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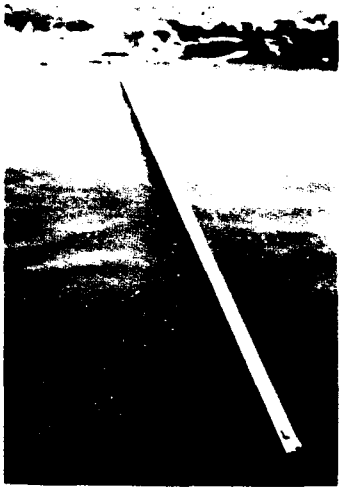

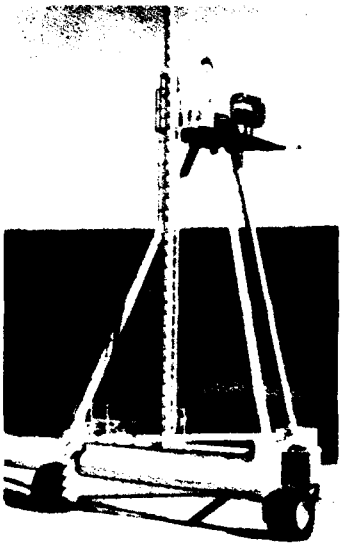

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COASTAL ENGINEERING RESEARCH CENTER

TECHNICAL REPORT CERC-92-3

(2)

ANNUAL DATA SUMMARY FOR 1990 CERC FIELD RESEARCH FACILITY

Volume II

APPENDIXES C THROUGH E

by

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APPENDIX C: WAVE DATA FOR GAGE 111

1. Wave data summaries for Gage 111 are presented for 1990 and for 1985 through 1990 in the following forms:

Daily H_{mo} and T_p

2. 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

3. Annual and monthly joint distributions tables are presented in Tables C1 and C2, and data for 1985 through 1990 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 total 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

4. Annual and monthly wave height distributions for 1990 are plotted in cumulative form in Figures C2 and C3. Data for 1985 through 1990 are in Figure C4.

Peak Spectral Wave Period Distributions

5. Annual and monthly peak wave period, T_p, distribution histograms for 1990 are presented in Figures C5 and C6. Data for 1985 through 1990 are in Figure C7.

Persistence of Wave Heights

6. Table C5 shows the number of times in 1990 when the specified wave height was equaled or exceeded at least once during each day for the duration (consecutive days). Data for 1985 through 1990 are given in Table C6. An example is shown below:

Height	Consecutive Day(s) or Longer																	
m	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 3 times the height exceeded 1 m for shorter durations.

Spectra

7. Monthly spectra for the offshore Waverider buoy (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-dimension surface drawing routine. Consequently, extremely high- and low-energy density values are modified to produce 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.

8. Monthly and annual wave statistics for Gage 111 for 1990 and for 1985 through 1990 are presented in Table C7.

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

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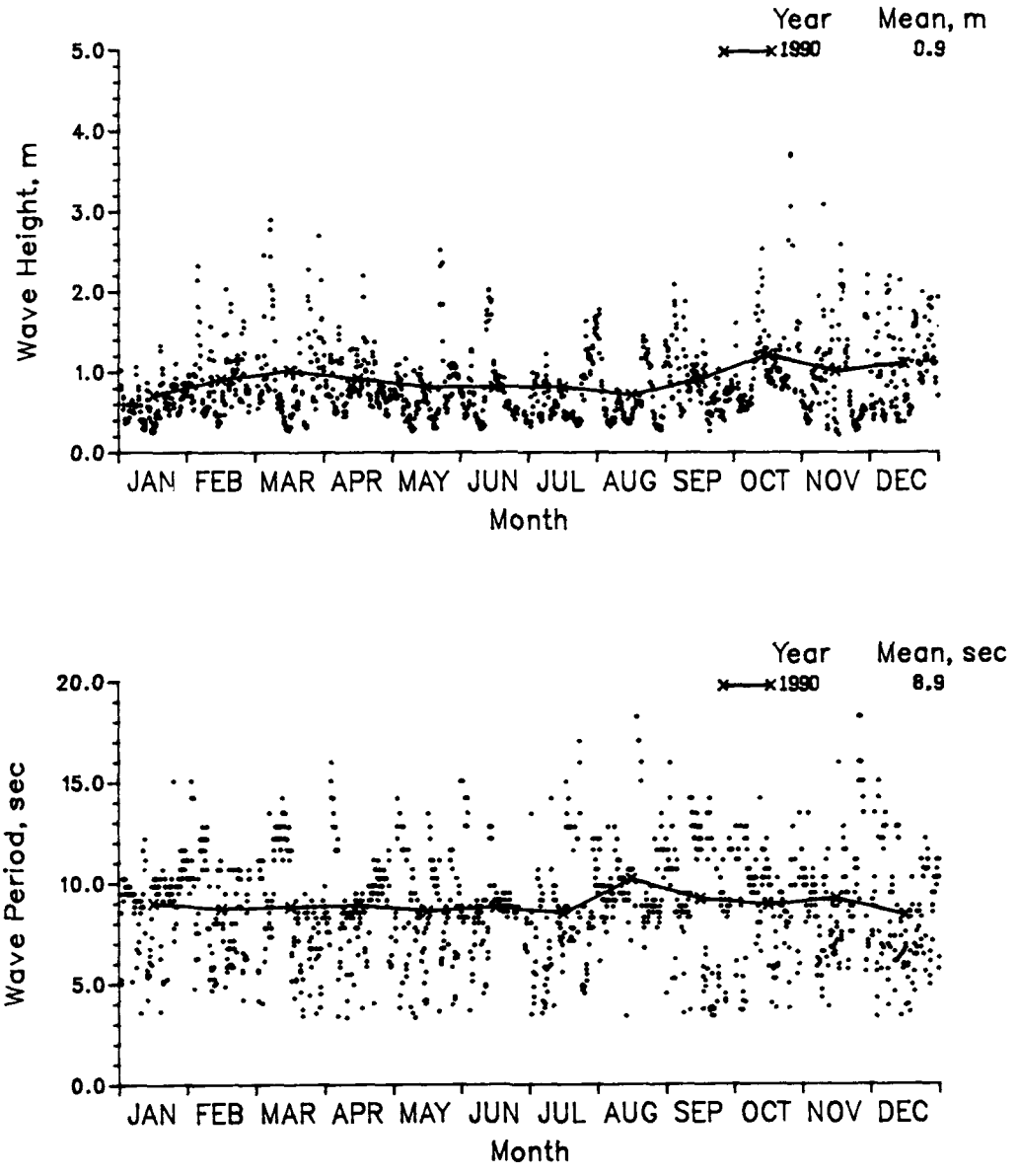

Figure C1. 1990 daily wave height and period values with monthly means for Gage 111

Table C1

Annual Joint Distribution of H_{mo} versus T_p

Annual 1990, Gage 111
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	Total
0.00 - 0.49	.	78	14	28	56	127	479	585	451	134	310	21	2283
0.50 - 0.99	.	183	282	317	331	338	1050	853	987	134	395	49	4919
1.00 - 1.49	.	28	120	338	275	134	296	233	296	42	99	.	1861
1.50 - 1.99	.	.	.	120	176	99	70	70	70	.	49	.	654
2.00 - 2.49	.	.	.	.	70	42	14	14	21	7	21	.	189
2.50 - 2.99	.	.	.	.	21	21	.	.	7	.	7	.	56
3.00 - 3.49	.	.	.	.	.	.	.	7	7	.	.	.	14
3.50 - 3.99	.	.	.	.	.	.	7	.	7	.	.	.	14
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	7	.	.	.	.	7
Total	0	289	416	803	929	761	1916	1769	1846	317	881	70	

Table C2

Monthly Joint Distribution of H_{mo} versus T_p

January 1990, Gage 111
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	Total
0.00 - 0.49	.	81	.	163	.	163	244	1707	894	.	81	.	3333
0.50 - 0.99	.	81	81	732	407	244	569	2276	1707	.	81	.	6178
1.00 - 1.49	.	.	.	163	163		.	163	.	.	.	.	489
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	162	81	1058	570	407	813	4146	2601	0	162	0	

February 1990, Gage 111
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	Total
0.00 - 0.49	.	.	.	90	.	.	180	180	631	.	90	.	1171
0.50 - 0.99	.	.	360	450	631	631	811	721	1532	180	541	.	5857
1.00 - 1.49	.	.	90	450	450	90	360	.	450	.	180	.	2070
1.50 - 1.99	.	.	.	270	180		90	.	90	.	.	.	630
2.00 - 2.49	.	.	.	.	180	90	.	.	.	.	.	.	270
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	450	1260	1441	811	1441	901	2703	180	811	0	

March 1990, Gage 111
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	Total
0.00 - 0.49	.	.	.	83	248	.	413	83	413	248	496	.	1984
0.50 - 0.99	.	331	83	331	.	579	1074	165	826	248	744	.	4381
1.00 - 1.49	.	.	496	413	331	83	248	331	.	.	165	.	2067
1.50 - 1.99	.	.	.	.	248	165	83	83	165	.	83	.	827
2.00 - 2.49	.	.	.	.	165	.	165	165	.	.	.	.	495
2.50 - 2.99	.	.	.	.	83	165	.	.	.	.	.	.	248
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	579	827	1075	[illegible]	1983	827	1404	496	1488	0	

(Continued)

Table C2 (Continued)

April 1990, 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	.	84	.	.	.	.	84	252	252	.	84	.	756
0.50 - 0.99	.	84	168	252	336	588	1849	1765	1176	84	336	.	6638
1.00 - 1.49	.	84	84	336	336	336	420	168	252	168	168	.	2352
1.50 - 1.99	.	.	.	.	168	.	.	.	.	.	.	.	168
2.00 - 2.49	.	.	.	.	84	.	.	.	.	.	.	.	84
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	252	252	588	924	924	2353	2185	1680	252	588	0	

May 1990, 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	.	161	.	.	.	161	242	806	887	.	161	.	2418
0.50 - 0.99	.	81	323	484	565	484	1855	403	806	323	484	.	5808
1.00 - 1.49	.	242	161	161	323	81	81	.	161	81	.	.	1291
1.50 - 1.99	.	.	.	81	81	81	.	.	.	.	.	.	243
2.00 - 2.49	.	.	.	.	81	81	.	.	.	.	.	.	162
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	484	484	726	1131	888	2178	1209	1854	404	645	0	

June 1990, 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	.	.	.	.	303	101	1818	404	.	303	202	.	3131
0.50 - 0.99	.	101	404	.	404	101	2323	1616	.	101	101	.	5151
1.00 - 1.49	.	.	.	202	101	.	.	303	.	.	.	.	606
1.50 - 1.99	.	.	.	.	202	202	101	101	.	.	303	.	909
2.00 - 2.49	.	.	.	.	.	.	.	.	.	.	202	.	202
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	101	404	202	1010	404	4242	2424	0	404	808	0	

(Continued)

Table C2 (Continued)

July 1990, Gage 111
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	Total
0.00 - 0.49	.	82	164	.	.	492	738	738	246	410	902	82	3854
0.50 - 0.99	.	246	902	574	410	820	820	164	328	.	.	.	4264
1.00 - 1.49	.	.	.	328	82	246	328	.	164	.	164	.	1312
1.50 - 1.99	.	.	.	82	.	.	.	246	246	.	.	.	574
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	328	1066	984	492	1558	1886	1148	984	410	1066	82	

August 1990, Gage 111
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	Total
0.00 - 0.49	.	84	.	.	.	168	1008	1681	1176	84	336	.	4537
0.50 - 0.99	.	.	.	.	.	84	504	1008	672	.	504	588	3360
1.00 - 1.49	.	.	84	.	168	84	840	420	168	.	168	.	1932
1.50 - 1.99	.	.	.	.	.	.	.	.	84	.	84	.	168
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	84	84	0	168	336	2352	3109	2100	84	1092	588	

September 1990, Gage 111
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	Total
0.00 - 0.49	.	250	.	.	.	83	333	250	167	250	167	.	1500
0.50 - 0.99	.	500	583	333	83	.	1167	417	1417	417	1000	.	5917
1.00 - 1.49	.	.	83	500	83	.	167	250	500	83	167	.	1833
1.50 - 1.99	.	.	.	83	.	83	250	83	167	.	.	.	666
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	750	666	916	249	166	1917	1000	2251	750	1334	0	

(Continued)

Table C2 (Concluded)

October 1990, Gage 111
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	Total
0.00 - 0.49	.	.	.	.	.	.	85	.	85	.	.	.	170
0.50 - 0.99	.	342	256	171	85	171	855	855	1624	.	513	.	4872
1.00 - 1.49	.	.	85	684	427	85	427	342	1026	85	85	.	3246
1.50 - 1.99	.	.	.	256	256	85	85	171	.	.	.	.	853
2.00 - 2.49	.	.	.	.	.	.	.	.	171	85	.	.	256
2.50 - 2.99	.	.	.	.	85	.	.	.	85	.	85	.	255
3.00 - 3.49	.	.	.	.	.	.	.	.	85	.	.	.	85
3.50 - 3.99	.	.	.	.	.	.	85	.	85	.	.	.	170
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	85	.	.	.	.	85
Total	0	342	341	1111	853	341	1537	1453	3161	170	683	0	

November 1990, Gage 111
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	Total
0.00 - 0.49	.	83	.	.	83	250	667	667	500	167	500	167	3084
0.50 - 0.99	.	.	167	83	417	167	667	750	500	250	83	.	3084
1.00 - 1.49	.	.	.	417	500	167	333	250	417	.	.	.	2084
1.50 - 1.99	.	.	.	250	333	250	.	167	83	.	83	.	1166
2.00 - 2.49	.	.	.	.	.	250	.	.	83	.	83	.	416
2.50 - 2.99	.	.	.	.	.	83	.	.	.	.	.	.	83
3.00 - 3.49	.	.	.	.	.	.	.	83	.	.	.	.	83
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	0
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	0	83	167	750	1333	1167	1667	1917	1583	417	749	167	

December 1990, Gage 111
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	Total
0.00 - 0.49	.	81	.	.	81	81	161	161	81	161	645	.	1452
0.50 - 0.99	.	403	81	323	645	161	323	242	1129	.	323	.	3630
1.00 - 1.49	.	.	323	403	323	403	323	565	403	81	81	.	2905
1.50 - 1.99	.	.	.	403	645	323	242	.	.	.	81	.	1694
2.00 - 2.49	.	.	.	.	242	81	.	.	.	.	.	.	323
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	484	404	1129	1936	1049	1049	968	1613	242	1130	0	

Table C3

Annual Joint Distribution of H_{mo} versus T_p (All Years)

Annual 1985-1990, Gage 111
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	Total
0.00 - 0.49	7	73	34	63	115	208	652	470	399	158	269	8	2456
0.50 - 0.99	4	149	246	441	500	393	960	768	624	138	307	19	
1.00 - 1.49	.	16	130	369	294	149	251	205	255	32	91	.	
1.50 - 1.99	.	.	8	120	180	78	83	68	112	28	58	2	
2.00 - 2.49	.	.	.	5	49	40	35	35	49	21	32	2	
2.50 - 2.99	.	.	.	.	7	13	6	11	32	7	18	.	
3.00 - 3.49	.	.	.	.	2	6	8	15	12	4	4	.	
3.50 - 3.99	.	.	.	.	.	1	7	2	15	4	2	.	
4.00 - 4.49	.	.	.	.	.	.	1	2	10	.	4	.	
4.50 - 4.99	.	.	.	.	.	.	.	.	2	.	.	.	
5.00 - Greater	.	.	.	.	.	.	.	1	.	.	.	.	
Total	11	238	418	998	1147	888	2003	1577	1510	392	785	31	

Table C4

Monthly Joint Distribution of H_{mo} versus T_p (All Years)

January 1985-1990, Gage 111
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	Total
0.00 - 0.49	.	111	14	42	28	181	417	779	459	139	236	14	2420
0.50 - 0.99	.	153	209	487	431	292	695	779	834	70	236	.	4186
1.00 - 1.49	.	14	181	570	389	153	209	250	223	28	42	.	2059
1.50 - 1.99	.	.	.	139	306	83	97	70	56	28	14	.	793
2.00 - 2.49	.	.	.	.	111	97	70	14	42	.	28	.	362
2.50 - 2.99	.	.	.	.	14	.	28	.	111	.	.	.	153
3.00 - 3.49	.	.	.	.	.	.	.	.	14	.	.	.	14
3.50 - 3.99	.	.	.	.	.	.	.	.	14	.	.	.	14
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	0	278	404	1238	1279	806	1516	1892	1753	265	556	14	

February 1985-1990, Gage 111
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	Total
0.00 - 0.49	.	46	46	31	77	62	170	325	341	31	155	.	1284
0.50 - 0.99	.	124	248	480	588	433	759	820	898	108	248	15	4721
1.00 - 1.49	.	.	139	604	464	186	279	310	372	15	186	.	2555
1.50 - 1.99	.	.	15	186	279	93	62	77	155	.	15	.	882
2.00 - 2.49	.	.	.	15	62	31	15	31	46	.	31	.	231
2.50 - 2.99	.	.	.	.	15	15	.	46	15	.	46	.	137
3.00 - 3.49	.	.	.	.	15	.	31	62	.	15	.	.	123
3.50 - 3.99	.	.	.	.	.	.	.	15	31	15	.	.	61
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	0	170	448	1316	1500	820	1316	1686	1858	184	681	15	

March 1985-1990, Gage 111
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	Total
0.00 - 0.49	14	.	.	83	83	83	413	193	261	96	151	.	1377
0.50 - 0.99	.	110	110	468	413	509	1073	880	702	83	165	.	4513
1.00 - 1.49	.	14	234	385	399	151	206	289	440	.	55	.	2173
1.50 - 1.99	.	.	14	110	206	138	96	83	193	14	96	.	950
2.00 - 2.49	.	.	.	.	83	14	96	138	96	.	83	.	510
2.50 - 2.99	.	.	.	.	14	28	.	41	69	14	41	.	207
3.00 - 3.49	.	.	.	.	.	.	.	14	55	.	.	.	69
3.50 - 3.99	.	.	.	.	.	.	14	.	83	14	14	.	125
4.00 - 4.49	.	.	.	.	.	.	.	.	41	.	28	.	69
4.50 - 4.99	.	.	.	.	.	.	.	.	14	.	.	.	14
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	14	124	358	1046	1198	923	1898	1638	1954	221	633	0	

(Continued)

Table C4 (Continued)

April 1985-1990, Gage 111
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	Total
0.00 - 0.49	14	14	.	86	14	57	417	330	402	230	259	.	1823
0.50 - 0.99	.	172	187	287	445	359	1020	1121	704	259	517	14	5085
1.00 - 1.49	.	29	43	187	287	144	374	374	158	29	129	.	1754
1.50 - 1.99	.	.	29	101	129	72	101	57	244	29	86	.	848
2.00 - 2.49	.	.	.	14	43	.	.	72	72	.	29	.	230
2.50 - 2.99	.	.	.	.	.	.	.	.	43	43	.	.	86
3.00 - 3.49	.	.	.	.	14	.	14	14	14	14	14	.	84
3.50 - 3.99	.	.	.	.	.	.	14	.	14	.	14	.	42
4.00 - 4.49	.	.	.	.	.	.	14	14	.	.	.	.	28
4.50 - 4.99	.	.	.	.	.	.	.	.	14	.	.	.	14
5.00 - Greater													0
Total	14	215	259	675	932	632	1954	1982	1665	604	1048	14	

May 1985-1990, Gage 111
Percent Occurrence(X100) of Height and Peri[od]

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	Total
0.00 - 0.49	15	102	29	102	190	204	758	452	481	248	394	.	2975
0.50 - 0.99	.	117	233	321	539	539	1297	641	554	102	277	.	4620
1.00 - 1.49	.	44	44	175	160	146	437	160	204	15	87	.	1472
1.50 - 1.99	.	.	15	73	44	29	87	73	131	44	73	15	584
2.00 - 2.49	.	.	.	.	29	29	15	15	15	58	29	.	190
2.50 - 2.99	.	.	.	.	29	.	.	.	29	15	44	.	117
3.00 - 3.49	.	.	.	.	.	.	.	.	.	15	29	.	44
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	0
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.		.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.		.	.	0
5.00 - Greater													0
Total	15	63	321	6[illegible]	991	947	2594	1341	1414	49[illegible]	933	15	

June 1985-1990, Gage 111
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	Total
0.00 - 0.49	29	204	44	8[illegible]	[illegible]0	496	173[illegible]	701	336	234	234	.	4483
0.50 - 0.99	15	131	263	3[illegible]	[illegible]82	263	1431	1[illegible]	175	146	44	.	4366
1.00 - 1.49	.	15	58	1[illegible]	[illegible]19	102	88		58	.	15	.	774
1.50 - 1.99	.	.	15	[illegible]	58	58	44		29	.	44	.	306
2.00 - 2.49	.	.	.		.	.	29		15	.	29	.	73
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	4	350	380	628	1139	919	3329	1854	613	380	366	0	

(Continued)

Table C4 (Continued)

July 1985-1990, Gage 111
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	Total
0.00 - 0.49	14	72	115	29	215	587	1633	917	587	272	559	29	5029
0.50 - 0.99	.	229	415	458	387	587	1246	415	244	115	186	29	4311
1.00 - 1.49	.	.	43	129	72	57	72	14	72	.	29	.	488
1.50 - 1.99	.	.	.	14	14	14	29	57	43	.	.	.	171
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	14	301	573	630	688	1245	2980	1403	946	387	774	58	

August 1985-1990, Gage 111
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	Total
0.00 - 0.49	.	74	45	89	163	253	951	713	609	119	178	.	3194
0.50 - 0.99	.	193	104	698	684	357	936	654	475	208	446	104	4859
1.00 - 1.49	.	.	178	312	178	89	357	119	134	30	59	.	1456
1.50 - 1.99	.	.	.	119	59	30	.	30	45	59	15	.	357
2.00 - 2.49	.	.	.	.	.	15	.	30	59	15	.	.	119
2.50 - 2.99	.	.	.	.	.	.	15	.	.	.	.	.	15
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	267	327	1218	1084	744	2259	1546	1322	431	698	104	

September 1985-1990, Gage 111
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	Total
0.00 - 0.49	.	45	15	15	15	135	316	256	511	75	256	.	1639
0.50 - 0.99	.	150	211	316	526	361	932	917	902	211	406	.	4932
1.00 - 1.49	.	15	75	316	226	241	391	241	316	105	135	.	2061
1.50 - 1.99	.	.	.	120	180	150	211	45	75	45	90	15	931
2.00 - 2.49	.	.	.	.	45	90	30	15	.	90	75	30	375
2.50 - 2.99	.	.	.	.	.	30	15	.	.	.	15	.	60
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	210	301	767	992	1007	1895	1474	1804	526	977	45	

(Continued)

Table C4 (Concluded)

October 1985-1990, Gage 111
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	Total
0.00 - 0.49	.	.	28	14	57	113	240	212	226	113	156	28	1187
0.50 - 0.99	.	127	311	339	537	297	905	750	835	57	438	14	4610
1.00 - 1.49	.	14	283	495	198	99	170	283	580	28	127	.	2277
1.50 - 1.99	.	.	14	240	240	42	156	156	184	71	85	.	1188
2.00 - 2.49	.	.	.	.	42	57	28	42	141	28	28	.	366
2.50 - 2.99	.	.	.	.	14	28	14	14	71	.	42	.	183
3.00 - 3.49	.	.	.	.	.	28	57	28	14	.	.	.	127
3.50 - 3.99	.	.	.	.	.	.	28	.	14	.	.	.	42
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	14	.	.	.	.	14
Total	0	141	636	1088	1088	664	1598	1499	2065	297	876	42	

November 1985-1990, Gage 111
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	Total
0.00 - 0.49	.	58	43	58	43	202	434	303	318	116	260	29	1864
0.50 - 0.99	14	130	376	491	549	405	737	607	491	188	347	.	4335
1.00 - 1.49	.	14	188	592	477	260	303	130	202	72	130	.	2368
1.50 - 1.99	.	.	.	159	275	116	58	101	101	.	43	.	853
2.00 - 2.49	.	.	.	29	29	116	130	43	72	.	14	.	433
2.50 - 2.99	.	.	.	.	.	29	.	14	.	.	.	.	43
3.00 - 3.49	.	.	.	.	.	14	.	43	29	.	.	.	86
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	0
4.00 - 4.49	.	.	.	.	.	.	.	.	14	.	.	.	14
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	14	202	607	1329	1373	1142	1662	1241	1227	376	794	29	

December 1985-1990, Gage 111
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	Total
0.00 - 0.49	.	155	31	124	124	109	310	450	264	217	403	.	2187
0.50 - 0.99	16	155	295	589	434	310	450	574	682	124	388	62	4079
1.00 - 1.49	.	31	78	527	465	171	140	217	295	62	109	.	2095
1.50 - 1.99	.	.	.	155	372	109	47	31	78	47	140	.	979
2.00 - 2.49	.	.	.	.	140	31	.	16	16	62	31	.	296
2.50 - 2.99	.	.	.	.	.	31	.	16	31	16	31	.	125
3.00 - 3.49	.	.	.	.	.	31	.	16	16	.	.	.	63
3.50 - 3.99	.	.	.	.	.	16	31	16	16	16	.	.	95
4.00 - 4.49	.	.	.	.	.	.	.	16	62	.	16	.	94
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	16	341	404	1395	1535	808	978	1352	1460	544	1118	62	

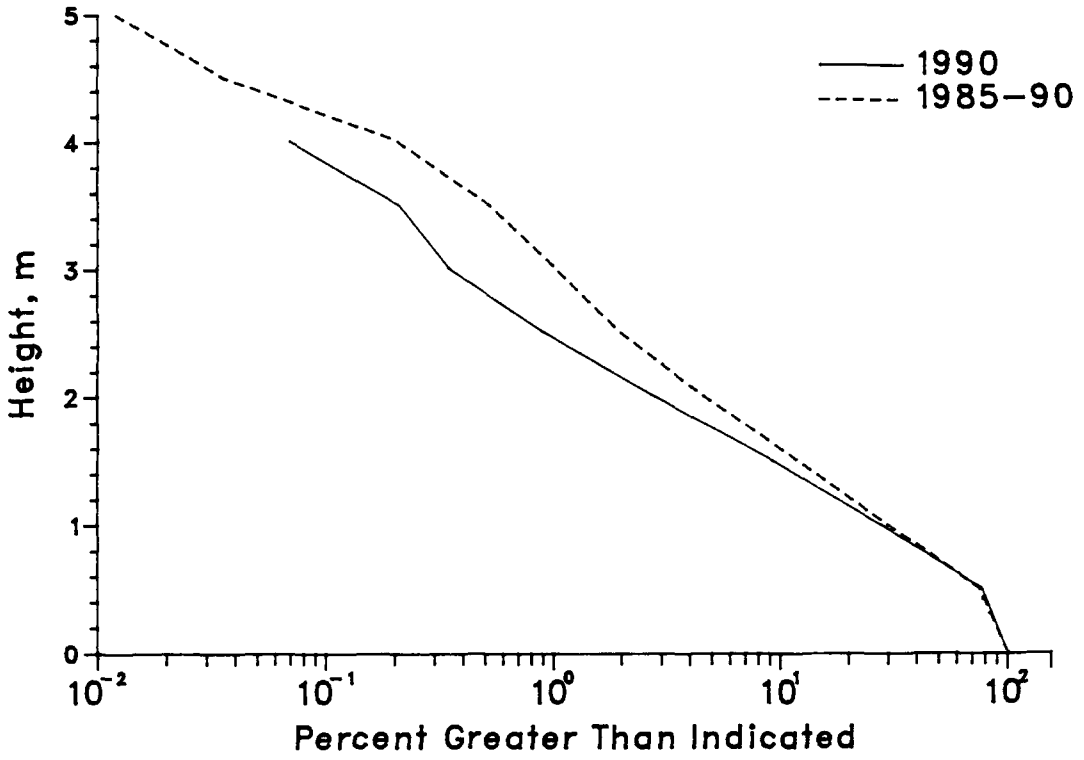

Figure C2. Annual cumulative wave height distributions for Gage 111

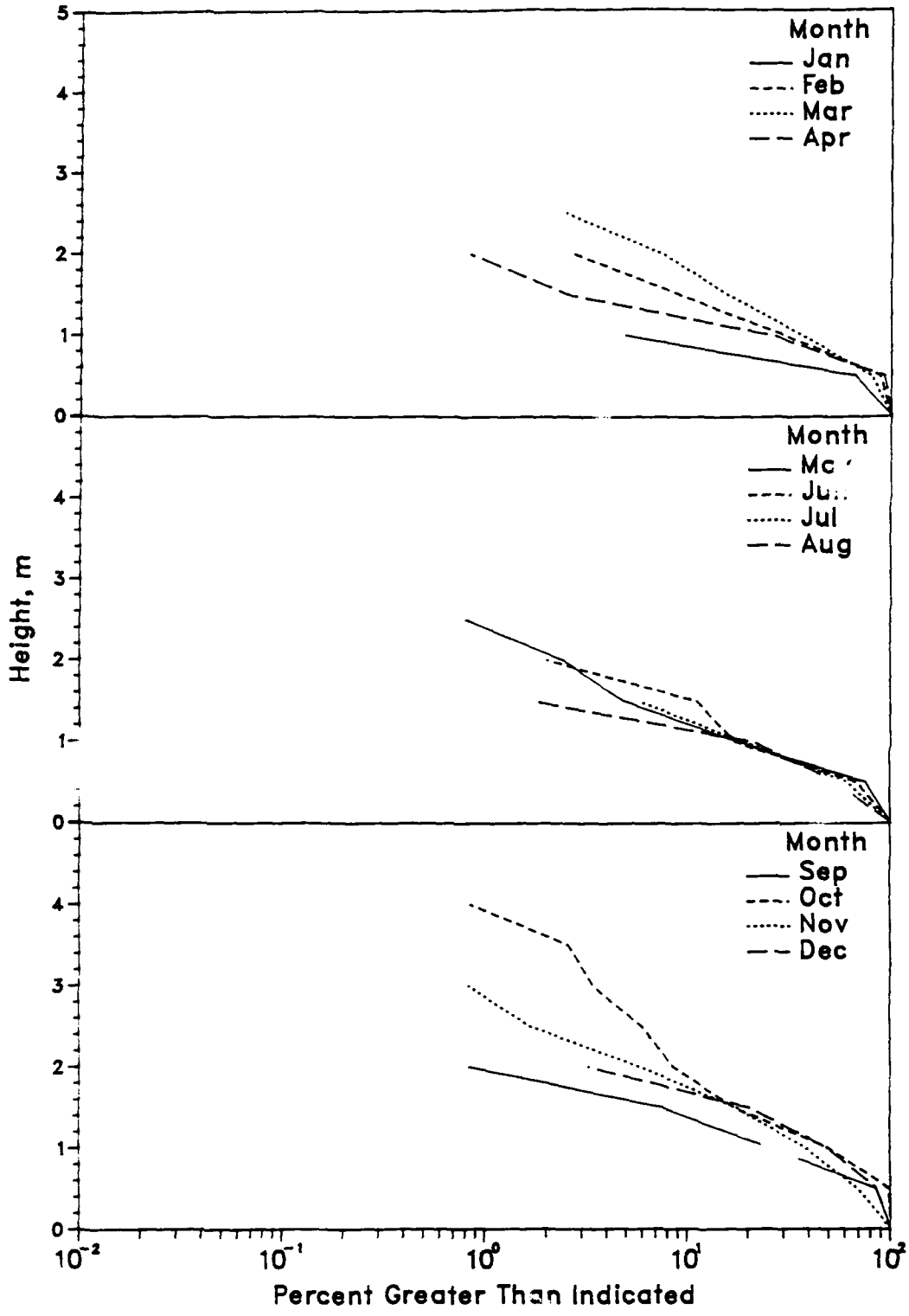

Figure C3. 1990 monthly wave ·ight distributions for Gage 11ı

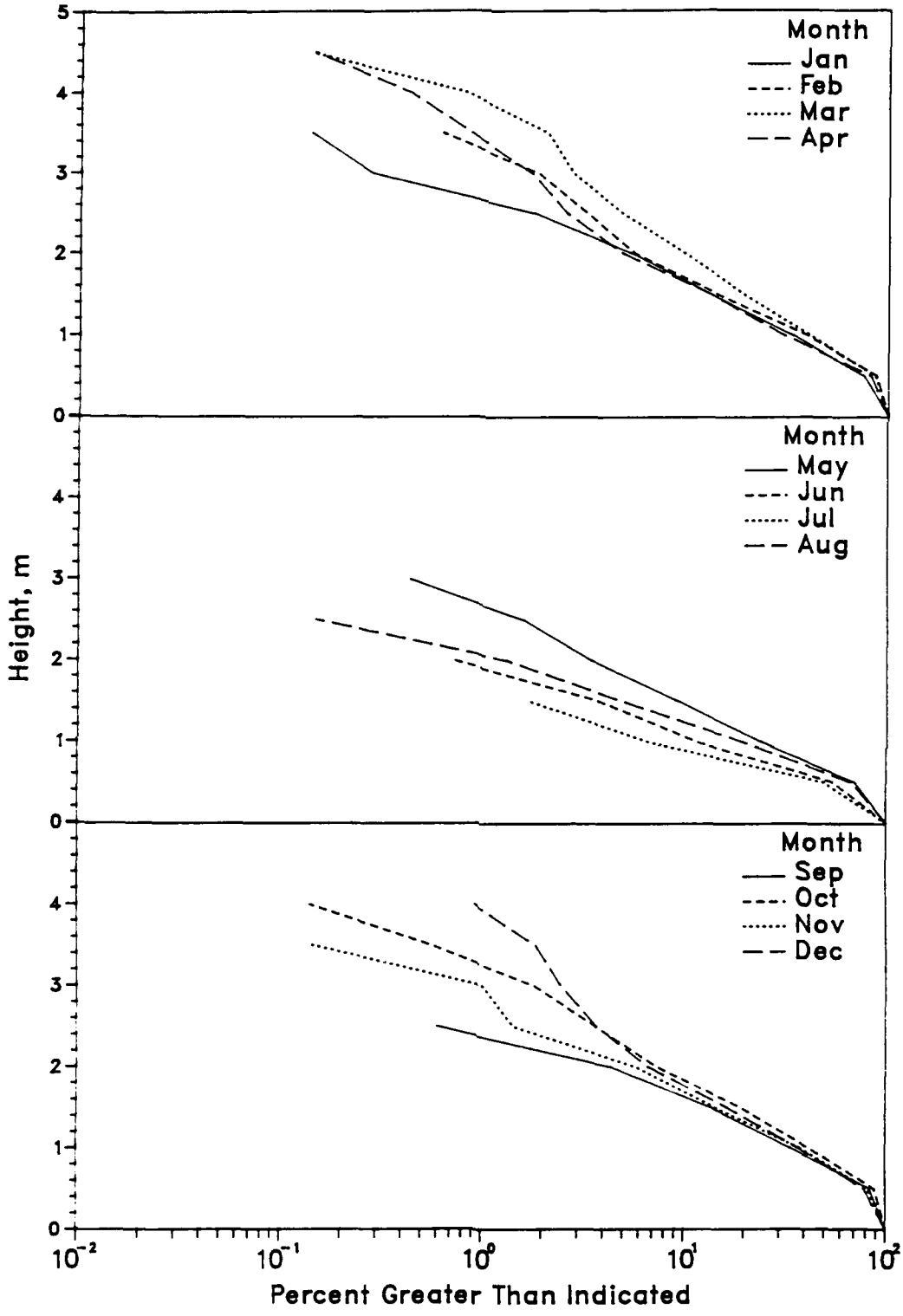

Figure C4. 1985–1990 monthly wave height distributions for Gage 111

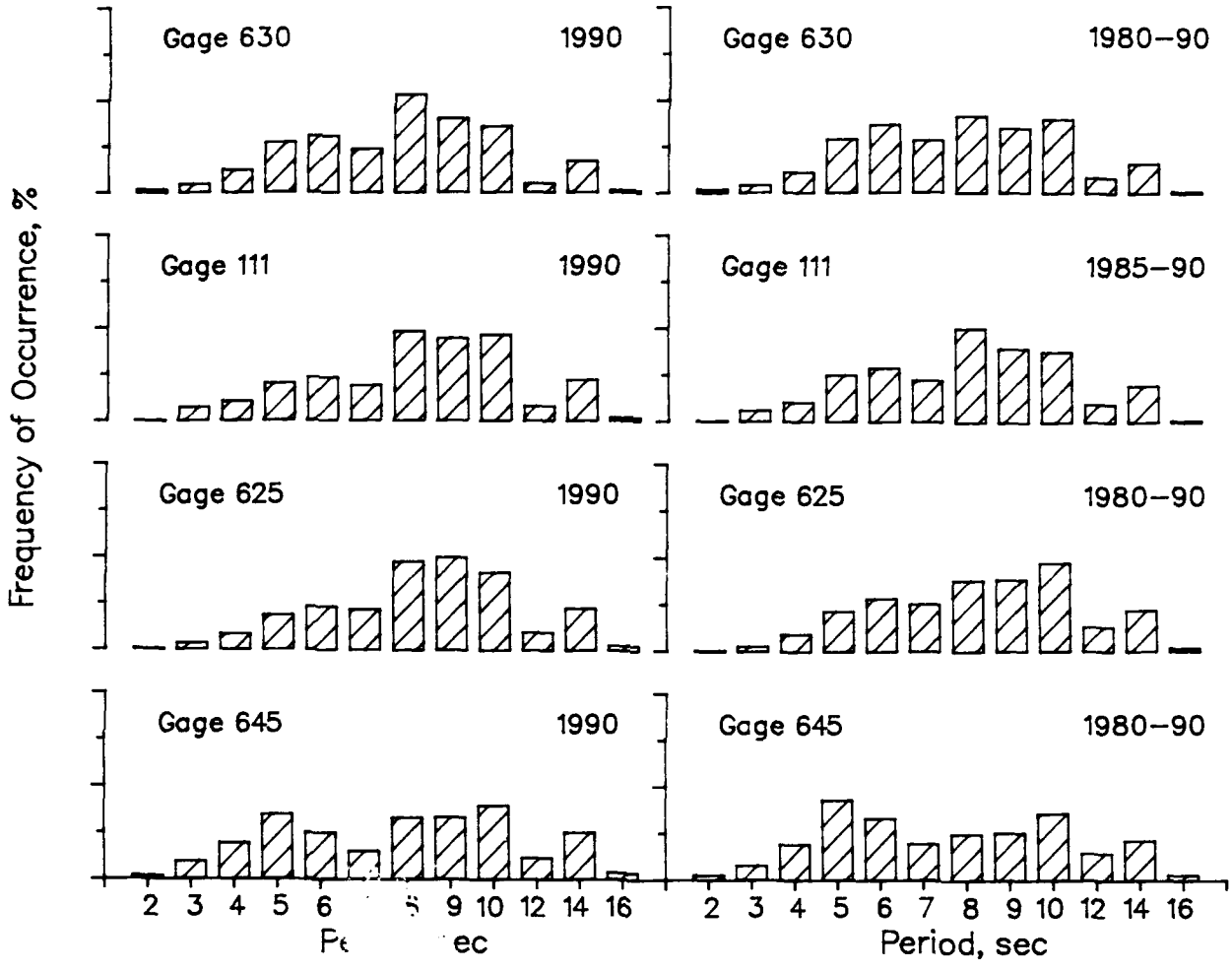

Figure C5. Annual wave period distributions for all gages

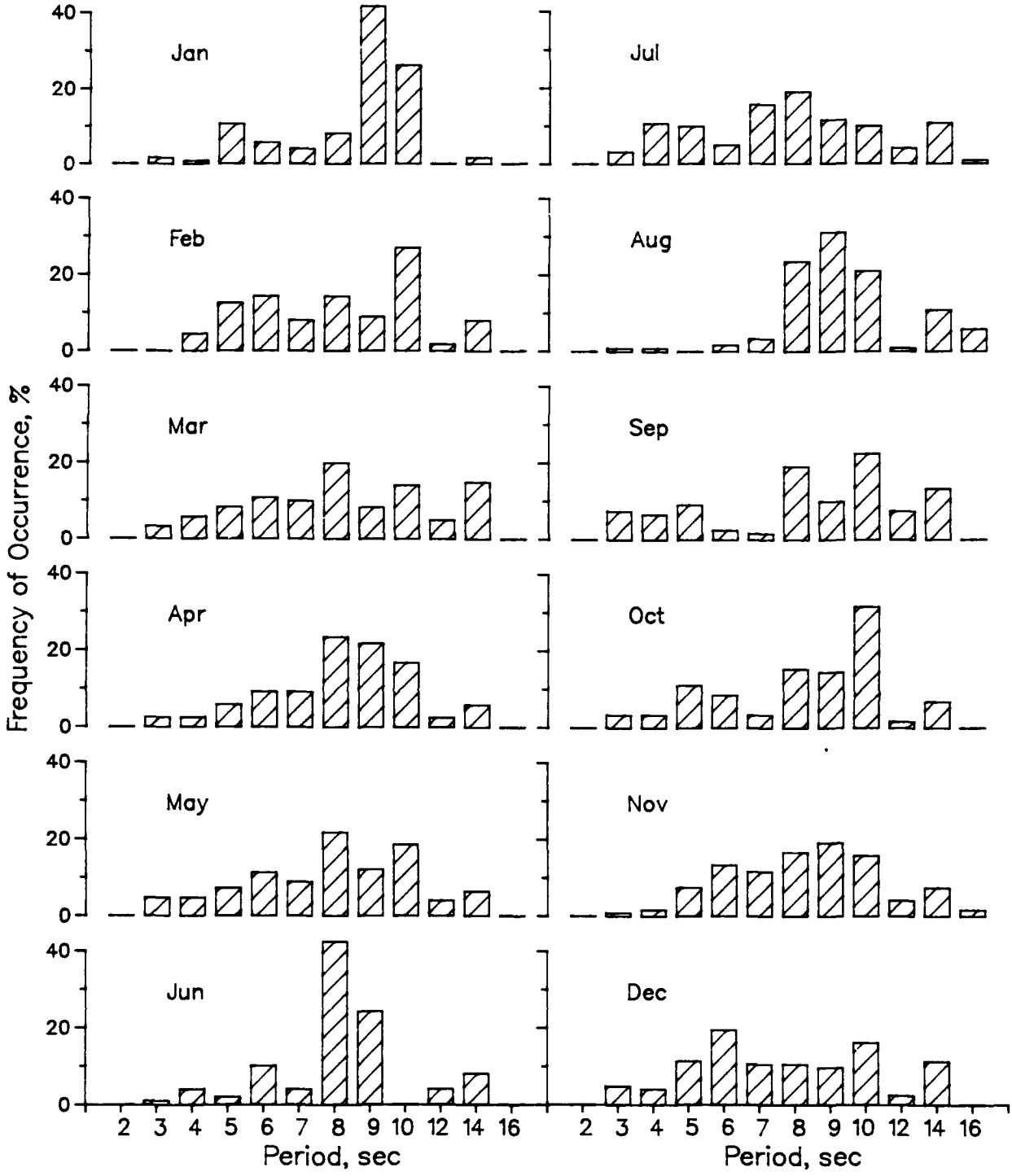

Figure C6. 1990 monthly wave period distributions for Gage 111

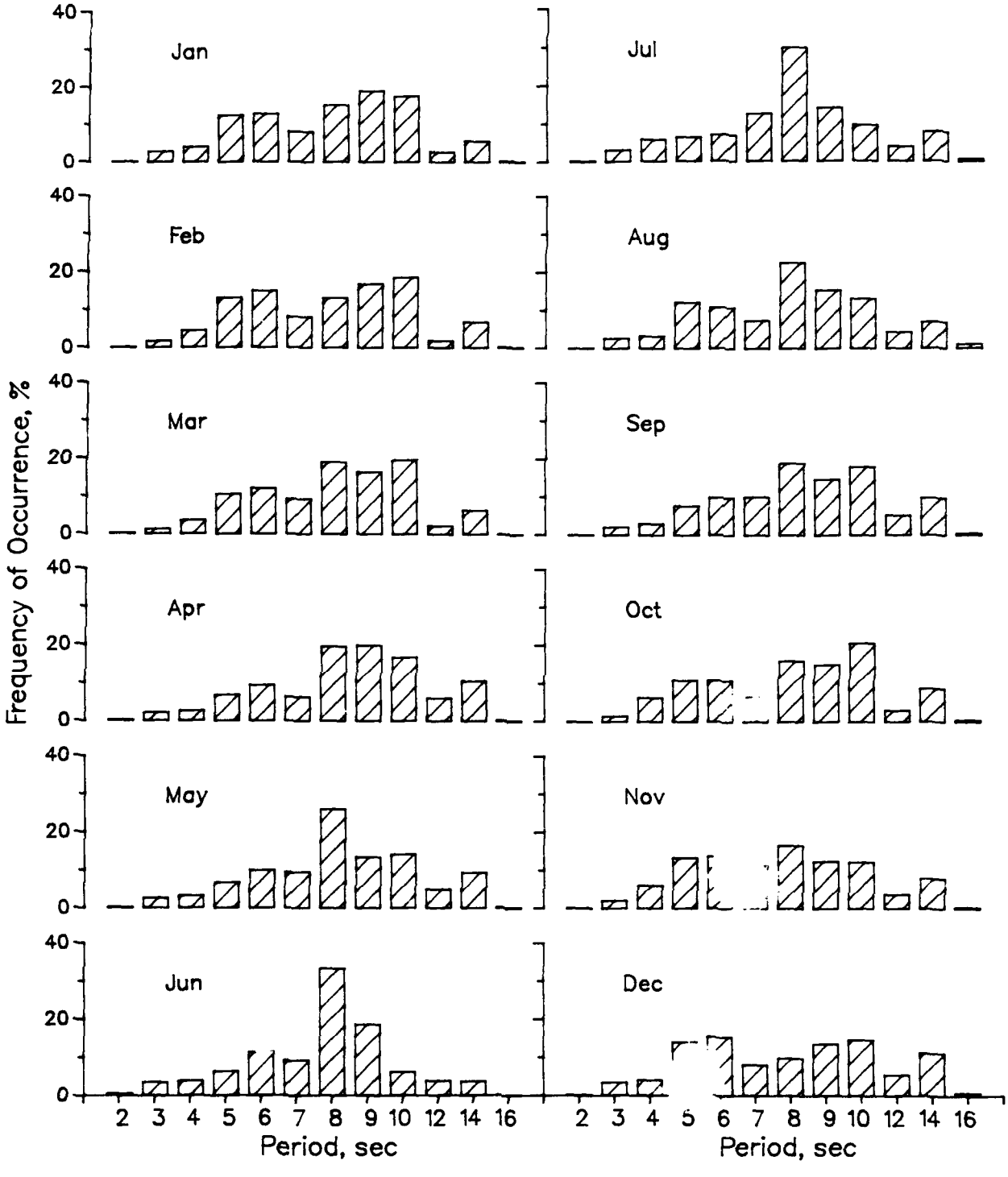

Figure C7. 1985–1990 monthly wave period distributions for Gage 111

Table C5

1990 Persistence of H_{mo} for Gage 111

Height	Consecutive Day(s) or Longer																	
(m)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19+
0.5	28	27	25	24	22		18	16	15	14		11	8				6	4	3
1.0	51	37	20	13	9		6	4					2						
1.5	34	18	5	1															
2.0	17	7	1																
2.5	7	1	1																
3.0	2																		
3.5	1																		
4.0	1																		

Table C6

1985 Through 1990 Persistence of H_{mo} for Gage 111

Height	Consecutive Day(s) or Longer																	
(m)	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	15	14	13	12	10	9	8		7		6		5
1.0	50	34	22	14	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	4	2	1																
3.5	2		1																
4.0	1																		

* Data from gage 640 from 1985 and 1986 as well as data from gage 141 for 1987 was used for comparison with gage 111.

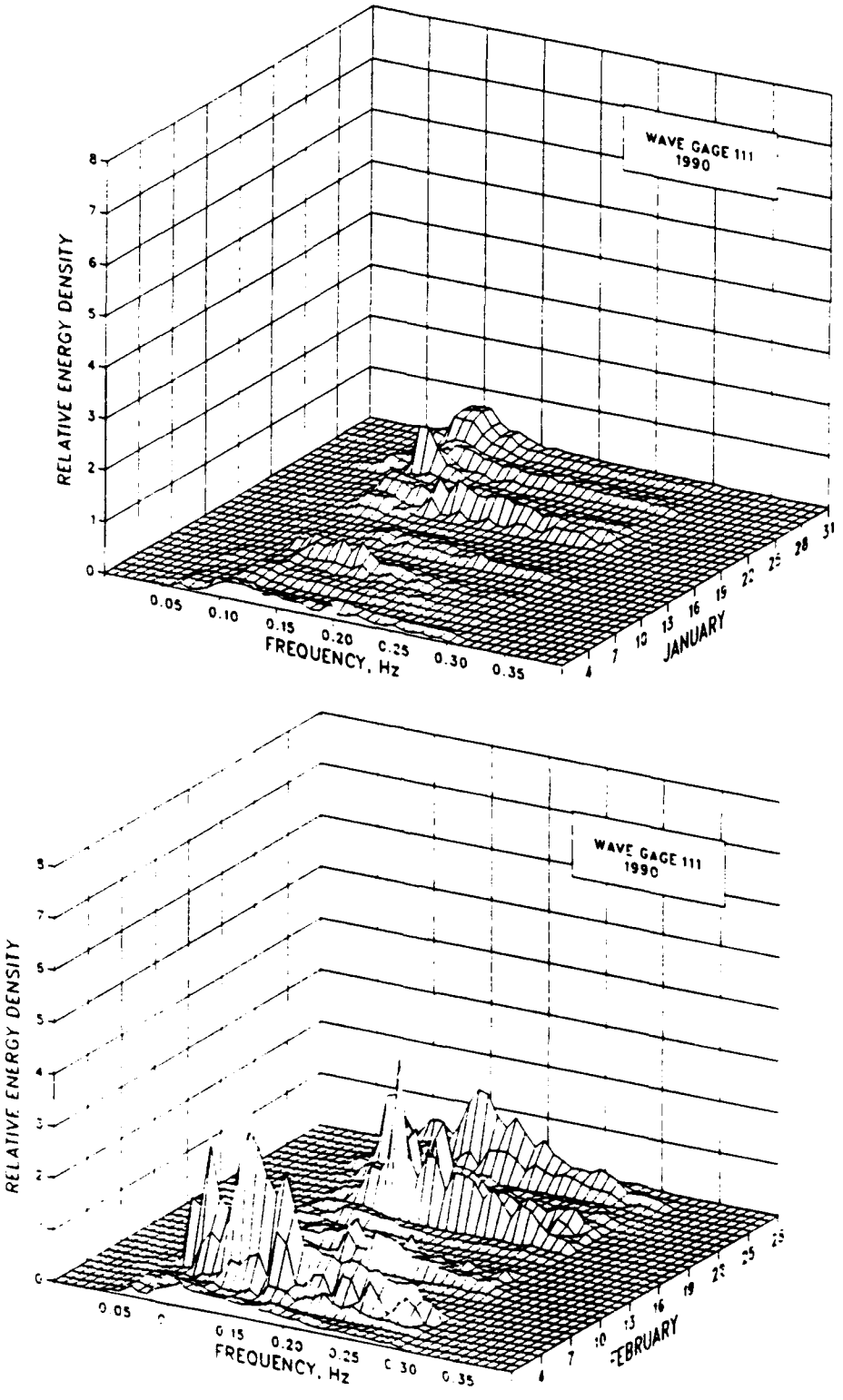

Figure C8. 1990 monthly spectra for Gage 111 (Sheet 1 of 6)

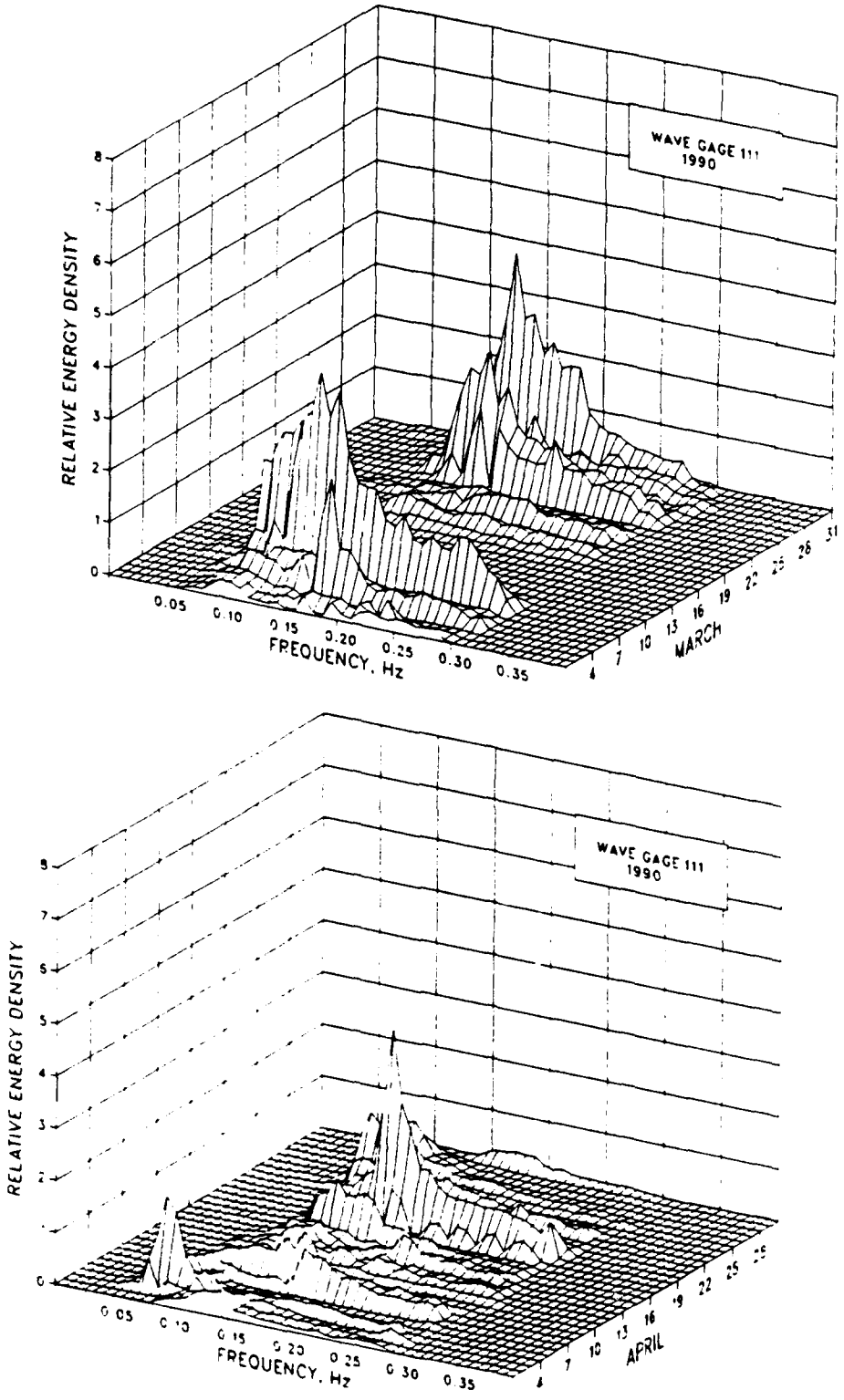

Figure C8. (Sheet 2 of 6)

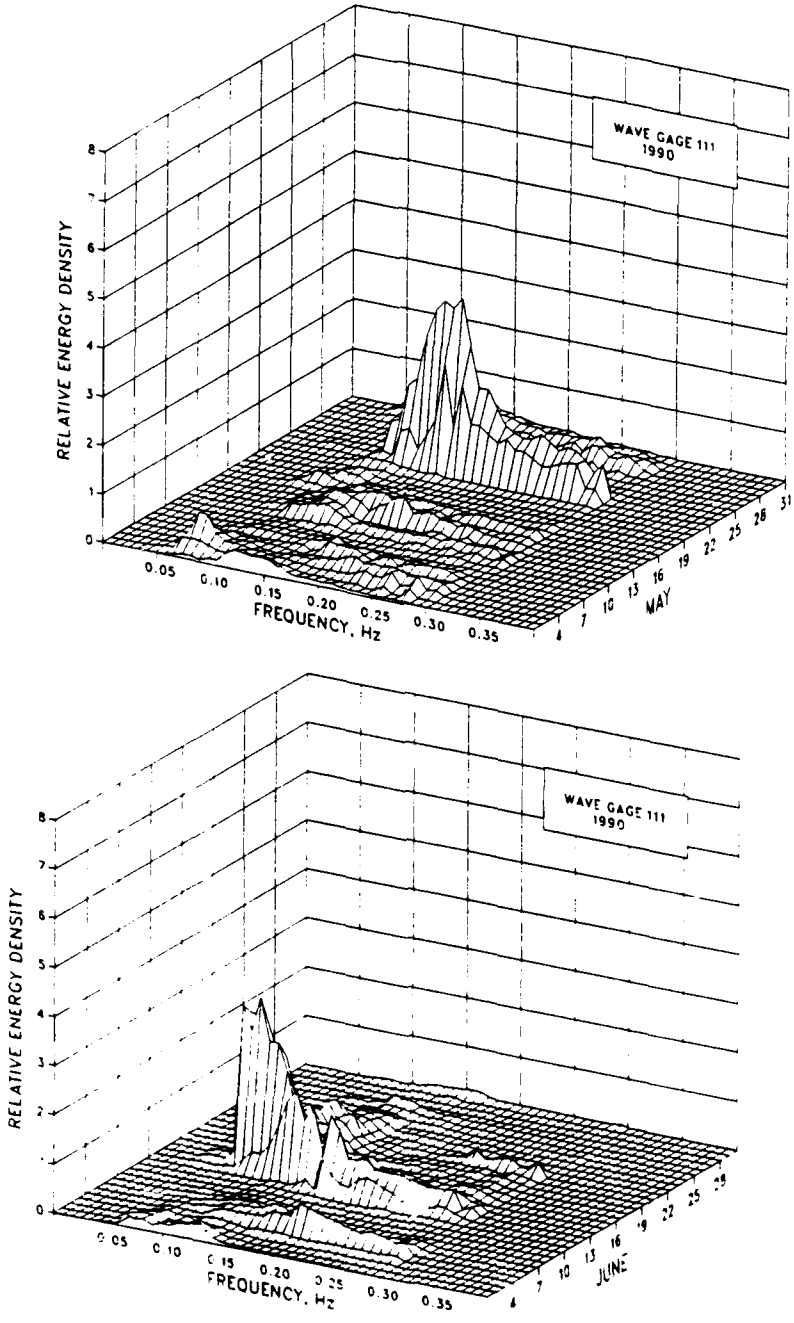

Figure C8. (Sheet 3 of 6)

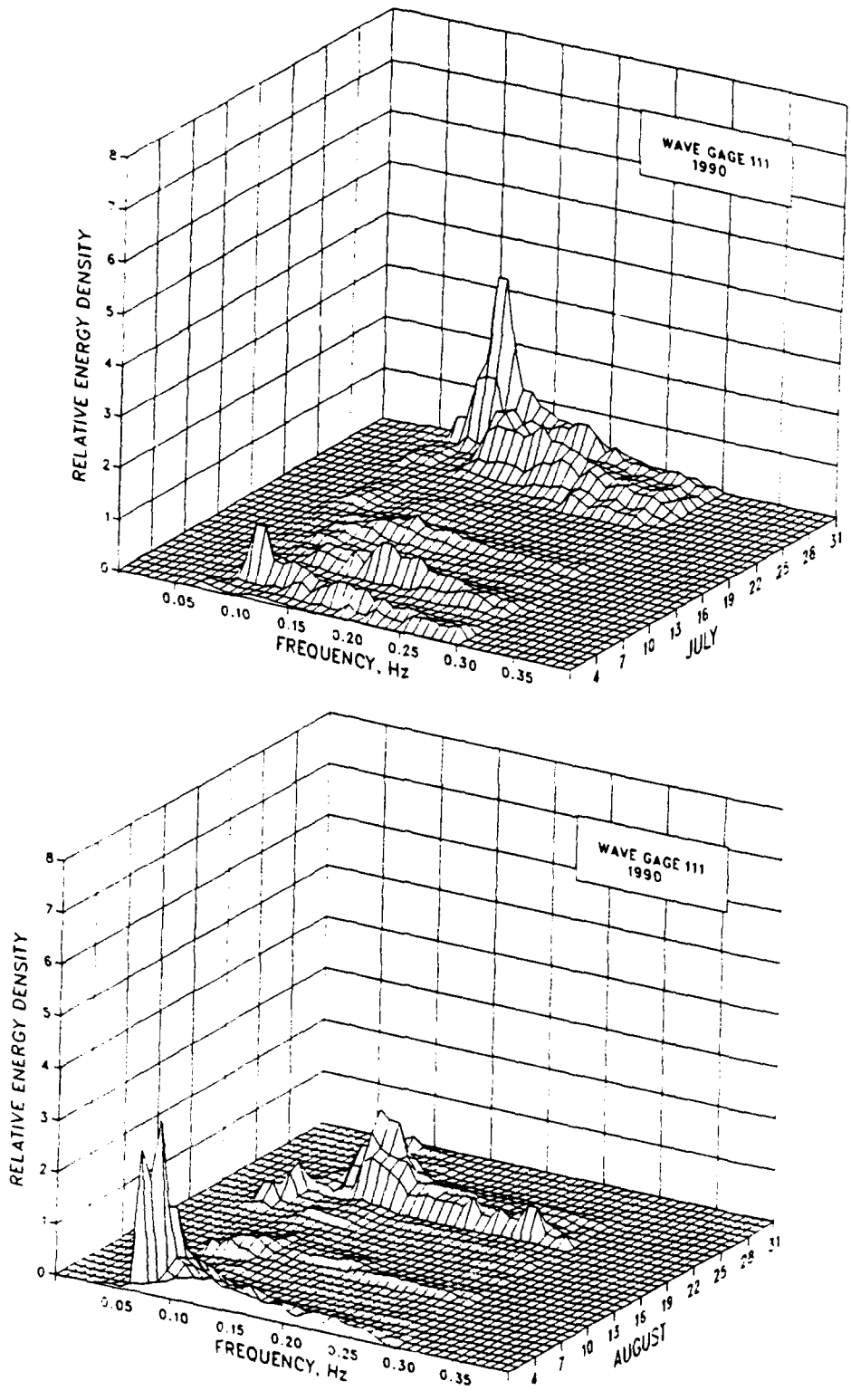

Figure C8. (Sheet 4 of 6)

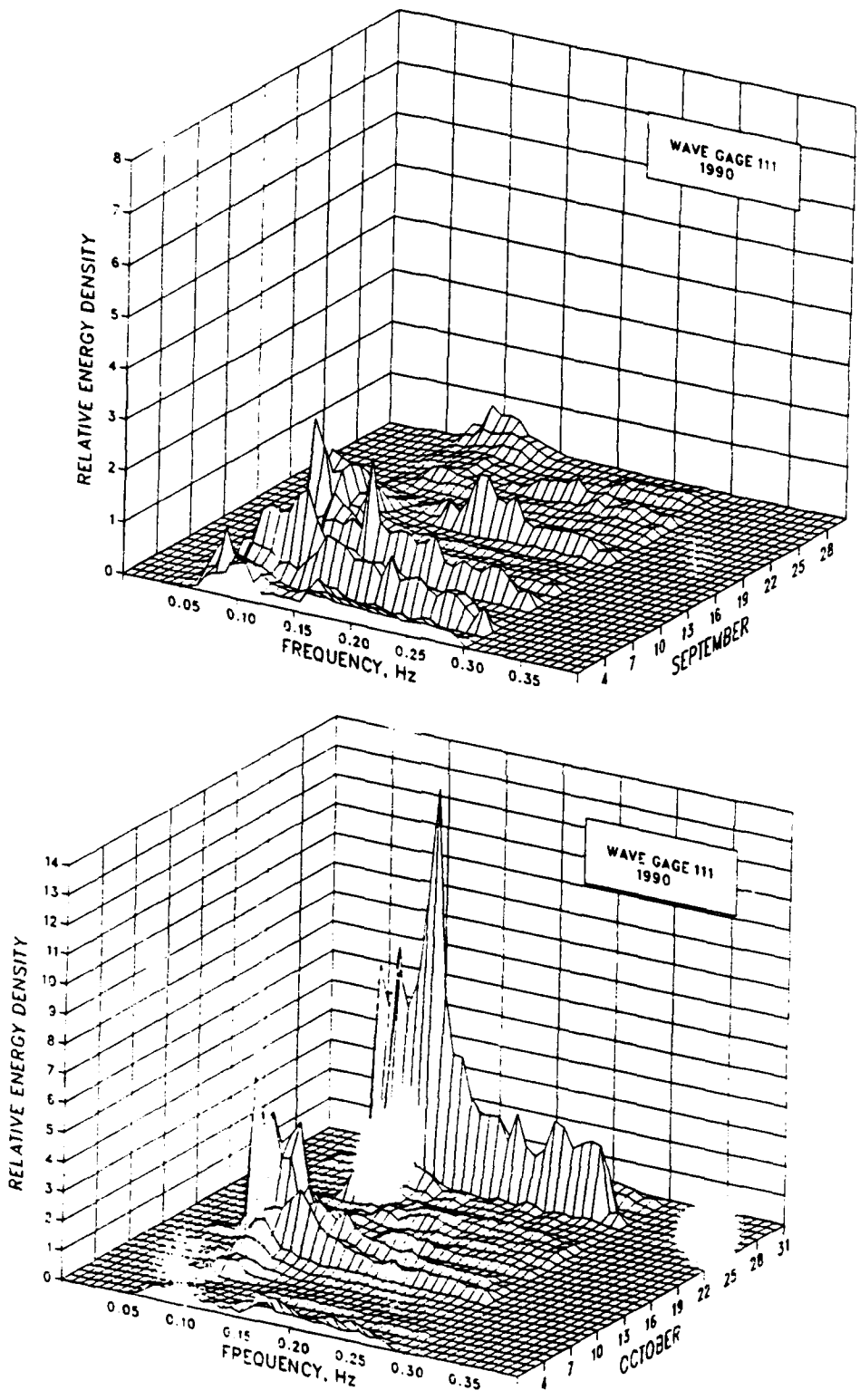

Figure C8. (Sheet 5 of 6)

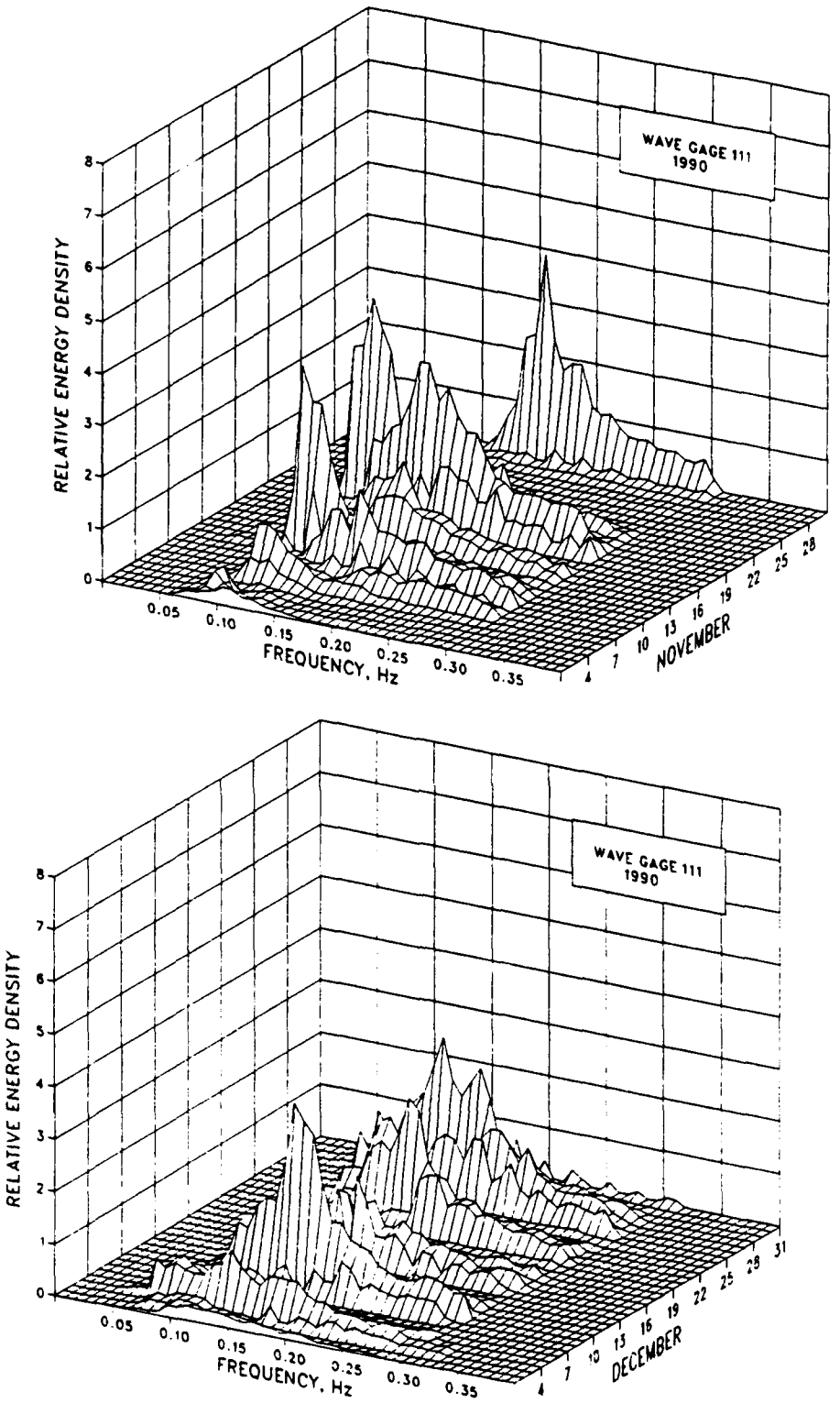

Figure C8. (Sheet 6 of 6)

Table C7

Wave Statistics for Gage 111

	1990							1985-1990						
	Height				Period			Height				Period		
Month	Mean m	Std. Dev. m	Extreme m	Date	Mean sec	Std. Dev. sec	Number Obs.	Mean m	Std. Dev. m	Extreme m	Date	Mean sec	Std. Dev. sec	Number Obs.
Jan	0.7	0.3	1.3	19	9.0	2.0	123	1.0	0.6	3.8	1987	8.6	2.6	719
Feb	0.9	0.5	2.3	5	8.7	2.5	111	1.1	0.6	4.0	1989	8.5	2.6	646
Mar	1.0	0.6	2.9	7	8.8	2.8	121	1.1	0.8	4.5	1987	8.7	2.4	727
Apr	0.9	0.4	2.2	18	8.9	2.4	119	1.0	0.6	4.8	1988	9.3	2.7	696
May	0.8	0.4	2.5	22	8.6	2.7	124	0.8	0.5	3.3	1986	9.0	2.8	686
Jun	0.8	0.5	2.0	13	8.8	2.2	99	0.7	0.4	2.3	1986	8.3	2.3	685
Jul	0.8	0.4	1.7	31	8.5	2.9	122	0.6	0.3	1.9	1986	8.7	2.7	698
Aug	0.7	0.4	1.8	1	10.2	2.6	119	0.8	0.4	2.8	1985	8.7	2.8	673
Sep	0.9	0.4	2.1	4	9.2	3.2	120	1.0	0.5	2.8	1989	9.1	2.8	665
Oct	1.2	0.7	5.0	26	8.9	2.5	117	1.1	0.7	5.0	1990	8.8	2.7	707
Nov	1.0	0.6	3.1	10	9.2	2.9	120	1.0	0.6	4.1	1985	8.4	2.8	692
Dec	1.1	0.5	2.2	9	8.4	2.7	124	1.0	0.7	4.5	1989	8.8	3.2	645
Annual	0.9	0.5	5.0	Oct	8.9	2.7	1419	0.9	0.6	5.0	Oct 1990	8.7	2.7	8239

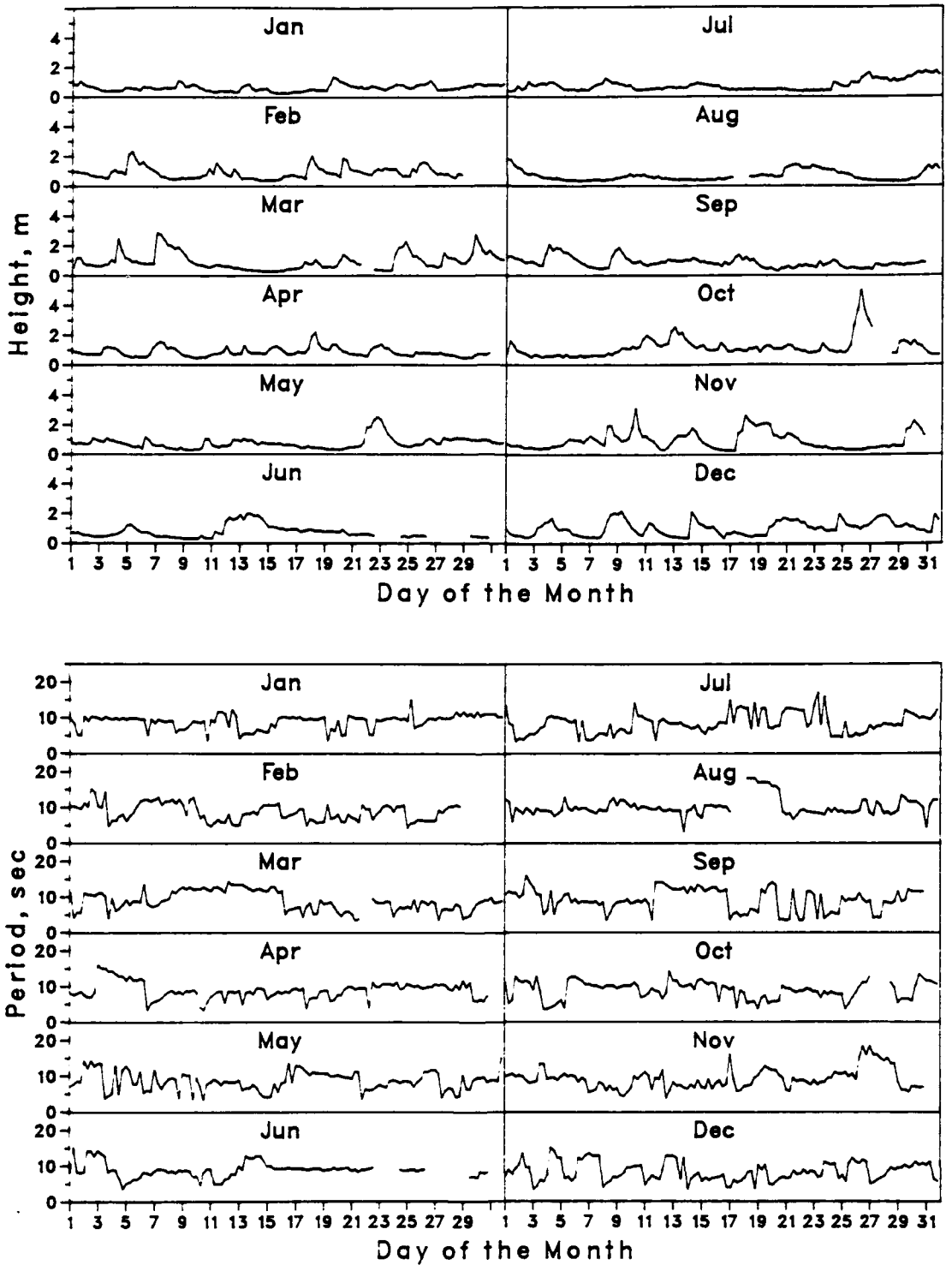

Figure C9. Time-histories of wave height and period for Gage 111

APPENDIX D: WAVE DATA FOR GAGE 625

1. Wave data summaries for Gage 625 are presented for 1990 and for 1980 through 1990 in the following forms:

Daily H_{mo} and T_p

2. 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

3. Annual and monthly joint distributions tables are presented in Tables D1 and D2, and data for 1980 through 1990 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

4. Annual and monthly wave height distributions for 1990 are plotted in cumulative form in Figures D2 and D3. Data for 1980 through 1990 are in Figure D4.

Peak Spectral Wave Period Distributions

5. Annual and monthly peak wave period, T_p, distribution histograms for 1990 are presented in Figures D5 and D6. Data for 1980 through 1990 are in Figure D7.

Persistence of Wave Heights

6. Table D5 shows the number of times in 1990 when the specified wave height was equaled or exceeded at least once during each day for the duration (consecutive days). Data for 1980 through 1990 are given in Table D6. An example is shown below

Height	Consecutive Day(s) or Longer																	
m	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 3 times the height exceeded 1 m for shorter durations.

Spectra

7. Monthly spectra for the offshore Waverider buoy (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-dimension 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.

8. Monthly and annual wave statistics for Gage 625 for 1990 and for 1980 through 1990 are presented in Table D7.

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

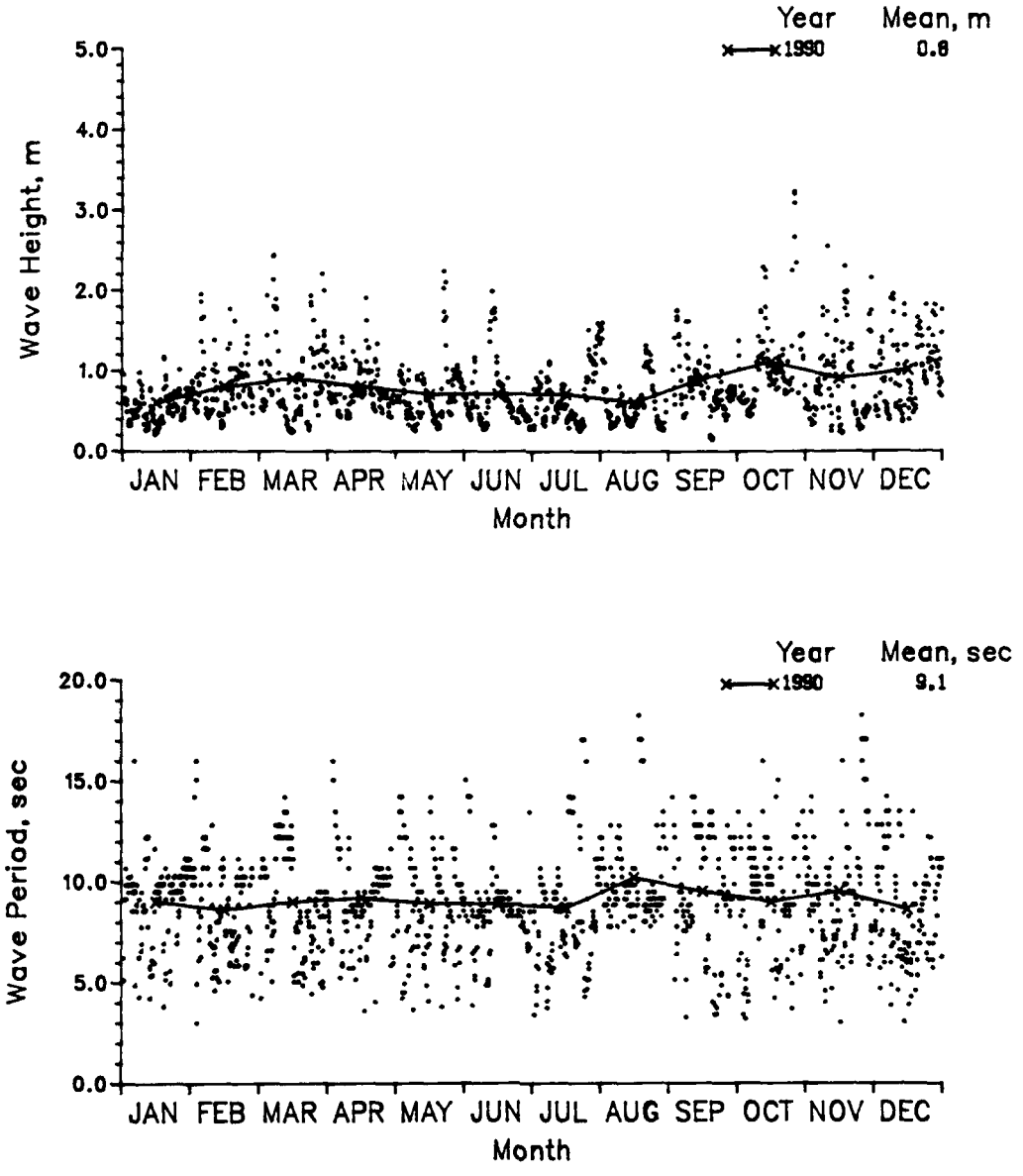

Figure D1. 1990 daily wave height and period values with monthly means for Gage 625

Table D1

Annual Joint Distribution of H_{mo} versus T_p

Annual 1990, 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	7	7	28	63	106	204	683	647	493	211	281	56	2786
0.50 - 0.99	7	120	225	331	394	359	922	1013	844	134	450	49	4848
1.00 - 1.49	.	7	91	324	204	204	211	246	246	35	91	.	1659
1.50 - 1.99	.	.	.	28	190	91	70	63	70	.	56	.	568
2.00 - 2.49	.	.	.	.	42	14	7	7	7	7	14	.	98
2.50 - 2.99	.	.	.	.	.	.	.	7	.	.	7	.	14
3.00 - 3.49	.	.	.	.	.	.	7	7	7	.	.	.	21
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	0
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	14	134	344	746	936	872	1900	1990	1667	387	899	105	

Table D2

Monthly Joint Distribution of H_{mo} versus T_p

January 1990, Gage 625
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	Total
0.00 - 0.49	.	.	.	244	163	163	569	2439	732	.	244	.	4554
0.50 - 0.99	.	81	325	488	569	163	325	1545	1626	.	81	.	5203
1.00 - 1.49	.	.	.	.	163	.	.	.	81	.	.	.	244
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	81	325	732	895	326	894	3984	2439	0	325	0	

February 1990, Gage 625
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	Total
0.00 - 0.49	.	.	.	90	90	180	450	180	991	.	90	.	2071
0.50 - 0.99	90	.	270	541	631	901	631	991	991	90	541	.	5677
1.00 - 1.49	.	.	.	541	270	360	.	180	270	.	.	.	1621
1.50 - 1.99	.	.	.	90	270	.	90	90	.	.	90	.	630
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 - Greate	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	90	0	270	1262	1261	1441	1171	1441	2252	90	721	0	

March 1990, Gage 625
Percent Occurrence(X100) of Height and Period

Height(m) / 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	Total
.00 - 0.49	.	.	.	165	83	248	579	83	413	331	496	.	2398
.50 - 0.99	.	.	.	496	248	331	992	413	992	83	909	.	4464
.00 - 1.49	.	.	413	496	165	165	331	248	.	.	165	.	1983
1.50 - 1.99	.	.	.	.	248	165	165	83	83	.	83	.	827
2.00 - 2.49	.	.	.	.	83	83	83	83	.	.	.	.	332
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	413	1157	827	992	2150	910	1488	414	1653	0	

(Continued)

Table D2 (Continued)

April 1990, Gage 625
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	Total
0.00 - 0.49	.	.	.	.	.	84	84	252	756	.	168	.	1344
0.50 - 0.99	.	.	84	252	420	504	2017	1597	1092	84	504	.	6554
1.00 - 1.49	.	84	.	420	336	84	168	420	168	84	168	.	1932
1.50 - 1.99	.	.	.	.	84	84	.	.	.	.	.	.	168
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	84	84	672	840	756	2269	2269	2016	168	840	0	

May 1990, Gage 625
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	Total
0.00 - 0.49	.	81	.	.	161	81	726	726	1210	.	403	.	3388
0.50 - 0.99	.	81	403	484	565	565	1210	806	484	565	403	.	5566
1.00 - 1.49	.	.	242	81	81	81	.	.	81	.	.	.	566
1.50 - 1.99	.	.	.	.	161	.	.	81	.	.	.	.	242
2.00 - 2.49	.	.	.	.	161	81	.	.	.	.	.	.	242
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	162	645	565	1129	808	1936	1613	1775	565	806	0	

June 1990, Gage 625
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	Total
0.00 - 0.49	.	.	90	.	360	541	2072	450	.	541	.	.	4054
0.50 - 0.99	.	90	90	180	360	270	1892	1351	.	90	270	.	4593
1.00 - 1.49	.	.	.	180	90	.	.	90	90	.	.	.	450
1.50 - 1.99	.	.	.	.	90	.	180	90	180	.	360	.	900
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	90	180	360	900	811	4144	1981	270	631	630	0	

(Continued)

Table D2 (Continued)

July 1990, Gage 625
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	Total
0.00 - 0.49	.	.	82	82	246	410	820	902	82	738	164	246	3772
0.50 - 0.99	.	246	492	574	738	738	492	574	410	82	82	.	4428
1.00 - 1.49	.	.	.	328	82	328	246	82	410	.	82	.	1558
1.50 - 1.99	.	.	.	82	.	.	.	82	82	.	.	.	246
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	246	574	1066	1066	1476	1558	1640	984	820	328	246	

August 1990, Gage 625
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	Total
0.00 - 0.49	.	.	.	.	.	345	1466	1810	776	86	431	.	4914
0.50 - 0.99	.	.	.	.	.	86	776	948	862	.	431	517	3620
1.00 - 1.49	.	.	.	.	.	.	862	345	86	.	.	.	1293
1.50 - 1.99	.	.	.	.	.	.	.	.	86	.	86	.	172
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	431	3104	3103	1810	86	948	517	

September 1990, Gage 625
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	Total
0.00 - 0.49	.	.	.	.	.	88	442	265	88	177	442	.	1502
0.50 - 0.99	.	442	442	177	88	88	973	1062	1239	26[F]	1327	.	6103
1.00 - 1.49	.	.	.	531	.	265	177	265	88	8c	442	.	1856
1.50 - 1.99	.	.	.	.	177	177	177	.	.	.	.	.	531
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	442	442	708	265	618	1769	1592	1415	530	2211	0	

(Continued)

Table D2 (Concluded)

October 1990, 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	.	.	85	85	.	.	.	.	171	.	85	.	426
0.50 - 0.99	.	256	342	342	256	85	1197	1026	1026	85	427	.	5042
1.00 - 1.49	.	.	85	598	513	256	171	684	598	256	171	.	3332
1.50 - 1.99	.	.	.	.	.	85	85	.	256	.	.	.	426
2.00 - 2.49	.	.	.	.	85	.	.	.	85	85	171	.	426
2.50 - 2.99	.	.	.	.	.	.	.	.	.	.	85	.	85
3.00 - 3.49	.	.	.	.	.	.	85	85	85	.	.	.	255
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	0
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	0	256	512	1025	854	426	1538	1795	2221	426	939	0	

November 1990, 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	83	.	83	.	.	250	917	500	583	333	333	417	3499
0.50 - 0.99	.	.	167	167	250	333	333	1000	500	167	167	83	3167
1.00 - 1.49	.	.	.	250	417	500	167	250	417	.	.	.	2001
1.50 - 1.99	.	.	.	83	250	250	.	250	167	.	83	.	1083
2.00 - 2.49	.	.	.	.	167	.	.	.	.	.	.	.	167
2.50 - 2.99	.	.	.	.	.	.	.	83	.	.	.	.	83
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	0	250	500	1084	1333	1417	2083	1667	500	583	500	

December 1990, 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	161	81	161	81	81	323	484	.	1453
0.50 - 0.99	.	242	81	242	565	242	323	887	887	81	323	.	3873
1.00 - 1.49	.	.	323	484	323	403	403	403	645	.	81	.	3065
1.50 - 1.99	.	.	.	81	968	323	161	81	.	.	.	.	1614
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	404	888	2017	1049	1048	1452	1613	404	888	0	

Table D3

Annual Joint Distribution of H_{mo} versus T_p (All Years)

Annual 1980-1990, Gage 625
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	Total
0.00 - 0.49	8	19	38	62	112	219	519	471	407	196	258	23	2332
0.50 - 0.99	5	85	242	429	470	427	711	755	869	175	315	34	4517
1.00 - 1.49	.	5	91	309	335	221	193	196	359	50	139	2	1900
1.50 - 1.99	.	.	3	64	180	103	64	68	138	43	78	5	746
2.00 - 2.49	.	.	.	1	38	42	22	35	71	41	47	2	299
2.50 - 2.99	.	.	.	.	4	13	20	23	41	16	32	1	150
3.00 - 3.49	.	.	.	.	.	.	5	7	17	6	11	.	46
3.50 - 3.99	.	.	.	.	.	.	.	.	3	1	3	.	7
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater													0
Total	13	109	374	865	1139	1025	1534	1555	1905	528	883	67	

Table D4

Monthly Joint Distribution of H_{mo} versus T_p (All Years)

January 1980-1990, Gage 625
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	Total
0.00 - 0.49	9	28	56	75	112	159	317	541	382	149	159	9	1996
0.50 - 0.99	.	159	261	401	457	280	466	513	970	140	271	9	3927
1.00 - 1.49	.	.	84	513	578	215	196	187	438	.	84	.	2295
1.50 - 1.99	.	.	.	93	243	224	75	112	168	37	37	.	989
2.00 - 2.49	.	.	.	.	75	159	9	37	159	47	84	.	570
2.50 - 2.99	.	.	.	.	9	19	28	28	56	28	28	.	196
3.00 - 3.49	.	.	.	.	.	.	.	9	9	.	.	.	18
3.50 - 3.99	.	.	.	.	.	.	.	.	9	.	.	.	9
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater													0
Total	9	187	401	1082	1474	1056	1091	1427	2191	401	663	18	

February 1980-1990, Gage 625
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	Total
0.00 - 0.49	.	9	28	28	46	64	193	147	313	83	147	.	1058
0.50 - 0.99	18	55	147	405	368	405	635	709	1160	83	331	9	4325
1.00 - 1.49	.	.	110	433	424	276	193	249	645	64	193	.	2587
1.50 - 1.99	.	.	.	147	285	120	74	129	249	83	101	.	1188
2.00 - 2.49	.	.	.	.	28	55	46	64	74	64	110	.	441
2.50 - 2.99	.	.	.	.	.	18	18	37	74	18	101	.	266
3.00 - 3.49	.	.	.	.	.	.	28	9	37	9	9	.	92
3.50 - 3.99	.	.	.	.	.	.	.	.	9	9	18	.	36
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater													0
Total	18	64	285	1013	1151	938	1187	1344	2561	413	1010	9	

March 1980-1990, Gage 625
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	Total
0.00 - 0.49	8	.	.	80	48	88	313	209	249	129	161	.	1285
0.50 - 0.99	8	40	201	514	442	482	779	635	876	112	345	.	4434
1.00 - 1.49	.	8	153	305	305	297	193	233	594	32	313	.	2433
1.50 - 1.99	.	.	.	64	201	88	104	80	225	64	153	8	987
2.00 - 2.49	.	.	.	8	64	40	40	40	137	72	64	.	465
2.50 - 2.99	.	.	.	.	.	8	32	16	96	40	56	.	248
3.00 - 3.49	.	.	.	.	.	.	16	16	56	16	40	.	144
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	0
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater													0
Total	16	48	354	971	1060	1003	1477	1229	2233	465	1132	8	

(Continued)

Table D4 (Continued)

April 1980-1990, Gage 625
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	Total
0.00 - 0.49	17	9	9	68	51	68	368	385	394	163	334	.	1866
0.50 - 0.99	.	51	188	223	334	385	830	985	1284	231	539	17	5067
1.00 - 1.49	.	9	86	197	274	231	214	325	385	51	188	.	1960
1.50 - 1.99	.	.	9	26	120	60	68	111	205	17	85	.	702
2.00 - 2.49	.	.	.	9	17	.	26	26	77	17	.	.	181
2.50 - 2.99	.	.	.	.	9	17	26	17	51	34	9	.	163
3.00 - 3.49	.	.	.	.	.	.	.	9	34	.	17	.	60
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	0
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	17	69	292	523	805	761	1532	1858	2430	513	1182	17	

May 1980-1990, Gage 625
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	Total
0.00 - 0.49	8	32	40	55	190	261	648	545	498	174	332	8	2791
0.50 - 0.99	8	126	253	411	585	530	1107	1028	751	119	237	8	5163
1.00 - 1.49	.	.	47	134	142	198	316	190	285	16	95	.	1423
1.50 - 1.99	.	.	.	47	71	16	55	55	71	16	71	.	402
2.00 - 2.49	.	.	.	.	40	32	.	8	.	40	24	8	152
2.50 - 2.99	.	.	.	.	.	.	.	.	24	24	16	.	64
3.00 - 3.49	.	.	.	.	.	.	.	.	.	.	8	.	8
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	0
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	16	158	340	647	1028	1037	2126	1826	1629	389	783	24	

June 1980-1990, Gage 625
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	Total
0.00 - 0.49	37	65	93	102	335	521	1367	726	428	186	158	19	4037
0.50 - 0.99	9	158	260	437	326	465	1209	1126	567	112	65	19	4753
1.00 - 1.49	.	.	47	130	167	121	121	112	177	.	9	9	893
1.50 - 1.99	.	.	.	37	47	28	19	9	84	.	56	.	280
2.00 - 2.49	.	.	.	.	9	9	9	9	9	.	.	.	45
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	46	223	400	706	884		2725	1982	1265	298	288	47	

(Continued)

Table D4 (Continued)

July 1980-1990, 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	.	49	108	79	187	570	1248	1061	717	373	383	79	4854
0.50 - 0.99	.	118	344	413	648	619	727	688	383	265	157	79	4441
1.00 - 1.49	.	.	49	167	138	88	59	39	49	.	20	.	609
1.50 - 1.99	.	.	.	10	20	20	20	10	10	.	.	.	90
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	167	501	669	993	1297	2054	1798	1159	638	560	158	

August 1980-1990, 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	.	18	18	46	176	453	887	943	665	287	231	9	3733
0.50 - 0.99	18	83	213	555	591	638	850	739	601	194	314	83	4879
1.00 - 1.49	.	.	55	203	203	120	194	83	65	18	9	.	950
1.50 - 1.99	.	.	.	46	102	37	9	9	46	9	37	.	295
2.00 - 2.49	.	.	.	.	9	9	.	.	28	.	46	.	92
2.50 - 2.99	.	.	.	.	.	.	9	9	9	.	.	.	27
3.00 - 3.49	.	.	.	.	.	.	.	9	9	.	.	.	18
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	0
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	18	101	286	850	1081	1257	1949	1792	1423	508	637	92	

September 1980-1990, 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	.	.	10	20	69	128	187	374	403	226	246	59	1722
0.50 - 0.99	.	79	246	295	482	383	482	747	1072	187	501	.	4474
1.00 - 1.49	.	.	39	344	364	324	246	285	462	138	226	.	2428
1.50 - 1.99	.	.	.	88	226	167	108	98	88	59	98	10	942
2.00 - 2.49	.	.	.	.	.	69	39	20	10	88	69	10	305
2.50 - 2.99	.	.	.	.	.	10	10	29	39	.	29	.	117
3.00 - 3.49	.	.	.	.	.	.	.	.	10	.	.	.	10
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	0
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	0	79	295	747	1141	1081	1072	1553	2084	698	1169	79	

(Continued)

Table D4 (Concluded)

October 1980-1990, Gage 625
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	Total
0.00 - 0.49	8	.	23	54	16	124	264	249	303	101	241	39	1422
0.50 - 0.99	.	78	210	358	389	295	537	661	1073	163	288	39	4091
1.00 - 1.49	.	8	140	435	358	194	117	295	482	101	218	16	2364
1.50 - 1.99	.	.	23	93	241	78	70	78	241	117	132	23	1096
2.00 - 2.49	.	.	.	.	86	62	54	117	156	78	62	8	623
2.50 - 2.99	.	.	.	.	16	47	54	47	23	16	70	16	289
3.00 - 3.49	.	.	.	.	.	.	16	8	8	31	31	.	94
3.50 - 3.99	.	.	.	.	.	.	.	.	16	8	.	.	24
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	8	86	396	940	1106	800	1112	1455	2302	615	1042	141	

November 1980-1990, Gage 625
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	Total
0.00 - 0.49	8	8	50	67	42	151	318	268	276	218	327	42	1775
0.50 - 0.99	.	42	352	477	586	402	528	586	678	268	343	34	4296
1.00 - 1.49	.	34	142	385	561	318	268	168	285	126	117	8	2412
1.50 - 1.99	.	.	.	59	251	209	117	67	117	84	67	17	988
2.00 - 2.49	.	.	.	.	67	25	25	8	67	50	59	.	301
2.50 - 2.99	.	.	.	.	.	8	25	42	17	25	34	.	151
3.00 - 3.49	.	.	.	.	.	.	.	8	25	8	17	.	58
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	17	.	17
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	8	84	544	988	1507	1113	1281	1147	1465	779	981	101	

December 1980-1990, Gage 625
Percent Occurrence(X100) of Height and Period

Height,	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	Total
0.00 - [illegible]	.	19	28	66	103	103	225	328	309	309	375	19	1884
0.50 - 0.99	.	47	244	665	440	253	328	628	956	244	384	122	4311
1.00 - 1.49	.	.	122	459	515	253	178	150	384	47	159	.	2267
1.50 - 1.99	.	.	.	56	347	206	37	47	122	19	75	.	909
2.00 - 2.49	.	.	.	.	37	47	9	84	122	28	37	.	364
2.50 - 2.99	.	.	.	.	9	28	28	47	94	.	28	.	234
3.00 - 3.49	.	.	.	.	.	.	.	19	9	.	.	.	28
3.50 - 3.99	.	.	.	.	.	.	.	.	.	.	.	.	0
4.00 - 4.49	.	.	.	.	.	.	.	.	.	.	.	.	0
4.50 - 4.99	.	.	.	.	.	.	.	.	.	.	.	.	0
5.00 - Greater	.	.	.	.	.	.	.	.	.	.	.	.	0
Total	0	66	394	1246	1451	890	805	1303	1996	647	1058	141	

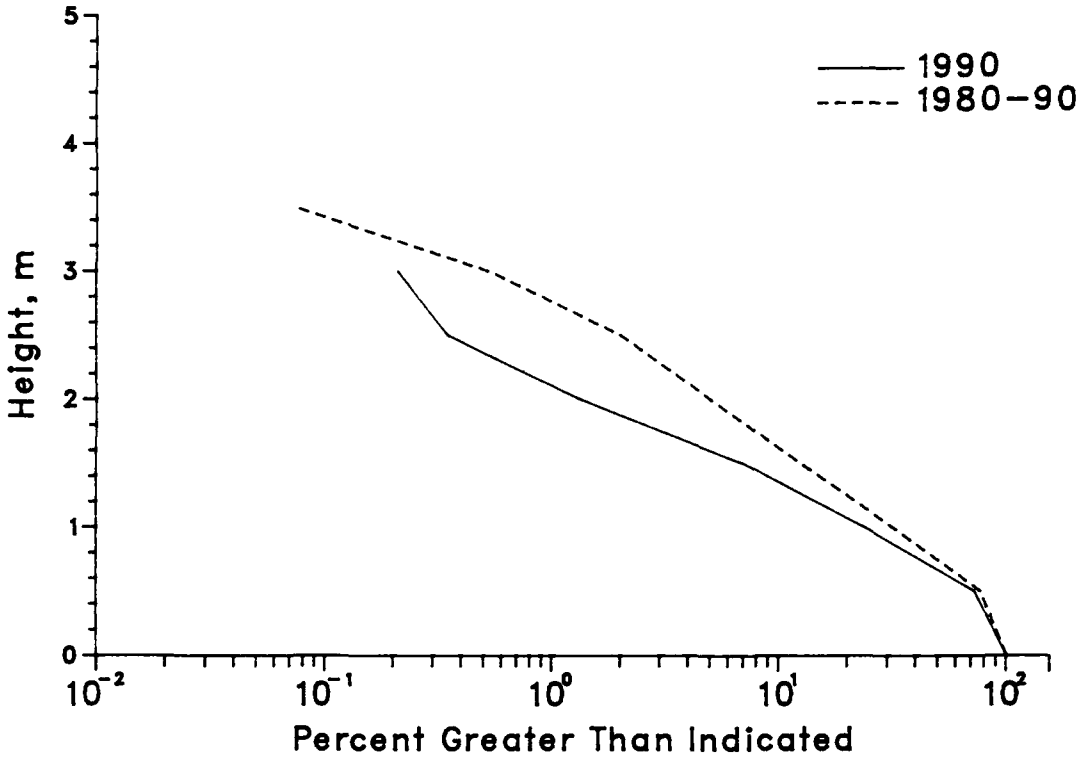

Figure D2. Annual cumulative wave height distributions for Gage 625

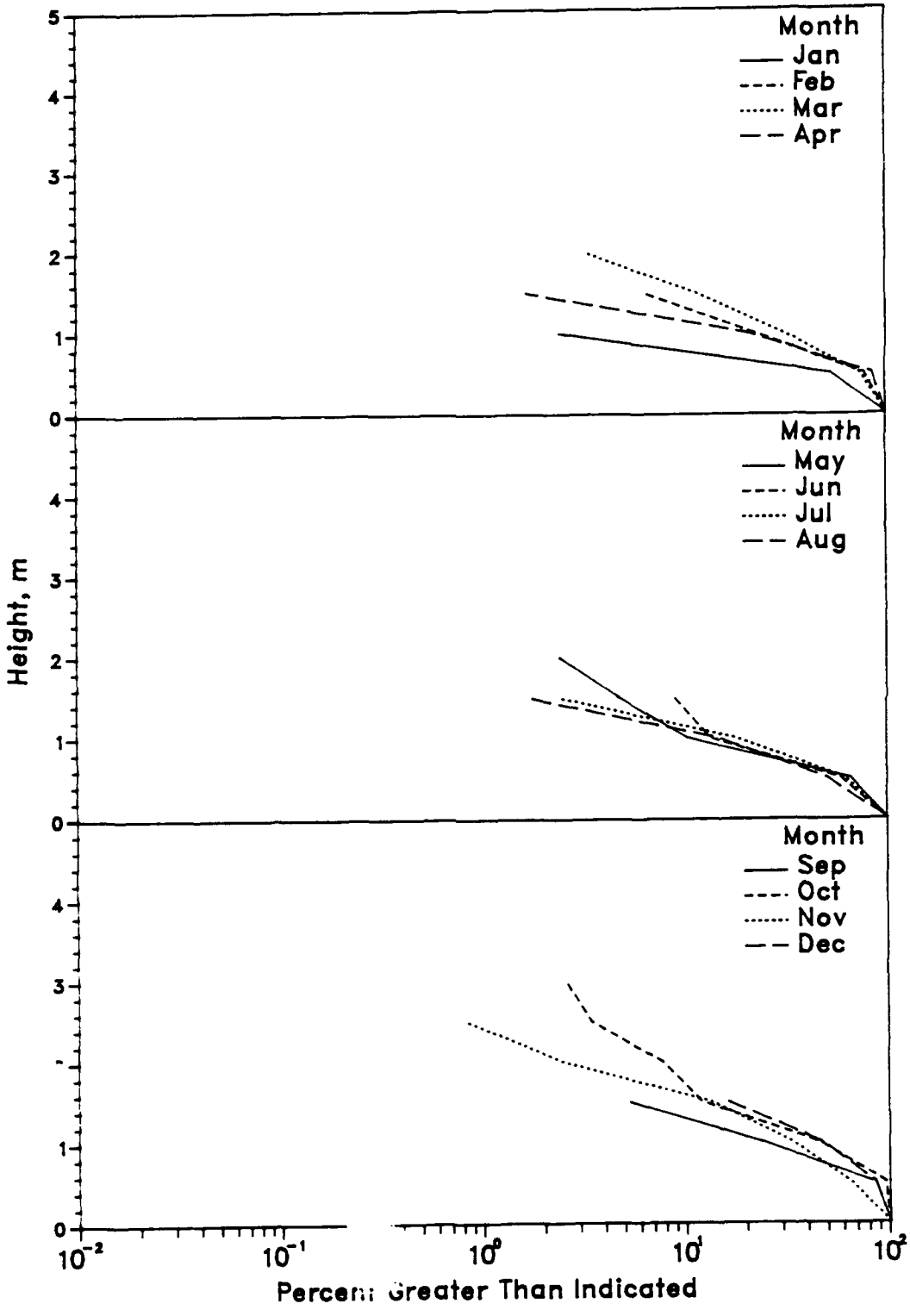

Figure D3. 1990 monthly wave height distributions for Gage 625

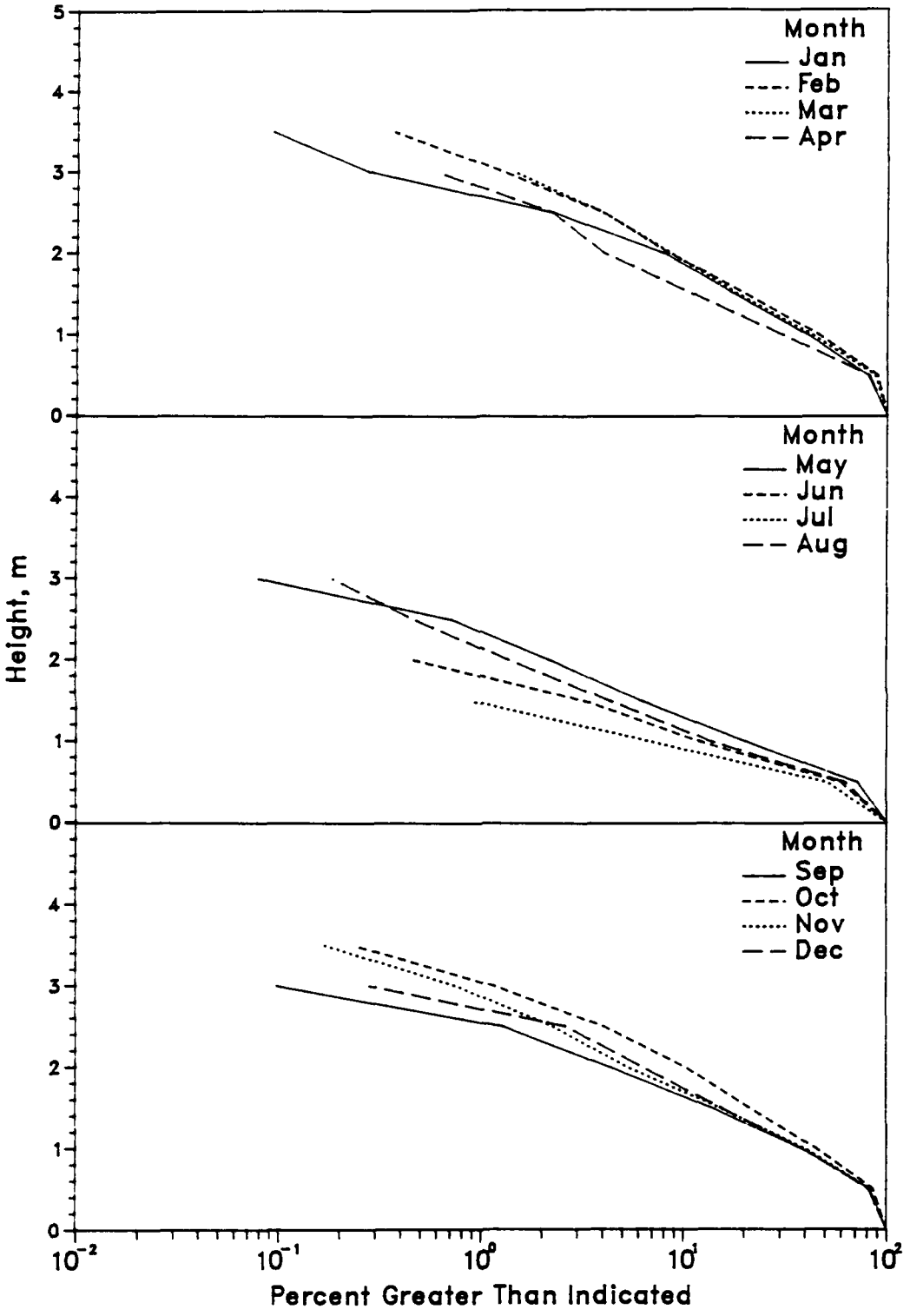

Figure D4. 1980-1990 monthly wave height distributions for Gage 625

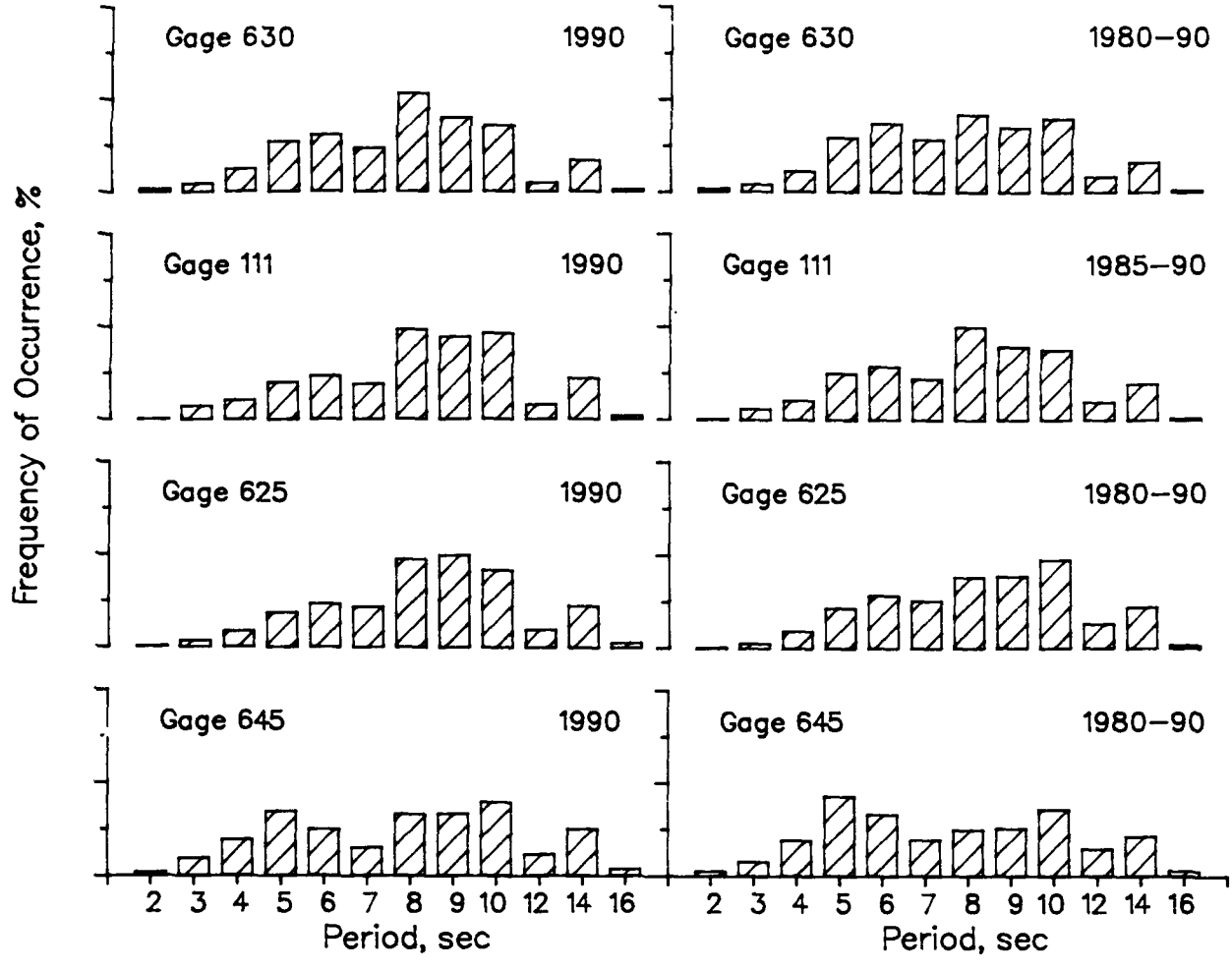

Figure D5. Annual wave period distributions for all gages

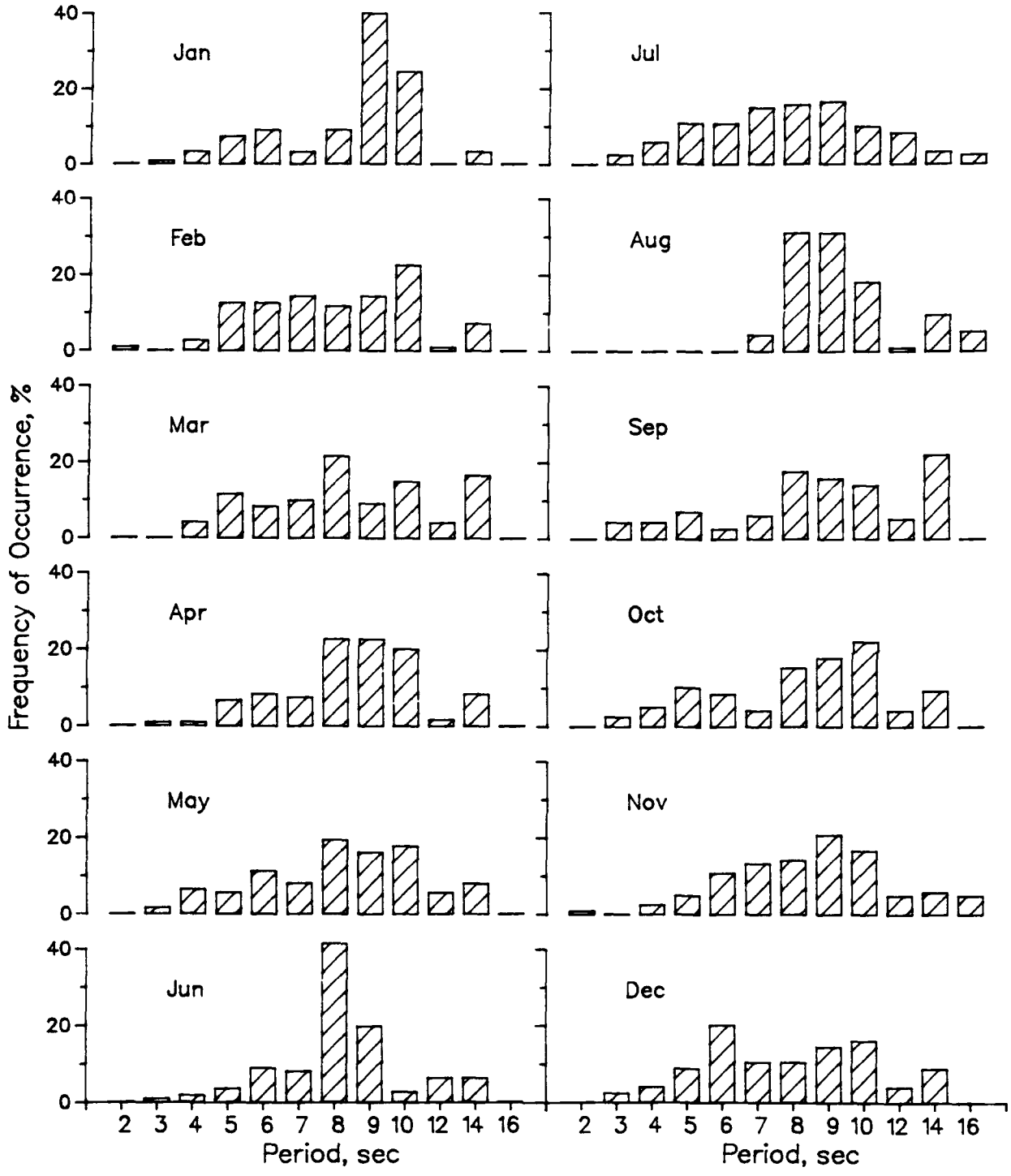

Figure D6. 1990 monthly wave period distributions for Gage 625

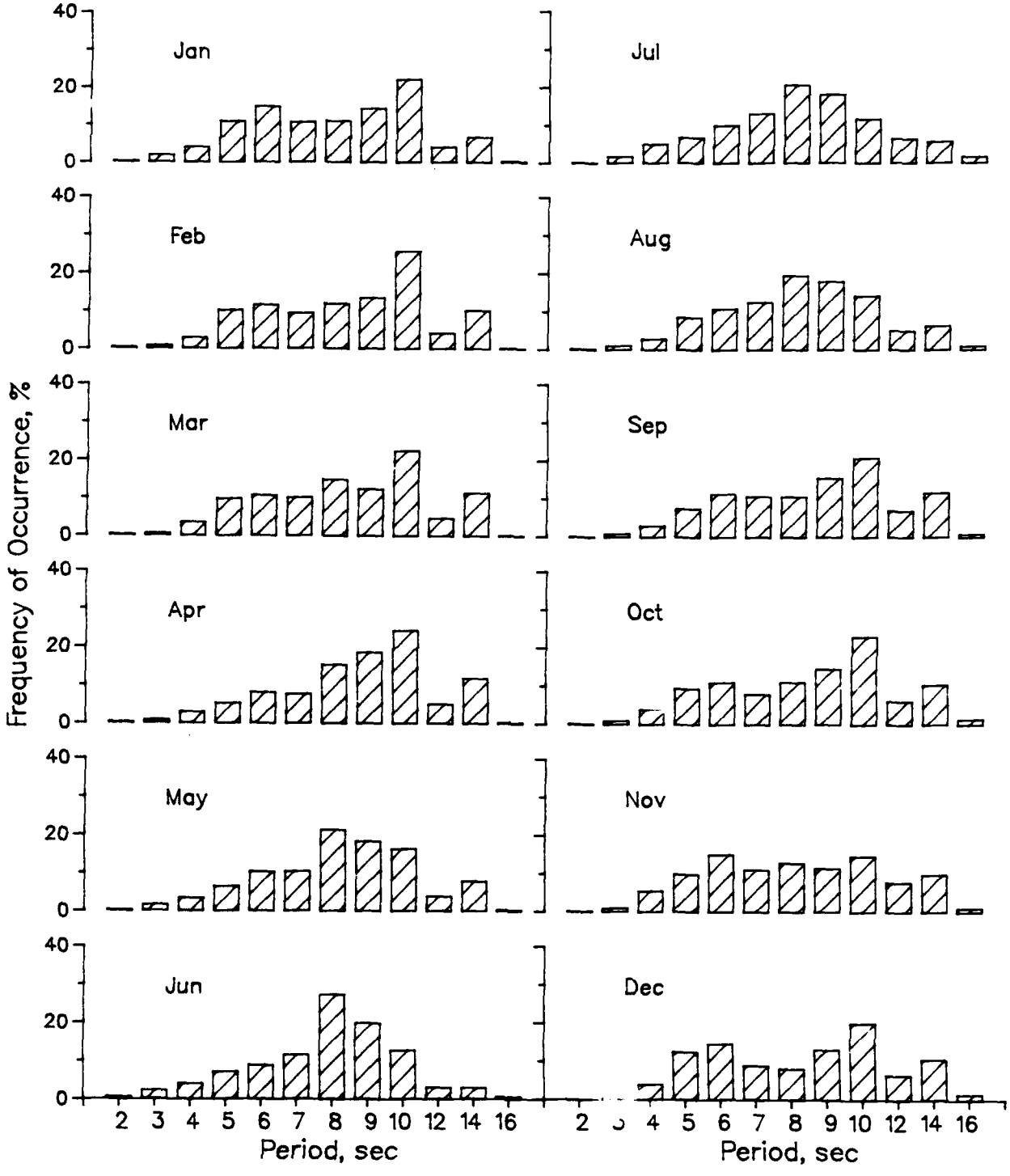

Figure D7. 1980-1990 monthly wave period distributions for Gage 625

Table D5

1990 Persistence of H_{mo} for Gage 625

Height	Consecutive Day(s) or Longer																	
(m)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19+
0.5	30	28	26	24	20	17	15	13		12	10	8	5				4	3	2
1.0	51	35	17	11	6			3											
1.5	27	16	4	1															
2.0	8	3	1																
2.5	2																		
3.0	1																		
3.5																			

Table D6

1980 Through 1990 Persistence of H_{mo} for Gage 625

Height	Consecutive Day(s) or Longer																		
(m)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19+
0.5	28	25	22	19	17	14	12	11	10		9	8	7		6	5		4	3
1.0	45	31	21	14	10	7	5	4	3			1							
1.5	29	16	9	5	3	2	1												
2.0	14	7	4	2	1														
2.5	7	3	1																
3.0	2	1																	
3.5	1																		
4.0																			

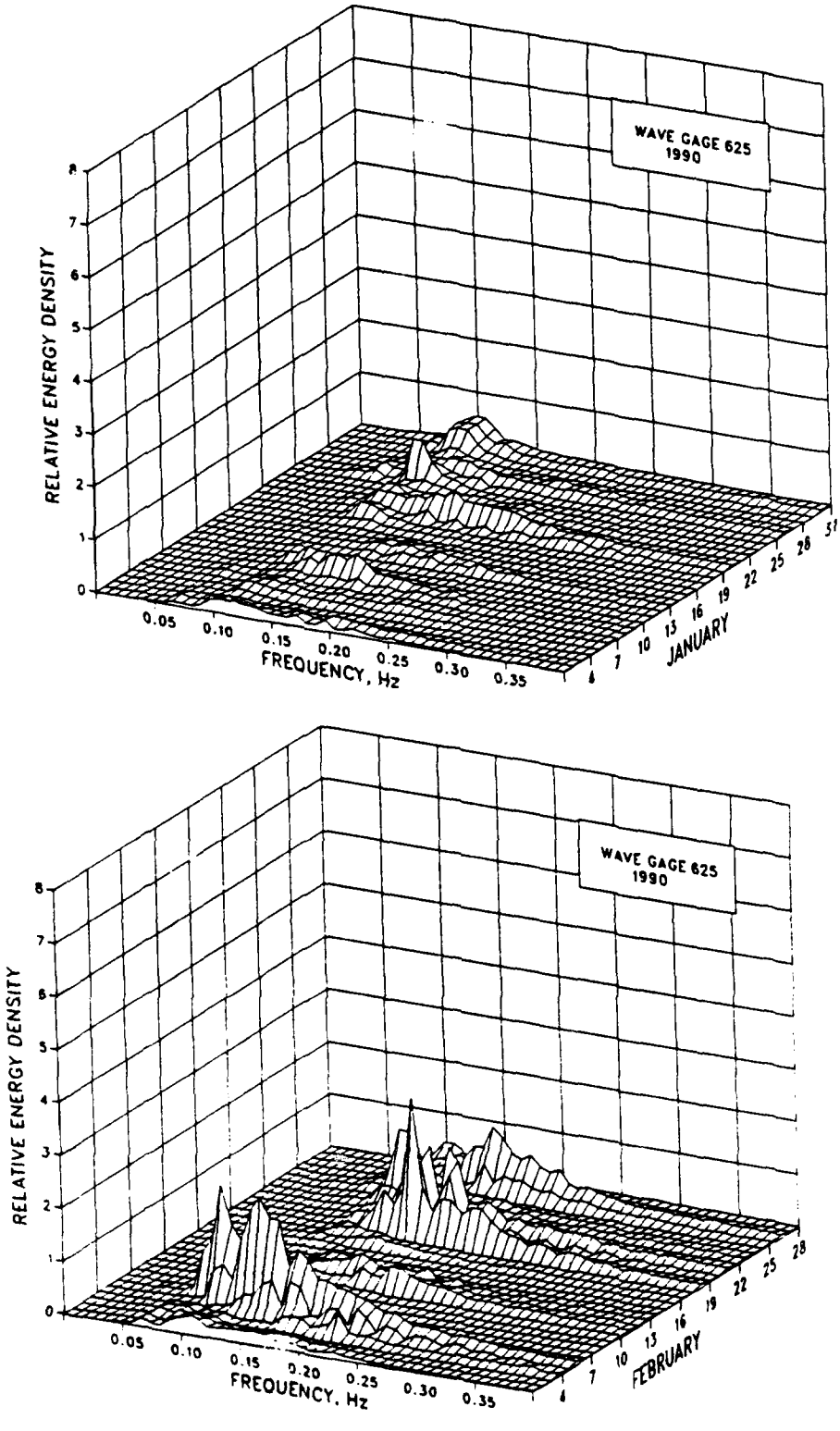

Figure D8. 1990 monthly spectra for Gage 625
(Sheet 1 of 6)

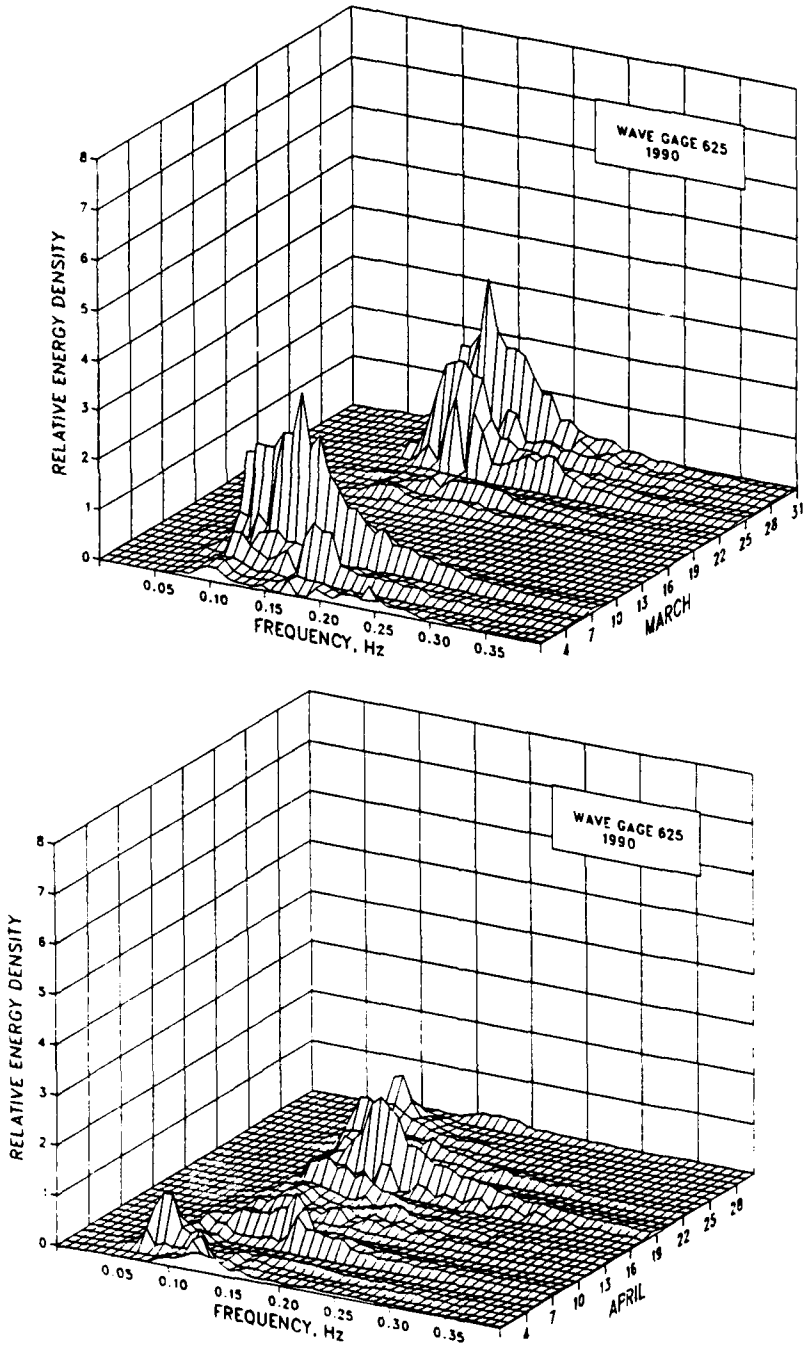

Figure D8. (Sheet 2 of 6)

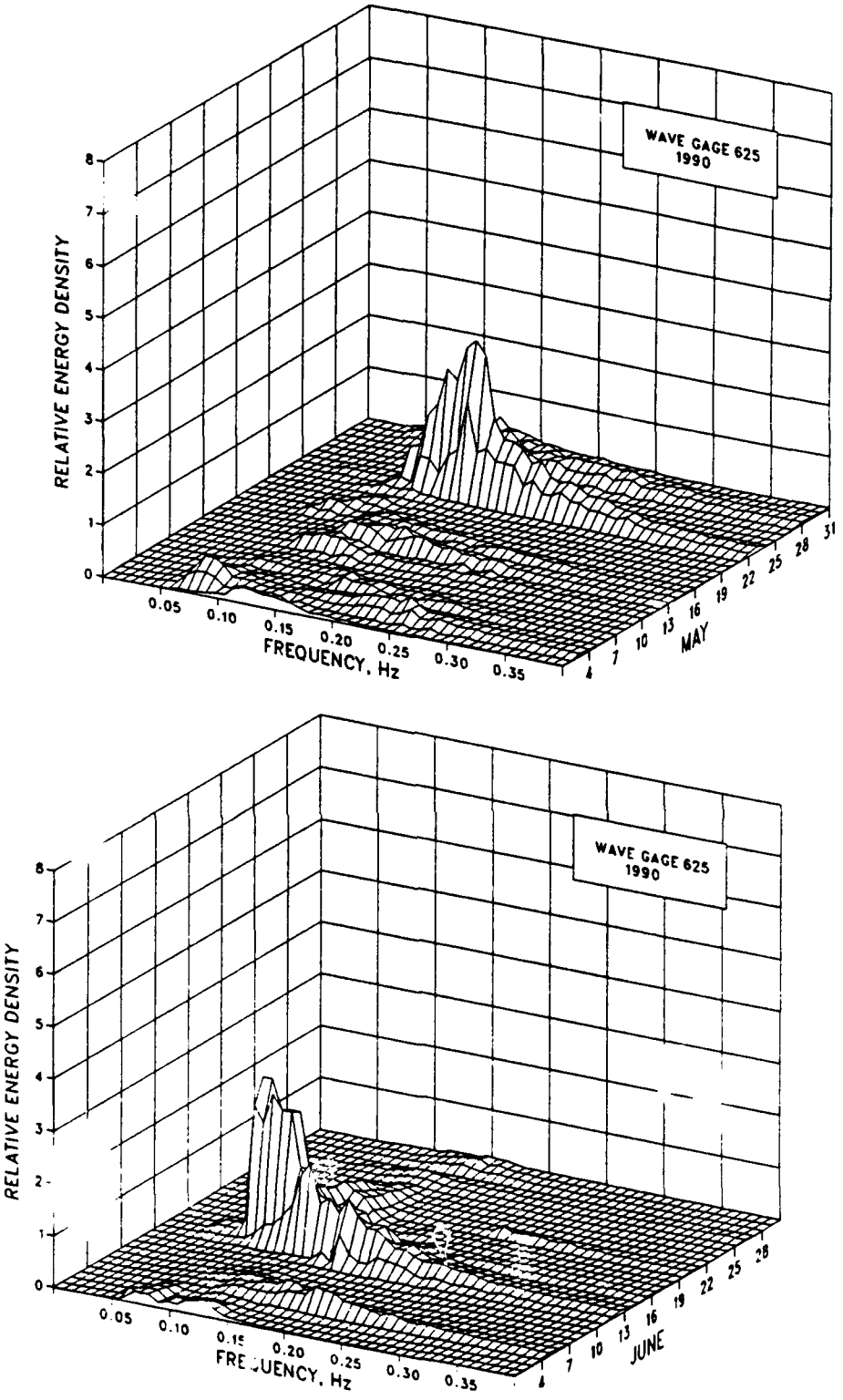

Figure D8. (Sheet 3 of 6)

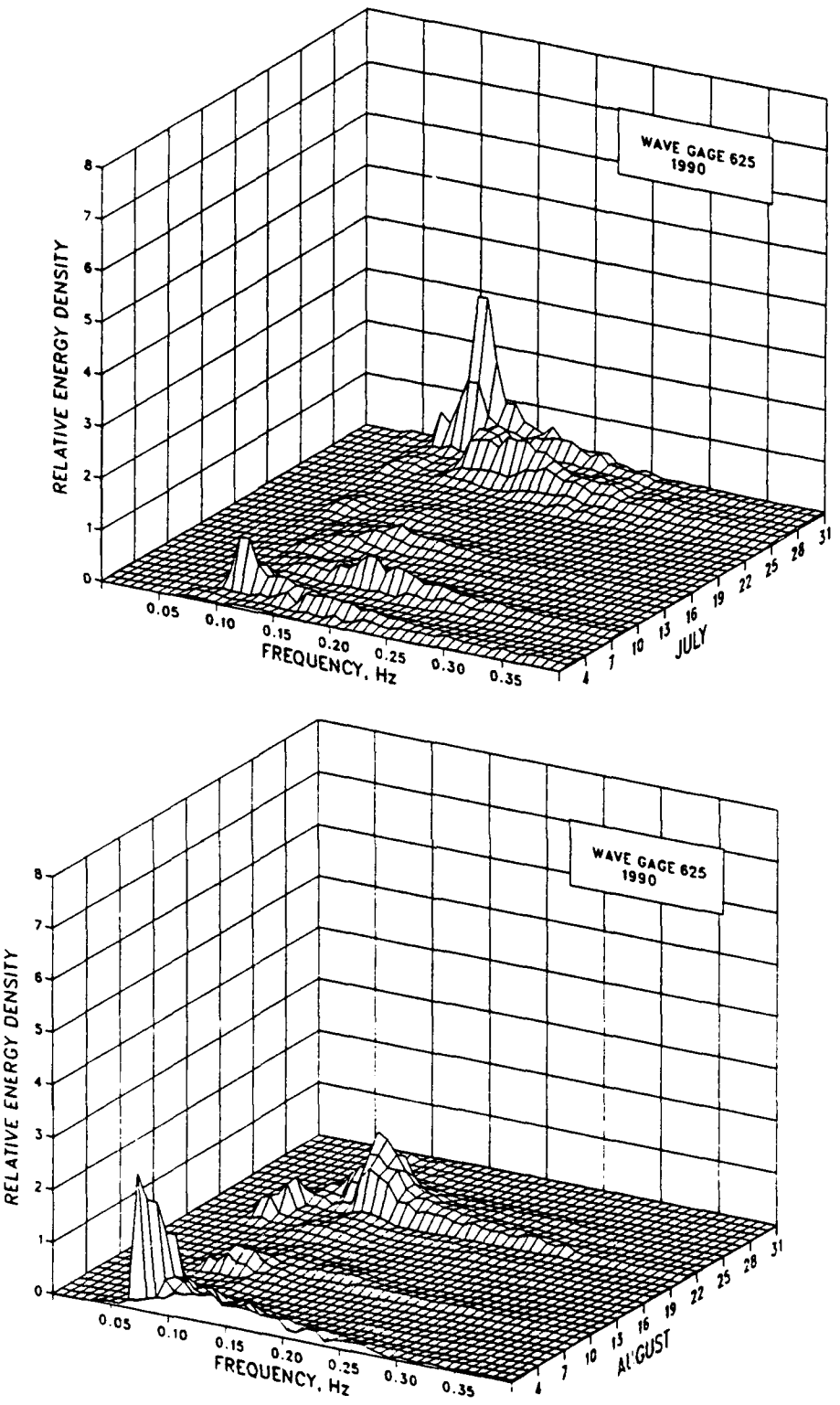

Figure D8. (Sheet 4 of 6)

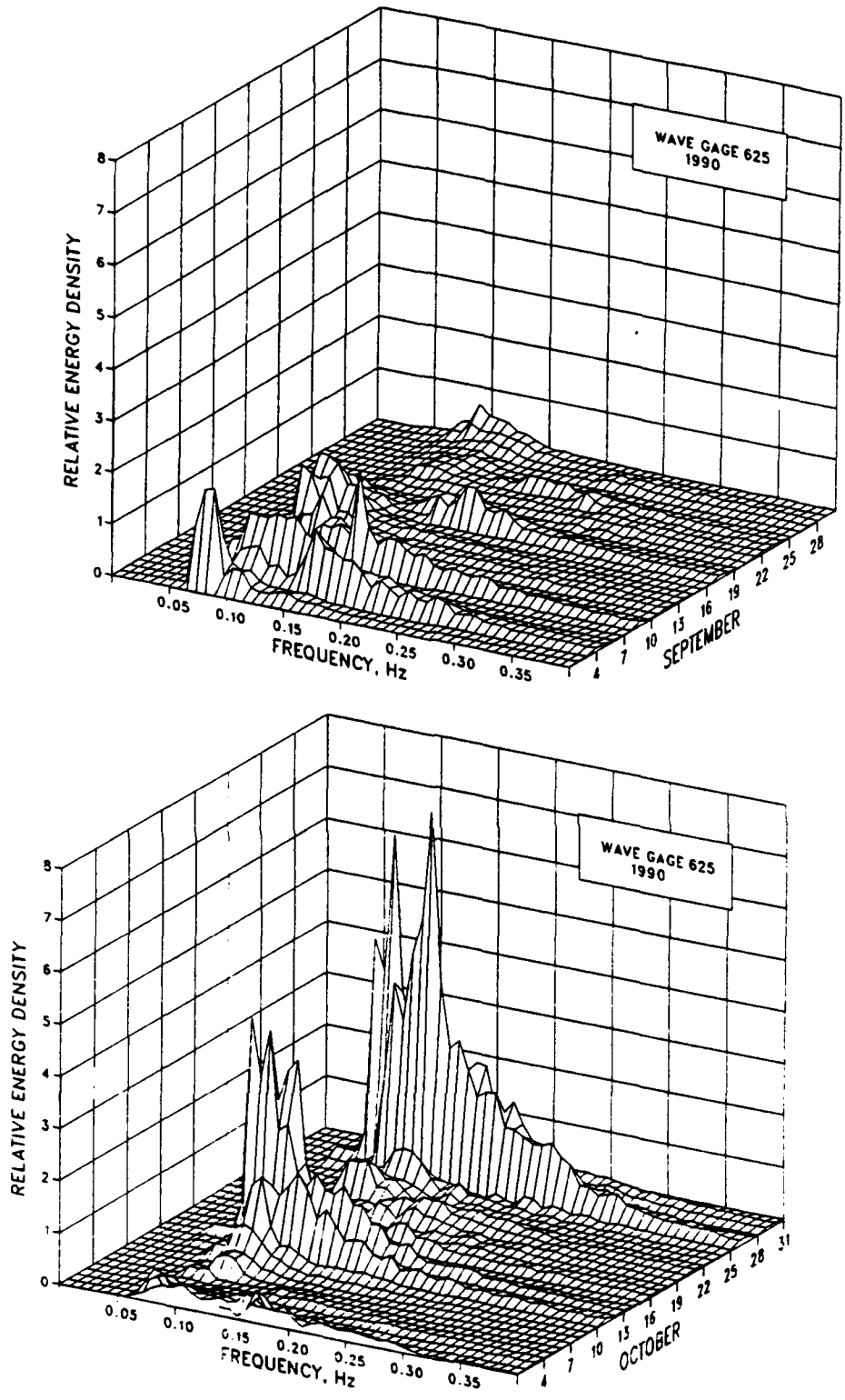

Figure D8. (Sheet 5 of 6)

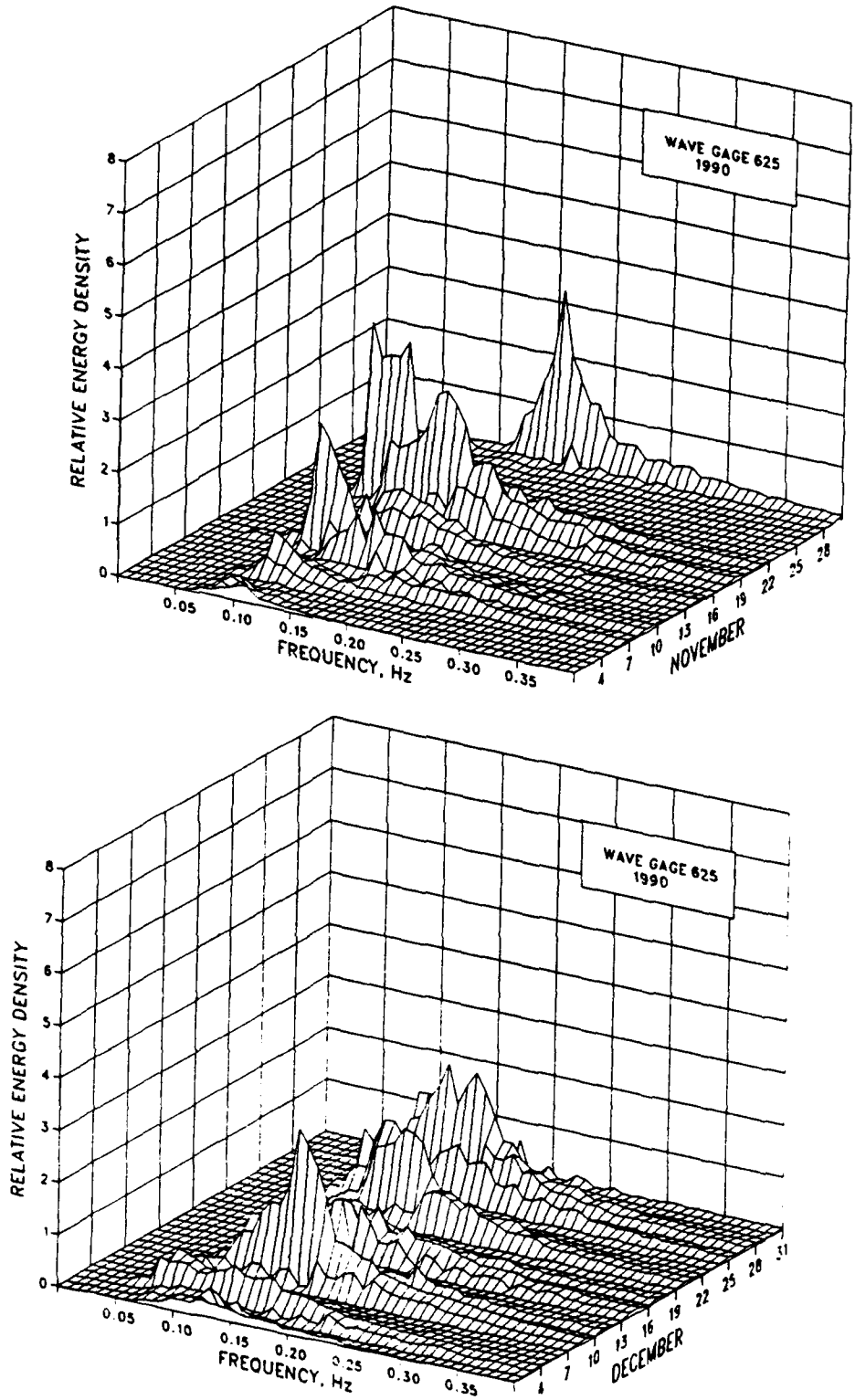

Figure D8. (Sheet 6 of 6)

Table D7

Wave Statistics for Gage 625

	1990							1980-1990						
	Height				Period			Height				Period		
Month	Mean m	Std. Dev. m	Extreme m	Date	Mean sec	Std. Dev. sec	Number Obs.	Mean m	Std. Dev. m	Extreme m	Date	Mean sec	Std. Dev. sec	Number Obs.
Jan	0.6	0.2	1.2	19	9.0	2.0	123	1.0	0.6	3.5	1988	8.5	2.7	1072
Feb	0.8	0.4	2.0	5	8.6	2.4	111	1.1	0.6	3.8	1989	9.0	2.7	1086
Mar	0.9	0.6	2.4	7	9.0	2.6	121	1.1	0.7	3.4	1983	9.0	2.6	1245
Apr	0.8	0.3	1.9	18	9.2	2.3	119	0.9	0.6	3.4	1988	9.4	2.6	1168
May	0.7	0.4	2.2	22	8.9	2.5	124	0.8	0.5	3.0	1986	8.8	2.6	1265
Jun	0.7	0.4	2.0	13	8.9	2.3	111	0.7	0.4	2.3	1983	8.3	2.3	1075
Jul	0.7	0.4	1.6	30	8.7	3.0	122	0.6	0.3	1.8	1985	8.7	2.8	1018
Aug	0.6	0.4	1.6	1	10.2	2.4	116	0.7	0.4	3.1	1981	8.7	2.7	1082
Sep	0.9	0.4	1.8	4	9.5	2.9	113	1.0	0.6	3.0	1983	9.2	2.8	1017
Oct	1.1	0.6	3.2	26	9.0	2.7	117	1.1	0.7	3.5	1980	9.1	2.9	1286
Nov	0.9	0.6	2.5	10	9.5	3.1	120	1.0	0.6	3.5	1981	8.8	3.0	1194
Dec	1.0	0.5	1.9	9	8.6	2.6	124	1.0	0.6	3.1	1986	9.0	3.1	1067
Annual	0.8	0.5	3.2	Oct	9.1	2.6	1421	0.9	0.6	3.8	Feb 1989	8.9	2.8	13575

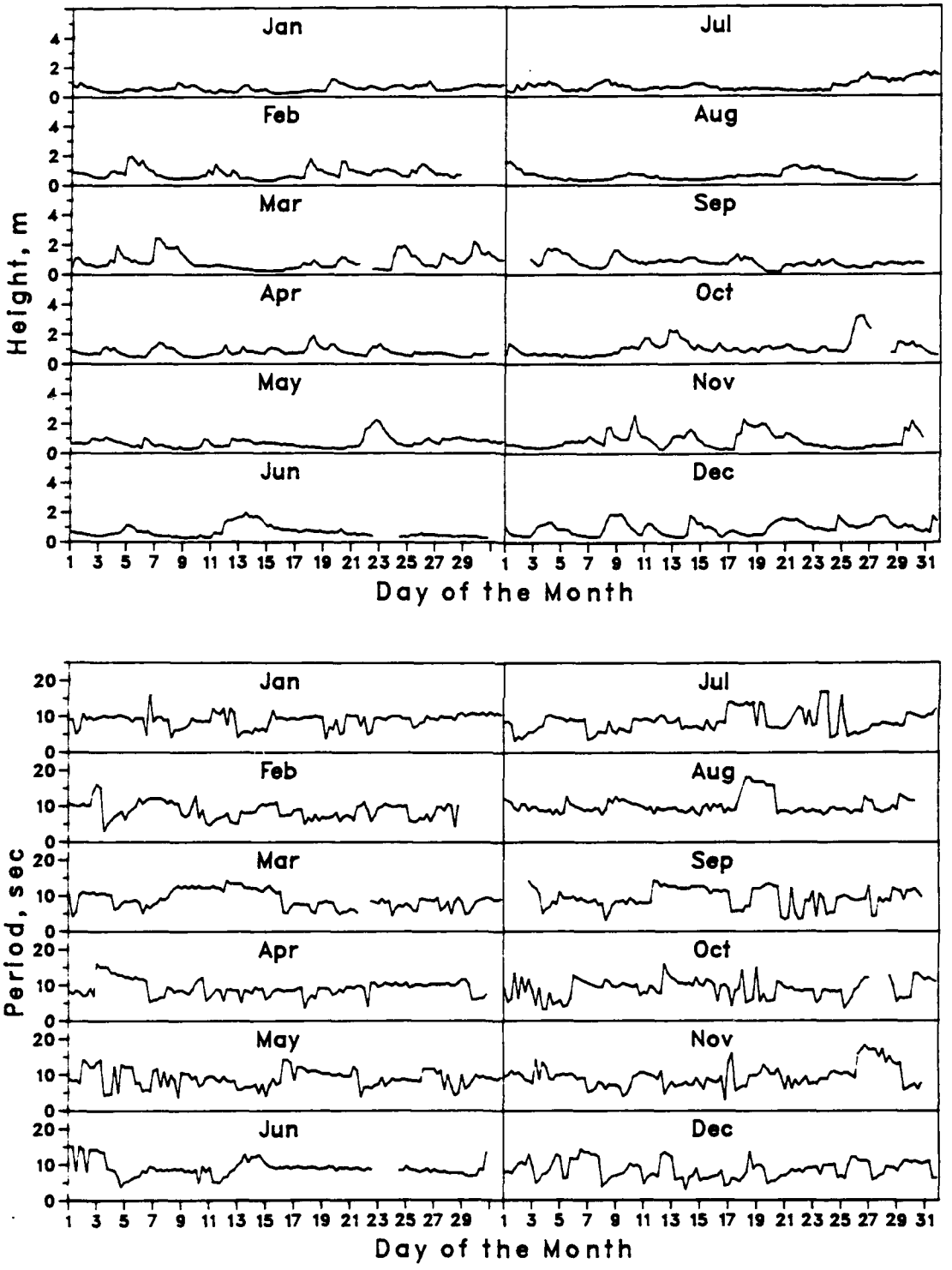

Figure D9. Time-histories of wave height and period for Gage 625

APPENDIX E: WAVE DATA FOR GAGE 645

1. Wave data summaries for Gage 645 are presented for 1990 and for 1980 through 1990 in the following forms:

Daily H_{mo} and T_p

2. 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

3. Annual and monthly joint distributions tables are presented in Tables E1 and E2, and data for 1980 through 1990 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

4. Annual and monthly wave height distributions for 1990 are plotted in cumulative form in Figures E2 and E3. Data for 1980 through 1990 are in Figure E4.

Peak Spectral Wave Period Distributions

5. Annual and monthly peak wave period, T_p, distribution histograms for 1990 are presented in Figures E5 and E6. Data for 1980 through 1990 are in Figure E7.

Persistence of Wave Heights

6. Table E5 shows the number of times in 1990 when the specified wave height was equaled or exceeded at least once during each day for the duration (consecutive days). Data for 1980 through 1990 are given in Table E6. An example is shown below:

Height	Consecutive Day(s) or Longer																	
m	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 3 times the height exceeded 1 m for shorter durations.

Spectra

7. Monthly spectra for the offshore Waverider buoy (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-dimension 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.

8. Monthly and annual wave statistics for Gage 645 for 1990 and for 1980 through 1990 are presented in Table E7.

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

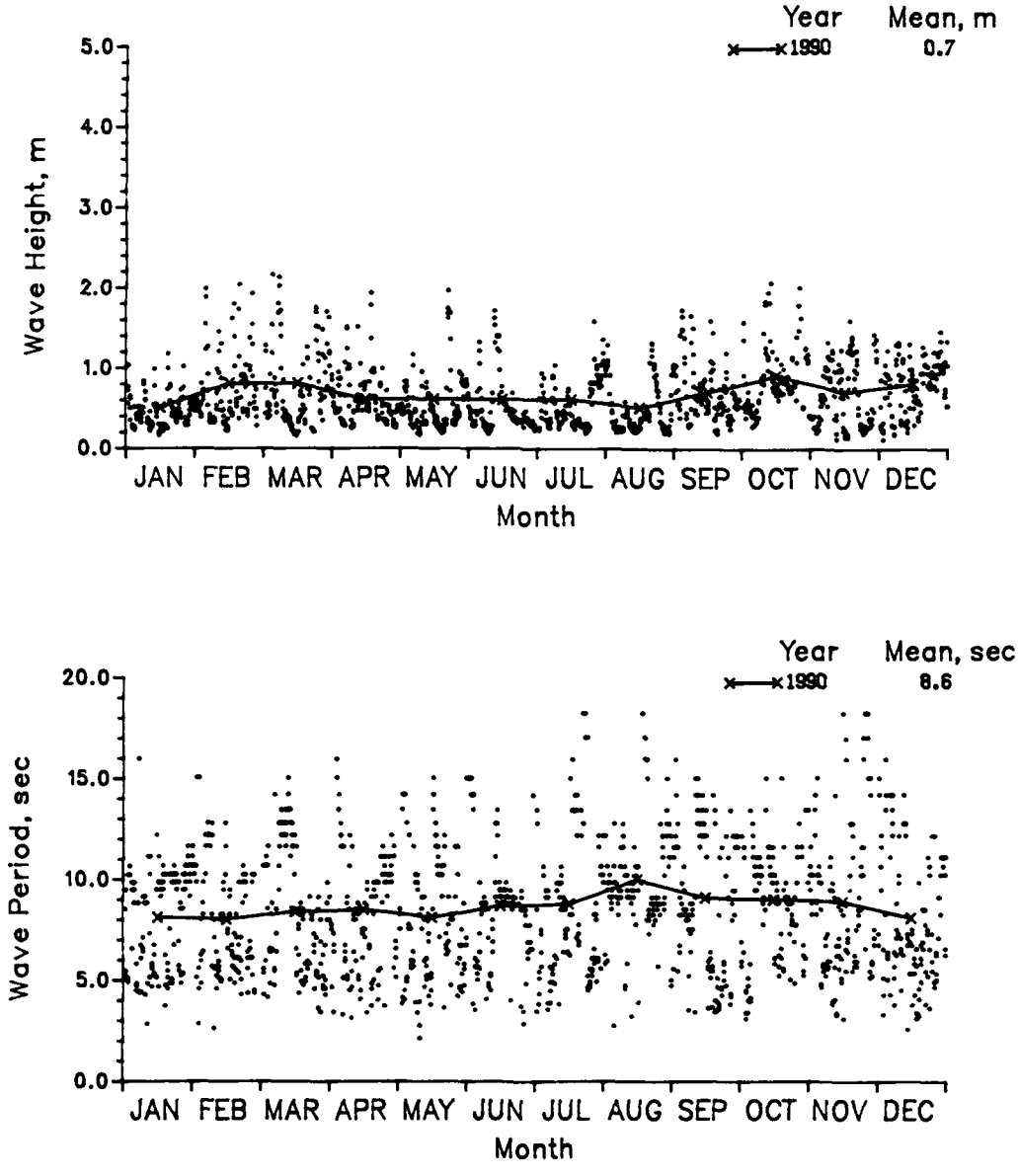

Figure E1. 1990 daily wave heigh and period values with monthly means fo: age 645

Table E1

Annual Joint Distribution of H_{mo} versus T_p

Annual 1990, Gage 645
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	Total
0.00 - 0.49	42	140	217	259	196	175	741	874	909	329	664	140	4686
0.50 - 0.99	14	238	503	734	357	238	406	350	531	112	252	.	3735
1.00 - 1.49	.	.	49	357	280	133	119	84	105	14	77	.	1218
1.50 - 1.99	.	.	.	28	147	49	42	21	14	7	7	.	315
2.00 - 2.49	.	.	.	.	14	7	7	.	21	.	.	.	49
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	56	378	769	1378	994	602	1315	1329	1580	462	1000	140	

Table E2

Monthly Joint Distribution of H_{mo} versus T_p

January 1990, Gage 645
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	Total
0.00 - 0.49	81	.	650	569	244	163	488	1951	2114	.	163	.	6423
0.50 - 0.99	.	81	650	976	488	81	244	407	407	.	.	.	3334
1.00 - 1.49	.	.	81	81	81	.	.	.	.	.	.	.	243
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	81	81	1381	1626	813	244	732	2358	2521	0	163	0	

February 1990, Gage 645
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	Total
0.00 - 0.49	90	.	270	450	90	180	631	721	631	.	1081	.	4144
0.50 - 0.99	90	.	541	901	631	360	270	270	721	.	90	.	3874
1.00 - 1.49	.	.	.	450	450	.	.	90	90	.	90	.	1170
1.50 - 1.99	.	.	.	90	360	90	180	.	.	.	.	.	720
2.00 - 2.49	.	.	.	.	90	.	.	.	.	.	.	.	90
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	180	0	811	1891	1621	630	1081	1081	1442	0	1261	0	

March 1990, Gage 645
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	Total
0.00 - 0.49	.	.	83	331	165	83	992	165	826	496	1157	.	4298
0.50 - 0.99	.	165	826	744	83	83	579	83	165	165	165	.	3058
1.00 - 1.49	.	.	165	744	248	.	165	83	83	.	.	.	1488
1.50 - 1.99	.	.	.	.	413	248	83	83	83	.	.	.	910
2.00 - 2.49	.	.	.	.	83	83	83	.	.	.	.	.	249
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	165	1074	1819	992	497	1902	414	1157	661	1322	0	

(Continued)

Table E2 (Continued)

April 1990, Gage 645
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	Total
0.00 - 0.49	.	168	168	168	420	168	504	756	1681	168	504	.	4705
0.50 - 0.99	.	336	672	588	336	588	672	504	336	168	252	.	4452
1.00 - 1.49	.	.	.	252	168	.	84	.	.	.	.	.	504
1.50 - 1.99	.	.	.	84	252	.	.	.	.	.	.	.	336
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	504	840	1092	1176	756	1260	1260	2017	336	756	0	

May 1990, Gage 645
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	Total
0.00 - 0.49	161	161	.	403	161	484	1048	726	1532	323	565	.	5564
0.50 - 0.99	.	323	1048	887	403	323	161	81	161	161	242	.	3790
1.00 - 1.49	.	.	.	161	81	.	.	.	.	.	.	.	242
1.50 - 1.99	.	.	.	.	323	81	.	.	.	.	.	.	404
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	161	484	1048	1451	968	888	1209	807	1693	484	807	0	

June 1990, Gage 645
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	Total
0.00 - 0.49	90	270	450	270	721	360	2162	1441	.	721	541	.	7026
0.50 - 0.99	.	90	90	360	90	.	360	721	.	90	.	.	1801
1.00 - 1.49	.	.	.	270	.	90	.	180	90	.	270	.	900
1.50 - 1.99	.	.	.	.	180	.	90	.	.	.	.	.	270
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	90	360	540	900	991	450	2612	2342	90	811	811	0	

(Continued)

Table E2 (Continued)

July 1990, Gage 645
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	Total
0.00 - 0.49	.	328	164	164	410	328	574	1148	328	820	738	492	5494
0.50 - 0.99	.	164	738	902	492	410	410	82	328	.	164	.	3690
1.00 - 1.49	.	.	.	328	82	.	.	.	246	.	82	.	738
1.50 - 1.99	.	.	.	.	82	.	.	.	.	.	.	.	82
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	492	902	1394	1066	738	984	1230	902	820	984	492	

August 1990, Gage 645
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	Total
0.00 - 0.49	83	167	167	83	.	83	1083	2167	1417	83	1250	500	7083
0.50 - 0.99	.	.	83	167	.	83	500	500	333	.	167	.	1833
1.00 - 1.49	.	.	83	167	83	83	500	.	.	.	167	.	1083
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	83	167	333	417	83	249	2083	2667	1750	83	1584	500	

September 1990, Gage 645
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	Total
0.00 - 0.49	.	83	250	83	.	.	667	500	500	250	417	.	2750
0.50 - 0.99	.	750	417	500	167	167	583	167	1000	583	1333	.	5667
1.00 - 1.49	.	.	.	583	167	.	167	250	83	.	.	.	1250
1.50 - 1.99	.	.	.	83	83	83	83	.	.	.	.	.	332
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	833	667	1250	417	250	1500	917	1583	833	1750	0	

(Continue

Table E2 (Concluded)

October 1990, 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	.	259	172	86	.	.	.	345	517	172	172	.	1723
0.50 - 0.99	.	86	259	517	431	259	862	1121	1724	.	172	.	5431
1.00 - 1.49	.	.	86	345	431	172	172	86	345	172	86	.	1895
1.50 - 1.99	.	.	.	86	.	86	86	172	86	86	86	.	688
2.00 - 2.49	.	.	.	.	.	.	.	.	259	.	.	.	259
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	345	517	1034	862	517	1120	1724	2931	430	516	0	

November 1990, 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	.	84	168	420	168	168	840	420	924	420	504	672	4788
0.50 - 0.99	.	336	168	1345	168	.	84	168	420	.	84	.	2773
1.00 - 1.49	.	.	.	504	588	672	.	168	168	.	252	.	2352
1.50 - 1.99	.	.	.	.	84	.	.	.	.	.	.	.	84
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	420	336	2269	1008	840	924	756	1512	420	840	672	

December 1990, 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	.	161	81	81	.	81	.	161	323	484	887	.	2259
0.50 - 0.99	81	484	484	887	968	484	161	161	806	161	323	.	5000
1.00 - 1.49	.	.	161	403	968	565	323	161	161	.	.	.	2742
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	81	645	726	1371	1936	1130	484	483	1290	645	1210	0	

Table E3

Annual Joint Distribution of H_{mo} versus T_p (All Years)

Annual 1980-1990, Gage 645
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	Total
0.00 - 0.49	76	133	247	428	292	284	547	607	689	330	408	76	4117
0.50 - 0.99	23	180	472	943	638	302	317	295	504	134	251	25	4084
1.00 - 1.49	.	1	50	335	347	158	108	87	175	86	140	6	1493
1.50 - 1.99	.	.	.	11	47	32	21	33	59	29	51	4	287
2.00 - 2.49	.	.	.	.	1	3	1	1	4	5	4	.	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	99	314	769	1717	1325	779	994	1023	1431	584	854	111	

Table E4

Monthly Joint Distribution of H_{mo} versus T_p (All Years)

January 1980-1990, Gage 645
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	Total
0.00 - 0.49	86	104	294	389	225	156	285	648	717	259	259	61	3483
0.50 - 0.99	26	173	432	1054	735	233	251	303	605	95	242	17	4166
1.00 - 1.49	.	.	69	570	596	277	182	69	216	35	156	.	2170
1.50 - 1.99	.	.	.	9	9	17	9	17	78	9	26	.	174
2.00 - 2.49	.	.	.	.	.	.	.	.	.	9	.	.	9
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	112	277	795	2022	1565	683	727	1037	1616	407	683	78	

February 1980-1990, Gage 645
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	Total
0.00 - 0.49	108	81	233	395	135	171	251	269	664	135	332	9	2783
0.50 - 0.99	54	162	431	1014	601	233	251	350	754	144	287	.	4281
1.00 - 1.49	.	.	45	601	583	233	117	135	323	197	206	.	2440
1.50 - 1.99	.	.	.	9	90	72	45	36	27	54	144	.	477
2.00 - 2.49	.	.	.	.	9	.	.	.	.	9	.	.	18
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	162	243	709	2019	1418	709	664	790	1768	539	969	9	

March 1980-1990, Gage 645
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	Total
0.00 - 0.49	137	105	226	363	202	113	355	355	468	169	371	.	2804
0.50 - 0.99	48	218	468	1016	565	282	306	323	621	185	363	8	4403
1.00 - 1.49	.	8	113	395	395	169	137	97	258	169	250	.	1991
1.50 - 1.99	.	.	.	16	65	48	48	97	177	105	129	.	685
2.00 - 2.49	.	.	.	.	8	8	8	.	.	16	16	.	56
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	185	331	807	1790	1235	620	854	872	1524	644	1129	8	

(Continued)

Table E4 (Continued)

April 1980-1990, Gage 645
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	Total
0.00 - 0.49	61	166	262	358	280	288	446	577	708	411	446	26	4029
0.50 - 0.99	17	245	472	787	490	306	393	323	743	122	385	9	4292
1.00 - 1.49	.	.	35	262	262	96	114	122	210	70	157	.	1328
1.50 - 1.99	.	.	.	9	52	26	52	35	87	26	26	.	313
2.00 - 2.49	.	.	.	.	.	.	.	17	17	.	.	.	34
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	78	411	769	1416	1084	716	1005	1074	1765	629	1014	35	

May 1980-1990, Gage 645
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	Total
0.00 - 0.49	91	189	247	453	297	395	717	643	881	280	502	58	4753
0.50 - 0.99	8	181	593	947	774	362	379	280	453	91	165	25	4258
1.00 - 1.49	.	.	25	157	124	49	82	82	148	49	107	.	823
1.50 - 1.99	.	.	.	25	66	8	.	8	16	16	16	.	155
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	99	370	865	1582	1261	814	1186	1013	1498	436	790	83	

June 1980-1990, Gage 645
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	Total
0.00 - 0.49	120	257	402	864	565	556	1104	1027	565	419	240	137	6256
0.50 - 0.99	26	180	402	804	428	248	368	325	282	43	26	26	3158
1.00 - 1.49	.	.	26	154	128	34	43	26	103	.	43	.	557
1.50 - 1.99	.	.	.	.	26	.	9	.	.	.	.	.	35
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	146	437	830	1822	1147	838	1524	1378	950	462	309	163	

(Continued)

Table E4 (Continued)

July 1980-1990, 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	58	216	407	648	540	556	1296	1138	831	457	540	174	6861
0.50 - 0.99	.	141	432	664	523	257	299	183	150	83	58	50	2840
1.00 - 1.49	.	.	8	150	42	17	25	.	42	.	8	.	292
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	58	357	847	1462	1113	830	1620	1321	1023	540	606	224	

August 1980-1990, 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	57	163	212	570	586	480	871	1009	936	342	464	65	5755
0.50 - 0.99	8	195	521	903	553	325	342	220	260	33	122	.	3482
1.00 - 1.49	.	.	33	179	171	73	65	16	41	33	73	.	684
1.50 - 1.99	.	.	.	.	16	24	8	.	24	8	.	.	80
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	65	358	766	1652	1326	902	1286	1245	1261	416	659	65	

September 1980-1990, 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	60	51	136	290	153	247	392	494	665	358	452	60	3358
0.50 - 0.99	43	188	426	767	563	426	384	384	554	281	529	17	4562
1.00 - 1.49	.	.	43	486	367	179	162	128	153	94	153	17	1782
1.50 - 1.99	.	.	.	17	51	68	17	9	17	26	60	9	274
2.00 - 2.49	.	.	.	.	.	.	.	.	.	9	17	.	26
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	103	239	605	1560	1134	920	955	1015	1389	768	1211	103	

(Continued)

Table E4 (Concluded)

October 1980-1990, Gage 645
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	Total
0.00 - 0.49	33	75	124	191	174	124	290	340	597	249	373	66	2636
0.50 - 0.99	8	91	431	896	630	240	365	381	862	182	274	41	4401
1.00 - 1.49	.	.	50	423	431	282	174	182	348	199	207	25	2321
1.50 - 1.99	.	.	.	17	75	66	33	75	149	58	58	41	572
2.00 - 2.49	.	.	.	.	.	8	.	.	25	17	17	.	67
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	41	166	605	1527	1310	720	862	978	1981	705	929	173	

November 1980-1990, Gage 645
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	Total
0.00 - 0.49	27	53	213	310	168	168	337	284	496	390	399	106	2951
0.50 - 0.99	18	160	550	1126	833	443	266	266	417	257	248	53	4637
1.00 - 1.49	.	.	53	310	576	310	115	71	133	168	186	35	1957
1.50 - 1.99	.	.	.	18	80	44	9	89	89	35	80	.	444
2.00 - 2.49	.	.	.	.	.	.	.	.	9	.	.	.	9
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	45	213	816	1764	1657	965	727	710	1144	850	913	194	

December 1980-1990, Gage 645
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	Total
0.00 - 0.49	69	129	207	293	155	129	172	457	724	500	508	146	3489
0.50 - 0.99	17	224	500	1352	973	267	189	207	370	103	327	60	4589
1.00 - 1.49	.	.	103	353	534	189	78	121	129	26	138	.	1671
1.50 - 99	.	.	.	9	34	9	26	34	34	9	78	.	233
2.00 - 49	.	.	.	.	.	17	.	.	.	.	.	.	17
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	86	353	810	2007	1696	611	465	819	1257	638	1051	206	

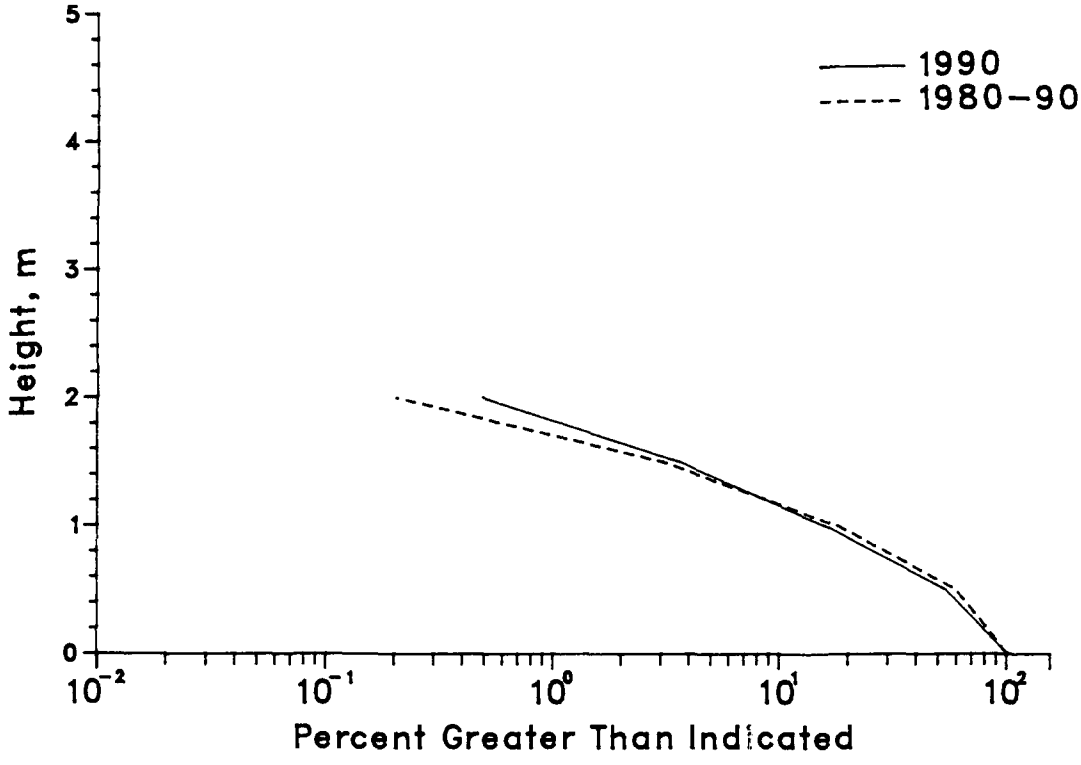

Figure E2. Annual cumulative wave height distributions for Gage 645

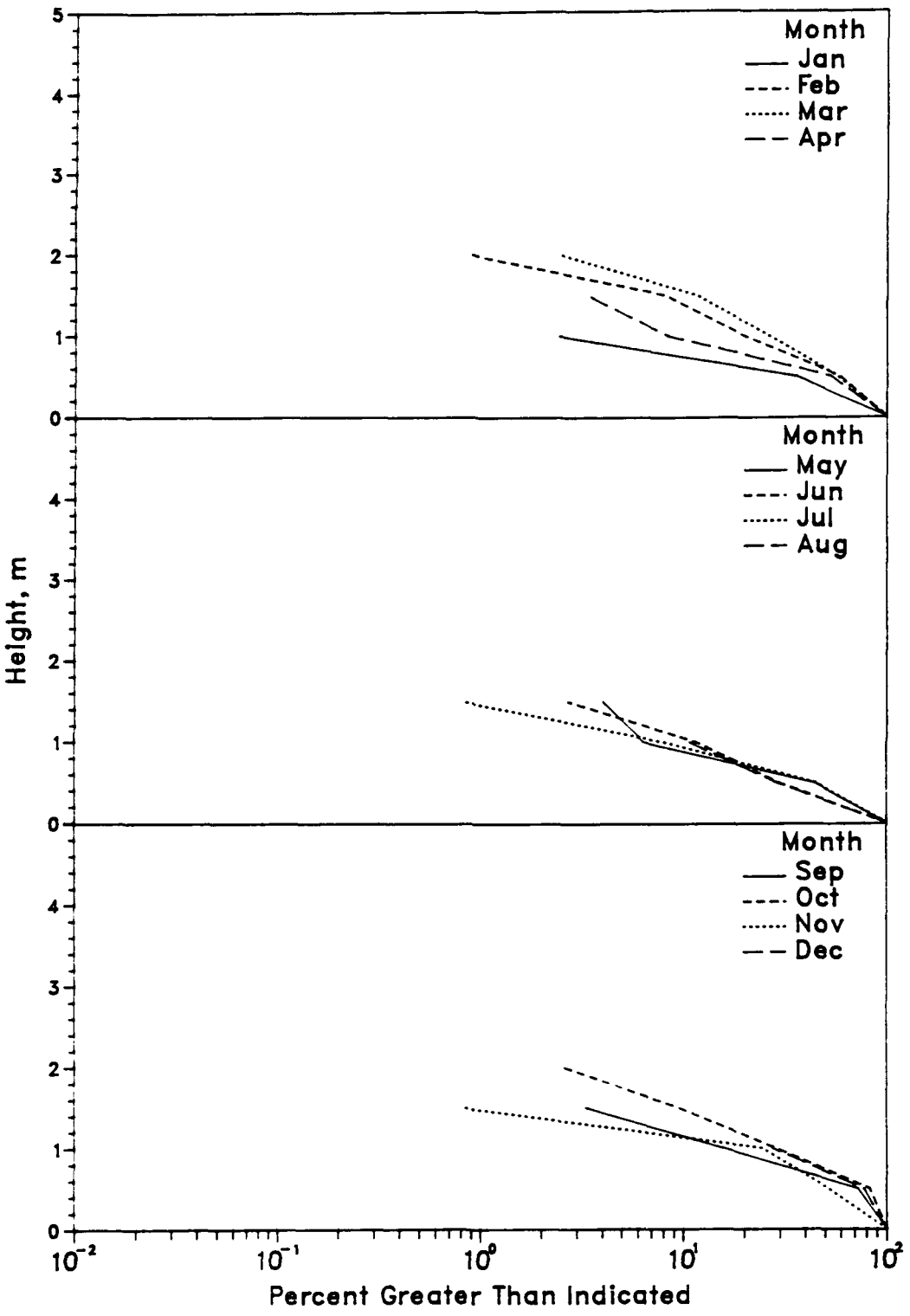

Figure E3. 1990 monthly wave height distributions for Gage 645

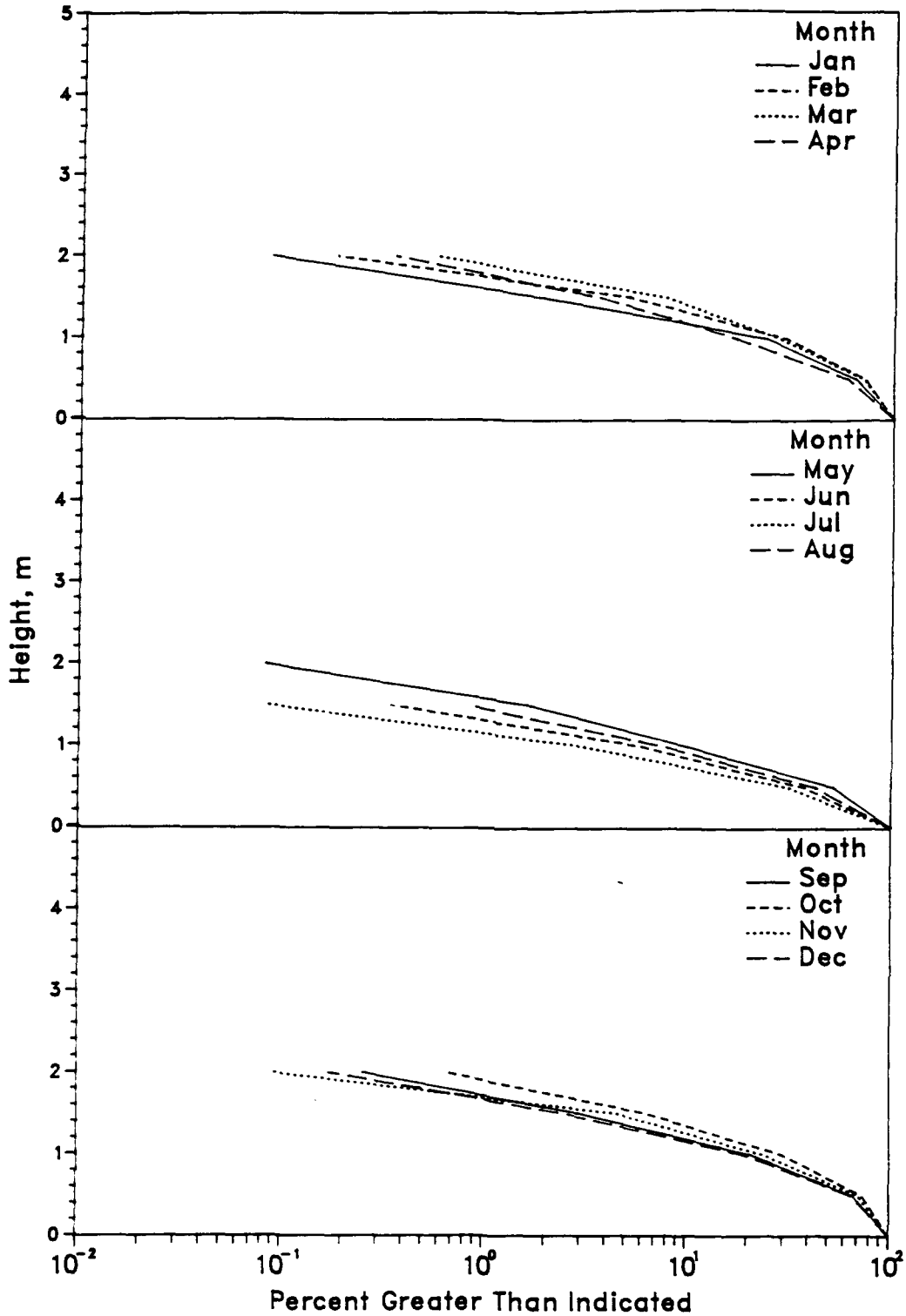

Figure E4. 1980-1990 monthly wave height distributions for Gage 645

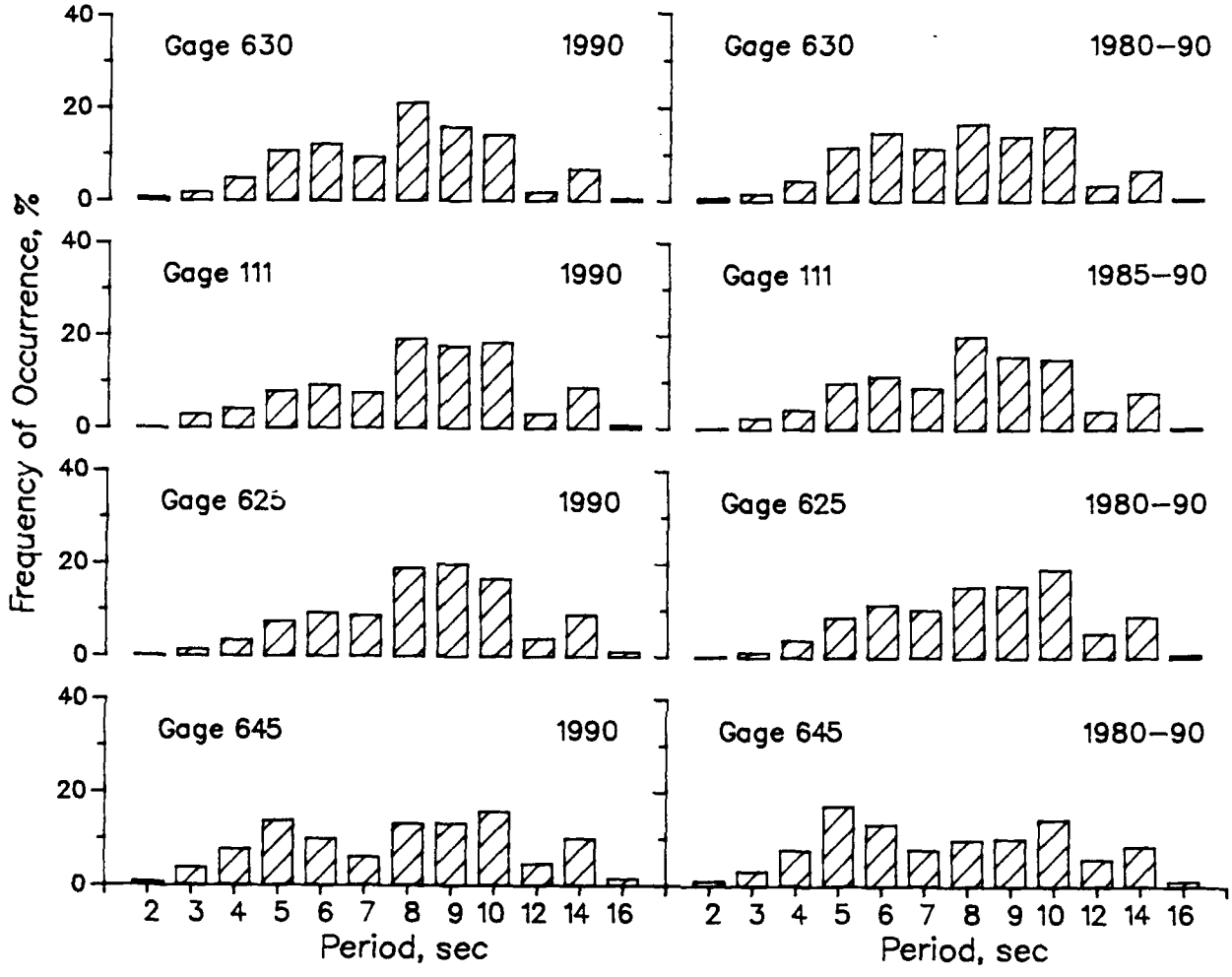

Figure E5. Annual wave period distributions for all gages

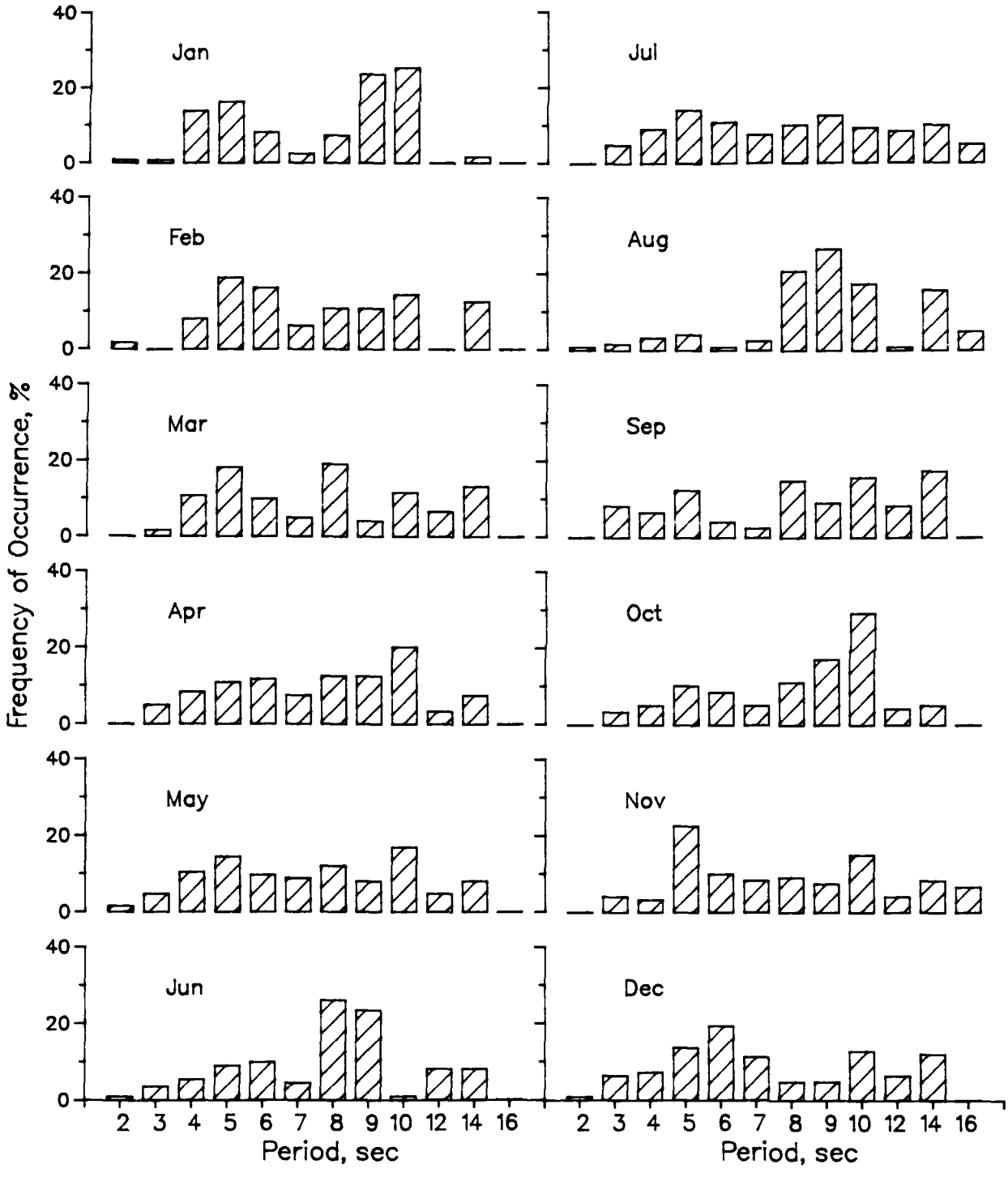

Figure E6. 1990 monthly wave period distributions for Gage 645

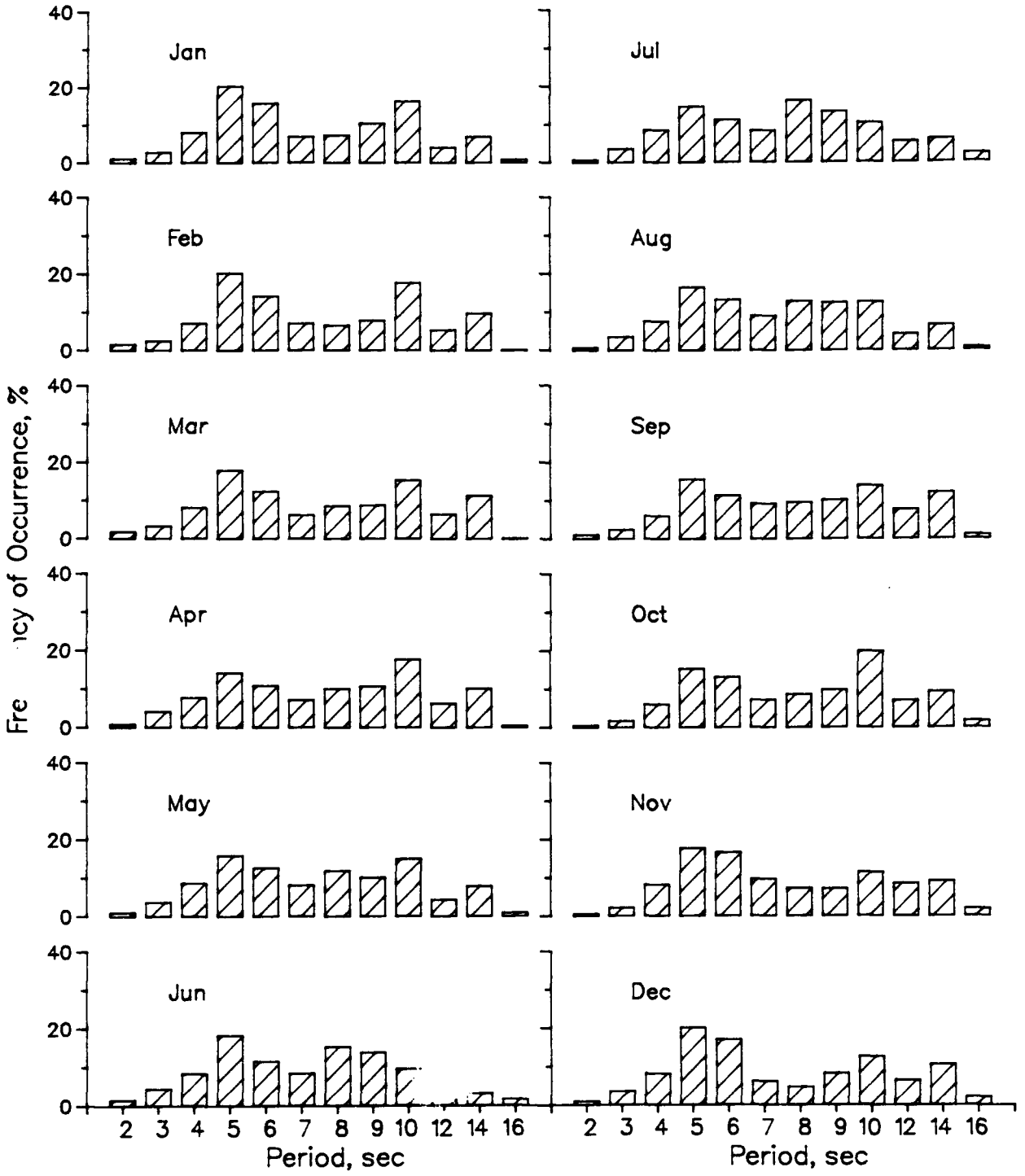

Figure E7. 1980-1990 monthly wave period distributions for Gage 645

Table E5

1990 Persistence of H_{mo} for Gage 645

Height	Consecutive Day(s) or Longer																	
(m)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19+
0.5	46	39	32	23	18	16	13	12	10	6	5		4				3	2	
1.0	51	31	11	5	3		1												
1.5	21	7	1																
2.0	5																		
2.5																			
3.0																			
3.5																			
4.0																			

Table E6

1980 Through 1990 Persistence of H_{mo} for Gage 645

Height	Consecutive Day(s) or Longer																		
(m)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19+
0.5	43	36	29	24	19	15	12	11	9	8	7	6		5			4	3	2
1.0	43	26	15	8	5	3	2	1											
1.5	14	6	2	1															
2.0	2	1																	
2.5																			
3.0																			
3.5																			
4.0																			

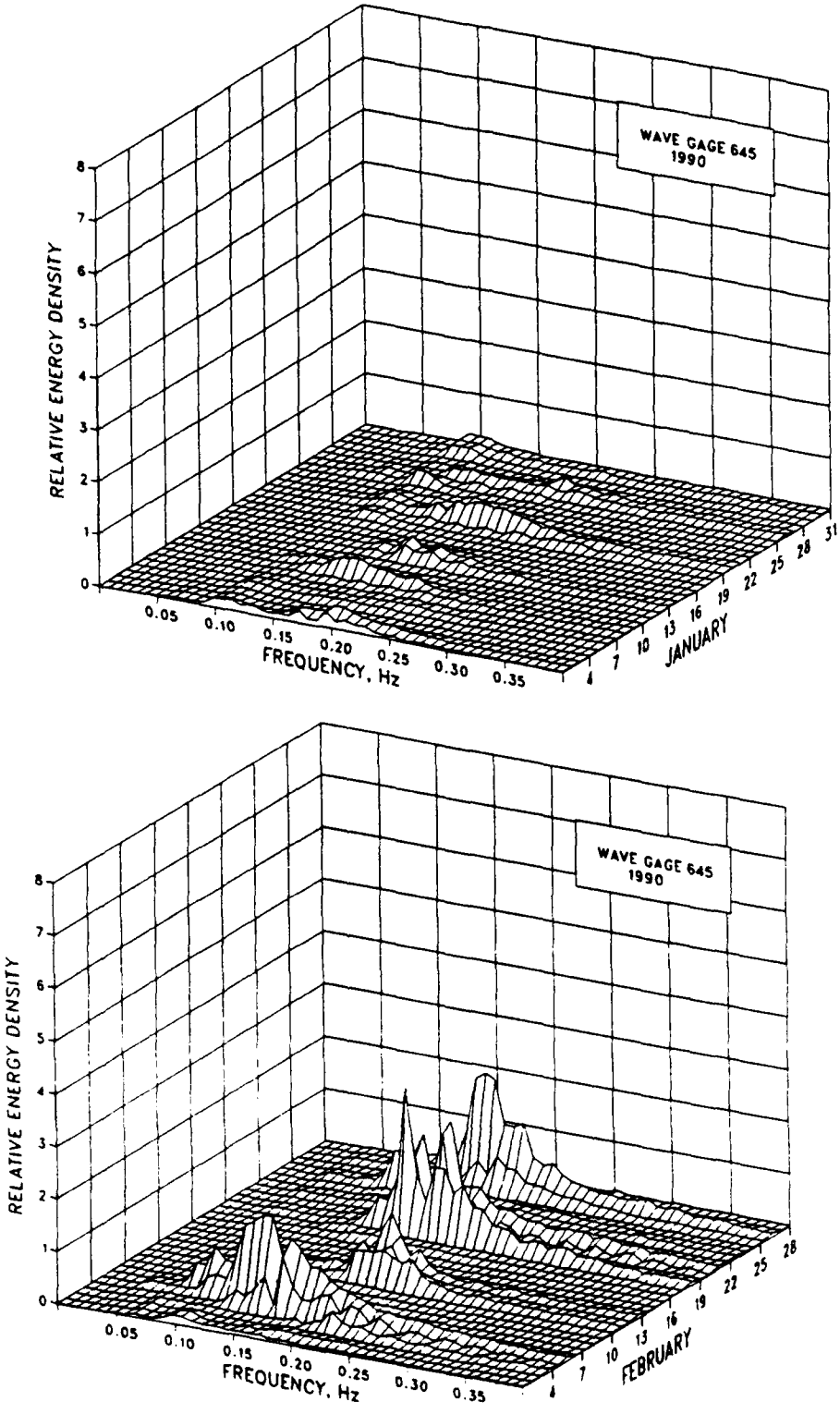

Figure E8. 1990 monthly spectra for Gage 645
(Sheet 1 of 6)

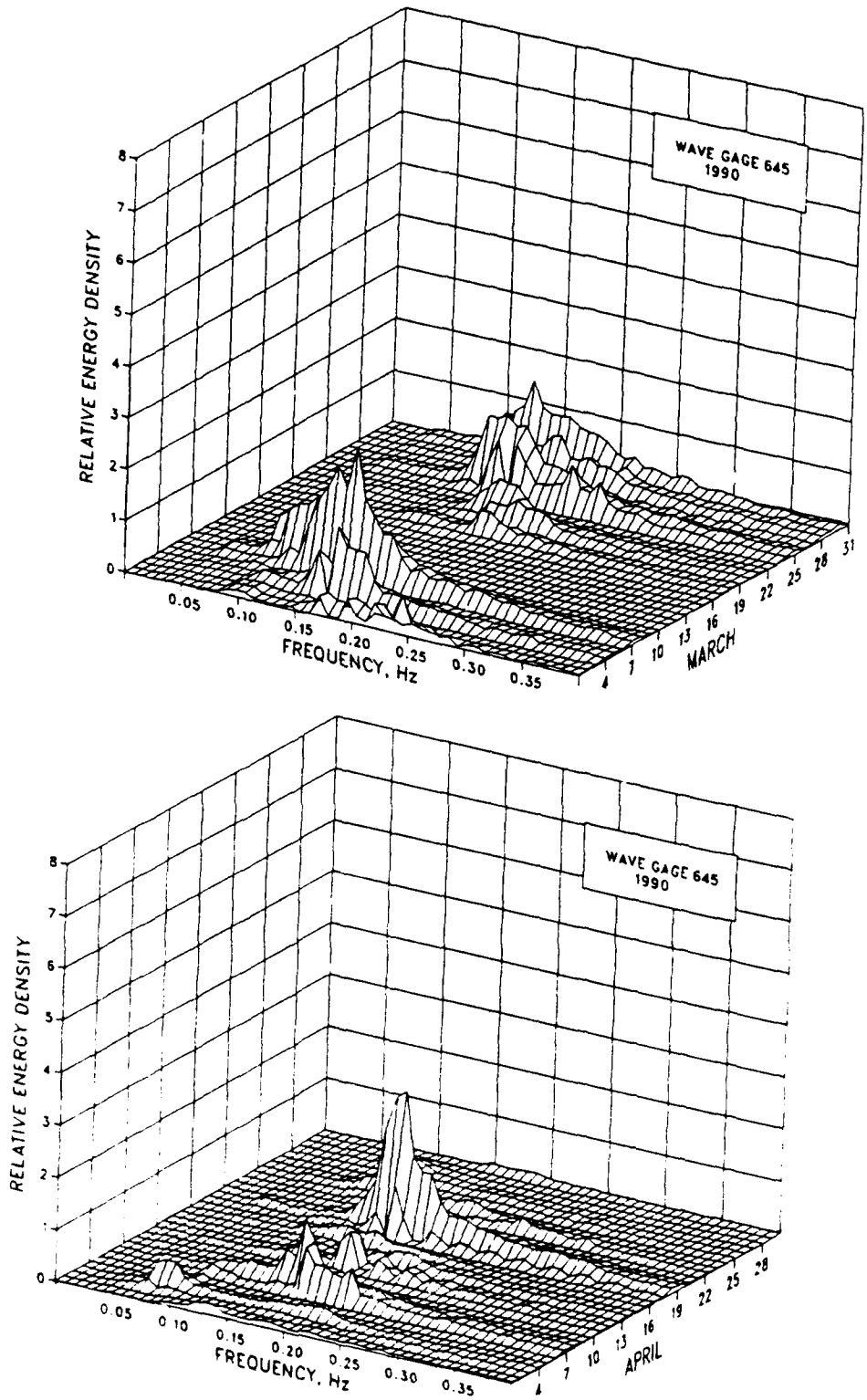

Figure E8. (Sheet 2 of 6)

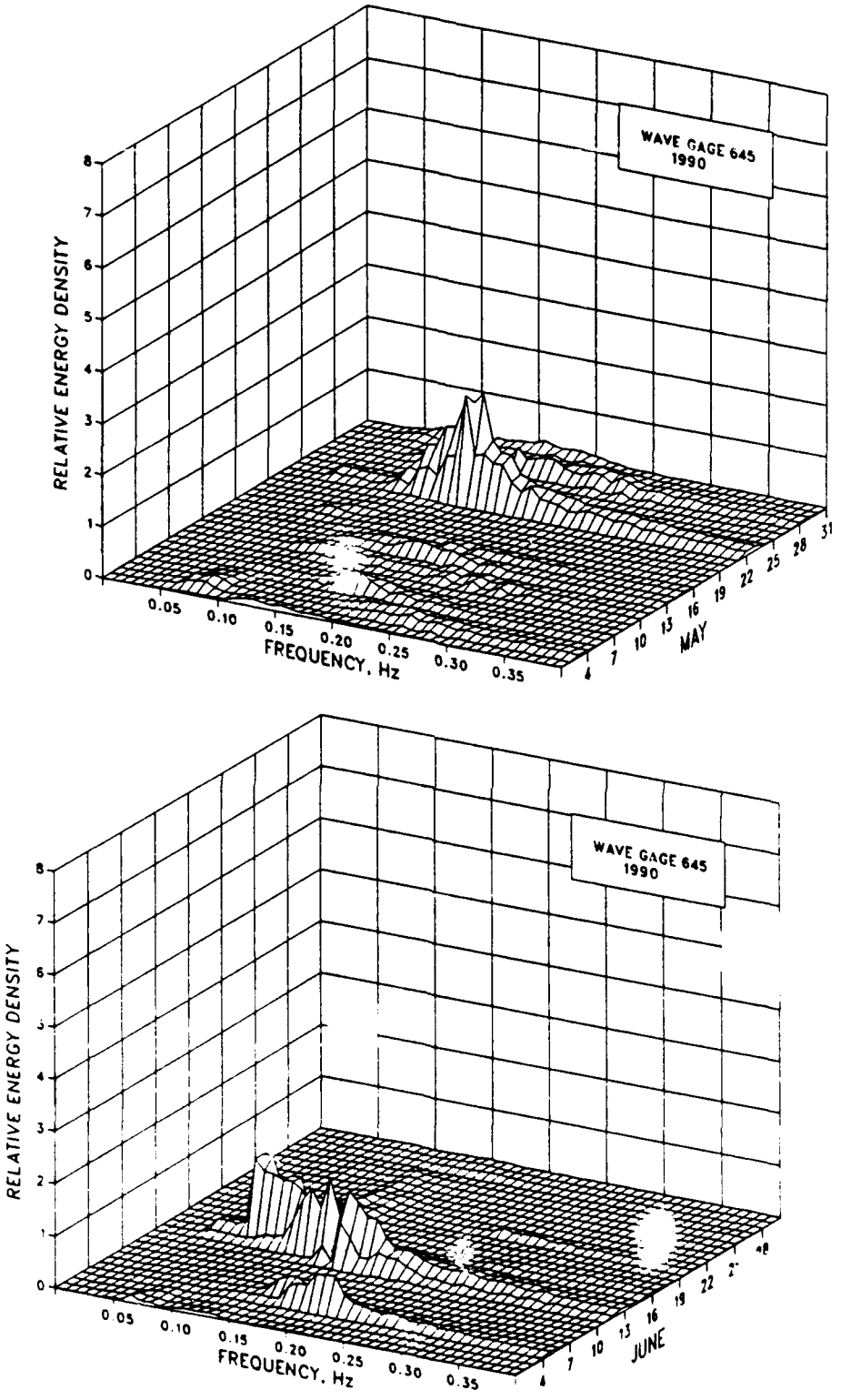

Figure E8. (Sheet 3 of 6)

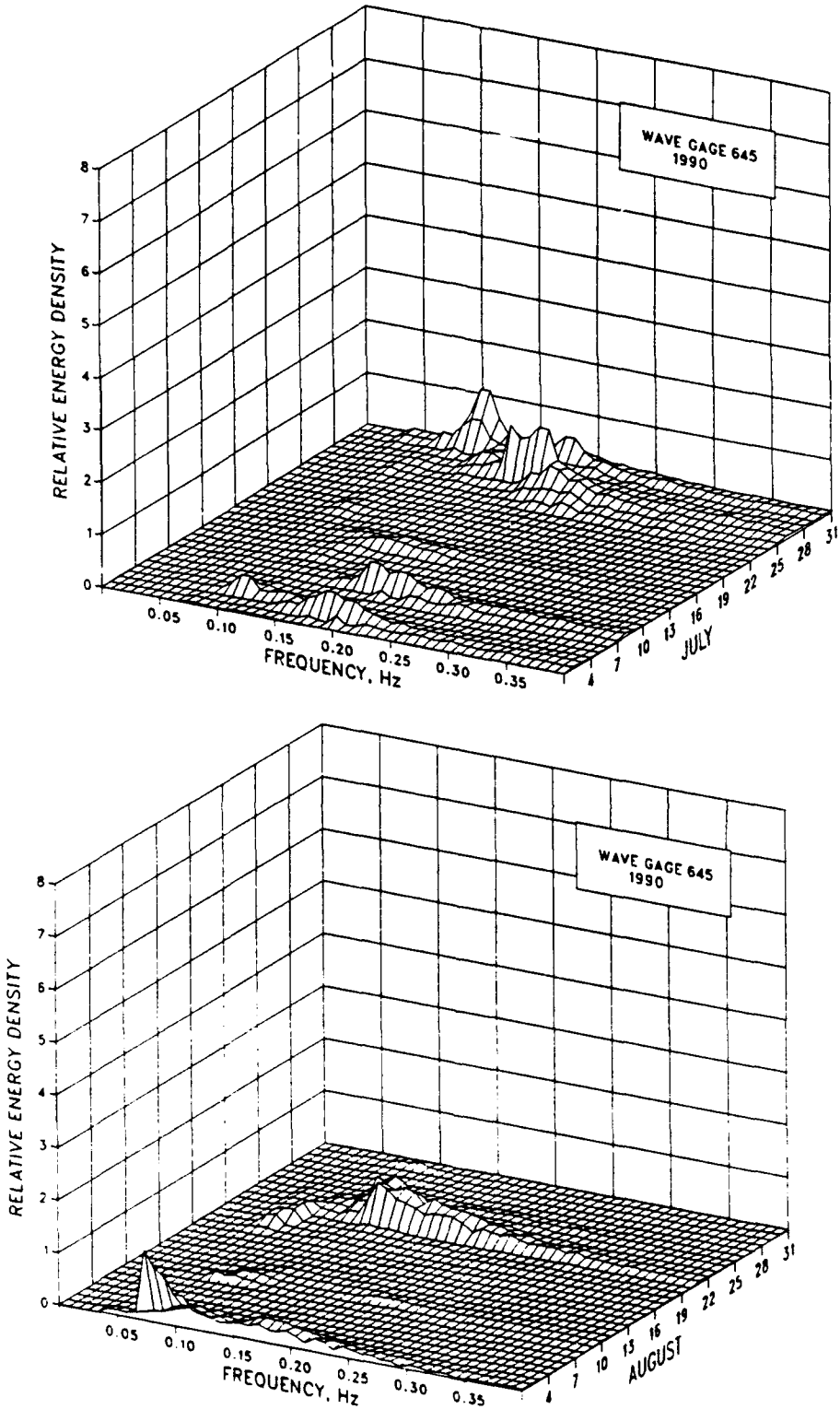

Figure E8. (Sheet 4 of 6)

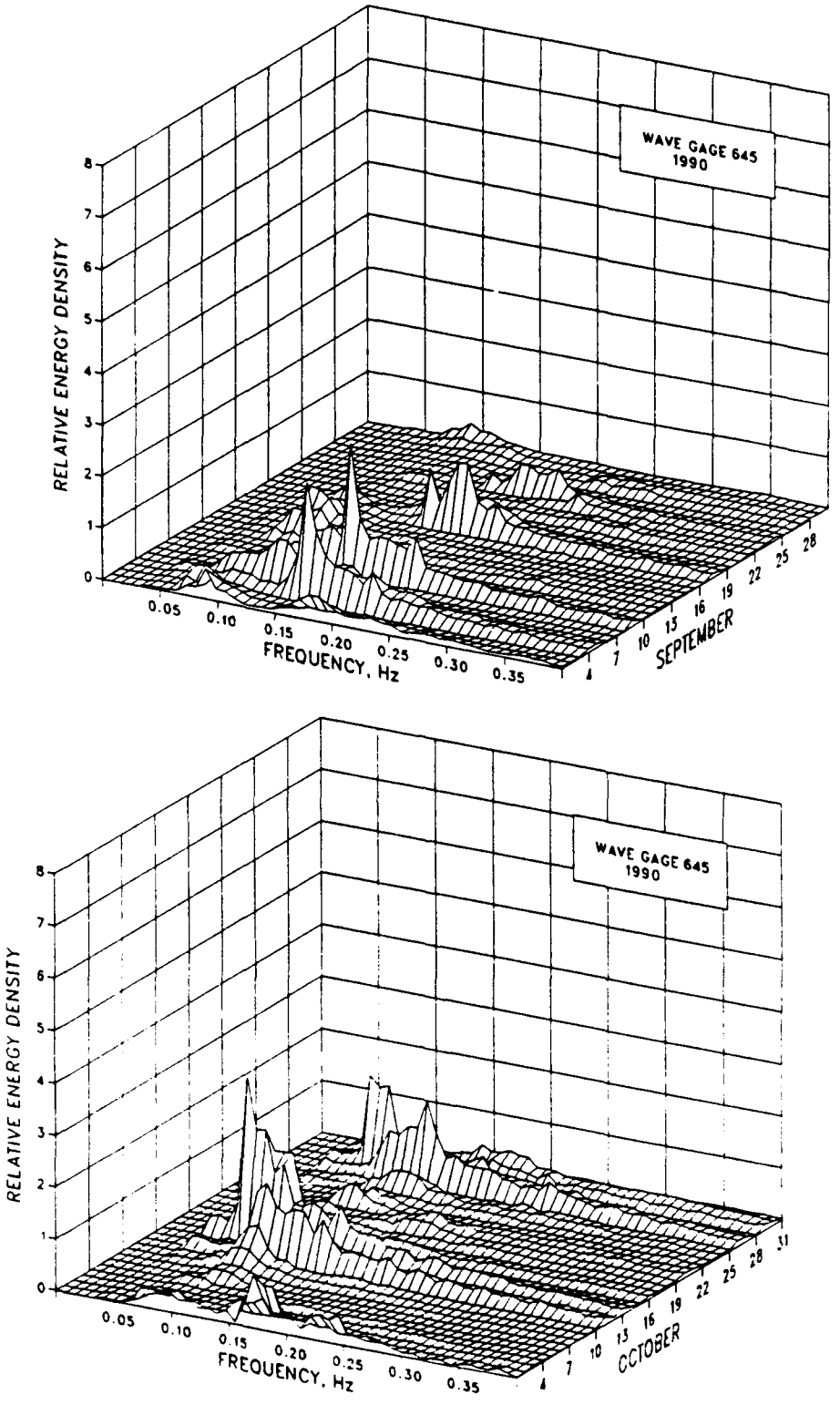

Figure E8. (Sheet 5 of 6)

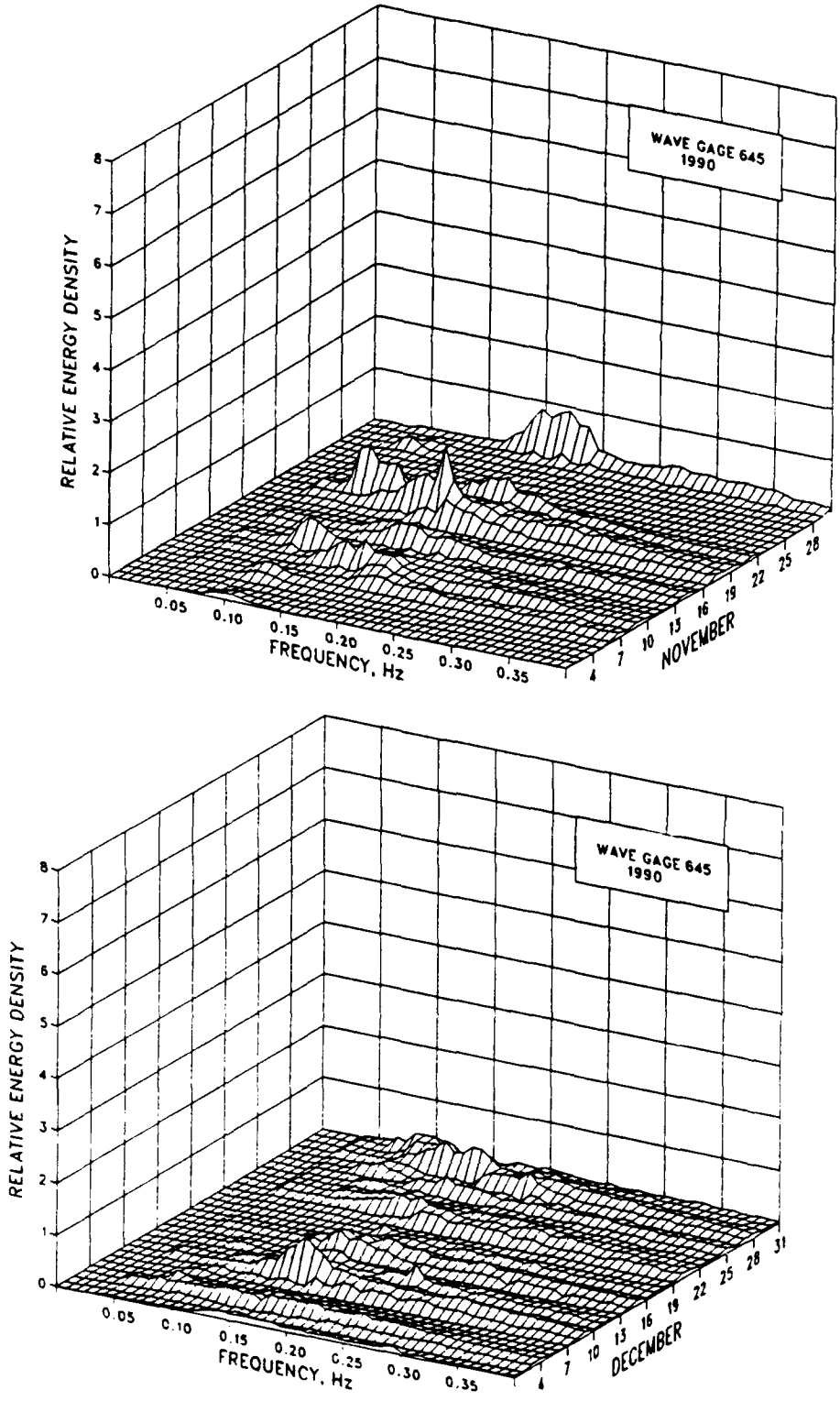

Figure E8. (Sheet 6 of 6)

Table E7

Wave Statistics for Gage 645

	1990							1980-1990						
	Height				Period			Height				Period		
Month	Mean m	Std. Dev. m	Extreme m	Date	Mean sec	Std. Dev. sec	Number Obs.	Mean m	Std. Dev. m	Extreme m	Date	Mean sec	Std. Dev. sec	Number Obs.
Jan	0.5	0.2	1.2	19	8.1	2.6	123	0.7	0.4	0	1980	7.9	3.1	1157
Feb	0.8	0.5	2.0	20	8.0	2 8	111	0.8	0.4	0	1983	8.1	3.1	1114
Mar	0.8	0.5	2.2	4	8.4	3.1	121	0.8	0.5	.3	1980	8.3	3.3	1240
Apr	0.6	0.4	1.9	18	8.5	3.0	119	0.7	0.4	2.3	1987	8.5	3.3	1144
May	0.6	0.4	2.0	22	8.1	3.1	124	0.6	0.4	2.0	1987	8.1	3.2	1214
Jun	0.6	0.4	1.7	12	8.7	3.0	111	0.5	0.3	1.7	1990	7.7	3.1	1169
Jul	0.6	0.3	1.6	26	8.8	3.7	122	0.5	0.3	1.6	1990	8.2	3.2	1204
Aug	0.5	0.4	1.3	21	10.0	3.1	120	0.6	0.3	1.7	1982	8.0	3.0	1229
Sep	0.7	0.4	1.7	4	9.1	3.4	120	0.7	0.4	2.1	1985	8.6	3.3	1173
Oct	0.9	0.5	2.1	13	9.0	2.8	116	0.8	0.5	2.2	1982	8.7	3.2	1206
Nov	0.7	0.4	1.6	18	8.9	3.9	119	0.8	0.4	2.0	1981	8.3	3.5	1128
Dec	0.8	0.4	1.5	28	8.1	3.3	124	0.7	0.4	2.2	1989	8.2	3.6	1161
Annual	0.7	0.4	2.2	Mar	8.6	3.2	1430	0.7	0.4	2.3	Apr 1987	8.2	3.3	14139

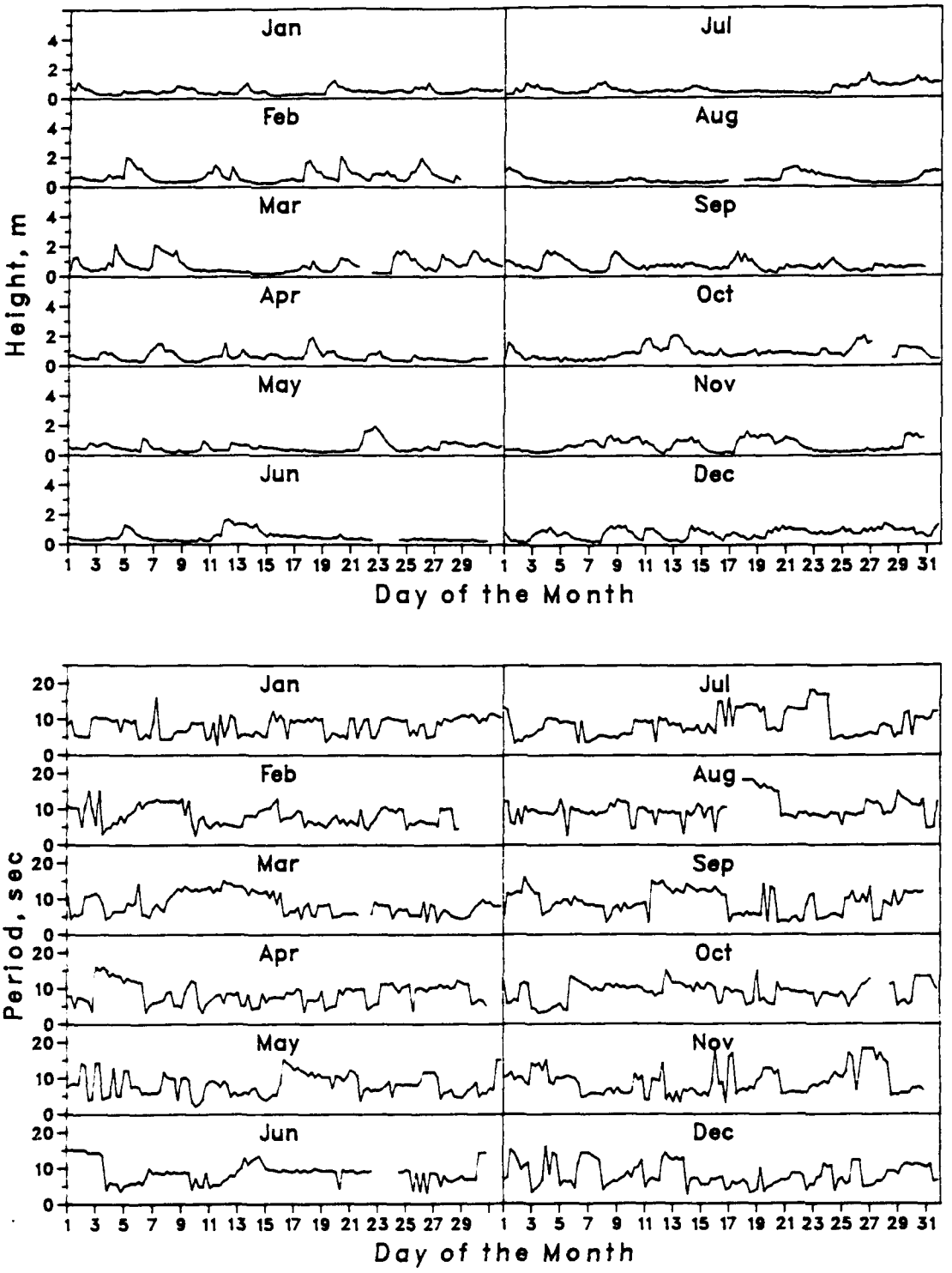

Figure E9. Time-histories of wave height and period for Gage 645