

UNIVERSITY OF FLORIDA  
COASTAL DATA NETWORK

Wave and Current Statistics for Selected  
Stations Along the Coast of Florida  
-From Directional Wave Gages, 1987-1990

BY

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## Summary

The Department of Coastal and Oceanographic Engineering, University of Florida, under the sponsorship of U.S. Navy, Coastal Engineering Research Center, U.S. Army Corps of Engineers and the State of Florida has been maintaining a coastal wave measurement network along the coast of Florida. All these stations are underwater gages that measure surface fluctuations. The network has been reporting wave data on monthly basis beginning 1982. Since 1987, the network has been gradually upgraded to include current measurements. The added capability also enables us to provide wave directional information. At the time of this report, there are three fully functional shore-linked directional wave gages -Kings Bay, St. Mary Entrance, Jacksonville and Miami. A fourth one at Perdido Key will be operational in Spring 1991. In addition to these permanent gages, a number of self-contained underwater packages are also in operation.

This is a special issue that compiles all the available directional wave information collected by this Department since 1987. Wave information collection is still an on-going effort.

This report, without the figures, is available in 5-1/4 or 3-1/2 inch diskettes in ASCII for IBM PCs or compatible PCs from the Coastal and Oceanographic Engineering Department, University of Florida 32611.

### Key Words:

Directional Wave  
Wave Data  
Florida Wave

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## Station at: CLEARWATER

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## Station at: PERDIDO KEY

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## Station at: PERDIDO KEY

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# P-U-V Wave Gage Station Locations

| STATION NAME:   | DEPTH(m): | LOCATION:                     |
|-----------------|-----------|-------------------------------|
| -----           | -----     | -----                         |
| KINGS BAY #4    | 12.0      | 30 42' 36" N,<br>81 18' 45" W |
| KINGS BAY #5    | 18.0      | 30 41' 31" N,<br>81 16' 30" W |
| KINGS BAY #6    | 14.1      | 30 42' 31" N,<br>81 24' 51" W |
| SEBASTIAN INLET | 11.2      | 27 52' 42" N<br>80 26' 4" W   |
| MIAMI           | 6.5       | 25 46' 06" N<br>80 07' 23" W  |
| JUPITER INLET   | 8.1       | 26 56' 55" N<br>80 3' 49" W   |
| CLEARWATER      | 6.1       | 27 58' 44" N<br>82 51' 00" W  |
| PERDIDO KEY     | 7.1       | 30 15' 41" N<br>87 24' 30" W  |

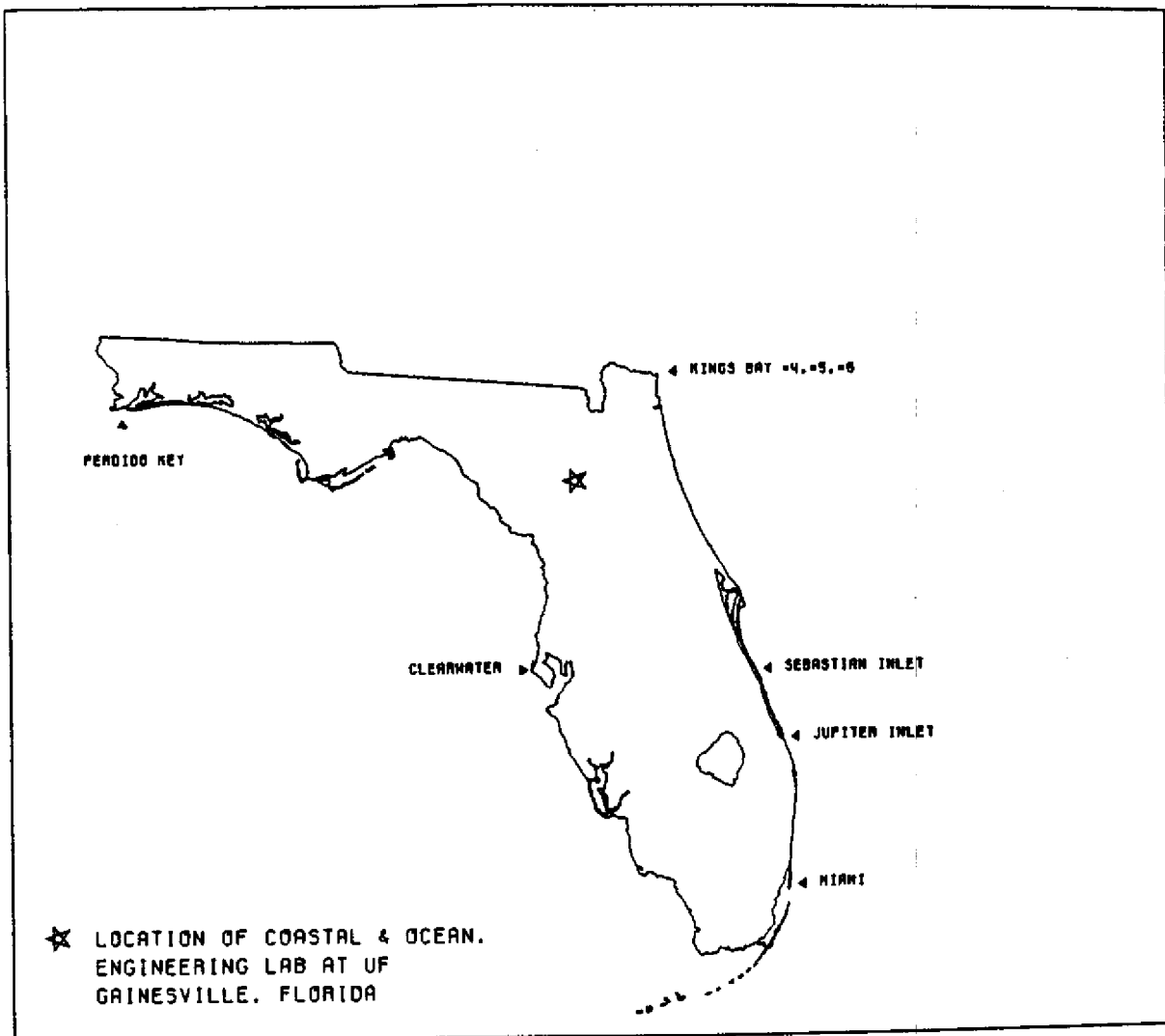


FIGURE 1. LOCATION OF THE COASTAL DATA NETWORK STATIONS

TABLE 1.1 Seasonal Percentage Joint Distribution  
of Significant Wave Height & Peak Period

Station at: KINGS BAY #4 - AUG-DEC 1987 Data

| Hs(m)   |         | Peak Period(sec) |       |       |       |       |      | Total%: |
|---------|---------|------------------|-------|-------|-------|-------|------|---------|
|         |         | 3-5              | 5-7   | 7-9   | 9-11  | 11-13 | 13-  |         |
| 0.0-0.3 | Summer  | 0.00             | 0.00  | 0.95  | 0.32  | 0.00  | 0.00 | 1.27    |
|         | Fall    | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
|         | Winter  | 0.32             | 0.00  | 0.00  | 0.32  | 0.00  | 0.00 | 0.63    |
|         | *Annual | 0.32             | 0.00  | 0.95  | 0.63  | 0.00  | 0.00 | 1.90    |
| 0.3-0.6 | Summer  | 3.80             | 0.95  | 7.59  | 11.39 | 0.95  | 0.00 | 24.68   |
|         | Fall    | 0.95             | 0.63  | 0.00  | 2.53  | 1.90  | 0.00 | 6.01    |
|         | Winter  | 9.81             | 0.32  | 1.27  | 4.11  | 2.22  | 0.00 | 17.72   |
|         | *Annual | 14.56            | 1.90  | 8.86  | 18.04 | 5.06  | 0.00 | 48.42   |
| 0.6-0.9 | Summer  | 0.95             | 0.32  | 0.32  | 3.48  | 0.32  | 0.00 | 5.38    |
|         | Fall    | 1.90             | 2.53  | 0.95  | 2.22  | 0.00  | 0.00 | 7.59    |
|         | Winter  | 3.48             | 4.11  | 0.63  | 2.22  | 1.58  | 0.32 | 12.34   |
|         | *Annual | 6.33             | 6.96  | 1.90  | 7.91  | 1.90  | 0.32 | 25.32   |
| 0.9-1.2 | Summer  | 0.00             | 0.32  | 0.00  | 1.27  | 0.00  | 0.00 | 1.58    |
|         | Fall    | 0.00             | 0.63  | 0.63  | 5.38  | 0.00  | 0.00 | 6.65    |
|         | Winter  | 2.53             | 1.90  | 0.95  | 0.63  | 0.00  | 0.32 | 6.33    |
|         | *Annual | 2.53             | 2.85  | 1.58  | 7.28  | 0.00  | 0.32 | 14.56   |
| 1.2-1.5 | Summer  | 0.00             | 0.32  | 0.00  | 0.32  | 0.00  | 0.00 | 0.63    |
|         | Fall    | 0.32             | 0.63  | 1.90  | 2.22  | 0.00  | 0.00 | 5.06    |
|         | Winter  | 0.00             | 0.32  | 0.63  | 0.00  | 0.00  | 0.00 | 0.95    |
|         | *Annual | 0.32             | 1.27  | 2.53  | 2.53  | 0.00  | 0.00 | 6.65    |
| 1.5-1.8 | Summer  | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
|         | Fall    | 0.32             | 0.00  | 0.95  | 0.32  | 0.00  | 0.00 | 1.58    |
|         | Winter  | 0.00             | 0.63  | 0.63  | 0.00  | 0.00  | 0.00 | 1.27    |
|         | *Annual | 0.32             | 0.63  | 1.58  | 0.32  | 0.00  | 0.00 | 2.85    |
| 1.8-2.1 | Summer  | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
|         | Fall    | 0.00             | 0.00  | 0.32  | 0.00  | 0.00  | 0.00 | 0.32    |
|         | Winter  | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
|         | *Annual | 0.00             | 0.00  | 0.32  | 0.00  | 0.00  | 0.00 | 0.32    |
| 2.1-2.4 | Summer  | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
|         | Fall    | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
|         | Winter  | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
|         | *Annual | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
| 2.4-2.7 | Summer  | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
|         | Fall    | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
|         | Winter  | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
|         | *Annual | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
| 2.7-    | Summer  | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
|         | Fall    | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
|         | Winter  | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
|         | *Annual | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
| Total%: | Summer  | 4.75             | 1.90  | 8.86  | 16.77 | 1.27  | 0.00 | 33.54   |
|         | Fall    | 3.48             | 4.43  | 4.75  | 12.66 | 1.90  | 0.00 | 27.22   |
|         | Winter  | 16.14            | 7.28  | 4.11  | 7.28  | 3.80  | 0.63 | 39.24   |
|         | *Annual | 24.37            | 13.61 | 17.72 | 36.71 | 6.96  | 0.63 | 100.00  |

\* Based on data analysed; one or more seasonal data are not available.

TABLE 1.2 Seasonal Marginal & Cumulative Probability  
Distribution of Significant Wave Height

Station at: KINGS BAY #4 - AUG-DEC 1987 Data

| Summer                              |         |         |                                  |                                  |
|-------------------------------------|---------|---------|----------------------------------|----------------------------------|
| <= Marginal Height(m) Cumulative => |         |         |                                  |                                  |
| 0                                   | 0.038   | 0.0-0.3 | 1.000                            | 00000000000000000000000000000000 |
| 00000000000000000000000000000000    | 0.736   | 0.3-0.6 | 0.962                            | 00000000000000000000000000000000 |
| 00000                               | 0.160   | 0.6-0.9 | 0.226                            | 000000                           |
| 00                                  | 0.047   | 0.9-1.2 | 0.066                            | 00                               |
| 0                                   | 0.019   | 1.2-1.5 | 0.019                            |                                  |
| 0.000                               | 1.5-1.8 | 0.000   |                                  |                                  |
| 0.000                               | 1.8-2.1 | 0.000   |                                  |                                  |
| 0.000                               | 2.1-2.4 | 0.000   |                                  |                                  |
| 0.000                               | 2.4-2.7 | 0.000   |                                  |                                  |
| 0.000                               | 2.7-    | 0.000   |                                  |                                  |
| Fall                                |         |         |                                  |                                  |
| <= Marginal Height(m) Cumulative => |         |         |                                  |                                  |
| 0.000                               | 0.0-0.3 | 1.000   | 00000000000000000000000000000000 |                                  |
| 00000000000000000000000000000000    | 0.221   | 0.3-0.6 | 1.000                            | 00000000000000000000000000000000 |
| 00000000000000000000000000000000    | 0.279   | 0.6-0.9 | 0.779                            | 00000000000000000000000000000000 |
| 00000000000000000000000000000000    | 0.244   | 0.9-1.2 | 0.500                            | 0000000000000000                 |
| 00000000000000000000000000000000    | 0.186   | 1.2-1.5 | 0.256                            | 000000                           |
| 00000                               | 0.058   | 1.5-1.8 | 0.070                            | 00                               |
| 0                                   | 0.012   | 1.8-2.1 | 0.012                            |                                  |
| 0.000                               | 2.1-2.4 | 0.000   |                                  |                                  |
| 0.000                               | 2.4-2.7 | 0.000   |                                  |                                  |
| 0.000                               | 2.7-    | 0.000   |                                  |                                  |
| Winter                              |         |         |                                  |                                  |
| <= Marginal Height(m) Cumulative => |         |         |                                  |                                  |
| 0                                   | 0.016   | 0.0-0.3 | 1.000                            | 00000000000000000000000000000000 |
| 00000000000000000000000000000000    | 0.452   | 0.3-0.6 | 0.984                            | 00000000000000000000000000000000 |
| 00000000000000000000000000000000    | 0.315   | 0.6-0.9 | 0.532                            | 0000000000000000                 |
| 000000000                           | 0.161   | 0.9-1.2 | 0.218                            | 00000                            |
| 0                                   | 0.024   | 1.2-1.5 | 0.056                            | 0                                |
| 00                                  | 0.032   | 1.5-1.8 | 0.032                            | 0                                |
| 0.000                               | 1.8-2.1 | 0.000   |                                  |                                  |
| 0.000                               | 2.1-2.4 | 0.000   |                                  |                                  |
| 0.000                               | 2.4-2.7 | 0.000   |                                  |                                  |
| 0.000                               | 2.7-    | 0.000   |                                  |                                  |
| *Annual                             |         |         |                                  |                                  |
| <= Marginal Height(m) Cumulative => |         |         |                                  |                                  |
| 0                                   | 0.019   | 0.0-0.3 | 1.000                            | 00000000000000000000000000000000 |
| 00000000000000000000000000000000    | 0.484   | 0.3-0.6 | 0.981                            | 00000000000000000000000000000000 |
| 00000000000000000000000000000000    | 0.253   | 0.6-0.9 | 0.497                            | 0000000000000000                 |
| 00000000                            | 0.146   | 0.9-1.2 | 0.244                            | 000000                           |
| 000                                 | 0.066   | 1.2-1.5 | 0.098                            | 00                               |
| 0                                   | 0.028   | 1.5-1.8 | 0.032                            | 0                                |
| 0.003                               | 1.8-2.1 | 0.003   |                                  |                                  |
| 0.000                               | 2.1-2.4 | 0.000   |                                  |                                  |
| 0.000                               | 2.4-2.7 | 0.000   |                                  |                                  |
| 0.000                               | 2.7-    | 0.000   |                                  |                                  |

\* Based on data analysed; one or more seasonal data are not available.

TABLE 1.3 Seasonal Marginal & Cumulative Probability  
Distribution of Wave Period

Station at: KINGS BAY #4 - AUG-DEC 1987 Data

| Summer                                |       |       |       |                                  |
|---------------------------------------|-------|-------|-------|----------------------------------|
| <= Marginal Period(sec) Cumulative => |       |       |       |                                  |
| 0000000                               | 0.142 | 3-5   | 1.000 | 00000000000000000000000000000000 |
| 000                                   | 0.057 | 5-7   | 0.858 | 00000000000000000000000000000000 |
| 00000000000000000000000000000000      | 0.264 | 7-9   | 0.802 | 00000000000000000000000000000000 |
| 00000000000000000000000000000000      | 0.500 | 9-11  | 0.538 | 00000000000000000000000000000000 |
| 00                                    | 0.038 | 11-13 | 0.038 | 0                                |
| 0.000                                 |       | 13-   | 0.000 |                                  |
| Fall                                  |       |       |       |                                  |
| <= Marginal Period(sec) Cumulative => |       |       |       |                                  |
| 0000000                               | 0.128 | 3-5   | 1.000 | 00000000000000000000000000000000 |
| 0000000000                            | 0.163 | 5-7   | 0.872 | 00000000000000000000000000000000 |
| 0000000000                            | 0.174 | 7-9   | 0.709 | 00000000000000000000000000000000 |
| 00000000000000000000000000000000      | 0.465 | 9-11  | 0.535 | 00000000000000000000000000000000 |
| 0000                                  | 0.070 | 11-13 | 0.070 | 00                               |
| 0.000                                 |       | 13-   | 0.000 |                                  |
| Winter                                |       |       |       |                                  |
| <= Marginal Period(sec) Cumulative => |       |       |       |                                  |
| 00000000000000000000000000000000      | 0.411 | 3-5   | 1.000 | 00000000000000000000000000000000 |
| 000000000000                          | 0.185 | 5-7   | 0.589 | 00000000000000000000000000000000 |
| 000000                                | 0.105 | 7-9   | 0.403 | 00000000000000000000000000000000 |
| 000000000000                          | 0.185 | 9-11  | 0.298 | 00000000000000000000000000000000 |
| 000000                                | 0.097 | 11-13 | 0.113 | 000                              |
| 0                                     | 0.016 | 13-   | 0.016 |                                  |
| *Annual                               |       |       |       |                                  |
| <= Marginal Period(sec) Cumulative => |       |       |       |                                  |
| 00000000000000000000000000000000      | 0.244 | 3-5   | 1.000 | 00000000000000000000000000000000 |
| 0000000000                            | 0.136 | 5-7   | 0.756 | 00000000000000000000000000000000 |
| 000000000000                          | 0.177 | 7-9   | 0.620 | 00000000000000000000000000000000 |
| 00000000000000000000000000000000      | 0.367 | 9-11  | 0.443 | 00000000000000000000000000000000 |
| 00000                                 | 0.070 | 11-13 | 0.076 | 00                               |
| 0.006                                 |       | 13-   | 0.006 |                                  |

\* Based on data analysed; one or more seasonal data are not available.

TABLE 1.4 Mean & Standard Deviation of Significant Wave Height & Period, and Maximum Significant Wave Height

Station at: KINGS BAY #4 - AUG-DEC 1987 Data

|         | Mean<br>Hs(m) | Std Dev<br>Hs(m) | Maximum#:<br>Hs(m) | Date  | Mean<br>Tp(sec) | Std Dev<br>Tp(sec) | #Data<br>Pts |
|---------|---------------|------------------|--------------------|-------|-----------------|--------------------|--------------|
| Mar     |               |                  |                    |       |                 |                    |              |
| Apr     |               |                  |                    |       |                 |                    |              |
| May     |               |                  |                    |       |                 |                    |              |
| Jun     |               |                  |                    |       |                 |                    |              |
| Jul     |               |                  |                    |       |                 |                    |              |
| Aug     | 0.51          | 0.22             | 1.50               | 8/13  | 8.41            | 2.06               | 106          |
| Sep     |               |                  |                    |       |                 |                    |              |
| Oct     |               |                  |                    |       |                 |                    |              |
| Nov     | 0.95          | 0.35             | 1.86               | 11/17 | 8.24            | 2.27               | 86           |
| Dec     | 0.70          | 0.31             | 1.73               | 12/30 | 6.98            | 2.92               | 124          |
| Jan     |               |                  |                    |       |                 |                    |              |
| Feb     |               |                  |                    |       |                 |                    |              |
| Summer  | 0.51          | 0.22             | 1.50               | 8/13  | 8.41            | 2.06               | 106          |
| Fall    | 0.95          | 0.35             | 1.86               | 11/17 | 8.24            | 2.27               | 86           |
| Winter  | 0.70          | 0.31             | 1.73               | 12/30 | 6.98            | 2.92               | 124          |
| *Annual | 0.71          | 0.30             | 1.86               | 11/17 | 7.80            | 2.49               | 316          |

TABLE 1.5 Wave & Current Information in the Dominant Wave & Current Directions

Station at: KINGS BAY #4 - AUG-DEC 1987 Data

|         | Wave Direction<br>(Deg. wrt North) | Hs<br>(m.) | Peak Period<br>(sec.) | Current Direction<br>(Deg. wrt North) | Current<br>(m/sec) |
|---------|------------------------------------|------------|-----------------------|---------------------------------------|--------------------|
| Mar     |                                    |            |                       |                                       |                    |
| Apr     |                                    |            |                       |                                       |                    |
| May     |                                    |            |                       |                                       |                    |
| Jun     |                                    |            |                       |                                       |                    |
| Jul     |                                    |            |                       |                                       |                    |
| Aug     | 274.13                             | 0.46       | 8.95                  | 21.74                                 | 0.31               |
| Sep     |                                    |            |                       |                                       |                    |
| Oct     |                                    |            |                       |                                       |                    |
| Nov     | 269.25                             | 0.87       | 9.49                  | 37.77                                 | 0.09               |
| Dec     | 286.52                             | 1.00       | 5.76                  | 61.88                                 | 0.42               |
| Jan     |                                    |            |                       |                                       |                    |
| Feb     |                                    |            |                       |                                       |                    |
| Summer  | 274.13                             | 0.46       | 8.95                  | 16.57                                 | 0.31               |
| Fall    | 269.25                             | 0.87       | 9.49                  | 18.86                                 | 0.09               |
| Winter  | 286.52                             | 1.00       | 5.76                  | 40.51                                 | 0.42               |
| *Annual | 272.51                             | 0.65       | 8.78                  | 25.23                                 | 0.26               |

\* Based on data analysed; one or more seasonal data are not available.

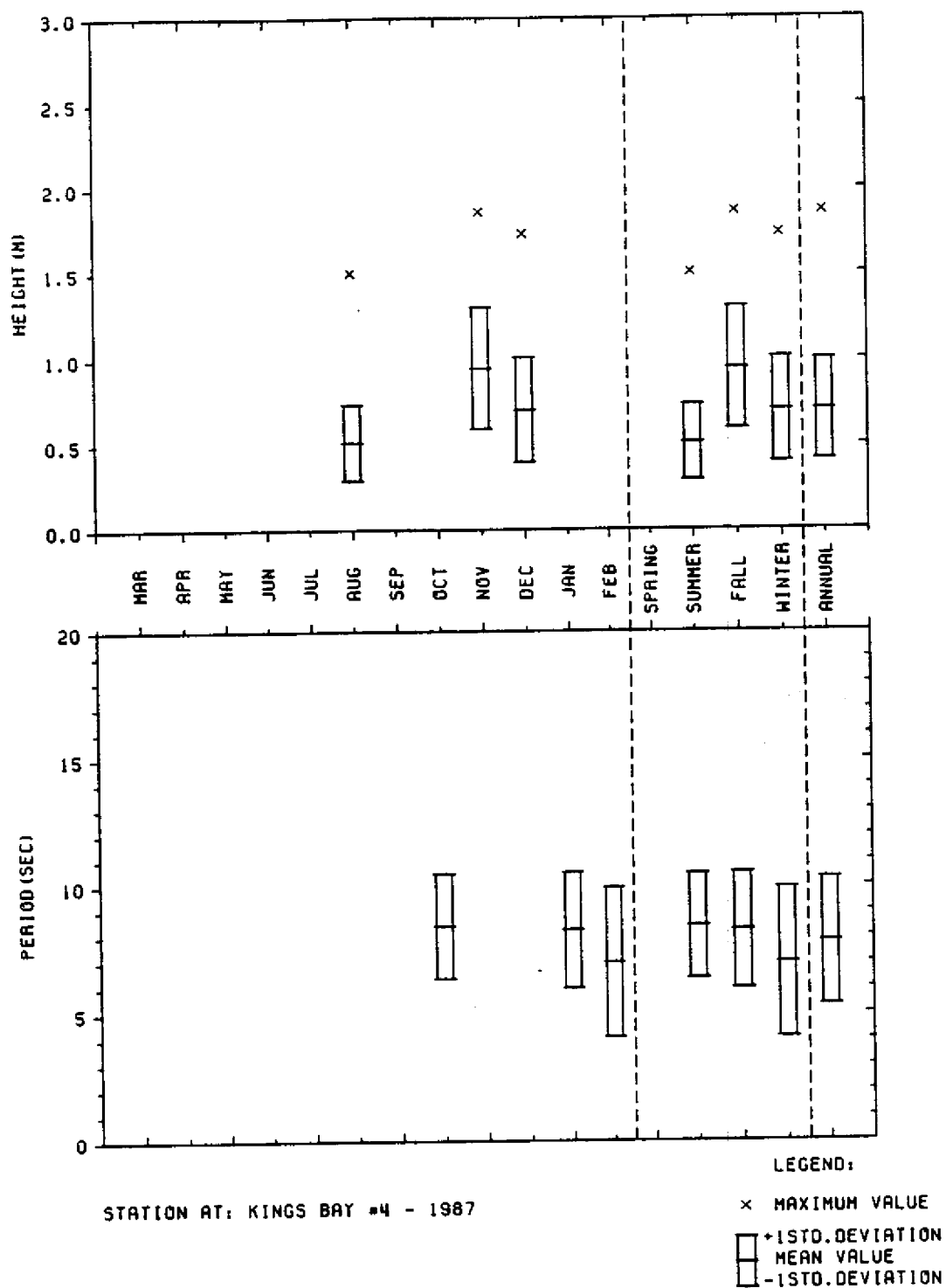
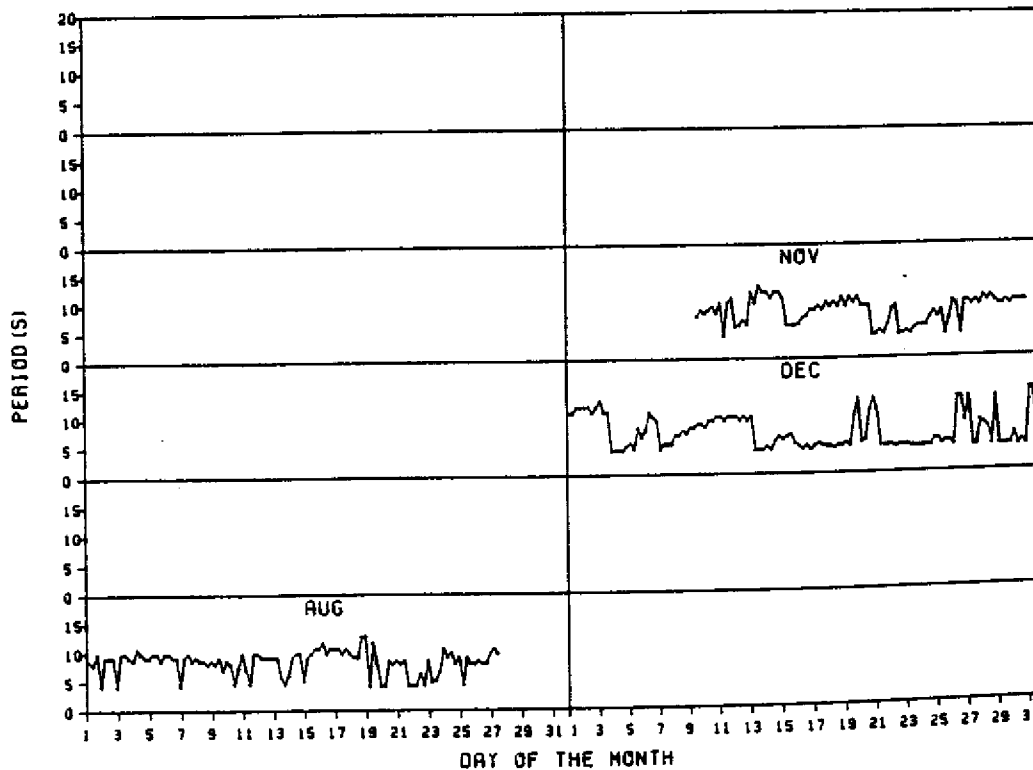
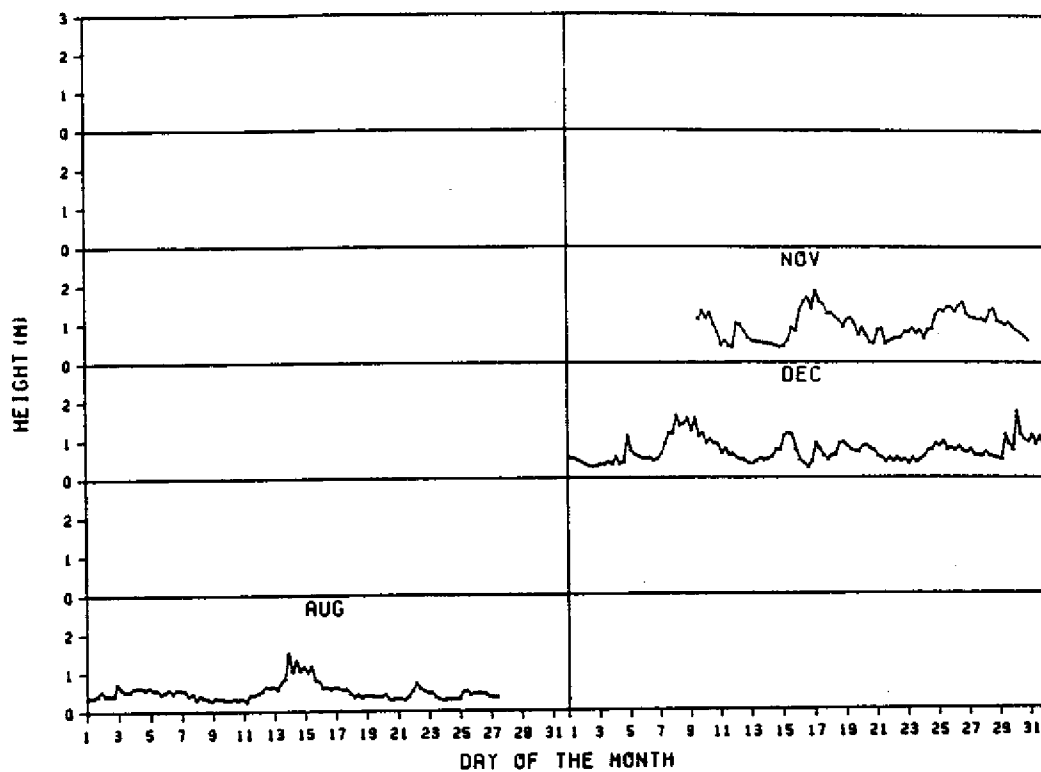
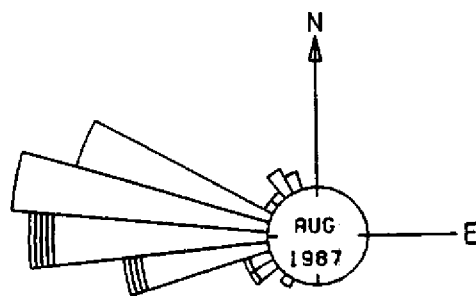


FIGURE 1-1 MONTHLY, SEASONAL & ANNUAL MEAN AND STD DEVIATION OF SIG.WAVE HEIGHT & PERIOD, AND MAXIMUM SIG.WAVE HEIGHT



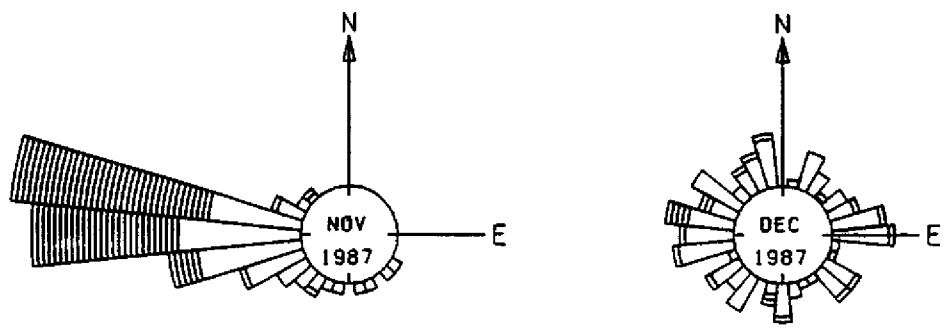
STATION AT: KINGS BAY #4 - AUG-DEC 1987

FIGURE 1-2 TIME HISTORY PLOTS OF SIGNIFICANT WAVE HEIGHT & PEAK PERIOD



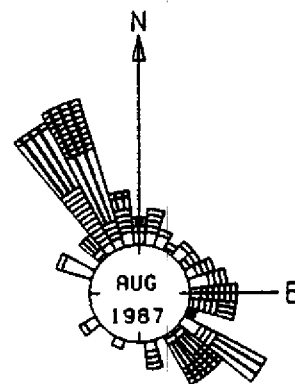
LEGEND:  $H_s < 1m$   $1m \leq H_s < 2m$   $2m \leq H_s < 3m$   $H_s \geq 3m$  0% 10% 20%

FIGURE 1-3A. AUG 1987 WAVE ROSE FOR STATION AT KINGS BAY #4



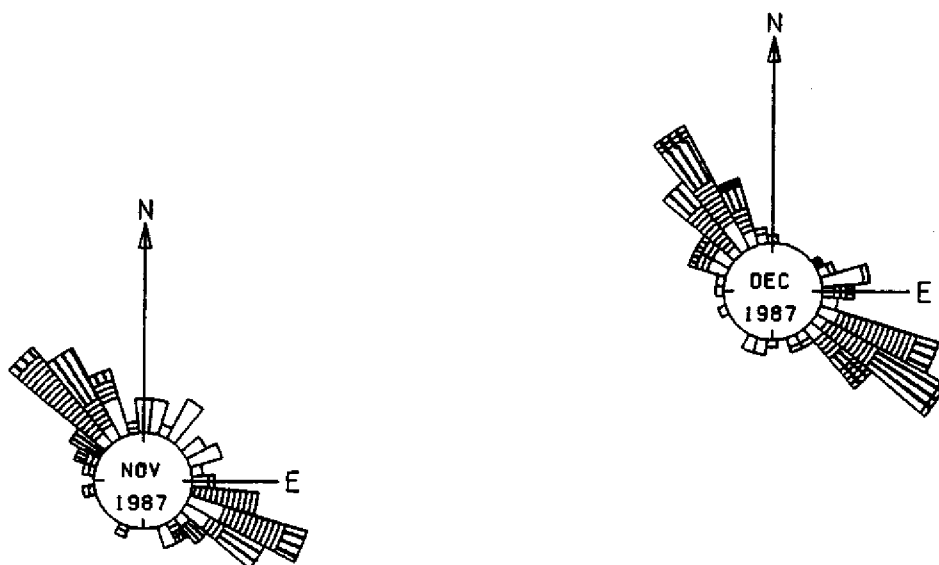
LEGEND:  $\square$   $H_s < 1\text{m}$   $\text{▨}$   $1\text{m} \leq H_s < 2\text{m}$   $\text{▩}$   $2\text{m} \leq H_s < 3\text{m}$   $\blacksquare$   $H_s \geq 3\text{m}$  0% 10% 20%

FIGURE 1-3B. NOV-DEC 1987 WAVE ROSES FOR STATION AT KINGS BAY #4



LEGEND:  $v < 0.2$   $0.2 \leq v < 0.4$   $0.4 \leq v < 0.6$   $0.6 \leq v < 0.8$   $v \geq 0.8$  0% 10% 20%  
(V IN M/S)

FIGURE 1-4A. AUG 1987 CURRENT ROSE FOR STATION AT KINGS BAY #4



LEGEND:  $v < 0.2$   $0.2 \leq v < 0.4$   $0.4 \leq v < 0.6$   $0.6 \leq v < 0.8$   $v \geq 0.8$  0% 10% 20%  
 (V IN M/S)

FIGURE 1-48. NOV-DEC 1987 CURRENT ROSES FOR STATION AT KINGS BAY #4

TABLE 1.6 Seasonal Percentage Joint Distribution  
of Significant Wave Height & Peak Period

Station at: KINGS BAY #4 - MAR 88-FEB 89 Data

|         |        | Peak Period(sec) |       |       |       |       |      | Total%: |
|---------|--------|------------------|-------|-------|-------|-------|------|---------|
| Hs(m)   |        | 3-5              | 5-7   | 7-9   | 9-11  | 11-13 | 13-  |         |
| 0.0-0.3 | Spring | 0.87             | 0.44  | 0.26  | 0.26  | 0.26  | 0.96 | 3.06    |
|         | Summer | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
|         | Fall   | 0.00             | 0.00  | 0.26  | 0.61  | 0.17  | 0.00 | 1.05    |
|         | Winter | 0.00             | 0.00  | 0.70  | 0.79  | 0.09  | 0.00 | 1.57    |
|         | Annual | 0.87             | 0.44  | 1.22  | 1.66  | 0.52  | 0.96 | 5.68    |
| 0.3-0.6 | Spring | 1.31             | 0.44  | 0.17  | 1.57  | 1.14  | 1.40 | 6.03    |
|         | Summer | 0.44             | 0.09  | 5.33  | 4.19  | 0.00  | 0.00 | 10.04   |
|         | Fall   | 1.83             | 1.40  | 2.88  | 1.75  | 0.96  | 0.44 | 9.26    |
|         | Winter | 1.05             | 0.70  | 1.83  | 4.89  | 0.52  | 0.09 | 9.08    |
|         | Annual | 4.63             | 2.62  | 10.22 | 12.40 | 2.62  | 1.92 | 34.41   |
| 0.6-0.9 | Spring | 1.22             | 1.83  | 0.52  | 2.01  | 1.05  | 0.26 | 6.90    |
|         | Summer | 0.70             | 0.44  | 7.86  | 6.38  | 0.00  | 0.00 | 15.37   |
|         | Fall   | 1.75             | 2.27  | 2.71  | 1.83  | 0.35  | 0.09 | 9.00    |
|         | Winter | 0.70             | 0.61  | 1.66  | 2.36  | 0.44  | 0.26 | 6.03    |
|         | Annual | 4.37             | 5.15  | 12.75 | 12.58 | 1.83  | 0.61 | 37.29   |
| 0.9-1.2 | Spring | 0.44             | 0.61  | 0.00  | 0.35  | 0.26  | 0.09 | 1.75    |
|         | Summer | 0.09             | 0.35  | 0.26  | 0.52  | 0.00  | 0.00 | 1.22    |
|         | Fall   | 1.40             | 1.66  | 0.96  | 1.75  | 0.26  | 0.17 | 6.20    |
|         | Winter | 0.44             | 0.96  | 0.26  | 0.52  | 0.17  | 0.17 | 2.53    |
|         | Annual | 2.36             | 3.58  | 1.48  | 3.14  | 0.70  | 0.44 | 11.70   |
| 1.2-1.5 | Spring | 0.09             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.09    |
|         | Summer | 0.00             | 0.09  | 0.52  | 0.09  | 0.00  | 0.00 | 0.70    |
|         | Fall   | 0.96             | 1.83  | 0.52  | 0.44  | 0.09  | 0.09 | 3.93    |
|         | Winter | 0.26             | 0.26  | 0.00  | 0.17  | 0.00  | 0.09 | 0.79    |
|         | Annual | 1.31             | 2.18  | 1.05  | 0.70  | 0.09  | 0.17 | 5.50    |
| 1.5-1.8 | Spring | 0.00             | 0.00  | 0.09  | 0.17  | 0.00  | 0.00 | 0.26    |
|         | Summer | 0.00             | 0.00  | 0.35  | 0.09  | 0.00  | 0.00 | 0.44    |
|         | Fall   | 0.35             | 1.14  | 0.17  | 0.09  | 0.00  | 0.00 | 1.75    |
|         | Winter | 0.17             | 0.26  | 0.00  | 0.09  | 0.09  | 0.00 | 0.61    |
|         | Annual | 0.52             | 1.40  | 0.61  | 0.44  | 0.09  | 0.00 | 3.06    |
| 1.8-2.1 | Spring | 0.00             | 0.00  | 0.09  | 0.00  | 0.00  | 0.00 | 0.09    |
|         | Summer | 0.00             | 0.00  | 0.09  | 0.26  | 0.00  | 0.00 | 0.35    |
|         | Fall   | 0.00             | 0.52  | 0.00  | 0.00  | 0.00  | 0.00 | 0.52    |
|         | Winter | 0.00             | 0.00  | 0.09  | 0.00  | 0.00  | 0.00 | 0.09    |
|         | Annual | 0.00             | 0.52  | 0.26  | 0.26  | 0.00  | 0.00 | 1.05    |
| 2.1-2.4 | Spring | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
|         | Summer | 0.00             | 0.00  | 0.09  | 0.09  | 0.00  | 0.00 | 0.17    |
|         | Fall   | 0.00             | 0.00  | 0.17  | 0.00  | 0.00  | 0.00 | 0.17    |
|         | Winter | 0.00             | 0.35  | 0.00  | 0.00  | 0.00  | 0.00 | 0.35    |
|         | Annual | 0.00             | 0.35  | 0.26  | 0.09  | 0.00  | 0.00 | 0.70    |
| 2.4-2.7 | Spring | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
|         | Summer | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
|         | Fall   | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
|         | Winter | 0.00             | 0.00  | 0.17  | 0.00  | 0.00  | 0.00 | 0.17    |
|         | Annual | 0.00             | 0.00  | 0.17  | 0.00  | 0.00  | 0.00 | 0.17    |
| 2.7-    | Spring | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
|         | Summer | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
|         | Fall   | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
|         | Winter | 0.00             | 0.00  | 0.17  | 0.09  | 0.17  | 0.00 | 0.44    |
|         | Annual | 0.00             | 0.00  | 0.17  | 0.09  | 0.17  | 0.00 | 0.44    |
| Total%: | Spring | 3.93             | 3.32  | 1.14  | 4.37  | 2.71  | 2.71 | 18.17   |
|         | Summer | 1.22             | 0.96  | 14.50 | 11.62 | 0.00  | 0.00 | 28.30   |
|         | Fall   | 6.29             | 8.82  | 7.69  | 6.46  | 1.83  | 0.79 | 31.88   |
|         | Winter | 2.62             | 3.14  | 4.89  | 8.91  | 1.48  | 0.61 | 21.66   |
|         | Annual | 14.06            | 16.24 | 28.21 | 31.35 | 6.03  | 4.10 | 100.00  |

TABLE 1.7 Seasonal Marginal & Cumulative Probability  
Distribution of Significant Wave Height

Station at: KINGS BAY #4 - MAR 88-FEB 89 Data

| Spring                              |         |         |                          |                          |
|-------------------------------------|---------|---------|--------------------------|--------------------------|
| <= Marginal Height(m) Cumulative => |         |         |                          |                          |
| 000000000000                        | 0.168   | 0.0-0.3 | 1.000                    | 000000000000000000000000 |
| 000000000000000000000000            | 0.332   | 0.3-0.6 | 0.832                    | 000000000000000000000000 |
| 000000000000000000000000            | 0.380   | 0.6-0.9 | 0.500                    | 000000000000000000000000 |
| 0000000                             | 0.096   | 0.9-1.2 | 0.120                    | 000                      |
| 0.005                               | 1.2-1.5 | 0.024   | 0                        |                          |
| 0                                   | 0.014   | 1.5-1.8 | 0.019                    |                          |
| 0.005                               | 1.8-2.1 | 0.005   |                          |                          |
| 0.000                               | 2.1-2.4 | 0.000   |                          |                          |
| 0.000                               | 2.4-2.7 | 0.000   |                          |                          |
| 0.000                               | 2.7-    | 0.000   |                          |                          |
| Summer                              |         |         |                          |                          |
| <= Marginal Height(m) Cumulative => |         |         |                          |                          |
| 0.000                               | 0.0-0.3 | 1.000   | 000000000000000000000000 |                          |
| 000000000000000000000000            | 0.355   | 0.3-0.6 | 1.000                    | 000000000000000000000000 |
| 000000000000000000000000            | 0.543   | 0.6-0.9 | 0.645                    | 000000000000000000000000 |
| 00                                  | 0.043   | 0.9-1.2 | 0.102                    | 000                      |
| 0                                   | 0.025   | 1.2-1.5 | 0.059                    | 0                        |
| 0                                   | 0.015   | 1.5-1.8 | 0.034                    | 0                        |
| 0                                   | 0.012   | 1.8-2.1 | 0.019                    |                          |
| 0.006                               | 2.1-2.4 | 0.006   |                          |                          |
| 0.000                               | 2.4-2.7 | 0.000   |                          |                          |
| 0.000                               | 2.7-    | 0.000   |                          |                          |
| Fall                                |         |         |                          |                          |
| <= Marginal Height(m) Cumulative => |         |         |                          |                          |
| 000                                 | 0.033   | 0.0-0.3 | 1.000                    | 000000000000000000000000 |
| 000000000000000000000000            | 0.290   | 0.3-0.6 | 0.967                    | 000000000000000000000000 |
| 000000000000000000000000            | 0.282   | 0.6-0.9 | 0.677                    | 000000000000000000000000 |
| 000000000000000000000000            | 0.195   | 0.9-1.2 | 0.395                    | 000000000000000000000000 |
| 000000000000                        | 0.123   | 1.2-1.5 | 0.200                    | 00000                    |
| 00000                               | 0.055   | 1.5-1.8 | 0.077                    | 00                       |
| 0                                   | 0.016   | 1.8-2.1 | 0.022                    | 0                        |
| 0.005                               | 2.1-2.4 | 0.005   |                          |                          |
| 0.000                               | 2.4-2.7 | 0.000   |                          |                          |
| 0.000                               | 2.7-    | 0.000   |                          |                          |
| Winter                              |         |         |                          |                          |
| <= Marginal Height(m) Cumulative => |         |         |                          |                          |
| 0000                                | 0.073   | 0.0-0.3 | 1.000                    | 000000000000000000000000 |
| 000000000000000000000000            | 0.419   | 0.3-0.6 | 0.927                    | 000000000000000000000000 |
| 000000000000000000000000            | 0.278   | 0.6-0.9 | 0.508                    | 000000000000000000000000 |
| 0000000                             | 0.117   | 0.9-1.2 | 0.230                    | 000000                   |
| 00                                  | 0.036   | 1.2-1.5 | 0.113                    | 000                      |
| 00                                  | 0.028   | 1.5-1.8 | 0.077                    | 00                       |
| 0.004                               | 1.8-2.1 | 0.048   | 0                        |                          |
| 0                                   | 0.016   | 2.1-2.4 | 0.044                    | 0                        |
| 0.008                               | 2.4-2.7 | 0.028   | 0                        |                          |
| 0                                   | 0.020   | 2.7-    | 0.020                    | 0                        |
| Annual                              |         |         |                          |                          |
| <= Marginal Height(m) Cumulative => |         |         |                          |                          |
| 0000                                | 0.057   | 0.0-0.3 | 1.000                    | 000000000000000000000000 |
| 000000000000000000000000            | 0.344   | 0.3-0.6 | 0.943                    | 000000000000000000000000 |
| 000000000000000000000000            | 0.373   | 0.6-0.9 | 0.599                    | 000000000000000000000000 |
| 000000000                           | 0.117   | 0.9-1.2 | 0.226                    | 000000                   |
| 0000                                | 0.055   | 1.2-1.5 | 0.109                    | 000                      |
| 00                                  | 0.031   | 1.5-1.8 | 0.054                    | 0                        |
| 0                                   | 0.010   | 1.8-2.1 | 0.024                    | 0                        |
| 0.007                               | 2.1-2.4 | 0.013   |                          |                          |
| 0.002                               | 2.4-2.7 | 0.006   |                          |                          |
| 0.004                               | 2.7-    | 0.004   |                          |                          |

TABLE 1.8 Seasonal Marginal & Cumulative Probability  
Distribution of Wave Period

Station at: KINGS BAY #4 - MAR 88-FEB 89 Data

| Spring                                |       |       |       |                          |
|---------------------------------------|-------|-------|-------|--------------------------|
| <= Marginal Period(sec) Cumulative => |       |       |       |                          |
| 000000000000000000000000              | 0.216 | 3-5   | 1.000 | 000000000000000000000000 |
| 000000000000000000000000              | 0.183 | 5-7   | 0.784 | 000000000000000000000000 |
| 00000000                              | 0.063 | 7-9   | 0.601 | 000000000000000000000000 |
| 000000000000000000000000              | 0.240 | 9-11  | 0.538 | 000000000000000000000000 |
| 000000000000000000000000              | 0.149 | 11-13 | 0.298 | 00000000                 |
| 000000000000000000000000              | 0.149 | 13-   | 0.149 | 0000                     |
| Summer                                |       |       |       |                          |
| <= Marginal Period(sec) Cumulative => |       |       |       |                          |
| 00                                    | 0.043 | 3-5   | 1.000 | 000000000000000000000000 |
| 00                                    | 0.034 | 5-7   | 0.957 | 000000000000000000000000 |
| 000000000000000000000000              | 0.512 | 7-9   | 0.923 | 000000000000000000000000 |
| 000000000000000000000000              | 0.410 | 9-11  | 0.410 | 0000000000               |
| 0.000                                 |       | 11-13 | 0.000 |                          |
| 0.000                                 |       | 13-   | 0.000 |                          |
| Fall                                  |       |       |       |                          |
| <= Marginal Period(sec) Cumulative => |       |       |       |                          |
| 000000000000000000000000              | 0.197 | 3-5   | 1.000 | 000000000000000000000000 |
| 000000000000000000000000              | 0.277 | 5-7   | 0.803 | 000000000000000000000000 |
| 000000000000000000000000              | 0.241 | 7-9   | 0.526 | 000000000000000000000000 |
| 000000000000000000000000              | 0.203 | 9-11  | 0.285 | 00000000                 |
| 00000                                 | 0.058 | 11-13 | 0.082 | 00                       |
| 00                                    | 0.025 | 13-   | 0.025 | 0                        |
| Winter                                |       |       |       |                          |
| <= Marginal Period(sec) Cumulative => |       |       |       |                          |
| 00000000                              | 0.121 | 3-5   | 1.000 | 000000000000000000000000 |
| 0000000000                            | 0.145 | 5-7   | 0.879 | 000000000000000000000000 |
| 000000000000000000000000              | 0.226 | 7-9   | 0.734 | 000000000000000000000000 |
| 000000000000000000000000              | 0.411 | 9-11  | 0.508 | 000000000000000000000000 |
| 0000                                  | 0.069 | 11-13 | 0.097 | 00                       |
| 00                                    | 0.028 | 13-   | 0.028 | 0                        |
| Annual                                |       |       |       |                          |
| <= Marginal Period(sec) Cumulative => |       |       |       |                          |
| 000000000000                          | 0.141 | 3-5   | 1.000 | 000000000000000000000000 |
| 000000000000000000000000              | 0.162 | 5-7   | 0.859 | 000000000000000000000000 |
| 000000000000000000000000              | 0.282 | 7-9   | 0.697 | 000000000000000000000000 |
| 000000000000000000000000              | 0.314 | 9-11  | 0.415 | 000000000000             |
| 00000                                 | 0.060 | 11-13 | 0.101 | 000                      |
| 000                                   | 0.041 | 13-   | 0.041 | 0                        |

TABLE 1.9 Mean & Standard Deviation of Significant Wave Height & Period, and Maximum Significant Wave Height

Station at: KINGS BAY #4 - MAR 88-FEB 89 Data

|        | Mean<br>Hs(m) | Std Dev<br>Hs(m) | Maximum#:<br>Hs(m) | Date  | Mean<br>Tp(sec) | Std Dev<br>Tp(sec) | #Data<br>Pts |
|--------|---------------|------------------|--------------------|-------|-----------------|--------------------|--------------|
| Mar    | 0.87          | 0.10             | 1.07               | 3/29  | 9.01            | 2.29               | 14           |
| Apr    | 0.55          | 0.25             | 1.13               | 4/ 1  | 9.09            | 3.89               | 180          |
| May    | 1.07          | 0.54             | 2.04               | 5/ 1  | 7.91            | 2.14               | 14           |
| Jun    | 0.66          | 0.18             | 1.31               | 6/28  | 8.77            | 1.02               | 80           |
| Jul    | 0.73          | 0.33             | 2.20               | 7/ 5  | 8.24            | 1.27               | 186          |
| Aug    | 0.63          | 0.09             | 0.81               | 8/10  | 8.69            | 0.62               | 58           |
| Sep    | 0.76          | 0.38             | 2.32               | 9/ 7  | 7.04            | 2.20               | 179          |
| Oct    | 0.91          | 0.41             | 1.99               | 10/13 | 7.71            | 2.75               | 186          |
| Nov    |               |                  |                    |       |                 |                    |              |
| Dec    | 0.72          | 0.40             | 2.31               | 12/12 | 8.11            | 2.45               | 97           |
| Jan    | 0.87          | 0.69             | 3.99               | 1/22  | 8.78            | 2.58               | 124          |
| Feb    | 0.38          | 0.13             | 0.61               | 2/ 5  | 8.47            | 1.66               | 27           |
| Spring | 0.60          | 0.27             | 2.04               | 5/ 1  | 9.00            | 3.71               | 208          |
| Summer | 0.70          | 0.27             | 2.20               | 7/ 5  | 8.45            | 1.12               | 324          |
| Fall   | 0.84          | 0.40             | 2.32               | 9/ 7  | 7.39            | 2.49               | 365          |
| Winter | 0.76          | 0.55             | 3.99               | 1/22  | 8.48            | 2.45               | 248          |
| Annual | 0.74          | 0.39             | 3.99               | 1/22  | 8.22            | 2.48               | 1145         |

TABLE 1.10 Wave & Current Information in the Dominant Wave & Current Directions

Station at: KINGS BAY #4 - MAR 88-FEB 89 Data

|        | Wave Direction<br>(Deg. wrt North) | Hs<br>(m.) | Peak Period<br>(sec.) | Current Direction<br>(Deg. wrt North) | Current<br>(m/sec) |
|--------|------------------------------------|------------|-----------------------|---------------------------------------|--------------------|
| Mar    | 281.68                             | 0.87       | 7.94                  | 317.60                                | 0.35               |
| Apr    | 265.36                             | 0.51       | 12.18                 | 330.83                                | 0.37               |
| May    | 267.02                             | 0.76       | 8.45                  | 181.72                                |                    |
| Jun    | 270.46                             | 0.65       | 8.87                  | 130.78                                | 0.19               |
| Jul    | 280.83                             | 0.79       | 8.63                  | 47.42                                 | 0.09               |
| Aug    | 280.76                             | 0.62       | 8.70                  | 119.95                                | 0.17               |
| Sep    | 275.42                             | 0.61       | 7.81                  | 253.78                                | 0.37               |
| Oct    | 251.66                             | 0.75       | 9.05                  | 202.52                                | 0.19               |
| Nov    |                                    |            |                       |                                       |                    |
| Dec    | 256.43                             | 0.65       | 9.35                  | 202.83                                | 0.07               |
| Jan    | 258.31                             | 0.77       | 10.67                 | 91.76                                 | 0.05               |
| Feb    | 278.90                             | 0.36       | 9.03                  | 321.23                                | 0.18               |
| Spring | 267.34                             | 0.56       | 11.47                 | 325.53                                | 0.37               |
| Summer | 278.40                             | 0.72       | 8.70                  | 76.42                                 | 0.16               |
| Fall   | 260.44                             | 0.68       | 8.47                  | 243.67                                | 0.32               |
| Winter | 258.79                             | 0.63       | 9.72                  | 130.64                                | 0.13               |
| Annual | 266.43                             | 0.67       | 9.42                  | 255.64                                | 0.29               |

x 4.0

x 4.0 x 4.0

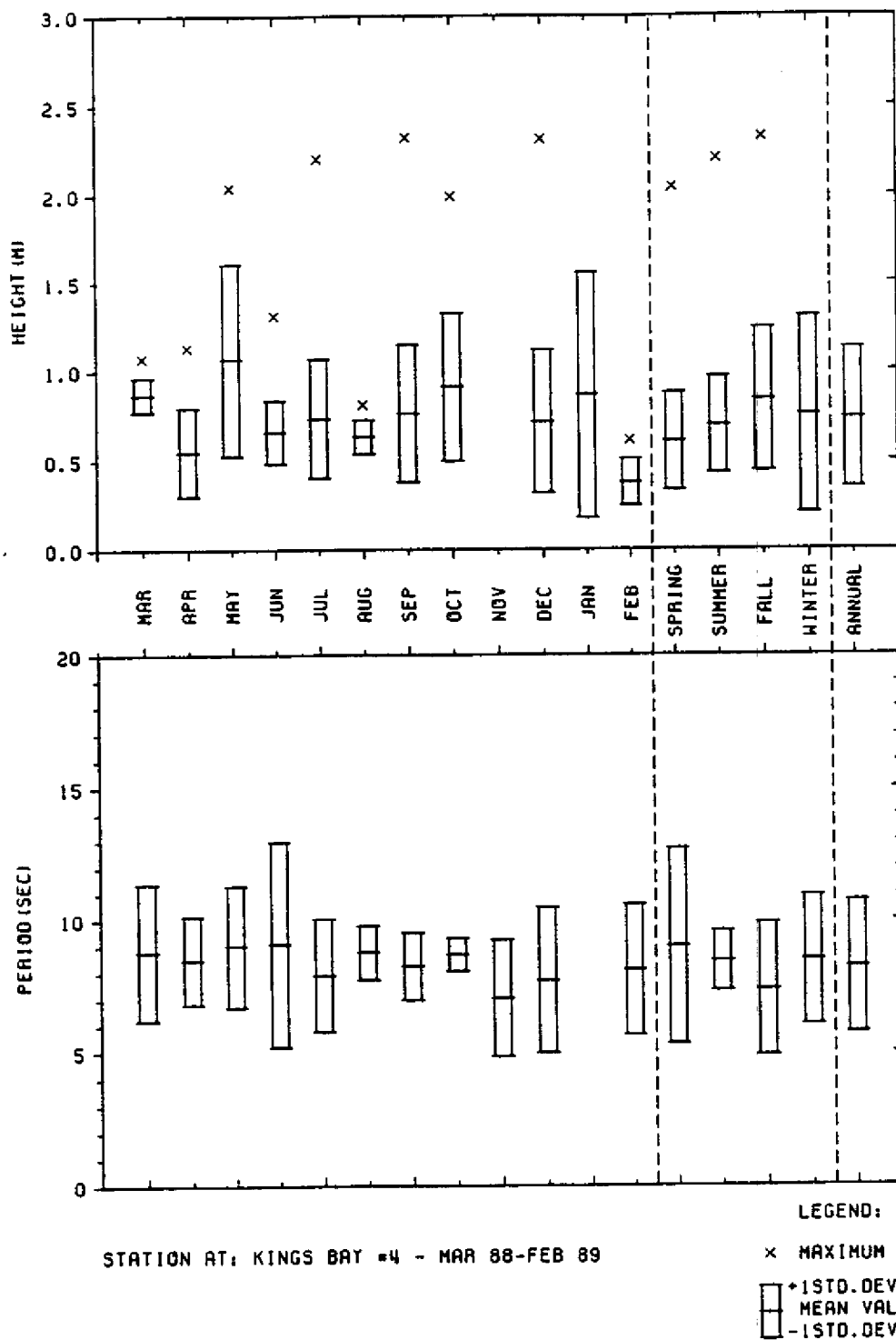
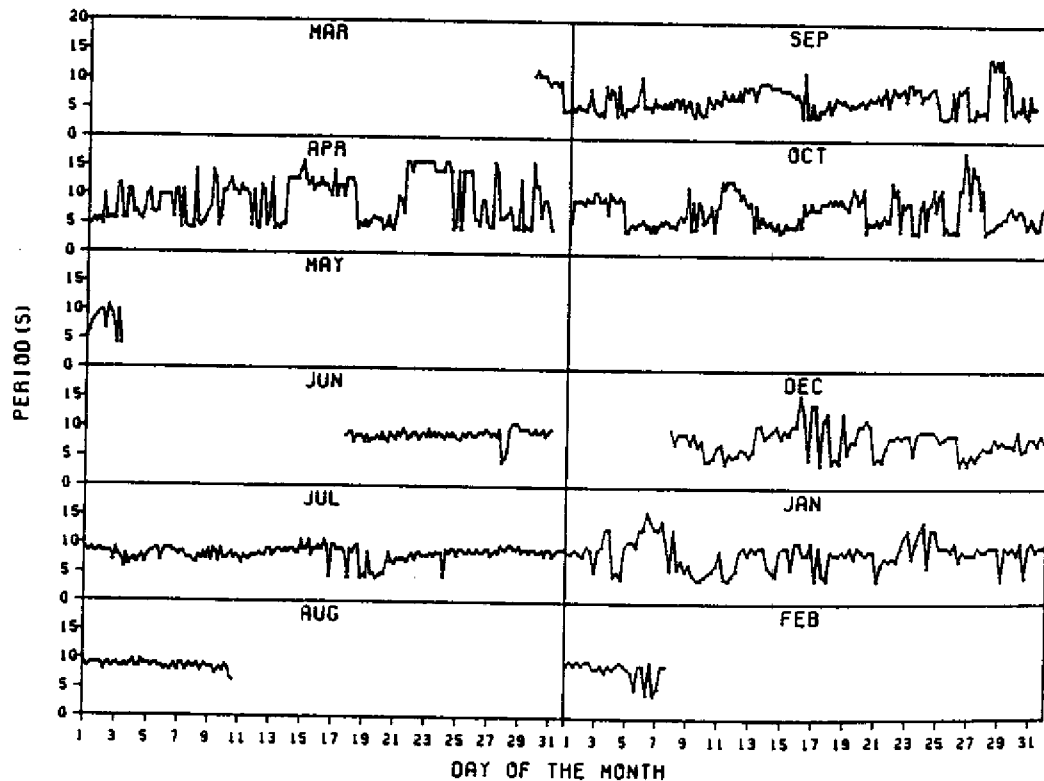
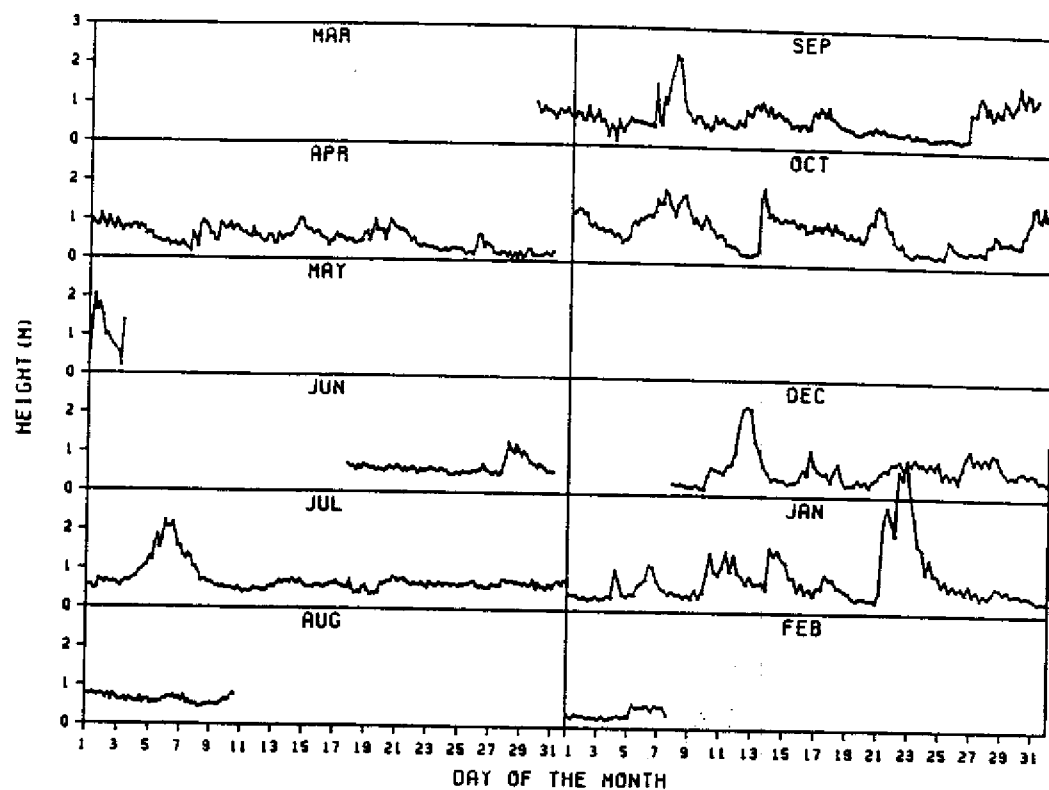


FIGURE 1-5 MONTHLY, SEASONAL & ANNUAL MEAN AND STD DEVIATION OF SIG.WAVE HEIGHT & PERIOD, AND MAXIMUM SIG.WAVE HEIGHT



STATION AT: KINGS BAY #4 - MAR 88-FEB 89

FIGURE 1-6 TIME HISTORY PLOTS OF SIGNIFICANT WAVE HEIGHT & PEAK PERIOD

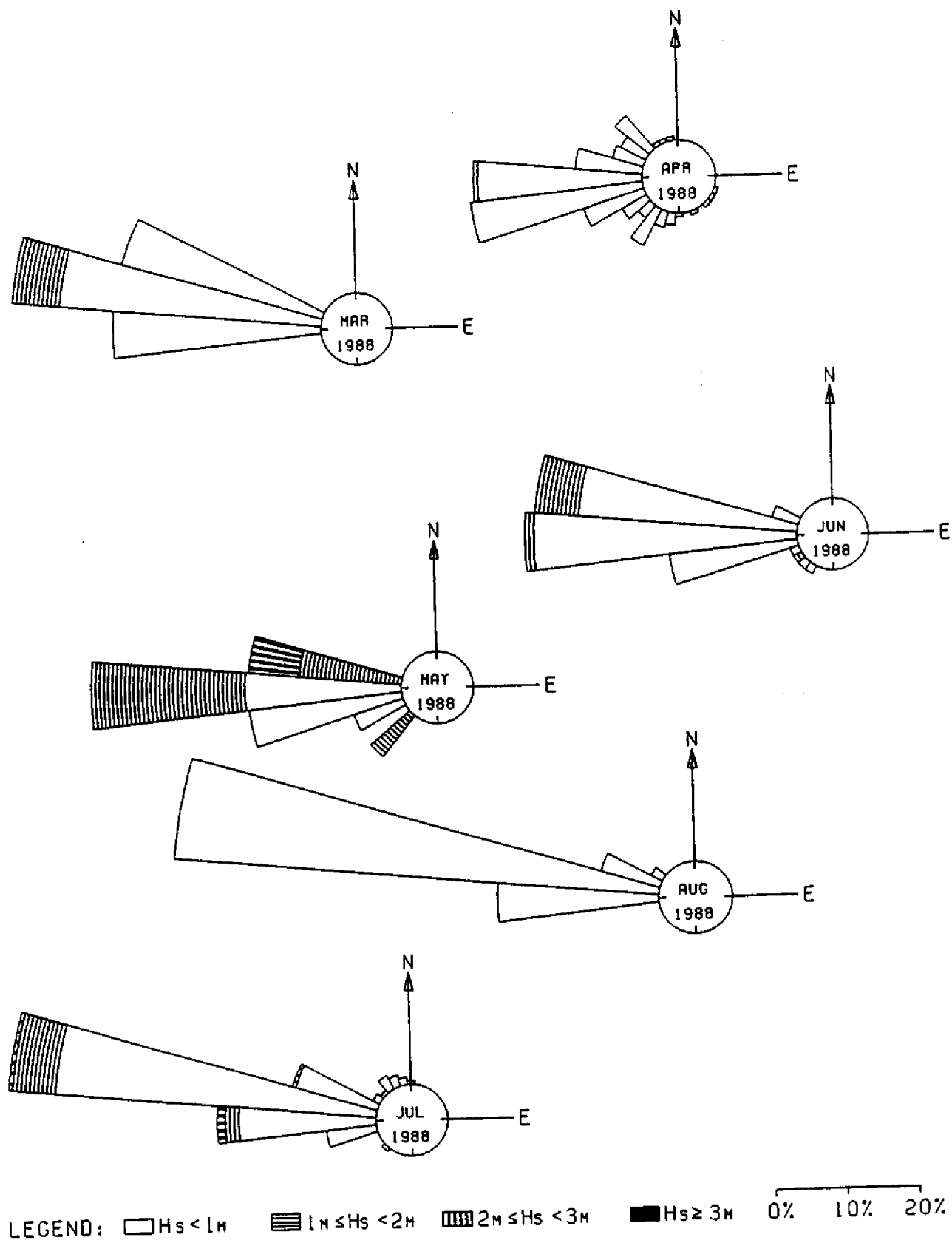
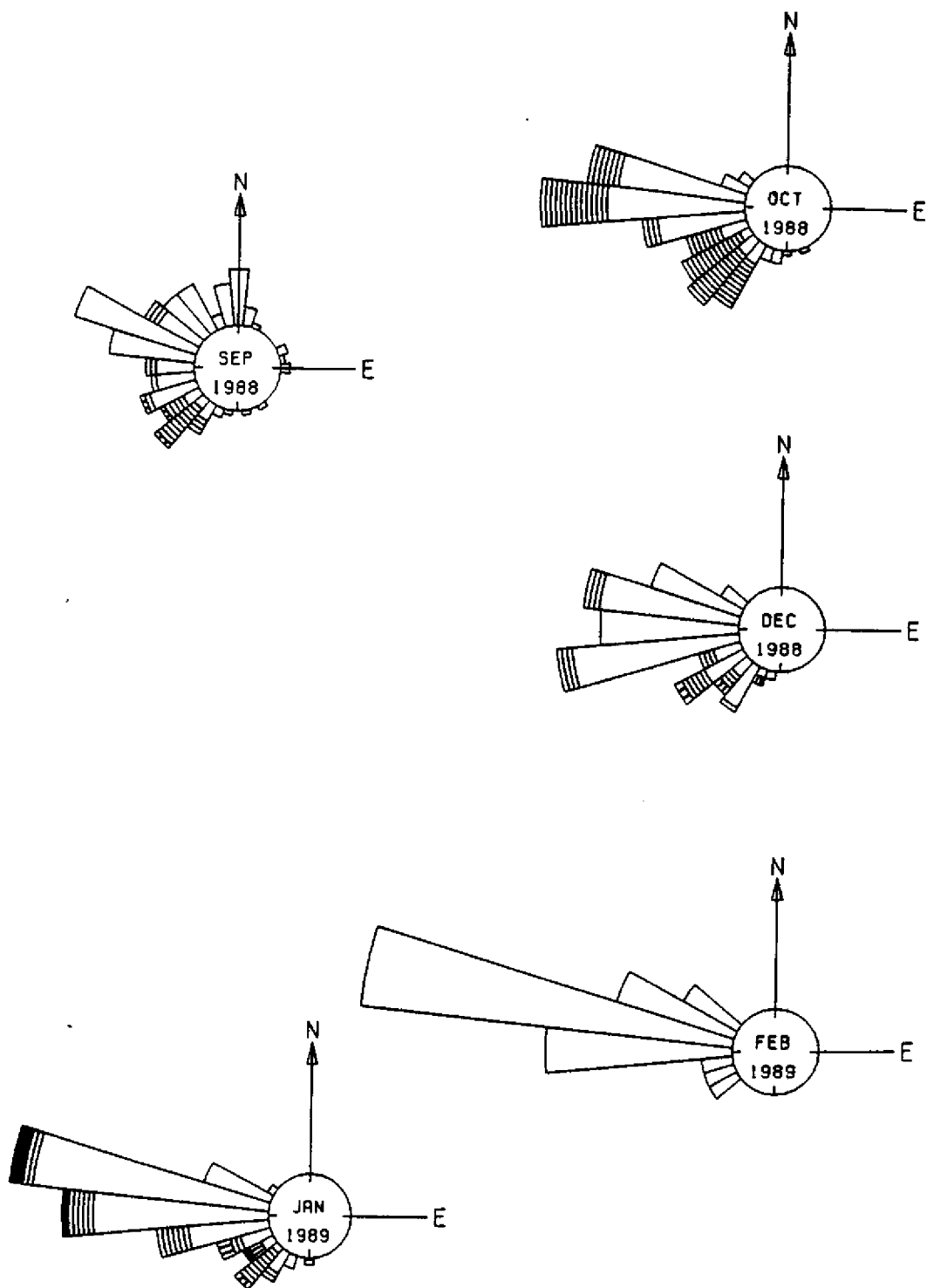
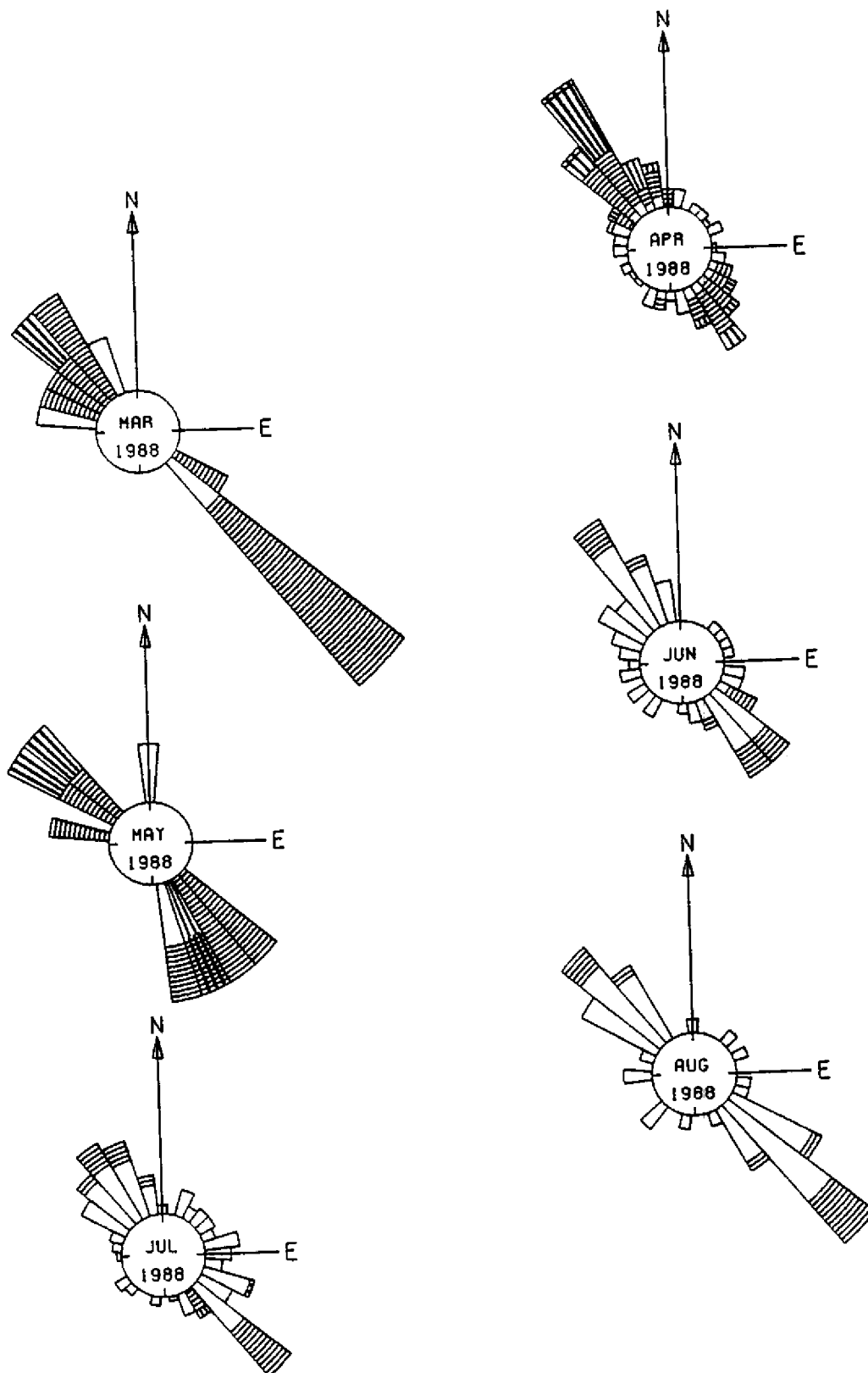


FIGURE 1-7A. MAR-AUG 1988 WAVE ROSES FOR STATION AT KINGS BAY #4



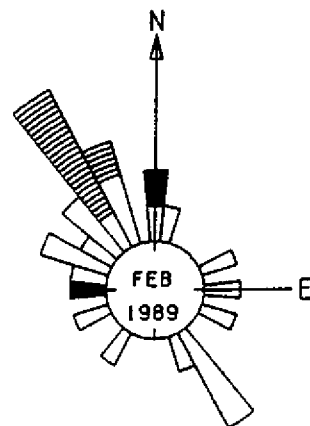
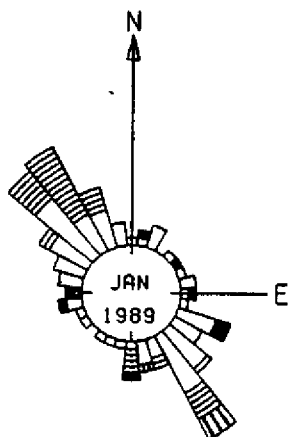
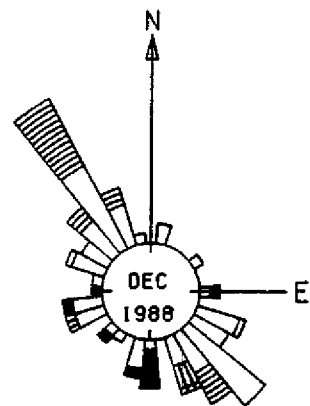
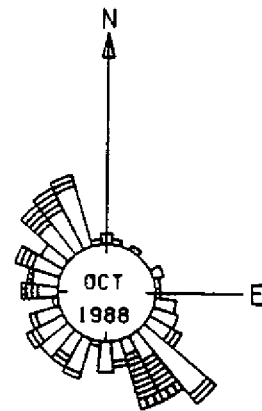
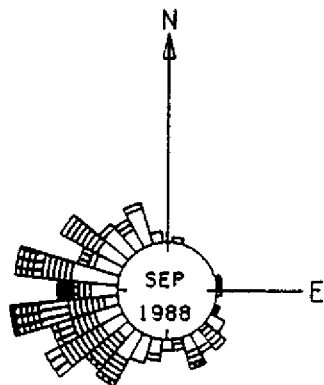
LEGEND:  $\square$   $H_s < 1m$   $\text{||||}$   $1m \leq H_s < 2m$   $\text{|||||}$   $2m \leq H_s < 3m$   $\blacksquare$   $H_s \geq 3m$  0% 10% 20%

FIGURE 1-78. SEP 88-FEB 89 WAVE ROSES FOR STATION AT KINGS BAY #4



LEGEND:  $v < 0.2$   $0.2 \leq v < 0.4$   $0.4 \leq v < 0.6$   $0.6 \leq v < 0.8$   $v \geq 0.8$  0% 10% 20%  
 (V IN M/S)

FIGURE 1-8A. MAR-AUG 1988 CURRENT ROSES FOR STATION AT KINGS BAY #4



LEGEND:  $v < 0.2$   $0.2 \leq v < 0.4$   $0.4 \leq v < 0.6$   $0.6 \leq v < 0.8$   $v \geq 0.8$  0% 10% 20%  
(V IN M/S)

FIGURE 1-88. SEP 88-FEB 89 CURRENT ROSES FOR STATION AT KINGS BAY #4

TABLE 1.11 Seasonal Percentage Joint Distribution  
of Significant Wave Height & Peak Period

Station at: KINGS BAY #4 - MAR 89-FEB 90 Data

|         |        | Peak Period(sec) |       |       |       |       |      | Total%: |
|---------|--------|------------------|-------|-------|-------|-------|------|---------|
| Hs(m)   |        | 3-5              | 5-7   | 7-9   | 9-11  | 11-13 | 13-  |         |
| 0.0-0.3 | Spring | 0.00             | 0.00  | 0.38  | 0.38  | 0.19  | 0.10 | 1.05    |
|         | Summer | 0.10             | 0.00  | 0.48  | 0.67  | 0.38  | 0.10 | 1.72    |
|         | Fall   | 0.10             | 0.00  | 0.29  | 0.76  | 0.10  | 0.00 | 1.24    |
|         | Winter | 0.00             | 0.00  | 0.29  | 1.15  | 0.67  | 0.10 | 2.19    |
|         | Annual | 0.19             | 0.00  | 1.43  | 2.96  | 1.34  | 0.29 | 6.20    |
| 0.3-0.6 | Spring | 1.81             | 0.67  | 2.96  | 2.58  | 0.38  | 0.57 | 8.97    |
|         | Summer | 2.77             | 1.81  | 6.11  | 5.15  | 1.24  | 0.00 | 17.08   |
|         | Fall   | 1.34             | 0.57  | 1.53  | 4.77  | 0.29  | 0.00 | 8.49    |
|         | Winter | 1.05             | 0.38  | 1.43  | 4.29  | 0.57  | 0.00 | 7.73    |
|         | Annual | 6.97             | 3.44  | 12.02 | 16.79 | 2.48  | 0.57 | 42.27   |
| 0.6-0.9 | Spring | 1.62             | 1.24  | 1.34  | 2.00  | 0.48  | 0.00 | 6.68    |
|         | Summer | 2.29             | 1.05  | 2.19  | 0.76  | 0.76  | 0.00 | 7.06    |
|         | Fall   | 2.67             | 1.15  | 3.34  | 1.43  | 0.67  | 0.00 | 9.26    |
|         | Winter | 1.24             | 0.86  | 0.76  | 5.15  | 0.86  | 0.00 | 8.87    |
|         | Annual | 7.82             | 4.29  | 7.63  | 9.35  | 2.77  | 0.00 | 31.87   |
| 0.9-1.2 | Spring | 0.38             | 1.15  | 0.19  | 0.19  | 0.00  | 0.00 | 1.91    |
|         | Summer | 0.29             | 0.38  | 0.00  | 0.00  | 0.10  | 0.00 | 0.76    |
|         | Fall   | 0.38             | 0.48  | 0.57  | 0.29  | 0.29  | 0.10 | 2.10    |
|         | Winter | 1.43             | 0.57  | 0.29  | 0.67  | 0.38  | 0.00 | 3.34    |
|         | Annual | 2.48             | 2.58  | 1.05  | 1.15  | 0.76  | 0.10 | 8.11    |
| 1.2-1.5 | Spring | 0.19             | 0.48  | 0.19  | 0.10  | 0.00  | 0.00 | 0.95    |
|         | Summer | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
|         | Fall   | 1.15             | 0.67  | 0.67  | 0.19  | 0.00  | 0.29 | 2.96    |
|         | Winter | 0.95             | 0.38  | 0.10  | 0.19  | 0.00  | 0.00 | 1.62    |
|         | Annual | 2.29             | 1.53  | 0.95  | 0.48  | 0.00  | 0.29 | 5.53    |
| 1.5-1.8 | Spring | 0.29             | 0.48  | 0.00  | 0.00  | 0.00  | 0.00 | 0.76    |
|         | Summer | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
|         | Fall   | 0.19             | 0.95  | 0.38  | 0.10  | 0.19  | 0.00 | 1.81    |
|         | Winter | 0.86             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.86    |
|         | Annual | 1.34             | 1.43  | 0.38  | 0.10  | 0.19  | 0.00 | 3.44    |
| 1.8-2.1 | Spring | 0.00             | 0.10  | 0.00  | 0.00  | 0.00  | 0.00 | 0.10    |
|         | Summer | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
|         | Fall   | 0.00             | 0.48  | 0.29  | 0.00  | 0.00  | 0.10 | 0.86    |
|         | Winter | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
|         | Annual | 0.00             | 0.57  | 0.29  | 0.00  | 0.00  | 0.10 | 0.95    |
| 2.1-2.4 | Spring | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
|         | Summer | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
|         | Fall   | 0.00             | 0.57  | 0.19  | 0.00  | 0.10  | 0.10 | 0.95    |
|         | Winter | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
|         | Annual | 0.00             | 0.57  | 0.19  | 0.00  | 0.10  | 0.10 | 0.95    |
| 2.4-2.7 | Spring | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
|         | Summer | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
|         | Fall   | 0.10             | 0.29  | 0.10  | 0.00  | 0.00  | 0.00 | 0.48    |
|         | Winter | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
|         | Annual | 0.10             | 0.29  | 0.10  | 0.00  | 0.00  | 0.00 | 0.48    |
| 2.7-    | Spring | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
|         | Summer | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
|         | Fall   | 0.00             | 0.19  | 0.00  | 0.00  | 0.00  | 0.00 | 0.19    |
|         | Winter | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
|         | Annual | 0.00             | 0.19  | 0.00  | 0.00  | 0.00  | 0.00 | 0.19    |
| Total%: | Spring | 4.29             | 4.10  | 5.06  | 5.25  | 1.05  | 0.67 | 20.42   |
|         | Summer | 5.44             | 3.24  | 8.78  | 6.58  | 2.48  | 0.10 | 26.62   |
|         | Fall   | 5.92             | 5.34  | 7.35  | 7.54  | 1.62  | 0.57 | 28.34   |
|         | Winter | 5.53             | 2.19  | 2.86  | 11.45 | 2.48  | 0.10 | 24.62   |
|         | Annual | 21.18            | 14.89 | 24.05 | 30.82 | 7.63  | 1.43 | 100.00  |

TABLE 1.12 Seasonal Marginal & Cumulative Probability  
Distribution of Significant Wave Height

Station at: KINGS BAY #4 - MAR 89-FEB 90 Data

| Spring                              |       |         |       |                          |
|-------------------------------------|-------|---------|-------|--------------------------|
| <= Marginal Height(m) Cumulative => |       |         |       |                          |
| 000                                 | 0.051 | 0.0-0.3 | 1.000 | 000000000000000000000000 |
| 000000000000000000000000            | 0.439 | 0.3-0.6 | 0.949 | 000000000000000000000000 |
| 000000000000000000000000            | 0.327 | 0.6-0.9 | 0.509 | 000000000000000000000000 |
| 00000                               | 0.093 | 0.9-1.2 | 0.182 | 000000                   |
| 000                                 | 0.047 | 1.2-1.5 | 0.089 | 00                       |
| 00                                  | 0.037 | 1.5-1.8 | 0.042 | 0                        |
|                                     | 0.005 | 1.8-2.1 | 0.005 |                          |
|                                     | 0.000 | 2.1-2.4 | 0.000 |                          |
|                                     | 0.000 | 2.4-2.7 | 0.000 |                          |
|                                     | 0.000 | 2.7-    | 0.000 |                          |
| Summer                              |       |         |       |                          |
| <= Marginal Height(m) Cumulative => |       |         |       |                          |
| 000                                 | 0.065 | 0.0-0.3 | 1.000 | 000000000000000000000000 |
| 000000000000000000000000            | 0.642 | 0.3-0.6 | 0.935 | 000000000000000000000000 |
| 000000000000                        | 0.265 | 0.6-0.9 | 0.294 | 00000000                 |
| 0                                   | 0.029 | 0.9-1.2 | 0.029 | 0                        |
|                                     | 0.000 | 1.2-1.5 | 0.000 |                          |
|                                     | 0.000 | 1.5-1.8 | 0.000 |                          |
|                                     | 0.000 | 1.8-2.1 | 0.000 |                          |
|                                     | 0.000 | 2.1-2.4 | 0.000 |                          |
|                                     | 0.000 | 2.4-2.7 | 0.000 |                          |
|                                     | 0.000 | 2.7-    | 0.000 |                          |
| Fall                                |       |         |       |                          |
| <= Marginal Height(m) Cumulative => |       |         |       |                          |
| 000                                 | 0.044 | 0.0-0.3 | 1.000 | 000000000000000000000000 |
| 000000000000000000000000            | 0.300 | 0.3-0.6 | 0.956 | 000000000000000000000000 |
| 000000000000000000000000            | 0.327 | 0.6-0.9 | 0.657 | 000000000000000000000000 |
| 000000                              | 0.074 | 0.9-1.2 | 0.330 | 00000000                 |
| 00000000                            | 0.104 | 1.2-1.5 | 0.256 | 000000                   |
| 00000                               | 0.064 | 1.5-1.8 | 0.152 | 0000                     |
| 00                                  | 0.030 | 1.8-2.1 | 0.088 | 00                       |
| 000                                 | 0.034 | 2.1-2.4 | 0.057 | 0                        |
| 0                                   | 0.017 | 2.4-2.7 | 0.024 | 0                        |
| 0                                   | 0.007 | 2.7-    | 0.007 |                          |
| Winter                              |       |         |       |                          |
| <= Marginal Height(m) Cumulative => |       |         |       |                          |
| 000000                              | 0.089 | 0.0-0.3 | 1.000 | 000000000000000000000000 |
| 000000000000000000000000            | 0.314 | 0.3-0.6 | 0.911 | 000000000000000000000000 |
| 000000000000000000000000            | 0.360 | 0.6-0.9 | 0.597 | 000000000000000000000000 |
| 0000000000                          | 0.136 | 0.9-1.2 | 0.236 | 00000000                 |
| 00000                               | 0.066 | 1.2-1.5 | 0.101 | 000                      |
| 00                                  | 0.035 | 1.5-1.8 | 0.035 | 0                        |
|                                     | 0.000 | 1.8-2.1 | 0.000 |                          |
|                                     | 0.000 | 2.1-2.4 | 0.000 |                          |
|                                     | 0.000 | 2.4-2.7 | 0.000 |                          |
|                                     | 0.000 | 2.7-    | 0.000 |                          |
| Annual                              |       |         |       |                          |
| <= Marginal Height(m) Cumulative => |       |         |       |                          |
| 0000                                | 0.062 | 0.0-0.3 | 1.000 | 000000000000000000000000 |
| 000000000000000000000000            | 0.423 | 0.3-0.6 | 0.938 | 000000000000000000000000 |
| 000000000000000000000000            | 0.319 | 0.6-0.9 | 0.515 | 000000000000000000000000 |
| 00000                               | 0.081 | 0.9-1.2 | 0.197 | 00000                    |
| 000                                 | 0.055 | 1.2-1.5 | 0.115 | 000                      |
| 00                                  | 0.034 | 1.5-1.8 | 0.060 | 00                       |
| 0                                   | 0.010 | 1.8-2.1 | 0.026 | 0                        |
| 0                                   | 0.010 | 2.1-2.4 | 0.016 |                          |
|                                     | 0.005 | 2.4-2.7 | 0.007 |                          |
|                                     | 0.002 | 2.7-    | 0.002 |                          |

TABLE 1.13 Seasonal Marginal & Cumulative Probability  
Distribution of Wave Period

Station at: KINGS BAY #4 - MAR 89-FEB 90 Data

| Spring                                |       |       |       |                      |
|---------------------------------------|-------|-------|-------|----------------------|
| <= Marginal Period(sec) Cumulative => |       |       |       |                      |
| 00000000000000000000                  | 0.210 | 3-5   | 1.000 | 00000000000000000000 |
| 00000000000000000000                  | 0.201 | 5-7   | 0.790 | 00000000000000000000 |
| 00000000000000000000                  | 0.248 | 7-9   | 0.589 | 00000000000000000000 |
| 00000000000000000000                  | 0.257 | 9-11  | 0.341 | 0000000000           |
| 00000000000000000000                  | 0.051 | 11-13 | 0.084 | 00                   |
| 000                                   | 0.033 | 13-   | 0.033 | 0                    |

| Summer                                |       |       |       |                      |
|---------------------------------------|-------|-------|-------|----------------------|
| <= Marginal Period(sec) Cumulative => |       |       |       |                      |
| 00000000000000000000                  | 0.204 | 3-5   | 1.000 | 00000000000000000000 |
| 0000000000                            | 0.122 | 5-7   | 0.796 | 00000000000000000000 |
| 00000000000000000000                  | 0.330 | 7-9   | 0.674 | 00000000000000000000 |
| 00000000000000000000                  | 0.247 | 9-11  | 0.344 | 0000000000           |
| 00000000                              | 0.093 | 11-13 | 0.097 | 00                   |
| 0.004                                 |       | 13-   | 0.004 |                      |

| Fall                                  |       |       |       |                      |
|---------------------------------------|-------|-------|-------|----------------------|
| <= Marginal Period(sec) Cumulative => |       |       |       |                      |
| 00000000000000000000                  | 0.209 | 3-5   | 1.000 | 00000000000000000000 |
| 00000000000000000000                  | 0.189 | 5-7   | 0.791 | 00000000000000000000 |
| 00000000000000000000                  | 0.259 | 7-9   | 0.603 | 00000000000000000000 |
| 00000000000000000000                  | 0.266 | 9-11  | 0.343 | 0000000000           |
| 000000                                | 0.057 | 11-13 | 0.077 | 00                   |
| 00                                    | 0.020 | 13-   | 0.020 | 0                    |

| Winter                                |       |       |       |                      |
|---------------------------------------|-------|-------|-------|----------------------|
| <= Marginal Period(sec) Cumulative => |       |       |       |                      |
| 000000000000                          | 0.225 | 3-5   | 1.000 | 00000000000000000000 |
| 00000                                 | 0.089 | 5-7   | 0.775 | 00000000000000000000 |
| 000000                                | 0.116 | 7-9   | 0.686 | 00000000000000000000 |
| 00000000000000000000                  | 0.465 | 9-11  | 0.570 | 0000000000000000     |
| 00000                                 | 0.101 | 11-13 | 0.105 | 000                  |
| 0.004                                 |       | 13-   | 0.004 |                      |

| Annual                                |       |       |       |                      |
|---------------------------------------|-------|-------|-------|----------------------|
| <= Marginal Period(sec) Cumulative => |       |       |       |                      |
| 00000000000000000000                  | 0.212 | 3-5   | 1.000 | 00000000000000000000 |
| 00000000000000                        | 0.149 | 5-7   | 0.788 | 00000000000000000000 |
| 00000000000000000000                  | 0.240 | 7-9   | 0.639 | 00000000000000000000 |
| 00000000000000000000                  | 0.308 | 9-11  | 0.399 | 0000000000           |
| 000000                                | 0.076 | 11-13 | 0.091 | 00                   |
| 0                                     | 0.014 | 13-   | 0.014 |                      |

TABLE 1.14 Mean & Standard Deviation of Significant Wave Height & Period, and Maximum Significant Wave Height

Station at: KINGS BAY #4 - MAR 89-FEB 90 Data

|        | Mean<br>Hs(m) | Std Dev<br>Hs(m) | Maximum#:<br>Hs(m) | Date  | Mean<br>Tp(sec) | Std Dev<br>Tp(sec) | #Data<br>Pts |
|--------|---------------|------------------|--------------------|-------|-----------------|--------------------|--------------|
| Mar    | 0.74          | 0.33             | 2.01               | 3/22  | 7.30            | 1.75               | 66           |
| Apr    | 0.80          | 0.33             | 1.66               | 4/12  | 6.98            | 2.27               | 67           |
| May    | 0.51          | 0.28             | 1.76               | 5/28  | 8.57            | 3.09               | 81           |
| Jun    | 0.49          | 0.18             | 1.16               | 6/ 8  | 6.83            | 2.28               | 120          |
| Jul    | 0.52          | 0.17             | 1.07               | 7/ 1  | 8.17            | 2.04               | 124          |
| Aug    | 0.54          | 0.20             | 1.03               | 8/ 9  | 9.41            | 2.24               | 35           |
| Sep    | 1.20          | 0.60             | 2.87               | 9/24  | 7.90            | 3.05               | 67           |
| Oct    | 1.06          | 0.65             | 2.58               | 10/28 | 7.01            | 2.12               | 110          |
| Nov    | 0.60          | 0.26             | 1.76               | 11/24 | 8.18            | 2.45               | 120          |
| Dec    | 0.41          | 0.22             | 0.95               | 12/ 3 | 8.40            | 2.54               | 22           |
| Jan    | 0.62          | 0.24             | 1.39               | 1/ 2  | 8.97            | 2.14               | 124          |
| Feb    | 0.88          | 0.39             | 1.80               | 2/20  | 7.29            | 2.92               | 112          |
| Spring | 0.67          | 0.31             | 2.01               | 3/22  | 7.68            | 2.49               | 214          |
| Summer | 0.51          | 0.18             | 1.16               | 6/ 8  | 7.75            | 2.17               | 279          |
| Fall   | 0.90          | 0.51             | 2.87               | 9/24  | 7.68            | 2.49               | 297          |
| Winter | 0.71          | 0.31             | 1.80               | 2/20  | 8.19            | 2.54               | 258          |
| Annual | 0.70          | 0.36             | 2.87               | 9/24  | 7.82            | 2.42               | 1048         |

TABLE 1.15 Wave & Current Information in the Dominant Wave & Current Directions

Station at: KINGS BAY #4 - MAR 89-FEB 90 Data

|        | Wave Direction<br>(Deg. wrt North) | Hs<br>(m.) | Peak Period<br>(sec.) | Current Direction<br>(Deg. wrt North) | Current<br>(m/sec) |
|--------|------------------------------------|------------|-----------------------|---------------------------------------|--------------------|
| Mar    | 272.58                             | 0.67       | 8.04                  | 317.66                                | 0.20               |
| Apr    | 261.93                             | 0.58       | 7.66                  | 232.07                                |                    |
| May    | 260.99                             | 0.43       | 10.73                 | 332.82                                | 0.22               |
| Jun    | 293.18                             | 0.57       | 4.44                  | 338.82                                | 0.18               |
| Jul    | 276.91                             | 0.51       | 9.12                  | 320.50                                | 0.18               |
| Aug    | 270.49                             | 0.47       | 9.58                  | 327.70                                | 0.23               |
| Sep    |                                    |            |                       |                                       |                    |
| Oct    | 258.74                             | 1.61       | 6.85                  | 200.47                                | 0.14               |
| Nov    | 268.48                             | 0.61       | 10.08                 | 356.23                                | 0.16               |
| Dec    | 244.36                             | 0.33       | 7.52                  | 343.72                                | 0.23               |
| Jan    | 278.73                             | 0.60       | 10.08                 | 139.53                                | 0.16               |
| Feb    | 270.30                             | 1.07       | 6.23                  | 151.41                                | 0.15               |
| Spring | 265.47                             | 0.55       | 9.18                  | 314.25                                | 0.21               |
| Summer | 282.47                             | 0.51       | 9.02                  | 334.16                                | 0.19               |
| Fall   | 262.38                             | 1.04       | 8.67                  | 352.42                                | 0.15               |
| Winter | 272.76                             | 0.85       | 7.95                  | 137.37                                | 0.16               |
| Annual | 270.35                             | 0.68       | 8.71                  | 343.08                                | 0.18               |

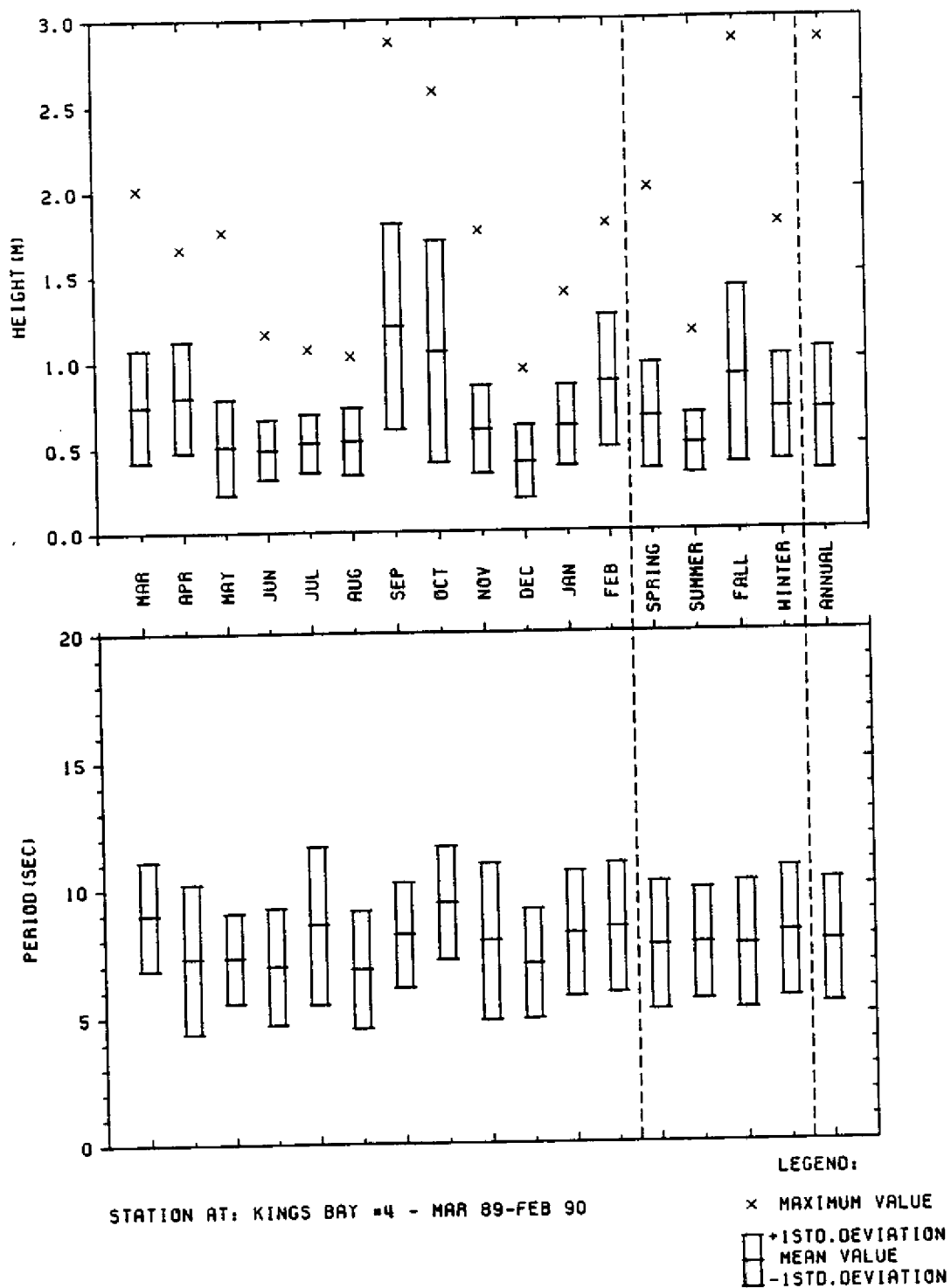
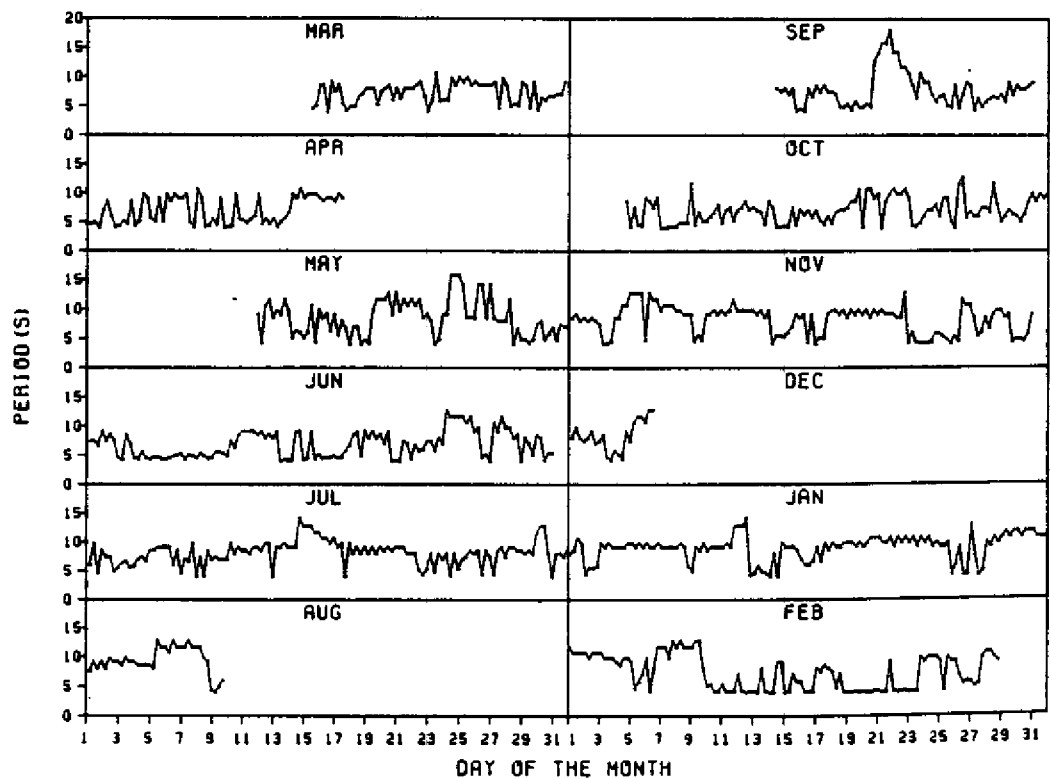
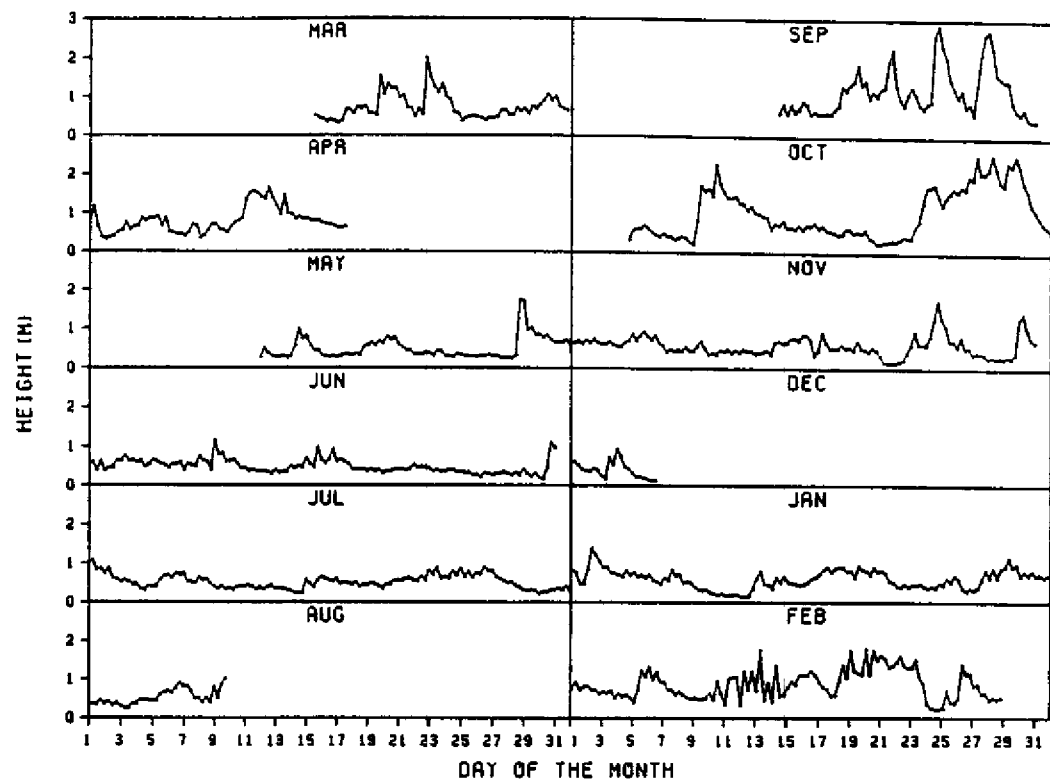
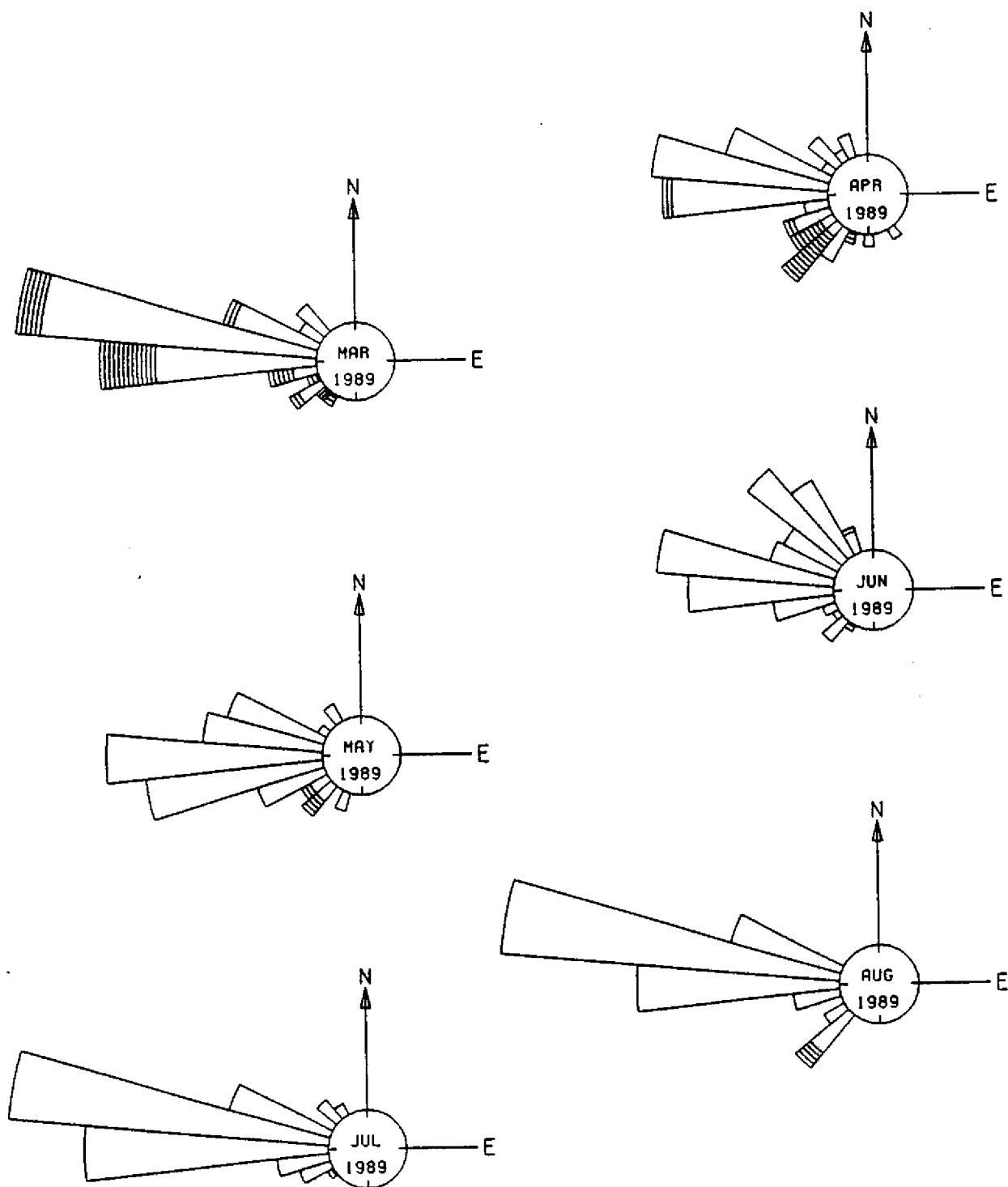


FIGURE 1-9 MONTHLY, SEASONAL & ANNUAL MEAN AND STD DEVIATION OF SIG.WAVE HEIGHT & PERIOD, AND MAXIMUM SIG.WAVE HEIGHT



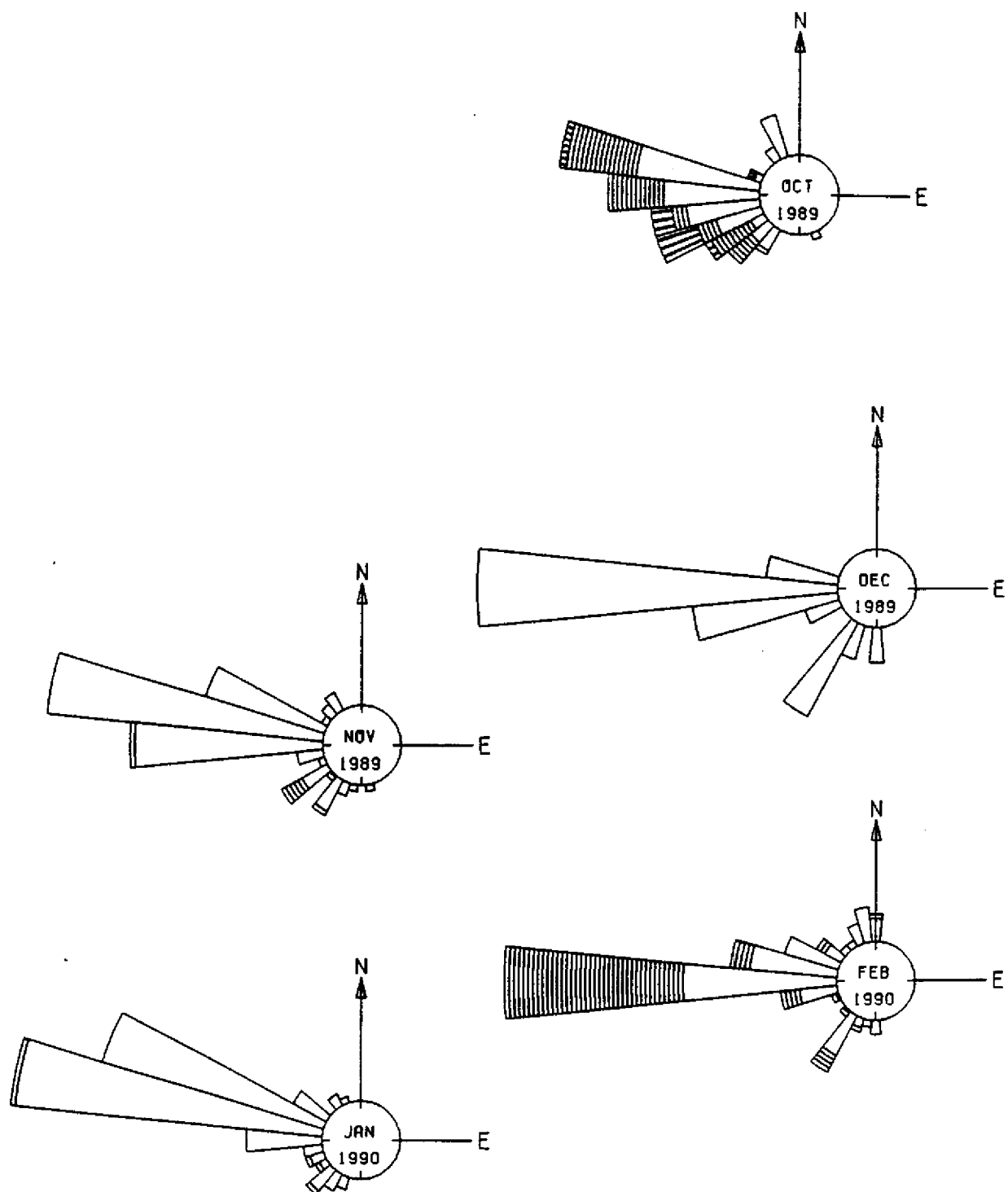
STATION AT: KINGS BAY #4 - MAR 89-FEB 90

FIGURE 1-10 TIME HISTORY PLOTS OF SIGNIFICANT WAVE HEIGHT & PEAK PERIOD



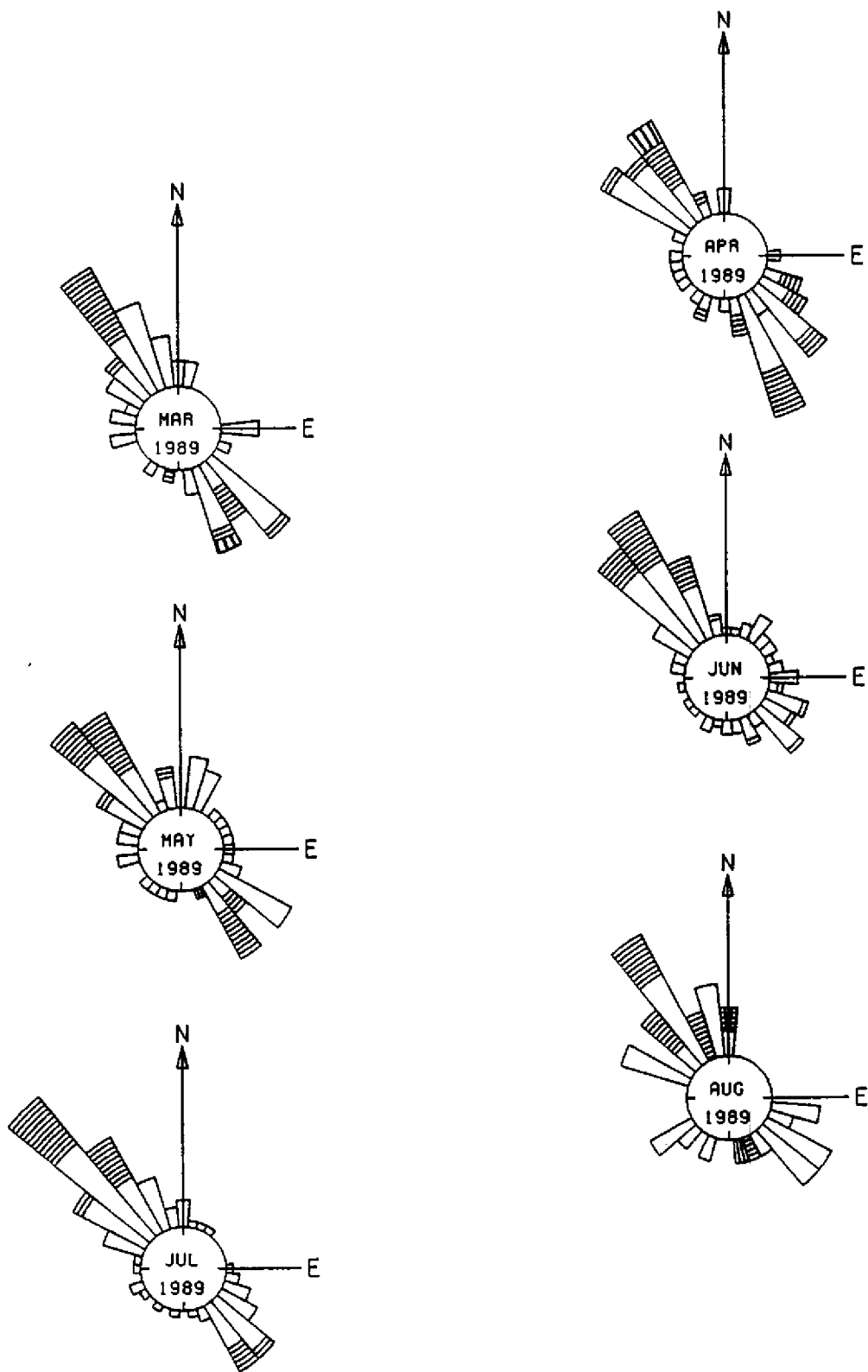
LEGEND:  $\square H_s < 1\text{m}$   $\text{▨ } 1\text{m} \leq H_s < 2\text{m}$   $\text{▩ } 2\text{m} \leq H_s < 3\text{m}$   $\blacksquare H_s \geq 3\text{m}$  0% 10% 20%

FIGURE 1-11A MAR-AUG 1989 WAVE ROSES FOR STATION AT KINGS BAY #4



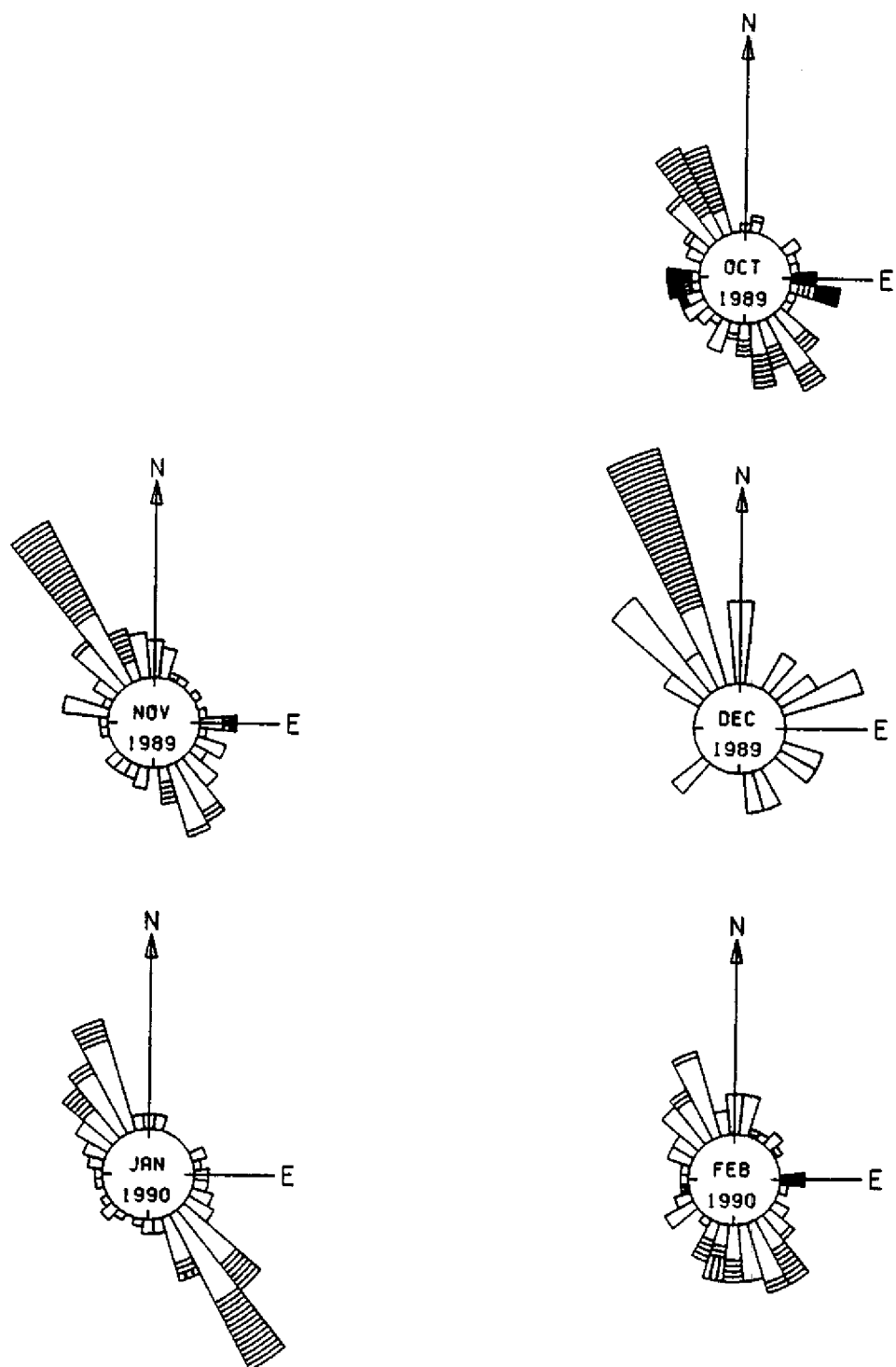
LEGEND:  $H_s < 1\text{M}$   $1\text{M} \leq H_s < 2\text{M}$   $2\text{M} \leq H_s < 3\text{M}$   $H_s \geq 3\text{M}$  0% 10% 20%

FIGURE 1-118 SEP 89-FEB 90 WAVE ROSES FOR STATION AT KINGS BAY #4



LEGEND:  $V < 0.2$   $0.2 \leq V < 0.4$   $0.4 \leq V < 0.6$   $0.6 \leq V < 0.8$   $V \geq 0.8$  0% 10% 20%  
(V IN M/S)

FIGURE I-12A. MAR-AUG 1989 CURRENT ROSES FOR STATION AT KINGS BAY #4



LEGEND:  $v < 0.2$   $0.2 \leq v < 0.4$   $0.4 \leq v < 0.6$   $0.6 \leq v < 0.8$   $v \geq 0.8$  0% 10% 20%  
(V IN M/S)

FIGURE 1-12B. SEP 89-FEB 90 CURRENT ROSES FOR STATION AT KINGS BAY #4

TABLE 1.16 Seasonal Percentage Joint Distribution  
of Significant Wave Height & Peak Period

Station at: KINGS BAY #4 - MAR-OCT 1990 Data

|         |         | Peak Period(sec) |       |       |       |       |      | Total%: |
|---------|---------|------------------|-------|-------|-------|-------|------|---------|
| Hs(m)   |         | 3-5              | 5-7   | 7-9   | 9-11  | 11-13 | 13-  |         |
| 0.0-0.3 | Spring  | 0.25             | 0.00  | 0.61  | 0.12  | 0.74  | 0.00 | 1.72    |
|         | Summer  | 5.64             | 0.12  | 0.74  | 0.25  | 0.00  | 0.37 | 7.11    |
|         | Fall    | 0.00             | 0.00  | 0.12  | 0.00  | 0.00  | 0.00 | 0.12    |
|         | *Annual | 5.88             | 0.12  | 1.47  | 0.37  | 0.74  | 0.37 | 8.95    |
| 0.3-0.6 | Spring  | 4.29             | 1.96  | 5.76  | 4.17  | 2.57  | 0.49 | 19.24   |
|         | Summer  | 4.53             | 0.86  | 9.31  | 6.74  | 1.47  | 1.35 | 24.26   |
|         | Fall    | 0.61             | 0.61  | 2.08  | 2.21  | 0.25  | 0.12 | 5.88    |
|         | *Annual | 9.44             | 3.43  | 17.16 | 13.11 | 4.29  | 1.96 | 49.39   |
| 0.6-0.9 | Spring  | 3.43             | 2.33  | 2.57  | 2.21  | 0.12  | 0.61 | 11.27   |
|         | Summer  | 1.72             | 0.61  | 2.33  | 1.47  | 0.74  | 0.00 | 6.86    |
|         | Fall    | 1.84             | 0.74  | 0.25  | 1.10  | 3.06  | 0.12 | 7.11    |
|         | *Annual | 6.99             | 3.68  | 5.15  | 4.78  | 3.92  | 0.74 | 25.25   |
| 0.9-1.2 | Spring  | 1.47             | 1.84  | 1.47  | 0.49  | 0.25  | 0.00 | 5.51    |
|         | Summer  | 0.98             | 0.25  | 0.12  | 0.74  | 0.12  | 0.00 | 2.21    |
|         | Fall    | 0.61             | 0.37  | 0.37  | 0.00  | 0.37  | 0.12 | 1.84    |
|         | *Annual | 3.06             | 2.45  | 1.96  | 1.23  | 0.74  | 0.12 | 9.56    |
| 1.2-1.5 | Spring  | 0.37             | 1.35  | 1.10  | 0.37  | 0.00  | 0.00 | 3.19    |
|         | Summer  | 0.12             | 0.49  | 0.12  | 0.12  | 0.12  | 0.00 | 0.98    |
|         | Fall    | 0.12             | 0.37  | 0.00  | 0.00  | 0.00  | 0.00 | 0.49    |
|         | *Annual | 0.61             | 2.21  | 1.23  | 0.49  | 0.12  | 0.00 | 4.66    |
| 1.5-1.8 | Spring  | 0.00             | 0.61  | 0.25  | 0.00  | 0.00  | 0.00 | 0.86    |
|         | Summer  | 0.00             | 0.25  | 0.12  | 0.25  | 0.00  | 0.00 | 0.61    |
|         | Fall    | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
|         | *Annual | 0.00             | 0.86  | 0.37  | 0.25  | 0.00  | 0.00 | 1.47    |
| 1.8-2.1 | Spring  | 0.00             | 0.49  | 0.00  | 0.00  | 0.00  | 0.00 | 0.49    |
|         | Summer  | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
|         | Fall    | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
|         | *Annual | 0.00             | 0.49  | 0.00  | 0.00  | 0.00  | 0.00 | 0.49    |
| 2.1-2.4 | Spring  | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
|         | Summer  | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
|         | Fall    | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
|         | *Annual | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
| 2.4-2.7 | Spring  | 0.00             | 0.12  | 0.12  | 0.00  | 0.00  | 0.00 | 0.25    |
|         | Summer  | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
|         | Fall    | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
|         | *Annual | 0.00             | 0.12  | 0.12  | 0.00  | 0.00  | 0.00 | 0.25    |
| 2.7-    | Spring  | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
|         | Summer  | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
|         | Fall    | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
|         | *Annual | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
| Total%: | Spring  | 9.80             | 8.70  | 11.89 | 7.35  | 3.68  | 1.10 | 42.52   |
|         | Summer  | 12.99            | 2.57  | 12.75 | 9.56  | 2.45  | 1.72 | 42.03   |
|         | Fall    | 3.19             | 2.08  | 2.82  | 3.31  | 3.68  | 0.37 | 15.44   |
|         | *Annual | 25.98            | 13.36 | 27.45 | 20.22 | 9.80  | 3.19 | 100.00  |

\* Based on data analysed; one or more seasonal data are not available.

TABLE 1.17 Seasonal Marginal & Cumulative Probability  
Distribution of Significant Wave Height

Station at: KINGS BAY #4 - MAR-OCT 1990 Data

| Spring                              |       |         |       |                          |  |
|-------------------------------------|-------|---------|-------|--------------------------|--|
| <= Marginal Height(m) Cumulative => |       |         |       |                          |  |
| 00                                  | 0.040 | 0.0-0.3 | 1.000 | 000000000000000000000000 |  |
| 000000000000000000000000            | 0.452 | 0.3-0.6 | 0.960 | 000000000000000000000000 |  |
| 000000000000000000000000            | 0.265 | 0.6-0.9 | 0.507 | 000000000000000000000000 |  |
| 00000000                            | 0.130 | 0.9-1.2 | 0.242 | 0000000                  |  |
| 0000                                | 0.075 | 1.2-1.5 | 0.112 | 000                      |  |
| 0                                   | 0.020 | 1.5-1.8 | 0.037 | 0                        |  |
| 0                                   | 0.012 | 1.8-2.1 | 0.017 |                          |  |
|                                     | 0.000 | 2.1-2.4 | 0.006 |                          |  |
|                                     | 0.006 | 2.4-2.7 | 0.006 |                          |  |
|                                     | 0.000 | 2.7-    | 0.000 |                          |  |
| Summer                              |       |         |       |                          |  |
| <= Marginal Height(m) Cumulative => |       |         |       |                          |  |
| 00000000                            | 0.169 | 0.0-0.3 | 1.000 | 000000000000000000000000 |  |
| 000000000000000000000000            | 0.577 | 0.3-0.6 | 0.831 | 000000000000000000000000 |  |
| 00000000                            | 0.163 | 0.6-0.9 | 0.254 | 0000000                  |  |
| 00                                  | 0.052 | 0.9-1.2 | 0.090 | 00                       |  |
| 0                                   | 0.023 | 1.2-1.5 | 0.038 | 0                        |  |
| 0                                   | 0.015 | 1.5-1.8 | 0.015 |                          |  |
|                                     | 0.000 | 1.8-2.1 | 0.000 |                          |  |
|                                     | 0.000 | 2.1-2.4 | 0.000 |                          |  |
|                                     | 0.000 | 2.4-2.7 | 0.000 |                          |  |
|                                     | 0.000 | 2.7-    | 0.000 |                          |  |
| Fall                                |       |         |       |                          |  |
| <= Marginal Height(m) Cumulative => |       |         |       |                          |  |
|                                     | 0.008 | 0.0-0.3 | 1.000 | 000000000000000000000000 |  |
| 000000000000000000000000            | 0.381 | 0.3-0.6 | 0.992 | 000000000000000000000000 |  |
| 000000000000000000000000            | 0.460 | 0.6-0.9 | 0.611 | 000000000000000000000000 |  |
| 000000                              | 0.119 | 0.9-1.2 | 0.151 | 0000                     |  |
| 00                                  | 0.032 | 1.2-1.5 | 0.032 | 0                        |  |
|                                     | 0.000 | 1.5-1.8 | 0.000 |                          |  |
|                                     | 0.000 | 1.8-2.1 | 0.000 |                          |  |
|                                     | 0.000 | 2.1-2.4 | 0.000 |                          |  |
|                                     | 0.000 | 2.4-2.7 | 0.000 |                          |  |
|                                     | 0.000 | 2.7-    | 0.000 |                          |  |
| *Annual                             |       |         |       |                          |  |
| <= Marginal Height(m) Cumulative => |       |         |       |                          |  |
| 00000                               | 0.089 | 0.0-0.3 | 1.000 | 000000000000000000000000 |  |
| 000000000000000000000000            | 0.494 | 0.3-0.6 | 0.911 | 000000000000000000000000 |  |
| 0000000000000000                    | 0.252 | 0.6-0.9 | 0.417 | 0000000000               |  |
| 00000                               | 0.096 | 0.9-1.2 | 0.164 | 0000                     |  |
| 00                                  | 0.047 | 1.2-1.5 | 0.069 | 00                       |  |
| 0                                   | 0.015 | 1.5-1.8 | 0.022 | 0                        |  |
|                                     | 0.005 | 1.8-2.1 | 0.007 |                          |  |
|                                     | 0.000 | 2.1-2.4 | 0.002 |                          |  |
|                                     | 0.002 | 2.4-2.7 | 0.002 |                          |  |
|                                     | 0.000 | 2.7-    | 0.000 |                          |  |

\* Based on data analysed; one or more seasonal data are not available.

TABLE 1.18 Seasonal Marginal & Cumulative Probability  
Distribution of Wave Period

Station at: KINGS BAY #4 - MAR-OCT 1990 Data

| Spring                                |       |       |       |                          |
|---------------------------------------|-------|-------|-------|--------------------------|
| <= Marginal Period(sec) Cumulative => |       |       |       |                          |
| 000000000000000000000000              | 0.231 | 3-5   | 1.000 | 000000000000000000000000 |
| 000000000000000000000000              | 0.205 | 5-7   | 0.769 | 000000000000000000000000 |
| 000000000000000000000000              | 0.280 | 7-9   | 0.565 | 000000000000000000000000 |
| 000000000000000000000000              | 0.173 | 9-11  | 0.285 | 00000000                 |
| 00000000                              | 0.086 | 11-13 | 0.112 | 000                      |
| 00                                    | 0.026 | 13-   | 0.026 | 0                        |
| Summer                                |       |       |       |                          |
| <= Marginal Period(sec) Cumulative => |       |       |       |                          |
| 000000000000000000000000              | 0.309 | 3-5   | 1.000 | 000000000000000000000000 |
| 00000                                 | 0.061 | 5-7   | 0.691 | 000000000000000000000000 |
| 000000000000000000000000              | 0.303 | 7-9   | 0.630 | 000000000000000000000000 |
| 000000000000000000000000              | 0.227 | 9-11  | 0.327 | 00000000                 |
| 00000                                 | 0.058 | 11-13 | 0.099 | 00                       |
| 000                                   | 0.041 | 13-   | 0.041 | 0                        |
| Fall                                  |       |       |       |                          |
| <= Marginal Period(sec) Cumulative => |       |       |       |                          |
| 000000000000000000000000              | 0.206 | 3-5   | 1.000 | 000000000000000000000000 |
| 000000000000000000000000              | 0.135 | 5-7   | 0.794 | 000000000000000000000000 |
| 000000000000000000000000              | 0.183 | 7-9   | 0.659 | 000000000000000000000000 |
| 000000000000000000000000              | 0.214 | 9-11  | 0.476 | 000000000000             |
| 000000000000000000000000              | 0.238 | 11-13 | 0.262 | 00000000                 |
| 000                                   | 0.024 | 13-   | 0.024 | 0                        |
| *Annual                               |       |       |       |                          |
| <= Marginal Period(sec) Cumulative => |       |       |       |                          |
| 000000000000000000000000              | 0.260 | 3-5   | 1.000 | 000000000000000000000000 |
| 000000000000                          | 0.134 | 5-7   | 0.740 | 000000000000000000000000 |
| 000000000000000000000000              | 0.275 | 7-9   | 0.607 | 000000000000000000000000 |
| 000000000000000000000000              | 0.202 | 9-11  | 0.332 | 00000000                 |
| 000000000                             | 0.098 | 11-13 | 0.130 | 000                      |
| 000                                   | 0.032 | 13-   | 0.032 | 0                        |

\* Based on data analysed; one or more seasonal data are not available.

TABLE 1.19 Mean & Standard Deviation of Significant Wave Height & Period, and Maximum# Significant Wave Height

Station at: KINGS BAY #4 - MAR-OCT 1990 Data

|         | Mean<br>Hs(m) | Std Dev<br>Hs(m) | Maximum#:<br>Hs(m) | Date  | Mean<br>Tp(sec) | Std Dev<br>Tp(sec) | #Data<br>Pts |
|---------|---------------|------------------|--------------------|-------|-----------------|--------------------|--------------|
| Mar     | 0.68          | 0.35             | 1.70               | 3/28  | 8.37            | 2.34               | 103          |
| Apr     | 0.85          | 0.43             | 2.66               | 4/18  | 8.00            | 2.87               | 120          |
| May     | 0.64          | 0.26             | 1.57               | 5/10  | 6.56            | 2.66               | 124          |
| Jun     | 0.35          | 0.28             | 1.21               | 6/14  | 6.32            | 3.41               | 113          |
| Jul     | 0.73          | 0.35             | 1.76               | 7/28  | 7.38            | 1.97               | 106          |
| Aug     | 0.42          | 0.10             | 0.78               | 8/30  | 9.24            | 3.34               | 124          |
| Sep     | 0.69          | 0.24             | 1.35               | 9/28  | 8.26            | 3.00               | 120          |
| Oct     | 0.66          | 0.04             | 0.71               | 10/ 1 | 11.16           | 0.71               | 6            |
| Nov     |               |                  |                    |       |                 |                    |              |
| Dec     |               |                  |                    |       |                 |                    |              |
| Jan     |               |                  |                    |       |                 |                    |              |
| Feb     |               |                  |                    |       |                 |                    |              |
| Spring  | 0.72          | 0.35             | 2.66               | 4/18  | 7.60            | 2.65               | 347          |
| Summer  | 0.49          | 0.26             | 1.76               | 7/28  | 7.70            | 3.01               | 343          |
| Fall    | 0.69          | 0.23             | 1.35               | 9/28  | 8.40            | 2.93               | 126          |
| *Annual | 0.62          | 0.30             | 2.66               | 4/18  | 7.76            | 2.85               | 816          |

TABLE 1.20 Wave & Current Information in the Dominant Wave & Current Directions

Station at: KINGS BAY #4 - MAR-OCT 1990 Data

|         | Wave Direction<br>(Deg. wrt North) | Hs<br>(m.) | Peak Period<br>(sec.) | Current Direction<br>(Deg. wrt North) | Current<br>(m/sec) |
|---------|------------------------------------|------------|-----------------------|---------------------------------------|--------------------|
| Mar     | 264.86                             | 0.71       | 8.32                  | 241.97                                | 0.28               |
| Apr     | 275.91                             | 0.87       | 9.22                  | 261.99                                | 0.23               |
| May     | 293.20                             | 0.41       | 6.48                  | 278.47                                | 0.39               |
| Jun     | 271.33                             | 0.41       | 7.94                  | 248.75                                | 0.05               |
| Jul     | 289.14                             | 0.67       | 8.49                  | 348.93                                | 0.19               |
| Aug     | 283.67                             | 0.43       | 10.63                 | 30.65                                 | 0.13               |
| Sep     | 269.94                             | 0.66       | 9.80                  | 15.76                                 |                    |
| Oct     | 281.89                             | 0.64       | 11.14                 | 267.76                                |                    |
| Nov     |                                    |            |                       |                                       |                    |
| Dec     |                                    |            |                       |                                       |                    |
| Jan     |                                    |            |                       |                                       |                    |
| Feb     |                                    |            |                       |                                       |                    |
| Spring  | 278.42                             | 0.76       | 8.56                  | 267.07                                | 0.30               |
| Summer  | 283.52                             | 0.52       | 9.21                  | 7.59                                  | 0.16               |
| Fall    | 270.53                             | 0.66       | 9.95                  | 11.60                                 |                    |
| *Annual | 278.75                             | 0.59       | 9.14                  | 289.11                                | 0.26               |

\* Based on data analysed; one or more seasonal data are not available.

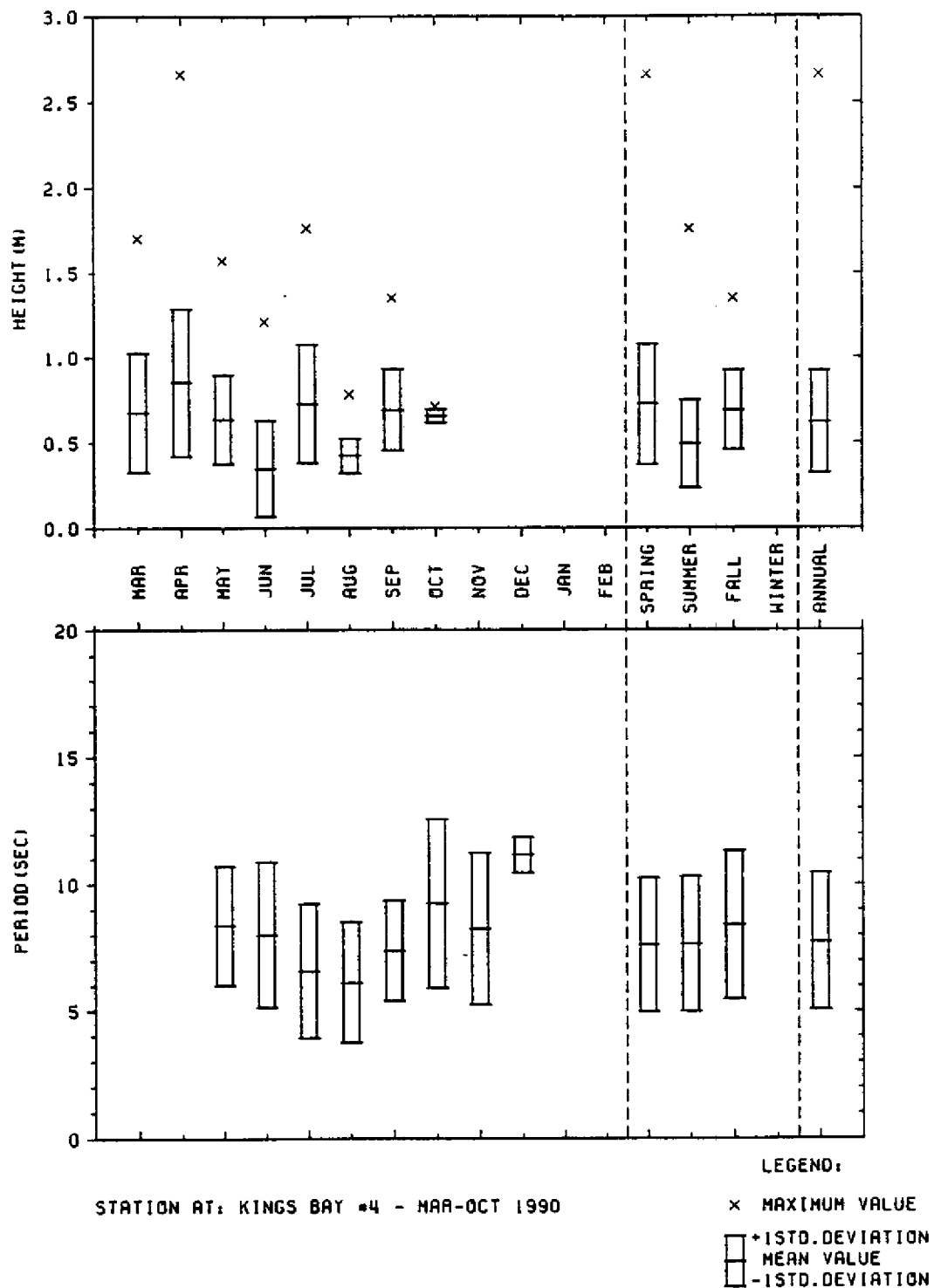
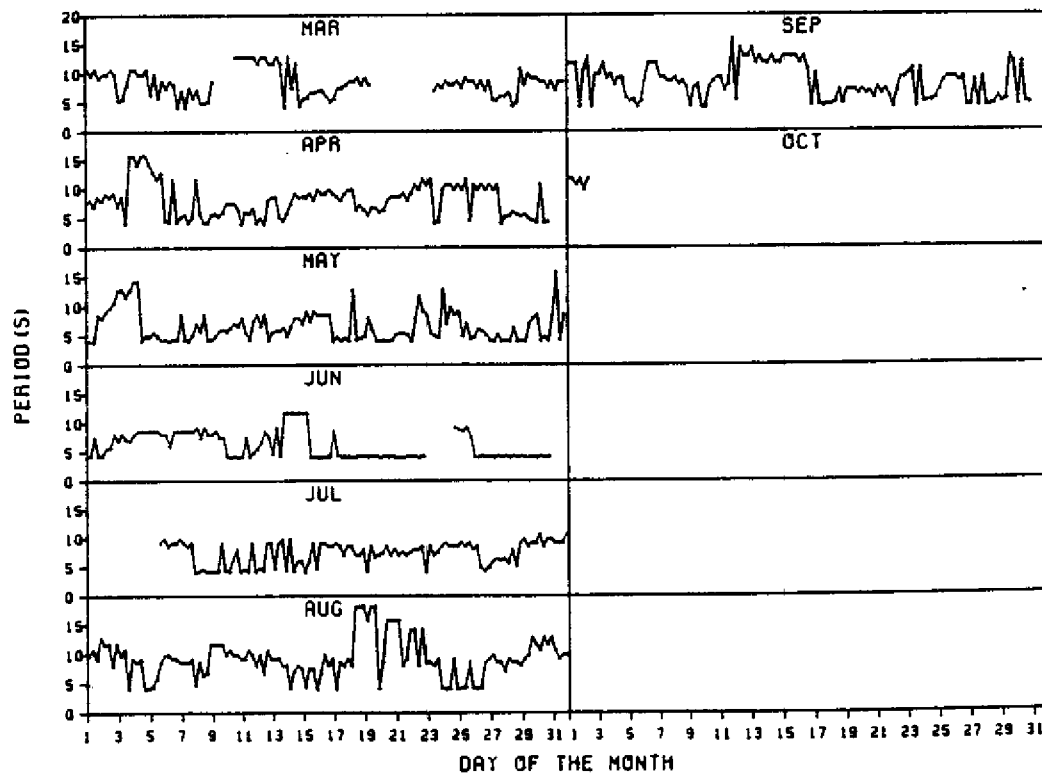
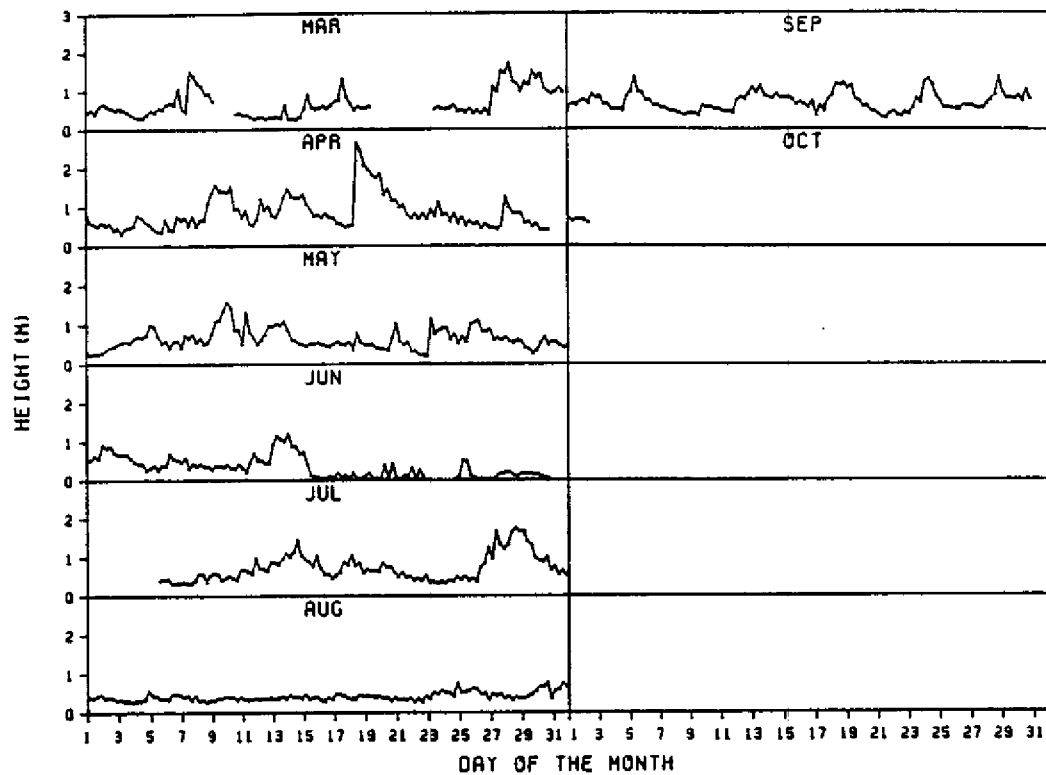
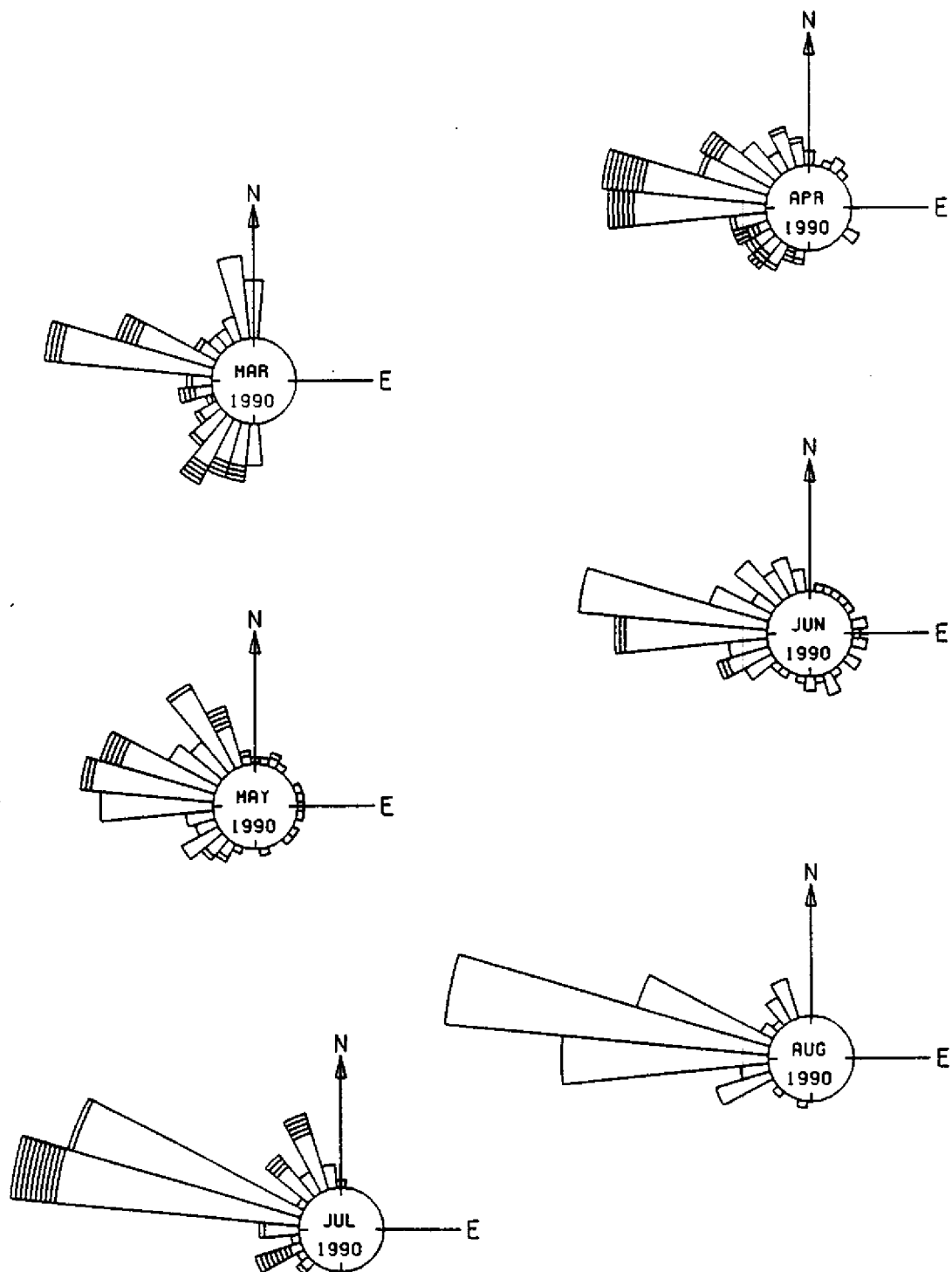


FIGURE 1-13 MONTHLY, SEASONAL & ANNUAL MEAN AND STD DEVIATION OF SIG.WAVE HEIGHT & PERIOD, AND MAXIMUM SIG.WAVE HEIGHT



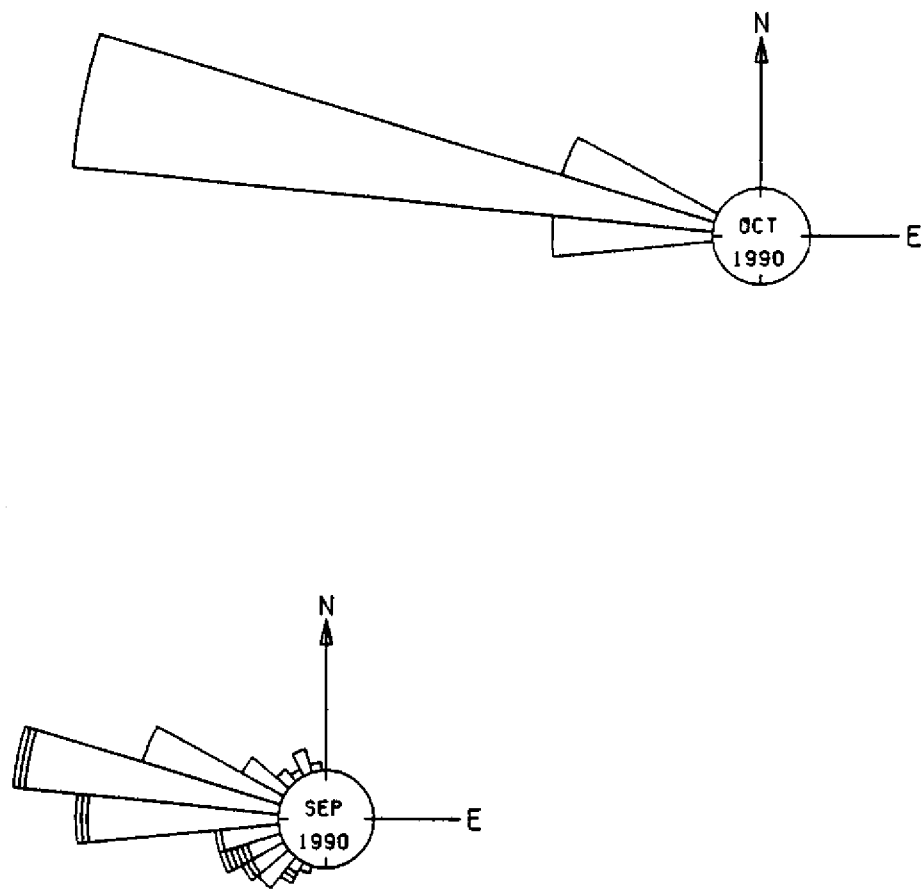
STATION AT: KINGS BAY #4 - MAR-OCT 1990

FIGURE 1-14 TIME HISTORY PLOTS OF SIGNIFICANT WAVE HEIGHT & PEAK PERIOD



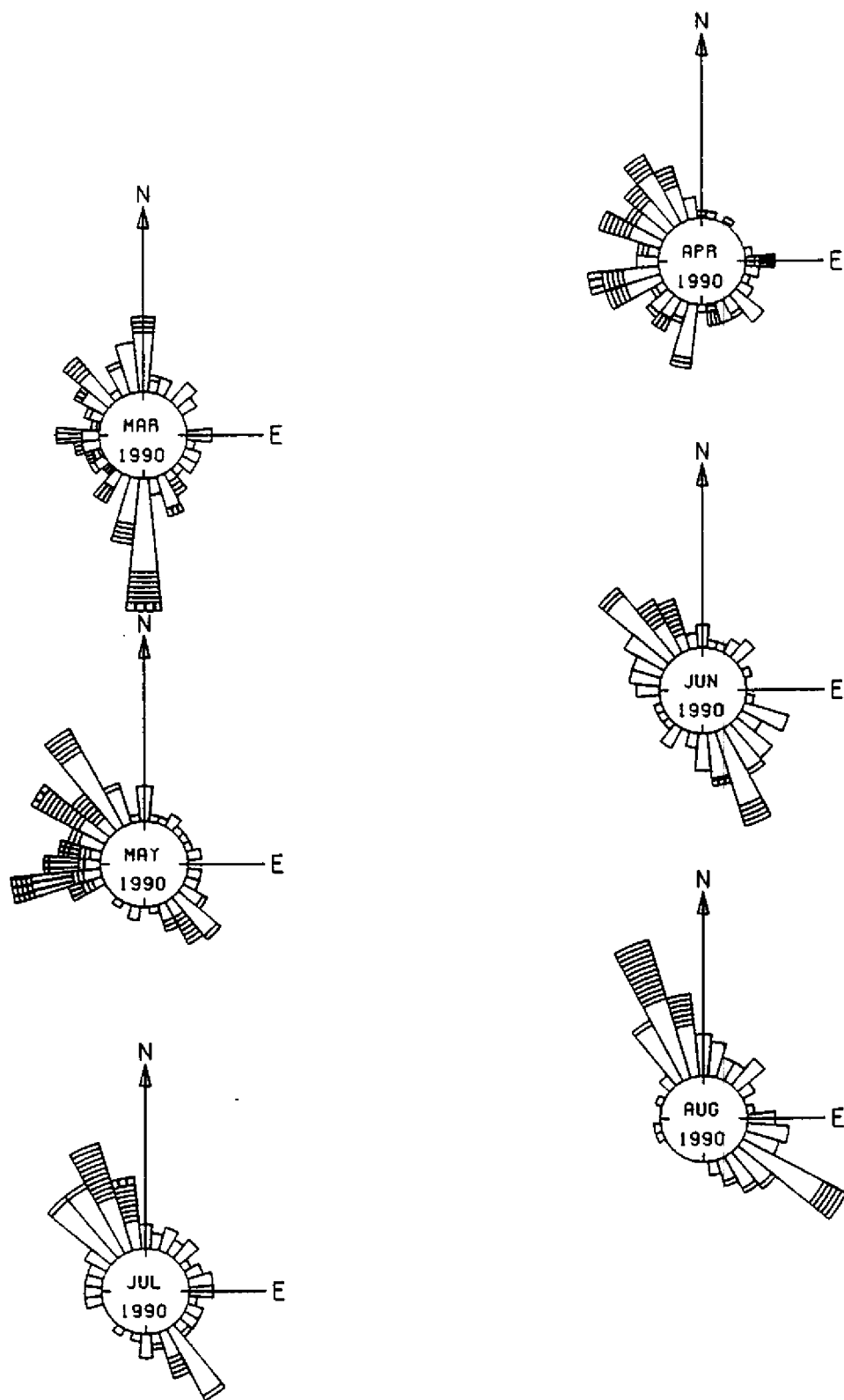
LEGEND:  $H_s < 1\text{m}$   $1\text{m} \leq H_s < 2\text{m}$   $2\text{m} \leq H_s < 3\text{m}$   $H_s \geq 3\text{m}$  0% 10% 20%

FIGURE 1-15A MAR-AUG 1990 WAVE ROSES FOR STATION AT KINGS BAY #4



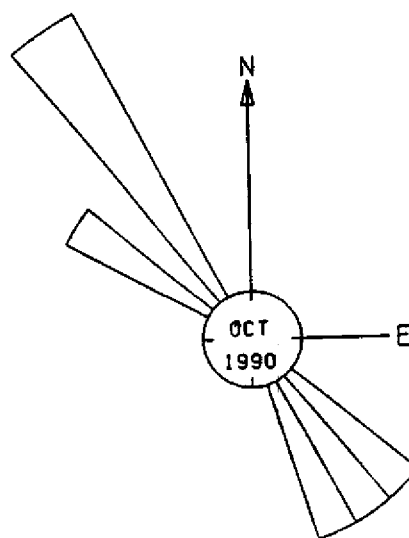
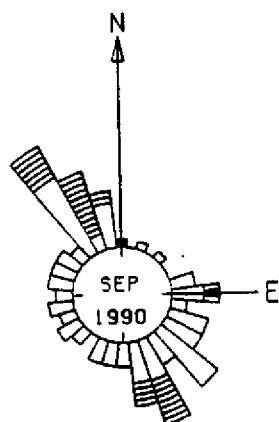
LEGEND:  $H_s < 1\text{m}$   $1\text{m} \leq H_s < 2\text{m}$   $2\text{m} \leq H_s < 3\text{m}$   $H_s \geq 3\text{m}$  0% 10% 20%

FIGURE I-15B SEP-OCT 1990 WAVE ROSES FOR STATION AT KINGS BAY #4



LEGEND:  $v < 0.2$   $0.2 \leq v < 0.4$   $0.4 \leq v < 0.6$   $0.6 \leq v < 0.8$   $v \geq 0.8$  0% 10% 20%  
(V IN M/S)

FIGURE 1-16A. MAR-AUG 1990 CURRENT ROSES FOR STATION AT KINGS BAY #4



LEGEND:  $v < 0.2$   $0.2 \leq v < 0.4$   $0.4 \leq v < 0.6$   $0.6 \leq v < 0.8$   $v \geq 0.8$   
 (V IN M/S)

0% 10% 20%

FIGURE 1-168. SEP-OCT 1990 CURRENT ROSES FOR STATION AT KINGS BAY #4

TABLE 2.1 Seasonal Percentage Joint Distribution  
of Significant Wave Height & Peak Period

Station at: KINGS BAY #5 - AUG 87-FEB 88 Data

| Hs(m)          | Peak Period(sec) |       |       |       |       |      | Total%: |
|----------------|------------------|-------|-------|-------|-------|------|---------|
|                | 3-5              | 5-7   | 7-9   | 9-11  | 11-13 | 13-  |         |
| 0.0-0.3 Summer | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
| Fall           | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
| Winter         | 0.45             | 0.15  | 0.30  | 1.66  | 1.20  | 0.30 | 4.07    |
| *Annual        | 0.45             | 0.15  | 0.30  | 1.66  | 1.20  | 0.30 | 4.07    |
| 0.3-0.6 Summer | 0.30             | 0.60  | 1.05  | 0.75  | 0.00  | 0.00 | 2.71    |
| Fall           | 0.60             | 1.05  | 4.22  | 5.42  | 0.60  | 0.15 | 12.05   |
| Winter         | 3.46             | 2.41  | 3.46  | 6.78  | 2.11  | 0.30 | 18.52   |
| *Annual        | 4.37             | 4.07  | 8.73  | 12.95 | 2.71  | 0.45 | 33.28   |
| 0.6-0.9 Summer | 0.00             | 0.45  | 0.00  | 0.15  | 0.00  | 0.00 | 0.60    |
| Fall           | 1.51             | 1.96  | 2.56  | 3.01  | 0.00  | 0.00 | 9.04    |
| Winter         | 2.56             | 4.22  | 1.51  | 5.42  | 2.11  | 0.15 | 15.96   |
| *Annual        | 4.07             | 6.63  | 4.07  | 8.58  | 2.11  | 0.15 | 25.60   |
| 0.9-1.2 Summer | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
| Fall           | 0.60             | 2.11  | 1.20  | 1.51  | 0.00  | 0.00 | 5.42    |
| Winter         | 2.41             | 3.77  | 1.66  | 1.20  | 1.05  | 0.30 | 10.39   |
| *Annual        | 3.01             | 5.87  | 2.86  | 2.71  | 1.05  | 0.30 | 15.81   |
| 1.2-1.5 Summer | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
| Fall           | 0.00             | 2.86  | 0.90  | 0.60  | 0.30  | 0.00 | 4.67    |
| Winter         | 0.30             | 3.46  | 1.05  | 0.30  | 0.00  | 0.00 | 5.12    |
| *Annual        | 0.30             | 6.33  | 1.96  | 0.90  | 0.30  | 0.00 | 9.79    |
| 1.5-1.8 Summer | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
| Fall           | 0.15             | 1.81  | 0.45  | 0.15  | 0.00  | 0.00 | 2.56    |
| Winter         | 0.00             | 1.96  | 0.90  | 0.15  | 0.00  | 0.00 | 3.01    |
| *Annual        | 0.15             | 3.77  | 1.36  | 0.30  | 0.00  | 0.00 | 5.57    |
| 1.8-2.1 Summer | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
| Fall           | 0.15             | 1.36  | 1.05  | 0.90  | 0.00  | 0.00 | 3.46    |
| Winter         | 0.00             | 0.90  | 0.30  | 0.00  | 0.00  | 0.00 | 1.20    |
| *Annual        | 0.15             | 2.26  | 1.36  | 0.90  | 0.00  | 0.00 | 4.67    |
| 2.1-2.4 Summer | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
| Fall           | 0.00             | 0.00  | 0.45  | 0.15  | 0.00  | 0.00 | 0.60    |
| Winter         | 0.00             | 0.00  | 0.45  | 0.00  | 0.00  | 0.00 | 0.45    |
| *Annual        | 0.00             | 0.00  | 0.90  | 0.15  | 0.00  | 0.00 | 1.05    |
| 2.4-2.7 Summer | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
| Fall           | 0.00             | 0.00  | 0.15  | 0.00  | 0.00  | 0.00 | 0.15    |
| Winter         | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
| *Annual        | 0.00             | 0.00  | 0.15  | 0.00  | 0.00  | 0.00 | 0.15    |
| 2.7- Summer    | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
| Fall           | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
| Winter         | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
| *Annual        | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
| Total%: Summer | 0.30             | 1.05  | 1.05  | 0.90  | 0.00  | 0.00 | 3.31    |
| Fall           | 3.01             | 11.14 | 10.99 | 11.75 | 0.90  | 0.15 | 37.95   |
| Winter         | 9.19             | 16.87 | 9.64  | 15.51 | 6.48  | 1.05 | 58.73   |
| *Annual        | 12.50            | 29.07 | 21.69 | 28.16 | 7.38  | 1.20 | 100.00  |

\* Based on data analysed; one or more seasonal data are not available.

TABLE 2.2 Seasonal Marginal & Cumulative Probability  
Distribution of Significant Wave Height

Station at: KINGS BAY #5 - AUG 87-FEB 88 Data

| Summer                   |       |           |               |                          |
|--------------------------|-------|-----------|---------------|--------------------------|
| <= Marginal              |       | Height(m) | Cumulative => |                          |
|                          | 0.000 | 0.0-0.3   | 1.000         | 000000000000000000000000 |
| 000000000000000000000000 | 0.818 | 0.3-0.6   | 1.000         | 000000000000000000000000 |
| 000000                   | 0.182 | 0.6-0.9   | 0.182         | 00000                    |
|                          | 0.000 | 0.9-1.2   | 0.000         |                          |
|                          | 0.000 | 1.2-1.5   | 0.000         |                          |
|                          | 0.000 | 1.5-1.8   | 0.000         |                          |
|                          | 0.000 | 1.8-2.1   | 0.000         |                          |
|                          | 0.000 | 2.1-2.4   | 0.000         |                          |
|                          | 0.000 | 2.4-2.7   | 0.000         |                          |
|                          | 0.000 | 2.7-      | 0.000         |                          |

| Fall                     |       |           |               |                          |
|--------------------------|-------|-----------|---------------|--------------------------|
| <= Marginal              |       | Height(m) | Cumulative => |                          |
|                          | 0.000 | 0.0-0.3   | 1.000         | 000000000000000000000000 |
| 000000000000000000000000 | 0.317 | 0.3-0.6   | 1.000         | 000000000000000000000000 |
| 000000000000000000000000 | 0.238 | 0.6-0.9   | 0.683         | 000000000000000000000000 |
| 000000000000             | 0.143 | 0.9-1.2   | 0.444         | 000000000000             |
| 000000000000             | 0.123 | 1.2-1.5   | 0.302         | 00000000                 |
| 000000                   | 0.067 | 1.5-1.8   | 0.179         | 0000                     |
| 00000000                 | 0.091 | 1.8-2.1   | 0.111         | 000                      |
| 0                        | 0.016 | 2.1-2.4   | 0.020         |                          |
|                          | 0.004 | 2.4-2.7   | 0.004         |                          |
|                          | 0.000 | 2.7-      | 0.000         |                          |

| Winter                   |       |           |               |                          |
|--------------------------|-------|-----------|---------------|--------------------------|
| <= Marginal              |       | Height(m) | Cumulative => |                          |
|                          | 00000 | 0.0-0.3   | 1.000         | 000000000000000000000000 |
| 000000000000000000000000 | 0.315 | 0.3-0.6   | 0.931         | 000000000000000000000000 |
| 000000000000000000000000 | 0.272 | 0.6-0.9   | 0.615         | 000000000000000000000000 |
| 0000000000000000         | 0.177 | 0.9-1.2   | 0.344         | 0000000000               |
| 00000000                 | 0.087 | 1.2-1.5   | 0.167         | 0000                     |
| 0000                     | 0.051 | 1.5-1.8   | 0.079         | 00                       |
| 00                       | 0.021 | 1.8-2.1   | 0.028         | 0                        |
| 0                        | 0.008 | 2.1-2.4   | 0.008         |                          |
|                          | 0.000 | 2.4-2.7   | 0.000         |                          |
|                          | 0.000 | 2.7-      | 0.000         |                          |

| *Annual                  |       |           |               |                          |
|--------------------------|-------|-----------|---------------|--------------------------|
| <= Marginal              |       | Height(m) | Cumulative => |                          |
|                          | 000   | 0.0-0.3   | 1.000         | 000000000000000000000000 |
| 000000000000000000000000 | 0.333 | 0.3-0.6   | 0.959         | 000000000000000000000000 |
| 000000000000000000000000 | 0.256 | 0.6-0.9   | 0.627         | 000000000000000000000000 |
| 0000000000000000         | 0.158 | 0.9-1.2   | 0.370         | 0000000000               |
| 00000000                 | 0.098 | 1.2-1.5   | 0.212         | 00000                    |
| 0000                     | 0.056 | 1.5-1.8   | 0.114         | 000                      |
| 0000                     | 0.047 | 1.8-2.1   | 0.059         | 0                        |
| 0                        | 0.011 | 2.1-2.4   | 0.012         |                          |
|                          | 0.002 | 2.4-2.7   | 0.002         |                          |
|                          | 0.000 | 2.7-      | 0.000         |                          |

\* Based on data analysed; one or more seasonal data are not available.

TABLE 2.3 Seasonal Marginal & Cumulative Probability  
Distribution of Wave Period

Station at: KINGS BAY #5 - AUG 87-FEB 88 Data

| Summer                                |       |       |       |                          |  |
|---------------------------------------|-------|-------|-------|--------------------------|--|
| <= Marginal Period(sec) Cumulative => |       |       |       |                          |  |
| 0000000                               | 0.091 | 3-5   | 1.000 | 000000000000000000000000 |  |
| 000000000000000000000000              | 0.318 | 5-7   | 0.909 | 000000000000000000000000 |  |
| 000000000000000000000000              | 0.318 | 7-9   | 0.591 | 000000000000000000       |  |
| 000000000000000000000000              | 0.273 | 9-11  | 0.273 | 00000000                 |  |
| 0.000                                 | 11-13 | 0.000 |       |                          |  |
| 0.000                                 | 13-   | 0.000 |       |                          |  |
| Fall                                  |       |       |       |                          |  |
| <= Marginal Period(sec) Cumulative => |       |       |       |                          |  |
| 000000                                | 0.079 | 3-5   | 1.000 | 000000000000000000000000 |  |
| 000000000000000000000000              | 0.294 | 5-7   | 0.921 | 000000000000000000000000 |  |
| 000000000000000000000000              | 0.290 | 7-9   | 0.627 | 000000000000000000       |  |
| 000000000000000000000000              | 0.310 | 9-11  | 0.337 | 00000000                 |  |
| 00                                    | 0.024 | 11-13 | 0.028 | 0                        |  |
| 0.004                                 | 13-   | 0.004 |       |                          |  |
| Winter                                |       |       |       |                          |  |
| <= Marginal Period(sec) Cumulative => |       |       |       |                          |  |
| 00000000000000                        | 0.156 | 3-5   | 1.000 | 000000000000000000000000 |  |
| 000000000000000000000000              | 0.287 | 5-7   | 0.844 | 000000000000000000000000 |  |
| 0000000000000000                      | 0.164 | 7-9   | 0.556 | 0000000000000000         |  |
| 000000000000000000000000              | 0.264 | 9-11  | 0.392 | 0000000000               |  |
| 0000000000                            | 0.110 | 11-13 | 0.128 | 000                      |  |
| 00                                    | 0.018 | 13-   | 0.018 |                          |  |
| *Annual                               |       |       |       |                          |  |
| <= Marginal Period(sec) Cumulative => |       |       |       |                          |  |
| 000000000000                          | 0.125 | 3-5   | 1.000 | 000000000000000000000000 |  |
| 000000000000000000000000              | 0.291 | 5-7   | 0.875 | 000000000000000000000000 |  |
| 000000000000000000000000              | 0.217 | 7-9   | 0.584 | 0000000000000000         |  |
| 000000000000000000000000              | 0.282 | 9-11  | 0.367 | 000000000                |  |
| 000000                                | 0.074 | 11-13 | 0.086 | 00                       |  |
| 0                                     | 0.012 | 13-   | 0.012 |                          |  |

\* Based on data analysed; one or more seasonal data are not available.

TABLE 2.4 Mean & Standard Deviation of Significant Wave Height & Period, and Maximum Significant Wave Height

Station at: KINGS BAY #5 - AUG 87-FEB 88 Data

|         | Mean<br>Hs(m) | Std Dev<br>Hs(m) | Maximum#:<br>Hs(m) | Date  | Mean<br>Tp(sec) | Std Dev<br>Tp(sec) | #Data<br>Pts |
|---------|---------------|------------------|--------------------|-------|-----------------|--------------------|--------------|
| Mar     |               |                  |                    |       |                 |                    |              |
| Apr     |               |                  |                    |       |                 |                    |              |
| May     |               |                  |                    |       |                 |                    |              |
| Jun     |               |                  |                    |       |                 |                    |              |
| Jul     |               |                  |                    |       |                 |                    |              |
| Aug     | 0.54          | 0.05             | 0.63               | 8/29  | 7.25            | 1.66               | 22           |
| Sep     | 0.69          | 0.30             | 1.58               | 9/30  | 8.44            | 1.95               | 120          |
| Oct     | 1.21          | 0.49             | 2.56               | 10/12 | 6.72            | 1.69               | 98           |
| Nov     | 1.41          | 0.53             | 2.11               | 11/ 3 | 8.19            | 1.56               | 34           |
| Dec     | 0.66          | 0.31             | 1.73               | 12/ 8 | 7.97            | 2.95               | 186          |
| Jan     | 1.18          | 0.44             | 2.38               | 1/ 3  | 7.66            | 2.49               | 78           |
| Feb     | 0.77          | 0.44             | 1.89               | 2/ 7  | 7.88            | 2.07               | 126          |
| Summer  | 0.54          | 0.05             | 0.63               | 8/29  | 7.25            | 1.66               | 22           |
| Fall    | 0.99          | 0.42             | 2.56               | 10/12 | 7.74            | 1.80               | 252          |
| Winter  | 0.80          | 0.38             | 2.38               | 1/ 3  | 7.88            | 2.60               | 390          |
| *Annual | 0.86          | 0.39             | 2.56               | 10/12 | 7.81            | 2.30               | 664          |

TABLE 2.5 Wave & Current Information in the Dominant Wave & Current Directions

Station at: KINGS BAY #5 - AUG 87-FEB 88 Data

|         | Wave Direction<br>(Deg. wrt North) | Hs<br>(m.) | Peak Period<br>(sec.) | Current Direction<br>(Deg. wrt North) | Current<br>(m/sec) |
|---------|------------------------------------|------------|-----------------------|---------------------------------------|--------------------|
| Mar     |                                    |            |                       |                                       |                    |
| Apr     |                                    |            |                       |                                       |                    |
| May     |                                    |            |                       |                                       |                    |
| Jun     |                                    |            |                       |                                       |                    |
| Jul     |                                    |            |                       |                                       |                    |
| Aug     | 293.30                             | 0.55       | 7.86                  | 345.00                                | 0.19               |
| Sep     | 280.22                             | 0.68       | 7.96                  | 273.58                                | 0.07               |
| Oct     | 252.36                             | 1.34       | 6.10                  | 215.62                                | 0.14               |
| Nov     | 281.57                             | 1.50       | 8.90                  | 231.39                                | 0.10               |
| Dec     | 270.52                             | 0.64       | 10.45                 | 296.00                                | 0.07               |
| Jan     | 256.90                             | 1.27       | 6.55                  | 213.69                                | 0.13               |
| Feb     | 267.41                             | 0.85       | 7.50                  | 286.67                                | 0.08               |
| Summer  | 293.30                             | 0.55       | 7.86                  | 341.66                                | 0.19               |
| Fall    | 267.27                             | 1.05       | 7.70                  | 230.67                                | 0.12               |
| Winter  | 265.35                             | 0.83       | 8.99                  | 279.30                                | 0.10               |
| *Annual | 266.81                             | 0.92       | 8.19                  | 260.37                                | 0.12               |

\* Based on data analysed; one or more seasonal data are not available.

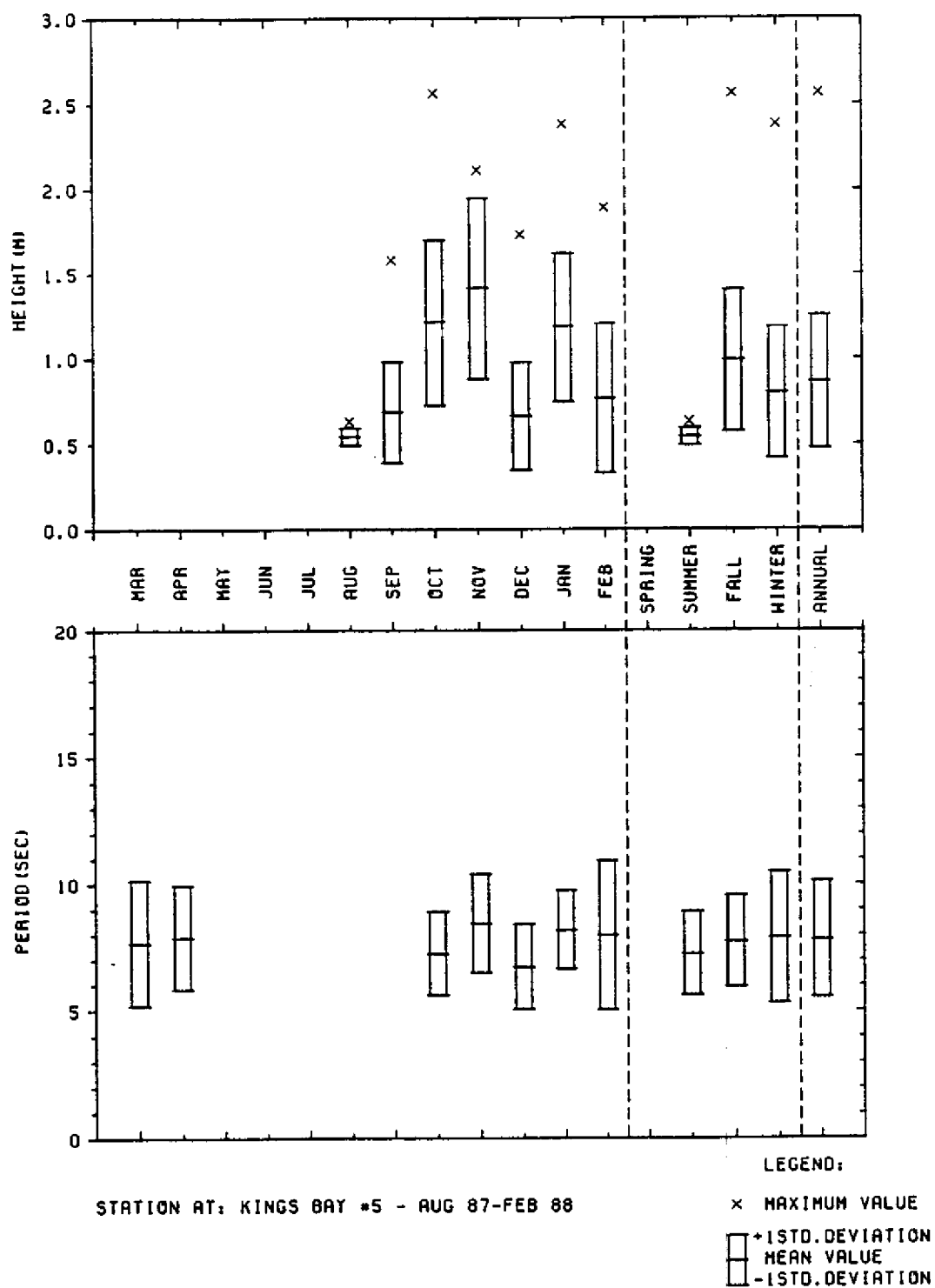
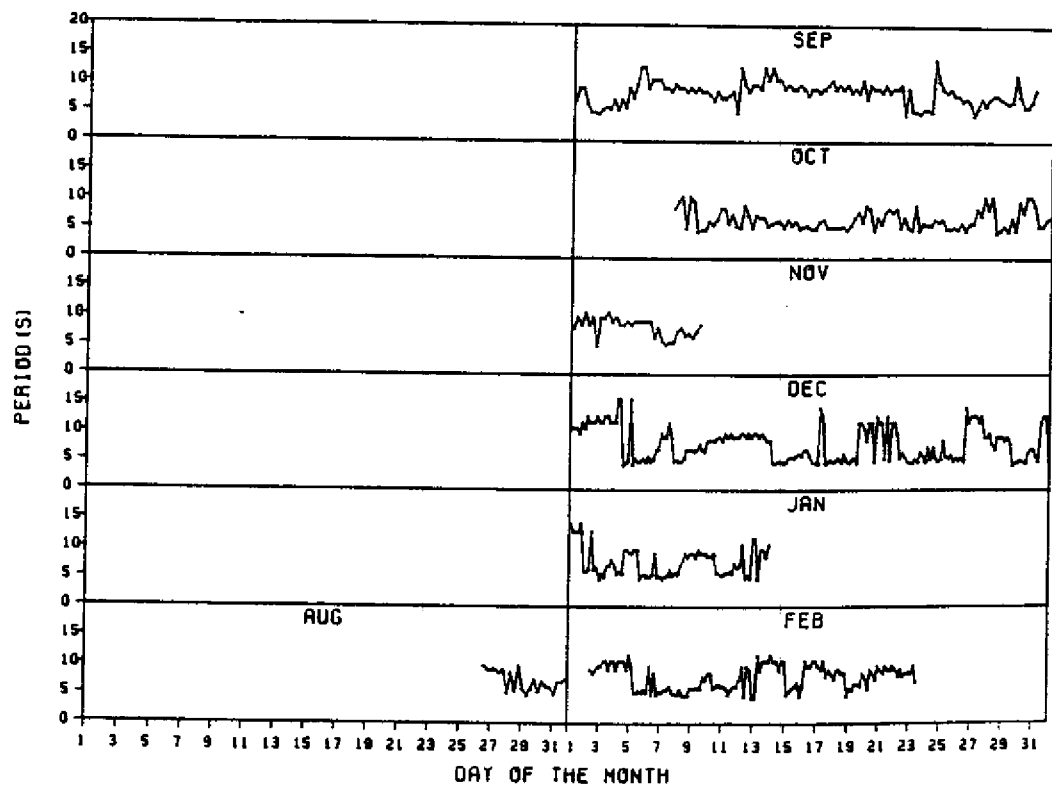
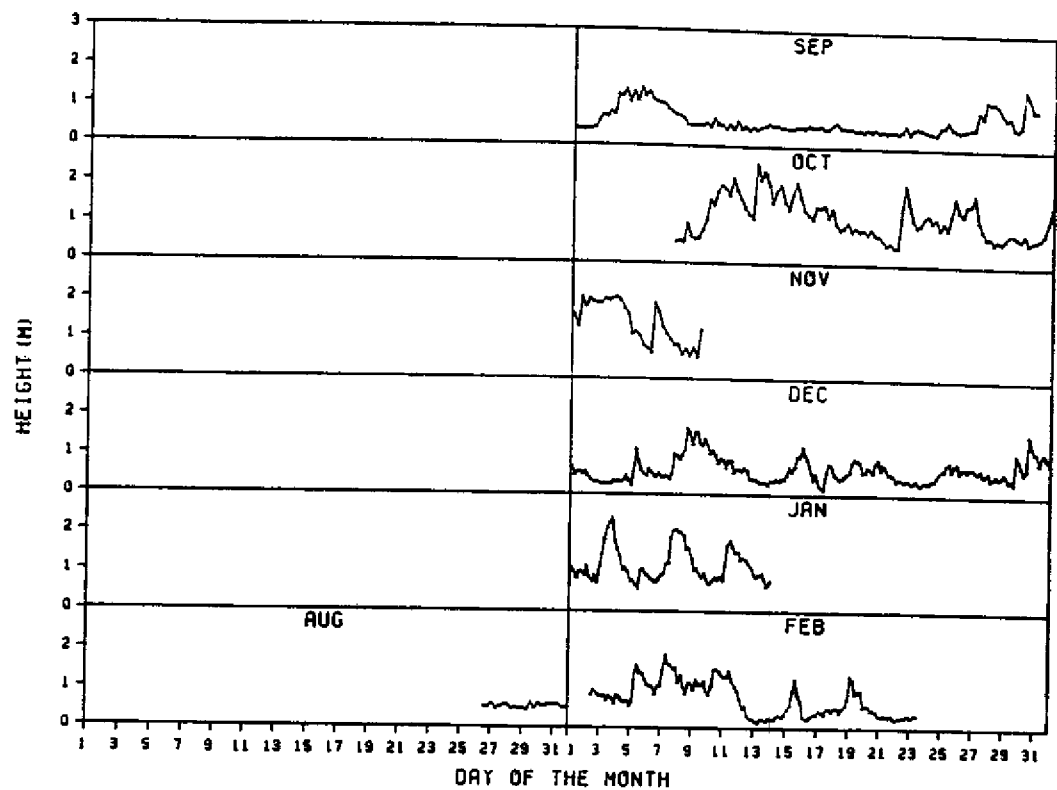
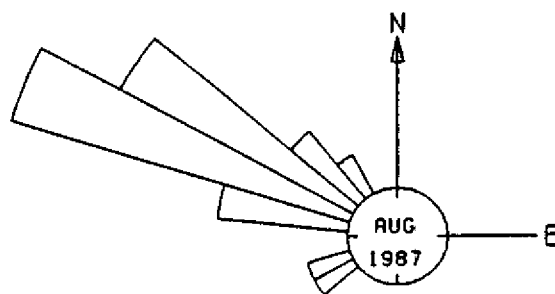


FIGURE 2-1 MONTHLY, SEASONAL & ANNUAL MEAN AND STD DEVIATION OF SIG.WAVE HEIGHT & PERIOD, AND MAXIMUM SIG.WAVE HEIGHT



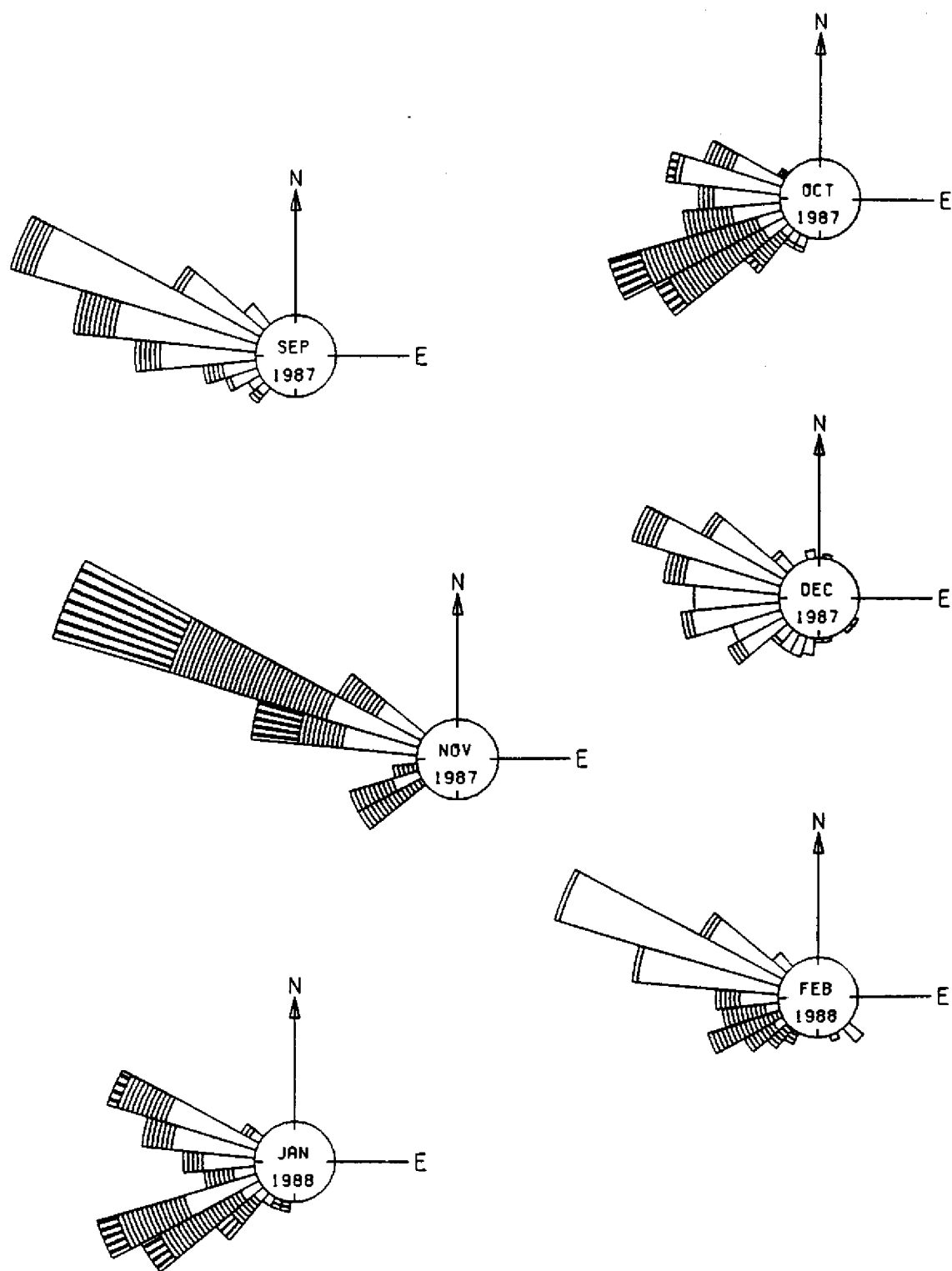
STATION AT: KINGS BAY #5 - AUG 87-FEB 88

FIGURE 2-2 TIME HISTORY PLOTS OF SIGNIFICANT WAVE HEIGHT & PEAK PERIOD



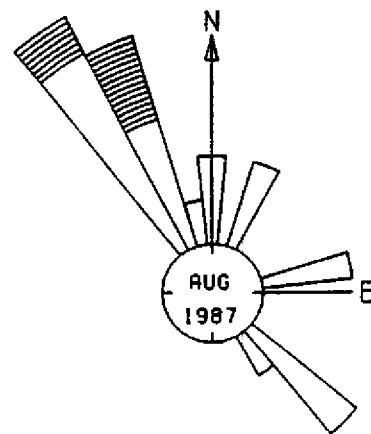
LEGEND:  $\square H_s < 1\text{m}$   $\text{▤ } 1\text{m} \leq H_s < 2\text{m}$   $\text{▨ } 2\text{m} \leq H_s < 3\text{m}$   $\blacksquare H_s \geq 3\text{m}$  0% 10% 20%

FIGURE 2-3A. AUGUST 1987 WAVE ROSE FOR STATION AT KINGS BAY #5



LEGEND:  $\square$   $H_s < 1\text{m}$   $\text{▨}$   $1\text{m} \leq H_s < 2\text{m}$   $\text{▩}$   $2\text{m} \leq H_s < 3\text{m}$   $\blacksquare$   $H_s \geq 3\text{m}$  0% 10% 20%

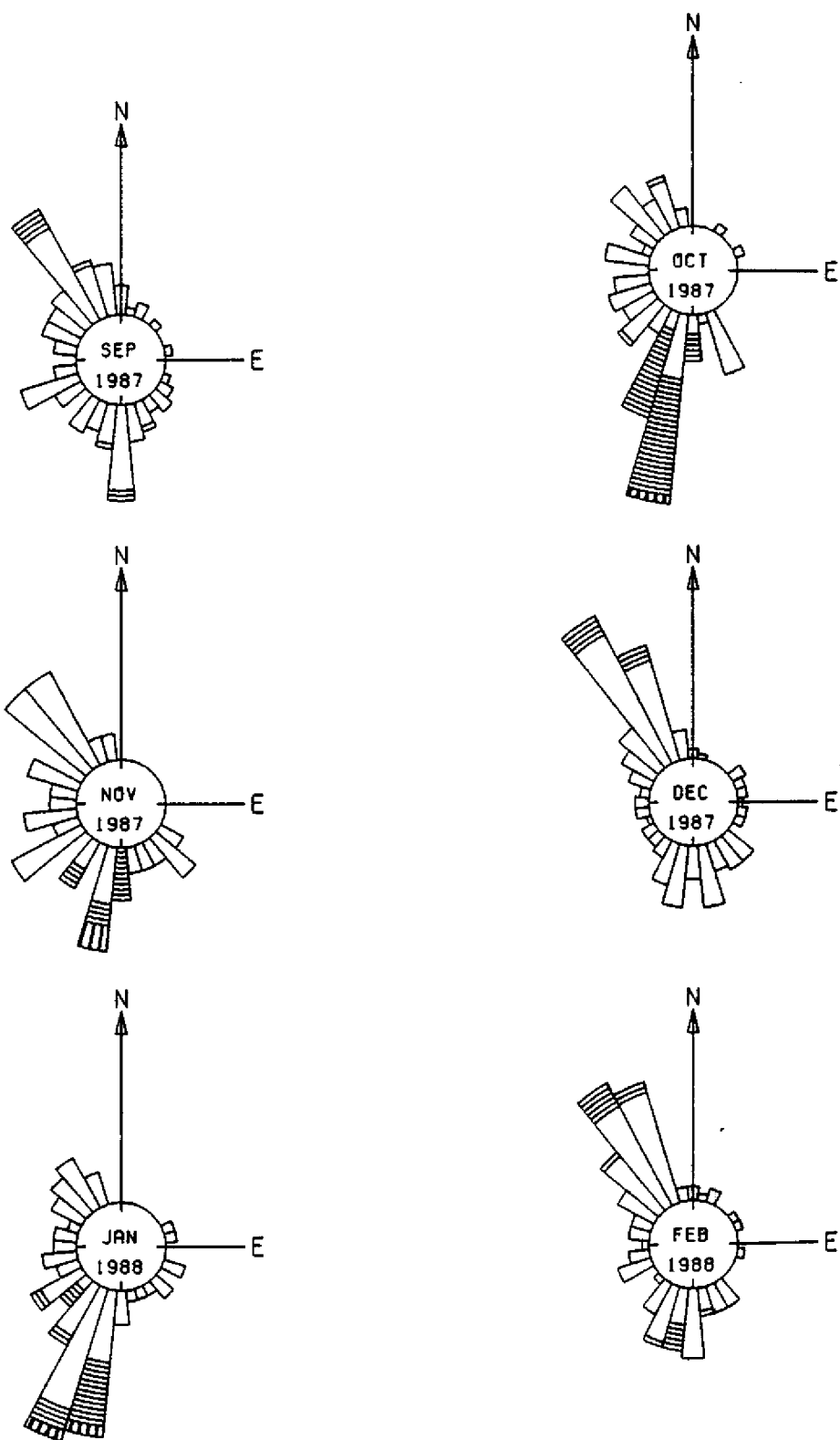
FIGURE 2-38. SEP 87-FEB 88 WAVE ROSES FOR STATION AT KINGS BAY #5



LEGEND:   $v < 0.2$    $0.2 \leq v < 0.4$    $0.4 \leq v < 0.6$    $0.6 \leq v < 0.8$    $v \geq 0.8$

(V IN M/S) 0% 10% 20%

FIGURE 2-4A. AUGUST 1987 CURRENT ROSE FOR STATION AT KINGS BAY #5



LEGEND:  $v < 0.2$   $0.2 \leq v < 0.4$   $0.4 \leq v < 0.6$   $0.6 \leq v < 0.8$   $v \geq 0.8$

(V IN M/S)

0% 10% 20%

FIGURE 2-4B. SEP 87-FEB 88 CURRENT ROSES FOR STATION AT KINGS BAY #5

TABLE 2.6 Seasonal Percentage Joint Distribution  
of Significant Wave Height & Peak Period

Station at: KINGS BAY #5 - APR 88-FEB 89 Data

|         |        | Peak Period(sec) |       |       |       |       |      | Total%: |
|---------|--------|------------------|-------|-------|-------|-------|------|---------|
| Hs(m)   |        | 3-5              | 5-7   | 7-9   | 9-11  | 11-13 | 13-  |         |
| 0.0-0.3 | Spring | 0.18             | 0.00  | 0.00  | 0.18  | 0.27  | 0.18 | 0.82    |
|         | Summer | 0.00             | 0.00  | 0.09  | 0.27  | 0.00  | 0.00 | 0.37    |
|         | Fall   | 0.18             | 0.09  | 0.27  | 0.64  | 0.09  | 0.00 | 1.28    |
|         | Winter | 0.18             | 0.09  | 1.01  | 1.74  | 0.00  | 0.00 | 3.02    |
|         | Annual | 0.55             | 0.18  | 1.37  | 2.84  | 0.37  | 0.18 | 5.50    |
| 0.3-0.6 | Spring | 2.29             | 0.73  | 2.29  | 3.57  | 1.10  | 1.37 | 11.37   |
|         | Summer | 1.10             | 1.01  | 6.97  | 3.76  | 0.09  | 0.00 | 12.92   |
|         | Fall   | 0.09             | 0.82  | 2.57  | 1.28  | 0.37  | 0.00 | 5.13    |
|         | Winter | 1.10             | 0.73  | 1.74  | 4.03  | 0.73  | 0.18 | 8.52    |
|         | Annual | 4.58             | 3.30  | 13.57 | 12.65 | 2.29  | 1.56 | 37.95   |
| 0.6-0.9 | Spring | 1.47             | 1.74  | 0.92  | 2.66  | 1.92  | 0.64 | 9.35    |
|         | Summer | 0.27             | 1.37  | 3.21  | 1.47  | 0.00  | 0.00 | 6.32    |
|         | Fall   | 1.01             | 1.92  | 2.57  | 1.01  | 0.37  | 0.00 | 6.87    |
|         | Winter | 0.46             | 1.10  | 1.19  | 2.11  | 0.64  | 0.27 | 5.77    |
|         | Annual | 3.21             | 6.14  | 7.88  | 7.24  | 2.93  | 0.92 | 28.32   |
| 0.9-1.2 | Spring | 0.37             | 2.29  | 0.37  | 0.82  | 1.83  | 0.18 | 5.87    |
|         | Summer | 0.09             | 0.46  | 0.92  | 0.64  | 0.00  | 0.00 | 2.11    |
|         | Fall   | 1.01             | 1.92  | 0.27  | 0.82  | 0.37  | 0.18 | 4.58    |
|         | Winter | 0.37             | 0.82  | 0.55  | 0.37  | 0.27  | 0.09 | 2.47    |
|         | Annual | 1.83             | 5.50  | 2.11  | 2.66  | 2.47  | 0.46 | 15.03   |
| 1.2-1.5 | Spring | 0.00             | 0.37  | 0.00  | 0.27  | 0.09  | 0.00 | 0.73    |
|         | Summer | 0.18             | 0.27  | 0.55  | 0.18  | 0.00  | 0.00 | 1.19    |
|         | Fall   | 0.37             | 2.38  | 0.46  | 0.37  | 0.46  | 0.00 | 4.03    |
|         | Winter | 0.09             | 0.55  | 0.18  | 0.09  | 0.09  | 0.00 | 1.01    |
|         | Annual | 0.64             | 3.57  | 1.19  | 0.92  | 0.64  | 0.00 | 6.97    |
| 1.5-1.8 | Spring | 0.00             | 0.09  | 0.09  | 0.09  | 0.00  | 0.00 | 0.27    |
|         | Summer | 0.00             | 0.00  | 0.46  | 0.37  | 0.00  | 0.00 | 0.82    |
|         | Fall   | 0.27             | 0.92  | 0.18  | 0.00  | 0.00  | 0.00 | 1.37    |
|         | Winter | 0.18             | 0.09  | 0.00  | 0.00  | 0.09  | 0.09 | 0.46    |
|         | Annual | 0.46             | 1.10  | 0.73  | 0.46  | 0.09  | 0.09 | 2.93    |
| 1.8-2.1 | Spring | 0.00             | 0.00  | 0.00  | 0.18  | 0.00  | 0.00 | 0.18    |
|         | Summer | 0.00             | 0.00  | 0.09  | 0.09  | 0.00  | 0.00 | 0.18    |
|         | Fall   | 0.00             | 0.64  | 0.09  | 0.00  | 0.00  | 0.00 | 0.73    |
|         | Winter | 0.09             | 0.09  | 0.00  | 0.00  | 0.00  | 0.00 | 0.18    |
|         | Annual | 0.09             | 0.73  | 0.18  | 0.27  | 0.00  | 0.00 | 1.28    |
| 2.1-2.4 | Spring | 0.00             | 0.00  | 0.27  | 0.00  | 0.00  | 0.00 | 0.27    |
|         | Summer | 0.09             | 0.00  | 0.18  | 0.00  | 0.00  | 0.00 | 0.27    |
|         | Fall   | 0.00             | 0.27  | 0.00  | 0.00  | 0.00  | 0.00 | 0.27    |
|         | Winter | 0.00             | 0.27  | 0.00  | 0.00  | 0.00  | 0.00 | 0.27    |
|         | Annual | 0.09             | 0.55  | 0.46  | 0.00  | 0.00  | 0.00 | 1.10    |
| 2.4-2.7 | Spring | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
|         | Summer | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
|         | Fall   | 0.00             | 0.00  | 0.18  | 0.00  | 0.00  | 0.00 | 0.18    |
|         | Winter | 0.00             | 0.09  | 0.09  | 0.09  | 0.00  | 0.00 | 0.27    |
|         | Annual | 0.00             | 0.09  | 0.27  | 0.09  | 0.00  | 0.00 | 0.46    |
| 2.7-    | Spring | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
|         | Summer | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
|         | Fall   | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
|         | Winter | 0.00             | 0.18  | 0.18  | 0.00  | 0.09  | 0.00 | 0.46    |
|         | Annual | 0.00             | 0.18  | 0.18  | 0.00  | 0.09  | 0.00 | 0.46    |
| Total%: | Spring | 4.31             | 5.22  | 3.94  | 7.79  | 5.22  | 2.38 | 28.87   |
|         | Summer | 1.74             | 3.12  | 12.47 | 6.78  | 0.09  | 0.00 | 24.20   |
|         | Fall   | 2.93             | 8.98  | 6.60  | 4.12  | 1.65  | 0.18 | 24.47   |
|         | Winter | 2.47             | 4.03  | 4.95  | 8.43  | 1.92  | 0.64 | 22.46   |
|         | Annual | 11.46            | 21.36 | 27.96 | 27.13 | 8.89  | 3.21 | 100.00  |

TABLE 2.7 Seasonal Marginal & Cumulative Probability  
Distribution of Significant Wave Height

Station at: KINGS BAY #5 - APR 88-FEB 89 Data

| Spring                              |         |         |       |                          |
|-------------------------------------|---------|---------|-------|--------------------------|
| <= Marginal Height(m) Cumulative => |         |         |       |                          |
| 00                                  | 0.029   | 0.0-0.3 | 1.000 | 000000000000000000000000 |
| 000000000000000000000000            | 0.394   | 0.3-0.6 | 0.971 | 000000000000000000000000 |
| 000000000000000000000000            | 0.324   | 0.6-0.9 | 0.578 | 000000000000000000000000 |
| 000000000000000000000000            | 0.203   | 0.9-1.2 | 0.254 | 000000                   |
| 00                                  | 0.025   | 1.2-1.5 | 0.051 | 0                        |
| 0                                   | 0.010   | 1.5-1.8 | 0.025 | 0                        |
| 0.006                               | 1.8-2.1 | 0.016   |       |                          |
| 0                                   | 0.010   | 2.1-2.4 | 0.010 |                          |
| 0.000                               | 2.4-2.7 | 0.000   |       |                          |
| 0.000                               | 2.7-    | 0.000   |       |                          |
| Summer                              |         |         |       |                          |
| <= Marginal Height(m) Cumulative => |         |         |       |                          |
| 0                                   | 0.015   | 0.0-0.3 | 1.000 | 000000000000000000000000 |
| 000000000000000000000000            | 0.534   | 0.3-0.6 | 0.985 | 000000000000000000000000 |
| 000000000000000000000000            | 0.261   | 0.6-0.9 | 0.451 | 000000000000             |
| 0000                                | 0.087   | 0.9-1.2 | 0.189 | 00000                    |
| 00                                  | 0.049   | 1.2-1.5 | 0.102 | 000                      |
| 00                                  | 0.034   | 1.5-1.8 | 0.053 | 0                        |
| 0.008                               | 1.8-2.1 | 0.019   |       |                          |
| 0                                   | 0.011   | 2.1-2.4 | 0.011 |                          |
| 0.000                               | 2.4-2.7 | 0.000   |       |                          |
| 0.000                               | 2.7-    | 0.000   |       |                          |
| Fall                                |         |         |       |                          |
| <= Marginal Height(m) Cumulative => |         |         |       |                          |
| 00000                               | 0.052   | 0.0-0.3 | 1.000 | 000000000000000000000000 |
| 000000000000000000000000            | 0.210   | 0.3-0.6 | 0.948 | 000000000000000000000000 |
| 000000000000000000000000            | 0.281   | 0.6-0.9 | 0.738 | 000000000000000000000000 |
| 000000000000000000000000            | 0.187   | 0.9-1.2 | 0.457 | 000000000000             |
| 000000000000000000000000            | 0.165   | 1.2-1.5 | 0.270 | 0000000                  |
| 00000                               | 0.056   | 1.5-1.8 | 0.105 | 000                      |
| 000                                 | 0.030   | 1.8-2.1 | 0.049 | 0                        |
| 0                                   | 0.011   | 2.1-2.4 | 0.019 |                          |
| 0                                   | 0.007   | 2.4-2.7 | 0.007 |                          |
| 0.000                               | 2.7-    | 0.000   |       |                          |
| Winter                              |         |         |       |                          |
| <= Marginal Height(m) Cumulative => |         |         |       |                          |
| 0000000000                          | 0.135   | 0.0-0.3 | 1.000 | 000000000000000000000000 |
| 000000000000000000000000            | 0.380   | 0.3-0.6 | 0.865 | 000000000000000000000000 |
| 000000000000000000000000            | 0.257   | 0.6-0.9 | 0.486 | 0000000000000            |
| 00000000                            | 0.110   | 0.9-1.2 | 0.229 | 0000000                  |
| 000                                 | 0.045   | 1.2-1.5 | 0.118 | 000                      |
| 0                                   | 0.020   | 1.5-1.8 | 0.073 | 00                       |
| 0                                   | 0.008   | 1.8-2.1 | 0.053 | 0                        |
| 0                                   | 0.012   | 2.1-2.4 | 0.045 | 0                        |
| 0                                   | 0.012   | 2.4-2.7 | 0.033 | 0                        |
| 0                                   | 0.020   | 2.7-    | 0.020 | 0                        |
| Annual                              |         |         |       |                          |
| <= Marginal Height(m) Cumulative => |         |         |       |                          |
| 0000                                | 0.055   | 0.0-0.3 | 1.000 | 000000000000000000000000 |
| 000000000000000000000000            | 0.379   | 0.3-0.6 | 0.945 | 000000000000000000000000 |
| 000000000000000000000000            | 0.283   | 0.6-0.9 | 0.566 | 000000000000000000000000 |
| 0000000000                          | 0.150   | 0.9-1.2 | 0.282 | 00000000                 |
| 00000                               | 0.070   | 1.2-1.5 | 0.132 | 000                      |
| 00                                  | 0.029   | 1.5-1.8 | 0.062 | 00                       |
| 0                                   | 0.013   | 1.8-2.1 | 0.033 | 0                        |
| 0                                   | 0.011   | 2.1-2.4 | 0.020 | 0                        |
| 0.005                               | 2.4-2.7 | 0.009   |       |                          |
| 0.005                               | 2.7-    | 0.005   |       |                          |

TABLE 2.8 Seasonal Marginal & Cumulative Probability  
Distribution of Wave Period

Station at: KINGS BAY #5 - APR 88-FEB 89 Data

| Spring                                |       |       |       |                          |  |
|---------------------------------------|-------|-------|-------|--------------------------|--|
| <= Marginal Period(sec) Cumulative => |       |       |       |                          |  |
| 000000000000000000                    | 0.149 | 3-5   | 1.000 | 000000000000000000000000 |  |
| 000000000000000000                    | 0.181 | 5-7   | 0.851 | 000000000000000000000000 |  |
| 000000000000000000                    | 0.137 | 7-9   | 0.670 | 000000000000000000000000 |  |
| 000000000000000000000000              | 0.270 | 9-11  | 0.533 | 000000000000000000000000 |  |
| 000000000000000000000000              | 0.181 | 11-13 | 0.263 | 00000000                 |  |
| 000000000                             | 0.083 | 13-   | 0.083 | 00                       |  |
| Summer                                |       |       |       |                          |  |
| <= Marginal Period(sec) Cumulative => |       |       |       |                          |  |
| 000                                   | 0.072 | 3-5   | 1.000 | 000000000000000000000000 |  |
| 0000000                               | 0.129 | 5-7   | 0.928 | 000000000000000000000000 |  |
| 000000000000000000000000              | 0.515 | 7-9   | 0.799 | 000000000000000000000000 |  |
| 000000000000000000000000              | 0.280 | 9-11  | 0.284 | 00000000                 |  |
| 000000000000000000000000              | 0.004 | 11-13 | 0.004 |                          |  |
| 0.000                                 | 0.000 | 13-   | 0.000 |                          |  |
| Fall                                  |       |       |       |                          |  |
| <= Marginal Period(sec) Cumulative => |       |       |       |                          |  |
| 000000000                             | 0.120 | 3-5   | 1.000 | 000000000000000000000000 |  |
| 000000000000000000000000              | 0.367 | 5-7   | 0.880 | 000000000000000000000000 |  |
| 000000000000000000000000              | 0.270 | 7-9   | 0.513 | 000000000000000000000000 |  |
| 000000000000000000000000              | 0.169 | 9-11  | 0.243 | 00000000                 |  |
| 000000                                | 0.067 | 11-13 | 0.075 | 00                       |  |
| 0                                     | 0.007 | 13-   | 0.007 |                          |  |
| Winter                                |       |       |       |                          |  |
| <= Marginal Period(sec) Cumulative => |       |       |       |                          |  |
| 00000000                              | 0.110 | 3-5   | 1.000 | 000000000000000000000000 |  |
| 000000000000000000000000              | 0.180 | 5-7   | 0.890 | 000000000000000000000000 |  |
| 000000000000000000000000              | 0.220 | 7-9   | 0.710 | 000000000000000000000000 |  |
| 000000000000000000000000              | 0.376 | 9-11  | 0.490 | 000000000000000000000000 |  |
| 000000                                | 0.086 | 11-13 | 0.114 | 000                      |  |
| 00                                    | 0.029 | 13-   | 0.029 | 0                        |  |
| Annual                                |       |       |       |                          |  |
| <= Marginal Period(sec) Cumulative => |       |       |       |                          |  |
| 0000000000                            | 0.115 | 3-5   | 1.000 | 000000000000000000000000 |  |
| 000000000000000000000000              | 0.214 | 5-7   | 0.885 | 000000000000000000000000 |  |
| 000000000000000000000000              | 0.280 | 7-9   | 0.672 | 000000000000000000000000 |  |
| 000000000000000000000000              | 0.271 | 9-11  | 0.392 | 000000000000             |  |
| 00000000                              | 0.089 | 11-13 | 0.121 | 000                      |  |
| .000                                  | 0.032 | 13-   | 0.032 | 0                        |  |

TABLE 2.9 Mean & Standard Deviation of Significant Wave Height & Period, and Maximum Significant Wave Height

Station at: KINGS BAY #5 - APR 88-FEB 89 Data

|        | Mean<br>Hs(m) | Std Dev<br>Hs(m) | Maximum#:<br>Hs(m) | Date  | Mean<br>Tp(sec) | Std Dev<br>Tp(sec) | #Data<br>Pts |
|--------|---------------|------------------|--------------------|-------|-----------------|--------------------|--------------|
| Mar    |               |                  |                    |       |                 |                    |              |
| Apr    | 0.70          | 0.26             | 1.33               | 4/20  | 9.12            | 3.74               | 180          |
| May    | 0.75          | 0.38             | 2.32               | 5/ 1  | 8.69            | 2.10               | 135          |
| Jun    | 0.62          | 0.20             | 1.45               | 6/28  | 8.36            | 1.17               | 80           |
| Jul    | 0.79          | 0.47             | 2.26               | 7/ 6  | 7.69            | 1.24               | 91           |
| Aug    | 0.64          | 0.33             | 1.71               | 8/28  | 7.88            | 1.87               | 93           |
| Sep    | 0.84          | 0.43             | 2.59               | 9/ 7  | 7.44            | 2.09               | 180          |
| Oct    | 1.11          | 0.46             | 2.07               | 10/ 7 | 7.24            | 2.46               | 87           |
| Nov    |               |                  |                    |       |                 |                    |              |
| Dec    | 0.74          | 0.43             | 2.43               | 12/12 | 7.88            | 2.48               | 94           |
| Jan    | 0.84          | 0.68             | 3.98               | 1/22  | 8.86            | 2.60               | 124          |
| Feb    | 0.32          | 0.13             | 0.63               | 2/ 5  | 8.54            | 1.57               | 27           |
| Spring | 0.73          | 0.32             | 2.32               | 5/ 1  | 8.94            | 3.14               | 315          |
| Summer | 0.69          | 0.36             | 2.26               | 7/ 6  | 7.96            | 1.47               | 264          |
| Fall   | 0.93          | 0.44             | 2.59               | 9/ 7  | 7.38            | 2.22               | 267          |
| Winter | 0.74          | 0.55             | 3.98               | 1/22  | 8.45            | 2.46               | 245          |
| Annual | 0.77          | 0.42             | 3.98               | 1/22  | 8.21            | 2.44               | 1091         |

TABLE 2.10 Wave & Current Information in the Dominant Wave & Current Directions

Station at: KINGS BAY #5 - APR 88-FEB 89 Data

|        | Wave Direction<br>(Deg. wrt North) | Hs<br>(m.) | Peak Period<br>(sec.) | Current Direction<br>(Deg. wrt North) | Current<br>(m/sec) |
|--------|------------------------------------|------------|-----------------------|---------------------------------------|--------------------|
| Mar    |                                    |            |                       |                                       |                    |
| Apr    | 269.09                             | 0.78       | 10.83                 | 314.00                                | 0.10               |
| May    | 279.39                             | 0.75       | 9.28                  | 309.91                                | 0.06               |
| Jun    | 280.81                             | 0.59       | 8.59                  | 309.42                                | 0.12               |
| Jul    | 289.07                             | 0.97       | 7.65                  | 304.74                                | 0.11               |
| Aug    | 289.36                             | 0.47       | 8.00                  | 331.67                                | 0.10               |
| Sep    | 33.56                              | 0.74       | 7.56                  | 348.93                                | 0.05               |
| Oct    | 251.50                             | 1.18       | 6.11                  | 334.83                                | 0.07               |
| Nov    |                                    |            |                       |                                       |                    |
| Dec    | 263.75                             | 0.56       | 10.04                 | 313.44                                | 0.14               |
| Jan    | 262.97                             | 0.94       | 10.61                 | 323.96                                | 0.17               |
| Feb    | 286.53                             | 0.30       | 9.17                  | 325.60                                | 0.15               |
| Spring | 273.98                             | 0.76       | 9.95                  | 307.86                                | 0.08               |
| Summer | 285.91                             | 0.81       | 7.93                  | 314.61                                | 0.10               |
| Fall   | 13.67                              | 0.81       | 7.35                  | 347.90                                | 0.06               |
| Winter | 264.44                             | 0.59       | 9.95                  | 316.77                                | 0.16               |
| Annual | 275.62                             | 0.75       | 9.11                  | 321.61                                | 0.09               |

x 4.0

x 4.0 x 4.0

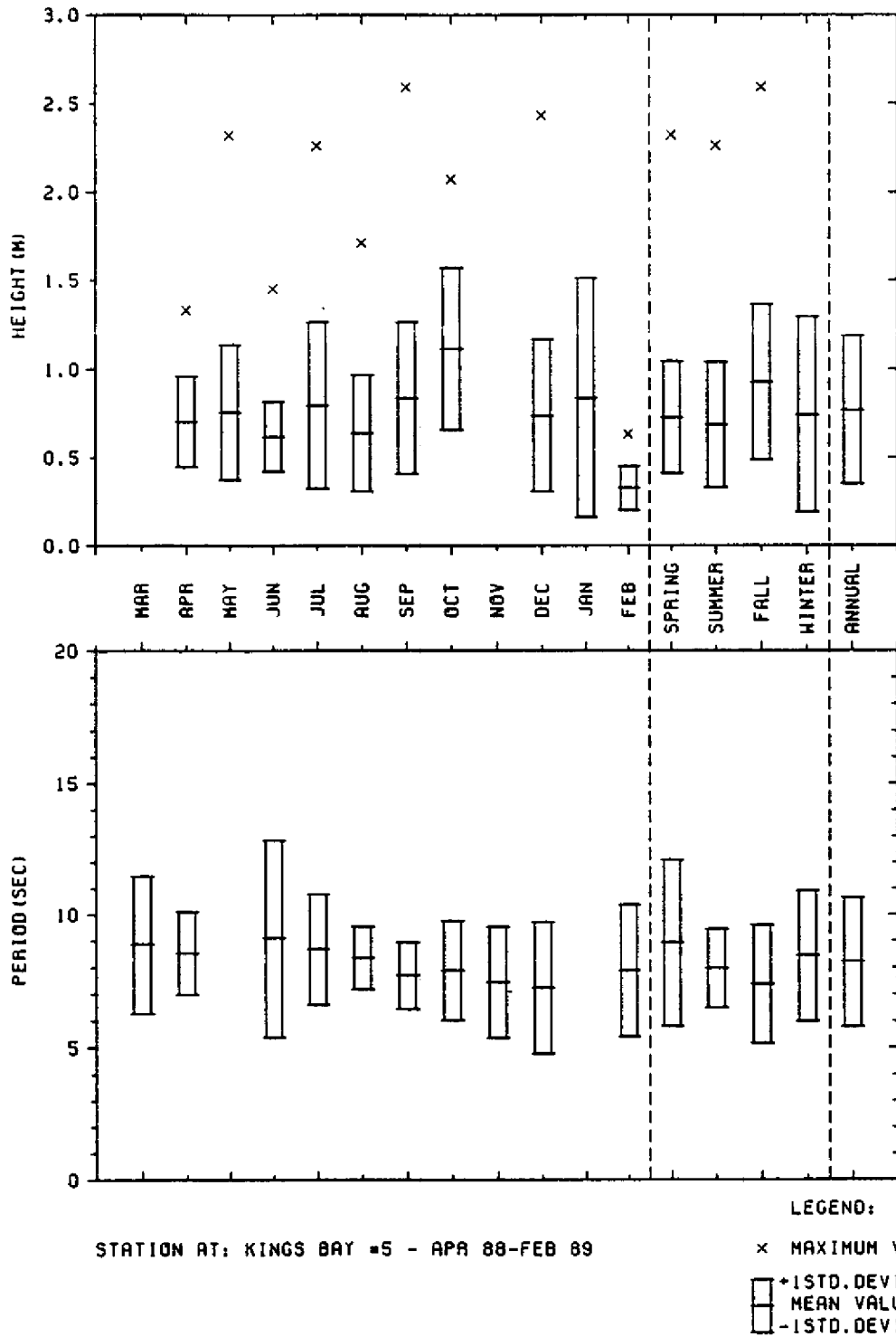
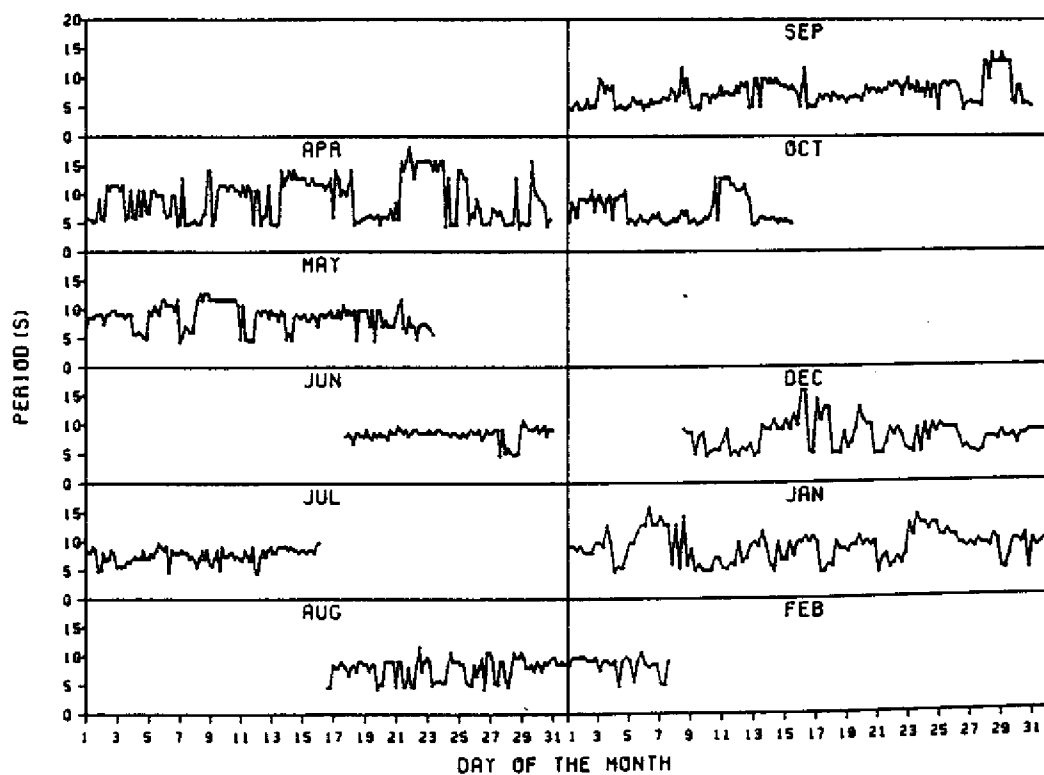
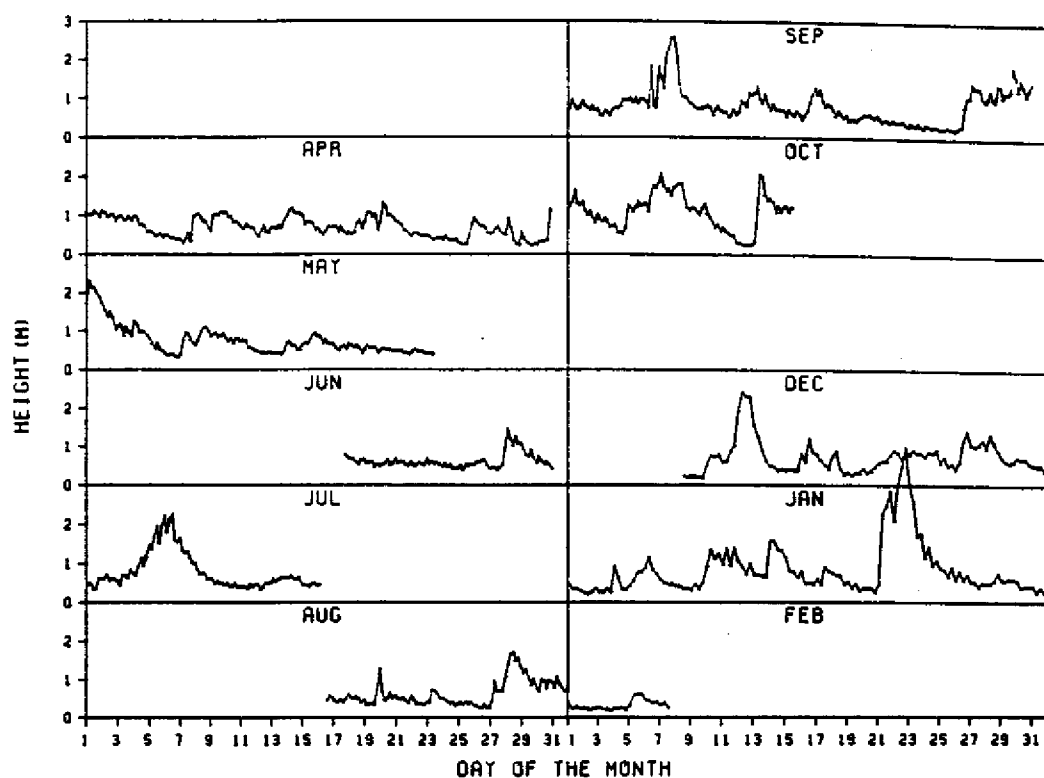


FIGURE 2-5 MONTHLY, SEASONAL & ANNUAL MEAN AND STD DEVIATION OF SIG.WAVE HEIGHT & PERIOD, AND MAXIMUM SIG.WAVE HEIGHT



STATION AT: KINGS BAY #5 - APR 88-FEB 89

FIGURE 2-6 TIME HISTORY PLOTS OF SIGNIFICANT WAVE HEIGHT & PEAK PERIOD

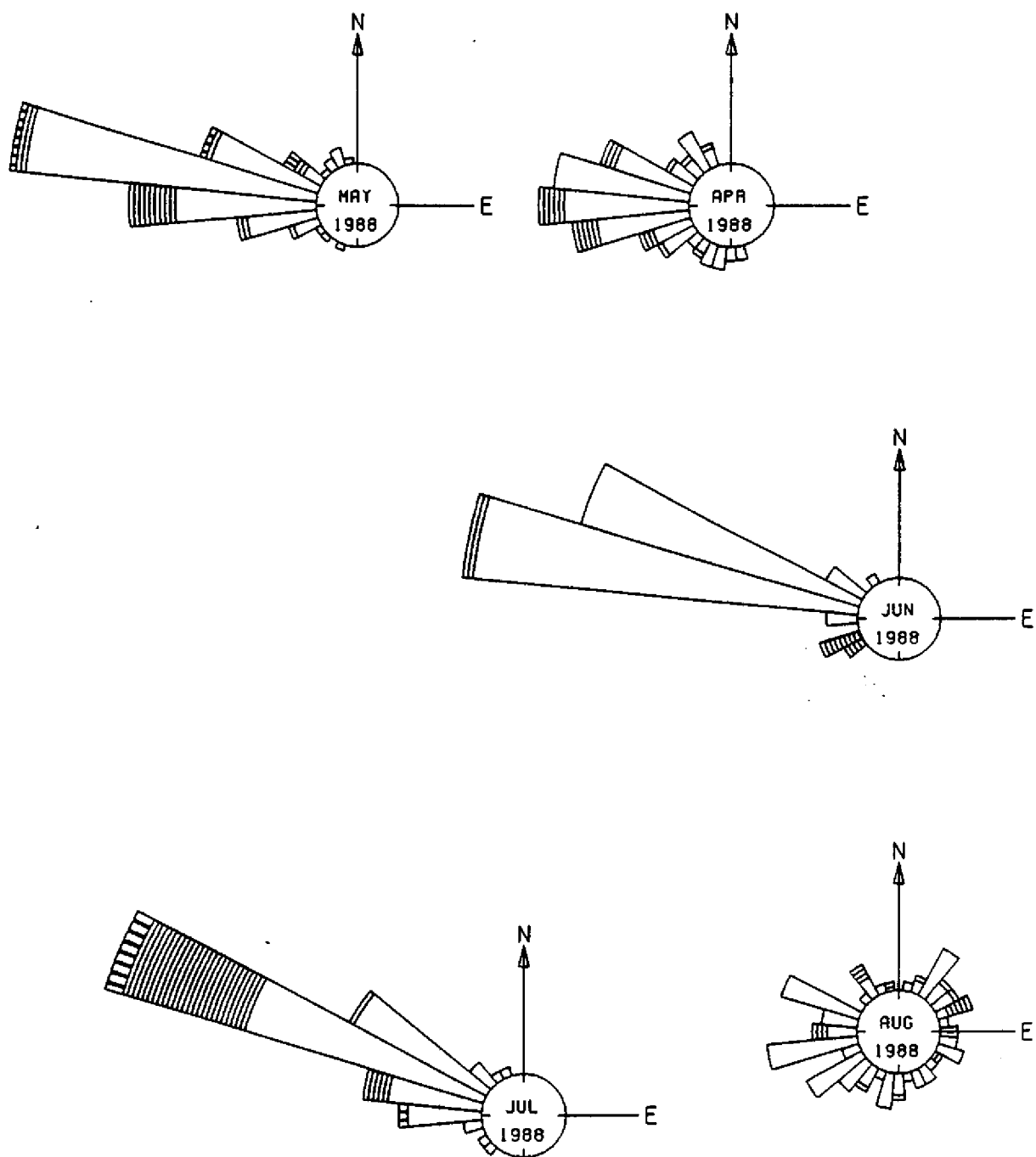
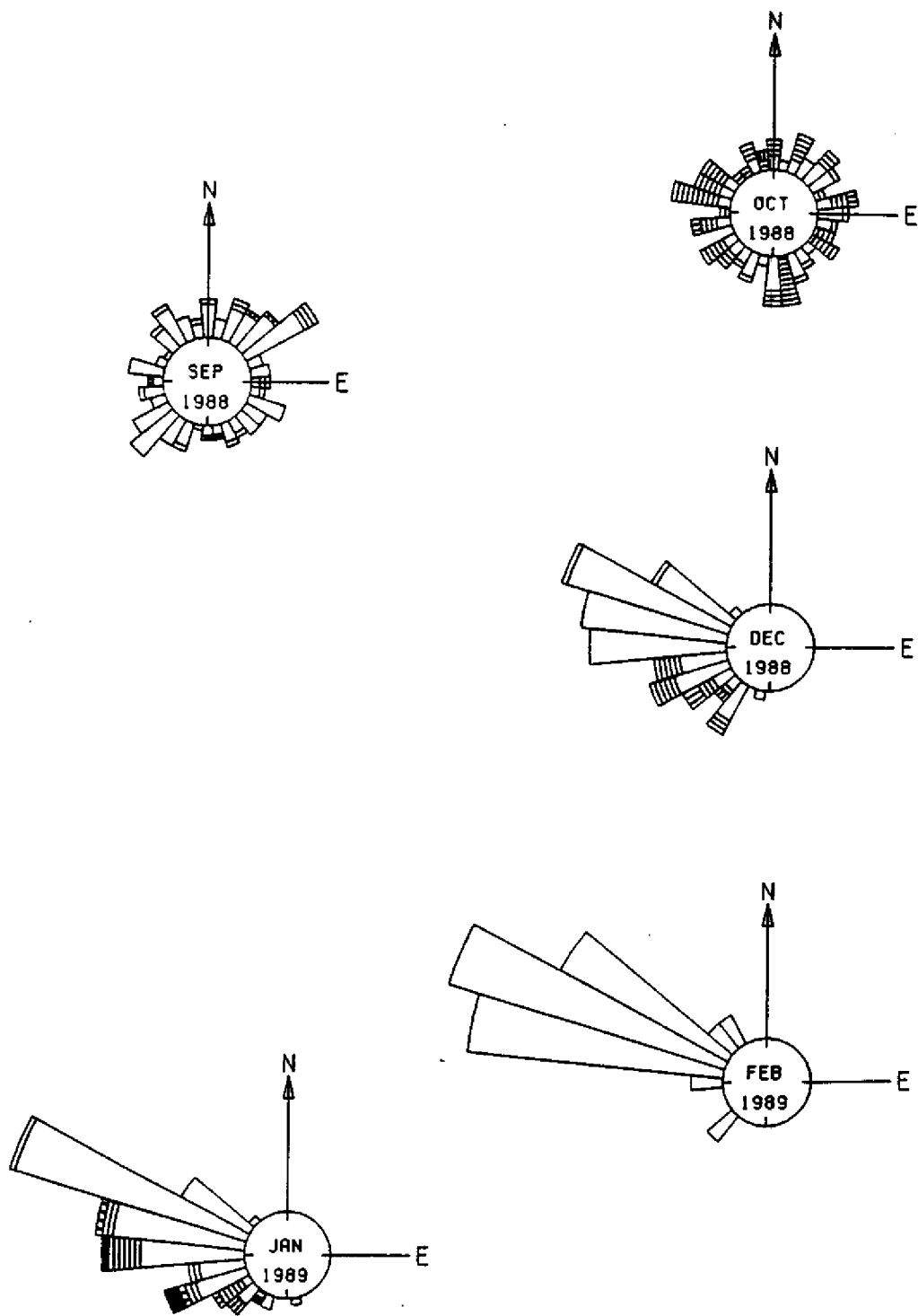


FIGURE 2-7A. APR-AUG 1988 WAVE ROSES FOR STATION AT KINGS BAY #5



LEGEND:  $\square H_s < 1m$   $\text{||||} 1m \leq H_s < 2m$   $\text{|||||} 2m \leq H_s < 3m$   $\blacksquare H_s \geq 3m$  0% 10% 20%

FIGURE 2-78. SEP 88-FEB 89 WAVE ROSES FOR STATION AT KINGS BAY #5

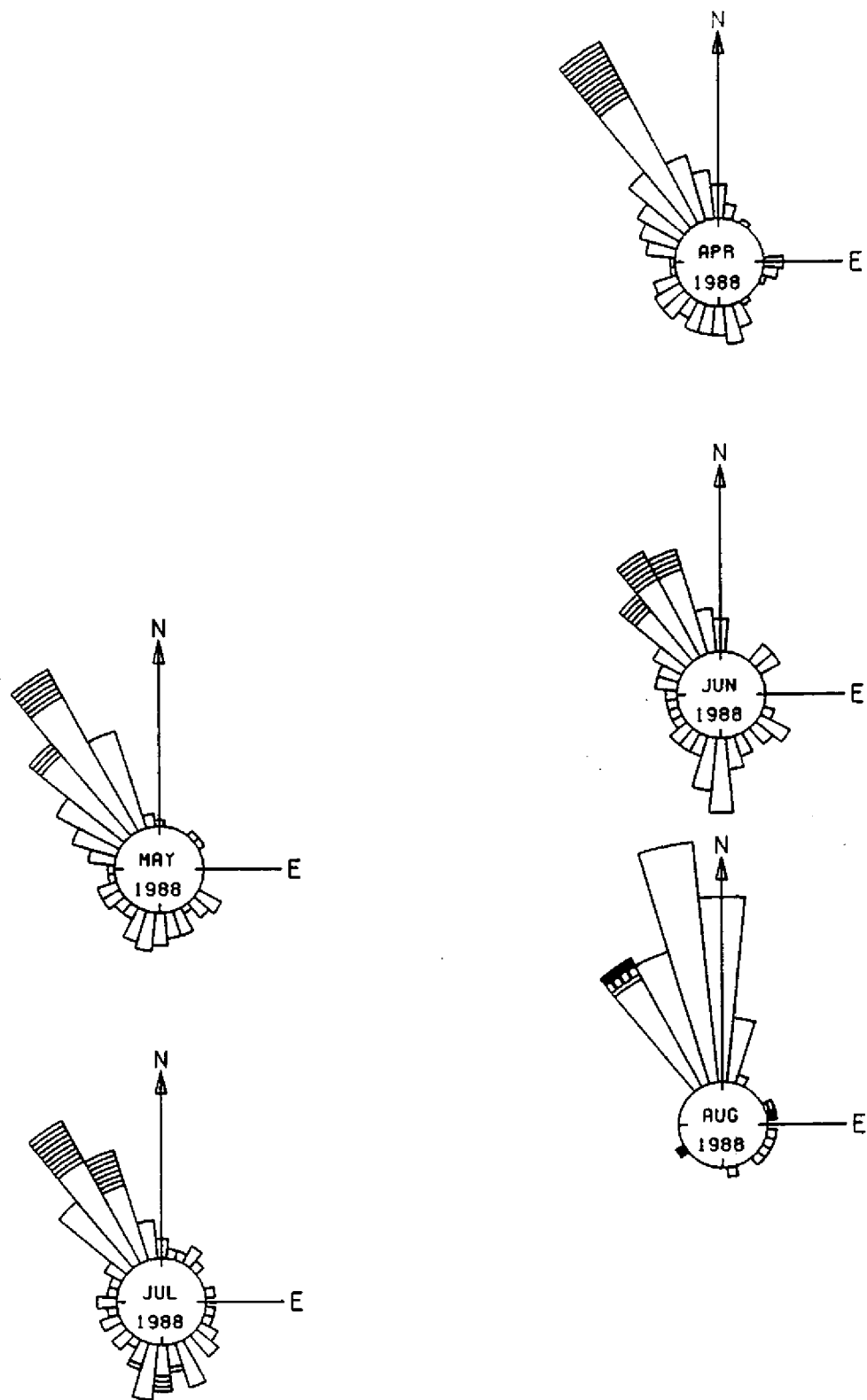
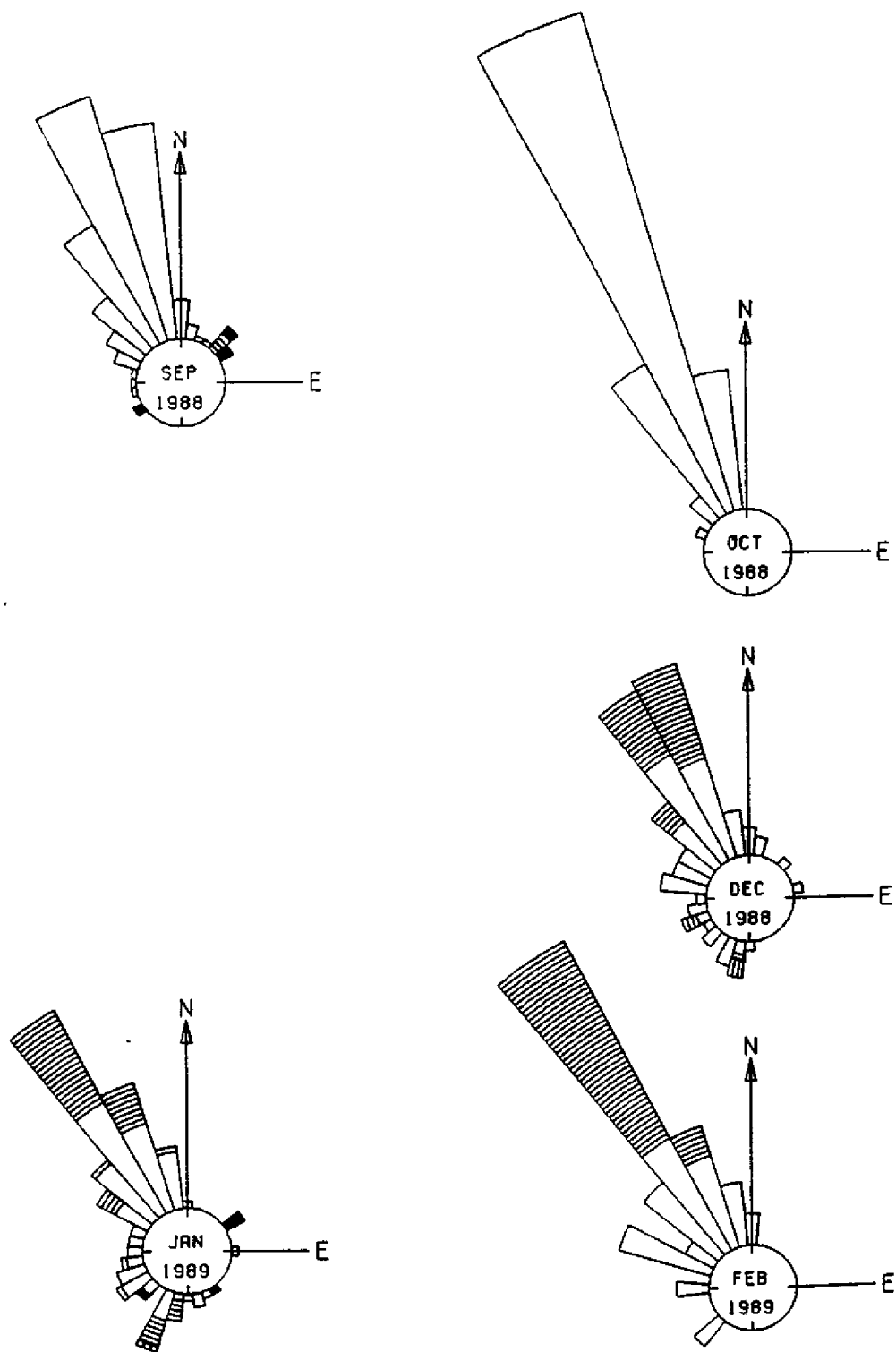


FIGURE 2-8A. APR-AUG 1988 CURRENT ROSES FOR STATION AT KINGS BAY #5



LEGEND:



(V IN M/S)

FIGURE 2-88. SEP 88-FEB 89 CURRENT ROSES FOR STATION AT KINGS BAY #5

TABLE 2.11 Seasonal Percentage Joint Distribution  
of Significant Wave Height & Peak Period

Station at: KINGS BAY #5 - MAR 89-FEB 90 Data

|         |        | Peak Period(sec) |       |       |       |       |      | Total%: |
|---------|--------|------------------|-------|-------|-------|-------|------|---------|
| Hs(m)   |        | 3-5              | 5-7   | 7-9   | 9-11  | 11-13 | 13-  |         |
| 0.0-0.3 | Spring | 0.10             | 0.00  | 0.70  | 0.40  | 0.20  | 0.30 | 1.71    |
|         | Summer | 0.10             | 0.20  | 0.70  | 0.80  | 0.10  | 0.00 | 1.91    |
|         | Fall   | 0.20             | 0.10  | 0.00  | 0.30  | 0.10  | 0.00 | 0.70    |
|         | Winter | 0.40             | 0.10  | 0.30  | 1.71  | 0.80  | 0.30 | 3.61    |
|         | Annual | 0.80             | 0.40  | 1.71  | 3.21  | 1.20  | 0.60 | 7.92    |
| 0.3-0.6 | Spring | 0.80             | 1.20  | 2.81  | 2.51  | 0.40  | 0.30 | 8.02    |
|         | Summer | 2.81             | 2.31  | 7.02  | 5.22  | 1.50  | 0.10 | 18.96   |
|         | Fall   | 0.70             | 0.80  | 2.61  | 2.31  | 0.10  | 0.00 | 6.52    |
|         | Winter | 1.30             | 1.20  | 0.70  | 5.42  | 1.50  | 0.00 | 10.13   |
|         | Annual | 5.62             | 5.52  | 13.14 | 15.45 | 3.51  | 0.40 | 43.63   |
| 0.6-0.9 | Spring | 1.60             | 2.41  | 1.10  | 2.01  | 0.30  | 0.00 | 7.42    |
|         | Summer | 1.91             | 2.21  | 1.60  | 0.30  | 0.50  | 0.00 | 6.52    |
|         | Fall   | 1.81             | 1.50  | 2.31  | 0.90  | 0.60  | 0.00 | 7.12    |
|         | Winter | 0.90             | 1.20  | 0.80  | 4.21  | 1.10  | 0.50 | 8.73    |
|         | Annual | 6.22             | 7.32  | 5.82  | 7.42  | 2.51  | 0.50 | 29.79   |
| 0.9-1.2 | Spring | 0.10             | 1.71  | 0.10  | 0.30  | 0.00  | 0.00 | 2.21    |
|         | Summer | 0.60             | 0.50  | 0.10  | 0.00  | 0.00  | 0.00 | 1.20    |
|         | Fall   | 0.90             | 0.20  | 1.00  | 0.20  | 0.10  | 0.00 | 2.41    |
|         | Winter | 0.30             | 1.71  | 0.00  | 0.10  | 0.20  | 0.20 | 2.51    |
|         | Annual | 1.91             | 4.11  | 1.20  | 0.60  | 0.30  | 0.20 | 8.32    |
| 1.2-1.5 | Spring | 0.10             | 0.60  | 0.30  | 0.00  | 0.00  | 0.00 | 1.00    |
|         | Summer | 0.00             | 0.10  | 0.10  | 0.00  | 0.00  | 0.00 | 0.20    |
|         | Fall   | 0.40             | 0.70  | 0.20  | 0.10  | 0.20  | 0.10 | 1.71    |
|         | Winter | 0.10             | 0.50  | 0.40  | 0.10  | 0.00  | 0.10 | 1.20    |
|         | Annual | 0.60             | 1.91  | 1.00  | 0.20  | 0.20  | 0.20 | 4.11    |
| 1.5-1.8 | Spring | 0.20             | 0.50  | 0.00  | 0.00  | 0.00  | 0.00 | 0.70    |
|         | Summer | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
|         | Fall   | 0.00             | 1.20  | 0.40  | 0.10  | 0.00  | 0.00 | 1.71    |
|         | Winter | 0.10             | 0.20  | 0.10  | 0.00  | 0.00  | 0.00 | 0.40    |
|         | Annual | 0.30             | 1.91  | 0.50  | 0.10  | 0.00  | 0.00 | 2.81    |
| 1.8-2.1 | Spring | 0.00             | 0.20  | 0.00  | 0.00  | 0.00  | 0.00 | 0.20    |
|         | Summer | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
|         | Fall   | 0.30             | 0.50  | 0.30  | 0.10  | 0.00  | 0.00 | 1.20    |
|         | Winter | 0.00             | 0.00  | 0.20  | 0.00  | 0.00  | 0.00 | 0.20    |
|         | Annual | 0.30             | 0.70  | 0.50  | 0.10  | 0.00  | 0.00 | 1.60    |
| 2.1-2.4 | Spring | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
|         | Summer | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
|         | Fall   | 0.00             | 0.10  | 0.80  | 0.00  | 0.00  | 0.00 | 0.90    |
|         | Winter | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
|         | Annual | 0.00             | 0.10  | 0.80  | 0.00  | 0.00  | 0.00 | 0.90    |
| 2.4-2.7 | Spring | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
|         | Summer | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
|         | Fall   | 0.00             | 0.10  | 0.40  | 0.10  | 0.00  | 0.00 | 0.60    |
|         | Winter | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
|         | Annual | 0.00             | 0.10  | 0.40  | 0.10  | 0.00  | 0.00 | 0.60    |
| 2.7-    | Spring | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
|         | Summer | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
|         | Fall   | 0.10             | 0.10  | 0.10  | 0.00  | 0.00  | 0.00 | 0.30    |
|         | Winter | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
|         | Annual | 0.10             | 0.10  | 0.10  | 0.00  | 0.00  | 0.00 | 0.30    |
| Total%: | Spring | 2.91             | 6.62  | 5.02  | 5.22  | 0.90  | 0.60 | 21.26   |
|         | Summer | 5.42             | 5.32  | 9.53  | 6.32  | 2.11  | 0.10 | 28.79   |
|         | Fall   | 4.41             | 5.32  | 8.12  | 4.11  | 1.10  | 0.10 | 23.17   |
|         | Winter | 3.11             | 4.91  | 2.51  | 11.53 | 3.61  | 1.10 | 26.78   |
|         | Annual | 15.85            | 22.17 | 25.18 | 27.18 | 7.72  | 1.91 | 100.00  |

TABLE 2.12 Seasonal Marginal & Cumulative Probability  
Distribution of Significant Wave Height

Station at: KINGS BAY #5 - MAR 89-FEB 90 Data

| Spring                              |       |         |       |                          |  |
|-------------------------------------|-------|---------|-------|--------------------------|--|
| <= Marginal Height(m) Cumulative => |       |         |       |                          |  |
| 00000                               | 0.080 | 0.0-0.3 | 1.000 | 000000000000000000000000 |  |
| 000000000000000000000000            | 0.377 | 0.3-0.6 | 0.920 | 000000000000000000000000 |  |
| 000000000000000000000000            | 0.349 | 0.6-0.9 | 0.542 | 000000000000000000000000 |  |
| 00000000                            | 0.104 | 0.9-1.2 | 0.193 | 00000                    |  |
| 000                                 | 0.047 | 1.2-1.5 | 0.090 | 00                       |  |
| 00                                  | 0.033 | 1.5-1.8 | 0.042 | 0                        |  |
| 0                                   | 0.009 | 1.8-2.1 | 0.009 |                          |  |
|                                     | 0.000 | 2.1-2.4 | 0.000 |                          |  |
|                                     | 0.000 | 2.4-2.7 | 0.000 |                          |  |
|                                     | 0.000 | 2.7-    | 0.000 |                          |  |
| Summer                              |       |         |       |                          |  |
| <= Marginal Height(m) Cumulative => |       |         |       |                          |  |
| 000                                 | 0.066 | 0.0-0.3 | 1.000 | 000000000000000000000000 |  |
| 000000000000000000000000            | 0.659 | 0.3-0.6 | 0.934 | 000000000000000000000000 |  |
| 0000000000                          | 0.226 | 0.6-0.9 | 0.275 | 00000000                 |  |
| 00                                  | 0.042 | 0.9-1.2 | 0.049 | 0                        |  |
|                                     | 0.007 | 1.2-1.5 | 0.007 |                          |  |
|                                     | 0.000 | 1.5-1.8 | 0.000 |                          |  |
|                                     | 0.000 | 1.8-2.1 | 0.000 |                          |  |
|                                     | 0.000 | 2.1-2.4 | 0.000 |                          |  |
|                                     | 0.000 | 2.4-2.7 | 0.000 |                          |  |
|                                     | 0.000 | 2.7-    | 0.000 |                          |  |
| Fall                                |       |         |       |                          |  |
| <= Marginal Height(m) Cumulative => |       |         |       |                          |  |
| 00                                  | 0.030 | 0.0-0.3 | 1.000 | 000000000000000000000000 |  |
| 000000000000000000000000            | 0.281 | 0.3-0.6 | 0.970 | 000000000000000000000000 |  |
| 000000000000000000000000            | 0.307 | 0.6-0.9 | 0.688 | 000000000000000000000000 |  |
| 0000000000                          | 0.104 | 0.9-1.2 | 0.381 | 0000000000               |  |
| 000000                              | 0.074 | 1.2-1.5 | 0.277 | 00000000                 |  |
| 000000                              | 0.074 | 1.5-1.8 | 0.203 | 000000                   |  |
| 0000                                | 0.052 | 1.8-2.1 | 0.130 | 000                      |  |
| 000                                 | 0.039 | 2.1-2.4 | 0.078 | 00                       |  |
| 00                                  | 0.026 | 2.4-2.7 | 0.039 | 0                        |  |
| 0                                   | 0.013 | 2.7-    | 0.013 |                          |  |
| Winter                              |       |         |       |                          |  |
| <= Marginal Height(m) Cumulative => |       |         |       |                          |  |
| 0000000000                          | 0.135 | 0.0-0.3 | 1.000 | 000000000000000000000000 |  |
| 000000000000000000000000            | 0.378 | 0.3-0.6 | 0.865 | 000000000000000000000000 |  |
| 000000000000000000000000            | 0.326 | 0.6-0.9 | 0.487 | 000000000000000000000000 |  |
| 000000                              | 0.094 | 0.9-1.2 | 0.161 | 0000                     |  |
| 000                                 | 0.045 | 1.2-1.5 | 0.067 | 00                       |  |
| 0                                   | 0.015 | 1.5-1.8 | 0.022 | 0                        |  |
|                                     | 0.007 | 1.8-2.1 | 0.007 |                          |  |
|                                     | 0.000 | 2.1-2.4 | 0.000 |                          |  |
|                                     | 0.000 | 2.4-2.7 | 0.000 |                          |  |
|                                     | 0.000 | 2.7-    | 0.000 |                          |  |
| Annual                              |       |         |       |                          |  |
| <= Marginal Height(m) Cumulative => |       |         |       |                          |  |
| 00000                               | 0.079 | 0.0-0.3 | 1.000 | 000000000000000000000000 |  |
| 000000000000000000000000            | 0.436 | 0.3-0.6 | 0.921 | 000000000000000000000000 |  |
| 000000000000000000000000            | 0.298 | 0.6-0.9 | 0.484 | 000000000000000000000000 |  |
| 00000                               | 0.083 | 0.9-1.2 | 0.187 | 00000                    |  |
| 00                                  | 0.041 | 1.2-1.5 | 0.103 | 000                      |  |
| 00                                  | 0.028 | 1.5-1.8 | 0.062 | 00                       |  |
| 0                                   | 0.016 | 1.8-2.1 | 0.034 | 0                        |  |
| 0                                   | 0.009 | 2.1-2.4 | 0.018 |                          |  |
|                                     | 0.006 | 2.4-2.7 | 0.009 |                          |  |
|                                     | 0.003 | 2.7-    | 0.003 |                          |  |

Station at: KINGS BAY #5 - MAR 89-FEB 90 Data

2-23

TABLE 2.14 Mean & Standard Deviation of Significant Wave Height & Period, and Maximum Significant Wave Height

Station at: KINGS BAY #5 - MAR 89-FEB 90 Data

|        | Mean<br>Hs(m) | Std Dev<br>Hs(m) | Maximum#:<br>Hs(m) | Date  | Mean<br>Tp(sec) | Std Dev<br>Tp(sec) | #Data<br>Pts |
|--------|---------------|------------------|--------------------|-------|-----------------|--------------------|--------------|
| Mar    | 0.75          | 0.33             | 1.88               | 3/22  | 7.07            | 1.57               | 66           |
| Apr    | 0.80          | 0.35             | 1.70               | 4/11  | 7.04            | 1.99               | 67           |
| May    | 0.51          | 0.30             | 1.83               | 5/28  | 8.67            | 2.90               | 79           |
| Jun    | 0.47          | 0.17             | 1.15               | 6/ 8  | 6.85            | 2.13               | 119          |
| Jul    | 0.53          | 0.18             | 1.11               | 7/ 1  | 8.04            | 1.82               | 124          |
| Aug    | 0.60          | 0.26             | 1.32               | 8/ 9  | 8.70            | 2.51               | 44           |
| Sep    | 1.17          | 0.63             | 3.17               | 9/27  | 6.93            | 2.28               | 69           |
| Oct    | 0.98          | 0.65             | 2.53               | 10/29 | 7.05            | 1.78               | 124          |
| Nov    | 0.57          | 0.15             | 0.88               | 11/ 4 | 9.17            | 2.27               | 38           |
| Dec    | 0.70          | 0.42             | 1.96               | 12/23 | 9.47            | 3.30               | 98           |
| Jan    | 0.52          | 0.19             | 1.08               | 1/ 2  | 8.77            | 2.24               | 124          |
| Feb    | 0.78          | 0.27             | 1.56               | 2/ 6  | 7.83            | 2.55               | 45           |
| Spring | 0.68          | 0.33             | 1.88               | 3/22  | 7.66            | 2.27               | 212          |
| Summer | 0.52          | 0.19             | 1.32               | 8/ 9  | 7.65            | 2.07               | 287          |
| Fall   | 0.97          | 0.59             | 3.17               | 9/27  | 7.36            | 2.03               | 231          |
| Winter | 0.63          | 0.31             | 1.96               | 12/23 | 8.87            | 2.73               | 267          |
| Annual | 0.69          | 0.37             | 3.17               | 9/27  | 7.91            | 2.30               | 997          |

TABLE 2.15 Wave & Current Information in the Dominant Wave & Current Directions

Station at: KINGS BAY #5 - MAR 89-FEB 90 Data

|        | Wave Direction<br>(Deg. wrt North) | Hs<br>(m.) | Peak Period<br>(sec.) | Current Direction<br>(Deg. wrt North) | Current<br>(m/sec) |
|--------|------------------------------------|------------|-----------------------|---------------------------------------|--------------------|
| Mar    | 274.11                             | 0.63       | 8.24                  | 321.16                                | 0.20               |
| Apr    | 263.52                             | 0.77       | 8.57                  | 313.93                                | 0.15               |
| May    | 264.74                             | 0.42       | 9.71                  | 320.00                                | 0.22               |
| Jun    | 302.75                             | 0.42       | 7.36                  | 322.10                                | 0.19               |
| Jul    | 286.82                             | 0.55       | 8.32                  | 315.08                                | 0.20               |
| Aug    | 266.51                             | 0.50       | 9.80                  | 291.28                                | 0.09               |
| Sep    | 266.50                             | 1.15       | 7.45                  | 98.94                                 | 0.16               |
| Oct    | 257.79                             | 1.41       | 7.16                  | 94.26                                 | 0.43               |
| Nov    | 275.13                             | 0.63       | 10.03                 | 81.63                                 | 0.53               |
| Dec    | 250.26                             | 0.77       | 9.94                  | 238.53                                | 0.11               |
| Jan    | 286.13                             | 0.52       | 9.75                  | 294.21                                | 0.08               |
| Feb    | 277.51                             | 0.71       | 7.26                  | 292.70                                | 0.07               |
| Spring | 267.65                             | 0.59       | 8.73                  | 320.57                                | 0.21               |
| Summer | 289.40                             | 0.50       | 7.95                  | 320.86                                | 0.19               |
| Fall   | 262.62                             | 1.06       | 8.36                  | 91.03                                 | 0.43               |
| Winter | 269.63                             | 0.62       | 9.50                  | 258.63                                | 0.09               |
| Annual | 271.15                             | 0.67       | 8.50                  | 32.54                                 | 0.26               |

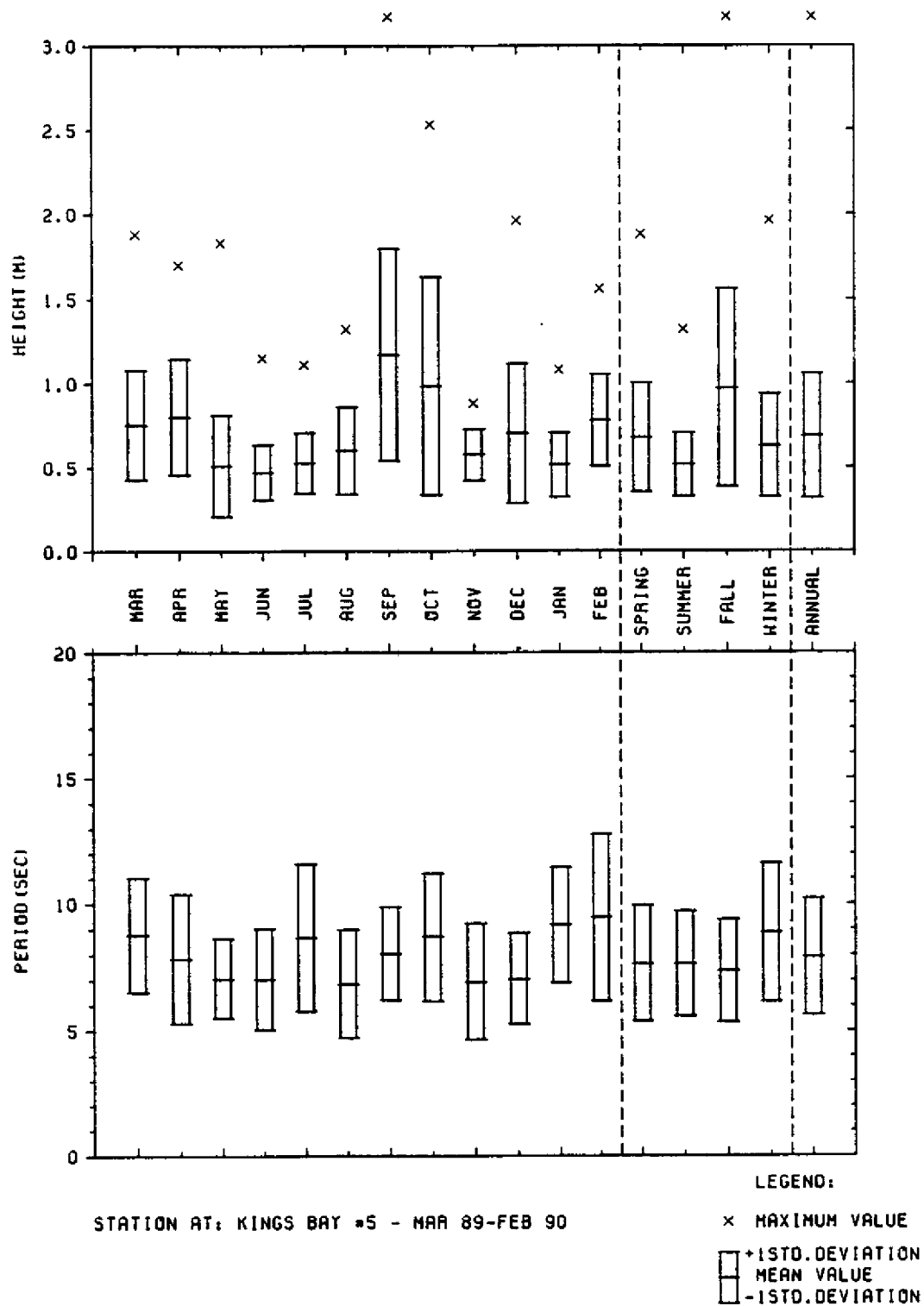
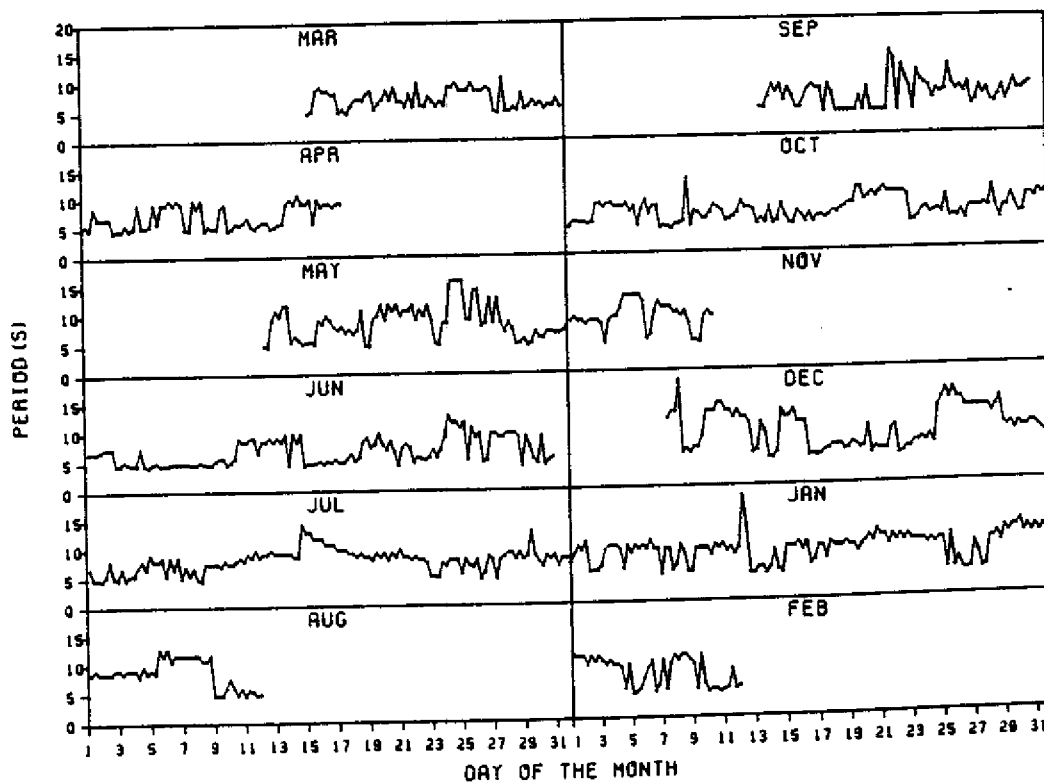
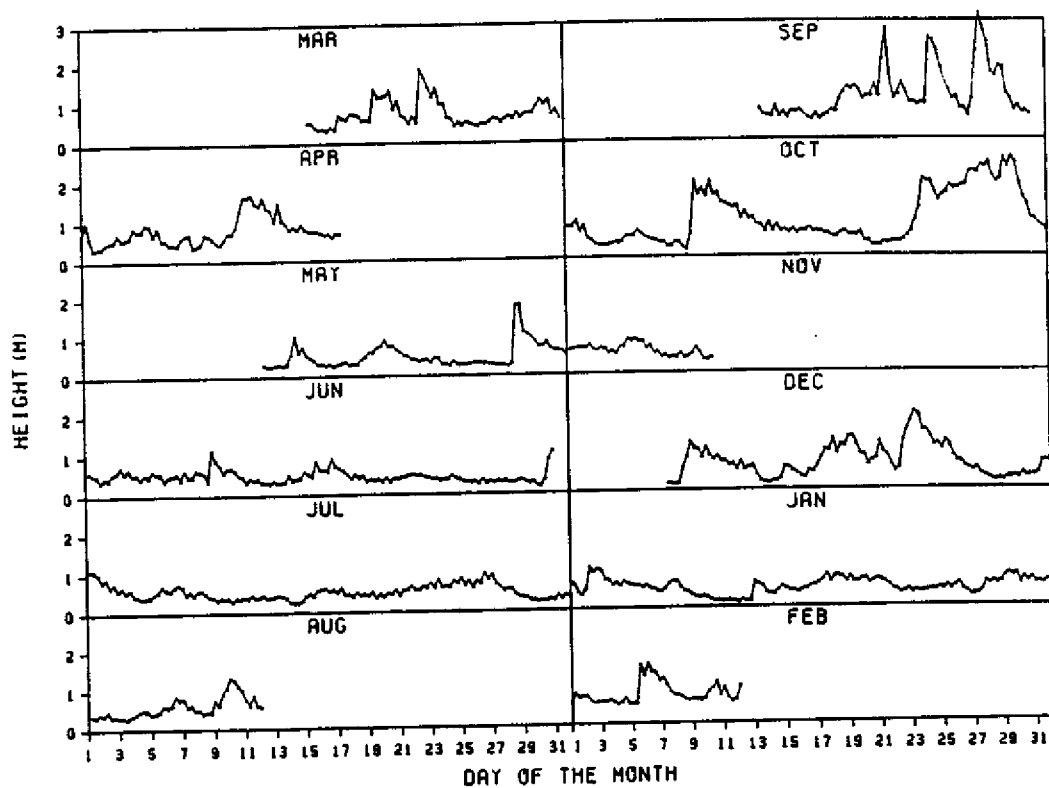
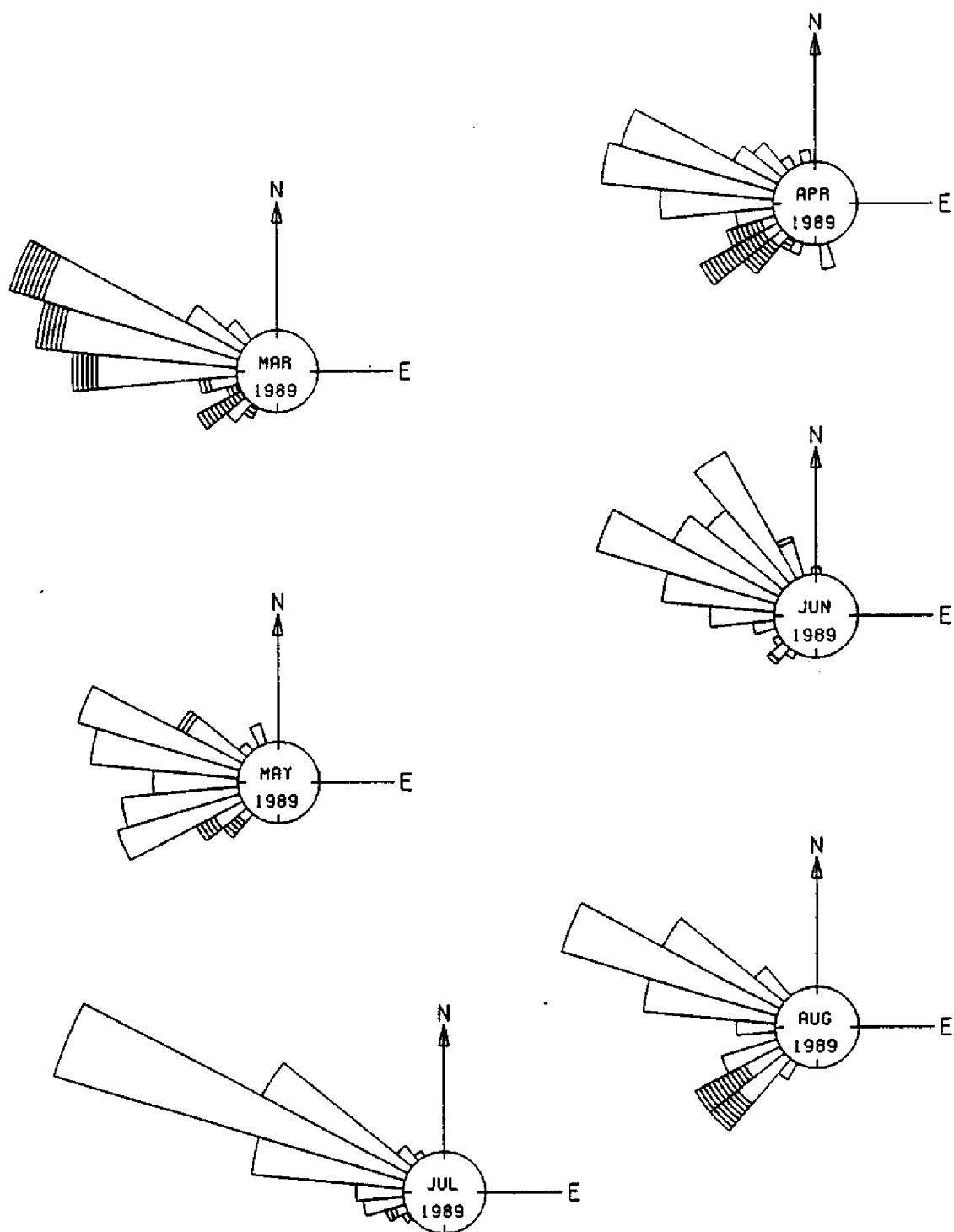


FIGURE 2-9 MONTHLY, SEASONAL & ANNUAL MEAN AND STD DEVIATION OF SIG.WAVE HEIGHT & PERIOD, AND MAXIMUM SIG.WAVE HEIGHT



STATION AT: KINGS BAY #5 - MAR 89-FEB 90

FIGURE 2-10 TIME HISTORY PLOTS OF SIGNIFICANT WAVE HEIGHT & PEAK PERIOD



LEGEND:  $\square H_s < 1\text{m}$   $\text{||||} 1\text{m} \leq H_s < 2\text{m}$   $\text{|||||} 2\text{m} \leq H_s < 3\text{m}$   $\blacksquare H_s \geq 3\text{m}$  0% 10% 20%

FIGURE 2-11A MAR-AUG 1989 WAVE ROSES FOR STATION AT KINGS BAY #5

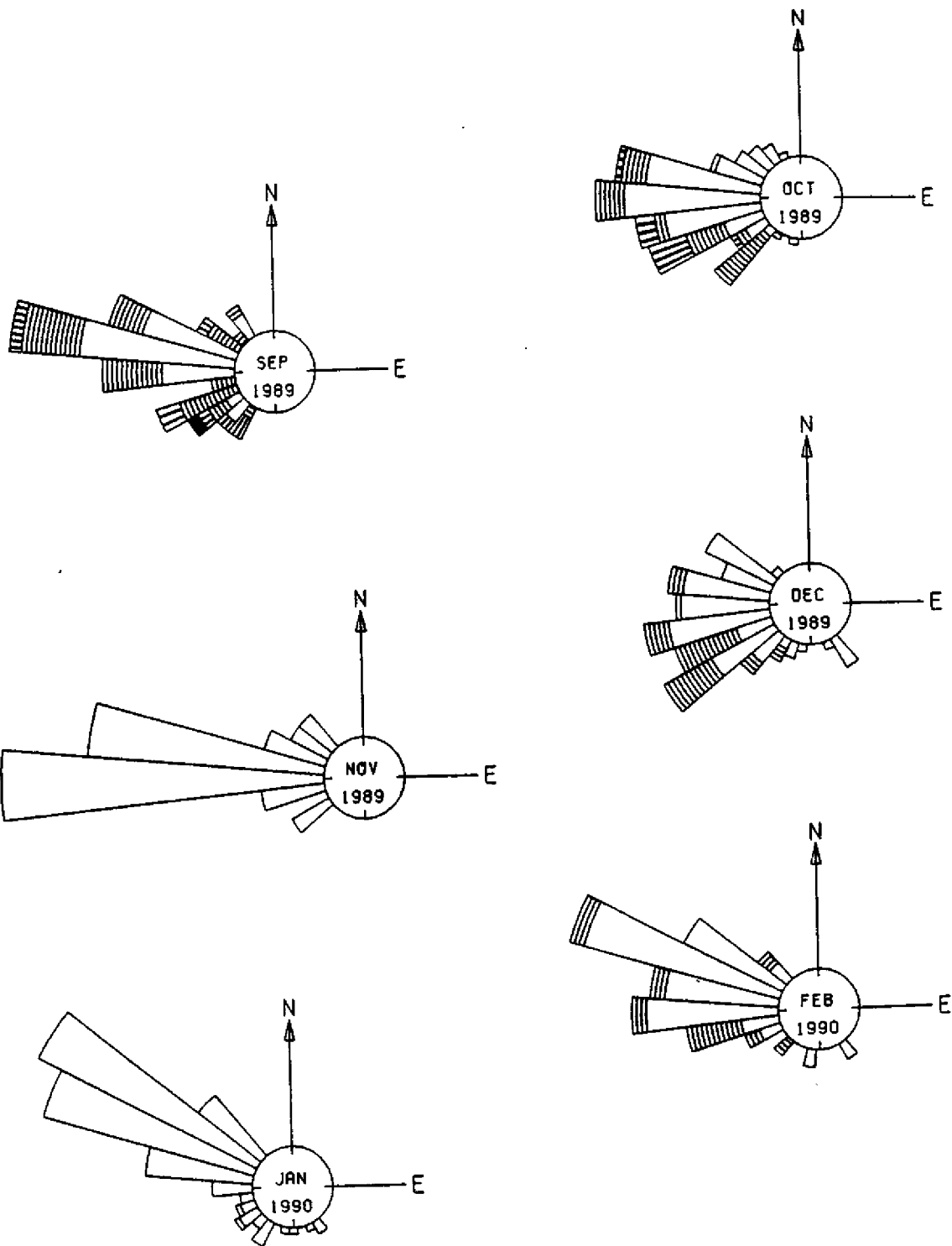


FIGURE 2-11B SEP 89-FEB 90 WAVE ROSES FOR STATION AT KINGS BAY #5

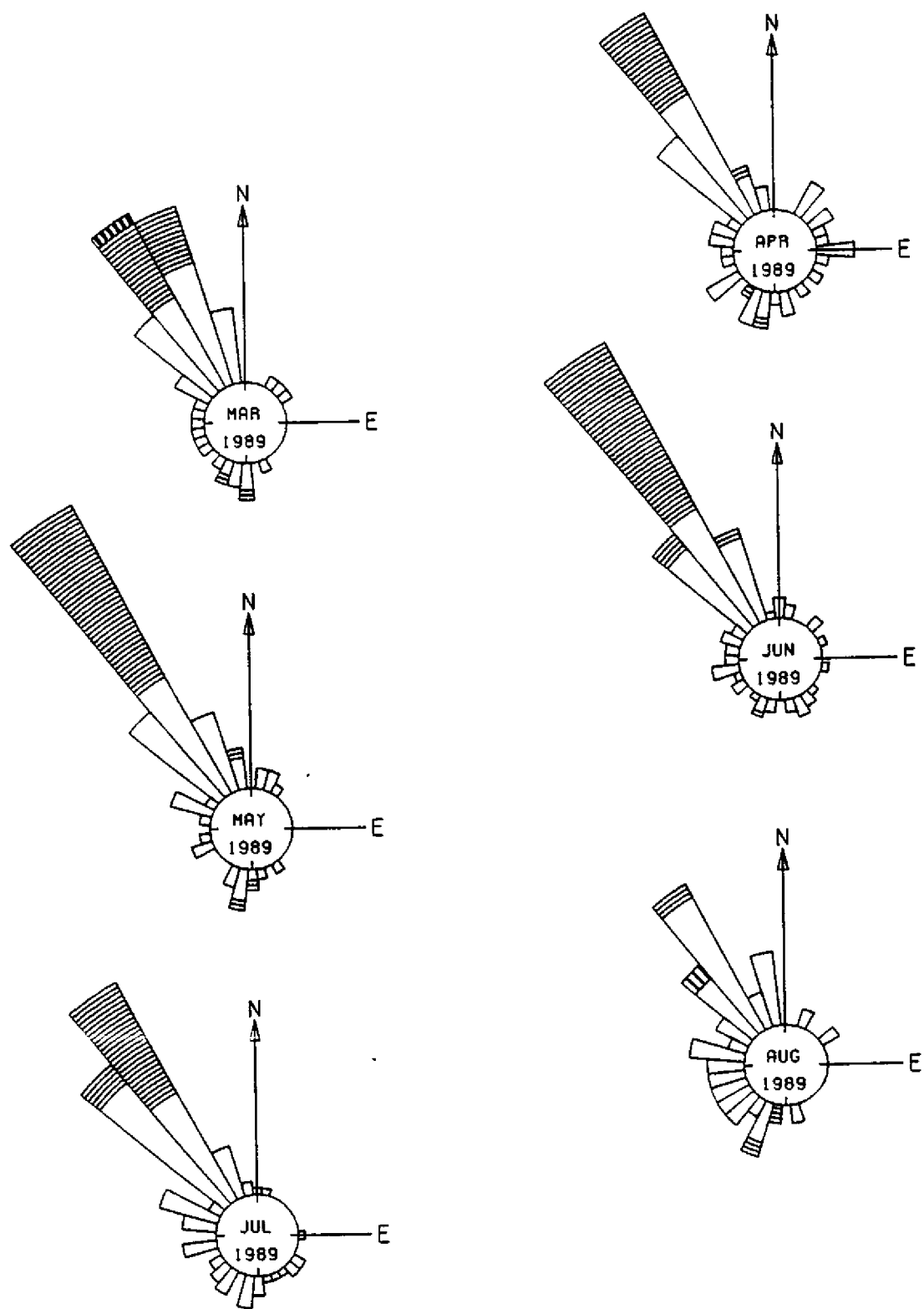
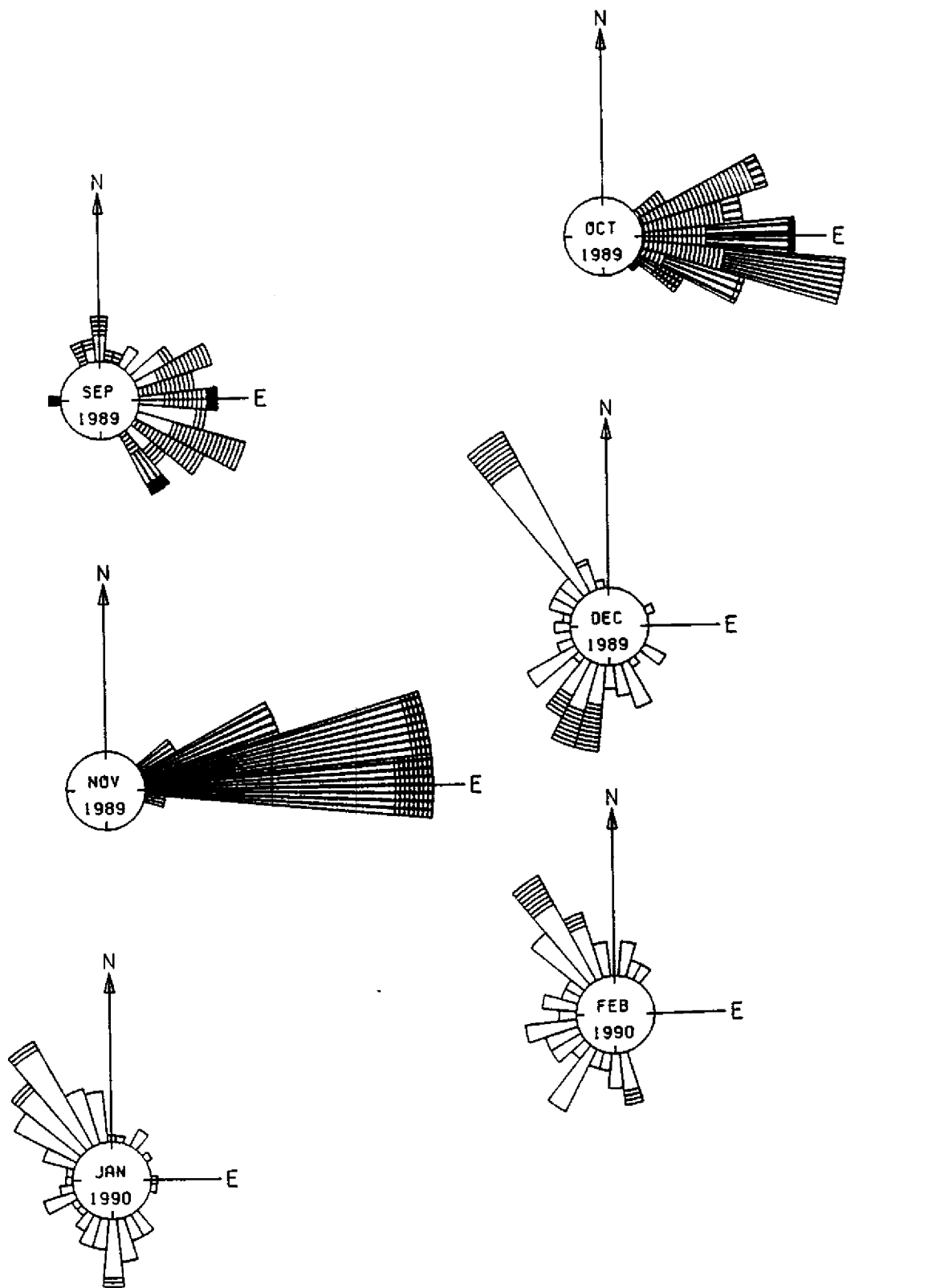


FIGURE 2-12A. MAR-AUG 1989 CURRENT ROSES FOR STATION AT KINGS BAY #5



LEGEND:  $V < 0.2$   $0.2 \leq V < 0.4$   $0.4 \leq V < 0.6$   $0.6 \leq V < 0.8$   $V \geq 0.8$   
(V IN M/S)

FIGURE 2-128. SEP 89-FEB 90 CURRENT ROSES FOR STATION AT KINGS BAY #5

TABLE 2.16 Seasonal Percentage Joint Distribution  
of Significant Wave Height & Peak Period

Station at: KINGS BAY #5 - JUL-OCT 1990 Data

| Hs(m)   |         | Peak Period(sec) |       |       |       |       |      | Total%: |
|---------|---------|------------------|-------|-------|-------|-------|------|---------|
|         |         | 3-5              | 5-7   | 7-9   | 9-11  | 11-13 | 13-  |         |
| 0.0-0.3 | Summer  | 0.00             | 0.00  | 1.19  | 0.89  | 0.30  | 0.00 | 2.37    |
|         | Fall    | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
|         | *Annual | 0.00             | 0.00  | 1.19  | 0.89  | 0.30  | 0.00 | 2.37    |
| 0.3-0.6 | Summer  | 2.08             | 1.48  | 11.57 | 12.17 | 2.37  | 2.67 | 32.34   |
|         | Fall    | 1.19             | 1.19  | 8.01  | 5.93  | 1.48  | 0.00 | 17.80   |
|         | *Annual | 3.26             | 2.67  | 19.58 | 18.10 | 3.86  | 2.67 | 50.15   |
| 0.6-0.9 | Summer  | 0.00             | 0.00  | 0.00  | 1.78  | 0.89  | 0.00 | 2.67    |
|         | Fall    | 2.67             | 3.56  | 1.78  | 8.61  | 7.42  | 0.89 | 24.93   |
|         | *Annual | 2.67             | 3.56  | 1.78  | 10.39 | 8.31  | 0.89 | 27.60   |
| 0.9-1.2 | Summer  | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
|         | Fall    | 2.37             | 4.75  | 0.89  | 1.19  | 1.78  | 0.30 | 11.28   |
|         | *Annual | 2.37             | 4.75  | 0.89  | 1.19  | 1.78  | 0.30 | 11.28   |
| 1.2-1.5 | Summer  | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
|         | Fall    | 0.30             | 2.67  | 0.30  | 0.89  | 0.00  | 0.00 | 4.15    |
|         | *Annual | 0.30             | 2.67  | 0.30  | 0.89  | 0.00  | 0.00 | 4.15    |
| 1.5-1.8 | Summer  | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
|         | Fall    | 0.00             | 0.30  | 0.00  | 0.30  | 0.00  | 0.00 | 0.59    |
|         | *Annual | 0.00             | 0.30  | 0.00  | 0.30  | 0.00  | 0.00 | 0.59    |
| 1.8-2.1 | Summer  | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
|         | Fall    | 0.00             | 0.00  | 1.19  | 0.89  | 0.00  | 0.00 | 2.08    |
|         | *Annual | 0.00             | 0.00  | 1.19  | 0.89  | 0.00  | 0.00 | 2.08    |
| 2.1-2.4 | Summer  | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
|         | Fall    | 0.00             | 0.30  | 0.30  | 0.30  | 0.00  | 0.00 | 0.89    |
|         | *Annual | 0.00             | 0.30  | 0.30  | 0.30  | 0.00  | 0.00 | 0.89    |
| 2.4-2.7 | Summer  | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
|         | Fall    | 0.00             | 0.30  | 0.30  | 0.00  | 0.00  | 0.00 | 0.59    |
|         | *Annual | 0.00             | 0.30  | 0.30  | 0.00  | 0.00  | 0.00 | 0.59    |
| 2.7-    | Summer  | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
|         | Fall    | 0.00             | 0.00  | 0.30  | 0.00  | 0.00  | 0.00 | 0.30    |
|         | *Annual | 0.00             | 0.00  | 0.30  | 0.00  | 0.00  | 0.00 | 0.30    |
| Total%: | Summer  | 2.08             | 1.48  | 12.76 | 14.84 | 3.56  | 2.67 | 37.39   |
|         | Fall    | 6.53             | 13.06 | 13.06 | 18.10 | 10.68 | 1.19 | 62.61   |
|         | *Annual | 8.61             | 14.54 | 25.82 | 32.94 | 14.24 | 3.86 | 100.00  |

\* Based on data analysed; one or more seasonal data are not available.

TABLE 2.17 Seasonal Marginal & Cumulative Probability  
Distribution of Significant Wave Height

Station at: KINGS BAY #5 - JUL-OCT 1990 Data

| Summer                              |         |         |                          |                          |
|-------------------------------------|---------|---------|--------------------------|--------------------------|
| <= Marginal Height(m) Cumulative => |         |         |                          |                          |
| 00                                  | 0.063   | 0.0-0.3 | 1.000                    | 000000000000000000000000 |
| 000000000000000000000000            | 0.865   | 0.3-0.6 | 0.937                    | 000000000000000000000000 |
| 00                                  | 0.071   | 0.6-0.9 | 0.071                    | 00                       |
| 0.000                               | 0.9-1.2 | 0.000   |                          |                          |
| 0.000                               | 1.2-1.5 | 0.000   |                          |                          |
| 0.000                               | 1.5-1.8 | 0.000   |                          |                          |
| 0.000                               | 1.8-2.1 | 0.000   |                          |                          |
| 0.000                               | 2.1-2.4 | 0.000   |                          |                          |
| 0.000                               | 2.4-2.7 | 0.000   |                          |                          |
| 0.000                               | 2.7-    | 0.000   |                          |                          |
| Fall                                |         |         |                          |                          |
| <= Marginal Height(m) Cumulative => |         |         |                          |                          |
| 0.000                               | 0.0-0.3 | 1.000   | 000000000000000000000000 |                          |
| 000000000000000000000000            | 0.284   | 0.3-0.6 | 1.000                    | 000000000000000000000000 |
| 000000000000000000000000            | 0.398   | 0.6-0.9 | 0.716                    | 000000000000000000000000 |
| 000000000000000000000000            | 0.180   | 0.9-1.2 | 0.318                    | 00000000                 |
| 0000                                | 0.066   | 1.2-1.5 | 0.137                    | 000                      |
| 0                                   | 0.009   | 1.5-1.8 | 0.071                    | 00                       |
| 00                                  | 0.033   | 1.8-2.1 | 0.062                    | 00                       |
| 0                                   | 0.014   | 2.1-2.4 | 0.028                    | 0                        |
| 0                                   | 0.009   | 2.4-2.7 | 0.014                    |                          |
| 0.005                               | 2.7-    | 0.005   |                          |                          |
| *Annual                             |         |         |                          |                          |
| <= Marginal Height(m) Cumulative => |         |         |                          |                          |
| 0                                   | 0.024   | 0.0-0.3 | 1.000                    | 000000000000000000000000 |
| 000000000000000000000000            | 0.501   | 0.3-0.6 | 0.976                    | 000000000000000000000000 |
| 000000000000000000000000            | 0.276   | 0.6-0.9 | 0.475                    | 000000000000000000000000 |
| 000000                              | 0.113   | 0.9-1.2 | 0.199                    | 000000                   |
| 00                                  | 0.042   | 1.2-1.5 | 0.086                    | 00                       |
| 0.006                               | 1.5-1.8 | 0.045   | 0                        |                          |
| 0                                   | 0.021   | 1.8-2.1 | 0.039                    | 0                        |
| 0.009                               | 2.1-2.4 | 0.018   |                          |                          |
| 0.006                               | 2.4-2.7 | 0.009   |                          |                          |
| 0.003                               | 2.7-    | 0.003   |                          |                          |

\* Based on data analysed; one or more seasonal data are not available.

TABLE 2.18 Seasonal Marginal & Cumulative Probability  
Distribution of Wave Period

Station at: KINGS BAY #5 - JUL-OCT 1990 Data

| Summer                                |       |       |       |                          |  |
|---------------------------------------|-------|-------|-------|--------------------------|--|
| <= Marginal Period(sec) Cumulative => |       |       |       |                          |  |
| 0000                                  | 0.056 | 3-5   | 1.000 | 000000000000000000000000 |  |
| 000                                   | 0.040 | 5-7   | 0.944 | 000000000000000000000000 |  |
| 000000000000000000000000              | 0.341 | 7-9   | 0.905 | 000000000000000000000000 |  |
| 000000000000000000000000              | 0.397 | 9-11  | 0.563 | 000000000000000000000000 |  |
| 000000                                | 0.095 | 11-13 | 0.167 | 0000                     |  |
| 00000                                 | 0.071 | 13-   | 0.071 | 00                       |  |
| Fall                                  |       |       |       |                          |  |
| <= Marginal Period(sec) Cumulative => |       |       |       |                          |  |
| 0000000000                            | 0.104 | 3-5   | 1.000 | 000000000000000000000000 |  |
| 000000000000000000000000              | 0.209 | 5-7   | 0.896 | 000000000000000000000000 |  |
| 000000000000000000000000              | 0.209 | 7-9   | 0.687 | 000000000000000000000000 |  |
| 000000000000000000000000              | 0.289 | 9-11  | 0.479 | 000000000000000000000000 |  |
| 000000000000000000000000              | 0.171 | 11-13 | 0.190 | 00000                    |  |
| 00                                    | 0.019 | 13-   | 0.019 |                          |  |
| *Annual                               |       |       |       |                          |  |
| <= Marginal Period(sec) Cumulative => |       |       |       |                          |  |
| 00000000                              | 0.086 | 3-5   | 1.000 | 000000000000000000000000 |  |
| 000000000000                          | 0.145 | 5-7   | 0.914 | 000000000000000000000000 |  |
| 000000000000000000000000              | 0.258 | 7-9   | 0.769 | 000000000000000000000000 |  |
| 000000000000000000000000              | 0.329 | 9-11  | 0.510 | 000000000000000000000000 |  |
| 000000000000                          | 0.142 | 11-13 | 0.181 | 00000                    |  |
| 000                                   | 0.039 | 13-   | 0.039 | 0                        |  |

\* Based on data analysed; one or more seasonal data are not available.

TABLE 2.19 Mean & Standard Deviation of Significant Wave Height & Period, and Maximum# Significant Wave Height

Station at: KINGS BAY #5 - JUL-OCT 1990 Data

|         | Mean<br>Hs(m) | Std Dev<br>Hs(m) | Maximum#:<br>Hs(m) | Date  | Mean<br>Tp(sec) | Std Dev<br>Tp(sec) | #Data<br>Pts |
|---------|---------------|------------------|--------------------|-------|-----------------|--------------------|--------------|
| Mar     |               |                  |                    |       |                 |                    |              |
| Apr     |               |                  |                    |       |                 |                    |              |
| May     |               |                  |                    |       |                 |                    |              |
| Jun     |               |                  |                    |       |                 |                    |              |
| Jul     | 0.62          | 0.07             | 0.69               | 7/31  | 10.22           | 0.42               | 2            |
| Aug     | 0.41          | 0.09             | 0.69               | 8/31  | 9.37            | 2.68               | 124          |
| Sep     | 0.65          | 0.23             | 1.29               | 9/18  | 8.88            | 2.60               | 120          |
| Oct     | 1.12          | 0.50             | 2.79               | 10/12 | 8.22            | 2.47               | 91           |
| Nov     |               |                  |                    |       |                 |                    |              |
| Dec     |               |                  |                    |       |                 |                    |              |
| Jan     |               |                  |                    |       |                 |                    |              |
| Feb     |               |                  |                    |       |                 |                    |              |
| Summer  | 0.41          | 0.09             | 0.69               | 7/31  | 9.38            | 2.66               | 126          |
| Fall    | 0.85          | 0.37             | 2.79               | 10/12 | 8.59            | 2.54               | 211          |
| *Annual | 0.69          | 0.30             | 2.79               | 10/12 | 8.89            | 2.59               | 337          |

TABLE 2.20 Wave & Current Information in the Dominant Wave & Current Directions

Station at: KINGS BAY #5 - JUL-OCT 1990 Data

|         | Wave Direction<br>(Deg. wrt North) | Hs<br>(m.) | Peak Period<br>(sec.) | Current Direction<br>(Deg. wrt North) | Current<br>(m/sec) |
|---------|------------------------------------|------------|-----------------------|---------------------------------------|--------------------|
| Mar     |                                    |            |                       |                                       |                    |
| Apr     |                                    |            |                       |                                       |                    |
| May     |                                    |            |                       |                                       |                    |
| Jun     |                                    |            |                       |                                       |                    |
| Jul     | 267.10                             | 0.54       | 10.64                 | 355.78                                |                    |
| Aug     | 286.02                             | 0.39       | 9.31                  | 7.71                                  | 0.06               |
| Sep     | 276.59                             | 0.63       | 10.15                 | 17.77                                 | 0.09               |
| Oct     | 285.41                             | 1.06       | 8.47                  | 53.30                                 | 0.11               |
| Nov     |                                    |            |                       |                                       |                    |
| Dec     |                                    |            |                       |                                       |                    |
| Jan     |                                    |            |                       |                                       |                    |
| Feb     |                                    |            |                       |                                       |                    |
| Summer  | 285.56                             | 0.40       | 9.33                  | 9.53                                  | 0.06               |
| Fall    | 281.64                             | 0.87       | 9.20                  | 25.17                                 | 0.09               |
| *Annual | 282.53                             | 0.62       | 9.27                  | 15.91                                 | 0.08               |

\* Based on data analysed; one or more seasonal data are not available.

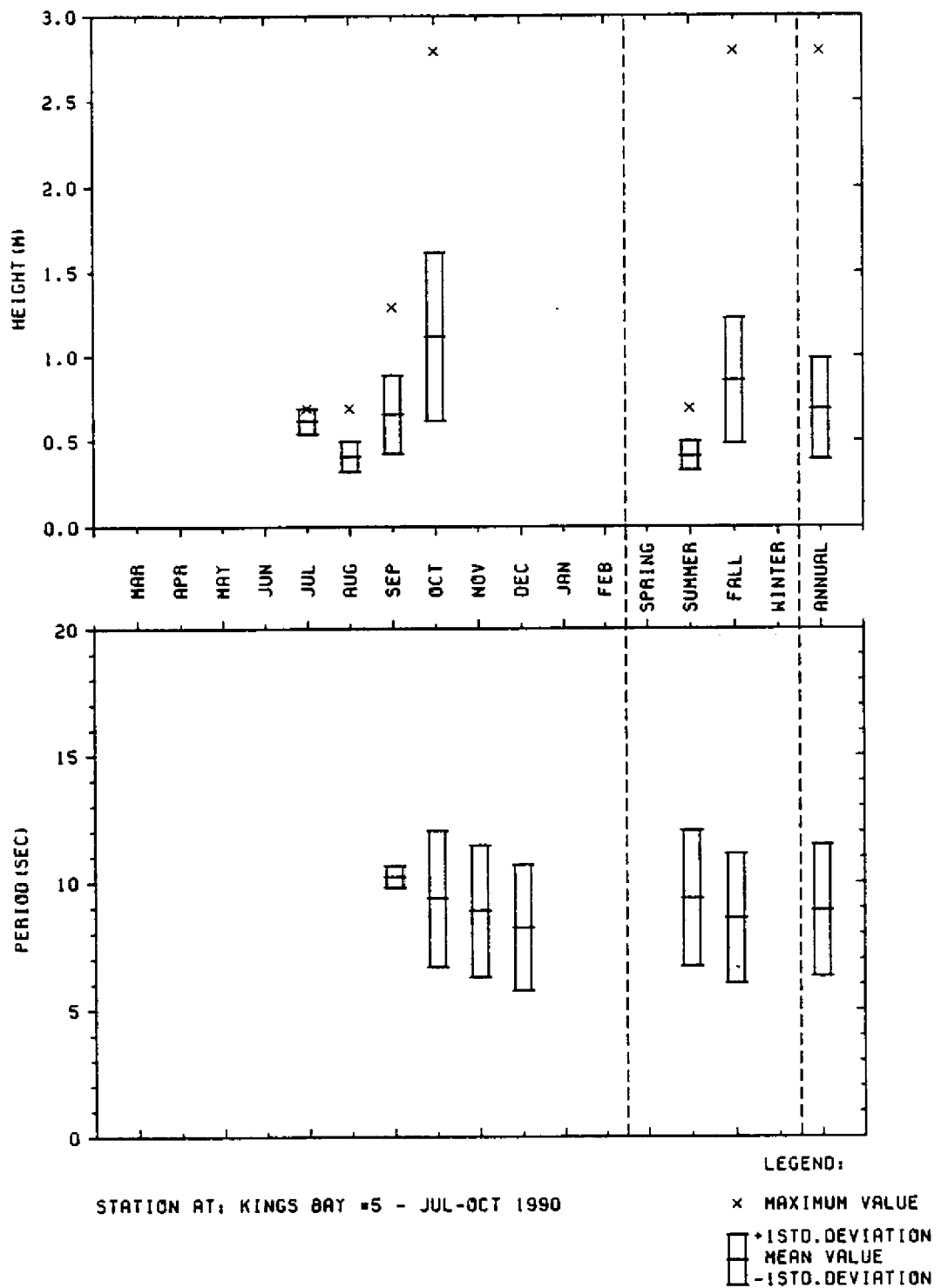
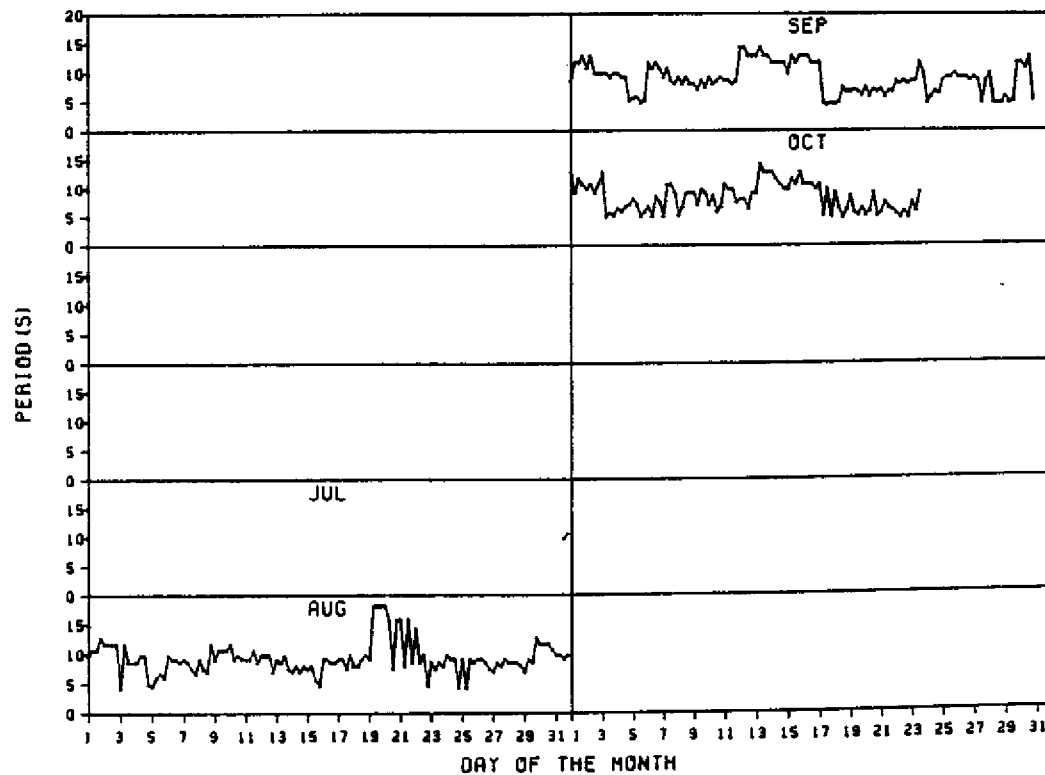
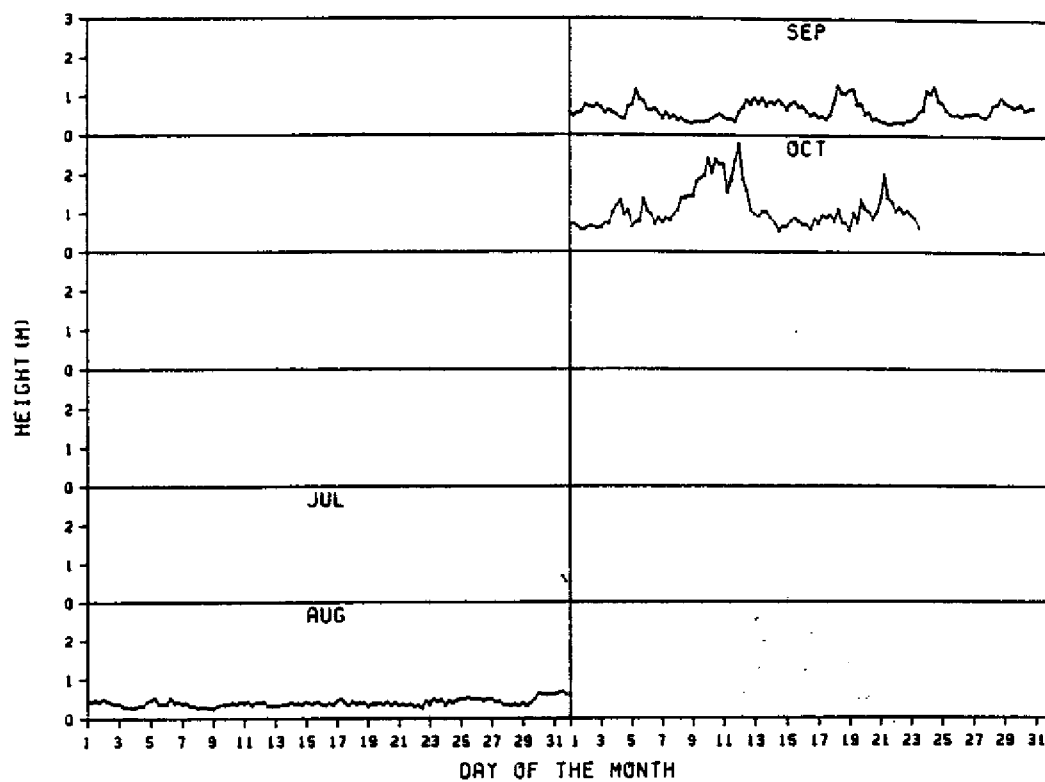
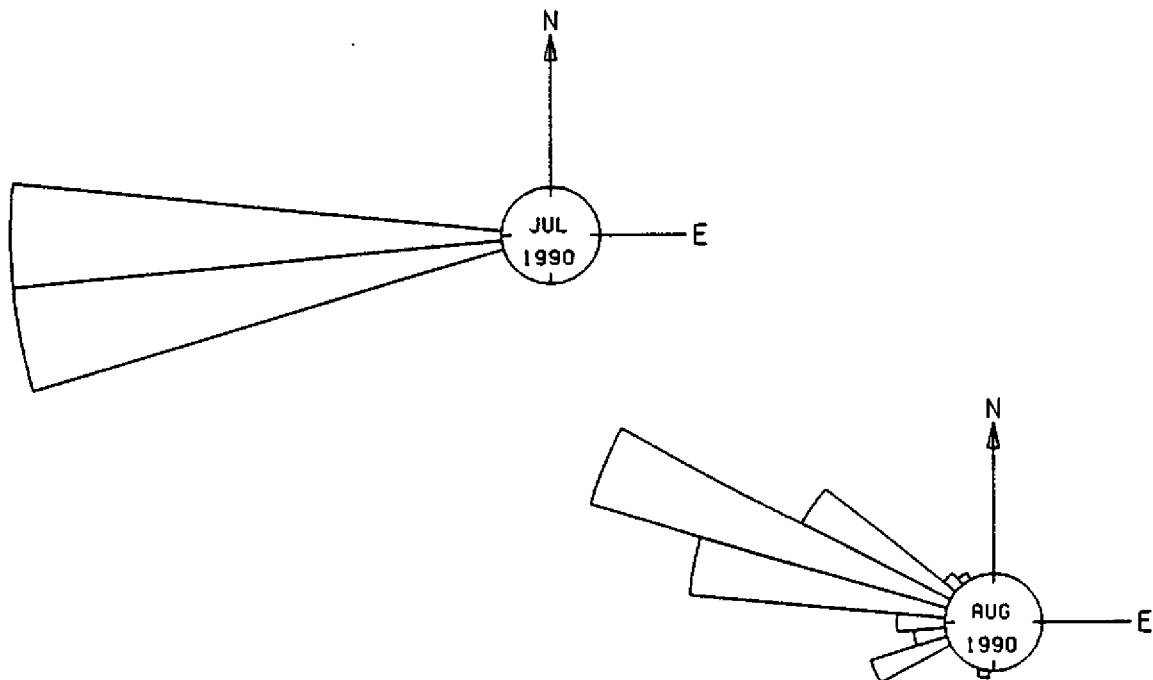


FIGURE 2-13 MONTHLY, SEASONAL & ANNUAL MEAN AND STD DEVIATION OF SIG.WAVE HEIGHT & PERIOD, AND MAXIMUM SIG.WAVE HEIGHT



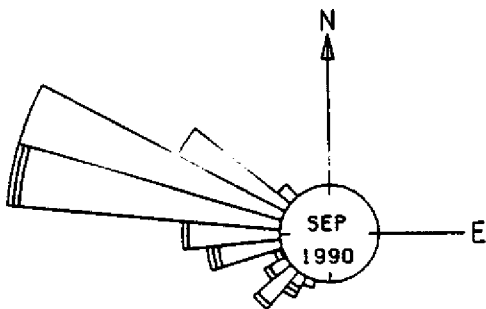
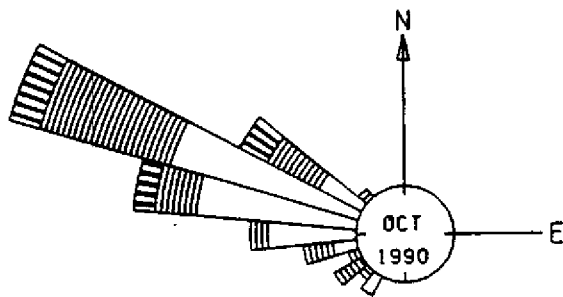
STATION AT: KINGS BAY 45 - JUL-OCT 1990

FIGURE 2-14 TIME HISTORY PLOTS OF SIGNIFICANT WAVE HEIGHT & PEAK PERIOD



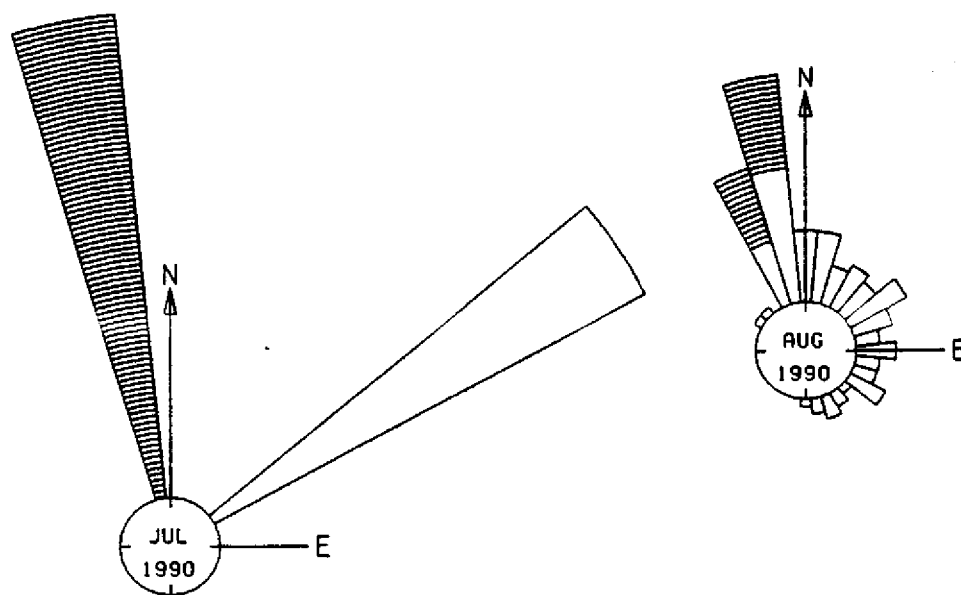
LEGEND:  $H_s < 1\text{m}$   $1\text{m} \leq H_s < 2\text{m}$   $2\text{m} \leq H_s < 3\text{m}$   $H_s \geq 3\text{m}$  0% 10% 20%

FIGURE 2-15A JUL-AUG 1990 WAVE ROSES FOR STATION AT KINGS BAY #3



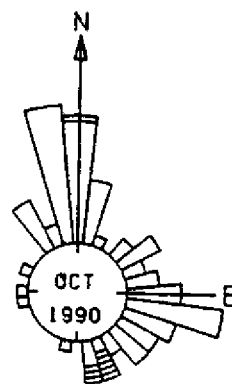
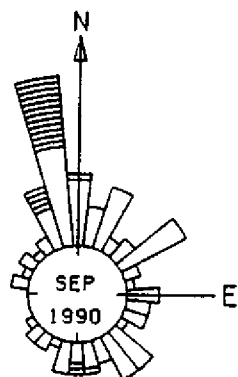
LEGEND:  $\square H_s < 1\text{m}$   $\text{▤} 1\text{m} \leq H_s < 2\text{m}$   $\text{▨} 2\text{m} \leq H_s < 3\text{m}$   $\blacksquare H_s \geq 3\text{m}$  0% 10% 20%

FIGURE 2-15B SEP-OCT 1990 WAVE ROSES FOR STATION AT KINGS BAY #5



LEGEND:  $v < 0.2$   $0.2 \leq v < 0.4$   $0.4 \leq v < 0.6$   $0.6 \leq v < 0.8$   $v \geq 0.8$  0% 10% 20%  
 (V IN M/S)

FIGURE 2-16A. JUL-AUG 1990 CURRENT ROSES FOR STATION AT KINGS BAY #5



LEGEND:  $v < 0.2$   $0.2 \leq v < 0.4$   $0.4 \leq v < 0.6$   $0.6 \leq v < 0.8$   $v \geq 0.8$  0% 10% 20%  
(V IN M/S)

FIGURE 2-168. SEP-OCT 1990 CURRENT ROSES FOR STATION AT KINGS BAY #5

TABLE 3.1 Seasonal Percentage Joint Distribution  
of Significant Wave Height & Peak Period

Station at: KINGS BAY #6 - JAN-FEB 1988 Data

| Hs(m)          | Peak Period(sec) |       |       |       |       |      | Total% |
|----------------|------------------|-------|-------|-------|-------|------|--------|
|                | 3-5              | 5-7   | 7-9   | 9-11  | 11-13 | 13-  |        |
| 0.0-0.3 Winter | 0.00             | 0.67  | 3.33  | 11.33 | 0.67  | 0.00 | 16.00  |
| *Annual        | 0.00             | 0.67  | 3.33  | 11.33 | 0.67  | 0.00 | 16.00  |
| 0.3-0.6 Winter | 2.00             | 2.00  | 10.67 | 12.67 | 0.00  | 0.00 | 27.33  |
| *Annual        | 2.00             | 2.00  | 10.67 | 12.67 | 0.00  | 0.00 | 27.33  |
| 0.6-0.9 Winter | 10.00            | 10.67 | 2.67  | 9.33  | 0.67  | 0.00 | 33.33  |
| *Annual        | 10.00            | 10.67 | 2.67  | 9.33  | 0.67  | 0.00 | 33.33  |
| 0.9-1.2 Winter | 6.00             | 6.67  | 3.33  | 2.00  | 0.00  | 0.00 | 18.00  |
| *Annual        | 6.00             | 6.67  | 3.33  | 2.00  | 0.00  | 0.00 | 18.00  |
| 1.2-1.5 Winter | 1.33             | 3.33  | 0.67  | 0.00  | 0.00  | 0.00 | 5.33   |
| *Annual        | 1.33             | 3.33  | 0.67  | 0.00  | 0.00  | 0.00 | 5.33   |
| 1.5-1.8 Winter | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00   |
| *Annual        | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00   |
| 1.8-2.1 Winter | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00   |
| *Annual        | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00   |
| 2.1-2.4 Winter | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00   |
| *Annual        | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00   |
| 2.4-2.7 Winter | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00   |
| *Annual        | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00   |
| 2.7- Winter    | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00   |
| *Annual        | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00   |
| Total%: Winter | 19.33            | 23.33 | 20.67 | 35.33 | 1.33  | 0.00 | 100.00 |
| *Annual        | 19.33            | 23.33 | 20.67 | 35.33 | 1.33  | 0.00 | 100.00 |

\* Based on data analysed; one or more seasonal data are not available.

Station at: KINGS BAY #6 - JAN-FEB 1988 Data

\* Based on data analysed; one or more seasonal data are not available.

TABLE 3.3 Seasonal Marginal & Cumulative Probability  
Distribution of Wave Period

Station at: KINGS BAY #6 - JAN-FEB 1988 Data

| Winter                                |       |       |       |                          |
|---------------------------------------|-------|-------|-------|--------------------------|
| <= Marginal Period(sec) Cumulative => |       |       |       |                          |
| 000000000000000000                    | 0.193 | 3-5   | 1.000 | 000000000000000000000000 |
| 000000000000000000                    | 0.233 | 5-7   | 0.807 | 0000000000000000000000   |
| 000000000000000000                    | 0.207 | 7-9   | 0.573 | 0000000000000000000000   |
| 0000000000000000000000                | 0.353 | 9-11  | 0.367 | 0000000000000000000000   |
| 0                                     | 0.013 | 11-13 | 0.013 |                          |
| 0.000                                 |       | 13-   | 0.000 |                          |

| *Annual                               |       |       |       |                          |
|---------------------------------------|-------|-------|-------|--------------------------|
| <= Marginal Period(sec) Cumulative => |       |       |       |                          |
| 000000000000000000                    | 0.193 | 3-5   | 1.000 | 000000000000000000000000 |
| 000000000000000000                    | 0.233 | 5-7   | 0.807 | 000000000000000000000000 |
| 000000000000000000                    | 0.207 | 7-9   | 0.573 | 000000000000000000000000 |
| 0000000000000000000000                | 0.353 | 9-11  | 0.367 | 000000000000000000000000 |
| 0                                     | 0.013 | 11-13 | 0.013 |                          |
| 0.000                                 |       | 13-   | 0.000 |                          |

\* Based on data analysed; one or more seasonal data are not available.

TABLE 3.4 Mean & Standard Deviation of Significant Wave Height & Period, and Maximum# Significant Wave Height

Station at: KINGS BAY #6 - JAN-FEB 1988 Data

|         | Mean<br>Hs(m) | Std Dev<br>Hs(m) | Maximum#:<br>Hs(m) | Date | Mean<br>Tp(sec) | Std Dev<br>Tp(sec) | #Data<br>Pts |
|---------|---------------|------------------|--------------------|------|-----------------|--------------------|--------------|
| Mar     |               |                  |                    |      |                 |                    |              |
| Apr     |               |                  |                    |      |                 |                    |              |
| May     |               |                  |                    |      |                 |                    |              |
| Jun     |               |                  |                    |      |                 |                    |              |
| Jul     |               |                  |                    |      |                 |                    |              |
| Aug     |               |                  |                    |      |                 |                    |              |
| Sep     |               |                  |                    |      |                 |                    |              |
| Oct     |               |                  |                    |      |                 |                    |              |
| Nov     |               |                  |                    |      |                 |                    |              |
| Dec     |               |                  |                    |      |                 |                    |              |
| Jan     | 0.89          | 0.26             | 1.32               | 1/31 | 5.98            | 1.02               | 14           |
| Feb     | 0.63          | 0.32             | 1.35               | 2/ 7 | 7.79            | 2.14               | 136          |
| Winter  | 0.65          | 0.31             | 1.35               | 2/ 7 | 7.62            | 2.06               | 150          |
| *Annual | 0.65          | 0.31             | 1.35               | 2/ 7 | 7.62            | 2.06               | 150          |

TABLE 3.5 Wave & Current Information in the Dominant Wave & Current Directions

Station at: KINGS BAY #6 - JAN-FEB 1988 Data

|         | Wave Direction<br>(Deg. wrt North) | Hs<br>(m.) | Peak Period<br>(sec.) | Current Direction<br>(Deg. wrt North) | Current<br>(m/sec) |
|---------|------------------------------------|------------|-----------------------|---------------------------------------|--------------------|
| Mar     |                                    |            |                       |                                       |                    |
| Apr     |                                    |            |                       |                                       |                    |
| May     |                                    |            |                       |                                       |                    |
| Jun     |                                    |            |                       |                                       |                    |
| Jul     |                                    |            |                       |                                       |                    |
| Aug     |                                    |            |                       |                                       |                    |
| Sep     |                                    |            |                       |                                       |                    |
| Oct     |                                    |            |                       |                                       |                    |
| Nov     |                                    |            |                       |                                       |                    |
| Dec     |                                    |            |                       |                                       |                    |
| Jan     | 170.76                             | 0.98       | 6.23                  | 342.65                                |                    |
| Feb     | 224.12                             | 0.88       | 5.62                  | 353.73                                | 0.50               |
| Winter  | 217.12                             | 0.93       | 5.91                  | 8.97                                  | 0.50               |
| *Annual | 217.12                             | 0.93       | 5.91                  | 8.97                                  | 0.50               |

\* Based on data analysed; one or more seasonal data are not available.

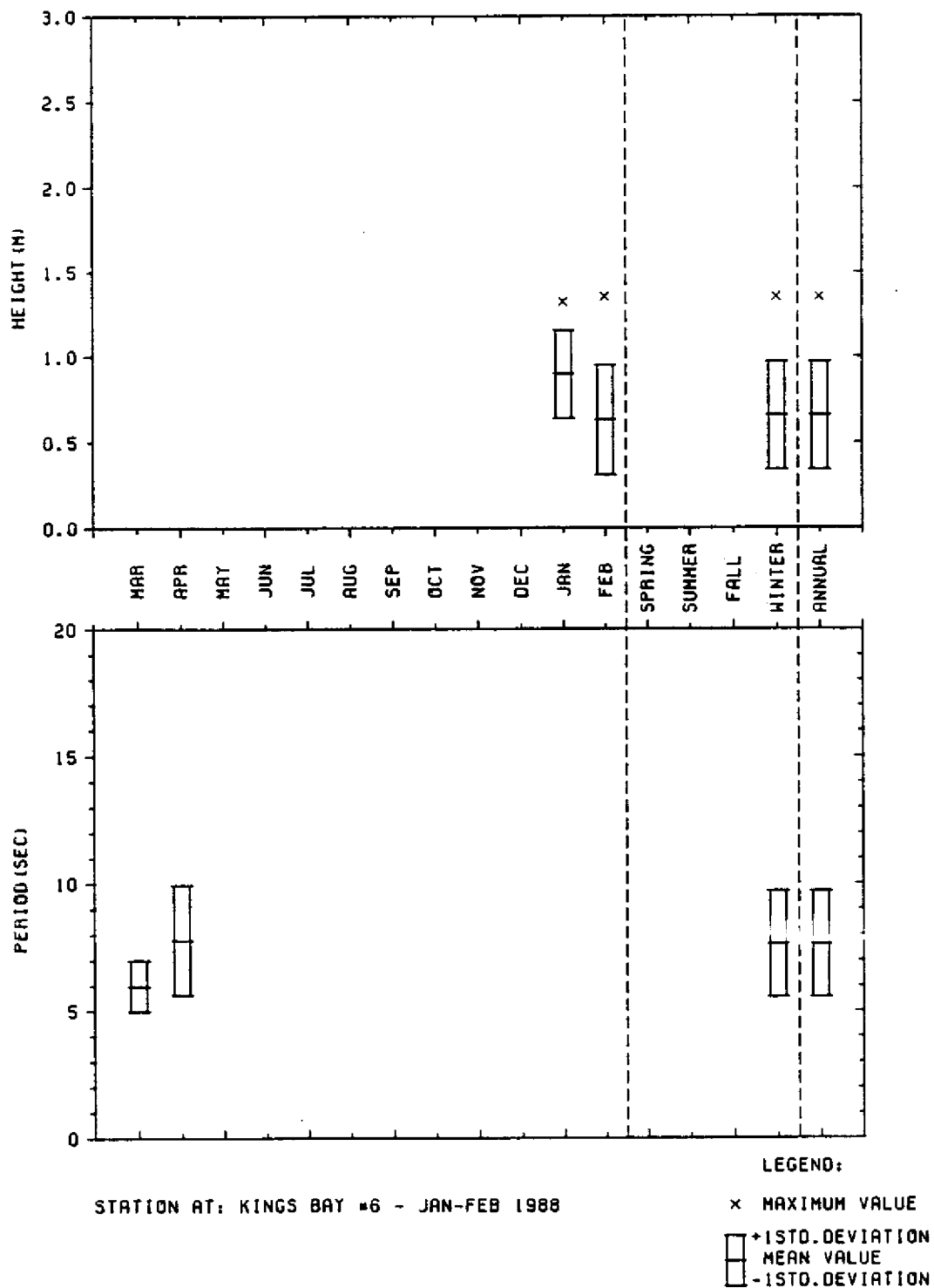
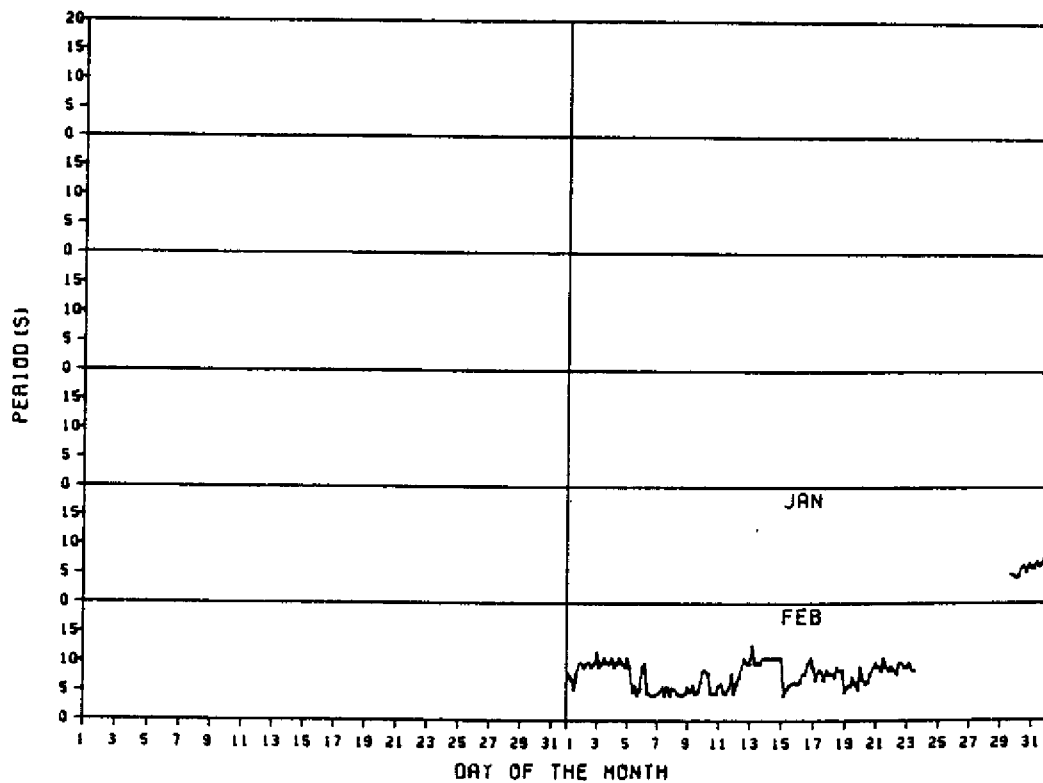
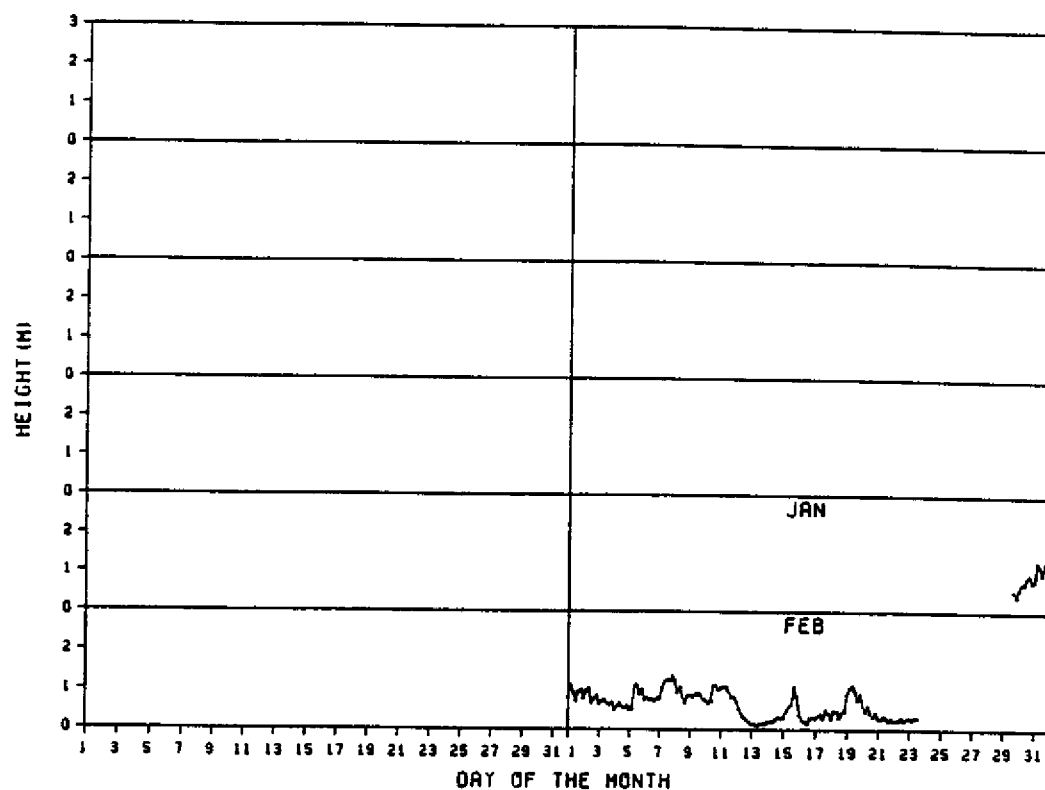
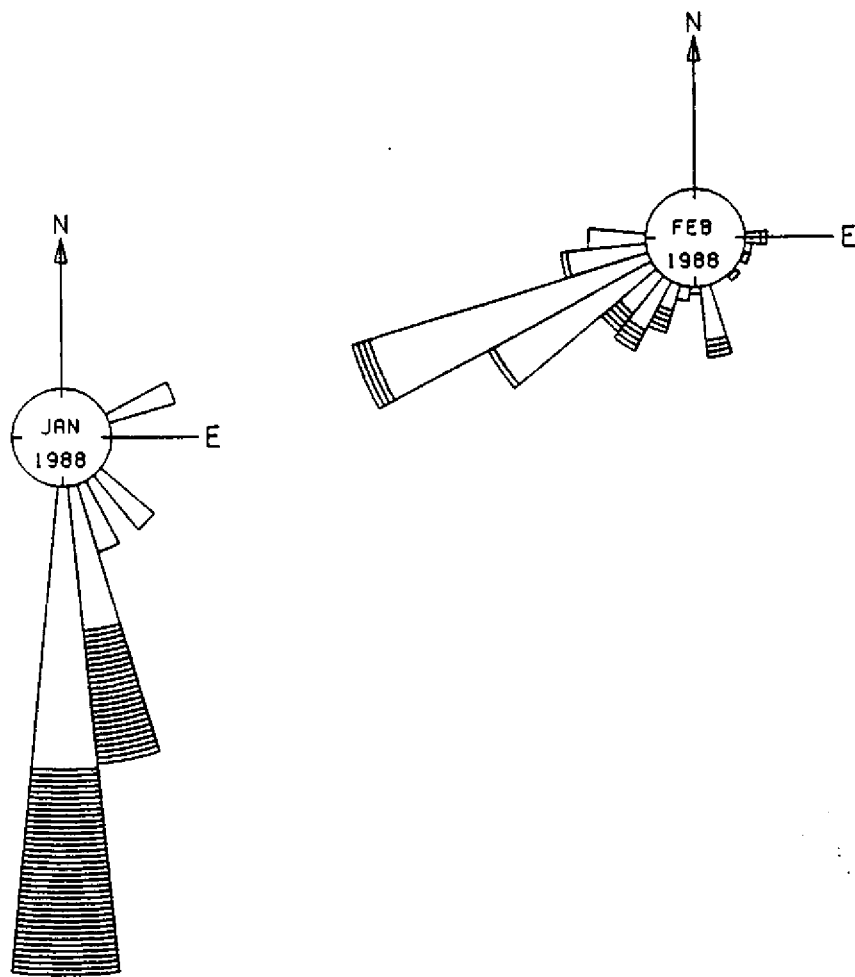


FIGURE 3-1 MONTHLY, SEASONAL & ANNUAL MEAN AND STD DEVIATION OF SIG.WAVE HEIGHT & PERIOD, AND MAXIMUM SIG.WAVE HEIGHT



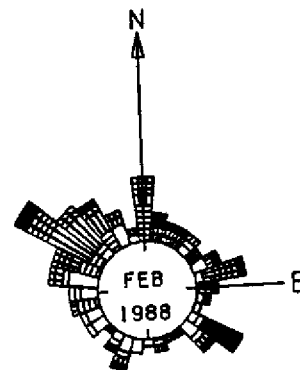
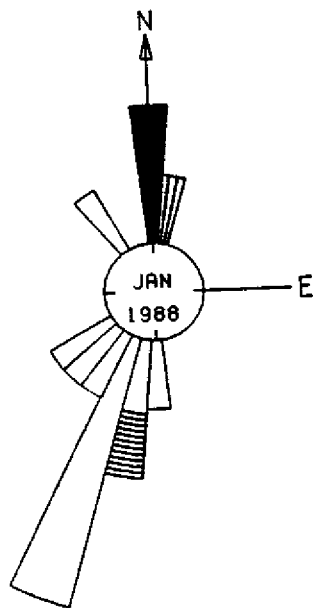
STATION AT: KINGS BAY #6 - JAN-FEB 1988

FIGURE 3-2 TIME HISTORY PLOTS OF SIGNIFICANT WAVE HEIGHT & PEAK PERIOD



LEGEND:  $\square$   $H_s < 1\text{m}$    $1\text{m} \leq H_s < 2\text{m}$    $2\text{m} \leq H_s < 3\text{m}$    $H_s \geq 3\text{m}$  0% 10% 20%

FIGURE 3-3. JAN-FEB 1988 WAVE ROSES FOR STATION AT KINGS BAY #6



LEGEND:  $v < 0.2$   $0.2 \leq v < 0.4$   $0.4 \leq v < 0.6$   $0.6 \leq v < 0.8$   $v \geq 0.8$   
 (V IN M/S)

0% 10% 20%

FIGURE 3-4. JAN-FEB 1988 CURRENT ROSES FOR STATION AT KINGS BAY #6

TABLE 3.6 Seasonal Percentage Joint Distribution  
of Significant Wave Height & Peak Period

Station at: KINGS BAY #6 - JUL 88-FEB 89 Data

| Hs(m)          | Peak Period(sec) |       |       |       |       |      | Total%: |
|----------------|------------------|-------|-------|-------|-------|------|---------|
|                | 3-5              | 5-7   | 7-9   | 9-11  | 11-13 | 13-  |         |
| 0.0-0.3 Summer | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
| Fall           | 1.67             | 2.96  | 7.58  | 5.27  | 0.39  | 0.00 | 17.87   |
| Winter         | 0.39             | 0.39  | 1.80  | 1.93  | 0.26  | 0.13 | 4.88    |
| *Annual        | 2.06             | 3.34  | 9.38  | 7.20  | 0.64  | 0.13 | 22.75   |
| 0.3-0.6 Summer | 2.19             | 1.03  | 12.60 | 5.78  | 0.00  | 0.00 | 21.59   |
| Fall           | 5.14             | 4.76  | 3.08  | 2.19  | 1.16  | 0.51 | 16.84   |
| Winter         | 2.31             | 2.06  | 2.06  | 5.78  | 1.03  | 0.51 | 13.75   |
| *Annual        | 9.64             | 7.84  | 17.74 | 13.75 | 2.19  | 1.03 | 52.19   |
| 0.6-0.9 Summer | 1.41             | 1.29  | 3.47  | 0.64  | 0.00  | 0.00 | 6.81    |
| Fall           | 0.39             | 1.67  | 0.51  | 0.13  | 0.00  | 0.00 | 2.70    |
| Winter         | 0.77             | 1.16  | 1.67  | 2.57  | 0.26  | 0.39 | 6.81    |
| *Annual        | 2.57             | 4.11  | 5.66  | 3.34  | 0.26  | 0.39 | 16.32   |
| 0.9-1.2 Summer | 0.00             | 0.13  | 0.90  | 0.00  | 0.00  | 0.00 | 1.03    |
| Fall           | 0.00             | 0.13  | 0.00  | 0.00  | 0.00  | 0.00 | 0.13    |
| Winter         | 0.90             | 0.77  | 0.39  | 0.51  | 0.13  | 0.00 | 2.70    |
| *Annual        | 0.90             | 1.03  | 1.29  | 0.51  | 0.13  | 0.00 | 3.86    |
| 1.2-1.5 Summer | 0.00             | 0.00  | 0.77  | 0.13  | 0.00  | 0.00 | 0.90    |
| Fall           | 0.00             | 0.13  | 0.00  | 0.00  | 0.00  | 0.00 | 0.13    |
| Winter         | 0.51             | 0.39  | 0.13  | 0.13  | 0.00  | 0.00 | 1.16    |
| *Annual        | 0.51             | 0.51  | 0.90  | 0.26  | 0.00  | 0.00 | 2.19    |
| 1.5-1.8 Summer | 0.00             | 0.26  | 0.13  | 0.39  | 0.00  | 0.00 | 0.77    |
| Fall           | 0.00             | 0.13  | 0.00  | 0.00  | 0.00  | 0.00 | 0.13    |
| Winter         | 0.00             | 0.26  | 0.13  | 0.00  | 0.13  | 0.00 | 0.51    |
| *Annual        | 0.00             | 0.64  | 0.26  | 0.39  | 0.13  | 0.00 | 1.41    |
| 1.8-2.1 Summer | 0.00             | 0.00  | 0.13  | 0.13  | 0.00  | 0.00 | 0.26    |
| Fall           | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
| Winter         | 0.00             | 0.39  | 0.00  | 0.00  | 0.13  | 0.00 | 0.51    |
| *Annual        | 0.00             | 0.39  | 0.13  | 0.13  | 0.13  | 0.00 | 0.77    |
| 2.1-2.4 Summer | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
| Fall           | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
| Winter         | 0.00             | 0.26  | 0.13  | 0.00  | 0.00  | 0.00 | 0.39    |
| *Annual        | 0.00             | 0.26  | 0.13  | 0.00  | 0.00  | 0.00 | 0.39    |
| 2.4-2.7 Summer | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
| Fall           | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
| Winter         | 0.00             | 0.00  | 0.13  | 0.00  | 0.00  | 0.00 | 0.13    |
| *Annual        | 0.00             | 0.00  | 0.13  | 0.00  | 0.00  | 0.00 | 0.13    |
| 2.7- Summer    | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
| Fall           | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
| Winter         | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
| *Annual        | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
| Total%: Summer | 3.60             | 2.70  | 17.99 | 7.07  | 0.00  | 0.00 | 31.36   |
| Fall           | 7.20             | 9.77  | 11.18 | 7.58  | 1.54  | 0.51 | 37.79   |
| Winter         | 4.88             | 5.66  | 6.43  | 10.93 | 1.93  | 1.03 | 30.85   |
| *Annual        | 15.68            | 18.12 | 35.60 | 25.58 | 3.47  | 1.54 | 100.00  |

\* Based on data analysed; one or more seasonal data are not available.

TABLE 3.7 Seasonal Marginal & Cumulative Probability  
Distribution of Significant Wave Height

Station at: KINGS BAY #6 - JUL 88-FEB 89 Data

| Summer                              |       |         |       |                          |
|-------------------------------------|-------|---------|-------|--------------------------|
| <= Marginal Height(m) Cumulative => |       |         |       |                          |
|                                     | 0.000 | 0.0-0.3 | 1.000 | 000000000000000000000000 |
| 000000000000000000000000            | 0.689 | 0.3-0.6 | 1.000 | 000000000000000000000000 |
| 00000000                            | 0.217 | 0.6-0.9 | 0.311 | 00000000                 |
| 0                                   | 0.033 | 0.9-1.2 | 0.094 | 00                       |
| 0                                   | 0.029 | 1.2-1.5 | 0.061 | 00                       |
| 0                                   | 0.025 | 1.5-1.8 | 0.033 | 0                        |
|                                     | 0.008 | 1.8-2.1 | 0.008 |                          |
|                                     | 0.000 | 2.1-2.4 | 0.000 |                          |
|                                     | 0.000 | 2.4-2.7 | 0.000 |                          |
|                                     | 0.000 | 2.7-    | 0.000 |                          |
| Fall                                |       |         |       |                          |
| <= Marginal Height(m) Cumulative => |       |         |       |                          |
| 000000000000000000000000            | 0.473 | 0.0-0.3 | 1.000 | 000000000000000000000000 |
| 000000000000000000000000            | 0.446 | 0.3-0.6 | 0.527 | 000000000000000000000000 |
| 0000                                | 0.071 | 0.6-0.9 | 0.082 | 00                       |
|                                     | 0.003 | 0.9-1.2 | 0.010 |                          |
|                                     | 0.003 | 1.2-1.5 | 0.007 |                          |
|                                     | 0.003 | 1.5-1.8 | 0.003 |                          |
|                                     | 0.000 | 1.8-2.1 | 0.000 |                          |
|                                     | 0.000 | 2.1-2.4 | 0.000 |                          |
|                                     | 0.000 | 2.4-2.7 | 0.000 |                          |
|                                     | 0.000 | 2.7-    | 0.000 |                          |
| Winter                              |       |         |       |                          |
| <= Marginal Height(m) Cumulative => |       |         |       |                          |
| 0000000000                          | 0.158 | 0.0-0.3 | 1.000 | 000000000000000000000000 |
| 000000000000000000000000            | 0.446 | 0.3-0.6 | 0.842 | 000000000000000000000000 |
| 000000000000                        | 0.221 | 0.6-0.9 | 0.396 | 0000000000               |
| 00000                               | 0.087 | 0.9-1.2 | 0.175 | 0000                     |
| 00                                  | 0.038 | 1.2-1.5 | 0.088 | 00                       |
| 0                                   | 0.017 | 1.5-1.8 | 0.050 | 0                        |
| 0                                   | 0.017 | 1.8-2.1 | 0.033 | 0                        |
| 0                                   | 0.013 | 2.1-2.4 | 0.017 |                          |
|                                     | 0.004 | 2.4-2.7 | 0.004 |                          |
|                                     | 0.000 | 2.7-    | 0.000 |                          |
| *Annual                             |       |         |       |                          |
| <= Marginal Height(m) Cumulative => |       |         |       |                          |
| 0000000000                          | 0.228 | 0.0-0.3 | 1.000 | 000000000000000000000000 |
| 000000000000000000000000            | 0.522 | 0.3-0.6 | 0.772 | 000000000000000000000000 |
| 0000000000                          | 0.163 | 0.6-0.9 | 0.251 | 000000                   |
| 00                                  | 0.039 | 0.9-1.2 | 0.087 | 00                       |
| 0                                   | 0.022 | 1.2-1.5 | 0.049 | 0                        |
| 0                                   | 0.014 | 1.5-1.8 | 0.027 | 0                        |
|                                     | 0.008 | 1.8-2.1 | 0.013 |                          |
|                                     | 0.004 | 2.1-2.4 | 0.005 |                          |
|                                     | 0.001 | 2.4-2.7 | 0.001 |                          |
|                                     | 0.000 | 2.7-    | 0.000 |                          |

\* Based on data analysed; one or more seasonal data are not available.

TABLE 3.8 Seasonal Marginal & Cumulative Probability  
Distribution of Wave Period

Station at: KINGS BAY #6 - JUL 88-FEB 89 Data

| Summer                                |       |       |       |                          |  |
|---------------------------------------|-------|-------|-------|--------------------------|--|
| <= Marginal Period(sec) Cumulative => |       |       |       |                          |  |
| 00000                                 | 0.115 | 3-5   | 1.000 | 000000000000000000000000 |  |
| 0000                                  | 0.086 | 5-7   | 0.885 | 0000000000000000000000   |  |
| 000000000000000000000000              | 0.574 | 7-9   | 0.799 | 0000000000000000000000   |  |
| 0000000000                            | 0.225 | 9-11  | 0.225 | 000000                   |  |
| 0.000                                 |       | 11-13 | 0.000 |                          |  |
| 0.000                                 |       | 13-   | 0.000 |                          |  |
| Fall                                  |       |       |       |                          |  |
| <= Marginal Period(sec) Cumulative => |       |       |       |                          |  |
| 0000000000000000                      | 0.190 | 3-5   | 1.000 | 000000000000000000000000 |  |
| 000000000000000000000000              | 0.259 | 5-7   | 0.810 | 0000000000000000000000   |  |
| 000000000000000000000000              | 0.296 | 7-9   | 0.551 | 0000000000000000         |  |
| 000000000000000000000000              | 0.201 | 9-11  | 0.255 | 000000                   |  |
| 000                                   | 0.041 | 11-13 | 0.054 | 0                        |  |
| 0                                     | 0.014 | 13-   | 0.014 |                          |  |
| Winter                                |       |       |       |                          |  |
| <= Marginal Period(sec) Cumulative => |       |       |       |                          |  |
| 000000000000                          | 0.158 | 3-5   | 1.000 | 000000000000000000000000 |  |
| 00000000000000                        | 0.183 | 5-7   | 0.842 | 0000000000000000000000   |  |
| 0000000000000000                      | 0.208 | 7-9   | 0.658 | 0000000000000000         |  |
| 000000000000000000000000              | 0.354 | 9-11  | 0.450 | 000000000000             |  |
| 0000                                  | 0.063 | 11-13 | 0.096 | 00                       |  |
| 00                                    | 0.033 | 13-   | 0.033 | 0                        |  |
| *Annual                               |       |       |       |                          |  |
| <= Marginal Period(sec) Cumulative => |       |       |       |                          |  |
| 000000000000                          | 0.157 | 3-5   | 1.000 | 000000000000000000000000 |  |
| 00000000000000                        | 0.181 | 5-7   | 0.843 | 0000000000000000000000   |  |
| 000000000000000000000000              | 0.356 | 7-9   | 0.662 | 0000000000000000         |  |
| 000000000000000000000000              | 0.256 | 9-11  | 0.306 | 00000000                 |  |
| 00                                    | 0.035 | 11-13 | 0.050 | 0                        |  |
| 0                                     | 0.015 | 13-   | 0.015 |                          |  |

\* Based on data analysed; one or more seasonal data are not available.

TABLE 3.9 Mean & Standard Deviation of Significant Wave Height & Period, and Maximum Significant Wave Height

Station at: KINGS BAY #6 - JUL 88-FEB 89 Data

|         | Mean<br>Hs(m) | Std Dev<br>Hs(m) | Maximum#:<br>Hs(m) | Date  | Mean<br>Tp(sec) | Std Dev<br>Tp(sec) | #Data<br>Pts |
|---------|---------------|------------------|--------------------|-------|-----------------|--------------------|--------------|
| Mar     |               |                  |                    |       |                 |                    |              |
| Apr     |               |                  |                    |       |                 |                    |              |
| May     |               |                  |                    |       |                 |                    |              |
| Jun     |               |                  |                    |       |                 |                    |              |
| Jul     | 0.62          | 0.31             | 1.97               | 7/ 6  | 7.54            | 1.62               | 186          |
| Aug     | 0.51          | 0.09             | 0.70               | 8/ 2  | 8.36            | 0.73               | 58           |
| Sep     | 0.32          | 0.21             | 1.59               | 9/ 7  | 7.46            | 2.29               | 180          |
| Oct     | 0.37          | 0.15             | 0.71               | 10/ 1 | 7.17            | 2.21               | 114          |
| Nov     |               |                  |                    |       |                 |                    |              |
| Dec     | 0.62          | 0.33             | 1.89               | 12/12 | 8.01            | 2.80               | 94           |
| Jan     | 0.71          | 0.47             | 2.58               | 1/22  | 8.13            | 2.51               | 124          |
| Feb     | 0.33          | 0.11             | 0.58               | 2/ 6  | 8.57            | 1.23               | 22           |
| Summer  | 0.60          | 0.28             | 1.97               | 7/ 6  | 7.74            | 1.46               | 244          |
| Fall    | 0.34          | 0.19             | 1.59               | 9/ 7  | 7.35            | 2.26               | 294          |
| Winter  | 0.64          | 0.40             | 2.58               | 1/22  | 8.12            | 2.55               | 240          |
| *Annual | 0.51          | 0.30             | 2.58               | 1/22  | 7.71            | 2.14               | 778          |

TABLE 3.10 Wave & Current Information in the Dominant Wave & Current Directions

Station at: KINGS BAY #6 - JUL 88-FEB 89 Data

|         | Wave Direction<br>(Deg. wrt North) | Hs<br>(m.) | Peak Period<br>(sec.) | Current Direction<br>(Deg. wrt North) | Current<br>(m/sec) |
|---------|------------------------------------|------------|-----------------------|---------------------------------------|--------------------|
| Mar     |                                    |            |                       |                                       |                    |
| Apr     |                                    |            |                       |                                       |                    |
| May     |                                    |            |                       |                                       |                    |
| Jun     |                                    |            |                       |                                       |                    |
| Jul     | 249.91                             | 0.62       | 7.88                  | 3.82                                  | 0.31               |
| Aug     | 247.06                             | 0.52       | 8.28                  | 24.46                                 |                    |
| Sep     | 243.15                             | 0.51       | 7.68                  | 78.72                                 | 0.33               |
| Oct     | 231.46                             | 0.38       | 6.59                  | 87.72                                 | 0.48               |
| Nov     |                                    |            |                       |                                       |                    |
| Dec     | 276.26                             | 0.57       | 9.50                  | 338.68                                | 2.01               |
| Jan     | 275.90                             | 0.74       | 9.16                  | 346.91                                | 0.65               |
| Feb     | 287.24                             | 0.34       | 9.07                  | 317.66                                | 0.92               |
| Summer  | 249.31                             | 0.59       | 8.00                  | 9.30                                  | 0.31               |
| Fall    | 238.14                             | 0.33       | 7.44                  | 86.36                                 | 0.35               |
| Winter  | 276.59                             | 0.64       | 9.27                  | 344.22                                | 0.90               |
| *Annual | 256.84                             | 0.52       | 8.15                  | 33.26                                 | 0.54               |

\* Based on data analysed; one or more seasonal data are not available.

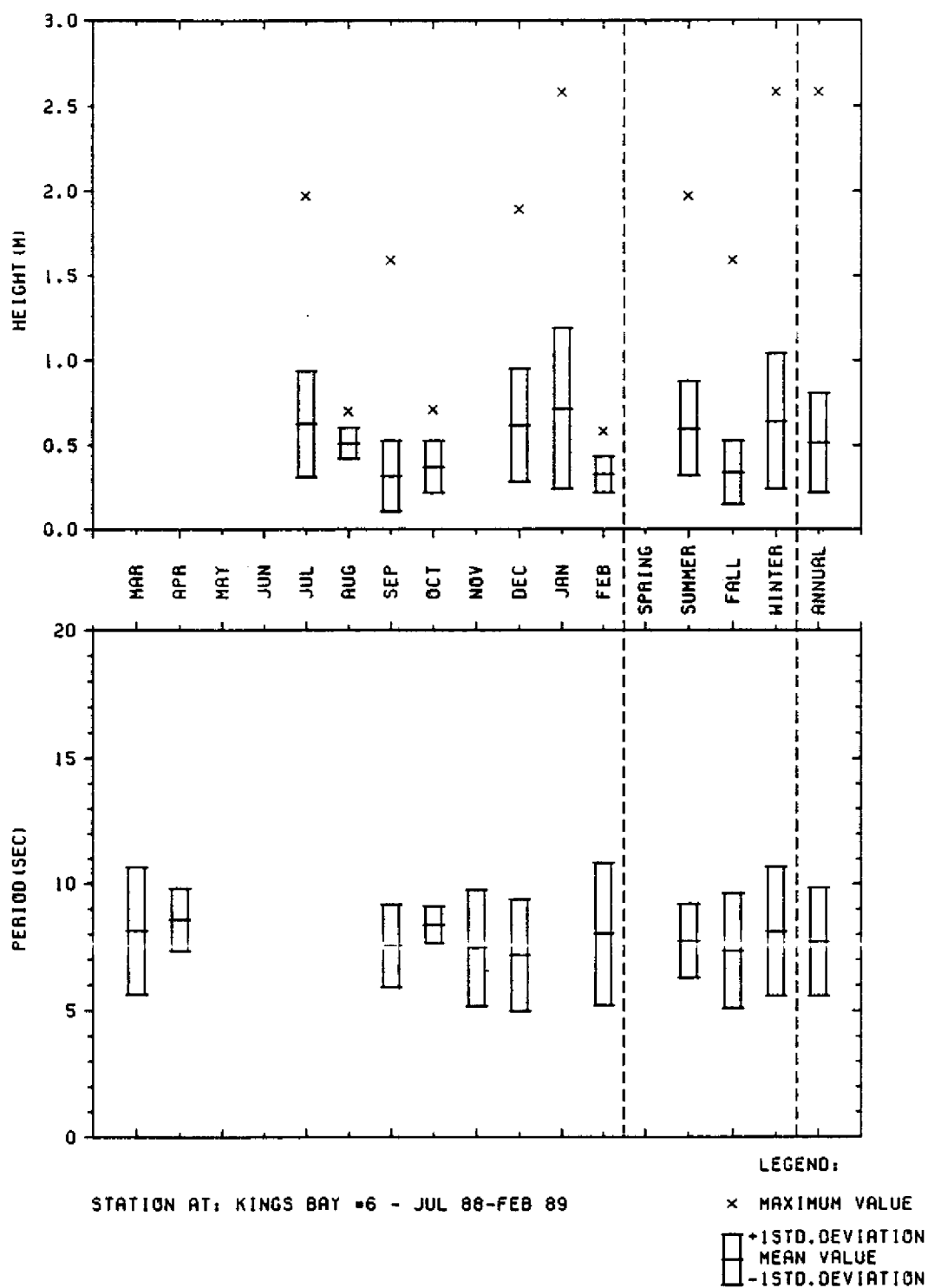
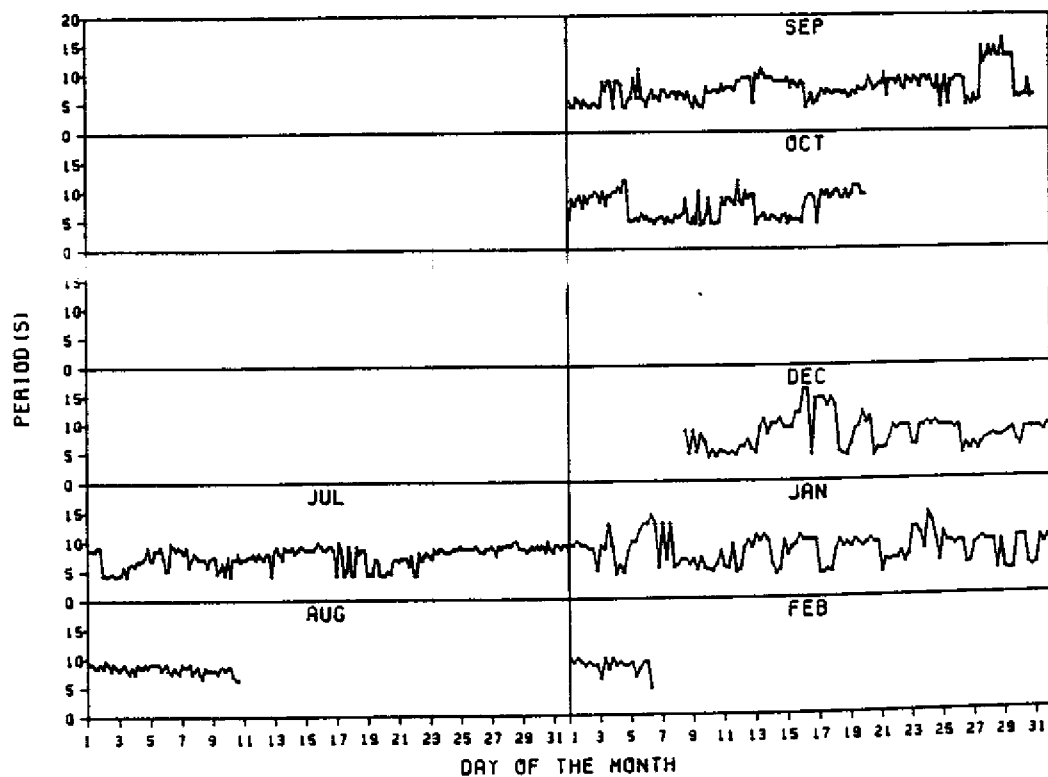
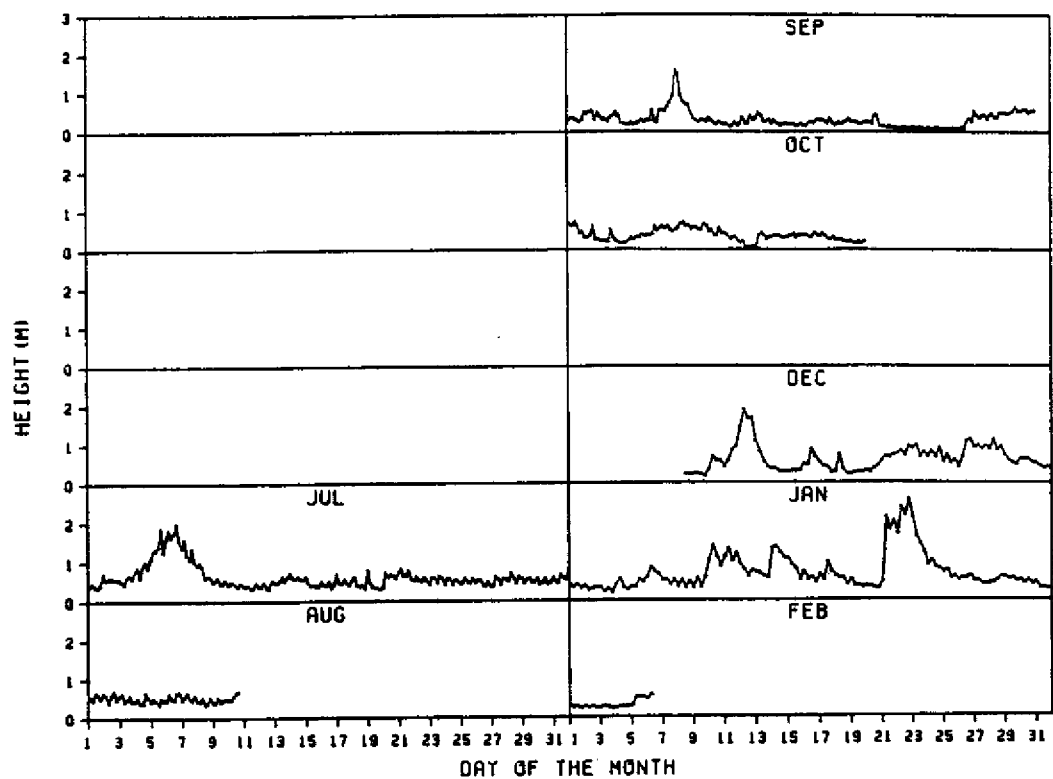
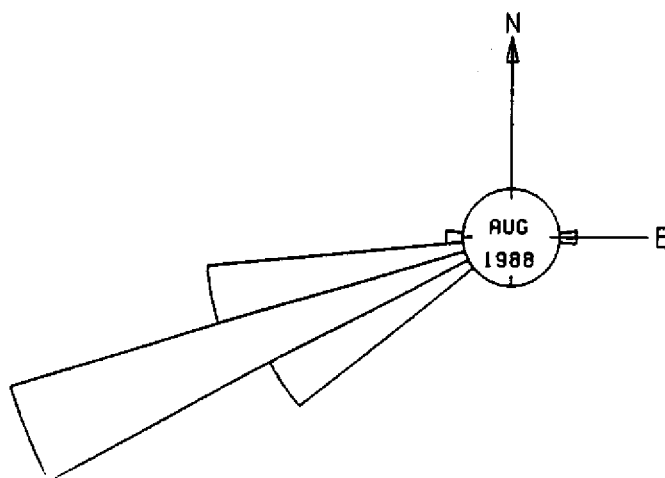
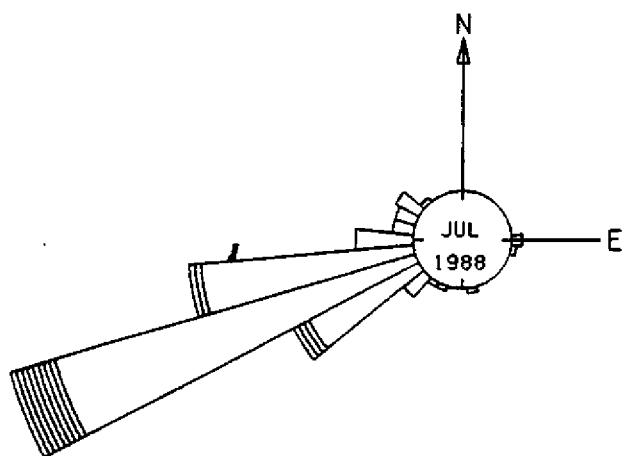


FIGURE 3-5 MONTHLY, SEASONAL & ANNUAL MEAN AND STD DEVIATION OF SIG.WAVE HEIGHT & PERIOD, AND MAXIMUM SIG.WAVE HEIGHT



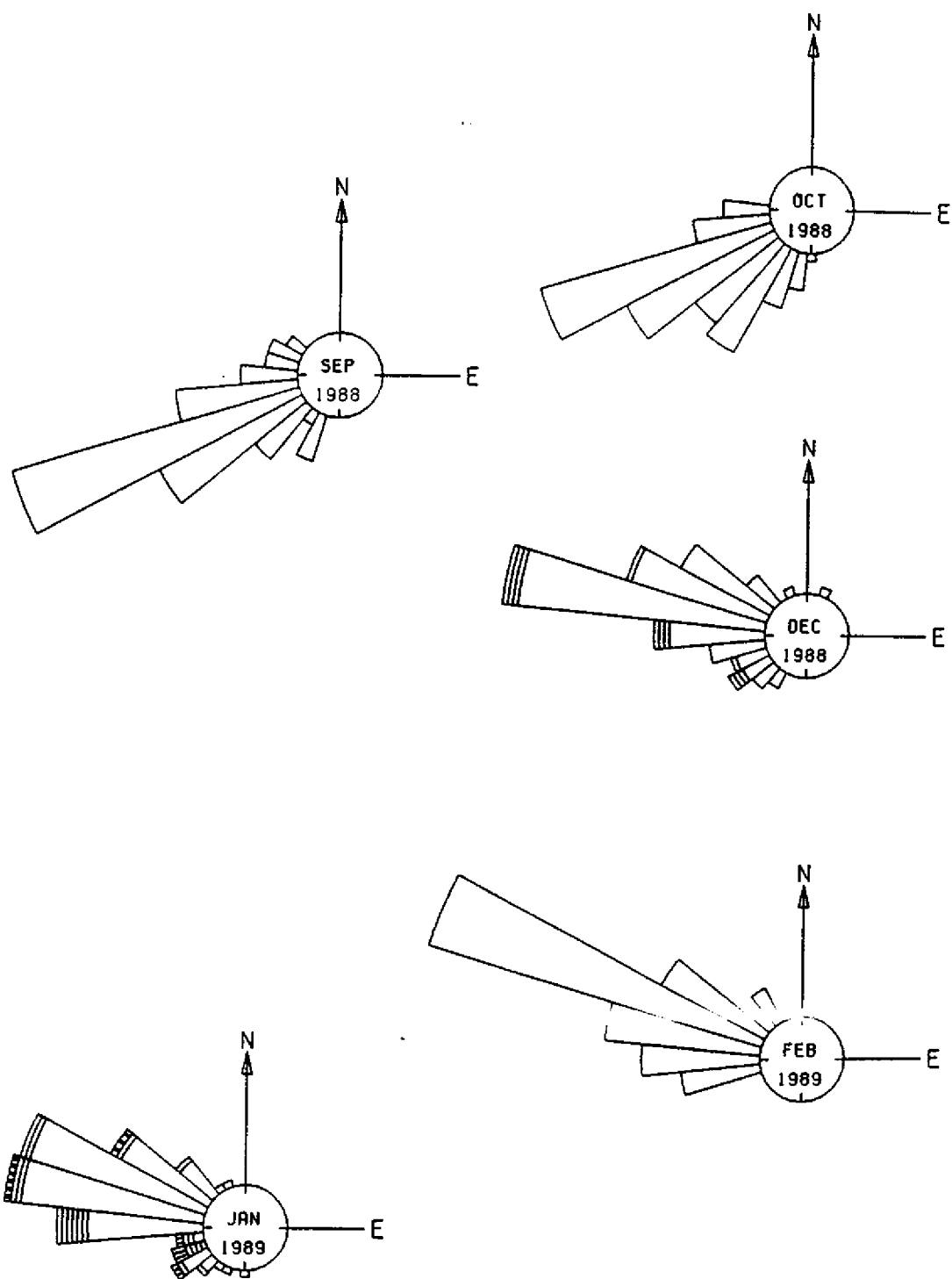
STATION AT: KINGS BAY #6 - JUL 88-FEB 89

FIGURE 3-6 TIME HISTORY PLOTS OF SIGNIFICANT WAVE HEIGHT & PEAK PERIOD



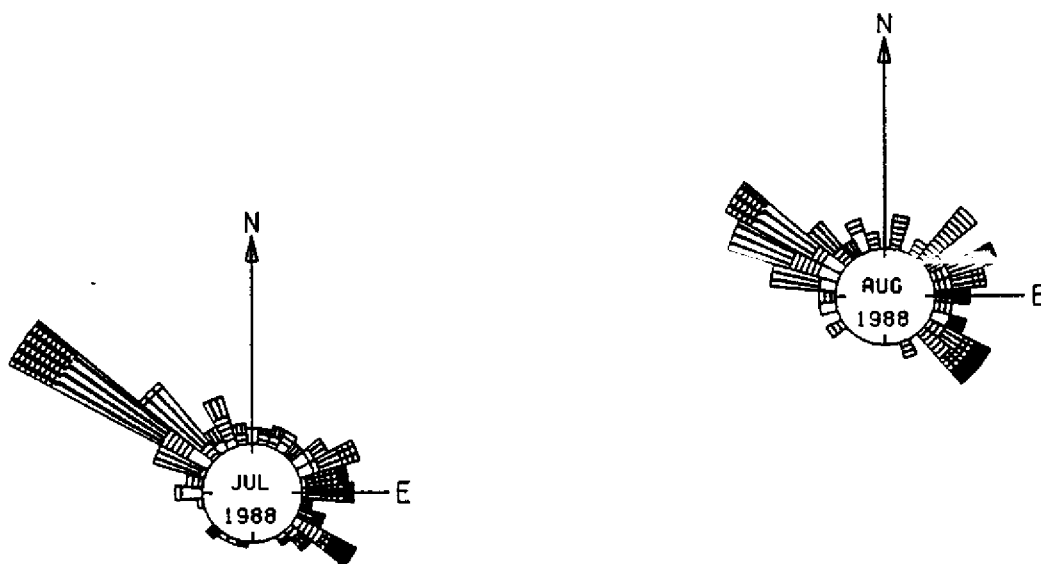
LEGEND:  $H_s < 1m$   $1m \leq H_s < 2m$   $2m \leq H_s < 3m$   $H_s \geq 3m$  0% 10% 20%

FIGURE 3-7A. JUL-AUG 1988 WAVE ROSES FOR STATION AT KINGS BAY #6



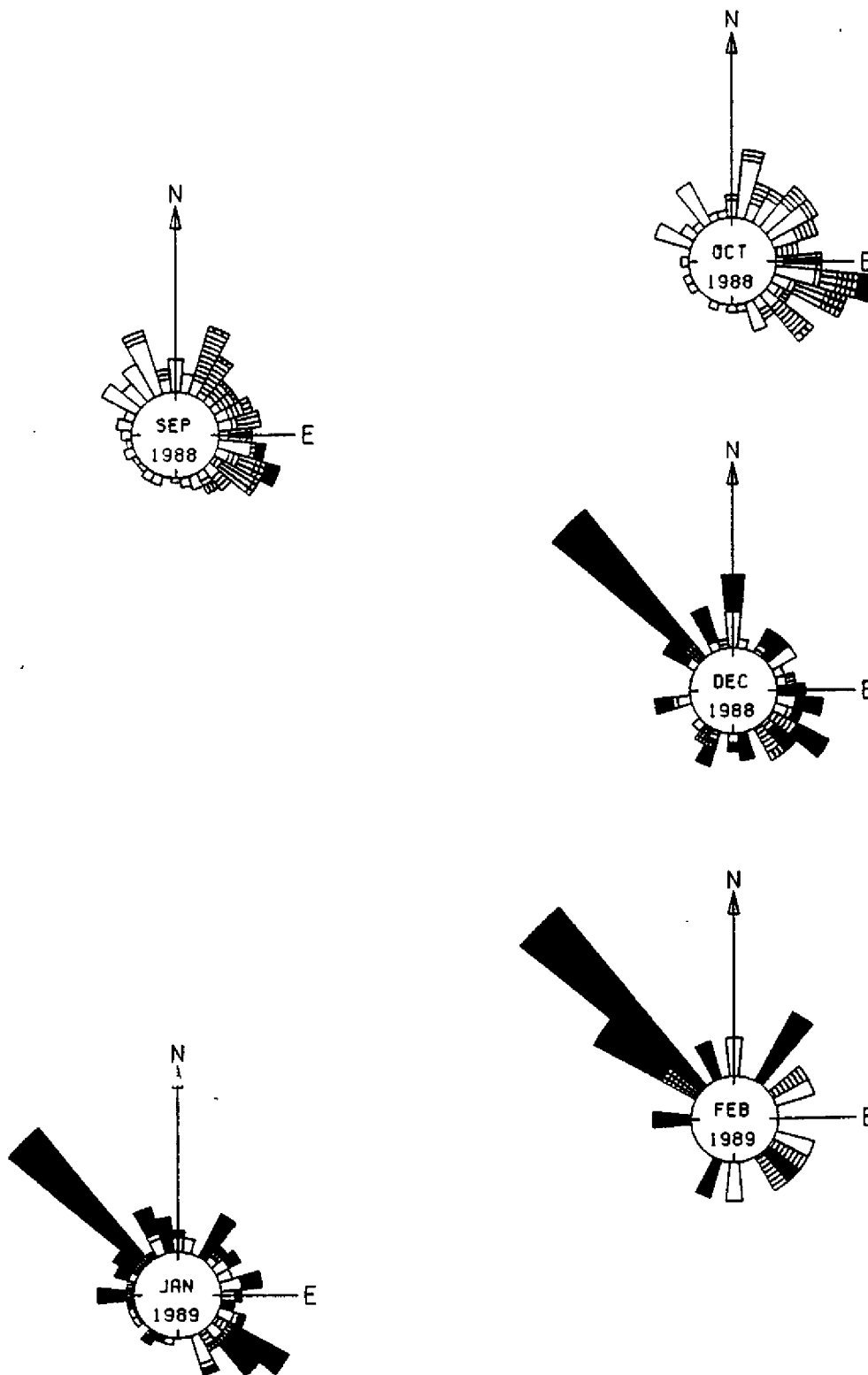
LEGEND:  $H_s < 1m$   $1m \leq H_s < 2m$   $2m \leq H_s < 3m$   $H_s \geq 3m$  0% 10% 20%

FIGURE 3-78. SEP 88-FEB 89 WAVE ROSES FOR STATION AT KINGS BAY #6



LEGEND:  $V < 0.2$   $0.2 \leq V < 0.4$   $0.4 \leq V < 0.6$   $0.6 \leq V < 0.8$   $V \geq 0.8$  0% 10% 20%  
(V IN M/S)

FIGURE 3-8A. JUL-AUG 1988 CURRENT ROSES FOR STATION AT KINGS BAY #6



LEGEND:  $v < 0.2$   $0.2 \leq v < 0.4$   $0.4 \leq v < 0.6$   $0.6 \leq v < 0.8$   $v \geq 0.8$   
(V IN M/S)

0% 10% 20%

FIGURE 3-88. SEP 88-FEB 89 CURRENT ROSES FOR STATION AT KINGS BAY #6

TABLE 3.11 Seasonal Percentage Joint Distribution  
of Significant Wave Height & Peak Period

Station at: KINGS BAY #6 - MAR-APR 1989 Data

| Hs(m)          | Peak Period(sec) |       |       |       |       |      | Total%: |
|----------------|------------------|-------|-------|-------|-------|------|---------|
|                | 3-5              | 5-7   | 7-9   | 9-11  | 11-13 | 13-  |         |
| 0.0-0.3 Spring | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
| *Annual        | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
| 0.3-0.6 Spring | 13.97            | 2.94  | 13.97 | 18.38 | 0.00  | 0.00 | 49.26   |
| *Annual        | 13.97            | 2.94  | 13.97 | 18.38 | 0.00  | 0.00 | 49.26   |
| 0.6-0.9 Spring | 8.09             | 14.71 | 2.21  | 5.88  | 0.00  | 0.00 | 30.88   |
| *Annual        | 8.09             | 14.71 | 2.21  | 5.88  | 0.00  | 0.00 | 30.88   |
| 0.9-1.2 Spring | 8.09             | 5.88  | 1.47  | 0.74  | 0.00  | 0.00 | 16.18   |
| *Annual        | 8.09             | 5.88  | 1.47  | 0.74  | 0.00  | 0.00 | 16.18   |
| 1.2-1.5 Spring | 0.74             | 2.21  | 0.00  | 0.00  | 0.00  | 0.00 | 2.94    |
| *Annual        | 0.74             | 2.21  | 0.00  | 0.00  | 0.00  | 0.00 | 2.94    |
| 1.5-1.8 Spring | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
| *Annual        | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
| 1.8-2.1 Spring | 0.00             | 0.74  | 0.00  | 0.00  | 0.00  | 0.00 | 0.74    |
| *Annual        | 0.00             | 0.74  | 0.00  | 0.00  | 0.00  | 0.00 | 0.74    |
| 2.1-2.4 Spring | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
| *Annual        | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
| 2.4-2.7 Spring | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
| *Annual        | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
| 2.7- Spring    | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
| *Annual        | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
| Total%: Spring | 30.88            | 26.47 | 17.65 | 25.00 | 0.00  | 0.00 | 100.00  |
| *Annual        | 30.88            | 26.47 | 17.65 | 25.00 | 0.00  | 0.00 | 100.00  |

\* Based on data analysed; one or more seasonal data are not available.

TABLE 3.12 Seasonal Marginal & Cumulative Probability  
Distribution of Significant Wave Height

Station at: KINGS BAY #6 - MAR-APR 1989 Data

| Spring                              |         |       |                          |
|-------------------------------------|---------|-------|--------------------------|
| <= Marginal Height(m) Cumulative => |         |       |                          |
| 0.000                               | 0.0-0.3 | 1.000 | 000000000000000000000000 |
| 0.493                               | 0.3-0.6 | 1.000 | 000000000000000000000000 |
| 0.309                               | 0.6-0.9 | 0.507 | 000000000000000000000000 |
| 0.162                               | 0.9-1.2 | 0.199 | 00000                    |
| 0.029                               | 1.2-1.5 | 0.037 | 0                        |
| 0.000                               | 1.5-1.8 | 0.007 |                          |
| 0.007                               | 1.8-2.1 | 0.007 |                          |
| 0.000                               | 2.1-2.4 | 0.000 |                          |
| 0.000                               | 2.4-2.7 | 0.000 |                          |
| 0.000                               | 2.7-    | 0.000 |                          |
| *Annual                             |         |       |                          |
| <= Marginal Height(m) Cumulative => |         |       |                          |
| 0.000                               | 0.0-0.3 | 1.000 | 000000000000000000000000 |
| 0.493                               | 0.3-0.6 | 1.000 | 000000000000000000000000 |
| 0.309                               | 0.6-0.9 | 0.507 | 000000000000000000000000 |
| 0.162                               | 0.9-1.2 | 0.199 | 00000                    |
| 0.029                               | 1.2-1.5 | 0.037 | 0                        |
| 0.000                               | 1.5-1.8 | 0.007 |                          |
| 0.007                               | 1.8-2.1 | 0.007 |                          |
| 0.000                               | 2.1-2.4 | 0.000 |                          |
| 0.000                               | 2.4-2.7 | 0.000 |                          |
| 0.000                               | 2.7-    | 0.000 |                          |

\* Based on data analysed; one or more seasonal data are not available.

Station at: KINGS BAY #6 - MAR-APR 1989 Data

|                        |       |       |       |                        |
|------------------------|-------|-------|-------|------------------------|
| 0000000000000000000000 | 0.309 | 3-5   | 1.000 | 0000000000000000000000 |
| 0000000000000000000000 | 0.265 | 5-7   | 0.691 | 0000000000000000000000 |
| 0000000000000000000000 | 0.176 | 7-9   | 0.426 | 0000000000000000000000 |
| 0000000000000000000000 | 0.250 | 9-11  | 0.250 | 0000000000000000000000 |
| 0.000                  |       | 11-13 | 0.000 |                        |
| 0.000                  |       | 13-   | 0.000 |                        |

3-21

TABLE 3.14 Mean & Standard Deviation of Significant Wave Height & Period, and Maximum# Significant Wave Height

Station at: KINGS BAY #6 - MAR-APR 1989 Data

|         | Mean<br>Hs(m) | Std Dev<br>Hs(m) | Maximum#:<br>Hs(m) | Date | Mean<br>Tp(sec) | Std Dev<br>Tp(sec) | #Data<br>Pts |
|---------|---------------|------------------|--------------------|------|-----------------|--------------------|--------------|
| Mar     | 0.66          | 0.29             | 1.82               | 3/22 | 6.76            | 1.80               | 69           |
| Apr     | 0.67          | 0.26             | 1.30               | 4/12 | 6.67            | 2.16               | 67           |
| May     |               |                  |                    |      |                 |                    |              |
| Jun     |               |                  |                    |      |                 |                    |              |
| Jul     |               |                  |                    |      |                 |                    |              |
| Aug     |               |                  |                    |      |                 |                    |              |
| Sep     |               |                  |                    |      |                 |                    |              |
| Oct     |               |                  |                    |      |                 |                    |              |
| Nov     |               |                  |                    |      |                 |                    |              |
| Dec     |               |                  |                    |      |                 |                    |              |
| Jan     |               |                  |                    |      |                 |                    |              |
| Feb     |               |                  |                    |      |                 |                    |              |
| Spring  | 0.66          | 0.28             | 1.82               | 3/22 | 6.71            | 1.99               | 136          |
| *Annual | 0.66          | 0.28             | 1.82               | 3/22 | 6.71            | 1.99               | 136          |

TABLE 3.15 Wave & Current Information in the Dominant Wave & Current Directions

Station at: KINGS BAY #6 - MAR-APR 1989 Data

|         | Wave Direction<br>(Deg. wrt North) | Hs<br>(m.) | Peak Period<br>(sec.) | Current Direction<br>(Deg. wrt North) | Current<br>(m/sec) |
|---------|------------------------------------|------------|-----------------------|---------------------------------------|--------------------|
| Mar     | 286.80                             | 0.61       | 7.37                  | 87.54                                 | 0.25               |
| Apr     | 276.59                             | 0.65       | 7.44                  | 98.08                                 |                    |
| May     |                                    |            |                       |                                       |                    |
| Jun     |                                    |            |                       |                                       |                    |
| Jul     |                                    |            |                       |                                       |                    |
| Aug     |                                    |            |                       |                                       |                    |
| Sep     |                                    |            |                       |                                       |                    |
| Oct     |                                    |            |                       |                                       |                    |
| Nov     |                                    |            |                       |                                       |                    |
| Dec     |                                    |            |                       |                                       |                    |
| Jan     |                                    |            |                       |                                       |                    |
| Feb     |                                    |            |                       |                                       |                    |
| Spring  | 281.77                             | 0.63       | 7.40                  | 94.29                                 | 0.25               |
| *Annual | 281.77                             | 0.63       | 7.40                  | 94.29                                 | 0.25               |

\* Based on data analysed; one or more seasonal data are not available.

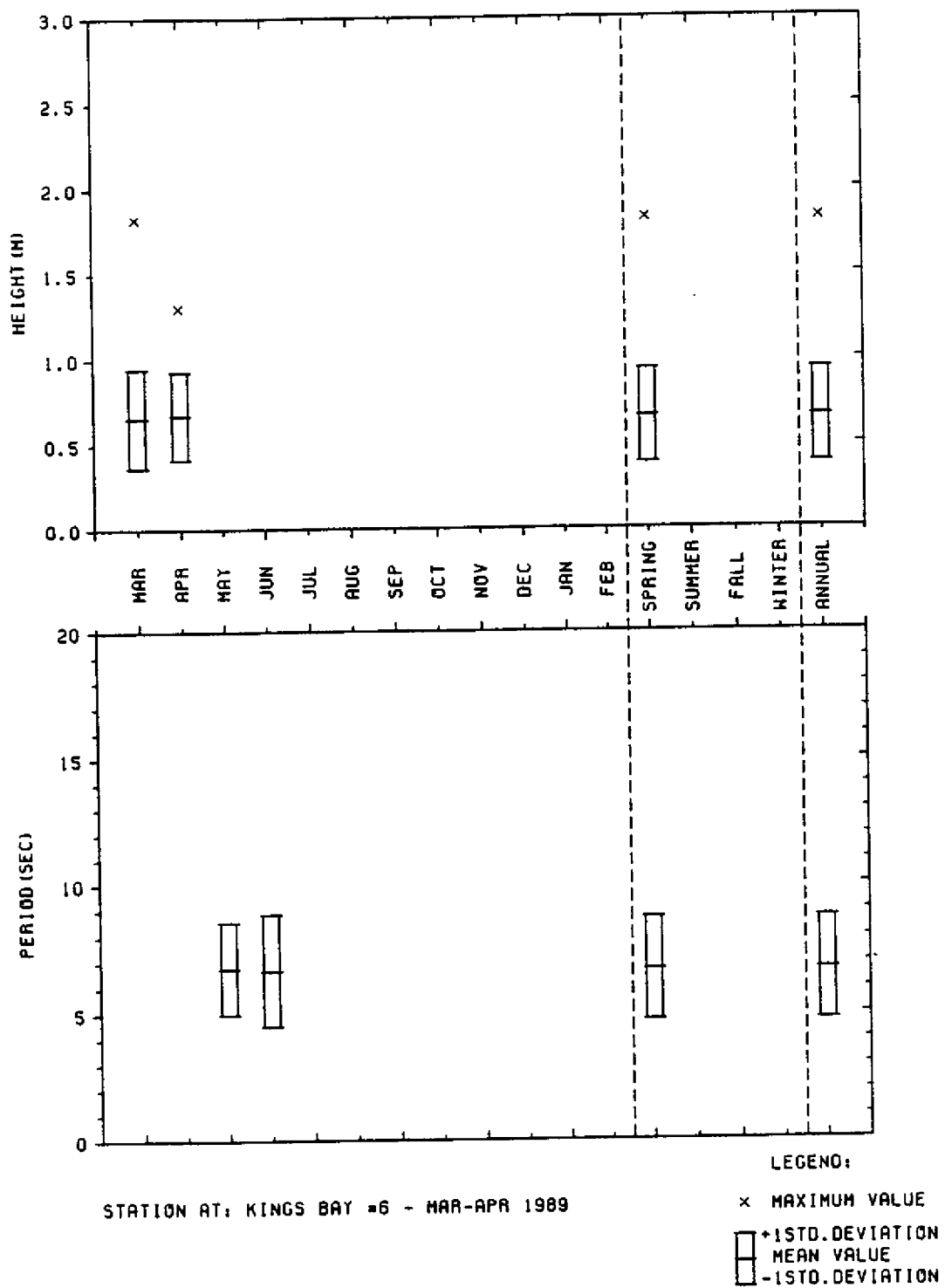
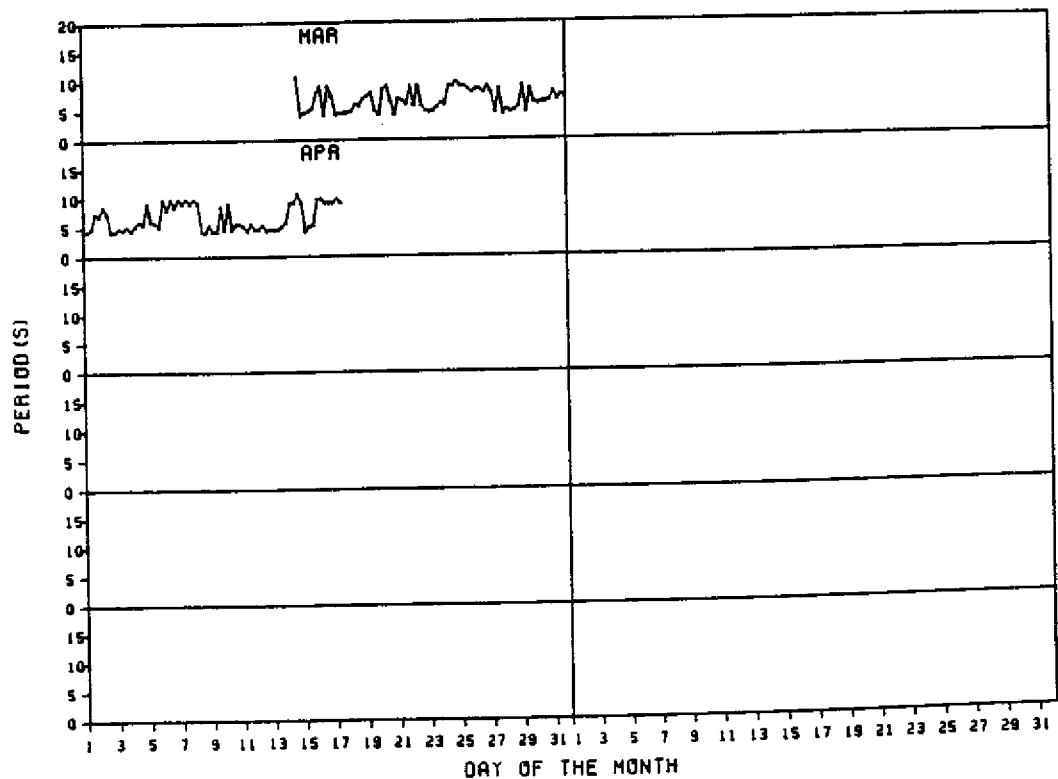
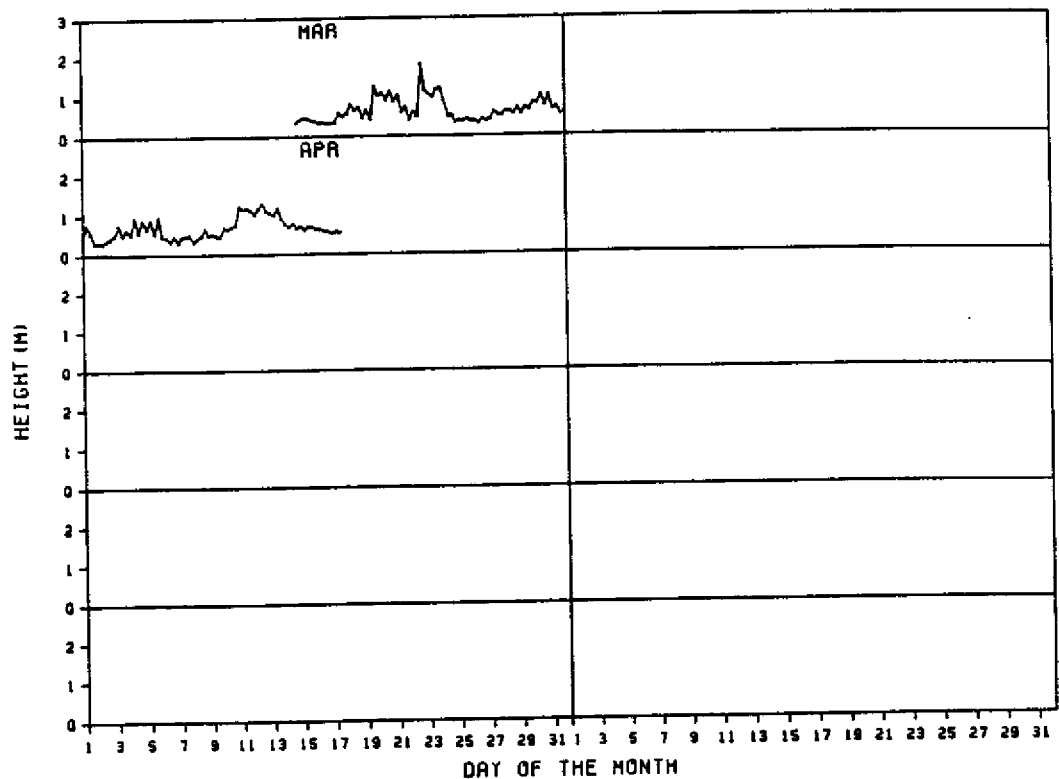
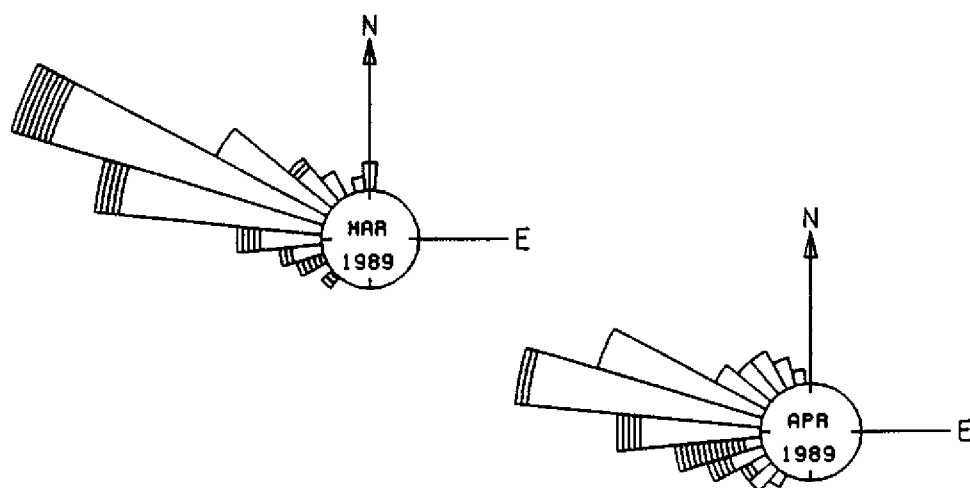


FIGURE 3-9 MONTHLY, SEASONAL & ANNUAL MEAN AND STD DEVIATION OF SIG.WAVE HEIGHT & PERIOD, AND MAXIMUM SIG.WAVE HEIGHT



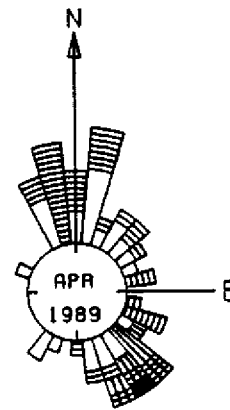
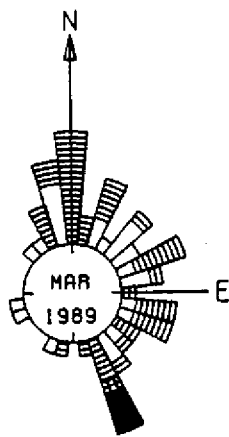
STATION AT: KINGS BAY #6 - MAR-APR 1989

FIGURE 3-10 TIME HISTORY PLOTS OF SIGNIFICANT WAVE HEIGHT & PEAK PERIOD



LEGEND:  $\square$   $H_s < 1\text{m}$      $\text{▨}$   $1\text{m} \leq H_s < 2\text{m}$      $\text{▩}$   $2\text{m} \leq H_s < 3\text{m}$      $\blacksquare$   $H_s \geq 3\text{m}$     0%    10%    20%

FIGURE 3-11. MAR-APR 1989 WAVE ROSES FOR STATION AT KINGS BAY #6



LEGEND:  $v < 0.2$   $0.2 \leq v < 0.4$   $0.4 \leq v < 0.6$   $0.6 \leq v < 0.8$   $v \geq 0.8$   
 (V IN M/S)

0% 10% 20%

FIGURE 3-12. MAR-APR 1989 CURRENT ROSES FOR STATION AT KINGS BAY #6

TABLE 4.1 Seasonal Percentage Joint Distribution  
of Significant Wave Height & Peak Period

Station at: SEBASTIAN - JANUARY 1990 Data

| Hs(m)          | Peak Period(sec) |       |       |       |       |      | Total%: |
|----------------|------------------|-------|-------|-------|-------|------|---------|
|                | 3-5              | 5-7   | 7-9   | 9-11  | 11-13 | 13-  |         |
| 0.0-0.3 Winter | 0.56             | 0.56  | 2.78  | 2.22  | 2.22  | 0.56 | 8.89    |
| *Annual        | 0.56             | 0.56  | 2.78  | 2.22  | 2.22  | 0.56 | 8.89    |
| 0.3-0.6 Winter | 4.44             | 1.67  | 3.33  | 15.56 | 0.00  | 0.00 | 25.00   |
| *Annual        | 4.44             | 1.67  | 3.33  | 15.56 | 0.00  | 0.00 | 25.00   |
| 0.6-0.9 Winter | 11.67            | 6.11  | 2.78  | 16.67 | 6.67  | 0.00 | 43.89   |
| *Annual        | 11.67            | 6.11  | 2.78  | 16.67 | 6.67  | 0.00 | 43.89   |
| 0.9-1.2 Winter | 2.78             | 6.11  | 2.22  | 3.89  | 0.56  | 0.00 | 15.56   |
| *Annual        | 2.78             | 6.11  | 2.22  | 3.89  | 0.56  | 0.00 | 15.56   |
| 1.2-1.5 Winter | 2.22             | 2.78  | 1.67  | 0.00  | 0.00  | 0.00 | 6.67    |
| *Annual        | 2.22             | 2.78  | 1.67  | 0.00  | 0.00  | 0.00 | 6.67    |
| 1.5-1.8 Winter | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
| *Annual        | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
| 1.8-2.1 Winter | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
| *Annual        | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
| 2.1-2.4 Winter | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
| *Annual        | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
| 2.4-2.7 Winter | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
| *Annual        | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
| 2.7- Winter    | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
| *Annual        | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
| Total%: Winter | 21.67            | 17.22 | 12.78 | 38.33 | 9.44  | 0.56 | 100.00  |
| *Annual        | 21.67            | 17.22 | 12.78 | 38.33 | 9.44  | 0.56 | 100.00  |

\* Based on data analysed; one or more seasonal data are not available.

TABLE 4.2 Seasonal Marginal & Cumulative Probability  
Distribution of Significant Wave Height

Station at: SEBASTIAN - JANUARY 1990 Data

|  |                          | Winter      |           |            |                          |
|--|--------------------------|-------------|-----------|------------|--------------------------|
|  |                          | <= Marginal | Height(m) | Cumulative | =>                       |
|  | 00000                    | 0.089       | 0.0-0.3   | 1.000      | 000000000000000000000000 |
|  | 0000000000000000         | 0.250       | 0.3-0.6   | 0.911      | 000000000000000000000000 |
|  | 000000000000000000000000 | 0.439       | 0.6-0.9   | 0.661      | 000000000000000000000000 |
|  | 0000000000               | 0.156       | 0.9-1.2   | 0.222      | 0000000                  |
|  | 0000                     | 0.067       | 1.2-1.5   | 0.067      | 00                       |
|  | 0.000                    |             | 1.5-1.8   | 0.000      |                          |
|  | 0.000                    |             | 1.8-2.1   | 0.000      |                          |
|  | 0.000                    |             | 2.1-2.4   | 0.000      |                          |
|  | 0.000                    |             | 2.4-2.7   | 0.000      |                          |
|  | 0.000                    |             | 2.7-      | 0.000      |                          |
|  |                          | *Annual     |           |            |                          |
|  |                          | <= Marginal | Height(m) | Cumulative | =>                       |
|  | 00000                    | 0.089       | 0.0-0.3   | 1.000      | 000000000000000000000000 |
|  | 0000000000000000         | 0.250       | 0.3-0.6   | 0.911      | 000000000000000000000000 |
|  | 000000000000000000000000 | 0.439       | 0.6-0.9   | 0.661      | 000000000000000000000000 |
|  | 0000000000               | 0.156       | 0.9-1.2   | 0.222      | 0000000                  |
|  | 0000                     | 0.067       | 1.2-1.5   | 0.067      | 00                       |
|  | 0.000                    |             | 1.5-1.8   | 0.000      |                          |
|  | 0.000                    |             | 1.8-2.1   | 0.000      |                          |
|  | 0.000                    |             | 2.1-2.4   | 0.000      |                          |
|  | 0.000                    |             | 2.4-2.7   | 0.000      |                          |
|  | 0.000                    |             | 2.7-      | 0.000      |                          |

\* Based on data analysed; one or more seasonal data are not available.

TABLE 4.3 Seasonal Marginal & Cumulative Probability  
Distribution of Wave Period

Station at: SEBASTIAN - JANUARY 1990 Data

| Winter                                |       |       |       |                          |  |
|---------------------------------------|-------|-------|-------|--------------------------|--|
| <= Marginal Period(sec) Cumulative => |       |       |       |                          |  |
| 0000000000000000                      | 0.217 | 3-5   | 1.000 | 000000000000000000000000 |  |
| 000000000000                          | 0.172 | 5-7   | 0.783 | 0000000000000000000000   |  |
| 000000000                             | 0.128 | 7-9   | 0.611 | 0000000000000000         |  |
| 000000000000000000000000              | 0.383 | 9-11  | 0.483 | 000000000000             |  |
| 000000                                | 0.094 | 11-13 | 0.100 | 000                      |  |
| 0.006                                 |       | 13-   | 0.006 |                          |  |

| *Annual                               |       |       |       |                          |  |
|---------------------------------------|-------|-------|-------|--------------------------|--|
| <= Marginal Period(sec) Cumulative => |       |       |       |                          |  |
| 0000000000000000                      | 0.217 | 3-5   | 1.000 | 000000000000000000000000 |  |
| 000000000000                          | 0.172 | 5-7   | 0.783 | 0000000000000000000000   |  |
| 000000000                             | 0.128 | 7-9   | 0.611 | 0000000000000000         |  |
| 000000000000000000000000              | 0.383 | 9-11  | 0.483 | 000000000000             |  |
| 000000                                | 0.094 | 11-13 | 0.100 | 000                      |  |
| 0.006                                 |       | 13-   | 0.006 |                          |  |

\* Based on data analysed; one or more seasonal data are not available.

TABLE 4.4 Mean & Standard Deviation of Significant Wave Height  
& Period, and Maximum Significant Wave Height

Station at: SEBASTIAN - JANUARY 1990 Data

|         | Mean<br>Hs(m) | Std Dev<br>Hs(m) | Maximum#:<br>Hs(m) | Mean<br>Date | Mean<br>Tp(sec) | Std Dev<br>Tp(sec) | #Data<br>Pts |
|---------|---------------|------------------|--------------------|--------------|-----------------|--------------------|--------------|
| Mar     |               |                  |                    |              |                 |                    |              |
| Apr     |               |                  |                    |              |                 |                    |              |
| May     |               |                  |                    |              |                 |                    |              |
| Jun     |               |                  |                    |              |                 |                    |              |
| Jul     |               |                  |                    |              |                 |                    |              |
| Aug     |               |                  |                    |              |                 |                    |              |
| Sep     |               |                  |                    |              |                 |                    |              |
| Oct     |               |                  |                    |              |                 |                    |              |
| Nov     |               |                  |                    |              |                 |                    |              |
| Dec     |               |                  |                    |              |                 |                    |              |
| Jan     | 0.71          | 0.29             | 1.46               | 1/26         | 7.92            | 2.60               | 180          |
| Feb     |               |                  |                    |              |                 |                    |              |
| Winter  | 0.71          | 0.29             | 1.46               | 1/26         | 7.92            | 2.60               | 180          |
| *Annual | 0.71          | 0.29             | 1.46               | 1/26         | 7.92            | 2.60               | 180          |

TABLE 4.5 Wave & Current Information in the Dominant Wave & Current Directions

Station at: SEBASTIAN - JANUARY 1990 Data

|         | Wave Direction<br>(Deg. wrt North) | Hs<br>(m.) | Peak Period<br>(sec.) | Current Direction<br>(Deg. wrt North) | Current<br>(m/sec) |
|---------|------------------------------------|------------|-----------------------|---------------------------------------|--------------------|
| Mar     |                                    |            |                       |                                       |                    |
| Apr     |                                    |            |                       |                                       |                    |
| May     |                                    |            |                       |                                       |                    |
| Jun     |                                    |            |                       |                                       |                    |
| Jul     |                                    |            |                       |                                       |                    |
| Aug     |                                    |            |                       |                                       |                    |
| Sep     |                                    |            |                       |                                       |                    |
| Oct     |                                    |            |                       |                                       |                    |
| Nov     |                                    |            |                       |                                       |                    |
| Dec     |                                    |            |                       |                                       |                    |
| Jan     | 252.60                             | 0.67       | 9.14                  | 21.65                                 | 0.45               |
| Feb     |                                    |            |                       |                                       |                    |
| Winter  | 252.60                             | 0.67       | 9.14                  | 25.45                                 | 0.45               |
| *Annual | 252.60                             | 0.67       | 9.14                  | 25.45                                 | 0.45               |

\* Based on data analysed; one or more seasonal data are not available.

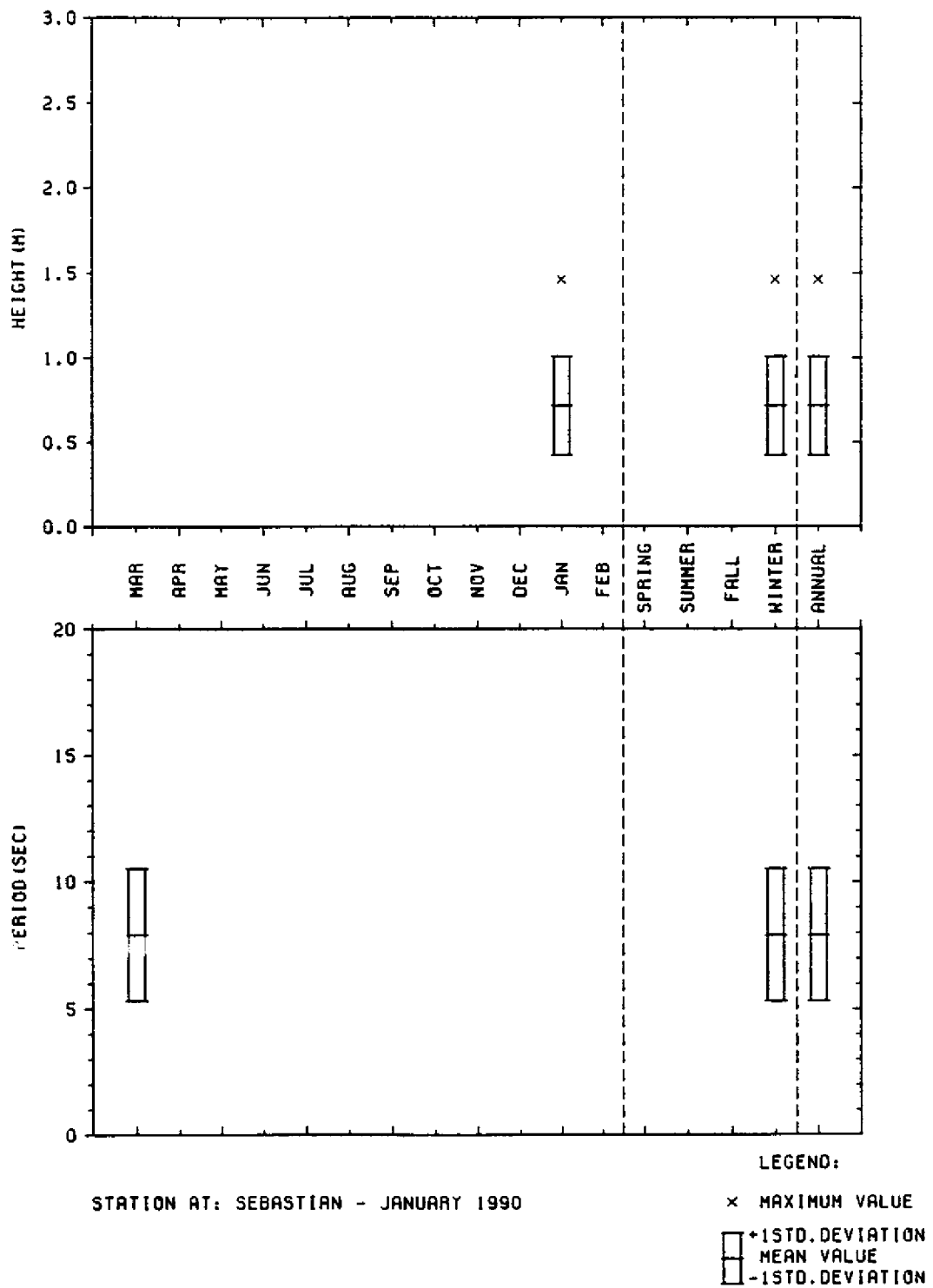
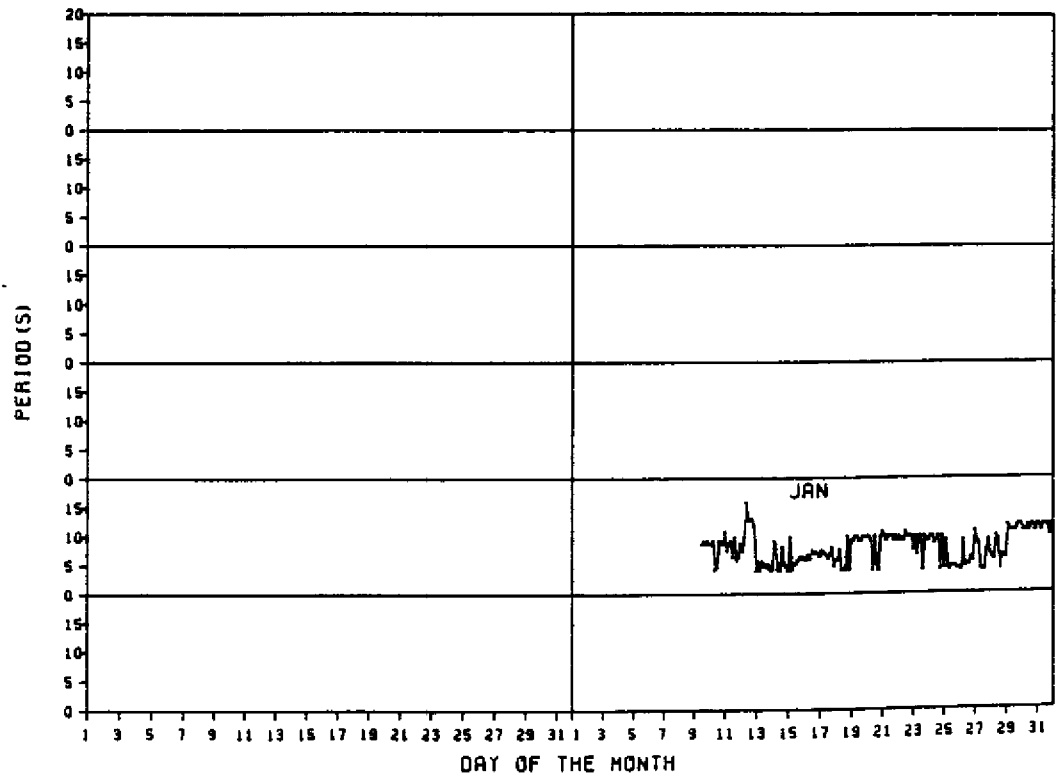
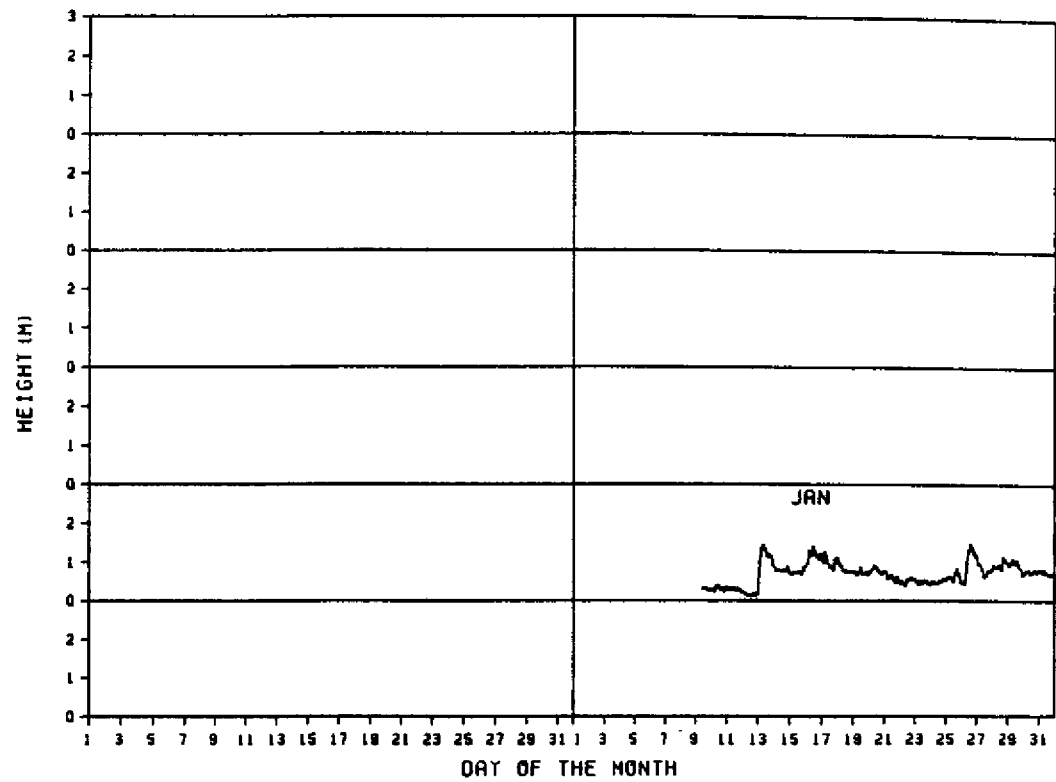
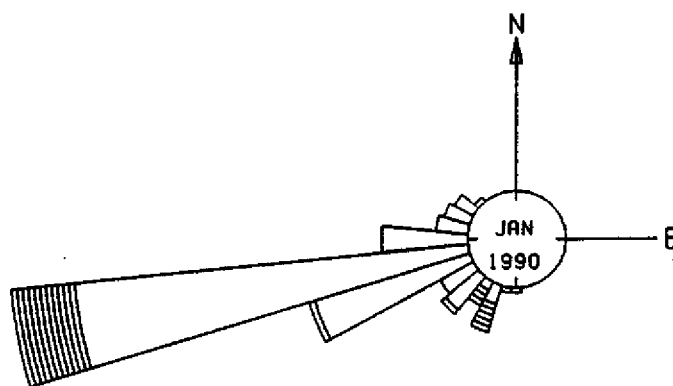


FIGURE 4-1 MONTHLY, SEASONAL & ANNUAL MEAN AND STD DEVIATION OF SIG.WAVE HEIGHT & PERIOD, AND MAXIMUM SIG.WAVE HEIGHT



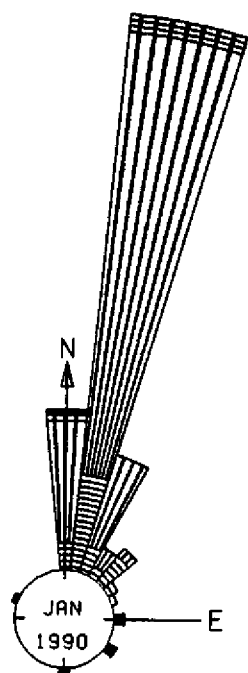
STATION AT: SEBASTIAN - JANUARY 1990

FIGURE 4-2 TIME HISTORY PLOTS OF SIGNIFICANT WAVE HEIGHT & PEAK PERIOD



LEGEND:  $\square$   $H_s < 1\text{m}$   $\text{▤}$   $1\text{m} \leq H_s < 2\text{m}$   $\text{▨}$   $2\text{m} \leq H_s < 3\text{m}$   $\blacksquare$   $H_s \geq 3\text{m}$  0% 10% 20%

FIGURE 4-3. JANUARY 1990 WAVE ROSE FOR STATION AT SEBASTIAN INLET



LEGEND:  $v < 0.2$   $0.2 \leq v < 0.4$   $0.4 \leq v < 0.6$   $0.6 \leq v < 0.8$   $v \geq 0.8$  0% 10% 20%  
(V IN M/S)

FIGURE 4-4. JANUARY 1990 CURRENT ROSE FOR STATION AT SEBASTIAN INLET

TABLE 5.1 Seasonal Percentage Joint Distribution  
of Significant Wave Height & Peak Period

Station at: JUPITER - MAR-NOV 1990 Data

| Hs(m)   |         | Peak Period(sec) |       |       |       |       |      | Total%: |
|---------|---------|------------------|-------|-------|-------|-------|------|---------|
|         |         | 3-5              | 5-7   | 7-9   | 9-11  | 11-13 | 13-  |         |
| 0.0-0.3 | Spring  | 2.42             | 0.00  | 0.46  | 0.35  | 0.58  | 0.23 | 4.03    |
|         | Summer  | 9.22             | 0.23  | 2.65  | 5.30  | 0.81  | 1.61 | 19.82   |
|         | Fall    | 0.46             | 0.12  | 0.58  | 0.92  | 0.35  | 0.00 | 2.42    |
|         | *Annual | 12.10            | 0.35  | 3.69  | 6.57  | 1.73  | 1.84 | 26.27   |
| 0.3-0.6 | Spring  | 5.41             | 0.23  | 1.84  | 1.61  | 0.46  | 0.23 | 9.79    |
|         | Summer  | 4.26             | 0.46  | 2.42  | 1.84  | 0.46  | 0.23 | 9.68    |
|         | Fall    | 0.81             | 0.58  | 2.07  | 2.53  | 2.30  | 0.23 | 8.53    |
|         | *Annual | 10.48            | 1.27  | 6.34  | 5.99  | 3.23  | 0.69 | 28.00   |
| 0.6-0.9 | Spring  | 5.76             | 0.81  | 0.92  | 1.15  | 1.04  | 0.69 | 10.37   |
|         | Summer  | 0.35             | 0.23  | 0.00  | 0.23  | 0.00  | 0.00 | 0.81    |
|         | Fall    | 2.07             | 1.50  | 1.61  | 2.53  | 1.61  | 0.35 | 9.68    |
|         | *Annual | 8.18             | 2.53  | 2.53  | 3.92  | 2.65  | 1.04 | 20.85   |
| 0.9-1.2 | Spring  | 3.92             | 1.38  | 1.84  | 1.38  | 0.35  | 0.00 | 8.87    |
|         | Summer  | 0.00             | 0.00  | 0.00  | 0.23  | 0.00  | 0.00 | 0.23    |
|         | Fall    | 0.92             | 1.50  | 0.46  | 0.92  | 0.69  | 0.00 | 4.49    |
|         | *Annual | 4.84             | 2.88  | 2.30  | 2.53  | 1.04  | 0.00 | 13.59   |
| 1.2-1.5 | Spring  | 1.15             | 0.46  | 0.69  | 0.23  | 0.35  | 0.00 | 2.88    |
|         | Summer  | 0.00             | 0.00  | 0.00  | 0.35  | 0.23  | 0.00 | 0.58    |
|         | Fall    | 0.00             | 1.96  | 0.58  | 0.46  | 0.69  | 0.00 | 3.69    |
|         | *Annual | 1.15             | 2.42  | 1.27  | 1.04  | 1.27  | 0.00 | 7.14    |
| 1.5-1.8 | Spring  | 0.58             | 0.23  | 0.12  | 0.12  | 0.00  | 0.00 | 1.04    |
|         | Summer  | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
|         | Fall    | 0.00             | 0.46  | 0.23  | 0.00  | 0.00  | 0.23 | 0.92    |
|         | *Annual | 0.58             | 0.69  | 0.35  | 0.12  | 0.00  | 0.23 | 1.96    |
| 1.8-2.1 | Spring  | 0.58             | 0.00  | 0.23  | 0.12  | 0.12  | 0.00 | 1.04    |
|         | Summer  | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
|         | Fall    | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.23 | 0.23    |
|         | *Annual | 0.58             | 0.00  | 0.23  | 0.12  | 0.12  | 0.23 | 1.27    |
| 2.1-2.4 | Spring  | 0.12             | 0.00  | 0.12  | 0.23  | 0.00  | 0.00 | 0.46    |
|         | Summer  | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
|         | Fall    | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
|         | *Annual | 0.12             | 0.00  | 0.12  | 0.23  | 0.00  | 0.00 | 0.46    |
| 2.4-2.7 | Spring  | 0.12             | 0.00  | 0.00  | 0.23  | 0.00  | 0.00 | 0.35    |
|         | Summer  | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
|         | Fall    | 0.00             | 0.00  | 0.12  | 0.00  | 0.00  | 0.00 | 0.12    |
|         | *Annual | 0.12             | 0.00  | 0.12  | 0.23  | 0.00  | 0.00 | 0.46    |
| 2.7-    | Spring  | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
|         | Summer  | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
|         | Fall    | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
|         | *Annual | 0.00             | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 | 0.00    |
| Total%: | Spring  | 20.05            | 3.11  | 6.22  | 5.41  | 2.88  | 1.15 | 38.82   |
|         | Summer  | 13.82            | 0.92  | 5.07  | 7.95  | 1.50  | 1.84 | 31.11   |
|         | Fall    | 4.26             | 6.11  | 5.65  | 7.37  | 5.65  | 1.04 | 30.07   |
|         | *Annual | 38.13            | 10.14 | 16.94 | 20.74 | 10.02 | 4.03 | 100.00  |

\* Based on data analysed; one or more seasonal data are not available.

TABLE 5.2 Seasonal Marginal & Cumulative Probability  
Distribution of Significant Wave Height

Station at: JUPITER - MAR-NOV 1990 Data

| Spring                              |         |         |       |                          |  |
|-------------------------------------|---------|---------|-------|--------------------------|--|
| <= Marginal Height(m) Cumulative => |         |         |       |                          |  |
| 0000000000                          | 0.104   | 0.0-0.3 | 1.000 | 000000000000000000000000 |  |
| 000000000000000000000000            | 0.252   | 0.3-0.6 | 0.896 | 0000000000000000000000   |  |
| 000000000000000000000000            | 0.267   | 0.6-0.9 | 0.644 | 0000000000000000000000   |  |
| 000000000000000000000000            | 0.228   | 0.9-1.2 | 0.377 | 0000000000               |  |
| 00000000                            | 0.074   | 1.2-1.5 | 0.148 | 0000                     |  |
| 000                                 | 0.027   | 1.5-1.8 | 0.074 | 00                       |  |
| 000                                 | 0.027   | 1.8-2.1 | 0.047 | 0                        |  |
| 0                                   | 0.012   | 2.1-2.4 | 0.021 | 0                        |  |
| 0                                   | 0.009   | 2.4-2.7 | 0.009 |                          |  |
| 0.000                               | 2.7-    | 0.000   |       |                          |  |
| Summer                              |         |         |       |                          |  |
| <= Marginal Height(m) Cumulative => |         |         |       |                          |  |
| 000000000000000000000000            | 0.637   | 0.0-0.3 | 1.000 | 000000000000000000000000 |  |
| 000000000000                        | 0.311   | 0.3-0.6 | 0.363 | 0000000000               |  |
| 0                                   | 0.026   | 0.6-0.9 | 0.052 | 0                        |  |
| 0                                   | 0.007   | 0.9-1.2 | 0.026 | 0                        |  |
| 0                                   | 0.019   | 1.2-1.5 | 0.019 |                          |  |
| 0.000                               | 1.5-1.8 | 0.000   |       |                          |  |
| 0.000                               | 1.8-2.1 | 0.000   |       |                          |  |
| 0.000                               | 2.1-2.4 | 0.000   |       |                          |  |
| 0.000                               | 2.4-2.7 | 0.000   |       |                          |  |
| 0.000                               | 2.7-    | 0.000   |       |                          |  |
| Fall                                |         |         |       |                          |  |
| <= Marginal Height(m) Cumulative => |         |         |       |                          |  |
| 000000                              | 0.080   | 0.0-0.3 | 1.000 | 000000000000000000000000 |  |
| 000000000000000000000000            | 0.284   | 0.3-0.6 | 0.920 | 000000000000000000000000 |  |
| 000000000000000000000000            | 0.322   | 0.6-0.9 | 0.636 | 000000000000000000000000 |  |
| 000000000000                        | 0.149   | 0.9-1.2 | 0.314 | 00000000                 |  |
| 0000000000                          | 0.123   | 1.2-1.5 | 0.165 | 0000                     |  |
| 00                                  | 0.031   | 1.5-1.8 | 0.042 | 0                        |  |
| 0                                   | 0.008   | 1.8-2.1 | 0.011 |                          |  |
| 0.000                               | 2.1-2.4 | 0.004   |       |                          |  |
| 0.004                               | 2.4-2.7 | 0.004   |       |                          |  |
| 0.000                               | 2.7-    | 0.000   |       |                          |  |
| *Annual                             |         |         |       |                          |  |
| <= Marginal Height(m) Cumulative => |         |         |       |                          |  |
| 000000000000000000000000            | 0.263   | 0.0-0.3 | 1.000 | 000000000000000000000000 |  |
| 000000000000000000000000            | 0.280   | 0.3-0.6 | 0.737 | 000000000000000000000000 |  |
| 000000000000000000000000            | 0.209   | 0.6-0.9 | 0.457 | 000000000000             |  |
| 000000000000                        | 0.136   | 0.9-1.2 | 0.249 | 000000                   |  |
| 000000                              | 0.071   | 1.2-1.5 | 0.113 | 000                      |  |
| 00                                  | 0.020   | 1.5-1.8 | 0.041 | 0                        |  |
| 0                                   | 0.013   | 1.8-2.1 | 0.022 | 0                        |  |
| 0.005                               | 2.1-2.4 | 0.009   |       |                          |  |
| 0.005                               | 2.4-2.7 | 0.005   |       |                          |  |
| 0.000                               | 2.7-    | 0.000   |       |                          |  |

\* Based on data analysed; one or more seasonal data are not available.

Station at: JUPITER - MAR-NOV 1990 Data

\* Based on data analysed: one or more seasonal data are not available.

TABLE 5.4 Mean & Standard Deviation of Significant Wave Height & Period, and Maximum Significant Wave Height

Station at: JUPITER - MAR-NOV 1990 Data

|         | Mean<br>Hs(m) | Std Dev<br>Hs(m) | Maximum#:<br>Hs(m) | Date  | Mean<br>Tp(sec) | Std Dev<br>Tp(sec) | #Data<br>Pts |
|---------|---------------|------------------|--------------------|-------|-----------------|--------------------|--------------|
| Mar     | 0.82          | 0.42             | 2.69               | 3/ 8  | 7.28            | 2.94               | 94           |
| Apr     | 0.78          | 0.47             | 2.39               | 4/20  | 8.27            | 3.29               | 119          |
| May     | 0.82          | 0.49             | 2.50               | 5/23  | 3.75            | 1.67               | 124          |
| Jun     | 0.38          | 0.27             | 1.50               | 6/15  | 6.29            | 2.75               | 120          |
| Jul     | 0.17          | 0.09             | 0.34               | 7/ 3  | 4.92            | 2.66               | 57           |
| Aug     | 0.26          | 0.09             | 0.55               | 8/13  | 9.44            | 4.34               | 93           |
| Sep     | 0.59          | 0.28             | 1.50               | 9/19  | 8.57            | 3.08               | 119          |
| Oct     | 0.92          | 0.40             | 2.45               | 10/10 | 8.59            | 2.87               | 117          |
| Nov     | 1.09          | 0.39             | 1.80               | 11/ 3 | 7.77            | 2.09               | 25           |
| Dec     |               |                  |                    |       |                 |                    |              |
| Jan     |               |                  |                    |       |                 |                    |              |
| Feb     |               |                  |                    |       |                 |                    |              |
| Spring  | 0.81          | 0.46             | 2.69               | 3/ 8  | 6.33            | 2.69               | 337          |
| Summer  | 0.30          | 0.19             | 1.50               | 6/15  | 7.08            | 3.37               | 270          |
| Fall    | 0.79          | 0.35             | 2.45               | 10/10 | 8.50            | 2.90               | 261          |
| *Annual | 0.64          | 0.36             | 2.69               | 3/ 8  | 7.22            | 2.98               | 868          |

TABLE 5.5 Wave & Current Information in the Dominant Wave & Current Directions

Station at: JUPITER - MAR-NOV 1990 Data

|         | Wave Direction<br>(Deg. wrt North) | Hs<br>(m.) | Peak Period<br>(sec.) | Current Direction<br>(Deg. wrt North) | Current<br>(m/sec) |
|---------|------------------------------------|------------|-----------------------|---------------------------------------|--------------------|
| Mar     | 242.15                             | 0.83       | 11.68                 | 173.19                                | 0.42               |
| Apr     | 236.09                             | 0.77       | 9.29                  | 177.67                                | 0.45               |
| May     |                                    |            |                       |                                       |                    |
| Jun     |                                    |            |                       |                                       |                    |
| Jul     |                                    |            |                       |                                       |                    |
| Aug     | 249.02                             | 0.21       | 9.60                  | 337.07                                | 0.13               |
| Sep     | 239.95                             | 0.53       | 10.63                 | 9.71                                  | 0.09               |
| Oct     | 242.28                             | 0.92       | 9.56                  | 349.11                                | 0.09               |
| Nov     | 239.90                             | 1.05       | 8.22                  | 57.82                                 |                    |
| Dec     |                                    |            |                       |                                       |                    |
| Jan     |                                    |            |                       |                                       |                    |
| Feb     |                                    |            |                       |                                       |                    |
| Spring  | 239.92                             | 0.79       | 10.16                 | 175.47                                | 0.43               |
| Summer  | 249.02                             | 0.21       | 9.60                  | 338.01                                | 0.13               |
| Fall    | 241.17                             | 0.78       | 9.81                  | 10.09                                 | 0.09               |
| *Annual | 241.29                             | 0.76       | 9.86                  | 162.03                                | 0.28               |

\* Based on data analysed; one or more seasonal data are not available.

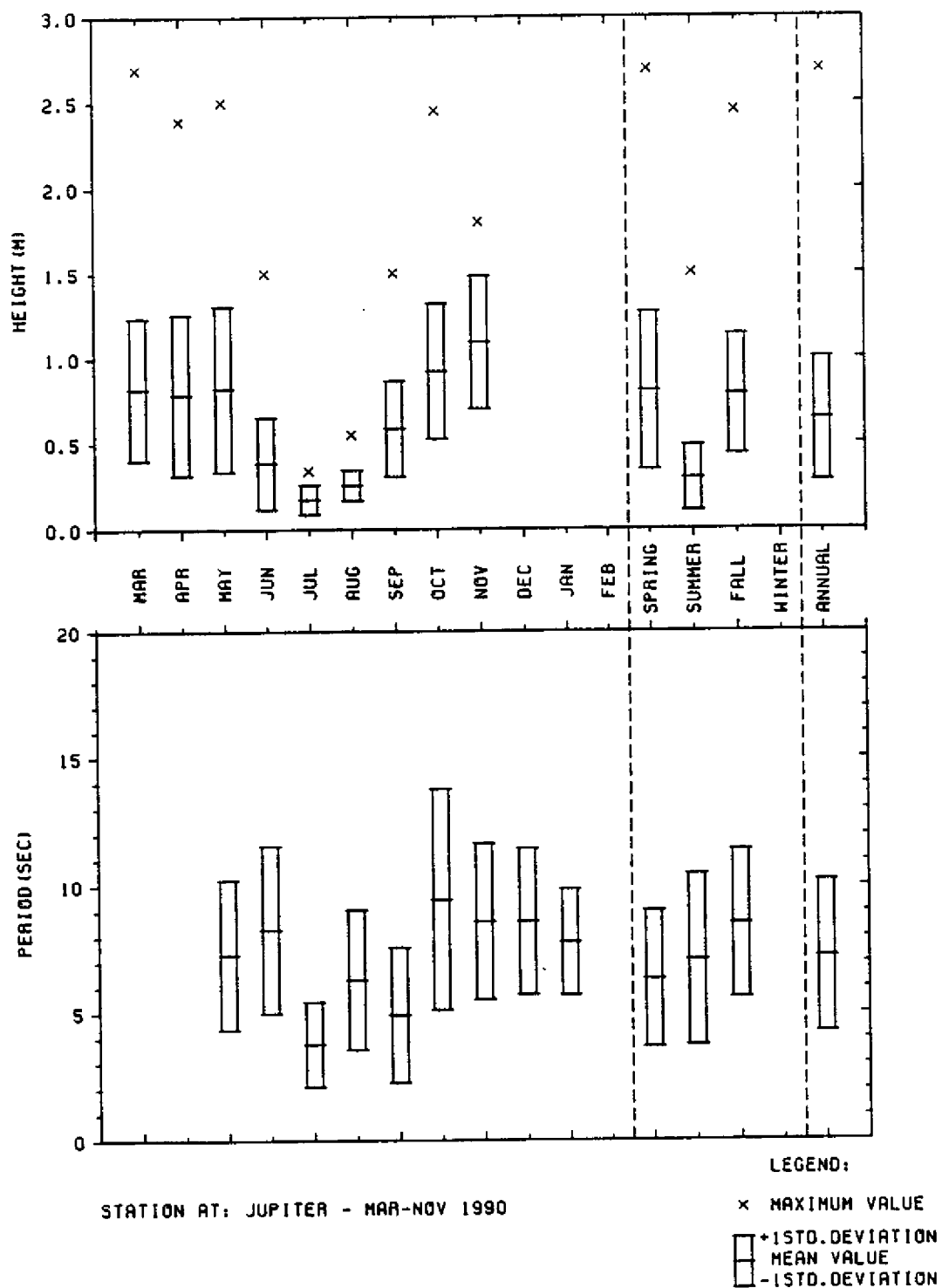
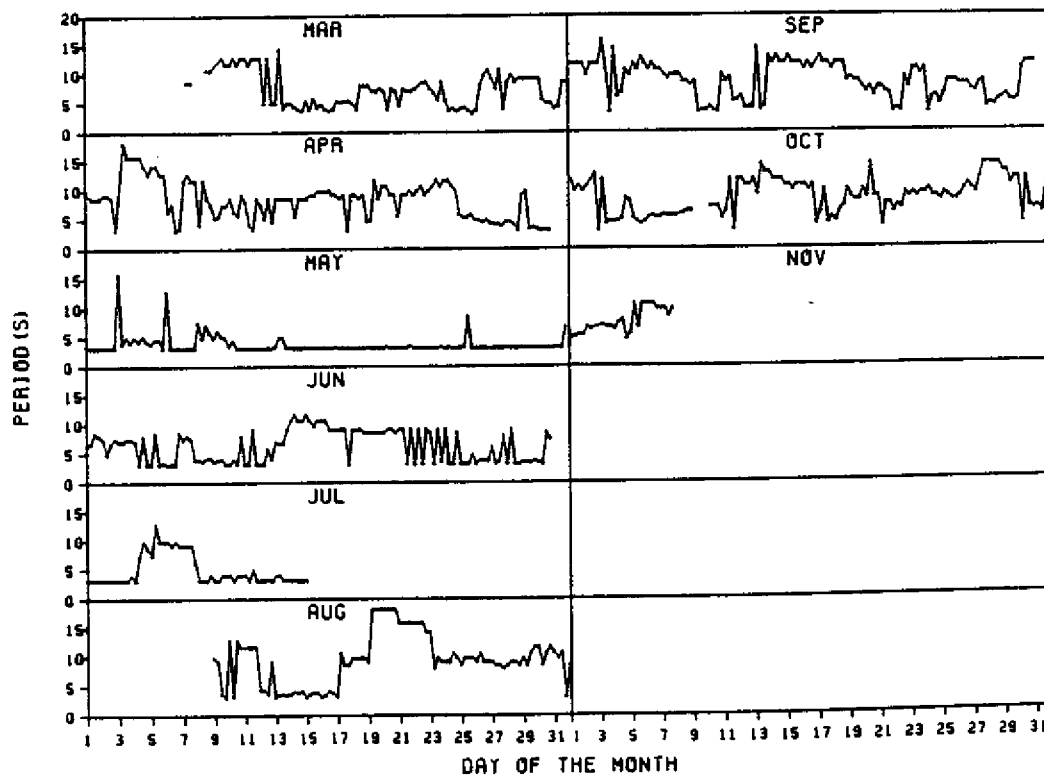
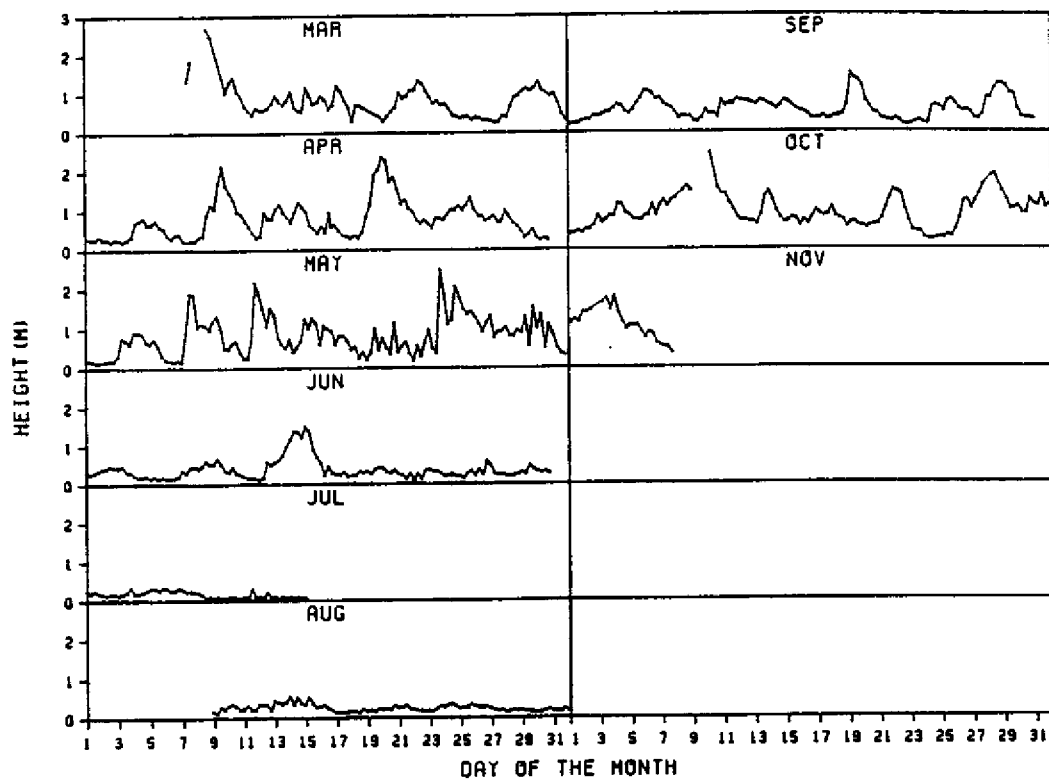
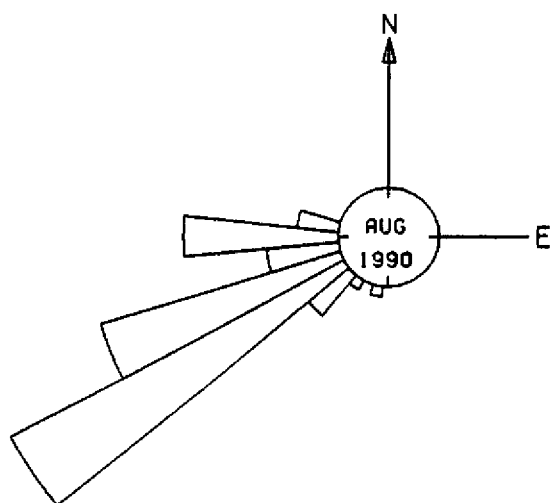
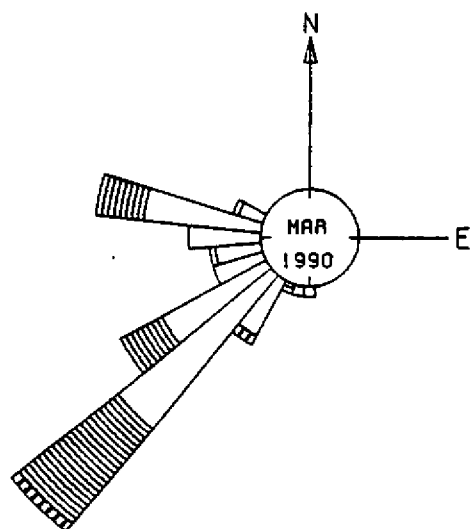


FIGURE 5-1 MONTHLY, SEASONAL & ANNUAL MEAN AND STD DEVIATION OF SIG.WAVE HEIGHT & PERIOD, AND MAXIMUM SIG.WAVE HEIGHT



STATION AT: JUPITER - MAR-NOV 1990

FIGURE 5-2 TIME HISTORY PLOTS OF SIGNIFICANT WAVE HEIGHT & PEAK PERIOD



LEGEND:  $\square H_s < 1m$   $\text{▤} 1m \leq H_s < 2m$   $\text{▨} 2m \leq H_s < 3m$   $\blacksquare H_s \geq 3m$  0% 10% 20%

FIGURE 5-3A. MAR-AUG 1990 WAVE ROSES FOR STATION AT JUPITER INLET

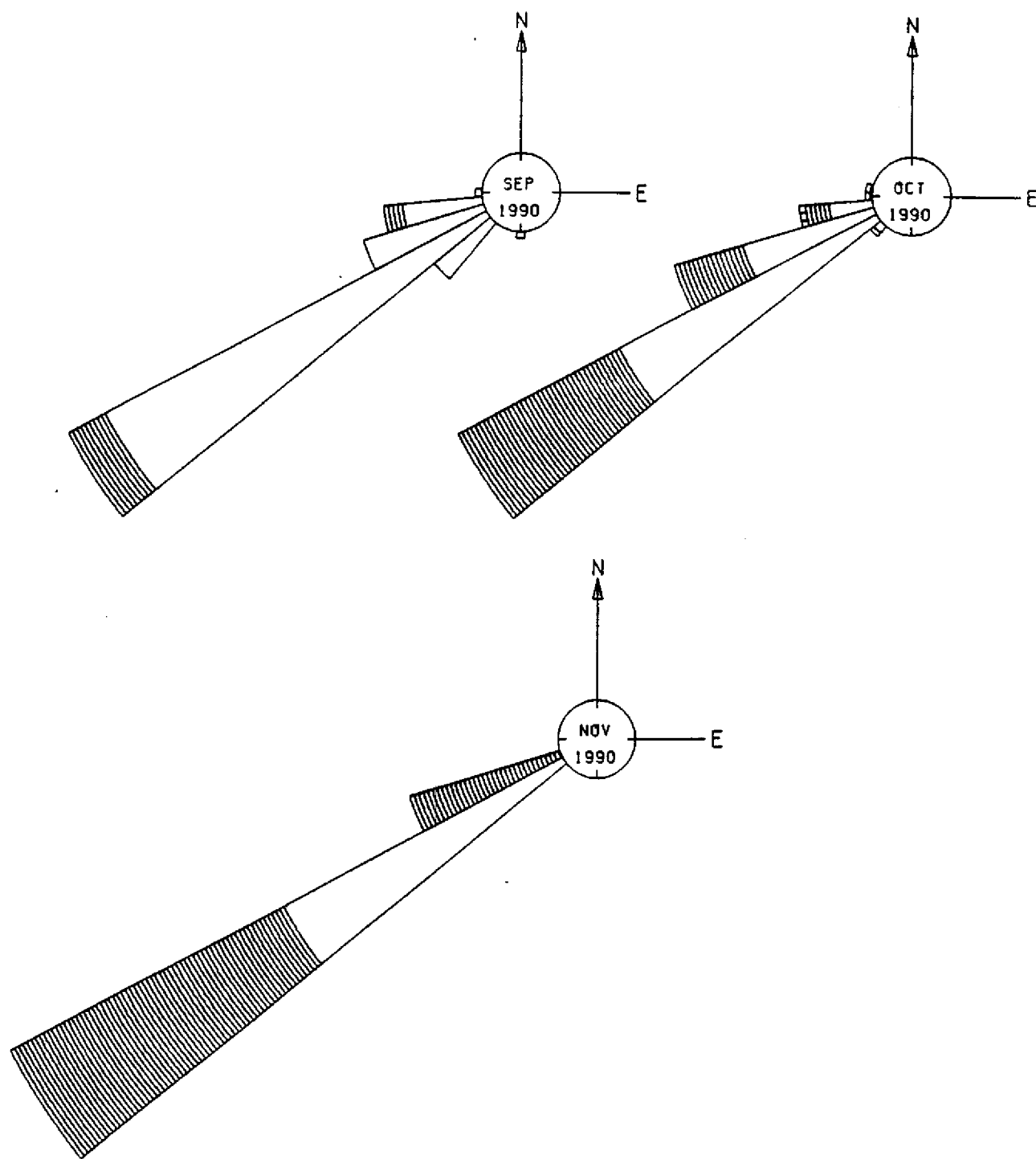
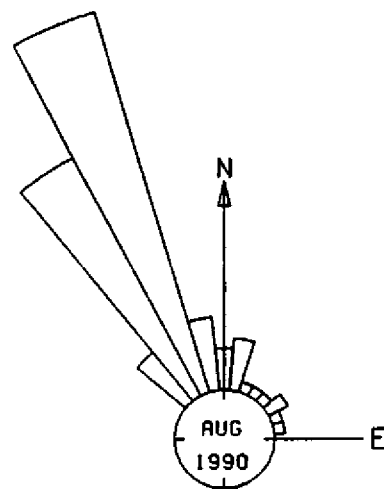
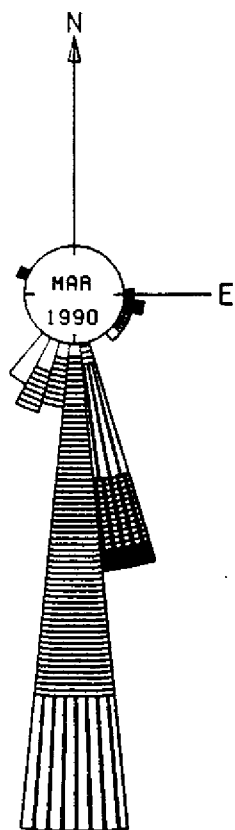
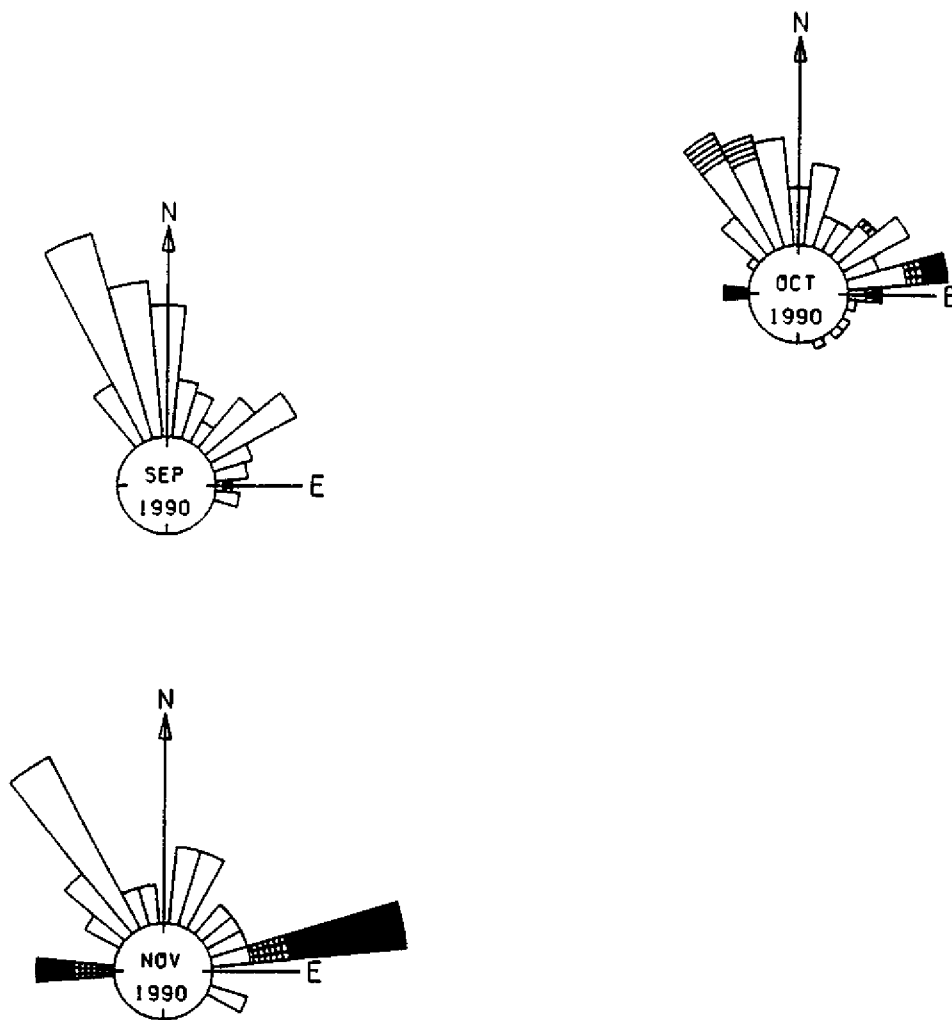


FIGURE 3-38. SEP-NOV 1990 WAVE ROSES FOR STATION AT JUPITER INLET



LEGEND:  $v < 0.2$   $0.2 \leq v < 0.4$   $0.4 \leq v < 0.6$   $0.6 \leq v < 0.8$   $v \geq 0.8$  0% 10% 20%  
(V IN M/S)

FIGURE S-4A. MAR-AUG 1990 CURRENT ROSES FOR STATION AT JUPITER INLET



LEGEND:  $v < 0.2$   $0.2 \leq v < 0.4$   $0.4 \leq v < 0.6$   $0.6 \leq v < 0.8$   $v \geq 0.8$  0% 10% 20%  
(V IN M/S)

FIGURE 5-48. SEP-NOV 1990 CURRENT ROSES FOR STATION AT JUPITER INLET

TABLE 6.1 Seasonal Percentage Joint Distribution  
of Significant Wave Height & Peak Period

Station at: CLEARWATER - JUN 89-FEB 90 Data

|         |         | Peak Period(sec) |       |       |      |       |      | Total%: |
|---------|---------|------------------|-------|-------|------|-------|------|---------|
| Hs(m)   |         | 3-5              | 5-7   | 7-9   | 9-11 | 11-13 | 13-  |         |
| 0.0-0.3 | Summer  | 18.51            | 8.98  | 2.41  | 0.11 | 0.00  | 0.00 | 30.01   |
|         | Fall    | 10.95            | 10.30 | 3.40  | 0.11 | 0.11  | 0.00 | 24.86   |
|         | Winter  | 6.57             | 5.91  | 4.05  | 0.33 | 0.00  | 0.00 | 16.87   |
|         | *Annual | 36.04            | 25.19 | 9.86  | 0.55 | 0.11  | 0.00 | 71.74   |
| 0.3-0.6 | Summer  | 2.30             | 1.53  | 0.33  | 0.00 | 0.00  | 0.00 | 4.16    |
|         | Fall    | 5.91             | 1.31  | 1.10  | 0.22 | 0.00  | 0.00 | 8.54    |
|         | Winter  | 4.27             | 2.41  | 1.86  | 0.22 | 0.00  | 0.00 | 8.76    |
|         | *Annual | 12.49            | 5.26  | 3.29  | 0.44 | 0.00  | 0.00 | 21.47   |
| 0.6-0.9 | Summer  | 0.66             | 0.44  | 0.00  | 0.00 | 0.00  | 0.00 | 1.10    |
|         | Fall    | 0.77             | 0.33  | 0.22  | 0.11 | 0.00  | 0.00 | 1.42    |
|         | Winter  | 0.66             | 0.66  | 0.99  | 0.33 | 0.00  | 0.00 | 2.63    |
|         | *Annual | 2.08             | 1.42  | 1.20  | 0.44 | 0.00  | 0.00 | 5.15    |
| 0.9-1.2 | Summer  | 0.00             | 0.00  | 0.00  | 0.00 | 0.00  | 0.00 | 0.00    |
|         | Fall    | 0.00             | 0.33  | 0.33  | 0.00 | 0.00  | 0.00 | 0.66    |
|         | Winter  | 0.00             | 0.22  | 0.22  | 0.11 | 0.00  | 0.00 | 0.55    |
|         | *Annual | 0.00             | 0.55  | 0.55  | 0.11 | 0.00  | 0.00 | 1.20    |
| 1.2-1.5 | Summer  | 0.00             | 0.00  | 0.00  | 0.00 | 0.00  | 0.00 | 0.00    |
|         | Fall    | 0.00             | 0.00  | 0.11  | 0.00 | 0.00  | 0.00 | 0.11    |
|         | Winter  | 0.00             | 0.22  | 0.11  | 0.00 | 0.00  | 0.00 | 0.33    |
|         | *Annual | 0.00             | 0.22  | 0.22  | 0.00 | 0.00  | 0.00 | 0.44    |
| 1.5-1.8 | Summer  | 0.00             | 0.00  | 0.00  | 0.00 | 0.00  | 0.00 | 0.00    |
|         | Fall    | 0.00             | 0.00  | 0.00  | 0.00 | 0.00  | 0.00 | 0.00    |
|         | Winter  | 0.00             | 0.00  | 0.00  | 0.00 | 0.00  | 0.00 | 0.00    |
|         | *Annual | 0.00             | 0.00  | 0.00  | 0.00 | 0.00  | 0.00 | 0.00    |
| 1.8-2.1 | Summer  | 0.00             | 0.00  | 0.00  | 0.00 | 0.00  | 0.00 | 0.00    |
|         | Fall    | 0.00             | 0.00  | 0.00  | 0.00 | 0.00  | 0.00 | 0.00    |
|         | Winter  | 0.00             | 0.00  | 0.00  | 0.00 | 0.00  | 0.00 | 0.00    |
|         | *Annual | 0.00             | 0.00  | 0.00  | 0.00 | 0.00  | 0.00 | 0.00    |
| 2.1-2.4 | Summer  | 0.00             | 0.00  | 0.00  | 0.00 | 0.00  | 0.00 | 0.00    |
|         | Fall    | 0.00             | 0.00  | 0.00  | 0.00 | 0.00  | 0.00 | 0.00    |
|         | Winter  | 0.00             | 0.00  | 0.00  | 0.00 | 0.00  | 0.00 | 0.00    |
|         | *Annual | 0.00             | 0.00  | 0.00  | 0.00 | 0.00  | 0.00 | 0.00    |
| 2.4-2.7 | Summer  | 0.00             | 0.00  | 0.00  | 0.00 | 0.00  | 0.00 | 0.00    |
|         | Fall    | 0.00             | 0.00  | 0.00  | 0.00 | 0.00  | 0.00 | 0.00    |
|         | Winter  | 0.00             | 0.00  | 0.00  | 0.00 | 0.00  | 0.00 | 0.00    |
|         | *Annual | 0.00             | 0.00  | 0.00  | 0.00 | 0.00  | 0.00 | 0.00    |
| 2.7-    | Summer  | 0.00             | 0.00  | 0.00  | 0.00 | 0.00  | 0.00 | 0.00    |
|         | Fall    | 0.00             | 0.00  | 0.00  | 0.00 | 0.00  | 0.00 | 0.00    |
|         | Winter  | 0.00             | 0.00  | 0.00  | 0.00 | 0.00  | 0.00 | 0.00    |
|         | *Annual | 0.00             | 0.00  | 0.00  | 0.00 | 0.00  | 0.00 | 0.00    |
| Total%: | Summer  | 21.47            | 10.95 | 2.74  | 0.11 | 0.00  | 0.00 | 35.27   |
|         | Fall    | 17.63            | 12.27 | 5.15  | 0.44 | 0.11  | 0.00 | 35.60   |
|         | Winter  | 11.50            | 9.42  | 7.23  | 0.99 | 0.00  | 0.00 | 29.13   |
|         | *Annual | 50.60            | 32.64 | 15.12 | 1.53 | 0.11  | 0.00 | 100.00  |

\* Based on data analysed; one or more seasonal data are not available.

Station at: CLEARWATER - JUN 89-FEB 90 Data

|                                  | <= Marginal | *Annual<br>Height(m) | Cumulative<br>=>                   |
|----------------------------------|-------------|----------------------|------------------------------------|
| 00000000000000000000000000000000 | 0.717       | 0.0-0.3              | 1.000 0000000000000000000000000000 |
| 00000000                         | 0.215       | 0.3-0.6              | 0.283 00000000                     |
| 00                               | 0.051       | 0.6-0.9              | 0.068 00                           |
|                                  | 0.012       | 0.9-1.2              | 0.016                              |
|                                  | 0.004       | 1.2-1.5              | 0.004                              |
|                                  | 0.000       | 1.5-1.8              | 0.000                              |
|                                  | 0.000       | 1.8-2.1              | 0.000                              |
|                                  | 0.000       | 2.1-2.4              | 0.000                              |
|                                  | 0.000       | 2.4-2.7              | 0.000                              |
|                                  | 0.000       | 2.7-                 | 0.000                              |

6-2

Station at: CLEARWATER - JUN 89-FEB 90 Data

\* Based on data analysed; one or more seasonal data are not available.

TABLE 6.4 Mean & Standard Deviation of Significant Wave Height  
& Period, and Maximum Significant Wave Height

Station at: CLEARWATER - JUN 89-FEB 90 Data

|         | Mean<br>Hs(m) | Std Dev<br>Hs(m) | Maximum#:<br>Hs(m) | Date  | Mean<br>Tp(sec) | Std Dev<br>Tp(sec) | #Data<br>Pts |
|---------|---------------|------------------|--------------------|-------|-----------------|--------------------|--------------|
| Mar     |               |                  |                    |       |                 |                    |              |
| Apr     |               |                  |                    |       |                 |                    |              |
| May     |               |                  |                    |       |                 |                    |              |
| Jun     | 0.23          | 0.17             | 0.83               | 6/ 8  | 4.67            | 1.55               | 120          |
| Jul     | 0.20          | 0.08             | 0.35               | 7/17  | 4.50            | 1.18               | 78           |
| Aug     | 0.09          | 0.10             | 0.63               | 8/ 1  | 5.19            | 1.11               | 124          |
| Sep     | 0.11          | 0.09             | 0.47               | 9/28  | 5.66            | 1.09               | 120          |
| Oct     | 0.40          | 0.26             | 1.33               | 10/20 | 5.02            | 2.02               | 85           |
| Nov     | 0.28          | 0.19             | 1.03               | 11/16 | 4.98            | 1.54               | 120          |
| Dec     | 0.39          | 0.25             | 1.26               | 12/ 9 | 5.45            | 1.63               | 124          |
| Jan     | 0.27          | 0.19             | 0.76               | 1/ 1  | 6.04            | 1.24               | 34           |
| Feb     | 0.22          | 0.24             | 1.39               | 2/23  | 5.94            | 1.86               | 108          |
| Summer  | 0.17          | 0.13             | 0.83               | 6/ 8  | 4.83            | 1.31               | 322          |
| Fall    | 0.25          | 0.18             | 1.33               | 10/20 | 5.24            | 1.54               | 325          |
| Winter  | 0.30          | 0.24             | 1.39               | 2/23  | 5.73            | 1.68               | 266          |
| *Annual | 0.24          | 0.19             | 1.39               | 2/23  | 5.24            | 1.51               | 913          |

TABLE 6.5 Wave & Current Information in the Dominant Wave & Current Directions

Station at: CLEARWATER - JUN 89-FEB 90 Data

|         | Wave Direction<br>(Deg. wrt North) | Hs<br>(m.) | Peak Period<br>(sec.) | Current Direction<br>(Deg. wrt North) | Current<br>(m/sec) |
|---------|------------------------------------|------------|-----------------------|---------------------------------------|--------------------|
| Mar     |                                    |            |                       |                                       |                    |
| Apr     |                                    |            |                       |                                       |                    |
| May     |                                    |            |                       |                                       |                    |
| Jun     | 69.99                              | 0.21       | 5.90                  | 341.59                                | 0.16               |
| Jul     | 114.12                             | 0.25       | 4.87                  | 299.89                                | 0.07               |
| Aug     | 92.28                              | 0.12       | 5.48                  | 201.58                                | 0.08               |
| Sep     | 70.38                              | 0.12       | 6.24                  | 268.35                                | 0.09               |
| Oct     | 136.61                             | 0.37       | 4.04                  | 262.84                                | 0.15               |
| Nov     | 115.35                             | 0.51       | 6.51                  | 236.72                                | 0.08               |
| Dec     | 117.61                             | 0.52       | 6.59                  | 235.68                                | 0.10               |
| Jan     | 100.23                             | 0.22       | 6.09                  | 357.04                                |                    |
| Feb     | 110.75                             | 0.16       | 7.26                  | 337.39                                | 0.05               |
| Summer  | 86.83                              | 0.20       | 5.31                  | 315.56                                | 0.10               |
| Fall    | 118.40                             | 0.33       | 5.96                  | 247.82                                | 0.09               |
| Winter  | 113.58                             | 0.37       | 6.60                  | 263.12                                | 0.08               |
| *Annual | 108.52                             | 0.28       | 5.89                  | 276.81                                | 0.09               |

\* Based on data analysed; one or more seasonal data are not available.

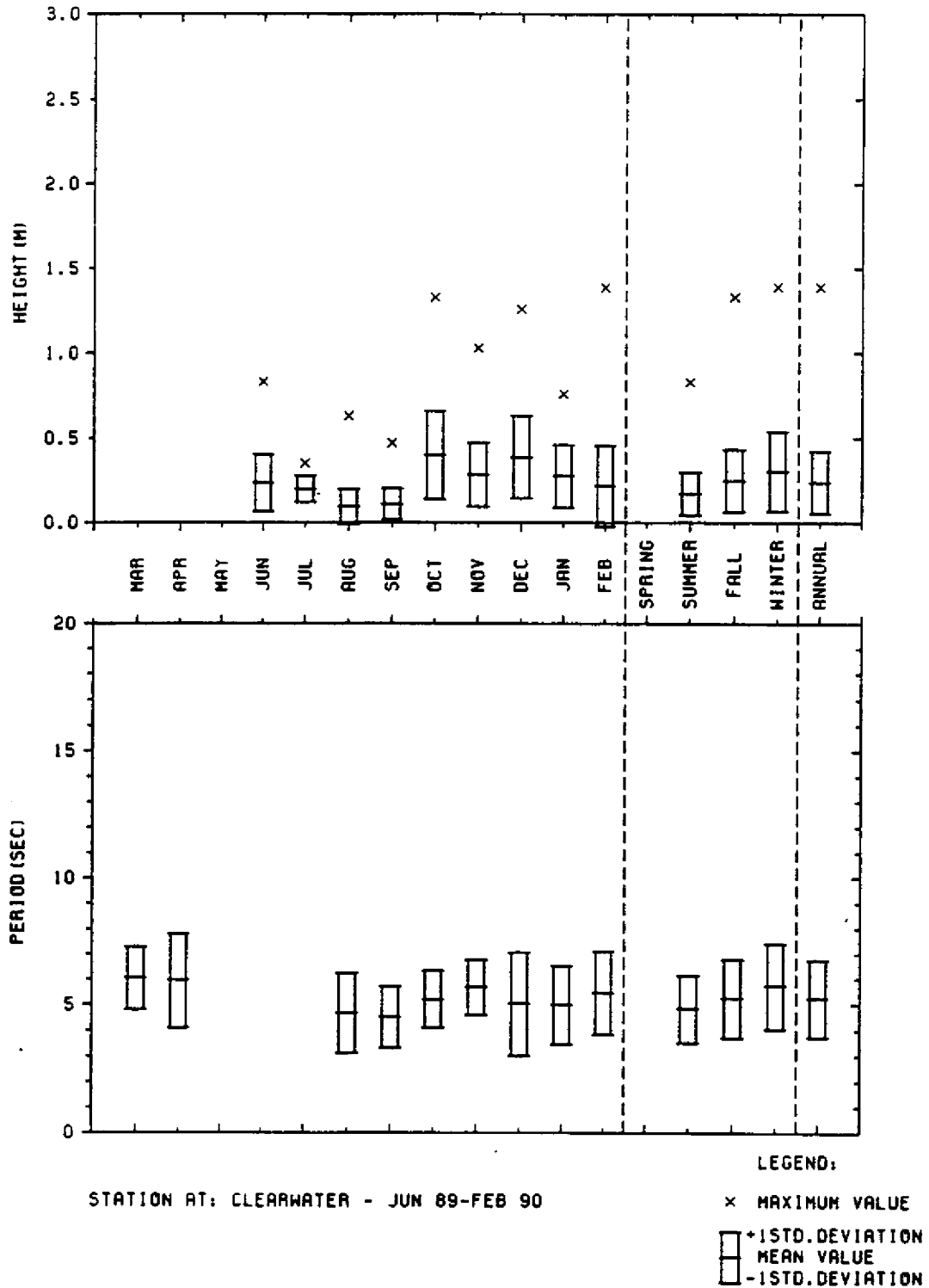
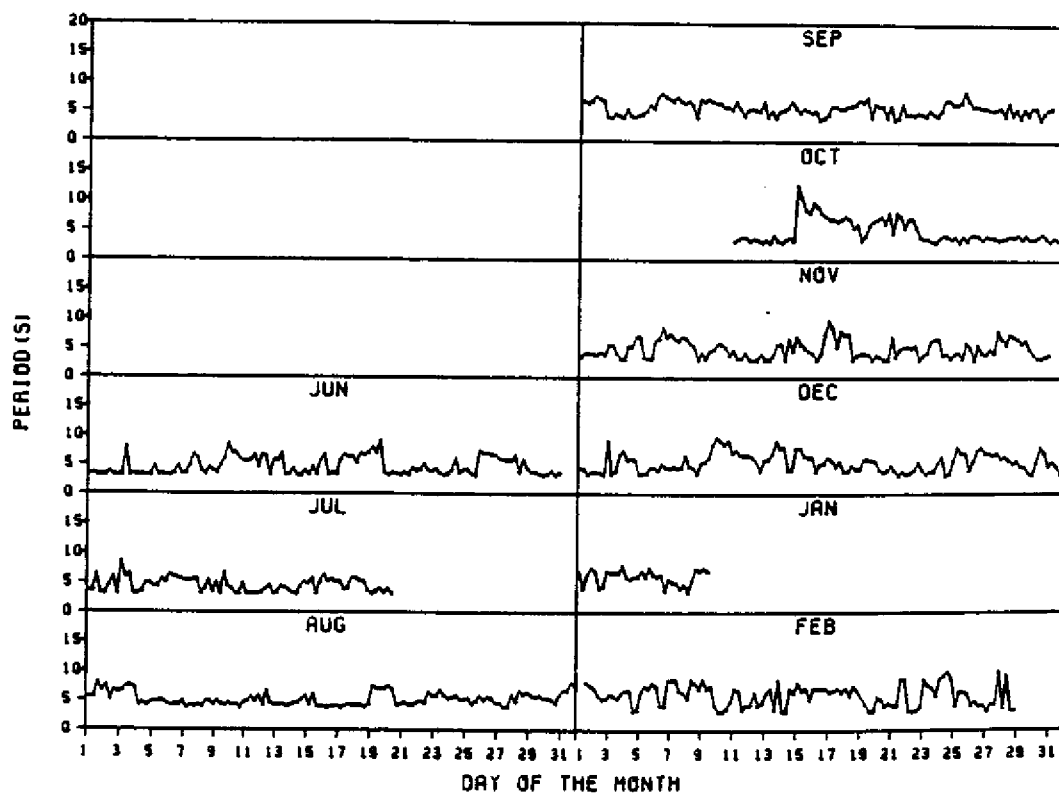
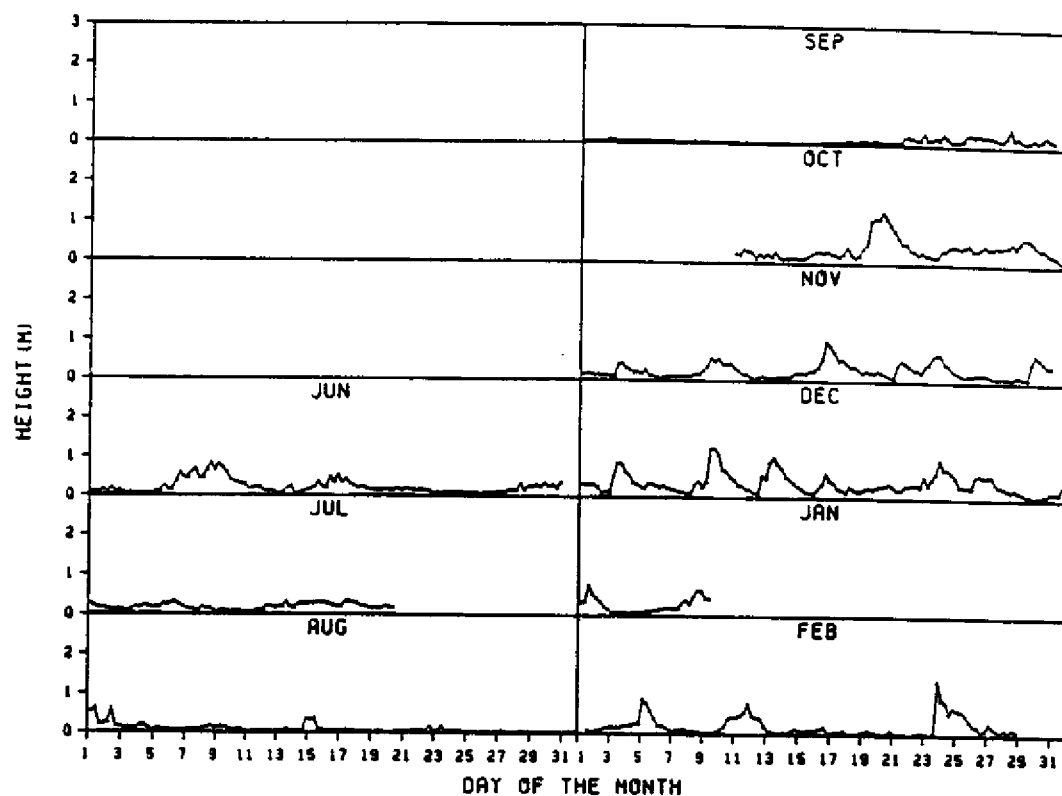
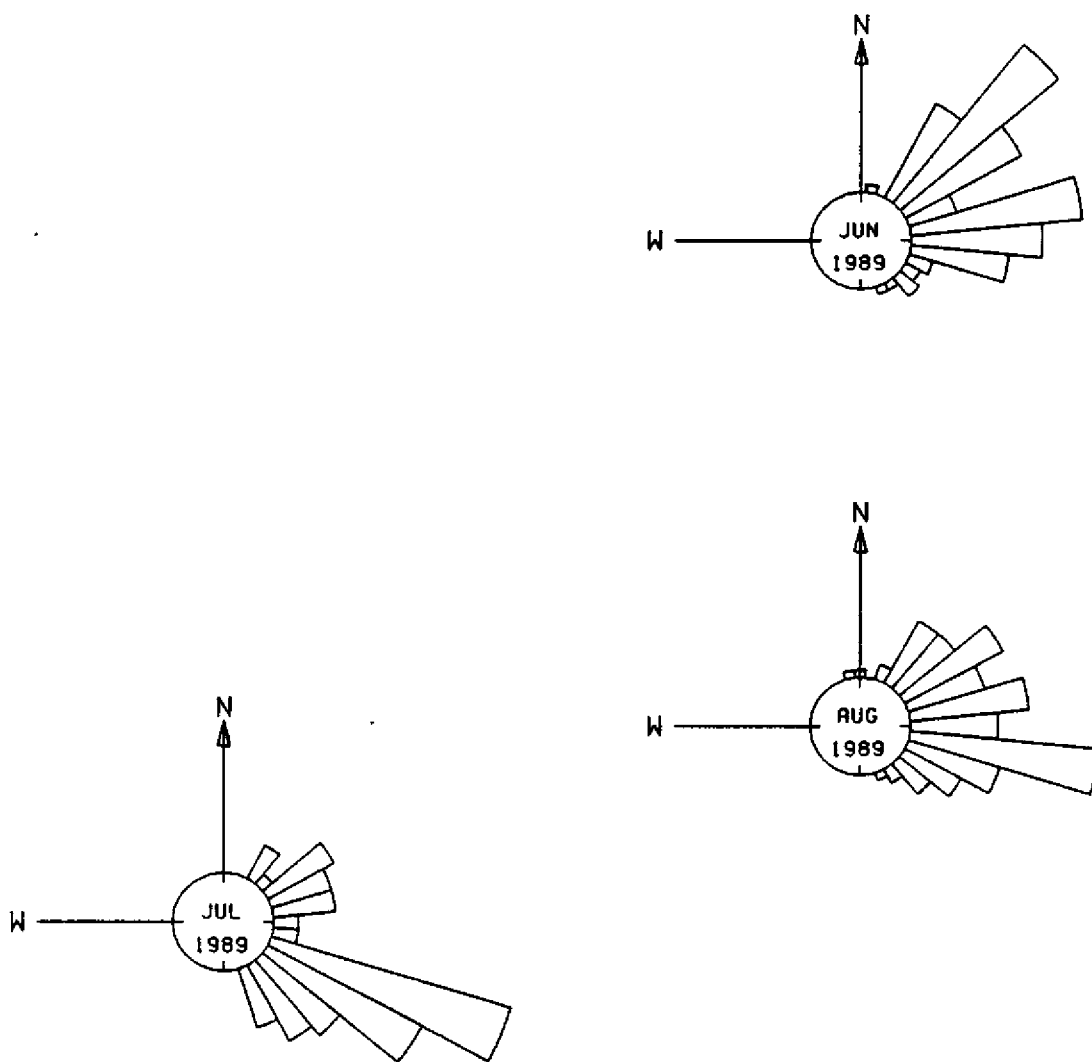


FIGURE 6-1 MONTHLY, SEASONAL & ANNUAL MEAN AND STD DEVIATION OF SIG.WAVE HEIGHT & PERIOD, AND MAXIMUM SIG.WAVE HEIGHT



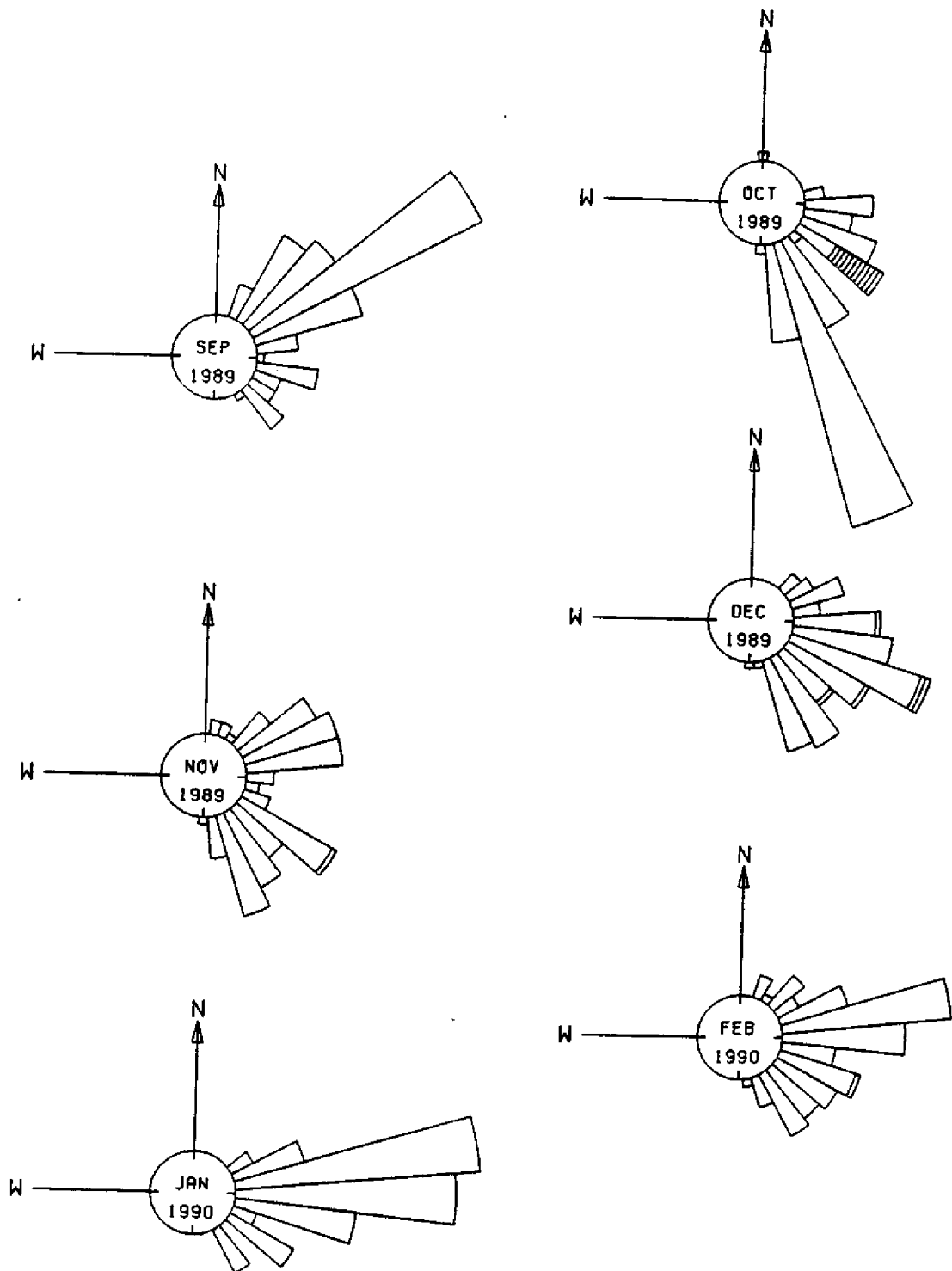
STATION AT: CLEARWATER - JUN 89-FEB 90

FIGURE 6-2 TIME HISTORY PLOTS OF SIGNIFICANT WAVE HEIGHT & PEAK PERIOD



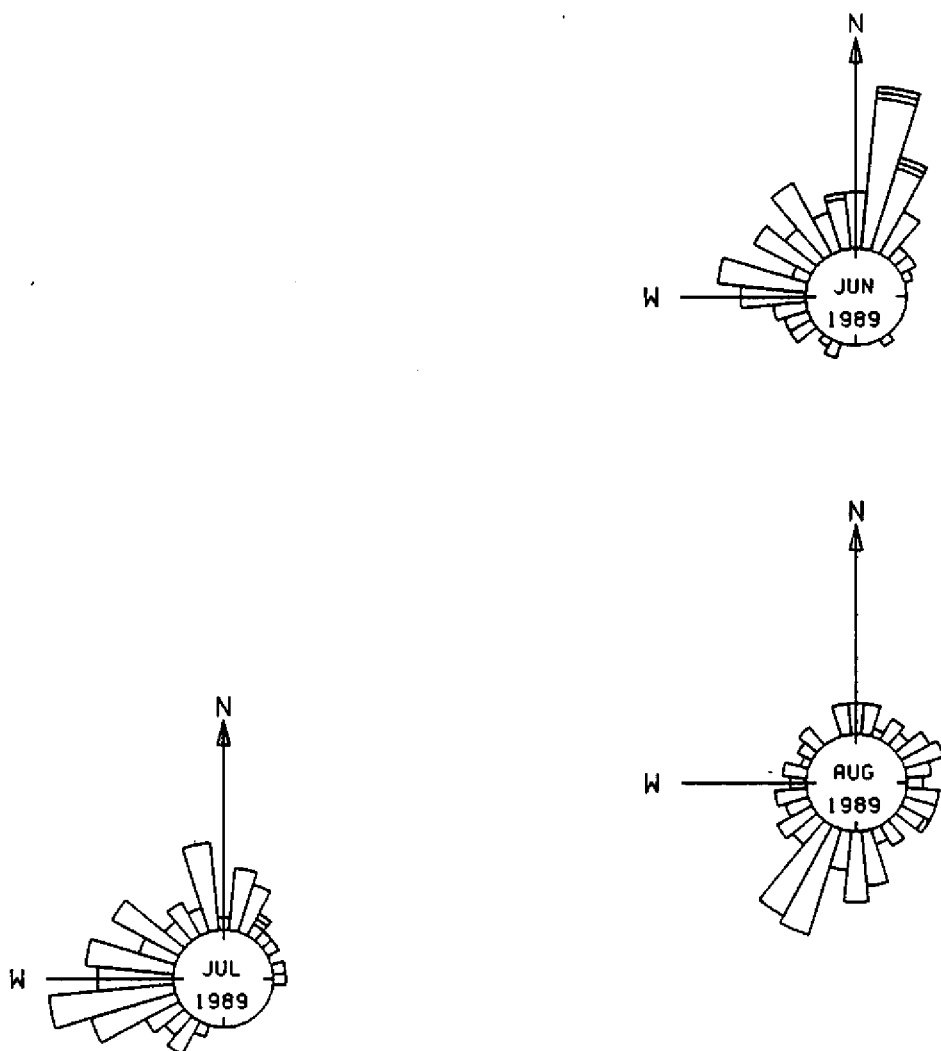
LEGEND:  $H_s < 1\text{m}$   $1\text{m} \leq H_s < 2\text{m}$   $2\text{m} \leq H_s < 3\text{m}$   $H_s \geq 3\text{m}$  0% 10% 20%

FIGURE 6-3A. JUN-AUG 1989 WAVE ROSES FOR STATION AT CLEARWATER



LEGEND:  $\square H_s < 1m$   $\text{||||} 1m \leq H_s < 2m$   $\text{|||||} 2m \leq H_s < 3m$   $\blacksquare H_s \geq 3m$  0% 10% 20%

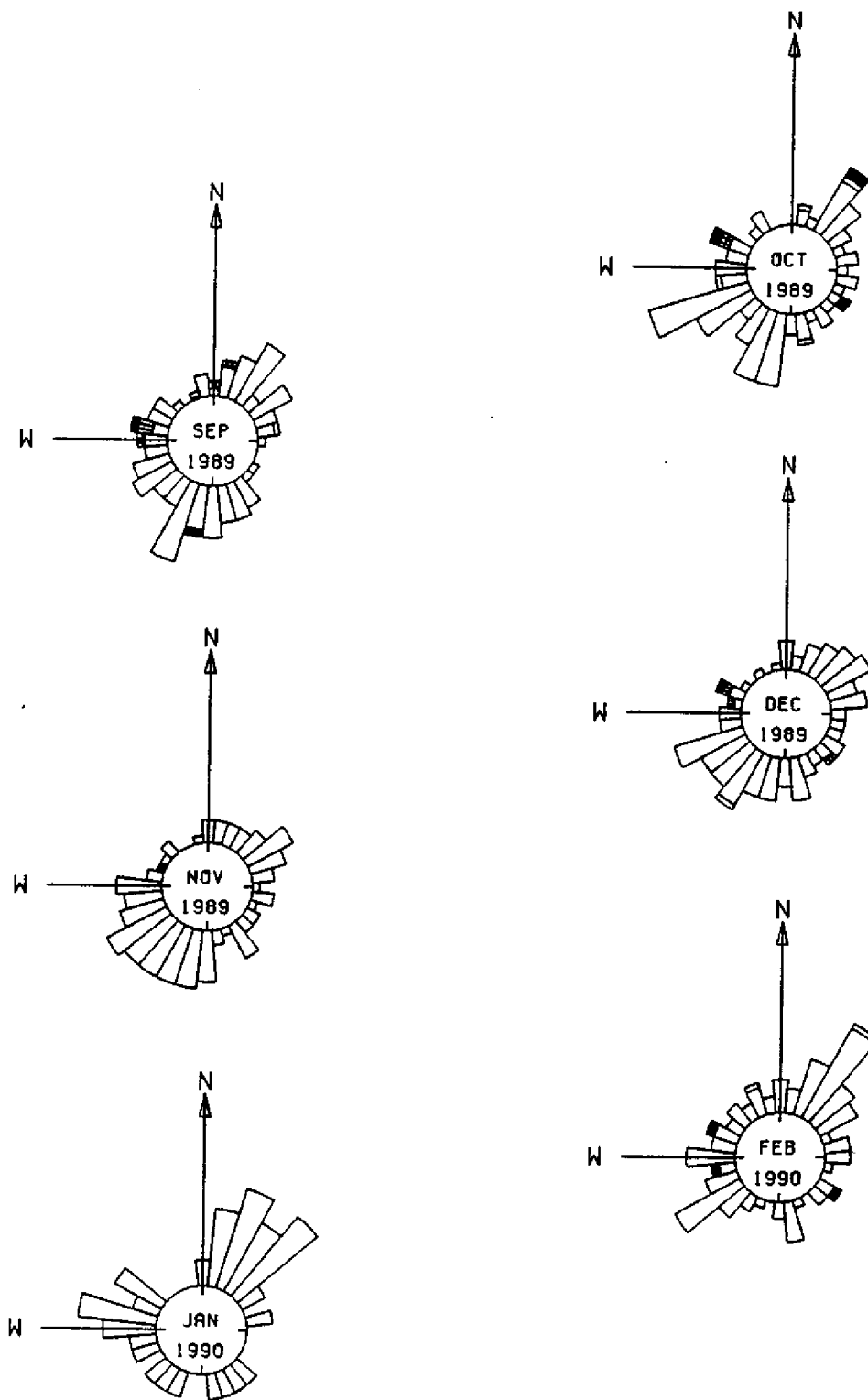
FIGURE 6-3B. SEP 89-FEB 90 WAVE ROSES FOR STATION AT CLEARWATER



LEGEND:  $v < 0.2$   $0.2 \leq v < 0.4$   $0.4 \leq v < 0.6$   $0.6 \leq v < 0.8$   $v \geq 0.8$   
(V IN M/S)

0% 10% 20%

FIGURE 6-4A. JUN-AUG 1989 CURRENT ROSES FOR STATION AT CLEARWATER



LEGEND:  $v < 0.2$   $0.2 \leq v < 0.4$   $0.4 \leq v < 0.6$   $0.6 \leq v < 0.8$   $v \geq 0.8$   
 (V IN M/S)

0% 10% 20%

FIGURE 6-48. SEP 89-FEB 90 CURRENT ROSES FOR STATION AT CLEARWATER

TABLE 6.6 Seasonal Percentage Joint Distribution  
of Significant Wave Height & Peak Period

Station at: CLEARWATER - MAR-NOV 1990 Data

| Hs(m)   |         | Peak Period(sec) |       |      |      |       |      | Total%: |
|---------|---------|------------------|-------|------|------|-------|------|---------|
|         |         | 3-5              | 5-7   | 7-9  | 9-11 | 11-13 | 13-  |         |
| 0.0-0.3 | Spring  | 20.46            | 9.71  | 3.47 | 0.12 | 0.00  | 0.00 | 33.76   |
|         | Summer  | 33.41            | 7.86  | 2.20 | 0.69 | 0.00  | 0.58 | 44.74   |
|         | Fall    | 8.09             | 0.35  | 0.00 | 0.00 | 0.00  | 0.81 | 9.25    |
|         | *Annual | 61.97            | 17.92 | 5.66 | 0.81 | 0.00  | 1.39 | 87.75   |
| 0.3-0.6 | Spring  | 3.93             | 2.20  | 0.46 | 0.00 | 0.00  | 0.00 | 6.59    |
|         | Summer  | 1.50             | 0.81  | 0.46 | 0.00 | 0.00  | 0.00 | 2.77    |
|         | Fall    | 0.12             | 0.12  | 0.00 | 0.00 | 0.00  | 0.00 | 0.23    |
|         | *Annual | 5.55             | 3.12  | 0.92 | 0.00 | 0.00  | 0.00 | 9.60    |
| 0.6-0.9 | Spring  | 1.04             | 0.69  | 0.12 | 0.00 | 0.00  | 0.00 | 1.85    |
|         | Summer  | 0.12             | 0.46  | 0.00 | 0.00 | 0.00  | 0.00 | 0.58    |
|         | Fall    | 0.00             | 0.00  | 0.00 | 0.00 | 0.00  | 0.00 | 0.00    |
|         | *Annual | 1.16             | 1.16  | 0.12 | 0.00 | 0.00  | 0.00 | 2.43    |
| 0.9-1.2 | Spring  | 0.12             | 0.12  | 0.00 | 0.00 | 0.00  | 0.00 | 0.23    |
|         | Summer  | 0.00             | 0.00  | 0.00 | 0.00 | 0.00  | 0.00 | 0.00    |
|         | Fall    | 0.00             | 0.00  | 0.00 | 0.00 | 0.00  | 0.00 | 0.00    |
|         | *Annual | 0.12             | 0.12  | 0.00 | 0.00 | 0.00  | 0.00 | 0.23    |
| 1.2-1.5 | Spring  | 0.00             | 0.00  | 0.00 | 0.00 | 0.00  | 0.00 | 0.00    |
|         | Summer  | 0.00             | 0.00  | 0.00 | 0.00 | 0.00  | 0.00 | 0.00    |
|         | Fall    | 0.00             | 0.00  | 0.00 | 0.00 | 0.00  | 0.00 | 0.00    |
|         | *Annual | 0.00             | 0.00  | 0.00 | 0.00 | 0.00  | 0.00 | 0.00    |
| 1.5-1.8 | Spring  | 0.00             | 0.00  | 0.00 | 0.00 | 0.00  | 0.00 | 0.00    |
|         | Summer  | 0.00             | 0.00  | 0.00 | 0.00 | 0.00  | 0.00 | 0.00    |
|         | Fall    | 0.00             | 0.00  | 0.00 | 0.00 | 0.00  | 0.00 | 0.00    |
|         | *Annual | 0.00             | 0.00  | 0.00 | 0.00 | 0.00  | 0.00 | 0.00    |
| 1.8-2.1 | Spring  | 0.00             | 0.00  | 0.00 | 0.00 | 0.00  | 0.00 | 0.00    |
|         | Summer  | 0.00             | 0.00  | 0.00 | 0.00 | 0.00  | 0.00 | 0.00    |
|         | Fall    | 0.00             | 0.00  | 0.00 | 0.00 | 0.00  | 0.00 | 0.00    |
|         | *Annual | 0.00             | 0.00  | 0.00 | 0.00 | 0.00  | 0.00 | 0.00    |
| 2.1-2.4 | Spring  | 0.00             | 0.00  | 0.00 | 0.00 | 0.00  | 0.00 | 0.00    |
|         | Summer  | 0.00             | 0.00  | 0.00 | 0.00 | 0.00  | 0.00 | 0.00    |
|         | Fall    | 0.00             | 0.00  | 0.00 | 0.00 | 0.00  | 0.00 | 0.00    |
|         | *Annual | 0.00             | 0.00  | 0.00 | 0.00 | 0.00  | 0.00 | 0.00    |
| 2.4-2.7 | Spring  | 0.00             | 0.00  | 0.00 | 0.00 | 0.00  | 0.00 | 0.00    |
|         | Summer  | 0.00             | 0.00  | 0.00 | 0.00 | 0.00  | 0.00 | 0.00    |
|         | Fall    | 0.00             | 0.00  | 0.00 | 0.00 | 0.00  | 0.00 | 0.00    |
|         | *Annual | 0.00             | 0.00  | 0.00 | 0.00 | 0.00  | 0.00 | 0.00    |
| 2.7-    | Spring  | 0.00             | 0.00  | 0.00 | 0.00 | 0.00  | 0.00 | 0.00    |
|         | Summer  | 0.00             | 0.00  | 0.00 | 0.00 | 0.00  | 0.00 | 0.00    |
|         | Fall    | 0.00             | 0.00  | 0.00 | 0.00 | 0.00  | 0.00 | 0.00    |
|         | *Annual | 0.00             | 0.00  | 0.00 | 0.00 | 0.00  | 0.00 | 0.00    |
| Total%: | Spring  | 25.55            | 12.72 | 4.05 | 0.12 | 0.00  | 0.00 | 42.43   |
|         | Summer  | 35.03            | 9.13  | 2.66 | 0.69 | 0.00  | 0.58 | 48.09   |
|         | Fall    | 8.21             | 0.46  | 0.00 | 0.00 | 0.00  | 0.81 | 9.48    |
|         | *Annual | 68.79            | 22.31 | 6.71 | 0.81 | 0.00  | 1.39 | 100.00  |

\* Based on data analysed; one or more seasonal data are not available.

Station at: CLEARWATER - MAR-NOV 1990 Data

|             | *Annual   |            |       |       |
|-------------|-----------|------------|-------|-------|
| <= Marginal | Height(m) | Cumulative | =>    |       |
| 0.877       | 0.0-0.3   | 1.000      | 0.000 | 0.000 |
| 0.096       | 0.3-0.6   | 0.123      | 0.000 | 0.000 |
| 0.024       | 0.6-0.9   | 0.027      | 0     | 0.000 |
| 0.002       | 0.9-1.2   | 0.002      |       | 0.000 |
| 0.000       | 1.2-1.5   | 0.000      |       | 0.000 |
| 0.000       | 1.5-1.8   | 0.000      |       | 0.000 |
| 0.000       | 1.8-2.1   | 0.000      |       | 0.000 |
| 0.000       | 2.1-2.4   | 0.000      |       | 0.000 |
| 0.000       | 2.4-2.7   | 0.000      |       | 0.000 |
| 0.000       | 2.7-      | 0.000      |       | 0.000 |

6-12

Station at: CLEARWATER - MAR-NOV 1990 Data

\* Based on data analysed; one or more seasonal data are not available.

TABLE 6.9 Mean & Standard Deviation of Significant Wave Height & Period, and Maximum# Significant Wave Height

Station at: CLEARWATER - MAR-NOV 1990 Data

|         | Mean<br>Hs(m) | Std Dev<br>Hs(m) | Maximum#:<br>Hs(m) | Date | Mean<br>Tp(sec) | Std Dev<br>Tp(sec) | #Data<br>Pts |
|---------|---------------|------------------|--------------------|------|-----------------|--------------------|--------------|
| Mar     | 0.21          | 0.20             | 0.95               | 3/ 3 | 5.48            | 1.73               | 123          |
| Apr     | 0.20          | 0.19             | 0.79               | 4/ 7 | 4.60            | 1.34               | 120          |
| May     | 0.19          | 0.12             | 0.52               | 5/22 | 4.46            | 1.03               | 124          |
| Jun     | 0.15          | 0.09             | 0.60               | 6/23 | 4.84            | 1.61               | 120          |
| Jul     | 0.16          | 0.13             | 0.64               | 7/14 | 5.12            | 4.34               | 86           |
| Aug     | 0.13          | 0.07             | 0.40               | 8/23 | 4.66            | 2.86               | 124          |
| Sep     | 0.08          | 0.05             | 0.34               | 9/24 | 5.82            | 7.20               | 82           |
| Oct     |               |                  |                    |      |                 |                    |              |
| Nov     |               |                  |                    |      |                 |                    |              |
| Dec     |               |                  |                    |      |                 |                    |              |
| Jan     |               |                  |                    |      |                 |                    |              |
| Feb     |               |                  |                    |      |                 |                    |              |
| Spring  | 0.20          | 0.17             | 0.95               | 3/ 3 | 4.85            | 1.40               | 367          |
| Summer  | 0.14          | 0.10             | 0.64               | 7/14 | 4.84            | 2.99               | 330          |
| Fall    | 0.08          | 0.05             | 0.34               | 9/24 | 5.82            | 7.20               | 82           |
| *Annual | 0.16          | 0.14             | 0.95               | 3/ 3 | 4.95            | 3.19               | 779          |

TABLE 6.10 Wave & Current Information in the Dominant Wave & Current Directions

Station at: CLEARWATER - MAR-NOV 1990 Data

|         | Wave Direction<br>(Deg. wrt North) | Hs<br>(m.) | Peak Period<br>(sec.) | Current Direction<br>(Deg. wrt North) | Current<br>(m/sec) |
|---------|------------------------------------|------------|-----------------------|---------------------------------------|--------------------|
| Mar     | 104.31                             | 0.40       | 5.82                  | 156.90                                | 0.02               |
| Apr     | 110.31                             | 0.23       | 5.50                  | 33.35                                 | 0.33               |
| May     | 83.91                              | 0.18       | 5.02                  | 31.58                                 | 0.37               |
| Jun     | 97.50                              | 0.11       | 5.50                  | 6.29                                  | 0.10               |
| Jul     | 86.13                              | 0.09       | 10.64                 | 317.07                                | 0.05               |
| Aug     | 103.76                             | 0.15       | 4.68                  | 301.03                                | 0.11               |
| Sep     | 64.83                              | 0.06       | 4.05                  | 308.00                                | 0.08               |
| Oct     |                                    |            |                       |                                       |                    |
| Nov     |                                    |            |                       |                                       |                    |
| Dec     |                                    |            |                       |                                       |                    |
| Jan     |                                    |            |                       |                                       |                    |
| Feb     |                                    |            |                       |                                       |                    |
| Spring  | 99.68                              | 0.27       | 5.45                  | 34.50                                 | 0.34               |
| Summer  | 96.74                              | 0.13       | 5.81                  | 325.68                                | 0.10               |
| Fall    | 64.83                              | 0.06       | 4.05                  | 312.54                                | 0.08               |
| *Annual | 97.56                              | 0.19       | 5.55                  | 14.80                                 | 0.25               |

\* Based on data analysed; one or more seasonal data are not available.

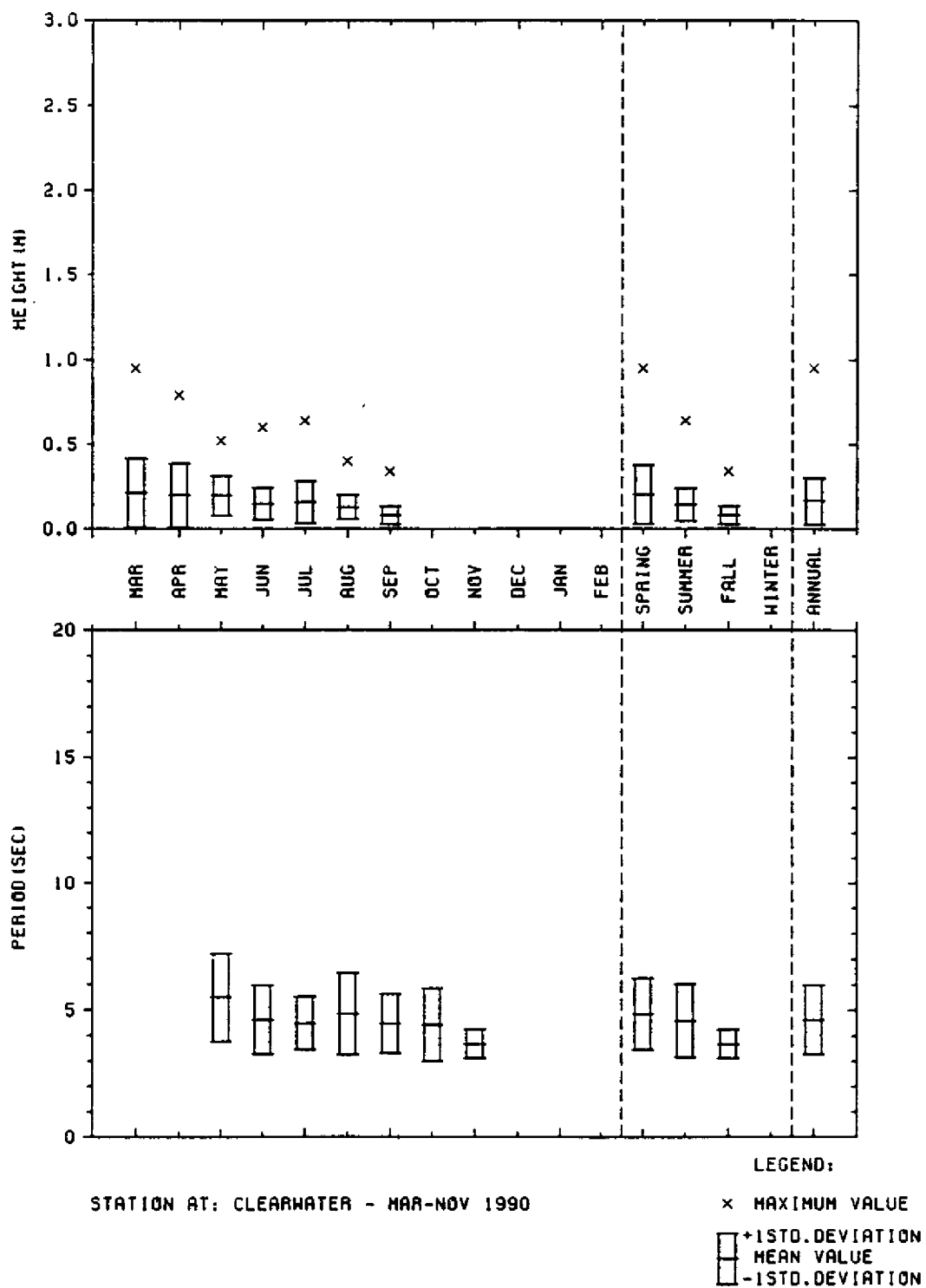
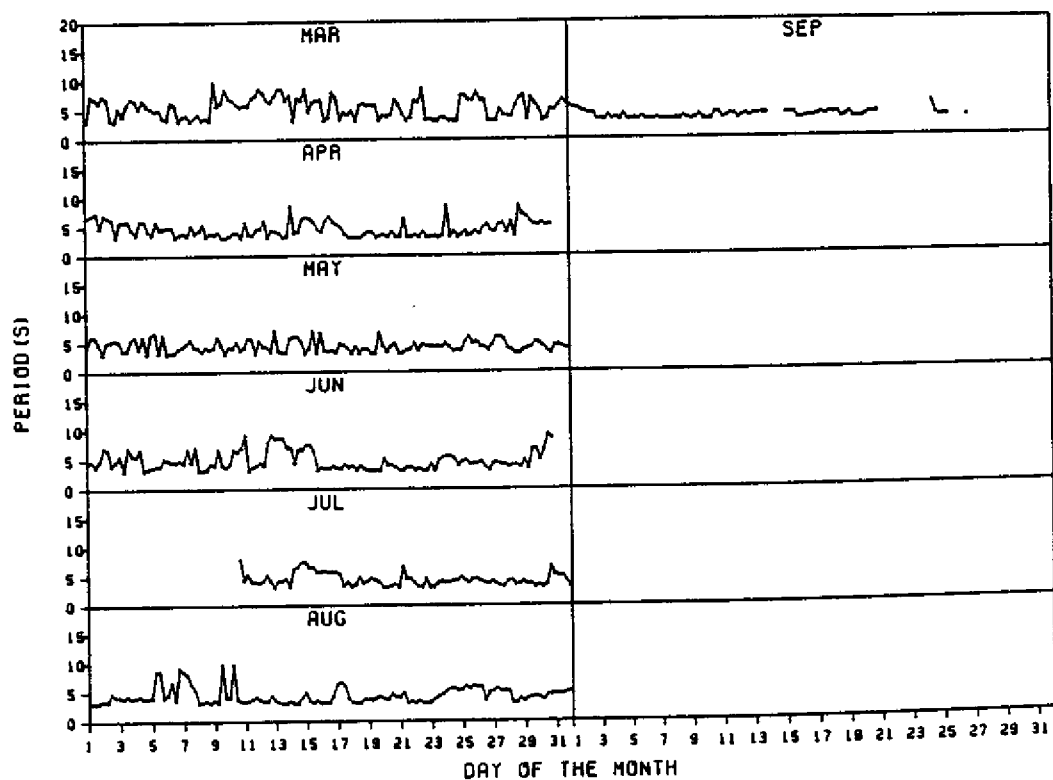
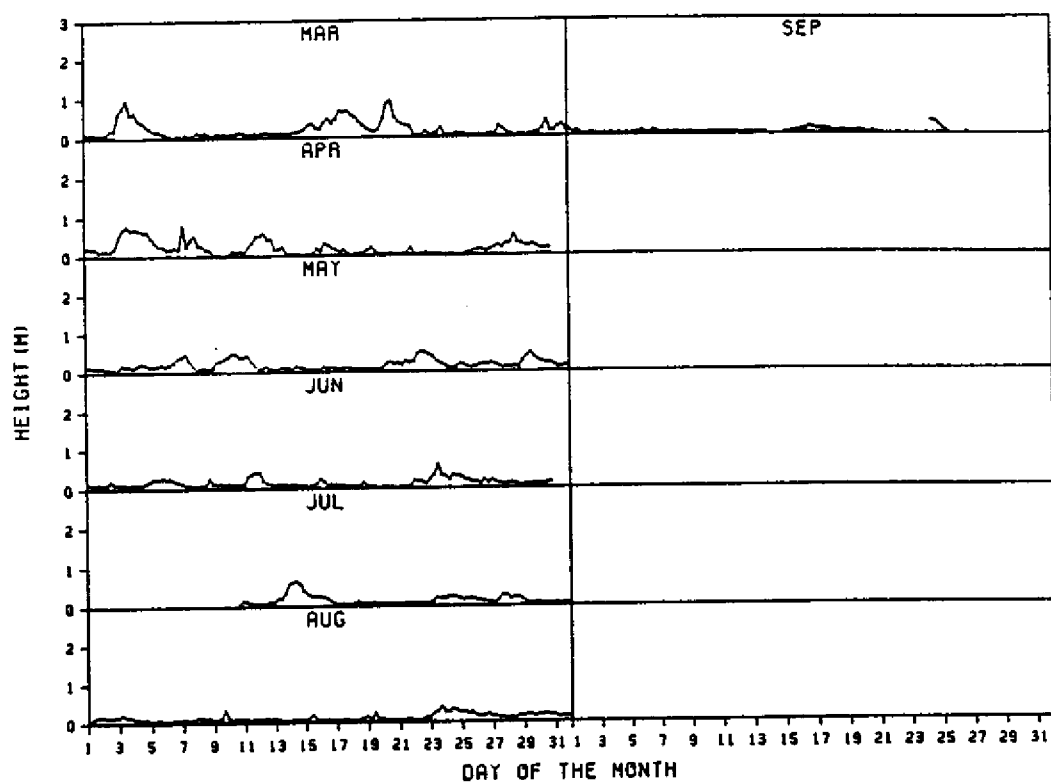
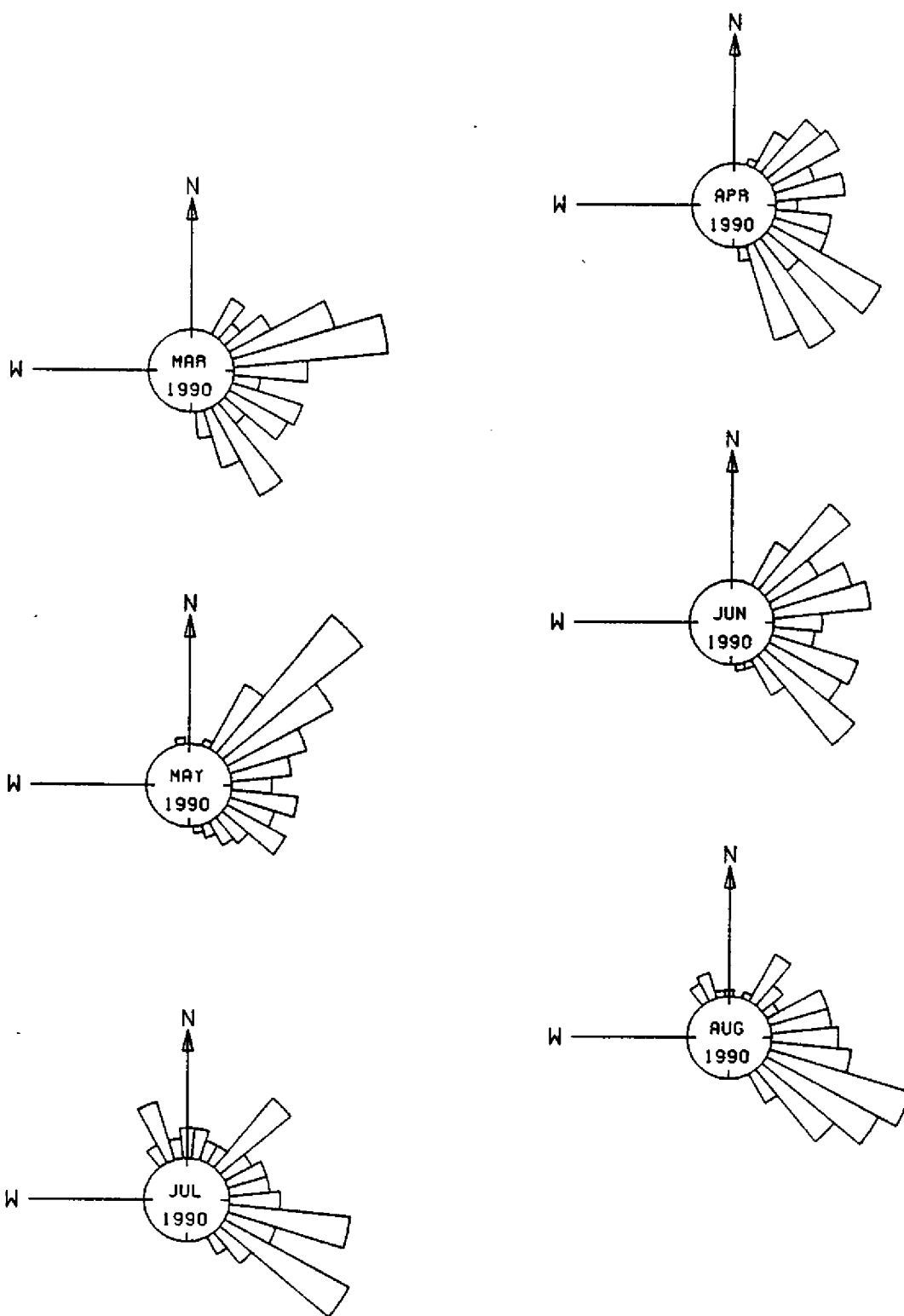


FIGURE 6-5 MONTHLY, SEASONAL & ANNUAL MEAN AND STD DEVIATION OF SIG.WAVE HEIGHT & PERIOD, AND MAXIMUM SIG.WAVE HEIGHT



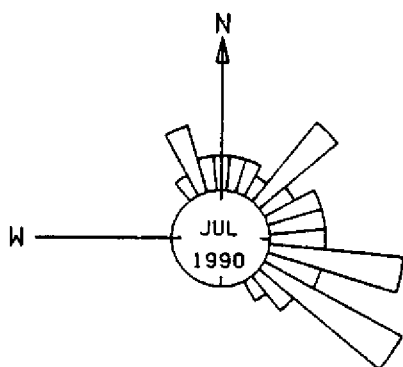
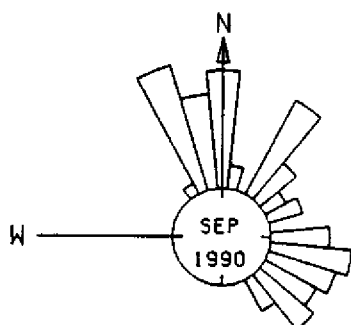
STATION AT: CLEARWATER - MAR-NOV 1990

FIGURE 6-6 TIME HISTORY PLOTS OF SIGNIFICANT WAVE HEIGHT & PEAK PERIOD



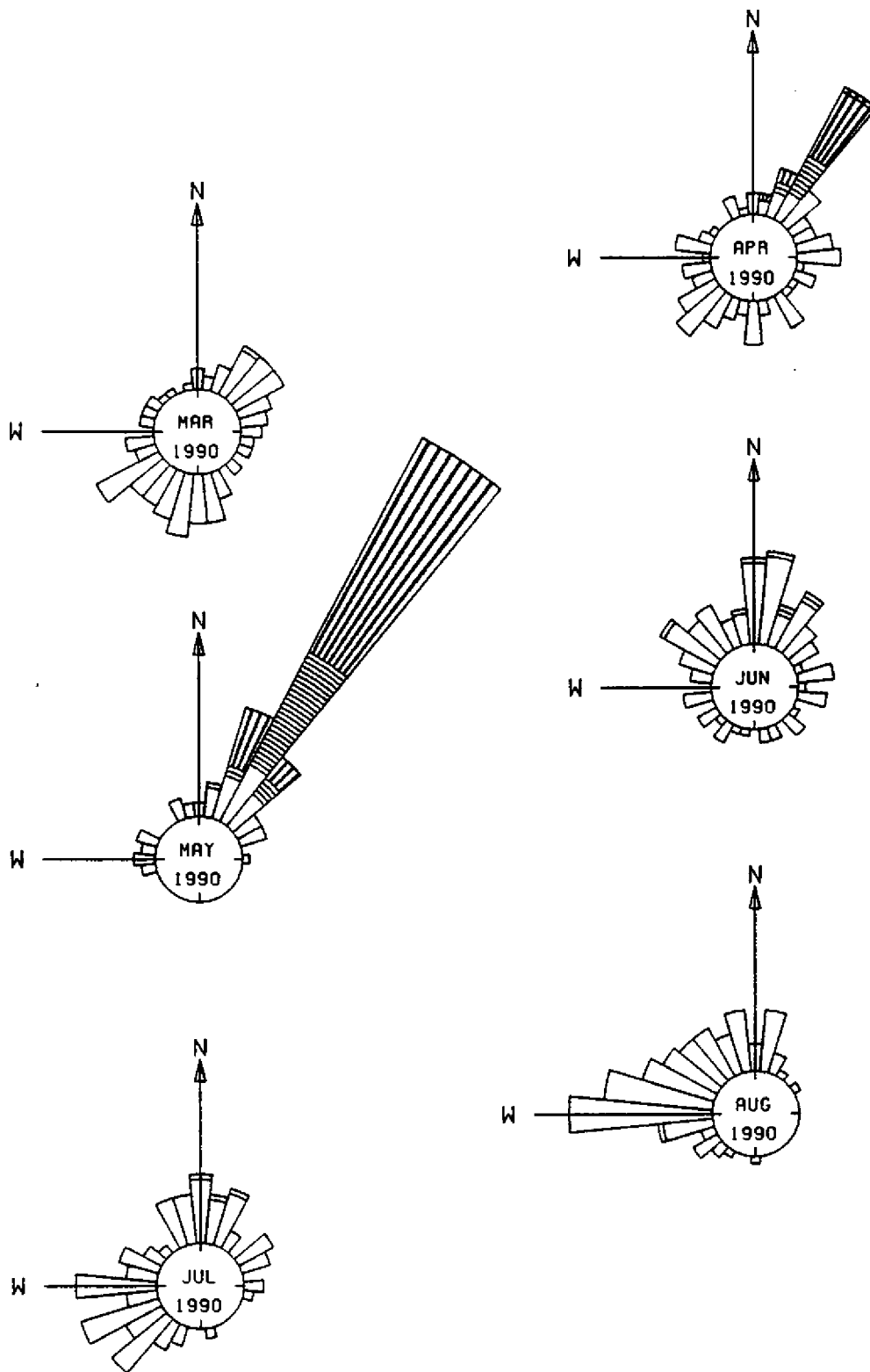
LEGEND:  $\square$   $H_s < 1\text{m}$   $1\text{m} \leq H_s < 2\text{m}$   $2\text{m} \leq H_s < 3\text{m}$   $H_s \geq 3\text{m}$  0% 10% 20%

FIGURE 6-7A. MAR-AUG 1990 WAVE ROSES FOR STATION AT CLEARWATER



LEGEND:  $H_s < 1\text{m}$   $1\text{m} \leq H_s < 2\text{m}$   $2\text{m} \leq H_s < 3\text{m}$   $H_s \geq 3\text{m}$  0% 10% 20%

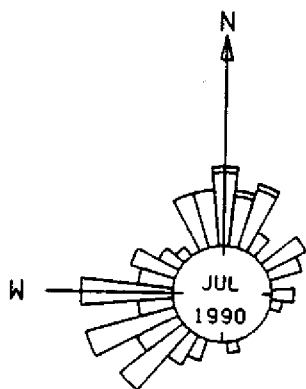
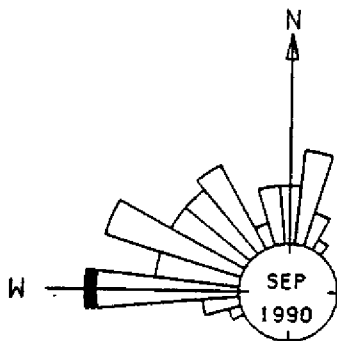
FIGURE 6-78. SEP-NOV 1990 WAVE ROSES FOR STATION AT CLEARWATER



LEGEND:  $v < 0.2$   $0.2 \leq v < 0.4$   $0.4 \leq v < 0.6$   $0.6 \leq v < 0.8$   $v \geq 0.8$   
(V IN M/S)

0% 10% 20%

FIGURE 6-8A. MAR-AUG 1990 CURRENT ROSES FOR STATION AT CLEARWATER



LEGEND:  $v < 0.2$   $0.2 \leq v < 0.4$   $0.4 \leq v < 0.6$   $0.6 \leq v < 0.8$   $v \geq 0.8$  0% 10% 20%  
(V IN M/S)

FIGURE 6-88. SEP-NOV 1990 CURRENT ROSES FOR STATION AT CLEARWATER

TABLE 7.1 Seasonal Percentage Joint Distribution  
of Significant Wave Height & Peak Period

Station at: PERDIDO KEY - JAN-FEB 1990 Data

| Hs(m)          | Peak Period(sec) |       |       |      |       |      | Total%: |
|----------------|------------------|-------|-------|------|-------|------|---------|
|                | 3-5              | 5-7   | 7-9   | 9-11 | 11-13 | 13-  |         |
| 0.0-0.3 Winter | 3.61             | 6.63  | 9.04  | 2.41 | 0.00  | 0.00 | 21.69   |
| *Annual        | 3.61             | 6.63  | 9.04  | 2.41 | 0.00  | 0.00 | 21.69   |
| 0.3-0.6 Winter | 19.28            | 19.88 | 6.02  | 0.60 | 0.00  | 0.00 | 45.78   |
| *Annual        | 19.28            | 19.88 | 6.02  | 0.60 | 0.00  | 0.00 | 45.78   |
| 0.6-0.9 Winter | 4.82             | 9.04  | 4.82  | 0.00 | 0.00  | 0.00 | 18.67   |
| *Annual        | 4.82             | 9.04  | 4.82  | 0.00 | 0.00  | 0.00 | 18.67   |
| 0.9-1.2 Winter | 0.00             | 3.01  | 5.42  | 0.00 | 0.00  | 0.00 | 8.43    |
| *Annual        | 0.00             | 3.01  | 5.42  | 0.00 | 0.00  | 0.00 | 8.43    |
| 1.2-1.5 Winter | 0.00             | 1.81  | 2.41  | 0.00 | 0.00  | 0.00 | 4.22    |
| *Annual        | 0.00             | 1.81  | 2.41  | 0.00 | 0.00  | 0.00 | 4.22    |
| 1.5-1.8 Winter | 0.00             | 0.60  | 0.60  | 0.00 | 0.00  | 0.00 | 1.20    |
| *Annual        | 0.00             | 0.60  | 0.60  | 0.00 | 0.00  | 0.00 | 1.20    |
| 1.8-2.1 Winter | 0.00             | 0.00  | 0.00  | 0.00 | 0.00  | 0.00 | 0.00    |
| *Annual        | 0.00             | 0.00  | 0.00  | 0.00 | 0.00  | 0.00 | 0.00    |
| 2.1-2.4 Winter | 0.00             | 0.00  | 0.00  | 0.00 | 0.00  | 0.00 | 0.00    |
| *Annual        | 0.00             | 0.00  | 0.00  | 0.00 | 0.00  | 0.00 | 0.00    |
| 2.4-2.7 Winter | 0.00             | 0.00  | 0.00  | 0.00 | 0.00  | 0.00 | 0.00    |
| *Annual        | 0.00             | 0.00  | 0.00  | 0.00 | 0.00  | 0.00 | 0.00    |
| 2.7- Winter    | 0.00             | 0.00  | 0.00  | 0.00 | 0.00  | 0.00 | 0.00    |
| *Annual        | 0.00             | 0.00  | 0.00  | 0.00 | 0.00  | 0.00 | 0.00    |
| Total%: Winter | 27.71            | 40.96 | 28.31 | 3.01 | 0.00  | 0.00 | 100.00  |
| *Annual        | 27.71            | 40.96 | 28.31 | 3.01 | 0.00  | 0.00 | 100.00  |

\* Based on data analysed; one or more seasonal data are not available.

Station at: PERDIDO KEY - JAN-FEB 1990 Data

\* Based on data analysed; one or more seasonal data are not available.

TABLE 7.3 Seasonal Marginal & Cumulative Probability  
Distribution of Wave Period

Station at: PERDIDO KEY - JAN-FEB 1990 Data

| Winter                                |       |       |       |                      |  |
|---------------------------------------|-------|-------|-------|----------------------|--|
| <= Marginal Period(sec) Cumulative => |       |       |       |                      |  |
| 00000000000000000000                  | 0.277 | 3-5   | 1.000 | 00000000000000000000 |  |
| 00000000000000000000                  | 0.410 | 5-7   | 0.723 | 000000000000000000   |  |
| 00000000000000000000                  | 0.283 | 7-9   | 0.313 | 00000000             |  |
| 00                                    | 0.030 | 9-11  | 0.030 | 0                    |  |
|                                       | 0.000 | 11-13 | 0.000 |                      |  |
|                                       | 0.000 | 13-   | 0.000 |                      |  |

| *Annual                               |       |       |       |                      |  |
|---------------------------------------|-------|-------|-------|----------------------|--|
| <= Marginal Period(sec) Cumulative => |       |       |       |                      |  |
| 00000000000000000000                  | 0.277 | 3-5   | 1.000 | 00000000000000000000 |  |
| 00000000000000000000                  | 0.410 | 5-7   | 0.723 | 000000000000000000   |  |
| 00000000000000000000                  | 0.283 | 7-9   | 0.313 | 00000000             |  |
| 00                                    | 0.030 | 9-11  | 0.030 | 0                    |  |
|                                       | 0.000 | 11-13 | 0.000 |                      |  |
|                                       | 0.000 | 13-   | 0.000 |                      |  |

\* Based on data analysed; one or more seasonal data are not available.

TABLE 7.4 Mean & Standard Deviation of Significant Wave Height & Period, and Maximum Significant Wave Height

Station at: PERDIDO KEY - JAN-FEB 1990 Data

|         | Mean<br>Hs(m) | Std Dev<br>Hs(m) | Maximum#:<br>Hs(m) | Date | Mean<br>Tp(sec) | Std Dev<br>Tp(sec) | #Data<br>Pts |
|---------|---------------|------------------|--------------------|------|-----------------|--------------------|--------------|
| Mar     |               |                  |                    |      |                 |                    |              |
| Apr     |               |                  |                    |      |                 |                    |              |
| May     |               |                  |                    |      |                 |                    |              |
| Jun     |               |                  |                    |      |                 |                    |              |
| Jul     |               |                  |                    |      |                 |                    |              |
| Aug     |               |                  |                    |      |                 |                    |              |
| Sep     |               |                  |                    |      |                 |                    |              |
| Oct     |               |                  |                    |      |                 |                    |              |
| Nov     |               |                  |                    |      |                 |                    |              |
| Dec     |               |                  |                    |      |                 |                    |              |
| Jan     | 0.41          | 0.17             | 0.74               | 1/20 | 6.21            | 1.54               | 54           |
| Feb     | 0.60          | 0.36             | 1.66               | 2/21 | 6.04            | 1.45               | 112          |
| Winter  | 0.54          | 0.31             | 1.66               | 2/21 | 6.10            | 1.48               | 166          |
| *Annual | 0.54          | 0.31             | 1.66               | 2/21 | 6.10            | 1.48               | 166          |

TABLE 7.5 Wave & Current Information in the Dominant Wave & Current Directions

Station at: PERDIDO KEY - JAN-FEB 1990 Data

|         | Wave Direction<br>(Deg. wrt North) | Hs<br>(m.) | Peak Period<br>(sec.) | Current Direction<br>(Deg. wrt North) | Current<br>(m/sec) |
|---------|------------------------------------|------------|-----------------------|---------------------------------------|--------------------|
| Mar     |                                    |            |                       |                                       |                    |
| Apr     |                                    |            |                       |                                       |                    |
| May     |                                    |            |                       |                                       |                    |
| Jun     |                                    |            |                       |                                       |                    |
| Jul     |                                    |            |                       |                                       |                    |
| Aug     |                                    |            |                       |                                       |                    |
| Sep     |                                    |            |                       |                                       |                    |
| Oct     |                                    |            |                       |                                       |                    |
| Nov     |                                    |            |                       |                                       |                    |
| Dec     |                                    |            |                       |                                       |                    |
| Jan     | 336.51                             | 0.46       | 6.87                  | 331.81                                | 0.10               |
| Feb     | 334.33                             | 0.74       | 6.36                  | 117.58                                | 2.00               |
| Winter  | 334.87                             | 0.68       | 6.47                  | 99.67                                 | 1.53               |
| *Annual | 334.87                             | 0.68       | 6.47                  | 99.67                                 | 1.53               |

\* Based on data analysed; one or more seasonal data are not available.

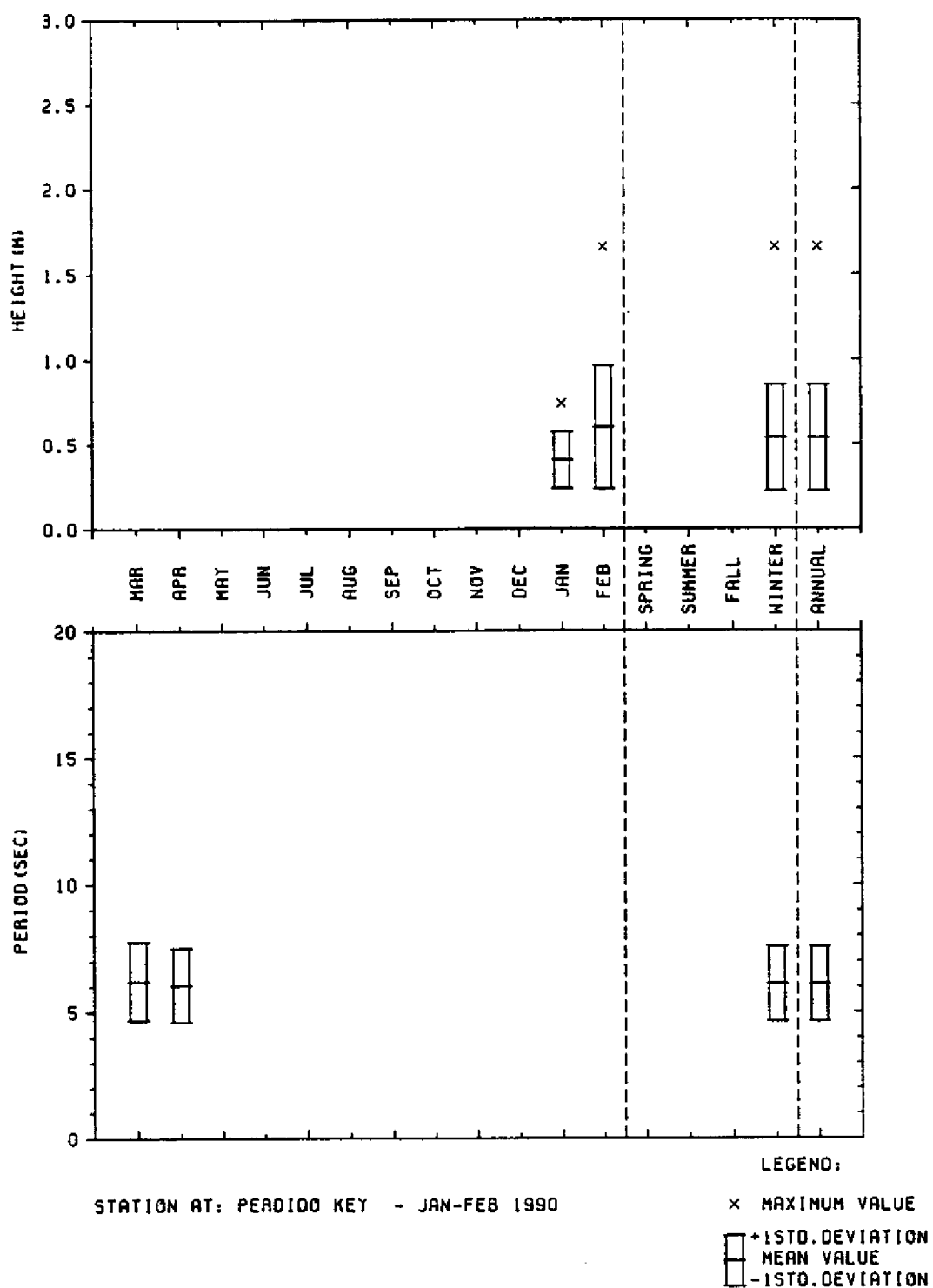
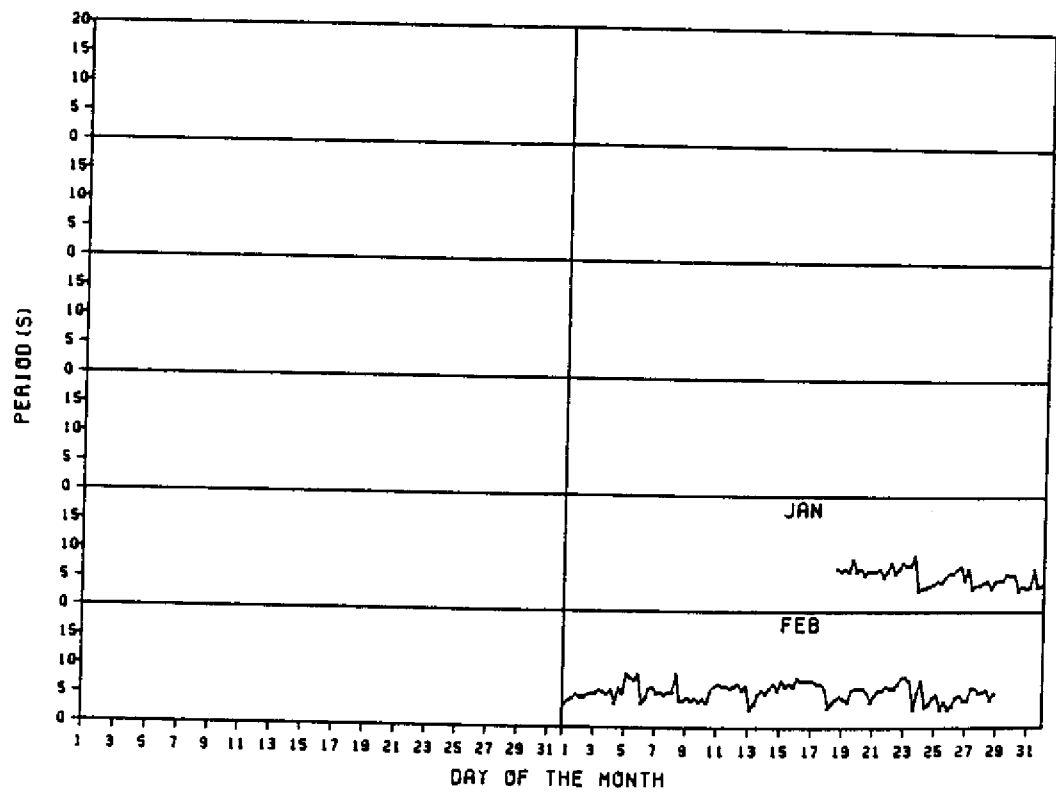
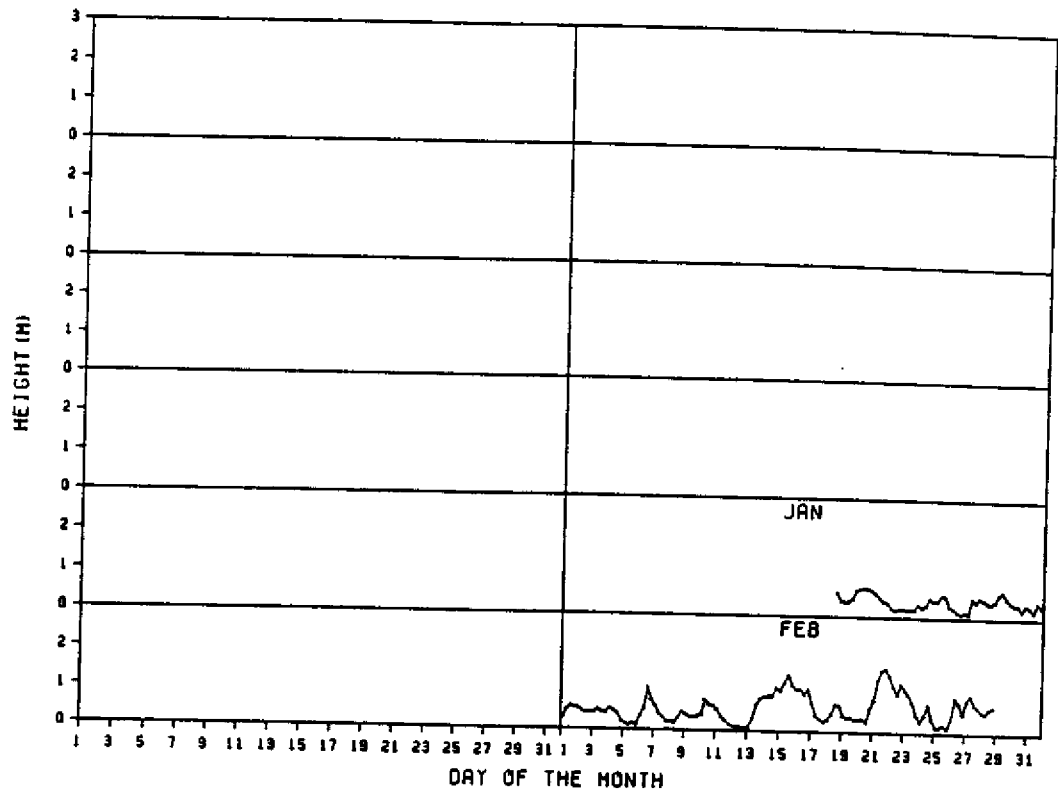
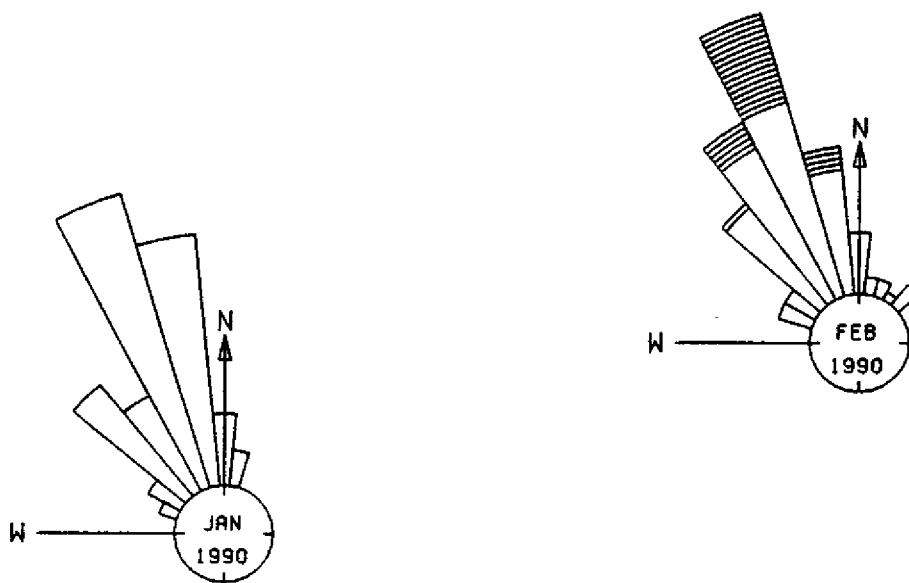


FIGURE 7-1 MONTHLY, SEASONAL & ANNUAL MEAN AND STD DEVIATION OF SIG.WAVE HEIGHT & PERIOD, AND MAXIMUM SIG.WAVE HEIGHT



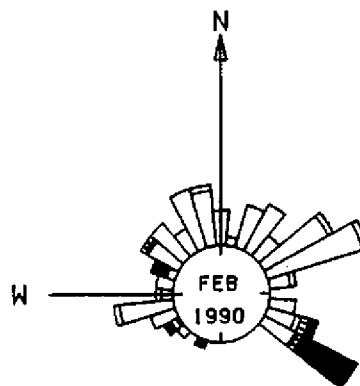
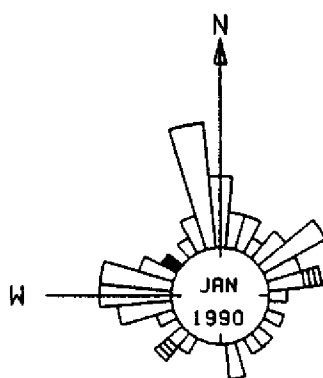
STATION AT: PERDIDO KEY - JAN-FEB 1990

FIGURE 7-2 TIME HISTORY PLOTS OF SIGNIFICANT WAVE HEIGHT & PEAK PERIOD



LEGEND:  $\square$   $H_s < 1m$      $\text{▨}$   $1m \leq H_s < 2m$      $\text{▩}$   $2m \leq H_s < 3m$      $\blacksquare$   $H_s \geq 3m$     0%    10%    20%

FIGURE 7-3. JAN-FEB 1990 WAVE ROSES FOR STATION AT PERDIDO KEY



LEGEND:  $v < 0.2$   $0.2 \leq v < 0.4$   $0.4 \leq v < 0.6$   $0.6 \leq v < 0.8$   $v \geq 0.8$   
 (V IN M/S)

0% 10% 20%

FIGURE 7-4. JAN-FEB 1990 CURRENT ROSES FOR STATION AT PERDIDO KEY

TABLE 7.6 Seasonal Percentage Joint Distribution  
of Significant Wave Height & Peak Period

Station at: PERDIDO KEY - MAR-NOV 1990 Data

| Hs(m)   |         | Peak Period(sec) |       |       |      |       |      | Total%: |
|---------|---------|------------------|-------|-------|------|-------|------|---------|
|         |         | 3-5              | 5-7   | 7-9   | 9-11 | 11-13 | 13-  |         |
| 0.0-0.3 | Spring  | 3.21             | 1.71  | 3.85  | 1.50 | 0.00  | 0.11 | 10.37   |
|         | Summer  | 10.80            | 4.06  | 10.48 | 3.53 | 0.00  | 0.86 | 29.73   |
|         | Fall    | 5.45             | 2.25  | 0.21  | 0.11 | 0.00  | 0.00 | 8.02    |
|         | *Annual | 19.47            | 8.02  | 14.55 | 5.13 | 0.00  | 0.96 | 48.13   |
| 0.3-0.6 | Spring  | 2.89             | 5.45  | 1.82  | 0.32 | 0.00  | 0.11 | 10.59   |
|         | Summer  | 8.02             | 3.74  | 1.71  | 1.18 | 0.21  | 0.00 | 14.87   |
|         | Fall    | 5.56             | 2.99  | 0.00  | 0.00 | 0.00  | 0.00 | 8.56    |
|         | *Annual | 16.47            | 12.19 | 3.53  | 1.50 | 0.21  | 0.11 | 34.01   |
| 0.6-0.9 | Spring  | 2.25             | 2.57  | 3.32  | 0.00 | 0.00  | 0.00 | 8.13    |
|         | Summer  | 0.32             | 1.07  | 0.11  | 0.00 | 0.00  | 0.00 | 1.50    |
|         | Fall    | 1.18             | 1.50  | 0.11  | 0.00 | 0.00  | 0.00 | 2.78    |
|         | *Annual | 3.74             | 5.13  | 3.53  | 0.00 | 0.00  | 0.00 | 12.41   |
| 0.9-1.2 | Spring  | 0.32             | 0.32  | 0.86  | 0.00 | 0.00  | 0.00 | 1.50    |
|         | Summer  | 0.00             | 0.11  | 0.00  | 0.00 | 0.00  | 0.00 | 0.11    |
|         | Fall    | 0.00             | 1.82  | 0.11  | 0.00 | 0.00  | 0.00 | 1.93    |
|         | *Annual | 0.32             | 2.25  | 0.96  | 0.00 | 0.00  | 0.00 | 3.53    |
| 1.2-1.5 | Spring  | 0.00             | 0.96  | 0.32  | 0.00 | 0.00  | 0.00 | 1.28    |
|         | Summer  | 0.00             | 0.00  | 0.00  | 0.00 | 0.00  | 0.00 | 0.00    |
|         | Fall    | 0.00             | 0.21  | 0.00  | 0.00 | 0.00  | 0.00 | 0.21    |
|         | *Annual | 0.00             | 1.18  | 0.32  | 0.00 | 0.00  | 0.00 | 1.50    |
| 1.5-1.8 | Spring  | 0.00             | 0.11  | 0.32  | 0.00 | 0.00  | 0.00 | 0.43    |
|         | Summer  | 0.00             | 0.00  | 0.00  | 0.00 | 0.00  | 0.00 | 0.00    |
|         | Fall    | 0.00             | 0.00  | 0.00  | 0.00 | 0.00  | 0.00 | 0.00    |
|         | *Annual | 0.00             | 0.11  | 0.32  | 0.00 | 0.00  | 0.00 | 0.43    |
| 1.8-2.1 | Spring  | 0.00             | 0.00  | 0.00  | 0.00 | 0.00  | 0.00 | 0.00    |
|         | Summer  | 0.00             | 0.00  | 0.00  | 0.00 | 0.00  | 0.00 | 0.00    |
|         | Fall    | 0.00             | 0.00  | 0.00  | 0.00 | 0.00  | 0.00 | 0.00    |
|         | *Annual | 0.00             | 0.00  | 0.00  | 0.00 | 0.00  | 0.00 | 0.00    |
| 2.1-2.4 | Spring  | 0.00             | 0.00  | 0.00  | 0.00 | 0.00  | 0.00 | 0.00    |
|         | Summer  | 0.00             | 0.00  | 0.00  | 0.00 | 0.00  | 0.00 | 0.00    |
|         | Fall    | 0.00             | 0.00  | 0.00  | 0.00 | 0.00  | 0.00 | 0.00    |
|         | *Annual | 0.00             | 0.00  | 0.00  | 0.00 | 0.00  | 0.00 | 0.00    |
| 2.4-2.7 | Spring  | 0.00             | 0.00  | 0.00  | 0.00 | 0.00  | 0.00 | 0.00    |
|         | Summer  | 0.00             | 0.00  | 0.00  | 0.00 | 0.00  | 0.00 | 0.00    |
|         | Fall    | 0.00             | 0.00  | 0.00  | 0.00 | 0.00  | 0.00 | 0.00    |
|         | *Annual | 0.00             | 0.00  | 0.00  | 0.00 | 0.00  | 0.00 | 0.00    |
| 2.7-    | Spring  | 0.00             | 0.00  | 0.00  | 0.00 | 0.00  | 0.00 | 0.00    |
|         | Summer  | 0.00             | 0.00  | 0.00  | 0.00 | 0.00  | 0.00 | 0.00    |
|         | Fall    | 0.00             | 0.00  | 0.00  | 0.00 | 0.00  | 0.00 | 0.00    |
|         | *Annual | 0.00             | 0.00  | 0.00  | 0.00 | 0.00  | 0.00 | 0.00    |
| Total%: | Spring  | 8.66             | 11.12 | 10.48 | 1.82 | 0.00  | 0.21 | 32.30   |
|         | Summer  | 19.14            | 8.98  | 12.30 | 4.71 | 0.21  | 0.86 | 46.20   |
|         | Fall    | 12.19            | 8.77  | 0.43  | 0.11 | 0.00  | 0.00 | 21.50   |
|         | *Annual | 40.00            | 28.88 | 23.21 | 6.63 | 0.21  | 1.07 | 100.00  |

\* Based on data analysed; one or more seasonal data are not available.

TABLE 7.7 Seasonal Marginal & Cumulative Probability  
Distribution of Significant Wave Height

Station at: PERDIDO KEY - MAR-NOV 1990 Data

| Spring                              |       |         |       |                        |
|-------------------------------------|-------|---------|-------|------------------------|
| <= Marginal Height(m) Cumulative => |       |         |       |                        |
| 0.00000000000000000000              | 0.321 | 0.0-0.3 | 1.000 | 0.00000000000000000000 |
| 0.00000000000000000000              | 0.328 | 0.3-0.6 | 0.679 | 0.00000000000000000000 |
| 0.00000000000000000000              | 0.252 | 0.6-0.9 | 0.351 | 0.00000000             |
| 0.000                               | 0.046 | 0.9-1.2 | 0.099 | 0.00                   |
| 0.00                                | 0.040 | 1.2-1.5 | 0.053 | 0                      |
| 0                                   | 0.013 | 1.5-1.8 | 0.013 |                        |
|                                     | 0.000 | 1.8-2.1 | 0.000 |                        |
|                                     | 0.000 | 2.1-2.4 | 0.000 |                        |
|                                     | 0.000 | 2.4-2.7 | 0.000 |                        |
|                                     | 0.000 | 2.7-    | 0.000 |                        |
| Summer                              |       |         |       |                        |
| <= Marginal Height(m) Cumulative => |       |         |       |                        |
| 0.00000000000000000000              | 0.644 | 0.0-0.3 | 1.000 | 0.00000000000000000000 |
| 0.000000000000                      | 0.322 | 0.3-0.6 | 0.356 | 0.00000000             |
| 0                                   | 0.032 | 0.6-0.9 | 0.035 | 0                      |
|                                     | 0.002 | 0.9-1.2 | 0.002 |                        |
|                                     | 0.000 | 1.2-1.5 | 0.000 |                        |
|                                     | 0.000 | 1.5-1.8 | 0.000 |                        |
|                                     | 0.000 | 1.8-2.1 | 0.000 |                        |
|                                     | 0.000 | 2.1-2.4 | 0.000 |                        |
|                                     | 0.000 | 2.4-2.7 | 0.000 |                        |
|                                     | 0.000 | 2.7-    | 0.000 |                        |
| Fall                                |       |         |       |                        |
| <= Marginal Height(m) Cumulative => |       |         |       |                        |
| 0.00000000000000000000              | 0.373 | 0.0-0.3 | 1.000 | 0.00000000000000000000 |
| 0.00000000000000000000              | 0.398 | 0.3-0.6 | 0.627 | 0.00000000000000000000 |
| 0.0000000                           | 0.129 | 0.6-0.9 | 0.229 | 0.00000                |
| 0.00000                             | 0.090 | 0.9-1.2 | 0.100 | 0.00                   |
| 0                                   | 0.010 | 1.2-1.5 | 0.010 |                        |
|                                     | 0.000 | 1.5-1.8 | 0.000 |                        |
|                                     | 0.000 | 1.8-2.1 | 0.000 |                        |
|                                     | 0.000 | 2.1-2.4 | 0.000 |                        |
|                                     | 0.000 | 2.4-2.7 | 0.000 |                        |
|                                     | 0.000 | 2.7-    | 0.000 |                        |
| *Annual                             |       |         |       |                        |
| <= Marginal Height(m) Cumulative => |       |         |       |                        |
| 0.00000000000000000000              | 0.481 | 0.0-0.3 | 1.000 | 0.00000000000000000000 |
| 0.0000000000000000                  | 0.340 | 0.3-0.6 | 0.519 | 0.0000000000000        |
| 0.00000                             | 0.124 | 0.6-0.9 | 0.179 | 0.000                  |
| 0.00                                | 0.035 | 0.9-1.2 | 0.055 | 0                      |
| 0                                   | 0.015 | 1.2-1.5 | 0.019 |                        |
|                                     | 0.004 | 1.5-1.8 | 0.004 |                        |
|                                     | 0.000 | 1.8-2.1 | 0.000 |                        |
|                                     | 0.000 | 2.1-2.4 | 0.000 |                        |
|                                     | 0.000 | 2.4-2.7 | 0.000 |                        |
|                                     | 0.000 | 2.7-    | 0.000 |                        |

\* Based on data analysed; one or more seasonal data are not available.

Station at: PERDIDO KEY - MAR-NOV 1990 Data

\* Based on data analysed; one or more seasonal data are not available.

TABLE 7.9 Mean & Standard Deviation of Significant Wave Height  
& Period, and Maximum Significant Wave Height

Station at: PERDIDO KEY - MAR-NOV 1990 Data

|         | Mean<br>Hs(m) | Std Dev<br>Hs(m) | Maximum#:<br>Hs(m) | Date  | Mean<br>Tp(sec) | Std Dev<br>Tp(sec) | #Data<br>Pts |
|---------|---------------|------------------|--------------------|-------|-----------------|--------------------|--------------|
| Mar     | 0.51          | 0.39             | 1.63               | 3/ 8  | 6.86            | 2.83               | 124          |
| Apr     | 0.50          | 0.28             | 1.46               | 4/ 9  | 5.68            | 3.68               | 60           |
| May     | 0.48          | 0.29             | 1.45               | 5/ 9  | 6.26            | 1.62               | 118          |
| Jun     | 0.17          | 0.18             | 0.74               | 6/23  | 6.98            | 6.61               | 120          |
| Jul     | 0.33          | 0.18             | 1.00               | 7/ 5  | 6.05            | 2.99               | 124          |
| Aug     | 0.27          | 0.09             | 0.58               | 8/23  | 6.34            | 2.29               | 94           |
| Sep     | 0.35          | 0.21             | 1.04               | 9/30  | 4.70            | 1.15               | 120          |
| Oct     | 0.61          | 0.28             | 1.37               | 10/17 | 4.55            | 1.23               | 81           |
| Nov     |               |                  |                    |       |                 |                    |              |
| Dec     |               |                  |                    |       |                 |                    |              |
| Jan     |               |                  |                    |       |                 |                    |              |
| Feb     |               |                  |                    |       |                 |                    |              |
| Spring  | 0.50          | 0.33             | 1.63               | 3/ 8  | 6.39            | 2.65               | 302          |
| Summer  | 0.26          | 0.16             | 1.00               | 7/ 5  | 6.46            | 4.50               | 338          |
| Fall    | 0.45          | 0.24             | 1.37               | 10/17 | 4.64            | 1.18               | 201          |
| *Annual | 0.39          | 0.25             | 1.63               | 3/ 8  | 6.00            | 3.31               | 841          |

TABLE 7.10 Wave & Current Information in the Dominant Wave & Current Directions

Station at: PERDIDO KEY - MAR-NOV 1990 Data

|         | Wave Direction<br>(Deg. wrt North) | Hs<br>(m.) | Peak Period<br>(sec.) | Current Direction<br>(Deg. wrt North) | Current<br>(m/sec) |
|---------|------------------------------------|------------|-----------------------|---------------------------------------|--------------------|
| Mar     | 333.06                             | 0.75       | 7.26                  | 92.37                                 | 0.08               |
| Apr     | 331.00                             | 0.44       | 6.01                  | 99.38                                 | 3.37               |
| May     | 333.40                             | 0.52       | 6.02                  | 97.39                                 | 0.09               |
| Jun     | 356.38                             | 0.23       | 6.61                  | 325.24                                | 0.07               |
| Jul     | 345.05                             | 0.32       | 6.28                  | 299.51                                | 0.04               |
| Aug     | 340.13                             | 0.27       | 7.00                  | 306.01                                | 0.29               |
| Sep     | 317.17                             | 0.39       | 5.03                  | 301.68                                | 0.27               |
| Oct     | 313.74                             | 0.61       | 4.68                  | 305.79                                | 0.37               |
| Nov     |                                    |            |                       |                                       |                    |
| Dec     |                                    |            |                       |                                       |                    |
| Jan     |                                    |            |                       |                                       |                    |
| Feb     |                                    |            |                       |                                       |                    |
| Spring  | 332.80                             | 0.63       | 6.70                  | 103.25                                | 0.63               |
| Summer  | 346.27                             | 0.26       | 6.65                  | 312.80                                | 0.21               |
| Fall    | 315.22                             | 0.44       | 4.96                  | 302.99                                | 0.32               |
| *Annual | 331.36                             | 0.43       | 6.13                  | 318.40                                | 0.29               |

\* Based on data analysed; one or more seasonal data are not available.

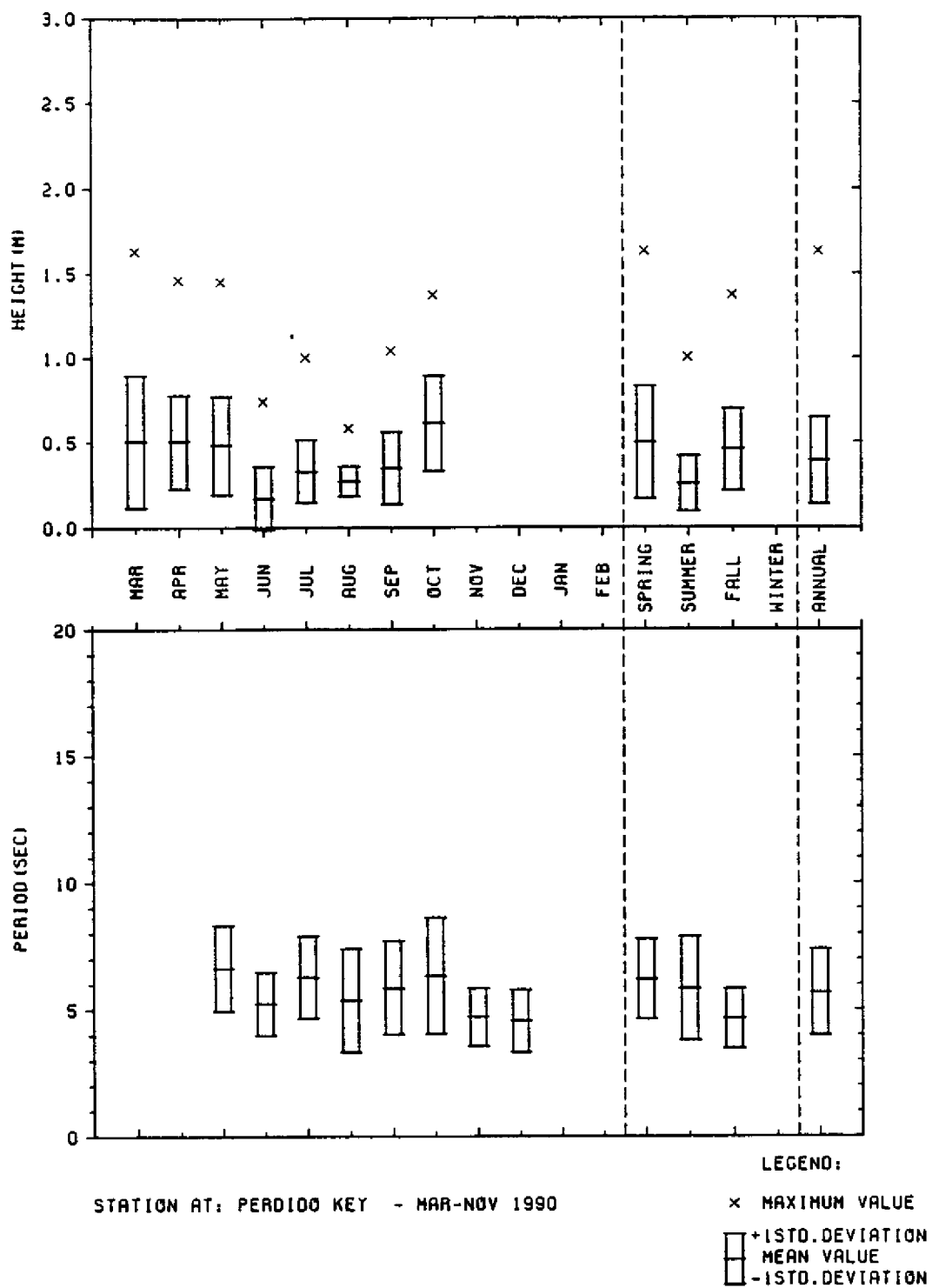
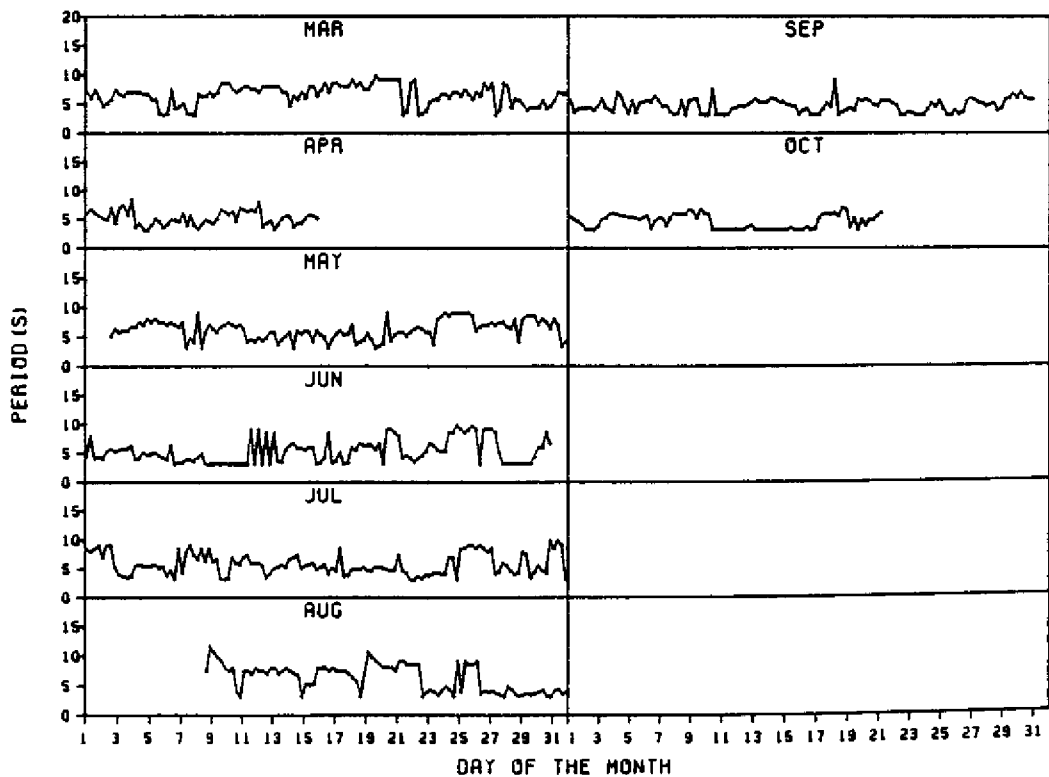
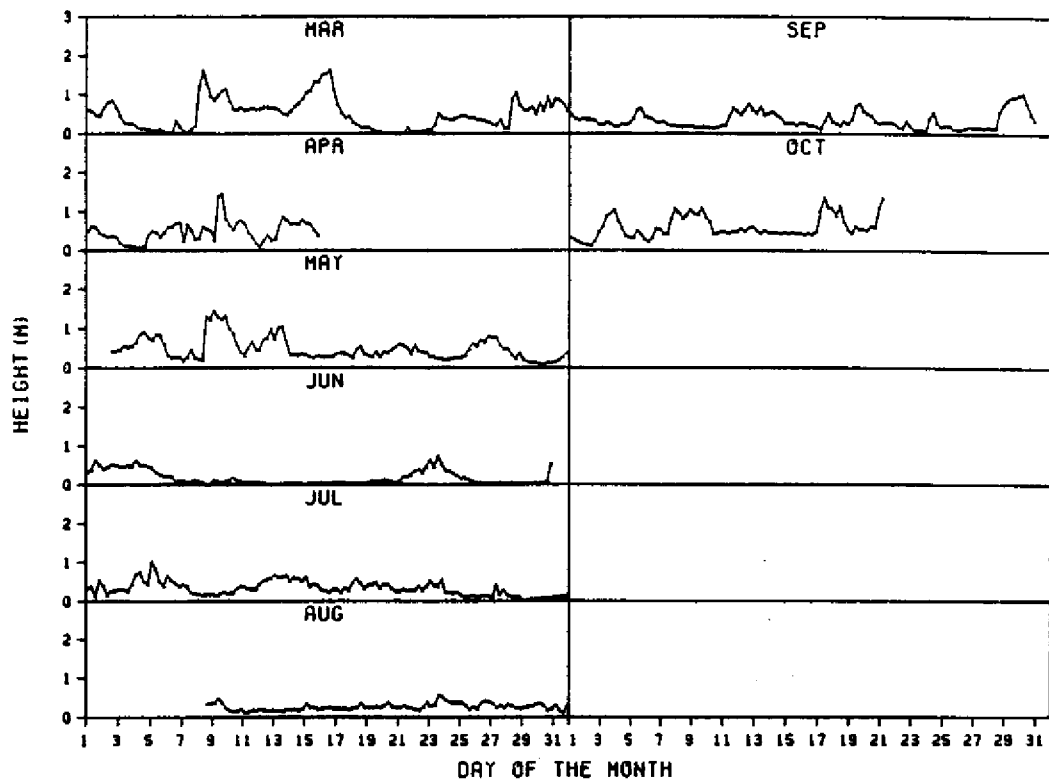
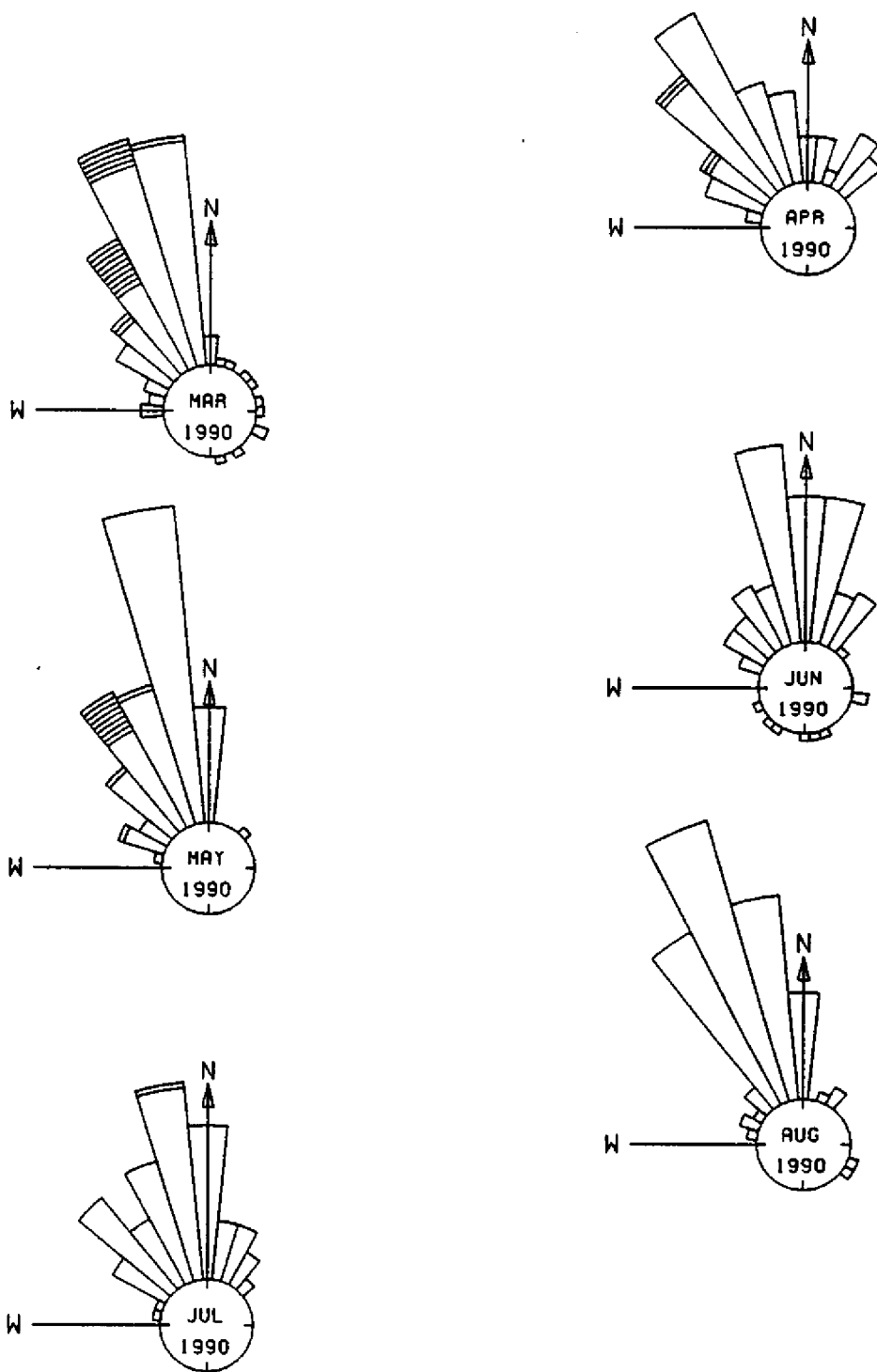


FIGURE 7-5 MONTHLY, SEASONAL & ANNUAL MEAN AND STD DEVIATION OF SIG.WAVE HEIGHT & PERIOD, AND MAXIMUM SIG.WAVE HEIGHT



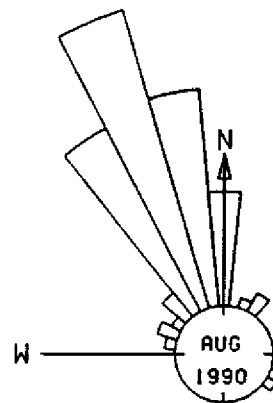
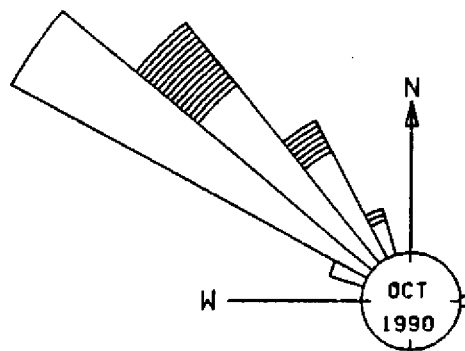
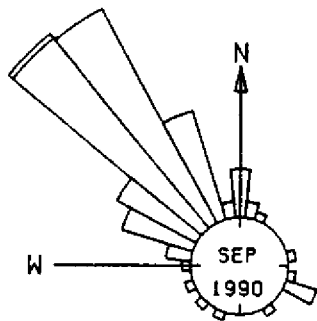
STATION AT: PERDIDO KEY - MAR-NOV 1990

FIGURE 7-6 TIME HISTORY PLOTS OF SIGNIFICANT WAVE HEIGHT & PEAK PERIOD



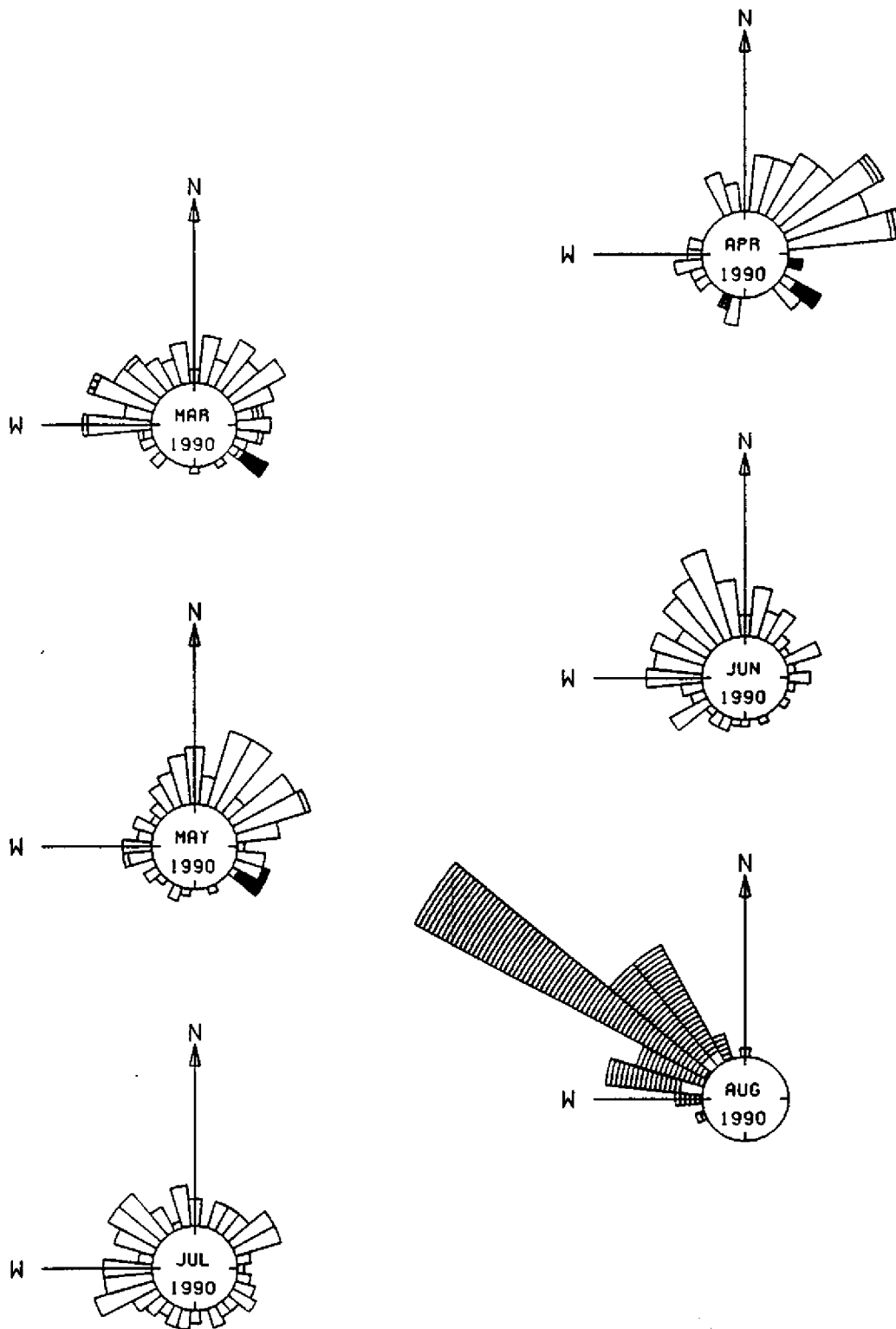
LEGEND:  $\square H_s < 1m$   $\text{▤} 1m \leq H_s < 2m$   $\text{▥} 2m \leq H_s < 3m$   $\blacksquare H_s \geq 3m$  0% 10% 20%

FIGURE 7-7A. MAR-AUG 1990 WAVE ROSES FOR STATION AT PERDIDO KEY



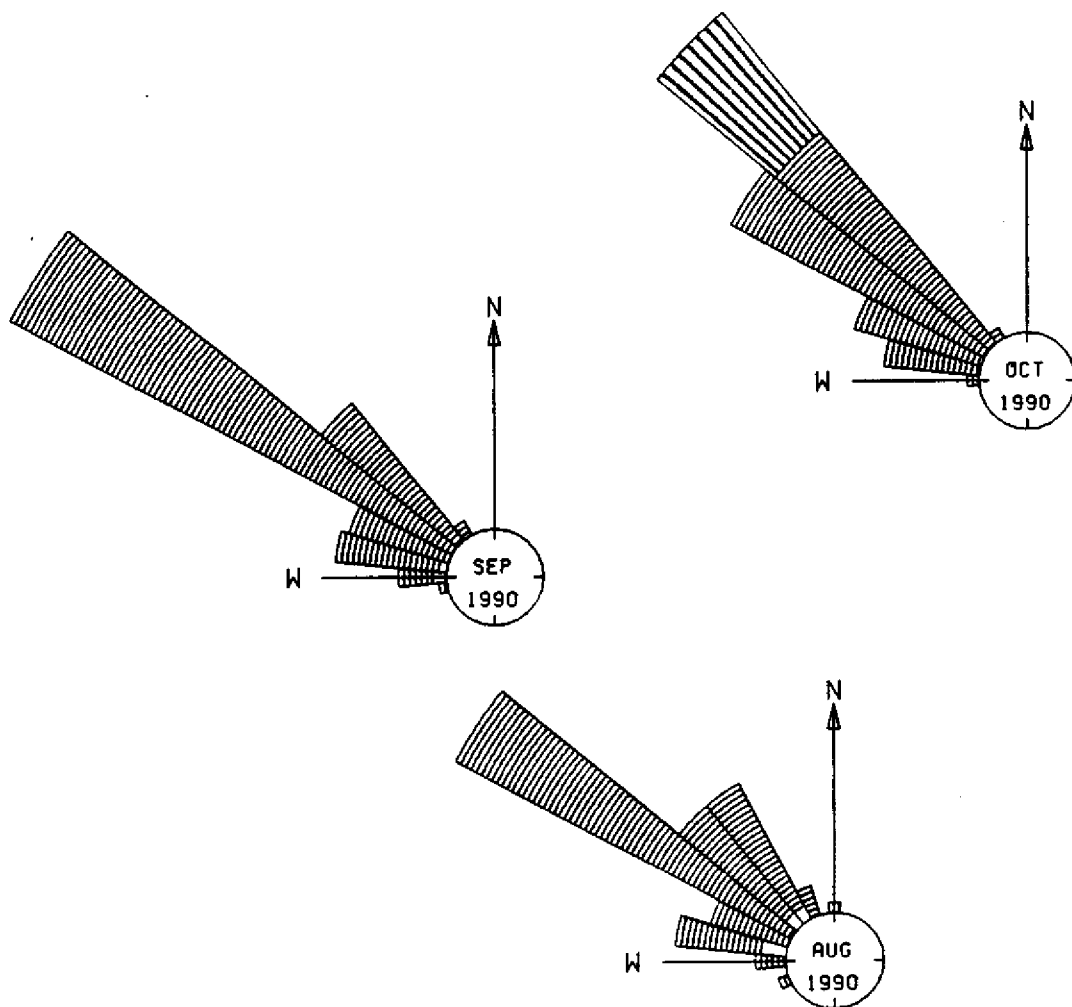
LEGEND:  $\square$   $H_s < 1\text{M}$    $1\text{M} \leq H_s < 2\text{M}$    $2\text{M} \leq H_s < 3\text{M}$    $H_s \geq 3\text{M}$  0% 10% 20%

FIGURE 7-7B. SEP-NOV 1990 WAVE ROSES FOR STATION AT PEROIDOO KEY



LEGEND:  $V < 0.2$   $0.2 \leq V < 0.4$   $0.4 \leq V < 0.6$   $0.6 \leq V < 0.8$   $V \geq 0.8$  0% 10% 20%  
(V IN M/S)

FIGURE 7-8A. MAR-AUG 1990 CURRENT ROSES FOR STATION AT PERIOD0 KEY



LEGEND:  $v < 0.2$   $0.2 \leq v < 0.4$   $0.4 \leq v < 0.6$   $0.6 \leq v < 0.8$   $v \geq 0.8$  0% 10% 20%

(V IN M/S)

FIGURE 7-88. SEP-NOV 1990 CURRENT ROSES FOR STATION AT PERIDO KEY

