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INFORMAL REPORT

CURRENT METER MEASUREMENTS TONGUE OF THE OCEAN MARCH AND APRIL 1964

FEBRUARY 1969

NAVAL OCEANOGRAPHIC OFFICE
WASHINGTON, D. C. 20390

INFORMAL REPORT

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ABSTRACT

The Naval Oceanographic Office measured current velocities in the Tongue of the Ocean (TOTO) during March and April 1964. Emphasis was placed on near-bottom current speeds.

Geodyne Corporation current meters were immersed from 2 to 16 days in taut-wire array configurations. Data from 15 current meters, implanted within 3 meters of the ocean bottom, revealed near-bottom current speeds to be greater than generally were believed. At two stations, near-bottom current speeds as great as 0.5 knot were recorded.

Range Support Section
Nearshore Surveys Division
Oceanographic Surveys Department

This report has been reviewed and is approved for release as an UNCLASSIFIED Informal Report.

L. B. BERTHOLF
Director, Nearshore Surveys Division

CONTENTS

FIGURES

TABLE

APPENDIX

I. INTRODUCTION

The Naval Oceanographic Office measured current velocities in the Weapons and Sonar Ranges, Tongue of the Ocean (TOTO), from 14 March to 25 April 1964. USS LITTLEHALES (AGCS 15) was employed as the survey ship. The primary objective was to obtain near-bottom current data. The survey was in support of the Atlantic Undersea Test and Evaluation Center (AUTEC) and by the request of the U.S. Naval Undersea Weapons Research and Engineering Station, Newport, Rhode Island (formerly, U.S. Naval Underwater Ordnance Station). A total of 12 current stations was occupied at 10 locations in TOTO in depths ranging from about 1,300 to 1,700 meters (Fig. 1).

II. METHODS OF COLLECTION AND ANALYSIS

All current data were collected with self-contained current meters, Woods Hole Current Meter, Model A-100, manufactured by Geodyne Corporation. The current meters were immersed from 2 to 16 days in taut-wire array configurations (Fig. 2). At station B, the deepest meter was attached to a bottom stand (insert, Figure 2). A summary of the current meter implantments is presented in Table I. Data from malfunctioning current meters or from current meters that were at questionable depths are not included in the table. At 10 of the stations, data were obtained within 11 meters of the ocean bottom by one to three current meters.

The current data were recorded by the current meters on standard 16mm photographic film. Vane and compass positions were coded in modified gray binary form and were transmitted by optical fibers to the camera field of view. Current speeds were recorded as a series of light pulses. The film data were transferred to magnetic tape and subsequently were converted to binary coded decimal form. From this decimal form, current speed and direction were calculated by an IBM 7074 computer.

III. DISCUSSION

A composite graph showing the mean and ranges of current speeds at all stations in TOTO is shown in Figure 3. Histograms and joint frequency tables of speed and direction from each current meter were made from the computer output. These data are presented in the Appendix.

Data from 15 current meters (at 8 locations), implanted within 3 meters of the bottom, revealed near-bottom current speeds to be greater than generally were believed. Physiographic control has much to do with circulation at 1-meter above the bottom, but the current meter data from this survey cannot be used to determine the extent of this phenomenon. Speeds as great as 0.5 knot were recorded by bottom meters at stations C-1 and D-2. A northward set was revealed by most of the current meters implanted within 1 meter of the bottom. Current meters implanted within 2 to 3 meters of the bottom showed a wider deflection both east and west of north.

At most current meter depths, the mean current speed approximates 0.1 knot. The current meter at 75 meters depth at station CR-2 recorded both the greatest mean current speed of 0.35 knot and the maximum speed of 0.8 knot.

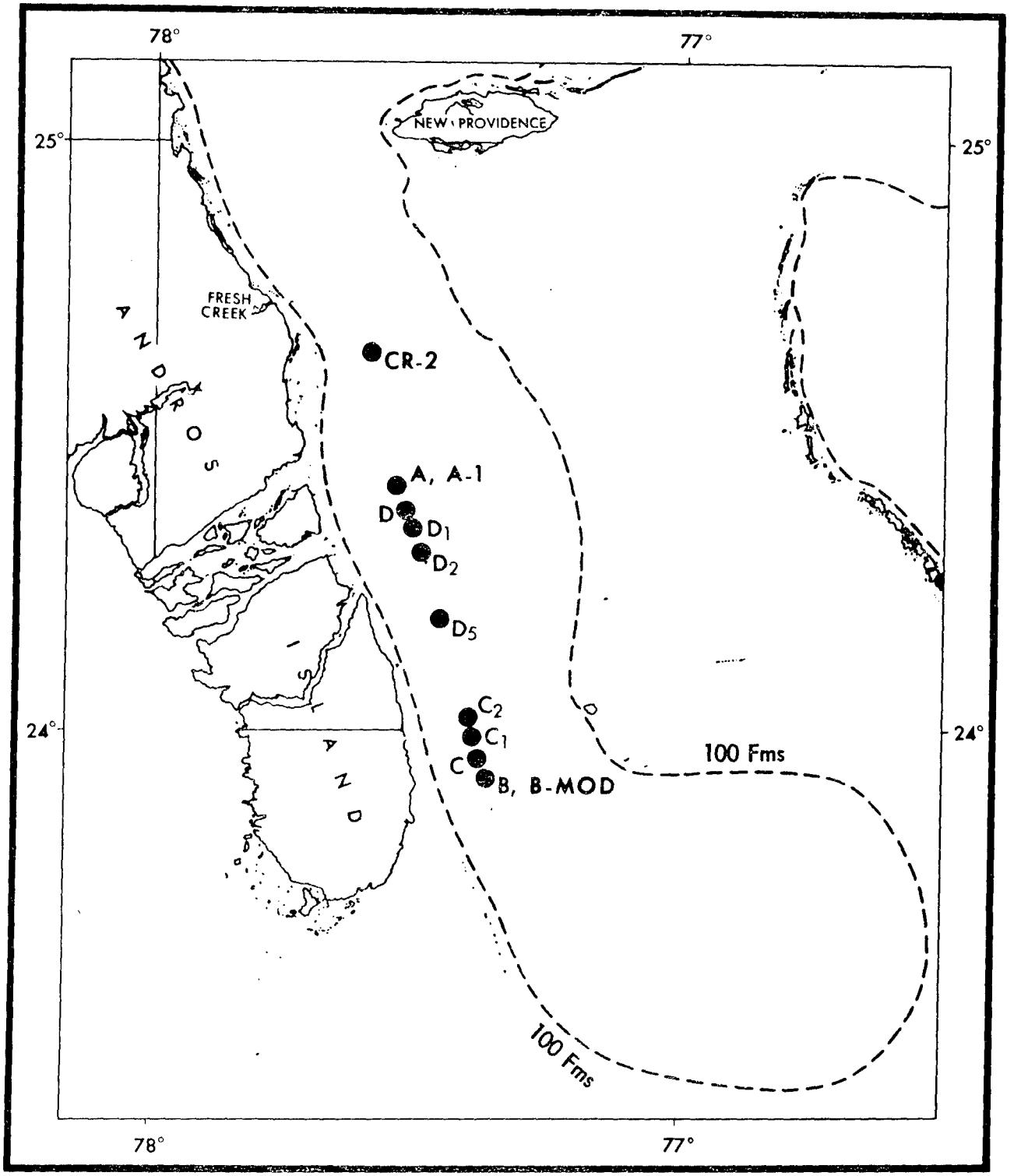


FIGURE 1. LOCATION OF CURRENT METER ARRAYS, MARCH—APRIL 1964

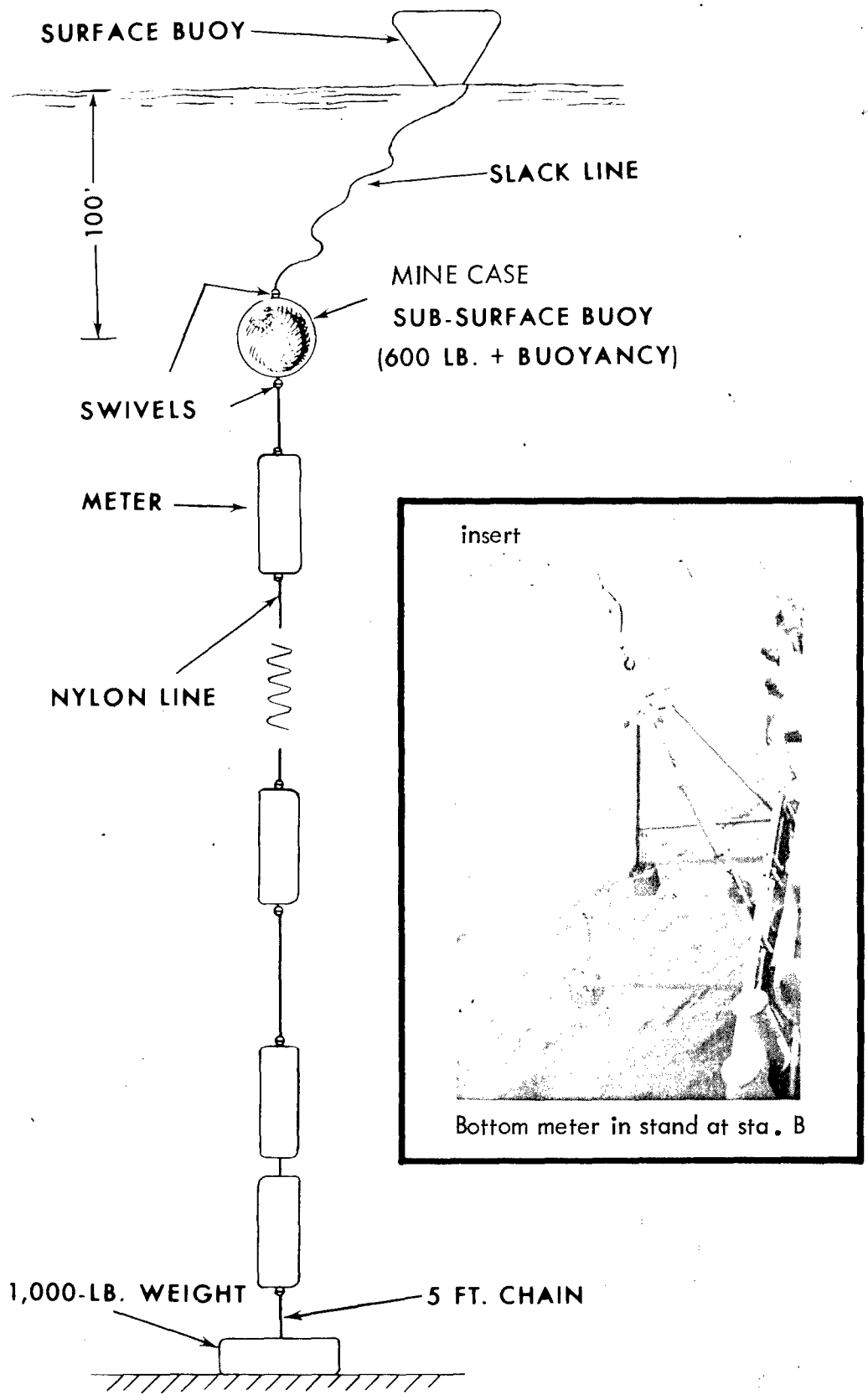


FIGURE 2. TECHNIQUE USED TO MOOR TAUT-WIRE ARRAYS ON STATION

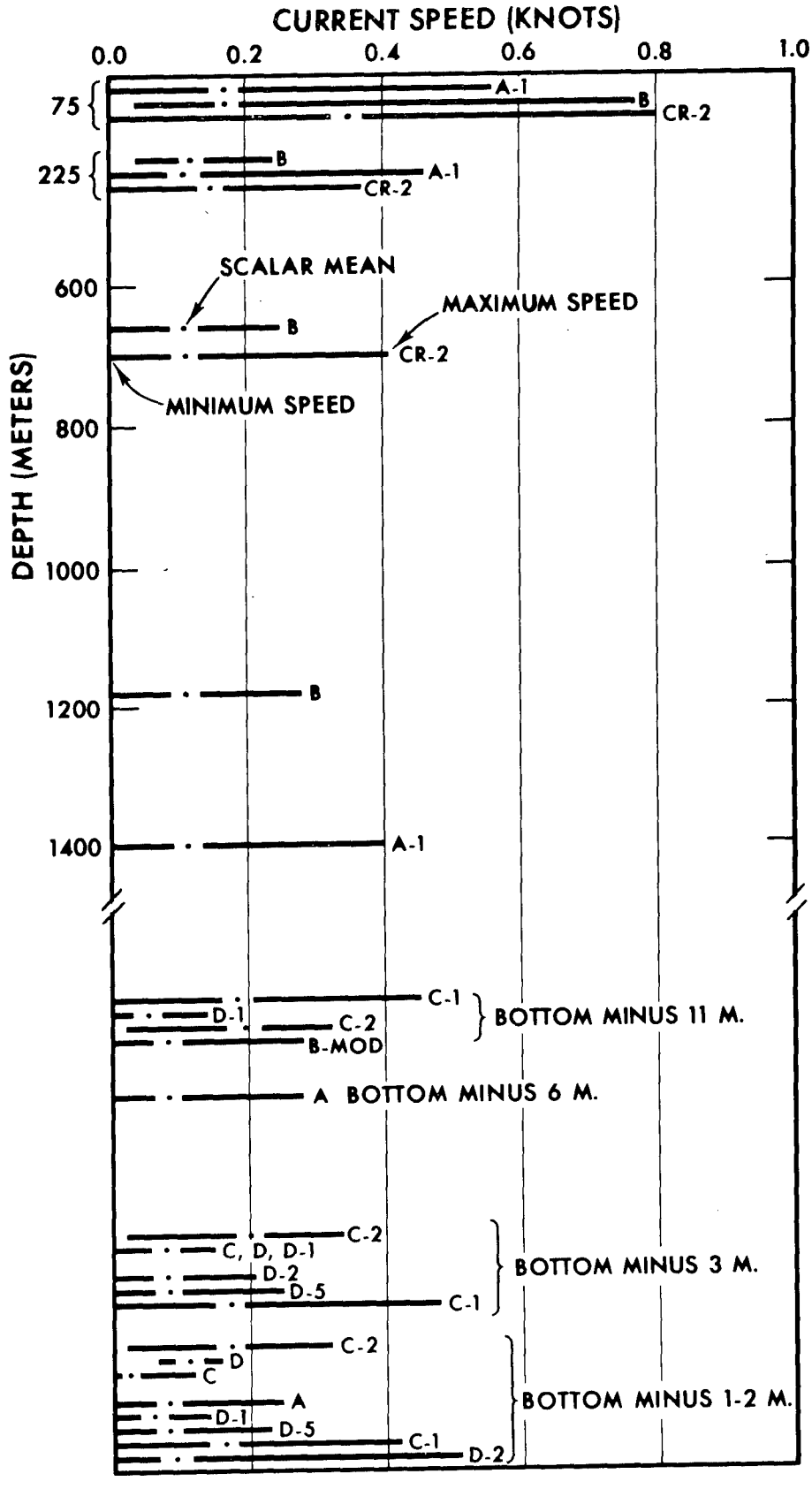


FIGURE 3. MEAN AND RANGES OF CURRENT SPEEDS FOR ALL STATIONS IN TOTO

TABLE I. SUMMARY OF CURRENT METER IMPLANTMENTS

ARRAY STATION	WATER DEPTH (meters)	TIME IN (LCT)	TIME OUT (LCT)	METER DEPTH (meters)	LAT. (°N)	LONG. (°W)
B*	1,344	3/14 1051	3/21 1620	75 225 664 1,178 1,269 Q 1,277 Q 1,279	23°54.6'	77°22.0'
C	1,335	3/14 1408	3/16 1750	1,332 1,334	23°57.0'	77°22.8'
D**	1,525	3/14 1750	3/17 0219	1,522 1,524	24°23.3'	77°31.8'
C-1	1,372	3/16 2305	3/19 0555	1,361 1,369 1,371	23°59.5'	77°23.9'
C-2***	1,335	3/19 1120	3/21 1335	1,324 1,332 1,334	23°59.8'	77°25.0'
B-MOD	1,280	3/21 2050	3/30 0557	1,269	23°54.5'	77°20.0'
A	1,554	3/22 0120	3/30 1455	1,549 1,553	24°25.7'	77°33.2'
D-1	1,525	3/22 0229	3/24 0625	1,514 1,522 1,524	24°23.2'	77°31.8'
D-2	1,481	3/24 1100	3/26 1245	1,478 1,480	24°18.4'	77°30.4'
D-5	1,431	3/26 1653	3/30 1050	1,428 1,430	24°11.4'	77°27.7'
A-1	1,554	3/30 1845	4/15 1455	75 226 1,402	24°25.5'	77°33.3'
CR-2	1,701	4/15 2120	4/25 1540	75 225 713	24°39.5'	77°36.1'

* Mine case imploded - array buoyed by surface buoy.

** Array retrieved 2.6 miles ENE of original position. Array probably was stationary until approximately 1430 on 15 March.

*** Plant position was 2 miles NE of given position which probably is valid from about 0000 on 20 March.

Q Questionable depth.

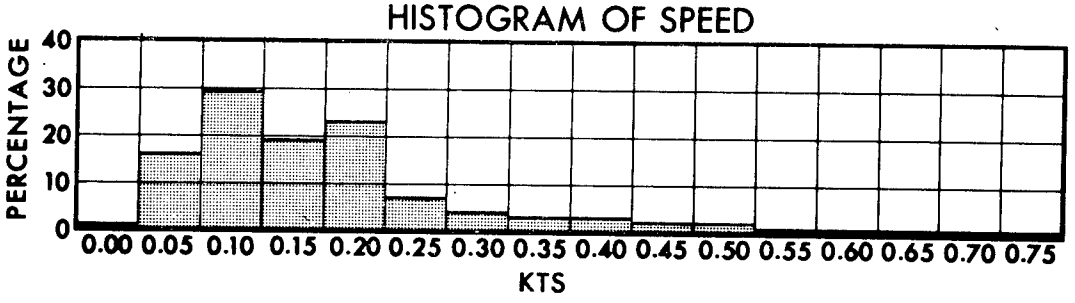
APPENDIX

CURRENT METER DATA

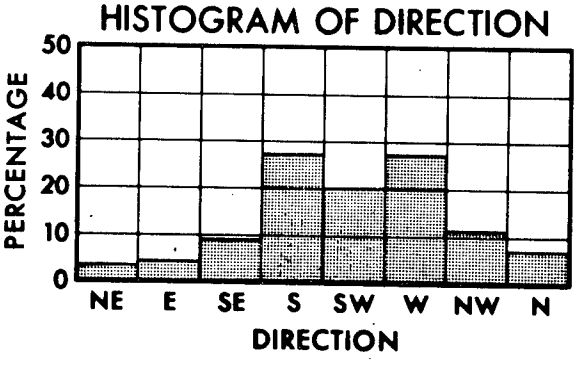
(Histograms and joint frequency tables of
speed and direction for each current meter.)

The frequency distributions for current speeds have 0.05 knot as the class interval. The abscissa values for the speed histograms are the class marks (mid-points) of the various intervals. For example, a speed of 0.10 knot includes observations from 0.075 to 0.125 knot. The headings for the directions are the usual 8-point compass directions. The numbers given in the frequency tables are not percentages but are frequencies of occurrence. A speed less than 0.03 knot is considered calm and is not included in the joint frequency tables. The percentage of calms is found in the speed histogram with the heading of 0.00. The total of percentages in the speed and direction histograms are more than 100 percent in some cases because the computer analysis always rounded to the next highest percent. Consequently, the total percentages varied from 100 to 100 plus the number of classes. A speed histogram only is given for meters where the compass or vane malfunctioned.

HISTOGRAM OF SPEED



HISTOGRAM OF DIRECTION

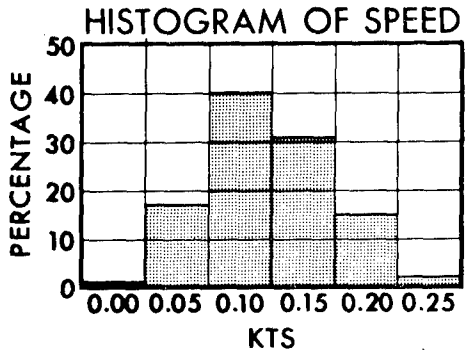


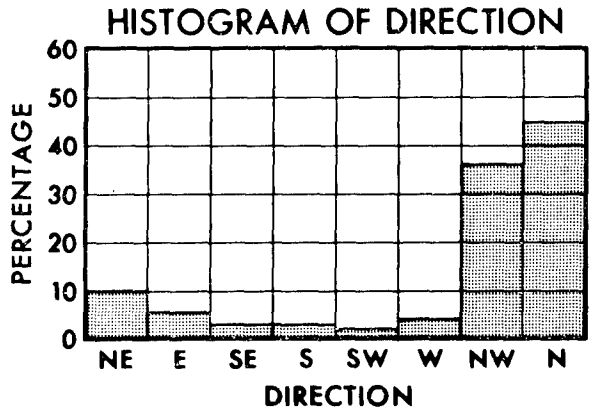
JOINT FREQUENCY TABLE

DIRECTION	KTS 0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75
NE	2		2	1	4					1					
E	5	2	1	1		1		1		1					
SE	2	5	4	5	4	3	2	3	4	2	1	1	1		1
S	5	24	27	40	10	5	4	4	2	1					
SW	20	27	18	21	3		1								
W	21	48	20	26	5	1									
NW	11	20	5	10	2										
N	6	5	6	1	1	5	1	3	1	1					

BLANK AREAS INDICATE NO OBSERVATIONS

STATION B DEPTH 75 METERS, 14-21 MARCH 1964



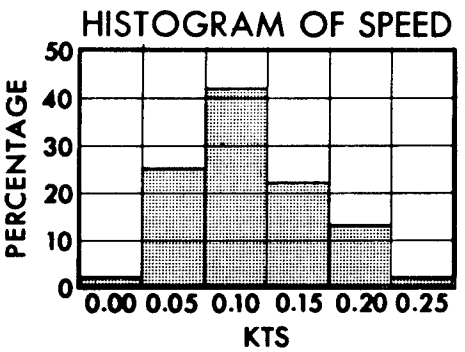


JOINT FREQUENCY TABLE

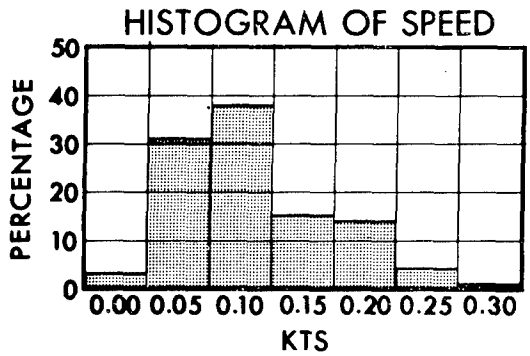
DIRECTION	KTS 0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45
NE	9	19	14	7					
E	7	10	3	2					
SE	4		4						
S	5	2	1						
SW	3	3							
W	8	3	2	1					
NW	22	70	62	25	4				
N	25	93	68	39	1				

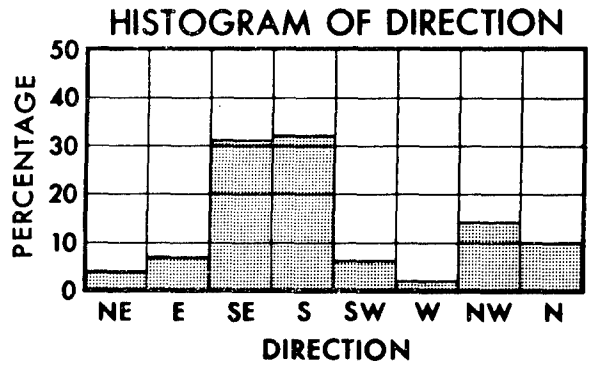
BLANK AREAS INDICATE NO OBSERVATIONS

STATION B DEPTH 225 METERS, 14-21 MARCH 1964



STATION B DEPTH 664 METERS, 14-21 MARCH 1964





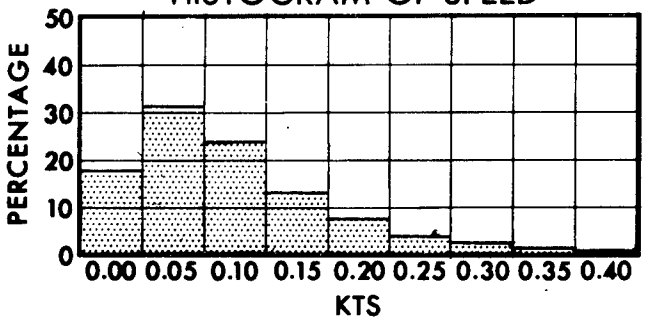
JOINT FREQUENCY TABLE

DIRECTION	KTS 0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50
NE	8	7								
E	20	10								
SE	32	57	27	34	2					
S	44	51	28	22	12	1				
SW	15	10	2							
W	6									
NW	15	33	10	9						
N	15	25	4		1					

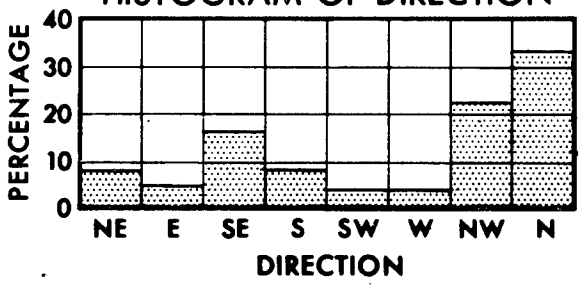
BLANK AREAS INDICATE NO OBSERVATIONS

STATION B DEPTH 1,178 METERS, 14-21 MARCH 1964

HISTOGRAM OF SPEED



HISTOGRAM OF DIRECTION

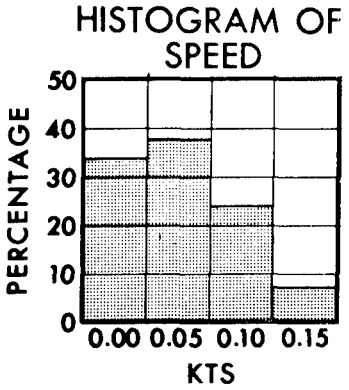


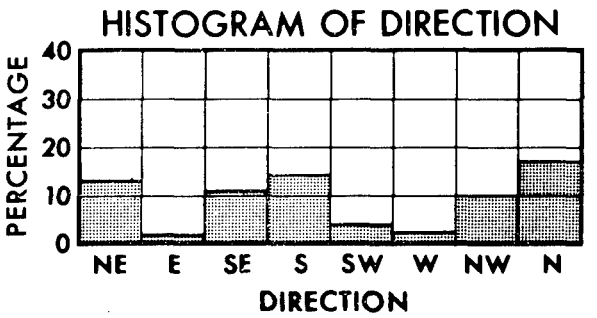
JOINT FREQUENCY TABLE

DIRECTION	KTS 0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40
NE	89	37	1					
E	35							
SE	89	121	77	2				1
S	118	41	7					
SW	40					1		
W	34	1						
NW	64	64	87	106	43	14	4	1
N	219	206	71	69	28	1		

BLANK AREAS INDICATE NO OBSERVATIONS

STATION B DEPTH 1,179 METERS, 14-21 MARCH 1964





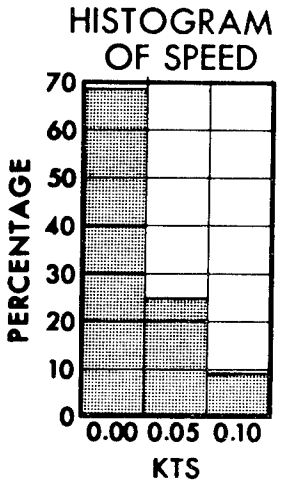
JOINT FREQUENCY TABLE

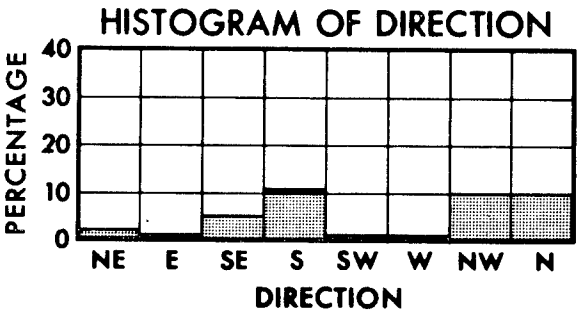
DIRECTION	KTS 0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40
NE	322							
E	37							
SE	85	93	94					
S	158	198						
SW	88							
W	28							
NW	156	84						
N	107	241	73					

BLANK AREAS INDICATE NO OBSERVATIONS

STATION C DEPTH 1,332 METERS, 14-16 MARCH 1964

(3 meters from bottom)



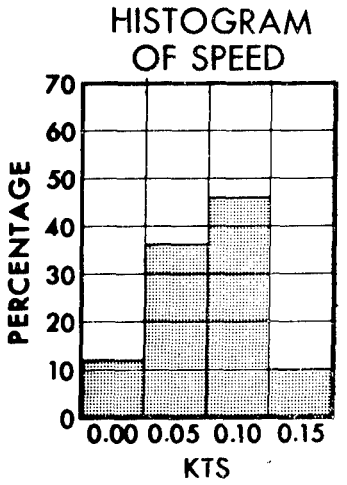


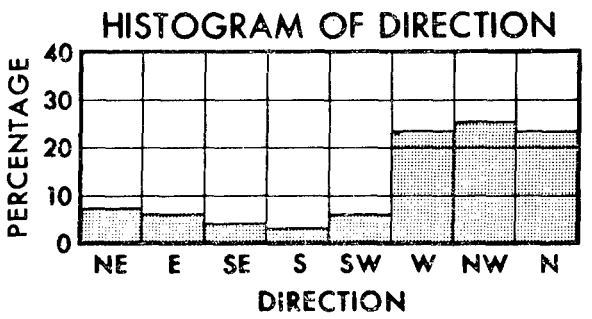
JOINT FREQUENCY TABLE

DIRECTION	KTS 0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60
NE	24											
E												
SE	75	38										
S	246	55										
SW												
W												
NW	167	99										
N	219	54										

BLANK AREAS INDICATE NO OBSERVATIONS

STATION C DEPTH 1,334 METERS, 14-16 MARCH 1964
(1 meter from bottom)



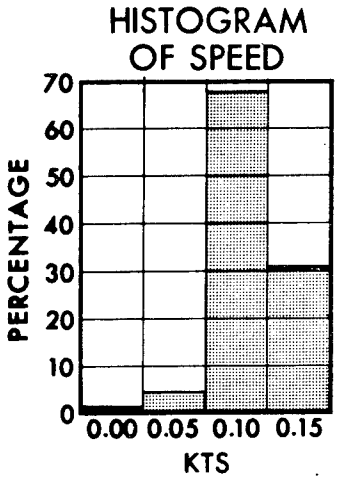


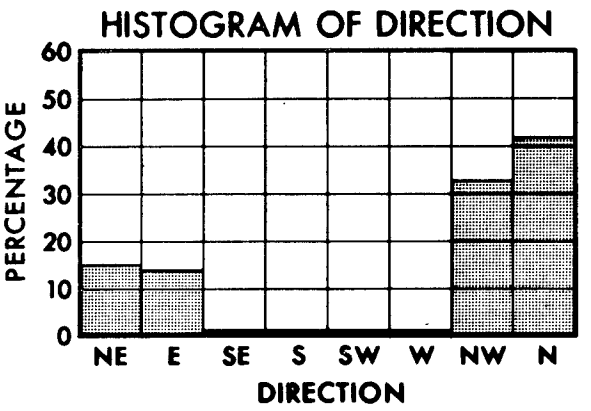
JOINT FREQUENCY TABLE

DIRECTION	KTS 0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45
NE	51	136							
E	46	134							
SE	87	19							
S	55								
SW	126	35	15						
W	261	408	53						
NW	307	400	82						
N	216	357	143						

BLANK AREAS INDICATE NO OBSERVATIONS

STATION D DEPTH 1,522 METERS, 14-17 MARCH 1964
(3 meters from bottom)





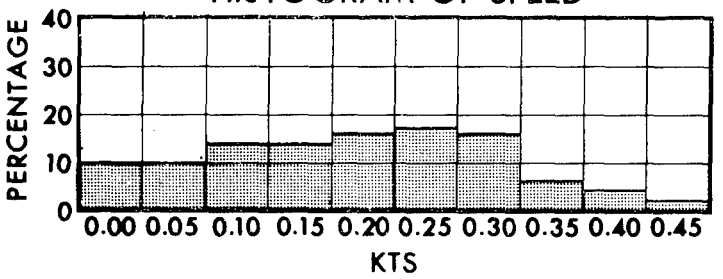
JOINT FREQUENCY TABLE

DIRECTION	KTS 0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55
NE	7	154									
E	23	125									
SE		1									
S											
SW											
W											
NW		234	130								
N	2	261	213								

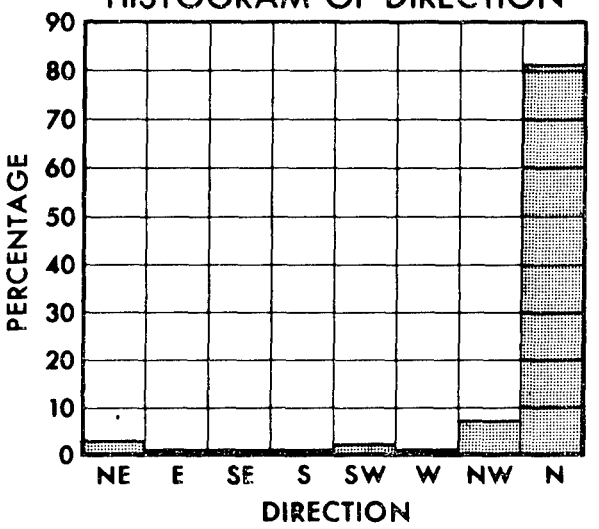
BLANK AREAS INDICATE NO OBSERVATIONS

STATION D DEPTH 1,524 METERS, 14-15 MARCH 1964
(1 meter from bottom)

HISTOGRAM OF SPEED



HISTOGRAM OF DIRECTION



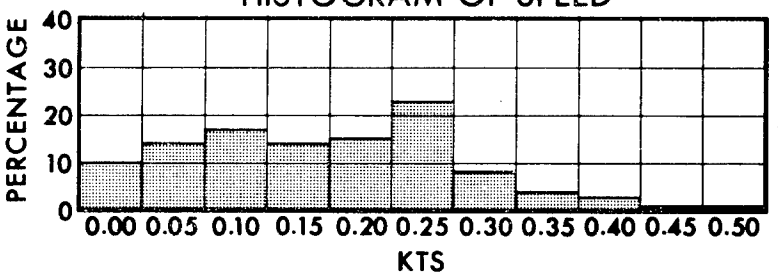
JOINT FREQUENCY TABLE

DIRECTION	KTS 0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50
NE	18	47	7							
E		1								
SE		1								
S										
SW	39									
W	11									
NW	122	57	2		7	18				
N	113	321	401	490	515	484	154	103	42	

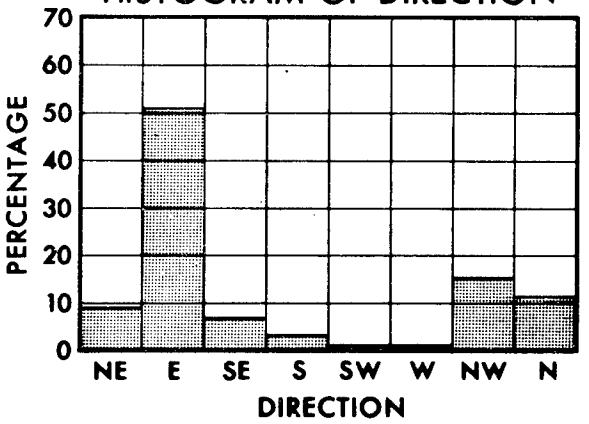
BLANK AREAS INDICATE NO OBSERVATIONS

STATION C-1 DEPTH 1,361 METERS, 16-19 MARCH 1964
(11 meters from bottom)

HISTOGRAM OF SPEED



HISTOGRAM OF DIRECTION

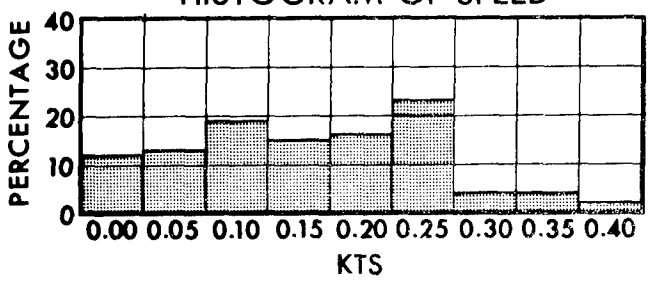


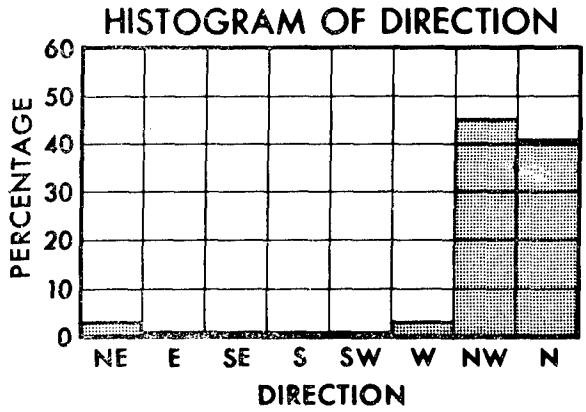
JOINT FREQUENCY TABLE

DIRECTION	KTS 0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50
NE	124	15	74	52	5					
E	66	189	251	298	519	138	101	76	1	1
SE	40	114	35	14	5					
S		70	1		1					
SW	1	1								
W										
NW	54	5	54	85	184	83				
N	153	146	11		2		1			

BLANK AREAS INDICATE NO OBSERVATIONS

STATION C-1 DEPTH 1,369 METERS, 16-19 MARCH 1964
(3 meters from bottom)



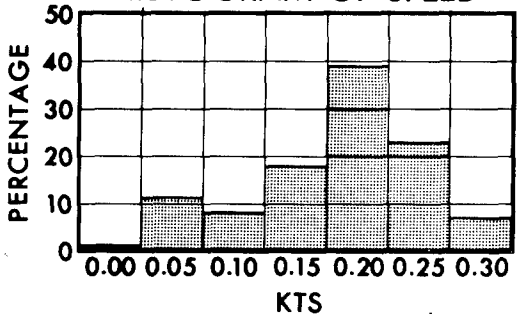


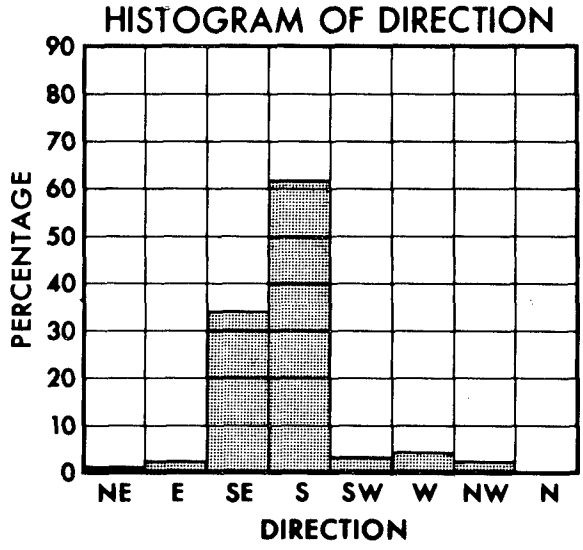
JOINT FREQUENCY TABLE

DIRECTION	KTS 0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45
NE	64	5			1				
E		4			1				
SE		2							
S									
SW	1								
W	73								
NW	72	65	153	291	618	109	104	37	
N	188	501	299	206	100	2	2	2	

BLANK AREAS INDICATE NO OBSERVATIONS

STATION C-1 DEPTH 1,371 METERS, 16-19 MARCH 1964
(1 meter from bottom)



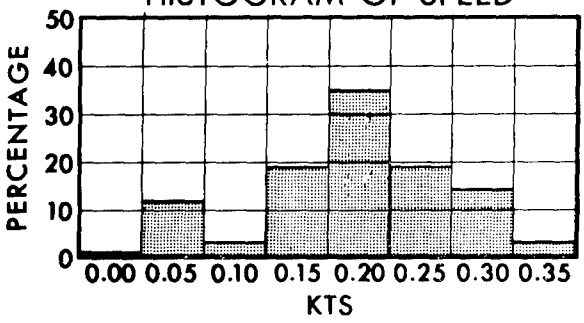


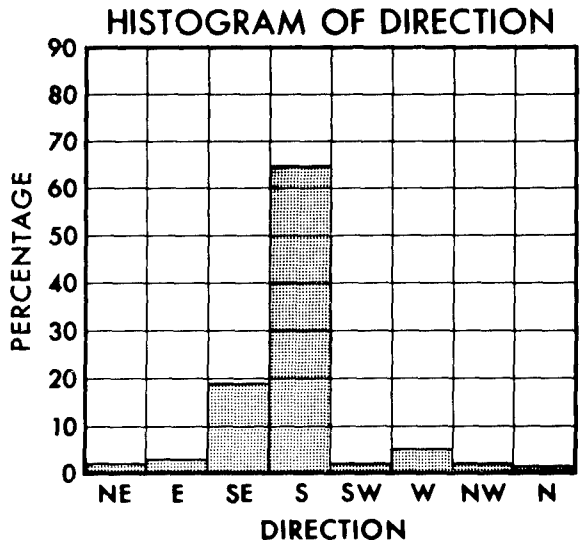
JOINT FREQUENCY TABLE

DIRECTION	KTS 0.05	0.10	0.15	0.20	0.25	0.30	0.35
NE	1		1				
E	8	16	5				
SE	63	46	95	254	345	133	
S	50	131	390	848	280	29	
SW	50	1					
W	90						
NW	31						
N							

BLANK AREAS INDICATE NO OBSERVATIONS

STATION C-2 DEPTH 1,324 METERS, 19-21 MARCH 1964
(11 meters from bottom)



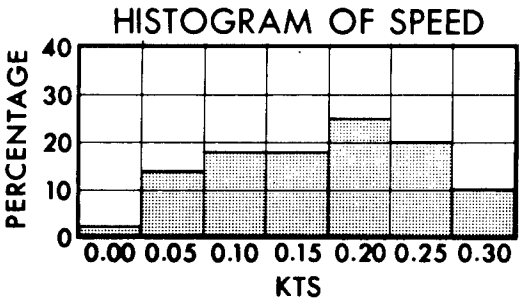


JOINT FREQUENCY TABLE

DIRECTION	KTS 0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45
NE	24								
E	53	3							
SE	8	54	80	50	83	186	56		
S	9	2	436	922	436	194	8		
SW	38		1						
W	122								
NW	41								
N	12								

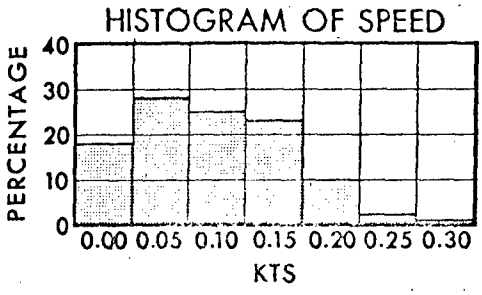
BLANK AREAS INDICATE NO OBSERVATIONS

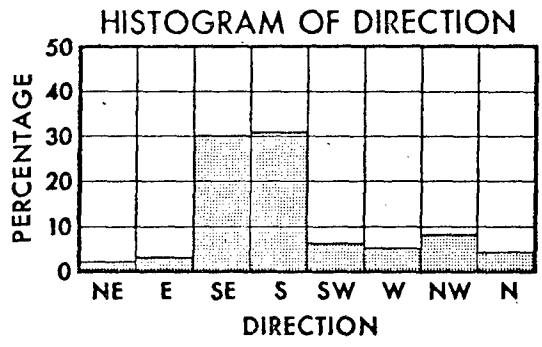
STATION C-2 DEPTH 1,332 METERS, 19-21 MARCH 1964
(3 meters from bottom)



STATION C-2 DEPTH 1,334 METERS, 19-21 MARCH 1964

(1 meter from bottom)



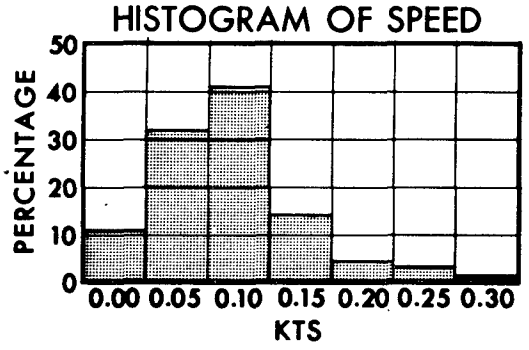


JOINT FREQUENCY TABLE

DIRECTION	KTS 0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45
NE	8								
E	12	2							
SE	40	37	57	37	1				
S	31	60	68	15	1				
SW	17	14	1						
W	13	9			2				
NW	20	19	3		1	1			
N	17			1					

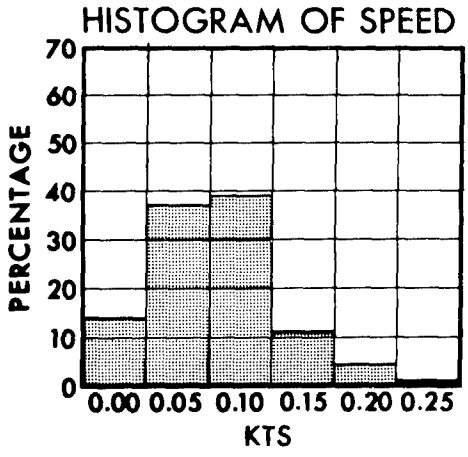
BLANK AREAS INDICATE NO OBSERVATIONS

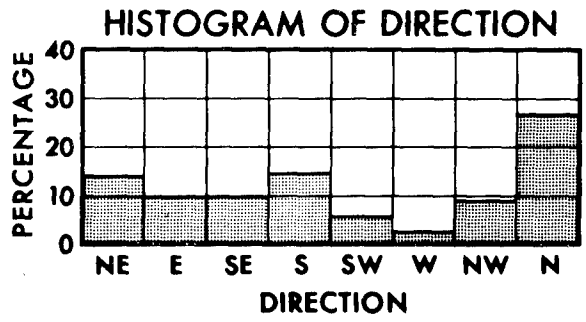
STATION B-MOD DEPTH 1,269 METERS, 21—30 MARCH 1964
(11 meters from bottom)



STATION A DEPTH 1,549 METERS, 22-30 MARCH 1964

(5 meters from bottom)



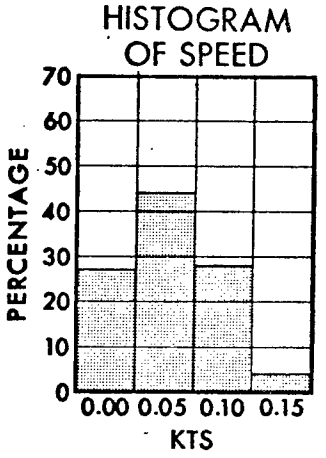


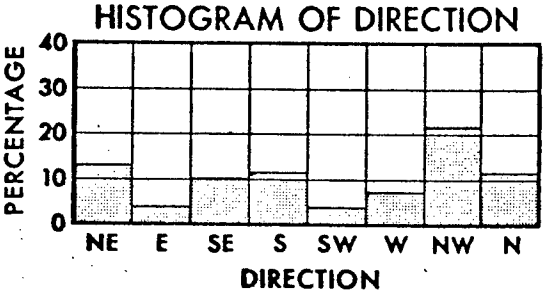
JOINT FREQUENCY TABLE

DIRECTION	KTS 0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45
NE	162	135	11	3					
E	117	104	10						
SE	71	119	33	1					
S	138	187	28						
SW	69	36	16						
W	34	12		1					
NW	105	80	20						
N	200	258	121	65	3				

BLANK AREAS INDICATE NO OBSERVATIONS

STATION A DEPTH 1,553 METERS, 22-30 MARCH 1964
(1 meter from bottom)





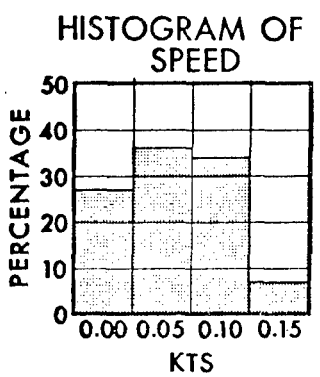
JOINT FREQUENCY TABLE

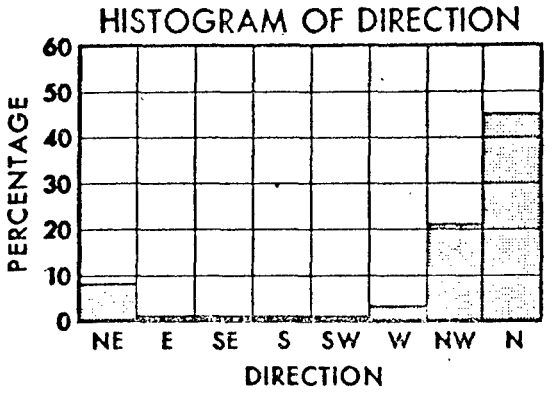
DIRECTION	KTS 0.05	0.10	0.15	0.20	0.25	0.30	0.35
NE	328	57					
E	89	19					
SE	98	79	94				
S	113	197	1				
SW	79						
W	194						
NW	280	367	1				
N	163	133					

BLANK AREAS INDICATE NO OBSERVATIONS

STATION D-1 DEPTH 1,514 METERS, 22-24 MARCH 1964

(11 meters from bottom)





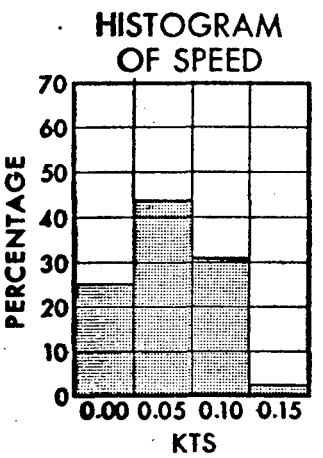
JOINT FREQUENCY TABLE

DIRECTION	KTS 0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45
NE	186	16	9						
E	14								
SE									
S		1							
SW									
W	56	3							
NW	311	309							
N	516	692	166						

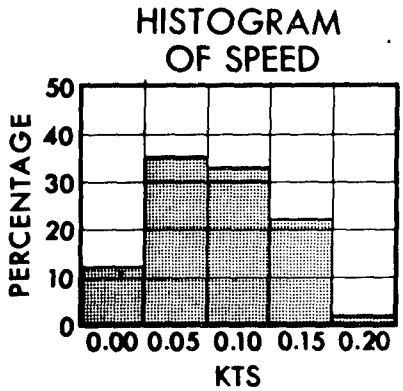
BLANK AREAS INDICATE NO OBSERVATIONS

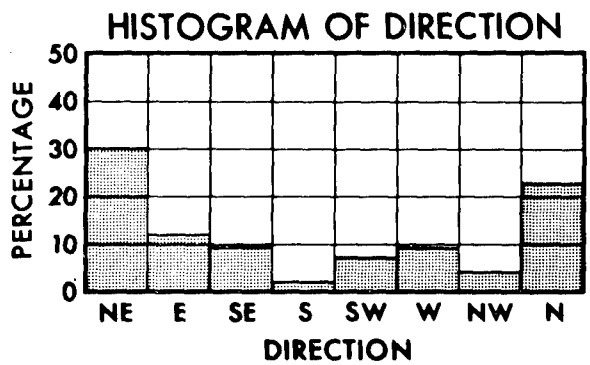
STATION D-1 DEPTH 1522 METERS, 22-24 MARCH 1964

(3 meters from bottom)



STATION D-1 DEPTH 1,524 METERS, 22-24 MARCH 1964
(1 meter from bottom)





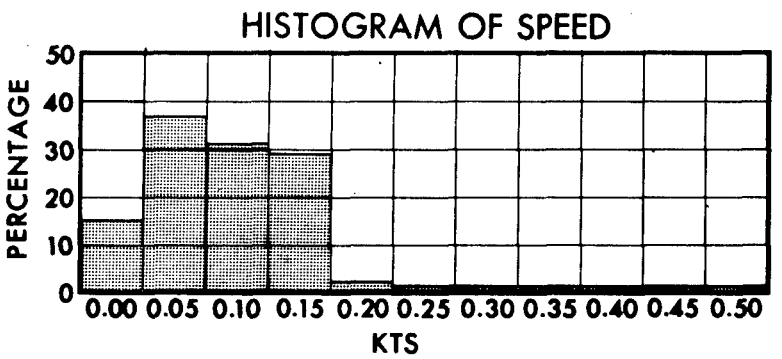
JOINT FREQUENCY TABLE

DIRECTION	KTS 0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45
NE	150	270	388	19					
E	215	86	18						
SE	129	88	14						
S	17	18	6						
SW	129	28	1						
W	152	76	2						
NW	77	10	4	1					
N	120	337	177	2					

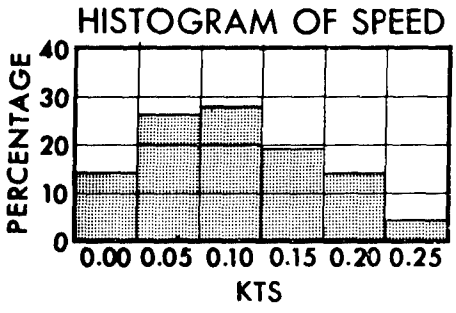
BLANK AREAS INDICATE NO OBSERVATIONS

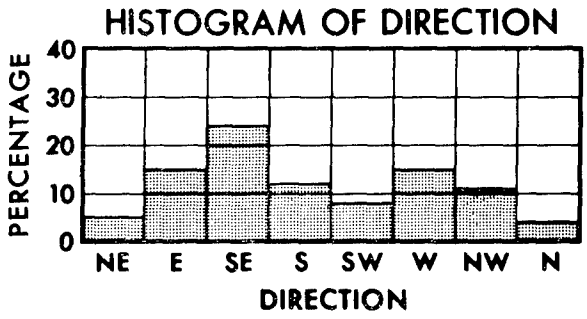
STATION D-2 DEPTH 1,478 METERS, 24-26 MARCH 1964

(3 meters from bottom)



STATION D-2 DEPTH 1,480 METERS, 24-26 MARCH 1964
(1 meter from bottom)





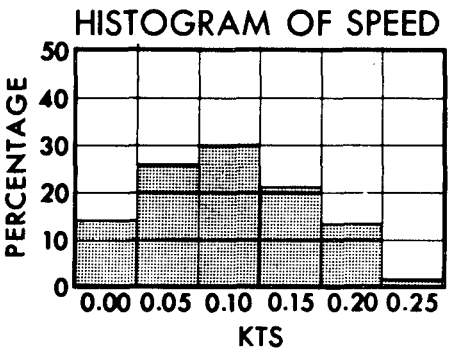
JOINT FREQUENCY TABLE

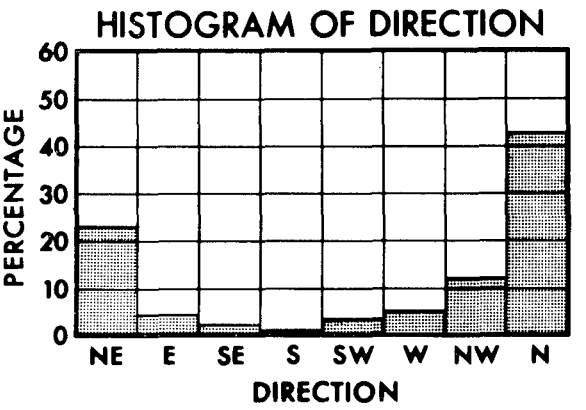
DIRECTION	KTS 0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45
NE	95	77							
E	197	180	132	138	3				
SE	144	327	174	317	115				
S	136	126	118	130	12				
SW	197	14	92	40					
W	218	254	199						
NW	96	243	118						
N	92	61							

BLANK AREAS INDICATE NO OBSERVATIONS

STATION D-5 DEPTH 1,428 METERS, 26-30 MARCH 1964

(3 meters from bottom)





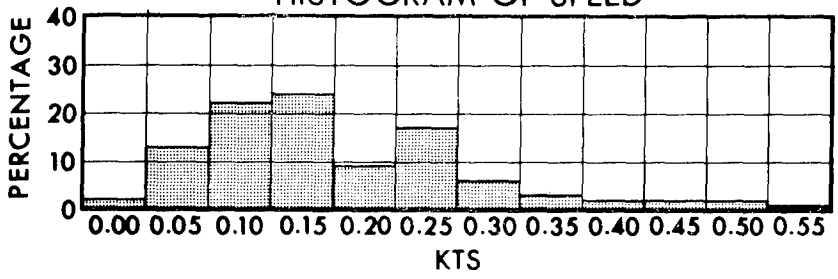
JOINT FREQUENCY TABLE

DIRECTION	KTS 0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45
NE	54	229	351	351	7				
E	103	46							
SE	56								
S	16								
SW	98								
W	176								
NW	239	241	5						
N	381	829	568	188	6				

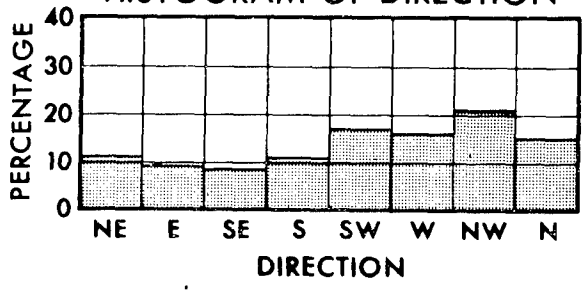
BLANK AREAS INDICATE NO OBSERVATIONS

STATION D-5 DEPTH 1,430 METERS, 26-29 MARCH 1964
(1 meter from bottom)

HISTOGRAM OF SPEED



HISTOGRAM OF DIRECTION



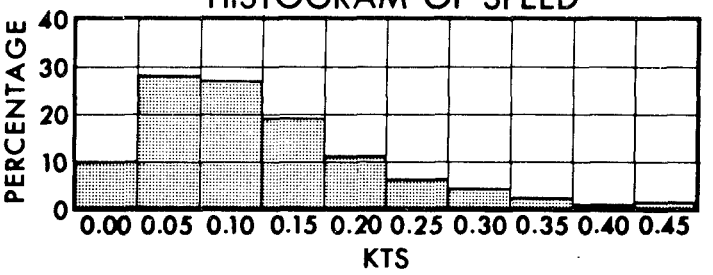
JOINT FREQUENCY TABLE

DIRECTION	KTS 0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55
NE	17	38	34	12	8						
E	22	35	16	10	5						
SE	6	12	13	13	17	6	6	5			
S	9	20	28	20	21	13	3		1	1	
SW	17	25	37	18	39	13	4	7	5	10	2
W	12	23	37	41	46	7	3	1			
NW	21	56	49	48	31	19	3				
N	31	31	47	40	12	1					

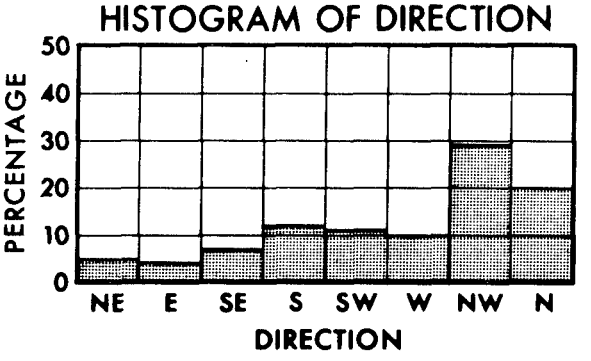
BLANK AREAS INDICATE NO OBSERVATIONS

STATION A-1 DEPTH 75 METERS, 30 MARCH-15 APRIL 1964

HISTOGRAM OF SPEED



HISTOGRAM OF DIRECTION

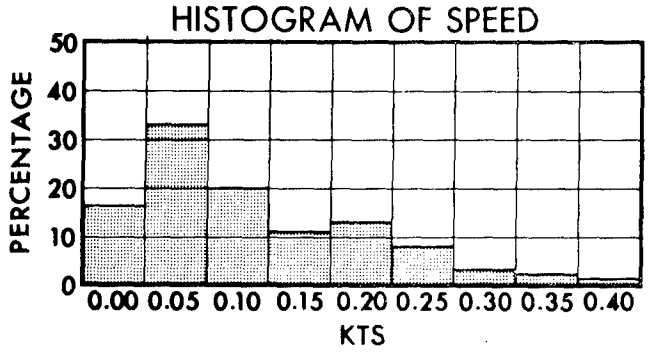


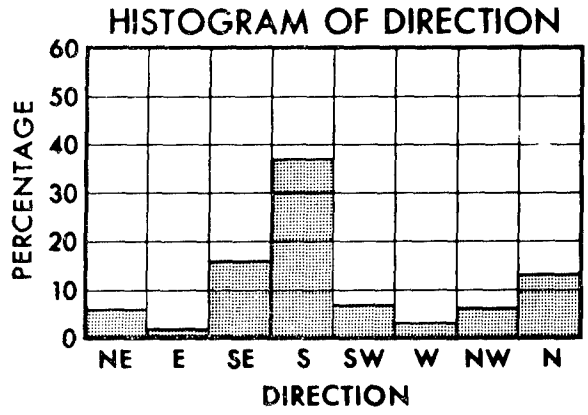
JOINT FREQUENCY TABLE

DIRECTION	KTS 0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45
NE	33	9	2						
E	13	9	6	1					
SE	13	25	20	9	1				
S	37	36	23	11	13				
SW	38	20	28	14	7	1			
W	54	35	10	4					
NW	76	101	62	45	12	19	5		1
N	40	49	54	29	22	16	3	3	3

BLANK AREAS INDICATE NO OBSERVATIONS

STATION A-1 DEPTH 226 METERS, 30 MARCH-15 APRIL 1964





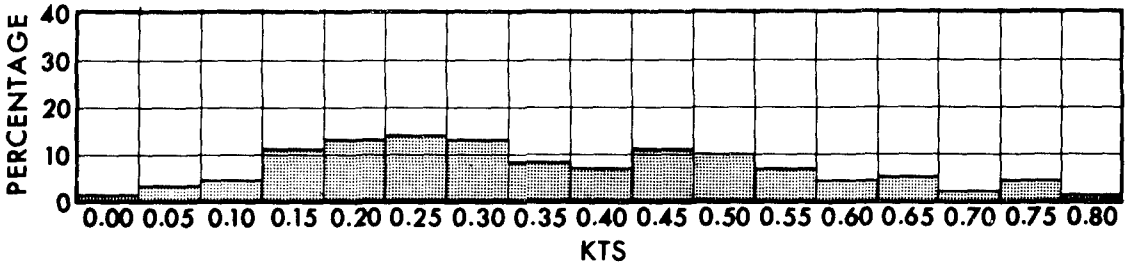
JOINT FREQUENCY TABLE

DIRECTION	KTS 0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45
NE	45	16							
E	10	5	1						
SE	51	55	35	25	4	5			
S	74	66	60	94	76	16	15	2	
SW	41	14	4	8	4				
W	23	5							
NW	48	11	1						
N	70	42	16	11					

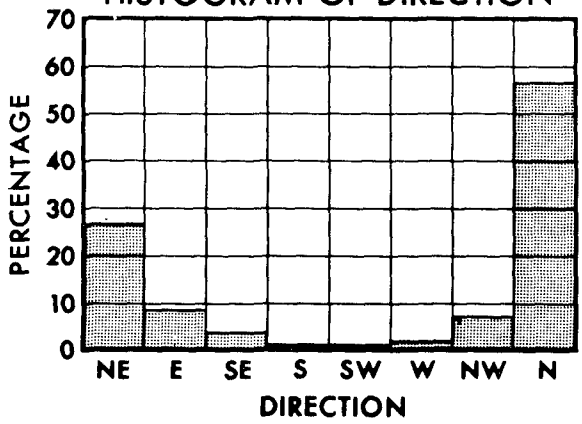
BLANK AREAS INDICATE NO OBSERVATIONS

STATION A-1 DEPTH 1,402 METERS, 30 MARCH-15 APRIL 1964

HISTOGRAM OF SPEED



HISTOGRAM OF DIRECTION

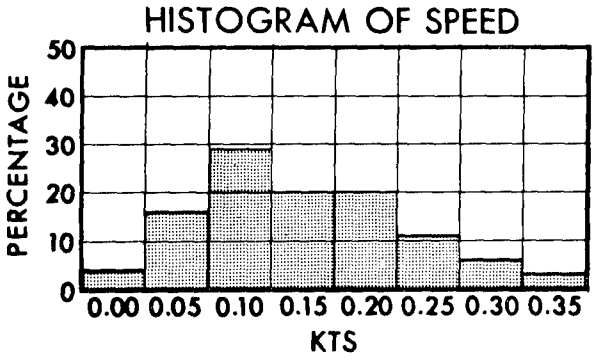


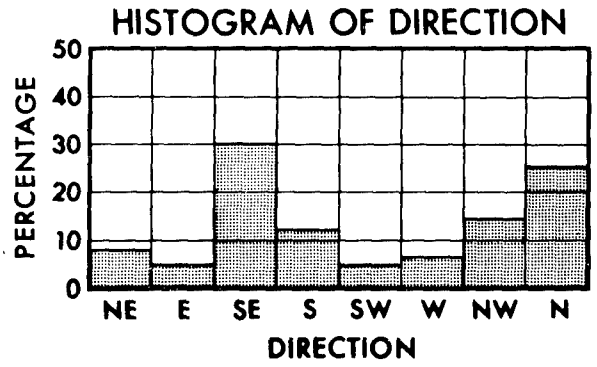
JOINT FREQUENCY TABLE

DIRECTION	KTS 0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80
NE	6	7	19	25	24	29	6	4	15	16	8	4	7	3	6	
E	4	10	17	10	8			1	1	2	1		2			
SE	2		6	6	4	5										
S																
SW																
W	2	2	1													
NW			5	3	6	2	6	2	1	2	1	2	2	2	4	1
N	1	1	25	40	46	46	34	32	56	43	22	18	17	4	9	

BLANK AREAS INDICATE NO OBSERVATIONS

STATION CR-2 DEPTH 75 METERS, 15-25 APRIL 1964





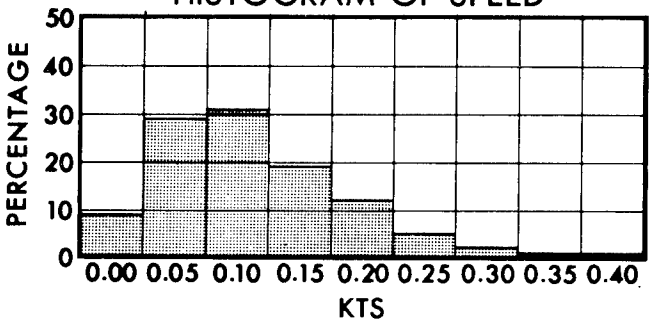
JOINT FREQUENCY TABLE

DIRECTION	KTS 0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45
NE	8	20	7	6	3	1			
E	11	15.	2						
SE	20	45	42	30	29	18	11		
S	12	26	5	13	7	8			
SW	19	7	1						
W	6	18	7						
NW	9	15	29	24	3	2	1		
N	12	36	31	54	24	3			

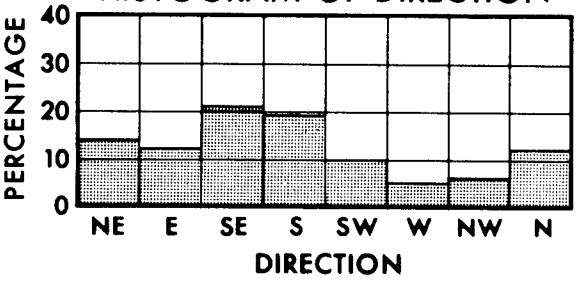
BLANK AREAS INDICATE NO OBSERVATIONS

STATION CR-2 DEPTH 225 METERS, 16-25 APRIL 1964

HISTOGRAM OF SPEED



HISTOGRAM OF DIRECTION



JOINT FREQUENCY TABLE

DIRECTION	KTS 0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45
NE	23	33	25	10					
E	29	29	8	5	1			1	
SE	32	45	38	16	3	2			
S	31	24	25	26	18	3			
SW	20	21	13	5	6				
W	27	3							
NW	14	16	3						
N	20	33	9	12	2				

BLANK AREAS INDICATE NO OBSERVATIONS

STATION CR-2 DEPTH 713 METERS, 15-25 APRIL 1964

UNCLASSIFIED
Security Classification

DOCUMENT CONTROL DATA - R & D

(Security classification of title, body of abstract and indexing annotation must be entered when the overall report is classified)

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U.S. NAVAL OCEANOGRAPHIC OFFICE

2a. REPORT SECURITY CLASSIFICATION

UNCLASSIFIED

2b. GROUP

3. REPORT TITLE

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4. DESCRIPTIVE NOTES *(Type of report and inclusive dates)*

Informal Report 14 March to 25 April 1964

5. AUTHOR(S) *(First name, middle initial, last name)*

RANGE SUPPORT SECTION
Nearshore Surveys Division

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c.	9b. OTHER REPORT NO(S) *(Any other numbers that may be assigned this report)*
d.	

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11. SUPPLEMENTARY NOTES	12. SPONSORING MILITARY ACTIVITY
	U.S. Naval Oceanographic Office

13. ABSTRACT

The Naval Oceanographic Office measured current velocities in the Tongue of the Ocean (TOTO) during March and April 1964. Emphasis was placed on near-bottom current speeds.

Geodyne Corporation current meters were immersed from 2 to 16 days in taut-wire array configurations. Data from 15 current meters, implanted within 3 meters of the ocean bottom, revealed near-bottom current speeds to be greater than generally were believed. Speeds as great as 0.5 knot were recorded.

DD FORM 1 NOV 65 1473 (PAGE 1)

S/N 0101-807-6801

UNCLASSIFIED
Security Classification

14. KEY WORDS	LINK A		LINK B		LINK C	
	ROLE	WT	ROLE	WT	ROLE	WT
AUTEC (Atlantic Undersea Test and Evaluation Center) TOTO (Tongue of the Ocean) USS LITTLEHALES (AGCS 15) CURRENT METER MEASUREMENTS						