Table 4-1 Result of Physical and Chemical Analysis for Bottom Material

(Coastal Survey at Bumi Anyar)

Location Name		Water Depth (m)	Bottom Material Name	Mechanical Composition (%)				Specific Gravity	Water Content (%)	Total Sulfide (mg/g)	Sampling Device
				Clay	Silt	Sand	Gravel				
AM－12		＋0.9	S M	15.0	27.1	57.9	0.0	2.717	47.87	0.09	Hand
AM－ 6		＋0.8	f S	1.5	19.4	79.1	0.0	2.687	—	＜0.01	Hand
AM－ 4		＋0.4	f S	2.0	17.5	80.5	0.0	2.692	—	—	Hand
AM－104	Seabed	15.8	M	58.0	40.6	1.4	0.0	2.707	114.43	0.17	Piston Corer
	0.65m below Seabed		M	63.0	32.5	4.5	0.0	2.717	113.80	0.09	

Table 4-2 Result of Physical and Chemical Analysis for Bottom Material

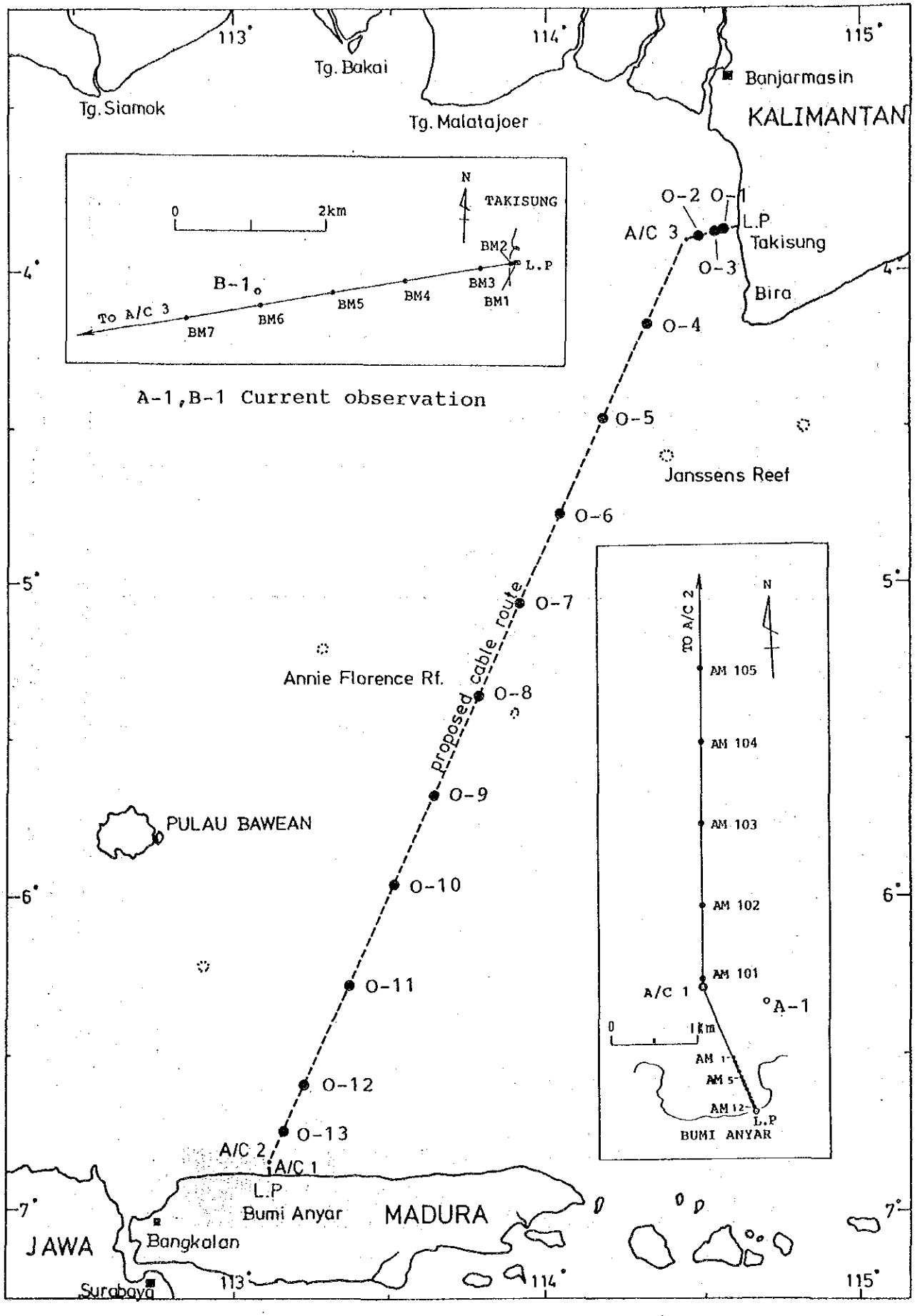
(Coastal Survey at Takisung)

Location Name	Water Depth (m)	Bottom Material Name	Mechanical Composition (%)				Specific Gravity	Water Content (%)	Total Sulfide (mg/g)	Sampling Device
			Clay	Silt	Sand	Gravel				
BM－1	+1.4	S	0.5	2.1	94.2	3.2	2.710	—	—	Hand
BM－4	3.6	M	65.0	30.1	4.9.	0.0	2.744	207.47	0.09	Grab Sampler
BM－7	7.4	MS	45.5	22.0	32.0	0.5	2.769	145.80	0.07	Grab Sampler

Table 4-3 Result of Physical and Chemical Analysis for Bottom Material

(Ocean Survey)

Location Name		Water Depth (m)	Bottom Material Name	Mechanical Composition (%)				Specific Gravity	Water Content (%)	Total Sulfide (mg/g)	Sampling Device
				Clay	Silt	Sand	Gravel				
0-2	Seabed	21.6	M	76.0	20.5	3.5	0.0	2.724	171.41	0.12	Piston Corer
	0.65 m below Seabed		S M	20.5	15.2	64.1	0.2	2.746	53.78	0.03	
0-5	Seabed	26.1	S M	13.0	19.0	67.5	0.5	2.729	44.48	0.01	Piston Corer
	0.65 m below Seabed		M	66.0	28.9	5.1	0.0	2.720	104.64	0.06	
0-9	Seabed	65.	M	54.5	41.1	4.4	0.0	2.732	92.04	0.04	Piston Corer
	0.65 m below Seabed		M	58.0	30.0	12.0	0.0	2.744	124.55	0.11	
0-11	Seabed	70.	M	77.5	20.1	2.4	0.0	2.713	141.00	0.02	Piston Corer
	0.65 m below Seabed		M	80.0	18.6	1.4	0.0	2.714	124.10	0.11	
0-13	Seabed	44.	M	76.5	20.0	3.5	0.0	2.710	122.87	0.23	Piston Corer
	0.65 m below Seabed		M S	39.5	25.7	34.1	0.7	2.785	105.22	0.18	



LOCATION MAP FOR OCEANOGRAPHIC STATION

Table 5-1 Data Sheet for Sampling and Deep Sea Photographing

Coastal survey at Offshore Bumi Anyar, including On-land survey

Item \ Location	AM-6	AM-5	AM-4	AM-3	AM-2	AM-1	
Measuring or Sampling Date	Feb.9	Feb.9	Feb.9	Feb.9	Feb.9	Feb.9	
Position (Lat.:S) (Long.:E)	6°53.46' 113°07.04'	6°53.43' 113°07.03'	6°53.41' 113°07.02'	6°53.37' 113°07.01'	6°53.35' 113°07.00'	6°53.32' 113°06.98'	
Water Depth (m)	+0.8	+0.7	+0.4	+0.3	+0.2	0.2	
Sampling Device	H	H	H	H	H	H	
Bottom Material	fine Sand with ripple	fine Sand with ripple	fine Sand with ripple & Coral	Sand with ripple & Coral	Coral	Coral	
Deep Sea Photo No.	—	—	—	—	—	—	—

Soft Rock
Gravel
Sand
Silt
Clay
Mud
Shell Fragment

* Sampling Device
P : Piston Corer, V : Vibro Corer, G : Grab Sampler
D : Dredger, H : Hand

Table 5-2 Data Sheet for Sampling and Deep Sea Photographing

Coastal survey at Offshore Bumi Anyar, including On-land survey

Item \ Location	L.P	AM-12	AM-11	AM-10	AM-9	AM-8	AM-7
Measuring or Sampling Date	Feb.9	Feb.9	Feb.9	Feb.9	Feb.9	Feb.9	Feb.9
Position (Lat.:S) (Long.:E)	6°53.64' 113°07.11'	6°53.62' 113°07.10'	6°53.58' 113°07.09'	6°53.57' 113°07.08'	6°53.53' 113°07.07'	6°53.51' 113°07.06'	6°53.48' 113°07.05'
Water Depth (m)	+3.5	+0.9	+0.8	+1.0	+0.9	+0.8	+0.8
Sampling Device	——	H	——	——	——	——	——
Bottom Material Soft Rock Gravel Sand Silt Clay Mud Shell Fragment Core Length(cm)	medium Sand well sorting	muddy Sand Poor sorting	muddy Sand with ripple	medium Sand with ripple	Sand	fine Sand with ripple	fine Sand with ripple
Deep Sea Photo No.	—	—	—	—	—	—	—

* Sampling Device
P : Piston Corer, V : Vibro Corer, G : Grab Sampler
D : Dredger, H : Hand

Table 5-3 Data Sheet for Sampling and Deep Sea Photographing

Coastal survey at Offshore Bumi Anyar, including On-land survey

Item \ Location	AM-101	AM-102	AM-103	AM-104	AM-105
Measuring or Sampling Date	Feb.10	Feb.11	Feb.11	Feb.11	Feb.11
Position (Lat.:S) (Long.:E)	6°52.83' 113°06.82'	6°52.41' 113°06.83'	6°51.92' 113°06.85'	6°51.43' 113°06.88'	6°51.02' 113°06.90'
Water Depth (m)	8.0	10.2	13.2	15.8	18.2
Sampling Device	P	P	P	P	H
Bottom Material & Core Length(cm)	Mud 110	Mud 148	Mud 154	Mud 160	Mud with Shell Fragment strong Viscosity
Deep Sea Photo No.	—	—	—	—	—

Soft Rock, Gravel, Sand, Silt, Clay, Mud, Shell Fragment

* Sampling Device
P : Piston Corer, V : Vibro Corer, G : Grab Sampler
D : Dredger, H : Hand

Table 5-4 Data Sheet for Sampling and Deep Sea Photographing

Coastal survey at Offshore Takisung, including On-land survey

Item \ Location	L.P	BM-1	BM-2	BM-3	BM-4	BM-5	BM-6	BM-7
Measuring or Sampling Date	Feb.15	Feb.15	Feb.15	Feb.17	Feb.17	Feb.17	Feb.17	Feb.17
Position (Lat.:S) (Long.:E)	3°52.43' 114°36.71'	3°52.43' 114°36.70'	3°52.44' 114°36.68'	3°52.48' 114°36.44'	3°52.59' 114°35.91'	3°52.70' 114°35.37'	3°52.81' 114°34.85'	3°53.01' 114°34.31'
Water Depth (m)	+2.9	+1.4	+0.9	1.4	3.6	5.2	6.4	7.4
Sampling Device	——	H	H	G	G	G	G	G
Bottom Material Soft Rock Gravel Sand Silt Clay Mud Shell Fragment	Sand with plants	medium Sand	coase Sand with small Pebble, Granule, Shell Fragment	Mud very soft well sorting	Mud with Shell Fragment very soft	Mud with Shell Fragment very soft	sandy Mud with Shell Fragment very soft bad sorting	sandy Mud very soft bad sorting
Deep Sea Photo No.	—	—	—	—	—	—	—	—

* Sampling Device
P : Piston Corer, V : Vibro Corer, G : Grab Sampler
D : Dredger, H : Hand

Table 5-5 Data Sheet for Sampling and Deep Sea Photographing

Ocean survey between Bumi Anyar and Takisung

Item \ Location	O-1	O-2	O-3	V-1	O-4	O-5	O-6
Measuring or Sampling Date	Feb.17	Feb.18	Feb.18	Feb.18	Feb.18	Feb.18	Feb.19
Position (Lat.:S) (Long.:E)	3°53.14' 114°33.32'	3°53.96' 114°29.23'	3°53.48' 114°33.00'	3°53.48' 114°33.00'	4°10.50' 114°19.40'	4°28.75' 114°11.26'	4°46.55' 114°02.93'
Water Depth (m)	9.8	21.6	10.7	10.7	37.	26.1	32.
Sampling Device	P	P	P	V	P	P	P
Bottom Material	sandy Mud - muddy Sand; Gravel is mixed at lower most Mud. This Mud is not soft.	Mud; muddy Sand	G. of Sand Stone; Diameter of G. is about 3 - 4 cm.	Soft Rock (estimation); Alternation S. & C.	muddy Sand; Soft Rock (estimation)	muddy Sand massive Mud Humus is mixed all over	muddy Sand; muddy Sand sandy Mud massive Mud
Core Length(cm)	42	98	6	320	87	136	93
Deep Sea Photo No.	—	—	—	—	1	2	3

Soft Rock, Gravel, Sand, Silt, Clay, Mud, Shell Fragment

* Sampling Device
P : Piston Corer, V : Vibro Corer, G : Grab Sampler
D : Dredger, H : Hand

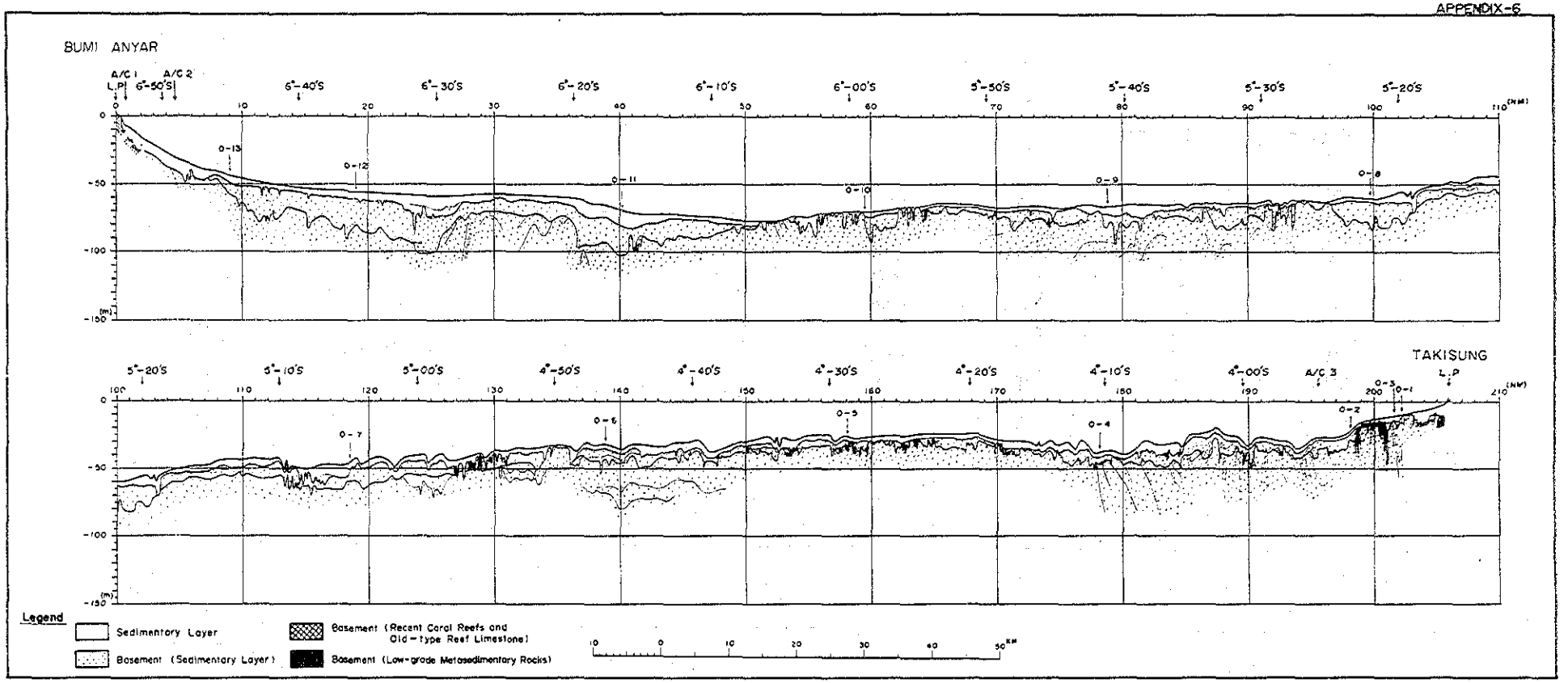
Table 5-6 Data Sheet for Sampling and Deep Sea Photographing

Ocean survey between Bumi Anyar and Takisung

Item \ Location	O-7	O-8	O-9	O-10	O-11	O-12	O-13
Measuring or Sampling Date	Feb.19	Feb.19	Feb.19	Feb.19	Feb.20	Feb.20	Feb.20
Position (Lat.:S) (Long.:E)	5°04.76' 113°54.62'	5°22.08' 113°46.45'	5°41.10' 113°38.00'	5°58.92' 113°30.21'	6°16.66' 113°22.21'	6°35.90' 113°13.00'	6°45.06' 113°08.85'
Water Depth (m)	45.	59.	65.	70.	70.	56.	44.
Sampling Device	P	P	P	P	P	P	P
Bottom Material	muddy Sand / Mud / massive Mud	muddy Sand / Mud / massive Mud; Patch of clay is mixed at lower part. Clay indicate strong viscosity.	Mud / massive Mud	muddy Sand / Mud / massive Mud	massive Mud	Mud / sandy Mud	Mud / sandy Mud - muddy Sand
Core Length(cm)	124	110	141	112	140	128	151
Deep Sea Photo No.	4	5	6	7	8	9	10

Soft Rock, Gravel, Sand, Silt, Clay, Mud, Shell Fragment

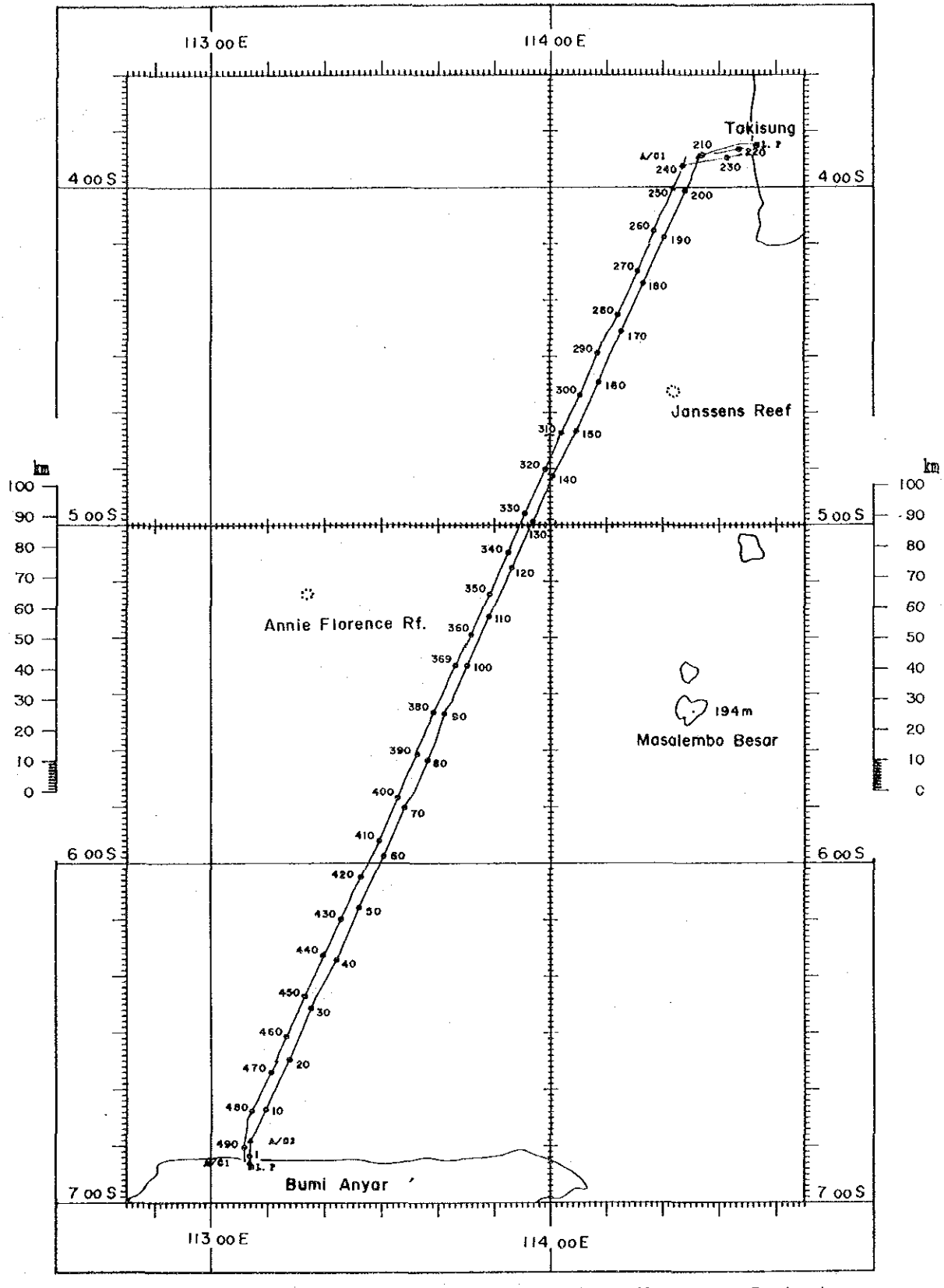
* Sampling Device
P : Piston Corer, V : Vibro Corer, G : Grab Sampler
D : Dredger, H : Hand



BOTTOM AND SUB-BOTTOM PLOFILE ALONG PROPOSED CABLE ROUTE

(Refer to original drawing in Vol. IV)

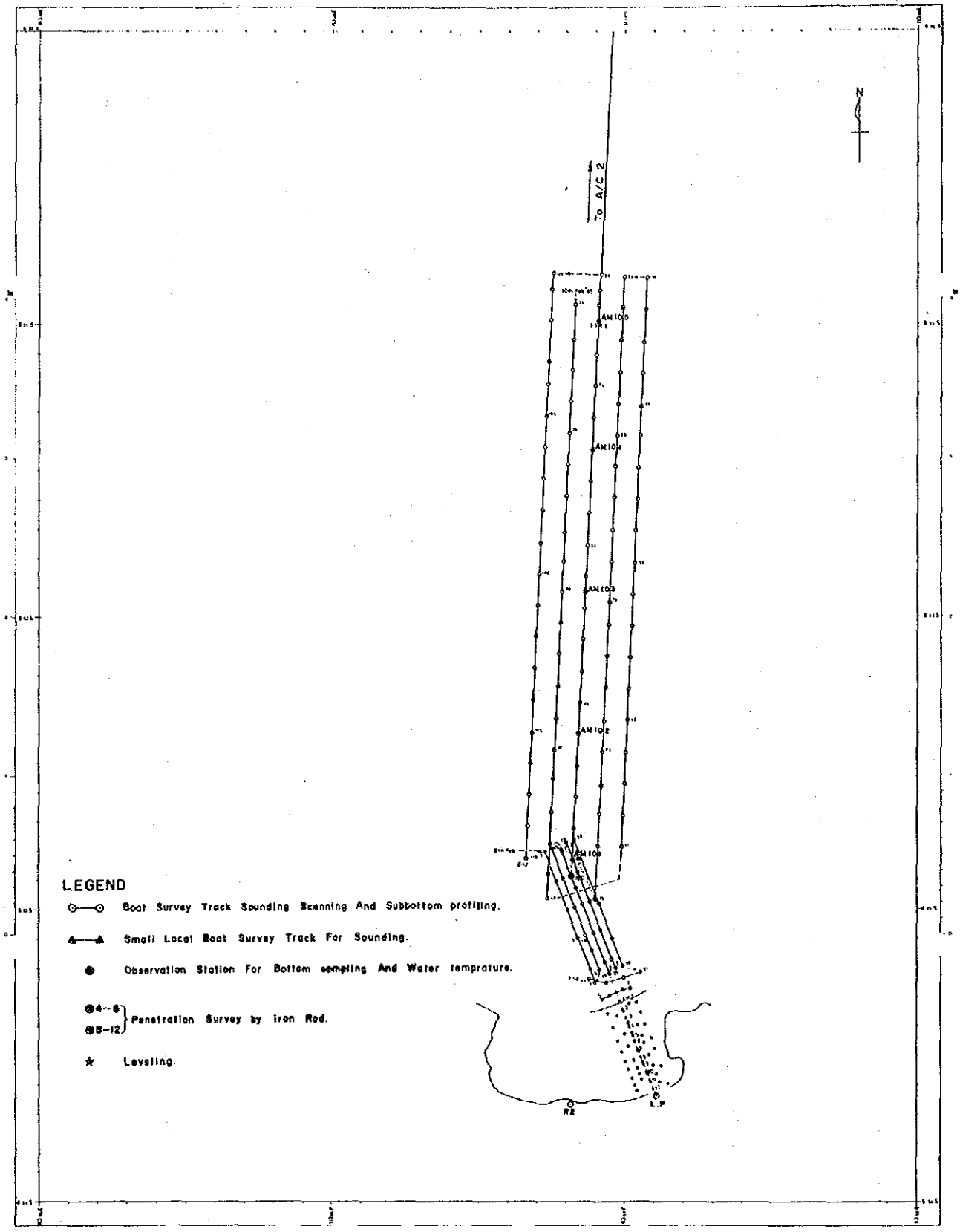
APPENDIX-7



Mercator's Projection

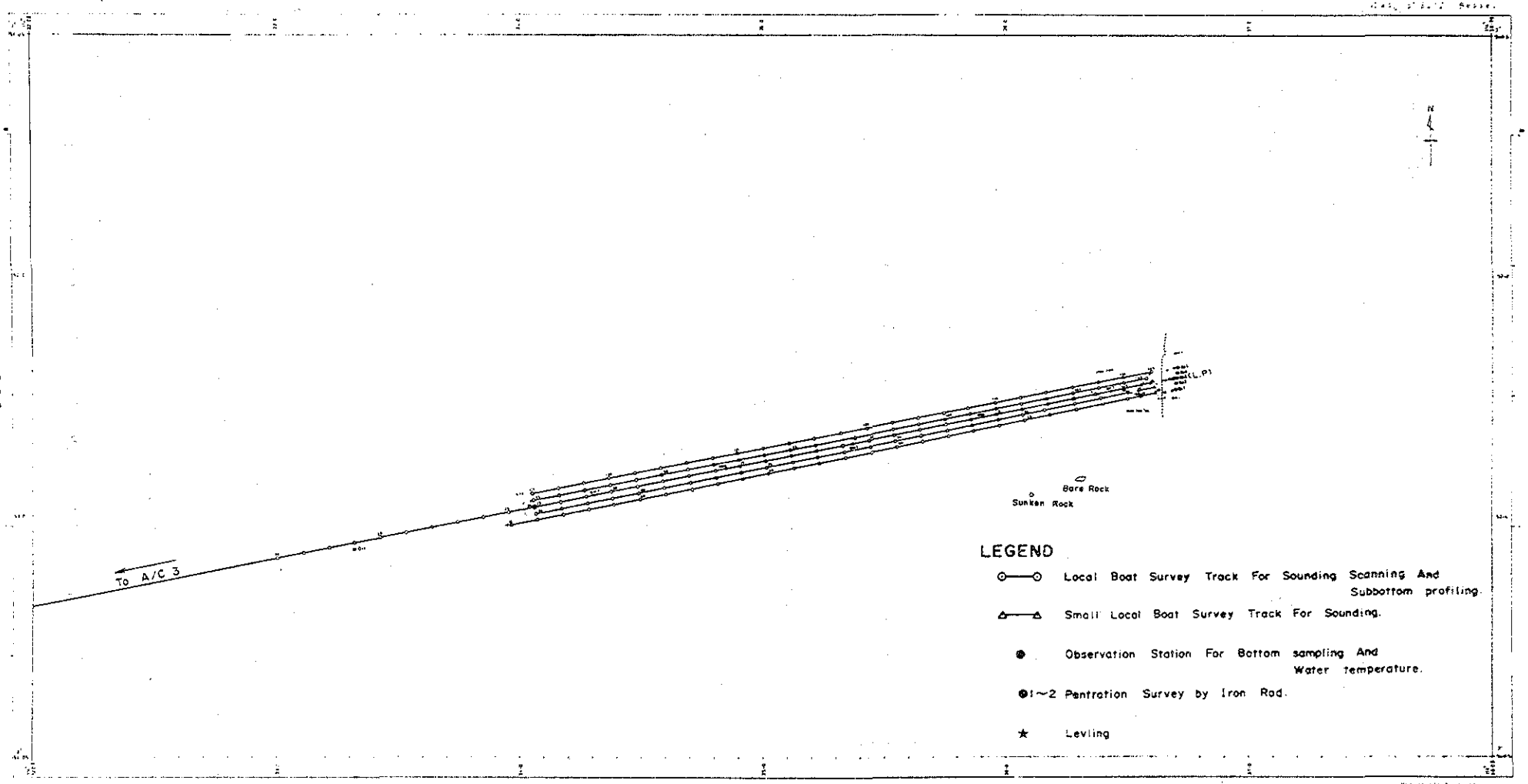
(Refer to original drawing in Vol. IV)

Survey Track for Ocean Area



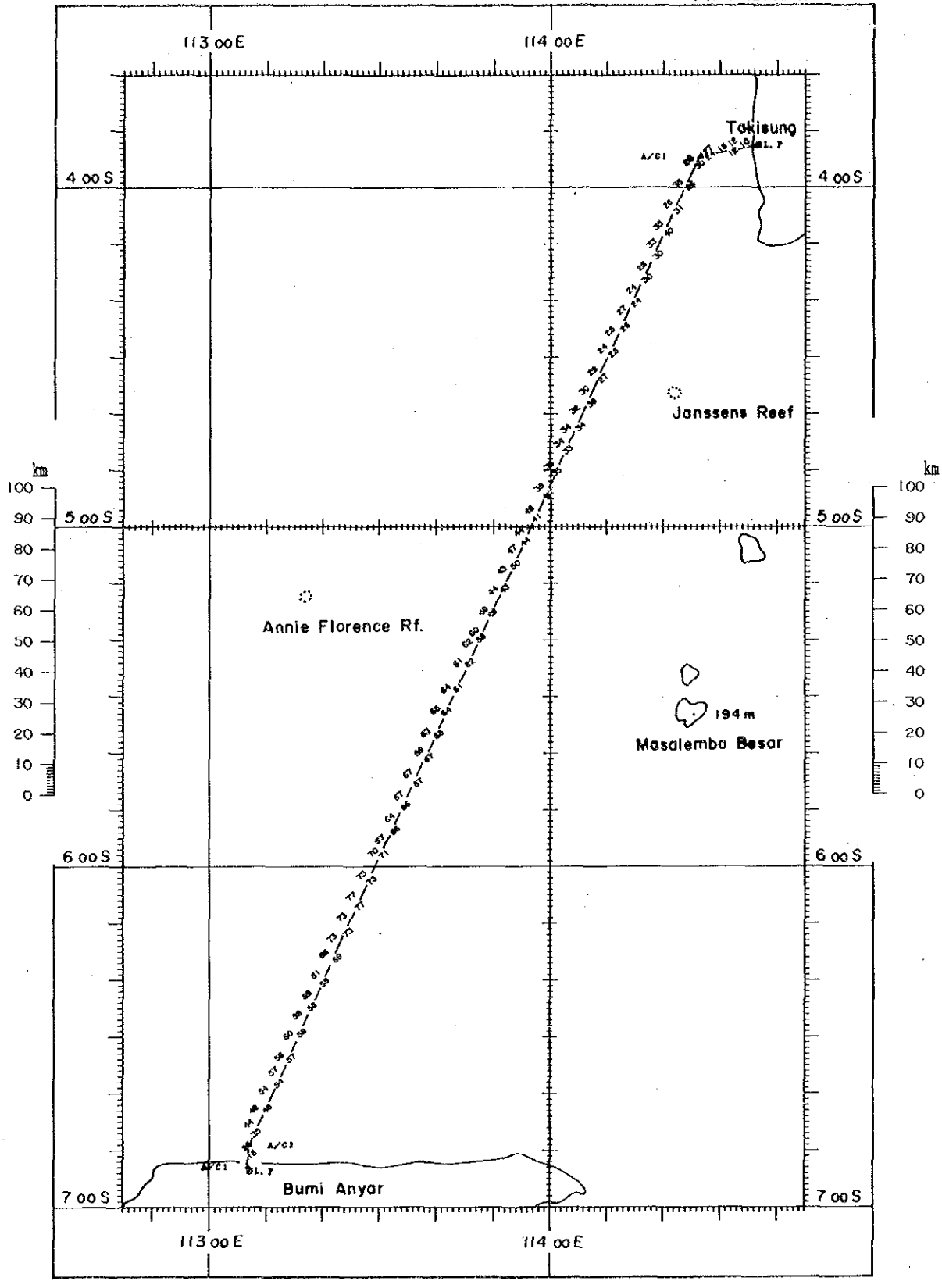
COASTAL SURVEY TRACKS (BUMI ANYAR)

(Refer to original drawing in Vol. IV)



COASTAL SURVEY TRACKS (TAKISUNG)

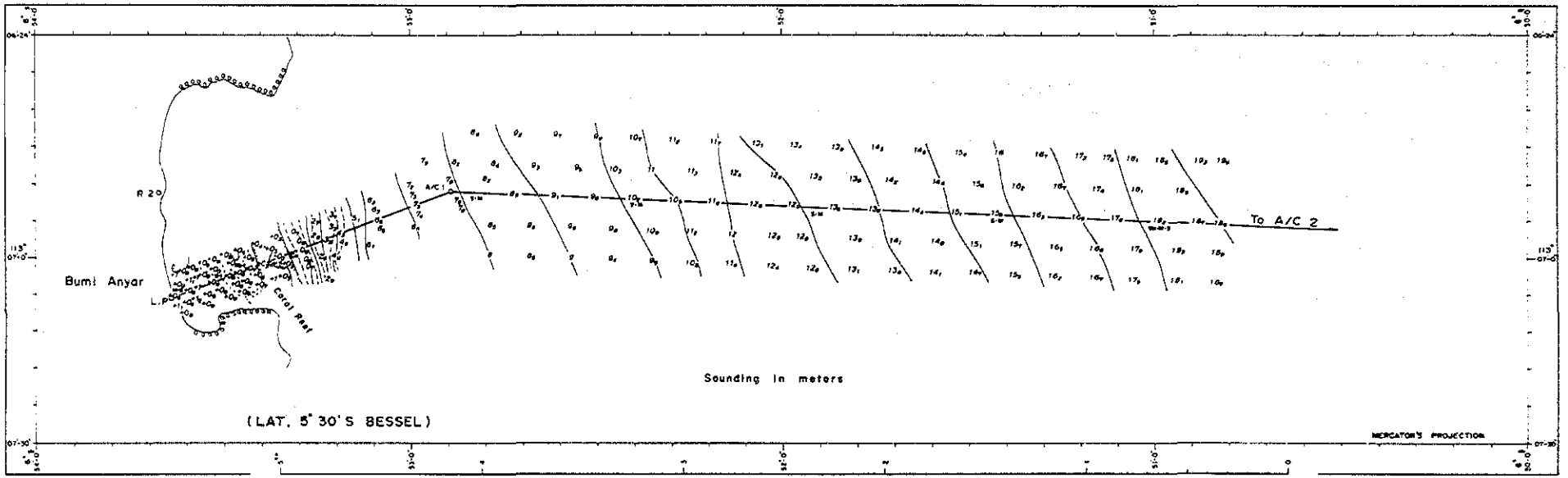
(Refer to original drawing in Vol. Ⅳ)



Mercator's Projection

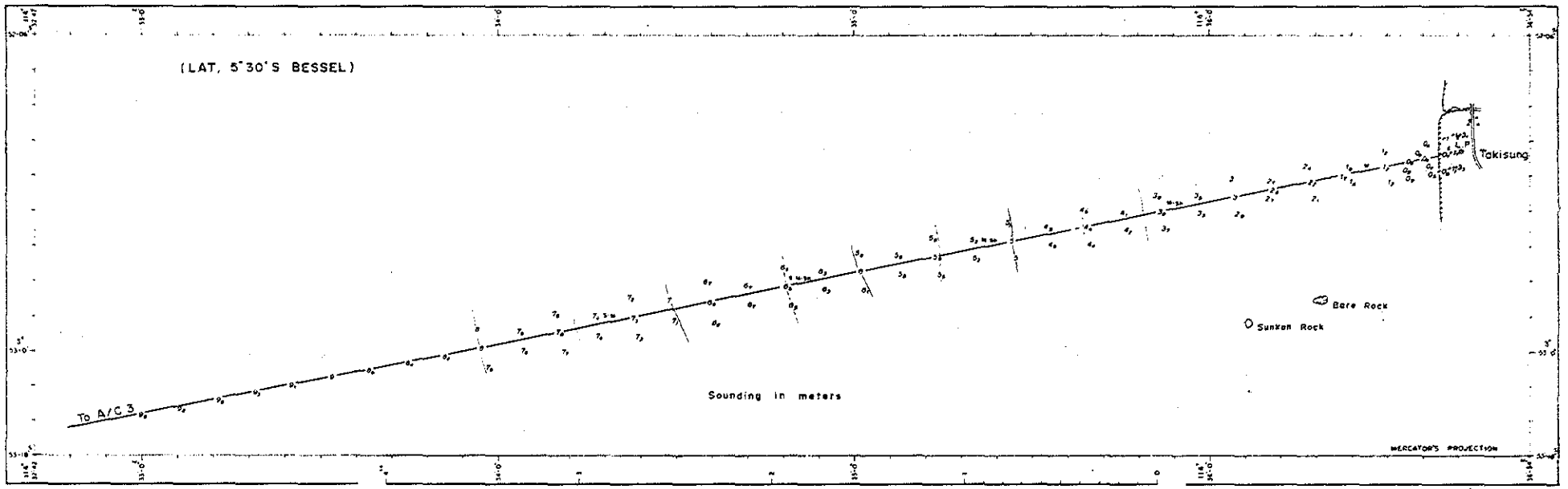
(Refer to original drawing in Vol. IV)

Bathymetric Chart for Ocean Area



BATHYMETRIC AND CONTOUR CHART (BUMI ANYAR APPROACH)

(Refer to original drawing in Vol. IV)



BATHYMETRIC AND CONTOUR CHART (TAKISUNG APPROACH)

(Refer to original drawing in Vol. IV)

Appendix 9. Undersea Photographs

To fully understand and grasp the conditions of sea bottom on the cable route, photographing is done at ten points using a deep sea camera. On the onshore, photographing was to be conducted by a diver, but it had to be abandoned because of extremely turbid sea water.

A list of photographs is given in Table 9-1, photos in Photos No. 01 to No. 10, and the photographing points in Appendix 5.

Table 9-1 Conditions of Undersea Photographing

Photo No.	Point	Water Depth (m)	Bottom	Sea Bottom Condition
1	0-4	37	Muddy sand	Totally covered with muddy sand.
2	0-5	26.1	Muddy sand	Totally covered with muddy sand.
3	0-6	32	Muddy sand	Totally covered with muddy sand.
4	0-7	45	Muddy sand	Totally covered with muddy sand.
5	0-8	59	Muddy sand	Totally covered with muddy sand.
6	0-9	65		Water on the upper layer of sea bottom is so turbid that no photos of the sea bottom have been obtained. Sampling results indicate the bottom is of muddy nature.
7	0-10	70	Muddy sand	Totally covered with muddy sand. Holes which appeared to be an inhabitation tube for sea-bottom creatures are scattered here and there.
8	0-11	70		The water on the upper layer of sea bottom is so turbid that no photos of the sea bottom could be obtained. Sampling results indicate that the bottom is of muddy nature.
9	0-12	56		Same as above.
10	0-13	44		Same as above.

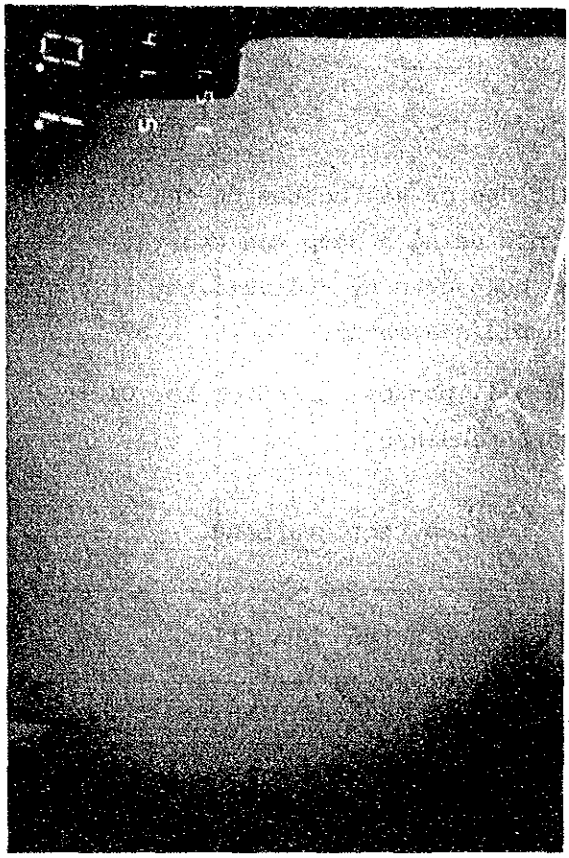


Photo No. 1 (Loc.o-4)

Muddy Sand

Muddy sand covers in all over.

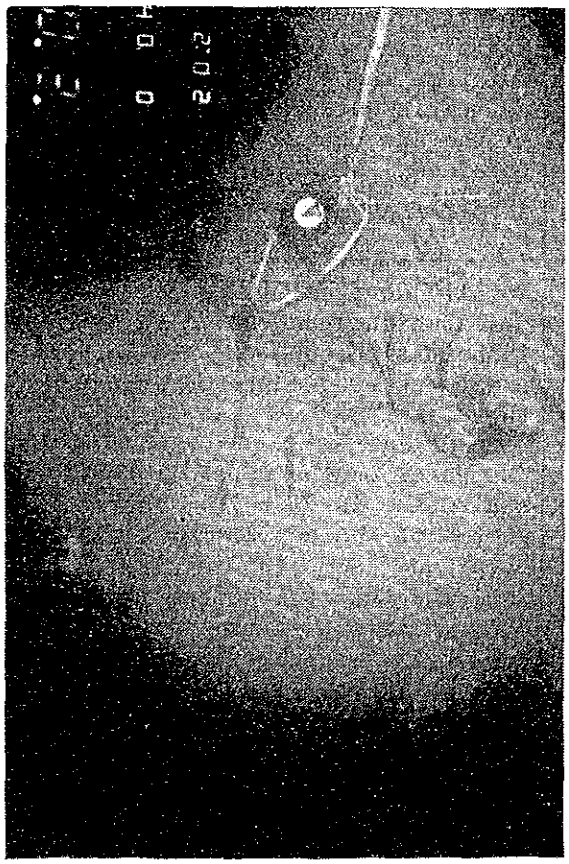


Photo No. 2 (Loc.o-5)

Muddy Sand

Muddy sand covers in all over.

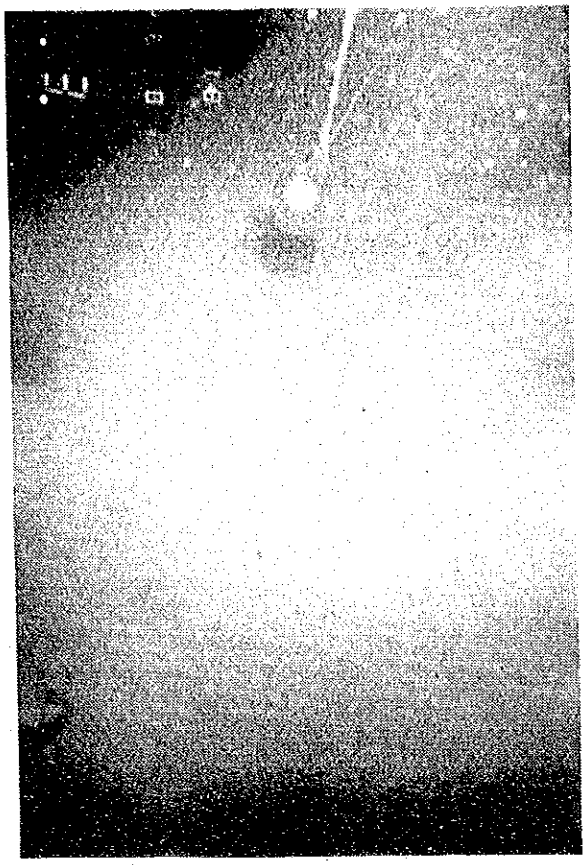


Photo No. 3 (Loc.o-6)

Muddy Sand

Muddy sand covers in all over.

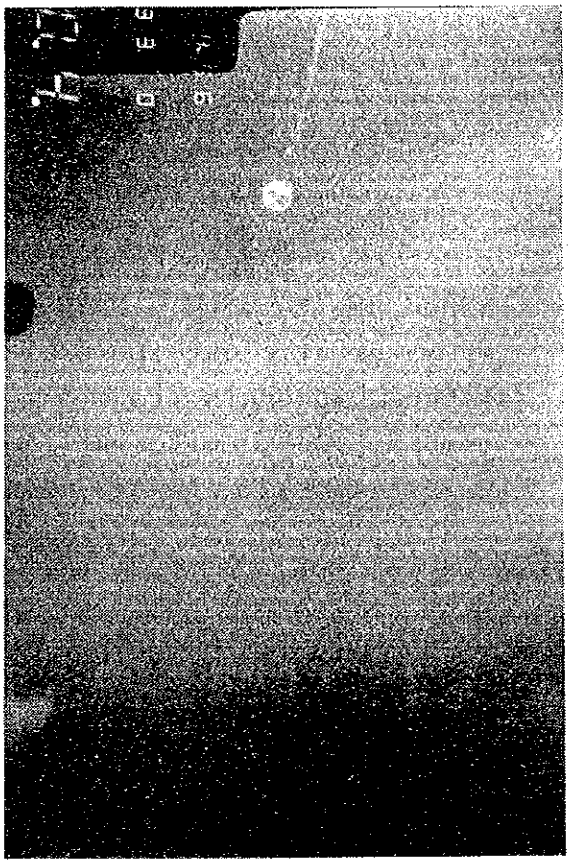


Photo No. 4 (Loc.o-7)

Muddy Sand

Muddy sand covers in all over.

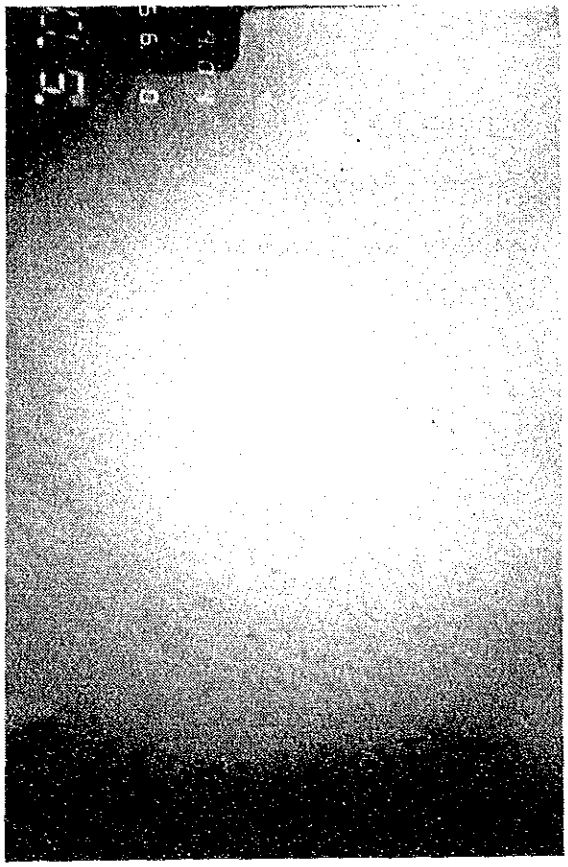


Photo No. 5 (Loc.o-8)

Muddy Sand

Muddy sand covers in all over.

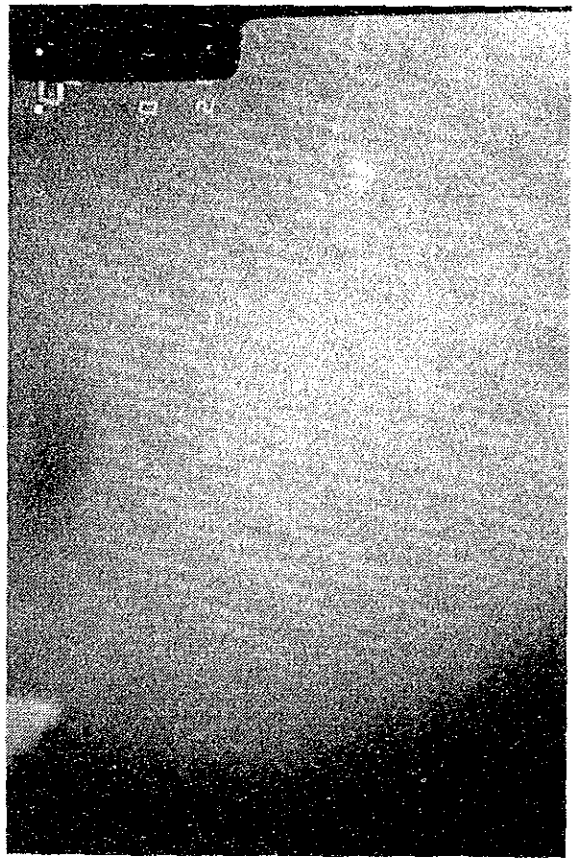


Photo No. 6 (Loc.o-9)

No seabed information obt-ained due to very turbid sea water at right above seabed. According to bot-tom sampling, bottom mat-erial was Mud.

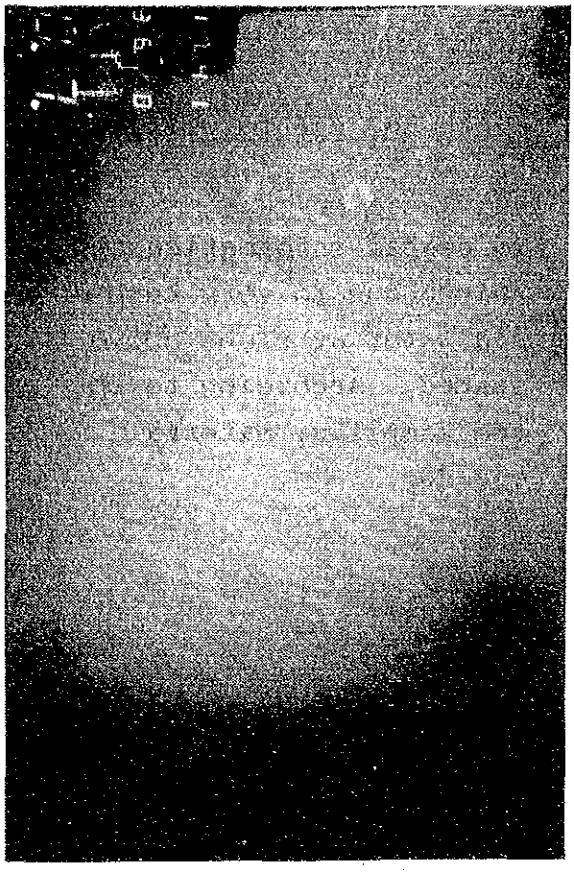


Photo No. 7 (Loc.o-10)

Muddy Sand

Muddy sand covers in all over. Small burrows of benthos which can be esti-mated tubes spreads in some places.

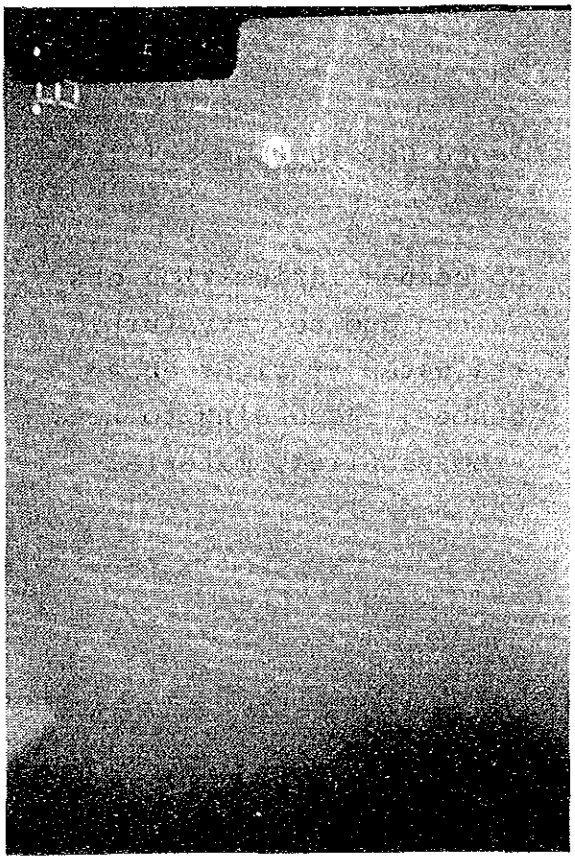


Photo No. 8 (Loc.o-11)

No seabed information obt-ained due to very turbid sea water at right above seabed. According to bot-tom sampling, material was Mud.

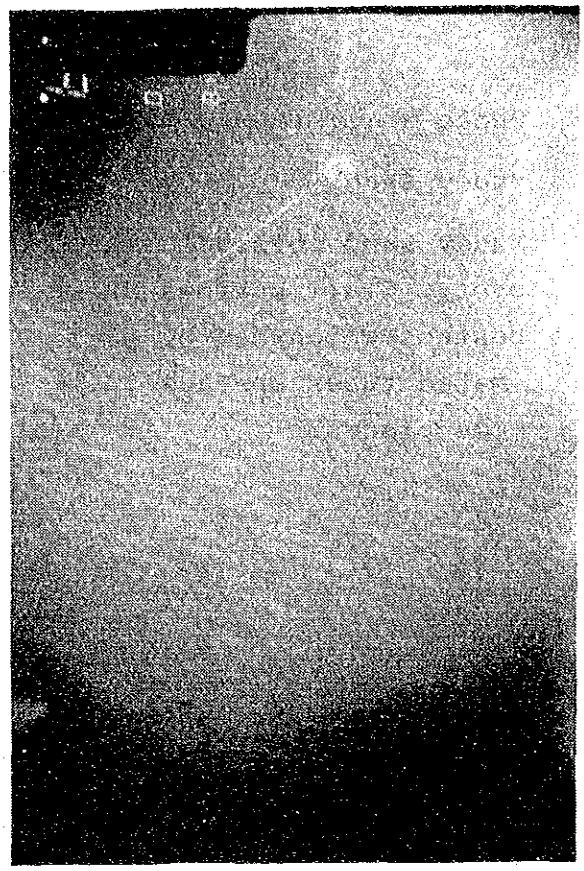


Photo No. 9 (Loc.o-12)

No seabed information obt
-ained due to very turbid
sea water at right above
seabed. According to bot
tom sampling, material
was Mud.

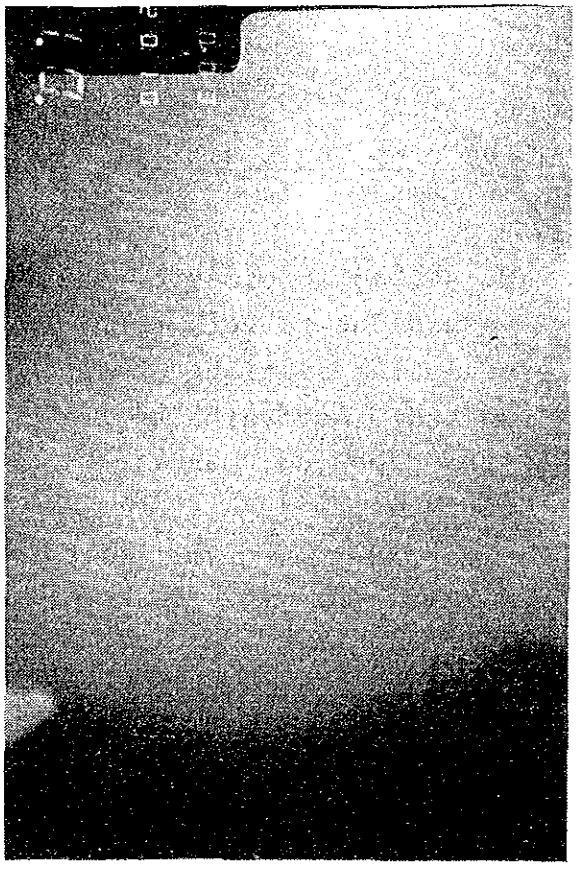


Photo No. 10 (Loc.o-13)

No seabed information obt
-ained due to very turbid
sea water at right above
seabed. According to bot
-tom sampling, material
was Mud.

Appendix 10. Results of Side Scanning

Table 10-1 Result of Side Scanning in Coastal Survey

(At Bumi Anyar, survey line No. 3)

Fix No.	Distance From L.P (N.M)	Recorded Information
19	0.4	
		The record which is estimated to be coral was obtained out of fix No. 19. Many wavy patterns*1
17	0.6	
		Almost no information
A/C 1	0.8	

Remarks

*1: The water was so shallow that waves were recorded .

It is estimated that the seafloor is almost flat and smooth as a whole.

Table 10-2 Result of Side Scanning in Coastal Survey

(At Bumi Anyar, survey line No. 3)

Fix No.	Distance From L.P (N.M)	Recorded Information
A/C 1	0.8	
		Almost no information*1
80	0.9	
		Many wavy patterns*2
87	1.6	Dark tone band (width: about 20 m, the direction of elongation: E-W)*3
		Several wavy patterns*2
90	1.9	
		Almost no information*1
97	2.7	
		Several dark tone bands (width: about 50 m, the direction of elongation: E-W)*4
99	2.9	

Remarks

*1: It is estimated that the seafloor is almost flat and smooth.

*2: The water is so shallow that waves were recorded.

*3: According to the sounding record, the relative steep slope of the seabed affected this record.

*4: According to the sounding record, the gentle relief affected this record.

Table 10-3 Result of Side Scanning in Ocean Survey

Fix No.	From L.P. Distance (N.M)	Dimple		Others
		Density (Nos/km^2)	Description	
1	2.0			
		0		Dark tone band*1
2	3.0			
		0		Almost no information*2
A/C 2	4.7			
		0		Almost no information*2
8	8.9			
		5	Shape: Circle, ellipse, rectangle and irregular shape Size : Several tens of meters in length and width or in diameter Relative height: several tens of centimeters in the rough (hereinafter referred to as dimple of type A)	
15	15.6			
		3	Type A	
23	23.4			
		1	Type A	
26	26.3			
		7	Type A	
27	27.2			
		0		Almost no information*2
43	42.8			

(to be continued)

Table 10-3 Result of Side Scanning in Ocean Survey (to be cont'd)

Fix No.	From L.P. Distance	Dimple		Others
		Density	Description	
		3	Most dimples have irregular shape*3. The scale and the relative height are same as type A (hereinafter referred to as dimple of type B)	
50	49.8			

Remarks

*1 : This is affected by the gentle relief according to the sounding record.
*2 : It is estimated that the seafloor is almost flat and smooth.
*3 : This dimple makes an irregular shape from the result that several dimples gather.

Table 10-4 Result of Side Scanning in Ocean Survey

Fix No.	Distance	Dimple		Others
		Density	Description	
50	49.8			
		9	Type B	
57	56.8			
			No record*1	
59 & Sur-roun dings	58.8		Gathering of rice-shaped dimples which are 10-20M in size*2 The gathering area is about 150x150M in size. (hereinafter referred to as dimple of type C)	
		8	Type B	
61 & Sur-roun dings	60.8		Type C There are two gathering areas. Both of these are about 200 x 200 M in size.	
		8	Type B	
67	66.3			
		0		Almost no information*3
69	68.2			
		7	Type B	
74	72.8			
		0		Almost no information*3
75	73.7			
		5	Type B	
77	75.7			

(to be continued)

Table 10-4 Result of Side Scanning in Ocean Survey (to be cont'd)

Remarks

*1: Because some drifting substances caught on the tow-fish, tow-fish are withdrawn on board.

*2: According to the sounding record, the gathering area exists in the large scale depression.

*3: It is estimated that the seafloor is almost flat and smooth.

Table 10-5 Result of Side Scanning in Ocean Survey

Fix No.	Distance	Dimple		Others
		Density	Description	
77	75.7			
		16	Type B	
80	78.5			
		34	Type B	
82	80.4			
		16	Type B	
87	84.7			
			No Record*1	
90	87.1			
		20	Type B	
102	98.4			

Remarks

*1 : Because some fishing implements caught on the tow-fish, tow-fish was withdrawn on board.

Table 10-6 Result of Side Scanning in Ocean Survey

Fix No.	Distance	Dimple		Others
		Density	Description	
102	98.4			
			Many rice-shaped dimples which are about 5 x 5 M in size gathering in the dark tone band mentioned right. (hereinafter referred to as dimple of type C')	Dark tone band*1 Those bands are 100 ∿ 1000 m in width.
105	101.3			
		17	Type B Many dimples of type C' gathering in the dark tone band mentioned right.	Between fix No. 110 and No. 111 dark tone band (about 80 M in width) was recorded.
118	113.8			
		26	Type B	
123	118.2			
		14	Type B Between fix No. 126 and No. 127, Many dimples of type C' gathering in the ellipse-shaped area (about 120 x 130 M in size).	
128	122.7			
		5	Type B	
132	126.3			
		16	Type B	
136	129.9			

Remarks

*1 : These dark tone bands have close relationship with topographic undulations, the wave length of which is about 300-500 M, according to the sounding record.

Table 10-7 Result of Side Scanning in Ocean Survey

Fix No.	Distance	Dimple		Others
		Density	Description	
136	129.9			
		5	Type B	
140	133.4			
			Few dimples were recorded.	
143	136.0			
		11	Type B	
144	136.8		Many dimples of type C' gathering in the small area (about 350 x 80 M in size).	
		0		Dark tone band*1
145	137.8		Many dimples of type C' gather in the small area (about 400 x 800 M in size).	
			Few dimples were recorded.	
147	139.5			
		4	Type B	
154	146.2			
		0		Dark tone band*1 (about 1 km in width)
155	147.1			
		34	Type B	
156	148.1			

Remarks

*1 : This dark tone band indicates convex topograpy, according to the sounding record.

Table 10-8 Result of Side Scanning in Ocean Survey

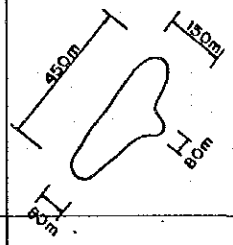
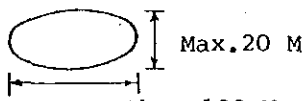
Fix No.	Distance	Dimple		Others
		Density	Description	
156	148.1			
		9	Type B	
158	149.9			
			Few dimples were recorded.	Recording tone is dark as a whole.*1
161	152.8			
		0		Recording tone is alternation of dark tone and light tone.
163	154.9			
		0		Striped pattern*2 Direction of arrangement: N-S Pitch: 30-50 M Recording tone is dark as a whole.*1
165	156.7			
		3	Type B	
167	158.7			
		19	Type B	
168	159.7			
		2	Type B	
169	160.6			
		13	Type B	
170	161.6			

Remarks

*1 : It seems that dark tone indicates the distribution of coarser sediments, such as sandy sediments.

*2 : It seems that this striped pattern shows sand wave. According to the shadows of record, the height of sand wave should be several tens centimeters.

Table 10-9 Result of Side Scanning in Ocean Survey

Fix No.	Distance	Dimple		Others
		Density	Description	
170	161.6			
		2	Type B	
174	165.5			
			Many dimples of type C' gather in the dark tone area mentioned at right.	Dark tone band shape is showed in the following figure. 
175	166.4			
		4	Type B	
177	168.3			
		20	The dimples in this area are larger than those in the other area. Shape: Ellipse Size :  Max. more than 100 M Relative height: Max. more than 1 M Direction of arrangement: NNE-SWS (hereinafter referred to as dimple of type D)	
180	171.0			
		8	Type B	
181	171.9			

Remarks

Table 10-10 Result of Side Scanning in Ocean Survey

Fix No.	Distance	Dimple		Others
		Density	Description	
181	171.9			
		16	Type D The direction of the arrangement is N-S.	
182	172.8			
		32	Type B	
185	175.5			
		26	Type B	
191	180.9			
		45	Type B	
195	184.5			
		20	Type B	
197	186.3			
		23	Type B	Recording tone is dark as a whole.*1
199	188.1			
		59	Type B	
200	189.1			

Remarks

*1 : It seems that dark tone indicates the distribution of coarser sediments, such as sandy sediments.

Table 10-11 Result of Side Scanning in Ocean Survey

Fix No.	Distance	Dimple		Others
		Density	Description	
200	189.1			
		38	Type B	
205	193.0			Spotted pattern (Dark tone*1 and light tone)
		8	Type B	Spotted pattern (Dark tone*1 and light tone)
206	193.8			
		14	Type B	
A/C 3	195.6			
		14	Type B	
209	195.7			
		0		Almost no information*2
213	198.9			
		0		The small areas of dark tone*1 were recorded in places
215	200.8			
		0		Almost no information*2
218	203.3			

Remarks

*1 : It seems that dark tone indicates the distribution of coarser sediments, such as sandy sediments.

*2 : It is estimated that the seafloor is almost flat and smooth.

Table 10-12 Result of Side Scanning in Coastal Survey

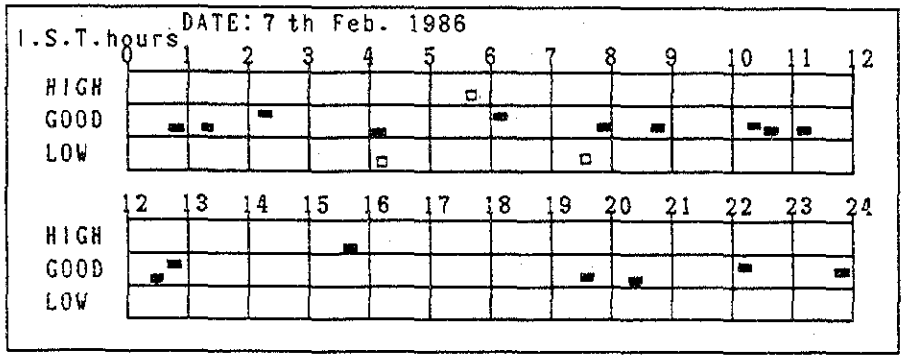
(At Takisung, Survey line No. 3)

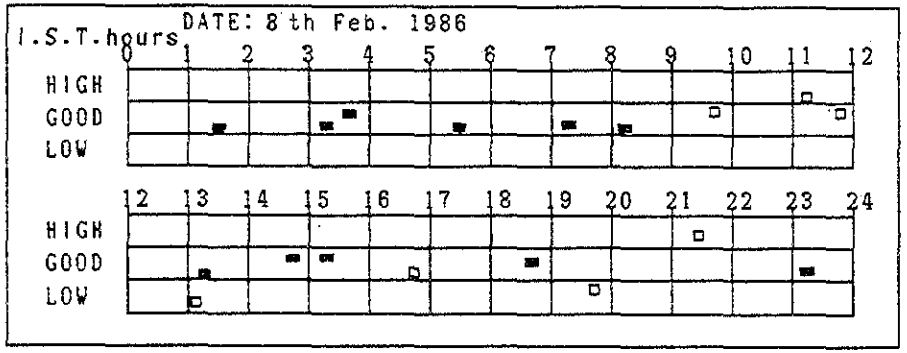
Fix No.	Distance From L.P	Recorded Information
34	202.2	
		Almost no information Wavy patterns and dark tone bands were recorded at here and there, but those were recorded caused by waves and wakes and were not true information from the seafloor.
1	205.6	

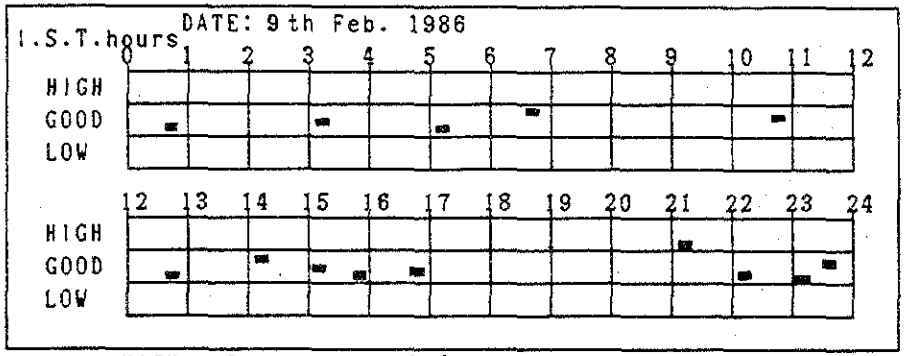
Remarks

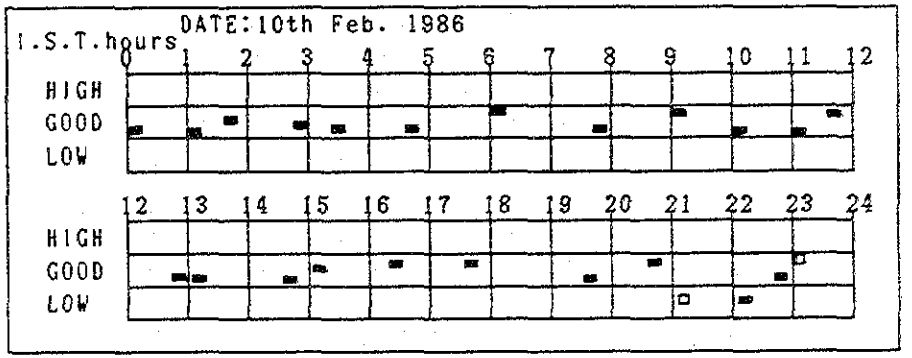
It is estimated as a whole that the seafloor is flat and smooth.

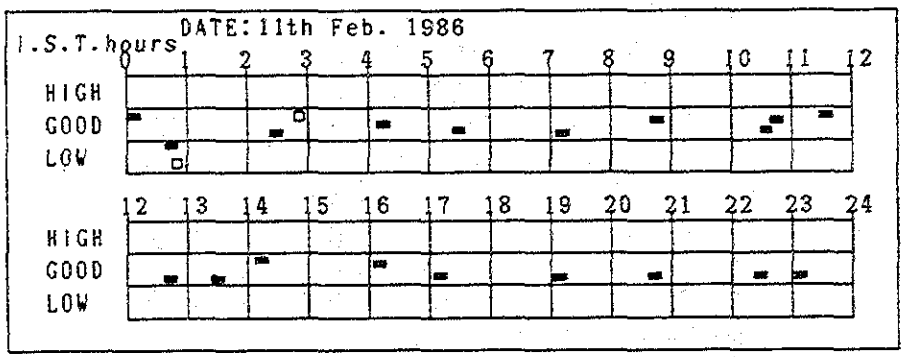
SATELLITE PASS FREQUENCY

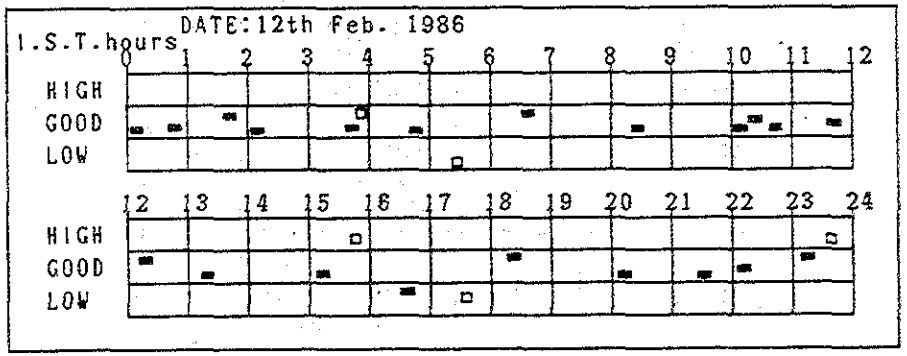












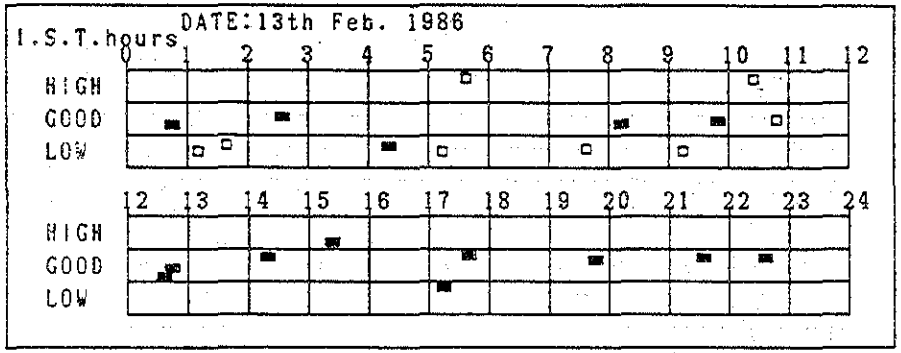
HIGH Passes-Above70°Alt ■:O.K

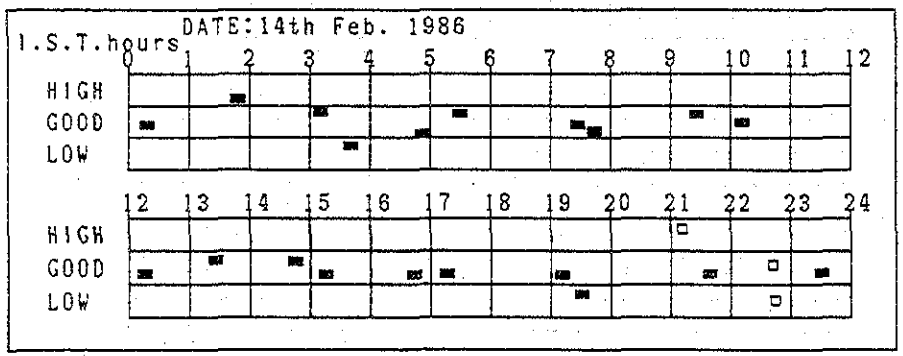
GOOD Passes-10°-70°Alt □:N.G

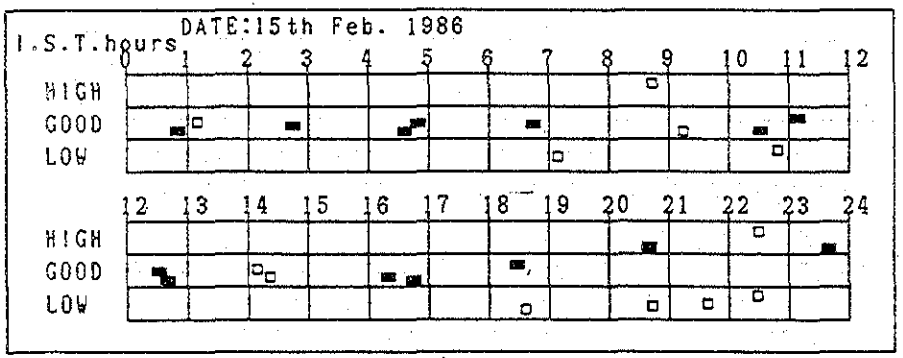
LOW Passes-Less than10°Alt

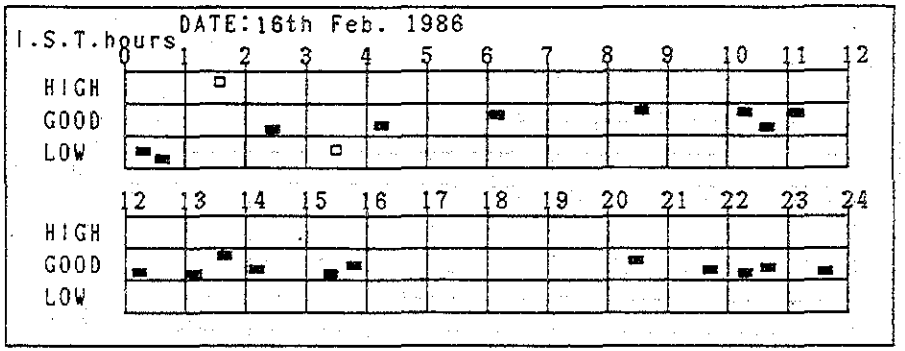
I.S.T:Indonesia Standard Time

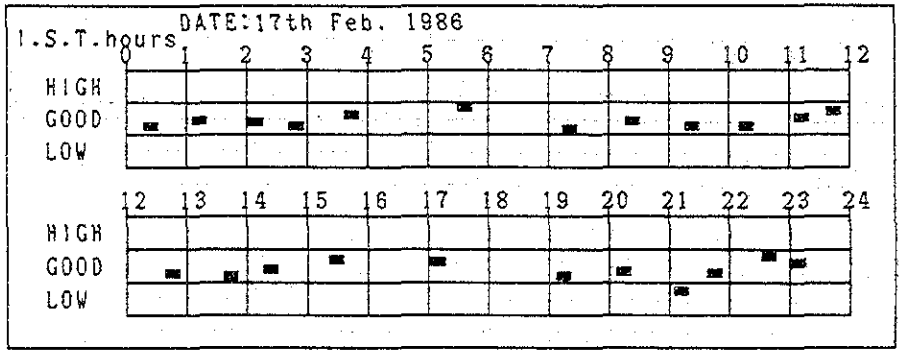
SATELLITE PASS · FREQUENCY

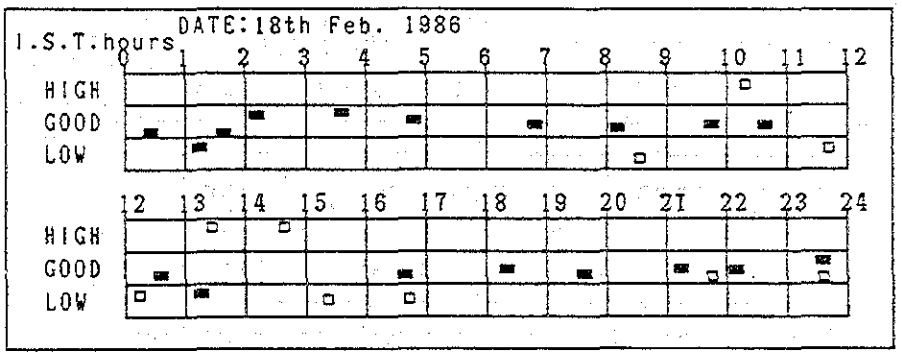






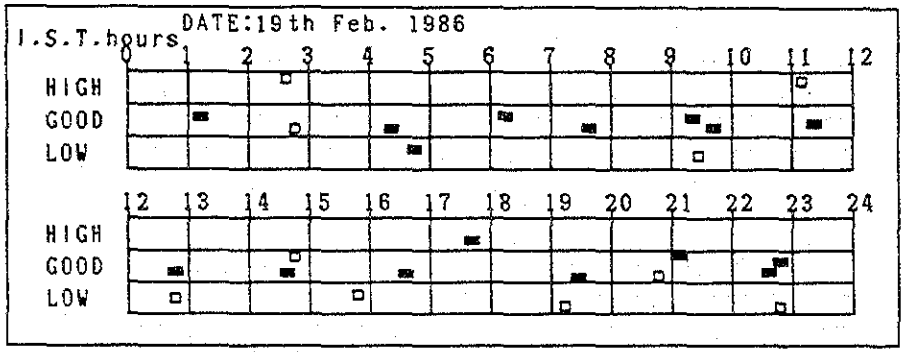


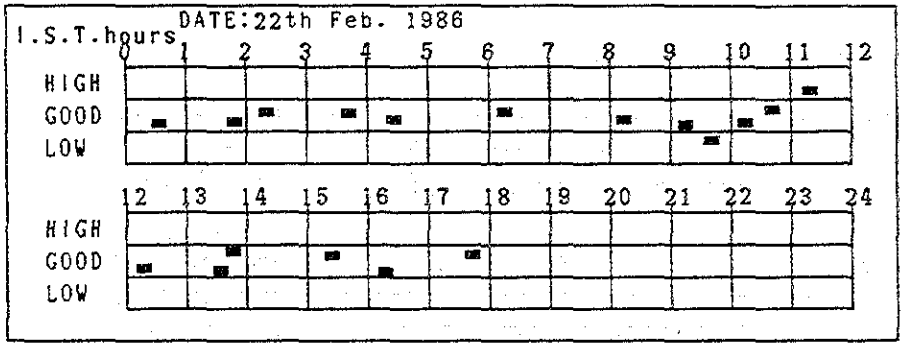


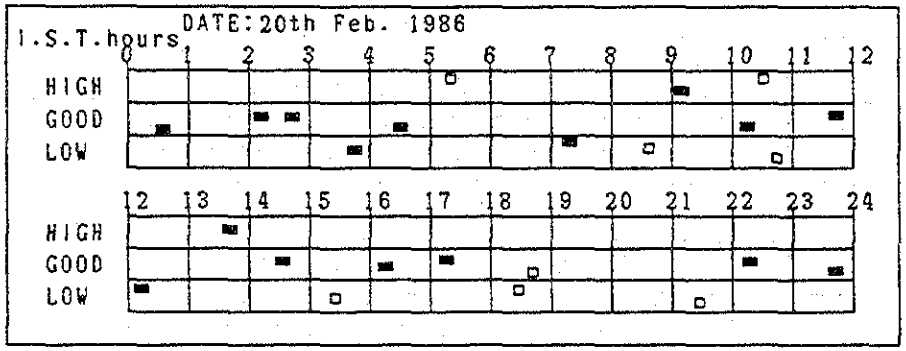


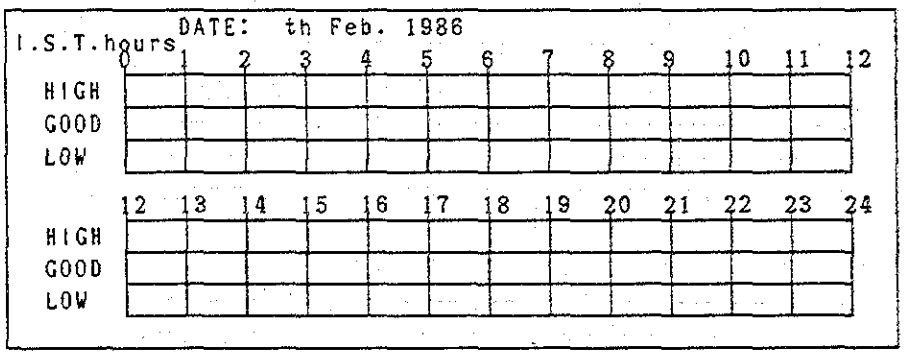
HIGH Passes-Above70°Alt ■:O.K
GOOD Passes-10°-70°Alt □:N.G
LOW Passes-Less than10°Alt
I.S.T:Indonesia Standard Time

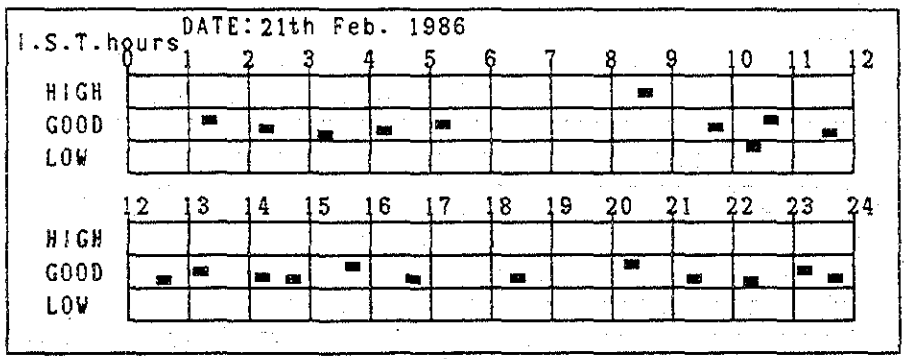
SATELLITE PASS FREQUENCY

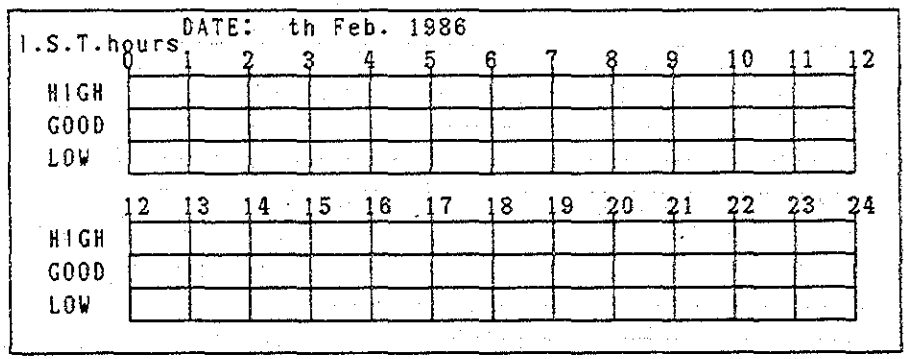










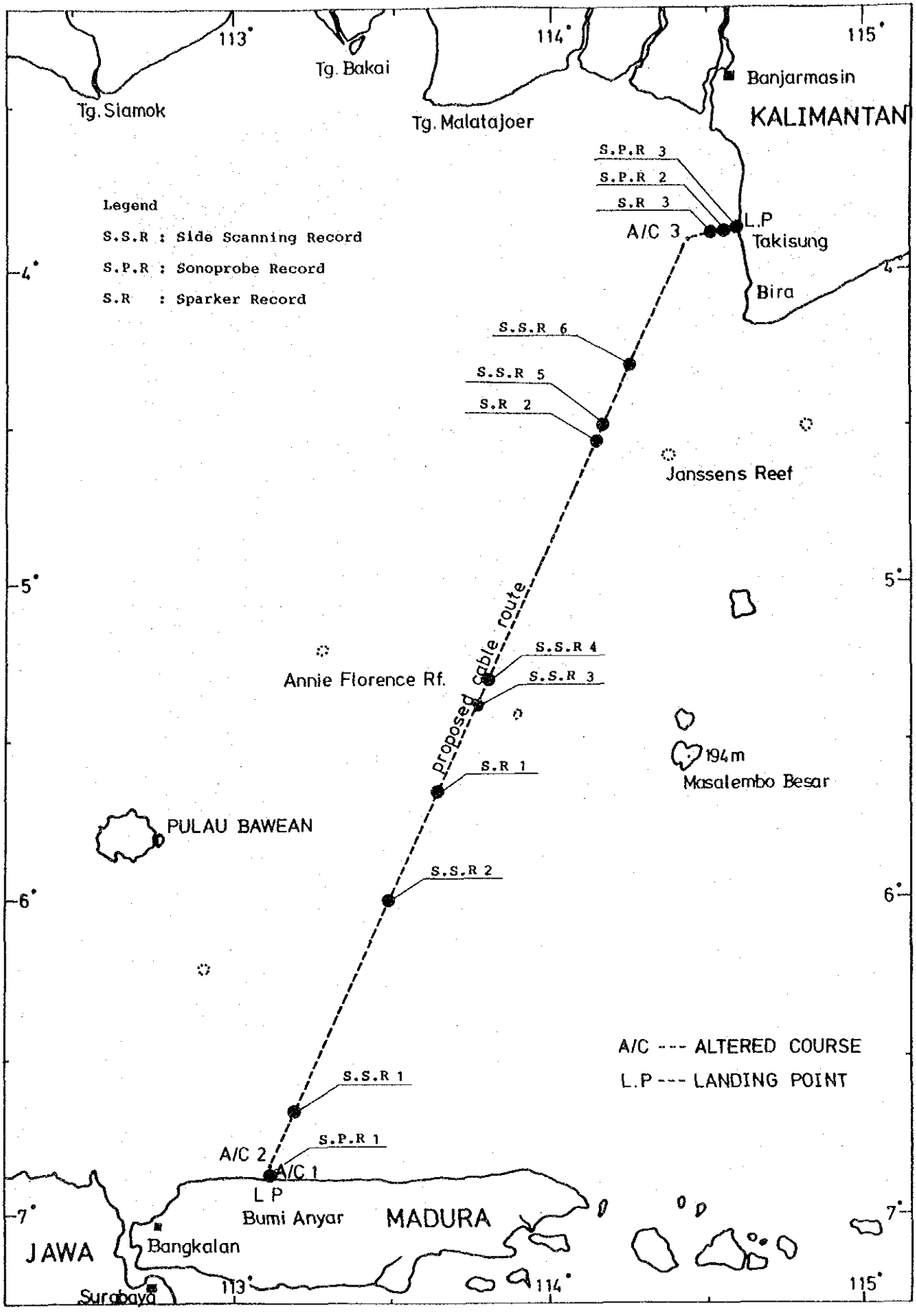


HIGH Passes-Above70°Alt ■:O.K

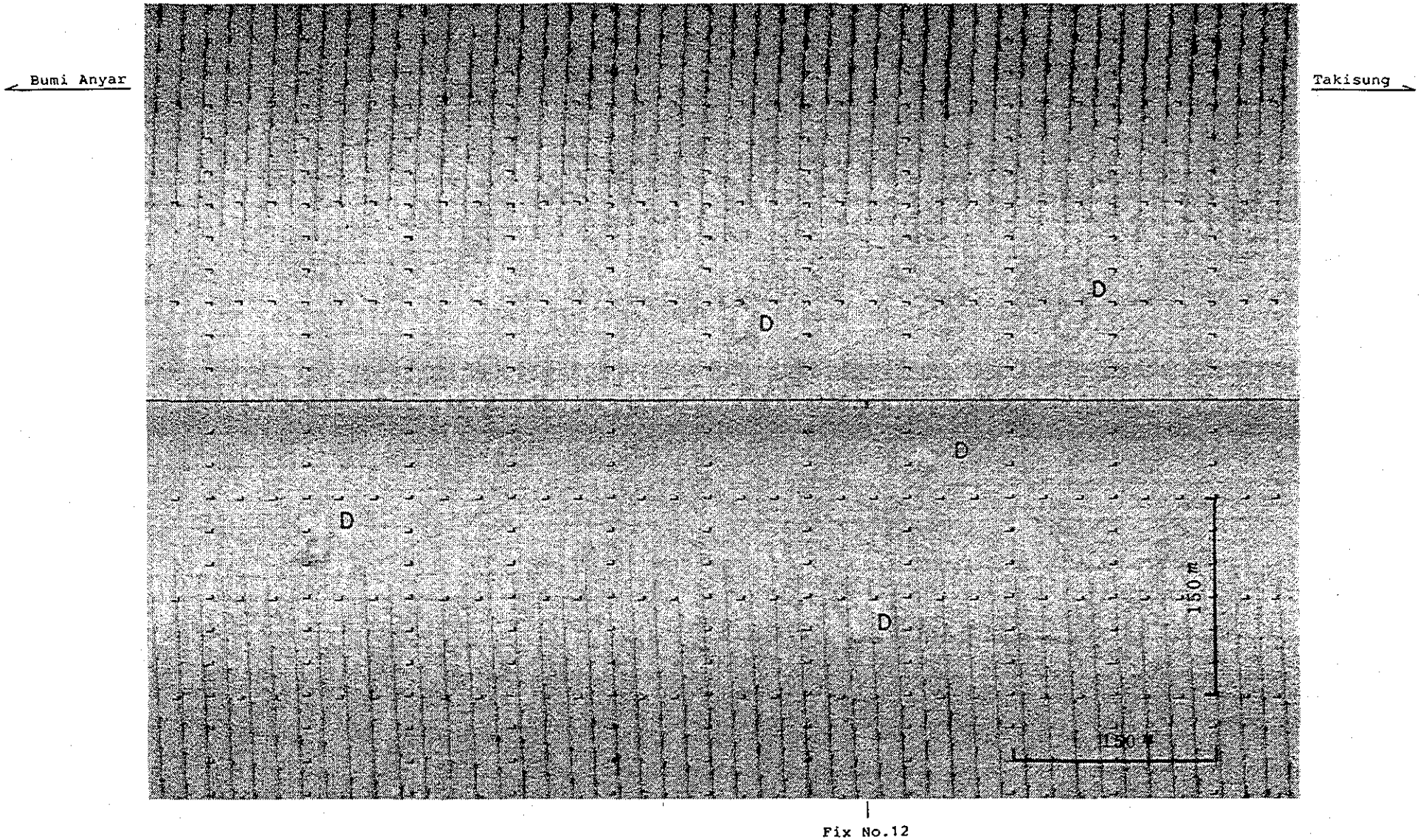
GOOD Passes-10°-70°Alt □:N.G

LOW Passes-Less than10°Alt

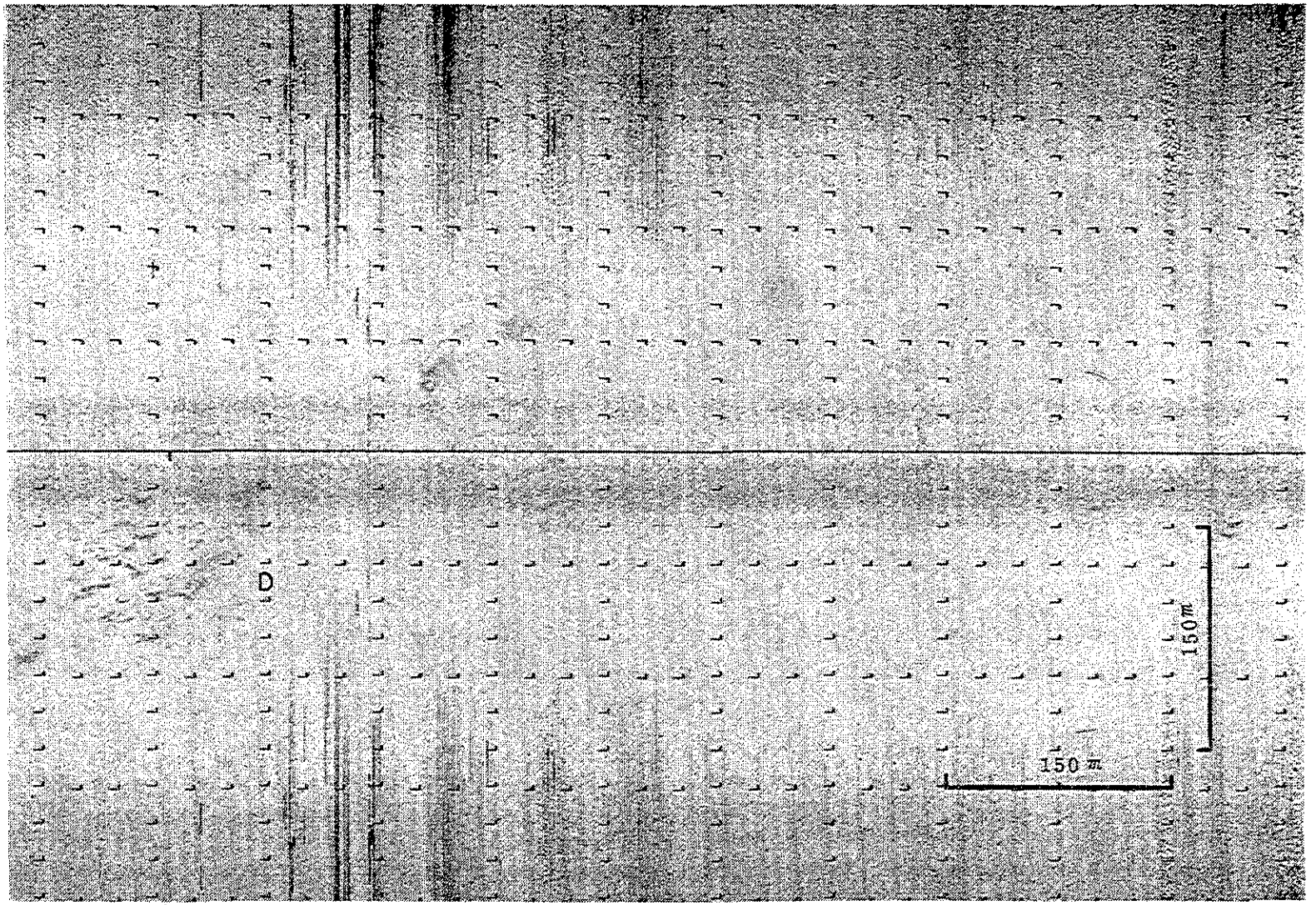
I.S.T:Indonesia Standard Time



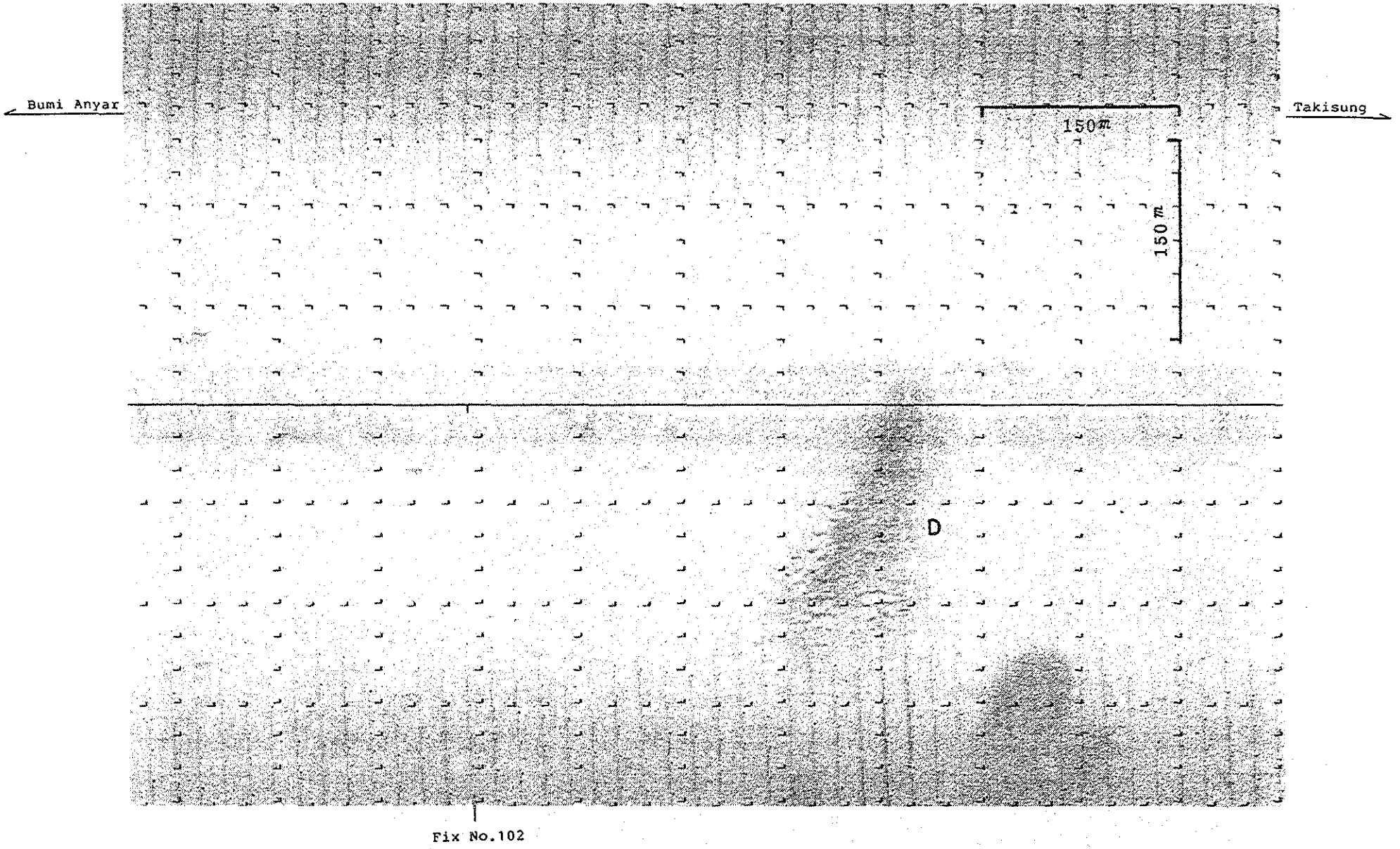
Location Map for Record of Side Scanning, Sonoprobe and Sparker



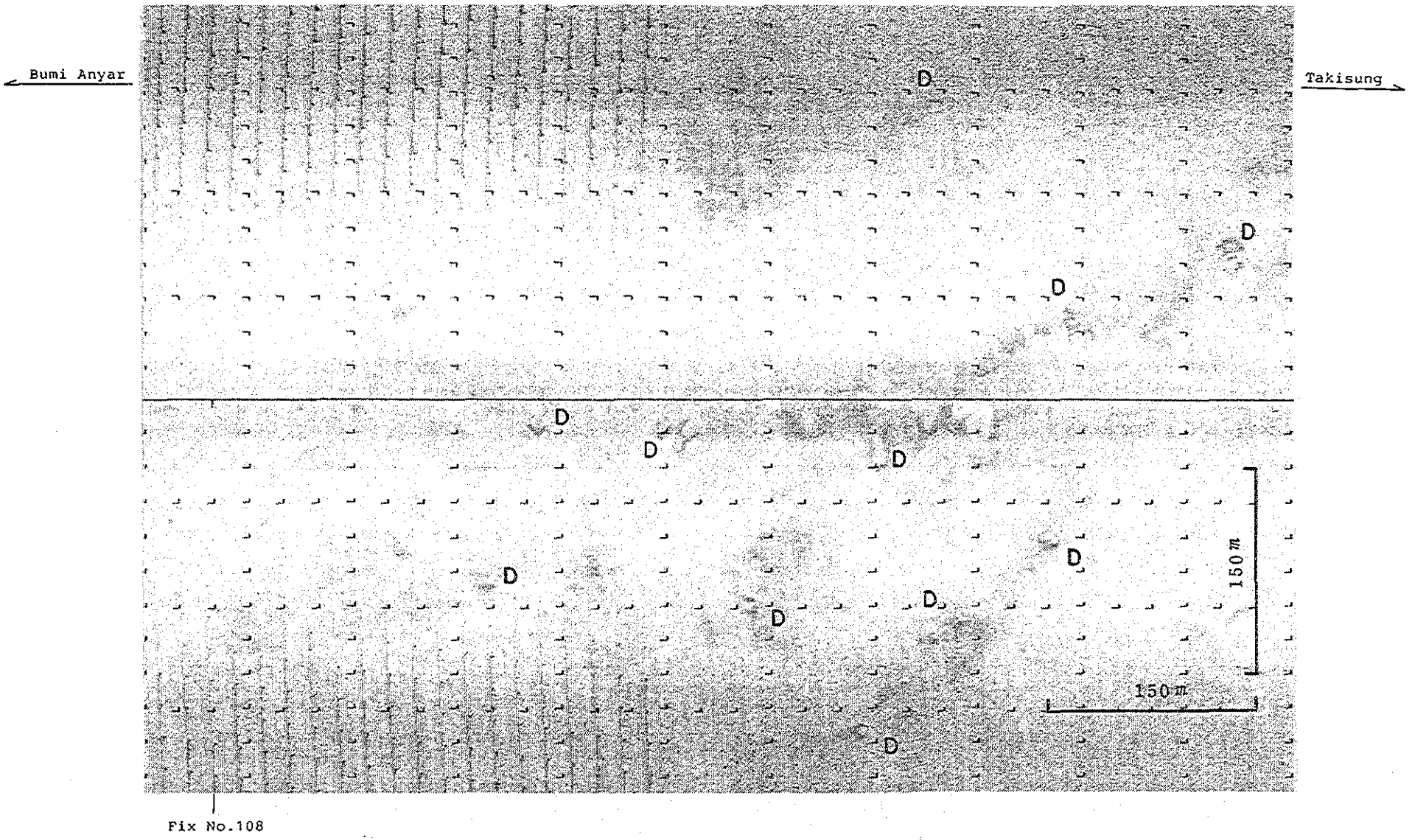
Side Scanning Record 1 Dimples of Type A



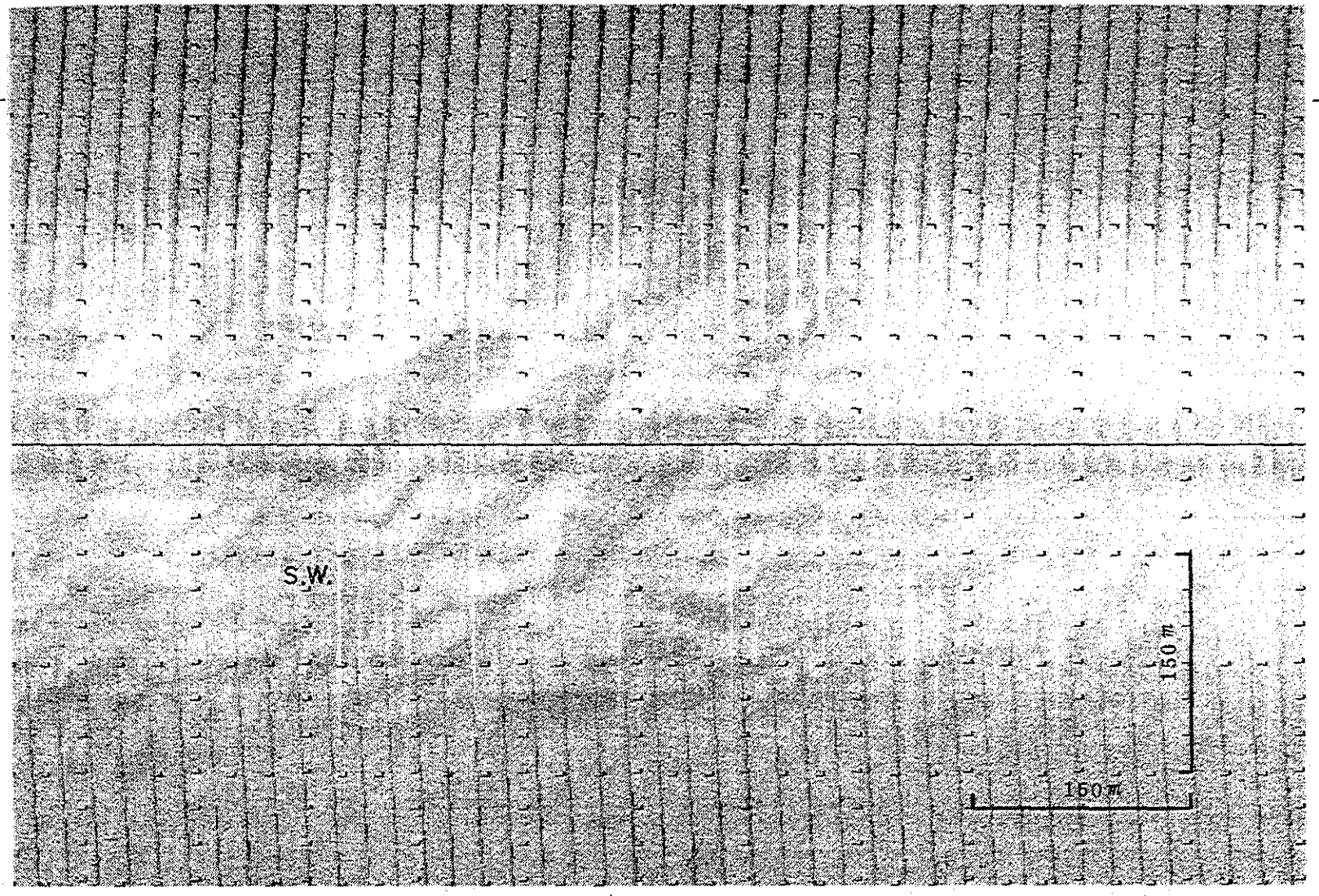
Side Scanning Record 2 Dimples of Type C



Side Scanning Record 3 Dimples of Type C'

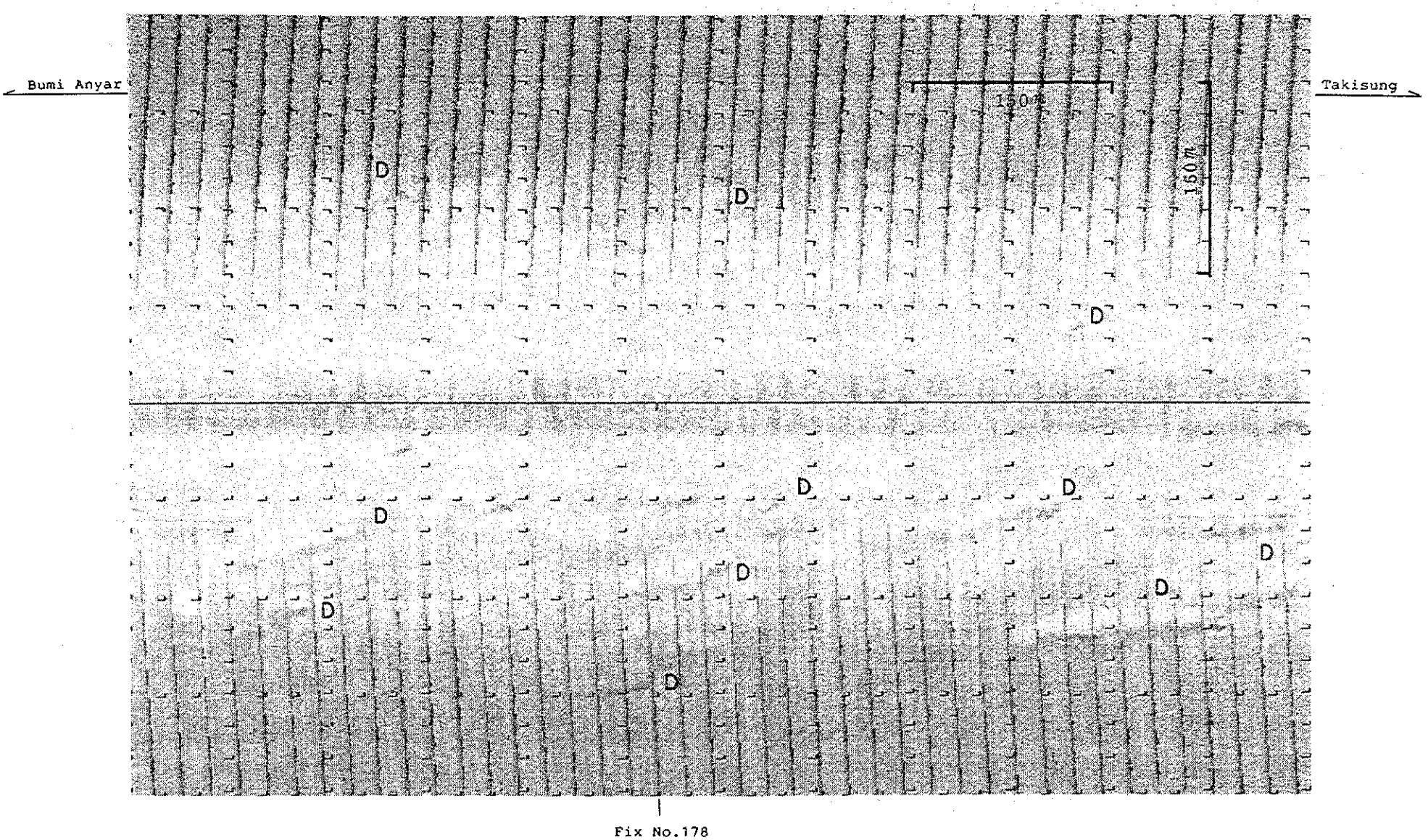


Side Scanning Record 4 Dimples of Type B



between Fix No.164 and 165

Side Scanning Record 5 Sand Waves



Side Scanning Record 6 Dimples of Type D