



**US Army Corps  
of Engineers**  
Waterways Experiment  
Station

# Annual Data Summary for 1992 CERC Field Research Facility

## Volume II: Appendices C Through E

by *Michael W. Leffler, Clifford F. Baron, Brian L. Scarborough,  
Kent K. Hathaway, Paul R. Hodges, C. Ray Townsend*



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# Annual Data Summary for 1992 CERC Field Research Facility

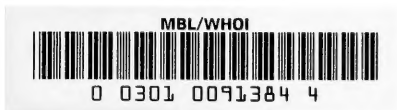
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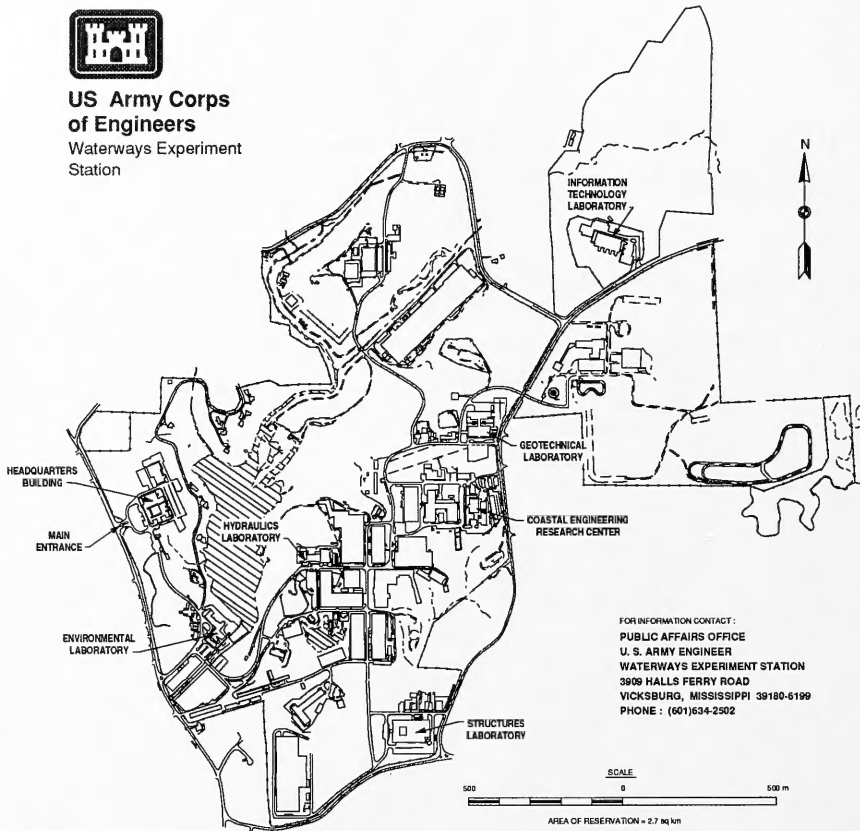
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# Appendix C

## Wave Data for Gage 111

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Wave data summaries for Gage 111 for 1992 and for 1985 through 1992 are presented in the following pages:

### Daily $H_{mo}$ and $T_p$

Figure C1 displays the individual wave height  $H_{mo}$  and peak spectral wave period  $T_p$  values, along with the monthly mean values.

### Joint Distributions of $H_{mo}$ and $T_p$

Annual and monthly joint distribution tables are presented in Tables C1 and C2, and data for 1985 through 1992 are in Tables C3 and C4. Each table gives the frequency (in parts per 10,000) for which the wave height and peak period were within the specified intervals; these values can be converted to percentages by dividing by 100. Marginal totals are also included. The row total gives the number of observations out of 10,000 that fell within each specified peak period interval. The column total gives the number of observations out of 10,000 that fell within each specified wave height interval.

### Cumulative Distributions of Wave Height

Annual and monthly wave height distributions for 1992 are plotted in cumulative form in Figures C2 and C3. Data for 1985 through 1992 are plotted in Figure C4.

### Peak Spectral Wave Period Distributions

Annual and monthly peak wave period  $T_p$  distribution histograms for 1992 are presented in Figures C5 and C6. Data for 1985 through 1992 are presented in Figure C7.

## Persistence of Wave Heights

Table C5 shows the number of times in 1992 when the specified wave height was equaled or exceeded at least once during each day for the duration (consecutive days). Data for 1985 through 1992 are averaged and given in Table C6. An example is shown below:

Height m	Consecutive Day(s) or Longer																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19+
0.5	18	15		14	13	12	7	11	10	9				8					
1.0	50	34	24	21	18	14	12	8	7	3			2						
1.5	41	19	8	6	2	1													
2.0	22	9	5	1															
2.5	10	5	2																
3.0	6	1																	
3.5		1																	
4.0	1																		

This example indicates that wave heights equaled or exceeded 1.0 m 50 times for at least 1 day; 34 times for at least 2 days; 24 times for at least 3 days, etc. Therefore, on 16 occasions the height equaled or exceeded 1.0 m for 1 day exactly ( $50 - 34 = 16$ ); on 10 occasions for 2 days; on 3 occasions for 3 days, etc. Note that the height exceeded 1 m 50 times for 1 day or longer, while heights exceeded 0.5 m only 18 times for this same duration. This change in durations occurred because the longer durations of lower waves may be interspersed with shorter, but more frequent, intervals of higher waves. For example, one of the times that the wave heights exceeded 0.5 m for 16 days may have represented three times the height exceeded 1 m for shorter durations.

## Spectra

Monthly spectra for the pressure gage (Gage 111) are presented in Figure C8. The plots show "relative" energy density as a function of wave frequency. These figures summarize the large number of spectra for each month. The figures emphasize the higher energy density associated with storms, as well as the general shifts in energy density to different frequencies. As used here, "relative" indicates the spectra have been smoothed by the three-dimensional surface drawing routine. Consequently, extremely high- and low-energy density values are modified to produce a smooth surface. The figures are not intended for quantitative measurements; however, they do provide the energy density as a function of frequency relative to the other spectra for the month.

Monthly and annual wave statistics for Gage 111 for 1992 and for 1985 through 1992 are presented in Table C7.

Figure C9 plots monthly time histories of wave height and period.

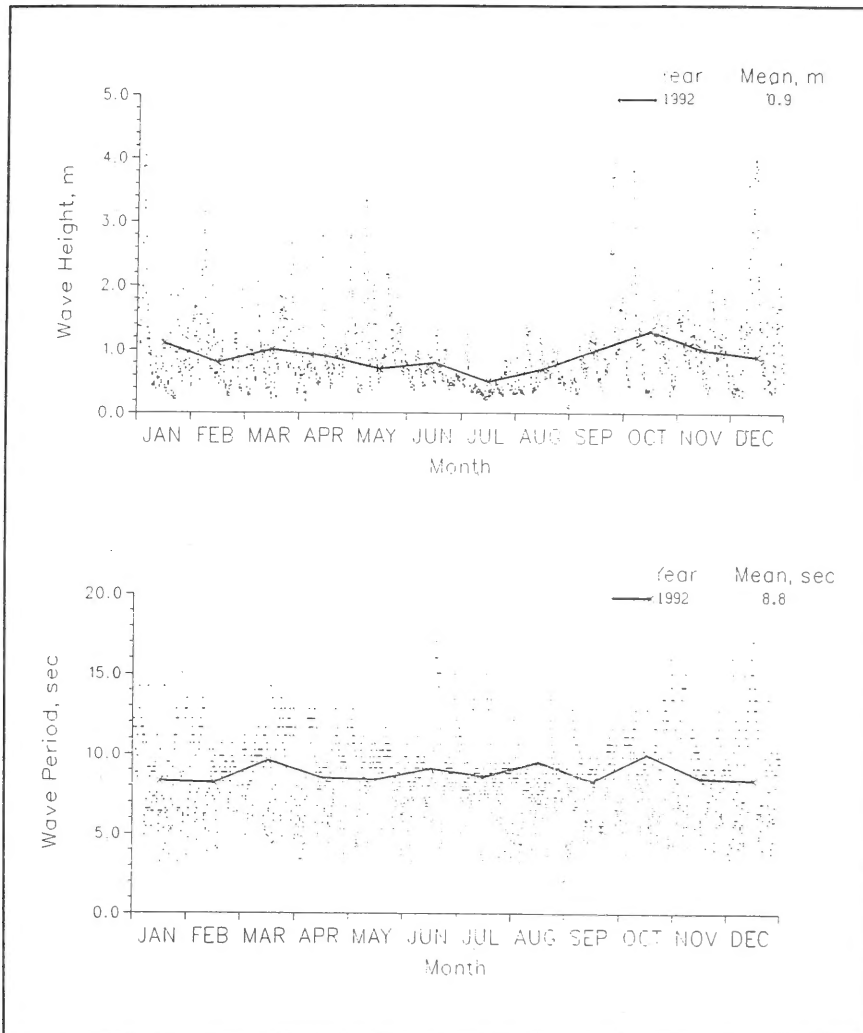


Figure C1. 1992 daily wave height and period values with monthly means for Gage 111

**Table C1**  
**Annual Joint Distribution of  $H_{mo}$  versus  $T_p$**

Height(m)	Annual 1992, Gage 111 Percent Occurrence(X100) of Height and Period												Total
	Period(sec)												
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer	
0.00 - 0.49	14	84	70	70	77	349	704	509	286	84	167	14	2428
0.50 - 0.99	.	84	272	363	467	453	774	802	572	77	286	14	4164
1.00 - 1.49	.	14	139	377	279	146	265	237	481	49	119	.	2106
1.50 - 1.99	.	.	.	77	181	70	84	84	174	14	42	.	726
2.00 - 2.49	.	.	.	7	42	21	28	42	49	14	21	.	224
2.50 - 2.99	.	.	.	.	7	28	14	35	42	.	28	.	154
3.00 - 3.49	.	.	.	.	.	.	7	7	28	28	7	.	77
3.50 - 3.99	.	.	.	.	.	.	14	14	35	7	35	7	112
4.00 - 4.49	.	.	.	.	.	.	.	.	.	7	7	.	14
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	14	182	481	894	1053	1067	1890	1730	1667	280	712	35	



**Table C2**  
**Monthly Joint Distribution of  $H_{mo}$  versus  $T_p$**

Height(m)	January 1992, Gage 111												Total
	Percent Occurrence(X100) of Height and Period												
	Period(sec)												
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer	
0.00 - 0.49	.	250	.	333	83	500	417	417	83	333	83	.	2499
0.50 - 0.99	.	167	.	500	1000	250	417	167	667	.	583	.	3751
1.00 - 1.49	.	.	167	333	750	.	250	.	500	.	83	.	2083
1.50 - 1.99	.	.	.	.	167	.	167	83	417	.	83	.	917
2.00 - 2.49	.	.	.	.	.	.	.	83	83	.	83	.	166
2.50 - 2.99	.	.	.	.	.	.	.	.	.	.	83	.	166
3.00 - 3.49	.	.	.	.	.	.	.	.	.	83	83	.	166
3.50 - 3.99	.	.	.	.	.	.	.	.	83	83	.	.	166
4.00 - 4.49	.	.	.	.	.	.	.	.	.	83	.	.	83
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	0	417	167	1166	2000	750	1251	750	1833	499	1164	0	

Height(m)	February 1992, Gage 111												Total
	Percent Occurrence(X100) of Height and Period												
	Period(sec)												
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer	
0.00 - 0.49	.	.	.	.	.	.	783	1043	87	.	.	.	1913
0.50 - 0.99	.	.	348	261	522	522	522	783	348	.	87	.	3393
1.00 - 1.49	.	87	.	348	348	435	348	435	522	87	261	.	2871
1.50 - 1.99	.	.	.	87	348	87	261	.	174	.	87	.	1044
2.00 - 2.49	.	.	.	.	87	174	.	.	.	.	87	.	348
2.50 - 2.99	.	.	.	.	.	.	.	.	348	.	.	.	348
3.00 - 3.49	.	.	.	.	.	.	.	.	87	.	.	.	87
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	0
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	0	87	348	696	1305	1218	1914	2261	1566	87	522	0	

Height(m)	March 1992, Gage 111												Total
	Percent Occurrence(X100) of Height and Period												
	Period(sec)												
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer	
0.00 - 0.49	.	.	81	.	.	161	.	403	1129	161	81	.	2016
0.50 - 0.99	.	.	242	484	565	403	484	887	968	.	323	.	4356
1.00 - 1.49	.	.	323	81	242	.	81	242	726	.	242	.	1937
1.50 - 1.99	.	.	.	81	81	81	161	161	484	81	161	.	1291
2.00 - 2.49	.	.	.	.	81	.	.	161	.	.	81	.	323
2.50 - 2.99	.	.	.	.	.	.	.	.	81	.	.	.	81
3.00 - 3.49	.	.	.	.	.	.	.	.	.	.	.	.	0
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	0
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	0	0	646	646	969	645	726	1854	3388	242	888	0	

(Continued)

(Sheet 1 of 4)

**Table C2 (Continued)**

April 1992, Gage 111  
Percent Occurrence(X100) of Height and Period

Height(m)	Period(sec)												Total
	2.0-	3.0-	4.0-	5.0-	6.0-	7.0-	8.0-	9.0-	10.0-	12.0-	14.0-	16.0-	
	2.9	3.9	4.9	5.9	6.9	7.9	8.9	9.9	11.9	13.9	15.9	Longer	
0.00 - 0.49	.	250	83	.	167	83	83	250	83	.	250	.	1249
0.50 - 0.99	.	.	333	833	750	500	1167	667	1333	.	750	.	6333
1.00 - 1.49	.	83	83	333	.	83	250	333	250	.	.	.	1415
1.50 - 1.99	.	.	.	83	.	83	83	.	250	.	.	.	499
2.00 - 2.49	.	.	.	.	167	.	.	83	.	.	.	.	250
2.50 - 2.99	.	.	.	.	.	.	83	167	.	.	.	.	250
3.00 - 3.49	.	.	.	.	.	.	.	.	.	.	.	.	0
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	0
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	0	333	499	1249	1084	749	1666	1500	1916	0	1000	0	

May 1992, Gage 111  
Percent Occurrence(X100) of Height and Period

Height(m)	Period(sec)												Total
	2.0-	3.0-	4.0-	5.0-	6.0-	7.0-	8.0-	9.0-	10.0-	12.0-	14.0-	16.0-	
	2.9	3.9	4.9	5.9	6.9	7.9	8.9	9.9	11.9	13.9	15.9	Longer	
0.00 - 0.49	.	.	163	.	81	163	163	244	325	.	.	.	1139
0.50 - 0.99	.	81	325	81	407	81	732	1463	732	.	.	.	3902
1.00 - 1.49	.	.	81	163	81	407	569	569	650	.	163	.	2683
1.50 - 1.99	.	.	.	81	244	.	.	407	488	.	.	.	1220
2.00 - 2.49	.	.	.	.	81	.	325	81	81	.	.	.	568
2.50 - 2.99	.	.	.	.	.	81	81	81	.	.	.	.	243
3.00 - 3.49	.	.	.	.	.	.	.	81	163	.	.	.	244
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	0
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	0	81	569	325	894	732	1870	2926	2439	0	163	0	

June 1992, Gage 111  
Percent Occurrence(X100) of Height and Period

Height(m)	Period(sec)												Total
	2.0-	3.0-	4.0-	5.0-	6.0-	7.0-	8.0-	9.0-	10.0-	12.0-	14.0-	16.0-	
	2.9	3.9	4.9	5.9	6.9	7.9	8.9	9.9	11.9	13.9	15.9	Longer	
0.00 - 0.49	.	.	85	.	254	847	847	1186	.	.	.	85	2457
0.50 - 0.99	.	85	85	169	678	847	1864	1271	424	254	1102	169	6948
1.00 - 1.49	.	.	85	254	.	.	85	.	169	.	.	.	593
1.50 - 1.99	.	.	.	.	.	.	.	.	.	.	.	.	0
2.00 - 2.49	.	.	.	.	.	.	.	.	.	.	.	.	0
2.50 - 2.99	.	.	.	.	.	.	.	.	.	.	.	.	0
3.00 - 3.49	.	.	.	.	.	.	.	.	.	.	.	.	0
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	0
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	0	85	255	423	678	1101	2796	2457	593	254	1102	254	

(Continued)

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**Table C2 (Continued)**

July 1992, Gage 111  
Percent Occurrence(X100) of Height and Period

Height(m)	Period(sec)													Total
	2.0-	3.0-	4.0-	5.0-	6.0-	7.0-	8.0-	9.0-	10.0-	12.0-	14.0-	16.0-		
	2.9	3.9	4.9	5.9	6.9	7.9	8.9	9.9	11.9	13.9	15.9	Longer		
0.00 - 0.49	.	331	.	248	248	1653	2893	1157	331	413	413	.	7687	
0.50 - 0.99	.	83	83	331	248	413	331	496	165	.	.	.	2150	
1.00 - 1.49	.	.	.	.	.	83	83	.	.	.	.	.	166	
1.50 - 1.99	.	.	.	.	.	.	.	.	.	.	.	.	0	
2.00 - 2.49	.	.	.	.	.	.	.	.	.	.	.	.	0	
2.50 - 2.99	.	.	.	.	.	.	.	.	.	.	.	.	0	
3.00 - 3.49	.	.	.	.	.	.	.	.	.	.	.	.	0	
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	0	
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0	
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0	
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0	
Total	0	414	83	579	496	2149	3307	1653	496	413	413	0	0	

August 1992, Gage 111  
Percent Occurrence(X100) of Height and Period

Height(m)	Period(sec)													Total
	2.0-	3.0-	4.0-	5.0-	6.0-	7.0-	8.0-	9.0-	10.0-	12.0-	14.0-	16.0-		
	2.9	3.9	4.9	5.9	6.9	7.9	8.9	9.9	11.9	13.9	15.9	Longer		
0.00 - 0.49	172	86	.	86	172	948	1466	86	86	.	86	86	3274	
0.50 - 0.99	.	172	345	345	776	1293	1552	517	431	86	86	.	5603	
1.00 - 1.49	.	.	172	259	172	345	86	86	.	.	.	.	1120	
1.50 - 1.99	.	.	.	.	.	.	.	.	.	.	.	.	0	
2.00 - 2.49	.	.	.	.	.	.	.	.	.	.	.	.	0	
2.50 - 2.99	.	.	.	.	.	.	.	.	.	.	.	.	0	
3.00 - 3.49	.	.	.	.	.	.	.	.	.	.	.	.	0	
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	0	
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0	
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0	
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0	
Total	172	258	517	690	1120	2586	3104	689	517	86	172	86	0	

September 1992, Gage 111  
Percent Occurrence(X100) of Height and Period

Height(m)	Period(sec)													Total
	2.0-	3.0-	4.0-	5.0-	6.0-	7.0-	8.0-	9.0-	10.0-	12.0-	14.0-	16.0-		
	2.9	3.9	4.9	5.9	6.9	7.9	8.9	9.9	11.9	13.9	15.9	Longer		
0.00 - 0.49	.	.	.	.	87	87	348	174	261	.	174	.	1131	
0.50 - 0.99	.	174	522	696	261	522	1130	1304	609	.	.	.	5218	
1.00 - 1.49	.	.	174	783	174	87	261	348	435	.	.	.	2262	
1.50 - 1.99	.	.	.	174	348	87	.	.	.	.	.	.	609	
2.00 - 2.49	.	.	.	.	.	.	.	.	.	.	.	.	0	
2.50 - 2.99	.	.	.	.	.	261	.	.	87	.	.	.	348	
3.00 - 3.49	.	.	.	.	.	.	87	.	.	.	.	.	87	
3.50 - 3.99	.	.	.	.	.	.	.	87	261	.	.	.	348	
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0	
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0	
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0	
Total	0	174	696	1653	870	1044	1826	1913	1653	0	174	0	0	

(Continued)

(Sheet 3 of 4)

**Table C2 (Concluded)**

October 1992, Gage 111  
Percent Occurrence(X100) of Height and Period

Height(m)	Period(sec)												Total
	2.0-	3.0-	4.0-	5.0-	6.0-	7.0-	8.0-	9.0-	10.0-	12.0-	14.0-	16.0-	
	2.9	3.9	4.9	5.9	6.9	7.9	8.9	9.9	10.9	13.9	15.9	Longer	
0.00 - 0.49	.	.	163	81	.	163	569	325	569	.	569	.	2439
0.50 - 0.99	.	81	163	244	.	244	325	488	488	244	325	.	2602
1.00 - 1.49	.	.	244	569	407	81	407	325	813	163	244	.	3253
1.50 - 1.99	.	.	.	163	325	244	.	.	244	.	.	.	976
2.00 - 2.49	.	.	.	81	.	.	.	81	163	.	.	.	325
2.50 - 2.99	.	.	.	.	.	.	.	81	.	.	.	.	81
3.00 - 3.49	.	.	.	.	.	.	.	.	81	.	.	.	81
3.50 - 3.99	.	.	.	.	.	.	163	.	81	.	.	.	244
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	0	81	570	1138	732	732	1464	1300	2439	407	1138	0	

November 1992, Gage 111  
Percent Occurrence(X100) of Height and Period

Height(m)	Period(sec)												Total
	2.0-	3.0-	4.0-	5.0-	6.0-	7.0-	8.0-	9.0-	10.0-	12.0-	14.0-	16.0-	
	2.9	3.9	4.9	5.9	6.9	7.9	8.9	9.9	11.9	13.9	15.9	Longer	
0.00 - 0.49	.	.	.	.	.	.	667	333	.	.	.	.	1000
0.50 - 0.99	.	.	250	250	83	250	833	833	500	333	167	.	3499
1.00 - 1.49	.	.	83	500	500	250	750	250	1417	250	167	.	4167
1.50 - 1.99	.	.	.	250	500	167	83	250	.	.	.	.	1250
2.00 - 2.49	.	.	.	.	83	.	.	.	.	.	.	.	83
2.50 - 2.99	.	.	.	.	.	.	.	.	.	.	.	.	0
3.00 - 3.49	.	.	.	.	.	.	.	.	.	.	.	.	0
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	0
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	0	0	333	1000	1166	667	2333	1666	1917	583	334	0	

December 1992, Gage 111  
Percent Occurrence(X100) of Height and Period

Height(m)	Period(sec)												Total
	2.0-	3.0-	4.0-	5.0-	6.0-	7.0-	8.0-	9.0-	10.0-	12.0-	14.0-	16.0-	
	2.9	3.9	4.9	5.9	6.9	7.9	8.9	9.9	11.9	13.9	15.9	Longer	
0.00 - 0.49	.	84	252	84	84	168	252	504	420	84	336	.	2268
0.50 - 0.99	.	168	588	168	336	168	.	756	168	.	.	.	2352
1.00 - 1.49	.	.	252	924	672	.	.	252	252	84	252	.	2688
1.50 - 1.99	.	.	.	.	168	84	252	84	84	168	168	.	840
2.00 - 2.49	.	.	.	.	.	84	.	84	252	168	.	.	538
2.50 - 2.99	.	.	.	.	84	.	.	.	.	.	252	.	336
3.00 - 3.49	.	.	.	.	.	.	.	.	.	.	.	.	252
3.50 - 3.99	.	.	.	.	.	.	.	84	.	84	336	84	588
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	84	.	84
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	0	252	1092	1176	1344	504	504	1764	1092	756	1428	84	

**Table C3**  
**Annual Joint Distribution of  $H_{mo}$  versus  $T_p$  (All Years)**

Height(m)	Annual 1985-1992, Gage 111 Percent Occurrence(X100) of Height and Period													Total
	Period(sec)													
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer		
0.00 - 0.49	7	74	37	69	122	228	666	487	399	150	260	13	2512	
0.50 - 0.99	3	141	249	419	488	405	939	772	634	129	292	16	4487	
1.00 - 1.49	.	13	130	351	284	149	260	210	273	31	96	.	1797	
1.50 - 1.99	.	.	8	107	183	77	82	67	118	24	55	2	723	
2.00 - 2.49	.	.	.	4	54	38	33	31	46	17	28	2	253	
2.50 - 2.99	.	.	.	.	8	15	10	13	30	5	20	.	101	
3.00 - 3.49	.	.	.	.	3	5	9	13	13	8	5	.	56	
3.50 - 3.99	.	.	.	.	.	1	7	6	16	5	7	2	44	
4.00 - 4.49	.	.	.	.	.	.	1	3	8	1	4	4	21	
4.50 - 4.99	.	.	.	.	.	.	.	.	2	.	.	.	2	
5.00 - Greater	.	.	.	.	.	.	.	1	.	.	.	.	1	
Total	10	228	424	950	1142	918	2007	1603	1539	370	767	39		

**Table C4**  
**Monthly Joint Distribution of  $H_{mo}$  versus  $T_p$  (All Years)**

January 1985-1992, Gage 111  
 Percent Occurrence(X100) of Height and Period

Height(m)	Period(sec)												Total
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer	
0.00 - 0.49	.	125	10	73	42	239	395	706	384	145	218	21	2358
0.50 - 0.99	.	156	166	478	509	291	696	706	748	73	260	.	4083
1.00 - 1.49	.	10	187	582	426	135	218	228	249	21	42	.	2098
1.50 - 1.99	.	.	10	145	270	83	104	73	125	21	21	.	852
2.00 - 2.49	.	.	.	.	83	83	52	10	52	.	31	.	311
2.50 - 2.99	.	.	.	.	10	.	42	21	93	.	21	.	187
3.00 - 3.49	.	.	.	.	.	.	21	10	21	10	10	.	72
3.50 - 3.99	.	.	.	.	.	.	.	.	21	.	10	.	31
4.00 - 4.49	.	.	.	.	.	.	.	.	.	10	.	.	10
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	0	291	373	1278	1340	831	1528	1754	1693	280	613	21	0

February 1985-1992, Gage 111  
 Percent Occurrence(X100) of Height and Period

Height(m)	Period(sec)												Total
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer	
0.00 - 0.49	.	46	34	57	103	57	344	458	344	34	172	.	1649
0.50 - 0.99	.	103	298	412	561	424	825	825	745	80	195	11	4479
1.00 - 1.49	.	11	115	504	424	252	309	286	344	23	172	.	2440
1.50 - 1.99	.	.	11	160	286	92	103	57	137	.	23	.	869
2.00 - 2.49	.	.	.	11	103	46	11	23	34	.	34	.	262
2.50 - 2.99	.	.	.	.	11	11	.	34	57	.	34	.	147
3.00 - 3.49	.	.	.	.	11	.	23	46	11	11	.	.	102
3.50 - 3.99	.	.	.	.	.	.	.	11	23	11	.	.	45
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	0	160	458	1144	1499	882	1615	1740	1695	159	630	11	0

March, 1985-1992, Gage 111  
 Percent Occurrence(X100) of Height and Period

Height(m)	Period(sec)												Total
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer	
0.00 - 0.49	10	.	10	62	62	83	310	206	372	93	144	.	1352
0.50 - 0.99	.	103	114	423	413	464	918	877	877	93	227	.	4509
1.00 - 1.49	.	10	227	372	402	144	227	310	475	.	175	.	2342
1.50 - 1.99	.	.	10	103	186	124	93	93	237	21	134	.	1001
2.00 - 2.49	.	.	.	.	72	10	72	124	72	.	72	.	422
2.50 - 2.99	.	.	.	.	10	21	.	31	62	10	31	.	165
3.00 - 3.49	.	.	.	.	.	.	.	10	41	.	.	.	51
3.50 - 3.99	.	.	.	.	.	.	10	.	62	10	10	.	92
4.00 - 4.49	.	.	.	.	.	.	.	.	31	.	21	.	52
4.50 - 4.99	.	.	.	.	.	.	.	.	10	.	.	.	10
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	10	113	361	960	1145	846	1630	1651	2239	227	814	0	0

(Continued)

(Sheet 1 of 4)

**Table C4 (Continued)**

April 1985-1992, Gage 111  
Percent Occurrence(X100) of Height and Period

Height(m)	Period(sec)												Total
	2.0-	3.0-	4.0-	5.0-	6.0-	7.0-	8.0-	9.0-	10.0-	12.0-	14.0-	16.0-	
	2.9	3.9	4.9	5.9	6.9	7.9	8.9	9.9	11.9	13.9	15.9	Longer	
0.00 - 0.49	11	43	11	64	64	85	395	374	342	171	235	.	1795
0.50 - 0.99	.	150	182	385	502	459	1058	1004	865	192	524	11	5332
1.00 - 1.49	.	32	53	203	246	128	321	331	160	21	96	.	1591
1.50 - 1.99	.	.	21	96	128	75	107	75	235	21	64	.	822
2.00 - 2.49	.	.	.	11	53	.	11	64	53	.	21	.	213
2.50 - 2.99	.	.	.	.	.	.	21	21	32	32	.	.	106
3.00 - 3.49	.	.	.	.	11	11	11	11	11	11	11	.	77
3.50 - 3.99	.	.	.	.	.	.	11	11	11	11	11	.	33
4.00 - 4.49	.	.	.	.	.	.	11	11	.	.	.	.	22
4.50 - 4.99	.	.	.	.	.	.	.	.	11	.	.	.	11
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	11	225	267	759	1004	758	1946	1891	1720	448	962	11	

May 1985-1992, Gage 111  
Percent Occurrence(X100) of Height and Period

Height(m)	Period(sec)												Total
	2.0-	3.0-	4.0-	5.0-	6.0-	7.0-	8.0-	9.0-	10.0-	12.0-	14.0-	16.0-	
	2.9	3.9	4.9	5.9	6.9	7.9	8.9	9.9	11.9	13.9	15.9	Longer	
0.00 - 0.49	11	107	54	150	236	225	643	407	482	268	450	.	3033
0.50 - 0.99	.	150	300	289	461	493	1147	686	536	96	204	.	4362
1.00 - 1.49	.	32	64	161	139	171	418	204	247	11	86	.	1533
1.50 - 1.99	.	.	11	64	75	21	64	107	171	32	54	11	610
2.00 - 2.49	.	.	.	.	54	21	64	21	32	43	21	.	256
2.50 - 2.99	.	.	.	.	43	11	11	11	21	11	32	.	140
3.00 - 3.49	.	.	.	.	.	.	.	11	21	11	21	.	64
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	0
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	11	289	429	664	1008	942	2347	1447	1510	472	868	11	

June 1985-1992, Gage 111  
Percent Occurrence(X100) of Height and Period

Height(m)	Period(sec)												Total
	2.0-	3.0-	4.0-	5.0-	6.0-	7.0-	8.0-	9.0-	10.0-	12.0-	14.0-	16.0-	
	2.9	3.9	4.9	5.9	6.9	7.9	8.9	9.9	11.9	13.9	15.9	Longer	
0.00 - 0.49	22	163	43	65	293	423	1562	846	336	174	184	11	4122
0.50 - 0.99	11	108	206	325	477	369	1410	1020	282	141	206	22	4577
1.00 - 1.49	.	11	65	152	184	108	119	65	152	.	54	.	910
1.50 - 1.99	.	.	22	22	54	54	33	22	43	.	43	.	293
2.00 - 2.49	.	.	.	.	11	11	43	.	11	.	22	.	98
2.50 - 2.99	.	.	.	.	.	.	.	.	.	.	.	.	0
3.00 - 3.49	.	.	.	.	.	.	.	.	.	.	.	.	0
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	0
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	33	282	336	564	1019	965	3167	1953	824	315	509	33	

(Continued)

(Sheet 2 of 4)

**Table C4 (Continued)**

July 1985-1992, Gage 111  
Percent Occurrence(X100) of Height and Period

Height(m)	Period(sec)													Total
	2.0-	3.0-	4.0-	5.0-	6.0-	7.0-	8.0-	9.0-	10.0-	12.0-	14.0-	16.0-		
	2.9	3.9	4.9	5.9	6.9	7.9	8.9	9.9	11.9	13.9	15.9	Longer		
0.00 - 0.49	11	118	76	64	214	748	1934	940	566	267	513	21	5492	
0.50 - 0.99	.	214	342	459	363	534	1058	449	267	107	160	21	3974	
1.00 - 1.49	.	.	32	96	53	53	85	11	53	.	21	.	404	
1.50 - 1.99	.	.	.	11	11	11	21	43	32	.	.	.	129	
2.00 - 2.49	.	.	.	.	.	.	.	.	.	.	.	.	0	
2.50 - 2.99	.	.	.	.	.	.	.	.	.	.	.	.	0	
3.00 - 3.49	.	.	.	.	.	.	.	.	.	.	.	.	0	
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	0	
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0	
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0	
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0	
Total	11	332	470	630	641	1346	3098	1443	918	374	694	42		

August 1985-1992, Gage 111  
Percent Occurrence(X100) of Height and Period

Height(m)	Period(sec)													Total
	2.0-	3.0-	4.0-	5.0-	6.0-	7.0-	8.0-	9.0-	10.0-	12.0-	14.0-	16.0-		
	2.9	3.9	4.9	5.9	6.9	7.9	8.9	9.9	11.9	13.9	15.9	Longer		
0.00 - 0.49	22	66	33	77	186	340	921	691	647	197	197	11	3388	
0.50 - 0.99	.	164	208	570	669	461	965	669	537	175	395	77	4890	
1.00 - 1.49	.	.	164	263	154	132	307	110	99	22	44	.	1295	
1.50 - 1.99	.	.	.	88	66	33	.	22	33	55	11	.	308	
2.00 - 2.49	.	.	.	.	11	11	.	22	44	11	.	.	99	
2.50 - 2.99	.	.	.	.	.	.	11	.	.	.	.	.	11	
3.00 - 3.49	.	.	.	.	11	.	.	.	.	.	.	.	11	
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	0	
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0	
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0	
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0	
Total	22	230	405	998	1097	977	2204	1514	1360	460	647	88		

September 1985-1992, Gage 111  
Percent Occurrence(X100) of Height and Period

Height(m)	Period(sec)													Total
	2.0-	3.0-	4.0-	5.0-	6.0-	7.0-	8.0-	9.0-	10.0-	12.0-	14.0-	16.0-		
	2.9	3.9	4.9	5.9	6.9	7.9	8.9	9.9	11.9	13.9	15.9	Longer		
0.00 - 0.49	.	33	11	11	33	111	323	267	445	56	222	.	1512	
0.50 - 0.99	.	133	245	367	489	434	1123	990	823	156	300	.	5060	
1.00 - 1.49	.	11	100	378	189	200	423	311	300	78	100	.	2090	
1.50 - 1.99	.	.	.	111	189	167	178	44	56	33	67	11	856	
2.00 - 2.49	.	.	.	.	56	89	22	11	.	67	56	22	323	
2.50 - 2.99	.	.	.	.	.	67	11	.	11	.	11	.	100	
3.00 - 3.49	.	.	.	.	.	.	11	.	.	.	.	.	11	
3.50 - 3.99	.	.	.	.	.	.	.	11	33	.	.	.	44	
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0	
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0	
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0	
Total	0	177	356	867	956	1068	2091	1634	1668	390	756	33		

(Continued)

(Sheet 3 of 4)



**Table C4 (Concluded)**

October 1985-1992, Gage 111  
Percent Occurrence(X100) of Height and Period

Height(m)	Period(sec)												Total
	2.0-	3.0-	4.0-	5.0-	6.0-	7.0-	8.0-	9.0-	10.0-	12.0-	14.0-	16.0-	
	2.9	3.9	4.9	5.9	6.9	7.9	8.9	9.9	11.9	13.9	15.9	Longer	
0.00 - 0.49	.	.	42	21	42	116	284	200	263	95	189	21	1273
0.50 - 0.99	.	116	273	284	473	294	851	777	819	158	420	11	4476
1.00 - 1.49	.	11	242	452	242	105	242	284	536	53	126	.	2293
1.50 - 1.99	.	.	11	200	284	63	147	116	189	53	84	.	1147
2.00 - 2.49	.	.	.	11	42	53	21	42	126	21	32	.	348
2.50 - 2.99	.	.	.	.	11	21	11	21	53	.	42	.	159
3.00 - 3.49	.	.	.	.	.	21	42	21	21	11	21	.	137
3.50 - 3.99	.	.	.	.	.	.	42	11	32	21	11	11	128
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	42	42
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	11	.	.	.	.	11
Total	0	127	568	968	1094	673	1640	1483	2039	412	925	85	

November 1985-1992, Gage 111  
Percent Occurrence(X100) of Height and Period

Height(m)	Period(sec)												Total
	2.0-	3.0-	4.0-	5.0-	6.0-	7.0-	8.0-	9.0-	10.0-	12.0-	14.0-	16.0-	
	2.9	3.9	4.9	5.9	6.9	7.9	8.9	9.9	11.9	13.9	15.9	Longer	
0.00 - 0.49	.	43	32	86	43	172	516	322	279	118	193	64	1868
0.50 - 0.99	11	150	344	494	505	376	773	666	494	183	290	.	4286
1.00 - 1.49	.	11	183	516	462	226	333	140	354	86	129	.	2440
1.50 - 1.99	.	.	.	150	290	107	64	107	86	11	32	.	847
2.00 - 2.49	.	.	.	21	43	97	97	32	54	.	21	.	365
2.50 - 2.99	.	.	.	.	.	32	11	11	.	.	11	.	65
3.00 - 3.49	.	.	.	.	.	11	.	.	21	11	.	.	21
3.50 - 3.99	.	.	.	.	.	.	.	21	.	.	.	.	75
4.00 - 4.49	.	.	.	.	.	.	.	11	21	.	.	.	32
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	11	204	559	1267	1343	1021	1794	1342	1309	409	676	64	

December 1985-1992, Gage 111  
Percent Occurrence(X100) of Height and Period

Height(m)	Period(sec)												Total
	2.0-	3.0-	4.0-	5.0-	6.0-	7.0-	8.0-	9.0-	10.0-	12.0-	14.0-	16.0-	
	2.9	3.9	4.9	5.9	6.9	7.9	8.9	9.9	11.9	13.9	15.9	Longer	
0.00 - 0.49	.	.	.	.	.	.	.	.	.	.	.	.	2308
0.50 - 0.99	11	146	327	552	439	259	439	597	608	90	315	45	3828
1.00 - 1.49	.	23	124	541	495	146	124	236	293	68	113	.	2163
1.50 - 1.99	.	.	.	135	360	101	68	34	56	45	124	.	923
2.00 - 2.49	.	.	.	.	124	34	.	23	68	68	23	.	340
2.50 - 2.99	.	.	.	.	11	23	.	11	23	11	56	.	135
3.00 - 3.49	.	.	.	.	.	23	.	11	11	34	.	.	79
3.50 - 3.99	.	.	.	.	.	11	23	23	11	23	45	11	147
4.00 - 4.49	.	.	.	.	.	.	.	11	45	.	23	.	79
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	11	315	519	1329	1587	721	1014	1374	1453	519	1104	56	

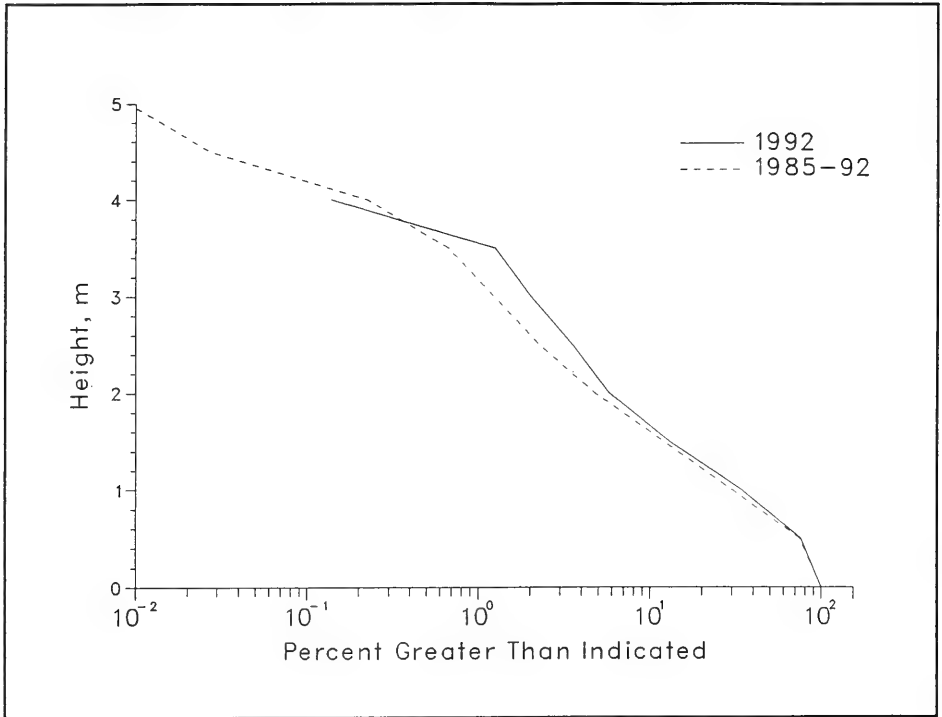


Figure C2. Annual cumulative wave height distributions for Gage 111

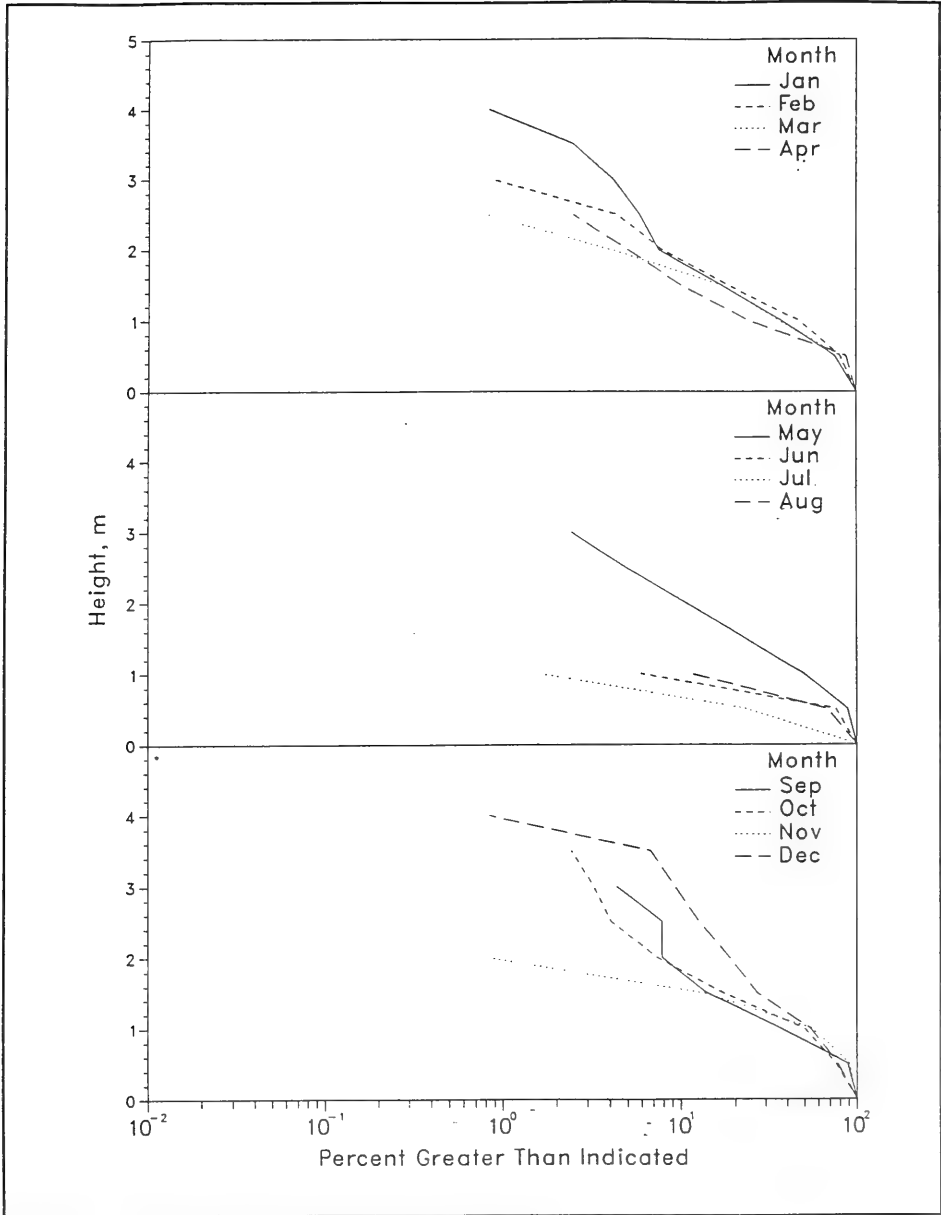


Figure C3. 1992 monthly wave height distributions for Gage 111

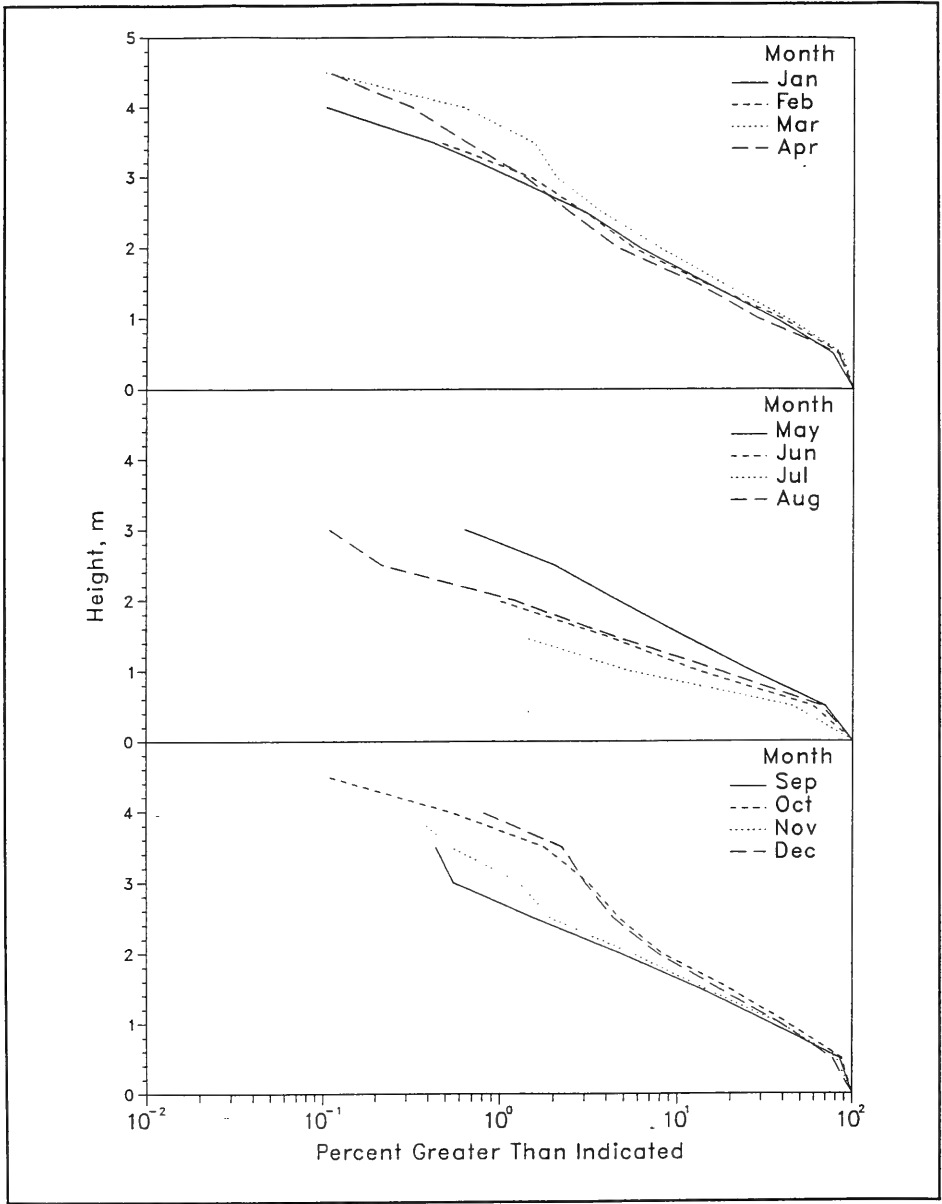


Figure C4. 1985-1992 monthly wave height distributions for Gage 111

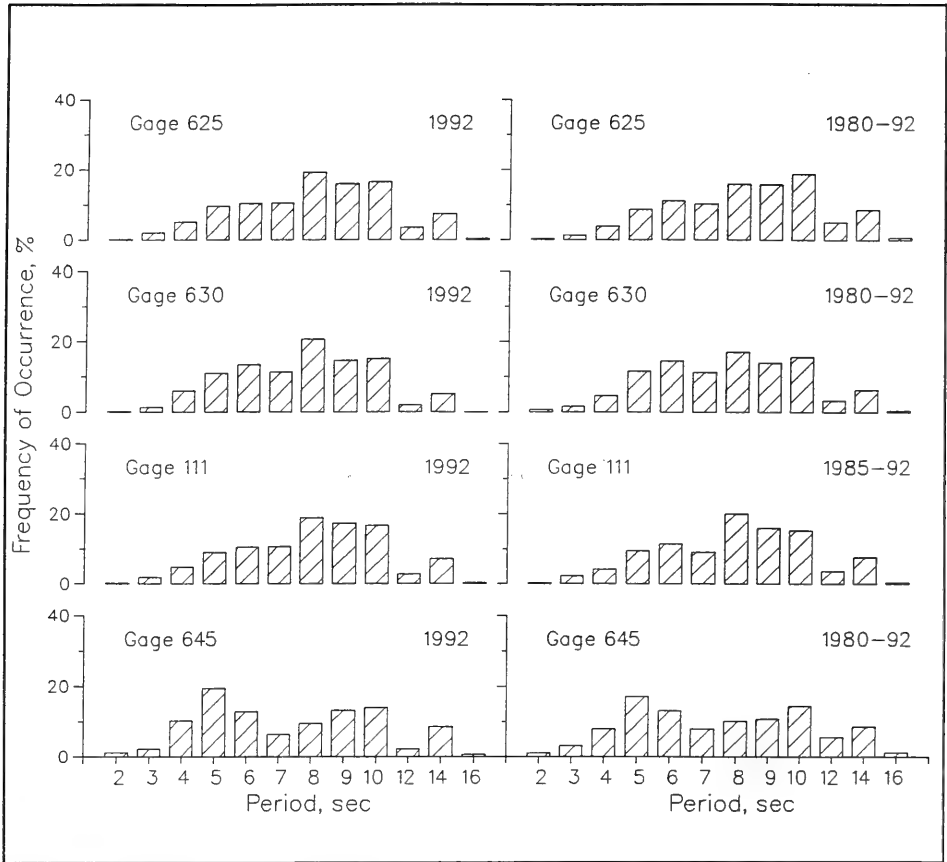


Figure C5. Annual wave period distributions for all gages

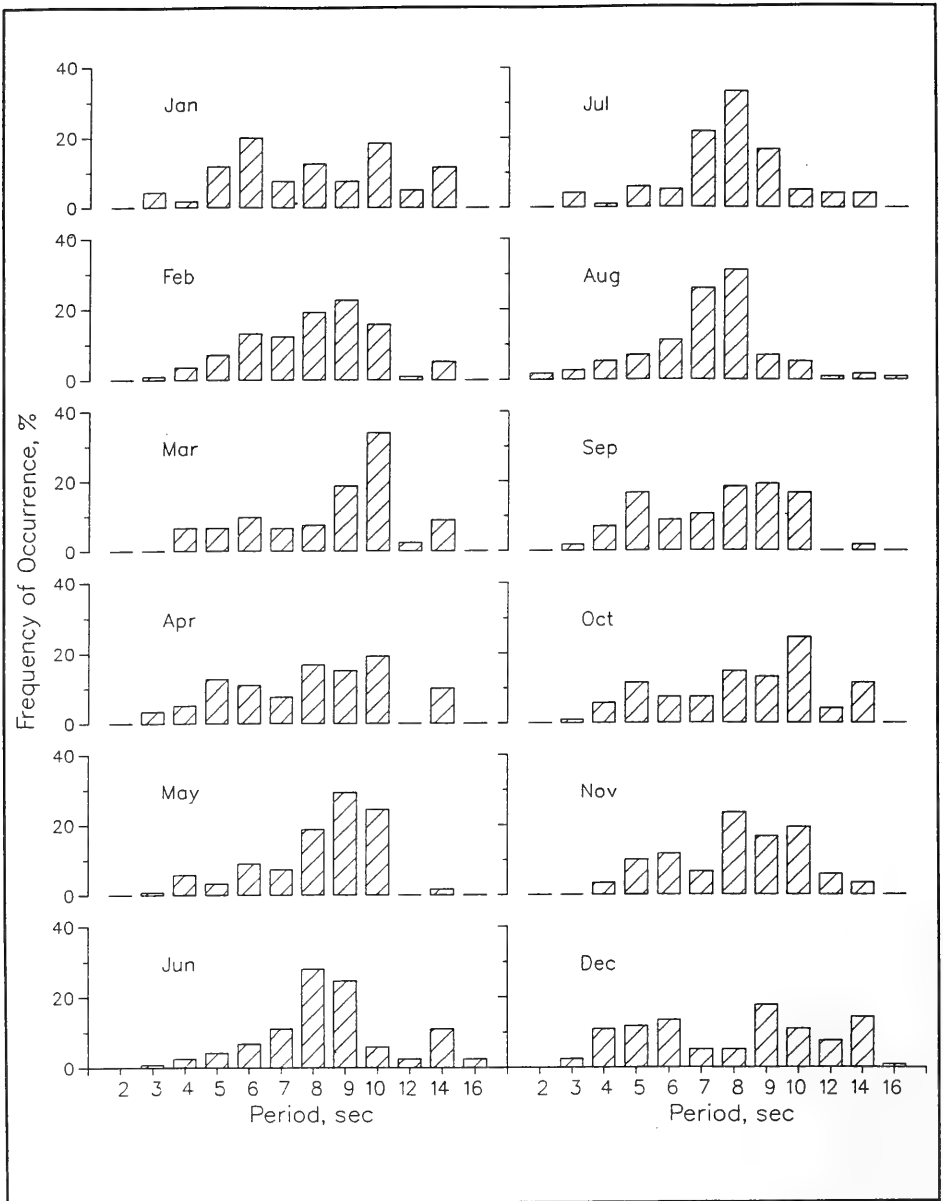


Figure C6. 1992 monthly wave period distributions for Gage 111

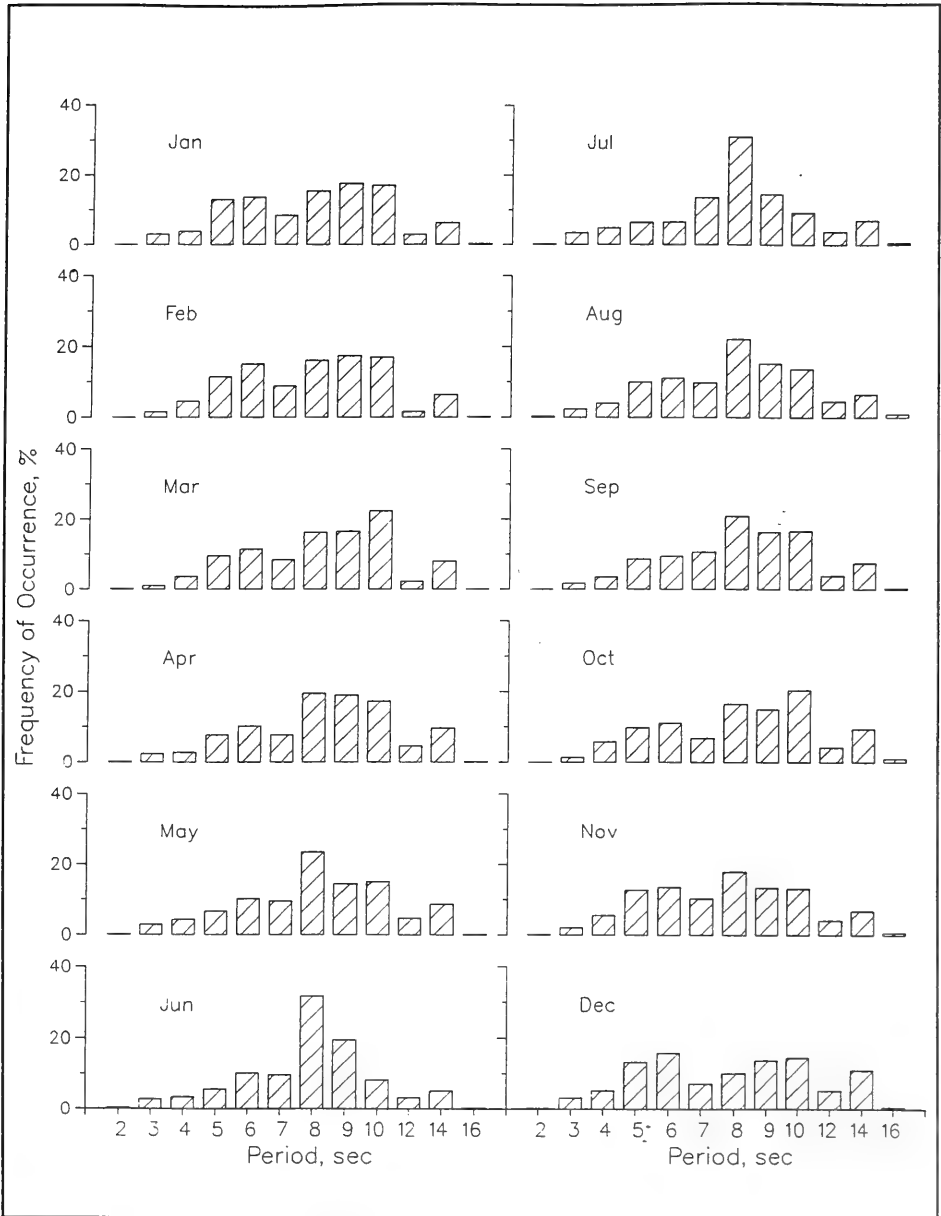


Figure C7. 1985-1992 monthly wave period distributions for Gage 111

**Table C5**  
**1992 persistence of  $H_{mo}$  for Gage 111**

Height (m)	Consecutive Day(s) or Longer																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19+
0.5	29	26	23	22	18		16			15		12	11	9			7		6
1.0	53	35	25	20	13	9	7		3	2	1								
1.5	33	20	12	6				1											
2.0	14	8	6				1												
2.5	10	6	3	1															
3.0	7	3	1																
3.5	5	3	1																
4.0	2																		

**Table C6**  
**1985 through 1992 persistence of  $H_{mo}$  for Gage 111**

Height (m)	Consecutive Day(s) or Longer																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19+
0.5	29	26	23	22	19	18	16	14	13	12	11	10	8	7		6		5	
1.0	49	34	22	15	11	7	6	4	3	2		1							
1.5	35	19	8	4	2		1												
2.0	16	8	3		1														
2.5	8	4	2		1														
3.0	5	2	1																
3.5	3	2	1																
4.0	2	1																	

\* Data from Gage 640 from 1985 and 1986 as well as data from Gage 141 for 1987 were used for comparison with Gage 111.



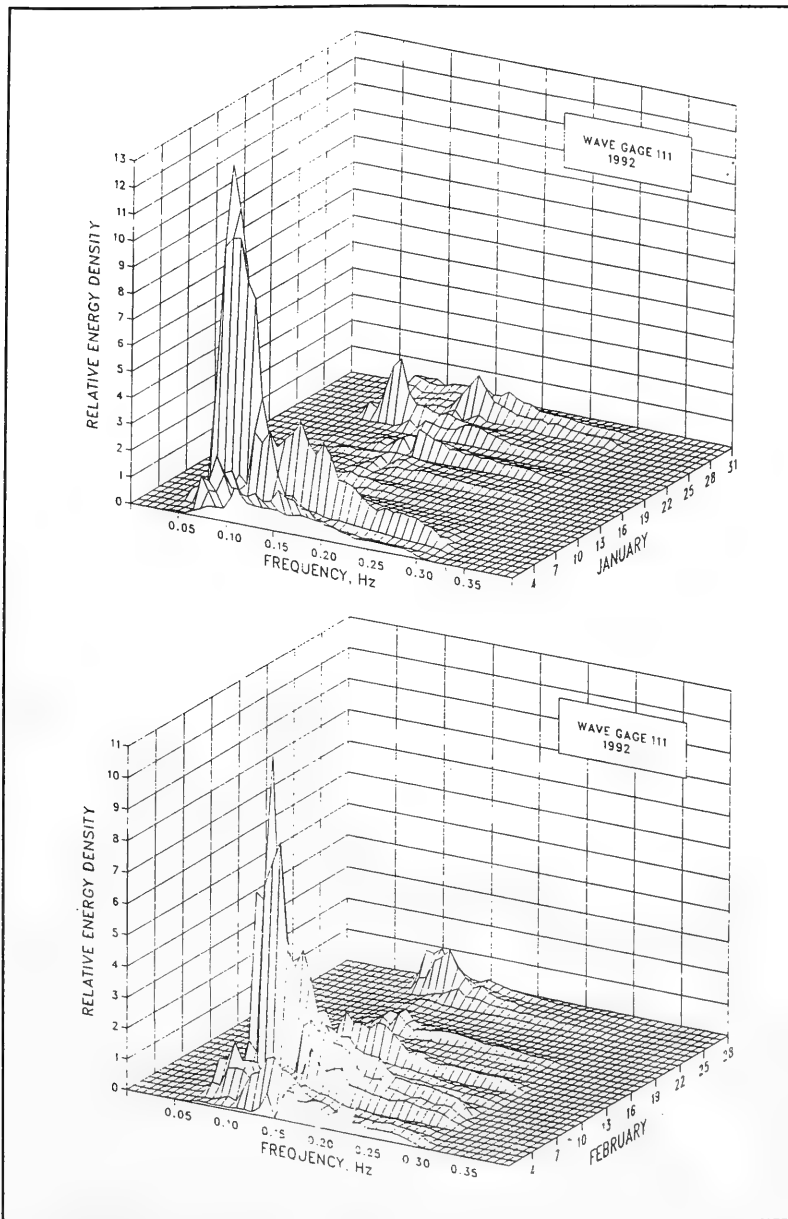


Figure C8. 1992 monthly spectra for Gage 111 (Sheet 1 of 6)

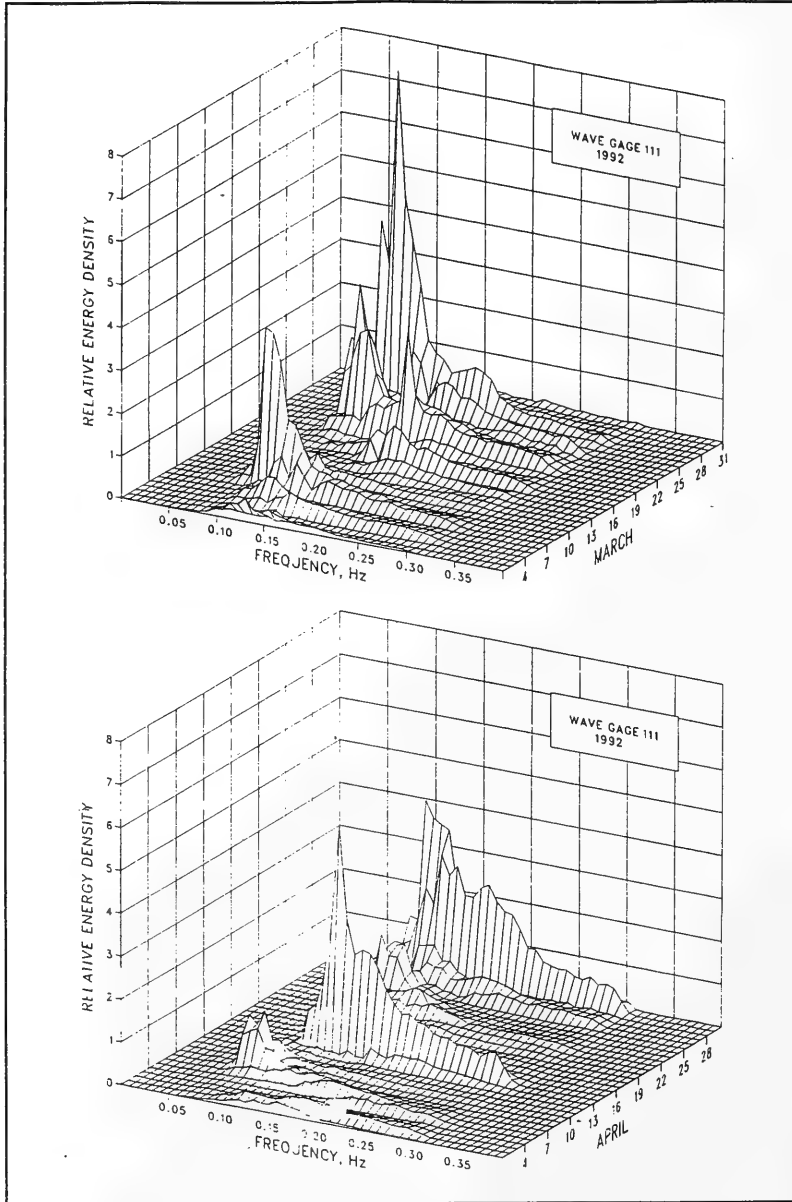


Figure C8. (Sheet 2 of 6)

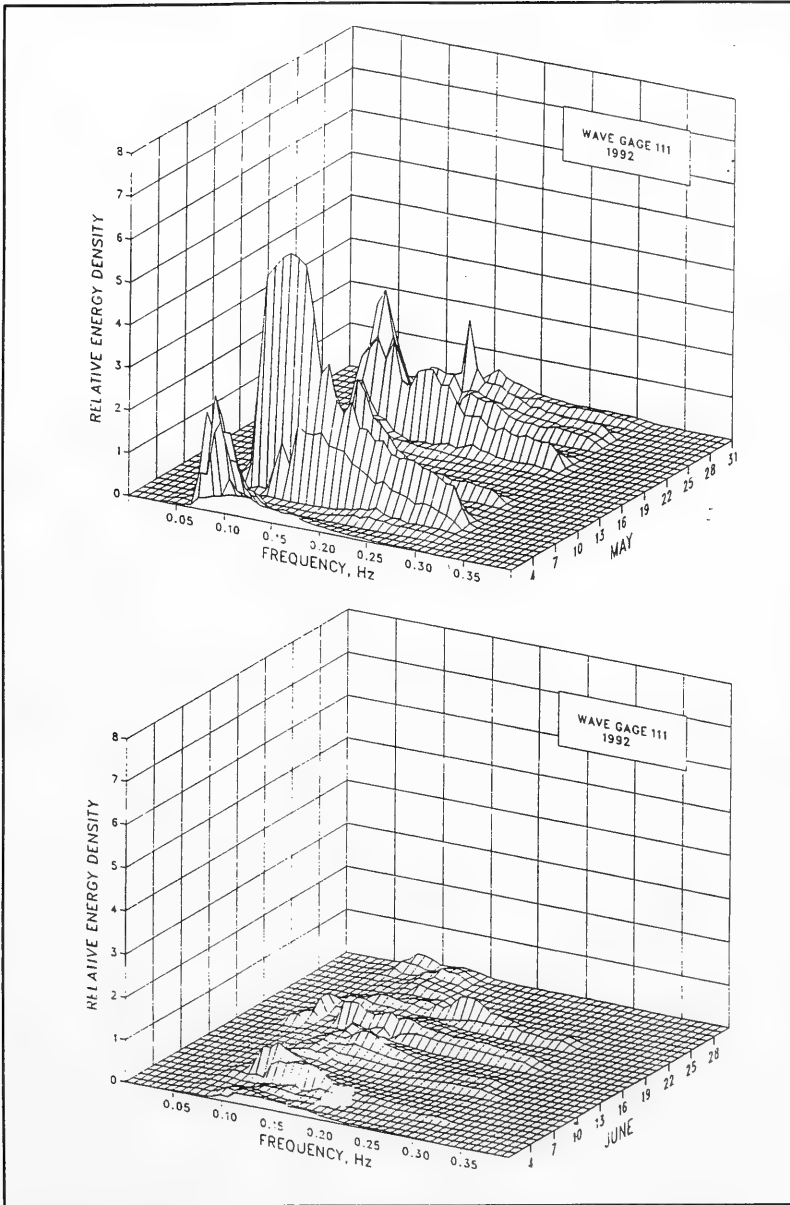


Figure C8. (Sheet 3 of 6)

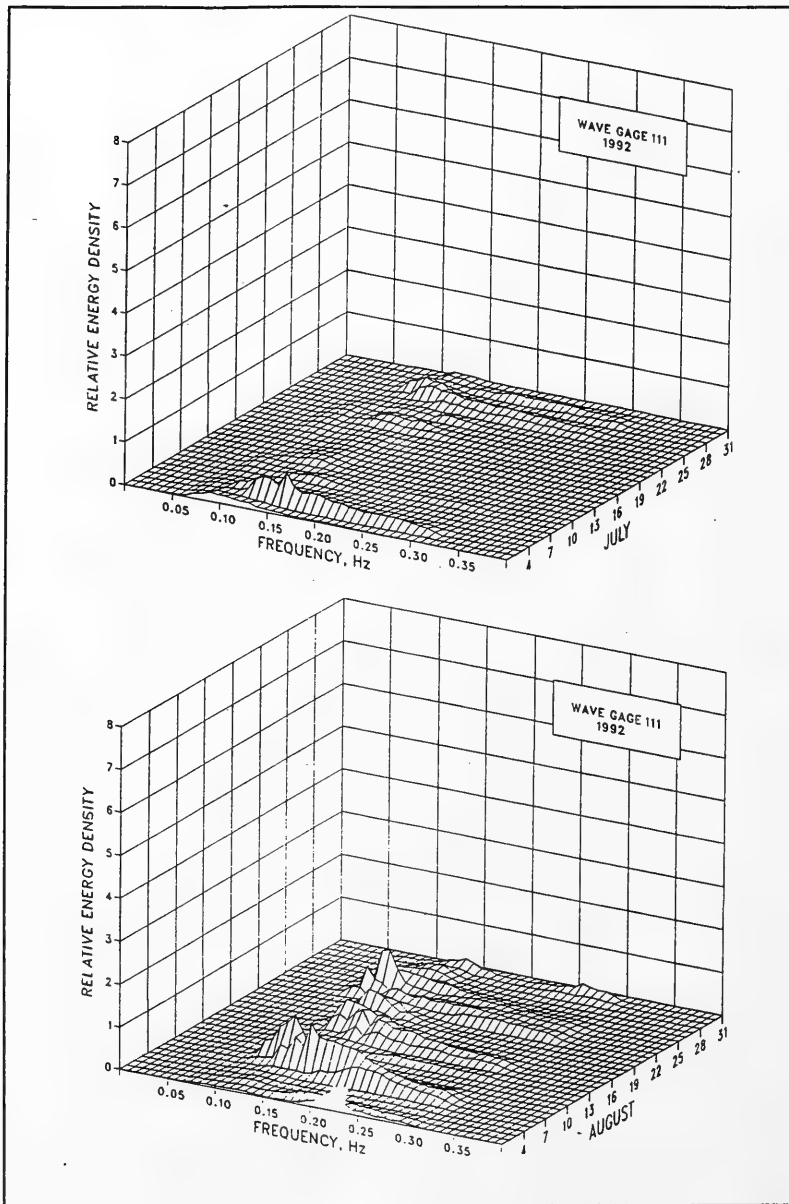


Figure C8. (Sheet 4 of 6)

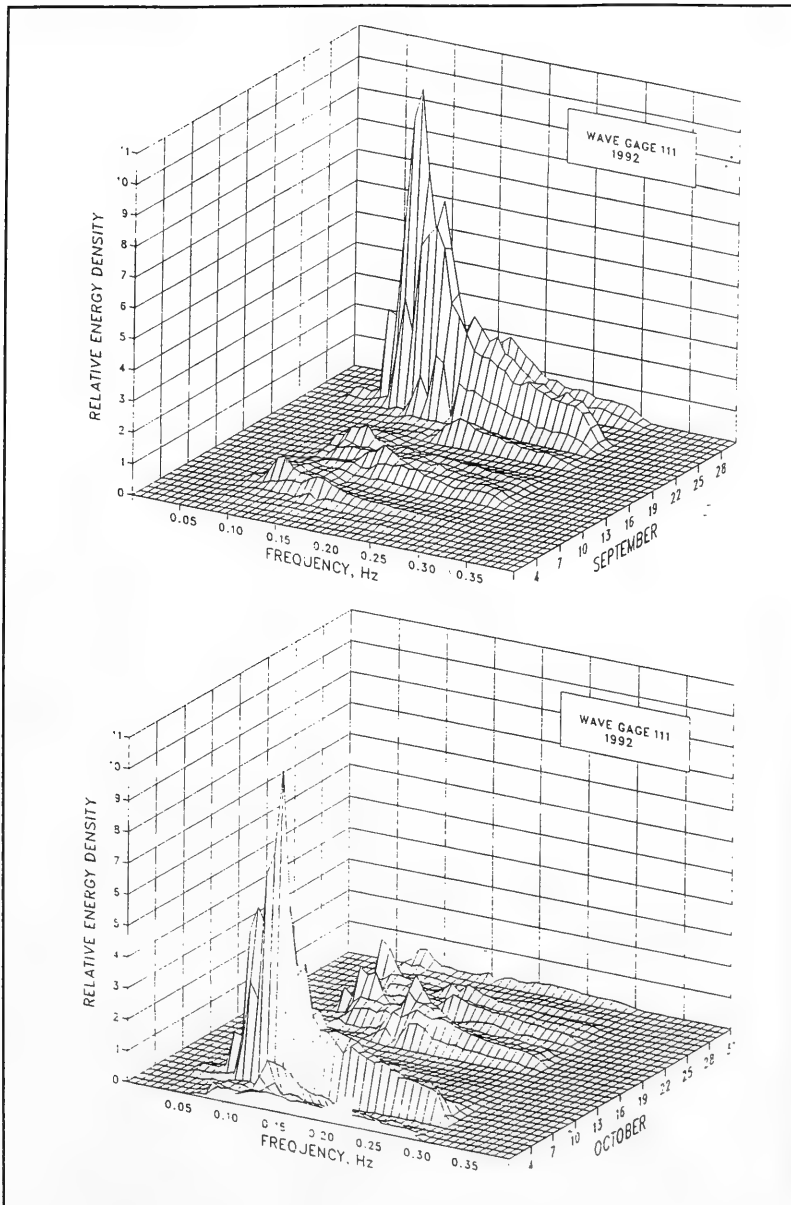


Figure C8. (Sheet 5 of 6)

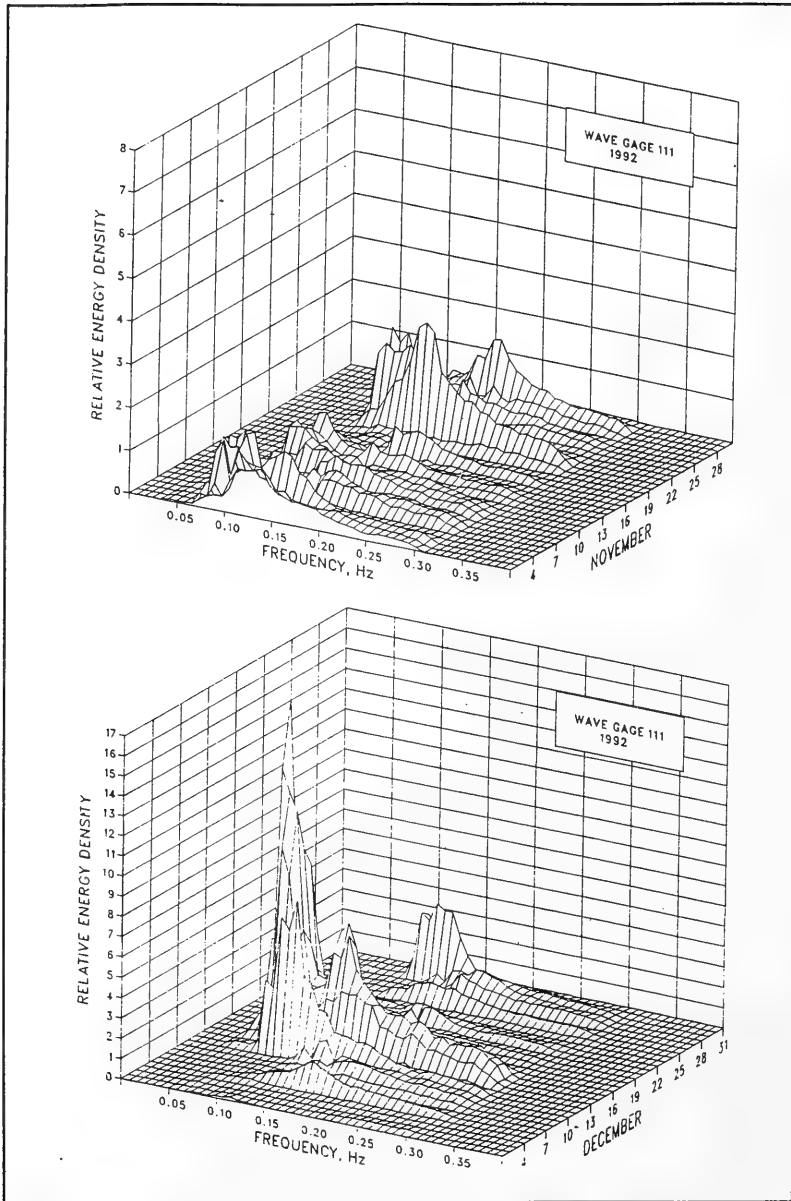


Figure C8. (Sheet 6 of 6)

**Table C7**  
**Wave statistics for Gage 111**

Month	1992							1985-1992						
	Height			Date	Period			Height			Date	Period		
	Mean	Std. Dev.	Extreme		Mean	Std. Dev.	Number	Mean	Std. Dev.	Extreme		Mean	Std. Dev.	Number
m	m	m	sec	sec	Obs.	m	m	m	sec	sec	Obs.			
Jan	1.1	0.8	4.0	4	8.7	3.0	120	1.0	0.7	4.0	1992	8.5	2.7	963
Feb	1.1	0.7	3.2	7	8.6	2.1	115	1.0	0.6	4.0	1989	8.5	2.5	873
Mar	1.0	0.6	2.7	26	9.3	2.5	124	1.1	0.7	4.5	1987	8.9	2.4	969
Apr	0.9	0.6	2.8	29	8.5	2.5	120	1.0	0.6	4.8	1988	9.1	2.6	936
May	1.2	0.7	3.3	7	8.8	2.0	123	0.9	0.6	3.3	1986	8.9	2.7	933
Jun	0.7	0.2	1.3	17	9.4	3.0	118	0.7	0.4	2.4	1986	8.6	2.4	922
Jul	0.5	0.2	1.3	3	8.4	2.2	121	0.6	0.3	1.9	1986	8.6	2.6	936
Aug	0.7	0.3	1.4	6	7.8	2.3	116	0.8	0.4	3.4	1991	8.7	2.7	912
Sep	1.1	0.8	4.0	25	8.0	2.2	115	1.0	0.6	4.0	1992	8.9	2.6	899
Oct	1.1	0.7	3.8	5	9.2	2.8	123	1.1	0.7	5.0	1991	9.0	2.8	952
Nov	1.1	0.4	2.3	20	8.9	2.5	120	1.0	0.6	4.2	1991	8.5	2.8	931
Dec	1.4	1.0	4.0	14	9.0	3.5	119	1.1	0.8	4.5	1989	8.8	3.2	888
Annual	1.0	0.7	4.0	Jan	8.7	2.6	1434	0.9	0.6	5.0	Oct 1991	8.7	2.7	11114

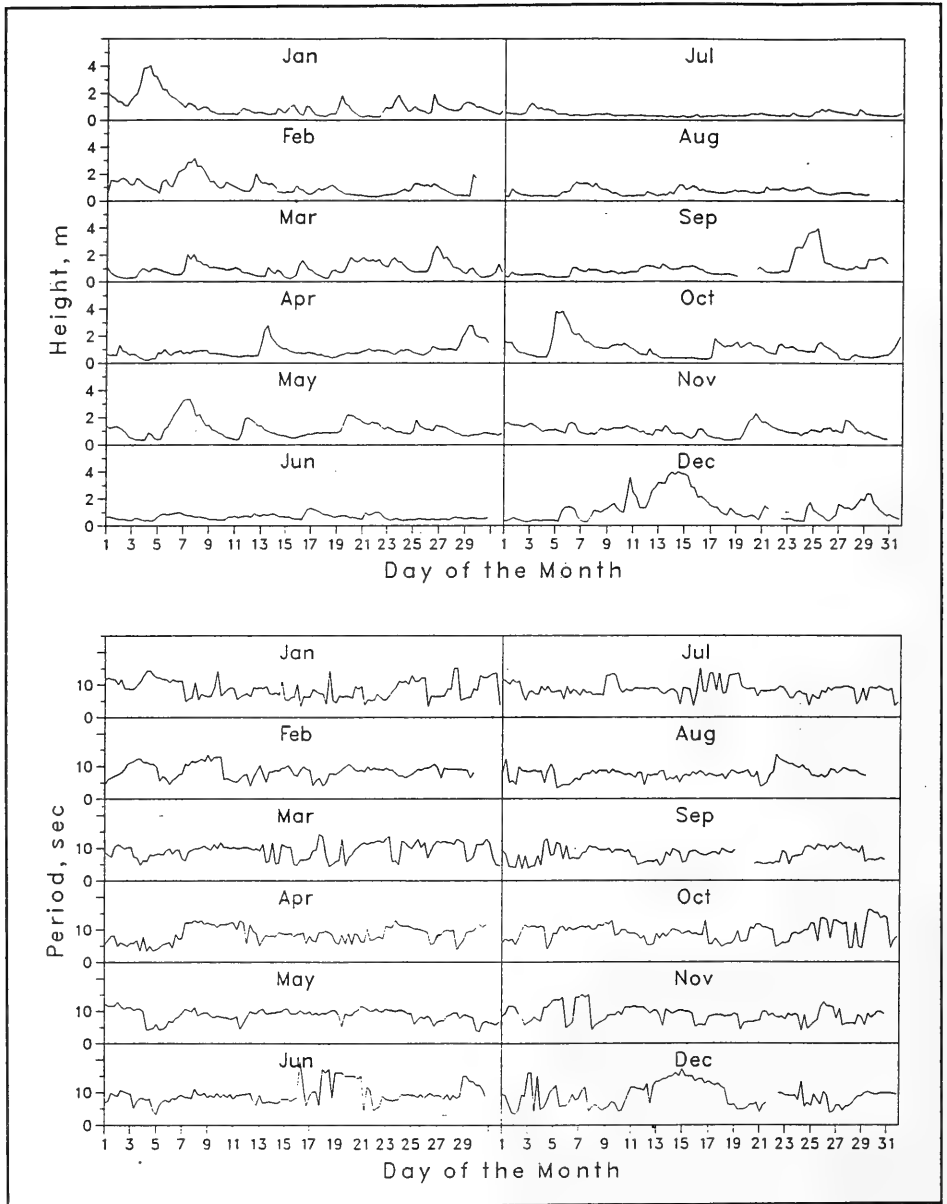


Figure C9. Time-histories of wave height and period for Gage 111



# Appendix D

## Wave Data for Gage 625

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Wave data summaries for Gage 625 for 1992 and for 1980 through 1992 are presented in the following pages:

### Daily $H_{mo}$ and $T_p$

Figure D1 displays the individual wave height  $H_{mo}$  and peak spectral wave period  $T_p$  values, along with the monthly mean values.

### Joint Distributions of $H_{mo}$ and $T_p$

Annual and monthly joint distribution tables are presented in Tables D1 and D2, and data for 1980 through 1992 are in Tables D3 and D4. Each table gives the frequency (in parts per 10,000) for which the wave height and peak period were within the specified intervals; these values can be converted to percentages by dividing by 100. Marginal totals are also included. The row total gives the number of observations out of 10,000 that fell within each specified peak period interval. The column total gives the number of observations out of 10,000 that fell within each specified wave height interval.

### Cumulative Distributions of Wave Height

Annual and monthly wave height distributions for 1992 are plotted in cumulative form in Figures D2 and D3. Data for 1980 through 1992 are plotted in Figure D4.

### Peak Spectral Wave Period Distributions

Annual and monthly peak wave period  $T_p$  distribution histograms for 1992 are presented in Figures D5 and D6. Data for 1980 through 1992 are presented in Figure D7.

## Persistence of Wave Heights

Table D5 shows the number of times in 1992 when the specified wave height was equaled or exceeded at least once during each day for the duration (consecutive days). Data for 1980 through 1992 are averaged and given in Table D6. An example is shown below:

Height m	Consecutive Day(s) or Longer																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19+
0.5	18	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1			
1.0	50	34	24	21	18	14	12	8	7	3			2						
1.5	41	19	8	6	2	1													
2.0	22	9	5	1															
2.5	10	5	2																
3.0	6	1																	
3.5		1																	
4.0	1																		

This example indicates that wave heights equaled or exceeded 1.0 m 50 times for at least 1 day; 34 times for at least 2 days; 24 times for at least 3 days, etc. Therefore, on 16 occasions the height equaled or exceeded 1.0 m for 1 day exactly ( $50 - 34 = 16$ ); on 10 occasions for 2 days; on 3 occasions for 3 days, etc. Note that the height exceeded 1 m 50 times for 1 day or longer, while heights exceeded 0.5 m only 18 times for this same duration. This change in durations occurred because the longer durations of lower waves may be interspersed with shorter, but more frequent, intervals of higher waves. For example, one of the times that the wave heights exceeded 0.5 m for 16 days may have represented three times the height exceeded 1 m for shorter durations.

## Spectra

Monthly spectra for the offshore staff gage (Gage 625) are presented in Figure D8. The plots show "relative" energy density as a function of wave frequency. These figures summarize the large number of spectra for each month. The figures emphasize the higher energy density associated with storms, as well as the general shifts in energy density to different frequencies. As used here, "relative" indicates the spectra have been smoothed by the three-dimensional surface drawing routine. Consequently, extremely high- and low-energy density values are modified to produce a smooth surface. The figures are not intended for quantitative measurements; however, they do provide the energy density as a function of frequency relative to the other spectra for the month.

Monthly and annual wave statistics for Gage 625 for 1992 and for 1980 through 1992 are presented in Table D7.

Figure D9 plots monthly time histories of wave height and period.

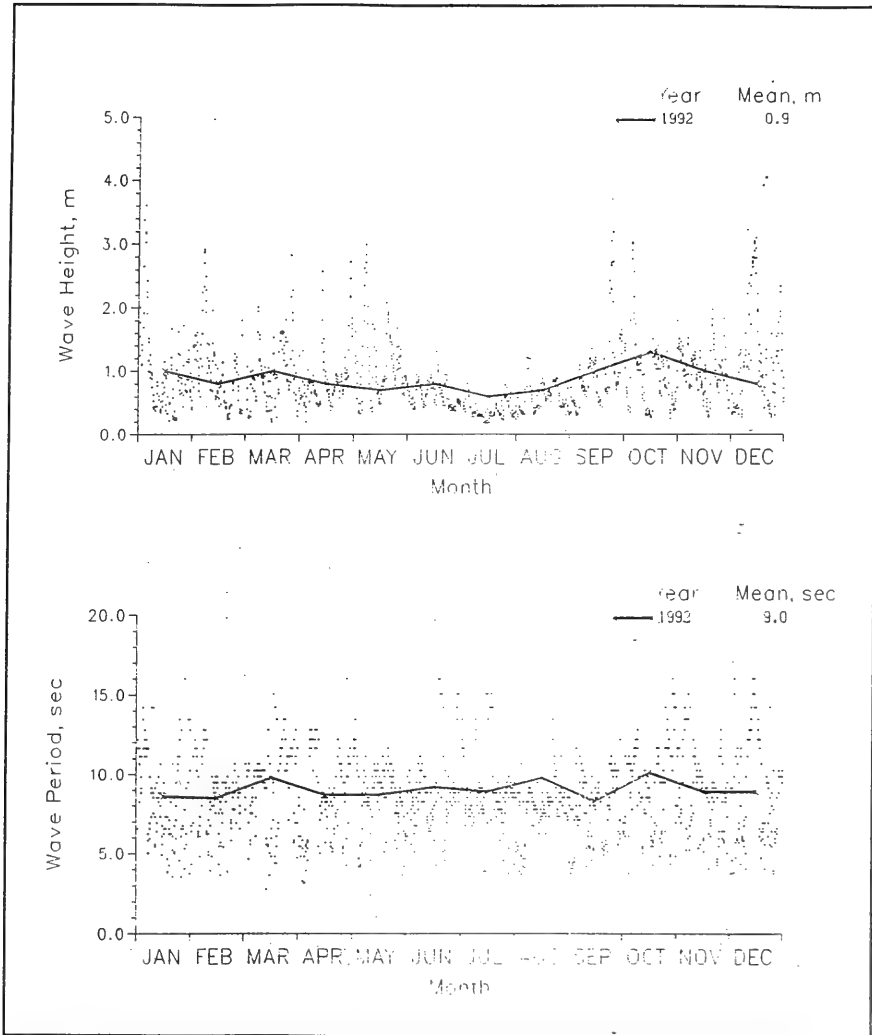


Figure D1. 1992 daily wave height and period values with monthly means for Gage 625

**Table D1**  
**Annual Joint Distribution of  $H_{mo}$  versus  $T_p$**

Height(m)	Annual 1992, Gage 625 Percent Occurrence(X100) of Height and Period													Total
	Period(sec)													
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer		
0.00 - 0.49	7	90	76	62	104	381	707	499	326	104	187	7	2550	
0.50 - 0.99	7	111	284	479	409	402	777	818	624	111	243	21	4286	
1.00 - 1.49	.	7	146	340	361	166	257	173	361	42	173	.	2026	
1.50 - 1.99	.	.	.	69	139	49	97	49	166	35	28	.	632	
2.00 - 2.49	.	.	.	.	14	42	28	28	69	7	35	.	223	
2.50 - 2.99	.	.	.	.	.	7	42	14	62	28	42	.	195	
3.00 - 3.49	.	.	.	.	.	.	7	7	35	14	21	.	84	
3.50 - 3.99	.	.	.	.	.	.	.	.	.	7	.	.	7	
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0	
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0	
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0	
Total	14	208	506	950	1027	1047	1915	1588	1643	348	729	28		

**Table D2**  
**Monthly Joint Distribution of  $H_{mo}$  versus  $T_p$**

January 1992, Gage 625  
 Percent Occurrence(X100) of Height and Period

Height(m)	Period(sec)												Total
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer	
0.00 - 0.49	.	167	.	167	167	333	667	333	83	250	167	.	2334
0.50 - 0.99	.	250	333	417	1083	333	583	333	583	167	167	.	4249
1.00 - 1.49	.	.	83	417	333	83	250	.	500	.	167	.	1833
1.50 - 1.99	.	.	.	.	250	.	83	167	250	.	.	.	750
2.00 - 2.49	.	.	.	.	.	.	.	.	167	.	167	.	334
2.50 - 2.99	.	.	.	.	.	.	.	83	.	.	.	.	83
3.00 - 3.49	.	.	.	.	.	.	.	.	167	167	.	.	334
3.50 - 3.99	.	.	.	.	.	.	.	.	.	83	.	.	83
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	0	417	416	1001	1833	749	1583	916	1750	667	668	0	

February 1992, Gage 625  
 Percent Occurrence(X100) of Height and Period

Height(m)	Period(sec)												Total
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer	
0.00 - 0.49	.	87	.	.	.	87	783	957	.	.	.	.	1914
0.50 - 0.99	.	87	261	261	522	261	1130	348	.	174	.	.	3566
1.00 - 1.49	.	87	174	87	783	174	783	174	348	.	435	.	3045
1.50 - 1.99	.	.	.	.	435	87	87	.	.	.	174	.	783
2.00 - 2.49	.	.	.	.	.	87	87	.	87	.	174	.	435
2.50 - 2.99	.	.	.	.	.	.	.	.	261	.	.	.	261
3.00 - 3.49	.	.	.	.	.	.	.	.	.	.	.	.	0
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	0
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	0	261	435	348	1740	957	2001	2261	1044	0	957	0	

March 1992, Gage 625  
 Percent Occurrence(X100) of Height and Period

Height(m)	Period(sec)												Total
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer	
0.00 - 0.49	.	81	.	.	81	.	.	403	968	161	161	.	1855
0.50 - 0.99	81	.	323	806	323	403	323	726	1371	81	161	.	4598
1.00 - 1.49	.	.	242	81	161	81	81	161	806	81	323	.	2017
1.50 - 1.99	.	.	.	.	161	.	81	81	726	161	.	.	1210
2.00 - 2.49	.	.	.	.	.	81	.	81	81	.	.	.	243
2.50 - 2.99	.	.	.	.	.	.	.	.	81	.	.	.	81
3.00 - 3.49	.	.	.	.	.	.	.	.	.	.	.	.	0
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	0
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	81	81	565	887	726	565	485	1452	4033	484	645	0	

(Continued)

(Sheet 1 of 4)

**Table D2 (Continued)**

April 1992, Gage 625  
Percent Occurrence(X100) of Height and Period

Height(m)	Period(sec)											Total	
	2.0-	3.0-	4.0-	5.0-	6.0-	7.0-	8.0-	9.0-	10.0-	12.0-	14.0-		16.0-
	2.9	3.9	4.9	5.9	6.9	7.9	8.9	9.9	11.9	13.9	15.9		Longer
0.00 - 0.49	.	167	83	.	.	83	167	333	167	.	250	.	1250
0.50 - 0.99	.	167	167	1500	500	500	1250	667	917	.	1167	.	6835
1.00 - 1.49	.	.	167	333	.	83	250	.	.	.	.	.	833
1.50 - 1.99	.	.	.	83	.	167	.	.	333	.	.	.	583
2.00 - 2.49	.	.	.	.	83	83	.	83	83	.	.	.	332
2.50 - 2.99	.	.	.	.	.	.	83	.	83	.	.	.	166
3.00 - 3.49	.	.	.	.	.	.	.	.	.	.	.	.	0
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	0
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	0	334	417	1916	583	749	1917	1083	1583	0	1417	0	

May 1992, Gage 625  
Percent Occurrence(X100) of Height and Period

Height(m)	Period(sec)											Total	
	2.0-	3.0-	4.0-	5.0-	6.0-	7.0-	8.0-	9.0-	10.0-	12.0-	14.0-		16.0-
	2.9	3.9	4.9	5.9	6.9	7.9	8.9	9.9	11.9	13.9	15.9		Longer
0.00 - 0.49	.	.	81	81	.	163	163	81	325	.	.	.	975
0.50 - 0.99	81	81	407	81	407	81	894	1382	894	.	81	.	4308
1.00 - 1.49	.	.	81	163	163	325	488	569	650	81	81	.	2601
1.50 - 1.99	.	.	.	325	81	81	244	163	407	.	.	.	1301
2.00 - 2.49	.	.	.	.	81	.	163	81	81	.	.	.	406
2.50 - 2.99	.	.	.	.	.	.	163	81	163	.	.	.	407
3.00 - 3.49	.	.	.	.	.	.	.	.	.	.	.	.	0
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	0
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	81	81	569	650	732	650	2115	2357	2520	81	162	0	

June 1992, Gage 625  
Percent Occurrence(X100) of Height and Period

Height(m)	Period(sec)											Total	
	2.0-	3.0-	4.0-	5.0-	6.0-	7.0-	8.0-	9.0-	10.0-	12.0-	14.0-		16.0-
	2.9	3.9	4.9	5.9	6.9	7.9	8.9	9.9	11.9	13.9	15.9		Longer
0.00 - 0.49	.	.	.	.	.	339	1102	1017	169	85	339	.	3051
0.50 - 0.99	.	.	169	424	932	847	1441	1186	508	169	678	254	6608
1.00 - 1.49	.	.	85	85	.	85	85	.	.	.	.	.	340
1.50 - 1.99	.	.	.	.	.	.	.	.	.	.	.	.	0
2.00 - 2.49	.	.	.	.	.	.	.	.	.	.	.	.	0
2.50 - 2.99	.	.	.	.	.	.	.	.	.	.	.	.	0
3.00 - 3.49	.	.	.	.	.	.	.	.	.	.	.	.	0
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	0
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	0	0	254	509	932	1271	2628	2203	677	254	1017	254	

(Continued)

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**Table D2 (Continued)**

July 1992, Gage 625														Total
Percent Occurrence(X100) of Height and Period														
Height(m)	Period(sec)													
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer		
0.00 - 0.49	.	248	83	83	496	1818	2479	1322	248	661	661	.	.	8099
0.50 - 0.99	.	83	83	248	248	165	661	165	83	83	.	.	.	1819
1.00 - 1.49	.	.	.	.	.	83	.	.	.	.	.	.	.	83
1.50 - 1.99	.	.	.	.	.	.	.	.	.	.	.	.	.	0
2.00 - 2.49	.	.	.	.	.	.	.	.	.	.	.	.	.	0
2.50 - 2.99	.	.	.	.	.	.	.	.	.	.	.	.	.	0
3.00 - 3.49	.	.	.	.	.	.	.	.	.	.	.	.	.	0
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	.	0
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	0	331	166	331	744	2066	3140	1487	331	744	661	0		0

August 1992, Gage 625														Total
Percent Occurrence(X100) of Height and Period														
Height(m)	Period(sec)													
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer		
0.00 - 0.49	.	161	161	161	242	1048	1774	161	242	.	.	.	.	3950
0.50 - 0.99	.	81	403	323	242	1290	1452	806	403	81	81	.	.	5162
1.00 - 1.49	.	.	242	161	81	242	161	.	.	.	.	.	.	887
1.50 - 1.99	.	.	.	.	.	.	.	.	.	.	.	.	.	0
2.00 - 2.49	.	.	.	.	.	.	.	.	.	.	.	.	.	0
2.50 - 2.99	.	.	.	.	.	.	.	.	.	.	.	.	.	0
3.00 - 3.49	.	.	.	.	.	.	.	.	.	.	.	.	.	0
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	.	0
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	0	242	806	645	565	2580	3387	967	645	81	81	0		0

September 1992, Gage 625														Total
Percent Occurrence(X100) of Height and Period														
Height(m)	Period(sec)													
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer		
0.00 - 0.49	.	87	348	.	.	261	435	.	174	.	.	.	.	1305
0.50 - 0.99	.	174	522	609	87	435	1130	1304	957	.	.	.	.	5218
1.00 - 1.49	.	.	174	783	435	261	261	87	174	.	87	.	.	2262
1.50 - 1.99	.	.	.	174	261	.	.	.	.	.	.	.	.	435
2.00 - 2.49	.	.	.	.	.	174	87	.	87	.	.	.	.	348
2.50 - 2.99	.	.	.	.	.	.	174	.	87	.	.	.	.	261
3.00 - 3.49	.	.	.	.	.	.	.	.	174	.	.	.	.	174
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	.	0
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	0	261	1044	1566	783	1131	2087	1391	1653	0	87	0		0

(Continued)

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**Table D2 (Concluded)**

October 1992, Gage 625													Total
Percent Occurrence(X100) of Height and Period													
Height(m)	Period(sec)												
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer	
0.00 - 0.49	.	.	.	81	.	325	407	407	894	.	488	.	2602
0.50 - 0.99	.	81	244	244	163	163	407	488	407	244	163	.	2604
1.00 - 1.49	.	.	325	407	1057	.	244	244	976	244	244	.	3741
1.50 - 1.99	.	.	.	81	81	81	81	81	163	.	.	.	568
2.00 - 2.49	.	.	.	.	.	.	.	.	81	.	.	.	81
2.50 - 2.99	.	.	.	.	.	81	81	.	81	.	.	.	243
3.00 - 3.49	.	.	.	.	.	.	81	.	81	.	.	.	162
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	0
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	0	81	569	813	1301	650	1301	1220	2683	488	895	0	

November 1992, Gage 625													Total
Percent Occurrence(X100) of Height and Period													
Height(m)	Period(sec)												
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer	
0.00 - 0.49	.	.	.	84	.	336	420	.	.	.	.	.	840
0.50 - 0.99	.	.	252	504	84	84	840	1345	756	504	168	.	4537
1.00 - 1.49	.	.	84	588	504	588	420	504	672	.	420	.	3780
1.50 - 1.99	.	.	.	84	420	168	168	.	.	.	.	.	840
2.00 - 2.49	.	.	.	.	.	.	.	.	.	.	.	.	0
2.50 - 2.99	.	.	.	.	.	.	.	.	.	.	.	.	0
3.00 - 3.49	.	.	.	.	.	.	.	.	.	.	.	.	0
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	0
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	0	0	336	1260	1008	840	1764	2269	1428	504	588	0	

December 1992, Gage 625													Total
Percent Occurrence(X100) of Height and Period													
Height(m)	Period(sec)												
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer	
0.00 - 0.49	.	83	167	83	250	83	167	583	583	83	167	83	2332
0.50 - 0.99	.	333	250	333	333	.	83	333	250	.	83	.	1998
1.00 - 1.49	.	.	83	1000	833	.	83	333	167	83	333	.	2915
1.50 - 1.99	.	.	.	83	.	167	250	83	83	250	167	.	1083
2.00 - 2.49	.	.	.	.	.	83	.	83	167	83	83	.	499
2.50 - 2.99	.	.	.	.	.	.	.	.	333	500	500	.	833
3.00 - 3.49	.	.	.	.	.	.	.	83	.	250	.	.	333
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	0
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	0	416	500	1499	1416	333	583	1498	1250	832	1583	83	



**Table D3**  
**Annual Joint Distribution of  $H_{mo}$  versus  $T_p$  (All Years)**

Height(m)	Annual 1980-1992, Gage 625 Percent Occurrence(X100) of Height and Period												Total
	Period(sec)												
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer	
0.00 - 0.49	10	24	39	63	113	236	547	491	414	191	262	22	2412
0.50 - 0.99	5	92	241	437	456	427	724	764	845	165	300	30	4486
1.00 - 1.49	.	5	97	304	326	211	207	197	345	46	140	2	1880
1.50 - 1.99	.	.	3	63	179	93	67	63	141	41	69	4	723
2.00 - 2.49	.	.	.	1	39	41	24	33	66	35	43	2	284
2.50 - 2.99	.	.	.	.	3	13	22	21	41	17	32	2	151
3.00 - 3.49	.	.	.	.	1	.	5	7	18	7	12	1	51
3.50 - 3.99	.	.	.	.	.	.	.	.	2	2	2	1	7
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	15	121	380	868	1117	1021	1596	1576	1872	504	860	64	

**Table D4**  
**Monthly Joint Distribution of  $H_{mo}$  versus  $T_p$  (All Years)**

January 1980-1992, Gage 625  
 Percent Occurrence(X100) of Height and Period

Height(m)	Period(sec)													Total
	2.0-	3.0-	4.0-	5.0-	6.0-	7.0-	8.0-	9.0-	10.0-	12.0-	14.0-	16.0-		
	2.9	3.9	4.9	5.9	6.9	7.9	8.9	9.9	11.9	13.9	15.9	Longer		
0.00 - 0.49	8	38	46	84	114	205	350	524	372	144	182	15	2082	
0.50 - 0.99	.	160	243	403	524	274	532	509	866	137	236	8	3892	
1.00 - 1.49	.	.	84	562	524	213	205	175	441	.	84	.	2288	
1.50 - 1.99	.	.	.	84	236	190	84	114	182	30	30	.	950	
2.00 - 2.49	.	.	.	.	61	129	30	30	152	38	84	.	524	
2.50 - 2.99	.	.	.	.	8	15	30	38	61	23	30	.	205	
3.00 - 3.49	.	.	.	.	.	.	.	8	23	15	.	.	46	
3.50 - 3.99	.	.	.	.	.	.	.	.	8	8	.	.	16	
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0	
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0	
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0	
Total	8	198	373	1133	1467	1026	1231	1398	2105	395	646	23		

February 1980-1992, Gage 625  
 Percent Occurrence(X100) of Height and Period

Height(m)	Period(sec)													Total
	2.0-	3.0-	4.0-	5.0-	6.0-	7.0-	8.0-	9.0-	10.0-	12.0-	14.0-	16.0-		
	2.9	3.9	4.9	5.9	6.9	7.9	8.9	9.9	11.9	13.9	15.9	Longer		
0.00 - 0.49	.	15	23	38	61	61	259	327	305	84	190	.	1363	
0.50 - 0.99	15	61	175	396	396	411	670	739	1005	69	289	8	4234	
1.00 - 1.49	.	8	107	381	457	274	259	228	564	53	198	.	2529	
1.50 - 1.99	.	.	.	122	305	114	84	107	206	69	99	.	1106	
2.00 - 2.49	.	.	.	.	30	61	46	53	69	53	107	.	419	
2.50 - 2.99	.	.	.	.	.	15	15	30	84	15	84	.	243	
3.00 - 3.49	.	.	.	.	.	.	23	8	30	8	8	.	77	
3.50 - 3.99	.	.	.	.	.	.	.	.	8	8	15	.	31	
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0	
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0	
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0	
Total	15	84	305	937	1249	936	1356	1492	2271	359	990	8		

March 1980-1992, Gage 625  
 Percent Occurrence(X100) of Height and Period

Height(m)	Period(sec)													Total
	2.0-	3.0-	4.0-	5.0-	6.0-	7.0-	8.0-	9.0-	10.0-	12.0-	14.0-	16.0-		
	2.9	3.9	4.9	5.9	6.9	7.9	8.9	9.9	11.9	13.9	15.9	Longer		
0.00 - 0.49	7	7	.	67	47	74	262	215	323	128	168	.	1298	
0.50 - 0.99	13	34	202	531	410	471	706	659	1015	114	343	.	4498	
1.00 - 1.49	.	7	148	289	316	276	202	222	632	40	336	.	2468	
1.50 - 1.99	.	.	.	61	182	81	94	74	276	67	148	7	990	
2.00 - 2.49	.	.	.	7	54	40	34	40	121	61	54	.	411	
2.50 - 2.99	.	.	.	.	.	7	27	13	87	34	47	.	215	
3.00 - 3.49	.	.	.	.	.	.	13	13	47	13	34	.	120	
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	0	
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0	
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0	
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0	
Total	20	48	350	955	1009	949	1338	1236	2501	457	1130	7		

(Continued)

(Sheet 1 of 4)

**Table D4 (Continued)**

April 1980-1992, Gage 625  
Percent Occurrence(X100) of Height and Period

Height(m)	Period(sec)												Total
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer	
0.00 - 0.49	14	21	14	57	50	85	412	391	405	135	305		1889
0.50 - 0.99	7	71	170	355	369	419	874	938	1278	192	554	14	5241
1.00 - 1.49		7	85	199	241	206	220	277	327	43	163		1768
1.50 - 1.99			7	36	121	50	78	114	213	14	71		704
2.00 - 2.49				7	28	7	28	28	71	14	7		190
2.50 - 2.99					7	21	28	14	50	28	7		155
3.00 - 3.49								7	28		14		49
3.50 - 3.99													0
4.00 - 4.49													0
4.50 - 4.99													0
5.00 - Greater													0
Total	21	99	276	654	816	788	1640	1769	2372	426	1121	14	

May 1980-1992, Gage 625  
Percent Occurrence(X100) of Height and Period

Height(m)	Period(sec)												Total
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer	
0.00 - 0.49	26	26	46	93	185	317	595	503	536	225	351	7	2910
0.50 - 0.99	7	152	298	384	522	489	1025	992	708	99	212	7	4895
1.00 - 1.49			60	126	139	192	317	205	311	20	86		1456
1.50 - 1.99				66	73	20	66	60	106	13	60		464
2.00 - 2.49					53	26	20	20	7	33	20	7	186
2.50 - 2.99							13	7	33	20	13		86
3.00 - 3.49											7		7
3.50 - 3.99													0
4.00 - 4.49													0
4.50 - 4.99													0
5.00 - Greater													0
Total	33	178	404	669	972	1044	2036	1787	1701	410	749	21	

June 1980-1992, Gage 625  
Percent Occurrence(X100) of Height and Period

Height(m)	Period(sec)												Total
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer	
0.00 - 0.49	30	53	76	84	305	473	1357	838	450	160	160	15	4001
0.50 - 0.99	8	130	236	412	373	480	1159	1075	595	107	122	38	4735
1.00 - 1.49			53	130	152	122	130	122	183		38	8	938
1.50 - 1.99				30	53	23	15	8	114		46		289
2.00 - 2.49					8	15	8	8					47
2.50 - 2.99													0
3.00 - 3.49													0
3.50 - 3.99													0
4.00 - 4.49													0
4.50 - 4.99													0
5.00 - Greater													0
Total	38	183	365	656	891	1113	2669	2051	1350	267	366	61	

(Continued)

(Sheet 2 of 4)

**Table D4 (Continued)**

July 1980-1992, Gage 625													Total
Percent Occurrence(X100) of Height and Period													
Height(m)	Period(sec)												
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer	
0.00 - 0.49	.	64	104	72	207	701	1457	1115	661	390	398	64	5233
0.50 - 0.99	.	127	303	430	565	573	709	613	398	239	151	64	4172
1.00 - 1.49	.	.	40	135	111	88	56	32	40	.	16	.	518
1.50 - 1.99	.	.	.	8	16	16	16	8	8	.	.	.	72
2.00 - 2.49	.	.	.	.	.	.	.	.	.	.	.	.	0
2.50 - 2.99	.	.	.	.	.	.	.	.	.	.	.	.	0
3.00 - 3.49	.	.	.	.	.	.	.	.	.	.	.	.	0
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	0
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	0	191	447	645	899	1378	2238	1768	1107	629	565	128	

August 1980-1992, Gage 625													Total
Percent Occurrence(X100) of Height and Period													
Height(m)	Period(sec)												
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer	
0.00 - 0.49	.	30	30	53	166	467	910	880	662	263	241	8	3710
0.50 - 0.99	15	90	226	504	564	670	858	790	662	211	309	68	4967
1.00 - 1.49	.	.	83	181	173	135	196	83	53	15	8	.	927
1.50 - 1.99	.	.	.	38	90	38	15	8	38	15	30	.	272
2.00 - 2.49	.	.	.	.	15	8	.	.	23	.	38	.	84
2.50 - 2.99	.	.	.	.	.	.	.	8	8	.	.	.	24
3.00 - 3.49	.	.	.	.	8	.	.	8	8	.	.	.	24
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	0
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	15	120	339	776	1016	1318	1987	1777	1454	504	626	76	

September 1980-1992, Gage 625													Total
Percent Occurrence(X100) of Height and Period													
Height(m)	Period(sec)												
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer	
0.00 - 0.49	.	8	40	16	64	136	200	328	344	184	208	48	1576
0.50 - 0.99	.	80	248	344	424	464	687	847	1015	152	416	.	4677
1.00 - 1.49	.	.	64	368	336	304	312	328	400	112	192	.	2416
1.50 - 1.99	.	.	.	104	240	136	96	88	72	48	80	8	872
2.00 - 2.49	.	.	.	.	16	88	48	16	16	72	56	8	320
2.50 - 2.99	.	.	.	.	.	8	24	24	40	.	24	.	120
3.00 - 3.49	.	.	.	.	.	.	.	.	24	.	.	.	24
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	0
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	0	88	352	832	1080	1136	1367	1631	1911	568	976	64	

(Continued)

(Sheet 3 of 4)

**Table D4 (Concluded)**

October 1980-1992, Gage 625														Total
Percent Occurrence(X100) of Height and Period														
Height(m)	Period(sec)													
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer		
0.00 - 0.49	7		20	52	13	131	274	242	327	98	255	33	1452	
0.50 - 0.99		78	209	333	366	287	536	705	1006	202	307	33	4062	
1.00 - 1.49		7	144	405	405	176	157	307	483	111	216	13	2424	
1.50 - 1.99			26	98	235	72	78	72	229	105	118	20	1053	
2.00 - 2.49					78	59	46	98	137	65	59	7	549	
2.50 - 2.99					13	46	59	39	33	26	72	20	308	
3.00 - 3.49							20	13	13	39	33	13	131	
3.50 - 3.99									13	7		7	27	
4.00 - 4.49													0	
4.50 - 4.99													0	
5.00 - Greater													0	
Total	7	85	399	888	1110	771	1170	1476	2241	653	1060	146		

November 1980-1992, Gage 625														Total
Percent Occurrence(X100) of Height and Period														
Height(m)	Period(sec)													
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer		
0.00 - 0.49	7	7	42	70	42	126	363	300	251	216	300	56	1780	
0.50 - 0.99		49	349	517	545	370	594	670	656	265	314	28	4357	
1.00 - 1.49		28	140	377	545	321	258	189	300	105	147	7	2417	
1.50 - 1.99				56	258	196	112	56	105	77	56	14	930	
2.00 - 2.49					70	21	21	7	63	49	49		280	
2.50 - 2.99						14	28	42	14	21	35		154	
3.00 - 3.49							7	7	28	7	21		70	
3.50 - 3.99											14		14	
4.00 - 4.49													0	
4.50 - 4.99													0	
5.00 - Greater													0	
Total	7	84	531	1020	1460	1048	1383	1271	1417	740	936	105		

December 1980-1992, Gage 625														Total
Percent Occurrence(X100) of Height and Period														
Height(m)	Period(sec)													
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer		
0.00 - 0.49	15	23	38	69	130	122	244	343	359	290	389	31	2053	
0.50 - 0.99		76	229	648	427	236	328	610	885	198	336	107	4080	
1.00 - 1.49			137	503	511	221	160	175	343	46	168		2264	
1.50 - 1.99				53	343	191	61	46	107	38	76		915	
2.00 - 2.49					46	46	8	84	114	31	38		367	
2.50 - 2.99					8	23	23	38	76	31	69		268	
3.00 - 3.49								23	8		23		54	
3.50 - 3.99													0	
4.00 - 4.49													0	
4.50 - 4.99													0	
5.00 - Greater													0	
Total	15	99	404	1273	1465	839	824	1319	1892	634	1099	138		

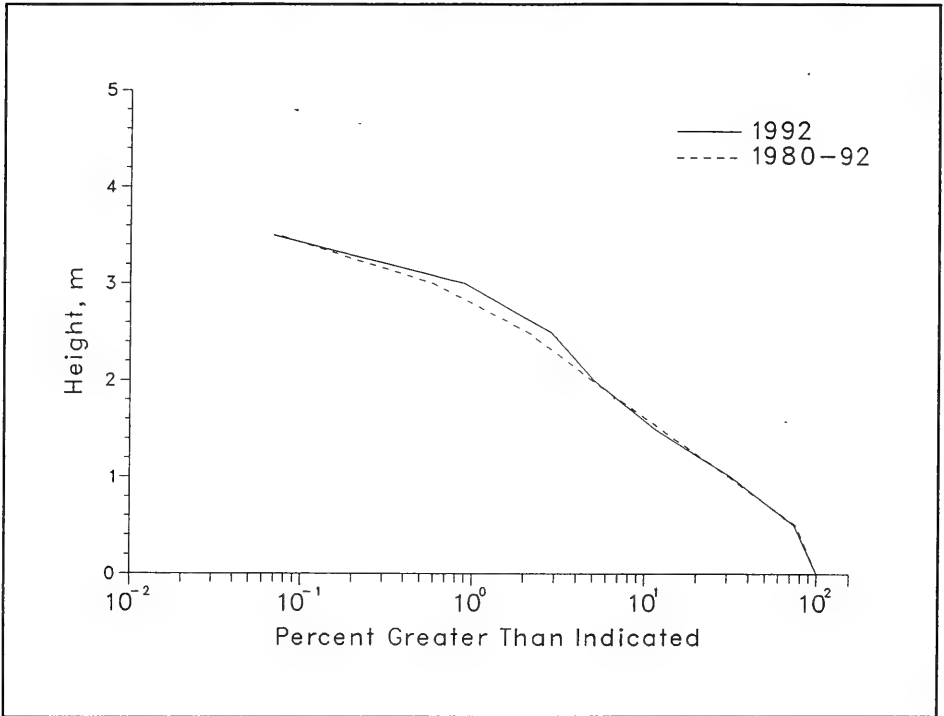


Figure D2. Annual cumulative wave height distributions for Gage 625

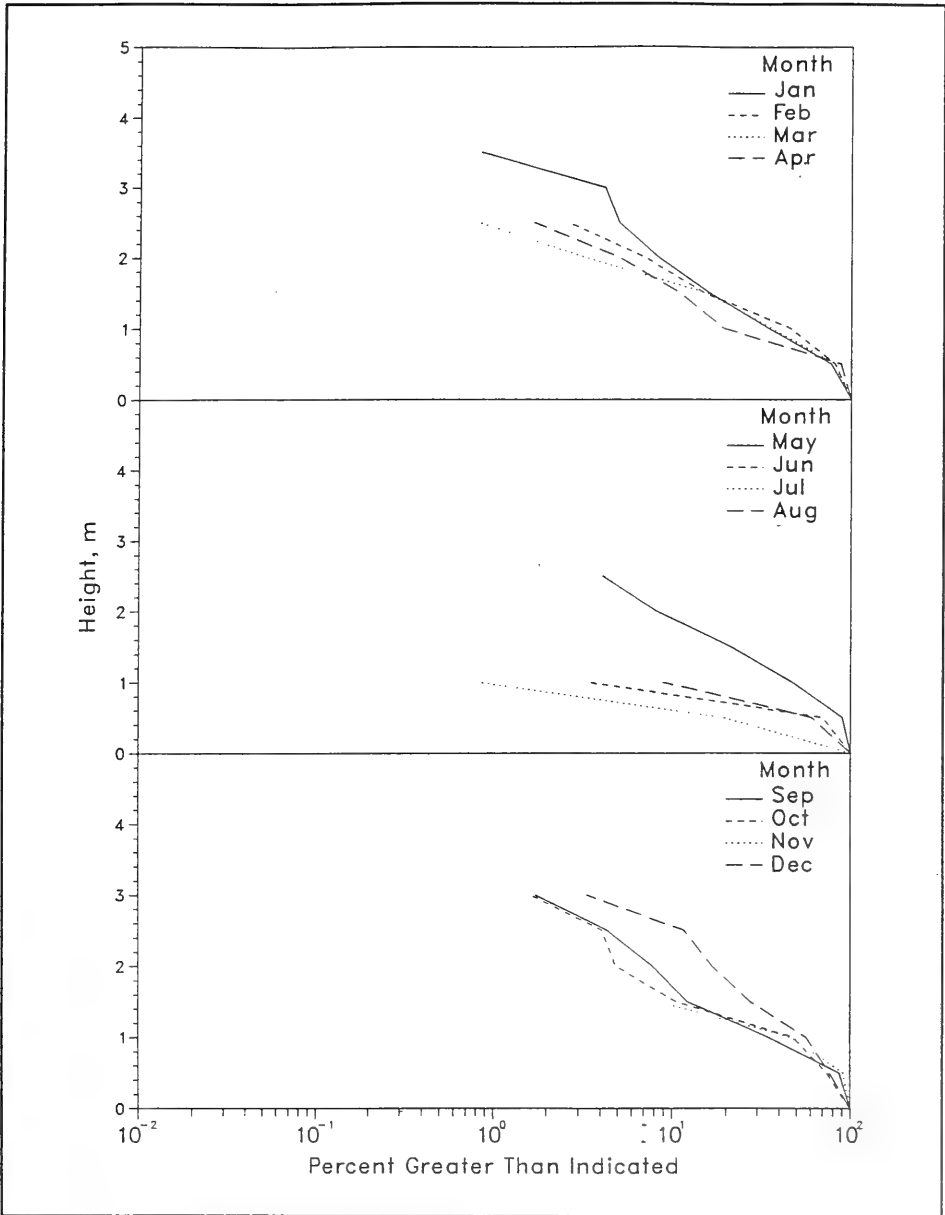


Figure D3. 1992 monthly wave height distributions for Gage 625

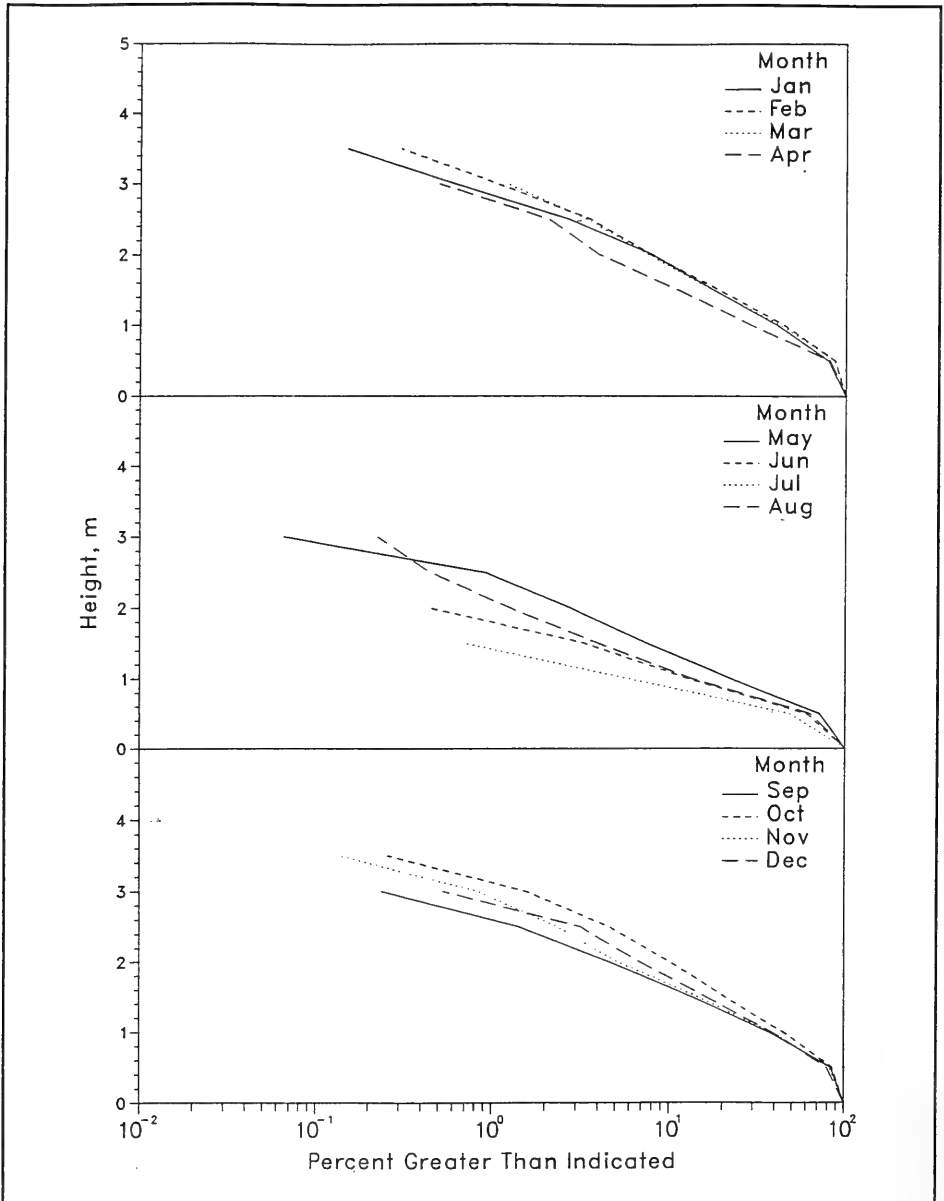


Figure D4. 1980-1992 monthly wave height distributions for Gage 625



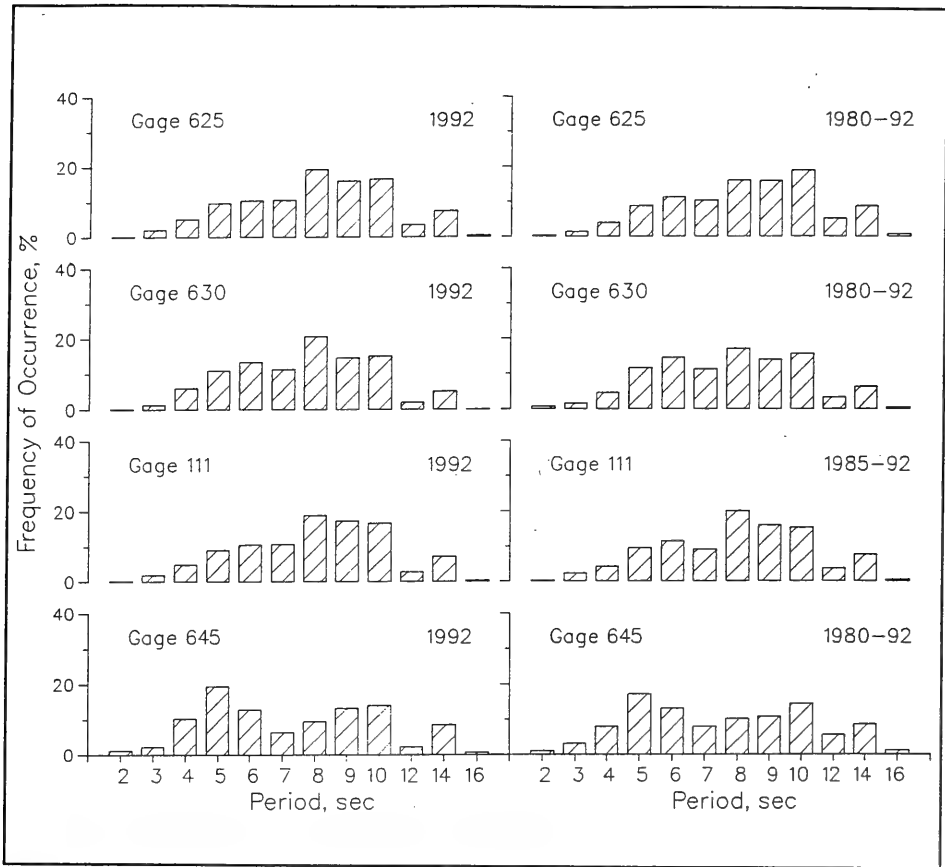


Figure D5. Annual wave period distributions for all gages

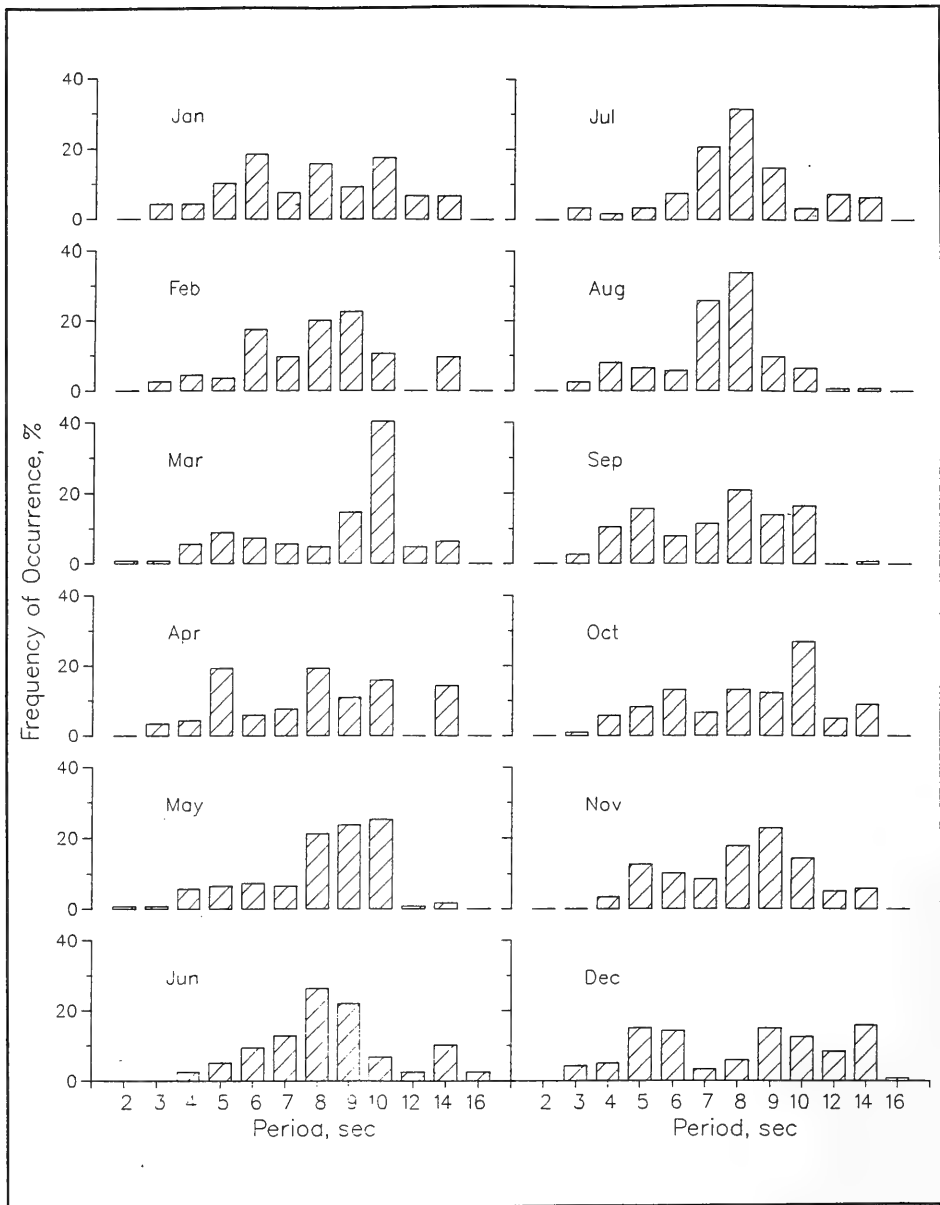


Figure D6. 1992 monthly wave period distributions for Gage 625

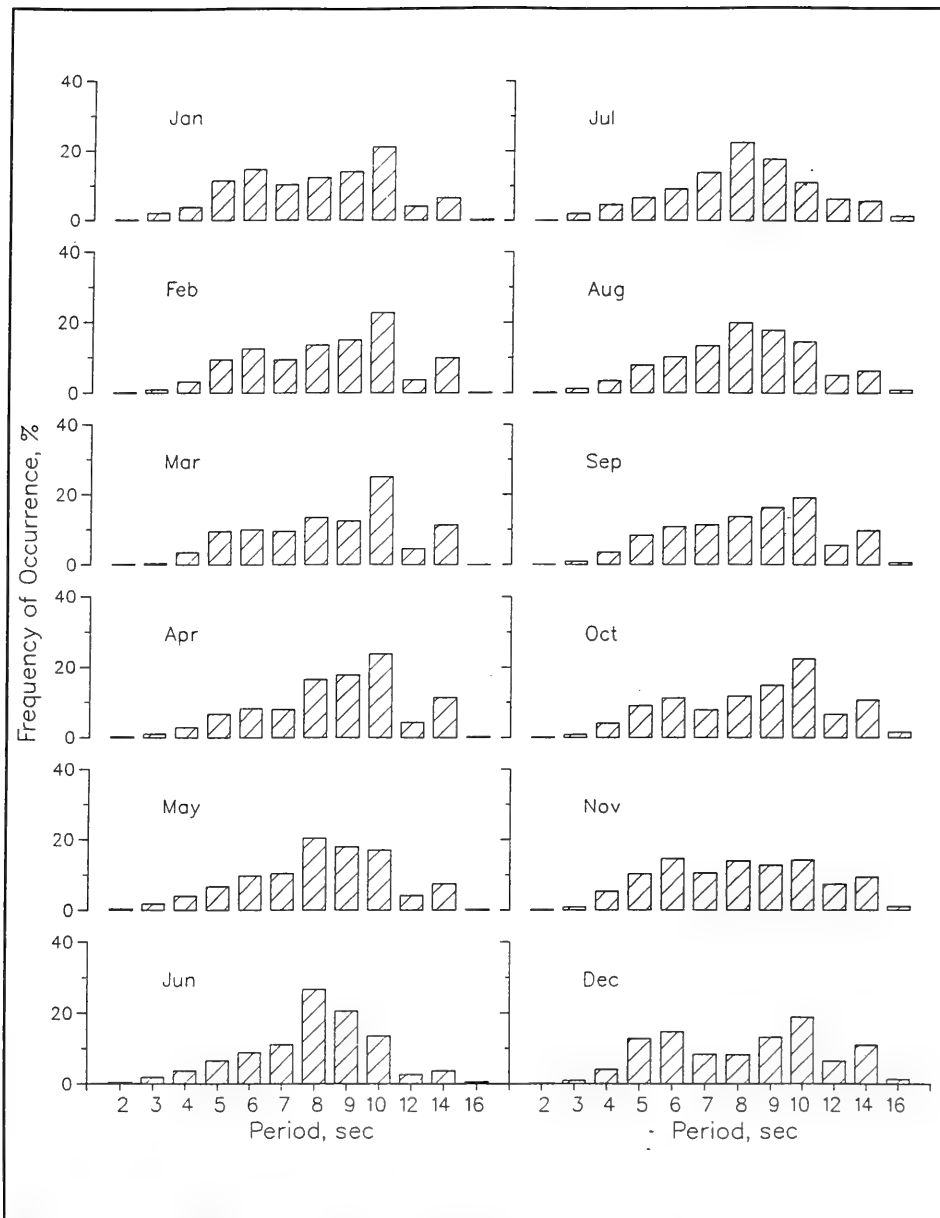


Figure D7. 1980-1992 monthly wave period distributions for Gage 625

**Table D5**  
**1992 persistence of  $H_{mo}$  for Gage 625**

Height (m)	Consecutive Day(s) or Longer																				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19+		
0.5	28	24	21	20	18		17	16	15	14	11		10	8						6	5
1.0	53	32	24	17	12	8	7			2	1										
1.5	31	18	10	6				1													
2.0	13	7	5																		
2.5	10	5		1																	
3.0	5	3																			
3.5	1																				

**Table D6**  
**1980 through 1992 persistence of  $H_{mo}$  for Gage 625**

Height (m)	Consecutive Day(s) or Longer																				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19+		
0.5	28	23	21	18	16	14	13		11	10	9	8		7	6	5			4	3	
1.0	45	31	21	14	10	7	5	4	2			1									
1.5	29	16	9	5	3	2	1														
2.0	14	7	4																		
2.5	7	3		1																	
3.0	3	1																			
3.5																					
4.0																					

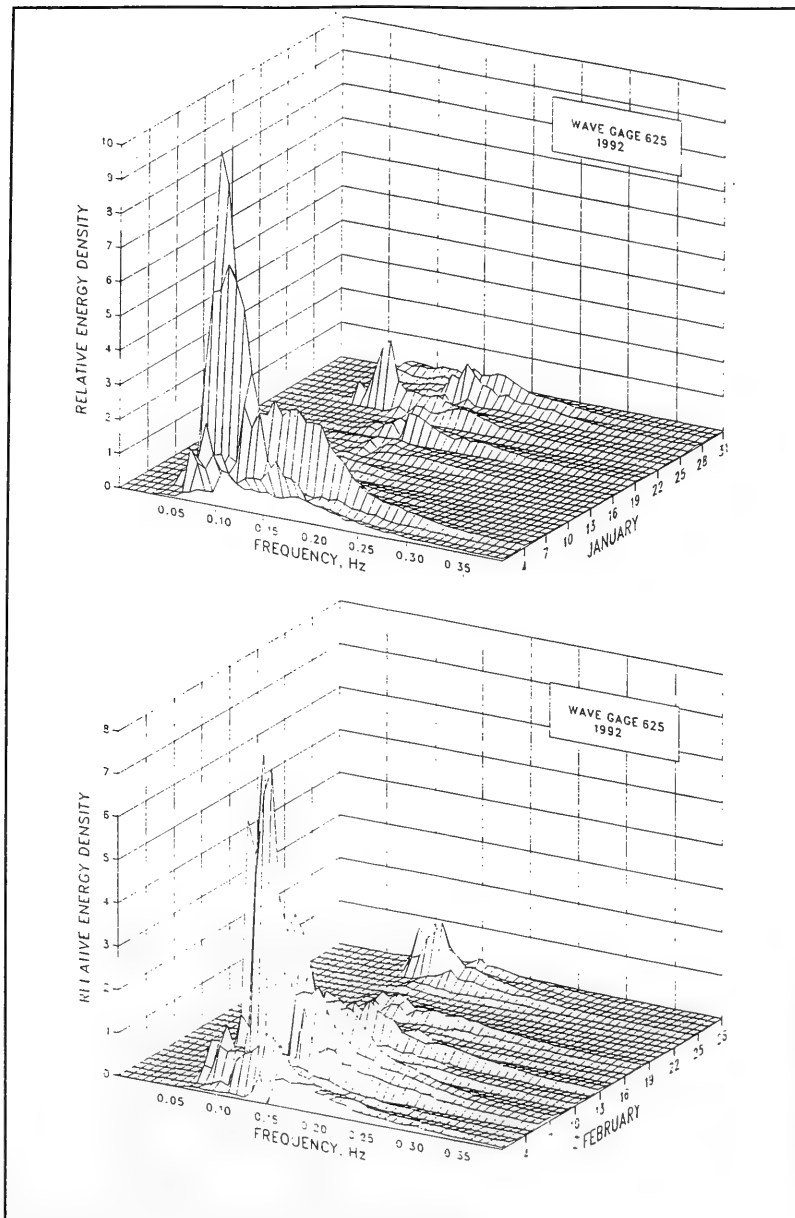


Figure D8. 1992 monthly spectra for Gage 625 (Sheet 1 of 6)

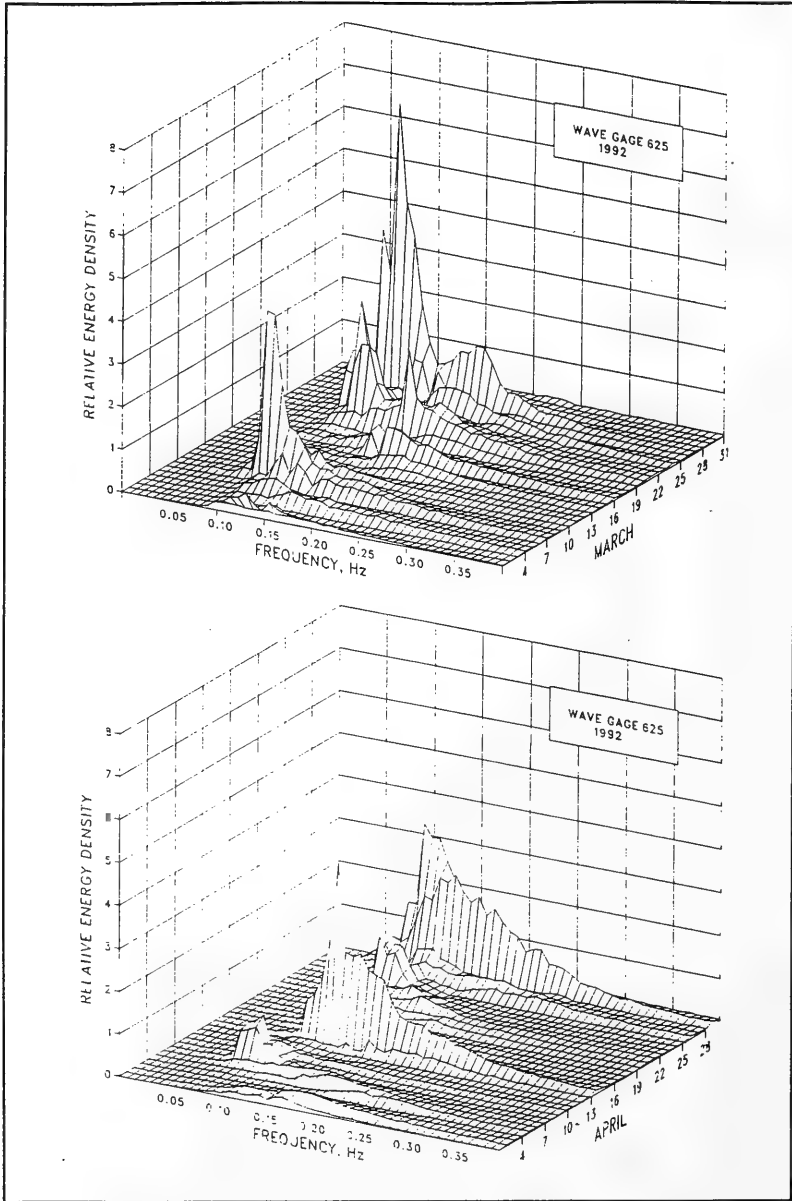


Figure D8. (Sheet 2 of 6)

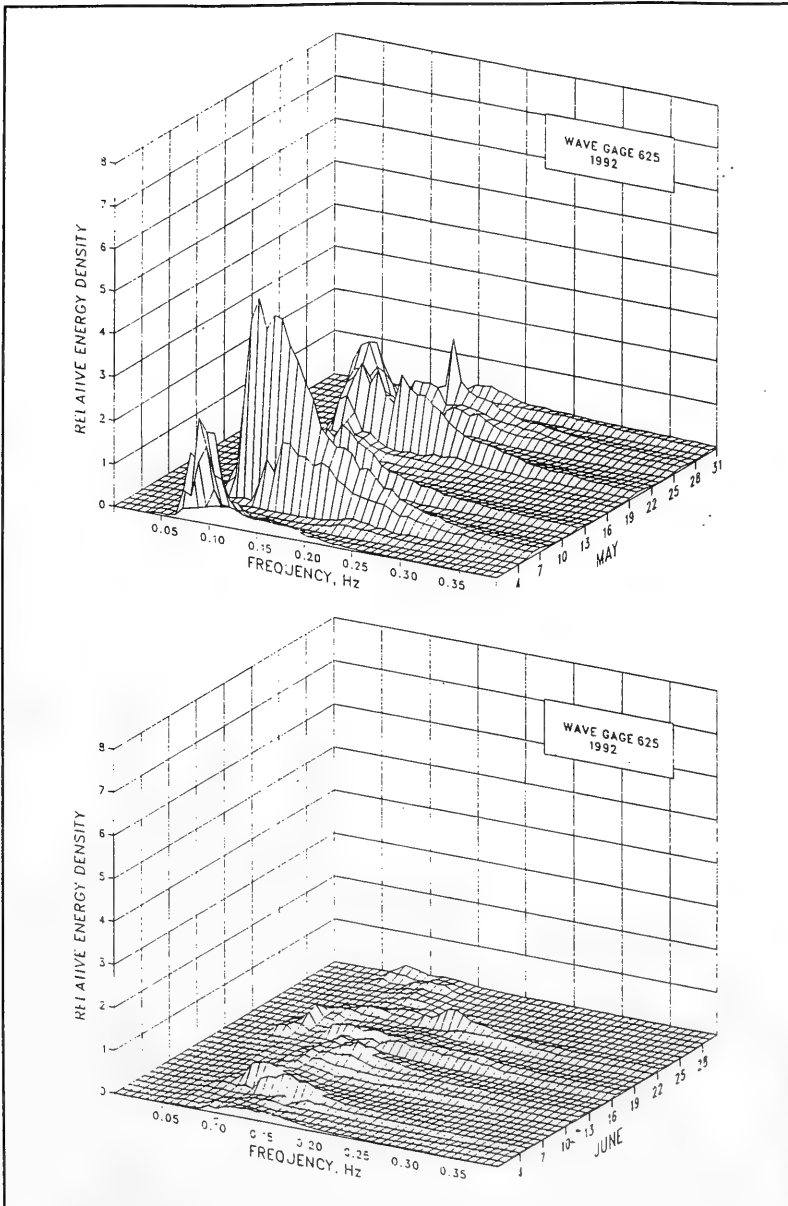


Figure D8. (Sheet 3 of 6)

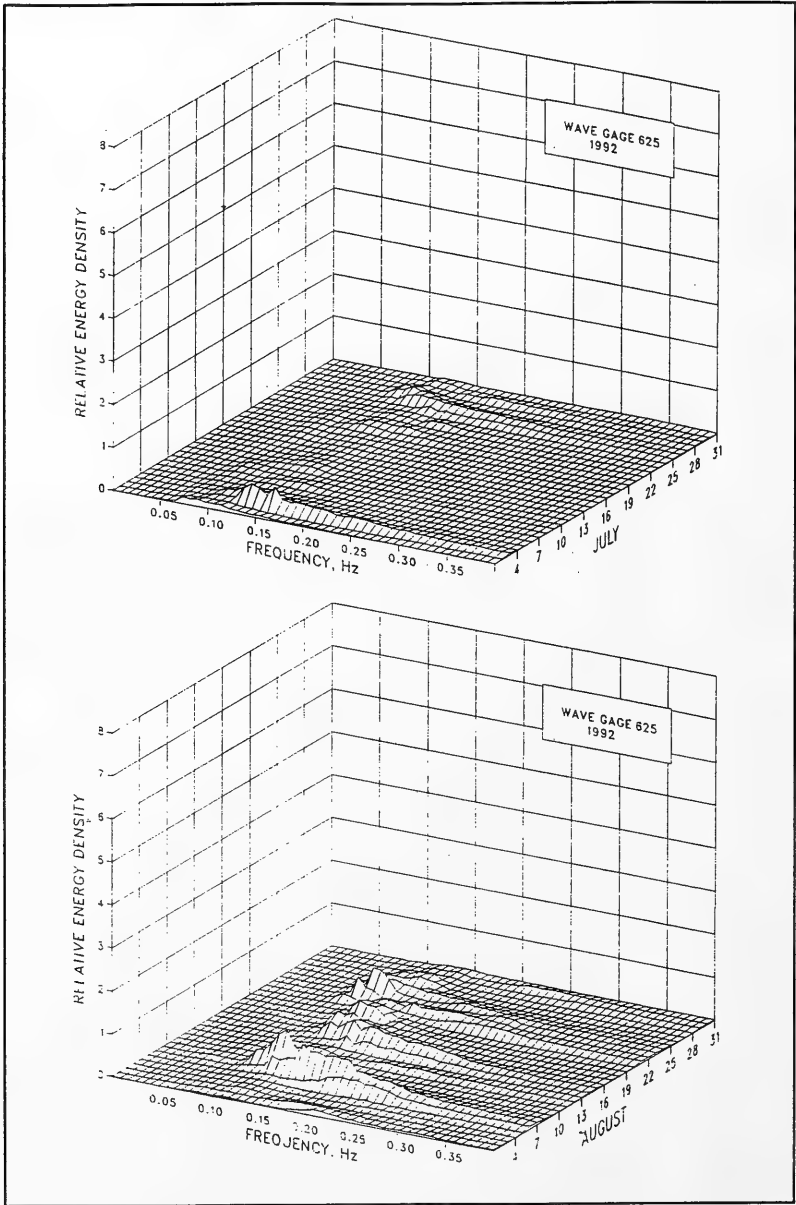


Figure D8. (Sheet 4 of 6)



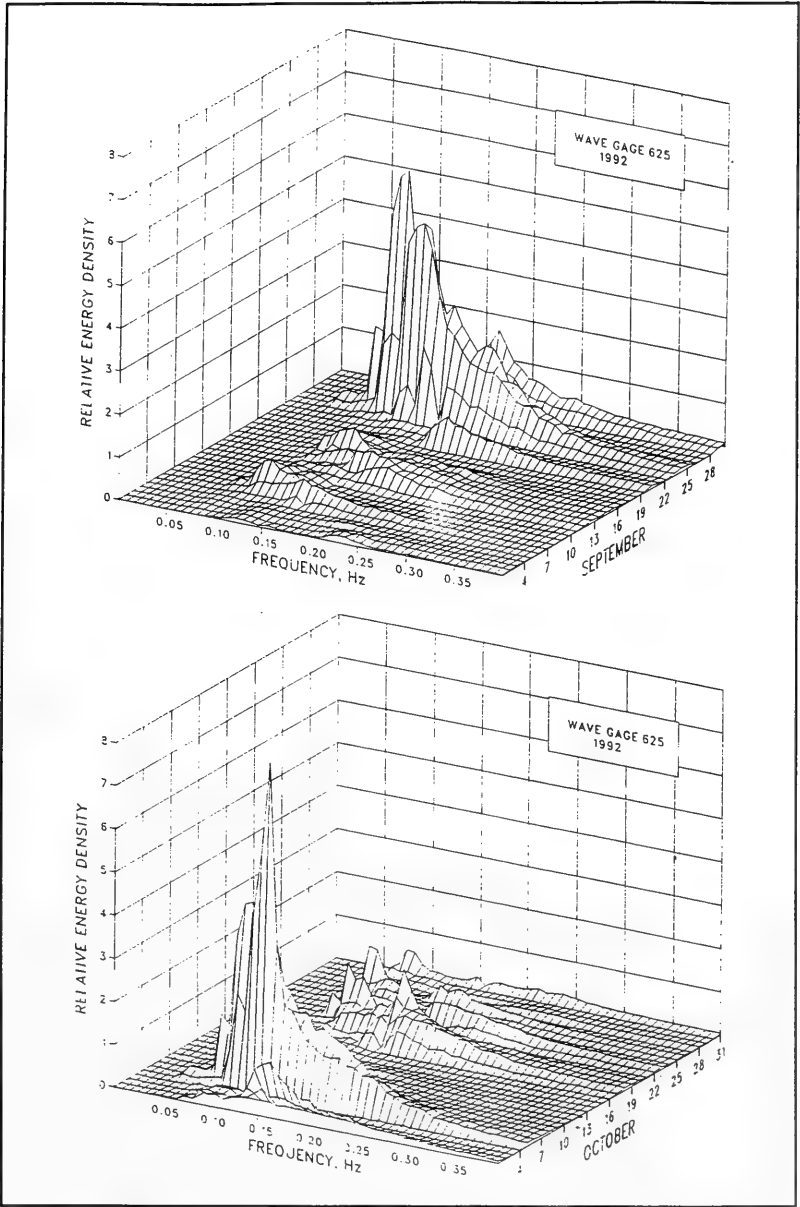


Figure D8. (Sheet 5 of 6)

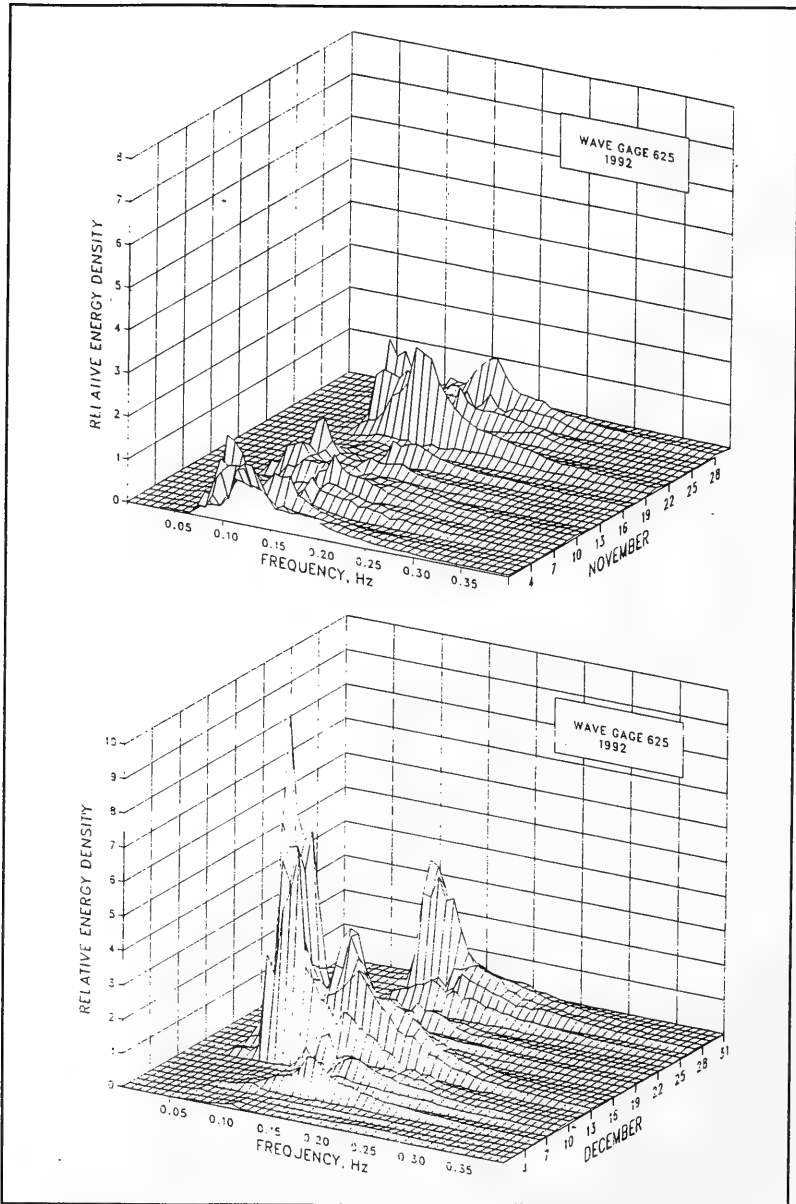


Figure D8. (Sheet 6 of 6)

**Table D7**  
**Wave statistics for Gage 625**

Month	1992							1980-1992						
	Height			Date	Period			Height			Date	Period		
	Mean	Std. Dev.	Extreme		Mean	Std. Dev.	Number	Mean	Std. Dev.	Extreme		Mean	Std. Dev.	Number
m	m	m	sec	sec	Obs.	m	m	m	sec	sec	Obs.			
Jan	1.0	0.7	3.6	4	8.6	2.9	120	1.0	0.6	3.6	1992	8.5	2.7	1316
Feb	1.1	0.6	2.9	7	8.5	2.2	115	1.1	0.6	3.8	1989	8.9	2.6	1313
Mar	1.0	0.5	2.8	26	9.3	2.6	124	1.1	0.6	3.4	1983	9.1	2.6	1487
Apr	0.9	0.5	2.7	29	8.5	2.8	120	0.9	0.5	3.4	1988	9.3	2.6	1408
May	1.2	0.6	3.0	7	8.6	2.1	123	0.8	0.5	3.0	1986	8.7	2.6	1512
Jun	0.7	0.2	1.3	16	9.3	3.0	118	0.7	0.4	2.3	1983	8.5	2.4	1312
Jul	0.4	0.2	1.1	3	8.9	2.5	121	0.6	0.3	1.8	1985	8.8	2.8	1256
Aug	0.7	0.3	1.4	6	7.8	1.9	124	0.7	0.4	3.1	1981	8.7	2.6	1329
Sep	1.0	0.6	3.2	25	7.7	2.2	115	1.0	0.6	3.2	1992	9.0	2.7	1251
Oct	1.0	0.6	3.0	5	9.2	2.8	123	1.1	0.7	3.5	1991	9.2	2.9	1531
Nov	1.0	0.4	2.0	20	8.8	2.5	119	1.0	0.6	3.5	1981	8.8	3.0	1432
Dec	1.3	0.8	3.2	10	9.2	3.5	120	1.0	0.6	3.2	1992	9.0	3.1	1311
Annual	0.9	0.6	3.6	Jan	8.7	2.7	1442	0.9	0.6	3.8	Feb 1989	8.9	2.7	16458

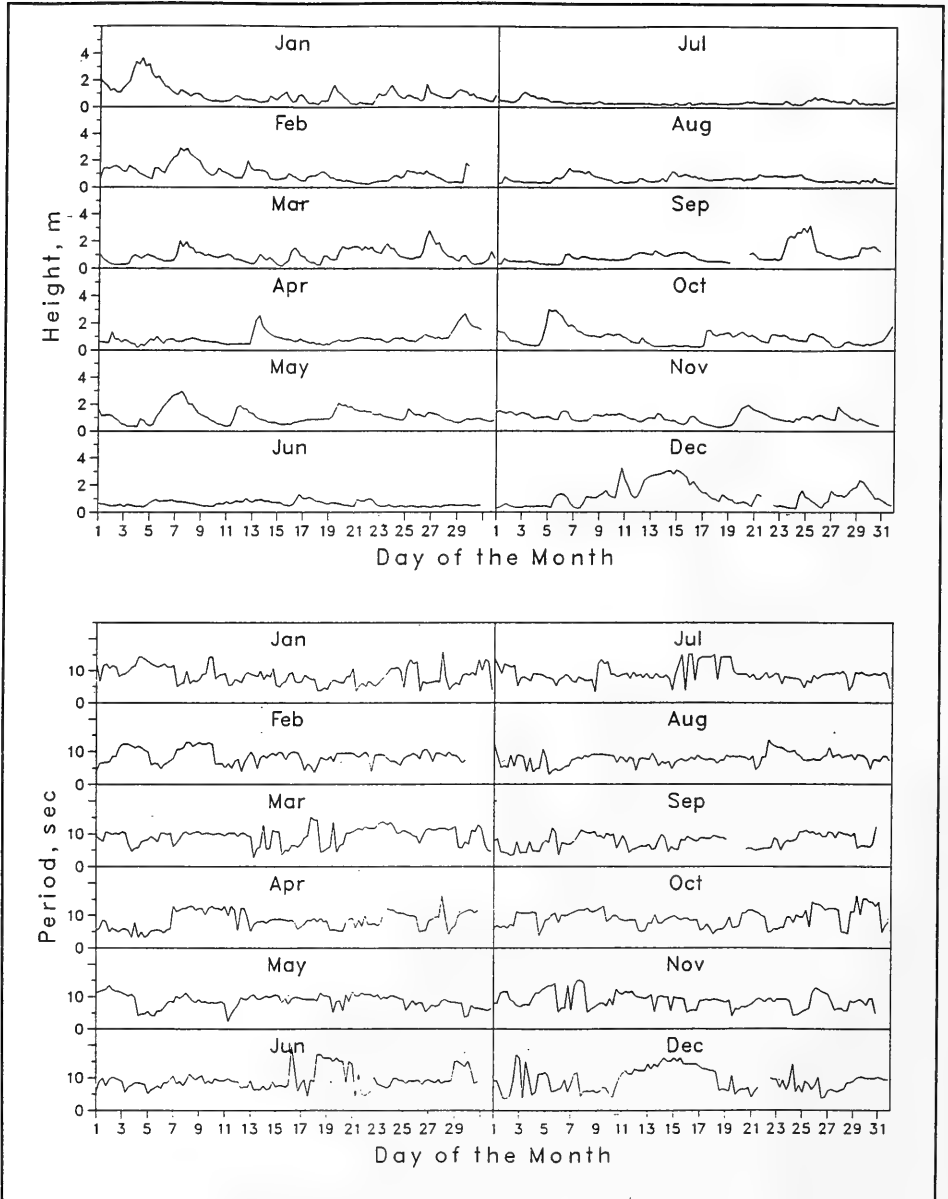


Figure D9. Time-histories of wave height and period for Gage 625

# Appendix E

## Wave Data for Gage 645

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Wave data summaries for Gage 645 for 1992 and for 1980 through 1992 are presented in the following pages:

### Daily $H_{mo}$ and $T_p$

Figure E1 displays the individual wave height  $H_{mo}$  and peak spectral wave period  $T_p$  values, along with the monthly mean values.

### Joint Distributions of $H_{mo}$ and $T_p$

Annual and monthly joint distribution tables are presented in Tables E1 and E2, and data for 1980 through 1992 are in Tables E3 and E4. Each table gives the frequency (in parts per 10,000) for which the wave height and peak period were within the specified intervals; these values can be converted to percentages by dividing by 100. Marginal totals are also included. The row total gives the number of observations out of 10,000 that fell within each specified peak period interval. The column total gives the number of observations out of 10,000 that fell within each specified wave height interval.

### Cumulative Distributions of Wave Height

Annual and monthly wave height distributions for 1992 are plotted in cumulative form in Figures E2 and E3. Data for 1980 through 1992 are plotted in Figure E4.

### Peak Spectral Wave Period Distributions

Annual and monthly peak wave period  $T_p$  distribution histograms for 1992 are presented in Figures E5 and E6. Data for 1980 through 1992 are presented in Figure E7.

## Persistence of Wave Heights

Table E5 shows the number of times in 1992 when the specified wave height was equaled or exceeded at least once during each day for the duration (consecutive days). Data for 1980 through 1992 are averaged and given in Table E6. An example is shown below:

Height m	Consecutive Day(s) or Longer																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19+
0.5	18	15	14	13	12	11	10	9						8		7			
1.0	50	34	24	21	18	14	12	8	7	3			2						
1.5	41	19	8	6	2	1													
2.0	22	9	5	1															
2.5	10	5	2																
3.0	6	1																	
3.5		1																	
4.0	1																		

This example indicates that wave heights equaled or exceeded 1.0 m 50 times for at least 1 day; 34 times for at least 2 days; 24 times for at least 3 days, etc. Therefore, on 16 occasions the height equaled or exceeded 1.0 m for 1 day exactly ( $50 - 34 = 16$ ); on 10 occasions for 2 days; on 3 occasions for 3 days, etc. Note that the height exceeded 1 m 50 times for 1 day or longer, while heights exceeded 0.5 m only 18 times for this same duration. This change in durations occurred because the longer durations of lower waves may be interspersed with shorter, but more frequent, intervals of higher waves. For example, one of the times that the wave heights exceeded 0.5 m for 16 days may have represented three times the height exceeded 1 m for shorter durations.

## Spectra

Monthly spectra for the offshore staff gage (Gage 645) are presented in Figure E8. The plots show "relative" energy density as a function of wave frequency. These figures summarize the large number of spectra for each month. The figures emphasize the higher energy density associated with storms, as well as the general shifts in energy density to different frequencies. As used here, "relative" indicates the spectra have been smoothed by the three-dimensional surface drawing routine. Consequently, extremely high- and low-energy density values are modified to produce a smooth surface. The figures are not intended for quantitative measurements; however, they do provide the energy density as a function of frequency relative to the other spectra for the month.

Monthly and annual wave statistics for Gage 645 for 1992 and for 1980 through 1992 are presented in Table E7.

Figure E9 plots monthly time histories of wave height and period.

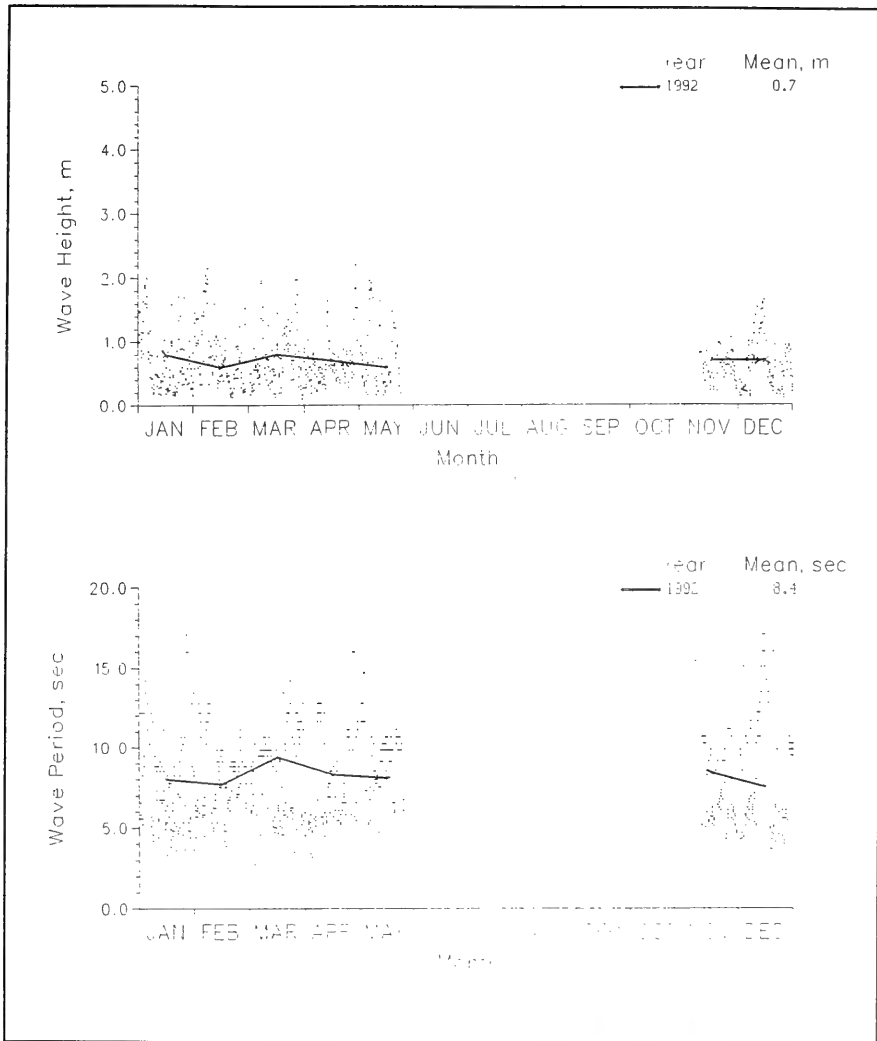


Figure E1. 1992 daily wave height and period values with monthly means for Gage 645

**Table E1**  
**Annual Joint Distribution of  $H_{mo}$  versus  $T_p$**

		Annual 1992, Gage 645 Percent Occurrence(X100) of Height and Period												
Height(m)	Period(sec)												Total	
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer		
0.00 - 0.49	78	105	444	641	183	261	562	641	497	26	261	39	3738	
0.50 - 0.99	39	92	510	1059	614	235	261	510	562	52	261	.	4195	
1.00 - 1.49	.	13	65	235	379	65	92	105	157	78	157	13	1359	
1.50 - 1.99	.	.	.	13	105	65	26	65	157	65	144	13	653	
2.00 - 2.49	.	.	.	.	.	.	.	.	26	.	26	.	52	
2.50 - 2.99	.	.	.	.	.	.	.	.	.	.	.	.	0	
3.00 - 3.49	.	.	.	.	.	.	.	.	.	.	.	.	0	
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	0	
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0	
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0	
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0	
Total	117	210	1019	1948	1281	626	941	1321	1399	221	849	65		



**Table E2**  
**Monthly Joint Distribution of  $H_{mo}$  versus  $T_p$**

Height(m)	January 1992, Gage 645 Percent Occurrence(X100) of Height and Period													Total
	Period(sec)													
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer		
0.00 - 0.49	.	250	583	750	333	417	1083	250	333	83	417	83	4582	
0.50 - 0.99	.	167	667	833	250	83	333	83	417	.	167	.	3000	
1.00 - 1.49	.	.	167	333	250	.	250	83	250	.	83	.	1416	
1.50 - 1.99	.	.	.	.	167	.	.	83	83	333	250	.	916	
2.00 - 2.49	.	.	.	.	.	.	.	.	.	.	83	.	83	
2.50 - 2.99	.	.	.	.	.	.	.	.	.	.	.	.	0	
3.00 - 3.49	.	.	.	.	.	.	.	.	.	.	.	.	0	
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	0	
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0	
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0	
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0	
Total	0	417	1417	1916	1000	500	1666	499	1083	416	1000	83	0	

Height(m)	February 1992, Gage 645 Percent Occurrence(X100) of Height and Period													Total
	Period(sec)													
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer		
0.00 - 0.49	87	.	.	87	435	522	1304	783	87	.	174	.	3479	
0.50 - 0.99	.	174	696	522	435	609	261	522	261	.	348	.	3828	
1.00 - 1.49	.	.	.	435	696	174	87	87	87	.	174	.	1740	
1.50 - 1.99	.	.	.	.	261	.	.	.	348	.	174	.	783	
2.00 - 2.49	.	.	.	.	.	.	.	.	87	.	87	.	174	
2.50 - 2.99	.	.	.	.	.	.	.	.	.	.	.	.	0	
3.00 - 3.49	.	.	.	.	.	.	.	.	.	.	.	.	0	
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	0	
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0	
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0	
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0	
Total	87	174	696	1044	1827	1305	1652	1392	870	0	957	0	0	

Height(m)	March 1992, Gage 645 Percent Occurrence(X100) of Height and Period													Total
	Period(sec)													
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer		
0.00 - 0.49	242	.	161	484	81	323	323	1048	645	.	81	.	3388	
0.50 - 0.99	81	81	403	1290	565	81	.	1129	484	81	323	.	4518	
1.00 - 1.49	.	.	81	161	323	.	81	242	242	81	242	.	1453	
1.50 - 1.99	.	.	.	.	81	81	.	161	242	.	81	.	646	
2.00 - 2.49	.	.	.	.	.	.	.	.	.	.	.	.	0	
2.50 - 2.99	.	.	.	.	.	.	.	.	.	.	.	.	0	
3.00 - 3.49	.	.	.	.	.	.	.	.	.	.	.	.	0	
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	0	
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0	
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0	
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0	
Total	323	81	645	1935	1050	485	404	2580	1613	162	727	0	0	

(Continued)

(Sheet 1 of 4)

**Table E2 (Continued)**

April 1992, Gage 645														Total
Percent Occurrence(X100) of Height and Period														
Height(m)	Period(sec)													
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer		
0.00 - 0.49		167	250	1333	167	83	250	83	250	.	750	.		3333
0.50 - 0.99	83		417	1667	1000	167	500	500	500	.	333	.		5167
1.00 - 1.49	.	83	167	167	167	167	.	.	167	.	83	.		1001
1.50 - 1.99	.	.	.	83	83	83	83	.	83	.	.	.		415
2.00 - 2.49	.	.	.	.	.	.	.	.	83	.	.	.		83
2.50 - 2.99	.	.	.	.	.	.	.	.	.	.	.	.		0
3.00 - 3.49	.	.	.	.	.	.	.	.	.	.	.	.		0
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.		0
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.		0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.		0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.		0
Total	83	250	834	3250	1417	500	833	583	1083	0	1166	0		

May 1992, Gage 645														Total
Percent Occurrence(X100) of Height and Period														
Height(m)	Period(sec)													
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer		
0.00 - 0.49	211		211	105	105	421	526	1368	1158	.	.	.		4105
0.50 - 0.99	105	105	421			211	211	632	1053	.	316	.		3054
1.00 - 1.49	.	.	.	421	632		211	316	211	.	.	.		1791
1.50 - 1.99	.	.	.	.	105	316	105	211	316	.	.	.		1053
2.00 - 2.49	.	.	.	.	.	.	.	.	.	.	.	.		0
2.50 - 2.99	.	.	.	.	.	.	.	.	.	.	.	.		0
3.00 - 3.49	.	.	.	.	.	.	.	.	.	.	.	.		0
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.		0
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.		0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.		0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.		0
Total	316	105	632	526	842	948	1053	2527	2738	0	316	0		

June 1992, Gage 645														Total
Percent Occurrence(X100) of Height and Period														
Height(m)	Period(sec)													
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer		
0.00 - 0.49	.	.	.	.	.	.	.	.	.	.	.	.		0
0.50 - 0.99	.	.	.	.	.	.	.	.	.	.	.	.		0
1.00 - 1.49	.	.	.	.	.	.	.	.	.	.	.	.		0
1.50 - 1.99	.	.	.	.	.	.	.	.	.	.	.	.		0
2.00 - 2.49	.	.	.	.	.	.	.	.	.	.	.	.		0
2.50 - 2.99	.	.	.	.	.	.	.	.	.	.	.	.		0
3.00 - 3.49	.	.	.	.	.	.	.	.	.	.	.	.		0
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.		0
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.		0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.		0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.		0
Total	0	0	0	0	0	0	0	0	0	0	0	0		

(Continued)

(Sheet 2 of 4)

**Table E2 (Continued)**

July 1992, Gage 645  
Percent Occurrence(X100) of Height and Period

Height(m)	Period(sec)												Total
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer	
0.00 - 0.49	.	.	.	.	.	.	.	.	.	.	.	.	0
0.50 - 0.99	.	.	.	.	.	.	.	.	.	.	.	.	0
1.00 - 1.49	.	.	.	.	.	.	.	.	.	.	.	.	0
1.50 - 1.99	.	.	.	.	.	.	.	.	.	.	.	.	0
2.00 - 2.49	.	.	.	.	.	.	.	.	.	.	.	.	0
2.50 - 2.99	.	.	.	.	.	Gage Inoperative		.	.	.	.	.	0
3.00 - 3.49	.	.	.	.	.	.	.	.	.	.	.	.	0
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	0
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0

August 1992, Gage 645  
Percent Occurrence(X100) of Height and Period

Height(m)	Period(sec)												Total
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer	
0.00 - 0.49	.	.	.	.	.	.	.	.	.	.	.	.	0
0.50 - 0.99	.	.	.	.	.	.	.	.	.	.	.	.	0
1.00 - 1.49	.	.	.	.	.	.	.	.	.	.	.	.	0
1.50 - 1.99	.	.	.	.	.	.	.	.	.	.	.	.	0
2.00 - 2.49	.	.	.	.	.	.	.	.	.	.	.	.	0
2.50 - 2.99	.	.	.	.	.	Gage Inoperative		.	.	.	.	.	0
3.00 - 3.49	.	.	.	.	.	.	.	.	.	.	.	.	0
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	0
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0

September 1992, Gage 645  
Percent Occurrence(X100) of Height and Period

Height(m)	Period(sec)												Total
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer	
0.00 - 0.49	.	.	.	.	.	.	.	.	.	.	.	.	0
0.50 - 0.99	.	.	.	.	.	.	.	.	.	.	.	.	0
1.00 - 1.49	.	.	.	.	.	.	.	.	.	.	.	.	0
1.50 - 1.99	.	.	.	.	.	.	.	.	.	.	.	.	0
2.00 - 2.49	.	.	.	.	.	.	.	.	.	.	.	.	0
2.50 - 2.99	.	.	.	.	.	Gage Inoperative		.	.	.	.	.	0
3.00 - 3.49	.	.	.	.	.	.	.	.	.	.	.	.	0
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	0
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0

(Continued)

(Sheet 3 of 4)

**Table E2 (Concluded)**

October 1992, Gage 645													Total
Percent Occurrence(X100) of Height and Period													
Height(m)	Period(sec)												
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer	
0.00 - 0.49	.	.	.	.	.	.	.	.	.	.	.	.	0
0.50 - 0.99	.	.	.	.	.	.	.	.	.	.	.	.	0
1.00 - 1.49	.	.	.	.	.	.	.	.	.	.	.	.	0
1.50 - 1.99	.	.	.	.	.	.	.	.	.	.	.	.	0
2.00 - 2.49	.	.	.	.	.	.	.	.	.	.	.	.	0
2.50 - 2.99	.	.	.	.	.	.	.	.	.	.	.	.	0
3.00 - 3.49	.	.	.	.	.	.	.	.	.	.	.	.	0
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	0
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0

November 1992, Gage 645													Total
Percent Occurrence(X100) of Height and Period													
Height(m)	Period(sec)												
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer	
0.00 - 0.49	.	132	921	921	.	.	263	526	658	.	.	.	3421
0.50 - 0.99	.	.	526	2105	1447	395	263	395	789	.	263	.	6183
1.00 - 1.49	.	.	.	.	395	.	.	.	.	.	.	.	395
1.50 - 1.99	.	.	.	.	.	.	.	.	.	.	.	.	0
2.00 - 2.49	.	.	.	.	.	.	.	.	.	.	.	.	0
2.50 - 2.99	.	.	.	.	.	.	.	.	.	.	.	.	0
3.00 - 3.49	.	.	.	.	.	.	.	.	.	.	.	.	0
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	0
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	0	132	1447	3026	1842	395	526	921	1447	0	263	0	0

December 1992, Gage 645													Total
Percent Occurrence(X100) of Height and Period													
Height(m)	Period(sec)												
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer	
0.00 - 0.49	.	174	1130	783	87	.	87	522	522	87	261	174	3827
0.50 - 0.99	.	87	435	1130	783	174	261	609	261	87	.	.	4088
1.00 - 1.49	.	.	.	87	261	87	.	.	87	435	435	87	1479
1.50 - 1.99	.	.	.	.	.	.	.	.	.	87	435	87	609
2.00 - 2.49	.	.	.	.	.	.	.	.	.	.	.	.	0
2.50 - 2.99	.	.	.	.	.	.	.	.	.	.	.	.	0
3.00 - 3.49	.	.	.	.	.	.	.	.	.	.	.	.	0
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	0
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	0	261	1565	2000	1131	261	348	783	1218	870	1218	348	0

**Table E3**  
**Annual Joint Distribution of  $H_{mo}$  versus  $T_p$  (All Years)**

Height(m)	Annual 1980-1992, Gage 645												Total
	Percent Occurrence(X100) of Height and Period												
	Period(sec)												
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer	
0.00 - 0.49	74	129	264	435	281	293	564	627	695	309	409	78	4158
0.50 - 0.99	23	178	466	931	619	294	312	318	497	126	244	23	4031
1.00 - 1.49	.	2	57	328	354	161	111	88	173	82	133	6	1495
1.50 - 1.99	.	.	.	10	48	32	21	33	60	30	56	6	296
2.00 - 2.49	.	.	.	.	1	2	1	1	5	4	5	.	19
2.50 - 2.99	.	.	.	.	.	.	.	.	.	.	.	.	0
3.00 - 3.49	.	.	.	.	.	.	.	.	.	.	.	.	0
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	0
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	97	309	787	1704	1303	782	1009	1067	1430	551	847	113	

**Table E4**  
**Monthly Joint Distribution of  $H_{mo}$  versus  $T_p$  (All Years)**

January 1980-1992, Gage 645  
 Percent Occurrence(X100) of Height and Period

Height(m)	Period(sec)												Total
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer	
0.00 - 0.49	79	121	307	407	228	200	357	642	678	228	286	86	3619
0.50 - 0.99	29	200	435	999	671	207	243	293	542	79	214	14	3926
1.00 - 1.49	.	.	107	600	557	250	207	71	236	29	136	.	2193
1.50 - 1.99	.	.	.	7	21	14	14	21	79	43	50	.	249
2.00 - 2.49	.	.	.	.	.	.	.	.	.	7	7	.	14
2.50 - 2.99	.	.	.	.	.	.	.	.	.	.	.	.	0
3.00 - 3.49	.	.	.	.	.	.	.	.	.	.	.	.	0
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	0
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	108	321	849	2013	1477	671	821	1027	1535	386	693	100	0

February 1980-1992, Gage 645  
 Percent Occurrence(X100) of Height and Period

Height(m)	Period(sec)												Total
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer	
0.00 - 0.49	119	97	224	350	164	194	380	373	656	127	380	7	3071
0.50 - 0.99	45	179	470	955	544	254	231	336	649	119	268	.	4050
1.00 - 1.49	.	.	52	567	641	254	119	119	276	164	186	.	2378
1.50 - 1.99	.	.	.	15	97	60	37	30	52	45	134	.	470
2.00 - 2.49	.	.	.	.	7	.	.	.	7	7	7	.	28
2.50 - 2.99	.	.	.	.	.	.	.	.	.	.	.	.	0
3.00 - 3.49	.	.	.	.	.	.	.	.	.	.	.	.	0
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	0
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	164	276	746	1887	1453	762	767	858	1640	462	975	7	0

March 1980-1992, Gage 645  
 Percent Occurrence(X100) of Height and Period

Height(m)	Period(sec)												Total
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer	
0.00 - 0.49	135	88	209	351	175	121	337	412	506	169	371	.	2874
0.50 - 0.99	47	196	459	1026	553	270	277	412	668	189	385	7	4489
1.00 - 1.49	.	7	108	378	398	162	135	108	250	155	263	.	1964
1.50 - 1.99	.	.	.	13	61	47	40	94	169	88	115	.	627
2.00 - 2.49	.	.	.	.	7	.	7	.	.	13	13	.	47
2.50 - 2.99	.	.	.	.	.	.	.	.	.	.	.	.	0
3.00 - 3.49	.	.	.	.	.	.	.	.	.	.	.	.	0
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	0
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	182	291	776	1768	1194	607	796	1026	1593	614	1147	7	0

(Continued)

(Sheet 1 of 4)

**Table E4 (Continued)**

April 1980-1992, Gage 645  
Percent Occurrence(X100) of Height and Period

Height(m)	Period(sec)													Total
	2.0-	3.0-	4.0-	5.0-	6.0-	7.0-	8.0-	9.0-	10.0-	12.0-	14.0-	16.0-		
	2.9	3.9	4.9	5.9	6.9	7.9	8.9	9.9	11.9	13.9	15.9	Longer		
0.00 - 0.49	51	152	253	426	282	275	455	578	788	347	455	22	4084	
0.50 - 0.99	29	246	441	838	542	282	405	340	658	101	354	7	4243	
1.00 - 1.49	.	7	51	246	275	116	116	123	210	58	137	.	1339	
1.50 - 1.99	.	.	.	14	51	29	58	29	79	22	22	.	304	
2.00 - 2.49	.	.	.	.	.	.	.	14	22	.	.	.	36	
2.50 - 2.99	.	.	.	.	.	.	.	.	.	.	.	.	0	
3.00 - 3.49	.	.	.	.	.	.	.	.	.	.	.	.	0	
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	0	
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0	
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0	
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0	
Total	80	405	745	1524	1150	702	1034	1084	1757	528	968	29		

May 1980-1992, Gage 645  
Percent Occurrence(X100) of Height and Period

Height(m)	Period(sec)													Total
	2.0-	3.0-	4.0-	5.0-	6.0-	7.0-	8.0-	9.0-	10.0-	12.0-	14.0-	16.0-		
	2.9	3.9	4.9	5.9	6.9	7.9	8.9	9.9	11.9	13.9	15.9	Longer		
0.00 - 0.49	98	167	279	482	279	412	684	677	886	314	502	49	4829	
0.50 - 0.99	21	181	579	851	670	363	349	300	461	84	161	21	4041	
1.00 - 1.49	.	.	42	188	161	42	91	112	154	42	91	.	923	
1.50 - 1.99	.	.	.	21	63	28	7	21	35	14	14	.	203	
2.00 - 2.49	.	.	.	.	.	.	7	.	.	.	.	.	7	
2.50 - 2.99	.	.	.	.	.	.	.	.	.	.	.	.	0	
3.00 - 3.49	.	.	.	.	.	.	.	.	.	.	.	.	0	
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	0	
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0	
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0	
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0	
Total	119	348	900	1542	1173	845	1138	1110	1536	454	768	70		

June 1980-1992, Gage 645  
Percent Occurrence(X100) of Height and Period

Height(m)	Period(sec)													Total
	2.0-	3.0-	4.0-	5.0-	6.0-	7.0-	8.0-	9.0-	10.0-	12.0-	14.0-	16.0-		
	2.9	3.9	4.9	5.9	6.9	7.9	8.9	9.9	11.9	13.9	15.9	Longer		
0.00 - 0.49	109	233	365	807	543	567	1110	1056	606	380	217	124	6117	
0.50 - 0.99	23	163	365	784	411	256	349	326	342	54	47	23	3143	
1.00 - 1.49	.	.	39	155	163	54	62	39	132	.	54	.	698	
1.50 - 1.99	.	.	.	.	23	8	8	.	.	.	.	.	39	
2.00 - 2.49	.	.	.	.	.	.	.	.	.	.	.	.	0	
2.50 - 2.99	.	.	.	.	.	.	.	.	.	.	.	.	0	
3.00 - 3.49	.	.	.	.	.	.	.	.	.	.	.	.	0	
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	0	
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0	
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0	
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0	
Total	132	396	769	1746	1140	885	1529	1421	1080	434	318	147		

(Continued)

(Sheet 2 of 4)

**Table E4 (Continued)**

July 1980-1992, Gage 645  
Percent Occurrence(X100) of Height and Period

Height(m)	Period(sec)												Total
	2.0-	3.0-	4.0-	5.0-	6.0-	7.0-	8.0-	9.0-	10.0-	12.0-	14.0-	16.0-	
	2.9	3.9	4.9	5.9	6.9	7.9	8.9	9.9	11.9	13.9	15.9	Longer	
0.00 - 0.49	53	197	439	659	522	568	1408	1143	810	416	522	159	6896
0.50 - 0.99	.	151	401	704	500	257	295	189	159	76	53	45	2830
1.00 - 1.49	.	.	8	136	38	15	23	.	38	.	8	.	266
1.50 - 1.99	.	.	.	.	8	.	.	.	.	.	.	.	8
2.00 - 2.49	.	.	.	.	.	.	.	.	.	.	.	.	0
2.50 - 2.99	.	.	.	.	.	.	.	.	.	.	.	.	0
3.00 - 3.49	.	.	.	.	.	.	.	.	.	.	.	.	0
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	0
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	53	348	848	1499	1068	840	1726	1332	1007	492	583	204	0

August 1980-1992, Gage 645  
Percent Occurrence(X100) of Height and Period

Height(m)	Period(sec)												Total
	2.0-	3.0-	4.0-	5.0-	6.0-	7.0-	8.0-	9.0-	10.0-	12.0-	14.0-	16.0-	
	2.9	3.9	4.9	5.9	6.9	7.9	8.9	9.9	11.9	13.9	15.9	Longer	
0.00 - 0.49	52	155	237	533	570	473	814	1065	1043	370	518	59	5889
0.50 - 0.99	7	192	518	858	518	318	333	237	259	30	111	.	3381
1.00 - 1.49	.	.	30	163	170	74	7	15	37	37	67	.	652
1.50 - 1.99	.	.	.	.	15	22	7	.	22	15	.	.	81
2.00 - 2.49	.	.	.	.	.	.	.	.	.	.	.	.	0
2.50 - 2.99	.	.	.	.	.	.	.	.	.	.	.	.	0
3.00 - 3.49	.	.	.	.	.	.	.	.	.	.	.	.	0
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	0
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	59	347	785	1554	1273	887	1213	1317	1361	452	696	59	0

September 1980-1992, Gage 645  
Percent Occurrence(X100) of Height and Period

Height(m)	Period(sec)												Total
	2.0-	3.0-	4.0-	5.0-	6.0-	7.0-	8.0-	9.0-	10.0-	12.0-	14.0-	16.0-	
	2.9	3.9	4.9	5.9	6.9	7.9	8.9	9.9	11.9	13.9	15.9	Longer	
0.00 - 0.49	62	46	147	279	147	325	433	511	642	325	426	54	3397
0.50 - 0.99	39	193	449	759	557	433	441	433	534	255	488	15	4596
1.00 - 1.49	.	.	46	457	348	217	155	124	147	85	139	15	1733
1.50 - 1.99	.	.	.	15	46	62	15	8	15	23	54	8	246
2.00 - 2.49	.	.	.	.	.	.	.	.	.	8	15	.	23
2.50 - 2.99	.	.	.	.	.	.	.	.	.	.	.	.	0
3.00 - 3.49	.	.	.	.	.	.	.	.	.	.	.	.	0
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	0
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	101	239	642	1510	1098	1037	1044	1076	1338	696	1122	92	0

(Continued)

(Sheet 3 of 4)



**Table E4 (Concluded)**

October 1980-1992, Gage 645  
Percent Occurrence(X100) of Height and Period

Height(m)	Period(sec)												Total
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer	
0.00 - 0.49	30	75	113	174	158	121	302	325	574	279	377	60	2588
0.50 - 0.99	8	91	423	853	664	226	385	453	853	204	302	38	4500
1.00 - 1.49	.	.	45	408	430	279	181	166	347	196	196	23	2271
1.50 - 1.99	.	.	.	15	68	60	30	68	136	60	91	53	581
2.00 - 2.49	.	.	.	.	.	8	.	.	23	15	15	.	61
2.50 - 2.99	.	.	.	.	.	.	.	.	.	.	.	.	0
3.00 - 3.49	.	.	.	.	.	.	.	.	.	.	.	.	0
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	0
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	38	166	581	1450	1320	694	898	1012	1933	754	981	174	

November 1980-1992, Gage 645  
Percent Occurrence(X100) of Height and Period

Height(m)	Period(sec)												Total
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer	
0.00 - 0.49	23	60	265	385	159	174	378	302	484	333	370	151	3084
0.50 - 0.99	15	144	567	1187	839	423	257	280	431	219	234	53	4649
1.00 - 1.49	.	8	45	295	552	280	106	76	121	159	159	30	1831
1.50 - 1.99	.	.	.	15	68	38	15	91	91	30	83	.	431
2.00 - 2.49	.	.	.	.	.	.	.	.	8	.	.	.	8
2.50 - 2.99	.	.	.	.	.	.	.	.	.	.	.	.	0
3.00 - 3.49	.	.	.	.	.	.	.	.	.	.	.	.	0
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	0
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	38	212	877	1882	1618	915	756	749	1135	741	846	234	

December 1980-1992, Gage 645  
Percent Occurrence(X100) of Height and Period

Height(m)	Period(sec)												Total
	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 11.9	12.0- 13.9	14.0- 15.9	16.0- Longer	
0.00 - 0.49	71	150	336	386	171	121	171	479	657	436	471	171	3620
0.50 - 0.99	14	193	479	1329	936	250	193	221	386	107	293	50	4451
1.00 - 1.49	.	.	100	336	507	193	71	100	121	57	150	7	1642
1.50 - 1.99	.	.	.	7	50	14	21	29	29	14	100	7	271
2.00 - 2.49	.	.	.	.	.	14	.	.	.	.	.	.	14
2.50 - 2.99	.	.	.	.	.	.	.	.	.	.	.	.	0
3.00 - 3.49	.	.	.	.	.	.	.	.	.	.	.	.	0
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	0
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	85	343	915	2058	1664	592	456	829	1193	614	1014	235	

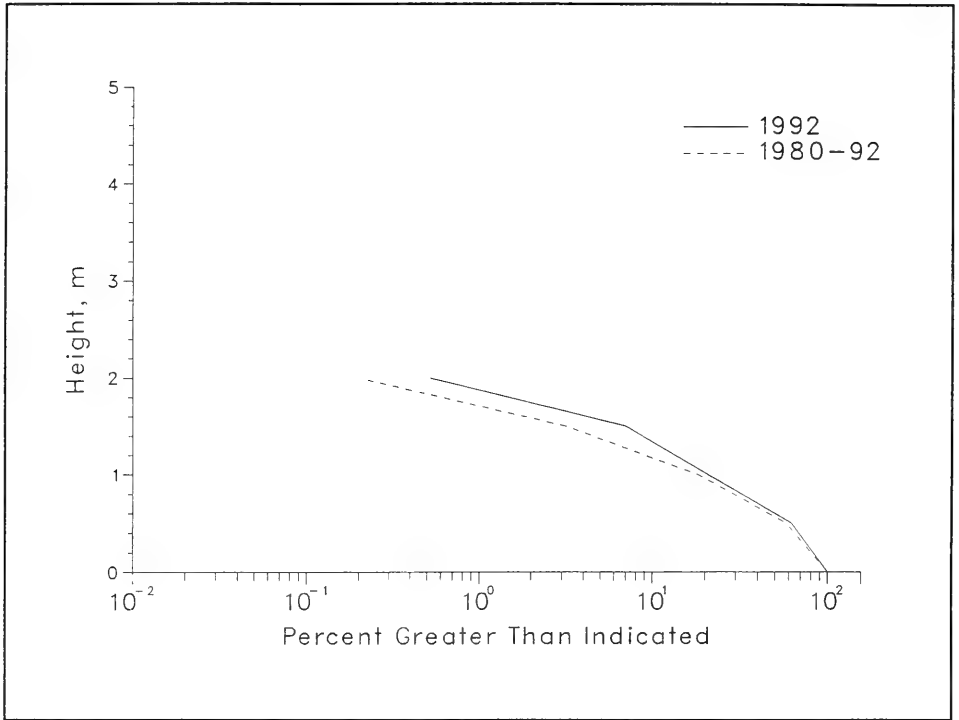


Figure E2. Annual cumulative wave height distributions for Gage 645

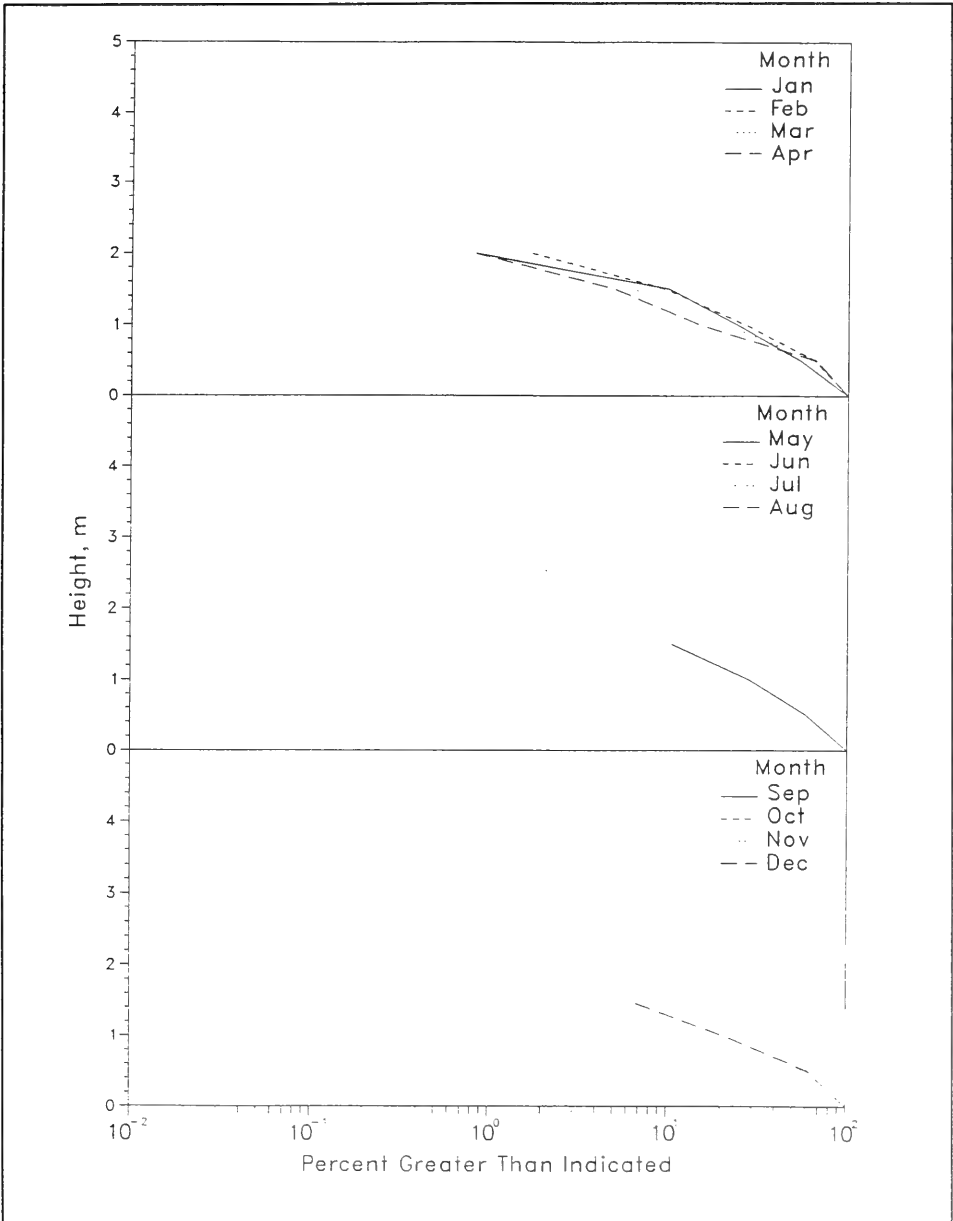


Figure E3. 1992 monthly wave height distributions for Gage 645

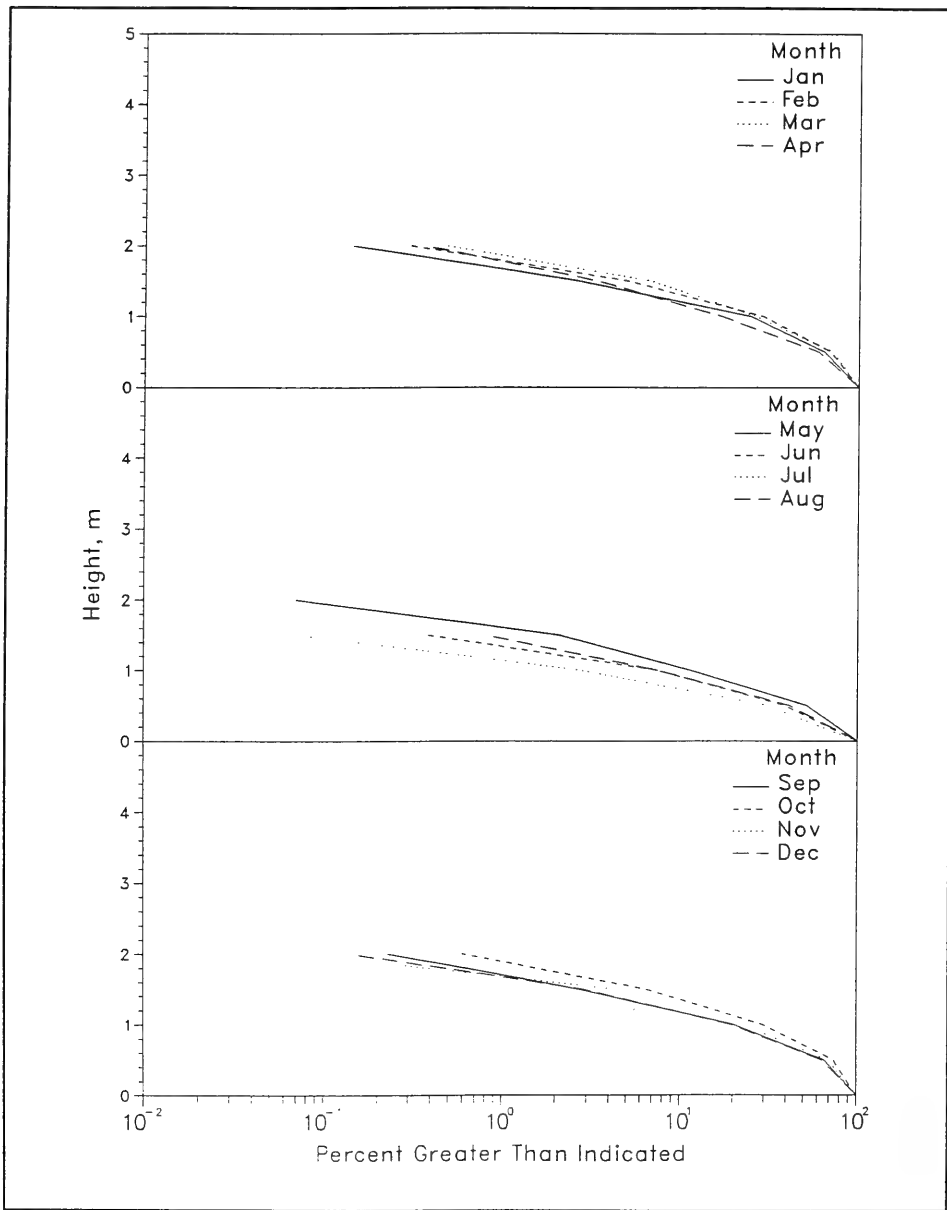


Figure E4. 1980-1992 monthly wave height distributions for Gage 645

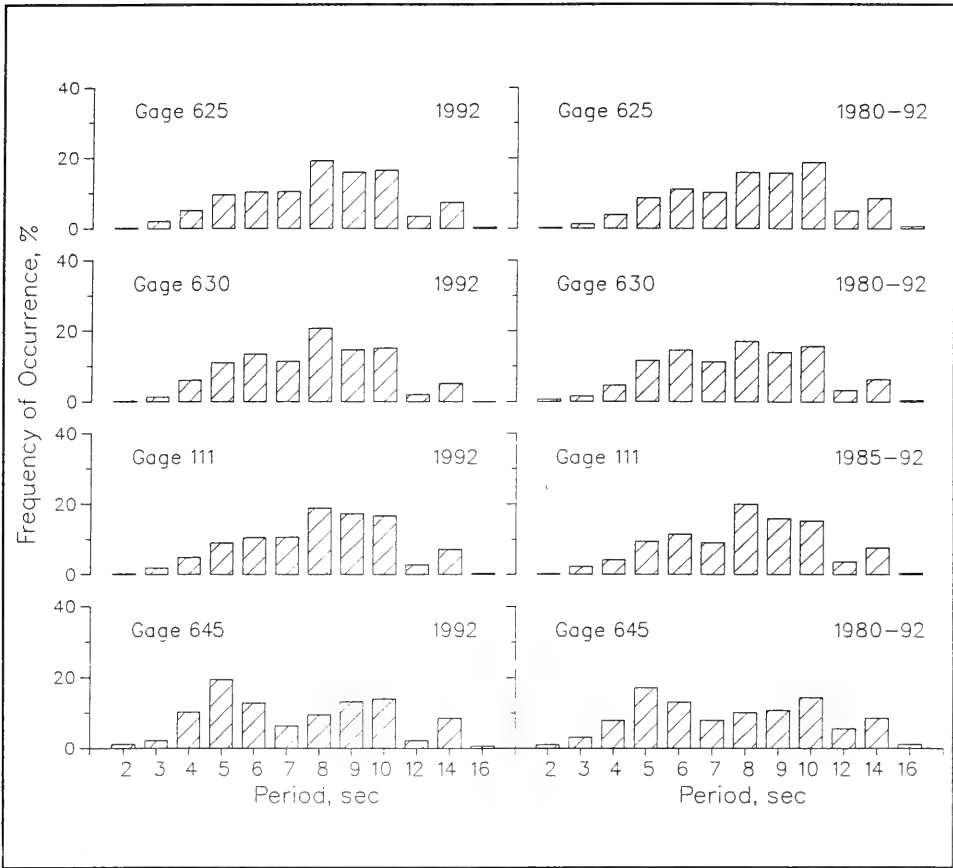


Figure E5. Annual wave period distributions for all gages

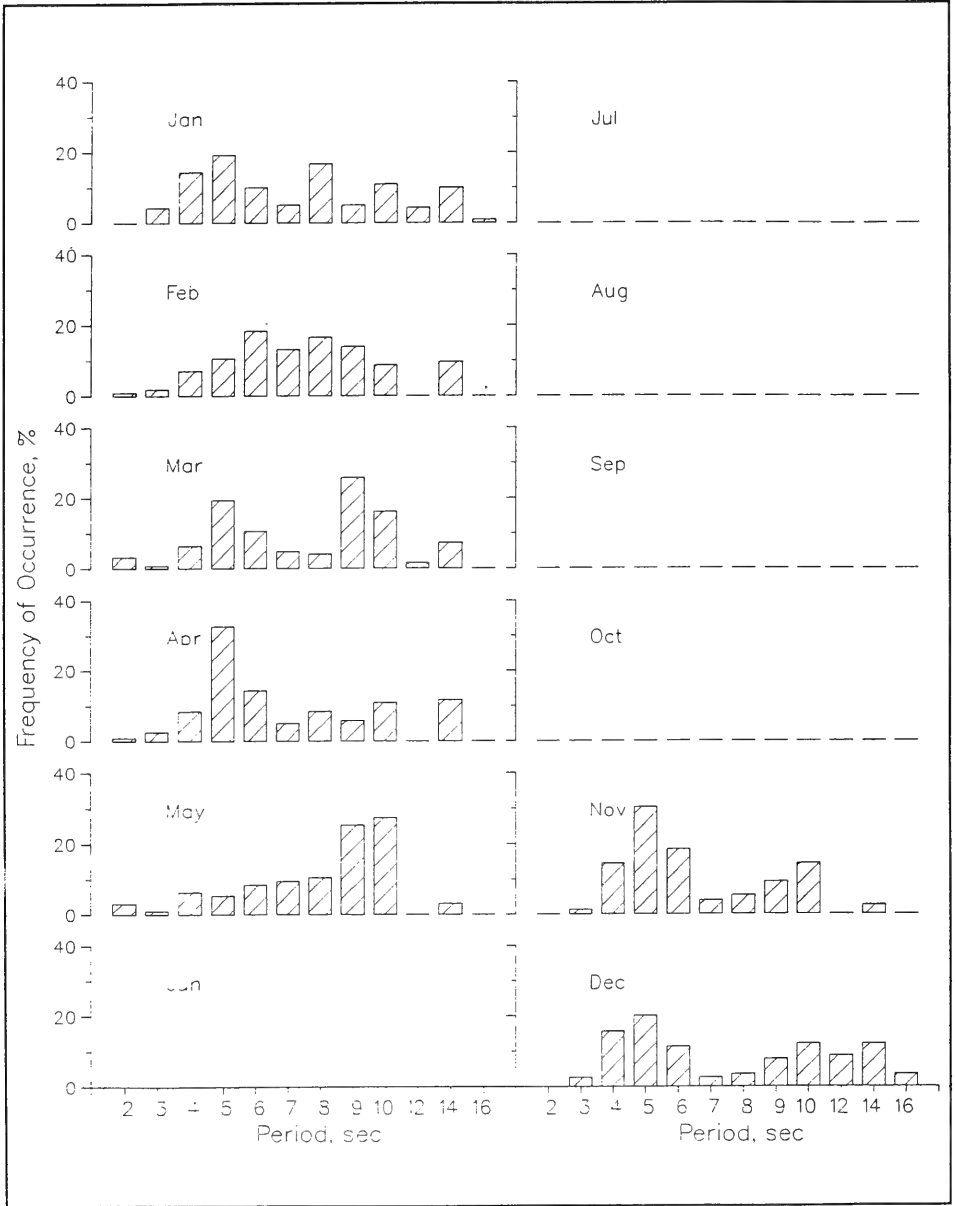


Figure E6. 1992 monthly wave period distributions for Gage 645

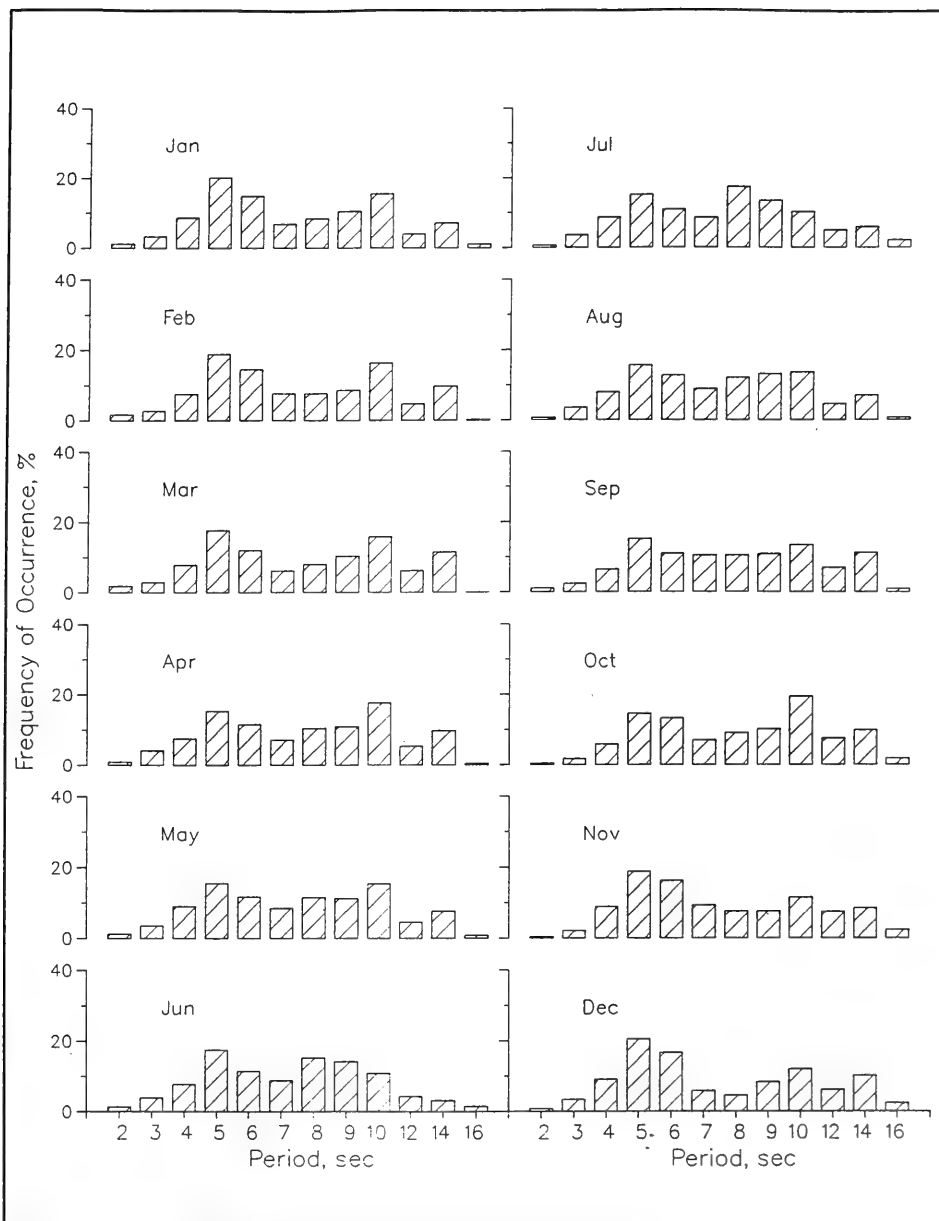


Figure E7. 1980-1992 monthly wave period distributions for Gage 645

**Table E5**  
**1992 persistence of  $H_{mo}$  for Gage 645**

Height (m)	Consecutive Day(s) or Longer																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19+	
0.5	33	30	25	21	18	16	14	13	9	12	10	9		8					6	5
1.0	51	30	19	13	9	8	6		5	2										
1.5	29	15	9	5	1															
2.0	3	2	1																	
2.5	3	2	1																	
3.0	2	1																		
3.5	2	1																		
4.0																				

**Table E6**  
**1980 through 1992 persistence of  $H_{mo}$  for Gage 645**

Height (m)	Consecutive Day(s) or Longer																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19+	
0.5	42	35	29	24	19	15	12	11	9	8	7	6		5	4					3
1.0	44	26	15	9	5	4	2		1											
1.5	15	6	3	2	1															
2.0	3		1																	
2.5	1																			
3.0	1																			
3.5																				
4.0																				



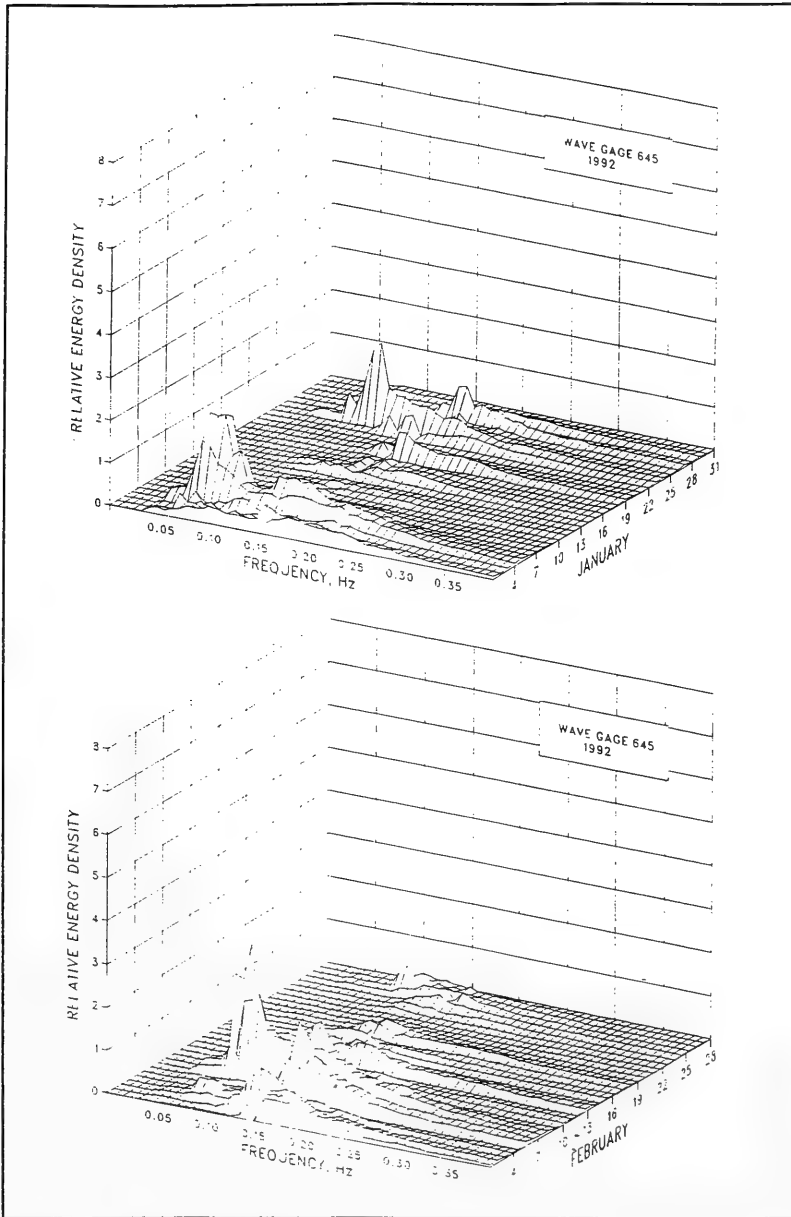


Figure E8. 1992 monthly spectra for Gage 645 (Sheet 1 of 6)

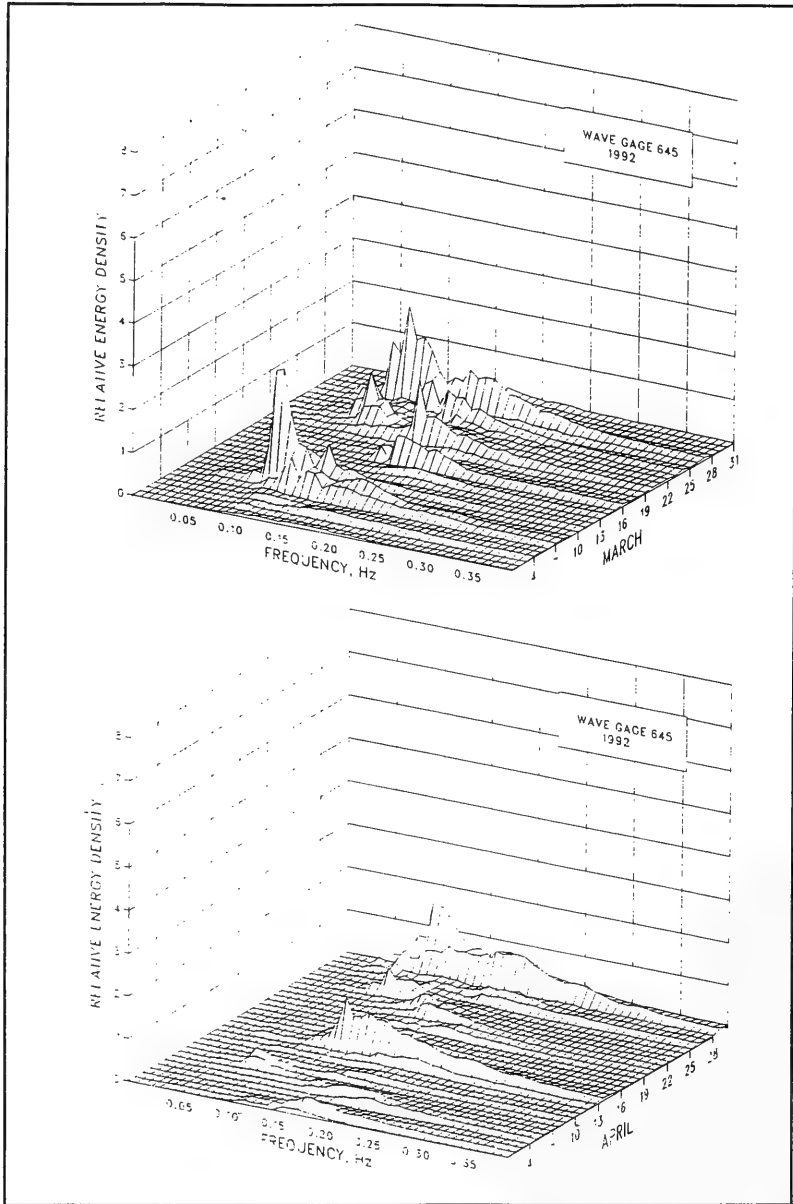


Figure E8. (Sheet 2 of 6)

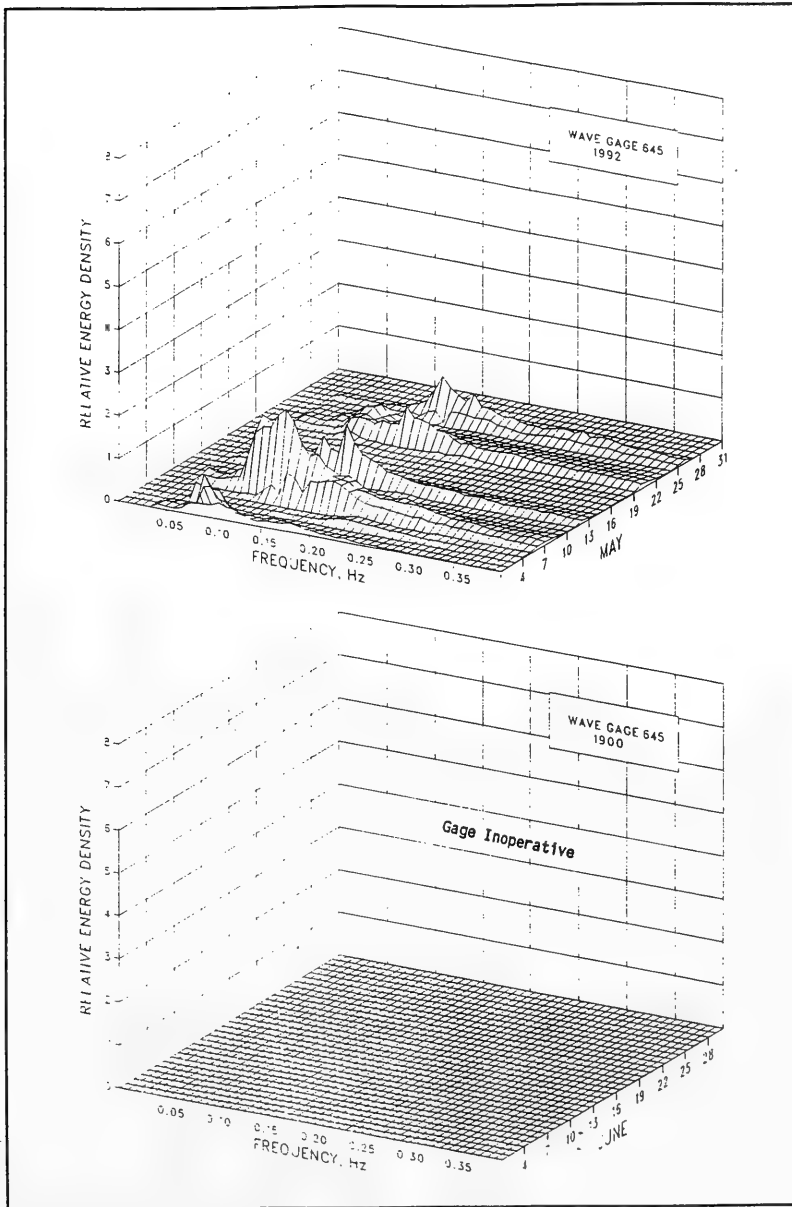


Figure E8. (Sheet 3 of 6)

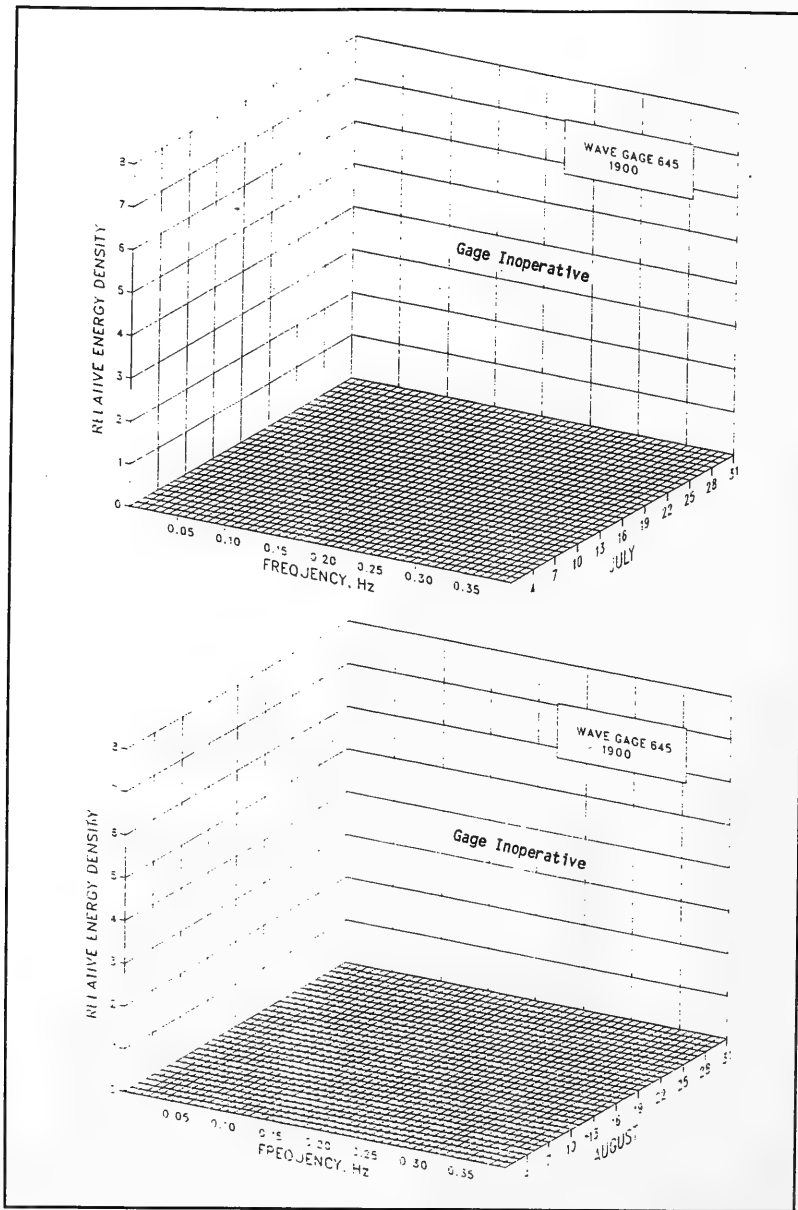


Figure E8. (Sheet 4 of 6)

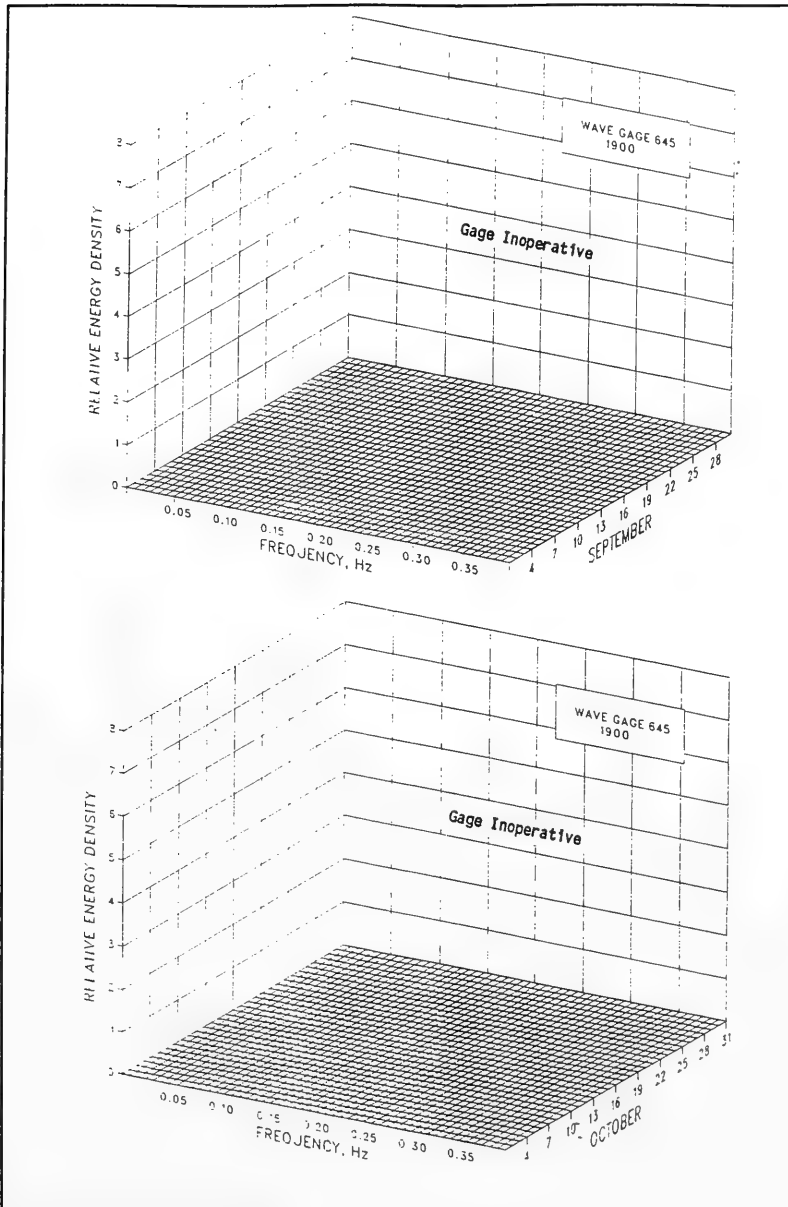


Figure E8. (Sheet 5 of 6)

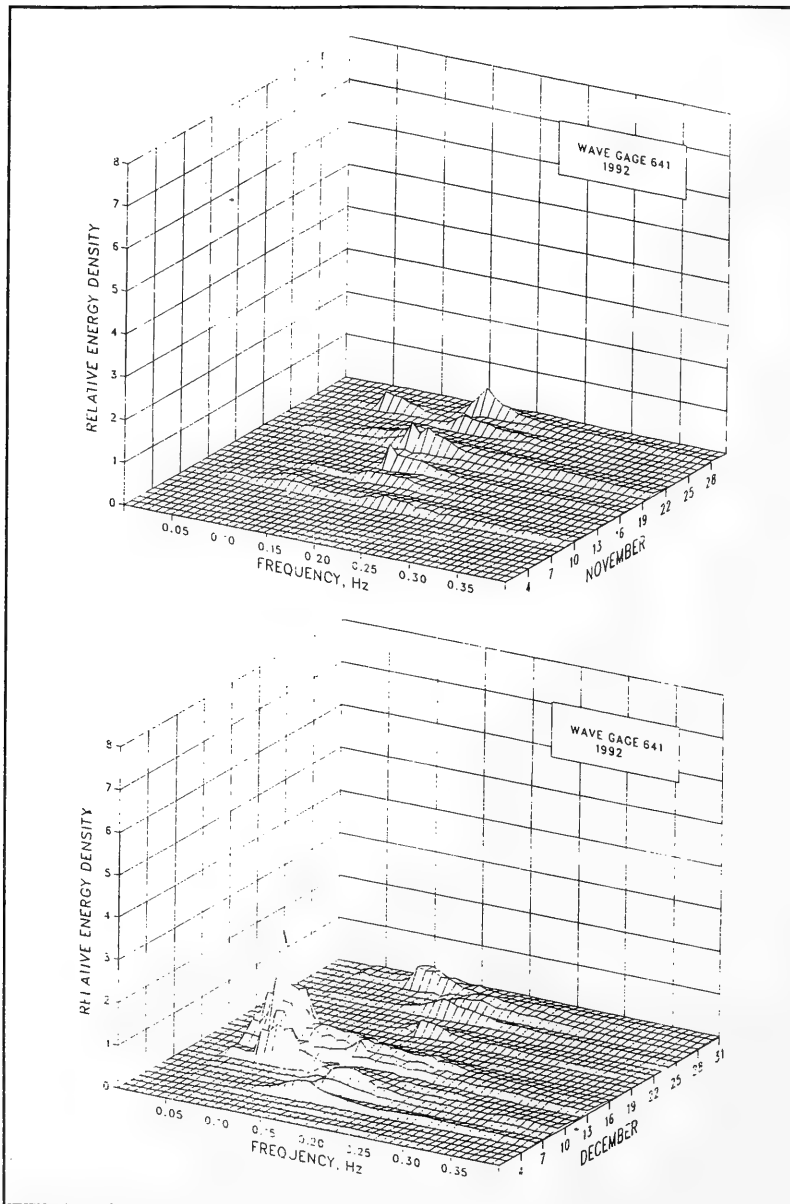


Figure E8. (Sheet 6 of 6)

**Table E7**  
**Wave statistics for Gage 645**

Month	1992							1980-1992							
	Height			Date	Period			Number	Height			Date	Period		
	Mean	Std.	Extreme		Mean	Std.	Number		Mean	Std.	Extreme		Mean	Std.	Number
m	m	m	sec	sec	Obs.	m	m	m	sec	sec	Obs.				
Jan	0.8	0.5	2.0	5	8.0	3.2	120	0.7	0.4	2.0	1980	8.0	3.2	1401	
Feb	0.8	0.5	2.2	8	8.1	2.4	115	0.8	0.4	2.2	1992	8.1	3.1	1341	
Mar	0.8	0.5	2.0	26	8.2	2.8	124	0.8	0.5	2.3	1980	8.3	3.3	1482	
Apr	0.7	0.4	2.2	29	7.6	3.0	120	0.7	0.4	2.3	1987	8.4	3.2	1384	
May	0.8	0.5	2.0	6	8.6	2.4	95	0.6	0.4	2.0	1987	8.1	3.2	1433	
Jun							0	0.5	0.3	1.7	1990	7.8	3.0	1288	
Jul							0	0.5	0.3	1.6	1990	8.2	3.2	1321	
Aug							0	0.6	0.3	1.7	1982	8.1	3.1	1352	
Sep							0	0.7	0.4	2.1	1985	8.6	3.2	1292	
Oct							0	0.8	0.5	2.2	1982	8.8	3.3	1325	
Nov	0.6	0.3	1.1	20	7.1	2.4	76	0.8	0.4	2.0	1981	8.3	3.5	1323	
Dec	0.7	0.5	1.7	15	8.8	4.2	115	0.7	0.4	2.2	1989	8.2	3.6	1400	
Annual	0.8	0.5	2.2	Apr	8.1	3.1	765	0.7	0.4	2.3	Apr 1987	8.2	3.2	16342	









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