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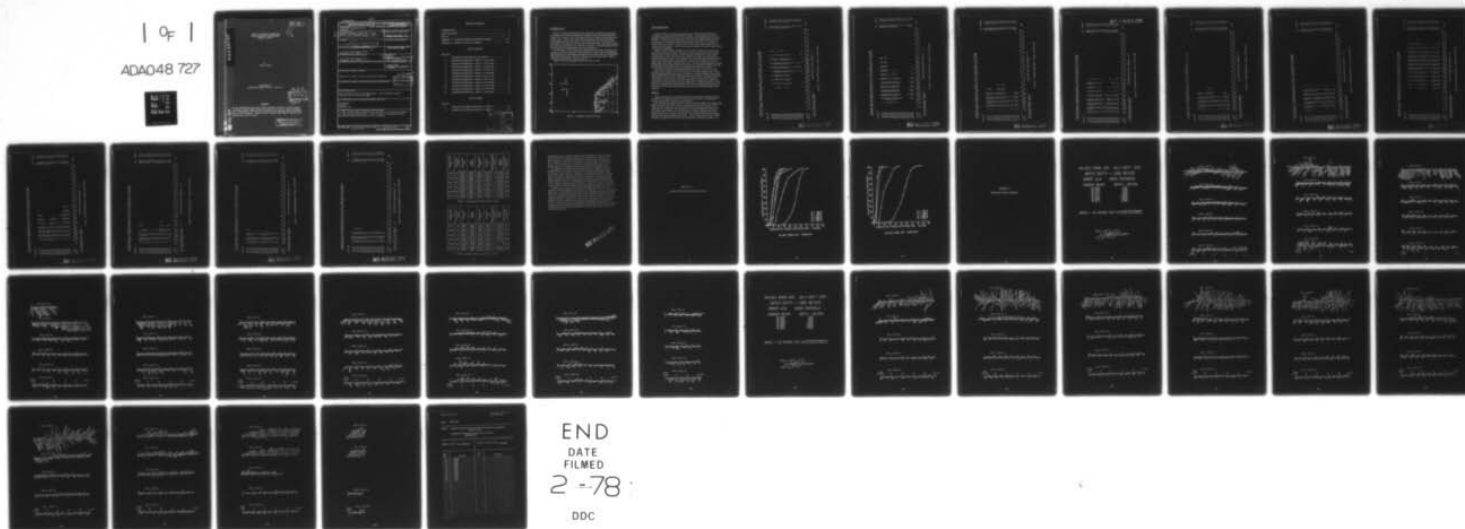
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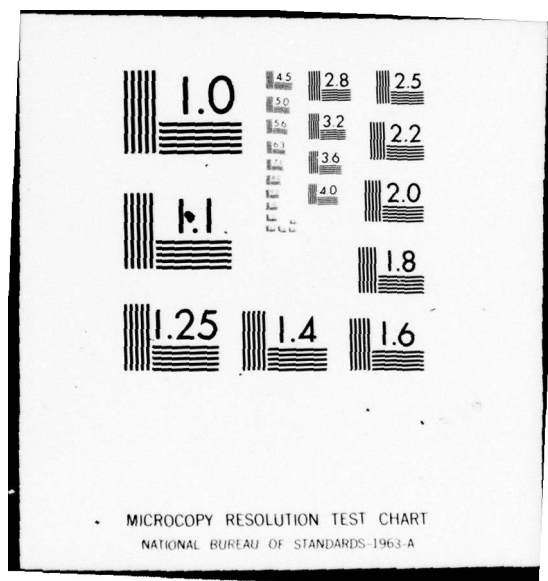
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RESULTS OF CURRENT OBSERVATIONS
WILKES NORWEGIAN SEA OPERATIONS
(ARRAYS 1 AND 2)

BY
OTIS R. SMITH

SUPPLEMENT TO
NAVOCEANO TECHNICAL NOTE NO. 6110-2-75

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ABSTRACT

Current measurements were made in four separate locations at various depths in support of the WILKES Norwegian Sea Operations in July through September 1974. Measurements from the two locations in the Southern part of the Norwegian Sea are discussed. Speeds at both locations were high to moderate with maximum values of 90 cm/sec.

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number)
→ Gives current data collected at two locations in the southern Norwegian Sea July through September 1974. Data are reported in cumulative speed distribution graphs and graphs of vector averages. ↑

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ADDRESS	STATE DISTRICT	COUNTY	DISTRIBUTION/AVAILABILITY CODES	SPECIAL
RTE	DIST	JUSTIFICATION	DIST	SPECIAL
				A

INTRODUCTION

The U.S. Naval Oceanographic Office implanted four tautlined arrays of self-contained current measuring instruments in support of Exercise WILKES-NORWAY, in July 1974. Arrays 1 and 2 will be discussed; Arrays 3 and 4 were discussed in an earlier report. Arrays 1 and 2 were bottom anchored in 1690 and 1960 meters of water respectively on 24 July 1974. Array 2 was retrieved on 9 September 1974 while Array 1 was retrieved a day later on 10 September 1974. The exercise yielded six usable data records for Array 1 and five for Array 2. The USNS WILKES (TAGS-33) was used for the implantation and recovery operations.

For information on (1) current meter components and hardware, (2) implant and recovery procedures, (3) physical characteristics of current meters and transponder/release devices, and (4) schematic representations of arrays, refer to NAVOCEANO TECHNICAL NOTE NO. 6110-2-75, "Results of Current Observations - WILKES Norwegian Sea Operations - (Arrays 3 and 4)".

Figure 1 shows the geographic locations of Arrays 1 and 2.

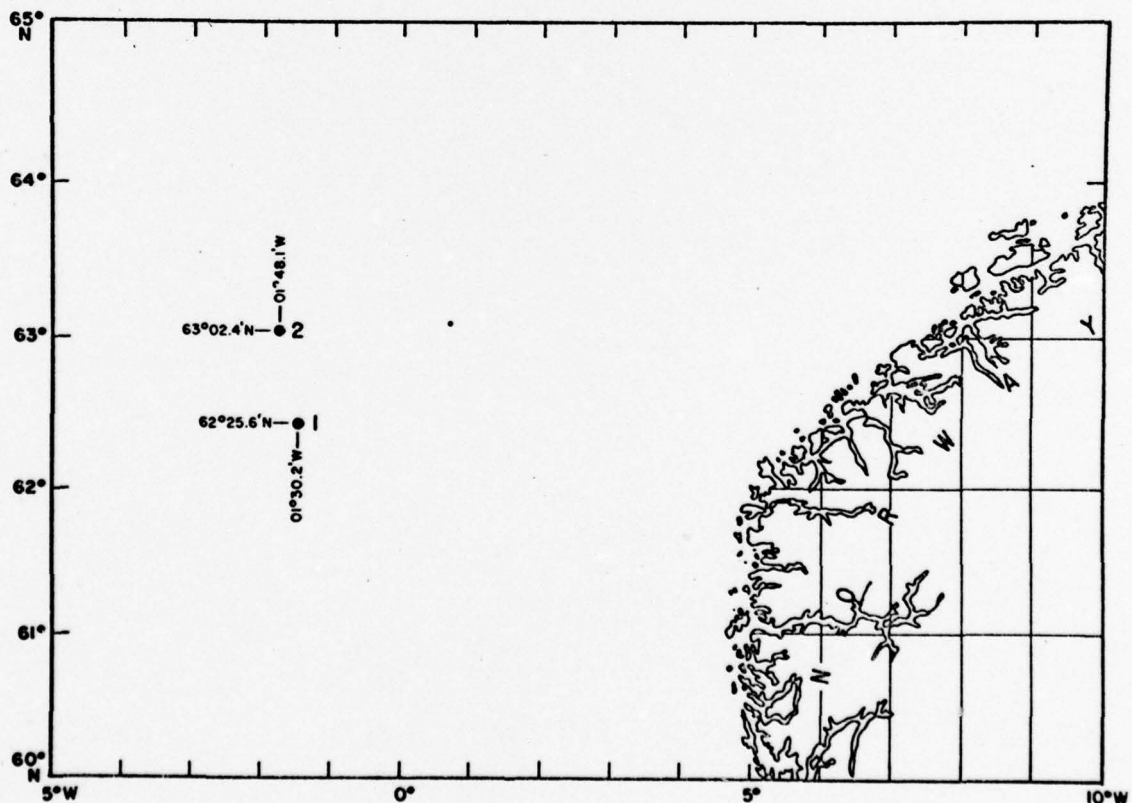


Figure 1. Geographic Location of Arrays

DATA PROCESSING

After recovery, the current meter cameras were unloaded and data films were developed at the Naval Research Laboratory (NRL). The developed films were processed at NAVOCEANO by an in-house developed Optical Digital Analog Computer (OPDAC). OPDAC transfers digital data from the film onto IBM magnetic tape and also generates a multichannel strip chart analog trace of the data. A summary of current meter data is shown in Tables 1 and 2. The number of frames listed for each current meter (last column in each of these tables) is based on the number of data frames actually read by OPDAC.

Based on a record length of 1165 hours and 57 minutes (meter start to meter stop time) and a sampling interval of 15 minutes, the maximum number of frames possible for any meter in Array 1 is 4663. The actual number of frames will vary by a small number (higher or lower than the maximum number) if the clock used in starting the sampling is off (plus or minus a few seconds). This can be observed from Table 1 as the actual number of frames for meters N-474, N-472, N-411, N-466, and N-417 is 4638, 4638, 4639, 4638, and 4643 respectively. The film advance mechanism of meter N-429 stopped functioning after the instrument had recorded only 1598 frames of data. The resulting record was thus short by some 3065 frames (791 hours) of data.

The maximum number of data frames possible for any meter on Array 2 is 4540 (a record length of 1135 hours and 13 minutes and a 15 minute sampling rate). Meter N-492 contained 4271 frames of data, due again to a faulty film advance mechanism. Approximately 270 frames of data (67 hours) were not recorded. No data was recorded on the film from meter N-415. Apparently, the sequence timer failed to operate; consequently, the micro-switch was not actuated and no commands were sent to the electronics to flash light pulses to the data light platen. Further substantiation of this failure was obtained when the batteries for each meter were checked for power drainage; after recovery of the arrays the battery for meter N-415 showed no appreciable drainage.

RESULTS

Figures 2 through 12 are computer printouts of the bivariate distribution of speed (5 cm/sec intervals) and direction (15° intervals) for each meter. Each printout is based on fifteen-minute averages (one data frame).

Data for printouts of Array 1 are for a 48-day period from 0000Z on 24 July through 0000Z on 10 September 1974, with the exception of the printout for meter N-429 (short record). Speeds were high to moderate and decreased with depth down to the 1000 meter level (maximum values of 75 cm/sec occurring at 100 meters decreasing to maximum values of 30 cm/sec at 1000 meters). Between 1000 and 1500 meters speeds increased to a maximum of 45 cm/sec. From 1500 to 1678 meters speeds again decrease with maximum values to 35 cm/sec. Currents throughout the water column (with the exception of the 100 meter level) exhibited a northeast flow pattern. At

WILKES NORM SEA 62 25.6N/01 30.2W ARRAY 1 CM N-429 DEPTH = 100M S/R = 15MIN
 15-MINUTE AVERAGES WATER DEPTH = 1690M START TIME = 2210 23JUL74 R/L = 1165 HRS

DIRECTION	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	SUM	PER.CT.
0-15	1																					18	1.1
15-30																						22	1.4
30-45																						41	2.6
45-60																						89	5.6
60-75																						141	8.9
75-90																						122	7.7
90-105																						145	9.1
105-120																						127	8.0
120-135																						131	8.2
135-150																						104	6.5
150-165																						113	7.1
165-180																						142	8.9
180-195																						172	10.8
195-210																						128	8.0
210-225																						41	2.6
225-240																						11	0.7
240-255																						11	0.7
255-270																						4	0.3
270-285																						5	0.3
285-300																						2	0.1
300-315																						4	0.3
315-330																						3	0.2
330-345																						4	0.3
345-360																						13	0.8

NUMBER OF ZERO SPEED AVERAGES = 0 PERCENTAGE ZERO SPEED AVERAGES = 0.0
 TOTAL NUMBER OF OSS. = 1593

Figure 2. Bivariate Distribution - Array 1, C/M N-429

WILKES NORW SEA 62 25.6M/01 30.2M ARRAY 1 CM N=474 DEPTH = 200M S/R = 15MIN
 15-MINUTE AVERAGES WATER DEPTH =1690M START TIME = 2210 23JUL74 R/L =1165 HRS

DIRECTION	SUM	PER.CT.
0-15	426	9.3
15-30	389	8.5
30-45	281	6.1
45-60	557	12.1
60-75	592	12.9
75-90	241	5.3
90-105	275	6.0
105-120	248	5.4
120-135	239	5.2
135-150	235	5.1
150-165	293	6.4
165-180	228	5.0
180-195	230	5.0
195-210	98	2.1
210-225	8	0.2
225-240	1	0.0
240-255	0	0.0
255-270	0	0.0
270-285	0	0.0
285-300	6	0.1
300-315	28	0.6
315-330	67	1.5
330-345	145	3.2
345-360		

SPEED	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	SUM	PER.CT.
SUM	0	35	313	912	817	705	657	407	204	192	162	135	48	0	0	0	0	0	0	0	0	4587	
PER.CT.	0.0	0.8	6.8	19.9	17.8	15.4	14.3	8.9	4.4	4.2	3.5	2.9	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100	

NUMBER OF ZERO SPEED AVERAGES = 0 PERCENTAGE ZERO SPEED AVERAGES = 0.0
 TOTAL NUMBER OF OBS. = 4587

Figure 3. Bivariate Distribution - Array 1, C/M N-474

WILKES NORW SEA 62 85.6M/01 39.2M ARRAY 1 CM N-472 DEPTH = 500M S/R = 15MIN
 15-MINUTE AVERAGES WATER DEPTH = 1690M START TIME = 2210 23JUL74 R/L = 1165 HRS

DIRECTION	0-15	15-30	30-45	45-60	60-75	75-90	90-105	105-120	120-135	135-150	150-165	165-180	180-195	195-210	210-225	225-240	240-255	255-270	270-285	285-300	300-315	315-330	330-345	345-360	SUM	PER.CT.	
	3	25	111	83	20	1	1	15	44	42	20	11	19	71	45	42	2	11	1	2	11	1	15	1	48	243	5.3
	1	34	119	143	50	1	1	19	71	45	42	20	11	19	71	45	42	2	11	1	2	11	1	15	1	348	7.6
	7	61	162	263	111	12	12	16	87	88	69	33	4	16	62	59	26	6	1	1	17	52	81	33	4	616	13.4
	5	53	154	191	83	7	7	17	52	81	33	4	1	13	57	41	28	10	2	2	12	51	38	17	15	503	11.0
	4	34	145	171	67	1	1	12	27	6	1	1	1	12	27	6	1	1	1	1	12	27	6	1	1	422	9.2
		37	97	74	7			20	60	35	4			20	60	35	4									215	4.7
		20	60	35	4			1	15	44	42	20		11	19	71	45	42	2	11	1	2	11	1	15	119	2.6
		1	15	44	42	20		1	16	87	88	69	33	4	16	62	59	26	6	1	17	52	81	33	4	122	2.7
		1	16	87	88	69	33	4	1	13	57	41	28	10	2	1	1	1	1	1	12	51	38	17	15	193	4.2
		2	17	52	81	33	4		2	16	62	59	26	6	1	1	1	1	1	1	12	27	6	1	1	277	6.0
		1	13	57	41	28	10	2		1	13	57	41	28	10	2	1	1	1	1	12	51	38	17	15	189	4.1
		2	12	27	6	1				2	12	27	6	1							2	12	27	6	1	170	3.7
		1	11	23	9	2				1	11	23	9	2							1	11	23	9	2	152	3.3
		1	19	7	2					1	19	7	2								1	19	7	2		134	2.9
		4	10	6	1					4	10	6	1								4	10	6	1		48	1.0
		3	10	15	1					3	10	15	1								3	10	15	1		23	0.5
		5	37	31	2					5	37	31	2								5	37	31	2		43	0.9
		2	22	61	86	12				2	22	61	86	12							2	22	61	86	12	19	0.4
		11	30	85	100	20				11	30	85	100	20							11	30	85	100	20	21	0.5
		7	17	91	60	21	1			7	17	91	60	21	1						7	17	91	60	21	29	0.6
		0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100				75	1.6
SUM	54	516	1636	1635	433	84	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	183	4.0
PER.CT.	1.2	11.2	35.7	36.1	13.8	1.8	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	246	5.4

NUMBER OF ZERO SPEED AVERAGES = 0 PERCENTAGE ZERO SPEED AVERAGES = 0.0
 TOTAL NUMBER OF OBS. = 4587

Figure 4. Bivariate Distribution - Array 1, C/M N-472

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WILKES NORW SEA 62 23.68/01 30.2W ARRAY 1 CM N=466 DEPTH =1500M S/R = 15MIN
 15-MINUTE AVERAGES WATER DEPTH =1690M START TIME = 2210 23JUL74 R/L =1165 HRS

DIRECTION	0-15	15-30	30-45	45-60	60-75	75-90	90-105	105-120	120-135	135-150	150-165	165-180	180-195	195-210	210-225	225-240	240-255	255-270	270-285	285-300	300-315	315-330	330-345	345-360	SUM	PER.CT.	
	26	93	41	36	1	7	4	5	16	8	16	25	8	338	7.4											193	4.2
	31	153	93	23	4	8	8	16	25	8	16	25	8	588	12.8											338	7.4
	36	191	170	109	14	14	21	20	4	1	1	1	1	452	9.9											452	9.9
	40	322	140	77	17	18	14	20	4	1	1	1	1	450	9.8											450	9.8
	38	145	135	67	23	10	17	14	1	1	1	1	1	219	4.8											219	4.8
	30	85	52	24	7	2	6	13	3	3	3	3	3	137	3.0											137	3.0
	12	34	25	19	5	3	8	8	7	7	7	7	7	107	2.3											107	2.3
	11	19	24	18	20	2	2	4	4	4	4	4	4	80	1.7											80	1.7
	8	25	15	12	12	5	5	1	2	2	2	2	2	71	1.5											71	1.5
	10	20	14	4	9	5	1	1	2	2	2	2	2	78	1.7											78	1.7
	8	10	22	13	20	2	1	1	2	2	2	2	2	56	1.2											56	1.2
	10	19	5	12	5	4	4	4	4	4	4	4	4	48	1.0											48	1.0
	16	24	1	7	1	1	1	1	1	1	1	1	1	33	0.7											33	0.7
	10	22	1	7	4	4	4	4	4	4	4	4	4	107	2.3											107	2.3
	13	71	12	27	12	12	12	12	12	12	12	12	12	172	3.7											172	3.7
	11	100	27	22	2	2	2	2	2	2	2	2	2	143	3.1											143	3.1
	13	76	25	25	2	1	1	1	1	1	1	1	1	186	4.1											186	4.1
	6	121	24	24	9	3	3	3	3	3	3	3	3	145	3.2											145	3.2
	27	83	12	17	3	1	1	1	1	1	1	1	1	182	4.0											182	4.0
	34	104	20	17	2	2	2	2	2	2	2	2	2	259	5.6											259	5.6
	32	140	43	18	7	5	9	4	1	1	1	1	1	188	4.1											188	4.1
	26	94	35	18	10	2	7	6	3	3	3	3	3	166	3.6											166	3.6
	31	113	15	12	10	1	1	1	1	1	1	1	1	169	3.7											169	3.7
	32	87	26	11	4	2	2	2	2	2	2	2	2	4587	100											4587	100

SPEED 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100
 SUM 511 1961 978 583 201 80 103 132 38 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
 PER.CT. 11.1 42.8 21.3 12.7 4.4 1.7 2.2 2.9 0.8 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0

NUMBER OF ZERO SPEED AVERAGES = 0 PERCENTAGE ZERO SPEED AVERAGES = 0.0
 TOTAL NUMBER OF OBS. = 4587

Figure 6. Bivariate Distribution - Array 1, C/M N-466

WILKES NORW SEA 62 25.6N/01 30.2W ARRAY 1 CM N-411 DEPTH =1000
 15-MINUTE AVERAGES WATER DEPTH =1690M START TIME = 2210 23JUL74 R/L =1165 HRS

DIRECTION	0-15	15-30	30-45	45-60	60-75	75-90	90-105	105-120	120-135	135-150	150-165	165-180	180-195	195-210	210-225	225-240	240-255	255-270	270-285	285-300	300-315	315-330	330-345	345-360	SUM	PER, CT.
	3	89	91	42	4																				229	5.0
	1	110	108	70	33																				322	7.0
	2	93	125	55	23																				303	6.6
	11	157	206	111	12																				527	11.5
	17	135	263	95	8																				518	11.3
	1	68	68	93	1																				191	4.2
	2	45	34	35	6																				123	2.7
		44	15	19	12																				91	2.0
	1	24	24	13	25																				105	2.3
	2	27	27	9	15																				85	1.9
		16	40	23	10																				91	2.0
		16	21	28	12																				78	1.7
	1	23	24	6																					54	1.2
		19	36	1																					56	1.2
	1	38	79	3																					121	2.6
	2	67	94	11																					174	3.8
	4	113	79	6																					202	4.4
	9	79	45																						133	2.9
	5	101	14																						120	2.6
	1	55	35	32	7																				130	2.8
	1	76	40	63	19																				205	4.5
	13	80	92	58	13																				257	5.6
	10	113	97	27																					247	5.4
	15	126	64	13																					223	4.9
SPEED	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100					
SUM	105	1730	1752	780	200	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4585
PER, CT.	2.3	37.7	38.2	17.0	4.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	

NUMBER OF ZERO SPEED AVERAGES = 3 PERCENTAGE ZERO SPEED AVERAGES = 0.1
 TOTAL NUMBER OF OBS. = 4588

Figure 5. Bivariate Distribution - Array 1, C/M N-411

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WILKES NORW SEA 62 25.68N/01 30.2W ARRAY 1 CM N-417 DEPTH #1678M S/R # 15MIN
 15-MINUTE AVERAGES WATER DEPTH #1690M START TIME # 2210 23JUL74 R/L #1165 HRS

DIRECTION	0-15	15-30	30-45	45-60	60-75	75-90	90-105	105-120	120-135	135-150	150-165	165-180	180-195	195-210	210-225	225-240	240-255	255-270	270-285	285-300	300-315	315-330	330-345	345-360	SUM	PER.CT.
	1	31	84	53	30	12	1																		207	4.5
	1	20	67	81	62	21	1																		254	5.5
	8	63	88	100	91	51	1																		402	8.8
	10	96	102	179	82	50	1																		380	9.0
	7	47	112	62	76	53																			376	6.3
	7	58	144	64	54	47	2																		223	8.2
	1	23	171	71	40	16	1																		162	4.9
		5	45	66	53	13																			107	3.5
		7	12	39	40	11																			83	2.3
		3	5	23	40	12																			92	2.0
		3	12	22	28	14																			44	1.8
		3	12	24	16	2																			44	2.0
	1	2	12	25	10	4																			76	1.0
		4	14	16	11																				45	1.0
		19	20	21	12	3																			170	1.7
		15	27	68	54	6																			200	3.7
		44	59	33	48	16																			212	4.4
	2	38	116	31	12	12																			110	4.6
	6	19	50	22	12	1																			123	2.4
		10	31	21	47	14																			174	2.7
		9	60	99	41	5																			228	3.8
		22	79	90	28	9																			217	5.0
	3	24	88	31	20	1																			251	4.7
	8	36	112	42	41	11																			251	5.5

SPEED 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100
 SUM 55 598 1412 1182 950 364 10 4592
 PER.CT. 1.2 13.0 30.8 25.7 20.7 8.4 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0

NUMBER OF ZERO SPEED AVERAGES = 0 PERCENTAGE ZERO SPEED AVERAGES = 0.0
 TOTAL NUMBER OF OBS. = 4592

Figure 7. Bivariate Distribution - Arroy 1, C/M N-417

WILKES NORW SEA 63 02.4N/02 48.1W ARRAY 2 CM N-467 DEPTH = 100M S/R = 15MIN
 15-MINUTE AVERAGES WATER DEPTH = 1960M START TIME = 0847 24JUL74 R/L = 1135 HRS

DIRECTION	5	26	13	19	21	32	31	39	27	13	10	2	SUM	PER.CT.
0-15													238	5.4
15-30	2	3	2	15	14	23	28	30	38	8	8	5	166	3.7
30-45		4	1	9	9	26	36	32	37	17	10		181	4.1
45-60		5	3	5	9	36	32	46	32	21	4	3	196	4.4
60-75	1	4	4	12	15	35	33	33	27	16	6	1	183	4.1
75-90		4	10	14	12	26	19	33	22	13	4	2	161	3.6
90-105	1	9	10	10	13	33	41	35	15	10	3	1	180	4.1
105-120		7	22	18	14	34	45	32	8	4	6	2	195	4.4
120-135		11	24	23	18	39	48	31	15	7	5	2	224	5.0
135-150	1	11	19	15	31	54	52	28	16	7	4	1	240	5.4
150-165		10	10	18	18	36	34	36	15	11	2	1	205	4.6
165-180	2	11	17	18	16	28	23	22	29	10	3	1	180	4.1
180-195	2	17	2	6	10	8	27	28	23	15	2	1	130	2.9
195-210	1	3	5	3	6	8	17	19	19	15	4	1	100	2.3
210-225			1	2	4	5	10	24	15	13	1		76	1.7
225-240				1	6	5	12	15	9	6	1		55	1.2
240-255			1	1	1	9	12	14	15	1	1		54	1.2
255-270		2	2	2	2	3	14	23	9	2	1		60	1.4
270-285	2	5	17	13	10	10	21	27	10	3	4	1	123	2.8
285-300	5	21	50	59	41	23	26	24	11	4	2	1	266	6.0
300-315	2	14	36	52	37	39	28	21	12	11	1	1	255	5.7
315-330	1	13	18	32	39	41	34	30	22	18	4	4	254	5.7
330-345	1	1	1	1	47	48	49	41	30	10	6	3	332	7.5
345-360	3	35	63	69	40	41	35	41	41	7	8	5	388	8.7

SPEED 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100
 SUM 1 3 3 1 1 35 220 361 452 434 647 707 704 497 242 100 32 2 0 0
 PER.CT. 0.0 0.1 0.1 0.0 0.0 0.8 5.0 8.1 10.2 9.8 14.6 15.9 15.8 11.2 5.4 2.3 0.7 0.0 0.0 0.0

NUMBER OF ZERO SPEED AVERAGES = 0 PERCENTAGE ZERO SPEED AVERAGES = 0.0
 TOTAL NUMBER OF OBS. = 4442

Figure 8. Bivariate Distribution - Array 2, C/M N-467

WILKES NORW SEA 63 02.4N/02 48.1W ARRAY 2 CM N-400 DEPTH = 200M S/R = 15MIN
 15-MINUTE AVERAGES WATER DEPTH 1960M START TIME = 0847 24JUL74 R/L = 1135 HRS

DIRECTION	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	SUM	PER.CT.	
0-15	3	39	63	23	8	29	36	6														206	4.6	
15-30	1	29	45	19	2	15	11															122	2.7	
30-45	1	32	57	39	9	2																146	3.3	
45-60	7	28	46	38	59	17	3															198	4.5	
60-75	2	38	39	32	36	14																134	3.0	
75-90	12	130	96	14	1																	253	5.7	
90-105	13	138	135	31	1																	319	7.2	
105-120	19	118	107	39	5																	288	6.5	
120-135	14	78	73	29	23	14																231	5.2	
135-150	23	58	50	36	23	19																209	4.7	
150-165	8	39	62	38	24	12	5															188	4.2	
165-180	2	22	30	14	5	16																89	2.0	
180-195	3	20	18	9	8	7																65	1.5	
195-210	2	25	24	21	1	4																75	1.7	
210-225	2	29	44	20	2	1																88	2.0	
225-240	2	24	40	21	1																	55	1.2	
240-255	1	21	15	12	5	10	12															80	1.8	
255-270	1	24	14	14	13	90	118	41	15													335	7.5	
270-285	2	20	20	16	9	58	55	34	6													233	5.2	
285-300	1	19	37	14	30	72	53	28	7													289	6.5	
300-315	1	23	47	24	19	27	89	90	18	10												326	7.3	
315-330	2	25	46	19	34	61	59	14	1													263	5.9	
330-345	5	34	39	16																				
345-360																								
SPEED	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100			
SUM	0	131	1081	1196	549	325	530	450	141	39	0	0	0	0	0	0	0	0	0	0	0	4442		
PER.CT.	0.0	2.9	24.3	26.9	12.4	7.3	11.9	10.1	3.2	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	44.42		

NUMBER OF ZERO SPEED AVERAGES = 1 PERCENTAGE ZERO SPEED AVERAGES = 0.0
 TOTAL NUMBER OF OBS. = 4442

Figure 9. Bivariate Distribution - Array 2, C/M N-400

WILKES NORW SEA 63 02.4N/02 48.1W ARRAY 2 CM N-492 DEPTH = 500M S/R = 15MIN
 15-MINUTE AVERAGES WATER DEPTH #1960M START TIME = 0847 24JUL74 R/L = 1135 HRS

DIRECTION	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	SUM	PER.CT.
0-15	9	104	59	2	1	2																184	4.4
15-30	4	109	82	4	1	2																202	4.8
30-45	7	130	92	4	6																	239	5.7
45-60	5	143	123	9	1																	291	6.7
60-75	4	149	165	26																		344	8.2
75-90	5	139	142	13																		299	7.1
90-105	8	103	170	6																		192	4.6
105-120	7	103	40																			150	3.6
120-135	5	70	21																			96	2.3
135-150	6	50	12																			79	1.9
150-165	4	47	10	1																		62	1.5
165-180	5	36	27	1																		69	1.6
180-195	4	72	52	1																		129	3.1
195-210	8	70	79	7	8																	164	3.9
210-225	5	69	97	8																		179	4.3
225-240	2	85	86	23	1																	197	4.7
240-255	3	93	73	30	5	3																207	4.9
255-270	5	90	97	32	5	4																223	5.3
270-285	4	71	84	46	1																	186	4.4
285-300	3	64	42	17	2																	131	3.1
300-315	4	49	41	13	2																	109	2.6
315-330	4	43	43	20	1																	111	2.7
330-345	1	77	49	23	9																	159	3.8
345-360	3	72	62	7																		153	3.7
SPEED	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100		
SUM	12	204	1649	280	43	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4145	
PER.CT.	2.9	48.9	39.4	6.7	1.0	0.2	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	41.5	

NUMBER OF ZERO SPEED AVERAGES = 37 PERCENTAGE ZERO SPEED AVERAGES = 0.9
 TOTAL NUMBER OF OBS. = 4182

Figure 10. Bivariate Distribution - Array 2, C/M N-492

WILKES MOKW SEA 63 02.4N/02 48.1W ARRAY 2 CM N=487 DEPTH =1000M S/R = 15MIN
 15-MINUTE AVERAGES WATER DEPTH #1960M START TIME = 0847 24JUL74 R/L =1135 HRS

DIRECTION	0-15	15-30	30-45	45-60	60-75	75-90	90-105	105-120	120-135	135-150	150-165	165-180	180-195	195-210	210-225	225-240	240-255	255-270	270-285	285-300	300-315	315-330	330-345	345-360	SUM	PER.CT.		
	9	203	48	3	2																					260	5.9	
	16	218	109	3																						337	7.6	
	24	251	137	2																						414	9.3	
	37	190	81																							308	6.9	
	35	160	75																							270	6.1	
	22	145	22																							189	4.3	
	34	138	4																							176	4.0	
	19	124	7																							150	3.4	
	22	95	2																							119	2.7	
	4	95	2																							101	2.3	
	12	85	2																							99	2.2	
	12	86	3																							101	2.3	
	11	112	12																							135	3.0	
	23	164	22																							209	4.7	
	30	194	50																							274	6.2	
	26	173	63	1																						263	5.9	
	5	172	72																							179	4.0	
	11	134	36																							136	3.1	
	11	109	16																							99	2.2	
	10	82	7																							82	1.8	
	15	64	3																							64	1.4	
	7	49	8																							94	2.1	
	13	74	7																							120	2.7	
	12	100	8																									

SPEED 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100
 SUM 420 3217 785 6 0 4428
 PER.CT. 9.5 72.5 17.7 0.1 0.0

NUMBER OF ZERO SPEED AVERAGES = 9 PERCENTAGE ZERO SPEED AVERAGES = 0.2
 TOTAL NUMBER OF OBS. = 4437

Figure 11. Bivariate Distribution - Array 2, C/M N-487

CURRENT METER S/N	METER DEPTH (meters)	METER START TIME	ARRAY MOORED	RELEASE DEVICE FIRED	METER STOP TIME	SAMPLING INTERVAL (minutes)	RECORD LENGTH	NO. OF FRAMES ON FILM
N-429	100	7-23-74 2210Z	7-24-74 0200Z	9-10-74 0746Z	9-10-74 1207Z	15	1165 hrs 57 min	1598
N-474	200	7-23-74 2210Z	7-24-74 0200Z	9-10-74 0746Z	9-10-74 1207Z	15	1165 hrs 57 min	4638
N-472	500	7-23-74 2210Z	7-24-74 0200Z	9-10-74 0746Z	9-10-74 1207Z	15	1165 hrs 57 min	4638
N-411	1000	7-23-74 2210Z	7-24-74 0200Z	9-10-74 0746Z	9-10-74 1207Z	15	1165 hrs 57 min	4639
N-466	1500	7-23-74 2210Z	7-24-74 0200Z	9-10-74 0746Z	9-10-74 1207Z	15	1165 hrs 57 min	4638
N-417	1678	7-23-74 2210Z	7-24-74 0200Z	9-10-74 0746Z	9-10-74 1207Z	15	1165 hrs 57 min	4643

Table 1. Summary of Current Meter Data - Array 1.

CURRENT METER S/N	METER DEPTH (meters)	METER START TIME	ARRAY MOORED	RELEASE DEVICE FIRED	METER STOP TIME	SAMPLING INTERVAL (minutes)	RECORD LENGTH	NO. OF FRAMES ON FILM
N-467	100	7-24-74 0847Z	7-24-74 1200Z	9-9-74 1319Z	9-9-74 1600Z	15	1135 hrs 13 min	4531
N-400	200	7-24-74 0847Z	7-24-74 1200Z	9-9-74 1319Z	9-9-74 1600Z	15	1135 hrs 13 min	4532
N-492	500	7-24-74 0847Z	7-24-74 1200Z	9-9-74 1319Z	9-9-74 1600Z	15	1135 hrs 13 min	4271
N-487	1000	7-24-74 0847Z	7-24-74 1200Z	9-9-74 1319Z	9-9-74 1600Z	15	1135 hrs 13 min	4526
N-415	1500	7-24-74 0847Z	7-24-74 1200Z	9-9-74 1319Z	9-9-74 1600Z	15	0	none
N-491	1948	7-24-74 0847Z	7-24-74 1200Z	9-9-74 1319Z	9-9-74 1600Z	15	1135 hrs 13 min	4529

Table 2. Summary of Current Meter Data - Array 2.

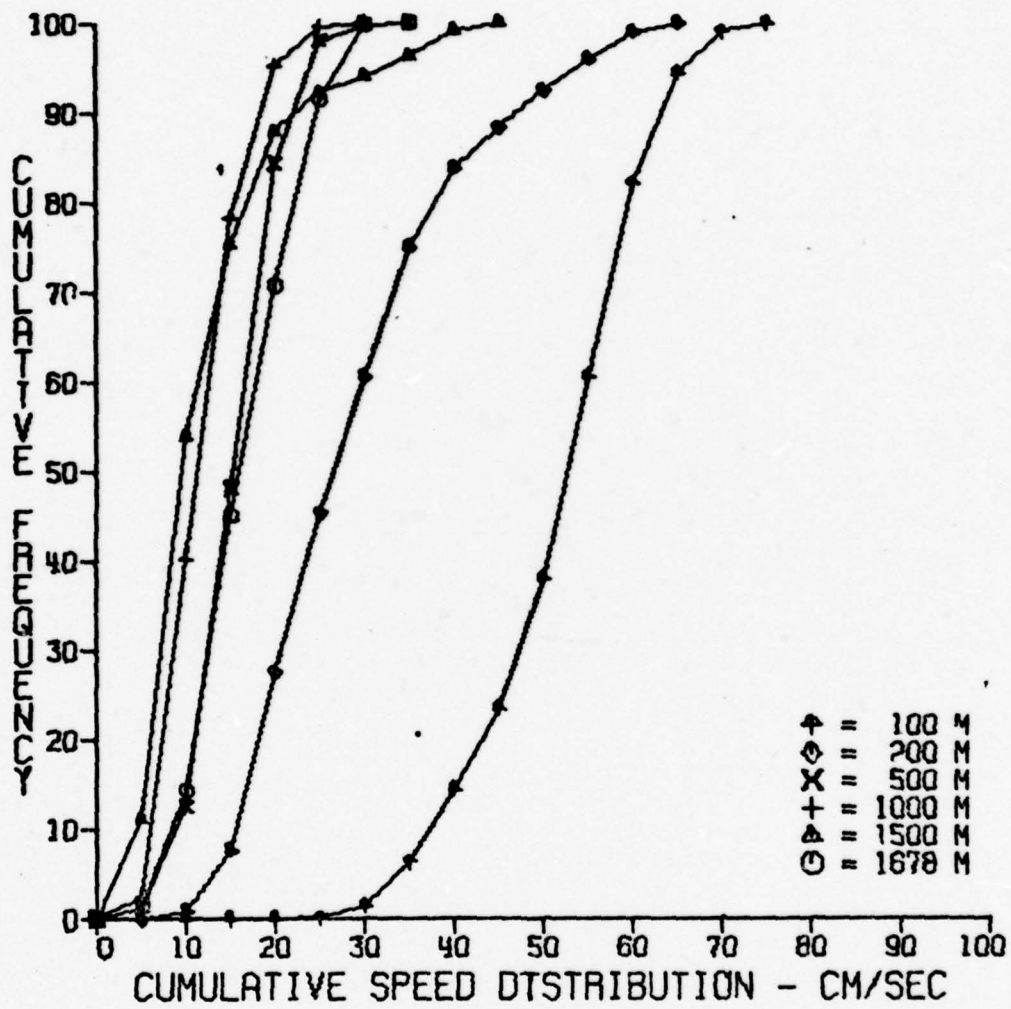
the 100 meter level, no distinct pattern could be determined. This is probably attributed to the fact that the record for the meter at this level was only one-third as long as the records for the other five-meters; therefore, the period of time (16 days) covered by the record may have been too short to establish a set pattern. The maximum speed of 75 cm/sec recorded at 100 meters may not be representative of the total period of the array due to the incomplete record.

Data for printouts of Array 2 span a 46-day period from 0000Z on 25 July through 0000Z on 9 September 1974 (meter N-492 was short by approximately 2 1/2 days). Speeds again were high to moderate and decreased with depth. The maximum values ranged from 90 cm/sec at 100 meters to 20 cm/sec at 1948 meters. It should be noted that the increase in speeds between 1000 and 1500 meters observed in Array 1 could not be detected because the meter (N-415) at 1500 meters did not operate. There appeared to be no dominant direction of flow at any of the five depths monitored by Array 2. Each depth seemed to exhibit two or more directions of flow with no one direction taking precedence over the others.

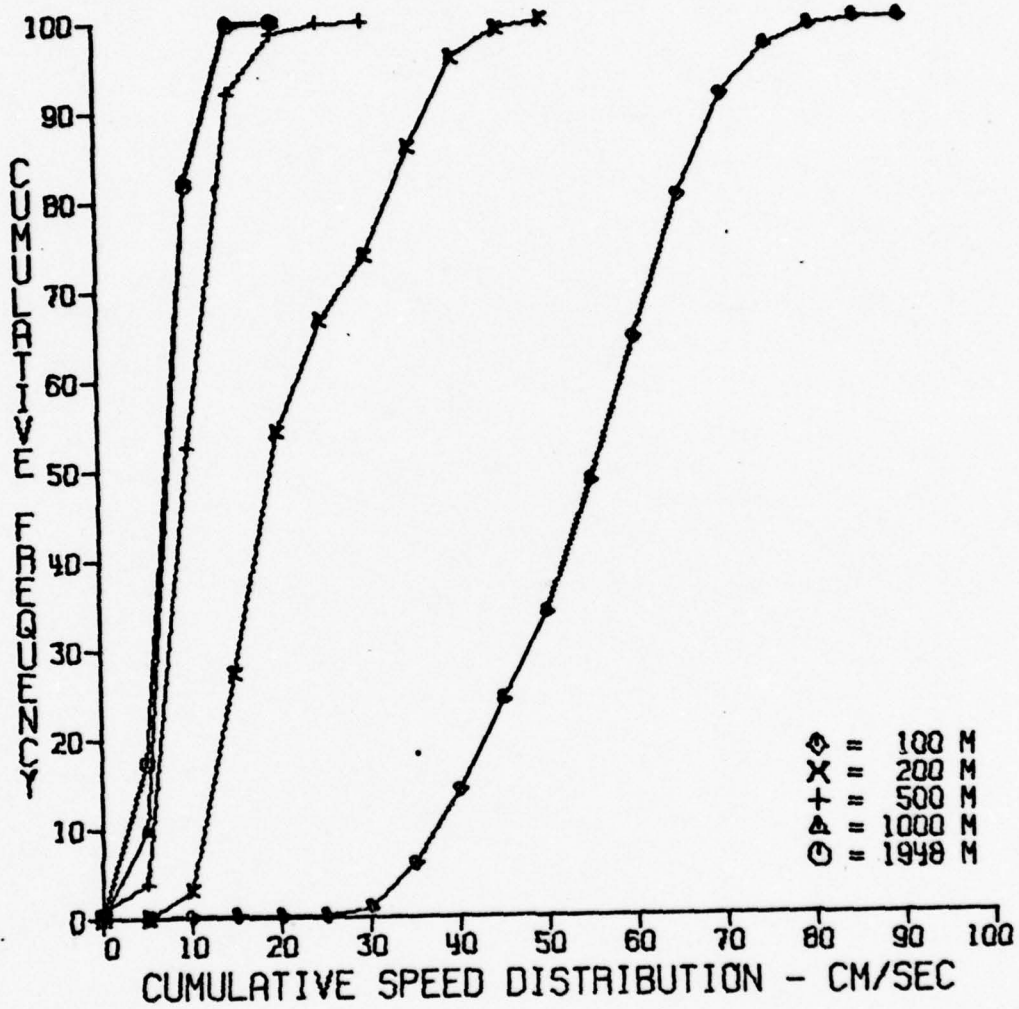
Appendix A contains a cumulative speed distribution graph for each array. Appendix B contains graphs of current vectors as a function of time for each meter of each array. Each plotted line represents a vector averaged over a 60 minute period. The distance between the long tick marks covers a period of 24 hours with each of these time periods being divided by a shorter tick mark representing 12 hours. It should be noted that north is to the reader's right. Currents in the area measured by Array 1 tended to exhibit the same general direction of flow throughout the column. The exception to this trend occurs in the first fifteen days when the top three levels show a different direction of flow than the bottom three levels. Currents in the area of Array 2 showed tidal influence at one or more depths for about 25 of the 46-day period.

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APPENDIX A
CUMULATIVE SPEED DISTRIBUTION GRAPHS



WILKES NORW SEA ARRAY #1*



WILKES NORW SEA ARRAY #2

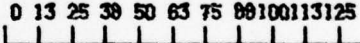
APPENDIX B
GRAPHS OF VECTOR AVERAGES

WILKES NORW SEA JULY-SEPT 1974

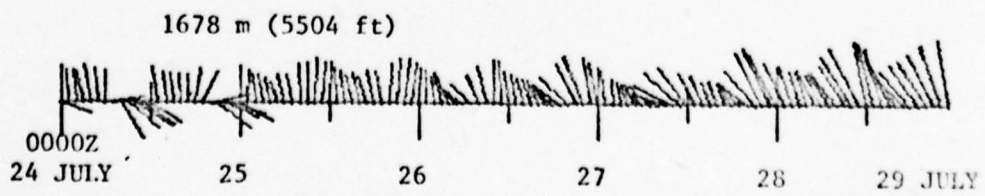
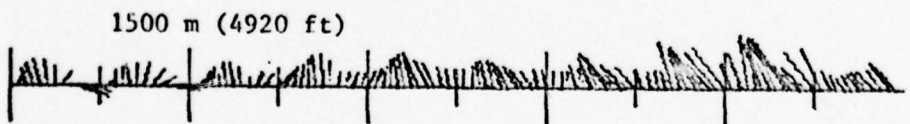
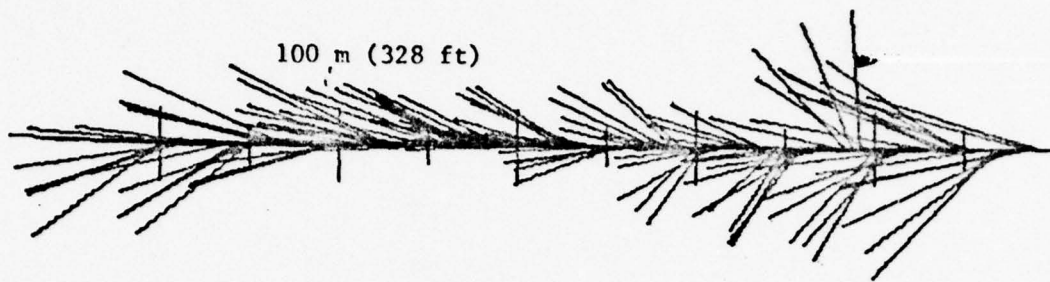
WATER DEPTH = 1690 METERS

ARRAY *1* HOUR AVERAGES

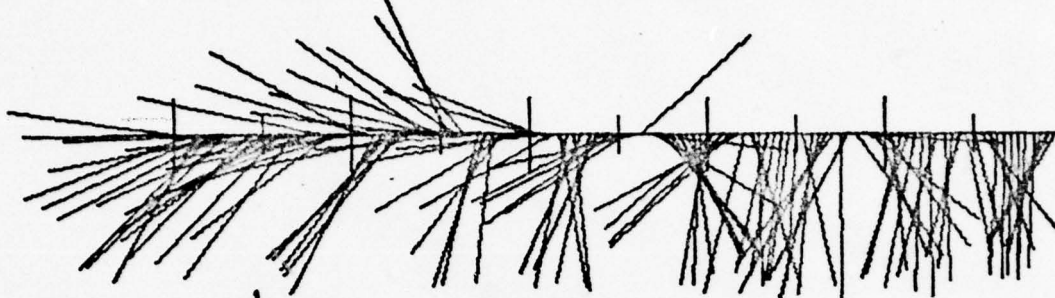
CURRENT METER	DEPTH - METERS
N-429	100
N-474	200
N-472	500
N-411	1000
N-466	1500
N-417	1678

SCALE = 25 CM/SEC PER CM 





100 m (328 ft)



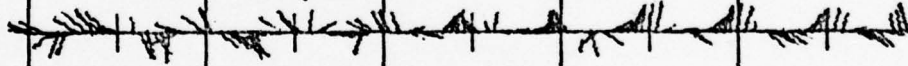
200 m (656 ft)



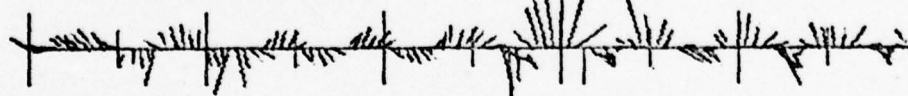
500 m (1640 ft)



1000 m (3280 ft)



1500 m (4920 ft)



1678 m (5504 ft)



0000Z
29 JULY

30

31

1

2

3 AUG.

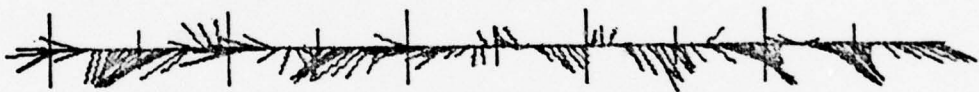
100 m (328 ft)



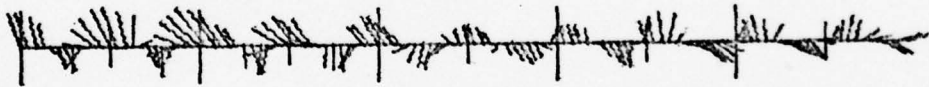
200 m (656 ft)



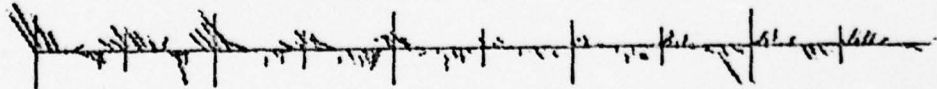
500 m (1640 ft)



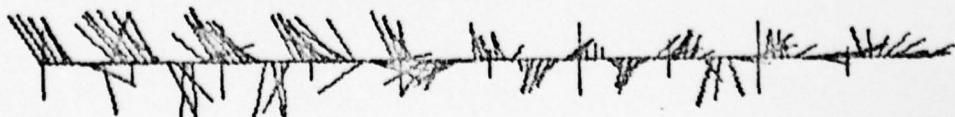
1000 m (3280 ft)



1500 m (4920 ft)



1678 m (5504 ft)



0000Z
3 AUG.

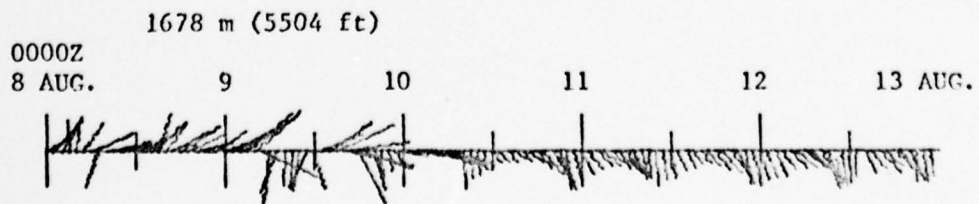
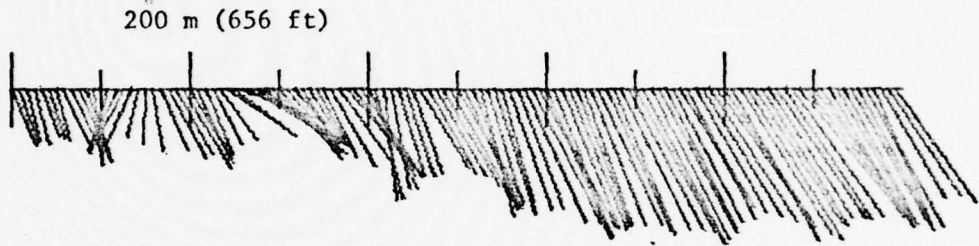
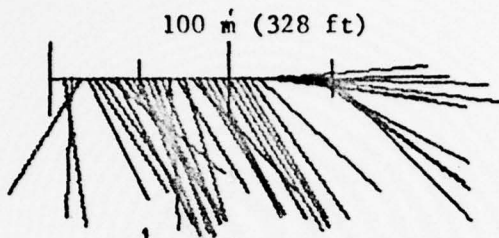
4

5

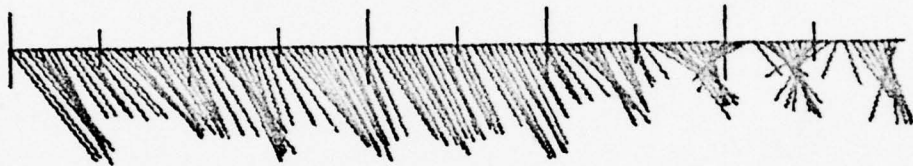
6

7

8 AUG.



200 m (656 ft)



500 m (1640 ft)



1000 m (3280 ft)



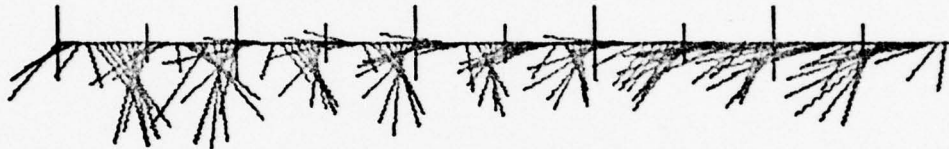
1500 m (4920 ft)



1678 m (5504 ft)



200 m (656 ft)



500 m (1640 ft)



1000 m (3280 ft)



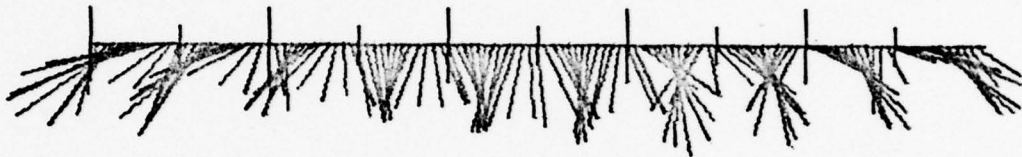
1500 m (4920 ft)



1678 m (5504 ft)



200 m (656 ft)



500 m (1640 ft)



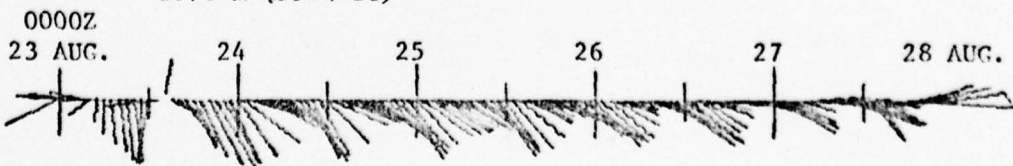
1000 m (3280 ft)



1500 m (4920 ft)



1678 m (5504 ft)



200 m (656 ft)



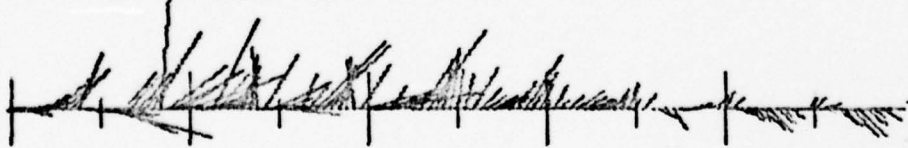
500 m (1640 ft)



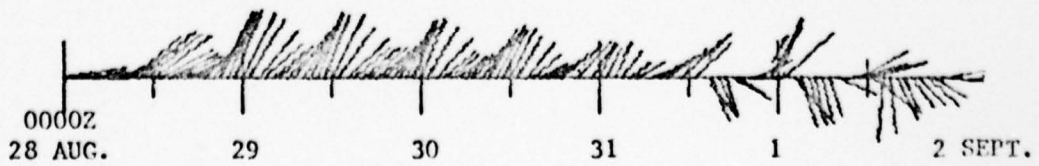
1000 m (3280 ft)



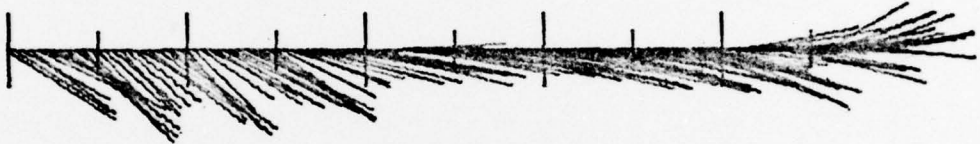
1500 m (4920 ft)



1678 m (5504 ft)



200 m (656 ft)



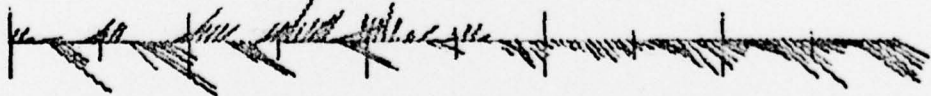
500 m (1640 ft)



1000 m (3280 ft)



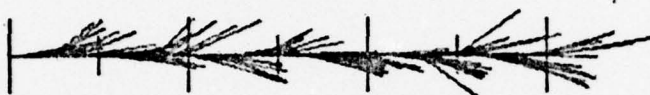
1500 m (4920 ft)



1678 m (5504 ft)



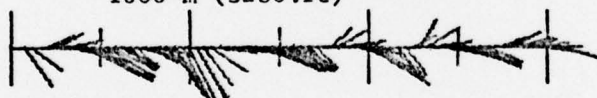
200 m (656 ft)



500 m (1640 ft)



1000 m (3280 ft)



1500 m (4920 ft)



1678 m (5504 ft)

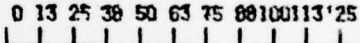


WILKES NORW SEA JULY-SEPT 1974

WATER DEPTH = 1960 METERS

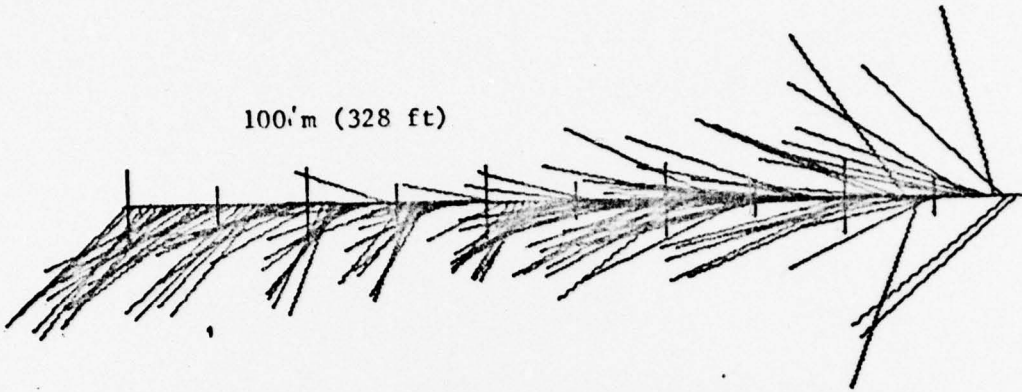
ARRAY *2* HOUR AVERAGES

CURRENT METER	DEPTH - METERS
N-467	100
N-400	200
N-492	500
N-487	1000
N-491	1948

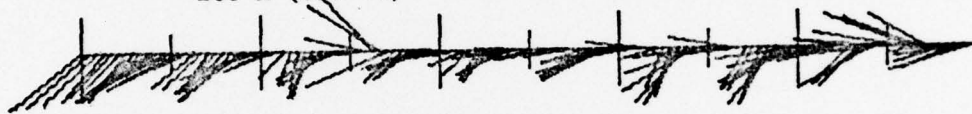
SCALE = 25 CM/SEC PER CM 



100.1 m (328 ft)



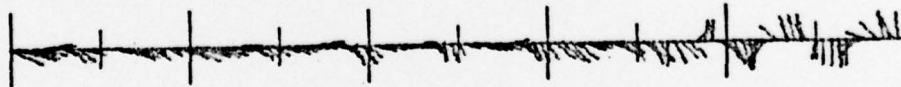
200 m (656 ft)



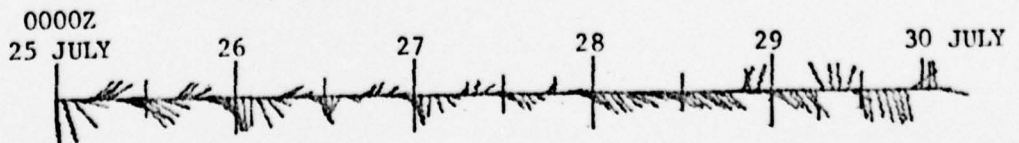
500 m (1640 ft)



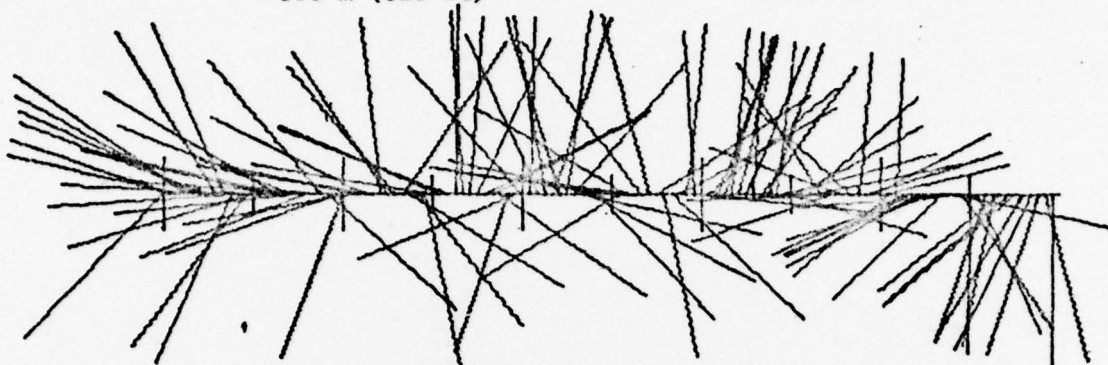
1000 m (3280 ft)



1948 m (6389 ft)



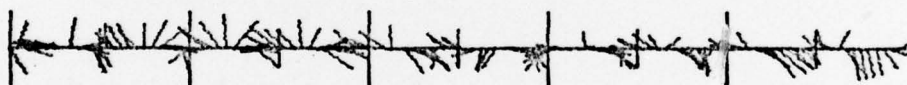
100 m (328 ft)



200 m (656 ft)



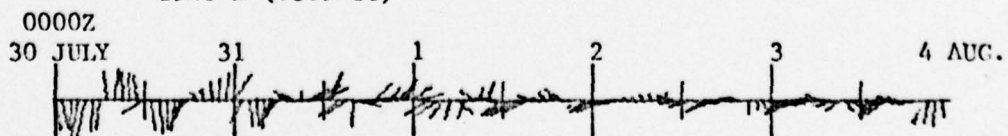
500 m (1640 ft)

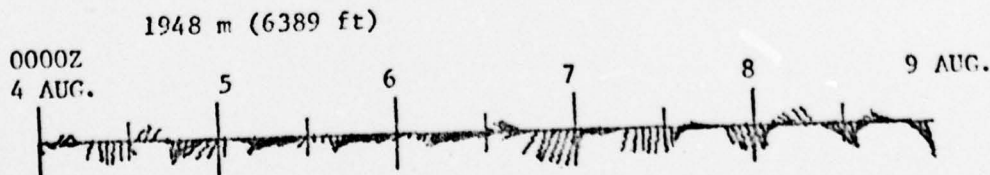
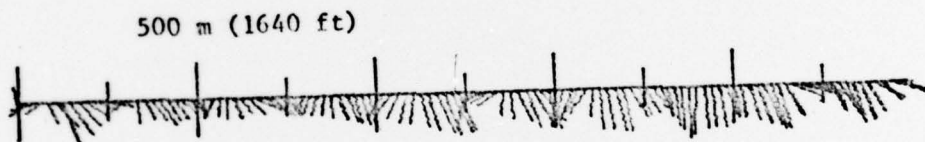
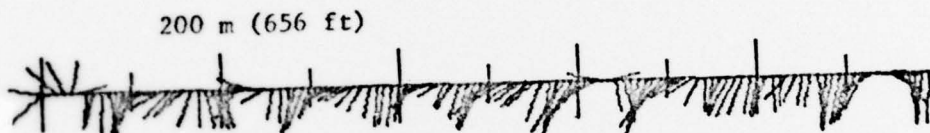
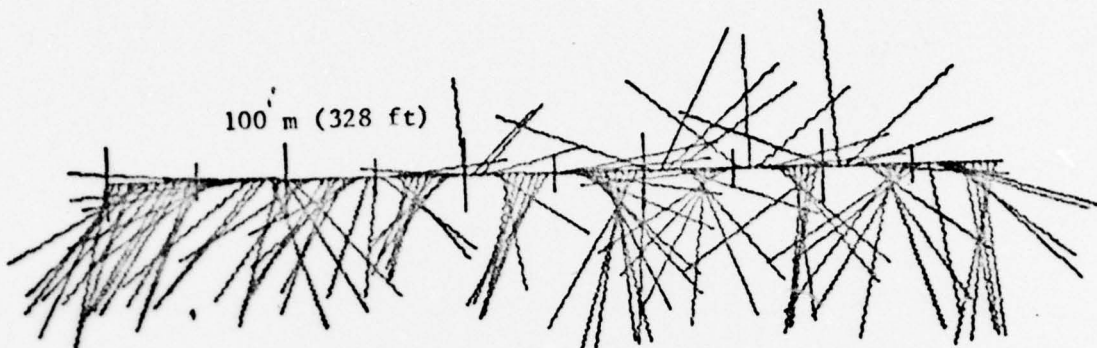


1000 m (3280 ft)

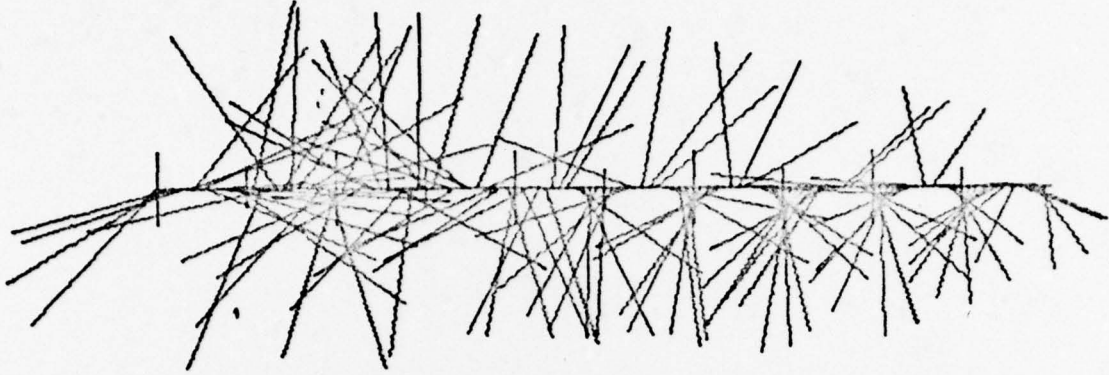


1948 m (6389 ft)





100 m (328 ft)



200 m (656 ft)



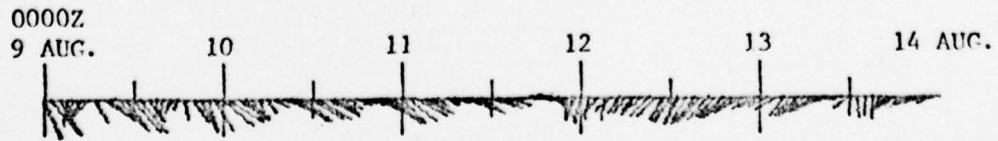
500 m (1640 ft)



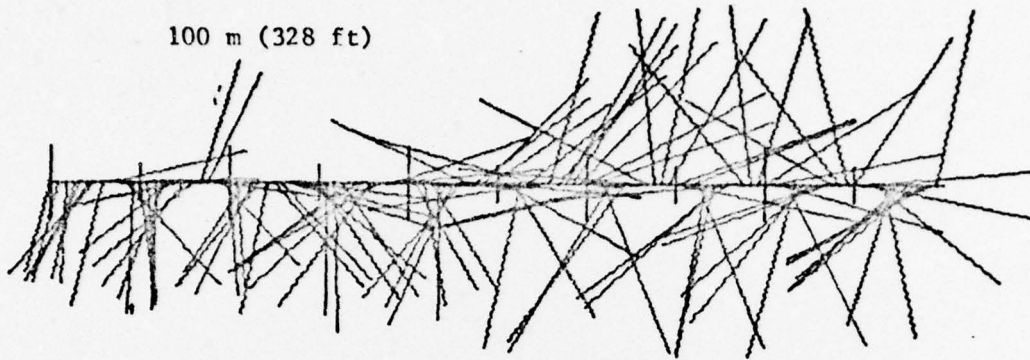
1000 m (3280 ft)



1948 m (6389 ft)



100 m (328 ft)



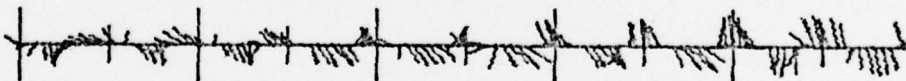
200 m (656 ft)



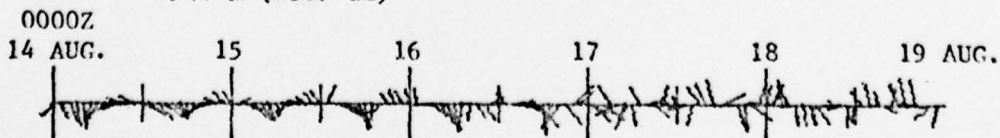
500 m (1640 ft)



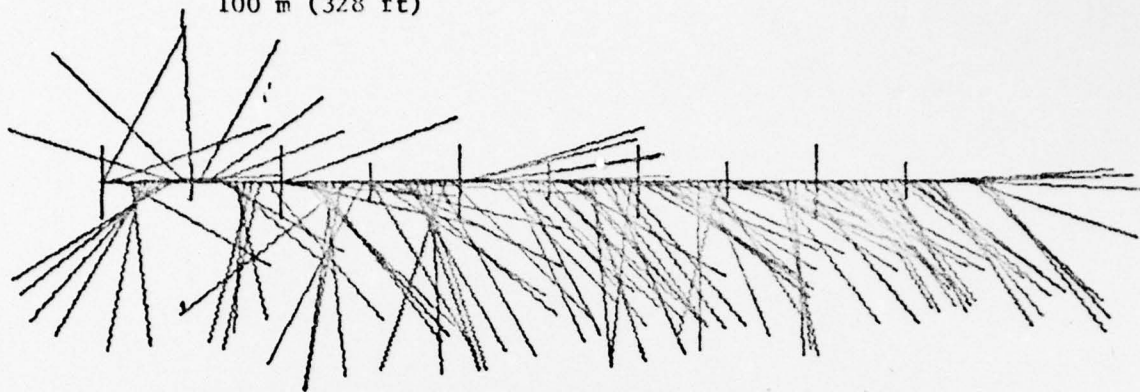
1000 m (3280 ft)



1948 m (6389 ft)



100 m (328 ft)



200 m (656 ft)



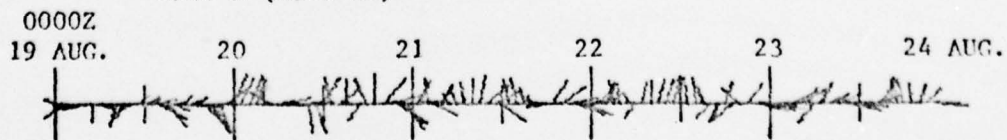
500 m (1640 ft)



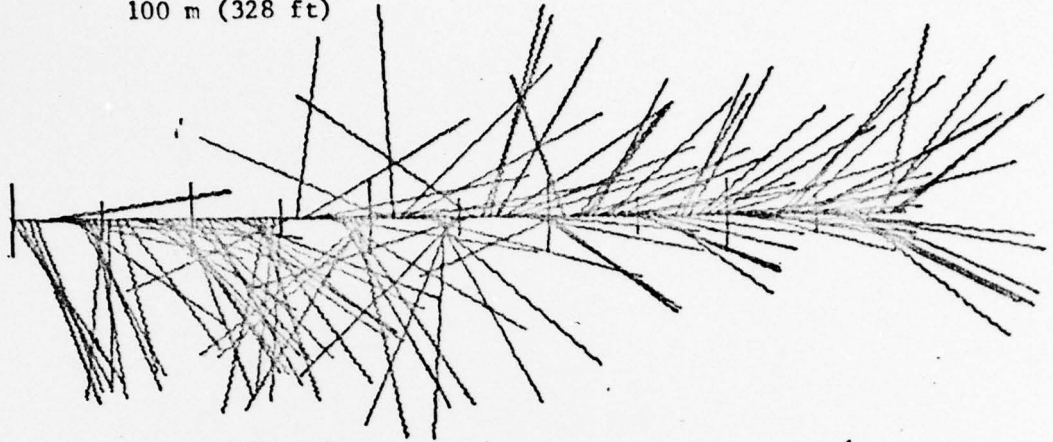
1000 m (3280 ft)



1948 m (6389 ft)



100 m (328 ft)



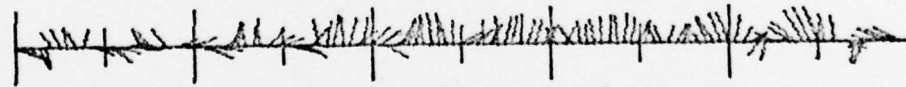
200 m (656 ft)



500 m (1640 ft)



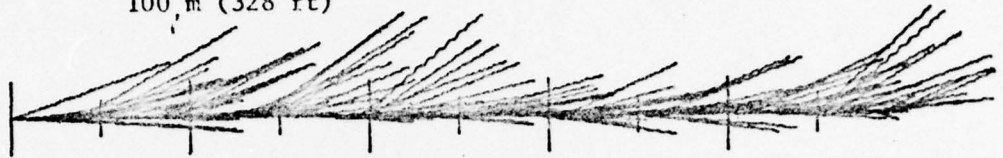
1000 m (3280 ft)



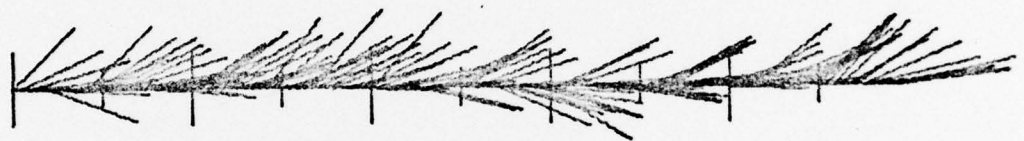
1948 m (6389 ft)



100 m (328 ft)



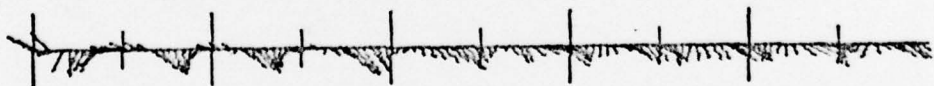
200 m (656 ft)



500 m (1640 ft)



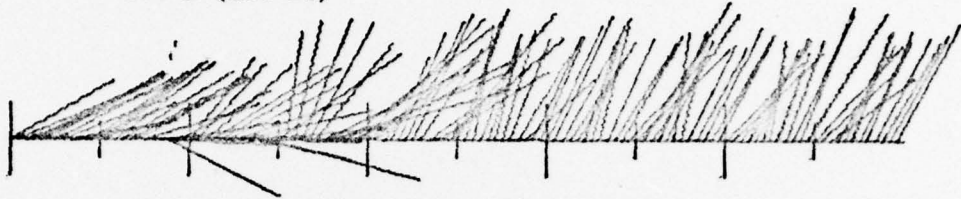
1000 m (3280 ft)



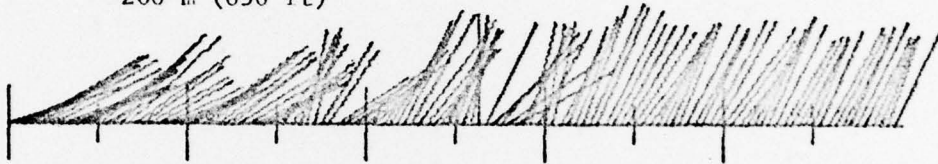
1948 m (6389 ft)



100 m (328 ft)



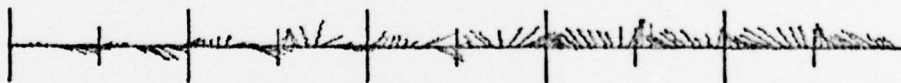
200 m (656 ft)



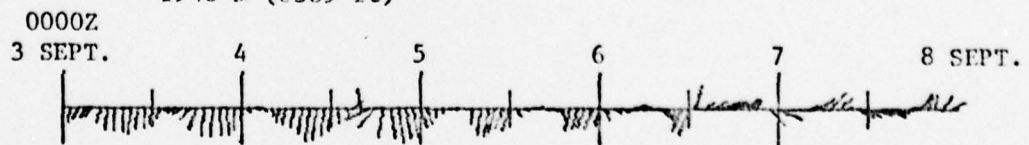
500 m (1640 ft)



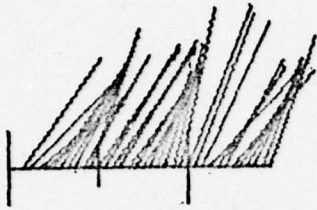
1000 m (3280 ft)



1948 m (6389 ft)



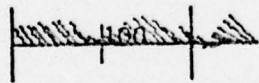
100 m (328 ft)



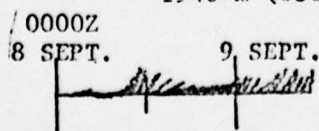
200 m (656 ft)



1000 m (3280 ft)



1948 m (6389 ft)



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NO. 6110-2-75

DATE: APRIL 1975

SUBJECT: Results of Current Observations WILKES Norwegian Sea Operations
(Arrays 1 and 2)

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