

**WAVE DATA SUMMARY: HOLLYWOOD BEACH,
FLORIDA, JANUARY 1990 TO MAY 1992**

by

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and
D.M. Hanes**

November 20, 1992

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16. Abstract The following report presents wave data collected at two near shore locations off Hollywood Beach, Florida beginning in January 1990 and ending May 1992. The methods used to collect and analyze the data are also presented. Significant wave height, peak wave period, and peak wave direction are presented in time series plots, and summarized monthly in tables. Appendices include the time series plots, wave roses of each deployment period, an overall wave rose for each site and a diskette of the data in ASCII format.					
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**Sea Grant College Program
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University of Florida
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Wave Data Summary: Hollywood Beach, Florida, January 1990 to May 1992

I. INTRODUCTION

The Department of Coastal and Oceanographic Engineering at the University of Florida has collected wave data from 1990 to 1992 at two near shore locations off the coast of Hollywood Beach, Florida. The following report includes descriptions of the methods used to collect and analyze the data as well as summaries of the data collected.

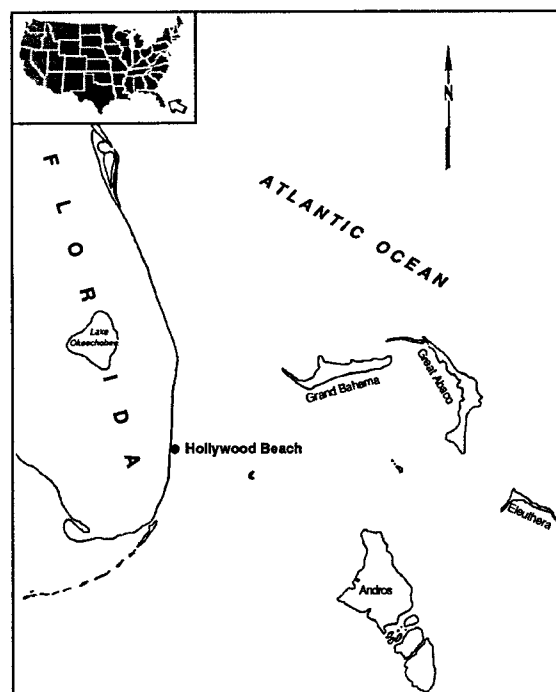


Fig. 1 Site location

Hollywood Beach is located on the southeast coast of Florida (Figure 1). The wave fetch is restricted to the East and southeast by the Bahama Banks; the fetch to the

north is open to the Atlantic Ocean. There is a series of three hard-bottom regions oriented parallel to the shoreline, in approximately 17, 30, and 70 feet of water. The measurements were obtained at two sites: at site 1 the water depth is 35 feet, and at site 2 the water depth is approximately 17 feet. Site 2, located at $26^{\circ} 00.5'$ north longitude and $80^{\circ} 06'$ west latitude, is 1/4 mile due east of site 1. The seabed adjacent to the outer site is a sandy region populated by several hard bottom communities, while the inner site is a sand dominated region.

II. METHODOLOGY

Instrumentation at each site consists of a pressure transducer, a two axis electromagnetic current meter (EM), and a data logger. There are also two turbidity sensors (OBS) present, however that data will be included in a separate report. The instruments are mounted on a goal post type system within the bottom 2 meters of the water column (Fig. 2). Wave amplitude, wave period, and tides are recorded using a Trans Metrics P21 pressure transducer mounted approximately 0.5 meters above the sea bed. The transducer measures pressure fluctuations through changes in resistance of a strain gage. Calibration is achieved in the laboratory using compressed air, resulting in curves with typical regression coefficients near unity. Wave direction and currents are measured using the EM mounted approximately 1.5 meters above the sea bed. The current meter operates on the Faraday principle of electromagnetic induction. As sea water (the conductor) moves in the magnetic field (produced by the current meter) a voltage is induced that is proportional to the water velocity. Calibration of this instrument is performed annually by the manufacturer. The data logger controls the sampling strategy and records the data. The data logger is equipped with an 8 channel, 12 bit, analog-to-digital converter and can store 20 megabytes of data.

Sampling efforts focus on continuous measurements at a rate that will both utilize the logger's storage capacity over a month and record significant events. Data is recorded

every 4 hours for 30 minutes at a sampling rate of 4 Hz. This produces records of 7166 points for each channel. There are 184 records per month per site.

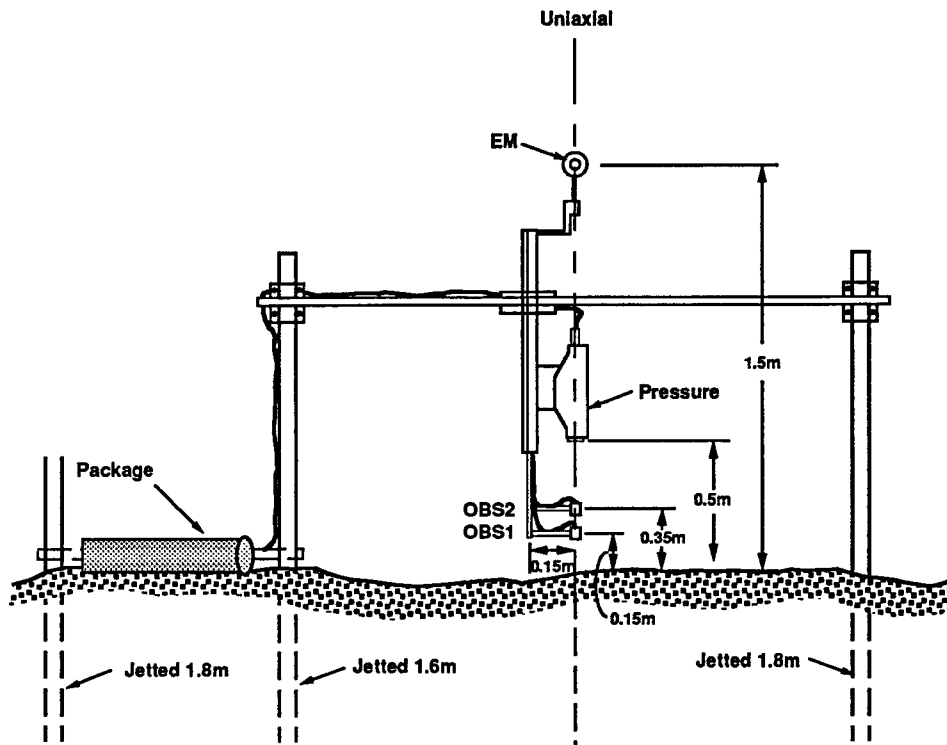


Fig. 2 Elevation view of the mounting configuration

III. ANALYSIS TECHNIQUES

Pressure and two orthogonal horizontal components of water velocity define a PUV system. This system utilizes the unique phase difference between pressure and the horizontal velocity vector in a wave train to describe moments of the wave directional spectrum (Long and Shay, 1991). PUV gages are most accurate for waves with narrow directional distributions. They are less accurate for calculating wave direction for waves with broad directional characteristics. Analysis of the pressure and current signals results in significant wave height (H_{m0}), peak wave period, and peak wave direction for each record. We utilize the spectrum-based definition for H_{m0} , which is equal to the square root of four times the spectral variance (SPM). The peak of the directional spectral

surface gives the frequency peak, and the direction of the highest energy waves (Dean and Dalrymple 1984).

The methods of Longuet-Higgins et al. (1963) are used to obtain the directional spectrum. The directional spectrum is expressed as a Fourier sum,

$$[F(\omega, \theta)] = \frac{1}{2} A_0 + \frac{2}{3} (A_1 \cos \theta + B_1 \sin \theta) + \frac{1}{6} (A_2 \cos 2\theta + B_2 \sin 2\theta)$$

In this equation, ω is the wave frequency, and θ is the compass heading from which the waves approach. Power and cross spectra of the time series are computed and then filtered to remove noise. To avoid amplifying high frequency noise in the data logging system, wave frequencies corresponding to values of k_p equal to or less than 0.04 are excluded. The influence of infra-gravity waves is removed by filtering wave periods higher than 20 seconds. The computed power spectrum quantities are converted to values at the free surface using the pressure and current response functions,

$$k_p = \frac{\cosh(k(h+p))}{\cosh(kh)}$$

$$k_c = \frac{\cosh(k(h+c))}{\cosh(kh)}$$

Where k is the wave number, h is the still water depth, p is the depth of the pressure sensor, c is the depth of the current meter, and g is gravity. A_m and B_m are determined for the first five harmonics of directional spectra in terms of the cross-spectra using the following expressions.

$$A_0(\omega) = \frac{\phi_{pp}}{2\pi k_p^2}$$

$$A_1(\omega) = \frac{\phi_{up}}{k_c k_p \pi}$$

$$A_2(\omega) = \frac{2\phi_{uu}}{\pi k_c^2} - \frac{\phi_{pp}}{\pi k_p^2}$$

$$B_1(\omega) = \frac{\phi_{vp}}{k_c k_p \pi}$$

$$B_2(\omega) = \frac{2\phi_{uv}}{k_c^2 \pi}$$

Where ϕ_{xx} is the power and cross spectra of the pressure and current signals.

As stated earlier, the peak wave period and peak wave direction are determined from the peak of the directional spectrum.

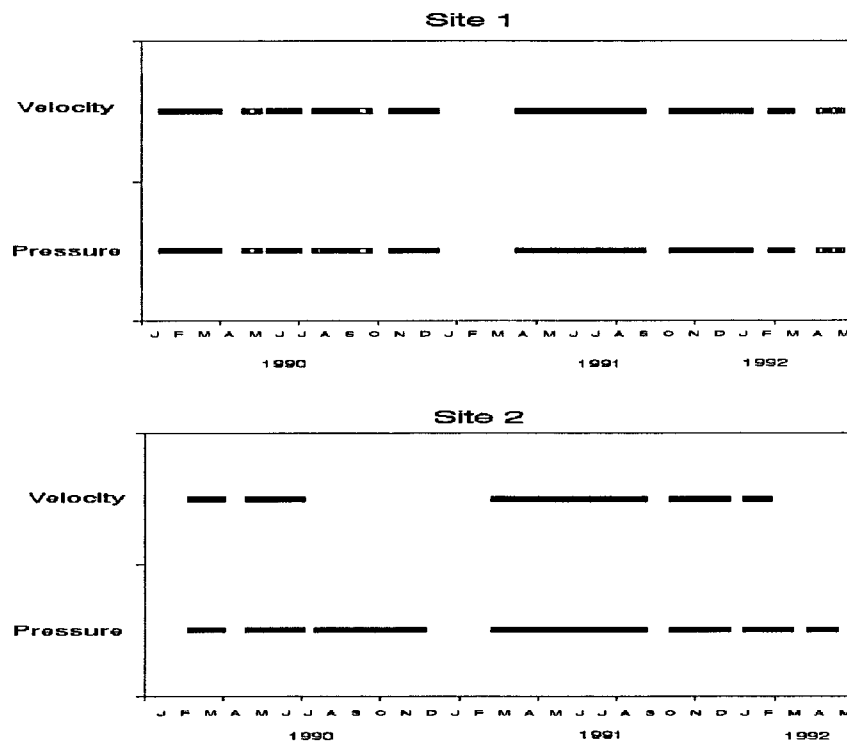


Fig. 3. Data availability

IV. DATA

Monitoring of the Hollywood site began in January of 1990 and continued (with occasional interruptions) through May of 1992. Figure 3 is a listing of each instruments' operational status. Throughout this period the instruments were serviced bimonthly for cleaning and monthly to offload data. The data is analyzed as stated earlier, and each 30

minute time series is plotted. Each time series is ranked for its quality. Quality of PUV data is generally dependent on whether the instruments are operating properly or malfunctioning. The pressure transducer was approximately 98% reliable, while the current meter was reliable only 89% of the time. The results of the data collection and analysis are plotted in Appendices A and B. Significant wave height, peak wave direction, and peak wave period are plotted in Appendix A. Appendix B contains plots of the wave roses for each deployment. Labeling of the figures in Appendix A and B is determined using the following convention; *Hab* signifies deployment number *a* at site *b*. Each point on the plots represents thirty minutes of data, where a line represents high quality data, circles represent data with reduced accuracy, and stars represent bad data. Peak wave direction in Appendix A is not plotted for instances where the sum of the standard deviation of the current components is less than 0.2 cm/sec. This avoids plotting a wave direction when no waves are present. The directional spectrum analysis is utilized to produce the wave roses in Appendix B. The wave roses for deployments 5 and 6 both sites, and site 2 of deployments 8, 19, and 20 are not included due to failure (or partial failure) of the current meter. The monthly averaged wave measurements are given in Tables 1 and 2.

V. ACKNOWLEDGMENTS

This report was developed under the auspices of the Florida Sea Grant College Program with support from the National Oceanic and Atmospheric Administration, Office of Sea Grant, U. S. Department of Commerce, Grant No. R/C-S-30. We also wish to thank Broward County Office of Natural Resources Protection for their support in kind and the Coastal and Oceanographic laboratory staff at the University of Florida for their assistance.

YR	Mnth	SIGNIFICANT WAVE HEIGHT (meters)				PEAK WAVE PERIOD (seconds)				PEAK WAVE DIRECTION (theta)				# of PTS
		MEAN	STD	MAX	MIN	MEAN	STD	MAX	MIN	MEAN	STD	MAX	MIN	
90	JAN	0.38	0.20	0.61	0.26	3.6	0.5	4.2	3.2	106	33	131	68	3
90	FEB	0.74	0.42	1.80	0.11	5.0	1.6	10.2	3.2	95	38	167	6	168
90	MAR	0.76	0.41	2.31	0.16	5.4	1.7	11.1	3.2	89	33	161	11	157
90	APR	0.23	0.06	0.37	0.13	5.3	2.2	8.8	3.2	49	0	49	49	26
90	MAY	0.42	0.34	1.55	0.11	4.0	0.8	6.6	3.1	123	22.2	152	68	51
90	JUN	0.26	0.14	0.71	0.12	3.9	1.5	13.4	3.2	118	40	146	49	93
90	JUL	0.34	0.21	0.83	0.12	3.8	0.8	8.8	3.2	105	32	161	38	87
90	AUG	0.26	0.18	0.75	0.10	3.6	0.6	5.4	3.2	138	19	161	114	96
90	SEP	0.27	0.12	0.74	0.11	3.4	0.7	11.1	3.2	N/A	N/A	N/A	N/A	4
90	OCT	1.2	0.56	3.01	0.55	3.3	0.0	3.4	3.2	N/A	N/A	N/A	N/A	27
90	NOV	0.65	0.41	1.76	0.15	5.6	2.5	12.2	3.2	72	31	131	8	47
90	DEC	0.64	0.38	1.43	0.13	5.1	2.1	11.1	3.2	70	31	133	6	124
91	JAN	0.63	0.14	0.83	0.38	4.2	0.6	5.0	3.2	94	36	135	49	12
91	FEB	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
91	MAR	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
91	APR	0.44	0.20	0.97	0.18	3.9	0.5	5.0	3.2	115	27	148	62	28
91	MAY	0.48	0.27	1.11	0.11	4.1	0.7	5.9	3.2	96	27	133	41	122
91	JUN	0.27	0.19	1.06	0.11	4.6	2.6	13.4	3.2	58	24	156	36	173
91	JUL	0.24	0.13	0.72	0.10	3.7	0.9	8.2	3.2	134	36	176	81	175
91	AUG	0.24	0.14	0.85	0.09	4.3	1.7	10.2	3.2	80	47	161	8	143
91	SEP	0.29	0.17	0.87	0.10	5.4	2.6	12.2	3.2	59	33	176	28	126
91	OCT	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
91	NOV	0.71	0.40	1.76	0.12	6.0	2.7	13.4	3.2	73	30	148	13	147
91	DEC	0.60	0.49	2.21	0.10	5.1	1.8	9.5	3.2	70	31	133	6	134
92	JAN	0.51	0.29	1.40	0.12	6.6	2.6	12.2	3.2	68	33	139	30	132
92	FEB	0.71	0.21	1.15	0.36	7.2	2.6	10.2	3.2	70	45	150	30	27
92	MAR	0.41	0.31	1.69	0.10	5.7	2.2	10.2	3.2	72	42	144	28	55
92	APR	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
92	MAY	0.50	0.27	0.82	0.11	5.1	2.0	10.2	3.2	54	29	133	26	21

Table 1: Monthly wave measurements, site 1

YR	MNTH	SIGNIFICANT WAVE HEIGHT (meters)				PEAK WAVE PERIOD (seconds)				PEAK WAVE DIRECTION (theta)				# of PTS
		MEAN	STD	MAX	MIN	MEAN	STD	MAX	MIN	MEAN	STD	MAX	MIN	
90	JAN	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
90	FEB	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
90	MAR	0.67	0.31	1.79	0.21	5.0	1.7	11.1	2.3	82	34	174	4	159
90	APR	0.27	0.05	0.38	0.18	3.1	1.5	7.3	2.3	114	78	178	2	24
90	MAY	0.44	0.30	1.30	0.10	3.9	1.1	6.6	2.3	120	15	148	84	87
90	JUN	0.32	0.16	0.79	0.09	3.9	2.0	12.2	2.3	96	32	139	36	179
90	JUL	0.36	0.20	0.78	0.11	3.7	1.0	8.2	2.4	105	29	170	38	90
90	AUG	0.25	0.14	0.69	0.10	3.1	0.8	5.4	2.4	N/A	N/A	N/A	N/A	74
90	SEP	0.30	0.12	0.69	0.11	3.7	2.0	12.2	2.4	N/A	N/A	N/A	N/A	106
90	OCT	0.63	0.40	1.86	0.10	5.2	2.4	15.0	2.5	N/A	N/A	N/A	N/A	108
90	NOV	0.73	0.44	1.46	0.20	5.5	1.3	7.3	2.6	N/A	N/A	N/A	N/A	28
90	DEC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
91	JAN	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
91	FEB	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
91	MAR	0.74	0.30	1.34	0.17	4.2	0.9	5.9	2.5	124	16	150	79	33
91	APR	0.64	0.37	1.64	0.12	4.4	1.3	8.2	2.4	98	30	159	15	174
91	MAY	0.58	0.35	1.80	0.13	4.1	1.1	7.3	2.3	98	24	140	32	161
91	JUN	0.34	0.22	1.08	0.11	3.8	2.1	15.0	2.5	80	36	167	30	162
91	JUL	0.28	0.13	0.70	0.12	3.3	1.1	8.8	2.3	97	26	141	45	174
91	AUG	0.27	0.12	0.73	0.13	3.6	1.6	9.5	2.3	87	38	141	32	171
91	SEP	0.30	0.14	0.73	0.13	4.8	2.7	11.1	2.4	57	36	161	11	126
91	OCT	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
91	NOV	0.68	0.32	1.56	0.13	6.0	2.7	17.0	2.4	66	30	144	13	146
91	DEC	0.56	0.34	1.79	0.13	4.9	1.9	12.2	2.4	73	35	148	6	167
92	JAN	0.38	0.17	0.80	0.18	8.2	3.5	13.4	2.4	37	25	103	0	38
92	FEB	0.38	0.17	0.90	0.12	5.6	3.2	13.4	2.0	83	44	154	15	123
92	MAR	0.90	0.35	1.99	0.47	2.9	1.1	9.5	2.5	N/A	N/A	N/A	N/A	81
92	APR	0.90	0.51	1.63	0.23	4.6	3.5	13.4	2.4	N/A	N/A	N/A	N/A	20
92	MAY	0.40	0.21	0.85	0.13	4.6	2.5	12.2	2.3	N/A	N/A	N/A	N/A	125

Table 2: Monthly wave measurements, site 2

VI. REFERENCES

Longuet-Higgins, M. S., D. E. Cartwright, and N. D. Smith, "Observations of the Directional Spectrum of Sea Waves Using the Motions of Floating Buoy", in *Ocean Wave Spectra*, Proceedings of a Conference Held at Easton, Prentice-Hall, Englewood Cliffs, N. J., 1963, pp. 111-131.

Long, C. E., J. M. Oltman-Shay, "Directional Characteristics of Waves in Shallow Water" Technical Report CREC-91-1, U. S. Army Corps of Engineers Washington D. C., 1991, pp. 11-12.

APPENDIX A
TIME SERIES OF WAVE PARAMETERS

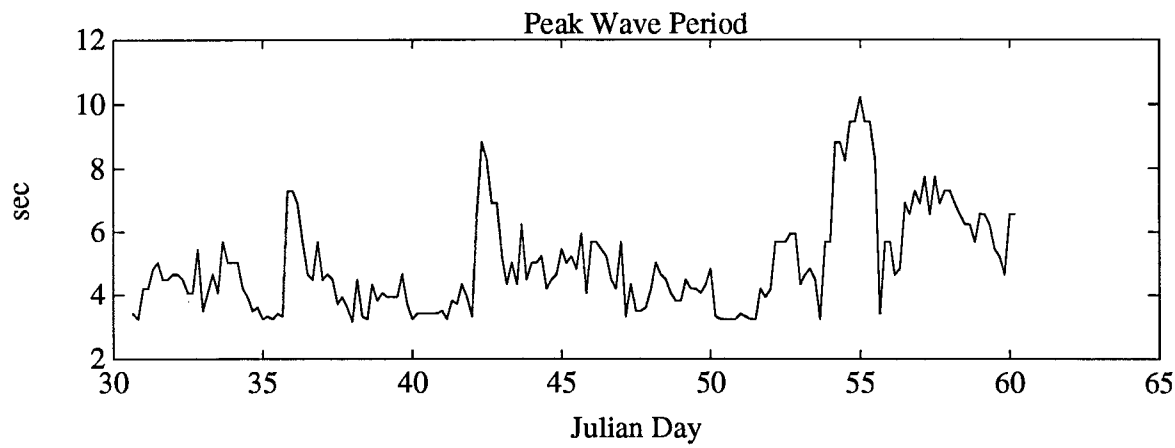
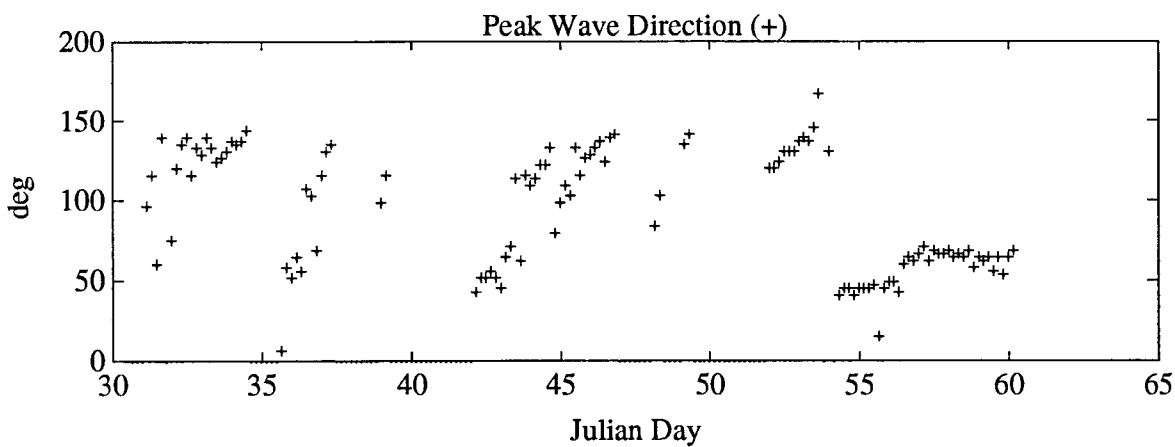
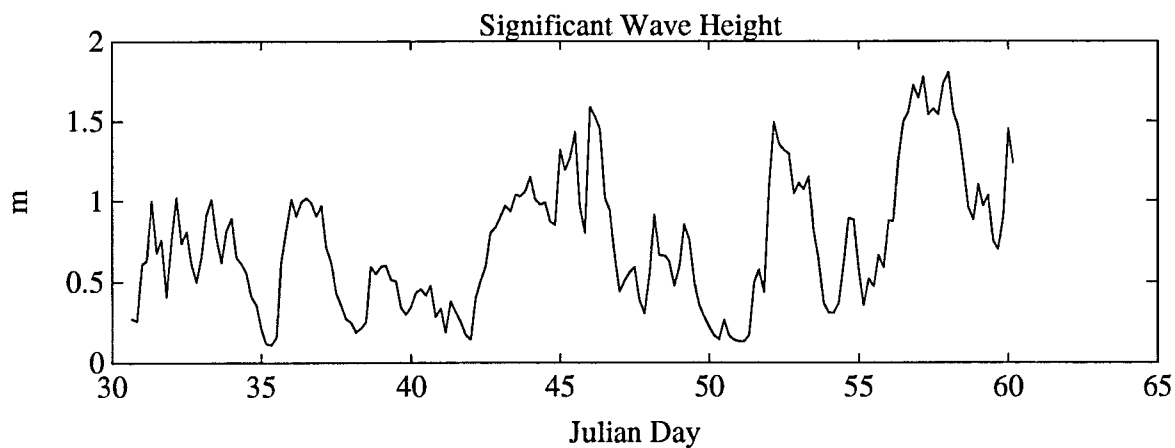
WAVE PARAMETERS FOR DEPLOYMENT H011

From: January 31,1990 Julian Day - 30.6

To: March 2,1990 Julian Day - 60.16

o : data with reduced accuracy

* : bad data



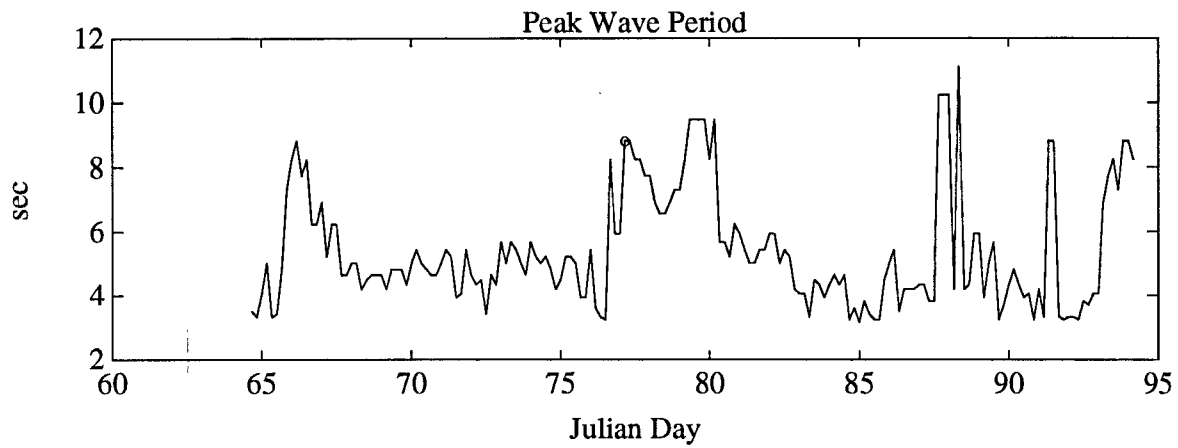
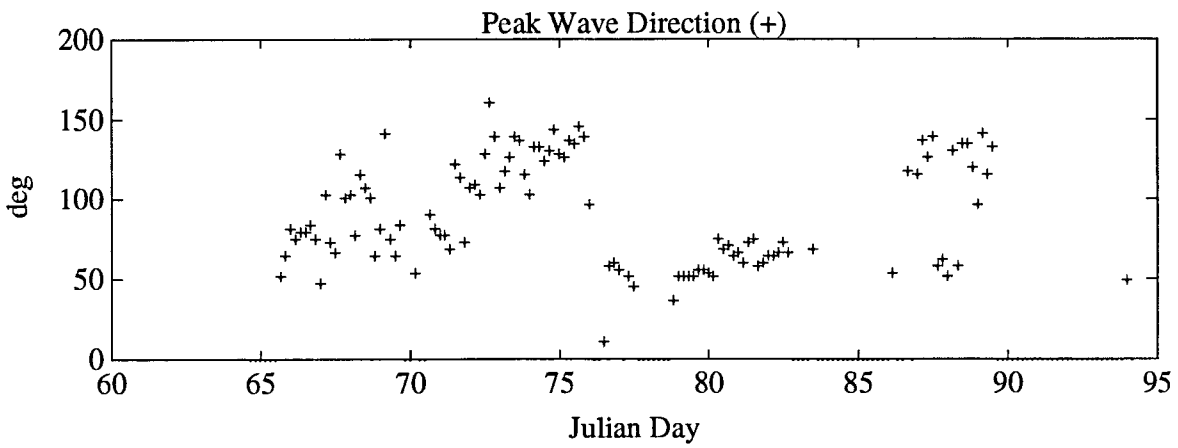
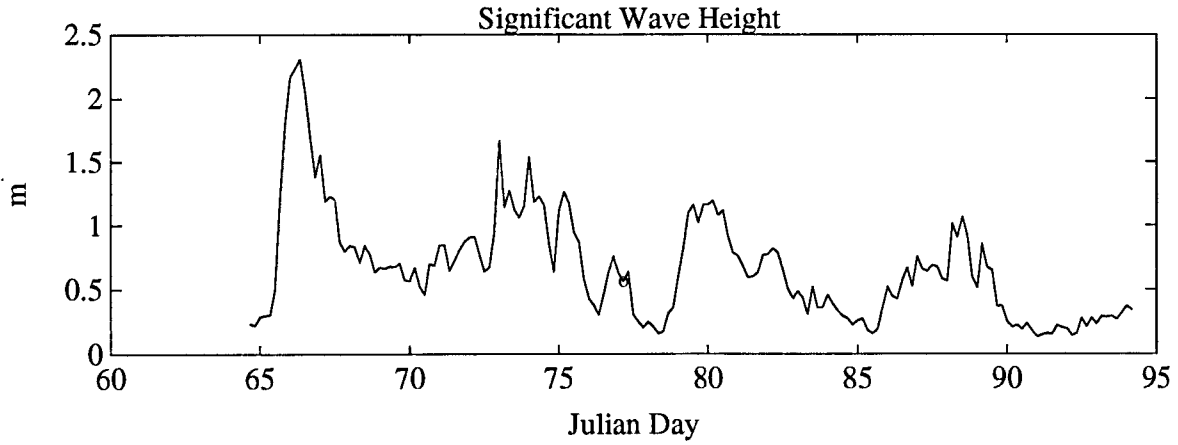
WAVE PARAMETERS FOR DEPLOYMENT H021

From: March 6, 1990 Julian Day - 64.6

To: April 5, 1990 Julian Day - 94.16

o : data with reduced accuracy

* : bad data



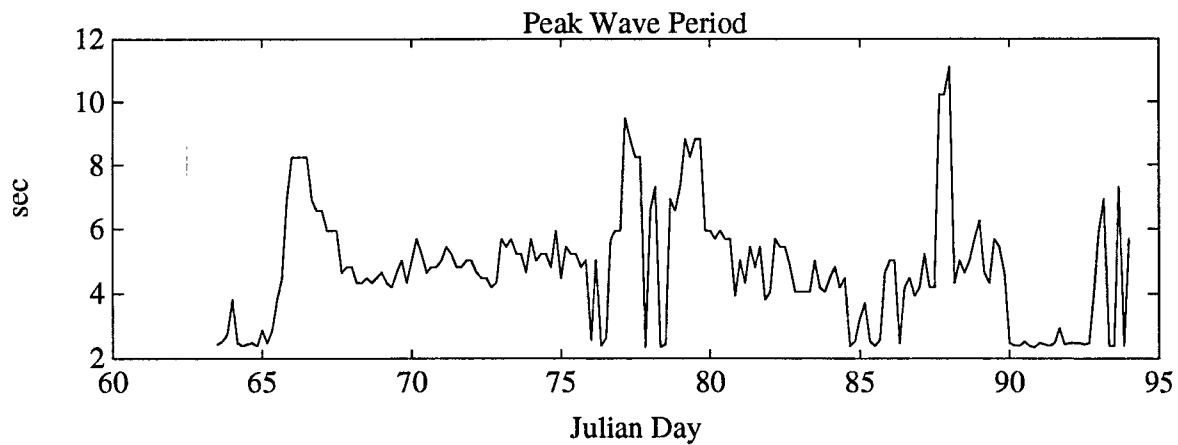
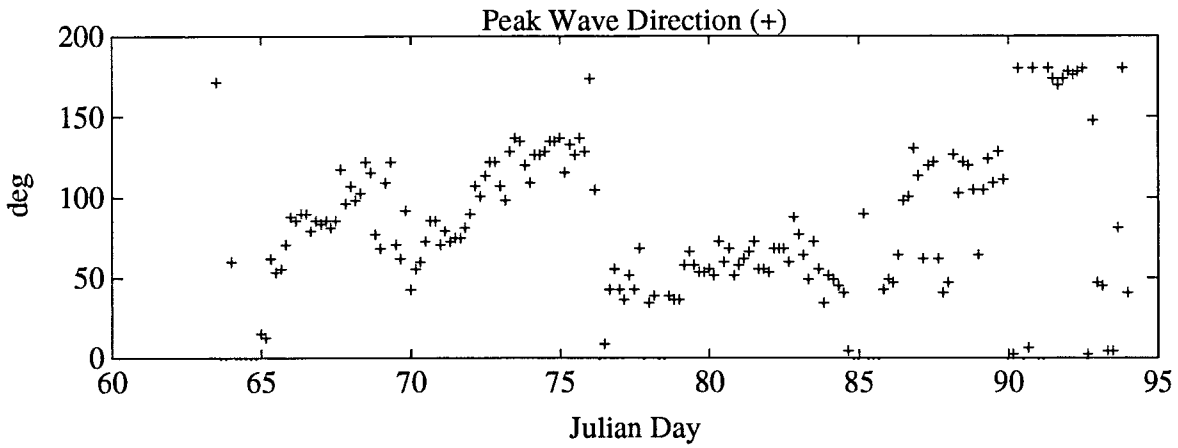
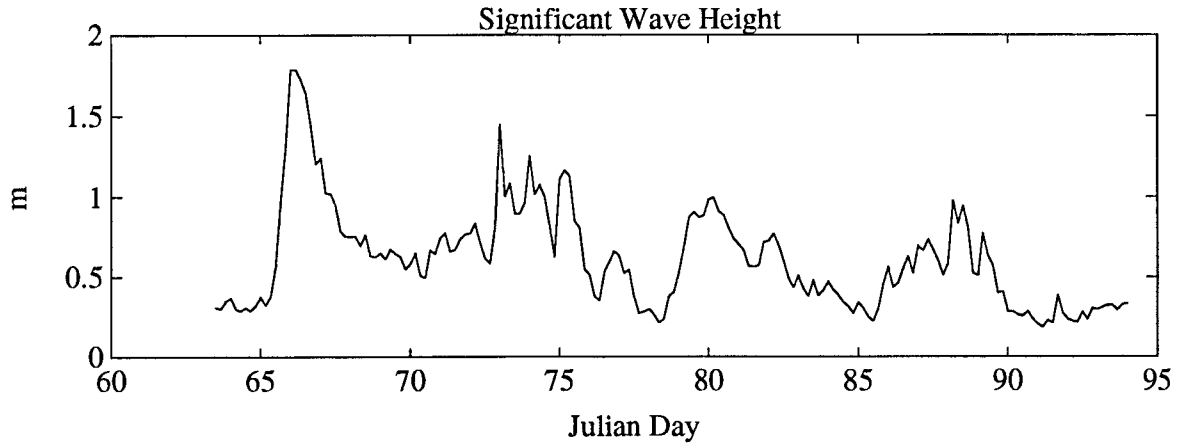
WAVE PARAMETERS FOR DEPLOYMENT H022

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To: April 5, 1990 Julian Day - 94.0

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* : bad data



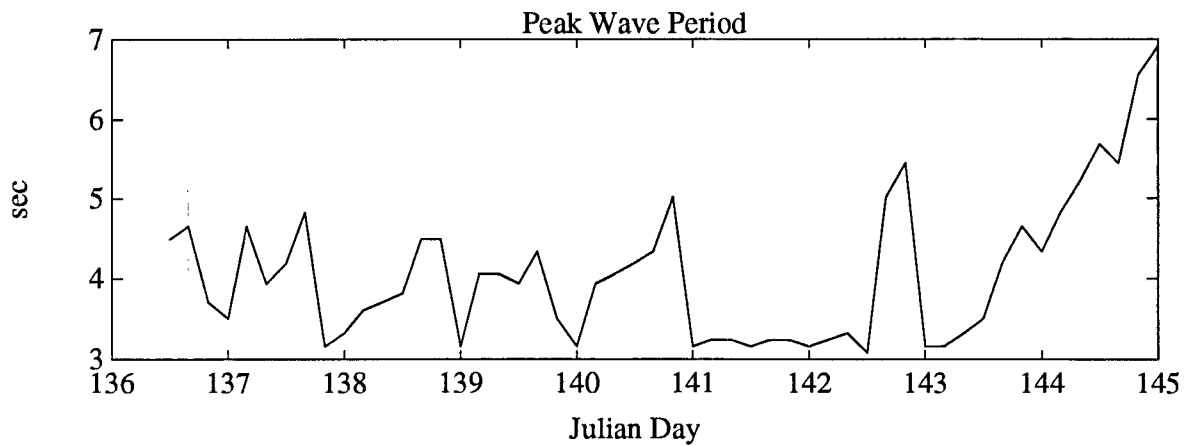
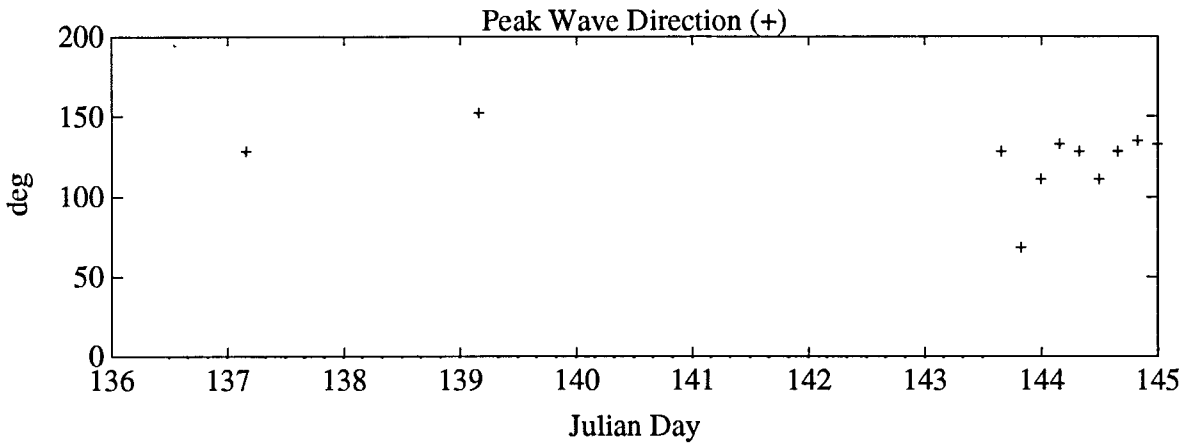
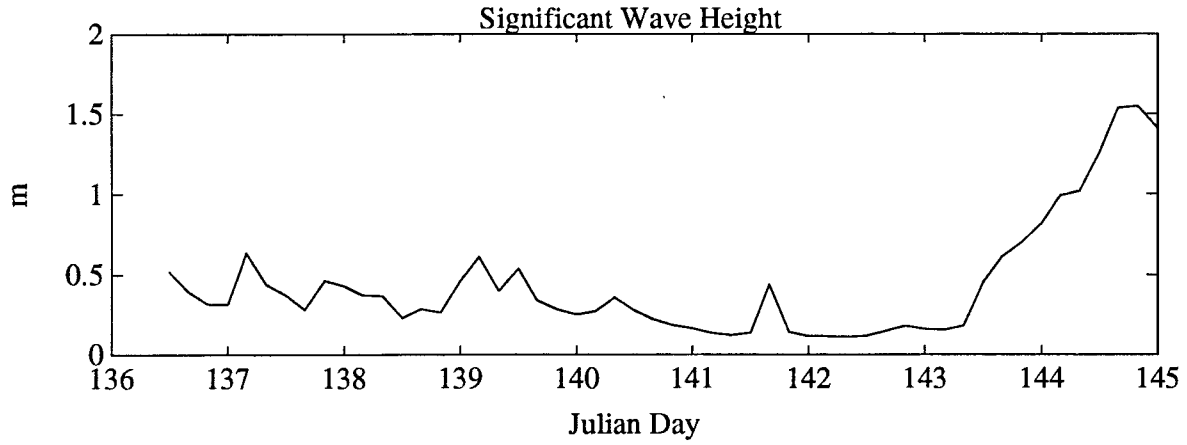
WAVE PARAMETERS FOR DEPLOYMENT H031

From: May 17,1990 Julian Day - 136.5

To: May 26,1990 Julian Day - 145.0

o : data with reduced accuracy

* : bad data



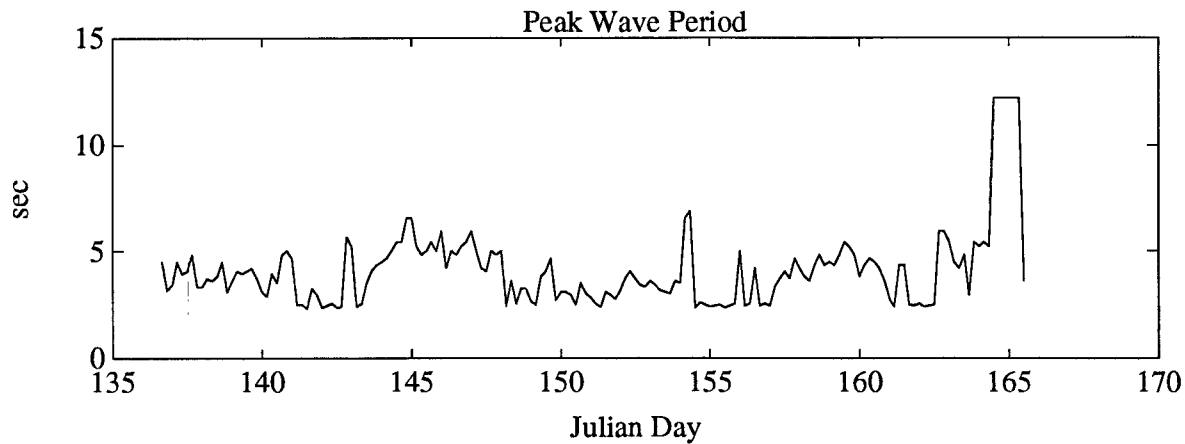
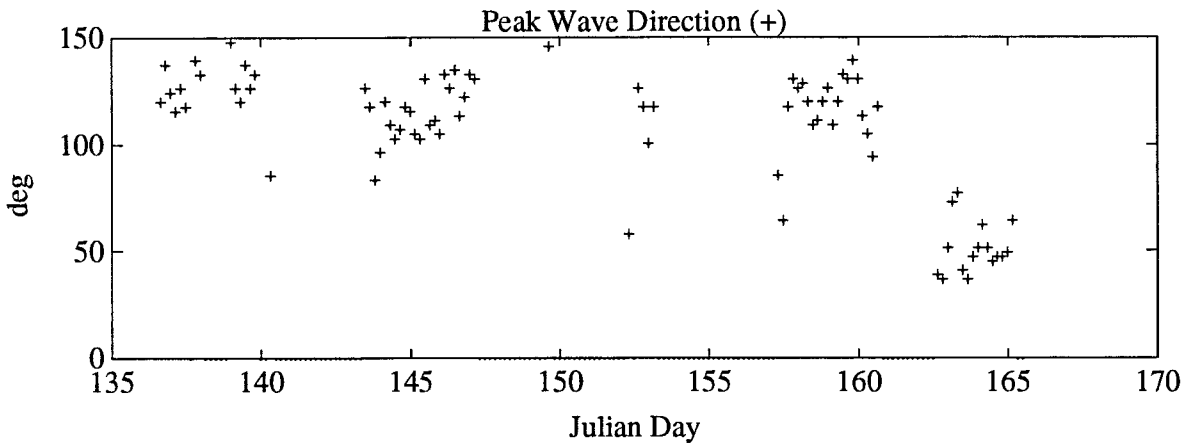
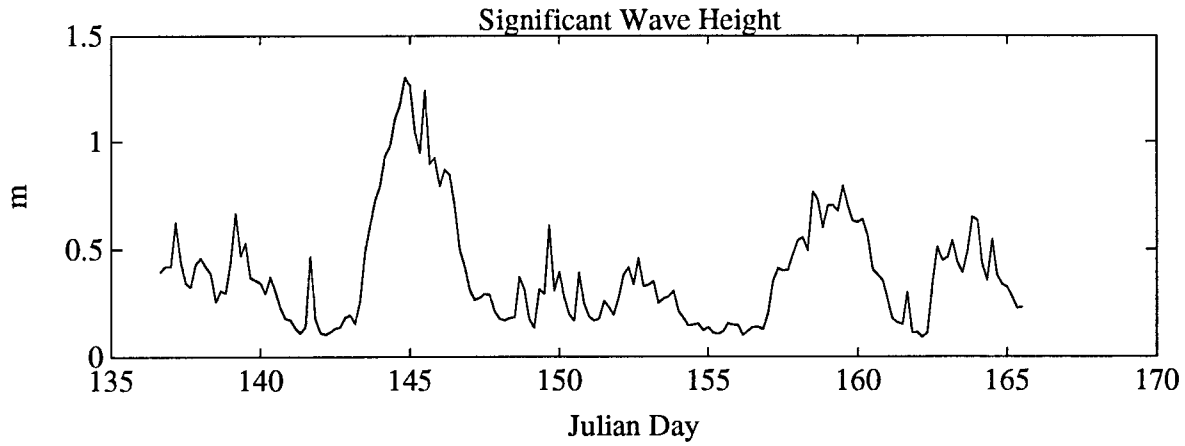
WAVE PARAMETERS FOR DEPLOYMENT H032

From: May 17,1990 Julian Day - 136.5

To: June 15,1990 Julian Day - 165.5

o : data with reduced accuracy

* : bad data



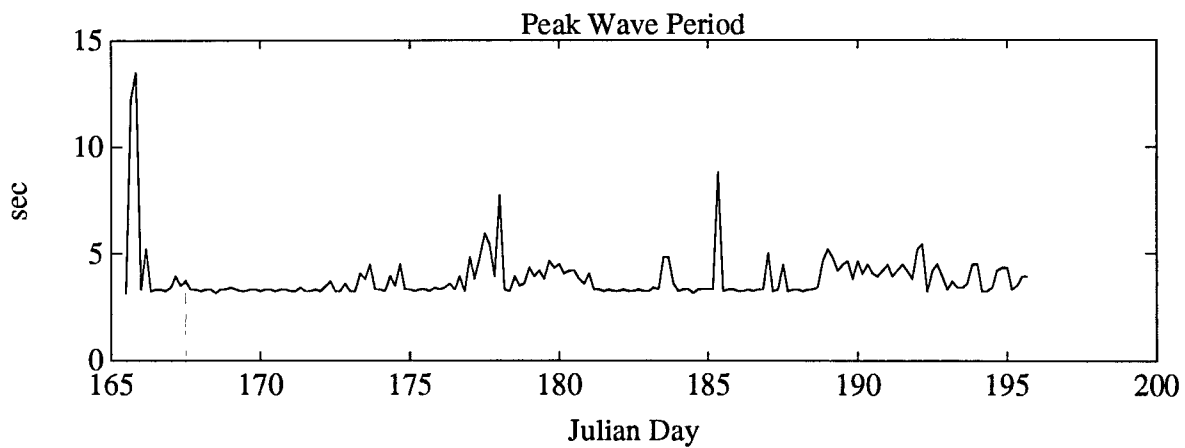
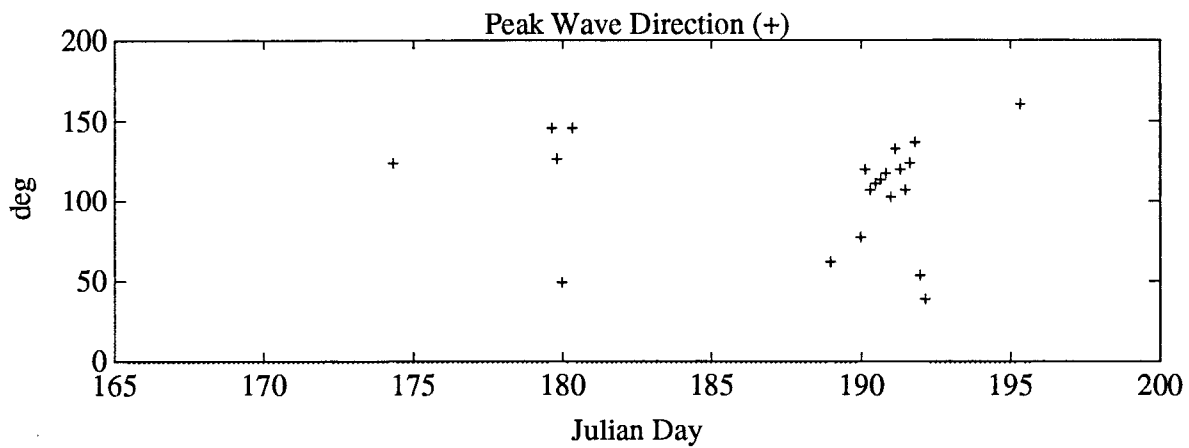
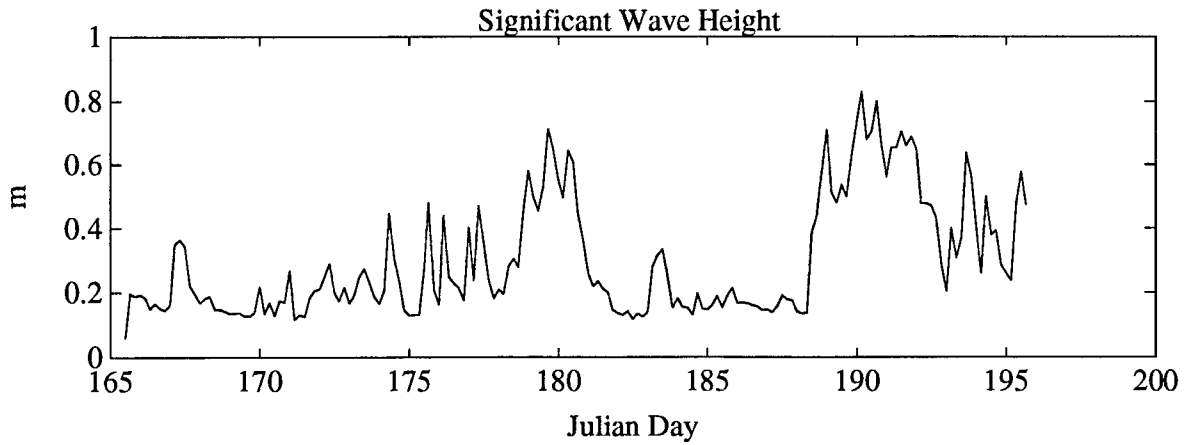
WAVE PARAMETERS FOR DEPLOYMENT H041

From: June 15,1990 Julian Day - 165.5

To: July 15,1990 Julian Day - 195.6

o : data with reduced accuracy

* : bad data



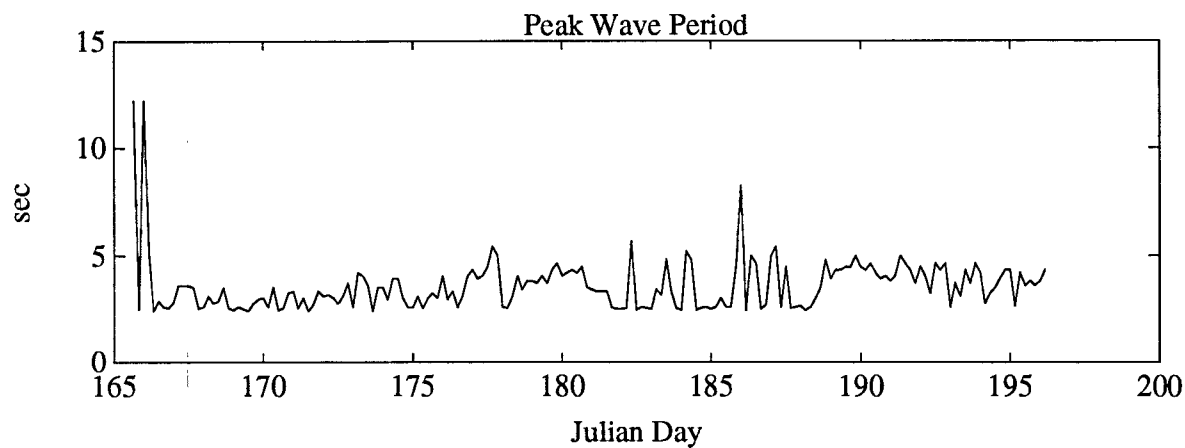
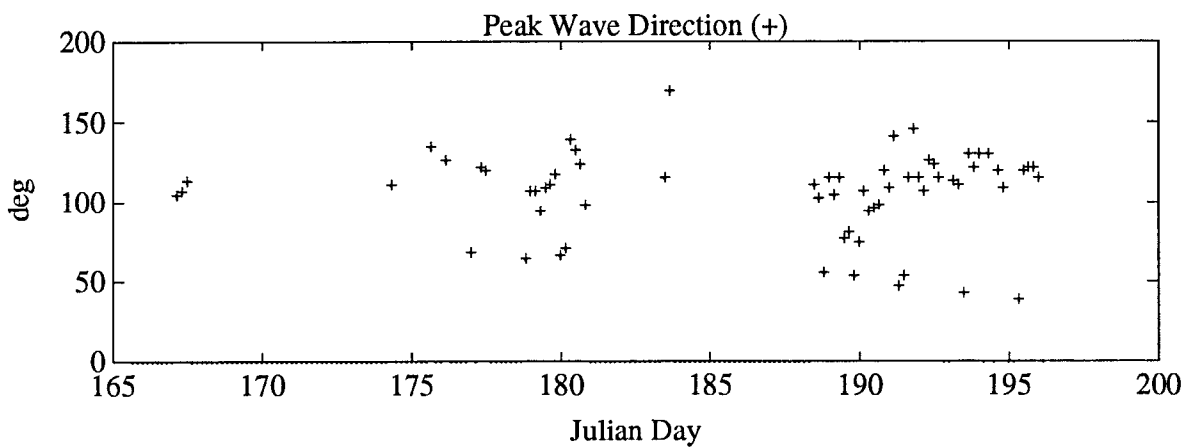
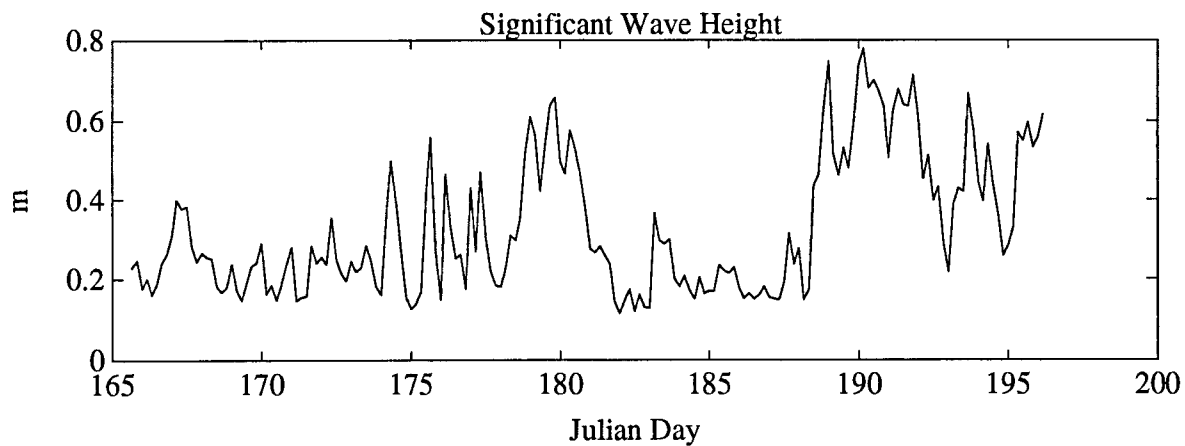
WAVE PARAMETERS FOR DEPLOYMENT H042

From: June 15,1990 Julian Day - 165.5

To: July 16,1990 Julian Day - 196.16

o : data with reduced accuracy

* : bad data



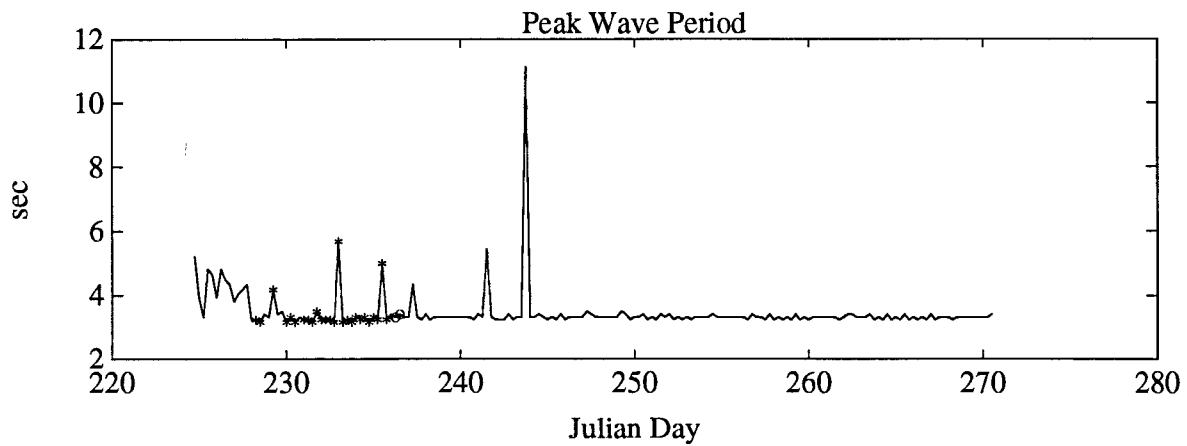
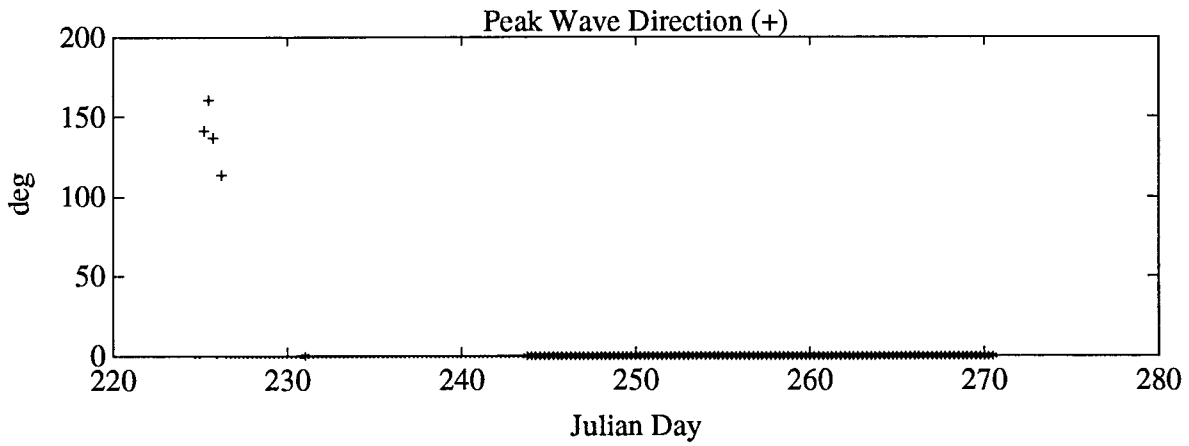
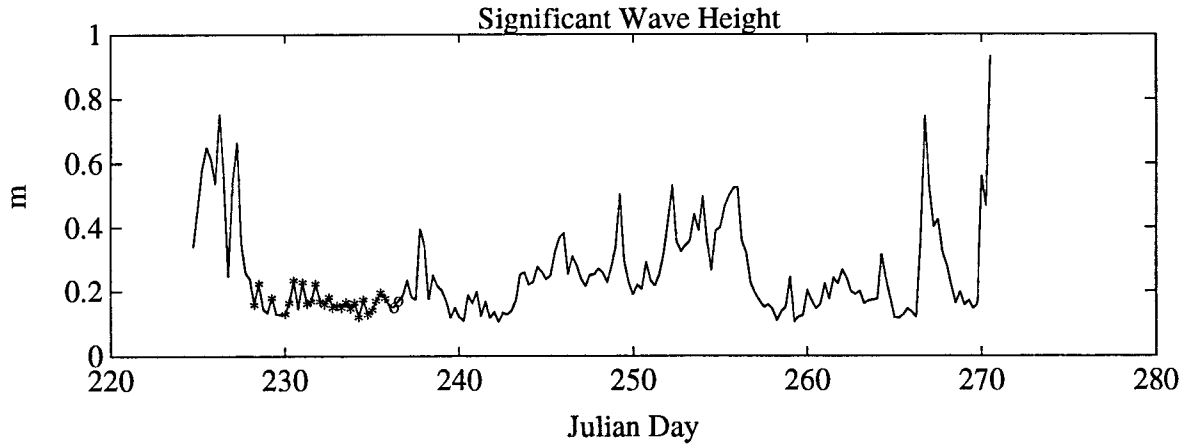
WAVE PARAMETERS FOR DEPLOYMENT H051

From: August 13,1990 Julian Day - 224.75

To: September 28,1990 Julian Day - 270.5

o : data with reduced accuracy

* : bad data



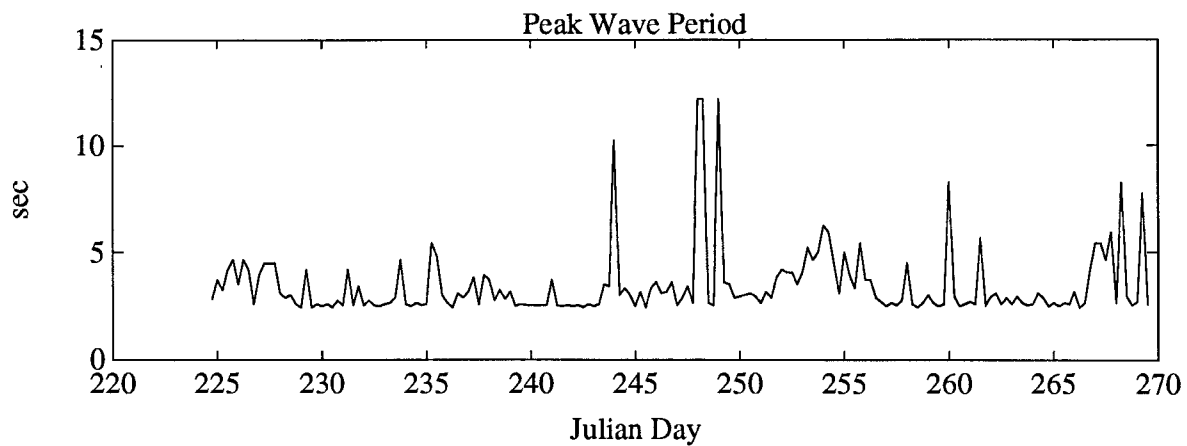
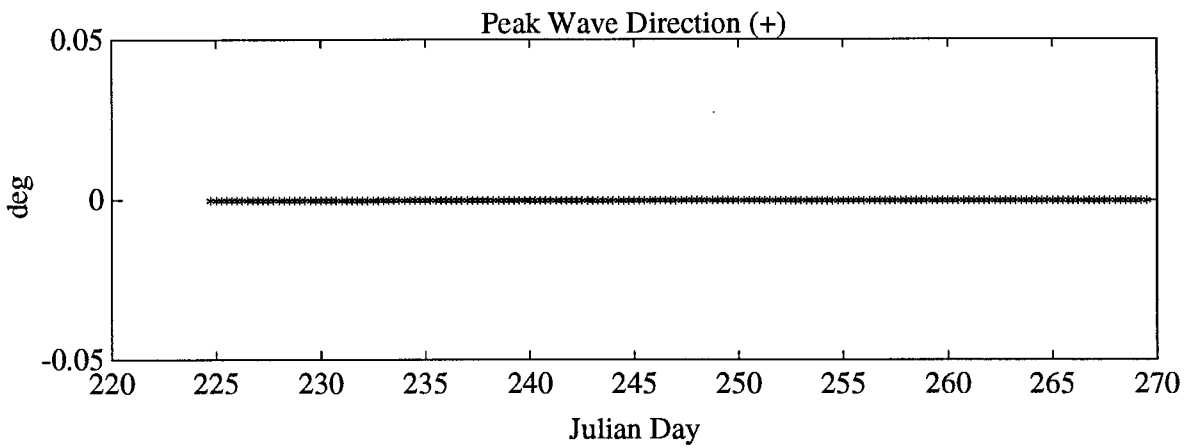
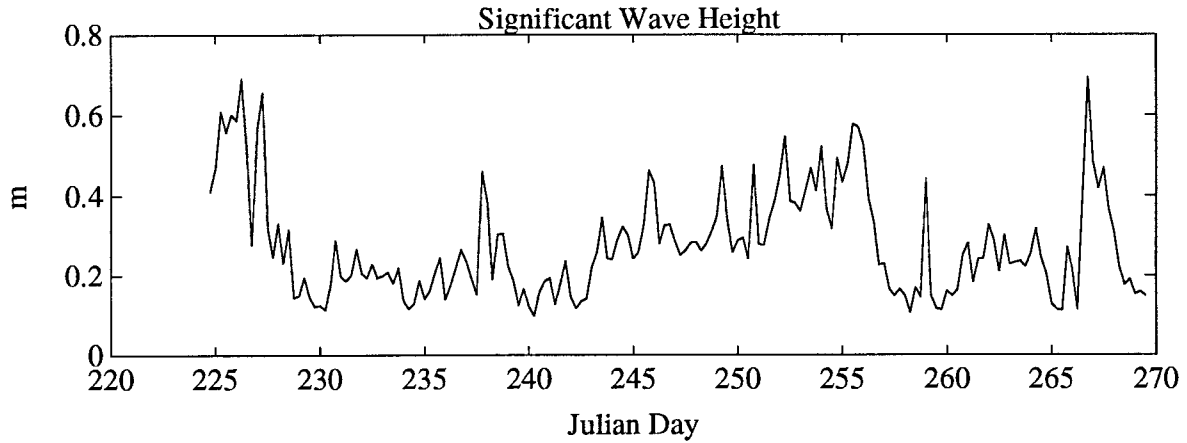
WAVE PARAMETERS FOR DEPLOYMENT H052

From: August 13,1990 Julian Day - 224.75

To: September 27,1990 Julian Day - 269.5

o : data with reduced accuracy

* : bad data



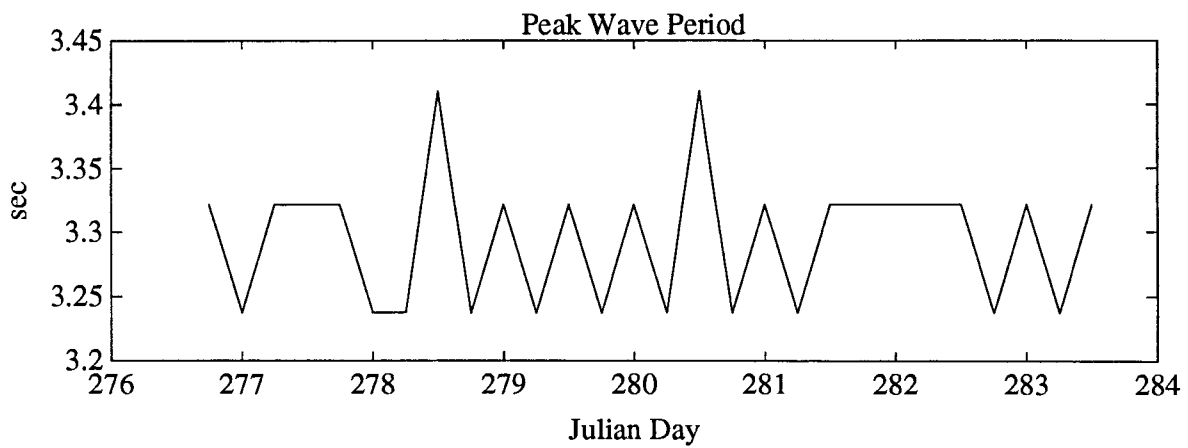
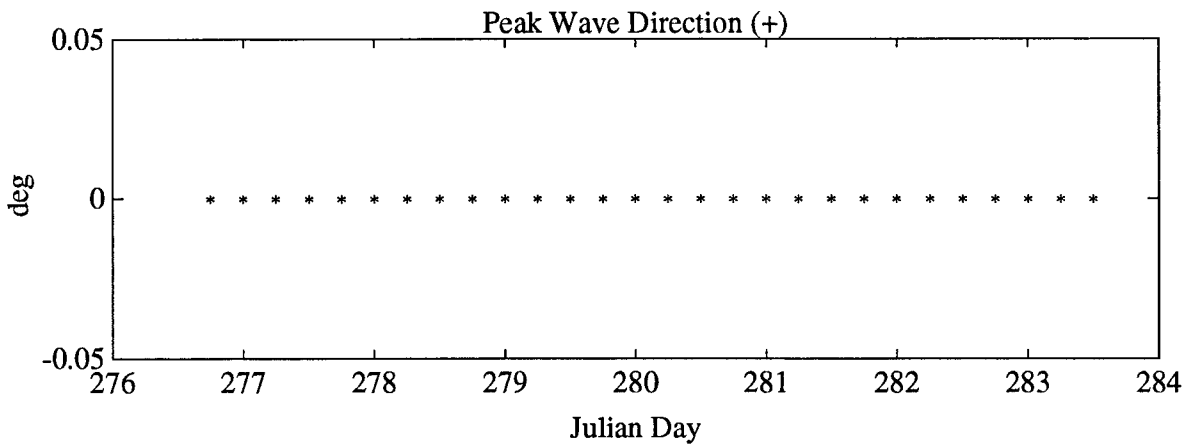
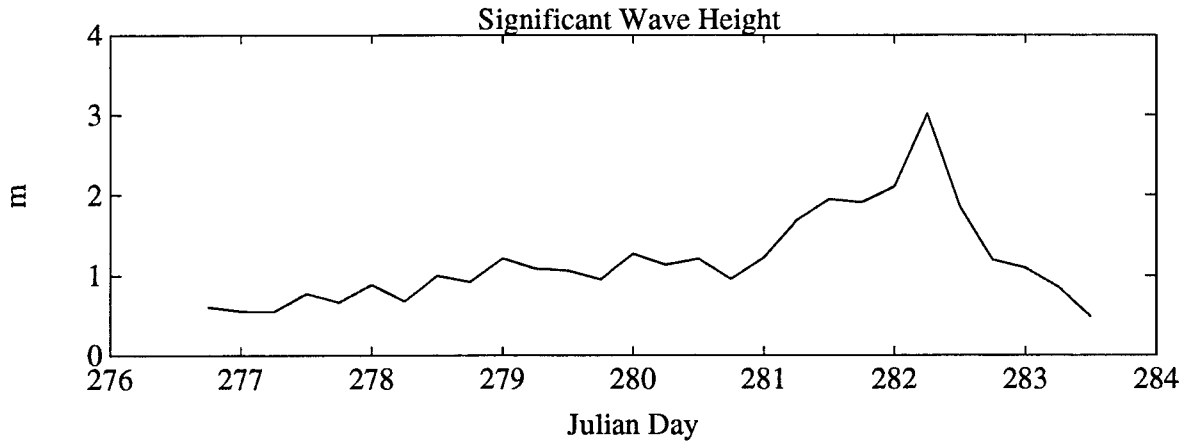
WAVE PARAMETERS FOR DEPLOYMENT H061

From: October 4,1990 Julian Day - 276.5

To: October 13,1990 Julian Day - 283.5

o : data with reduced accuracy

* : bad data



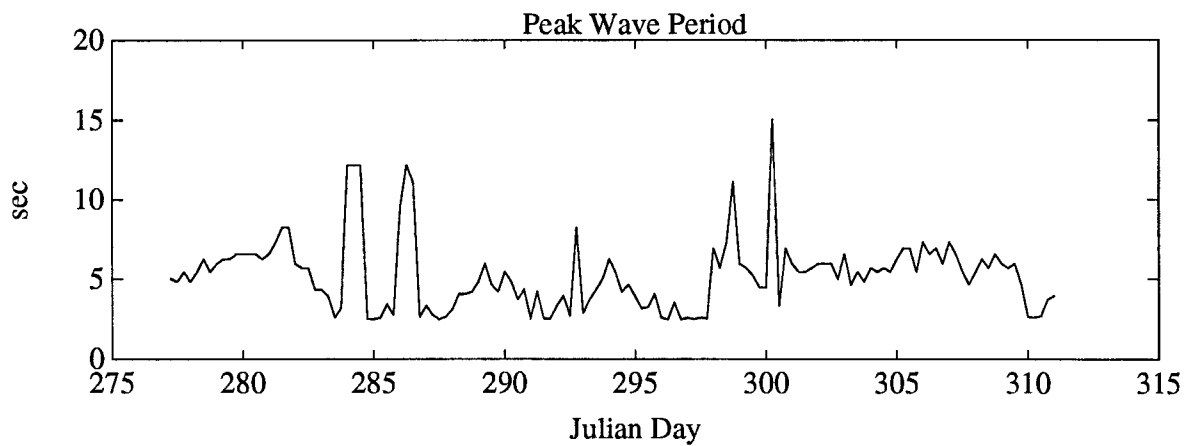
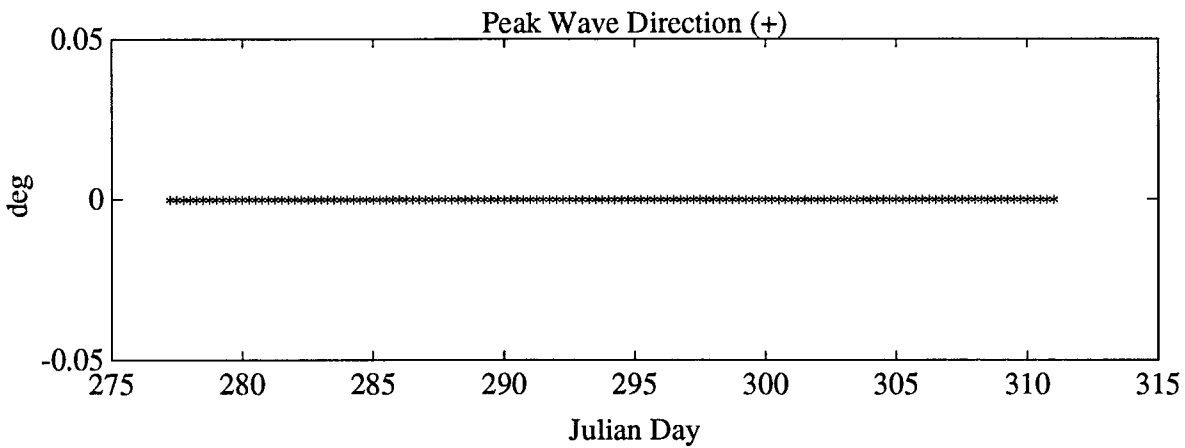
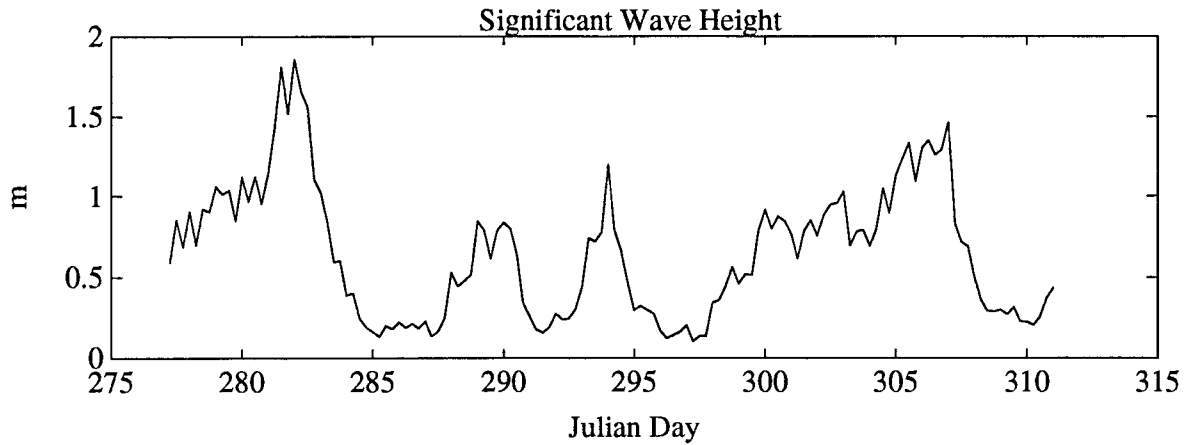
WAVE PARAMETERS FOR DEPLOYMENT H062

From: October 5,1990 Julian Day - 277.5

To: November 8,1990 Julian Day - 311.0

o : data with reduced accuracy

* : bad data



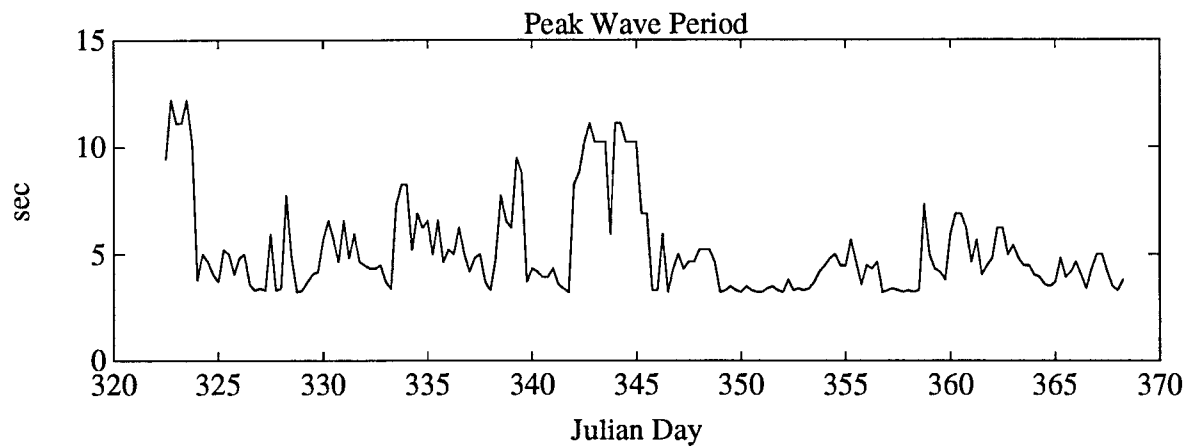
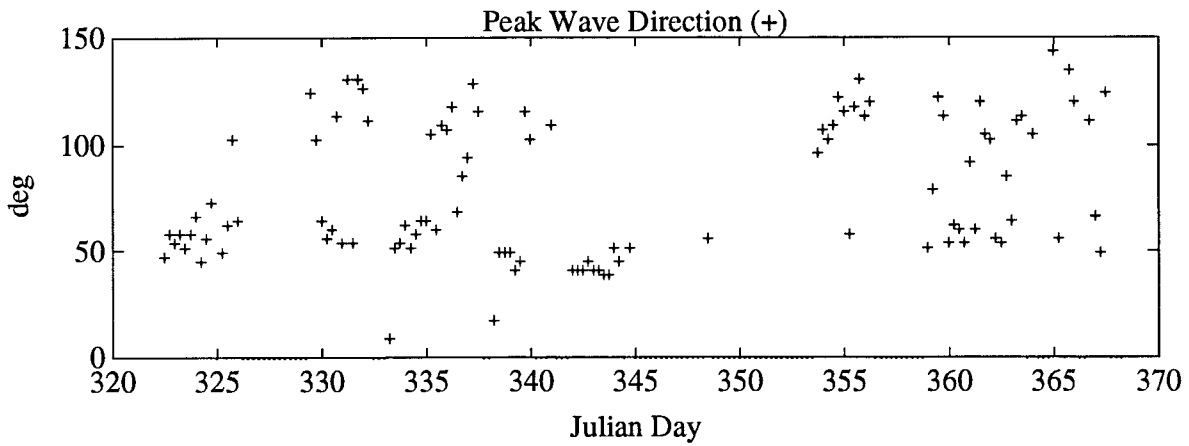
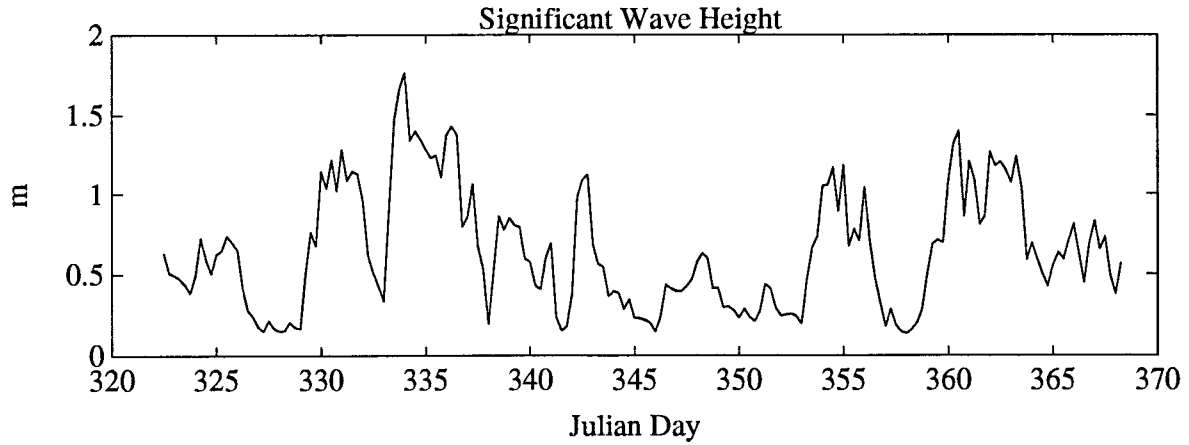
WAVE PARAMETERS FOR DEPLOYMENT H071

From: November 19,1990 Julian Day - 322.5

To: January 8,1991 Julian Day - 3.25

o : data with reduced accuracy

* : bad data



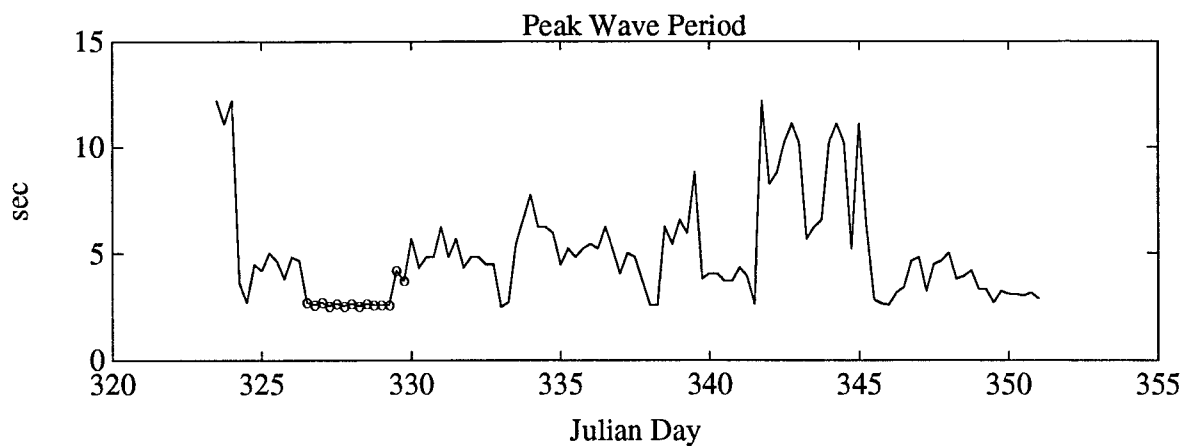
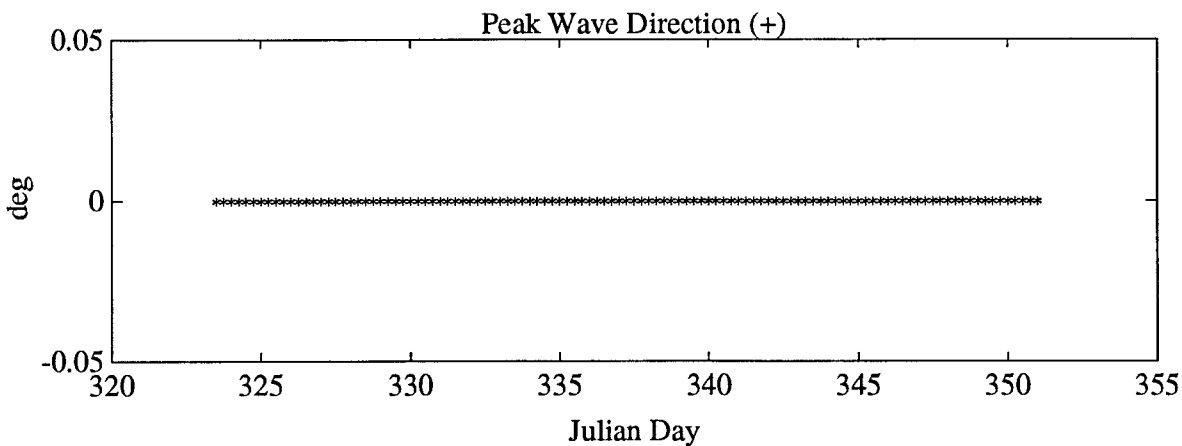
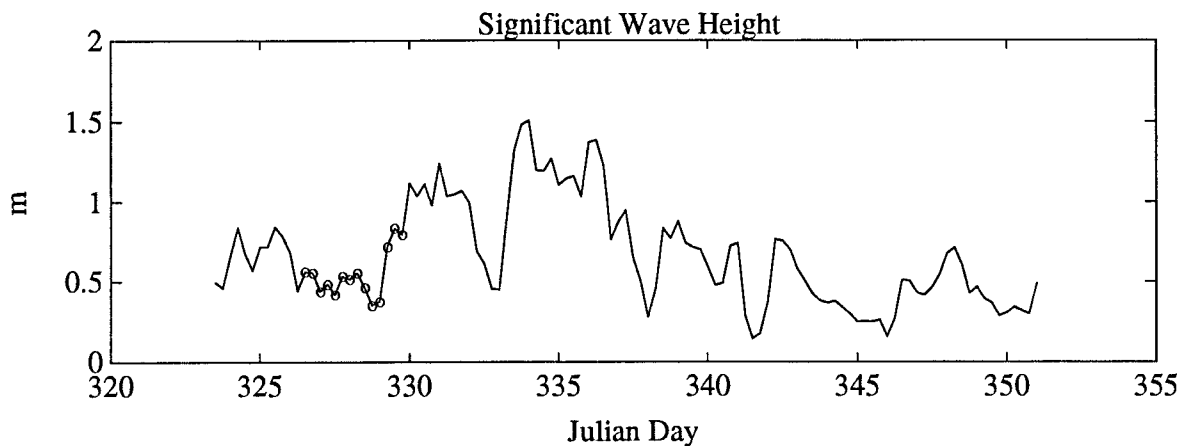
WAVE PARAMETERS FOR DEPLOYMENT H072

From: November 20,1990 Julian Day - 323.5

To: December 18,1990 Julian Day - 351.0

o : data with reduced accuracy

* : bad data



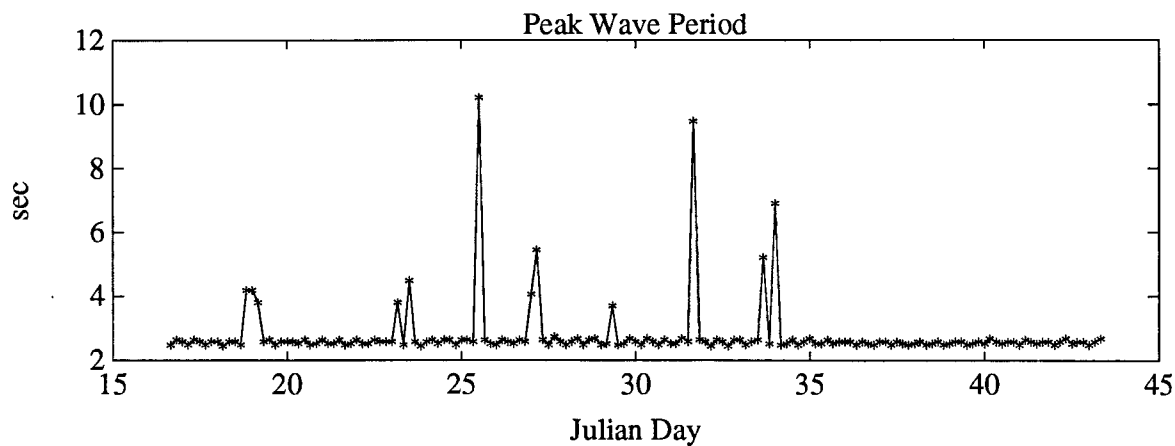
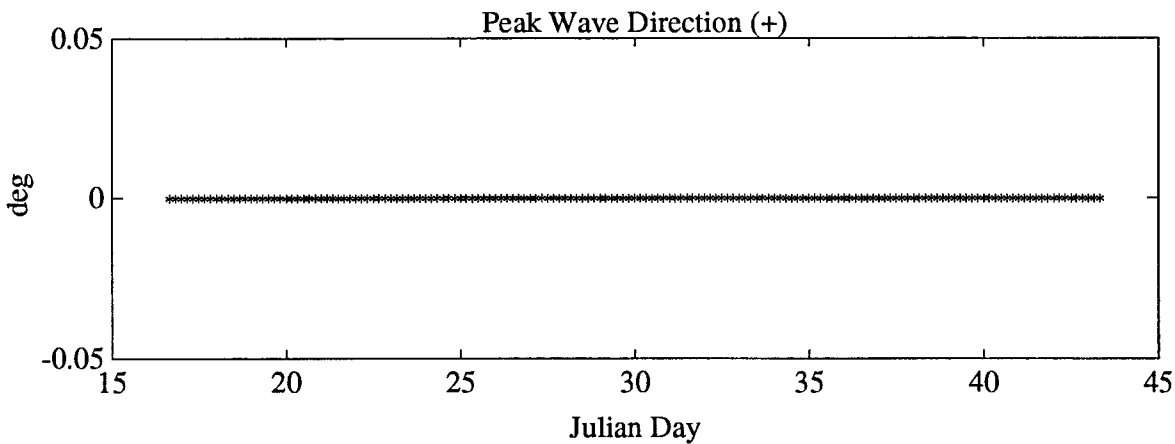
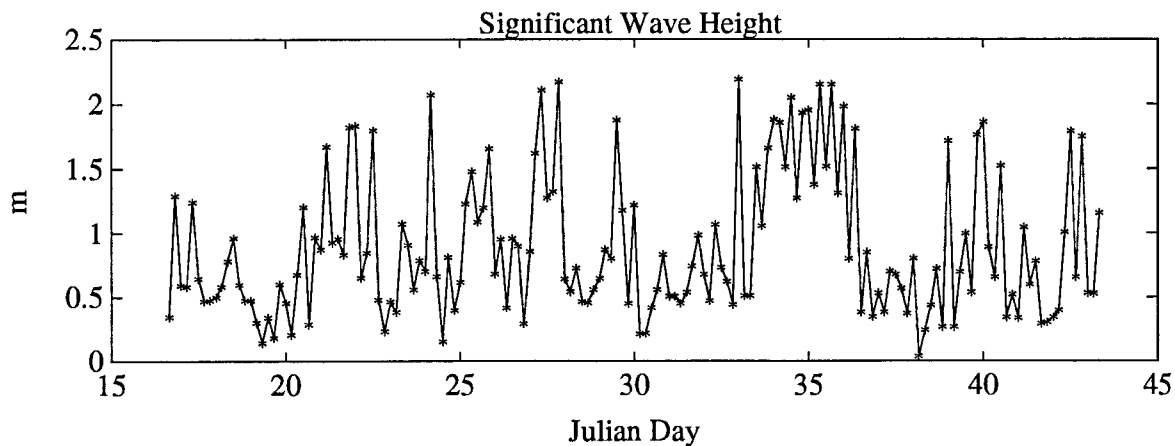
WAVE PARAMETERS FOR DEPLOYMENT H082

From: January 17,1991 Julian Day - 16.0

To: February 13,1991 Julian Day - 43.0

o : data with reduced accuracy

* : bad data



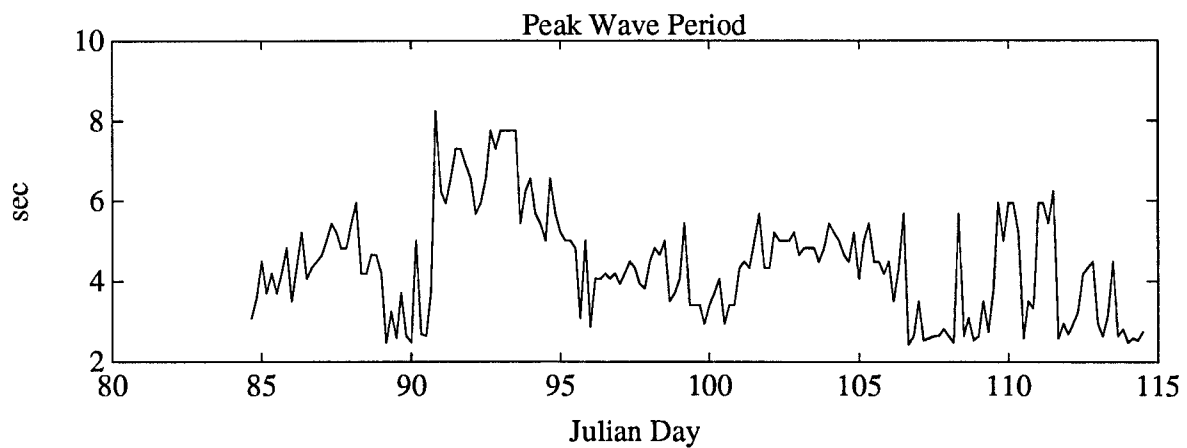
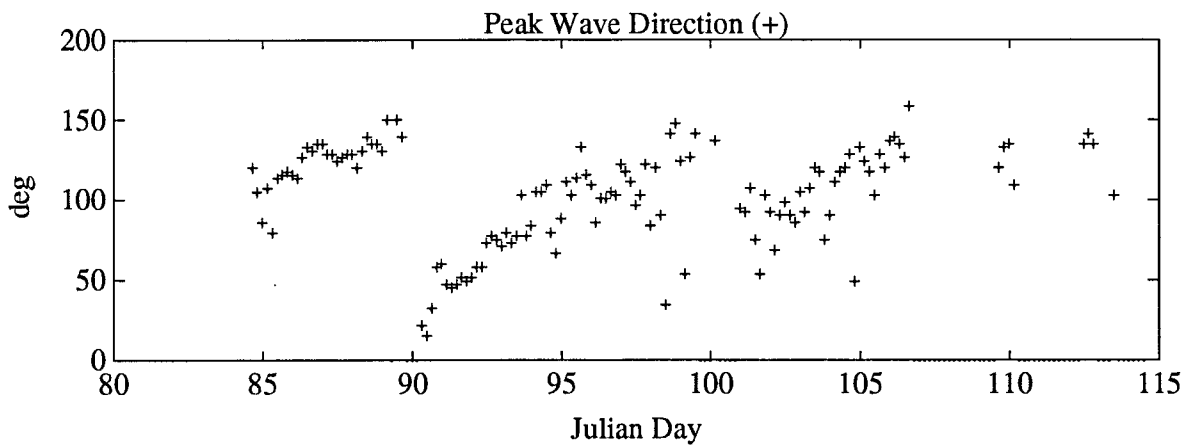
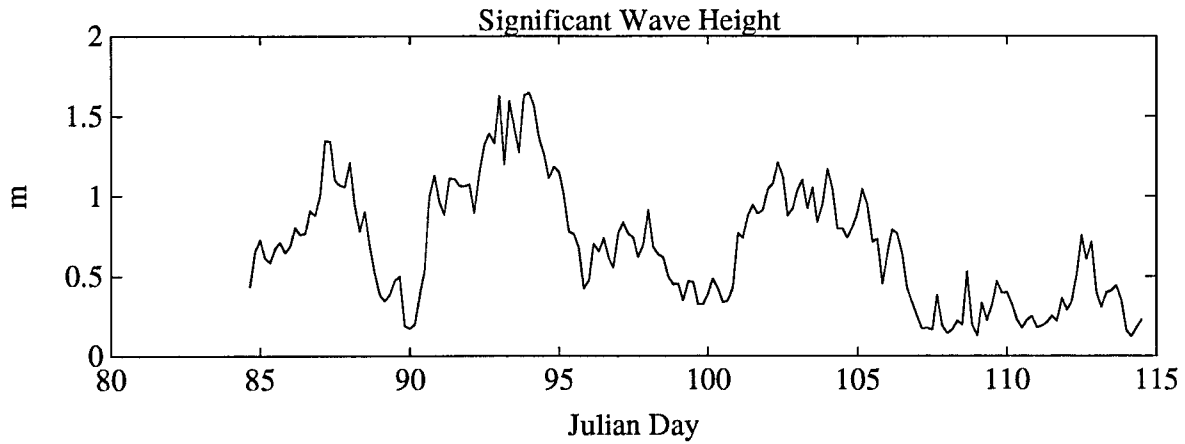
WAVE PARAMETERS FOR DEPLOYMENT H092

From: March 26,1991 Julian Day - 84.16

To: April 25,1991 Julian Day - 114.5

o : data with reduced accuracy

* : bad data



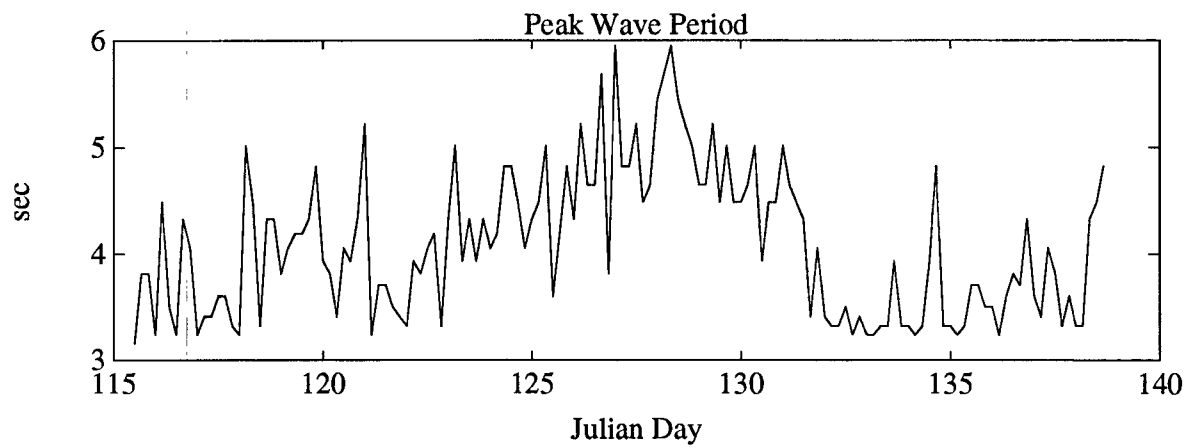
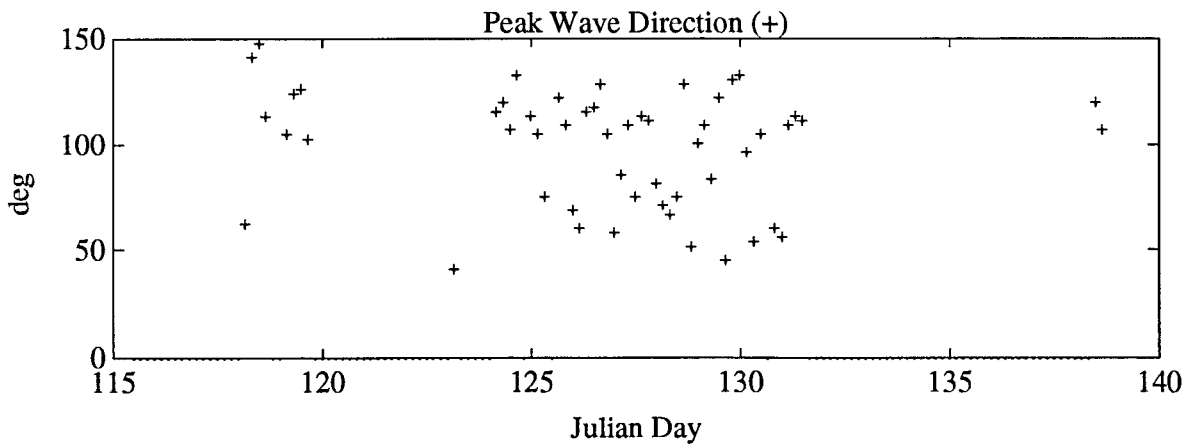
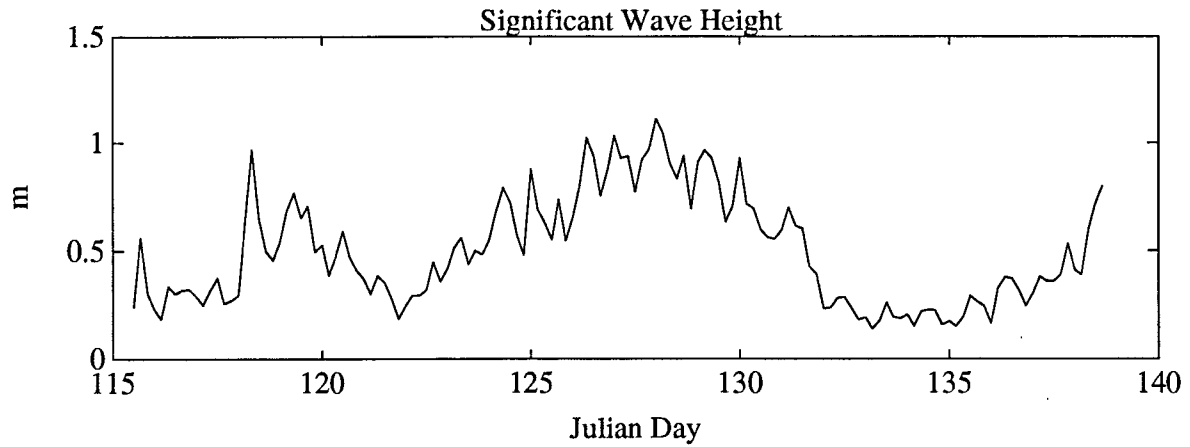
WAVE PARAMETERS FOR DEPLOYMENT H101

From: April 26,1991 Julian Day - 115.5

To: May 19,1991 Julian Day - 138.7

o : data with reduced accuracy

* : bad data



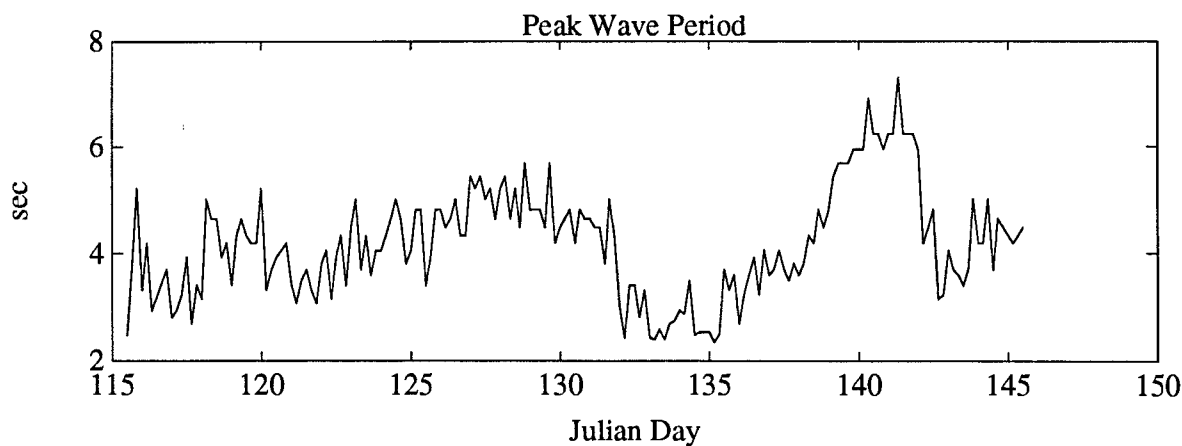
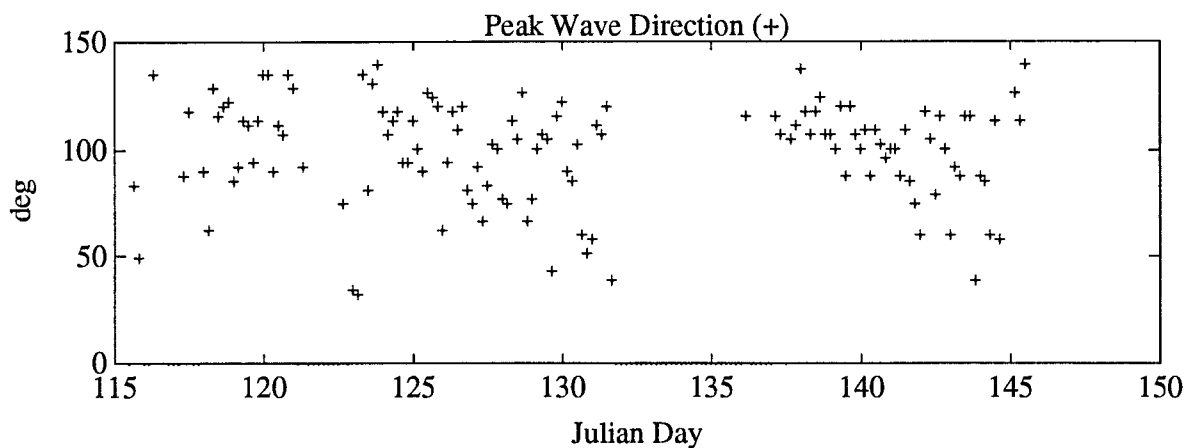
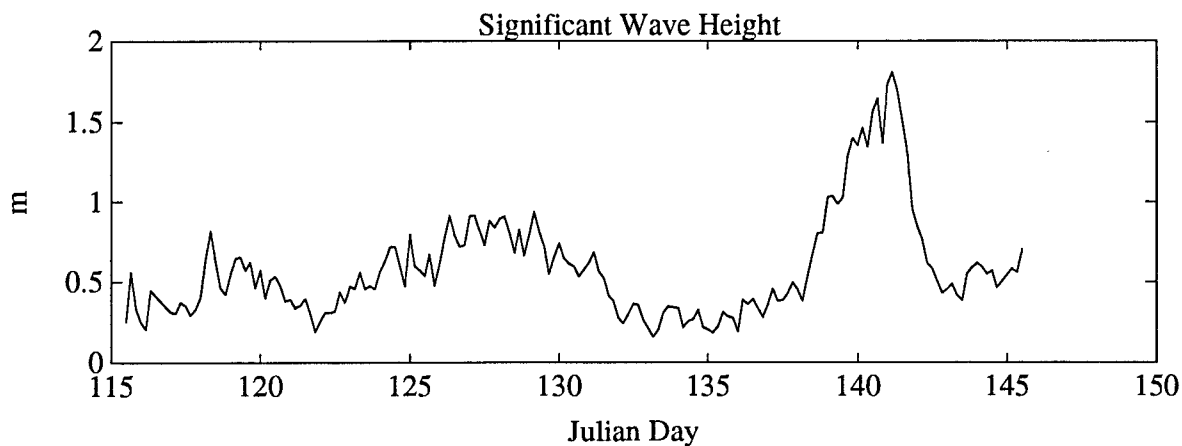
WAVE PARAMETERS FOR DEPLOYMENT H102

From: April 26,1991 Julian Day - 115.5

To: May 26,1991 Julian Day - 145.5

o : data with reduced accuracy

* : bad data



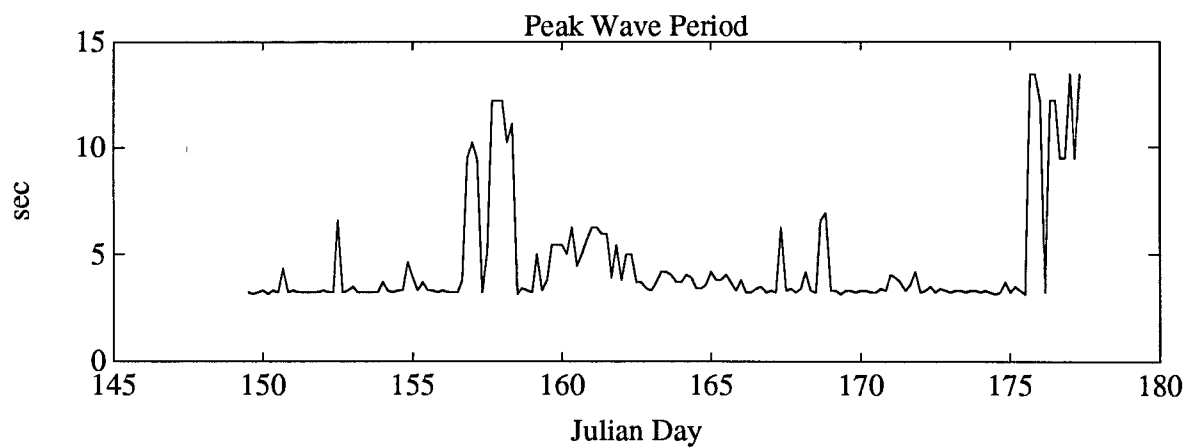
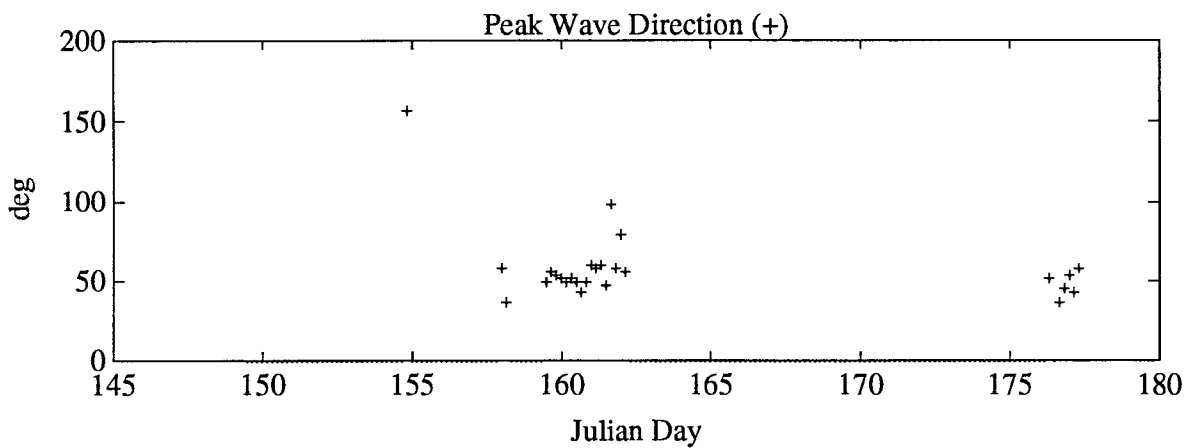
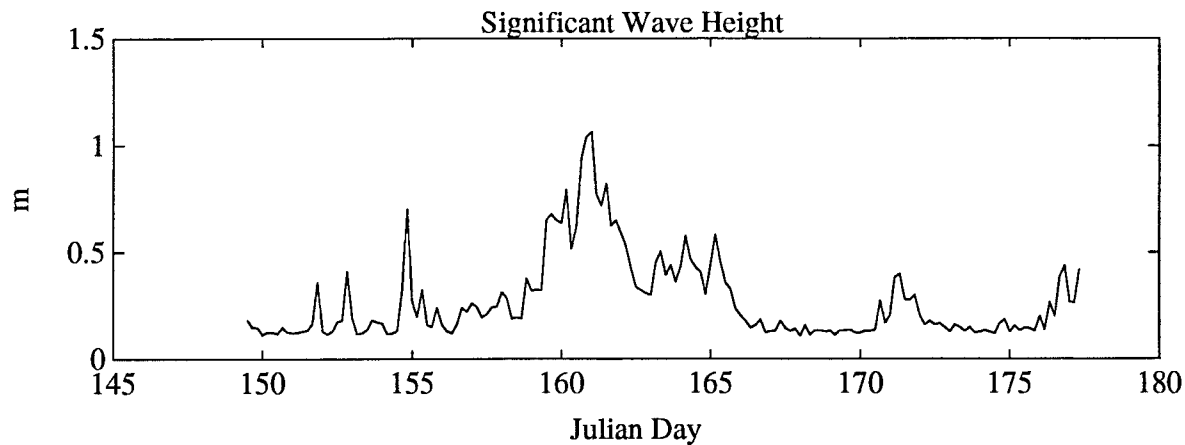
WAVE PARAMETERS FOR DEPLOYMENT H111

From: May 30,1991 Julian Day - 149.5

To: June 27,1991 Julian Day - 177.3

o : data with reduced accuracy

* : bad data



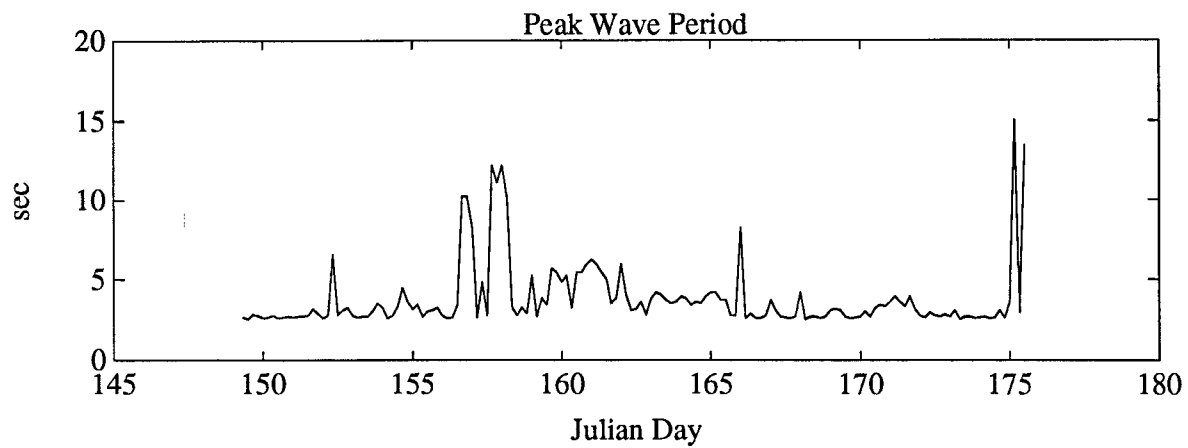
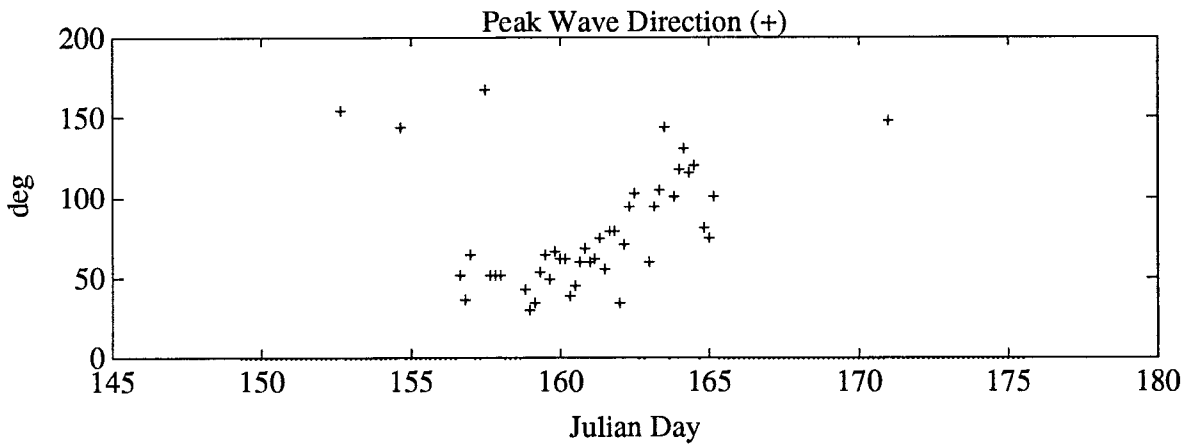
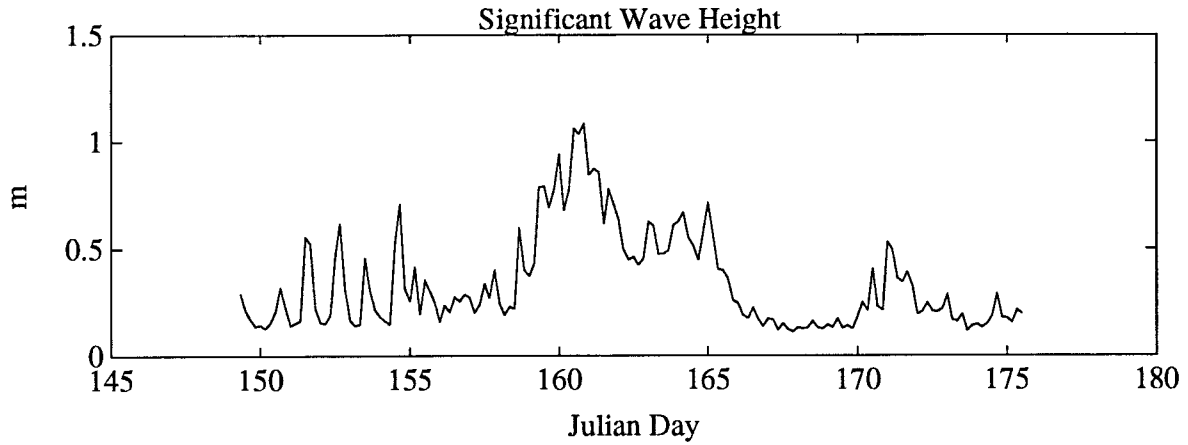
WAVE PARAMETERS FOR DEPLOYMENT H112

From: May 30,1991 Julian Day - 149.5

To: June 25,1991 Julian Day - 175.5

o : data with reduced accuracy

* : bad data



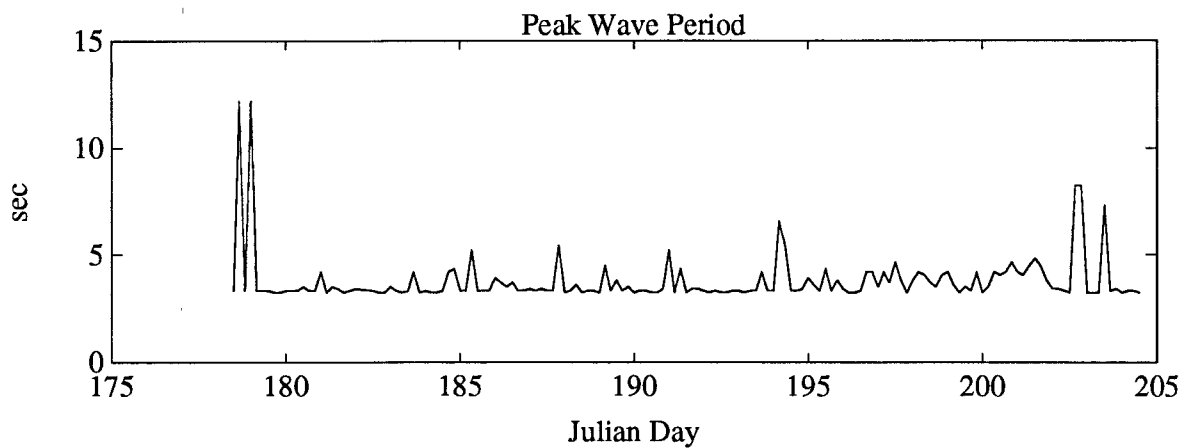
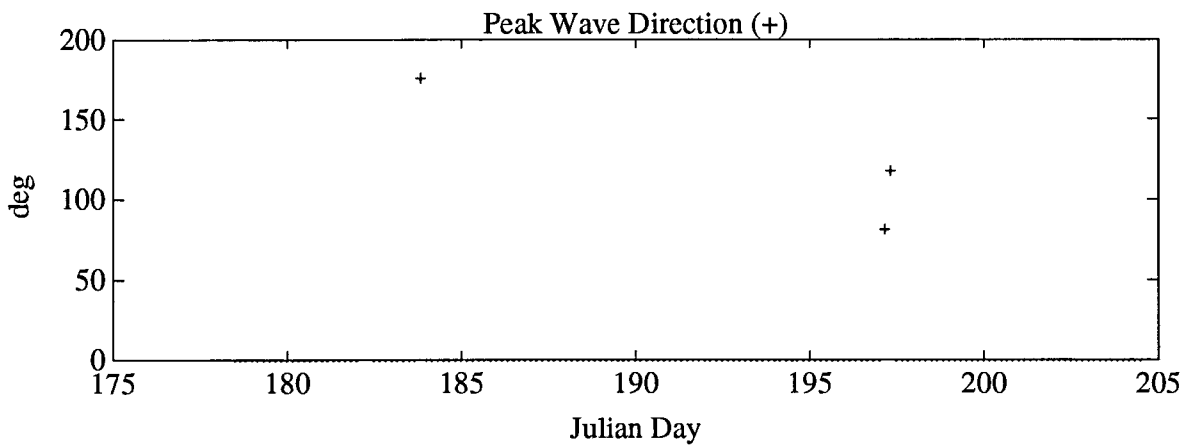
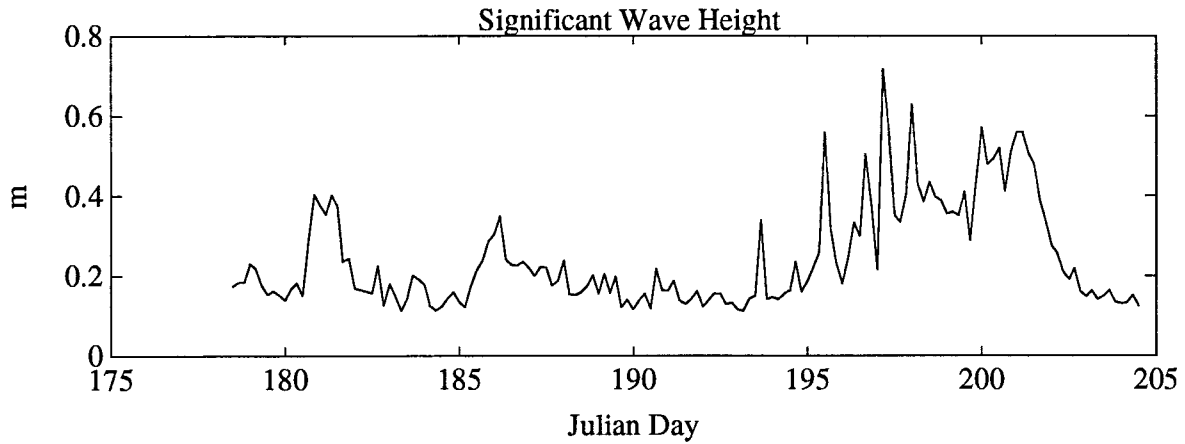
WAVE PARAMETERS FOR DEPLOYMENT H121

From: June 28,1991 Julian Day - 178.5

To: July 24,1991 Julian Day - 204.5

o : data with reduced accuracy

* : bad data



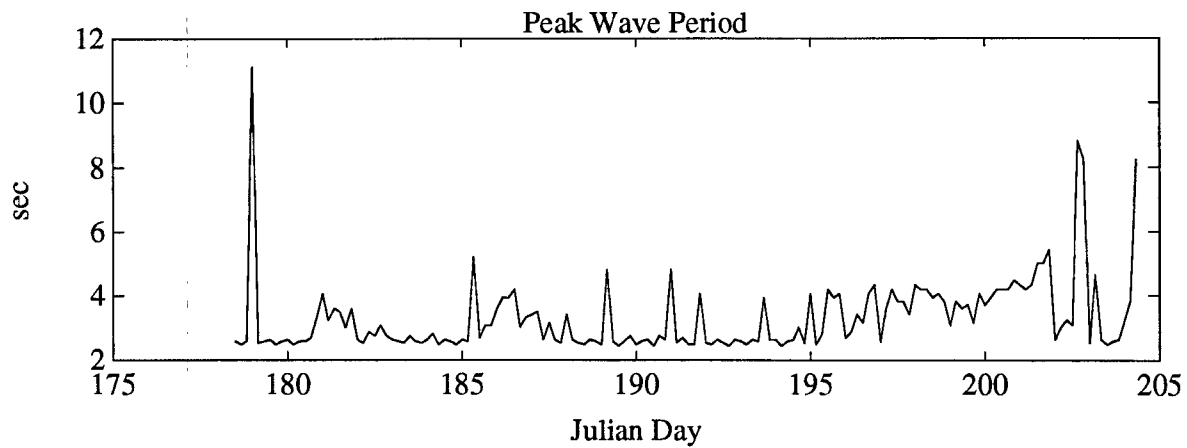
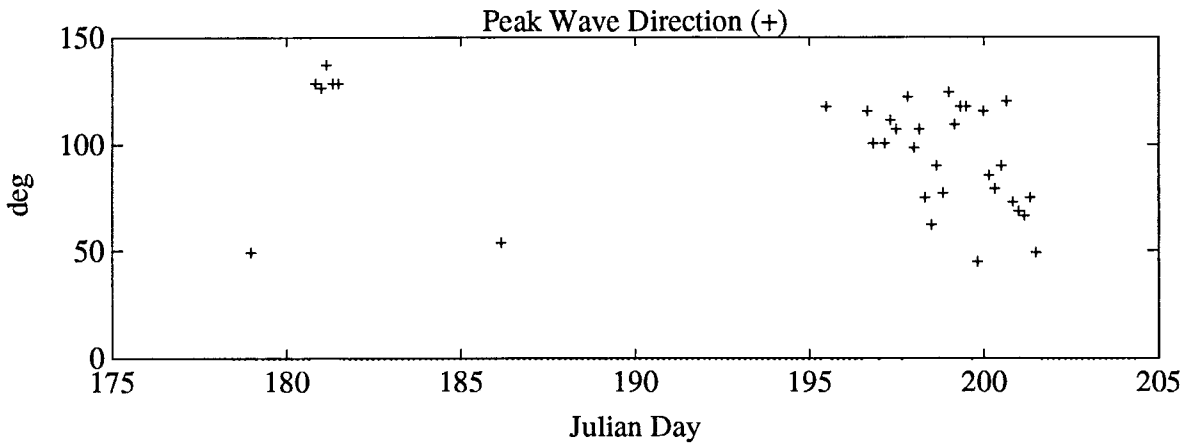
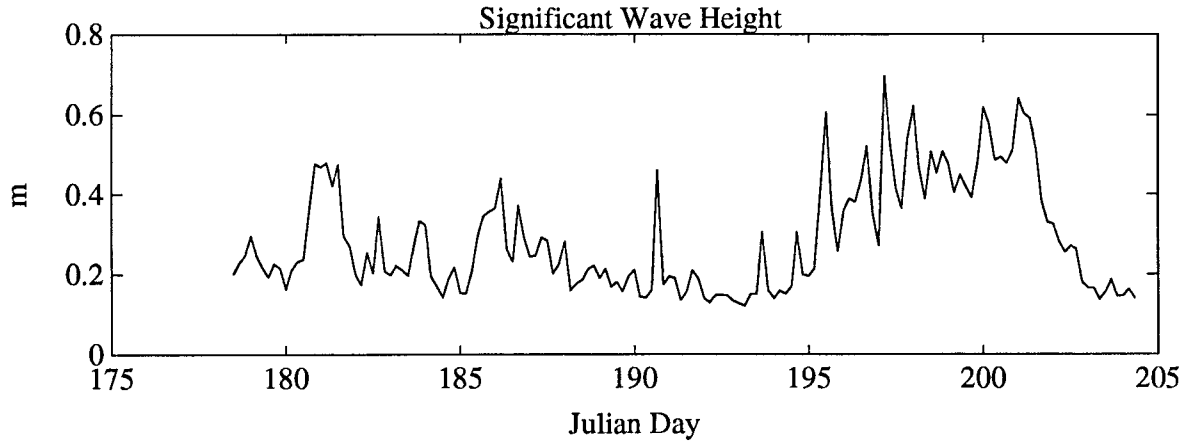
WAVE PARAMETERS FOR DEPLOYMENT H122

From: June 28,1991 Julian Day - 178.5

To: July 24,1991 Julian Day - 204.3

o : data with reduced accuracy

* : bad data



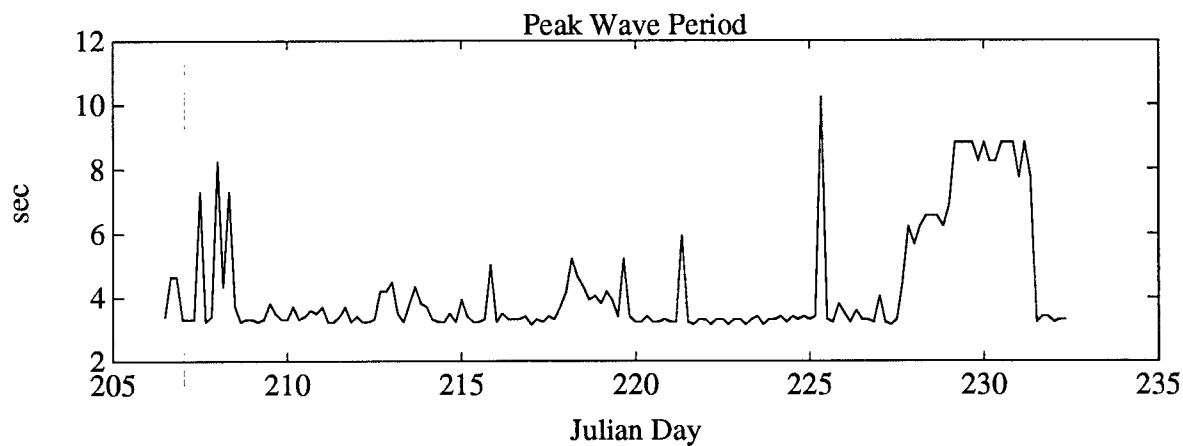
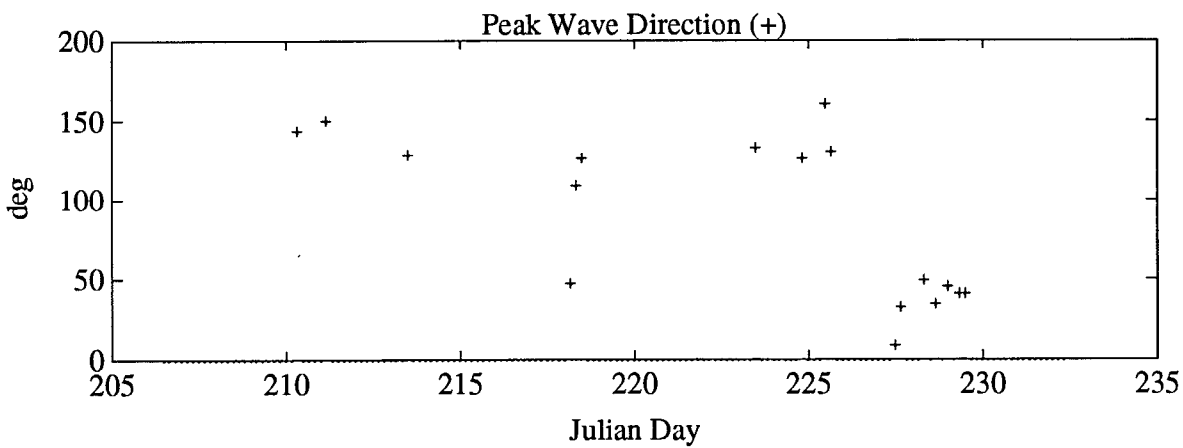
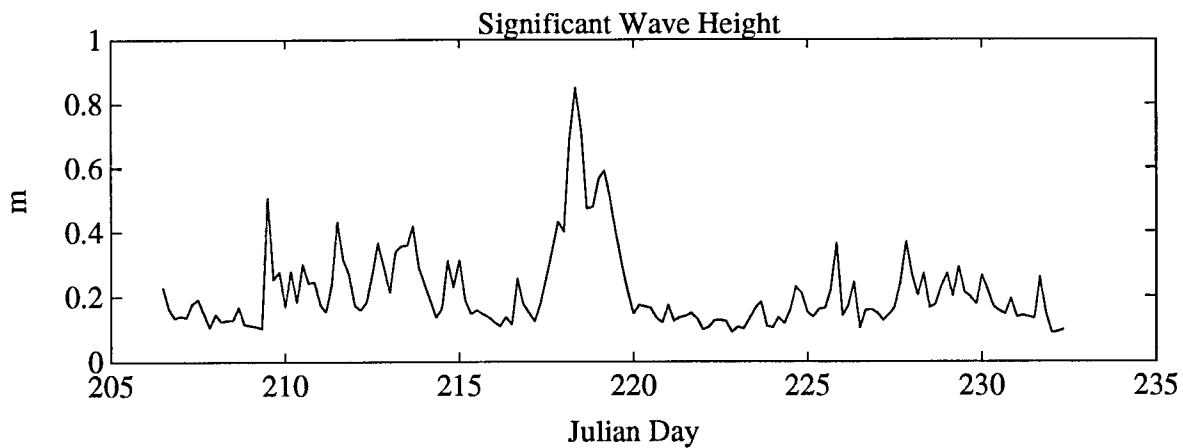
WAVE PARAMETERS FOR DEPLOYMENT H131

From: July 26,1991 Julian Day - 206.5

To: August 21,1991 Julian Day - 232.3

o : data with reduced accuracy

* : bad data



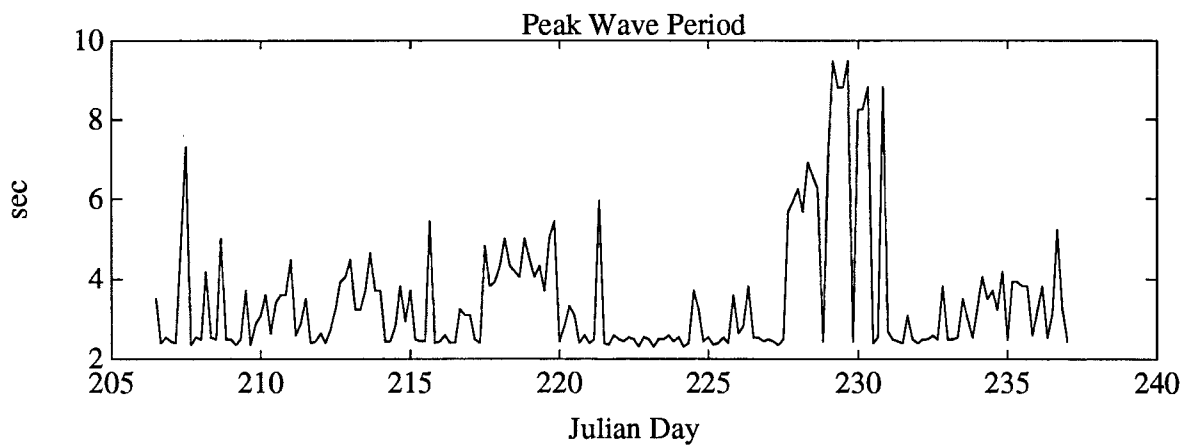
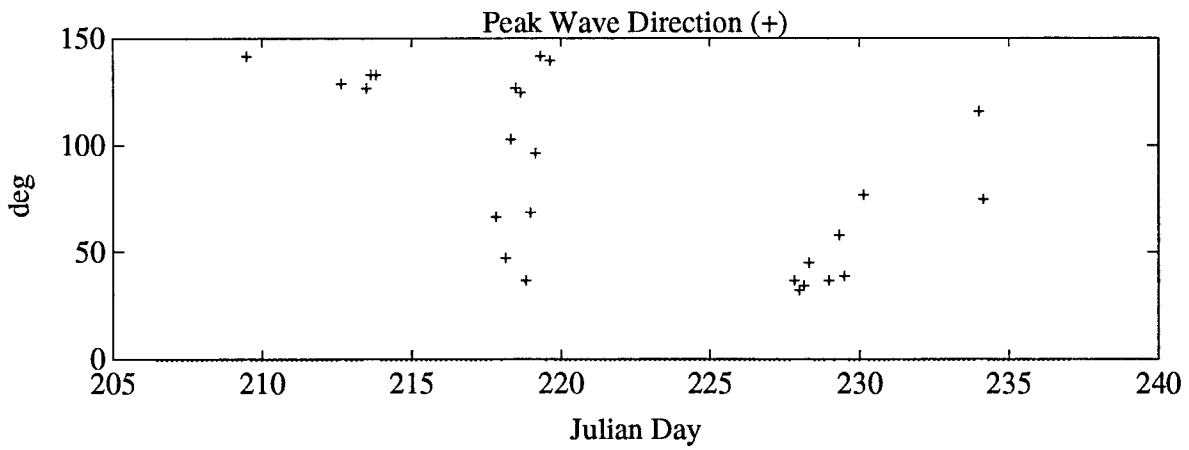
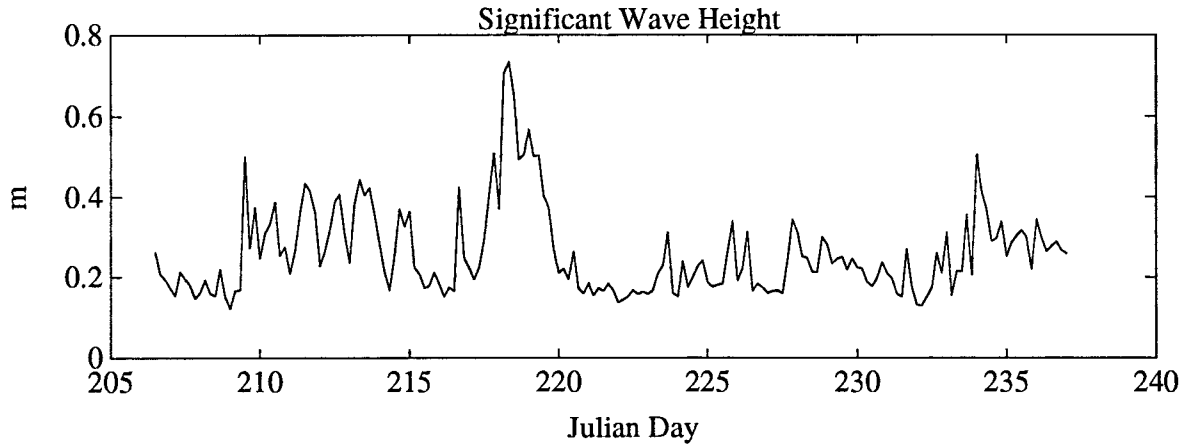
WAVE PARAMETERS FOR DEPLOYMENT H132

From: July 26,1991 Julian Day - 206.5

To: August 26,1991 Julian Day - 237.0

o : data with reduced accuracy

* : bad data



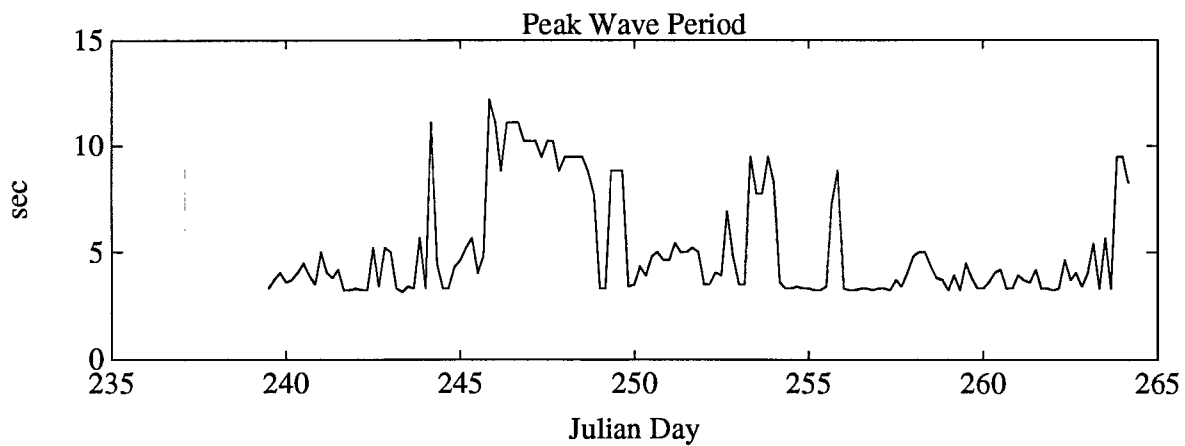
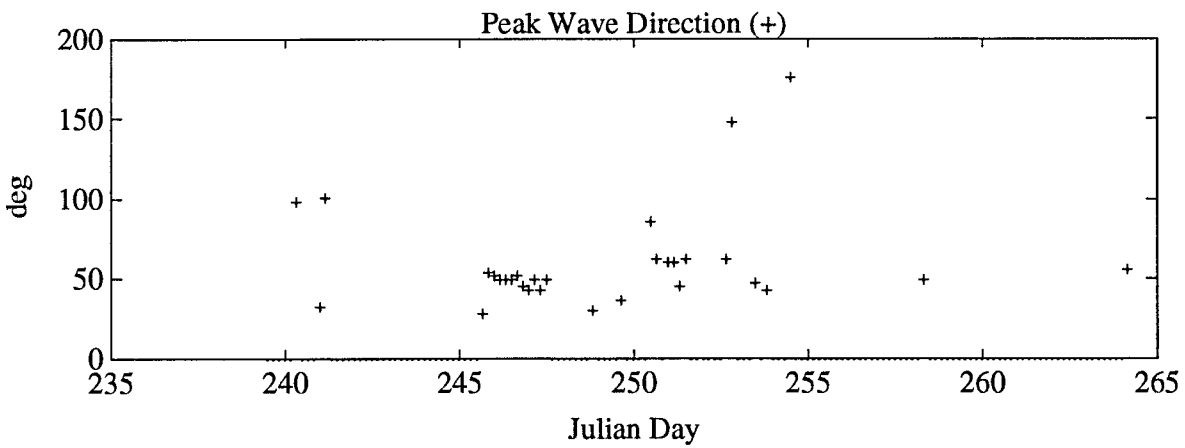
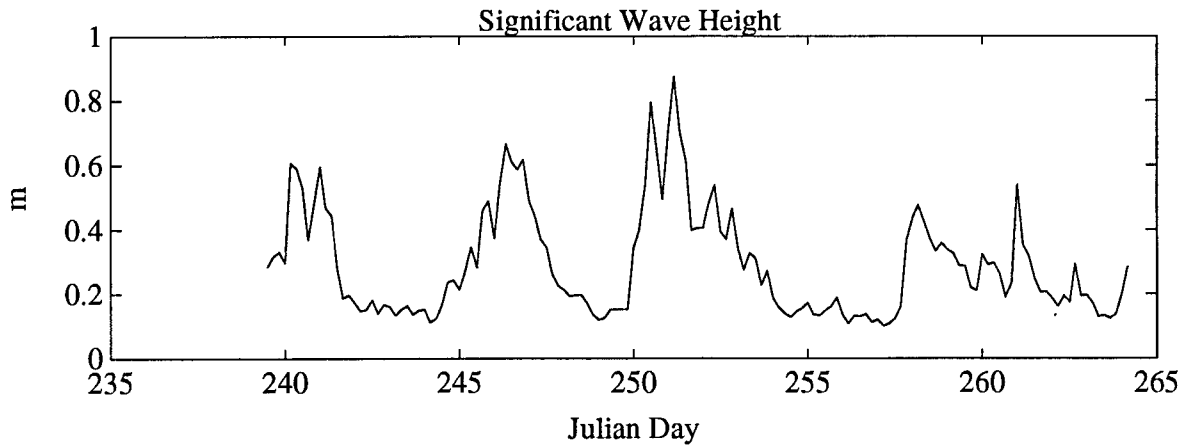
WAVE PARAMETERS FOR DEPLOYMENT H141

From: August 28,1991 Julian Day - 239.5

To: September 22,1991 Julian Day - 264.0

o : data with reduced accuracy

* : bad data



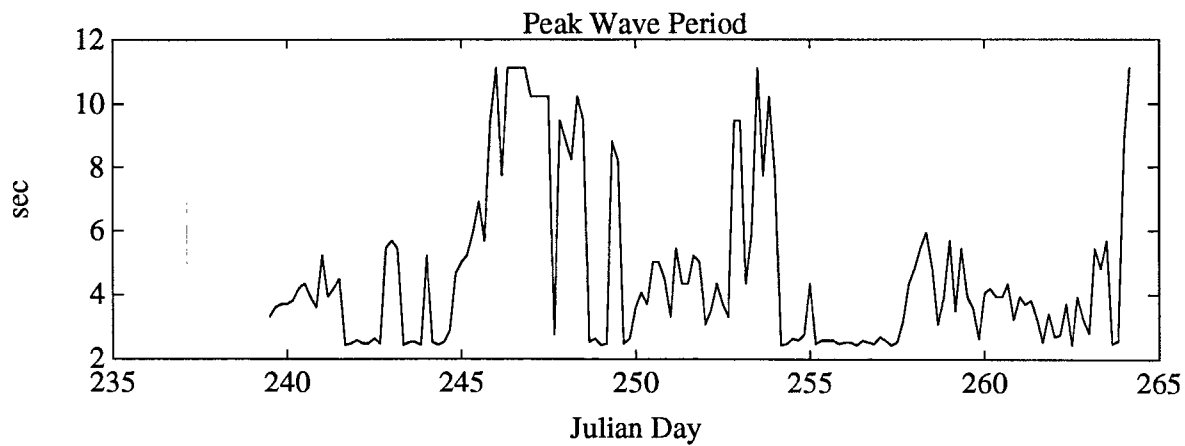
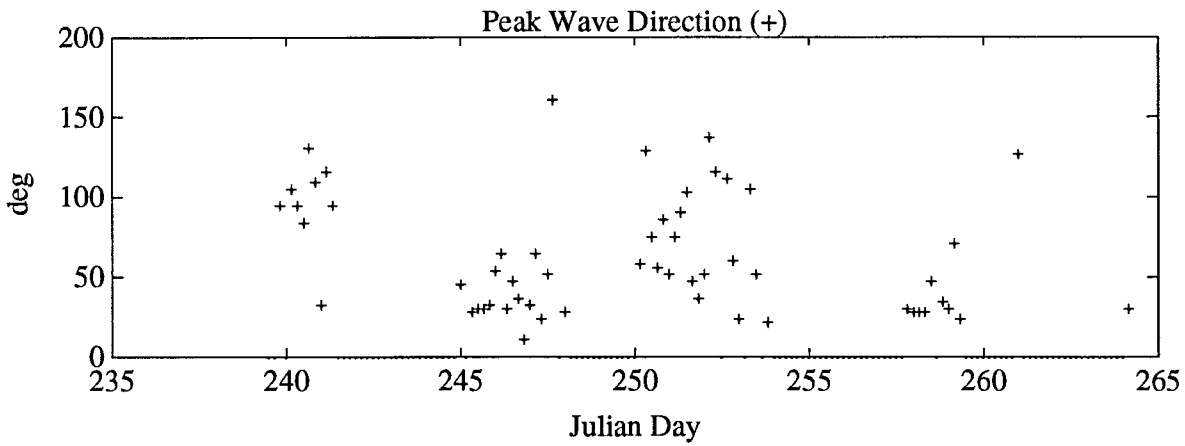
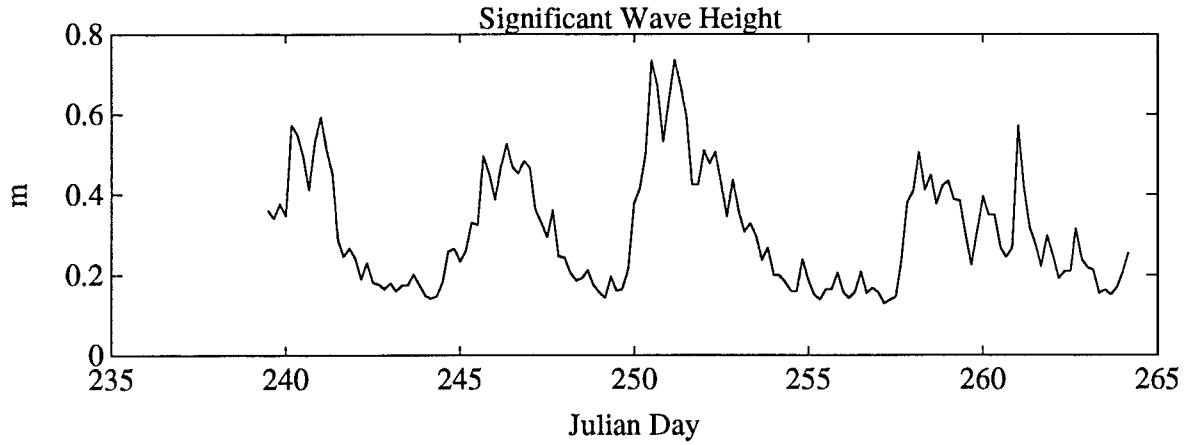
WAVE PARAMETERS FOR DEPLOYMENT H142

From: August 28,1991 Julian Day - 239.5

To: September 22,1991 Julian Day - 264.0

o : data with reduced accuracy

* : bad data



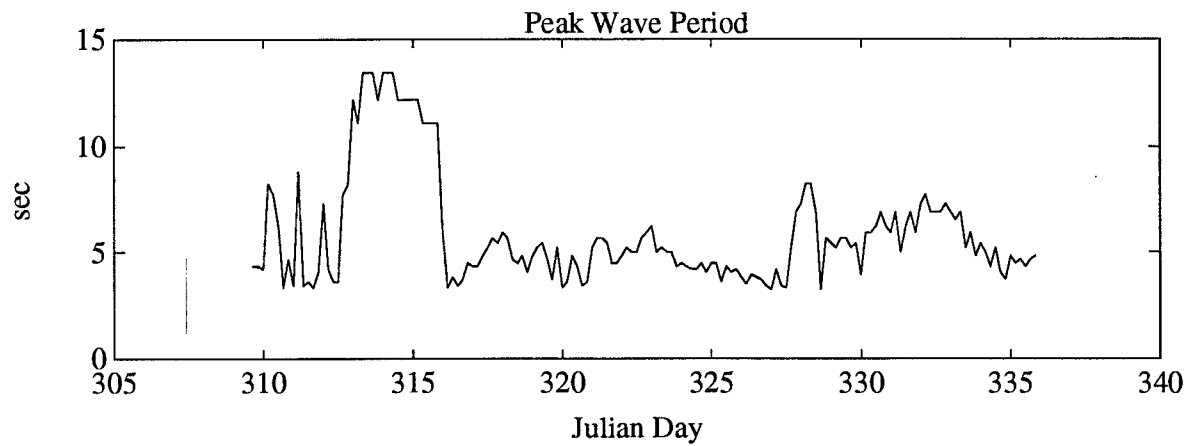
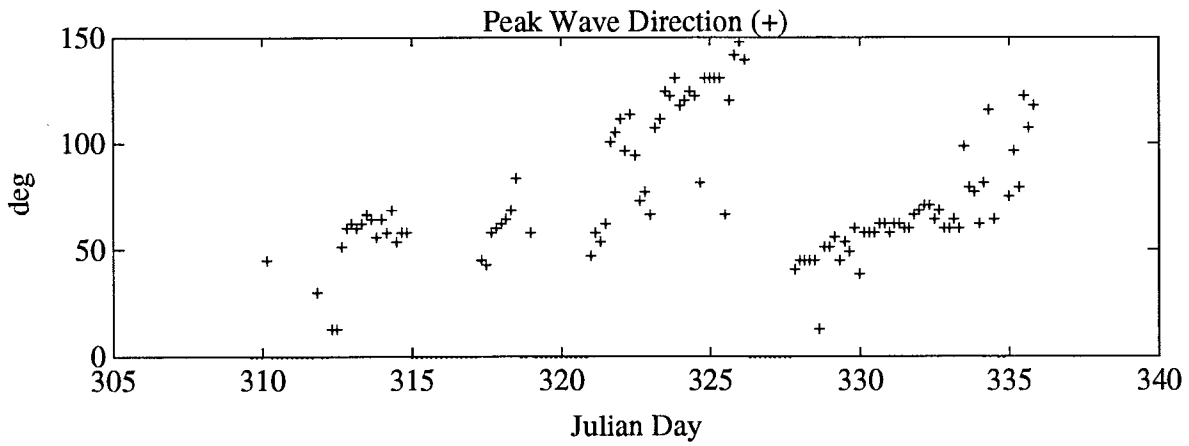
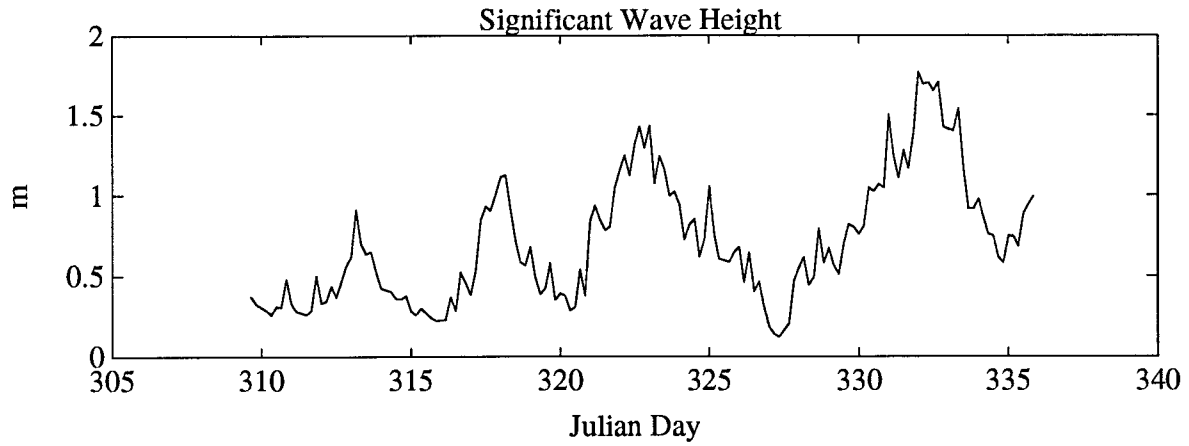
WAVE PARAMETERS FOR DEPLOYMENT H151

From: November 6, 1991 Julian Day - 309.7

To: December 2, 1991 Julian Day - 335.8

o : data with reduced accuracy

* : bad data



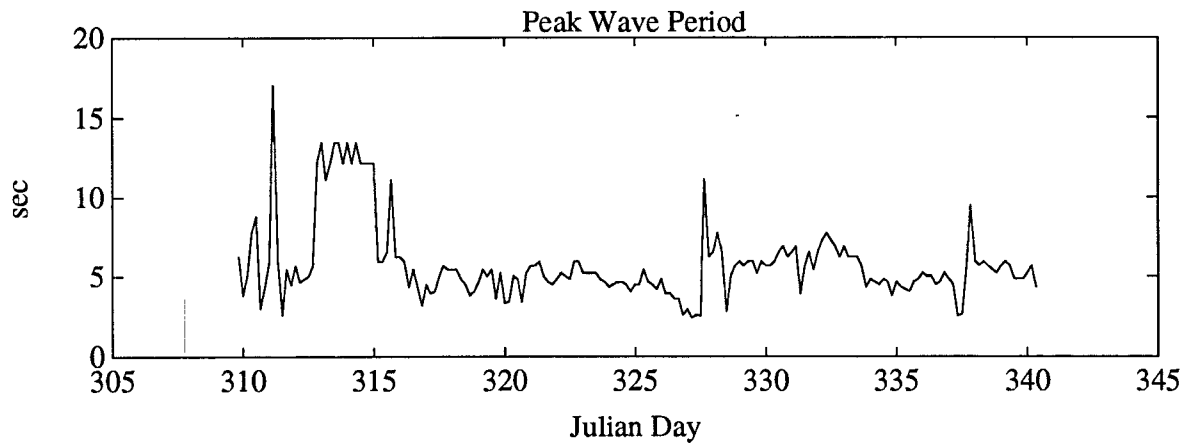
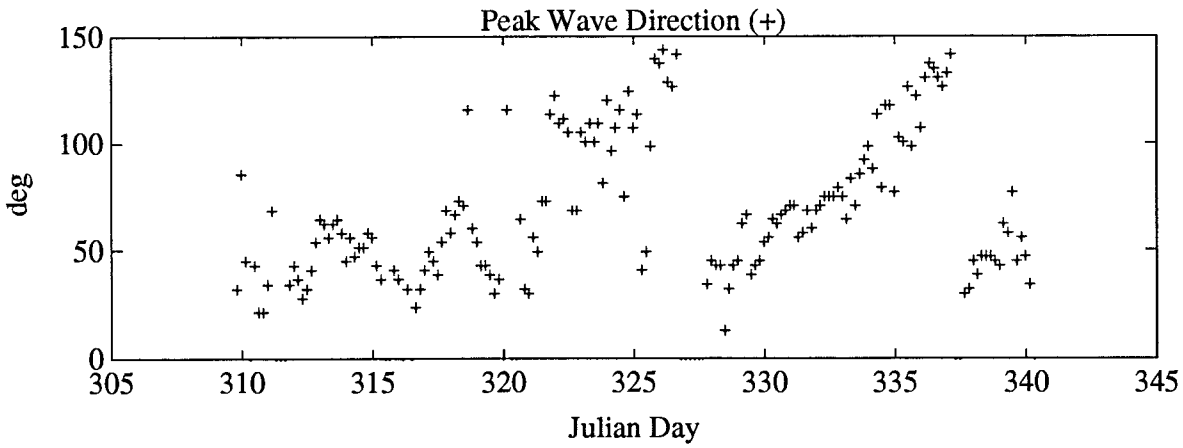
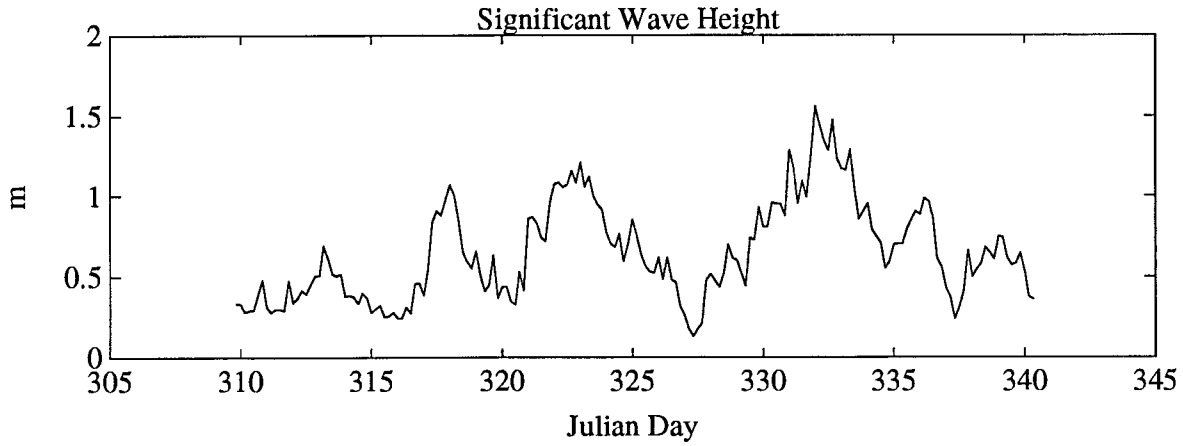
WAVE PARAMETERS FOR DEPLOYMENT H152

From: November 6,1991 Julian Day - 309.7

To: December 7,1991 Julian Day - 340.3

o : data with reduced accuracy

* : bad data



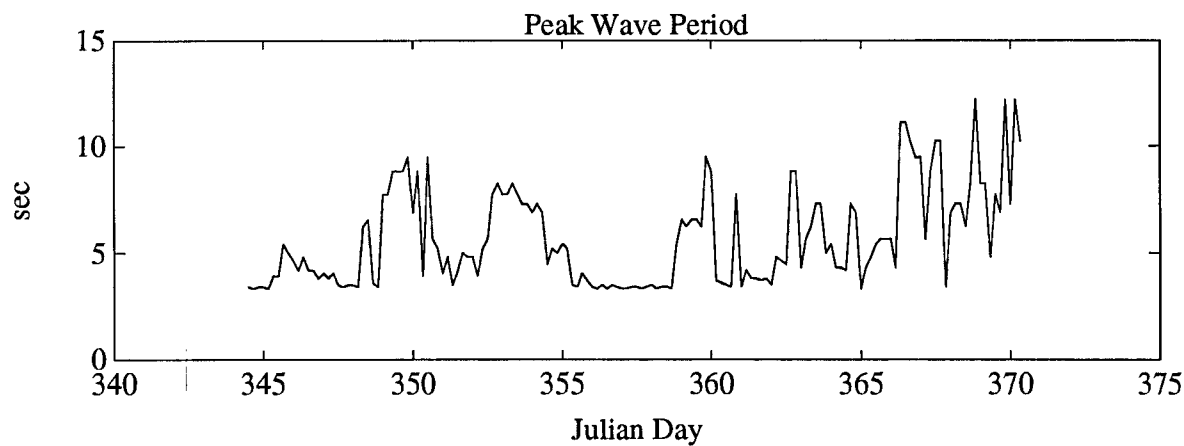
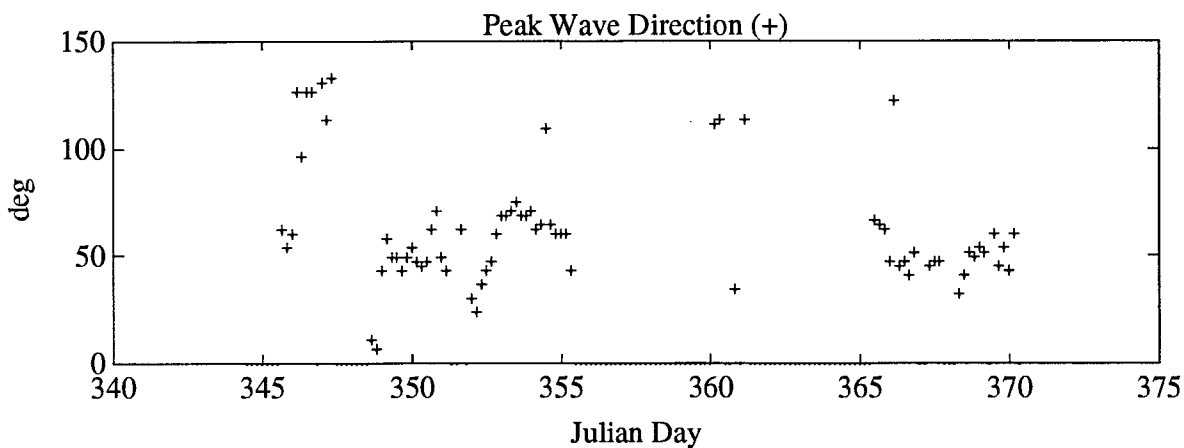
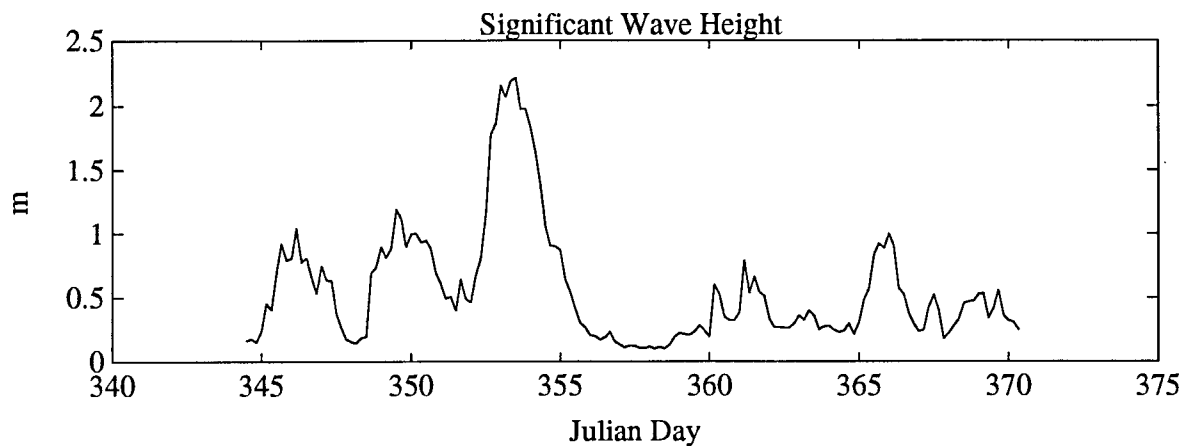
WAVE PARAMETERS FOR DEPLOYMENT H161

From: December 11,1991 Julian Day - 344.5

To: January 6,1992 Julian Day - 5.3

o : data with reduced accuracy

* : bad data



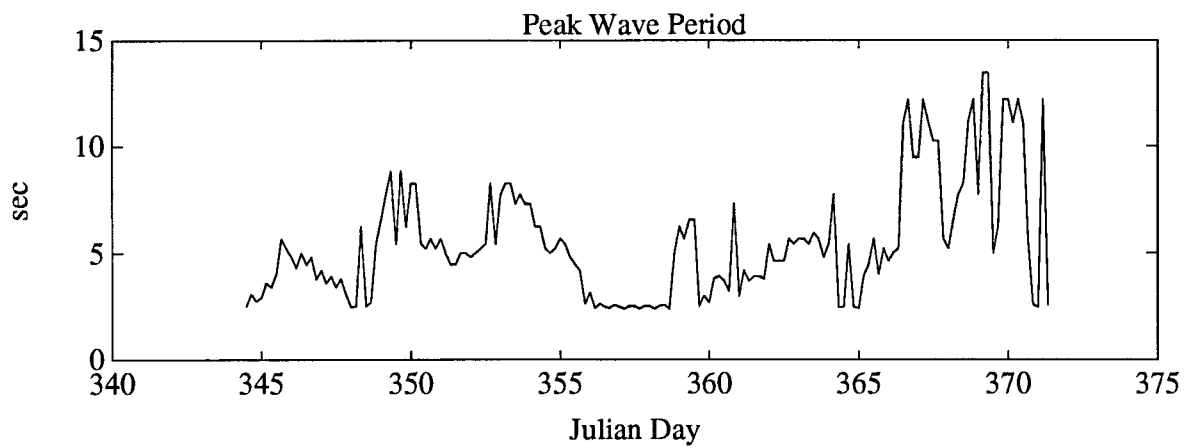
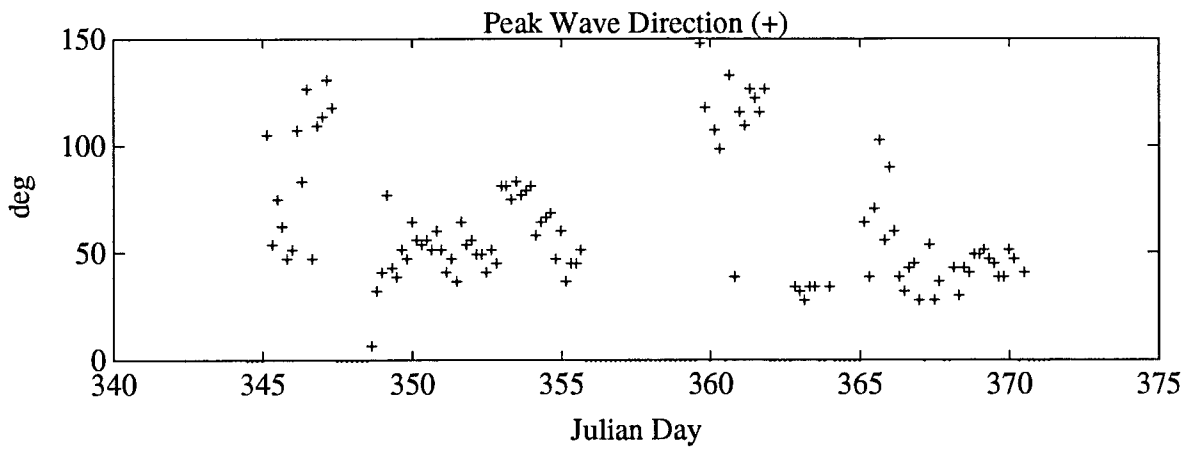
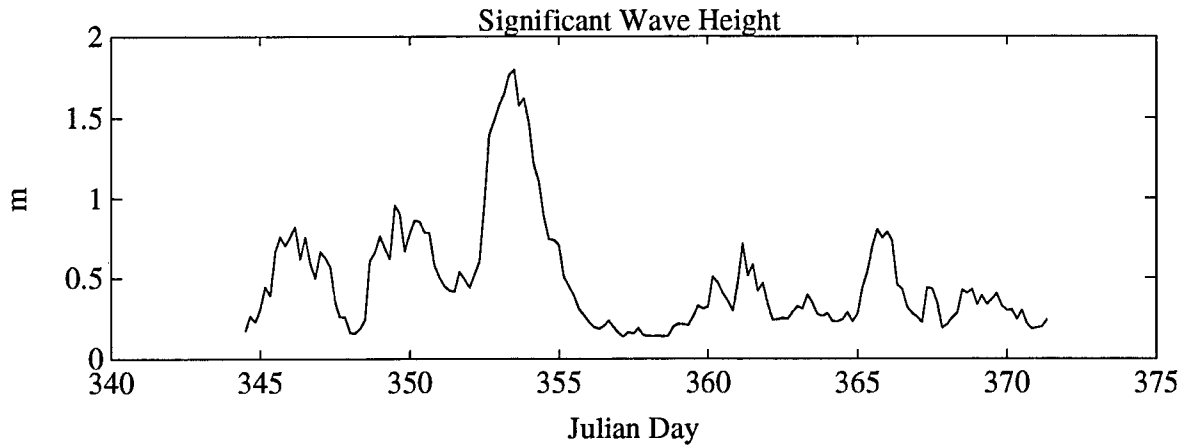
WAVE PARAMETERS FOR DEPLOYMENT H162

From: December 11, 1991 Julian Day - 344.5

To: January 7, 1992 Julian Day - 6.3

o : data with reduced accuracy

* : bad data



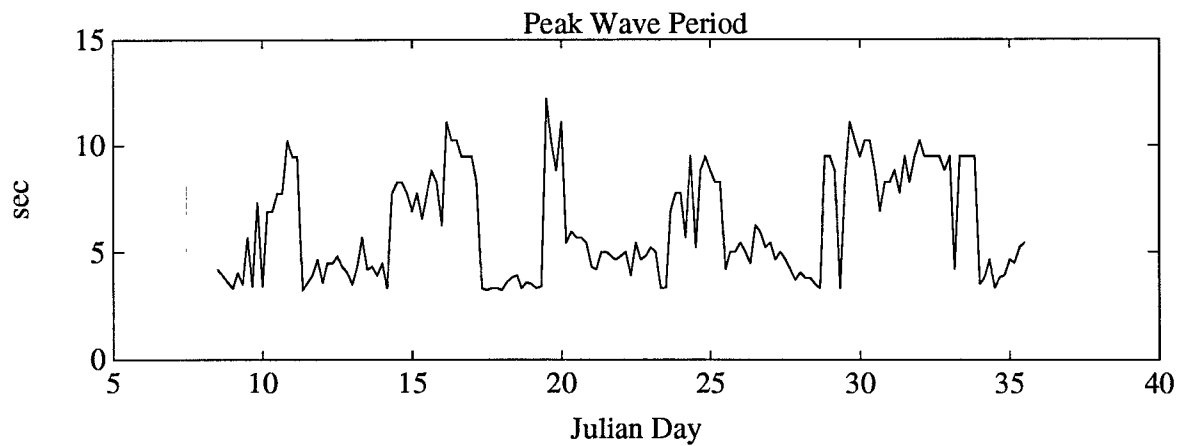
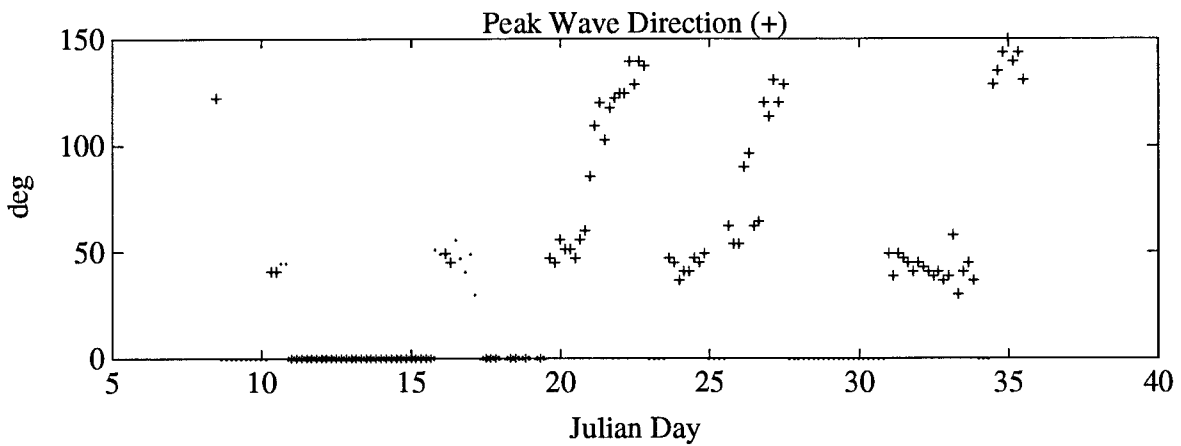
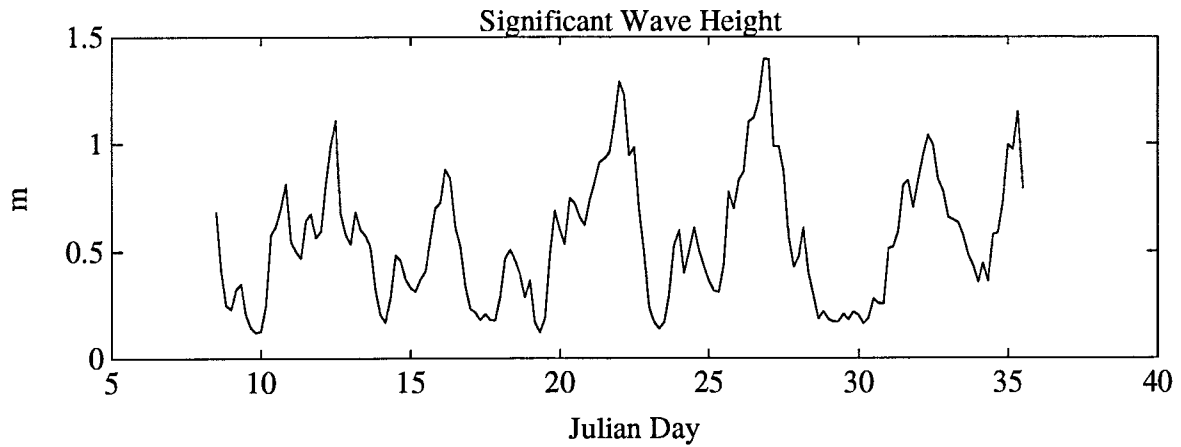
WAVE PARAMETERS FOR DEPLOYMENT H171

From: January 9, 1992 Julian Day - 8.5

To: February 6, 1992 Julian Day - 35.5

o : data with reduced accuracy

* : bad data



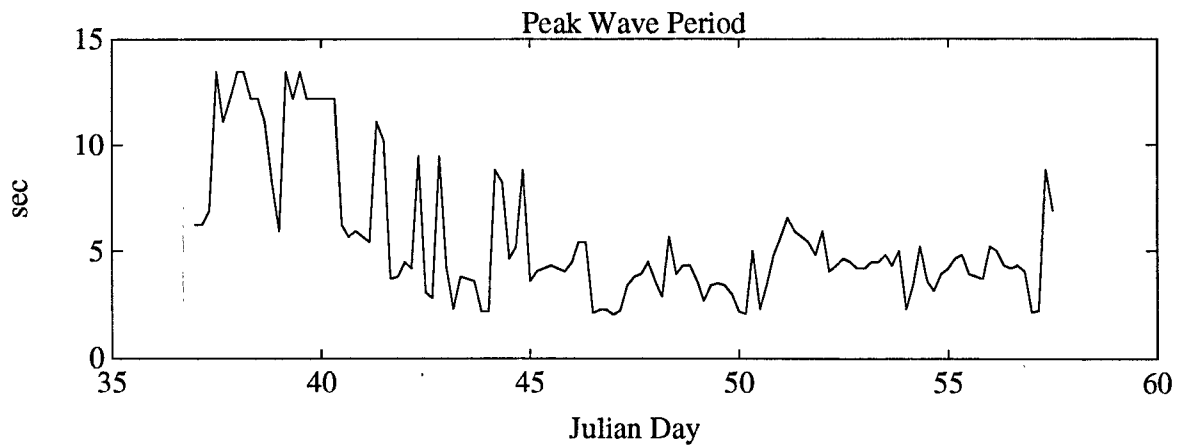
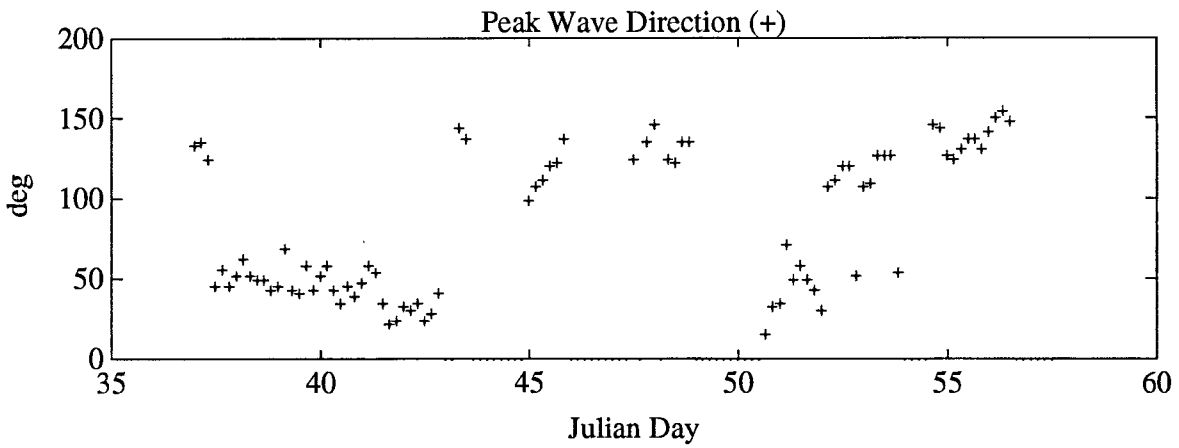
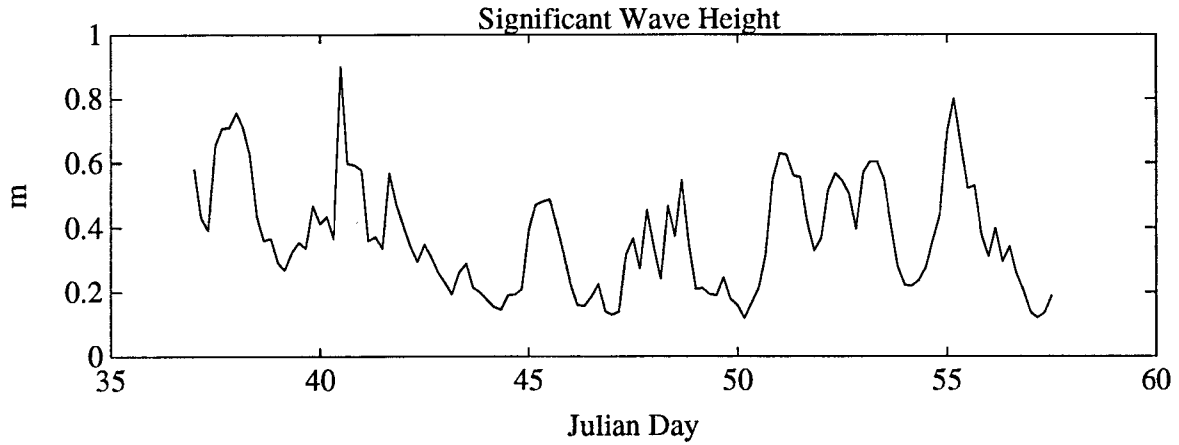
WAVE PARAMETERS FOR DEPLOYMENT H182

From: February 7, 1992 Julian Day - 37.0

To: February 27, 1992 Julian Day - 57.5

o : data with reduced accuracy

* : bad data



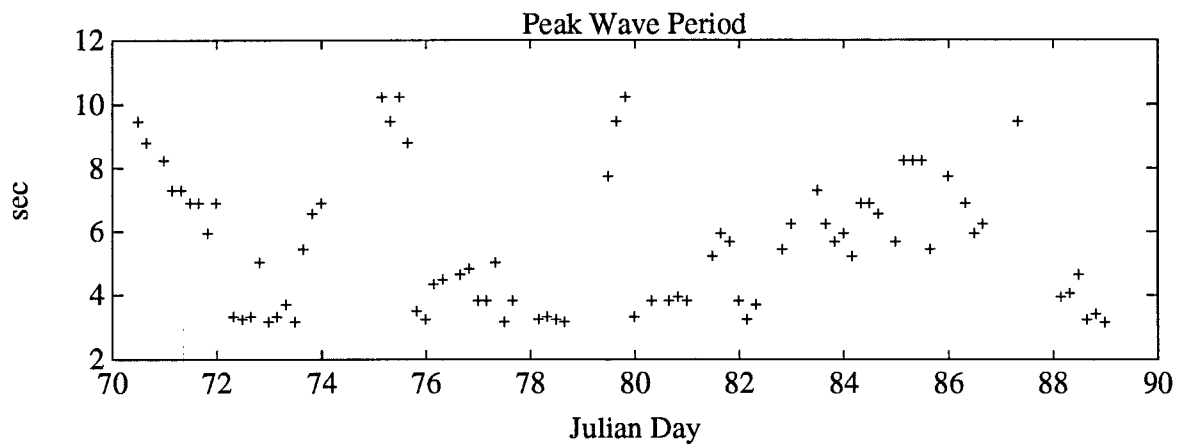
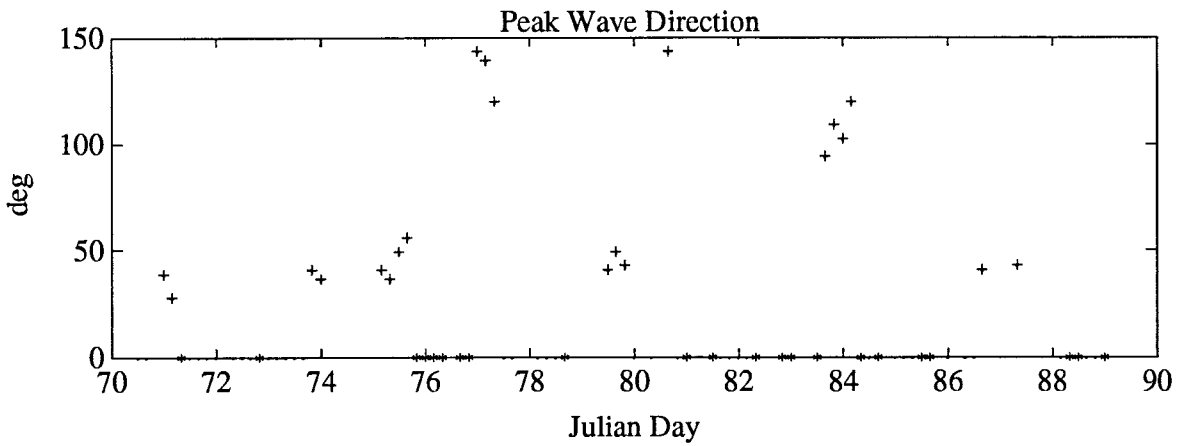
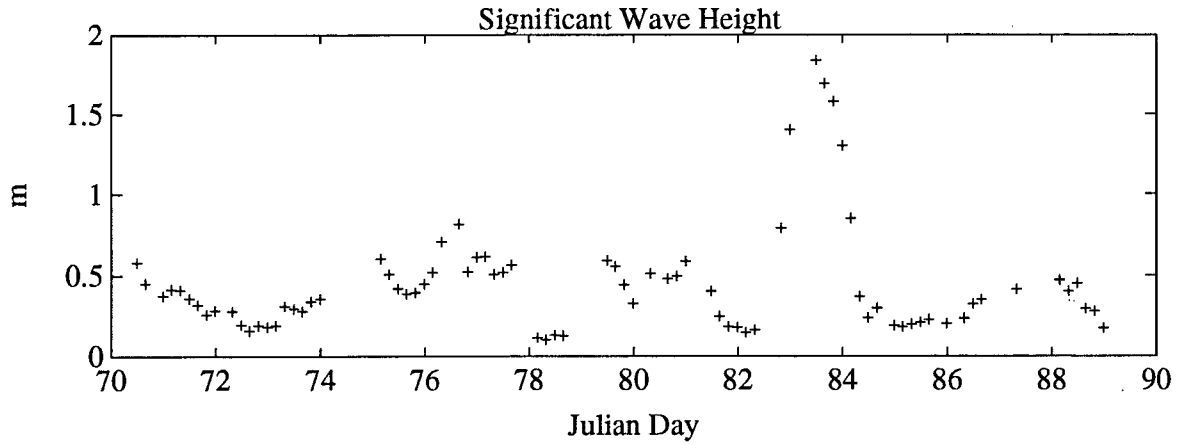
WAVE PARAMETERS FOR DEPLOYMENT H191

From: March 12,1992 Julian Day - 70.5

To: April 10,1992 Julian Day - 99.0

o : data with reduced accuracy

* : bad data



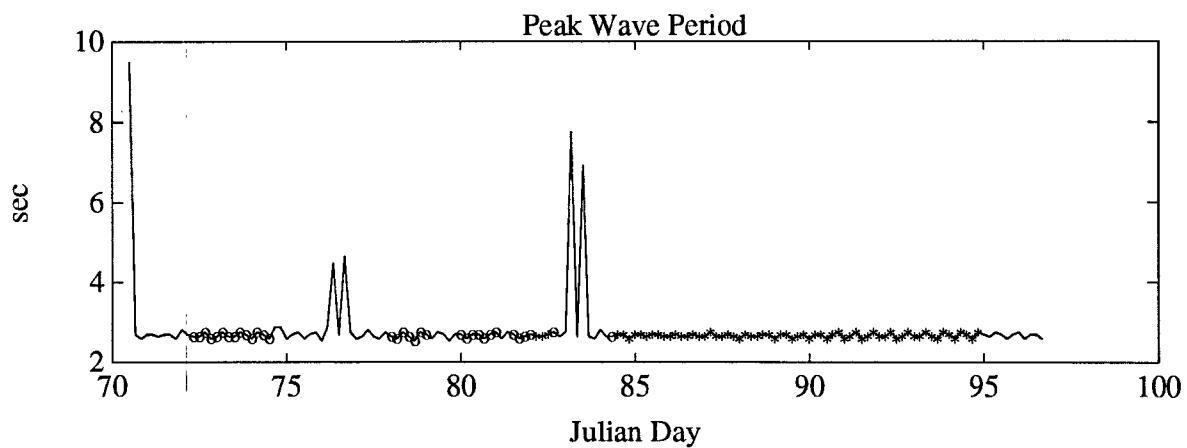
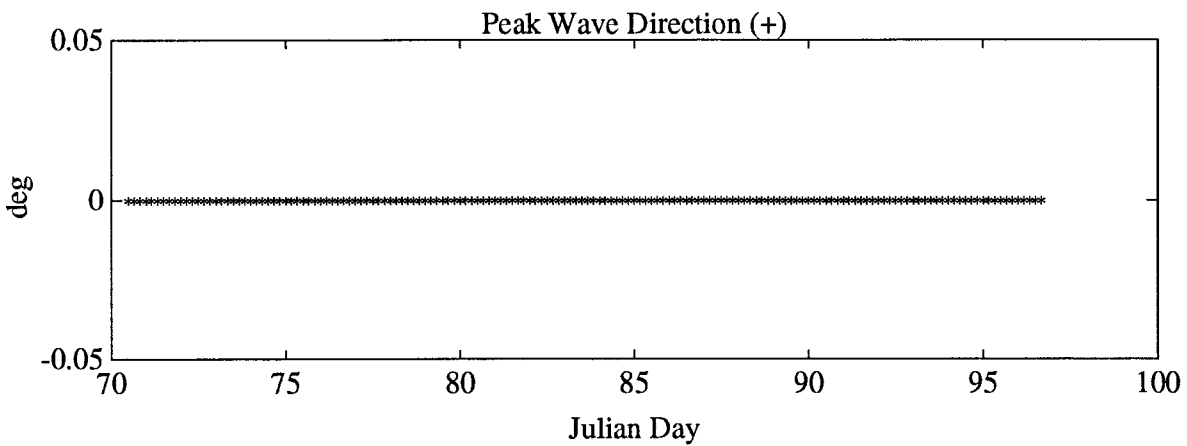
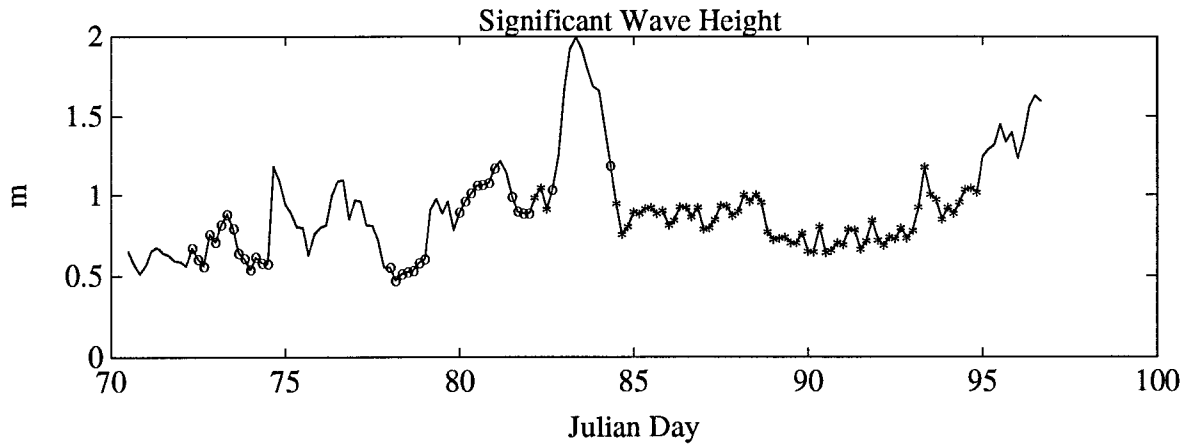
WAVE PARAMETERS FOR DEPLOYMENT H192

From: March 12,1992 Julian Day - 70.5

To: April 7,1992 Julian Day - 96.6

o : data with reduced accuracy

* : bad data



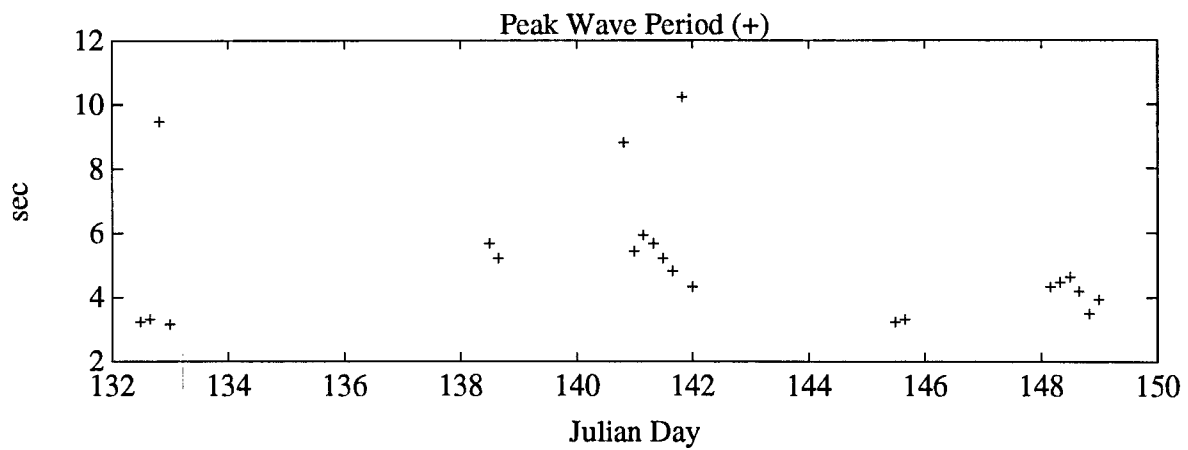
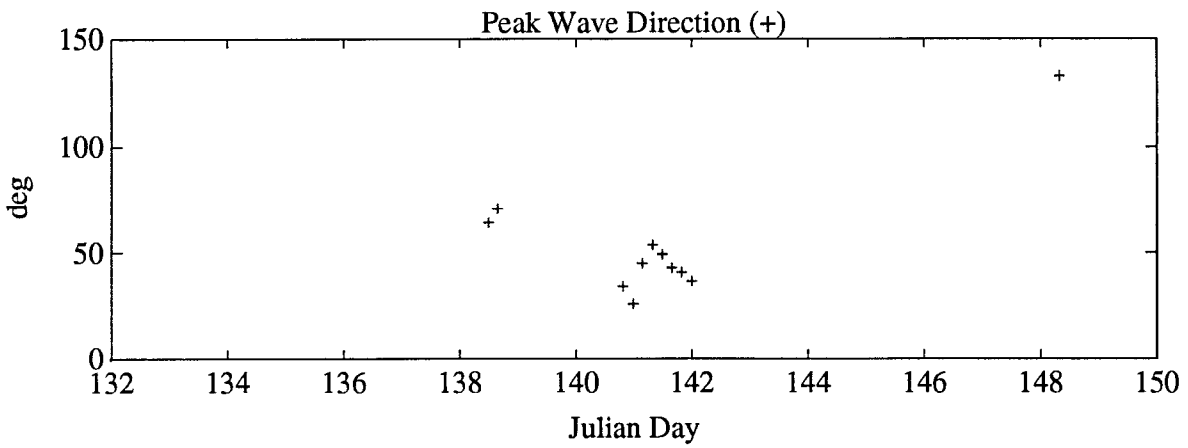
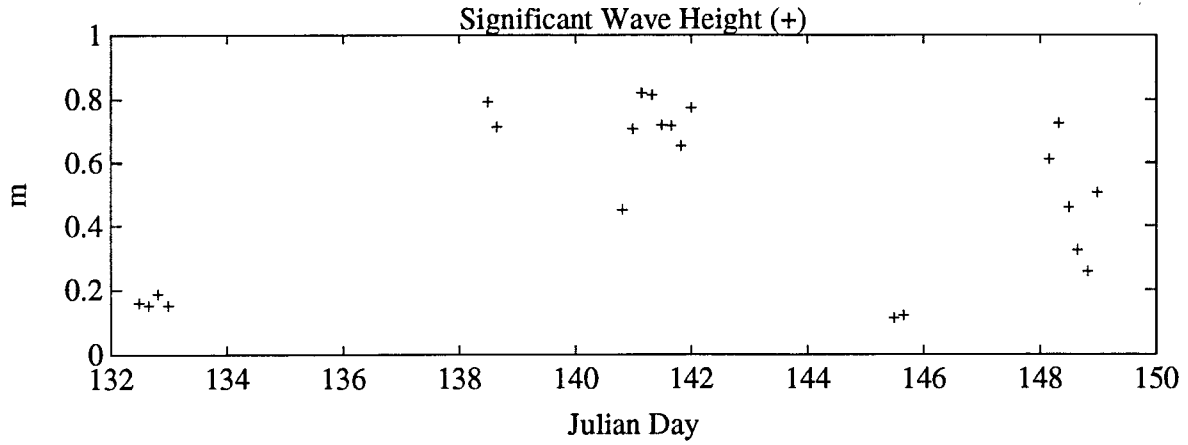
WAVE PARAMETERS FOR DEPLOYMENT H201

From: May 13,1992 Julian Day - 132.5

To: May 30,1992 Julian Day - 149.0

o : data with reduced accuracy

* : bad data



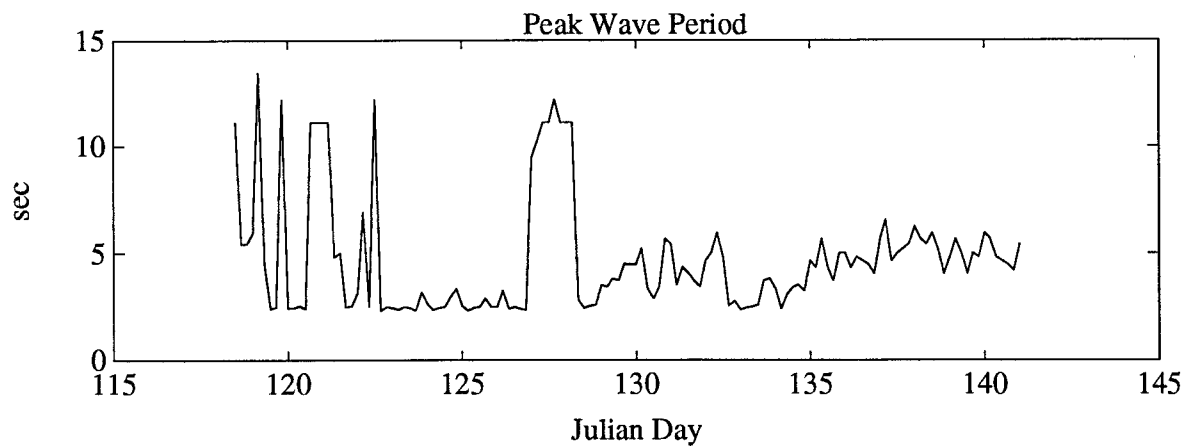
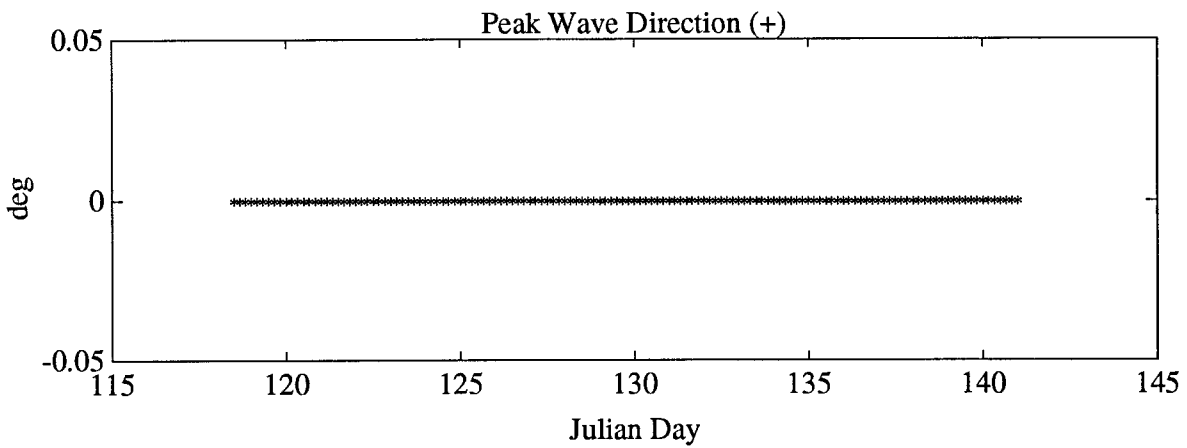
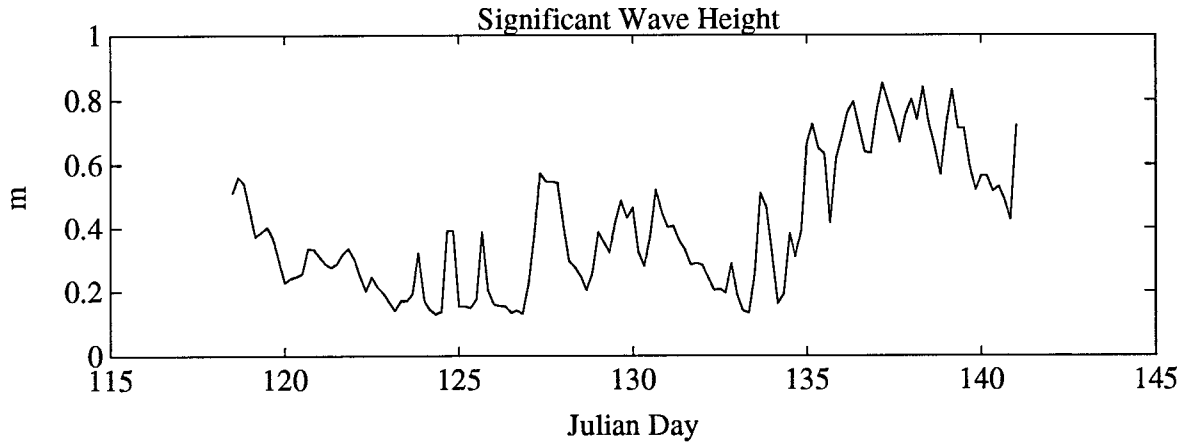
WAVE PARAMETERS FOR DEPLOYMENT H202

From: April 29,1992 Julian Day - 118.5

To: May 22,1992 Julian Day - 141.0

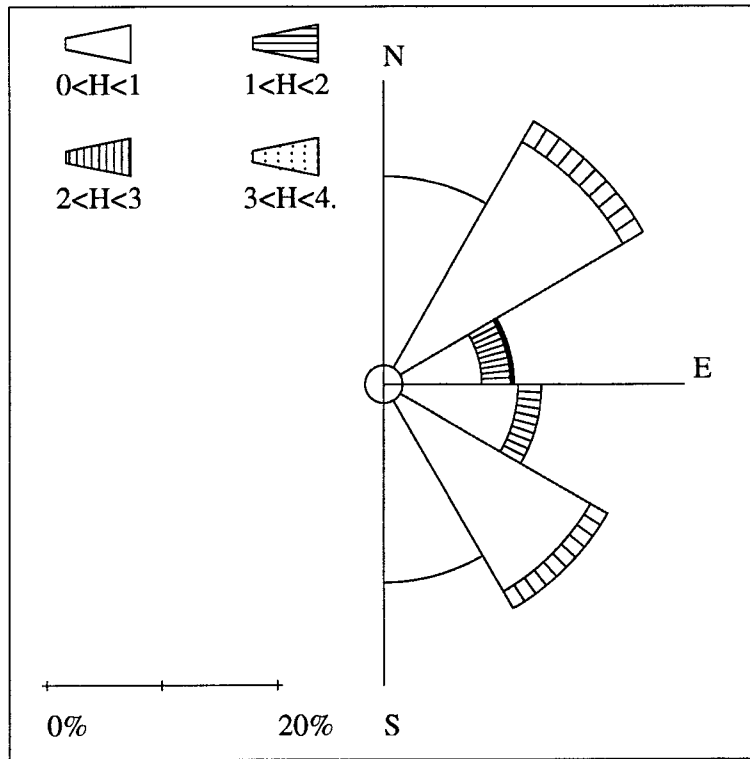
o : data with reduced accuracy

* : bad data



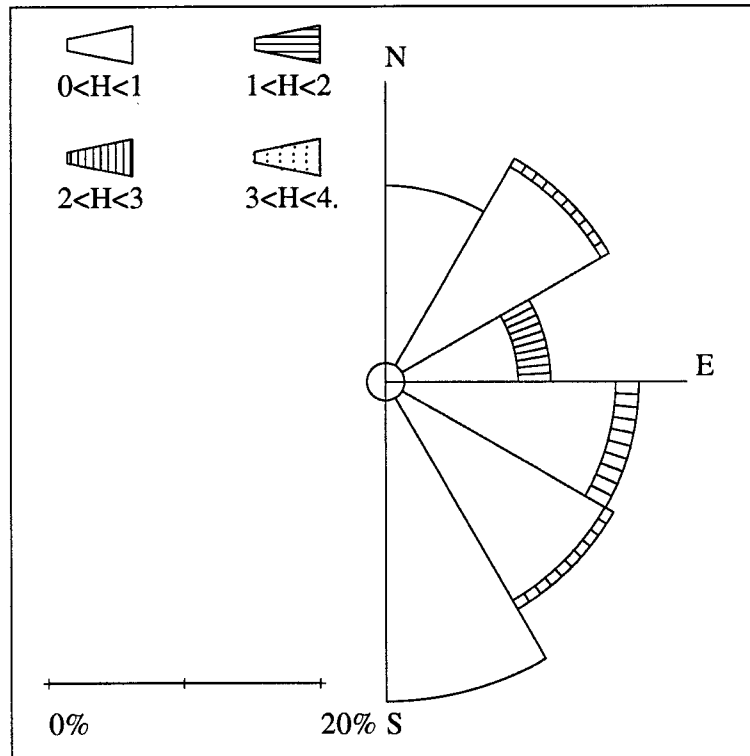
**APPENDIX B
WAVE ROSES**

Sig. Wave Height - Hmo, meters.



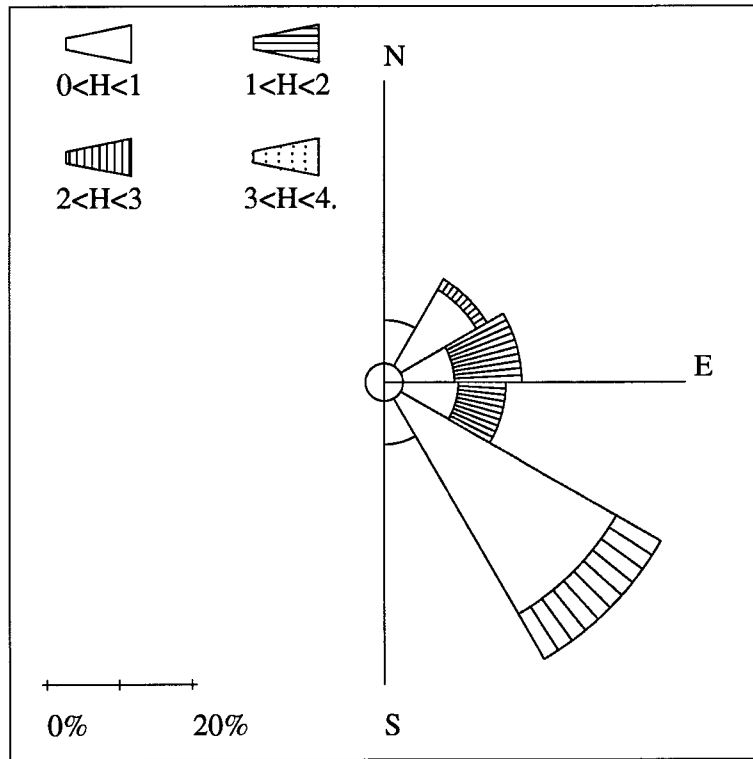
Wave Rose - January 1990 to May 1992
All Deployments Site 1

Sig. Wave Height - Hmo, meters.



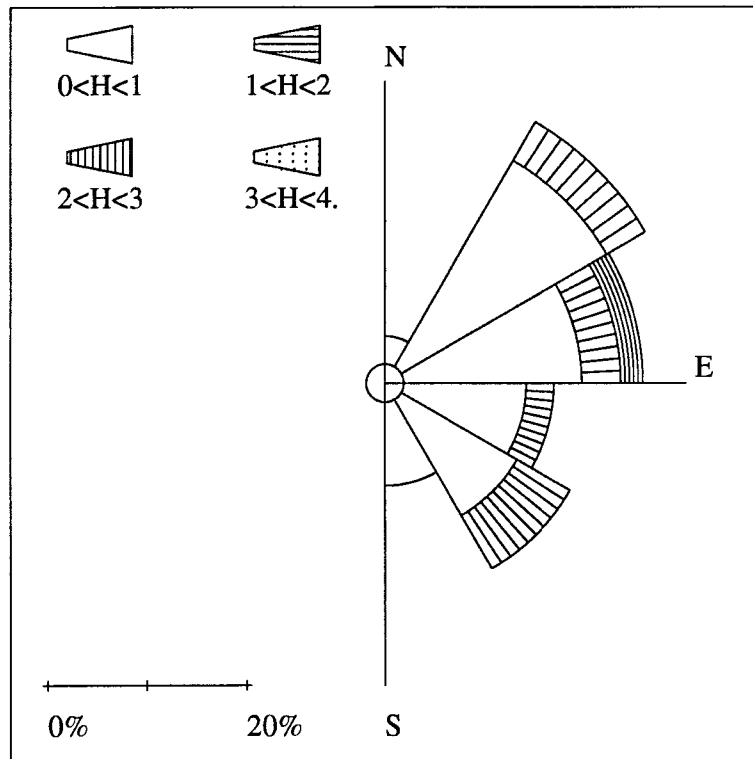
Wave Rose - March 1990 to February 1992
All Deployments Site 2

Fig. Wave Height - Hmo, meters.



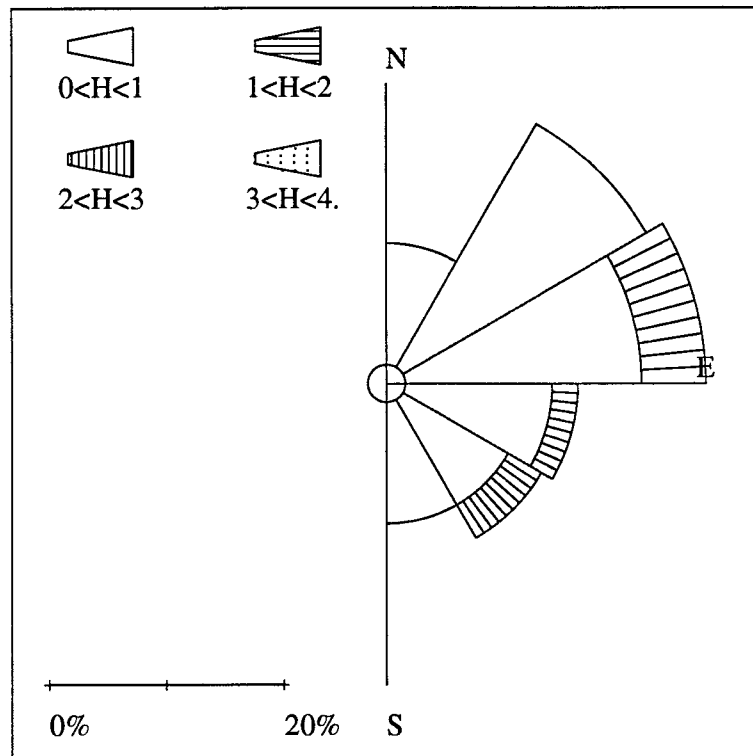
Wave Rose - 30\1\1990 to 2\3\1990
Deployment; H011

Sig. Wave Height - Hmo, meters.



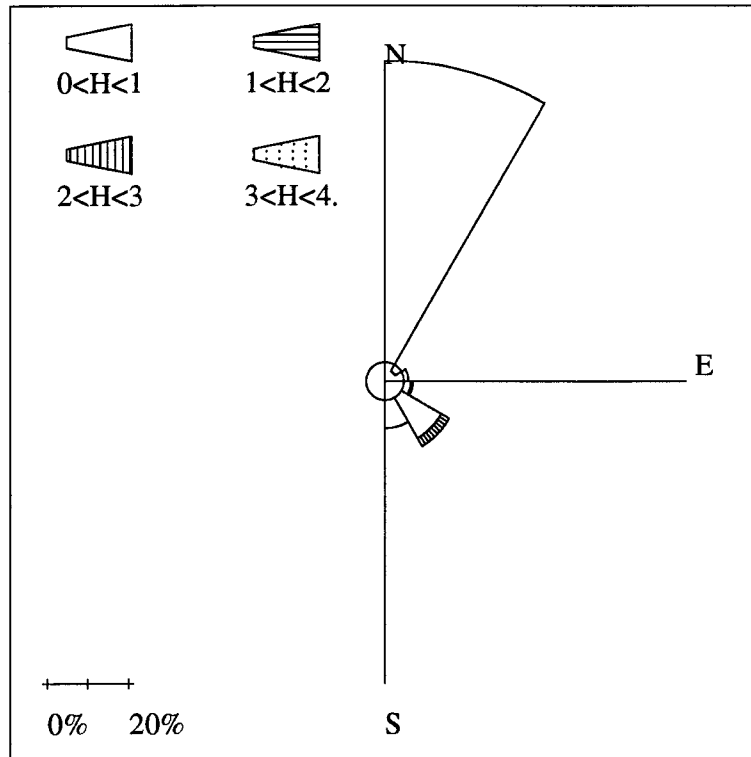
Wave Rose - 6\3\1990 to 5\4\1990
Deployment; H021

Sig. Wave Height - Hmo, meters.



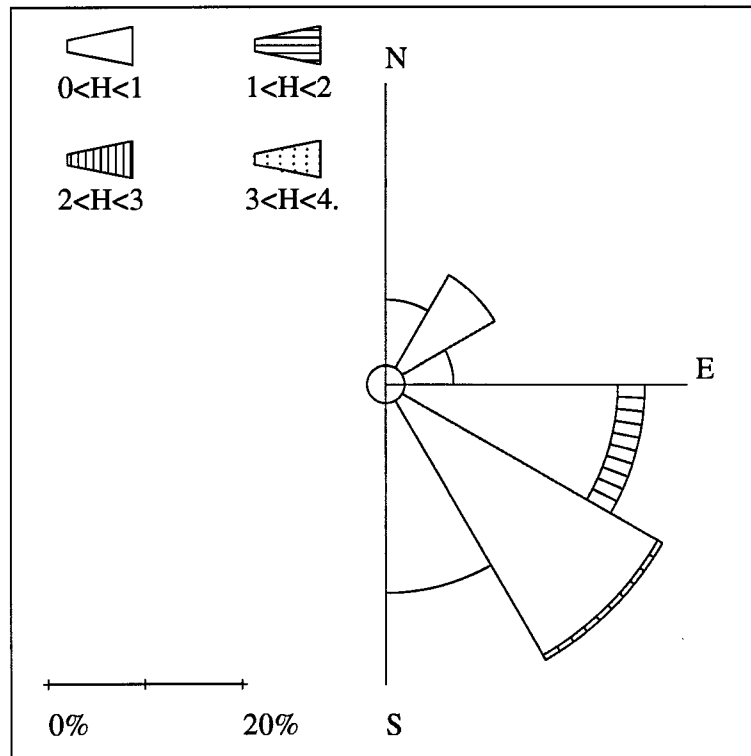
Wave Rose - 5\3\1990 to 5\4\1990
Deployment; H022

Sig. Wave Height - Hmo, meters.



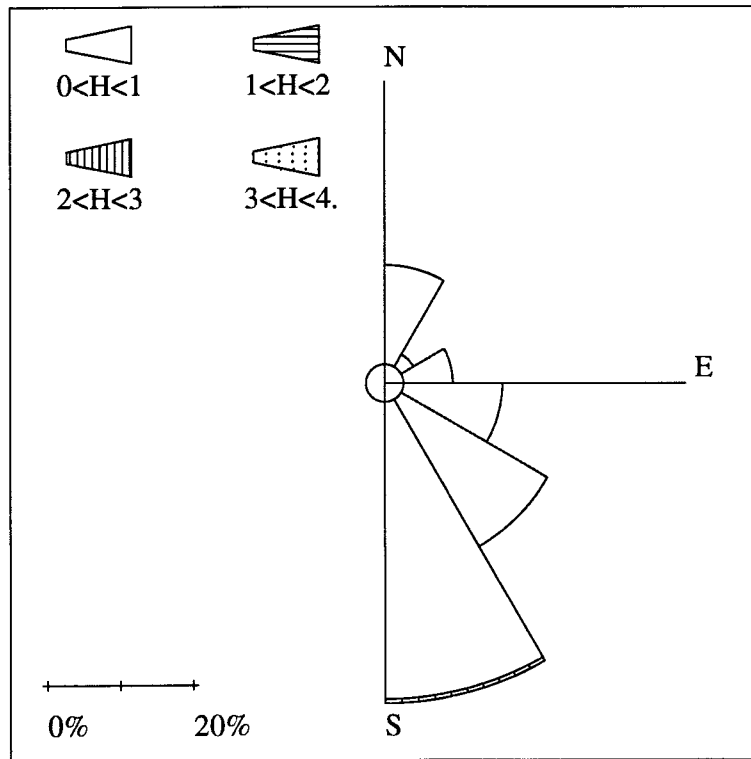
Wave Rose - 17/5/1990 to 26/5/1990
Deployment; H031

Sig. Wave Height - Hmo, meters.



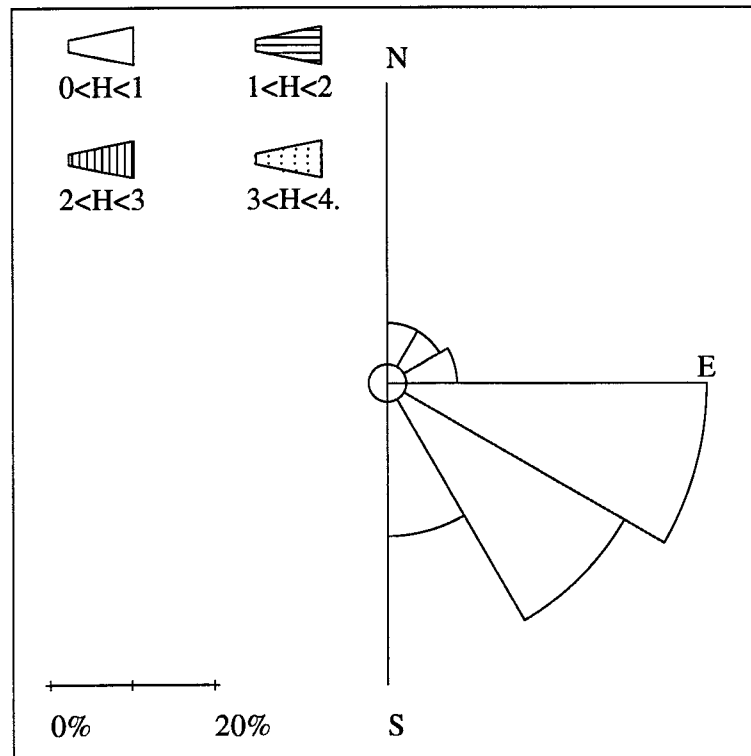
Wave Rose - 17/5/1990 to 15/6/1990
Deployment; H032

Sig. Wave Height - Hmo, meters.



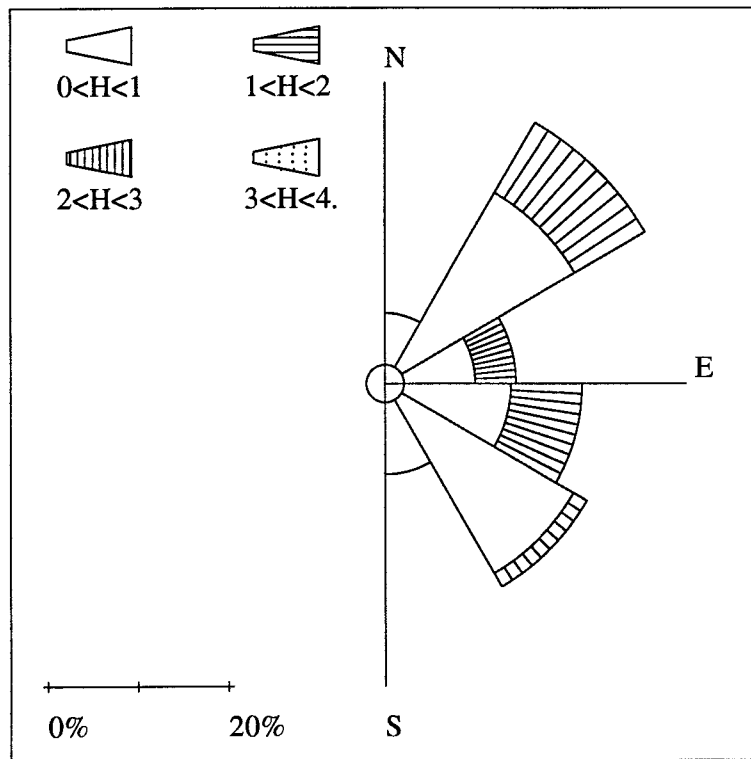
Wave Rose - 15/6/1990 to 15/7/1990
Deployment; H041

Sig. Wave Height - Hmo, meters.



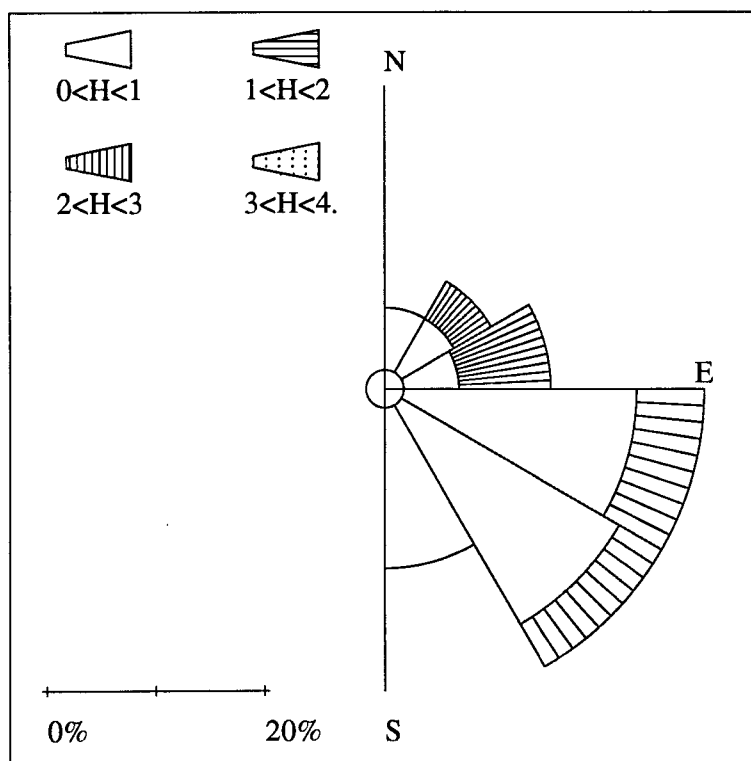
Wave Rose - 15/6/1990 to 15/7/1990
Deployment; H042

Fig. Wave Height - Hmo, meters.



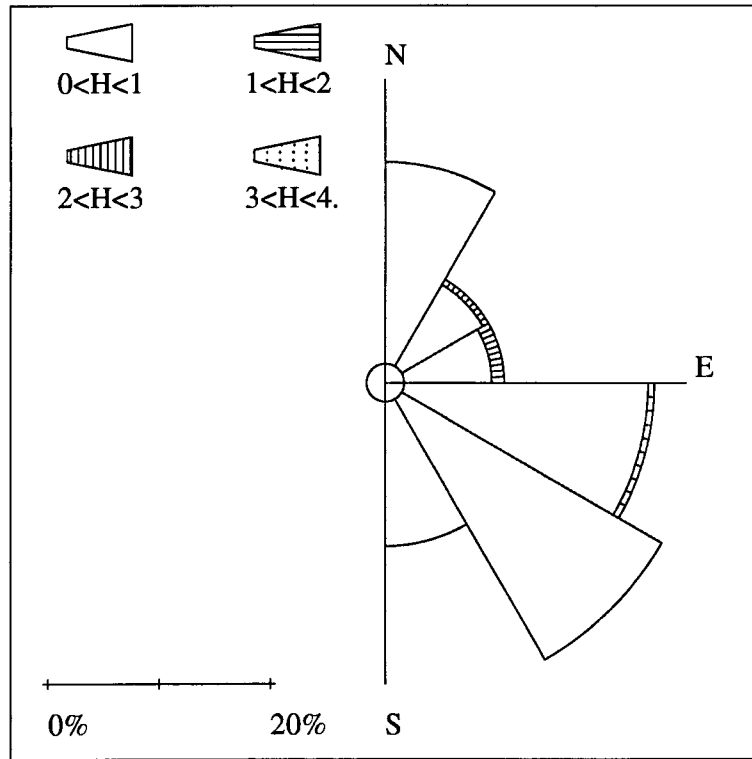
Wave Rose - 19/11/1990 to 4/1/1991
Deployment; H071

Fig. Wave Height - Hmo, meters.



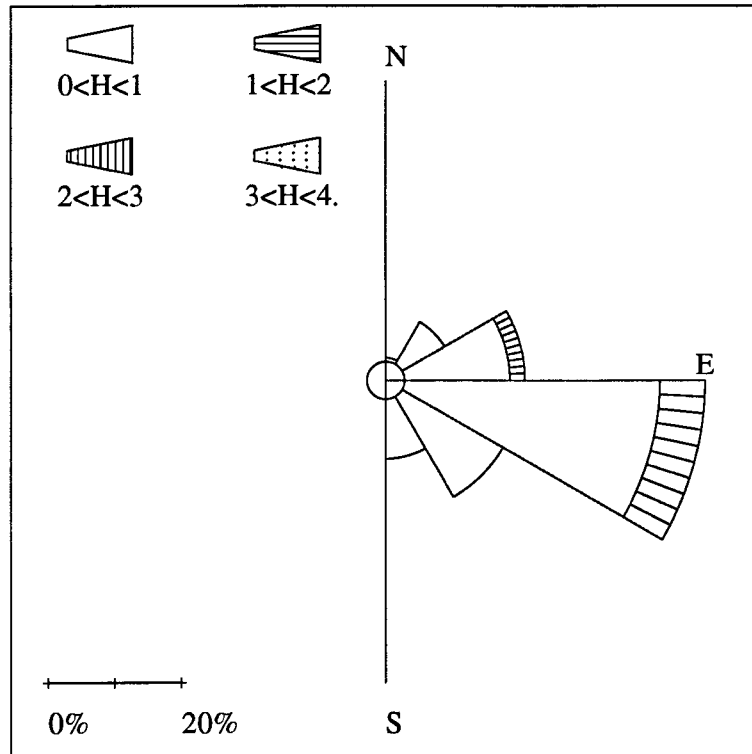
Wave Rose - 26/3/1991 to 25/4/1991
Deployment; H092

Sig. Wave Height - Hmo, meters.



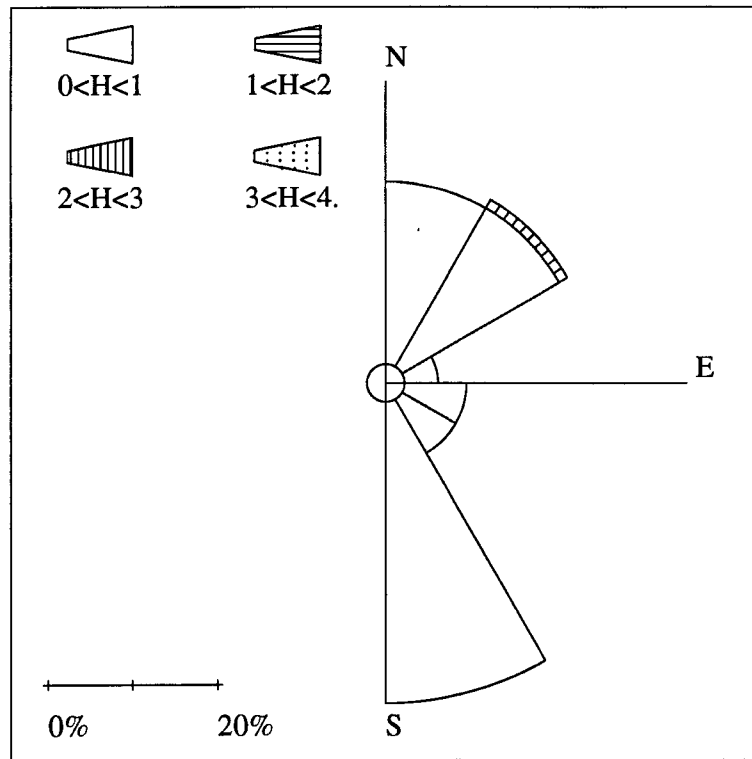
Wave Rose - 26/4/1991 to 19/5/1991
Deployment; H101

Sig. Wave Height - Hmo, meters.



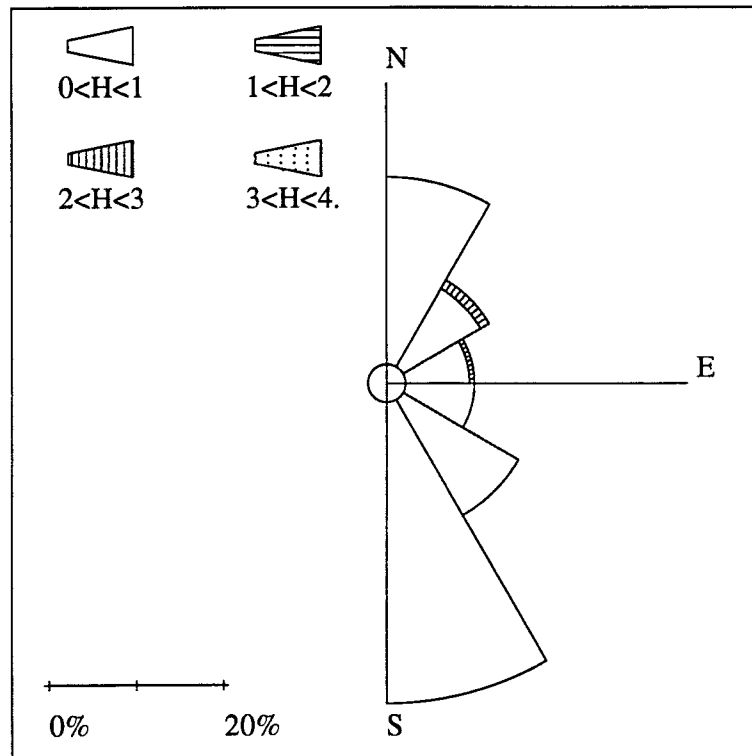
Wave Rose - 26/4/1991 to 26/5/1991
Deployment; H102

Sig. Wave Height - Hmo, meters.



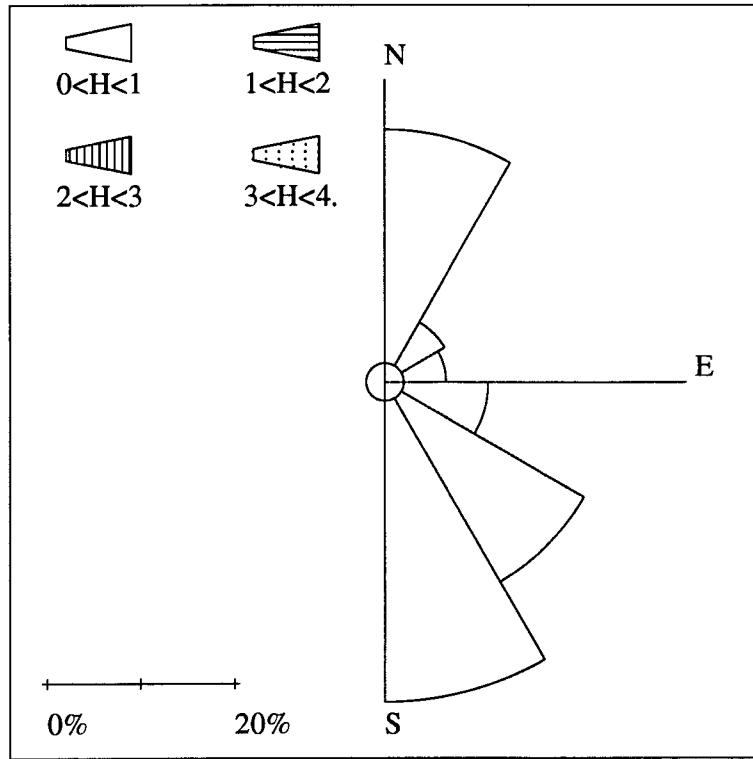
Wave Rose - 30/5/1991 to 27/6/1991
Deployment; H111

Sig. Wave Height - Hmo, meters.



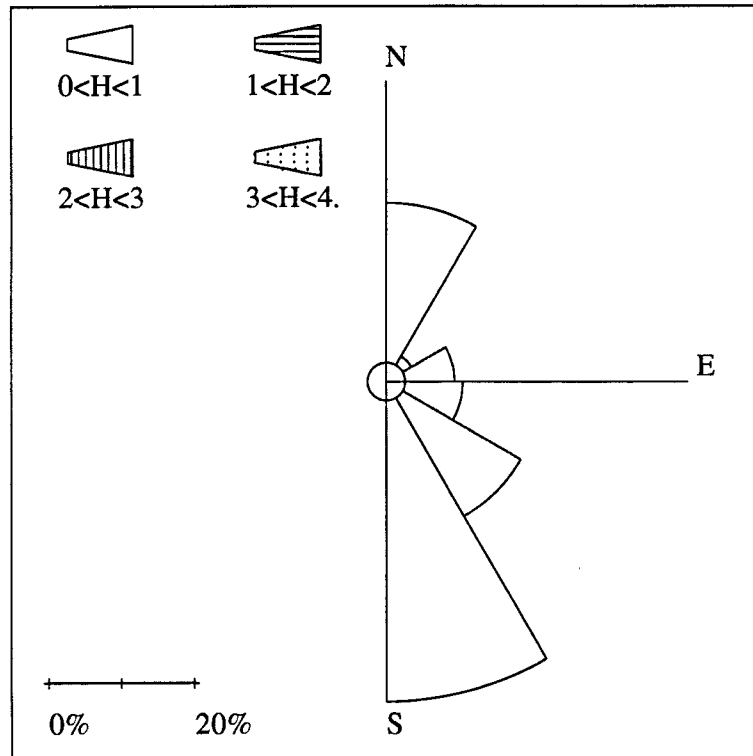
Wave Rose - 30/5/1991 to 25/6/1991
Deployment; H112

Sig. Wave Height - Hmo, meters.



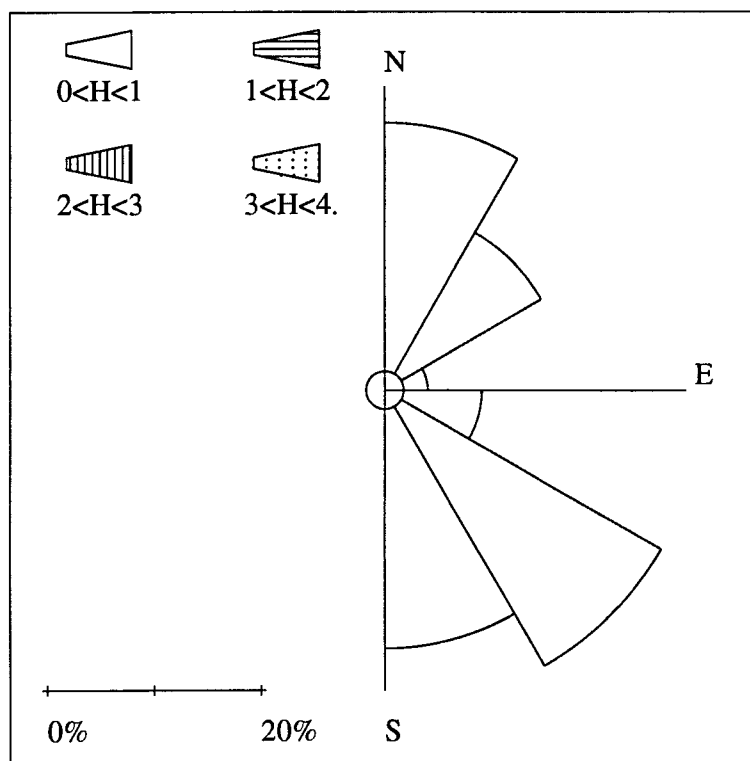
Wave Rose - 28/6/1991 to 24/7/1991
Deployment; H121

Sig. Wave Height - Hmo, meters.



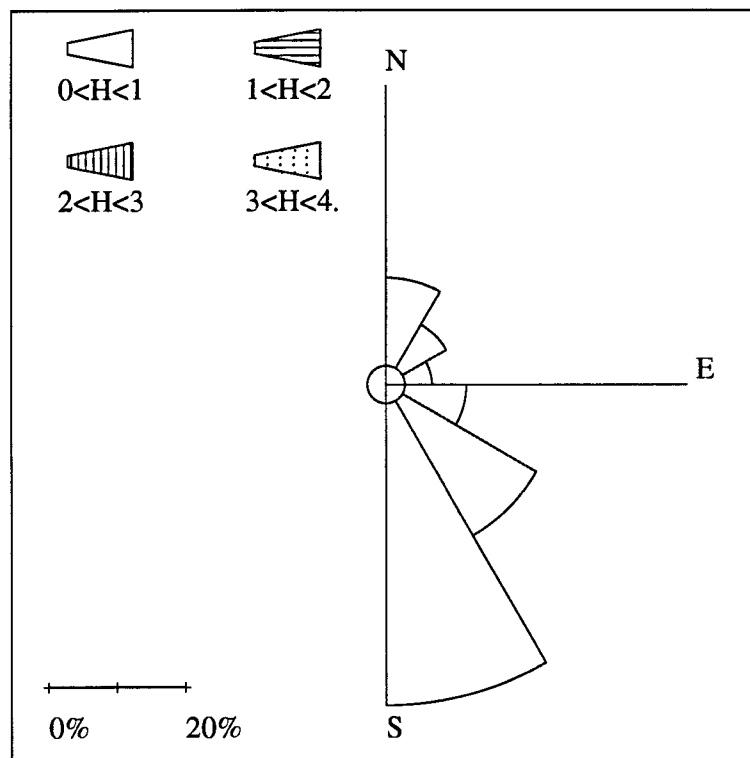
Wave Rose - 28/6/1991 to 24/7/1991
Deployment; H122

Sig. Wave Height - Hmo, meters.



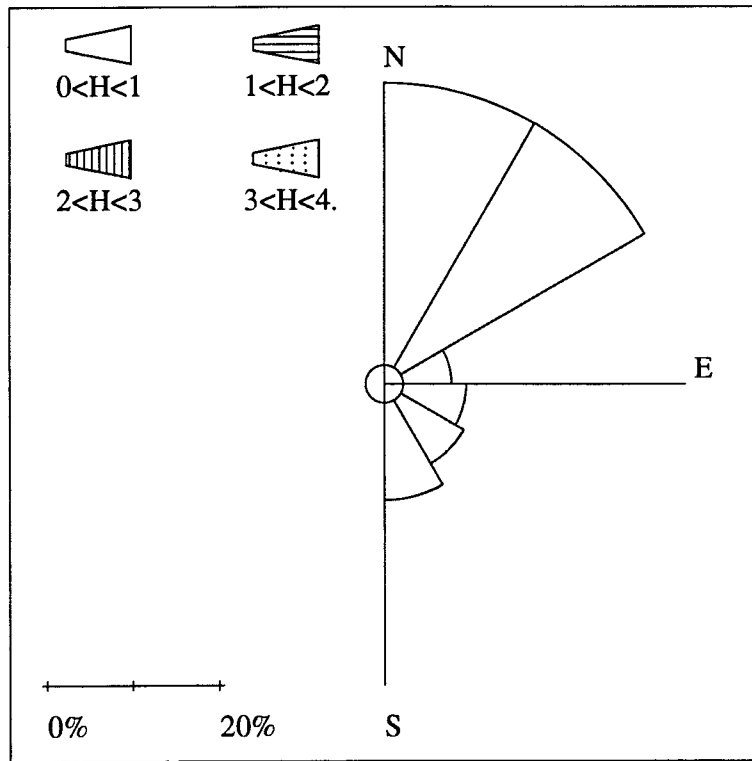
Wave Rose - 26/7/1991 to 21/8/1991
Deployment; H131

Sig. Wave Height - Hmo, meters.



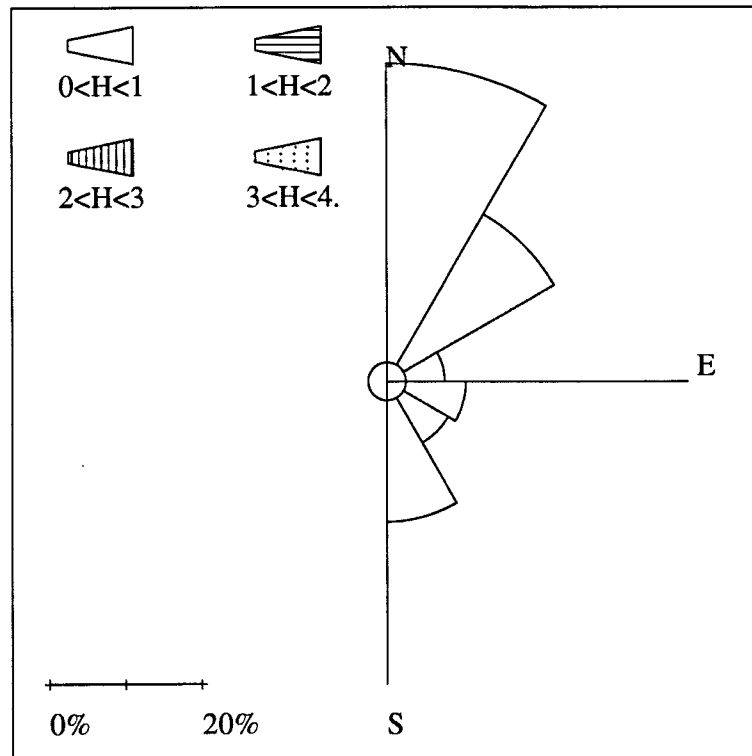
Wave Rose - 26/7/1991 to 26/8/1991
Deployment; H132

Sig. Wave Height - Hmo, meters.



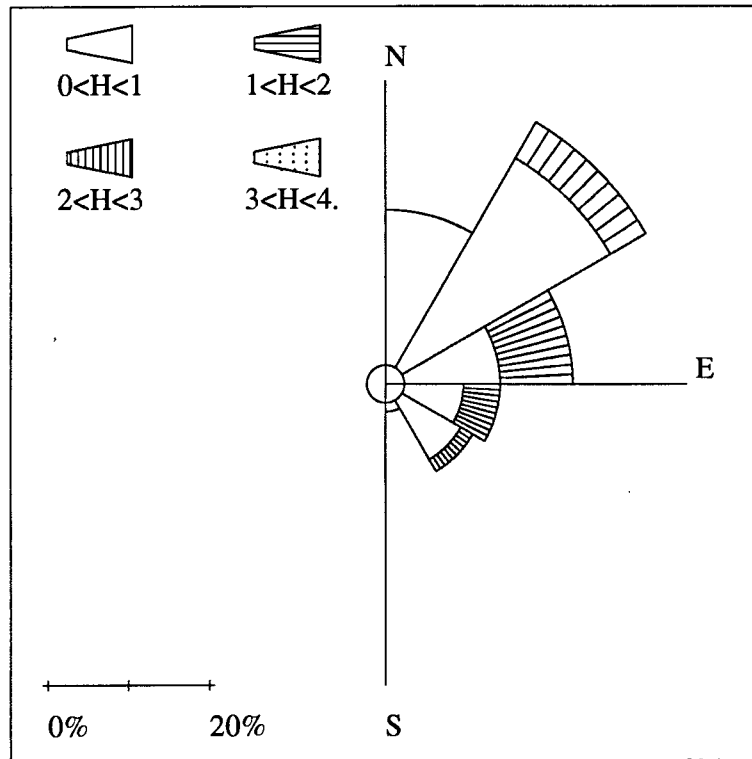
Wave Rose - 28/8/1991 to 22/9/1991
Deployment; H141

Sig. Wave Height - Hmo, meters.



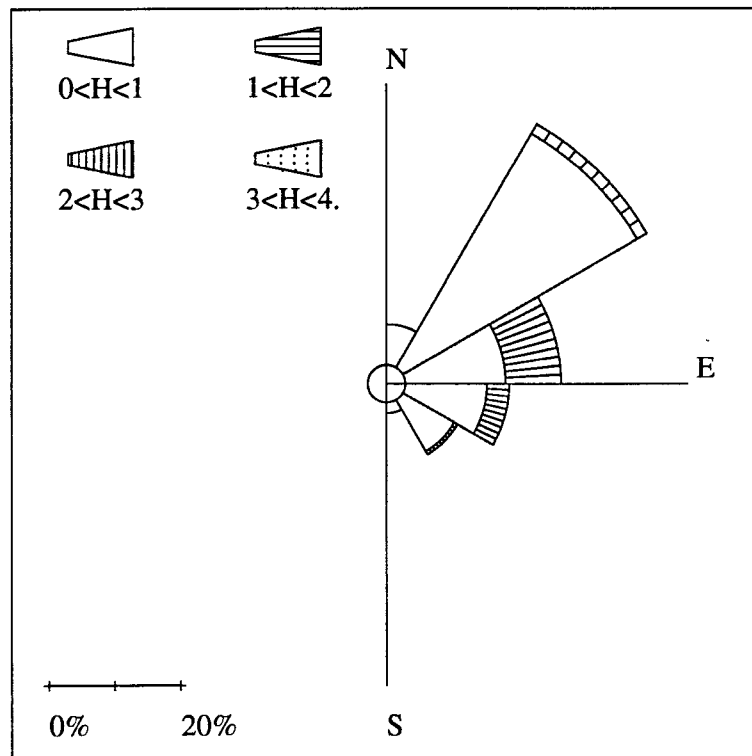
Wave Rose - 28/8/1991 to 22/9/1991
Deployment; H142

Sig. Wave Height - Hmo, meters.



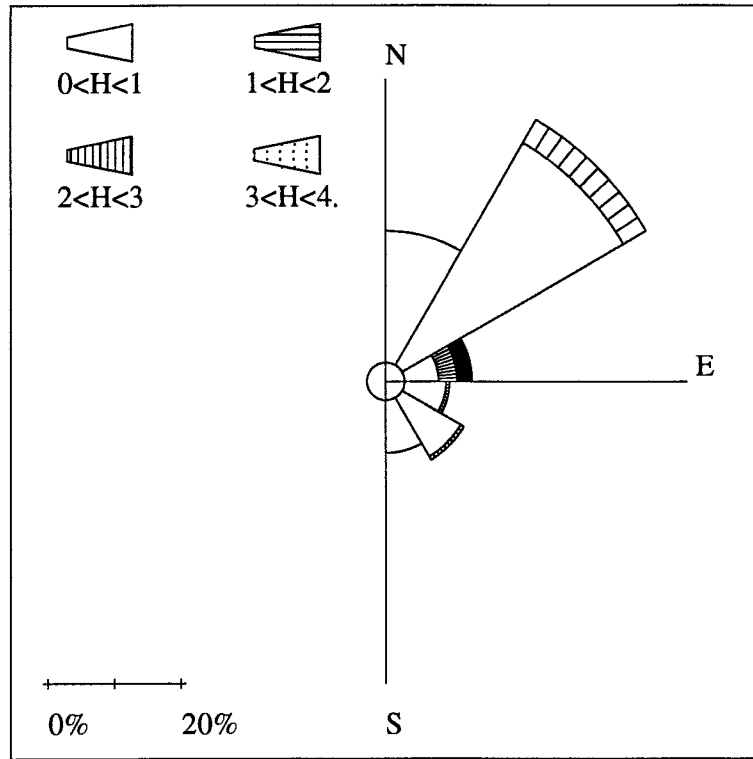
Wave Rose - 6/11/1991 to 2/12/1992
Deployment; H151

Sig. Wave Height - Hmo, meters.



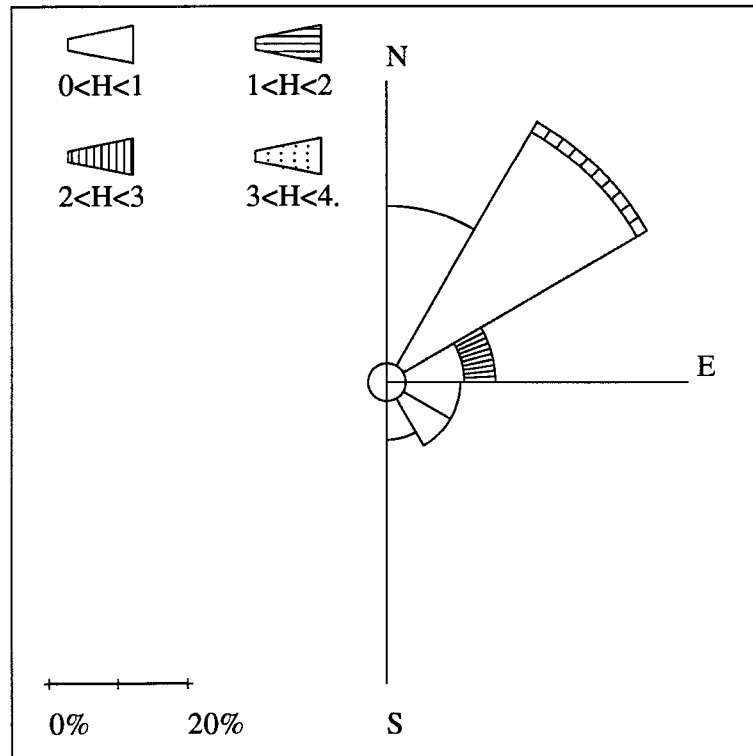
Wave Rose - 6/11/1991 to 7/12/1992
Deployment; H152

Sig. Wave Height - Hmo, meters.



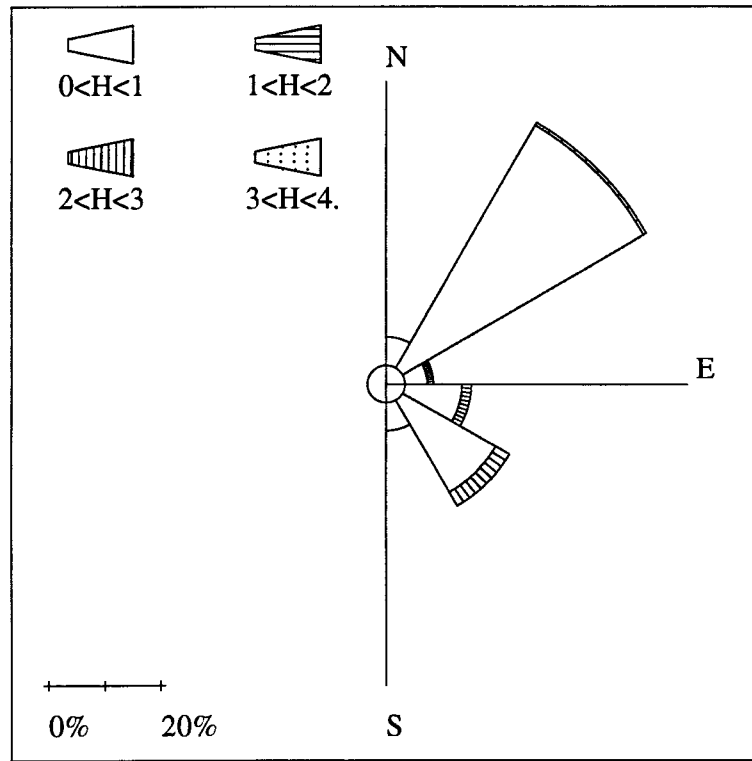
Wave Rose - 11/12/1991 to 6/1/1992
Deployment; H161

Sig. Wave Height - Hmo, meters.



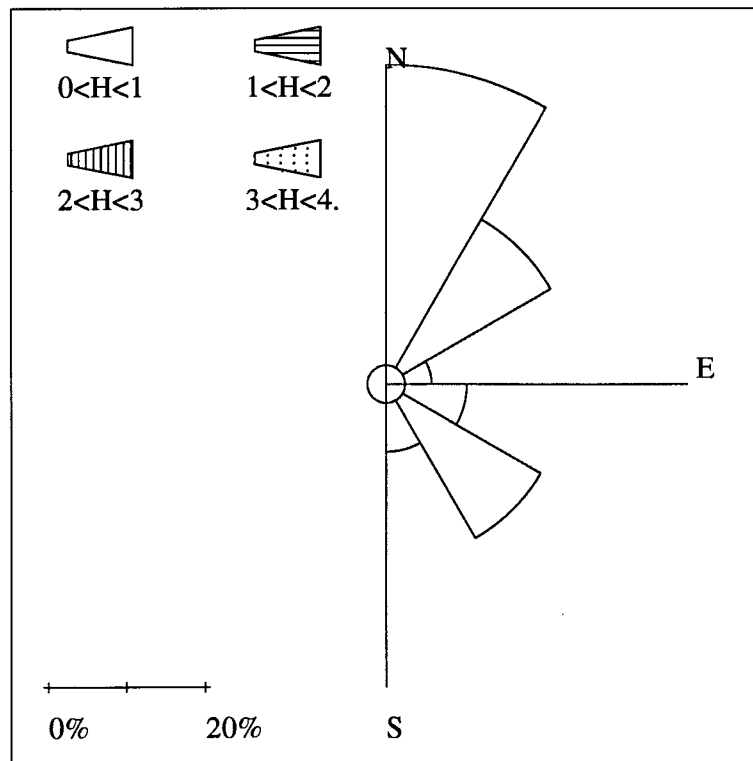
Wave Rose - 11/12/1991 to 7/1/1992
Deployment; H162

Fig. Wave Height - Hmo, meters.



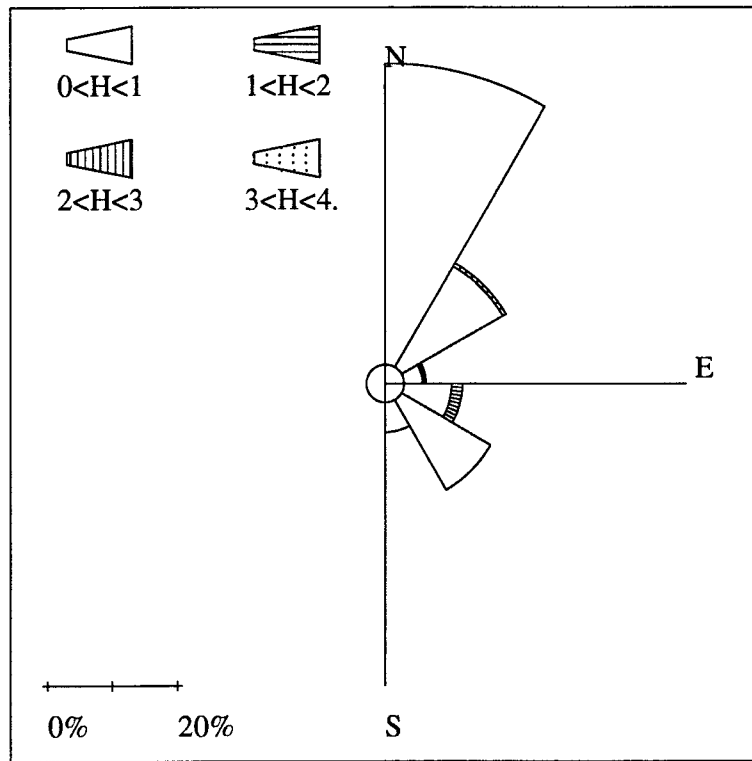
Wave Rose - 9/1/1992 to 5/2/1992
Deployment; H171

Sig. Wave Height - Hmo, meters.



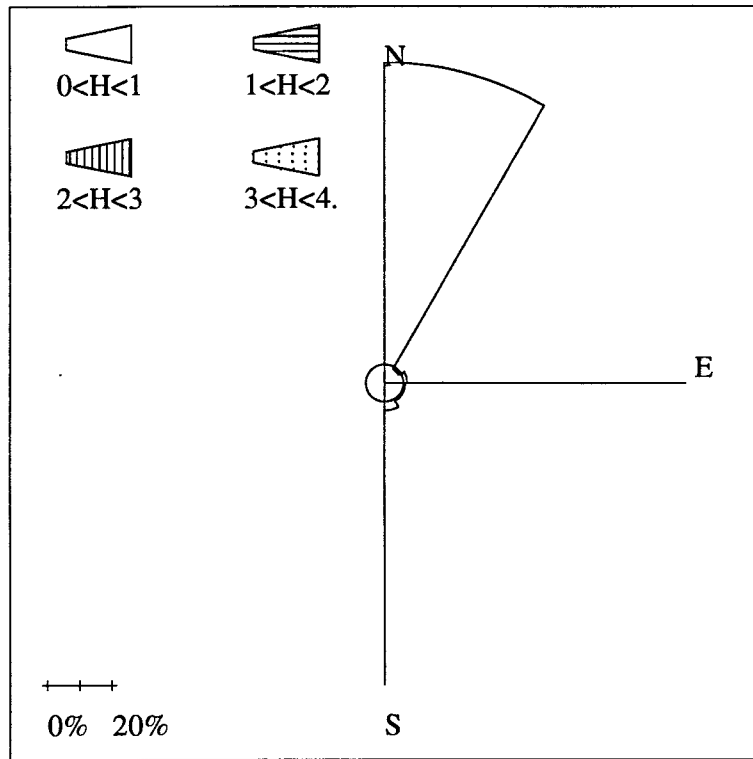
Wave Rose - 7/2/1992 to 27/2/1992
Deployment; H182

Fig. Wave Height - Hmo, meters.



Wave Rose - 12/3/1992 to 10/4/1992
Deployment; H191

Fig. Wave Height - Hmo, meters.



Wave Rose - 13/5/1992 to 30/5/1992
Deployment; H201

APPENDIX C DATA ON DISKETTE

The data is presented on diskette in ASCII format as follows. Each deployment is in its own file, and files are named using the following convention; *wavehab.dat* where *a* and *b* distinguish the deployment number and site as mentioned earlier. The files are in matrix form. Columns 1 through 7 are time in Julian days (example: noon, January 1 equals Julian day 0.5), significant wave height (meters), peak wave period (seconds), peak wave direction (the compass heading from which the waves approach in degrees), quality of the pressure signal, and quality of the current signal respectively. Quality of the pressure and current signals are tagged as follows: 1, 2, 3, or 0 corresponding to good data, data with reduced accuracy, bad data, or no data respectively. Rows represent the results of thirty minute observations.