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CORINDON IV

A FRENCH-INDONESIAN SURVEY

APRIL 1981

SCIENTIFIC RESULTS

(HYDROLOGY AND DYNAMICS,

PRODUCTIVITY, PLANKTON)

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ABSTRACT

The main results of the CORINDON IV cruise achieved in the Banda Sea and the Ambon Bay are presented. They consist of hydrological data from 32 hydrocasts, current measurements from moorings, current profiler and surface G.E.K., 58 plankton tows, chlorophyll and productivity data. Horizontal and vertical distribution maps of the different parameters are included.

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INTRODUCTION

The CORINDON (Coriolis-Indonesia) -IV cruise was a France-Indonesia joint oceanographic cruise and was carried out in the Bay of Ambon, the northern part of the Banda Sea and the Bay of Piru from the 3rd to 16th April 1981. Preceeding the CORINDON-IV cruise there had already been three other CORINDON, namely, the CORINDON -I,II in October 1980 working on geology and biology in the Strait of Makassar, the CORINDON-III in March 1981 working on geophysics in the Banda Sea. All the CORINDON cruises used the Research Vessel CORIOLIS from France.

As the previous cruises, the CORINDON-IV cruise was organized within the framework of the bilateral cooperation on oceanology between the Governments of France and Indonesia. This cruise was planned and attended jointly by the scientists from the both countries. The scientists participating in the cruise came from ORSTOM in Noumea, Center of Oceanology in Brest, and from the National Institute of Oceanology in Jakarta and Ambon.

The main objective of the CORINDON-IV cruise was to obtain additional oceanographic data in the Bay of Ambon and the near-by seas, and it was expected that the results of the cruise would be complementary to the results of the previous work carried out by the Ambon Oceanographic Field Station. Knowledge and technological exchanges between the scientists from both countries participating in the cruise and increasing capabilities of methods and data processing were also the aims of this venture. In regards to the importance of the study in the Bay of Ambon, at least two reasons are worth being mentioned. Firstly, the Bay of Ambon is well known as a potential ground for life bait that plays an important role in tuna fisheries in the area. Secondly, the effects of the rapid development of the city of Ambon and ever increasing activities along the coastal areas of the bay, may in the near future result in an unexpected impact or even deteriorate the conditions of the ecosystem of this bay. Knowledge on the oceanographic as well as biological processes of the bay will certainly contribute to the formulation of a sound policy for the future utilization, development and management of it.

In accordance with the objective of the cruise CORINDON-IV in April 1981 three areas of activity were covered, namely :

- The bay of Ambon with main activities on oceanography and pollution study,
- Northern part of the Banda Sea with the main activity on oceanography, and
- The bay of Piru with the main activity on biosystematic studies of benthic fauna.

The results of the pollution and the biosystematic studies will be prepared by another group of scientists and will appear in separate report.

Itinerary

The cruise started on April 5 and after the mooring of two current-meters, the first two days were devoted to the study of the inner and outer bay where 19 hydrocasts were achieved. From April 7 to 9 two transects were done in the Banda sea, between Ambon and Buru and southward of the Ambon bay. This part of itinerary is described in figure 1 and figure 2. On the 10,11 and 12th April, productivity studies were achieved on three fixed points (see location on fig.1), together with additional measurements of thermal structure and currents. On the 13th, sediments and sea-water samples were taken in the inner bay for pollution studies. From the 14th to the 16th April, 8 trawlings were done in the Piru and Ambon bay on transects described in figure 1.

Participants

The following french and indonesian scientists participated to the different parts of the cruise.

First name	Name	Quality	Laboratory	Cruise 1	Cruise 2	Cruise 3
Jean Paul	REBERT	Scientist	ORSTOM	+	+	+
Alain	MORLIERE	"	"	+		
Yves	DANDONNEAU	"	"	+		
Lionel	LEMASSON	"	"	+	+	
Alain	DESSIER	"	"	+	+	+
Henri	FERRER	Assistant	"	+	+	+
Jean Louis	MARTIN	Scientist	CNEXO-COB		+	
Sujatno	BIROWO	"	LON	+		
A.B.	SUTOMO	"	LON	+		+
Luc	WENNO	"	LON	+		
Kasim	MOOSA	"	LON			+
Sofian	RANY	Liaison officer		+	+	+
	BURHANUDIN	Scientist	LON			+
Agus	TUPAMAHU	Student	Un. Patti.			+
Sam	WOUTHUYZEN	Assistant	LON			+
	THAYEB	Scientist	LON		+	
	HAMIDAH	"	LON		+	
Horace	HUTAGALUNG	Assistant	LON		+	
Surti	PANTI	Scientist	Batan		+	
Joko	SANTOSO	Assistant	LON		+	
	ANGEL	Expert	Un. Patti.		+	
B.	WENNO	Enseignant	Un. Patti.		+	

MATERIAL AND METHODS

A total of 32 hydrological stations were occupied during the CORINDON-IV cruise in April 1981. They consisted of 23 stations in the Bay of Ambon and 9 stations in the northern part of the Banda Sea. The area of activities/studies and the positions of stations are shown in figures 1 and 2.

Sea water sampling for hydrological analysis and temperature measurements using Nansen Bottle equipped with reversing thermometers were carried out at standard depths at each station. Data collected during the cruise include temperature, salinity, oxygen, phosphate, nitrate, nitrite, silicate and chlorophyll. One mooring current observation in the inner Bay of Ambon and two current profilings in the outer Bay of Ambon were also carried out during the cruise. In the Banda Sea one current profiling down to 600 m depth was executed at every hydrological station. Geoelectrokinetograph (GEK) recordings for surface currents were also run along the tracks Buru-Ambon and Ambon-South.

- Temperature -

Temperature at every standard depth was measured by Reversing Thermometers and expressed in °C. Continuous vertical temperature recording down to 300 m depth at every station using a bathythermograph (BT) was also carried out.

- Salinity -

Salinity was determined by an inductive couple salinometer (Model 601, Mark III) and it was expressed in °/₀₀ .

- Oxygen -

The free soluble dissolved oxygen in sea water was determined by titration following WINKLER method. The titration was done by Metrohm Herisau-Multi Dosima E415 coupled with a pH meter E512. The oxygen content is expressed in ml/l.

- Nutrients -

These nutrients contents were all determined by Technicon Auto Analyzer II and expressed in µmol/l.

- Chlorophyll -

Chlorophyll measurement was carried out from the surface down to 200 m depth. It was determined by a fluorometer Turner model 110 and expressed in µg/l or mg/m^3. In vivo fluorescence was calibrated at each station with a measurement of chlorophyll concentration of the surface water according to the method of HOLM-HANSEN et al. (1965).

B.O.D.

An attempt to determine the BOD was done at some stations in the bay. As no special device was available on board, the BOD has been determined according to the following method : at each station two surface samples were taken and the O_2 content of the first one immediately analysed. The second bottle was put at dark in the air-conditioned lower laboratory during five days. The room temperature was about 21°C. After five days the O_2 content was analysed and the oxygen demand was determined by substracting the result from the first one.

Currents

Three different kinds of direct current measurements were achieved during the cruise.

1. - Moorings

Two Aanderaa RCM4 current-meters were moored between the inner and outer Bay.

The mooring was located near the navigation buoy indicating the entrance of the inner Bays i.e. in the west side of the channel. The depth was about 17 meters. The depths of the current-meters were 7 and 14 meters. To minimize the noise in current measurements the mooring was of subsurface type, the line of current-meters being lighten by subsurface floats ensuring a positive buoyancy to the current-meters line.

2. - Current profiles

From stations 20 to 30 in the Banda sea after each hydrocast vertical profiles of belocity, salinity and temperature were made using a diving profiling current-meter. This instrument consists of an Aanderaa RCM3 recording current-meter mounted in a cylindrical hull manufactured by Tareq. The hull was balasted to sink slowly along the hydrographic wire at a mean speed of 10 cm/s. With a sampling time rate of 30 s the vertical resolution is therefore of about 3 meters.

To get relative currents the ship drifting with wind and surface currents, the ship motion is deduced from the measurements of a second RCM4 current-meter hanging at the end of the wire at a depth of 600 meters, and sampling at the same rate. The currents at 600 m are then vector-substracted from the currents measured at each depth at the same time, thus giving the current profile relative to the 600 meters layer. This method has proved to give better results than the method consisting of substracting a constant drift when the surface drift of the vessel is irregular and the weather is calm, which was the main case during this cruise. When the sea is rough the ship's movements introduce too much noise in the bottom current-meter measurements and the resulting profile may be strongly biased.

All the data processing and mapping was performed on board, using an Anderaa decoder directly linked to a HP 85 micro-computer, and software developped in the ORSTOM Center of Nouméa. Unfortunately mechanical malfunction of the bottom current-meter appeared after station 23. All the following profiles of resulting currents were therefore computed using a constant drift referenced to the average velocity in the last 30 meters of the profile.

3. - G.E.K.

On the two legs in the Banda sea the surface current was measured during the way back to station 20 from stations 25 and 28. The instrument used was a RINKEN model, with electrodes manufactured at ORSTOM Nouméa.

Plankton

At each station two vertical WP2 zooplankton net tows have been made between 200 m and the surface or from the bottom to the surface when the depth was less than 200 m.

Productivity

The material, method and results are described together in the part 3.

PART 2

HYDROLOGY AND DYNAMICS

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1 - THE BAY OF AMBON

1.1. - *Hydrological descriptors*

A total of 19 hydrological stations in the Bay of Ambon had been worked out. The following description is the result of the cruise and it is mainly intended to deal with several hydrological parameters especially their horizontal distribution at the surface and near the bottom.

Maps 3 to 9 show respectively the horizontal distributions of temperature, salinity, oxygen, phosphate, nitrite, silicate and chlorophyll contents at the surface, and maps 10 to 15 show the horizontal distributions of the same parameters near the bottom, except for chlorophyll.

1.1.1. - *At the surface*

Temperature (fig.3)

The horizontal distribution of temperature in the bay has more or less uniform values. The temperature varies from 28.6°C to 30.2°C, and shows the highest value in the apex of the inner bay and the lowest value in the outer bay just next to the Banda Sea. The relatively low temperature in the outer bay might be due to the direct influence of the Banda Sea.

Salinity (fig.4)

The salinity distribution shows a clear horizontal variation. The salinity increases from the inner bay towards the outer bay and the Banda Sea. In the outer bay the salinity ranges between 33.6°/oo and 34.0°/oo while in the inner bay it ranges between 32.6°/oo and 33.5°/oo. The dilution of fresh water discharge from several small rivers flowing into the inner bay is considered to be a main important factor that causes the low salinity in the inner bay. On the other hand, the high salinity greater than 34.0°/oo in the mouth of the bay, likewise for temperature, might be caused by the direct influence of the high saline water from the Banda Sea.

Oxygen (fig.5)

The value of oxygen content in the bay is nearly uniform. It is mostly higher than 4.0 ml/l, except at a few places, such as, in the middle and northern parts of the outer bay where a value lesser than 4.0 ml/l is found.

Phosphate (fig.6)

The phosphate content in the inner bay is ranging between 0.5 and 1.0 μmol/l except at a limited place in the middle part of the inner bay a value of less than 0.3 μmol/l is recorded. In the outer bay the phosphate content is almost everywhere less than 0.5 μmol/l, but at few places near the coast, especially in front of the city of Ambon, a higher value of more than 0.5 μmol/l is observed.

Nitrite (fig.7)

As in the case of phosphate the nitrite content in the inner bay is higher than that in the outer bay. The nitrite content in the inner bay shows a wide range of variation, it varies from 0.7 to 2.0 μmol/l and the highest value is found in the apex of the bay. In the outer bay the nitrite content is smaller, ranging between 0.4 and 1.0 μmol/l with a relatively high value in the middle part of the outer bay.

Silicate (fig.8)

The silicate content in the inner bay is between 13.0 and 68.0 μmol/l and the highest value is recorded in the tip of the bay. In the outer bay it is much lower, and varies from 3.0 to 10.0 μmol/l. The gradual decrease of silicate content from the inner bay towards the outer bay is clearly seen.

Chlorophyll (fig.9)

The chlorophyll content decreases gradually from the inner bay towards the outer bay. In the inner bay the chlorophyll content varies between 0.5 and 0.7 μmol/l and shows the highest value in the apex of the bay. In the outer bay the chlorophyll content is smaller and has a more widerrange of variation, it ranges between 0.1 and 0.6 μmol/l. The value drops quickly towards the Banda Sea and in the mouth of the bay it becomes less than 0.1 μmol/l.

It is worth to mention that the high content of phosphate, nitrite as well as silicate in the inner bay seems to be associated with the effect of several small rivers flowing into the inner bay and carrying nutrients from the land into the bay. The higher nutrient content in the inner bay is also reflected by the higher content of chlorophyll. And the relatively high phosphate content at few places near the coast in the outer bay, especially in front of the city of Ambon, might also be associated with the influence of a river passing by the city and carrying nutrients and organic matter before it enters the bay.

1.1.2. - Near the bottom

In dealing with the distribution of hydrological parameters near the bottom a first and important consideration which should be born in mind is the depth of the sea bottom, since the values of the hydrological parameters are in general a function of depth. It will apply to the Bay of Ambon in particular to the outer bay which has more irregular and greater depths.

Temperature (fig.10)

The inner bay is not only narrow but it is also shallow therefore the expected value of each hydrological parameter near the bottom will not differ much from one station to another station.

In the inner bay the temperature near the bottom is almost uniform, and varies from 26.3 to 28.5°C. In the outer bay the role of the depth of the bottom is very clear as it is reflected by a wide range of temperature variation from 8.4 to 28.2°C. The high temperatures are recorded at shallow places along the coast and the low temperatures are recorded at deeper places in the middle part of the bay. The decrease of temperature from the inner bay towards the outer bay and the Banda Sea is mainly due to the increase of the depth of the sea from the inner bay towards the outer bay.

Salinity (fig.11)

The salinity in the inner bay is completely uniform, and ranges around 34.0‰. In the outer bay the salinity varies from around 34.0‰ to more than 34.5‰. The low values, slightly higher than 34.0‰ are recorded at shallow places along the coast, and the high ones, more than 34.5‰ at deep places in the bay .

Oxygen (fig.12)

The oxygen content in the inner bay shows values between 2.0 ml/l and 3.8 ml/l and the lowest value is found in the tip of the bay. In the outer bay the oxygen content ranges between 2.5 ml/l and 4.5 ml/l, and it is clearly observed that the low values are found at shallow parts while the high ones at deeper parts of the bay.

Phosphate (fig.13)

The phosphate content in the inner bay is uniform, ranging between 0.6 and 0.7 µmol/l. In the outer bay, on the other hand, the phosphate content shows a wide range of variation. The value between 0.4 and 1.0 µmol/l is recorded at shallow places near the coast and the value greater than 2.0 µmol/l is found at deeper places in the middle part of the bay.

Nitrite (fig.14)

In the inner bay the nitrite content is recorded between 0.5 and 2.2 µmol/l and showing the high value in the apex of the bay. In the outer bay the nitrite content is much lower, it is in general between 0.05 µmol/l and 0.2 µmol/l but just in front of the city of Ambon a high value greater than 0.5 µmol/l is recorded. This high value of nitrite at limited place in front of the city of Ambon as already mentioned previously, might be associated with the effect of a river passing by the city and carrying nutrients as well as organic matters into the bay.

Silicate (fig.15)

The silicate content in the whole bay shows a wide range of variation. In the inner bay it ranges between 1.6 and 22.2 µmol/l, and the high value is recorded in the tip of the bay. In the outer bay the silicate content varies very widely from 2.2 to 59.7 µmol/l, and indicates the high value at depeer place in the mouth of the bay just near to the Banda Sea and the low one at shallow places near the coast.

The distribution of the hydrological descriptors in the Bay of Ambon will certainly be associated with the water exchange between the inner bay and the outer bay, and also by the water exchange between the bay and the Banda Sea. The water exchanges will in turn be governed by the current pattern as well as the character of the tide in the area.

1.2. - Currents

1.2.1. - Moorings on the sill

The results of measurements achieved during 7 days are represented in fig.16. An harmonic analysis was performed on the data and revealed the following features :

The main variability of the currents is concentrated around the tidal period. The tidal currents are important and the tidal ellipses are nearly rectilinear and oriented along the bay's axis with the following ccharacteristics.

At 7 m maximum speed: 32 cm/s direction 71°
At 14m maximum speed: 14 cm/s direction 73°

A interesting feature is the existence of a near residual flow directed towards the inner bay (6 cm/s in the 69° direction at 7 meters, 15 cm/s in the 58° direction at 14 m), which is more important in the lower layers. This means that a residual outflow must exist either in the surface layer or in the right part of the channel. The entrance of water in the inner bay through the deeper layer is connected with the phenomenon of internal tide in the outer bay (see further) and this phenomenon probably explains the persistancy in the inner bay of cold water in the layer deeper than the sill depth (fig.17).

1.2.2. - Profiles in the bay (figs. 18,19,20 & 21)

The current profiles achieved in the outer bay are illustrated in fig. 18 to 21 (station 31), where the currents are presented using their components along the axis of the bay (54° in comparison with geographical north) and perpendicular to the axis (144° id°). The main feature observed during this experiment is the presence of a very important internal wave of tidal period. The amplitude of the interface displacement exceeds 150 meters. This phenomenon wich is under study has probably the character of a standing wave and is due to the fact that the period of the fondamental internal oscillation of the outer bay lies close to that of the semi-diurnal tide.

It is interesting to compare the values of several hydrological parameters in the Bay of Ambon observed during the CORINDON-IV cruise to those that had been measured previously by the Ambon Field Station.

The following table contains the average values of temperature, salinity, oxygen and phosphate contents measured by the Ambon Field Station in April (Yusuf, 1979) and those observed during the CORINDON-IV cruise in April 1981.

Table 1

	Inner Bay		Outer Bay	
Parameter	April 1975	April 1981	April 1975	April 1981
T°C	29.98	29.99	29.53	29.00
S°/oo	31.79	33.09	33.59	33.83
O_2 ml/l	4.16	4.55	4.11	4.77
PO_4 µmol/l	0.51	0.64	0.70	0.41

The values of each parameter are mostly comparable, except for lower salinity in April 1975 in the inner bay and for higher phosphate content in April 1975 in the outer bay. The low salinity in April 1975 is thought to be associated with the rainy season which may have started earlier in 1975. There were three peaks of rainfall recorded in 1974/1975, namely in July and September 1974 and in April 1975 (Yusuf, 1979). The possible factors that may cause the high value of phosphate in April 1975 in the outer bay remains questionable. Yusuf (1979) also noted that the monthly average temperature at the surface in the outer bay is relatively lower than that in the inner bay, and the same for phosphate content. For salinity, on the other hand, its value in the outer bay is higher. The results of CORINDON-IV are also showing the same pattern.

Based on the temperature measurements in the Bay of Ambon from 1973 to 1978, Wenno (1979) drew as conclusion that the vertical temperature distributions in the outer bay are strongly influenced by the monsoons. During the east monsoon the temperature in the surface layer is relatively low, ranging between 24.6 and 26.9°C, and the thermocline is found at about 100 m depth. This condition is more or less stable from year to year. During the west monsoon the temperature in the surface layer is higher, it is between 28.2°C and 28.8°C ; the depth of the thermocline changes from year to year and fluctuates from 50-70 m to 150-200 m. This fluctuation of the thermocline depth is associated with the weather variations from one west monsoon to another. The strong winds prevailing during the west monsoon have much effect on the surface layer. The mixing between surface layer and layer underneath will take place intensively due to the strong winds, waves and currents.

For the comparison the vertical temperature distribution along the Northeast-Southwest cross-section (stations 4,6,1,7,9,11,14 and 16) in the Bay of Ambon is shown in figure 17. It shows that the temperature in the surface layer is slightly higher, varying from 27.0°C to 29.0°C, and the thermocline is found at about 80 m depth. The deepening of the isotherms below the surface layer, particularly at station 11, might be due to the tides in the area. An indication of this kind of deepening of the isotherms is also shown by the west monsoon's cross-section presented by Wenno (1979). Of course the short term fluctuations of the thermal structure, as revealed by the measurements at fixed point, may considerably modify the pattern of the cross-section.

2 - THE BANDA SEA

2.1. - *Hydrological descriptors*

As part of the CORINDON-IV cruise a number of hydrological stations along two cross-section in the Northern Banda Sea were also worked out. The first cross-section was the Ambon-Buru cross-section (stations 20 to 25) and the second one was the Ambon-south cross-section (stations 20,26 to 28). The vertical distributions of temperature, salinity, oxygen, phosphate, nitrate, nitrite, silicate, and chlorophyll contents are respectively shown in figures 22 to 29 for the first transect, and in figures 30 to 37 for the second transect.

An attempt to give a general description for each parameter along the two cross-sections is presented in the following note.

2.1.1. - The Ambon - Buru cross-section

Temperature (fig.22)

A uniform distribution of high temperature is found in the surface layer. In this homogeneous layer the temperature decreases slightly downwards from around 29.0°C to 26.0°C at about 90 m depth. Below the homogeneous layer the thermocline layer is found, as it is revealed by a very rapid decrease of temperature from around 26.0°C at 90 m depth to around 19.0°C at about 130 m depth. In the lower boundary of the discontinuity layer, at about 250 m depth, the temperature is between 14°C and 13°C. In the greater depths the temperature continue to decrease with depth and at about 600 m depth it reaches 6°C.

Salinity (fig.23)

The salinity at the surface is around 33.8°/₀₀, it increases with depth and reaches the maximum value of more than 34.8°/₀₀ in the layer between 1 60 m and 2 80 m depths. This kind of tongue of the salinity maximum is clearly observed in the western part of the cross-section. As described by Wyrtki (1961) the salinity maximum in this area indicates or characterizes the presence of the Southern Subtropical Lower Water within the discontinuity layer. Below the depth of 300 m the salinity decreases again downwards, but only slightly, and at 700 m depth (station 20) it is around 34.6°/₀₀.

Oxygen (fig.24)

In the eastern part of the section the oxygen content in the surface layer is always greater than 4.0 ml/l, and at greater depth a relatively high value of around 2.5 ml/l is still recorded. In the western part of the section the oxygen content in the same layer is less than 4.5 ml/l, and at a relatively shallow place, at 250 m depth, a value of 2.0 ml/l is already observed. For the whole cross-section the oxygen content varies from 4.0 to 4.5 ml/l in the discontinuity layer.

The low oxygen content at shallow level, especially in the eastern part of the section, might be considered as an indication of the possibility that Intermediate Water having low oxygen content from the greater depth be presents in this layer. It will only happen if an upward motion or upwelling takes place in the area. However, the distributions of the other parameters, such as, temperature, salinity and nutrient contents do not reveal a clear concommitant indication of the possibility of upward motions, either in the surface layer or in the discontinuity layer. And as already noted by Wyrtki (1957), the upwelling in the Banda Sea (in the eastern part) just begins in April and will end in September. The other possibility that may cause the formation of the low oxygen content in this layer is the biological processes, and of course a conclusion about this question can only be expected after the biological processes have been examined.

Phosphate (fig.25)

In the surface layer the phosphate content varies 0.2 and 0.5 μmol/l, and shows the relatively high value between 0.4 and 0.5 μmol/l in the middle part of the section and the low value of less than 0.3 μmol/l either in the eastern or western parts of the section. The value of the phosphate content increases with depth and it reaches nearly 3.0 μmol/l at depth of about 600 m.

Nitrate (fig.26)

As in the case of the phosphate the low nitrate content is recorded in the surface layer and it will increase with depth. In the surface layer the nitrate content is everywhere less than 0.5 μmol/l. At the deeper layers the phosphate content in the eastern part is generally higher than that in the western part of the cross-section, as it is clearly shown by the value of station 21 compared to that of the other stations. The value at station 21 at any depth is always higher than that of the stations in the western part of the cross-section.

Nitrite (fig.27)

From the surface down to 50 m depth the nitrite content is less than 0.1 μmol/l. It will increase with depth and reaches the maximum value of more than 0.3 μmol/l in the layer between 50 m and 100 m depths, and even a greater value of more than 0.5 µmol/l is found at station 23. Beyond the 100 m depth downwards the nitrite content decreases and everywhere in deeper layers the recorded values are lesser than 0.1 µmol/l.

Silicate (fig.28)

In the surface layer, from the surface to the depth of 100 m, the silicate content is low, ranging between 0.1 and 0.5 µmol/l and showing the high value in the eastern part of the cross-section (near to Ambon). The silicate content will then increase very rapidly downwards and at about 550 m depth it reaches 50 µmol/l.

Chlorophyll (fig.29)

The chlorophyll content at the surface is low, it is less than 0.5 µg/l in the western part and around 0.1 µg/l in the eastern part of the cross-section. A high value of more than 0.3 µg/l is recorded in the layer between 30 m and 80 m depths. From 80 m depth downwards the chlorophyll content decreases and in the deeper layers it is always less then 0.05 µg/l.

2.1.2. - The Ambon - South cross-section

Temperature (fig.30)

The vertical distribution of temperature along the cross-section is more or less uniform, particularly from the surface down to 75 m depth. Within the surface layer the temperature is ranging between 27.0°C and 30.0°C, and below this layer the thermocline layer is found and it is characterized by a rapid decrease of temperature from around 25°C at 100 m depth to around 15°C at 200 m depth. In the greater depth the temperature still continue to decrease downwards, but only slowly, and at about 800 m depth it attains 6°C.

Salinity (fig.31)

The salinity between 33.9 and 34.4°/oo occupies the surface layer. The maximum salinity of more than 34.7°/oo is recorded in the layer between 180 m and 225 m depths, and it can be observed in the northern part of the cross-section. This maximum salinity can also be considered as an indication of the presence of the Southern Subtropical Lower Water in the area. Its presence here, however, is not so clearly marked as in the case along the Ambon-Buru cross-section. In the greater depths the salinity differs only slightly from 34.6°/₀₀ and below 600 m depth, particularly in the northern part of the section, it is less than 34.6°/₀₀ .

Oxygen (fig.32)

In the surface layer the oxygen content is normally high, it varies between 4.0 and 4.5 ml/l. In the discontinuity layer, i.e. in the layer between 100 m and 250 m depths the oxygen content is low ranging between 2.6 and 3.5 ml/l and in the depths of more than 500 m it is generally less than 2.5 ml/l.

Phosphate (fig.33)

The phosphate content in the surface layer shows a slight variation, it varies from less than 0.3 to 0.6 µmol/l. It will then increase with depth and in the continuity layer it is recorded between 0.6 and 2.0 µmol/l and from 300 m to the greater depth it is always more than 2.0 µmol/l.

Nitrate (fig.34)

The nitrate content, especially in the surface layer, shows a wide range of variation. The zero value is found in the northern part of the section, the value of less than 0.1 µmol/l in the middle part of the section, and the higher value of more than 0.1 µmol/l in the southern part of the section. Below the surface layer the nitrate content increases quite rapidly with depth as it is shown by a value of 1.0 µmol/l at about 80 m depth, it will increase rapidly downwards and becomes 5.0 µmol/l just at about 100 m depth. Below 100 m depth, however, the distribution of the nitrate content is rather unique. The values of stations 20 and 27 are always much higher than those of stations 26 and 28 at the same depths.

Nitrite (fig.35)

In the surface layer the nitrite content is everywhere less than 0.1 µmol/l. The maximum value between 0.2 and 0.3 µmol/l is recorded in a thin layer between 70 m and 100 m depths, and from about 100 m depth downwards the value decreases again and in the deeper layers the uniform value of less than 0.1 µmol/l (around 0.08 µmol/l) is observed.

Silicate (fig.36)

The silicate content in the surface layer ranges between less than 1.0 and 6.0 µmol/l, and shows the low value, (even zero value), in the middle part of the cross-section. At about 100 m depth the silicate content is only around 8.0 µmol/l, and from this depth downwards it increases very rapidly and at about 600 m depth it reaches a value greater than 60.0 µmol/l.

Chlorophyll (fig.37)

From the surface down to 50 m depth the chlorophyll content is less than 0.05 µg/l, except at station 20 (near to Ambon) a higher value between 0.05 and 0.1 µg/l is found. The maximum value between 0.1 and 0.2 µg/l is recorded in the layer between 50 m and 100 m depths, and from 100 m depth downwards it decreases again and below 150 m depth it is generally less than 0.05 µg/l.

It seems interesting to note the station 20 of CORINDON-IV. This station occupied exactly the station 231 of the SNELLIUS Expedition which had been conducted half century age in the Eastern Part of the Archipelago. The vertical distributions of temperature and salinity of the two observations are compared and shown in figure 43. It shows that the vertical profiles of temperature and salinity of the two observations are quite similar, especially in deep layers, from about 400 m depth downwards. This fact suggests that in the surface layer the variations of water properties will happen due to the climatological changes, while in the greater depths the water layers are stable and the horizontal motion or exchanges of water masses may take place very slowly.

2.2. - *Currents*

2.2.1. - *Surface measurements (fig. 38 & 39)*

The currents measured using the GEK are presented in figures 38 and 39. The currents measurements where made on April 9 from 00h to 06h between Buru and Ambon and on April 10th from 00h to 06h for the south leg.

Figure 38 illustrates the currents component perpendicular to the vessel's route, as it is the rough result obtained by GEK. In figure 39 are presented the currents computed at points where perpendicular loops were achieved.

As can be seen, the general pattern observed leads to a westward transport for surface waters in the Banda Sea and a weak southward flow through the strait between Ambon and Buru corresponding probably to water exchange from the Ceram Sea to the Banda Sea. Individual currents (fig.39) look rather irregular, partly due to tidal influence (the wind was very weak and its effect on surface circulation can be considered as negligible). The strongest currents (75 cm/s) were observed near the southwestern edge of Ambon island.

2.2.2. - *Current profiles (fig. 18,40,41 & 42)*

The current profiles are illustrated in fig 18 and 40 to 42 (station 20 to 30). They reveal the complexity of the structure of deep-currents. In general there is no obvious association between the surface mixed layer (fig. 44 to 47, bathythermograms) and a layer of constant current, though there seems to exist a current discontinuity between 100 and 150 meters. These results combined with works from previous authors enhance the probable main role of short term baroclinic waves in the vertical structure of currents in this area.

2.2.3. - *Geostrophic currents*

The geostrophic currents have been computed with the data issued from hydrocasts. The results are not presented here on account of their lack of signification. No reasonable pattern of currents can be deduced from this type of calculation. Once more the reason is presumably the presence of large short term baroclinics variability combined with the proximity of the equator wich enhances the effects of small variation of dynamic depths on the computation of geostrophic currents.

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PART 3

PRIMARY PRODUCTION AND NITRATE UPTAKE

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PRIMARY PRODUCTION AND NITRATE UPTAKE

1 - METHODS

1.1. - Primary production

Measurements of carbon uptake have been carried out by the standard ^{14}C method (Steeman Nielsen 1952). The ^{14}C used was provided by the CSIRO (Australia) as $Na_2\,^{14}CO_3$ (10 µCi in 1 ml sterile aqueous solution). Each inoculum was from 200 or 400 µl of ^{14}C solution, giving an activity from 4.4×10^6 dpm to 8.8×10^6 dpm, and was added in a 280 ml flask sample.

Two kinds of experiments have been carried out during the cruise :

a) Simulated in situ incubations :

The sample bottle were wrapped in neutral density screens in order to simulate light intensities from depth to which 100,50,25,10,5, 3 and 1 % of the incident light penetrated, and placed in a deck incubator. The flasks were filled with surface water filtered on 125 µm plankton net to discard the largest living zooplankters.

b) In situ incubations :

The samples were taken with Niskin bottles at depths determined by the Secchi disk to which 100,50,25,10,5 and 1 % of the incident light penetrated ; after filling up the incubation flasks with filtered water on 125 µm plankton net, these ones were immersed for incubation at the predetermined depths.

In the two cases immediately after sampling, the nutrients were measured according to Strickland and Parsons(1968).

Seston was uptaken after pre-filtration on 125 µm plankton net and filtration on silver filters (0.8 µm ; Selas Flotronics) and preserved at −20°C for further determination for particulate carbon and nitrogen at the laboratory (CHN Hwelett-Packard 185 B). Incubations times ranged from 4 to 10 hours.

After incubation and filtration, filters were washed with HCl N/100 and preserved in a freezer (-20°C), and counted later on a Packard Tri-Carb scintillation counter.

The CO_2 concentrations of the waters were estimated by the relation established for brackish waters (Lemasson and Pages 1980). Uptake rates from carbon are expressed in $\mu mol.h^{-1}C$ (ρ_c) and specific uptake rates in h^{-1} (V_c, in μmol C. (μmol $C_p)^{-1}.h^{-1}$).

1.2. - Nitrate uptake

Inorganic nitrogen uptake was measured by the ^{15}N method by two ways :

a) In situ incubations :

The water sample is was prefiltered on a 125 µm plankton net and is enriched of about 10 % of the ^{15}N labelled compound compared with the ambient concentration of the unlabelled compound. The labelled nitrate was $(^{15}NO_3)_2Ca$ at 99 %. Bottles (2.580 liters) were incubated for 12 hours, from dawn to sunset, under in situ light conditions by suspending bottles vertically in the water column at the depths corresponding to 100,50,25,10,5 and 1 % level of incident light.

b) Simulated in situ incubations :

When dealing with low ambient concentrations of nutrients (near the minimum limit of detection), an addition of labelled nutrient quantitatively equivalent to the minimum limit of detection would lie between 50 and 100 per cent of the nutrient pool, and the calculated rate of uptake would vary accordingly. But it is possible to extrapolate with assumed parameters for uptake kinetics from rates measured at high and saturating concentrations of labelled substrate to rates for uptake at ambient nutrient concentrations (MacIsaac and Dugdale, 1972).

By using the Michaelis-Menten kinetic expression :

$$V = \frac{V_{max} \cdot S}{K_t + S}$$

if we know V_{max} (maximal velocity of uptake) and K_t (substrate concentration at which $V = V_{max}/2$) called "transport constant", it is theoretically possible to calculate V, the velocity of uptake of substrate (in this paper, units of NO_3-N taken up per unit time per unit N_p, i.e. t^{-1}).

Incubations were made with enrichments of 0.2, 0.5, 1, 5 and 10 $\mu mol.l^{-1}$ KNO_3, and incubations were carried out at 100 % of incident light in on deck incubator. The kinetics constants were computed by the Sakoda and Hiromi (1976) method. Incubation times were about 6 hours.

In the two cases the filters were filtered under low depression (100 mm Hg vacuum), preserved at -20°C and analyzed at the laboratory on shore by optical emission spectrometry (Lemasson et al. 1982).

2 - RESULTS

Tables 2,3 and 4 and figures 48 and 49 summarize the productivity data for carbon and nitrogen-nitrate. The conditions are typical of coastal waters, and the stations in the outer Ambon bay are highly productive. C/N composition ratios (at:at) of the particulate matter (lower than 125 µm) range between 4.8 to 11.4 in the whole water column in Ambon bay. Assimilation ratios ($\Delta C/\Delta N$: $\mu mol.h^{-1}$ C/$\mu mol.h^{-1}$ N-NO_3) are high in the range of 36.3 to 68.7 ; these numbers, higher than the "Redfield" ratio (106/16 ; Redfield 1958) are showing that nitrate seems to be only a few part of the nitrogenous taken up nutrition. Ammonium, preferentially taken up in comparison to nitrate, must be present in abundance in these Ambon bay waters where urban waste products are thrown.

Integrated uptake rates for carbon range from 10.8 $mg.m^{-2}.h^{-1}$C in open sea to 85.8 $mg.m^{-2}.h^{-1}$C in the bay near Ambon city. The specific uptake rates for nitrate (V_{NO3}) range from 0.0005 h^{-1} in open sea to 0.023 h^{-1} in the bay near Ambon City.

In the inner bay the primary productivity is lower than that in the external bay ; the data for nutrients and primary productions in the whole bay are those of mesotrophic waters, likewise in the coastal waters of Banda Sea. Nitrogen is likely the limiting element as it is suggested by the often undetectable values of nitrate concentrations in the waters.

Acknowledgements

We are very grateful to the Centre Océanologique de Bretagne (Brest) for allowing us to use their CHN analyzer, and the Centre d'Etudes Nucléaires (Cadarache) for permitting the use of their apparatus for ^{14}C and ^{15}N determinations.

Table 2 - Integrated values of primary production (^{14}C) on the water column between 100 % and 1 % incident light.

N° Station	Prod ($mg.m^{-2}.h^{-1}C$)	C_p/N_p	100 % light ρ_c ($\mu mol.l^{-1}h^{-1}$)	100 % light V_c (h^{-1})	C_p $\mu mol.l^{-1}$
2	30.4	11.4	0.242	0.0121	19.97
10	85.8	13.6	0.291	0.0184	15.78
20	25.9	16.5	0.054	0.0086	5.71
23	26.1	10.0	0.092	0.0144	6.37
30	10.8	7.7-8.3	0.012	0.0019	5.4-15.5
31	62.1	7.5-9.9	0.167	0.0136	7.7-16.3
32	49.2	4.8-8.2	0.624	0.0295	13.3-21.1

St. 30 and 32 : in situ

St. 2,10,20,23 : in situ simulated

C_p : particulate carbon : limit values on the water column between 1 % and 100 % incident light.

Table 3 - Nitrate uptake. Specific uptake rate (V_{NO3}) and uptake rate (ρ_{NO3}) calculated from kinetics constants for surface water.

N° Station	V_{max} (h^{-1})	K_t ($\mu mol.l^{-1}$)	V_{NO3} (h^{-1})	N_p ($\mu mol.\ l^{-1}$)	NO_3-N ($\mu mol.l^{-1}$)	ρ_{NO3} ($\mu mol.l^{-1}$)
2	0.0014 *	0.408 *	0.0004 *	1.75	0.15	0.00023
10	0.0408	0.248	0.0230	1.16	0.32	0.0267
20	0.0051	0.954	0.0000(5)	0.605	(0.01)**	0.00003
23	0.0041	0.370	0.0001(1)	0.634	(0.01)**	0.00007

* Uncertain values.

** Undetectable. This value is an estimation and was used in calculations.

Table 4 - Summary of results of nitrate uptake (*in situ* incubations)

N° Station	Z	Im %	N_p	P_{NO_3} ($\mu mol.l^{-1}h^{-1}$)	V_{NO_3} (h^{-1})	C_p/N_p	ΔC/ΔN
30	0	100	0.81	0.00048	0.00059	7.7	36.3
	15	50	1.96	0.00013	0.00007	7.9	
	26	25	0.05	0.00002	0.00003	8.3	
31	0	100	1.63	0.00332	0.00204	7.2	58.2
	16	25	0.91	0.00214	0.00234	9.9	
	27	10	1.34	0.00116	0.00086	7.5	
	40	5	1.30	0.00022	0.00017	8.1	
32	0	100	2.21	0.00783	0.00354	8.2	68.7
	5	50	1.85	0.00249	0.00135	5.3	
	10	25	2.36	0.00127	0.00054	4.8	
	17	10	1.93	0.0051	0.00026	6.2	
	25	5	1.55	0	0	7.2	

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PART 4

ZOOPLANKTON

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ZOOPLANKTON

The zooplankton samples carried out at each station have been used to get an estimation of the zooplankton biomass, settling volume and wet weight (Table 5).

The main taxons have been counted on the whole sample or on an aliquot part (Table 6). The meroplanktonic and neritic holoplankton are dominant in the Inner Bay. The oceanic taxons appear more abundant in the north part of the Bay, perhaps owing to the circulation in the Bay.

ZOOPLANKTON SAMPLES

Station number	Depth of bottom m	Sample number	Local time	Length of wire m	Angle of wire	Volume filtered m^{-3}	Zooplankton biomass	
							Settling volume $ml.10m^{-3}$	Wet weigh $g.10m^{-3}$
1	41	1	16h.05	38	0	9.9		
		2	16h.10	38	0	9.9	59	6.9
2	25	3	17h.00	22	15	5.5		
		4	17h.10	22	15	5.8	68	7.9
3	26	5	17h.50	23	0	5.5		
		6	17h.55	23	0	5.5	105	10.7
4	32	7	18h.30	28	10	5.8		
		8	18h.35	28	10	7,3	120	14.7
5	25	9	19h.10	22	0	5.7		
		10	19h.15	22	0	5.8	137	18.4
6	31	11	20h.10	28	0			
		12	20h.15	28	0	6.9	85	9.4
7	45	13	21h.20	42	10	10.6		
		14	21h.25	42	10	11	60	8.2
8	166 to 200	16	22h.45	170	25	29.2		
		17	23h.00	170	40	46	33	5.3
9	165	18	08h.05	163	5	38.3		
		19	08h.10	163	5		15	1.8
10	75 to 100	20	09h.15	100	35	30.3		
		21	09h.35	100	35	29.6	23	2.7
11	250	22	10h.55	200	25	49.3		
		23	11h.05	200	25	51.1	14	2.2
12	69	24	12h.15	65	20			
		25	12h.20	65	20	12.8	30	3.9

TABLE 5(1): Zooplankton : sampling informations and biomass

ZOOPLANKTON SAMPLES

Station number	Depth of bottom m	Sample number	Local time	Length of wire m	Angle of wire	Volume filtered m^{-3}	Zooplankton biomass	
							Settling volume $ml.10m^{-3}$	Wet weigh $g.10m^{-3}$
13	250	26	14h.15	200	25	51.1		
		27	14h.20	200	25	49.3	10	1.1
14	500	28	15h.45	200	20	48.5		
		29	16h.55	200	20	46.4	11	1.7
15	100 to 200	30	16h.50	150	15			
		31	17h.00	150	15	35.8	14	1.8
16	500	32	18h.25	200	0	44.9		
		33	18h.35	200	0	44.9	9	1.2
17	500	34	20h.00	200	15	52.6		
		35	20h.10	200	15	52.6	8	1
18	60 to 70	36	21h.35	55	25	16.4		
		37	21h.40	55	25	13.5	28	4.2
19	1.000 and +	38	00h.05	200	25	46.4		
		39	00h.15	200	35	47.5	9	1.3
20	1.000 and +	40	09h.10	200	15	47.5		
		41	09h.20	200	20	48.5	7	0.9
21	1.000 and +	42	14h.55	200	15	47.8		
		43	15h.05	200	15	44.2	9	1.3
22	1.000 and +	44	20h.15	200	25	46.4		
		45	20h.25	200	40	55.1	7	1.7
23	1.000 and +	46	08h.30	200	20	50		
		47	08h.35	200	20	48.5	6	0.9
24	1.000 and +	48	14h.30	200	25	48.9		
		49	14h.35	200	25	50.4	6	1.2

TABLE 5(2)(continuation)

ZOOPLANKTON SAMPLES

Station number	Depth of bottom m	Sample number	Local time	Length of wire m	Angle of wire	Volume filtered m^{-3}	Zooplankton biomass Settling volume $ml.10m^{-3}$	Wet weigh $g.10m^{-3}$
25	1.000 and +	50	19h.35	200	25	48.9		
		51	19h.40	200	25	52.6	7	1.1
26	1.000 and +	52	08h.55	200	25	49.3		
		53	09h.00	200	25	47.5	3	0.5
27	1.000 and +	54	14h.25	200	25	45.6		
		55	14h.30	200	25	45.6	4	0.7
28	1.000 and +	56	20h.00	200	5	48.9		
		57	20h.05	200	5	49.3	5	0.6
		58	20h.30	1.000	5	227.4	1	0.2

TABLE 5(3)(continuation)

TAXONS \ SAMPLES	2	4	6	8	10	12	14	17	19	21	23	25	27	29
Foraminifera	388	248	262	197	166	278	218	188	119	122	188	25	29	83
Hydromedusae	48	41	44	66	83	139	196	31	25	24	38	13	15	5
Siphonophores	2 036	29 79	2 967	1 447	3 310	1 426	502	104	75	81	132	138	24	41
Ctenophores							44			16				
Polychaete (larvae and adults ?)	606	1 117	1 091	1 184	1 076	1 426	415	125	38	122	66	125	34	41
Penilia avirostris	24	83	87				22							
Evadne sp.		41	349	66	331	104								
Ostracods total	582	83		197	166	661	458	1.878	476	908	517	1.000	662	310
Copepods total	16 485	16 552	18 502	32 351	28 469	33 113	18 327	11 019	7 244	10 930	6 575	13 700	4 751	4 034
Cirripede larvae	48		44	132		70	131	10	38	32	47	50	10	
Amphipods	73	41		66		35	262	42		16	38	38	24	26
Isopods						70	22		6			9		
Euphausiids calyptosis							22	42	50	24	28	25	10	10
Euphausiids furcilia		41	44					83	13	32	28	50	15	10
Euphausiids adults												13		
Lucifer zoea	1 624	3 807	1 440	2 564	2 979	1 600	1 004	94	88	114	178	250	83	52
Lucifer mysis	364	910	873	723	1.241	765	676	21	13	16	66	63	39	26
Lucifer mastigopus	24	83	218			70	109	21	6	8	28			
Lucifer adults	24	124			83		44	21	6			13		
Brachyuran zoea		83							6	24	9	50	10	

TABLE 6(1): Abundance of the main taxons in the zooplankton samples (per 10 m^{-3})

TAXONS \ SAMPLES	2	4	6	8	10	12	14	17	19	21	23	25	27	29
Brachyuran megalopa														
Phyllosoma larvae											9			
Others decapod larvae	97	83		132	331	104	218		56	73	47	38	5	16
Heteropods														
Pteropods thecosomes	24	83	218	132		209	218	115	113	146	103	50	49	47
Pteropods gymnosomes														
Gastropods larvae	218	248	349	263	248	1 113	567	240	357	138	169	263	88	67
Bivalves larvae	1 067	1 076	1 091	1 249	1 076	2 330	785	104	88	32	94	75	19	36
Cephalopods										8		13		
Cyphonautes larvae	24							10	6	8	9	13		5
Actinotroch larvae	73	41	175	197	414	139	44							
Brachiopod larvae					248	70	22		13		9			5
Echinoderm larvae	97	166	349	263'	497	174	196	10	19	49	38	25	29	21
Chaetognaths	1 842	2 979	3 316	3 156	6 290	4 870	2 444	960	476	908	714	1 150	701	228
Larvaceans	267	207	1 047	395	3 310	1 670	1 047	626	727	357	178	400	331	36
Salps	48	248	567	1 052	414	35	65					38		5
Doliolids							22	10	25	8	19	13	5	
Amphioxus larvae														
Fish eggs	121		87	66		35	196	10	6	8				
Fish larvae		166	218	132	331	313	240	63		16	9	13	24	5

TABLE 6(2)(continuation)

TAXONS \ SAMPLES	31	33	35	37	39	41	43	45	47	49	51	53	55	57	58
Foraminifera	54	21	37	267	86	25	18	39	20	10	32	10	25	10	4
Hydromedusae	20	16	18	53	15	30	7	9	20	5	27	7	21		1
Siphonophores	40	48	27	196	25	45	36	78	54	29	41	30	74	45	16
Ctenophores	7														
Polychaete (larvae and adults ?)	74	37	50	89	45	30	47	48	40	19	82	17	35	29	17
Penilia avirostris															
Evadne sp.										5			4	6	
Ostracods total	697	321	329	711	263	257	319	314	277	124	237	175	196	149	59
Copepods total	6 168	3 143	4 289	12 587	4 406	2 256	4 952	5 419	4 731	2 914	3 486	2 776	2 582	2 570	773
Cirripede larvae	40	11		89	5	5						3			
Amphipods	20		5	89		5	7	9	5	19	5			6	1
Isopods	7							4	5				4		
Euphausiids calyptosis		5	9	391	71	25	80	30	25	29	18	3	25	23	2
Euphausiids furcilia	54	27	18	160	20	5	87	30		29	23	13	4	23	5
Euphausiids adults	13		9	18				9			9			16	5
Lucifer zoea		48	46	71	35		29	52	5	10	23				
Lucifer mysis	67	32	14	107	10		14	17			5				1
Lucifer mastigopus	13	5	14	36							5				
Lucifer adults	7		5	124				4							
Brachyuran zoea	20	11	9	36		5		9			5				

TABLE 6(3) (continuation)

TAXONS \ SAMPLES	31	33	35	37	39	41	43	45	47	49	51	53	55	57	58
Brachyuran megalopa	7						4	4			5				
Phyllosoma larvae															
Others decapod larvae	34	11	5	142	40	5	7	13	5	5	9	3	4	3	1
Heteropods		5					4								
Pteropods thecosomes	54	48	78	107	15	54	90	109	10	71	87	44	46	32	10
Pteropods gymnosomes			5				4	13	15	76	5		7	6	1
Gastropods larvae	54	80	87	551	81	49	51	100	59	29	41	24	56	39	9
Bivalves larvae	13	27	14	142	15	15	43	26	10	14	23	10	7	3	2
Cephalopods											5			6	2
Cyphonautes larvae	13			36		5		4	5					3	
Actinotroch larvae															
Brachiopod larvae							4				5				
Echinoderm larvae	47	21	41	89	25	5	14	4	10	24	23	10	7	33	1
Chaetognaths	617	134	256	782	424	178	261	209	277	667	219	229	196	97	51
Larvaceans	114	166	132	1 422	243	218	681	139	594	100	456	323	351	182	80
Salps	7	5			10		4	22	5	14		13	11		1
Doliolids	13	16	9	53	5	10	14	4	35	14	14	17	14	10	2
Amphioxus larvae	13								5		14			3	
Fish eggs	7	5	5	53	15	10	11	4							
Fish larvae	20	5	5	107	30	10	14	17	35	10	27	3	11	3	1

TABLE 6(4)(continuation)

A N N E X E 1

HYDROLOGICAL DATA

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Campagne	CORINDON 4	Station : 1	Nb Niveaux : 7					
Latitude	Longitude	Jo/Mo/An	Heure	D/V Vent	H/D/P Houle			
3.39 S	128.12 E	5/ 4/81	15.53	40/ 3nd	/ /			
E Mer	T Mer	T A Sec	T A Hum	P Atmo	D Hyg	Neb	D Gmt	
	30.10			1016.8			+ 9	

Z	T	S	O2	PO4	NO3	NO2	SIO3	CHLA1
0	30.10	33.100	4.65	.96	.15	.07	23.65	.48
5	29.14	33.820	4.57	.60	.16	.06	8.62	.27
10	29.03	33.850	4.58	.95	.08	.07	7.25	.30
15	28.34	33.920	4.17	.79	.64	.24	9.07	1.03
20	28.26	33.930	3.76	.74	1.80	.63	16.35	.92
30	27.70	33.970	3.93	.70	2.51	.73	15.43	.45
40	26.29	34.070	3.81	.77	3.81	.61	14.52	.38

Campagne :	CORINDON 4	Station : 2	Nb Niveaux : 5					
Latitude	Longitude	Jo/Mo/An	Heure	D/V Vent	H/D/P Houle			
3.38 S	128.12 E	5/ 4/81	16.56	0/ 0nd	/ /			
E Mer	T Mer	T A Sec	T A Hum	P Atmo	D Hyg	Neb	D Gmt	
	29.94			1016.8			+ 9	

Z	T	S	O2	PO4	NO3	NO2	SIO3	CHLA1
0	29.94	32.870	4.70	.46	.15	.06	28.62	.47
5	29.41	33.770	4.53	.41	.16	.05	9.50	.16
10	28.79	33.880	4.45	.56	.15	.06	6.77	.27
15	28.55	33.910	4.28	.51	.14	.06	6.76	.42
20	28.33	33.930	3.64	.63	1.57	.47	12.22	.75

Campagne :	CORINDON 4	Station : 3	Nb Niveaux : 6					
Latitude	Longitude	Jo/Mo/An	Heure	D/V Vent	H/D/P Houle			
3.38 S	128.13 E	5/ 4/81	17.40	0/ 0nd	/ /			
E Mer	T Mer	T A Sec	T A Hum	P Atmo	D Hyg	Neb	D Gmt	
	29.83			1016.8			+ 9	

Z	T	S	O2	PO4	NO3	NO2	SIO3	CHLA1
0	29.83	33.310	4.63	.50	.42	.08	21.77	.51
5	29.07	33.810	4.64	.34	.14	.06	7.66	.63
10	28.81	33.860	4.47	.33	.13	.07	6.74	.87
15	28.58	33.910	4.15		.11	.09	7.19	1.27
20	28.37		3.47	.48	.76	.32	10.37	2.34
25	28.28	33.950	2.48	.67	.89	1.30	15.38	1.74

Campagne :	CORINDON 4	Station : 4	Nb Niveaux : 6					
Latitude	Longitude	Jo/Mo/An	Heure	D/V Vent	H/D/P Houle			
3.38 S	128.13 E	5/ 4/81	18.23	0/ 0nd	/ /			
E Mer	T Mer	T A Sec	T A Hum	P Atmo	D Hyg	Neb	D Gmt	
	30.12			1016.8			+ 9	

Z	T	S	O2	PO4	NO3	NO2	SIO3	CHLA1
0	30.12	33.520	4.55	.27	.94	.07	13.10	.59
5	29.15	33.840	3.34	.30	2.78	.07	19.01	.55
10	28.93	33.870	4.39	.34	.56	.07	13.09	.80
15	28.63	33.900	3.58	.37	.04	.08	8.08	.92
20	28.43	33.930	3.38	.45	1.16	.38	12.62	2.44
30	27.81	33.980	2.01	.64	5.59	1.03	34.92	.63

Campagne : CORINDON 4			Station : 5			Nb Niveaux : 5		
Latitude	Longitude	Jo/Mo/An	Heure	D/V Vent	H/D/P Houle			
3.38 S	128.14 E	5/ 4/81	19.04	0/ 0nd	/ /			
E Mer	T Mer	T A Sec	T A Hum	P Atmo	D Hyg	Neb	D Gmt	
	30.21			1016.8			+ 9	
Z	T	S	O2	PO4	NO3	NO2	SIO3	CHLA1
0	30.21	32.560	4.49	1.07	.62	.23	68.54	.72
5	29.27	33.090	4.30	.47	.29	.04	11.70	.76
10	28.95	33.100	2.15	.46	.15	.03	7.60	.75
15	28.76	33.950	3.38	.50	.13	.05	10.32	1.52
20	28.52	33.980	2.30	.69	2.60	2.16	22.15	1.82

Campagne : CORINDON 4			Station : 6			Nb Niveaux : 6		
Latitude	Longitude	Jo/Mo/An	Heure	D/V Vent	H/D/P Houle			
3.39 S	128.13 E	5/ 4/81	20.02	0/ 0nd	/ /			
E Mer	T Mer	T A Sec	T A Hum	P Atmo	D Hyg	Neb	D Gmt	
	29.79			1016.8			+ 9	
Z	T	S	O2	PO4	NO3	NO2	SIO3	CHLA1
0	29.79	33.080	4.28	.60	.36	.11	22.60	.44
5	29.42	33.770	4.56	.36	.15	.03	8.94	.36
10	28.78	33.860	4.45	.36	.14	.04	7.12	.64
15	28.42	33.910	3.65	.39	.28	.12	7.57	1.44
20	28.33	33.920	3.96	.38		.41	1.65	1.60
30	27.47	33.980	3.17	.58		1.15	1.64	.52

Campagne : CORINDON 4			Station : 7			Nb Niveaux : 7		
Latitude	Longitude	Jo/Mo/An	Heure	D/V Vent	H/D/P Houle			
3.40 S	128.11 E	5/ 4/81	21.13	0/ 0nd	/ /			
E Mer	T Mer	T A Sec	T A Hum	P Atmo	D Hyg	Neb	D Gmt	
	29.16			1015.0			+ 9	
Z	T	S	O2	PO4	NO3	NO2	SIO3	CHLA1
0	29.16	33.600	3.71	.53		.06	10.74	.69
5	28.81	33.820	3.63	.41		.05	23.48	.81
10	28.74	33.870	4.02	.56		.14	11.64	.81
15	28.63	33.870	2.78	.43		.16	6.63	.81
25	28.47	33.890	3.13	.47		.20	57.27	.94
35	28.38	33.900	4.38	.50		.06	5.71	.94
45	28.21	33.930	4.32	.46		.05	7.07	1.06

Campagne : CORINDON 4 — Station : 8 — Nb Niveaux : 11

Latitude	Longitude	Jo/Mo/An	Heure	D/V Vent	H/D/P Houle
3.40 S	128.10 E	5/ 4/81	22.20	0/ 0nd	/ /

E Mer	T Mer	T A Sec	T A Hum	P Atmo	D Hyg	Neb	D Gmt
	29.16			1015.0			+ 9

Z	T	S	O2	PO4	NO3	NO2	SIO3	CHLA1	DBO
0	29.16	33.767	4.72	.33		.05	7.07	.44	.61
5	29.11	33.795	4.67	.37		.05	7.52	.36	
10	29.08	33.837	4.66	.48		.06	6.60	.17	
15	28.93	33.873	4.61	.43		.04	5.23	.22	
20	28.98	33.883	4.61	.59		.00	4.32	.19	
30	28.94	33.912	4.65	.38		.05	3.40	.19	
50	28.73		2.83			.00			
75	28.51	33.956	2.24	.41		.08	3.39	.25	
100	28.37	33.973	2.34			.23		.41	
125	28.18	33.977	2.72	.36			2.93	.55	
150	27.02	34.041	2.34	.39			2.92	.50	

Campagne : CORINDON 4 — Station : 9 — Nb Niveaux : 10

Latitude	Longitude	Jo/Mo/An	Heure	D/V Vent	H/D/P Houle
3.41 S	128.10 E	6/ 4/81	7.45	0/ 0nd	/ /

E Mer	T Mer	T A Sec	T A Hum	P Atmo	D Hyg	Neb	D Gmt
	28.64			1015.2			+ 9

Z	T	S	O2	PO4	NO3	NO2	SIO3	CHLA1	DBO
0	28.64	33.637	4.65	.30		.09	8.43	.21	.79
5	28.78	33.885	4.67	.26		.09	5.16	.13	
10	28.83	33.888	4.70	.26		.07	5.84	.14	
20	28.15	33.973	4.56	.32		.11	5.49	.38	
30	28.08	34.010	4.53	.29		.10	4.98	.35	
50	26.54	34.096	4.04	.41		.42	9.11	.27	
75	24.02	34.260	2.08	.68		.42	13.07	.13	
105	19.63	34.474	3.20	1.05		.22	21.32	.05	
125	18.03	34.531	3.14	1.23		.17	24.66	.09	
150	16.32	34.588	3.00	1.71		.14	26.94	.10	

Campagne : CORINDON 4 — Station : 10 — Nb Niveaux : 8

Latitude	Longitude	Jo/Mo/An	Heure	D/V Vent	H/D/P Houle
3.42 S	128.10 E	6/ 4/81	9.10	0/ 0nd	/ /

E Mer	T Mer	T A Sec	T A Hum	P Atmo	D Hyg	Neb	D Gmt
	28.68			1016.0			+ 9

Z	T	S	O2	PO4	NO3	NO2	SIO3	CHLA1	DBO
0	28.68	33.896	4.26	.52		.10	4.38	.29	.00
5	28.60	33.899	4.63	.46		.10	3.86	.30	
10	28.53		4.63	.39		.10	3.78	.35	
20	28.25	33.966	4.62	.42		.10	3.43	.42	
30	27.87	33.995	4.57	.36		.15	4.36	.49	
40	27.41	34.039	4.32	.39		.26	5.30	.49	
50	27.27	34.049	4.31	.39		.31	5.72	.50	
70	25.82	34.140	3.23	.47		.53	8.56	.30	

Campagne : CORINDON 4 Station : 11 Nb Niveaux : 10

Latitude	Longitude	Jo/Mo/An	Heure	D/V Vent	H/D/P Houle
3.42 S	128.08 E	6/ 4/81	10.30	0/ 0nd	/ /

E Mer	T Mer	T A Sec	T A Hum	P Atmo	D Hyg	Neb	D Gmt
	28.98			1016.0			+ 9

Z	T	S	O2	PO4	NO3	NO2	SIO3	CHLA1	DBO
0	28.98	33.828	4.65	.35		.13	4.42	.19	.08
10	28.74	33.909	4.68	.29		.07	3.38	.12	
20	28.44	33.941	4.66	.25		.07	3.21	.23	
30	28.12	33.982	4.58	.25		.09	3.38	.40	
50	27.71	34.035	4.39	.28		.19	4.41	.38	
75	26.51	34.124	4.09	.34		.49	6.82	.37	
100	25.10	34.231	3.77	.52		.40	9.23	.18	
150	22.40	34.373	3.38	.79		.27	14.05	.16	
200	21.12	34.409	3.41	1.01		.25	16.98		
250	18.69	34.510	3.08	1.19		.17	21.78		

Campagne : CORINDON 4 Station : 12 Nb Niveaux : 8

Latitude	Longitude	Jo/Mo/An	Heure	D/V Vent	H/D/P Houle
3.41 S	128.07 E	6/ 4/81	12.05	0/ 0nd	/ /

E Mer	T Mer	T A Sec	T A Hum	P Atmo	D Hyg	Neb	D Gmt
	29.03			1015.3			+ 9

Z	T	S	O2	PO4	NO3	NO2	SIO3	CHLA1	DBO
0	29.03	33.849	4.62	.42		.09	5.06	.19	.19
5	28.73	33.873	4.63	.36		.08	4.28	.21	
10	28.68	33.889	4.59	.32		.09	4.28	.23	
20	28.54	33.889	4.56	.32		.10	4.28	.29	
30	28.18	33.965	4.49	.29		.12	4.02	.38	
40	28.03	33.979	4.64	.29		.15	4.01	.33	
50	28.03	33.993	5.07	.29		.15	4.01	.39	
65	27.41	34.055	4.25	.31		.26	5.04	.30	

Campagne : CORINDON 4 Station : 13 Nb Niveaux : 10

Latitude	Longitude	Jo/Mo/An	Heure	D/V Vent	H/D/P Houle
3.42 S	128.07 E	6/ 4/81	13.45	0/ 0nd	/ /

E Mer	T Mer	T A Sec	T A Hum	P Atmo	D Hyg	Neb	D Gmt
	29.37			1015.3			+ 9

Z	T	S	O2	PO4	NO3	NO2	SIO3	CHLA1	DBO
0	29.37	33.794	3.97	.53		.10	5.29	.19	.00
10	28.62	33.766	3.91	.31		.08	3.23	.15	
20	28.18	33.923	4.27	.28		.08	3.23	.18	
30	28.12	33.971	4.07	.28		.10	3.74	.32	
50	27.59	34.033	3.82	.27		.19	14.28	.34	
75	26.54								
100	24.69	34.231	3.40	.55		.38	9.69	.12	
125	21.27	34.447	2.64	.82		.14	15.03	.09	
150	17.90	34.539	2.98	1.15		.10	22.50	.08	
200	17.41	34.553	2.98	1.30		.10	23.53		

Campagne : CORINDON 4			Station : 14				Nb Niveaux : 12		
Latitude	Longitude	Jo/Mo/An	Heure	D/V Vent	H/D/P Houle				
3.44 S	128.07 E	6/ 4/81	15.30	270/ 3nd	/ /				
E Mer	T Mer	T A Sec	T A Hum	P Atmo	D Hyg	Neb	D Gmt		
	28.99			1014.2			+ 9		
Z	T	S	O2	PO4	NO3	NO2	SIO3	CHLA1	DBO
0	28.99	33.881	4.70	.45		.07	4.23	.15	.20
10	28.90	33.862	4.70	.32		.06	3.72	.12	
20	28.27	33.957	4.42	.29		.06	2.94	.37	
30	27.75	34.009	4.05	.32		.16	3.97	.36	
50	27.06	34.081	4.08	.35		.32	5.51	.25	
75	23.35	34.326	3.52	.65		.25	12.19	.13	
100	19.25	34.500	3.05	1.01		.12	19.65	.06	
125	16.66	34.601	2.88	1.35		.09	24.79	.04	
150	16.04	34.626	2.88	1.47		.08	25.82	.04	
200	14.74	34.640	2.84	1.65		.08	29.47		
300	10.91	34.633	2.57	2.14		.07	41.85		
400	10.14	34.637	2.57	2.44		.07	44.50		

Campagne : CORINDON 4			Station : 15				Nb Niveaux : 6		
Latitude	Longitude	Jo/Mo/An	Heure	D/V Vent	H/D/P Houle				
3.45 S	128.07 E	6/ 4/81	16.35	270/ 3nd	/ /				
E Mer	T Mer	T A Sec	T A Hum	P Atmo	D Hyg	Neb	D Gmt		
	29.32			1014.2			+ 9		
Z	T	S	O2	PO4	NO3	NO2	SIO3	CHLA1	DBO
0	29.32	33.841	4.77	.57		.06	.76	.22	.08
10	28.39	33.962	4.71	.42		.07	.50	.30	
20	28.04	34.004	4.60	.39		.10	.50	.34	
30	27.93	34.016	4.49	.32		.12	.50	.35	
50	27.19	34.069	4.24	.35		.33	.84	.22	
75	22.77	34.390	3.62	.68		.19	2.19	.06	

Campagne : CORINDON 4			Station : 16				Nb Niveaux : 12		
Latitude	Longitude	Jo/Mo/An	Heure	D/V Vent	H/D/P Houle				
3.45 S	128.05 E	6/ 4/81	18.05	0/ 0nd	/ /				
E Mer	T Mer	T A Sec	T A Hum	P Atmo	D Hyg	Neb	D Gmt		
	29.00			1014.2			+ 9		
Z	T	S	O2	PO4	NO3	NO2	SIO3	CHLA1	DBO
0	29.00	33.871	4.73	.32		.07	3.78	.14	.00
10	28.37	33.956	4.68	.28		.06	3.08	.28	
20	28.36	34.056	4.59	.25		.06	3.25	.28	
30	27.92	34.049	4.51	.28		.12	3.59	.38	
50	26.21	34.145	4.01	.40		.43	6.69	.20	
75	21.94	34.431	3.18	.67		.11	13.93	.12	
100	19.60	34.528	3.01	.91		.08	18.06	.09	
125	16.67	34.636	2.94	1.25		.07	23.20	.09	
150	15.05	34.681	2.89	1.49		.06	26.77	.07	
200	12.25	34.644	2.69	1.92		.06	36.49		
300	10.85	34.636	2.59	2.19		.06	39.59		
400	9.34	34.641	2.58	2.40		.05	47.63		

Campagne : CORINDON 4			Station : 17			Nb Niveaux : 12
Latitude	Longitude	Jo/Mo/An	Heure	D/V Vent	H/D/P Houle	
3.45 S	128.04 E	6/ 4/81	19.40	0/ 0nd	/ /	

E Mer	T Mer	T A Sec	T A Hum	P Atmo	D Hyg	Neb	D Gmt
	28.94			1014.0			+ 9

Z	T	S	O2	PO4	NO3	NO2	SIO3	CHLA1	DBO
0	28.94	33.869	4.66	.57		.04	.38	.12	.00
10	28.52	33.961	4.12	.38		.04	.20	.23	
20	28.33	33.998	4.60	.35		.06	.20	.31	
30	27.88	34.050	4.08	.31		.12	.28	.24	
49	27.17	34.169	3.41	.34		.33	.36	.17	
74	23.47	34.317	3.40	.58		.27	11.34	.08	
99	22.23	34.427	2.59	.80		.13	13.14	.07	
124	19.99	34.500	3.04	1.04		.06	17.76	.06	
148	17.22	34.619	2.64	1.52		.00	33.37	.06	
197	14.07	34.669	2.81	1.86		.06	41.77		
295	11.37	34.641	2.63	2.28		.05	50.30		
394	9.73	34.640	2.67			.05	59.69		

Campagne : CORINDON 4			Station : 18			Nb Niveaux : 6
Latitude	Longitude	Jo/Mo/An	Heure	D/V Vent	H/D/P Houle	
3.44 S	128.02 E	6/ 4/81	21.20	0/ 0nd	/ /	

E Mer	T Mer	T A Sec	T A Hum	P Atmo	D Hyg	Neb	D Gmt
	28.86			1015.0			+ 9

Z	T	S	O2	PO4	NO3	NO2	SIO3	CHLA1	DBO
0	28.86	33.875	4.65	.20		.04	11.53	.21	.00
10	28.73	33.889	4.53	.23		.04	3.95	.33	
20	28.65	33.926	6.58	.22		.04	3.94	.33	
30	28.57	33.925	4.61	.19		.05	3.93	.36	
39	28.48	33.950	4.53	.22		.05	3.92	.36	
49	28.43	33.974	4.55	.22		.05	3.92	.36	

Campagne : CORINDON 4			Station : 19			Nb Niveaux : 13
Latitude	Longitude	Jo/Mo/An	Heure	D/V Vent	H/D/P Houle	
3.46 S	128.02 E	6/ 4/81	23.25	40/ 3nd	/ /	

E Mer	T Mer	T A Sec	T A Hum	P Atmo	D Hyg	Neb	D Gmt
	28.73			1015.0			+ 9

Z	T	S	O2	PO4	NO3	NO2	SIO3	CHLA1	DBO
0	28.73	34.018	4.08	.21		.06	3.23	.10	.00
10	28.58	34.058	4.67	.18		.05	3.31	.15	
20	28.50	34.064	4.54	.21		.05	3.30	.17	
30	28.43	34.061	4.59	.21		.05	3.29	.18	
50	28.27	34.019	4.53	.20		.06	3.54	.22	
75	26.97	34.152	4.15	.29		.24	5.23	.20	
99	22.47	34.418	3.36	.62		.12	12.21	.06	
124	21.12	34.474	3.23	.84		.10	15.29	.06	
149	18.99	34.552	3.03	1.08		.07	18.88	.06	
198	15.59	34.708	2.90	1.47		.06	24.52		
297	11.99	34.651	2.64	2.02		.06	36.21		
396	10.32	34.640	2.54	2.29		.06	41.58		
495	8.35	34.634	2.52	2.65		.06	51.00		

Campagne : CORINDON 4			Station : 20			Nb Niveaux : 18		
Latitude	Longitude	Jo/Mo/An	Heure	D/V Vent	H/D/P Houle			
3.53 S	128.02 E	7/ 4/81	8.40	220/ 2nd	/ /			
E Mer	T Mer	T A Sec	T A Hum	P Atmo	D Hyg	Neb	D Gmt	
	29.11			1016.8			+ 9	

Z	T	S	O2	PO4	NO3	NO2	SIO3	CHLA1
0	29.11	33.896	4.47	.27	.00	.04	2.93	.05
10	29.09	33.903	4.55	.27	.00	.04	2.93	.05
20	28.90	34.028	4.59	.23	.00	.04	3.00	.07
30	28.56	34.174	4.52	.23	.00	.04	2.83	.07
50	27.79	34.159	4.28	.26	.58	.14	3.73	.32
75	27.32	34.207	4.15	.32	1.18	.40	4.05	.36
100	24.94	34.310	3.56	.53	7.00	.26	8.12	.15
125	22.71	34.443	3.05	.80	9.89	.11	11.60	.09
150	20.46	34.499	3.03	1.04	12.80	.08	15.73	.05
200	17.00	34.685	2.95	1.37	16.82	.05	20.85	
250	14.22	34.639	2.76	1.71	20.41	.05	27.25	
300	12.17	34.597	2.63	1.95	22.57	.04	30.23	
400	9.96	34.628	2.49	2.34	27.60	.04	41.32	
500	8.90	34.646	2.40	2.74	30.11	.04	48.22	
600	7.71	34.599	2.34	3.12	32.32	.05	53.39	
699	6.68	34.588	2.23	3.11	34.22	.05	58.56	
799	6.04	34.596	2.29	3.30	35.18	.05	62.87	
998	5.55	34.597	2.52	3.29	35.65	.05	64.59	

Campagne : CORINDON 4			Station : 21			Nb Niveaux : 15		
Latitude	Longitude	Jo/Mo/An	Heure	D/V Vent	H/D/P Houle			
3.50 S	127.53 E	7/ 4/81	14.20	0/ 0nd	/ /			
E Mer	T Mer	T A Sec	T A Hum	P Atmo	D Hyg	Neb	D Gmt	
	28.82			1015.4			+ 9	

Z	T	S	O2	PO4	NO3	NO2	SIO3	CHLA1
0	28.82	33.617	4.90	.34	.01	.04	3.42	.12
10	28.54	33.813	4.61	.31	.01	.04	3.50	.16
20	28.53	33.849	4.62	.25	.01	.04	3.49	.17
30	28.55	33.900	4.59	.18	.06	.03	3.49	.20
50	27.90	34.071	4.46	.21	.23	.13	3.49	.48
74	25.96	34.206	3.90	.42	4.18	.30	7.00	.18
99	22.03	34.442	3.28	.78	10.71	.11	12.78	.09
124	18.87	34.591	3.06	1.09	15.36	.07	17.74	.10
148	17.33	34.702	3.08	1.24	17.17	.06	18.72	.10
197	14.47	34.684	2.87	1.60	21.50	.04	25.89	
247	12.73	34.576	2.77	1.87	24.01	.04	30.58	
296	11.59	34.578	2.56	2.14	27.24	.04	35.70	
394	10.28	34.668	2.81	2.41	29.38	.05	40.81	
493	8.56	34.625	2.49	2.69	32.98	.04	49.92	
591	7.20	34.617	2.51	3.01	35.13	.05	57.72	

Campagne : CORINDON 4			Station : 22			Nb Niveaux : 15		
Latitude	Longitude	Jo/Mo/An	Heure	D/V Vent	H/D/P Houle			
4.52 S	127.43 E	7/ 4/81	19.40	320/ 8nd	/ /			
E Mer	T Mer	T A Sec	T A Hum	P Atmo	D Hyg	Neb	D Gmt	
	28.72	27.2		1015.7		6	+ 9	

Z	T	S	O2	PO4	NO3	NO2	SIO3	CHLA1
0	28.72	33.787	4.61	.30	.05	.07	3.85	.12
9	28.46	33.932	5.19	.52	.07	.05	3.68	.17
18	28.30	33.971	4.55	.42	.19	.09	4.02	.36
27	28.13	34.001	4.52	.45	.15	.09	4.01	.35
45	27.74	34.037	4.48	.41	.67	.33	4.44	.26
68	27.21	34.109	4.10	.34	1.91	.42	5.47	.11
91	25.97	34.216	3.81	.34	4.10	.29	7.35	.06
113	25.37	34.248	3.74	.57	5.19	.24	8.38	.04
136	21.29	34.521	3.23	.92	10.07	.13	14.29	.02
181	16.19	34.795	3.05	1.43	15.23	.08	21.06	
227	15.18	34.733	2.92	1.65	17.22	.08	24.71	
272	12.67	34.612	2.63	2.13	21.23	.07	33.56	
363	10.47	34.675	2.72	2.51	24.62	.07	41.18	
453	9.40	34.660	2.59	2.76	26.65	.07	47.76	
544	8.63	34.646	2.54	2.77	27.67	.07	50.49	

Campagne : CORINDON 4			Station : 23			Nb Niveaux : 15		
Latitude	Longitude	Jo/Mo/An	Heure	D/V Vent	H/D/P Houle			
3.45 S	127.35 E	8/ 4/81	8.00	280/ 7nd	/ /			
E Mer	T Mer	T A Sec	T A Hum	P Atmo	D Hyg	Neb	D Gmt	
	28.90	28.3	28.3	1016.8		6	+ 9	

Z	T	S	O2	PO4	NO3	NO2	SIO3	CHLA1
0	28.90	33.739	4.51	.44	.01	.08	1.48	.04
10	28.77	33.790	4.54	.55	.14	.06	1.87	.05
20	28.28	33.967	4.52	.38	.08	.06	2.27	.09
30	27.82	34.039	4.35	.43	.77	.32	2.76	.10
50	27.58	34.115	4.31	.51	1.17	.45	2.85	.10
75	27.06	34.166	4.15	.37	2.07	.55	3.75	.08
99	24.23	34.330	3.64	.55	6.47	.23	8.82	.04
124	20.81	34.612	3.37	.82	10.75	.12	13.10	.02
149	18.10	34.790	3.19	1.23	13.97	.10	17.39	.02
198	16.18	34.868	3.11	1.41	16.42	.08	20.76	
248	14.17	34.691	2.93	1.60	20.02	.06	30.89	
297	12.20	34.708	2.77	1.91	23.34	.05	37.89	
393	10.55	34.673	2.68	2.11	26.09	.05	45.81	
489	9.36	34.658	2.63	2.29	28.47	.05	52.14	
587	7.22	34.628	2.42	2.64	31.82	.05	66.66	

Campagne : CORINDON 4			Station : 24			Nb Niveaux : 15	
Latitude	Longitude	Jo/Mo/An	Heure	D/V Vent	H/D/P Houle		
3.42 S	127.24 E	8/ 4/81	14.00	190/ 6nd	/ /		
E Mer	T Mer	T A Sec	T A Hum	P Atmo	D Hyg	Neb	D Gmt
	29.66	31.5	26.5	1016.5		6	+ 9

Z	T	S	O2	PO4	NO3	NO2	SIO3	CHLA1
0	29.66	33.705		.20	.06	.03	.89	.02
10	28.98	33.718		.26	.07	.03	1.10	.02
20	28.52	33.952		.23	.07	.03	1.39	.06
30	28.20	34.063		.26	.12	.07	1.39	.08
50	27.99	34.076		.25	.42	.11	1.45	.08
75	27.32	34.144		.28	1.13	.20	2.19	.06
100	24.90	34.299	3.49	.43	3.68	.30	5.10	.02
125	20.68	34.641	2.71	.82	7.77	.12	9.64	.03
150	18.17	34.762	2.03	1.02	10.33	.08	13.12	.02
200	15.59	34.825	2.10	1.29	12.24	.06	10.08	
250	14.17	34.859	1.83	1.56	13.93	.05	12.80	
300	12.04	34.736	1.60	2.00	16.75	.06	27.92	
400	10.73	34.668	1.88	2.27	18.70	.05	33.36	
500	8.71	34.649	1.90	2.71	21.08	.05	41.99	
600	7.30	34.622	1.63	2.86	23.07	.05	47.91	

Campagne : CORINDON 4			Station : 25			Nb Niveaux : 15	
Latitude	Longitude	Jo/Mo/An	Heure	D/V Vent	H/D/P Houle		
3.41 S	127.15 E	8/ 4/81	19.00	350/10nd	/ /		
E Mer	T Mer	T A Sec	T A Hum	P Atmo	D Hyg	Neb	D Gmt
	28.81	24.5		1016.6		7	+ 9

Z	T	S	O2	PO4	NO3	NO2	SIO3	CHLA1
0	28.81	33.600	4.06	.28	.00	.07	1.04	.04
10	28.72	33.860	3.86	.30	.00	.07	1.03	.03
20	28.34	33.929	4.31	.38	.00	.18	1.11	.08
30	27.94	33.982	4.08	.35	.10	.29	1.27	.13
50	27.70	34.032	3.82	.48	1.03	.41	3.02	.12
75	24.65	34.280	3.25	.73	3.47	.35	7.32	.04
100	22.32	34.468	2.94	.85	5.50	.23	10.31	.03
125	20.00	34.607	3.33	1.15	7.49	.15	14.03	.02
150	17.97	34.754	1.91	1.33	8.68	.12	15.89	.01
200	15.83	34.829	3.06	1.38	9.89	.11	18.27	
250	14.38	34.807	2.46	1.60	11.01	.11	23.32	
300	10.54	34.682	2.13	2.25	15.17	.11	39.67	
400	9.02	34.655	2.22	2.49	16.85	.10	47.34	
500		34.622	2.30	2.59	18.24	.10	53.61	
600	7.04	34.611	2.39	2.84	19.35	.10	59.19	

Campagne : CORINDON 4			Station : 26			Nb Niveaux : 15
Latitude	Longitude	Jo/Mo/An	Heure	D/ Vent	H/D/P Houle	
4.08 S	128.01 E	9/ 4/81	8.15	90/10nd	/ /	

E Mer	T Mer	T A Sec	T A Hum	P Atmo	D Hyg	Neb	D Gmt
	28.93	27.5	25.2	1017.1		4	+ 9

Z	T	S	O2	PO4	NO3	NO2	SIO3	CHLA1
0	28.93	33.842	4.55	.21	.00	.05	.81	.03
20	28.93	34.089	4.56	.25	.00	.06	.80	.03
30	28.59	34.162	4.53	.38	.00	.06	.98	.04
40	28.32	34.180	4.51	.25	.00	.06	.87	.05
50	28.04	34.198	4.44	.27	.00	.00	.96	.13
60	27.81	34.159	4.28	.29	.00	.21	1.32	.16
80	26.31	34.267	3.84	.36	.00	.36	3.96	.10
100	25.07	34.345	3.65	.60	6.67	.17	6.32	.08
125	23.64	34.409	3.23	.63	3.42	.12	8.47	.07
150	19.94	34.524	2.81	.95	4.80	.08	16.20	.02
200	15.67	34.741	2.91	1.42	7.36	.08	23.35	
300	11.14	34.561	2.48	1.89	9.79	.07	38.89	
400	10.15	34.643	2.54	2.13	13.55	.07	44.14	
500		34.635	2.50	2.42	16.32	.08	52.39	
600	7.92	34.615	2.47	2.46	17.15	.08	56.13	

Campagne : CORINDON 4			Station : 27			Nb Niveaux : 15
Latitude	Longitude	Jo/Mo/An	Heure	D/V Vent	H/D/P Houle	
4.23 S	128.02 E	9/ 4/81	13.55	0/ 0nd	/ /	

E Mer	T Mer	T A Sec	T A Hum	P Atmo	D Hyg	Neb	D Gmt
	31.00	31.8	29.0	1016.5		4	+ 9

Z	T	S	O2	PO4	NO3	NO2	SIO3	CHLA1
0	31.00	33.865	4.51	.27	.08	.05	.00	.00
20	28.92	33.930	4.54	.36	.08	.05	.00	.00
40	28.69	34.149	4.67	.38	.08	.05	.00	.01
50	28.41	34.191	4.58	.34	.08	.05	.00	.03
60	28.38	34.209	4.48	.43	.08	.05	.00	.04
70	28.03	34.230	4.31	.33	.48	.24	.41	.20
80	26.54	34.258	4.23	.48	3.11	.35	2.38	.11
100	23.96	34.398	3.31	.91	7.55	.14	6.40	.06
125	22.35	34.448	3.07	1.03	10.12	.09	8.75	.05
150	21.36	34.484	2.97	1.14	11.59	.08	10.59	.04
200	18.51	34.575	2.84	1.46	14.57	.07	15.91	
300	11.38	34.567	2.43	2.41	22.73	.08	32.12	
400	9.59	34.599	2.42	2.79	26.83	.07	38.95	
499	8.22	34.636	2.34	2.97	28.86	.08	46.92	
599	7.48	34.592	2.34	2.97	30.91	.07	50.83	

Campagne : CORINDON 4			Station : 28				Nb Niveaux : 15
Latitude	Longitude	Jo/Mo/An	Heure	D/V Vent	H/D/P Houle		
4.38 S	128.02 E	9/ 4/81	19.35	0/ 0nd	/ /		
E Mer	T Mer	T A Sec	T A Hum	P Atmo	D Hyg	Neb	D Gmt
	29.72	28.7	26.6	1016.2		3 .	+ 9

Z	T	S	O2	PO4	NO3	NO2	SIO3	CHLA1
0	29.72	33.874	4.67	.27	.18	.05	1.97	.02
20	28.96	34.085	4.67	.31	.18	.06	2.14	.02
40	28.56	34.132	4.66	.30	.11	.06	2.11	.07
50	28.44	34.250	4.70	.32	.08	.06	2.29	.15
60	28.07	34.259	4.49	.34	.06	.09	2.89	.23
70	27.81	34.249	4.49	.31	.10	.15	3.27	.20
80	27.43	34.263	4.31	.35	.44	.38	5.12	.05
100	23.33	34.422	3.34	.64	4.34	.11	9.39	
125	21.76	34.479	3.21	.68	4.77	.10	11.44	
150	20.54	34.509	3.20	.71	5.35	.09	13.66	
200	15.42	34.582	3.00	1.13	7.31	.08	27.17	
300	10.98	34.565	2.59	1.70	10.64	.08	36.80	
400	8.47	34.578	2.58	2.00	12.66	.07	46.07	
500	8.05	34.626	2.57	2.09	13.02	.07	50.08	
599	6.63	34.585	2.40	2.37	14.11	.07	58.09	

Campagne : CORINDON 4			Station : 29				Nb Niveaux : 12
Latitude	Longitude	Jo/Mo/An	Heure	D/V Vent	H/D/P Houle		
3.53 S	128.01 E	10/ 4/81	8.30	340/ 8nd	/ /		
E Mer	T Mer	T A Sec	T A Hum	P Atmo	D Hyg	Neb	D Gmt
	28.90	27.2	26.0	1017.0		5	+ 9

Z	T	S	O2	PO4	NO3	NO2	SIO3	CHLA1
0	28.90	33.794		.18	.00	.06	1.60	.02
10	28.33	33.979		.20	.01	.08	2.10	.09
20	27.68	34.094		.25	.41	.17	2.94	.09
30	27.45			.44	.34	.34	2.52	.13
40	27.07			.29	.59	.54	3.36	.10
50	25.90			.56	2.73	.35	5.63	.06
60	24.63			.56	2.68	.24	7.82	.04
70	22.66			.65	4.11	.13	10.24	.03
80	21.97			.75	4.63	.10	11.61	.03
90	21.57			.82	5.19	.11	13.49	.03
100	20.47			.92	5.70	.10	15.19	
120	19.20			.89	5.54	.11	14.00	

Campagne : CORINDON 4			Station : 30			Nb Niveaux : 16
Latitude	Longitude	Jo/Mo/An	Heure	D/V Vent	H/D/P Houle	
3.56 S	127.58 E	10/ 4/81	9.15	340/10nd	/ /	

E Mer	T Mer	T A Sec	T A Hum	P Atmo	D Hyg	Neb	D Gmt
	28.93	34.1	25.7	1017.0		3	+ 9

Z	T	S	O2	PO4	NO3	NO2	SIO3	CHLA1
0	28.93	33.916	4.62	.21	.00	.06	1.88	.00
10	28.87	34.112	4.67	.23	.00	.06	1.85	.01
15								.01
20	28.68	34.132	4.71	.21	.00	.06	1.93	.01
26								.02
30	28.09	34.177	4.56	.20	.00	.07	2.10	.03
40	27.53	34.212	4.31	.22	.13	.39	2.27	.07
43								.07
50	27.25	34.202	4.23	.27	.48	.45	3.20	.06
60		34.233	4.05	.29	1.14	.49	4.54	.04
64								.05
70	26.09	34.263	3.99	.36	1.72	.37	5.63	.04
80	25.18	34.323	4.37	.41	2.59	.20	7.32	.04
85								.03
90	22.67	34.437	3.23	.61	4.13	.12	10.19	.02
100	22.06	34.458	3.06	.60	4.56	.11	11.47	.02

Campagne : CORINDON 4			Station : 31			Nb Niveaux : 12
Latitude	Longitude	Jo/Mo/An	Heure	D/V Vent	H/D/P Houle	
3.42 S	128.09 E	11/ 4/81	8.00	0/ 0nd	/ /	

E Mer	T Mer	T A Sec	T A Hum	P Atmo	D Hyg	Neb	D Gmt
	28.45	28.5	27.0	1017.2		3	+ 9

Z	T	S	O2	PO4	NO3	NO2	SIO3	CHLA1
0	28.45	33.630	5.14	.34	.03	.04	5.02	.19
10	28.26	33.962	4.65	.34	.02	.05	.22	.14
20	27.50	34.045	4.57	.33	.53	.35	.65	.09
30	27.01	34.075	4.22	.32	.64	.45	2.05	.09
40	25.94	34.163	3.74	.37	1.36	.39	3.84	.07
50	24.02	34.267	3.68	.44	2.35	.35	7.57	.07
60	22.89	34.327	3.52	.57	3.23	.32	10.32	.07
70	20.97	34.418	3.39	.56	4.25	.23	14.43	.06
80	20.09	34.459	3.25	.71	4.78	.19	16.02	.04
90	19.31	34.515	3.16	.84	5.26	.14	15.61	.04
100	18.53	34.536	3.09	.86	5.54	.14	17.10	.04
120	17.55	34.584	3.00	.98	5.97	.14	20.03	.04

Campagne : CORINDON 4			Station : 32			Nb Niveaux : 6
Latitude	Longitude	Jo/Mo/An	Heure	D/V Vent	H/D/P Houle	
3.38 S	128.13 E	12/ 4/81	9.00	0/ 0nd	/ /	

E Mer	T Mer	T A Sec	T A Hum	P Atmo	D Hyg	Neb	D Gmt
	30.39	34.2	27.7	1018.0		7	+ 9

Z	T	S	O2	PO4	NO3	NO2	SIO3	CHLA1	DBO
0	30.39	31.354	4.59	.40	.02	.09	54.02	.18	.42
5	28.94	33.719	4.60	.31	.00	.07	7.11	.22	
10	28.78	33.831	4.47	.31	.00	.07	5.41	.20	
15	28.41	33.879	4.06	.33	.02	.16	6.13	.32	
20	28.10	33.912	3.63	.38	.21	.77	12.93	.38	
25	27.74	33.952	3.70	.52	.45	.64	13.47	.22	.16

A N N E X E 2

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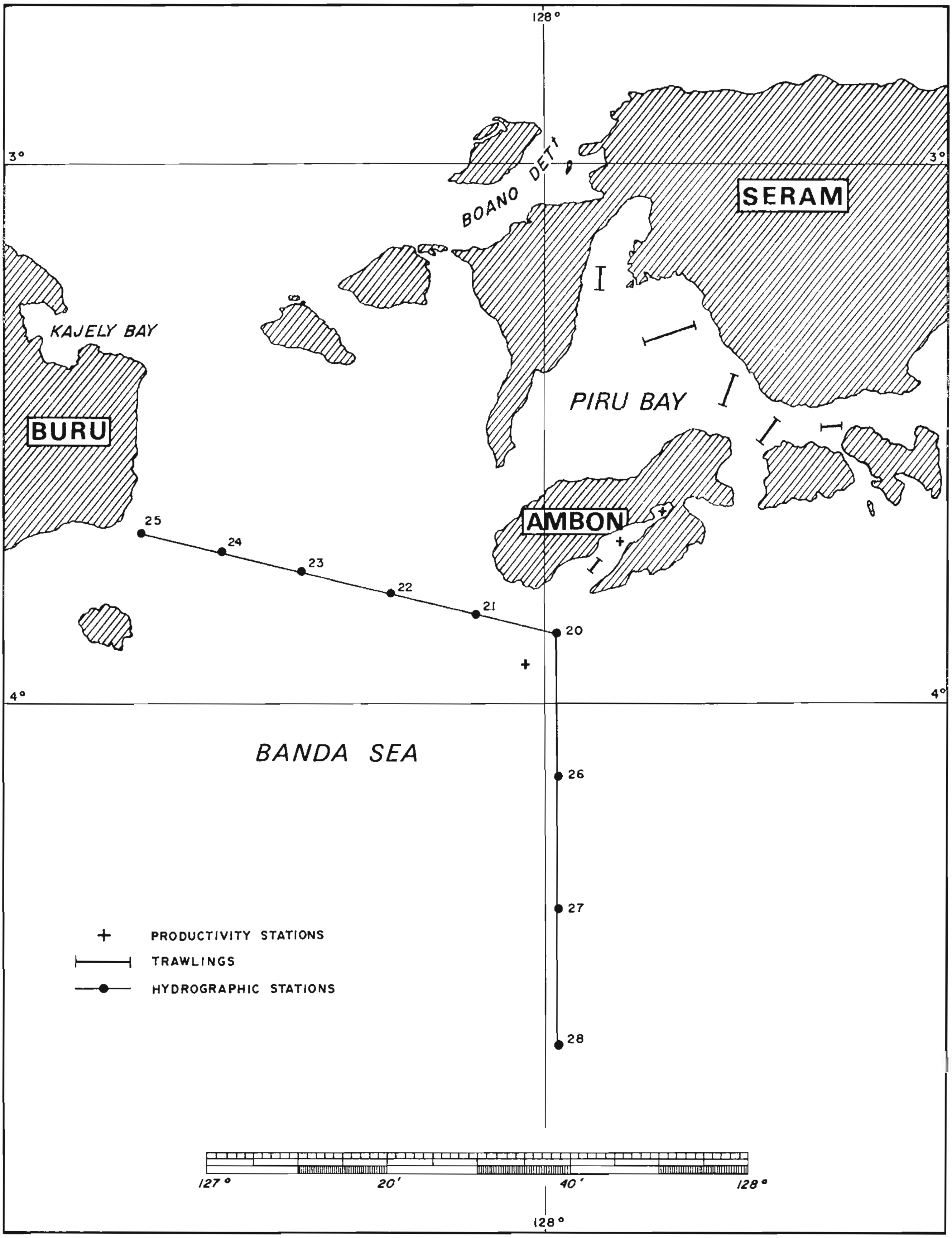


Fig. 1

Location in the stations in the Banda Sea

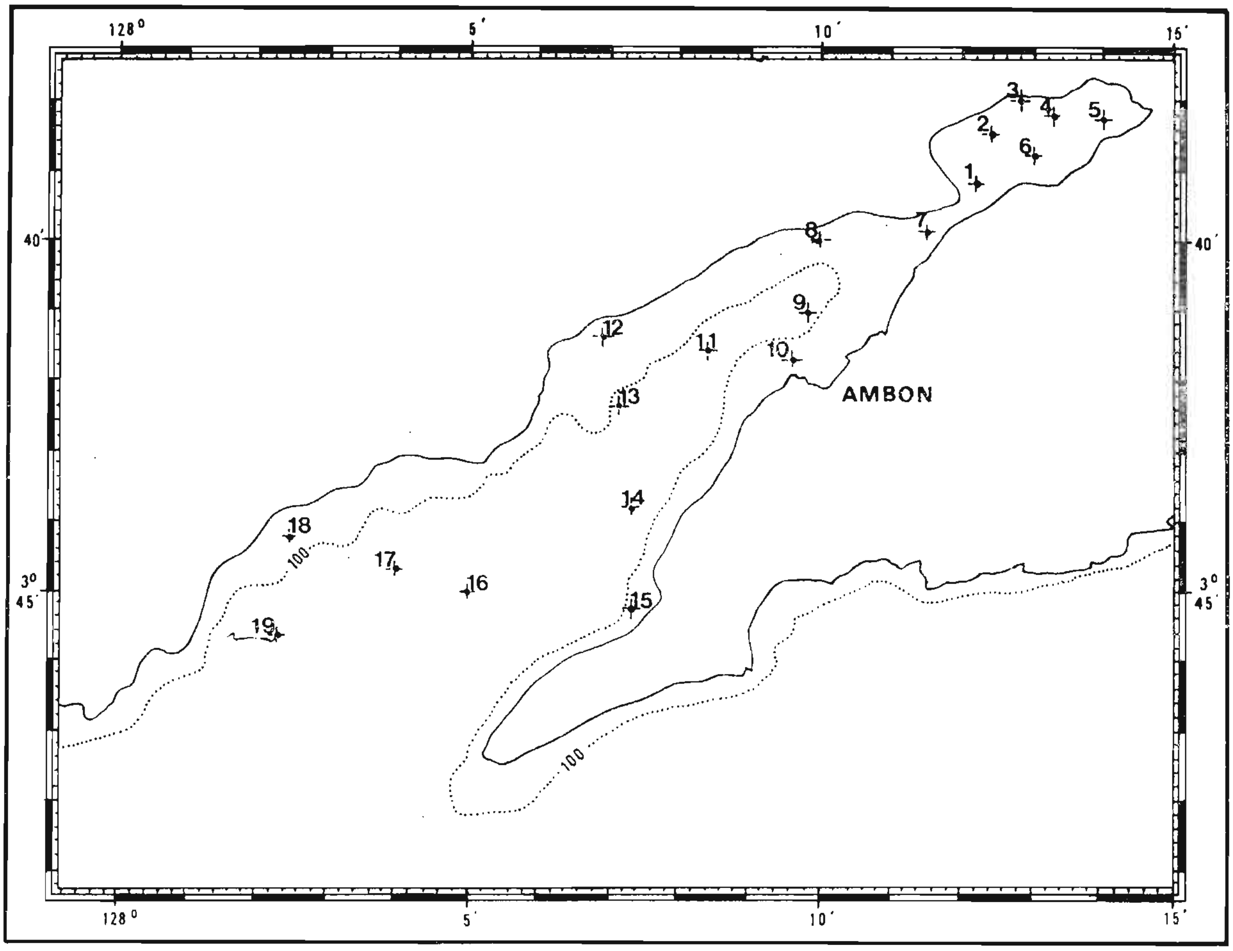


Fig. 2 - Location of the stations in the Ambon Bay

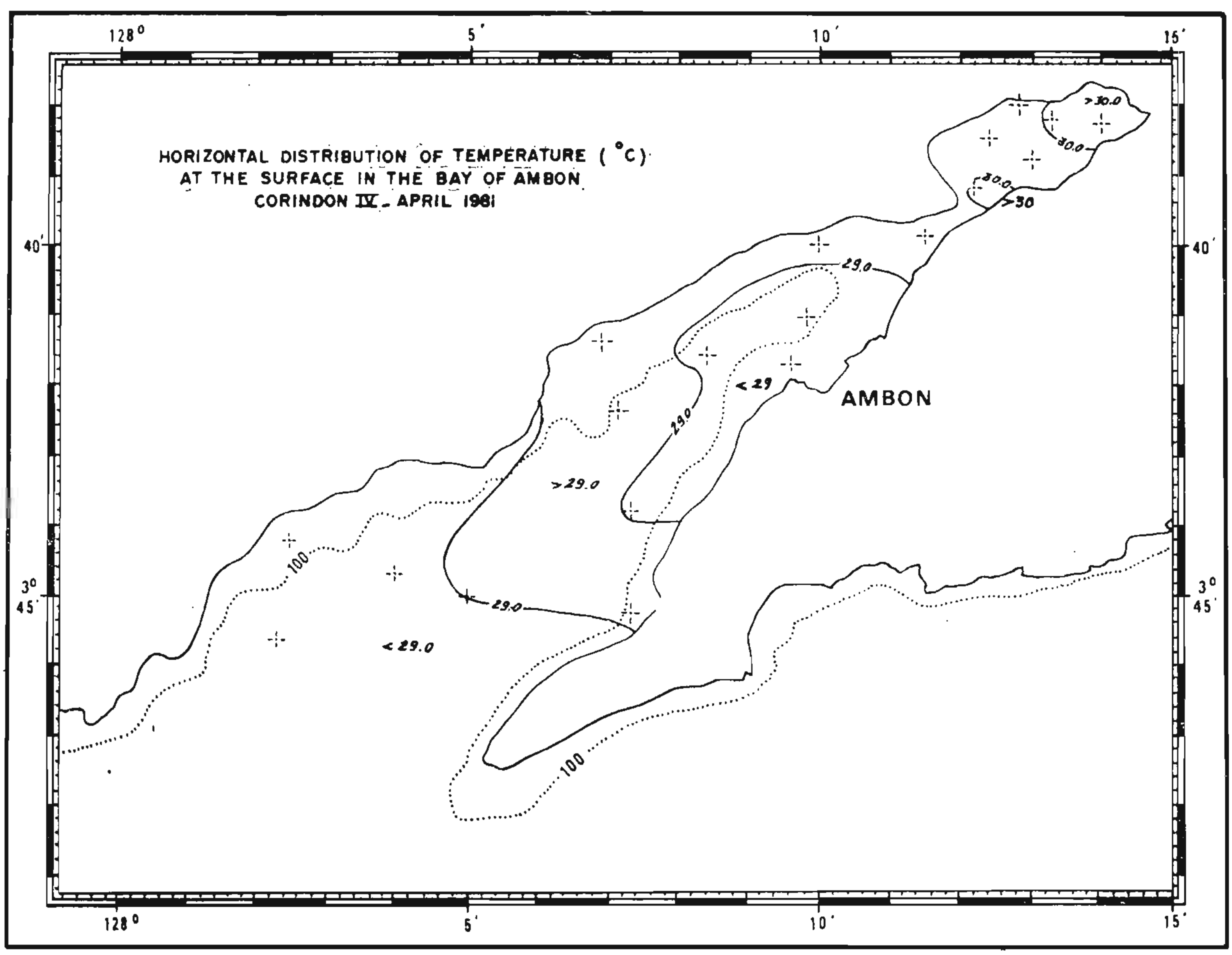


Fig. 3

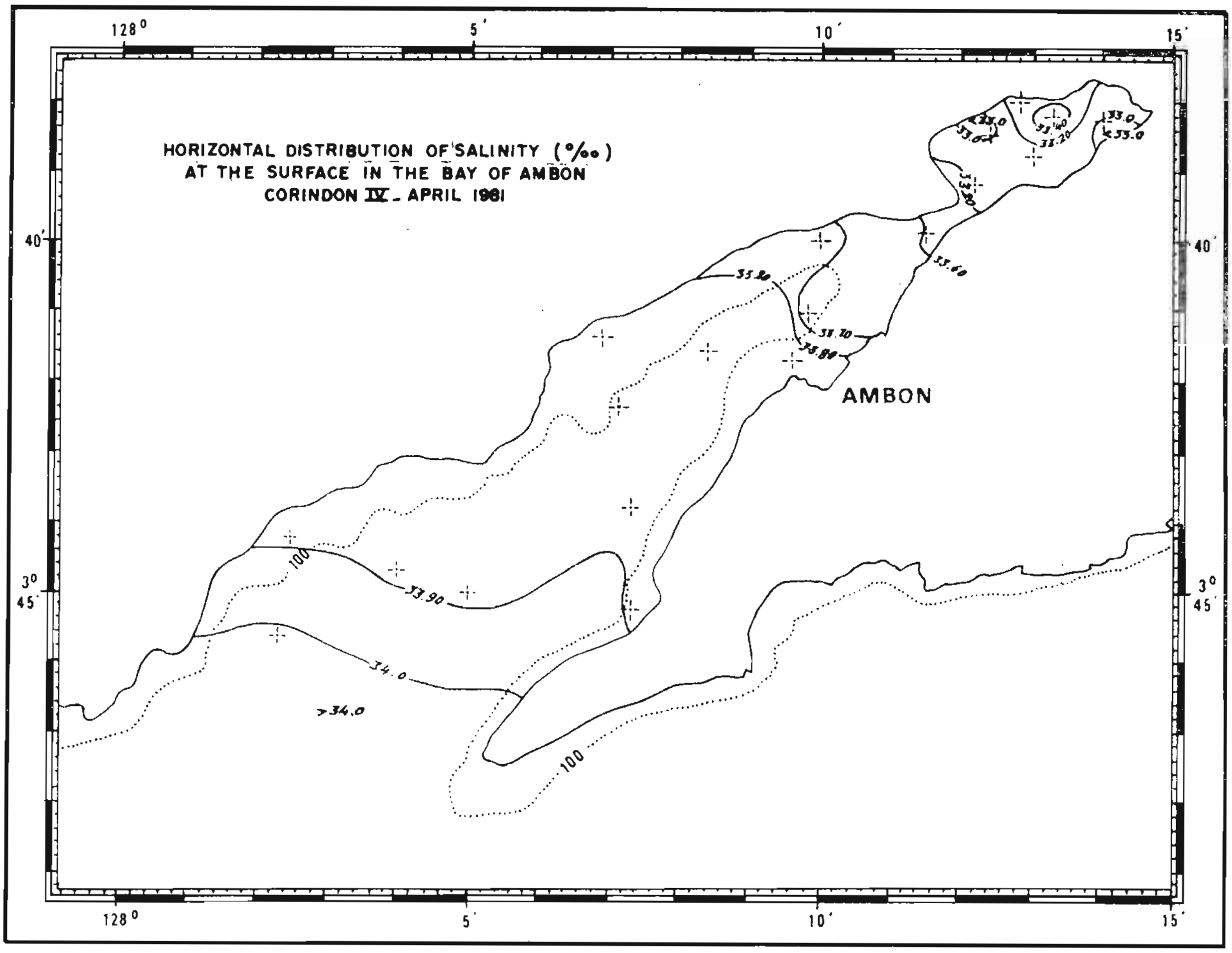

HORIZONTAL DISTRIBUTION OF SALINITY (‰)
AT THE SURFACE IN THE BAY OF AMBON
CORINDON IV - APRIL 1981
AMBON
128°
5'
10'
15'
40'
3°
45'
100
33.90
34.0
>34.0
33.60
33.80
33.70
33.20
33.0

Fig. 4

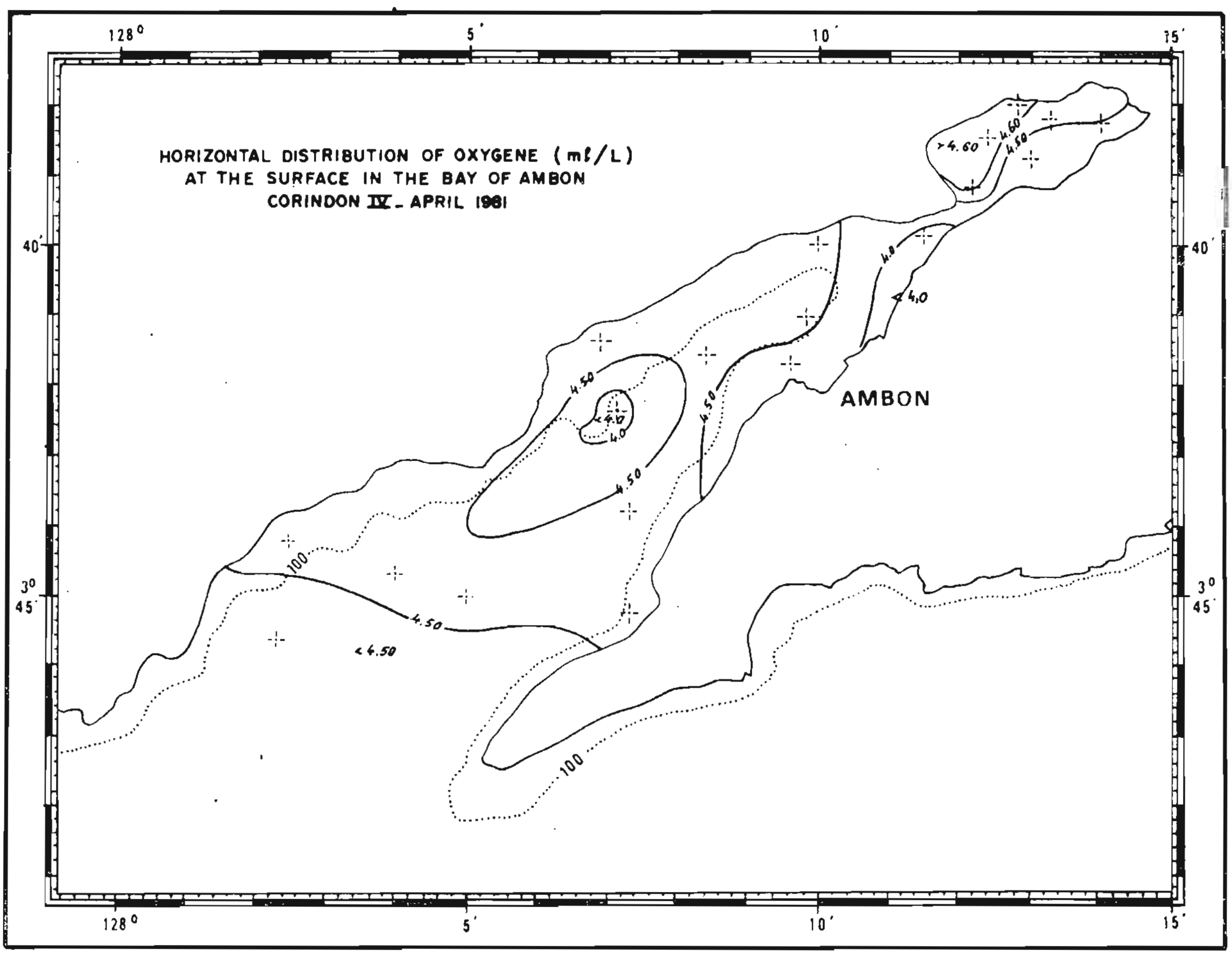

HORIZONTAL DISTRIBUTION OF OXYGENE (ml/L)
AT THE SURFACE IN THE BAY OF AMBON
CORINDON IV - APRIL 1981
AMBON
128°
5'
10'
15'
40'
3°
45'
100
4.50
<4.50
4.0
>4.60
4.60

Fig. 5

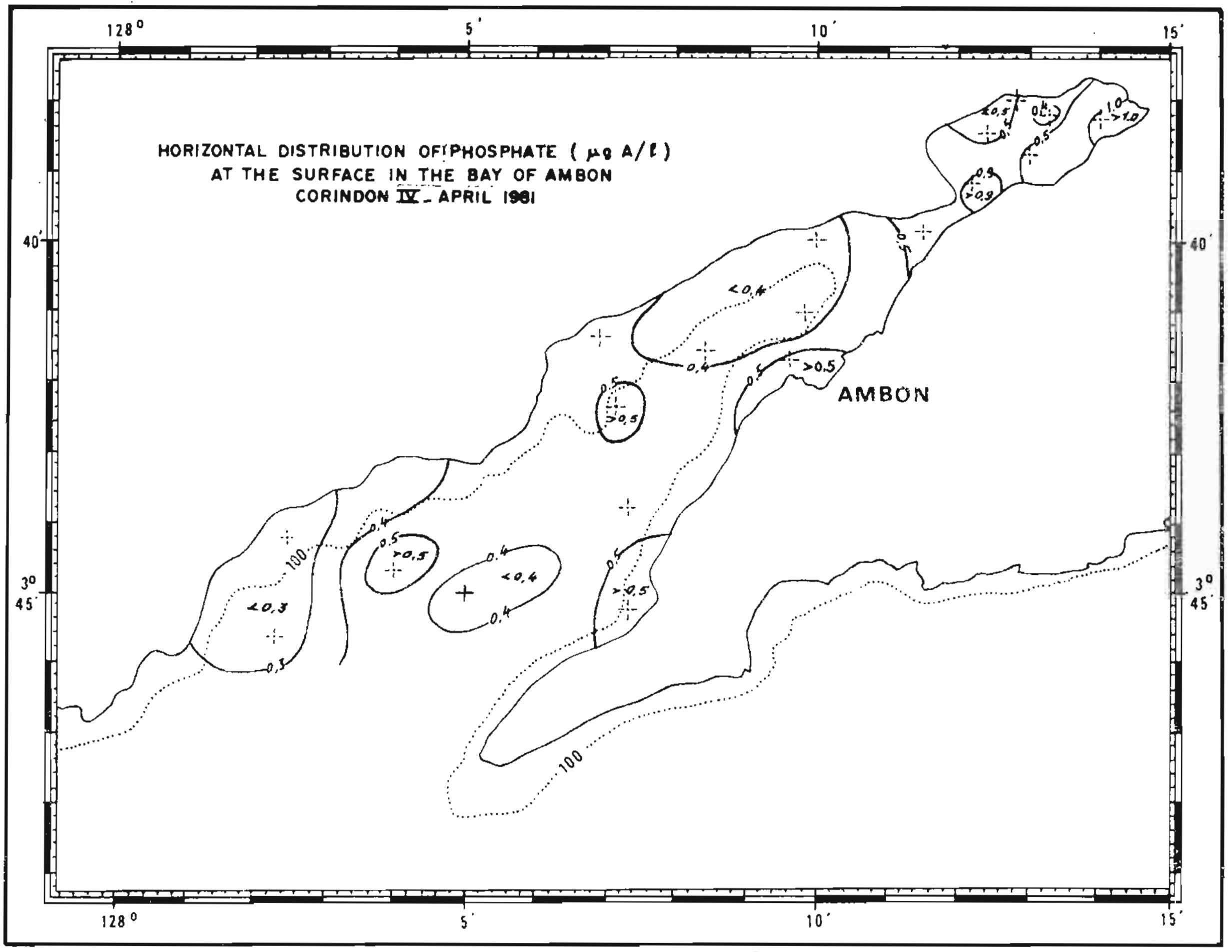

HORIZONTAL DISTRIBUTION OF PHOSPHATE (µg A/l)
AT THE SURFACE IN THE BAY OF AMBON
CORINDON IV - APRIL 1981
AMBON
128°
5'
10'
15'
40'
3° 45'
100

Fig. 6

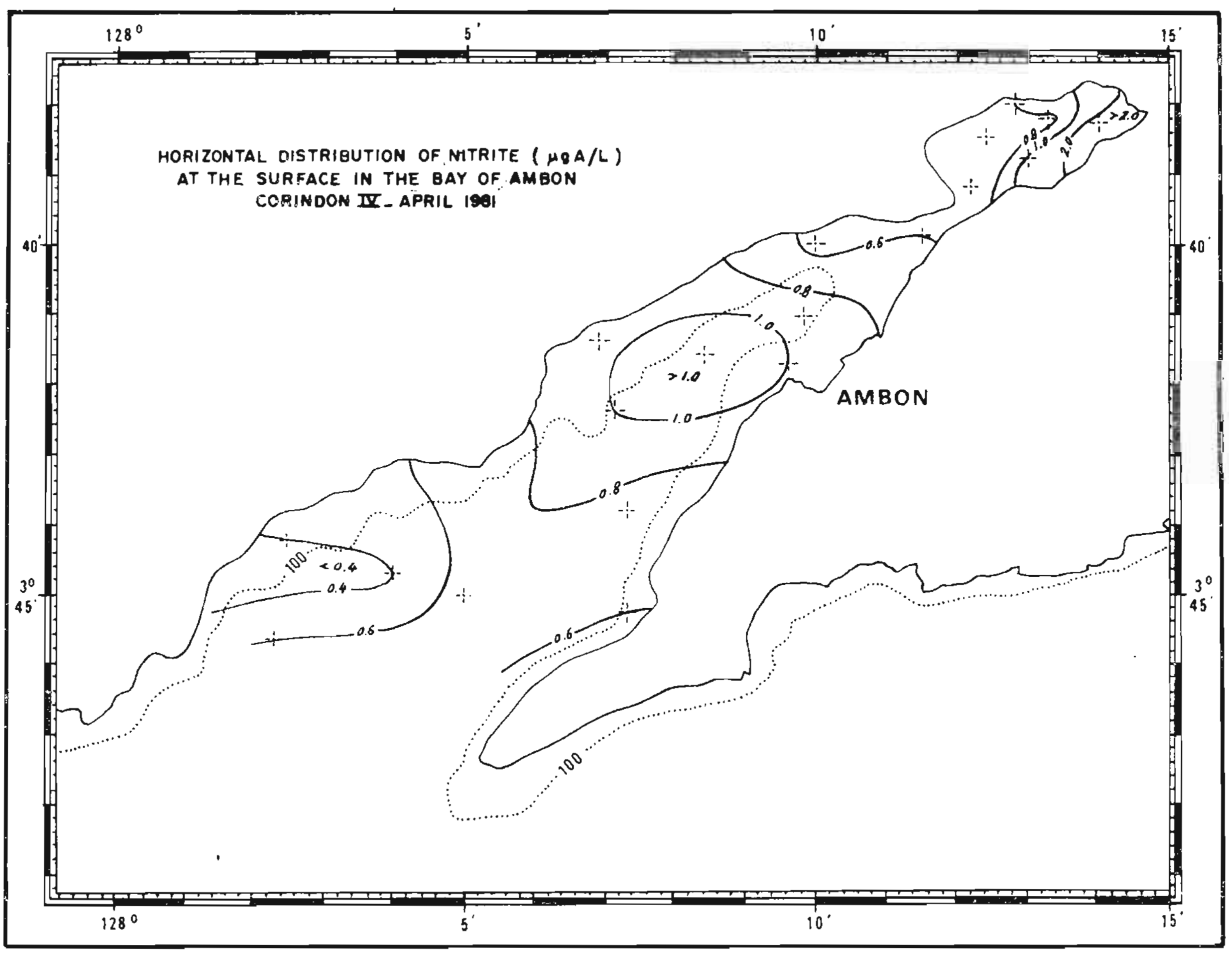

HORIZONTAL DISTRIBUTION OF NITRITE (µg A/L)
AT THE SURFACE IN THE BAY OF AMBON
CORINDON IV - APRIL 1981
AMBON
128°
5'
10'
15'
40'
3° 45'
100

Fig. 7

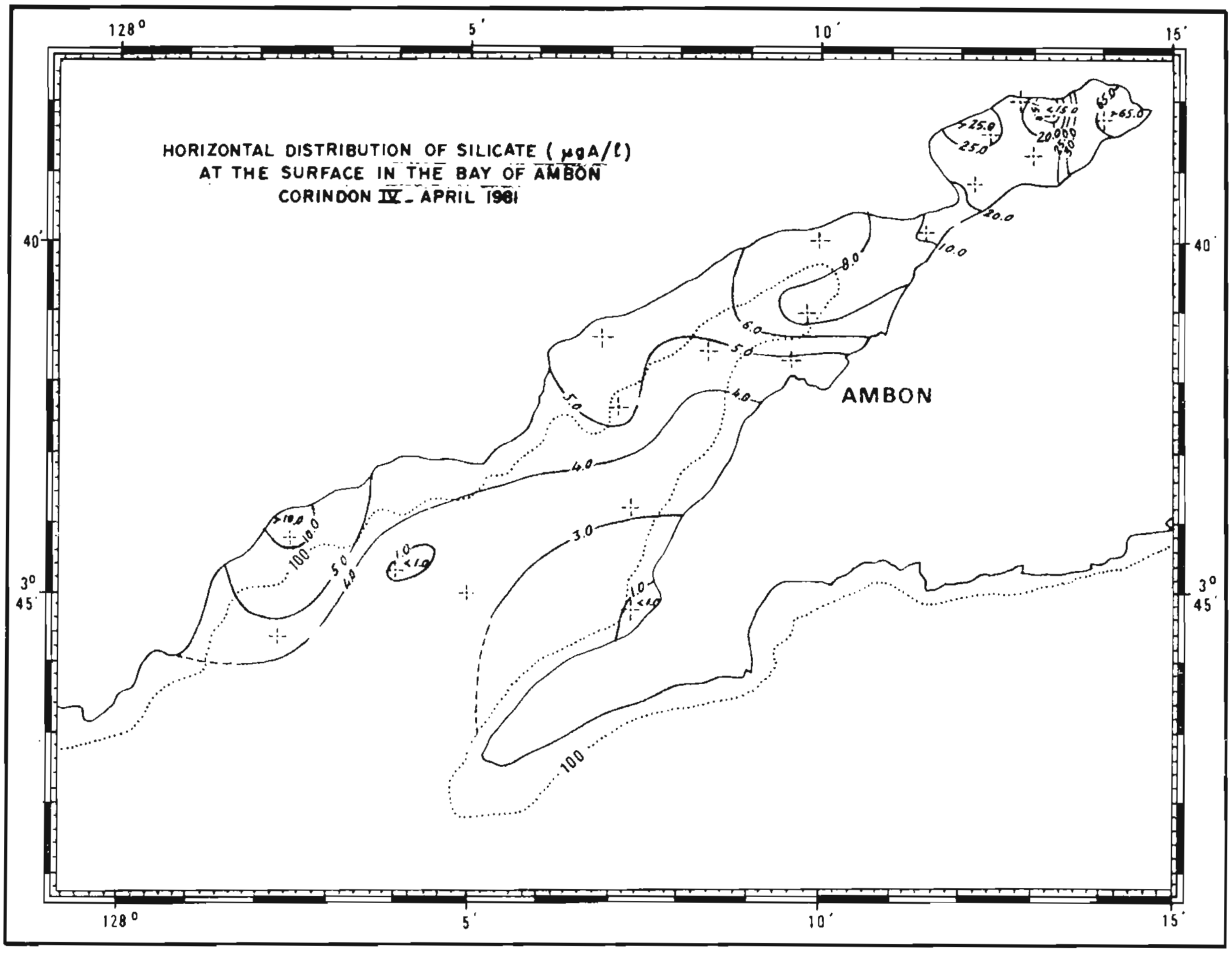

HORIZONTAL DISTRIBUTION OF SILICATE (µgA/ℓ)
AT THE SURFACE IN THE BAY OF AMBON
CORINDON IV - APRIL 1981
AMBON
128°
5'
10'
15'
40'
3° 45'

Fig. 8

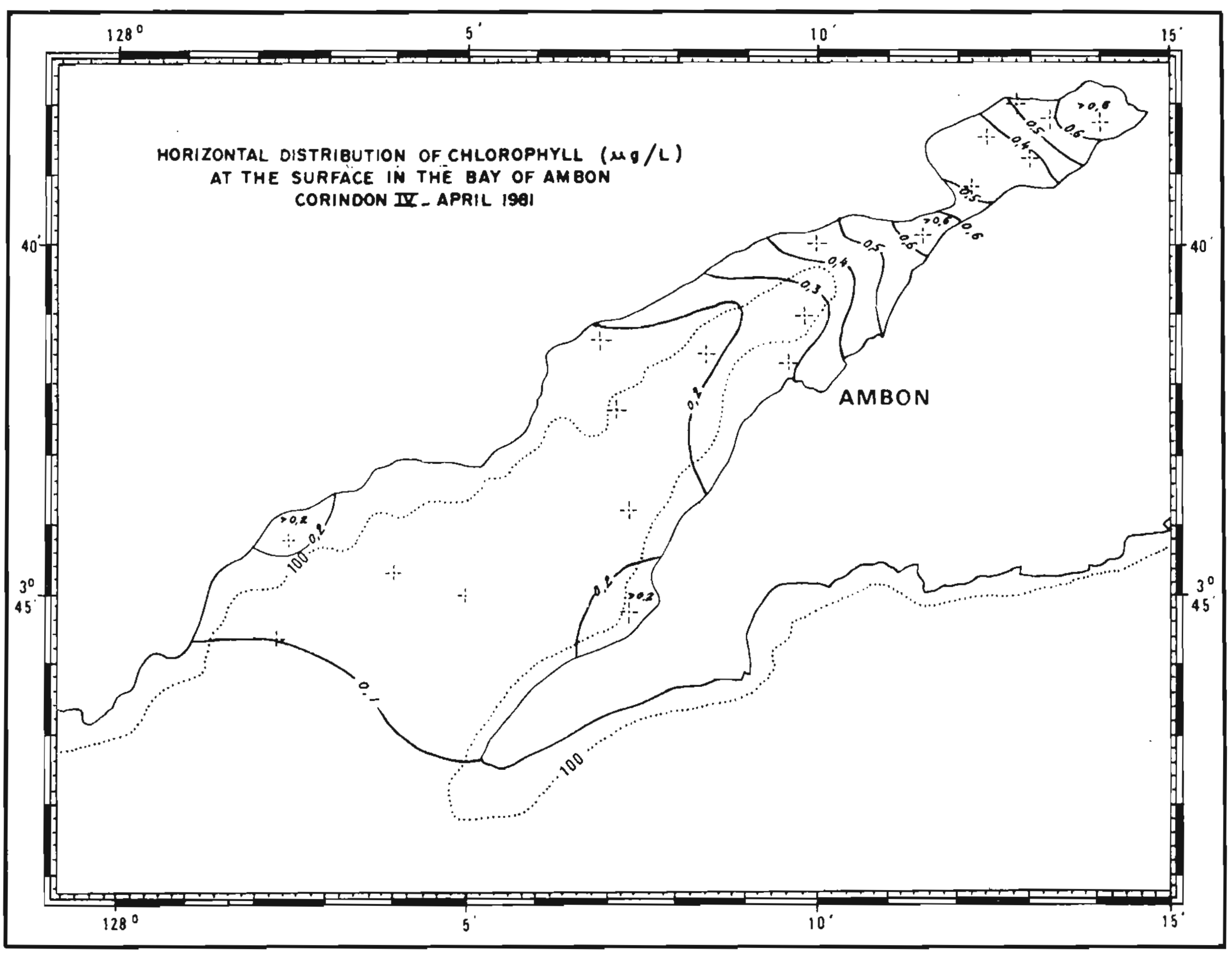

HORIZONTAL DISTRIBUTION OF CHLOROPHYLL (µg/L)
AT THE SURFACE IN THE BAY OF AMBON
CORINDON IV - APRIL 1981
AMBON
128°
5'
10'
15'
40'
3° 45'

Fig. 9

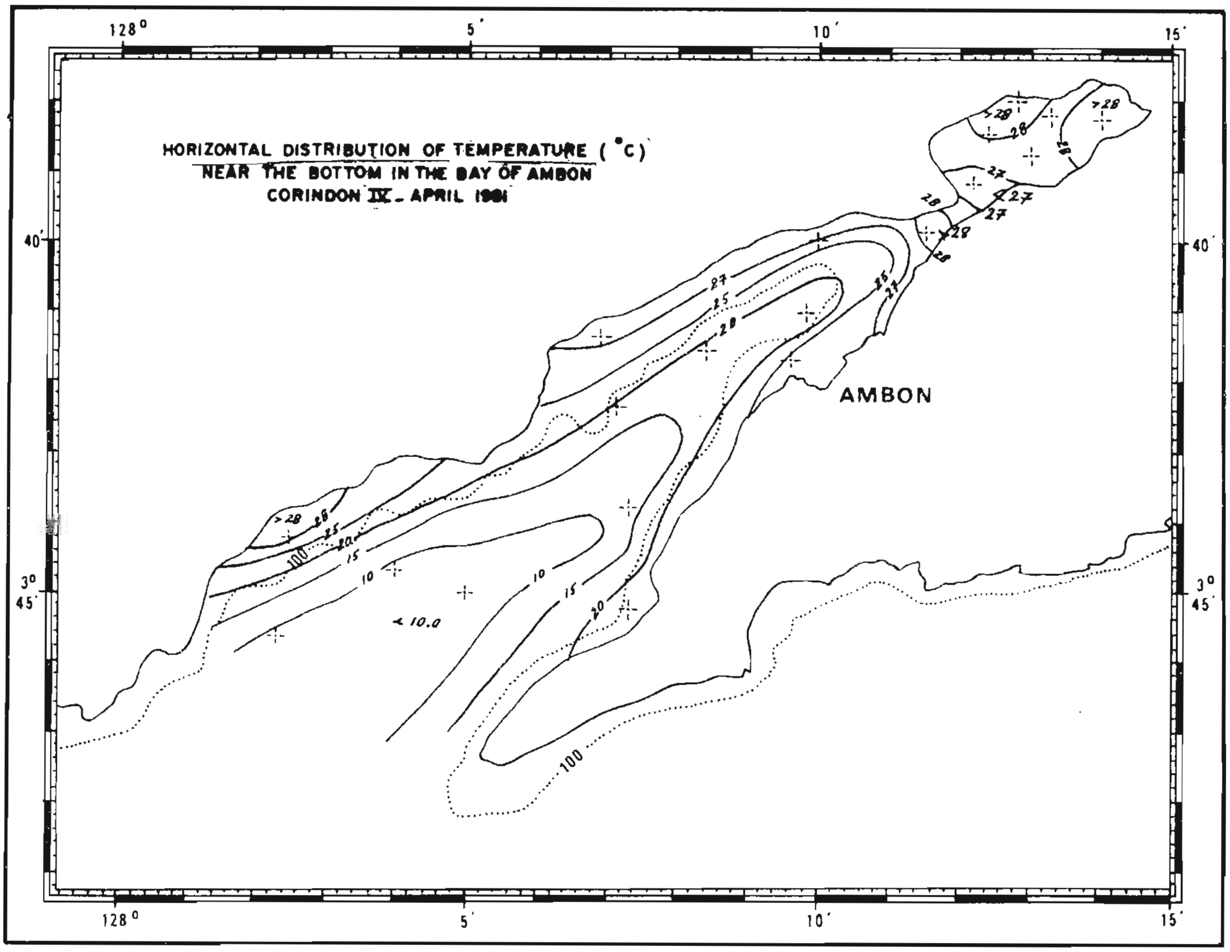

HORIZONTAL DISTRIBUTION OF TEMPERATURE (°C)
NEAR THE BOTTOM IN THE BAY OF AMBON
CORINDON IX - APRIL 1981
AMBON
128°
5'
10'
15'
40'
3°
45'
>28
28
27
25
20
15
10
100
< 10.0

Fig. 10

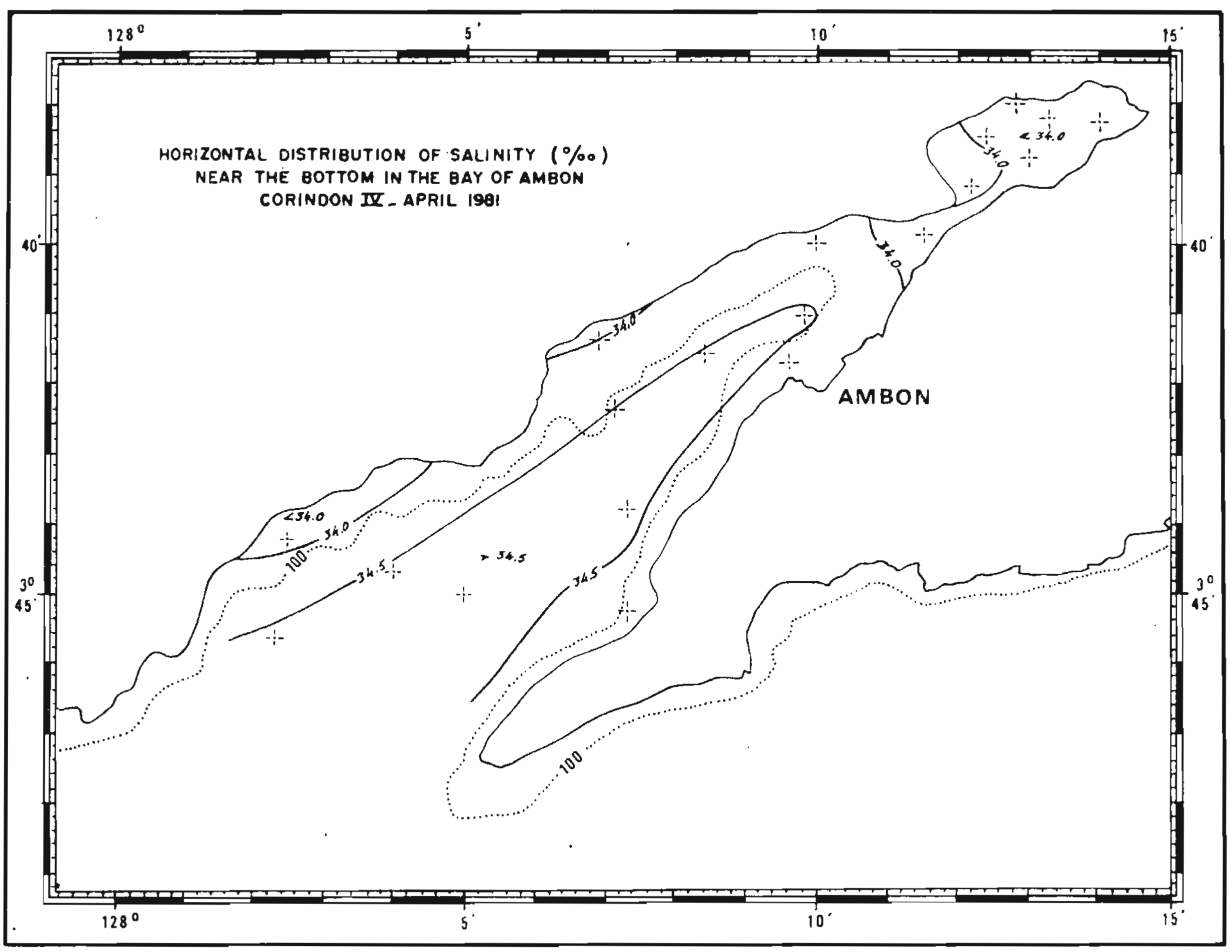

HORIZONTAL DISTRIBUTION OF SALINITY (‰)
NEAR THE BOTTOM IN THE BAY OF AMBON
CORINDON IX - APRIL 1981
AMBON
128°
5'
10'
15'
40'
3°
45'
< 34.0
34.0
34.5
> 34.5
100

Fig. 11

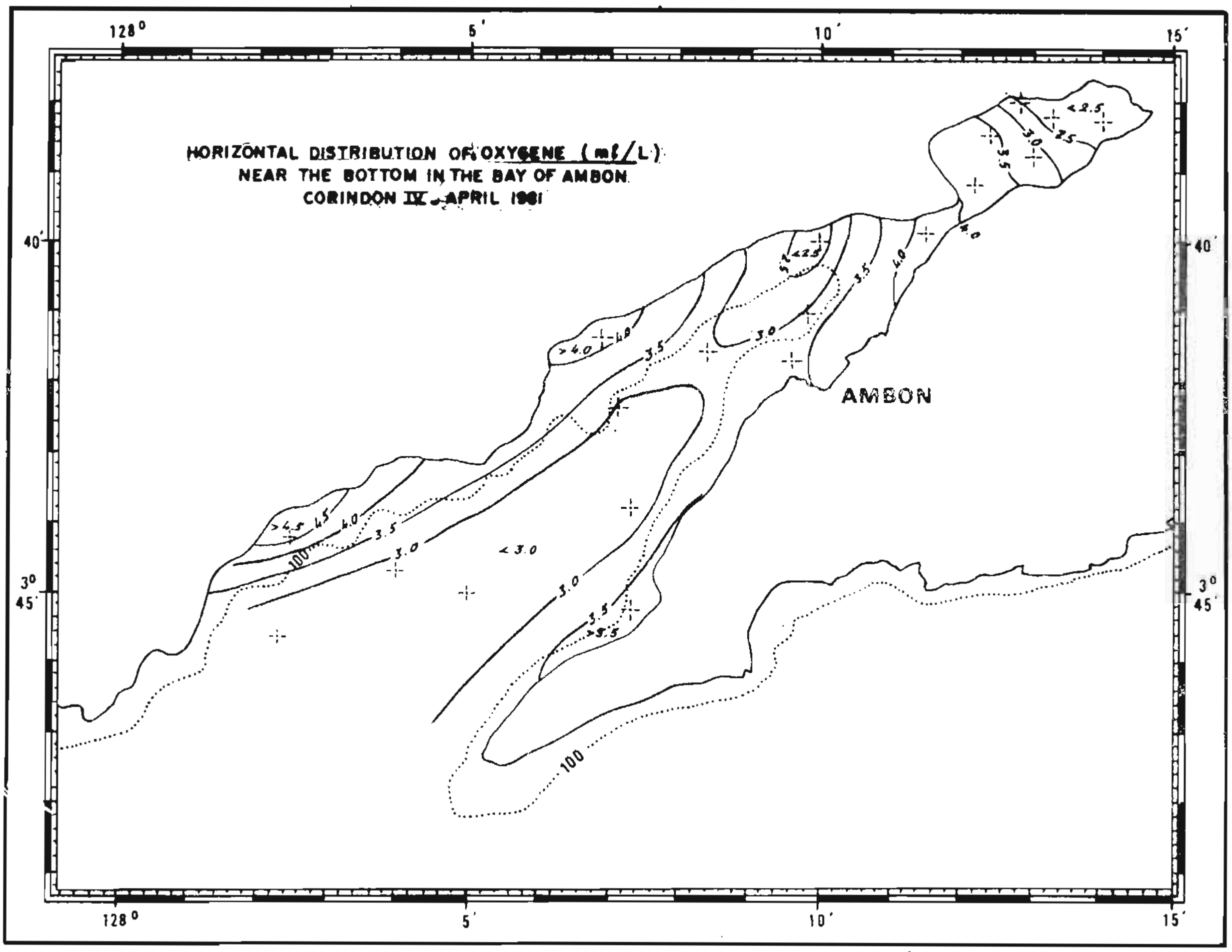

HORIZONTAL DISTRIBUTION OF OXYGENE (ml/L)
NEAR THE BOTTOM IN THE BAY OF AMBON
CORINDON IV - APRIL 1981
AMBON
128°
5'
10'
15'
40'
3° 45'
100

Fig. 12

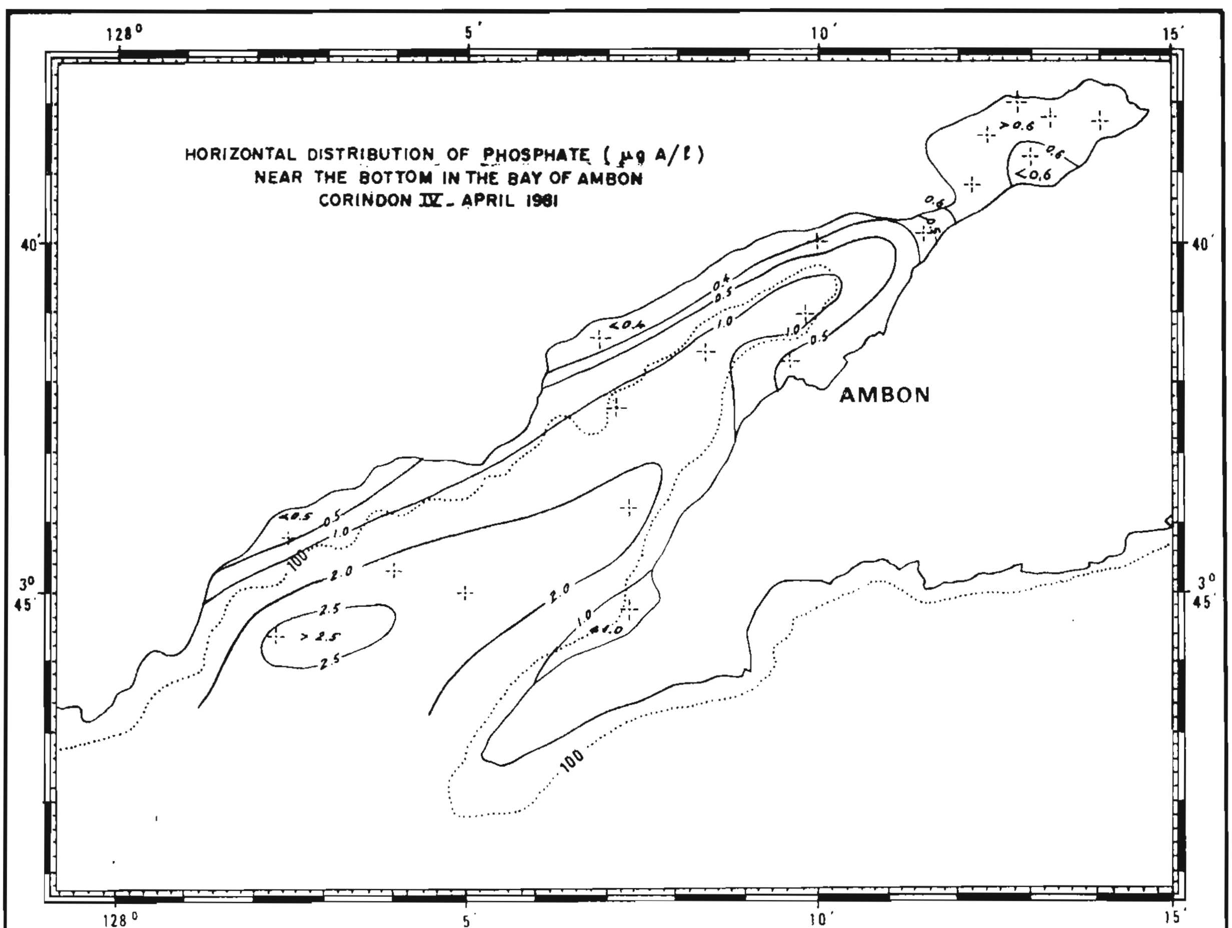

HORIZONTAL DISTRIBUTION OF PHOSPHATE (µg A/l)
NEAR THE BOTTOM IN THE BAY OF AMBON
CORINDON IV - APRIL 1981
AMBON
128°
5'
10'
15'
40'
3° 45'
100

Fig 13

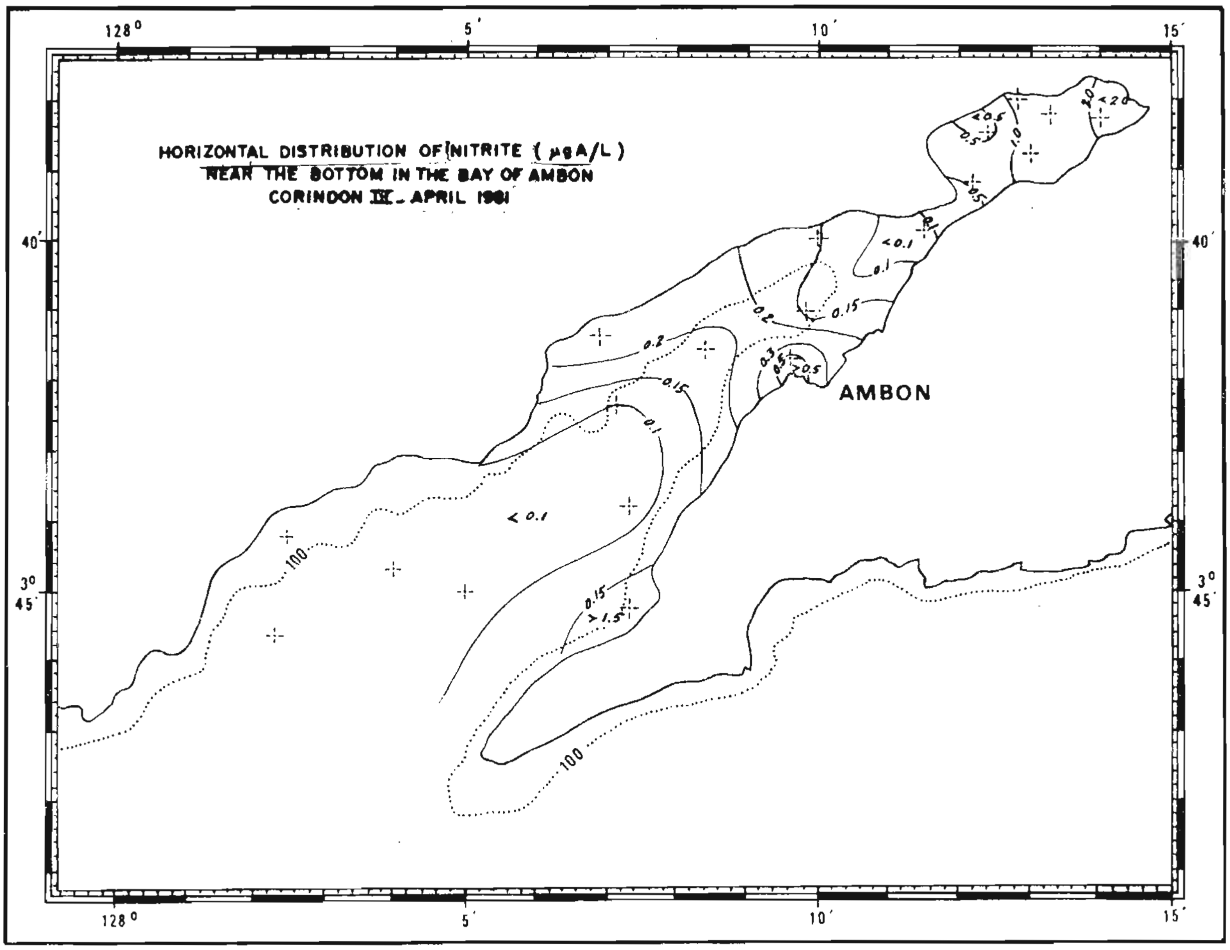

HORIZONTAL DISTRIBUTION OF NITRITE (μgA/L)
NEAR THE BOTTOM IN THE BAY OF AMBON
CORINDON IX - APRIL 1981
AMBON

Fig. 14

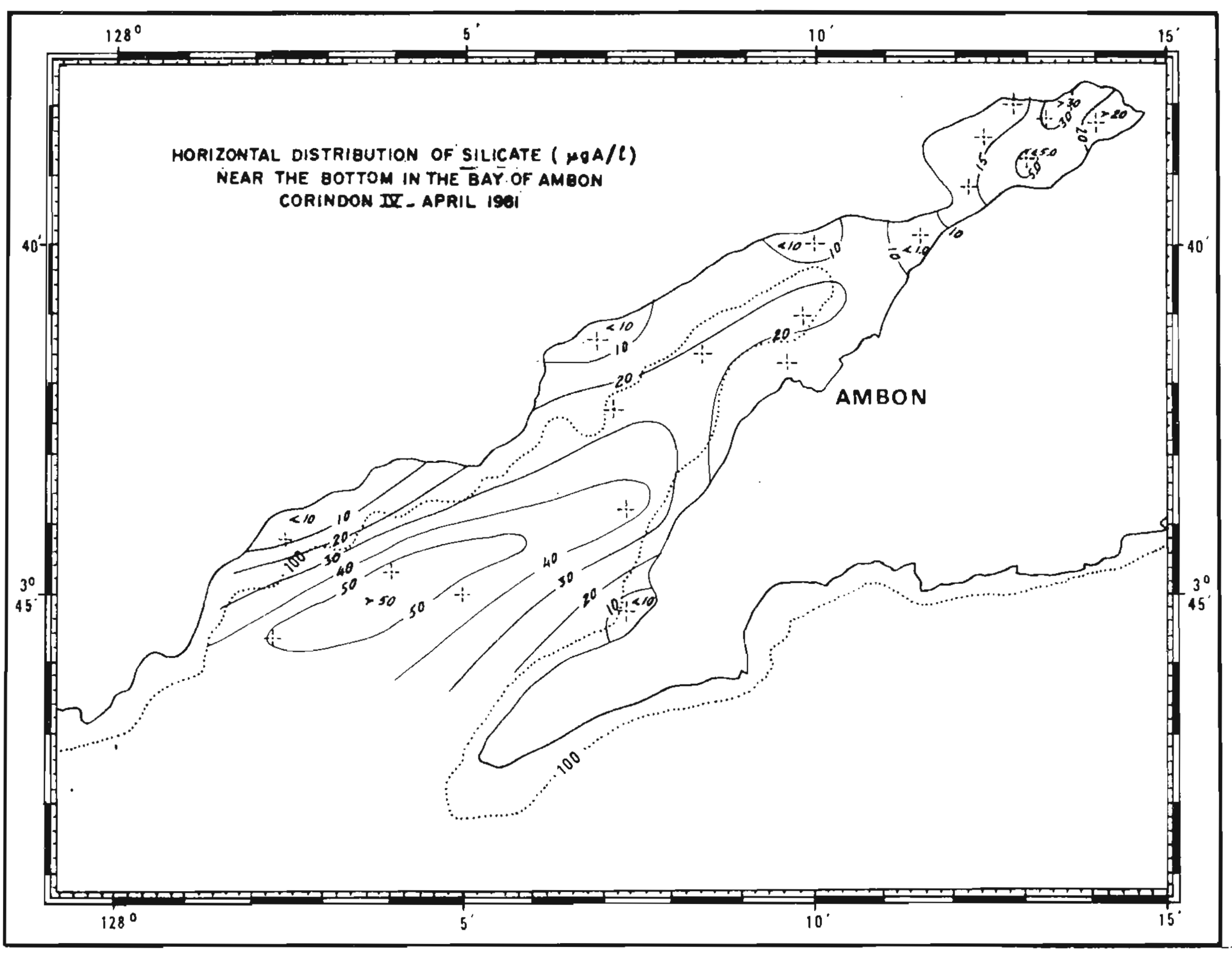

HORIZONTAL DISTRIBUTION OF SILICATE (μgA/ℓ)
NEAR THE BOTTOM IN THE BAY OF AMBON
CORINDON IX - APRIL 1981
AMBON

Fig. 15

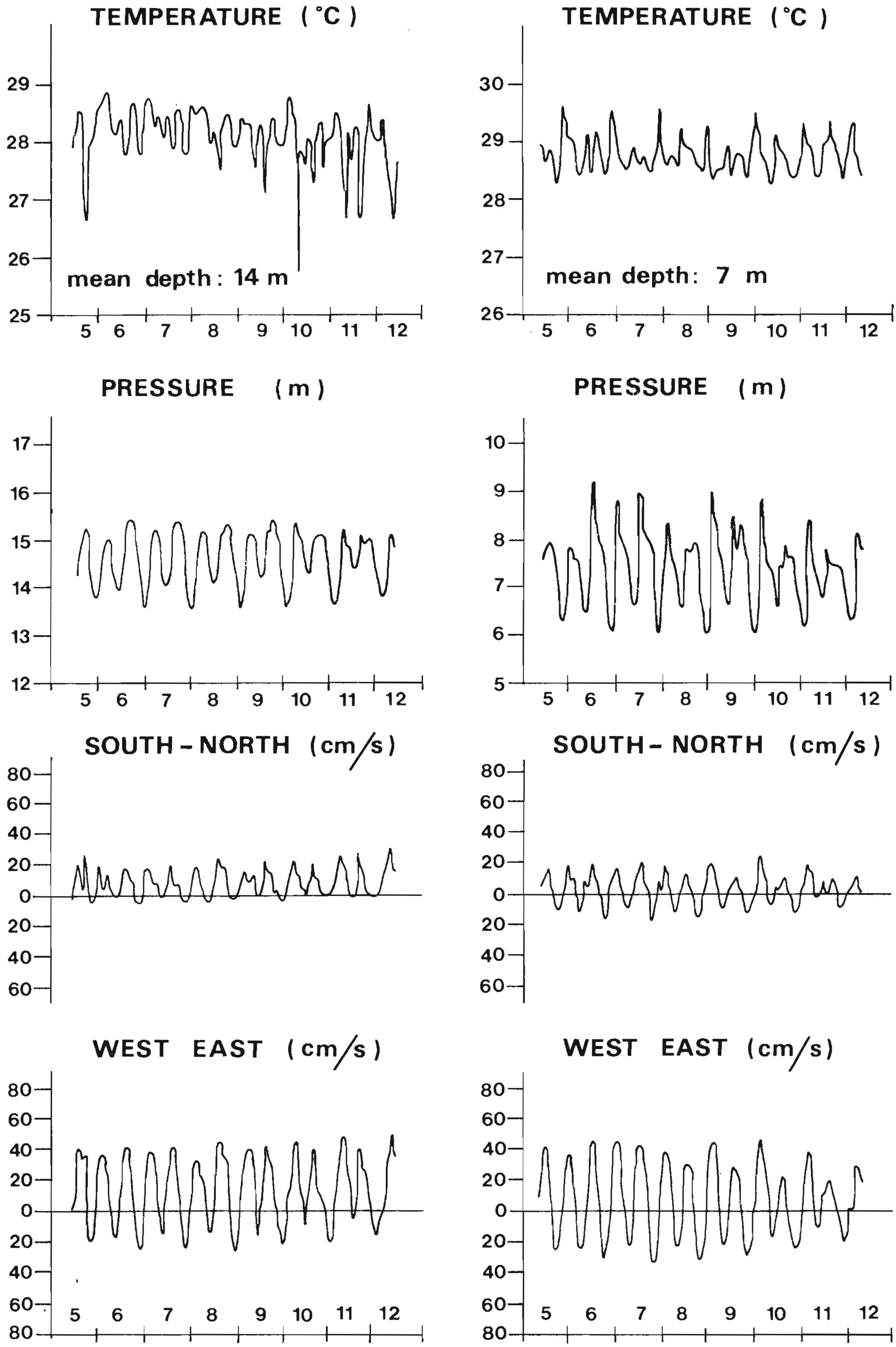


Fig. 16

Current measurements on the still.

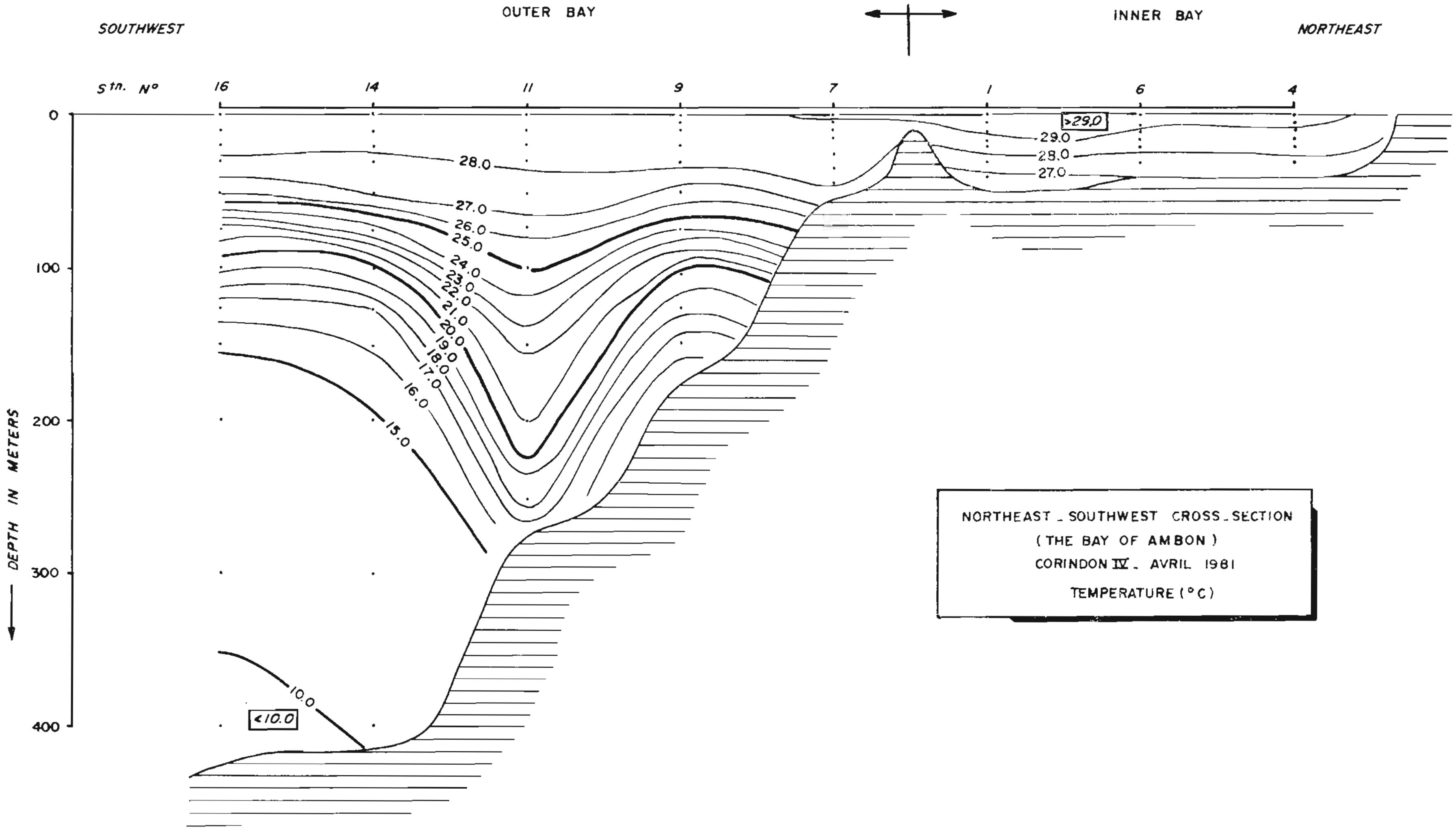

OUTER BAY
INNER BAY
SOUTHWEST
NORTHEAST
Stn. N°
16
14
11
9
7
1
6
4
0
100
200
300
400
DEPTH IN METERS
>29.0
29.0
28.0
27.0
26.0
25.0
24.0
23.0
22.0
21.0
20.0
19.0
18.0
17.0
16.0
15.0
10.0
<10.0
NORTHEAST - SOUTHWEST CROSS-SECTION
(THE BAY OF AMBON)
CORINDON IV - AVRIL 1981
TEMPERATURE (°C)

Fig. 17

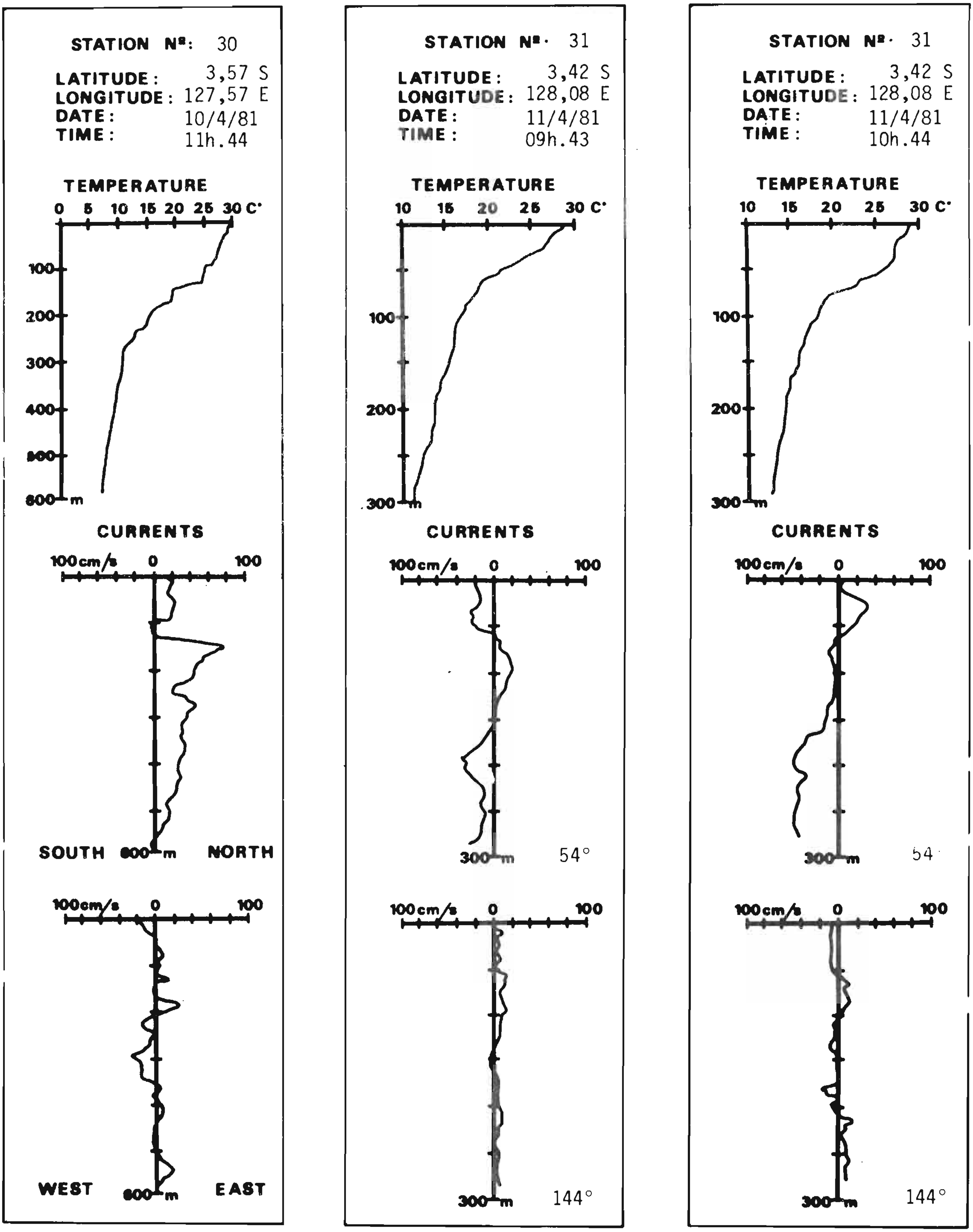


Fig. 18

Current profiles in the Bay : St. 30 and 31

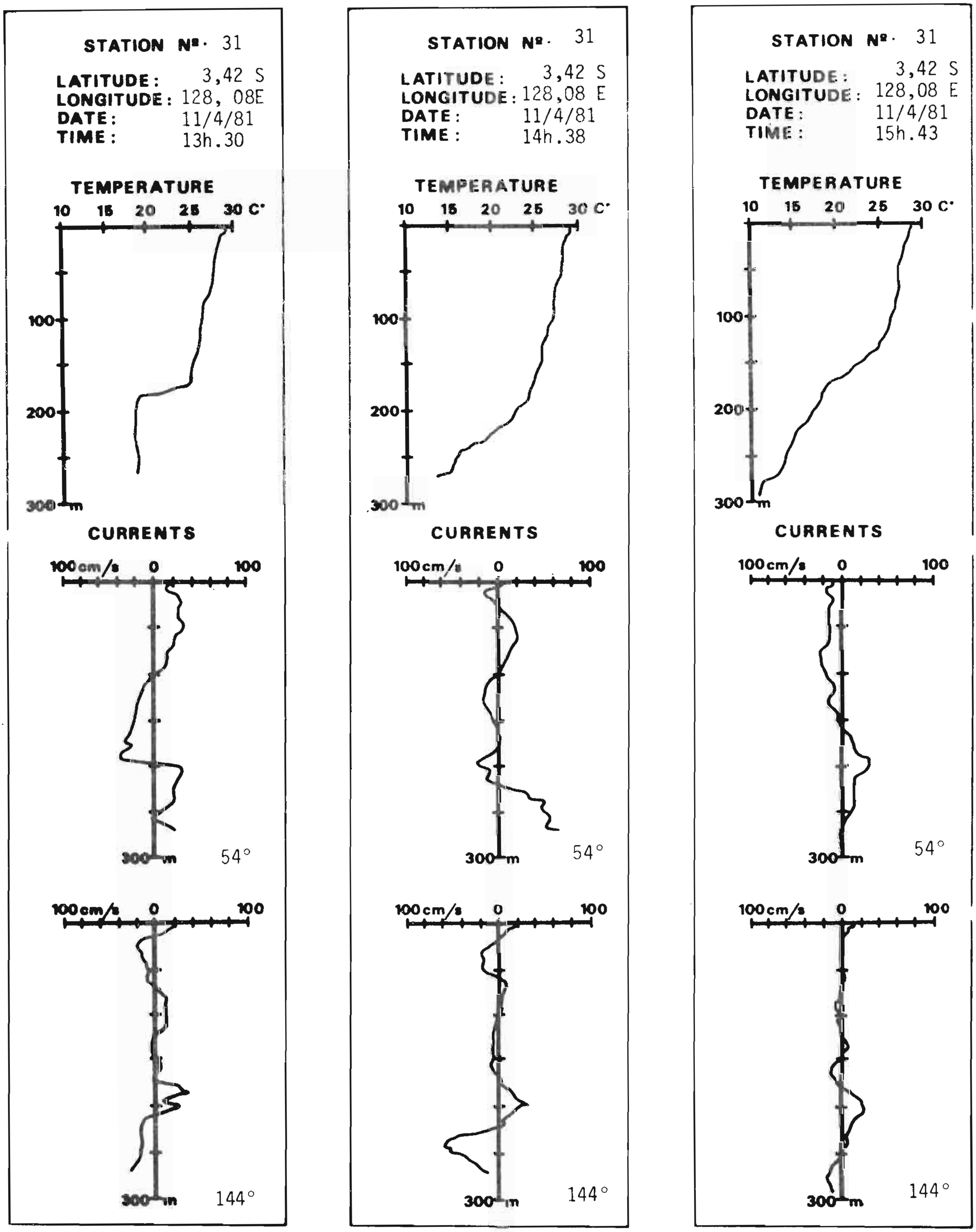


Fig. 19

Current profiles in the Bay : St. 31

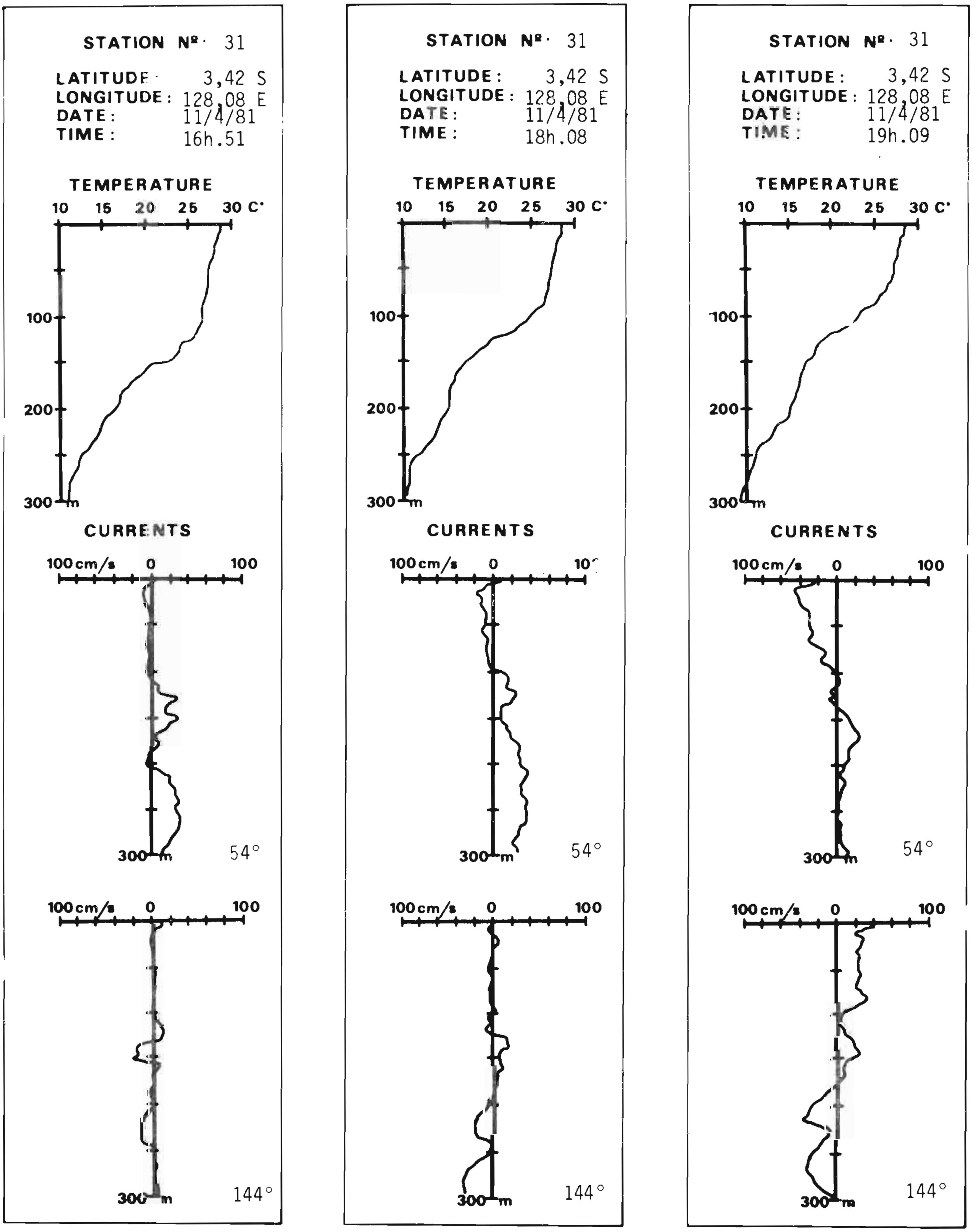


Fig. 20

Current profiles in the Bay : St. 31

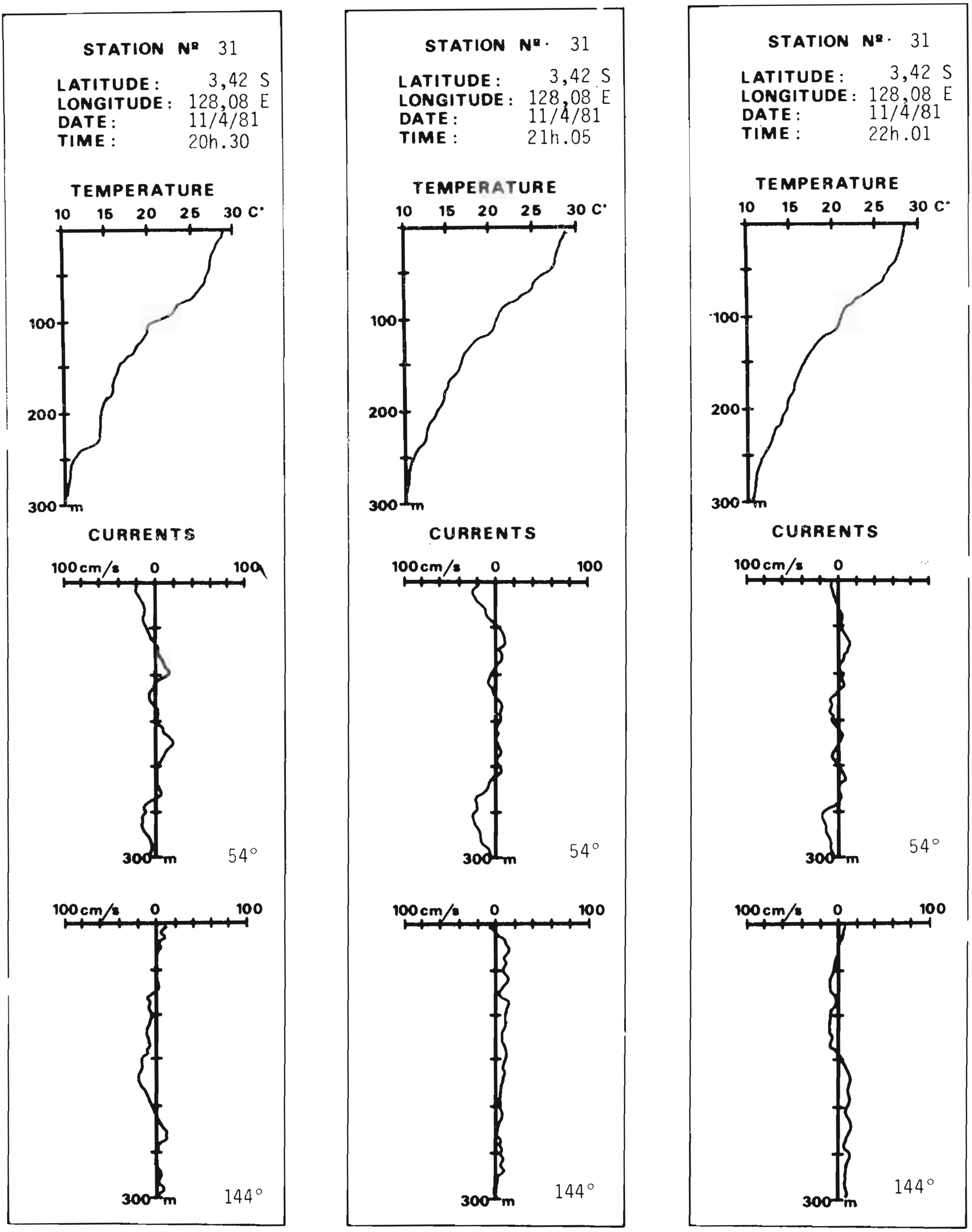


Fig. 21

Current profiles in the Bay : St. 31

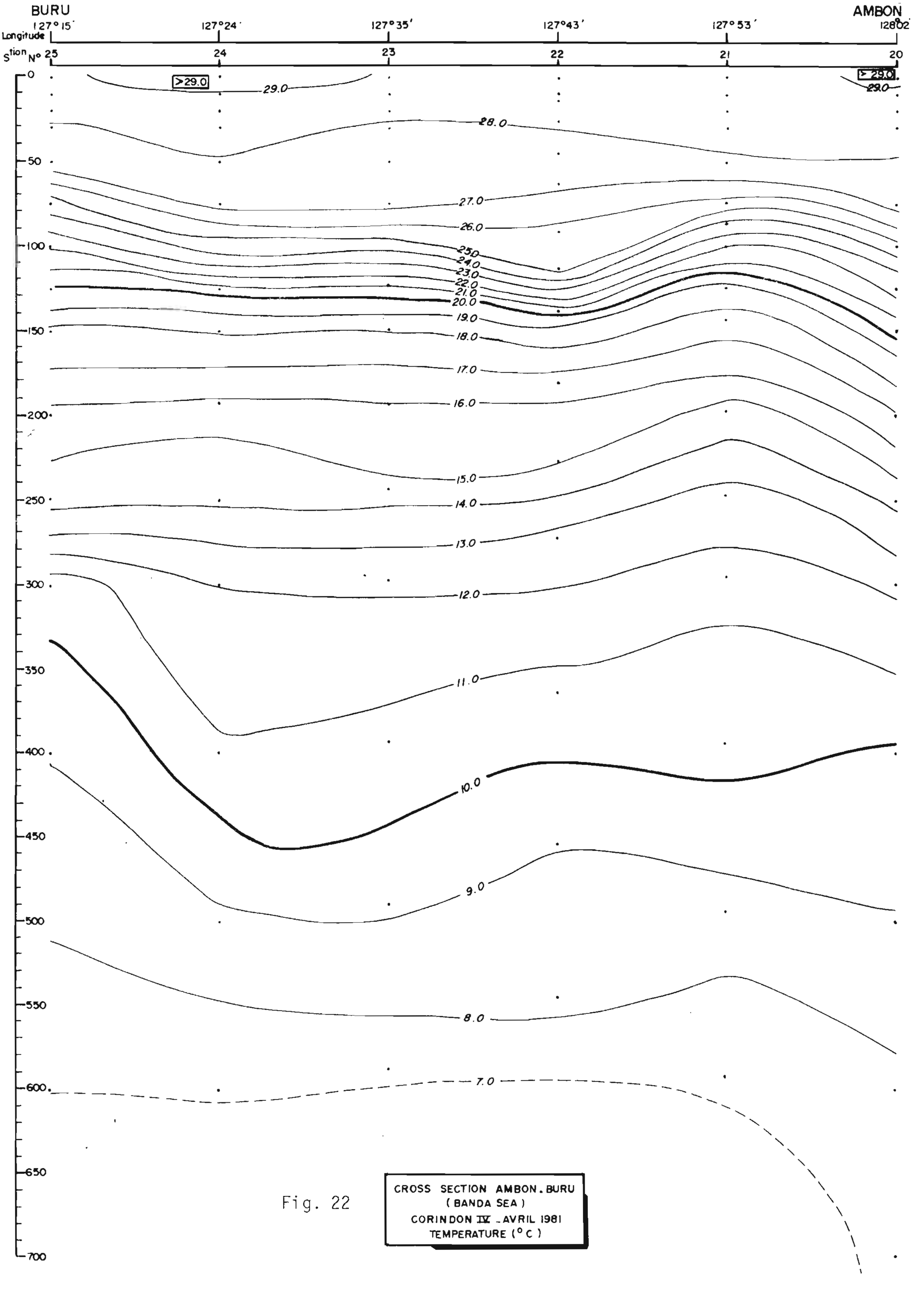


Fig. 22

CROSS SECTION AMBON . BURU
(BANDA SEA)
CORINDON IV - AVRIL 1981
TEMPERATURE (°C)

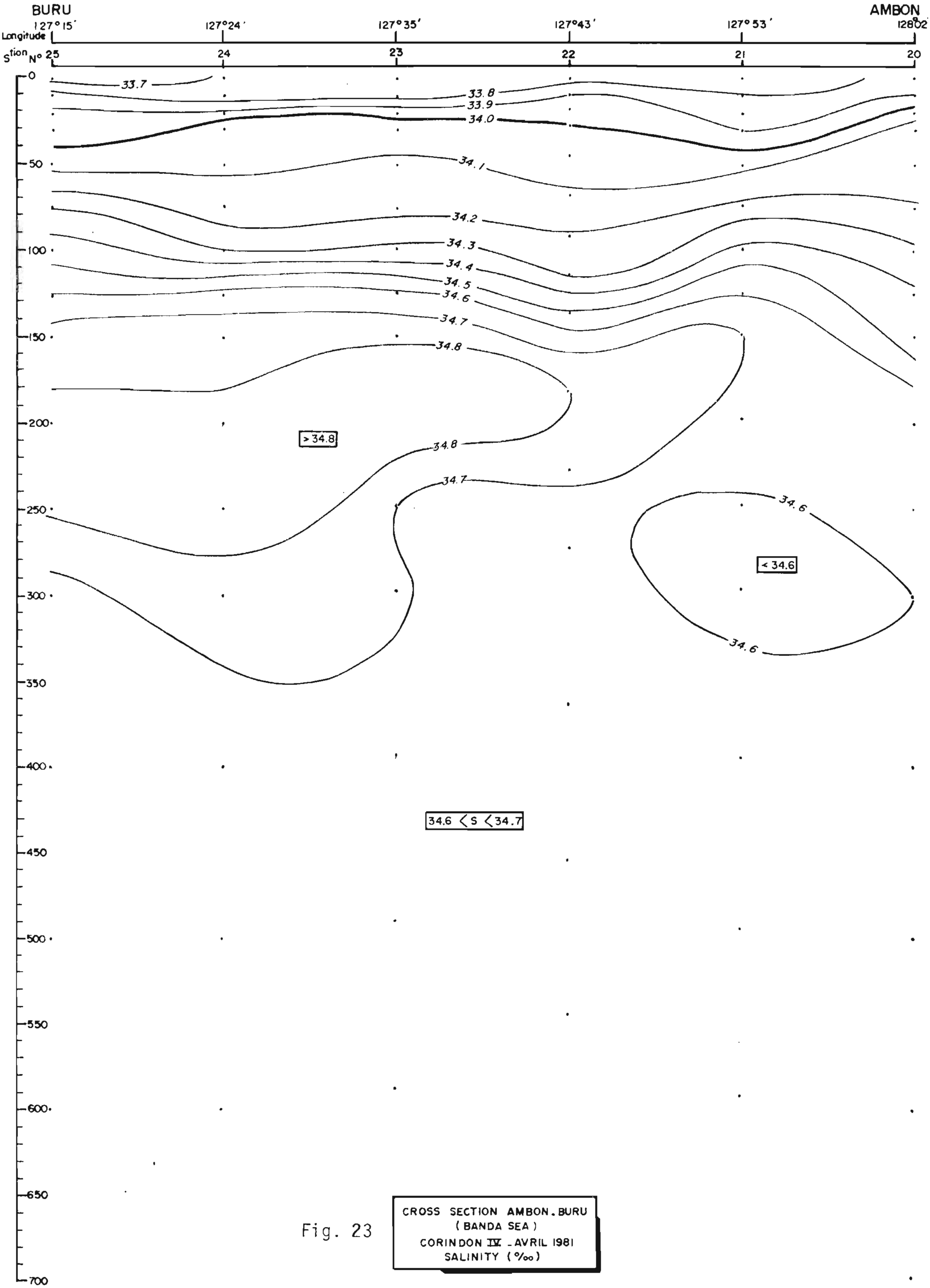

BURU
AMBON
Longitude
127°15'
127°24'
127°35'
127°43'
127°53'
128°02'
Stion No 25
24
23
22
21
20
0
50
100
150
200
250
300
350
400
450
500
550
600
650
700
33.7
33.8
33.9
34.0
34.1
34.2
34.3
34.4
34.5
34.6
34.7
34.8
> 34.8
34.8
34.7
34.6
< 34.6
34.6
34.6 < S < 34.7
CROSS SECTION AMBON . BURU
(BANDA SEA)
CORINDON IV . AVRIL 1981
SALINITY (‰)

Fig. 23

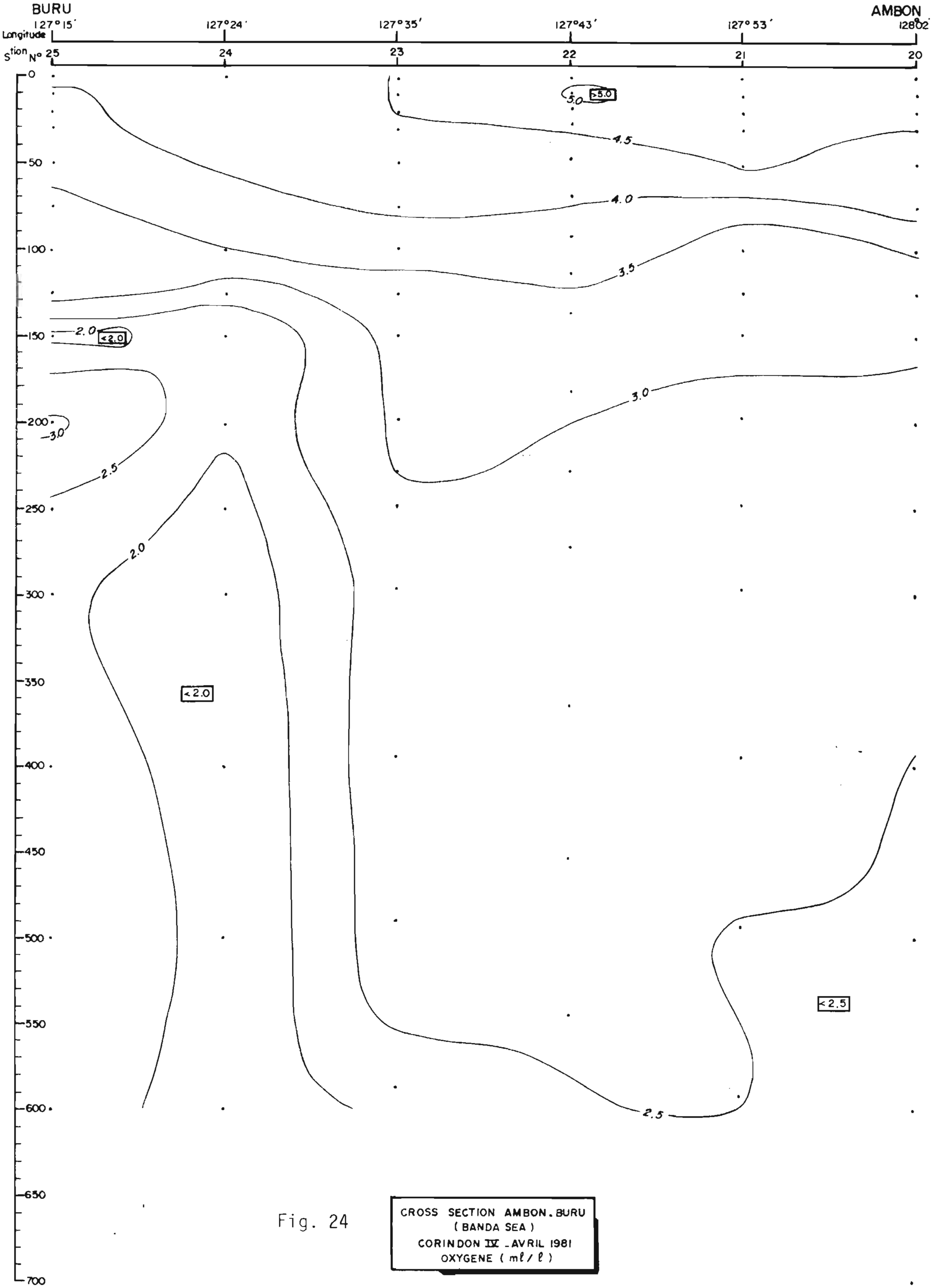


Fig. 24

CROSS SECTION AMBON . BURU
(BANDA SEA)
CORINDON IV _ AVRIL 1981
OXYGENE (ml / l)

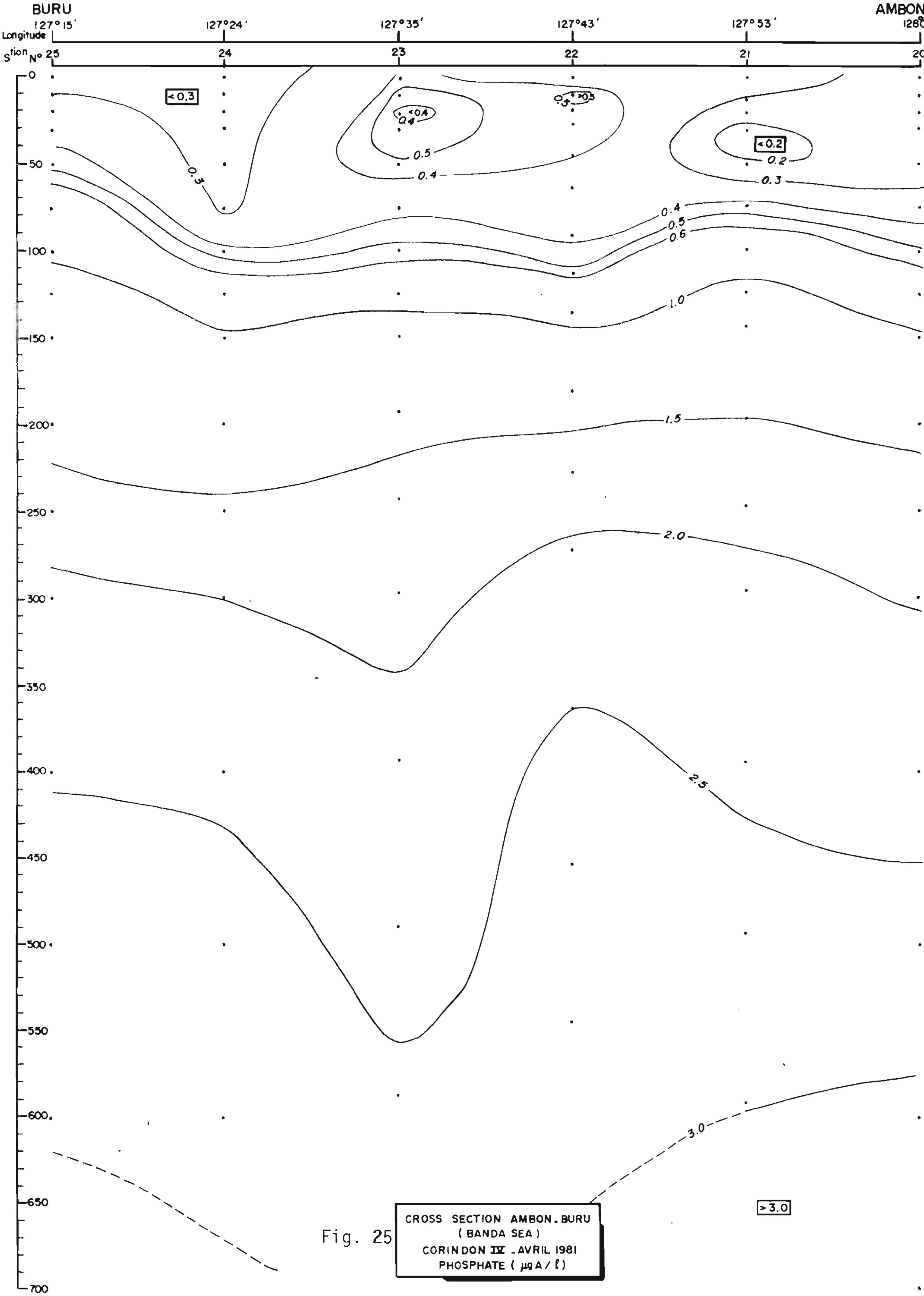


Fig. 25

CROSS SECTION AMBON. BURU
(BANDA SEA)
CORINDON IV _ AVRIL 1981
PHOSPHATE (µg A / ℓ)

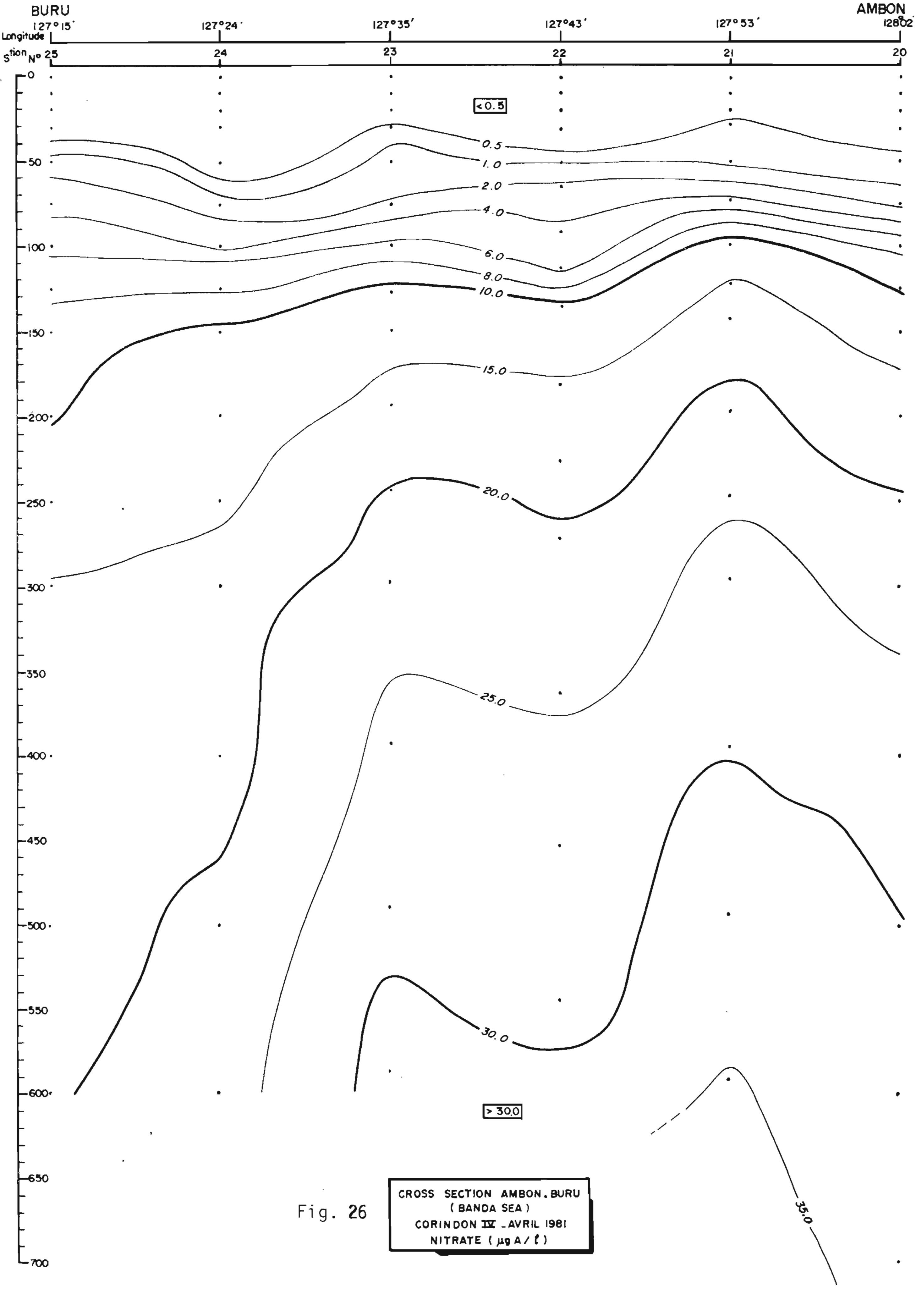


Fig. 26

CROSS SECTION AMBON.BURU
(BANDA SEA)
CORINDON IV - AVRIL 1981
NITRATE (µg A/l)

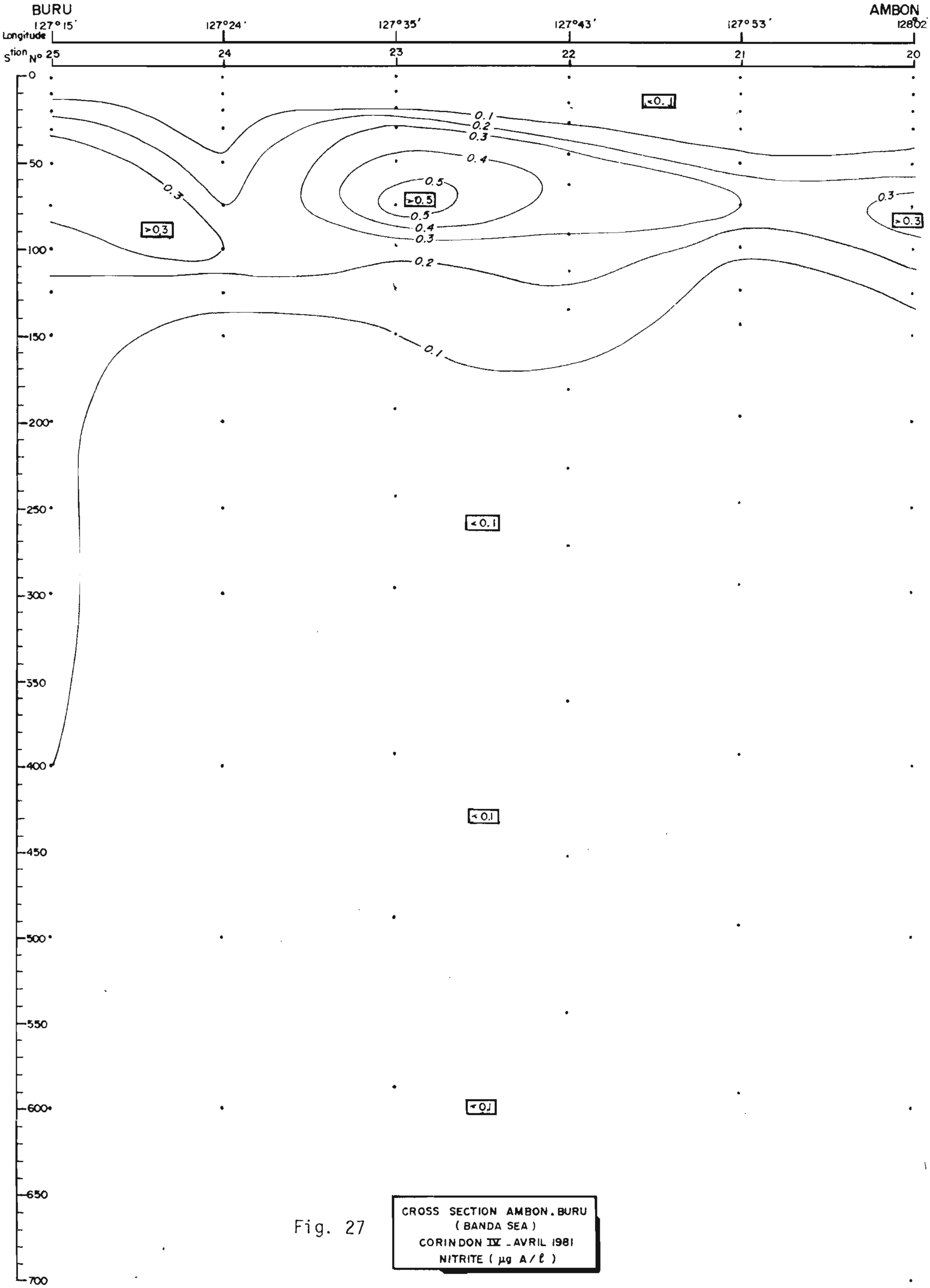


Fig. 27

CROSS SECTION AMBON . BURU
(BANDA SEA)
CORINDON IV _ AVRIL 1981
NITRITE (µg A / ℓ)

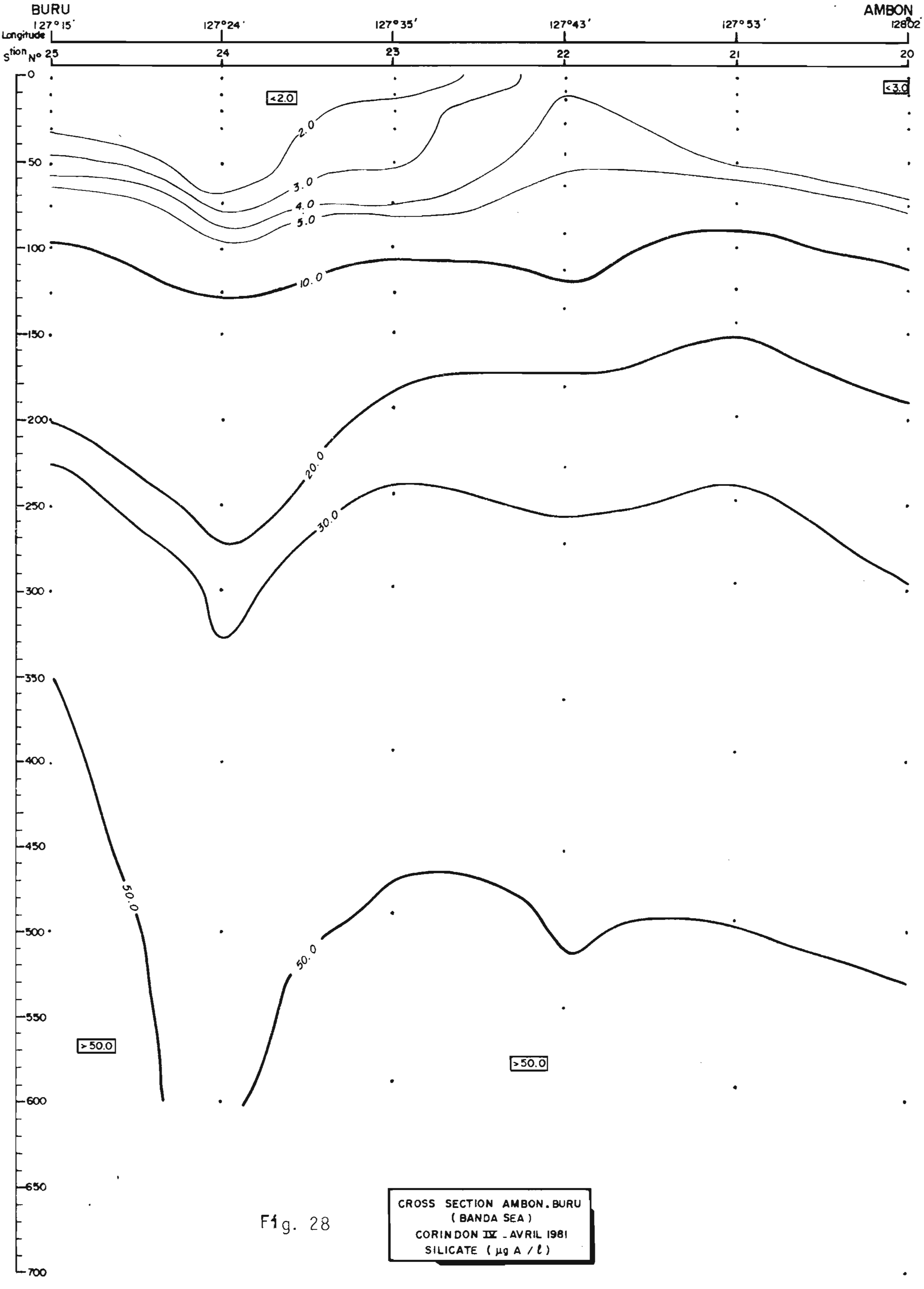


Fig. 28

CROSS SECTION AMBON. BURU
(BANDA SEA)
CORINDON IV - AVRIL 1981
SILICATE (µg A / l)

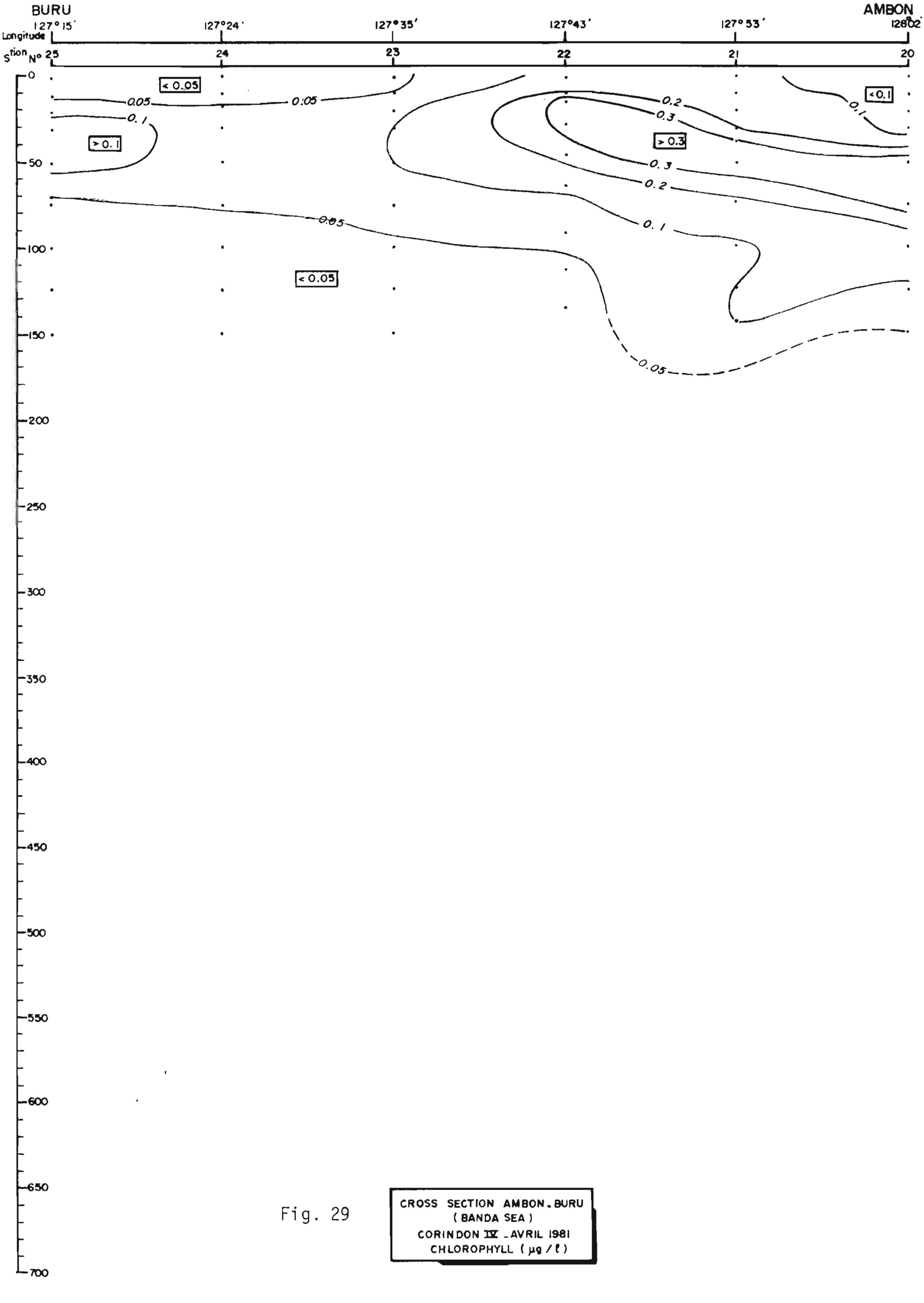


Fig. 29

CROSS SECTION AMBON . BURU
(BANDA SEA)
CORINDON IV . AVRIL 1981
CHLOROPHYLL (μg / ℓ)

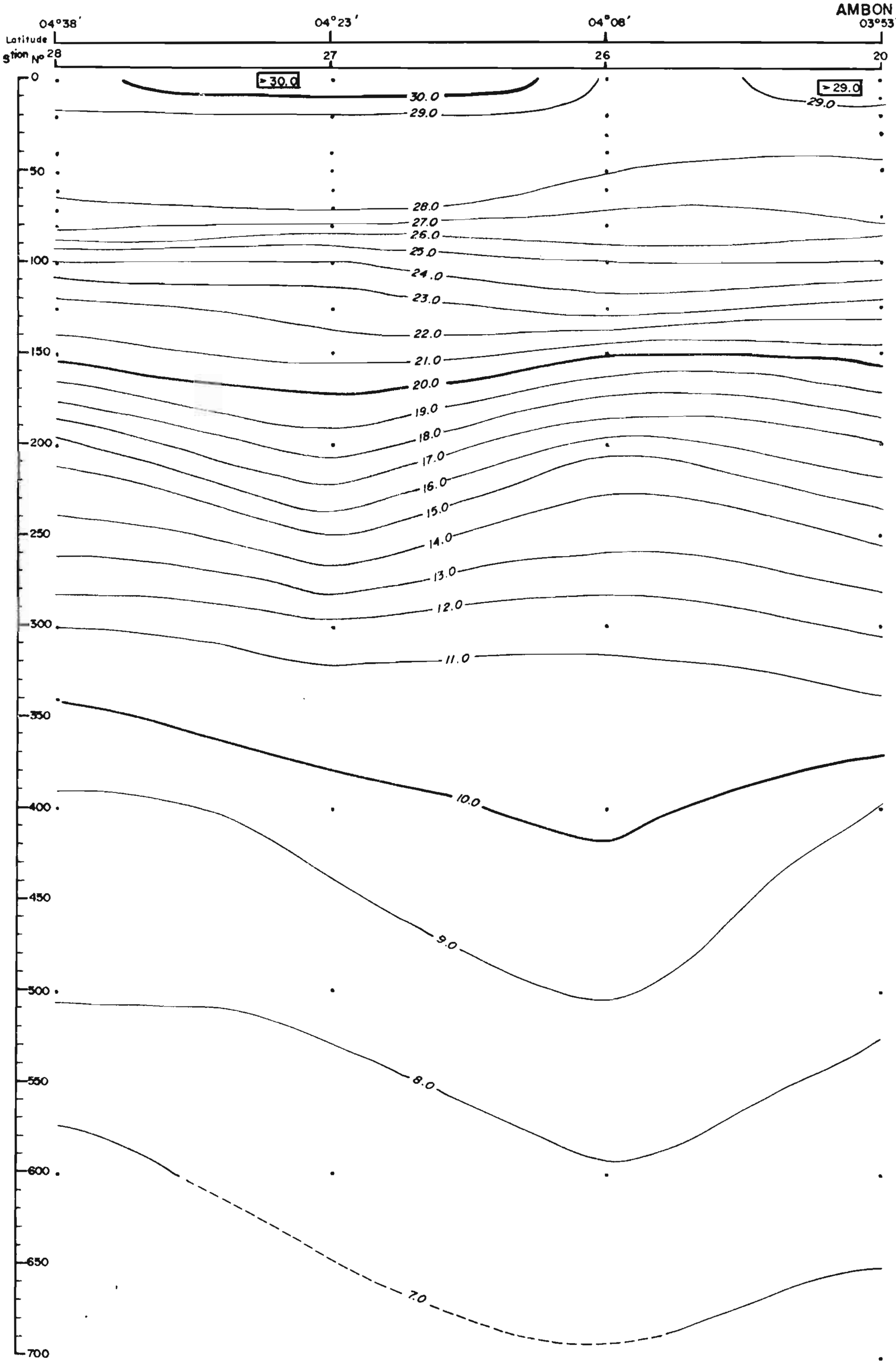


Fig. 30

CROSS SECTION AMBON - SOUTH
(BANDA SEA)
CORINDON IV - AVRIL 1981
TEMPERATURE (°C)

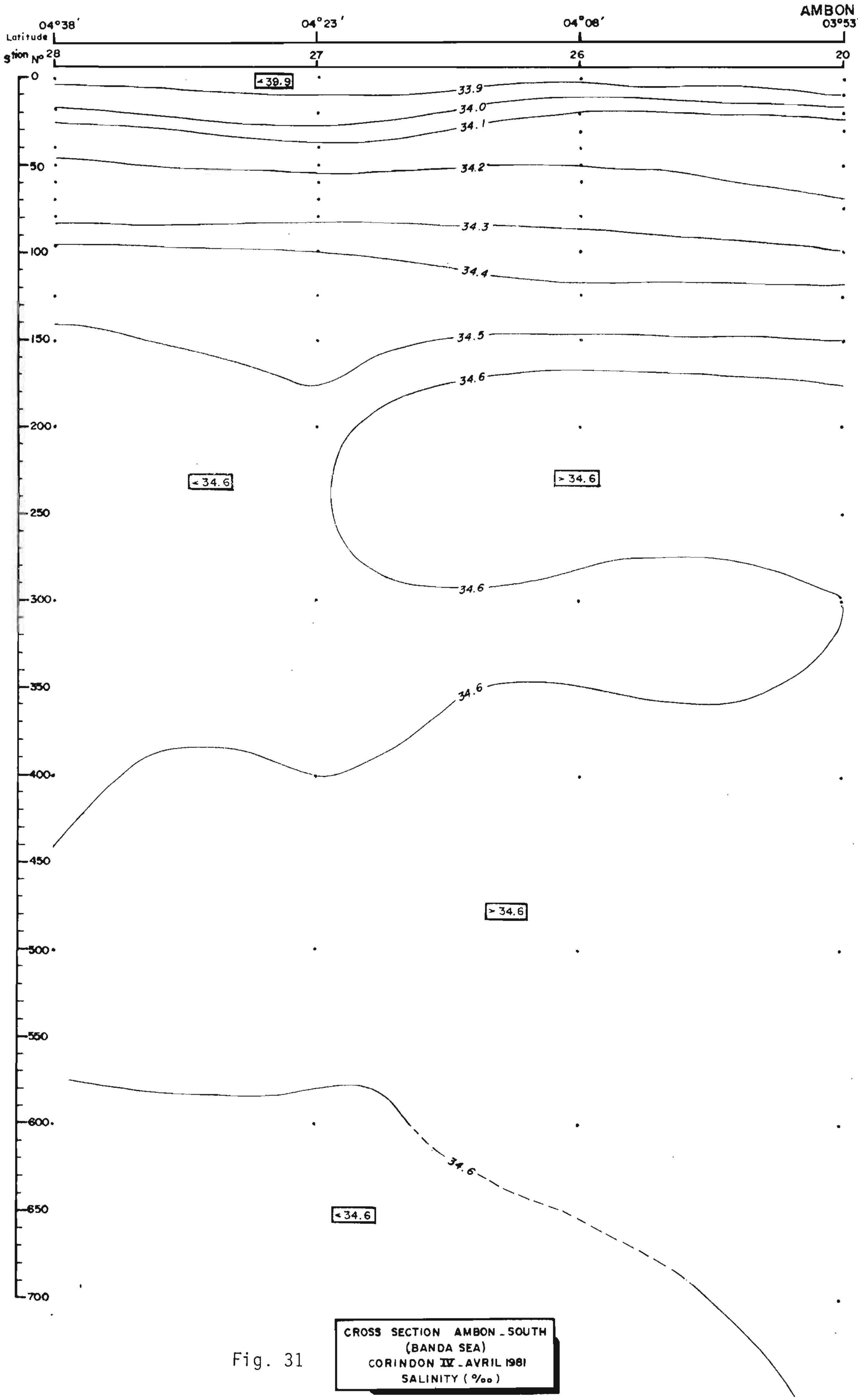


Fig. 31

CROSS SECTION AMBON _ SOUTH
(BANDA SEA)
CORINDON IV _ AVRIL 1981
SALINITY (‰)

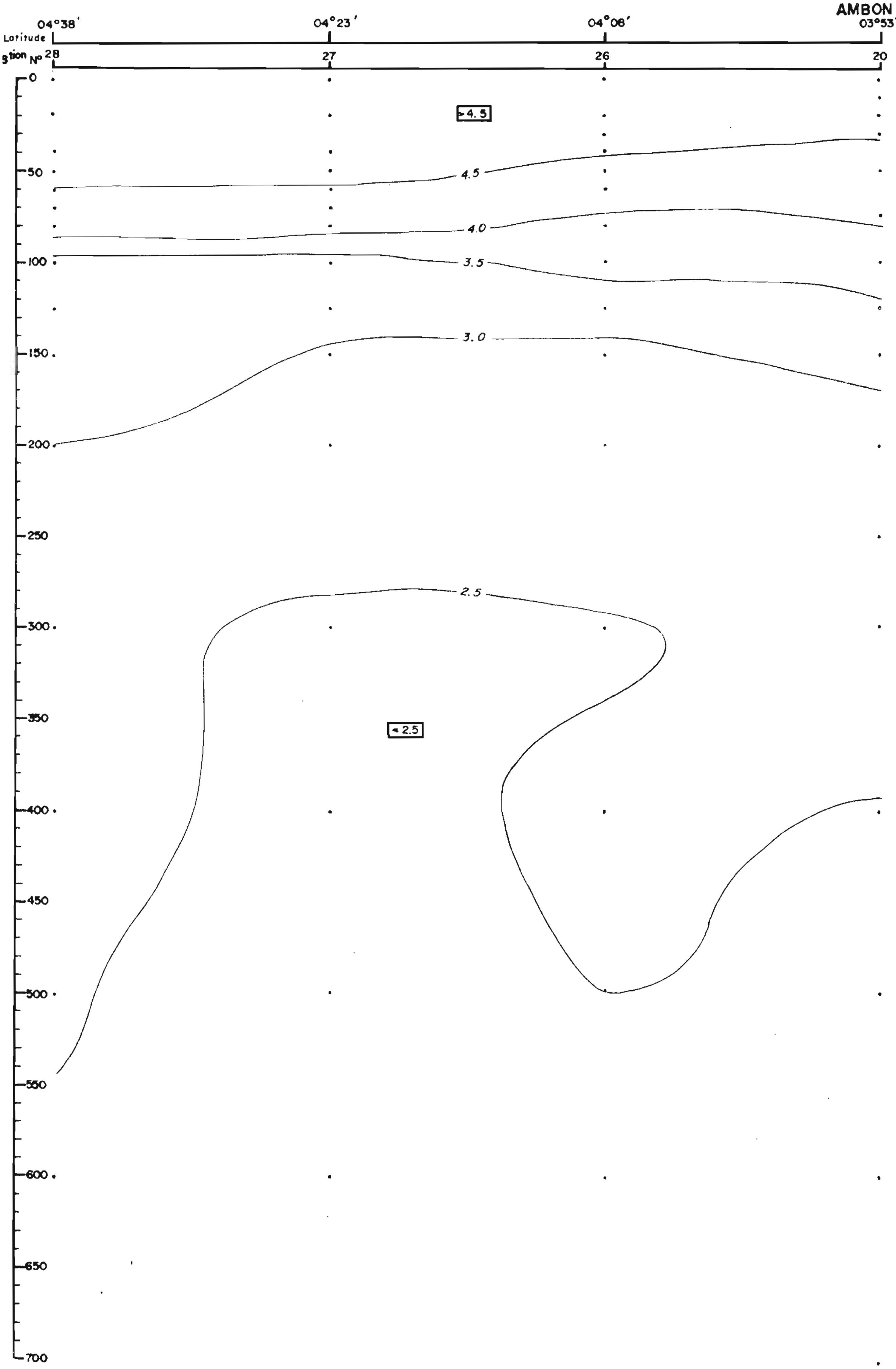


Fig. 32

CROSS SECTION AMBON _ SOUTH
(BANDA SEA)
CORINDON IV _ AVRIL 1981
OXYGENE (ml / l)

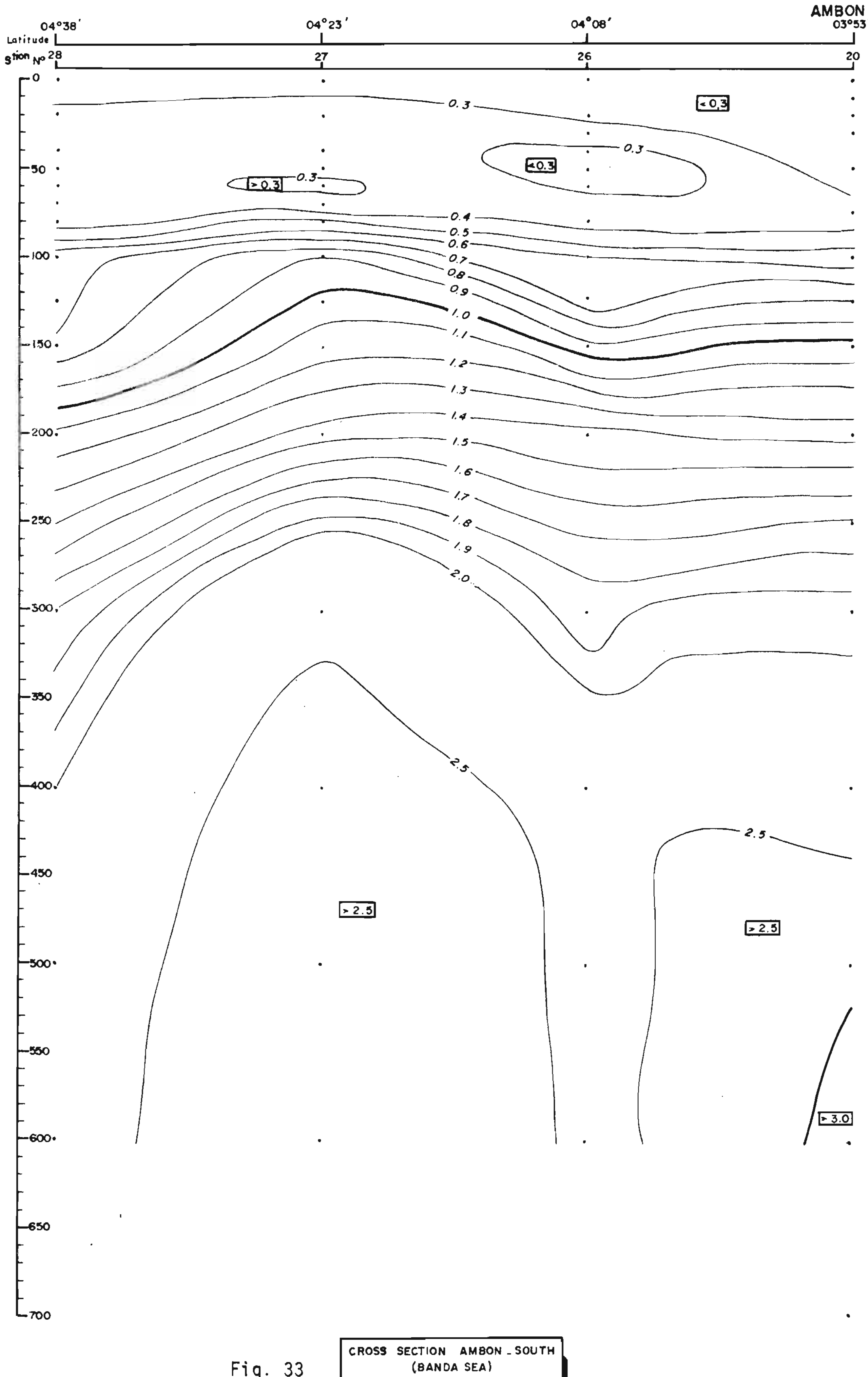


Fig. 33

CROSS SECTION AMBON _ SOUTH
(BANDA SEA)
CORINDON IV _ AVRIL 1981
PHOSPHATE (µg A / ℓ)

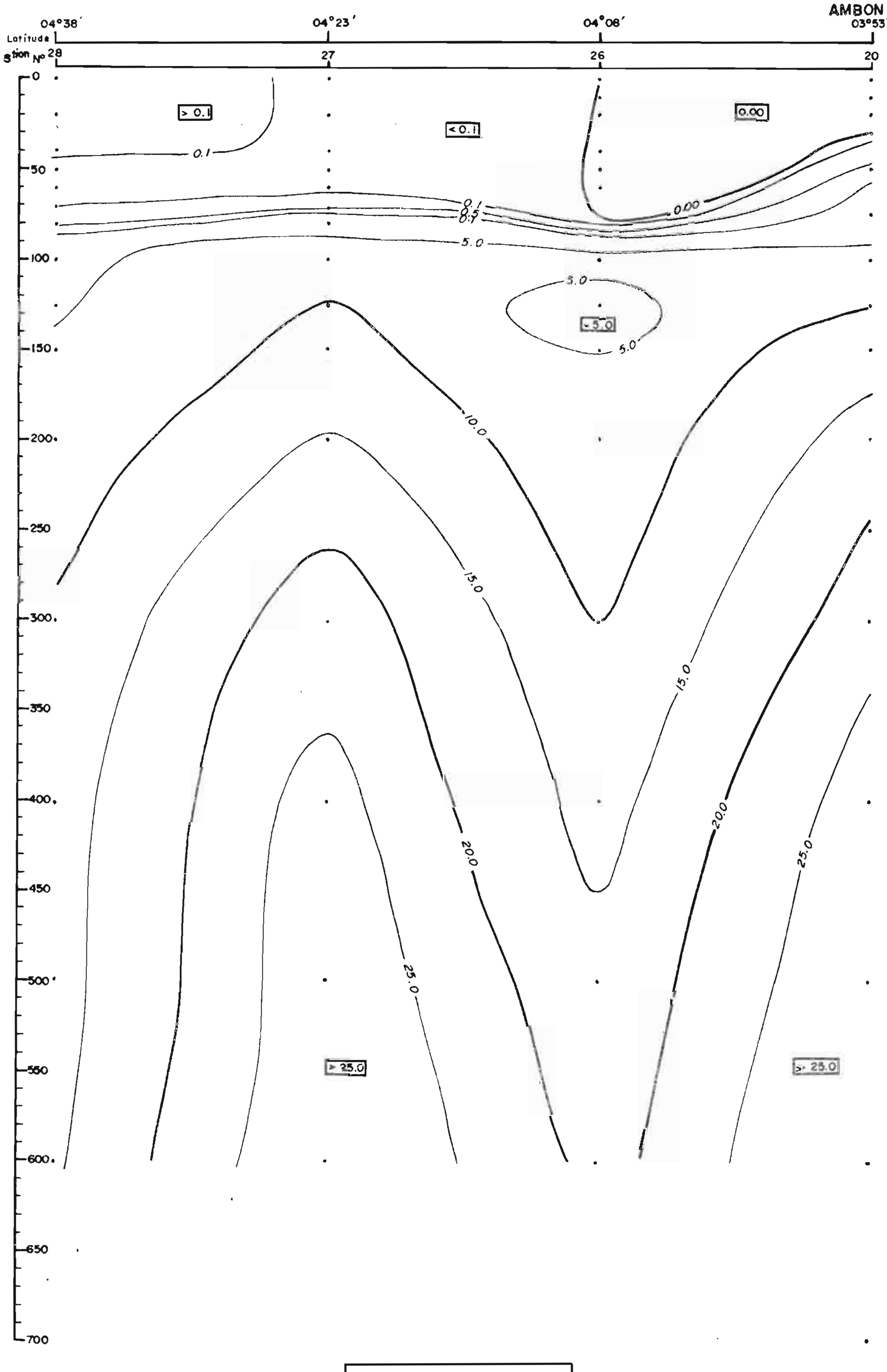


Fig. 34

CROSS SECTION AMBON _ SOUTH
(BANDA SEA)
CORINDON IV _ AVRIL 1981
NITRATE (μg A / ℓ)

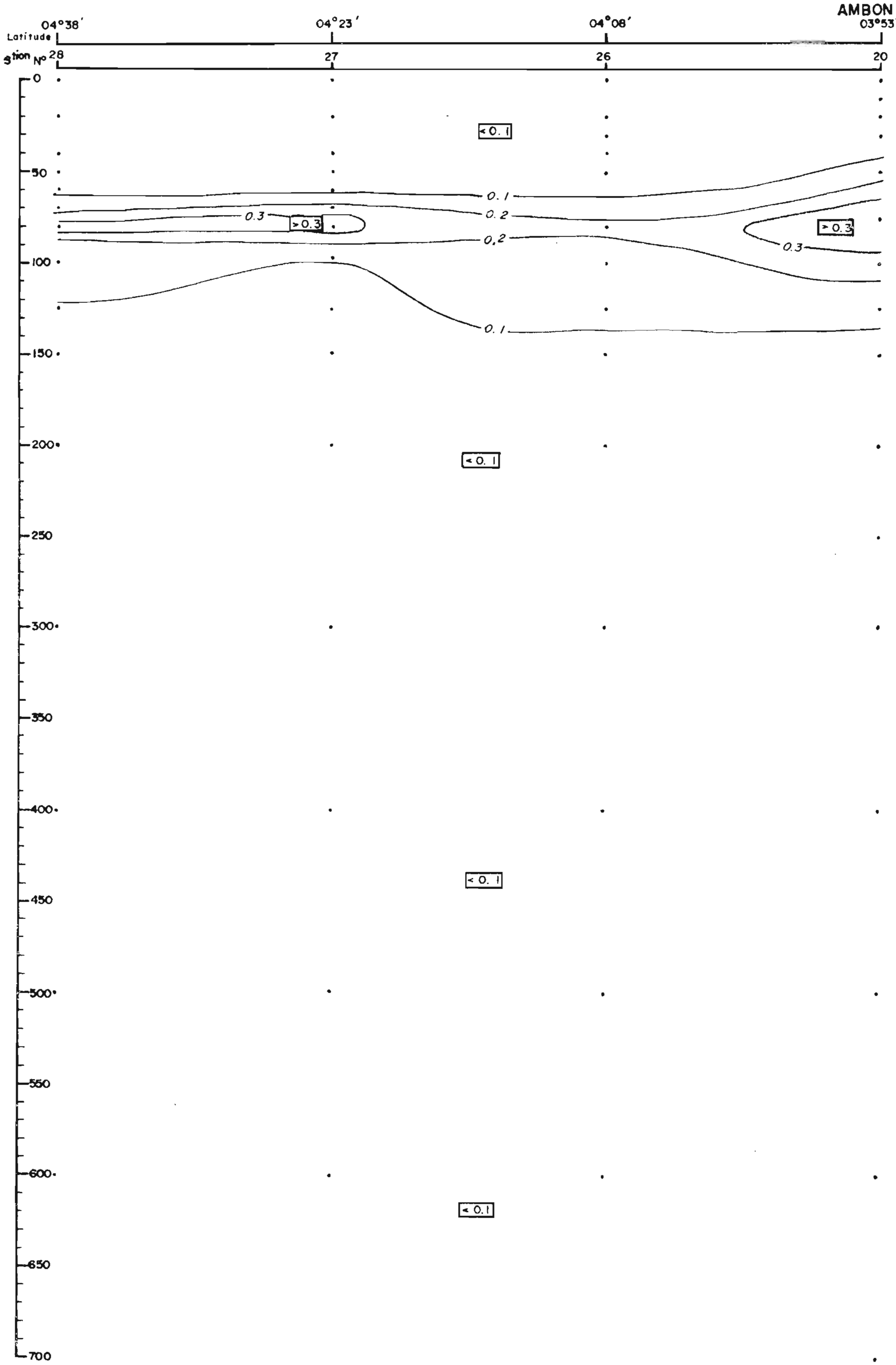


Fig. 35

CROSS SECTION AMBON _ SOUTH
(BANDA SEA)
CORINDON IX . AVRIL 1981
NITRITE (µg A / l)

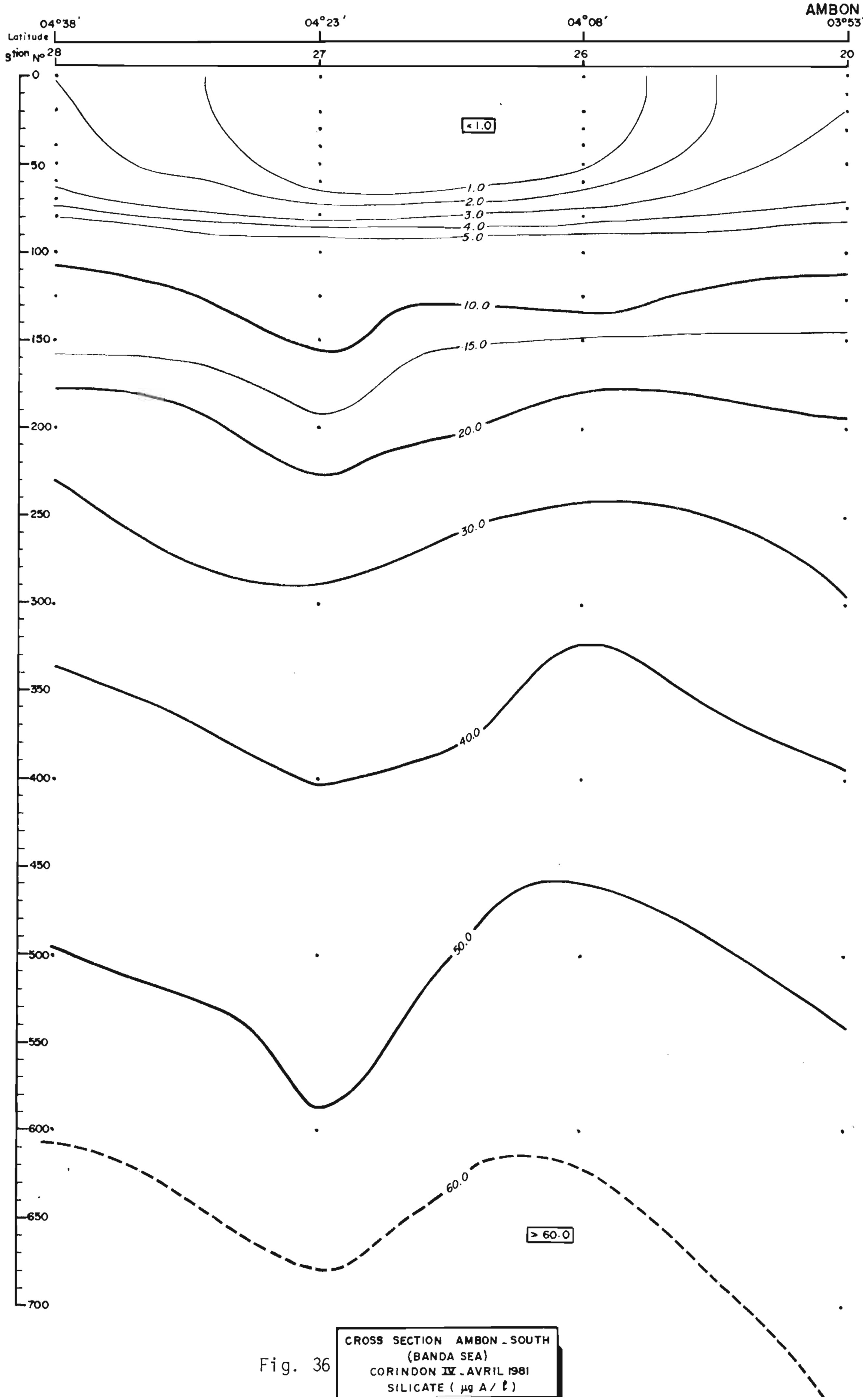


Fig. 36

CROSS SECTION AMBON _ SOUTH
(BANDA SEA)
CORINDON IV _ AVRIL 1981
SILICATE (µg A / ℓ)

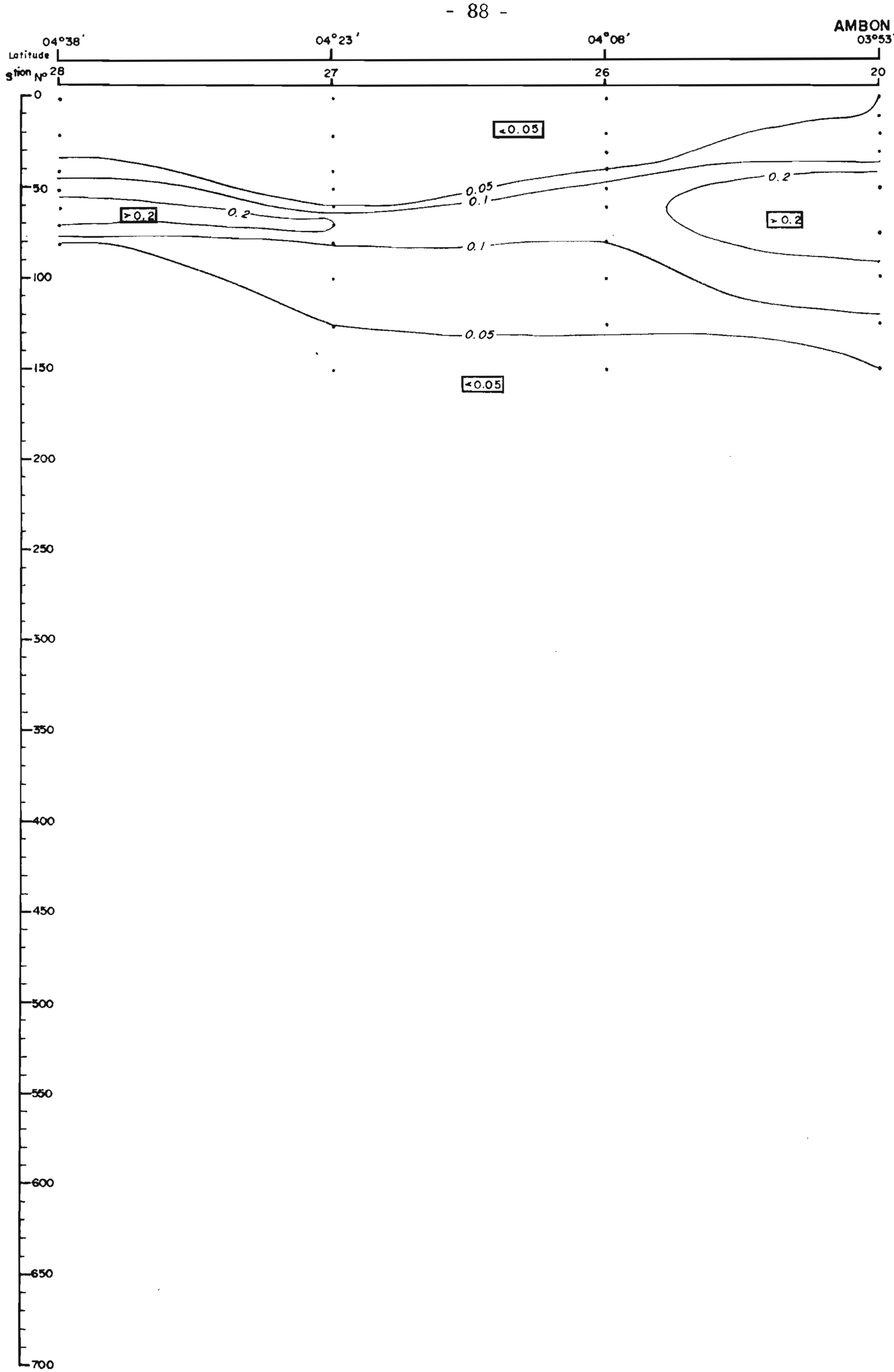


Fig. 37

CROSS SECTION AMBON _ SOUTH
(BANDA SEA)
CORINDON IV _ AVRIL 1981
CHLOROPHYLL (μg / l)

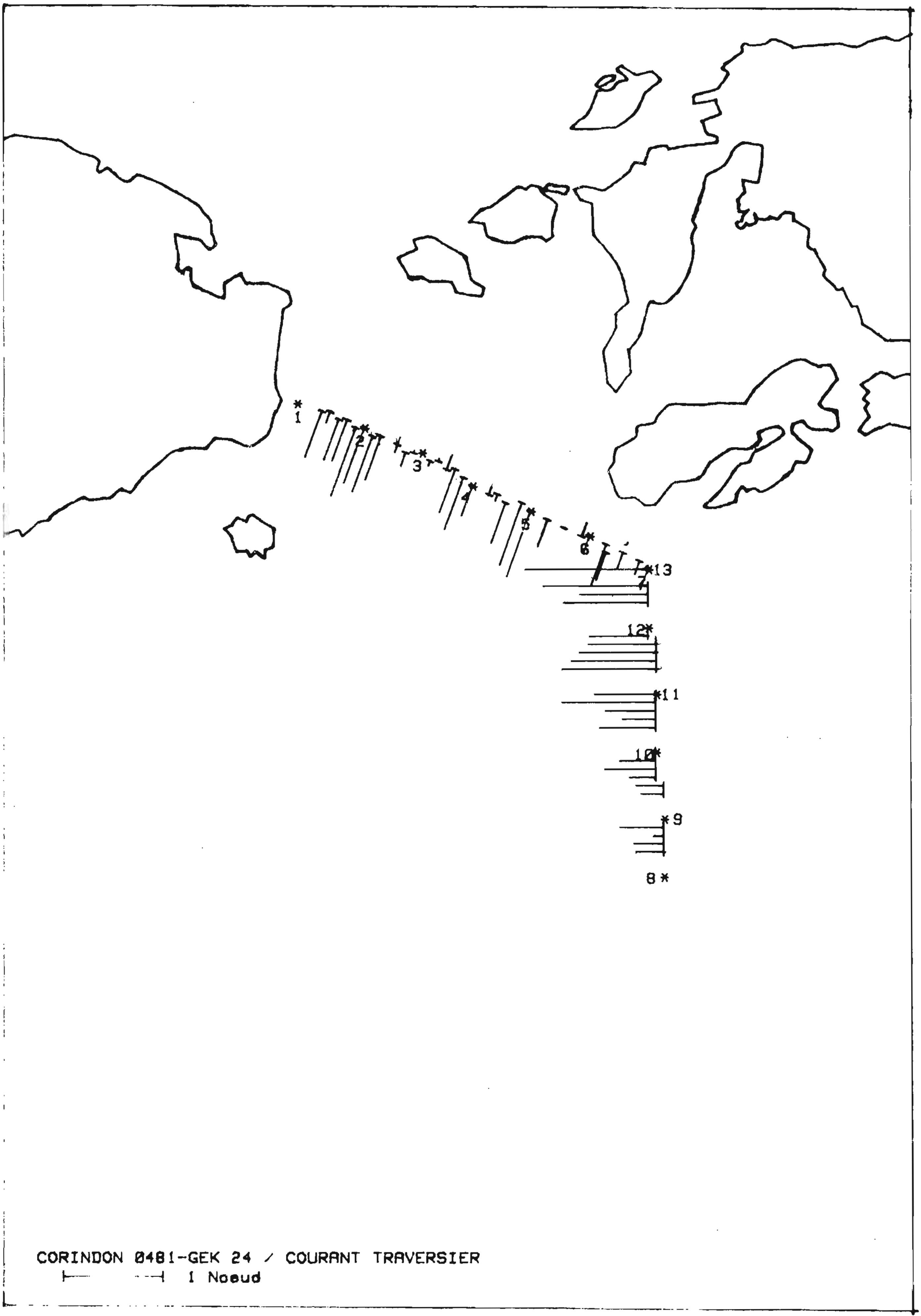

1
2
3
4
5
6
7
13
12
11
10
9
8
CORINDON 0481-GEK 24 / COURANT TRAVERSIER
1 Noeud

Fig. 38

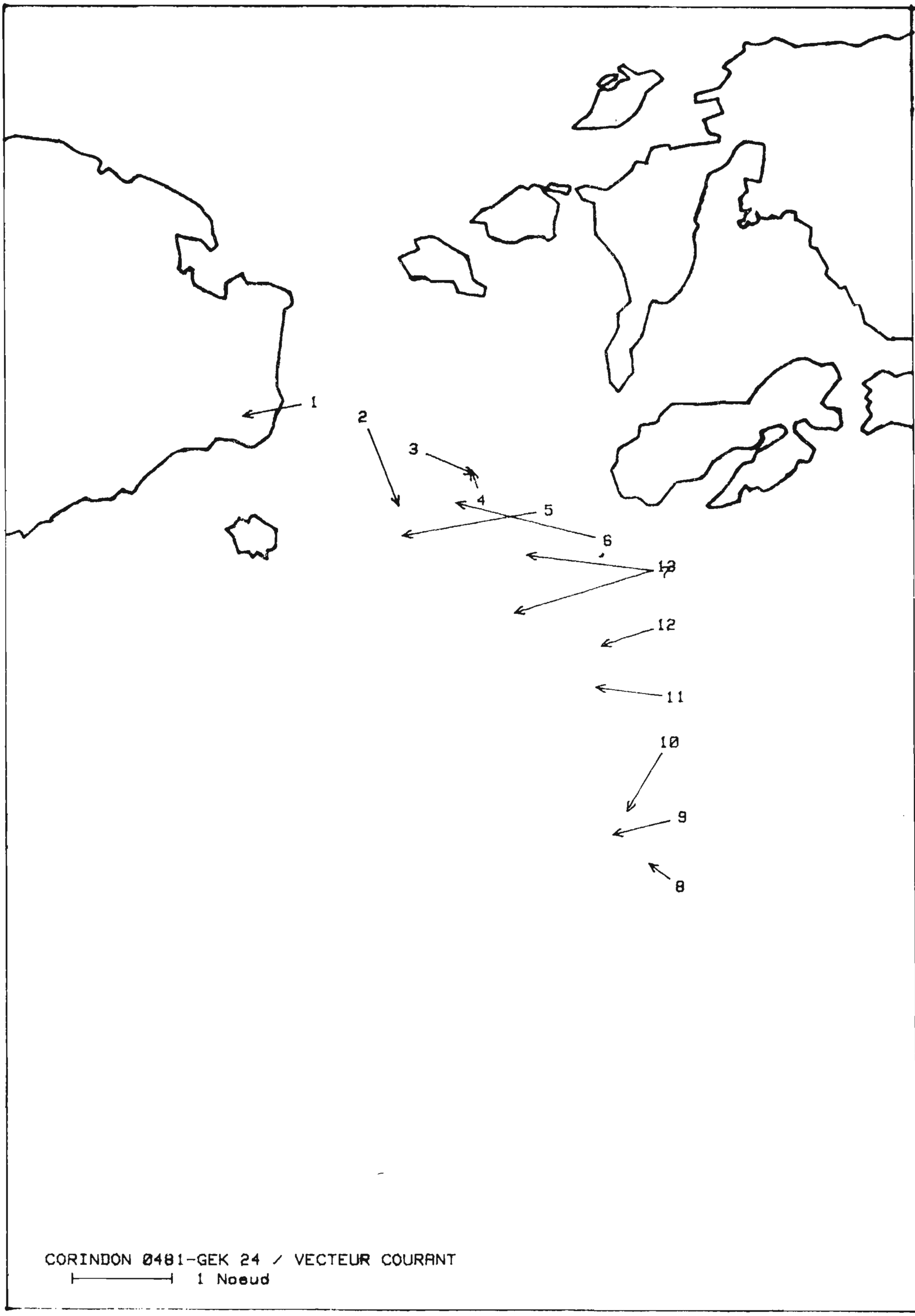

1
2
3
4
5
6
13
7
12
11
10
9
8
CORINDON Ø481-GEK 24 / VECTEUR COURANT
1 Noeud

Fig. 39

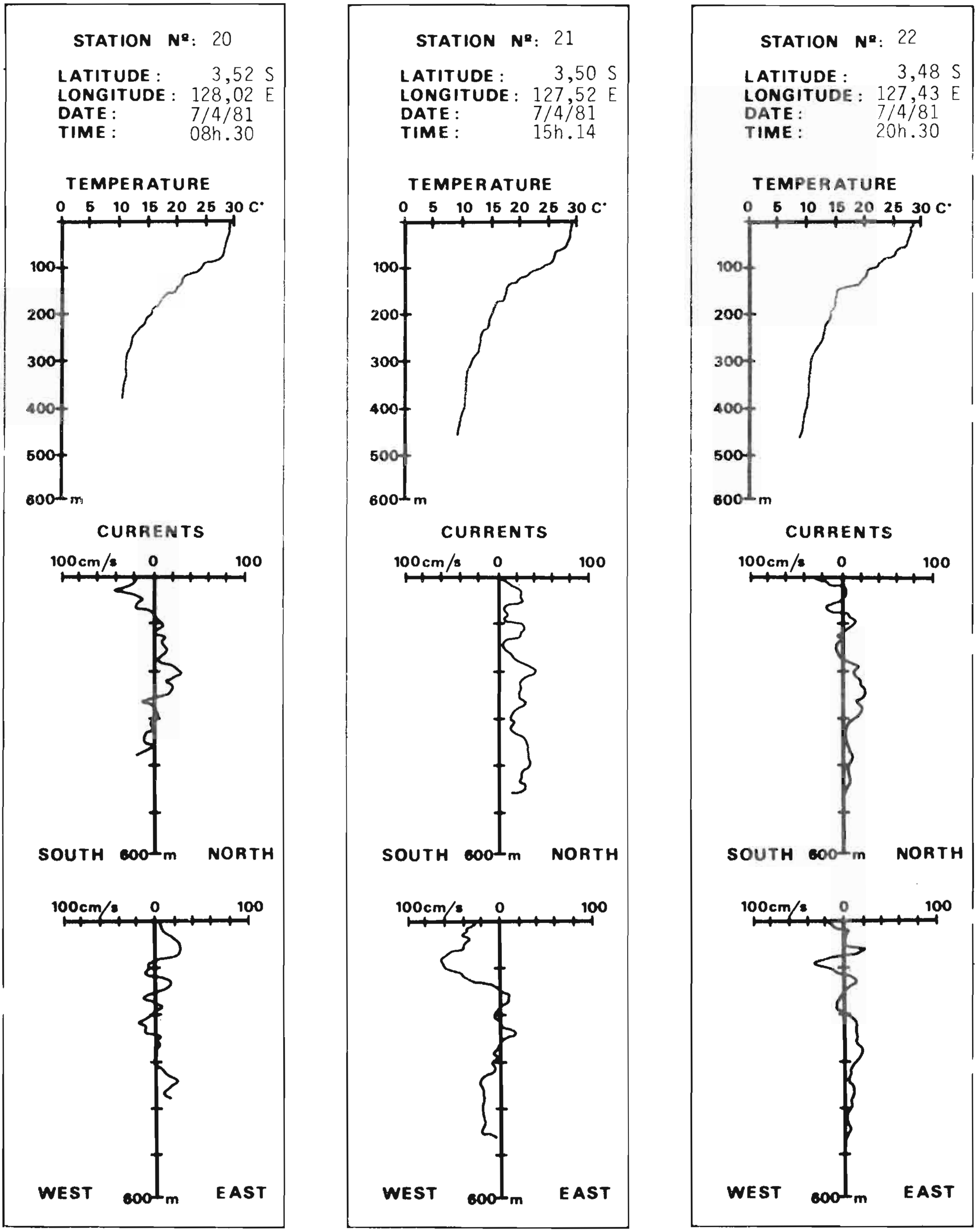


Fig. 40

Current profiles in the Banda Sea

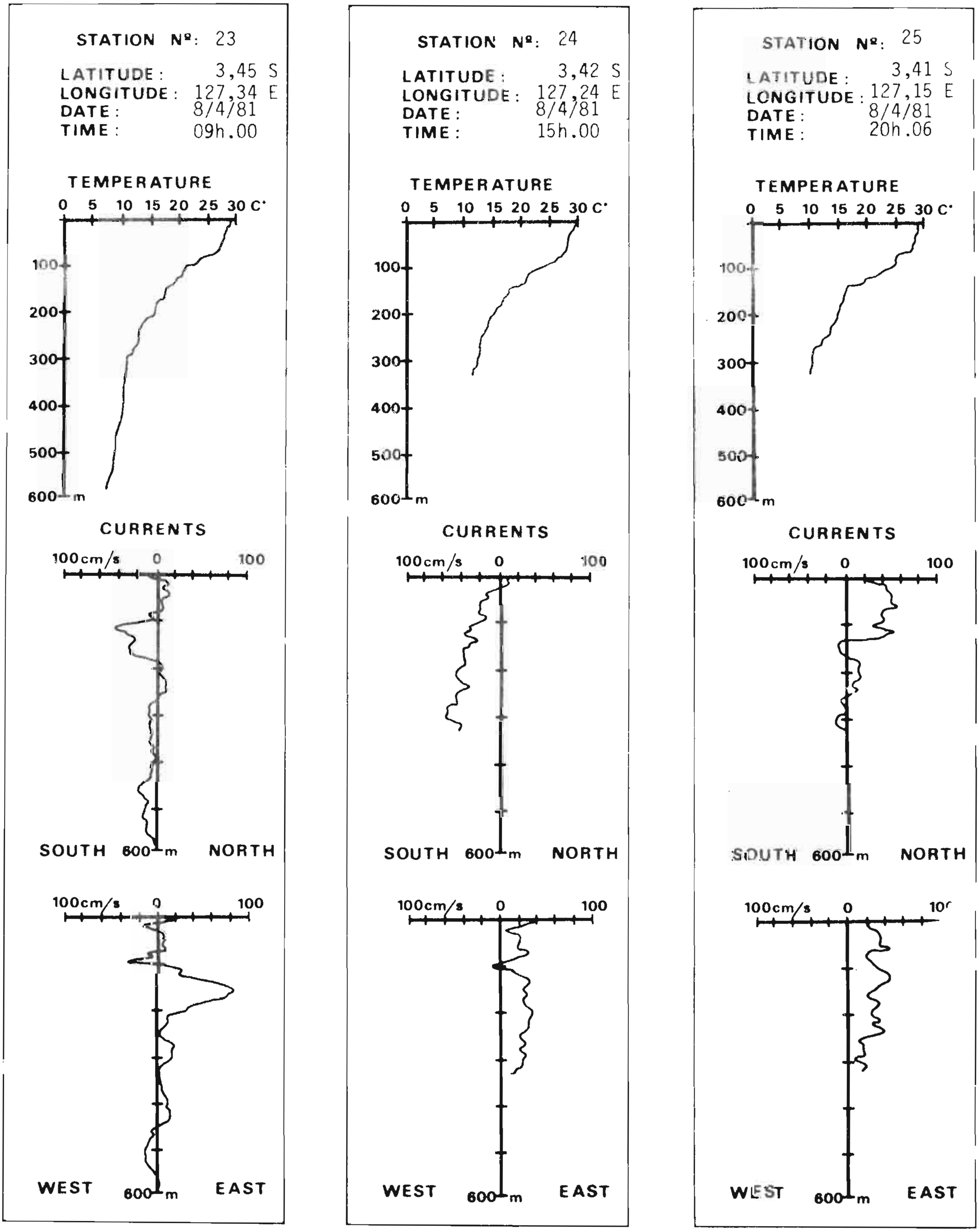


Fig. 41

Current profiles in the Banda Sea

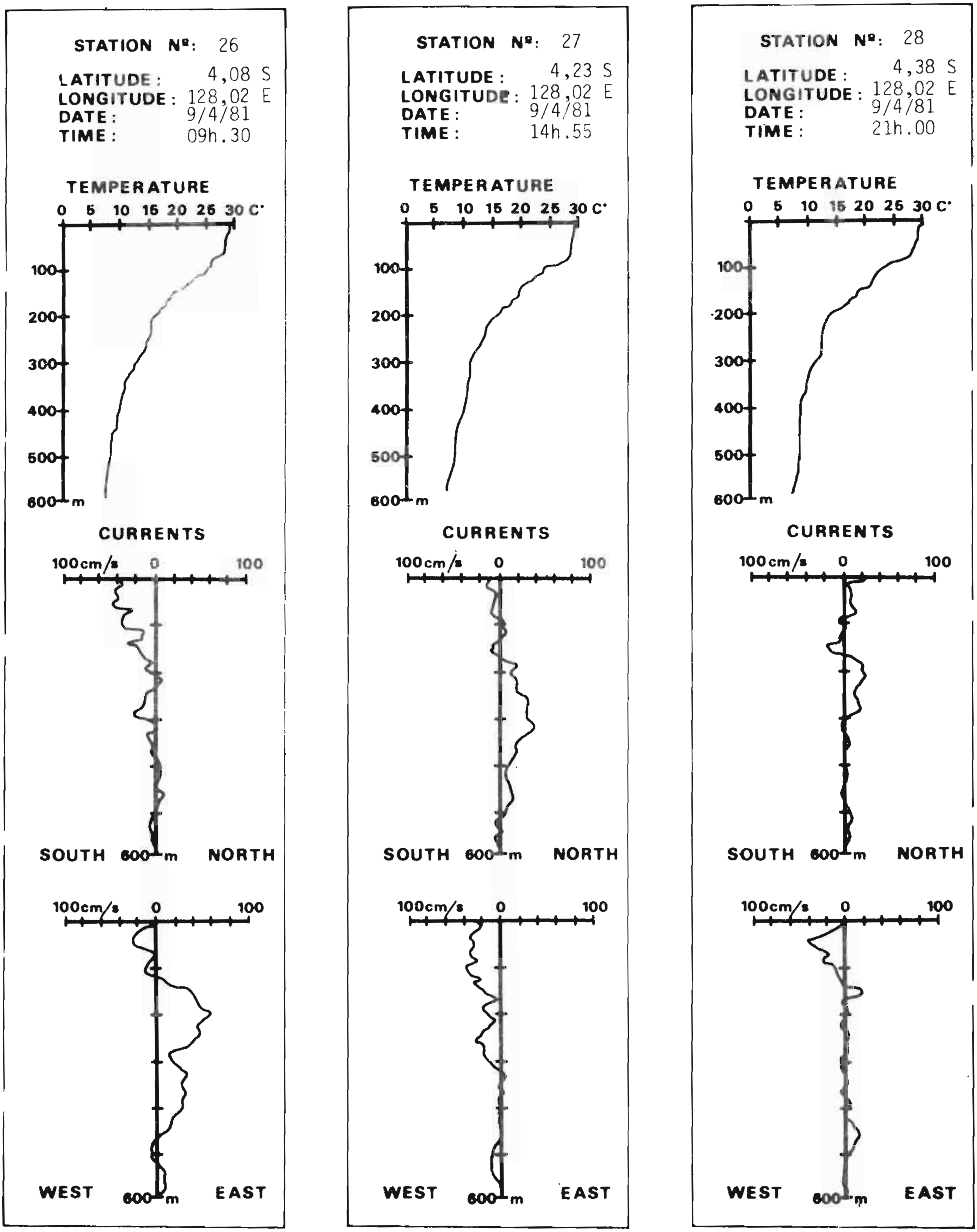


Fig. 42

Current profiles in the Banda Sea

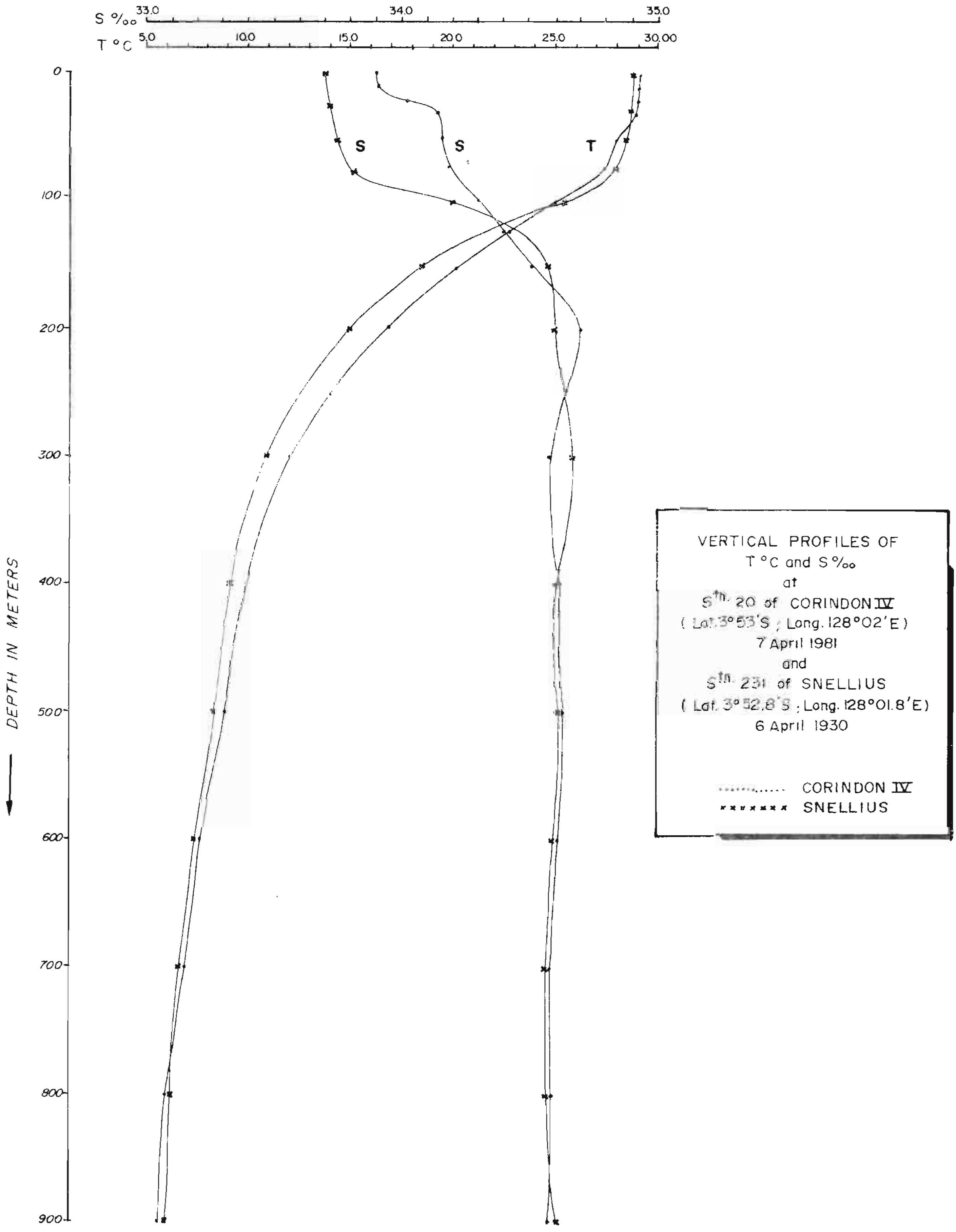

S ‰ 33.0 34.0 35.0
T °C 5.0 10.0 15.0 20.0 25.0 30.00
0
100
200
300
400
500
600
700
800
900
m.
DEPTH IN METERS
S
S
T
VERTICAL PROFILES OF
T °C and S ‰
at
S^tn. 20 of CORINDON IV
(Lat. 3°53'S ; Long. 128°02'E)
7 April 1981
and
S^tn. 231 of SNELLIUS
(Lat. 3°52.8'S ; Long. 128°01.8'E)
6 April 1930
CORINDON IV
SNELLIUS

Fig. 43

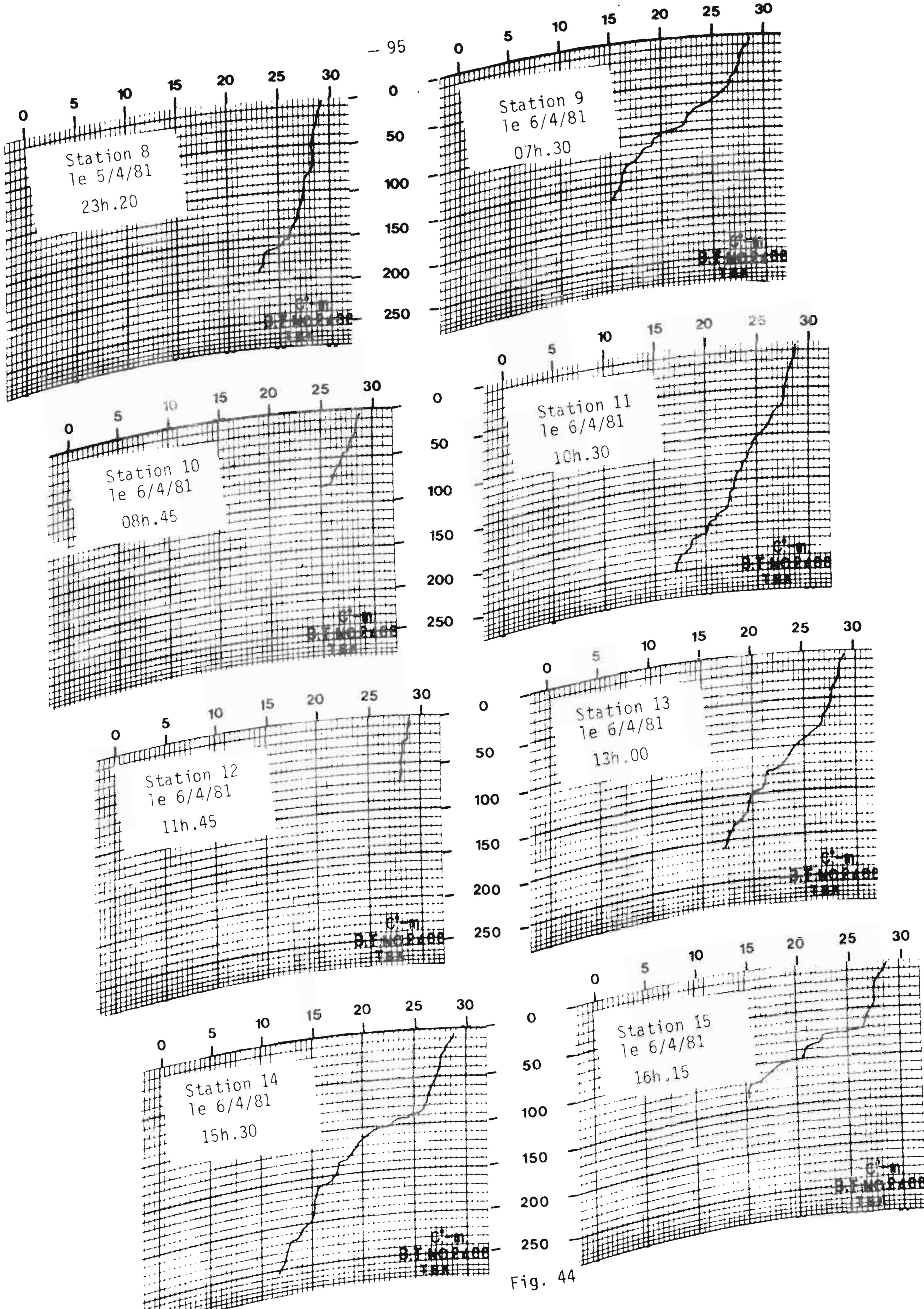

Station 8
le 5/4/81
23h.20
Station 9
le 6/4/81
07h.30
Station 10
le 6/4/81
08h.45
Station 11
le 6/4/81
10h.30
Station 12
le 6/4/81
11h.45
Station 13
le 6/4/81
13h.00
Station 14
le 6/4/81
15h.30
Station 15
le 6/4/81
16h.15
0 5 10 15 20 25 30
0 50 100 150 200 250

Fig. 44

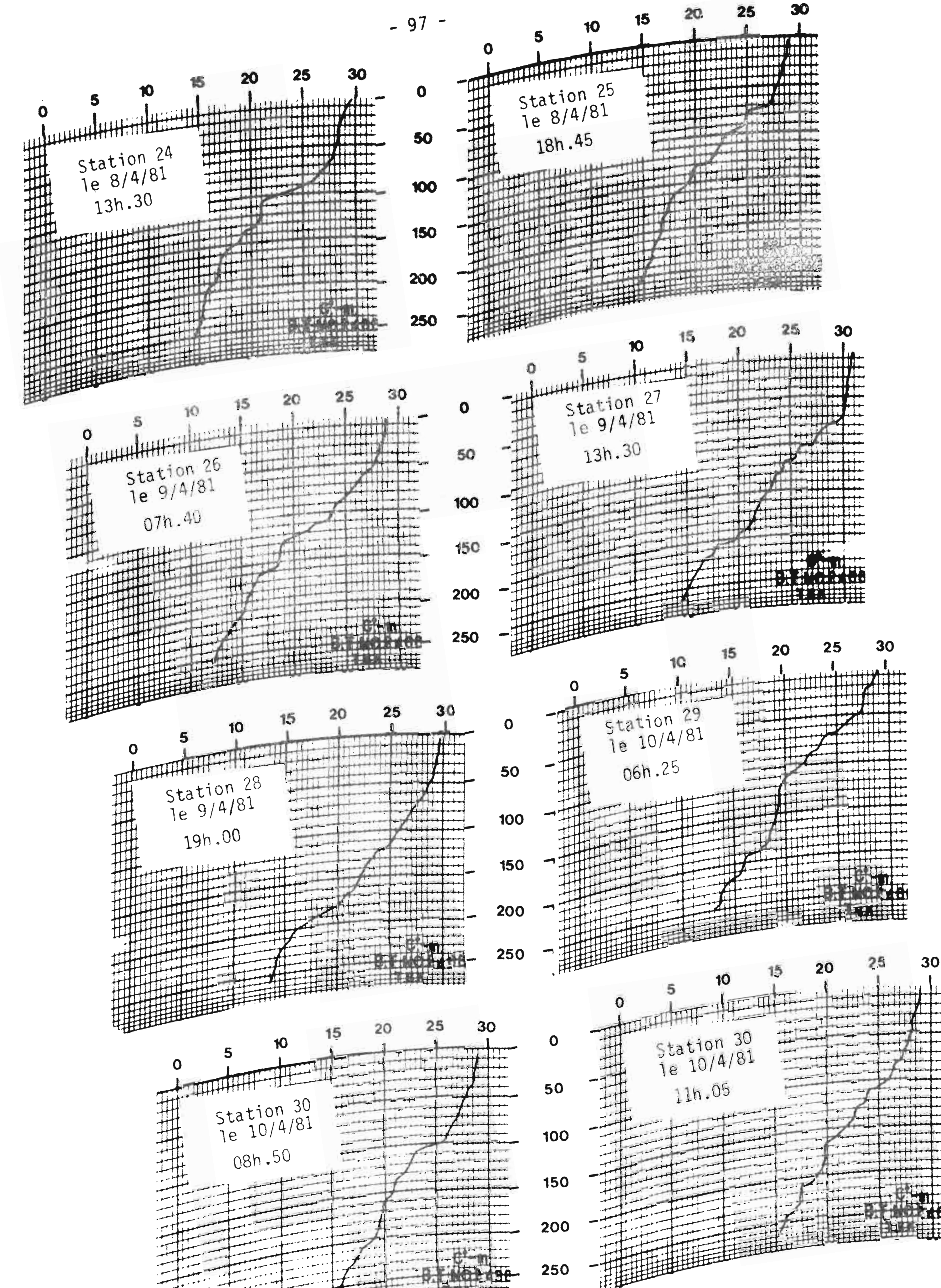

Station 24
le 8/4/81
13h.30
Station 25
le 8/4/81
18h.45
Station 26
le 9/4/81
07h.40
Station 27
le 9/4/81
13h.30
Station 28
le 9/4/81
19h.00
Station 29
le 10/4/81
06h.25
Station 30
le 10/4/81
08h.50
Station 30
le 10/4/81
11h.05
0
5
10
15
20
25
30
50
100
150
200
250

Fig. 46

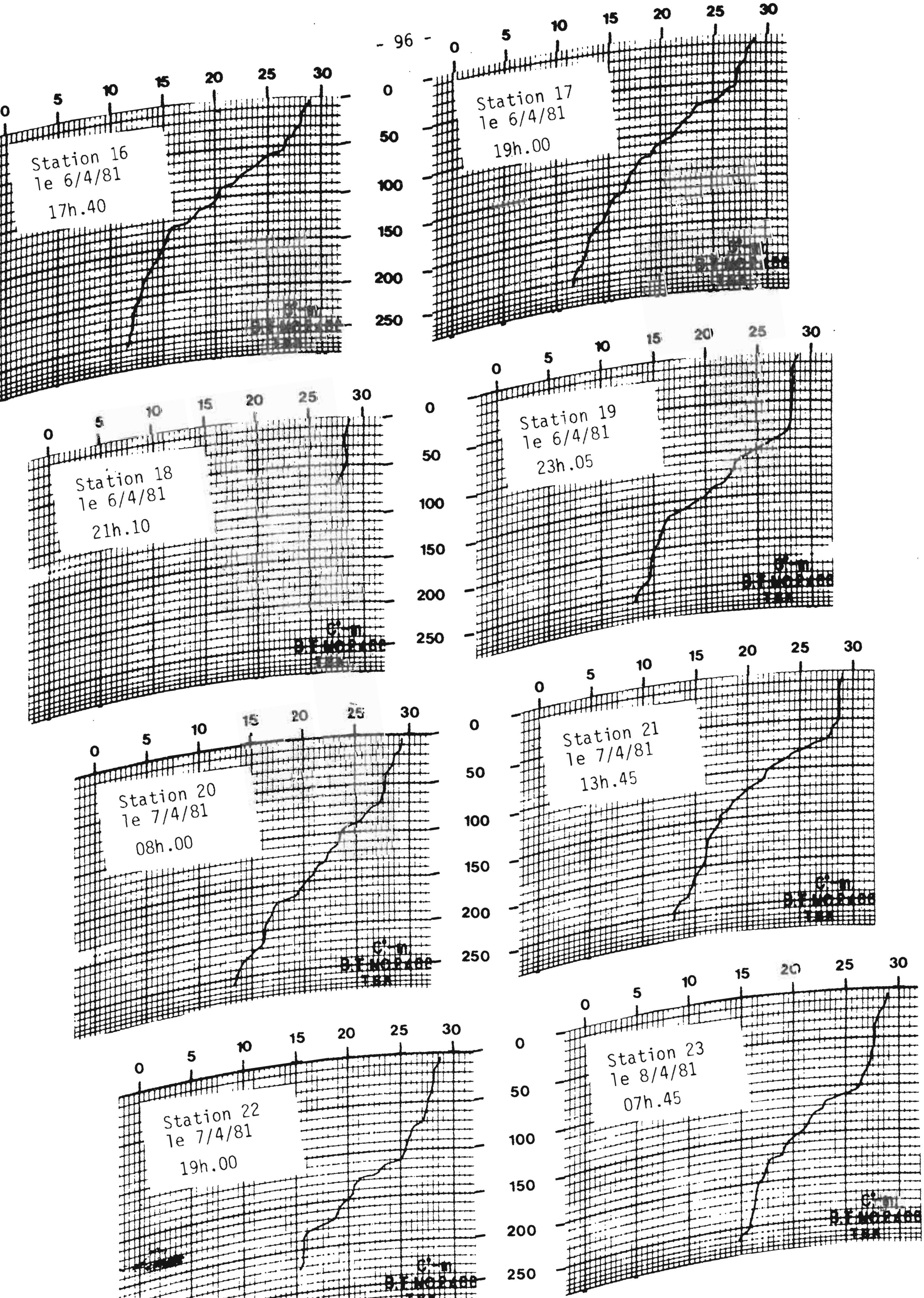
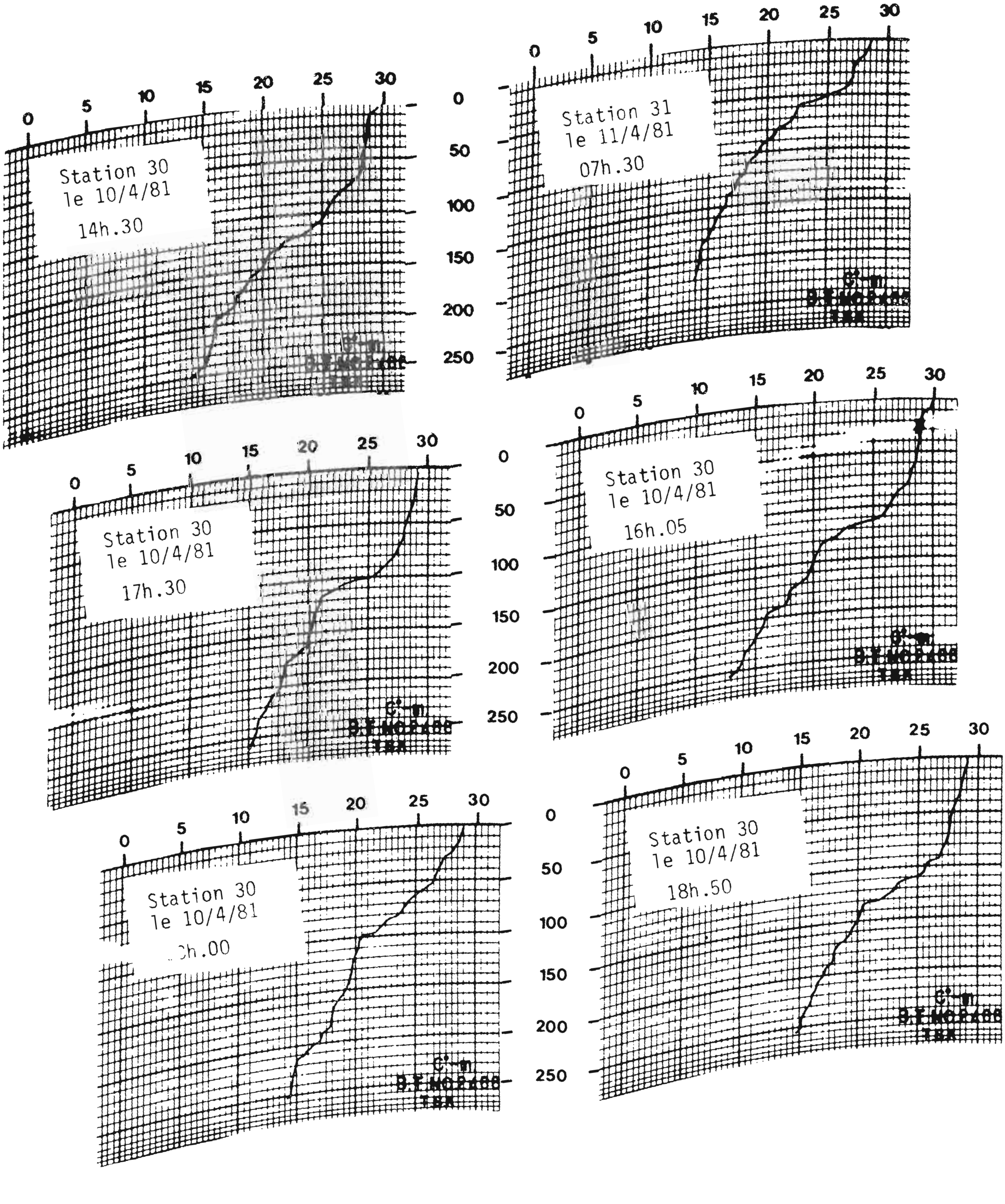

Station 16
le 6/4/81
17h.40
Station 17
le 6/4/81
19h.00
Station 18
le 6/4/81
21h.10
Station 19
le 6/4/81
23h.05
Station 20
le 7/4/81
08h.00
Station 21
le 7/4/81
13h.45
Station 22
le 7/4/81
19h.00
Station 23
le 8/4/81
07h.45
0
5
10
15
20
25
30
50
100
150
200
250

Fig. 45



Station 30
le 10/4/81
14h.30
Station 31
le 11/4/81
07h.30
Station 30
le 10/4/81
17h.30
Station 30
le 10/4/81
16h.05
Station 30
le 10/4/81
Station 30
le 10/4/81
18h.50
0
5
10
15
20
25
30
0
50
100
150
200
250
C°-m
B.T.MC.F488
TBX

Fig. 47

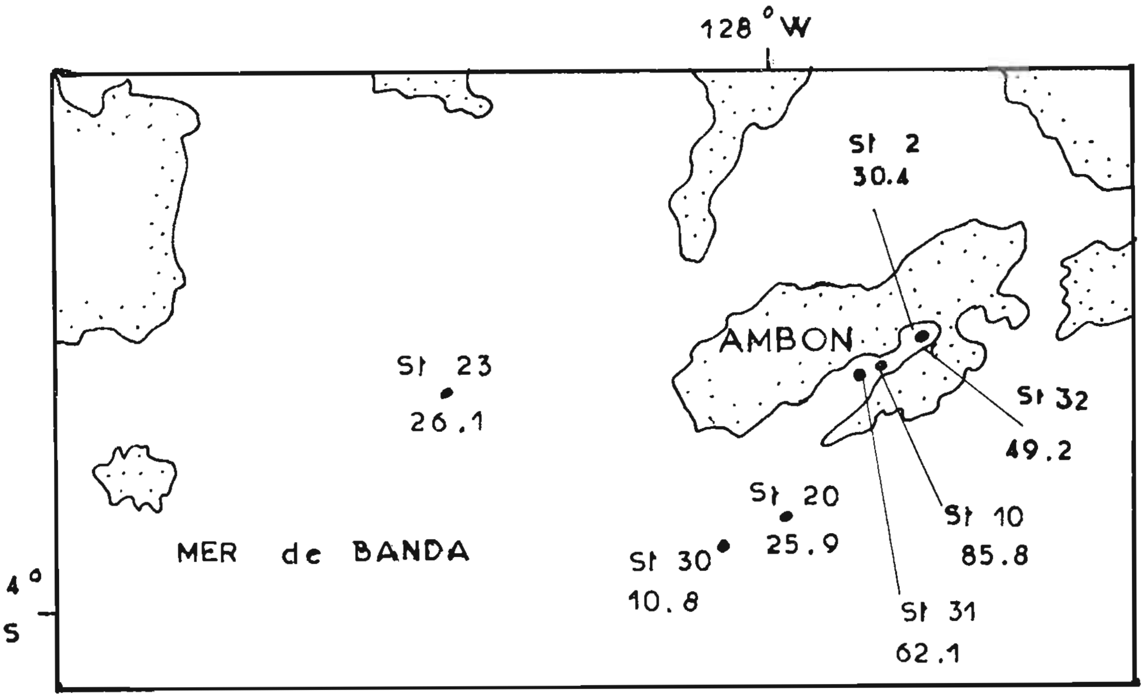


Fig. 48

Specific uptake rates of nitrate in surface waters ($V\ NO_3$) in h^{-1} (i.e. $\mu\ mol\ l^{-1}\ NO_3 \cdot (\mu\ mol\ l^{-1}\ Np)^{-1}\ h^{-1}$)

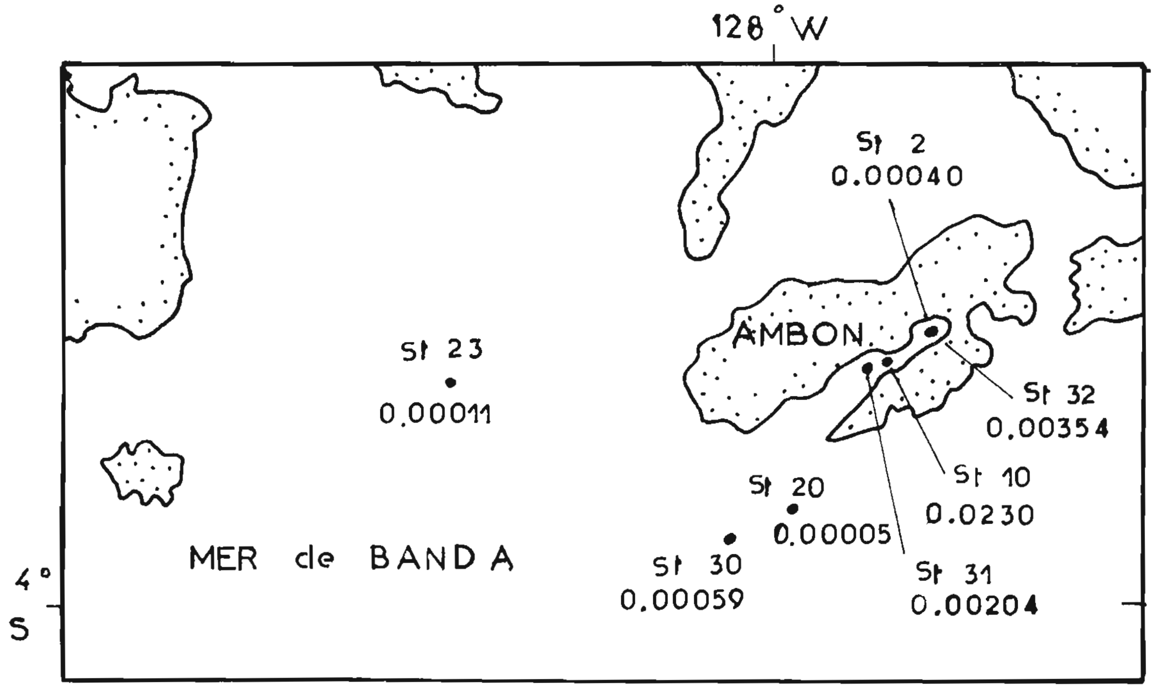


Fig. 49

Primary production on the water column in mg.m^{-2}. h^{-1} C

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