

Fig. 4-1-1(2)A Average currents during August

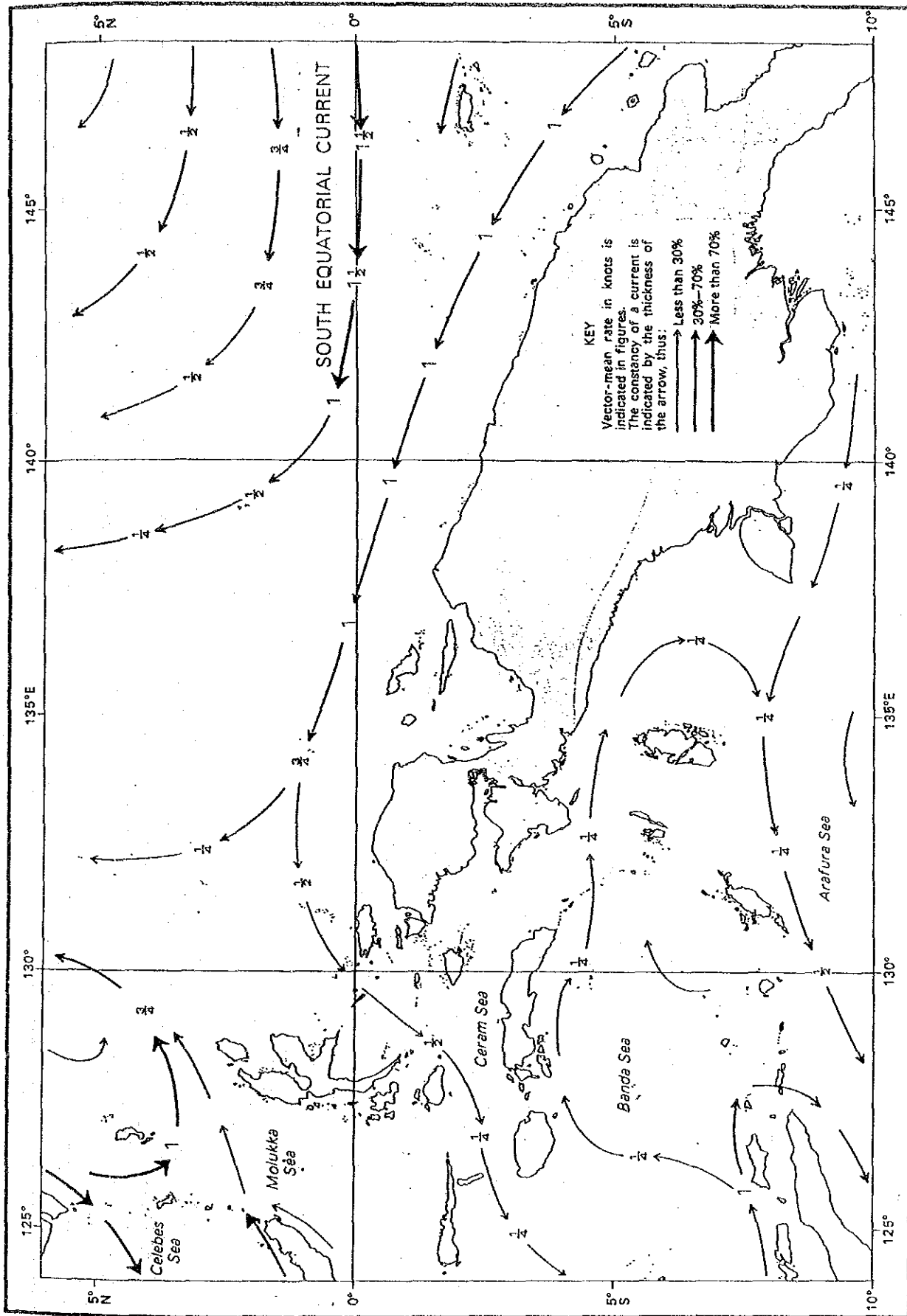


Fig. 4-1-1(3)A Average currents during April

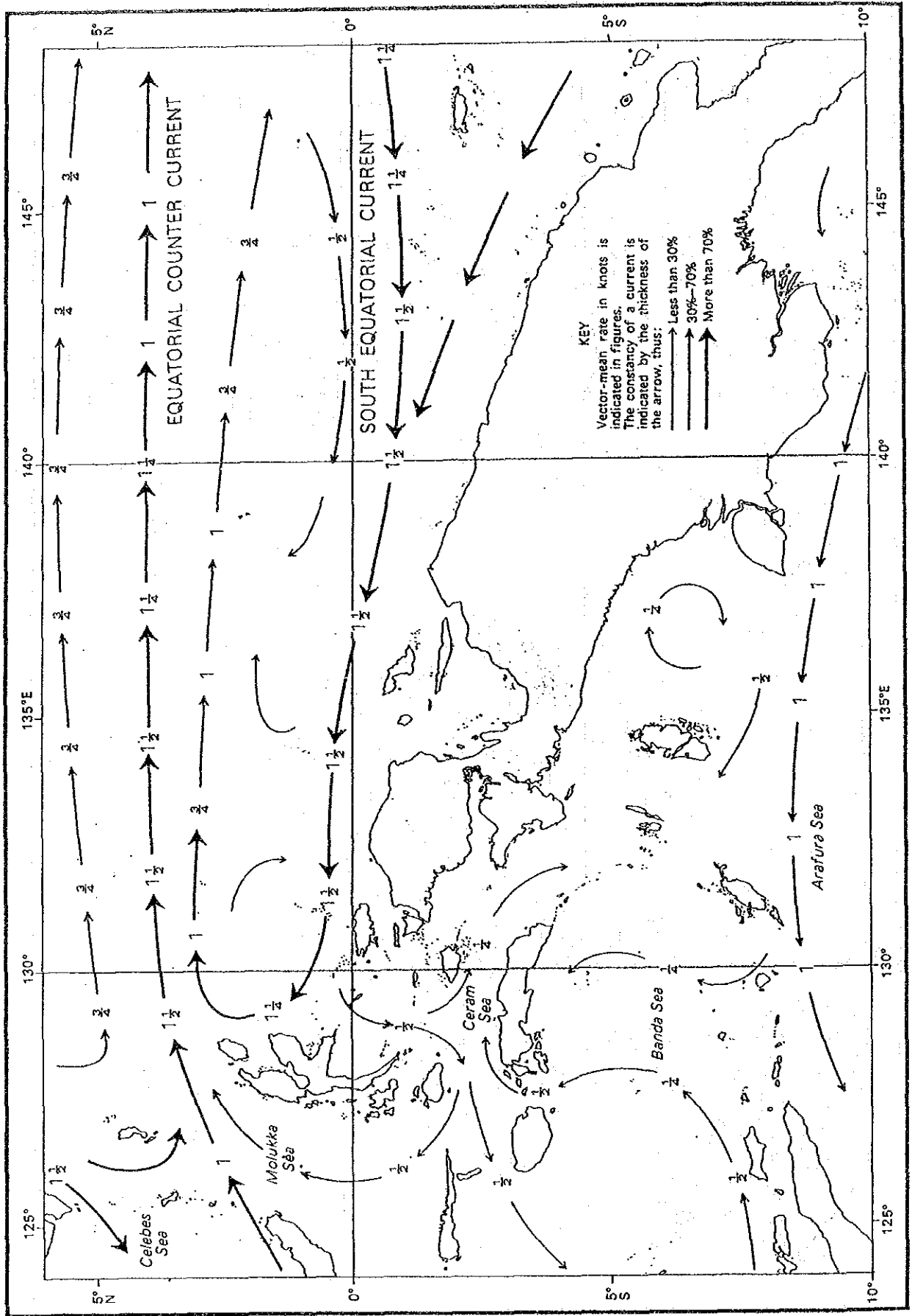


Fig. 4-1-1(4)A Average currents during October

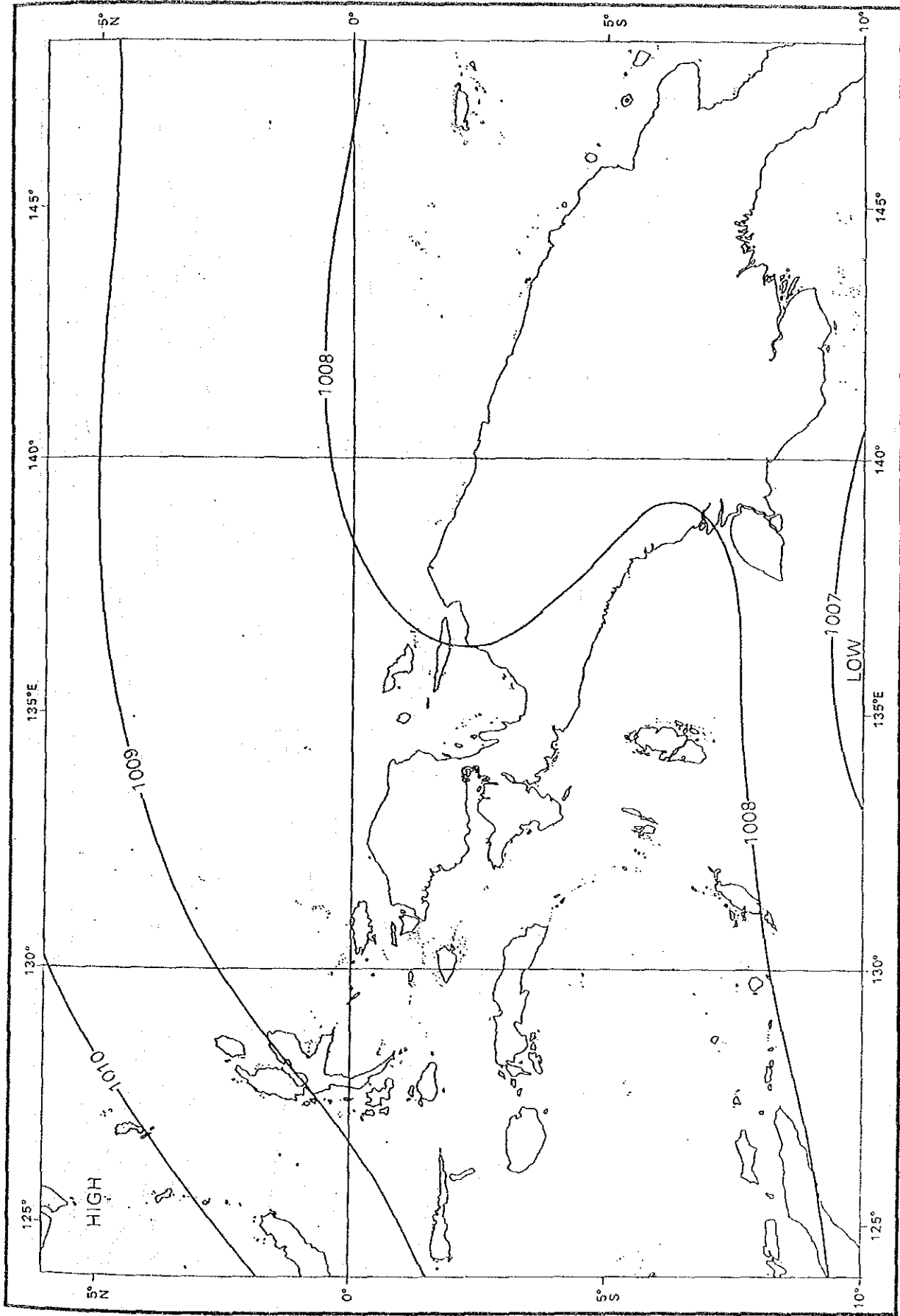


Fig. 4-1-2(1)A Mean barometric pressure (mb) - January

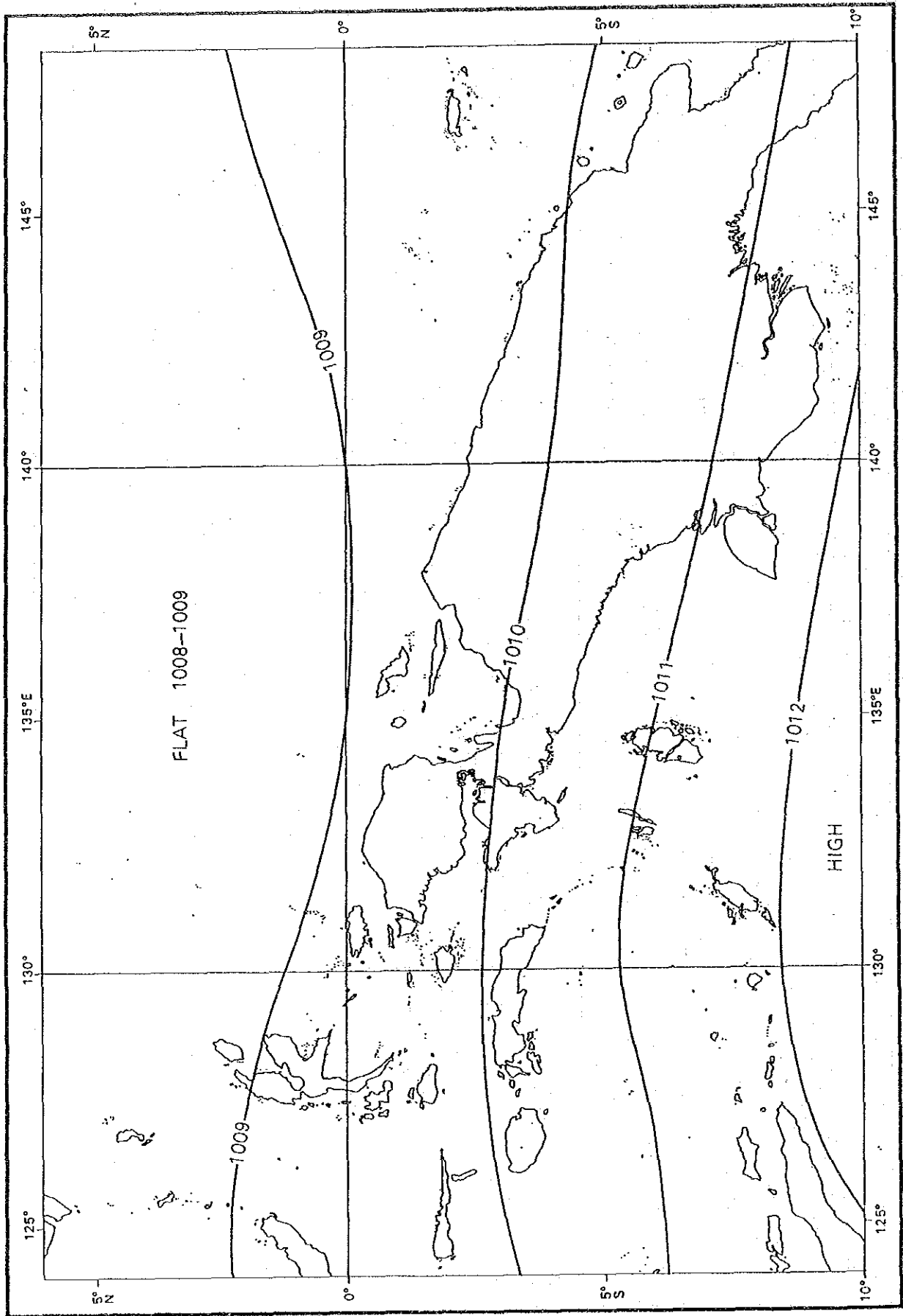


Fig. 4-1-2(2)A Mean barometric pressure (mb) - July

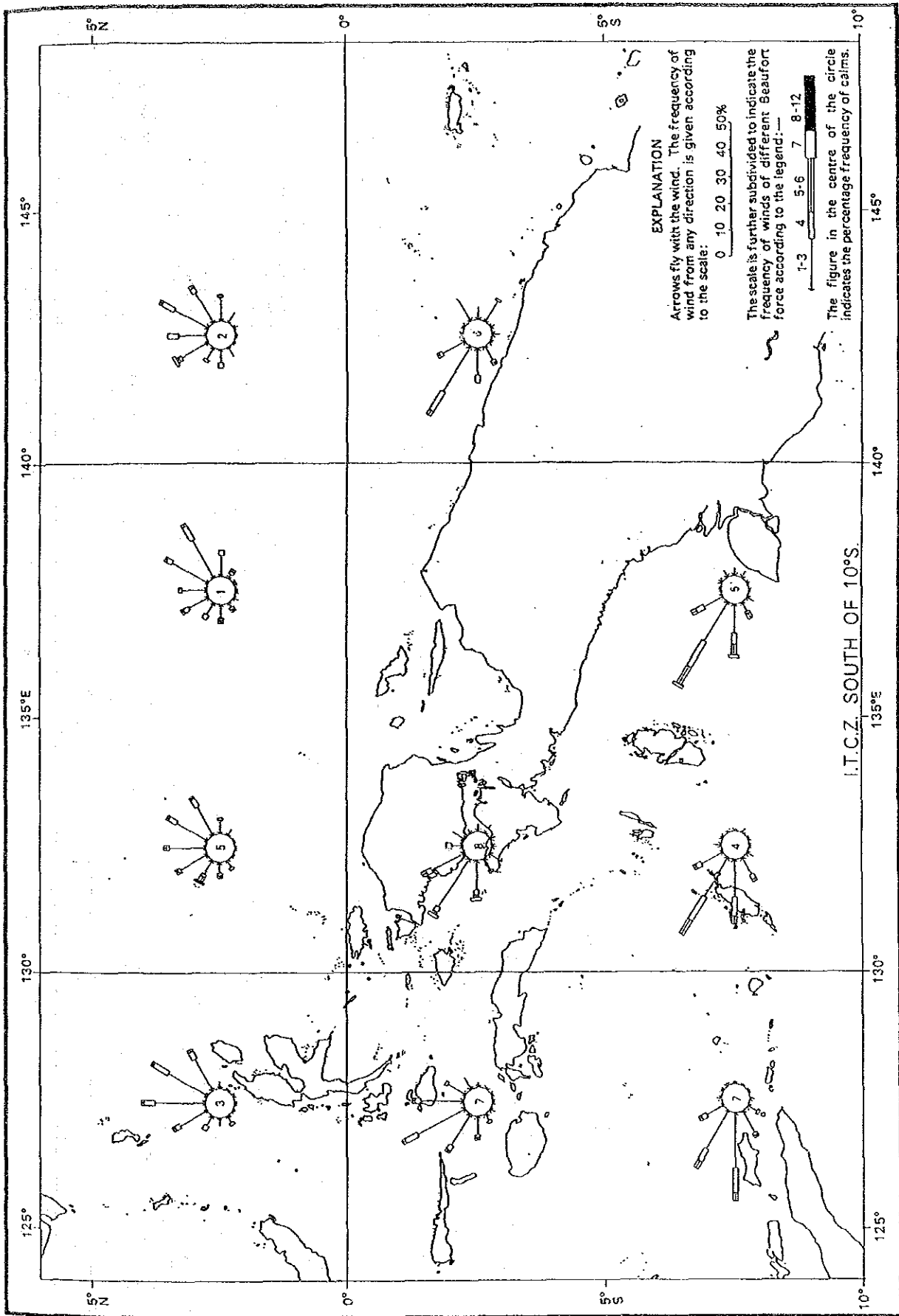


Fig. 4-1-3(1)A Wind distribution and Inter-Tropical Convergence Zone (ITCZ) - January

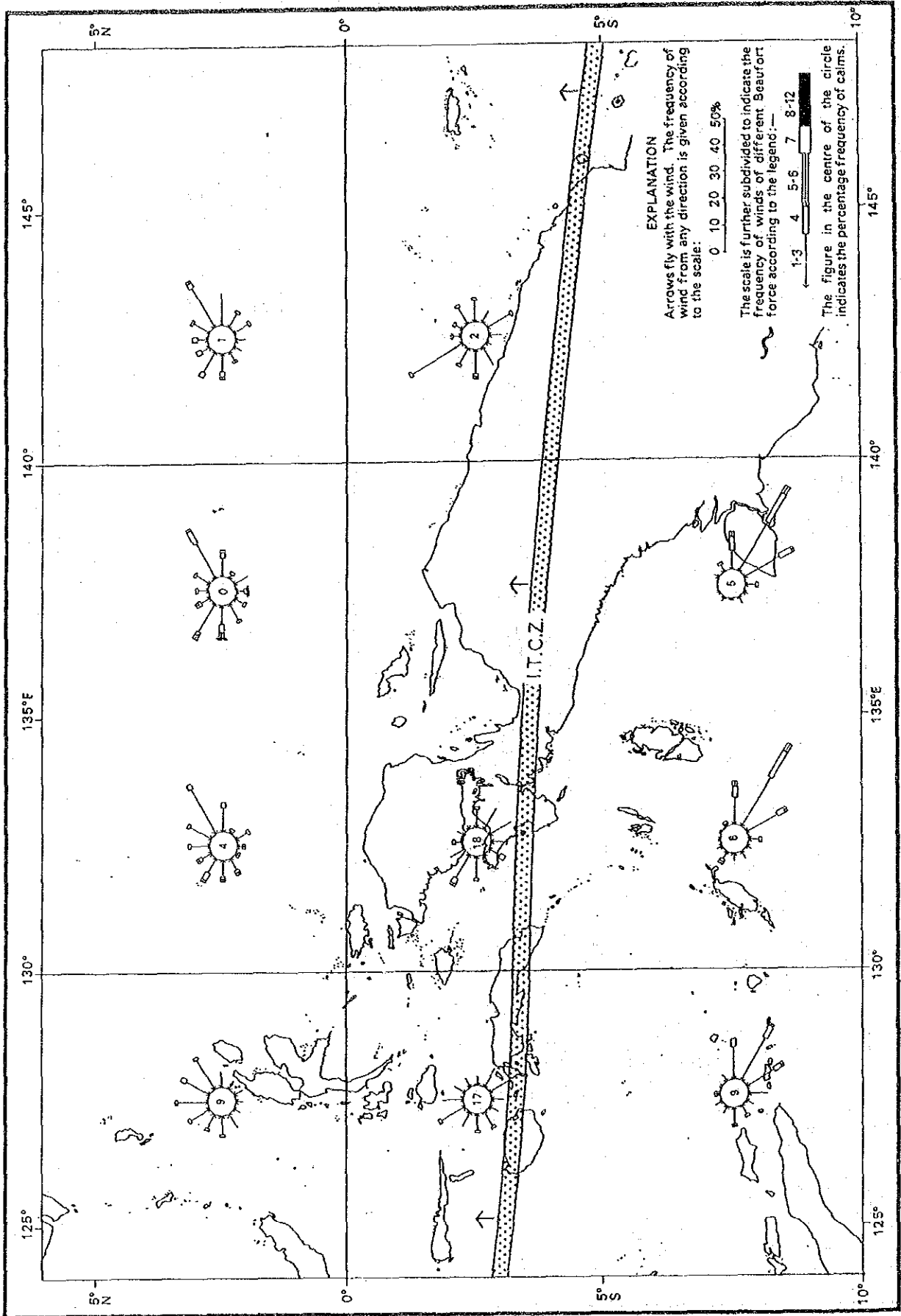


Fig. 4-1-3(2)A Wind distribution and Inter-Tropical Convergence Zone (ITCZ) - April

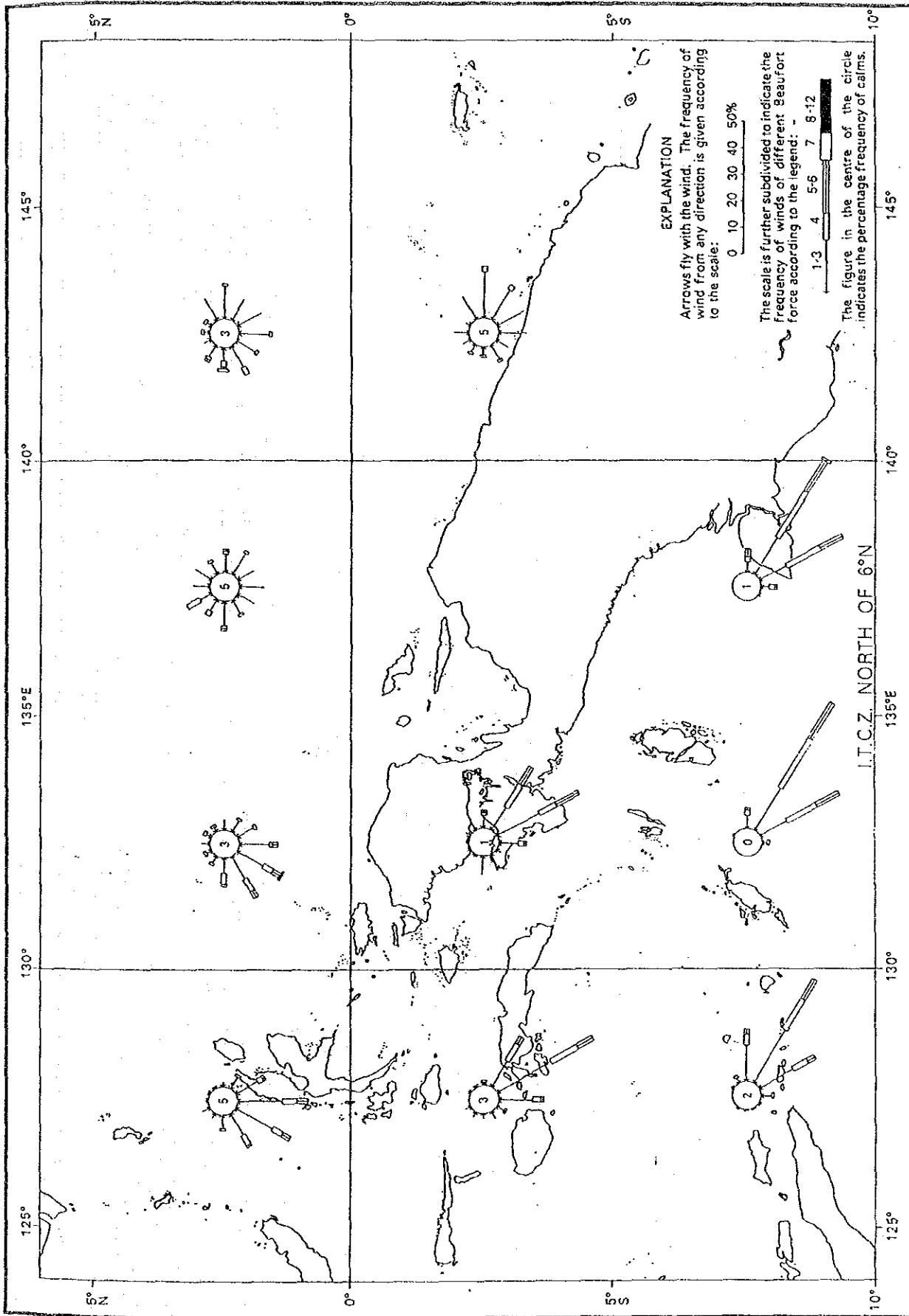


Fig. 4-1-3(3)A Wind distribution and Inter-Tropical Convergence Zone (ITCZ) - July

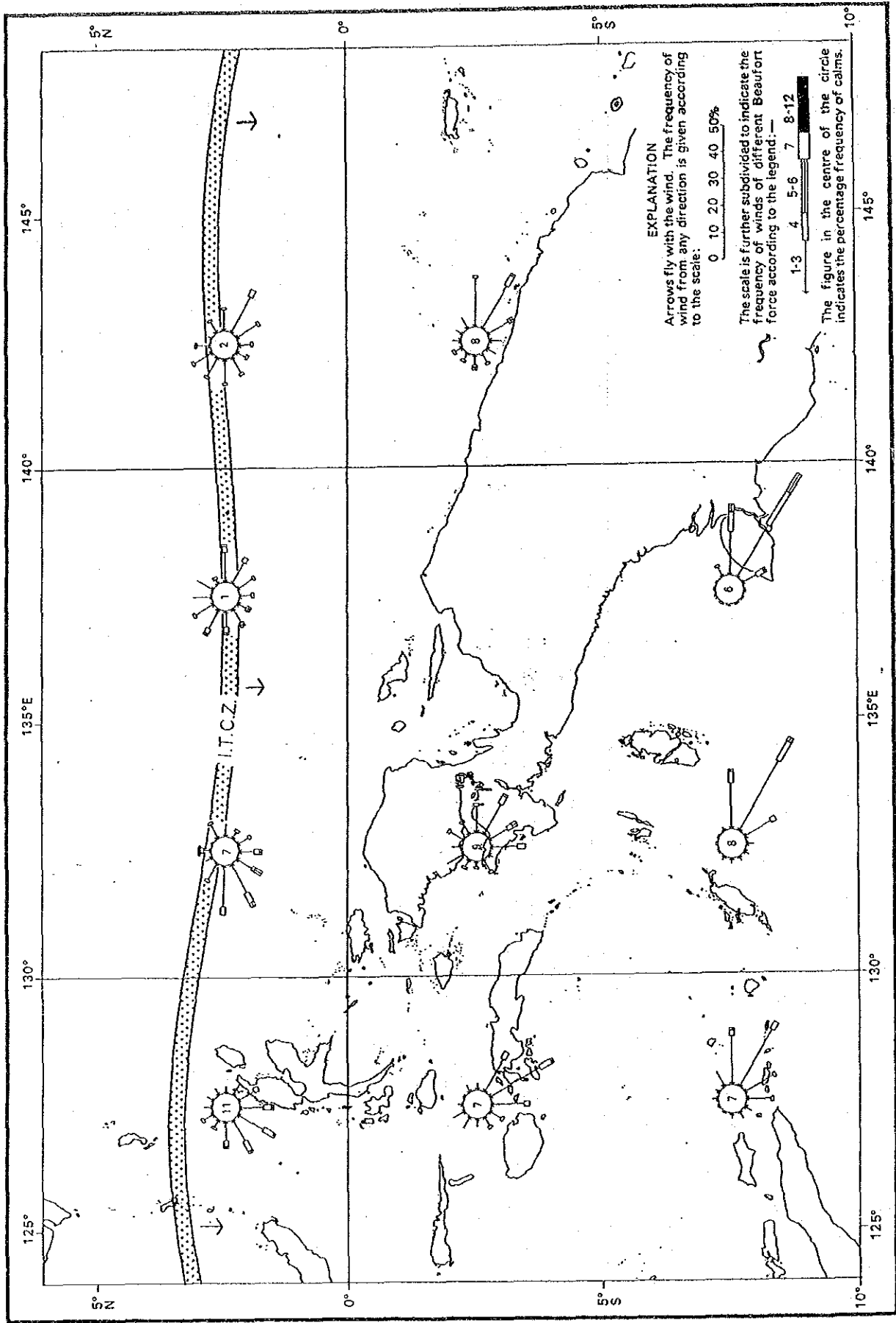


Fig. 4-1-3(4)A Wind distribution and Inter-Tropical Convergence Zone (ITCZ) - October

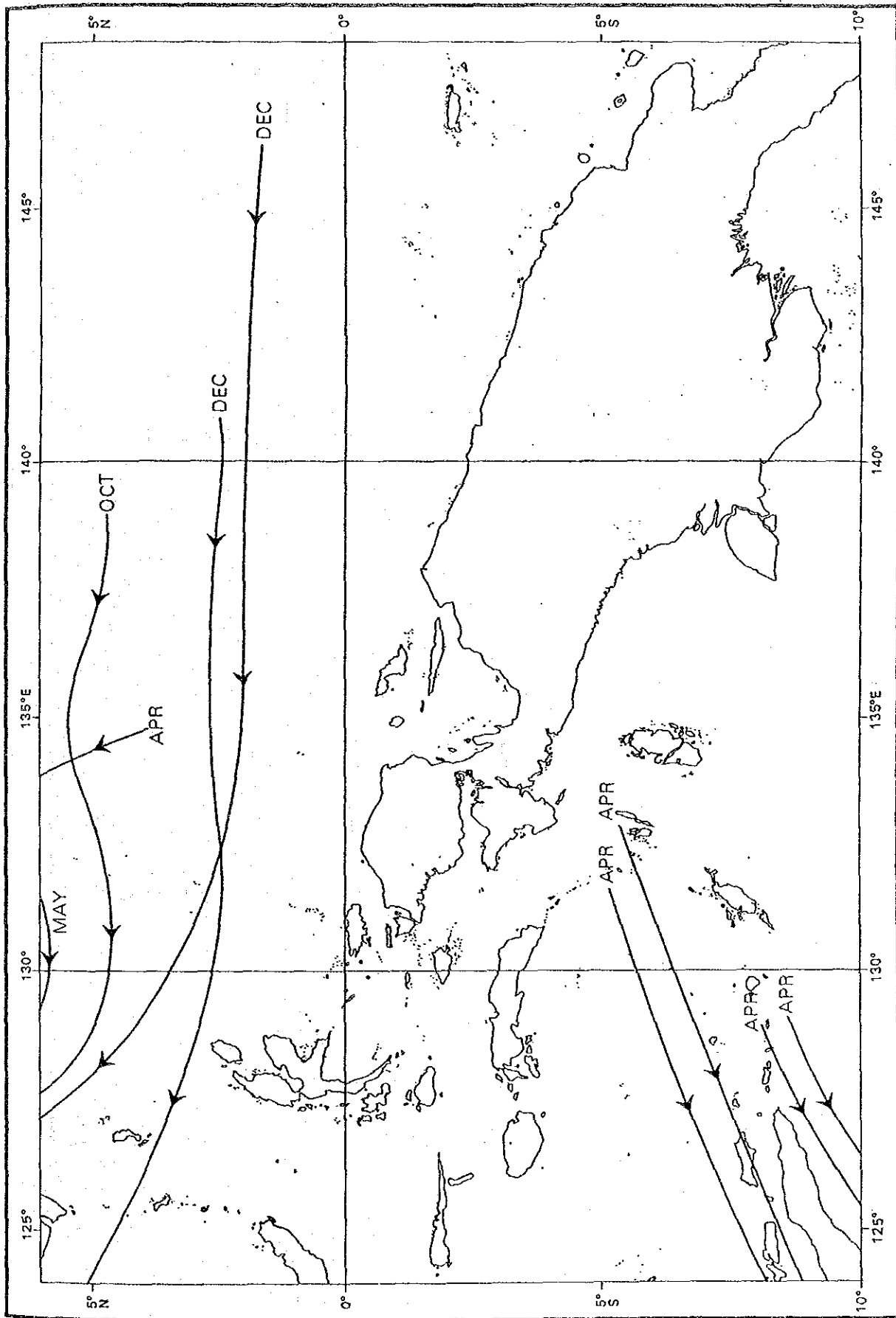


Fig. 4-1-4A Tracks of cyclones

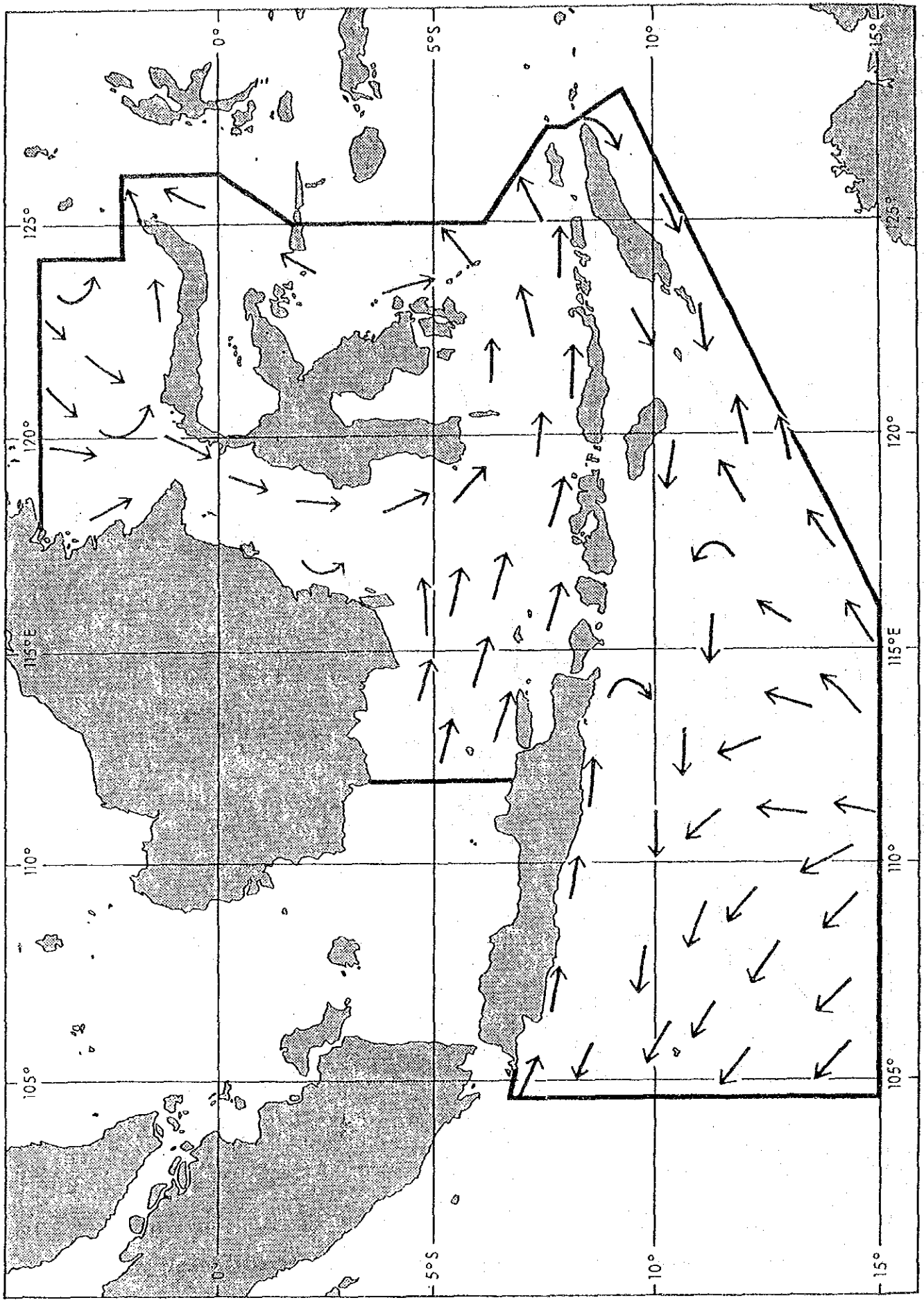


Fig. 4-1-5(1)A General Surface Current Circulation - February
(North-west Monsoon)

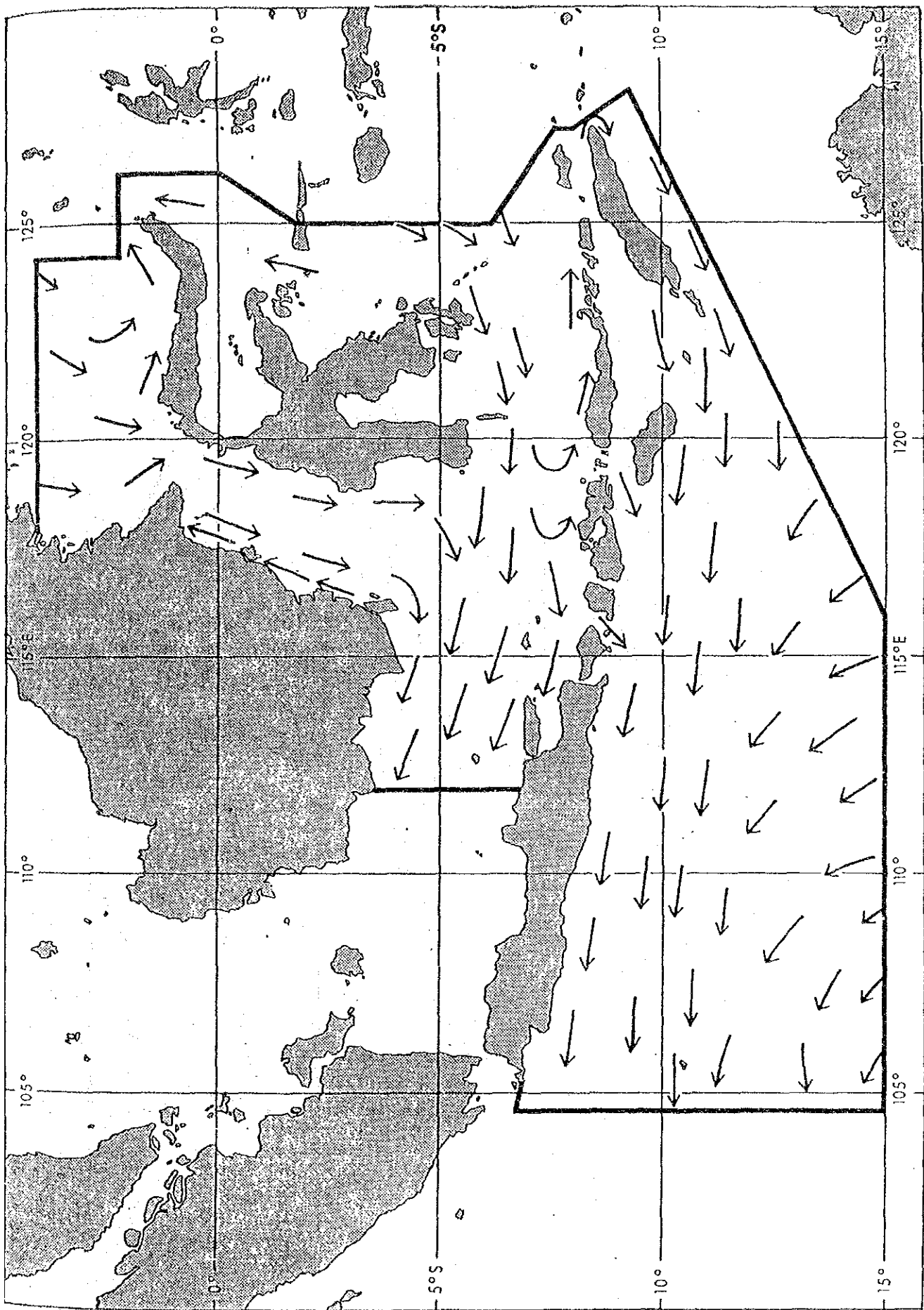


Fig. 4-1-5(2)A General Surface Current Circulation - August
(South-east Monsoon)

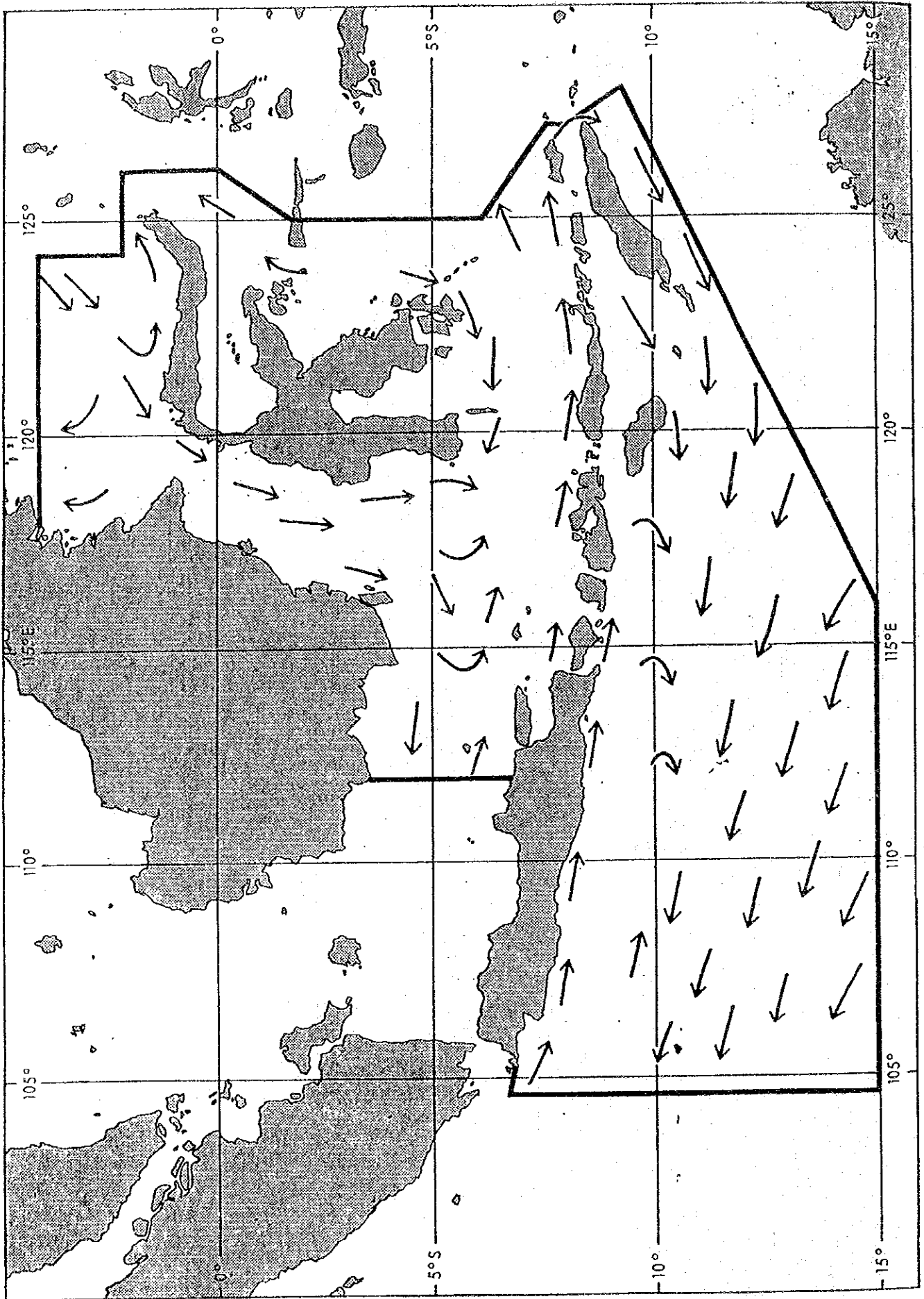


Fig. 4-1-5(3)A General Surface Current Circulation - April (Transition)

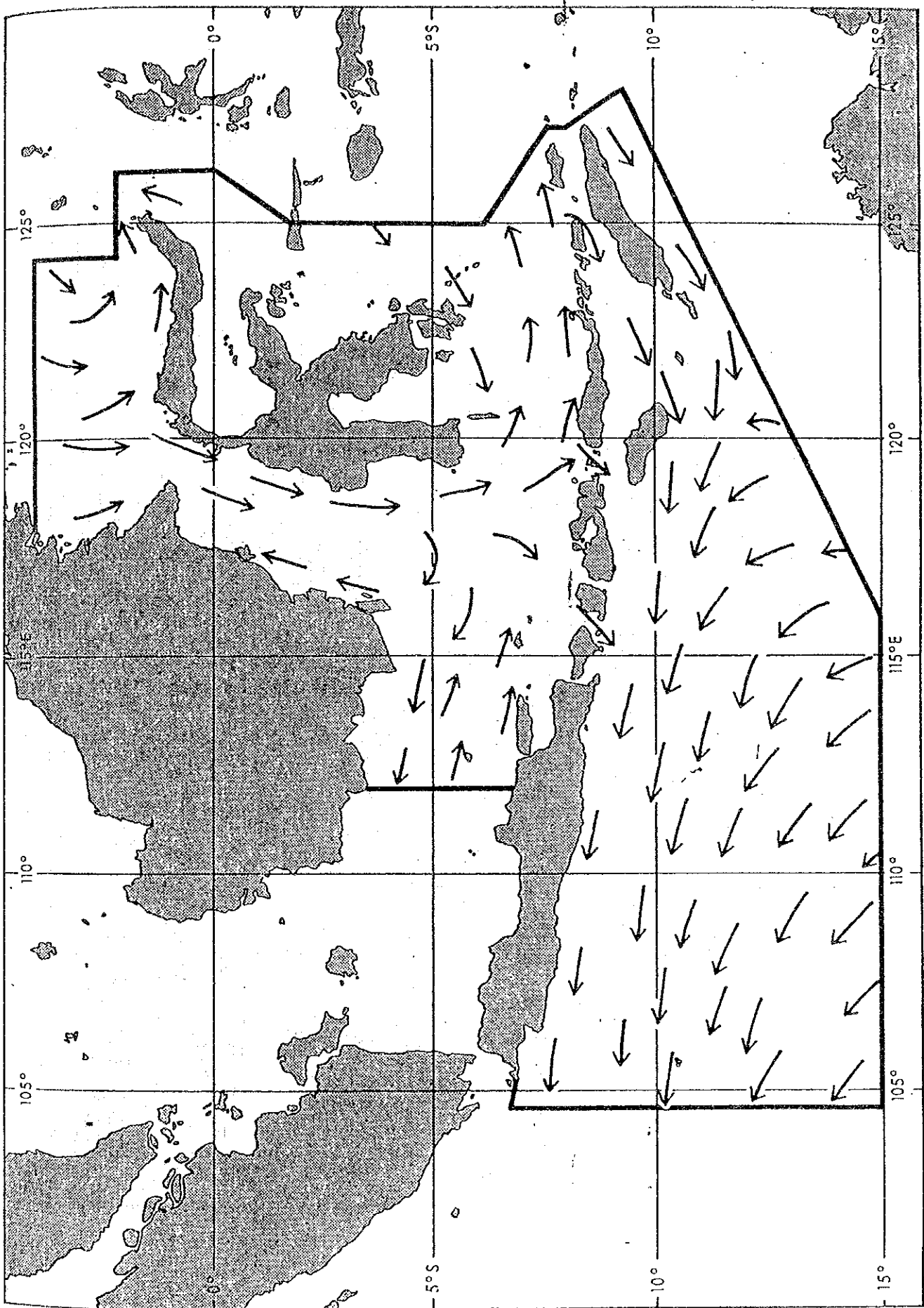


Fig. 4-1-5(4)A General Surface Current Circulation - October (Transition)

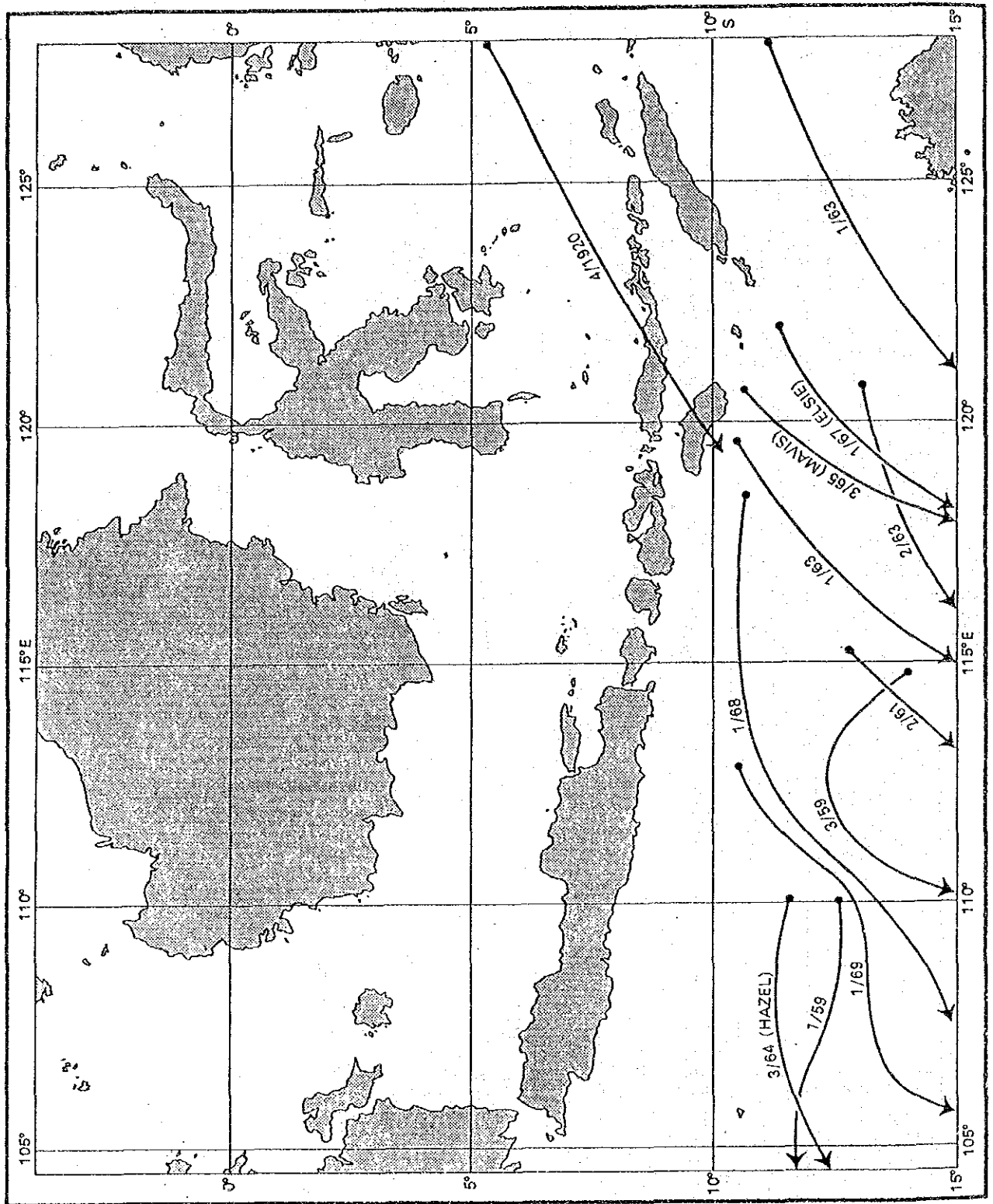


Fig. 4-1-6A Tracks of Tropical Revolving Storms - 1920 - 1969

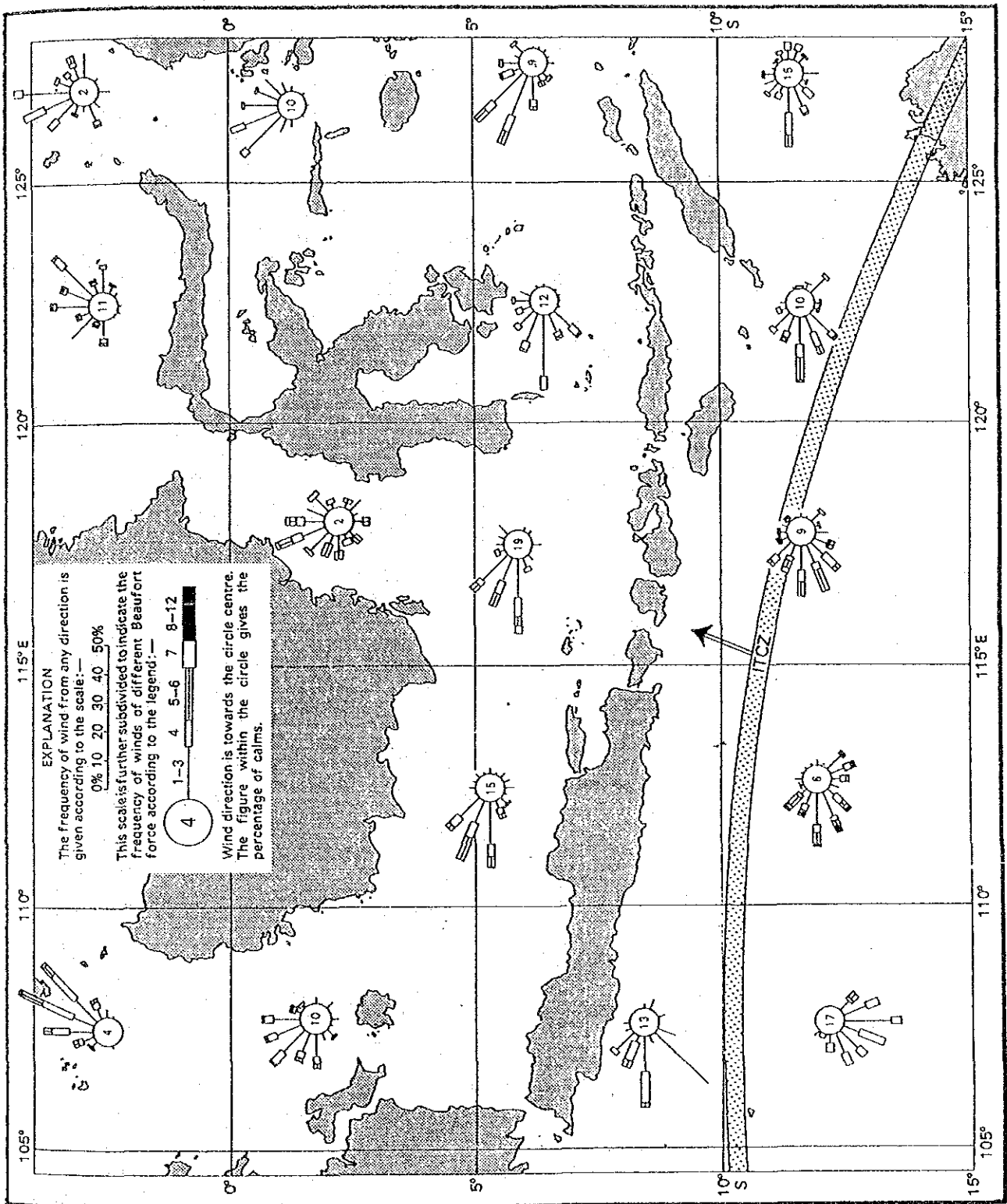


Fig. 4-1-7(1)A Wind Roses and Mean Position of I.T.C.Z. - January

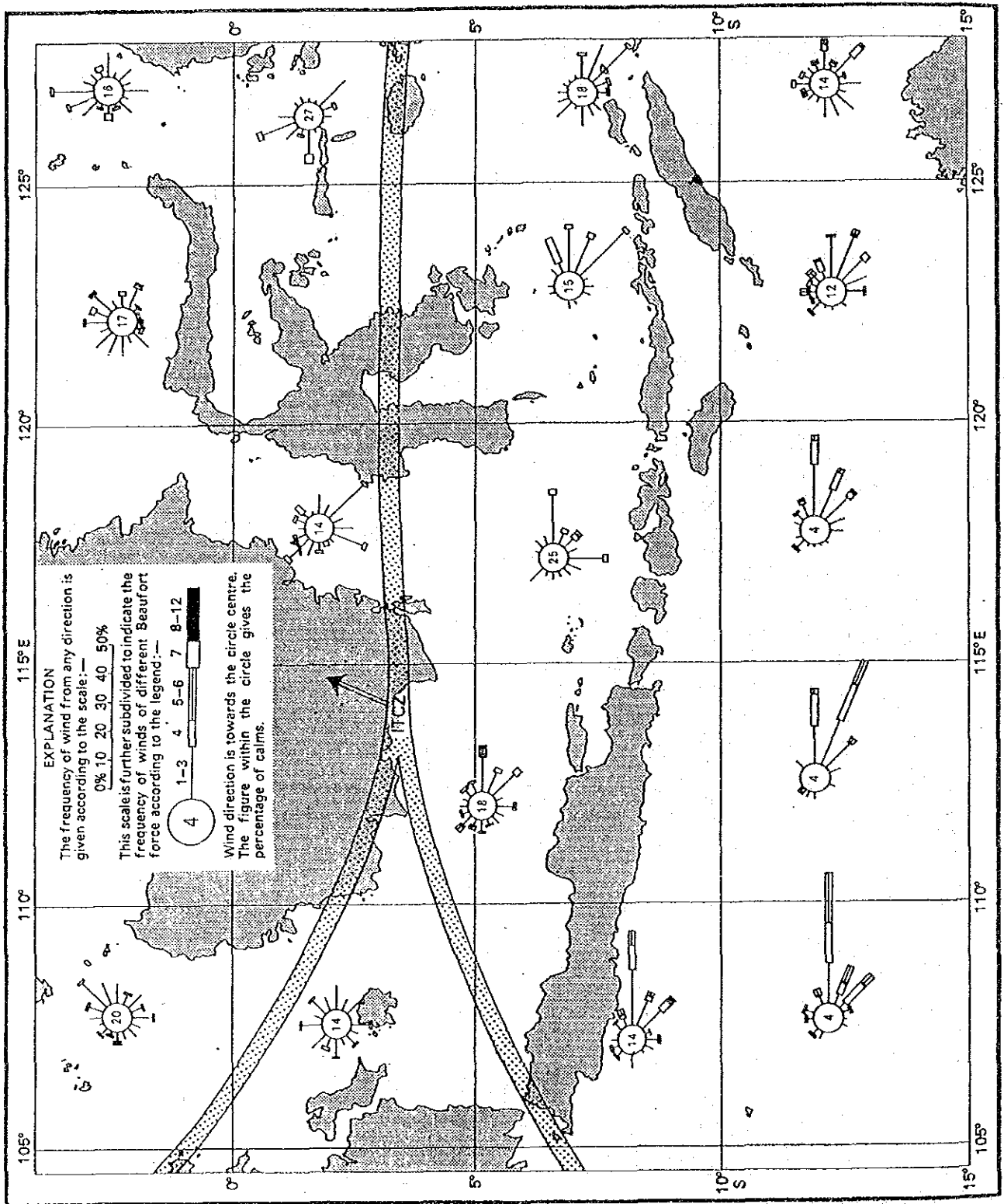


Fig. 4-1-7(2)A Wind Roses and Mean Position of I.T.C.Z. - April

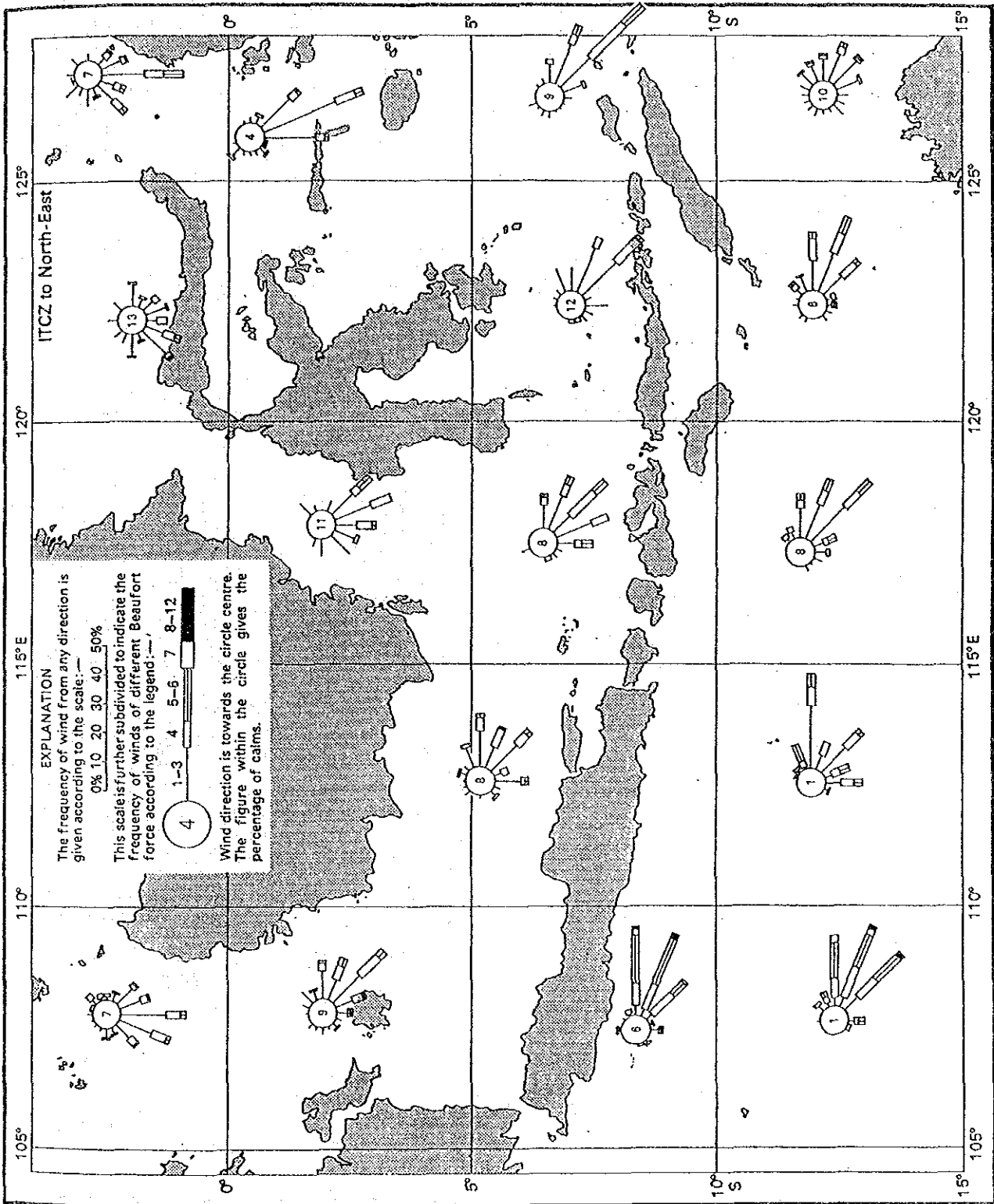


Fig. 4-1-7(3)A Wind Roses and Mean Position of I.T.C.Z. - Jul

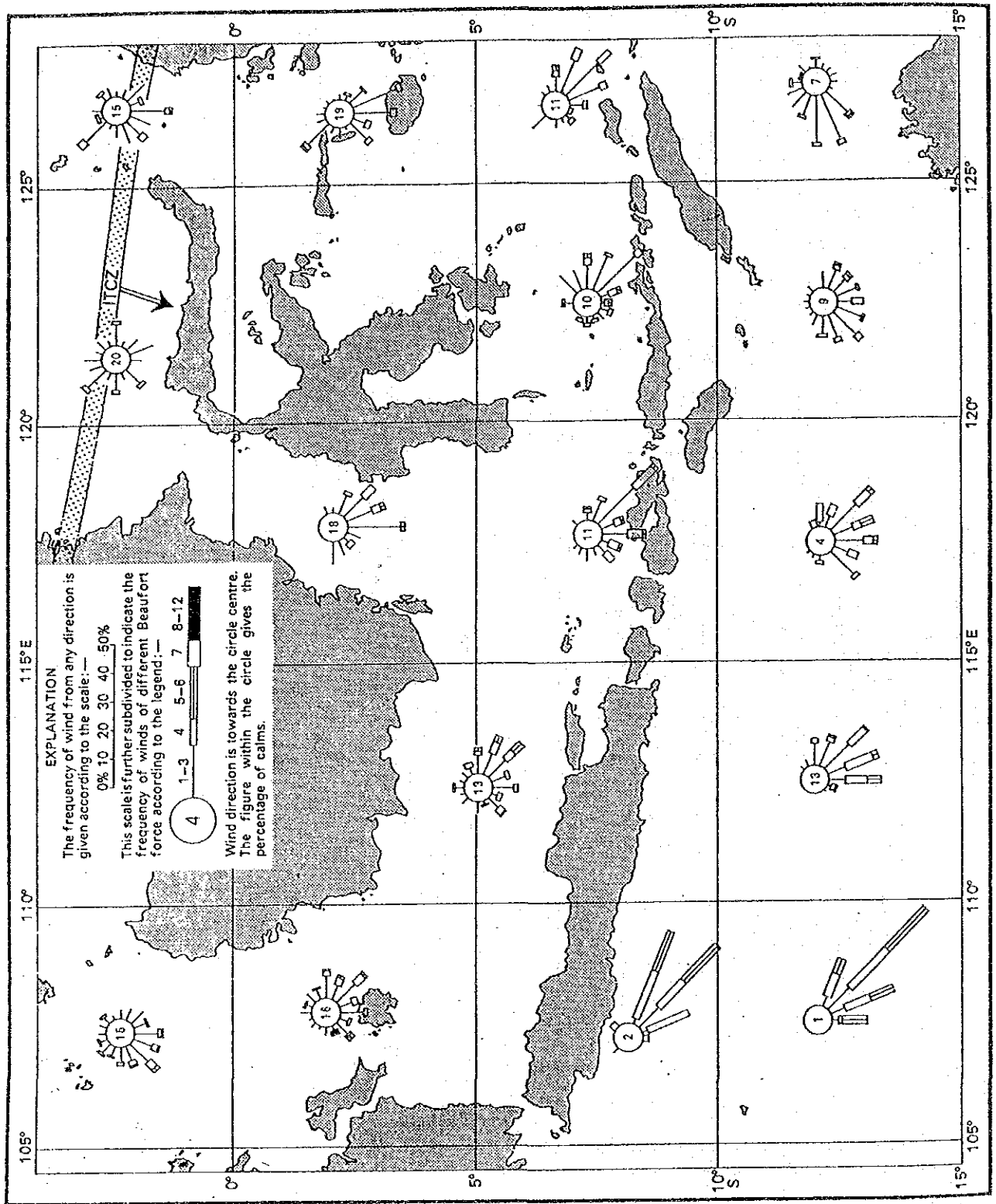


Fig. 4-1-7(4)A Wind Roses and Mean Position of I.T.C.Z. - October

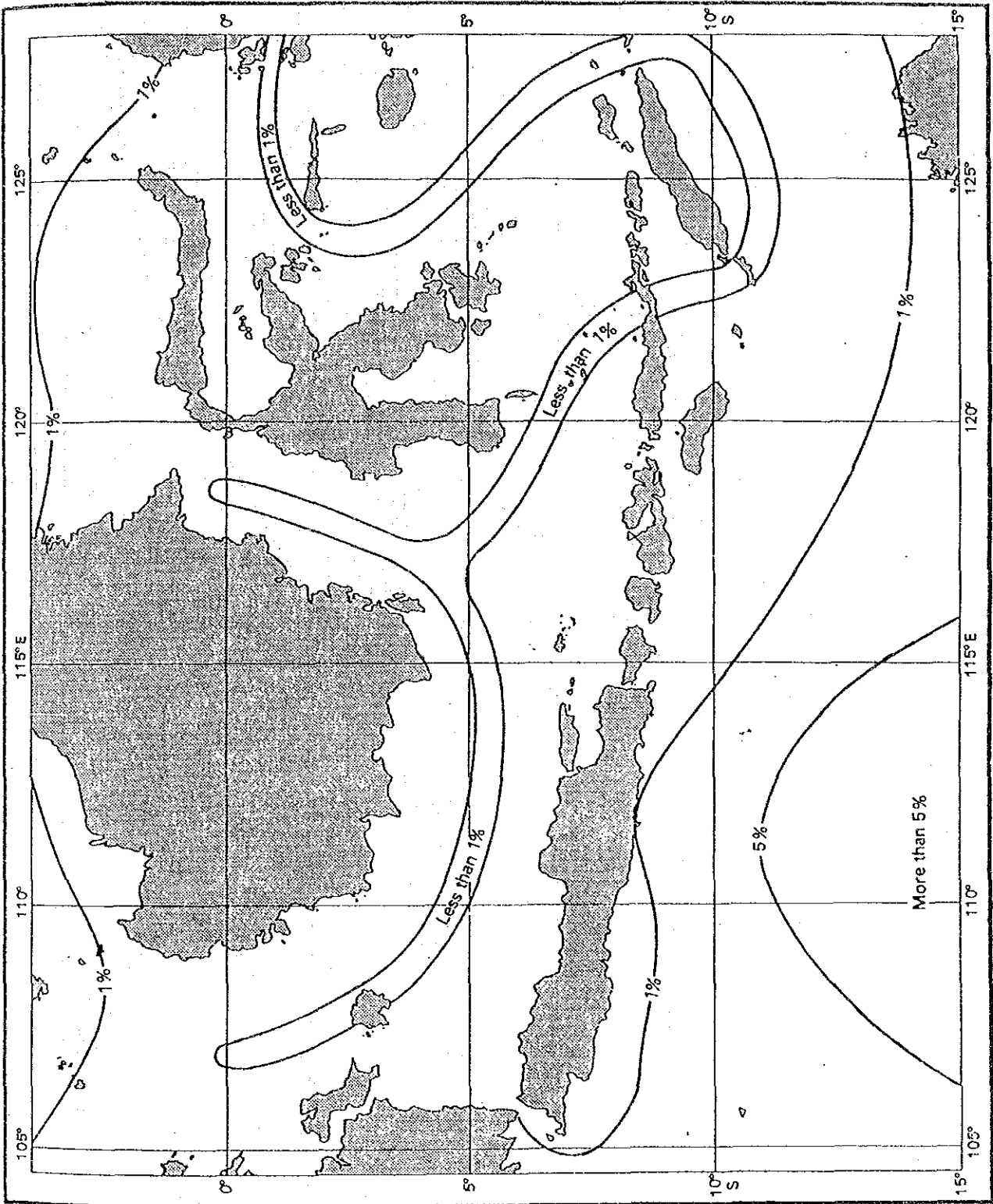


Fig. 4-1-8(1)A Gale Frequency Distribution - January

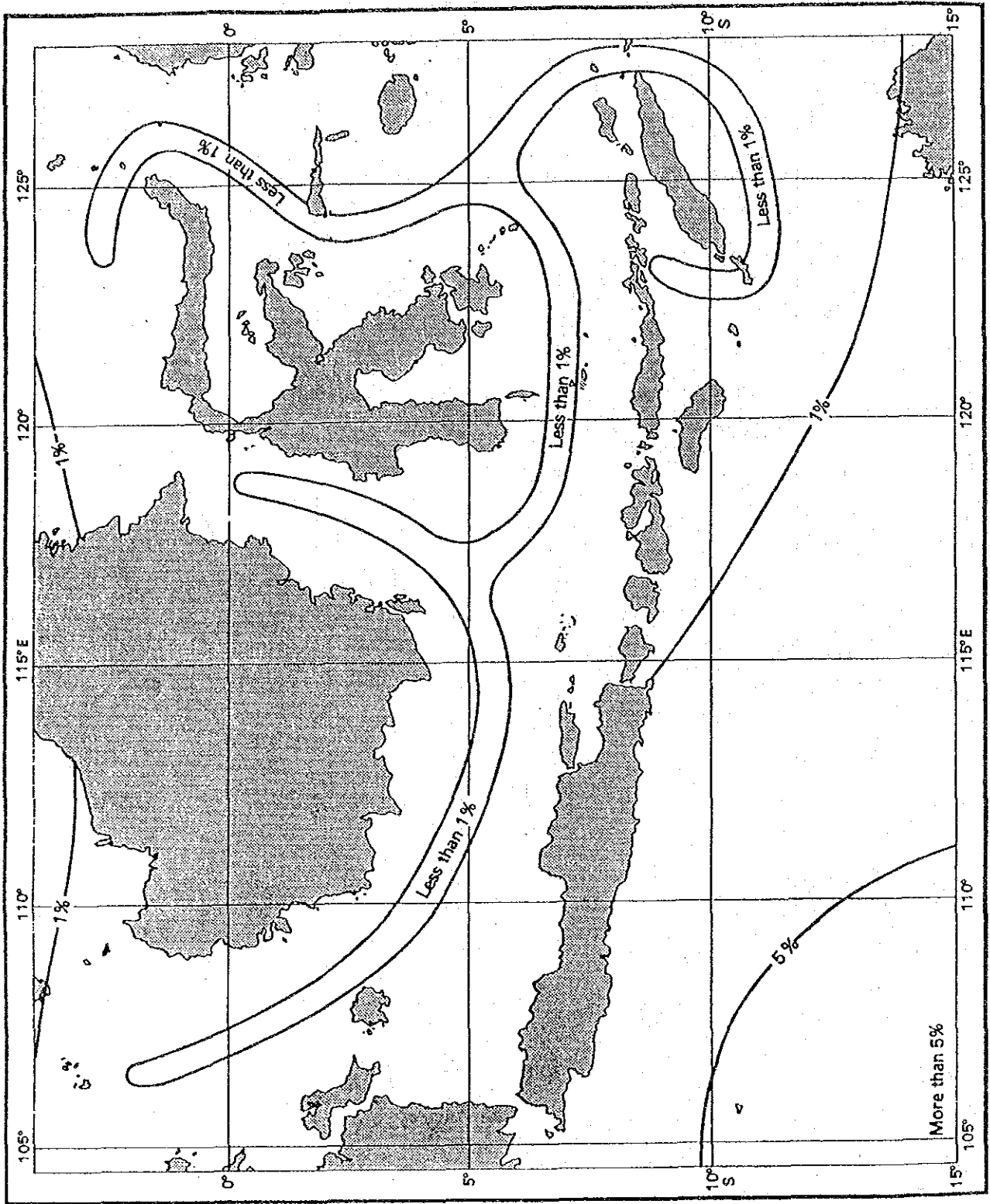


Fig. 4-1-8(2)A Gale Frequency Distribution - July

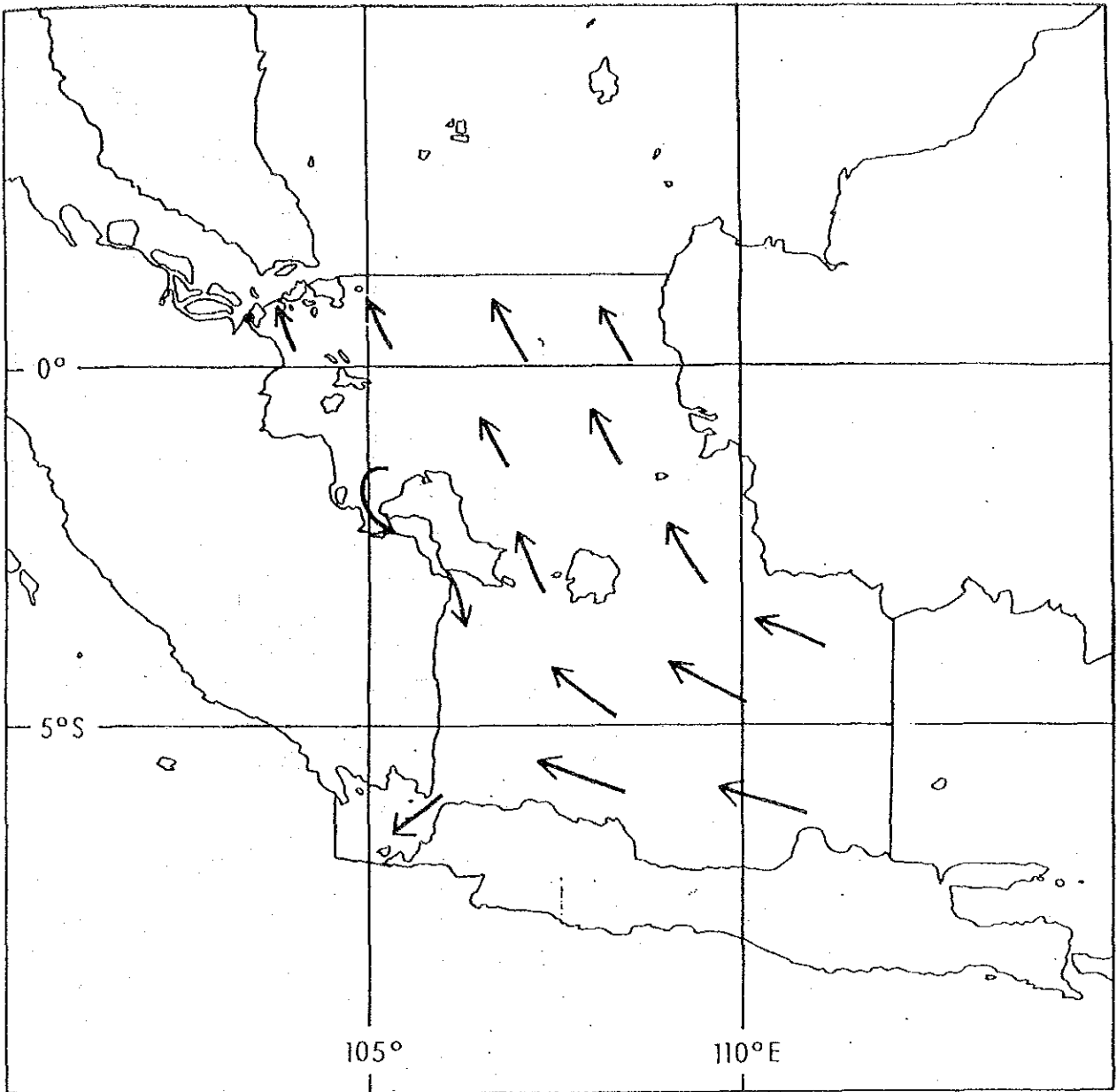


Fig. 4-1-9(1)A General surface current circulation - SE Monsoon
(May-September)

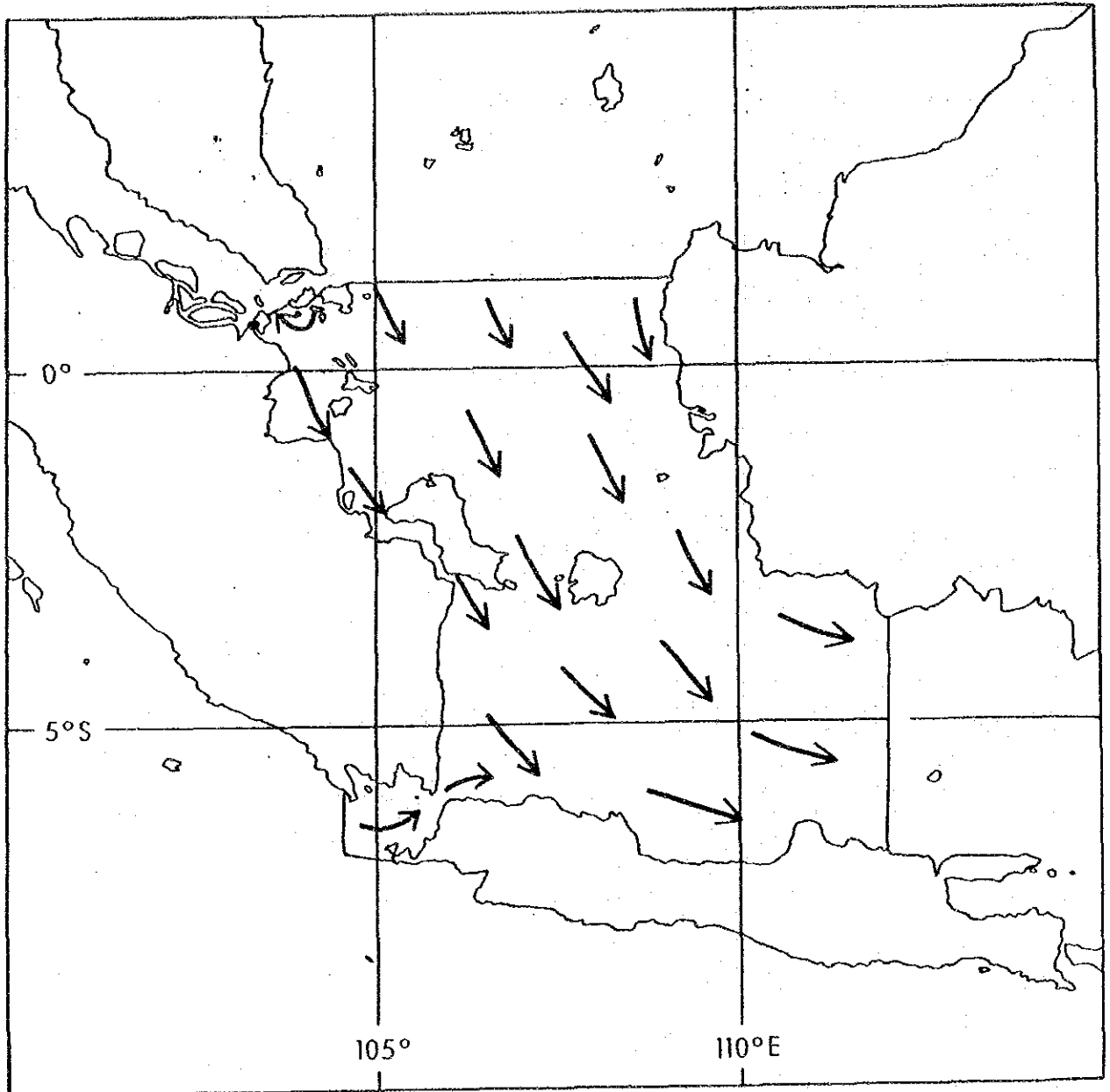


Fig. 4-1-9(2)A General surface current circulation - NW Monsoon (November to March)

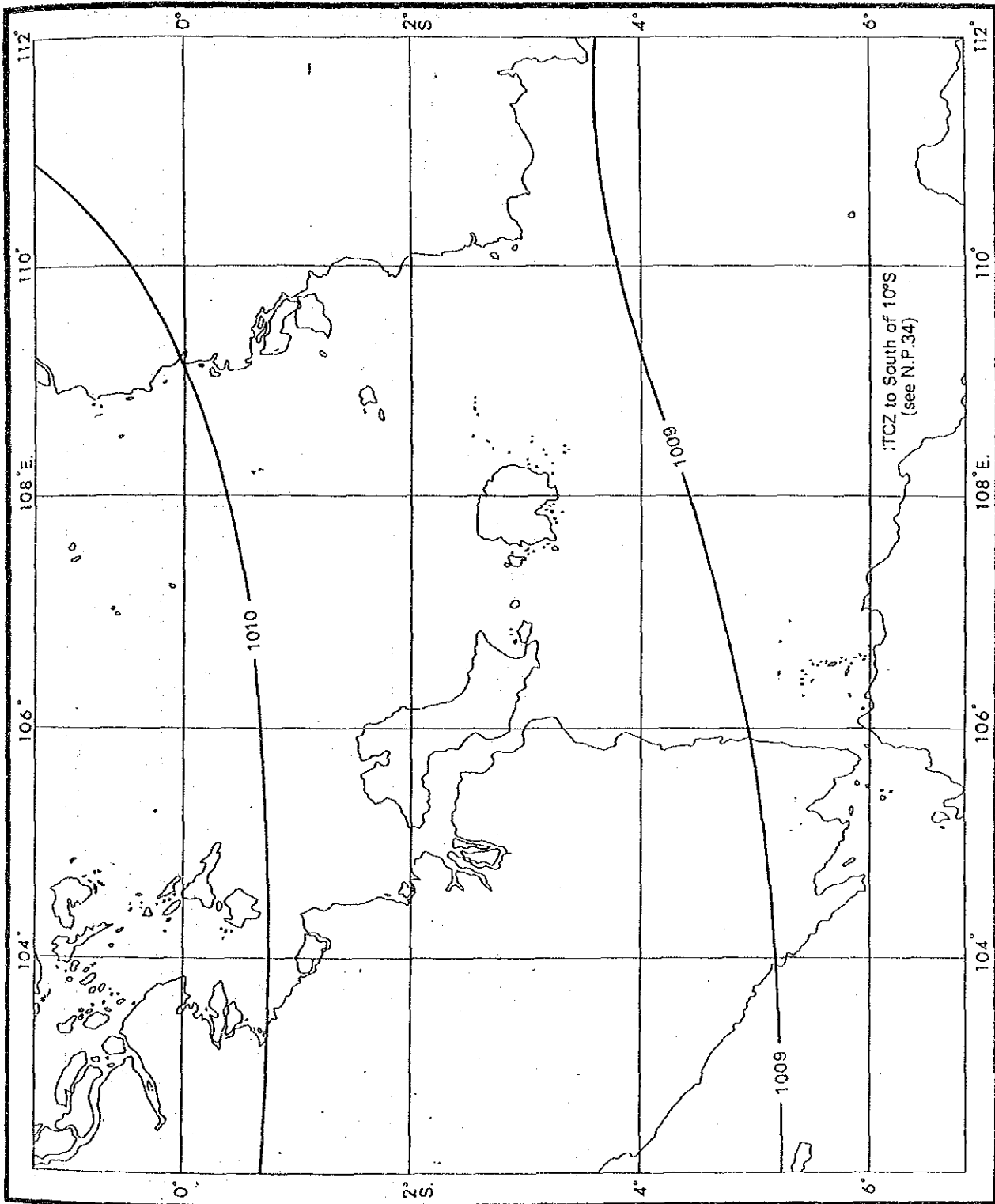


Fig. 4-1-10(1)A Average pressure at mean sea level (mb) - January

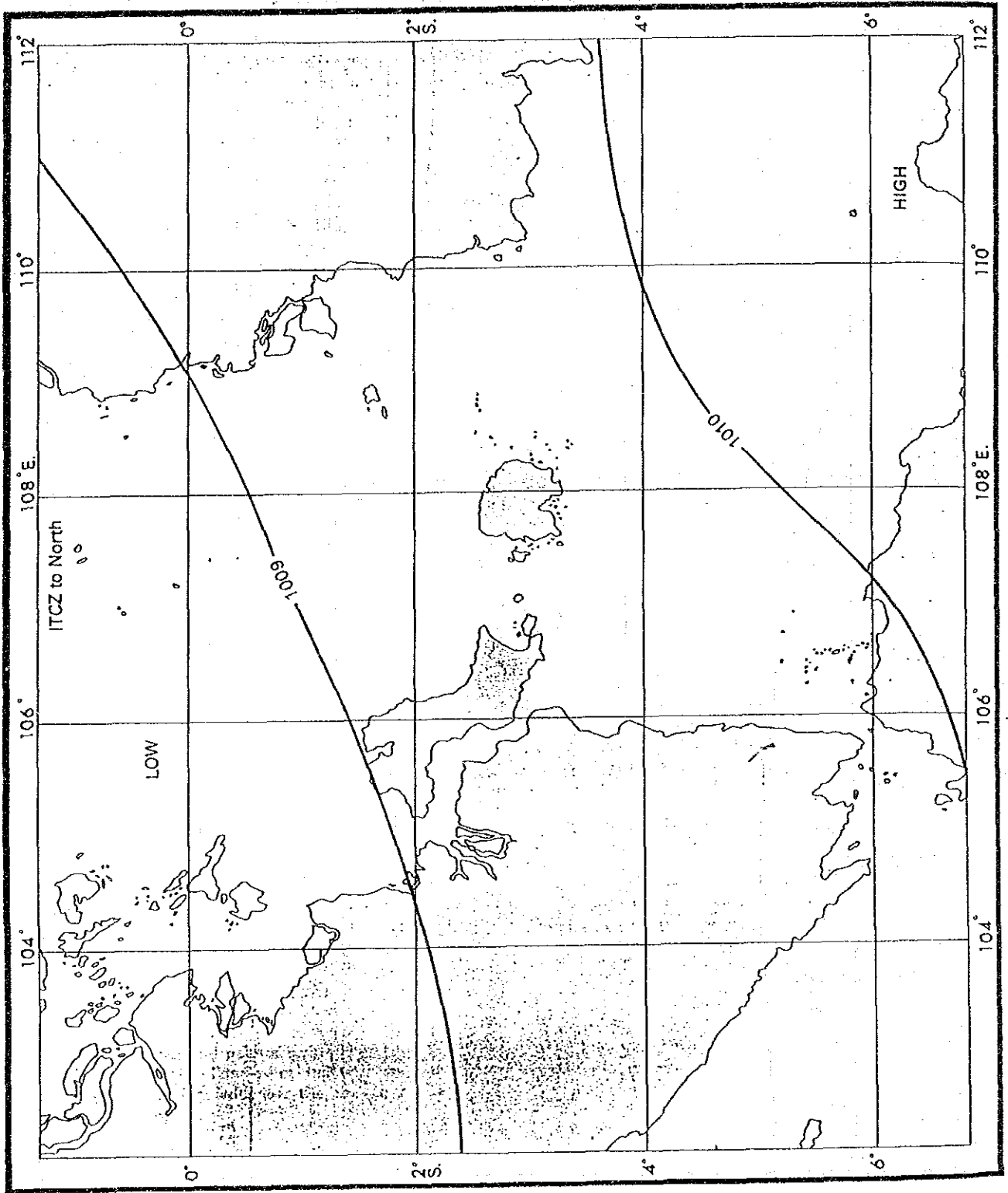


Fig. 4-1-10(2)A Average pressure at mean sea level (mb) - July

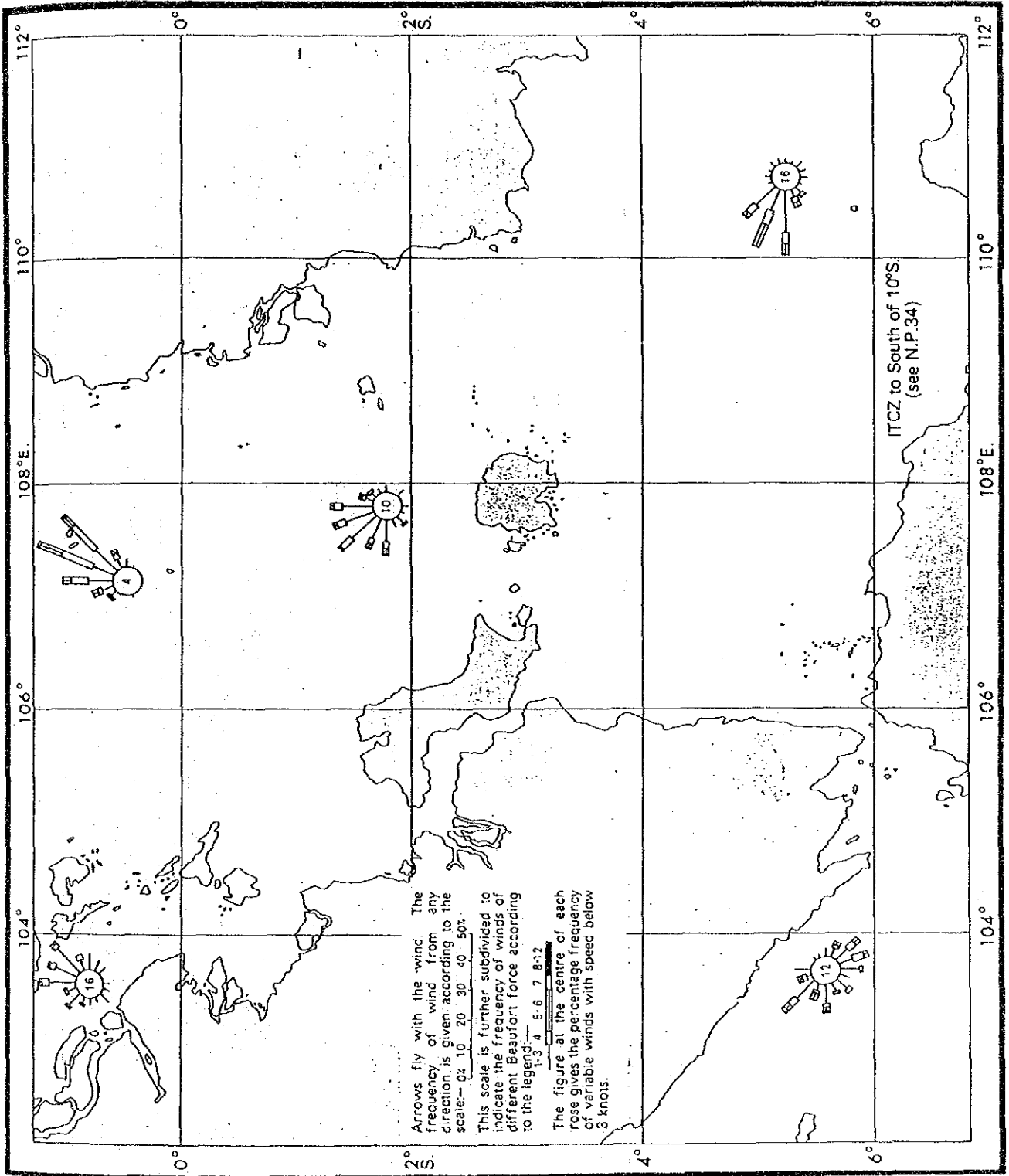


Fig. 4-1-11(1)A Wind roses - January

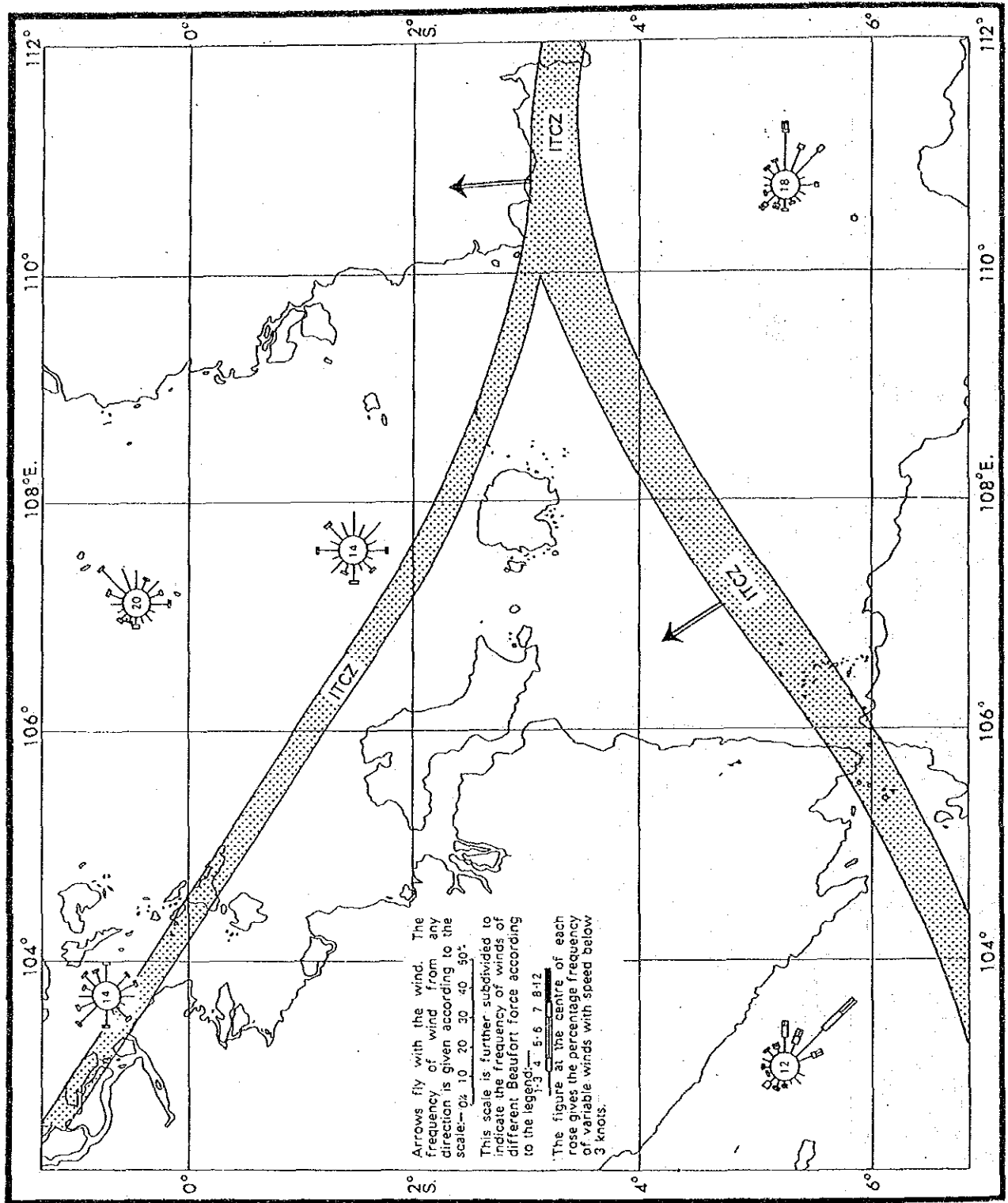


Fig. 4-1-11(2)A Wind roses and mean position of I.T.C.Z. - April

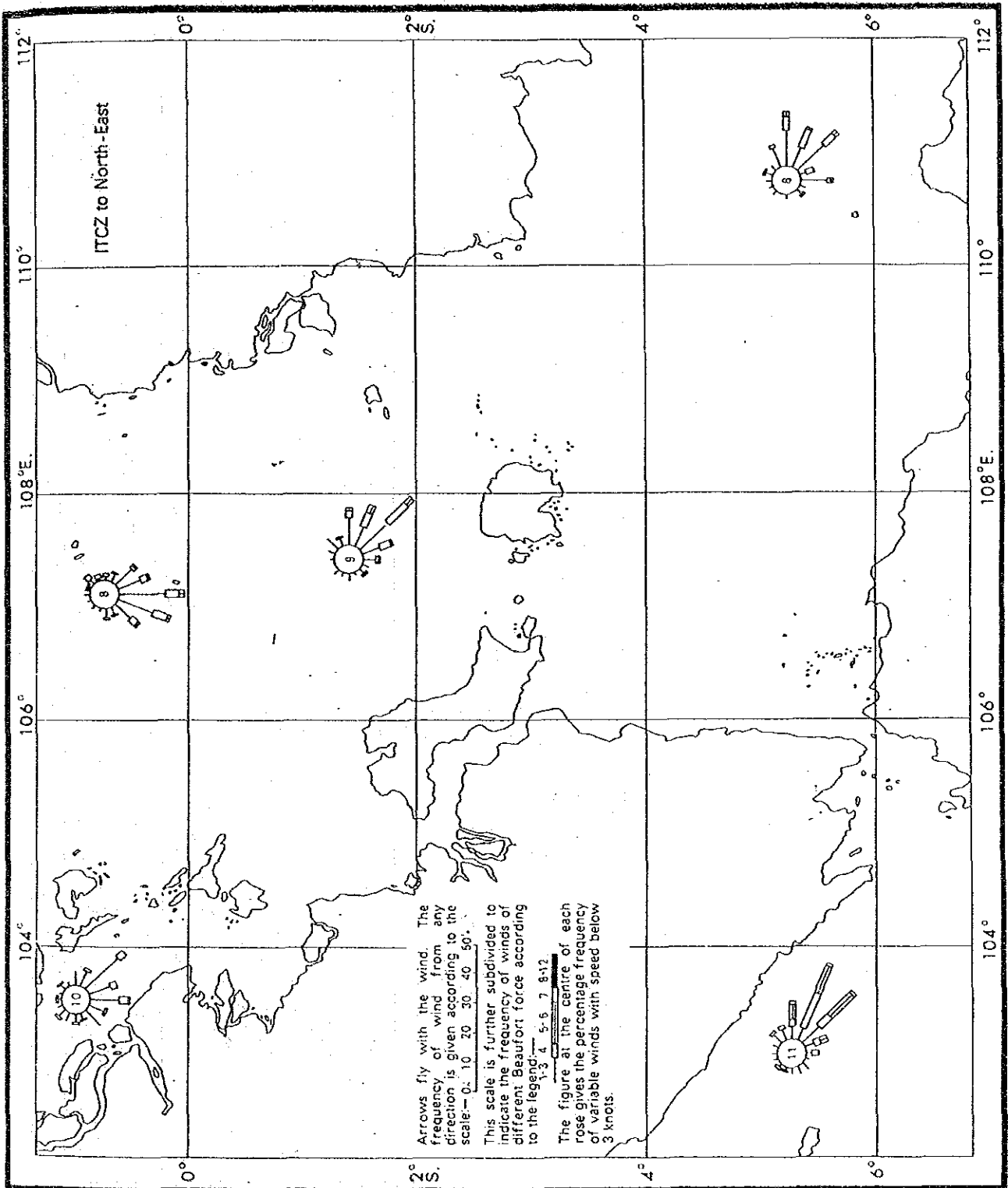


Fig. 4-1-11(3)A Wind roses - July

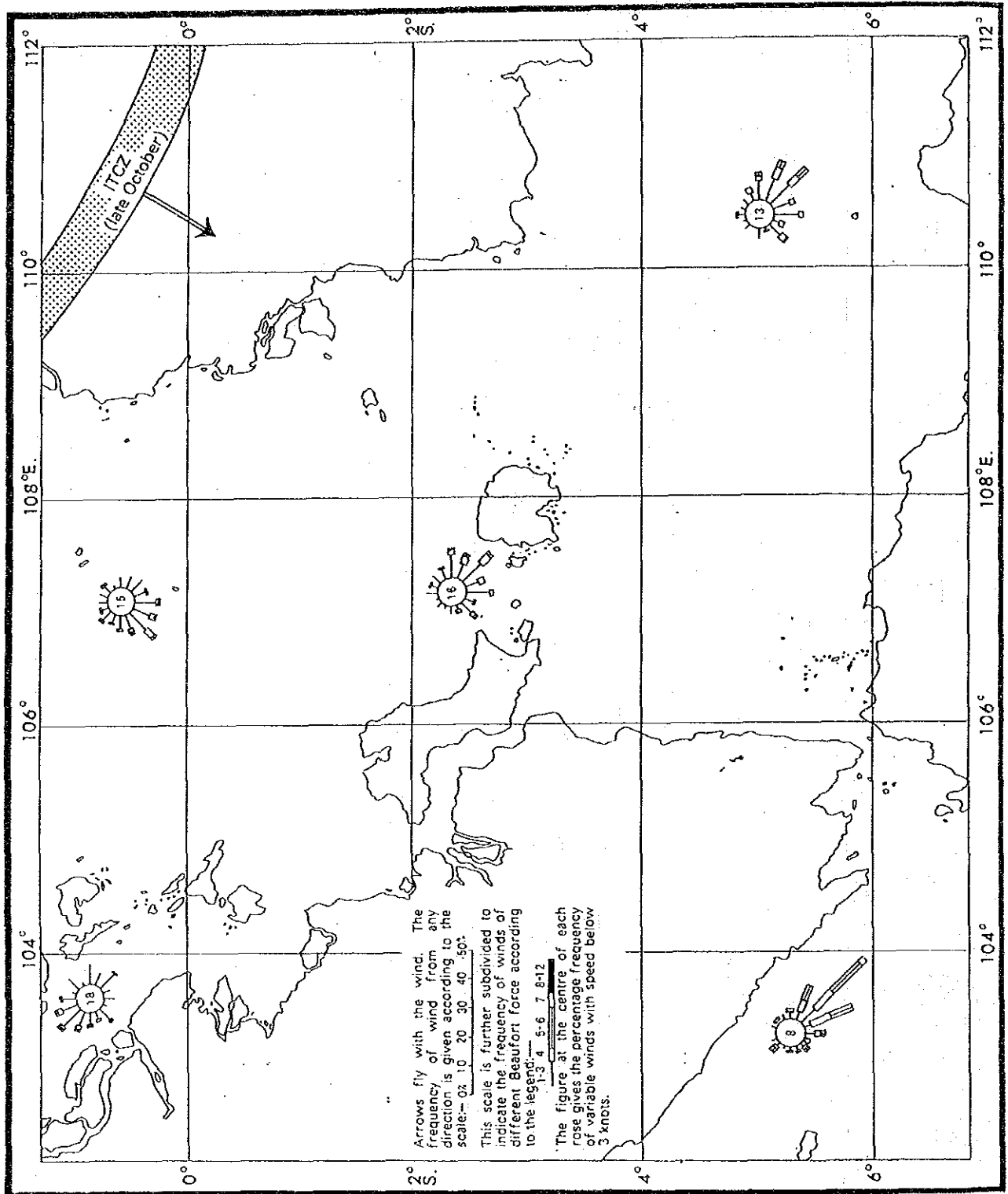


Fig. 4-1-11(4)A Wind roses and Mean position of I.T.C.Z. - October

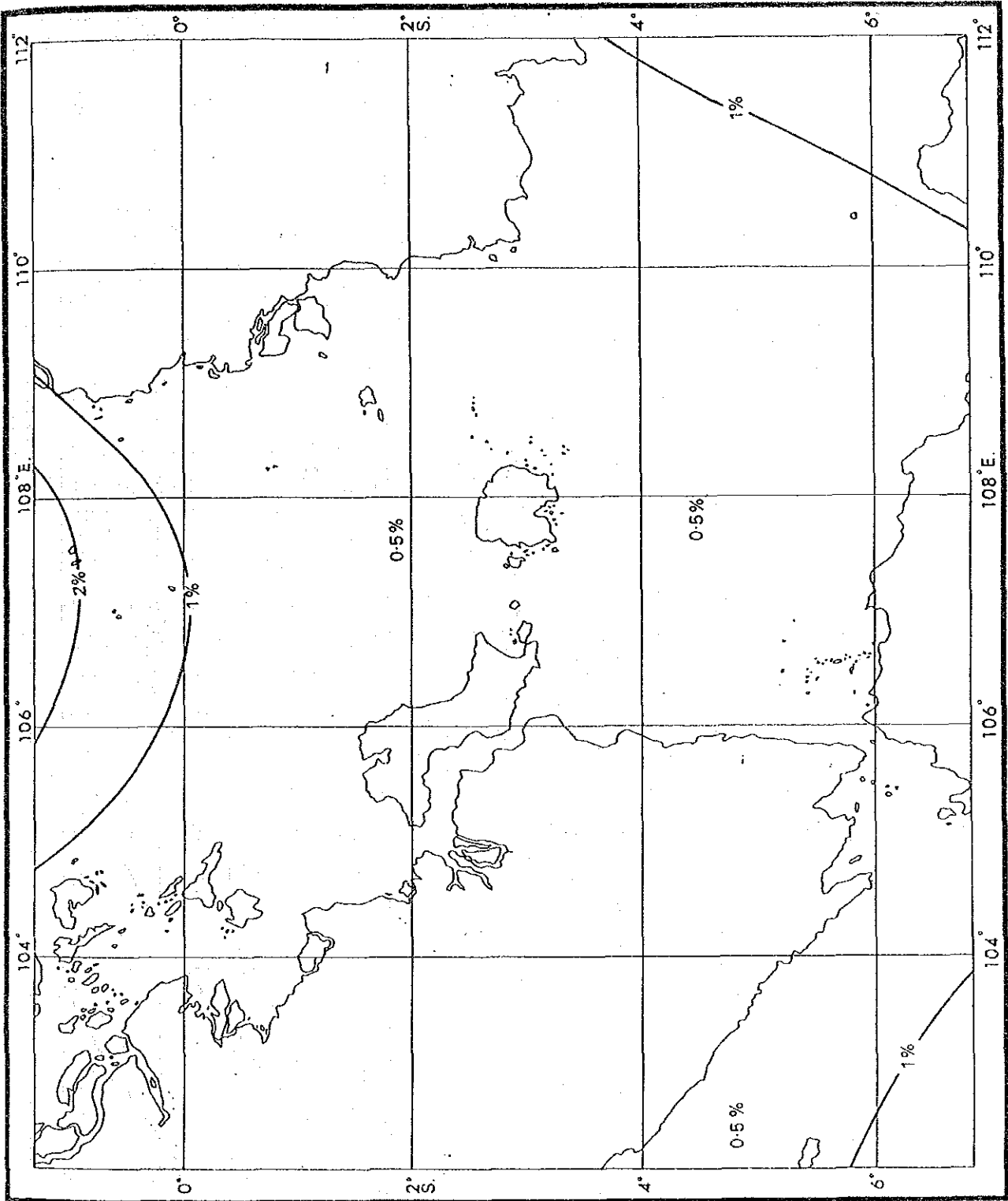


Fig. 4-1-12(1)A Gales. Percentage of wind observations reporting Force 7 or over - January

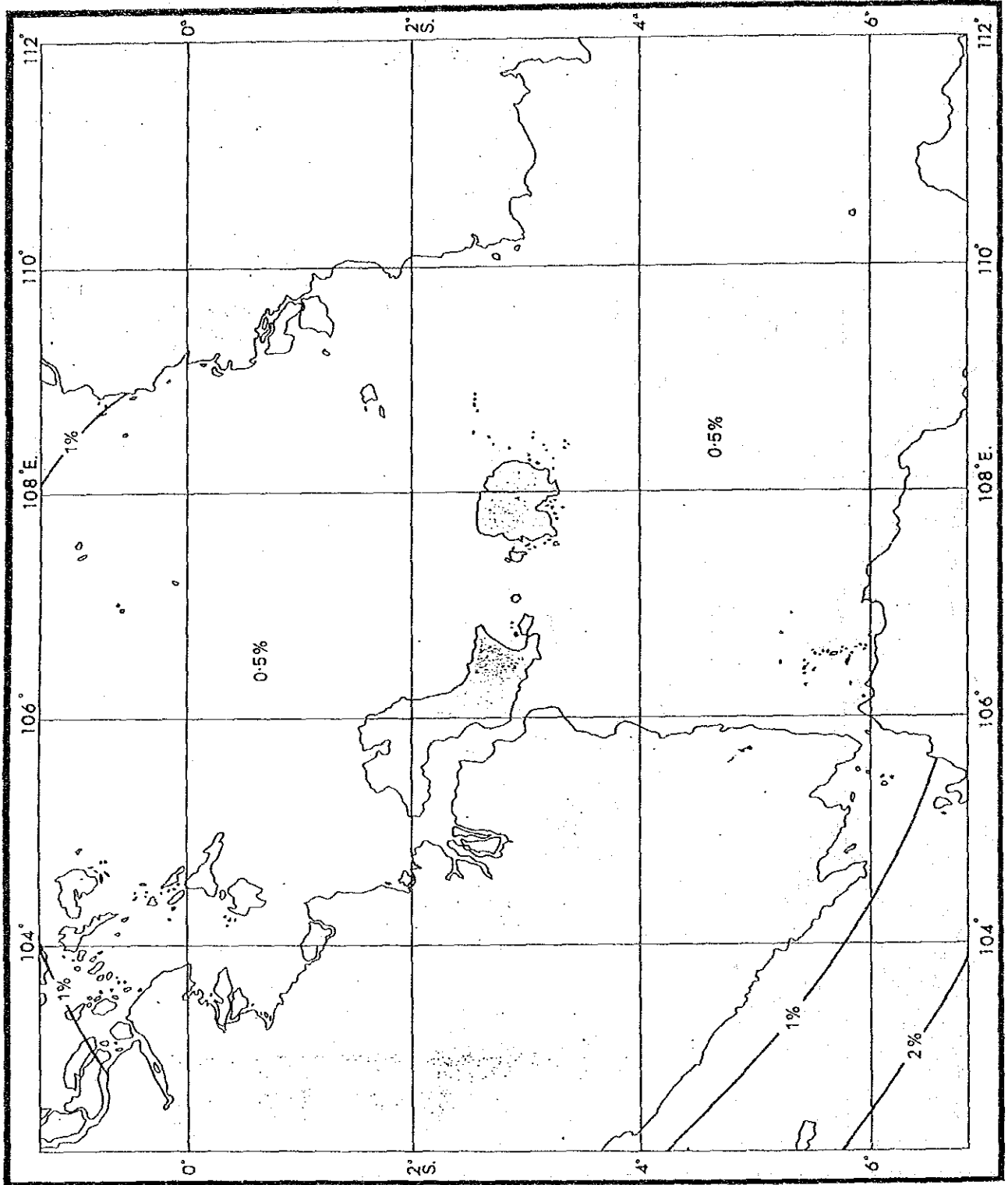


Fig. 4-1-12(2)A Gales. Percentage of wind observations reporting Force 7 or over - July

Table 4-2-3A The Five Optimal Types of Ferry Vessel in the Proposed Routes from commissioned/under construction ferry vessels in INDONESIA -

NAME	GRT	LOA	B	FD	SPD	CAPACITY		ROUTE
						P	C	
KMP.LAMPUNG	980	62.00	13.40	3.00	16	495	18T/40S	MERAK-BAKAUHENI
KMP.KOTABUMI	1070	71.57	12.40	3.65	16	800	22T/55S	DITTO
KMP.NUSA DHARMA	1302	105.34	15.02	3.52	15	650	150 MIX	DITTO
KMP.BANTEN	985	69.80	14.20	2.95	17	500	20T/15S	BAJOE-KOLAKA
TYPE "A"	1000	70.00	14.00	3.50	16	600	27(8 ^t T)	

KMP.NIAGA F1	421	46.00	12.00	1.90	8	394	22	UJUNG-KAMAL
KMP.NIAGA F2	421	46.00	12.00	1.90	8	394	22	DITTO
KMP.MERAK	499	44.50	11.50	2.60	14	500	15	PADANGBAI-LEMBER
KMP.BAKAUHENI	510	44.50	11.30	2.60	12	500	20T	DITTO
KMP.NUSA PENIDA	570	55.00	14.00	2.50	13	350	20T	DITTO
KMP.NASA BHAKTI	570	55.00	14.00	2.50	13	350	30 MIX	DITTO
KMP.BONE RAYA	499	47.80	11.40	2.30	14	480	15	BAJOE-KOLAKA
KMP.GAJAH MADA	513	37.50	13.20	3.50	9	375	8T(24S)	DITTO
KMP.MUJAIR	467	33.00	8.00	1.20	11	224	10S	WAINURU-WAIPIRIT
KMP.KOLAKA	467	45.00	9.60	2.54	9	250	14 MIX	JANGKAR-KALIANGET
KMP.CUCUT *	500	45.35	12.00	2.00	10	400	21	LOMBOK-POTOTANO
KMP.ILE MANDIRI*	-----	-----	-----	-----	-----	-----	-----	KUPANG-ROTE
----- *	-----	-----	-----	-----	-----	-----	-----	LEWOLEBA-WAIWE'G
----- *	-----	-----	-----	-----	-----	-----	-----	ATAPUPU-KALABAHI
----- *	-----	-----	-----	-----	-----	-----	-----	TUAL-ELAT
----- *	-----	-----	-----	-----	-----	-----	-----	TERNATE-BITUNG
----- *	-----	-----	-----	-----	-----	-----	-----	PAGIMANA-GORON'O
TYPE "B"	500	47.00	11.50	2.60	14	500	15(8 ^t T)	

KMP. TONGKOL	260	40.90	8.90	2.70	10	200	18 MIX	UJUNG-KAMAL
KMP. POTRE KONENG	342	33.50	13.60	1.80	7	300	12T/30S	DITTO
KMP. AENG MAS	334	49.07	10.38	2.20	8	437	28 MIX	DITTO
KMP. TRISILA PRA'A375	40.82	10.04	3.28	10	75	10 MIX	KETAPANG-GILIM'K	
LCT. TRIGUNA VIII	232	38.77	9.73	1.40	8	60	13 MIX	DITTO
KMP. KERAPU I	288	39.00	9.51	1.75	11	200	8 MIX	LOMBOK-POTOTANO
KMP. KAKAP	279	39.00	9.50	1.75	10	200	20 MIX	MEULABOH-SINAB'G
KMP. LEMBAR	241	45.48	11.00	2.20	8	178	16 MIX	BANGKA-BELITUNG
KMP. TENGGIRI	278	41.20	11.50	2.10	9	302	6 MIX	BIRA-PAMATATA
KMP. KERAPU II	328	39.00	9.50	1.75	12	200	10 MIX	KUPANG-SABU
KMP. KERAPU III	328	39.00	9.50	1.75	12	200	10 MIX	KUPANG-KALABAHI
KMP. MADIDIHANG	233	33.50	9.00	1.50	12	100	10 MIX	LARANTUKA-
								WAIWERNG-LEWOLEBA
KMP. TERUBUK *	300	38.50	10.50	1.80	11	300	12	HUNIMUA-WAIPIRIT
----- *				DITTO	-----			BIAK-SERUI
----- *				DITTO	-----			SERUI-NABIRE
TYPE "C"	300	38.50	10.50	2.20	11	300	11(8 ^t T)	
"C'"	300	42.00	10.00	2.40	14	300	11(8 ^t T)	

JOKOTOLE	187	29.90	9.02	0.90	11	150	6T/15S	UJUNG-KAMAL
KMP. SELAT MADURA	216	38.40	10.00	1.90	9	230	6T+4S	DITTO
DITTO	II							DITTO
LCT. ARJUNA	215	39.73	9.91	1.22	9	75	10 MIX	KETAPANG-GILIM'K
KMP. MUNAWAR II	155	28.35	8.40	1.75	10	220	4T+2J	LOMBOK- POTOTANO
KMP. PARAY	148	31.00	8.00	1.10	10	100	9 MIX	DITTO
KMP. KUALA BATE	139	23.78	7.02	1.65	5	150	-	BALOHAN-MALAHA' I
KMP. GURITA	196	34.00	7.80	2.50	10	188	8S	DITTO
KMP. TAOTOBA	186	29.50	8.00	1.00	8	105	5B+2S	AJIBATA-TOMOK
KMP. MUSI RAYA	148	31.20	8.00	1.20	12	94	6 MIX	PALEMB'G-KAYUA'G
KMP. BANGKA RAYA	199	35.00	8.00	2.00	11	108	6 MIX	DITTO
KMP. ARIWANGAN	157	29.85	7.00	1.75	10	50	4 MIX	TOROBULU-TAMPO
KMP. JAMBAL	100	24.85	7.00	1.75	5	100	3S	BAUBAU-TOLANDONA
KMP. LAYUR	176	33.00	7.80	1.20	9	80	4T+1S	LUWUK-SALAKAN

KMP.GABUS	134	26.00	10.00	1.50	8	50	8	MIX	POKA-GALALA
KMP.SEPAT	100	27.00	9.00	1.45	6	72	10	MIX	DITTO
KMP.KOMODO	150	33.00	8.00	1.20	9	70	10	MIX	SAPE-L BAJO
KMP.PASUT	118	31.76	9.00	1.00	5	45	16	MIX	PENAJAM-BALIKP'N
KMP.YRUNOJOYO	197	29.90	9.02	0.90	11	150	6T/15S		DITTO
KMP.GURAMI	100	38.40	10.02	1.49	8	120	10	MIX	KOJYA-PONTIANAK
KMP.BIRAMATA	198	21.50	8.00	1.30	-	50	4	MIX	SEKURA
KMP.MATOA	103	16.70	4.40	1.00	10	60	-		DANAU-SENTANI
KMP.MERANTI	134	26.60	6.00	1.30	9	60	-		JAMBI-KL.TUNGKAL
KMP.MERBAU	134	26.60	6.00	1.30	9	60	-		DITTO
KMP.GORARE *	150	35.50	9.00	1.30	11	70	12		BALIKP'N-PENAJAM
KMP.GUNUNG PAL'G*150		38.40	8.00	1.30	11	54	12		RASAUJAYA-TK.B'G
KMP.KURISI *									DITTO
									SORONG-JEFFMAN
TYPE "D"	150	30.00	8.00	1.50	11	100			7(8 ^t T)

Table 4-3-1A Allocation of Desired Types of Ferry boat in The Proposed Routes

ROUTE NO.		SEA AREA	DIST.	TRIP	TIDAL	MAX.	BASIN	MAX.	TYPE OF VESSEL		
From	to		mile	h m	RANGE	DRIFT	DEPTH	WIND	by NATURAL	by TRAFFIC	CONCLUSION
					m	knot	m	force	COND'N	DEMAND	
1											
AMBON	- SERAM	INLAND SEA	11	0-55	2-20	1	?	6	D	B	B
(HUNIHUA)	- (WAIPIRIT)	(TK.PIRU)									
2-1											
BIAK	- YAPEN-S	OPEN SEA	113	08-20	2-20(BIAK)3		?	6	C'	C	C'
(MOKMER)	(KABUAENA)	(ST.SOREHARWA)			2-80(YAPEN)-						
YAPEN-S	- IRIANJAYA	OPEN SEA	93	9-00	2-50(KIMI)3		?	6	C	C	C
(KABUAENA)	(KIMI)	(TK.IRIAN)									
2-2											
BIAK	- YAPEN-N	OPEN SEA	31	02-30	2-20	3	?	6	C'	C	C'
(MOKMER)	(SAUBEBA)	(ST.SOREHARWA)			(BIAK)						
YAPEN-S	- IRIANJAYA	OPEN SEA	93	9-00	2-50	3	?	6	C	C	C
(KABUAENA)	(KIMI)	(TK.IRIAN)			(KIMI)						
3-1											
FLORES	- ALOR	OPEN SEA	128	13-10	2-20	9 ¹	?	6	B	C	B
(LARANTUKA)	(KALABAH)	(FLORES SEA)			(LARANTUKA)						
3-2											
FLORES-ADONARA-		OPEN/INLAND SEA									
LONBLEN-PANTAR-ALOR											
(LARANTUKA)-	(TERONG)	(ST.SOLOR)	14	1-10	2-20(L)	1 ²	?	6	B	C	B
(TERONG)-	(LEWOLEBA)	(ST.LAMAKERA)	17	1-30	2-75(LEWO)7 ³		?	6	-	-	-
(LEWOLEBA) -	(BARANUSA)	(ST.BOLING/FLORES S.)	60	4-30	2-60(BARA)DITTO		?	6	-	-	-
(BARANUSA) -	(KALABAH)	(FLORES S./ST.PANTAR)	37	3-00	2-55(KALA)5 ⁴		?	6	-	-	-
3-3(Compromised Plan of 3-1 & 3-2)											

ROUTE NO.		SEA AREA	DIST.	TRIP	TIDAL	MAX.	BASIN	MAX.	-- TYPE OF VESSEL --		
from	to		mile	TIME	RANGE	DRIFT	DEPTH	WIND	by NATURAL	by TRAFFIC	CONCLUSION
				h m	m	knot	m	force	COND'N	DEMAND	
4											
SE. SULAWESI-	M. KABAENA	OPEN SEA	34	3-30	2-80	-	?	6	C	C	C
(PULENO)	(SIKELI)	(ST. KABAENA)			(BAUBAU)						
5											
E. KABAENA	- W. MUNA	INLAND SEA	14	1-30	-DO-	- ⁵	?	8 ⁶	D	D	D
(DONGGALA)	(MAMASANGKA)	(ST. MUNA)									
6											
KENDARI	- WOWONI	INLAND SEA	26	2-30	-DO-	3 ⁷	?	6	D	D	D
	(LANGGALA)	(ST. WOWONI)									
7											
MOROTAI	- HALMAHERA	OPEN SEA	25	2-30	2-10	SLIGHT	?	6 ⁸	C	C	C
(TOBELO)	(GORUA)	(HALMAHERA SEA)			(GORUA)						
8											
BAJOE	- KOLAKA	OPEN SEA	80	5-20	2-40	SLIGHT ⁹	?	6	C	A	A
		(TK. BONE)									
9											
PALEMB'G	- BANGKA	INLAND SEA	74	6-30	3-80	2	?	6	C	A	B
	(MUNTOK)	(ST. BANGKA)									
BANGKA	- BELITUNG	OPEN SEA	70	5-30	-	3	?	6	C'	C	C'
(SADAI)	(TG. BARONG)	(S. CHINA SEA)			(TG. PANDAN)						

*1 **Tidal streams in Selat Larantuka.** The N-going tidal streams, known locally as "Wurrah", starts in Selat Larantuka with the rising of the moon, and the S-going stream, known locally as "Olah", six hours later, the changes recurring regularly. During the survey this theory was found to be fairly correct, with an average departure of one hour in the times given by local inhabitants. It may be generally accepted that the N-going stream being one hour after the rising and setting of the moon, and the S-going six hours later. Slack water, especially during the spring tides, is of very short duration.

The maximum rate of the stream occurs from two to three days after full and new moon, **when it may attain a rate of nine knots.** The lowest rate occurs two to three days after the quarters, when it does not exceed three and a half knots.

In port Larantuka there is usually a N-going tidal stream, the average rate being one knot and the maximum two knots. Whenever there is a S-going stream in the strait an eddy may be expected in the roadstead, its strength and also the distance it is felt from the shore being influenced by the rate in Selat Larantuka.

*2 **Tidal streams in Selat Solor.** During the short period occupied in the survey of Selat Solor it was observed that the tidal streams set W and E, never attaining a rate of more than one and a half knots, and **usually not more than one knot.** The direction of the stream is governed by the tidal streams setting at that time in Selat Flores, Selat Lamakera and Selat Boling, also by the vertical movement of the water in the straits.

*3 **Tidal streams in Selat Lamakera and Selat Boling set NE and SW.** The horizontal movement of the water in both straits is of a semi-diurnal character, the NE-going running for two to three hours before to two to three hours after the moon's passage in Slet Boling, and usually earlier in Slet Lamakera. The SW-going stream runs from three to four hours after to nine to ten hours after the moon's passage. In Slet Boling the NE-going stream sets towards Tg. Wurgobin and the reef on which Pulau Ipet and Pulau Kenawehlie, whilst the SW-going stream sets more in the direction of the

channel.

In Selat Lamakera the NE-going stream sets strongly towards the coast of Adonara, especially between Tg.Watu Woko and Tg.Ana-burakawutun, three and three quarters miles W, but decreases in strength to Tg.Ana-burakawutun. With the SW-going stream there is a strong eddy under this part of the coast, and heavy tide-rips may be seen both here and N of Tg.Watu Woko.

The strongest tidal streams are found in the narrows close under Tg.Watu Woko. During the survey a rate of five knots was observed two days after spring tides, so it may be assumed that the maximum rate there may be seven knots. Tidal streams in Selat Boling are also very strong.

Spring tides occur about three days after full and new moon, and neap tides the same period after the quarters. Eddies are caused by the strong tidal stream in the various bights and bays in the straits. The NE-going stream into Leba Leba Bay causes a strong eddy in the bight on the coast of Pulau Adonara opposite N of Tg.Deriwutun. The survey vessel, when lying at anchor here, was nearly swung with her head N.

With strong tidal streams there are often whirling eddies near the coast of Plau Lomblen off Tg.Mitanwutun, caused by the irregular nature of the bottom. The N-going stream may be expected two to three hours before to two to three hours after the moon's passage, and S-going stream three to four hours after to nine to ten hours after the moon's passage.

The stream sets W with the NE-going stream S of Tg.Tuak, thus causing the set towards Tg.Wurgobin. Farther inside Leba Leba Bay the tidal streams are not so noticeable.

*4 **Tidal streams in Selat Alor.** The horizontal movement of the water in Selat Alor is of a semidiurnal character, and may attain a considerable rate. Owing to the lack of anchorage in the strait it was impossible to carry out any thorough observations during survey. The following general information, obtained from the local inhabitants and checked by observations, give a fairly good idea of the prevailing tidal streams.

The tidal streams mainly follow the direction of the strait, throughout.

During the SE monsoon the SW-going stream lasts longer and is stronger than the NE-going stream. It has been observed that the SW-going stream flowed from about two hours after to about nine hours after the moon's passage, and the NE-going stream for the remaining hours. During the NW monsoon the NE-going stream is presumably of longer duration and stronger than the SW-going stream.

Spring tidal streams appear to occur two to three days after the full moon and new moon, and neaps from two to three days after the quarters. **The rate at springs average five to six knots.** The maximum rate can probably be expected when spring tides occur during the period of the moon's greatest declination either S or N, and particularly the years that the moon's declination greater than the sun's declination.

Off projecting points and around the islands the direction and rate of the tidal streams are naturally irregular. In the N part of the strait the rate of the tidal streams is considerably less than in the S part, except close off Tg.Leur, where a rate of five knots was observed.

Tidal eddies have been reported midway between Pulau Lapang and Tg.Leur.

*5 **Tidal streams in Donggala roadstead are sometimes strong.** It may occur that during a strong SE-going stream outside the charted 100 fm(183m) line there may be a strong NNW-going stream in the roadstead.

Tidal streams in Selat Muna set N with the flood tide and S during ebb through the strait, but **seldom exceed two knots.**

*6 **Winds in Selat Tiworo during the NW monsoon, winds between SW and NW** blow fairly regularly in the afternoon, abating again in the evening. **During squalls the wind sometimes reaches Force eight.**

*7 **Tidal streams in Selat Wowoni set N and S and may attain a rate of three knots.** There is practically no period of slack water, except at neap tides, and even then it is only of short duration. **Tidal streams in the approach channels to Teluk Kendari and in the bay are strong at times.**

*8 **Wind in Tobelo** during November to March, daytime winds are mainly from NE, in May to September these winds are mainly from SE.

On the E coasts of Halmahera and Morotai a steady swell breaks strongly on steep beaches, especially in NE winds.

*9 **Tidal streams set irregularly between the reefs in Teluk Mekongga.** They set generally E and W in N of the islands. A S-going stream has been observed E of the islands and between Pulau Maniang and the coast.

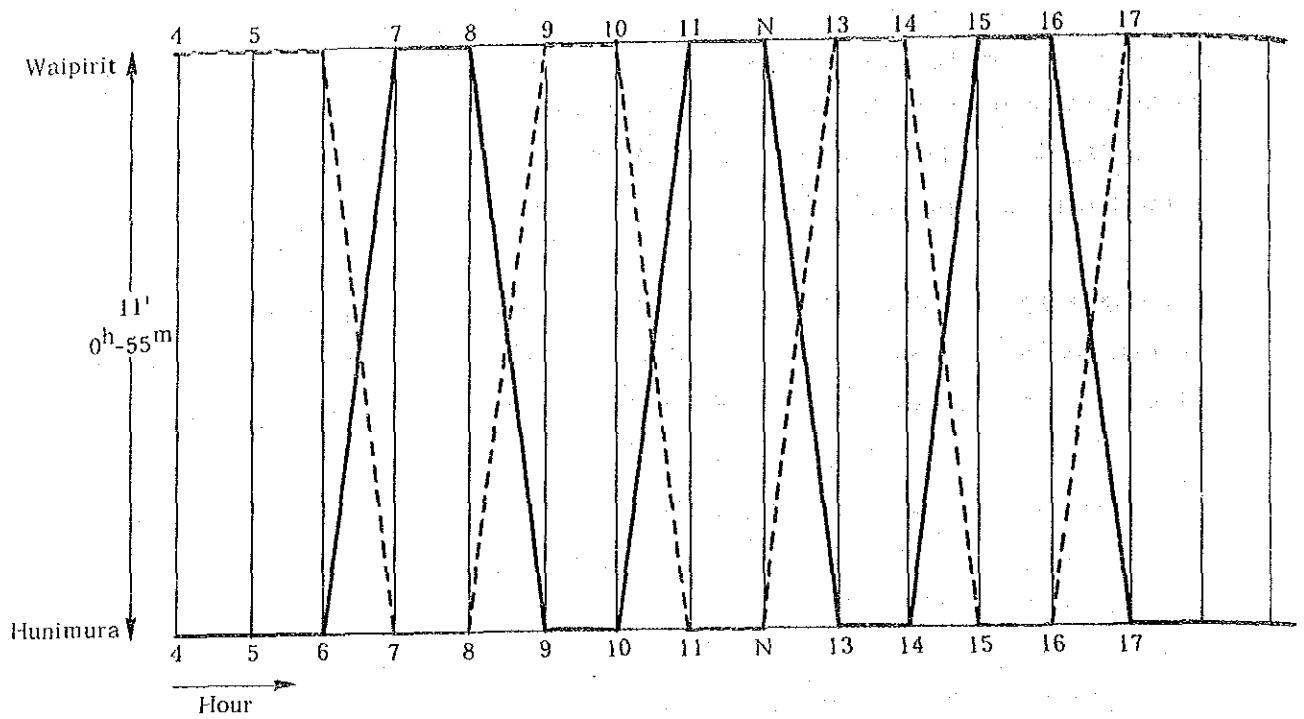


Fig. 4-4-1A Time Table of Ferry Service
 ROUTE 1 Hunimura - Waipirit
 (six round trips/day by two B ferryboats)

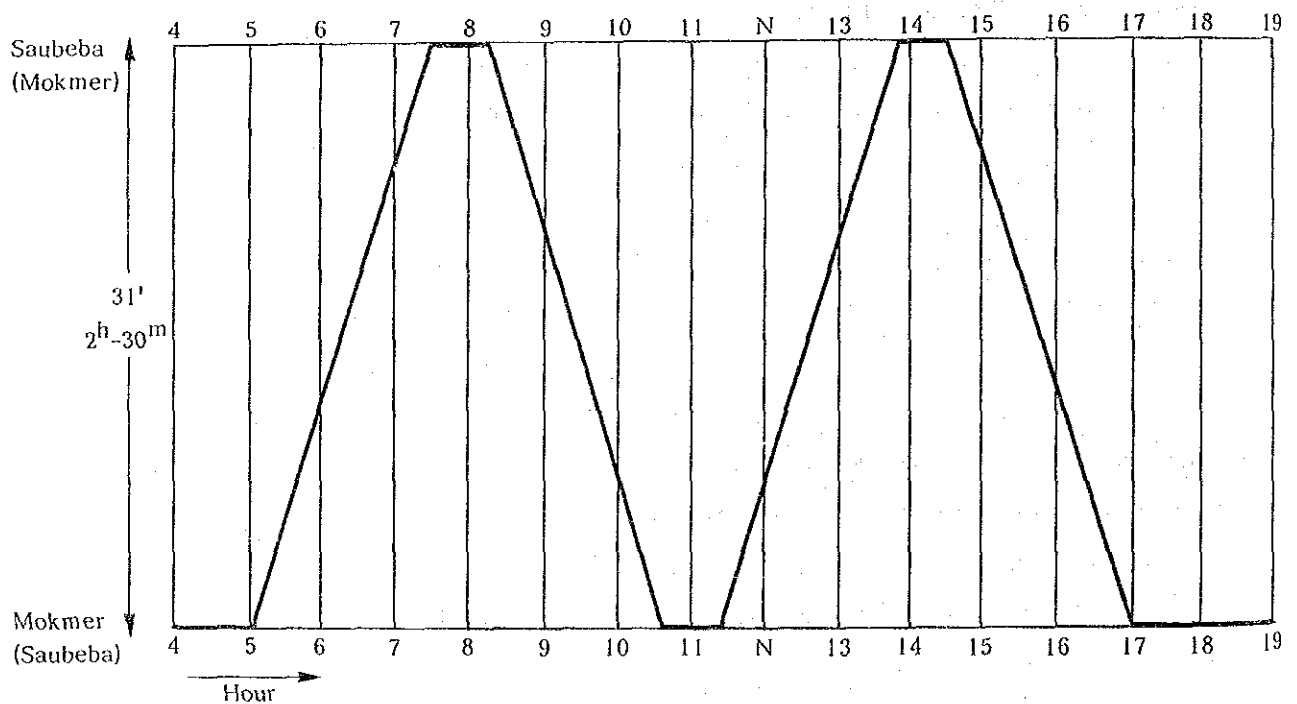


Fig. 4-4-2(1) A
 ROUTE 2-1 Saubeba Mokmer
 (two round trips/day one c' ferryboat)

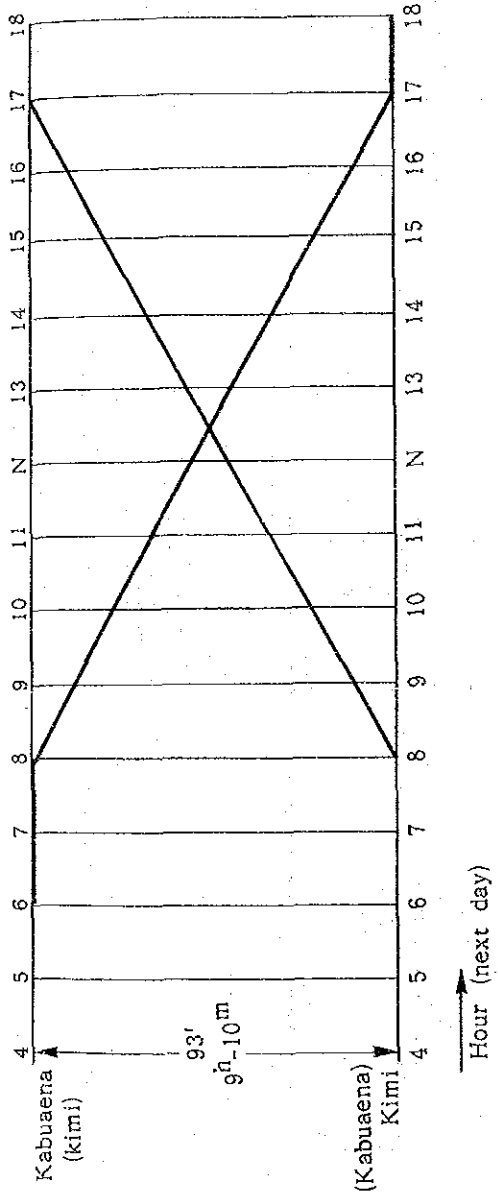


Fig. 4-4-2(2)A

ROUTE 2-2 Kabuaena - Kimi
 (one round trip/week by one C ferryboat)

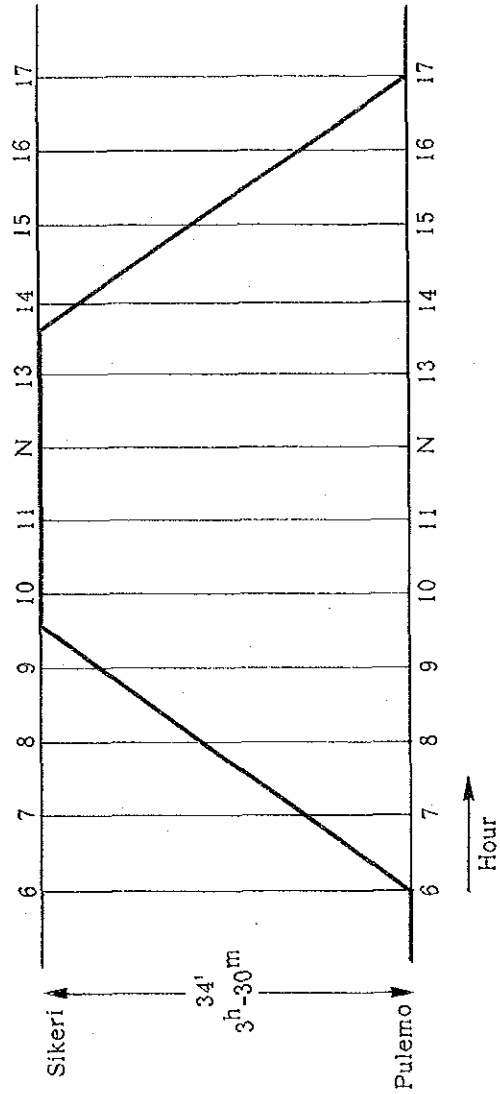


Fig. 4-4-4A

ROUTE 4 Sikeli - Pulemo
 (one round trip/week by one C ferryboat)

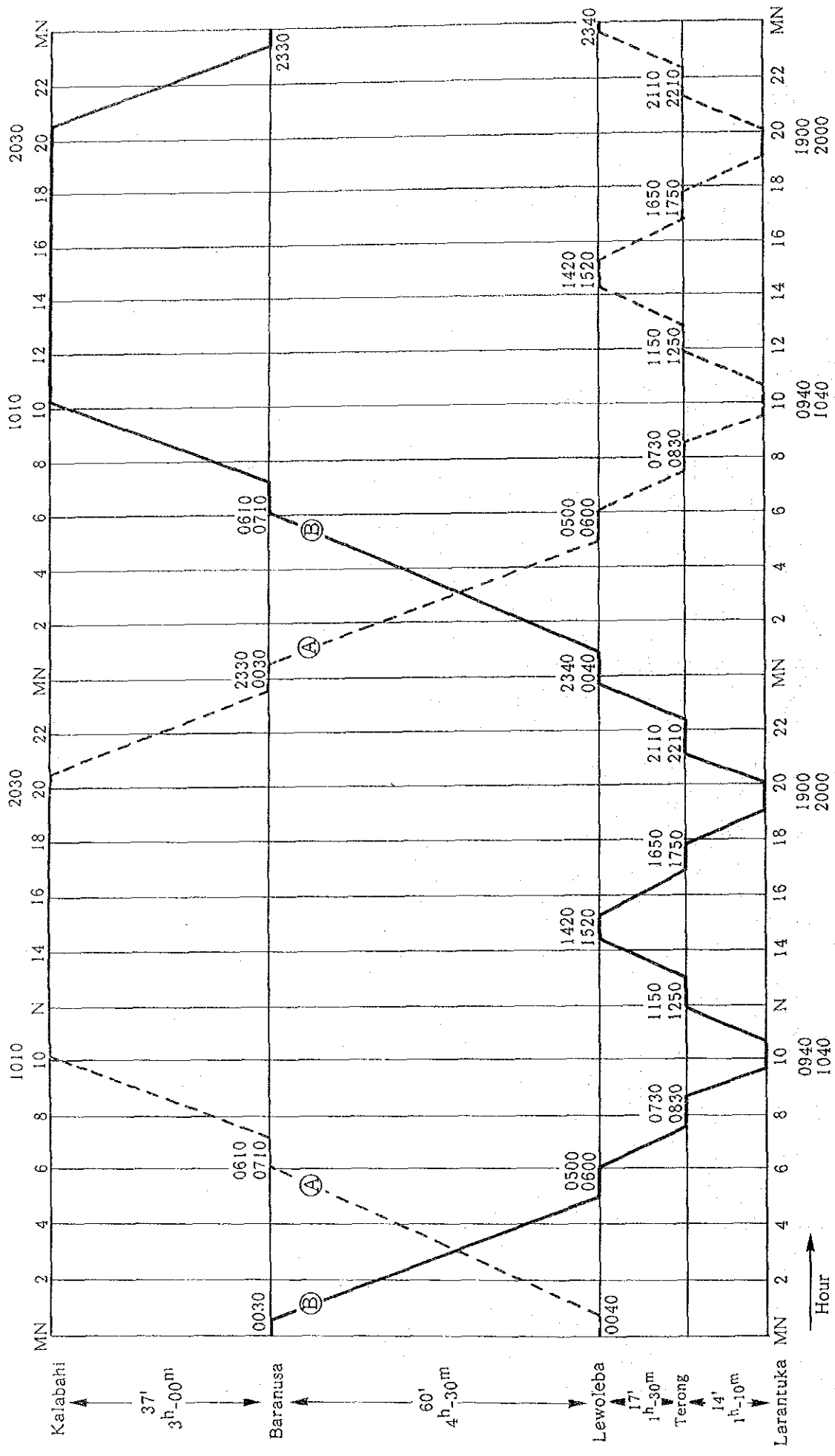


Fig. 4-4-3A
ROUTE 3

Larantuka - Teromng - Lewoleba - Baranusa - Kalabahi
 (Larantuka - Lewoleba: two round trip/day
 (Lewoleba - Baranusa - Kalabahi: one round trip/day

by two B ferryboat)

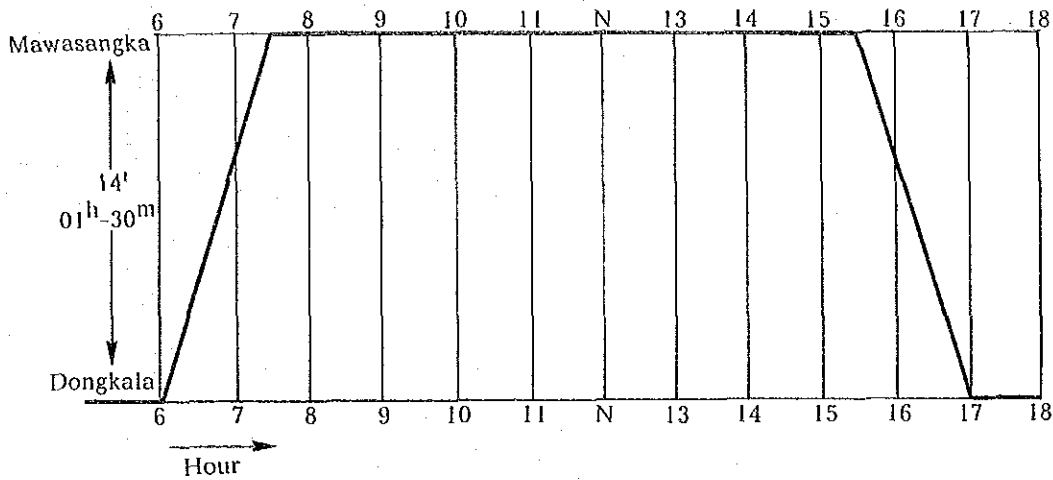


Fig. 4-4-5A

ROUTE 5 Dongkala - Mawasangka
(one round trip/day by one D ferryboat)

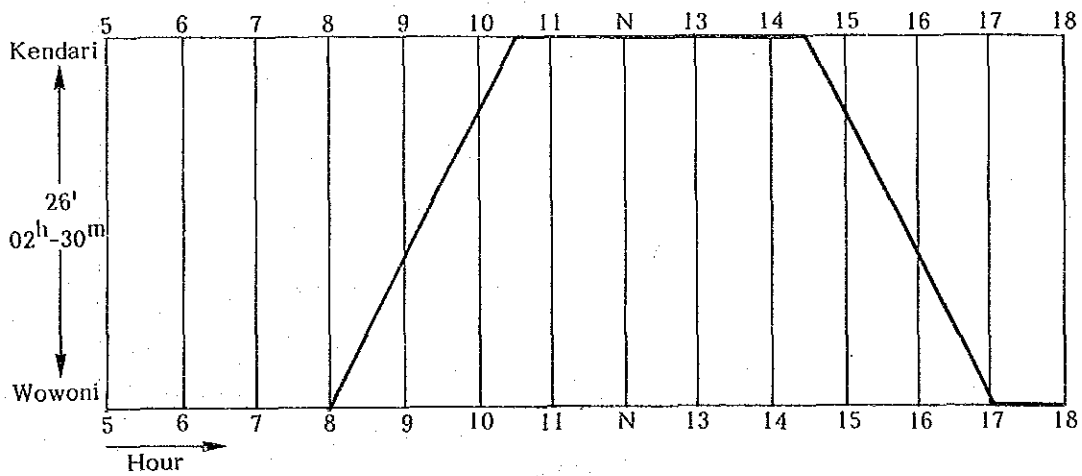


Fig. 4-4-6A

ROUTE 6 Wowoni - Kendari
(one round trip/day by one D ferryboat)

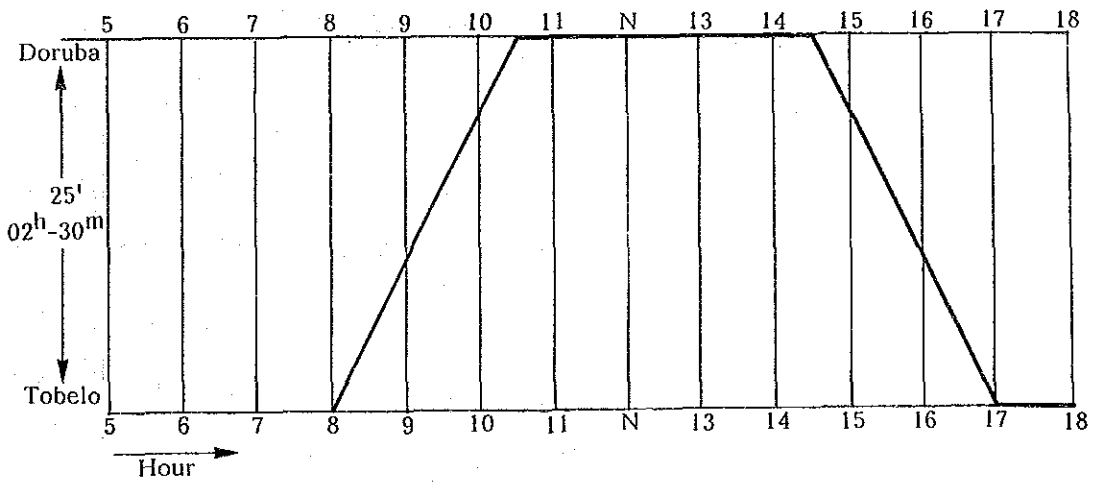


Fig. 4-4-7A

ROUTE 7 Doruba - Tobelo
(one round trip/day by one C ferryboat)

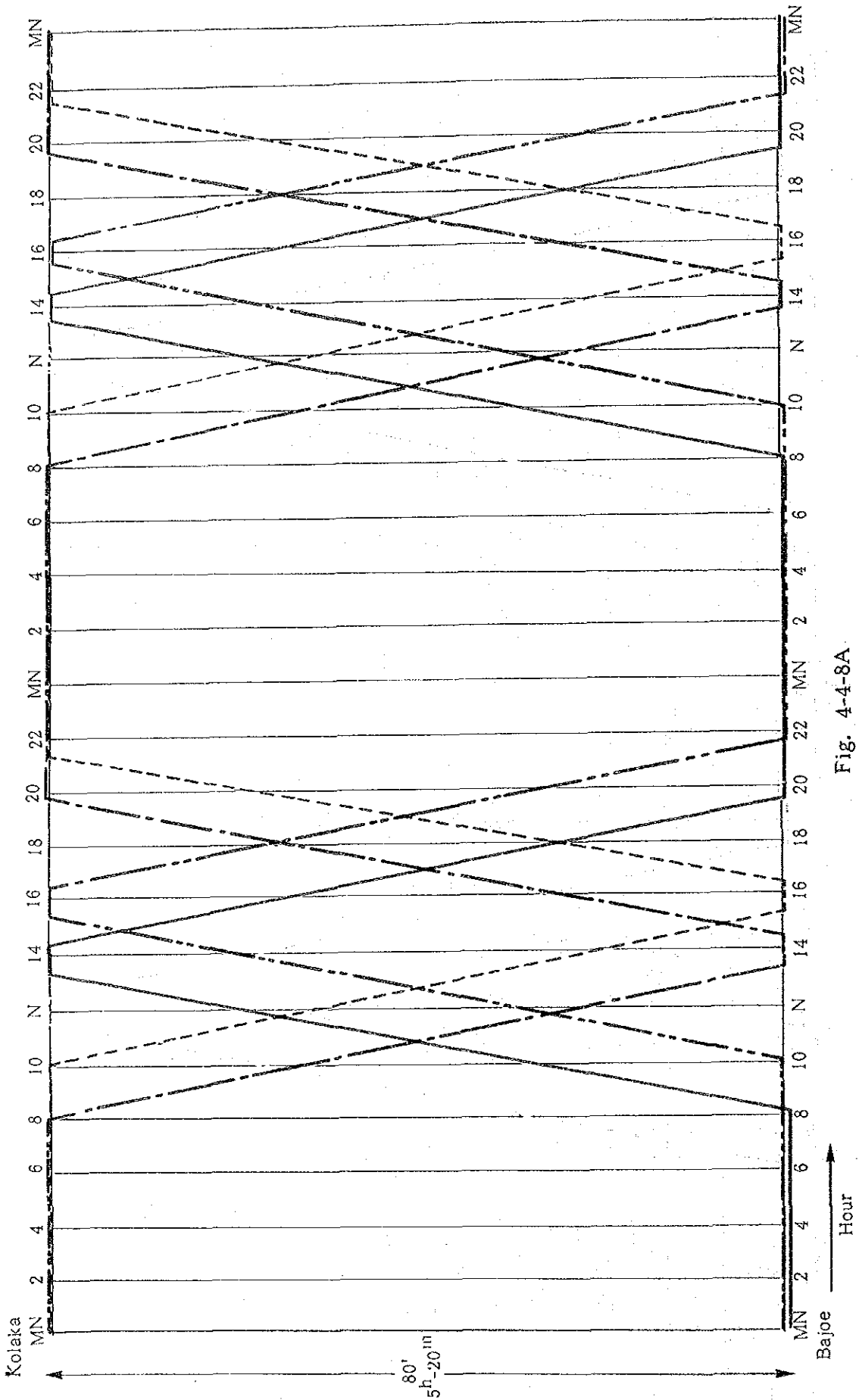


Fig. 4-4-8A

ROUTE 8 Kolaka - Bejoe
(five round trips/day by five A ferryboats)

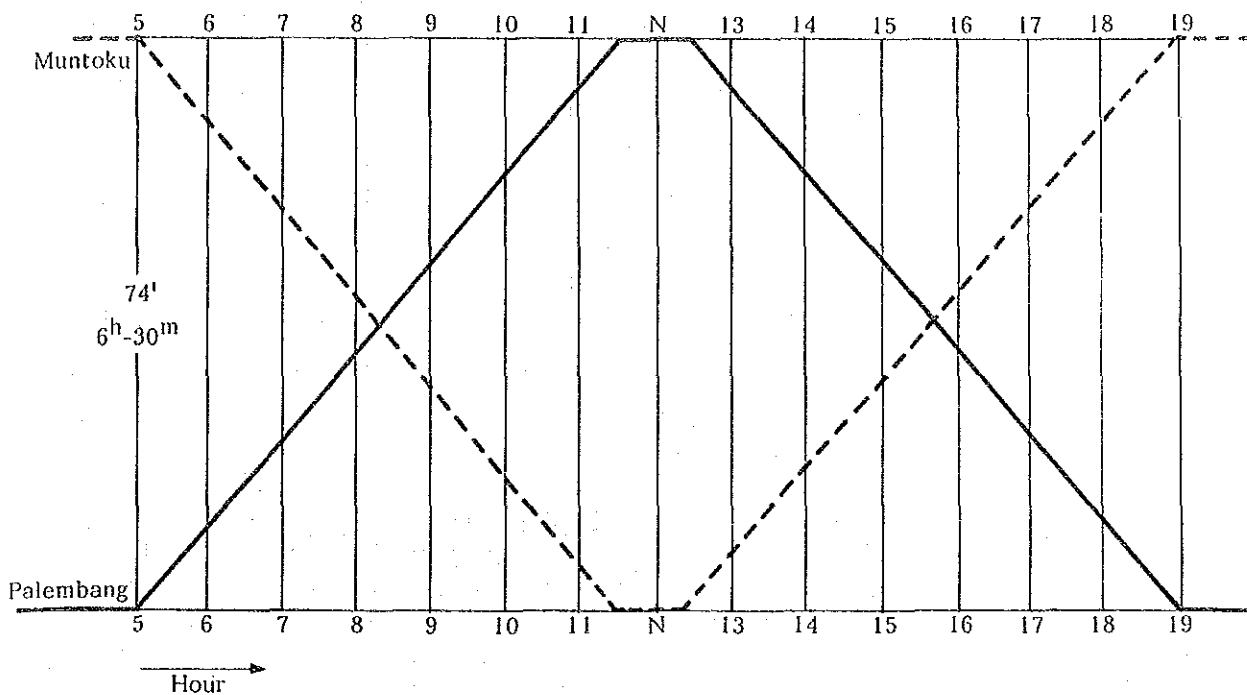


Fig. 4-4-9(1)A
 ROUTE 9-1 Palembang - Muntoku
 (two round trips/day by two B ferryboats)

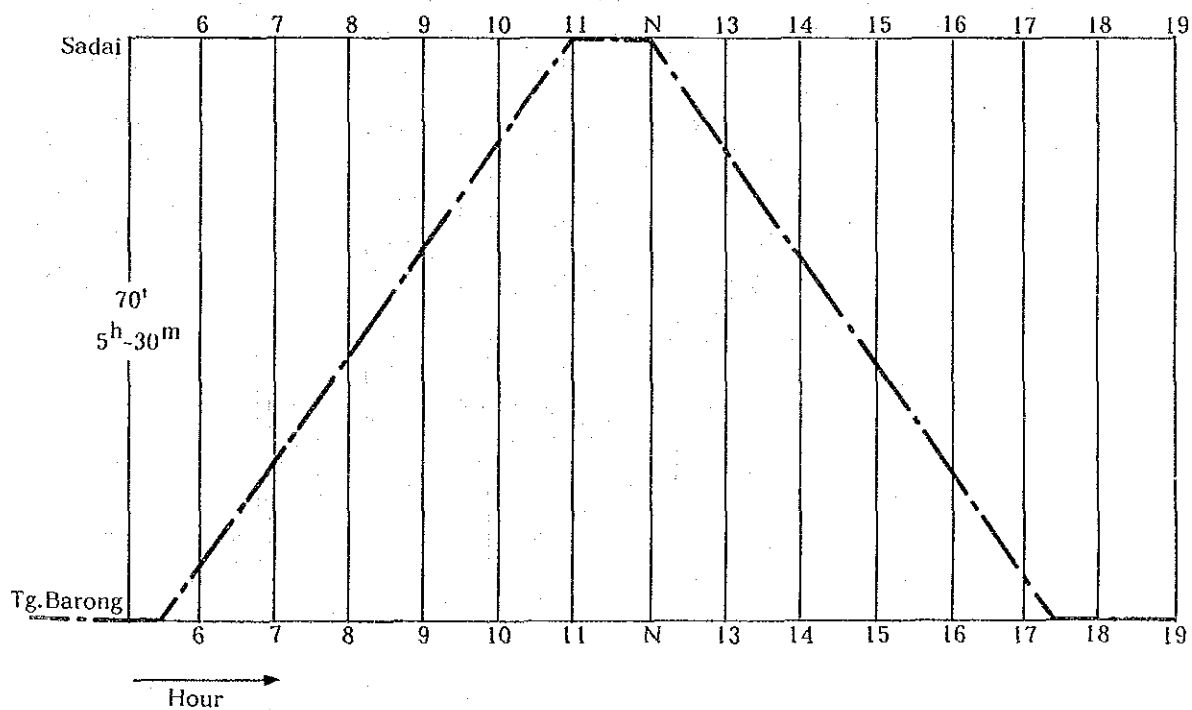


Fig. 4-4-9(2)A
 ROUTE 9-2 Tg. Barong - Sadai
 (one round trip/day by one C' ferryboat)

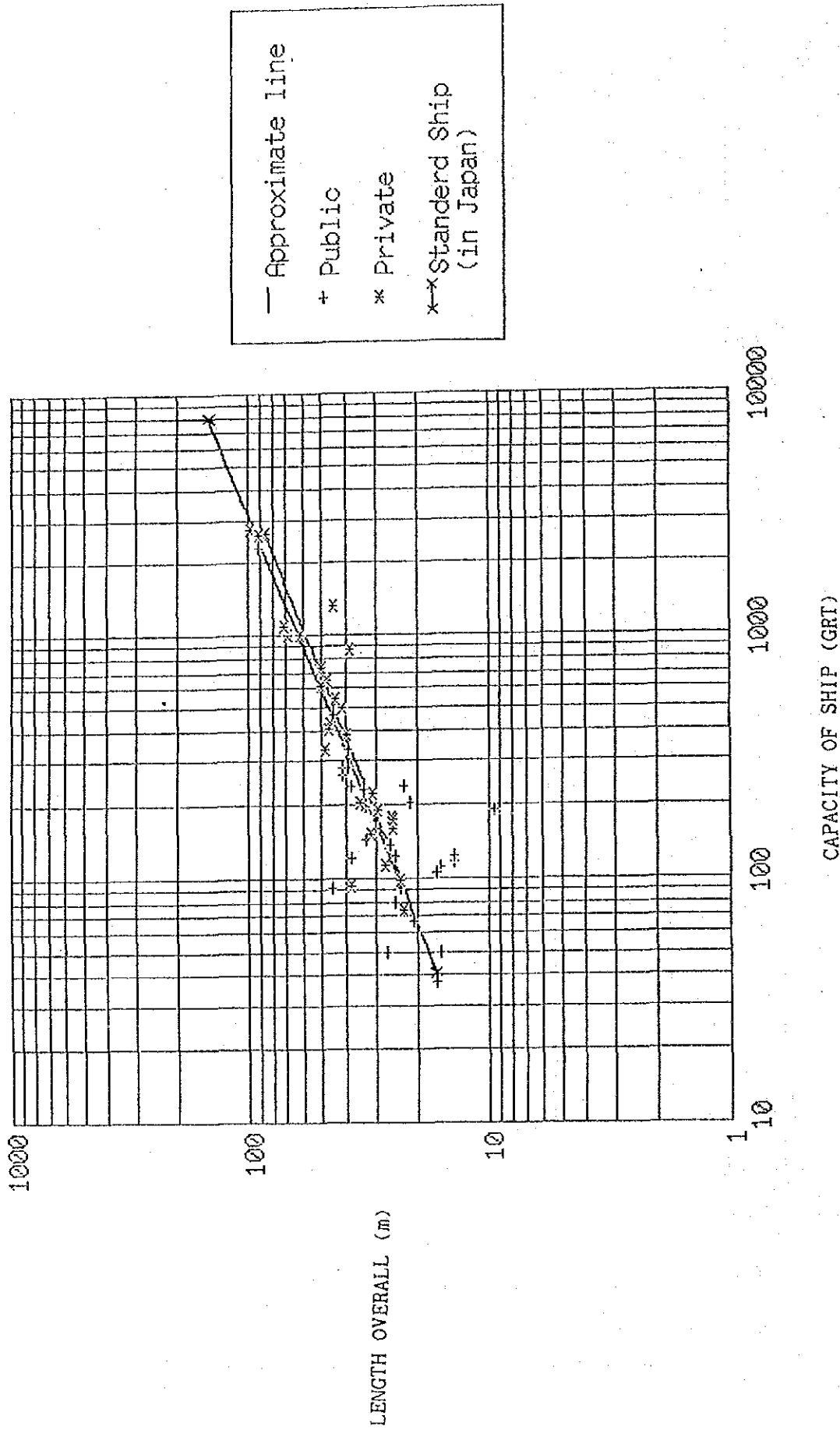


Fig. 6-2-1A Length Overall and Capacity of Ship

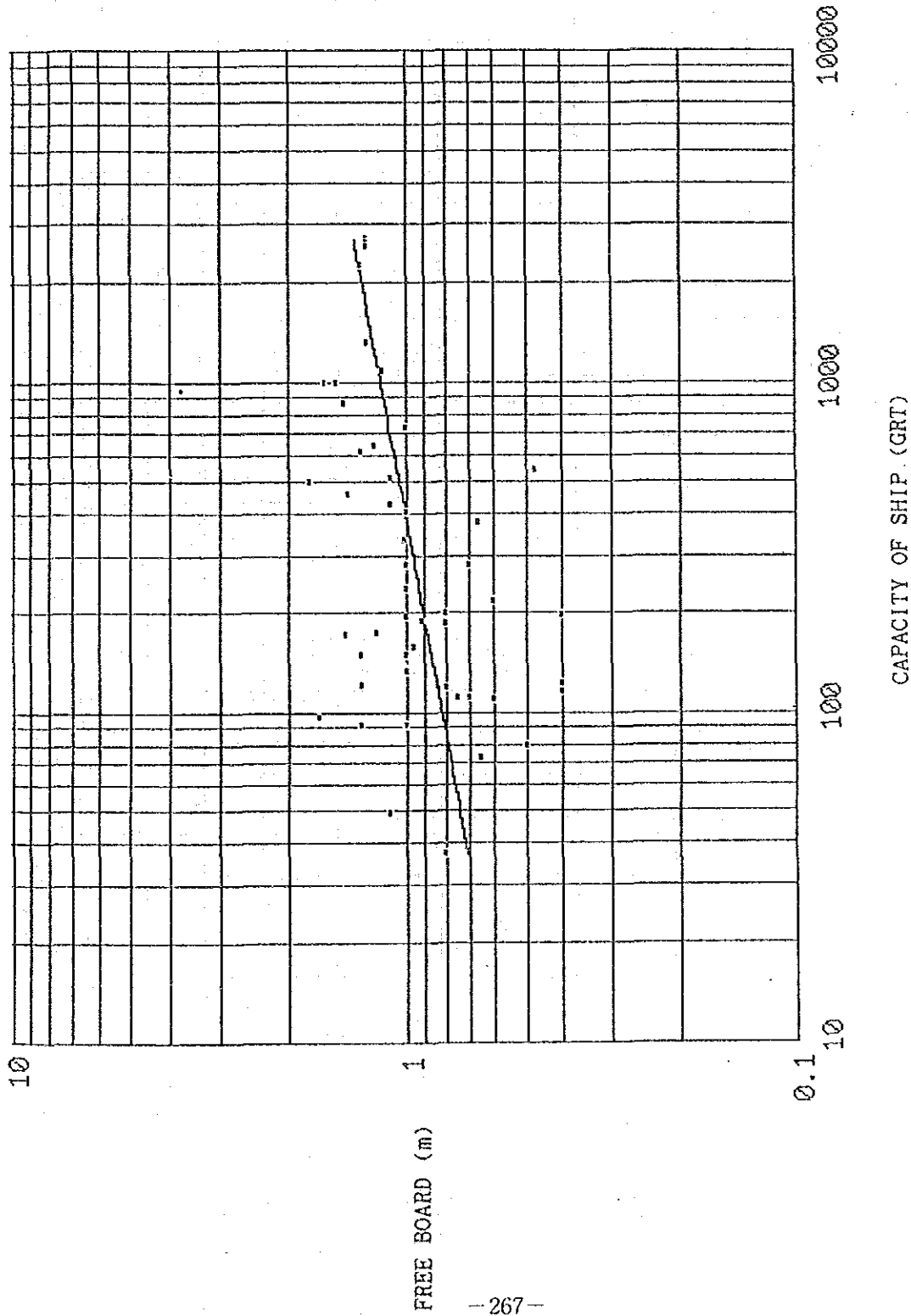


Fig. 6-2-4A Free board and Capacity of Ship

Table 6-5-1A Space demand of Terminal Building

$a1 = a * n * N * x * y$
 a ; Required area for one person (m2) a1; Waiting Room a2= a1*0.15
 n ; Number of passengers a2; Kiosk/Panteen a3= a1*0.15
 N ; Berthing/deberthing ships in same time (1.0) a3; Admi. Office a4= (a1+a2+a3)*0.25
 x ; Concentration ratio (1.0-1.6) a4; Other Utilities a5= (a1+a2+a3+a4)*0.10
 y ; Fluctuation rate (1.2) a5; Public Hall/Passage

ROUTE No.	coefficient					a1 (m2)	a2 (m2)	a3 (m2)	a4 (m2)	a5 (m2)	TOTAL A (m2)
	a	n	N	x	y						
1	1.2	500	1.0	1.6	1.2	1,152	180	180	400	240	2,200
2-1	1.2	300	1.0	1.0	1.2	432	70	70	150	60	800
2-2	1.2	300	1.0	1.0	1.2	432	70	70	150	60	800
3-1	1.2	300	1.0	1.0	1.2	432	70	70	150	60	800
3-2	1.2	300	1.0	1.0	1.2	432	70	70	150	60	800
4	1.2	100	1.0	1.0	1.2	144	25	25	50	50	300
5	1.2	100	1.0	1.0	1.2	144	25	25	50	50	300
6	1.2	100	1.0	1.0	1.2	144	25	25	50	50	300
7	1.2	300	1.0	1.0	1.2	432	70	70	150	60	800
8	1.2	600	1.0	1.6	1.2	1,382	200	200	450	250	2,500
9-1	1.2	500	1.0	1.0	1.2	720	120	120	250	160	1,400
9-2	1.2	300	1.0	1.0	1.2	432	70	70	150	60	800

Table 6-5-2A Space Demand of Parking Lot

A1= a*n*N*x*y
 A2= a*n1*N*x*y*z*1/n2

A1:Loading perking area (m2)
 A2:Waiting perking area (m2)
 a :Required parking area for one car(m2)
 n :Number of car
 n1:Number of passnger
 n2:Number of passengers per car
 N ;Berthing/deberthing ships in same time (1.0)
 x ;Utilization ratio (1.0)
 y ;Concentration ratio (1.0-1.6)
 z ;Ratio of car use passenger

ROUTE No.	LOADING PARKING AREA						WAITING PARKING AREA							
	a	n	N	X	Y	area A1 (m2)	a	n1	N	X	Y	Z	n2	area A1 (m2)
1	45	20	1.0	1.0	1.6	1,440 ---->	25	500	1.0	1.0	1.6	1.0	8	2,500 ---->
2-1	45	14	1.0	1.0	1.0	630 ---->	25	300	1.0	1.0	1.0	1.0	8	938 ---->
2-2	45	14	1.0	1.0	1.0	630 ---->	25	300	1.0	1.0	1.0	1.0	8	938 ---->
3-1	45	14	1.0	1.0	1.0	630 ---->	25	300	1.0	1.0	1.0	1.0	8	938 ---->
3-2	45	14	1.0	1.0	1.0	630 ---->	25	300	1.0	1.0	1.0	1.0	8	938 ---->
4	45	9	1.0	1.0	1.0	405 ---->	25	100	1.0	1.0	1.0	1.0	8	313 ---->
5	45	9	1.0	1.0	1.0	405 ---->	25	100	1.0	1.0	1.0	1.0	8	313 ---->
6	45	9	1.0	1.0	1.0	405 ---->	25	100	1.0	1.0	1.0	1.0	8	313 ---->
7	45	14	1.0	1.0	1.0	630 ---->	25	300	1.0	1.0	1.0	1.0	8	938 ---->
8	60	27	1.0	1.0	1.6	2,592 ---->	25	600	1.0	1.0	1.6	1.0	8	3,000 ---->
9-1	45	20	1.0	1.0	1.0	900 ---->	25	500	1.0	1.0	1.0	1.0	8	1,563 ---->
9-2	45	14	1.0	1.0	1.0	630 ---->	25	300	1.0	1.0	1.0	1.0	8	938 ---->

Table 8-1-1A Evaluation of the Nine Routes

Route	Evaluation Items and Evaluation							
	① Demand(2010)		② Project Scale (Develop. Cost)	③ Development Efficiency		④ Necessity of Reinf. /Improv.		⑤ Inter-Regional Balance
	①-1 Passeng. Person / Y	①-2 Cargo Ton / Y		③-1 Dev. Cost/ P. Demand	③-2 Dev. Cost/ C. Demand	④-1 Exist. of Ferry S.	④-2 S. Level of Conv.	
1	◎	○	○	◎	◎	-	○	○
2-1	○	△	△	◎	◎	◎	◎	◎
2-2	▲	▲	△	▲	▲	◎	◎	◎
3-1	○	○	△	◎	◎	-	○	△
3-2	△	▲	△	○	△	◎	○	△
3-3	▲	▲	△	○	△	◎	◎	△
4	▲	▲	▲	△	△	◎	◎	◎
5	▲	▲	△	▲	▲	◎	◎	◎
6	▲	▲	▲	△	△	◎	○	◎
7	○	▲	△	△	○	◎	◎	○
8	◎	◎	◎	◎	◎	-	○	◎
9-1	○	○	○	○	◎	-	○	◎
9-2	△	▲	△	○	○	-	◎	◎

Note:

1. Route

- Route 1: Ambon Isl. (Hunimua) ~ Seram Isl. (Waipirit)
- Route 2-1: Biak Isl. ~ Yapen Isl.
- Route 2-2: Yapen Isl. ~ Irian Jaya (Nabire)
- Route 3-1: Flores Isl. ~ Adonara Isl. ~ Lomblen Isl.
- Route 3-2: Alor Isl. ~ Pantar Isl.
- Route 3-3: Flores (Larantuka) ~ Alor (Kalkabahi)
- Route 4: Sulawesi ~ Kabaena
- Route 5: Kabaena ~ Muna
- Route 6: Sulawesi ~ Wawoni
- Route 7: Morotai Isl. ~ Halmahera Isl.
- Route 8: Sulawesi (Bajoe) ~ Sulawesi (Kolaka)
- Route 9-1: Sumatra (Palembang) ~ Bangka Isl.
- Route 9-2: Bangka Isl. ~ Belitung Isl.

2. ①: Demand

Rounds/Day (By 300GRT)	① -1 Passenger (person)	① -2 Cargo (ton)
◎: 3 Rounds/Day ~	360,000 ~	36,000 ~
○: 1~3 Rounds/Day	120,000 ~ 360,000	12,000 ~ 36,000
△: 0.5~1 Round/Day	60,000 ~ 120,000	6,000 ~ 12,000
▲: ~0.5 Round/Day	~60,000	~6,000

3. ②: Project Scale (Development Cost)

- 1,000,000Rp.
- ◎: 50,000 ~
- : 20,000 ~ 50,000
- △: 10,000 ~ 20,000
- ▲: ~10,000

4. ③: Development Efficiency (Development Cost/Demand Volume)

③ -2: Passenger 1,000Rp./Parson	③ -2: Cargo 1,000Rp./Ton
◎: ~100	~1,500
○: 100 ~ 200	1,500 ~ 3,000
△: 200 ~ 300	3,000 ~ 6,000
▲: 300 ~	6,000 ~

5. ④: Necessity of Reinforcement/Improvement

④ -1: Necess. Reinf. Existance of Ferry Service	④ -2: Necess. Improv. Service Level of Conventional Sea Transportation
◎: Not Exist	Poor (Weekly/Monthly Service)
○: -	Fair (Daily Service)
-: Exist	-

6. ⑤: Inter-Regional Balance

- Number of Existing Ferry Route in the Related Province
- ◎: 0 ~ 2
- : 3 ~ 4
- △: 5 ~

Table 8-1-2A Evaluation of the Nine Routes

Route	Evaluation Items and Evaluation							
	① Demand(2010)		② Project Scale 1,000,000 Rp.	③ Development Efficiency		④ Necessity of Reinf. /Improv.		⑤ Regional Develop. Balance
	①-1 Passeng. Person / Y	①-2 Cargo Ton / Y		③-1= ②/① -1 Rp./Pers.	③-2 ②/①-2 Rp./Ton	④-1 Exist. of Ferry S.	④-2 S. Level of Conv.	
1	① 1,100,000	③ 33,000	21,000	① 19,000	② 640,000			3
2-1	⑤ 160,000	⑤ 8,800	13,000	④ 81,000	⑤ 1,500,000			2
2-2	35,000	3,600	14,000	400,000	③ 3,900,000			2
3-1	④ 270,000	④ 17,000	19,000	③ 70,000	1,100,000			5
3-2	85,000	5,000	12,000	140,000	2,400,000			5
3-3	46,000	1,600	17,000	370,000	11,000,000			5
4	24,000	1,700	6,300	260,000	3,700,000			2
5	29,000	2,000	11,000	380,000	5,500,000			2
6	50,000	3,000	8,600	170,000	2,900,000			2
7	120,000	6,000	16,000	⑤ 130,000	2,700,000			3
8	① 1,100,000	① 206,000	72,000	② 65,000	① 350,000			2
9-1	③ 320,000	② 40,000	45,000	140,000	③ 1,100,000			2
9-2	70,000	5,600	12,000	170,000	2,100,000			2

Note:

* The development cost of Route-3 should be allocated to each of the three individual routes concerned, for the 'Evaluation'. The development cost of each individual route is calculated as follows:

- (1) The terminal construction cost of Larantuka is divided by three, and the same cost is allocated to each of the three routes, namely, Kupang~Larantuka, Larantuka~Terong~Lewoleba (Route 3-1) and Larantuka~Kalabahi (Route 3-3).
- (2) The terminal construction cost of Kalabahi similarly is divided by three, and the same cost is allocated to each of the three routes, namely, Kupang~Kalabahi, Kalabahi~Baranusa (Route 3-2) and Larantuka~Kalabahi (Route 3-3).
- (3) The two ships on the Route-3 will be used in common on the three individual routes. Then, one-half of the total cost is allocated to Route 3-1, one-fourth to Route 3-2 and one-fourth to Route 3-3, depending on the service frequency on each route.

PART 3

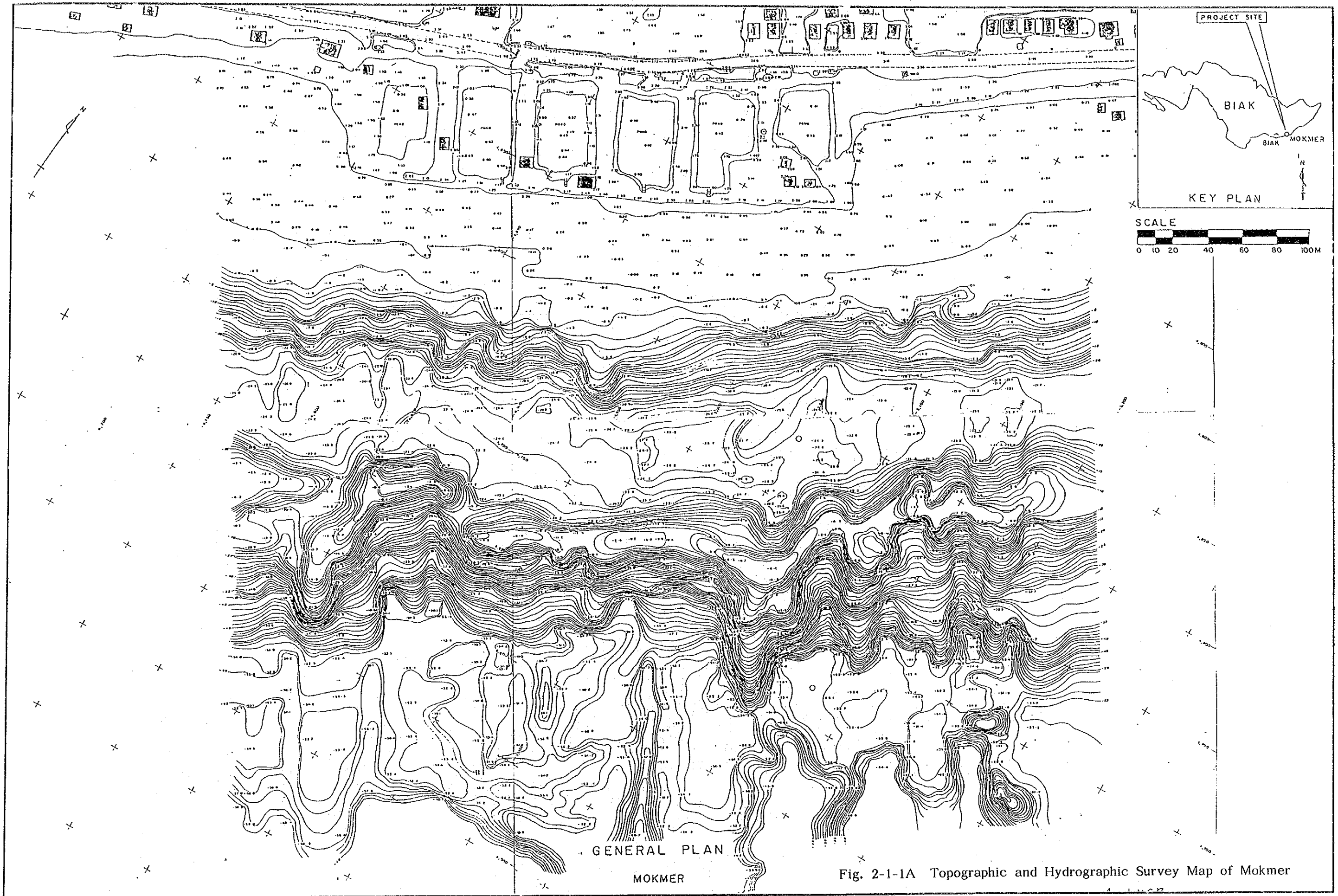


Fig. 2-1-1A Topographic and Hydrographic Survey Map of Mokmer

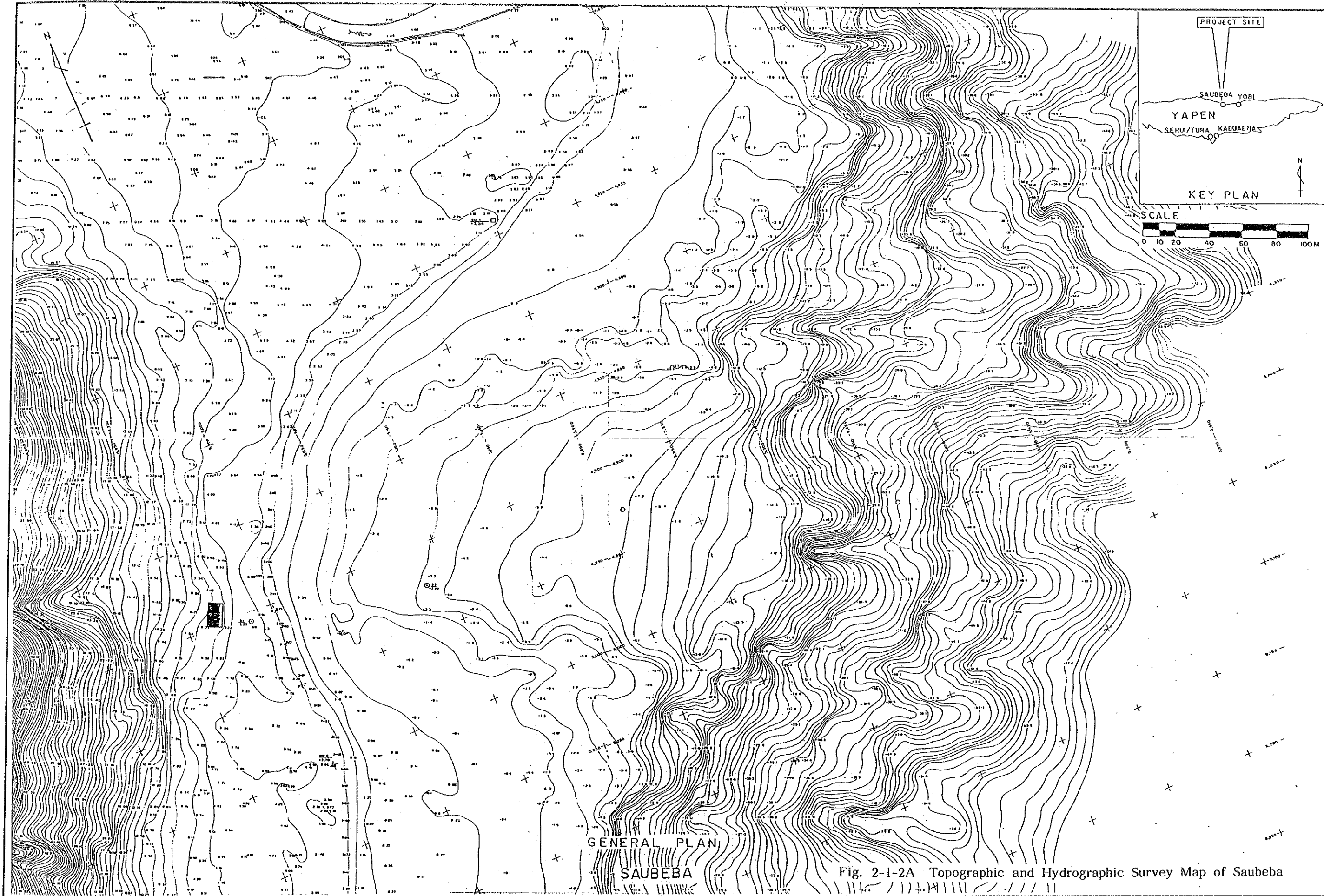


Fig. 2-1-2A Topographic and Hydrographic Survey Map of Saubeba

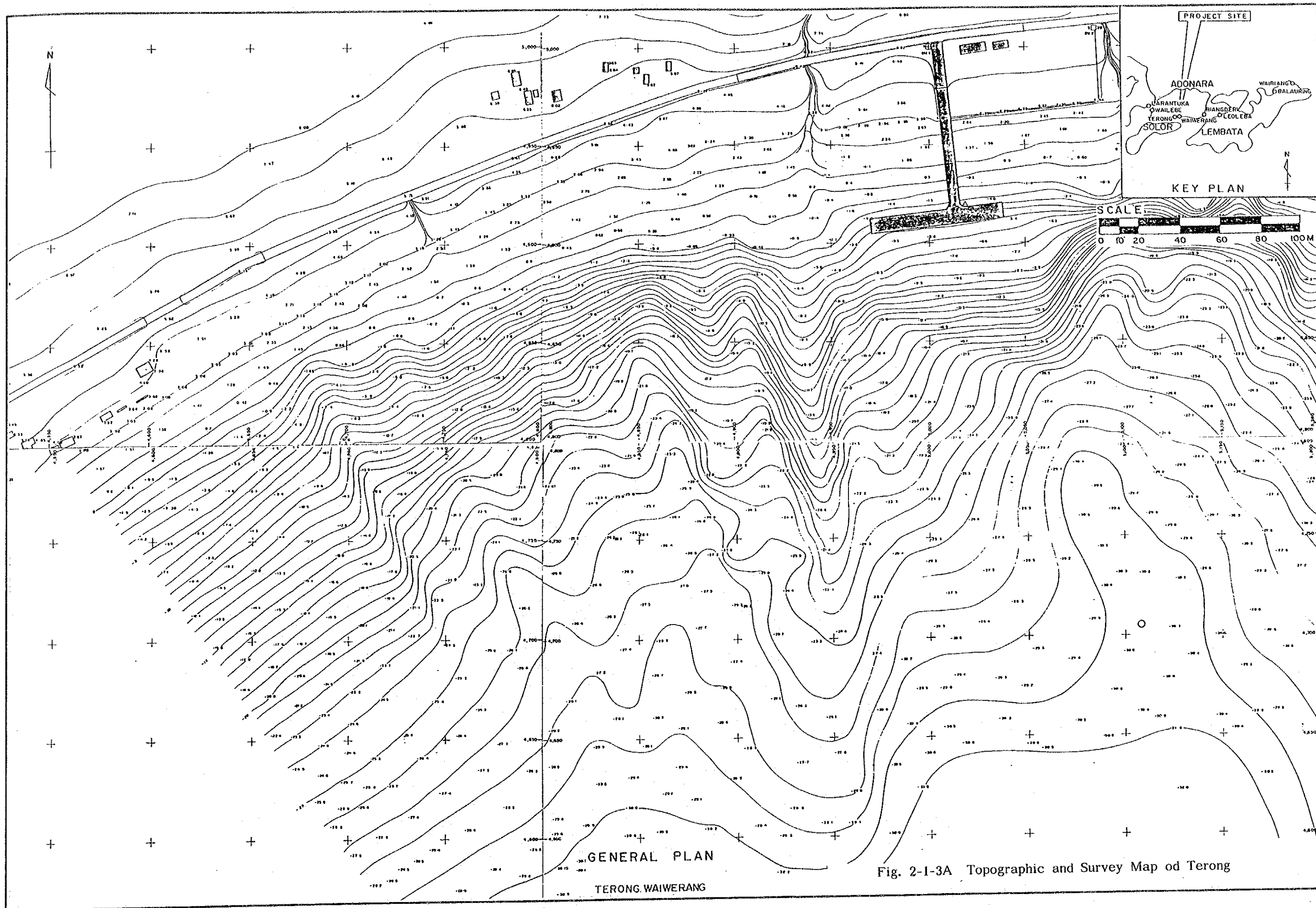


Fig. 2-1-3A Topographic and Survey Map of Terong

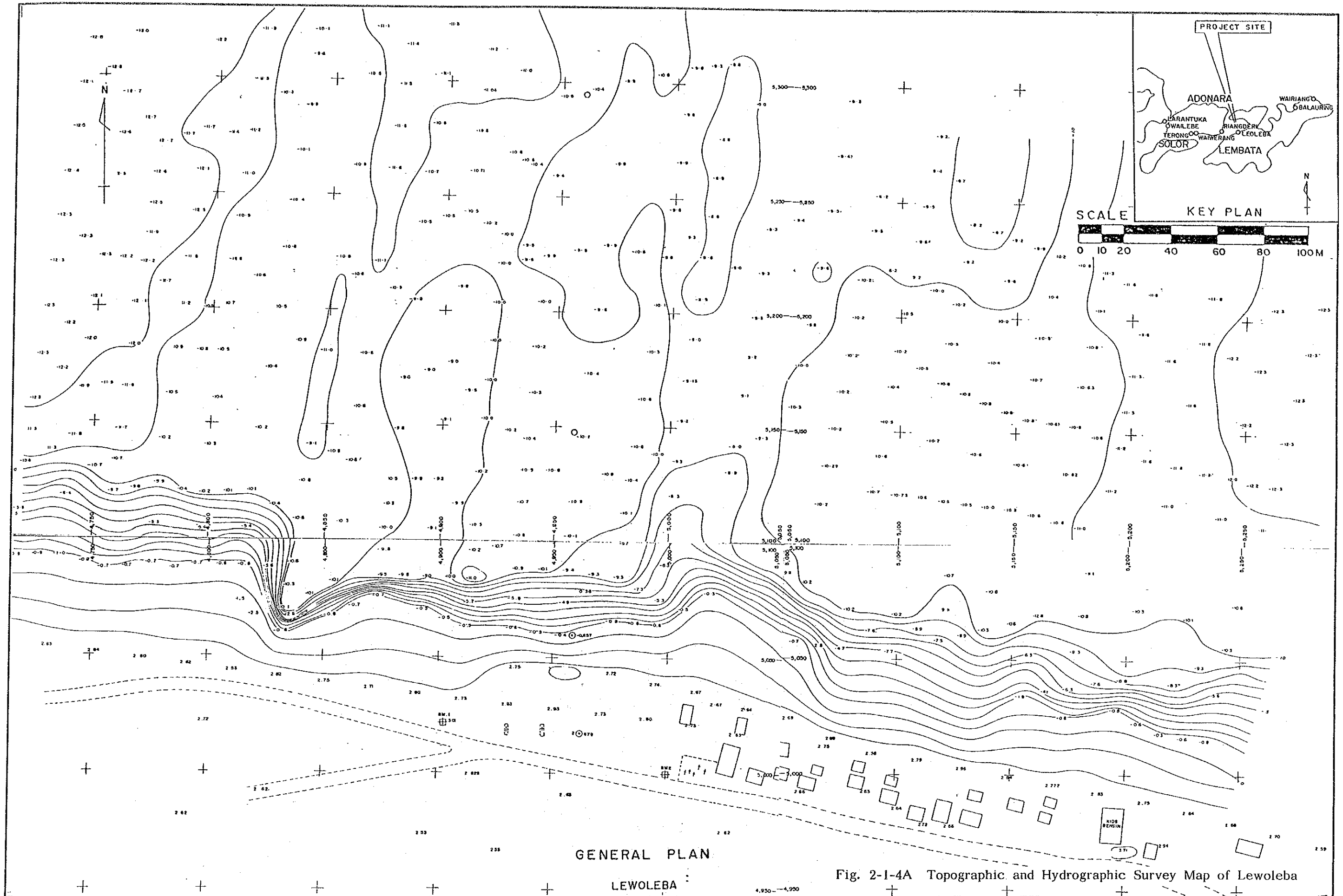


Fig. 2-1-4A Topographic and Hydrographic Survey Map of Lewoleba

