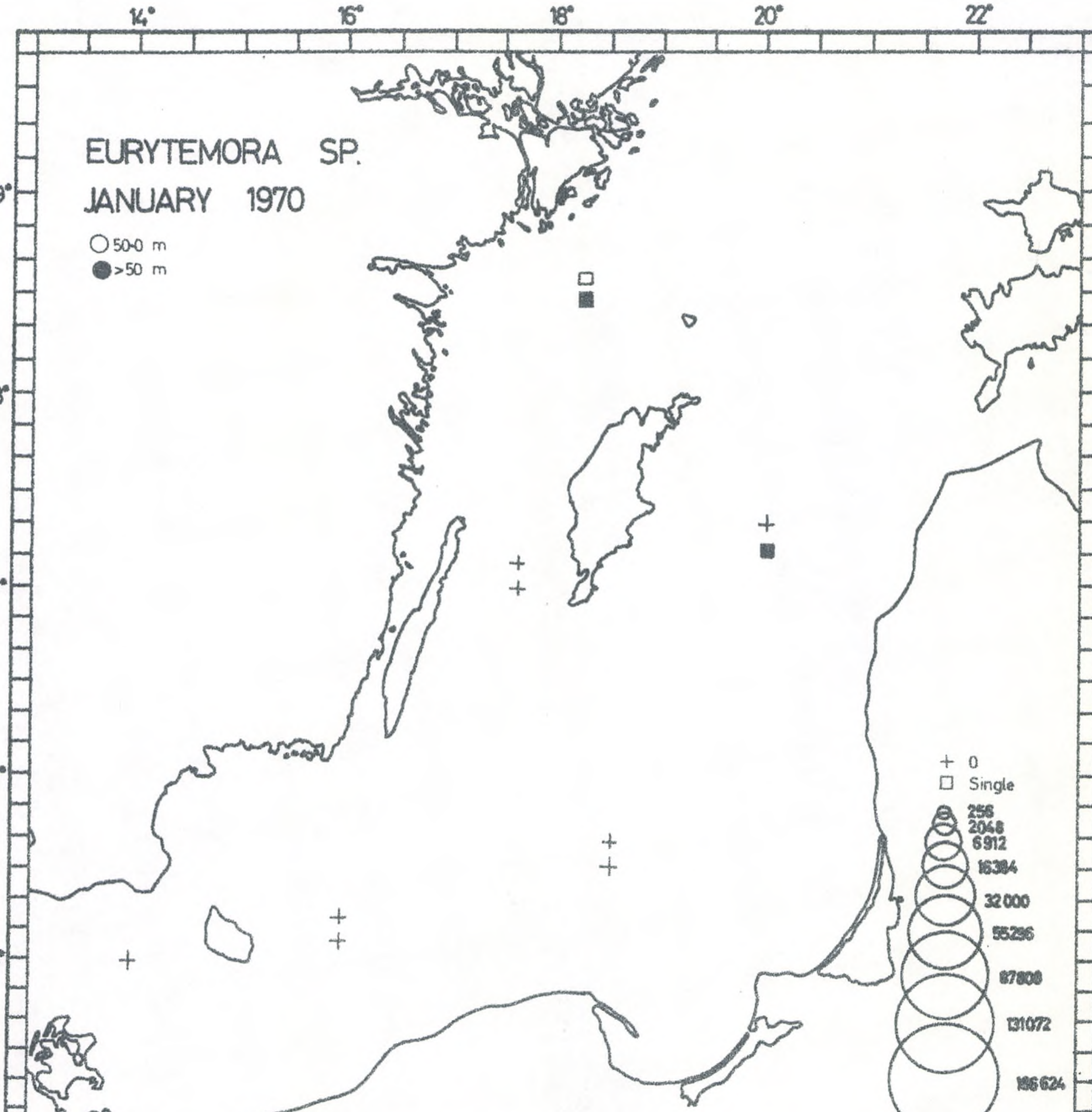
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JANUARY 1970
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Fig 35.

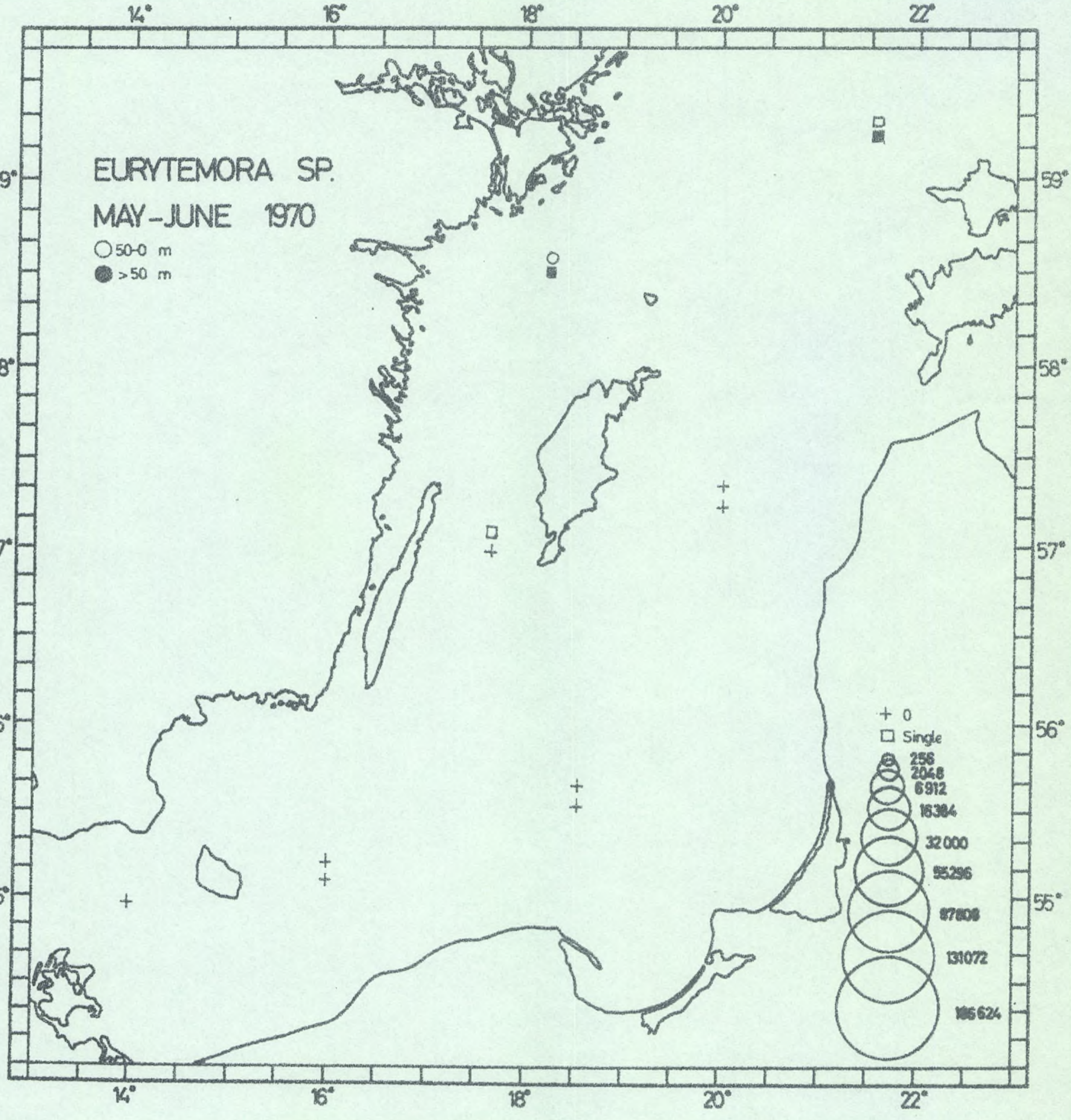
EURYTEMORA SP.
MAY-JUNE 1970
50-0 m
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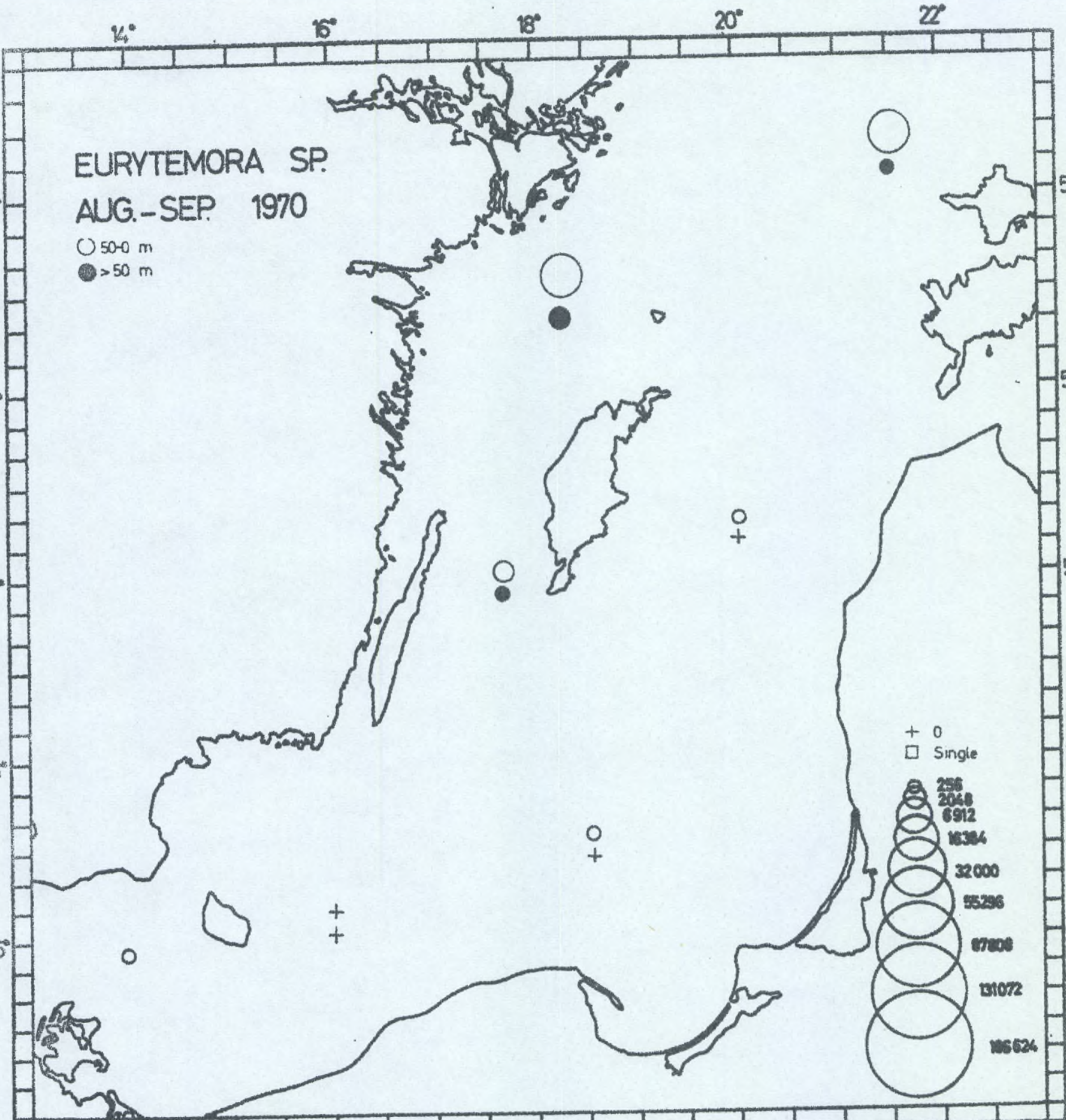
Fig 36.



EURYTEMORA SP.
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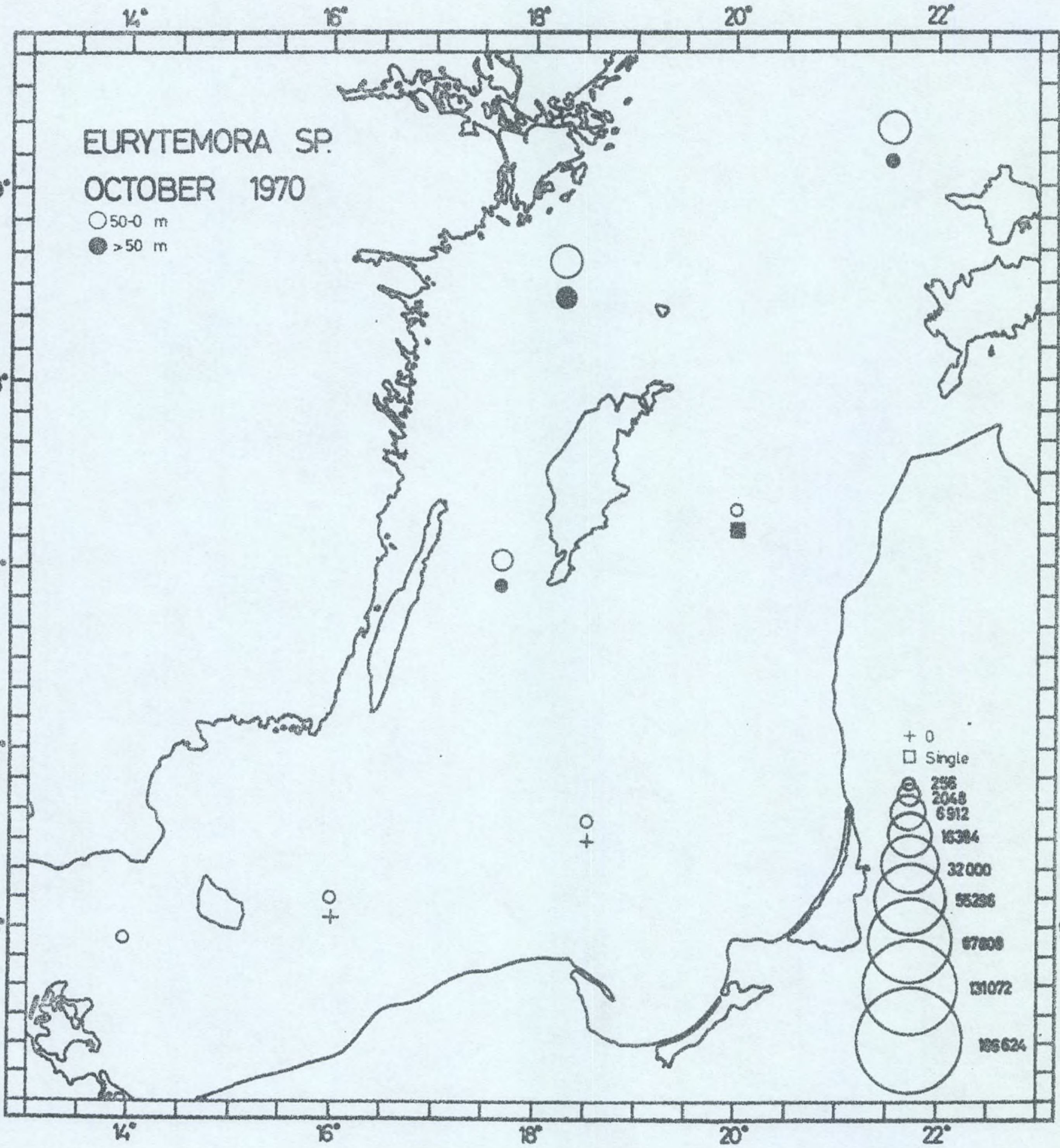
Fig 37.



EURYTEMORA SP.
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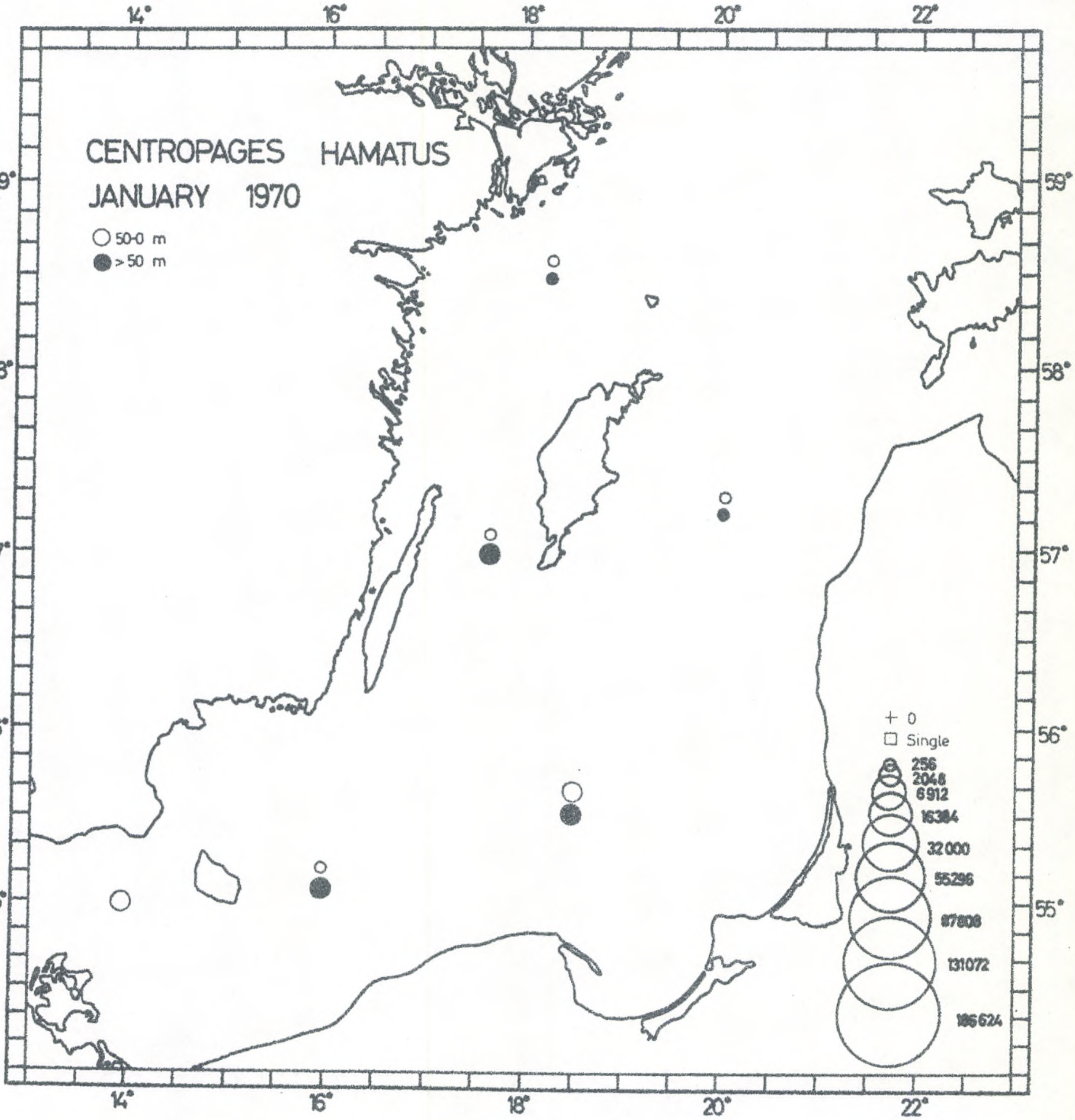
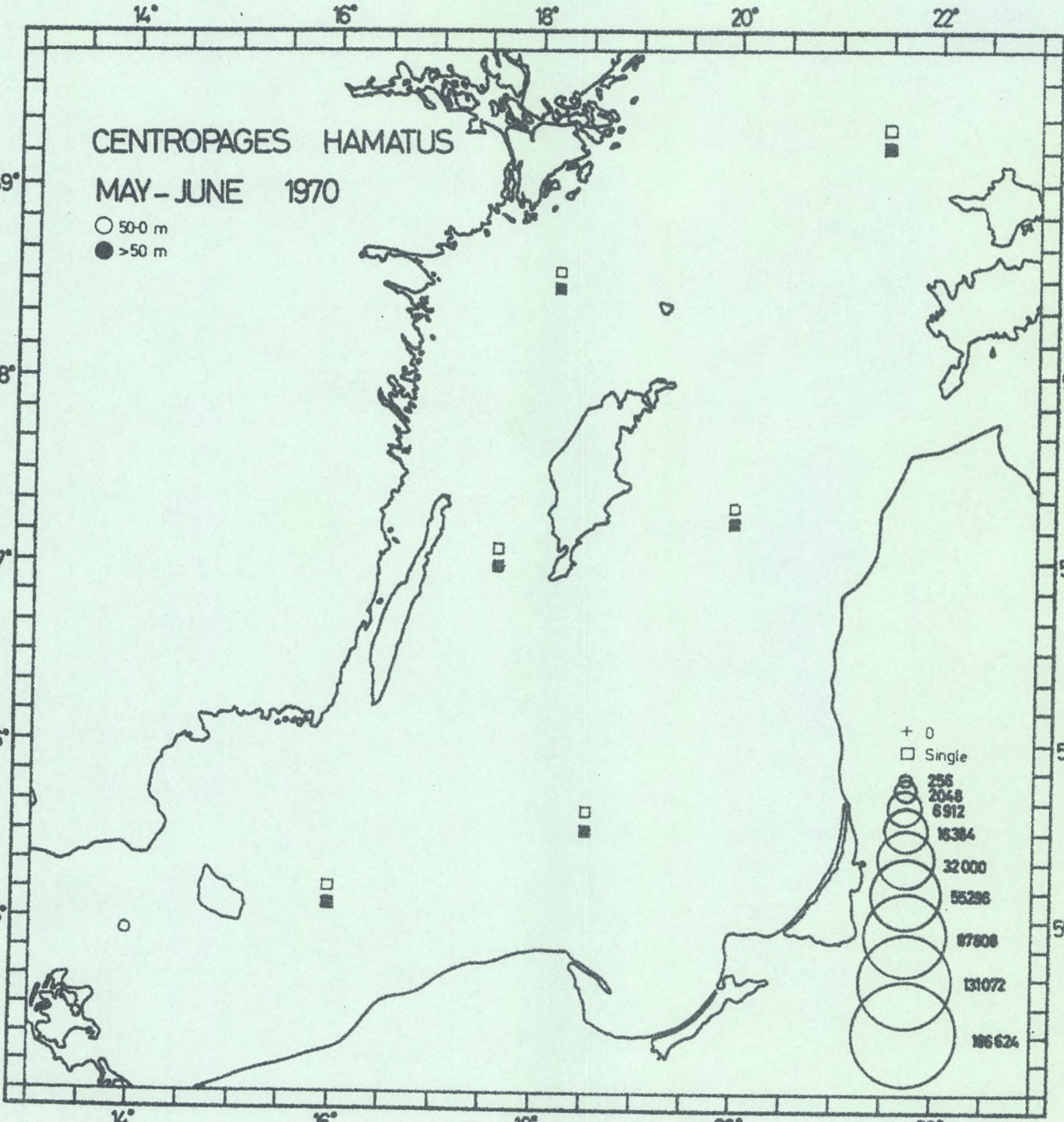
22°
59°
58°
57°
56°
55°

Fig 38.



CENTROPAGES HAMATUS
JANUARY 1970
50-0 m
> 50 m
+ 0
Single
256
2048
6912
16384
32000
55296
87808
131072
186624
14°
16°
18°
20°
22°
59°
58°
57°
56°
55°

Fig 39.



CENTROPAGES HAMATUS
MAY-JUNE 1970
50-0 m
>50 m
14°
16°
18°
20°
22°
59°
58°
57°
56°
55°
+ 0
Single
256
2048
6912
16384
32000
55296
87808
131072
186624

Fig 40.

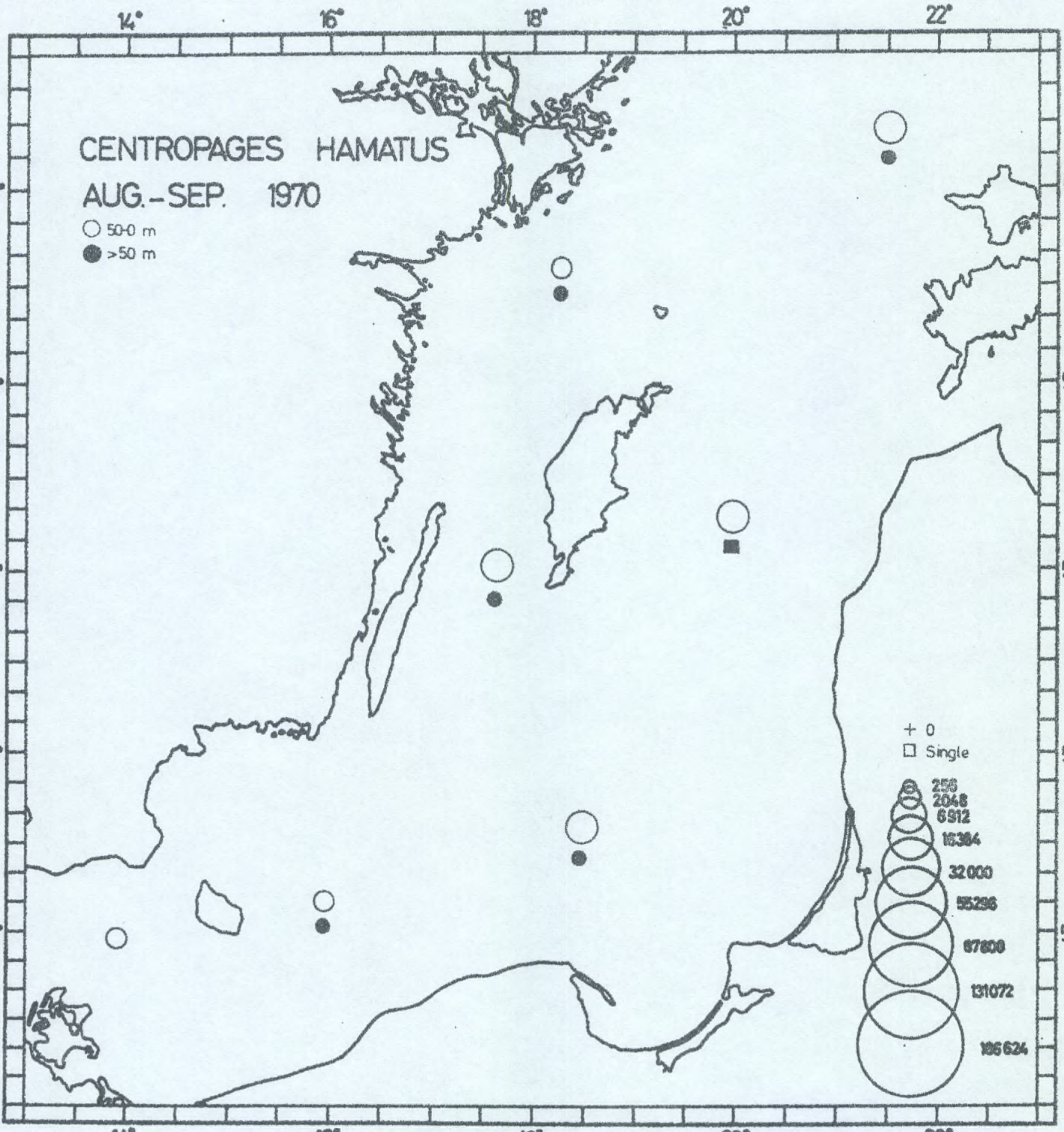

CENTROPAGES HAMATUS
AUG.-SEP. 1970
50-0 m
>50 m
+ 0
Single
256
2048
6912
16384
32000
55296
87808
131072
186624
14°
16°
18°
20°
22°
59°
58°
57°
56°
55°

Fig 41.

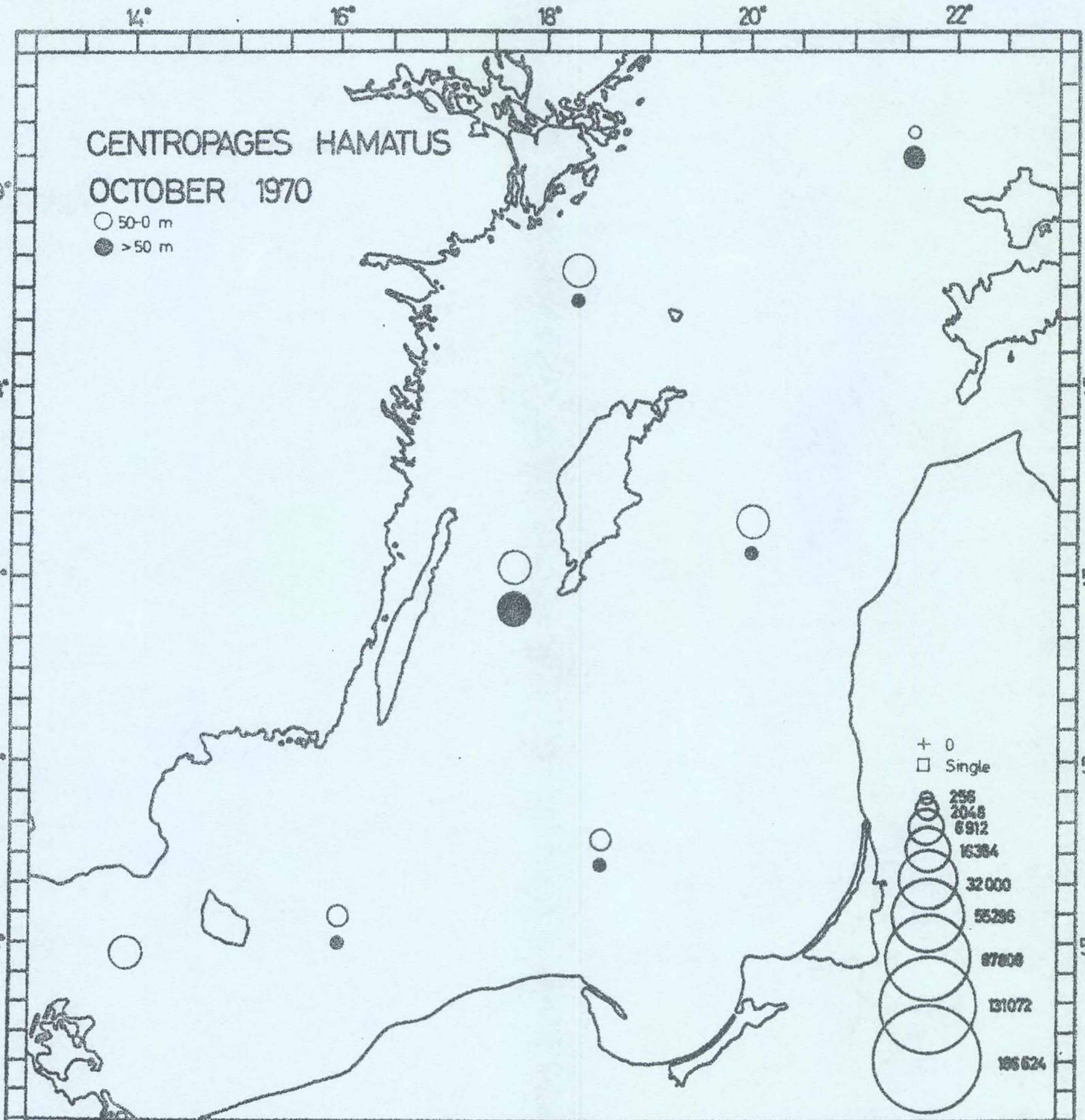

CENTROPAGES HAMATUS
OCTOBER 1970
50-0 m
>50 m
14°
16°
18°
20°
22°
59°
58°
57°
56°
55°
+ 0
Single
256
2048
6912
16384
32000
55296
87808
131072
186624

Fig 42.

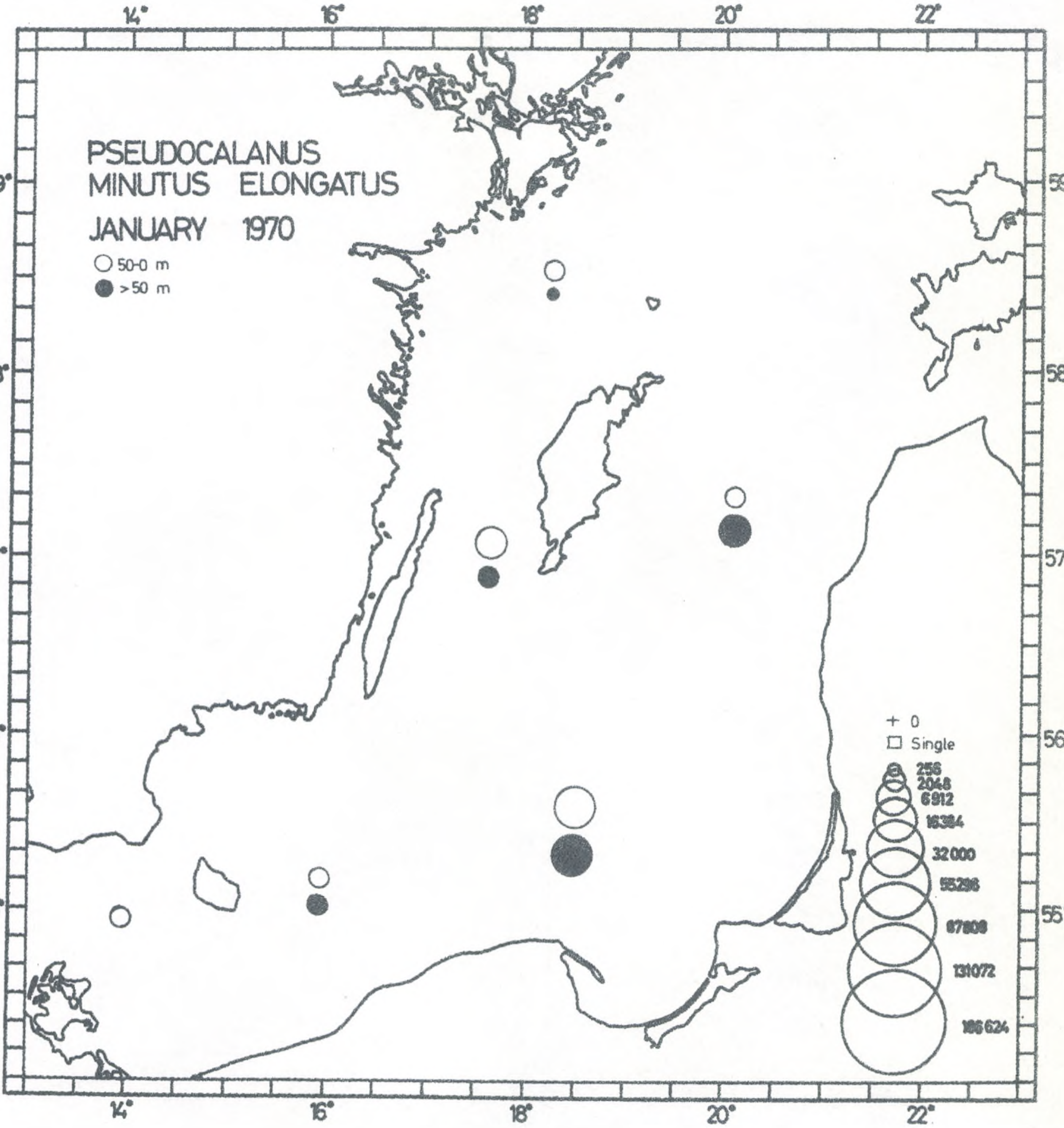
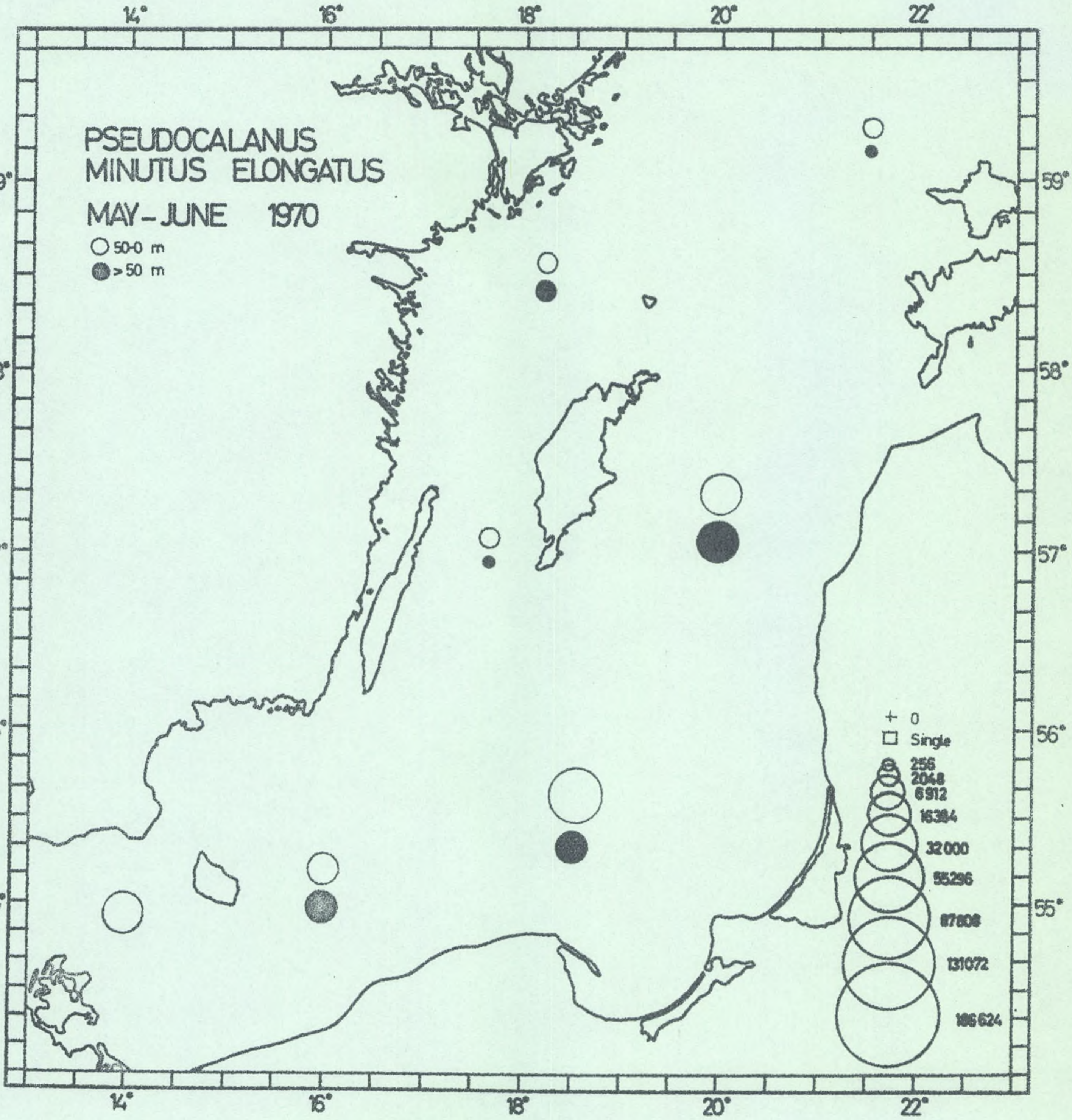

PSEUDOCALANUS
MINUTUS ELONGATUS
JANUARY 1970
50-0 m
>50 m
+ 0
Single
256
2048
6912
16384
32000
55296
87808
131072
186624
14°
16°
18°
20°
22°
59°
58°
57°
56°
55°

Fig 43.



14°
16°
18°
20°
22°
59°
58°
57°
56°
55°
PSEUDOCALANUS
MINUTUS ELONGATUS
MAY-JUNE 1970
50-0 m
>50 m
+ 0
Single
256
2048
6912
16384
32000
55296
87808
131072
186624

Fig 44.

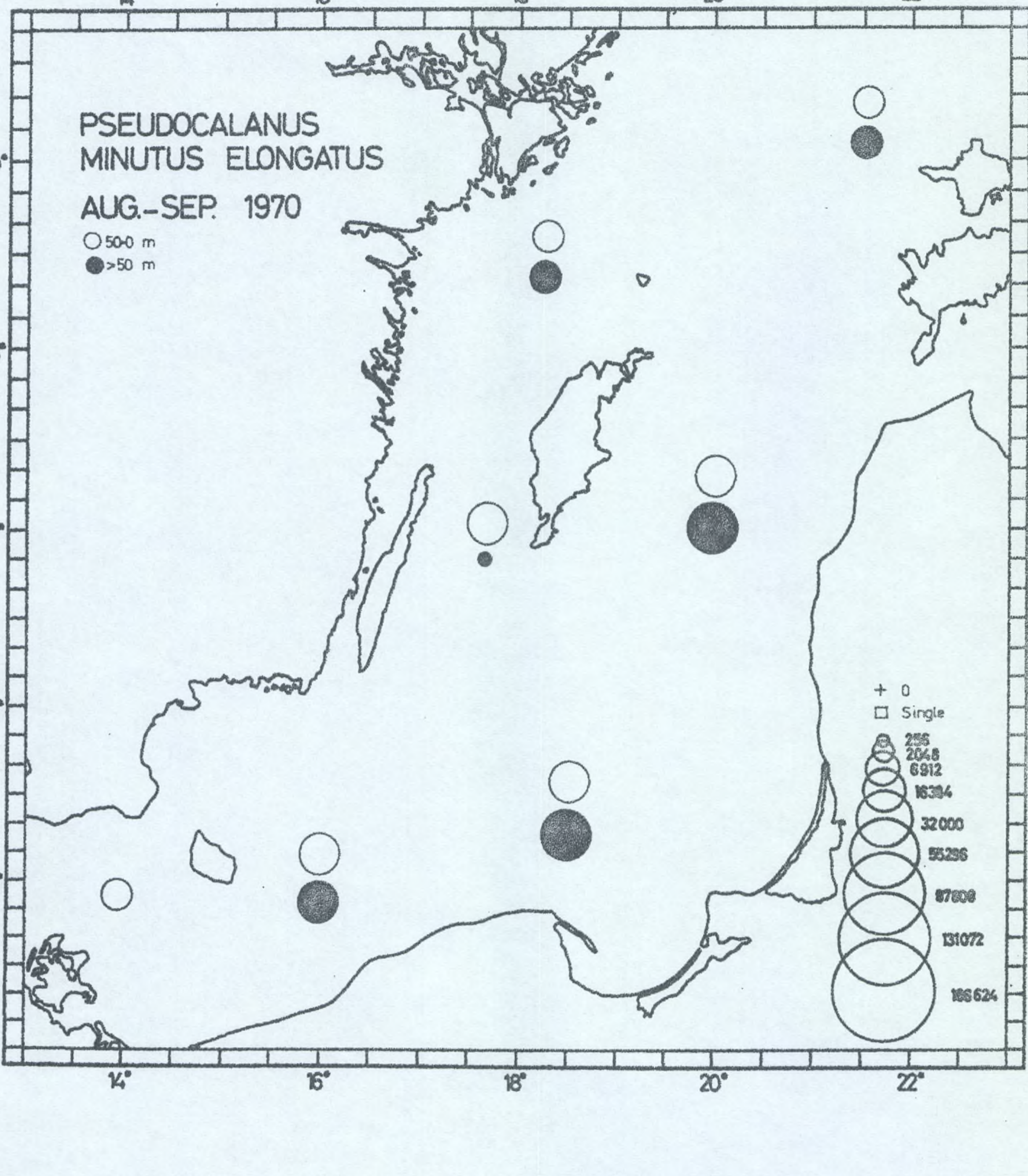

PSEUDOCALANUS
MINUTUS ELONGATUS
AUG.-SEP. 1970
50-0 m
>50 m
+ 0
Single
256
2048
6912
16384
32000
55296
87808
131072
186624
14°
16°
18°
20°
22°
59°
58°
57°
56°
55°

Fig 45.

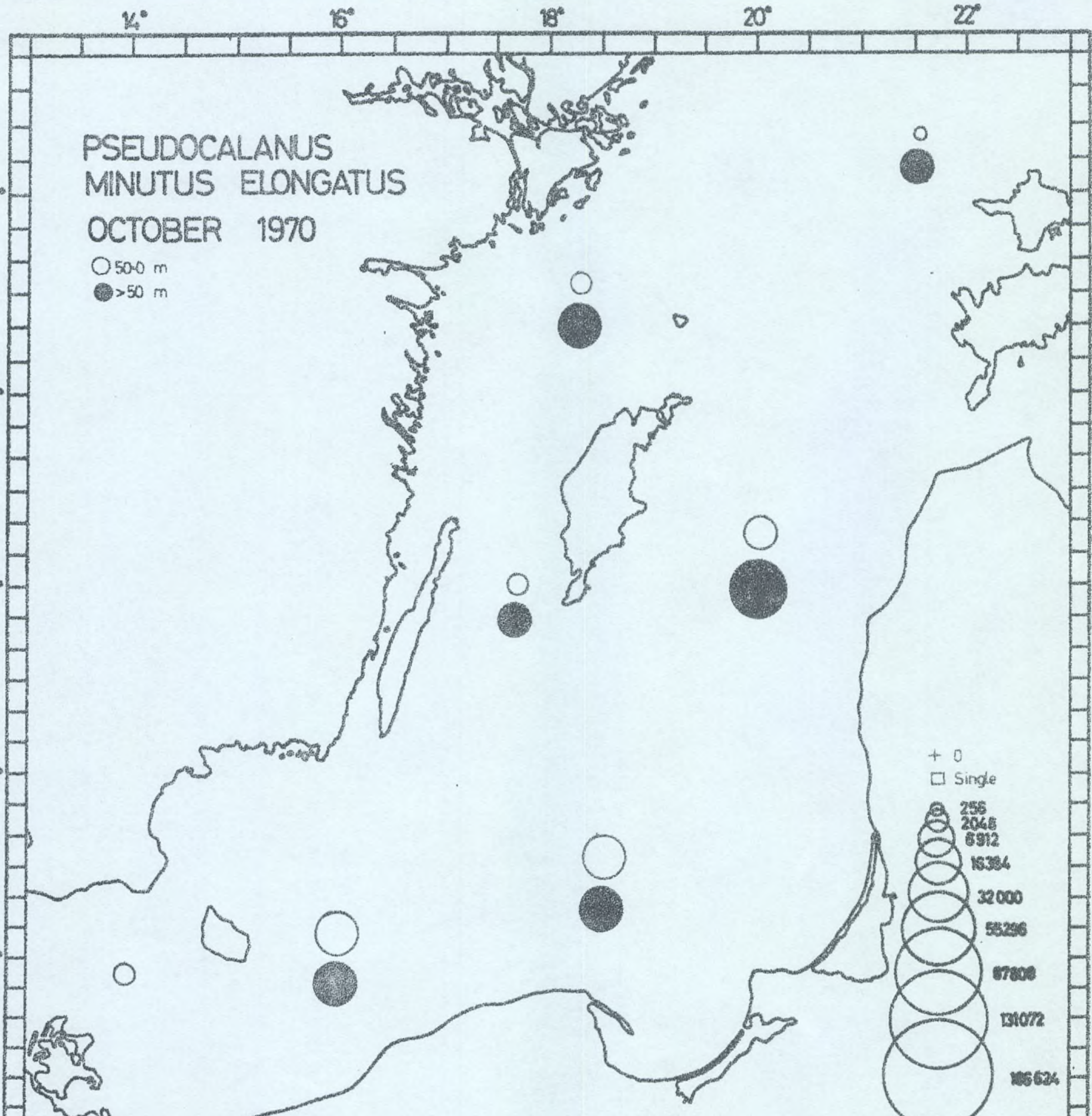

PSEUDOCALANUS
MINUTUS ELONGATUS
OCTOBER 1970
50-0 m
>50 m
+ 0
Single
256
2048
6912
16384
32 000
55296
87808
131072
185 624
14°
16°
18°
20°
22°
55°
56°
57°
58°
59°

Fig 46.

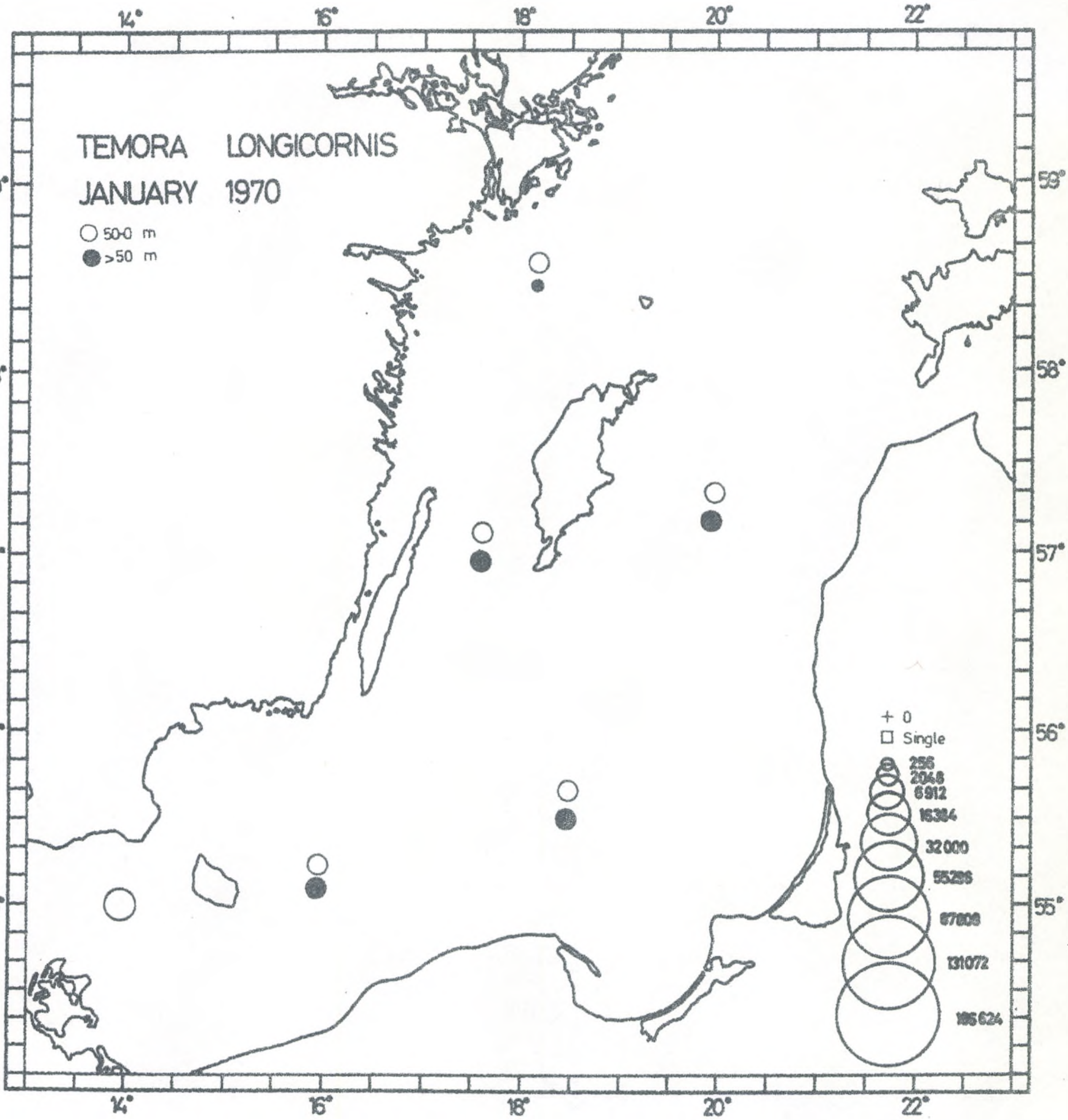
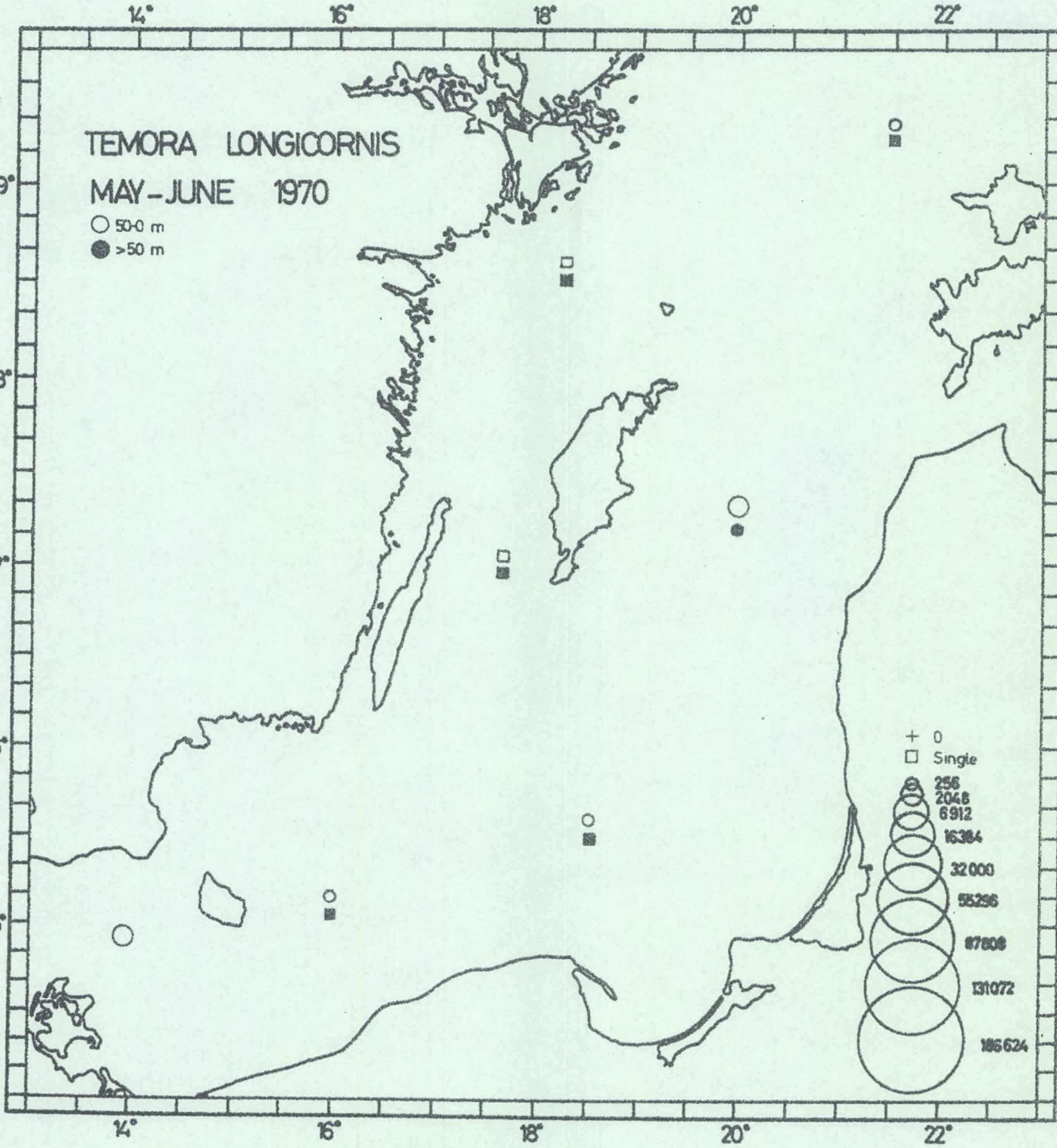
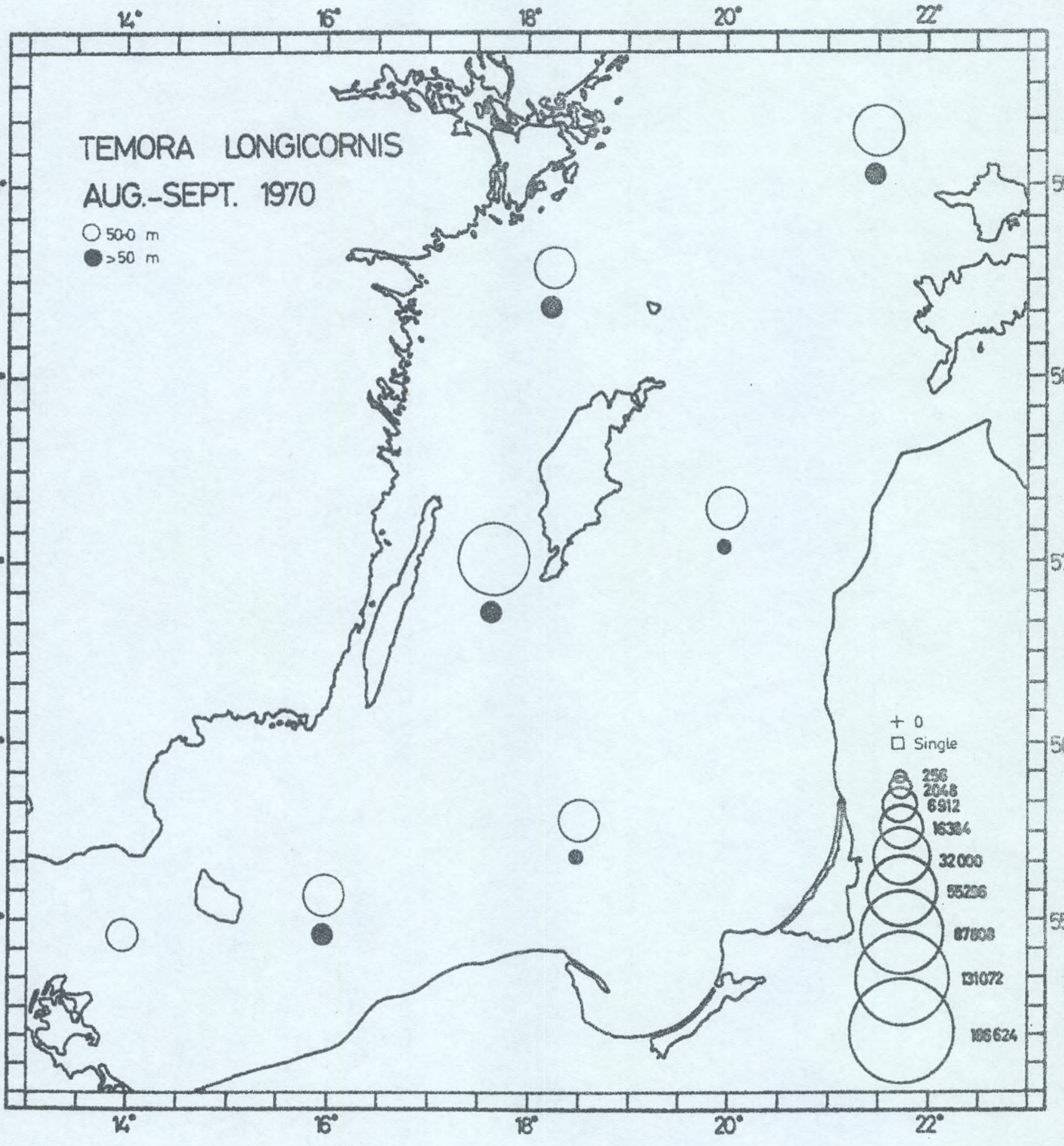

14°
16°
18°
20°
22°
59°
58°
57°
56°
55°
TEMORA LONGICORNIS
JANUARY 1970
50-0 m
>50 m
+ 0
Single
256
2048
6912
16384
32000
55296
87808
131072
186 624

Fig 47.



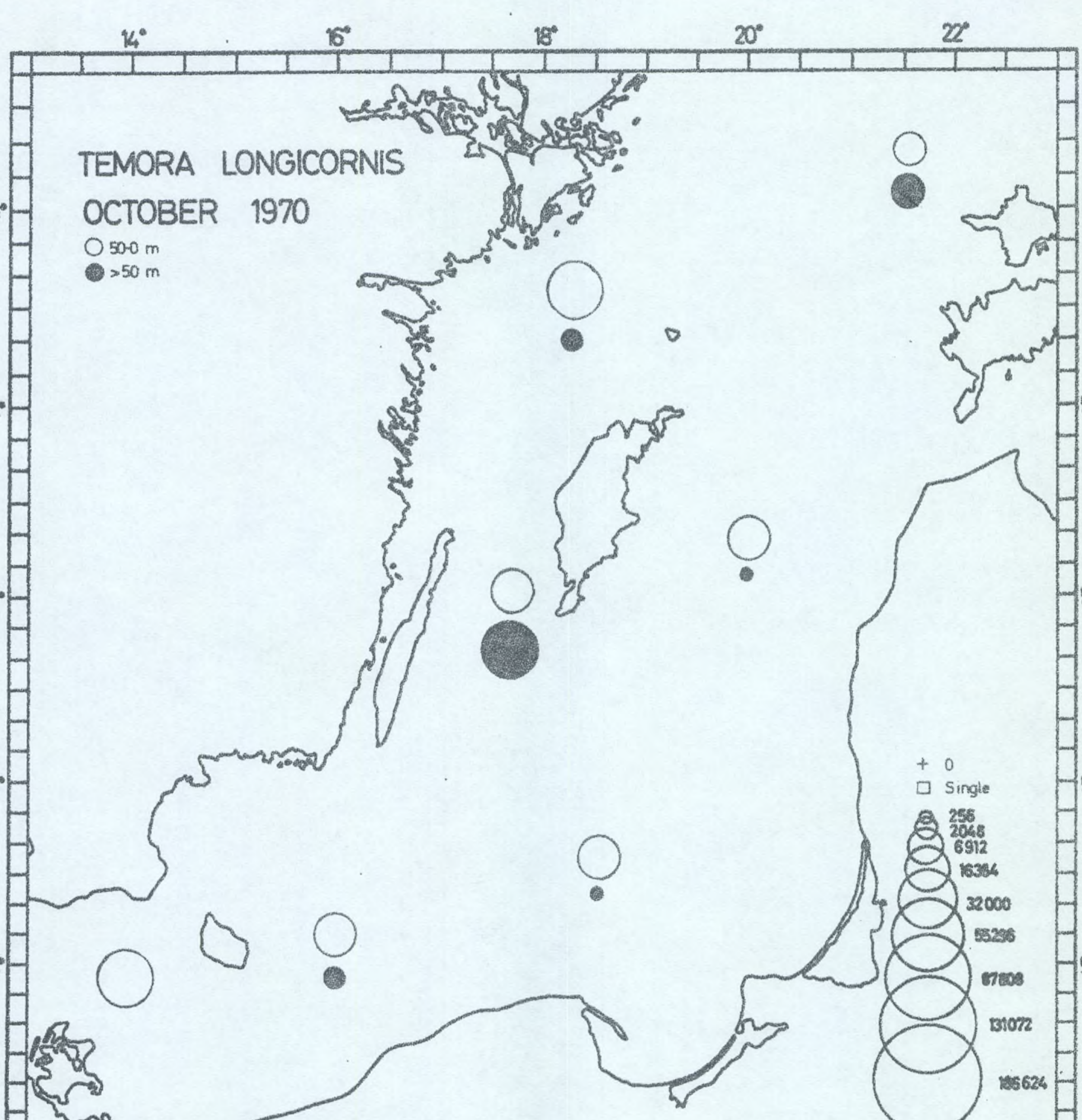
TEMORA LONGICORNIS
MAY-JUNE 1970
50-0 m
>50 m
14°
16°
18°
20°
22°
59°
58°
57°
56°
55°
+ 0
Single
256
2048
6912
16384
32000
55296
87808
131072
186624

Fig 48.



TEMORA LONGICORNIS
AUG.-SEPT. 1970
50-0 m
>50 m
14°
16°
18°
20°
22°
59°
58°
57°
56°
55°
+ 0
Single
256
2048
6912
16384
32000
55296
87808
131072
186624

Fig 49.



TEMORA LONGICORNIS
OCTOBER 1970
50-0 m
>50 m
14°
16°
18°
20°
22°
59°
58°
57°
56°
55°
+ 0
Single
256
2048
6912
16384
32000
55296
87808
131072
186624

Fig 50.

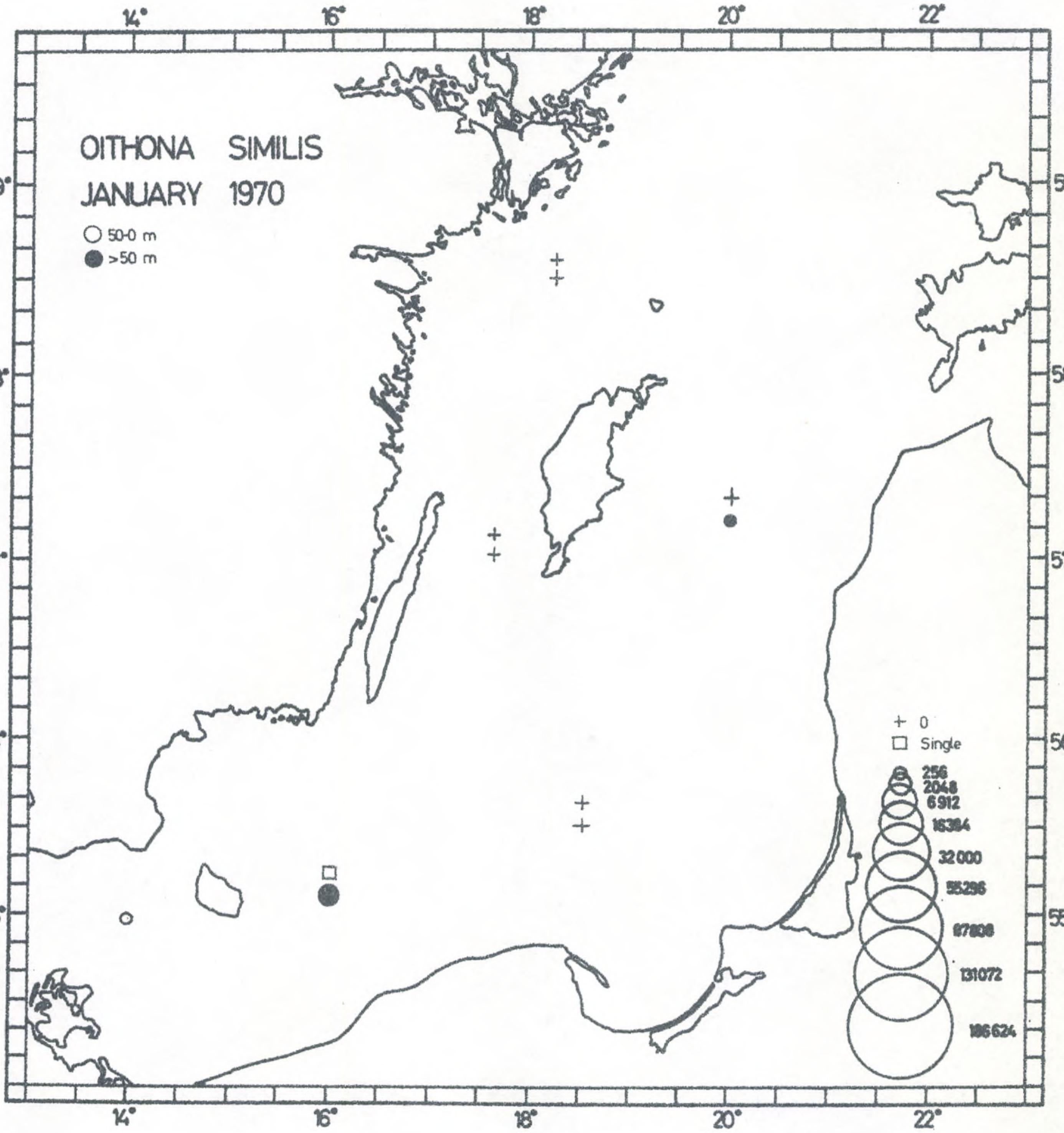

OITHONA SIMILIS
JANUARY 1970
50-0 m
>50 m
+ 0
Single
256
2048
6912
16384
32000
55296
87808
131072
186624
14°
16°
18°
20°
22°
55°
56°
57°
58°
59°

Fig 51.

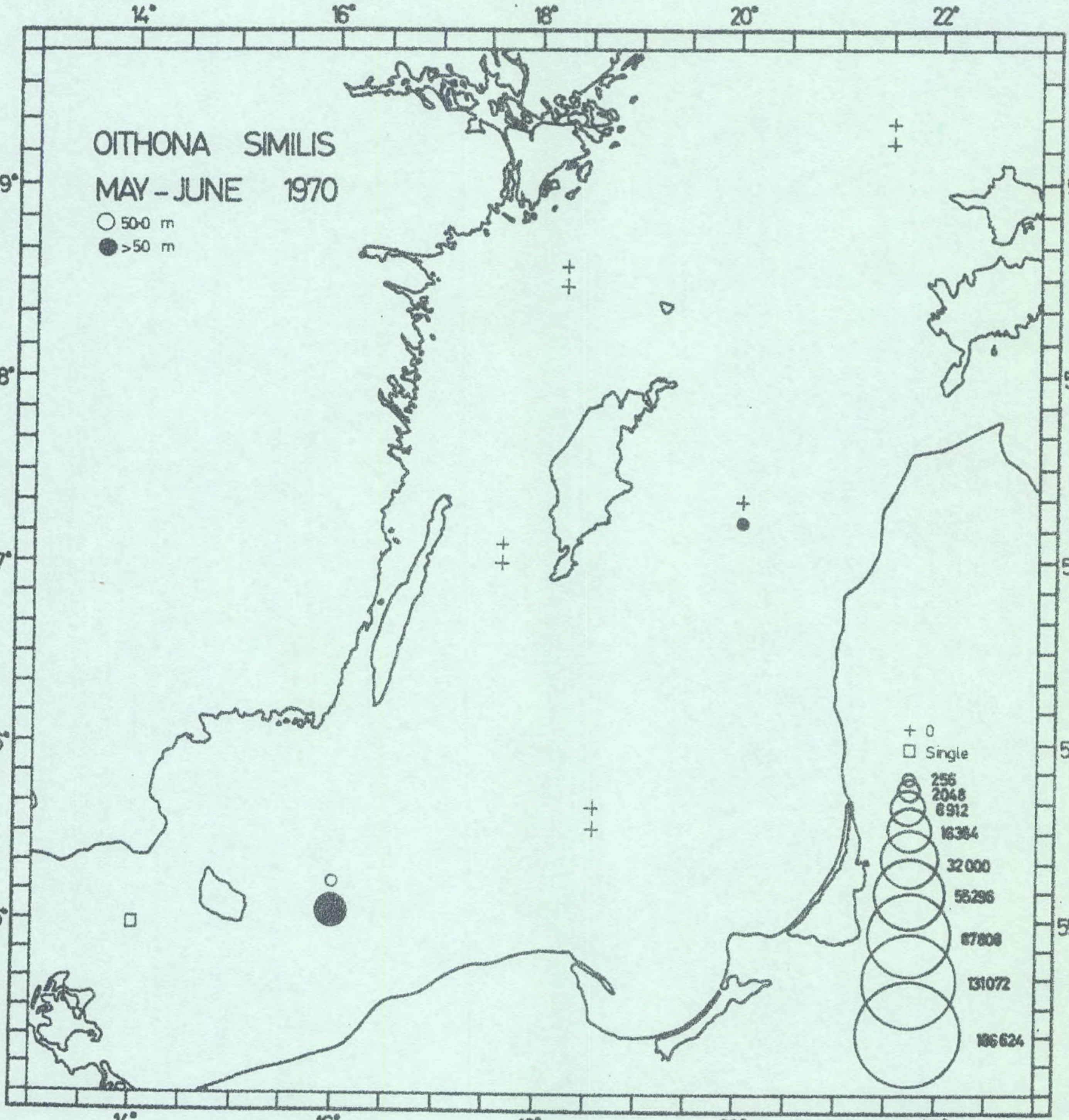
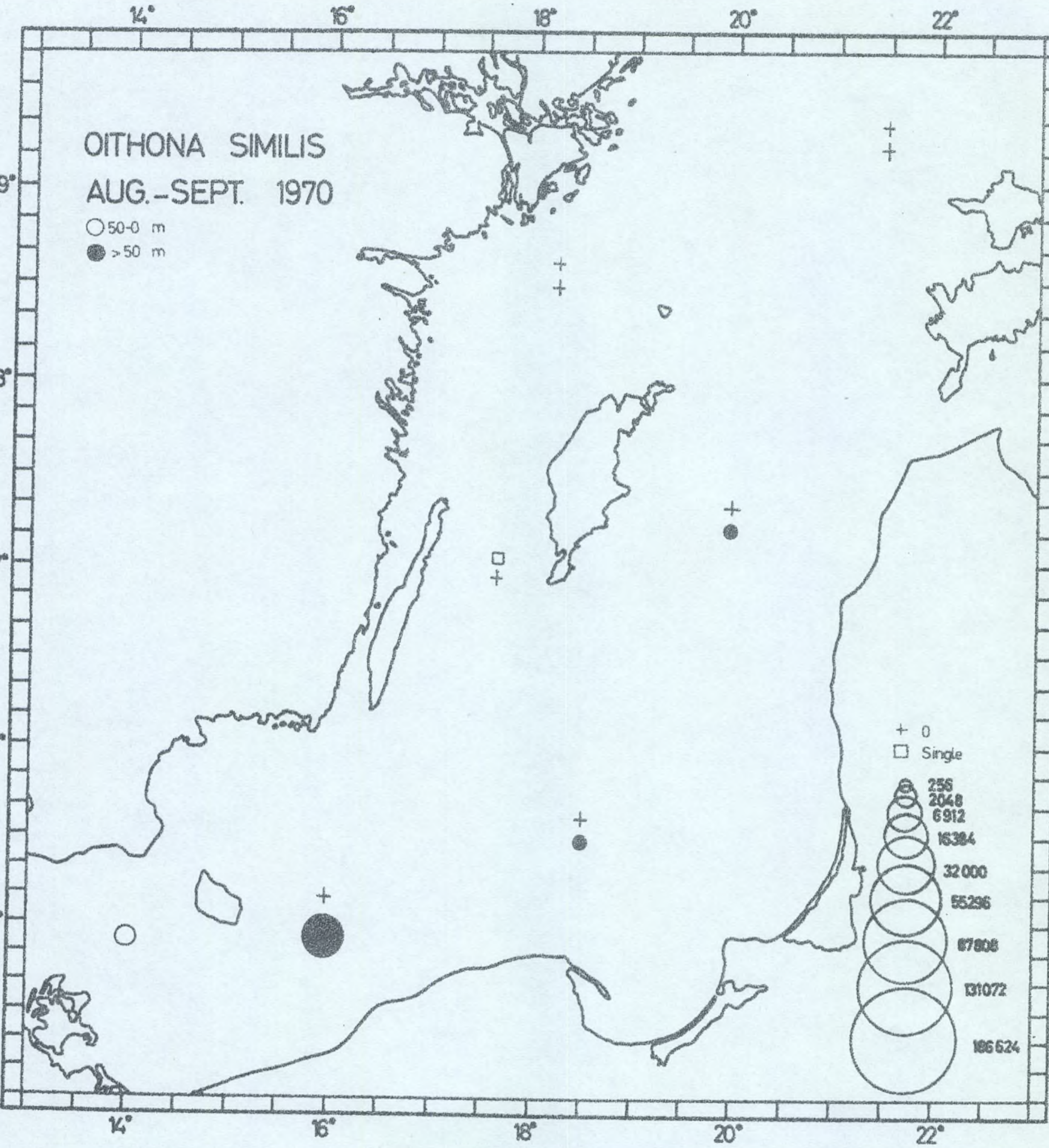
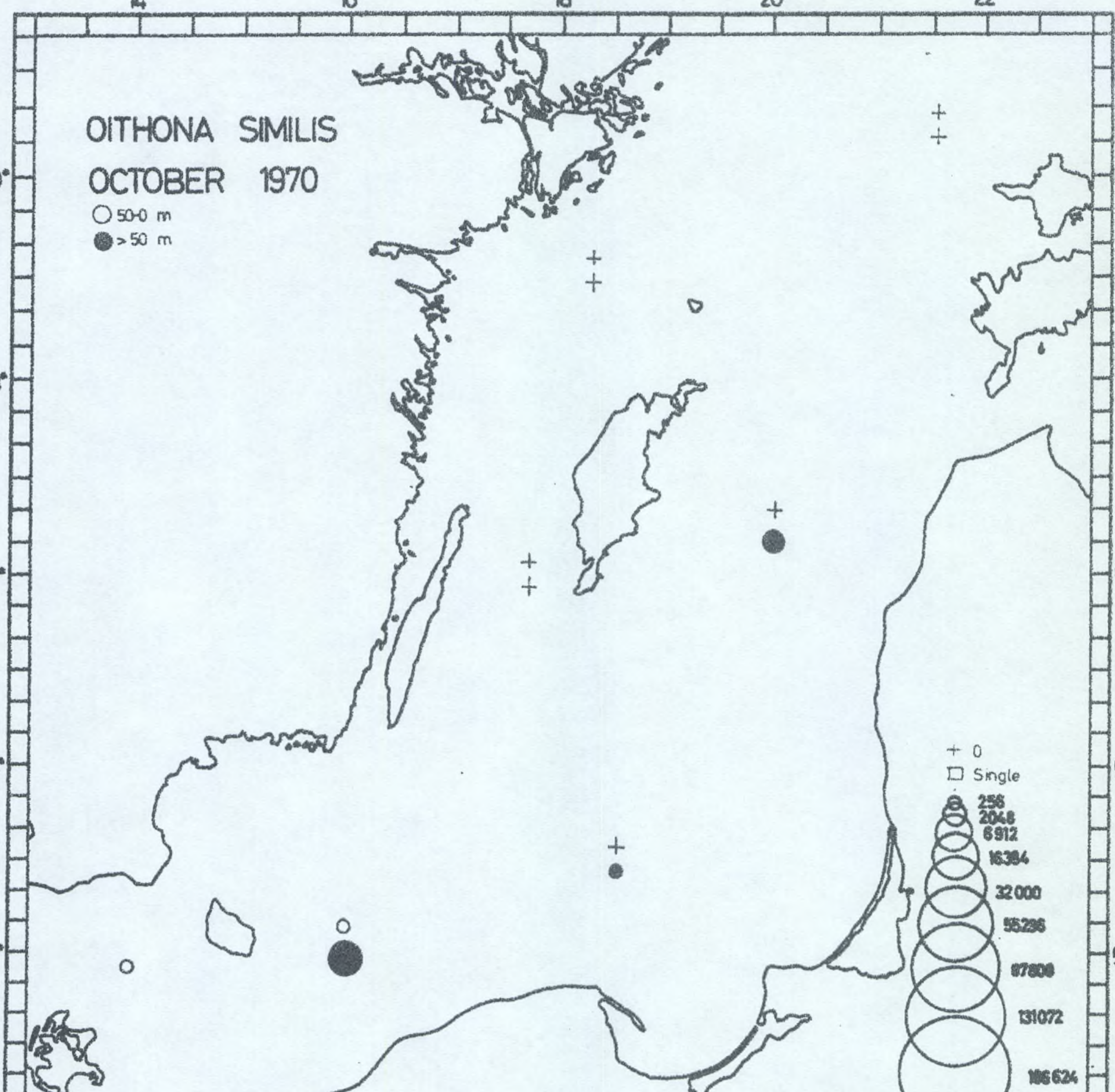

OITHONA SIMILIS
MAY - JUNE 1970
○ 50-0 m
● >50 m
+ 0
□ Single
256
2048
6912
16384
32000
58296
87808
131072
186624
14°
16°
18°
20°
22°
55°
56°
57°
58°
59°

Fig 52.



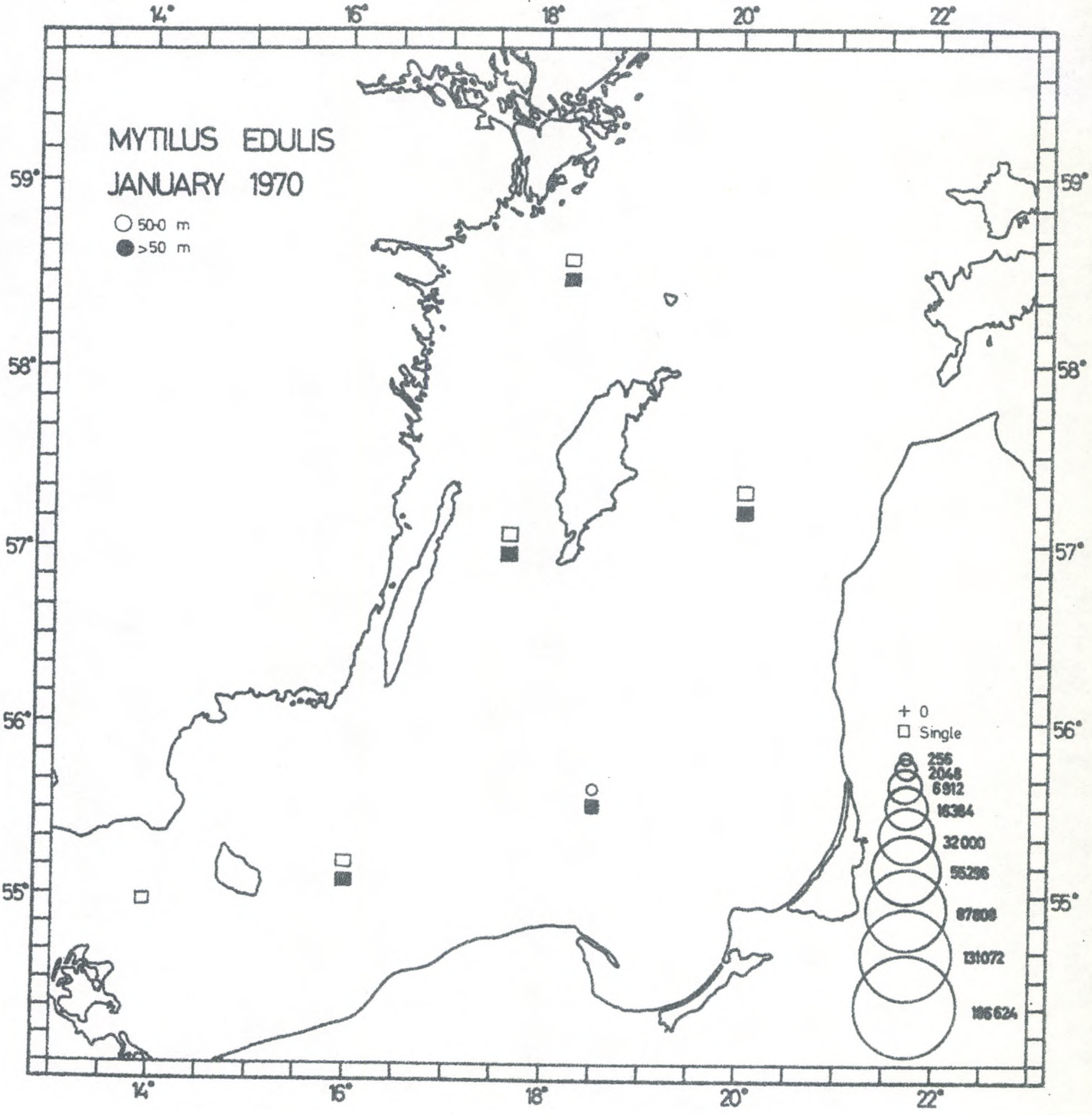
OITHONA SIMILIS
AUG.-SEPT. 1970
50-0 m
>50 m
14°
16°
18°
20°
22°
59°
58°
57°
56°
55°
+ 0
Single
256
2048
6912
16384
32000
55296
87808
131072
186624

Fig 53.



OITHONA SIMILIS
OCTOBER 1970
50-0 m
>50 m
14°
16°
18°
20°
22°
59°
58°
57°
56°
55°
+ 0
Single
256
2048
6912
16384
32000
55296
87808
131072
186624

Fig 54.



MYTILUS EDULIS
JANUARY 1970
50-0 m
>50 m
+ 0
Single
256
2048
6912
16384
32000
55296
87808
131072
186624
14°
16°
18°
20°
22°
55°
56°
57°
58°
59°

Fig 55.

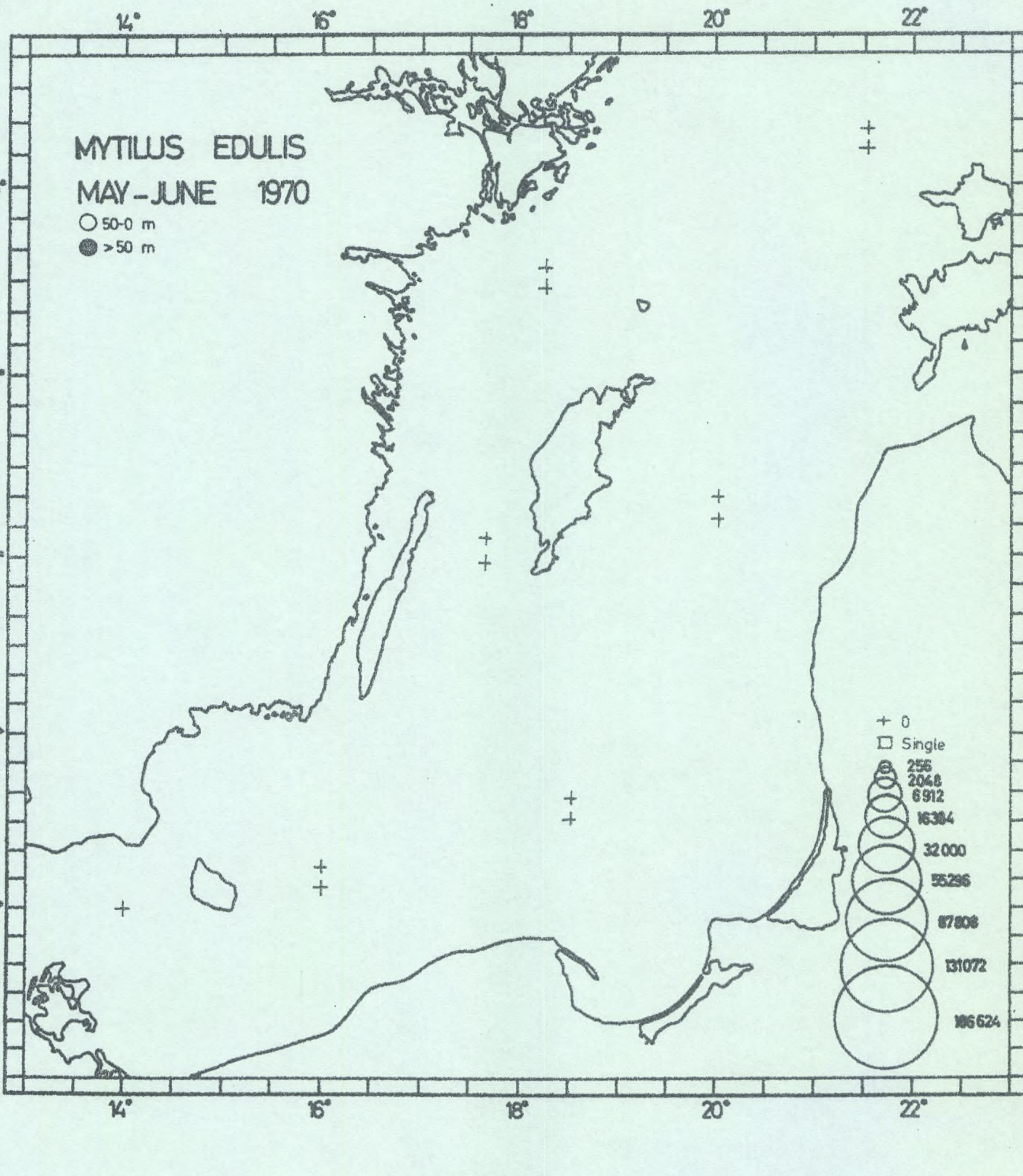
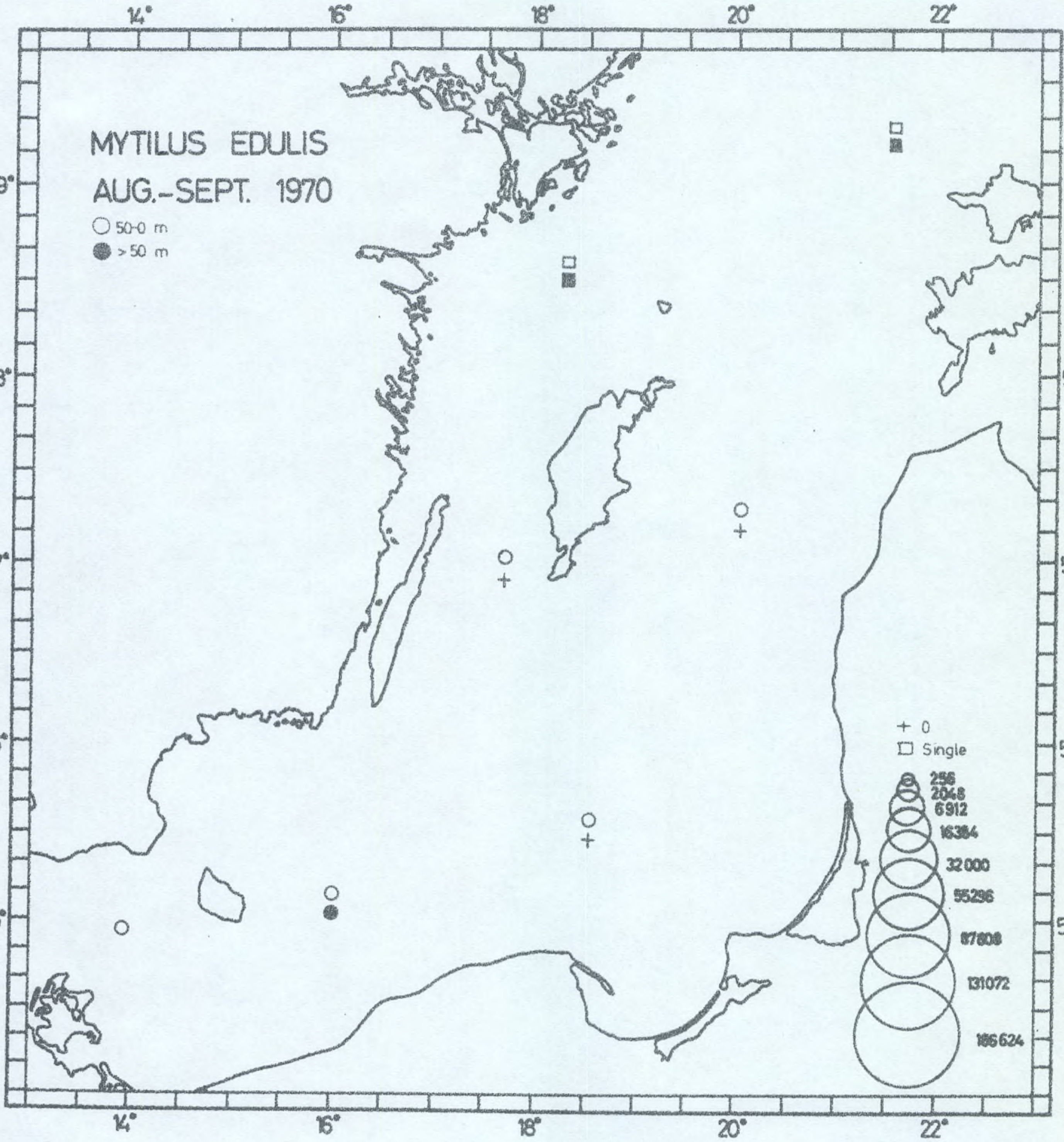
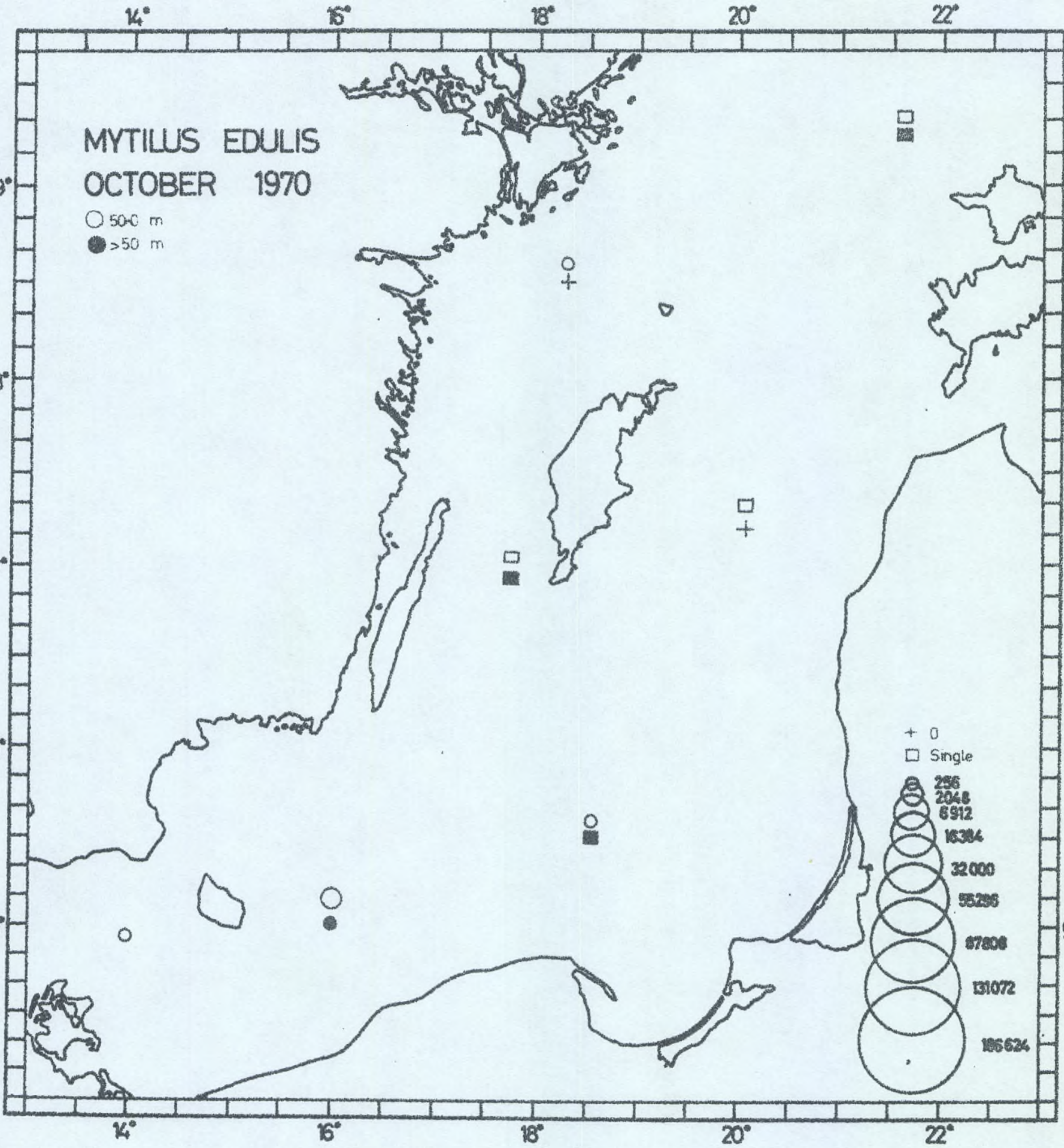

MYTILUS EDULIS
MAY-JUNE 1970
50-0 m
>50 m
+ 0
Single
256
2048
6912
16384
32000
55296
87808
131072
186624
14°
16°
18°
20°
22°
59°
58°
57°
56°
55°

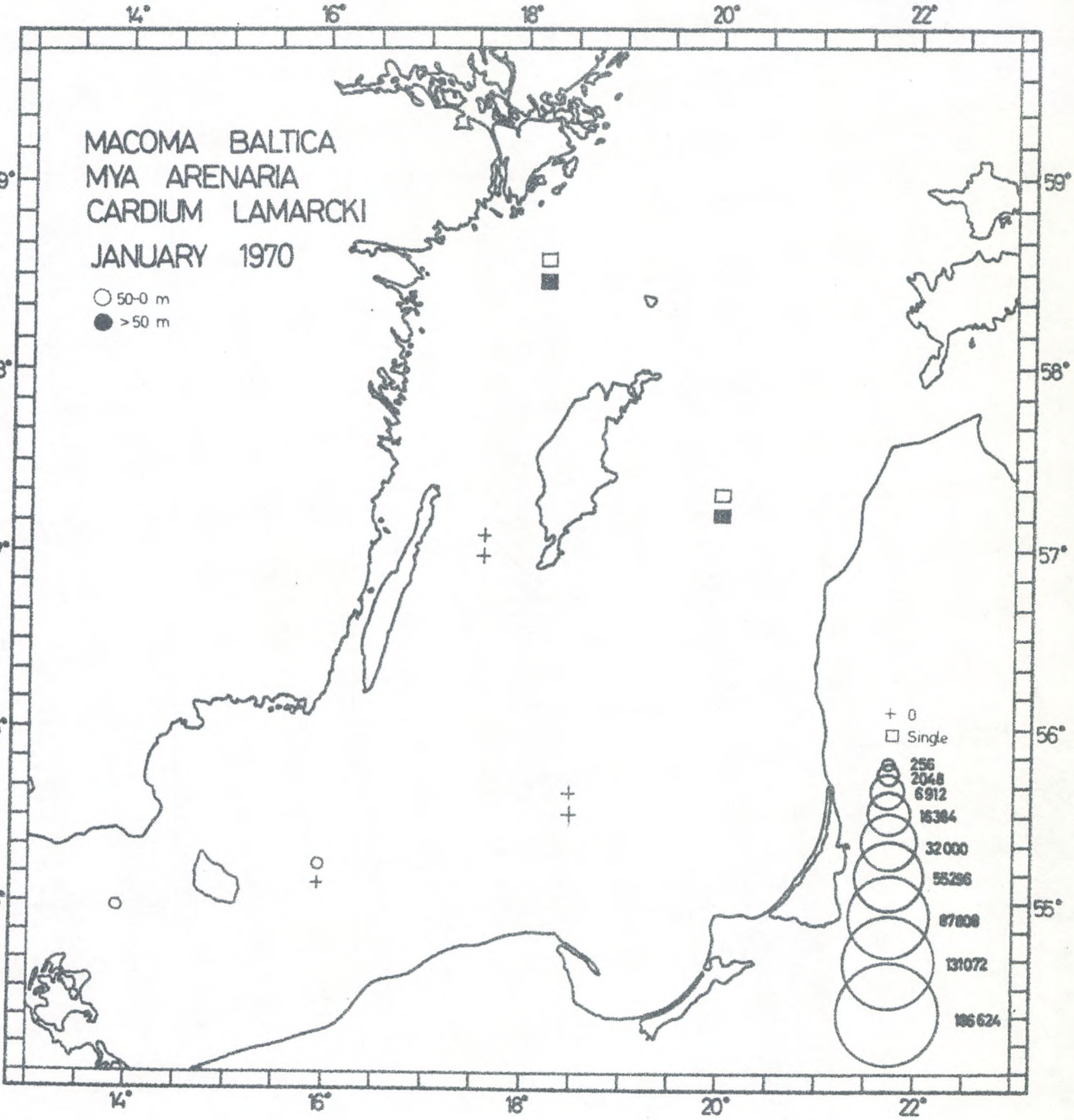
Fig 56.



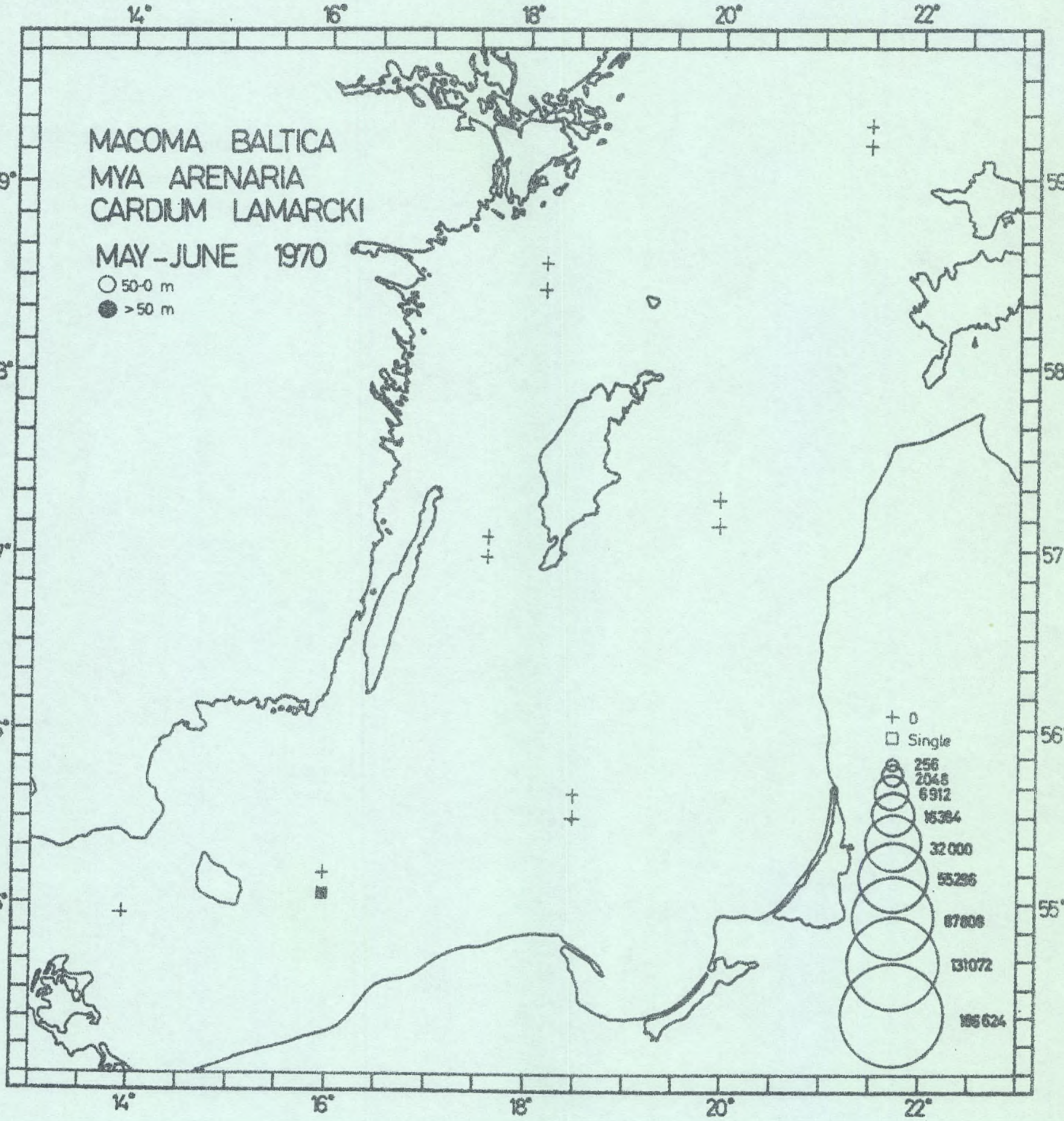
MYTILUS EDULIS
AUG.-SEPT. 1970
50-0 m
> 50 m
+ 0
Single
256
2048
6912
16384
32000
55296
87808
131072
186624
14°
16°
18°
20°
22°
59°
58°
57°
56°
55°

Fig 57.


14°
16°
18°
20°
22°
MYTILUS EDULIS
OCTOBER 1970
50-0 m
>50 m
59°
58°
57°
56°
55°
+ 0
Single
256
2048
6912
16384
32000
55296
87808
131072
186624

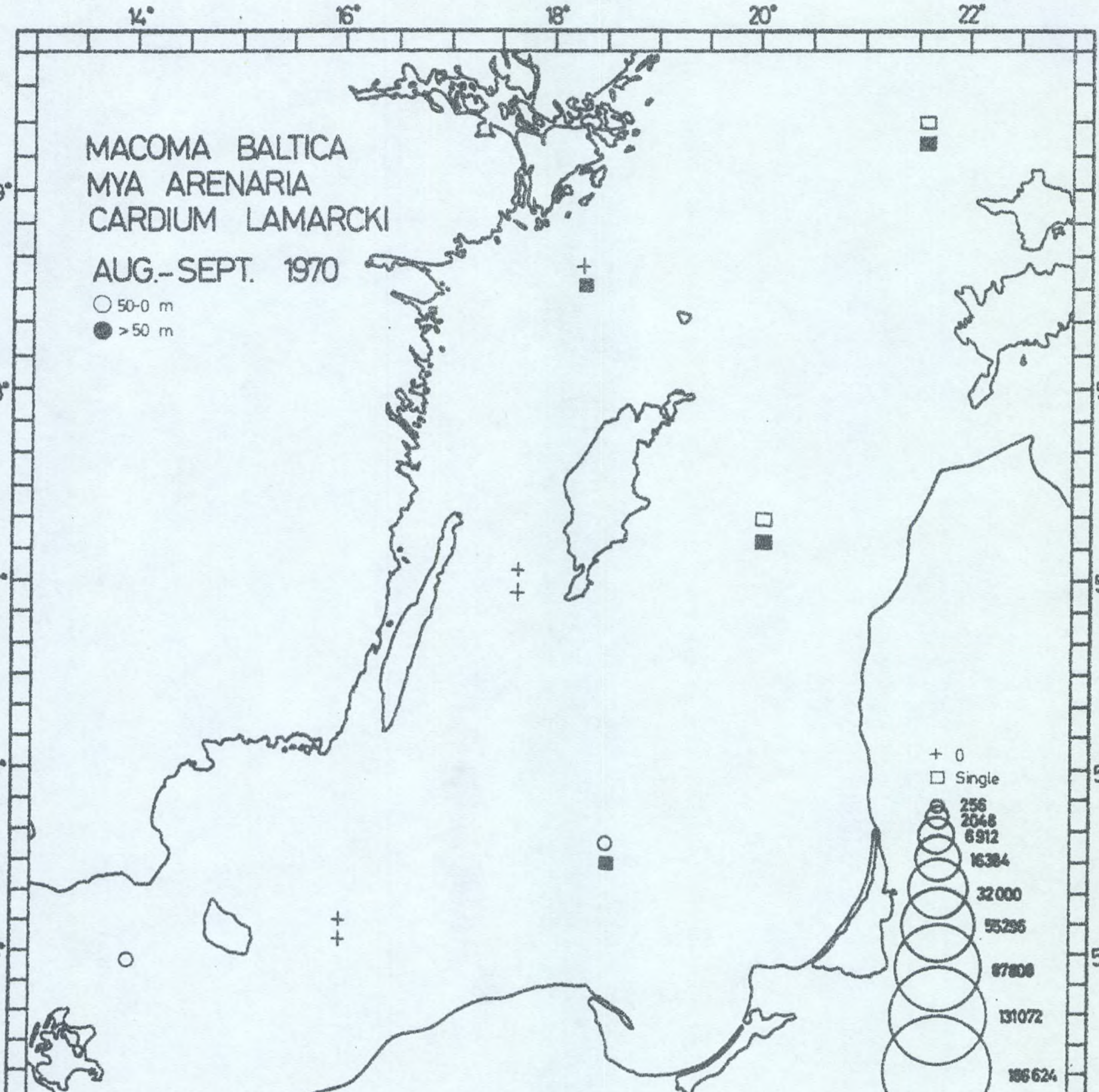


MACOMA BALTICA
MYA ARENARIA
CARDIUM LAMARCKI
JANUARY 1970
50-0 m
>50 m
+ 0
Single
256
2048
6912
16384
32000
55296
87808
131072
186624
14°
16°
18°
20°
22°
59°
58°
57°
56°
55°



MACOMA BALTICA
MYA ARENARIA
CARDIUM LAMARCKI
MAY-JUNE 1970
50-0 m
>50 m
+ 0
Single
256
2048
6912
16384
32 000
55296
87808
131072
186 624
14°
16°
18°
20°
22°
55°
56°
57°
58°
59°

Fig 60.



MACOMA BALTICA
MYA ARENARIA
CARDIUM LAMARCKI
AUG.-SEPT. 1970
50-0 m
>50 m
+ 0
Single
256
2048
6912
16384
32000
55296
87808
131072
186624
14°
16°
18°
20°
22°
59°
58°
57°
56°
55°

Fig 61.

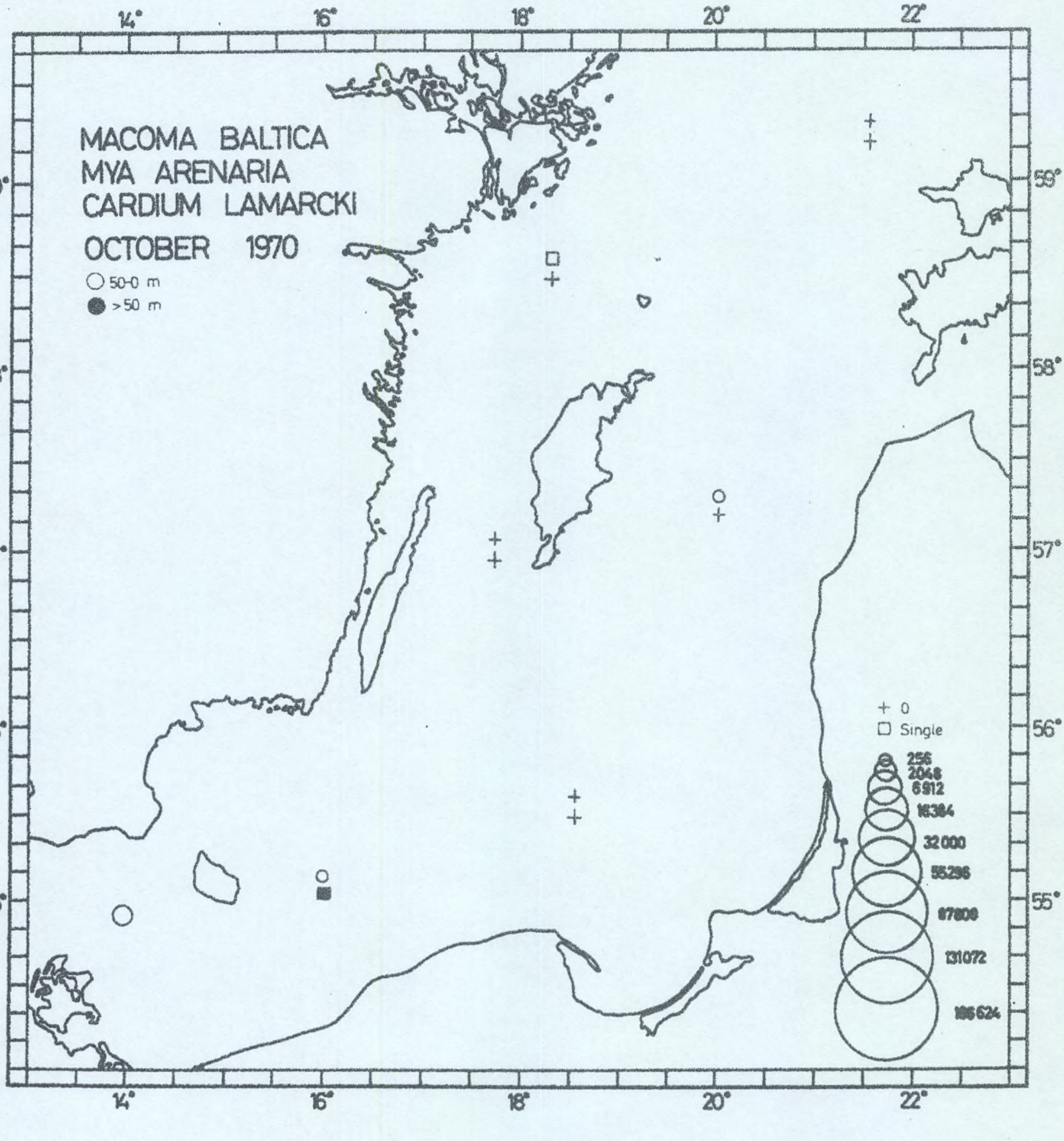

MACOMA BALTICA
MYA ARENARIA
CARDIUM LAMARCKI
OCTOBER 1970
50-0 m
>50 m
14°
16°
18°
20°
22°
59°
58°
57°
56°
55°
+ 0
Single
256
2048
6912
16384
32000
55296
87808
131072
186624

Fig 62.

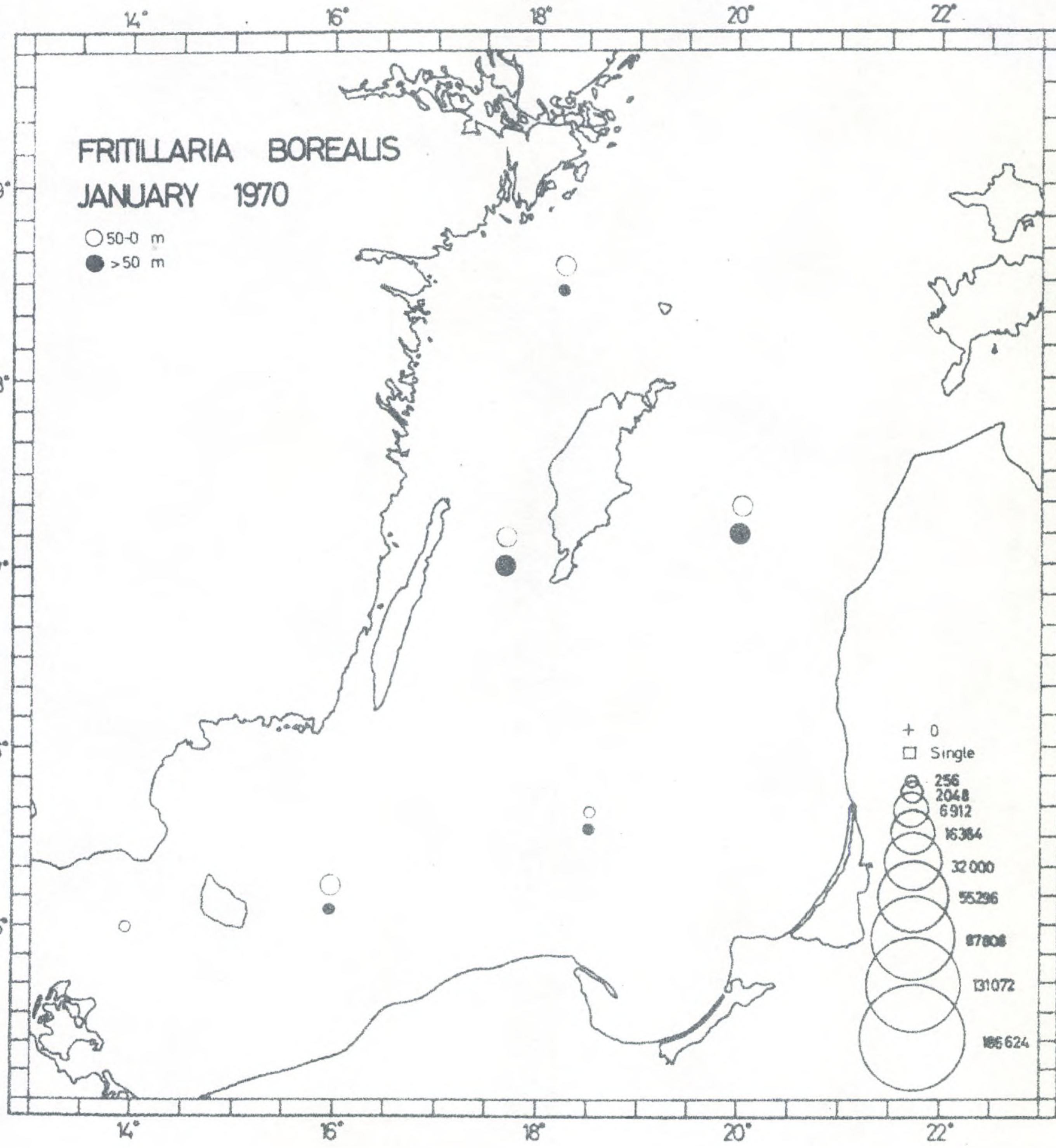

14°
16°
18°
20°
22°
FRITILLARIA BOREALIS
JANUARY 1970
50-0 m
>50 m
59°
58°
57°
56°
55°
+ 0
Single
256
2048
6912
16384
32000
55296
87808
131072
186624

Fig 63.

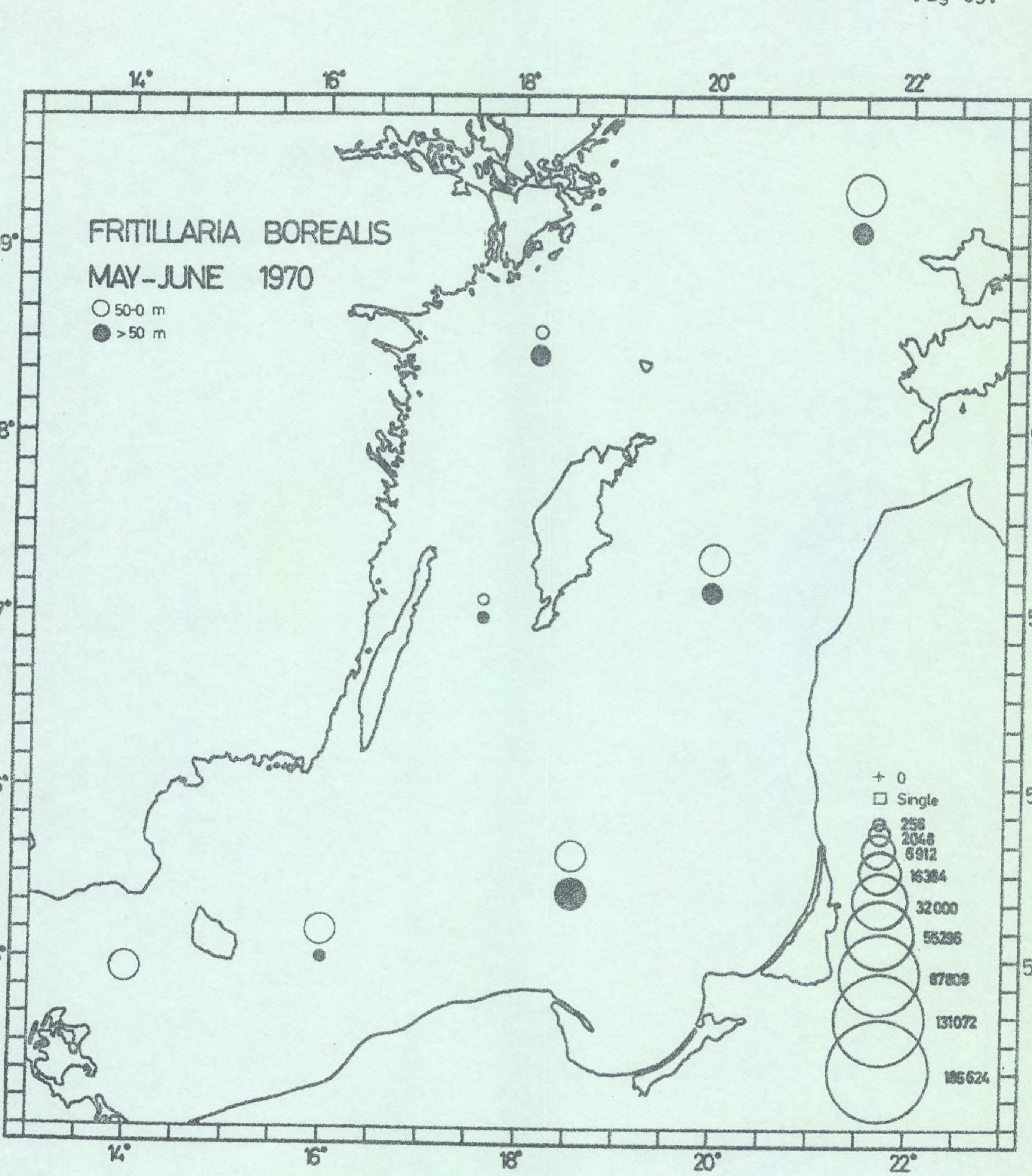

FRITILLARIA BOREALIS
MAY-JUNE 1970
50-0 m
> 50 m
14°
16°
18°
20°
22°
59°
58°
57°
56°
55°
+ 0
Single
256
2048
6912
16384
32000
55296
87808
131072
186624

Fig 64.

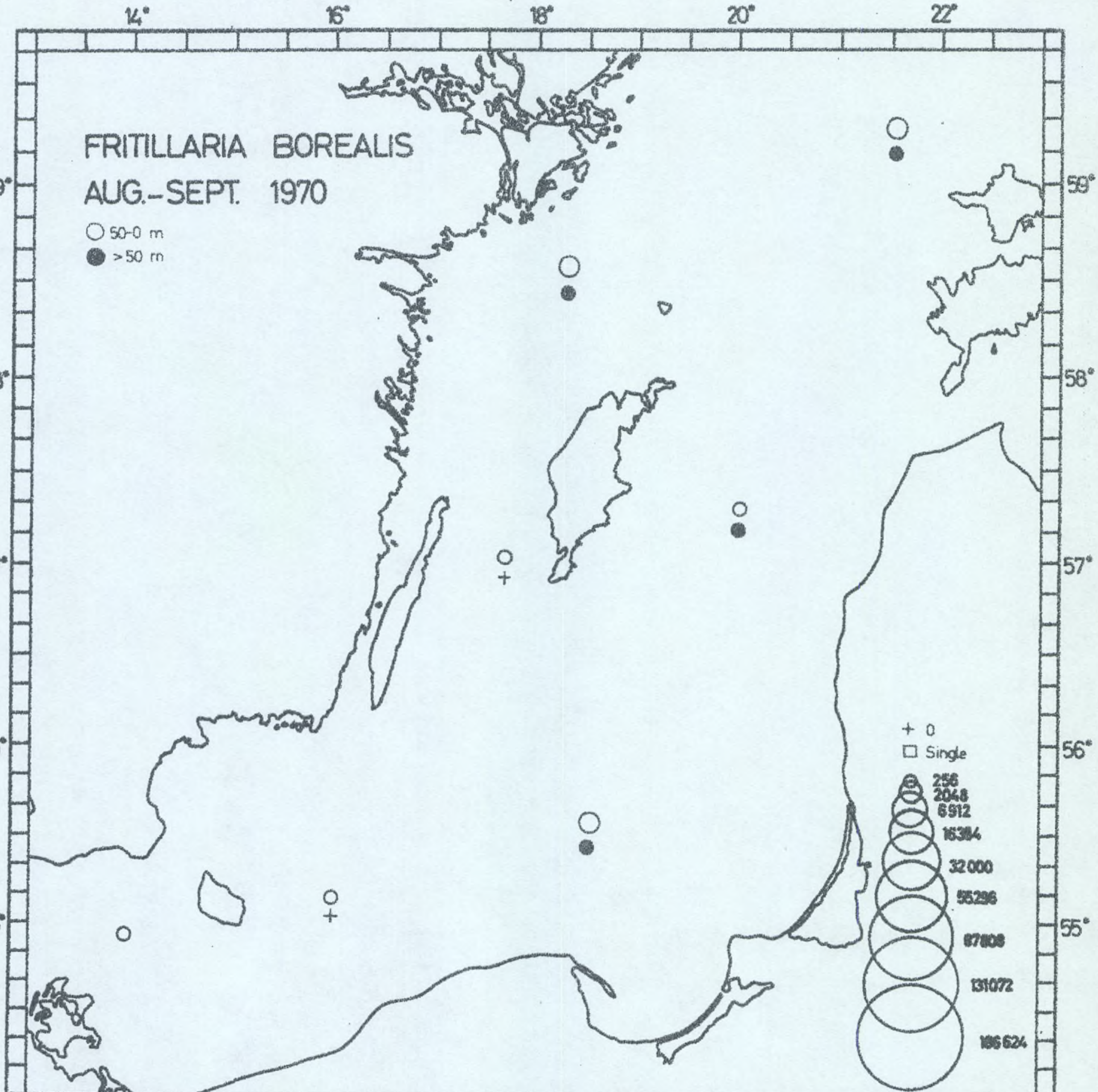
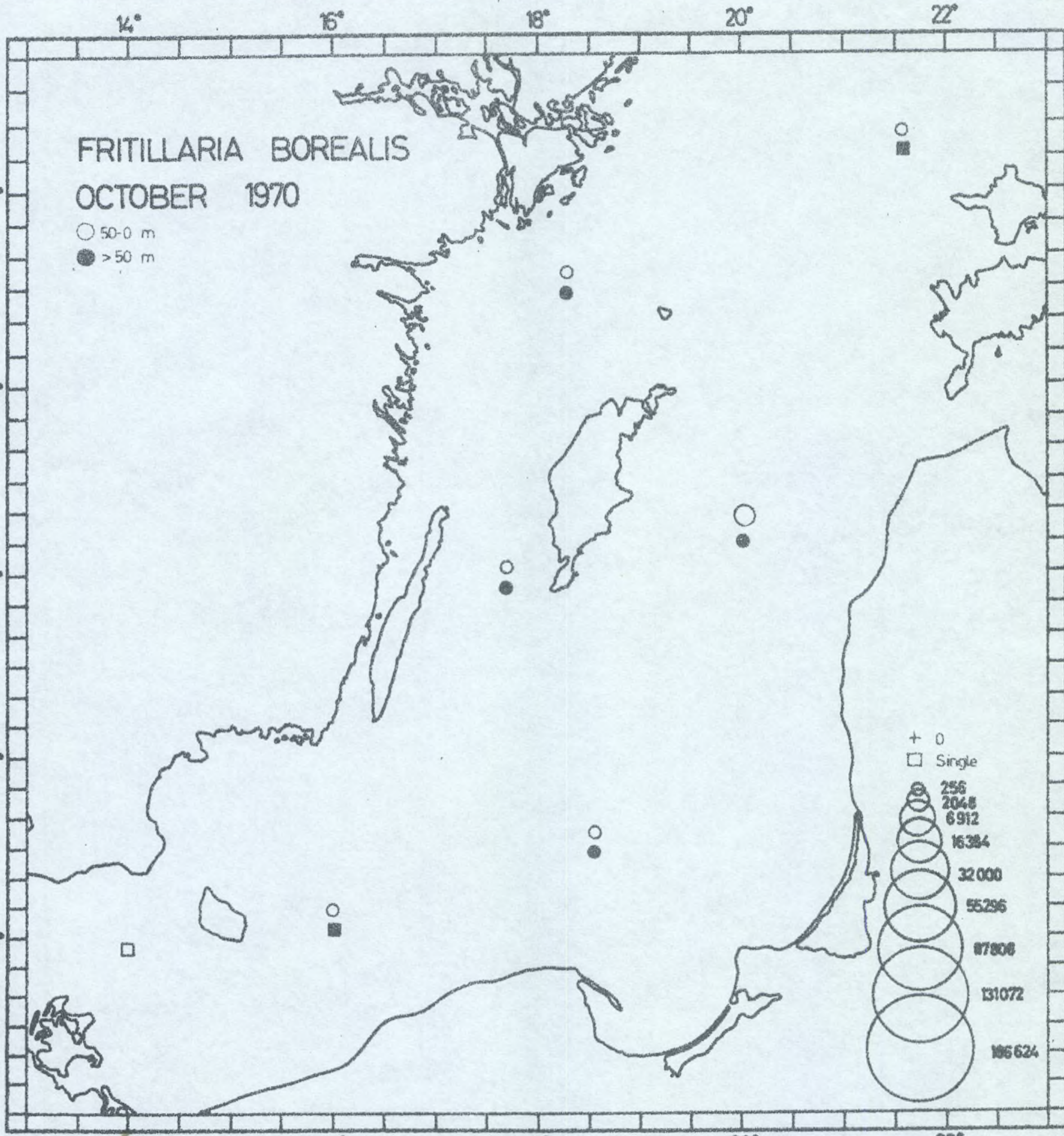

FRITILLARIA BOREALIS
AUG.-SEPT. 1970
50-0 m
>50 m
+ 0
Single
256
2048
6912
16384
32000
55296
87808
131072
186624
14°
16°
18°
20°
22°
59°
58°
57°
56°
55°

Fig 65.



FRITILLARIA BOREALIS
OCTOBER 1970
50-0 m
>50 m
14°
16°
18°
20°
22°
59°
58°
57°
56°
55°
+ 0
Single
256
2048
6912
16384
32000
55296
87808
131072
186624

Fig 66.

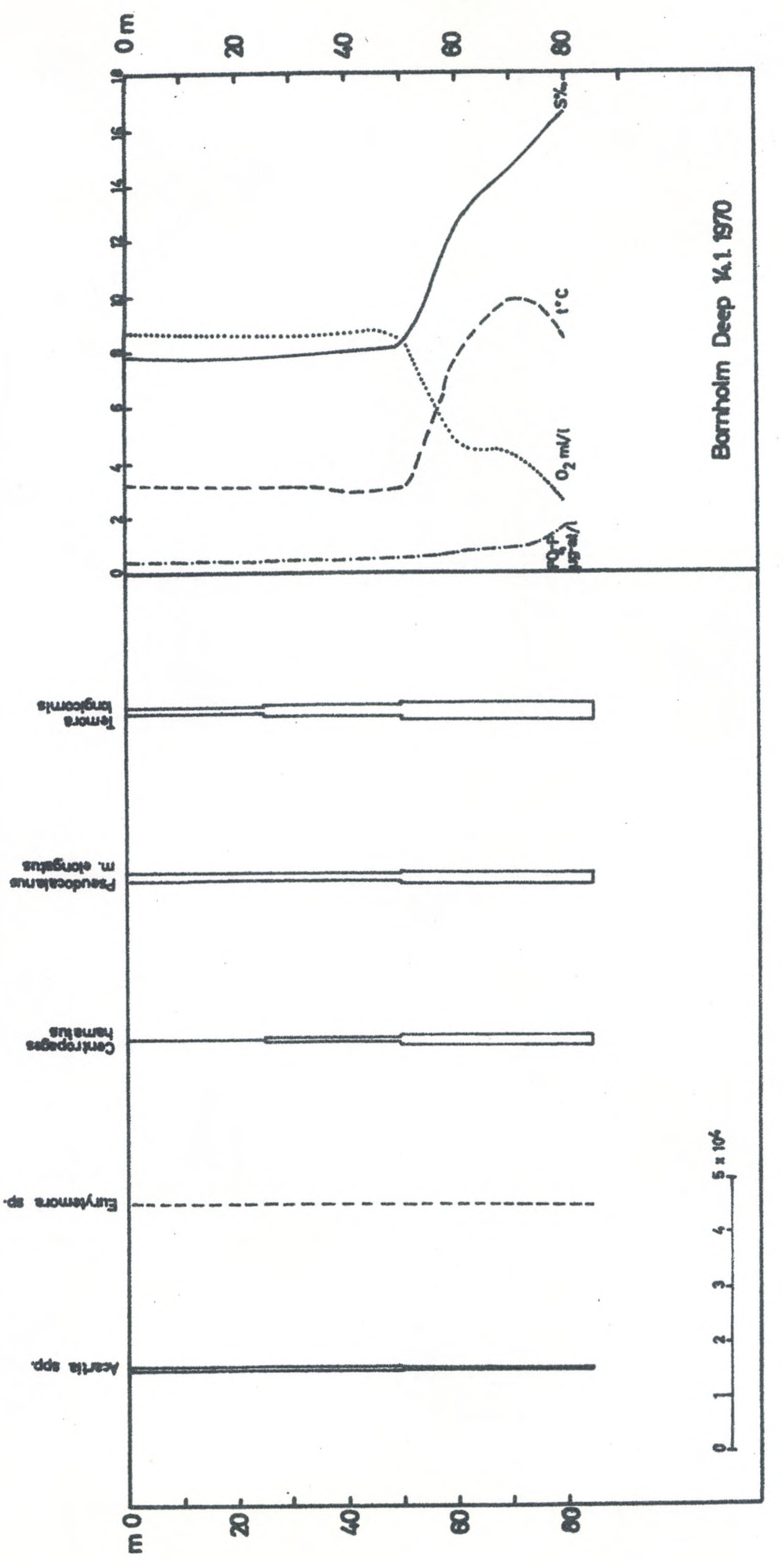

Bornholm Deep 14.1.1970
S‰
t°C
O_2 ml/l
PO_4 µg-at/l
Temora longicornis
Pseudocalanus m. elongatus
Centropages hamatus
Eurytemora sp.
Acartia spp.
5 x 10⁴
0 m
20
40
60
80

Fig 67.

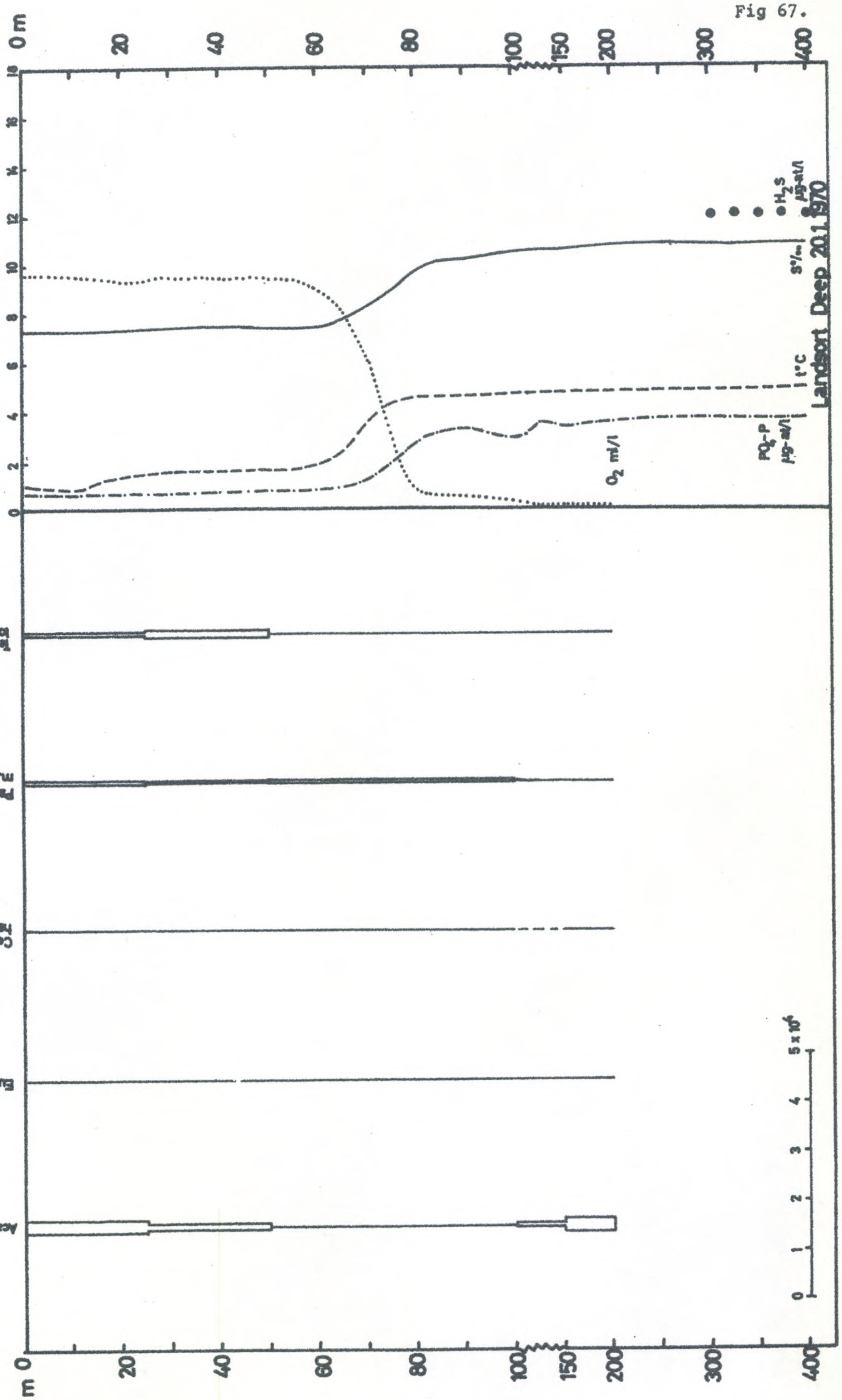

Landsort Deep 201.1970
S‰
t°C
O_2 ml/l
PO_4-P µg-at/l
H_2S µg-at/l
Temora longicornis
Pseudocalanus m. elongatus
Centropages hamatus
Eurytemora sp.
Acartia spp.
m
0 m
20
40
60
80
100
150
200
300
400
5 x 10^4

Fig 68,

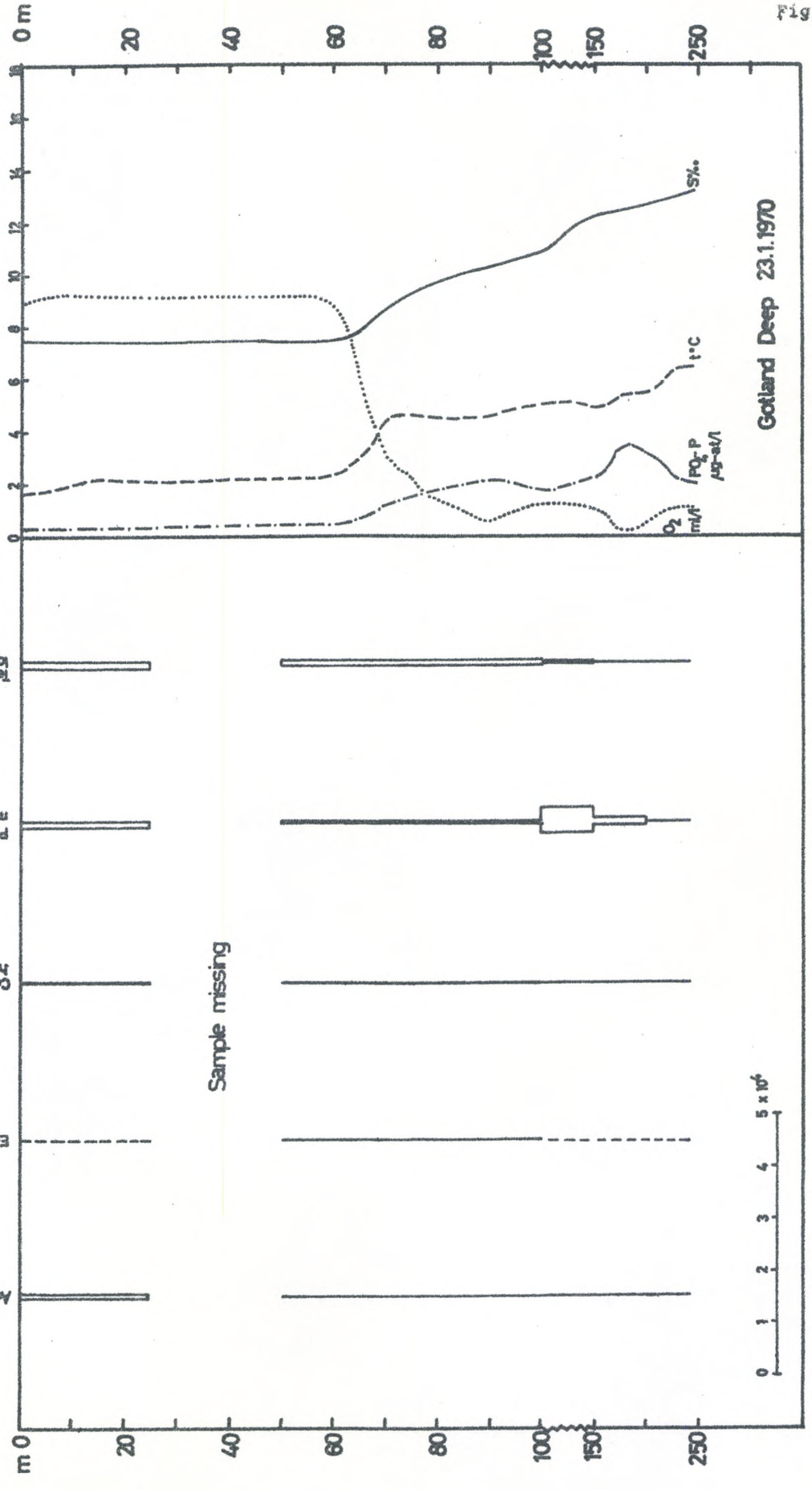
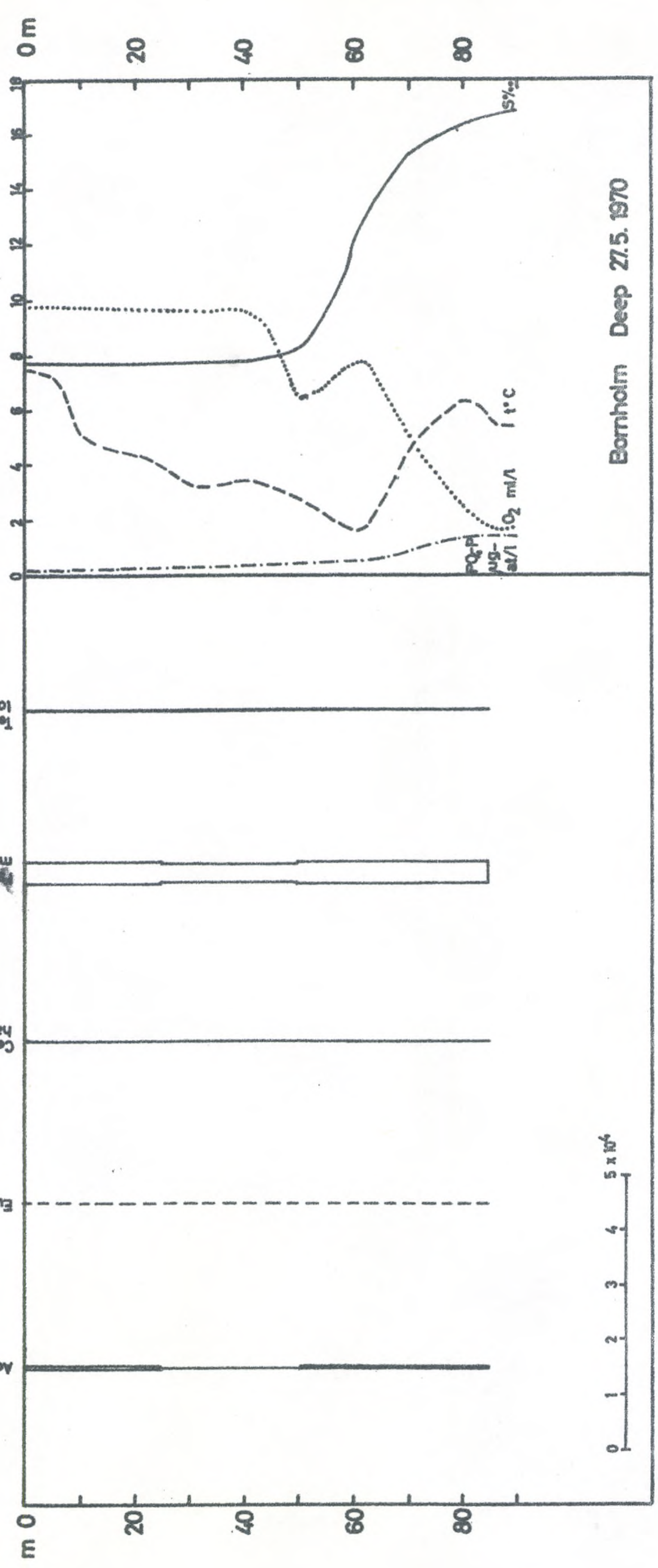

Gotland Deep 23.1.1970
S‰
t°C
PO4-P µg-at/l
O2 ml/l
0 m
20
40
60
80
100
150
250
Temora longicornis
Pseudocalanus m. elongatus
Centropages hamatus
Eurytemora sp.
Acartia spp.
Sample missing
0
1
2
3
4
5 x 10⁴

Fig 69.



Bornholm Deep 27.5.1970
S‰
t°C
O2 ml/l
PO4-P µg-at/l
0 m
20
40
60
80
Temora longicornis
Pseudocalanus m. elongatus
Centropages hamatus
Eurytemora sp.
Acartia spp.
5 x 10^4

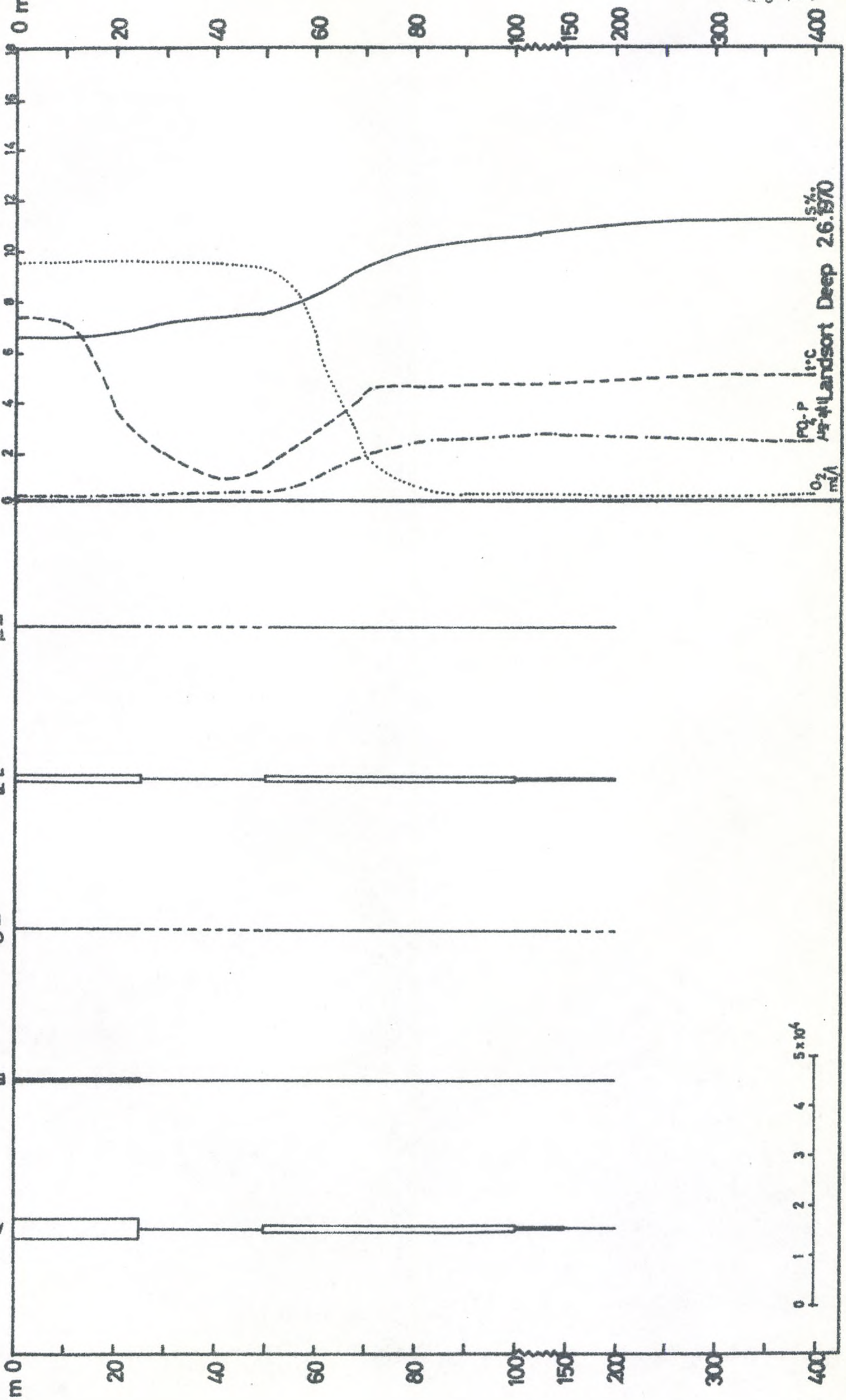
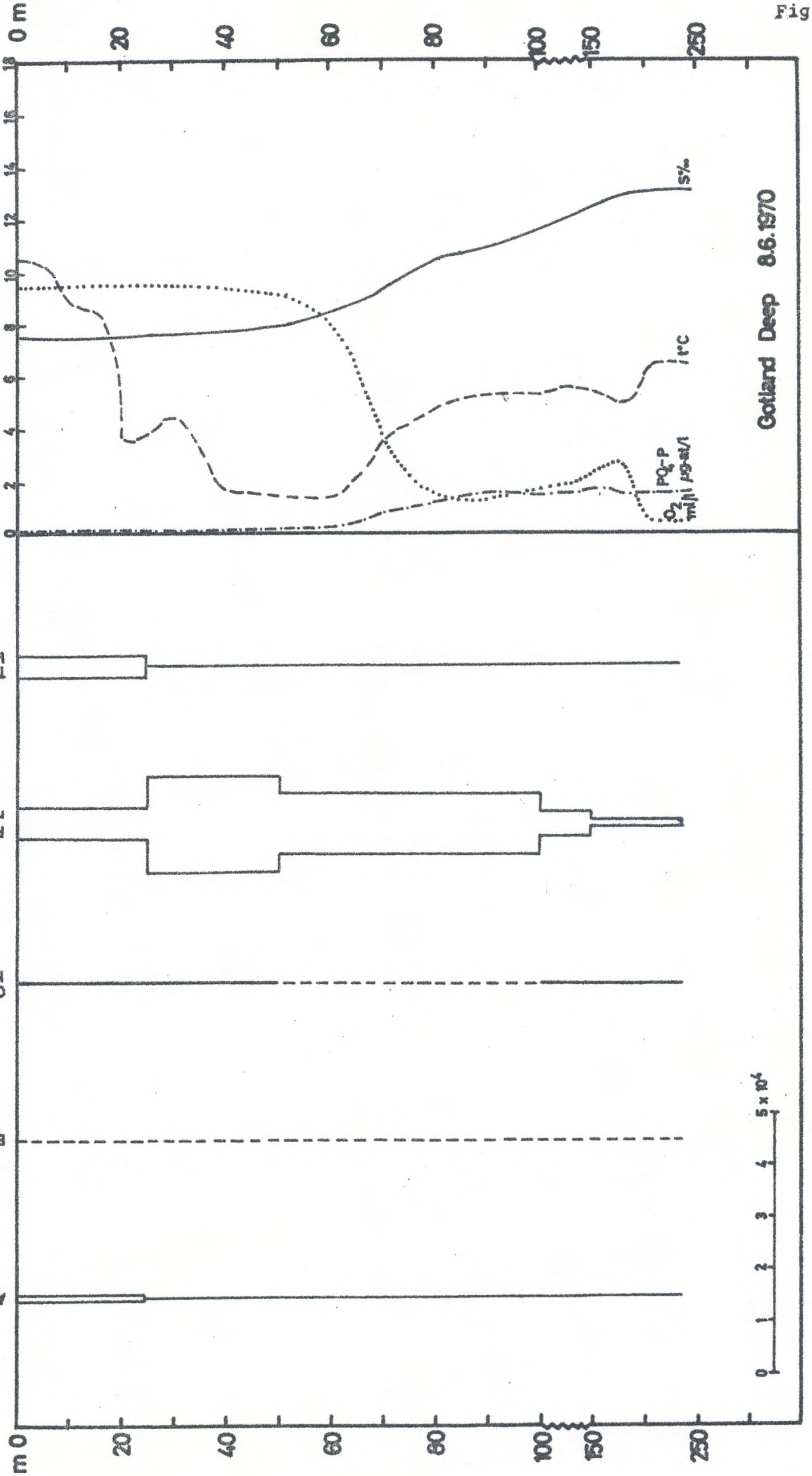

Landsort Deep 2.6.1970
S‰
t°C
PO_4-P µg-at/l
O_2 ml/l
0 m
Temora longicornis
Pseudocalanus m. elongatus
Centropages hamatus
Eurytemora sp.
Acartia spp.
5 x 10⁴

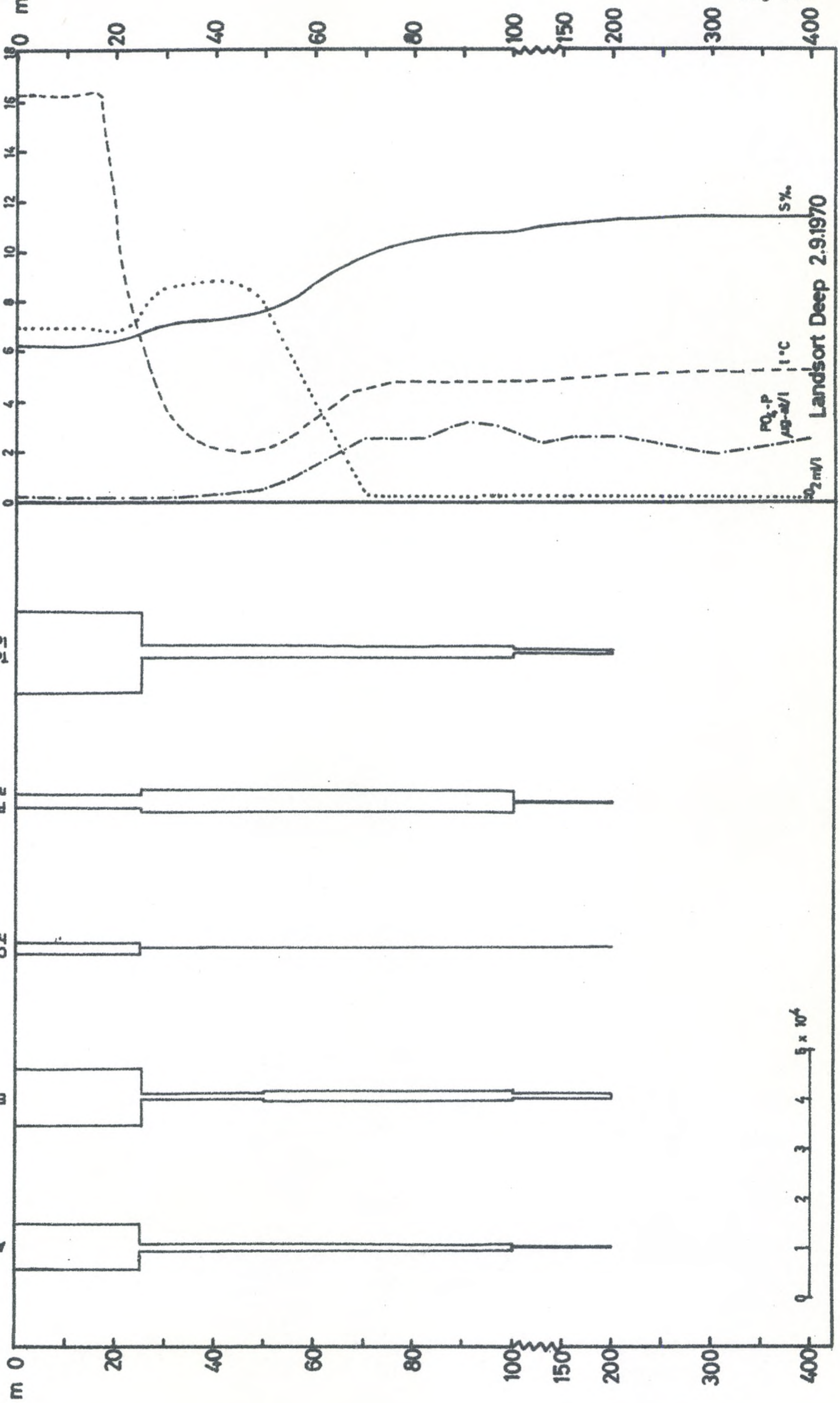
Fig 70.

Fig 71.



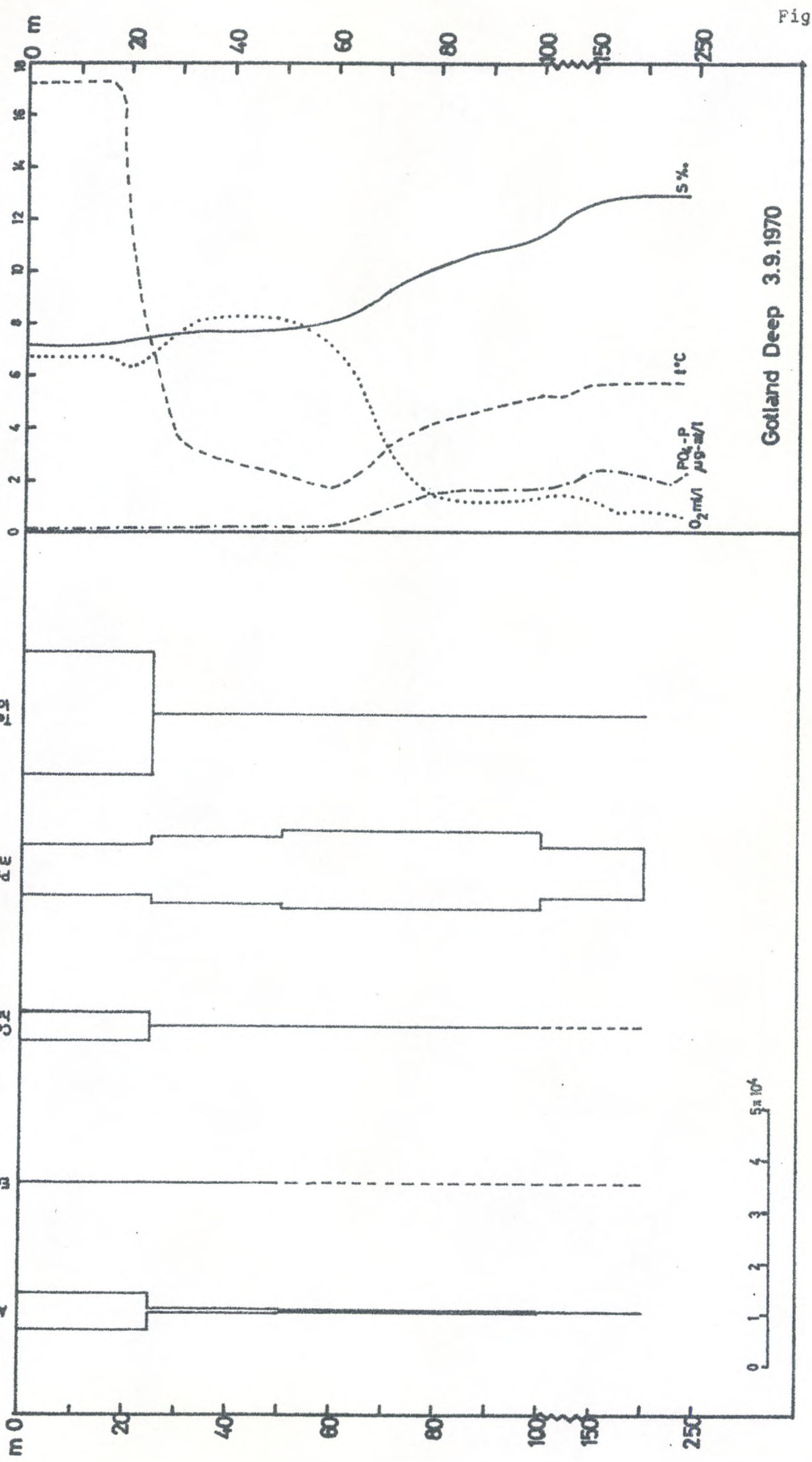
Gotland Deep 8.6.1970
S‰
t°C
O2 ml/l
PO4-P µg-at/l
0 m
20
40
60
80
100
150
250
Temora longicornis
Pseudocalanus m. elongatus
Centropages hamatus
Eurytemora sp.
Acartia spp.
5 x 10⁴

Fig 72.



Landsort Deep 2.9.1970
S‰
t °C
PO_4-P µg-at/l
O_2 ml/l
Temora longicornis
Pseudocalanus m. elongatus
Centropages hamatus
Eurytemora sp.
Acartia spp.
5 x 10⁴
m
0
20
40
60
80
100
150
200
300
400

Fig 73.


Gotland Deep 3.9.1970
S ‰
t °C
PO4-P µg-at/l
O2 ml/l
Temora longicornis
Pseudocalanus m. elongatus
Centropages hamatus
Eurytemora sp.
Acartia spp.
5 x 10⁴
m
0
20
40
60
80
100
150
250

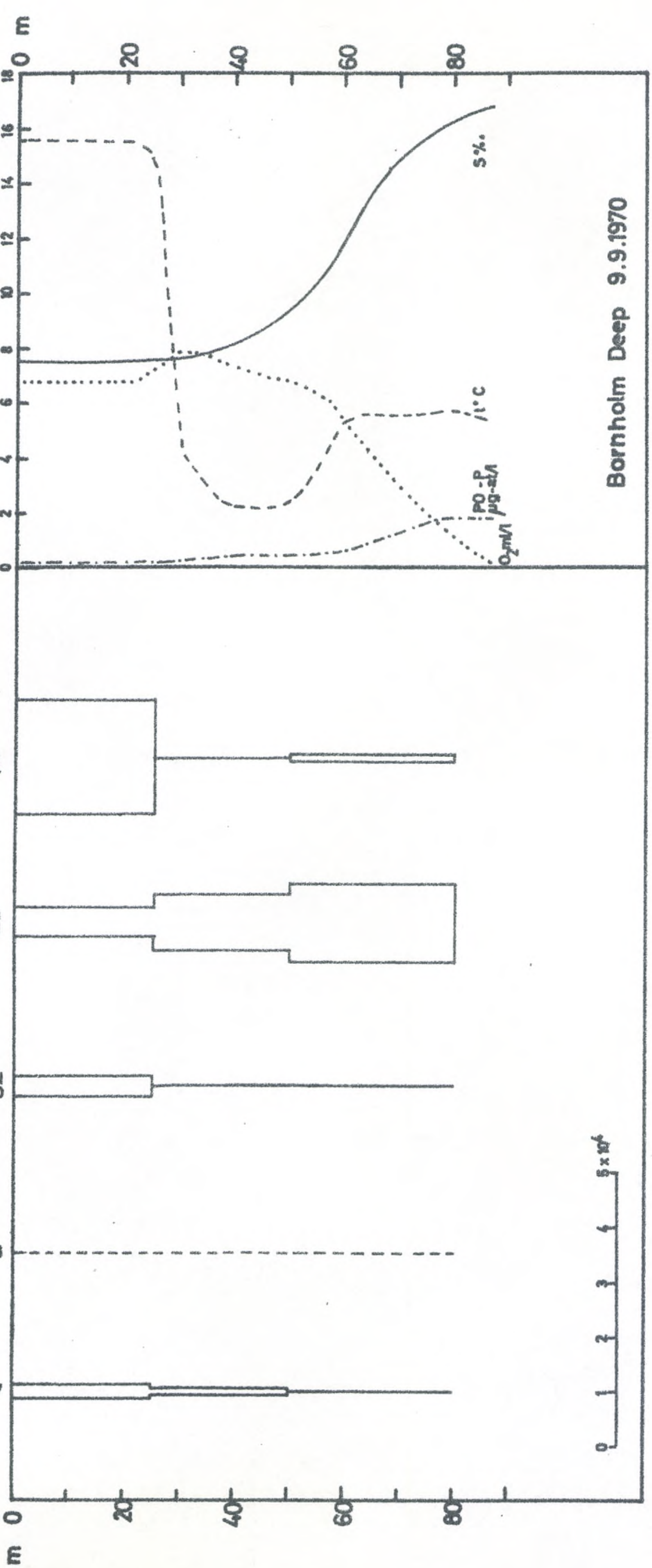
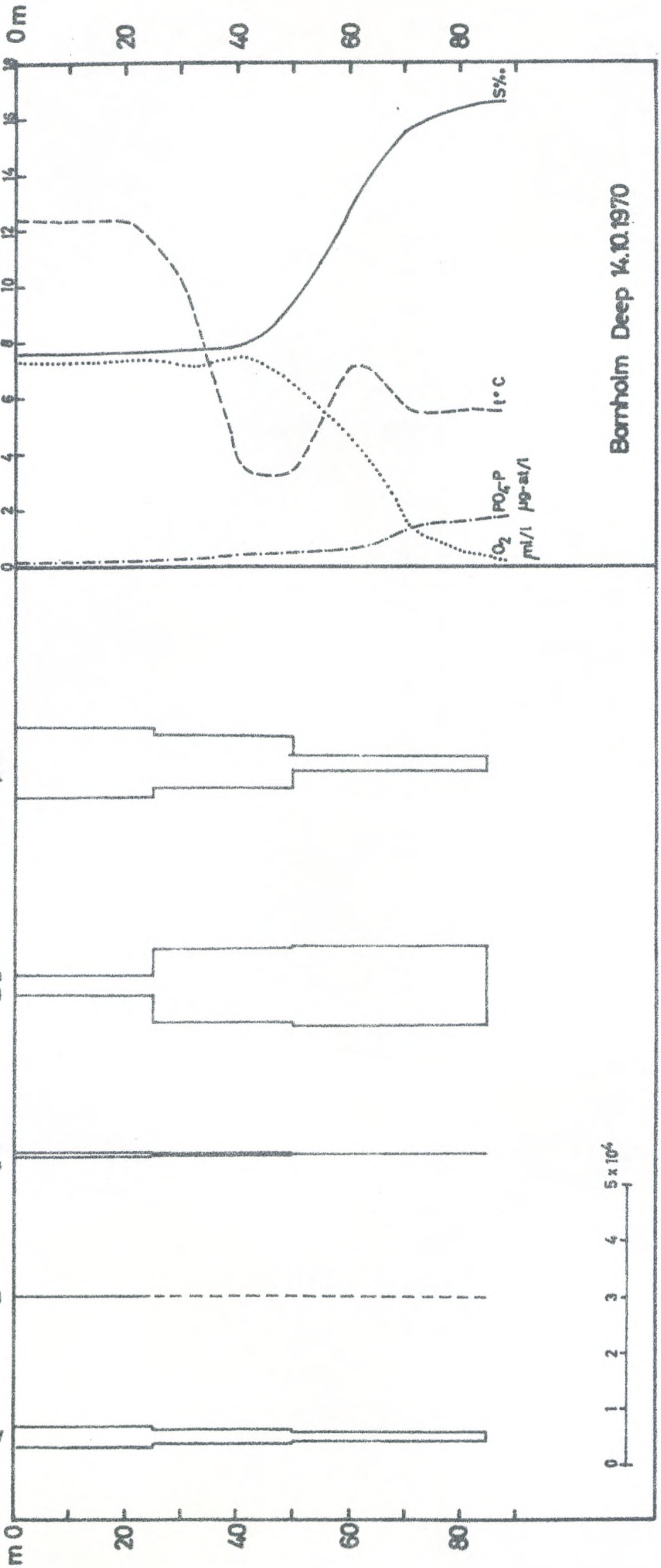
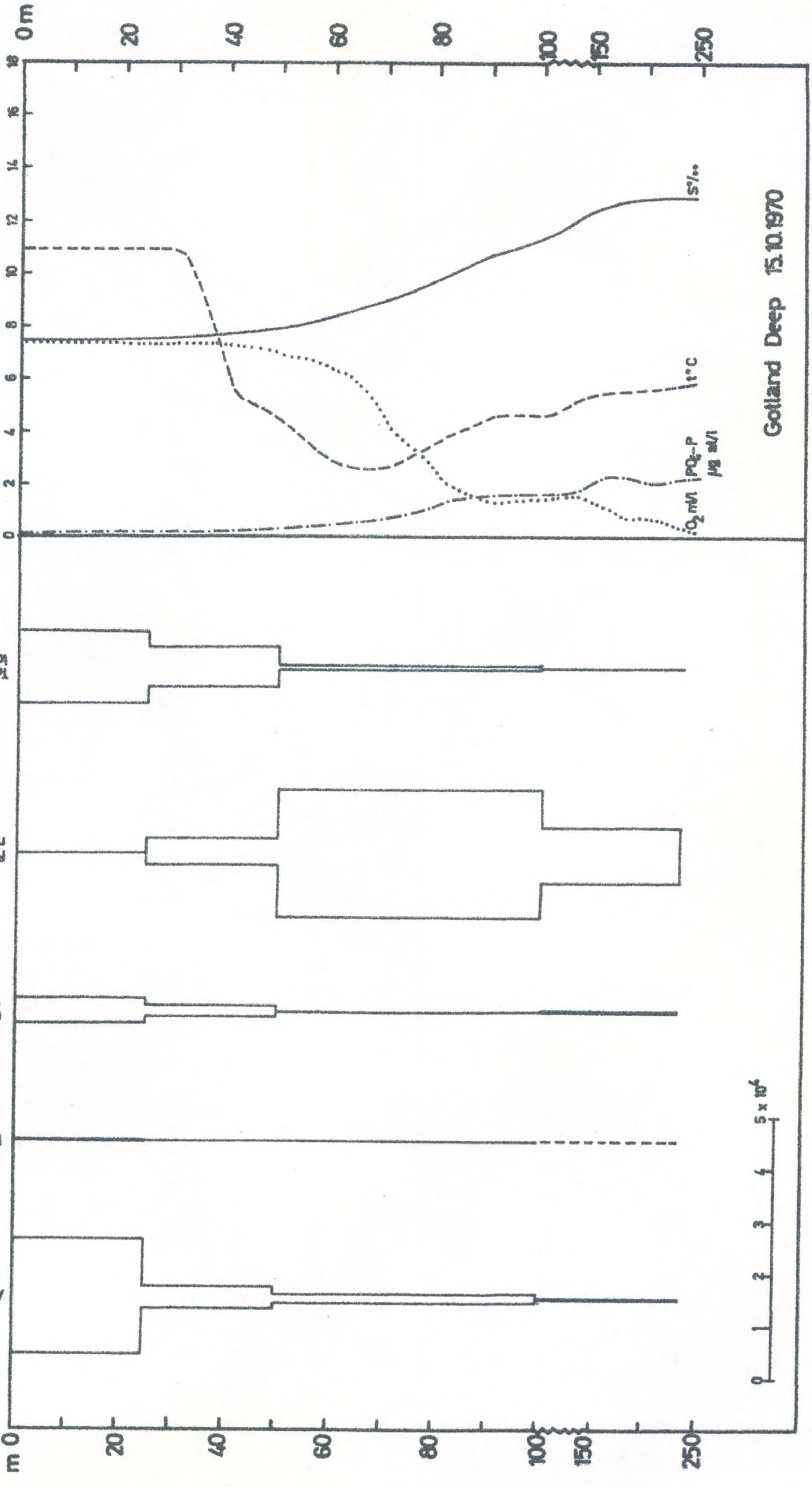

Bornholm Deep 9.9.1970
S ‰
t °C
PO_4-P µg-at/l
O_2 ml/l
Temora longicornis
Pseudocalanus m. elongatus
Centropages hamatus
Eurytemora sp.
Acartia spp.
5 x 10⁴
m

Fig 75.



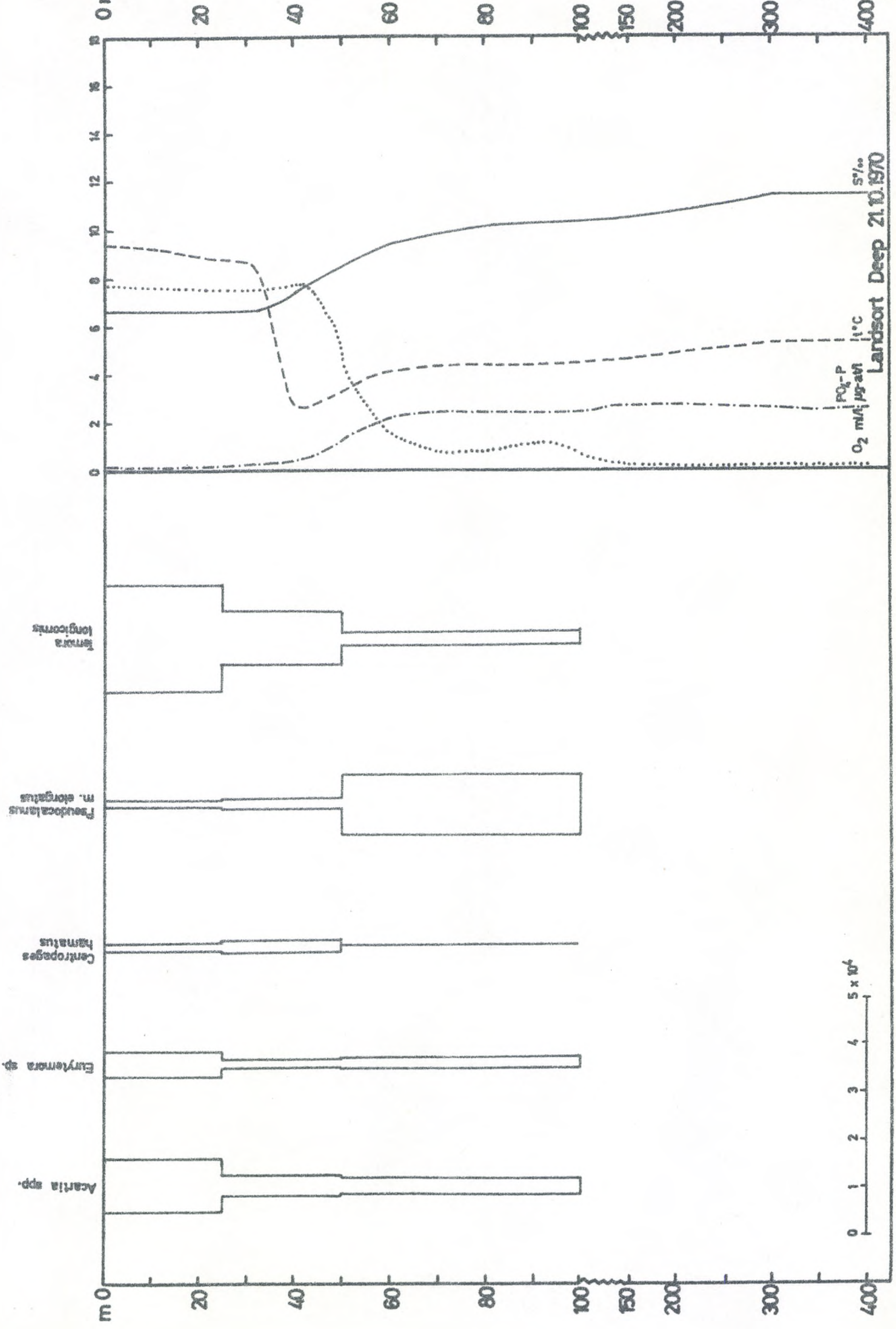
Bornholm Deep 14.10.1970
S‰
t°C
PO4-P µg-at/l
O2 ml/l
Temora longicornis
Pseudocalanus m. elongatus
Centropages hamatus
Eurytemora sp.
Acartia spp.
5 x 10⁴

Fig 76.



Gotland Deep 15.10.1970
S‰
t°C
PO4-P µg at/l
O2 ml/l
0 m
20
40
60
80
100
150
250
Temora longicornis
Pseudocalanus m. elongatus
Centropages hamatus
Eurytemora sp.
Acartia spp.
0 1 2 3 4 5 x 10^4
m 0

Fig 77.



0 m
20
40
60
80
100
150
200
300
400
0
2
4
6
8
10
12
14
16
18
S‰
t°C
PO4-P µg-at/l
O2 ml/l
Landsort Deep 21.10.1970
Temora longicornis
Pseudocalanus m. elongatus
Centropages hamatus
Eurytemora sp.
Acartia spp.
0
1
2
3
4
5 x 10^4

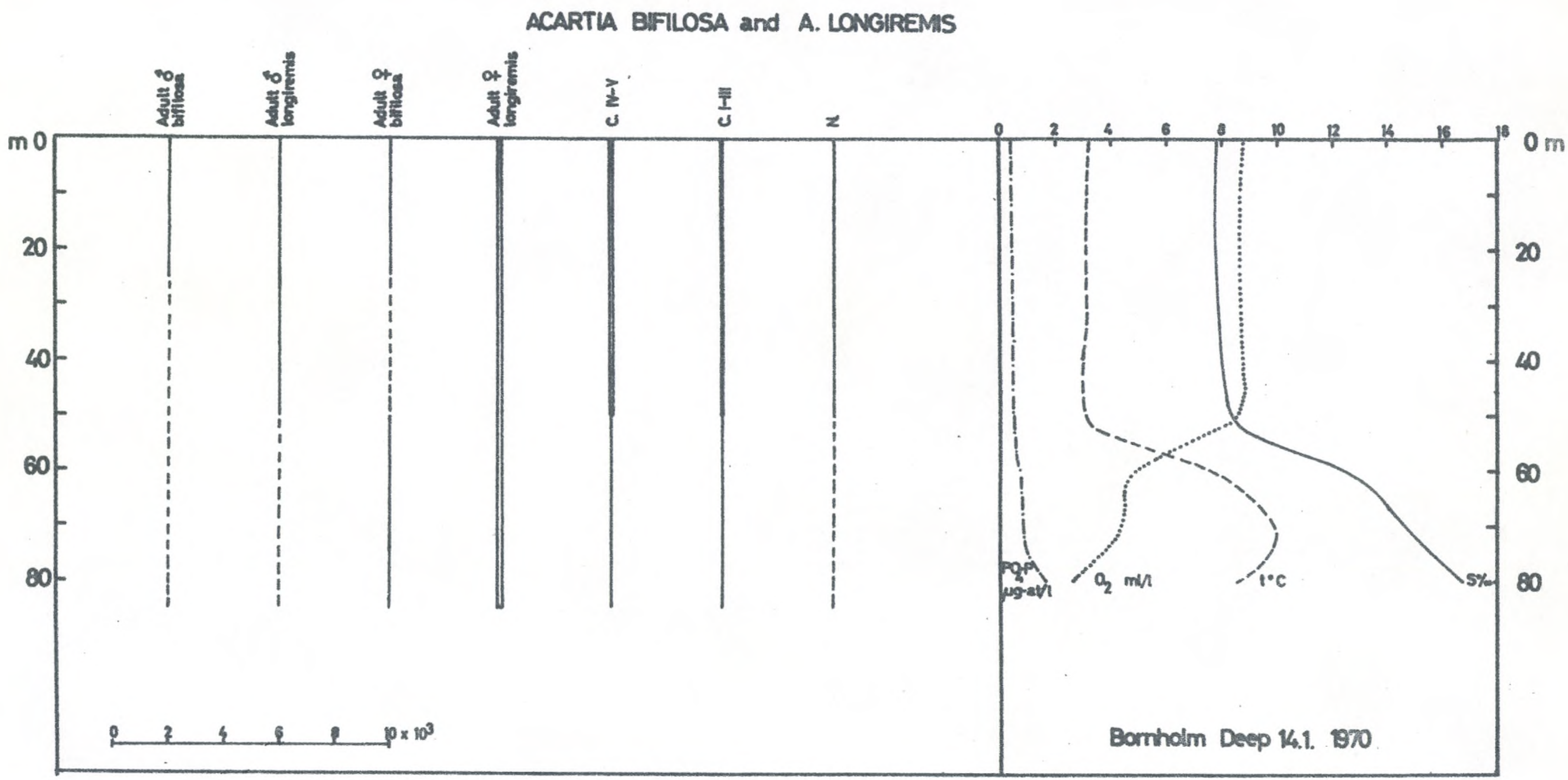

ACARTIA BIFILOSA and A. LONGIREMIS
Adult ♂ bifilosa
Adult ♂ longiremis
Adult ♀ bifilosa
Adult ♀ longiremis
C. IV-V
C. I-III
N
m 0
20
40
60
80
0 m
0
2
4
6
8
10
12
14
16
18
PO_4-P µg-at/l
O_2 ml/l
t°C
S‰
0 2 4 6 8 10 x 10^3
Bornholm Deep 14.1. 1970

Fig 78.

ACARTIA BIFILOSA and A. LONGIREMIS

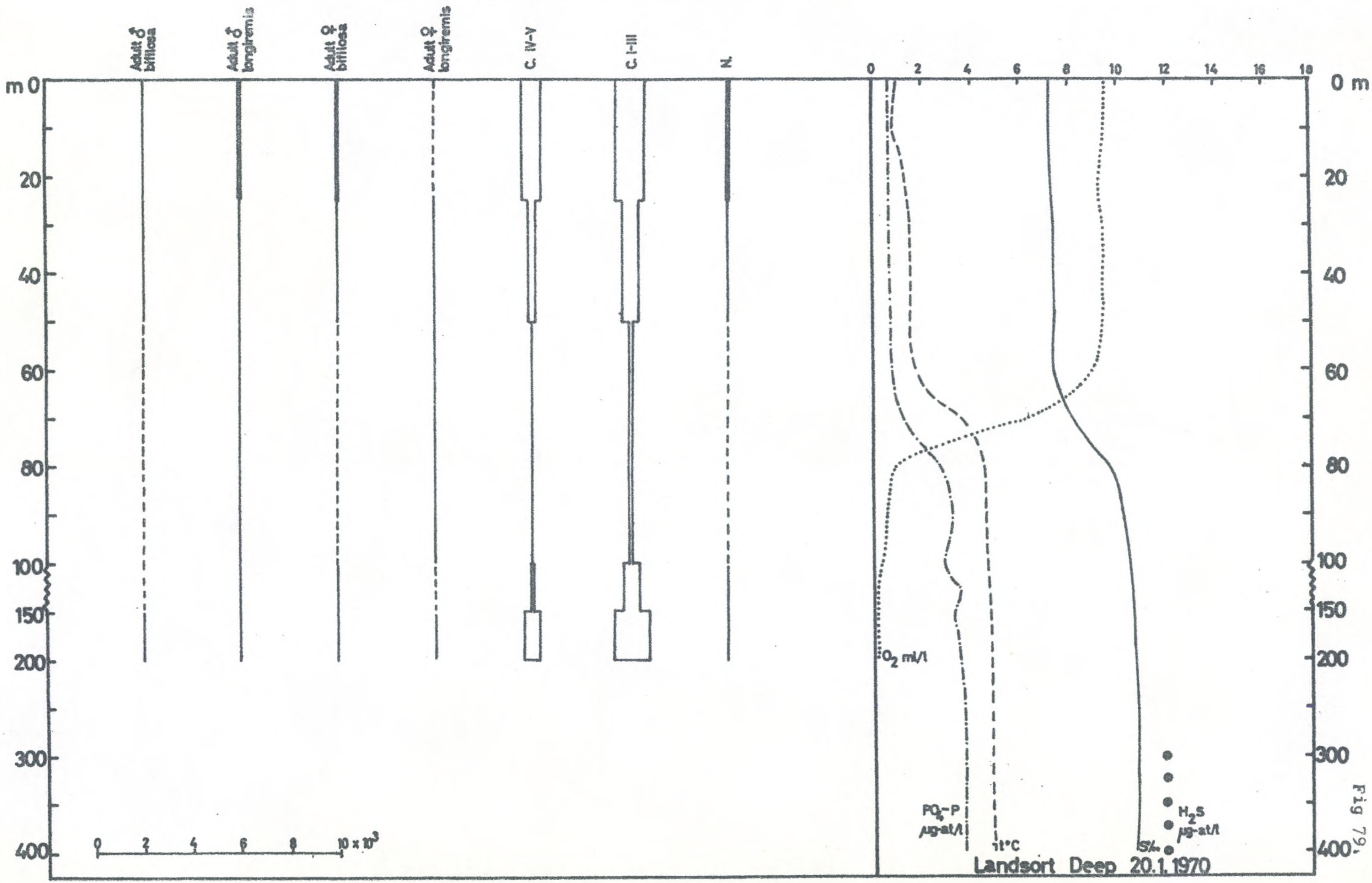
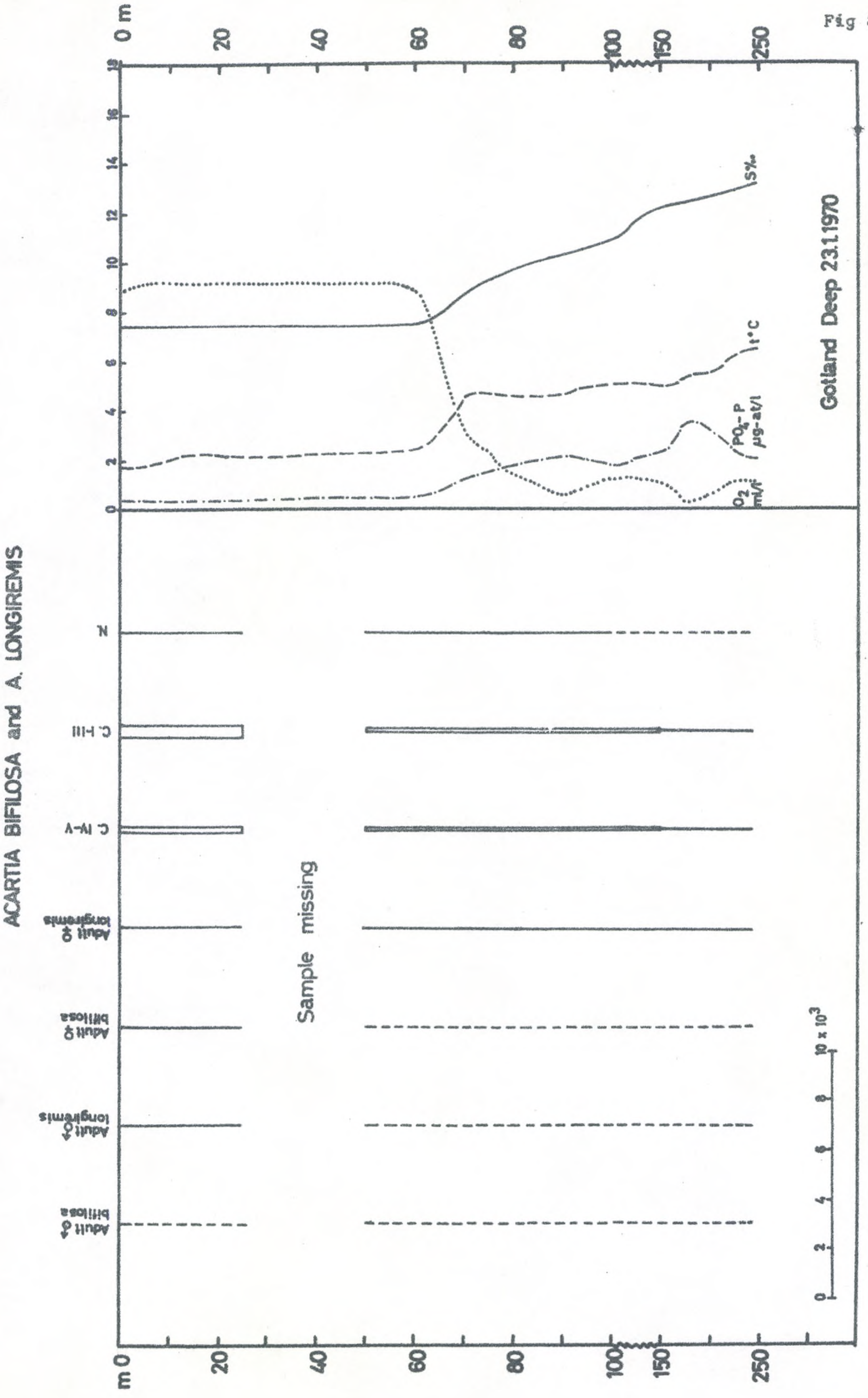


Fig 79.

Fig 80.



ACARTIA BIFILOSA and A. LONGIREMIS
Gotland Deep 23.1.1970
S‰
t°C
PO4-P µg-at/l
O2 ml/l
Sample missing
N
C. I-III
C. IV-V
Adult ♀ longiremis
Adult ♀ bifilosa
Adult ♂ longiremis
Adult ♂ bifilosa
10 x 10³
0 m
m 0
20
40
60
80
100
150
250

Fig 81.

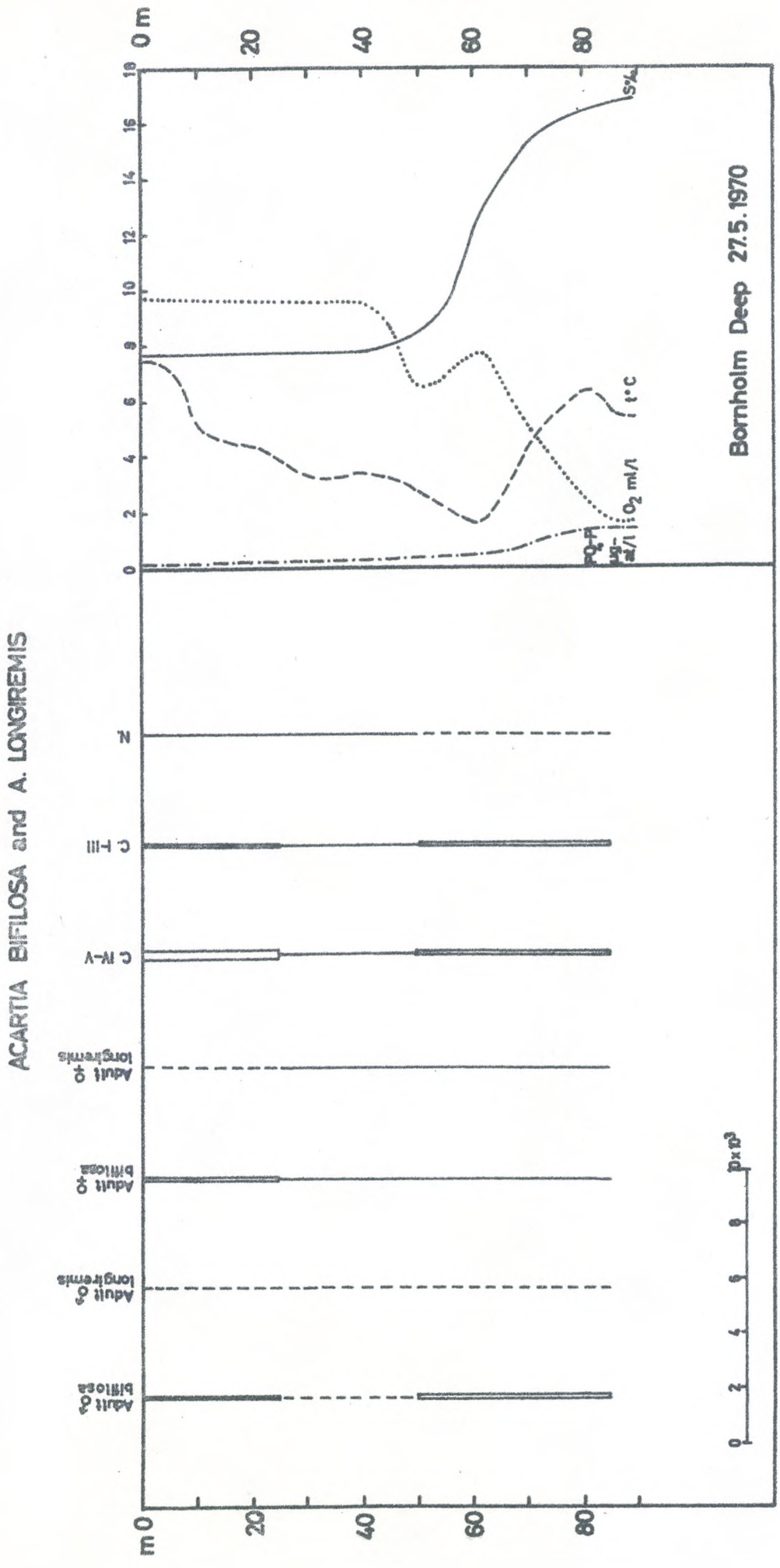

ACARTIA BIFILOSA and A. LONGIREMIS
Bornholm Deep 27.5.1970
S‰
t°C
O2 ml/l
PO4-P µg-at/l
N
C. I-III
C. IV-V
Adult ♀ longiremis
Adult ♀ bifilosa
Adult ♂ longiremis
Adult ♂ bifilosa
p x 10³
0 m
20
40
60
80
m 0

Fig 82.

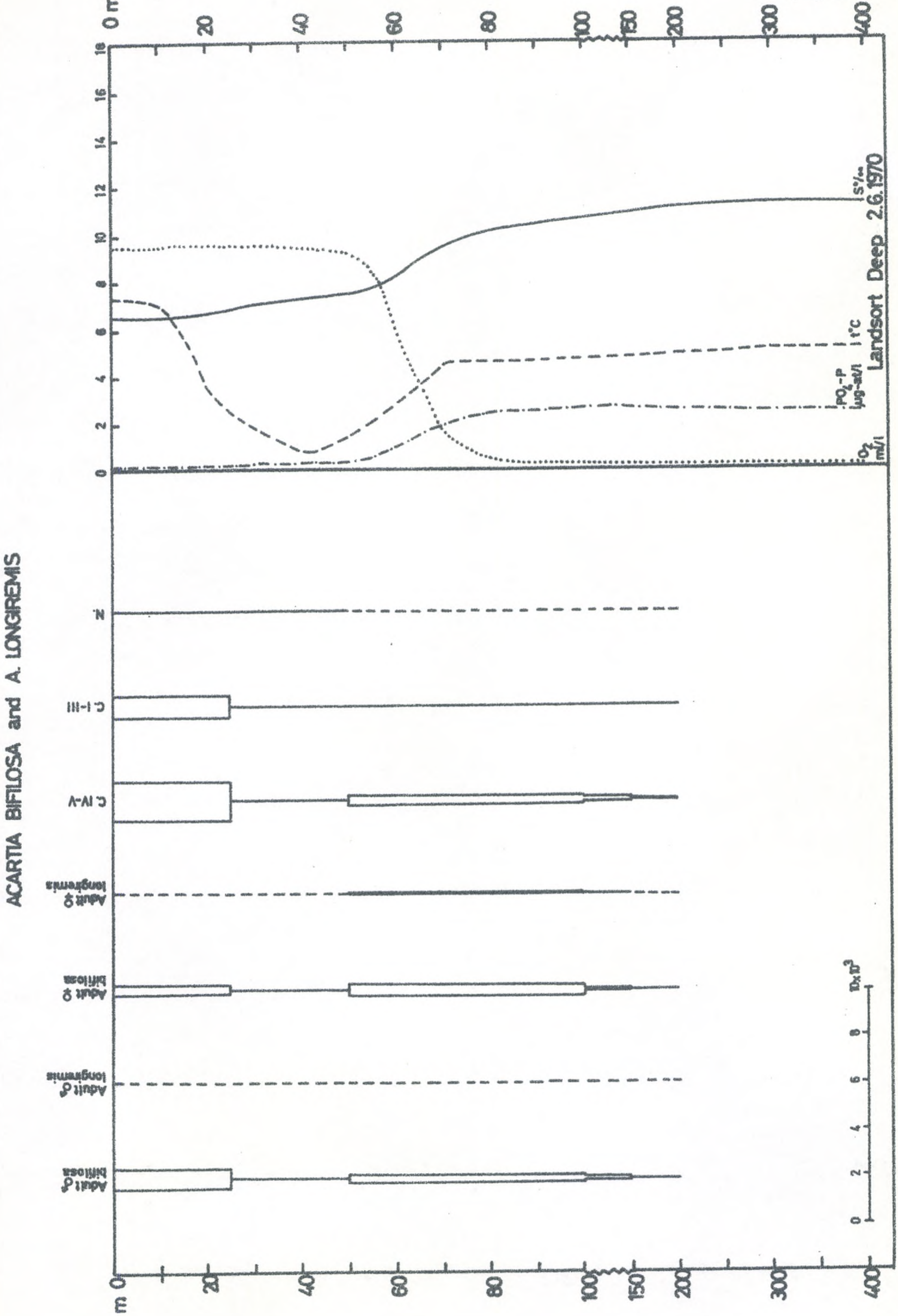
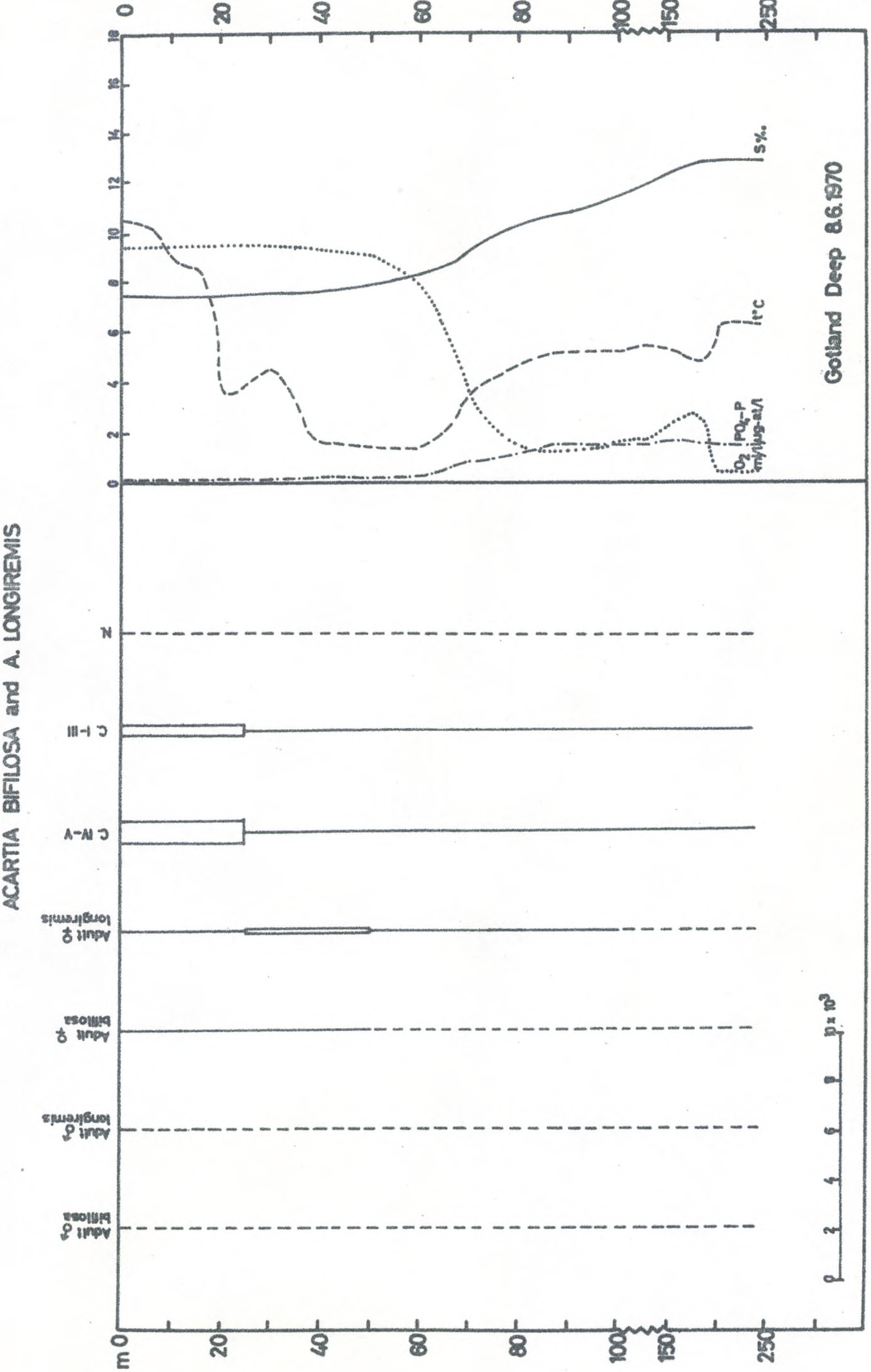

ACARTIA BIFILOSA and A. LONGIREMIS
Landsort Deep 2.6.1970
S‰
t°C
PO4-P µg-at/l
O2 ml/l
N.
C. I-III
C. IV-V
Adult ♀ longiremis
Adult ♀ bifilosa
Adult ♂ longiremis
Adult ♂ bifilosa
10x10^3
0 m
m 0

Fig 83.



ACARTIA BIFILOSA and A. LONGIREMIS
Gotland Deep 8.6.1970
S‰
t°C
O2 ml/l
PO4-P µg-at/l
N
C. I-III
C. IV-V
Adult ♀ longiremis
Adult ♀ bifilosa
Adult ♂ longiremis
Adult ♂ bifilosa
p x 10³
0 m
20
40
60
80
100
150
250

Fig 84.

ACARTIA BIFILOSA and A. LONGIREMIS

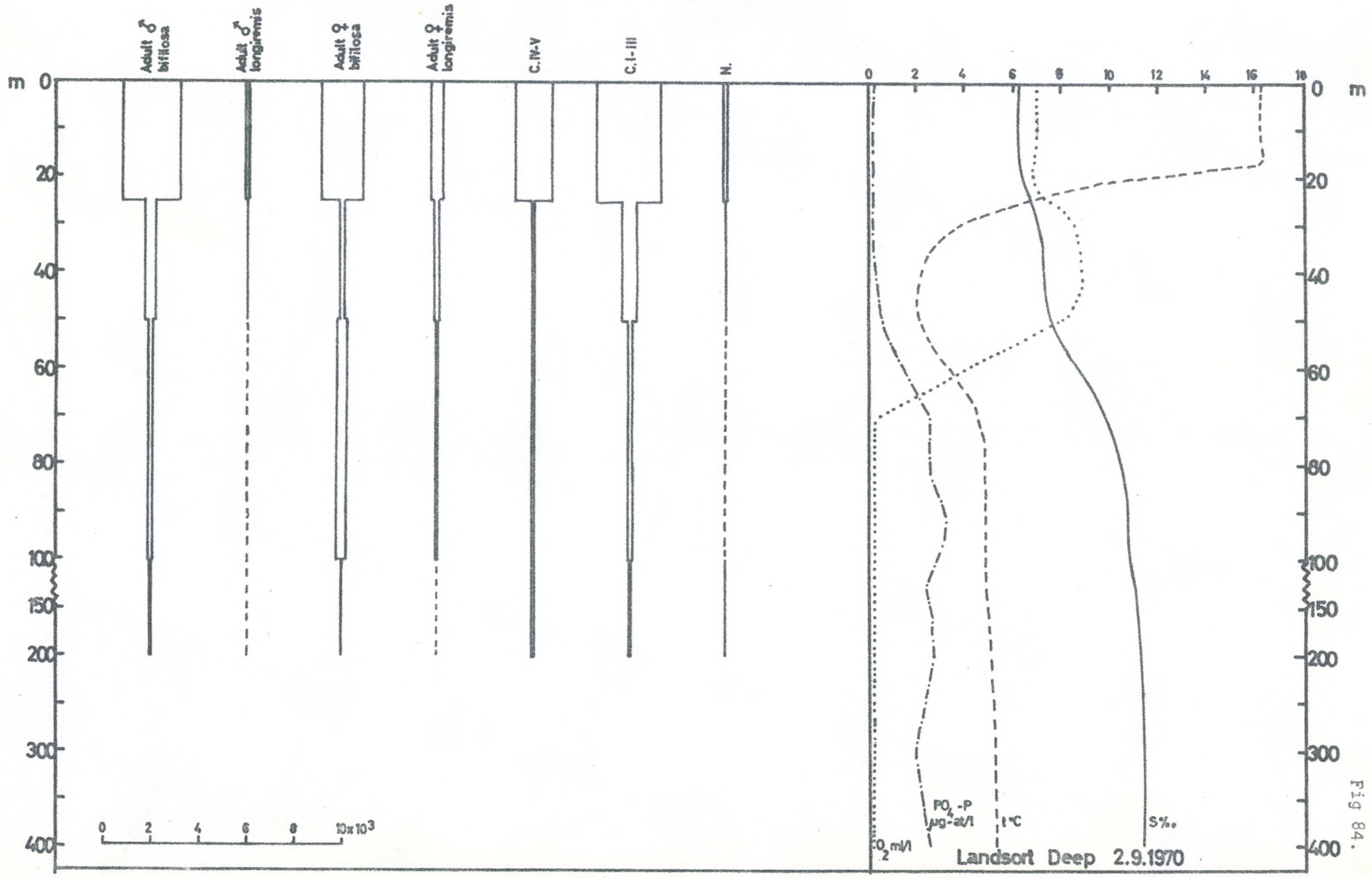
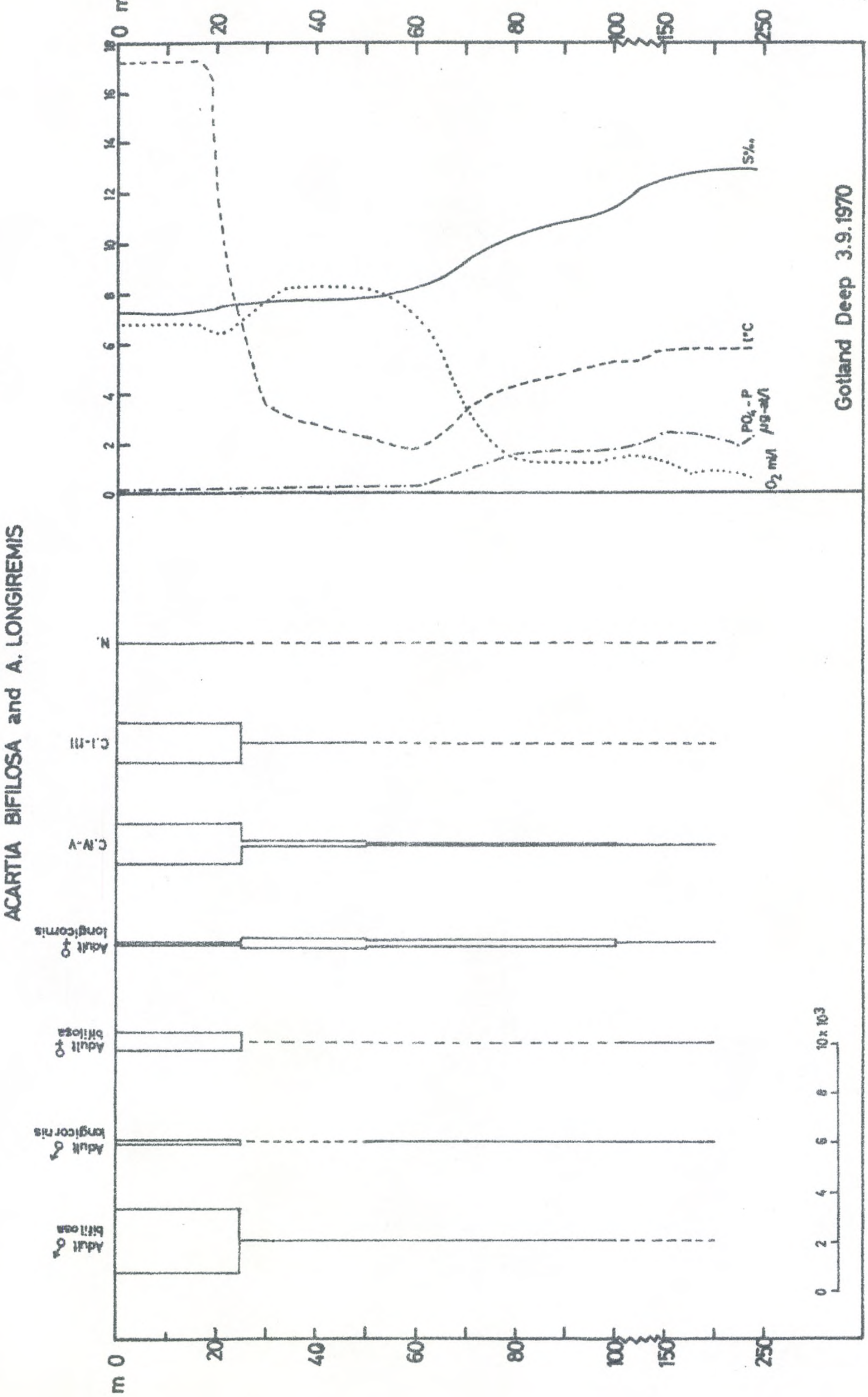
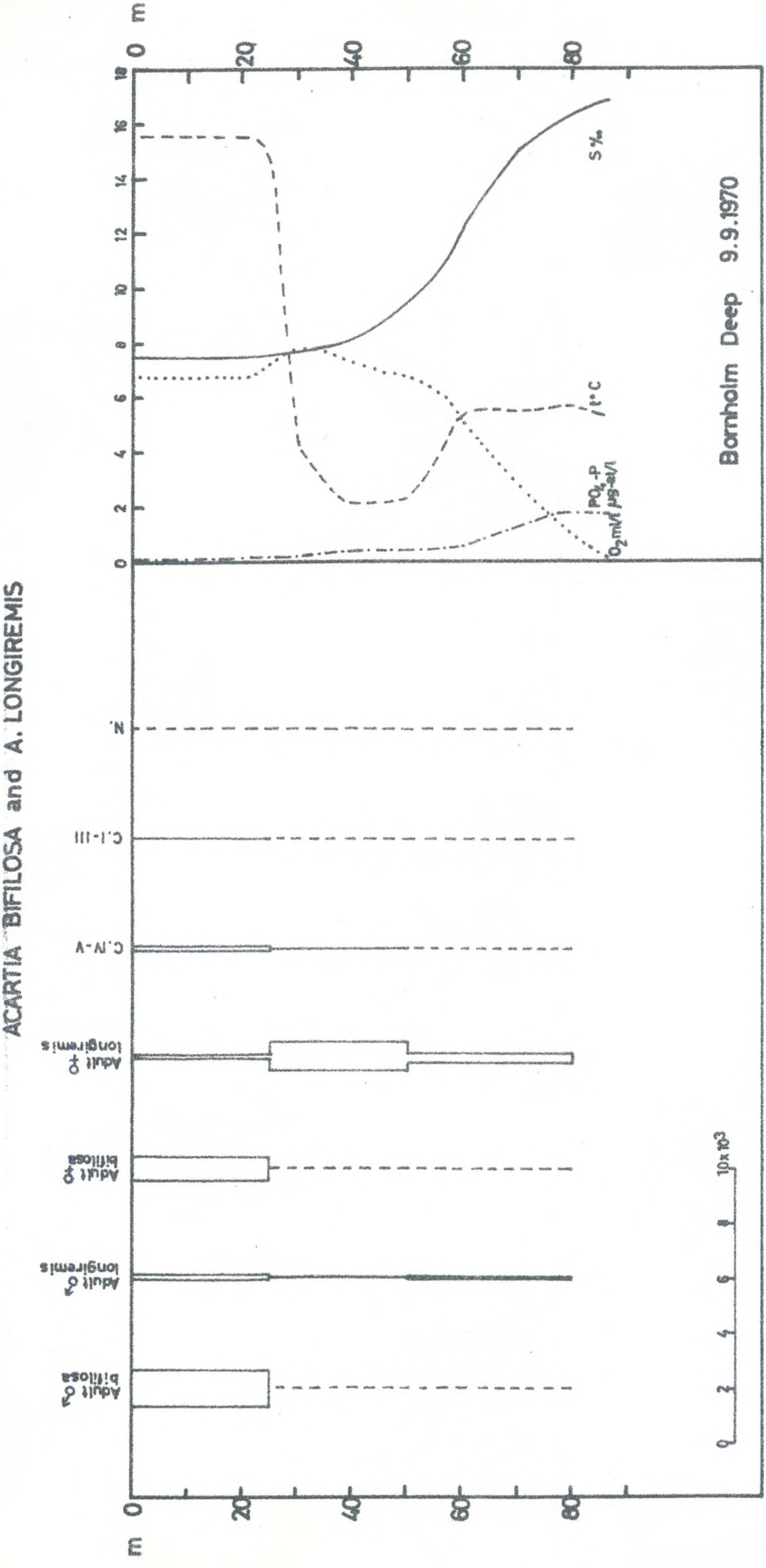


Fig 85.



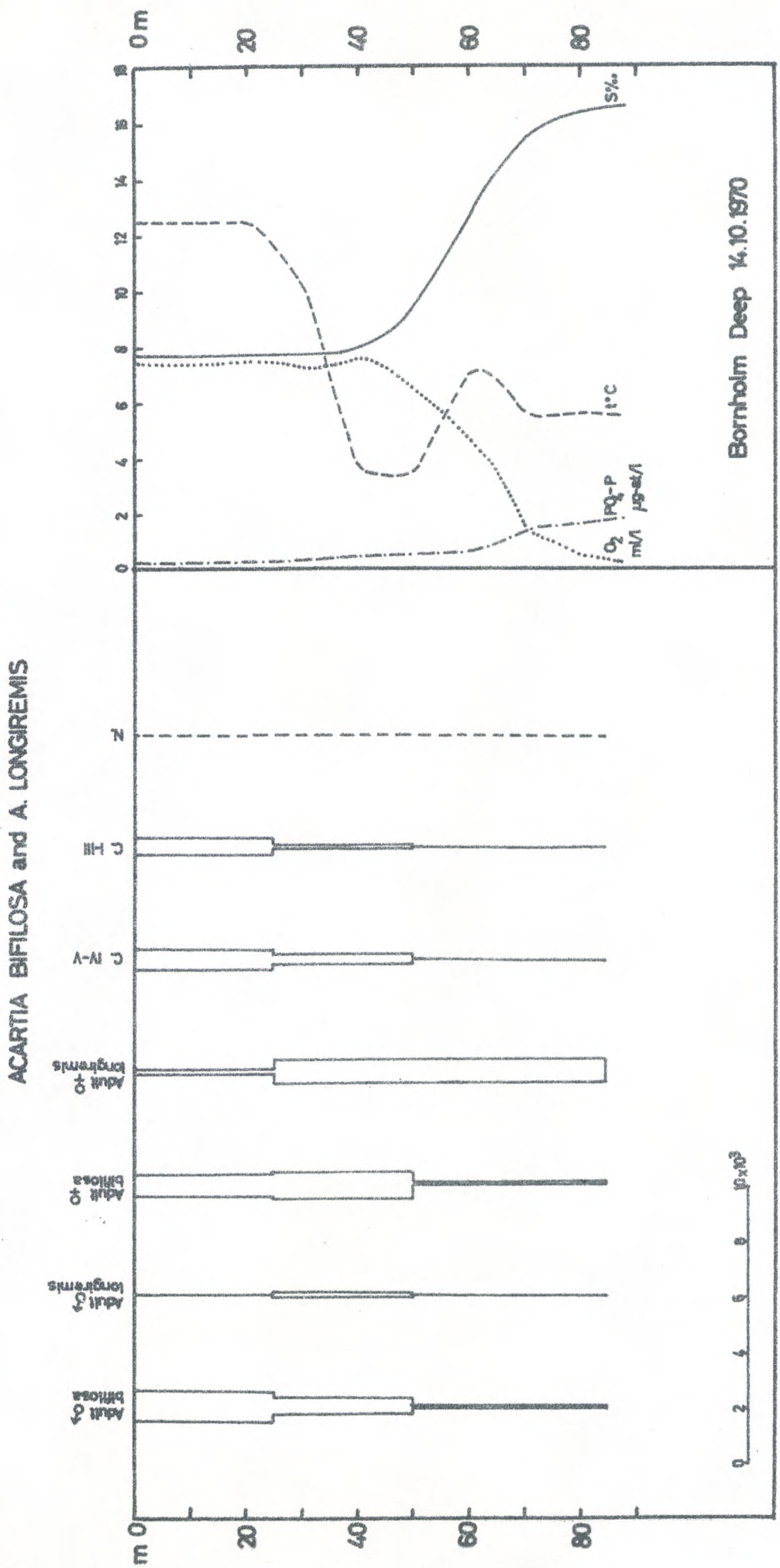
ACARTIA BIFILOSA and A. LONGIREMIS
Gotland Deep 3.9.1970
0 m
20
40
60
80
100
150
250
S‰
t°C
PO4-P µg-at/l
O2 ml/l
N.
C.I-III
C.IV-V
Adult ♀ longicornis
Adult ♀ bifilosa
Adult ♂ longicornis
Adult ♂ bifilosa
10x10³

Fig 86.

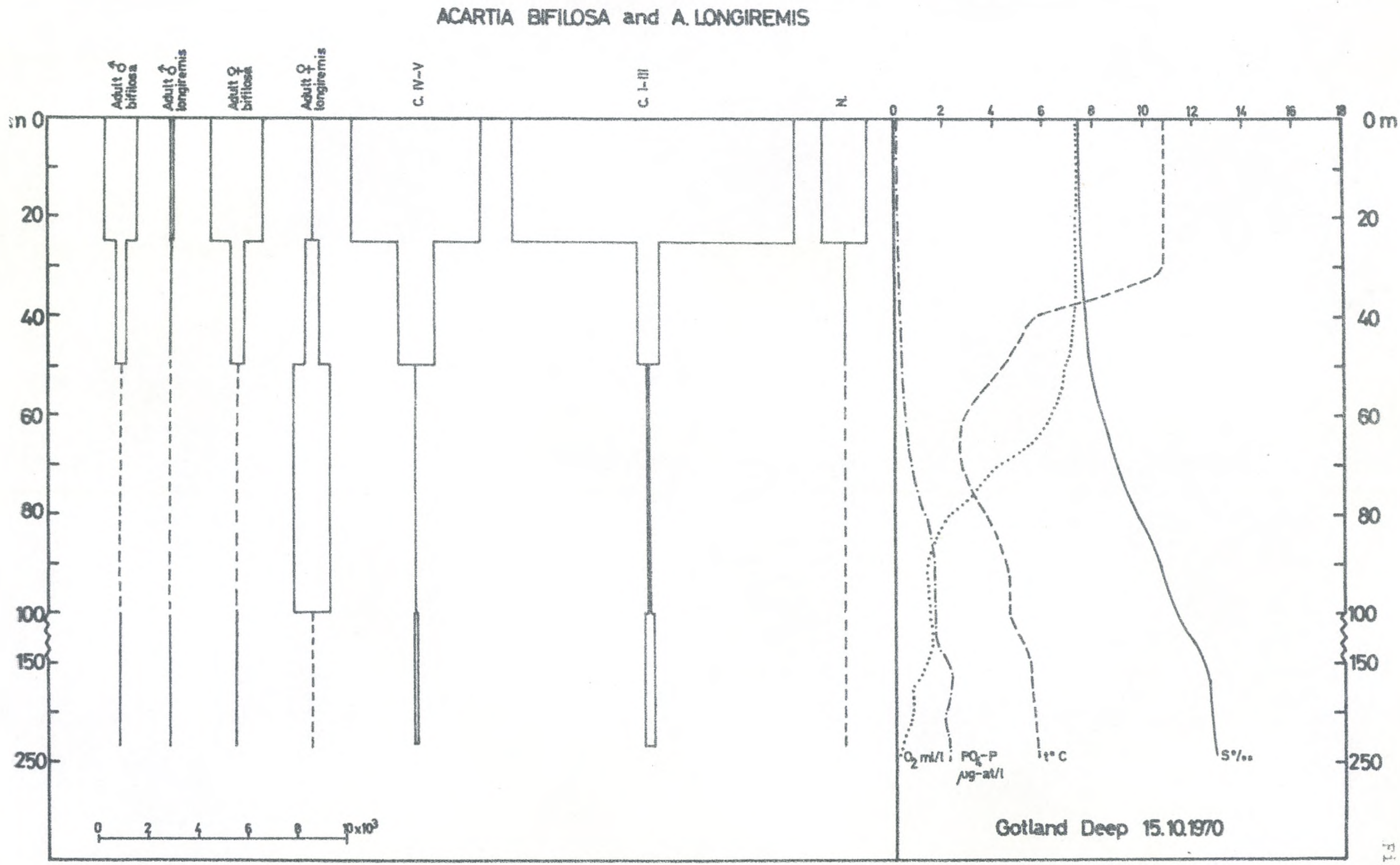


ACARTIA BIFILOSA and A. LONGIREMIS
Bornholm Deep 9.9.1970
S ‰
t° C
PO_4-P μg-at/l
O_2 ml/l
N.
C.I-III
C.IV-V
Adult ♀ longiremis
Adult ♀ bifilosa
Adult ♂ longiremis
Adult ♂ bifilosa
10 x 10³
m
0
20
40
60
80
2
4
6
8
10
12
14
16
18

Fig 87.



ACARTIA BIFILOSA and A. LONGIREMIS
Bornholm Deep 14.10.1970
S‰
t°C
O_2 ml/l
PO_4-P µg-at/l
Adult ♂ bifilosa
Adult ♂ longiremis
Adult ♀ bifilosa
Adult ♀ longiremis
C IV-V
C III
N
n x 10^3
0 m
20
40
60
80



ACARTIA BIFILOSA and A. LONGIREMIS
Adult ♂ bifilosa
Adult ♂ longiremis
Adult ♀ bifilosa
Adult ♀ longiremis
C. IV–V
C. I–III
N.
m 0
20
40
60
80
100
150
250
0 m
0 2 4 6 8 10 12 14 16 18
0 2 4 6 8 10x10³
O_2 ml/l
PO_4–P µg-at/l
t° C
S °/oo
Gotland Deep 15.10.1970

Fig 88.

ACARTIA BIFILOSA and A. LONGIREMIS

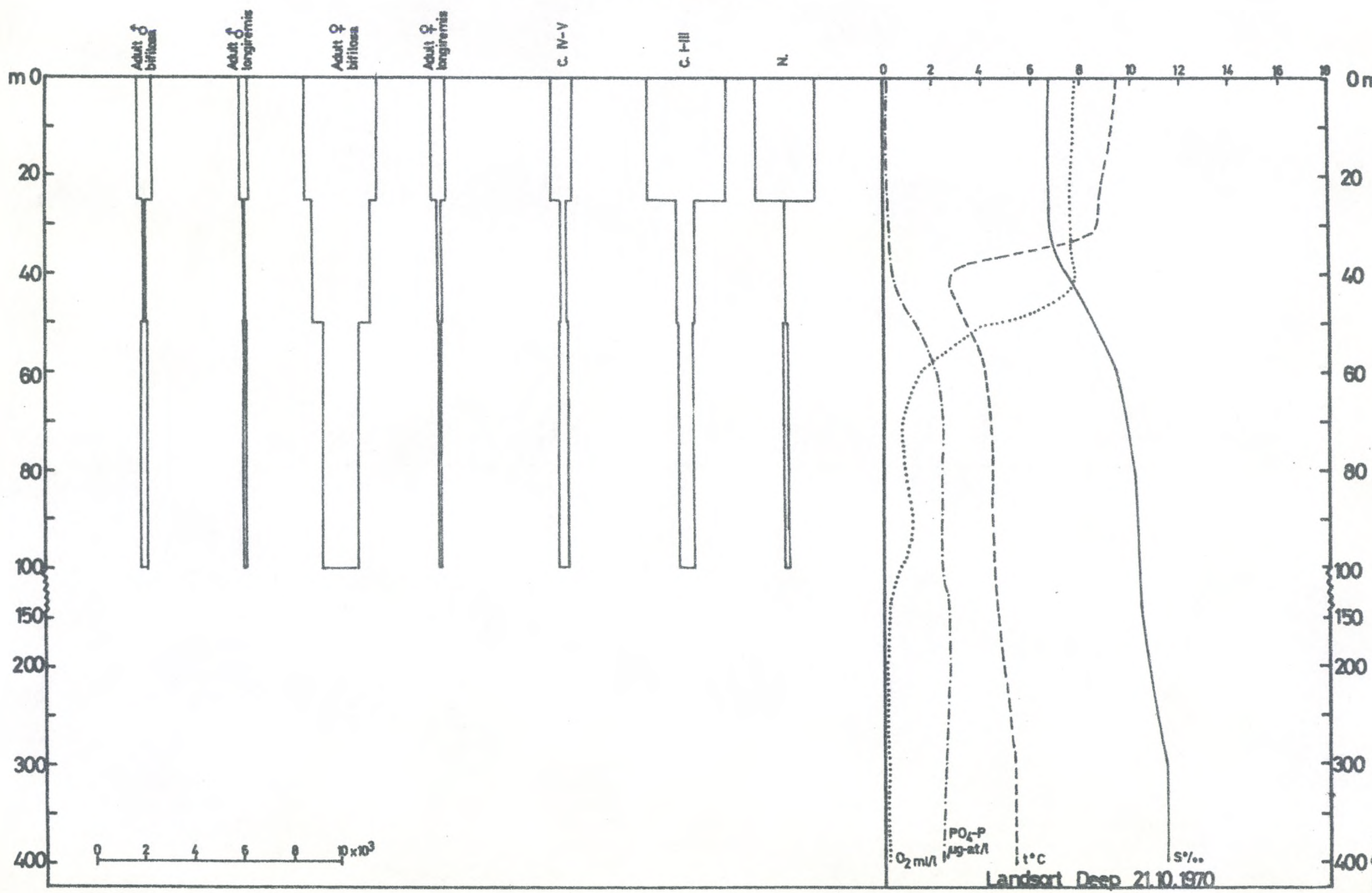
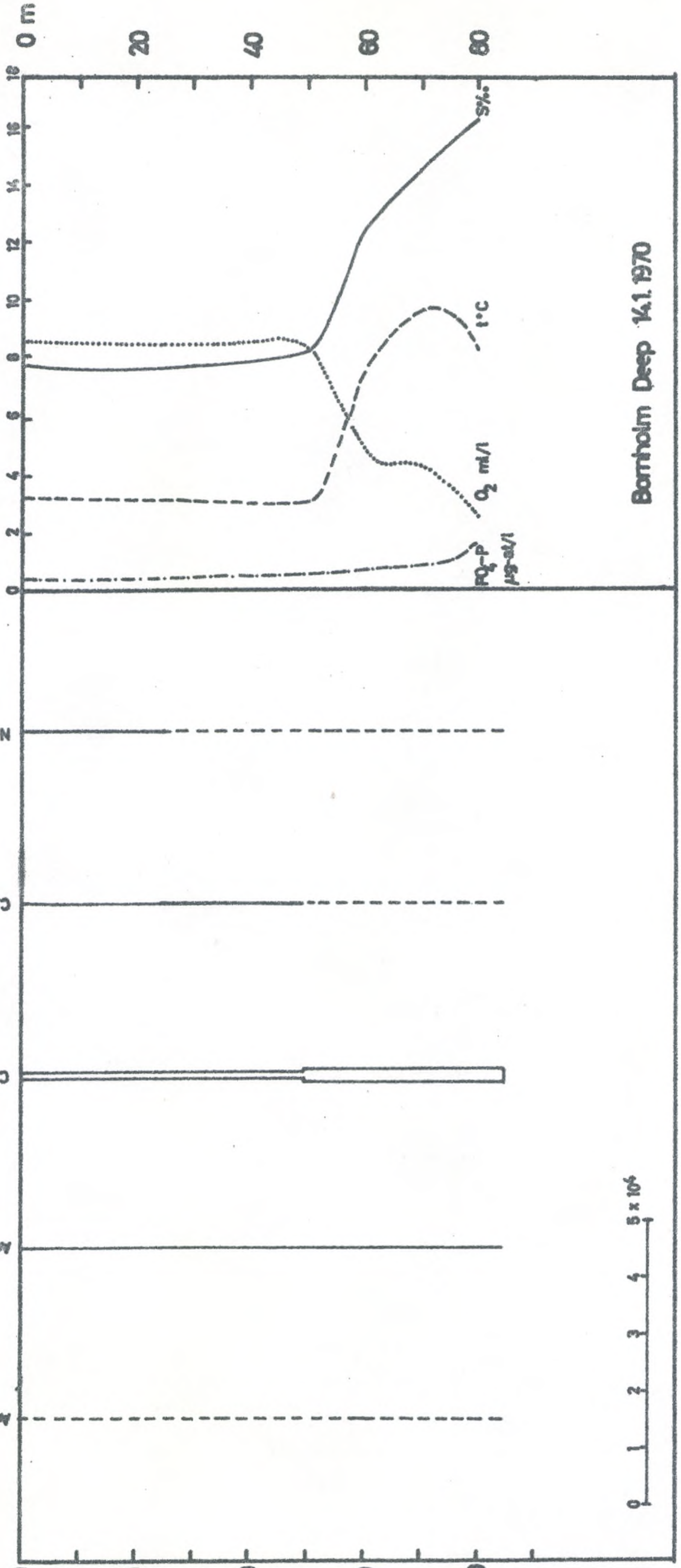


Fig 89.

Fig 90.

PSEUDOCALANUS MINUTUS ELONGATUS



PSEUDOCALANUS MINUTUS ELONGATUS

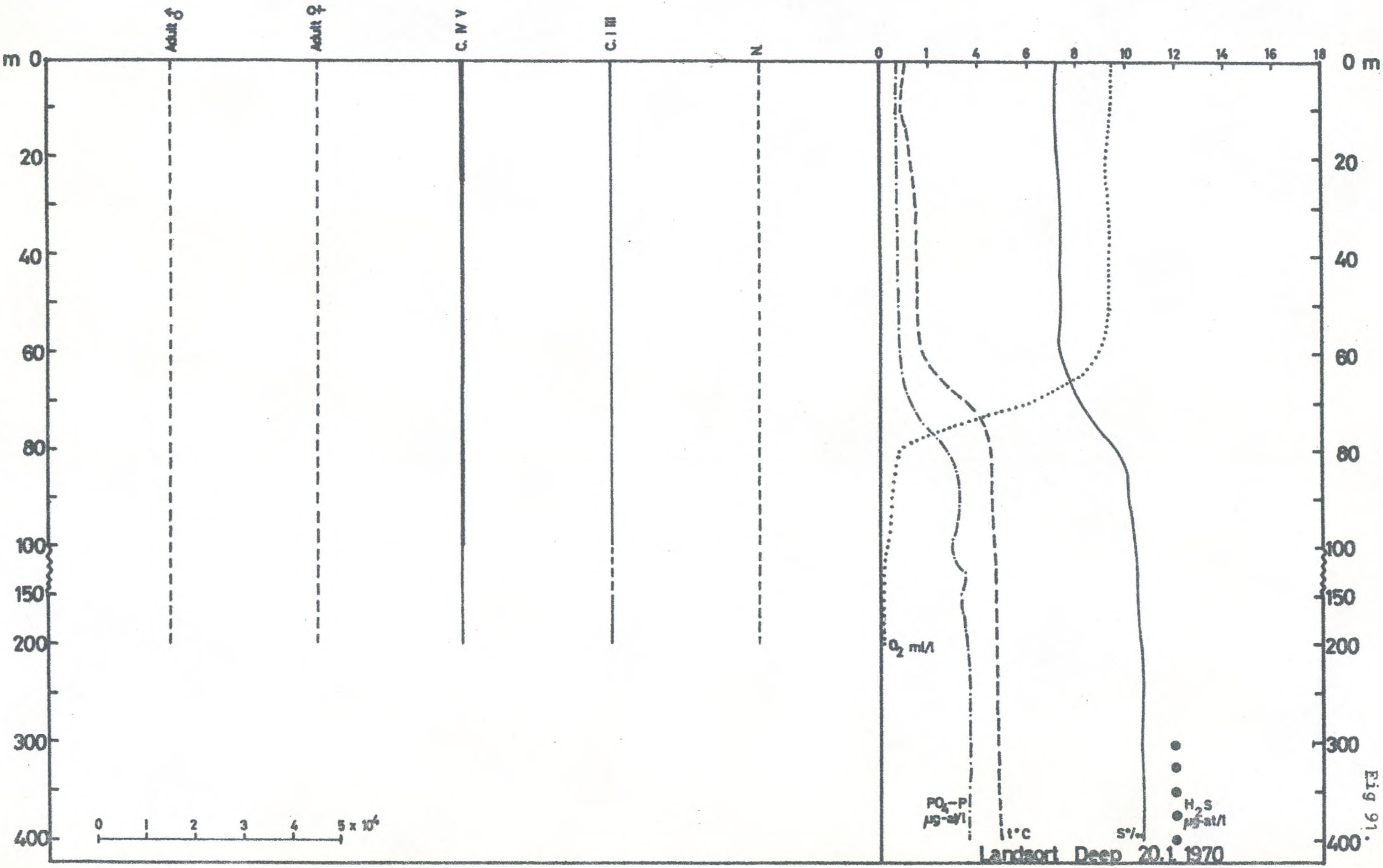
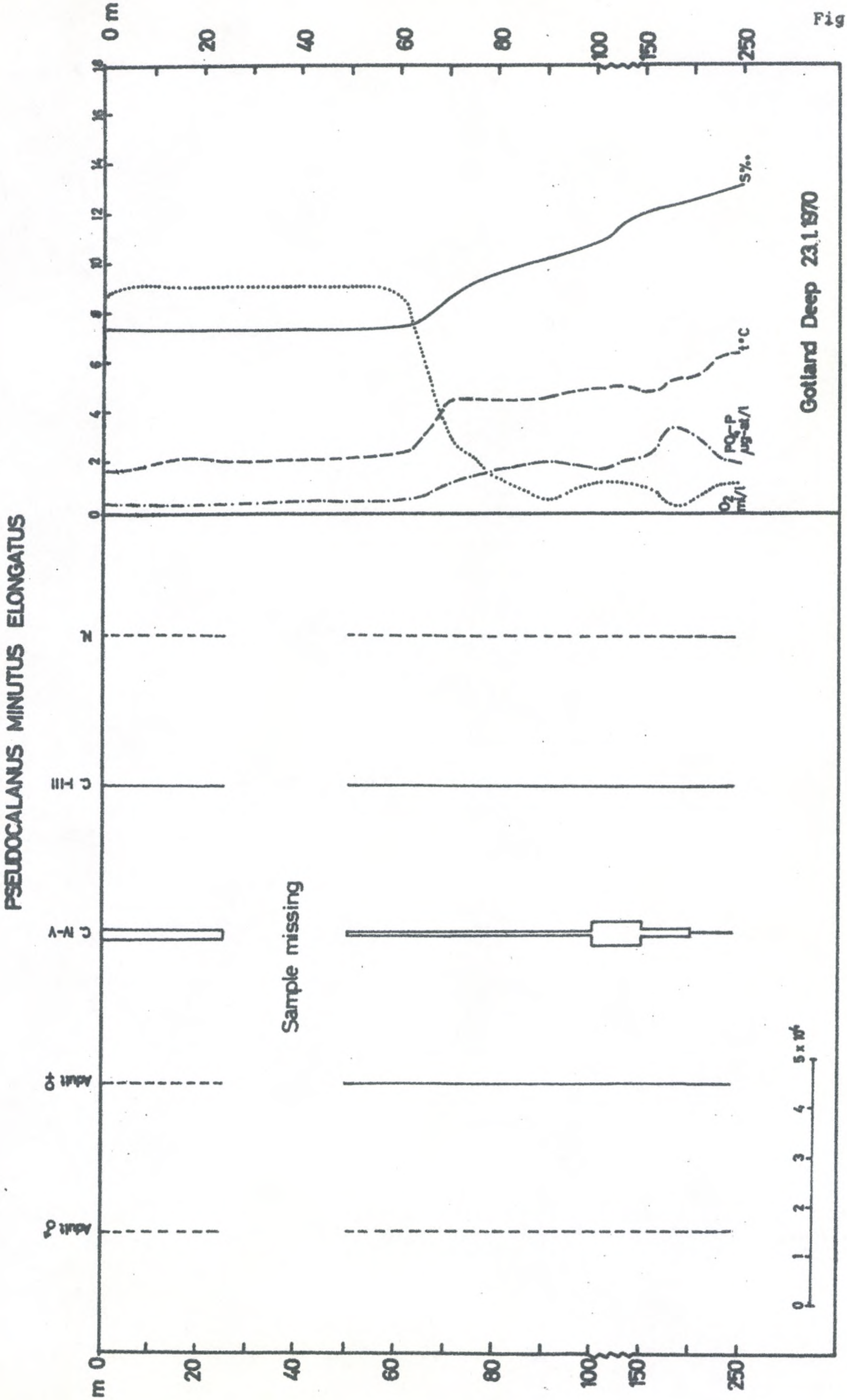


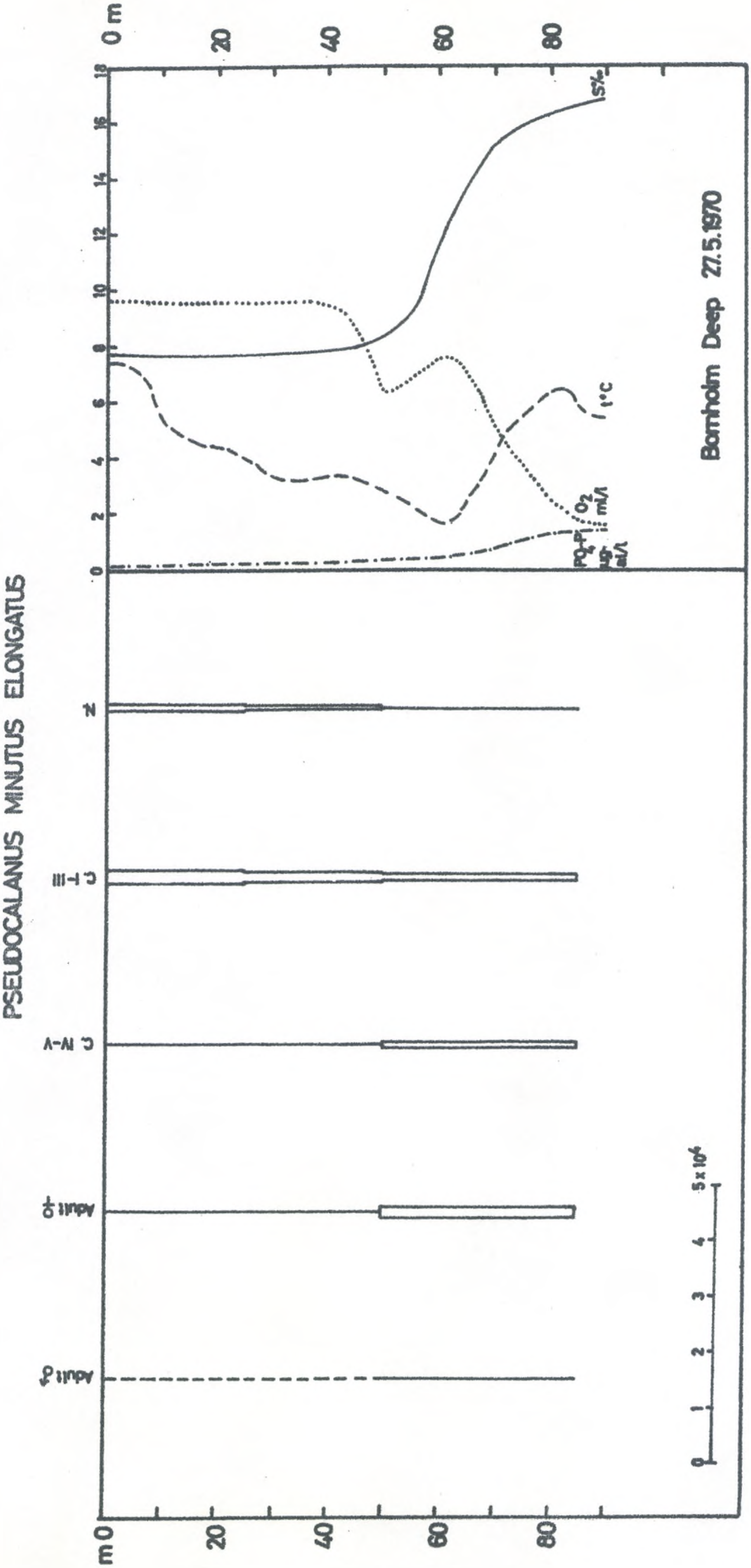
Fig 91.

Fig 92..



PSEUDOCALANUS MINUTUS ELONGATUS
Gotland Deep 23.1.1970
S‰
t°C
PO_4-P µg-at/l
O_2 ml/l
Sample missing
N
C I-III
C IV-V
Adult ♀
Adult ♂
5 x 10⁴
0 m
20
40
60
80
100
150
250

Fig 93.


PSEUDOCALANUS MINUTUS ELONGATUS
Bornholm Deep 27.5.1970
S‰
t°C
O2 ml/l
PO4-P µg-at/l
N.
C. I-III
C. IV-V
Adult ♀
Adult ♂
5 x 10⁴
0 m
20
40
60
80

PSEUDOCALANUS MINUTUS ELONGATUS

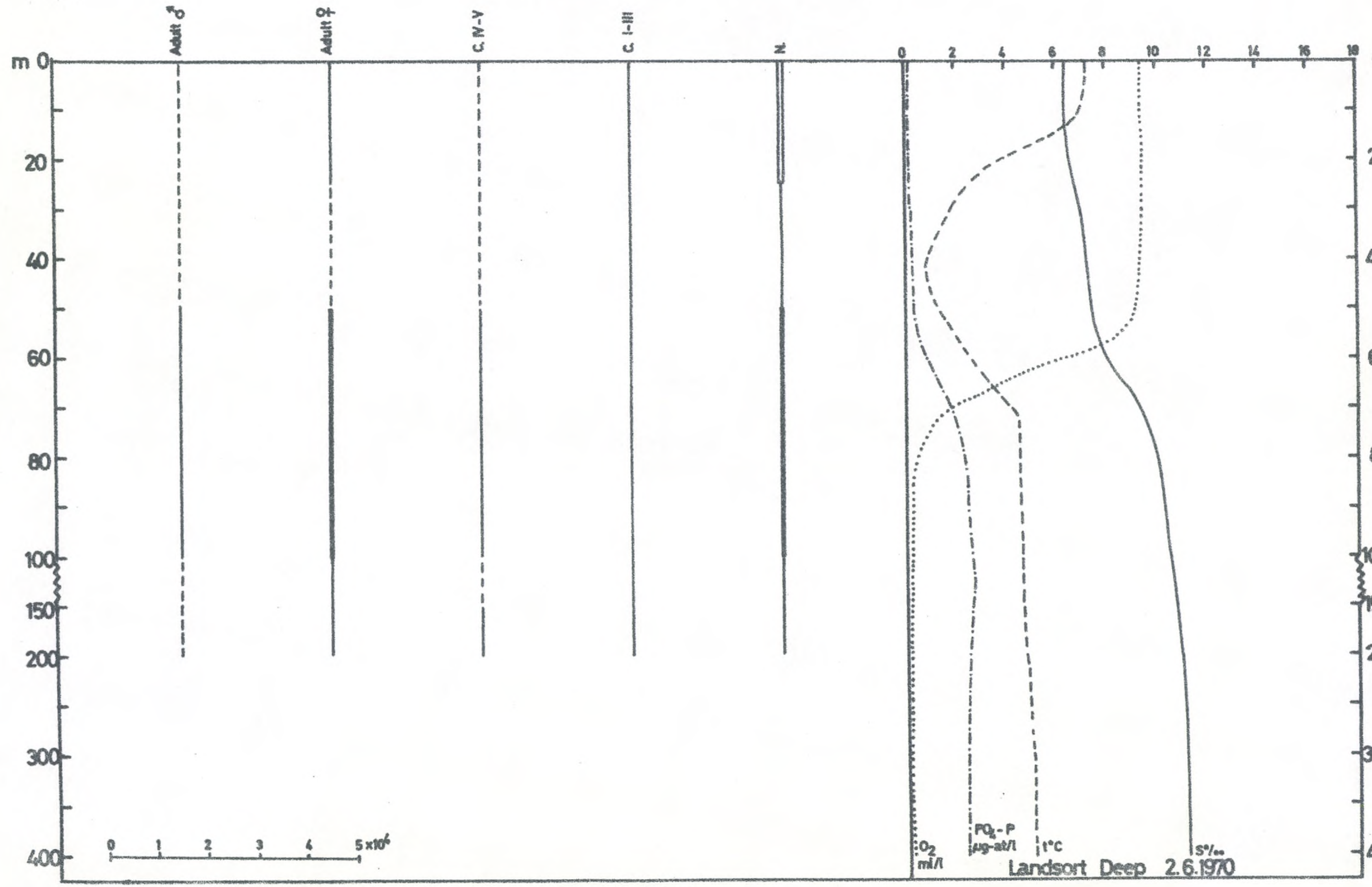


Fig 94.

Fig 95.

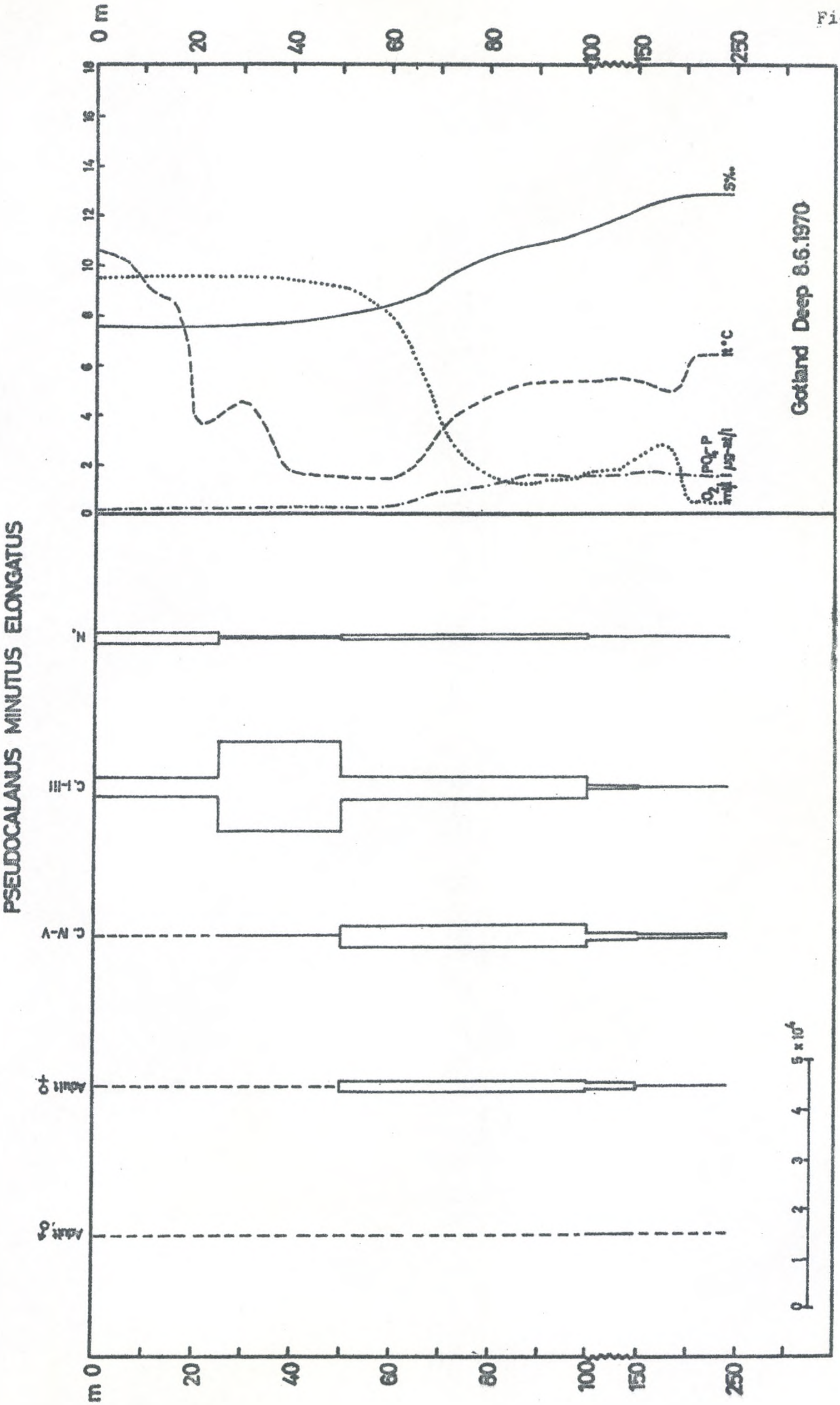
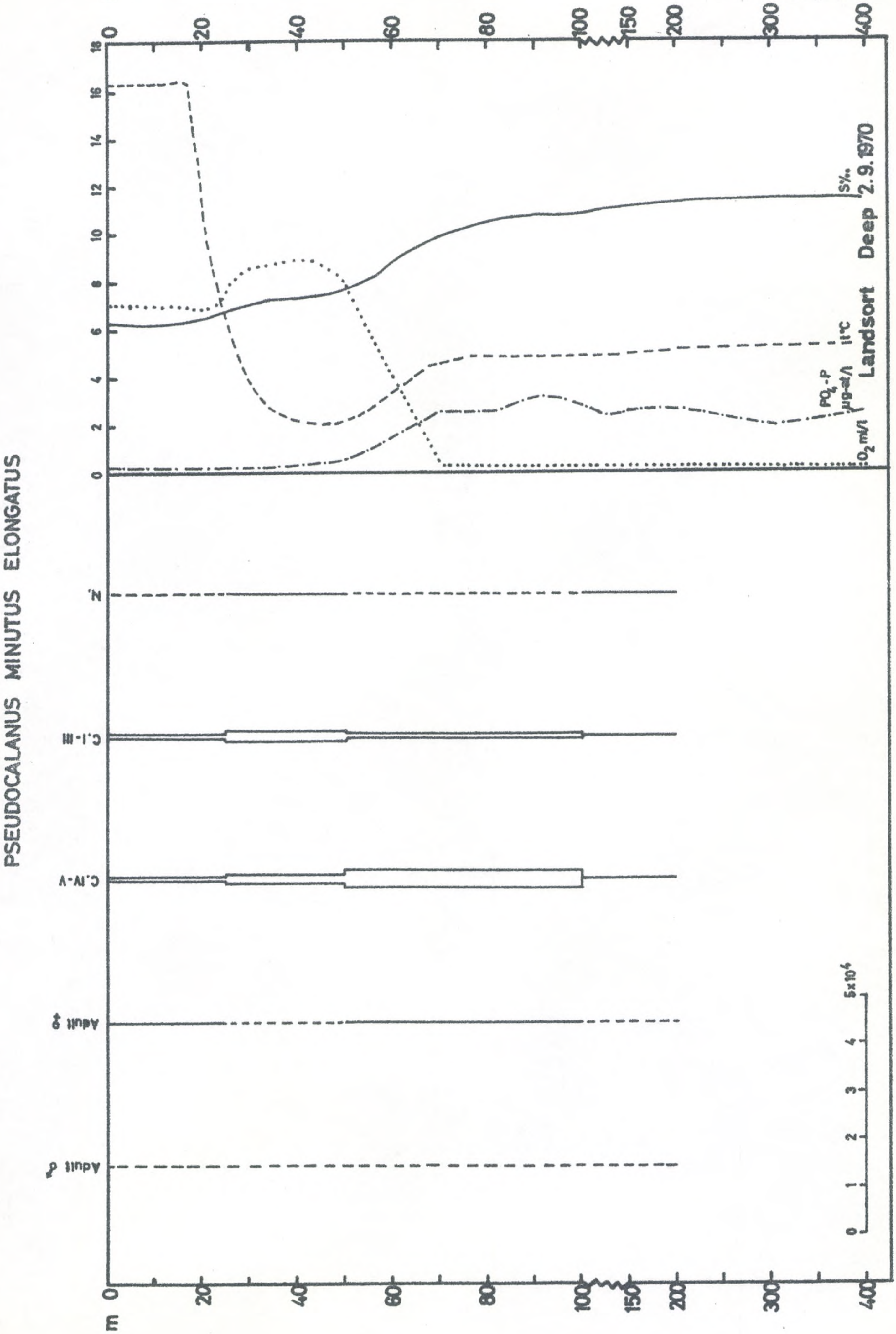

PSEUDOCALANUS MINUTUS ELONGATUS
Gotland Deep 8.6.1970
S‰
t°C
O_2 ml/l
PO_4-P µg-at/l
N.
C. I-III
C. IV-V
Adult ♀
Adult ♂
5 x 10^4
0 m
20
40
60
80
100
150
250

Fig 96.



PSEUDOCALANUS MINUTUS ELONGATUS
Landsort Deep 2.9.1970
S‰
t°C
PO_4-P µg-at/l
O_2 ml/l
N.
C.I-III
C.IV-V
Adult ♀
Adult ♂
5x10⁴
m
0
20
40
60
80
100
150
200
300
400

PSEUDOCALANUS MINUTUS ELONGATUS

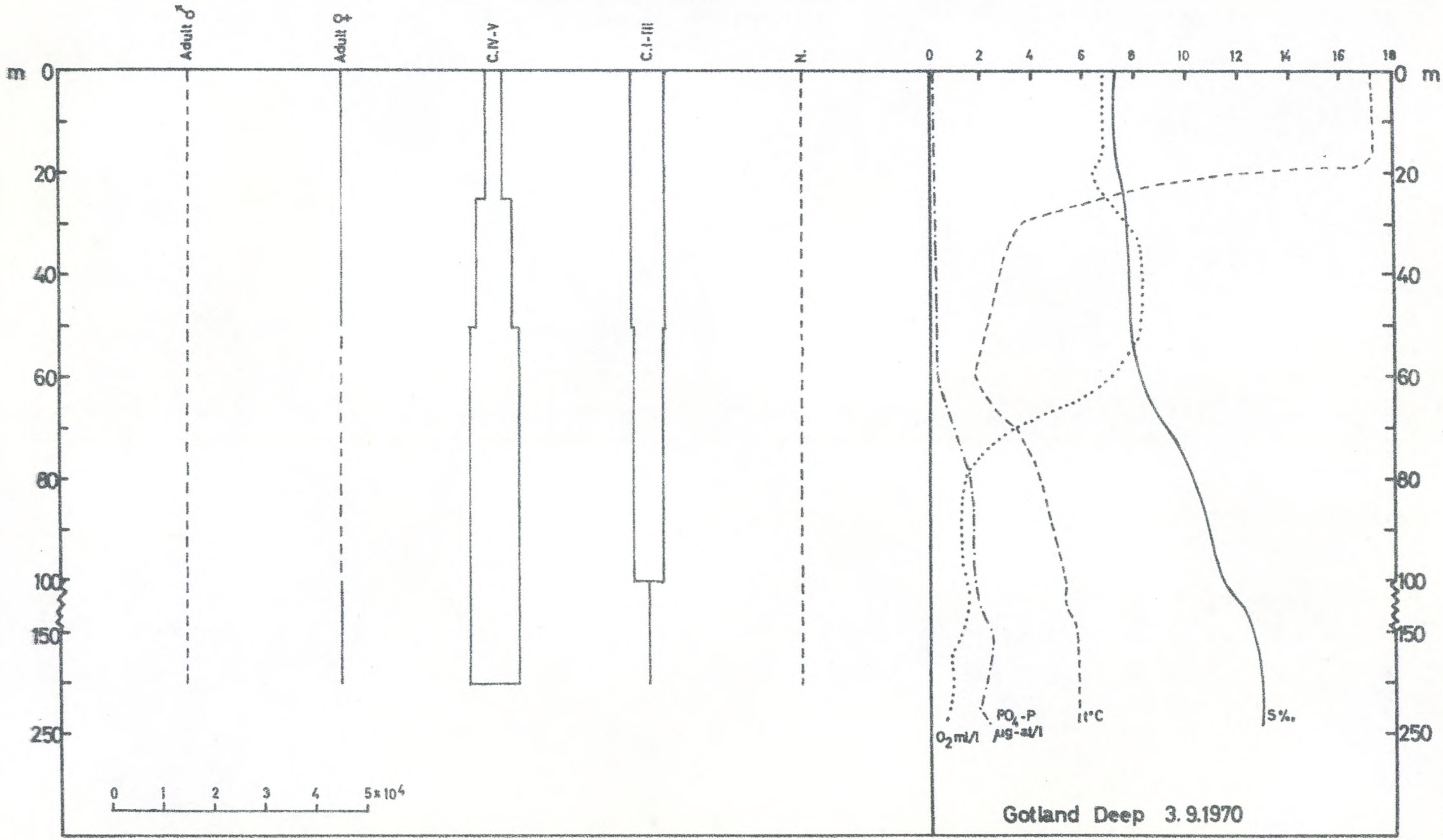
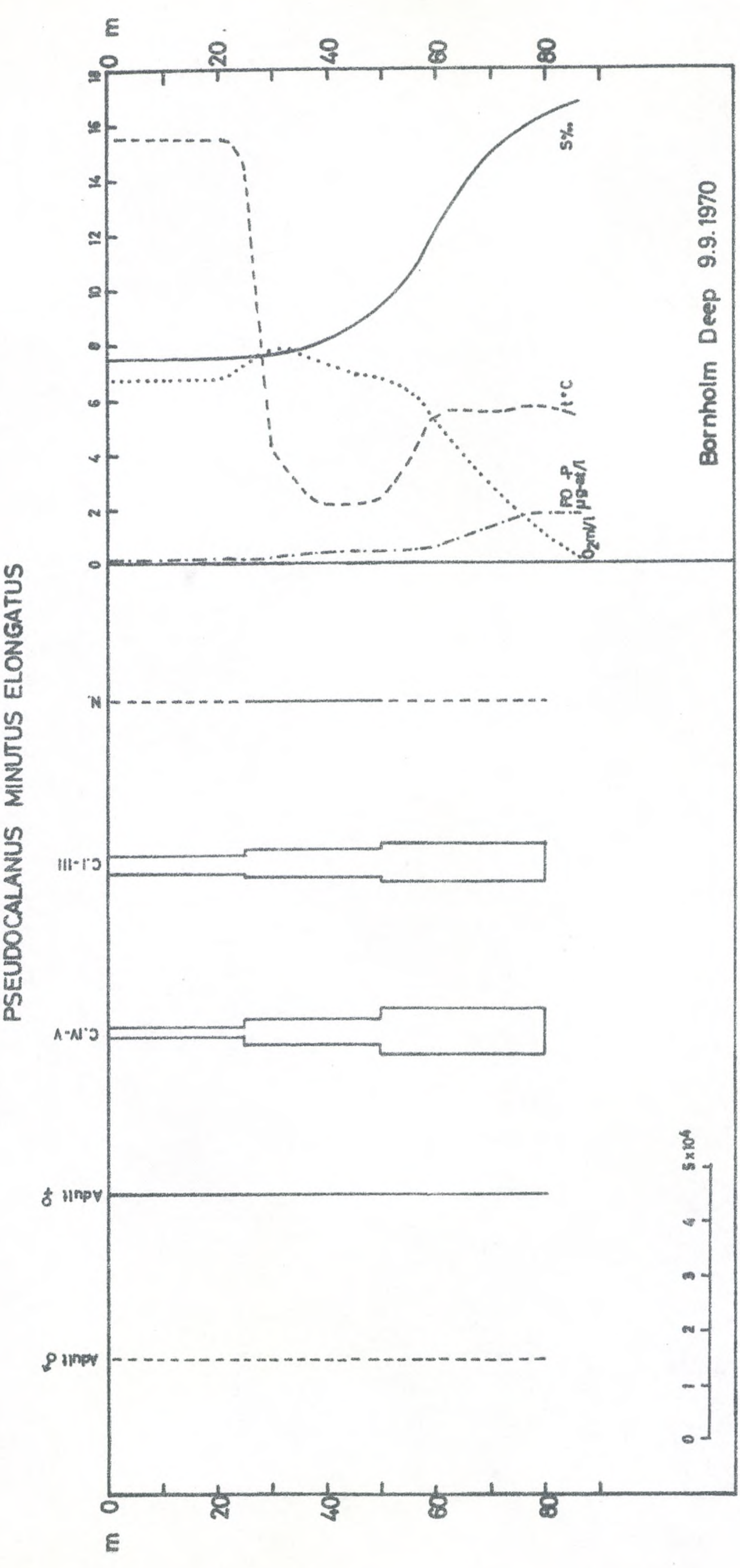


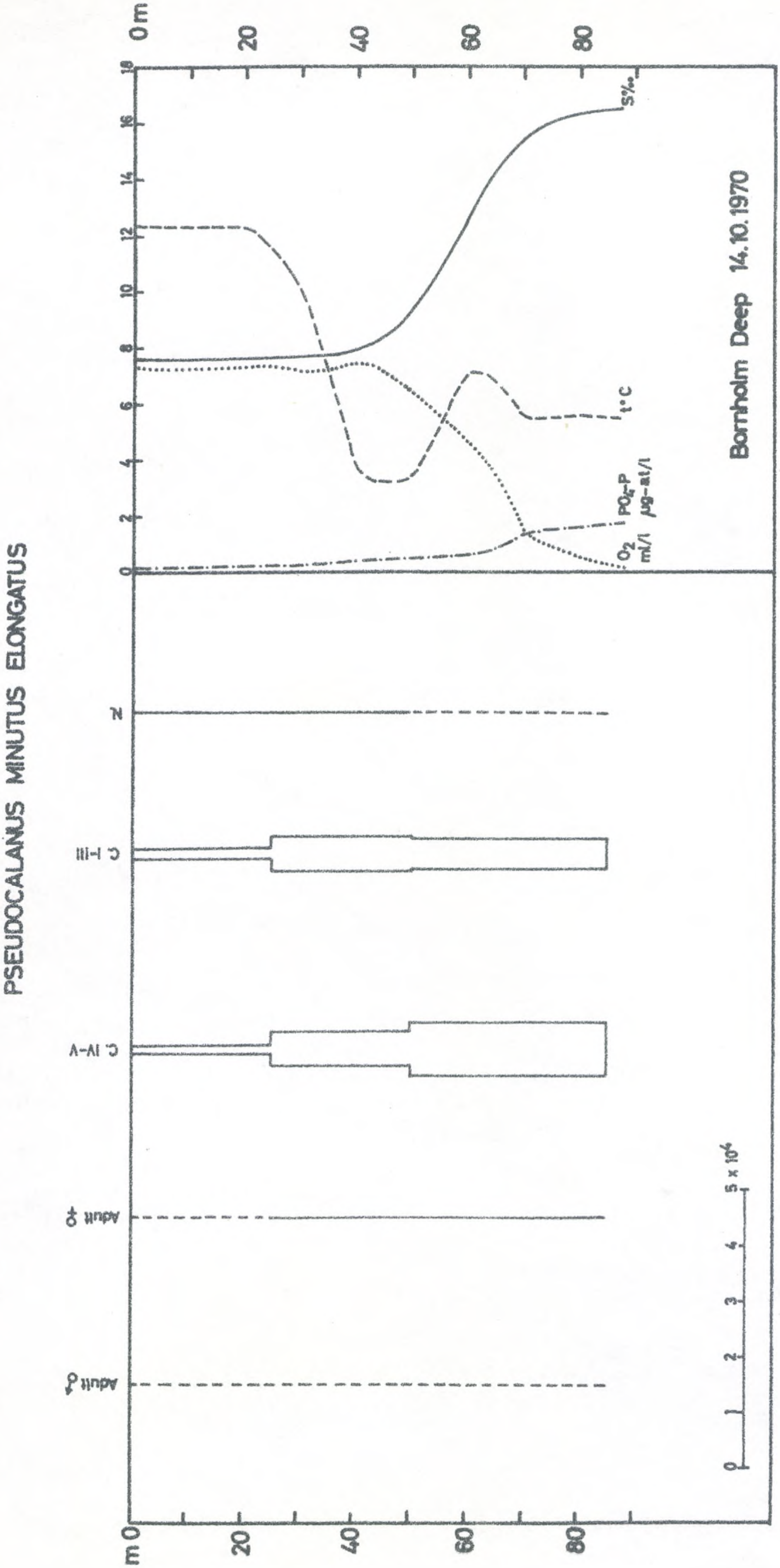
Fig 97.

Fig 98.



PSEUDOCALANUS MINUTUS ELONGATUS
Bornholm Deep 9.9.1970
S‰
t°C
PO4-P µg-at/l
O2ml/l
N
C.I-III
C.IV-V
Adult ♀
Adult ♂
5x10^4
m

Fig 99.



PSEUDOCALANUS MINUTUS ELONGATUS
Bornholm Deep 14.10.1970
S‰
t°C
PO_4-P µg-at/l
O_2 ml/l
N
C. I-III
C. IV-V
Adult ♀
Adult ♂
5 x 10⁴
0 m
20
40
60
80
m 0
0
2
4
6
8
10
12
14
16
18
1
3
5

Fig 100.

PSEUDOCALANUS MINUTUS ELONGATUS

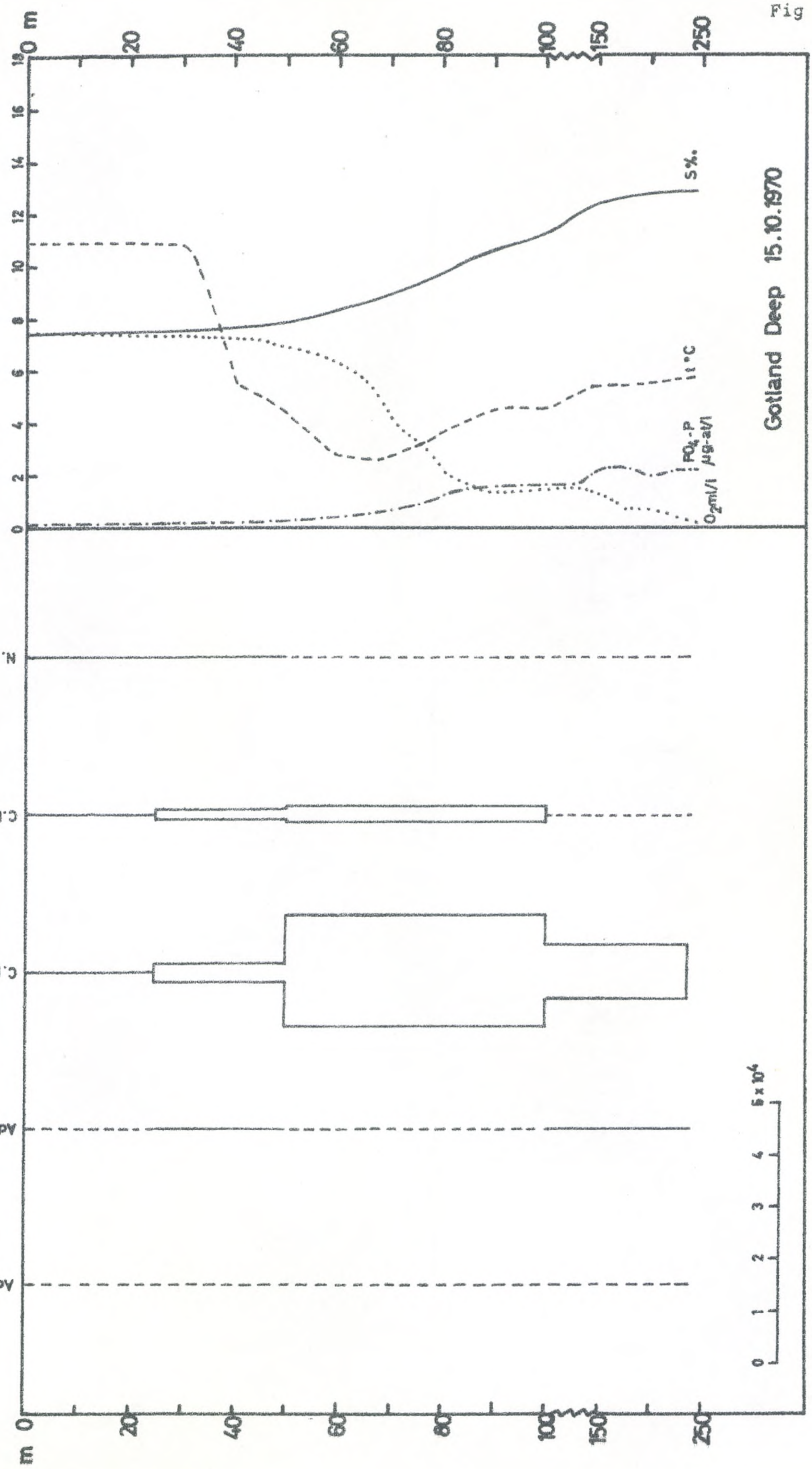
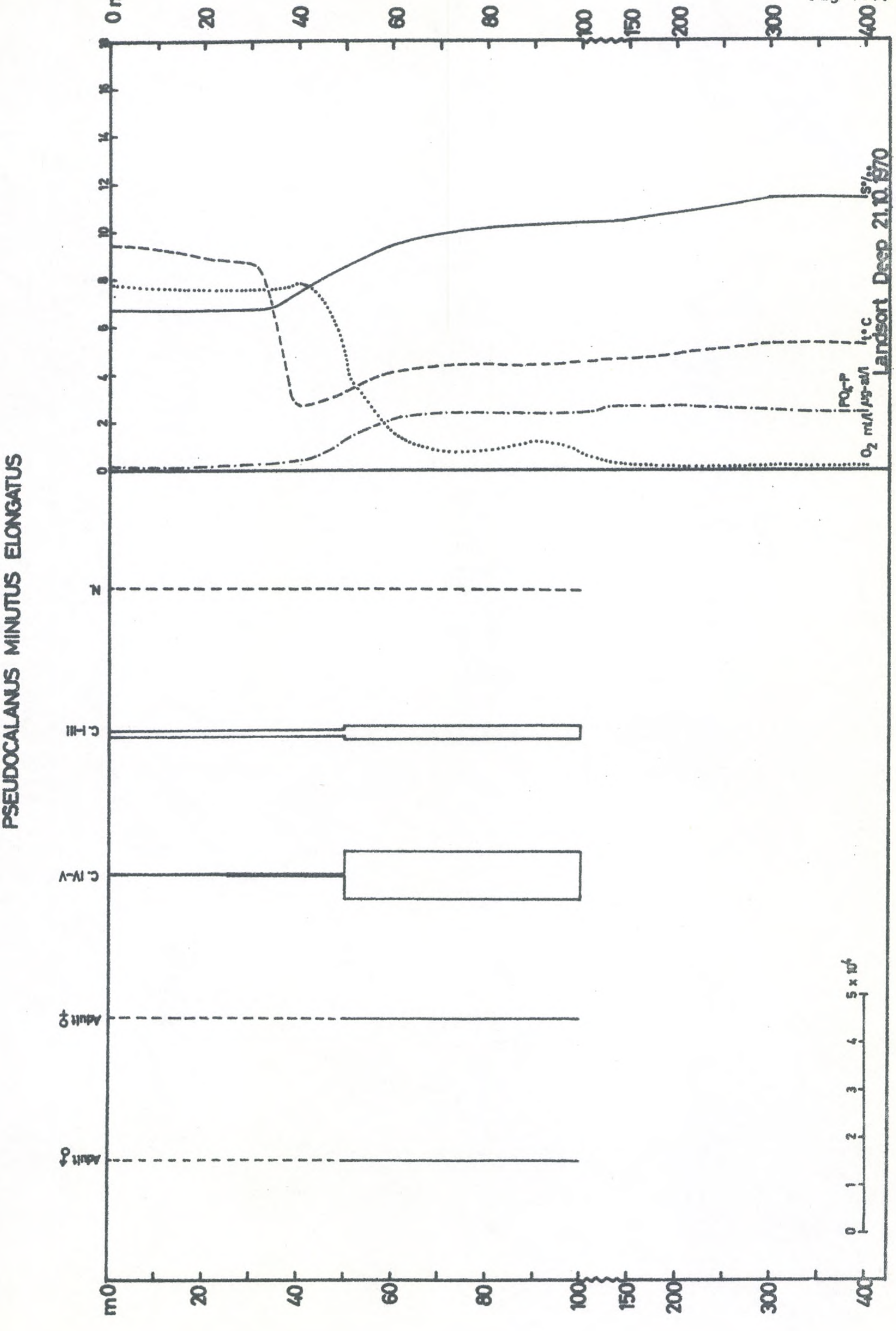
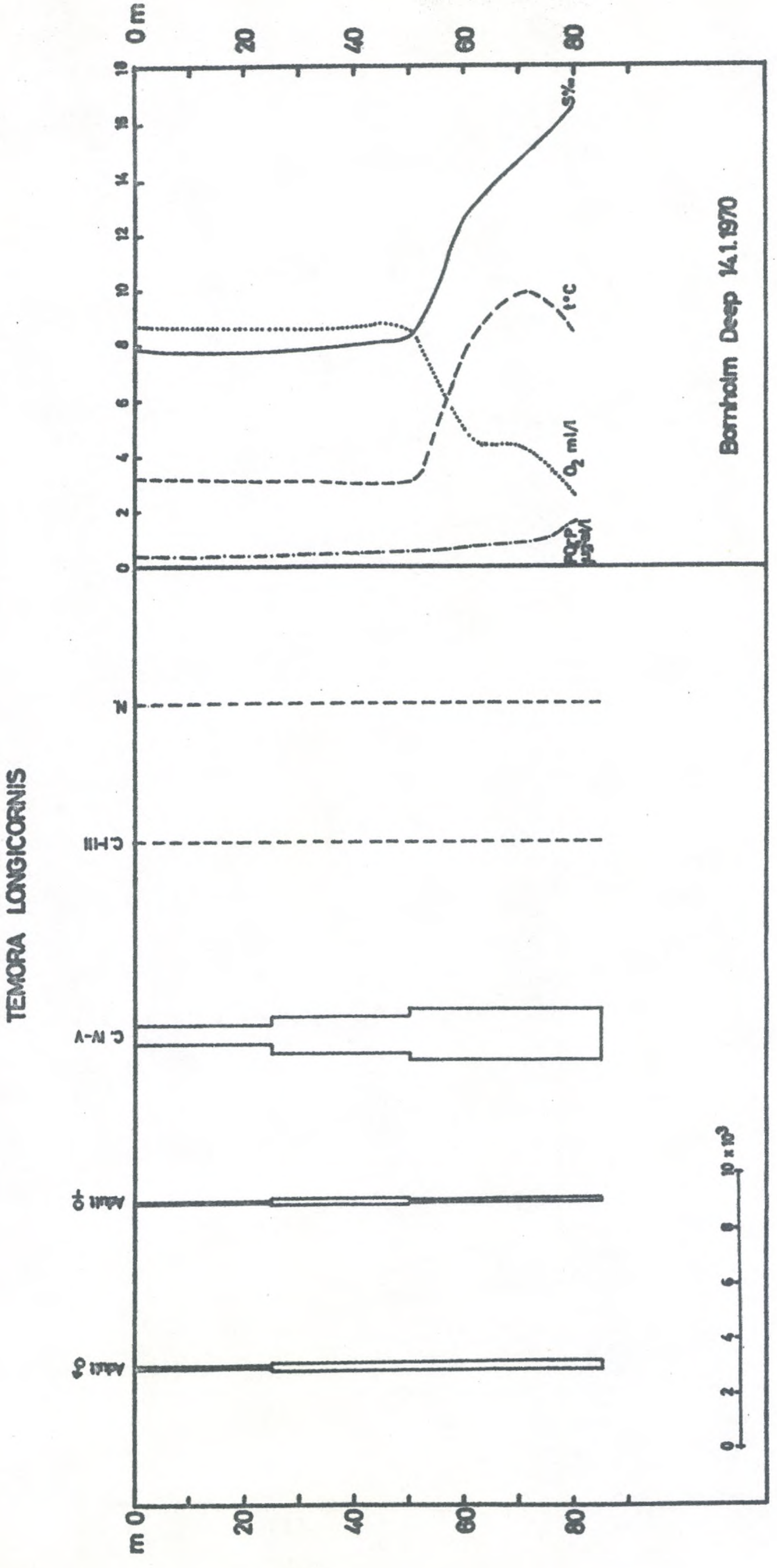


Fig 101.

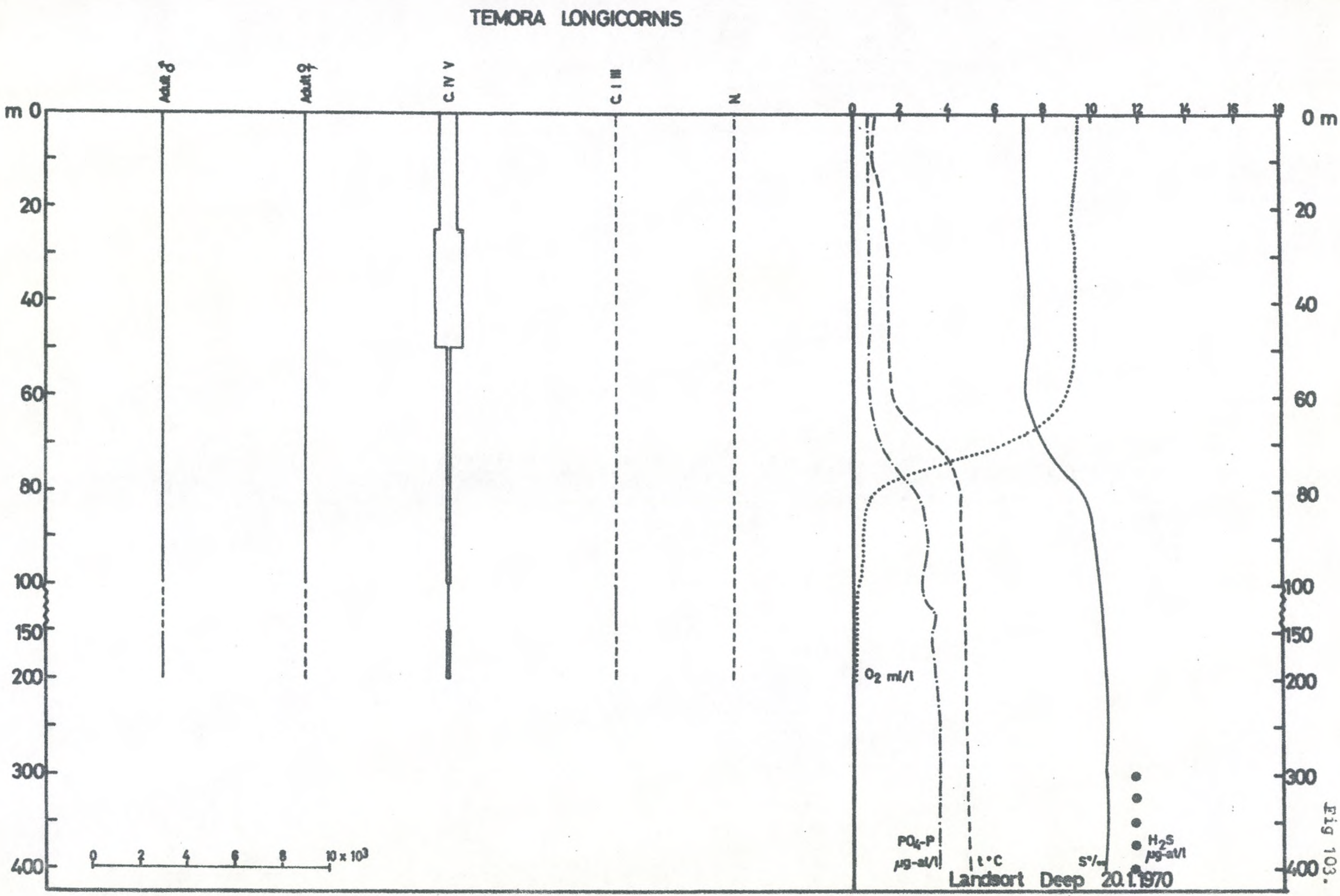


PSEUDOCALANUS MINUTUS ELONGATUS
Landsort Deep 21.10.1970
S‰
t°C
PO4-P
O2 ml/l µg-at/l
N.
C. I-III
C. IV-V
Adult ♀
Adult ♂
5 x 10³
0 m
20
40
60
80
100
150
200
300
400
0
2
4
6
8
10
12
14
16
18
1
2
3
4
5

Fig 102.



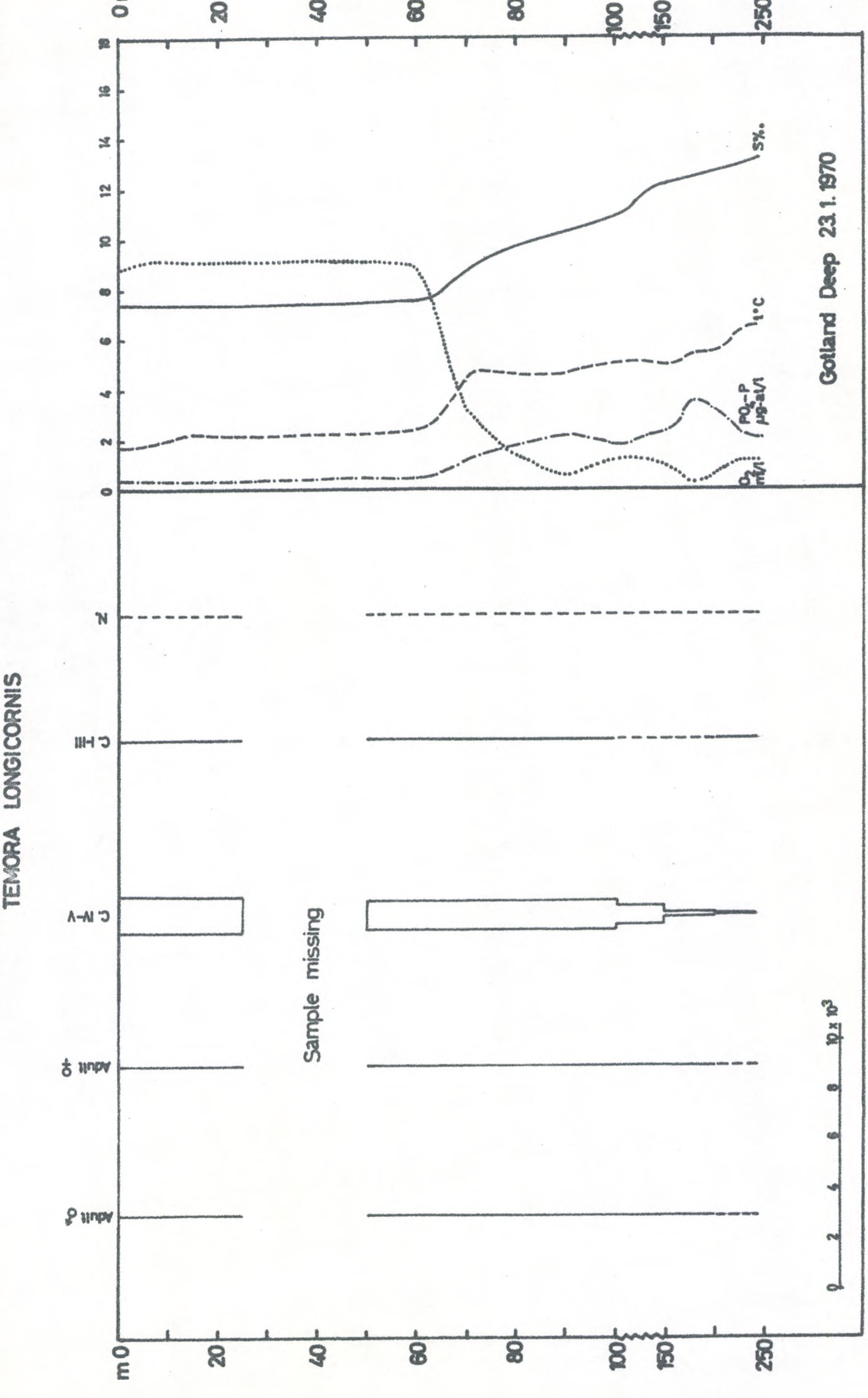
TEMORA LONGICORNIS
Bornholm Deep 14.1.1970
S‰
t°C
O2 ml/l
PO4-P µg at/l
N
C.I-III
C.IV-V
Adult ♀
Adult ♂
10 x 10³
0 m
20
40
60
80
m 0



TEMORA LONGICORNIS
Adult ♂
Adult ♀
C IV V
C I III
N
m 0
20
40
60
80
100
150
200
300
400
0
2
4
6
8
10 x 10³
0 m
10
12
14
16
18
O₂ ml/l
PO₄-P
µg-at/l
t °C
S‰
H₂S
µg-at/l
Landsort Deep 20.1.1970

Fig 103.

Fig 104.



TEMORA LONGICORNIS
Gotland Deep 23.1.1970
S‰
t°C
PO4-P µg-at/l
O2 ml/l
N
C I-III
C IV-V
Adult ♀
Adult ♂
Sample missing
10 x 10³
0 m
20
40
60
80
100
150
250

Fig 105.

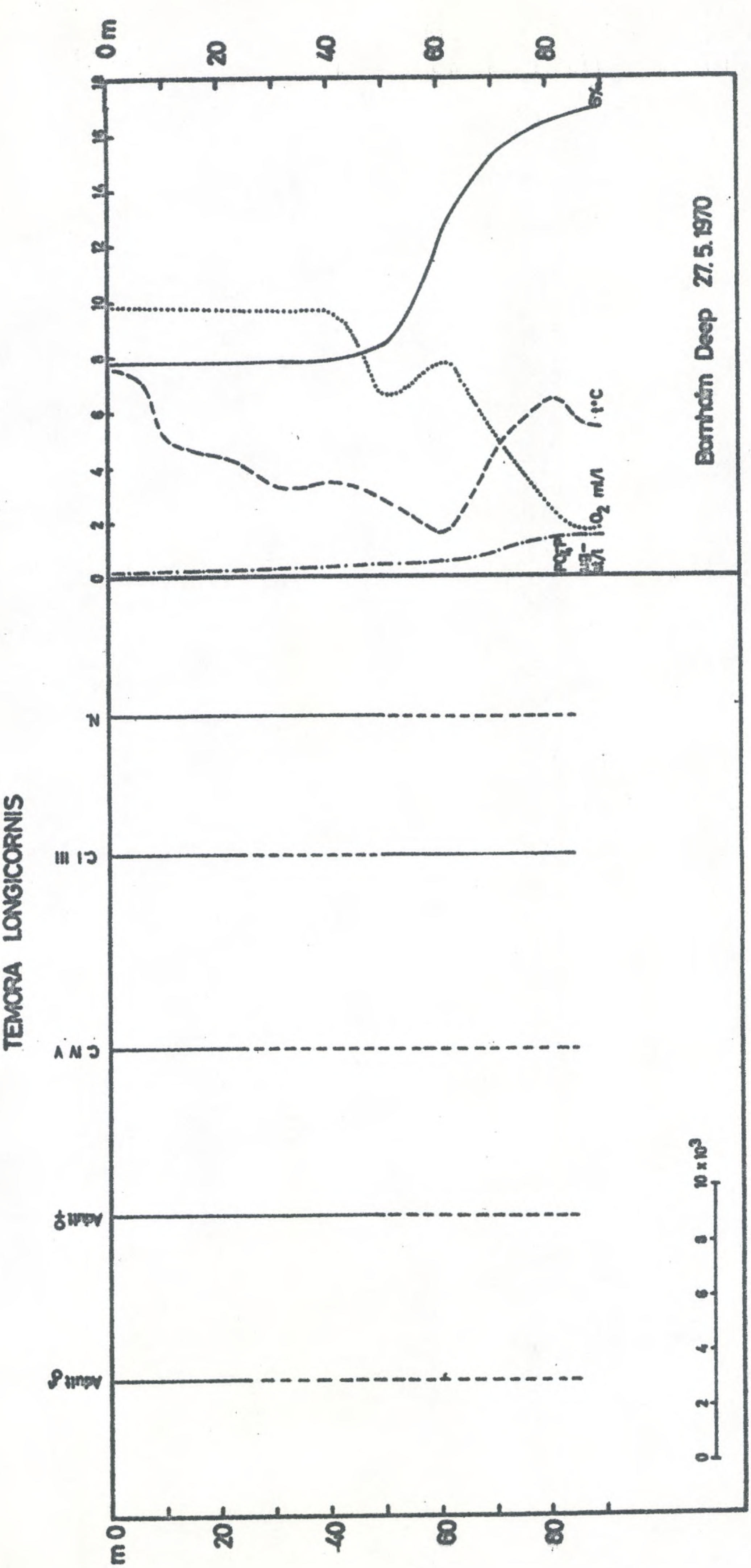

TEMORA LONGICORNIS
Bornholm Deep 27.5.1970
t°C
O2 ml/l
S‰
N
C III
C IV
Adult ♀
Adult ♂
10 x 10³
0 m
20
40
60
80

Fig 106.

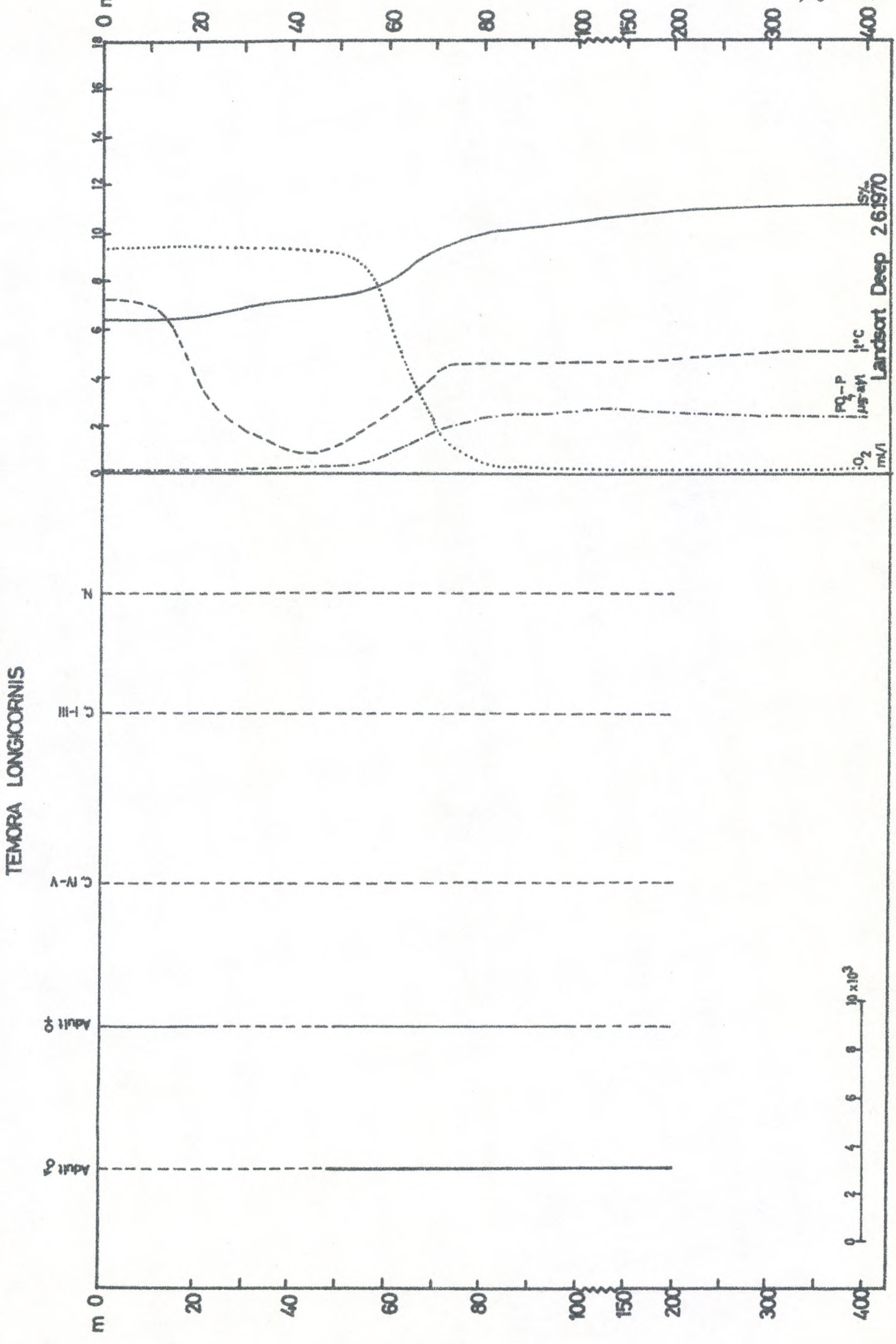
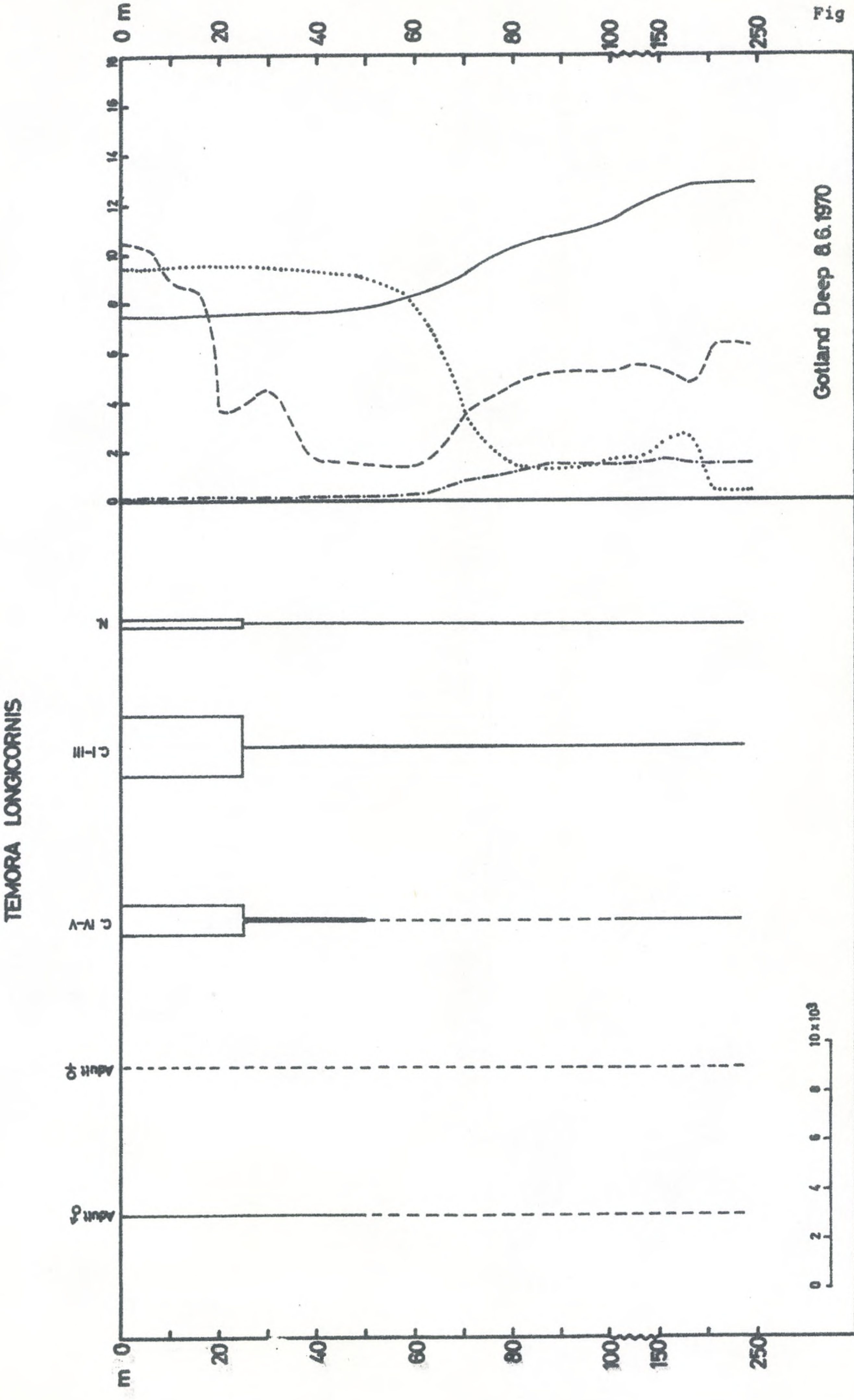

TEMORA LONGICORNIS
Landsort Deep 2.6.1970
S‰
t°C
PO_4-P µg-at/l
O_2 ml/l
0 m
20
40
60
80
100
150
200
300
400
N
C I-III
C IV-V
Adult ♀
Adult ♂
10×10³

Fig 107.



TEMORA LONGICORNIS
Gotland Deep 8.6.1970
N
C I-III
C IV-V
Adult ♀
Adult ♂
10 x 10³
0 m
20
40
60
80
100
150
250

Fig 108,

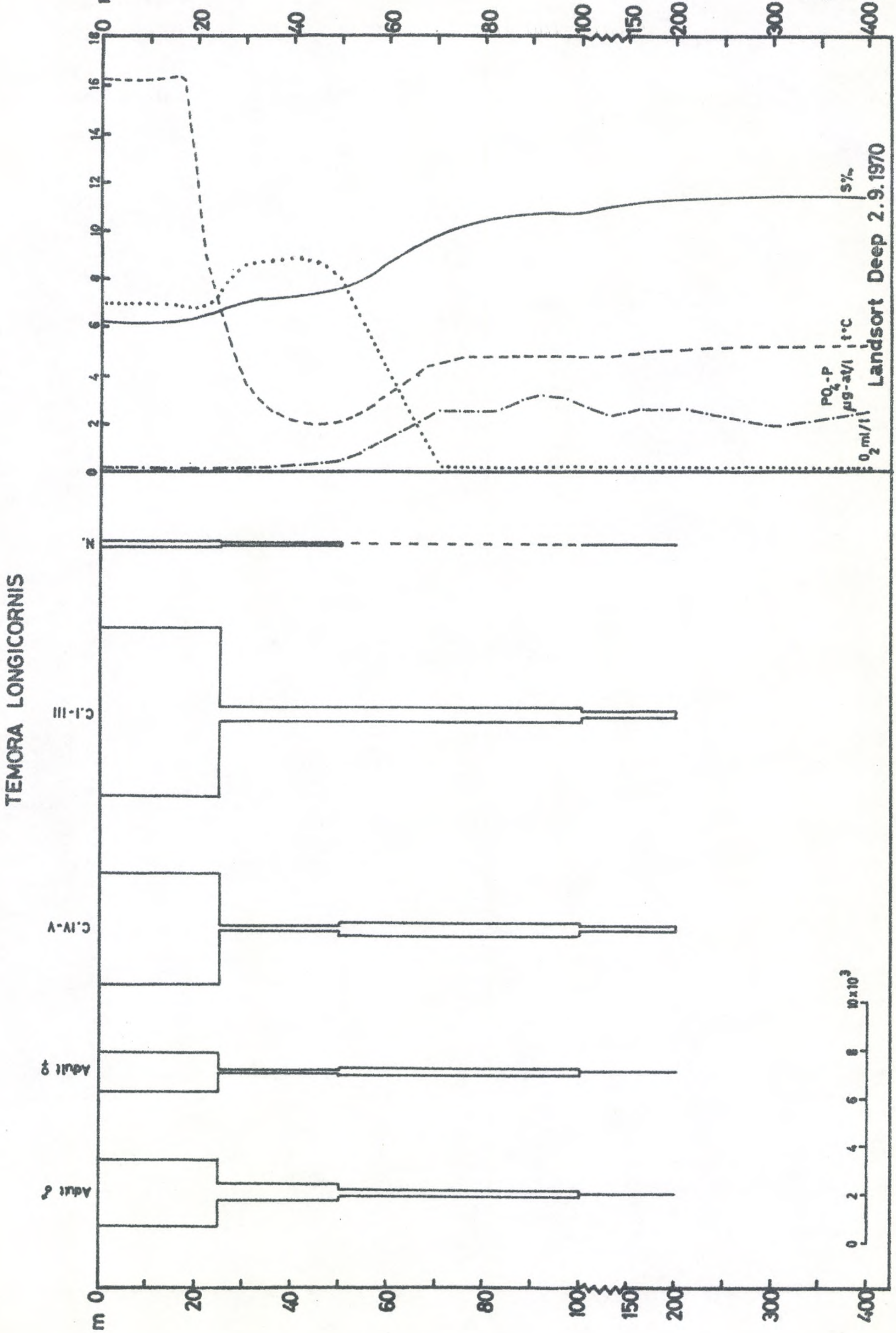

TEMORA LONGICORNIS
Landsort Deep 2.9.1970
S‰
t°C
PO_4-P µg-at/l
O_2 ml/l
N.
C.I-III
C.IV-V
Adult ♀
Adult ♂
10x10³
m

Fig 109.

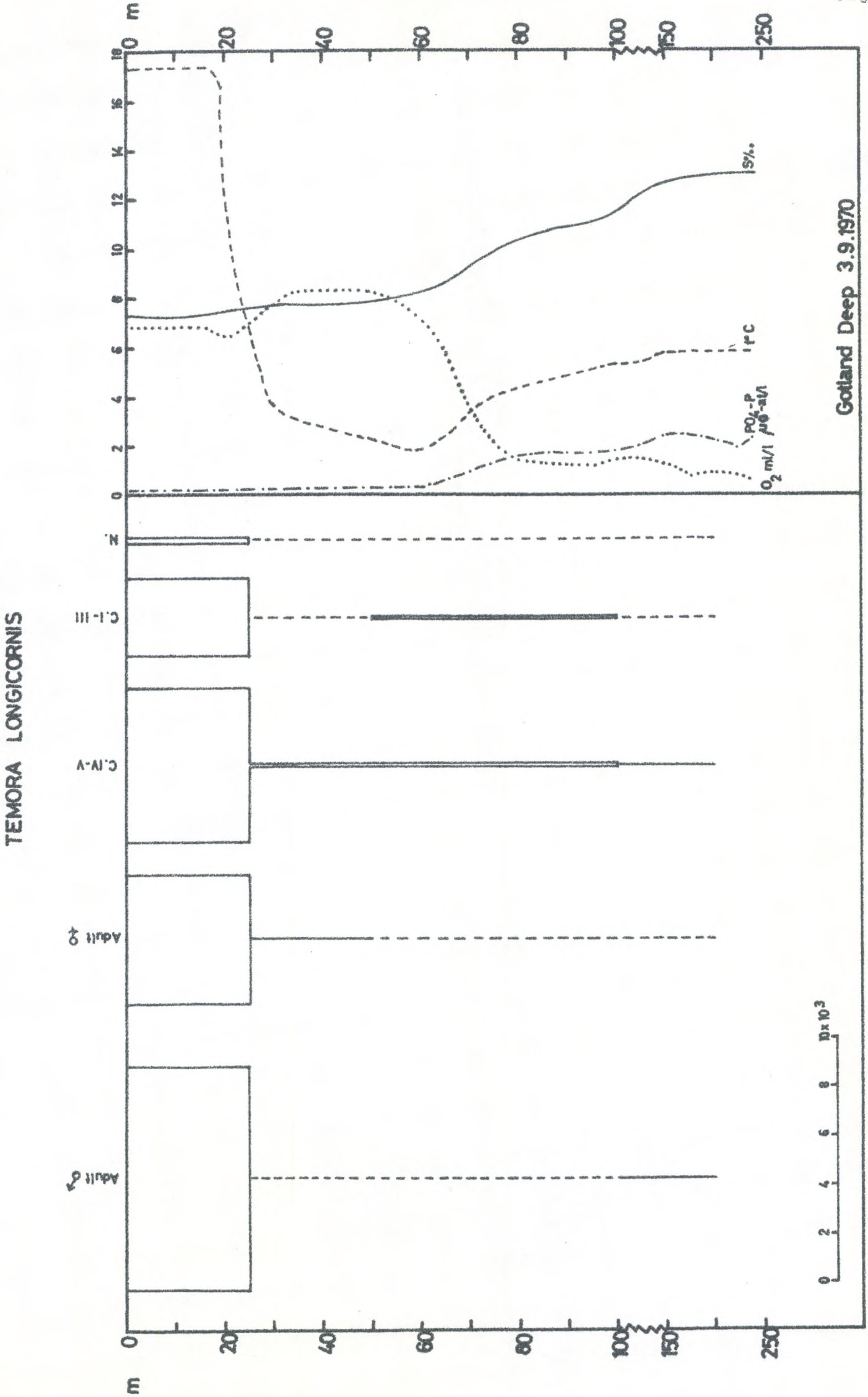

TEMORA LONGICORNIS
Gotland Deep 3.9.1970
S‰
t°C
PO4-P µg-at/l
O2 ml/l
N.
C.I-III
C.IV-V
Adult ♀
Adult ♂
10x10³
m
0
20
40
60
80
100
150
250

Fig 110.

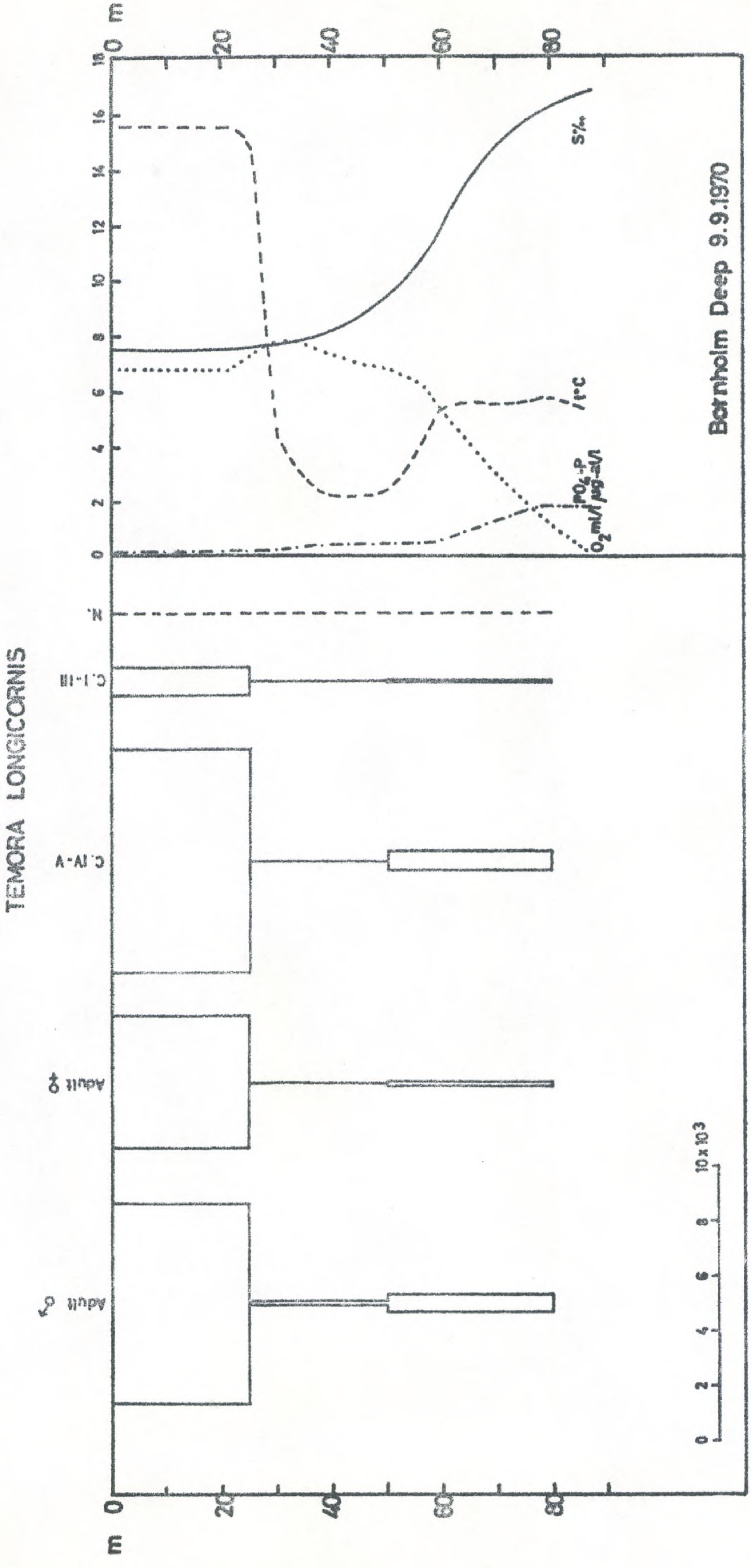

TEMORA LONGICORNIS
Bornholm Deep 9.9.1970
S‰
t°C
PO4-P µg-at/l
O2 ml/l
N.
C.I-III
C.IV-V
Adult ♀
Adult ♂
10x10³
m

Fig 111.

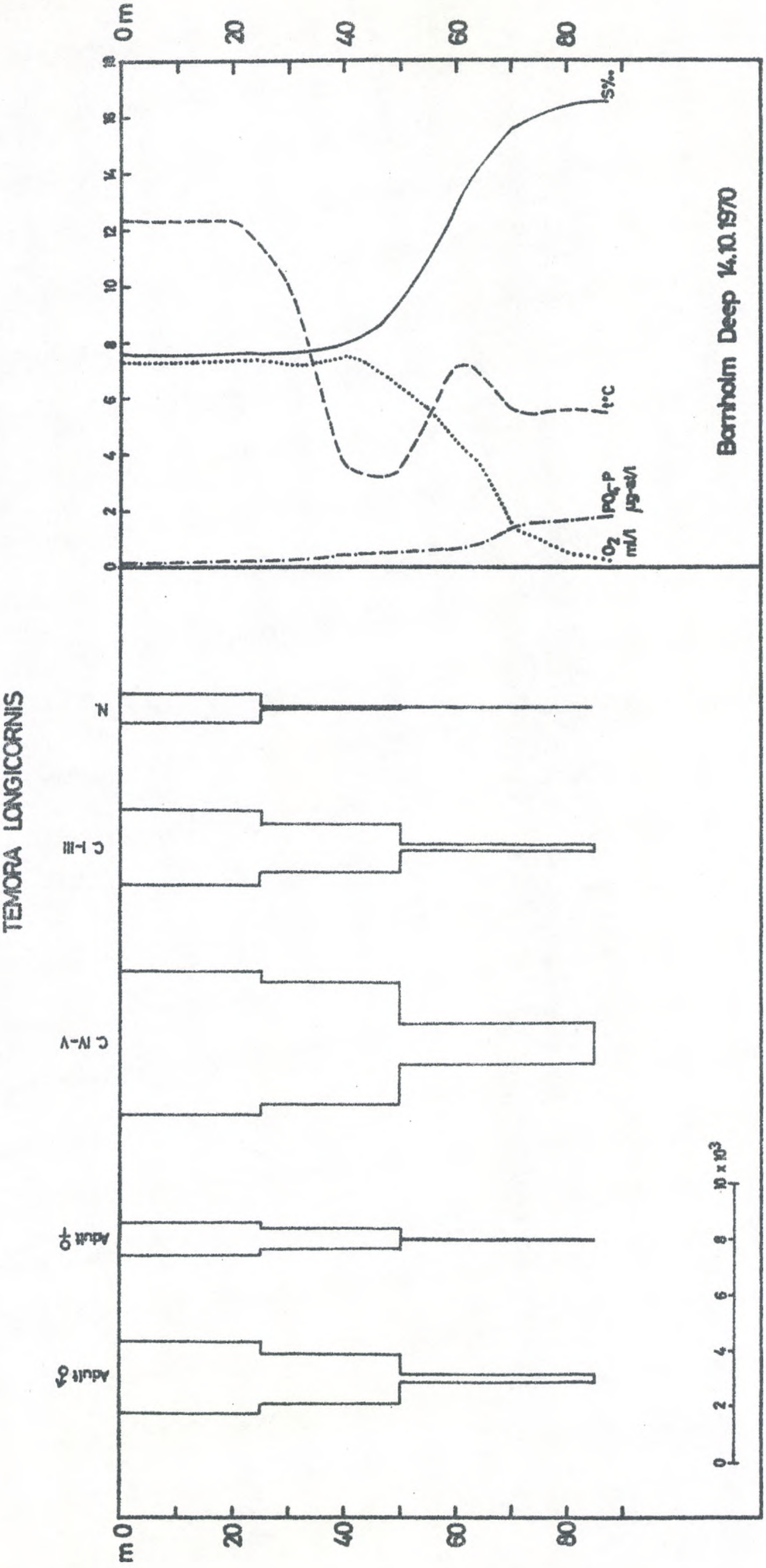
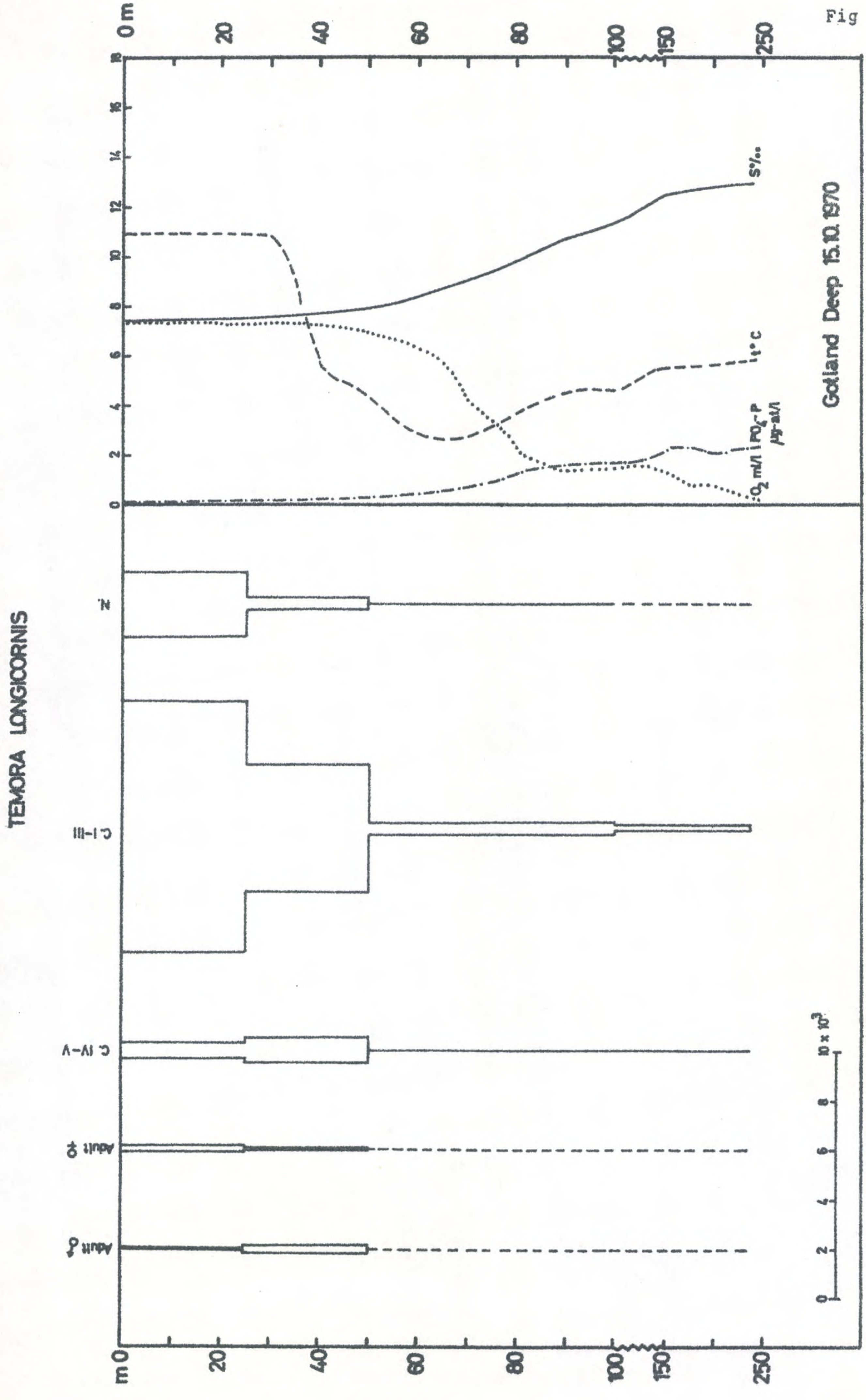

TEMORA LONGICORNIS
Bornholm Deep 14.10.1970
S‰
t°C
PO4-P µg-at/l
O2 ml/l
N
C I–III
C IV–V
Adult ♀
Adult ♂
10 x 10^3
0 m
20
40
60
80

Fig 112.



TEMORA LONGICORNIS
Gotland Deep 15.10.1970
0 m
20
40
60
80
100
150
250
m 0
0
2
4
6
8
10
12
14
16
18
S‰
t° C
O_2 ml/l
PO_4-P µg-at/l
N.
C. I–III
C. IV–V
Adult ♀
Adult ♂
10×10^3

Fig 113.

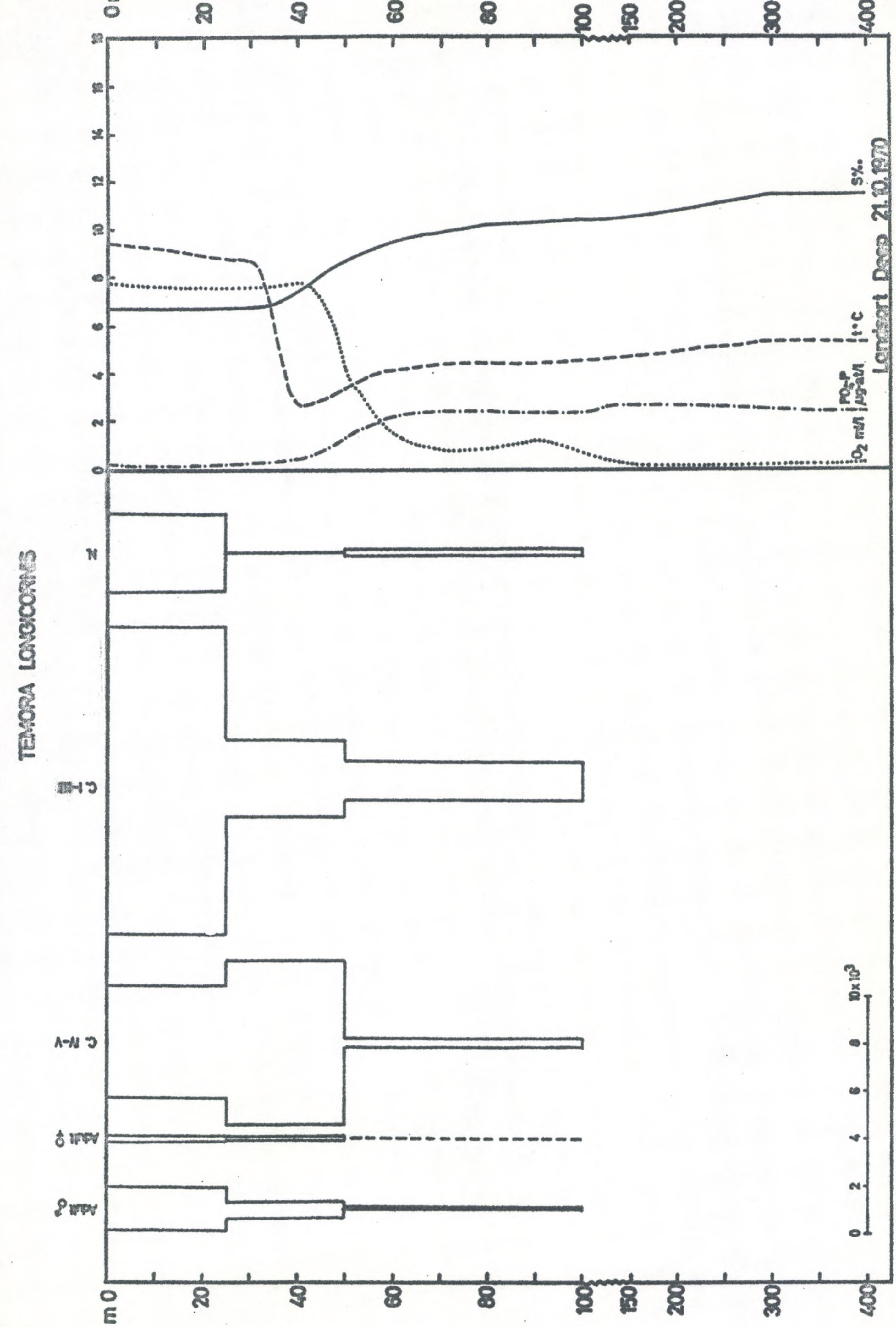

TEMORA LONGICORNIS
Landsort Deep 21.10.1970
S‰
t°C
PO4-P µg-at/l
O2 ml/l
N
C I-III
C IV-V
Ad ♀
Ad ♂
10x10³
0 m
m 0

Table 1. Plankton stations visited in 1970.

S 12 (2A)	Arkona	55°00'N	14°05'E
S 24 (5A)	Bornholm Deep	55°15'N	15°59'E
8A	"Rysshålan"	55°38'N	18°36'E
F 81 (15A)	Gotland Deep	57°20'N	20°03'E
F 72		59°18'N	21°34'E
F 78 (31A)	Landsort Deep	58°35'N	18°14'E
S 41 (38A)		57°07'N	17°40'E

Table 2. Temperature, salinity, oxygen and hydrogen sulphide values at stations F 78, F 81, S41, 8 A, S 24 and S 12 in the Baltic proper, January, 1970 (ANON., 1971a).

Station F 78; 20 January, 1970

Depth m	t°C	S°/oo	O_2 ml/l	H_2S µgat/l
0	0.91	7.14	9.55	
5	0.81	7.14	9.48	
10	0.93	7.20	9.48	
15	1.05	7.24	9.36	
20	1.30	7.24	9.18	
30	1.48	7.27	9.37	
40	1.43	7.30	9.30	
50	1.44	7.32	9.28	
60	1.88	7.34	8.97	
70	3.59	8.05	6.29	
80	4.54	9.94	0.95	
90	4.54	10.05	0.53	
100	4.71	10.49	0.24	
125	4.81	10.66	0.12	
150	4.78	10.65	0.15	
200	4.84	10.75	0.16	
300	4.92	10.83		12.1
400	4.93	10.84		12.2
425	4.94	10.85		14.4
440	4.96	10.86		17.3

Station F 81; 23 January, 1970

Depth m	t°C	S°/oo	O_2ml/l
0	1.70	7.40	8.98
5	1.87	7.40	9.10
10	2.04	7.41	9.17
15	2.20	7.41	9.10
20	2.09	7.42	9.08
30	2.18	7.42	9.05
40	2.25	7.42	9.10
50	2.26	7.42	9.05
60	2.42	7.43	8.97
70	4.55	8.95	3.18
80	4.47	9.77	1.44
90	4.69	10.36	0.61
100	5.02	10.85	1.13
125	5.13	11.63	1.20
150	4.98	12.11	1.02
175	5.37	12.41	0.18
200	5.48	12.62	0.50
225	6.27	12.92	1.11
240	6.43	13.05	1.07

Continued

Table 2. Continued)

Station S 41; 21 January, 1970

Depth m	t^oC	S^o/oo	O_2ml/l
0	1.79	7.42	9.22
5	1.68	7.42	9.20
10	1.83	7.42	9.17
15	1.91	7.42	9.12
20	1.91	7.42	9.19
30	2.10	7.42	9.11
40	2.04	7.42	9.04
50	2.04	7.42	9.13
60	2.11	7.42	9.08
70	2.37	7.42	8.99
80	4.75	8.76	3.39
90	4.52	9.57	1.33
100	4.44	9.95	0.25

Station 8 A; 14 January, 1970

Depth m	t^oC	S^o/oo	O_2ml/l
0	3.46	7.58	8.68
5	3.47	7.58	8.75
10	3.51	7.58	8.88
15	3.49	7.58	8.60
20	3.51	7.58	8.60
30	3.48	7.58	8.61
40	3.53	7.58	8.59
50	3.53	7.58	8.74
60	3.55	7.58	8.62
70	4.13	9.32	3.04
80	4.68	10.39	1.40
90	5.14	10.93	1.16

Station S 24; 14 January, 1970

Depth m	t^oC	S^o/oo	O_2ml/l
0	3.15	7.92	8.82
5	3.19	7.92	8.85
10	3.13	7.92	8.72
15	3.14	7.94	8.77
20	3.06	7.97	8.74
30	3.10	8.00	8.82
40	2.99	8.05	8.80
50	3.00	8.16	8.65
60	7.89	12.62	4.77
70	9.92	14.74	4.36
80	8.51	16.60	2.76

Station S 12; 13 January, 1970

Depth m	t^oC	S^o/oo	O_2ml/l
0	1.90	8.33	9.15
5	1.87	8.33	9.13
10	1.87	8.34	9.19
15	1.80	8.38	9.17
20	1.74	16.07	9.20
30	2.12	16.13	9.04
40	7.20	-	4.22

Table 3. Temperature, salinity, oxygen and hydrogen sulphide values at stations S 12, S 24, 8A, S 41, F 81, F 78 and F 72 in the Baltic proper, May-June, 1970 (ANON., 1971a).

Station S 12; 26 May, 1970

Depth m	t^oC	S^o/oo	O_2ml/l
0	7.12	7.64	9.06
5	7.11	7.64	9.05
10	7.09	7.65	9.03
15	5.36	7.76	9.14
20	5.18	8.09	9.06
30	3.33	8.79	8.66
40	1.48	13.09	7.80
45	1.25	15.11	5.67
49	1.32	15.21	5.57

Station S 24; 27 May, 1970

Depth m	t^oC	S^o/oo	O_2ml/l
0	7.30	7.58	9.67
5	7.12	7.56	9.82
10	5.05	7.53	9.65
15	4.64	7.55	9.59
20	4.53	7.63	9.54
30	3.16	7.74	9.56
40	3.33	7.83	9.48
50	2.79	8.18	6.26
60	1.60	12.18	7.67
70	4.35	15.19	5.00
80	6.18	16.15	2.65
87	5.36	16.71	1.65
89	5.36	16.72	1.68

Continued

Table 3. Continued)

Station 8A; 28 May, 1970

Depth m	t°C	S°/oo	O_2ml/l
0	5.60	7.62	10.24
5	5.60	7.61	10.31
10	5.59	7.61	10.08
15	5.41	7.62	10.29
20	4.45	7.61	9.91
30	4.14	7.64	9.73
40	2.88	7.67	9.69
50	1.64	7.96	8.53
60	1.99	8.53	7.47
70	4.37	9.78	1.30
80	4.71	10.43	1.21
90	5.12	11.02	1.01

Station S 41; 29 May, 1970

Depth m	t°C	S°/oo	O_2ml/l	H_2S µgat/l
0	4.73	6.85	9.78	
5	4.52	6.84	9.83	
10	4.50	6.85	9.75	
15	4.07	6.86	9.80	
20	3.34	6.90	9.77	
30	0.52	7.16	9.66	
40	0.40	7.27	9.57	
50	0.54	7.37	9.38	
60	1.03	7.59	8.31	
70	3.24	8.37	5.03	
80	4.33	9.42	1.44	
90	4.56	10.05	0.14	
100	4.57	10.15		6.3
108	4.57	10.17		13.5

Station F 81; 8 June, 1970

Depth m	t°C	S°/oo	O_2ml/l
0	10.40	7.50	9.34
5	10.24	7.51	9.39
10	8.93	7.57	9.53
15	8.62	7.61	9.52
20	3.58	7.68	9.52
30	4.50	7.75	9.44
40	1.74	7.81	9.10
50	1.46	7.99	9.00
60	1.49	8.33	7.96
70	3.63	9.32	3.60
80	4.72	10.22	1.48
90	5.11	10.77	1.39
100	5.12	11.30	1.79
125	5.53	11.95	1.86
150	5.20	12.33	2.27
175	4.88	12.72	2.81
200	6.20	12.97	0.28
225	6.24	12.97	0.29
237	6.18	12.97	0.37

Station F 78; 2 June, 1970

Depth m	t°C	S°/oo	O_2ml/l
0	7.16	6.48	9.32
5	7.17	6.48	9.33
10	7.06	6.48	9.46
15	5.74	6.66	9.65
20	3.45	6.73	9.67
30	1.90	7.02	9.46
40	0.91	7.25	9.46
50	1.41	7.41	9.11
60	2.76	8.08	6.03
70	4.32	9.41	1.70
80	4.56	10.02	0.47
90	4.70	10.39	0.11
100	4.74	10.61	0.12
125	4.85	10.82	0.10
150	4.92	10.98	0.12
200	4.95	11.04	0.16
300	5.02	11.13	0.19
400	5.04	11.15	0.20
425	5.04	11.16	0.24
440	5.00	11.16	0.33

Continued

Table 3. Continued)

Station F 72; 3 June, 1970

Depth m	t°C	S°/oo	O_2ml/l	H_2S µgat/l
0	6.80	6.61	9.46	
5	6.74	6.62	9.45	
10	6.59	6.63	9.48	
15	1.93	7.03	9.65	
20	2.71	7.21	9.62	
30	2.56	7.34	9.78	
40	2.78	7.38	10.05	
50	0.85	7.56	9.20	
60	3.19	8.51	5.17	
70	4.65	10.32	0.60	
80	4.92	10.75	0.16	
90	4.95	10.95	0.16	
100	4.97	10.98	0.14	
125	4.97	11.01	0.16	
150	5.04	11.20		7.1
172	4.98	11.22		11.9

Table 4. Temperature, salinity, oxygen and hydrogen sulphide values at stations F 78, F 81, F 72, S 41, 8A, S 24 and S 12 in the Baltic proper, August-September, 1970 (ANON., 1971b).

Station F 78; 2 September, 1970

Depth m	t°C	S°/oo	O_2ml/l
0	16.24	6.24	6.93
5	16.26	6.23	6.97
10	16.27	6.24	6.94
15	16.47	6.35	6.92
20	11.16	6.54	6.73
30	3.51	7.11	8.52
40	2.13	7.33	8.71
50	2.02	7.63	7.69
60	3.28	8.70	3.84
70	4.45	9.91	0.26
80	4.71	10.41	0.17
90	4.78	10.64	0.12
100	4.87	10.80	0.08
125	4.98	11.00	0.13
150	4.96	11.06	0.02
200	5.15	11.28	0.10
300	5.23	11.41	0.15
400	5.25	11.44	0.20
425	5.27	11.44	0.25
440	5.19	–	–

Station F 81; 3 September, 1970

Depth m	t°C	S°/oo	O_2ml/l
0	17.18	7.12	6.88
5	17.22	7.12	6.86
10	17.21	7.12	6.88
15	17.25	7.13	6.81
20	11.50	7.44	6.39
30	3.63	7.65	7.85
40	2.80	7.75	8.13
50	2.21	7.88	8.05
60	1.84	8.25	7.00
70	3.29	9.32	3.04
80	4.24	10.19	1.32
90	4.75	10.82	1.21
100	5.13	11.38	1.39
125	5.15	12.14	1.52
150	5.66	12.49	1.18
175	5.64	12.68	0.93
200	5.69	12.77	0.94
225	5.76	12.88	0.70
240	5.73	12.97	0.40

Continued

Table 4. Continued)

Station F 72; 1 September, 1970

Depth m	t°C	S°/oo	O_2ml/l	H_2S µgat/l
0	15.66	6.52	7.22	
5	15.62	6.52	7.02	
10	15.64	6.52	7.04	
15	15.61	6.52	7.09	
20	8.06	6.83	7.07	
30	4.42	7.15	8.48	
40	2.16	7.39	8.53	
50	1.97	7.52	8.04	
60	2.35	8.17	5.83	
70	4.18	9.83	0.72	
80	4.90	11.03		11.45
90	5.07	11.16		11.30
100	5.07	11.17		9.90
125	5.04	11.20		3.45
150	5.21	11.41		3.35
170	5.19	11.48		6.40

Station S 41; 3 September, 1970

Depth m	t°C	S°/oo	O_2ml/l	H_2S µgat/l
0	16.69	-	6.93	
5	16.65	6.77	6.87	
10	16.70	6.77	6.91	
15	16.38	6.78	6.88	
20	6.93	7.16	7.65	
30	3.43	7.38	8.45	
40	-	-	-	
50	3.12	8.36	4.56	
60	3.60	8.90	2.29	
70	3.91	9.16	1.31	
80	4.20	9.52	0.27	
90	4.57	10.15		20.30
100	4.66	10.37		23.30
105	4.64	10.40		24.80

Station 8A; 8 September, 1970

Depth m	t°C	S°/oo	O_2ml/l
0	15.70	7.39	6.83
5	15.70	7.39	6.81
10	15.52	7.39	6.72
15	15.53	7.39	6.70
20	15.51	7.39	6.59
30	12.20	7.46	6.40
40	3.23	7.65	8.20
50	3.45	7.82	7.98
60	2.11	8.22	7.41
70	3.70	9.63	2.11
80	4.56	11.07	1.34
90	3.55	11.97	3.50

Station S 24; 9 September, 1970

Depth m	t°C	S°/oo	O_2ml/l
0	15.49	7.58	6.76
5	15.51	7.58	6.74
10	15.52	7.58	6.77
15	15.53	7.58	6.75
20	15.48	7.58	6.73
30	4.26	7.74	7.83
40	2.05	8.09	7.25
50	2.34	9.47	6.75
60	5.36	12.41	5.02
70	5.54	15.12	2.77
80	5.80	16.25	0.87
87	5.37	16.74	0.19

Station S 12; 9 September, 1970

Depth m	t°C	S°/oo	O_2ml/l
0	15.39	8.11	6.97
5	15.37	8.11	7.01
10	15.32	8.12	6.97
15	14.97	8.14	6.92
20	15.72	8.85	6.46
30	13.79	10.82	5.70
40	11.81	16.10	3.42
45	11.28	17.85	2.14

Table 5. Temperature, salinity, oxygen and hydrogen sulphide values at stations F 78, F 81, F 72, 8A, S 41, S 24 and S 12 in the Baltic proper, October, 1970 (ANON., 1971b).

Station F 78; 21 October, 1970

Depth m	t°C	S°/oo	O_2ml/l
0	9.33	6.81	7.81
5	9.28	6.81	7.65
10	9.22	6.82	7.67
15	9.02	6.81	7.57
20	8.98	6.81	7.58
30	8.83	6.82	7.55
40	2.72	7.52	7.81
50	3.31	8.63	4.05
60	4.03	9.54	1.43
70	4.37	9.93	0.81
80	4.42	10.15	0.98
90	4.46	10.22	1.10
100	4.55	10.34	0.60
125	4.64	10.41	0.35
150	4.66	10.53	0.17
200	4.94	10.86	0.10
300	5.28	11.45	0.17
400	5.27	11.44	0.13
425	5.31	11.49	0.15
440	5.25	11.49	0.13

Station F 81; 15 October, 1970

Depth m	t°C	S°/oo	O_2ml/l
0	10.93	7.42	7.40
5	10.94	7.41	7.42
10	10.93	7.41	7.38
15	10.95	7.41	7.38
20	10.91	7.41	7.34
30	10.85	7.41	7.30
40	5.57	7.67	7.23
50	4.32	7.90	6.95
60	2.73	8.30	6.13
70	2.84	8.98	4.12
80	3.68	9.90	2.05
90	4.41	10.72	1.27
100	4.57	11.17	1.46
125	5.04	11.91	1.58
150	5.36	12.37	1.23
175	5.47	12.57	0.70
200	5.65	12.76	0.88
225	5.74	12.87	0.40
237	5.71	12.91	0.22

Station F 72; 26 October, 1970

Depth m	t°C	S°/oo	O_2ml/l
0	8.07	6.75	7.91
5	8.09	6.75	7.80
10	8.08	6.75	7.86
15	8.10	6.75	7.81
20	8.15	6.75	7.83
30	8.08	6.78	7.81
40	7.38	7.18	7.53
50	4.28	7.63	7.32
60	3.87	8.40	5.10
70	3.74	9.48	1.97
80	3.82	9.56	1.73
90	3.88	9.63	1.63
100	4.42	10.25	0.79
125	4.57	10.52	0.41
150	4.70	10.67	0.27
180	4.66	10.69	0.19

Station 8A; 14 October, 1970

Depth m	t°C	S°/oo	O_2ml/l
0	11.55	7.13	7.56
5	11.55	7.13	7.43
10	11.54	7.13	7.34
15	11.58	7.13	7.40
20	11.56	7.13	7.41
30	11.42	7.14	7.35
40	3.57	7.68	7.86
50	2.71	7.82	7.69
60	2.05	8.24	7.01
70	3.30	9.52	3.28
80	4.10	11.16	2.25
90	4.04	12.21	3.09

Continued

Table 5. Continued)

Station S 41; 27 October, 1970

Depth m	t°C	S°/oo	O_2ml/l	H_2S µgat/l
0	8.34	6.90	7.76	
5	8.32	6.90	7.72	
10	8.38	6.90	7.80	
15	7.93	6.98	7.83	
20	7.75	7.00	7.87	
30	7.76	7.03	7.82	
40	6.33	7.16	7.82	
50	3.37	7.64	7.13	
60	3.66	8.85	2.97	
70	4.41	9.93	0.17	
80	4.64	10.32		20.7
90	4.66	10.37		23.8
100	4.67	10.41		25.0
105	4.64	10.45		23.8

Station S 24; 14 October, 1970

Depth m	t°C	S°/oo	O_2ml/l
0	12.37	7.60	7.24
5	12.35	7.60	7.20
10	12.39	7.60	7.20
15	12.42	7.60	7.20
20	12.39	7.60	7.21
30	10.20	7.67	7.10
40	3.83	7.97	7.45
50	3.55	9.31	6.40
60	7.07	12.76	4.57
70	5.60	15.51	1.56
80	5.72	16.28	0.52
87	5.57	16.52	0.39

Station S. 12; 13 October, 1970

Depth m	t°C	S°/oo	O_2ml/l
0	12.39	7.59	7.56
5	12.40	7.97	7.44
10	12.41	8.04	7.27
15	12.24	8.09	7.27
20	12.05	8.13	6.98
30	11.43	9.66	6.49
40	13.21	14.64	3.84
45	13.40	18.00	1.80