

Technical Report

FUNAFUTI SEA AND SWELL OBSERVATIONS

A Baseline Study of Breaking Wave Period and Height
Conducted at Funafuti, Tuvalu
An Analysis of The Daily
Observations

BY

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Areas (CCOP/SOPAC) Work
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Development Project
Project Office
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Pacific

Funafuti Sea and Swell Observations
Fongafale, Funafuti, Tuvalu
5 November 1984 to 31 August 1985

INTRODUCTION AND BACKGROUND

This work was started under PE/TU.3 by Bruce M. Radke in cooperation with the New Zealand Meteorological Office. The staff in the meteorological station located at the Fongafale Airport makes the daily observations under the supervision of Cris M Rogers, OIC.

To date the sea and swell information developed for the Tuvalu areas has been from hindcast using wind data. As there is a continuing need for these data with respect to coastal protection, miscellaneous marine structures, and energy planning, the wave height observation program was began in order of fill this need for background data.

OBJECTIVES

The following report includes nine months of daily observations. The analysis is preliminary and the objective is to collate the data and make it available for review as early as practical. Additional analysis will be made of the data as more is accumulated and as the specific needs are identified. The daily observations are assembled into the computer files by month for further processing.

PERSONNEL PARTICIPATING

As indicated above the program was initiated by Bruce M Radke, Marine Geologist from CCOP/SOPAC. The present data analysis was made by Ralf Carter, Marine Scientist on the CCOP/SOPAC Staff. Others that have participated in the program or have made it possible are:

Tauaasa Taafaki, Secretary of Commerce and Natural Resources
J.T. Steiner, Assistant Director Research, N Z Mete Service
Chris Rogers, OIC, Meteorological Office in Tuvalu
T. Lopati, Funafuti Mete Staff
T. George, Funafuti Mete Staff
V. Fonotapu, Funafuti Mete Staff
P. Tavo, Funafuti Mete Staff

METHODS AND EQUIPMENT

A wave staff was erected at the location indicated in Figure 1. It is used as indicated in Figure 2 to estimate the height of the breaking waves sighted against the sea horizon and is calibrated to indicate elevation of the wave crest above the local tide datum.

The time period for 20 waves is measured and the higher crest heights are recorded and assumed to represent the breaker height resulting from the significant wave height at that time. All 20 breakers are characterized as small, medium, or large, and their individual periods are indicated. No distinction is made between sea or swell by the observer; however, from the wave periods and local wind conditions it would appear that swell is the dominant wave observed.

The time of the wave observation, the times of the related high and low tides, and their elevations are indicated upon the data sheet. The predicted tide elevation at the time of wave observation is later calculated and used to correct the wave elevation observed to estimated breaker height.

The wave period is estimated by dividing the total time for 50 waves by 19. The wave height is estimated by assuming that the reef face upon which the wave breaks has a slope of 1:10. The relationship employed was developed by Munk (1949) and the factors were modified so to give values for a slope of 1:10 when compared with Figure 2-65 page 2-122 of Vol I, U.S. Corp of Engineering Shore Protection Manual 1977. The expression employed was:

$$H_o = 0.3918 [H_b]^{1.5} / T \quad (1)$$

where H_o is the deep water wave height, H_b is the height of the breaker, and T is the wave period. The units are meters and seconds. The deep water wave length is taken as $L = 5.12 (T^2)$ in development of (1) above.

The Longuet-Higgins relationship that showed the maximum wave height, H_m in N waves?

$$H_m = 0.707 H_o [\ln N]^{0.5} \quad (2)$$

was employed to estimate the highest wave to expect during the period of observation. It was assumed that 8000 waves could result from the storm that produced the highest observed swell during the study.

RESULTS

The daily observations for the nine months reported are given in Appendices I entitled "Observations Taken at The Funafuti Airport by The New Zealand Meteorological Service". The month of observation is indicated in the file name. The reported wave period and deep water wave height are also included in these tables and their values were calculated as indicated previous. The observations began on 5 November 1985, Some months have a day or so of missing observations, and the percentage distribution of waves was calculated using the number of days reported for those months.

The month of daily wave heights were ordered from high to low wave height and the percent of waves having equal or smaller wave heights was calculated and given in tabular format in Appendice II. The monthly average breaker height, wave period and wave height are also given. The extreme conditions have been graphed on log-probability scale and are shown in Figure 3. The mean wave height and period are shown in graphic format in Figure 4. Maximum and minimum values are shown in Figures 5 and 6.

DISCUSSION

Emphasis is made of the fact that less than one year of observations were included in the reporting period and as with weather data several years of data are required to characterize the conditions that can be expected at a given location. Not withstanding this warning it appears that certain wave conditions do exist in Funafuti during the different parts of the year.

There appears to be some swell present at the south east exposure of the atoll most of the time. The average wave period of the swell is 10.54 seconds and values range from 4.84 to 18.74 seconds. The swell appears to have traveled a further distance as indicated by the longer period during January than in May and August. Wave height ranged from 0.05 m in January to 1.5 m in May. However, as shown in Figure 3 the waves tend to be the largest during August. These relationships are also shown in Figure 4. With additional data these curves would be expected to smooth out some as well as have greater extremes.

The maximum wave estimated using equation (2) would be on the order of 3.2 m (the 1.5 m wave observed in May x a factor of 2.119 for 8000 waves). This wave would be much less than a 9 m wave and a 15 to 17 m maximum wave that could occur during a major hurricane. The 3.2 m wave may be an annual event at the observation site.

CONCLUSIONS

This report was made primarily to make the wave data available as early as possible, and it would be premature to draw firm conclusions based upon the data presented. Suggestions as to changes to improve the program without increasing the work load significantly would be welcome at this time. The following conclusions are tentative and based upon the data presented:

- 01 The program should be continued as the data being developed appears to be useful with respect to the amount of effort required by the program.
- 02 Certain characteristics patterns of wave period and wave height appear to be present and related to the season.
- 03 Seas generated locally from westerly winds during summer may not be observed at the wave station.
- 04 The depth profile of the reef face at the observation station should be determined.
- 05 Swell appears to be the main wave observed at the station.

REFERENCES

- Longuet-Higgins, M.S, (1952) "On the Statistical Distribution of the Heights of Sea Waves," Journal, Marine Science, Vol II, pp 345-366
- Munk, W.H. (1949) "The Solitary Wave Theory and Its Application to Surf Problems," Annals of the New York Academy of Sciences, Vol. 51, 1949, pp 376-464
- U.S. Corps (1977) "Shore Protection Manual," Vol I, pp 2-121

1. The views expressed in this report are those of the Author and do not necessarily reflect those of the United Nations.
2. Mention of any firm or licences process does not imply endorsement by the United Nations.

APPENDICES I

Observations taken at the Funafuti Airport

by

The New Zealand Meteorological Service

data for

November 1984 through August 1985

OBSERVATIONS TAKEN AT THE FUNAFUTI AIRPORT BY
THE NEW ZEALAND METEOROLOGICAL SERVICE

DATA FROM FILE NOV84.TXT

| DATE | TIME (Hrs) | TIDE (m) | WIND SPEED (kts) | DIRECTION (deg) | BREAKER, Hb (m) | PERIOD (SEC) | WAVE, Ho (m) | DIRECTION From |
|----------|---------------|-------------|---------------------|--------------------|--------------------|-----------------|-----------------|-------------------|
| 11/05/84 | 1000 | 0.63 | 2 | 130 | 1.16 | 9.84 | 0.49 | SE |
| 11/06/84 | 930 | 0.57 | 11 | 120 | 1.33 | 9.05 | 0.60 | S |
| 11/07/84 | 1530 | 1.89 | 11 | 110 | 1.51 | 9.47 | 0.73 | SE |
| 11/08/84 | 1100 | 0.63 | 2 | 130 | 1.16 | 9.84 | 0.49 | SE |
| 11/09/84 | 1000 | 0.55 | 12 | 350 | 1.00 | 10.26 | 0.39 | SE |
| 11/10/84 | 1200 | 0.53 | 12 | 90 | 1.47 | 9.47 | 0.70 | SE |
| 11/11/84 | 1100 | 0.69 | 11 | 110 | 1.87 | 9.37 | 1.00 | SE |
| 11/12/84 | 1000 | 0.94 | 7 | 130 | 2.06 | 9.05 | 1.16 | SE |
| 11/13/84 | 1000 | 1.09 | 7 | 30 | 1.41 | 8.79 | 0.66 | SE |
| 11/14/84 | 800 | 0.75 | 10 | 30 | 2.00 | 11.21 | 1.11 | SE |
| 11/15/84 | 800 | 1.31 | 12 | 70 | 1.07 | 8.16 | 0.43 | SE |
| 11/16/84 | 800 | 1.14 | 10 | 110 | 0.86 | 9.05 | 0.31 | SE |
| 11/17/84 | 1200 | 1.56 | 12 | 40 | 0.84 | 7.26 | 0.30 | E |
| 11/18/84 | 1100 | 1.35 | 5 | 70 | 0.90 | 8.16 | 0.33 | E |
| 11/19/84 | 1000 | 0.77 | 12 | 120 | 0.73 | 7.79 | 0.24 | SE |
| 11/20/84 | 1000 | 0.49 | 4 | 90 | 1.01 | 11.84 | 0.40 | S |
| 11/21/84 | 1500 | 2.09 | 6 | 350 | 2.09 | 12.32 | 0.57 | E |
| 11/22/84 | 1300 | 1.22 | 3 | 430 | 1.91 | 8.79 | 1.03 | SE |
| 11/23/84 | 1100 | 0.40 | 2 | 200 | 0.97 | 10.26 | 0.37 | S |
| 11/24/84 | 1200 | 0.49 | 7 | 140 | 1.26 | 12.89 | 0.55 | SE |
| 11/25/84 | 1500 | 0.57 | 7 | 210 | 1.93 | 10.53 | 1.05 | SE |
| 11/26/84 | 900 | 1.45 | 5 | 20 | 1.05 | 8.68 | 0.42 | S |
| 11/27/85 | 1000 | 1.24 | 13 | 30 | 0.94 | 8.74 | 0.36 | E |
| 11/28/84 | 840 | 1.48 | 5 | 90 | 1.48 | 9.32 | 0.60 | E |
| 11/29/84 | 900 | 1.46 | 10 | 90 | 1.47 | 9.68 | 0.70 | E |
| 11/30/84 | 900 | 1.39 | 3 | 70 | 1.11 | 8.79 | 0.46 | E |

OBSERVATIONS TAKEN AT THE FUNAFUTI AIRPORT BY
THE NEW ZEALAND METEOROLOGICAL SERVICE

DATA FROM FILE DEC84.TXT

| DATE | TIME (Hrs) | TIDE (m) | WIND SPEED (kts) | DIRECTION (deg) | BREAKER, Hb (m) | PERIOD (SEC) | WAVE, Ho (m) | DIRECTION From |
|----------|---------------|-------------|---------------------|--------------------|--------------------|-----------------|-----------------|-------------------|
| 12/02/84 | 1430 | 1.63 | 10 | 80 | 1.02 | 11.00 | 0.40 | E |
| 12/03/84 | 925 | 0.91 | 11 | 100 | 0.97 | 8.05 | 0.37 | SE |
| 12/04/84 | 1206 | 1.25 | 2 | 100 | 1.25 | 8.42 | 0.55 | SE |
| 12/05/84 | 1105 | 0.96 | 8 | 270 | 0.97 | 9.00 | 0.37 | SE |
| 12/06/84 | 854 | 0.68 | 6 | 29 | 0.68 | 4.84 | 0.32 | SE |
| 12/07/84 | 1110 | 0.69 | 6 | 300 | 0.81 | 9.47 | 0.29 | SE |
| 12/08/84 | 1515 | 1.88 | 9 | 360 | 1.12 | 12.89 | 0.46 | E |
| 12/09/84 | 1330 | 1.02 | 14 | 30 | 1.02 | 8.53 | 0.55 | E |
| 12/10/84 | 1030 | 0.77 | 13 | 40 | 0.86 | 11.37 | 0.31 | NE |
| 12/11/84 | 1417 | 0.90 | 12 | 120 | 1.10 | 10.42 | 0.45 | SE |
| 12/12/84 | 800 | 1.66 | 2 | 130 | 1.34 | 9.47 | 0.61 | SE |
| 12/13/84 | 1405 | 0.80 | 8 | 60 | 1.80 | 10.37 | 0.95 | E |
| 12/14/84 | 1202 | 1.32 | 12 | 360 | 1.68 | 10.79 | 0.85 | NE |
| 12/15/84 | 1515 | 0.99 | 10 | 60 | 1.51 | 10.79 | 0.73 | E |
| 12/16/84 | 1420 | 1.50 | 10 | 40 | 0.65 | 8.32 | 0.21 | E |
| 12/17/84 | 910 | 1.01 | 2 | 100 | 1.40 | 9.84 | 0.65 | E |
| 12/18/84 | 820 | 0.64 | 5 | 100 | 1.24 | 9.47 | 0.54 | E |
| 12/19/84 | 937 | 0.66 | 4 | 310 | 1.09 | 10.42 | 0.45 | SE |
| 12/20/84 | 815 | 0.64 | 11 | 320 | 1.74 | 10.58 | 0.90 | SE |
| 12/21/84 | 757 | 0.90 | 21 | 340 | 0.60 | 11.47 | 0.18 | SE |
| 12/22/84 | 1245 | 0.90 | 14 | 320 | 0.40 | 10.53 | 0.10 | NW |
| 12/23/84 | 1400 | 1.13 | 14 | 300 | 0.67 | 10.53 | 0.21 | NW |
| 12/14/84 | 836 | 1.39 | 10 | 230 | 1.11 | 11.63 | 0.46 | SE |
| 12/25/84 | 1410 | 0.86 | 14 | 260 | 0.39 | 10.79 | 0.10 | S |
| 12/26/84 | 810 | 1.69 | 11 | 330 | 1.31 | 11.95 | 0.59 | SE |
| 12/27/84 | 1020 | 1.44 | 21 | 240 | 1.31 | 9.21 | 0.59 | SE |
| 12/28/84 | 815 | 1.58 | 16 | 10 | 1.33 | 8.53 | 0.60 | NE |
| 12/29/84 | 1015 | 1.48 | 16 | 340 | 0.67 | 10.16 | 0.21 | NW |
| 12/30/84 | 1415 | 1.32 | 0 | 90 | 1.43 | 11.42 | 0.67 | E |
| 12/31/84 | 800 | 1.11 | 12 | 290 | 1.22 | 8.95 | 0.53 | SE |

OBSERVATIONS TAKEN AT THE FUNAFUTI AIRPORT BY
THE NEW ZEALAND METEOROLOGICAL SERVICE

DATA FROM FILE JAN85.TXT

| DATE | TIME (Hrs) | TIDE (m) | WIND SPEED (kts) | DIRECTION (deg) | BREAKER, Hb (m) | PERIOD (SEC) | WAVE, Ho (m) | DIRECTION From |
|----------|---------------|-------------|---------------------|--------------------|--------------------|-----------------|-----------------|-------------------|
| 01/1/85 | 1500 | 1.54 | 18 | 320 | 1.34 | 10.05 | 0.61 | SE |
| 01/02/85 | 907 | 0.93 | 14 | 350 | 1.00 | 8.26 | 0.39 | SE |
| 01/03/85 | 858 | 0.78 | 10 | 350 | 0.60 | 9.84 | 0.18 | SE |
| 01/04/85 | 1215 | 1.32 | 0 | 90 | 0.61 | 11.00 | 0.19 | SE |
| 01/05/85 | 1315 | 1.45 | 13 | 280 | 1.55 | 13.16 | 0.76 | S |
| 01/06/85 | 1430 | 1.70 | 5 | 360 | 1.30 | 13.00 | 0.58 | SE |
| 01/07/85 | 855 | 0.90 | 4 | 330 | 0.78 | 9.63 | 0.27 | E |
| 01/08/85 | 1135 | 0.52 | 14 | 280 | 0.98 | 8.16 | 0.38 | S |
| 01/09/85 | 1810 | 1.57 | 10 | 240 | 1.03 | 10.53 | 0.41 | SW |
| 01/10/85 | 1025 | 1.01 | 18 | 250 | 0.69 | 11.84 | 0.22 | S |
| 01/11/85 | 1240 | 0.78 | 9 | 30 | 0.82 | 10.26 | 0.29 | SE |
| 01/12/85 | 845 | 1.74 | 11 | 310 | 1.39 | 12.68 | 0.64 | E |
| 01/13/85 | 930 | 1.69 | 18 | 270 | 1.31 | 15.11 | 0.59 | SE |
| 01/14/85 | 1020 | 1.64 | 11 | 310 | 0.24 | 17.21 | 0.05 | SE |
| 01/15/85 | 1055 | 1.59 | 12 | 340 | 0.91 | 13.16 | 0.34 | NW |
| 01/16/85 | 1040 | 1.34 | 12 | 340 | 0.66 | 11.74 | 0.21 | N |
| 01/17/85 | 1105 | 1.20 | 15 | 360 | 0.80 | 13.42 | 0.28 | SE |
| 01/18/85 | 1030 | 0.80 | 14 | 360 | 0.58 | 13.00 | 0.17 | N |
| 01/19/85 | 1430 | 1.79 | 11 | 330 | 1.46 | 18.74 | 0.69 | SE |
| 01/20/85 | 1500 | 1.76 | 7 | 340 | 1.62 | 12.58 | 0.81 | E |
| 01/21/85 | 1400 | 1.17 | 8 | 300 | 0.63 | 11.68 | 0.20 | SE |
| 01/22/85 | 1410 | 1.02 | 4 | 90 | 0.68 | 13.05 | 0.22 | S |
| 01/23/85 | 905 | 1.31 | 6 | 190 | 0.44 | 14.47 | 0.11 | SW |
| 01/24/85 | 900 | 1.50 | 0 | 90 | 0.88 | 10.58 | 0.32 | SE |
| 01/25/85 | 1050 | 1.15 | 8 | 290 | 0.60 | 15.58 | 0.18 | SW |
| 01/26/85 | 1420 | 0.82 | 7 | 330 | 1.56 | 11.95 | 0.76 | SE |
| 01/27/85 | 620 | 1.36 | 7 | 320 | 0.79 | 12.11 | 0.28 | NW |
| 01/28/85 | 1120 | 1.49 | 13 | 300 | 0.64 | 16.42 | 0.20 | SW |
| 01/29/85 | 845 | 1.44 | 5 | 270 | 1.06 | 12.11 | 0.43 | SW |
| 01/30/85 | 910 | 1.34 | 6 | 330 | 0.79 | 11.63 | 0.28 | SE |
| 01/31/85 | 1130 | 1.55 | 4 | 90 | 0.58 | 14.58 | 0.17 | S |

OBSERVATIONS TAKEN AT THE FUNAFUTI AIRPORT BY
THE NEW ZEALAND METEOROLOGICAL SERVICE

DATA FROM FILE FEB85.TXT

| DATE | TIME (Hrs) | TIDE (m) | WIND SPEED (kts) | DIRECTION (deg) | BREAKER, Hb (m) | PERIOD (SEC) | WAVE, Hb (m) | DIRECTION From |
|----------|---------------|-------------|---------------------|--------------------|--------------------|-----------------|-----------------|-------------------|
| 02/01/85 | 1105 | 1.36 | 0 | 90 | 1.02 | 10.16 | 0.40 | SE |
| 02/02/85 | 1515 | 1.88 | 12 | 60 | 1.12 | 9.84 | 0.46 | NE |
| 02/03/85 | 1315 | 1.58 | 8 | 50 | 1.17 | 9.47 | 0.50 | NE |
| 02/04/85 | 1430 | 1.81 | 4 | 90 | 1.07 | 12.11 | 0.43 | NE |
| 02/05/85 | 900 | 0.81 | 6 | 100 | 1.32 | 9.21 | 0.59 | SE |
| 02/06/85 | 850 | 1.09 | 7 | 80 | 0.71 | 10.26 | 0.23 | E |
| 02/07/85 | 1035 | 0.70 | 13 | 50 | 0.93 | 10.21 | 0.35 | NE |
| 02/08/85 | 815 | 1.84 | 18 | 30 | 1.54 | 12.47 | 0.75 | SE |
| 02/09/85 | 940 | 1.62 | 14 | 50 | 1.18 | 8.68 | 0.50 | NE |
| 02/10/85 | 1445 | 0.64 | 14 | 90 | 0.61 | 7.37 | 0.19 | NE |
| 02/11/85 | 1050 | 1.65 | 11 | 90 | 0.85 | 10.68 | 0.31 | NE |
| 02/12/85 | 1515 | 1.00 | 0 | 0 | 1.28 | 9.53 | 0.57 | SE |
| 02/13/85 | 1020 | 1.55 | 17 | 90 | 1.40 | 8.74 | 0.65 | SE |
| 02/14/85 | 900 | 1.10 | 18 | 80 | 1.28 | 8.79 | 0.57 | SE |
| 02/15/85 | 900 | 0.89 | 6 | 60 | 1.11 | 11.42 | 0.46 | E |
| 02/16/85 | 1300 | 1.50 | 16 | 70 | 1.63 | 10.53 | 0.82 | E |
| 02/17/84 | 1430 | 1.75 | 14 | 70 | 1.75 | 8.95 | 0.91 | E |
| 02/18/85 | 925 | 0.69 | 18 | 90 | 1.19 | 9.42 | 0.51 | E |
| 02/19/85 | 1020 | 0.59 | 16 | 90 | 1.79 | 8.89 | 0.94 | SE |
| 02/20/85 | 900 | 1.04 | 11 | 90 | 1.09 | 9.21 | 0.45 | E |
| 02/21/85 | 930 | 1.05 | 4 | 60 | 1.33 | 12.42 | 0.60 | E |
| 02/22/85 | 840 | 1.50 | 10 | 360 | 1.38 | 13.16 | 0.64 | NE |
| 02/23/85 | 1000 | 1.23 | 10 | 10 | 1.37 | 10.26 | 0.63 | N |
| 02/24/85 | 1520 | 0.95 | 12 | 30 | 1.43 | 10.89 | 0.67 | SE |
| 02/25/85 | 915 | 1.64 | 14 | 360 | 1.74 | 14.84 | 0.90 | NE |
| 02/26/85 | 1045 | 1.45 | 11 | 20 | 0.95 | 10.79 | 0.36 | NW |
| 02/27/85 | 900 | 1.60 | 12 | 10 | 1.53 | 15.26 | 0.74 | NE |
| 02/28/85 | 1400 | 1.32 | 10 | 250 | 1.31 | 11.95 | 0.59 | NE |

OBSERVATIONS TAKEN AT THE FUNAFUTI AIRPORT BY
THE NEW ZEALAND METEOROLOGICAL SERVICE

DATA FROM FILE APR85.TXT

| DATE | TIME (Hrs) | TIDE (m) | WIND SPEED (kts) | DIRECTION (deg) | BREAKER, Hb (m) | PERIOD (SEC) | WAVE, Ho (m) | DIRECTION From |
|----------|---------------|-------------|---------------------|--------------------|--------------------|-----------------|-----------------|-------------------|
| 04/01/85 | 820 | 0.84 | 12 | 90 | 1.41 | 12.42 | 0.66 | E |
| 04/02/85 | 810 | 0.71 | 11 | 80 | 1.17 | 10.79 | 0.50 | SE |
| 04/03/85 | 815 | 0.68 | 8 | 90 | 1.20 | 10.84 | 0.52 | E |
| 04/04/85 | 840 | 0.67 | 14 | 80 | 1.08 | 10.16 | 0.44 | E |
| 04/05/85 | 815 | 1.10 | 13 | 120 | 1.53 | 9.53 | 0.74 | SE |
| 04/06/85 | 830 | 1.33 | 12 | 60 | 1.42 | 12.05 | 0.66 | E |
| 04/07/85 | 1015 | 0.86 | 12 | 30 | 1.39 | 10.37 | 0.64 | E |
| 04/08/85 | 915 | 1.61 | 12 | 70 | 1.39 | 7.95 | 0.64 | E |
| 04/09/84 | 815 | 1.95 | 12 | 70 | 1.93 | 13.84 | 1.05 | E |
| 04/10/84 | 815 | 1.81 | 10 | 90 | 1.94 | 10.84 | 1.06 | E |
| 04/11/84 | 1010 | 1.63 | 14 | 80 | 1.75 | 10.84 | 0.91 | E |
| 04/12/84 | 810 | 1.30 | 15 | 80 | 1.80 | 10.00 | 0.97 | E |
| 04/13/84 | 800 | 1.06 | 10 | 100 | 1.57 | 11.05 | 0.77 | E |
| 04/14/84 | 757 | 0.90 | 14 | 90 | 1.85 | 8.11 | 0.99 | SE |
| 04/15/84 | 850 | 0.78 | 8 | 80 | 2.22 | 10.00 | 1.30 | SE |
| 04/16/84 | 835 | 0.73 | 6 | 140 | 1.65 | 10.89 | 0.83 | E |
| 04/17/84 | 830 | 0.77 | 4 | 0 | 1.36 | 9.58 | 0.62 | E |
| 04/18/84 | 815 | 0.93 | 7 | 60 | 1.07 | 9.63 | 0.43 | E |
| 04/19/84 | 830 | 0.98 | 0 | 0 | 1.27 | 9.68 | 0.56 | SE |
| 04/20/84 | 1530 | 1.57 | 0 | 0 | 1.31 | 12.00 | 0.59 | SE |
| 04/21/84 | 815 | 1.38 | 9 | 100 | 1.62 | 9.21 | 0.81 | SE |
| 04/22/84 | 830 | 1.43 | 0 | 0 | 1.45 | 10.47 | 0.69 | SE |
| 04/23/84 | 830 | 1.56 | 0 | 0 | 1.57 | 11.37 | 0.77 | E |
| 04/24/84 | 810 | 1.70 | 16 | 90 | 1.80 | 13.26 | 0.95 | E |
| 04/25/84 | 810 | 1.70 | 7 | 70 | 1.93 | 14.00 | 1.05 | E |
| 04/26/84 | 815 | 1.64 | 10 | 100 | 1.99 | 11.84 | 1.10 | E |
| 04/27 | 10 | 1.52 | 7 | 190 | 1.54 | 8.95 | 0.75 | SE |
| 04/28/85 | 1035 | 1.53 | 16 | 90 | 1.63 | 7.26 | 0.82 | SE |
| 04/29/84 | 1115 | 1.54 | 16 | 3 | 1.59 | 11.05 | 0.79 | NE |
| 04/30/84 | 800 | 0.78 | 13 | 40 | 1.85 | 9.68 | 0.99 | NE |

OBSERVATIONS TAKEN AT THE FUNAFUTI AIRPORT BY
THE NEW ZEALAND METEOROLOGICAL SERVICE

DATA FROM FILE MAY85.TXT

| DATE | TIME (Hrs) | TIDE (m) | WIND SPEED (kts) | DIRECTION (deg) | BREAKER, Hb (m) | PERIOD (SEC) | WAVE, Ho (m) | DIRECTION From |
|----------|---------------|-------------|---------------------|--------------------|--------------------|-----------------|-----------------|-------------------|
| 05/01/85 | 825 | 0.61 | 16 | 90 | 1.52 | 9.95 | 0.73 | E |
| 05/02/85 | 850 | 0.48 | 19 | 8 | 1.27 | 9.58 | 0.56 | E |
| 05/03/85 | 910 | 0.43 | 11 | 30 | 1.20 | 8.63 | 0.52 | NE |
| 05/04/85 | 1435 | 0.81 | 10 | 350 | 2.32 | 8.63 | 1.38 | SE |
| 05/05/85 | 1415 | 0.99 | 6 | 330 | 1.26 | 11.63 | 0.55 | SE |
| 05/06/85 | 810 | 1.68 | 12 | 350 | 1.68 | 11.95 | 0.68 | NE |
| 05/07/85 | 1435 | 0.58 | 10 | 300 | 1.42 | 14.68 | 0.66 | E |
| 05/08/85 | 815 | 1.91 | 4 | 360 | 1.47 | 17.89 | 0.70 | NE |
| 05/09/85 | 810 | 1.80 | 0 | 0 | 1.58 | 12.37 | 0.78 | E |
| 05/10/85 | 810 | 1.59 | 0 | 0 | 1.41 | 12.84 | 0.66 | NE |
| 05/11/85 | 800 | 1.32 | 17 | 130 | 1.43 | 9.37 | 0.67 | SE |
| 05/12/85 | 830 | 1.16 | 13 | 130 | 1.59 | 10.32 | 0.79 | SE |
| 05/13/85 | 820 | 0.94 | 8 | 110 | 1.69 | 13.95 | 0.86 | E |
| 05/14/85 | 815 | 0.80 | 3 | 120 | 1.83 | 11.95 | 0.97 | E |
| 05/15/85 | 815 | 0.75 | 4 | 70 | 1.13 | 15.58 | 0.47 | E |
| 05/16/85 | 815 | 0.76 | 14 | 150 | 1.37 | 12.37 | 0.63 | SE |
| 05/17/85 | 815 | 0.83 | 8 | 40 | 1.42 | 13.42 | 0.66 | E |
| 05/18/85 | 1315 | 1.05 | 11 | 110 | 1.45 | 11.74 | 0.68 | SE |
| 05/19/85 | 1315 | 0.88 | 14 | 130 | 2.45 | 7.11 | 1.50 | SE |
| 05/20/85 | 910 | 0.95 | 15 | 110 | 1.18 | 11.42 | 0.50 | SE |
| 05/21/85 | 820 | 1.37 | 14 | 100 | 1.76 | 10.26 | 0.91 | E |
| 05/22/85 | 840 | 1.45 | 9 | 80 | 1.55 | 10.21 | 0.76 | E |
| 05/23/85 | 810 | 1.69 | 8 | 80 | 1.44 | 11.17 | 0.68 | E |
| 05/24/85 | 815 | 1.72 | 6 | 50 | 1.78 | 10.32 | 0.93 | E |
| 05/25/85 | 815 | 1.69 | 10 | 70 | 2.06 | 8.79 | 1.16 | E |
| 05/26/85 | 830 | 1.58 | 7 | 50 | 1.92 | 11.26 | 1.04 | E |
| 05/27/85 | 815 | 2.23 | 8 | 170 | 0.90 | 11.74 | 0.33 | S |
| 05/28/85 | 920 | 1.31 | 18 | 140 | 1.57 | 9.37 | 0.77 | SE |
| 05/29/85 | 820 | 0.82 | 4 | 360 | 1.31 | 11.05 | 0.59 | NE |
| 05/30/85 | 815 | 0.59 | 17 | 350 | 1.29 | 13.74 | 0.57 | E |
| 05/31/85 | 825 | 0.49 | 7 | 360 | 1.39 | 14.84 | 0.64 | NE |

OBSERVATIONS TAKEN AT THE FUNAFUTI AIRPORT BY
THE NEW ZEALAND METEOROLOGICAL SERVICE

DATA FROM FILE JUN65.TXT

| DATE | TIME (Hrs) | TIDE (m) | WIND SPEED (kts) | DIRECTION (deg) | BREAKER, Hb (m) | PERIOD (SEC) | WAVE, Ho (m) | DIRECTION From |
|----------|---------------|-------------|---------------------|--------------------|--------------------|-----------------|-----------------|-------------------|
| 06/01/85 | 1730 | 1.66 | 5 | 120 | 1.59 | 10.53 | 0.79 | SE |
| 06/02/85 | 1345 | 1.12 | 11 | 150 | 2.26 | 11.32 | 1.33 | SE |
| 06/02/85 | 810 | 1.24 | 16 | 140 | 0.89 | 11.42 | 0.33 | SE |
| 06/04/85 | 815 | 1.54 | 10 | 90 | 1.34 | 10.26 | 0.61 | E |
| 06/05/85 | 840 | 1.65 | 17 | 100 | 1.73 | 7.89 | 0.89 | E |
| 06/06/85 | 830 | 1.83 | 16 | 110 | 1.67 | 12.42 | 0.85 | SE |
| 06/07/85 | 830 | 1.82 | 8 | 120 | 2.05 | 10.42 | 1.15 | E |
| 06/08/85 | 1145 | 1.33 | 6 | 360 | 1.92 | 8.53 | 1.04 | SE |
| 06/09/85 | 815 | 1.48 | 0 | 0 | 1.77 | 9.32 | 0.92 | E |
| 06/10/85 | 815 | 1.26 | 14 | 80 | 1.37 | 10.16 | 0.63 | E |
| 06/11/85 | 830 | 1.10 | 8 | 50 | 1.28 | 9.32 | 0.57 | E |
| 06/12/85 | 825 | 0.91 | 12 | 120 | 1.72 | 8.53 | 0.88 | E |
| 06/13/85 | 905 | 0.83 | 16 | 120 | 1.80 | 11.32 | 0.95 | E |
| 06/14/85 | 825 | 0.74 | 16 | 60 | 1.64 | 9.84 | 0.82 | NE |
| 06/15/85 | 1000 | 0.65 | 7 | 350 | 1.35 | 6.74 | 0.61 | SE |
| 06/16/85 | 1510 | 1.55 | 6 | 40 | 1.25 | 9.63 | 0.55 | E |
| 06/17/85 | 1800 | 1.51 | 0 | 0 | 0.89 | 11.05 | 0.33 | SW |
| 06/18/85 | 820 | 1.13 | 0 | 0 | 1.12 | 12.42 | 0.46 | SW |
| 06/19/85 | 815 | 1.35 | 15 | 40 | 1.15 | 11.84 | 0.48 | E |
| 06/20/85 | 820 | 1.53 | 14 | 80 | 1.22 | 13.32 | 0.53 | E |
| 06/21/85 | 820 | 1.69 | 15 | 90 | 1.44 | 11.84 | 0.68 | E |
| 06/22/85 | 930 | 1.55 | 15 | 80 | 1.33 | 9.74 | 0.60 | E |
| 06/23/85 | 915 | 1.73 | 10 | 90 | 1.52 | 10.84 | 0.73 | E |
| 06/24/85 | 850 | 1.73 | 9 | 90 | 1.52 | 10.11 | 0.73 | E |
| 06/25/85 | 805 | 1.42 | 20 | 130 | 1.58 | 10.16 | 0.78 | E |
| 06/26/85 | 825 | 1.20 | 23 | 140 | 2.18 | 9.74 | 1.26 | SE |
| 06/27/85 | 810 | 0.85 | 22 | 90 | 1.90 | 10.58 | 1.03 | E |
| 06/28/85 | 830 | 0.65 | 0 | 0 | 1.48 | 10.58 | 0.71 | E |
| 06/27/85 | 1430 | 1.66 | 2 | 0 | 1.59 | 12.11 | 0.79 | SE |
| 06/30/85 | 1415 | 1.50 | 6 | 60 | 2.26 | 9.26 | 1.24 | SE |

OBSERVATIONS TAKEN AT THE FUNAFUTI AIRPORT BY
THE NEW ZEALAND METEOROLOGICAL SERVICE

DATA FROM FILE JUL85.TXT

| DATE | TIME (Hrs) | TIDE (m) | WIND SPEED (kts) | DIRECTION (deg) | BREAKER, Hb (m) | PERIOD (SEC) | WAVE, Ho (m) | DIRECTION From |
|----------|---------------|-------------|---------------------|--------------------|--------------------|-----------------|-----------------|-------------------|
| 07/01/85 | 905 | 0.55 | 0 | 0 | 1.45 | 13.42 | 0.68 | E |
| 07/02/85 | 830 | 1.02 | 10 | 70 | 1.11 | 12.63 | 0.46 | E |
| 07/03/85 | 840 | 1.27 | 4 | 190 | 1.11 | 12.58 | 0.46 | SE |
| 07/04/85 | 845 | 1.52 | 6 | 180 | 1.11 | 12.63 | 0.46 | S |
| 07/05/85 | 810 | 1.84 | 10 | 130 | 1.16 | 11.05 | 0.49 | SE |
| 07/06/85 | 815 | 1.85 | 11 | 80 | 1.40 | 11.95 | 0.65 | E |
| 07/07/85 | 945 | 1.64 | 6 | 50 | 1.49 | 12.05 | 0.71 | E |
| 07/08/85 | 830 | 1.63 | 15 | 100 | 1.62 | 10.89 | 0.81 | SE |
| 07/09/85 | 815 | 1.42 | 18 | 100 | 1.46 | 8.84 | 0.69 | SE |
| 07/10/85 | 830 | 1.25 | 22 | 90 | 1.88 | 7.42 | 1.01 | E |
| 07/11/85 | 815 | 1.04 | 7 | 150 | 1.71 | 10.00 | 0.88 | SE |
| 07/12/85 | 815 | 0.89 | 6 | 70 | 2.11 | 10.84 | 1.20 | E |
| 07/13/85 | 940 | 0.85 | 0 | 0 | 1.31 | 7.89 | 0.59 | SE |
| 07/14/85 | 840 | 0.67 | 12 | 90 | 1.58 | 8.74 | 0.78 | E |
| 07/15/85 | 825 | 0.75 | 5 | 30 | 1.75 | 12.11 | 0.91 | E |
| 07/16/85 | 830 | 0.81 | 11 | 120 | 1.32 | 11.16 | 0.59 | SE |
| 07/17/85 | 815 | 1.06 | 12 | 180 | 1.32 | 13.26 | 0.59 | SE |
| 07/18/85 | 815 | 1.28 | 19 | 130 | 1.35 | 10.68 | 0.61 | SE |
| 07/19/85 | 820 | 1.49 | 5 | 120 | 1.39 | 8.74 | 0.64 | E |
| 07/20/85 | 1555 | 0.82 | 7 | 150 | 1.18 | 10.00 | 0.58 | E |
| 07/21/85 | 1415 | 0.39 | 5 | 170 | 2.02 | 8.79 | 1.12 | SE |
| 07/22/85 | 845 | 1.81 | 18 | 110 | 2.19 | 9.63 | 1.27 | SE |
| 07/23/85 | 830 | 1.81 | 19 | 120 | 2.19 | 9.63 | 1.27 | SE |
| 07/24/85 | 1045 | 1.61 | 6 | 70 | 1.52 | 9.47 | 0.73 | SE |
| 07/25/85 | 840 | 1.32 | 17 | 90 | 1.48 | 8.68 | 0.71 | E |
| 07/26/85 | 801 | 0.67 | 12 | 100 | 1.58 | 9.05 | 0.78 | SE |
| 07/27/85 | 1330 | 1.00 | 14 | 130 | 2.13 | 9.47 | 1.22 | SE |
| 07/28/85 | 1330 | 1.00 | 14 | 130 | 2.13 | 9.47 | 1.22 | SE |
| 07/29/85 | 820 | 0.60 | 8 | 40 | 1.53 | 12.37 | 0.74 | E |
| 07/30/85 | 820 | 0.77 | 0 | 0 | 1.61 | 11.37 | 0.80 | E |
| 07/31/85 | 845 | 0.86 | 14 | 60 | 1.35 | 9.00 | 0.61 | E |

OBSERVATIONS TAKEN AT THE FUNAFUTI AIRPORT BY
THE NEW ZEALAND METEOROLOGICAL SERVICE

DATA FROM FILE AUG85.TXT

| DATE | TIME (Hrs) | TIDE (m) | WIND SPEED (kts) | DIRECTION (deg) | BREAKER, Hb (m) | PERIOD (SEC) | WAVE, Ho (m) | DIRECTION From |
|----------|---------------|-------------|---------------------|--------------------|--------------------|-----------------|-----------------|-------------------|
| 08/01/85 | 820 | 1.30 | 12 | 110 | 1.33 | 11.47 | 0.60 | SE |
| 08/02/85 | 810 | 1.59 | 15 | 120 | 1.54 | 9.05 | 0.75 | SE |
| 08/04/85 | 1040 | 1.04 | 12 | 120 | 1.76 | 11.16 | 0.91 | E |
| 08/05/85 | 808 | 1.76 | 9 | 100 | 1.99 | 9.26 | 1.10 | SE |
| 08/06/85 | 830 | 1.66 | 14 | 130 | 1.72 | 10.89 | 0.88 | SE |
| 08/07/85 | 825 | 1.52 | 14 | 100 | 1.98 | 10.84 | 1.09 | SE |
| 08/08/85 | 815 | 1.33 | 22 | 90 | 2.05 | 9.79 | 1.15 | E |
| 08/09/85 | 830 | 1.17 | 14 | 120 | 1.96 | 10.16 | 1.08 | SE |
| 08/10/85 | 1515 | 1.13 | 19 | 120 | 1.62 | 9.00 | 0.81 | SE |
| 08/11/85 | 1000 | 0.95 | 18 | 110 | 1.80 | 8.79 | 0.95 | SE |
| 08/12/85 | 815 | 0.74 | 10 | 120 | 1.39 | 9.68 | 0.64 | SE |
| 08/13/85 | 820 | 0.70 | 19 | 100 | 1.93 | 10.26 | 1.05 | SE |
| 08/14/85 | 810 | 0.79 | 13 | 100 | 1.34 | 10.53 | 0.61 | E |
| 08/15/85 | 810 | 0.95 | 8 | 40 | 1.30 | 9.63 | 0.58 | E |
| 08/16/85 | 835 | 1.01 | 14 | 90 | 1.37 | 10.21 | 0.63 | E |
| 08/17/85 | 1645 | 1.70 | 17 | 90 | 2.13 | 7.37 | 1.22 | SE |
| 08/18/85 | 850 | 1.45 | 16 | 100 | 2.05 | 8.42 | 1.15 | SE |
| 08/19/85 | 850 | 1.68 | 17 | 110 | 2.02 | 10.16 | 1.12 | E |
| 08/20/85 | 815 | 1.91 | 16 | 100 | 1.97 | 10.32 | 1.08 | E |
| 08/21/85 | 930 | 1.68 | 15 | 90 | 1.70 | 9.32 | 0.87 | E |
| 08/22/85 | 815 | 1.67 | 12 | 60 | 1.83 | 10.89 | 0.97 | E |
| 08/23/85 | 825 | 1.24 | 17 | 160 | 1.76 | 9.58 | 0.91 | SE |
| 08/24/85 | 800 | 0.87 | 19 | 120 | 1.88 | 10.47 | 1.01 | SE |
| 08/26/85 | 835 | 0.55 | 19 | 120 | 2.20 | 11.00 | 1.28 | E |
| 08/27/85 | 835 | 0.53 | 18 | 100 | 2.10 | 11.32 | 1.19 | E |
| 08/28/85 | 810 | 0.76 | 12 | 110 | 1.62 | 10.47 | 0.81 | E |
| 08/29/85 | 820 | 0.91 | 16 | 80 | 1.72 | 9.74 | 0.88 | E |
| 08/30/85 | 825 | 1.10 | 14 | 120 | 1.78 | 9.58 | 0.93 | E |
| 08/31/85 | 810 | 1.40 | 16 | 150 | 1.60 | 10.53 | 0.79 | SE |

APPENDICES II

Table of Arranged Values

TABLE OF ARRANGED VALUES
Data from NOV84.ARA

| BREAKER HEIGHT | WAVE PERIOD | WAVE HEIGHT | DIRECTION | PERCENT < |
|----------------|-------------|-------------|-----------|-----------|
| 2.06 | 9.05 | 1.16 | SE | 96.30 |
| 2.00 | 11.21 | 1.11 | SE | 92.59 |
| 1.93 | 10.53 | 1.05 | SE | 88.89 |
| 1.91 | 8.79 | 1.03 | SE | 85.19 |
| 1.87 | 9.37 | 1.00 | SE | 81.48 |
| 1.51 | 9.47 | 0.73 | SE | 77.78 |
| 1.47 | 9.68 | 0.70 | E | 74.07 |
| 1.47 | 9.47 | 0.70 | SE | 70.37 |
| 1.41 | 8.79 | 0.66 | SE | 66.67 |
| 1.33 | 9.05 | 0.60 | S | 62.96 |
| 1.48 | 9.32 | 0.60 | E | 59.26 |
| 2.09 | 12.32 | 0.57 | E | 55.56 |
| 1.26 | 12.89 | 0.55 | SE | 51.85 |
| 1.16 | 9.84 | 0.49 | SE | 48.15 |
| 1.16 | 9.84 | 0.49 | SE | 44.44 |
| 1.11 | 8.79 | 0.46 | E | 40.74 |
| 1.07 | 8.16 | 0.43 | SE | 37.04 |
| 1.05 | 8.68 | 0.42 | S | 33.33 |
| 1.01 | 11.84 | 0.40 | S | 29.63 |
| 1.00 | 10.26 | 0.39 | SE | 25.93 |
| 0.97 | 10.26 | 0.37 | S | 22.22 |
| 0.94 | 8.74 | 0.36 | E | 18.52 |
| 0.90 | 8.16 | 0.33 | E | 14.81 |
| 0.86 | 9.05 | 0.31 | SE | 11.11 |
| 0.84 | 7.26 | 0.30 | E | 7.41 |
| 0.73 | 7.79 | 0.24 | SE | 3.70 |

Average Breaker Height = 1.33
Average Wave Period = 9.56
Average wave Height = 0.59

TABLE OF ARRANGED VALUES

Data from DEC84.ARA

| BREAKER HEIGHT | WAVE PERIOD | WAVE HEIGHT | DIRECTION | PERCENT < |
|----------------|-------------|-------------|-----------|-----------|
| 1.80 | 10.37 | 0.95 | E | 96.67 |
| 1.74 | 10.58 | 0.90 | SE | 93.33 |
| 1.68 | 10.79 | 0.85 | NE | 90.00 |
| 1.51 | 10.79 | 0.73 | E | 86.67 |
| 1.43 | 11.42 | 0.67 | E | 83.33 |
| 1.40 | 9.84 | 0.65 | E | 80.00 |
| 1.34 | 9.47 | 0.61 | SE | 76.67 |
| 1.33 | 8.53 | 0.60 | NE | 73.33 |
| 1.31 | 11.95 | 0.59 | SE | 70.00 |
| 1.31 | 9.21 | 0.59 | SE | 66.67 |
| 1.25 | 8.42 | 0.55 | SE | 63.33 |
| 1.02 | 8.53 | 0.55 | E | 60.00 |
| 1.24 | 9.47 | 0.54 | E | 56.67 |
| 1.12 | 12.89 | 0.46 | E | 53.33 |
| 1.11 | 11.63 | 0.46 | SE | 50.00 |
| 1.09 | 10.42 | 0.45 | SE | 46.67 |
| 1.10 | 10.42 | 0.45 | SE | 43.33 |
| 1.02 | 11.00 | 0.40 | E | 40.00 |
| 0.97 | 8.05 | 0.37 | SE | 36.67 |
| 0.97 | 9.00 | 0.37 | SE | 33.33 |
| 0.68 | 4.84 | 0.32 | SE | 30.00 |
| 0.86 | 11.37 | 0.31 | NE | 26.67 |
| 0.81 | 9.47 | 0.29 | SE | 23.33 |
| 0.65 | 8.32 | 0.21 | E | 20.00 |
| 0.67 | 10.16 | 0.21 | NW | 16.67 |
| 0.67 | 10.53 | 0.21 | NW | 13.33 |
| 0.60 | 11.47 | 0.18 | SE | 10.00 |
| 0.40 | 10.53 | 0.10 | NW | 6.67 |
| 0.39 | 10.79 | 0.10 | S | 3.33 |

Average Breaker Height = 1.09

Average Wave Period = 10.01

Average wave Height = 0.47

TABLE OF ARRANGED VALUES
Data from JAN85.ARA

| BREAKER HEIGHT | WAVE PERIOD | WAVE HEIGHT | DIRECTION | PERCENT < |
|----------------|-------------|-------------|-----------|-----------|
| 1.62 | 12.58 | 0.81 | E | 96.88 |
| 1.56 | 11.95 | 0.76 | SE | 93.75 |
| 1.55 | 13.16 | 0.76 | S | 90.63 |
| 1.46 | 18.74 | 0.69 | SE | 87.50 |
| 1.39 | 12.68 | 0.64 | E | 84.38 |
| 1.34 | 10.05 | 0.61 | SE | 81.25 |
| 1.31 | 15.11 | 0.59 | SE | 78.13 |
| 1.30 | 13.00 | 0.58 | SE | 75.00 |
| 1.06 | 12.11 | 0.43 | SW | 71.88 |
| 1.03 | 10.53 | 0.41 | SW | 68.75 |
| 1.00 | 8.26 | 0.39 | SE | 65.63 |
| 0.98 | 8.16 | 0.38 | S | 62.50 |
| 0.91 | 13.16 | 0.34 | NW | 59.38 |
| 0.88 | 10.58 | 0.32 | SE | 56.25 |
| 0.82 | 10.26 | 0.29 | SE | 53.13 |
| 0.79 | 11.63 | 0.28 | SE | 50.00 |
| 0.79 | 12.11 | 0.28 | NW | 46.88 |
| 0.80 | 13.42 | 0.28 | SE | 43.75 |
| 0.78 | 9.63 | 0.27 | E | 40.63 |
| 0.69 | 11.84 | 0.22 | S | 37.50 |
| 0.68 | 13.05 | 0.22 | S | 34.38 |
| 0.66 | 11.74 | 0.21 | N | 31.25 |
| 0.63 | 11.68 | 0.20 | SE | 28.13 |
| 0.64 | 16.42 | 0.20 | SW | 25.00 |
| 0.61 | 11.00 | 0.19 | SE | 21.88 |
| 0.60 | 15.58 | 0.18 | SW | 18.75 |
| 0.60 | 9.84 | 0.18 | SE | 15.63 |
| 0.58 | 13.00 | 0.17 | N | 12.50 |
| 0.58 | 14.58 | 0.17 | S | 9.38 |
| 0.44 | 14.47 | 0.11 | SW | 6.25 |
| 0.24 | 17.21 | 0.05 | SE | 3.13 |

Average Breaker Height = 0.91
Average Wave Period = 12.50
Average wave Height = 0.36

TABLE OF ARRANGED VALUES
Data from FEB85.ARA

| BREAKER HEIGHT | WAVE PERIOD | WAVE HEIGHT | DIRECTION | PERCENT < |
|----------------|-------------|-------------|-----------|-----------|
| 1.79 | 8.89 | 0.94 | SE | 96.55 |
| 1.75 | 8.95 | 0.91 | E | 93.10 |
| 1.74 | 14.84 | 0.90 | NE | 89.66 |
| 1.63 | 10.53 | 0.82 | E | 86.21 |
| 1.54 | 12.47 | 0.75 | SE | 82.76 |
| 1.53 | 15.26 | 0.74 | NE | 79.31 |
| 1.43 | 10.89 | 0.67 | SE | 75.86 |
| 1.40 | 8.74 | 0.65 | SE | 72.41 |
| 1.38 | 13.16 | 0.64 | NE | 68.97 |
| 1.37 | 10.26 | 0.63 | N | 65.52 |
| 1.33 | 12.42 | 0.60 | E | 62.07 |
| 1.31 | 11.95 | 0.59 | NE | 58.62 |
| 1.32 | 9.21 | 0.59 | SE | 55.17 |
| 1.28 | 8.79 | 0.57 | SE | 51.72 |
| 1.28 | 9.53 | 0.57 | SE | 48.28 |
| 1.19 | 9.42 | 0.51 | E | 44.83 |
| 1.18 | 8.68 | 0.50 | NE | 41.38 |
| 1.17 | 9.47 | 0.50 | NE | 37.93 |
| 1.12 | 9.84 | 0.46 | NE | 34.48 |
| 1.11 | 11.42 | 0.46 | E | 31.03 |
| 1.09 | 9.21 | 0.45 | E | 27.59 |
| 1.07 | 12.11 | 0.43 | NE | 24.14 |
| 1.02 | 10.16 | 0.40 | SE | 20.69 |
| 0.95 | 10.79 | 0.36 | NW | 17.24 |
| 0.93 | 10.21 | 0.35 | NE | 13.79 |
| 0.85 | 10.68 | 0.31 | NE | 10.34 |
| 0.71 | 10.26 | 0.23 | E | 6.90 |
| 0.61 | 7.37 | 0.19 | NE | 3.45 |

Average Breaker Height = 1.25

Average Wave Period = 10.55

Average wave Height = 0.56

TABLE OF ARRANGED VALUES
Data from APR85.ARA

| BREAKER HEIGHT | WAVE PERIOD | WAVE HEIGHT | DIRECTION | PERCENT < |
|----------------|-------------|-------------|-----------|-----------|
| 2.22 | 10.00 | 1.30 | SE | 96.77 |
| 1.99 | 11.84 | 1.10 | E | 93.55 |
| 1.94 | 10.84 | 1.06 | E | 90.32 |
| 1.93 | 14.00 | 1.05 | E | 87.10 |
| 1.93 | 13.84 | 1.05 | E | 83.87 |
| 1.85 | 9.68 | 0.99 | NE | 80.65 |
| 1.85 | 8.11 | 0.99 | SE | 77.42 |
| 1.80 | 10.00 | 0.97 | E | 74.19 |
| 1.80 | 13.26 | 0.95 | E | 70.97 |
| 1.75 | 10.84 | 0.91 | E | 67.74 |
| 1.65 | 10.89 | 0.83 | E | 64.52 |
| 1.63 | 7.26 | 0.82 | SE | 61.29 |
| 1.62 | 9.21 | 0.81 | SE | 58.06 |
| 1.59 | 11.05 | 0.79 | NE | 54.84 |
| 1.57 | 11.37 | 0.77 | E | 51.61 |
| 1.57 | 11.05 | 0.77 | E | 48.39 |
| 1.54 | 8.95 | 0.75 | SE | 45.16 |
| 1.53 | 9.53 | 0.74 | SE | 41.94 |
| 1.45 | 10.47 | 0.69 | SE | 38.71 |
| 1.42 | 12.05 | 0.66 | E | 35.48 |
| 1.41 | 12.42 | 0.66 | E | 32.26 |
| 1.39 | 7.95 | 0.64 | E | 29.03 |
| 1.39 | 10.37 | 0.64 | E | 25.81 |
| 1.36 | 9.58 | 0.62 | E | 22.58 |
| 1.31 | 12.00 | 0.59 | SE | 19.35 |
| 1.27 | 9.68 | 0.56 | SE | 16.13 |
| 1.20 | 10.84 | 0.52 | E | 12.90 |
| 1.17 | 10.79 | 0.50 | SE | 9.68 |
| 1.08 | 10.16 | 0.44 | E | 6.45 |
| 1.07 | 9.63 | 0.43 | E | 3.23 |

Average Breaker Height = 1.58

Average Wave Period = 10.59

Average wave Height = 0.79

TABLE OF ARRANGED VALUES
Data from MAY85.ARA

| BREAKER HEIGHT | WAVE PERIOD | WAVE HEIGHT | DIRECTION | PERCENT < |
|----------------|-------------|-------------|-----------|-----------|
| 2.45 | 7.11 | 1.50 | SE | 96.88 |
| 2.32 | 8.63 | 1.38 | SE | 93.75 |
| 2.06 | 8.79 | 1.16 | E | 90.63 |
| 1.92 | 11.26 | 1.04 | E | 87.50 |
| 1.83 | 11.95 | 0.97 | E | 84.38 |
| 1.78 | 10.32 | 0.93 | E | 81.25 |
| 1.76 | 10.26 | 0.91 | E | 78.13 |
| 1.69 | 13.95 | 0.86 | E | 75.00 |
| 1.59 | 10.32 | 0.79 | SE | 71.88 |
| 1.58 | 12.37 | 0.78 | E | 68.75 |
| 1.57 | 9.37 | 0.77 | SE | 65.63 |
| 1.55 | 10.21 | 0.76 | E | 62.50 |
| 1.52 | 9.95 | 0.73 | E | 59.38 |
| 1.47 | 17.89 | 0.70 | NE | 56.25 |
| 1.68 | 11.95 | 0.68 | NE | 53.13 |
| 1.44 | 11.17 | 0.68 | E | 50.00 |
| 1.45 | 11.74 | 0.68 | SE | 46.88 |
| 1.43 | 9.37 | 0.67 | SE | 43.75 |
| 1.42 | 14.68 | 0.66 | E | 40.63 |
| 1.41 | 12.84 | 0.66 | NE | 37.50 |
| 1.42 | 13.42 | 0.66 | E | 34.38 |
| 1.39 | 14.84 | 0.64 | NE | 31.25 |
| 1.37 | 12.37 | 0.63 | SE | 28.13 |
| 1.31 | 11.05 | 0.59 | NE | 25.00 |
| 1.29 | 13.74 | 0.57 | E | 21.88 |
| 1.27 | 9.58 | 0.56 | E | 18.75 |
| 1.26 | 11.63 | 0.55 | SE | 15.63 |
| 1.20 | 8.63 | 0.52 | NE | 12.50 |
| 1.18 | 11.42 | 0.50 | SE | 9.38 |
| 1.13 | 15.58 | 0.47 | E | 6.25 |
| 0.90 | 11.74 | 0.33 | S | 3.13 |

Average Breaker Height = 1.54
Average Wave Period = 11.55
Average wave Height = 0.75

TABLE OF ARRANGED VALUES
Data from JUN85.ARA

| BREAKER HEIGHT | WAVE PERIOD | WAVE HEIGHT | DIRECTION | PERCENT < |
|----------------|-------------|-------------|-----------|-----------|
| 2.26 | 11.32 | 1.33 | SE | 96.77 |
| 2.18 | 9.74 | 1.26 | SE | 93.55 |
| 2.26 | 9.26 | 1.24 | SE | 90.32 |
| 2.05 | 10.42 | 1.15 | E | 87.10 |
| 1.92 | 8.53 | 1.04 | SE | 83.87 |
| 1.90 | 10.58 | 1.03 | E | 80.65 |
| 1.80 | 11.32 | 0.95 | E | 77.42 |
| 1.77 | 9.32 | 0.92 | E | 74.19 |
| 1.73 | 7.89 | 0.89 | E | 70.97 |
| 1.72 | 8.53 | 0.88 | E | 67.74 |
| 1.67 | 12.42 | 0.85 | SE | 64.52 |
| 1.64 | 9.84 | 0.82 | NE | 61.29 |
| 1.59 | 10.53 | 0.79 | SE | 58.06 |
| 1.59 | 12.11 | 0.79 | SE | 54.84 |
| 1.58 | 10.16 | 0.78 | E | 51.61 |
| 1.52 | 10.84 | 0.73 | E | 48.39 |
| 1.52 | 10.11 | 0.73 | E | 45.16 |
| 1.48 | 10.58 | 0.71 | E | 41.94 |
| 1.44 | 11.84 | 0.68 | E | 38.71 |
| 1.37 | 10.16 | 0.63 | E | 35.48 |
| 1.34 | 10.26 | 0.61 | E | 32.26 |
| 1.35 | 6.74 | 0.61 | SE | 29.03 |
| 1.33 | 9.74 | 0.60 | E | 25.81 |
| 1.28 | 9.32 | 0.57 | E | 22.58 |
| 1.25 | 9.63 | 0.55 | E | 19.35 |
| 1.22 | 13.32 | 0.53 | E | 16.13 |
| 1.15 | 11.84 | 0.48 | E | 12.90 |
| 1.12 | 12.42 | 0.46 | SW | 9.68 |
| 0.89 | 11.42 | 0.33 | SE | 6.45 |
| 0.89 | 11.05 | 0.33 | SW | 3.23 |

Average Breaker Height = 1.56

Average Wave Period = 10.37

Average wave Height = 0.78

TABLE OF ARRANGED VALUES
Data from JUL85.ARA

| BREAKER HEIGHT | WAVE PERIOD | WAVE HEIGHT | DIRECTION | PERCENT < |
|----------------|-------------|-------------|-----------|-----------|
| 2.19 | 9.63 | 1.27 | SE | 96.88 |
| 2.19 | 9.63 | 1.27 | SE | 93.75 |
| 2.13 | 9.47 | 1.22 | SE | 90.63 |
| 2.13 | 9.47 | 1.22 | SE | 87.50 |
| 2.11 | 10.84 | 1.20 | E | 84.38 |
| 2.02 | 8.79 | 1.12 | SE | 81.25 |
| 1.88 | 7.42 | 1.01 | E | 78.13 |
| 1.75 | 12.11 | 0.91 | E | 75.00 |
| 1.71 | 10.00 | 0.88 | SE | 71.88 |
| 1.62 | 10.89 | 0.81 | SE | 68.75 |
| 1.61 | 11.37 | 0.80 | E | 65.63 |
| 1.58 | 8.74 | 0.78 | E | 62.50 |
| 1.58 | 9.05 | 0.78 | SE | 59.38 |
| 1.53 | 12.37 | 0.74 | E | 56.25 |
| 1.52 | 9.47 | 0.73 | SE | 53.13 |
| 1.48 | 8.68 | 0.71 | E | 50.00 |
| 1.49 | 12.05 | 0.71 | E | 46.88 |
| 1.46 | 8.84 | 0.69 | SE | 43.75 |
| 1.45 | 13.42 | 0.68 | E | 40.63 |
| 1.40 | 11.95 | 0.65 | E | 37.50 |
| 1.39 | 8.74 | 0.64 | E | 34.38 |
| 1.35 | 10.68 | 0.61 | SE | 31.25 |
| 1.35 | 9.00 | 0.61 | E | 28.13 |
| 1.32 | 11.16 | 0.59 | SE | 25.00 |
| 1.32 | 13.26 | 0.59 | SE | 21.88 |
| 1.31 | 7.89 | 0.59 | SE | 18.75 |
| 1.18 | 10.00 | 0.58 | E | 15.63 |
| 1.16 | 11.05 | 0.49 | SE | 12.50 |
| 1.11 | 12.63 | 0.46 | S | 9.38 |
| 1.11 | 12.63 | 0.46 | E | 6.25 |
| 1.11 | 12.58 | 0.46 | SE | 3.13 |

Average Breaker Height = 1.57
Average Wave Period = 10.45
Average wave Height = 0.78

TABLE OF ARRANGED VALUES
Data from AUG85.ARA

| BREAKER HEIGHT | WAVE PERIOD | WAVE HEIGHT | DIRECTION | PERCENT (%) |
|----------------|-------------|-------------|-----------|-------------|
| 2.20 | 11.00 | 1.28 | E | 96.67 |
| 2.13 | 7.37 | 1.22 | SE | 93.33 |
| 2.10 | 11.32 | 1.19 | E | 90.00 |
| 2.05 | 9.79 | 1.15 | E | 86.67 |
| 2.05 | 8.42 | 1.15 | SE | 83.33 |
| 2.02 | 10.16 | 1.12 | E | 80.00 |
| 1.99 | 9.26 | 1.10 | SE | 76.67 |
| 1.98 | 10.84 | 1.09 | SE | 73.33 |
| 1.97 | 10.32 | 1.08 | E | 70.00 |
| 1.96 | 10.16 | 1.08 | SE | 66.67 |
| 1.93 | 10.26 | 1.05 | SE | 63.33 |
| 1.88 | 10.47 | 1.01 | SE | 60.00 |
| 1.83 | 10.89 | 0.97 | E | 56.67 |
| 1.80 | 8.79 | 0.95 | SE | 53.33 |
| 1.78 | 9.58 | 0.93 | E | 50.00 |
| 1.76 | 9.58 | 0.91 | SE | 46.67 |
| 1.76 | 11.16 | 0.91 | E | 43.33 |
| 1.72 | 9.74 | 0.88 | E | 40.00 |
| 1.72 | 10.89 | 0.88 | SE | 36.67 |
| 1.70 | 9.32 | 0.87 | E | 33.33 |
| 1.62 | 9.00 | 0.81 | SE | 30.00 |
| 1.62 | 10.47 | 0.81 | E | 26.67 |
| 1.60 | 10.53 | 0.79 | SE | 23.33 |
| 1.54 | 9.05 | 0.75 | SE | 20.00 |
| 1.39 | 9.68 | 0.64 | SE | 16.67 |
| 1.37 | 10.21 | 0.63 | E | 13.33 |
| 1.34 | 10.53 | 0.61 | E | 10.00 |
| 1.33 | 11.47 | 0.60 | SE | 6.67 |
| 1.30 | 9.63 | 0.58 | E | 3.33 |

Average Breaker Height = 1.77
Average Wave Period = 10.00
Average wave Height = 0.93

OBSERVATIONS TAKEN AT THE FUNAFUTI AIRPORT BY
THE NEW ZEALAND METEOROLOGICAL SERVICE

DATA FROM FILE NOV84.TXT

| DATE | TIME (Hrs) | TIDE (m) | WIND SPEED (kts) | DIRECTION (deg) | BREAKER, Hb (m) | PERIOD (SEC) | WAVE, Ho (m) | DIRECTION From |
|----------|---------------|-------------|---------------------|--------------------|--------------------|-----------------|-----------------|-------------------|
| 11/05/84 | 1000 | 0.63 | 2 | 130 | 1.16 | 9.84 | 0.49 | SE |
| 11/06/84 | 930 | 0.57 | 11 | 120 | 1.33 | 9.05 | 0.60 | S |
| 11/07/84 | 1530 | 1.89 | 11 | 110 | 1.51 | 9.47 | 0.73 | SE |
| 11/05/84 | 1100 | 0.63 | 2 | 130 | 1.16 | 9.84 | 0.49 | SE |
| 11/09/84 | 1000 | 0.55 | 12 | 350 | 1.00 | 10.26 | 0.39 | SE |
| 11/10/84 | 1200 | 0.53 | 12 | 90 | 1.47 | 9.47 | 0.70 | SE |
| 11/11/84 | 1100 | 0.69 | 11 | 110 | 1.87 | 9.37 | 1.00 | SE |
| 11/12/84 | 1000 | 0.94 | 7 | 130 | 2.06 | 9.05 | 1.16 | SE |
| 11/13/84 | 1000 | 1.09 | 7 | 30 | 1.41 | 8.79 | 0.66 | SE |
| 11/14/84 | 800 | 0.75 | 10 | 30 | 2.00 | 11.21 | 1.11 | SE |
| 11/15/84 | 800 | 1.31 | 12 | 70 | 1.07 | 8.16 | 0.43 | SE |
| 11/16/84 | 800 | 1.14 | 10 | 110 | 0.86 | 9.05 | 0.31 | SE |
| 11/17/84 | 1200 | 1.56 | 12 | 40 | 0.84 | 7.26 | 0.30 | E |
| 11/18/84 | 1100 | 1.35 | 5 | 70 | 0.90 | 8.16 | 0.33 | E |
| 11/19/84 | 1000 | 0.77 | 12 | 120 | 0.73 | 7.79 | 0.24 | SE |
| 11/20/84 | 1000 | 0.49 | 4 | 90 | 1.01 | 11.84 | 0.40 | S |
| 11/21/84 | 1500 | 2.09 | 6 | 350 | 2.09 | 12.32 | 0.57 | E |
| 11/22/84 | 1300 | 1.22 | 3 | 430 | 1.91 | 8.79 | 1.03 | SE |
| 11/23/84 | 1100 | 0.40 | 2 | 200 | 0.97 | 10.26 | 0.37 | S |
| 11/24/84 | 1200 | 0.49 | 7 | 140 | 1.26 | 12.89 | 0.55 | SE |
| 11/25/84 | 1500 | 0.57 | 7 | 210 | 1.93 | 10.53 | 1.05 | SE |
| 11/26/84 | 900 | 1.45 | 5 | 20 | 1.05 | 8.68 | 0.42 | S |
| 11/27/84 | 1000 | 1.24 | 13 | 30 | 0.94 | 8.74 | 0.36 | E |
| 11/28/84 | 840 | 1.48 | 5 | 90 | 1.48 | 9.32 | 0.60 | E |
| 11/29/84 | 900 | 1.46 | 10 | 90 | 1.47 | 9.68 | 0.70 | E |
| 11/30/84 | 900 | 1.39 | 3 | 70 | 1.11 | 8.79 | 0.46 | E |

OBSERVATIONS TAKEN AT THE FUNAFUTI AIRPORT BY
THE NEW ZEALAND METEOROLOGICAL SERVICE

DATA FROM FILE JAN85.TXT

| DATE | TIME (Hrs) | TIDE (m) | WIND SPEED (kts) | DIRECTION (deg) | BREAKER, Hb (m) | PERIOD (SEC) | WAVE, Ho (m) | DIRECTION From |
|----------|---------------|-------------|---------------------|--------------------|--------------------|-----------------|-----------------|-------------------|
| 01/01/85 | 1500 | 1.54 | 18 | 320 | 1.34 | 10.05 | 0.61 | SE |
| 01/02/85 | 907 | 0.93 | 14 | 350 | 1.00 | 8.26 | 0.39 | SE |
| 01/03/85 | 858 | 0.78 | 10 | 350 | 0.60 | 9.84 | 0.18 | SE |
| 01/04/85 | 1215 | 1.32 | 0 | 90 | 0.61 | 11.00 | 0.19 | SE |
| 01/05/85 | 1315 | 1.45 | 13 | 280 | 1.55 | 13.16 | 0.76 | S |
| 01/06/85 | 1430 | 1.70 | 5 | 360 | 1.30 | 13.00 | 0.58 | SE |
| 01/07/85 | 855 | 0.90 | 4 | 330 | 0.78 | 9.63 | 0.27 | E |
| 01/08/85 | 1135 | 0.52 | 14 | 280 | 0.98 | 8.16 | 0.38 | S |
| 01/09/85 | 1810 | 1.57 | 10 | 240 | 1.03 | 10.53 | 0.41 | SW |
| 01/10/85 | 1025 | 1.01 | 18 | 250 | 0.69 | 11.84 | 0.22 | S |
| 01/11/85 | 1240 | 0.78 | 9 | 30 | 0.82 | 10.26 | 0.29 | SE |
| 01/12/85 | 845 | 1.74 | 11 | 310 | 1.39 | 12.68 | 0.64 | E |
| 01/13/85 | 930 | 1.69 | 18 | 270 | 1.31 | 15.11 | 0.59 | SE |
| 01/14/85 | 1020 | 1.64 | 11 | 310 | 0.24 | 17.21 | 0.05 | SE |
| 01/15/85 | 1055 | 1.59 | 12 | 340 | 0.91 | 13.16 | 0.34 | NW |
| 01/16/85 | 1040 | 1.34 | 12 | 340 | 0.66 | 11.74 | 0.21 | N |
| 01/17/85 | 1105 | 1.20 | 15 | 360 | 0.80 | 13.42 | 0.28 | SE |
| 01/18/85 | 1030 | 0.80 | 14 | 360 | 0.58 | 13.00 | 0.17 | N |
| 01/19/85 | 1430 | 1.79 | 11 | 330 | 1.46 | 18.74 | 0.69 | SE |
| 01/20/85 | 1500 | 1.76 | 7 | 340 | 1.62 | 12.58 | 0.81 | E |
| 01/21/85 | 1400 | 1.17 | 8 | 300 | 0.63 | 11.68 | 0.20 | SE |
| 01/22/85 | 1410 | 1.02 | 4 | 90 | 0.68 | 13.05 | 0.22 | S |
| 01/23/85 | 905 | 1.31 | 6 | 190 | 0.44 | 14.47 | 0.11 | SW |
| 01/24/85 | 900 | 1.50 | 0 | 90 | 0.88 | 10.58 | 0.32 | SE |
| 01/25/85 | 1050 | 1.15 | 8 | 290 | 0.60 | 15.58 | 0.18 | SW |
| 01/26/85 | 1420 | 0.82 | 7 | 330 | 1.56 | 11.95 | 0.76 | SE |
| 01/27/85 | 620 | 1.36 | 7 | 320 | 0.79 | 12.11 | 0.28 | NW |
| 01/28/85 | 1120 | 1.49 | 13 | 300 | 0.64 | 16.42 | 0.20 | SW |
| 01/29/85 | 845 | 1.44 | 5 | 270 | 1.06 | 12.11 | 0.43 | SW |
| 01/30/85 | 910 | 1.34 | 6 | 330 | 0.79 | 11.63 | 0.28 | SE |
| 01/31/85 | 1130 | 1.55 | 4 | 90 | 0.58 | 14.58 | 0.17 | S |

OBSERVATIONS TAKEN AT THE FUNAFUTI AIRPORT BY
THE NEW ZEALAND METEOROLOGICAL SERVICE

DATA FROM FILE FEB85.TXT

| DATE | TIME (Hrs) | TIDE (m) | WIND SPEED (kts) | DIRECTION (deg) | BREAKER, Hb (m) | PERIOD (SEC) | WAVE, Ho (m) | DIRECTION From |
|----------|---------------|-------------|---------------------|--------------------|--------------------|-----------------|-----------------|-------------------|
| 02/01/85 | 1105 | 1.36 | 0 | 90 | 1.02 | 10.16 | 0.40 | SE |
| 02/02/85 | 1515 | 1.88 | 12 | 60 | 1.12 | 9.84 | 0.46 | NE |
| 02/03/85 | 1315 | 1.58 | 8 | 50 | 1.17 | 9.47 | 0.50 | NE |
| 02/04/85 | 1430 | 1.81 | 4 | 90 | 1.07 | 12.11 | 0.43 | NE |
| 02/05/85 | 900 | 0.81 | 6 | 100 | 1.32 | 9.21 | 0.59 | SE |
| 02/06/85 | 850 | 1.09 | 7 | 80 | 0.71 | 10.26 | 0.23 | E |
| 02/07/85 | 1035 | 0.70 | 13 | 50 | 0.93 | 10.21 | 0.35 | NE |
| 02/08/85 | 815 | 1.84 | 18 | 30 | 1.54 | 12.47 | 0.75 | SE |
| 02/09/85 | 940 | 1.62 | 14 | 50 | 1.18 | 8.68 | 0.50 | NE |
| 02/10/85 | 1445 | 0.64 | 14 | 90 | 0.61 | 7.37 | 0.19 | NE |
| 02/11/85 | 1050 | 1.65 | 11 | 90 | 0.85 | 10.68 | 0.31 | NE |
| 02/12/85 | 1515 | 1.00 | 0 | 0 | 1.28 | 9.53 | 0.57 | SE |
| 02/13/85 | 1020 | 1.55 | 17 | 90 | 1.40 | 8.74 | 0.65 | SE |
| 02/14/85 | 900 | 1.10 | 18 | 80 | 1.28 | 8.79 | 0.57 | SE |
| 02/15/85 | 900 | 0.89 | 6 | 60 | 1.11 | 11.42 | 0.46 | E |
| 02/16/85 | 1300 | 1.50 | 16 | 70 | 1.63 | 10.53 | 0.82 | E |
| 02/17/85 | 1430 | 1.75 | 14 | 70 | 1.75 | 8.95 | 0.91 | E |
| 02/18/85 | 925 | 0.69 | 18 | 90 | 1.19 | 9.42 | 0.51 | E |
| 02/19/85 | 1020 | 0.59 | 16 | 90 | 1.79 | 8.89 | 0.94 | SE |
| 02/20/85 | 900 | 1.04 | 11 | 90 | 1.09 | 9.21 | 0.45 | E |
| 02/21/85 | 930 | 1.05 | 4 | 60 | 1.33 | 12.42 | 0.60 | E |
| 02/22/85 | 840 | 1.50 | 10 | 360 | 1.38 | 13.16 | 0.64 | NE |
| 02/23/85 | 1000 | 1.23 | 10 | 10 | 1.37 | 10.26 | 0.63 | N |
| 02/24/85 | 1520 | 0.95 | 12 | 30 | 1.43 | 10.89 | 0.67 | SE |
| 02/25/85 | 915 | 1.64 | 14 | 360 | 1.74 | 14.84 | 0.90 | NE |
| 02/26/85 | 1045 | 1.45 | 11 | 20 | 0.95 | 10.79 | 0.36 | NW |
| 02/27/85 | 900 | 1.60 | 12 | 10 | 1.53 | 15.26 | 0.74 | NE |
| 02/28/85 | 1400 | 1.32 | 10 | 250 | 1.31 | 11.95 | 0.59 | NE |

OBSERVATIONS TAKEN AT THE FUNAFUTI AIRPORT BY
THE NEW ZEALAND METEOROLOGICAL SERVICE

DATA FROM FILE APR85.TXT

| DATE | TIME (Hrs) | TIDE (m) | WIND SPEED (kts) | DIRECTION (deg) | BREAKER, Hb (m) | PERIOD (SEC) | WAVE, Ho (m) | DIRECTION From |
|----------|---------------|-------------|---------------------|--------------------|--------------------|-----------------|-----------------|-------------------|
| 04/01/85 | 820 | 0.84 | 12 | 90 | 1.41 | 12.42 | 0.66 | E |
| 04/02/85 | 810 | 0.71 | 11 | 80 | 1.17 | 10.79 | 0.50 | SE |
| 04/03/85 | 815 | 0.68 | 8 | 90 | 1.20 | 10.84 | 0.52 | E |
| 04/04/85 | 840 | 0.67 | 14 | 80 | 1.08 | 10.16 | 0.44 | E |
| 04/05/85 | 815 | 1.10 | 13 | 120 | 1.53 | 9.53 | 0.74 | SE |
| 04/06/85 | 830 | 1.33 | 12 | 60 | 1.42 | 12.05 | 0.66 | E |
| 04/07/85 | 1015 | 0.86 | 12 | 30 | 1.39 | 10.37 | 0.64 | E |
| 04/08/85 | 915 | 1.61 | 12 | 70 | 1.39 | 7.95 | 0.64 | E |
| 04/09/85 | 815 | 1.95 | 12 | 70 | 1.93 | 13.84 | 1.05 | E |
| 04/10/85 | 815 | 1.81 | 10 | 90 | 1.94 | 10.84 | 1.06 | E |
| 04/11/85 | 1010 | 1.63 | 14 | 80 | 1.75 | 10.84 | 0.91 | E |
| 04/12/85 | 810 | 1.30 | 15 | 80 | 1.80 | 10.00 | 0.97 | E |
| 04/13/85 | 800 | 1.06 | 10 | 100 | 1.57 | 11.05 | 0.77 | E |
| 04/14/85 | 757 | 0.90 | 14 | 90 | 1.85 | 8.11 | 0.99 | SE |
| 04/15/85 | 850 | 0.78 | 8 | 80 | 2.22 | 10.00 | 1.30 | SE |
| 04/16/85 | 835 | 0.73 | 6 | 140 | 1.65 | 10.89 | 0.83 | E |
| 04/17/85 | 830 | 0.77 | 4 | 0 | 1.36 | 9.58 | 0.62 | E |
| 04/18/85 | 815 | 0.93 | 7 | 60 | 1.07 | 9.63 | 0.43 | E |
| 04/19/85 | 830 | 0.98 | 0 | 0 | 1.27 | 9.68 | 0.56 | SE |
| 04/20/85 | 1530 | 1.57 | 0 | 0 | 1.31 | 12.00 | 0.59 | SE |
| 04/21/85 | 815 | 1.38 | 9 | 100 | 1.62 | 9.21 | 0.81 | SE |
| 04/22/85 | 830 | 1.43 | 0 | 0 | 1.45 | 10.47 | 0.69 | SE |
| 04/23/85 | 830 | 1.56 | 0 | 0 | 1.57 | 11.37 | 0.77 | E |
| 04/24/85 | 810 | 1.70 | 16 | 90 | 1.80 | 13.26 | 0.95 | E |
| 04/25/85 | 810 | 1.70 | 7 | 70 | 1.93 | 14.00 | 1.05 | E |
| 04/26/85 | 815 | 1.64 | 10 | 100 | 1.99 | 11.84 | 1.10 | E |
| 04/27/85 | 10 | 1.52 | 7 | 190 | 1.54 | 8.95 | 0.75 | SE |
| 04/28/85 | 1035 | 1.53 | 16 | 90 | 1.63 | 7.26 | 0.82 | SE |
| 04/29/85 | 1115 | 1.54 | 16 | 3 | 1.59 | 11.05 | 0.79 | NE |
| 04/30/85 | 800 | 0.78 | 13 | 40 | 1.85 | 9.68 | 0.99 | NE |

FIGURE 1.

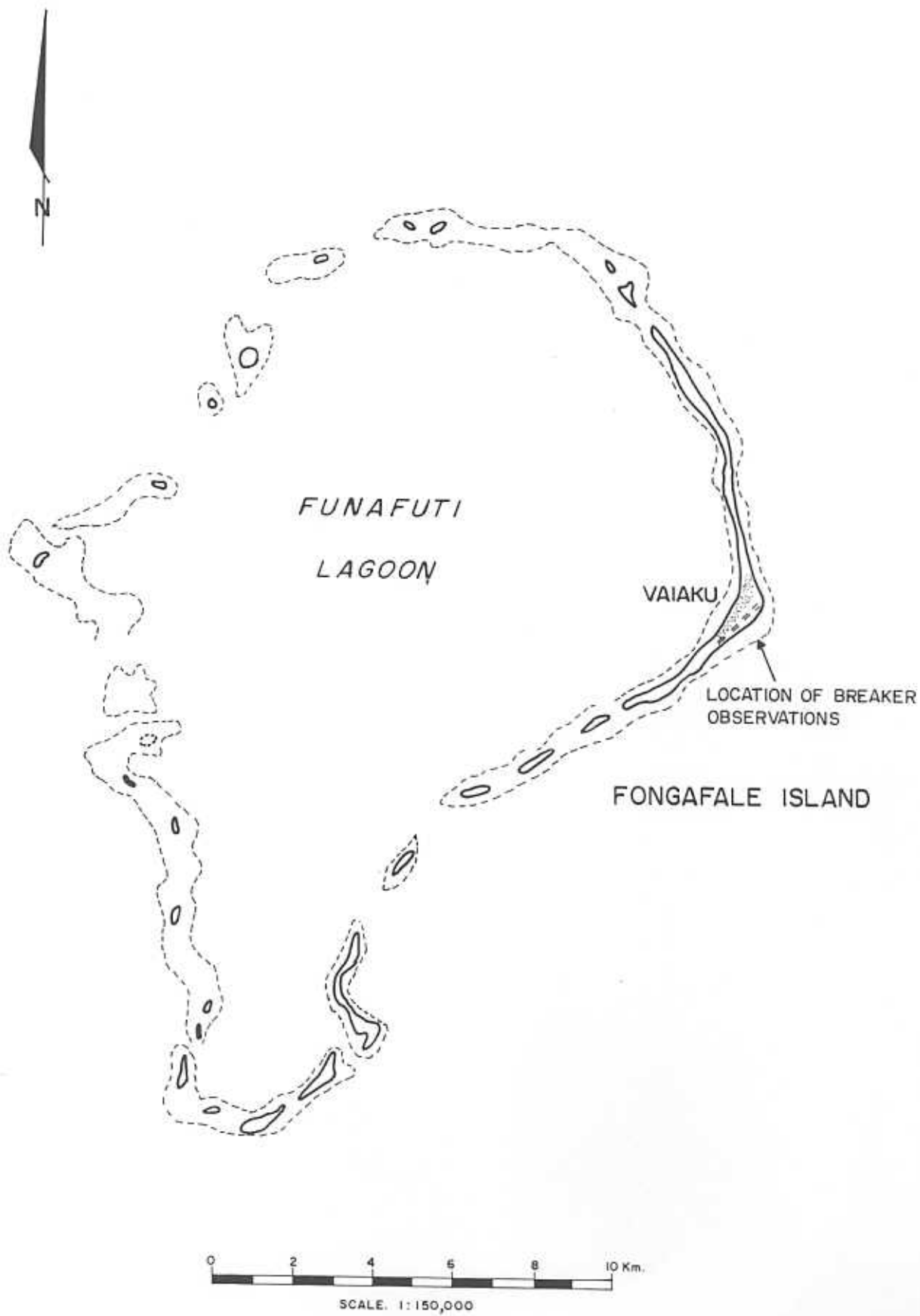
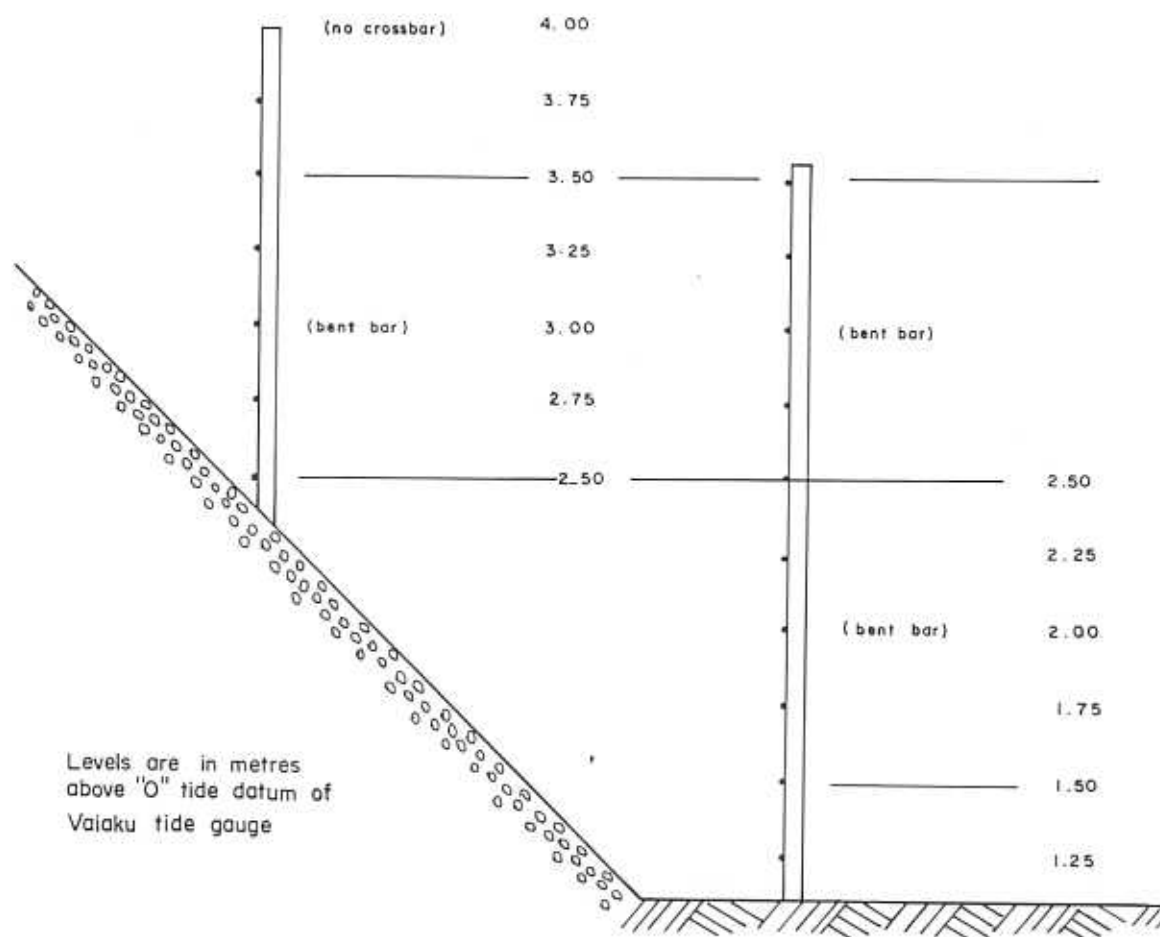


FIGURE 2.

FUNAFUTI OBSERVATION POSTS (POWER STATION SITE)



BREAKER CREST LEVEL MEASUREMENT

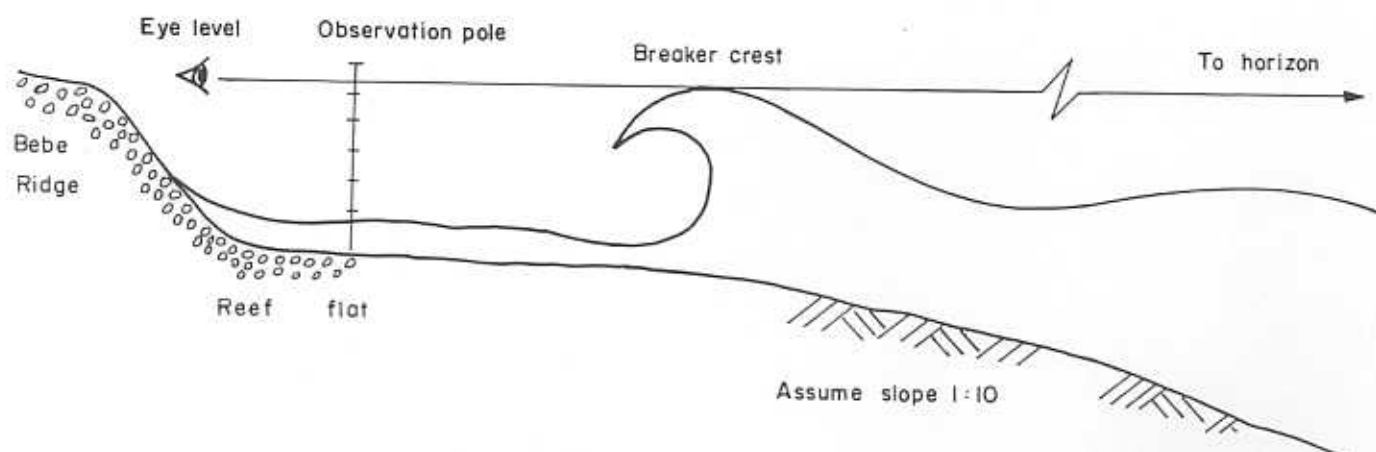


FIGURE 3.

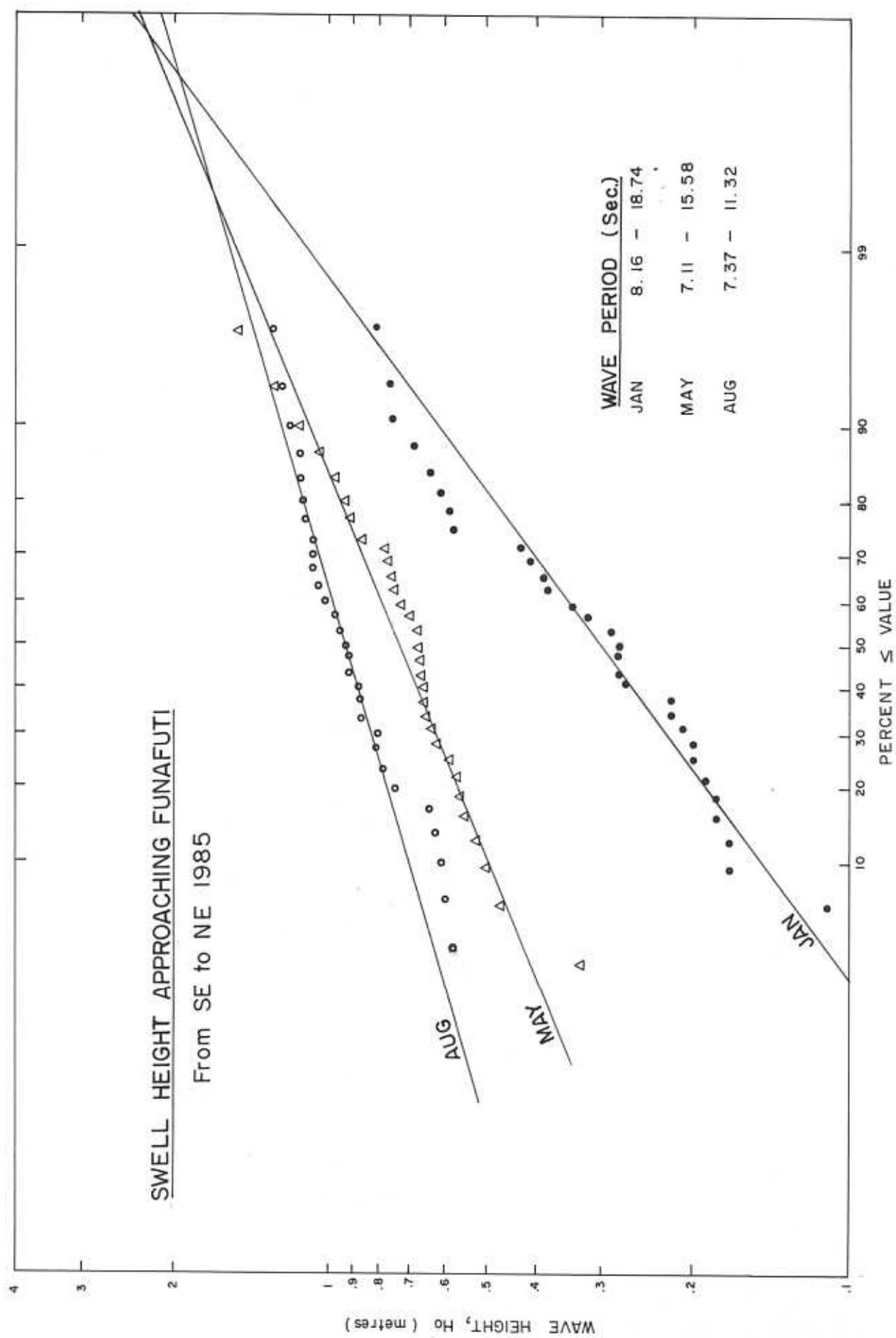


FIGURE 4

Mean Wave Period and Height
Observed at Funafuti during
5 Nov 1984 to 31 Aug 1985

2

1

0

PERIOD X .17

WAVE HEIGHT

H

J F M A M J J J A S O N D

FIGURE 5

Maximum and Minimum Wave Periods
Observed at Funafuti in 1984-85

20

Sec

10

0

H

J F M A M J J A S O N D

